

Sandoval County Community Wildfire Protection Plan

August 2012

Submitted by:

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ENVIRONMENTAL CONSULTANTS

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**SANDOVAL COUNTY, NEW MEXICO
COMMUNITY WILDFIRE PROTECTION PLAN**

Prepared for

SANDOVAL COUNTY
314 Melissa Road
P.O. Box 40
Bernalillo, New Mexico 87004

Prepared by

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

Victoria Amato, M.S.
Cody Stropki, Ph.D.

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EXECUTIVE SUMMARY

This is a 2012 update to the 2008 Sandoval County Community Wildfire Protection Plan (SCCWPP), which addresses hazards and risks of wildland fire throughout Sandoval County and makes recommendations for fuels reduction projects, public outreach and education, structural ignitability reduction, and fire response capabilities. Sandoval County comprises a diverse landscape and landownership, but a population with one common concern, the need to prepare for wildfire to reduce the risk of loss of life and property.

Community members in Sandoval County are familiar with large fires as several have occurred in recent years. The most significant was the Los Conchas fire, the second largest fire in New Mexico history and the largest ever fire in Sandoval County. Prior to that the Cerro Grande Fire (2003) started in Sandoval County and, until Los Conchas (2011) and later the Whitewater-Baldy Complex (2012), was the largest fire in state history. This SCCWPP has been developed to assist Sandoval County in ensuring that a catastrophic wildfire will be avoided in the future by assessing areas at risk and recommending measures to decrease that risk.

The purpose of the SCCWPP is to assist in protecting human life and reducing property loss due to wildfire throughout Sandoval 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 2012 in response to the federal Healthy Forests Restoration Act (HFRA) of 2003.

The SCCWPP 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 fuel 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 SCCWPP.

A group of multi-jurisdictional agencies (tribal, federal, state, and local), organizations, and residents joined together as a Core Team to develop this plan. Many of these Core Team members had been part of the initial 2008 planning process and had many years of experience working in fire management in Sandoval County. After the Core Team was assembled, public meetings were held to obtain vital information from stakeholders and homeowners in Sandoval County regarding wildfire protection and community concerns. The public outreach process is critical to the SCCWPP's effectiveness, and community concerns and comments have been considered and addressed within.

The planning process has served to identify many physical hazards throughout Sandoval County that could increase the threat of wildfire to communities. The public also has helped to identify community values that it would most like to see protected. By incorporating public and Core Team input into the recommendations, treatments are tailored specifically for Sandoval County. The SCCWPP emphasizes the importance of collaboration among multi-jurisdictional agencies

in order to develop fuels mitigation treatment programs to address wildfire hazards. Sandoval County has a committed team of career and volunteer firefighters, who work arduously to protect the life and property of citizens, but without homeowners taking on some of the responsibility of reducing fire hazards in and around their own homes, these resources are severely stretched. A combination of homeowner and community awareness, public education, and agency collaboration and treatments are necessary to fully reduce wildfire risk. Sandoval County's varied landscape is categorized into wildland urban interface (WUI) corridors for the purpose of this project. Each corridor has distinct characteristics, most notably the Rio Grande corridor and the Jemez corridor. The Rio Grande corridor is densely populated, urban, mostly developed, and is generally flat and rolling but with fire risk associated with thick bosque fuels close to homes, while the Jemez corridor is rural, but highly visited, characterized by steep mountainous terrain, dense forests, and limited access. Both areas have been subjected to catastrophic wildfire and structure losses.

Changes in both the fire environment and community structure have been documented in the SCCWPP. Several communities in Sandoval County are recognized by the program Firewise Communities as being relatively well prepared for wildland fires, and in some cases risk ratings for individual homes have decreased due to community work efforts and organization. Maintenance of treated areas is paramount, however, in order for mitigation to remain effective, and some residents who have treated their homes are put at risk by neighboring property owners refusing to reduce fuel loads. A significant amount of fuels reduction has been employed on public lands throughout Sandoval County, particularly in the Jemez corridor; landscape-scale projects are being implemented to significantly reduce hazardous fuels in the ponderosa pine and mixed conifer communities. These positive changes contribute to decreasing the likelihood of wildfire's negative impacts on communities in the Sandoval County WUI. Since not all communities have taken the necessary steps to mitigate increasing fire risks, the SCCWPP highlights the need for increased preventive activities to reduce the negative impacts that wildland fire can have on communities and community members living in the WUI.

The SCCWPP provides background information, a risk assessment, and recommendations. Section 1 provides a general overview of Community Wildfire Protection Plans and describes Sandoval County's need for a plan, Section 2 provides demographic and background information about Sandoval 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. It is important to stress that this document is an initial step in raising public awareness and treating areas of concern, and should serve as a tool in doing so.

The SCCWPP should be treated as a *live document* to be updated approximately every two years. As is the case with this 2012 update, the plan should continue to be revised to reflect changes, modifications, or new information. These elements are essential to the success of mitigating wildfire risk throughout Sandoval County and will be important in maintaining the ideas and priorities of the plan and the communities in the future.

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List of Abbreviations and Acronyms

°F	Degrees Fahrenheit
APNM	Animal Protection of New Mexico
ATV	all-terrain vehicle
BAER	Burned Area Emergency Rehabilitation
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BTU/ft/sec	British Thermal Units per foot per second
CARs	Communities at Risk
CFRP	Collaborative Forest Restoration Program
CIG	Conservation Innovation Grants
County	Sandoval County
CVARs	Community Values at Risk
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
DEM	digital elevation model
DHS	Department of Homeland Security
EAS	Emergency Alert System
EMS	Emergency Management System
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FLAME	Federal Land Assistance, Management and Enhancement Act
FP&S	Fire Prevention and Safety
FRCC	Fire Regime Condition Class
FRI	fire return interval
GAID	Geographic Area Interagency Division
GEJWUIC	Greater Eastern Jemez Wildland Urban Interface Corporation
GIS	Geographic Information System
GPS	global positioning system
HFRA	Healthy Forest Restoration Act
HIZ	Home Ignition Zone
IC	Incident Command
ICC	International Code Council
ISO	International Standards Organization
JPA	Joint Powers Agreement
MFI	mean fire interval
MRCOG	Mid-Region Council of Governments
NASF	National Association of State Foresters
NEPA	National Environmental Policy Act
NFP	National Fire Plan
NIFC	National Interagency Fire Center
NMCC	New Mexico Climate Center
NMDHSEM	New Mexico Department of Homeland Security and Emergency Management
NM-FPTF	New Mexico Fire Planning Task Force

NMSF	New Mexico State Forestry
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
PERI	Public Entity Risk Institute
PNM	Public Service Company of New Mexico
RAWS	remote automated weather station
RFA	Rural Fire Assistance
SAF	Society of American Foresters
SAFER	Staffing for Adequate Fire and Emergency Response
SCCWPP	Sandoval County Community Wildfire Protection Plan
SWCA	SWCA Environmental Consultants
ULI	Urban Land Institute
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WRCC	Western Regional Climate Center
WUI	wildland urban interface
WUIWT	Wildland Urban Interface Working Team

1.0 INTRODUCTION

1.1 OVERVIEW OF SANDOVAL COUNTY'S COMMUNITY WILDFIRE PROTECTION PLAN

In 2008 community members of Sandoval County (hereafter referred to as the County), representing federal, state, tribal, and local agencies, expressed an interest and need for community wildfire protection planning and as a result convened to develop a Community Wildfire Protection Plan (CWPP) for the County to seek to reduce the threat to life and property that wildfire poses to communities in the wildland urban interface (WUI). This 2012 CWPP update was initiated in response to changing wildfire hazards in the County since 2008, resulting from population growth and expansion of the WUI, as well as changes to natural fuels and community composition as a consequence of the 2011 fire season, a season that saw the second largest wildfire in New Mexico history—the Las Conchas fire—burn 156,593 acres of Sandoval County.

While ecosystems are able to naturally adapt to wildland fires, communities located amidst forests and grasslands require a plan for preparing for, reducing the risk of, and adapting to wildland fire events. The population in contact with wildland fire is increasingly growing as more people are moving into the wildlands (Bushey 2012). Living in the WUI means that both communities and individuals must learn how to prepare for wildland fires and reduce their negative impacts. A CWPP helps accomplish both goals and attempts to reduce, but not eliminate, the extreme severity or risk of wildland fire. Eliminating all risk is not possible given various uncontrollable factors (such as climate) that affect wildland fire.

This CWPP, entitled the Sandoval County CWPP (SCCWPP), is a countywide plan that evaluates wildfire threat to communities and infrastructure and identifies measures that homeowners, land managers, and fire districts can take to reduce the impact of wildfire to life, property, and other Community Values at Risk (CVARs). 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 the 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, initiating public education and outreach, reducing structural ignitability, and improving fire response capabilities. The SCCWPP 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, it is important to note that the recommendations are specific to WUI areas and are expected 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 detail in this plan. The recommendations for public lands adjacent to communities have been collaboratively planned with land management agencies.

1.2 OVERVIEW OF COMMUNITY WILDFIRE PROTECTION PLANS

In response to a landmark fire season in 2000, 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 by a report in 2001, entitled *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-year Comprehensive Strategy*, which was updated in 2002 to include an implementation plan. This plan was updated once more in 2006, with a similar focus on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, mitigating risks to communities, providing economic benefits, and improving fire prevention and suppression strategies. The 2006 implementation plan also emphasized information sharing and monitoring of accomplishments and forest conditions, a long-term commitment to maintaining the essential resources for implementation, a landscape-level vision for restoration of fire-adapted ecosystems, the importance of using fire as a management tool, and continued improvements to collaboration efforts (Western Governors' Association 2006). Progress reports and lessons learned reports for community fire prevention are provided annually (Western Governors' Association 2010).

In 2003 the U.S. Congress recognized widespread declining forest health by passing the Healthy Forests Restoration Act (HFRA), and President Bush signed the act into law (Public Law 108-148, 2003). The act was revised in 2009 to address changes to funding and provide a renewed focus on wildfire mitigation (H.R.4233, Healthy Forest Restoration Amendments Act of 2009). The HFRA expedites the development and implementation of hazardous fuels reduction projects on federal land and emphasizes the need for federal agencies to work collaboratively with communities. A key component of the HFRA is the development of CWPPs, which facilitates the collaboration between federal agencies and communities in order to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. A CWPP also allows communities to establish their own definition of the WUI. In addition, communities with an established CWPP are 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' Association *10-Year Comprehensive Strategy*, and the Federal Emergency Management Agency (FEMA) 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. In 2009 the U.S. Government Accountability Office emphasized the need for a cohesive strategy in order to capitalize on the steps that had been made by federal agencies with respect to fire preparedness (U.S. Government Accountability Office 2009). Despite these policy initiatives for fire prevention, federal funding for wildfire suppression has continued to rise, and the acres burned annually have also increased over the last 50 years (Gorte 2011). In 2009 Congress enacted the Federal Land Assistance, Management and Enhancement Act (FLAME) (Public Law 111-88) in order to insulate other agency programs for high wildfire suppression costs by creating a separate funding structure for emergency supplemental wildfire suppression efforts (Gorte 2011). FLAME identified the need for a cohesive strategy for the management of wildland fire. In March 2011 the U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDI) unveiled the National Cohesive Wildland Fire

Management Strategy as a collaborative effort to identify, define, and address wildland fire management problems and opportunities for successful wildland fire management (Wildland Fire Leadership Council 2012). In June 2012 the second phase of this three-phase strategy was launched and focused on regional level planning for the restoration of landscapes, building fire-adapted communities and effective, risk-based wildfire response. More information on Phase II of the strategy can be found at:

- http://www.forestsandrangelands.gov/strategy/documents/reports/phase2/CSPhaseIIReport_FINAL20120524.pdf

New Mexico State Forestry (NMSF) has statutory responsibilities for cooperation with federal, state, and local agencies in the development of systems and methods for the prevention, control, suppression, and use of prescribed fires on rural lands and within rural communities on all non-federal and non-municipal lands in the state (New Mexico Statutes Annotated 1978, Section 68-2-8). As a result, NMSF is involved in the CWPP planning process. The New Mexico Fire Planning Task Force (NM-FPTF) was created in 2003 by the New Mexico legislature to identify the WUI areas (Communities at Risk [CARs]) in the state that were most vulnerable to wildland fire danger. The NM-FPTF updates its CARs list annually, reviews completed CWPPs, and approves CWPPs that are compliant with the HFRA. The *2011 Communities at Risk Plan* identifies 600 communities in New Mexico at risk from wildfire, 281 of which are listed as high risk (NMSF 2011). CARs identified in the annual plan are also updated federally from the January 2001 *Federal Register* listing for CARs (NMSF 2011).

New Mexico CWPPs are a mix of county- and community-level plans, with some CARs being represented in more than one plan (Council of Western State Foresters 2006). The NM-FPTF has adopted the International Code Council (ICC) WUI Code (NMSF 2007).

1.3 NEED FOR A CWPP

Communities located in a fire's path, from the bosque to the mountains, will face many questions and challenges in the event of a wildland fire. Fire traverses the landscape without stopping at political boundaries, which presents a need for all communities to prepare for wildfire. In recent decades, fires throughout the western United States have become more widespread, deadly, and frequent. In 2011 8,711,367 acres were burned by wildfire across the United States with 1,286,487 of those acres occurring in New Mexico. The Los Conchas fire was the largest fire in Sandoval County history and devastated over 156,000 acres and destroyed more than 60 homes. The cost of fire suppression and post-fire recovery also continues to increase. In 2008 a record \$4.4 billion was spent on wildfire funding nationwide (Gorte 2011), and the costs for suppressing wildfires on public lands have exceeded the amount appropriated almost every year since 1990, according to the U.S. Government Accountability Office (Wells 2007). In 2011 over \$2.5 billion of federal funds were appropriated for wildfire funding, \$1.4 billion of that going to fire suppression efforts and \$527 million going to fuels reduction. The suppression costs for the Los Conchas fire alone were over \$48 million.

In addition to a growing WUI and increased contact between people and wildfire, the wildfire season is also extending, with many localities that once experienced a distinct wildfire season,

now experiencing nearly year-round fire danger (Bushey 2012). Coupled with increased fuel loading, the potential for wildfire disaster has grown considerably (Bushey 2012).

The trend toward increased fire severity has called communities and individuals to action throughout the country. Firewise Communities was initiated to provide education and raise awareness about reducing the risk of wildfire and increasing community protection at a grassroots levels.

Many communities in the County are “Firewise,” meaning they have taken appropriate actions outlined by the program and are recognized by Firewise Communities. Community-based planning contributes to wildfire prevention efforts. In an effort to connect these communities and others to create a greater network of prepared communities, the County began developing a countywide CWPP.

Across this geographically and culturally diverse landscape, overseen by federal, state, tribal, and local governments, one common concern is the need to prepare for wildfire to reduce the risk of loss of life and property.

1.4 THE GOAL OF A CWPP

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize 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 fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the HFRA, are:

- **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).
- **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 CARs and their essential infrastructures (SAF 2004).
- **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).

The SCCWPP addresses all the requirements for completion of a CWPP outlined in the HFRA.

1.5 PLANNING PROCESS

This CWPP update required the same multiparty collaborative planning process as the 2008 plan. Representatives from various government agencies—along with members of fire departments and local communities—formed a Core Team (please see Section 1.7) and participated in decision-making activities that led to the development of the CWPP. Stakeholder involvement

was important in producing a meaningful document that included all collaborators' diverse perspectives.

The SAF, 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* (SAF 2004) to provide communities with a clear process to use in developing a CWPP. The guide outlines eight steps for developing a CWPP and was followed in preparing the SCCWPP. The eight recommended steps are as follows:

- 1) **Convene Decision Makers:** Form a Core Team made up of representatives from the appropriate local governments, local fire authorities, and state agencies responsible for forest management.
- 2) **Involve Federal Agencies:** Identify and engage local representatives of the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM). Contact and involve other land management agencies as appropriate.
- 3) **Engage Interested Parties:** Contact and encourage active involvement in plan development from a broad range of interested organizations and stakeholders.
- 4) **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.
- 5) **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 CVARs; and local preparedness capability. Rate the level of risk for each factor and incorporate this information into the base map(s) as appropriate.
- 6) **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, reduction of structural ignitability, and other issues such as improvement of fire-response capability. Clearly indicate whether priority projects are directly related to the protection of communities and essential infrastructure or reducing wildfire risks to other community values.
- 7) **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.
- 8) **Finalize Community Wildfire Protection Plan:** Finalize the CWPP and communicate the results to community and key partners.

1.6 DOCUMENTS CONTRIBUTING TO THE CWPP PLANNING PROCESS

1.6.1 SANDOVAL COUNTY COMMUNITY WILDFIRE PROTECTION PLAN (2008)

This 2012 update is based on the 2008 SCCWPP. The 2008 plan was developed through a collaboration of various stakeholders, including local, state, and federal agencies; soil and water conservation districts; environmental advocacy groups; homeowner associations; and private landowners. The CWPP involved considerable public input through organized meetings throughout the County where representatives of the local and County fire departments answered questions relating to wildfire prevention. The risk assessments were developed using geographic information system (GIS) fire behavior modeling and community-based assessments of structural ignitability, surrounding fuels, ingress/egress, and fire response capabilities. Recommendations were made for reducing hazardous fuels on both private and public lands, reducing structural ignitability using proven Firewise Communities techniques, improving public education and outreach through organized events with volunteer fire departments and local agencies, and improving fire response capabilities by identifying needed resources to assist volunteer and career fire districts in better serving the public.

1.6.2 SANDOVAL COUNTY WUI AREA INVENTORY ASSESSMENT

In January 2003 a WUI assessment was completed for the County; this assessment was used to guide the 2008 CWPP (Barz et al. 2004). The WUI areas in the County have been broken down into five different corridors, each containing specific communities and values at risk. Each of the communities within the identified areas have been visited, assessed, and assigned a hazard rating based on fuel conditions and vegetation, forest health, access, quality of defensible space, water availability, terrain, proximity to the nearest fire station, extent of the area, housing density, and other special concerns. The assessment includes descriptions of all the rating factors and hazard ratings for each individual area within each corridor.

1.6.3 OTHER DOCUMENTS

Other studies and plans have been completed for areas within the County that may play a role in planning for the SCCWPP. These reports include the New Mexico Communities at Risk Assessment Plan (NMSF 2007), the Greater Cuba CWPP (Forest Guild 2006), the Sandoval County Hazard Mitigation Plan (URS 2004), Fuels Treatment Management and Planning on Santo Domingo Tribal Lands (SWCA Environmental Consultants [SWCA] 2005), and the Middle Rio Grande Bosque CWPP (SWCA 2007). Information and recommendations from these documents can be used, modified, and consolidated based on the most recent and accurate findings in order to plan wildfire mitigation techniques that are consistent throughout the County across multiple jurisdictional boundaries.

1.7 CORE TEAM

The Core Team for the SCCWPP update was composed of approximately 15 to 20 people, ranging from community members to those representing various agencies and levels of government (Appendix A). Representatives from the County; fire departments in the town of Bernalillo, village of Corrales, city of Rio Rancho, and village of Jemez Springs; the Sandoval

County Fire Department; Jemez, Zia, Santa Ana, and Santo Domingo pueblos; NMSF; the Bureau of Indian Affairs (BIA); the Jemez and Cibola Ranger Districts of the USFS; the New Mexico Cattle Growers Association; and a community member from the Jemez corridor participated as part of the Core Team.

All members have experience or interest in preparation for wildland fires, planning, response, mitigation, and/or education. The Core Team met three times over the course of seven months to discuss issues related to completing the project. The Core Team drives the planning process in its decision making, data sharing, experience, and communication with community members who were not on the Core Team. The group met for the first time in January 2012, and the final meeting was July 26th 2012.

1.8 PROJECT AREA

The project area includes all of Sandoval County as delineated by its geographic and political boundaries. The project boundary encompasses multiple cities, towns, pueblos, communities, roadways, and railroads. The largest municipal area is Rio Rancho, while Bernalillo is the County Seat. Other communities in the County include Algodones, Cochiti Lake, Corrales, Cuba, Jemez Springs, La Jara, Peña Blanca, Placitas, Ponderosa, Regina, San Ysidro, and Sile, along with tribal entities of San Felipe, Sandia, Santa Ana, Santo Domingo, Santa Clara, Laguna, Zia, Cochiti, Jemez, three Navajo chapters, and part of the Jicarilla Apache Reservation (Figure 1.1).

1.9 PUBLIC INVOLVEMENT

Engaging interested parties is critical in the CWPP process because 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 discussion it generates among community members regarding their priorities for local fire protection and forest management (SAF 2004).

The 2012 update involved two public meetings to gather information regarding fire risk and hazard in communities throughout the County. The meetings were held in La Cueva and Corrales in order to reach members of the public in both the Jemez Mountain and Rio Grande Bosque WUI communities. The meetings were announced using local media outlets, email distribution, and an SCCWPP Facebook page. The meetings were in a traditional public meeting format with an open house session followed by a facilitated discussion with a PowerPoint presentation. At the meetings, educational information regarding defensible space was provided, maps were posted, and surveys requesting feedback regarding wildfire protection from community members were distributed. Public comments addressed a need for:

- More volunteer firefighters
- Increased water supply and water storage
- Fuel treatments on federal and state lands
- Better enforcement of burn restrictions
- Better signage relating to fire danger
- Maintained wildlife habitat
- Landowners to take responsibility for fire mitigation
- Landscape-scale fuels treatments
- Better slash disposal facilities

Full public comments and responses to the surveys are provided in Appendix B.



Figure 1.1. Project location map.

2.0 SANDOVAL COUNTY BACKGROUND

2.1 LOCATION AND GEOGRAPHY

Located in north-central New Mexico, the Sandoval County boundary delineates the SCCWPP planning area. The County is 3,715 square miles and is bordered by seven other New Mexico counties: Rio Arriba to the north, Los Alamos and Santa Fe to the east, Bernalillo to the south, Cibola to the southwest, McKinley to the west, and San Juan to the northwest.

The main transportation corridors that travel through the planning area include U.S. Highway 550, which travels from the northwest corner to the southeast corner of the County where it intersects with the section of Interstate 25 that travels through the southeast corner of the County. State Highway 197 travels southwest from U.S. Highway 550 in the northwest portion to the east-central boundary of the County. State Highway 4 travels north from its intersection with U.S. Highway 550 in the center of Sandoval County to the western boundary of Los Alamos County. Secondary paved, dirt, and gravel roads lead off of the main transportation corridors to various locations throughout the region.

Current landowners within or near the project area include the USFS, the New Mexico State Land Office, the BLM, the Department of Defense, the National Park Service (NPS), Valles Caldera Land Trust, other private entities, three Navajo Nation chapters, part of the Jicarilla Apache Reservation, and all or part of nine Native American pueblos (Sandoval County 2006) including Sandia, Santa Ana, San Felipe, Santo Domingo, Cochiti, Santa Clara, Laguna, Zia, and Jemez (Table 2.1, Figure 2.1).

Table 2.1. Landownership in Sandoval County

Landownership	Square Miles	Percentage of the County
Tribal Land	1,267	34%
BLM	789	21%
Private	771	21%
USFS	601	16%
Valles Caldera National Preserve	135	3 %
New Mexico State Land Office	108	3%
NPS	41	1%
Department of Defense	3	<1%

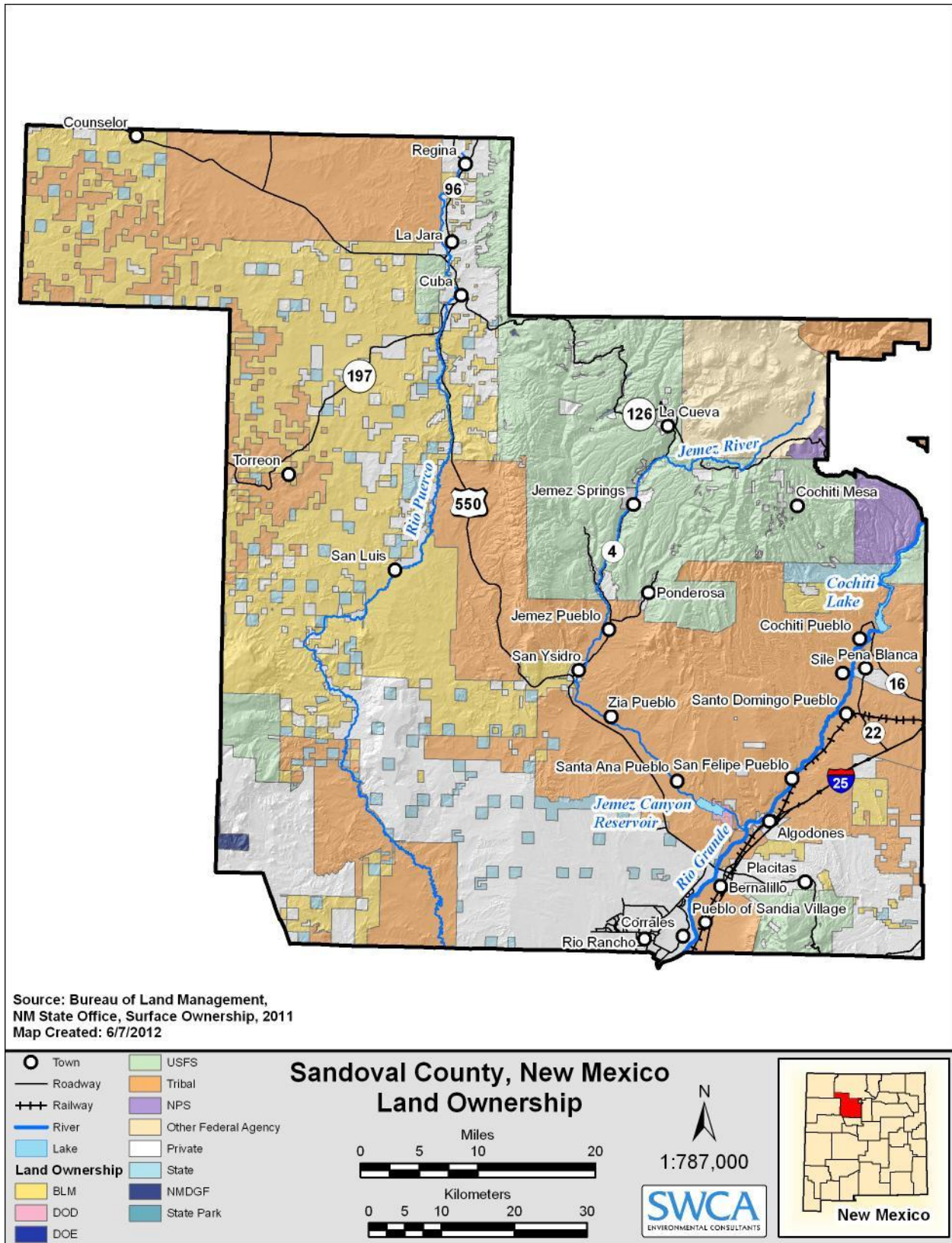


Figure 2.1. Sandoval County landownership map.

2.2 CLIMATE

Differences in topographical characteristics throughout New Mexico and Sandoval County contribute to the divergent climatic regimes within the planning area. The state generally 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. Relative humidity across the state is lower in the valleys but higher in the mountains due to the lower temperatures at higher elevations. Average relative humidity at all elevations during the warmer months is commonly less than 20% and occasionally may drop as low as 4%. During the cooler months, relative humidity is higher and ranges from approximately 65% at sunrise to about 30% during midday. Across the state, 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 (New Mexico Climate Center [NMCC] 2012).

July is generally the warmest month of the year for New Mexico, with average monthly maximum temperatures ranging from 90 degrees Fahrenheit (°F) at lower elevations to 75°F to 80°F at higher elevations. From lower to higher elevations, mean annual temperatures for Sandoval County range from approximately 55°F to 46°F. Within the County, maximum mean annual temperatures on record range from 64°F in Cuba to 71.0°F in Corrales, while minimum annual temperatures range from 28.5°F in Cuba to 40.0°F at the Cochiti Dam (Table 2.2) (Western Regional Climate Center [WRCC] 2012). Generally, January is the coldest month, with average daytime temperatures ranging from mid-50°F to mid-30°F. 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 (NMCC 2012).

Table 2.2. Mean Annual Temperature and Precipitation by Station in Sandoval County

Station	Elevation (feet)	Mean Annual Temperature (°F)		Annual Precipitation (inches)				Period of Record
		Max	Min	Mean Annual	Max	Min	Mean Snowfall	
Cochiti Dam	5,560	69.5	40.00	12.70	19.86	6.08	9.50	1975–2011
Corrales	5,110	71.00	37.5	9.94	15.31	5.12	8.10	1982–2012
Jemez Springs	6,260	66.40	37.00	17.01	28.72	6.17	29.20	1910–2012
Cuba	6,910	63.80	28.50	13.15	25.81	6.62	28.60	1938–2010

Source: WRCC 2012.

Average annual precipitation ranges from fewer than 10 inches over much of the southern desert and the Rio Grande and San Juan valleys to more than 20 inches at the higher elevations in the state. The mean annual precipitation within the County is relatively low, ranging from as low as 9.94 inches in Corrales to 17.01 inches in Jemez Springs. The maximum annual rainfall within the planning area has been recorded as high as 28.72 inches in 1957 in Jemez Springs. Corrales had the lowest minimum average annual precipitation at 5.12 inches in 2003 (Table 2.2) (WRCC 2012). July and August mark the onset of the region’s monsoonal weather patterns and are typically the hottest and wettest months of the year, accounting for 30% to 40% of the state’s annual precipitation (Figure 2.2 and Figure 2.3) (NMCC 2012). These seasonal rains take place almost entirely as frequent and brief intense thunderstorms. The moisture associated with these storms originates in the Gulf of Mexico. These storms also generate intense lightning activity, which may result in multiple fire ignitions from one storm across a fire management district.

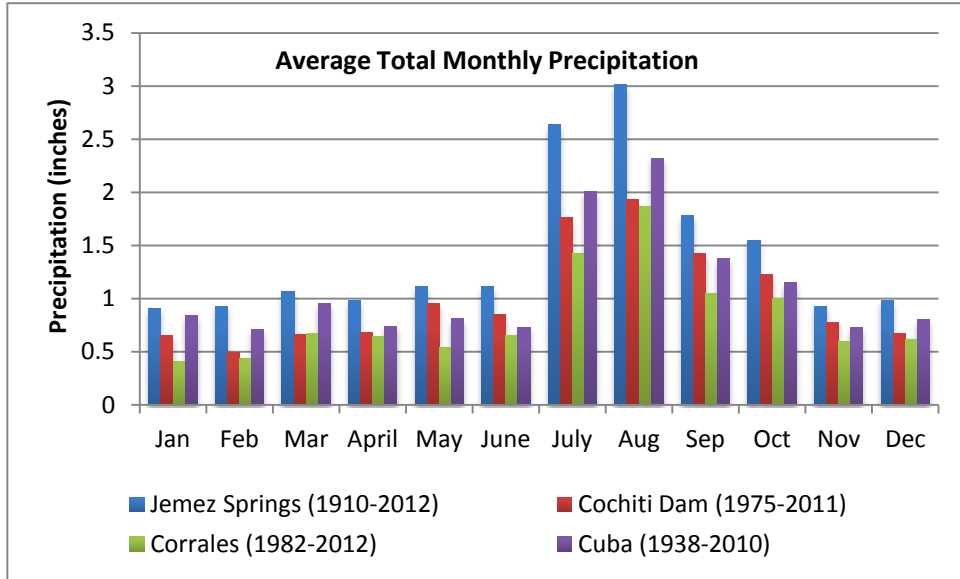


Figure 2.2. Average total monthly precipitation for each weather station’s period of record (WRCC 2012).

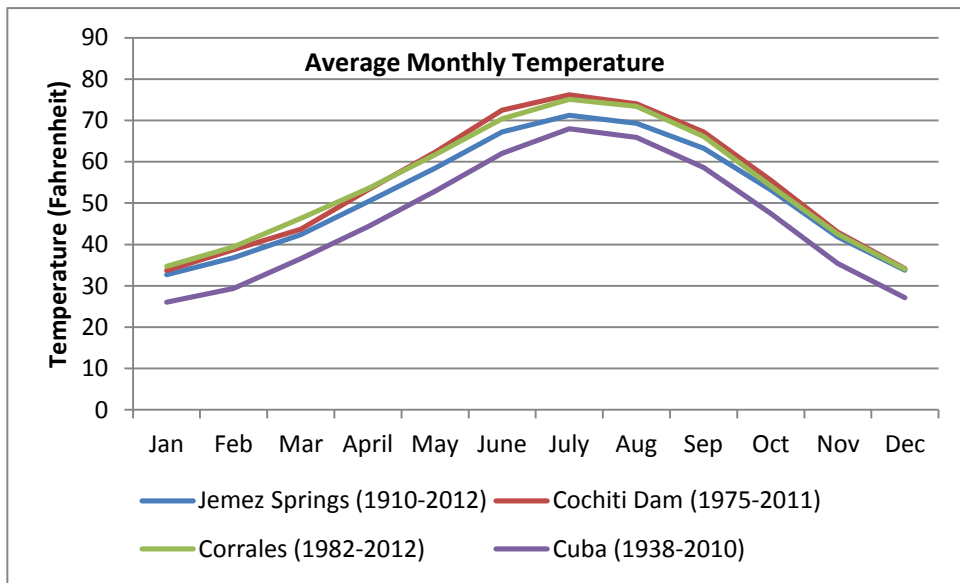


Figure 2.3. Average total monthly temperatures for each weather station’s period of record (WRCC 2012).

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. Much of this precipitation falls as snow in mountain areas. 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 (NMCC 2012).

Overall climate regimes in the state typically consist of cyclical drought/wet-year patterns that are driven by El Niño-Southern Oscillation. 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 (Swetnam and Betancourt 1998). Severe and prolonged droughts on record have occurred once every century on average (Gray et al. 2003).

2.3 VEGETATION AND LAND COVER

Vegetation types within Sandoval County are primarily a function of elevation, slope, aspect, substrate, and associated climatic regimes. Characteristics in vegetation communities are quite variable from site to site because elevation and topography exhibit a broad range across the County.

Dominant vegetation types within the County are described based on a large spatial scale and represent the overall community structure that will play a general role in fire occurrence and behavior. 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 focus should be taken into consideration when planning fuels treatments.

The major vegetation types in Sandoval County are listed below and are described in more detail using the NatureServe United States Ecological Systems categories (NatureServe 2012; U.S. Geological Survey [USGS] 2012). Other types of land cover (e.g., agricultural, developed, etc.) also exist in a very small percentage of the County and are not described in more detail because they do not play a significant role in fire behavior. See Table 2.3 major vegetation type percentages for the County.

Table 2.3. Percentage of Major Vegetation Types within Sandoval County

Existing Vegetation Type	Acres	Percent
Overall Grassland Communities	1,057,385	45%
Intermountain Basins Semidesert Grassland	403,347	17%
Intermountain Basins Semidesert Shrub-steppe	399,428	17%
Southern Rocky Mountain Juniper Woodland and Savanna	201,936	9%
Southern Rocky Mountain Montane-subalpine Grassland	27,750	1%
Other Miscellaneous Grassland Types	52,674	1%
Overall Forested Communities	914,331	38%
Colorado Plateau Piñon-juniper Woodland	316,490	13%
Southern Rocky Mountain Ponderosa Pine Woodland	239,567	10%
Southern Rocky Mountain Piñon-juniper Woodland	200,740	9%
Rocky Mountain Dry-mesic and Mesic Montane Mixed Conifer Forest and Woodland	135,833	6%
Rocky Mountain Aspen Forest and Woodland	10,079	<1%
Other Miscellaneous Forested Types	11,622	<1%
Overall Shrub/Scrub Communities	173,629	7%
Intermountain Basins Mixed Salt Desert Scrub	70,838	3%
Intermountain Basins Big Sagebrush Shrubland	43,861	2%
Colorado Plateau Mixed Low Sagebrush Shrubland	36,309	2%
Other Miscellaneous Shrub/Scrub Types	22,621	<1%
Riparian Woodlands and Wetlands	97,102	4%
Western Great Plains and Rocky Mountain Lower Montane Riparian Woodland and Shrublands	65,801	3%
Intermountain Basins Greasewood Flat	26,981	1%
Other Miscellaneous Riparian and Wetland Types	4,320	<1%
Other Types	134,076	6%

Source: NatureServe 2012; USGS 2012.

2.3.1 GRASSLAND COMMUNITIES

The majority of the vegetation in Sandoval County is grassland and forest. Grasslands within the County are composed largely of shrub-steppe or juniper savanna-type ecosystems. Graminoid species that are typically dominant at the lower elevations (approximately 4,750–7,600 feet) throughout the County include drought-tolerant perennial bunchgrass species such as Indian ricegrass (*Achnatherum hymenoides*), blue grama (*Bouteloua gracilis*), threeawn (*Aristida* sp.), needle and thread (*Hesperostipa comata*), muhly grass (*Muhlenbergia* sp.), or James' galleta (*Pleuraphis jamesii*). Species composition varies from site to site. Other associated graminoid species may include prairie Junegrass (*Koeleria macrantha*), western wheatgrass (*Pascopyrum smithii*), sand dropseed (*Sporobolus cryptandrus*), and alkali sacaton (*S. airoides*).

A few scattered shrub or dwarf-shrub species may be present in some grassland areas. Although most grassland ecosystems only have an herbaceous component, semiarid shrub-steppe ecosystems are typically dominated by graminoid cover of greater than 25% with an open shrub layer. Shrub species that may be present in these communities include rabbitbrush (*Chrysothamnus* sp.), sagebrush (*Artemisia* sp.), fourwing saltbush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), and winterfat (*Krascheninnikovia lanata*). Juniper savannas

are best represented just below the lower elevational range of ponderosa pine (*Pinus ponderosa*) forests and contain widely spaced, mature juniper trees (*Juniperus scopulorum* or *J. monosperma*) and occasionally piñon pine (*P. edulis*).

High-elevation grasslands exist in only approximately 1% of the County at elevations of approximately 7,200 to 9,800 feet, and typically consist of perennial bunch grasses of oatgrass (*Danthonia* sp.), fescue (*Festuca* sp.), muhly grass, and blue grama. These stands are typically patchy in nature and intermixed among a matrix of stands of spruce-fir, lodgepole, ponderosa pine, and aspen forests.

2.3.2 FORESTED COMMUNITIES

The most common forested community consists of piñon-juniper woodlands. This ecological system occurs on the dry mountains, plateaus, and foothills of north-central New Mexico and the Colorado Plateau, and is represented in the elevational region between ponderosa pine and grassland communities. Colorado Plateau piñon-juniper forests are most common in the County and contain mostly piñon pine and Utah juniper (*J. osteosperma*), but also may be co-dominated by oneseed juniper (*J. monosperma*) in northwestern New Mexico. Understory layers are variable and may be dominated by shrubs and/or graminoids or be absent. Associated species include big sagebrush (*Artemisia tridentata*), mahogany (*Cercocarpus* sp.), antelope bitterbrush (*Purshia tridentata*), Gambel oak (*Quercus gambelii*), blue grama, James' galleta, or muttongrass (*Poa fendleriana*).

Southern Rocky Mountain piñon-juniper woodlands are dominated by piñon pine and/or oneseed juniper; however, in some locations, Rocky Mountain juniper (*J. scopulorum*) may co-dominate or replace oneseed juniper in higher elevations. Similar to the Colorado Plateau piñon-juniper woodlands, understory layers are variable and may be dominated by shrubs and/or graminoids, or be absent. Associated understory species may include blue grama, James' galleta, Bigelow sagebrush (*Artemisia bigelovii*), mountain mahogany (*Cercocarpus montanus*), and Gambel oak.

Ponderosa pine forests exist in mountainous areas on all slopes and aspects within the County from elevations ranging from 7,000 to 9000 feet, where the transition from piñon-juniper woodlands to ponderosa pine communities typically takes place. Ponderosa pine is the predominant conifer in these forests; however, Douglas-fir (*Pseudotsuga menziesii*), piñon pine, and Rocky Mountain juniper may also be present in the sub-canopy. The understory of this community is usually shrubby and generally includes species such as black sagebrush (*Artemisia nova*), big sagebrush, greenleaf manzanita (*Arctostaphylos patula*), mountain mahogany, Stansbury cliffrose (*Purshia stansburiana*), antelope bitterbrush, wild rose (*Rosa* sp.), Gambel oak, and snowberry (*Symphoricarpos* sp.). Common graminoids are similar to those of other communities in the County, including species of needle and thread, fescue, muhly grass, and blue grama.

Mixed conifer forests also exist in the higher, more mesic elevations above ponderosa pine in the County. These are composed primarily of Douglas-fir, white fir (*Abies concolor*), Engelmann spruce (*Picea engelmannii*), and blue spruce (*P. pungens*); however, ponderosa pine may also be present in some areas. Associated understory species may include kinnikinnick (*Arctostaphylos uva-ursi*), creeping barberry (*Mahonia repens*), Oregon boxleaf (*Pachystima myrsinites*),

snowberry, fivepetal cliffbush (*Jamesia americana*), Gambel oak, Rocky Mountain maple (*Acer glabrum*), and water birch (*Betula occidentalis*). Herbaceous species include sedge species (*Carex* sp.), muhly grass, Arizona fescue (*Festuca arizonica*), strawberry (*Fragaria* sp.), and meadow rue (*Thalictrum* sp.).

A very small amount of aspen (*Populus tremuloides*) woodlands exist in the County, but are not well represented. These deciduous forests are dominated by aspen, but may have some shade-tolerant coniferous species such as white fir and spruce developing in the understory in older stands. The understory may consist of shrub and herbaceous layers or may only have a simple herbaceous layer. Understory species may consist of snowberry and serviceberry (*Amelanchier* sp.). This community type is typically created and maintained by stand-replacing disturbances, including fire.

2.3.3 SHRUB/SCRUB COMMUNITIES

Shrub communities only represent approximately 7% of the County and are most commonly made up of salt desert scrub and sagebrush communities. Stands of salt desert scrub are characterized by an open to moderately dense shrubland composed of one or more salt brush species such as shadscale saltbush (*Atriplex confertifolia*) or fourwing saltbush. Other co-dominating or present shrubs may include big sagebrush, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*Ericameria nauseosa*), winterfat, or horsebush (*Tetradymia* sp.). The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as Indian ricegrass, blue grama, western wheatgrass, James' galleta, or sand dropseed.

Other shrublands within the County are dominated by big sagebrush or other sagebrush species and may contain several associated species that are similar to the salt desert scrub communities. Semiarid grasses occupy the understory, including Indian ricegrass, threeawn, blue grama, needle and thread, James' galleta, western wheatgrass, and muttongrass.

2.3.4 RIPARIAN WOODLAND COMMUNITIES

The bosque riparian habitat type stretches throughout the County along the Rio Grande corridor. The bosque and lowland regions are also where most of the developed and agricultural land occurs, with the highest densities of human population occurring within and around the city of Rio Rancho.

Dominant native woody vegetation includes Rio Grande cottonwood (*Populus fremontii* var. *wislizeni*), coyote willow (*Salix exigua*), and Goodding's willow (*S. gooddingii*). Invasive species such as saltcedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolia*), and Siberian elm (*Ulmus pumila*) also exist within large stands along the bosque ecosystem. Herbaceous plant species commonly associated with the bosque understory include a variety of wheatgrass (*Pascopyrum* sp.), ryegrass (*Elymus* sp.), dropseed and sacaton, and inland saltgrass (*Distichlis stricta*). Near the river or floodplain, the dominant native shrub species are coyote willow, arrowweed (*Pluchea sericea*), willow baccharis (*Baccharis salicina*), three-leaf sumac (*Rhus trilobata*), Torrey's wolfberry (*Lycium torreyi*), and screwbean mesquite (*Prosopis pubescens*) (Sivinski 2005).

Greasewood flats also exist in a small percentage of County area near drainages on stream terraces and flats. Typically having saline soils and a shallow water table, these sites flood intermittently but remain dry for most growing seasons. This system usually occurs as a mosaic of open to moderately dense shrublands that are dominated or co-dominated by greasewood (*Sarcobatus vermiculatus*). Saltbush and winterfat may also be present within this community. The herbaceous layer, if present, is sparse and is dominated by graminoids.

2.3.5 OTHER TYPES

Other types of land cover include a very small percentage of shrub communities, sparsely vegetated or barren areas, altered or disturbed areas, agricultural land, and developed areas.

2.4 HISTORIC CONDITIONS AND PRESENT CHANGES IN FIRE-ADAPTED ECOSYSTEMS

During the past few centuries, humans have altered the fire-adapted ecosystem in the Southwest. Prior to 1900, periodic, low-intensity surface fires burned through much of the forested landscape. This process reduced fuel loads by removing small-diameter understory trees and creating park-like ponderosa stands. Thus, in the past, these fire-adapted ecosystems were routinely renewed, which supported healthy ecosystems.

Prior to European settlement, fire ignited by various Native American groups and lightning-caused fires were common and removed encroaching shrubs, forbs, and trees and promoted vigorous grassland vegetation (Pyne 1982). Juniper savannas and woodlands have also changed over time and have expanded above their historic range and densities as a result of livestock grazing, fire suppression, and climatic variation (Allen and Breshears 1998; Swetnam et al. 1999).

2.4.1 NON-NATIVE AND INVASIVE SPECIES

Fire-tolerant, flammable, non-native species now exist within cottonwood (*Populus* sp.) and willow (*Salix* sp.) stands along the Rio Grande corridor. One species that deserves special mention with regard to wildfire is the non-native phreatophyte saltcedar. This species, also referred to as tamarisk, is common along the Rio Grande and occurs within the SCCWPP planning area. Programs to reduce saltcedar are already active in the County, and these efforts should continue in the future to ensure the control of this highly flammable invasive species (Figure 2.4).

Native cottonwood trees and willows are not fire adapted and thus are less capable of recovering from the effects of fire than non-native saltcedar and Russian olive (Stromberg et al. 2002). Extensive bosque fires could result in further shifts away from diverse mesic native plant communities to more xeric non-native woodlands and shrublands.



Figure 2.4. Fire burning in saltcedar along the Rio Grande corridor.

Once established, saltcedar can obtain water at deeper groundwater levels and has higher water-use efficiency than native riparian trees in both mature and post-fire communities (Busch and Smith 1993; Busch 1995). One of the major competitive advantages of saltcedar is its ability to sprout from the root crown following fire or other disturbances (e.g., flood, herbicides) that kill or severely injure aboveground portions of the plant (Brotherson and Winkel 1986; Brotherson and Field 1987; Smith et al. 1998). Saltcedar flammability increases with the buildup of dead and senescent woody material within the dense bases of the plant (Busch 1995). Saltcedar can also contribute to increased canopy density, which creates volatile fuel ladders and increases the likelihood of wildfire (Stuever et al. 1995). Other non-native species, such as Russian olive and Siberian elm, also exist along the Rio Grande and have created similar problems, although not as extensive, to those created by saltcedar.

Saltcedar and Russian olive are on the state list of noxious weeds for New Mexico (USDA 2012). For more information on noxious weeds, refer to USDA noxious species lists by state, which can be found at <http://plants.usda.gov>.

2.5 TOPOGRAPHY

The County contains a diverse topographical landscape that includes mountain ranges, canyons, river basins, a giant caldera, rolling hills, and relatively flat terrain. Elevations in Sandoval County range from 5,026 to 11,257 feet. Three major river systems transect the County: the Rio Puerco in the western half, the Jemez River in the central portion, and the Rio Grande in the southeast corner.

The Rio Grande watershed, which the County is part of, is the fifth largest in North America, and for much of its course, the river follows the Rio Grande Rift, which extends from central Colorado to southern New Mexico. The Rio Grande Rift is bordered by three major physiographic provinces: the Colorado Plateau to the northwest, and the southern Rocky

Mountains and Great Plains to the east (New Mexico Bureau of Geology and Mineral Resources 2007). The western half of Sandoval County lies within the Colorado Plateau, with the eastern half of the County being within the southern Rocky Mountains. Below the Cochiti Dam, the river flows into a relatively broad basin as it eventually flows out of the County's southeastern corner.

The Jemez Mountains are located in the County's northeast corner as a subrange of the Southern Rocky Mountains and extend into Los Alamos County and a small portion of Santa Fe and Rio Arriba counties. The highest peak in this range within the County is Redondo Peak at 11,254 feet; this peak is within the Valles Caldera National Preserve, which encompasses the massive caldera of Valle Grande.

2.6 POPULATION

The County, which was very rural and sparsely settled in the past, has far exceeded every other county in the state in population growth (Mid-Region Council of Governments [MRCOG] 2008). In 2010, the human population within the County was 131,561, which represents 6.4% of the entire population of New Mexico. Populations within the County have grown over the past several years and are continuing to grow. In addition to the entire state of New Mexico, which has continued to experience a growth rate of 13.2% from 2000 to 2010, the population in the County has grown by 46.3% from 2000 to 2010 (U.S. Census Bureau 2012).

The census data indicate that as of 2010, approximately 52,287 households and 44,860 families were located within the County. In 2000, the housing density in the County was approximately 14.1 housing units per square mile, an increase from 9 housing units per square mile in 2000. Housing units and population densities are not equally distributed throughout the County and are concentrated around communities and metropolitan areas. The most densely populated portion is within the Rio Rancho metropolitan area, with a population of 87,521 a 69% increase from 2000 numbers.

Within the entire range of the planning area, economic and employment statistics are quite variable depending on the community and available employment opportunities. The state of New Mexico had an overall median household income in 2010 of \$43,820, while the County had a median household income of \$57,158. Communities within the County, such as Corrales, had a much larger median household income of \$90,201 in 2010.

2.7 HISTORY AND LAND USE

Human occupation in New Mexico is believed to date from the Late Pleistocene (about 10,000 years ago) during the Paleoindian period (10,000–5,500 B.C.). During this time, prehistoric Sandia peoples lived and hunted throughout this region (Sandoval County 2006; MRCOG 2008). Following that time, by the early to mid-1300s, the major historic pueblo villages along the Rio Grande and its tributaries were founded, with the County being home to a number of these ancient communities. Pueblo communities relied on persistent surface water resources in order to practice agriculture and construct elaborate dwelling structures (Scurlock 1998).

After initial explorations, the Spanish established permanent settlements throughout the County, when Don Francisco de Coronado explored the area and camped near present-day Bernalillo in

A.D. 1540. The area was established as a district when New Mexico was still a Spanish province. After New Mexico became a territory of the United States, it became a part of Santa Ana County, which was one of seven political subdivisions created in 1852 (Sandoval County 2006; MRCOG 2008). In the late 1800s, early European settlers began to inhabit the area, and land uses such as logging, mining, and livestock grazing began to increase significantly (Scurlock 1998).

Nine years before New Mexico's statehood, Sandoval County was established on March 10, 1903. Los Alamos was also eventually identified as a separate county at a later time in 1949. The County was named for the Sandoval family, who were early settlers. This County has multiple tourist attractions such as Bandelier National Monument, Coronado State Monument, Valles Caldera National Preserve, multiple ancient Native American ruins, and excellent hunting and fishing opportunities (MRCOG 2008; Sandoval County 2006).

2.8 FIREFIGHTING CAPABILITY

Both volunteer and career fire departments respond to fires throughout the County. The volunteer fire departments include Algodones, La Cueva, La Madera, Pena Blanca, Ponderosa, Placitas, Regina, Cuba, Torreon, Zia Pueblo, and Jemez Springs. Corrales, Rio Rancho, Bernalillo, and Sandoval County fire departments are career fire departments (see Fire Department Resource List, Appendix C). The capabilities of career and volunteer fire departments can differ greatly; however, the availability of water resources is a universal concern. Throughout the County, a need for increased water storage is seen in communities, including standard fire hydrants, dry hydrants, and water storage tanks with the capability to store more than 5,000 gallons.

Volunteer firefighters provide service throughout the County; however, the demand for their services is heightened in rural or outlying areas because the distance and access to these remote areas often slow the response time of the career departments. While volunteers may be closer in vicinity, they often have full-time jobs and need additional travel time to respond to fires, as they must first travel from an unspecified location to the fire station and then to a fire. These factors and others contribute to the increased challenges of responding to fire in rural areas.

It is important that homeowners understand the limitations of fire responders in the County and the condition of the surrounding ecosystem. Responsibility should be placed on the landowner or homeowner to mitigate the risk of wildfire on his or her own properties. Homeowners need to be aware that many forested areas are in an unnaturally dense condition, due to decades of fire suppression. Trees are also weakened by climatic conditions and insect infestation. When building homes in proximity to forests, homeowners need to understand the risks associated with this choice. Fires occurring in these areas usually have increased risk of loss of life and property. Wildfires have the potential to become crown fires due to thick understory fuels, which act like ladders and allow surface fires to climb or transform into crown fires, which are very difficult to suppress and burn much hotter than surface fires.

Fire response is often contingent upon the actions of the homeowner, particularly when impending fire risk requires evacuation. In this instance, the County has an Enhanced 911 system that can inform homeowners of information regarding a wildfire incident.

2.8.1 LOCAL RESPONDERS

Volunteer and career firefighters at the County and community level have similar capabilities throughout the entire year, while state and federal responders are affected by fire season. In spite of the continuous level of capabilities, ebbs and flows occur within the volunteer service. Recruiting and retaining volunteers is challenging due to peoples' lifestyles and the training requirements one must follow to be a volunteer firefighter. Although several volunteer firefighters are present in the County, not all are available to respond to every fire.

2.8.2 STATE AND FEDERAL RESPONDERS

The availability of resources is dictated by the state and federal wildland fire season. From approximately April 15 through July 15, resources are plentiful around the region. This time period is considered the Southwest fire season, so multiple crews, engines, helicopters, and air tankers are available. However, from July 15 to October 31 firefighting focus often changes to other regions, such as to the Northwest United States and California. During this period, the time frame to obtain resources is extended, sometimes taking up to 48 hours. During the winter months, obtaining resources is difficult as many firefighters are employed seasonally from April through October. Given the changing fire regimes, wildfires now occur throughout the entire year, extending beyond the state and federally designated wildland fire season. Resources are limited for fires that occur outside of this time frame.

2.8.3 FIRE MANAGEMENT POLICY

Within the CWPP planning area, the responsibility for managing and responding to wildfire varies according to landownership. Resources available for initial attack on fire starts include federal, state, and local fire departments. The County has mutual aid agreements between itself and the surrounding counties and municipalities. In addition, the County has a Joint Powers Agreement (JPA) for fire protection at the both the state and national levels. When a fire incident occurs within the County's jurisdiction and is activated by the 911 system, the County must respond appropriately even though the state and federal agencies have agreements for initial attack. The County is directed by the JPA to notify the state in the case of response to a wildland fire incident. The state in turn will advise the jurisdictional agency, if it is one other than the state. Due to cost and safety concerns, tactics in fire suppression are shifting from overall fire suppression to point protection. Point protection is a firefighting strategy in which fire suppression efforts are focused at certain points (e.g., around communities), rather than from many directions.

2.8.4 EVACUATION PROCEDURES

In the event that evacuation is imminent, notification to the public is conducted at three levels. First, a "Code Red" system is used to call telephones in the affected area with a recorded message that advises residents and businesses of the nature of the emergency and gives them instructions. Secondly, the Emergency Alert System (EAS) uses radio and television to convey the message. Finally, if time permits, law enforcement and other emergency personnel will go door to door to alert any others that may not have received the message. However, door-to-door notifications are not guaranteed, as emergency workers may be fully involved with the incident.

3.0 FIRE ENVIRONMENT

3.1 WILDLAND URBAN INTERFACE

The WUI is composed of both interface and intermix communities, and is defined as a group of areas where human habitation and development meet or intermix with wildland fuels (USDA and USDI 2001:752–753). Interface areas include housing developments that meet or are in the vicinity of continuous vegetation; these areas consist of less than 50% vegetation. Intermix areas are those areas where structures are scattered throughout a wildland area of greater than 50% continuous vegetation and fuels, and must meet or exceed a minimum of one house per 40 acres. 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 (Stewart et al. 2007).

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property. Human encroachment into wildland ecosystems in recent decades has increased the extent of the WUI and has therefore had a significant influence on wildland fire management practices. 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; Bushey 2012). Fuels and fire management mitigation techniques have been proven effective with strategic planning and implementation in WUI areas (Bushey 2012); however, all WUI mitigation focus areas will be different and should be planned for accordingly.

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

The Core Team defined the WUI boundary as areas highlighted by Sandoval County's 2007–2008 WUI assessment and inventory. Communities were identified and grouped within five different corridors (Greater Cuba, Jemez Springs, Jemez Mountains, Rio Grande, and Sandia Mountains). The Core Team decided to use corridors rather than points to define the WUI. The WUI is defined as the area 1.5 miles from the boundaries of the communities in each corridor (Figure 3.1). Other areas considered within the WUI include sparsely populated areas not covered by the current assessment, bosque areas, a buffer around the Jemez and Rio Grande valleys, and critical infrastructure (see Map D.1 in Appendix D) areas. These additional areas include important community water sources and other infrastructures such as electronic sites, mountaintop repeaters, towers, pipelines, cultural resources, reservoirs, dams, treatment plants, bridges, lift stations, hospitals, tribal clinics, and other critical infrastructure. WUI areas will be expanded in areas of greater risk and based on community and Core Team input.

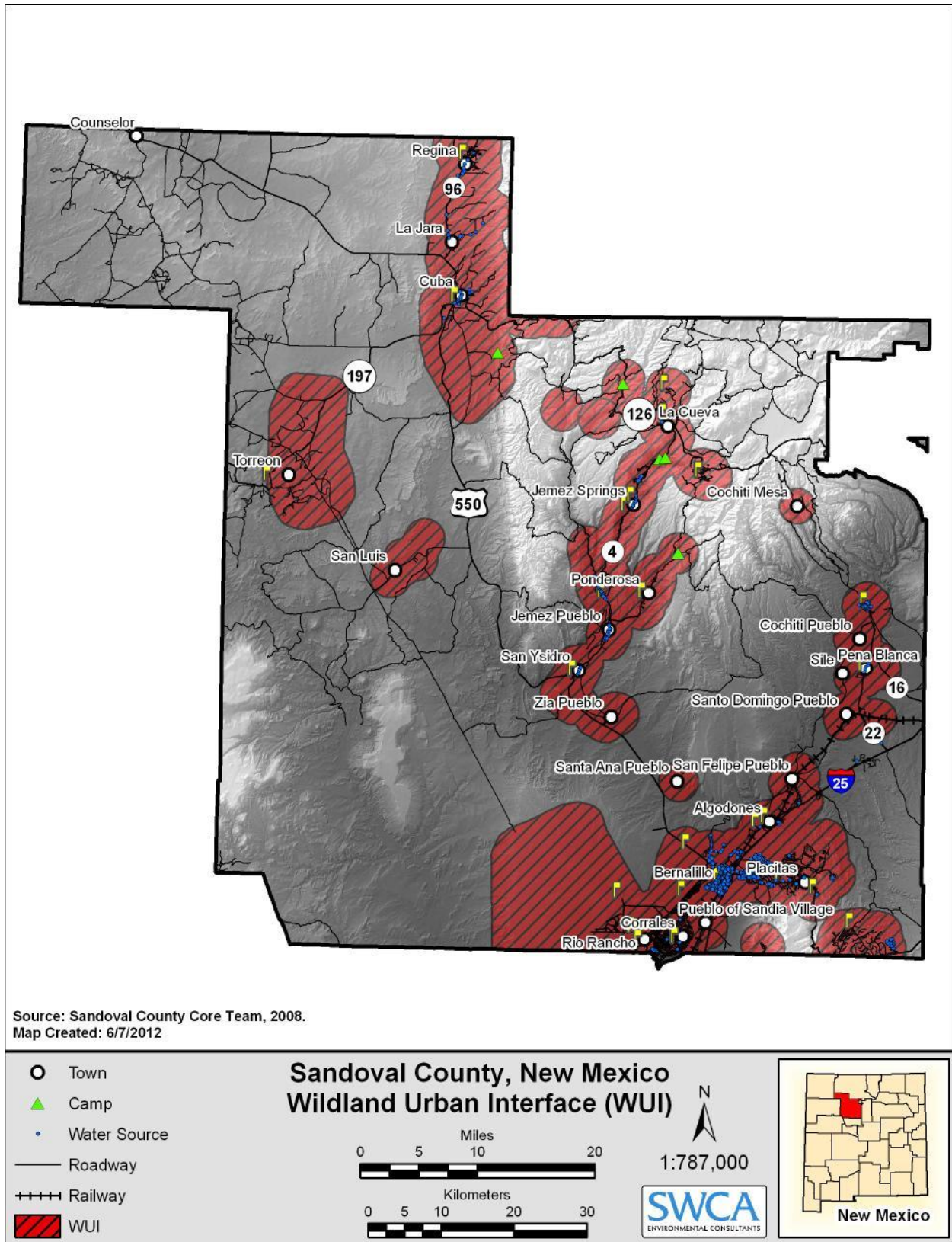


Figure 3.1. Sandoval County WUI map.

3.2 FIRE HISTORY

3.2.1 FUELS AND TOPOGRAPHY WITHIN THE WUI IN SANDOVAL COUNTY

In wildland fire management, fuels refer to the live and dead vegetation available to burn in any given area across the landscape. In other words, when live or dead vegetation is dry enough to be available for combustion, it is considered potential fuel for a wildland fire. Grassland fuel types are found predominately in the southeastern portion of the County and in scattered areas throughout the County's western portion. Grassland communities are basically sparse and often discontinuous across the landscape; they usually occur on flat to rolling topography in lower elevations as pure stands or as juniper savanna. Grassland fires often move quickly under windy and steep conditions and can easily spread into property where the fuels have not been treated. Rates of spread can be very high, often reaching more than 300 feet per minute.

A predominant fuel type in the lower to mid elevations is piñon-juniper woodland. The natural fire regimes within pure piñon-juniper stands have been largely altered. Consequently, the once open and patchy nature of these stands that has been maintained by frequent, low-intensity surface fires in the past now exists in dense stands with a closed canopy. These dense thickets have choked out the native understory grasses, forbs (flowering plants), and shrubs in many areas. These stands are now more likely to burn as stand-replacing crown fires through the canopy, especially in the presence of wind and steep topography.

Pure stands of ponderosa pine are scattered in the higher elevations above about 9,000 feet in the northeastern portion of the County in the Jemez Mountains. These stands currently exist as dense stands with an understory of younger trees, increasing the likelihood for a fire to be lifted into the canopy. Where the forest canopy is continuously spaced fewer than 20 feet apart, a sustained crown fire with long-range spotting can occur, especially in the presence of wind and steep slopes.

The ponderosa pine community was particularly badly hit in the Las Conchas fire, which burned 33,699 acres of Southern Rocky Mountain Ponderosa Pine Woodland, 19,237 acres of Colorado Plateau Pinyon Juniper Woodland, 52,894 acres of Mesic and Dry Mesic Montane Mixed Conifer Forest and Woodland, and 16,443 acres of Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodlands. Of the 33,699 acres of ponderosa pine woodland burned, 16.6% burned with high severity and 29.8% burned with moderate severity, burn severities that are atypical for this dry forest type (Bird and Menke 2011).

The recent outbreaks of Ips beetle (*Ips* sp.) and mountain pine beetle (*Dendroctonus ponderosae*) has killed significant numbers of piñon and ponderosa pines throughout the Southwest. In areas where needles have fallen to the ground and only the trunk and branches of trees remain, fire is less likely to be carried through the canopy. In areas where the canopy is still maintaining dead needles, the risk of fire being carried through the canopy is much greater and should be mitigated appropriately.

For fire behavior modeling purposes, wildland fuels are divided into specific fuel models. A detailed discussion of fuel model use for this project is included in Section 4.4.2.

3.2.2 PAST FIRE MANAGEMENT POLICIES AND LAND MANAGEMENT ACTIONS

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 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 playing a role in influencing historical fire occurrences.

Prior to European settlement throughout the West in the 1800s, lightning- and human-ignited fires burned more frequently and less intensively. Following European settlement, a dramatic increase in livestock grazing, fire suppression, and other human-related activities have altered the landscape and the fire regimes associated with them (Covington and Moore 1994). Some species of non-native vegetation have also been introduced over time and have invaded many native landscapes across the West, which has also altered natural fire disturbance processes (Brooks et al. 2004).

Beginning in the early 1900s, the policy for handling wildland fire was initiated by the USFS and leaned heavily toward suppression. Over the years, other agencies such as the BLM, the BIA, and the NPS followed the USFS lead 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.

3.2.3 HISTORICAL FIRE REGIMES AND PRESENT CHANGES

Historical fire regimes represent the frequency and severity of fires that took place prior to Euro-American settlement. Multiple fire-history studies and historical written records in the Southwest describe the condition of pre-Euro-American–settlement ponderosa pine forests as much more open and park-like. These studies have documented the historical fire regime to exhibit high-frequency, low-severity fires (Covington and Moore 1994). Although stands of ponderosa pine do not exist throughout the entire County, they represent a common condition that influences the vegetative structure and historical fire regimes within most ecosystems throughout the West. These changes have been attributed to intensive livestock grazing, past policies on wildland fire suppression, and other human land uses that have impacted natural environments.

Decreases in Fire Frequency

Fire occurrence and behavior in the West has changed dramatically within the past century. Historically, frequent low-intensity surface fires burned throughout many areas within the County, creating a mosaic of different stages of vegetative structure across the landscape. For the most part, these fires helped preserve an open vegetative community structure by consuming fuels on the ground surface, which maintained open meadows and cleared the forest understory of encroaching vegetation.

In general, studies have found that pre-1900 mean fire intervals (MFI, which is the mathematical average of all fire frequencies for a specific study site) ranged from five to 25 years across the Jemez Mountains, and that fire frequencies and areas burned were the greatest in mid-elevation ponderosa pine forests (Allen 2001). Ponderosa pine stands that exist in the higher elevations within the County are fire-adapted ecosystems maintained by frequent low-intensity fires. Throughout the Southwest, extensive fire history studies have documented historical fire frequencies in ponderosa pine using tree-ring data. Studies in ponderosa pine communities of New Mexico have found the MFI in ponderosa pine to be within the range of approximately three to 11 years. Large variation in the spatial and temporal scales of fires in ponderosa pine has been common and is usually based on forcing factors such as seasonality, regional climate, elevation, aspect, and other site conditions (Brown et al. 2001).

Historic MFIs for grasslands are thought to have occurred every couple years; however, over the past few decades, encroachment of shrubs and trees has been taking place within this community type. Recent studies conducted in the Valles Caldera within the planning unit have documented an approximate 18% decline in the area of grasslands from 1935 to 1996 (Coop and Givnish 2007). In general, grassland communities have been heavily impacted by livestock grazing, because many types of grassland have converted to shrublands due to sparse vegetative cover, which has limited fire spread. Piñon-juniper and juniper have also been expanding their ranges into grasslands and the understory of ponderosa pine communities as a result of past livestock grazing practices, lack of fire occurrence, and climate change (Allen and Breshears 1998; Swetnam et al. 1999).

Mixed Changes in Fire Frequency

One of most common vegetative communities in the planning area is piñon-juniper woodland. These woodlands are some of the most poorly understood ecosystems in terms of fire regimes, but recent research suggests that fire may have been a less-common and less-important disturbance agent in piñon-juniper woodlands as compared to adjacent ponderosa pine and grassland ecosystems. In a recent review of piñon-juniper disturbance regimes, Romme et al. (2007) subdivided the piñon-juniper cover type into three subtypes: areas of potential woodland expansion and contraction, piñon-juniper savannas, and persistent woodlands. These categories are helpful in separating the broad piñon-juniper cover type into distinct communities, which are subject to different climatic, topographic, and disturbance conditions.

As mentioned previously, many grasslands in the Southwest have been colonized by trees as a result of a complex interplay of environmental factors. The issue of woodland encroachment into grasslands goes hand in hand with the assessment of historical conditions of the woodlands. Areas of potential expansion and contraction are those zones wherein the boundaries of the piñon-juniper ecotones have shifted. These shifting boundaries have been widely documented (e.g., Gottfried 2004), but the historical condition of the ecosystem may be relative to the time scale of evaluation. Betancourt (1987) has suggested that the changing distribution patterns seen in the last century may be part of larger trends that have occurred over millennia and not the result of land use changes. Overall, it is believed that greater landscape heterogeneity existed previously in many of these areas that are now uniformly covered with relatively young trees (Romme et al. 2007).

Piñon-juniper savannas are found on lower elevation sites with deep soils where most of precipitation comes during the summer monsoon season. Juniper savanna, the most common savanna in New Mexico, consists of widely scattered trees in a grass matrix (Dick-Peddie 1993). Similar to grasslands, the range of savannas has decreased as tree density has increased, but the mechanisms for the tree expansion are complex and the subject of current research. Significant scientific debate currently exists over the natural fire return interval (FRI) for savannas, but most experts agree that fire was more frequent in savannas than in persistent woodlands.

Persistent woodlands, characteristic of rugged upland sites with shallow, coarse soils tend to have older and denser trees. Herbaceous vegetation within this community is typically sparse, even in the absence of heavy livestock grazing. Research from persistent woodlands provides strong evidence to support the theory that the natural fire regime of piñon-juniper woodlands was dominated by infrequent but high-severity fires and that FRIs may have been on the order of 400 years (Baker and Shinneman 2004; Romme et al. 2007). These findings are in stark contrast to previous estimates of piñon-juniper FRIs of 30 to 40 years (Schmidt et al. 2002; Smith 2000). The short FRI estimates were mostly inferred from FRIs of adjacent ponderosa pine ecosystems due to the scarcity of fire-scarred trees in these ecosystems.

In contrast to ponderosa pine, piñon pine and juniper produce relatively small volumes of litter. Understory fuels, either living or dead, must be sufficiently contiguous to carry a low-intensity surface fire. In the absence of fine surface fuels, fires that spread beyond individual trees have been most likely wind driven and spread from crown to crown (Romme et al. 2007). Fire extent has been greatest in higher-density woodlands and has been limited by both fuels and topography in sparse, low-productivity stands on rocky terrain. Most scientists agree that fire was more common in savannas and areas of expansion and contraction than it was in persistent woodlands, but debate remains on the exact range of fire frequency. Overall, frequent, low-intensity surface fires have not been the predominant fire regime in piñon-juniper woodlands. Therefore, fire exclusion may not have altered forest structure as dramatically in this forest type.

Increases in Fire Frequency

Although most of the County exhibits decreased occurrence of wildland fires compared to historical conditions, some areas within the County are actually experiencing an increase in fire occurrence and severity. Riparian ecosystems along the Rio Grande were historically shaped by natural hydrologic regimes. Native riparian vegetation is not adapted to fire, and fires did not typically occur within this ecological zone. As a result, fire can actually influence the composition and structure of riparian ecosystems (Ellis 2001). The ecology of this habitat type has changed significantly over time, as fire-adapted invasive species such as saltcedar and Russian olive have invaded many areas. Once saltcedar has been established at a location, it increases the likelihood that the riparian area will burn and, as a result, alter the natural disturbance regime. Saltcedar and Russian olive both sprout readily after fire, and although cottonwood will also regenerate after fire, it typically has limited survival of resprouting individuals. Studies have found that the density of saltcedar foliage is higher at burned sites than unburned sites within riparian areas (Smith et al. 2006).

Changes in Fire Severity

Fire severity refers to a fire's impact on an aspect of an ecosystem resulting from a combination of heat produced in the flaming front (intensity) and the duration of an area's exposure to heat. Areas that have experienced reduced fire frequency and a resultant increase in fuel loading are likely to experience more severe fires. Changes in climate are also likely to contribute to increased fire severity throughout the western United States. This may result in significant impacts to soil, runoff, the vegetation community, and the ecosystem at large.

3.2.4 RECENT FIRE OCCURRENCE IN THE CWPP PLANNING AREA

Basic Wildland Fire Terminology

The several different types of fires that may take place all referred to using the following terms:

- Wildland Fire:** Any fire burning in wildland fuels, including prescribed fires, wildland fire use, and wildfires.
- Prescribed Fires:** Planned fires ignited by land managers to accomplish resource management objectives.
- Fires for Resource Benefit:** Event where naturally occurring fires are allowed to burn under carefully prescribed conditions in order to accomplish resource management objectives.
- Wildfires:** Unwanted and unplanned fires that result from natural- or human-caused ignitions.

Recent Fires in Sandoval County

Over the course of a season, a certain amount of County acreage is burned through prescribed burning. However, lightning- and human-caused ignitions are also common causes of fires throughout the County. Lightning ignitions are frequent throughout the monsoon season, which typically takes place from July through August. Fire records obtained and combined from NMSF and federal land management agencies (such as the NPS, BLM, and USFS) show that the greatest fire occurrence in the County takes place in June and July each year (Figure 3.2) and the number of fires occurring each year varies considerably (Figure 3.3). According to available fire records, nearly 70% of the fires that occurred within the County from 1970 to 2007 were ignited by lightning. Human-caused ignitions were most significant on state jurisdictional lands within the County and accounted for approximately 74% of the state fires during the period of record from 1987 to 2007.

A primary concern of residents in the WUI is the growing number of human-caused ignitions, particularly with the development and improvement of roads, residences, and recreational opportunities into wildland areas. The use of illegal fireworks is a concern for a number of residents and fire departments particularly close to urban areas such as Rio Rancho and Corrales. Human-caused fires increase the numbers of fire events that take place overall and increase the probability of fire occurrence throughout the year, including the winter months (see Figure 3.2). This is particularly true in grassland and bosque ecosystems.

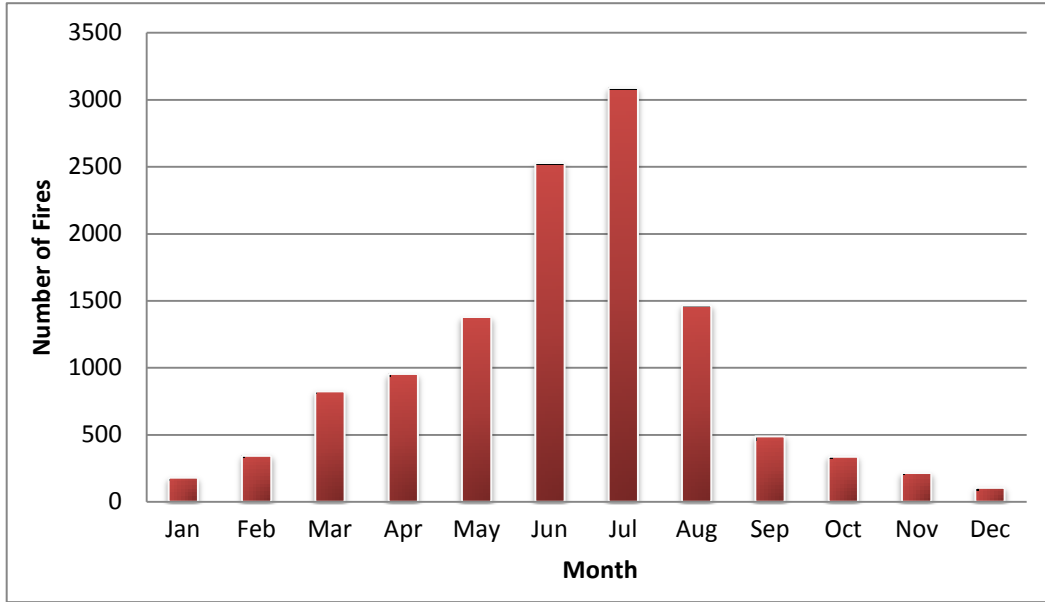


Figure 3.2. Number of fires per month based on state and federal fire records from 1970 to 2010.

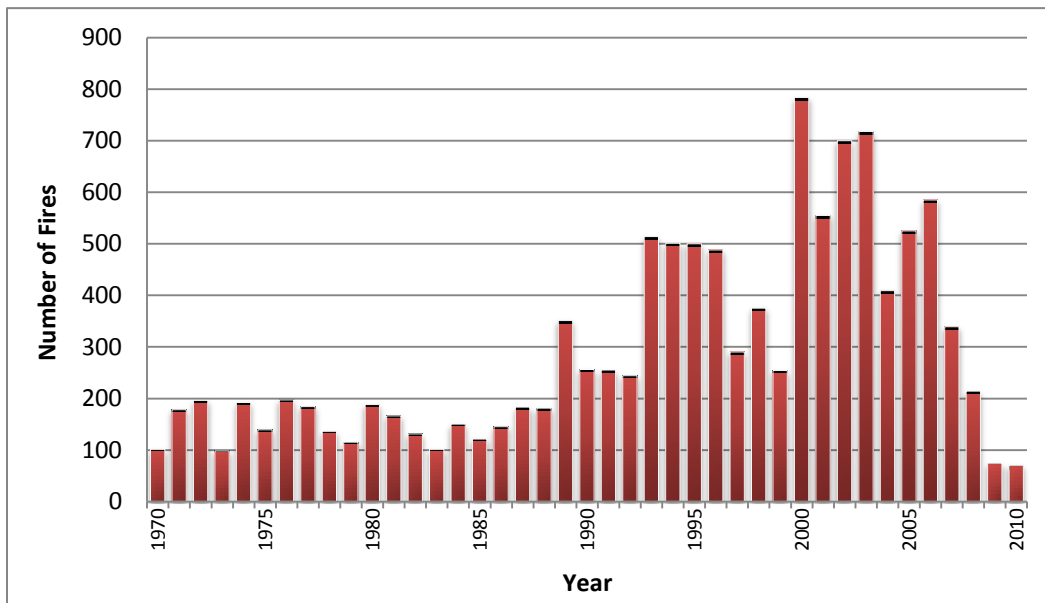


Figure 3.3. Annual fire occurrence from 1970 to 2010

Most ignited fires are detected early and suppressed before they gain acreage; however, depending on environmental conditions and response time, they may spread rapidly across a sizable area, becoming difficult to suppress before they are effectively controlled. Fires that are ignited within the region are usually smaller than 10 acres. However, within the last 40 years on record (1970–2010) in the County, 188 wildfires have been greater than 100 acres in size. In total, 35 fires on record grew to greater than 1,000 acres, including the Porter, La Mesa, Dome, Stable, Lakes, Cerro Grande, and Las Conchas fires. Some of these large fires were significant in bringing about changes to fire management and research, and are discussed in more detail below. Table 3.1 lists the fires larger than 5,000 acres that have occurred within the planning area from 1970 to 2011. As noted, most of these large fires took place as a result of human-caused ignitions, such as debris burning, equipment use, arson, smoking, camping, children, and other sources of human-caused ignitions.

Table 3.1. Fires Larger Than 1,000 Acres on Record within Sandoval County*

Fire Name	Start Date	Acres Burned	Description
La Mesa	June 16, 1977	15,270	Human-caused fire burning mainly within Bandelier National Monument.
Dome	April 26, 1996	16,575	Started by an improperly extinguished campfire. Burned on USFS lands and Bandelier National Monument.
Oso	July, 1998	5,185	None available.
Cerro Grande	May 4, 2000	47,650	Escaped prescribed burn started in Bandelier National Monument.
Molina	June 23, 2003	7,165	Complex made up of the Molina and Capulin fires. Started by lightning strike.
Las Conchas	June 26, 2011	156,593	Ignited by downed power line.

*Based on 1970–2011 state fire records.

The following examples provide descriptions of the largest fires on record in the County and the subsequent fire prevention and protection initiatives as a result of each fire event.

Las Conchas Fire

The Las Conchas fire is the largest fire in recorded history in Sandoval County and the second largest in New Mexico as a whole. The fire started on June 26, 2011, and spread rapidly (Figure 3.4 and Figure 3.5). It continued to burn for five weeks, ultimately impacting 156,593 acres of land across multiple jurisdictions (Table 3.2) and burning over 100 buildings, including 63 homes. The fire started as a result of a wind-felled aspen downing a power line on private land near the Las Conchas trailhead off New Mexico Highway 4 between Los Alamos and Jemez Springs, just south of the Valles Caldera National Preserve. The fire burned in ponderosa pine, mixed conifer, and piñon-juniper with mixed severity, spreading as a result of strong and unpredictable winds. According to Burned Area Emergency Rehabilitation (BAER) data sets from the fire, 20% burned with high severity, 29% moderate and 39% low severity (Bird and Menke 2011). Topography was predominantly moderate to steep, with some mesa areas. The size and intensity of the fire resulted in considerable threats to life and property, natural resources and values at risk (Figure 3.6 and Figure 3.7), with many communities undergoing mandatory evacuation, including Los Alamos residents who were evacuated for a week. Cultural and archaeological resources are abundant in the burn area and are threatened by future soil erosion. The burn area, particularly the areas burned with moderate and high severity, is also

now prone to non-native species invasion. A number of BAER treatments were implemented in the burn area, including replacing culverts, installing trash racks to protect channels, clearing stream channels of large woody debris that may mobilize in high flows, installing signs warning residents and visitors of potential flooding, aerial seeding and mulching high-severity burn areas, gating off unsafe areas of the burn, removing hazard trees and rocks from roads and treatment areas, controlling against invasion of noxious weeds, and installing water bars to minimize erosion.



Figure 3.4. Las Conchas fire from Placitas



Figure 3.5. Las Conchas fire headed down Frijoles Canyon (photo credit: Craig Allen, USGS).



Figure 3.6. Santa Clara Canyon (photo credit: Southwest Area Fires 2011).



Figure 3.7. Cochiti Mesa area post Las Conchas (photo credit: Feldman).

Table 3.2. Las Conchas Burn Acres by Jurisdiction

Landownership/Administered By	Acres	%
BIA - Jemez	2,842	1.9%
BIA - Santa Clara	16,609	11.0%
BIA - Santo Domingo	63	0.0%
Los Alamos County	44	0.0%
Department of Energy	118	0.1%
NPS	20,817	13.8%
Private or other	5,033	3.3%
USFS Santa Fe National Forest Coyote	22	0.0%
USFS Santa Fe National Forest Española	27,220	18.1%
USFS Santa Fe National Forest Jemez	50,023	33.2%
Valles Caldera National Preserve	27,837	18.5%

Lessons Learned from Las Conchas

The following excerpts are taken from a June 2012 report by EPSCoR and New Mexico First entitled ‘*New Mexico Fire and Water, Impacts and Lessons Learned from the Las Conchas Fire*’ and are examples of some of the impacts recorded to various resources (page numbers refer to the location of the excerpt within the EPSCoR and New Mexico First document):

Plants

“Because of the variation in the severity of the burn as well as the variety of forests, woodlands, and grasslands burned, a general discussion of the impact of the fire on plants is difficult. The areas that burned “lightly” (low severity or unchanged) will see little impact, while in some severely burned areas all Ponderosa pines burned, leaving no live trees for seeds.” (Fleck 2012- page 12).

“Much of the moderate and high severity burned areas were in the forests. In the moderate-severity burned areas, smaller plants and dead brush were consumed. Trees were killed either because they burned through a “Roman Candle” effect, or in some cases, the heat on the ground resulted in the roots of the tree being cooked.” (Parmenter 2011- page 13).

Wildlife

“Large wildlife species fared well on the Valles Caldera preserve. Elk, deer, bear, cougar, and coyotes moved of the way of the fire. For example, 28 radio-tagged elk calves and their mothers all survived.” (Parmenter 2011- page 13).

Water Quality

“The summer monsoons mobilized soil, ash, and charcoal from burned sites. Intense storms, coupled with little vegetative cover in severely burned areas, deposited the material into streams through runoff. The impacts in water quality are site specific and, again, streams within the Valles Caldera National Preserve provide examples. The initial monsoon storms began in late July on the preserve. While only about a third of the Indios Creek watershed burned in the fire, it was a high severity burn removing vegetation and leaving little ability for the soil to hold moisture. The first storm was intense with more than a half and inch of rain and hail in a few

minutes. The impact was impressive with sheet-flows (a thin continuous film of water moving downslope) of water depositing ash, soil, rocks and debris into the creek.”(Parmenter 2011- page 14).

Land use and Activities

“Both the Valles Caldera Preserve and the Bandelier National Monument are favorite recreation areas. The impact of the fire on recreational activities is long-term and the opportunities once available may not be there, or may not be the same, for many years to come. Within hours of the start of the fire, Bandelier park visitors, employees, and residents were evacuated. While the visitor center and main archeological sights were minimally impacted, the majority of the canyon burned and much of it was high severity. Concerns about the fires quickly became concerns about floods. Preparations minimized the damage and protected the visitor center. Heavy rains brought floods and considerable damage to trails. There is now no access to the Rio Grande, because the trail that led to it was destroyed.” (National Park Service 2012- page 15).

Downstream Impacts

“The impact from the floods extends far beyond the burn zone. Measurements immediately after the forest fire documented seriously degraded water quality in regional streams and rivers. Reduced oxygen levels in the water (with negative affects on animal and plant life) were detected down the Rio Grande over distances of at least 100 kilometers.” (page 16).

Economic Impacts

“The potential costs for the Las Conchas fire are staggering. The suppression costs alone are over \$48 million. The cost of testing water from the Buckman Direct Diversion is estimated at over \$250,000 and will be paid by the federal government.⁶⁶ Additional costs include: expenses to reclaim and revitalize the land burned, and to mitigate the damage of floods; the lost workdays and productivity; the permanent loss of Dixon’s Apple Orchard and the livelihoods of people who worked there; revenue loss associated with reductions in recreation and tourism; land-use loss to ranchers or other private land owners; and the enormous economic costs to Santa Clara Pueblo. In addition, there are non-market values of lost cultural sites, lost habitat, lost recreational opportunities, and lost ecosystem services.” (National Interagency Fire Center 2012, Matlock 2011- page 17)

Cerro Grande Fire

Another significant and monumental fire that took place within the planning area in recent years was the Cerro Grande fire in 2000. This fire consumed 47,650 acres, destroyed 235 residences, and damaged or destroyed several other structures, including facilities in the Los Alamos National Laboratory (NPS 2008). The Cerro Grande fire originated as a result of a prescribed fire implemented by NPS staff that was part of the 10-year plan for reducing fire hazards within Bandelier National Monument. The prescribed burn was ignited on May 4 and was converted to a wildfire on May 5 after it was driven out of control by a combination of high, erratic winds and extreme drought conditions. The fire originated on Cerro Grande, which is a 10,200-foot summit on the rim of Valles Caldera. The fire was thought to be contained by early May 7; however, at approximately 11 am that day, winds increased significantly from the west, and the fire raged out of control again. On May 10, the fire burned through the town of Los Alamo and threatened

White Rock, forcing 18,000 residents to evacuate. The fire also burned other private lands and portions of San Ildefonso and Santa Clara pueblos.

The Cerro Grande fire was one of many fires in the landmark fire season of 2000, which spurred the development of the NFP in August 2000. New direction from this plan was to provide guidance for the response to severe wildland fires and their impacts to communities while also ensuring sufficient firefighting capacity for the future. This was followed by legislation responding to the severity of the wildfire seasons that took place following 2000, which included the Healthy Forests Initiative launched in August 2002 and the HFRA.

Dome Fire

The Dome fire took place in the Jemez Mountains in the northern portion of the County and burned through portions of Santa Fe National Forest and Bandelier National Monument. The fire was ignited on April 26, 1996, from an improperly extinguished campfire and eventually reached 16,575 acres in size. High fuel loadings, low fuel moistures, and wind contributed to the fire's extremely rapid spread. It was finally contained in early May 1996. The Dome fire was significant in pointing out the difficulty of controlling wildland fires, and it inspired interagency collaboration in order to prevent future fires (University of Arizona 2002).

La Mesa Fire

On June 16, 1977, the La Mesa fire burned 15,270 acres of ponderosa pine in Bandelier National Monument and part of Los Alamos National Laboratory. The La Mesa fire burned through a large portion of the Rio de los Frijoles drainage basin and increased awareness of the effect of wildfires on watersheds. As a result of this fire, researchers began studying the effects of fires on ecosystems (University of Arizona 2002).

During the writing of this 2012 update, in June 2012 three other fires burned in the County: the Bear Springs fire burned 622 acres of ponderosa pine and mixed conifer on the Santa Fe National Forest Jemez Ranger District, the Colorado Peak fire burned over 245 acres of piñon-juniper and brush on the Española Ranger District of the Santa Fe National Forest, and the Romero fire burned 359 acres of the Middle Rio Grande Bosque through Corrales and Sandia Pueblo.

3.3 CHALLENGES TO FUTURE FIRE AND FUELS MANAGEMENT EFFORTS

In addition to all the anthropogenic impacts that have degraded natural fire regimes, climate change has 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. Fires in the past few years have grown to record sizes, are burning earlier and longer, and are burning hotter and more intensively than they have in the past (Westerling et al. 2006; Roos and Swetnam 2012). Westerling et al. (2006) consider climate change to be a dominant factor in increasing fire severity particularly in the northern Rockies; in the Southwest the authors claim that the concentrations of heavy fuels are also responsible for the increasing severities (Fleck 2012). Roos and Swetnam (2012) support this assertion, stating that the United States would not be experiencing massive large canopy killing crown fires (in ponderosa pine) today if human activities had not begun to suppress the low-severity surface fires that were so common more than a century ago. Ponderosa pine forests would have been equipped to handle climate change but not in the condition they are currently in (Roos and Swetnam 2012).

According to the National Interagency Fire Center (NIFC), occurrence of catastrophic wildfires has greatly increased over the last 20 years. Within just the last 10 years, a record number of acreage has burned, and this number is continually growing (NIFC 2012). In 2011 the Southwest experienced above average acres burned, by August reaching 323% of the 10-year average for the region, having experienced its fifth warmest summer and second driest summer on record (NIFC 2012).

Climate change, along with all of the other mentioned land management impacts, is likely to make the restoration of natural systems to their historical conditions difficult, if not impossible, and should be taken into account when planning fuels treatments and other general fire management practices.

Due to scattered human developments throughout the WUI and intermix, suppression will always have to be a priority in those areas. Although fire suppression is still aggressively practiced, fire management techniques are continually adapting and improving. Using prescribed fire and wildland fire use combined with effective fuels management techniques will help re-establish natural fire regimes and reduce the potential for catastrophic wildfires.

3.4 FIRE REGIMES AND FIRE REGIME CONDITION CLASSES

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

3.4.1 FIRE REGIMES

A historic fire regime, or natural fire regime, is a general classification of the frequency and severity of fires and the roles they would play throughout a landscape in the absence of modern human intervention (Euro-American settlement), but include the influence of aboriginal burning (Agee 1993; Brown 1995; Hann et al. 2003). Historic 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). Natural fire regime classes presented in the 2008 plan have recently undergone a nationwide update to create discrete, mutually exclusive criteria appropriate for use with LANDFIRE's fire frequency and severity data products (LANDFIRE 2012). These data products are used in the SCCWPP's risk assessment modeling.

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

- Class I** 0–35 year frequency and low (mostly surface fires) to mixed severity (fewer than 75% of the dominant overstory vegetation is replaced).
- Class II** 0–35 year frequency and replacement severity (more than 75% of the dominant overstory vegetation is replaced).
- Class III** 35–200 or more year fire frequency low (mostly surface fire) and mixed severity (fewer than 75% of the dominant overstory vegetation is replaced).

Class IV 35–200 or more year fire frequency and replacement severity (more than 75% of the dominant overstory vegetation is replaced).

Class V 200 or more year frequency and any severity.

3.4.2 FIRE REGIME CONDITION CLASS

The Fire Regime Condition Class (FRCC) is a measure of the degree of departure from 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 disease mortality, insects, grazing, and drought (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).

The three FRCC rankings are:

FRCC 1 No or low departure from the central tendency of the reference conditions.

FRCC 2 Moderate departure from the central tendency of the reference conditions.

FRCC 3 High departure from the central tendency of the reference conditions.

The *central tendency* is a composite estimate of the reference condition vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure includes a range of plus or minus 33% deviation from the central tendency (Hann and Bunnell 2001; Hardy et al. 2001; Schmidt et al. 2002).

3.4.3 FIRE REGIME AND CONDITION CLASSIFICATIONS IN SANDOVAL COUNTY

Almost half of the County is ranked as FRCC 3. Grasslands and shrublands within the planning area typically exhibit FRCC 3 for the majority of the area. Piñon-juniper and juniper forests are variable in their natural fire regimes and FRCC classifications across the planning area. Juniper savanna communities most likely have a natural fire regime of Class I with the fire severity ranging from low to moderate. Many of these stands have experienced extensive encroachment of trees and are FRCC 3. Ponderosa pine communities generally have an FRCC ranking of either 2 or 3 (see Map D.2 in Appendix D). These departures from historic conditions can create a widespread loss of natural vegetation communities and conversion to fuel types inclined to support more intense and problematic fire behavior.

4.0 RISK ASSESSMENTS

4.1 OVERVIEW AND PURPOSE OF RISK ASSESSMENT PROCESS

The purpose of a WUI risk assessment is to determine the relative degree of hazard for each community and identify the specific hazards and elements of risk. Mitigation efforts can then be prioritized and more detailed planning can take place as needed. This risk assessment process evaluates the threat of fire that local hazards pose to values at risk within the County's WUI.

In the wildland fire vernacular, "hazard" generally refers to wildland fuel in terms of its contribution to problem fire behavior and its resistance to control when combined with terrain and weather features. Fire "risk" refers to the chance of a wildfire starting, as determined by the presence and activity of causative agents (National Wildfire Coordinating Group [NWCG] 1998) and other variables that may impact people living in these areas such as dead-end roads and proximity to fire response facilities. Currently, no uniform methodology is available for synthesizing elements of hazard and risk into a comprehensive analysis, though very general guidelines have been published in the National Association of State Foresters' (NASF's) *Field Guidance for Identifying and Prioritizing Communities at Risk* and the NWCG's *WUI Fire Hazard Assessment Methodology*. Each jurisdiction must evaluate hazard and risk according to the environment and values unique to the area.

For the 2012 update the Core Team reviewed the 2008 risk assessment results and determined which communities required revisions to their risk ratings. These revisions could be due to a series of factors; for example, changes in community structure or composition resulting from growth and expansion of homes; altered hazards in the WUI such as increased hazardous fuel loads or growth of oil and gas infrastructure; changes to essential infrastructure, such as a new road network or a new fire station; or changes to community structure and/or hazards as a result of the Las Conchas fire and other recent fires. As was the case for the 2008 risk assessment, the 2012 update analyzed elements of hazard and risk through a series of steps consistent with NASF and NWCG guidelines.

- 1) **Community Hazard/Risk Assessment:** Field assessments were performed for each WUI community in the County. Road access, fuels, topography, and community characteristics were evaluated using a National Fire Protection Association (NFPA) form (Appendix E), and a numeric rating was assigned.
- 2) **Fire Behavior Analysis:** Inputs such as fuel characteristics and weather conditions were processed in the GIS-based FlamMap 3.0 model to generate fire behavior predictions such as flame length and rate of spread over the geographic area (see Appendix D).
- 3) **Composite Risk Assessment:** Fire behavior outputs (hazard) were combined with geographic fire occurrence data (risk) in a weighted overlay to produce a Composite Risk Assessment. This illustrates the relative degree of wildfire risk throughout the County.
- 4) **Risk Assessment Comparison:** A side-by-side comparison of the Composite Risk Assessment and the Community Hazard/Risk Assessment was conducted to determine the WUI areas of highest priority. Please see Table 4.1 to see how the Community Assessment Rating (field component) and the Composite Risk Rating (modeling component) compare.

Many methods can be used to perform wildfire risk assessments, and several have been applied to the County. Different methods will highlight different factors, and it should be emphasized that these assessments illustrate relative risk for the purpose of prioritizing mitigation and planning efforts. Subjectivity plays a role in any WUI risk assessment, and the significance of risk ratings must be kept in perspective. Once relative risk has been determined, components of the assessment can be used to guide mitigation efforts.

Table 4.1. Sandoval County Community Hazard/Risk Severity Ratings Summary

Community	Community Assessment Rating	Factors Summarized from NFPA Form 1144	Composite Risk Rating
Greater Cuba Area			
Cuba	High	(+/-) Generally light fuels with some pockets of brush close to homes (+/-) Combustible building materials, but generally non-combustible roofs (+) Flat terrain (-) Many outlying homes lack adequate defensible space	Moderate-Extreme
Regina	High	(+/-) Mix of light fuels and brush fuels (+) Generally flat terrain (+) Fire hydrants and fire station present (-) Narrow, dead-end roads are prevalent	Moderate-Extreme
La Jara	High	(+) Primarily light fuels and agricultural lands (+) Generally flat terrain (-) Lack of fire hydrants and fire station (-) Heavy fuels within upper watershed on and near USFS land and along irrigation ditches	Moderate-Extreme
Jemez Springs Corridor			
Zia Pueblo	Moderate	(+) Generally light fuels (+/-) Generally adequate defensible space, though some areas could be improved (-) Some homes exposed to slopes	High
Jemez Pueblo	High	(+) Generally light fuels (-) Many outlying homes lack adequate defensible space (+/-) Combustible building materials, but generally non-combustible roofs (-) Limited fire service water supply	High
Ponderosa, South	Moderate	(-) One main access/egress route (-) Some long, narrow drives with inadequate turnarounds (+) Generally fire resistant construction (+) Surrounded by agricultural land	Moderate-High
San Ysidro	High	(+/-) Generally light fuels with some pockets of brush close to homes (+) Flat terrain (-) Combustible building materials with inadequate defensible space (+) Multiple access points from major roads	Moderate-High

Table 4.1. Sandoval County Community Hazard/Risk Severity Ratings Summary, continued

Community	Community Assessment Rating	Factors Summarized from NFPA Form 1144	Composite Risk Rating
Jemez Springs Corridor, continued			
Cañon	High	(+/-) Access/egress routes range from poor to good (-) Combustible building materials with some need for defensible space improvement (-) Remote from fire service response (+/-) Fuels are not heavy, but bosque and brush present a hazard under dry conditions	High
485 Corridor (Gilman, Cañones)	High	(-) One main access/egress route (-) Moderate fuel loading in bosque and juniper (+/-) Defensible space is adequate for many homes along the valley floor, but not for many homes on the surrounding slopes	High
Ponderosa, North	High	(-) One main access/egress route and long, narrow drives with inadequate turnarounds (-) Combustible building materials with some need for defensible space improvement	Moderate-Extreme
Jemez Springs	High	(-) Unkempt bosque in the center of town poses a hazard to multiple structures that generally have inadequate defensible space (-) An increasing number of homes are being built on the surrounding brush-covered steep hillsides with poor access and poor water supplies (-) Unreliable water supply, low water pressure for hydrants (+) Multiple access routes to most areas in town	Extreme
Areas 1, 2, 3	Extreme	The subdivisions north of Jemez Springs generally share hazard/risk characteristics (-) Combustible building materials and inadequate defensible space are typical (-) Access/egress is poor due to steep, narrow, unpaved roads with limited turnarounds (-) Characterized by slopes with heavy brush and juniper fuels (-) Limited fire service water supply	Extreme
Jemez Mountains			
La Cueva	High	(+) Good signage and addressing (+) Generally good defensible space (+) Emergency response in close proximity (-) Unreliable water supply and lack of water storage (+/-) Combustible building materials, non-combustible roofs (-) Heavy fuels on neighboring public lands	Extreme

Table 4.1. Sandoval County Community Hazard/Risk Severity Ratings Summary, continued

Community	Community Assessment Rating	Factors Summarized from NFPA Form 1144	Composite Risk Rating
Jemez Mountains, continued			
Thompson Ridge	High	(+/-) Most of the road system built on loops or with turnarounds, though roads are narrow, non-surfaced, and steep in areas. (-) Potential for evacuation routes to be blocked as roads funnel (-) Unreliable water supply and lack of water storage (+/-) Combustible building materials, non-combustible roofs (+) 1,500 x 450-foot clearing in the community center (+) Generally good defensible space (+) Adjacent to fuel reduction projects	Extreme
126 Corridor	High	(-) Remote from fire service response (+) Homes generally located on flat terrain in moderate to light fuels (-) Limited water access (-) Poor addressing and signage	Extreme
Rio Las Vacas	Extreme	(-) Gravel and dirt roads (-) Locked gates (+) Water sources from creek and wells	Extreme
Taylor	High	(+) Water sources from creek and wells (+) Well-maintained gravel road (-) Heavy fuels (-) Long response time (-) Weak bridge (-) Dependence on single evacuation route	High
Girl Scout Ranch	High	(-) Difficult access (-) Heavy fuels (-) Poor defensibility (-) Difficult evacuation	High
Seven Springs	High	(-) No fire hydrants (-) Inadequate signage and addressing (-) Exposure to slopes (+/-) Defensible space present with some structures, inadequate for others (-) Limited forms of emergency communication	Extreme

Table 4.1. Sandoval County Community Hazard/Risk Severity Ratings Summary, continued

Community	Community Assessment Rating	Factors Summarized from NFPA Form 1144	Composite Risk Rating
Jemez Mountains, continued			
Deer Lake	Extreme	(-) Single point of access/egress (-) Despite considerable efforts on the part of some homeowners, the community has generally inadequate defensible space (+/-) Combustible building materials, non-combustible roofs (-) Inadequate signage and addressing (-) Remote from fire service response	Extreme
Sierra Los Pinos	Extreme	(+) Active fuels reduction program and defensible space around many homes (+) Good signage (-) Steep terrain and heavy fuels (-) Single access point, narrow roads with poor turnarounds (-) unreliable water supply and lack of water storage	Extreme
Valle Grande	High	(-) Heavy fuels (-) Difficult evacuation	Moderate-Extreme
Rio Grande Corridor			
Algodones	Moderate	(+) Multiple access routes (+/-) Narrow roads with turnarounds (-) Combustible construction features and lack of defensible space	Moderate-High
Santa Domingo Pueblo	Moderate	(+/-) Low-pressure fire hydrants, but no fire station (+) Flat terrain, generally light fuels and adequate defensible space (-) Narrow roads, lack of turnarounds (-) Lack of street signs	Moderate-High
Pena Blanca	Moderate	(+) Multiple access routes (+) Flat terrain and generally light fuels (-) Narrow roads, lack of turnarounds (-) Combustible construction features and lack of defensible space (+/-) Limited number of fire hydrants, but no fire station	Moderate-High

Table 4.1. Sandoval County Community Hazard/Risk Severity Ratings Summary, continued

Community	Community Assessment Rating	Factors Summarized from NFPA Form 1144	Composite Risk Rating
Rio Grande Corridor, continued			
Cochiti Lake	High	(+) Fire hydrants and fire station (+) Paved roads with turnarounds (-) Moderate slopes with medium fuels (-) Single access route (-) Some lack of defensible space	Moderate
Sile	Moderate	(+) Light fuels and agricultural land (-) Heavy fuels near bosque (+) Low housing density (+) Good accessibility from primary roads	Moderate-High
Cañada	High-Extreme	(-) Narrow, non-surfaced roads (-) Recent fire occurrences (-) One lane road with bridge (-) Steep slopes	High
Bernalillo	Moderate	(+) Low to moderate fuels (+) Career fire department (+) Water availability (+) Good access and evacuation potential (-) Higher fire risk close to bosque fuels	Moderate
Corrales East	High	(+) Career fire department (+) Irrigated lands (-) Heavy bosque fuels (-) Narrow roads and poor ingress/egress (-) Lack of water supply for firefighting	Moderate/High
Corrales West	Moderate	(+) Light fuels (+) Good signposting (+) Newer construction homes (-) Lack of water	Moderate/High
Cochiti Pueblo	Moderate	(+) Moderate to good access (-) Large engines may have difficulty accessing some roads (+) Light to moderate fuels (+) Hydrants and water tanks (-) Piñon die back and poor forest health (-) Recent fire occurrences	Moderate/High

Table 4.1. Sandoval County Community Hazard/Risk Severity Ratings Summary, continued

Community	Community Assessment Rating	Factors Summarized from NFPA Form 1144	Composite Risk Rating
Rio Grande Corridor, continued			
Rio Rancho	Low-Moderate	(+) Career fire department (+) Good defensible space and agricultural lands (-) Areas closer to bosque have heavy fuels (-) Risk of fire from fireworks is a hazard for homes on the edge of town	Moderate
Angostura	Moderate	(+) Agricultural lands (+) Good defensible space (-) Narrow roads	Moderate
Budaghers	High	(+) Agricultural lands (+) Good defensible space (-) Narrow roads	Moderate
Sandia Mountains			
Placitas Corridor	Moderate	(+) Generally non-combustible construction with defensible space (+) Fire hydrants and fire station (+) Paved roads with turnarounds (+) Light fuels (-) Some steep terrain in proximity to homes	Moderate
Historic Placitas	High	(-) Brush fuels and areas with steep terrain (-) Combustible construction features, some areas lack defensible space (-) Poor house numbering (+/-) Multiple access points, though roads are narrow, unpaved, and lack turnarounds (+) hydrant system	High
La Madera	High	(+) Fire station (+/-) Light to moderately heavy fuels (-) Dead-end roads and limited access are concerns (-) Defensible space is inadequate in much of the community	High
Evergreen Hills	High	(+) Built on a loop road (-) Single point of access via narrow dirt road (-) Brush fuels in steep terrain (-) Very limited water supply	High
Puertocito	Moderate	(+) Light fuels (+/-) Variable road conditions	Moderate

4.2 COMMUNITY HAZARD/RISK ASSESSMENTS

During June and July 2012, field assessments were conducted to determine wildfire hazard and risk for WUI communities in the County. Original assessments were completed in November 2008. The NFPA Wildland Fire Risk and Hazard Severity Assessment Form 1144 was used to rate communities based on access, adjacent fuels, defensible space, topography, roof and building characteristics, available fire protection, and utilities placement. Where several clearly disparate and divisible sets of conditions were found, the community was divided into more than one assessment. Where a variety of conditions was less easily parsed out, a range of values was assigned on a single assessment form. Each score was given a corresponding adjective rating of low, moderate, high, or extreme.

Individual communities within the County were grouped by geographic corridor. Previous risk assessments of the area (see Section 1.6) were referenced, and their results compared to this study's findings. A detailed methodology and complete community assessment are provided in Section 4.3. Please see Appendix E for more information on the ratings assigned to the communities visited and the NFPA Form 1144. This is the first study to conduct field assessments using the complete NFPA Form 1144, increasing the resolution and precision of previous studies. The Core Team assisted in determining which communities should be revisited in this 2012 update.

The community risk assessments along with input from the public and the Core Team were used to compile a table of CARs as required by the NM-FPTF. A copy of this list can be found in Appendix E. The list does not discriminate between communities based on the value of homes or land.

In addition to these community assessments, potential fire behavior was evaluated for the entire County (Section 4.4). This composite risk rating is used in conjunction with the community assessments to help prioritize mitigation priorities.

4.3 DETAILED COMMUNITY ASSESSMENTS

The communities of the County were evaluated in the 2004 WUI Area Inventory Assessment. These field assessments were based on a modified version of the NFPA Wildland Fire Risk and Hazard Severity Assessment Form 1144.

The complete NFPA Form 1144 was used for the 2007–2008 and 2012 update field assessments, thereby enhancing the detail and ensuring that a consistent national standard has been met. These assessments rated WUI areas based on conditions within the communities and immediately surrounding structures, including access, adjacent vegetation (fuels), defensible space, adjacent topography, roof and building characteristics, available fire protection, and placement of utilities.

Where several clearly disparate and divisible sets of conditions were found, the community was divided into more than one assessment. Where a range of conditions was less easily parsed out, a range of values was assigned on a single assessment form. Each score was given a corresponding adjective rating of low, moderate, high, or extreme.

Using visual inspection alone to determine whether a roof is Class A, B, or C is difficult and impractical for this assessment. As such, roofs were given a Class A rating if they were metal or asphalt and labeled “unrated” if they were made of wood shake.

Note: The scope of the SCCWPP is landscape level. The field assessments were completed for most of the communities in the WUI, but it is beyond the scope of the planning process to complete field observations for every community in the County. Developed urban communities that have minimum WUI, for example Rio Rancho were not assessed as part of this plan under the direction of the Core Team. Specific recommendations pertaining to each community are provided below each community description. More general, all-encompassing recommendations for fuels reduction, reducing structural ignitability, public education and outreach, and firefighting capabilities are provided in Chapter 5.

4.3.1 GREATER CUBA AREA

Cuba

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Moderate

Population: 731 by the 2010 Census, high housing density.

Terrain: The village of Cuba is located along a broad valley floor with generally flat terrain.

Fuels: Fuels are typically grass and light brush that encroach well within the town limits. On the outskirts of town, heavier concentrations of sagebrush and juniper can be found in close proximity to homes. The community is in an urban setting. The BLM has treated and continues to treat areas south of the village.



Access: Infrastructure, road access, and proximity of fire suppression resources are relatively favorable.

Defensibility: Defensible space is adequate for many homes in town. Construction materials are generally flammable, and substantial portions of the community lack adequate defensible space. A system of fire hydrants and a local volunteer fire department are available but water supply is sometimes unreliable and water distribution infrastructure is lacking. There are minimal community resources for investment in WUI mitigation.

Special Concerns: Aboveground utilities, response time east of town, unmaintained open spaces and empty lots, and fuel build-up in many areas are special concerns.

Recommendations:

- 1) Secure funding to provide capacity for the community to implement homeowner fire protection workshops and community clean-up days.
- 2) Increase defensible space with accompanying public education/outreach.
- 3) Complete nearby federal fuels treatment projects.
- 4) Study possibility of mowing brush and grasslands adjacent to private property.
- 5) Carryout needed upgrades to the municipal water supply.
- 6) Coordinate efforts with the BLM and NMSF to increase the extent and type of fuels treatments to mitigate high and extreme rated areas.
- 7) Develop community evacuation plans under the supervision of the Sandoval County Emergency Manager.
- 8) Organize community chipper days to facilitate disposal of slash from defensible space projects.

La Jara

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Moderate

Population: 207 by the 2010 Census, moderate housing density.

Terrain: La Jara is located along a broad valley floor with generally flat terrain.

Fuels: Residential areas of La Jara are primarily agricultural and grassland, but some dwellings are located in woodland and forest settings.

Access: Most roads are asphalt with good access, although some secondary dirt roads are present.

Defensibility: Defensibility is established for many areas with large yards or barren areas and scattered trees. La Jara has no true fire hydrants but has several low-capacity hydrants used to flush the water system. The water system currently has three tanks that can store a total of no more than 95,000 gallons. Many stock ponds in the area are seasonally filled from the acequia, but a few are fed by springs and store water year-round. Sandoval County Fire Department, District 11, is staffed by volunteers.

Special Concerns: The community is dependent on surface water from La Jara Creek for drinking water and irrigation, therefore, protection of the watershed, particularly the upper watershed, is a primary concern. Flammable roofing; aboveground power lines; and proximity of propane tanks, wood outbuildings, and woodpiles to structures are special concerns.

Recommendations:

- 1) Increase defensible space with accompanying public education/outreach.
- 2) Secure funding for fuels treatment on federal lands to increase extent of treatments to protect La Jara's watershed which supplies surface drinking water from catastrophic crown fire and negative post fire effects. Work with other stakeholders to develop a Collaborative Forest Restoration Program (CFRP) proposal to secure funding for National Environmental Policy Act (NEPA) clearance.
- 3) Work with the BLM and NMSF to strategically locate areas in need of fuels reduction to build upon previous BLM Naranjo Phase I and II treatments.
- 4) Increase retention of volunteer firefighters following recommendations in Chapter 5.
- 5) Increase water storage capacity. Consider installing 25,000-gallon tanks at fire the department or staged in highest risk areas of the community.

Regina

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: 105 by the 2010 Census, moderate housing density.

Terrain: Regina is located along a broad valley floor with generally flat terrain.

Fuels: Regina is primarily piñon-juniper and oak woodland.

Access: Most roads are asphalt with good access, although some secondary dirt roads are present. Some Regina driveways are narrow with fuels on both sides. Roads around and in Regina may be difficult during inclement weather. Large swales around town centers can serve as evacuation points for residents in surrounding forested hills.

Defensibility: Most areas in Regina are wooded. Hydrants are present along with several lakes and stock ponds. Sandoval County Fire Department, District 11, is staffed by volunteers.

Special Concerns: Flammable roofing; aboveground power lines; and proximity of propane tanks, wood outbuildings, and woodpiles to structures are special concerns. The community's capacity to mitigate WUI risk is low.

Recommendations:

- 1) Increase defensible space with accompanying public education/outreach. Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 2) Secure funding to provide capacity for community to implement homeowner fire protection workshops and community clean-up days.
- 3) Organize community chipper days to facilitate disposal of slash from defensible space projects.
- 4) Develop community evacuation plans under the supervision of the Sandoval County Emergency Manager.
- 5) Coordinate efforts with the BLM and NMSF to increase the extent and type of fuels treatments to mitigate high and extreme rated areas.

4.3.2 JEMEZ SPRINGS CORRIDOR

Zia Pueblo

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate/High

Population: 737 by the 2010 Census, high housing density.

Terrain: The Zia Pueblo community is concentrated on two small mesas and the valley floor to the south.

Fuels: Fuels are generally light, consisting of grass and light brush. Potential for very rapid rates of spread and high fireline intensity are the foremost fire behavior concerns in this area.

Access: Several good access/egress routes are available. Roads are paved with turnarounds, though some long dead-end roads are present.

Defensibility: The majority of structures are set back from slopes. Defensible space is typically 30 to 70 feet. Though this may be adequate in these light fuels improvements could be made. A system of fire hydrants and a local fire station is also present.

Special Concerns: Aboveground utilities and combustible construction features such as decks are prevalent.

Recommendation:

- 1) Develop a targeted defensible space initiative in areas of greatest need with an accompanying broad-based public education/outreach.
- 2) Establish evacuation plans, including for the school.

Jemez Pueblo

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: 1788 by the 2010 Census, high housing density.

Terrain: The Jemez Pueblo is located on the broad floor of the Jemez River valley and along the adjoining slopes.

Fuels: Fuels are generally grass and light brush. Juniper is found on the adjoining slopes, but surface fuels are sparse in these areas. Areas of bosque are at the community's periphery, but few homes are directly adjacent to these fuels.



Access: Roads are narrow, unsurfaced, and often lack turnarounds, but multiple access routes are available.

Defensibility: The center of the pueblo is characterized by high-density, fire-resistant construction along very narrow roads. The outskirts of town are more exposed to the surrounding wildland fuels, as it is adjacent to forested lands. Defensible space is adequate in the town center, but generally lacking along the periphery of the community.

Special Concerns: A system of fire hydrants was not apparent.

Recommendations:

- 1) Increase defensible space for outlying structures with accompanying public education/outreach.
- 2) Assess the need for saltcedar and fuels reduction projects in the adjacent bosque.
- 3) Develop pre-fire plans with special attention to water supply and access to structures.

Ponderosa, South

The town of Ponderosa exhibited two distinct sets of WUI characteristics, and was thus divided into two assessment areas. The division between the north and south assessment areas is the fire station. The town is considered to have only one viable access/egress route, which narrows and continues up a steep canyon.

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate/High

Population: 387 for all of Ponderosa by the 2010 Census.

Terrain: The community lies along broad valley floor.

Fuels: Potential fire behavior in the fuels around Ponderosa exhibit relatively moderate fireline intensity and crown fire activity under extreme conditions. Potential rates of spread and the number of historic ignitions in this area are relatively high. Much of the land adjacent to the community is agricultural.



Access: A single viable access route is available for the community.

Defensibility: Structures in the town's southern portion are generally fire resistant, surrounded by agricultural lands that are less combustible than the surrounding wildlands. A local fire station is available.

Special Concerns: No fire hydrants; single access route.

Recommendations:

- 1) Develop pre-fire plans with special emphasis on civilian evacuation, livestock protection, and water supply.
- 2) Increase defensible space with special attention to homes with combustible decks and mobile homes.

Ponderosa, North

The town of Ponderosa exhibited two distinct sets of WUI characteristics, and was thus divided into two assessment areas. The division between the north and south assessment areas is the fire station. The town is considered to have only one viable access/egress route, which narrows and continues up a steep canyon.

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Moderate/High

Population: 387 for all of Ponderosa by the 2010 Census.

Terrain: The northern part of town is exposed to slightly steeper slopes than the southern part.

Fuels: Potential fire behavior in the fuels around Ponderosa exhibit relatively moderate fireline intensity and crown fire activity under extreme conditions. Potential rates of spread and the number of historic ignitions in this area are relatively high.

Access: A single viable access route for the community is available.

Defensibility: Construction characteristics are less fire resistant and defensible space is smaller than the southern area. A local fire station is available.

Special Concerns: No fire hydrants; single access route.

Recommendations:

Recommendations are the same as for Ponderosa, South, with an increased emphasis on defensible space.

- 1) Develop pre-fire plans with special emphasis on civilian evacuation, livestock protection, and water supply.
- 2) Increase defensible space with special attention to homes with combustible decks and mobile homes.

San Ysidro

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Moderate

Population: 193 by the 2010 Census.

Terrain: Flat

Fuels: The area is characterized by grass and light brush fuels, but concentrations of dense brush have been allowed to build up in vacant lots and near some homes. Some areas are dominated by taller weedy vegetation. Exotics are also present in nearby riparian areas.



Access: Access/Egress is afforded to the north via State Highway 4 and to the southeast or northwest via U.S. Highway 550. Roads are wide with turnarounds.

Defensibility: Buildup of brush fuels within the town and inadequate defensible space prevent this community from receiving an attainable low risk/hazard score. Combustible siding and decks are prevalent.

Special Concerns: The town lacks fire hydrants and water storage for firefighting. No fire station is available in San Ysidro, though the Jemez Pueblo station is within 5 miles.

Recommendations:

- 1) Increase defensible space for outlying structures with accompanying public education/outreach.
- 2) Assess the need for saltcedar and fuels reduction projects in the adjacent bosque.
- 3) Assess the fire service water supply and consider the placement of a cistern or other on-site water source.

126 Corridor (between Seven Springs and Deer Lake, including Taylor and Rio Las Vaca)

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Extreme

Population: Several hamlets lie along New Mexico Highway 126 between Seven Springs and Deer Lake, estimated to contain more than 30 seasonal cabins. This area is characterized by low housing density and predominantly absentee ownership.



Terrain: Terrain ranges from steep slopes to open valleys. Most structures are located in generally flat terrain.

Fuels: Many of the structures are located next to relatively open forest stands or meadows along the Rio de las Vacas. Some areas along this corridor exhibit heavy forest fuels.

Access: Access to individual homesites is variable, but roads are narrow and unpaved. Many homes are relatively close to New Mexico Highway 126, which affords two directions of travel.

Defensibility: Homes generally have combustible siding and decks, but tend to be located in open areas, which afford some degree of defensible space.

Special Concerns: The area is quite remote from emergency service response, and water supply is limited to wells and draft sites along the river. Street signs and address posting is inadequate.

Recommendations:

- 1) Increase defensible space with accompanying public education/outreach.
- 2) Develop pre-fire plans with special attention to mapping structure locations, access, and water supply.
- 3) Improve street signs and addressing.
- 4) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 5) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.
- 6) Stage mobile water tanks along New Mexico Highway 4 during fire season.

Rancho del Chaparral Girl Scout Camp

The Girl Scout camp is located off of Forest Road 20 south of NM 126. It is occupied primarily during the summer season.

Composite Risk Assessment for Surrounding Area: High/Extreme



Population: Seasonal.

Terrain: Topographic influences are present, including steep and rolling terrain.

Fuels: Dense ponderosa pine and mixed conifer is present throughout the area.

Access: Access is difficult; the camp is reached via 5 miles of unsurfaced USFS roads that can be impassable during inclement weather.

Defensibility: There is minimal defensible space and most structures are constructed with combustible roofing and siding.

Special Concerns: Ingress/Egress is poor along unsurfaced roads. The population at the camp is at its highest during fire season. There are wood outbuildings and propane tanks above ground. The camp is located in an area of high fire occurrence.

Recommendations:

- 1) Expand defensible space.
- 2) Implement strategically placed fuel breaks based on ground-level assessment (minimum 300-foot width). Fuel breaks should be placed to protect camp structures and evacuation routes.
- 3) Coordinate efforts with adjacent landowners to ensure existing treatments remain effective through additional restoration based thinning and prescribed burning.
- 4) Carryout pre-fire planning focusing on evacuation and safety zones in case evacuation routes are cut off.
- 5) Develop fire prevention materials and evacuation maps to distribute to camp participants.
- 6) Coordinate efforts with Cuba Public Schools, Jemez Mountain Schools, the Girl Scouts, and NMSF to develop fire ecology and fire prevention teaching materials/curriculum to be used as a camp exercise for attendees.
- 7) Coordinate efforts with Cuba Public Schools, Jemez Mountain Schools, the Girl Scouts, and NMSF on ecological monitoring and youth collaboration opportunities.
- 8) Stage a mobile water storage tanker at the camp during fire season for use for fire suppression.

Cañon

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: 118 by the 2010 Census, high housing density.

Terrain: The town of Cañon is located on a narrowing valley floor with some exposure to slopes up to 30%.

Fuels: The town is adjacent to bosque, which can fuel relatively intense fires when dry. The surrounding fuels are more xeric grass and brush fuels.

Access: The town is accessible from two directions, but access to individual structures ranges in quality from poor to good.

Defensibility: Construction is more combustible than many local communities. Much of the community would benefit from enhanced defensible space. Several fire hydrants are in the community.

Special Concerns: Dense fuels buildup is present in the river corridor. There is no local fire station.

Recommendations:

- 1) Increase defensible space with accompanying public education/outreach.
- 2) Assess the need for saltcedar and fuels reduction projects in the adjacent bosque.
- 3) Develop pre-fire plans with special attention to water supply and access to structures.
- 4) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 5) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.
- 6) Overhaul water supply system and install hydrants.

485 Corridor (Gilman, Cañones)

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: Medium housing density.

Terrain: The narrow valleys in the area have the potential to create strong local winds.

Fuels: Fire behavior modeling indicates the potential for relatively rapid rates of spread and high fireline intensity. Light vegetation abuts thicker bosque fuels.

Access: The towns of Gilman and Cañones have one viable access route along a narrow dirt road. The area has heavy traffic during periods of the year due to Gillman Tunnels and swimming holes.



Defensibility: Many homes are located adjacent to light fuels along the valley floor and have some measure of defensible space. Several homes are located on slopes and are surrounded by brush fuels. Few homes have sufficient defensible space.

Special Concerns: This area is located in an area of relatively high historic fire occurrence. The area lacks fire hydrants and has no local fire station.

Recommendations:

- 1) Increase defensible space focusing on homes located on brush-covered and forested slopes.
- 2) Develop pre-fire plans with special attention to civilian evacuation and fire department access to individual structures.
- 3) Study the potential need for fuel breaks adjacent to private residences.
- 4) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 5) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.

Jemez Springs

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Extreme



Population: 250 by the 2010 census, high to medium housing density.

Terrain: The center of Jemez Springs is located along a narrow portion of the Jemez River valley floor, with a growing number of homes perched on the surrounding slopes. Many homes are exposed to slopes approaching 40%.

Fuels: Dense fuels are found along the river with moderate loads of brush fuels on the surrounding hills. Fire behavior modeling indicates that Jemez Springs is exposed to rapid rates of spread and high fireline intensity.

Access: Though New Mexico Highway 4 affords travel to the north and south of town, many of the homes are located on very narrow and steep dirt roads. Turnarounds are generally inadequate.

Defensibility: The bosque runs down the center of town. It is notably unkempt and in close proximity to homes. Homes on the hillsides around town are exposed to brush fuels and generally have poor access. Defensible space is generally inadequate throughout the community and there is minimal separation between some structures.

Special Concerns: The town is located in an area of relatively high historic fire occurrence. Water sources are unavailable or inadequate in much of the area as leaks in the water system reduce the utility of fire hydrants.

Recommendations:

- 1) Increase defensible space for outlying structures with accompanying public education/outreach. Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 2) Assess possible saltcedar and fuels reduction projects in the adjacent bosque.
- 3) Develop pre-fire plans with special attention to water supply and access to structures. Make pre-fire planning documents and evacuation plans available to the public.
- 4) Examine the possibility of creating fuel breaks around this community.
- 5) Plan roadside thinning projects along the Highway 4 corridor to reduce potential ignitions from the road.
- 6) Improve water system to facilitate utility of hydrants.

- 7) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 8) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.

Areas 1, 2, and 3

Community Hazard/Risk Assessment: Extreme

Composite Risk Assessment for Surrounding Area: Extreme

Population: Medium housing density estimated at 100+ residences with an estimated 50% being permanent residents. Area 3 is made up primarily of full-time residents.

Terrain: Homes are in close proximity to slopes up to 60%.

Fuels: The subdivisions north of Jemez Springs, known as Areas 1, 2, and 3, are built in heavy piñon-juniper and ponderosa pine fuels, currently suffering high mortality. Fire behavior modeling indicates that these areas are exposed to rapid rates of spread and high fireline intensity. The fire behavior models underestimate the potential for crown fire activity in the potentially volatile piñon-juniper fuels of these areas. Most homes have wood siding and decks and many homes have firewood stacked against structures. Many homes have metal roofs.



Access: Though New Mexico Highway 4 affords travel to the north and south of town, many of the homes are located on very narrow and steep dirt roads. Turnarounds are generally inadequate. On mesa tops roads are poorly signposted and difficult to navigate.

Defensibility: Homes are lacking defensible space and there is no year-round water supply. Some years La Cueva Fire Department will place a 5,000-gallon portable water bladder on the mesa top within Area 3. There are hydrants located along Highway 4; however, they are connected to the Jemez Springs water supply which is unreliable due to insufficient pressure.

Special Concerns: The town is located in an area of relatively high historic fire occurrence. No local fire station or fire service water supply is available. There is no safety zone within the community and few available evacuation routes due to limited ingress/egress. Much of the land in the community is private land and so private land owners are responsible for reducing fuel loading around their homes.

Recommendations:

- 1) Increase defensible space with a strong educational component is imperative for these areas. Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 2) Build on efforts to develop a Firewise community. One resident in Area 1 has already begun making attempts.

- 3) Develop pre-fire plans with special attention to civilian evacuation, firefighter escape, water supply, and access to structures.
- 4) Participate in Greater Eastern Jemez Wildland Urban Interface Corporation (GEJWUIC) efforts.
- 5) Examine the possibility of creating fuel breaks around these communities in coordination with state and federal agencies. For example, a shaded fuel break along Forest Road 167 to the west may have potential. Thinning along local roads may enhance overall defensibility of the area or at least improve the viability of egress routes.
- 6) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 7) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.
- 8) Add turnaround locations along roads to assist in evacuation and emergency vehicle access.
- 9) Thin fuels along roadside to create a wider roadside buffer to facilitate safe evacuation and reduce potential ignitions.

4.3.3 JEMEZ MOUNTAINS

La Cueva

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: More than 200 homes, including Sulphur Flats; year-round residents are estimated at 75%. Many homes are scattered along Highway 126.

Terrain: Ranges from relatively flat to 30% slope.



Fuels: The community of La Cueva is set within relatively open stands of ponderosa pine and the lighter fuels of the valley floor. The forest stands appear to be well maintained with little buildup of surface fuels. The surrounding forests, however, have potential for crown fire activity. Surface fuels will support moderate rates of spread and surface fire intensity under dry and windy conditions. The USFS has carried out a prescribed burn on the east side of La Cueva for the protection of the Thompson Ridge community. Forest areas on the north and west have also been treated but more work is needed to reduce hazardous fuels.

Access: Access to neighborhoods is designed on systems of loops, mitigating some access issues. Homes are clearly addressed.

Defensibility: Defensible space is widely present, as exemplified by the stacking of firewood away from homes. There is only one fire hydrant in the community and insufficient availability of water for firefighting is a major concern because of the low storage capacity of the system and low water pressure. The fire department is currently dependent on drafting water from the San Antonio River for firefighting.

Special Concerns: This area has benefited from obvious efforts to create defensible space and reduce fuel loads. Failure to maintain these efforts could result in this area becoming high hazard/risk.

Recommendations:

- 1) Examine the possibility of creating additional fuel breaks around this community, particularly along the western periphery.
- 2) Engage neighboring stakeholders (private, state, federal, tribal) in forming a CFRP group to develop a proposal to seek funds for hazardous fuel treatments and associated NEPA. Utilize established GEJWUIC partnership to build wider collaboration for a CFRP project.
- 3) Maintain and improve defensible space as appropriate.

- 4) Implement “curbside” slash disposal or chipper day with support from local, County, and/or state authorities.
- 5) Develop new slash disposal site that is maintained and accessible to all residents.
- 6) Overhaul water system, increase water storage capacity for the community and install additional hydrants.
- 7) Update or install new communication towers so as to provide methods for emergency communication for residents via internet/cell phone. Use more understandable language when providing information on current wildfire status.
- 8) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 9) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.

Thompson Ridge

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Extreme

Population: Approximately 120 lots with more than 75 homes currently. Year-round residency is estimated at 20%.

Terrain: Slopes in the immediate area may approach 20%, but homes are generally located on flat terrain. Slopes approximately 500 feet to the west of the community's edge drop away at a 50% slope.

Fuels: Fire behavior modeling reinforces the potential for relatively high to extreme fireline intensity, rates of spread, and crown fire activity.

The USFS has done a lot of thinning within the area and has conducted prescribed burns in the last two years. There is contrasting thinning activity within the community, with many residents carrying out defensible space treatments but neighbors not following suit. Slash disposal is an issue in the community, a concern raised by residents in meetings and community surveys. Better maintenance of the current slash pit and access road is needed to alleviate slash disposal problems.



Access: The relatively steep dirt roads have good turnarounds, and the community is accessible from two directions, but because access is in a loop format, if egress is restricted to Forest Road 106 evacuation may be restricted. If not familiar with the community, roads may be confusing to navigate.

Defensibility: Though remote, Thompson Ridge has a fire station and hydrant system. There is a pond in the community that holds an estimated 1,000,000 gallons. The homeowners association has invested ~\$11,000 in a pump to draft water from the pond to a pipe that is compatible with fire department tenders. The pump is rated for 250 gallons per hour. Most homes are built of combustible materials but have some degree of defensible space. Although built among the timber, significant fuels reduction work has taken place downslope of the community.

Special Concerns: Historic fire occurrence in this area is relatively high. The area is heavily frequented by tourists and recreationists and camp fires are an ignition concern that was raised by residents in meetings and through community surveys. The USFS and Sheriff's Office have been increasing patrols and enforcing campfire bans. Defensible space and fuels management efforts are preventing this area from rating in the high to extreme category for hazard/risk.

Recommendations:

- 1) Complete nearby fuels treatment projects and assess need for further work in coordination with state and federal agencies.
- 2) Engage neighboring stakeholders (private, state, federal, tribal) in forming a CFRP group to develop a proposal to seek funds for hazardous fuel treatments and associated NEPA. Utilize established GEJWUIC partnership to build wider collaboration for a CFRP project.
- 3) Increase and maintain defensible space as needed. Encourage community-wide defensible space projects.
- 4) Maintain and improve access to the current slash disposal site. Consider addition of a new site that can be more closely monitored and is accessible to all vehicle types.
- 5) Develop pre-fire plans with special attention to civilian evacuation, firefighter escape, and safety zones.
- 6) Examine providing emergency vehicle access route between East Deer Lane and Lighting Lane.
- 7) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 8) Pursue Firewise Communities and similar grant funding opportunities to assist residents with cost of treatments on private lands.
- 9) Update or install new communication towers so as to provide methods for emergency communication for residents via internet/cell phone. Use more understandable language when providing information on current wildfire status.

Seven Springs

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Extreme

Seven Springs is located in the bottom of a canyon in forest fuels along the Rio Cebolla between Fenton Lake State Park and Seven Springs Fish Hatchery. Residences in this area are primarily summer vacation homes.



Population: Approximately 75 homes with 25% year-round residency. The Seven Springs Fish Hatchery and Fenton Lake have structures and resources valued by the community for protection.

Terrain: Slopes in the area approach 30%, but most homes are set in lower angle terrain. Seven Springs is located in a narrow valley, containing the Rio Cebolla running from south to northeast, this terrain has the potential to funnel strong winds, increasing fire intensity.

Fuels: Fuels are ponderosa pine and dense mixed conifer with crown fire potential. Fire behavior modeling illustrates the potential for relatively high to extreme fireline intensity, rates of spread, and crown fire activity. Some residents have developed defensible space, though others have not.

Access: The road into the community is paved for 5 miles from Fenton Lake. Work is currently underway to pave and widen an additional mile of road. Trees have been removed along the right-of-way during widening efforts. Side roads are narrow, unimproved, and generally not signed. Though New Mexico Highway 126 provides two directions of access, its entire length could be compromised by a major fire event.

Defensibility: Though many homes have defensible space on some level, improvements are needed throughout the community. Many homes have firewood stacked close to structures. There is water available from Cebolla Creek and from a raceway at the fish hatchery but a dry hydrant at Fenton Lake would help this area with water supply for year-round firefighting. The community is served by the La Cueva (Seven Springs) volunteer fire department.

Special Concerns: Historic fire occurrence in this area is relatively high. Historic structures are located in the fish hatchery area. Many homes and other structures are quite old and no longer “up to code.” Access is also problematic for fire crews and equipment.

Recommendations:

- 1) Increase defensible space with a strong educational component. Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 2) Complete nearby fuels treatment projects and assess need for further work in coordination with state and federal agencies.
- 3) Engage neighboring stakeholders (private, state, federal, tribal) in forming a CFRP group to develop a proposal to seek funds for hazardous fuel treatments and associated NEPA. Utilize established GEJWUIC partnership to build wider collaboration for a CFRP project.
- 4) Improve visibility of street signs.
- 5) Pursue pre-fire planning efforts particularly relating to citizen evacuation and safety zones.
- 6) Update or install new communication towers to provide methods for emergency communication for residents via internet/cell phone. Use more understandable language when providing information on current wildfire status.
- 7) Enforce campfire bans on National Forest lands.
- 8) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 9) Pursue funding to install a dry hydrant at Fenton Lake to facilitate drafting of water for fire suppression.



Deer Lake

Community Hazard/Risk Assessment: Extreme

Composite Risk Assessment for Surrounding Area: Extreme

Population: Low to moderate housing density.

Terrain: Deer Lake is characterized by relatively steep terrain.

Fuels: Dense oak brush is proximate to many homes, and the community is surrounded by ponderosa pine and mixed conifer forest with high density and stocking. The fuels and topography of this area are capable of sustaining relatively high rates of spread and fireline intensity.



Access: Access to many homes is problematic for fire crews and equipment. Access along Highway 126 is reasonably good; however, secondary county roads within the estate would be difficult to navigate with large engines. There are only single entry/exit areas for portions of the community.

Defensibility: Some homeowners have taken strong steps in establishing defensible space, while many have taken no action at all or have taken negative actions, stacking combustibles under the residences. A large pond provides an easily accessible water source through a dry hydrant, viability depends on water levels. No local fire station is available.

Special Concerns: The area has a history of relatively high fire occurrence. There are very long response times from the nearest fire departments (Cuba Fire Department, Regina Fire Department). Some homes have only a single entry/exit in the event of evacuation. The small vacation home community of Miller Landing (east of Deer Lake along Highway 126) was identified in the Greater Cuba CWPP as an at risk community. This community is also isolated, surrounded by heavy fuels, and has a lack of water supply for fire suppression.

Recommendations:

- 1) Increase defensible space with a strong educational component. Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 2) Complete nearby fuels treatment projects and assess the need for further work in coordination with state and federal agencies. Carryout treatment to compliment USFS actions on the mesas north and south of Highway 126.
- 3) Engage neighboring stakeholders (private, state, federal, tribal) in forming a CFRP group to develop a proposal to seek funds for hazardous fuel treatments and associated NEPA.

Utilize established GEJWUIC partnership to build wider collaboration for a CFRP project.

- 4) Focus fuel treatment efforts on areas with high fuel loading for example Forest Road 103.
- 5) Implement strategically placed fuel break based on ground-level assessment. Consider a 300-foot minimum width.
- 6) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 7) Update or install new communication towers to provide methods for emergency communication for residents via internet/cell phone. Use more understandable language when providing information on current wildfire status.
- 8) Improve water availability for structural fire suppression. Place a water storage tank during the fire season.

Cochiti Mesa

Cochiti Mesa was heavily impacted by the Los Conchas fire. The majority of homes were lost. Approximately three residents are currently living in the area. On the advice of the Core Team, 2012 assessments were not completed for this community.

Sierra Los Pinos

Sierra Los Pinos is located off of Highway 4, on Forest Road 10 in the Jemez Mountains. The community assessment was carried out on subdivisions on the north and south side of the highway.

Community Hazard/Risk Assessment: Extreme

Composite Risk Assessment for Surrounding Area: Extreme



Population: Over 150 homes, of which more than 75% are estimated to be year-round residents.

Terrain: Topographic influences are present, including steep and rolling terrain. Some roads may be too steep for access by emergency vehicles. Steep canyons would make the area act like a chimney in the event of a fire.

Fuels: Dense ponderosa pine and mixed conifer. Many homes have combustible siding and decks and wood piles stacked close to the structure.

Access: Although access to the highway is good, the roads within the community are steep, narrow, and unsurfaced. There is no signage showing evacuation routes or exits. Turnarounds are limited for a fire truck. Access during the winter would be difficult for emergency vehicles due to steep slopes. The only other egress is via the Forest “High Road,” which is unmaintained and inaccessible for some vehicles. If maintained this road would serve as a potential evacuation route.

Defensibility: There are three wells that supply water to the entire community, and water supply for firefighting therefore is extremely limited. Although there are fire hydrants in the community, the water pressure is extremely unreliable and the water system is in need of upgrade. Permanent installation of a water storage tank is needed for the community. Many homeowners have carried out fuels treatments reducing this hazard; removal of thinning slash and thinning of residual patches of small-diameter ponderosa pine is still required. Many homes have good defensible space, but some located with limited setback from the slope may need additional clearance. Most homes have good roof construction, but the majority has combustible siding and decks. The area is served by La Cueva Station #2.

Special Concerns: The community has a volunteer fire department, but water availability is limited.

Vallecitos de los Indios (included in Sierra los Pinos assessment)

This is an old logging/sheep cattle camp community located near Sierra los Pinos. Ingress/Egress is poor due to narrow road widths. The area is located in thick ponderosa pine and mixed conifer

and homes have insufficient defensible space. There is limited turnaround space for emergency vehicles, which is a concern for the La Cueva Fire Chief. The closest water source is approximately 1 mile away so water for fire suppression is limited. The USFS has done some treatment along the border near San Juan Mesa but more is needed.

Holt Track (included in Sierra los Pinos assessment)

This is a small community of just 10 homes. Ingress/Egress is a concern for the La Cueva Fire Department. There is a potential evacuation route that would require crossing private lands. The area is situated among thick mixed conifer and homes have insufficient defensible space.

Recommendations:

- 1) Continue to expand upon current defensible space, fuel break, and Firewise Communities efforts.
- 2) Seek funding for home hazard assessments to inform homeowners about actions to reduce structural ignitability and defensible space.
- 3) Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 4) Develop a new slash disposal site that is regularly maintained and accessible to residents.
- 5) Consider a community-based CWPP with a detailed fuels project plan for the GEJWUIC.
- 6) Install a permanent water tank. The La Cueva Fire Department has access to a 25,000-gallon tank that could be installed.
- 7) Upgrade/Overhaul existing aging water system to improve reliability of hydrants.
- 8) Improve grade and maintain the USFS High Road to serve as evacuation route for the community.
- 9) Pursue pre-fire planning efforts particularly relating to citizen evacuation and safety zones.
- 10) Implement hazardous fuels reduction treatments on private and public lands.
- 11) Engage neighboring stakeholders (private, state, federal, tribal) in forming a CFRP group to develop a proposal to seek funds for hazardous fuel treatments and associated NEPA. Utilize established GEJWUIC partnership to build wider collaboration for a CFRP project.
- 12) Update or install new communication towers to provide methods for emergency communication for residents via internet/cell phone. Use more understandable language when providing information on current wildfire status.

4.3.4 RIO GRANDE CORRIDOR

Pueblo of Santo Domingo

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate

Population: 2,456 by 2010 Census.

Terrain: This community is located in the Rio Grande valley in generally flat terrain.

Fuels: Two population centers (the historic old town area and an area of new development) are surrounded largely by light grass and shrubland fuels. To the west of these communities are heavier bosque fuels made up of Rio Grande cottonwood with willow understory.

Access: Access is a concern, particularly in the old town areas of the pueblo due to narrow streets and limited turnarounds. Access to Interstate 25 is generally straightforward.

Defensibility: A significant amount of work has been completed to remove saltcedar and Russian olive throughout Santa Domingo lands, and additional work would further support the ecosystem. Bosque fuels are at some distance from the majority of homes, but fire could spread from the bosque through adjacent cropland and grassland. Defensible space is generally good due to the sparse nature of the vegetation. Construction is predominantly in the adobe style and as such structures have low flammability; however, flammable decks and fixtures increase the fire hazard.

Special Concerns: The greatest ignitions in recent years have been as a result of arson fires and the railroad, which crosses pueblo land. Accumulations of tumbleweeds beneath railroad bridges have added to railroad-related fire hazards. The pueblo has no on-site fire suppression resources, but low pressure hydrants have been installed in recent years.

Recommendations:

- 1) Continue saltcedar removal along the Rio Grande and Rio Galisteo bosque.
- 2) Provide regular removal of tumbleweed from beneath bridges and adjacent to railroad and structures.
- 3) Continue public education and outreach regarding arson and fire hazards.



Pueblo of San Felipe

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate

Population: 2,404 by the 2010 Census.

Terrain: This community is located in the Rio Grande valley in generally flat terrain.

Fuels: The community is surrounded largely by light grass and shrubland fuels. To the west of these communities are heavier bosque fuels made up of Rio Grande cottonwood with willow understory. Dense saltcedar infestations are present throughout the bosque.

Access: Access to Interstate 25 is generally good, but access within the town is poor with predominantly unsurfaced narrow roads.

Defensibility: Bosque fuels are heavy with a dense infestation of saltcedar. Bosque fire could spread to adjacent homes. Overall defensible space is good, given the light nature of adjacent fuels. Construction is predominantly in the adobe style and roofs are primarily of non-flammable material.

Special Concerns: The area is prone to strong winds and fires could exhibit fast spread rates. Bosque fuels are prone to high-intensity fire behavior given the dominance of saltcedar and Russian olive. The area is far from the nearest fire station and water availability is limited.

Recommendations:

- 1) Implement increased saltcedar removal along the Rio Grande and arroyos.
- 2) Seek funding to install hydrant systems and increase water storage capacity.
- 3) Implement public education and outreach regarding arson and fire hazards.

Pena Blanca

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Low

Population: 709 by the 2010 Census. Homes are typically in larger plots and many have adjoining pastures and croplands.



Terrain: Pena Blanca is located in the Rio Grande valley in a generally flat agricultural area.

Fuels: Fuels are light to moderate, the highest fuel densities occurring in the bosque areas.

Access: The community is close to Interstate 25; however, narrow road widths within the community reduce overall access. Many homes are located down dead-end roads with limited turnarounds.

Defensibility: Defensible space is minimal around many structures; however, adjacent fuels are often light and/or irrigated. Derelict properties and discarded trash and debris add to the fuel complex. Many homes are surrounded by irrigated fields or are bordered by irrigation ditches.

Special Concerns: Many older homes have combustible construction with combustible decks raising the fire hazard. The community has no fire station, but fire hydrants are found in limited numbers throughout the area.

Recommendations:

- 1) Clear debris from irrigation ditches and provide regular maintenance.
- 2) Raise awareness of reducing structural ignitability through homeowner guides and Firewise Communities workshops.

Algodones

Algodones is located just off of Interstate 25 in the Rio Grande valley. This sparsely populated community is surrounded by light to moderate fuels in a generally flat agricultural area.

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate

Population: 814 by the 2010 Census. Homes are typically in larger plots and many horse properties are present.

Terrain: Generally flat.

Fuels: Fuels are light to moderate, the highest fuel densities occurring in the bosque areas.

Access: Many dead-end roads are unsurfaced, narrow, and have limited turnarounds, reducing access.



Defensibility: Defensible space is limited, and a number of homes have highly flammable construction such as wood shake sidings and combustible roofs. The community has a volunteer fire department and a limited number of fire hydrants are found throughout.

Special Concerns: The community is adjacent to the railroad and dense tree and brush lining the route is susceptible to railroad ignitions.

Recommendations:

- 1) Implement Firewise Communities program to raise awareness of defensible space.
- 2) Regularly maintain clearance along railroad adjacent to community.
- 3) Create vehicle turnarounds or pullouts where possible.

Cochiti Lake

Cochiti Lake is located off of Highway 22 adjacent to the Cochiti Lake Recreation Area.

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: Moderate/High

Population: 569 by the 2010 Census; housing density is high.

Terrain: Cochiti Lake is located in the eastern foothills of the Jemez Mountains. Slopes may exceed 30% around this community.

Fuels: Fuels are moderate and patchy, but defensible space is often limited. Thick piñon juniper is present throughout the community in draws and on slopes below homes.



Access: Although the major access along Highway 22 is good, access is limited from alternative routes, posing a hazard for evacuation. The roads are surfaced but steep as the community is built on a hill.

Defensibility: Many homes are built mid-slope. Homes generally have non-combustible construction but many have combustible decks and fixtures. The community has a well-developed modern infrastructure with fire department and hydrants.

Special Concerns: A number of homes are exposed to juniper fuels on slopes.

Recommendations:

- 1) Increase defensible space with a strong educational component. Include an organized slash disposal day or site with cooperation from local, County, and/or state authorities.
- 2) Evaluate viability of a fuel break along the western periphery of the community. Coordinate any such project with federal efforts in the area.
- 3) Develop an emergency evacuation plan.
- 4) Pursue BLM Community Assistance Grants for implementing fuel treatment and public outreach exercises.

4.3.5 CORRALES

The village of Corrales is located north of Albuquerque, bordered on the east by the Rio Grande and the Pueblo of Sandia and on the west and north by the city of Rio Rancho. The community is split in two for the purpose of this risk assessment into East Corrales, incorporating Main Street and old town Corrales and the Corrales Bosque Preserve, and then West Corrales, incorporating some of the newer developments in the upper sand hill community, which is typified by more open, light fuels and desert vegetation.

East Corrales

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: 8,329 from the 2010 Census.



Terrain: East Corrales is made up of relatively flat terrain. The Bosque Preserve is made up of 662.4 acres of bosque habitat on the west side of the Rio Grande. The Corrales riverside drain runs the entire length of the preserve and is owned and managed by the Middle Rio Grande Conservancy District. The Rio Grande is highly channelized along the extent of the Bosque Preserve with little to no overbank flooding.

Fuels: Medium to heavy fuels are made up of a cottonwood gallery with an understory of New Mexico olive, Russian olive, and saltcedar.

Access: Main access to Corrales is via Corrales Road (Highway 448) or Loma Larga. Roads within the village are narrow and lack turnarounds large enough for emergency vehicles. There is also a lack of roads that connect Corrales Road and Loma Larga to evacuate Old Town. Evacuation in the event of a fire is a significant concern to the Corrales Fire Chief and Corrales residents. Access to the Bosque Preserve is through a small number of roads intersecting with the bosque and drains; vehicular access is limited to emergency and maintenance vehicles only through use of locked gates.

Defensibility: Defensible space is generally lacking around most homes, particularly those located immediately adjacent to the bosque; some irrigated and agricultural lots are an exception to this. Newer building construction is generally non-combustible, but many properties have combustible decks and fixtures. Older homes tended to have higher potential for combustibility due to roofing materials. The community has a career fire department with two stations; however, water supply is extremely lacking throughout the area, which is preventing the department from lowering International Standards Organization (ISO) ratings and as a consequence residents' insurance premiums are impacted.

West Corrales

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate/High

Population: 8,329 from the 2010 Census.



Terrain: West Corrales is made up of rolling terrain intersected by some deep drainages.

Fuels: Light desert fuels.

Access: The main access to this area is via Loma Larga Road and Meadowlark Road. There are a number of dead-end roads throughout the area, which is a concern to the Corrales Fire Chief. The Harvey Jones Channel that bisects the community at the northern end is a concern since it may cut off evacuation routes to the north. There are very few access points from Corrales Road to Highway 528.

Defensibility: Defensible space is generally good around most homes because of the light and limited wildland fuels; some homes do have landscape vegetation too close to structures, however. Newer building construction is generally non-combustible, but many properties have combustible decks and fixtures. The community is served by the Corrales substation, which is staffed by one full-time firefighter and a group of volunteers; however, water supply is extremely lacking throughout the area, which is preventing the department from lowering ISO ratings and as a consequence residents' insurance premiums are impacted. Wildfire occurrence is lower than the east side of Corrales; however, there have been a number of structure fires in recent years.

Recommendations:

- 1) Remove and treat non-native fuels in strategic locations throughout the Corrales Bosque Preserve. Provide a patch structure with fuel break areas to improve safety for firefighters and residents.
- 2) Install shaded fuel breaks as outlined by the Corrales Bosque Advisory Board (in italics below):

Goals of proposed shaded fuel break:

- a. *Reduce potential wildfire threats and impacts to humans and properties.*
- b. *Reduce potential wildfire threats and effects to the Corrales Bosque Preserve.*
- c. *Reduce the impact of future wildfire suppression activities to the Corrales Bosque Preserve.*
- d. *Utilize a conservative approach (e.g., shaded fuel breaks) that minimizes footprint and maintains wildlife habitat continuity and values.*

The Advisory Board has a pilot site located at La Entrada and East Ella Roads in an area of the Corrales Bosque Preserve just northeast of the Boy Scout Bridge. Eight similar shaded fuel breaks are proposed, located at 0.75-mile spacing along the extent of the preserve. Fuel breaks should follow specifications approved by the Corrales Bosque Advisory Board: maintaining large trees in open spacing, removing exotic species (and treating stumps), and strategically locating in the highest risk areas. The breaks should be free of ladder fuels and be approximately 75 meters wide. Large native trees should be left on-site. Woody biomass should be removed from the site.

- 3) Provide regular maintenance of fuel break areas and begin revegetation with native species.
- 4) Develop defensible space around homes, particularly those located adjacent to the bosque.
- 5) Work collaboratively with residents, the fire department, and the Village of Corrales on pre-evacuation planning related to home access and turnaround on dead-end roads. Install sufficient turnaround areas for emergency vehicles where possible.
- 6) Develop an emergency evacuation plan that provides alternative escape routes in the event that evacuation is prevented along Corrales Road.
- 7) Develop a community-level CWPP that provides detailed recommendations for fuels reduction, public education and outreach, firefighting capabilities, and structural ignitability.
- 8) Assess water availability for firefighting and propose additional water storage facilities and hydrant systems.
- 9) Increase WUI code enforcement to assist in reducing potential structural ignitability of homes and businesses.
- 10) Work with utility companies to better maintain clearance of vegetation along utility lines, and implement a regular maintenance schedule.
- 11) Continue to work with the Corrales Bosque Advisory Commission on implementing fuel breaks, emergency access, and pre-suppression planning as outlined in Section 3.2 of the 2009 *Corrales Bosque Preserve Habitat Management Plan* (Corrales Bosque Advisory Commission 2009). Carry out annual review of the management plan.
- 12) Develop livestock evacuation plan for Corrales in conjunction with Animal Protection of New Mexico and the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM).
- 13) Implement public outreach program (and school educational program) focused on fire behavior and fuel mitigation in the bosque. Utilize recently burned areas (e.g., Romero fire, June 2012) as an example of the burn severity that can be expected in a Corrales bosque fire.
- 14) Remove jetty jacks that pose a hazard to emergency responders as outlined in the Corrales Bosque Hazardous Jacks Project and as approved by U.S. Army Corps of Engineers.
- 15) Continue to carry out biannual chipper days for removal of slash.

- 16) Work with Sandia Pueblo on fire fighter training and cooperative agreements. Pursue YCC program for Sandia tribal members to establish a YCC fire crew.

4.3.6 SANDIA MOUNTAINS

Placitas Corridor

The historic town of Placitas is off of Highway 165. The corridor area has been heavily developed and is assessed here separately from the town of Placitas because of differences in fire hazard and risk.

Community Hazard/Risk Assessment: Moderate

Composite Risk Assessment for Surrounding Area: Moderate

Population: 4,977 by the 2010 Census (total for Placitas).

Terrain: The Placitas Corridor is located in the rolling terrain of the northern foothills of the Sandia Mountains. Slopes exceed 20%.

Fuels: Light and patchy grass and shrub lands.

Access: The community along this corridor is easily accessed from Interstate 25, but alternative escape routes to the east are narrow and steep, raising concerns for evacuation. The community is served by modern infrastructure, has good road surfaces and good turnarounds. Roads are clearly signposted.



Defensibility: Defensible space is generally good since adjacent fuels are light and patchy. Some homes, however, are located mid-slope, and the entire corridor is built on rolling hills in the shadow of the Sandia Mountain Range leading to topographic fire hazards. Building construction is generally non-combustible, but many properties have combustible decks and fixtures. The community has a volunteer fire department and a number of hydrants.

Recommendations:

- 1) Treat fuels and create defensible space around homes situated mid-slope.
- 2) Develop an emergency evacuation plan that provides alternative escape routes in the event that evacuation is prevented along Highway 165.

Historic Placitas

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: 4,977 by the 2010 Census.

Terrain: Rolling terrain in the northern foothills of the Sandia Mountains. Slopes exceed 30%.

Fuels: Fuels are light to moderate and few houses have sufficient defensible space, particularly those with limited setback from the slope.

Access: The historic town of Placitas is off of Highway 165 in the foothills of the Sandia Mountains. Although easily accessed from Interstate 25, access from the south is limited by steep and narrow roads. The community is scattered throughout rolling foothills with some steep sections. Road width within the community is narrow, particularly to homes located upslope. Most roads are unsurfaced and have limited turnarounds. Many homes do not have visible numbering.



Defensibility: Many older homes have combustible construction with wood siding. There is only minimal separation between many homes. Generally, roof construction is good. The area shows signs of a close-knit community that may benefit from an organized fire prevention program. The community has a volunteer fire department and a number of hydrants.

Recommendations:

- 1) Treat fuels and create defensible space around homes, particularly those situated mid-slope.
- 2) Improve house numbering and signage.
- 3) Develop an emergency evacuation plan that provides alternative escape routes in the event that evacuation is prevented along Highway 165.
- 4) Implement a Firewise Communities program.
- 5) Initiate a community-based CWPP.
- 6) Work with BLM and Sandia Ranger District of the Forest Service to develop plans for fuel breaks around the area south of Diamond Tail Estates and south and east side of Placitas. Tie in with existing treatment areas, particularly around the Las Huertas Creek area. Treatments would be in a checkerboard formation, approximately 150 acres each.
- 7) Pursue BLM Community Assistance Grants for implementing fuel treatment on private lands adjacent to BLM and public outreach exercises.

La Madera

Community Hazard/Risk Assessment: High

Composite Risk Assessment for Surrounding Area: High

Population: by the 2010 Census.

Terrain: Rolling terrain in the eastern foothills of the Sandia Mountains. Slopes exceed 30%.

Fuels: Fuels are moderate to heavy Pinyon-Jupier and few houses have sufficient defensible space.

Access: The community of La Madera is off of La Madera road which is off of Highway 14 in the foothills of the Sandia Mountains. The community is scattered throughout rolling foothills with some steep sections. Road width within the community are is narrow, particularly to homes located upslope. Most roads are surfaced and have turnarounds. Many homes do not have visible numbering.



Defensibility: Defensible space is limited. Many older homes have combustible construction, however, roof construction is good with many homes having metal roofs. The community has a volunteer fire department.

Special Concerns: The community has a volunteer fire department, but water availability is limited.

Recommendations:

- 1) Treat fuels and create defensible space around homes, particularly those situated mid-slope.
- 2) Improve house numbering and signage.
- 3) Develop an emergency evacuation plan that provides alternative escape routes in the event that evacuation is prevented along Highway 14 or Highway 165.
- 4) Implement a Firewise Communities program.
- 5) Initiate a community-based CWPP.
- 6) Work with BLM and Sandia Ranger District of the Forest Service to develop plans for fuel breaks around La Madera. Tie in with existing treatment areas, particularly around the Las Huertas Creek area. Treatments would be in a checkerboard formation, approximately 150 acres each.
- 7) Pursue BLM Community Assistance Grants for implementing fuel treatment and public outreach exercises.

4.4 COMPOSITE RISK ASSESSMENT MODEL

4.4.1 MODELING FIRE BEHAVIOR

Fire behavior is defined as the manner in which a fire reacts to the influences of fuel, weather, and topography. Fire behavior is often described in terms of its rate of spread and flame length. Wildland fire may also be defined by the strata of the fuel bed through which it burns. Ground fires smolder below surface litter in decomposing wood and roots. Surface fires consume grass, low shrubs, small branches, and forest litter. Crown fires move into or through the forest canopy.

The primary fire behavior modeling tool used for the SCCWPP is FlamMap 3.0, which analyzes fuel and terrain characteristics in a raster format under specific weather and fuel moisture scenarios. Surface fire behavior is modeled based on Rothermel's (1972) surface fire behavior model, while the more difficult to evaluate crown fire behavior is predicted using Van Wagner's (1977) crown fire initiation model and Rothermel's (1991) crown fire spread model. A variety of geographically displayed outputs are then available, including rate of spread, flame length, fireline intensity, and crown fire behavior. These outputs are used to help direct mitigation recommendations and as inputs to the Composite Risk Assessment.

4.4.2 FIRE BEHAVIOR INPUTS

The required inputs for FlamMap are fuel model, canopy closure, slope, aspect, weather parameters, and fuel moisture characteristics. Optional inputs are canopy base height, stand height, and canopy bulk density. Fuels are characterized by the fuel models and the canopy features. Topography is modeled through slope and aspect, which are derived from digital elevation models (DEMs). Weather and fuel moisture data are determined using historic weather data for the County.

Fuels

Fuels is the term given to vegetation that is available for combustion. Fuels are often grouped into the general categories of grass, shrubs, and timber. For modeling fire behavior, fuels are further categorized into fuel models based on characteristics such as fuel bed depth, surface area to volume ratio, and the amount of fuel loading in an area.

Two sets of fuel models are widely used in the United States: Anderson's 13 fuel models (Anderson 1982) and Scott and Burgan's fuel models (Scott and Burgan 2005). GIS coverages for both fuel model sets are available through the LANDFIRE database. This plan uses the more recent Scott and Burgan fuel models that were designed with several intended improvements for use with GIS-based modeling (Table 4.2).

GIS data in 30-meter pixel resolution were available for both fuel model sets through the LANDFIRE data library. FlamMap fire behavior runs were conducted with each data set and compared. The resulting predicted fire behavior and a comparison of fuel maps to georeferenced field photographs favors the use of the Scott and Burgan fuel models for this analysis. The capability to more precisely model crown fire behavior through more precise surface fire predictions is one of the stated intents of this fuel model set.

Table 4.2. Fire Behavior Fuel Models Used for Sandoval County Fire Behavior Modeling

Scott and Burgan Fuel Model	Description	Similar Anderson Fuel Model
GR1: Short sparse dry climate grass	Grass is short and/or discontinuous naturally or as a result of grazing.	1, Short grass
GR2: Low load dry climate grass	Short grass with greater loading and continuity than GR1.	1, Short grass 2, Timber grass and understory
GR3: Very coarse grass	Fuel load and fuel bed depth are greater than GR2; fuel bed depth is about 2 feet. Spread rate high, flame length moderate.	3, Tall grass
GS1: Low load dry climate grass-shrub	The grass load is low and shrub height is about 1 foot, producing moderate spread rates and low flame lengths.	2, Timber grass and understory
GS2: Moderate load dry climate grass-shrub	The grass load is moderate and shrub height is 1–3 feet, producing high spread rates and moderate flame lengths.	2, Timber grass and understory
SH1: Low load, dry climate shrub	Fire is carried by scattered woody shrubs and litter. Fuel load is low and fuel bed depth is less than a foot, producing very low spread rates and flame lengths.	5, Brush 6, Dormant brush
SH2: Moderate load dry climate shrub	Woody shrubs and litter are more continuous than SH1. Fuel bed depth is about a foot. Rates of spread and flame lengths are low.	5, Brush 6, Dormant brush
SH5: High load dry climate shrub	A heavy load of continuous shrubs 4–6 feet deep produces very high spread rates and flame lengths.	4, Chaparral
SH6: Heavy shrub load	Fuel bed depth 4–6 feet, high spread rate, and very high flame lengths.	6, Dormant brush 7, Southern rough
SH7: Very high load dry climate shrub	Very dense and continuous shrub fuels, 4–6 feet deep, very high flame lengths comparable to SH5. Spread rate is high, but slightly lower than SH5.	4, Chaparral 5, Brush
TL1: Low load compact conifer litter	The light to moderate fuel load is composed of compact forest litter 1–2 inches deep, which produces very low spread rates and flame lengths.	8, Compact timber litter
TL2: Broad leaf litter	Low load compact fuel bed, spread rates very low, flame length very low.	9, Hardwood litter
TL3: Moderate load conifer litter	Moderate loads of conifer litter and some coarse woody fuels produce very low spread rates with low flame lengths.	8, Compact timber litter
TL5: High load conifer litter	Light slash or mortality fuel, spread rate low, flame length low.	8, Compact timber litter
TL6: Broadleaf litter	Less compact moderate load. Spread rate moderate, flame length low.	9, hardwood litter
TL8: Long-needle litter	Long-needle pine litter produce moderate spread rates and low flame lengths.	9, Hardwood or long needle litter
TU1: Timber overstory, grass/shrub understory	Low load grass fuel bed, spread rate low, flame length low.	10, Timber understory
TU5: Very high load dry climate timber-shrub	The heavy forest litter and shrub understory is the primary carrier of fire. Spread rates and flame length are moderate.	10, Timber litter and understory
NB1: Urban development	Insufficient wildland fuel to carry wildland fire.	NA
NB3: Agricultural	Agricultural lands maintained in a non-burnable condition.	NA
NB8: Open water	Lakes and rivers.	NA
NB9: Bare ground	No burnable vegetation.	NA

Weather

Of the three major fire behavior input categories (fuel, topography, and weather), weather is the most ephemeral and difficult to model. It influences the FlamMap model primarily through its effects on fuel moisture and through wind speed and direction. These weather inputs are derived through an analysis of past weather and fuel conditions in Sandoval County.

The critical weather components used in the FlamMap model are wind and fuel moistures, which in this case are calculated using remote automated weather station (RAWS) data and standardized algorithms. Fuels can be divided into diameter classes based on the amount of time that they take to reach moisture equilibrium with the surrounding environment: 1 hour (<0.25 inch), 10 hour (0.25–1.00 inch), 100 hour (1–3 inches). Live herbaceous and woody fuel moistures are inputs as well (Table 4.3). Each of these fuels classes distinctly affects fire behavior.

The Jemez RAWS is located at an elevation of 8,000 feet in the forested mountains of north-central Sandoval County. The past 30 years of data from the Jemez station were analyzed using FireFamilyPlus 4.0 per standard practices. Fuel moisture scenarios were developed for low, moderate, high, and extreme climatic conditions based on the energy release component. The extreme fuel moisture conditions were used in the FlamMap model to illustrate the potential fire behavior that has become increasingly common throughout the western United States. Wind speeds of 20 feet for extreme conditions were set to 35 miles per hour based on input from local experts.

Table 4.3. Fuel Moisture Parameters Derived from the Jemez RAWS, 1981–2011

Parameter	Low	Moderate	High	Extreme
Percentile range	0–15	16–85	86–94	95–100
1-hour fuel moisture	12.25	5.31	2.79	1.99
10-hour fuel moisture	21.57	6.96	3.57	2.52
100-hour fuel moisture	16.60	10.28	5.76	4.59
Herbaceous fuel moisture	53.30	37.68	36.42	35.51
Woody fuel moisture	103.90	81.57	65.23	60.93

Topography

Topography is the third input category for modeling fire behavior. Slope steepness, aspect, elevation, and landscape features affect vegetation type, fuel moisture, local weather, and ultimately fire behavior. Topographic characteristics are available in the same 30-m resolution as the fuels characteristics obtained through LANDFIRE. The FlamMap model requires aspect and slope as inputs, which are derived from DEMs.

4.4.3 FIRE BEHAVIOR OUTPUTS

Four FlamMap outputs, plus the fire occurrence data (fire history/density of starts), are used to depict predicted fire behavior under extreme climatic conditions: flame length, fireline intensity, crown fire activity, and rate of spread. These outputs are helpful for illustrating potential fire behavior under severe conditions to highlight areas of concern and serve as the basis for the Composite Risk Assessment. See Appendix E for more specific fire behavior predictions for individual communities.

Flame Length

Flame length is the distance from the base to the tip of the flaming front. Surface fire flame length is a major factor in determining crown fire initiation. It also provides a visual indication of fireline intensity.

Flame length is used as an indicator of resistance to suppression and a guideline as to what suppression resources are needed. For example, NWCG guidelines indicate that direct attack by hand crews is most effective for flame lengths under 4 feet, whereas engines and heavy equipment may affect direct attack on flame lengths up to 8 feet.

Flame length is greatest in tall grass, dense brush, and heavy timber fuels. In the County, modeled flame lengths are lowest in the sparse grass and brush fuels of the southern portion of the County (see Map D.3 in Appendix D). As brush fuels become denser in the northern part of the County, modeled flame lengths increase to more than 8 feet. In the Jemez Mountains to the northeast, the more open lower elevation forests will support moderate flame lengths between 4 and 8 feet. The dense timber understory in the higher elevation forests is predicted to produce extreme flame lengths in excess of 11 feet. The fire behavior model may not adequately represent the potential for high flame lengths in bosque fuels under dry conditions.

Fireline Intensity

Fireline intensity is measured in terms of heat released per unit of time from a 1-foot-wide section of the fuel bed along the flaming front, often expressed in British Thermal Units per foot, per second (BTU/ft/sec). As with flame length, to which it is exponentially related, fireline intensity is used as an indicator of resistance to suppression and a guideline for needed suppression resources. Due to the exponential relationship between fireline intensity and flame length, the attributes of this fire behavior index are reflected by flame length (see Map D.4 in Appendix D).

Crown Fire Activity

Crown fire activity describes fire behavior in terms of no fire activity, surface fire activity, passive crown fire (torching), and active crown fire (crown to crown spread). This output can help guide mitigation activities. For example, active crown fire may indicate a need to thin a forest stand to prevent propagation of fire across a contiguous canopy, whereas passive crown fire activity may indicate a need to reduce ladder fuels (high surface fuels and lower branches that allow fire to spread into tree crowns) to reduce the initiation of crown fire from surface fire.

With the exception of the Jemez Mountains, most of the fuels in the County are brush and grass that cannot support crown fire activity in the conventional sense. The denser timber of the Jemez Mountains will support active crown fire, while the forests with lower crown density or a less dense understory may only support a passive crown or surface fire (see Map D.5 in Appendix D).

Rate of Spread

The rate at which fire travels through the fuel bed is often expressed in chains (66 feet per hour, which is equal to 1.1 feet per minute). Rate of spread can be helpful for planning the number and type of fire suppression resources that may be required to contain fire growing at a given rate.

The predicted rate of spread closely corresponds to fireline intensity. It is highest in the more contiguous grass and brush in northern Sandoval County and the crown-fire prone areas of the Jemez Mountains (see Map D.6 in Appendix D).

Fire Occurrence (Fire History/Density of Starts)

Geographic data for fire locations was provided by the State of New Mexico and the USFS. This was used to develop a GIS layer displaying the density of ignitions. The highest rate of occurrence per unit of area was in the Jemez Mountains. A significant concentration of ignitions was also present in the more densely populated area around Bernalillo (see Map D.7 in Appendix D).

4.4.4 COMPOSITE RISK ASSESSMENT AND THE GIS OVERLAY PROCESS

The Composite Risk Assessment is a synthesis of fire occurrence and the four outputs from the FlamMap fire behavior model previously discussed. Each of these elements has been selected based on its relevance to fire suppression and WUI mitigation. The results of this process can be used to guide fire response levels and can then be compared to the Community Hazard/Risk Assessment to prioritize mitigation efforts.

These components were integrated using a GIS-based weighted overlay. The datasets were each ranked into four classes, with 1 being the lowest hazard and 4 being the highest. Once formatted into compatible scales, weighting was established to emphasize the areas of highest risk throughout the County. Historic fire occurrence, fireline intensity plus flame length, and crown fire activity are equally represented at 30% each. Rate of spread is weighted at 10% to prevent overestimating the risk in the sparsely populated grasslands of the County where fire spread is rapid but historic fire occurrence and fire intensity are relatively low (Figure 4.1).

As can be expected across most of the fire-adapted western United States, much of the County is at moderate or high risk of potentially problematic fires. The areas of most extreme risk are concentrated in the steep, dense forests of the Jemez Mountains (Figure 4.2). The high risk area located to the east of the County from the central line is a consequence of the fuels in that half of the County that are classified as moderate load grass/shrub fuels (GS2) that are capable of fast rates of spread and moderate flame lengths. Fuels on the western half of the County are classified as heavily grazed short grass fuels and low-load shrub/brush fuels capable of only low spread rates and flame lengths, hence the more moderate risk rating. The Las Conchas burn area has been classified as a TL1 fuel type, this fuel type is used to classify recently burned fuels that are still able to carry fire. The lower risk associated with the TL1 model can be seen by the moderate area delineated in the northeast corner of the County in the shape of the Las Conchas burn perimeter. Additional burn areas that experienced wildfire since 2008 have also been classified in this way and appear as moderate patches surrounded by extreme risk. This TL1 fuel model should be updated as the burn area goes through various levels of vegetative succession and as more fuel data become available across the burn areas.

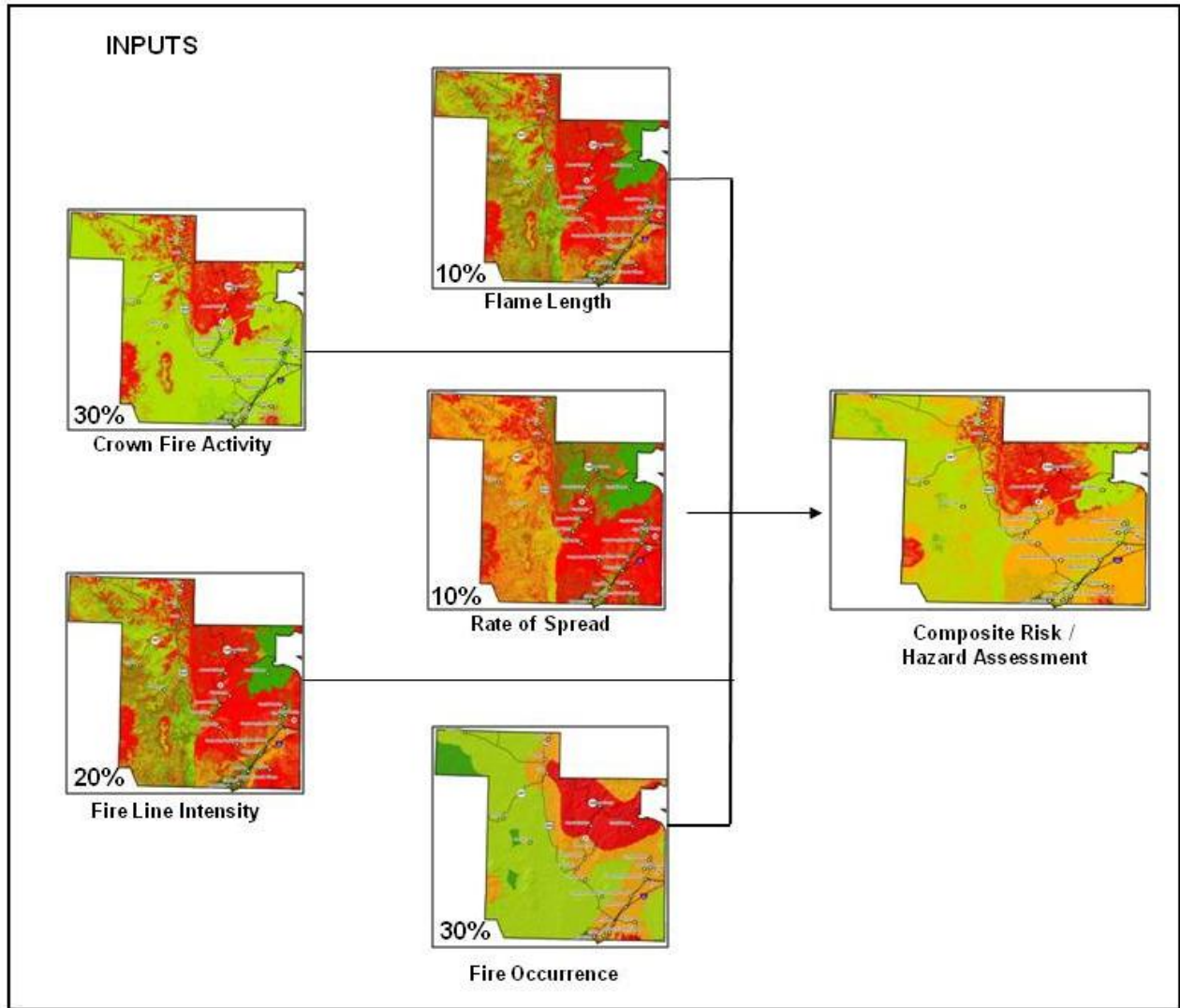


Figure 4.1. Composite Risk Assessment process.

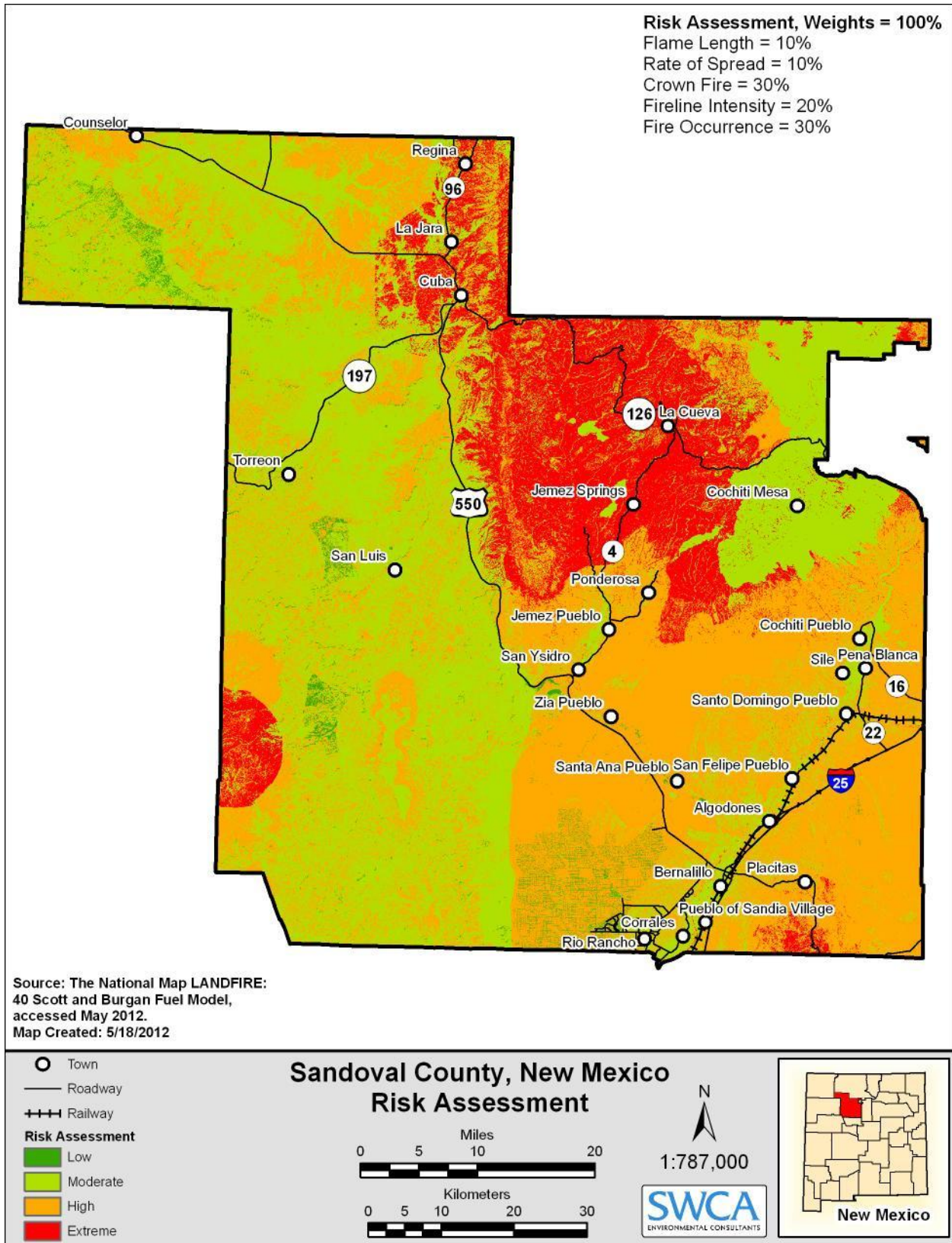
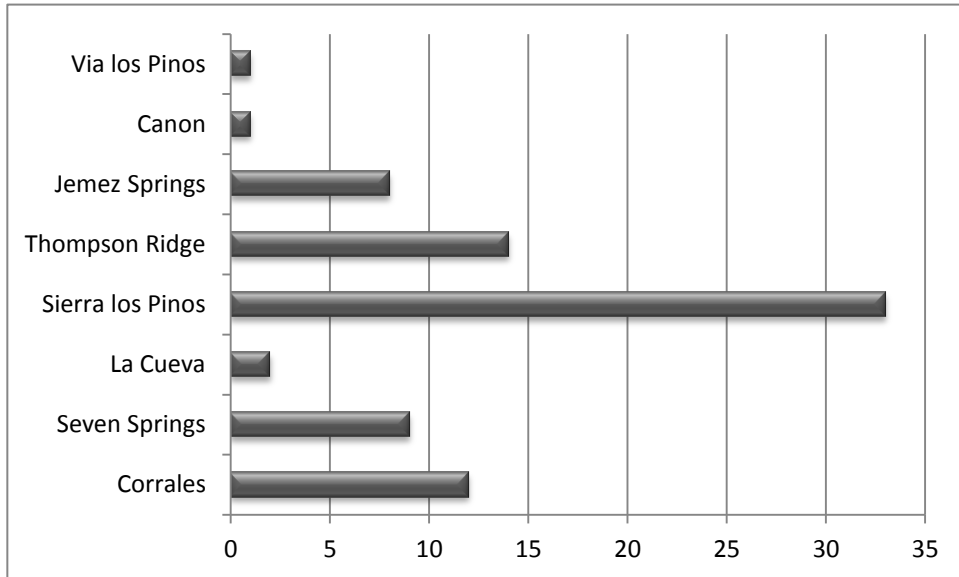


Figure 4.2. Composite Risk Assessment.

4.5 PUBLIC OUTREACH

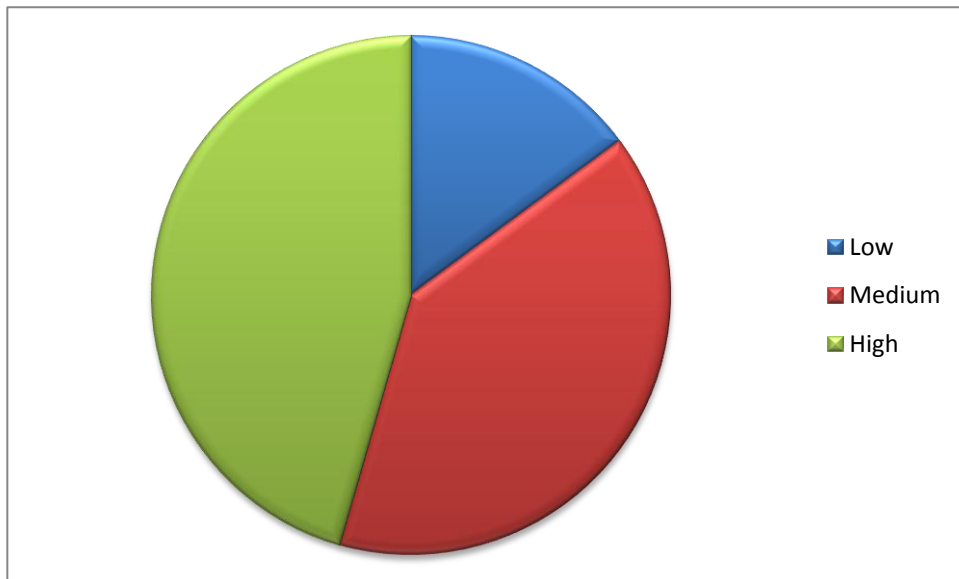
The following is a summary of the results of the community survey. In total, 82 residents have responded to the survey, providing the following information.

Respondents represented the following communities:

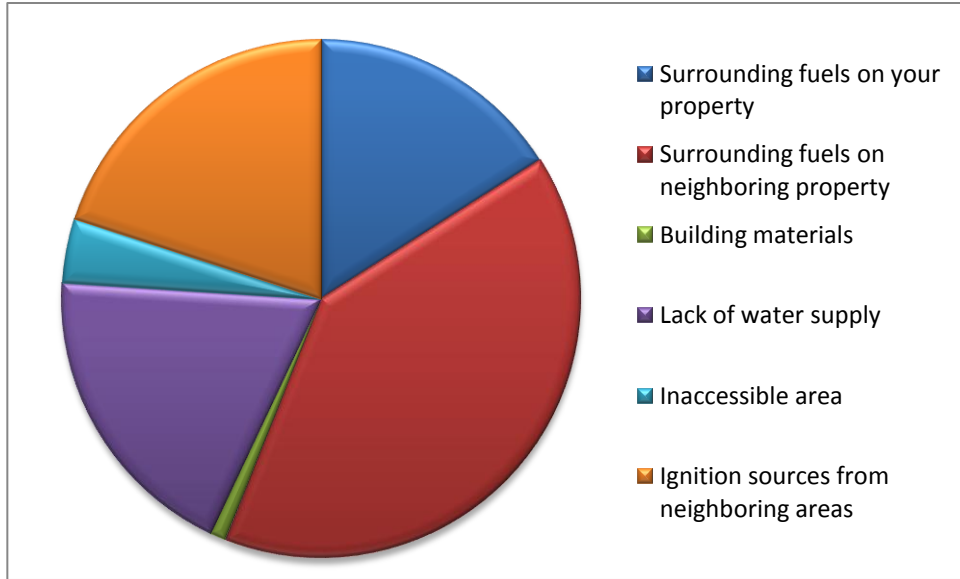


The survey asked the following questions; charts display the percentage of the total responses.

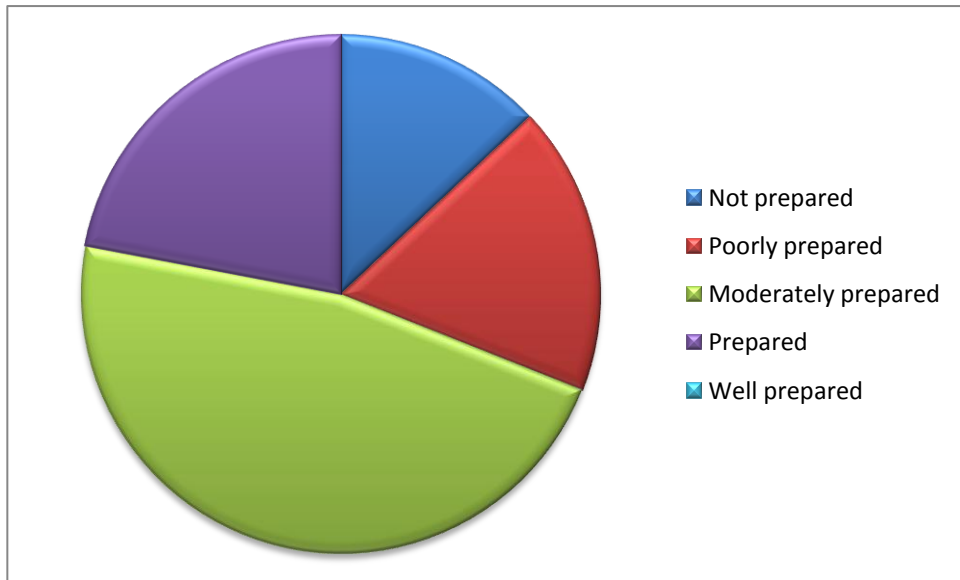
1) How would you rate your house in terms of risk from wildfire?



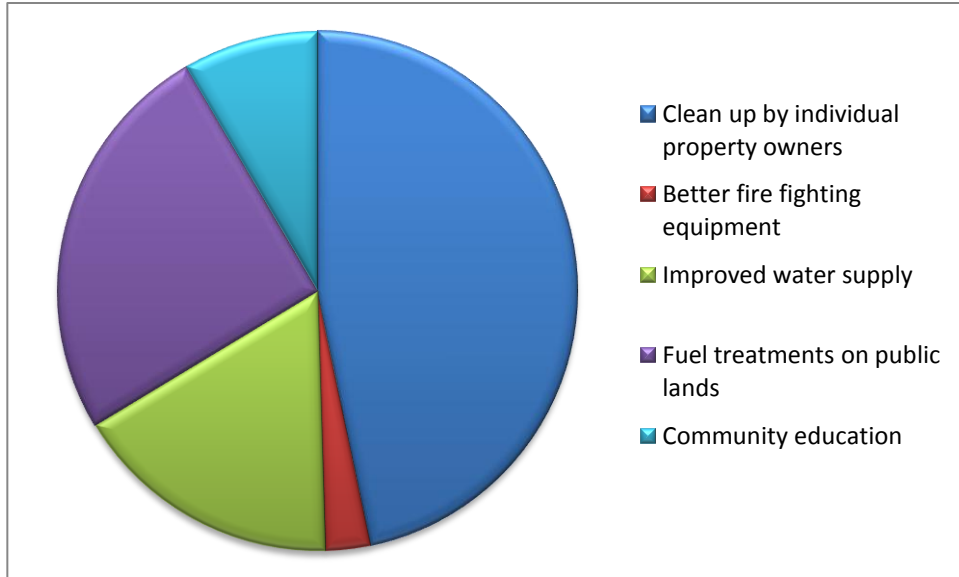
2) My home is vulnerable to wildfire because of...?



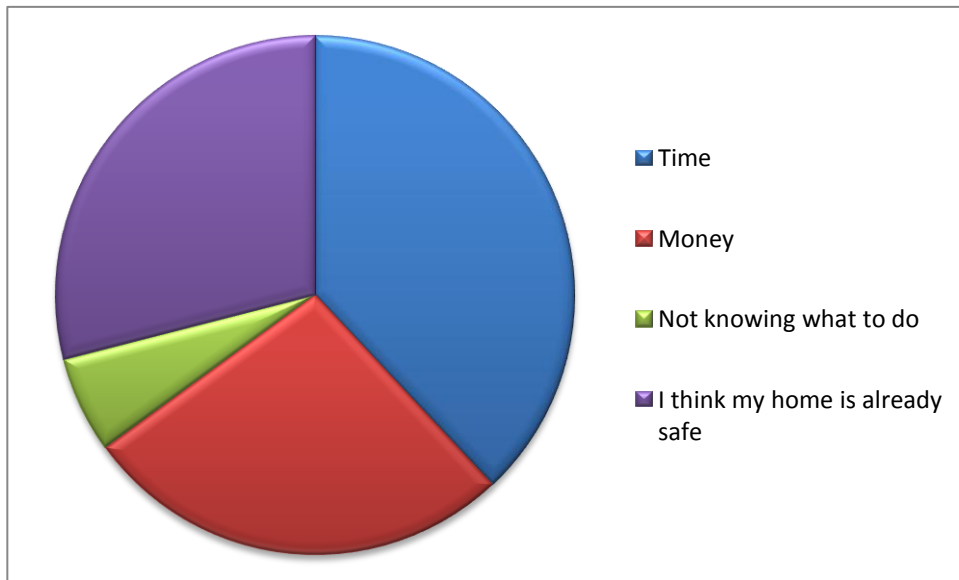
3) How prepared is your community for a large wildfire?



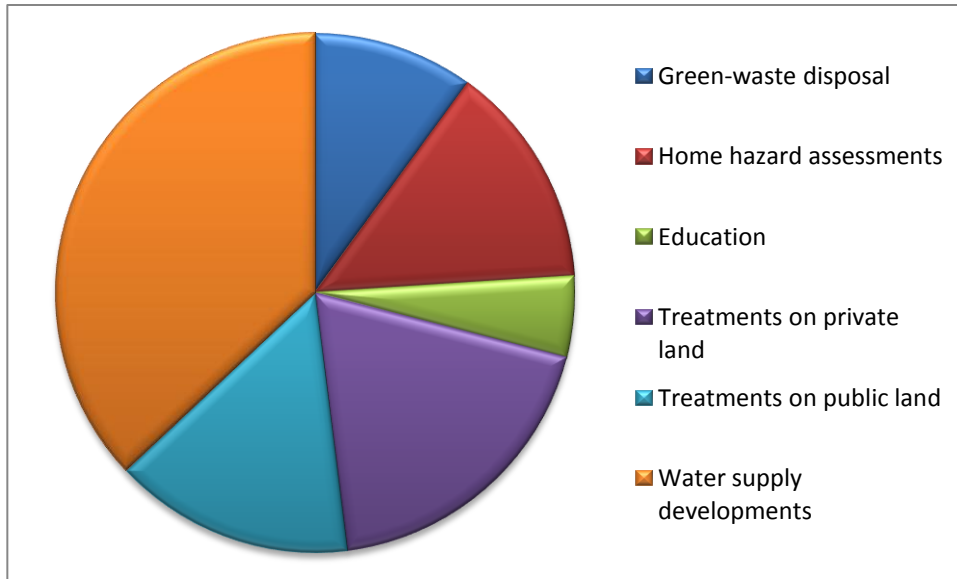
4) The action most important to making my community prepared for wildfire is...?



5) My biggest challenge to making my home fire safe is...?



6) I would be most interested in funding to help me and my community with...?



Below is a subset of comments from the public outreach process. A complete compilation of public comments are included in Appendix B.

- *“Done a great job on reducing risks around our community. If funding is available, would like to see some more focus on controlled fires or mastication/cleanup like done at Thompson Ridge (risky but effective) near cultural areas like Bandelier. The use of prisoners to help was the most excellent idea and is appreciated. The pendulum has gone too far in favor of the environmentalist agenda of closure, do nothing, and keep the general public out of the forest. Let’s go back to involved and associated management. Finally, two of my neighbors have not done “fire wise” to their properties so my risk is medium at best. I have spoken to them with no avail.”*
- *“The main issue is the lack of enforcement of camping restrictions and lack of monitoring of fires for campers. Either staffing needs to be increased or a better schedule/system of monitoring campers put in place or - if that is not possible - camping must be significantly restricted or not allowed except in designated camp grounds. It is simply unsafe to permit camping in dry conditions.”*
- *“Need better community awareness of all resources available in our community, possibly a resource book of who to call when.”*
- *“Clean up the bosque!!! deadfall in some areas is chest deep!!! More needs to be done. Then we need fire hydrants and a public water system, too.”*
- *“Need in residence HOT SHOTS at the Jemez Ranger Station”*
- *“I believe that property owners should be held accountable for the clean-up of trees etc. or for the approval to possible funding available to have it cleared and cleaned up.”*
- *“Easier access to slash removal options would be helpful. Where can we take the fuel sources, especially pine needles?”*
- *“Could use more fire wise grant money and participation.”*

- *“We need more trained and available firefighters.”*
- *“Wild areas need to be patrolled more and people who violate fire restrictions need to be arrested and prosecuted to the fullest extent.”*
- *“Consider leveraging business owners and their staff that make a living in wilderness areas. Rafting businesses could be utilized by setting up a communications system that would enable this business sector to quickly report fire danger.”*
- *“The state needs to be leaned on to ban the use and sale of illegal fireworks and legal fireworks, because they are both being used unsafely.”*

These results (from 82 respondents) suggest that almost 90% of people in the County perceive their homes to be at high or moderate risk from wildfire. Approximately 40% of these residents felt that their homes were at risk from wildfire because of fuels on surrounding neighbors’ properties (including public lands). Lack of water supply and risk of ignitions from neighboring properties were also a concern. In terms of preparedness, no residents felt that their community was well prepared, about half thought they were moderately prepared, and a quarter thought they were unprepared or poorly prepared. Almost half of those questioned thought that clean-up by individual property owners was the most important way to better prepare the community. Improved water supply and fuel treatments on public lands were also important ways to improve preparedness. When asked what was the greatest challenge for residents in making their homes fire safe, 38% wrote that time was the greatest hurdle, 29% felt that their home was already safe, and 27% stated that money was their greatest challenge to mitigating risk. Only 6% of people claimed they did not know what to do to improve the safety of their home, suggesting that public outreach in these communities has been effective in educating homeowners on wildfire mitigation. This was also evident from question 6, where only 5% of people felt that funding for education was necessary for their community. About 37% of people cite water supply developments as a priority focus for funding; this was the case across communities and was also voiced during community meetings. Fuel treatments on public and private lands made up a quarter of the residents requests for funding. Green waste disposal was important particularly for Jemez Mountain communities, as was heard in community meetings and through additional public input.

Many homeowners voiced concern about the risk of fires spreading from illegal campfires on public lands. Although many point to stricter enforcement of burn restrictions as a solution, the Forest Service already distribute a large number of citations for illegal campfires in the Jemez Ranger District and have been increasing patrols each year. Public education to better inform the public of burn restrictions as well as educating the broader public in Rio Rancho, Albuquerque and other metropolitan areas about their responsibility to prevent wildfire ignitions through illegal burning, is a preventative approach that may serve as more effective than the reactive approach currently employed. The use of illegal fireworks is also a concern to residents because of the ignition risks they impose. Fire restrictions were also a source of confusion for many residents because of the differences in restrictions imposed by differing jurisdictions. A single source for burn restrictions was suggested as a means to overcome this confusion.

4.6 COMMUNITY VALUES AT RISK

Earlier compilation of the critical infrastructure in the planning area (Map D.1. Appendix D), coupled with the community assessments, public outreach, and Core Team input, has helped in

the development of a list of community values that are at risk from wildland fire (CVARs). The WUI boundary has been developed to encompass the majority of these CVARs. CVARs are split into natural, social, and cultural classes. It is important to note that although an identification of CVARs can inform treatment recommendations, a number of factors must be considered in order to fully prioritize areas for treatment; these factors include appropriateness of treatment, landownership constraints, locations of ongoing projects, available resources, and other physical, social, or ecological barriers to treatment.

The scope of this CWPP does not allow determination of the absolute natural, socioeconomic, and cultural values that could be impacted by wildfire in the planning area. In terms of socioeconomic values, the impact due to wildfire would cross many scales and sectors of the economy and call upon resources locally, regionally, and nationally. To understand the breadth of such an impact, land agencies and local communities may guide efforts towards completing a comprehensive economic and demographic analysis in relation to wildfire impacts. This CWPP may be used to identify priority areas and communities that could experience the greatest economic strain. It is suggested that communities included in the SCCWPP achieve a finer-grained analysis of the smaller jurisdictional and community wildfire concerns by pursuing further funding to complete a community-level CWPP.

4.6.1 NATURAL COMMUNITY VALUES AT RISK

For residents and visitors alike, ecological values are central to the interests and aesthetics of the County. While wildland fire is a natural and necessary part of the local ecology, high-severity fire poses a hazard to many of the natural resources. Under a normally occurring fire regime, many ecological values will recover within a few years of a fire. Air quality should recover within days, but wildlife habitat may take years. However, severe or unseasonable wildfire may compromise ecosystem health producing conditions conducive to the spread of noxious and invasive weeds, as outlined in the BAER report for the Las Conchas fire (USFS 2011)

Many of these values lie outside the WUI boundary, often on federal or tribal lands. The Composite Risk Assessment and the FRCC rankings (see Map D.2 in Appendix D) illustrate the ecosystem and forest health concerns for these areas, but planning efforts to address these landscape-scale issues should be driven at the federal level and are outside the scope of the CWPP. The recommendations of this CWPP, however, are designed to be consistent with the New Mexico Forest Restoration Principles (Appendix F).

Ecological values at risk to wildfire in this area include the following:

- Wildlife and aquatic habitat
- Watersheds
- State parks
- Rivers (Rio Cebolla, Jemez and San Antonio)
- Nearby forests
- Riparian habitat/bosque
- Viewsheds
- Soil stability
- Natural vegetation communities
- Air quality
- Mature cottonwoods
- Native species
- Water resources
- Wetlands
- Fenton Lake State Park
- Valles Caldera National Reserve

- San Antonio Creek (firefighting water source for La Cueva fire department)
- Jemez Canyon corridor
- National Forest: Soda Dam to La Cueva (fishing area)
- National recreation areas
- Fish hatchery
- Bosque between Highway 4 mile marker 11 and Jemez Springs

4.6.2 SOCIAL COMMUNITY VALUES AT RISK

Social values include population, recreation, infrastructure, agriculture, and the built environment. Much of the built environment associated with the bosque falls within the WUI. Examples include the following:

- Communities
- Homes
- Utilities (i.e., power and communication)
- Community buildings
- Water supply and treatment sites (e.g., the Rio Rancho Wastewater Treatment Plant)
- Campgrounds (Fenton Lake, Jemez Falls, Redondo, San Antonio, Vista Linda, Clear Creek, Rio De Las Vacas, etc.)
- Valles Caldera
- Private campgrounds: Girl Scout, Hummingbird Camp, Fenton Ranch, Manzano, Shaffer, Gallagher
- Seven Springs Fish Hatchery
- Hot springs
- Tourism
- Recreational facilities (National Forest)
- Hiking trails (Jemez Falls, San Antonio, East Fork trailheads)
- Community facilities (e.g., hospitals, schools, churches)
- Agricultural land

CULTURAL COMMUNITY VALUES AT RISK

A large number of historic resources are in this planning area, including cultural sites, historic pueblos and villages, adobe churches, plaza structures and adjoining houses, and many historic civic and private buildings along the river corridor. Many of these historic cultural resources maintain their use and purpose within the neighborhoods that surround them; they also may be recognized as critical social infrastructure.

The following cultural resources were identified by members of the public and the Core Team:

- Seven Springs hatchery registered landmark buildings
- Historic churches
- Old homes and homesteads
- Historic plaza buildings

- Historic municipal buildings
- Historic buildings and houses (non-municipal) recognized on the National Register of Historic Places and New Mexico State Historic Registry
- Traditional irrigated agricultural lands in the bosque corridor and their corresponding acequia systems and acequia components and structures
- Prehistoric and historic pueblo sites along the Rio Grande
- State parks and monuments (Coronado, Jemez)
- Bandelier National Monument
- Archaeological sites
- Jemez National Recreation Area
- Jemez Pueblo
- Jemez State Park (Highway 4)

5.0 MITIGATION PRIORITIES, RECOMMENDATIONS, IMPLEMENTATION, AND MONITORING

As discussed, numerous values throughout Sandoval County are exposed to potential loss from wildfire. The SCCWPP focuses on the protection of lives, structures, and infrastructure of the WUI communities. Prioritization is based on the Community Hazard/Risk Assessments and the Composite Risk Assessment. Many of these recommendations were included in the 2008 SCCWPP with additional updates developed during Core Team meetings and by the public during the public outreach sessions for the 2012 update.

Wildfire mitigation is defined as reduction of the probability and negative impacts of wildfire. This can be accomplished through wildland fuels management, non-fuels mitigation measures, and public outreach. Results are often most effective when all three approaches are pursued by governmental entities, citizen groups, and individuals working in concert. The key to success and the primary value of this document are with the implementation of action items and the maintenance thereof. Maintenance must be anticipated and planned, whether for fuels treatment maintenance or the continuation of an educational program.

The prioritized recommendations are aimed at reducing loss of life, property, and community values in the WUI within the County and are drawn from Core Team involvement, public input, Community Hazard/Risk Assessments, the Composite Risk Assessment, and input from resource professionals. These recommendations are presented in the categories of fuels management, reduction of structural ignitability, fire response capacity, and community education and outreach.

Specific recommendations for each community were discussed in the detailed community assessments (Section 4.3). This chapter provides guidance for implementing these recommendations and a discussion of large-scale projects. Many of these community-specific recommendations can be implemented at the homeowner or community level. Projects requiring large-scale support can be prioritized based on the Community Hazard/Risk Assessments and Composite Risk Assessments.

5.1 RECOMMENDATION FOR FUELS REDUCTION PROJECTS

Fuels should be modified with a strategic approach across the project area to reduce the threat that high-intensity wildfires pose to lives, property, and other values. Pursuant to these objectives, recommendations have been developed in the context of existing and planned fuels management projects. These recommendations initially focus adjacent to structures (defensible space), then near community boundaries (fuel breaks, cleanup of adjacent open spaces), and finally in the wildlands beyond community boundaries (larger scale forest health and restoration treatments). A common focus of fuels treatment is to reduce brush, diseased trees, dead fuels, and immature trees in favor of healthy, more mature trees.

While not necessarily at odds with one another, the emphasis of each of these treatment types is different. Proximate to structures, the recommendations focus on reducing fire intensity consistent with Firewise Communities and International Fire Code standards. Further into the wildlands, treatments will tend to emphasize the restoration of historic conditions and general

forest health consistent with the New Mexico Forest Restoration Principles (see Appendix F). Cooperators in fuels management should include federal, state, and local agencies, as well as groups such as the Cuba Regional Economic Development Organization, the Small Wood Opportunity Team, and the GEJWUIC.

The GEJWUIC is the Firewise Communities board representing the Greater Eastern Jemez Wildland Urban Interface Corridor, which includes six communities within the Santa Fe National Forest and County boundaries: Cochiti Mesa, Jemez Corridor (Areas 1, 2, and 3), La Cueva, Seven Springs, Sierra Los Pinos, and Thompson Ridge Estates. It is recommended that mitigation efforts for these communities continue to be coordinated through the GEJWUIC and that the GEJWUIC continues to coordinate efforts with local, County, state, and federal authorities.

Defensible Space: Defensible space is perhaps the fastest, most cost-effective, and most efficacious means of reducing the risk of loss of life and property. Although fire agencies can be valuable in providing guidance and assistance, creating defensible space is the responsibility of the individual homeowner.

Effective defensible space consists of an essentially fuel-free zone adjacent to the home, a treated secondary zone that is thinned and cleaned of surface fuels, and (if the parcel is large enough) a transitional third zone that is basically a managed forest area. These components work together in a proven and predictable manner. Zone 1 keeps fire from burning directly to the home; Zone 2 reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember production; and Zone 3 does the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition (Figure 5.1).

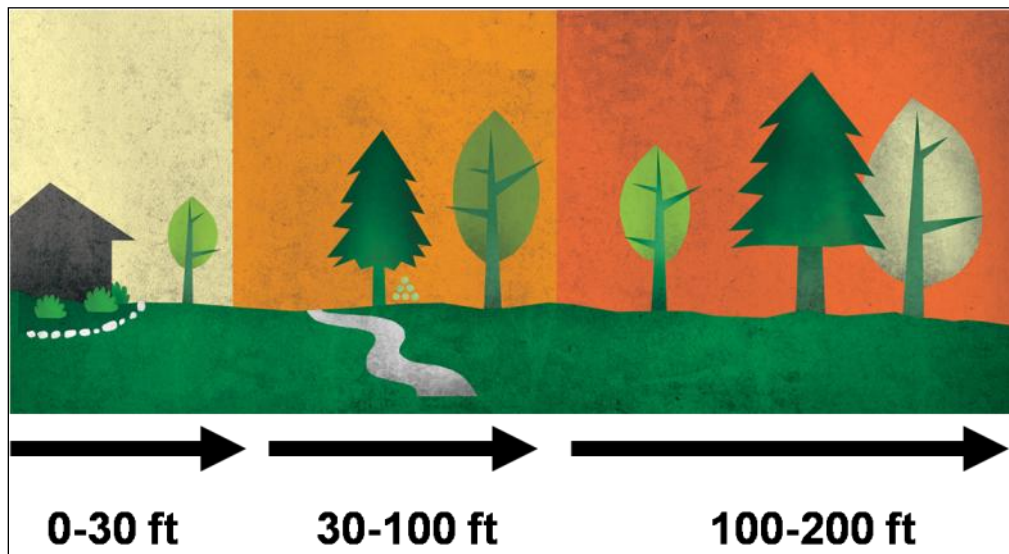


Figure 5.1. Defensible space zones.

Source: www.firewise.org

It should be emphasized that defensible space is just that—an area that allows firefighters to work effectively and with some degree of safety to defend structures. While defensible space may increase a home’s chance of surviving a fire on its own, a structure’s survival is not guaranteed, with or without firefighter protection. Nevertheless, when these principles are consistently applied across a neighborhood, everybody benefits.

Specific recommendations should be based on the particular hazards adjacent to a structure such as slope steepness and fuel type. Local fire authorities or a state forester should be contacted if a professional assessment seems warranted. Firewise Communities guidelines and the Homeowners Guide (Appendix G) are an excellent resource, but creating defensible space does not have to be an overwhelming process. Assisting neighbors may be essential in many cases. Homeowners should consider assisting the elderly, sharing ladders for gutter cleaning, and assisting neighbors with large thinning needs. Adopting a phased approach can make the process more manageable and encourage maintenance (Table 5.1).

Table 5.1. Example of a Phased Approach to Mitigating Home Ignitability

Year	Project	Actions
1	Basic yard cleanup (annual)	Dispose of clutter in the yard and under porches. Remove dead branches from yard. Mow and rake. Clean off roofs and gutters. Remove combustible vegetation near structures. Coordinate disposal as a neighborhood or community. Post 4-inch reflective address numbers visible from road.
2	Understory thinning near structures	Repeat basic yard cleanup. Limb trees up to 6–10 feet. Trim branches back 15 feet from chimneys. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
3	Understory thinning on private property along roads and drainages	Limb trees up to 6–10 feet. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
4	Overstory treatments on private property	Evaluate the need to thin mature or diseased trees. Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness.
5	Restart defensible space treatment cycle	Continue the annual basic yard cleanup. Evaluate need to revisit past efforts or catch those that were by-passed.

Fuel Breaks and Open Space Cleanup: The next location priority for fuels treatments should be where the community meets the wildland. This may be the outer margins of a town or an area adjacent to occluded open spaces such as a park or river corridor. Shaded fuel breaks may be created to provide options for suppression resources, provide opportunities to introduce prescribed fire, or create a zone where crown fire will be forced to the ground where it is more easily contained. In many cases, shaded fuel breaks may be created by thinning along roads. This provides access for mitigation resources and firefighters and enhances the safety of evacuation routes.

Some areas adjacent to communities require fuel reduction to mitigate a hazardous condition, although are not suitable for fuel breaks. The most prevalent example of this in the County is the bosque that runs through the center of many towns.

Larger-scale Treatments: Farther away from WUI communities, the emphasis of treatments often becomes broader. While reducing the buildup of hazardous fuels remains important, other objectives are often included, such as restoration of historic conditions and forest health. Wildfires frequently burn across jurisdictional boundaries, sometimes on landscape scales. As such, these larger treatments need to be coordinated on a strategic level. This requires coordination between projects and jurisdictions, as is currently occurring.

5.1.1 METHODS OF FUELS REDUCTION

Several treatment methods are commonly used, including manual treatments, mechanized treatments, and prescribed fire (Table 5.2). This brief synopsis of treatment options and cost estimates is provided for general knowledge; specific projects will require further planning. Cost estimates for treatments range from \$300 to \$1,200 but should be considered as very general guidelines. The appropriate treatment method and cost will vary depending on factors such as the following:

- Diameter of materials
- Proximity to structures
- Acreage of project
- Fuel costs
- Steepness of slope
- Area accessibility
- Density of fuels
- Project objectives

It is imperative that long-term monitoring and maintenance of all treatments is implemented. Post-treatment rehabilitation such as seeding with native plants and erosion control may be necessary.

Table 5.2. Summary of Fuels Treatment Methods

Treatment	Estimated Cost	Comments
Machine mowing	\$90–\$200 per acre	Appropriate for large, flat, grassy areas on relatively flat terrain.
Prescribed fire	\$100–\$125 per acre	Can be very cost effective. Ecologically beneficial. Can be used as training opportunities for firefighters. May require manual or mechanical pretreatment. Carries risk of escape, which may be unacceptable in some WUI areas. Unreliable scheduling due to weather and smoke management constraints.
Brush mastication	\$300–\$500 per acre	Brush species (Gambel oak in particular) tend to resprout vigorously after mechanical treatment. Follow-up treatment with herbicides, fire, grazing, or further mechanical treatments are typically necessary. Mastication tends to be less expensive than manual (chainsaw) treatment and eliminates disposal issues.
Timber mastication	\$300–\$1,200 per acre	Materials up to 10 inches in diameter and slopes up to 30% can be treated. Eliminates disposal issues. Environmental impact of residue being left on-site is still being studied.
Manual treatment with chipping or pile burning	\$300–\$1,200 per acre	Allows for removal of merchantable materials or firewood in timber. Requires chipping, hauling, pile burning of slash in cases where lop and scatter is inappropriate. Pile burning must comply with smoke management policy.
Feller-buncher	\$750 and up per acre	Mechanical treatment on slopes more than 30% or of materials more than 10 inches in diameter may require a feller-buncher rather than a masticator. Costs tend to be considerably higher than a masticator. May allow for removal of merchantable material.

Manual Treatment

Manual treatment refers to crew-implemented cutting with chainsaws. Although it can be more expensive than mechanized treatment, crews can access many areas that are too steep or otherwise inaccessible with machines. Treatments can often be implemented with more precision than prescribed fire or mechanized methods. Merchantable materials and firewood can be removed while non-merchantable materials are often lopped and scattered, chipped, or piled and burned on-site. Care should be exercised to not increase the fire hazard by failing to remove or treat discarded material in a site-appropriate manner.

Prescribed Fire

The use of fire has existed for thousands of years as a resource management tool for driving game, improving habitat and hunting grounds (Pyne 1982), and later for agricultural purposes. Contemporary land managers currently use management-ignited prescribed fire and naturally occurring fires to fulfill natural resource goals under very specific climatic parameters.

Prescribed fire can be applied in a variety of ways to achieve a broad range of goals and objectives. These may include rejuvenating rangelands, reducing brush, consuming dead materials, reducing small-diameter trees, and creating canopy breaks by eliminating some mature trees. The result may be increased forest health, reduced fire intensity, and/or the restoration of historic conditions.

Prescribed fire generally results in a less predictable post-treatment stand structure as compared with mechanized thinning. However, prescribed fire is often more economically and environmentally beneficial than other treatments.

Mechanized Treatments

Mechanized treatments include mowing, mastication, and whole tree felling. These treatments allow for more precision than prescribed fire and are often more cost effective than manual treatment.

Mowing, including all-terrain vehicle (ATV) and tractor-pulled mower decks, can effectively reduce grass fuels adjacent to structures. For heavier fuels, a number of different masticating machines can be used, including drum- or blade-type masticating heads mounted on machines and ranging in size from a small skid-steer to large front-end loaders. Some masticators are capable of grinding standing timber up to 10 inches in diameter. Other masticators are more effective for use in brush or surface fuels. Mowing and mastication do not actually reduce the amount of on-site biomass, but alter the fuel arrangement to a less combustible profile.

Mechanical shears mounted on feller-bunchers are used for whole tree removal. The stems are typically hauled off-site for utilization while the limbs are discarded. The discarded material may be masticated, chipped, or burned in order to reduce the wildfire hazard and to speed the recycling of nutrients.

Thinning and Prescribed Fire Combined

Combining thinning and prescribed fire can be the most effective treatment (Graham et al. 2004). In forests where fire exclusion or disease has created a buildup of hazardous fuels, prescribed fire cannot be safely applied and pre-burn thinning is required. The subsequent use of fire can further reduce residual fuels and reintroduce this ecologically imperative process.

Herbicides

Brush fuels such as Gambel oak will often vigorously resprout after treatment. Herbicides often prove to be the most practical and cost-effective method for treating brush fuels, especially when combined with mechanized treatments. The type and amount of herbicide applied will depend on a number of variables such as brush type, runoff and exposure concerns, brush age and density, and type of initial treatment. Herbicide treatments can be costly, often easily exceeding \$500 per acre, but this must be weighed against the benefit of prolonging the efficacy of the initial mechanized treatment. Herbicide treatments should be conducted by a certified contractor and may require additional environmental studies and permits.

Treatments for Saltcedar Infestation

Many riparian areas throughout the County have become overrun by saltcedar. The eradication and control of saltcedar have many challenges. Long-term commitment and multiple techniques are required to reduce its extent and minimize its spread. Techniques that are used for the management of saltcedar include mechanical, chemical, and biological methods.

Mechanical treatments, such as hand-pulling and cutting, can be used for smaller stands of young saltcedar saplings, but these treatments become expensive and ineffective within large stands of shrub-sized individuals. Root cutting and bulldozing can be effective, but the benefits may not outweigh the problems resulting from soil damage and the expense of this method. Fire has been used with some success, but because saltcedar is fire-adapted, the species readily resprouts. Resprouting is likely to occur after using any of these methods, so it is highly recommended to combine methods and follow-up treatments to continue control of this species. Treatments using application of deep mulch have been successful in the Middle Rio Grande at reducing the growth ability of invasive plants (Finch et al. 2008).

Chemical control is typically the most effective method used for saltcedar; however, application of herbicides should be site specific. Aerial applications of imazapyr or an imazapyr and glyphosphate mixture should occur from late August through September. This method is slow-acting, and treated trees should not be removed for up to three years after the treatment to ensure root kill. It is important to only use herbicides that are approved for application near water. Biological control methods have also shown some success. The saltcedar leaf beetle (*Diorhabda elongata*) has had proven success in Colorado at selectively attacking salt cedar infestations through asserting physiological stress on the tree through defoliation. Sandoval County is starting to see occurrence of the beetle along the Rio Grande, with large numbers of salt cedar defoliating around Sandia Pueblo, Algodones and Corrales. These large numbers of dead trees however add to the fuel load in the bosque increasing fire hazard, subsequent thinning is required to reduce this hazard once the tree has been killed. Beetle defoliation coupled with burning in the summer months under intense prescribed fire prescription has been found to be successful in some saltcedar stands. Significant damage to the root crown is required for high mortality; this may require supplementing fuel loading, particularly around the root crown. NM State Forestry have been working with local agencies to develop a plan for the beetle infested areas and funding is available for thinning salt cedar and Russian olive in the bosque. The combination of cutting and/or chemical application to cut stumps or small-diameter whips is one of the most common management techniques used for saltcedar. The methods used will depend on the size of the saltcedar stand, the characteristics of the riparian area, and the distance to a community.

5.2 RECOMMENDATIONS FOR FUELS TREATMENTS

Fuels treatment priorities were determined based on the Community Hazard/Risk Assessment, the Composite Risk Assessment, and existing fuels management projects. Treatment recommendations are made in the strategic context of state and federal projects as well as the needs of local residents. Specific treatment recommendations for each community are included in Section 4.3, Detailed Community Assessments. The top five general priorities for fuels treatment in the County have not changed since the 2008 plan, highlighting an ongoing need for continuing implementation of fuel treatments across jurisdictions. These priorities are:

1. Increase creation of defensible space on a countywide basis.
2. Initiate fuels treatments around Jemez Springs and the Area 1, 2, and 3 subdivisions.
3. Complete and maintain (Continue) fuels treatments around Thompson Ridge, Seven Springs, Deer Lake, La Cueva, and Sierra Los Pinos.

4. Reduce fuel buildup in the bosque adjacent to the communities along the Jemez River and Rio Grande corridors.
5. Continue fuels treatments in the Greater Cuba area.
6. (add more infor on projects in placitas, la Madera, cuba, tent rocks, Cochiti...)

Despite considerable efforts on the part of some homeowners, defensible space improvements are needed throughout the County. This should be considered the highest priority in terms of fuels treatments, public education, and the reduction of structure ignitions. As such, a holistic approach should be adopted, including:

- Increased public education targeted toward defensible space, including the ability for homeowners to get assistance with on-site recommendations.
- Increased assistance for slash disposal.
- Increased assistance in obtaining funding.
- The consideration of code adoption to consistently mandate defensible space establishment and maintenance.

The imperative for improved defensible space should be considered the universal top priority throughout the County. As such, it will be assumed rather than listed as a treatment for each community in the fuels treatment project table (Table 5.3).

Federal agencies and NMSF have largely addressed mid- and large-scale fuels management projects around the most at-risk communities in the County. Much of the focus has been in the forested Jemez Mountains. Four areas to look at in the future are the completion of planned projects, the maintenance of completed projects, the reduction of hazard fuels in the bosque, and the reduction of hazard fuels in the piñon-juniper fuel types. Table 5.3 summarizes various treatments in the area. Treatments that were completed during the past 10 years (categorized as existing in Table 5.3), along with treatments that a federal agency plans to carry out (categorized as planned in Table 5.3) and proposed fuels treatment projects that this CWPP recommends for the upcoming five years (categorized as proposed in Table 5.3) were compiled through discussion with agency representatives and input from the Core Team. Existing, planned and proposed treatments on BLM lands are illustrated in Figure 5.2.

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Greater Cuba Area					
Cuba	Existing Treatments	The BLM's Rio Puerco Field Office completed 630 acres of PJ mastication under the Arroyo Hondo Fuel Reduction Project from 2007-2008 (BLM) Coal Creek broadcast burn 2003-2005- 1074 acres, 15 miles south of Cuba. Chijuilla broadcast burn of 1,276 acres of PJ/sagebrush from 2002-2005.			
	Planned Treatments	1037 acres broadcast burn of PJ/sagebrush in 2013 in the Chijuilla Mesa area west of Cuba (BLM) 538 acres of broadcast burn of PJ/sagebrush in 2014 in the Chijuilla Mesa area west of Cuba (BLM) 958 acres of broadcast burn of PJ/sagebrush in 2014 in the Chijuilla Mesa area west of Cuba (BLM)			
	Proposed Treatments	Increase emphasis on defensible space and consider seasonal mowing of grasslands and fallow lands proximate to structures.	Ongoing	High	Homeowners
Regina	Existing Treatments	The BLM has recently treated fuels north of La Jara and south of Regina along the road corridor totaling approximately 210 acres (Naranjo and Road Cut).			
	Planned Treatments	Naranjo Phase II: 70 acres, expansion of Naranjo Phase I north of La Jara (BLM, Farmington Field Office).			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach.	Ongoing	High	Homeowners
La Jara	Existing Treatments	Naranjo Phase I: The BLM has recently treated fuels north of La Jara and south of Regina along the road corridor, totaling approximately 210 acres.			
	Planned Treatments	La Jara Watershed, 400 acres, protects La Jara surface water drinking supply by reducing crown fire potential in that watershed (USFS). Naranjo Phase II: 70 acres, expansion of Naranjo Phase I north of La Jara (BLM, Farmington Field Office).			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach. Include organized slash disposal with support of appropriate agencies. Pursue implementation funds for treatment in the La Jara watershed (NEPA ready). Possible CFRP implementation project.	CFRP deadline Jan 2013. Build stakeholder group summer/fall 2012.	High	FS, community members, state forestry.
Jemez Springs Corridor					
Zia Pueblo	Existing Treatments	None reported.			
	Planned Treatments	None reported.			
	Proposed Treatments	Develop a targeted defensible space program in areas of greatest need.	Fall 2012	Moderate	Zia Pueblo
Jemez Pueblo	Existing Treatments	Coyote Flats pinyon-juniper reduction across two phases (2004-2006). FS land located west of Jemez Pueblo, thinning and broadcast prescribed burn proposed.			
	Planned Treatments	Bosque fuel reduction and saltcedar removal. Paliza project incorporates a portion of Jemez Pueblo lands.			
	Proposed Treatments	Improve defensible space for homes on the outskirts of town.	Ongoing	High	Homeowners

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Jemez Springs Corridor, continued					
Ponderosa, South	Existing Treatments	None reported.			
	Planned Treatments	None reported.			
	Proposed Treatments	Improve defensible space with emphasis on mobile homes and homes with combustible decks.	Ongoing	High	Homeowners
San Ysidro	Existing Treatments	None reported.			
	Planned Treatments	None reported.			
	Proposed Treatments	Reduce bosque fuels. Improve defensible space for homes on the outskirts of town.	Fall 2012	Moderate	Homeowners, BLM
Cañon	Existing Treatments	None reported.			
	Planned Treatments	None reported.			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach. Bosque fuel reduction and saltcedar removal.	Ongoing	High	Homeowners
485 Corridor (Gilman, Cañones)	Existing Treatments	Joaquin Mesa- manage fire for resource benefit. Pursue extraction of small diameter material for merchantable products (USFS).			
	Planned Treatments	None reported.			
	Proposed Treatments	Create or improve defensible space with emphasis on homes located on slopes near piñon-juniper fuels.	Ongoing	High	Homeowners
Ponderosa, North	Existing Treatments	Paliza campground scenic enhancement thin- 10acres 2002-2008 (USFS) Forest Road 10 hazard tree removal from Ponderosa to Sierra los Pinos, clearing of 10-15 ft from the road (USFS)			
	Planned Treatments	San Juan Mesa Prescribed burn 7,000 acres (USFS). Paliza Prescribed burn 15,700 acres (USFS)			
	Proposed Treatments	Improve defensible space with emphasis on mobile homes and homes with combustible decks. Paliza thinning and prescribed fire, as proposed in Paliza Fuel Reduction Complement, Decision Memo 2006- reduce the risk of high intensity wildfire impacting Ponderosa (USFS)	Ongoing	High	Homeowners

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Jemez Springs Corridor, continued					
Jemez Springs	Existing Treatments	Monument Canyon Fuelbreak Fuelwood area. 50 acres. Implemented 2007 (USFS) Monument Canyon Research Natural Area CFRP, 640 acres thinned 2006, ongoing prescribed burning (USFS) San Diego Maintenance Burn 13,020 acres prescribed burn implemented 2006-08 (USFS) San Juan Mesa Prescribed Burn, 7,150 acres, implemented 2004-2006 (USFS)			
	Planned Treatments	Bosque fuel reduction and saltcedar removal.			
	Proposed Treatments	Improve defensible space for homes with emphasis on homes located on slopes near piñon-juniper fuels or adjacent to bosque. Implement San Juan burn, 7,000 acres (planned and funded), and San Diego burn area (USFS). Awaiting burn window.	Ongoing	High	Homeowners
Areas 1, 2, 3	Existing Treatments	None reported.			
	Planned Treatments	None reported.			
	Proposed Treatments	Create community fuel breaks, possibly in coordination with USFS. Initiate coordination with GEJWUIC efforts.	Fall 2012	Extreme	Private landowners in collaboration NM State Forestry.
Southwest Jemez Mountains Landscape Restoration Project	Proposed Treatments	The overall Southwest Jemez Mountains project is a long-term collaborative effort to restore sustainable ecological forest conditions on a landscape of approximately 210,000 acres in the Southwest Jemez Mountains. The area is composed primarily of the entire upper Jemez River watershed including Jemez Pueblo tribal lands, the 89,000-acre Valles Caldera National Preserve, 110,000 acres of the Santa Fe National Forest, as well as some private lands. The Forest Service are carrying out scoping meetings (from July 14 th to August 13 th 2012) to kick off planning for the environmental impact statement needed on the 110,000 acres of national forest before certain treatments can be accomplished (USFS).			
Las Conchas Meadow Restoration	Existing Treatments	70 acres proposed for meadow restoration. 17 acres left to pile burn.			
Oaks and West Mesa Prescribed Burn for wildlife improvement	Existing Treatments	3,950 acres proposed. West Mesa Prescribed Burn 2008. No Oaks Mesa implementation.			
Pines Canyon WUI thin and helispot. 1,800 acres.	Existing Treatments	Working with landowners for private land thinning, 2004 USFS.			

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Jemez Mountains					
Jemez Collaborative Forest Restoration Project	Existing Treatments	Jemez CFRP project- 2007-392 acres- 203-acre area north of Redondo Campground and a 47-acre area directly east of the East Fork Trailhead. The project also proposed experimental treatments to reduce mistletoe on two mistletoe-infected stands, totaling 142 acres, located to the east of the East Fork Trailhead. Implementation occurred 2007/2008 with tree thinning. Thinning and/or mastication would continued through 2008 on the restoration plots and through 2012 on the mistletoe treatment plots. Once completed and slash has had time to cure, prescribed fire treatments would begin and would continue for the next five to ten years during which prescribed fire will be applied and potentially re-applied through low-intensity broadcast burns (USFS).			
Jemez Campgrounds Thinning (Redondo Campground, Paliza, San Antonio, and Jemez Falls Campground)	Existing Treatments	Approximately 270 acres of thinning of ponderosa pine trees 4-inches and larger for removal of forest products (sawlogs, vigas, latillas or firewood) while maintaining screening and visual integrity for recreational purposes. The Redondo campground has already been implemented via thinning and pile burning of slash 2005-06. Paliza was partially thinned in 2005, Jemez Falls was thinned in 2008, and San Antonio campground was thinned in 2008/09 (USFS)			
Valles Caldera NP, Vegetation Management and Fuel Reduction Project	Existing Treatments	Decision Document 2003 proposed small diameter tree removal along New Mexico Highway 4 corridor and around the HQ office compound for approximately 500 acres of VCNP lands.			
La Cueva	Existing Treatments	GEJWUIC grant funded project treated 5 acres of private land in 2007. CFRP Thin-Burn Project, 392 acres, Redondo and East Fork Trailhead treated 2007/2008 (USFS)			
	Planned Treatments	No specific projects reported.			
	Proposed Treatments	Continue with GEJWUIC coordinated projects. Maintenance of CFRP project area.	Ongoing	High	GEJWUIC, VFD, County, State Forestry, CFRP stakeholders.
Thompson Ridge	Existing Treatments	Jemez WUIs Hazardous Fuel Reduction, 5,855 acres. Ongoing since 2007 (USFS) GEJWUIC grant funded project treated 23 acres of private land in 2007.			
	Planned Treatments	Continuation of USFS fuel breaks.			
	Proposed Treatments	Continue establishment of defensible space and develop slash disposal program.	Ongoing	High	Homeowner
		Continue with GEJWUIC coordinated projects. Examine potential fuel breaks on west side of community.	Fall 2012	High	State Forestry and community

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Jemez Mountains, continued					
Seven Springs	Existing Treatments	Fenton Lake State Park, partially completed, 100 acres (NMSF). Fenton Lake Thin and Pile Burn, 19 acres thinned and slash removed 2008 (USFS). Jemez WUIs Hazardous Fuel Reduction, 5,855 acres. Ongoing since 2007 (USFS). Lakes BMG Wildfire Timber Salvage, 890 acres 2003. Only Lake Fork Mesa and Sandoval Ridge Units were harvested (2003/2004). Oat-Pony_Hay Meadow Restoration- thinning of encroaching ponderosa pine and mixed conifer, 250 acres, hand thinned and piled 2006-2009. No prescribed fire. GEJWUIC grant funded project treated 17 acres of private land in 2007. Ongoing treatments in and around the village of Seven Springs (USFS).			
	Planned Treatments	Seven Springs Fish Hatchery, 50 acres (NMSF). Jemez 4 fuel reduction/ prescribed fire project, 5,855 acres (USFS). Seven Springs fuel breaks, acres unknown, primarily south and southwest of Seven Springs (USFS).			
Seven Springs	Proposed Treatments	Continue with GEJWUIC coordinated projects.	Ongoing	High	Community members, State Forestry
		Improve defensible space with accompanying public education/outreach.	Ongoing	High	Homeowners
		Include organized slash disposal with support of appropriate agencies.	Twice annually	High	Forest Service, County Fire, VFD's, GEJWUIC
Deer Lake	Existing Treatments	Recent treatments on the mesas north and south of Deer Lake Estates (USFS).			
	Planned Treatments	Creation of more defensible space in this community is essential. Eureka Mesa II, 275 acres, expanding on earlier treatment on mesa north of Deer Lake Estates, followed up by maintenance burns (USFS). FR 103, acres unknown, proximate to Deer Lake Estates and Miller's Landing. Deer Lake II, 950 acres, expanding on earlier treatment immediately south of Deer Lake Estates, followed up by maintenance burns.			
	Proposed Treatments	Create more defensible space in this community is essential.	Ongoing	High	Homeowners

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Jemez Mountains, continued					
126 Corridor (between Seven Springs and Deer Lake)	Existing Treatments	Projects at the Girl Scout Camp include: Timber sale on 832 acres in 2000 (NMSF). Forest Land Enhancement Program (FHIP), 50/50 Cost Share, 75 acres (NMSF). Recent treatments in the Bales/Ojitos prescribed burn area near the Girl Scout ranch (USFS).			
	Planned Treatments	None reported			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach.	Ongoing	High	Homeowners
Sierra Los Pinos	Existing Treatments	Sierra Los Pinos II, prescribed fire on 483 acres completed in 2005 (USFS). Jemez WUIs Hazardous Fuel Reduction, 5,855 acres. Ongoing since 2007 (USFS) GEJWUIC grant funded project treated 55 acres of private land in 2007. Sierra los Pinos II project, 483 acres of thinning and fuel wood collection (USFS).			
	Planned Treatments	No specific projects reported.			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach.	Ongoing	High	Homeowners
		Include organized slash disposal with support of appropriate agencies.	Twice annually	High	Forest Service, County Fire, VFD's, GEJWUIC
		Continue with GEJWUIC coordinated projects.	Ongoing	High	GEJWUIC, state forestry, fire department, community members
Roadside thinning particularly along Forest Road 10 T17-18N R3E. NEPA has been completed, was not implemented.		Spring 2012	High	FS, DOT	
Rio Grande Corridor					
Pueblo of Santo Domingo	Existing Treatments	Saltcedar removal along the Rio Grande and Rio Galisteo			
	Planned Treatments	None reported			
	Proposed Treatments	Continue saltcedar removal along the Rio Grande and Rio Galisteo bosque.	Ongoing	High	Pueblo of Santo Domingo
Provide regular removal of tumbleweed from beneath bridges and adjacent to railroad and structures.		Ongoing	High	Pueblo of Santo Domingo	

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Rio Grande Corridor, continued					
Pena Blanca	Existing Treatments	None reported			
	Planned Treatments	None reported			
	Proposed Treatments	Clear debris from irrigation ditches and provide regular maintenance.	Ongoing	Moderate	MRGCD
		Improve defensible space with accompanying public education/outreach.	Ongoing	Moderate	Homeowners
Algodones	Existing Treatments	None reported			
	Planned Treatments	None reported			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach.	Ongoing	Moderate	Homeowners
		Regularly maintain clearance along railroad adjacent to community.	Ongoing	High	Railroad
Cochiti Lake	Existing Treatments	PJ thin of 113 acres around Tent Rocks National Monument in 2005. Biomass removal, lop/scatter of PJ on 465 acres around Tent Rocks National Monument in 2010 (BLM) Biomass removal, lop/scatter of PJ on 26 acres around Tent Rocks National Monument in 2012 (BLM)			
	Planned Treatments	None reported			
	Proposed Treatments	Improve defensible space with accompanying public education/outreach. Include organized slash disposal with support of appropriate agencies.	Ongoing	High	Homeowners/HO A
		Evaluate viability of a fuel break along the western periphery of the community. Coordinate any such project with federal efforts in the area.	Fall 2012	High	State Forestry, HOA, County
Cochiti Pueblo	Existing Treatments	14.65 acres of mastication and burn in Peralta Canyon 2009 (BLM)			
	Planned Treatments	101 acres of biomass removal, lop/scatter in Peralta Canyon 2013 (BLM)			
Sandia Mountains					
Placitas Corridor	Existing Treatments	None reported			
	Planned Treatments	None reported			
	Proposed Treatments	Treat fuels and create defensible space with emphasis around homes situated mid-slope.	Ongoing	High	Homeowners
Historic Placitas	Existing Treatments	None reported			
	Planned Treatments	None reported			
	Proposed Treatments	Treat fuels and create defensible space with emphasis around homes situated mid-slope.	Ongoing	High	Homeowners
		Reduce stand density on Sandia Fire Management Unit- Treat average of 17 acres/yr using mechanical means (BLM)	Ongoing	High	BLM

Table 5.3. Summary of Mid- and Large-scale Fuels Treatment Projects, continued

Community	Treatment Project	Description of Treatment Project	Timeline for proposed treatments	Priority	Responsibility
Sandia Mountains, continued					
La Madera	Existing Treatments	None reported			
	Planned Treatments	None reported			
	Proposed Treatments	Treat fuels and create defensible space with emphasis around homes situated mid-slope.	Ongoing	High	Homeowners
Reduce stand density on Sandia Fire Management Unit- Treat average of 17 acres/yr using mechanical means (BLM)		Ongoing	High	BLM	
Non WUI treatments					
Mesa Chivato	Existing Treatments	Combination hand pile and lop and scatter of ponderosa pine and PJ of 1,645 acres from 2002-2011 (BLM). Broadcast burns across numerous ponderosa pine and PJ sites amounting to 5,800 acres from 2003 to 2010 (BLM). Chivato wildfire 2009- managed for resource benefit on 441 acres of ponderosa pine (BLM) Heifer wildfire 2011- managed for resource benefit on 1061 acres of ponderosa pine and PJ (BLM)			
	Planned Treatments	Lop and scatter of 2742 acres of PJ in 2014 (BLM)			
Continental Divide	Existing Treatments	Broadcast burn of 1117 acres of sagebrush (BLM).			
Elk Springs Mesa	Existing Treatments	Thin and burn in 225 acres of PJ in 2001/2002 (BLM) Thin followed by broadcast burn of 200 acres in 2012 (BLM)			
	Proposed Treatments	Combination lop/scatter and broadcast burn of 3931 acres in 2014 (BLM)			

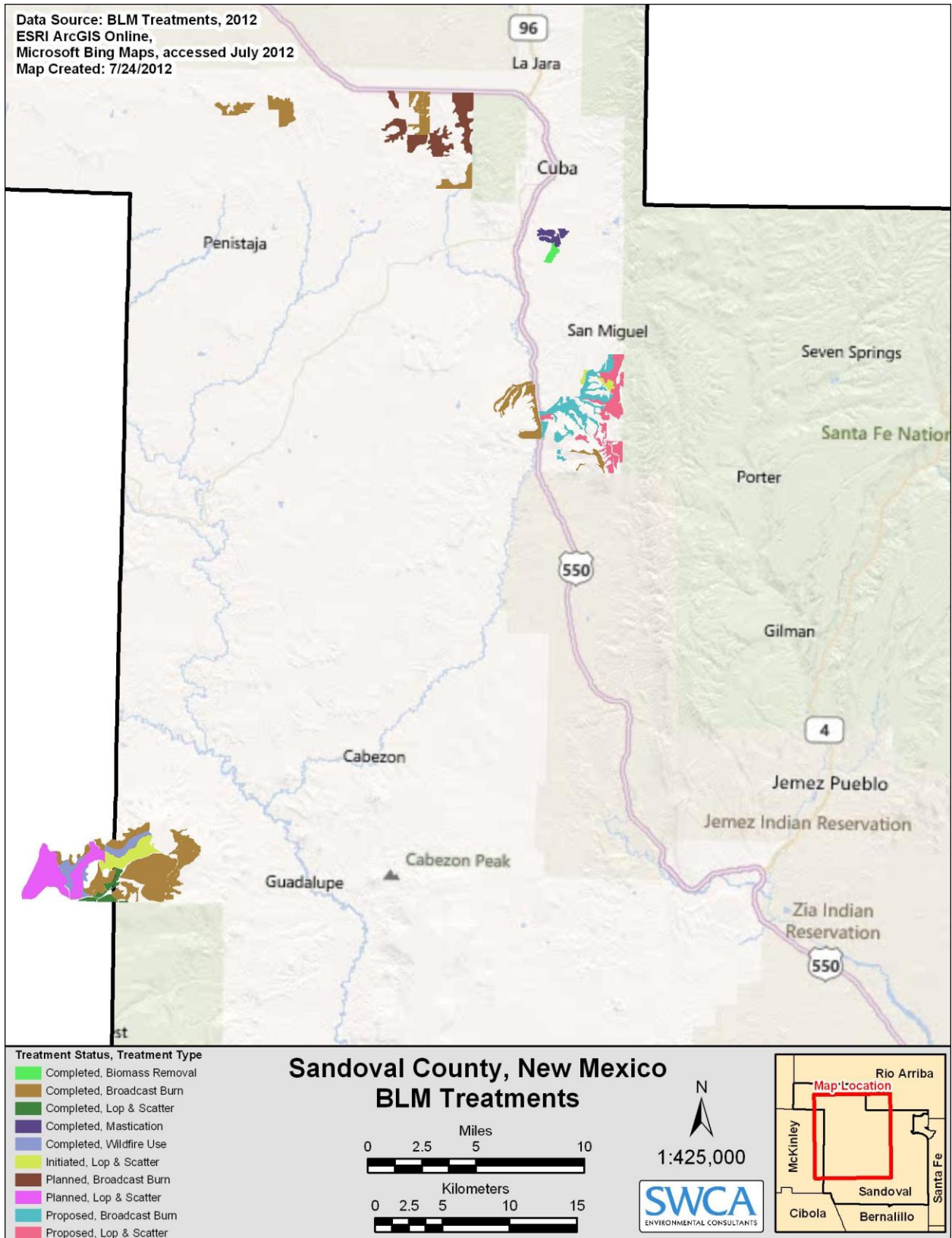


Figure 5.2. BLM fuel treatments, existing, planned and proposed.

5.3 RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Just as environmental hazards need to be mitigated to reduce the risk of fire loss, so do the human hazards. Lack of knowledge, lack of positive actions, and negative actions all contribute to increased risk of loss in the WUI. The Core Team has acknowledged a need for increased public education and outreach.

The wildland fire public education messages and methods of delivery are not new to the County. While many efforts in this arena have been ongoing for years, a restatement of the mission and a reorganization of efforts can often provide a much-needed boost to public outreach.

Public Education Messages

- Defensible space and reducing home combustibility
- Fire prevention on public lands
- Camp fire safety
- Burn restrictions and burn ordinances
- Adequate posting of home addresses
- The role of fire on the landscape, prescribed fire and fire for resource benefit
- The intent of fuels treatment projects
- What to do in the event of a fire- dealing with pets and livestock
- Fire restriction information

Public Education Methods

- Newspaper advertisements
- Annual public education events, such as homeowners associations, schools, community meetings, and fire department events
- Increased and perhaps unique signage
- Community work groups or work days
- Demonstration projects
- Slash-disposal programs (chipper days, on-site disposal for later burning, etc.)
- Website that provides consistent educational materials, contact information, and funding information
- Pre-established evacuation/information centers
- Implement a mass mailing to communities to encourage them to produce an emergency plan and divulge important details to fire departments (e.g., available water sources, gate codes, etc.)
- Fire restriction information is available through the Southwest Coordination Center Website (<http://gacc.nifc.gov/swcc>)
- Firewise Communities Mapper program real-time fire info and Firewise community profiles (<http://nfpa.typepad.com/firewise/2012/06/new-interactive-firewise-mapper-beta-version-is-now-available-1.html>)

Table 5.4 lists public education and outreach projects recommended for implementation in the County.

Table 5.4. Recommendations for Public Education and Outreach

Project	Description	Presented By	Target Date	Resources Needed	Serves To
Create a public outreach team for each area (e.g., Greater Cuba, Jemez Mountains, Rio Grande Corridor, etc.)	Responsibilities could include scheduling and implementing public education events, coordinating and conducting individual home assessments, promoting and assisting with grant opportunities and, and reporting to the public all available resources available to them relating to wildfire preparedness in a resource book or website format.	Federal, state, tribal, and local agency members to develop a coordinated and consistent message	Spring 2013	Develop a community resource book or fire preparedness website specific to County communities.	Inform the public about available resources for fire preparedness, share ideas for treatments and announce outreach events.
Improve emergency communications	Residents discussed the need for more reliable methods of communication regarding emergency evacuations and fire reporting. Many mountain communities felt ill-informed during the Las Conchas fire. Need varied methods for alerting the public of fire status.	County	Fall 2013	Continually review and update the reverse 911 emergency alert system (home phone and cell phone— encourage residents to sign up with cell phone numbers and update old numbers). The County should provide a range of media for emergency alerts: radio, Twitter, Facebook posts, and County websites. Residents in meetings and via surveys requested that fire information be more readily available from both the County and federal agencies. Information hotlines with recorded information could be set up and updated regularly by agency Public Information Officer's.	Better inform the public so that homeowners can make safe decisions regarding evacuation of their homes.
Create a program for assessing individual home defensibility	Prioritize the program based on the Community Hazard/Risk Assessment, Composite Risk Assessment, and community interest. It should be noted that this process is very time intensive and can generate concern and resistance among homeowners. It should be emphasized that such an assessment program is for public education and mitigation planning purposes, not a triage of structures.	County fire departments	Spring 2013	The Fire Adapted Communities website is a good resource (http://www.fireadapted.org/en/Role/Residents%20and%20Homeowners.aspx).	Better inform the public so that homeowners can make safe decisions regarding defensibility for their homes.

Table 5.4. Recommendations for Public Education and Outreach; continued

Project	Description	Presented By	Target Date	Resources Needed	Serves To
Mock evacuation	Plan a mock evacuation in the County, particularly in the Jemez Corridor in order for agencies to build collaboration and unified command in preparation for a real incident.	County, state, and federal agencies	Fall 2012	GIS software or maps.	Educate public on proper evacuation in the event of a wildfire threatening their community.
Pre-evacuation planning	Raise awareness of the need to pre-plan through mailings, fire department open houses, or workshops. Encourage residents to prepare a bag of important documents and valuables during fire- season in the event of an urgent evacuation. Develop a grab-and-go list of important articles that you should take if evacuated. Take regular photographic inventories of home possessions. Be prepared to evacuate early.	County fire departments	Fall 2012	Ready, Set, Go! (www.wildlandfirersg.org). Post pre-evacuation planning documents on the County website or fire department website(s) to increase transparency and facilitate information transfer to the public. NMDHSEM resources (http://www.nmdhsem.org/uploads/FileLinks/161d000bfefa42f98eb4953daa59e9aa/18%20Wildfire.pdf). The Inciweb Incident Information System is a good fire information resource (http://www.inciweb.org). New Mexico Fire Information provides specific New Mexico fire-related information (http://nmfireinfo.com). Southwest Coordination Center provides interagency information for wildfire in the Southwest designed mostly for active firefighters (http://gacc.nifc.gov/swcc).	Facilitates early evacuations in order to preserve life safety. Informs the public what they should do in the event of a fire to reduce stress and anxiety should a fire occur.

Table 5.4. Recommendations for Public Education and Outreach; continued

Project	Description	Presented By	Target Date	Resources Needed	Serves To
Pre-planning for pets and livestock evacuation	Residents need to plan how they will evacuate livestock in event of wildfire evacuations. Consider transport, feed, water, and boarding options while evacuated. Include a contingency plan for if you are not at home. Practice loading horses and livestock in trailers to reduce stress in the event of rushed evacuation. Evacuate early. (Example Animal Evacuation Plan (DRAFT form) is provided in Appendix G).	Animal control, livestock boars, Animal Services, Animal Protection of New Mexico (APNM), and NMDHSEM, organizations like CHAMP in Corrales.	Fall 2012	Household Pet Emergency Resource Manual— APNM/NMDHSEM is developing a plan APNM fire fund moneys have been available following wildfire to shelters that have assisted animals impacted by wildfire. The Equine Protection Fund Volunteer Network provides assistance, including shelter and transportation in the event of fire related horse evacuation. APNM and NMDHSEM are working to develop a comprehensive list of resources for emergency managers to address emergency shelter of displaced animals, including companion animals during wildfire.	Provide for the safe evacuation and care of animals and alleviate bottlenecks caused by livestock handling during wildfire response by firefighters. May encourage residents to evacuate who would otherwise refuse so as to not leave animals and livestock.
Unified burn restrictions in order to develop a standardized Countywide approach	Historically, fire restrictions are imposed at four or five levels— municipal, County, state, and federal—and from time to time, tribal authorities, the Middle Rio Grande Conservancy District, and other recreational or local authorities may also impose restrictions.	Federal, state, tribal, and local agency members to develop a coordinated and consistent message	On-going	Whenever restrictions are being considered, every effort should be made to coordinate with adjoining entities or jurisdictions in order to assure that the message to the public is cohesive.	Facilitate education and enforcement.
Targeted wildfire info sessions across the County	Fund development of materials and presentations to highlight how a fire might affect particular groups within the community, such as farmers, acequia communities, and real estate developers.	Community fire representative or agency outreach personnel	Spring 2013	Funding for research, writing, and presentation of detailed information on how large-scale wildfire would affect the target audience and the measures that could be taken to reduce the threat. Flyers could be sent out with utility bills or other community mailings.	Deliver a clear and consistent message that impacts of wildfire are far-reaching.

Table 5.4. Recommendations for Public Education and Outreach; continued

Project	Description	Presented By	Target Date	Resources Needed	Serves To
Volunteer fire department open invitation days	Raise awareness of the fire districts through open house and tours of equipment.	Volunteer fire departments	Annually	Advertising, refreshments, handouts.	Protect communities and infrastructure by potentially increasing recruitment and financial support for the fire service.
Neighbors for defensible space	Organize a community group made up of residents and agency personnel to develop materials and communicate relevant defensible space messages.	County, soil and water conservation districts, BLM, USFS, local residents	Fall 2013	Funding to help cover costs of materials and participation.	Engage diverse stakeholders in reaching out to community members and encourage defensible space practices.
Media involvement	Develop a local newspaper column that provides fire safety information, promotional information for volunteer fire departments, fire announcements, and emergency planning.	County, municipal and community level media	Weekly column year-round	Columns, information, and articles to be provided by volunteer fire departments, NMSF, USFS, BLM, New Mexico State Land Office, Natural Resources Conservation Service, and the County.	Protect communities/ infrastructure through increasing public awareness and providing a channel for information regarding emergency fire response.
Increase signage	Increase fire prevention signage along highways to reduce human-caused ignitions.	New Mexico Department of Transportation	Summer 2013	Signs, posts, and people to post signs.	Protect communities and infrastructure by raising awareness of local citizens and visitors.

Table 5.4. Recommendations for Public Education and Outreach; continued

Project	Description	Presented By	Target Date	Resources Needed	Serves To
Improve enforcement of burn bans and illegal fireworks	Implement burn ban enforcement and raise public awareness of the ban particularly on public lands and in campsites. Fines should be applied for infractions of burn bans and use of illegal fireworks. Residents are calling for earlier burn restrictions before fire risk gets too high.	County	Summer 2013	Funding for increased numbers of enforcement officers or a volunteer fire patrol group for the Santa Fe National Forest to report campfire use. Enforcement of illegal fireworks and proactive legislation.	Raise awareness of the dangers of burning on private property and emphasize that burning is illegal and will be punished. Alleviate concerns voiced at public meetings and in community surveys that camp fires are a serious threat to County communities.
Strengthen ordinances to allow enforcement of trash and debris clean-up on private property	Implement enforcement of clean-up and raise public awareness of the County code.	County	Summer 2013	Funding for increased numbers of enforcement officers. Incentives to encourage property owners to clean-up their properties.	Raise awareness of the dangers of trash and debris build-up on properties and the risk that yard waste and debris fuels can pose for fire danger. Many people surveyed commented that their properties were threatened by fire because of debris, weeds, and trash in their neighbors' yards.
School curriculum	Inclusion of fire ecology, forest restoration, and fire prevention in school curriculum.	All County school districts, NMSF	Fall 2013	Written materials and funding.	Educate children about healthy forest systems, fire ecology, and fire prevention.

Table 5.4. Recommendations for Public Education and Outreach; continued

Project	Description	Presented By	Target Date	Resources Needed	Serves To
Homeowner's guide	Develop a handbook that gives locally relevant and detailed information to help residents be more prepared for wildfire, including a defensible space checklist specific to local structural and wildland fuel considerations. Refer to Appendix G.	County fire departments, State Cooperative Extension agents	2013	Funding to develop and print copies of the handbook. Volunteers to help distribute and explain the document.	Give residents detailed and locally specific tools that they can use to improve preparedness.
Emergency preparedness meetings	Use American Red Cross volunteers and other preparedness experts. Attend community functions and hold special meetings to provide guidance for creating household emergency plans.	American Red Cross, County personnel	Ongoing	Written materials. FEMA information (http://www.ready.gov/new-mexico).	Improve preparedness by facilitating the communication between family members and neighbors about what procedures to follow in the event of a wildfire.
Defensible space workshops	Attend all possible community meetings and hold additional workshops to educate homeowners about why and how to create effective defensible space.	Community fire representative or agency outreach personnel	Summer 2013, ongoing	Written materials and trained personnel. Consider applying for Title III Secure Rural Schools funding for Firewise Communities work.	Empower homeowners to make affordable and effective changes to reduce the vulnerability of individual homes.
Neighbors helping neighbors	Neighborhood assistance to members of the public who cannot maintain their yards and dispose of yard waste. Use community service youth to carry out yard maintenance and defensible space practices to reduce fire hazards in the community.	Neighborhood associations, municipal leaders, church groups	Spring 2013	Website and community meeting forum.	Assist elderly or disabled residents who are unable to clean up yard waste or create defensible space. Reduces fire hazard and fire spread potential between structures.
Agency promotion of "Red Flag Days"	Hold press conference with agency representatives and fire chiefs on Red Flag Days warning the public of the risks of burning and carelessness relating to fire.	Public Information Officer's, federal, state, and County fire prevention officials	Spring 2013	Media contacts.	Emphasize risk associated with Red Flag Days to reduce human-ignited wildfire.
Form a public outreach working group	Agency representatives and County representatives on the Core Team should continue regular Core Team meetings to collaborate on public outreach and education.	Agency Public Information Officer's, Core Team members	Fall 2012	Meeting venue.	Build on momentum for needed public education and outreach identified as necessary by the public and Core Team.

5.4 ACTIONS TO REDUCE STRUCTURAL IGNITABILITY

Preventing the loss of structures is the centerpiece of WUI protection planning, secondary in emphasis only to life safety. Fuels treatments (especially defensible space), public education, and fire department response all play crucial roles in protecting structures from fire loss. Another essential factor in structure survival is the structure itself. Design features and construction materials are critical to determining if a home survives the passage of a wildfire. Vulnerable homes can be destroyed by low-intensity fires, smoldering debris, or the smallest embers.

Structure ignition may occur from direct flame impingement, radiant heat, or an ember becoming lodged in a receptive spot. Most structures can withstand a substantial amount of radiant heat, and several studies indicate that a minimum defensible space of 30 to 45 feet can often be enough to prevent ignition from this source. Direct flame impingement can occur even with low-intensity fires if a lack of defensible space allows an avenue for fire to spread to a vulnerable design feature such as a wood deck, cedar siding, or a fence; such features can cause the loss of a structure even after the main body of fire has passed. Similarly, firebrands can burn a home to the ground long after it appears to have survived. Attic vents without screens, pine needles on roofs or in gutters, or small gaps in a home can help facilitate this type of ignition. Key items that can facilitate fire-related damage are flammable roofing materials (e.g., cedar shingles, tar-based shingles, etc.), wood decks and siding, the presence of burnable vegetation (e.g., ornamental trees, shrubs, etc.), and the presence of other fuel (e.g., propane tanks, wood piles, etc.) immediately adjacent to homes. Additional information can be found at www.firewise.org

Table 5.5 provides a list of community-based recommendations to reduce structural ignitability that should be implemented throughout the SCCWPP planning area. Reduction of structural ignitability depends largely on public education that provides homeowners the information they need to take responsibility for protecting their own properties. Below is a list of action items that individual homeowners can follow (see Section 5.4.1). Carrying out fuels reduction treatments on public lands may only be effective in reducing fire risk to some communities; however, if homeowners have failed to provide mitigation efforts on their own land, the risk of home ignition remains high and firefighter lives are put at risk when they carry out structural defense. Many committed members of the County serve their neighbors as volunteer firefighters, but these firefighting resources are continually stretched, particularly during a widespread wildfire.

It is important to note that no two properties are the same. Homeowners and communities are encouraged to research which treatments would have the most effect for their properties. Owners of properties on steep slopes, for example, should be aware that when constructing defensible space they have to factor in slope and topography, which would require extensions to the conventional 30-foot recommendations. A number of educational programs are now available to homeowners through local fire districts or NMSF; Firewise Communities is one example of such a scheme (www.firewise.org). More detailed information on structural ignitability can also be found in Appendix G (Homeowner's Guide).

Some structural ignitability hazards are related to homes being in disrepair, vacant or abandoned lots, and minimal yard maintenance. In order to influence change in homeowner behavior, County ordinances may be needed.

Weed and junk accumulation is a problem in the County that is recognized in the SCCWPP community assessments. Enforcement is difficult for the County, due to its size and the lack of enforcement officers, and many homeowners do not agree on what is junk and whether it is a bad thing. Often homeowners feel that the County is infringing on property rights if they enforce clean-up, plus most people do not have the equipment or the money to clean up their properties.

Abandoned buildings are recognized as a hazard to health, safety, and the welfare of a community. There are many abandoned properties throughout the County. Some owners do not have the resources to keep their properties clean and in good repair either because they are elderly, in ill health, or do not have the funds.

Affecting change with regard to structural ignitability at the community, homeowner association, municipality, or County levels requires varying degrees of public support and political will. Jurisdictions throughout the fire-prone West are now adopting a regulatory approach. Ruidoso, New Mexico, is one example of a town that has established fuel management standards. Whether or not regulation is adopted, the key components to decreasing structure ignition are public education and action by individual homeowners.

5.4.1 INTERNATIONAL CODE COUNCIL WILDLAND URBAN INTERFACE CODE

While individual actions are necessary to reduce structural ignitability, actions taken at a countywide level affect change on a larger scale. The ICC published the International Wildland Urban Interface 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 by 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). A number of concerns was raised at public meetings for the 2008 plan and the 2012 update that could be resolved through greater code enforcement. Comments included the following: County roads need base materials, roads are narrow and overgrown, large trucks cannot turn around, many communities have only one way in-out, firefighting infrastructure in many rural communities is inadequate, water resources and hydrant systems are inadequate, and culverts are often blocked leading to greater runoff, which undercuts roads making them narrower.

The SCCWPP recommends adopting the Wildland Urban Interface Code so that similar concerns are addressed in future construction. When approaching this task, the County will determine if the ICC code will be adopted in its entirety or in certain portions that most appropriately address the County's needs. This code can be used to develop standards for improved public safety and community driven protection and prevention measures. Since the ICC would not resolve any present issues in existing subdivisions (since it grandfathers in current structure conditions), it is recommended that the County review current fire ordinances to acknowledge fire safety concerns in these areas.

Table 5.5. Recommendations for Reducing Structural Ignitability

Project	Private Lands/ Homeowner	Public Lands	Programs Available	Description	Possible Contacts for More Information	Priority
Offer fire protection workshops	County - All residents would be encouraged to participate	None	Community fire liaison, agency outreach personnel	Offer hands-on workshops to highlight individual home vulnerabilities and teach how-to techniques to reduce ignitability of common structural elements. Examples include installing metal flashing between houses and fences or decks, and installing wire mesh over eaves, vents, and under decks.	State Firewise Communities personnel, Natural Resources Conservation Service, fire chiefs	High
Strengthen building codes for new development	County	None	International Wildland Urban Interface Code	ICC enforces building codes and ordinances for new development in the WUI.	State fire marshal, NMSF	Moderate
Implement individual and community-scale defensible space projects	All residents would be encouraged to participate	None	Firewise Communities, NMSF, local fire district liaison	Educate homeowners about defensible space practices. Remove all but scattered trees within 30 feet of structures. Keep grass mown and green within 100 feet of structures. Keep flammable materials at least 30 feet from structures. Surround foundations with rocks or gravel to a width of 1 foot. Utilize volunteers in the community to assist on a community wide project.	www.firewise.org or local NMSF Firewise Communities-trained personnel; possible landownership assistance program through NMSF-sponsored program; requires preparation of a Wildfire Mitigation Cost Share Assistance Application	High
Participate in defensible space cost-sharing programs	All private land within the SCCWPP area would be eligible	None	Soil and water conservation districts in other counties are already offering these programs and could be used as a model	This project would provide additional funding to Soil and water conservation districts to expand existing program and target new participants.	Soil and water conservation district managers	High
Implement community chipper days	All residents would be encouraged to participate	None	NMSF	A chipper and operator would be provided free of charge in a central location for residents to bring small trees and brush. Chips could remain at chipper location or be utilized by participants.	NMSF, County. GEJWUIC carries out community chipper days in Jemez Mountain communities . There is a small fee for slash disposal.	High
Propose new slash pit location for Jemez Mountain communities	For use by residents	None	There is one slash pit along the Highway 4 corridor located in Thompson Ridge that requires better maintenance and more regular burning. This pit and access road could be improved or a new location could be proposed.	The current slash pit is very inaccessible and is not maintained. The residents of the Jemez Corridor and Highway 4 have identified insufficient slash disposal facilities as one of the main reasons for lack of treatment on private property.	GEJWUIC, County, USFS	High - identified by residents as extreme need
Assess and improve accessibility to property	All residents would be encouraged to participate	None	Fire districts, code enforcement officers	Inform homeowners about the importance of keeping driveways accessible to fire trucks and emergency responders.	Local fire districts	Moderate
Provide a list of mitigation measures to homeowners with different scales of actions	All residents would be encouraged to participate	None	Fire districts, Firewise Communities, NMSF literature, BLM literature, academic and peer-reviewed literature	See list of action items below (see Section 5.4.1).	Soil and water conservation districts, NMSF, fire districts	High

5.4.2 ACTION ITEMS FOR HOMEOWNERS TO REDUCE STRUCTURAL IGNITABILITY

Low or No Cost Investment (<\$50)

- Regularly check fire extinguishers and have a 100-foot hose available to wet perimeter.
- Maintain defensible space for 30 feet around home (see Table 5.5). Work with neighbors to provide adequate fuels mitigation in the event of overlapping property boundaries.
- Make every effort to keep lawn mowed and green during fire season.
- Screen vents with non-combustible meshing with mesh opening not to exceed nominal ¼-inch size.
- Ensure that house numbers are easily viewed from the street.
- Keep wooden fence perimeters free of dry leaves and combustible materials. If possible, non-combustible material should link the house and the fence.
- Keep gutters free of vegetative litter. Gutters can act as collecting points for fire brands and ashes.
- Store combustible materials (firewood, propane tanks, grills) away from the house; in shed, if available.
- Clear out materials from under decks and/or stacked against the structure. Stack firewood at least 30 feet from the home, if possible.
- Reduce your workload by considering local weather patterns. Since the prevailing winds in the area are often from the southwest, consider mitigating hazards on the southwest corner of your property first, then work around to cover the entire area.
- Seal up any gaps in roofing material and enclose gaps that could allow fire brands to enter under the roof tiles or shingles.
- Remove flammable materials from around propane tanks.

Minimal Investment (<\$250)

- When landscaping in the Home Ignition Zone (HIZ) (approximately 30 feet around the property), select non-combustible plants, lawn furniture, and landscaping material. Combustible plant material like junipers and ornamental conifers should be pruned and kept away from siding. If possible, trees should be planted in islands and no closer than 10 feet to the house. Tree crowns should have a spacing of at least 18 feet when within the HIZ. Vegetation at the greatest distance from the structure and closest to wildland fuels should be carefully trimmed and pruned to reduce ladder fuels, and density should be reduced with approximately 6-foot spacing between trees crowns (Figure 5.3).
- Box in eaves, attic ventilation, and crawl spaces with non-combustible material.
- Work on mitigating hazards on adjoining structures. Sheds, garages, barns, etc., can act as ignition points to your home.
- Enclose open space underneath permanently located manufactured homes using non-combustible skirting.
- Clear and thin vegetation along driveways and access roads so they can act as a safe evacuation route and allow emergency responders to access the home.
- Purchase or use a National Oceanic and Atmospheric Administration weather alert radio to hear fire weather announcements.



Figure 5.3. Structure requiring defensible space and fuels mitigation.

Moderate to High Investment (>\$250)

- Construct a non-combustible wall or barrier between your property and wildland fuels. This could be particularly effective at mitigating the effect of radiant heat and fire spread where 30 feet of defensible space is not available around the structure.
- Construct or retrofit overhanging projections with heavy timber that is less combustible.
- Replace exterior windows and skylights with tempered glass or multilayered glazed panels.
- Invest in updating your roof to non-combustible construction. Look for materials that have been treated and given a fire-resistant roof classification of Class A. Wood materials are highly combustible unless they have gone through a pressure-impregnation fire-retardant process.
- Construct a gravel turnaround in your driveway to improve access and mobilization of fire responders.
- Treat construction materials with fire-retardant chemicals.
- Install a roof irrigation system.
- Replace wood or vinyl siding with non-flammable materials.

5.5 IMPROVING FIRE RESPONSE CAPABILITIES

The County is served by 10 County fire districts and three municipal fire districts. Despite the fact that the majority of these stations are served by volunteers, each of these districts has been proactive in seeking funds to support their services. Educating the public so they can reduce its dependence on fire districts is essential because these resources are often stretched thin during fire season. Greater emergency planning for communities is necessary, particularly those communities in areas where response times for emergency services may be greater than in municipal zones.

Table 5.6 provides recommendations for improving firefighting capabilities. These recommendations are general in nature; given the variety of fire agencies within the County, it is unrealistic to apply one set of specific recommendations for all agencies.

Table 5.6. Recommendations to Improve Firefighting Capability

Project	Fire District	Possible Solution	Timeline	Contact
Increase fire district recruitment (diversify age classes)	All fire districts	Target fire education in schools to encourage younger generations to become interested in firefighting. Carry out recruitment drives through open house and mailings.	Annually	Fire district chiefs, school districts
Increase funds for fire districts	All fire districts	1) Maintain contact with state fire marshals and regularly seek grant money. 2) Implement regular evaluations of resource needs for each volunteer fire department and make available to public to raise awareness of shortages. 3) Use local media to inform public of fire resources situation. Work with local newspaper editor to have a year-round column that documents fire district activities. 4) Apply for Rural Fire Assistance Program grants through the USDI. 5) Apply to State Capital Improvement Grants. 6) Improve ISO ratings. 7) Hire a grant writer to serve numerous volunteer fire departments.	Monthly review of grant opportunities	Fire district chiefs, County emergency managers, Fire Services staff, and County managers to approach County commissioners to raise the issue in commissioner meetings.
Improve fire reporting	All fire districts	Maintain updated list of fires in the County on the National Fire Information Reporting System and provide to NMSF. Will increase funding opportunities and facilitates update of fire risk and hazard assessments.	After each fire event	NMSF, fire district chiefs
Train all firefighters	All fire districts	1) Hire NMSF contract trainers and provide National Wildfire Coordinating Group – S-130/S-190 wildland classes free to volunteer fire departments. 2) Research online training classes for volunteer firefighters. Would require an in-house mentor. 3) Train the Trainer programs 4) Coordinate training schedules and classes for city and County fire districts to reduce costs.	Spring 2013	Fire Services staff, fire district chiefs, NMSF
Provide wildland personal protective equipment to all firefighters	All fire districts	Grant application to the New Mexico Volunteer Fire Assistance Grant Program through NMSF, to meet NFPA 1977 standards for wildland firefighting protective clothing.	Determined by grant deadline	NMSF
Create a County Wildfire Coordinator position	County	Employ a full-time administrative staff position whose role will be to coordinate wildfire training and equipment and apparatus support for wildfire response in the County.	Spring 2013	Sandoval County Fire
Update dated apparatuses	All fire districts	Regular communication with the BLM and other federal agencies who may be decommissioning old trucks/tankers that could be acquired by volunteer fire departments.	Ongoing, quarterly	Fire Services Administrator
Provide adequate water supplies at fire stations	All fire districts	Obtain funding to improve water supply systems at fire stations.	Summer 2013 (this is an ongoing process)	Fire district chiefs, County commissioners

Table 5.6. Recommendations to Improve Firefighting Capability, continued

Project	Fire District	Possible Solution	Timeline	Contact
Increase water sources and water delivery systems, particularly in areas adjacent to WUI	All fire districts	<ol style="list-style-type: none"> 1. Obtain funding to purchase equipment and to implement rainwater harvesting or similar systems on all volunteer fire department stations. 2. Obtain portable dip tanks for fire districts. 3. Strategically locate water storage/cisterns on private lands with prior agreement from landowner to maintain water supply. Fire districts would have permission to access tanks in the event of wildfire. 4. Seek funding to engineer water storage delivery using donated Intel water tanks in Jemez Mountain communities. 	Summer 2013 (this is an ongoing process); lack of water supply was a concern raised by many citizens in meetings and via surveys	Fire district chiefs, County
Regularly seek funding to purchase improved equipment	All fire districts	Obtain funding to purchase equipment or continue to make trade agreement with other fire stations.	Fall 2013 (this is an ongoing process)	Funding agencies
Map water supplies	All fire districts	Use global positioning system (GPS) units to map all available water supplies.	Spring 2013	Fire district chiefs, Fire Services staff, County emergency managers, and County managers to approach County commissioners about potential funding
Carry out quarterly audit of department equipment	All fire districts	Most fire departments have an established cache of wildland fire tools and personal protective equipment. An inventory and audit of the equipment's condition should occur on a regularly scheduled basis. A schedule for equipment replacement should be established to allow for allocation of funds and seeking of grants. Prepare a list of desired new equipment	Quarterly	Fire district chiefs, County
Implement mutual aid agreements	All fire districts	Mutual aid agreements should be reviewed, updated, and enhanced if necessary. Automatic aid agreements should be considered, as well. Interagency training and planning might be discussed as part of this process. It is recommended that the interagency operations plan currently being developed by NMSF be completed and regularly updated.	Review quarterly	Municipal, County, state, federal
Coordinate pre-incident planning	All fire districts and agencies	The SCCWPP can serve as a catalyst for more detailed pre-incident planning. The SCCWPP verifies areas of high risk and hazard, allowing engine companies to target specific areas for tactical planning. The plan and associated GIS data can be used as a whole to assist planning at the strategic level. Issues of access and water supply are also addressed in the SCCWPP, highlighting areas in need of infrastructure improvement.	Spring 2013	Municipal, County, state, federal

Table 5.6. Recommendations to Improve Firefighting Capability, continued

Project	Fire District	Possible Solution	Timeline	Contact
Develop strategic dispatch and communications plan	County Fire administration	Improvements in the dispatch system needed, including new software for computer-aided dispatch, increased training for dispatchers, updated communications equipment, and integration of mutual and automatic aid with the dispatch system.	Spring 2013	County, state
Retain volunteer firefighters	All fire districts	<p>Retaining experienced firefighters, training new firefighters, and continued training and development of veterans is an issue for all departments that have a volunteer component. Methods that may be considered for addressing this and other training issues include the following:</p> <ul style="list-style-type: none"> • Establish County, fire district, or shared mitigation crews that perform grant-funded mitigation work during the summer and are available to respond to fires as well. • Recruit young people locally and from major population centers who are interested in a fire service career for a summer residency program. In exchange for staffing the station several shifts a week, they will receive basic wildland fire and other training that can launch their careers. • Create a stipend system for expenses such as fuel and boots to acknowledge and retain firefighters. • Determine qualification needs and provide training to accomplish these needs. For example, in three years the department would like to have 10 Type II firefighters, four squad leaders, three driver/operators, three engine bosses, and one strike team leader/Type IV incident commander. Defining specific goals would aid in recruiting strategies, resource allocations, mutual aid, and automatic aid. • Create a training detail program between volunteer and paid departments. Allow aspiring driver/operators and officers a chance to attend training and then perform in an acting capacity under the direct supervision of fully-qualified personnel. This will provide familiarity with the personnel, equipment, and procedures of a cooperating agency and allow volunteers to gain experience in a more active system. • Create a countywide interagency training cadre to establish a routine class rotation. 	Ongoing	County Fire Admin
Leverage business owners who operate in wild land areas	All fire districts	Business owners like Rafting companies could be utilized by setting up a communications system that would enable this business sector to quickly report fire danger.	Spring 2013	County Fire Admin, County commissioners

5.6 MONITORING AND EVALUATION

Monitoring is a difficult component of the CWPP process to maintain. It is crucial in determining which methods and initiatives are successful. Individual projects should be monitored, as well as the progress of the SCCWPP as a whole. It is important to evaluate whether fuel treatments have accomplished the defined objectives, whether any unexpected outcomes have occurred, and whether the goals of the SCCWPP remain valid and are being fulfilled.

Adaptive management refers to adjusting future management based on the effects of past management. Monitoring is required to gather the information necessary to inform 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 most important consideration when choosing a monitoring program is the selection of a method appropriate to the people, place, and available time. The following list outlines several levels of monitoring activities that meet different objectives, have different levels of time intensity, and are appropriate for different groups of people.

Minimum–Level 1: Pre- and post-treatment photographs of a project are appropriate for many individual homeowners who conduct fuel reduction projects on their property. Aerial photographs may also be used for this purpose in some situations.

Moderate–Level 2: Multiple permanent photograph locations are established (e.g., with rebar or wood posts), and photographs 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: A series of basic vegetation plots can allow monitors to evaluate vegetation characteristics such as species composition, percent cover, and frequency and record site characteristics such as slope, aspect, and elevations. Parameters would be assessed pre- and post-treatment. Plot protocols should be established by the monitoring agency based on the types of vegetation and level of detail needed to analyze the management objectives.

Intense–Level 4: Basic vegetation plus dead and downed fuels inventory protocol would include the vegetation plots described above but would also 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 Brown’s transects (Brown 1974) or an appropriate photograph series (Ottmar et al. 2000).

5.7 IDENTIFY TIMELINE AND PROCESS FOR UPDATING THE CWPP

The SCCWPP should be reviewed and updated annually. At this time, changes to the plan should be made to reflect changing environmental conditions and community concerns. Also, site assessments that were not executed during this planning period should be implemented and incorporated into the plan at the annual review.

5.8 IMPLEMENTATION

The SCCWPP makes recommendations for prioritized fuels reduction projects. However, each fuels reduction project will be unique and will require distinct steps to complete the identified tasks. The tasks will be further identified as the projects begin to take place. On the ground implementation of the recommendations in the SCCWPP planning area will require development of an action plan and assessment strategy for completing each project. This step will identify the roles and responsibilities of the people and agencies involved, as well as funding needs and timetables for completing the highest priority projects (SAF 2004). Information pertaining to funding can be found in Appendix H.

5.9 CONCLUSION

The Las Conchas fire in 2011 demonstrated the extreme severity of wildfire that the County is subject to. A growing WUI coupled with uncharacteristically dense forests and prolonged drought has combined to create extreme fire risk in the County that threatens life, property, infrastructure, and natural and cultural resources. This 2012 update to the 2008 plan emphasizes public participation and collaborative planning among federal, tribal, state, County, and local governments, as well as other contributing agencies. Wildland fire is a concern for all residents of the County, and the SCCWPP goal is to reduce the risk for catastrophic wildfire by providing specific information regarding areas most at risk and how to protect these areas.

The SCCWPP identifies areas most at risk and makes recommendations for fuels reduction treatments, educational outreach activities, structural ignitability reduction, and improved fire response capabilities to reduce risk. The purpose of making recommendations is to raise awareness about the various strategies that can be implemented to reduce the risk of losing life, property, and community and natural values.

The recommendations are based on fire-risk assessment, identification of CVARs, and comments from community members. The recommendations are general in nature to provide high levels of flexibility in the implementation phase, and range from simple tasks that an individual can accomplish at no cost to large costly landscape treatments that require multiparty collaboration.

The SCCWPP should be considered a living document, and as such should be reviewed and updated annually or immediately following a significant fire event.

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**APPENDIX A
CORE TEAM LIST**

Sandoval County Community Wildfire Protection Plan

Agency or Organization	Name	Position	Email
Fire Departments			
Sandoval County	Jess Lewis	Deputy Fire Chief	jlewis@sandovalcountynm.gov
	Dave Bervin	Assistant Chief/Emergency Manager	dbervin@sandovalcountynm.gov
	Jon Tibbets	County Fire Chief	jtibbets@sandovalcountynm.gov
Jemez Springs	Robert Cart	Jemez Springs Volunteer Fire Department	robertcartis@gmail.com
Town of Bernalillo	John Pata	Fire Marshal	jpata@townofbernalillo.org
	Mike Carroll	Fire Chief	mcarroll@townofbernalillo.org
Village of Corrales	Anthony Martinez	Fire Chief	amartinez@corrales-nm.org
	Biff Tallada	Volunteer District Commander	pikepole911@aol.com
Rio Rancho Fire Department	Marc Sandoval	Wildland Coordinator Captain	msandoval@ci.rio-rancho.nm.us
	Tom Parascandola	Battalion Chief	tparascandole@ci.rio-rancho.nm.us
Pueblos, Tribes and BIA			
BIA	Jose Tenorio		jose.tenorio@bia.gov
	Troy Cachini		Troy.cachini@bia.gov
Jemez Pueblo	David Ryan	EMS Program Manager	dryan@jemezpueblo.us or dprmedic51@msn.com
	John Galvan	Tribal Forest Manager	john.l.galvan@jemezpueblo.org
Zia Pueblo	Antonio Medina	Emergency Manager	tmedina@hotmail.com
Santo Domingo	Kenneth Pin	Emergency Manager	kennethpin@hotmail.com
Cochiti Pueblo	Calvin Suina	Emergency Manager	Calvin_suina@pueblodecochiti.org
Santa Ana Pueblo	Harry Betz	Emergency Manager	hbetz@santaana-nsn.gov
Sandia Pueblo	Isaac Lujan	Emergency Manager	ilujan@sandiapueblo.nsn.us
San Felipe	Pam Ellis	Emergency Manager	prellis@hotmail.com
State Agencies			
New Mexico State Forestry	Todd Haines	District Forester	Todd.haines@state.nm.us
	Terrell Treat	Wildland Urban Interface Specialist	terrelltreat@state.nm.us
NM Dept Homeland Security and Emergency Management	Courtney McBride		Courtney.mcbride@state.nm.us
Animal Protection NM	Sharon Jones		Sharon@apnm.org
Middle Rio Grande Conservancy District	Yasmeen Najmi	Planner	Yasmeen@mrgcd.com
NM Cattle Growers Association	Ernie Torrez		-
Federal Agencies			
Forest Service, Santa Fe National Forest	Bill King	FMO, Jemez	wfking@fs.fed.us
Forest Service, Cibola National Forest	Richard Bustamante	FMO, Sandia	rbustamante@fs.fed.us
Forest Service, Cibola National Forest	Karen Takai	Fire Information	ktakai@fs.fed.us
Forest Service, Santa Fe National Forest	James Lerke	AFMO, Jemez	jtlerke@fs.fed.us
Valle Caldera National Preserve	Dennis Trujillo	Executive Director	dtrujillo@vallescaldera.gov
Bureau of Land Management	Todd Richards	FMO, Rio Puerco Field Office	Todd_Richards@nm.blm.gov
Sandoval County Technical Support			
Sandoval County	Gary Pals	Sandoval County GIS	garypals@sandovalcounty.com
	Stephen Martinez	Sandoval County GIS	smartinex@sandovalcounty.com
Community Members			
GEJWUIC	Anne Cook		abcooke@g.com
Consultants			
SWCA Environmental Consultants	Victoria Amato	Natural Resources Planner/Project Manager	vamato@swca.com
SWCA Environmental Consultants	Cody Stropki	Watershed Scientist	cstropki@swca.com

**APPENDIX B
PUBLIC COMMENTS**

**Sandoval County CWPP
Public Meeting Notes
La Cueva, New Mexico
May 29, 2012**

This meeting was held at the Jemez Mountain Baptist Church on May 29, 2012. The meeting was attended by 24 people.

The meeting began with a 20-minute open house where attendees were invited to complete community surveys and read through the 2008 CWPP.

Vicky Amato of SWCA then provided a PowerPoint presentation of the CWPP planning process that involved interaction with the audience regarding feedback on their concerns relating to wildfire and input regarding community values at risk.

The following public comments were recorded:

Fire Behavior:

- The recent Las Conchas fire came close to Jemez Mountain communities and destroyed a number of homes. There are concerns regarding future large wildfires with extreme fire behavior.

Fuel Reduction:

- Slash removal is a concern for local residents wanting to create defensible space. The Sulphur Springs site used to be available for slash disposal but is no longer in operation.
- The site off of Forest Road 106 near Thompson Ridge is difficult to access and needs road improvements between Aspen Drive and the slash pit. The slash pit also needs to be burnt at a shorter interval to accommodate more material.
- This area near Thompson Ridge could also act as a potential safety zone for residents.
- The La Cueva fire department was used as a staging site for slash removal but the USFS did not assist with disposal of the slash and so now it represents a hazard to the community.
- Jemez Electric has been doing some treatments around utility lines but these areas need to be constantly maintained. Consider expanding easement to encompass the heights of the tallest trees.
- The USFS has been doing prescribed burns in the area that has reduced fuel loading. Increased work needed.
- Residents are concerned about the dense nature of the forest along boundaries with the USFS and want the USFS to actively treat these areas.
- Prescribed fires can be carried out on private lands under the management of the local fire department.
- Need a way to manage slash and removal of small diameter trees. There is no current market. Non-profits or cottage industries that utilize small-diameter timber are needed. Potential for pellet stove or firewood company.
- Thinning projects should utilize mastication and chipping.

- In the Seven Springs neighborhood there are lots that are not maintained that pose a hazard to those that are fire wise.
- Residents concerned about what to do with excess pine needles.
- Regular chipping exercises would help alleviate some issues with the excess slash and small diameter material.

Firefighting Capabilities:

- Need more volunteers that are qualified to drive/use equipment and fight fires.
- Need more viable road signs and improve quality of signs.
- Need better maps or access to better maps for the area.
- Need increased water supply and water storage options.
- Dry hydrants could be installed in strategic locations. Draft sites need to be identified.
- Some draft sites on USFS land have been closed due to concerns of resource damage.
- Need a dry hydrant for Fenton Lake State Park so firefighters and the park can draft from the lake in the event of wildfire.
- Helicopter dip site available at Fenton Lake.
- The lake is silting up and needs to be maintained. Would assist in water supply issue.
- 25,000-gallon water storage tanks are available from Intel at no cost. The Sierra Los Pinos community rejected placement of the storage tank in the community due to installation costs. Need funding to support installation and engineering costs. Easements are needed for placement of tanks.
- Thompson Ridge has a year-round water supply and the pump on the community pond can be used to fight fire.
- Some residents are considering installation of roof sprinklers (Rainbird Sprinklers). Sprinklers would need to be attached to external power generator.
- Locked gates are serious problem for fire departments.
- Need improved interagency communications (radios that can be programmed).
- Need cell towers and internet service for emergency announcements.

Education and Outreach:

- Firewise Communities status for Thompson Ridge and other communities has not been maintained due to insufficient treatment acres.
- Educate people that are camping further in the wildland area in undeveloped sites about the importance of burying the fire or make sure it is out with water.
- Need better maps of the roads within the Jemez region.
- The Baptist church puts on a fire preparedness event every year that is free and open to the public.
- Public outreach and education generally good in the community due to GEJWUIC and fire department efforts.
- Evacuation planning needs to be enhanced for Jemez Mountain communities. Thompson Ridge residents could be trapped at a common access point.

- The drill pad area in Thompson Ridge could be a potential safety zone. The community needs to be educated on what are safe safety zones. Large meadow areas have fine flashy fuels and are not suitable safety zones.
- Fire department fire prevention meetings in La Cueva are held regularly and information is sent out via a list-serve. The fire department has also held workshops on interpreting fire restrictions from state, County, and local authorities. Residents felt a central website is needed that houses all fire restriction information. www.nmfireinfo.com is a resource but only helpful when regularly updated.
- Fire preparedness seminars are held regularly in the Jemez Mountain area.
- Insurance companies may become an information resource and enforcer of defensible space. Risk of inflated premiums for homeowners who have not carried out fire mitigation may raise awareness.
- Need increased signage along major access routes, using more visible and effective signs.
- Need more signs to make public aware of fire danger and the damages fire incur on the ecosystem.
- Need increased forest service patrols, particularly during fire season.

Community Values at Risk:

- Campgrounds (Fenton Lake, Jemez Falls, Redondo, San Antonio, Vista Linda, Clear Creek, Rio De Las Vacas, etc.)
- Valles Caldera
- Hiking trails (Jemez Falls, San Antonio, and East Fork trailheads)
- Hot Springs
- Rivers (Rio Cebolla, Jemez, and San Antonio)
- Scenic views
- Highways
- Seven Springs fish hatchery
- Girl Scout camp
- Area churches
- Humming Bird camp
- Fenton Ranch (Manzano Camp)
- Camp Schaffer, Gallagher
- La Cueva Lodge, Amanda's Country Store
- Jemez State Monument

**Sandoval County CWPP
Public Meeting Notes
Corrales, New Mexico
May 30, 2012**

This meeting was held at the Corrales Council Chambers on May 30, 2012. The meeting was attended by 27 people.

The meeting began with a 20-minute open house where attendees were invited to complete community surveys and read through the 2008 CWPP.

Vicky Amato of SWCA then provided a PowerPoint presentation of the CWPP planning process that involved interaction with the audience regarding feedback on their concerns relating to wildfire and input regarding community values at risk.

The following public comments were recorded:

Fire Behavior:

- Concern of recent fires—a lot of human-made fires (squatters/homeless) and heavy use of the bosque- children playing with fireworks and matches.
- Fires are getting larger and more severe in the bosque.
- Fires have potential to jump the river and drains. Spot fire potential is high with 0.5 mile capacity for spread.

Bosque fuels:

- Southern end of the bosque is a particular concern due to squatters. The area has been cleared, which reduced the potential for squatters to hide and set up camp.
- Fuel reduction needed in high use areas such as the Romero Road access area where there is more potential for ignitions.
- Dead and downed fuel loading is high in the bosque. Need to remove fuels to reduce the hazards.
- Bosque Advisory Commission is in favor of a conservative approach to thinning.
- Need to include both sides of the river in thinning actions. The Pueblo of Sandia has carried out extensive fuels reduction to protect their community and resources.
- Concerns that fuels reduction would reduce habitat for mid-story birds.
- Consider chipping and mastication instead of removal of material.
- Community support for strategic thinning in areas where there are high volumes of dead and downed materials and less habitat impacts and in areas identified as highest risk.
- Resident felt that the thinned areas had no birds and had observed higher densities of birds in the non-thinned areas. They wanted to keep the ladder fuels and bosque intact in order to provide habitat for birds. The residents feel that the ladder fuels are the most important in order to maintain the bird habitat.
- Todd Haines (New Mexico State Forestry District Forester) stated that bird densities are not a good metric for habitat quality, bird biodiversity and optimum densities is a better

metric. Need species diversity and habitat diversity through creating patches and mixed age habitat to increase edge effects.

- Bosque Advisory Commission has created a demonstration shaded fuel break and willow swale. The community is invited to visit the area and provide comment to the commission. The fuel breaks could be installed in a patch structure in strategic locations throughout the bosque. Removal of non-natives and revegetation with native species is primary goal in these fuel break areas.
- Planting of native shrubs and trees could replace habitat for mid-story species and non-natives are a lower fire risk.
- Resident concerned that we should not restore an ecosystem that can no longer perpetuate itself without flooding.
- Resident concerned that removal of vegetation for fuels reduction purposes makes the area vulnerable to flooding.
- Public Service Company of New Mexico (PNM) needs to assist in mitigating hazards around power lines by maintaining clearance.
- Residents want to see focus on areas of high risk instead of focusing on fuel breaks that are uniform.

West Corrales:

- More open area with brushy fuels. Still a considerable fire risk and extreme lack of water.

Livestock Evacuation:

- Animal rescue and welfare is a concern to the community because of large numbers of horses in the area.
- Narrow roads hinder evacuation of livestock.
- CHAMP group are taking charge of pet evacuation (Draft Animal Evacuation Plan in Appendix G).
- Animal Protection of New Mexico is working on a statewide initiative with the New Mexico Department of Homeland Security to develop pet and livestock evacuation planning.
- Equine Protection Fund- is a volunteer network that is also a resource for evacuation of livestock.

Terrorism and Vandalism:

- Serious threat to the bosque. Would be easy for someone to tie up assets.

Education and Outreach:

- Fire sizes are increasing in the bosque ecosystems in New Mexico and people need to be educated about the threat of wildfire and prevention of ignitions.
- Need more Firewise Communities education initiatives.
- Need more signage regarding fire risk at bosque entrance points.
- Lack of ingress/egress—need more pre-planning for evacuation.

- Need to better publicize safety zones (e.g., recreation center, Loma Larda Substation).
- Need better property clean-up. Enforce the clean-up of abandoned buildings, junk, and flammables.

Water Supply:

- A need to work with Middle Rio Grande Conservancy District regarding emergency water supply. Corrales Fire Department already has agreements set up regarding water supply for wildfire.
- Lack of water supply in town. No hydrants.
- Need to add more water storage tanks.

Community Values at Risk:

- Registered historic buildings
- Trees of Corrales
- Corrales road corridor
- Schools, clinics, and public buildings
- Commercial areas
- Bosque
- Wildlife

Email Correspondence from Ann Cooke, Jemez Mountain resident, June 12, 2012:

Victoria,

I'm attaching a list of 19 potential reasons that people give as to why they don't create defensible space. It has been observed that people are quite aware of the threat, but the action to do something in response to the threat requires much more than just having knowledge and or being educated to the threat. If you read the list I think that maybe some of these reasons were prevalent in previous years – but now days, I think people understand the threat and there are other reasons that things don't get done. As one expert in the field commented, you best know what the problem is before you try to address solutions to it.

I've filled out your survey – and I will pass it on.

Ann

Victoria,

The last reason – I don't own it – I've been struggling with for years.

The one I'm trying to address right now is how to dispose of the green waste. This is a very big problem – quite intractable.

Ann

Victoria,

Along Highway 4 – there is only the Slash Pit in Thompson Ridge that will take slash.

It is on FS land and access is on a road that will take out the undercarriage of most privately owned vehicles, the pit is well off the beaten track (12 miles off Highway 4 and a 1000 ft up) FS, while understanding its need, worries about people dumping things other than green waste, it is against 'policy' to even have such a place (eye sore) on fed property, or to favor one part of the public over another part of the public by having it at all, and they really don't want its existence broadcast far and wide for abuses that might occur and complaints from people/organizations that object in principle. Further, even if people get green waste to the pit area, people don't want to back up too deep into the pit to dump their load and the rim becomes full, the center empty, the slash needs to be pushed further in and if not, no new green waste can be added to the pit easily. It is difficult to get burned – smoke issues require the FS to burn in small windows of opportunity. It hasn't been burned in about 2-3 years now. We've asked that the access road in be smoothed (been asking for years) – local FS is trying and there are some issues that the access runs across private land (they went to the effort of getting approval from these owners, and approval was given for improvement) and then bureaucrats higher up in the FS complained that they shouldn't be fixing roads across private property... And that is the one place we do have to take slash to.

Otherwise, you can't bag it and have it hauled off as trash. We no longer even have privately operated house hold garbage pickup. The county dumps don't really want it and it really is intractable to load into a pickup – you can't get much in and it is too far to go for a single load with transportation costs. Chipping it may make it more manageable, but renting your own chipper, lots of \$, time and effort. Plus the chipper is going to probably be of the smaller order meaning more physical effort to get the stuff processed, but if you get your hands on a big one, the safety concern of the thing increase (don't want to lose small animals down it.) Then if you know you can't get rid of the stuff, you don't cut any new. Old piles are tangled messes and after untangling one, a match starts looking mighty nice. Burning the piles of slash is probably the best way to go – and I'm sure, we all want to encourage that by the inexperienced weekend homeowner... Of course we need permission to burn, and Sandoval County hasn't lifted its burn restrictions since last year... And then the smoke issues and permission from the air quality control people.... I'm sure all the recent wildfires in NM applied for permission before burning, too.

The final answer is that if we want less of a fire risk, the fuel has got to be reduced. Oxygen and ignition sources are readily available. We need to limit the fuel – and that is everyone's responsibility. The most efficient way of reducing the fuel is as nature has done it for eons – it burns. And if low intensity fire is back in the environment, doing the house cleaning of our forests, then we start putting nutrients back into the soil. Diversity of the bio-system increases and the threat of catastrophic fire decreases. This also means that the public, in the end, needs to welcome fire as a partner and part of the environment – not a threat to be kept out. And they will only do that, if they feel that they are prepared to weather a fire across their private property – and most of them are not there yet. We have too much green waste everywhere.

Email correspondence from Jean Pratschner, Corrales resident, May 11, 2012:

Hi, I am a fire watch patroler in Bosque by Corrales. As I go through the Bosque, I see huge amounts of fuel on the ground that would seriously impact controlling a wildfire in that area. The Northern end by Corrales road was somewhat cleaned out a few years ago, but the next mile or so is extremely bad with fuel (deadwood, brush, and huge limbs) on the ground so dense that it is a holocaust waiting to happen. Can we get some County or state or federal "workers" in there to continue the removal and cleaning out of the fuel? I would be interested in volunteering to help, but the big equipment is needed to remove and grind up the fuel and that operation is in itself a fire risk, and protection is needed. BEFORE the high dry season starts please. July is too late. thank you Jean.

Email correspondence from Mike Bornfield, Corrales resident, June 21-22ndst, 2012:

I do not know how involved anyone was last night. I left my office, home, animals, and started at my sister-in-laws (which everyone should have seen on the news) trying to help. From there I went to Pine Ridge Arabians and helped Paul. Andrew, from the Mercantile, and I both showed up. Later different neighbors came by and Paul's cell phone was ringing off the hook. There was a total of four people for 45 horses. Makes me SICK!

Corrales is not ready for a FIRE. Say it and believe it. Wind going a different direction or the wind we get down here that just whips around and the Village would have been gone.

Corrales road was blocked by groups of idiots stopping to watch the fire which made it impossible to get through. Looky Loos, news crews, and the police all bunched up at Romero Road. While the Village people owning animals are running down the streets trying to control their animals since they cannot get through the traffic with their trailers. I am not even sure why there was not an even bigger problem.

My wife is stopping clients with animals and directing them to our property where we have fields open with water standing around them so the fire can be kept at bay. That was one of the reasons I had left my home and office knowing all of my animals and property were safe.

I am not writing just to bitch but it is time to sit down and get something together. Corrales needs to be divided into zones. I know my office and home are in a red zone. When there is a problem down here I cannot get to my office or home since the road is closed.

The vehicles in those zones should have color coded tags. This way the police can wave traffic on or out. If you have a blue tag for the south part of the village you are not allowed past Mercantile and so forth. If you do not have a tag you do not come into Corrales PERIOD! That goes for News Crews! They have helicopters so they will not be missing anything. And so traffic can get OUT!

Additionally the police cannot handle the BS on their own. As the police setup check points they will need people walking the traffic identifying those which do and do not belong. Yes, I know more people in the street. But hopefully less traffic so the people of the Village can get their animals out. We better find a way a very good way to find order because last night we were tested and we failed. We got Lucky.

The start of the Village needs a sign when there is an emergency that states Village closed or some type of message that you will not be allowed through. This needs to happen on all intersections coming in.

I also believe a group needs to be started that can help get pumps and water out into the Bosque. I know what the answer to this is going to be well we are not firefighters and will get hurt. I guess we will sit back and watch it all burn. I have a pump that sits in my garage my wife has teased me about for years. Well I am getting it ready for the next fire. I want to make sure the three family homes on the 15 acres in my neighborhood will be okay. But that is what I saw last night everyone worried about themselves and not coming together as a community.

But again everyone can laugh and let this go but we stand to lose everything down here. Patrols are a garden hose to what Corrales needs after last night.

Let me know. I am all ears after what I witnessed last night. My children and grandchildren live down here.

Mike Bornfield email received 6/22/12:

Thank you very much for your reply. I would have thought that I would have heard from at least two of the others but NO!

As for additional ideas I have two others. There are properties which have ponds on them. On Paseo de Dulcelina there is a pond which I feel is a HUGE waste of water till this week. During dry periods these ponds should be allowed to be full at all times so the water drops can be filled at these locations. I was surprised to find out that the fire department does not even know that there are these ponds.

Next, there needs to be collection points for animals for people who may not have trailers to get their animals out. Properties like Pine Ridge Arabians should be identified because there is no way to get 45 horses out. Some properties are going to have to be protected.

I am sure you have other things to do other than read my emails. The fire did prove the Village is not ready for a fire on a larger scale. And we all better HOPE that whoever set that fire was not just going for a test run to obtain data. If that the case we are done for.

Mike Bornfield email received 6/22/12:

I forgot to add one item. When they closed Corrales Road for the sewer installation everyone in my family received text and calls at home tells us this. And all of the calls came in at once. We were home when this happened and all cell phones and land lines rang at the same time. When the fire started there was NOTHING!

Timothy Crum email received 8/9/12:

I'd like to see the committee consider leveraging business owners and thier staff that make a living in wilderness areas. Rafting businesses could be utilized by setting up a communications system that would enable this business sector to quickly report fire danger.

Best Regards,

Tim

Timothy C. Crum

City Councilor, District 5

Rio Rancho, New Mexico

Kris VanHofwegen email received 8/15/12:

Hi. I live in Rio Rancho, in the southwestern quadrant. I'm concerned because I didn't see any details included in the Sandoval County plan for Rio Rancho. I'm sure it is argued that because RR has its own career fire department, RR doesn't need more detail included in the County plan. If RR has its own wild fire plan, I've not seen it.

Police say that more than 800 calls were logged reporting ignition of illegal fireworks in the city of Rio Rancho this last fourth of July. Clearly, the state needs to be leaned on to ban the use and sale of illegal fireworks and legal fireworks, because they are both being used unsafely. Pueblo lands in Sandoval County have road-side stands selling illegal fireworks. Rio Rancho has stands selling illegal fireworks.

The Feds should get a load of what is actually going on in Sandoval County, and in New Mexico, when it comes to hazardous wild-fire behavior. Local, County, and State ordinances are not being well advertized and enforced. A homeowner could have perfectly fire-proofed property and still see the home burn down from the rapid, high volume of illegal firecrackers flying through the air from one property to another. This dangerous behavior peaks on the evening of the fourth of July each year, but it commences well before that day and persists through the end of the summer.

Proactive legislation and enforcement against this illegal activity needs to take place now. Other states and cities in this country treat these illegal incendiary sales and activities as targets of sting operations by bomb squads. In other words, they take this activity seriously (especially during droughts). But maybe New Mexico has fostered such a "fire and wild fire" culture that mini financial empires are created and maintained around it?

The Feds send a lot of money to Pueblos suffering from wildfire burn scarring. Maybe that money should decrease if/when the sales of illegal fireworks take place on those Pueblo lands.

Anyway, Sandoval County does this planning to satisfy the Feds. Maybe county money should be withheld from cities like Rio Rancho (that keep allowing illegal fireworks sales and behavior). There is nothing like financial incentive to shape desired behavior. This should also apply to the abundance of federal money available to a state like New Mexico to fight wild fires when the state won't ban the sale of illegal fireworks.

Maybe I should be writing this to the Feds! And maybe the New Mexico legislators who won't pass a law banning fireworks sales in this state should be barred from state and federal aid for wild fires in their district!

APPENDIX C
FIREFIGHTING RESOURCE

SANDOVAL COUNTY FIRE DEPARTMENT

FIRE DISTRICT INFORMATION

Sandoval County Fire Department Administration

James Maxon – Interim Chief- Fire Marshal

Jess Lewis - Deputy Chief- Fire Ops

Dave Bervin - Assistant Chief- Emergency Manager

Gregg Kotila - Deputy Chief- Emergency Management System (EMS)

Algodones - District 1: 26 active firefighters

- Algodones Volunteer Main Fire Station # 22
1401 Highway 313, Algodones, NM 87001
- Algodones/Santa Ana Main Station #21 Career Station
1 West Prairie Rd, Bernalillo, NM 87004

La Cueva - District 5: 46 active firefighters

- La Cueva Volunteer Main Fire Station #51
122 Twisted Junipers, Jemez, NM 87025
- Sierra Los Pinos Main Fire Station #52
960 Forrest Road 10, Jemez Springs, NM 87025
- Cochiti Mesa La Cueva Substation
23 Forest Road 286, Jemez Springs, NM 87025
- Seven Springs La Cueva Substation
Forest Road 314, Jemez Springs, NM 87025
- Thompson Ridge La Cueva Substation
725 Aspen Dr, Jemez Springs, NM 87025

La Madera - District 16: 22 active firefighters

- La Madera Volunteer Main Fire #28
1 Wildflower Lane, Sandia Park, NM 87047

Pena Blanca - District 10: 31 active firefighters

- Pena Blanca Volunteer Main Fire Station #25
P.O. Box 1476, Pena Blanca, NM 87041

Placitas - District 4: 49 active firefighters

- Placitas Volunteer Main Fire Station #41
463 Hwy 165, Placitas, NM 87043
- Placitas Main Fire Station #42
16 Perdiz Canyon Rd, Placitas, NM 87043
- Placitas Main Fire Station #43 Career Station
#10 Petroglyph Trails, Placitas, NM 87043

Ponderosa - District 6: 36 active firefighters

- Ponderosa Volunteer Main Fire Station #61
4252 Highway 290, Ponderosa, NM 87044
- Ponderosa Volunteer Main Fire Station #62
8154 Hwy 4, Jemez Springs, NM 87025
- San Ysidro Ponderosa Substation #63
348 State Hwy 4, San Ysidro, NM 87053

Regina - District 11: 18 active firefighters

- Regina Volunteer Main Station # 46
HCR 78 Box 14, Regina, NM 87046
- La Jara Regina Volunteer Main Station #47
108 CR 496, La Jara, NM 87027

Torreon - District 15: 20 Active Firefighters

- Torreon Volunteer Main Fire Station #48
2465 Hwy 197, Cuba, NM 87013

Zia - District 3: 11 Active Firefighters

- Zia Volunteer Main Fire Station #31
131 Sunset Dr, Zia Pueblos, NM 87053

**SANDOVAL COUNTY FIRE DEPARTMENT
FIRE APPARATUS BY DISTRICT**

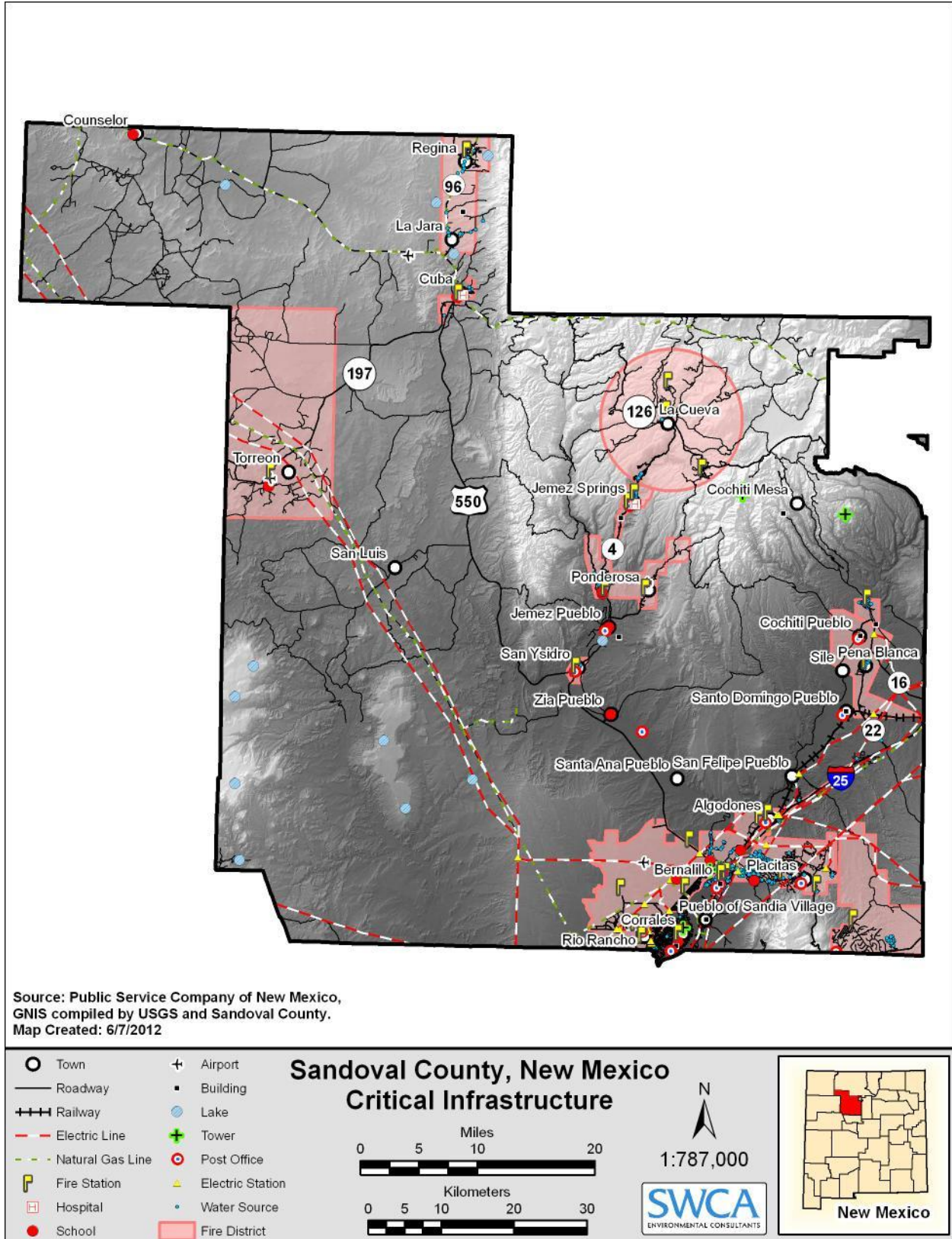
District	Type	Kind	Year	Description
Algodones				
	lii	Ambulance	1996	Ford F350 Rescue
	li	Tender	1996	GMC Tender
	N/A	Service	1996	Ford Utility F250 Pickup
	Vi	Engine, Brush	1997	Ford F350 Brush Pickup
	Vi	Engine	2002	Ford F550 Squad
	li	Engine	2008	International 7400 Workstar
	I	Tender	2008	International 7400 Workstar
	I	Eng/Ladder	2007	Spartan 75ft Aerial
	N/A	Unit/SUV	2004	Chevy Tahoe
Fire Admin				
	lii	Ambulance	1995	Ford F350 Ambulance
	N/A	Trailer	2000	Utility Wellscargo Trailer
	N/A	Unit/Pick Up	2003	Ford F250 Pickup
	N/A	Unit/Pick Up	2003	Ford F150 XLT Pickup
	N/A	Unit/SUV	2004	Ford Explorer XLT
	N/A	Unit/SUV	2004	Ford Explorer
	N/A	Trailer	2004	Utility Trailer 16ft
	N/A	Unit/Pick Up	2005	Ford F150 Pickup
	N/A	RV	2005	Chevy Mobile Command Unit
	li	Ambulance	2007	Ford Navistar Medic 10
	li	Ambulance	2007	Ford Navistar Medic 20
	li	Ambulance	2007	Ford Navistar Medic 30
	N/A	Trailer	2005	Utility Trailer
	N/A	Unit/Pick Up	2009	Ford F150
	N/A	Trailer	2010	Interstate/Disaster
	N/A	Trailer	2010	Interstate/Disaster
La Cueva				
	I	Tender	1974	American General
	lii	Engine, Brush	1979	GMC Sierra
	Vi	Engine, Brush	1987	Dodge, Brush
	li	Engine	1995	Freightliner FI80
	I	Tender	1996	Freightliner Tanker
	lii	Ambulance	1996	Chevy Rescue
	N/A		1999	Ford F350, Service
	li	Engine	2007	International 7400 Workstar 4x4
	li	Eng/Tender	2008	International 7400 Workstar
	N/A	Unit/SUV	2009	Chevrolet Suburban
	lii	Engine	2010	International 7400 Workstar
	li	Engine	1986	GMC 7000
	Iv	Engine, Brush	1994	Chevy
	N/A	SUV	1994	Chevy, Pickup
	li	Engine	1996	Freightliner FI80
		ATV	2001	325 Polaris 4x4 ATV
		ATV	2001	325 Polaris 4x4 ATV
		Trailer	2001	ATV Trailer
	lii	Ambulance	2002	Ford Excursion, Rescue
	Vi	Engine, Brush	2004	Ford F550
	I	Tender	2004	Freightliner
	Vi	Engine, Brush	2008	Ford F550, 4x4, Reg Cab
	lii	Ambulance	2008	Horton

District	Type	Kind	Year	Description
La Madera				
	li	Engine	1998	GMC Engine
	li	Tender	1999	International Tender
	Vi	Engine, Brush	2001	Ford F350 XLT Brush Pickup
	I	Tender	2008	International 7400 Workstar
	lii	Ambulance	2008	Ford F350 4x4, Rescue
	N/A	Pick Up	2008	Ford F250, 4x4, Reg Cab
	N/A	Trailer	2004	Titan, Wildland
	N/A	Unit	1997	Ford Explorer Command
Pena Blanca				
	li	Engine	1985	Ford C-3000
	li	Tender	1996	GMC Tender
	N/A	SUV	1997	Ford Explorer
	li	Engine	2008	International 7400 Workstar
	lii	Ambulance	2008	Ford F350 4x4, Rescue
	Vi	Engine, Brush	2008	Ford F550, 4x4, Supercrew
	li	Eng/Tender	2008	International 7400 Workstar
Placitas				
	li	Engine	1993	International, Engine
	lv	Engine, Brush	1994	Chevy 1 Ton, Brush
	N/A	Service	1994	Chevy 1 Ton Pickup, Service
	li	Tender	1995	International Tender
	li	Tender	1995	International Tender
	lii	Ambulance	1996	Ford Rescue
	lv	Engine, Brush	1996	Ford Brush Pickup
	li	Engine	1996	International 4900
	N/A	Unit/ SUV	1998	Ford Explorer
	I	Engine	2006	International 4400
	li	Engine	2007	International 7400 Workstar
	N/A	Unit/ SUV	2008	Ford Expedition
	lii	Ambulance	2008	Ford F350 4x4, Rescue
	N/A	Unit/ SUV	2008	Honda CRV
Ponderosa				
	li	Engine	1993	International, Engine
	li	Engine	1996	GMC Fire Engine
	li	Tender	1996	GMC Topkick
	li	Engine	1996	GMC Topkick
	lii	Ambulance	2002	Ford Rescue Ambulance
	N/A	Unit/Pick Up	2003	Ford F550 Utility Pickup
	I	Tender	2007	International 7400 Workstar
	I	Tender	2007	International 7400 Workstar
	Vi	Engine, Brush	2008	Ford F550, 4x4, Supercrew
	N/A	Unit/ SUV	2004	Chevy Tahoe
	N/A	Unit/Pick Up	2009	Ford F450
	N/A	Unit/ SUV	1997	Ford Explorer Command
Regina				
	Vi	Engine, Brush	1980	International 5500
	Vi	Engine, Brush	1988	Chevy 3500, Brush
	I	Tender	1989	International, Tender
	li	Engine	1996	GMC C-60, Engine
	lii	Ambulance	1996	Ford F350, Rescue
	Vi	Engine, Brush	1996	Chevy 3500, Brush
	N/A	Unit	1998	GMC 1500, Pickup
	li	Engine	2008	International 7400 Workstar
	I	Tender	2008	International 7400 Workstar

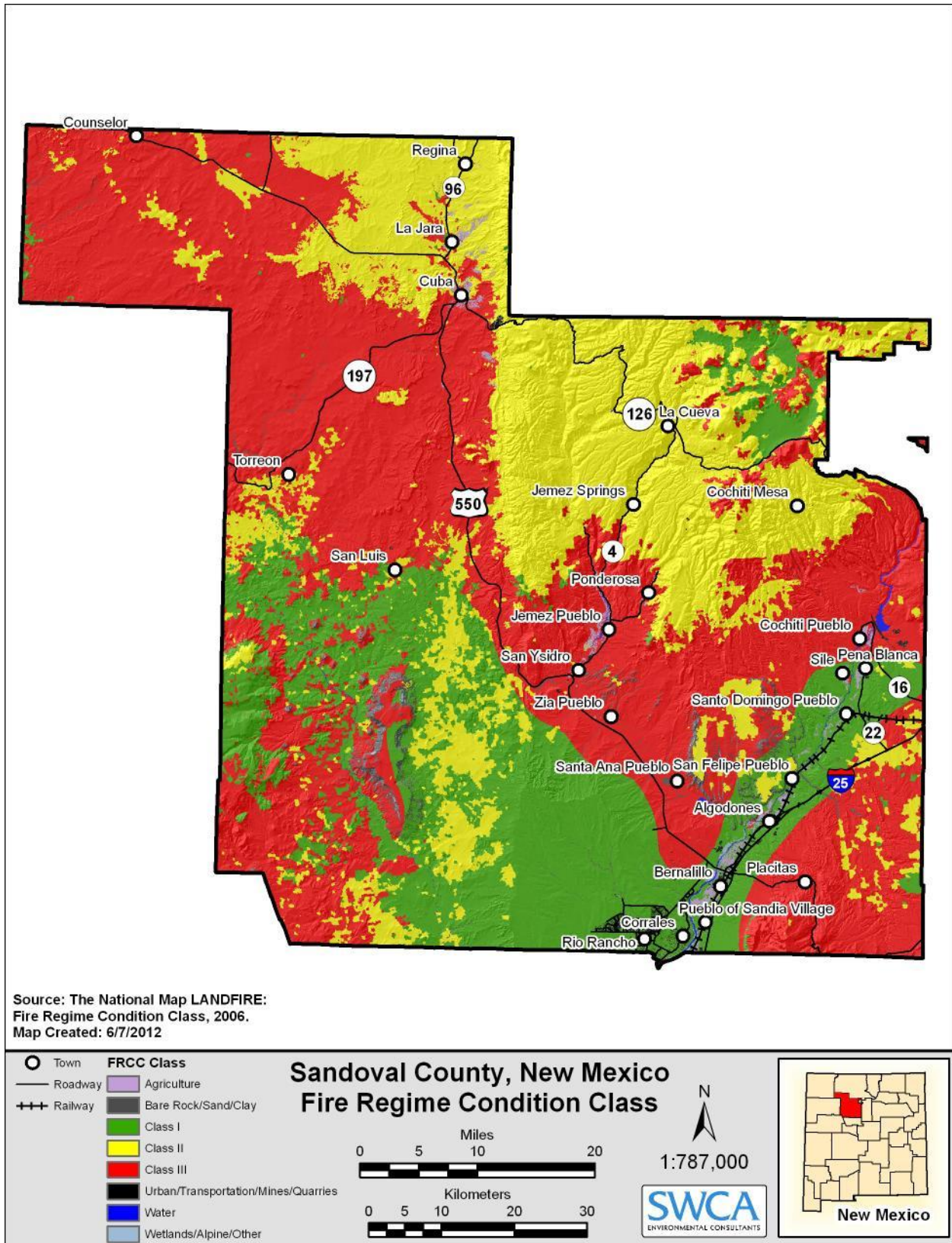
District	Type	Kind	Year	Description
Torreon				
	Vi	Engine, Brush	1992	Chevy, 2500
	li	Engine	2008	International 7400 Workstar 4x4
	li	Engine, Tender	2008	International 7400 Workstar 4x4
	lii	Ambulance	2008	Ford F350 4x4
	N/A	SUV	2004	Chevy Tahoe
Zia Pueblo				
	N/A	SUV	1995	Ford Explorer Command
	li	Engine	1996	GMC Fire Engine
	lii	Ambulance	2002	02 Ford F350 XLT Rescue
	Vi	Engine, Brush	2003	Ford F550 Brush Pickup
	N/A	Unit/ SUV	2004	Chevy Tahoe

Source: Sandoval County.

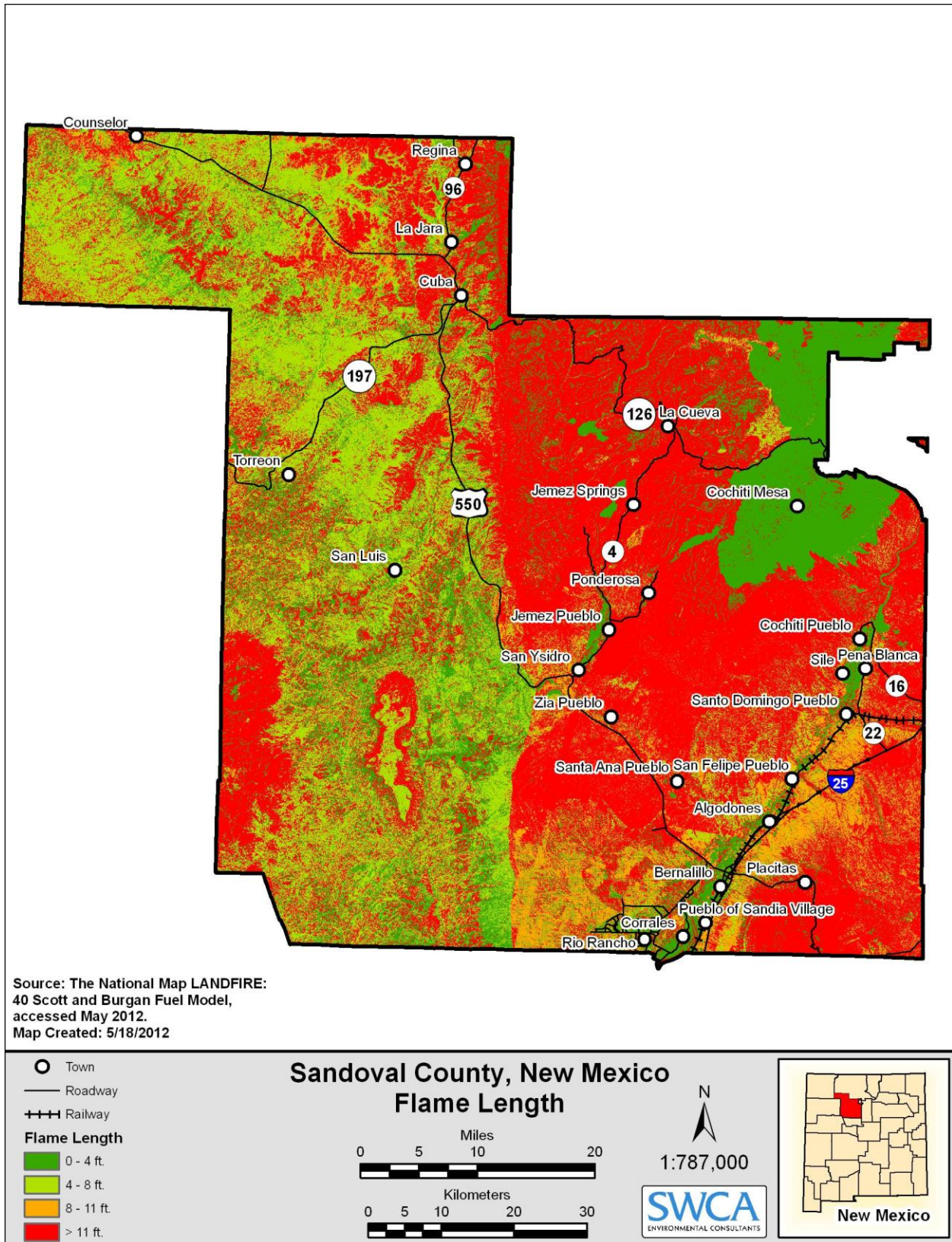
APPENDIX D
MAPS



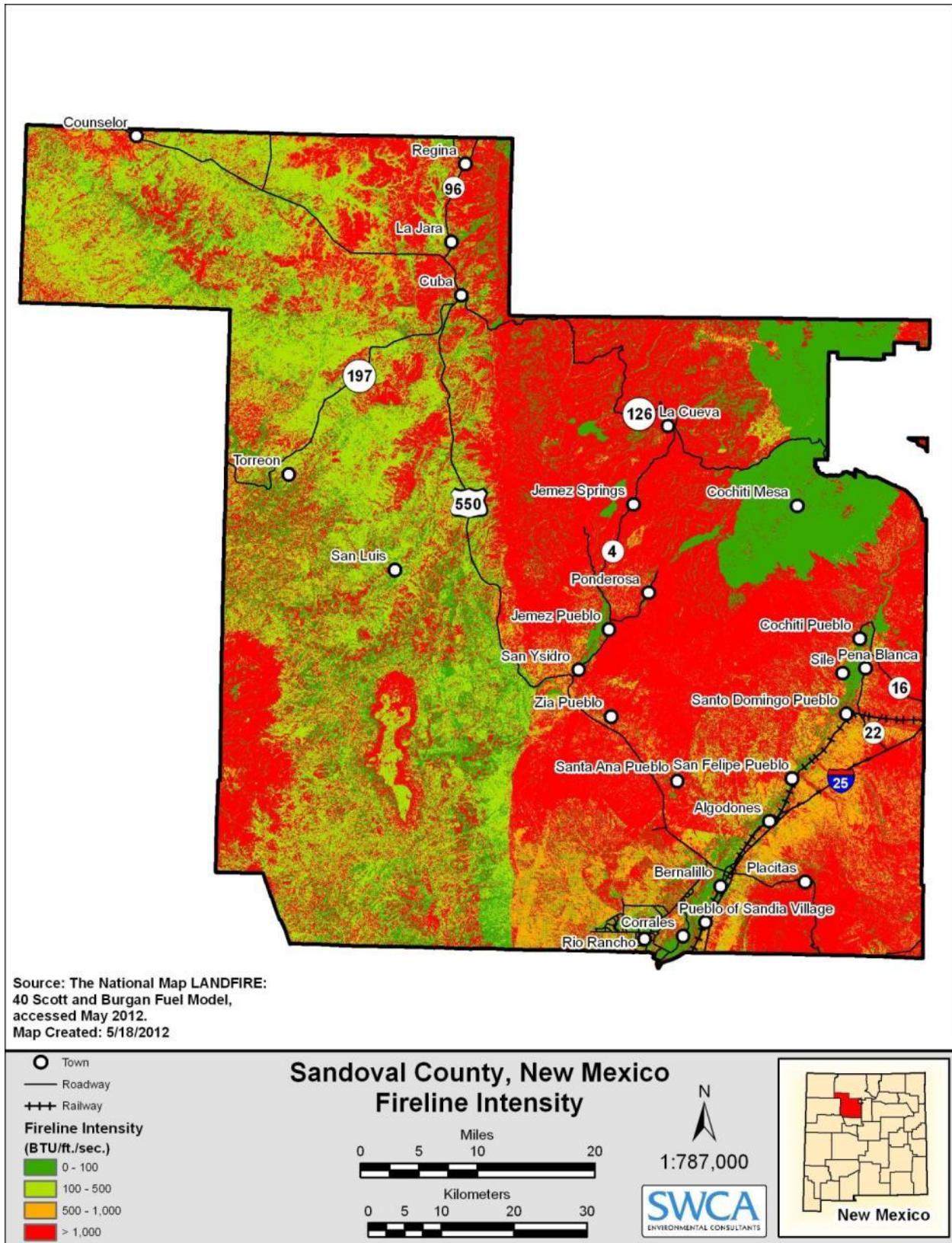
Map D.1. Sandoval County critical infrastructure.



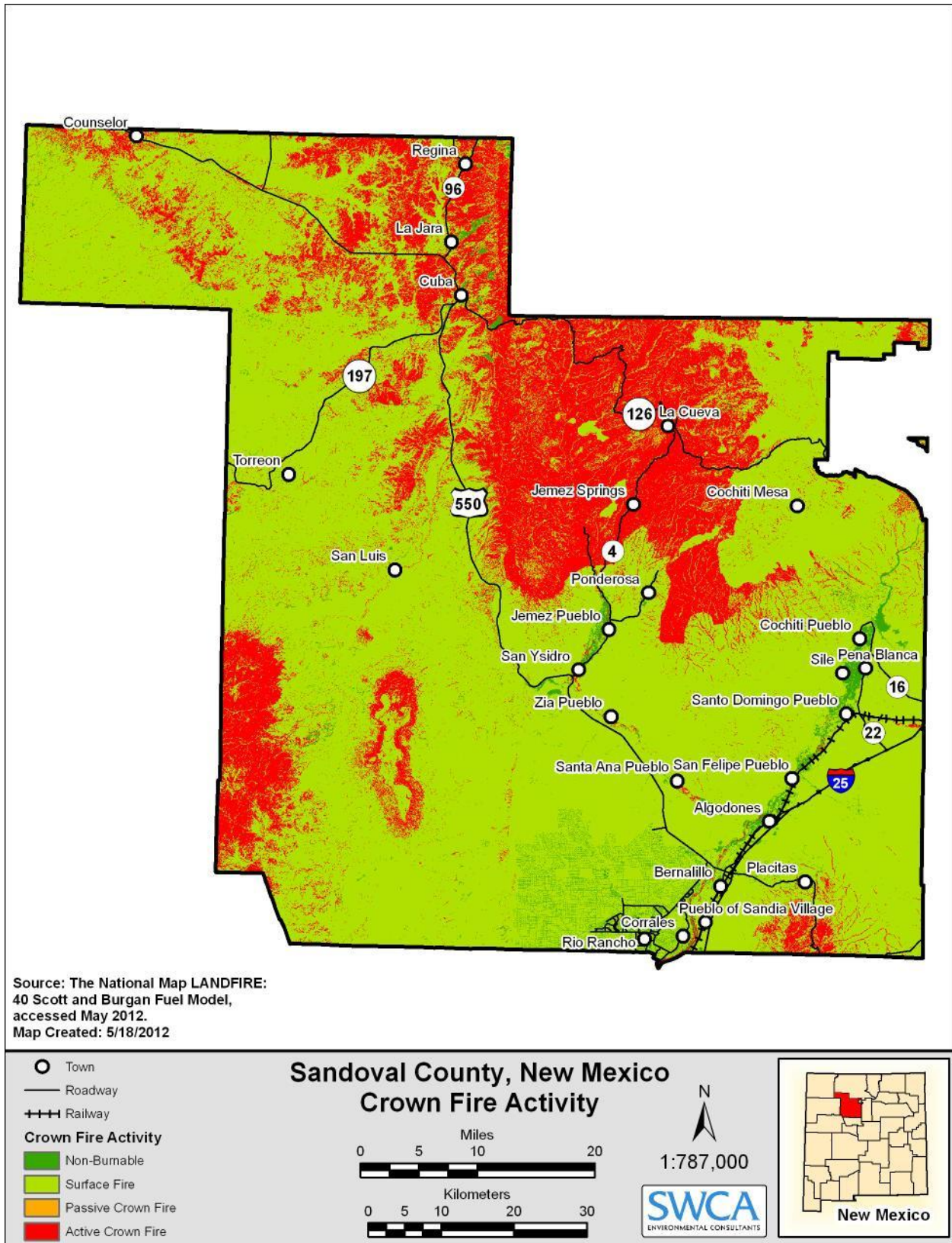
Map D.2. Sandoval County Fire Regime Condition Class.



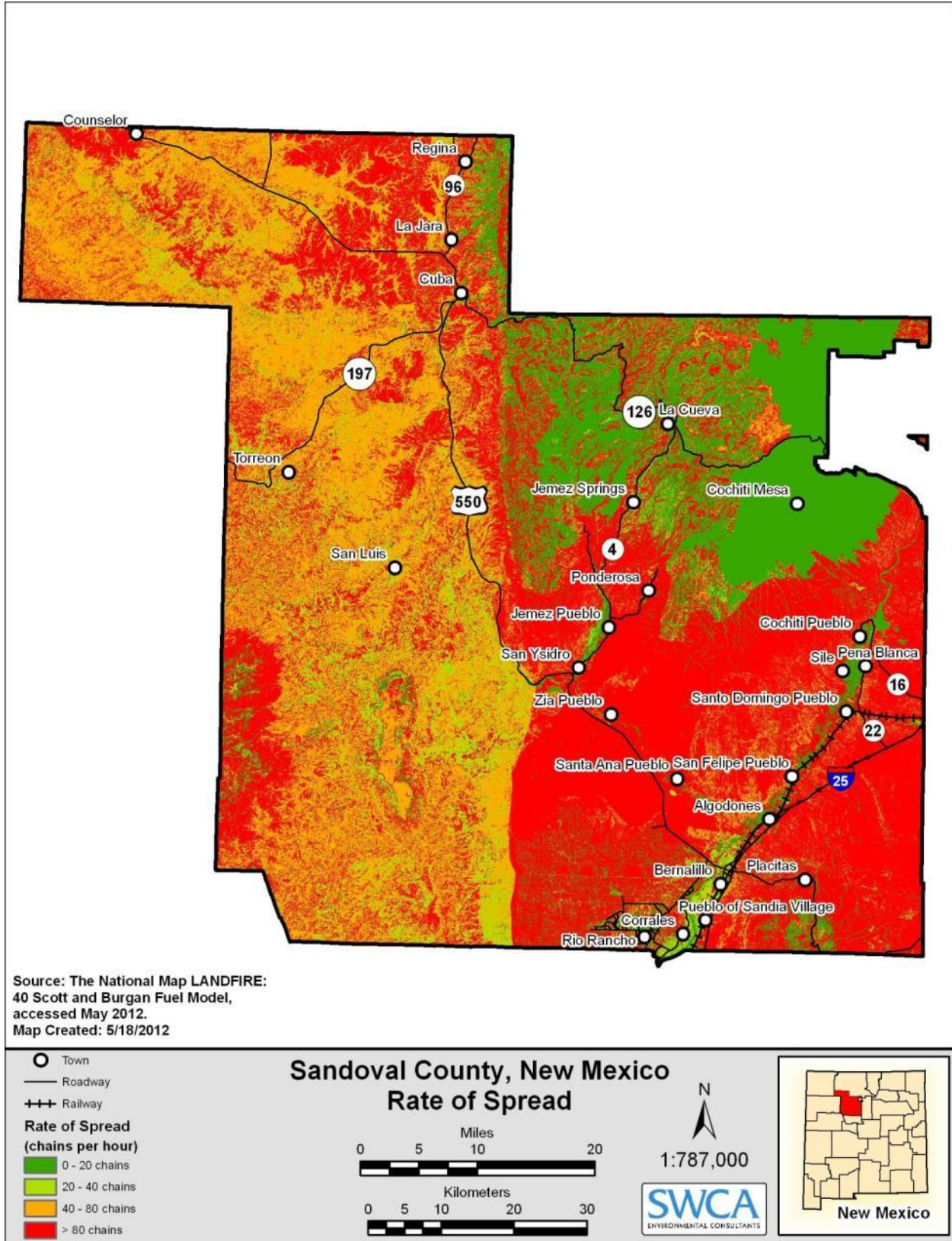
Map D.3. Sandoval County flame length.



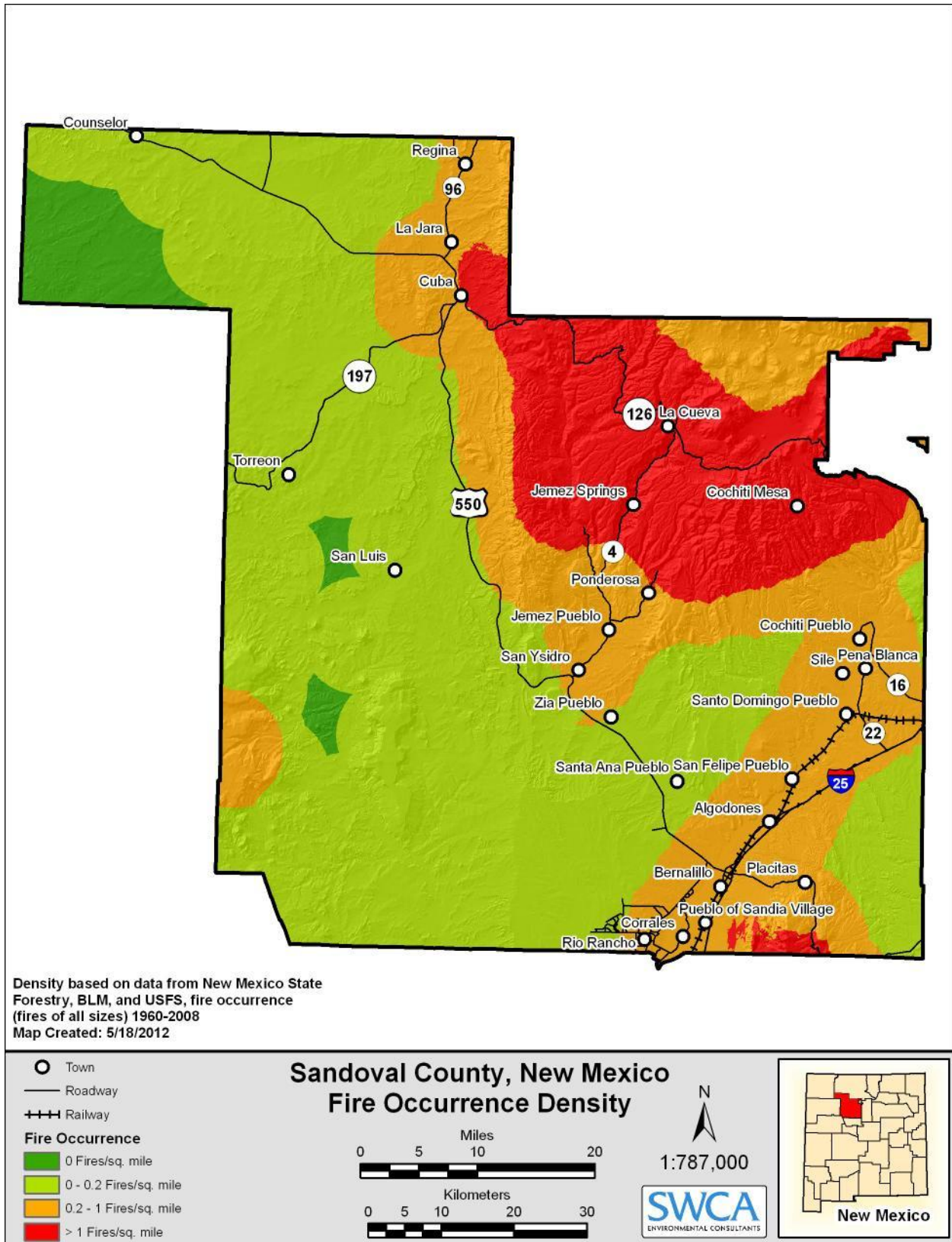
Map D.4. Sandoval County fireline intensity.



Map D.5. Sandoval County crown fire activity.



Map D.6. Sandoval County rate of spread.



Map D.7. Sandoval County fire occurrence density.

APPENDIX E
COMMUNITY HAZARD RISK ASSESSMENT

Table E.1. NFPA Form 1144

Wildland Fire Risk and Hazard Severity Form NFPA 1144

Means of Access						
Ingress and Egress	Points					
Two or more roads in and out	0					
One road in and out	7					
Road Width						
> 24 ft	0					
> 20 ft < 24 ft	2					
< 20 ft	4					
Road Conditions						
Surfaced road, grade < 5%	0					
Surfaced road, grade > 5%	2					
Non-surfaced road, grade < 5%	2					
Non-surfaced road, grade > 5%	5					
Other than all season	7					
Fire Access						
< 300 ft with turnaround	0					
> 300 ft with turnaround	2					
< 300 ft with no turnaround	4					
> 300 ft with no turnaround	5					
Street Signs						
Present – reflective	0					
Present – non-reflective	2					
Not present	5					
Vegetation (fuel models)						
Predominant veg						
Light – 1,2,3	5					
Medium – 5,6,7,8,9	10					
Heavy – 4,10	20					
Slash – 11,12,13	25					
Defensible Space						
> 100 ft around structure	1					
> 70 ft < 100 ft around structure	3					
> 30 ft < 70 ft around structure	10					
< 30 ft around structure	25					
Topography Within 300 ft of Structures						
Slope						
< 9%	1					
10% to 20%	4					
21% to 30%	7					
31% to 40%	8					
>41%	10					
Additional Rating Factors (rate all that apply)						
Additional Factors						
Topographic features	0-5					
History of high fire occurrence	0-5					
Severe fire weather potential	0-5					
Separation of adjacent structures	0-5					

Wildland Fire Risk and Hazard Severity Form NFPA 1144

Building Construction						
Materials (predominant)						
Non-combustible siding, eaves, deck	0					
Non-combustible siding/combustible deck	5					
Combustible siding and deck	10					
Building Set-back						
> 30 ft to slope	1					
< 30 ft to slope	5					
Available Fire Protection						
Water Sources						
Hydrants 500 gpm < 1000 ft apart	0					
Hydrants 250 gpm < 1000 ft apart	1					
Non-pressurized > 250 gpm/2 hrs	3					
Non-pressurized < 250 gpm/2hrs	5					
Water unavailable	10					
Organized Response						
Station < 5 mi from structure	1					
Station > 5 mi from structure	3					
Fixed Fire Protection						
NFPA sprinkler system	0					
None	5					
Placement of Gas and Electric Utilities						
Utilities						
Both underground	0					
One above, one below	3					
Both above ground	5					
Totals for Home or Subdivision						

Hazard Rating Scale:

- < 40 = Low
- > 40 = Moderate
- > 70 = High
- > 112 = Extreme

Table E.2. Overview of all Community Assessments 2004–2012

Community	Community Hazard/Risk Score and Rating 2012	Composite Risk Assessment for Surrounding Area, 2012	Community Hazard/Risk Score and Rating 2007	Composite Risk Assessment for Surrounding Area, 2007	Area Inventory Assessment, 2004	New Mexico State Communities at Risk, 2004
Greater Cuba Area						
Cuba	High 71	Extreme	57–66 Moderate	Moderate	Moderate	–
Regina	High 72	Extreme	–	High	Moderate	–
La Jara	High 83	Extreme	–	Moderate	Moderate	–
Jemez Springs Corridor						
Zia Pueblo	46 Moderate	High	46 Moderate	Moderate/High	–	High
Jemez Pueblo	75 High	High	56 Moderate	Moderate	–	High
Ponderosa, South	Moderate 61	High	60–65 Moderate	Moderate/High	Low	–
San Ysidro	71 High	Moderate/ High	62–69 Moderate	Low	Low	–
126 Corridor (between Seven Springs and Deer Lake)	72 High	Extreme	67–75 Moderate/ High	Moderate/High	–	–
Canon	73 High	High	55–76 Moderate /High	High	–	–
485 Corridor (Gilman, Cañones)	73 High	High	66–84 Moderate/ High	High	Low	–
Ponderosa, North	High 103	High/Extreme	63–83 Moderate/ High	Moderate/High	–	–
Jemez Springs	91 High	Extreme	73–97 High	High	Extreme	Moderate
Area 1	130 Extreme	Extreme	115–120 Extreme	High	Extreme	--
Area 2	125 Extreme	Extreme	115–120 Extreme	High	Extreme	--
Area 3	126 Extreme	Extreme	115–120 Extreme	High	Extreme	--
Jemez Mountains						
La Cueva	83 High	Extreme	54–64 Moderate	High	Very High	High
Thompson Ridge	98 High	Extreme	57–66 Moderate	Extreme	Very High	High
Seven Springs	90 High	Extreme	77–83 High	Extreme	Very High	High
Deer Lake	129 Extreme	Extreme	105 High	High	Very High	–
Rio Las Vacas	Extreme 143	Extreme	–	High	Very High	–
Taylor	-	Extreme	–	High	Very High	–
Sierra Los Pinos	134 Extreme	Extreme	104.5 High	High	Very High	High
Girl Scout Ranch	–	–	–	High	Very High	–
Valle Grande	–	Extreme	–	Moderate	Very High	–

Table E.2. Overview of all Community Assessments 2004–2012, continued

Community	Community Hazard/Risk Score and Rating 2012	Composite Risk Assessment for Surrounding Area, 2012	Community Hazard/Risk Score and Rating 2007	Composite Risk Assessment for Surrounding Area, 2007	Area Inventory Assessment, 2004	New Mexico State Communities at Risk, 2004
Rio Grande Corridor						
Sile	62 Moderate	Moderate/ High	–	Moderate	Moderate	–
Algodones	56 Moderate	Moderate/ High	69 Moderate	Moderate	Moderate	–
San Felipe Pueblo	69 Moderate	Moderate/ High	69 Moderate	Moderate	Moderate	High
Santa Domingo Pueblo	60 Moderate	Moderate/ High	53.5 Moderate	Low	Moderate	High
Cañada	–	Moderate	–	Moderate	Moderate	--
Bernalillo	48 Moderate	Moderate	–	Moderate	Moderate	High
Corrales (East)	94 High	Moderate	–	Moderate	Moderate	High
Corrales (West)	50 Moderate	–	–	–	–	–
Cochiti Pueblo	–	Moderate/ High	–	Moderate	Moderate	High
Pena Blanca	64	Moderate/ High	64 Moderate	Low	Moderate	Moderate
Rio Rancho	–	Moderate	–	Moderate	Moderate	–
Angostura	–	Moderate	–	Moderate	Moderate	–
Budaghers	–	Moderate	–	Moderate	Moderate	–
Cochiti Lake	70.5	Moderate	70.5 High	High	Moderate	High
Sandia Mountains						
Placitas (Historic)	96 High	High/Extreme	71.5 High	High	Moderate	Moderate
Placitas Corridor	55 Moderate	High	49 Moderate	High	–	–
La Madera	High 87	Moderate/ High	–	High	Moderate	–
Evergreen Hills	–	High	–	High	High	–
Puertocito	–	High	–	Moderate	Moderate	–

Table E.3. Communities at Risk
Risk Ratings for New Mexico Fire Planning Task Force
 High, Medium, Low and No Risk

Community	Community Rating High, Medium, Low, No Risk
Cuba	High
Regina	High
La Jara	High
Zia Pueblo	High
Jemez Pueblo	High
Ponderosa, South	Moderate
San Ysidro	Moderate
126 Corridor (between Seven Springs and Deer Lake)	Extreme
Cañon	High
485 Corridor (Gilman, Cañones)	High
Ponderosa, North	High
Jemez Springs	High
Areas 1, 2, 3	High
La Cueva	High
Thompson Ridge	High
Seven Springs	High
Deer Lake	Extreme
Rio Las Vacas	Extreme
Taylor	High
Sierra Los Pinos	Extreme
Girl Scout Ranch	High
Valle Grande	High
Sile	Moderate
Algodones	Moderate
San Felipe Pueblo	Moderate
Santa Domingo Pueblo	Moderate
Cañada	High
Bernalillo	Moderate
Corrales	High
Cochiti Pueblo	Moderate
Pena Blanca	Moderate
Rio Rancho	Moderate
Angostura	Moderate
Budaghers	Moderate
Cochiti Lake	High
Placitas	High
La Madera	High
Evergreen Hills	High
Puertocito	Moderate

APPENDIX F
RESTORATION PRINCIPLES



New Mexico Forest Restoration Principles

Preamble

These principles were collaboratively developed by a team of dedicated professionals representing industry, conservation organizations, land management agencies, and independent scientists. These principles for restoration should be used as guidelines for project development and they represent the “zone of agreement” where controversy, delays, appeals, and litigation are significantly reduced. They may be appropriate for application to specific restoration projects in New Mexico. These principles were developed for use in designing and implementing projects with a primary objective of ecological restoration while promoting economic and social benefits.



SIERRA CLUB
FOUNDED 1892



Participants

The Nature Conservancy in New Mexico
 Natural Resources Conservation Service
 Bureau of Land Management
 Sierra Club, Rio Grande Chapter
 Forest Guardians
 New Mexico State Forestry Office
 U.S. Forest Service
 Bureau of Indian Affairs
 New Mexico State Land Office
 Forest Guild
 Center for Biological Diversity
 Restoration Solutions
 Public Service of New Mexico



forest GUILD



Restoration Solutions, LLC

Principles

1. **Collaborate.** Landscape scale assessment, and project design, analysis, implementation and monitoring should be carried out collaboratively by actively engaging a balanced and diverse group of stakeholders.
2. **Reduce the threat of unnatural crown fire.** A key restoration priority must be moving stands toward a more natural restored condition and the reduction of the risk of unnatural crown fires both within stands and across landscapes. Specific restoration strategies should vary based upon forest vegetation type, fire regime, local conditions, and local management objectives. Forests and woodlands characterized by infrequent and mixed-severity fire should be managed toward a stand structure consistent with their historical ranges of variation—including, in some cases, high-density, continuous stands. Discontinuous stand structure may be appropriate to meet community protection objectives in areas such as the wildland urban interface for these forest and woodland types.

3. **Prioritize and strategically target treatment areas.** Key considerations for prioritizing restoration treatment areas are: degree of unnatural crown fire risk, proximity to human developments and important watersheds, protection of old-growth forests and habitats of federally threatened, endangered, or listed sensitive species, and strategic positioning to break up landscape-scale continuity of hazardous fuels. Treatments should be done at a landscape scale to decrease forest vulnerability to unnatural stand-replacing fire. This priority-setting should take place during fire management planning, land management planning, and community wildfire protection planning.
4. **Develop site-specific reference conditions.** Site-specific historical ecological data can provide information on the natural range of variability for key forest attributes, such as tree age structure and fire regimes that furnish local “reference conditions” for restoration design. A variety of constraints, however, prevent the development of historical information on every hectare of land needing restoration. General goals should be to restore ecological integrity and function.
5. **Use low-impact techniques.** Restoration treatments should strive to use the least disruptive techniques, and balance intensity and extensiveness of treatments. In many areas, conservative initial treatments would be the minimum necessary to adequately reduce the threat of unnatural crown fire. Wildland fire use or management ignited fires may be sufficient to reestablish natural conditions in many locations. In the extensive areas where fire alone cannot safely reduce tree densities and hazardous ladder fuels, mechanical thinning of trees may be needed before the introduction of prescribed fire. Patient, effective treatments will provide more options for the future than aggressive attempts to restore 120 years of change at once. In certain areas, however, such as some urban-wildland interfaces, trade-offs with imminent crown fire risks require considerations of rapid, heavy thinning of mostly small diameter trees.
6. **Utilize existing forest structure.** Restoration efforts should incorporate and build upon valuable existing forest structures, such as large trees, and groups of trees of any size with interlocking crowns excluding aspen. These features are important for some wildlife species, such as Abert’s squirrels and goshawks, and should not be removed completely just to recreate specific historical tree locations. Since evidence of long-term stability of precise tree locations is lacking, especially for piñon and juniper, the selection of “leave” trees and tree clusters in restoration treatments can be based on the contemporary spatial distribution of trees, rather than pre-1900 tree positions. Maximizing use of existing forest structure can restore historical forest structure conditions more quickly. Leaving some relatively dense within-stand patches of trees need not compromise efforts to reduce landscape-scale crown fire risk.

The underlying successional processes of natural tree regeneration and mortality should be incorporated into restoration design. Southwestern conifer regeneration occurs in episodic, often region-wide pulses, linked to wet-warm climate conditions and reduced fire occurrence. Periods with major regeneration pulses in the Southwest occurred in the 1910s–1920 and in 1978–1998. Some of this regeneration would have survived under natural conditions. Restoration efforts should retain a proportion of these cohorts.

7. **Restore ecosystem composition.** Missing or diminished compositional elements, such as herbaceous understories, or extirpated species also require restoration attention. The forest understory, including shrubs, grasses, forbs, snags, and down logs, is an important ecosystem

component that directly affects tree regeneration patterns, fire behavior, watershed functioning, wildlife habitat, and overall patterns of biodiversity. Similarly, soil organisms, such as mycorrhizal fungi, are vital elements that can influence community composition and dynamics. A robust understory provides a restraint on tree regeneration and is essential for carrying surface fires. The establishment and maintenance of more natural patterns of understory vegetation diversity and abundance are integral to ecological restoration.

Restoration planning should include the conservation of habitats for diminished or extirpated wildlife species. Comprehensive forest ecosystem restoration requires balancing fire risk reduction with retention of forest structures necessary for canopy dependent species.

Recovery plans and conservation plans for threatened, endangered, and sensitive species should be incorporated to the fullest extent possible in planning for comprehensive forest restoration.

8. **Protect and maintain watershed and soil integrity.** Low impact treatments will minimize sedimentation, disruption of surface runoff, and other detrimental ecosystem effects. Equipment and techniques should be managed according to soil and water conservation “best management practices” applicable to site-specific soil types, physiography and hydrological functions.

Reconstruction, maintenance, or decommissioning of existing roads to correct for poor hydrologic alignment and drainage condition can greatly reduce soil loss and sedimentation rates. Projects should strive for no net increase in road density.

Managing forest density and fuels to avoid uncharacteristically intense wildfire events will reduce the likelihood of catastrophic post-fire soil erosion and nutrient depletion from forested landscapes. Soil productivity should be protected and maintained by avoiding soil loss and compaction, and managing for on-site nutrient retention. Avoid repeated whole tree biomass removal from the forest to maximize nutrient retention. Whenever feasible, green foliage should be recycled by scattering on site; followed by prescribed burning to release stored nutrients.

9. **Preserve old or large trees while maintaining structural diversity and resilience.** Large and old trees, especially those established before ecosystem disruption by Euro-American settlement, are important forest components and critical to functionality of ecosystem processes. Their size and structural complexity provide critical wildlife habitat by broadly contributing crown cover, influencing understory vegetation patterns, and providing future snags. Ecological restoration should manage to ensure the continuing presence of large and old trees, both at the stand and landscape levels. This includes preserving the largest and oldest trees from cutting and crown fires, focusing treatments on excess numbers of small young trees.

Develop “desired” forest condition objectives that favor the presence of both abundant large diameter trees and an appropriate distribution of age classes on the landscape, with a wide distribution of older trees. It is generally advisable to maintain ponderosa pines larger than 41 cm (16 inches) diameter at breast height (dbh) and other trees with old-growth morphology regardless of size (e.g. yellow-barked ponderosa pine or any species with large drooping limbs, twisted trunks or flattened tops).

Treatments should also focus on achievement of spatial forest diversity by managing for variable densities. Overall, forest densities should be managed to maintain tree vigor and

stand resiliency to natural disturbances. Disease conditions are managed to retain some presence of native forest pathogens on the landscape, but constrained so that forest sustainability is not jeopardized. Guidelines must provide opportunities to apply differing site-specific management strategies to work towards attainment of these goals, and recognize that achievement may sometimes require more than one entry.

Stand level even-aged management may be appropriate for some objectives, including disease management, post wildfire tree regeneration, accelerating development of old growth characteristics, or for, forest types for which even-aged stands are characteristic, such as spruce or aspen. Treatments should be identified through collaboration with key stakeholders.

Some ponderosa pine forests contain extremely old trees and dead wood remnants that may be small but are important because they contain unique and rare scientific information in their growth rings. Such trees have become increasingly rare in the late 20th century, and the initial reintroduction of fire often consumes these tree-ring resources. Restoration programs should preserve them where possible.

10. **Manage to restore historic tree species composition.** Forest density levels and the presence of fire in the ecosystem are key regulators of tree species composition. Where fire suppression has allowed fire-sensitive trees like junipers or shade-tolerant white fir or spruce to become abundant in historical ponderosa pine forests, treatments should restore dominance of more fire-resistant ponderosa pines. However, fire intolerant species sometimes make up the only remaining large tree component in a stand. Retention of these large trees is important to canopy dependent wildlife species. In mixed conifer forests, landscapes should be managed for composition and structure that approximates the natural range of variability.
11. **Integrate process and structure.** Ecological sustainability requires the restoration of process as well as structure. Natural disturbance processes, including fire, insect outbreaks, and droughts, are irreplaceable shapers of the forest. In particular, fire regimes and stand structures interact and must be restored in an integrated way; mechanical thinning alone will not reestablish necessary natural disturbance regimes. At the same time, fire alone may be too imprecise or unsafe in many settings, so a combination of treatments may often be the safest and most certain restoration approach.

The single best indicator of whether a proposed approach should be considered as “ecological restoration” is to evaluate if the treatment would help successfully restore the fire regime that is natural for that forest type. Approaches that do not restore natural fire regimes will not achieve full ecological restoration.

12. **Control and avoid using exotic species.** Seeding of exotic grasses and forbs should be prohibited as ecologically incompatible with good restoration. Once established, exotic species can be extremely difficult or impossible to remove. Seeding should be conducted with certified or weed free seeds to reduce the risk of contamination by non-native species or varieties.

In general, it is ecologically desirable to allow native herbaceous vegetation to recover incrementally unless there is potential for serious soil erosion or the potential for establishment of non-native invasive plants. If enhancement of herbaceous vegetation is needed, especially for road closures and recovery, using locally sourced native seeds or transplanting individuals from nearby areas into treatments is ecologically desirable.

Restoration treatments should also routinely incorporate early actions to control the establishment and spread of aggressive exotics that can be expected from restoration-related site disturbance.

13. **Foster regional heterogeneity.** Biological communities vary at local, landscape, and regional scales, and so should restoration efforts. Ecological restoration should also incorporate the natural variability of disturbance regimes across heterogeneous landscapes. Heterogeneity should be fostered in planning and implementing ecological restoration and all spatial scales, including within and between stands, and across landscape and regional scales.
14. **Protect sensitive communities.** Certain ecological communities embedded within ponderosa pine or other types of forests and some riparian areas, could be adversely affected by on-site prescribed burning or mechanical thinning. Restoration efforts should protect these and other rare or sensitive habitats, which are often hotspots of biological diversity, particularly those that are declining in abundance and quality in the region.
15. **Plan for restoration using a landscape perspective that recognizes cumulative effects.** Forest restoration projects should be linked to landscape assessments that identify historical range of variation (reference condition), current condition, restoration targets, and cumulative effects of management. Ecosystems are hierarchical; changing conditions at one level arise from processes occurring at lower levels, and are constrained, in turn, by higher levels. The landscape perspective captures these complex relationships by linking resources and processes to the larger forest ecosystem. Forest restoration projects should incorporate plans for long-term maintenance of ecological processes.
16. **Manage grazing.** Grass, forbs, and shrub understories are essential to plant and animal diversity and soil stability. Robust understories are also necessary to restore natural fire regimes and to limit excessive tree seedling establishment. Where possible, defer livestock grazing after treatment until the herbaceous layer has established its current potential structure, composition, and function.
17. **Establish monitoring and research programs and implement adaptive management.** Well-designed monitoring, research, and documentation are essential to evaluate and adapt ongoing restoration efforts. Monitoring programs must be in place prior to treatment, and must evaluate responses of key ecosystem components and processes at multiple scales. Use research and monitoring results from a variety of sources to adjust and develop future restoration treatments.

When possible, restoration projects should be set up as experiments with replicates and controls to test alternative hypotheses. The locations and prescriptions for all restoration treatments should be archived in a geographic information system, so that land managers and researchers have access to site-specific records of restoration treatments.

18. **Exercise caution and use site-specific knowledge in restoring or managing piñon-juniper ecosystems and other woodlands and savannas.** These systems are diverse and complex. Knowledge of local reference structure, composition, processes and disturbance regimes is lacking or uncertain for many piñon–juniper ecosystem types. Given the diversity, variability, and complexity of piñon–juniper systems, identification of local reference conditions is critical to the development of restoration objectives. Exercise caution and use best available science and site-specific knowledge in planning and implementing ecological restoration projects. Use the Grassland and Woodland Restoration and Management

Framework for development and implementation of specific projects (The Framework is currently under development).

Active management may be appropriate to mitigate soil erosion, community wildland fire hazard, or degraded hydrologic function in cases where historical ecological dynamics are insufficiently understood to justify ecological restoration. Piñon–juniper sites may be particularly susceptible to ecological damage from treatments, for example, soil erosion and invasion by non-native plants.

APPENDIX G
HOMEOWNER'S GUIDE AND ANIMAL EVACUATION

INTRODUCTION

This guide has been developed to address site-specific information on wildfire for the 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 CWPP. This guide suggests specific measures that can be taken by homeowners to reduce structure ignitability, and 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 materials are wood shingles. Removing debris from roof gutters and downspouts at least twice a year will help to prevent fire (and keep 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 a protective barrier such as metal or masonry between the fence and the house.

If you are designing a new home or remodeling an 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 a 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 a 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.

Always store flammable materials such as paint, solvents, or gasoline 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 high-voltage lines run 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 provides 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 from the ground. 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 firefighting" 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 in height. 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 through 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 fewer than 10%. 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 turnaround 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. A phone tree is a preconceived system for notifying a group of people by telephone. 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 (SEE ALSO CHAMP DOCUMENT BELOW FOR CORRALES)

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% 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 this: **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 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 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 to 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 rerouting 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.

ANIMAL PROTECTION OF NEW MEXICO

CONTACTS FOR SANDOVAL COUNTY

POSSIBLE COMPANION ANIMAL RESOURCES FOR EMERGENCY EVACUATION SUPPORT

1) NM Livestock Board

Area Supervisor: Livestock Inspector Gary Mora

2) Animal Amigos of Jemez Valley

Website: www.jemezanimalamigos.org

(limited rehab/adoptions, foster-based; spay/neuter program; feral cat TNR and support; pet food bank; disaster evacuation assistance)

Emergency Resources: foster homes as available for 2 dogs, 2 cats, 2 horses; several portable traps and crates available for transport assistance.

3) Bernalillo City Animal Control

(enforces town ordinance, no shelter)

4) Companion Animal Rescue and Medical Assistance (CARMA)

Website: www.broadtracy.org/carma, <http://www.petfinder.com/shelters/NM53.html>

(works w/ animal control; foster network; spay/neuter before placement)

Emergency Resources: Working with the Village and other local organizations to develop evacuation plan for small animals (similar to CHAMP plan); foster & volunteer networks.

5) Corrales Animal Control

(enforces village ordinance, no shelter)

Emergency Resources: 3 officers and vehicle available to assist with animal evacuations.

6) Corrales Horse and Mule People (CHAMP)

Website: www.champnm.com

(events, newsletter, helps protect and promote equestrian activities and lifestyle in Corrales)

Emergency Resources: Steve Henry & Terry Brown are working with the Village on a detailed evacuation plan for large animals; extensive network of members with transportation and sheltering capacity.

7) Corrales Kennels

(business - dog and cat boarding, dog grooming and training)

Emergency Resources: May have space available for dogs and cats.

8) Village of Corrales - TopForm Arena

Emergency Resources: Arena used as staging area for large animals during evacuation; potential staging areas in other parts of the Village, including the NW area fire station. Fire Chief Anthony Martinez, Mayor Philip Gasteyer and Village Councilor Ennio Garcia-Miera are working with CHAMP and CARMA to develop a comprehensive plan for large and small animals.

9) FOCAS Friends of Corrales Animal Shelter

(raising funds to build a permanent animal shelter in Corrales; volunteer network)

10) Fur and Feathers Rescue and Rehabilitation

(advice and referrals for wildlife rescue and rehab)

11) Haven for Hamsters Rescue & Sanctuary

Website: www.havenforhamsters.webs.com

(hamsters, gerbils, mice and guinea pigs)

12) Jemez Pueblo Police Department

Emergency Contact: David Ryan, Emergency Medical Services Program Manager, 4531 Highway 4 (PO Box 100), Jemez Pueblo, NM 87024, (575) 834-7628, Fax: (575) 834-7576

13) New Mexico Boston Terrier Rescue

Website: www.nmbostonrescue.com

Emergency Resources: fenced area for up to 5 dogs; fenced field for horses, but no enclosures; foster/volunteer network of 10-12; 5 crates.

14) New Mexico House Rabbit Society

Website: www.newmexicohrs.org

(foster-based rabbit rescue; assist local shelters; volunteers for boarding and grooming; bunny care classes; veterinarian referrals)

15) Rio Rancho Animal Control

(shelter; enforces city ordinance)

Emergency Resources: 7 field officers as available, 6 animal control trucks (up to 6 dogs or several cats per unit); shelter capacity: 59 dog runs, 50 cat cages, 2 small bird cages, 1 aquarium for reptiles.

16) Sandia Pueblo Tribal Police

Website: <http://sandiapueblo.nsn.us/tribalpolice.html>

17) Sandoval County Animal Control

(enforces county ordinance, no shelter)

18) Sandoval County Sheriff's Posse

Emergency Resources: Arena available for equine and livestock.

19) San Felipe Pueblo

Governor Anthony Ortiz

20) Santa Ana Pueblo Animal Control

21) Santo Domingo (Kewa) Pueblo

Governor Sisto Quintana

22) Second Chance Animal Rescue, Inc.

Website: www.secondchancenm.org

(foster-based dog rescue, spay/neuter, adoption, thrift store)

Emergency Resources: foster and volunteer network.

23) **Tiny Toes Rat Rescue**

Website: www.tinytoesratrescue.wix.com/nm

(rescue and rehabilitation for rats; veterinarian referrals)

Emergency Resources: in addition to rats, will take ferrets, gerbils, hamsters for temporary sheltering; can also house 3 dogs; 2 SUV's, 6-7 carriers to assist with transport.

24) **Village Mercantile**

Website: www.thevillagemercantile.com

(feed store)

Emergency Resources: can help with communications and coordination of transportation and placement of large animals; identifying trained volunteers.

25) **Watermelon Mountain Ranch**

Website: www.wmranch.org

(dog/cat adoptions; shelter and foster homes, spay/neuter program; humane education; serves central and northern NM; outreach for at-risk youth and special needs children)

Disaster Resources: 14 staff; shelter capacity for up to 120 dogs, 150 cats, some small livestock; 10 acres, fenced could be used for equines/livestock if panels provided; large transport trailer w/cages (30+ small animals), 3 large vans, 25' RV; lots of crates and carriers for dogs, cats, and other small animals; volunteers network; full service veterinary clinic on-site. Disaster Animal Rescue and Recovery Team helped evacuate 1500 animals during Hurricane Katrina.

26) **Zia Pueblo**

Governor Marcellus Medina

Other Emergency Resources In The Area:

> **Bernalillo County Animal Care Services**

Emergency Resources: Capacity for 15-20 equines or small livestock; potential to shelter over 100 dogs and cats for short-term emergency sheltering only. Could possibly use 150+ stalls at Dennison Park in

> **Bernalillo County Sheriff's Posse Arena**

Emergency Resources: Available for large and small equines and livestock

> **New Mexico State Fairgrounds**

Emergency Resources: Available for equines and livestock, about 200 stalls but depends on current horse show and race schedule.

For additional information, contact:

Sharon Jonas

Disaster Preparedness Coordinator

Animal Protection of New Mexico

PO Box 11395, Albuquerque, NM 87192

sharon@apnm.org

Phone: 505-265-2322, ext. 23

Fax: 505-265-2488

DRAFT ANIMAL EVACUATION PLAN

Corrales, New Mexico

Author-Corrales Horse and Mule People (CHAMP)

July, 2012

ORGANIZATION

General Principals

1. Designate holding area locations for large animals.
2. Receive written access on private property granted from residents.
3. Collect all data-phone, map, who to call, where to house/shelter animals, where to park trailers
4. Provide all above information to person in authority for evacuation.

A. Shelter Command Center Coordinator

1. Village Animal Control Officer will be the single point of contact for management decisions in responding to the needs of all animals during an emergency or disaster.
 - Ensure large animal corrals are in working order.
 - Provide support services for volunteers.
 - Maintain communication with Police, Fire Department, Mayor, Animal Control, volunteers and field animal shelter.
 - Coordinate volunteers sign in and tasks.
 - Communicate with media-radio, TV (if designated by Mayor).
2. Main Volunteer - If needed, Village Animal Control Officers shall designate a volunteer or volunteers, if required to help. That person will help implement the staging, opening of holding pens, coordinate volunteers.
 - Identify all animals with registration/intake form. A digital photo might be helpful. Attach intake form to cage or pen.
 - Evaluate animal's immediate needs and carry out if possible.
 - Provide food and water.
 - Ensure safe and secure containment.
 - Euthanasia –coordinate with a veterinarian.
 - Assign all tasks including those of volunteers.

D. Set up staging area

1. Area for trailer personnel to gather and take directions as to which homes or areas they are to go to evacuate animals.
2. Have on board, the granting authority to gain access in a mandatory evacuation.
3. Have with trailers, tools, halters, and paper work to identify home/animals
4. Volunteers who remove animals from private property must leave notice as to where animals will be taken

E. Holding areas

1. Will be opened by Animal Control Officer
Top Form Arena and New Fire Station
2. Small animal pens, crates shall be staged where they are visible to the volunteers
2. Will be staffed by on site volunteers
 - a. feed, water, pens, lights
3. Determine a veterinarian to be on call

F. Release Procedure

1. The Village of Corrales has the authority to release animals
3. Owner must sign release form after providing proof of ownership
 - a. Owner’s driver license or State ID
 - b. Proof of ownership (Animal Control to determine requirements)

G. Maintain list of volunteers who have trailers/list trailer capacity

H. Maintain list of large and small animal owners who agree to evacuation of their animals

I. Provide Training/Seminars

1. How to handle animals and how to transport animals during emergencies.

SHELTER SET-UP

General Principals

1. Move the animals from danger to designated areas in the Village or if needed, in county and state facilities. If owners bring in their animals they are responsible for feeding and watering all their animals at the Field Shelter.
2. Set up a command center and ensure to establish contact and coordination of all intake and releases of animals.

A. Field Shelter

Checklist for set up of Field Shelter

Provide the following if required:

- Information Table
First stopping point for everyone entering the Field Shelter area. Volunteers at this location direct people to where they can get the services they need.
- Animal Intake Area
Where paperwork is completed on all incoming animals. The animals are identified and ID is placed on their stalls.
- Stalls, pens and crates
Where animals are housed until they are reclaimed. Areas must be designated for dogs, cats, livestock, and all other animals. Large animals shall be taken to the Top Form Arena or other designated areas in the Village. (Corrales at New fire station?). A large scale evacuation may require coordination and evacuation to county and state facilities.
- Medical Care
Where all animals are treated for minor injuries. Seriously injured animals may be treated elsewhere depending on available resources. It is especially important to keep animals suspected to have contagious diseases, separate from the rest of the population.
- Animal Care
Animal supplies are kept for the animals –Supplies should include feeding dishes, buckets, litter boxes, litter, scoops, manure forks, cages, halters and lead ropes , collars and identification tags, muzzles, leashes, newspaper, towels, blankets, tarps, trash bags and any other needed items.
Provide alfalfa or grass hay.

- **Dead Animals**
Dead animals must be kept in corrals until proper authorities can come to remove them. Cover large animals with tarps.
- **Volunteer Information and Sign In**
After volunteers report sign in, they should be assigned tasks.
- **Rescue Equipment Storage-if available**
Volunteers are responsible for providing their own “go kits”. Go kits are defined as the equipment necessary to effect rescue and service in their specified area of expertise.
- **Parking**
Designated areas for volunteers and visitors to the Field Shelter. Effort should be made if possible, to not disturb adjacent residents or businesses.
- **Human First Aid**
First Aid should be provided by qualified personnel.
- **Garbage Area**
Designated area for bagged garbage until it is picked up by the proper authority.
- **Volunteer Groups/Guidelines-Ensure that all volunteers are covered by liability insurance (Village of Corrales and Good Samaritan laws)**

APPENDIX H
FUNDING OPPORTUNITIES

SANDOVAL COUNTY CWPP FUNDING OPPORTUNITIES

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

I. Federal Funding Information

Source: Predisaster 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 predisaster 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 predisaster 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 multihazard 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 noncompetitive 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 State Component. 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 nongovernmental 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. Forest Service

Website: <http://www.fs.fed.us/fire/partners/vfa/>

Description: U.S. 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 website.

Source: Economic Action Programs
Agency: U.S. Forest Service
Website: <http://www.fs.fed.us/spf/coop/programs/eap/index.shtml>
Description: U.S. 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: U.S. 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; reestablishment of historic 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/>
- Predisaster Mitigation Program, <http://www.fema.gov/government/grant/pdm/index.shtm>
- Environmental Education Grants, http://www.epa.gov/enviroed/grants_contacts.html

Source: Firewise Communities
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 U.S. Forest Service, Bureau of Indian Affairs, BLM, U.S. Fish and Wildlife Service, 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

Communities activities are available help homes and whole neighborhoods become safer from wildfire without significant expense. Community cleanup 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 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 non-combustible 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 websites and e-mail contacts.

Source: The National Fire Plan (NFP)

Website: <http://www.forestsandrangelands.gov/>

Description: Many states are using funds from the NFP 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.

Source: Rural Fire Assistance (RFA)

Agency: USDI – U.S. Fish and Wildlife Service

Website: <http://www.nifc.gov/rfa>.

Description: The RFA program provides funds for RFDs that protect rural, wildland-urban interface communities; play a substantial cooperative role in the protection of federal lands; are cooperators with the Department of the Interior (USDI) managed lands through cooperative agreements with the USDI, or their respective state, tribe or equivalent; are less than 10,000 in population. The required cost share amount for the recipient RFD will not exceed 10 percent of the amount awarded. The RFD must demonstrate the capability to meet cost share requirements. Cooperator contribution may be contributed as in-kind services. Cooperator contribution may exceed, but not amount to less than 10 percent. Examples of in-kind services may include but are not limited to: facility use incurred by and RFD for hosting training courses, travel and per diem costs incurred by an RFD when personnel attend training courses, and administration costs related to purchasing RFA equipment and supplies. Finding or in-kind resources may not be derived from other federal finding programs.

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.

Source: New Mexico Association of Counties: 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 (CWPPs), a prerequisite 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 Communities 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 website 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 website: <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>
- Department of Homeland Security U.S. Fire Administration:
<http://www.usfa.dhs.gov/fireservice/grants/rfff/>