Lincoln County Community Wildfire Protection Plan

Walsh Project Number: 7969-010
June 1, 2008

LINCOLN COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

June 1, 2008

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LINCOLN COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

We the undersigned approve and support the Lincoln County Community Wildfire Protection Plan:

Title Tom Battin, Chairman, County Commission Date: June 17, 2008

Title Eileen Lovelace, Vice-Chair, County Commission Date: June 17, 2008

Title Dave Parks, County Commissioner Date: June 17, 2008

Title Jackie Powell, County Commissioner Date: June 17, 2008 6/17/08

Title Don Williams, County Commissioner Date: June 17, 2008

Title Thomas F. Stewart, County Manager Date: June 17, 2008

COUNTY COMMISSIONERS LINCOLN COUNTY, MT SEAL

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LINCOLN COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

We the undersigned approve and support the Lincoln County Community Wildfire Protection Plan:

Title Lieutenant Ruidoso Downs FD Date 10/27/08

Title Director of Forestry Ruidoso Date 11/03/08

Title District Ranger, Smokey Bear Ranger District Date 11/03/08

Title Date

Title Date

Title Date

LINCOLN COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

We the undersigned approve and support the Lincoln County Community Wildfire Protection Plan:

VILLAGE OF CAPITAN

MAYOR — DATE 5-12-2008

WATER SUPERVISOR /Fire Chief — DATE 5-12-2008

VILLAGE CLERK — DATE 5-12-2008

LINCOLN COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

I the undersigned approve and support the Lincoln County Community Wildfire Protection Plan:

EMNRD – Forestry Division, Capitan District 5/5/2008
Eddie Tudor, Capitan District Forester

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LINCOLN COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

We the undersigned approve and support the Lincoln County Community Wildfire Protection Plan:

5/21/08

Lincoln County Fire and Emergency Services — Date
Travis Atwell, Coordinator

05/21/08

Lincoln County Fire and Emergency Services — Date
James Mason, Director

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List of Acronyms and Abbreviations

BLM	Bureau of Land Management
BTU	British Thermal Unit
CFD	County Fire District
CRWB	Crew Boss
CWPP	Community Wildfire Protection Plan
DOZB	Dozer Boss
EA	Extended Attack
ENGB	Engine Boss
FBFM	Fire Behavior Fuel Model
FD	Fire District
FEMA	Federal Emergency Management Agency
FFT1	Advanced Firefighter/Squad Boss
FFT2	Firefighter
FRCC	Fire Regime Condition Class
F	Fahrenheit
g	gallon
GIS	Geographical Information System
HFRA	Healthy Forests Restoration Act
IA	Initial Attack
IJPA	Interagency Joint Powers Agreement
IRP	Ignition Risk Potential
IWUIC	International Wildland-Urban Interface Code
LANDFIRE	Landscape Fire and Resources Management Tools Project
MFD	Municipal Fire District
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System
NFPA	National Fire Protection Association
NMSFD	New Mexico State Forestry Division
NRCS	National Resource Conservation Service
NWCG	National Wildfire Coordination Group
PPE	personal protective equipment
SWCD	Soil Water Conservation District
USFS	U.S. Forest Service
VFD	Volunteer Fire Department
WALSH	Walsh Environmental Scientists and Engineers, LLC
WFU	Wildland Fire Use
WUI	Wildland-Urban Interface

List of Fire Behavior Terms

Aerial Fuels All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs, cones, snags, moss, and high brush.

Aspect Direction a slope faces.

Direct Attack A method of fire suppression where actions are taken directly along the fire's edge. In a direct attack, burning fuel is treated directly, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Chain A unit of linear measurement equal to 66 feet.

Crown Fire The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

Dead Fuels Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Defensible Space An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation by building and maintaining fire-safe communities compatible with the natural surroundings.

Firewise Firewise is a national program to serve as a resource for agencies, tribes, organizations, communities, fire departments, and private landowners who are working on the goal to reduce the loss of lives, property, and resources to wildfire.

Fire Behavior The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Danger The broad-scale condition of fuels as influenced by environmental factors.

Fire Front The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified, the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Hazard	The presence of ignitable fuel coupled with the influences of terrain and weather.
Fire Intensity	A general term relating to the heat energy released by a fire.
Fire Return Interval	The historic frequency that fire burns in a particular area or fuel type without human intervention.
Fire Regime	The characterization of fire's role in a particular ecosystem, usually characteristic of a particular vegetation and climatic regime, and typically a combination of fire return interval and fire intensity (i.e., high frequency low intensity/low frequency high intensity).
Fire Weather	Weather conditions that influence fire ignition, behavior, and suppression.
Flame Length	The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.
Flaming Front	The zone of a moving fire where combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.
Fuels	Combustible material; includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire. Not all vegetation is necessarily considered fuel; deciduous vegetation such as aspen actually serve more as a barrier to fire spread, and many shrubs are only available as fuels when they are drought-stressed.
Fuel Break	An area of land where fuel continuity and load is reduced to reduce wildfire rate of spread and severity and to improve control opportunities.
Fuel Loading	The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.
Fuel Model	Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.
Fuel Type	An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Ground Fuel	All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame.
Hazard	Vegetation-fuel attributes that may be conducive to propagate and carry a fire.
Indirect Attack	A method of fire suppression where actions are taken some distance from the active edge of the fire due to intensity, terrain, or other factors that make direct attack difficult or undesirable.
Intensity	The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.
Ladder Fuels	Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and ensure the continuation of crowning.
Live Fuels	Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.
National Fire Danger Rating System (NFDRS)	A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.
Prescribed Fire	Any fire ignited by management actions under certain predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and National Environmental Policy Act (NEPA) requirements must be met prior to ignition.
Rate of Spread	The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, rate of forward spread of the fire front, or rate of increase in an area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history. Sometimes it is expressed as feet per minute; one chain per hour is equal to 1.1 feet per minute.
Risk	The probability that a fire will start from natural or human-caused ignition.
Surface Fuels	Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and

	medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.
Topography	Referred to as "terrain." The term also refers to parameters of the "lay of the land" that influence fire behavior and spread. Key elements are slope (in percent), aspect (the direction a slope faces), elevation, and specific terrain features such as canyons, saddles, "chimneys," and chutes.
Wildfire	A wildland fire that is unwanted and unplanned.
Wildland Fire	Any fire burning in wildland fuels, including prescribed fire, fire use, and wildfire.
Wildland Fire Use	The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

EXECUTIVE SUMMARY

The Healthy Forests Restoration Act (HFRA) of 2003 provides the impetus for wildfire risk assessment and planning at the county and community level. HFRA refers to this level of planning as a Community Wildfire Protection Plan (CWPP). The CWPP allows a community to evaluate its current situation with regard to wildfire risks and hazards, and devise ways to protect human welfare and important economic or ecological values. The CWPP may address issues such as community wildfire risk, fuel hazard, structure flammability, fuel treatments, non-fuel mitigation, community preparedness, and emergency procedures. A Core Team provides oversight to the development of the CWPP.

This CWPP is not a legal document. There are no legal requirements to implement the recommendations herein. However, treatments on private land may require compliance with county land use codes, building codes, and local covenants; treatments on public lands will be carried out by appropriate agencies and may be subject to federal, state, and county policies and procedures such as adherence to the HFRA and National Environmental Policy Act (NEPA).

The Lincoln County CWPP is countywide with emphasis on the protection of communities and other economic and ecological values. Historic fire occurrence was a major ecological influence in shaping the natural vegetation. The threat of wildfire continues today. However, wildfire risk to human welfare and economic and ecological values is more serious today than in the past because of the buildup of hazardous fuels, communities and other infrastructure in proximity to forests and rangelands, and a lack of public appreciation for wildfire. Human-caused ignitions account for 64 percent of wildfires, and their frequency will likely become more numerous as the county's population grows and outdoor recreation increases. The Village of Ruidoso and City of Ruidoso Downs were not accessed in this plan since they are accessed in the Greater Ruidoso CWPP and both plans shall work in tandem.

The accumulation of hazardous fuels may set the stage for catastrophic wildfire occurrence, resulting in the loss of economic and ecological values. There are varieties of fuels around communities, ranches, structures, and on public lands that create problems for fire protection. Fuels include grasslands, weedy fields, shrublands, pinion-juniper woodlands, and ponderosa pine and mixed conifer forests. Fuels such as dried grass and weeds are highly flammable, burn rapidly, and resist control. A coordinated effort among all fire authorities and private landowners is needed to manage hazardous fuels and reduce the risk of wildfire. The CWPP provides the means to identify wildfire risks and hazards, and prioritize mitigation projects.

Several sources of information were gathered and synthesized to formulate an understanding of wildfire risks and hazards. Sources of information included surveys of communities and vegetation-fuels using a standardized procedure, various maps obtained

from state and federal databases, interviews with county fire chiefs and state and federal fire management officers, and community meetings.

As part of the assessment, a concerted effort was made to solicit feedback from the public and local experts on fire and natural resource issues. A Core Team consisting of Bureau of Land Management (BLM), U.S. Forest Service (USFS), Natural Resources Conservation Service (NRCS), New Mexico State Forestry Division (NMSFD), soil and water conservation district (SWCD), and Lincoln County representatives was formed. A Core Team meeting was held on December 5, 2007 at the Lincoln County Emergency Services office to discuss CWPP issues, schedule, communities for assessments, Core Team function, and meetings. A second Core Team meeting was held on February 5, 2008 to review and discuss initial CWPP developments. Two community meetings were held on March 17 and 18, 2008 in Corona and Alto. The purposes of the community meetings were to introduce CWPP goals and objectives, discuss wildfire risks and hazards, provide an opportunity for the public to participate in the process, and review proposed mitigation possibilities. The draft CWPP was made available on Lincoln County's website (www.lincolncountynm.net/lcoes.htm) to enable public review. Review comments were sent to Lincoln County Office of Emergency Services or WALSH.

A survey of Lincoln County was conducted to define wildland-urban interface (WUI) areas. The WUI is an area where communities and other infrastructure intermix with wildland vegetation-fuels. Seven WUI areas were defined, and they include Arabela, Ancho, Carrizozo, Corona, Hondo-Tinnie, Nogal-Alto-Lincoln, and White Oaks. The WUI boundaries were approved by the Core Team. The communities of the City of Ruidoso Downs and the Village of Ruidoso are accessed in the Greater Ruidoso CWPP and both ranked High.

The National Fire Protection Association (NFPA) Form 1144, *Standard for Protection of Life and Property from Wildfire 2002 Edition,* was used to assess the level of risk and hazard to communities and individual houses. The evaluation consisted of rating attributes such as means of access, surrounding vegetation (fuels), presence of defensible space, topography, roofing and other construction materials, available fire protection, and placement of utilities. Scores were assigned to each element and then totaled to determine the level of risk. A community was labeled as having low, moderate, high, or extreme risk based on the total score. Community surveys were conducted during October 2007.

Table ES-1. Community Wildfire Hazard Summary Information

Community	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings
Arabela WUI		
Arabela	High	▪ Limited ingress/egress ▪ Heavy vegetation-fuel loads ▪ Lack of defensible space around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Lack of structure sprinkler system ▪ Utilities above ground

Community	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings
Ancho WUI		
Ancho	High	▪ Moderate fuel loads ▪ Defensible space less than 30 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Lack of structure sprinkler system ▪ Utilities above ground
Carrizozo WUI		
Carrizozo	Low	▪ Light fuel loads ▪ Electrical utilities above ground ▪ Lack of structure sprinkler system
Corona WUI		
Corona	Moderate	▪ Medium fuel loads ▪ Defensible space 30-70 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Combustible decks and porches ▪ Electrical utilities above ground ▪ Lack of structure sprinkler system
Hondo – Tinnie WUI		
Hondo-Tinnie	Moderate	▪ Light fuel loads ▪ Defensible space less than 70 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Combustible porches and decks ▪ Lack of fixed sprinkler system in structures ▪ Utilities above ground
Nogal-Alto-Lincoln WUI		
Alto	High	▪ Non-surfaced, steep roads ▪ Heavy vegetation-fuel loads ▪ Lack of defensible space around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Lack of structure sprinkler system ▪ Utilities above ground
Capitan	Low	▪ Light fuel loads ▪ Electrical utilities above ground ▪ Lack of structure sprinkler system
Fort Stanton	Low	▪ Medium vegetation-fuel loads ▪ Defensible space 30-70 feet from structures ▪ Structures with combustible sidings, porches, and decks
Glencoe	High	▪ Non-surface road ▪ Medium fuel loads ▪ Defensible space less than 25 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Combustible decks and porches ▪ Lack of fixed sprinkler system in structures ▪ Utilities above ground
Lincoln	High	▪ Medium fuel loads ▪ Defensible space less than 70 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Closeness of structures can contribute to fire spread ▪ Lack of structure sprinkler system ▪ Electrical utilities above ground
Nogal	High	▪ Nogal Canyon limited ingress/egress with narrow road ▪ Limited fire service access ▪ Moderate to heavy fuel loads ▪ Lack of defensible space around structures ▪ Combustible structure siding, porches, and decks ▪ Terrain conducive to unfavorable fire behavior ▪ Utilities above ground

Community	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings
White Oaks WUI		
White Oaks	High	▪ Medium fuel loads ▪ Defensible space less than 25 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Closeness of structures can contribute to fire spread ▪ Combustible sidings, porches, and decks
White Oaks	High	▪ Structures lack fixed sprinkler system ▪ Utilities above ground

The following actions are proposed to reduce wildfire risks and hazards. Project recommendations are based on interviews with county fire chiefs, municipal fire chiefs, federal and state fire management officers, field observations, and questionnaire responses. Proposed mitigation projects were also presented and discussed at two public meetings.

- Encourage the development of defensible space around structures, utilities stations, communication towers, and other structures at risk to wildfire.
- Grass and weed abatement needs to occur throughout the county. A common fuel hazard is herbaceous weedy vegetation. Native and non-native weedy grasses and forbs become flashy fuels as they dry in the late summer and fall. These fine fuels ignite easily and burn rapidly. Herbaceous fuels are common and widespread in the WUIs. Herbaceous fuels occur among structures, along roads and driveways, and in fallowed fields and abandoned lots.
- Mowing along highways and roads will create fuel breaks. Highways and roads are linear features that provide a break to fuel continuity. Mowing to a minimum distance of 6 feet along each side of highways and roads will enhance their usefulness as fuel breaks, and reduce the chance of fire ignitions from vehicles or discarded smoking materials.
- Salt cedar abatement along Rio Hondo is recommended. Abatement is warranted because of its fuel load, high water use, and limited wildlife habitat value.
- Fuel breaks are recommended along roads for the Alto and Glencoe communities, as appropriate, and along Nogal Canyon Road, and White Oaks Highway. Strategically located fuel breaks are recommended around the communities of Arabela, Corona, Nogal, and White Oaks. Strategically positioned fuel breaks also are recommended along public and private land boundaries, which occur in all WUIs. Priority should be given to Arabela, Lincoln, Fort Stanton, Glencoe, Alto, Nogal, White Oaks and Corona communities.
- Fire regime condition class (FRCC) is a measure of forest and rangeland health. Forests and rangelands classified as FRCC 2 or 3 are considered unhealthy because there have been changes in plant community attributes and/or the fire regime in comparison with vegetation conditions prior to European settlement. Eighty-two percent of the county is classified as FRCC 2 or 3. Vegetation-fuels management

plans should consider ways to improve forest and rangeland health, thus reducing vegetation-fuel hazards.

- Community education and public outreach is an effective means to initiate local action to reduce wildfire risks and hazards. Community outreach could occur through each WUI to achieve improved awareness of wildfire issues such as creation of defensible space around structures.
- A recommendation is for the county and incorporated towns and villages to consider adopting the International Wildland-Urban Interface Code (IWUIC). The IWUIC provides a set of codes that, if implemented by communities, may reduce wildfire risks and hazards. Improving the fire-resistant characteristics of structures in the assessment area goes hand-in-hand with the development of defensible space.
- A recommendation is to develop, map, and maintain strategically located water sources throughout each WUI. Dry hydrants, permanent surface water, stock ponds, or irrigation systems may be suitable water sources. Agreements with private landowners need to be negotiated annually for property and water access.
- Training of the County Fire Districts (CFDs) and Municipal Fire Districts (MFDs) is an ongoing need. National Wildfire Coordination Group (NWCG) annual training needs to occur. Nearly all fire districts have wildfire fighters trained at the Firefighter 2 level but there is a need for training at the Firefighter 1 level. Because volunteer firefighters work during the week, training should occur on weekends. The county is fortunate to have the Sierra Blanca Wildland Fire Academy to provide needed training.
- The fire protection authorities include eight CFDs, three MFDs, the USFS, the NMSFD, and the BLM. All agencies need to collaborate to maintain, and in some cases improve, wildfire fighting equipment, engines, and firefighter training.

Implementing and sustaining the CWPP is the key to success. This is the responsibility of the Core Team. Building partnerships among community-based organizations, fire protection authorities, local governments, public land management agencies, and private landowners is necessary in identifying and prioritizing measures to reduce wildfire risk. Maintaining this cooperation is a long-term effort that requires the commitment of all partners involved. The CWPP encourages citizens to take an active role in identifying needs, developing strategies, and implementing solutions to address wildfire risk by assisting with the development of local community wildfire plans and participating in countywide fire prevention activities.

Lincoln COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

1 INTRODUCTION

1.1 CWPP Purpose

A Community Wildfire Protection Plan (CWPP) is a strategic plan that identifies specific wildland fire risks and hazards facing communities. The CWPP also provides prioritized mitigation recommendations that are designed to reduce wildfire risks and hazards. Once the CWPP is approved, it is the responsibility of Lincoln County Office of Emergency Services and Core Team to move forward and implement the recommended action items. This may require working with federal, state, county and community fire authorities, and private landowners for project-specific planning and implementation, acquisition of funds, or motivating individual homeowners.

Decades of aggressive wildfire suppression practices in fire-adapted ecosystems have removed a critical natural disturbance mechanism from plant community dynamics. Such management tactics have also led to an alteration of plant composition and structure through the invasion of aggressive and highly flammable weeds and grasses. Fire exclusion has reduced forest and rangeland health through an unprecedented buildup of wildland flammable fuels and changes to the natural fire regime. Fires prior to European settlement would reduce the buildup of fuels, which facilitated forest and rangeland health.

At the same time, demographic trends have shifted as families move into forest and rangeland settings away from traditional urban and suburban communities. Areas where structures and communities intermix with forest and rangeland ecosystems are known as the wildland-urban interface (WUI). Because of the accumulation of flammable fuels in many forests and rangelands, the potential for catastrophic wildfire and loss of human values are great. Appropriate action is needed to reduce wildfire risks and hazards in WUIs through fuels management and improved community awareness. Recent large-scale WUI wildfires that have resulted in devastating losses of structures, business, communities, and human life have received U.S. Congressional attention in the pursuit of effective solutions.

Precipitated by over a decade of increasing WUI wildfires, related losses, and spiraling suppression costs, the National Fire Plan was developed by the federal government in 2000. The Healthy Forests Restoration Act (HFRA) of 2003 implements the core components of the National Fire Plan. HFRA provides the impetus for wildfire risk and hazard assessments and strategic mitigation planning at the county and community level. HFRA refers to this level of planning as the CWPP process. A CWPP empowers a community to take advantage of wildland fire and hazardous fuel management opportunities offered under HFRA including a framework for hazard and risk evaluations

and mitigation planning. A CWPP provides prioritized access to federal and state grant funding to support identified risk and hazard reduction projects, and a basis for collaboration with local, state, and federal land management agencies.

1.2 Need for a CWPP

The Lincoln County CWPP assessment area is countywide but with four caveats:

- The Village of Ruidoso completed a CWPP for the Greater Ruidoso Area (2004), which includes the Village of Ruidoso Fire District and the City of Ruidoso Downs Fire Department (Map 1). The Lincoln County CWPP references the Greater Ruidoso Area CWPP and will not duplicate that effort.
- The Claunch-Pinto Soil and Water Conservation District (SWCD) is also developing a CWPP, which includes part of the Corona WUI. The Lincoln County CWPP will partner in identifying wildfire risks, hazards, and mitigation with the Claunch-Pinto SWCD CWPP as appropriate.
- White Sands Missile Range is Department of Defense land in the southeast corner of the county and is not part of the CWPP assessment area. However, wildfire risks and hazards for the missile range will be presented as information is available from state and federal databases.
- The Village of Corona has developed the Village of Corona Fire Plan (2004), which was reviewed as vegetation-fuels management projects were evaluated for the Corona WUI.

The Lincoln County CWPP is countywide with emphasis on the protection of communities and other economic and ecological values. Historic fire occurrence was a major ecological influence in shaping the natural vegetation. The threat of wildfire continues today. However, wildfire risk to human welfare and economic and ecological values is more serious today than in the past because of the buildup of hazardous fuels, communities, and other infrastructure in proximity to forests and rangelands, and a lack of public appreciation of wildfire. Human-caused ignitions are the main cause of wildfires in Lincoln County and their frequency will likely become more numerous as the county's population grows and outdoor recreation increases.

Natural resource management policy and changing ecological conditions have interacted in ways that resulted in hazardous fuel situations throughout the county. These forces include historic fire-suppression policy, juniper and shrub invasion into grasslands, overstocked forests stands, invasive weeds, livestock grazing, land-use changes, and changing climatic patterns.

The accumulation of hazardous fuels may set the stage for catastrophic wildfire occurrence, resulting in the loss of economic and ecological values. There are varieties of fuels around communities, ranches, structures, and on public lands that create problems for fire protection. Fuels include grasslands, shrublands, pinion-juniper woodlands, ponderosa pine and mixed conifer forests, and weedy fields. Fuels such as dried grass and weeds are highly flammable, burn rapidly, and resist control. A coordinated effort among all fire authorities and private landowners is needed to manage

hazardous fuels and reduce the risk of wildfire. The CWPP provides the means to identify wildfire risks and hazards, and prioritize mitigation projects.

The CWPP provides a coordinated assessment of wildfire risks and hazards, and recommends specific mitigation treatments designed to make the assessment area a safer place to live, work, and play. Collaboration among federal, state, and county agencies and private landowners is essential to reduce wildfire risks and hazards. This CWPP provides the framework for collaboration. All information was gathered, analyzed, and prepared by Walsh Environmental Scientists and Engineers, LLC (WALSH).

1.3 Policy Framework

This Lincoln County CWPP is not a legal document. There are no legal requirements to implement the recommendations presented herein. Actions on public lands will be subject to federal, state, and county policies and procedures such as adherence to the HFRA, National Environmental Policy Act (NEPA), and New Mexico's smoke management and open burn polices. Actions on private land may require compliance with county land use codes.

Federal legislative acts that set policy and provide guidance to the development of the CWPP include:

- HFRA (2003) – Federal legislation that promotes healthy forest and open space management, hazardous fuels reduction on federal land, community wildfire protection planning, and biomass energy production.
- National Fire Plan and 10-Year Comprehensive Strategy (2001) – Interagency plan that focuses on firefighting coordination, firefighter safety, post-fire rehabilitation, hazardous fuels reduction, community assistance, and accountability.
- Federal Emergency Management Agency (FEMA) Disaster Mitigation Act (2000) – Provides criteria for state and local multiple-hazard and mitigation planning.

The New Mexico State Forestry Division (NMSFD) is a valuable resource that provides education and guidance to communities and individual landowners concerned with the threat of wildfire, as well as forest resource management in the WUI (http://www.emnrd.state.nm.us/fd/index.htm).

1.4 CWPP Process and Core Team

The HFRA designed the CWPP to be a flexible process that can accommodate a wide variety of community needs. The Lincoln County CWPP follows the standardized steps as outlined in *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (Table 1).

The Village of Ruidoso and Clauch-Pinto CWPP can be found at www.nmforestry.com website.

Table 1. CWPP Development Process

Step	Task	Explanation
One	Convene Decision Makers	Form a Core Team made up of representatives from local governments, fire authorities, NMSFD, and interested stakeholders.
Two	Involve Federal Agencies	Engage local representatives of the USFS, BLM, and other land management agencies as appropriate.
Three	Engage Interested Parties	Contact and encourage participation from a broad range of interested organizations and stakeholders.
Four	Establish a Community Base Map	Develop a base map of the district that provides a better understanding of communities, critical infrastructure, and forest/open space at risk.
Five	Develop a Community Risk Assessment	Develop a risk assessment that considers fuel hazards, community and commercial infrastructure, resources, and preparedness capability. Rate the level of risk and incorporate into the base map as appropriate.
Six	Establish Community Priorities and Recommendations	Use the risk assessment and base map to facilitate a collaborative public discussion that prioritizes fuel treatments and non-fuel mitigation practices to reduce fire risk and structural ignitability.
Seven	Develop an Action Plan and Assessment Strategy	Develop a detailed implementation strategy and a monitoring plan that will ensure long-term success.
Eight	Finalize the CWPP	Finalize the CWPP and communicate the results to interested parties and stakeholders.

Source: Society of American Foresters (2004)

The initial step in developing the Lincoln County CWPP was to organize an operating group that serves as the core decision-making team. The Core Team was formed by WALSH with input from Lincoln County Emergency Services.

The Core Team consists of representatives from local government, local fire authorities, and the NMSFD (Table 2). In addition, the Core Team includes relevant land management agencies and community stakeholders. Collaboration among agencies and communities is an important CWPP component because it promotes sharing of perspectives, plans, priorities, and other information that is useful to the planning process. Together, these entities guide the development of the CWPP and must mutually agree on the plan's final content.

Table 2. Lincoln County CWPP Core Team Members

Team Member	Organization	Telephone	E-mail
Thomas Stewart	County Manager	575-648-2385 ext 101	linclnco@tularosa.net
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Travis Atwell	County Emergency Services Coordinator	575-258-9991	awfr107@hotmail.com
Eddie Tudor	NMSFD Capitan District Forester	575-354-2231	eddie.tudor@state.nm.us
Nancy Rose	Cibola National Forest Supervisor	575-346-3900	nrose@fs.fed.us
Lou Woltering	Lincoln National Forest Supervisor	575-434 7200	lwoltering@fs.fed.us
Eddie Bateson	BLM Roswell Field Office Manager	575-627-0272	eddie_bateson@blm.gov
Clark Taylor	Carrizozo SWCD Chair	575-648-2941 ext 105	clark.taylor@nm.usda.gov
Glenda Booker	Upper Hondo SWCD Chair	575-354-2220	uhswcd@valornet.com
Phillipe Labota	Claunch-Pinto SWCD Chair	575-847-2243	
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Bob Hemphill	Village of Carrizozo Mayor	575-354-2247	zozomayor@tularosa.net
John Waters	Ruidoso Downs Manager	575-378-4422	jwaters@ruidosodowns.us
Sam Hammons	Village of Capitan Mayor	575-354-2247	shammons@villageofcapitan.org
William Hignight	Corona Mayor	575-849-5511	villageofcorona@plateautel.net
Kim Kuhar	Smokey Bear Ranger District	575-630-3025	kkuhar@fs.fed.us

As a strategic plan, the CWPP success hinges on effective and long-term implementation of the identified objectives. The CWPP planning and development process must include efforts to build a stakeholder group that serves as an implementation team and will oversee the execution of prioritized recommendations and maintain the plan as the characteristics of the WUI change over time. Specific projects may be undertaken by individual communities, while large-scale fuel treatments will require collaboration among local government and public land management agencies. The Core Team may assist in the implementation of the CWPP action plan in cooperating with communities and private landowners. Public meetings targeted at specific WUIs are recommended as a means to generate additional support and maintain momentum.

CWPP fuel treatment recommendations derived from this analysis are prioritized through an open and collaborative effort with the Core Team and stakeholders. Prioritized treatments target wildfire hazard reduction in the WUI communities, including structural ignitability and critical supporting infrastructure. An action plan guides treatment implementation for high-priority projects over the span of several years.

The finalized CWPP represents a strategic plan with Core Team consensus that provides prioritized vegetation-fuels treatment projects, non-fuels mitigation recommendations, maps of the assessment area, defensible space recommendations, and other information relevant to the scope of the project.

1.5 Lincoln County CWPP Goals and Objectives

Table 3 provides the goals and objectives for the Lincoln County CWPP.

Table 3. Lincoln County CWPP Goals and Objectives

Goal	Objective
Facilitate and develop a CWPP	▪ Provide oversight for all activities related to the CWPP. ▪ Ensure representation and coordination among agencies and interest groups. ▪ Develop a long-term framework for sustaining CWPP efforts.
Conduct wildfire risk and hazard assessments	▪ Identify hazardous fuel loads and locations. ▪ Determine the level of risk to communities that wildfires and contributing factors pose. ▪ Identify WUIs at risk to large-scale fire.
Develop a mitigation plan	▪ Identify and prioritize vegetation-fuel treatment projects. ▪ Identify and prioritize non-fuel mitigation needs.
Manage hazardous fuels	▪ Identify community hazards and prioritize hazard reduction treatments. ▪ Develop sustainable initiatives for communities. ▪ Secure funding and assist project implementation.
Facilitate emergency planning	▪ Develop strategies to strengthen emergency management, response, and evacuation capabilities for wildfire. ▪ Build relationships among federal, state, and county government, fire authorities, and communities.
Facilitate public outreach	▪ Develop strategies to increase citizen awareness and action for Firewise landscaping and construction practices. ▪ Promote public outreach and cooperation for fuel reduction projects to solicit community involvement and private landowner cooperation.

2 WILDLAND FIRE MANAGEMENT PRIMER

Wildland fire is defined as any fire burning wildland fuels; it includes prescribed fire, wildland fire use, and wildfire. Prescribed fires are planned fires ignited by land managers to accomplish specific natural resource improvement objectives. Fires that occur from natural causes, such as lightning, that are then used to achieve management purposes under carefully controlled conditions with minimal suppression costs are known as wildland fire use (WFU). Wildfires are unwanted and unplanned fires that result from natural ignition, unauthorized human-caused fire, escaped WFU, or escaped prescribed fire.

County fire districts (CFD), municipal fire districts (MFD), NMSFD, U.S. Forest Service (USFS), and Bureau of Land Management (BLM) suppress wildfires in the assessment area according to their operational procedures. The Interagency Joint Powers Agreement (IJPA) calls for the closest force to provide initial attack (IA) on wildfires. The IA responding force may choose to call for additional support as required.

The approach to wildfire suppression depends on landownership policy. Wildland fires on New Mexico State lands are suppressed immediately. BLM and USFS lands operate on a modified fire suppression policy. This means that fires may be allowed to burn under careful observation to a strategic point to improve the likelihood of suppression and minimize costs. Wildfire suppression on private lands is at the discretion of the landowner unless fires threaten public lands or communities.

Wildland fires may be further classified as ground, surface, or crown fires. Ground fire refers to burning or smoldering materials including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame. Surface fire refers to loose fuels burning on the surface of the ground such as leaves, needles, and small branches, as well as grasses, forbs, low and medium shrubs, tree seedlings, fallen branches, downed timber, and slash. Crown fire is a wildfire that moves rapidly through the crowns of trees or shrubs independently of a surface fire.

2.1 Wildland Fire Behavior

Fire behavior is a description of the manner in which a fire reacts to the influences of fuel, weather, and topography. Fire behavior is observed and assessed at the flaming front of the fire and described most simply in terms of fire intensity (in feet of flame length) and in rate of forward spread (Table 4). The implications of observed or expected fire behavior are important components of suppression strategies and tactics, particularly in terms of the difficulty of control and effectiveness of various suppression resources. Fire risk is the probability that wildfire will start from natural or human-caused ignitions. Fire hazard is the presence of ignitable fuel coupled with the influences of topography and weather, and is directly related to fire behavior. Fire severity, on the other hand, refers to the immediate effect a fire has on vegetation and soils.

Table 4. Fire Behavior Ratings

Rating	Flame Length (feet)	Implication
Low	0 - 1	Fire will burn and spread; however, it presents very little resistance to control and direct attack by firefighters is possible.
Moderate	1 - 3	Fire spreads rapidly presenting moderate resistance to control but can be countered with direct attack by firefighters.
Active	3 - 7	Fire spreads very rapidly presenting substantial resistance to control. Direct attack by firefighters must be supplemented with equipment and/or air support.
Very Active	7 - 15	Fire spreads very rapidly presenting extreme resistance to control. Indirect attack may be effective. Safety of firefighters in the area becomes a concern.
Extreme	> 15	Fire spreads very rapidly presenting extreme resistance to control. Any form of attack will probably not be effective. Safety of firefighters in the area is of critical concern.

Source: Stubbs (2005)

The nature of fuels, topography, and weather conditions combine to dictate fire behavior, rate of spread, and intensity. Wildland fuel attributes refer to both dead and live vegetation and include such factors as density, bed depth, continuity, vertical arrangement, and moisture content. Structures with flammable materials are also considered a fuel source.

When fire burns in the forest understory or through grass, it is a surface fire. When fire burns through the canopy of shrubs and trees, it is considered a crown fire. Ladder fuel is the vegetation that spans the gap between the forest floor and tree crowns and can conduct a surface fire to become a crown fire.

For fire to spread, potential fuels such as trees, shrubs, or structures in the flame front must meet the conditions of ignitability. The conditions needed are the presence of oxygen, flammable fuel, and heat. Oxygen and heat are implicitly available in a wildland fire; however, if the potential fuels do not meet combustion conditions, the fire will not ignite. This explains why some trees, patches of vegetation, or structures may survive a wildfire, while others in the near vicinity are completely burned.

Weather conditions such as high ambient temperatures, low relative humidity, and windy conditions favor fire ignition and high-intensity fire behavior. Under no-wind conditions, fire burns more rapidly and intensely upslope than on level terrain. However, wind tends to be the driving force in fire behavior in the WUI.

2.2 History of Wildfire

Lightning-induced fire is a natural component of forest and rangeland ecosystems in Lincoln County, and its occurrence is important to maintaining the health of forest and rangeland ecosystems. Native Americans used fire as a tool for hunting, improving wildlife habitat, and land clearing. As such, many of the plant species and communities are adapted to recurring fire through phenological, physiological, or anatomical

attributes. Some plants, such as ponderosa pine and western wheatgrass, are fire adapted and may require recurring fire to maintain viable populations.

European settlers, land use policy, and changing ecosystems have altered fire behavior and fuels accumulation from their historic setting. Euro-American settlers in Lincoln County changed the natural fire regime in several interrelated ways. The nature of vegetation-fuel changed because of land use practices such as homesteading, livestock grazing, agriculture, water development, and road construction. Livestock grazing reduced the amount of fine fuels such as grasses and forbs, which carried low-intensity fire across the landscape. Continuous stretches of forest and rangeland vegetation-fuels were broken up by land-clearing activities. The removal of the natural vegetation facilitated the invasion of non-native grasses and forbs, some of which create more flammable fuel beds than their native predecessors.

2.3 Prescribed Fire

Prescribed fire occurs throughout the county as field burns, ditch fires, rangeland improvement, weed abatement, burn piles, wildlife habitat improvement, and fuels management. Prescribed fire may be used as a resource management tool under carefully controlled conditions. This includes pre-treatment of the fuel load and close monitoring of weather and other factors. Prescribed fire ultimately improves wildlife habitat, helps abate invasive vegetation, reduces excess fuel loads, and lowers the risk of future, severe wildfires in the assessment area. These and other fuel management techniques are employed to protect human life, economic values, and ecological values. The use of prescribed fire in the WUI is carefully planned, enacted only under favorable weather conditions, and must meet smoke management requirements of the New Mexico Environment Department, Air Quality Bureau (www.nmenv.state.nm.us/aqb/Wildfire-PM.html).

Prescribed fire may be conducted either in a defined area, as a broadcast burn, or in localized burn piles. Broadcast burns are used to mimic naturally occurring wildfire, but only under specific weather conditions and fuel loads, and with expert supervision. Burn piles are utilized to dispose of excess woody material after thinning if other means of disposal are not available or cost-prohibitive. Prescribed fire must be conducted in accordance with Lincoln County fire ordinance, which consists of a burn permit issued by the Office of Emergency Services, and adherence to New Mexico smoke management policy.

2.4 Wildland-Urban Interface

A WUI involves areas where communities and a wildland fuel intermix. Every fire season, catastrophic losses occur as a result of wildfire in WUI areas throughout the western United States. Homes are lost, businesses are destroyed, community infrastructure is damaged, and most tragically, lives are lost. Precautionary action taken before a wildfire strikes often makes the difference between saving and losing a home. Creating a defensible space around homes, businesses, and other structures is an important component in wildfire hazard reduction. Providing an effective defensible space can be as basic as pruning trees, planting low-flammability vegetation, and cleaning up surface fuels and other hazards near a home. These efforts are typically

concentrated within 30 feet of a home to increase the chance for structure survival and to create an area for firefighters to work.

WUI studies suggest that the intense radiant heat of a wildfire is unlikely to ignite a structure that is more than 30 feet away as long as there is no direct flame impingement. Studies of home survivability indicate that homes with noncombustible roofs and a minimum of 30 feet of defensible space have an 85-percent survival rate (Cohen 2000). Conversely, homes with wood shake roofs and less than 30 feet of defensible space have a 15-percent survival rate.

2.5 Hazardous Fuels Mitigation

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

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

3 LINCOLN COUNTY CWPP ASSESSMENT AREA PROFILE

3.1 County and District Setting

The Lincoln County CWPP assessment area is countywide (Map 1). Land ownership within the assessment area is divided among federal, state, and private at 1,094,936, 297,843, and 1,696,570 acres, respectively. Lincoln County is located in south-central New Mexico with Otero and Chaves counties on its southern border. Debaca and Chaves counties are located to the east. Torrance and Guadalupe counties form its northern boundary. Socorro County is on the western boundary. The county is 4,831 square miles with a population of 19,411 (2000 census). The population growth rate has been approximately 3 percent each year since the 2000 census. The projected population growth is estimated to be approximately 1.5 percent per annum.

Incorporated communities include the Town of Carrizozo (County Seat), Village of Capitan, Village of Corona, Village of Ruidoso, and City of Ruidoso Downs. The wildfire risks and hazards for the Town of Carrizozo and Villages of Capitan and Corona are addressed in this CWPP. The wildfire risks and hazards for the Village of Ruidoso and City of Ruidoso Downs were addressed in the Greater Ruidoso CWPP. Unincorporated areas addressed in this CWPP include Alto, Ancho, Arabela, Hondo, Lincoln, Nogal, Tinnie, and White Oaks.

Important economic values are year-round recreational resort facilities, tourism, historical communities and buildings, Ruidoso Downs, site seeing, nearby Mescalero Apache Reservation, and retirement communities. Ecological values include such things as watersheds, wildlife and aquatic habitats, rangeland grazing, forest products, and viewsheds. The Bonito and other watersheds are water sources for communities inside and outside of the county. Important infrastructure includes such things as U.S. Highways (54, 70, 285, and 380), county roads, a railroad, communication towers, communities, watersheds, ski area, and historical communities (Map 3).

Wildland fire protection in the assessment areas occurs from eight CFDs, three MFDs, the NMSFD, the USFS, and the BLM. The CFDs and MFDs have responsibility for structure and wildfire suppression within their respective districts. The NMSFD has wildland fire management responsibilities on state and private lands. The USFS and the BLM have authority for wildfire suppression and fuels management on their respective lands. The IJPA calls for mutual aid and support among the various fire authorities.

3.2 Wildland-Urban Interface

The WUI involves areas where communities and wildland fuels intermix and is the focus of this CWPP. WUI boundaries were determined by the Core Team. The WUIs were assessed for their wildfire risks and hazards. The WUI areas identified are Arabela, Hondo-Tinnie, Nogal-Alto-Lincoln, Carrizozo, White Oaks, Ancho, and Corona (Map 4). Large-scale wildfire could occur in all WUIs because of fuel load and continuity.

3.3 Climate

The climate of Lincoln County is moderate (Table 5). Summertime high temperatures range in the 80s Fahrenheit (°F) with lows in the 40s and 50s °F. Winter temperatures vary from highs in the upper 40s and 50s °F; lows in the 20s °F. The assessment area has over 300 days of sunshine per year. Average annual precipitation is 22 inches around Ruidoso and 15 inches around Corona. **The majority of precipitation is received during summer months.** Snowfall in Ruidoso and Corona is 38 and 44 inches, respectively.

Table 5. Average Monthly Climate Summary for the Villages of Ruidoso and Corona
(January 1914–June 2006)

Climate Attribute	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ruidoso													
High Temperature (°F)	49	52	57	65	74	82	81	79	75	67	57	50	66
Low Temperature (°F)	19	20	24	29	35	43	48	48	41	32	23	19	32
Average Total Precipitation (inches)	1.1	1.1	1.1	0.7	0.9	1.02	3.8	4.2	2.5	1.6	0.9	0.6	21.5
Corona													
High Temperature (°F)	42	48	55	64	70	81	82	79	73	65	52	45	63
Low Temperature (°F)	18	21	26	32	40	50	54	54	48	36	27	19	35
Average Total Precipitation (inches)	0.8	0.8	0.7	0.4	1.3	1.1	1.9	2.6	1.8	1.2	1.0	1.2	14.8

Source: www.wrcc.dri.edu

3.4 Terrain

Terrain, elevation, and aspect play an important role in determining vegetation-fuels and wildland fire behavior. Different vegetation-fuel types occur with various combinations of terrain, elevation, and aspect. Terrain affects fire behavior because the rate of fire spread and flame length are greater on steep slopes than on level ground. Elevation is important because of differences in precipitation and temperatures. At higher elevations, precipitation is usually greater, and temperatures are usually lower than at lower

elevations. Aspect is the orientation of the terrain to sun light. This means that south facing slopes are usually drier and warmer than north facing slopes.

The terrain in Lincoln County varies from relatively flat prairie lands and rolling foothills to high mountain peaks (Map 1). In north, northeast, northwest, and central portions of the county, slopes vary from 0 to 8 percent with elevations of 4,000 to 6,000 feet. The terrain in the southeast has slopes of 3 to 15 percent with elevations of 6,300 to 7,000 feet. Valley bottoms, ridge slopes, ridges, and mountain peaks occur in the southwest to west-central portions of the county. Slopes depend on terrain position and range from 0 to 45 percent with elevations from 5,500 to 10,300 feet.

3.5 Wildland Vegetation and Fuels

The plant species composition of Lincoln County is diverse because there is a mixing of vegetation from the Chihuahuan Desert, Sonora-Mohave, the Western Great Plains, and the Madrean vegetation provenances (Map 2). Also, plant communities vary from desert scrub and grasslands to alpine vegetation due to elevation diversity. The unique mix of vegetation in Lincoln County needs protection from catastrophic wildfire.

Wildland vegetation-fuels include grass, leaves, twigs, ground litter, weeds, shrubs, and trees. Structures in the WUI are also a fuel source. Vegetation-fuels throughout Lincoln County are varied and include grasslands, desert scrub, pinion-juniper woodlands, ponderosa pine and mixed-conifer forests. Grasslands and desert scrub occur at the lower elevations, pinion-juniper woodlands occur at mid-elevations, and ponderosa pine and mixed conifer dominate at the higher elevations. Short- and mid-grass prairie is widespread in the northeastern, eastern, southeastern, northwestern, western, and central portions of the county on relatively flat terrain. In some areas, juniper or ponderosa pine trees are encroaching into grasslands. Pinion-juniper woodlands occur in the northwestern, north-central and southeastern parts of the county on rolling foothills. Ponderosa pine and mixed conifer forests are located in the southwestern and northwestern sections of the county in mountainous terrain. Bosque (riparian) vegetation occurs along arroyos and stream banks. Each type of vegetation-fuel presents unique challenges to reduce fuel hazards.

Understanding the fire behavior characteristics of different vegetation-fuel types facilitates effective fuel-management and wildfire suppression strategies (Table 6). Classifications of vegetation-fuel types are known as fire behavior fuel model (FBFM). The value of FBFMs is that fire behavior within grasses, shrubs, and timber vegetation groups can be predicted. Map 5 illustrates the spatial orientation of FBFMs within the county.

Table 6. Lincoln County Fire Behavior Fuel Models

Fire Behavior Fuel Model	Percent of County	Description
FBFM 1	56	**Grass Group** – Fire spread is determined by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. These surface fires move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the cover of the area. Annual and perennial grasses occur in this model. Fire rate of spread is fast at 5,148 feet per hour with flame lengths greater than 4 feet.
FBFM 2	7	**Grass Group** – Fire spread occurs through cured dead herbaceous fuels. These are surface fires where downed woody debris from the shrub and tree component adds to fire intensity. Open shrublands, pine stands, or oakbrush stands that cover from one-third to two-thirds of the area generally fit this model. Fire rate of spread is rapid at 3,210 feet per hour with flame lengths of 6 feet.
FBFM 4	< 1	**Shrub Group** – Fire intensity and fast-spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, 6 or more feet tall, such as mesquite, cat's claw, and oak. Besides flammable foliage, dead woody material in the stands significantly contributes to the fire intensity. Height of stands qualifying for this model depends on local conditions. A deep litter layer may also hamper suppression efforts. Fire rate of spread is 4,950 feet per hour with flame length of 19 feet.
FBFM 5	5	**Shrub Group** – Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. Young, green stands with no dead wood would qualify: young mesquite, catclaw, oak and creosote would qualify. Fire rate of spread is 1,188 feet per hour and flame length is 4 feet.
FBFM 6	6	**Shrub Group** – Fire spreads though the shrub layer with flammable foliage but requires moderate winds to maintain the foliage fire. Fire will drop to the ground in low-wind situations. Shrubs are mature with heights less than 6 feet. These stands include oak, creosote and mesquite less than 6 feet tall. Fire rate of spread is fairly fast at 2,110 feet per hours with flame lengths of 6 feet.
FBFM 8	19	**Timber Group** – These are slow-burning ground fires with low flame lengths, although the fire may encounter an occasional "jackpot" of heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperature, low humidity, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Representative conifer types are pinion pine and mixed-conifer. Aspen stands also qualify. Fire rate of spread is slow at 132 feet per hour with a flame length of 1 foot.
FBFM 9	2	**Timber Group** – Fires in this FBFM run through the surface litter faster than model 8 and have longer flame height. Long-needle conifer stands such as ponderosa pine are typical. Closed stands of long-needled pine, e.g., ponderosa, are grouped in this model. Concentrations of dead-down woody material will contribute to possible torching of trees, spotting, and crowning. Fire rate of spread is slow at 528 feet per hour with a flame length of 3 feet.

Fire Behavior Fuel Model	Percent of County	Description
FBFM 10	2	**Timber Group** – These fires burn in surface and ground fuels with greater fire intensity than the timber litter models. Dead-down fuels include greater quantities of 3-inch or larger limb wood resulting from over maturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire-control difficulties. Any forest type may be considered if heavy down material is present (examples are insect fested or diseased, wind thrown, overmature, or partial-cut slash stands; ponderosa pine and mixed conifer). Fire rate of spread is slow at 528 feet per hour with a flame length of 5 feet.
FBFM 12	< 1	**Logging Slash Group** – This model supports rapidly spreading fires with high intensities capable of generating firebrands. When fire starts, it is generally sustained until a fuel break or change in fuel is encountered. The fuel is dominated by slash with much of it less than 3 inches in diameter. Heavily thinned conifer stands, clear cuts, and medium or heavy partial cuts are examples. Fire rate of spread is slow at 858 feet per hour with a flame length of 11 feet.

Source: Anderson (1982)

FBFMs 1 and 2 account for 63 percent of wildland fuels in Lincoln County where the dominant surface fuels are grasses with a mixture of woody vegetation (Map 5). FBFMs 1 and 2 occur throughout the county. The timber FBFMs account for approximately 23 percent of the county. These vegetation-fuel types are found in mountainous areas.

Grass fuels are especially dangerous when they dry in the fall and winter because they ignite easily, resist suppression, and burn rapidly. A wind-driven fire will move rapidly through dry grasslands. Vegetation-fuels management, such as mowing along roads, livestock grazing, and judicial use of herbicides, is warranted. A rapid response to grass fires is needed in the WUI to protect structures and other values. Homeowners need to create defensible space to protect structures and be prepared for rapid evacuation.

3.6 Water Resources

All of the fire districts (FDs) have access to water through hydrants or wells within the respective communities that they service. However, there is a paucity of water available for nearly all FDs. Surface water includes the Rio Ruidoso, Rio Hondo, Alto Lake, Eagle Lake, Grindstone Lake, Alto County Club Lake, Kokepelli Lake, Rain Make Lake, Copper Ridge Lake, Bonito Lake, Alto Reservoir, Silver Pond, and other streams and ponds. Tender access for water drafting and helicopter dipping to fill water buckets are available at the Alto Lake, Eagle Lake, Grindstone Lake, Alto County Club Lake, Kokopelli Lake, Rain Make Lake, Copper Ridge Lake, Bonito Lake, Alto Reservoir, and Silver Pond. There are also stock ponds and irrigation systems available on private lands, but availability depends on precipitation and landowner permission.

3.7 Wildfire Protection Authorities

Table 7 presents the wildfire protection capacity of all fire authorities in Lincoln County.

Table 7. Wildfire Protection Authorities' Suppression Capacities

Authority	Apparatus	Number of Trained Wildland Firefighters
Arabela FD	▪ One 500 gallon (g) brush engine ▪ One 1,800 g tender ▪ One 300 g attack engine	▪ 3-person crew
Bonito FD	▪ One 500 g interface engine ▪ One 250 g attack engine ▪ One 350 g attack engine ▪ One 1,865 g tender ▪ One 2,000 g tender ▪ One 260 g brush engine ▪ One 300 g brush engine ▪ One rescue engine ▪ One command truck	▪ 27-person crew
Fort Station FD	▪ One 200 g brush engine	▪ 10-person crew; but with a turnover every 6 months
Hondo FD	▪ One attack engine ▪ One 400 g brush engine ▪ One 350 g brush engine ▪ One rescue engine ▪ One 1,000 g tender ▪ One command truck	▪ 7-person crew
Lincoln FD	▪ One 250 g attack engine ▪ One 350 g brush engine	▪ 9-person crew
Nogal FD	▪ One 300 g attack engine ▪ One 1,500 g tender/pumper	▪ 8-person crew
Glencoe FD	▪ One 250 g attack engine ▪ One 400 g brush engine ▪ One rescue truck ▪ One 4,000 g tender	▪ Information not provided
White Oaks FD	▪ One 200 g brush engine ▪ One 1200 tender ▪ One utility truck	▪ Information not provided
Village of Capitan Volunteer Fire Department (VFD)	▪ One 500 g brush engine ▪ One 400 g brush engine ▪ One 300 g brush engine	▪ 2-person crew
Town of Carrizozo VFD	▪ Two 350 g brush engine ▪ One Rescue truck	▪ 10-person crew
Village of Corona FD	▪ One 250 g brush engine ▪ One 300 g reserve engine ▪ One support vehicle	▪ 14-person crew
USFS	▪ One 300 g brush engine ▪ One 600 g brush engine	▪ 5-person permanent and 9-person seasonal
NMSFD	▪ One 300 g brush engine ▪ One 350 g brush engine ▪ One 400 g brush engine	▪ 9-person emergency firefighters
BLM	▪ One brush truck that patrols BLM land as needed	▪ 3-person crew

3.8 Values at Risk

Human welfare receives priority protection in the event of a wildfire. Economic and ecological values are secondary to human welfare, but they can also receive proper

protection through collaborative planning. Economic values are agriculture, communities, homes, and businesses. Ecological values include wildlife and aquatic resources, recreation and tourism, and watersheds for municipal water supplies. Examples of values at risk in the assessment area include:

- Human welfare
- Homes
- Businesses
- Local economies
- Municipal water supply
- Community infrastructure
- Communication towers
- Major highways and railroads
- County and state parks
- Agricultural lands
- Wildlife and aquatic habitats
- Watersheds
- Water quality
- Air quality
- Natural vegetation
- Viewsheds
- Recreation and tourism

Wildfire could occur in all portions of the county and would have a severe and long-term impact on economic and ecological values. The actions recommended in this CWPP are targeted at lowering wildfire risks and hazards to communities and other economic and ecological resources.

4 WILDFIRE RISK AND HAZARD ASSESSMENTS

Wildfire risk is the probability that a wildfire will ignite from lightning or human causes. Wildfire hazard refers to vegetation-fuel attributes that may be conducive to propagate and carry a fire.

4.1 Approach to Wildfire Risk and Hazard Assessments

Several sources of information were gathered and synthesized to formulate an understanding of wildfire risks and hazards. Sources for information included WUI/community and vegetation-fuel surveys, various maps, interviews with county fire authorities, and community meetings.

A standardized survey process defined by the National Fire Protection Association (NFPA) was utilized to assess the relative level of wildfire risk and hazard for communities. Appendix B contains the NFPA Form 1144, *Standard for Protection of Life and Property from Wildfire*. Surveys assess predominant characteristics within individual communities and subdivisions as they relate to structural ignitability, fuels, topography, expected fire behavior, emergency response, and ultimately human safety and welfare. Scores are assigned to each element and then totaled to determine the community's relative level of risk. Low, moderate, high, and extreme hazard ratings may be assigned based on the total score.

The CWPP assessment used two main sources of information to generate various maps, which provide crucial information on wildfire risks and hazards. Sources of these data were the NMSFD, the BLM, and the Landscape Fire and Resource Management Planning Tools Project (LANDFIRE). NMSFD provided data on wildfire starts throughout the assessment area for the years 1987 to 2007. Maps 7 and 8 were generated from the NMSFD data. Lincoln County and BLM provided information on landownership and infrastructure illustrated in Maps 1, 3, and 4.

Wildfire hazards and risks data were obtained from a national database known as LANDFIRE (www.landfire.gov). LANDFIRE produces consistent and comprehensive maps and data describing vegetation, fuels, and fire regimes across the United States. Maps for the assessment area illustrating existing vegetation (Map 2), fire behavior fuel model (Map 5), historic reference fire regime (Map 6), and fire regime condition class (Map 9) were obtained from LANDFIRE.

County fire chiefs, municipal fire chiefs, and federal and state fire management officers were interviewed to obtain information on firefighting engines available for their respective authority, number of trained wildland firefighters, vegetation-fuels management needs, equipment and resource needs, and training needs. This information is important to determine and prioritize non-fuels mitigation needs to improve wildfire fighting capability and capacity.

As part of the assessment, a concerted effort was made to solicit feedback from the public and local experts on fire and natural resource issues. A Core Team consisting of BLM,

USFS, Natural Resources Conservation Service (NRCS), NMSFD, SWCD, and Lincoln County representatives was formed. A Core Team meeting was held on December 5, 2007 at the Lincoln County Emergency Services office to discuss CWPP issues, schedules, communities for assessments, Core Team function, and meetings. A second Core Team meeting was held on February 5, 2008 to review and discuss initial CWPP developments. Two community meetings were held on March 17 and 18, 2008 in Corona and Alto, respectively. The purposes of the community meetings were to introduce CWPP goals and objectives, discuss wildfire risks and hazards, provide an opportunity for the public to participate in the process, and review proposed mitigation possibilities. The draft CWPP was made available on Lincoln County's website (www.lincolncountynm.net/lcoes.htm) to enable public review. Review comments were sent to Lincoln County Office of Emergency Services or WALSH.

Questionnaires were provided at the community meetings to solicit information on perceived wildfire risks, fuel hazards, and mitigation opportunities (Appendix C). The questionnaire was also available on Lincoln County's website. Homeowners were asked to return their responses to the Lincoln County Office of Emergency Management or mail them to WALSH (see Appendix D for summary of the questionnaire).

4.2 Historic Wildfire Regime

Historic reference wildfire regimes are the kind of fires that occurred in Lincoln County prior to European settlement (Map 6). Lightning and Native Americans were the causes for these fires. The historic fire regime is composed of the average return interval for wildfire and its severity. The average return interval is the number of years between wildfires. Fire severity is the amount of vegetation top-kill. Low-severity, mixed-severity, and stand-replacement fires are those resulting in less than 25, 25 to 75, and greater than 75 percent top-kill, respectively. Understanding the historic fire regime is important to understanding the present risk of wildfire.

There are five different historic reference fire regimes within Lincoln County (Map 6 and Table 8). The dominant historic fire regime was less than 35 years return interval with replacement severity. This means that severe wildfires burned over 82 percent of the county approximately every 35 years.

Table 8. Historic Fire Regime

Fire Regime	Percent of Assessment Area
0-35 Year Return Frequency; Low and Mixed Severity	< 1
0-35 Year Return Frequency; Replacement Severity	82
200+ Year Return Frequency; Replacement Severity	12

Fire Regime	Percent of Assessment Area
35-200 Year Return Frequency; Low and Mixed Severity	3
35-200 Year Return Frequency; Replacement Severity	< 1

4.3 Recent Wildfire History

Wildfire occurrence in Lincoln County is common (Map 7). Fires were especially common in the Nogal-Alto-Lincoln WUI. Another dominant pattern of fire occurrence is along U.S. Highways 54, 70, 285, and 380.

During the period of 1987 through 2007, there were 650 fires that burned 135,669 acres (Table 9). Approximately 79 percent of all wildfires burned less than 9.9 acres per fire, regardless of ignition source, while less than 1 percent of all fires burn over 1,000 acres. Lightning caused 36 percent of wildfires, and 64 percent were human-caused. Human-caused wildfire resulted mainly from escaped fire (e.g., debris burning and campfires). The railroad accounted for 22 fires.

Table 9. Wildfire History for the Years 1987–2007

Fire Size Class (Acres)	Acres Burnt	Number of Fires	Fire Ignition Source	
			Lightning	Human
A 0 – 0.25	81	265	97	168
B 0.25 – 9.9	1949	246	59	187
C 9.9 – 99.9	2653	79	38	41
D 100 – 299.9	4312	20	14	6
E 300 – 999.9	15177	22	14	8
F 1,000 – 4,999.9	23965	14	10	4
G 5,000 – 9,999.9	87532	4	2	2

Source: New Mexico State Forestry Division

Wildfire occurrence varied among the different vegetation types (Table 10). Forty-eight, 21, and 16 percent of fires occurred in grasslands, pinion-juniper woodlands, and ponderosa pine forests, respectively. Fires that burned thousands of acres occurred in grasslands, shrublands, pinion-juniper woodlands and ponderosa pine forests.

Table 10. Wildfire Occurrence by Vegetation Type

Fire Size Class (Acres)	Grassland	Shrubland	Pinion-Juniper Woodland	Ponderosa Pine	Mixed Conifer	Bosque
A 0 – 0.25	103	14	58	62	21	5
B 0.25 – 9.9	122	12	59	34	10	9
C 9.9 – 99.9	49	8	15	3	4	
D 100 – 299.9	11	2	4	1	2	
E 300 – 999.9	17	2	1		2	
F 1,000 – 4,999.9	11	1	2			
G 5,000 – 9,999.9	1			3		

Source: New Mexico State Forestry Division

4.4 Wildfire Ignition Risk Potential

Wildfire ignition risk potential (IRP) is a measure for the probability of fire occurrence. The IRP is a landscape spatial analysis of the 1987 to 2007 wildfire data presented in Map 7. IRP illustrates the patterns of fires in the various WUIs. IRP is defined as the number of fires per 1,000 acres for the years 1987 to 2007. No fires occurred in the low-risk areas. One fire occurred in the moderate-risk areas. Two or more fires occurred in the high-risk areas. The low-risk lands occupied 69 percent of Lincoln County, and fires generally occurred in areas away from communities and roads (Map 8). Seventeen percent of the county was classified as high-risk, and fires occurred near communities, roads, agricultural lands, and the railroad corridor. The moderate-risk areas accounted for 14 percent, and they occurred on lands between the high- and low-risk areas. IRP was used to determine the level of wildfire risk in the WUIs and to communities.

4.5 Vegetation-Fuel Hazards

Fire Regime Condition Class (FRCC) is a measure of the degree of departure from a reference condition, which is determined by comparing the existing fire regime and vegetation-fuels situation with the historic fire regime and natural vegetation, respectively (Table 11). The degree of departure may result from differences in the historical fire regime (i.e., fire return frequency and severity) and/or vegetation composition. According to HFRA, FRCC is the accepted tool for assessing forest or rangeland health. FRCC classification is necessary to support federal vegetation-fuel management in the WUI. Because, many times, changes in natural vegetation composition and structure (i.e., the presence of invasive weeds or overstocked forest stands) include changes in vegetation-fuel attributes (i.e., fuel continuity and load), FRCC may serve as a surrogate to judge the degree of fuels hazard. FRCC 1, FRCC 2, and FRCC 3 may be viewed as low-, moderate-, and high-hazard fuel conditions, respectively.

All three classes occur in the assessment area (Map 9). FRCC 1 is the least common, as it occupies approximately 16 percent of the county (Table 11). FRCC 2 and 3 occupy 36 and 46 percent, respectively. FRCC 1 vegetation occurs mainly in the west-central, southeastern, and south-central parts of the county. FRCC 2 vegetation is located in the southwestern, northwestern, central, and eastern portions. FRCC 3 is located mainly in the northeastern and central part of the county. All three classes occur within different

vegetation types. FRCC information was used to help define vegetation-fuel hazard in the WUIs and possible fuels management projects.

Table 11. Fire Regime Condition Class

Fire Regime Condition Class	Percent of County	Description
1	16	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g., native species, large trees, and soil) is low.
2	36	Fire behavior, effects, and other associated disturbances show moderate departure from the natural or historical conditions (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of loss of key ecosystem components is moderate.
3	46	Fire behavior, effects, and other associated disturbances show a high departure from natural or historic conditions (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

Source: http://www.frcc.gov

4.6 Wildfire Risk to Wildland-Urban Interface

Community and WUI assessments occurred December 5 through 10, 2007. The Core Team identified seven WUIs (Table 12). The WUIs represent a specific response area with unique characteristics, resources, and identifiable wildfire hazards and risks. Surveys of the WUIs were conducted to identify wildfire hazards using the NFPA 1144 procedure, fuel hazards, and values at risk. The risk of wildfire occurrence was judged based on the IRP map (Map 8). The seven WUIs are Ancho, Arabela, Carrizozo, Corona, Hondo-Tinnie, Nogal-Alto-Lincoln, and White Oaks (Map 4).

Table 12. Assessment Area Summary Information

Community	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
Arabela WUI					
Arabela	▪ Homes ▪ Wildlife habitat ▪ Aesthetics ▪ Air quality ▪ Soil stability	Moderate	High	▪ Limited ingress/egress ▪ Heavy vegetation-fuel loads ▪ Lack of defensible space around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Lack of structure sprinkler system	▪ Arabela FD ▪ Hydrants

Community	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
				▪ Utilities above ground	
Ancho WUI					
Ancho	▪ Homes ▪ Wildlife habitat ▪ Rangeland ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	High	▪ Moderate fuel loads ▪ Defensible space less than 30 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Lack of structure sprinkler system ▪ Utilities above ground	▪ Corona FD with extended response time ▪ Water is an issue
Carrizozo WUI					
Carrizozo	▪ Homes ▪ Businesses ▪ Tourism ▪ Agriculture land ▪ Railroad ▪ Watershed quality ▪ Wildlife habitat ▪ Rangeland ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	Low	▪ Light fuel loads ▪ Electrical utilities above ground ▪ Lack of structure sprinkler system	▪ Carrizozo FD ▪ Hydrants
Corona WUI					
Corona	▪ Homes ▪ Businesses ▪ Railroad ▪ Watershed quality ▪ Wildlife habitat ▪ Rangeland ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	Moderate	▪ Medium fuel loads ▪ Defensible space 30 to 70 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Combustible decks and porches ▪ Electrical utilities above ground ▪ Lack of structure sprinkler system	▪ Corona FD ▪ Hydrants
Hondo – Tinnie WUI					
Hondo-Tinnie	▪ Homes ▪ Businesses ▪ Major highway ▪ Agriculture land ▪ Watershed quality ▪ Wildlife habitat ▪ Aquatic habitat ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	Moderate	▪ Light fuel loads ▪ Defensible space less than 70 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Combustible porches and decks ▪ Lack of fixed sprinkler system in structures ▪ Utilities above	▪ Hondo FD ▪ Hydrants

Community	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
				ground	
Nogal-Alto-Lincoln WUI					
Alto	▪ Homes ▪ Businesses ▪ Recreation ▪ Tourism ▪ Communication towers ▪ Church camp ▪ Watershed quality ▪ Wildlife habitat ▪ Aquatic habitat ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	High	▪ Non-surfaced, steep roads ▪ Heavy vegetation-fuel loads ▪ Lack of defensible space around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Lack of structure sprinkler system ▪ Utilities above ground	▪ Bonito FD ▪ Ruidoso and Monjau fire lookout towers ▪ Hydrants
Capitan	▪ Homes ▪ Businesses ▪ Tourism ▪ Agriculture land ▪ Watershed quality ▪ Wildlife habitat ▪ Aquatic habitat ▪ Rangeland ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	Low	▪ Light fuel loads ▪ Electrical utilities above ground ▪ Lack of structure sprinkler system	▪ Capitan FD ▪ Hydrants
Fort Stanton	▪ Historic buildings ▪ Hospital ▪ Correctional institution ▪ Tourism ▪ Wildlife habitat ▪ Aquatic habitat ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	Low	▪ Medium vegetation-fuel loads ▪ Defensible space 30-70 feet from structures ▪ Structures with combustible sidings, porches, and decks	▪ Fort Stanton FD ▪ Hydrants
Glencoe	▪ Homes ▪ Historic buildings ▪ Businesses ▪ Tourism ▪ Recreation ▪ Major highway ▪ Watershed quality ▪ Wildlife habitat ▪ Aquatic habitat ▪ Rangeland ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	High	▪ Non-surface road ▪ Medium fuel loads ▪ Defensible space less than 25 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Combustible decks and porches ▪ Lack of fixed sprinkler system in structures ▪ Utilities above ground	▪ Glencoe FD ▪ Hydrants

Community	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
Lincoln	▪ Homes ▪ Historic buildings ▪ Businesses ▪ Tourism ▪ Recreation ▪ Agriculture land ▪ Major highway ▪ Watershed quality ▪ Wildlife habitat ▪ Aquatic habitat ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	High	▪ Medium fuel loads ▪ Defensible space less than 70 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Closeness of structures can contribute to fire spread ▪ Lack of structure sprinkler system ▪ Electrical utilities above ground	▪ Lincoln FD ▪ Hydrants
Nogal	▪ Homes ▪ Businesses ▪ Tourism ▪ Recreation ▪ Watershed quality ▪ Wildlife habitat ▪ Aquatic habitat ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	High	▪ Nogal Canyon limited ingress/egress with narrow road ▪ Limited fire service access ▪ Moderate to heavy fuel loads ▪ Lack of defensible space around structures ▪ Combustible structure siding, porches, and decks ▪ Terrain conducive to unfavorable fire behavior ▪ Utilities above ground	▪ Nogal FD ▪ Hydrants
White Oaks WUI					
White Oaks	▪ Homes ▪ Historic buildings ▪ Businesses ▪ Tourism ▪ Recreation ▪ Railroad ▪ Watershed quality ▪ Wildlife habitat ▪ Rangeland ▪ Aesthetics ▪ Air quality ▪ Soil stability	High	High	▪ Medium fuel loads ▪ Defensible space less than 25 feet around structures ▪ Terrain conducive to unfavorable fire behavior ▪ Closeness of structures can contribute to fire spread ▪ Combustible sidings, porches, and decks ▪ Structures lack fixed sprinkler system ▪ Utilities above ground	▪ White Oaks FD ▪ Hydrants

The communities of Alto, Ancho, Arabela, Glencoe, Lincoln, Nogal, and White Oaks received a high-hazard rating mainly because of the proximity of fuels, lack of defensible space, and terrain conducive to severe wildfire behavior. The communities of Corona and Hondo-Tinnie were ranked moderate-hazard because of limited defensible space around structures. Capitan, Carrizozo, and Fort Stanton received a low-hazard rating because of light fuels and sufficient defensible space around many structures. The Village of Ruidoso and City of Ruidoso Downs were not accessed in the plan since they are accessed in the Greater Ruidoso CWPP.

In the Greater Ruidoso CWPP, the Village of Ruidoso and City of Ruidoso Downs received a ranked high-hazard rating mainly because of the proximity of fuels, lack of defensible space, and terrain conducive to severe wildfire behavior.

5 WILDFIRE MITIGATION PLAN

Wildfire mitigation involves actions taken to reduce the likelihood of wildfire loss. Effective mitigation can be accomplished through a variety of methods including managing wildland vegetation-fuels, creating strategic fuel breaks, utilizing fire-resistant building materials and defensible space landscaping, improving emergency preparedness and response capabilities, upgrading current infrastructure, and developing programs that foster community awareness and action. Unincorporated communities may choose to petition Lincoln County to consider the implementation of the International Wildland-Urban Interface Code (IWUIC). Incorporated towns and villages should also consider adopting the IWUIC. Map 10 illustrates recommended fuels management projects.

5.1 Recommended Vegetation-Fuels Mitigation

Table 13 presents proposed priority fuels treatments and responsible organizations for implementing the various projects. Hazardous fuels reduction actions include such things as defensible space implementation around homes, mowing along highways and roads, weed abatement, fuel breaks, and improving FRCC 2/3 vegetation to FRCC 1 (Map 10). Those communities with a high wildfire hazard and IRP are those with an excellent chance to reduce fire danger.

Table 13. Proposed Priority Fuels Treatments for Lincoln County WUI Areas

Community	Priority Fuels Treatments	Responsible Organization
Arabela WUI		
Arabela	▪ Defensible space ▪ Fuel break around community ▪ Fuel break between USFS and private land ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ NMSFD/Private landowner ▪ USFS/Private landowner ▪ USFS/Private landowner
Ancho WUI		
Ancho	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ County/Private landowner ▪ State/County ▪ BLM/Private landowner
Carrizozo WUI		
Carrizozo	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Railroad right-of-way fuels abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ County/Village/Private landowner ▪ State/County ▪ Railroad company ▪ BLM/Private landowner
Corona WUI		
Corona	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break around village ▪ Fuel break between USFS and private land ▪ Railroad right-of-way fuels abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ County/Village/Private landowner ▪ State/County ▪ Village/NMSFD/Private landowner ▪ USFS/Private landowner ▪ Railroad company ▪ USFS/Private landowner
Hondo-Tinnie WUI		
Hondo-Tinnie Hondo-Tinnie	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break on USFS boundary as appropriate	▪ Homeowner ▪ County/Private landowner ▪ State/County/Private landowner ▪ USFS/Private landowner

Community	Priority Fuels Treatments	Responsible Organization
	▪ Salt cedar abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ SWCD ▪ USFS/Private Landowner
Nogal-Alto-Lincoln WUI		
Alto	▪ Defensible space ▪ Shaded fuel breaks along roads as appropriate ▪ Shaded fuel breaks along USFS and private land boundaries ▪ Manage FRCC 2/3 vegetation to FRCC 1 ▪ Complete 5-mile fuel break	▪ Homeowner ▪ County/NMSFD ▪ USFS/NMSFD/Private landowner ▪ USFS/NMSFD/Private landowner ▪ USFS
Capitan	▪ Defensible space ▪ Mowing along roads ▪ Grass/weed abatement ▪ Salt cedar abatement	▪ Homeowner ▪ State/County ▪ County/Village/Private landowner ▪ SWCD
Fort Stanton	▪ Grass/weed abatement ▪ Mowing along roads ▪ Reduce large woody debris and ladder fuels in riparian corridor ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ State ▪ County/BLM ▪ BLM ▪ BLM
Glencoe	▪ Defensible space ▪ Grass/weed abatement ▪ Fuel break along side roads as appropriate ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ County/Private landowner ▪ County/Private landowner ▪ USFS/Private landowner
Lincoln	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel breaks along USFS boundary as appropriate ▪ Fuel break southeast of town ▪ Salt cedar abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ USFS/Private landowner ▪ County/Private landowner ▪ USFS/Private landowner ▪ State/County ▪ Private landowner ▪ USFS/Private landowner
Nogal	▪ Defensible space ▪ Fuel break along Nogal Canyon Road ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break around community ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ County/NMSFD/Private landowner ▪ County ▪ State/County ▪ USFS/NMSFD/Private landowner ▪ USFS/Private landowner
White Oaks WUI		
White Oaks	▪ Defensible space ▪ Grass/weed abatement ▪ Fuel break around community ▪ Mowing along roads ▪ Juniper removal along White Oaks Highway as needed ▪ Railroad right-of-way fuels abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ Homeowner ▪ County/Private landowner ▪ NMSFD/Private landowner ▪ County ▪ County/NMSFD ▪ Railroad company ▪ BLM/Private landowner

5.1.1 Defensible Space

An action that can immediately improve community wildfire risks and hazards is the implementation of defensible space. It is recommended that defensible space be created for homes in all WUIs following NMSFD guidelines (www.emnrd.state.nm.us/fd/index.htm). Homeowners need to evaluate their own situations to determine needed actions. NMSFD and SWCD staff is available to help homeowners determine the best actions to protect structures. Also, considerable information is available through the Firewise program (www.firewise.org). Firewise is

an interagency effort to supply information and training to communities and homeowners on ways to reduce wildfire risks and hazards.

The defensible space concept can also be applied to such things as utility stations, communication towers, recreation facilities, and other important structures. Defensible space is an important practice for reducing wildfire risks and hazards to structures. Defensible space is part of the IWUIC and it is recommended by NMSFD.

When defensible space is combined with fire-resistant construction, the risk of structure loss is greatly reduced. When these principals are consistently applied across a neighborhood, everybody benefits. Additionally, in the event of a wildfire, homes and neighborhoods with defensible space are much more likely to be assigned structure defense crews than those without. Defensible space provides room for firefighters to protect structures. There are normally three components to a defensible space (Figure 1):

- Zone 1 is the area of maximum modification and treatment. It consists of an area 15 to 30 feet around the structure where all flammable vegetation is removed. Remaining vegetation is pruned, mowed, and watered. The width of Zone 1 depends on the flammability of the structure.
- Zone 2 is an area of fuel reduction that extends from Zone 1 up to a distance of 125 feet depending on slope. Stressed, diseased, dead, or dying trees and shrubs are removed. The remaining large trees and shrubs are trimmed and pruned to eliminate horizontal and vertical fuel continuity while enhancing home-site safety and aesthetics.
- Zone 3 is an area of management for landowner objectives and is of no particular size. It extends from the edge of Zone 2 to the property boundary.

Figure 1. NMSFD Defensible Space Guidelines and Standards (Dennis, not dated)

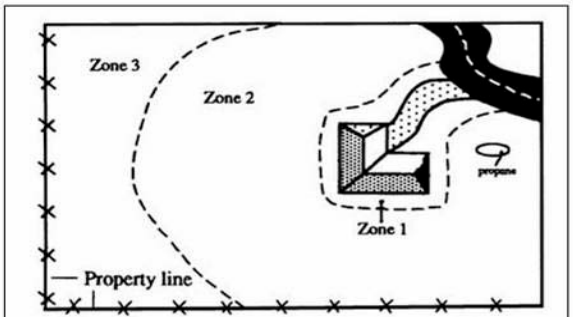


Figure 1: Forested property showing the three fire-defensible zones around a home or other structure.

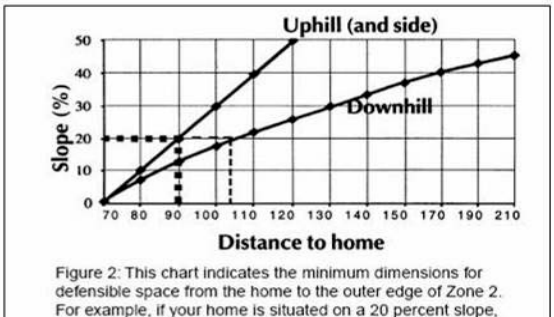


Figure 2: This chart indicates the minimum dimensions for defensible space from the home to the outer edge of Zone 2. For example, if your home is situated on a 20 percent slope, the minimum defensible space dimensions would be 90 feet uphill and to the sides of the home and 104 feet downhill from the home.

Defensible space efforts can be encouraged and coordinated annually through community meetings, planned spring cleanups, and organized disposal efforts. Although most of the work can be accomplished by individual homeowners in a phased approach over time, neighborhood cooperation and support is essential to help those who are unable, and to provide access to critical hazardous areas. Table 14 outlines a manageable phased implementation schedule.

Table 14. Proposed Defensible Space Schedule for Homeowners and Communities

Year	Project	Actions
1	Annual spring outreach	▪ Contact and/or organize homeowners
	Annual spring mitigation (defensible space)	▪ Clean roofs and gutters ▪ Trim and thin trees and bushes in Zone 1 ▪ Rake and remove fine fuels from Zones 1 and 2 ▪ Relocate firewood from Zone 1 to Zone 2 ▪ Help a neighbor ▪ Organize debris disposal
2	Annual spring outreach	▪ Contact and/or organize homeowners
	Annual spring mitigation (defensible space)	▪ Trim and thin trees and bushes in Zone 2 ▪ Repeat basic yard cleanup in Zones 1 and 2 ▪ Help a neighbor ▪ Organize woody debris disposal
3	Annual spring outreach	▪ Contact and/or organize homeowners ▪ Advise individual homeowners on needed improvements to construction features
	Annual spring mitigation (defensible space)	▪ If necessary, coordinate defensible space efforts between homeowner groups who have created defensible space and adjacent open space land managers ▪ Work with NMSFD to improve forest or rangeland health in Zone 3 ▪ Repeat basic yard cleanup in Zones 1 and 2
4	Annual spring outreach	▪ Contact and/or organize homeowners ▪ Follow up on construction feature recommendations
	Annual spring mitigation (defensible space)	▪ Complete any outstanding projects from previous years ▪ Continue maintenance phase ▪ Initiate construction feature improvements

The community of Lincoln County is conducting a project known as the "Lincoln Fuels Reduction Project." BLM has been working with private landowners to develop defensible space around structures, remove downed woody debris, and create fuel breaks.

5.1.2 Grass and Weed Abatement

A common fuel hazard is herbaceous weedy vegetation. Native and non-native weedy grasses and forbs become flashy fuels as they dry in the late summer and fall. These fine fuels ignite easily and burn rapidly. Herbaceous fuels are common and widespread in the WUIs. Herbaceous fuels occur among structures, along roads and driveways, in fallowed fields and abandoned lots, and in the railroad right-of-way.

Grass and weedy fuel abatement is important and must occur annually in order to be effective. Mechanical methods, manual methods, herbicide, prescribed fire, and livestock grazing can all be used to control grasses and weeds. The approach for grass and weed abatement depends on locations and land area. Sometimes a combination of methods is best. The key to successful herbaceous vegetation-fuel control is persistence, as it may take several years to achieve desired abatement. Mowing around structures and along roads and driveways is one way to reduce fuel load. Abatement can also occur with the limited use of herbicides by trained and certified applicators. Prescribed fire can be effective and safe when used in appropriate locations away from structures. Livestock grazing can be effective in reducing herbaceous fuel loads. The IWUIC provides

guidance on a weed abatement ordinance. Communities and private landowners should work with the county extension office to determine methods for weed abatement.

5.1.3 Mowing along Roads

Vegetation-fuel throughout Lincoln County is generally continuous. Highways and roads are features that provide a break to fuel continuity. Mowing to a minimum distance of 6 feet along highways and roads will enhance their usefulness as fuel breaks and reduce the chances of fire ignitions from vehicles or discarded smoking materials. The mowing along highways and roads should occur once in mid-summer and again in the fall depending on precipitation and subsequent herbaceous plant growth. New Mexico State Department of Transportation is responsible for mowing along state highways. Lincoln County is responsible for mowing along county roads. The BLM and USFS are responsible for their road systems. Private landowners should survey their roads and driveways to determine the need for mowing.

5.1.4 Fuel Breaks

A fuel break is an area of land in which fuel continuity and load is reduced to improve wildfire control opportunities (Dennis, not dated). Fuel breaks provide areas where firefighters may have opportunities to suppress fire. The width and length of the fuel break depends on terrain, wind patterns, and values to be protected. Strategically placed fuel breaks reduce horizontal and vertical fuel continuity.

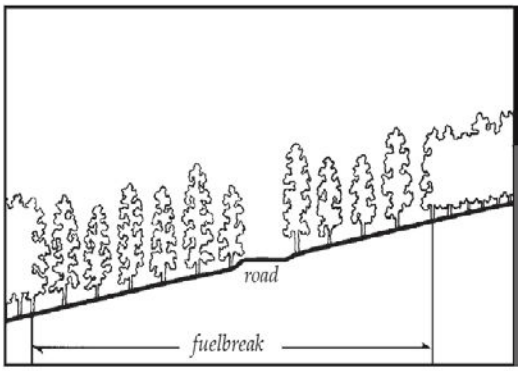
Fuel breaks do not require that all vegetation be removed to bare soil or rock (Figure 2). They can be aesthetically pleasing and improve wildfire habitat. Typically, trees are thinned to a spacing of 10 to 15 feet among tree canopies. Dead and diseased trees are removed. The lower tree limbs are pruned 6 to 10 feet from the ground depending on tree size. Ladder fuels are removed. Ladder fuels are the majority of small trees and large shrubs that may conduct fire in tree canopies. When thinning trees, it is important to leave trees of various sizes to create diversity. Herbaceous vegetation may be mowed or grazed to reduce its fuel load. Mechanical equipment and/or prescribed fire are used to create shaded fuel breaks. Prescribed fire may be useful in reducing shrub and herbaceous fuel loads. Areas with extensive vegetation removal because of dense tree and shrub growth may have to be reseeded with native grasses and forbs to reduce soil erosion and enhance wildfire habitat.

The woody debris harvested from the treated area will need to be disposed. Ideally, the woody debris will be utilized in a post-harvest economic manner. Information for post-harvest economic development opportunities can be obtained from the New Mexico Forest Industry Association (www.nmfia.org). The harvested limbs and trees can be made available to individuals for free firewood. The last option is to burn the woody debris in burn piles.

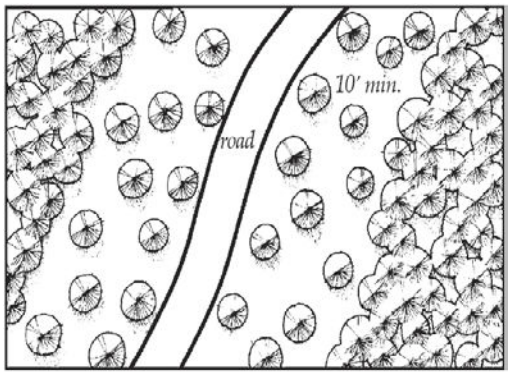
Fuel breaks are recommended for the Alto and Glencoe communities' roads, as appropriate, Nogal Canyon road, and White Oaks highway. Strategically located fuel breaks are recommended around the communities of Arabela, Corona, Nogal, and White Oaks. Strategically positioned fuel breaks also are recommended along public and private land boundaries. Such boundaries occur in all of the WUIs. Priority should be

given to Arabela, Lincoln, Fort Stanton, Glencoe, Alto, Nogal, White Oaks and Corona communities.

Figure 2. Fuel Break along a Road (Dennis, not dated)



Cross-section of a typical fuelbreak built in conjunction with a road.



Plan view of fuelbreak showing minimum distance between tree crowns.

5.1.5 Salt Cedar Abatement

Salt cedar is a noxious, invasive shrub that grows along Rio Hondo. Salt Cedar is ranked by New Mexico State as a Class C noxious weed. Class C weeds are widespread species with management decisions determined by local authorities based on feasibility of control and level of infestation (http://weeds.nmsu.edu/). Pertinent information on salt cedar ecology and reclamation methods has been compiled by New Mexico State University weed management specialists and can be found on their website at http://agesvr1.nmsu.edu/saltcedar/.

Salt cedar abatement is warranted because of its fuel load, high water use, and limited value as wildlife habitat. Priority treatment areas would be those with moderate to heavy fuel loads in proximity to communities, structures, and other values. Salt cedar is a flashy fuel that burns rapidly because of its fine foliage and essential oils. Salt cedar abatement can occur through mechanical harvest, herbicide, or prescribed fire. Usually, a combination of treatments is necessary for eradication because the shrub will readily root sprout. Mechanical harvest followed with painting the stumps with herbicide is an effective treatment. Treated areas should be re-planted with desirable vegetation such as willows or cottonwood trees.

5.1.6 Railroad Corridor Weed Control

Trains can be a significant source for fire ignitions because of sparks generated from such things as hot brakes or car couplers. Fires have occurred along the railroad corridor that passes through the Carrizozo, Ancho, and Corona WUIs. Vegetation-fuel management is needed along the corridor to reduce wildfire hazards. Appropriate action would be similar for grass and weed abatement as presented in Section 5.1.2.

5.1.7 FRCC Vegetation Management

FRCC is a measure of forest and rangeland health. Forests and rangelands classified as FRCC 2 or 3 are considered unhealthy because there have been changes in plant community attributes and/or the fire regime in comparison with conditions prior to European settlement. Eighty-two percent of the county is classified as FRCC 2 or 3.

Vegetation-fuels management plans should consider ways to improve forest and rangeland health. Prescribed fire, mechanical methods, and herbicide treatments can be used to remove unwanted plants and decrease woody plant density to improve plant community composition and structure in accordance with historic vegetation characteristics. Federal, state, and private landowners need to collaborate to improve FRCC. The BLM and USFS fuel treatments that are planned for the years 2008 through 2010 will improve FRCC at these sites (Map 10). Both agencies have in past years conducted extensive vegetation-fuels management in the assessment area to reduce vegetation-fuel hazards and improve forest and rangeland health.

The BLM Roswell Field Office has defined 33 vegetation-fuels treatments in the assessment area (Map 10). Areas treated will vary from 20 to 1,710 acres for a total of 5,212 acres. Treatments will be implemented during the years 2008 through 2010. Most of the treatments will occur on BLM land in the Fort Stanton WUI. Vegetation-fuel management will occur by mechanical tree/shrub thinning, burn-pile and broadcast prescribed fire, and herbicide application. Management objectives are to reduce fuel loads, improve wildlife habitat, and improve rangeland health.

The USFS Smokey Bear Ranger District has instigated vegetation-fuels management in the Turkey-Gavilan Fuels/Watershed Planning Area, Perk-Grindstone Fuels/Watershed Planning Area, and Eagle Fuels/Watershed Planning Area (Map 10). These large planning areas are located in the southern and southwestern portions of Lincoln County on USFS lands. The District has completed vegetation-fuels management projects in these planning areas in recent years to reduce the risk of wildfire and improve forest health. Additional vegetation-fuels management projects will occur in future years. However, specific projects have not yet been fully conceptualized. The purposes of the projects will be to increase fire suppression capabilities, minimize wildfire impacts, improve firefighter safety, improve forest health, and manage vegetation associations rated as FRCC 2/3 to FRCC 1. Prescribed fire and mechanical treatments will be used to achieve vegetation-fuels management objectives.

5.1.8 Treatment Options and Costs

Reducing vegetation-fuel continuity and load in Lincoln County will require a combination of treatment methods as described in the above sections and collaboration among agency and private landowners. Each of the recommended fuel mitigation projects can be achieved by a variety of methods (Table 15). Selecting the most appropriate, cost-effective option is an important planning step. This brief synopsis of treatment options and cost estimates is provided to assist in this process. Cost estimates for treatments are relative and should be considered as general guidelines. Fuel treatment costs can vary tremendously based on vegetation-fuel attributes, pre-project preparations,

acres to be treated, slope, proximity to structures, access, erosion control and surface water protection, and transportation costs.

It is imperative that implementers plan for long-term monitoring and maintenance of all treatments. Costs should also consider post-treatment rehabilitation needs including seeding with native plants, weed abatement, and soil erosion control.

Table 15. Treatment Methods

Treatment	Estimated Cost	Comments
Machine Mowing	$90–$200 per acre	▪ Appropriate for large, flat grassy areas on relatively flat topography
Prescribed Fire	$100–$125 per acre	▪ Can be cost effective ▪ Ecologically beneficial ▪ Can be used as training opportunities for firefighters ▪ Cost varies with complexity ▪ 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 (Gamble oak in particular) tend to re-sprout vigorously after mechanical treatment ▪ Follow-up treatments with herbicides, fire, grazing, or further mechanical treatments are typically necessary ▪ Mastication tends to be less expensive than manual treatment and eliminates disposal issues
Timber Mastication	$300–$1,200 per acre	▪ Materials up to 10 inches in diameter and slopes up to 30 percent can be treated ▪ Eliminates disposal issues ▪ Environmental impacts of residue being left on site are still under study as the mulch may inhibit seed germination
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, and pile burning of slash
Feller Buncher	$750–$900 per acre	▪ Mechanical treatment on slopes over 30 percent or of materials over 10 inches in diameter may require a feller buncher rather than a masticator ▪ Costs tend to be considerably higher than mastication ▪ May allow for removal of merchantable material
Herbicide	$15–$65 per gallon	▪ Application can be species- or area-specific ▪ Cost per acre will vary depending on application rates and target species ▪ Easy to apply on steep slopes and other rough terrain ▪ Costs may be lower than mechanical methods ▪ Dead woody material may need to be removed ▪ Applicator license required

5.2 Recommended Non-Fuels Mitigation

5.2.1 Public Outreach and Education

An effective means to initiate local action is through community education and public outreach. Community outreach could occur in each WUI. Examples of the purposes of public outreach include:

- Initiate creation of a WUI or community oversight group to support CWPP implementation and seek grant funding;
- Introduce and discuss the benefits of IWUIC defensible space and construction principals;
- Promote and collaborate on developing defensible spaces around structures;
- Increase awareness for the need to improve forest and rangeland health to reduce wildfire risk; and
- Identify and map evacuation routes.

Annual WUI or community meetings in the spring can spur action on the part of neighborhoods and individuals. This can be a forum for presentations by firewise experts and allow for coordination of cleanup efforts within the community. Firewise materials and postings should be made available at fire stations, post offices, and schools on a regular basis. The scheduling of an annual "Defensible Space Week" would remind residents of the need to maintain their property. A WUI or community would hire a contractor to remove harvested plant materials along roads. Each residence would pay for the provided service.

5.2.2 Reducing Structure Flammability

Improving the fire-resistant characteristics of structures in the assessment area goes hand-in-hand with the development of defensible space. An important improvement that can be made for many structures is replacing roofs with low flammable materials. Screening gutters, roof vents, and deck or porch openings is recommended. Embers from a wildfire can become windborne and travel long distances before settling on structure roofs and in crevices that could result in fire. Common structural fuel hazards associated with homes in the assessment area include:

- Combustible roofs and siding materials;
- Decks or porches with exposed undersides;
- Open attic vents;
- Propane tanks adjacent or downhill from home; and
- Combustible fences attached to structures.

A recommendation is for Lincoln County and the incorporated cities and villages to consider the adoption of the IWUIC, which will ensure that new construction and remodels will be fire-resistant. The objective of the IWUIC is to establish minimum regulations consistent with nationally recognized good practices for safeguarding life and

property. Regulations in the code are intended to mitigate wildfire risks and hazards and to prevent fire from spreading from structure to structure in the WUI. The codes also help ensure that there is access and water supply for fire suppression. The following items are examples of issues covered by the code:

- Ignition-resistant building materials on new construction, additions, and remodels;
- Ignition-resistant building techniques (such as covering eaves, no openings under houses, decks or porches) on new construction, additions, and remodels;
- Driveway access for fire apparatus;
- Vegetation plans for new structures and subdivisions that meet defensible space requirements;
- Vegetation and weed control codes;
- Water supply requirements to ensure continuous water supply during a fire; and
- Structure-address marking and road marking.

Information on IWUIC fee-based training and the purchase of the code manual may occur at http://www.iccsafe.org. A source of free information for reducing structure flammability and community hazard is the interagency Firewise program (www.firewise.com). WUIs and/or communities may want to consider becoming Firewise certified communities.

5.2.3 Strengthen Fire Protection Authorities

The fire protection authorities include CFDs, MFDs, the NMSFD, the USFS, and the BLM. These fire authorities put forth tremendous efforts to suppress small fires before they grow into large fires. Even so, all agencies need to collaborate to maintain, and in some cases, improve wildfire fighting equipment, engines, and firefighter training. Table 16 presents information on resource and training needs obtained from the interviews. CFDs need to work with Lincoln County Office of Emergency Services to obtain funding for upgrading resources and improve firefighting training.

Table 16. Wildfire Protection Authorities' Resource and Training Needs

Authority	Resources Needs	Training Needs
Arabela FD	▪ 5 sets of hand tools ▪ One brush engine ▪ 5 sets of PPE and shelters ▪ 5 handheld radios	▪ Annual National Wildfire Coordination Group (NWCG) training ▪ NWCG FFT2 with training on weekends
Bonito FD	▪ 15 sets of PEE and shelters	▪ NWCG FFT1, FFT2, ENGB, Dozer Boss (DOZB), Crew Boss (CRWB), etc. ▪ NWCG annual training
Capitan FD	▪ Upgrade form capacity on all brush engines	▪ NWCG FFT2 with training on weekends ▪ NWCG annual training
Carrizozo FD	▪ One Type 6 engine ▪ 5 sets of hand tools ▪ 10 sets of PPE and shelters	▪ Annual NWCG training ▪ NWCG FFT2 with training on weekends

Authority	Resources Needs	Training Needs
Corona FD	▪ One 2000 g tender ▪ 14 handheld radios	▪ Annual NWCG training ▪ Currently receiving training through New Mexico Training Facility on weekends
Fort Stanton FD	▪ 6 sets of PPE and shelters ▪ One 250 g brush engine	▪ Constant training need because of 6-month turnover in firefighters
Glencoe FD	▪ Information not available	▪ Information not available
Hondo FD	▪ 10 sets of PPE and shelters ▪ 3 sets of hand tools ▪ 5 handheld radios	▪ NWCG annual training ▪ Volunteers trained at NWCG FFT2
Lincoln FD	▪ One 2000 g tender	▪ NWCG annual training ▪ Volunteers trained at NWCG FFT2
Nogal FD	▪ One brush engine ▪ New fire station south end of district ▪ Upgrade hydrant system	▪ Annual NWCG training ▪ NWCG FFT2 with training on weekends
White Oaks FD	▪ Information not available	▪ Information not available
BLM	▪ No needs identified	▪ No needs identified
NMSFD	▪ No needs identified	▪ Annual NWCG training ▪ Train with CFDs
USFS	▪ One Type 6 engine ▪ 10-person fuels crew	▪ NWCG annual training ▪ Train with CFDs

A common need among CFDs and MFDs is weekend training because volunteer firefighters work during the week. It is not reasonable to expect volunteers to take time off from their employment for firefighting training. This means that the NWCG Firefighter 2 and 1 class's need to be taught over several weekends. The Corona FD is currently receiving training through the New Mexico Training Facility on weekends in Corona. If this approach to training is successful, perhaps it should be made available to other FDs. Another source for training is the Sierra Blanca Wildland Fire Academy in Ruidoso.

Another common need of FDs is strategically located water sources throughout their extended response areas. The CFDs and all MFDs have hydrant systems or other water sources close to their stations for re-filling tenders and brush engines. However, with distance from communities, reliable water sources are scarce in many districts. Also, water sources for new subdivisions maybe lacking. A recommendation is that all FDs review their water needs and current water sources. Identify areas where water is not readily available, and identify ways to correct the situation. Strategically located water sources should be identified throughout a response area and mapped. These sites might include stock ponds, irrigation systems, or developing a dry hydrant system serviced by a well. The need for access to private lands for water drafting should be negotiated with the landowner. All water sources should be evaluated at least annually to evaluate the need for maintenance or replacement.

5.3 Implementation of Mitigation Recommendations

5.3.1 Project Support

Grant funding support is often a necessary component of a fuels treatment project and can facilitate recommended mitigation on both private and public lands. In addition to opportunities that may be available through NMSFD or New Mexico Associations of Counties, an excellent resource for researching available public funding sources is the Southwest Area Forest, Fire, and Community Assistance Grants website (http://www.southwestareagrants.org/).

The CWPP development process is designed to facilitate collaboration with federal and state agencies on public and private wildfire and fuels management strategies. As the CWPP strategic plan is implemented, dialogue and collaboration needs to be maintained with these agencies in order to coordinate strategies and treatments, and make adjustments if necessary. Annual meetings are necessary to discuss completed projects, the status of multi-year projects, and future projects. The CWPP should be adjusted according to accomplishments and future needs.

One of the major issues confronting defensible space and vegetation-fuels mitigation is the need for continual maintenance. Defensible spaces around structures require annual maintenance to remove fine fuels, which accumulate during the year. Herbaceous fuels along roads and in fields need annual mowing or grazing as appropriate. Shaded fuel breaks and prescribed fire may have an effective life span of 10 to 15 years before trees and shrubs once again become hazardous fuels. Federal, state, and private landowners will need to evaluate fuel treatments on their lands to determine the need for maintenance. Also, as areas are developed with new housing and communities, vegetation-fuels management will need to occur on an individual basis. However, with adoption of the IWUIC, existing and new communities will have guidance on landscaping and construction standards.

5.3.2 Vegetation-Fuels Mitigation Schedule

Table 17 recommends a general schedule for vegetation-fuels mitigation projects throughout the assessment area. A five-year timeframe is proposed to accomplish all vegetation-fuels projects. A schedule for defensible space installment is presented in Table 14. Projects such as mowing along roads need to occur on an annual basis or perhaps more often depending on herbaceous plant growth in response to precipitation. Fuel break development along roads, wildlife areas, and federal lands will depend on resources available including money and availability of fuel-management crews. National Environmental Policy Act (NEPA) requirements and other agency-specific necessities need to be satisfied before fuel treatments occur on federal lands. Forest and rangeland health management (i.e., FRCC classification) should occur annually because improving plant community health needs to be considered as a part of all projects.

The communities with an asterisk (*H*) next to them are priority fuel projects.

Table 17. Recommend Vegetation-Fuels Management Schedule

Community	Proposed Fuels Treatments	Schedule
Arabela WUI		
Arabela	▪ Defensible space ▪ Fuel break around community ▪ Fuel break between USFS and private land ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ 2010 ▪ 2012 ▪ Annually
Ancho WUI		
Ancho	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ Annually ▪ Annually
Carrizozo WUI		
Carrizozo	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break on USFS boundary as appropriate ▪ Railroad right-of-way fuels abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ Annually ▪ 2010 ▪ Annually ▪ Annually
Corona WUI		
Corona	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break around village ▪ Fuel break between USFS and private land ▪ Railroad right-of-way fuels abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ Annually ▪ 2010 ▪ 2012 ▪ Annually ▪ Annually
Hondo-Tinnie WUI		
Hondo-Tinnie	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break on USFS boundary as appropriate ▪ Salt cedar abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ Annually ▪ 2012 ▪ 2011 ▪ Annually
Nogal-Alto-Lincoln WUI		
Alto **(*H*)**	▪ Defensible space ▪ Shaded fuel breaks along roads as appropriate ▪ Shaded fuel breaks along USFS and private land boundaries ▪ Manage FRCC 2/3 vegetation to FRCC 1 ▪ Complete 5-mile fuel break	▪ See Table 14 ▪ 2010 ▪ 2012 ▪ Annually ▪ 2012
Capitan	▪ Defensible space ▪ Mowing along roads ▪ Grass/weed abatement ▪ Salt cedar abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ Annually ▪ 2011 ▪ Annually
Fort Stanton	▪ Grass/weed abatement ▪ Mowing along roads ▪ Reduce large woody debris and ladder fuels in riparian corridor ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ 2010 ▪ Annually
Glencoe	▪ Defensible space ▪ Grass/weed abatement ▪ Fuel break along side roads as appropriate ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ 2010 ▪ Annually

Community	Proposed Fuels Treatments	Schedule
Lincoln **(*H*)**	▪ Defensible space ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel breaks along USFS boundary as appropriate ▪ Fuel break southeast of town ▪ Salt cedar abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ Annually ▪ 2012 ▪ 2010 ▪ 2011 ▪ Annually
Nogal **(*H*)**	▪ Defensible space ▪ Fuel break along Nogal Canyon Road ▪ Grass/weed abatement ▪ Mowing along roads ▪ Fuel break around community ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ 2011 ▪ Annually ▪ Annually ▪ 2010 ▪ Annually
White Oaks WUI		
White Oaks	▪ Defensible space ▪ Grass/weed abatement ▪ Fuel break around community ▪ Mowing along roads ▪ Juniper removal along White Oaks Highway as needed ▪ Railroad right-of-way fuels abatement ▪ Manage FRCC 2/3 vegetation to FRCC 1	▪ See Table 14 ▪ Annually ▪ 2010 ▪ Annually ▪ 2011 ▪ Annually ▪ Annually

5.3.3 Prioritized Fuel Treatments

The prioritized fuel treatments are: the Alto area, complete the 5 mile fuel break on the forest boundary on the west side of highway 48 and a fuel break around the community. For the Nogal area, a fuel break along the Nogal Canyon Road and a fuel break around the community. For the Lincoln area a fuel break southeast of town and fuel breaks along the Forest Service boundary.

EMERGENCY OPERATIONS

5.4 Fire Authority Response

Wildfire suppression in Lincoln County is provided by CFDs, MFDs, NMSFD, USFS, and BLM. Each fire authority has its own operational procedures. However, the IJPA provides for mutual aid and support for wildfire incidents. IA on a wildfire is the first responding force to a wildfire. The closest fire authority to a wildfire is usually the IA force. An extended attack (EA) occurs when fire escapes IA and additional forces are needed for suppression or the fire threatens important values such a structures.

The risk of large-scale wildfire exists in all seven WUIs (Map 4). But wildfire may occur at any season throughout the county. The potential for wildfire rate of spread and severity to exceed the IA suppression capability is great because of fuel continuity and load. This is especially true where the surrounding terrain is difficult to access. The maintenance of training, apparatus, and equipment is essential for rapid response. Extended wildfire incidents in the assessment area could become very complex management challenges. The development and annual review of pre-attack plans for specific locations and scenarios in coordination with likely cooperators would provide tactical and strategic guidelines in the event of an actual wildfire.

5.5 Family Emergency Preparedness

The time to plan for an emergency evacuation is before the incident occurs. Family members should understand what actions are needed in the event of a wildfire incident. Information on preparing for a wildfire evacuation is presented at Firewise (www.firewise.org).

Families can take several steps to prepare for a wildfire event to improve safety and FD response. A defensible space should be developed around homes and other structures. Families should have emergency numbers readily available. Private roads and driveways should be at least 12-feet wide with a 15-foot vertical clearance for family egress and emergency vehicle access. House numbers and street signs should be readily visible. Hand tools such as rakes and shovels are valuable for fighting spot fires and debris cleanup. A fully charged hose that reaches around the house should also be available for firefighter use. Families should have known meeting locations and phone numbers to call in case family members are separated.

In the event that New Mexico State Police orders a community to evacuate because of threatening wildfire, residents should leave in an orderly manner. The State Police would proclaim the preferred evacuation routes and evacuation centers. However, the need for evacuation can occur without notice when conditions for wildfire are favorable. Homeowners should be prepared to evacuate without formal notice. Wildfires can occur unexpectedly even in the low-risk WUIs.

Before residents leave, they should take every precaution to reduce the chance of structure loss as time allows. Human safety is the number one concern in an evacuation. Actions could include removing all debris from rain gutters and the roof; ensuring all flammable materials such as woodpiles, leaves, debris, and patio furniture are at least 30 feet from the house; and cleaning leaves and twigs from underneath decks and porches.

Windows and doors should be closed but not locked. Other openings should be covered. A ladder should be placed for roof access by firefighters, and porch lights left on to allow firefighters to find homes at night. Families should take important papers, documents, pets, food, water, medicines, and other essential items with them.

The exterior of structures should be monitored for smoke for several days after return as embers may lodge in small cracks and crevices and smolder before flaming.

Evacuation routes vary according to WUI (Table18). The appropriate FD should ensure that residents have the opportunity to become familiar with these procedures. Evacuation plans should outline routes and available evacuation centers. These procedures should be addressed in community meetings, newspaper releases, and distributed door-to-door.

Table 18. Evacuation Routes for Lincoln County Communities

Community	Primary Evacuation Route	Secondary Evacuation Route
Alto	State Highway 48	State Highway 532
Ancho	Ancho Highway	Ancho Road
Arabela	State Highway 368	County Road BO31
Capitan	U.S. Highway 380	State Highways 48 and 246
Carrizozo	U.S. Highway 380, 285	Water Canyon
Corona	State Highway 247, US Highway 54	County Line Road
Fort Stanton	State Road 214	State Highway 220
Glencoe	U.S. Highway 70	Coe Canyon Road
Hondo-Tinnie	U.S. Highway 70, 380	Alamo Canyon Road, Picacho Road
Lincoln	U.S. Highway 380	Las Pasadas
Nogal	State Highway 37	Ranchmans Camp Road
White Oaks	State Highway 349	White Oaks Highway

The main evacuation routes for all communities are paved and maintained by federal, state, or county agencies. Because there are small, isolated residences throughout the county, evacuation routes should be identified that would be suitable for these communities. Families away from communities need to determine primary and secondary evacuation routes that would be suitable for their situations. All county residents should have information on primary and secondary evacuation routes.

6 LINCOLN COUNTY CWPP MONITORING AND EVALUATION

6.1 CWPP Plan Adoption

Interagency collaboration, public meetings, and public comment opportunities were incorporated into the CWPP process to provide the opportunity for widespread participation and input. Comments and input were solicited from federal, state, and local agencies, and stakeholders. The CWPP was formally adopted by the Core Team, comprised of representatives from the federal, state, and local agencies.

The HFRA authority for CWPP requires adoption of this plan, as does the FEMA Disaster Mitigation Act of 2000. With formal adoption by the Core Team, participating agencies and WUI communities will be competitive for available hazardous fuels and non-fuels mitigation funding that may assist with plan implementation. Furthermore, adoption of this plan highlights a collaborative planning and development process among federal, state, and county agencies, WUI communities, and private landowners.

6.2 Sustaining CWPP Efforts

A CWPP can serve as the foundation for a safer and healthier Lincoln County through strategic planning, focusing on the threat of wildfire. The mitigation strategies outlined in this report will greatly reduce risk, but only if implemented. Converting strategy into action is the key to achieving the goals and objectives of the planning process.

The CWPP process encourages private landowners to take an active role as fuel treatment strategies are developed and prioritized. Ownership of CWPP implementation at the WUI level is the most effective means to achieving effective results and sustaining the effort from year to year. WUIs may choose to develop their own CWPP specific to their needs.

Proactive communities can seek support and guidance through a variety of state and local resources including NMSFD, Lincoln County Emergency Services, and local FDs. The Firewise program is an excellent source for information on ways to help communities reduce wildfire risks and hazards (www.firewise.org).

6.3 CWPP Oversight, Monitoring, and Evaluation

As wildfire hazard reduction efforts are implemented over time and the characteristics of the WUI change, the County may wish to reassess particular areas and update the CWPP. A WUI may want to develop a CWPP specific to their vegetation-fuels management needs.

Monitoring the progress of project implementation and evaluating the effectiveness of treatments is an important component of CWPP oversight and maintenance. The assessment methodology utilized in this report is a standardized, well-documented hazard and risk survey approach that is designed to provide a benchmark against which future assessments may be compared. Successes, challenges, and new concerns should be noted and guide any modifications to the CWPP that better accommodate changing communities.

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APPENDIX A
MAPS

Map 1. Lincoln County CWPP Land Ownership
Map 2. Lincoln County CWPP Vegetation (Acres)
Map 3. Lincoln County CWPP Infrastructure
Map 4. Lincoln County CWPP Wildland-Urban Interface
Map 5. Lincoln County CWPP Fire Behavior Fuel Model
Map 6. Lincoln County CWPP Historic Reference Fire Regime (Acres)
Map 7. Lincoln County CWPP Fire History 1987–2007
Map 8. Lincoln County Ignition Risk Potential
Map 9. Lincoln County CWPP Fire Regime Condition Class (Acres)
Map 10. Lincoln County CWPP Fuel Treatments

APPENDIX B
NFPA WILDLAND FIRE RISK AND HAZARD SEVERITY ASSESSMENT FORM 1144

WILDLAND FIRE RISK AND HAZARD SEVERITY ASSESSMENT FORM

Assign a value to the most appropriate element in each category and place the number of points in the column on the right.

Element	Points	
A. Means of Access		
1. Ingress and egress		
a. Two or more roads in/out	0	_____
b. One road in/out	7	_____
2. Road width		
a. ≥7.3 m (24 ft)	0	_____
b. ≥6.1 m (20 ft) and <7.3 m (24 ft)	2	_____
c. <6.1 m (20 ft)	4	_____
3. All-season road condition		
a. Surfaced road, grade <5%	0	_____
b. Surfaced road, grade >5%	2	_____
c. Non-surfaced road, grade <5%	2	_____
d. Non-surfaced road, grade >5%	5	_____
e. Other than all-season	7	_____
4. Fire Service Access		
a. ≤91.4 m (300 ft) with turnaround	0	_____
b. >91.4 m (300 ft) with turnaround	2	_____
c. <91.4 m (300 ft) with no turnaround	4	_____
d. ≥91.4 m (300 ft) with no turnaround	5	_____
5. Street signs		
a. Present [10.2 cm (4 in.) in size and reflectorized]	0	_____
b. Not present	5	_____
B. Vegetation (Fuel Models)		
1. Characteristics of predominate vegetation within 91.4 m (300 ft)		
a. Light (e.g., grasses, forbs, sawgrasses, and tundra) NFDRS Fuel Models A, C, L, N, S, and T	5	_____
b. Medium (e.g., light brush and small trees) NFDRS Fuel Models D, E, F, H, P, Q, and U	10	_____
c. Heavy (e.g., dense brush, timber, and hardwoods) NFDRS Fuel Models B, G, and O	20	_____
d. Slash (e.g., timber harvesting residue) NFDRS Fuel Models J, K, and L	25	_____
2. Defensible space		
a. More than 30.48 m (100 ft) of vegetation treatment from the structure(s)	1	_____
b. 21.6 m to 30.48 m (71 ft to 100 ft) of vegetation treatment from the structure(s)	3	_____
c. 9.14 m to 21.3 m (30 ft to 70 ft) of vegetation treatment from the structure(s)	10	_____
d. <9.14 m (30 ft) of vegetation treatment from the structure(s)	25	_____
C. Topography Within 91.4 m (300 ft) of Structure(s)		
1. Slope <9%	1	_____
2. Slope 10% to 20%	4	_____
3. Slope 21% to 30%	7	_____
4. Slope 31% to 40%	8	_____
5. Slope >41%	10	_____

(NFPA 1144, 1 of 2)

Element	Points	
D. Additional Rating Factors (rate all that apply)		
1. Topographical features that adversely affect wildland fire behavior	0–5	_____
2. Areas with a history of higher fire occurrence than surrounding areas due to special situations (e.g., heavy lightning, railroads, escaped debris burning, and arson)	0–5	_____
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds	0–5	_____
4. Separation of adjacent structures that can contribute to fire spread	0–5	_____
E. Roofing Assembly		
1. Class A roof	0	_____
2. Class B roof	3	_____
3. Class C roof	15	_____
4. Nonrated	25	_____
F. Building Construction		
1. Materials (predominate)		
a. Noncombustible/fire-resistive siding, eaves, and deck (*see Chapter 8*)	0	_____
b. Noncombustible/fire-resistive siding and combustible deck	5	_____
c. Combustible siding and deck	10	_____
2. Building setback relative to slopes of 30% or more		
a. ≥9.14 m (30 ft) to slope	1	_____
b. <9.14 m (30 ft) to slope	5	_____
G. Available Fire Protection		
1. Water source availability		
a. Pressurized water source availability		
1892.7 L/min (500 gpm) hydrants ≤304.8 m (1000 ft) apart	0	_____
946.4 L/min (250 gpm) hydrants ≤304.8 m (1000 ft) apart	1	_____
b. Nonpressurized water source availability (off site)		
≥946.4 L/min (250 gpm) continuous for 2 hours	3	_____
<946.4 L/min (250 gpm) continuous for 2 hours	5	_____
c. Water unavailable	10	_____
2. Organized response resources		
a. Station ≤8 km (5 mi.) from structure	1	_____
b. Station >8 km (5 mi.) from structure	3	_____
3. Fixed fire protection		
a. NFPA 13, 13R, 13D sprinkler system	0	_____
b. None	5	_____
H. Placement of Gas and Electric Utilities		
1. Both underground	0	_____
2. One underground, one aboveground	3	_____
3. Both aboveground	5	_____
I. Totals for Home or Subdivision (Total of all points)		

Hazard Assessment	Total Points
Low hazard	<40
Moderate hazard	40–69
High hazard	70–112
Extreme hazard	>112

(NFPA 1144, 2 of 2)

APPENDIX C
QUESTIONNAIRE

Questionnaire for Lincoln County Community Wildfire Protection Plan

March 2008

Lincoln County Office of Emergency Services contracted with Walsh Environmental Scientists and Engineers, LLC to develop the Lincoln County Community Wildfire Protection Plan (CWPP). The CWPP is a collaborative effort among federal, state, county, community, and private landowners to determine ways to reduce the risks of wildfire. The results of this questionnaire will be used to help identify and prioritize appropriate mitigation actions. You can help by responding to this questionnaire. Please mail, fax, or e-mail this questionnaire to one of the addresses on the back by March 15.

1. What **community** do you live in or are you closest to? (please write in)	
2. How great of **risk** does wildfire pose to your community?	□ Extreme Risk □ Moderate Risk □ Low Risk □ No Risk
3. What areas are at **extreme fire hazard** and pose a risk to homes or property?	□ Forestlands □ Grasslands □ Shrublands □ Juniper Stands □ Other Areas: _____ **Location:**
4. What is the best way to mitigate or reduce wildfire hazards?	□ Increase number of fire department personnel □ Reduce vegetation (grasses, trees, etc.) on public lands by controlled burns. □ Reduce vegetation (grasses, trees, etc.) on public lands by mechanical treatments. □ Increase firefighting equipment (more trucks, water tenders, etc.) □ Increase water availability □ Encourage private landowners to reduce fuels and develop defensible spaces around structures.

5. What **recent actions** have been taken to reduce the risk of wildfire to your community?	□ None that I am aware of. □ If you know of actions that have been taken, please explain:
6. What **fire education programs** have occurred in your community?	□ None that I am aware of. □ If you know of programs that have occurred, please explain:
7. Is the community **prepared** to combat wildfire?	□ □ No, if not, why: □ □ □ Yes, if so, why: □ □ □ I do not know
8. What **actions** do you think need to be taken to reduce the risk of wildland fire?	
Additional Comments:	

Please provide **contact information** in case we have further questions:

Name	
Address	
Phone	

Please fill out this survey and mail, fax, or email your response to:

Lincoln County Emergency Services Travis Atwell, Coordinator 115 Kansas City Rd Ruidoso, NM 88345 505-258-9998 (fax) awfr107@hotmail.com	Walsh Environmental Jerry Barker 4888 Pearl E. Circle, Suite 108 Boulder, CO 80301-2475 303-443-0367 (fax) E-mail: jbarker@walshenv.com

APPENDIX D
QUESTIONNAIRE FEEDBACK SUMMARY

Questionnaire Summary

Questionnaires were provided to the public at public meetings convened on March 17 and 18, 2008. There have been two questionnaires received to date.

Questionnaire Summary

Question		Number of Response
2. How great of risk do wildfires pose to your property and community?	Extreme	2
	Moderate	
	Low	
	None	
3. What areas do you think are at extreme fire hazard and pose a risk to homes or property?	Forestlands	2
	Grasslands	
	Shrublands	
	Woodlands	
	Other	
4. What do you think would be the best way to mitigate or reduce these hazardous?	Prescribed fire	
	Mechanical control	
	Fuel breaks	1
	Increase Equipment	
	Increase Volunteers	
	Increase available water	
	Develop Defensible Space	1
	Firewise Education	1
	Evacuation Routes	
5. Do you know of recent actions taken to reduce the risk of wildfires or to protect residents from wildfire spreading from public lands onto private lands or vice versa? See Table A.	No	1
	Yes	1
6. Have there been recent fire education programs in your community? See Table B	No	1
	Yes	1
7. Do you think that the community in which you live is prepared to combat wildfire? See Table C	No	
	Yes	2
	I do not know	
8. What actions do you think need to be taken to reduce wildfire risk? See Table 2.	See Table D for responses.	

Table A. Summary of Responses to Question Number 5

Comment	Number Received	Comment
1	1	Soil Water Conservation District working on public and private lands
2		
3		
4		
5		

Table B. Summary of Responses to Question Number 6

Comment	Number Received	Comment
1	1	We need it for absentee landowners
2	1	Public meetings and materials available at city hall
3		
4		
5		
6		

Table C. Summary of Responses to Question Number 7

Comment	Number Received	Comment
1	2	Strong training and people who live here; there is a fire plan
2		
3		
4		
5		

Table D. Summary of Responses to Question Number 8

Comment	Number Received	Comment
1	2	Fuel break around community
2	1	Create defensible space around structures
3	1	Law to enforce property owners to clean up
4	1	Mow along roads
5		
6		

APPENDIX E
LIST OF PREPARERS

Preparer	Company
Jerry Barker, Ph,D., Rangeland and Fire Ecologist	Walsh Environmental Scientists and Engineers, LLC
Margaret Carew, Geographical Information System (GIS) Specialist	Walsh Environmental Scientists and Engineers, LLC
Stan Spencer, Principal Scientist	Walsh Environmental Scientists and Engineers, LLC
Eric Linderman, Technical Editor	Walsh Environmental Scientists and Engineers, LLC

APPENDIX F
CORE TEAM MEMBERS AND ORGANIZATION REPRESENTATIVES ASKED TO REVIEW DRAFT CWPP

Review	Organization
Thomas Stewart	County Manager
James Mason	County Emergency Services Director
Travis Atwell	County Emergency Services Coordinator
Eddie Tudor	NMSFD Capitan District Forester
Nancy Rose	Cibola National Forest Supervisor
Lou Woltering	Lincoln National Forest Supervisor
Eddie Bateson	BLM Roswell Field Office Manager
Clark Taylor	Carrizozo SWCD Chair
Glenda Booker	Upper Hondo SWCD Chair
Phillipe Labota	Claunch-Pinto SWCD Chair
Dierdre Tarr	Claunch-Pinto SWCD
Rick DeIaco	Village of Ruidoso Forestry
L. Ray Nunley	Village of Ruidoso Mayor
John Waters	Ruidoso Downs City Manager
Sam Hammons	Village of Capitan Mayor
William Hignight	Corona Mayor
Kim Kuhar	Smokey Bear Ranger District
David Cox	Village of Capitan FD
Walter Hill	Town of Carrizozo FD
Walter Garfield	Village of Corona FD
Fernando Montoya	Arabela FD
Carl Bartley	Bonito FD
Barney Mancha	Fort Stanton FD
Mike Lopes	Glencoe-Palo Verde FD

Review	Organization
Modesto Chavez	Hondo FD
Bennie Long	Lincoln FD
Ken Cramer	Nogal FD
Bob Cranston	White Oaks FD

APPENDIX G
CD-ROM WITH ELECTRONIC FILES OF CWPP AND MAPS