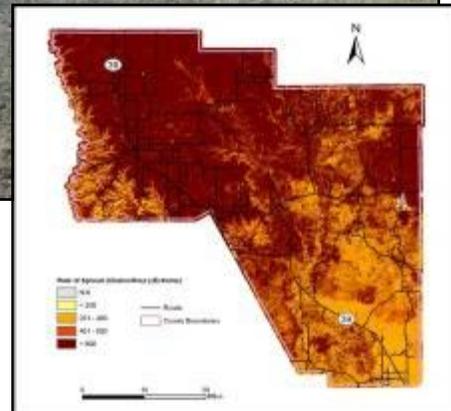


Harding County, New Mexico

Wildland Urban Interface

Community Wildfire Protection Plan



Prepared for:
Harding County, New Mexico

Submitted by:
Anchor Point Group, LLC
The Placitas Group, Inc.

Harding County Community Wildfire Protection Plan

We the undersigned approve the Harding County Community Wildfire Protection Plan.

Organization: **Harding County Commission**

Signature: Michael E. Lewis Date: 5-8-08

Name and Title: Mr. Michael Lewis, Chairman

Signature: Robert L. Casado Date: 5-8-08

Name and Title: Mr. Robert Casados, Vice-Chairman

Signature: Jerry Porterfield Date: 5-8-08

Name and Title: Mr. Jerry Porterfield, Commissioner

Organization: **Harding County Fire Chiefs**

Signature: Michael Montoya Date: 5-4-08

Name and Title: Michael Montoya, Fire Chief, Harding District 1 FD

Signature: Josh Smith Date: 5/4/08

Name and Title: Josh Smith, Fire Chief, Rosebud FD

Organization: **New Mexico Energy, Minerals and Natural Resources Department-
Forestry Division**

Signature: Ernesto Hurtado Date: 4-11-2008

Name and Title: Mr. Ernesto Hurtado, Las Vegas District Forester

Harding County Community Wildfire Protection Plan

We the undersigned support the Harding County Community Wildfire Protection Plan.

Organization: Cibola National Forest + Grasslands

Signature: Nancy Rose Date: 5/9/08

Name and Title: Nancy Rose, Forest Supervisor

Organization: Natural Resources Conservation Service

Signature: Randy Velasquez Date: 5/1/08

Name and Title: Randy Velasquez, District Conservationist

Organization: Natural Resource Conservation Service

Signature: Jason Scott Date: 5-1-08

Name and Title: Jason Scott, Soil Con. Tech.

Harding County Community Wildfire Protection Plan

We the undersigned support the Harding County Community Wildfire Protection Plan.

Organization: Village of Mosquero

Signature: Pablo Trujillo Date: 4-8-08

Name and Title of Signatory: Pablo Trujillo, Mayor

Approved at Regular Meeting on April 8, 2008

Organization: Village of Roy

Signature: Edward L. Fishman Date: 4/08/2008

Name and Title: Edward L. Fishman, Mayor

Harding County Community Wildfire Protection Plan

We the undersigned support the Harding County Community Wildfire Protection Plan.

Organization: Ute Creek Soil and Water

Signature: Robert L Casado Date: 5-1-08

Name and Title of Signator: Robert L Casado Chairman

Organization: More SWCO

Signature: S. Hubman Date: April 26, 2008

Name and Title: Sherrita Elman, Admin Asst

Organization: FSA

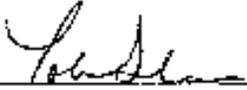
Signature: Darlene Hazen Date: 4-14-08

Name and Title: Darlene Hazen PT

Harding County Community Wildfire Protection Plan

We the undersigned support the Harding County Community Wildfire Protection Plan.

Organization: NEW MEXICO STATE POLICE

Signature:  Date: 4/15/2008

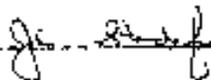
Name and Title: TOBY DOLAN, CAPTAIN

Organization: New Mexico State Land Office

Signature:  Date: 4-15-08

Name and Title: District Resource Manager

Organization: PRE - FIRE MARSHAL'S OFFICE

Signature:  Date: 4/15/08

Name and Title: JIM STANDEFF - STATE FIRE MARSHAL

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SUMMARY OF THIS DOCUMENT

This document incorporates new and existing information relating to wildfire for citizens, policy makers, and public agencies within Harding County, New Mexico. Wildfire hazard data is derived from the community wildfire hazard rating analysis (WHR) and the analysis of fire behavior potential, which are extensive and/or technical in nature. For this reason, detailed findings and methodologies are included in their entirety in appendices rather than the main report text. This approach is designed to make the plan more readable, while establishing a reference source for those interested in the technical elements of the Harding County wildfire hazard and risk assessment.

The Harding County Community Wildfire Protection Plan (CWPP) is the result of a community-wide fire protection planning effort that included extensive field data gathering, compilation of existing fire suppression documents, a scientific analysis of the fire behavior potential of the study area, and collaboration with various participants: homeowners, Harding County officials, and several federal and state agencies.

This project meets the requirements of the federal Healthy Forests Restoration Act (HFRA) of 2003 for community fire planning by:

1. Identifying and prioritizing fuels reduction opportunities across the landscape
See the *Fuels Modification* section on pages 33-38 of this document.
2. Addressing structure ignitability
See the *Reducing Structure Ignitability* section on pages 39-43 and *Appendix B* of this document
3. Collaborating with stakeholders
See *Appendix E* of this document

Special thanks and recognition go to the State of New Mexico, the New Mexico Energy, Minerals and Natural Resources Department and its Forestry Division for providing grant funds to Harding County to conduct this project.

THE NATIONAL FIRE PLAN

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

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

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

1. Respond to severe fires
2. Reduce the impact of fire on rural communities and the environment
3. Ensure sufficient firefighting resources

Congress increased its specific appropriations to accomplish these goals. But 2002 was another severe season, with more than 1,200 homes destroyed and seven million acres burned. In response to public pressure, Congress and the Bush administration continued to obligate funds for specific actionable items, such as preparedness and suppression. That same year, the Bush administration announced the HFRA initiative, which enhanced measures to restore forest and rangeland health and reduce the risk of catastrophic wildfires. In 2003, that act was signed into law.

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

PURPOSE OF THE HARDING COUNTY CWPP

The purpose of the Harding County Community Wildfire Protection Plan is several-fold:

1. Promote firefighter and public safety
2. Identify communities at risk
 - a. Reduce fuel hazards and prevent fires
 - b. Consider fuels treatment prescriptions and locations

- c. Consider wildland urban interface codes and the Firewise Communities Program
3. Increase fire department capacity
4. Improve the County's position as it completes for grants

GOALS AND OBJECTIVES

Goals for this project include the following:

1. Enhance life safety for residents and responders
2. Mitigate undesirable fire outcomes to property and infrastructure
3. Mitigate undesirable fire outcomes to the environment and quality of life

In order to accomplish these goals the following objectives were identified:

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

Other desired outcomes

1. Promote community awareness:
Quantification of the community's hazards and risk from wildfire will facilitate public awareness and assist in creating public action to mitigate the defined hazards.
2. Improve wildfire prevention through education:
Awareness, combined with education, will help to reduce the risk of unplanned human ignitions.
3. Facilitate and prioritize appropriate hazardous fuel reduction:
Organizing and prioritizing hazard mitigation actions into an "Action Plan" with priorities, timelines and monitoring can assist stakeholders in focusing future efforts from both a social and fire management perspective.
4. Promote improved levels of response:
The identification of areas of concern will improve the accuracy of pre-planning, and facilitate the implementation of cross-boundary, multi-jurisdictional projects.

COLLABORATION: COMMUNITIES, AGENCIES AND CORE TEAM

The people involved in the development of the Harding County CWPP are included in the following table. Their names, organization, and roles and responsibilities are indicated in Table 1. For more information on the collaborative process that led to the development of this CWPP, see **Appendix E, Harding County CWPP Collaborative Effort**.

Table 1. CWPP Core Team and Development Team

Name	Organization	Roles / Responsibilities
Michael Lewis, Chairman Robert Casados, Vice-Chair Jerry Porterfield, Commissioner	Harding County Commission	Local information and expertise, including community risk and value assessment, development of community protection priorities, and establishment of fuels treatment project areas and methods.
Barbara Shaw, Administrative Assistant Herman Martinez, County Sheriff	Harding County	
Josh Smith, Chief Judy Casados Tom Mitchell Terry Mitchell	Rosebud Fire Department	
Michael Montoya, Chief Matt Mitchell	Harding #1	
Charles Hammer, Chief Shawn Jeffrey Jane Roby-Velarde	Mosquero Fire Department	
Lino Paiz, Chief Betty Jo Martinez Augustine Velarde	Roy Fire Department	
Blair Clavel	New Mexico State University-Cooperative Extension Service	
James R Hazen	New Mexico State Police	
Louie Lujan	New Mexico Department of Transportation	

<p>Scott Draney, Habitat Specialist</p> <p>Nancy Walls, District Ranger Justin Thompson, Fire Management Officer</p> <p>Kyle Sahd, Fire Management</p> <p>Richard Shaw Nick Gonzales</p>	<p>New Mexico Game and Fish</p> <p>USDA Forest Service-Kiowa National Grasslands</p> <p>USDI Bureau of Land Management</p> <p>Interested Landowners</p>	
<p>Ernesto Hurtado, District Forester Eugene Pino, Fire Management Terrell Treat, Office of Forest and Watershed Health</p>	<p>New Mexico State Forestry Division</p>	<p>Facilitation of planning process and approval of CWPP minimum standards.</p>
<p>Shelley Rossbach, President, Meeting Facilitation</p> <p>Fred Rossbach, Project Manager</p>	<p>The Placitas Group, Inc. Consultants</p>	<p>Facilitation of Planning Process and development of the CWPP</p>
<p>Chris White, CEO, Wildland-Urban Interface Specialist</p> <p>Rodrigo Moraga, Managing Member, Fire Behavior Analyst</p> <p>Mark McLean, GIS Project Manager</p> <p>Marc McDonald, Project Manager</p> <p>Quinn MacLeod, WUI Project Specialist</p>	<p>Anchor Point Group LLC Consultants</p>	<p>Development of the CWPP, community risk and value assessment, development of community protection priorities, establishment of fuels treatment project areas and methods.</p>

STUDY AREA OVERVIEW

Harding County was established in 1921 and named after Warren G. Harding, then President of the United States. It is located on the northeast side of New Mexico and is adjacent to Colfax, Quay, Mora, San Miguel and Union counties. Harding County is 2,126 square miles or 1,360,483 acres (Anchor Point Group, GIS, 2007). The approximate population for the County is 718 (U.S. Census 2006, estimate), making it the least populated county in the state. It is also the least densely populated area with only 0.4 people per square mile. The County Seat is the Village of Mosquero, New Mexico with a population of approximately 160. The other municipality located in Harding County is the Village of Roy with a population of approximately 350.

The topography is rolling plains, canyons, escarpments and mesas that reach elevations ranging from 3,900 to 6,500 feet above sea level. Harding County is bounded on the western border by the deep and narrow Canadian River Canyon. Carrizo and Mosquero Canyons form an escarpment that bisects the middle of the County north and south. A little further to the east, Ute Creek also divides the County north and south. The dominant land cover type is non-forest watershed made up of grasslands, pinon-juniper woodland and agriculture. The grasslands are representative of the Southern Shortgrass Prairie Eco-region and the Western Great Plains Terrestrial Habitat Types including Shortgrass Prairie Grasslands in the north and west and Sandhill Sagebrush Shrublands in the south and east (Comprehensive Wildlife Strategy for New Mexico, New Mexico Game and Fish, 2006).

Average rainfall in the County is approximately 15 inches per year with three quarters of the precipitation occurring during the months of May through October (Harding Soil Survey, USDA-Natural Resource Conservation Service, 1973).

Most of the lands are privately owned. There are approximately 71,100 acres of federal lands managed by the USDA Forest Service as the Kiowa National Grasslands. There are approximately 345,000 acres of state lands that are leased on the surface primarily for grazing. (1994 Land Entitlement Acreages from Bureau of Land Management). Figure 1 shows the general ownership patterns in Harding County.

Figure 1. Harding County Land Ownership

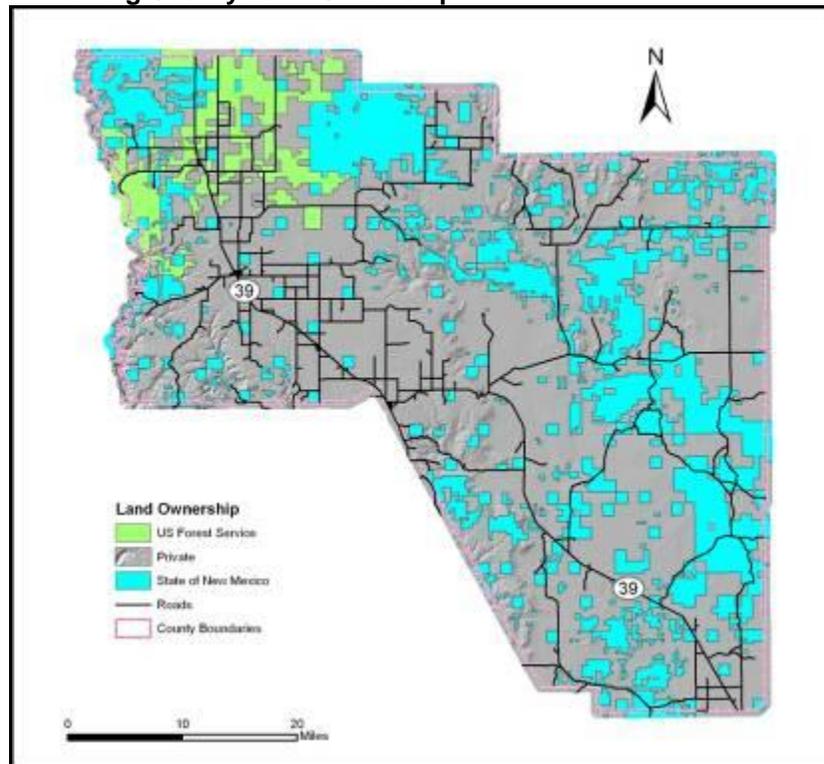


Figure 2 and **Table 2** show the communities that define the Wildland Urban Interface (WUI) study area. For the purposes of this project, the most populated areas were divided into 3 communities. Each community represents certain dominant hazards from a wildfire perspective. The overall hazard ranking of these communities was determined by considering the following variables: fuels, topography, and structural flammability, availability of water for fire suppression, egress and navigational difficulties, as well as other hazards, both natural and manmade. The methodology for this assessment uses the Wildfire Hazard Rating (WHR) community hazard rating system developed specifically to evaluate communities within the WUI for their relative wildfire hazard.¹ The WHR model combines physical infrastructure such as structure density and roads, and fire behavior components like fuels and topography, with the field experience and knowledge of wildland fire experts. For more information on the WHR methodology please see **Appendix B**.

¹ C. White, "Community Wildfire Hazard Rating Form" *Wildfire Hazard Mitigation and Response Plan*, Colorado State Forest Service, Ft. Collins, CO, 1986.

Figure 2. County Graphic - Overview

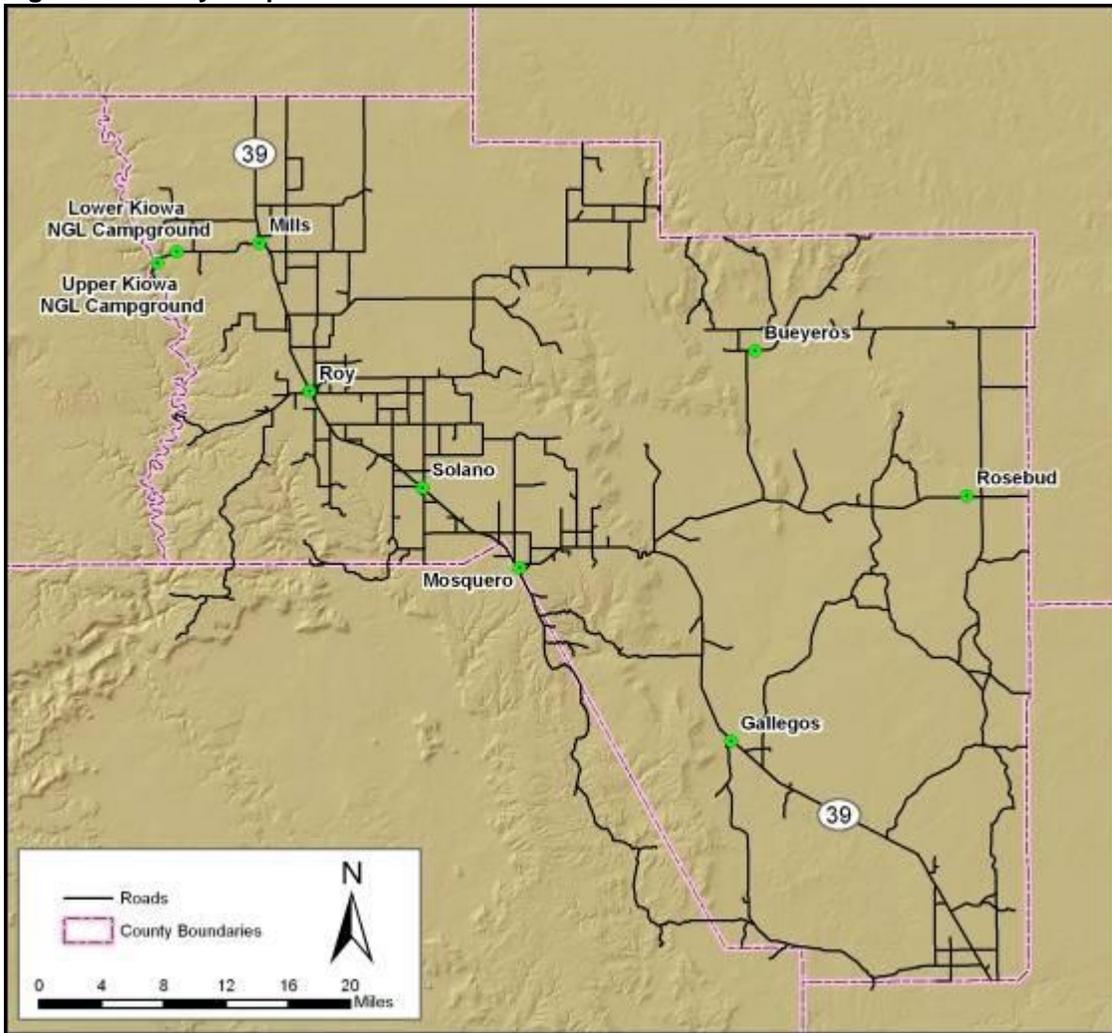


Table 2. Ratings of the Communities

COMMUNITY	SCORE	HAZARD RATING
Mosquero	38	MODERATE
Roy	38	MODERATE
Solano	40	LOW

VALUES AT RISK

Harding County is 2,126 square miles or 1,360,483 acres (Anchor Point Group, GIS, 2007). The approximate population for the County is 718 (U.S. Census 2006, estimate), making it the least populated county in the state. It is also the least densely populated area with only 0.4 people per square mile. The County Seat is the Village of Mosquero, New Mexico with a population of approximately 160. The other municipality located in Harding County is the Village of Roy with a population of approximately 350.

Harding County fire suppression is provided by a mixture of County and municipal fire departments. The County has organized two rural fire departments; Harding County #1 and Rosebud. These two fire departments cover the entire County and provide initial attack on small portions of Union and San Miguel Counties. Like many rural departments most of their responses are related to emergency medical service and wildland fire. The fire departments are continually challenged to recruit and train members, and to provide reliable communications and adequate water delivery capacity to extinguish fires. They rely on mutual aid from municipal fire departments in the Villages of Mosquero and Roy. These municipalities have developed water systems and fire hydrants for fire suppression. Harding County also relies on neighboring Colfax, Quay and Union Counties for mutual aid, although the distances and response times are great. New Mexico State Forestry and the USDA Forest Service have also provided support for extended attack incidents. The Harding County Road Department can respond to wildfires with road graders. The State of New Mexico Department of Transportation can also respond to wildfires when life or property is threatened. Over the years Harding County fire departments have been very resourceful in managing large incidents. During large incidents, the whole community gets involved.

A number of large wildfires occurred in Harding County during the summer of 2006. These fires were caused by lightning. They were spread out over the whole County and burned approximately 60,000 acres of grassland and pinon-juniper woodland. No communities were threatened, however individual ranch compounds were at risk and a number of ranch improvements and livestock were destroyed. There was a tremendous fire response from multiple area fire departments, but it dramatized how quickly local fire protection resources can be overwhelmed in a large, fast moving wildfire. The Texas State Forest Service conducted a case study of the 2005 and 2006 grass fires that destroyed many homes in Texas and can provide valuable lessons learned (<http://txforests-service.tamu.edu> (search "case study")). Fire Department after action reviews recognized the importance of improving equipment, training, communications and organization. The fires were also a call for citizens to be aware of the danger from wildfire and take action around their homes to better protect them.

Wildland Urban Interface and Communities at Risk

Rural development is very dispersed in the County. The Harding Community Wildfire Protection Plan Core Team agreed with the Wildland Urban Interface (WUI) as designated by the USDA-Forest Service and did not expand the area. The WUI area is contained within the USDA Forest Service boundary in the northwestern section of the County.

Commerce and Infrastructure

The Harding County economy is dominated by agriculture, primarily ranching. Farming of cultivated crops is limited and primarily associated with support of livestock. The County has approximately 19,000 acres enrolled in the Conservation Reserve Program (CRP). The eastern part of Harding County is underlain in part by the Bravo Dome carbon dioxide gas field, which is commercially extracted (www.hardingcounty.org). Public administration, education, health and social services are also important employers.

There are 545 housing units within the County. The median household income with earnings is \$33,400 compared to the state median of \$43,900. The median income for all households in the County is \$26,100 and for a family is \$36,700. About 12.9% of families and 16.3% of the population are below the poverty line (U.S. Census, 2000).

History and Lifestyle

There were approximately 5,000 people living in Harding County when it was created in 1921. Early settlers were brought to the country as homesteaders but the area never recovered from the Great Plains Dust bowl and it has been losing population ever since. The area is a wonderful and often overlooked part of New Mexico. The County is actively promoting tourism to highlight its western lifestyle. The countryside is scenic and unspoiled with clear skies and wide open spaces. It is cowboy and cowgirl country with a number of large ranches in the County. Attractions include Canadian River Canyon and Mills Canyon in the Kiowa National Grasslands. There are also a number of historic churches or missions throughout the County. These beautiful stone structures can be seen in Bueyeros, Gallegos and Solano. Ancient history is part of this area as well with dinosaur tracks located in the Mosquero Creek area (www.hardingcounty.org).

Environment

The dominant land cover type is non-forest watershed made up of grasslands, pinon-juniper woodland and agriculture. The grasslands are representative of the Southern Shortgrass Prairie Eco-region and the Western Great Plains Terrestrial Habitat Types including Shortgrass Prairie Grasslands in the north and west and Sandhill Sagebrush Shrublands in the south and east (Comprehensive Wildlife Strategy for New Mexico, New Mexico Game and Fish, 2006).

Harding County has suffered from repeated drought and consequent desertification since the 1930s. Some of the Harding County soils are very susceptible to wind erosion. The Conservation Reserve Program (CRP) in the mid-1980's encouraged the introduction of lovegrasses to stabilize the soil and prevent erosion. Lovegrasses are fire-adapted and once established, these non-native grasses are persistent and very difficult and expensive to displace with native vegetation. Harding County has approximately 19,000 acres of "CRP grass" meant to stabilize soils; however it also provides a uniform bed of vegetation that periodically fuels very intense wildfires.

Harding County residents understand fire has a natural role in the environment. The County has adopted burn ordinances that recognize the value of planned prescribed burns. Fire can provide benefits including maintenance and rejuvenation of grasslands

and reduction of hazardous fuels that can be difficult to control during extreme fire danger conditions. In general wildlife species are adapted to and benefit from fire.

There are 309 wildlife species found in Harding County. Big game species include pronghorn antelope, mule deer and Rocky Mountain elk. The lesser prairie-chicken has received much attention in these habitat types and conservation efforts have provided excellent examples of collaborative efforts between state, federal land private land managers and conservation organizations. To protect wildlife, CRP management activities, such as mowing grass for fuel breaks, are prohibited during nesting season, from April to October.

The New Mexico Department of Game and Fish (NMDCF) reviewed the Harding CWPP and does not expect the plan to result in significant impacts to wildlife or sensitive habitats (NMDGF letter No. 11988, 3/24/08). NMDGF expressed a desire to be involved in future planning efforts, especially on projects with wildlife concerns.

The following is the federal threatened and endangered species list for Harding County (New Mexico Game and Fish Department, Bison-M, <http://www.bison-m.org>): *plains minnow, suckermouth minnow, arid land ribbon snake, yellowbilled cuckoo, bald eagle, peregrine falcon, southwest willow flycatcher, burrowing owl, mountain plover, lesser prairie-chicken, loggerhead shrike, Baird's sparrow, black tailed prairie dog, swift fox, paper pondshell, and the Conchas crayfish.*

Through public involvement, local support, and a regional perspective, the fuels reduction and other mitigation elements described in this document can and should enhance and protect the values of the study area.

CURRENT RISK SITUATION

For the purposes of this report the following definitions apply:

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

Hazard is the combination of the wildfire hazard ratings of the Wildland Urban Interface (WUI) communities and fire behavior potential, as modeled from the fuels, weather and topography of the study area.

The majority of the district is at a moderate risk for WUI fires. This assessment is based on the analysis of the following factors:

1. Harding County fire departments respond to an average of 15 wildland incidents annually (based on interviews with local fire departments). The largest fire occurred in July of 2006 and grew to 60,000 acres (fire size based on local fire department mapping). Fire occurrence is variable. In 2006, 17 lightning caused fires occurred in one evening.
2. New Mexico State Forestry (NMSF) tracks the large fires or extended attack fires reported to them for reimbursement. NMSF reports 86 fires in an 18 year period between the years of 1989 and 2006. It is important to point out that fires have the ability to burn and grow to a large size during most months of the year. Fire cause is primarily lightning related with only 24 of the 86 being attributed to human causes.
3. Harding County fire departments provide fire suppression assistance to a number of neighboring counties. These counties have an equal or increased level of fire occurrence.
4. The USDA Forest Service fire regime and condition class evaluation of forest stands in the study area shows that historic fire regimes have been moderately altered. Please see the *Fire Regime and Condition Class* section of this report for details.
5. The surrounding federal lands report a low fire history. Fire occurrences for the Kiowa National Grasslands Ranger District of the Cibola National Forest (see **Figure 3**) were calculated from the USDA Forest Service Personal Computer Historical Archive for the twenty one-year period from 1986-2006. These areas represent federal lands adjacent to the study area, but do not include any data from state, county, or private lands. The data have been processed and graphed using the Fire Family Plus software program and are summarized below.

Figure 3a shows the number of fires (red bars) and the total acres burned (blue hatched bars) in the Kiowa National Grasslands Ranger District for each year. The number of annual fires range from zero to 10 fires per year, with the largest amount of acreage burned in 2006.

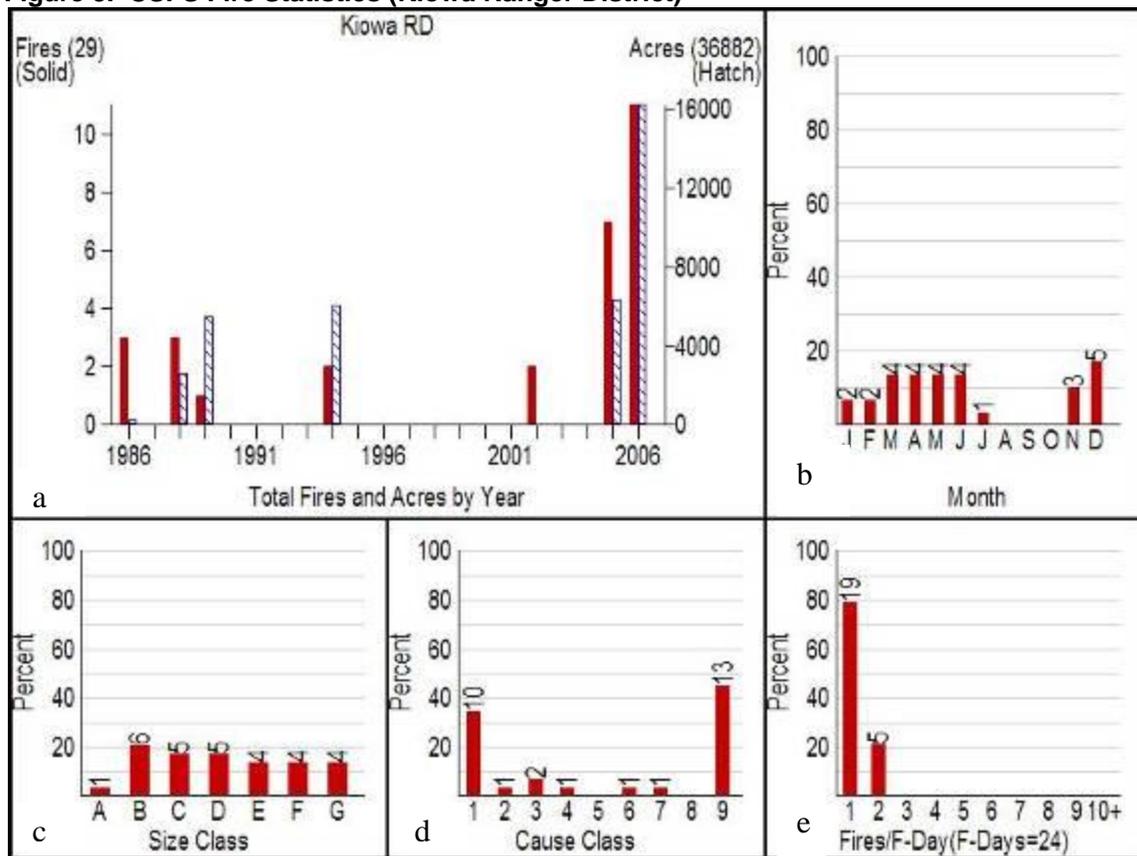
Figure 3b shows the percentage and number of fires between 1986 and 2006 occurring in each month of the year. December had the greatest number of fires, but March through June had nearly the same number which shows that spring is the most active time of the year.

Figure 3c shows the size class distribution of fires.

Figure 3d shows the number of fires caused by each factor.

Figure 3e shows the number of fire starts for each day that a fire start was recorded.

Figure 3. USFS Fire Statistics (Kiowa Ranger District)



Size Class (in acres)	A < ¼	B ¼ - 9	C 10 - 99	D 100-299	E 300-999	F 1000 - 4999	G 5000 +		
Causes	1 Lightning	2 Equipment	3 Smoking	4 Campfire	5 Debris Burning	6 Railroad	7 Arson	8 Children	9 Misc.

FIRE REGIME AND CONDITION CLASS

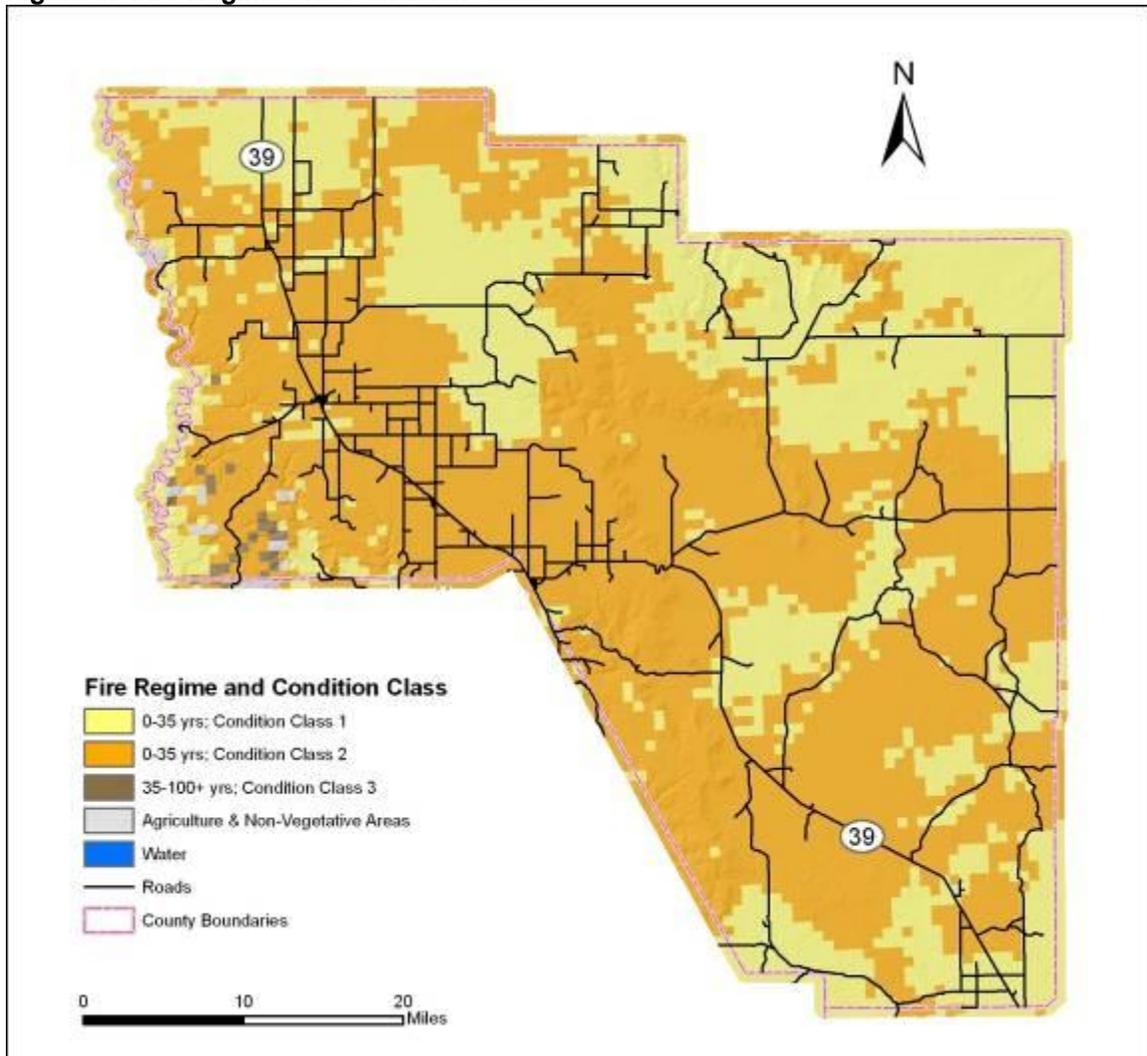
Fire Regime and Condition Class (FRCC) is a landscape evaluation of expected fire behavior as it relates to the departure from historic norms. The data used for this study is from a national level map. The minimum mapping unit for this data is 1 square kilometer. FRCC is not to be confused with BEHAVE and FlamMap fire behavior models (detailed in the fire behavior section) which provide the fire behavior potential analysis for expected flame length, rate of spread and crown fire development.

The FRCC is an expression of the departure of the current condition from the historical fire regime. It is used as a proxy for the probability of severe fire effects (e.g., the loss of key ecosystem components - soil, vegetation structure, species, or alteration of key ecosystem processes - nutrient cycles, hydrologic regimes). Consequently, FRCC is an index of hazards to the status of many components (e.g., water quality, fish status, wildlife habitats, etc.). **Figure 4** displays graphically the return interval and condition class of the study area.

Deriving FRCC entails comparing current conditions to some estimate of the historical range that existed prior to substantial settlement by Euro-Americans. The departure of the current condition from the historical baseline serves as a proxy for probable ecosystem effects. In applying the condition class concept, it is assumed that historical fire regimes represent the conditions under which the ecosystem components within fire-adapted ecosystems evolved and have been maintained over time. Thus, if it is projected that fire intervals and/or fire severity have changed from the historical conditions, then it would be expected that fire size, intensity, and burn patterns would also be subsequently altered if a fire occurred. Furthermore, if it is assumed that these basic fire characteristics have changed, then it is likely that there would be subsequent effects to those ecosystem components that had adapted to the historical fire regimes.

As used here, the potential of ecosystem effects reflect the probability that key ecosystem components would be lost if a fire were to occur within the study area. It should be noted that a key ecosystem component can represent virtually any attribute of an ecosystem (for example, soil productivity, water quality, floral and faunal species, large-diameter trees, snags, etc.).

Figure 4. Fire Regime and Condition Class



The following categories of condition class are used to qualitatively rank the potential of effects to key ecosystem components:

Table 3. Condition Class Descriptions²



Condition Class	Condition Class Description
1	Fire regimes are within their historical range and the risk of losing key ecosystem components as a result of wildfire is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. Fire effects would be similar to those expected under historic fire regimes.
2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components as a result of wildfire is moderate. Fire frequencies have changed by one or more fire-return intervals (either increased or decreased). Vegetation attributes have been moderately altered from their historical range. Consequently, wildfires would likely be larger, more intense, more severe, and have altered burn patterns, as compared with those expected under historic fire regimes.
3	Fire regimes have changed substantially from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have changed by two or more fire-return intervals. Vegetation attributes have been significantly altered from their historical range. Consequently, wildfires would likely be larger, more intense, and have altered burn patterns, as compared with those expected under historic fire regimes.

The communities of the study area are dominantly classified under Condition Class 2. By definition, historic fire regimes have been moderately altered. Consequently, wildfires are likely to be larger, more severe, and have altered burn patterns, as compared with those expected under historic fire regimes.

² Fire Regime Condition Class, website, <http://www.frcc.gov/>, July 2005.

FIRE BEHAVIOR POTENTIAL

As a part of the wildfire hazard analysis carried out for this study, the fire behavior potential of the study area was modeled (see **Appendix A**). This model can be combined with the community wildfire hazard ratings (WHR), structure density and Values at Risk information to generate current and future “areas of concern.” **Figures 4, 6, and 8** show the fire behavior potential for the analysis area, given the average weather conditions existing between April 1 and November 1. Weather observations from the Mills Canyon Remote Automated Weather Station (RAWS) were averaged for a four-year period (2004-2007) to calculate these conditions.

Figures 5, 7, and 9 show the fire behavior potential for the analysis area, given ninety-seventh percentile weather data. In other words, the weather conditions existing on the five most severe fire weather days in each season for the thirty-year period were averaged together to provide the weather data for this calculation. It is a reasonable assumption that similar conditions may exist for at least five days of the fire season during an average year. In fact, during extreme years, such conditions may exist for significantly longer periods.

Weather conditions are extremely variable and not all combinations are accounted for. These outputs are best used for pre-planning and not as a stand-alone product for tactical operations. This model can be combined with the WHR and Values at Risk information to generate current and future “areas of concern,” which are useful for prioritizing mitigation actions. It is recommended that when this information is used for tactical operations, fire behavior calculations be done with actual weather observations during the fire event. For greatest accuracy, the most current Energy Release Component (ERC) values should be calculated and distributed during the fire season to be used as a guideline for fire behavior potential. For a more complete discussion of the fire behavior potential methodology, please see **Appendix A**.

Figure 4. Flame Length, Moderate Conditions

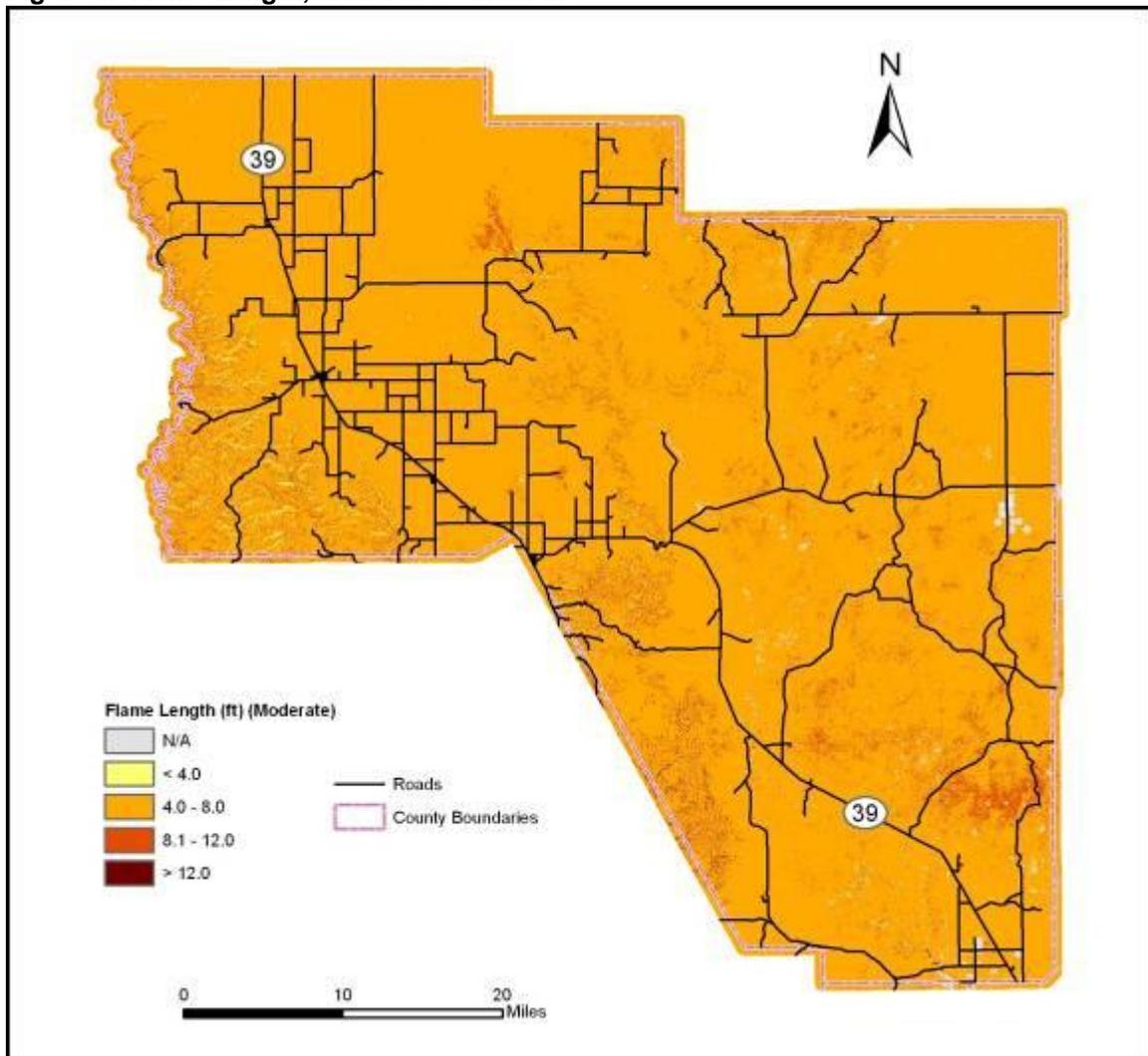


Figure 5. Flame Length, Extreme Conditions

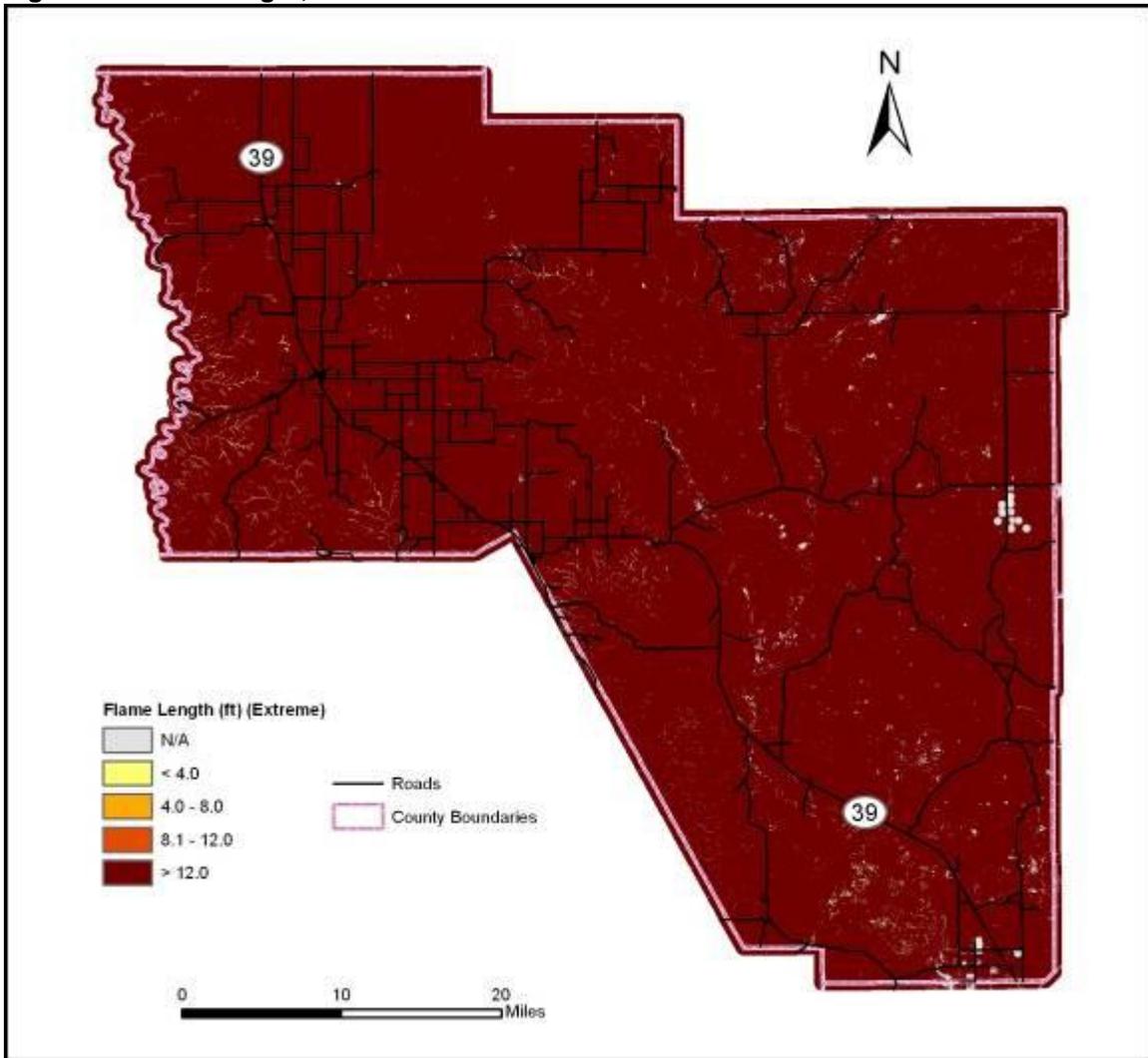


Figure 6. Rate of Spread, Moderate Conditions

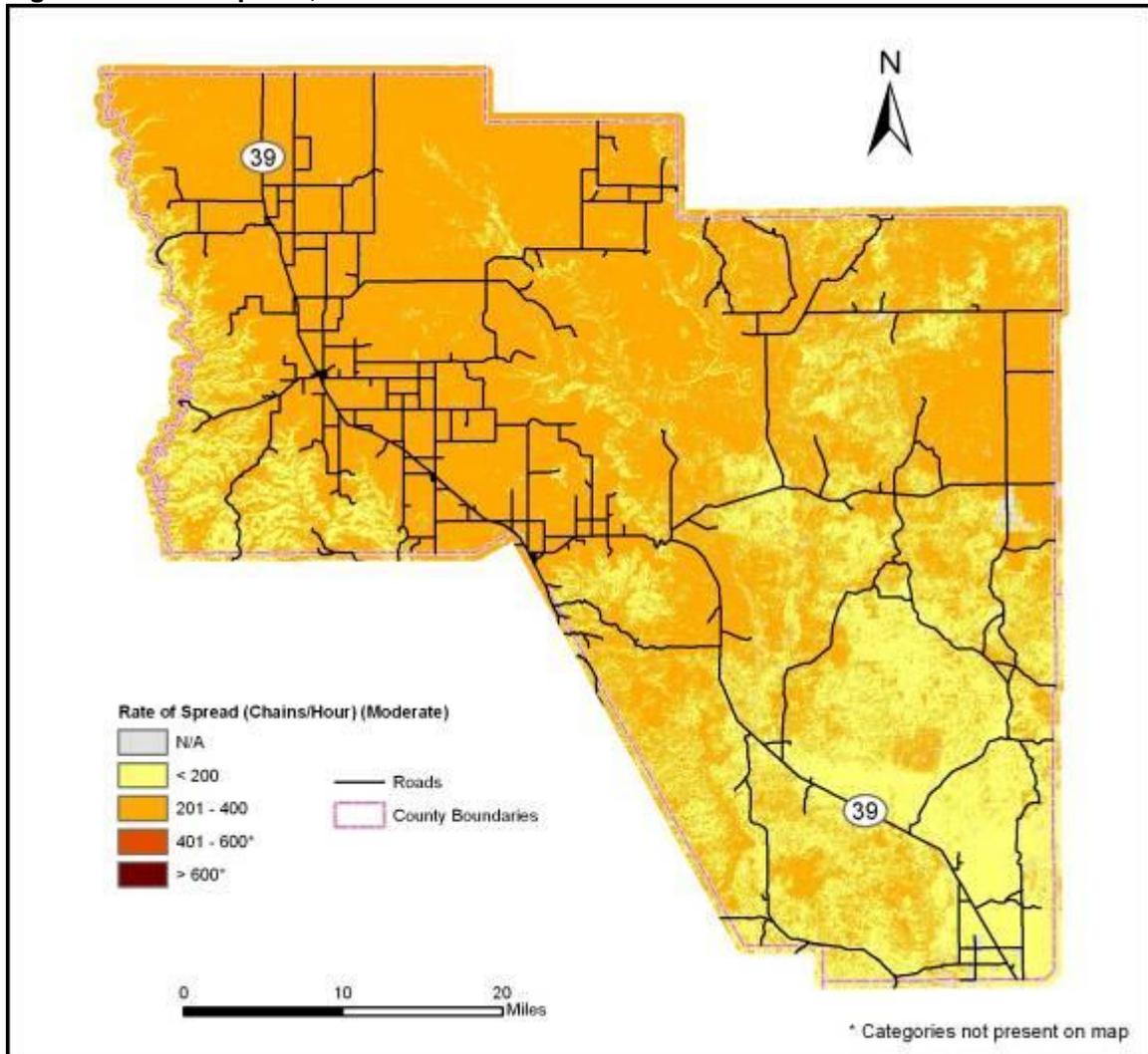


Figure 7. Rate of Spread, Extreme Conditions

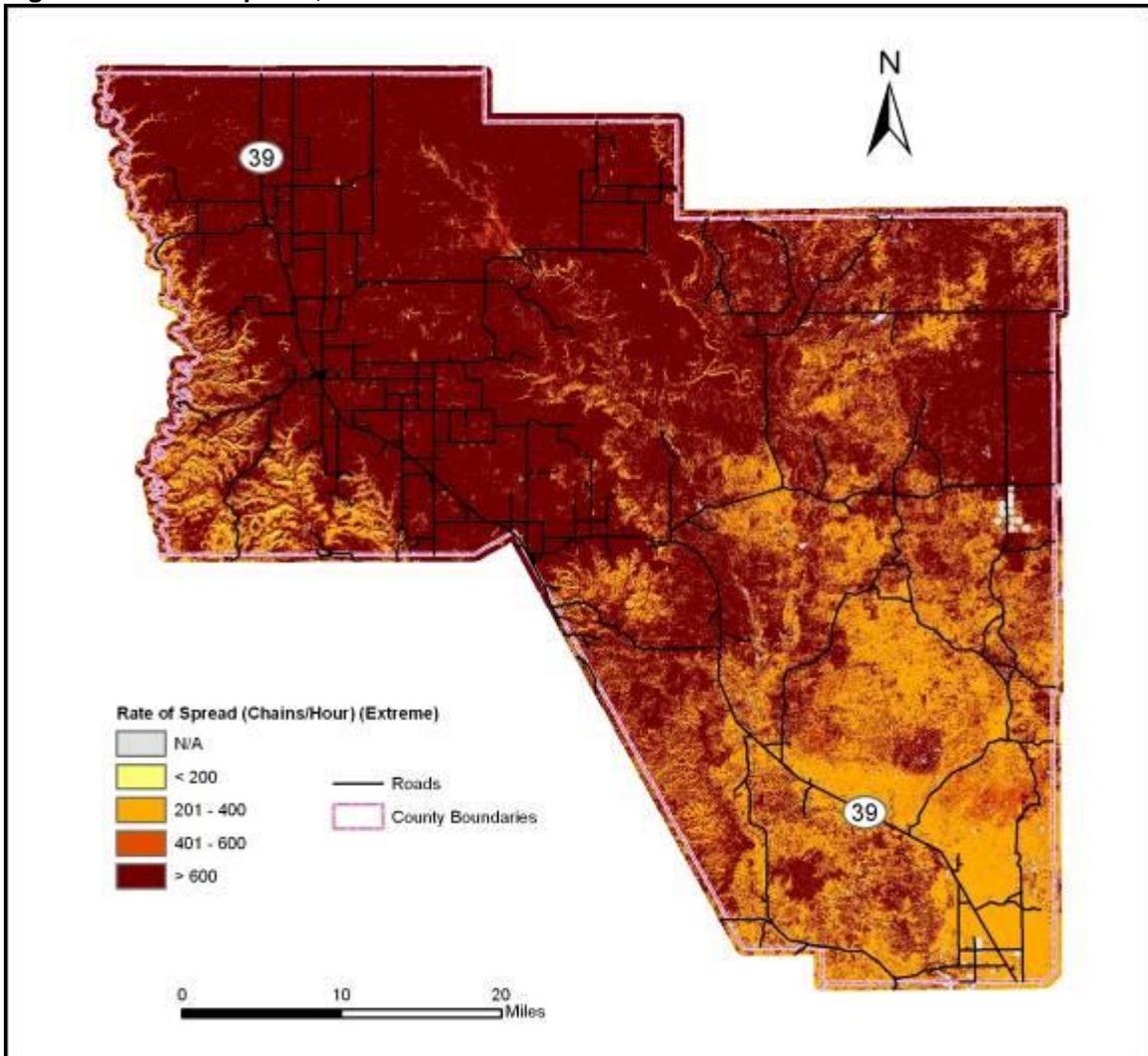


Figure 8. Crown Fire, Moderate Conditions

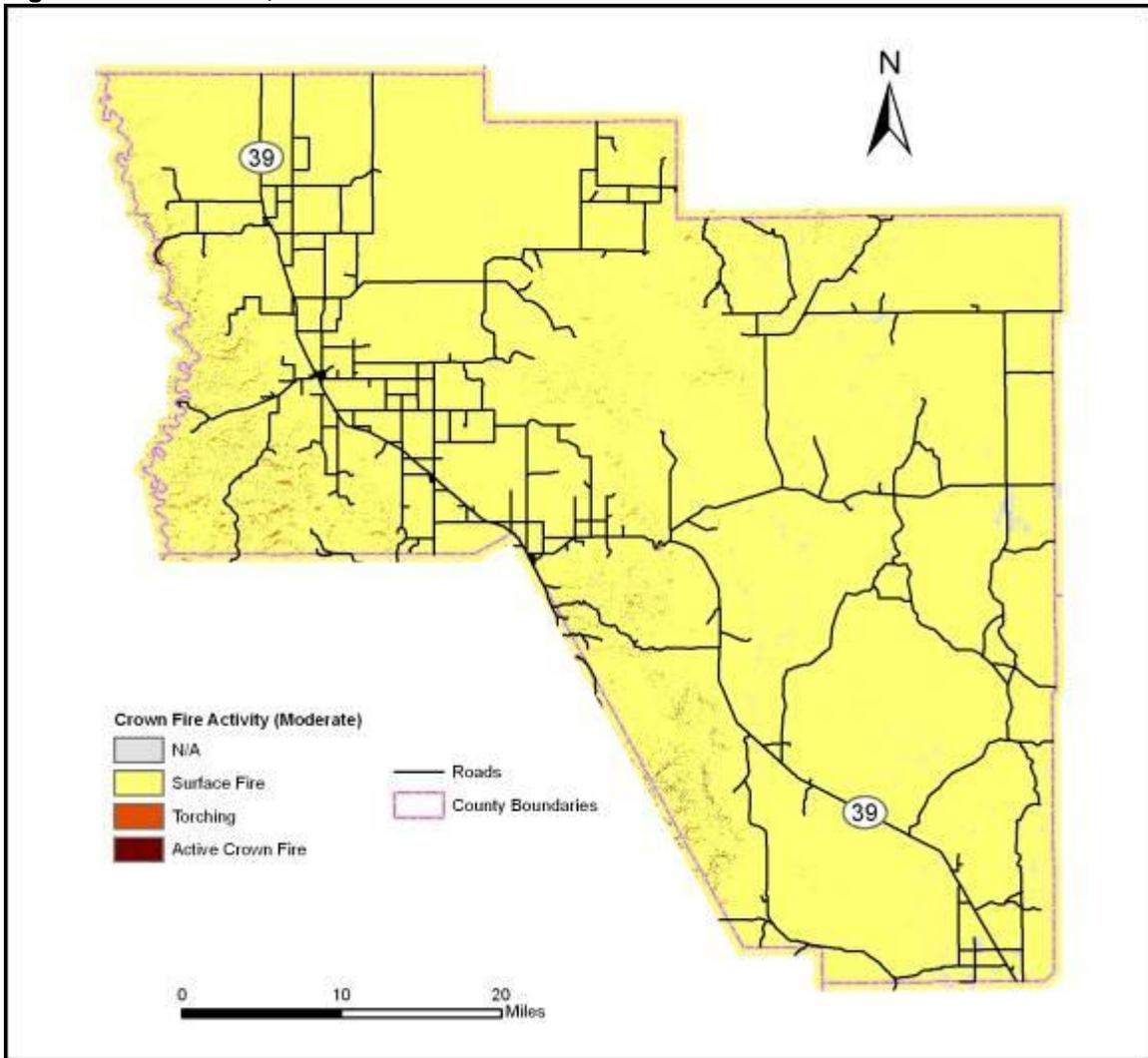
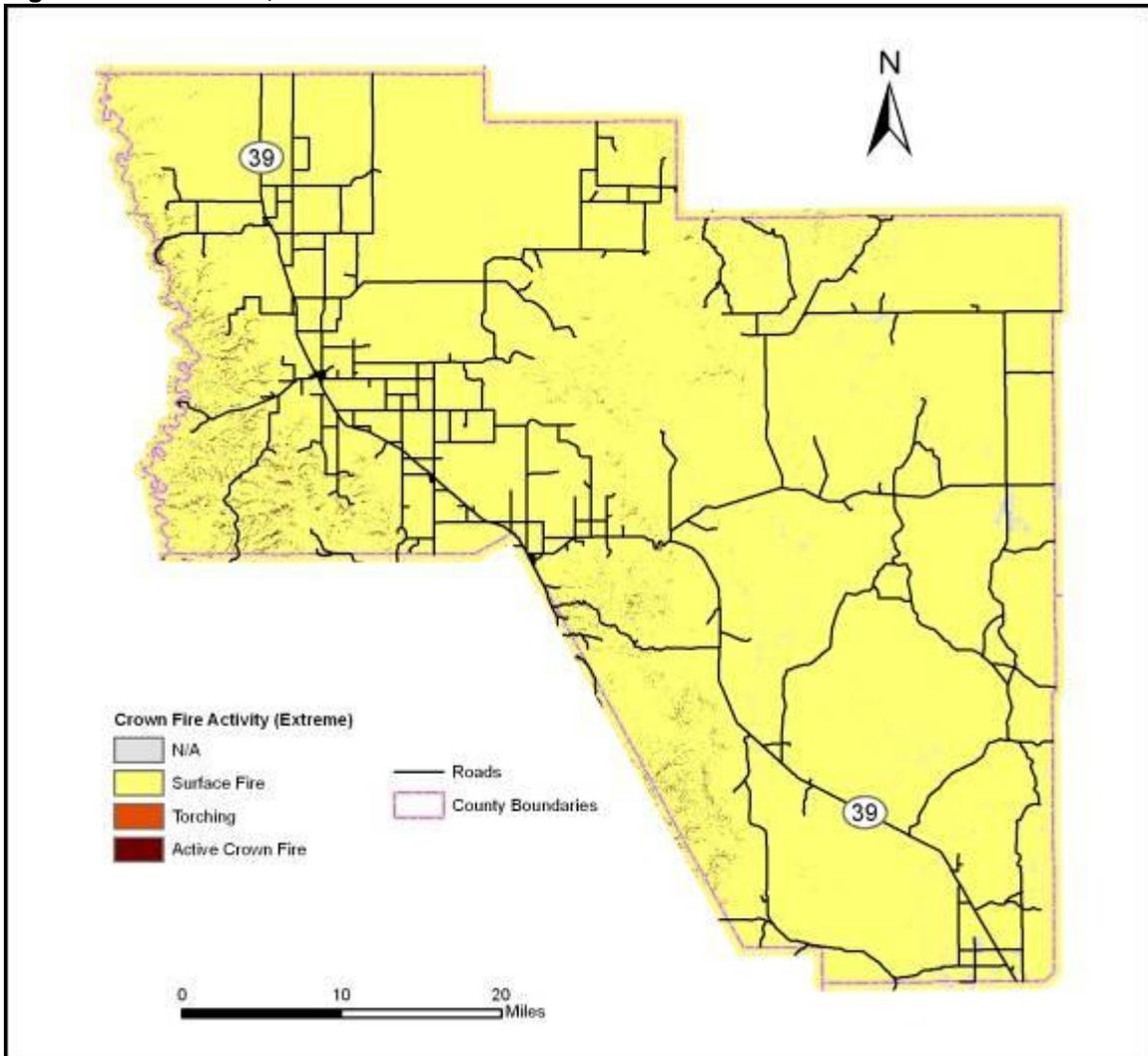


Figure 9. Crown Fire, Extreme Conditions



ACTION PLAN

The action plan is the heart of the CWPP. It details the prioritized actions that the County and cooperators want to take to reduce the risk of wildland fire damage to people, property and the environment. It will require a high level of commitment of landowners, citizens and public officials to accomplish the tasks shown in this action plan and reduce the risk of catastrophic wildland fire in Harding County.

The major topics in the Action Plan are:

1. Organization and Funding
2. Local Preparedness and Firefighting Capabilities
3. Fuels Treatment
4. Reducing Structure Ignitability
5. Fire Prevention
6. Areas of Special Interest

Projects described in this Action Plan will be on-going, accomplished or substantially initiated over the next ten years. The Harding County Fire Chiefs will take the lead in monitoring the progress of the proposed projects. The projects have been prioritized but it is not meant to be restrictive. If an opportunity arises to accomplish a lower priority, the Fire Chiefs should take advantage. The Harding County Community Wildfire Protection Plan will be a living document that can periodically be adjusted to reflect lessons learned and new ideas. The Harding County Commission Office will be the “keeper” of the official copy of the plan.

ORGANIZATION AND FUNDING

The purpose of this organization and funding section is to provide recommendations on how to best achieve certain administrative activities within Harding County related to this CWPP. The underlying issue is that of funding. Like many rural areas of New Mexico funding for projects (ranging from creating agreements to maintaining fire apparatus) is always the number one issue.

Organization and Funding Action Items

- **Priority Level Very High.** Develop an annual operating plan with various agencies including County and municipal fire departments, the County Road Department, the County Sheriff, the New Mexico Department of Public Safety-State Police, the New Mexico Department of Transportation, New Mexico State Forestry and the USDA Forest Service to coordinate wildfire management. An annual operating plan could address mobilization of resources for fire suppression, communications, fuels treatments, fire prevention, and public education to encourage defensible space.
- **Priority Level Very High.** Consider developing a Countywide Fire Chiefs' Organization and a Countywide wildfire coordinator position to increase communication and help promote ideas on developing new stations, increasing volunteer fire department membership and finding increased operating funds and grants.
- **Priority Level High.** Emphasize the use of the Incident Command System (ICS). ICS will help organize multi-agency incidents and smooth out communications problems.
- **Priority Level High.** Consider developing an "appropriate response" strategy. Each fire would be assessed to determine a suppression action based on the potential fire behavior and fire effects or damage. An appropriate response may be to initially keep fire away from an area of value or threat, but then allow it to burn itself out in other areas. (Offense vs. defense; direct vs. indirect; confine vs. contain.)
- **Priority Level High.** Inventory and review mutual aid, cooperative fire agreements, and Resource Mobilization Agreements. Check on liability and workers compensation issues.
- **Priority Level High.** Update Emergency Management Operating Plan and Hazard Mitigation Plan.

LOCAL PREPAREDNESS AND FIREFIGHTING CAPABILITIES

Harding County fire suppression is provided by a mixture of rural fire departments and Village fire departments.

Wildfires are suppressed using the strategy of mobile attack. Large wind driven fires that burn in grass are attacked directly with water apparatus in a flanking action.

Local preparedness and firefighting capabilities was a major topic of discussion during the Harding CWPP development process. This topic was separated into the following areas of concern:

- Firefighter training
- Firefighter safety
- Dispatch/Communications
- Water Supply
- Equipment

Firefighter Training Action Items

The Las Vegas District of New Mexico State Forestry has recently provided training to departments within Harding County. There is a continuing need for additional basic and advanced wildfire training. Firefighters need to know how to interpret fire weather data and how conduct indirect fire attack tactics. There is a need for more advanced fire training to understand and predict fire behavior and how to conduct operations in the wildland/urban interface.

Training should provide education and experience for all firefighters. Because of restricted time and travel budgets, emphasize should be placed on local trainings, after hours and on the weekends, within the County. Joint trainings among County and Village fire departments should be encouraged. All training opportunities should be advertised.

- **Priority Level High.** Request wildfire instructor assistance from the New Mexico State Forestry and the USDA Forest Service. Use these opportunities to introduce different fire tactics.
- **Priority Level High.** Conduct Basic Wildland Firefighting and Fire Behavior (NWCG S-130/190) for all Village and County fire department members. Emphasize fire fighting in the grass fuel type. Also emphasize safety and weather.
- **Priority Level High.** Provide I-100 (basic ICS) for all firefighters and I-200 (Intermediate ICS) for all fire officers. National Incident Management System (NIMS) courses offered through the Federal Emergency Management Agency (www.fema.gov) could satisfy these recommendations.

- **Priority Level High.** At a minimum, have the safety and structure triage units from S-215 Fire Operations in the Urban Interface presented to all Village and County fire department members.
- **Priority Level High.** Organize and facilitate table-top or sand table wildfire exercises with many agencies attending
- **Priority Level High.** Organize and facilitate an annual wildfire interface training exercise within the communities outlined in this CWPP and encourage multi-agency participation.
- **Priority Level High.** Encourage personnel to participate in out of County training opportunities. Participate in regional trainings put on by groups such as the Permian Basin out of Carlsbad and the Enchanted Circle out of Colfax County. Explore future regional training in San Miguel County.
- **Priority Level High.** Consider a Forest Service offer to train and contract with local resources for fire suppression. Resources that are “red-card” qualified can work all over the western United States.

Firefighter Safety Action Items

- **Priority Level High.** Consider adopting “appropriate response” or indirect fire suppression tactics in heavier fuels.
- **Priority Level High.** Provide minimum wildland Personal Protective Equipment (PPE) for all career and volunteer firefighters (see NFPA Standard 1977 for requirements).
- **Priority Level High.** Ensure that the current fire operations personnel rehabilitation system is sufficient. At a minimum each department should have drinking water and MRE’s (meals ready to eat) to support their personnel for 24-48 hours.

Dispatch / Communications Action Items

Quay County provides Emergency Medical System (EMS) and fire dispatching communications for Harding County. The dispatch facility, located in Tucumcari, NM is a 24 hour, seven days a week operation. In reality, many of the dispatches for wildland fire are still initiated by a local “phone tree.”

Recent large grass fires revealed that communication problems exist in a multitude of areas from equipment to emergency incident usage. Communication problems are very commonly linked to tragic results with regards to firefighter safety. Funding availability will influence recommendation priorities.

- **Priority Level Very High.** Use Clear Text for labeling frequencies and in transmissions.
- **Priority Level Very High.** Publish a list of frequencies for each agency and list the associated channels.

- **Priority Level Very High.** Work with the USDA Forest Service to utilize the existing radio site at Sugarloaf to expand the County's radio coverage.
- **Priority Level Very High.** Apply for a grant from the New Mexico Emergency Management System (EMS) Bureau to purchase a radio repeater thus improving County wide coverage. Work with the USDA Forest Service, State Police, Office of Emergency Management and neighboring local governments to cooperate on communication issues including acquisition of grants.
- **Priority Level High.** Consider organizing all fire department frequencies in similar configurations.
- **Priority Level High.** Develop and publish a general communications plan for incidents that require multi-fire department response.
- **Priority Level High.** Develop an inventory of radio equipment and create a list of needs for replacement and new acquisitions.
- **Priority Level High.** Participate in the New Mexico Statewide Interoperability Communications Program to increase competitiveness for communication grants.
- **Priority Level High.** Consider development of at least two new repeaters to increase coverage. Suggested locations are the Mills and Clavel Ranch areas.
- **Priority Level Moderate.** Consider the acquisition of a mobile repeater.

Water Supply Action Items

Water is a critical fire suppression resource for wildfire fire suppression and for operations in the wildland/urban interface. The communities of Mosquero and Roy are serviced by an adequate hydrant network. Ground water is stored in elevated tanks; it is then distributed via electric operated pumps to the hydrants. Immediately accessible water sources must always be considered to fully support fire operations.

- **Priority Level High.** Locate and map all rural water sources.
 - Rural water storage tanks.
 - Stock reservoirs.
 - Ranch property windmill and other stock tanks.

Note: Map points / GPS coordinates and capacity in gallons should be displayed on all fire department run maps. Additional information such as access difficulties or fitting specifics should also be included.

- **Priority Level High.** A secondary means of retrieving water from the storage tanks in the event of a power outage should be considered. All elevated water tanks should be able to flow water without the electric pumping system.
 - Install piping that allows for the water to flow freely via gravity pressure from the tanks.
 - Install piping connections that allow for the fire apparatus to “pull” the water out via a drafting operation.
- **Priority Level High.** Ensure hydrants are operational. Test hydrants annually, and guarantee that they are obstruction free and visible.

Equipment Action Items

During the meeting of the interested parties in October 2007 one of the most important topics of discussion was that of funding for future fire apparatus purchases and maintenance of current fire apparatus. One of the most critical equipment needs is to develop a mobile water supply for rural structural and wildland fires.

Harding County fire departments primarily rely on funding from the State Fire Marshal’s office. This funding emphasizes the purchase of equipment for structural fire protection. However, most of Harding County’s fires are wildland fires where structural equipment is not well suited. Wildland fires require a more mobile fire suppression strategy. Wildland fires are the biggest threat to structures in Harding County.

- **Priority Level High.** Develop and publish a complete list of fire equipment by location. Develop an equipment needs and replacement list.
- **Priority Level High.** Consider shifting resources throughout the County to meet the State Fire Marshal minimum structural fire protection requirements. Use results from this CWPP to submit a formal request for a variance to purchase wildfire equipment.
- **Priority Level High.** Apply for New Mexico State Forestry and State Fire Marshal grants for wildland fire equipment
- **Priority Level High.** Consider acquisition of Federal Excess Property Program (FEPP) equipment. Provide a list of needs to New Mexico State Forestry, Las Vegas District regarding FEPP.
- **Priority Level High.** Work with Harding County Road Department and New Mexico Department of Transportation to train employees in wildfire suppression. Personal protective equipment including fire shelters will need to be provided.

Figure 10. Harding County Fire District Boundaries (Fire District 1 is shown in green and Rosebud Fire is shown in blue)

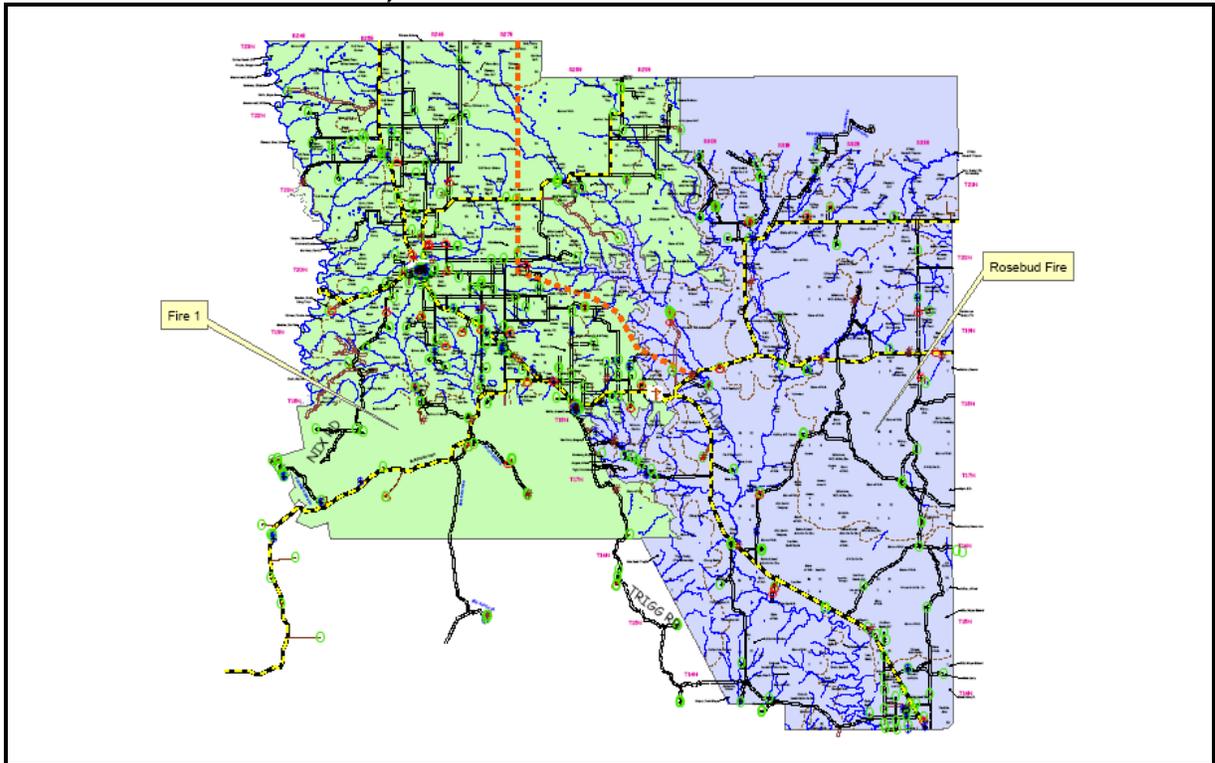


Table 4. Fire Resources in Harding County

Harding County – Rosebud Fire District				
Engine #	Location	Year	Model	Class Type
1	McCarty	1969	Kaiser 2.5 Ton 6x6 1000 Gal	
2	Mitchell	1967	Ford F600 4x2 1000 GAL	
4	Cain	1972	Dodge 4x4 250 Gal	
5	Campbell	1953	GMC 2.5 Ton 6x6 1000 Gal	
6	Casados	1968	Dodge 5/4 Ton 4x4 400 Gal	
8	Red Rock		Trailer, 200 gal.	
32	Red Rock	1967	Kaiser, 5/4 Ton, 4x4, 300 gal.	
14	Aragon		Trailer 250 Gal	
15	Polling Station	1973	Kaiser 2.5 Ton 6x6 1000 Gal	
20	Smith	1996	Chevy 4x4 300 gal	
21	Fitzgerald	1986	Chevy 4x4 300 Gal	
22	Whatley	1969	Kaiser 2.5 Ton 6x6 1000 Gal	
23	Fitzgerald	1969	Kaiser 2.5 Ton 6x6 1000 Gal	
25	Sorells	1969	Kaiser 6x6 5 Ton 1800 Gal	
26	Rosebud Station	1969	Kaiser 6x6 5 Ton Tractor	
27	Rosebud Station	1969	Fruhauf 5000GAL Tanker Trailer	
28	Poling Station	1969	Kaiser 6x6 Pumper 750GPM 250Gal	
29	Polling Station	1969	Kaiser 6x6 2.5 Ton 1200 Gal	
30	Rosebud Station	2006	Smeal 4x2 1250GPM 1500Gal Class A	
69	Heimann	1996	Kaiser 2.5 Ton 6x6 1000 Gal	
2222	Rosebud	1989	Ford 4x4 Type 1 Ambulance	
2250	Rosebud	2008	Ambulance, Type I, Ford, 4x4	

Table 4. Fire Resources in Harding County (cont'd)

Harding County – District 1				
Engine #	Location	Year	Model	Class Type
	Mills	1970	Kaiser 2.5 Ton 6x6	
	Mills	1975	Chevrolet Pickup	
	Solano	2005	US Fire, First Attack/Brush,	
	Solano	1967	Ford	
	Main Station	1998	Class A Pumper	
	Main Station	1995	Chevrolet Chas Cab	
	Main Station	1960's	Ford Pumper, 300 gal	
	Main Station	1961	Chevrolet	
	Main Station	2008	Ambulance, Type I, Ford, 4x4	
	Main Station	1980's	Ambulance, 4x4	
	Main Station		2- Water Buffaloes,	
	Costa	1970	Kaiser 5/4 ton Jeep	
	Costa		Water Buffalo	
	Clavel Ranch	1963	Chevy, 2 Ton, 1200 gal	
<u>Village of Roy</u>				
		2007	International, Engine, 1500 gal	
		1993	Brush Truck, 250 gal	
		1976	Water Tender, 500 gal	
2444		2005	Ambulance,	
		1990's	Ambulance	
<u>Village of Mosquero</u>				
		2006	International, Engine/Pumper, 1000 Gal	
		1997	Brush/Rescue, 300 gal.	

FUELS TREATMENTS

Introduction

Harding County is primarily grassland. However, in areas of the County where there are trees and large shrubs, one of the most effective forms of landscape-scale fuels modification is the fuel break. A fuel break is an easily accessible strip of land of varying width (depending on fuel and terrain) in which fuel density is reduced, thus improving fire control opportunities. The use of fuel breaks under normal burning conditions can limit the uncontrolled spread of fires and aid firefighters in slowing the spread rate. Under extreme burning conditions, even the best fuel breaks are not effective, but they will help to slow the spread of the advancing fire front.

An issue in mechanical thinning is the removal of cut materials. One consequence of failing to remove slash is to add to the surface fuel loading, perhaps making the area more hazardous than before treatment. It is important that slash materials be disposed of by piling and burning, chipping, physical removal from the area, or lopping and scattering. Of all of these methods lopping and scattering is the cheapest, but also the least effective since it adds to the surface fuel load.

It is also important to note that fuel breaks must be maintained to be effective. Thinning usually accelerates the process of regenerative growth. The effectiveness of the fuel break may be lost in as little as three to four years if ladder fuels and regeneration are not controlled. Fuel breaks should not be constructed without a maintenance plan.

As of this writing there are approximately 19,000 acres of **Conservation Reserve Program (CRP)** grass within Harding County. The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.³

Unfortunately these CRP grass sections contain a higher fuel load for wildfires. Contained within the recommendation below are the specifications referenced from the Memo titled "Firebreaks on CRP", dated January 31, 2006. This memo and supporting documents are contained within **Appendix D**. The New Mexico State Farm Service Agency (FSA) office is very interested in working with landowners and the local FSA offices to investigate potential cost-share programs and management practices that would reduce the fuel hazards of CRP grass.

³ <http://www.nrcs.usda.gov/programs/crp/>; referenced 10-12-07

Fuel Break Guidelines

Thin trees and large shrubs so there is at least 10 feet between tree tops (crowns). Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree. On steep slopes or areas subject to high winds, allow at least 1.5 times more space between tree crowns.⁴ Remove all ladder fuels from under these remaining trees. Prune all trees to a height of at least 10 feet, or 1/3 of the live crown height. Small clumps of 2 to 3 trees may be occasionally left but leave more space between the crowns of these clumps and surrounding trees. Isolated shrubs may remain, provided they are not under tree crowns. Remove dead stems from trees and shrubs annually. Where shrubs are the primary vegetation the minimum spacing recommendations between clumps of brush or shrubs is 2 1/2 times the height of the vegetation. Maximum diameter of clumps should be 2 times the height of the vegetation. All measurements are made from the edges of vegetation crowns.⁵

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

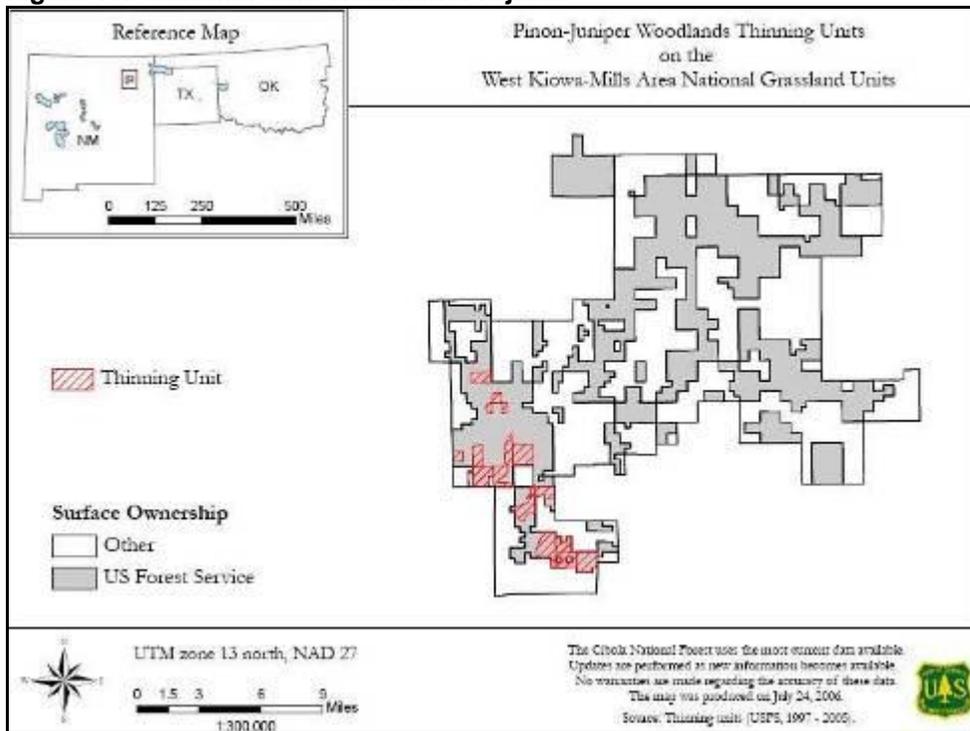
USDA-Forest Service Current and Planned Projects

The USDA-Forest Service is the only public land manager in the study area. The Kiowa National Grasslands have existing, current and or planned fuels reduction treatments in the study area. These treatments vary from prescribed fire to hazard tree/hazardous fuels removal. The USDA-Forest Service goal is to treat fuels on the entire southwestern portion of the West Kiowa-Mills Management Unit within the next 10 years. The information contained in **Figure 11** is to document their efforts through 2007. These treatments are not in close proximity to the Harding County communities, therefore no cross boundary projects are suggested. Individual ranches near public lands would be wise to incorporate their defensible space plans into the fuels thinning projects where applicable.

⁴ A Homeowner's Guide to Fire Safe Landscaping (2005), www.firesafecouncil.org, referenced 9/10/07

⁵ <http://www.ext.colostate.edu/PUBS/natres/06302.html>, referenced 9/10/07

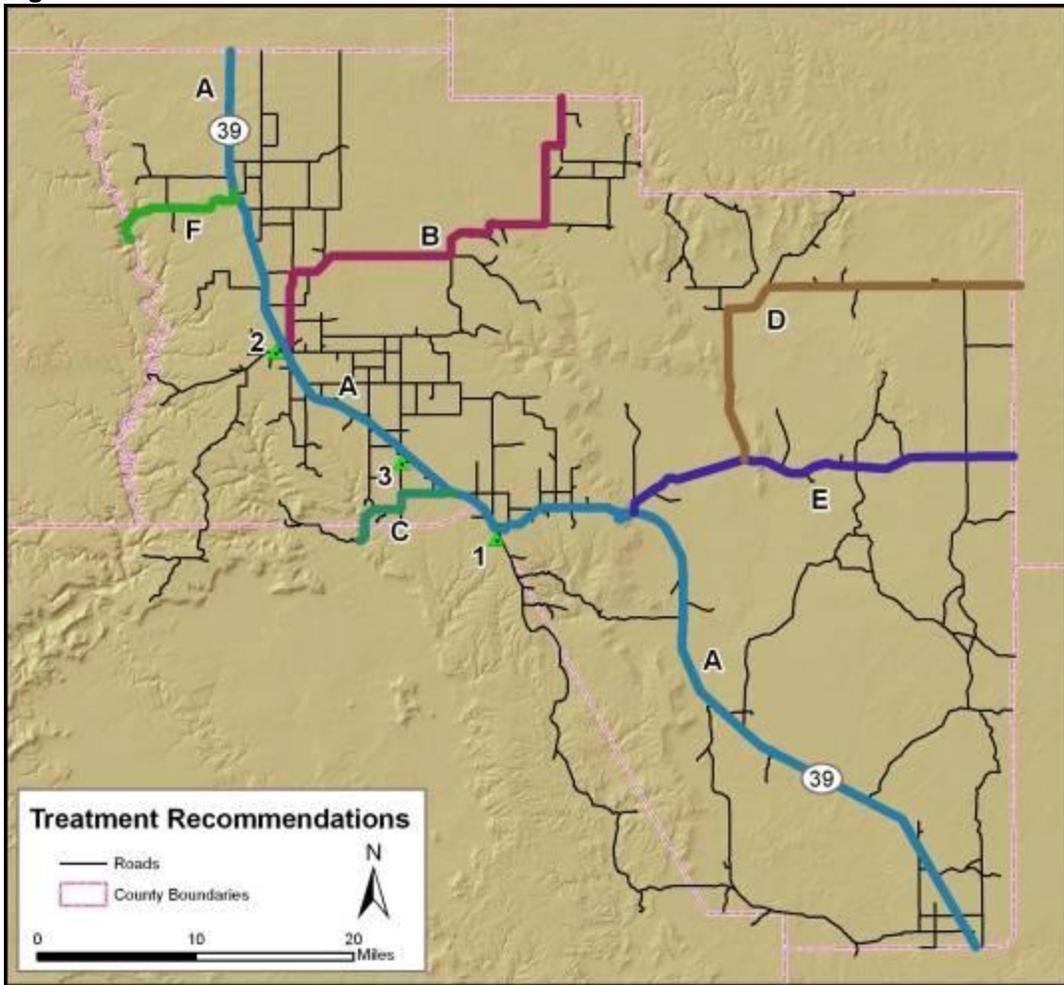
Figure 11. Current Fuels Treatment Projects



Fuel Modification Action Items

- **Priority Level Very High.** Work with the New Mexico Department of Transportation (NM-DOT) to promote the highest degree of Right of Way (ROW) maintenance that their budget allows. The use of mowing to reduce the grass fuel load is considered the most effective and preferred treatment method. Consider mowing to the fences lines rather than just one or two mower widths.
- **Priority Level High.** Encourage individual landowners to mow fuels near homes and along roadways and fence lines during times of high fire danger. CRP sections will need to follow the guidelines as detailed in Appendix D.
- **Priority Level High.** Support the use of prescribed fire and wildfire use projects by the USDA Forest Service and private landowners.
- **Priority Level High.** Encourage state and local Farm Service Agency offices to provide CRP program oversight to ensure appropriate management practices are followed and to create cost-share programs that encourage landowners to treat fuels and reduce fire hazard near communities and values at risk.
- **Priority Level Moderate.** Identify locations of CRP grass. Fire department members could map the CRP grass areas by hand or Harding County can request electronic data from FSA in 2008.

Figure 12. Recommended Treatment Areas



Road Treatments: (The list is arranged in order of priority)

Specification: minimum width along each side of 20 feet, height mowed to 5 inches.

- A. Hwy 39.
- B. Hwy 120.
- C. Hwy 419. This should be discussed with San Miguel County and viewed as a cross-boundary project benefiting both counties.
- D. Hwy 102.
- E. Hwy 420.
- F. Mills Canyon Road and CR U-1 (Hwy 39 to the Mills Canyon Campground).

Fuel Breaks:

Specification: minimum width of 50 feet, height mowed to 5 inches.

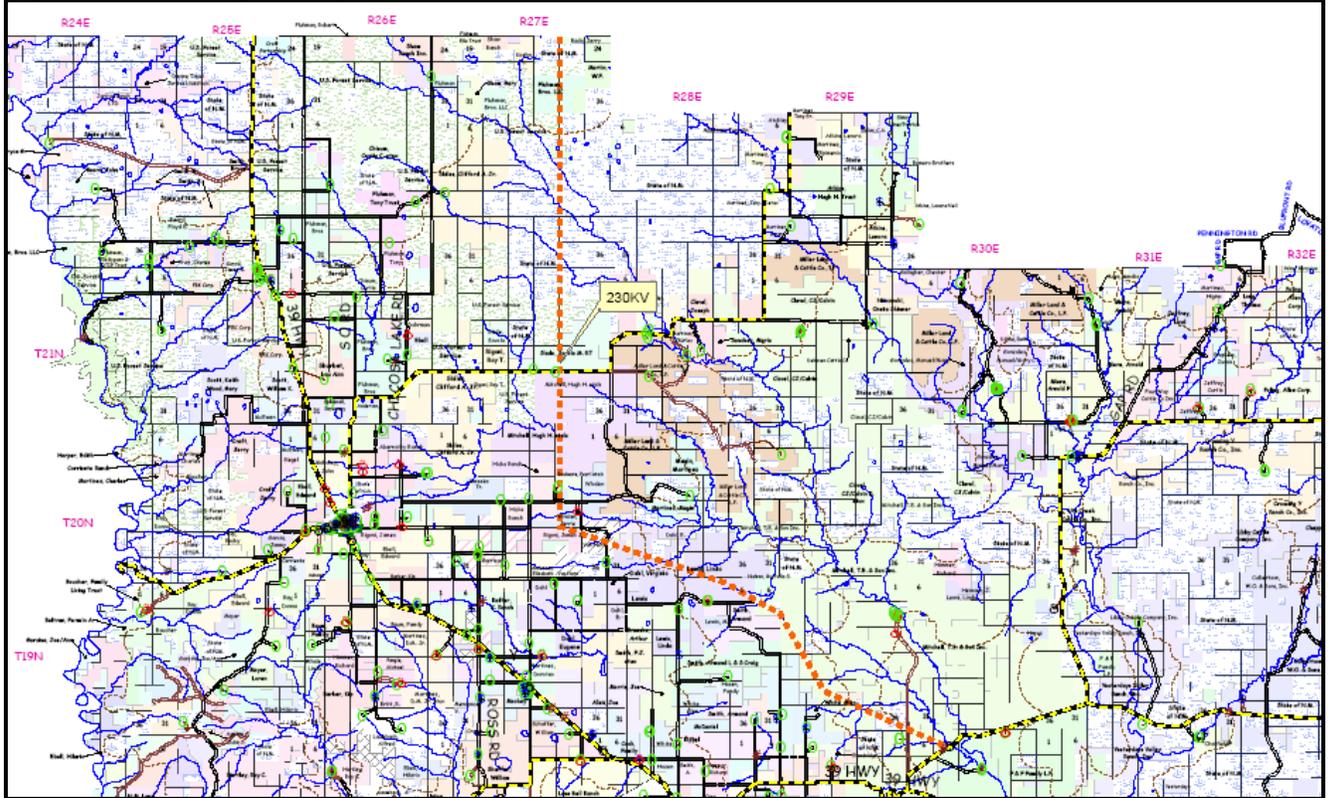
- 1. Mosquero – south & west sides
- 2. Roy – south & west sides
- 3. Solano - south & west sides

NOTE: Land ownership will determine the exact locations of the fuel breaks.

Infrastructure Fuels Treatment Action Items

- **Power Line Thinnings. Priority level - High.** This recommendation is for the power lines located within brush and timber type fuel beds. Thinning and maintenance cutting should conform to the Fuel Break Guidelines (see page 34). The recommended width is at least three times the height of the fuel.

Figure 13. Harding County, 230KV Transmission Line (red dotted line) Proposed for 2008



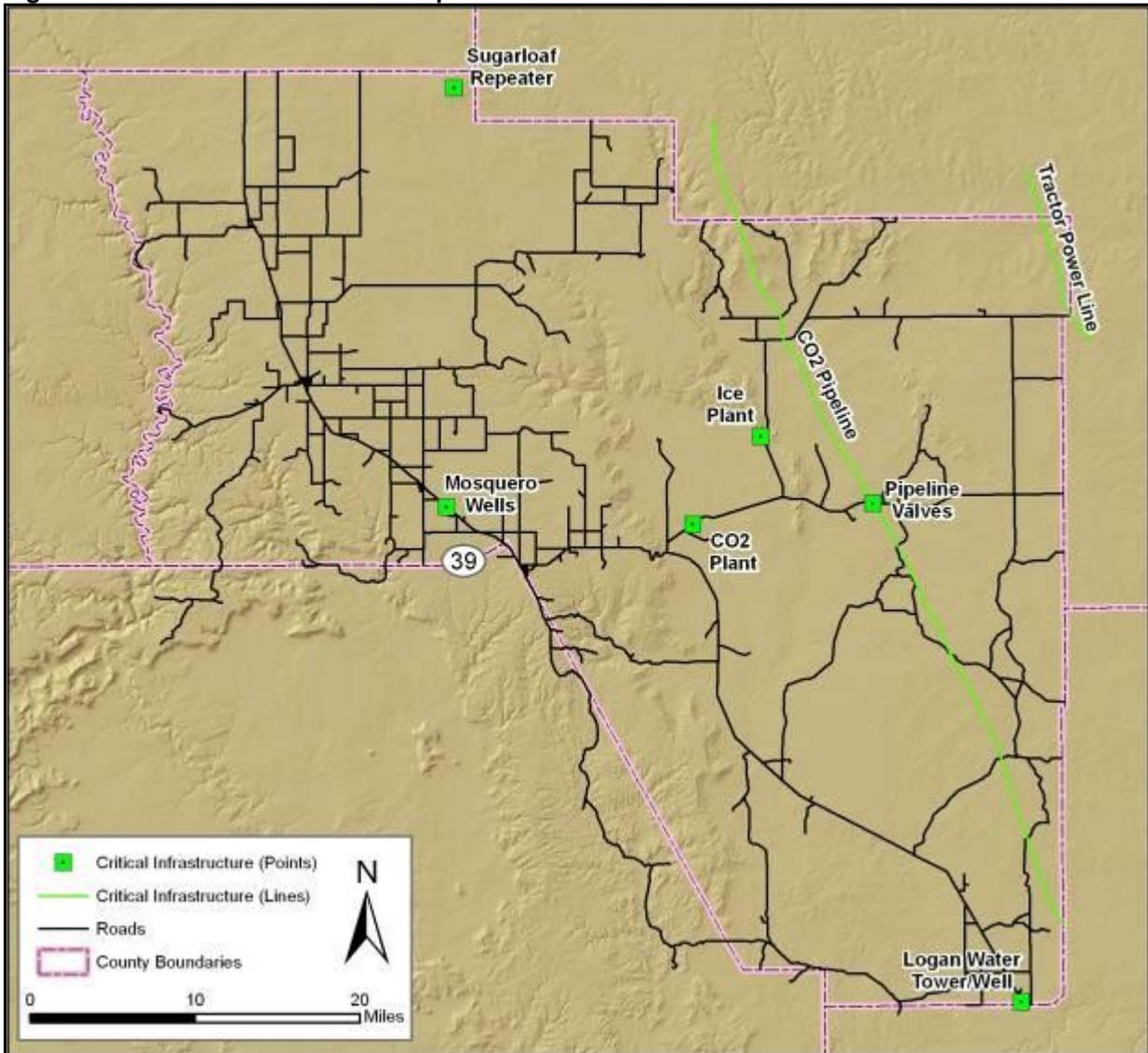
- **Improvement Point Treatments. Priority level - Moderate.** This project focuses on providing point protection to well heads, radio repeater sites and pipeline valve sites. Thinning to defensible space standards (zone 1 and 2) is recommended for a distance of at least three times the height of the fuels (see page 41).

Radio repeater sites of concern in Harding County are:

- Sugarloaf;
- Rosebud FD;
- State Police; located 2/1/2 miles NW of Roy (T20N, R25E, Sec 12 SE,NW); and
- County; located ¼ mile south Hwy 39, Mosquero

- **Ice and CO2 Plant Treatments. Priority level - Moderate.** This project focuses on providing protection for the Ice, CO2, and other buildings in the County. Thinning to defensible space standards (zone 1 and 2) is recommended for a distance of at least three times the height of the fuels.

Figure 14. Critical Infrastructure Graphic



REDUCING STRUCTURE IGNITABILITY

The community-level assessment identified three of the communities in the study area to be at moderate and low hazard level. The construction type, condition, age, and fuel loading near the structure are all contributing factors that make homes more susceptible to ignition under even moderate burning conditions. There is also a likelihood of rapid fire growth and spread in these areas, due to fast burning or flashy fuel components which promote extreme fire behavior.

Table 5 illustrates the relative hazard rankings for communities in the study area.

- A rating of 19 or less indicates an area of extreme hazard.
- A rating of 20 to 26 indicates a very high hazard.
- A rating of 27 to 33 indicates high hazard.
- A rating of 34 to 39 indicates moderate hazard.
- A rating of 40 or greater indicates a low hazard.

Table 5. Ratings of the communities

COMMUNITY	SCORE	HAZARD RATING
Mosquero	38	MODERATE
Roy	38	MODERATE
Solano	40	LOW

Outside of the established communities many ranches and individual home sites exist. The following recommendations apply to all structures which could be threatened by wildfire.

An aggressive program of evaluating and implementing defensible space for homes will do more to limit fire-related property damage than any other single recommendation in this report.

There is no question that any type of dense/flammable vegetation should be removed from around a home in order to reduce the risk of structural ignition during a wildfire. The question is how much should be removed? There are several different versions of defensible space recommendations from different organizations across the country. They all endorse the same basic concepts, the distances will differ depending on the local fire behavior and other factors such as the dominate fuel type and topography, etc. All recognize the fact that areas exposed to winds will require the defensible space distances to be increased.

The term “clearance” leads some people to believe that all vegetation must be removed down to bare soil. This is not the case. Removing all vegetation unnecessarily increases erosion and will encourage the growth of weeds in the newly disturbed soil. These

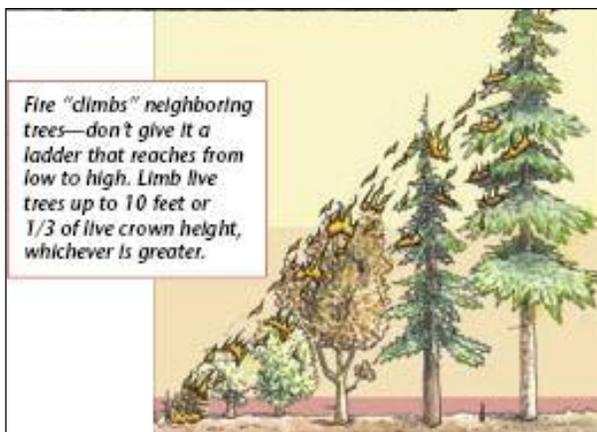
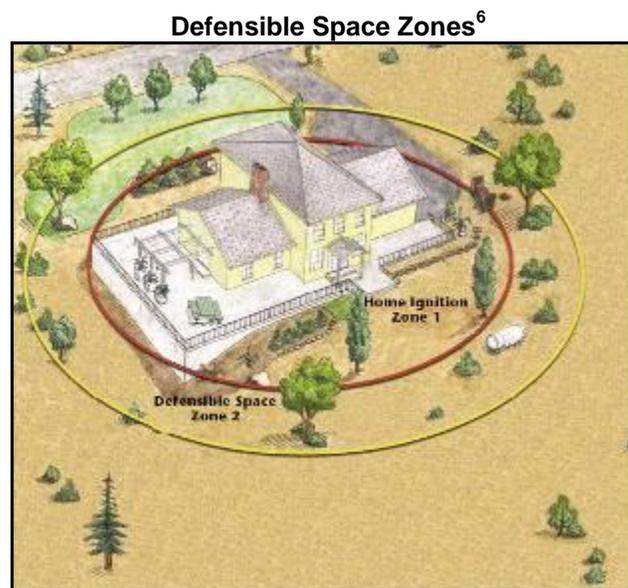
weeds are considered “flashy fuels,” which actually increase fire risk because they ignite so easily.

The most important element for the improvement of life safety and property preservation for every home in the study area is *compliant, effective defensible space.*

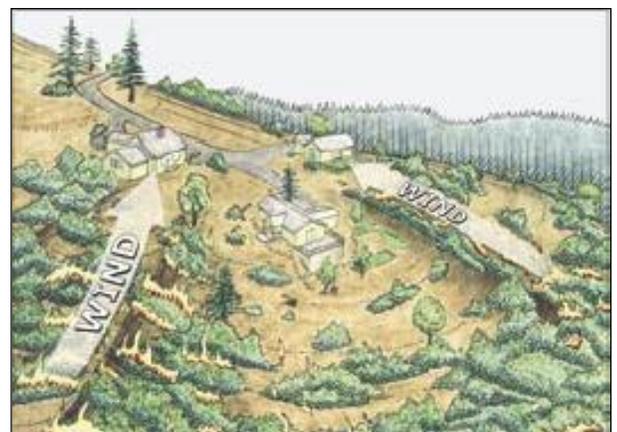


ZONE 1 (within 10 feet of the home) shown as Home Ignition Zone 1 below, suggests eliminating all flammable materials (fire-prone vegetation, wood stacks, wood decking, patio furniture, other yard debris, etc.). Irrigated grass, rock gardens, non-flammable decking, or stone patios would be desirable substitutions.

ZONE 2 Defensible Space (10 to 100 + feet from the home – areas of high winds the Defensible Space will need to be expanded to 150 feet) suggests removing dead and dying grass, shrubs and trees. For areas with multiple windbreaks reduce the density of the windbreak closest to the home and other structures. Mow the grass down short next to the windbreak. Rake out the accumulated needle litter from beneath the shrubs. Remove dead stems from trees and shrubs annually.



Eliminate Ladder Fuels



Increase Defensible Space in Windy Areas

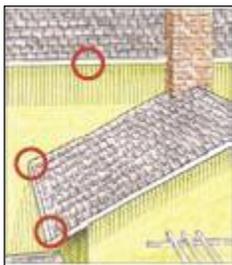
⁶ <http://www.firesafecouncil.org/education/attachments/landscapinggrassland.pdf>;
referenced 10-1-07

Maintaining Your Defensible Space⁷

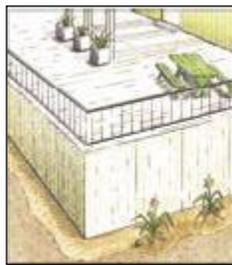
Your home is located in an ecosystem that is dynamic, and always changing. Trees, shrubs, and grass continue to grow, plants die or are damaged, new plants begin to grow, and plants drop their leaves and needles. Like other parts of your home, defensible space requires maintenance. Use the following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

Defensible Space and FireWise Annual Checklist

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



Clean Gutters and Roof



Enclose Decks



Maintain Chimneys

⁷ <http://www.ext.colostate.edu/PUBS/natres/06302.html>, referenced 7/07

Reducing Structure Ignitability Action Items

- **Priority Level High.** The communities should have individual structure assessments conducted as soon as possible. Please see **Appendix B** for more detailed community information. This data should facilitate the following important fire management practices:
 - Establishment of a baseline hazard assessment for homes in these communities
 - Education of the community through the presentation of these assessments at neighborhood public meetings
 - Identification of defensible space needs and other effective mitigation techniques
 - Development of a Pre-Attack/Operational Plan in the wildland urban interface (WUI) (as part of the Action Item to: Develop an Annual Operating Plan) for entire County area. A pre-attack plan assists fire agencies in developing strategies and tactics that will mitigate WUI incidents that occur.
- **Priority Level High.** Ensure that reflective address signs are present. Some homes will need signs at both the home and driveway. (See **Appendix D** for recommendations.)
- **Priority Level High.** Use the structure triage methodology provided in **Appendix C** to identify homes not likely to be defensible.
- **Priority Level High.** Ensure that the Address Map books are updated to reflect information stemming from this CWPP. As recommended in other areas of this CWPP, they should include the individual home assessments. Every piece of emergency equipment in the County should have a copy (County and municipal fire departments, The County road department, Kiowa National Grasslands). Command/Supervisor vehicles will need multiple copies or the ability to generate multiple copies. This will allow for the distribution of specific maps to incoming mutual aid resources that may not have the maps.

FIRE PREVENTION

Within Harding County there is likely to be a varied understanding among property owners of the hazards associated with the threat of a wildfire. An approach to wildfire education that emphasizes safety and hazard mitigation on an individual property level should be undertaken, in addition to fire department efforts at risk reduction. Educational materials should be provided through personal contacts. Property owner education and the wildfire hazard mitigation message should be an ongoing effort.

Fire Prevention Action Items

- **Priority Level High.** Provide Firewise fire prevention materials to encourage all homeowners/landowners to take responsibility and voluntarily implement defensible space practices that will reduce the chance of their homes catching fire during a wildfire. Consider having firefighters distribute Firewise materials door to door to provide fire prevention and home protection advice in person. Visit these web sites for a list of public education materials. These are suitable for firefighters and homeowners alike:
 - <http://www.nwcg.gov/pms/pubs/pubs.htm>
 - <http://www.firewise.org>
 - <http://www.firesafecouncil.org/homeowner/index.cfm>
 - <http://txforestservation.tamu.edu/main/default.aspx?dept=frp>
 - <http://texasforestservation.tamu.edu/uploadedFiles/FRP/UWI/CrossPlainsCaseStudy.pdf>
- **Priority Level High.** Conduct fire prevention campaigns during times when fire danger is high such as during the spring when fires can start in dry fuels and spread rapidly in windy conditions. Create fire prevention messages in the local newspaper and on the radio to raise public awareness of the danger of wildfires.
- **Priority Level High.** Continue to implement County ordinances that restrict open burning during periods of high fire danger. Provide a process for exceptions for planned prescribed burns. Coordinate fire restrictions with neighboring counties and state and federal agencies.
- **Priority Level High.** Obtain “Smokey Bear” signs for use along major highways to inform the public of the current fire danger and to promote fire prevention. The USDA Forest Service is planning to post a “Smokey Bear” fire danger sign in the Mills area. Consider posting signs in other areas of the County such as at the state road entrances into the County.
- **Priority Level Moderate.** Fire districts should work with Harding County to discuss methods to reduce structure ignitability in the event of a wildfire. The International Code Council Wildland Urban Interface Code may be considered in the future but fire districts must first work with landowners to educate them on how to create defensible space to protect their homes and communities. Fire districts can use Firewise and fire prevention programs to encourage homeowners to voluntarily reduce their hazard and risk from wildfire.

AREAS OF SPECIAL INTEREST

Introduction

In addition to residential communities, certain other properties have been identified by stakeholders as areas of special concern or interest. In some cases these areas present special problems for firefighters. A brief description of each of these properties is presented in this section, followed by recommendations, where applicable, designed to address concerns specific to the individual property. These recommendations are in addition to, not in place of, other recommendations in this report concerning the community or area where these properties are located.

Historical Churches

A number of historical churches exist within Harding County. Dating back to the 1800's the churches are well preserved and one even offers services today. Small cemeteries accompany the churches. Overall these structures are at a low hazard level with regards to damage potential from wildfires. Therefore the following recommendations are suggested.



Recommendations

- Mow grass and weeds to a low height of 5 inches for a minimum of 10 feet from the edge of the structures.

Mills Canyon and Rim Campgrounds - Kiowa National Grasslands

Within the short grass prairie of the southern Great Plains lie the Kiowa and Rita Blanca National Grasslands. These grasslands encompass approximately 230,000 acres in six counties within New Mexico, Texas, and Oklahoma. These administrative units are not solid blocks of Government owned land; rather they consist of numerous small Government parcels, intermingled with privately owned tracts.



Recommendations

- The public should be provided with wildfire educational materials available at the entrance or other suitable location.
- Fire danger signage should also be posted at the entrance. The fire danger for the day should be displayed, and this information will need to be kept current.
- Mow grass and weeds along roads to a low height of 5 inches. This should be a minimum of 10 feet from the edge of the road.
- All buildings and improvements adjacent to wildland fuels should follow the recommendations as outlined within the Reducing Structure Ignitability section.

GLOSSARY

The following definitions apply to terms used in the Harding County Community Wildfire Protection Plan.

1 hour Timelag fuels: Grasses, litter and duff; <1/4 inch in diameter.

10 hour Timelag fuels: Twigs and small stems; ¼ inch to 1 inch in diameter.

100 hour Timelag fuels: Branches; 1 to 3 inches in diameter.

1000 hour Timelag fuels: Large stems and branches; >3 inches in diameter.

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

ArcGIS 9.x: Geographic Information System (GIS) software designed to handle mapping data in a way that can be analyzed, queried, and displayed. ArcGIS is in its ninth major revision and is published by the Environmental Systems Research Institute (ESRI).

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

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

Energy Release Component: An index of how hot a fire could burn. ERC is directly related to the 24-hour, potential worst case, total available energy within the flaming front at the head of a fire.

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

Fine Fuels: Fuels that are less than ¼ inch in diameter such as grass, leaves, draped pine needles, fern, tree moss, and some kinds of slash which, when dry, ignite readily and are consumed rapidly.

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

Fire Danger: Not used as a technical term in this document due to various and nebulous meanings that have been historically applied.

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

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

Fire Outcomes (a/k/a Fire Effects): A description of the expected effects of a wildfire on people, property, and/or the environment based on the Fire Behavior Potential and physical presence of Values at Risk. Outcomes can be desirable as well as undesirable.

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

Flagged Addressing: A term describing the placement of multiple addresses on a single sign, servicing multiple structures located on a common access.

FlamMap: A software package created by the Joint Fire Sciences Program, Rocky Mountain Research Station. The software uses mapped environmental data such as Elevation, Aspect, Slope, and Fuel Model, along with fuel moisture and wind information, to generate predicted fire behavior characteristics such as Flame Length, Crown Fire Activity, and Spread Rate.

Flame Length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface) – an indicator of fire intensity.

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

ICP (Incident Command Post): The base camp and command center from which fire suppression operations are directed.

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

Jackpot Fuels: a large concentration of discontinuous fuels in a given area such as a slash pile.

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

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

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

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

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

Timelag: Time needed under specified conditions for a fuel particle to lose 63 percent of the difference between its initial moisture content and its equilibrium moisture content.

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

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

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