Roosevelt County
Community Wildfire Protection Plan

ROOSEVELT COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

Prepared for

ROOSEVELT COUNTY
109 West 1st Room B-6
Portales, New Mexico 88103

Prepared by

SWCA® ENVIRONMENTAL CONSULTANTS
5647 Jefferson Street NE
Albuquerque, New Mexico 87109
Telephone: 505-254-1115; Fax: 505-254-1116
www.swca.com

Emily Geery, MCRP, MWR
Vicky Williams, MS
Kristen Meyer
Joseph Fluder, MS

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List of Acronyms

°F	degrees Fahrenheit
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railroad
BOR	Bureau of Reclamation
BTU/ft/sec	British Thermal Units per linear foot, per second
CBD	Canopy Bulk Density
CBH	Canopy Base Height
Ch/h	Chains/ hour
CRP	Conservation Reserve Program
CVAR	Community Values at Risk
CWPP	Community Wildfire Protection Plan
DOD	U.S. Department of Defense
EMS	Emergency Management System
ENSO	El Niño/Southern Oscillation
FBFM	Fire Behavior Fuel Model
FIREMON	Fire Effects Monitoring and Inventory System
FRCC	Fire Regime Condition Class
FSA	Farm Service Agency
GAID	Geographic Area Interagency Division
GAO	Government Accountability Office
GIS	geographic information system
GISP	Global Invasive Species Program
HFRA	Healthy Forest Restoration Act
IC	Incident Command
ICC	International Code Council
ISO	International Standards Organization
JPA	Joint Powers Agreement
m	meter
MFI	Mean Fire Interval
mi^2	Square miles
NFP	National Fire Plan
NIFC	National Interagency Fire Center
NMAC	New Mexico Association of Counties
NMSF	New Mexico State Forestry Division
NPS	National Park Service
NRCS	Natural Resources Conservation Service
PDO	Pacific Decadal Oscillation
RAW	Remote Automated Weather
SAF	Society of American Foresters
t/ac	tons/ acre
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U.S. Forest Service
VFD	volunteer fire department
WRCC	Western Regional Climate Center
WUI	Wildland Urban Interface

Executive Summary

The Roosevelt County Community Wildfire Protection Plan (CWPP) addresses hazards and risks of wildfire throughout Roosevelt County (County) and makes recommendations for fuels reduction projects, public outreach and education, structural ignitability reduction, and fire response capabilities. Community members involved in the planning emphasized a need for increased public outreach and education, and this document provides recommendations, along with a homeowner's guide that outlines actions that individuals can take to reduce the risk of wildland fire.

The CWPP was a collaborative planning project and the following entities joined together to form a Core Team and participate in its development: Roosevelt County, County Emergency Management, County Fire Departments, Town of Elida, U.S. Department of Defense, Natural Resources Conservation Service, New Mexico State Forestry Division, State Land Office, and the U.S. Fish and Wildlife Service.

The CWPP combined two methods of risk assessment to produce a comprehensive risk assessment; one method was based on a computer modeling program, FlamMap, and the other was developed using a matrix based on community knowledge and place-based information to prioritize areas of greatest risk. The communities of Kenna, Elida, Floyd, Dora, Tolar, Pep, and Milnesand were identified as high risk in the County.

The purpose of the CWPP is to assist in protecting human life and reducing property loss due to wildfire throughout the County. The plan is the result of a community-wide wildland fire protection planning process and the compilation of documents, reports, and data developed by a wide array of contributors. This plan was compiled in 2008 in response to the federal Healthy Forest Restoration Act (HFRA) of 2003.

The CWPP meets the requirements of the HFRA by:

1. Having been developed collaboratively by multiple agencies at the state and local levels in consultation with federal agencies and other interested parties.

2. Prioritizing and identifying fuels reduction treatments and recommending the types and methods of treatments to protect at-risk communities and pertinent infrastructure.

3. Suggesting multi-party mitigation, monitoring, and outreach.

4. Recommending measures and action items that residents and communities can take to reduce the ignitability of structures.

5. Facilitating public information meetings to educate and involve the community to participate in and contribute to the development of the CWPP.

The CWPP provides background information, a risk assessment, and recommendations. Section 1 provides a general overview of CWPPs and describes the County's need for a plan; Section 2 provides demographic and background information about the County; Section 3 presents an overview of the fire environment and specific information about fuel types; Section 4 describes

in detail the methodology and results of the risk assessment; and Section 5 provides recommendations that incorporate action plans and monitoring strategies for implementing fuels reduction projects, reducing structural ignitability, improving fire response capabilities, and initiating public outreach and education. The plan does not require implementation of any of the recommendations. However, the message throughout this document is that the greatest fire mitigation could be achieved through the joint actions of individual homeowners and local, state, and federal governments. This document is an initial step in raising public awareness and treating areas of concern, and should serve as a tool for County, state, and federal officials and residents. The CWPP should be treated as a living document and should be updated approximately every two years.

1.0 INTRODUCTION

1.1 OVERVIEW OF ROOSEVELT COUNTY'S COMMUNITY WILDFIRE PROTECTION PLAN

In May 2007, Roosevelt County initiated a Community Wildfire Protection Plan (CWPP) to proactively prepare for wildland fire events. Although, many perceive the risks of wildland fire to be associated with timber forests, the risks associated in grassland communities should not be underestimated. Fuels in the grasslands are prone to ignition, and fires spread quickly through these fuel types. Communities located in the Wildland Urban Interface (WUI) that take an active role in learning how to prepare for wildland fires are better prepared to reduce the negative impacts of fire on both community structures and individuals. This CWPP attempts to reduce, but not eliminate, the extreme risk of wildland fire. Eliminating all risk is not possible given the various and uncontrollable factors, such as climate, that affect wildland fire.

The CWPP addresses wildfire threat to the communities in Roosevelt County (referred to hereafter as the County) and reduces the risk of wildfire to community members, property, and landscapes. The plan provides background information, a risk assessment, and recommendations. Section 1 provides an overview of CWPPs and describes the County's need for a plan; Section 2 provides demographic and background information about Roosevelt County; Section 3 gives an overview of the fire environment; Section 4 describes the methodology for the risk assessment and the results in detail; and Section 5 provides recommendations that incorporate action plans for reducing fuels and structural ignitability, improving fire response capabilities, and enhancing public outreach and education.

The plan does not require implementation of any of the recommendations. However, these recommendations may be used as guidelines for the implementation process if funding opportunities become available. The recommendations for fuels reduction projects are general in nature, meaning site-specific planning that addresses location, access, landownership, topography, soils, and fuels would need to be employed upon implementation. Also, the recommendations are specific to WUI areas and intend to reduce the loss of life and property. Recommendations for the restoration of ecosystems and the role that fire plays in ecosystems are distinct from recommendations for WUI areas and are not addressed in this plan.

1.2 OVERVIEW OF COMMUNITY WILDFIRE PROTECTION PLANS

The summer of 2000 demonstrated how devastating severe wildfires could be, particularly with the Cerro Grande fire. The Cerro Grande Fire was the largest wildfire in New Mexico's history, burning approximately 48,000 acres, 235 homes, and 39 structures at Los Alamos National Laboratory, and leaving almost 400 families without homes (Los Alamos County Reports 2000). In the following years, record-breaking fire events have continued to mark history. In response to the 2000 landmark season, the National Fire Plan (NFP) was established to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient firefighting capacity for the future. The NFP was followed in 2002 by the 10-Year Comprehensive Strategy Implementation Plan, which focuses on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels,

mitigating risks to communities, and providing economic benefits, as well as improving fire prevention and suppression strategies (Western Governors' Association 2006).

In recognition of widespread declining forest health, in 2003 the U.S. Congress passed and President Bush signed into law the Healthy Forest Restoration Act (HFRA) (White House 2003). The HFRA expedites the development and implementation of hazardous fuels reduction projects on federal land. A key component of the HFRA is the development of CWPPs. Collaboration between federal agencies and communities is necessary to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. In addition, communities with an established CWPP will be given priority for funding of hazardous fuels reduction projects carried out in accordance with the HFRA.

Although the HFRA and the specific guidelines are new, the principles behind the CWPP program are not. The National and State Fire Plans, the Western Governors' 10-Year Comprehensive Strategy, and the Federal Emergency Management Agency Disaster Mitigation Act of 2000 all mandate community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multi-agency cooperation.

1.3 NEED FOR COMMUNITY WILDFIRE PROTECTION PLAN

Both the landscape and the communities within Roosevelt County have unique qualities that contribute to the likelihood of wildland fire and present a need for a CWPP. While the County does not exhibit the typical characteristics of communities that are highly prone to fire, such as steep slopes or dense timber, these grassland areas experience strong winds and a current prolonged drought, making the areas extremely prone to high severity wildland fire and devastating impacts on communities (Figure 1.1). The perceived risk of fire in grasslands has often been underestimated in comparison to forested areas. Catastrophic losses have occurred recently throughout Southwestern grassland areas because communities were poorly prepared for wildland fire events. In December 2005, a devastating wildfire ripped through the town of Cross Plains, Texas, destroying 85 single-family homes and 25 mobile homes, killing 2 firefighters and 17 citizens (Texas Forest Service 2007). This town was not the stereotypical mountain community, packed in against dense forest stands and steep inaccessible terrain; instead, it was a community in the northern plains of Texas, predominantly grassland and agricultural with flat terrain and typified by non-combustible home construction. This community was not unlike the many communities that are scattered throughout the grasslands of Roosevelt County, highlighting that grassland areas are as much at risk for wildland fire as their forested counterparts.

Figure 1.1. Results of fire near a home in Roosevelt County.

Grass fuel loads, even those associated with lawns and suburban landscapes, experience a vigorous growing season in the spring and summer, particularly if increased rainfall occurs. These fuel loads are subject to human activity, such as crop production and lawn maintenance in the home ignition zone (30 feet surrounding the house). Many factors can quickly transform an unassuming landscape into a highly fire prone landscape: changed land practices in rural areas, including expansion of the WUI, ranch closures, and parceling of land; reduced grazing and Conservation Reserve Program (CRP) land programs, which are set-aside programs designed to conserve natural grasses and habitat and therefore contribute to high fuel loading; grass and shrubland landscapes; and weather patterns, such as strong winds and drought.

Roosevelt County has a need for a CWPP, particularly because it is located in the eastern plains of New Mexico, where grasses are the predominant fuel type and the topography is flat and rolling, creating an environment that is familiar to high-speed wind events. (Figure 1.2) Rainfall in the summer often leads to increased fuels, and drought experienced in the fall or winter often leaves these fuels dried and prone to ignition. In these landscapes, fire can spread rapidly due to the continuous fuels and wind direction. Grassland fires can be difficult to maintain, as they move quickly across the landscape because of the speed and fire behavior under which these light, flashy fuels burn.

Figure 1.2. Typical topography and fuel type in Roosevelt County.

Communities must prepare for wildland fire events by reducing fuel loads, preparing resources, and raising awareness on how homeowners can protect their properties to mitigate the impacts of wildland fire. Local response agencies must train for, plan, and execute a rapid, coordinated response to all wildland incidents. The need for a CWPP is particularly important for strengthening organizational response, improving communication, and re-examining priorities of the County, communities, and citizens.

1.4 GOAL OF CWPP

The goal of a CWPP is to enable local communities to improve their wildfire mitigation capacity and while working with government agencies to identify high fire risk areas and prioritize these areas for mitigation, fire suppression, and emergency preparedness. Another goal of the CWPP is to enhance public awareness and understanding by helping residents better understand the natural and human-caused risk of wildland fire that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the HFRA, are:

1. Collaboration: Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (Society of American Foresters [SAF] 2004).
2. Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment

that will protect one or more at-risk communities and their essential infrastructure (SAF 2004).

3. Treatments of Structural Ignitability: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan (SAF 2004).

This Roosevelt County CWPP addresses all the requirements for completion of a CWPP outlined in the HFRA, with special attention to the characteristics of grassland and shrubland communities.

1.5 PLANNING PROCESS

The SAF (2004), in collaboration with the National Association of Counties, the National Association of State Foresters, the Western Governors' Association, and the Communities Committee, developed a guide entitled "Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities" to provide communities with a clear process to use in developing a CWPP. The guide, which can be accessed at http://www.safnet.org/policyandpress/cwpphandbook.pdf, outlines eight steps for developing a CWPP and was followed in preparing this Roosevelt County CWPP. The eight recommended steps are as follows:

Step One: Convene Decision Makers. Form a Core Team made up of representatives from the appropriate local governments, local fire authority, and state agency responsible for forest management.

Step Two: Involve Federal Agencies. Identify and engage local representatives of the U.S. Forest Service (USFS) and Bureau of Land Management (BLM). Contact and involve other land management agencies as appropriate.

Step Three: Engage Interested Parties. Contact and encourage active involvement in plan development from a broad range of interested organizations and stakeholders.

Step Four: Establish a Community Base Map(s). Work with partners to establish a baseline map (or maps) defining the community's WUI and showing inhabited areas at risk, forested areas that contain critical human infrastructure, and forest areas at risk for large-scale fire disturbance.

Step Five: Develop a Community Risk Assessment. Work with partners to develop a community risk assessment that considers fuel hazards; risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other community values at risk (CVAR); and local preparedness capability. Rate the level of risk for each factor and incorporate this information into the base map as appropriate.

Step Six: Establish Community Priorities and Recommendations. Use the base map(s) and community risk assessment to facilitate a collaborative community discussion that leads to the identification of local priorities for fuel treatment, reducing structural ignitability, and other issues of interest, such as improving fire response capability. Clearly indicate whether priority projects are directly related to protection of communities and essential infrastructure or to reducing wildfire risks to other community values.

Step Seven: Develop an Action Plan and Assessment Strategy. Consider developing a detailed implementation strategy to accompany the CWPP, as well as a monitoring plan that will ensure its long-term success.

Step Eight: Finalize Community Wildfire Protection Plan. Finalize the CWPP and communicate the results to community and key partners.

1.6 CORE TEAM

The Core Team serves many roles; however, its primary role is to drive the decision-making process. Members of the Core Team attend regular planning meetings and serve as liaisons to share information between the Core Team and community members. The Core Team brings experience, local knowledge, and data to the meetings that guide the direction of future planning efforts for the County, in terms of both community and regional, as well as natural resources planning.

The Core Team for the Roosevelt CWPP includes approximately 10 to 20 people representing various agencies and levels of government, including the County, County Emergency Management, County Fire Departments, Town of Elida, U.S. Department of Defense (DOD), Natural Resources Conservation Service (NRCS), New Mexico State Forestry Division (NMSF), State Land Office, and the U.S. Fish and Wildlife Service (USFWS). All members have experience or interest in preparing for wildland fires, planning, response, mitigation, or education. The Core Team met four times over the course of 11 months to discuss issues related to completing the project. The group members met for the first time on July 18, 2007, and their final meeting was in March 2008. Please see Appendix A for a contact list for the Core Team.

1.7 PROJECT AREA

The project area includes all of Roosevelt County as delineated by its geographic and political boundaries (Figure 1.3). Within the project area, land ownership is predominantly private, with some federally-managed land in the jurisdiction of the CRP, BLM, DOD, USFWS, and State Land Office.

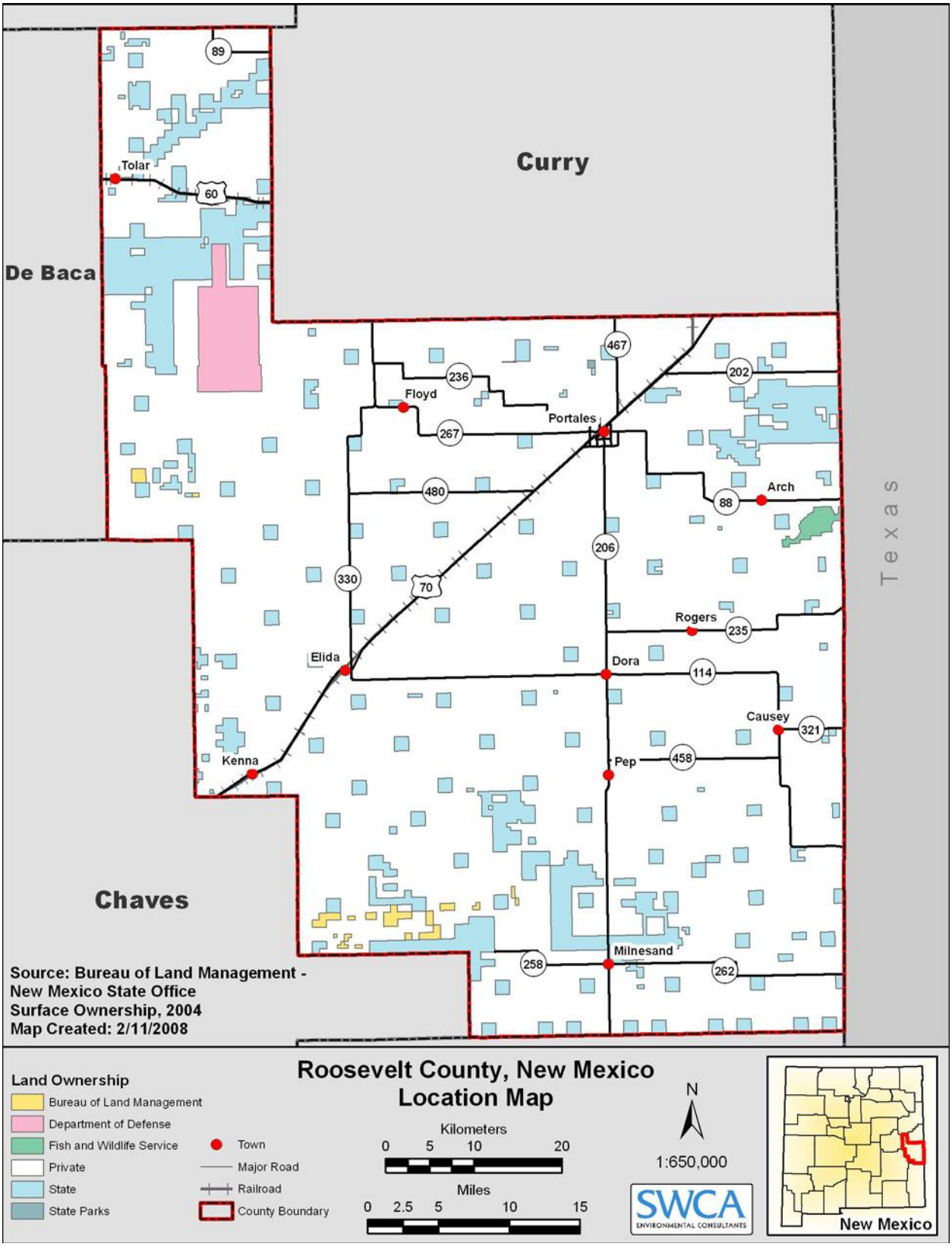

Figure 1.3. Project location map.

1.8 PUBLIC INVOLVEMENT

Engaging interested parties is critical in the CWPP process, as substantive input from the public will ensure that the final document reflects the highest priorities of the local community. A key element in the CWPP process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (SAF 2004).

The public involvement process commenced with a public meetings, held in conjunction with the County Fire Meeting. The public meeting followed the fire meeting and was well attended, particularly by those involved in volunteer fire departments (VFDs). The second meeting was held at the Roosevelt County Fair.

It is often difficult for community members to attend public meetings because of long distances required for travel in rural Roosevelt County. The Core Team decided that the most effective way to interact with the public was to be present at an event that was widely attended by community members throughout the state. The meeting was announced using a variety of media, including the local radio station, newspapers, newsletters, and flyers posted in public places. At the meeting, educational information focused on defensible space was provided, maps were posted, and surveys requesting feedback regarding wildfire protection from community members were distributed. The public responses to the surveys are provided in Appendix B.

2.0 ROOSEVELT COUNTY BACKGROUND

2.1 LOCATION AND GEOGRAPHY

Roosevelt County is located in east-central New Mexico. Its County seat, the city of Portales, is situated in the northeastern corner of the County. Other towns located in the County include Causey, Elida, Dora, and Floyd, along with the unincorporated areas Kenna and Milnesand. Private land ownership comprises 86.2% of the County, while the following agencies manage the following: BLM 0.33%, DOD 1.41%, USFWS 0.21%, State Land Office 11.84%, and State Parks 0.01% (Figure 2.1). The New Mexico Department of Game and Fish also manage a small percentage of land in the County, which is known for providing habitat for the lesser prairie chicken.

2.2 TOPOGRAPHY

Roosevelt County encompasses an area of approximately 2,455 square miles with overall elevations ranging from approximately 3,815 feet to 4,927 feet. The County is characterized by gently rolling, high plains topography with occasional canyons and bluffs.

2.3 NEW MEXICO CLIMATE

New Mexico has a mild, arid to semiarid, continental climate characterized by abundant sunshine, light total precipitation, low relative humidity, and relatively large annual and diurnal temperature ranges (New Mexico Climate Center 2006). The average hours of annual sunshine range from nearly 3,700 hours in the southwestern portions of the state to 2,800 hours in the north-central portions.

The Southwest region of the U.S., including New Mexico, is located in the confluence of mid-latitude and subtropical circulation patterns that are coupled with orographic influences, which ultimately account for variable climatic conditions across the region (Sheppard et al. 2002). Overall climate regimes in the state typically consist of cyclical drought/wet year patterns that are driven by El Niño/Southern Oscillation (ENSO). Understanding the effects of ENSO and Pacific Decadal Oscillation (PDO) on the climate of the region is important for planning fire management and mitigation activities because of their impact on precipitation, snow pack, and the subsequent influences on vegetation growth and fuel moistures (Swetnam and Betancourt 1990; Swetnam and Betancourt 1998).

In New Mexico, July is generally the warmest month of the year, with average monthly maximum temperatures ranging from 90 degrees Fahrenheit (ºF) at lower elevations to 75ºF to 80ºF at higher elevations. A preponderance of clear skies and generally low relative humidity permit rapid cooling after sundown, resulting in comfortable summer nights. Generally, January is the coldest month, with average daytime temperatures ranging from the 55ºF to the 35ºF. Minimum temperatures below freezing are common throughout the state, but subzero temperatures are rare outside of high mountain habitats. The freeze-free season ranges from more than 200 days in the southern valleys to fewer than 80 days in the northern mountains, where some high mountain valleys have freezes in the summer months. Wind speeds across New Mexico are usually moderate. However, relatively strong and unpredictable winds can accompany frontal activity during the late winter and spring. Wind direction is typically from the southwest.

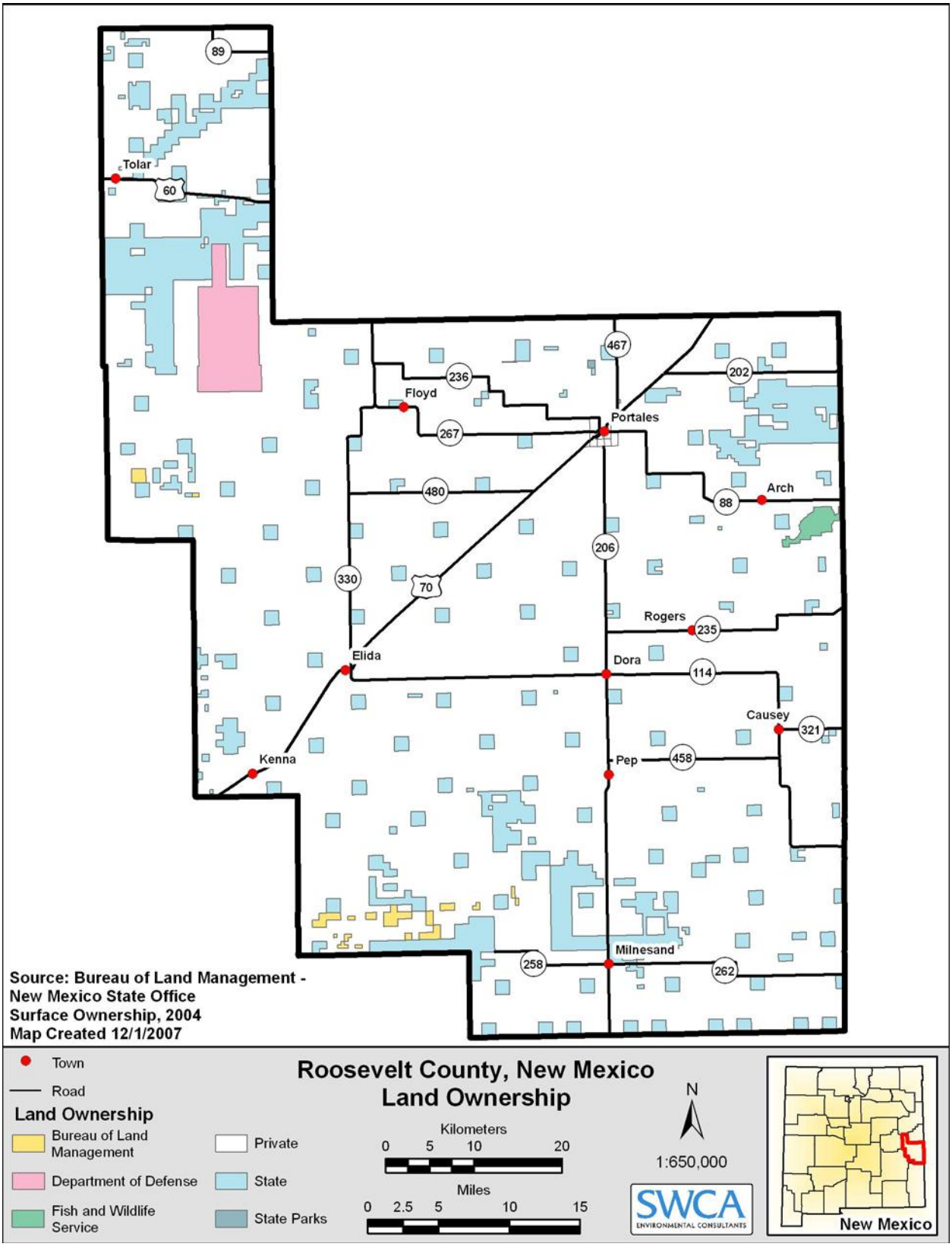

Figure 2.1. Land ownership in Roosevelt County.

A wide variation in annual precipitation totals is characteristic of arid and semiarid climates. The climate of the Southwest shows strong seasonal patterns both within and between years. Drought cycles are common and most annual precipitation comes in the course of a summer rainy season. Generally, July and August are the rainiest months of the year, accounting for 30% to 40% of the state's annual precipitation. These rainfall events are often associated with brief but intense thunderstorms, driven from unstable southeasterly air flows out of the Gulf of Mexico. Lightning fires are common during this period but are typically small owing to the generous precipitation. Winter is the driest season in New Mexico, when precipitation is primarily a result of frontal activity associated with Pacific Ocean storms that move across the country from west to east.

Landscape-scale drought and above-average precipitation have historically occurred at irregular intervals in the past as documented by tree-ring and other data with varying degrees of intensity. A period of warm and notably wet climatic conditions that were preceded by a significant drought in the 1950s took place from 1976 to 1991 (Swetnam and Betancourt 1998). Severe and prolonged droughts on record have occurred once every century on average (Gray et al. 2003). The U.S. Drought Monitor (2008) reported that approximately 70% of the state is experiencing some level of drought conditions, with the southeastern region of the state experiencing the worst conditions (Governor's Drought Task Force 2008).

2.4 ROOSEVELT COUNTY'S CLIMATE

The climate in Roosevelt County is mild and is characterized by relatively light annual precipitation, a wide range of diurnal and annual temperatures, abundant sunshine, and low relative humidity, which create arid to semiarid climatic conditions. Elevations and topography do not vary much across the County; thus, mean annual temperature and precipitation ranges do not vary significantly over the span of the planning area.

According to climate data recorded from 1914 to 2007, the city of Portales in Roosevelt County experiences a mild, semiarid climate, with annual mean maximum temperatures of 74ºF and annual mean minimum temperatures of 42.3ºF. In the summer months, daily temperatures may exceed 100ºF with the warmest temperatures generally occurring in June and July, before the onset of the monsoon thunderstorm season. Throughout the winter months, minimum temperatures below freezing are common, and the coldest temperatures generally occur in January (Western Regional Climate Center [WRCC] 2007) (Figure 2.2).

Like most semiarid regions, Roosevelt County experiences some variation in seasonal and annual precipitation. However, the mean annual precipitation recorded in the city of Portales is typically light with an annual average precipitation of 16.9 inches and an average annual snowfall of 8.9 inches. The maximum annual rainfall along the planning corridor has been recorded as high as 44.1 inches at Portales. The largest quantity of precipitation occurs in July and August during monsoonal moisture patterns that produce high-intensity storms (Figure 2.3). These storms also generate intense lightning activity, which may result in multiple fire ignitions from one storm across a fire management district. The driest season is winter, with much of the precipitation falling as snow in the mountains and rain in the valleys.

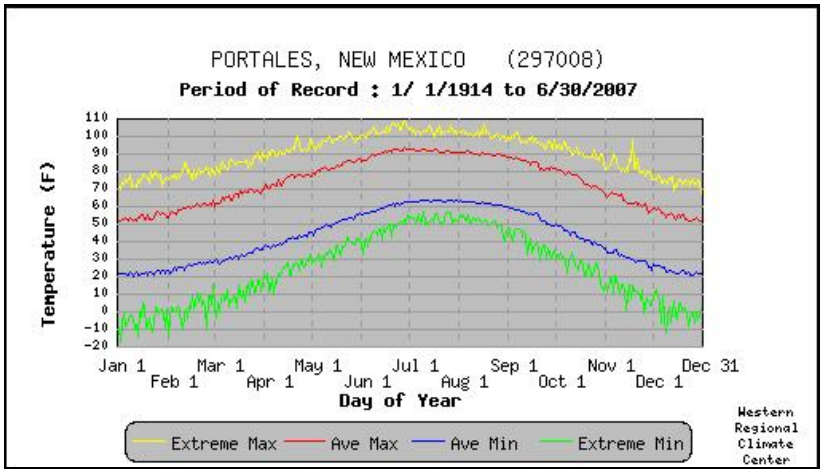

Figure 2.2. Average daily extremes and average temperatures for Portales, New Mexico (WRCC 2007).

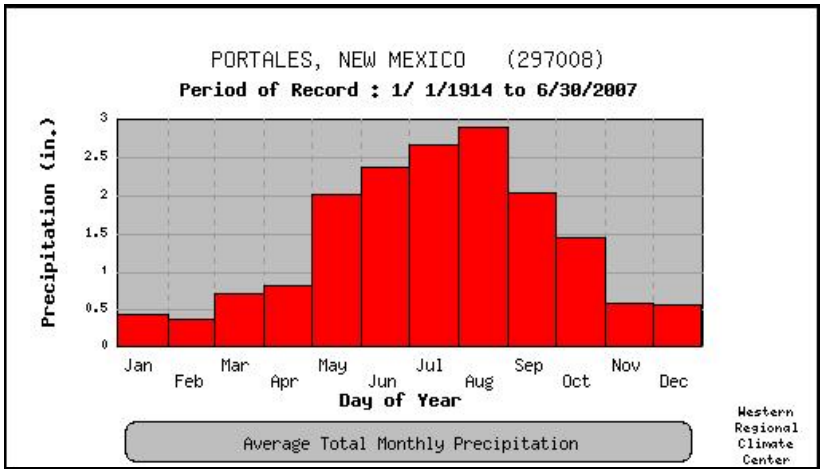

Figure 2.3. Monthly average total precipitation for Portales, New Mexico (WRCC 2007).

2.5 VEGETATION

Roosevelt County encompasses a variety of vegetation types. Vegetation zones are primarily a function of elevation, slope, aspect (the direction a slope faces), substrate, and associated climatic regimes. Although some variation in location exists, the biophysical habitat types described in this section are typically governed by topography and substrate within the County.

Dominant vegetation types described in this section for Roosevelt County represent the general overall community structure that will play a role in fire occurrence and behavior on a large scale. Expected fire behavior for each vegetation type is described in more detail in Section 4.0 Risk Assessment. Although the vegetation types are outlined and described for the entire County in this plan, site-specific evaluations of the vegetative composition and structure in each area of concern should take place prior to planning fuels treatments.

2.5.1 VEGETATION TYPES

Overall vegetation in Roosevelt County is composed predominantly of Plains-Mesa Grassland, interspersed with cultivated areas and patches of Plains-Mesa Sand Scrub (Dick-Peddie 1993). Plains-Mesa shortgrass prairie is the most extensive grassland in New Mexico, covering much of the eastern plains, but its extent is diminishing as a result of dry land and irrigated farming. In its climax condition, Plains-Mesa grassland is composed almost entirely of grass, with blue grama (*Bouteloua gracilis*) as the dominant graminoid and buffalograss (*Buchloe dachtyloides*) as the co-dominant graminoid. Plains-Mesa Sand Scrub is also present in this area, and the vegetation is made up of species that are deep sand tolerant or sand adapted (Dick-Peddie 1993). Sand sage brush (*Armtemisia filifolia*) is the dominant species in Sand Scrub communities, in association with soapweed yucca (*Yucca glauca*), leadplant (*Amorpha canescens*), and sand shinnery oak (*Quercus havardii*). The shrubs are usually low growing (less than 18 feet) and are highly branched. Common grasses in the eastern region of the state are sand reed (*Calamovilfa gigantean*), red lovegrass (*Eragrostis secundiflora*), and sand bluestem (*Andropogon hallii*).

Vegetation in Roosevelt County is listed in Table 2.1 and is described in more detail using the NatureServe United States Ecological Systems categories in the Fire Behavior Overview section (NatureServe 2007). Invasive species, such as wheeping lovegrass (see Section 5.3.1), also are becoming more prevalent in the County. Other types of land cover (e.g., agricultural, developed, and other land cover types) that do not play a significant role in fire behavior and spread are described below.

Table 2.1. Vegetation in Roosevelt County

Existing Vegetation Type	Structural Type	Acres	Percent
Western Great Plains Shortgrass Prairie	Herbaceous/Grassland	61,295	40
Central Mixed-grass Prairie	Herbaceous/Grassland	31,228	20
Agriculture-cultivated Crops and Irrigated Agriculture	Herbaceous/Grassland	27,980	18
Western Great Plains Sandhill Steppe	Shrubland	12,372	8
Western Great Plains Mesquite Woodland and Shrubland	Shrubland	5,922	4
Quercus havardii shrubland alliance	Shrubland	6,969	4
Introduced Upland Vegetation–Perennial Grassland/Forbland	Herbaceous/Grassland	6,367	4
Developed	No natural land cover	26,604	1
Other Types		25,892	1

2.5.2 AGRICULTURE-CULTIVATED CROPS AND IRRIGATED AGRICULTURE

Agriculture-cultivated Crops and Irrigated Agriculture is a generic vegetation type that can encompass any type of agriculture. This land cover type occupies the third largest amount of land within the County. In Roosevelt County, agriculture is the primary industry and includes ranching, dairy farming, peanuts, cotton, wheat, corn, milo, and alfalfa (Roosevelt County Chamber of Commerce 2007). Fire occurrence within this land cover type is most typically human induced by agricultural burning and does not exhibit a typical fire behavior pattern.

2.5.3 DEVELOPED

Developed is another generic vegetation type that describes human-made developed areas. It can include structures, parking lots, dirt lots, and roads. Although these areas are not typically described under a natural fire regime, structures can be a receptive fuel, and these areas are most typically what define the WUI areas of concern.

2.5.4 OTHER TYPES

Other Types is a comprehensive category for vegetation types that exist within, but are not well represented in Roosevelt County. This category accounts for 18 other land cover types that comprise less than 2% of the cover throughout the County. These types include riparian areas along streams, rivers, and lakes; other shrub and herbaceous dominated vegetation types; areas of introduced species; barren areas; and open water.

2.6 POPULATION

In 2000, the population within Roosevelt County was 18,018 and represented only 0.99% of the entire population of New Mexico, with a population density of 7.4 persons per square mile. Population in the County has grown over the past several years and is continuing to grow. Roosevelt County experienced a population increase of approximately 93% from 1990 to 2000 and has grown approximately 1.5% from 2000 to 2006 to a total estimated population of 18,291 (U.S. Census Bureau 1991, 2001a, and 2001b).

The County seat and largest and only city in Roosevelt County is Portales, with a population of 11,131 in 2000. The second largest town is Elida with a population of 183 in 2000, which is followed in size by the village of Dora, which had a population of 130 in 2000. All other communities throughout the County have populations of 100 or less (U.S. Census Bureau 2001a).

Overall housing characteristics across the County are found to be primarily rural in nature with a large number of agricultural lands. Census data indicate that as of 2000, the County had 7,746 housing units with an average density of 3 housing units per square mile. By 2005, the number of housing units had increased to 8,049 (U.S. Census Bureau 2001b). Portales had a housing density of 705 housing units per square mile, while the housing density within Elida was estimated to be about 123 housing units per square mile (U.S. Census Bureau 2001a).

The state of New Mexico had an overall median household income of $37,838 in 2004. In 2000, the County consisted of 6,639 households; the median income for households in 2000 was $26,586, and the median income for families was $31,185. In Roosevelt County, the largest median household income in 1999 was the village of Dora, which was $38,333. In general, the range of median incomes was from approximately $22,917 to almost $38,333 in 1999 (U.S. Census Bureau 2001a and 2001b).

2.7 HISTORY AND LAND USE

Human occupation within Roosevelt County is believed to date back to about 10,000 years ago to the Clovis culture of hunters and gatherers who originally inhabited the eastern plains of New

Mexico. Most archaeologists believe that during this time, these bands of mobile hunter-gatherers (Paleoindians) subsisted primarily on large game supported by the cooler, wetter environment of that era, but collected wild plant foods as well (Wase et al. 2003). Near the beginning of the twelfth century, early Puebloan cultures began to appear across regions of New Mexico and the Southwest. These communities may have developed from the earlier transient populations, settling permanently in the area (Ivey 1988). Pueblo communities used agriculture, constructed elaborate dwelling structures, and relied on persistent surface water resources.

Continued fire suppression and livestock grazing following European settlement have caused grasslands in eastern New Mexico to experience a reduction of herbaceous cover, an increase in shrub and tree encroachment, and invasions of non-native vegetative species. As a result of these activities, much of the eastern plains have undergone widespread type conversion, which has altered the historic fire frequencies and intensities across much of the area.

2.8 FIRE RESPONSE CAPABILITIES

There are six VFDs in Roosevelt County and one paid department. The Portales Fire Department has 22 full-time firefighters on a three shift schedule, and all have red cards, which provide certification and training for fire fighters to respond to wildland fires. The city has mutual aid agreements with six rural departments and Cannon Air Force Base Fire Departments; 75% of the fire responders at Canon Air Force Base Fire Departments have red cards. The Emergency Management Services (EMS) ambulance service provides intermediate-level services and paramedic services with four ambulance units with a response time of three minutes within the city.

The International Organization for Standardization, commonly referred to as ISO, develops standards for managing and measuring levels of risk. These standards are based on information related to municipal fire-protection efforts in communities throughout the United States. A Public Protection Classification from 1 to 10 is assigned. Class 1 represents exemplary public protection and Class 10 signifies that the area's fire suppression program doesn't meet the ISO's minimum criteria. The ISO ratings help communities evaluate their public fire-protection services (Insurance Services Offices 2008) The area International Standards Organization (ISO) Fire Rating is Class IV.

Both career and volunteer firefighters in the County are considering attending the National Wildfire Coordinating Group's Crosswalk training program, which provides an opportunity for structural firefighters to participate in a comprehensive training that addresses both structural and wildland fire, and therefore reduces the number of hours of required for training.

Appendix C provides a list of firefighting resources for the fire departments in Roosevelt County. Also included in Appendix C is a summary of emergency operation protocols taken from a document entitled, "Interagency Emergency Operations in Wildland Fire with NM State Forestry Division: Planning Projects and Incident Management". This unpublished document was developed by NMSF to provide guidelines for emergency responders.

3.0 FIRE ENVIRONMENT

The wildland fire environment consists of three factors that influence fire behavior: fuels, topography, and weather. Understanding how these factors interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the WUI. In the wildland fire environment, fuels refer to the live and dead vegetative component. Fuels vary over time and space in loading, size and shape, compactness, horizontal continuity, chemical composition, and moisture content. Topography includes elements such as slope, position on the slope, aspect, elevation, and the general "lay of the land," which varies over space. The third factor, weather, is also variable across time and space and includes elements such as temperature, wind speed and direction, relative humidity, cloud cover, precipitation, and atmospheric stability. Of the three fire behavior components, weather is the most variable and can significantly and rapidly change fire behavior. Changes in wind speed, wind direction, and relative humidity can change a creeping ground fire into a rapidly spreading canopy fire in a short period of time and may be difficult to predict.

3.1 WILDLAND URBAN INTERFACE

The WUI is composed of both interface and intermix communities and is defined as areas where human habitation and development meet or intermix with wildland fuels (U.S. Department of Agriculture [USDA] and U.S. Department of Interior [USDI] 2001, p. 752-753). In the absence of a CWPP, the WUI is defined as the area extending 0.5 miles from the boundary of an at-risk community; however, depending on the surrounding fuel conditions, topography and present structures, wildland areas of up to 1.5 miles from structures may be included in the WUI (SAF 2004)

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, and increases the potential for wildland fire ignitions and the corresponding potential loss of life and property. Human encroachment into wildland ecosystems within recent decades has increased and continues to increase the extent of the WUI. The expansion of the WUI into areas with high fire risk combined with the collective effects of past fire-management policies, resource management practices, land-use patterns, climate change, and insect and disease infestations has created an urgent need to modify fire management practices and policies while understanding and managing fire risk effectively in the WUI (Pyne 2001; Stephens and Ruth 2005). Where fuels and fire management mitigation techniques have been strategically planned and implemented in WUI areas, it has proven to be effective. For the most success in planning for fuels treatments, all WUI mitigation focus areas will be different and should be planned for accordingly.

A CWPP offers the opportunity for fire and land managers to collaborate to establish a definition and a boundary tailored for the local WUI; better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area; and prioritize and plan fuels treatments to mitigate for fire risks. At least 50% of all funds appropriated for projects under HFRA must be used within the WUI area.

The Core Team for the Roosevelt County CWPP defined the WUI as the area extending 0.5 miles from towns, villages, and fire stations and 1 mile from Portales and Milnesand (see Figure

3.1). The definition of the WUI was created with the consideration of where the greatest loss of life is likely to occur, critical infrastructure, and the areas that are most likely to experience a source of ignition.

3.2 FIRE SPREAD

Fire can spread across an area as a surface fire, a crown fire, or by spotting. A surface fire is where the fire remains on the ground surface. Resistance to control is variable within this type of fire behavior, depending on the structure and condition of the fuels on the ground surface. For example, if the fuel bed consists of densely packed pine needles or moist fuels, the fire will creep along the surface and can be suppressed at the flaming front. If the fuels consist of tall, loosely packed, continuous grasses, the fire may exhibit a rapid rate of spread (especially in the presence of wind) as a running surface fire, making it more difficult to control.

Crown fires are elevated from the ground surface and burn in the canopies of trees or shrubs and can be passive, active, or independent. Passive crown fires take place when trees or shrubs torch individually, as they are ignited by the passing surface fire. Active crown fires are those fires in which a solid flaming front develops with both the surface fire and the canopy fire advancing as a single unit dependent on one another. Finally, an independent crown fire advances in the canopy individually and independent of the surface fire. Active and independent crown fires are very difficult to control and must be suppressed from a distance. Effective fuels treatments are designed with the goal in mind of keeping the fire out of the canopy and on the ground surface to provide a safe buffer around the WUI where fire suppression activities can take place.

The third way that a fire can advance across the landscape is by spotting, where embers are lifted and carried by wind or topography to receptive fuels in front of the head of the fire. When excessive, long-range spotting occurs, resistance to control can be very high, and the fire can move across the landscape rapidly. Spotting occurs most frequently when fire is burning in the tree or shrub canopy, which reiterates the importance of designing fuels treatments to keep fire on the ground surface and out of the canopy.

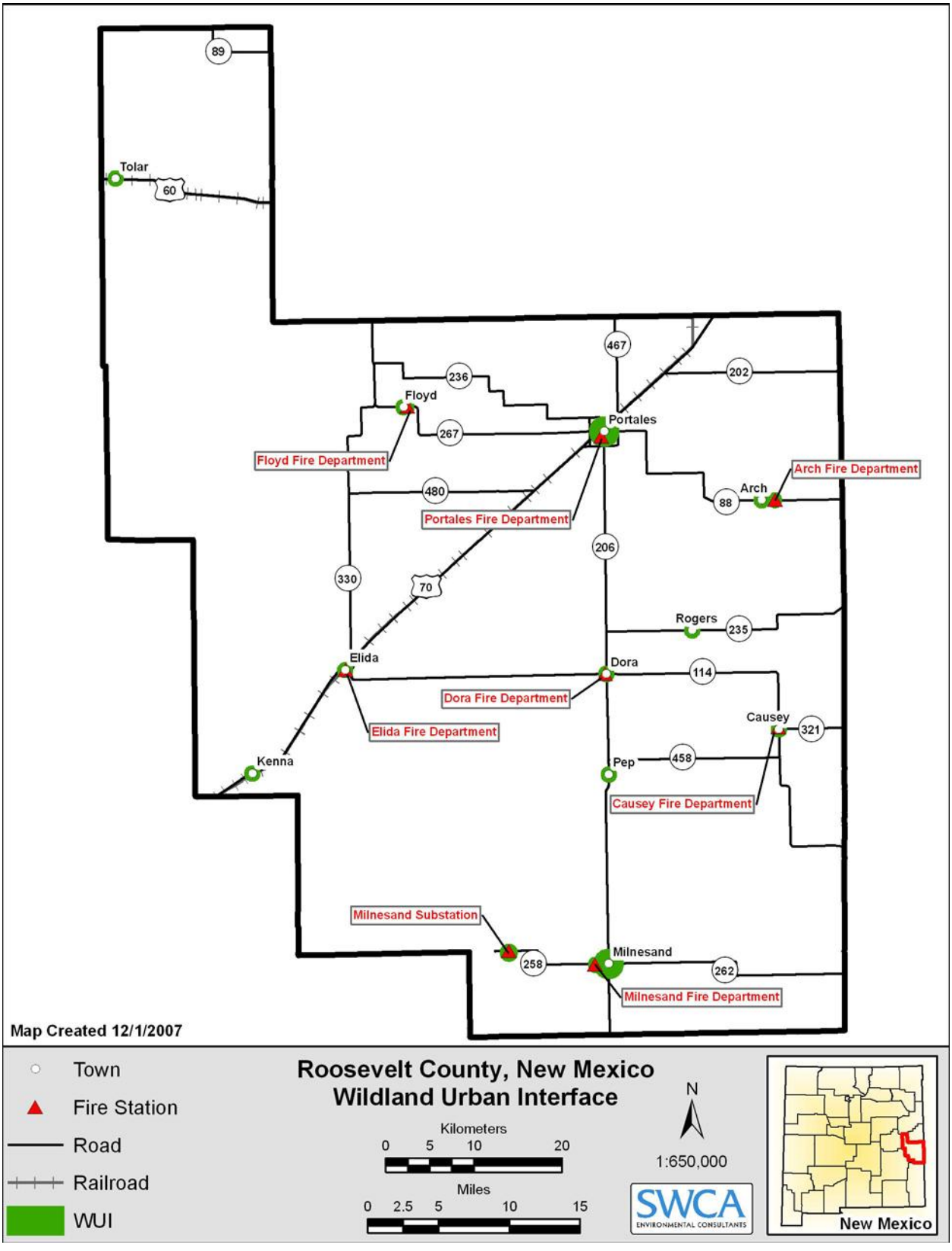

Figure 3.1. WUI map.

3.3 FIRE HISTORY

3.3.1 PAST FIRE MANAGEMENT POLICIES AND LAND MANAGEMENT ACTIONS

Prior to European settlement throughout the West in the 1800s, lightning and human-ignited fires took place as a natural disturbance within many different ecosystems. Following that time, a dramatic increase in livestock grazing, fire suppression, and other human-related activities have had the tendency to alter the landscape and the fire regimes associated with them. Some species of non-native vegetation were also introduced during that time period and eventually invaded many native landscapes across the West and have altered natural fire disturbance processes.

Beginning in the early 1900s, the policy for handling wildland fire leaned heavily toward suppression and was initiated by the USFS. Over the years, other agencies, such as the BLM, the Bureau of Indian Affairs (BIA), and the National Park Service (NPS), followed the lead of the USFS and adopted fire suppression as the proper means for protecting the nation from wildfire. As a result, many areas currently have excessive fuel build-ups, dense and continuous vegetative cover, and tree and shrub encroachment into open grasslands.

Native Americans modified the landscape in the United States before the arrival of European settlers by tilling land for crops, such as maize and squash; constructing houses of mud bricks or tree bark; building mounds and terraces; harvesting and gathering wild rice, nuts, and roots; hunting deer, rabbits, and other animals; and igniting fires in prairies, fields, and forests (Wuerthner 2006). In the past, tribes have used fire as a tool to open land for agricultural use, hunting, or travel; to drive game for hunting; to promote desirable post-fire herbaceous vegetation; or to manage the land for habitat protection and resource use (Scurlock 1998). Although the specific influence that Native Americans had on historic fire regimes remains uncertain, human-caused fires can also be attributed to having played a role in influencing historical fire occurrences.

3.3.2 HISTORICAL FIRE REGIMES AND PRESENT CHANGES

Fire has played an important role in all grassland ecosystems and is thought to have been a significant ecological component of Great Plains shortgrass prairie ecosystems in the past (Brockway et al. 2002). Historically, frequent, low-intensity, surface fires burned throughout many large-scale areas within Roosevelt County, creating a mosaic of different stages of vegetative structure across the landscape. Mixed-grass communities experienced fire every three to five years, and fire is likely to have been an important component of maintaining those ecosystems (Unbanhowar 1996). Although fires may have burned less frequently in shortgrass prairies than in mixed or tallgrass prairies, they were likely to have burned over large areas. For the most part, in all grassland communities, fires helped to preserve an open vegetative community structure by consuming excess fuel buildup and suppressing the development of woody vegetation.

The natural fire regime has been altered in all types of grassland ecosystems over the past several years since the mid 1800s by systematic heavy grazing of large herds of domestic livestock and since the early 1900s by effective fire suppression efforts. These management practices have led to a reduction in fine fuels and fire occurrence, which has caused a shift in vegetative

composition and encroachment of trees and shrubs into grassland ecosystems. In the shortgrass prairie, it is believed that fire-dependent or fire-tolerant species have been replaced by less fire-tolerant species (Brockway et al. 2002). As a result, fires are likely to play a different role than they have in the past in these ecosystems, making restoration efforts challenging.

3.3.3 Recent Fire Occurrence in the CWPP Planning Area

Lightning ignitions are accountable for a portion of the fires that are started in Roosevelt County. NMSF compiled fire records from 1989 to 2007 show that 41% of the fires were ignited by lightning, which is widespread throughout monsoon season and usually takes place from June through August. However, human-caused ignitions are significant in the County and accounted for approximately 59% of the fires during the period of state fire records. A primary concern of residents in the WUI is the growing number of human ignitions, particularly with the development and improvement of roads, residences, and recreational opportunities into wildland areas. Human-caused fires increase the probability of fire occurrence throughout the year, including the winter months (Figure 3.2).

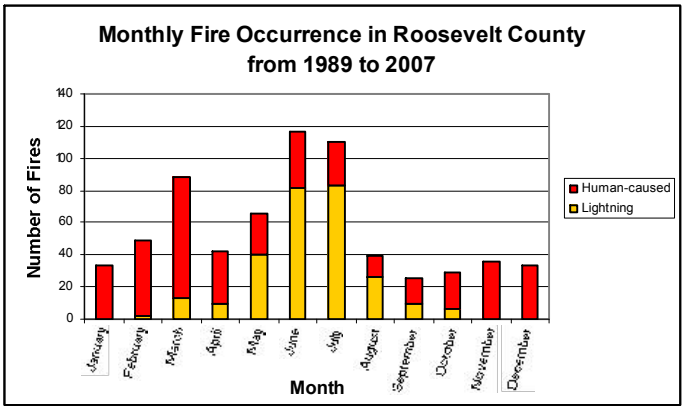

Figure 3.2. Number of fires per month from 1989 to 2007 (NMSF Fire Records).

From 1989 to 2007, 658 fires were recorded in grassland fuel types, 7 in brush fuel types, and 1 in other woodland fuel types. The fires that occur in grassland fuels, which are characteristic of the majority of the County's land cover, have the ability to spread quickly. Grassland fuels are light and flashy and can carry a fire rapidly, especially in the presence of wind. As a result, many of the fires that occur in the County grow to sizes larger than 1 acre. The majority of fires over the course of the period of fire records reached a size class of 0.5 acre to more than 100 acres, with very few fires that burned less than 0.5 acre (Figure 3.3).

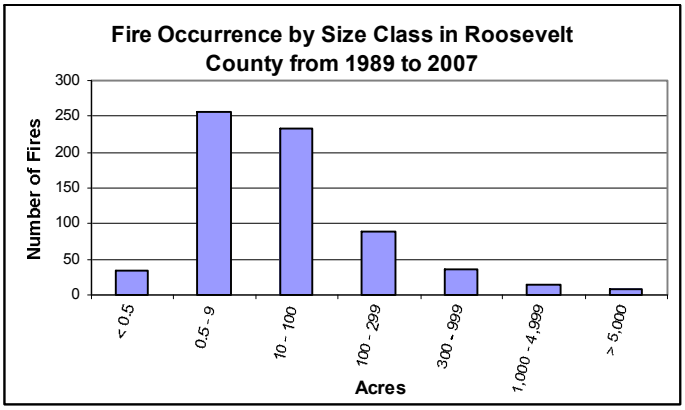

Figure 3.3. Number of fires by size class from 1989 to 2007 (NMSF State Fire Records).

A total of 21 fires on record grew to greater than 1,000 acres. Table 3.1 lists the large fires over 1,000 acres that have occurred within the planning area during the period of record. Roughly half of those fires were the result of anthropogenic causes.

Table 3.1. Fires over 1,000 Acres in Size on Record within Roosevelt County (1989 to 2007)

Fire Name	Start Date	Acres	Cause
Ashbrook	April 12, 1991	1,800	Smoking
Weems	March 31, 1994	1,500	Miscellaneous
Clemons	July 1, 1994	1,240	Lightning
Game	July 2, 1994	1,000	Lightning
Chavaroo	January 16, 1995	1,700	Equipment use
Industrial	June 10, 1996	1,000	Lightning
State	July 24, 1998	1,500	Lightning
Bomb	February 3, 2000	1,000	Incendiary
French	April 22, 2000	1,500	Equipment use
Sundale	May 6, 2000	5,120	Equipment use
Arch	June 10, 2002	1,920	Miscellaneous
Kizer	April 2, 2003	1,000	Miscellaneous
Floyd	November 30, 2005	26,000	Incendiary
467 MM6	January 11, 2006	1,300	Miscellaneous
Lingo	March 12, 2006	3,195	Miscellaneous
Taiban	April 22, 2006	5,800	Lightning
Pep #2	May 21, 2006	8,000	Lightning
Woody	May 21, 2006	9,000	Lightning
Jet	May 21, 2006	11,000	Lightning
Davis #3	June 9, 2006	4,350	Lightning
NM 467	October 17, 2007	15,000	Equipment use

3.4 CHALLENGES FOR FUTURE RESTORATION EFFORTS

In addition to the human impacts that have degraded natural fire regimes, climate change has also played an extensive role in altering fire occurrence and severity. Climate change has influenced the vegetative cover and available burnable fuel across the Western landscape. In the past few years, fires have grown to record sizes and are burning earlier, longer, hotter, and more intensely than they have in the past (Westerling et al. 2006). According to the National Interagency Fire Center (NIFC), the occurrence of catastrophic wildfires has greatly increased over the last 20 years. Westerling et al. (2006) claim that a study of large (>400ha) wildfires throughout the Western United States for the period 1970 to 2003 saw a pronounced increase in frequency of fire since the mid 1980s (1987–2003 fires were 4 times more frequent than the 1970–1986 average). The length of the fire season was also observed to increase by 78 days, comparing 1970–1986 to 1987–2003. Within just the last seven years, a record number of acreages have burned and numbers are continually getting larger (NIFC 2006).

Changes in relative humidity have been blamed for much of these changes as increased drying over much of the Southwest has led to an increase in days with high fire danger (Brown et al. 2004). Advanced computer models are now making national scale simulations of ecosystems providing predictions of how fire regimes will change in the twenty-first century (Neilson 2004). Predictions are that Western grasslands will undergo increased woody expansion of piñon juniper associated with increased precipitation occurring during typical wet seasons. Summer months are predicted to be hotter and longer contributing to increased fire risk (Neilson 2004). Under greater climatic extremes widely predicted throughout the United States, fire behavior is expected to become more erratic, with larger flame lengths, increased torching and crowning and more rapid runs and blow ups associated with extremely dry conditions (Brown et al. 2004).

In a Government Accountability Office (GAO) report on climate change and federal lands (GAO 2007), natural resource experts from numerous federal and state governments as well as leading academic experts predict that climate change will cause forest fires to grow in size and severity. This climate change in turn will impact the safety of communities located in the WUI as well as over larger areas as a result of impaired air quality resulting from vast smoke production. Experts working under the auspices of the Department of Energy Accelerated Climate Prediction Initiative similarly warn of the increased risks. Fire suppression costs as well as the expense of fire preparedness are likely to increase in parallel with increased larger fires. Experts warn that Southwest fire and fuels management strategies and policies need to address these risks now in order to prepare for these changing regimes, while also accommodating complex changing ecosystems subject to growing human stresses (Brown et al. 2004).

3.5 FIRE REGIMES AND FIRE REGIME CONDITION CLASSES

Methods to assess the condition of wildland areas have been developed that help to classify, prioritize, and plan for fuels treatments across a fire management region.

3.5.1 FIRE REGIMES

A natural fire regime or historic fire regime is a general classification of the role fire would play throughout a landscape in the absence of modern human intervention, but including the influence

of aboriginal burning (Agee 1993; Brown 1995; Hann et al. 2003). Natural fire regime reference conditions have been developed for vegetation-fuel class composition, fire frequency, and fire severity for the biophysical settings at a landscape level for the Southwest and most other parts of the United States (Hann et al. 2003).

The following five fire regime classifications are based on the average number of years between fires (fire frequency or Mean Fire Interval [MFI]) combined with the severity (amount of vegetation replacement) of the fire and its effect on the dominant overstory vegetation (Hann et al. 2003).

I 0- to 35-year frequency and low (mostly surface fires) to mixed severity (less than 75% of the dominant overstory vegetation is replaced)

II 0- to 35-year frequency and high severity (more than 75% of the dominant overstory vegetation is replaced)

III 35- to 200+-year fire frequency and mixed severity (less than 75% of the dominant overstory vegetation is replaced)

IV 35- to 200+-year fire frequency and high severity (more than 75% of the dominant overstory vegetation is replaced)

V 200+-year frequency and high severity (more than 75% of the dominant overstory vegetation is replaced)

3.5.2 Fire Regime Condition Class

The Fire Regime Condition Class (FRCC) is a measure of the degree of departure from vegetative reference conditions, possibly resulting in changes to key ecosystem components, such as vegetation characteristics (species composition, structural stage, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances, such as insect and disease mortality, grazing, and drought (Hann et al. 2003). The three condition classes are used to describe the departure from reference conditions: no or low departure (FRCC I), moderate departure (FRCC II), and high departure (FRCC III) (Hann and Bunnell 2001; Hardy et al. 2001; Schmidt et al. 2002 in Hann et al. 2003). Several factors, such as fire suppression, timber harvesting, livestock overgrazing, introduction and establishment of non-native species, introduced disease and insects, and other management activities, are all possible causes of this departure from historic conditions (Schmidt et al. 2002; Hann et al. 2003).

Roosevelt County has an FRCC II throughout the majority of the County within grasslands and shrublands. Depending on their location (in sections along the western and southwestern edges of the County), some areas of Western Great Plains Sandhill Steppe and Shortgrass Prairie have an FRCC I. Very few areas in the County have an FRCC III; however, a very large amount of agricultural land exists in the central and northeastern portions of the County. Figure 3.4 illustrates the FRCCs throughout the County.

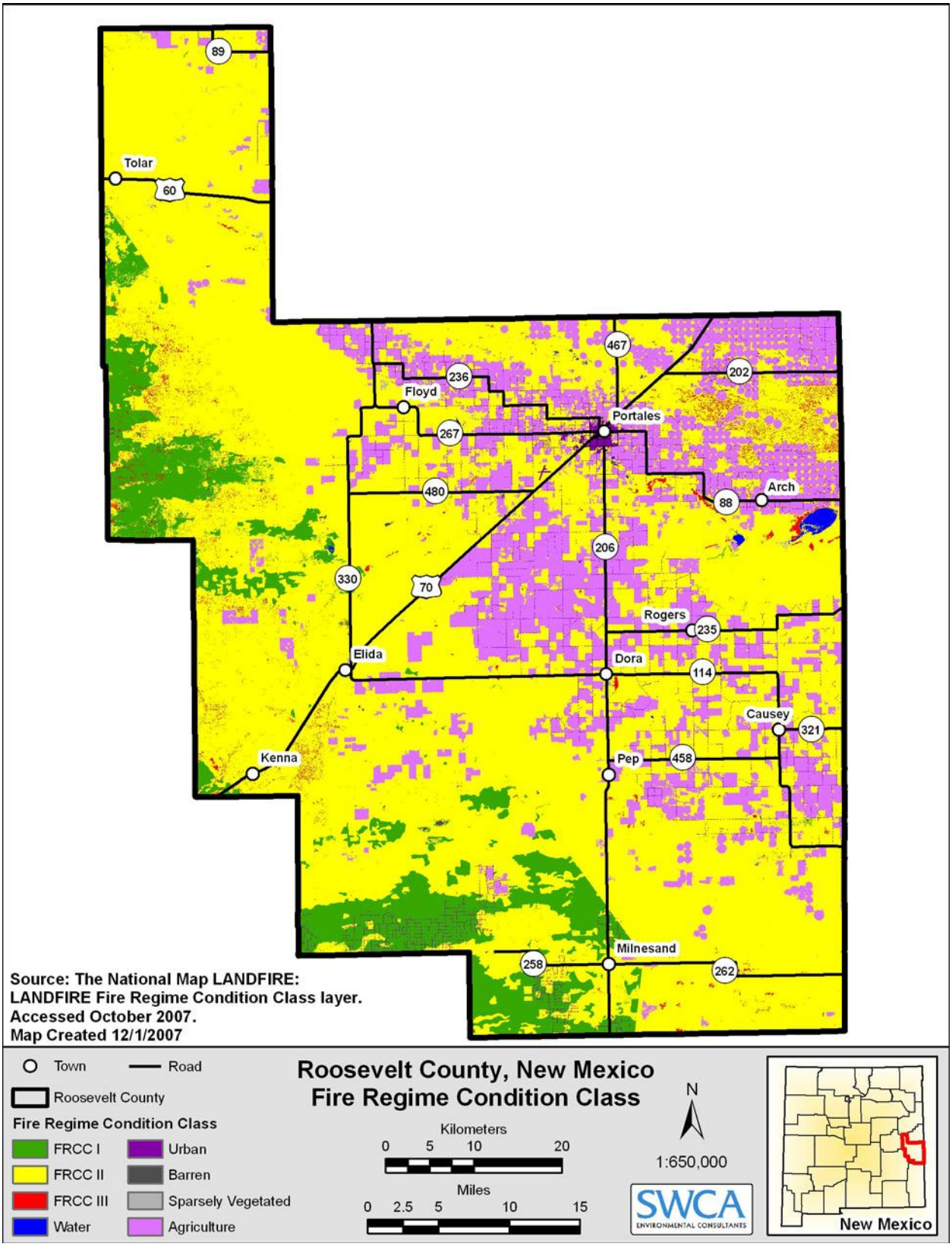

Figure 3.4. FRCC map.

4.0 RISK ASSESSMENT

4.1 OVERVIEW AND PURPOSE OF RISK ASSESSMENT

The purpose of developing the risk assessment model described here was to create a unique tool for evaluating the risk of wildland fires to communities living within the WUI areas of Roosevelt County.

Although many definitions exist for hazard and risk, for the purpose of this document, these terms follow the definitions used by the firefighting community. *Hazard* is a fuel complex defined by kind, arrangement, volume, condition, and location, forming a special threat of ignition and resistance to control. *Risk* is defined as the chance of a fire starting as determined by the presence and activity of causative agents (National Wildfire Coordinating Group 1998). A risk assessment uses geographic information system (GIS) technology to provide spatial information about the level of risk associated with wildfire in relation to particular WUI areas and consequences of wildfire for residents and built structures within a WUI.

From this assessment, land use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire while working with community members to educate them about methods for reducing the damaging consequences of fire. The fuels reduction treatments can be implemented on both private and public land, so community members have the opportunity to actively apply the treatments on their properties, as well as recommend treatments on public land that they use or care about.

4.2 FIRE BEHAVIOR MODELING

For this plan, an assessment of fire behavior was carried out using well-established fire behavior models: FlamMap, FARSITE, BehavePlus, and FireFamily Plus, as well as ArcGIS Desktop Spatial Analyst tools. Data used in the risk assessment were largely obtained from Landfire.

4.2.1 LANDFIRE

Landfire is a national remote-sensing project that provides land managers a data source for all inputs needed for FARSITE, FlamMap, and other fire behavior models. The database, managed by the USFS and USDI, is widely used throughout the country for land management planning. More information can be obtained from http://www.landfire.gov.

4.2.2 FARSITE

FARSITE is a computer model based on Rothermel's Spread Equations (Rothermel 1983), which also incorporates crown fire models. FARSITE uses spatial data on fuels, canopy cover, crown bulk density, canopy base height (CBH), canopy height, aspect, slope, elevation, wind, and weather to model fire behavior across a landscape. In essence, FARSITE is a spatial and temporal fire behavior model. FARSITE was used to generate fuel moisture and landscape files as inputs for FlamMap. Detailed information on fire behavior models can be obtained from http://www.fire.org.

4.2.3 BEHAVEPLUS

BehavePlus also uses Rothermel (1983) equations. It is a multifaceted fire behavior model, and in this process, was used to determine fuel moisture.

4.2.4 FLAMMAP

Like FARSITE, FlamMap uses a spatial component for its inputs, but only provides fire behavior predictions for a single set of weather inputs. In essence, it gives fire behavior predictions across a landscape for a snapshot of time. FlamMap does not predict fire spread across the landscape. FlamMap was used in this project to predict fire behavior across the landscape under extreme (worst case) weather scenarios.

4.3 FIRE BEHAVIOR MODEL INPUTS

The fuels in the planning area are classified using Scott and Burgan's (2005) Standard Fire Behavior Fuel Model (FBFM) classification system. This classification system is based on the Rothermel surface fire spread equations (Rothermel 1972), and each vegetation type is broken down into 40 fuel models. This classification was selected due to the large coverage of herbaceous fuel in the planning area.

The Scott and Burgan (2005) classification system acknowledges that all fuel models with an herbaceous component are dynamic to account for the curing of herbaceous vegetation over the course of a growing season. Fuel loading and size class, fuelbed depth, heat content, and moisture of extinction are also accounted for in these fire models (Scott and Burgan 2005). These FBFMs can serve as input to multiple fire behavior and growth modeling software packages, including FlamMap (Stratton 2004), which is used for the purposes of the risk assessment in this document (Figure 4.1).

The general classification of fuels is by the dominant fire-carrying fuel type (Scott and Burgan 2005):

(NB) Nonburnable
(GR) Grass
(GS) Grass-Shrub
(SH) Shrub
(TU) Timber-Understory
(TL) Timber Litter
(SB) Slash-Blowdown

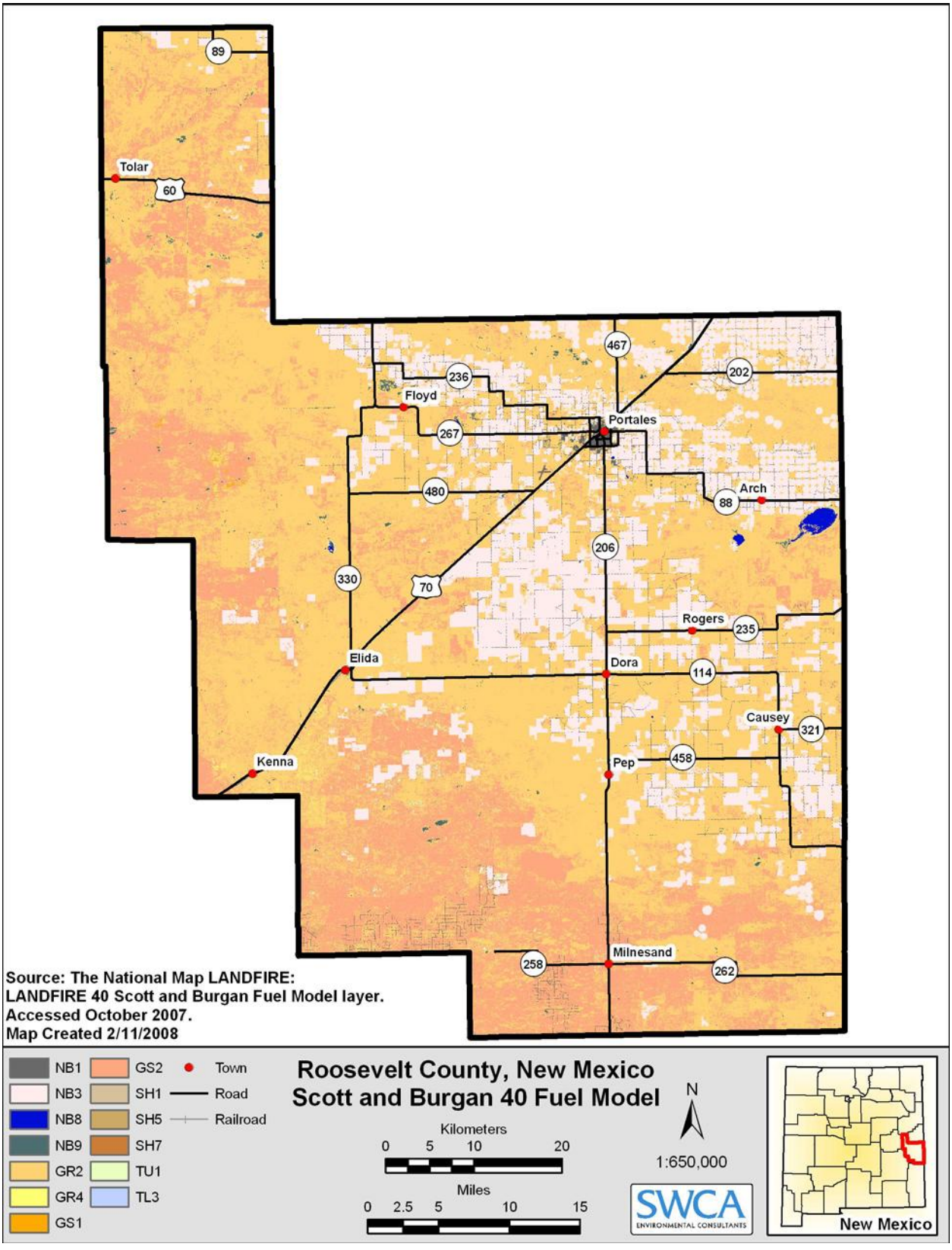

Figure 4.1. Scott and Burgan (2005) 40 fuel model.

4.3.1 FIRE BEHAVIOR FUEL MODELS

The following section provides more specific descriptions of fuel models.

Western Great Plains Shortgrass Prairie

Western Great Plains Shortgrass Prairie is by far the most abundant vegetation type in Roosevelt County, representing 40% of the total land cover. It occurs throughout the County, but is especially evident in the west-northwestern section. The soils within this community type are typically loamy and semiarid and range from sandy to clayey. As the name implies, shortgrass prairies are dominated by low growing grasses. In most areas, this means the grass-level vegetation will rarely grow taller than 1 foot, excluding inflorescences. Herbaceous and/or shrub-level are often components to this vegetation type, but they will occur in low proportions. The most dominant grass is blue grama (*Bouteloua gracilis*), but this species forms a complex matrix with many other grass species, including but not limited to the following: sideoats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), buffalograss (*Buchloe dactyloides*), and alkali sacaton (*Sporobolus airoides*). At the herbaceous level, common species include buckwheat (*Eriogonum effusum*) and broom snakeweed (*Gutierrezia sarothrae*). Patches of shrub species are not uncommon and will include various sage species (*Artemisia* spp.) and four-winged saltbush (*Atriplex canescens*). These species are more likely to occur on ridges and rocky areas.

The fire behavior that can be expected in the shortgrass prairie ecosystem is described by Scott and Burgan's (2005) fuel model GR2, which is a grass-type fuel model. In this fuel model, fires are carried by moderately, coarse continuous grass cover of an average depth of 1 foot and tend to move rapidly through light and flashy fuels with moderate flame lengths. Fires in this fuel model completely depend upon fuel moisture levels that vary by life stage and hourly changes in ambient weather conditions. The low structural height of the grasses implies that the fuel load is light; however, these light and flashy fuels, along with the lack of wind breaks or cover, means that fire can move very quickly in the presence of wind.

Central Mixed-grass Prairie

Central Mixed-grass Prairie is the second most abundant vegetation type in Roosevelt County, representing 20% of the total land cover, and it exists in scattered areas along the eastern side of the County. The physical characteristics of this vegetation type are between tallgrass prairie and shortgrass prairie, and it contains species components of both communities. Grass species, such as blue and sideoats grama, needle and thread, little bluestem, and western wheatgrass (*Pascopyrum smithii*), are most common. Herbaceous species commonly present include coneflower (*Echinacea angustifolia*) and ragweed (*Ambrosia psilostachya*). This vegetation type may exhibit longer flame lengths in taller herbaceous vegetation but still can be classified in fuel model GR2 because it exhibits similar fire behavior to that of the shortgrass prairie described above.

Western Great Plains Sandhill Steppe

The Western Great Plains Sandhill Steppe vegetation type occurs mostly along the west-central and southwestern edge of the County and occupies approximately 8% of the vegetative cover. Nationwide, it is found throughout the interior West on well-drained sandy soils and includes

sand dunes in some areas. This system is of a similar structure to Western Great Plains Shortgrass Prairie, in that it is characterized by dominant grass-level vegetation with interspersed herbaceous and shrubby patches. The difference is in the dominant species. In the grassland areas, blue grama is still very common, but is accompanied by dropseed (*Sporobolus* spp.), little bluestem (*Schizachyrium scoparium*), and needle and thread (*Hesperostipa comata*). The herbaceous layer can contain broom snakeweed and soapweed yucca (*Yucca glauca*). It is important to note that the herbaceous layer is highly variable in this vegetation type and depends on a multitude of factors, including precipitation, disturbance, and topography. The shrub layer will contain predominantly sand sagebrush (*Artemisia filifolia*) with honey mesquite (*Prosopis glandulosa*) and sand shinnery oak (*Quercus havardii*) components. Fire and grazing are the most important dynamic processes for this vegetation type and determine the species that will be present at a specific location.

This vegetation type is characterized in Roosevelt County by Scott and Burgan's (2005) fuel model GS2. The fuel load is relatively light, and the fire spread primarily takes place through the cured or dead fine herbaceous fuels on the ground surface. However, dense patches of woody vegetation may also catch fire and increase flame lengths and fire intensity in some areas. Fire behavior in this fuel model depends on seasonal moisture changes. During wetter periods, fire tends to remain on the ground surface and will burn litter with low intensity as a result of high fuel moistures, especially early in the growing season and during spring green-up. However, during drier periods and near the end of the growing season, the fire can move into the shrub canopy and burn with longer flame lengths and higher intensity. This type of fire can move quickly and increase spotting potential, making it more difficult to suppress and, as a result, may pose a threat to human-made structures that it comes into contact with.

Western Great Plains Mesquite Woodland and Shrubland

Western Great Plains Mesquite Woodlands and Shrublands cover only about 4% of Roosevelt County, mostly on the eastern side. The soil type is variable and can go from sandy to clayey, dry to semiarid. Honey mesquite dominates this vegetation type, but co-dominant shrub species, such as four-winged saltbush and cholla (*Opuntia* spp.), may also occur. A grassy understory component is typical, which includes blue grama and buffalograss.

Scott and Burgan's (2005) fuel model GS2 is the fuel type that best describes this vegetation type and other similar types of shrub ecosystems with shrubs that range from 1 to 3 feet high. The spread rate is high, and flame length is moderate.

Historically, mesquite's range was controlled by fire, but as a result of livestock grazing and fire suppression, it has spread out of its original range to a significant degree (Wells 1970). This means that in the areas where mesquite is dominant, a significant departure from the historical fire regime has occurred. As a result, higher fuel loadings and more continuous fuels may occur within areas of this habitat type and will result in increased fire intensity.

Quercus Havardii Shrubland Alliance

The *Quercus havardii* (sand shinnery oak) Shrubland Alliance also covers about 4% of Roosevelt County and occurs along the southwestern edge. This alliance includes deciduous

shrublands on stabilized dunes. Species composition varies with precipitation and with the depth and degree of dune stabilization. This vegetation type is characterized by large areas of open grassland with scattered patches of sand shinnery oak that occurs with little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), sand dropseed (*Sporobolus cryptandrus*), giant dropseed (*Sporobolus giganteus*), giant sandreed (*Calamovilfa gigantea*), plains yucca (*Yucca campestris*), honey mesquite (*Prosopis glandulosa* var. *glandulosa*), and sand sagebrush (*Artemisia filifolia*). Similar to the Western Great Plains mesquite woodland and shrubland, Scott and Burgan's (2005) fuel model GS2 in the grass-shrub group best describes this vegetation type.

Introduced Upland Vegetation – Perennial Grassland and Forbland

Introduced perennial grassland vegetation covers about 4% of the area in Roosevelt County and occurs in its central and southeastern portions. This vegetation type includes areas that are dominated by introduced perennial grass species, such as the following: crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), Lehmann lovegrass (*Eragrostis lehmanniana*), fountain grass (*Pennisetum* spp.), bulbous bluegrass (*Poa bulbosa*), Kentucky bluegrass (*P. pratensis*), and intermediate wheatgrass (*Thinopyrum intermedium*). This vegetation is likely to exhibit longer flame lengths than the shortgrass and mixed-grass prairie ecosystems, and should be classified as a fuel model GR4. The condition of these grasslands typically has a greater fuel load and fuel depth than fuel model GR2, with a fuelbed depth of about 2 feet.

Wheeping Lovegrass

Although wheeping lovegrass has soil conservation benefits, its dominance in the County may cause difficulties for producers attempting to mitigate fire risk in identified vegetation. Wheeping lovegrass (*Eragrostis curvula*) is native to South Africa and was first introduced into the United States in 1932. The grass is now prevalent throughout much of eastern New Mexico and is particularly dominant in CRP grasslands. Wheeping lovegrass was originally planted for soil conservation and has been described as providing excellent protection for soils, particularly in the high plains of New Mexico (Garcia 1993). Despite its value in soil conservation, like other lovegrasses, it is allelopathic—able to inhibit the germination and growth of neighboring plants by releasing chemical substances into the soil (Global Invasive Species Program [GISP] 2008). As a result, lovegrass inhibits the growth of native grasses and reduces overall biodiversity and structure. Although considered fair forage for livestock (Cox 1992), lovegrass is considered poor for wildlife (Stubbendieck et al. 1986), which is why many are concerned by for its dominance on CRP lands that are set aside for wildlife value.

Agricultural and Non-burnable Fuels

Non-burnable fuels are also present throughout the planning area, with urban fuels (NB1) dominant throughout communities, agricultural fuels (cultivated crops and pasture) (NB3) scattered throughout the County, and open water in a few select areas (NB8). Agricultural areas are extensive and account for approximately 18% of the land cover in the County. These fuel types are considered non-combustible when input into the fire behavior model. Fuel model NB3 applies to agricultural land that is kept in a non-burnable condition. In areas where agricultural

land is kept in a burnable condition or at certain times of the year, prior to harvest, a fuel model other than NB3 should be applied to the area for prioritizing and planning fuels treatments.

Table 4.1 provides more details about the Fuel Modification Classification.

Table 4.1. Fuel Model Classification for Roosevelt County CWPP Planning Area

1.	**Nearly pure grass and/or forb type (Grass)**
i.	**GR1:** Grass is short, patchy, and possibly heavily grazed. Spread rate is moderate (5–20 ch/h); flame length low (1–4 feet); fine fuel load 0.40 (t/ac).
ii.	**GR2:** Moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 ch/h); flame length moderate (4–8 feet); fine fuel load 1.10 (t/ac).
iii.	**GR4:** Moderately coarse continuous grass, average depth about 2 feet. Spread rate very high (50–150 ch/h); flame length high (8–12 feet); fine fuel load 2.15 (t/ac).
2.	**Mixture of grass and shrub, up to about 50% shrub cover (Grass-Shrub)**
i.	**GS1:** Shrubs are about 1 foot high, low grass load. Spread rate moderate (5–20 ch/h); flame length low (1–4 feet); fine fuel load 1.35 (t/ac).
ii.	**GS2:** Shrubs are 1–3 feet high, moderate grass load. Spread rate high (20–50 ch/h); flame length moderate (4–8 feet); fine fuel load 2.1 (t/ac).
3.	**Shrubs cover at least 50% of the site; grass sparse to nonexistent (Shrub)**
i.	**SH1:** Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate very low (0–2 ch/h); flame length very low (0–1 foot); fine fuel load 1.7 (t/ac).
ii.	**SH2:** Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuels present. Spread rate low (2–5 ch/h); flame length low (1–4 feet); fine fuel load 5.2 (t/ac).
iii.	**SH5:** Heavy shrub load, depth 4–6 feet. Spread rate very high (50–150 ch/h); flame length very high (12–25 feet); fine fuel load 6.5 (t/ac).
iv.	**SH7:** Very heavy shrub load, depth 4–6 feet. Spread rate lower than SH5, but flame length similar. Spread rate high (20–50 ch/h); flame length very high (12–25 feet); fine fuel load 6.9 (t/ac).
v.	**SH6:** Dense shrubs, little or no herb fuel, depth about 2 feet. Spread rate high (20–50 ch/h); flame lengths high (8–12 feet) (*only occurring in uplands beyond CWPP boundary*); fine fuel load 4.3 (t/ac).
4.	**Insufficient wildland fuel to carry wildland fire under any condition (Nonburnable)**
i.	**NB1:** Urban or suburban development; insufficient wildland fuel to carry wildland fire.
ii.	**NB3:** Agricultural field, maintained in nonburnable condition.
iii.	**NB8:** Open water.
iv.	**NB9:** Bare ground.

Notes:
Based on Scott and Burgan's (2005) 40 Fuel Models System.
Climate is arid to semiarid for all fuel types.
Only categories present on the CWPP fuel maps are presented above. For more information, refer to Scott and Burgan 2005.

4.4 GIS OVERLAY PROCESS

All data used in the risk assessment were processed using ESRI ArcGIS desktop and the ESRI Spatial Analyst extension. Information on these programs can be found at http://www.esri.com. Data were gathered from all relevant agencies, and the most current data were used.

All parameter data sets were converted to raster format (a common GIS data format comprising a grid of cells or pixels, with each pixel containing a single value). The cell size for the data is 98 x 98 feet (2,953 square feet). Each of the original cell values were reclassified with a new value between 1 and 4, based on the significance of the data (1=lowest, 4=highest). Prior to running the models on the reclassified data sets, each of the input parameters were weighted (i.e., they were assigned a percentage value reflecting that parameter's importance in the model). The parameters

were then placed into a Weighted Overlay Model, which "stacks" each geographically aligned data set and evaluates an output value derived from each cell value of the overlaid data set in combination with the weighted assessment. The resulting data set contains only values 1 through 4 (1=Low, 2=Medium, 3=High, 4=Extreme) denoting fire risk. This ranking shows the relative fire risk of each cell based on the input parameters. Table 4.2 lists the individual datasets, the classes assigned to the data, and the relative weights assigned within the modeling framework.

Table 4.2. Model FlamMap Outputs and Weightings

Layer	Source	Year	Weight (%)	Ranks
Fireline Intensity	Landfire: Elevation, Aspect, Slope, Scott and Burgan 40 Fuel Model, Forest CBH, Forest Canopy Bulk Density (CBD), Forest Canopy Cover, Forest Canopy Height Remote Automated Weather (RAW) Station - 8 Mile (Weather)	2007	15	1: 0–100 British Thermal Units per linear foot, per second (BTU/ft/sec)= 1 2: 100–500 BTU/ft/sec = 2 3: 500–1,000 BTU/ft/sec = 3 4: Greater than 1,000 BTU/ft/sec = 4
Flame Length	Remote Automated Weather (RAW) Station - 8 Mile Draw (Weather)	1992–2006	15	1: 0–4 feet 2: 4–8 feet 3: 8–11 feet 4 Greater than 11 feet
Fire Occurrence	NMSF	1987–2007	45	1: No Fires/square miles (mi^2) 2: 0–0.2 Fires/mi^2 3: 0.2–1 Fires/mi^2 4 Greater than 1 Fires/mi^2
Rate of Spread	Landfire: Elevation, Aspect, Slope, Scott and Burgan 40 Fuel Model, Forest CBH, Forest CBD, Forest Canopy Cover, Forest Canopy Height	2007	25	1: 0–5 feet/minute 2: 5–15 feet/minute 3: 15–40 feet/minute 4: Greater than 40 feet/minute

4.5 FIRE BEHAVIOR MODEL OUTPUTS

4.5.1 FLAME LENGTH AND FIRELINE INTENSITY

In Appendix D, the Flame Length and Fire Intensity maps illustrate the flame length and fireline intensity classifications for the County. The maps show that both flame length and fireline intensity appear to be highly correlated. Flame length is a measure of the length of the flame from its base to its tip. Fireline intensity describes the rate of energy released by the flaming front and is measured in British Thermal Units per linear foot, per second (BTU/ft/s). Both flame lengths and fireline intensity are determined by fuels, weather, and topography. Flame length and fireline intensity are important components of the risk assessment because they relate to suppression tactics. Both of these parameters provide a good measure to which suppression activities are planned. Direct attack by hand lines is usually limited to flame lengths less than 4 feet and a fireline intensity of less than 100 BTU/ft/s. In excess of 4-foot flame lengths and a fireline intensity of greater than 100 BTU/ft/s, indirect suppression is the dominant tactic. Suppression using engines and heavy equipment will move from direct to indirect with flame lengths in excess of 8 feet and a fireline intensity of greater than 500 BTU/ft/s.

The highest predicted concentration of extreme flame lengths (>11 feet) and extreme fireline intensity (> 1,000 BTU/ft/s) are found scattered throughout the western and southwestern portion of the County. Patches of extreme flame lengths and fireline intensity can also be found in the more populated areas. Only a few very small patches along the southwestern side of the County are predicted to experience moderate (4- to 8-foot) flame lengths and fireline intensity (100 to 500 BTU/ft/s). The remainder of the County is predicted to have low (0- to 4-foot) flame lengths and fireline intensity (<100 BTU/ft/s) in the event of a fire, which is largely a consequence of the shortgrass steppe fuel types that dominate the landscape. The moderate flame lengths are predicted to occur in the moderate fuel loading of the Western Great Plains depressional wetland systems scattered throughout the southwestern portion of the County. Greater flame lengths are predicted in areas dominated by shrub and shrub steppe fuels found in the largest concentration along the southwestern portion of the County.

The expected fireline intensity throughout the County is similar in pattern to the predicted flame length, as fire line intensity is a function of flame length. High fireline intensity is predicted to occur in the shrubland communities (Scott and Burgan's [2005] Fuel Model GS2). Fireline intensities are typically lower in the shortgrass and mixed-grass dominated fuels.

4.5.2 Rate of Spread

The rate of spread map in Appendix D illustrates the rate of spread classifications for the planning area. As requested by the Core Team, FlamMap was run using extreme weather parameters to represent the strong winds experienced in these plains ecosystems. Rate of spread plays a significant role in impacting suppression capabilities in grassland communities because grassland fuels are light and flashy and can rapidly carry a fire, especially with high winds and/or steep slopes. Shrub steppe communities are likely to exhibit an even higher rate of spread because shrubs add to the fuel loading and can cause the fire to spot a greater distance ahead of the flaming front than a fire burning in only grassland fuels.

The greatest rates of spread are predicted to occur in southwestern and western edges of the County. In these areas, rate of spread is predicted to be greater than 40 feet per minute. These spread rates are highest in the grass/shrub model GS2. Agricultural and urban areas are clearly delineated in this model by a low rate of spread. Other areas in the County that are not forecasted to have a high or low rate of spread are predicted to have a moderate rate of spread. Those areas are primarily in the shortgrass prairie fuel type (GR2).

4.5.3 Fire Occurrence/Density of Fire Ignitions

The concentrations of fire ignitions were determined by performing a density analysis on fire start locations using ArcGIS desktop Spatial Analyst. These locations were provided by the NMSF and the USFS as a spatial GIS dataset, and the dataset showed the areas of fire starts within the project area over the last 18 years (1989 to 2007). The density analysis was performed over a 5-mile search radius. The density of fires recorded during that period within the designated area is used to determine the risk of ignition of a fire. The Fire Occurrence map in Appendix D illustrates the fire occurrence in the County. The highest density (> than 1 fire/square mile) of past fires has occurred within approximately a 5-mile radius around Portales. A density of 0.2 to 1 fire per square mile took place throughout the more populated areas in the

central and eastern half of the County. The map clearly shows high densities of fires within the road corridors where more of the communities exist, indicating that many of the fire ignitions are human-caused. This has been illustrated in the fire occurrence section of this document, as well where over half of the fires on record were human-ignited.

4.6 RISK ASSESSMENT RESULTS

The risk assessment classifies the planning area into low, moderate, high, and extreme risk categories. Figure 4.2 shows the risk assessment and the WUI areas and illustrates the level of risk associated within and around each WUI area.

The final risk assessment reflects closely the fire behavior predicted by the flame length, fireline intensity, and rate of spread combined with the likelihood of a fire ignition based on past fire occurrences. The flame length and fireline intensity outputs appeared to be identical; however, both were included in the modeling process to keep more parameters in the model. Flame length and fireline intensity are not always correlated. They are typically different in heavier fuels, such as timber. For example, if a fire is burning through heavy forest fuels on the ground surface, flame lengths may not be very tall, but the fireline intensity may be high due to the buildup of heat from the longer residence time of the fire burning in heavy fuel. Shortgrass and mixed-grass fuels have very light fuels that do not have a very long residence time of the fire. As a result, the two parameters are correlated because the fireline intensity can be predicted to be higher when the flame lengths are higher.

The greatest risk is predicted to be in the south-central portion of the County around the community of Milnesand. A number of the communities are shown as low risk in the risk assessment map because of urban and adjacent agricultural fuels. Agricultural lands pose a challenge in the modeling process because they are assumed to be maintained in a non-burnable state and are classified as Scott and Burgan's (2005) fuel model NB3. Agricultural land is not always non-burnable because crops may become cured prior to harvest and some areas receive limited irrigation. Agricultural areas may fluctuate due to crop rotation and areas that are left fallow may have dead and dry fuels or weeds, which are highly combustible and would significantly increase the fire risk within areas that are predicted to have a low fire risk by the model. Therefore, it is important to take these factors relating to agricultural land into consideration when prioritizing fuels treatments.

Fire occurrence was weighted heavily in this model. Although fireline intensity, flame length, and rate of spread are all predicted to be the highest in the southwestern portion of the County, very few fires occur within those areas relative to the more developed areas (see Fire Occurrence map in Appendix D). The southwestern portion is the least populated section of the County and should not weigh too heavily in the risk assessment due to the lack of human values at risk within that region. Fire occurrences are the highest throughout the agricultural and more populated areas where more values are at risk. This higher fire occurrence trend demonstrates two facts: (1) the majority of the fires in the County are human-ignited, and (2) fires are more likely to occur in areas where there are a greater number of human values at risk. As a result of these findings, it made the best sense to assign a higher weight and rating to fire occurrence in the model.

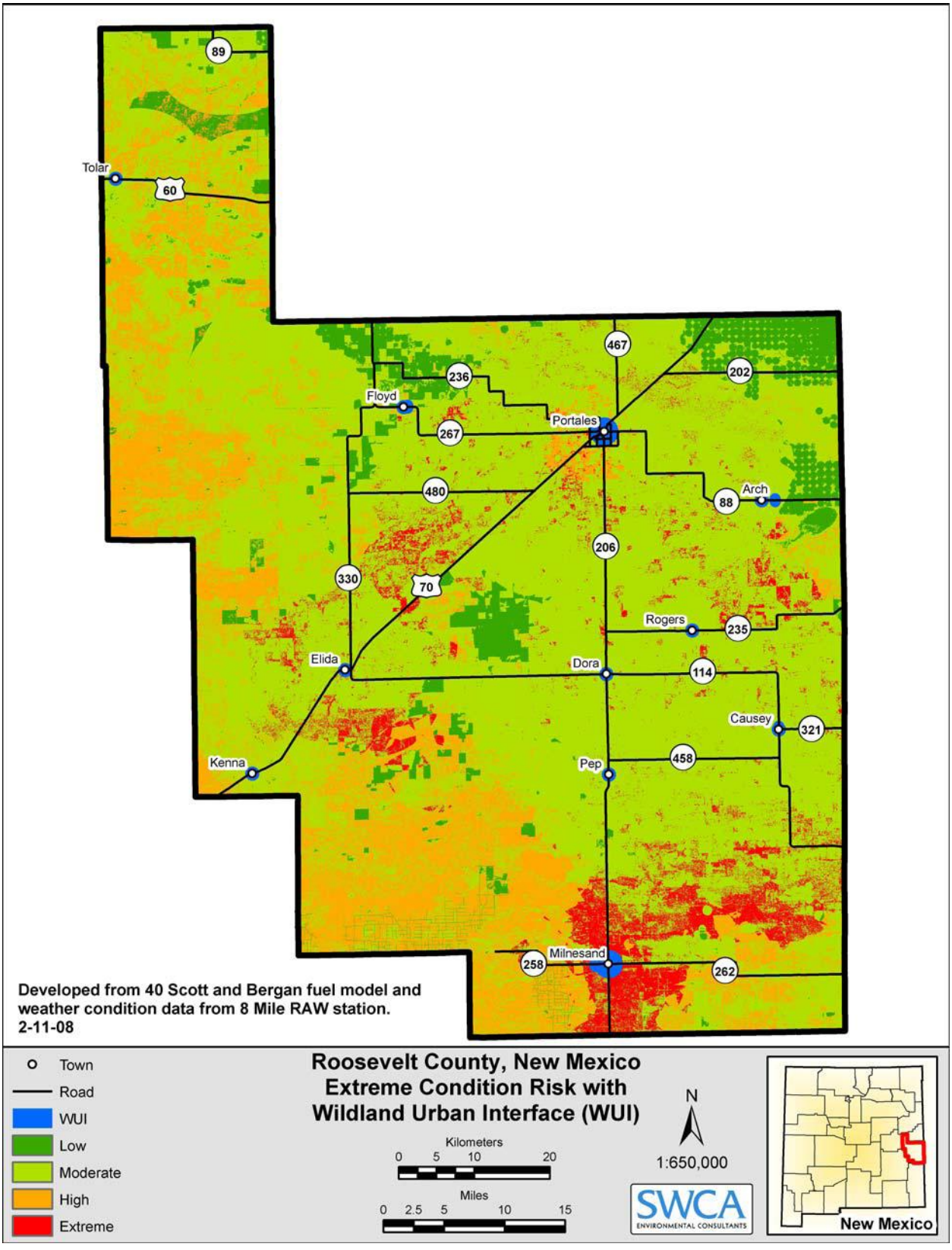

Figure 4.2. Risk Assessment with WUI.

The fire behavior models help identify the areas at highest risk and prioritize treatment in the vicinity of a community. Very few areas of the wildland are considered to be at low risk of severe fire behavior, with the majority of the landscape classified either as moderate or high risk with a few patches of extreme fire risk. The largest area of extreme fire risk exists in the south-central portion with several other small patches scattered throughout the central region of the County. These are areas where all of the parameters (fire occurrence, rate of spread, flame length, and fireline intensity) that were input into the model had high ratings. Agricultural areas that exist in locations further away from communities have a low risk rating.

According to the final risk assessment map, the community of Milnesand would be given the highest priority, followed by Portales and other communities that are surrounded by high to extreme fire risk. A certain degree of risk surrounds all of the communities identified by the CWPP; however, according to the risk assessment, Milnesand clearly has the most significant fire risk in the County. Ultimately, the Core Team will review the risk ratings for each community along with other factors that may play a role in fire risk and will establish a prioritization of communities and fuels treatments throughout the County.

4.7 COMMUNITY VALUES AT RISK

CVARs provide a measure of people, property, and natural and other resources that could suffer losses in a wildfire event. Examples of CVARs may include, but are not limited to, housing, business and infrastructure (including utilities, trails, and roads), natural resources (including wildlife and water resources), cultural resources, tribal concerns, recreation areas and open space, and scenic resources (including significant landscapes),. CVARs identified by community members help guide the risk assessment and the recommendations.

The public meeting process and community surveys were used to compile information identifying community values that the public deems to be at risk from wildland fire and values that they would like to see protected. This information helped to drive the treatment recommendations outlined in Section 5.0 (Appendix B is a compilation of all community comments and public meeting minutes.) In addition, with Core Team collaboration, additional CVARs were identified; the WUI boundary was developed to encompass the majority of these CVARs.

4.7.1 NATURAL CVARS

The public outreach emphasized the importance of natural/ecological values to the general public. Examples of natural values identified by the public and the Core Team include:

- Grasslands
- Wildlife habitat/wildlife preserve
- Water resources

4.7.2 SOCIAL CVARS

Social values include population, recreation, infrastructure, agriculture, industry, and the built environment. Much of the built environment falls within the WUI zones. Oil and gas production helps drive the local economy in the County, as it provides employment opportunities for many

citizens. At the same time, oil and gas fields are prone to severe fire if ignition occurs, which creates potential for significant loss of economic and social values, and compromises public safety. Examples included the following:

- Residential housing
- Town centers
- Schools
- Churches
- Industry
- Power sources
- Water wells
- Infrastructure, public and private
- Oil and gas fields
- Rural character

4.7.3 CULTURAL CVARS

Land-based activities, such as agriculture and ranching, have shaped the culture of Roosevelt County. Resources contributing to this livelihood or traditional lifestyle would be considered cultural values at risk. Many of these landscapes maintain their use and purpose and have been productive agricultural and ranching areas for generations.

- Traditional agricultural lands
- Open space used for livestock grazing

4.8 COMMUNITIES AT RISK IDENTIFIED

The Core Team, the Local Knowledge Risk Assessment and Prioritization Matrix (located in Section 5.0) and the risk assessment guided the rankings assigned to the following communities in Table 4.3. The community at risk table, as required by the New Mexico Fire Planning Task Force, is listed below.

Table 4.3. Communities at Risk in Roosevelt County

Community	Risk Rating
Kenna	High
Elida	High
Floyd	High
Dora	High
Tolar	High
Pep	High
Milnesand	High
Portales	Low
Causey	Low
Arch	Low
Rogers	Low

5.0 RECOMMENDATIONS

5.1 OVERVIEW OF RECOMMENDATIONS, ACTION ITEMS, AND MONITORING

This section addresses recommendations, action plans, and monitoring. This CWPP presents four different types of recommendations: (1) fuels reduction projects; (2) public education and outreach; (3) reduction of structural ignitability; and (4) improved fire response capabilities. These recommendations are based on Core Team input, public outreach, and the GIS risk assessment. The recommendations are general in nature to provide maximum flexibility in implementation. General action plans are incorporated into recommendation tables and address timeframes, contacts, and prioritization. However, developing a specific action plan and assessment strategy that identifies roles and responsibilities, funding needs, and timetables for completing highest-priority projects is an important step in organizing the implementation of any of the recommendations. The action plan would also include monitoring and evaluating completed fuels reduction projects.

An important component of fuels treatment is monitoring. It is important to evaluate whether fuels treatments have accomplished their defined objectives and whether any unexpected outcomes have occurred. In addition to monitoring mechanical treatments, it is important to carry out comprehensive monitoring of burned areas to establish the success of fuels reduction treatments on fire behavior, as well as monitoring for ecological impacts, repercussions of burning on wildlife, and effects on soil chemistry and physics. Adaptive management is a term that refers to adjusting future management based on the effects of past management. Monitoring is required to gather the information necessary to inform those making future management decisions. Economic and legal questions may also be addressed through monitoring. In addition, monitoring activities can provide valuable educational opportunities for students.

The monitoring of each fuels reduction project would be site specific, and decisions regarding the timeline for monitoring and the type of monitoring to be used would be determined by each project. Monitoring and reporting contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base about how natural resource management decisions affect both the environment and the people who live in it.

The most important part of choosing a monitoring program is selecting a method appropriate to the people, place, and available time. Several levels of monitoring activities meet different objectives, have different levels of time intensity, and are appropriate for different groups of people. They include the following:

Minimum—Level 1: Pre- and post-project photos

Appropriate for many individual homeowners who conduct fuels reduction projects on their properties.

Moderate—Level 2: Multiple permanent photo points

Permanent photo locations are established using rebar or wood posts, and photos are taken on a regular basis. Ideally, this process would continue over several years. This approach might

be appropriate for more enthusiastic homeowners or for agencies conducting small-scale, general treatments.

High—Level 3: Basic vegetation plots

A series of plots can allow monitors to evaluate vegetation characteristics, such as species composition, percent cover, and frequency. Monitors then can record site characteristics, such as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols based on the types of vegetation present and the level of detail needed to analyze the management objectives.

Intense—Level 4: Basic vegetation plus dead and downed fuels inventory

The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974), an appropriate photo series (Ottmar et al. 2000), or Fire Effects Monitoring and Inventory System (FIREMON) plots.

5.2 ROOSEVELT COUNTY LOCAL KNOWLEDGE RISK ASSESSMENT / PRIORITIZED LIST

The Core Team's collective local and intimate knowledge of the area directed an assessment of risk along with the levels of prioritization for the recommendations. Local knowledge is critical to any CWPP, and particularly to Roosevelt County's CWPP, as natural resource and other County data are not abundant. Determining a process for identifying the level of risk, the types of recommendations needed, and the process for prioritization involved assigning quantitative values to concerns that are more qualitative in nature. Much discussion was generated as the Core Team collaboratively worked to create a matrix. Clarifying the meaning of the headings in the columns matrix was important for all to gain a mutual understanding of the process. The Core Team determined loose definitions of the following terms:

Fuels: Risk of fire based on fuel types and density

Starts: Likelihood of fire igniting

Values at risk: Potential loss of critical infrastructure, homes, businesses, historical sites, and cultural sites

Water availability: Accessibility to water supplies

Local preparedness: Level of preparedness or ability to respond to fire

The results of the discussions are captured in Table 5.1. These assessments guided the subsequent discussions in this section.

Table 5.1. Local Knowledge Risk and Priorities Table

Location	Fuels[1]	Starts[2]	Values at Risk[3]	Local Preparedness[4]	Average	Priority-Fuels	Priority-Education	Priority-Preparedness
Kenna	5	5	3	4	4.25	H	H	H
Elida	5	5	4	2	4.00	H	H	H
Floyd	5	4	4	2	3.75	H	H	H
Dora	5	4	4	2	3.75	H	H	H
Tolar	4	5	2	4	3.75	H	H	H
Pep	5	3	2	4	3.50	H	H	H
Causey	5	3	3	2	3.25	H	H	H
Rogers	5	2	2	4	3.25	H	H	H
Milnesand	5	3	3	2	3.25	H	H	H
Bombing Range	3	5	3	1	3.00	N	N	N
Portales	3	2	5	1	2.75	M	H	H
Arch	3	2	3	2	2.50	H	H	H
Oasis State Park	2	1	1	4	2.00	M	H	H

Scale	Fuels	Starts	Values at Risk	Local Preparedness
1	no / little risk	no / little risk	least risk for potential loss of values	no / little risk due to very high level of preparedness
2	low risk	low risk	low risk for potential loss of values	low risk due to high level of preparedness
3	moderate risk	moderate risk	moderate risk for potential loss of values	moderate risk due to moderate level of preparedness
4	high risk	high risk	high risk for potential loss of values	high risk due to low level of preparedness
5	extreme risk	extreme risk	extreme risk for potential loss of values	extreme risk due to very low level of preparedness

[1] Fuels: risk of fire based on fuel types and density
[2] Starts: likelihood of fire starting in this area
[3] Values at Risk: critical infrastructure, homes, businesses, historical sites, cultural sites
[4] Local Preparedness: the level of preparedness or ability to respond to fire

5.3 RECOMMENDATIONS FOR FUELS REDUCTION PROJECTS

The fuels reduction recommendations are addressed on a landscape level, and many of the recommendations fall within WUI areas. Site specific implementation plans will need to be developed for each project and at that time the exact number of treatments within the WUI will be determined. The majority of the recommended fuel breaks surrounding medium and small towns and villages fall within the WUI, as do the recommendations for roads that intersect WUI areas. Approximately 50% or more of the recommendations fall within the WUI.

5.3.1 CONSERVATION RESERVE PROGRAM LANDS

In 1985, the CRP was initiated to remove fragile, marginal land from crop production. Producers who enrolled were required to convert marginal acreages to perennial vegetation for a 10-year period. The objectives of the program were to reduce soil erosion, decrease sedimentation, increase herbaceous cover, improve wildlife habitat, improve water quality, and provide financial incentives for participants.

Core Team members raised concern about the risk of fire in CRP lands, as they are common in the County. Heavy fuel loads accumulate in these locations because of reduced production of crops. Strict management practices associated with these lands are usually outlined in CRP contracts, which is why recommendations for possible treatments on CRP lands are included in this plan.

An important feature of the CRP is that the land is not simply idled from crop production, but is replanted in permanent vegetative cover—either grassland or trees. The government shares (50/50) with the farmer the cost of converting the lands to this permanent vegetative cover. Soils in the County are highly erodible, which is why the CRP was originally initiated. The eastern counties of New Mexico are prone to high wind conditions; therefore, soil erosion is of paramount concern. Burning and wildfire also contribute to erosion with the removal of surface vegetation, which then accelerates soil losses. The Core Team and public are concerned that current mid-management practices, such as shredding, that are required under some CRP contracts are expensive and difficult to implement. Moreover many CRP landowners are absentee landowners and privacy laws prevent identification of the property owner. In order to target at risk areas, County staff and fire departments should work with their local Farm Service Agency (FSA) office to contact the appropriate landowner to discuss fire mitigation measures. Furthermore many producers favor increased grazing of CRP lands, but currently grazing results in a 25% reduction in CRP payment. The current policy also states that grazing can only occur 1 in every 10 years over a 3 month period from July 1st to September 30th, which some members of the Core Team felt was inadequate in reducing fire risk. Efforts are underway to change this policy at the national level.

Mid-contract Management

Mid-contract management is required for certain practices starting with General CRP Signup 29. Each CRP contract requires some type of mid-management on 100% of the acres in the 10-year cycle. Management activity must be completed before the end of year 6 for a 10-year contract and before the end of year 9 for 15-year contracts. The purpose of this mid-management is to enhance CRP cover for wildlife by creating a more diverse vegetation community. Grassland

areas need to be managed so that the grasses do not crowd out forbs and legumes, which provide wildlife benefits. The requirements of CRP contracts could be used to help landowners carry out fire mitigation treatments on their lands while remaining compliant with their CRP contracts. It is important to note, however, that there are some limitations of mid-management:

- Mid-management cannot be performed during the nesting period for grassland bird species (March 1 through July 1).
- Mid-management should be limited/or excluded where it could impact the Lesser Prairie Chicken (State Candidate Species) and its habitat.
- The maximum amount that can be disturbed during any year of the contract is one-third of the land.
- No mid-management activities can be implemented on grassed waterways or riparian buffers of areas planted to trees or shrubs.
- Mid-management cannot be carried out on environmentally sensitive areas such as areas prone to gully erosion or areas within 20 feet of a water resource.
- Handbook 2-CRP Par. 238 (page 10-13) states, "Participants are responsible for fire management on CRP acreage. Where appropriate, firebreaks shall be:
    - Included in the contract support document
    - Installed according to NRCS firebreak standard 394."

Mid-management options are available for new applicants, re-enrollments, and contract extensions. Table 5.2 outlines some of the mid-management activities that landowners can carry out on CRP lands.

Table 5.2. Action Items for Fuels Mitigation on CRP Lands

Create Fuel Break (reduce fuel loading and fuel bed depth)
Mowing must meet practice standard 528. • Mow or clear trees and shrubs to a minimum width of 10–16 feet around boundary of CRP lands or in strips orientated to minimize fire spread. • Remove vegetation exceeding 1.5 feet in height. • Inspect annually. • Monitor for weeds and remove. • No cost share available.
Create Fire Break (reduce fuels to mineral soil)
Firebreaks should be installed according to NRCS firebreak standard 394 (refer to Statement of Work Firebreak –Job Sheet 394 [2006] available from NRCS/FSA field offices). Fire breaks should be site-specific and located only in non-erodible soils in areas of high fire risk, along transportation corridors, and in rural communities and adjacent farmsteads. • Fire breaks may be temporary or permanent. • Fire breaks should be located to minimize the risk to the resources being protected. • Use existing natural or human-made barriers where possible. • In highly erodible soils, chiseling a fire break to form a narrow strip of mineral soil reduces potential erosion as the root system is left intact within the soil. • Firebreaks should also be located on the contour where possible, to reduce erosion. • In less erodible, soils wider strips (6–8ft) can be cleared down to mineral soil. For best results locate within fuel break area. This strip should be inspected semi-annually for erosion and regrowth and all flammable material exposed. • In all cases the designated conservationist shall document in the contract support document that no erosion hazard will result from the firebreak. • Adequate erosion control treatments must be installed and maintained where slopes exceed 5%. • If erosion becomes a problem remedial action shall be taken. • Grazing is not an option to remove vegetation on firebreaks. • Weed control is mandated in all fire and fuel breaks to remain within CRP compliance. • No cost share is available.
Remove Invasive Species
Spot treatment to remove invasive species—annually, if needed. Periodic mowing or mowing for generic weed control is prohibited. Only spot treatment is allowed. Can shred 100% of the acreage once in 10 years, usually no more than 50% in one year. If mid-management of weeds was written into the original CRP contract, landowners can shred for weeds using cost share.
Prescribed Grazing
A prescribed grazing plan may be developed with suggested stocking rates when emergency haying/grazing or managed haying/grazing is implemented. Must be in accordance with Practice 528. • Only outside of primary nesting season. • Stocking rates established as 1AUM (1 ac/head/month) for lovegrass or .5 AUM (2 ac/head/month) for native grasses. • Must observe FSA intervals set at 1 in 10 years. • Reduces payment by 25%. • Often CRP grasses are dense and have minimal nutrient value for livestock.

Table 5.2. Action Items for Fuels Mitigation on CRP Lands, continued

Convert CRP to Native Grasslands
This option could be suitable where a producer has stands of lovegrass or other non-natives and wants to reseed native grasses to benefit wildlife. This would lessen fuel loads. Must be carried out in accordance with practice standard 643. • Requires first eradicating the non-natives. • Mid-management cost share is available to replant with natives. Producers gain points to reinstate native grasses and this raises their chances of successfully re-enrolling in the program at the end of the 10-year contract. If the landowner is unsuccessful in re-enrolling in the CRP, having native grassland would increase the value of the land as natives are more palatable to cattle and other livestock. • At present the cost share for mid-management practices is 50%. It is possible that other partners could provide the other 50%; options include Quail Unlimited and the CP33 Wildlife Buffer Program (provides up to 90% cost share). Possible funding could also come from NRCS Conservation Innovation Grants. • The limitation of planting natives is that they usually require significant water in their first season. This could be the limiting factor in the east counties.
Reduce Lovegrass
To reduce lovegrass landowners would need to use pesticides and reseed using drill seeding and water. It is important for the County to continue to stay apprised of research on how to control lovegrass, as this species is abundant on CRP lands. Some current research, presented at the "Fire in the Southwest" conference hosted by the Fire Ecology Association, stated that prescribed fire can reduce lovegrass for one to two years. However, if rainfall is above average, this timeframe can be reduced.
Spot Treatment
Although a treatment ban is in place from March 1 to July 1 because of the nesting period, spot treatments such as fire breaks are allowed with permission. Producers should go to their local FSA offices to discuss CRP treatment options. NRCS is a technical advisor to the FSA, who administers the program. Landowners can do spot treatments (in the line of an approaching fire) without permission; however, they can't treat 100% of the acres.
Emergency Grazing
Provisions in the past have allowed for emergency grazing when areas are or have been threatened by severe fire risk. During the 2006 fire season, landowners were allowed to graze their CRP lands without losing their 25% of payment.
Prescribed Burning
Should comply with standard practice 643. • Requires permission and a burn plan that dictates parameters of the burn. • Quail Unlimited has been known to provide liability insurance for these burns. • Difficult to stay within the required 25–75% of acreage.

Source: Summarized from NRCS practice standards, specifications and job sheets (Available at – http://www.nm.nrcs.usda.gov/technical/fotg/section-4/std-specs.html)

CRP lands throughout the County have been identified as areas of significant fire risk because of their increased lovegrass fuel loading relative to neighboring grazed pastures. Wheeping lovegrass is fire adapted and generally increases or remains stable following fire (Wright et al. 1978), even under extreme fire behavior (Pase and Knipe 1977). The grass also responds positively to continuous grazing (Ethridge et al. 1987); however, when the land is not grazed, the lovegrass becomes coarse and is unattractive to livestock. When CRP lands are not actively managed, the lovegrass is not used by wildlife due to inadequate habitat structure or by producers as fodder, and it presents a fire risk to communities because of heavy fuel loading.

In areas where monocultures of lovegrass could constitute fire risk to neighboring communities, it is suggested that the producer implement management to control or limit the density of the stands. Suggested mechanical control methods include hand-digging out the root system in late winter or early spring, followed (where possible) by a prescribed fire to kill remaining seeds.

Chemical control measures include application of Glyphosate herbicides during spring months, after the new foliage is in full growth, but before blossom heads have formed (GISP 2008). Treatment options are limited however on CRP lands and so the producer or agency should contact their local FSA representative for specific guidance.

5.3.2 Fuel Reduction Projects

Fuels treatments will vary depending on each specific targeted area, but in general, mowing and prescribed fire should be implemented to create fuel breaks. Fuel breaks that are at least two times as wide as the expected flame lengths or wider should be placed along roads surrounding the WUI or at-risk areas. The topography is primarily flat throughout the County, meaning the placement and width of the fuel breaks should remain relatively consistent across the CWPP area.

In general, fuels within the Plains-Mesa Grassland of Roosevelt County are characteristic of Scott and Burgan's (2005) FBFM GR 2 and primarily consist of semiarid, shortgrass prairie vegetation, which consists almost entirely of native grasses. Shrubs represent only a very small percentage of the vegetative cover within this ecosystem.

Fire behavior in the Plains-Mesa Grassland could exhibit a rapid rate of spread during dry conditions with short to moderate flame lengths. Fire behavior in this fuel model will vary based on weather conditions, the vegetative life stage, and the density and structure of the existing vegetation. Spotting is not generally a problem in this fuel type because fire activity remains mainly on the ground surface and typically burns cooler than vegetation types with heavier fuels. The main objective of fuels treatments in this fuel type is to reduce fuels in areas where they have accumulated to allow engines and firefighters to be able to safely suppress a fire.

Table 5.3 identifies the recommendations for fuels reduction projects for Roosevelt County. In addition to the risks and prioritized recommendations outlined in the table, other considerations, including appropriateness of treatment, landownership constraints, locations of ongoing projects, available resources, and other physical or ecological barriers to treatment, need to be considered when implementing any recommendations.

Figure 5.1 identifies some of the areas for fuel reduction projects. When projects are being implemented, a site-specific map for each project should be created.

Table 5.3. Recommendations for Fuels Reduction Projects for Roosevelt County

Project	Location	Land Ownership or Management	Method	Serves To	Target Date for Beginning Implementation	Priority (H,M,L)	Monitoring
Create Fuel Breaks	Southwest boundaries of municipalities and around critical infrastructure	Public or Private	Mowing	Protect community and infrastructure by reducing fuel loads	Summer 2008	H	Monitor effects of treatments on species dynamics and species composition, particularly invasion of exotic species. Monitor regrowth and erosion and maintain clearance. Refer to Section 5.1 levels 1 through 4. Monitor twice a year, prior to fire season and at end of growing season.
Create Fuel Breaks	Southwest boundaries of unincorporated population areas or small communities	Public or Private	Mowing	Protect community and infrastructure by reducing fuel loads	Fall 2008	M	Monitor effects of treatments on species dynamics and species composition, particularly invasion of exotic species. Monitor regrowth and erosion and maintain clearance. Refer to Section 5.1 levels 1 through 4. Monitor twice a year, prior to fire season and at end of growing season.
Create Fuel Breaks	Create 70-foot buffers adjacent to County Roads, particularly on 70, 206, 267,236, 467, 88, and railroads	Public or Private	Mowing	Protect community and infrastructure by reducing fuel loads	Continue ongoing work	H	Monitor effects of treatments on species dynamics and species composition, particularly invasion of exotic species. Monitor regrowth and erosion and maintain clearance. Refer to Section 5.1 levels 1 through 4. Monitor twice a year, prior to fire season and at end of growing season.
Defensible Space Cost-Sharing Programs	All private land within CWPP planning area would be eligible. For priority communities please see Table 4.3	Private	Selective thinning of trees to lower density around homes; crown spacing adjusted for slope; pruning (to about 25% of tree/shrub height); chip and/or remove debris; providing adequate defensible space	Reduce crown fire potential, improve vehicle access, increase tree health/vigor, and give firefighters margin of safety	Spring 2009	H	Conduct on-site inspections with owners; consider photo documentation pre- and post-treatment; apply adaptive management from best available information; determine if Firewise techniques are being applied

Table 5.3. Recommendations for Fuels Reduction Projects for Roosevelt County, continued

Project	Location	Land Ownership or Management	Method	Serves To	Target Date for Beginning Implementation	Priority (H,M,L)	Monitoring
Conduct Defensible Space Assessments	All private land within CWPP planning area would be eligible	Private	Firewise-based assessments of individual homes. The professional assessment would help to identify the most critical actions that an individual could take. Assessments could also include marking of trees suggested for removal	Reduce risk of home ignitions. Empower homeowners to make the most effective actions. Allow funding to address a larger number of homes	Fall 2009	H	Conduct on-site inspections with owners; identify and mark trees for removal within the 100-foot safety zone.
Plan Fuels Reduction in Conjunction with BLM, USFWS, DOD, Bureau of Reclamation (BOR), or State Land Office	Landscape scale	Public	Create partnerships that will enable Roosevelt County to obtain funding opportunities through collaborative fuels reduction planning	Protect community and infrastructure by reducing fuel loads	Summer 2008	M	Site-specific monitoring required.
Mesquite Treatment and Removal (Figure 5.2)	Landscape scale	Public or Private	Mechanical clearance of mesquite and pile burning to remove residual slash. In areas of potential soils erosion, some residual slash should remain on the ground to reduce wind erosion	Protect community and infrastructure by reducing fuel loading	Summer 2008	H	Monitoring for soil erosion. Pre- and post-treatment monitoring needed. Continued monitoring twice a year is needed.
Create Defensible Space around Homes; 200-foot mowed buffer around homes	Create a mowed buffer up to 200 feet around home. Increased buffer is needed in strong wind, 30-foot buffer will not be sufficient in strong winds	Private	Mowing	Protect community and infrastructure by reducing fuel loading	Summer 2008	H	Conduct on-site inspections with owners; consider photo documentation pre- and post-treatment; apply adaptive management from best available information; determine if Firewise techniques are being applied and effective.

Table 5.3. Recommendations for Fuels Reduction Projects for Roosevelt County, continued

Project	Location	Land Ownership or Management	Method	Serves To	Target Date for Beginning Implementation	Priority (H,M,L)	Monitoring
Mow around Perimeter of Property	Perimeter of property	Public and Private	Mow around perimeter of property	Protect community and infrastructure by reducing fuel loading	Summer 2008	H	Monitor for soil erosion. Refer to Section 5.1 to levels 1 and 2. Monitor annually using photo points. Maintenance to retain clearance twice a year.
Create Continuous Fuel Breaks across Landscape	Landscape scale	Public and Private	Mowing	Protect community and infrastructure by empowering local residents in the protection of their local property	Fall 2008	H	Monitor effects of treatments on species dynamics and species composition, particularly invasion of exotic species. Monitor regrowth and erosion and maintain clearance. Refer to Section 5.1 levels 1 through 4. Monitor twice a year, prior to fire season and at end of growing season.
Create Local Fire Task Force where Locals Volunteer to Illustrate How to Implement Treatments on Their Property. Local person is available to guide others.	Landscape scale	Private	Demonstration sites and workshops from local community leaders developing skill sets. Look to the Malpais Borderlands group as an example of a collaborative planning effort led by ranchers	Protect community and infrastructure by reducing fuel loading and providing an area from which firefighters can suppress a fire and escape route	Summer 2008	H	Site-specific monitoring required. Use Section 5.1 levels 1 and 2 to conduct photo points.
Implement Weed Control	Landscape level	Public and Private	Annual shredding of invasive species	Protect community and infrastructure by reducing fuel loading and providing an area from which firefighters can suppress a fire and escape route	Summer 2008	H	Monitor effects of treatments on species dynamics and species composition, particularly invasion of exotic species. Monitor regrowth and erosion and maintain clearance. Refer to Section 5.1 levels 1 through 4. Monitor twice a year, prior to fire season and at end of growing season.

Table 5.3. Recommendations for Fuels Reduction Projects for Roosevelt County, continued

Project	Location	Land Ownership or Management	Method	Serves To	Target Date for Beginning Implementation	Priority (H,M,L)	Monitoring
Monitor for Cheatgrass	Areas invaded by cheatgrass or likely to be invaded	Public or Private	Chemical treatment. Research has shown imazapic to be successful in reducing cheatgrass with fall application after a burn	Protect community and infrastructure by reducing fuel loading.	Fall 2008	H	Monitor for dominance of cheatgrass. Refer to Section 5.1 level 4 for monitoring to determine if species composition has changed.
Implement Pre-planned Fire Breaks	Identify areas on public and private lands that would be appropriate for fire breaks. Select areas where soils are less erodible because all vegetation will be removed, such as caprock	Public or Private	Chisel the soil, cut a swath, and fold over to retain the root structure and prevent soil erosion	Protect community and infrastructure by reducing fuel loading.	Fall 2008	M	Monitor for soil erosion twice a year. Refer to Section 5.1 levels 1 and 2.

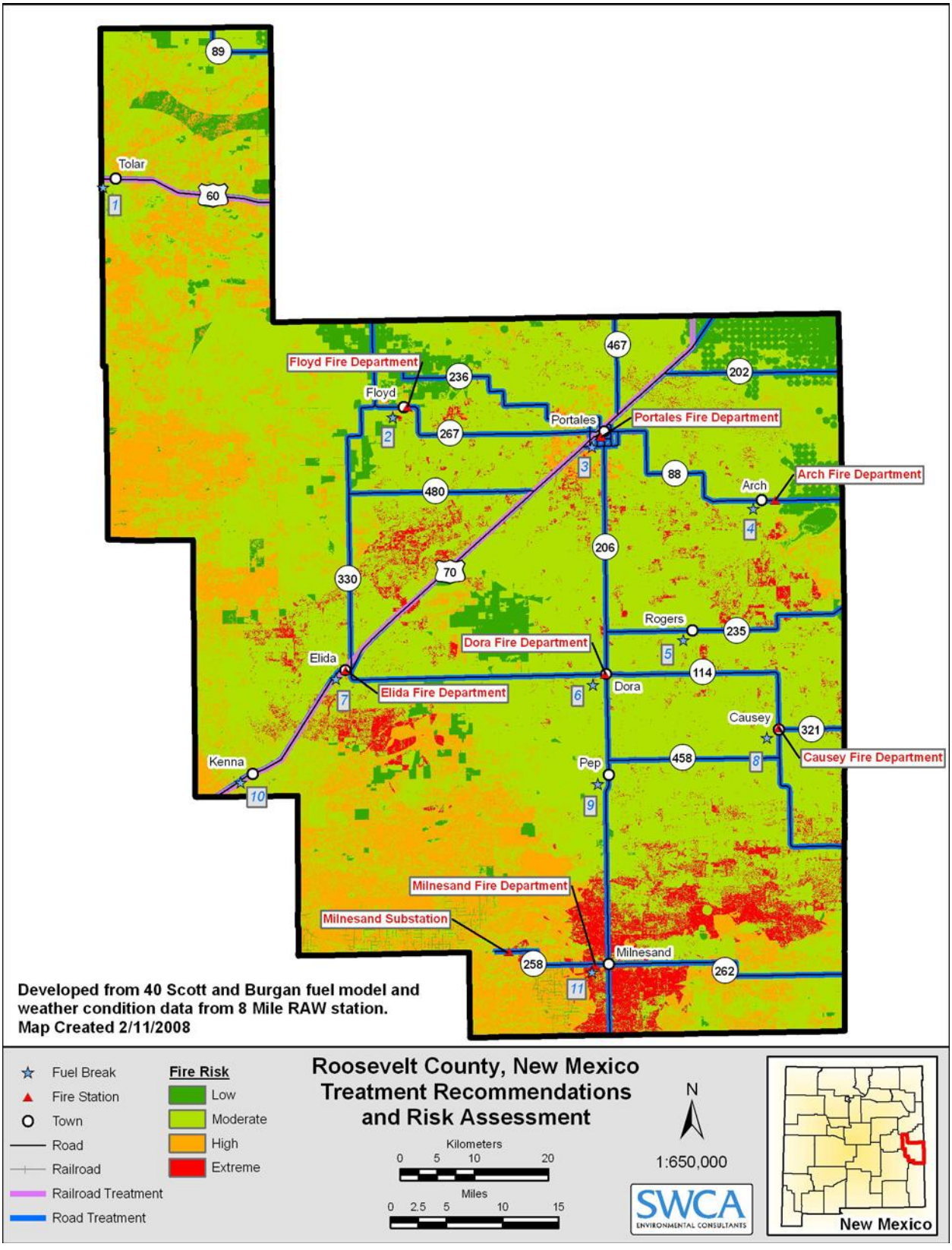

Figure 5.1. Treatment map.

Figure 5.2. Mesquite in Roosevelt County; removal is recommended.

5.4 FUELS REDUCTION TREATMENT METHODS

Strategic timing and placement of mowing and planned fire treatments is critical for effective fuel management and should be prescribed based on the conditions of each particular treatment area. Some examples of this include placing fuel breaks in areas where the fuels are heavier and in the path of prevailing winds and mowing grasses just before they cure and become flammable. Also, burning during the hotter end of the prescription is important because hotter fires are typically more effective at reducing heavy fuels and shrub growth. In areas where the vegetation is sparse and not continuous, fuel treatments may not be necessary to create a defensible area where firefighters can work. In this situation, where the amount of fuel to carry a fire is minimal, it is best to leave the site in its current condition to avoid the introduction of more flammable, exotic species like cheatgrass (*Bromus tectorum*).

5.4.1 MOWING

Mowing should take place at least once every growing season and possibly more, depending on the regrowth of vegetation over the course of the fire season. Areas with cheatgrass and/or other exotic species should be mowed in the early spring and later in the season, depending on the amount of regeneration that takes place throughout the course of the season. Although mowing will not permanently remove stands of cheatgrass, limiting the production of seedheads will help to control the density and spread of cheatgrass over time.

In areas where encroachment of shrubs or trees occurs, more intensive fuels treatments may be necessary to keep the fire on the ground surface and reduce flame lengths. Within the fuel break, shrubs should be removed and trees should be pruned to a height of 4 to 8 feet, depending on the height of the fuel below the canopy and thinned with a spacing of at least two to three times the height of the trees to avoid movement of an active fire into the canopy.

5.4.2 PRESCRIBED BURNING

Prescribed burning is also a useful tool to reduce the threat of extreme fire behavior by removing excessive standing plant material, litter, and woody debris while limiting the encroachment of shrubby vegetation, such as broom snakeweed (*Gutierrezia sarothrae*) and other woody species, into the grasslands. Similar to mowing, prescribed fires should be conducted along roads surrounding the WUI and around the particular areas at risk, but should take place on a larger scale beyond the road and WUI corridors because fire is ecologically beneficial to the grassland community and wildlife habitat. Some areas, particularly along roadsides, may be susceptible to the invasion of exotic species, so this practice should be carried out with management of invasive species in mind. While cheatgrass is not prevalent in the County at the moment, it is important to note that if it does become established, cheatgrass is adapted to fire and will easily regenerate at the site following a fire. Other methods of control will be necessary if a large amount of cheatgrass is present at the site. Prescribed fires within the grassland ecosystem should be implemented when the conditions are dry enough for the fine fuels to carry a fire, but not so dry that the fire containment is difficult.

Using prescribed burns can initiate the regeneration of grasslands and rangelands, as they facilitate natural ecosystem dynamics, such as nutrient and water cycling, which increases variability in vegetation composition and density. Grasslands are threatened by woody encroachment that shades out desirable plant species and uses large amounts of water. Prescribed fire can be used to periodically remove unwanted trees. Fires provide restoration of productivity and diversity of grasslands, while controlling non-native or undesirable plant species and woody invasions (USFWS 2006).

An ecosystem restoration approach in grassland communities is likely to be an effective fuel treatment. Studies have found that depending on the season of burning, fires can either have a positive or a negative effect on shortgrass prairie ecosystems. Overall, they found that dormant-season fires were the most effective at reducing the build-up of fine fuels, increasing productivity of native grasses, and inhibiting the encroachment of woody vegetation, such as broom snakeweed (*Gutierrezia sartothrae*) (Brockway et al. 2002; Ford and Johnson 2006; McDaniel et al. 1997).

Following any type of fuels reduction treatments, post-treatment monitoring should continue to ensure that management actions continue to be effective throughout the fire season. Vegetation in a grassland community can change rapidly in response to drought or moisture from year to year and during the course of the season, so fuels treatments should be adjusted accordingly.

5.5 RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Public education and outreach is a major focus of the CWPP planning process. Table 5.4 provides a list of recommendations for Roosevelt County. These recommendations are valuable because Core Team representatives and members of the public expressed the need for greater education regarding wildfire in all communities throughout the planning area.

Although many residents are familiar with Firewise, a program that encourages and acknowledges communities that take preventative actions to protect themselves from wildfire, many others could benefit from greater exposure to this program. Workshops demonstrating and explaining Firewise principles provide homeowners with a greater awareness and understanding of home protection from wildfire. NMSF administers a program to recognize Firewise communities within the state. Information about the program is available at http://www.firewise.org/usa/index.htm. Greater participation in the Firewise Communities USA program could improve local understanding of wildfire and in turn improve protection and preparedness.

Other methods to improve public education could include providing signs indicating fire danger level (low, moderate, high, extreme) to be displayed in highly visible areas where they do not already exist, improving awareness about fire department response and fire department resource needs, providing fire evacuation plans, providing workshops at demonstration sites showing Firewise landscaping techniques or fuels treatment projects, organizing community clean-ups, publicizing availability of government funds for thinning, and, most importantly, improving communication between homeowners and local land management agencies to improve and build trust. The degree of implementation of these public education and outreach recommendations is contingent upon available funding.

Table 5.4. Public Education and Outreach Recommendations for Roosevelt County

Project	Description	Presented By	Suggested Target Date	Resources Needed	Serves To
Raise Awareness about Defensible Space	Provide educational materials and workshops to raise awareness.	VFDs, Roosevelt County, Schools	Annually	Firewise literature about defensible space, homeowners guide	Protect communities and infrastructure.
Defensible Space Cost-Sharing Programs	Selective thinning of trees to lower density around homes; crown spacing adjusted for slope; pruning (to about 25% of tree/shrub height); chip and/or remove debris; provide adequate defensible space.	Soil and Water Conservation District	Annually	Defensible space education, site assessment with professionals to determine mitigation plan for the site	Protect communities and infrastructure.
VFD Open Invitation Days	Raise fire department awareness through open house and tours of equipment.	VFDs	Annually	Advertising, refreshments, handouts	Protect communities and infrastructure through potentially increased recruitment and financial support for the fire service.
Coordinate between VFDs and Local Ranchers	Community members that have available equipment and skills could be made known so VFDs know what equipment is available on each privately owned parcel of land.	VFDs, FSA	Annually	FSA members lists, contact information, meeting place	Protect communities and infrastructure through increasing available resources and reducing response times.
Media Involvement	Develop a network of local contacts for the local newspaper to work with to write a column that provides fire safety information, promotional information for VFDs, fire announcements, and emergency planning.	Portales News-Tribune	Weekly column year-round	Columnists; information and articles to be provided by VFDs, NMSF, BLM, State Land Office, FSA, NRCS, County, and others	Protect communities and infrastructure through increasing public awareness and providing a channel for information regarding emergency fire response.
Media Involvement	Include a fire risk blurb with the daily weather.	Portales News-Tribune	Daily blurb	Reliable source of information on fire risk that journalists can easily access	Protect communities and infrastructure through increasing public awareness and providing a channel for information regarding emergency fire response.
Involvement of Railroad in Fire and Emergency Planning	Increase coordination with railroad representatives to increase awareness of the ignition potential of the railroad and improving fire mitigation in the railroad corridor.	Burlington Northern Santa Fe Railroad (BNSF), County, state and federal agencies	Summer 2009	Meeting venues, coordination, and facilitation	Protect communities and infrastructure through uniting land managers in a plan to limit ignition potential and risks posed by the BNSF railroad.
Increase Signage	Increase and maintain fire prevention signage along highways to reduce human ignitions. Keep awareness high by coordinating with the media. The public needs to know level of fire risk.	New Mexico Department of Transportation	Summer 2009	Signs, posts, people to post signs	Protect communities and infrastructure by raising awareness of local citizens and those traveling in the County about actions that can prevent fire.

Table 5.4. Public Education and Outreach Recommendations for Roosevelt County, continued

Project	Description	Presented By	Suggested Target Date	Resources Needed	Serves To
Increase the Use of Prescribed Burning as a Fuels Reduction Method	Gain support for using prescribed burns to reduce fuel loads and to improve ecosystem health.	BLM, other applicable agencies, private landowners	Summer 2009	Prescribed burn prescription, type 6 engines, handcrews, equipment	Protect communities and infrastructure by reducing fuel loads.
Increase Landowner Awareness of Methodology to Reduce Invasive Species	Raise awareness about the removal of lovegrass, mesquite, snakewood, shinnery, and other common invasives. Encourage sharing of success stories and demonstration sites on local landowners' properties. Look to Malpais Borderland Group as an example.	BLM, range scientists, private landowners, Malpais Borderlands Group	Ongoing	Informational handouts, workshop	Protect communities and infrastructure by reducing fuel loads.
Distribution of Homeowner Guide to Communities	Provide homeowners with guide through mail or at events where people can pick up.	VFDs, County	Summer 2009	Homeowner guide	Protect communities and infrastructure through increasing public awareness and providing a channel for information for homeowners.
Increase the Number of Firefighters Involved in VFDs	Increase awareness and recruitment to VFDs through greater recruiting efforts at public events, in schools, and by community planning.	VFDs, County, schools	Summer 2009	Information about VFD and requirements for becoming a volunteer	Protect communities and infrastructure through increased number of able volunteers.
Improved Understanding of Grass Fire Risk	Providing education and information about the risks associated with grass fires. Dispelling misunderstanding that wildland fires affect only communities surrounded by timber.	VFDs, Fire Specialists, NRCS, BLM, private landowners	Summer 2009	Information about the risks associated with grassland fires and examples of communities affected by grassland fires	Protect communities and infrastructure through increased awareness.
Plan Evacuation Routes and Inform Communities	Work with Emergency Management officials to plan evacuation routes and then inform the public about the routes.	Emergency Management officials	Fall 2009	GIS software or maps	Protect communities and infrastructure through increased awareness.
Implement Firewise USA Programs	Work with communities to participate in Firewise USA and prepare for fire events.	NMSF	Fall 2009	Firewise educational materials	Protect communities and infrastructure through increased awareness and defensible space.
Community Clean-up Days	Promote community activity to remove litter and debris and provide service for removal.	County, city, towns	Summer 2009	Tools, service to remove waste, volunteers	Protect communities and infrastructure through fuels reduction and defensible space.
Educate Students from Kindergarten through 12th Grade	Increase awareness about fire preparedness through school age appropriate educational programs.	Schools	Fall 2009	Educational Curriculum	Protect communities and infrastructure through increased awareness.

Table 5.4. Public Education and Outreach Recommendations for Roosevelt County, continued

Project	Description	Presented By	Suggested Target Date	Resources Needed	Serves To
Make Property Owners Aware of the Need for Them to Take Responsibility for Their Own Property	Increase awareness of homeowner's ability to prepare for fire and the limitations of the fire departments.	VFDs, County, state and federal agencies	Summer 2009	Educational materials, public meetings, and site visits	Protect communities and infrastructure through increased awareness.
Improved Communication among VFDs and Dispatchers when Responding to Fires	Improve communication and provide training to dispatchers. Improve response and suppression in the WUI.	VFDs	Summer 2009		Protect communities and infrastructure through improved communication and response.
Information on Actions to Take in the Event of Fire	Provide information about who to contact and phone numbers, safety zones that people can evacuate to, evacuation routes, and how to help Fire Departments.	Emergency management officials, municipal governments, VFDs	Summer 2009	Contact list, evacuation routes, and locations of safety zones	Protect communities and infrastructure through increased awareness.
Plan for People who are in Need of Assistance	Pre-planning for those who will need assistance in the event of a fire will decrease the risk of someone getting hurt.	Emergency Management officials, municipal governments, VFDs, neighbors	Summer 2009	Contact list of those who need assistance provided to VFDs	Protect communities and infrastructure through increased awareness and planning.
Provide Education and Disincentives about Burning Trash	Raise awareness and work to prevent people from burning trash. Institute permit system to burn trash.	VFDs, municipal governments, County	Summer 2009	Educational information, permitting system	Protect communities and infrastructure through increased awareness and planning.

5.6 RECOMMENDATIONS TO REDUCE STRUCTURAL IGNITABILITY

Table 5.5 provides a list of recommendations for reducing structural ignitability in Roosevelt County. Reducing structural ignitability depends on public education that provides homeowners the information they need to take responsibility for protecting their property. Preparing for wildland fire by creating defensible space around the home is an effective strategy for reducing structural ignitability. Education about managing the landscape around a structure, such as removing weeds and debris within a 30-foot radius and keeping the roof and gutters of a home clean is one way for creating awareness about methods for creating defensible space. Raising awareness among community members about the benefits of cutting grass and trees on their property is also essential for successful household protection. Shared information and communication among neighbors strengthens a community's ability to reduce the likelihood of structural ignitability. An increased network of people prepared for fire helps increase safety. More detailed information is provided in Appendix E (Homeowner's Guide).

While individual actions are necessary to reduce structural ignitability, actions taken on the county level are another important consideration. The International Code Council (ICC) published the International WUI Code, which provides minimum regulations for land use and the built environment in the designated WUI areas. The standards for the codes are based on data collected from tests and incidents, technical reports, and mitigation strategies from various countries around the world. These codes address the mitigation of fire in the WUI (ICC 2006). At this time, the Core Team does not recommend that the Roosevelt County adopts the ICC WUI codes. The primary reason for not recommending adoption of the ICC codes is due to a lack of resources to provide enforcement of the codes. Presently, the County relies on the state to enforce codes, and does not have the resources to enforce codes at the County level.

The County does have burn ordinances. The County's burn ordinances are subject to change and community members should check with the local office to learn what policy is most current.

Table 5.5. Recommendations to Reduce Structural Ignitability in Roosevelt County

Location	Project	Goals and Objectives	Priority	Potential Agencies and Groups to Carry Out Education
Fire departments throughout the planning area should provide information to or organize workshops for homeowners to teach them techniques to reduce structural ignitability. The following recommendations should be followed by homeowners (*Source: Firewise, USFWS, NMSF*):				
Roosevelt County	Defensible space	Educate homeowners on defensible space practices: 1. Remove all but scattered trees within 30 feet of structures. 2. Keep grass green and mowed 100 feet from structures. 3. Keep flammable materials (woodpiles, etc.) at least 30 feet from structures. 4. Surround foundations with rocks or gravel, to a width of 1 foot.	High	Homeowners, NMSF, fire departments
Roosevelt County	Accessibility	Inform homeowners about the importance of keeping driveways clear and accessible for fire trucks.	High	Fire departments, NMSF
Roosevelt County	Green waste	Inform homeowners about the importance of cleaning up green waste and clearing debris from around structures, in gutters, and under decks.	High	Fire Departments, NMSF
Roosevelt County	Install screens	Inform homeowners about the importance of installing metal screens on all openings and around deck to prevent embers entering/collecting.	High	Fire departments
Roosevelt County	Replace roofs with fire resistant materials	It may be costly, but replacement of old roof construction to roofing made of inflammable material can lower ignitability.	Low	Fire departments
Roosevelt County	Propane tanks	Inform homeowners about the importance of relocating propane tanks underground or removing surrounding flammable materials to distance of 10 feet.	Moderate	Fire departments
Roosevelt County	Windows	Inform homeowners about the importance of replacing single-pane glass and plastic skylights with tempered double-pane glass.	Low	Fire departments

5.7 RECOMMENDATIONS FOR IMPROVED FIRE RESPONSE CAPABILITIES

VFDs are the primary source of assistance for fire protection and response in Roosevelt County. Community involvement, along with financial support, is imperative to maintain operations in the fire departments. Securing adequate water supply, continued training, and equipment maintenance are among some of the foremost concerns for improving fire response capabilities. Table 5.6 provides recommendations that will help improve fire response capabilities in VFDs in Roosevelt County.

Table 5.6. Recommendations for Improved Fire Response Capabilities

Project	Fire Department	Possible Solution	Target Date	Contact
Provide Adequate Water Supplies at Fire Stations	All VFDs	Obtain funding to improve water supply systems at fire stations	Summer 2009. This is an on-going process.	VFDs and Roosevelt County
Increase Water Sources and Water Delivery Systems, such as wells and storage tanks	All VFDs	Obtain funding to purchase equipment	Summer 2009. This is an on-going process.	VFDs and Roosevelt County
Improve Road Accessibility on County roads	All VFDs	Obtain funding for road improvements	Fall 2009. This is an on-going process	Roosevelt County
Provide Maps with Accurate Information about Road Access and Water Supply	All VFDs	County GIS may be able to provide	Fall 2009. This is an on-going process	Roosevelt County
Purchase Improved Equipment	All VFDs	Obtain funding to purchase equipment or make trade agreement with other fire stations	Fall 2009. This is an on-going process.	Funding Agencies
Provide Funding and Training for VFD to obtain Red Cards and Crosswalk Trainings and Sign Joint Powers Agreements (JPA)	All VFDs	Obtain funding for training. Organize training in Roosevelt County so more people can participate. Contact Funding Agencies and NMSF regarding JPA and other funding opportunities	Summer 2008. This is an on-going process.	Funding Agencies and NMSF
Develop Countywide Plan to Determine where Water is Needed	All VFDs	Obtain funding to develop plan that involves mapping and determining where water supplies exist and where they are needed	Summer 2009	Roosevelt County

5.8 IDENTIFY TIMELINE AND PROCESS FOR UPDATING THE CWPP

The CWPP is a living document and should be revised as environmental conditions change or social issues arise. As the needs of communities and community members shift or as environmental conditions change, the CWPP will need to be modified. The Core Team has decided that every two years they should reconvene to update the plan, particularly to review the recommendations and make changes to reflect which projects have been accomplished, as well as list new projects. Representatives from local fire departments who participated in the Core Team work together closely, which should enable them to communicate with each other and other members of the Core Team to reconvene to update the CWPP.

5.9 CONCLUSION

This document is designed to aid the communities and individuals of Roosevelt County in wildfire protection planning. Roosevelt County's CWPP describes the conditions in the fire environment, along with the community structure, and addresses the risks of wildland fire to communities in the County. The risks and hazards have been clarified through public involvement, collaborative planning, Core Team participation, and GIS data and modeling. Once the risks and hazards were identified, the planning process turned to finding solutions to reduce the risk of wildland fire. Recommendations falling into the categories of fuels reduction, public outreach and education, reducing structural ignitability, and improving fire response capabilities were outlined and will potentially be implemented. The CWPP alone does not require implementation of any of the recommendations; however, the support and momentum driving the planning process will hopefully lead to active implementation. Securing funding will aid in the completion of many of the project goals. However, many of the recommendations for public outreach and education can be accomplished with little or no funding. Community planning and grass roots organizing has proven to be very effective in terms of reducing the risk of life and property in many Firewise communities throughout the country. Some of these communities offer positive examples of how rural communities can prepare for wildland fire.

The development of this CWPP has required multi-party collaboration across a region almost 2,500 square miles in size. The Core Team meetings were attended by a wide cross section of people, which enabled team members to consider various suggestions, concerns, and recommendations. With the limits of government support for fire suppression, environmental conditions that lead to fuels being highly prone to ignition, the increasing WUI, and unpredictable events in nature, it is important for individuals and communities to take actions to prepare for wildland fire events. This document provides tools and information that should be widely shared with community members throughout the County and practiced in an effort to protect community values, landscapes, and land-based heritage.

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APPENDIX A
CONTACT LIST

Roosevelt County Contacts			
Agency or Organization	**Name**	**Position**	**Office Phone**
Local Agencies & Municipal Governments			
Roosevelt County	Charlene Hardin	County Manager	505-356-5307
Roosevelt County Chairman of Fire and EMS Association	John Mohon	Chairman of Fire and EMS Association	505-760-9120
Portales Emergency Management	Keith Wattenbarger	Coordinator	505-356-4404
Arch Fire Department (Fire Chief)	Hugh Frank	Fire Chief	505-356-2610
Causey Fire Department	Mike Clark	Fire Chief	505-273-4249
Dora Fire Department	Paul Luscombe	Fire Chief	505-356-0586
Elida Fire Department	Adam Anthony	Fire Chief	505-274-6408
Floyd Fire Department	Leland Terry	Fire Chief	505-760-9017
Floyd Fire Department	Josh Corbin		505-749-3534
Milnesand Fire Department	John Mohon	Fire Chief	505-675-2411
Portales Fire Department	John Bridges	Portales Fire Chief	505-356-4406
Portales Fire Department	Mickey Hargroup		505-356-4406
CMSgt	Ivan Godwin	Chief, Fire Emergency services	505 784 2578
27 FW Wildland Fire Manager	Richard Chandler	Cannon AFB	505 784 6035
Local Governments Roosevelt County Law Enforcement	Darren Hooker	Roosevelt County Sheriff	505-356-4405
Local Governments Portales City Law Enforcement	Jeff Gill	Portales Police Chief	505-356-4404
Local Governments Portales City Law Enforcement	Lonnie Berry	Portales Police Captian	505-356-4404
Local Governments Portales City Manager	Debi Lee	Portales City Manager	
City of Elida	Kay Nuckols	Mayor	505-274-6461
Milk Transportation Services		1705 S. Industrial Dr, Portales, NM 88130	505-359-3500
Oil and Gas Roswell Field Office (FEDERAL)	J.R Hogwood	Oil field inspector	505-627-0272
Oil and Gas Hobbs OCD	Ricky Smith	Clovis Railroad	
Federal Agencies			
BLM Roswell Field Office	Chuck Schmidt	Roswell BLM Fire Management Officer	505-627-0310
BLM	Donna Hummel	BLM	
BLM	Jeff McCarthy	BLM	
BLM	Jill Pickren	BLM	
Department of Defense (Cannon AFB)	Rich Givney	Cannon Deputy Fire Chief	505-784-2578
Grulla National Wildlife Refuge	Harold Beierman	GNWR manager	806-946-3341
U.S. Fish and Wildlife Service, Grulla	Jude Smith		806-674-6369
Bombing Range	Rick Crow		784-6383
NM Game and Fish	Brian Guzman	Officer	

State Agencies			
Roosevelt Soil and Water Conservation (NRCS)	Joe Whitehead	District Conservationist	505-356-6629
Roosevelt Soil and Water Conservation (NRCS)	Scotty Savage	Area Resource Conservationist	505-763-7412
State - USDA - NRCS	Barbara Garrett	Public Affairs Specialist	505-761-4406
NRCS	Curtis Scott		
NRCS	Douglas Walker		505-356-4465
EMNRD Forestry Division, Capitan District	Bill Rogge	Capitan District	505-354-2231
EMNRD State Parks Division, Oasis State Park			
Department of Public Safety	Steve Mulkey	NMSP	505-762-1305
State Land Office	Erik Nelson	SLO rep from Clovis	
State Forestry, Capitan District	Eddie Tudor	District Forester	
State Forestry, Santa Fe	Tony Delfin	State Deputy Forester Santa Fe	505-476-3340
State Forestry, Albuquerque	Terrell Treat	State Forestry	505-345-2200

APPENDIX B
PUBLIC COMMENTS

ROOSEVELT COUNTY WILDFIRE QUESTIONNAIRE	
Responses to Community Comment Form	
Question	**Response**
What areas (man-made and/or natural) are the most important to protect from wildfire?	Both.
	Grass it is used in Roosevelt Co. primarily for grazing and is many peoples source of income.
	Resources needed to maintain human life.
	Man-made.
	Town centers. Private homes.
	Village property (homes, schools, churches). Homes in area. Industry.
	Towns & power sources, water wells, homes.
	Village and village well site.
	Community & private infrastructure.
What areas (man-made and/or natural) are the most at risk in the event of wildfire?	Natural.
	Grass.
	CRP
	Man-made but all burn.
	Same as above.
	Homes.
	Water wells and village.
	Areas bordered by CRP (high fuel areas).
What information would you like to have to be more prepared for fire in the community?	Advanced notice so livestock and family can be moved to a safe place.
	Evacuation plans and destinations.
	Keep clean around your property.
	Water sources available. Access to private lands.
	Additional resources.
	Education / defensible measures.
What actions could the community take to protect homes and the community in the event of wildfire?	Planning in advance for prevention and fighting wildfires.
	Fire breaks and not the ones your daddy made.
	More fire awareness.
	Fire breaks (defensible spaces) through education? Possibly funding to help create these fire breaks.
	Protection plan of village limits where shred cropland.
	Preventative burning, shredding, fire guards.
	Community is so small that most able bodied people are already actively involved in the suppression thru the fire dept.
	Education, fuel reduction.
What would you like fire emergency service agencies and personnel to know about protecting your community from wildfire?	Safe two track roads and entry route.
	We want it protected.
	??
Other questions and Comments:	I feel uninformed and don't know much about risk, prevention, and safety measures.
	Our community does an excellent job of protecting our property and wildlife in Roosevelt Co as evidenced by the Floyd fire last year.

APPENDIX C
FIREFIGHTING RESOURCES

APPARATUS	DESCRIPTION
VILLAGE OF DORA FIRE DEPARTMENT – 26 Members (7 EMT-Basic, 5 EMT-I, 1 EMT-P)	
Truck 1	Class A, E1 Pumper - 1000 gallons
Truck 2	Pump & Roll Pumper - 1000 gallons
Truck 3	Pump & Roll Grass Unit Pumper - 2000 gallons
Truck 4	Mini-pumper Rescue Unit 4X 300 gallons
Truck 5	Pump & Roll Tanker 6X 3500 gallons
Truck 6	Pump & Roll Tanker Eng/8X 4000 gallons
Truck 8	Support SUV/Suburban
Rescue 1	Rescue Pumper 500 gallons
Air Truck	Mobile Air Unit
ILS Ambulance	Vehicle No. 2342 Ambulance
ILS Ambulance	Vehicle No. 2340 Ambulance
CAUSEY FIRE DEPARMENT- 16 Members (3 EMT- Basic, 3 EMT-I)	
Unit 1	1959 E2 – 500 gallons
Unit 2	1970 Ford Type III – 800 gallons
Unit 3	1990 GMC Rescue/Pumper – 1000 gallons
Unit 4	1953 Brush Truck – 1200 gallons
Unit 5	1982 Mack Pumper/Tanker – 4000 gallons
Unit 6	2002 Peterbilt Pumper/Tanker – 4000 gallons
Unit 7	1980 GMC Pumper/Tanker – 1000 gallons
Unit 8	1978 Crown Engine – 1000 gallons
Unit 9	1984 Brush Truck – 1000 gallons
2775	1995 Ford Type III Ambulance
2670	1991 Ford Type III Ambulance
Truck	1999 Yukon

APPARATUS	DESCRIPTION
PORTALES FIRE DEPARTMENT – 23 People (9 EMT-I, 11 EMT-P)	
Unit 700	2002 Ford F-150 Pickup
Unit 701	2006 Ford F-250 Pickup
Unit 702	2003 Chevrolet 250 pickup
Unit 706	2004 Chevy Suburban
Unit 711	1995 International Fire Truck – 1000 gallons
Unit 712	2005 Freightliner tanker – 2000 gallons
Unit 713	2006 Ford F-250 Pickup Brush Truck – 250 gallons
Unit 714	2003 Fire Truck – 750 gallons
Unit 715	1993 Ford F-250 Pickup Brush Truck – 275 gallons
Unit 716	1988 LTI Fire Aerial Ladder Truck – 150 gallons
Unit 720	1978 Fire Truck – 500 gallons
760	2001 Max E Air Cascade Trailer
Unit 761	2006 Scotty Fire Safe House
Unit 762	2004 Wells Cargo Hazmat Trailer
Unit 763	2006 Ranger Polaris
Unit 764	2006 Cargo Mate MCI Trailer
Unit 765	2006 Brown Cargo Van Trailer
Unit 801	2001 Ford F-350 Ambulance
Unit 803	1994 Ford F-350 Ambulance
Unit 804	2000 Ford F-350 Ambulance
Unit 805	2005 Ford F-350 Ambulance
MILNESAND FIRE DEPARTMENT- 17 members (4 EMT Basic, 2 EMT IV)	
Milnesand 1	200 GPM / 300 gal Mini Rescue / Grass
Milnesand 2	200 GPM / 300 gal CAFS Unit
Milnesand 3	1000 GPM / 3000 gal Structure/Engine Class A – W/Foam Unit
Milnesand 4	250 GPM / 1500 gal 6X6 Grass/Tanker
Milnesand 5	165 GPM / 300 gal 4X4 Grass/Engine
Milnesand 6	250 GPM / 4000 gal 6X6 Grass/Tanker/Engine
Milnesand 7	No pump yet 6X6 Tender (3500 gal Porta-tank)
Milnesand 8	165 GPM /4000 gal 6X6 Grass/Tanker/Engine
Milnesand 9	1250 GPM / 1200 gal Structure/Engine Class A – W/Foam Unit
Milnesand 10	165 GPM / 1200 gal 6X6 Grass Engine
Milnesand 3290	EMT-BLS / ILS EMS Type 3
Milnesand 3291	EMT-BLS / ILS Type 1 EMS

APPARATUS	DESCRIPTION
ELIDA FIRE DEPARTMENT- 28 Members (8 EMT Basics and 1 EMT-1)	
Unit 1	1989 Ford F-250 4x4 Mini Pumper - 300 gallons
Unit 2	1993 International 4x4 Class A Pumper -1000 gallons
Unit 3	1994 Western Starr semi-tanker - 5000 gallons
Unit 4	1982 Ford Tanker – 2000 gallons
Unit 5	1988 Ford F-250 4x4 Mini-pumper – 300 gallons
Unit 6	2000 Ford F-350 4x4 Mini-pumper – 325 gallons
Unit 7	2002 International 4x4 Class A Pumper – 1000 gallons
2343	Ambulance - IV Defibrilator
2347	Ambulance- IV Defibrilator
ARCH- 22 Members (11 fire and 11 fire and EMS)	
Arch 1	Engine – 1000 gallons
Arch 2	Pump & Roll 4x4 Grass Truck- 500 gallons
Arch 3	Engine and Pump & Roll Grass Truck – 750 gallons
Arch 4	Engine and Pump & Roll Grass Truck – 750 gallons
Arch 5	Tanker
Arch 6	Pump & Roll Grass Truck – 250 gallons

Interagency Emergency Operations in Wildland Fire with NM State Forestry Division Planning Projects and Incident Management

In the County, the fire planning responses are specific to each incident. However, some general procedures are outlined below. The following information is summarized from a document entitled: "Interagency Emergency Operations in Wildland Fire with NM State Forestry Division: Planning Projects and Incident Management." This unpublished document was developed by Dave Bervin of New Mexico State Forestry to provide guidelines for emergency responders.

Three factors are always present in any emergency incident and all jurisdictions responding to a fire in the CWPP planning area follow these three basic parameters:

- Life Safety
- Incident Stabilization
- Resource Protection

Emergency management and emergency management planning have a number tiers. A Geographic Area Operations Plan is the overarching document that defines roles and responsibilities for the responders to an incident by jurisdiction and activity. The three levels to this plan are:

- State Federal Geographic Area Operations Plan
- A local area operations plan
- Mutual aid plans

General Incident Operations

The following outlines the general set of procedures for wildland fire response:

1. Local resources (e.g., municipal, county, or VFD) are often the first to be called and dispatched when a fire is reported. The dispatch office with jurisdictional authority will activate the initial attack.
2. The initial attack Incident Command (IC) assesses the size of the fire to determine the need for additional resources.
3. An IC post is established and staging areas set up.
4. Dispatched resources from all jurisdictions check in at the staging area.
5. If the IC level changes (higher or lower), a briefing occurs to inform a change of status or tactic.

For initial attack responders:

- No notification to New Mexico State Forestry Division (NMSF) is necessary for fires controlled at initial attack with municipal resources.
- For initial attack on fires in a county response area, notification to NMSF is necessary.

- For initial attack response by federal agency responders or Bureau of Indian Affairs (BIA), notification must be made to the Geographic Area Interagency Dispatch (GAID).
- For federal jurisdiction fires, notification must be made to NMSF who will contact the GAID to confirm resource needs and act as liaison.

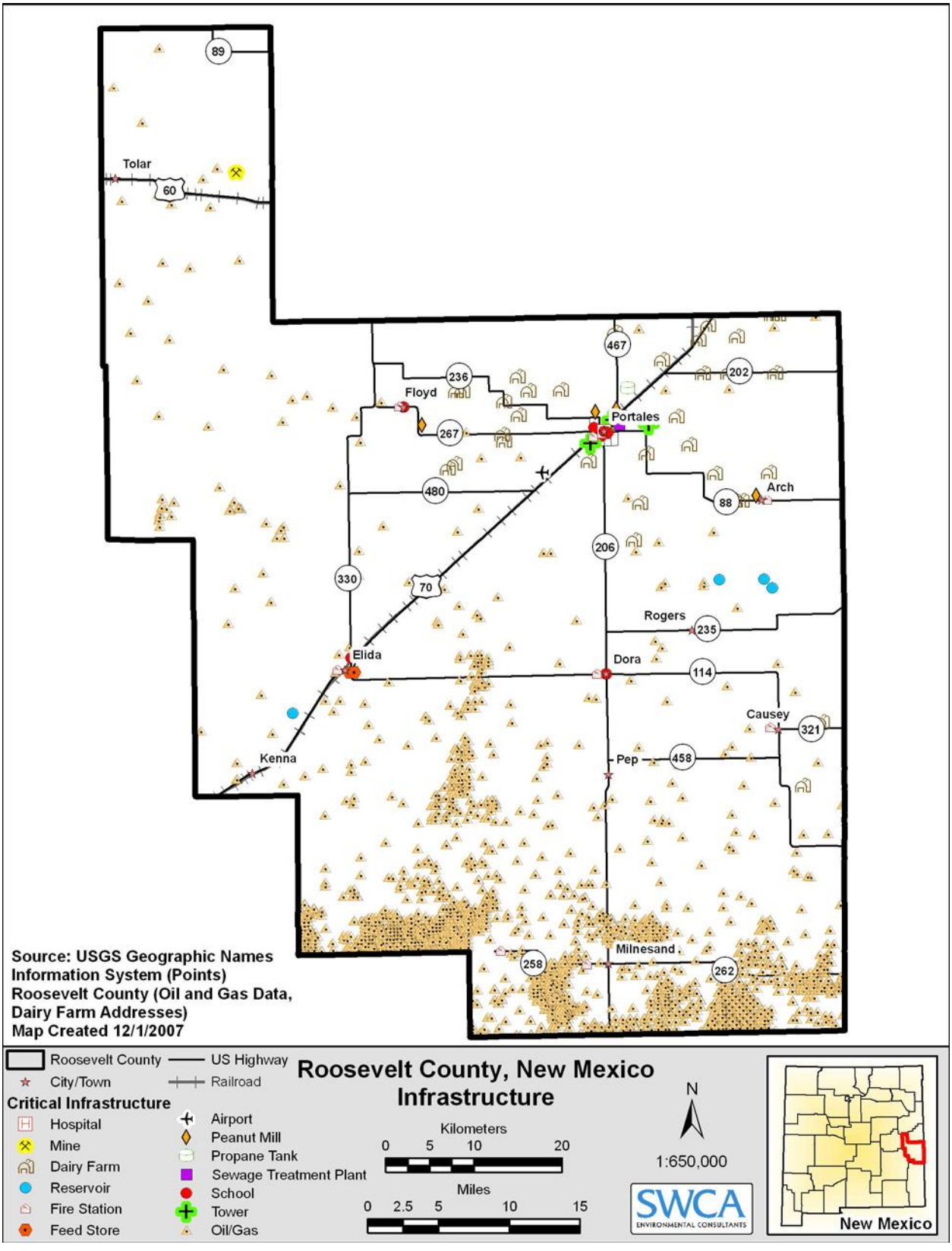
For fires that activate Mutual Aid Agreements (e.g., spread potential, red flag warnings, values at risk):

- Municipal fire departments must notify NMSF if they respond.
- All requests for additional resources must be made through NMSF.
- For federal jurisdictions, NMSF will respond to all resource requests.
- For additional requests from federal jurisdictions, all additional requests must pass through GAID.

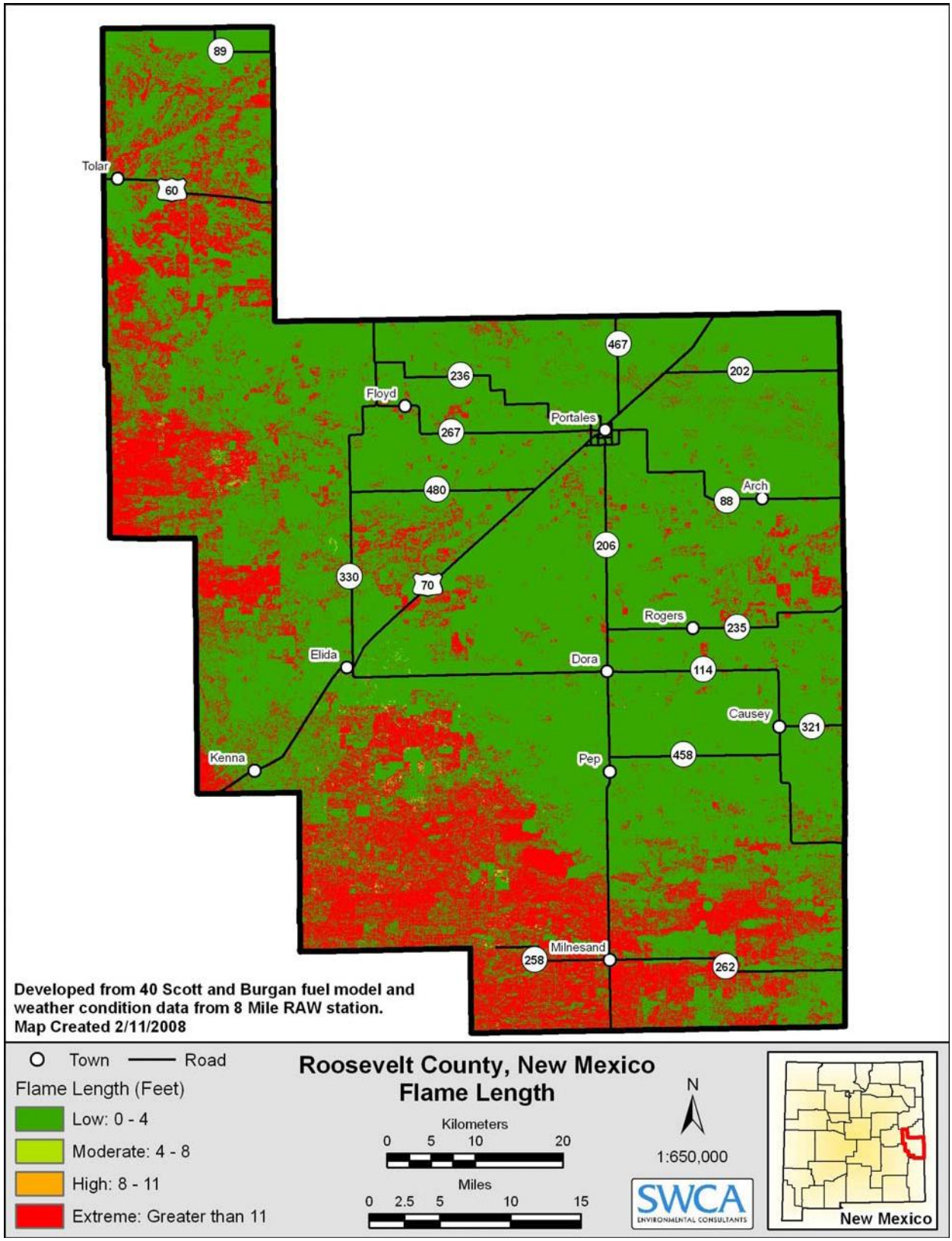
If the fire goes to extended attack, additional operation procedures are implemented:

- Dispatch responsibilities are transferred to GAID.
- Requests activation of Type 3 Team.
- Establish IC post and unified command.
- Identify and establish a large staging area.
- Request activation of New Mexico resource mobilization plan.
- Request implementation of Emergency Preparedness Network.
- Notify Red Cross to set up rehabilitation units.
- Begin collecting information for complexity analysis and wildland situation analysis.
- Notify office of Emergency Management to activate EOCs.
- Notify NMSF
    - Type 3 Management Team
    - NM resources mobilization plan
    - Air Attack Operations

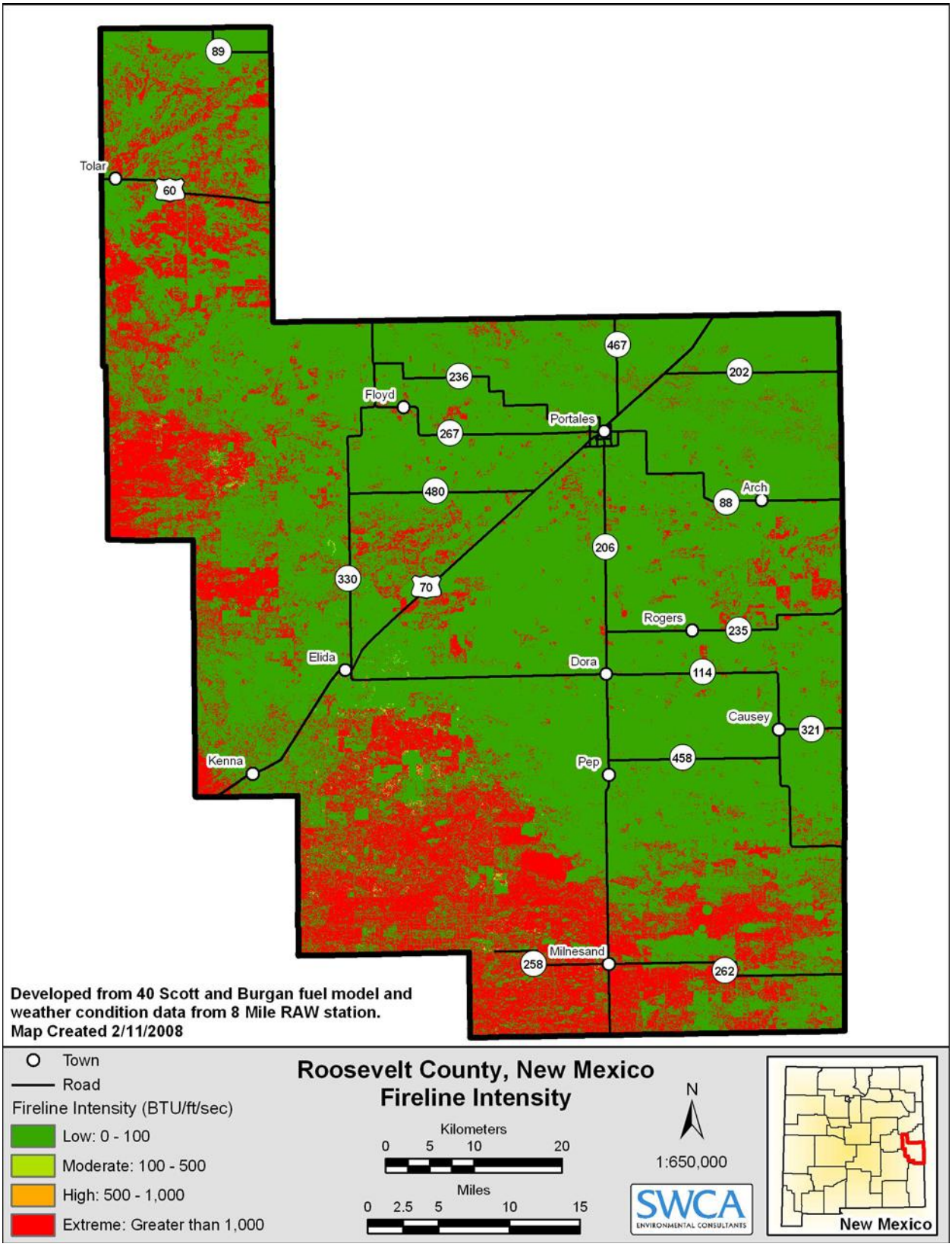
APPENDIX D
MAPS



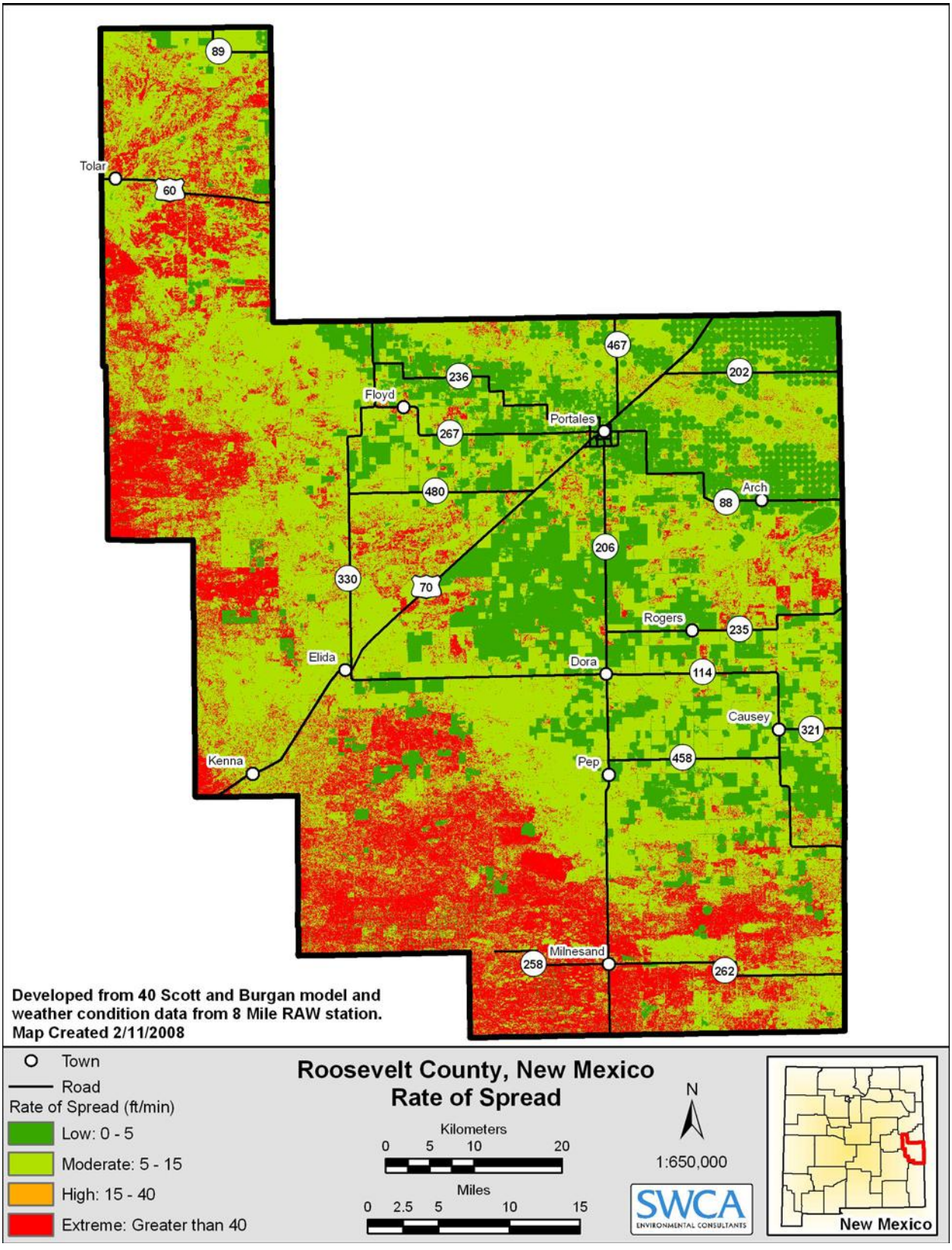
Map 1. Infrastructure in Roosevelt County.



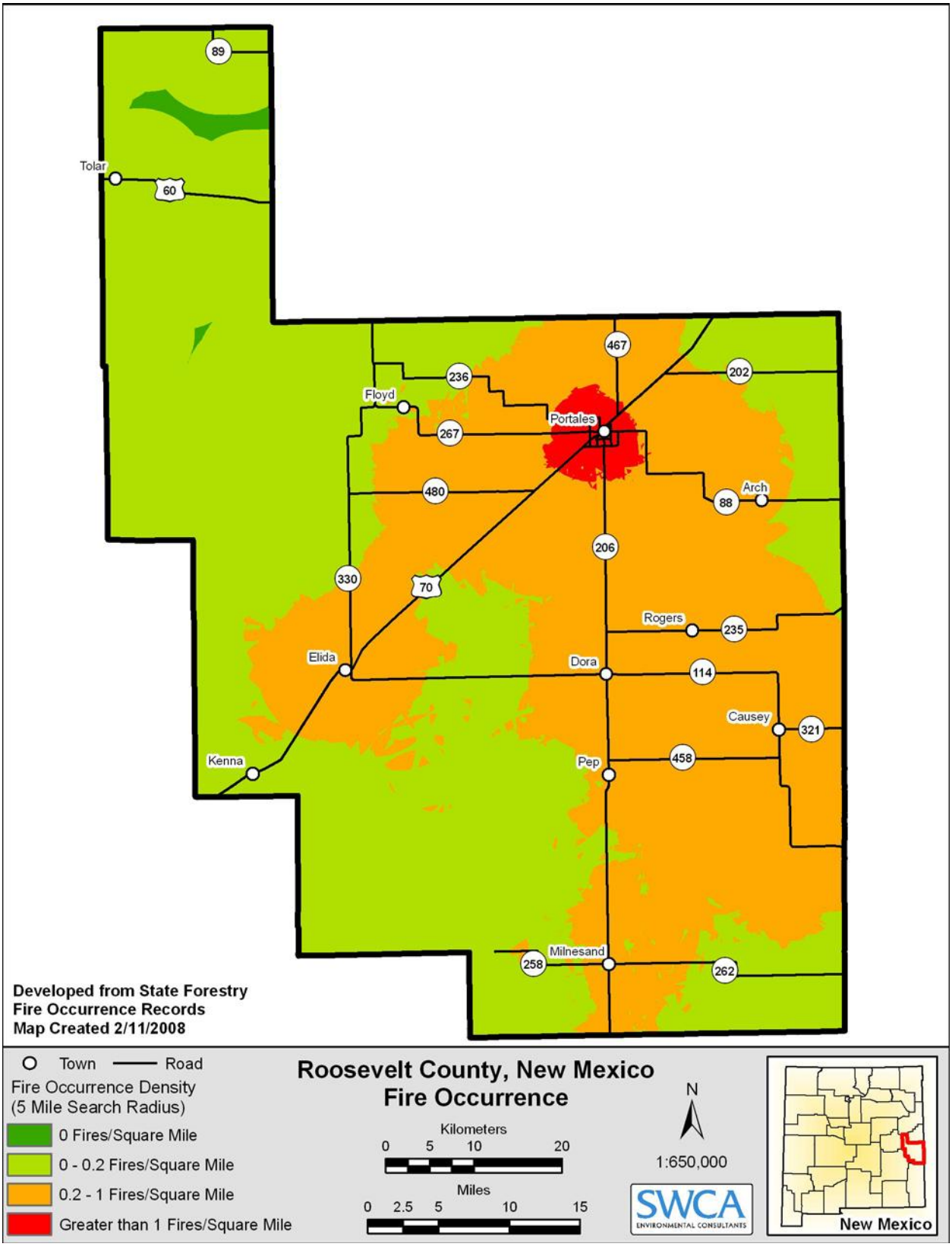
Map 2. Flame length.



Map 3. Fireline intensity.



Map 4. Rate of spread.



Map 5. Fire occurrence.

APPENDIX E
HOMEOWNER'S GUIDE

This guide has been developed to address site-specific information on wildfire for Roosevelt County. In public meetings and written comments, residents expressed a need for better information on reducing wildfire risk and what to do in the event of a wildfire. This document was developed to meet these expressed community needs, as well as to fulfill requirements for the Community Wildfire Protection Plan. This guide (1) suggests specific measures that can be taken by homeowners to reduce structure ignitability and (2) enhances overall preparedness in the planning area by consolidating preparedness information from several local agencies and departments.

BEFORE THE FIRE—PROTECTION AND PREVENTION

REDUCING STRUCTURE IGNITABILITY

Structural Materials

Roofing—The more fire-resistant the roofing material, the better. The roof is the portion of the house that is most vulnerable to ignition by falling embers, known as firebrands. Metal roofs afford the best protection against ignition from falling embers. Slate or tile roofs are also non-combustible, and Class-A asphalt shingles are recommended as well. The most dangerous type of roofing material is wood shingles. Removing debris from roof gutters and downspouts at least twice a year will help to prevent fire, along with keeping them functioning properly.

Siding—Non-combustible materials are ideal for the home exterior. Preferred materials include stucco, cement, block, brick, and masonry.

Windows—Double-pane windows are most resistant to heat and flames. Smaller windows tend to hold up better within their frames than larger windows. Tempered glass is best, particularly for skylights, because it will not melt as plastic will.

Fencing and trellises—Any structure attached to the house should be considered part of the house. A wood fence or trellis can carry fire to your home siding or roof. Consider using non-flammable materials or use a protective barrier such as metal or masonry between the fence and the house.

If you are designing a new home or remodeling your existing one, do it with fire safety as a primary concern. Use non-flammable or fire-resistant materials and have the exterior wood treated with UL-approved fire-retardant chemicals. More information on fire-resistant construction is available at http://www.firewise.org.

SCREEN OFF THE AREA BENEATH DECKS AND PORCHES

The area below an aboveground deck or porch can become a trap for burning embers or debris, increasing the chances of the fire transferring to your home. Screen off the area using screening with openings no larger than one-half inch. Keep the area behind the screen free of all leaves and debris.

FIREWOOD, KINDLING, AND OTHER FLAMMABLES

Although convenient, stacked firewood on or below a wooden deck adds fuel that can feed a fire close to your home. Be sure to move all wood away from the home during fire season. Stack all firewood uphill, at least 30 feet and preferably 100 feet from your home.

When storing flammable materials such as paint, solvents, or gasoline, always store them in approved safety containers away from any sources of ignition such as hot water tanks or furnaces. The fumes from highly volatile liquids can travel a great distance after they turn into a gas. If possible, store the containers in a safe, separate location away from the main house.

The Public Service Company of New Mexico (PNM) does not have sufficient crews for frequent inspection of all its high-voltage power lines. If you have high-voltage lines running near your property, take a moment to walk underneath them and ensure that no tree branches are close to the towers or lines. If there is any situation that could be a fire hazard, contact a customer service representative from PNM.

CHIMNEYS AND FIREPLACE FLUES

Inspect your chimney and damper at least twice a year and have the chimney cleaned every year before first use. Have the spark arrestor inspected and confirm that it meets the latest safety code. Your local fire department will have the latest edition of National Fire Prevention Code 211 covering spark arrestors. Make sure to clear away dead limbs from within 15 feet of chimneys and stovepipes.

FIREPLACE AND WOODSTOVE ASHES

Never take ashes from the fireplace and put them into the garbage or dump them on the ground. Even in winter, one hot ember can quickly start a grass fire. Instead, place ashes in a metal container, and as an extra precaution, soak them with water. Cover the container with its metal cover and place it in a safe location for a couple of days. Then either dispose of the cold ash with other garbage or bury the ash residue in the earth and cover it with at least 6 inches of mineral soil.

PROPANE TANKS

Your propane tank has many hundreds of gallons of highly flammable liquid that could become an explosive incendiary source in the event of a fire. The propane tank should be located at least 30 feet from any structure. Keep all flammables at least 10 feet from your tank. Learn how to turn the tank off and on. In the event of a fire, you should turn the gas off at the tank before evacuating, if safety and time allow.

SMOKE ALARMS

A functioning smoke alarm can help warn you of a fire in or around your home. Install smoke alarms on every level of your residence. Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

FIRE-SAFE BEHAVIOR

- If you smoke, always use an ashtray in your car and at home.
- Store and use flammable liquids properly.
- Keep doors and windows clear as escape routes in each room.

DEFENSIBLE SPACE

The removal of dense, flammable foliage from the area immediately surrounding the house reduces the risk of structure ignition and allows firefighters access to protect the home. A 100-foot safety zone, free of all trees and shrubs, is recommended by the fire department; the minimum distance is 30 feet. Steep slopes require increased defensible space because fire can travel quickly uphill.

Within the minimum 30-foot safety zone, plants should be limited to fire-resistant trees and shrubs. Focus on fuel breaks such as concrete patios, walkways, rock gardens, and irrigated garden or grass areas within this zone. Use mulch sparingly within the safety zone, and focus use in areas that will be watered regularly. In areas such as turnarounds and driveways, non-flammable materials such as gravel are much better than wood chips or pine needles.

Vegetative debris such as dead grasses or leaves provide important erosion protection for soil but also may carry a surface fire. It is simply not feasible to remove all the vegetative debris from around your property. However, it is a good idea to remove any accumulations within the safety zone and extending out as far as possible. This is particularly important if leaves tend to build up alongside your house or outbuildings. Removing dead vegetation and leaves and exposing bare mineral soil is recommended in a 2-foot-wide perimeter along the foundation of the house. Also, be sure to regularly remove all dead vegetative matter including grasses, flowers, and leaf litter surrounding your home and any debris from gutters, especially during summer months. Mow the lawn regularly and promptly dispose of the cuttings properly. If possible, maintain a green lawn for 30 feet around your home.

All trees within the safety zone should have lower limbs removed to a height of 6–10 feet. Remove any branches within 15 feet of your chimney or overhanging any part of your roof. Ladder fuels are short shrubs or trees growing under the eaves of the house or under larger trees. Ladder fuels carry fire from the ground level onto the house or into the tree canopy. Be sure to remove all ladder fuels within the safety zone first. The removal of ladder fuels within about 100 feet of the house will help to limit the risk of crown fire around your home. More information about defensible space is provided at http://www.firewise.org.

FIRE RETARDANTS

For homeowners who would like home protection beyond defensible space and fire-resistant structural materials, fire retardant gels and foams are available. These materials are sold with various types of equipment for applying the material to the home. They are similar to the substances applied by firefighters in advance of wildfire to prevent ignition of homes. Different products have different timelines for application and effectiveness. The amount of product needed is based on the size of the home, and prices may vary based on the application tools. Prices range from a few hundred to a few thousand dollars. An online search for "fire blocking gel" or "home fire fighting" will provide a list of product vendors.

ADDRESS POSTING

Locating individual homes is one of the most difficult tasks facing emergency responders. Every home should have the address clearly posted with numbers at least 3 inches high. The colors of the address posting should be contrasting or reflective. The address should be posted so that it is visible to cars approaching from either direction.

ACCESS

Unfortunately, limited access may prevent firefighters from reaching many homes in the County. Many of the access problems occur at the property line and can be improved by homeowners. First, make sure that emergency responders can get in your gate. This may be important not only during a fire but also to allow access during any other type of emergency response. If you will be gone for long periods during fire season, make sure a neighbor has access, and ask them to leave your gate open in the event of a wildfire in the area.

Ideally, gates should swing inward. A chain or padlock can be easily cut with large bolt cutters, but large automatic gates can prevent entry. Special emergency access red boxes with keys are sold by many gate companies but actually are not recommended by emergency services. The keys are difficult to keep track of and may not be available to the specific personnel that arrive at your home. An alternative offered by some manufacturers is a device that opens the gate in response to sirens. This option is preferred by firefighters but may be difficult or expensive to obtain.

Beyond your gate, make sure your driveway is uncluttered and at least 12 feet wide. The slope should be less than 10 percent. Trim any overhanging branches to allow at least 13.5 feet of overhead clearance. Also make sure that any overhead lines are at least 14 feet above the ground. If any lines are hanging too low, contact the appropriate phone, cable, or power company to find out how to address the situation.

If possible, consider a turn around within your property at least 45 feet wide. This is especially important if your driveway is more than 300 feet in length. Even small fire engines have a hard time turning around and cannot safely enter areas where the only means of escape is by backing out. Any bridges must be designed with the capacity to hold the weight of a fire engine.

NEIGHBORHOOD COMMUNICATION

It is important to talk to your neighbors about the possibility of wildfire in your community. Assume that you will not be able to return home when a fire breaks out and may have to rely on your neighbors for information and assistance. Unfortunately, it sometimes takes tragedy to get people talking to each other. Do not wait for disaster to strike. Strong communication can improve the response and safety of every member of the community.

PHONE TREES

Many neighborhoods use phone trees to keep each other informed of emergencies within and around the community. The primary criticism is that the failure to reach one person high on the tree can cause a breakdown of the system. However, if you have willing and able neighbors, particularly those that are at home during the day, the creation of a well-planned phone tree can

often alert residents to the occurrence of a wildfire more quickly than media channels. Talk to your neighborhood association about the possibility of designing an effective phone tree.

NEIGHBORS IN NEED OF ASSISTANCE

Ask mobility-impaired neighbors if they have notified emergency responders of their specific needs. It is also a good idea for willing neighbors to commit to evacuating a mobility-impaired resident in the event of an emergency. Make sure that a line of communication is in place to verify the evacuation.

ABSENTEE OWNERS

Absentee owners often are not in communication with their neighbors. If a home near you is unoccupied for large portions of the year, try to get contact information for the owners from other neighbors or your neighborhood association. Your neighbors would probably appreciate notification in the event of an emergency. Also, you may want to contact them to suggest that they move their wood pile or make sure that the propane line to the house is turned off.

HOUSEHOLD EMERGENCY PLAN

A household emergency plan does not take much time to develop and will be invaluable in helping your family deal with an emergency safely and calmly. One of the fundamental issues in the event of any type of emergency is communication. Be sure to keep the phone numbers of neighbors with you rather than at home.

It is a good idea to have an out of state contact, such as a family member. When disaster strikes locally, it is often easier to make outgoing calls to a different area code than local calls. Make sure everyone in the family has the contact phone number and understands why they need to check in with that person in the event of an emergency. Also, designate a meeting place for your family. Planning an established meeting site helps to ensure that family members know where to meet, even if they cannot communicate by phone.

CHILDREN

Local schools have policies for evacuation of students during school hours. Contact the school to get information on how the process would take place and where the children would likely go.

The time between when the children arrive home from school and when you return home from work is the most important timeframe that you must address. Fire officials must clear residential areas of occupants to protect lives and to allow access for fire engines and water drops from airplanes or helicopters. If your area is evacuated, blockades may prevent you from returning home to collect your children. It is crucial to have a plan with a neighbor for them to pick up your children if evacuation is necessary.

PETS AND LIVESTOCK

Some basic questions about pets and livestock involve whether you have the ability to evacuate the animals yourself and where you would take them. Planning for the worst-case scenario may save your animals. An estimated 90 percent of pets left behind in an emergency do not survive.

Do not expect emergency service personnel to prioritize your pets in an emergency. Put plans in place to protect your furry family members.

PETS

Assemble a pet disaster supply kit and keep it handy. The kit should contain a three-day supply of food and water, bowls, a litter box for cats, and a manual can opener if necessary. It is also important to have extra medication and medical records for each pet. The kit should contain a leash for each dog and a carrier for each cat. Carriers of some kind should be ready for birds and exotic pets. In case your pet must be left at a kennel or with a friend, also include an information packet that describes medical conditions, feeding instructions, and behavioral problems. A photograph of each pet will help to put the right instructions with the right pet.

In the event of a wildfire you may be prevented from returning home for your animals. Talk to your neighbors and develop a buddy system in case you or your neighbors are not home when fire threatens. Make sure your neighbor has a key and understands what to do with your pets should they need to be evacuated.

If you and your pets were evacuated, where would you go? Contact friends and family in advance to ask whether they would be willing to care for your pets. Contact hotels and motels in the area to find out which ones accept pets. Boarding kennels may also be an option. Make sure your pets' vaccinations are up-to-date if you plan to board them.

Once you have evacuated your pets, continue to provide for their safety by keeping them cool and hydrated. Try to get your pets to an indoor location rather than leaving them in the car. Do not leave your pets in your vehicle without providing shade and water. It is not necessary to give your pets water while you are driving, but be sure to offer water as soon as you reach your destination.

LIVESTOCK

Getting livestock out of harm's way during a wildfire is not easy. You may not be able or allowed to return home to rescue your stock during a wildfire evacuation. Talk to your neighbors about how you intend to deal with an evacuation. If livestock are encountered by emergency responders, they will be released and allowed to escape the fire on their own. Make sure your livestock have some sort of identification. Ideally, your contact information should be included on a halter tag or ear tag so that you could be reached if your animal is encountered.

If you plan to evacuate your livestock, have a plan in place for a destination. Talk to other livestock owners in the area to find out whether they would be willing to board your stock in the event of an emergency. Often in large-scale emergencies, special accommodations can be made at fair and rodeo grounds, but personal arrangements may allow you to respond more quickly and efficiently.

If you do not own a trailer for your horses or other livestock, talk to a neighbor who does. Find out whether they would be willing to assist in the evacuation of your animals. If you

do own a trailer, make sure it is in working condition with good, inflated tires and functioning signal lights. Keep in mind that even horses that are accustomed to a trailer may be difficult to load during an emergency. Practicing may be a good idea to make sure your animals are as comfortable as possible when being loaded into the trailer.

HOUSE AND PROPERTY

Insurance companies suggest that you make a video that scans each room of your house to help document and recall all items within your home. This video can make replacement of your property much easier in the unfortunate event of a large insurance claim. See more information on insurance claims in the "After the Fire" section below.

PERSONAL ITEMS

During fire season, items you would want to take with you during an evacuation should be kept in one readily accessible location. As an extra precaution, it may be a good idea to store irreplaceable mementos or heirlooms away from your home during fire season.

It is important to make copies of all important paperwork, such as birth certificates, titles, and so forth, and store them somewhere away from your home, such as in a safe deposit box. Important documents can also be protected in a designated fire-safe storage box within your home.

IN THE EVENT OF A FIRE

NOTIFICATION

In the event of a wildfire, announcements from the local Emergency Management Office will be broadcast over local radio and television stations. Media notification may be in the form of news reports or the Emergency Alert System (EAS). On the radio, the AM station 770 KOB generally provides frequent updates. On television, the emergency management message will scroll across the top of the screen on local channels. The notice is not broadcast on non-local satellite and cable channels.

One good way to stay informed about wildfire is to use a National Oceanic and Atmospheric Administration (NOAA) weather alert radio. The radios can be purchased at most stores that carry small appliances, such as Target, Sears, or Radio Shack. The radio comes with instructions for the required programming to tune the radio to your local frequency. The programming also determines the types of events for which you want to be alerted. The weather alert radio can be used for any type of large incident (weather, wildfire, hazardous materials, etc.), depending on how it is programmed. Local fire personnel can assist with programming if needed.

WHEN FIRE THREATENS

Before an evacuation order is given for your community, there are several steps you can take to make your escape easier and to provide for protection of your home. When evaluating what to do as fire threatens, the most important guideline is: DO NOT JEOPARDIZE YOUR LIFE.

Back your car into the garage or park it in an open space facing the direction of escape. Shut the car doors and roll up the windows. Place all valuables that you want to take with you in the vehicle. Leave the keys in the ignition or in another easily accessible location. Open your gate.

Close all windows, doors, and vents, including your garage door. Disconnect automatic garage openers and leave exterior doors unlocked. Close all interior doors as well.

Move furniture away from windows and sliding glass doors. If you have lightweight curtains, remove them. Heavy curtains, drapes, and blinds should be closed. Leave a light on in each room.

Turn off the propane tank or shut off gas at the meter. Turn off pilot lights on appliances and furnaces.

Move firewood and flammable patio furniture away from the house or into the garage.

Connect garden hoses to all available outdoor faucets and make sure they are in a conspicuous place. Turn the water on to "charge," or fill your hoses and then shut off the water. Place a ladder up against the side of the home, opposite the direction of the approaching fire, to allow firefighters easy access to your roof.

EVACUATION

When evacuation is ordered, you need to go ***immediately***. Evacuation not only protects lives, it also helps to protect property. Some roads in the County are too narrow for two-way traffic, especially with fire engines. Fire trucks often cannot get into an area until the residents are out. Also, arguably the most important tool in the wildland urban interface toolbox is aerial attack. Airplanes and helicopters can be used to drop water or retardant to help limit the spread of the fire, but these resources cannot be used until the area has been cleared of civilians.

Expect emergency managers to designate a check-out location for evacuees. This process helps to ensure that everyone is accounted for and informs emergency personnel as to who may be remaining in the community. Every resident should check out at the designated location before proceeding to any established family meeting spot.

A light-colored sheet closed in the front door serves as a signal to emergency responders that your family has safely left. This signal saves firefighters precious time, as it takes 12–15 minutes per house to knock on each door and inform residents of the evacuation.

AFTER THE FIRE

RETURNING HOME

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

Even if the fire did not damage your house, do not expect to return to business as usual immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Have the fire department or utility companies turn the utilities back on once the area is secured.

INSURANCE CLAIMS

Your insurance agent is your best source of information as to the actions you must take in order to submit a claim. Here are some things to keep in mind. Your insurance claim process will be much easier if you photographed your home and valuable possessions before the fire and kept the photographs in a safe place away from your home. Most if not all of the expenses incurred during the time you are forced to live outside your home could be reimbursable. These could include, for instance, mileage driven, lodging, and meals. Keep all records and receipts. Do not start any repairs or rebuilding without the approval of your claims adjuster. Beware of predatory contractors looking to take advantage of anxious homeowners wanting to rebuild as quickly as possible. Consider all contracts very carefully, take your time to decide, and contact your insurance agent with any questions.

POST-FIRE REHABILITATION

Homes that may have been saved in the fire may still be at risk from flooding and debris flows. Burned Area Emergency Rehabilitation (BAER) teams are inter-disciplinary teams of professionals who work to mitigate the effects of post-fire flooding and erosion. These teams often work with limited budgets and manpower. Homeowners can assist the process by implementing treatments on their own properties as well as volunteering on burned public lands to help reduce the threat to valuable resources. Volunteers were instrumental in implementing many of the BAER treatments following the Cerro Grande fire. Volunteers can assist BAER team members by planting seeds or trees, hand mulching, or helping to construct straw-bale check dams in small drainages.

Volunteers can help protect roads and culverts by conducting storm patrols during storm events. These efforts dramatically reduce the costs of such work as installing trash racks, removing culverts, and re-routing roads.

Community volunteers can also help scientists to better understand the dynamics of the burned area by monitoring rain gauges and monitoring the efficacy of the installed BAER treatments.

APPENDIX F
FUNDING OPPORTUNITIES

The following section provides information on federal, state, and private funding opportunities for conducting wildfire mitigation projects.

I. FEDERAL FUNDING INFORMATION

Source: Pre-Disaster Mitigation Grant Program
Agency: Department of Homeland Security Federal Emergency Management Agency (DHS FEMA)
Website: http://www.fema.gov/government/grant/pdm/index.shtm
Description: The DHS includes FEMA and the U.S. Fire Administration. FEMA's Federal Mitigation and Insurance Administration is responsible for promoting pre-disaster activities that can reduce the likelihood or magnitude of loss of life and property from multiple hazards, including wildfire. The Disaster Mitigation Act of 2000 created a requirement for states and communities to develop pre-disaster mitigation plans, and established funding to support the development of the plans and to implement actions identified in the plans. This competitive grant program, known as PDM, has funds available to state entities, tribes, and local governments to help develop multi-hazard mitigation plans and to implement projects identified in those plans.

Source: Section 319 Base Grant to State Entities and Indian Tribes
Agency: Environmental Protection Agency (EPA)
New Mexico State 319 Coordinator
David Hogge
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502
Phone: (505) 827-2981
Fax: (505) 827-0160
david_hogge@nmenv.state.nm.us
Website: http://www.epa.gov
Description: Funding under this program is often used for reduction of nonpoint-source pollution; however, one community successfully used the grant to obtain funding to reduce hazardous fuels to protect the municipal watershed. For additional information on this success story, visit http://www.santafewatershed.com. To learn about obtaining this type of funding for your community, contact New Mexico's 319 Grant Coordinator, Dave Hogge, New Mexico Environmental Department at (505) 827-2981.

This funding opportunity is a Request for Proposals from state entities and Indian tribes for competitive grants under section 319 of the Clean Water Act (CWA). The purpose of this grant program is to provide funding to implement nonpoint-source management programs developed pursuant to CWA section 319(b). The primary goal of this management program is to control nonpoint-source pollution. This is done through implementation of management measures and practices to reduce pollutant loadings resulting from each category or subcategory of nonpoint-source identified in the grant recipient's nonpoint-source assessment report, which should be developed pursuant to CWA section 319(a). The EPA has set aside a portion of section 319 funds appropriated by Congress for competitive grant awards to tribes for the purpose of funding the development and implementation of watershed-based plans and other on-the-ground

watershed projects that result in a significant step toward solving nonpoint-source impairments on a watershed-wide basis. Please note that the funding opportunity described here is found in section B of the full announcement. (Section A includes the EPA's national guidelines, which govern the process for awarding non-competitive base grants to all eligible Tribes.)

Source: Funding for Fire Departments and First Responders
Agency: DHS, U.S. Fire Administration
Website: http://www.usfa.dhs.gov/fireservice/grants/
Description: Includes grants and general information on financial assistance for fire departments and first responders. Programs include the Assistance to Firefighters Grant Program (AFGP), Reimbursement for Firefighting on Federal Property, State Fire Training Systems Grants, and National Fire Academy Training Assistance.

Source: Conservation Innovation Grants (CIG)
Agency: National Resource Conservation Service
Website: http://www.nm.nrcs.usda.gov/programs/cig/cig.html
Description: CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program (EQIP) funds are used to award competitive grants to non-federal governmental or non-governmental organizations, tribes, or individuals. CIG enables the Natural Resources Conservation Service (NRCS) to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with federal, state, and local regulations. The NRCS administers the CIG program. The CIG requires a 50–50 match between the agency and the applicant. The CIG has two funding components: national and state. Funding sources are available for water resources, soil resources, atmospheric resources, and grazing land and forest health.

Source: Volunteer Fire Assistance
Agency: U.S. Department of Agriculture (USDA) Forest Service
Website: http://www.fs.fed.us/fire/partners/vfa/
Description: USDA Forest Service funding will provide assistance, through the states, to volunteer fire departments to improve communication capabilities, increase wildland fire management training, and purchase protective fire clothing and firefighting equipment. For more information, contact your state representative; contact information can be found on the National Association of State Foresters web site.

Source: Economic Action Programs
Agency: USDA Forest Service
Website: http://www.fs.fed.us/spf/coop/programs/eap/index.shtml
Description: USDA Forest Service funding will provide for Economic Action Programs that work with local communities to identify, develop, and expand economic opportunities related to traditionally under-utilized wood products and to expand the utilization of wood removed through hazardous fuel-reduction treatments. Information, demonstrations, application

development, and training will be made available to participating communities. For more information, contact a Forest Service Regional Representative.

Source: Collaborative Forest Restoration Program (CFRP)
Agency: USDA Forest Service
Website: http://www.fs.fed.us/r3/spf/cfrp/index.shtml
Description: The Community Forest Restoration Act of 2000 (Title VI, Public Law 106-393) established a cooperative forest restoration program in New Mexico to provide cost-share grants to stakeholders for forest restoration projects on public land to be designed through a collaborative process (the CFRP). Projects must include a diversity of stakeholders in their design and implementation, and should address specified objectives including: wildfire threat reduction; ecosystem restoration, including non-native tree species reduction; re-establishment of historical fire regimes; reforestation; preservation of old and large trees; increased utilization of small-diameter trees; and the creation of forest-related local employment. The act limits projects to four years and sets forth cost limits and provisions respecting collaborative project review and selection, joint monitoring and evaluation, and reporting. The act authorizes appropriations of up to $5 million annually and directs the Secretary to convene a technical advisory panel to evaluate proposals that may receive funding through the CFRP.

Source: Catalog of Federal Funding Sources for Watershed Protection
Agency: N/A
Website: http://cfpub.epa.gov/fedfund/
Examples of the types of grants found at this site are:

- Native Plant Conservation Initiative, http://www.nfwf.org/AM/Template.cfm?Section=Browse_All_Programs&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=3966
- Targeted Watershed Grants Program, http://www.epa.gov/owow/watershed/initiative/
- Pre-Disaster Mitigation Program, http://www.fema.gov/government/grant/pdm/index.shtm
- Environmental Education Grants, http://www.epa.gov/enviroed/grants_contacts.html

Source: Firewise
Agency: Multiple
Website: http://www.firewise.org
Description: The Wildland/Urban Interface Working Team (WUIWT) of the National Wildfire Coordinating Group is a consortium of wildland fire organizations and federal agencies responsible for wildland fire management in the United States. The WUIWT includes the USDA Forest Service, U.S. Department of the Interior (USDI) Bureau of Indian Affairs, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, FEMA, U.S. Fire Administration, International Association of Fire Chiefs, National Association of State Fire Marshals, National Association of State Foresters, National Emergency Management Association, and National Fire Protection Association. Many different Firewise activities are available to help homes and whole neighborhoods become safer from wildfire without significant expense. Community clean-up days, awareness events, and other cooperative activities can often be successfully accomplished through partnerships among neighbors, local businesses, and local

fire departments at little or no cost. The Firewise Communities/USA recognition program page (http://www.firewise.org/usa) provides a number of excellent examples of these kinds of projects and programs.

The kind of help you need will depend on who you are, where you are, and what you want to do. Among the different activities individuals and neighborhoods can undertake, the following actions often benefit from some kind of seed funding or additional assistance from an outside source:

- Thinning/pruning/tree removal/clearing on private property—particularly on very large, densely wooded properties
- Retrofit of home roofing or siding to noncombustible materials
- Managing private forest
- Community slash pickup or chipping
- Creation or improvement of access/egress roads
- Improvement of water supply for firefighting
- Public education activities throughout the community or region

Some additional examples of what communities, counties, and states have done can be found in the National Database of State and Local Wildfire Hazard Mitigation Programs at http://www.wildfireprograms.usda.gov. You can search this database by keyword, state, jurisdiction, or program type to find information about wildfire mitigation education programs, grant programs, ordinances, and more. The database includes links to local web sites and e-mail contacts.

Source: The National Fire Plan
Website: http://www.forestsandrangelands.gov/
Description: Many states are using funds from the National Fire Plan to provide funds through a cost-share with residents to help them reduce the wildfire risk to their private property. These actions are usually in the form of thinning or pruning trees, shrubs, and other vegetation and/or clearing the slash and debris from this kind of work. Opportunities are available for rural, state, and volunteer fire assistance.

Source: Staffing for Adequate Fire and Emergency Response (SAFER)
Agency: DHS
Website: http://www.firegrantsupport.com/safer/
Description: The purpose of SAFER grants is to help fire departments increase the number of frontline firefighters. The goal is for fire departments to increase their staffing and deployment capabilities and ultimately attain 24-hour staffing, thus ensuring that their communities have adequate protection from fire and fire-related hazards. The SAFER grants support two specific activities: (1) hiring of firefighters and (2) recruitment and retention of volunteer firefighters. The hiring of firefighters activity provides grants to pay for part of the salaries of newly hired firefighters over the five-year program. SAFER is part of the Assistance to Firefighters Grants and is under the purview of the Office of Grants and Training of the DHS.

Source: The Fire Prevention and Safety Grants (FP&S)
Agency: DHS
Website: http://www.firegrantsupport.com/fps/
Description: The FP&S are part of the Assistance to Firefighters Grants and are under the purview of the Office of Grants and Training in the DHS. FP&S offers support to projects that enhance the safety of the public and firefighters who may be exposed to fire and related hazards. The primary goal is to target high-risk populations and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire prevention and public safety education campaigns, juvenile fire-setter interventions, media campaigns, and arson prevention and awareness programs. In fiscal year 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include firefighter safety research and development.

II. STATE FUNDING INFORMATION

Source: State and Private Forestry Programs
Agency: National Association of State Foresters
Website: http://www.stateforesters.org/S&PF/coop_fire.html
Description: The National Association of State Foresters recommends that funds become available through a competitive grant process on Wildland Urban Interface hazard mitigation projects. State fire managers see opportunities to use both the State Fire Assistance Program and the Volunteer Fire Assistance Program to improve the safety and effectiveness of firefighters in the interface, as well as in other wildland fire situations. To ensure firefighter safety, minimize property and resource loss, and reduce suppression costs, land management agencies, property owners, local leaders, and fire protection agencies must work cooperatively to mitigate interface fire risks, as well as to ensure that wildland firefighters receive the training, information, and equipment necessary to safely carry out their responsibilities.

The 2007 Western WUI Grant Program is a specific grant available under the State Fire Assistance Program. It includes opportunities for hazardous fuels reduction, education, and community and homeowner actions. An application and instructions can be found at: http://www.firesafecouncil.org/news/attachments/
2007_CDF_application-proccess_final168.pdf

Source: New Mexico Association of Counties 2007–2008 Wildfire Risk Reduction Program
Agency: New Mexico Association of Counties
Website: http://www.nmcounties.org/wildfire.html
Description: This program targets at-risk communities by offering seed money to help defray the costs of community wildfire protection projects. During the past two years, the Wildfire Risk Reduction Grant Program has primarily funded projects for the development of Community Wildfire Protection Plans (CWPP), a pre-requisite to all other activities. In 2007, priority was given to projects that requested funding for hazardous fuel reduction, wildfire prevention, and community outreach activities that were identified in completed CWPPs.

III. PRIVATE FUNDING INFORMATION

Source: The Urban Land Institute (ULI)
Website: http://www.uli.org
Description: ULI is a 501(c)(3) nonprofit research and education organization supported by its members. The institute has more than 22,000 members worldwide, representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. The mission of the ULI is to provide responsible leadership in the use of land to enhance the total environment. ULI and the ULI Foundation have instituted Community Action Grants (http://www.uli.org/Content/NavigationMenu/MyCommunity/CommunityActionGrants/Community_Action_Gr.htm) that could be used for Firewise activities. Applicants must be ULI members or part of a ULI District Council. Contact actiongrants@uli.org or review the web page to find your District Council and the application information.

Source: Environmental Systems Research Institute (ESRI)
Website: http://www.esri.com/grants
Description: ESRI is a privately held firm and the world's largest research and development organization dedicated to geographic information systems. ESRI provides free software, hardware, and training bundles under ESRI-sponsored Grants that include such activities as conservation, education, and sustainable development, and posts related non-ESRI grant opportunities under such categories as agriculture, education, environment, fire, public safety, and more. You can register on the website to receive updates on grant opportunities.

Source: StEPP Foundation
Website: http://www.steppfoundation.org/default.htm
Description: StEPP is a 501(c)(3) organization dedicated to helping organizations realize their vision of a clean and safe environment by matching projects with funders nationwide. The StEPP Foundation provides project oversight to enhance the success of projects, increasing the number of energy efficiency, clean energy, and pollution prevention projects implemented at the local, state, and national levels for the benefit of the public. The web site includes an online project submittal system and a Request for Proposals page.

Source: The Public Entity Risk Institute (PERI)
Website: http://www.riskinstitute.org
Description: PERI is a not for profit, tax-exempt organization. Its mission is to serve public, private, and nonprofit organizations as a dynamic, forward-thinking resource for the practical enhancement of risk management. With its growing array of programs and projects, along with its grant funding, PERI's focus includes supporting the development and delivery of education and training on all aspects of risk management for public, nonprofit, and small business entities, and serving as a resource center and clearinghouse for all areas of risk management.

IV. OTHER FUNDING INFORMATION

The following resources may also provide helpful information for funding opportunities:

- National Agricultural Library Rural Information Center: http://www.nal.usda.gov/ric/ricpubs/fire_department_resources.htm

- Forest Service Fire Management web site: http://www.fs.fed.us/fire/
- Insurance Services Office Mitigation Online (town fire ratings): http://www.isomitigation.com/
- National Fire Protection Association: http://www.nfpa.org
- National Interagency Fire Center, Wildland Fire Prevention/Education: http://www.nifc.gov/preved/rams.htm
- U.S. Department of Agriculture "How to Get Information" (contacts): http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB/.cmd/ad/.ar/
- sa.retrievecontent/.c/6_2_1UH/.ce/7_2_5JN/.p/5_2_4TR/.d/0/_th/J_2_9D/_s.7_0_A/7_0_1OB?PC_7_2_5JN_navid=NEW_NOTEWORTHY&PC_7_2_5JN_navtype=RT&PC_7_2_5JN_parentnav=NEWSROOM#7_2_5JN
- Department of Homeland Security U.S. Fire Administration: http://www.usfa.dhs.gov/fireservice/grants/rfff/