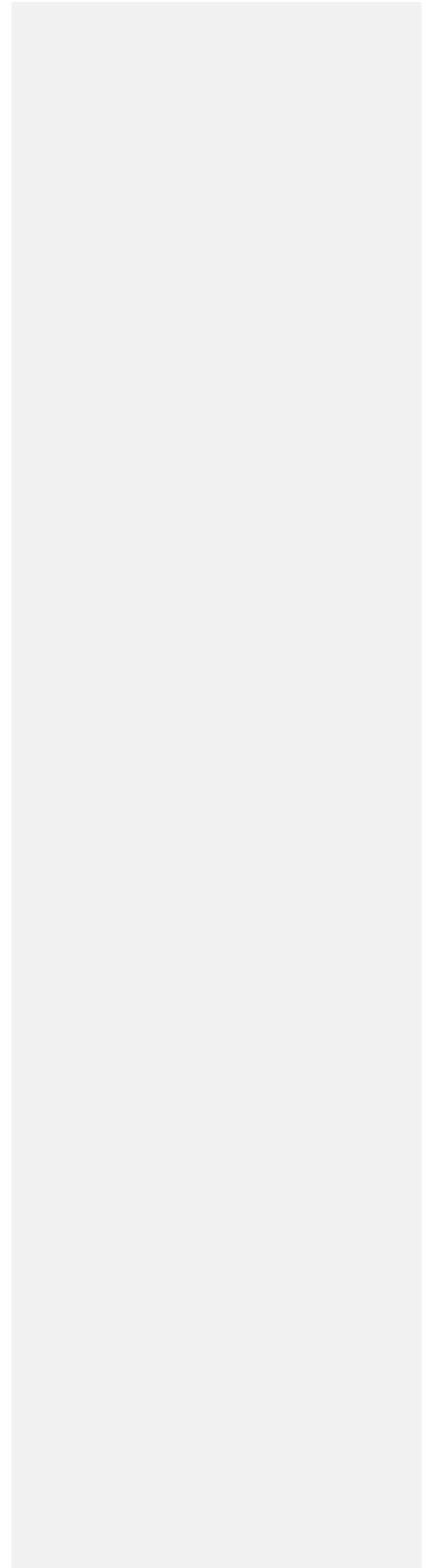


# **Eddy County Community Wildfire Protection Plan**

Walsh Project Number: 7957-010  
June 1, 2008  
Revised: November 3, 2008



# EDDY COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

June 1, 2008  
Revised: November 3, 2008

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## List of Acronyms and Abbreviations

BLM	Bureau of Land Management
CIFO	Carlsbad Interagency Fire Organization
CFD	County Fire District
CSFS	Colorado State Forest Service
CWPP	Community Wildfire Protection Plan
EA	Extended Attack
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
ft	feet
ENGB	Engine Boss (Single Resource)
g	gallon
GIS	Geographical Information System
GPS	Geographic Positioning 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
NPS	National Park Service
NRCS	National Resource Conservation Service
NWCG	National Wildfire Coordination Group
PPE	personal protective equipment
SWCD	Soil Water Conservation District
USFS	U.S. Forest Service
WALSH	Walsh Environmental Scientists and Engineers, LLC
WFU	Wildland Fire Use
WIPP	Waste Isolation Pilot Project
WUI	Wildland-Urban Interface

## List of Fire Behavior Terms

<b>Aerial Fuels</b>	All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs, cones, snags, moss, and high brush.
<b>Aspect</b>	Direction a slope faces.
<b>Direct Attack</b>	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.
<b>Chain</b>	A unit of linear measurement equal to 66 feet.
<b>Crown Fire</b>	The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.
<b>Dead Fuels</b>	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.
<b>Defensible Space</b>	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.
<b>Firewise</b>	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.
<b>Fire Behavior</b>	The manner in which a fire reacts to the influences of fuel, weather, and topography.
<b>Fire Danger</b>	The broad-scale condition of fuels as influenced by environmental factors.
<b>Fire Front</b>	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.

<b>Fire Hazard</b>	The presence of ignitable fuel coupled with the influences of terrain and weather.
<b>Fire Intensity</b>	A general term relating to the heat energy released by a fire.
<b>Fire Return Interval</b>	The historic frequency that fire burns in a particular area or fuel type without human intervention.
<b>Fire Regime</b>	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).
<b>Fire Weather</b>	Weather conditions that influence fire ignition, behavior, and suppression.
<b>Flame Length</b>	The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.
<b>Flaming Front</b>	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.
<b>Fuels</b>	Combustible material; includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire. Not all vegetation is necessarily considered fuels; 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.
<b>Fuel Break</b>	An area of land where fuel continuity and load is reduced to reduce wildfire rate of spread and severity and to improve control opportunities.
<b>Fuel Loading</b>	The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.
<b>Fuel Model</b>	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.
<b>Fuel Type</b>	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.



<b>Ground Fuel</b>	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.
<b>Hazard</b>	Vegetation-fuel attributes that may be conducive to propagate and carry a fire.
<b>Indirect Attack</b>	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.
<b>Intensity</b>	The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.
<b>Ladder Fuels</b>	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.
<b>Live Fuels</b>	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.
<b>National Fire Danger Rating System (NFDRS)</b>	A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.
<b>Prescribed Fire</b>	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.
<b>Rate of Spread</b>	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 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.
<b>Risk</b>	The probability that a fire will start from natural or human-caused ignition.
<b>Surface Fuels</b>	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 presented 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 Eddy 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 account for 98 percent of wildfires and their frequency will likely become more numerous as the county's population grows and outdoor recreation increases.

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, desert scrub, pinion-juniper woodlands, and weedy fields. Many of these fuels such as dried grass and weeds are highly flammable, burn rapidly, and resist control. The buildup of salt cedar on the Pecos and other rivers is a hazardous fuel situation. 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 risk and hazards. Sources of information included community and vegetation-fuel surveys using a standardized procedure, various maps obtained from state and federal databases, interviews with county fire chiefs and federal fire management officers, and public participation.

As part of the assessment, a concerted effort was made to solicit information from the public and local experts on fire and natural resource issues. Core team meetings were held on October 19 and October 29, 2007, and on March 13, 2008 to discuss CWPP development, findings, and recommendations. Two community meetings were held on February 6, 2008 in Queen and Carlsbad and one on February 7 in Artesia. 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 Eddy County’s website (www.co.eddy.nm.us) for public review. Questionnaires were available on Eddy County’s website and distributed at the public meetings to obtain public opinion information concerning the perceived level of wildfire risk in the assessment area and assess tolerance for mitigation practices that may be recommended to reduce risk.

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. Assessment Area Summary Information**

Wildland-Urban Interface	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings
Artesia	<ul style="list-style-type: none"> <li>▪ Low for city proper</li> <li>▪ Moderate for perimeter</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>
Atoka	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 100 feet</li> <li>▪ Utilities above ground</li> </ul>
Carlsbad	<ul style="list-style-type: none"> <li>▪ Low for city proper</li> <li>▪ Moderate for perimeter</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>
Carlsbad Caverns	<ul style="list-style-type: none"> <li>▪ High around staff housing</li> <li>▪ Low around visitor center</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate fuels (small trees and shrubs)</li> <li>▪ Defensible space less than 25 feet</li> <li>▪ Terrain slope</li> <li>▪ Utilities above ground</li> <li>▪ Some structures with flammable roofs</li> </ul>



Wildland-Urban Interface	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings
Cottonwood	<ul style="list-style-type: none"> <li>Low</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
Happy Valley	<ul style="list-style-type: none"> <li>Low</li> </ul>	<ul style="list-style-type: none"> <li>Moderate fuels (shrubs)</li> <li>Defensible space less than 100 feet</li> <li>Utilities above ground</li> </ul>
Hope	<ul style="list-style-type: none"> <li>Low</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
Joel	<ul style="list-style-type: none"> <li>Moderate</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure roofs, siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
La Huerta	<ul style="list-style-type: none"> <li>Low</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
Loco Hills	<ul style="list-style-type: none"> <li>Moderate for community</li> <li>Low WUI</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Mix of non-Class A roofs</li> <li>Combustible structure siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
Loving	<ul style="list-style-type: none"> <li>Low</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
Malaga	<ul style="list-style-type: none"> <li>Moderate for community</li> <li>Low WUI</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure roofs, siding, decks, or porches</li> <li>Utilities above ground</li> </ul>
Otis	<ul style="list-style-type: none"> <li>Low</li> </ul>	<ul style="list-style-type: none"> <li>Light fuels (weeds and grasses)</li> <li>Defensible space less than 70 feet</li> <li>Combustible structure siding, decks, or porches</li> <li>Utilities above ground</li> </ul>

Wildland-Urban Interface	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings
Queen	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heavy fuels (trees and shrubs)</li> <li>▪ Defensible space less than 25 feet</li> <li>▪ Terrain</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>
Riverside	<ul style="list-style-type: none"> <li>▪ Moderate for community</li> <li>▪ Low WUI</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Mix of non-Class A roofs</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>
Waste Isolation Pilot Plant	<ul style="list-style-type: none"> <li>▪ None</li> </ul>	<ul style="list-style-type: none"> <li>▪ Non-flammable structures</li> </ul>
White's City	<ul style="list-style-type: none"> <li>▪ High for community</li> <li>▪ Low WUI</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (grasses and weeds) but heavy fuels (trees) to the north and east</li> <li>▪ Defensible space less than 25 feet</li> <li>▪ Terrain slope</li> <li>▪ Combustible structure roofs, siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>

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 fire management officers, field observations, and questionnaire responses. Proposed mitigation projects were also presented and discussed at three public meetings.

- Encourage the development of defensible space around structures, utilities stations, communication towers, oil & gas infrastructure, 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, driveways, and on 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 chances of fire ignitions from vehicles or discarded smoking materials.

- Fuel breaks are recommended for State Highway 6 leading to Carlsbad Caverns National Park and the road leading into the church sponsored camp in the Queen WUI.
- Salt cedar abatement along the Pecos River and other drainages is warranted because of its fuel load, high water use, and limited value as wildlife habitat. A significant number of human-caused fires occur in this vegetation-fuel type. Priority treatment areas would be designated as those with moderate-to-heavy fuel loads in proximity to urban areas, structures, and other values.
- 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 conditions prior to European settlement. Sixty 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 fire danger.
- Community education and public outreach is an effective means to initiate local action to reduce wildfire risks and hazards. Community outreach should 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 communities to consider adopting the International Wildland-Urban Interface Code (IWUIC). The IWUIC provides a set of codes that, if implemented, 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 (FDs) and municipal FDs is an ongoing need. National Wildfire Coordination Group (NWFC) annual training needs to occur. Nearly all fire districts have wildfire fighters trained at the Firefighter Type 2 (FFT) level, but there is a need for training at the Firefighter Type 1 (FFT1) and Single Resource Engine Boss (ENGB) level. Because volunteer firefighters work during the week, training should occur on weekends. The county is fortunate to have the Permian Basin Regional Training Center to provide the needed training.
- The fire protection authorities include 14 volunteer fire districts, four municipal fire districts, Waste Isolation Pilot Project, Carlsbad Interagency Fire Organization, and National Park Service. All agencies need to collaborate to maintain, and in some cases improve, wildfire fighting equipment, engines, and firefighter training throughout the county.

Implementing and sustaining the CWPP is key to success. This is the responsibility of the Eddy County Office of Emergency Management and Core Team. Building partnerships among community-based organizations, fire protection authorities, local governments, public land management agencies, and private landowners is necessary in



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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.



# EDDY 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 Core Team's responsibility 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. Fires prior to European settlement would reduce the buildup of fuels that facilitate 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 is 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.

The National Fire Plan was developed by the federal government in 2000 in response to increasing WUI wildfires, human welfare losses, and spiraling suppression costs. 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 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 Eddy 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. Lightning-caused fires are few. Human-caused ignitions are the main cause of wildfires in Eddy 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, invasive weeds, overgrazing, and changing climatic patterns.

The accumulation of vegetation-fuels may set the stage for catastrophic wildfire occurrence, resulting in the loss of economic and ecological values. There are varieties of vegetation-fuels around communities, ranches, structures, and on public lands that create problems for fire protection. Fuels include grasslands, shrublands, desert scrub, pinion-juniper woodlands, and weedy fields. Many of these fuels such as dried grass and weeds are highly flammable, burn rapidly, and resist control. The buildup of salt cedar on the Pecos and other rivers is a hazardous fuel situation. 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.

## 1.3 Policy Framework

This Eddy 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, NEPA, and New Mexico's smoke management and open burn polices. Actions on private land may require compliance with county land-use and open-burning 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, vegetation-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 Eddy County CWPP follows the standardized steps as outlined in *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (Table 1).

**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 U.S. Forest Service (USFS) 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 district CWPP and

Step	Task	Explanation
		communicate the results to interested parties and stakeholders.

Source: Society of American Foresters (2004)

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

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. Eddy County CWPP Core Team Members**

Team Member	Organization	Telephone	E-mail
Lila Mohesky-Roybal	Carlsbad Caverns NPS	575-785-3035	<a href="mailto:lila_mohesky-roybal@nps.gov">lila_mohesky-roybal@nps.gov</a>
Travis Neppi	Carlsbad Caverns NPS	432-940-4365	<a href="mailto:travis_neppi@nps.gov">travis_neppi@nps.gov</a>
John A. Montoya	Carlsbad Caverns NPS	916-828-3251	<a href="mailto:john_a_montoya@nps.gov">john_a_montoya@nps.gov</a>
<del>Rebby Harris</del> <del>Mike Reynolds</del>	Carlsbad Fire Department	505-885- <del>31256626</del>	<del><a href="mailto:mike.reynolds@cityofcarlsbadnm.com">mike.reynolds@cityofcarlsbadnm.com</a></del>
Carol Telles	USFS	505-885-4181	<a href="mailto:ctelles@fs.fed.us">ctelles@fs.fed.us</a>
Ty Bryson	Carlsbad Interagency Fire Organization	505-361-7760	<a href="mailto:ty_bryson@nm.blm.gov">ty_bryson@nm.blm.gov</a>
Alan Fiala	NM State Parks - SE Region	505-887-2757	<a href="mailto:alan.fiala@state.nm.us">alan.fiala@state.nm.us</a>
Steve Massey	Eddy County	575-887-9511	<a href="mailto:smassey@co.eddy.nm.us">smassey@co.eddy.nm.us</a>
Greg Sahhd	DOE - WIPP	575-234-8117	<a href="mailto:greg.sahhd@wipp.ws">greg.sahhd@wipp.ws</a>
Eddie Tudor	NMSFD Capitan District	505-354-2231	<a href="mailto:eddie.tudor@state.nm.us">eddie.tudor@state.nm.us</a>
Robert Brader	Eddy County Fire	575-200-9393	<a href="mailto:rbrader@eddyoem.com">rbrader@eddyoem.com</a>
Joel Arnwine	Eddy County OEM	575-885-3581	<a href="mailto:jarnwine@eddyoem.com">jarnwine@eddyoem.com</a>

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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 representatives may assist in the implementation of the CWPP action plan in cooperating with communities and private landowners. Continued public meetings 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.

This Eddy County 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 Eddy County CWPP Goals and Objectives

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

**Table 3. Eddy County CWPP Goals and Objectives**

Goal	Objective
Facilitate and develop a CWPP	<ul style="list-style-type: none"> <li>▪ Provide oversight for all activities related to the CWPP.</li> <li>▪ Ensure representation and coordination among agencies and interest groups.</li> <li>▪ Develop a long-term framework for sustaining CWPP efforts.</li> </ul>
Conduct wildfire risk and hazard assessments	<ul style="list-style-type: none"> <li>▪ Identify communities at wildfire risk and contributing factors.</li> <li>▪ Identify hazardous fuel loads and locations.</li> <li>▪ Determine the level of risk to communities that wildfires and contributing factors pose.</li> <li>▪ Identify areas at risk to large-scale fire.</li> </ul>
Develop a mitigation plan	<ul style="list-style-type: none"> <li>▪ Identify and prioritize vegetation-fuel treatment projects.</li> <li>▪ Identify and prioritize non-fuel mitigation needs.</li> </ul>
Manage hazardous fuels	<ul style="list-style-type: none"> <li>▪ Identify community hazards and prioritize hazard reduction treatments.</li> <li>▪ Develop sustainable initiatives for communities.</li> <li>▪ Secure funding and assist project implementation.</li> </ul>
Facilitate emergency planning	<ul style="list-style-type: none"> <li>▪ Develop strategies to strengthen emergency management, response, and evacuation capabilities for wildfire.</li> <li>▪ Build relationships among federal, state, and county government; fire authorities; and communities.</li> </ul>



Goal	Objective
Facilitate public outreach	<ul style="list-style-type: none"><li data-bbox="483 436 1084 485">▪ Develop strategies to increase citizen awareness and action for Firewise landscaping and construction practices.</li><li data-bbox="483 489 1084 533">▪ Promote public outreach and cooperation for fuel reduction projects to solicit community involvement and private landowner cooperation.</li></ul>

## 2 WILDLAND FIRE MANAGEMENT PRIMER

Wildland fire is defined as any fire burning wildland fuels, and 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 FDs, municipal FDs, Waste Isolation Pilot Project (WIPP), Carlsbad Interagency Fire Organization (CIFO), and the National Park Service (NPS) suppress wildfires in the assessment area in accordance to the Interagency Joint Powers Agreement (IIPA) and operational procedures.

The approach to wildfire suppression depends on landownership policy. Wildland fires on New Mexico State and NPS lands are suppressed immediately. Management on Bureau of Land Management (BLM) and U.S. Forest Service (USFS) lands is 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.

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 it 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 fuel does not meet the conditions of combustion, it will not ignite. This explains why some trees, patches of vegetation or structures may survive a wildfire, and 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 fire-prone ecosystems, and its occurrence is important to maintaining healthy 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 pinion pine and western wheatgrass, are fire adapted and may require reoccurring 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 Eddy 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 open-space 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, burn barrels, ditch fires, rangeland improvement, weed abatement, 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. 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](http://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 used 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 Eddy County policy, which consists of a burn permit issued by the County Fire Marshal, and adherence to New Mexico smoke management policy.

### **2.4 Wildland-Urban Interface (WUI)**

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, business, 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 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 (Class A roofing material) and a minimum of 30 feet of defensible space had an 85-percent survival rate (Cohen 2000). Conversely, homes with wood shake roofs and less than 30 feet of defensible space had 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 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 EDDY COUNTY CWPP ASSESSMENT AREA PROFILE**

#### **3.1 County and District Setting**

Eddy County is located in southeastern New Mexico with Texas on its southern border. Lea, Chaves and Otero Counties are located to the east, west and north, respectively. Eddy County has a land area of 4,198 square miles and a 2000 census population of 51,658. The City of Carlsbad is the County Seat. The City of Artesia, Village of Hope, and Village of Loving are the incorporated communities. Homes and ranches throughout unincorporated county are widespread and dispersed. There are a few small communities such as Loco Hills, Malaga, Queen, Riverside, and White's City. Eddy County is home to Carlsbad Caverns National Park. The Pecos River flows southward through approximately the middle of the county.

The Eddy County CWPP assessment area is countywide (Map 1). Land ownership within the assessment area is divided among federal, state, and private at 1,426,250, 541,148, and 599,881 acres, respectively. The assessment area is characterized by small rural communities surrounded by agricultural lands and grasslands. Pinion-juniper woodlands and the Guadalupe Mountains surround the community of Queen in the southwest corner of the county. The vegetation of Eddy County is predominantly grasslands and shrublands (Map 2).

Major economic and ecological values in the assessment area at risk to wildfire include communities; agricultural fields; U.S. Highways 180, 285, and 62; oil and gas infrastructure; Brantley Lake Wildlife Refuge; Carlsbad Caverns National Park; Living Desert State Park; Lincoln National Forest; and community infrastructure (Map 3).

Wildland fire protection occurs from 14 county FDs, four municipal FDs, Waste Isolation WIPP, CIFO, and NPS. The FDs have responsibility for structure and wildfire suppression within their respective districts. WIPP is responsible for structure and wildfire suppression on their property. CIFO has authority for wildfire suppression and fuels management on BLM, USFS, State, and private lands. The NPS has wildfire and fuels management responsibility on their property. The IJPA specifies initial attack (IA) zones and mutual aid as needed.

#### **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 Queen and Carlsbad Caverns staff housing received a high-risk classification because of the proximity of fuel load and lack of defensible space. The Joel WUI received a moderate ranking mainly because of limited defensible space. All other WUI were rated a low hazard.

#### **3.3 Climate**

The climate of Eddy County is hot and dry (Table 5). Summertime high temperatures range in the 90s with lows in the 60s. Winter temperatures vary from highs in the upper

30s to lows in the 20s. The assessment area has over 300 days of sunshine per year. Average annual precipitation is 12 inches with the majority received during summer months. Snowfall is minimal.

**Table 5. Climate Summary for the Cities of Carlsbad and Artesia**  
(January 1914–June 2006)

Climate Attribute	Month												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Carlsbad													
High Temperature (°F)	59	64	71	80	88	95	96	94	88	79	67	59	78
Low Temperature (°F)	28	32	38	47	56	64	67	66	59	48	36	28	47
Average Total Precipitation (inches)	0.4	0.4	0.5	0.6	1.3	1.4	1.6	1.8	2.1	1.4	0.6	0.5	12.7
Artesia													
High Temperature (°F)	57	62	69	78	86	94	94	93	87	78	66	58	77
Low Temperature (°F)	24	28	34	42	52	61	65	63	56	44	32	24	44
Average Total Precipitation (inches)	0.4	0.4	0.5	1.6	1.3	1.5	1.6	1.8	1.8	1.2	0.5	1.5	11.9

Source: www.wrcc.dri.edu

### 3.4 Topography

Topography and elevation play an important role in determining vegetation-fuels and wildland fire behavior. Topography also dictates community infrastructure design that influences overall wildfire hazards and risks. The terrain in Eddy County is relatively flat to rolling hills. The Pecos River flows southerly and drains the dominant watershed. Elevations generally vary from 3,000 to 4,600 feet above mean sea level. The Guadalupe Mountains occur in the southwest corner of the County and reach an elevation of 5,850 feet.

### 3.5 Wildland Vegetation and Fuels

The plant species composition of Eddy County is diverse because there is a mixing of vegetation from the Chihuahuan Desert, the Rocky Mountains, the Western Great Plains, and the Madrean vegetation provenances (Map 2). Thus, it is important to protect natural vegetation from wildfire and other disturbances. Wildland vegetation-fuels include grass,

leaves, twigs, ground litter, weeds, shrubs, and trees. Structures in the WUI are also a fuel source. Vegetation-fuels in the assessment area are diverse and vary from grasslands and shrublands at lower elevations to pinion-juniper woodlands at higher elevations. Grass vegetation types are dominant throughout the county except in Queen WUI where pinion-juniper woodlands prevail. Short- to mid-height grasses along with stool, agave, ocotillo, catclaw, and juniper occur in the western part of the county. This area is mainly grazed. West of the Pecos River, and north of the Black River, the vegetation is short- and mid-height grasses, tarbush, creosote, mesquite, and yucca along with irrigated crops. The centrally located vegetation includes short- and mid-height grasses, tarbush, mesquite, yucca, and coldenia. This area is grazed and supports irrigated crops. In the northeast the vegetation is short- to mid-height grasses, creosote, mesquite, cactus, and catclaw. Grazing occurs throughout the area. In the eastern part of the county the vegetation is found mid to tall grasses, sand sage, Harvard oak, and mesquite, which support livestock grazing and wildlife habitat. The flood plains of the Pecos River support salt-tolerant plants, which include alkali sacaton, inland saltgrass, salt cedar, salt sedge, and seepweed.

Understanding the fire behavior characteristics of different vegetation-fuel types facilitates effective fuel-management and wildfire suppression strategies. 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 different FBFMs and their spatial orientation within the county. The grass FBFM 1 and FBFM 2 account for 75 percent of vegetation-fuels in the county (Table 6).

**Table 6. Eddy County Fire Behavior Fuel Models**

Fire Behavior Fuel Model	Percent of County	Description
FBFM 1	61	<b>Grass Group</b> – 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 78 chains per hour (5,148 ft per hour) with flame lengths greater than 4 feet.
FBFM 2	14	<b>Grass Group</b> – 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 oak brush stands that cover from one-third to two-thirds of the area generally fit this model. Fire rate of spread is rapid at 35 chains per hour (3,210 feet per hour) with flame lengths of 6 feet.
FBFM 4	< 1	<b>Shrub Group</b> – 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, catclaw, 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 75 chains per hour (4,950 ft per hour) with flame length of 19 feet.

Fire Behavior Fuel Model	Percent of County	Description
FBFM 5	5	<b>Shrub Group</b> – 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 18 chains per hour (1,188 ft per hour) and flame length is 4 feet.
FBFM 6	< 1	<b>Shrub Group</b> – 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 creosote and mesquite less than 6 feet tall. Fire rate of spread is fairly fast at 32 feet per hour (2,110 ft per hours) with flame lengths of 6 feet.
FBFM 8	16	<b>Timber Group</b> – 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 juniper. Fire rate of spread is slow at 2 chains per hour (132 ft per hour) with a flame length of 1 foot.

Source: Anderson (1982)

Grass fuels are especially dangerous when they dry out 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 judicious use of herbicides are warranted. A rapid response to grass fires is needed in the WUI to protect structures and other values. Home owners need to create defensible space to protect structures and be prepared for rapid evacuation.

### 3.6 Water Resources

Surface water includes the Pecos River, Black River, Penasco River, Seven River, Brantley Lake, Avalon Reservoir, and Salt Lake (Map 3). Tender access for water drafting and helicopter dipping are available at the Pecos River, Brantley Lake, and Avalon Reservoir. Nearly all county FDs and all municipal FDs have hydrant systems. Ranches and oil & gas rigs can also be water sources when tankers are away from hydrants and surface water.

### 3.7 Wildfire Protection Authorities

Table 7 lists the wildland fire resources and trained wildland firefighters by protection authority.

**Table 7. Wildfire Protection Authorities' Suppression Capacities**

Authority	Apparatus	Number of Trained Wildland Firefighters
Atoka Fire District	<ul style="list-style-type: none"> <li>▪ Two 2000 g pumpers</li> <li>▪ One 1000 g pumper</li> <li>▪ One 2000 g tanker</li> <li>▪ One 1000 g tanker</li> <li>▪ Three 350 g brush engines</li> <li>▪ One rescue truck</li> </ul>	<ul style="list-style-type: none"> <li>▪ 10-person crew</li> </ul>
Cottonwood Fire District	<ul style="list-style-type: none"> <li>▪ One 3000 g tanker</li> <li>▪ One 2500 g tanker</li> <li>▪ One 700 g pumper</li> <li>▪ One 1200 g pumper</li> <li>▪ One 400 g brush engine</li> <li>▪ One 300 g brush engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ 0</li> </ul>
Happy Valley Fire District	<ul style="list-style-type: none"> <li>▪ Two 350 g brush engines</li> <li>▪ One 600 g brush engine</li> <li>▪ One 2500 g tanker</li> <li>▪ One 1300 g tanker</li> <li>▪ One 750 g engine</li> <li>▪ One 1000 g engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ 5-person crew</li> </ul>
Joel Fire District	<ul style="list-style-type: none"> <li>▪ Three 1000 g pumpers</li> <li>▪ One 2500 g pumper</li> <li>▪ Three 250 g brush engines</li> <li>▪ One 300 g brush engine</li> <li>▪ Command vehicle</li> </ul>	<ul style="list-style-type: none"> <li>▪ 12-person crew</li> </ul>
La Huerta Fire District	<ul style="list-style-type: none"> <li>▪ Two 400 g brush engines</li> <li>▪ One 300 g brush engine</li> <li>▪ One 2000 g tender</li> </ul>	<ul style="list-style-type: none"> <li>▪ 4-person crew</li> </ul>
Loco Hills Fire District	<ul style="list-style-type: none"> <li>▪ Two brush engines</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1-person crew</li> </ul>
Malaga Fire District	<ul style="list-style-type: none"> <li>▪ No information provided by the FD</li> </ul>	<ul style="list-style-type: none"> <li>▪ No information provided by the FD</li> </ul>
Otis Fire District	<ul style="list-style-type: none"> <li>▪ Two 1000 g pumpers</li> <li>▪ Two 300 g brush engines</li> <li>▪ One 2000 g tanker</li> <li>▪ One 3500 g tanker</li> <li>▪ One rescue truck</li> </ul>	<ul style="list-style-type: none"> <li>▪ 10-person crew</li> </ul>
Queen Fire District	<ul style="list-style-type: none"> <li>▪ Two 500 g brush engines</li> </ul>	<ul style="list-style-type: none"> <li>▪ 12-person crew</li> </ul>



Authority	Apparatus	Number of Trained Wildland Firefighters
	<ul style="list-style-type: none"><li>One 1200 g structure engine</li><li>One 2000 g tanker pumper</li></ul>	<ul style="list-style-type: none"><li>12-person crew</li></ul>
Riverside Fire District	<ul style="list-style-type: none"><li>One 2500 g tanker</li><li>One 1000 g pumper</li><li>One 150 g brush engine</li></ul>	<ul style="list-style-type: none"><li>4-person crew</li></ul>
Sun Country Fire District	<ul style="list-style-type: none"><li>One 1200 g pumper</li><li>One 3000 g tanker</li><li>One 660 g pumper</li><li>One 1200 g pumper</li><li>One 400 g brush engine</li><li>One 250 g brush engine</li><li>One Cascade trailer</li></ul>	<ul style="list-style-type: none"><li>16-person crew</li></ul>
White's City Fire District	<ul style="list-style-type: none"><li>One ambulance</li><li>One rescue truck</li><li>One 1800 g tender</li><li>One 250 g brush engine</li><li>One 1000 g interface engine</li><li>One 250 g brush engine</li></ul>	<ul style="list-style-type: none"><li>10-person crew</li></ul>
Artesia Municipal Fire District	<ul style="list-style-type: none"><li>One 750 g engine</li><li>One 200 g ladder truck</li><li>One 1250 g interface engine</li><li>One 500 g engine (backup)</li></ul>	<ul style="list-style-type: none"><li>18-person crew</li></ul>
Carlsbad Municipal Fire District	<ul style="list-style-type: none"><li>Two ladder trucks</li><li>Four 250-300 g pumpers</li><li>One 125 g brush engine</li><li>One rescue truck</li><li>One hazmat trailer</li><li>One command trailer</li></ul>	<ul style="list-style-type: none"><li>5-person crew</li></ul>
Loving Municipal Fire District	<ul style="list-style-type: none"><li>Three 1000 g pumpers</li><li>One 2000 g pumper</li><li>One 300 g rescue/brush engine</li><li>One 300 g brush engine</li><li>One 250 brush engine</li><li>One command truck</li></ul>	<ul style="list-style-type: none"><li>11-person crew</li></ul>
Hope Municipal Fire District	<ul style="list-style-type: none"><li>One 2000 g pumper</li><li>One 1000 g pumper</li></ul>	<ul style="list-style-type: none"><li>8-person crew</li></ul>



Authority	Apparatus	Number of Trained Wildland Firefighters
	<ul style="list-style-type: none"> <li>▪ One 400 g brush engine</li> <li>▪ One 500 g brush engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ 8-person crew</li> </ul>
Waste Isolation Pilot Plant	<ul style="list-style-type: none"> <li>▪ One 500 g brush/structure engine</li> <li>▪ One fire rescue engine</li> <li>▪ One 700 g structure engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ 4-person crew</li> </ul>
Carlsbad Caverns NPS	<ul style="list-style-type: none"> <li>▪ One 2000 g tender</li> <li>▪ One 250 g brush engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2-person full time crew</li> <li>▪ 2–4-person seasonal crew</li> </ul>
Carlsbad Interagency Fire Organization	<ul style="list-style-type: none"> <li>▪ Three Type 6 engines</li> <li>▪ One Type 4 engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ 15-person full time crew</li> <li>▪ 8-person seasonal crew</li> </ul>

### 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 the oil and gas fields, 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
- Oil and gas infrastructure
- Municipal water supply
- Community infrastructure
- Communication towers
- Major highways and railroads
- County and state parks
- Carlsbad Caverns National Park
- Agricultural lands
- Wildlife and aquatic habitats
- Watersheds
- Water quality
- Air quality
- Natural vegetation
- Viewsheds
- Recreation and tourism



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Wildfire could occur throughout the county and could have a severe and long-term impact on economic and ecological values. The actions recommended in this CWPP are targeted toward lowering wildfire risks and hazards to 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 hazards are vegetation-fuel attributes that are 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 risk and hazards. Sources for information included WUI/community and vegetation-fuel surveys, various maps, interviews with county fire chiefs and federal fire management officers, and public 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 that provide crucial information on wildfire risks and hazards. Sources of these data were NMSFD, 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 2003–2007. Maps 7 and 8 were generated from the NMSFD data. Eddy 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](http://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 7) were obtained from LANDFIRE.

County fire chiefs, municipal fire chiefs, and federal 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. Core team meetings were held on

October 19 & 29, 2007, and on March 13, 2008 to discuss CWPP procedures, developments, findings, and recommendations. Three community meetings were held on February 6, 2008 in Queen and Carlsbad and on February 7 in Artesia. The purposes of the communities 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 Eddy County’s website ([www.co.eddy.nm.us](http://www.co.eddy.nm.us)) for public review. Review comments were sent to Eddy County Office of Emergency Management or WASLH.

Questionnaires were available on Eddy County’s website and distributed at the public meetings to obtain public opinion information concerning the perceived level of wildfire risk in the assessment area and assess tolerance for mitigation practices that may be recommended to reduce risk (see Appendix C). Homeowners were asked to return their response to Eddy 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 the assessment area before European settlement. Lightning and Native Americans were ignition sources for historic wildfires. 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, 25–75, and greater than 75 percent top-kill, respectively. Understanding the historic fire regime is important to understanding the present risk of wildfire.

There are two different historic reference fire regimes within the assessment area (Map 6 and Table 8). The average historic fire regime for the county was less than 35 years with stand replacement severity.

**Table 8. Historic Fire Regime**

Fire Regime	Percent of Assessment Area
0-35 yrs; Low and mixed severity	1
0-35 yrs; stand replacement severity	99

#### 4.3 Recent Wildfire History

Grasslands, shrublands, desert scrub and pinion-juniper woodlands occur in the assessment area. These are fire-adapted ecosystems in which wildfire is a natural occurrence, but variation has occurred in its return interval and severity. The characteristics of wildfire and wildfire ignitions have changed drastically since the era of

pre-European settlement. Today, a majority of wildfire ignitions can be traced to human causes. In order to protect values at risk, suppression is the guiding fire management policy.

From 2003 through 2007, there was an average of 25 fires per year that were responded to by volunteer fire departments and/or CIFO. Lightning caused 2 percent of wildfires and 98 percent were human-caused (Map 7 and Table 9). Human-caused wildfire resulted mainly from escaped fire (e.g., trash burning, field burning, campfires, land clearing, or slash burning). Fires along highways and the railroad corridor are evident.

**Table 9. Wildfire History for the Years 2003–2007**

Number of Fires	Acres Burned	Fire Ignition Source (%)	
		Lightning	Human
127	6,546	2	98

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 2003–2007 wildfire data presented in Map 8. IRP illustrates the patterns of fires in the various WUIs. IRP is defined as the number of fires per 1000 acres for the years 2003–2007. Low-risk areas had no fires. Moderate-risk areas had one fire. High-risk areas had more than one fire. The low-risk areas occupied 94 percent of the assessment area and the fire generally occurred in areas away from communities and roads (Map 8). Two percent of the county was classified as high-risk, and fires occurred near communities, roads, agricultural lands and the railroad corridor. The moderate risk lands were located between the low-risk and high-risk areas. IRP was used to determine the level of wildfire risk to the WUIs and communities.

#### 4.5 Vegetation-Fuel Hazards

A vegetation attribute important to fuels characterization is fire regime condition class (FRCC). FRCC is composed of three classes. All three classes occur in the assessment area (Map 9 and Table 10). FRCC 1 is the most common as it occupies approximately 40 percent of the county. FRCC 2 and 3 occupy 27 and 33 percent, respectively. FRCC 1 vegetation occurs mainly in the south-central to western parts of the county, and it encompasses numerous different vegetation types. FRCC 3 vegetation is mainly located in the eastern sections of the county associated with grasslands. FRCC 2 vegetation is associated with the pinion-juniper woodlands of the Guadalupe Mountains and desert scrub, shrublands, and grasslands of the north-central part of the county. FRCC information was used to help determine vegetation-fuel hazard in the WUIs and possible fuels management projects.

FRCC is a measure of the degree of departure from a reference condition which is determined by comparing the existing fire regime and fuels situation with the historic fire regime and natural vegetation, respectively (Table 10). The degree of departure may

result from differences in vegetation composition, or the historical fire regime (i.e., fire return frequency and severity). 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.

**Table 10. Fire Regime Condition Class**

Fire Regime Condition Class	Percent in County	Description
1	40	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	27	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	33	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

WUI and community hazard and risk surveys were conducted the week of October 29, 2007. The Core Team identified 18 WUIs to be assessed (Map 4, Table 11). Each WUI represents the assigned response area of the various authorities in the county. 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 structure hazards using the NFPA 1144 procedure, fuel hazards, and values at risk.

**Table 11. Assessment Area Summary Information**

Wildland-Urban Interface	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
Artesia	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Businesses</li> <li>▪ Industry</li> </ul>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low for city proper</li> <li>▪ Moderate for perimeter</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Artesia Municipal Fire District</li> </ul>
Atoka	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Agricultural land</li> <li>▪ Business</li> <li>▪ Industry</li> <li>▪ Recreation</li> <li>▪ Rangeland</li> <li>▪ Wildlife habitat</li> <li>▪ Watershed quality</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Watershed health</li> <li>▪ Soil stability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 100 feet</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Atoka Fire District</li> </ul>
Carlsbad	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Businesses</li> <li>▪ Industry</li> </ul>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low for city proper</li> <li>▪ Moderate for perimeter</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Carlsbad Municipal Fire District</li> </ul>
Carlsbad	<ul style="list-style-type: none"> <li>▪ Staff housing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate fuels</li> </ul>	<ul style="list-style-type: none"> <li>▪ NPS brush</li> </ul>

Wildland-Urban Interface	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
Caverns NPS	<ul style="list-style-type: none"> <li>▪ Visitor center</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Woodlands</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> <li>▪ RAWS</li> </ul>		<ul style="list-style-type: none"> <li>▪ around staff housing</li> <li>▪ Low around visitor center</li> </ul>	<ul style="list-style-type: none"> <li>▪ (small trees and shrubs)</li> <li>▪ Defensible space less than 25 feet</li> <li>▪ Terrain slope</li> <li>▪ Utilities above ground</li> <li>▪ Some structures with flammable roofs</li> </ul>	<ul style="list-style-type: none"> <li>▪ trucks and firefighters</li> <li>▪ White's City Fire District</li> </ul>
Cottonwood	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Industry</li> <li>▪ Agricultural land</li> <li>▪ Rangeland</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cottonwood Fire District</li> </ul>
Happy Valley	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Agricultural land</li> <li>▪ Rangeland</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate fuels (shrubs)</li> <li>▪ Defensible space less than 100 feet</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Happy Valley Fire District</li> </ul>

Comment [e1]: Content or bullets missing in highlighted text areas?



Wildland-Urban Interface	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
Hope	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Agricultural land</li> <li>▪ Rangeland</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Watershed health</li> <li>▪ Soil stability</li> <li>▪ Businesses</li> </ul>	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hope Municipal Fire District</li> </ul>
Joel	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Agricultural land</li> <li>▪ Businesses</li> <li>▪ Oil &amp; gas</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Rangeland</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure roofs, siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Joel Fire District</li> </ul>
La Huerta	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Oil &amp; gas</li> <li>▪ Industry</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Rangeland</li> <li>▪ Watershed Health</li> <li>▪ Aesthetics</li> </ul>	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ La Huerta Fire District</li> </ul>

Wildland-Urban Interface	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
	<ul style="list-style-type: none"> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>				
Loco Hills	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Water quality</li> <li>▪ Oil &amp; gas</li> <li>▪ Industry</li> <li>▪ Rangeland</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate for community</li> <li>▪ Low for WUI</li> <li>▪ Moderate for community</li> <li>▪ Low for WUI</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Mix of non-Class A roofs</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Loco Hills Fire District</li> <li>▪ Loco Hills Fire District</li> </ul>
Loving	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Agricultural land</li> <li>▪ Oil &amp; gas</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Water quality</li> <li>▪ Soil stability</li> <li>▪ Businesses</li> </ul>	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Loving Municipal Fire District</li> </ul>
Malaga	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Oil &amp; gas</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Watershed health</li> <li>▪ Rangeland</li> <li>▪ Agricultural land</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate Community</li> <li>▪ Low WUI</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Combustible structure roofs, siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Malaga Fire District</li> </ul>
Otis	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Oil &amp; gas</li> <li>▪ Industry</li> <li>▪ Recreation</li> </ul>	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> </ul>	<ul style="list-style-type: none"> <li>▪ Otis Fire District</li> </ul>

Wildland-Urban Interface	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
	<ul style="list-style-type: none"> <li>▪ Wildlife habitat</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>			<ul style="list-style-type: none"> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	
Queen	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Woodlands</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ High</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heavy fuels (trees and shrubs)</li> <li>▪ Defensible space less than 25 feet</li> <li>▪ Terrain</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Queen Fire District</li> </ul>
Riverside	<ul style="list-style-type: none"> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Watershed health</li> <li>▪ Industry</li> <li>▪ Rangeland</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate for community</li> <li>▪ Low for WUI</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (weeds and grasses)</li> <li>▪ Defensible space less than 70 feet</li> <li>▪ Mix of non-Class A roofs</li> <li>▪ Combustible structure siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ Riverside Fire District</li> </ul>
Waste Isolation Pilot Plant	<ul style="list-style-type: none"> <li>▪ Industry</li> <li>▪ Rangeland</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Watershed health</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low</li> </ul>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>	<ul style="list-style-type: none"> <li>▪ Non-flammable structures</li> </ul>	<ul style="list-style-type: none"> <li>▪ WIPP Fire Department</li> </ul>

Wildland-Urban Interface	Values at Risk	Wildfire Risk of Occurrence	NFPA 1144 Hazard Rating	Contributing Factors to NFPA 1144 Ratings	Firefighting Capacity
White's City	<ul style="list-style-type: none"> <li>▪ Soil stability</li> <li>▪ Homes</li> <li>▪ Businesses</li> <li>▪ Recreation</li> <li>▪ Wildlife habitat</li> <li>▪ Watershed quality</li> <li>▪ Watershed health</li> <li>▪ Rangeland</li> <li>▪ Aesthetics</li> <li>▪ Air quality</li> <li>▪ Soil stability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Moderate</li> </ul>	<ul style="list-style-type: none"> <li>▪ High for community</li> </ul>	<ul style="list-style-type: none"> <li>▪ Light fuels (grasses and weeds); Heavy (trees) to east and north</li> <li>▪ Defensible space less than 25 feet</li> <li>▪ Terrain slope</li> <li>▪ Combustible structure roofs, siding, decks, or porches</li> <li>▪ Utilities above ground</li> </ul>	<ul style="list-style-type: none"> <li>▪ White's City Fire District</li> <li>▪ NPS engines and firefighters</li> <li>▪ White's City Fire District</li> <li>▪ NPS engines and firefighters</li> </ul>

Queen, White's City, and Carlsbad Caverns staff housing received a high-hazard rating because of the proximity of moderate to heavy fuels and lack of defensible space. The Joel WUI and the communities of Malaga, Loco Hills, Riverside, and White's City were ranked moderate-hazard because of limited defensible space around structures. The most important and immediate practice that these extreme and high-hazard communities could do to reduce their level of hazard is the development of defensible space around structures.

## 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 Eddy County to consider the implementation of the International Wildland-Urban Interface Code (IWUIC). Incorporated cities and villages should also consider adopting the IWUIC. The IWUIC is a set of building and landscaping codes that, if implemented, may reduce the risk of wildfire to individual structures and communities. Training on IWUIC can be found at on the website [www.iccsafe.org/training/WUI/](http://www.iccsafe.org/training/WUI/). Specific mitigation treatment recommendations for the 18 WUIs were identified through community surveys and interviews with CFD and MFD fire chiefs and federal fire management officers.

### 5.1 Priority Vegetation-Fuels Mitigation

Table 12 presents priority fuels treatments and responsible organizations for implementing the various projects. Recommended action items are divided into a number of fuels mitigation and non-fuels related categories. High priority fuels reduction actions include defensible space implementation and improvements around homes, and weed abatement in and around communities. Lower priority projects include mowing along highways and roads, and salt cedar control (Map 10). Priority fuel treatments were identified through community observations, discussions with CFD and MFD chiefs, federal fire management officers, and the questionnaire.

**Table 12. Priority Fuels Treatments for Eddy County WUI Areas**

Wildland Urban Interface	Priority Fuels Treatments <sup>1</sup>	Responsible Agency
Artesia	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement(H)</li> <li>▪ Mow along roads (M)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County/City</li> <li>▪ State/County</li> </ul>
Atoka	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ County</li> <li>▪ Railroad company</li> <li>▪ Penasco &amp; Central Valley SWCD</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Carlsbad	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> </ul>

Wildland Urban Interface	Priority Fuels Treatments <sup>1</sup>	Responsible Agency
	<ul style="list-style-type: none"> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad right-of-ways (L)</li> <li>▪ Salt cedar abatement (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Landowner/County/City</li> <li>▪ County/City</li> <li>▪ Railroad company</li> <li>▪ Carlsbad SWCD</li> </ul>
Carlsbad Caverns NPS	<ul style="list-style-type: none"> <li>▪ Defensible space around staff housing (H)</li> <li>▪ Fuel breaks along access road as needed (M)</li> <li>▪ Reduce fuels on west slope leading to parking lot (M)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ NPS</li> <li>▪ NPS</li> <li>▪ NPS</li> <li>▪ NPS</li> </ul>
Cottonwood	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ County</li> <li>▪ Railroad company</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Happy Valley	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-ways (L)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ Eddy County</li> <li>▪ Railroad company</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Hope	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Fuel break in riparian area (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County/Village</li> <li>▪ State/County</li> <li>▪ Municipality/County</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Joel	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ BLM fuel treatments (M)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ County</li> <li>▪ BLM</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Loco Hills	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> </ul>

Wildland Urban Interface	Priority Fuels Treatments <sup>1</sup>	Responsible Agency
	<ul style="list-style-type: none"> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ BLM fuel treatment (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Landowner/County</li> <li>▪ County</li> <li>▪ Railroad company</li> <li>▪ BLM</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
La Huerta	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ BLM fuels treatment (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ County</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Loving	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Salt Cedar abatement (L)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County/Village</li> <li>▪ State/County</li> <li>▪ Carlsbad SWCD</li> <li>▪ Railroad company</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Malaga	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ BLM fuel treatments (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ State/County</li> <li>▪ Railroad company</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Otis	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (L)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ BLM fuel treatment (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ County</li> <li>▪ County</li> <li>▪ Railroad company</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Queen	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> </ul>

Wildland Urban Interface	Priority Fuels Treatments <sup>1</sup>	Responsible Agency
	<ul style="list-style-type: none"> <li>▪ Church camp road (M)</li> <li>▪ Fuel load on roads (M)</li> <li>▪ Mow along roads (M)</li> <li>▪ Fuel breaks around community (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sponsoring church</li> <li>▪ County/Homeowner</li> <li>▪ State/County</li> <li>▪ USFS</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Riverside	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow along roads (M)</li> <li>▪ Railroad track right-of-way (L)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ County</li> <li>▪ Railroad company</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Sun Country	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mow grasses along roads (M)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ State/County</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>
Waste Isolation Pilot Plant	<ul style="list-style-type: none"> <li>▪ Mow along roads (M)</li> <li>▪ Weed abatement (H)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ WIPP</li> <li>▪ WIPP</li> <li>▪ BLM</li> </ul>
White's City	<ul style="list-style-type: none"> <li>▪ Defensible space (H)</li> <li>▪ Weed abatement (H)</li> <li>▪ Mowing along roads (M)</li> <li>▪ Salt cedar abatement (L)</li> <li>▪ BLM fuel treatments (L)</li> <li>▪ Manage FRCC 2/3 vegetation to FRCC 1 (L)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Homeowner</li> <li>▪ Landowner/County</li> <li>▪ State/County</li> <li>▪ Carlsbad SWCD</li> <li>▪ BLM</li> <li>▪ BLM/NRSC/SWCD/private landowner</li> </ul>

<sup>1</sup> H=High Priority; M=Moderate Priority; L=Low Priority



### 5.1.1 Defensible Space

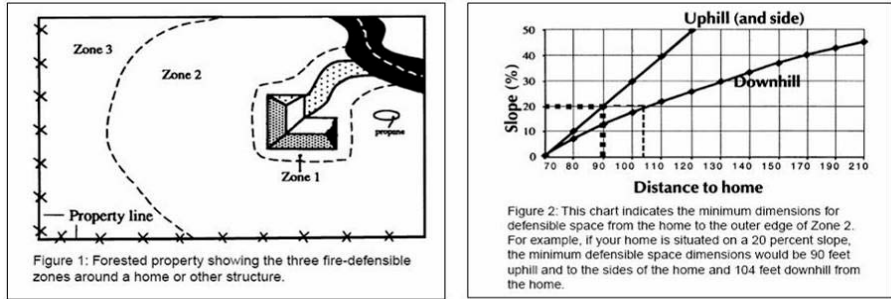
An action that can immediately improve community wildfire hazard is the implementation of defensible space around individual homes. It is recommended that defensible space be created for homes in all WUIs following the NMSFD guidelines (<http://www.emnrd.state.nm.us/fd/index.htm>). Homeowners need to evaluate their own situations to determine needed actions. NMSFD is available to help homeowners determine the best actions to protect structures. Also considerable information is available through the Firewise program ([www.firewise.org](http://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, oil and gas infrastructure, 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. Also, the use of low-flammable construction practices for roofs, siding, decks and porches is recommended in accordance with IWUIC.

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 fire fighters to protect structures. There are normally three components to a defensible space:

- Zone 1 is the area of maximum modification and treatment (Figure 1). It consists of an area 15-30 feet around the structure in which 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 (Figure 1). 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).

**Figure 1. NMSFD Defensible Space Guidelines and Standards**



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 13 outlines a manageable phased implementation schedule.

**Table 13. Proposed Defensible Space Schedule for Homeowners and Communities**

Year	Project	Actions
1	Annual spring outreach	<ul style="list-style-type: none"> <li>Contact and/or organize homeowners</li> </ul>
	Annual spring mitigation (defensible space)	<ul style="list-style-type: none"> <li>Clean roofs and gutters</li> <li>Trim and thin trees and bushes in Zone 1</li> <li>Rake and remove fine fuels from Zones 1 and 2</li> <li>Relocate firewood from Zone 1 to Zone 2</li> <li>Help a neighbor</li> <li>Organize debris disposal</li> </ul>
2	Annual spring outreach	<ul style="list-style-type: none"> <li>Contact and/or organize homeowners</li> </ul>
	Annual spring mitigation (defensible space)	<ul style="list-style-type: none"> <li>Trim and thin trees and bushes in Zone 2</li> <li>Repeat basic yard cleanup in Zones 1 and 2</li> <li>Help a neighbor</li> <li>Organize woody debris disposal</li> </ul>
3	Annual spring outreach	<ul style="list-style-type: none"> <li>Contact and/or organize homeowners</li> <li>Advise individual homeowners on needed improvements to construction features</li> </ul>
	Annual spring mitigation (defensible space)	<ul style="list-style-type: none"> <li>If necessary, coordinate defensible space efforts between homeowner groups who have created defensible space and adjacent open space land managers</li> </ul>

Year	Project	Actions
		<ul style="list-style-type: none"> <li>▪ Work with NMSFD to improve forest or rangeland health in Zone 3</li> <li>▪ Repeat basic yard cleanup in Zones 1 and 2</li> </ul>
4	Annual spring outreach	<ul style="list-style-type: none"> <li>▪ Contact and/or organize homeowners</li> <li>▪ Follow-up on construction feature recommendations</li> </ul>
	Annual spring mitigation (defensible space)	<ul style="list-style-type: none"> <li>▪ Complete any outstanding projects from previous years</li> <li>▪ Continue maintenance phase</li> <li>▪ Initiate construction feature improvements</li> </ul>

### 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, and in fallowed fields and abandoned lots.

Grass and weedy fuel abatement is important, and it 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 effectively and safely used in appropriate locations away from structures. Prescribed fire must adhere to Eddy County policy and New Mexico smoke management and air quality regulations. Livestock grazing can be effective in reducing herbaceous fuel loads. Eddy County does not have a weed abatement office. 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 load throughout the assessment area is generally continuous. Highways and roads are features that provide a break to fuel continuity. Natural features such as the Pecos and Black rivers provide limited fuel breaks to communities. 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 early 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. Eddy 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 that 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.

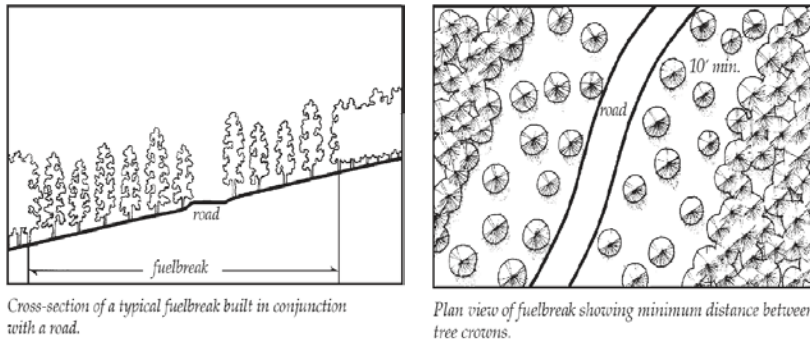
Fuel breaks do not require that all vegetation be removed to bare soil or rock (Figure 2). They can be aesthetically pleasing and improve wildfire habitat. Typically, trees are thinned to a spacing of 10-15 feet among tree canopies. Dead and diseased trees are removed. The lower tree limbs are pruned 6-10 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 in the forest canopy. Herbaceous vegetation may be mowed or grazed to reduce its fuel load. Mechanical equipment and/or prescribed fire are used to create fuel breaks. Prescribed fire may be useful in reducing shrub and herbaceous fuel loads in these areas. 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](http://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 according to Eddy County burning guidelines and New Mexico State air quality and smoke management policy.

Fuel breaks are recommended for State Highway 6 leading to Carlsbad Caverns National Park and the road leading into the church-sponsored camp area in the Queen WUI. These roads provide the only ingress and egress to for these recreational areas. Fuel breaks would help limit smoke and fire severity to improve emergency access.

The Carlsbad Caverns road is long and winding. Wildfire along the road could impede egress of vehicles evacuating a fire and ingress of emergency vehicles from the White's City FD. A fuel break is not recommended for the entire road length, but for strategic locations where fuel load and terrain are conducive to severe fire behavior. Actions should be in accordance with Park's fire and fuels management plan. Carlsbad Caverns National Park has planned prescribed fire in future years to reduce fuel loads and enhance vegetation along Highway 6. If a fire were to occur, fire management with law enforcement rangers would block traffic at the entrance and at the visitor's center until safe passage was ensured.

**Figure 2. Example of Fuel Break along a Road**



Source: Dennis, not dated

### 5.1.5 Salt Cedar Abatement

Salt cedar is a noxious, invasive shrub that grows in the riparian vegetation of the Pecos River, Delaware River, Black River, Rocky Arroyo, and Dark Canyon Arroyo, and perhaps other areas. 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/>.

Comment [e2]: Change to "bogues"?

Salt cedar abatement is warranted because of its fuel load, high water use, and limited value as wildlife habitat. A significant number of human-caused fires occur in this vegetation-fuel type (Map 8). Priority treatment areas would be those with moderate-to-heavy fuel loads in proximity to urban areas, structures, and other values. Salt cedar is a flashing 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 by painting the stumps with herbicide, is an effective treatment, and treated areas should be re-planted with desirable vegetation such as willows or cottonwood trees. The Carlsbad Soil and Water Conservation District has had success with whole plant extraction and pile burning the woody debris. The District then follows up with natural rehabilitation, cottonwood pole plantings, or seeding the disturbed areas as appropriate.

### 5.1.6 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. Sixty 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, 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 fuel treatments that are planned for the years 2008–2010 will improve FRCC at these sites (Map 10). The vegetation in BLM land in the southern part of the county has already been treated with herbicides to reduce the density of woody plants such as mesquite, catclaw, and creosote.

Carlsbad Caverns National Park has planned prescribed fire to enhance and reduce fuel continuity and loads along Highway 6. These fires will improve FRCC and also improve emergency egress and ingress in the event of a wildfire.

### **5.1.7 Oil and Gas Infrastructure**

The oil and gas industry is important economically to Eddy County. Oil and gas infrastructure occurs throughout the county but is more prevalent on eastern lands. Defensible space should be developed for infrastructure at risk to wildfire following the principles presented in Section 5.1.1. Trucks should carry shovels, rakes, and fire extinguishers to suppress small fires that may ignite around oil and gas rigs. In the event of a large fire, 911 should be called to report the fire location, and the site should be evacuated.

The wildfire risks and hazards posed by the miles of surface polyurethane piping are not known because of a paucity of experience. Different colored piping carries different fluids on BLM lands. The risks and hazards of black piping, which carries water, are obviously non-existent. However, the risks and hazards to green and yellow piping, which carry oil and gas, respectively, are high in the event of leakage. It is not desirable to remove vegetation along green and yellow piping routes because it would leave areas susceptible to weed colonization.

### **5.1.8 Treatment Options and Costs**

Reducing vegetation-fuel continuity and load will require a combination of treatment methods as described in Section 5.1.5. Each of the recommended fuel mitigation projects can be achieved by a variety of methods (Table 14). 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 should be considered as only general guidelines for comparative purposes. Fuel treatment costs can vary tremendously based on vegetation-fuel attributes, project acreage, terrain, proximity to structures, access, and transportation costs.

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

**Table 14. Treatment Methods**

Treatment	Estimated Cost	Comments
Machine Mowing	\$90–\$200 per acre	<ul style="list-style-type: none"> <li>▪ Appropriate for large, flat grassy areas on relatively flat topography.</li> </ul>
Prescribed Fire	\$100–\$125 per acre	<ul style="list-style-type: none"> <li>▪ Can be cost effective.</li> <li>▪ Ecologically beneficial.</li> <li>▪ Can be used as training opportunities for firefighters.</li> <li>▪ Cost varies with complexity.</li> <li>▪ Carries risk of escape, which may be unacceptable in some WUI areas.</li> <li>▪ Unreliable scheduling due to weather and smoke management constraints.</li> </ul>
Brush Mastication	\$300–\$500 per acre	<ul style="list-style-type: none"> <li>▪ Brush species (Gamble oak in particular) tend to re-sprout vigorously after mechanical treatment.</li> <li>▪ Follow-up treatments with herbicides, fire, grazing, or further mechanical treatments are typically necessary.</li> <li>▪ Mastication tends to be less expensive than manual treatment and eliminates disposal issues.</li> </ul>
Timber Mastication	\$300–\$1,200 per acre	<ul style="list-style-type: none"> <li>▪ Materials up to 10 inches in diameter and slopes up to 30 percent can be treated.</li> <li>▪ Eliminates disposal issues.</li> <li>▪ Environmental impacts of residue being left onsite are still under study as the mulch may inhibit seed germination.</li> </ul>
Manual Treatment with Chipping or Pile Burning	\$300–\$1,200 per acre	<ul style="list-style-type: none"> <li>▪ Allows for removal of merchantable materials or firewood in timber.</li> <li>▪ Requires chipping, hauling, and pile burning of slash.</li> </ul>
Feller Buncher	\$750–\$900 per acre	<ul style="list-style-type: none"> <li>▪ Mechanical treatment on slopes over percent or of materials over 10 inches in diameter may require a feller buncher rather than a masticator.</li> <li>▪ Costs tend to be considerably higher than mastication.</li> <li>▪ May allow for removal of merchantable material.</li> </ul>
Herbicide	\$15–\$65 per gallon	<ul style="list-style-type: none"> <li>▪ Application can be species or area specific</li> <li>▪ Cost per acre will vary depending on application rates and target species</li> <li>▪ Easy to apply on steep slopes and other rough terrain</li> <li>▪ Costs may be lower than mechanical methods</li> <li>▪ Dead woody material may need to be removed</li> <li>▪ Applicator license required</li> </ul>

## 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. Respondents to the questionnaire considered public outreach as a critical component of reducing wildfire risk (Appendix D). 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.

An annual WUI or community meeting 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 to the 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 in front of residences. Each landowner 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 to many structures is replacing roofs with Class A roofing material. The screening of 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, which 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 Eddy 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](http://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 put forth a tremendous effort to suppress small fires before they grow into large fires. Even so, all authorities need to collaborate to maintain, and in some cases improve, wildfire fighting equipment, engines, and firefighter training.

During the course of the CWPP assessment and needs, FD fire chiefs and federal fire management officers were interviewed to ascertain their current level of wildfire fighting preparedness and anticipated needs. Table 15 presents information on resource and training needs obtained from the interviews. County FDs need to work with Eddy County Office of Emergency Management to obtain funding for upgrading resources and improve firefighting training.

**Table 15. Wildfire Protection Authorities' Resource and Training Needs**

Authority	Resource Needs	Training Needs
Atoka Fire District	<ul style="list-style-type: none"> <li>▪ 10 sets of hand tools such as fire swatter, firefighting shovel, fire rake, and Pulaski</li> <li>▪ GPS unit for all engines</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> <li>▪ Incident command training</li> </ul>
Cottonwood Fire District	<ul style="list-style-type: none"> <li>▪ One 1,000 tender</li> <li>▪ One Type 6 brush engine</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> <li>▪ Incident command training</li> </ul>
Happy Valley Fire District	<ul style="list-style-type: none"> <li>▪ One Type 6 brush engine</li> <li>▪ New station add-on to increase room</li> <li>▪ 6 sets of personal protective equipment and shelters</li> <li>▪ Radio repeater on Highway 137</li> <li>▪ One GPS unit for each engine</li> <li>▪ Dry hydrants needed for McNew subdivision and Marathon</li> </ul>	<ul style="list-style-type: none"> <li>▪ FFT1 and FFT2</li> <li>▪ Annual CWPP training</li> <li>▪ Update red cards</li> </ul>
Joel Fire District	<ul style="list-style-type: none"> <li>▪ One rescue truck</li> <li>▪ One 2500 g pumper tanker</li> <li>▪ One Type 6 brush engine</li> <li>▪ 6 sets of personal protective equipment and shelters</li> <li>▪ 10 handheld radios</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual CWPP training</li> </ul>
La Huerta Fire District	<ul style="list-style-type: none"> <li>▪ No equipment needs</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ FFT2 and FFT2</li> <li>▪ Annual NWCG training</li> </ul>
Loco Hills Fire District	<ul style="list-style-type: none"> <li>▪ Two Type 6 brush engines (ordered)</li> <li>▪ One 2000 g 4 x 4 tanker</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ FFT2 and FFT1</li> <li>▪ Annual NWCG training</li> </ul>
Malaga Fire District	<ul style="list-style-type: none"> <li>▪ One GPS unit for each engine</li> <li>▪ No other information received</li> </ul>	<ul style="list-style-type: none"> <li>▪ No information received</li> </ul>
Otis Fire District	<ul style="list-style-type: none"> <li>▪ 10 handheld radios</li> <li>▪ One 200 g brush engine</li> <li>▪ 6 sets of personal protective equipment and shelters</li> <li>▪ Chain saw</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> </ul>
Queen Fire District	<ul style="list-style-type: none"> <li>▪ One 2000 g tender</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> </ul>

Authority	Resource Needs	Training Needs
	<ul style="list-style-type: none"> <li>▪ Heliport behind station</li> <li>▪ Younger volunteers</li> <li>▪ One 20,000 g water tank</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ ENGB</li> <li>▪ Actual experience</li> </ul>
Riverside Fire District	<ul style="list-style-type: none"> <li>▪ 6 handheld radios</li> <li>▪ 6 sets of personal protective equipment and shelters</li> <li>▪ 6 sets of hand tools including fire swatters, firefighting shovels, fire rakes, and Pulaski</li> <li>▪ Substation west of Pecos River with tanker and brush engine</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ FFT2 and FFT1</li> <li>▪ Annual NWCG training</li> </ul>
Sun Country Fire District	<ul style="list-style-type: none"> <li>▪ 6 sets of personal protective equipment and 16 shelters</li> <li>▪ 6 sets of hand tools including fire swatters, firefighting shovels, fire rakes, and Pulaski</li> <li>▪ One chainsaw</li> <li>▪ One GPS unit for each engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ WUI firefighting</li> <li>▪ Incident command system</li> </ul>
White's City Fire District	<ul style="list-style-type: none"> <li>▪ One GPS unit for each engine</li> <li>▪ Dry hydrant for Black River area</li> <li>▪ Dry hydrant for Washington Ranch area</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> <li>▪ Single resource level training</li> </ul>
Artesia Municipal Fire District	<ul style="list-style-type: none"> <li>▪ One Type 6 brush engine</li> <li>▪ 18 sets personal protection equipment and shelters</li> <li>▪ 10 sets of hand tools including fire swatters, firefighting shovels, fire rakes, and Pulaski</li> <li>▪ GPS unit for each wildfire engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ Current wildfire fighters need red card</li> <li>▪ Mutual aid training</li> <li>▪ Incident command training</li> </ul>
Carlsbad Municipal Fire District	<ul style="list-style-type: none"> <li>▪ One Type 4 brush engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> </ul>
Loving Municipal Fire District	<ul style="list-style-type: none"> <li>▪ 10 sets of hand tools such as fire swatter, firefighting shovel, fire rake, and Pulaski</li> <li>▪ 10 sets of personal protection equipment and shelters</li> <li>▪ 6 handheld radios</li> <li>▪ 2 chainsaws</li> <li>▪ GPS unit for each wildfire engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> <li>▪ NWCG up to engine boss</li> </ul>
Hope Municipal Fire District	<ul style="list-style-type: none"> <li>▪ One 2000 g pumper</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> </ul>

Authority	Resource Needs	Training Needs
	<ul style="list-style-type: none"> <li>▪ 10 handheld radios</li> <li>▪ GPS unit for each wildfire engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ New volunteers need training</li> <li>▪ FFT1</li> </ul>
Waste Isolation Pilot Plant	<ul style="list-style-type: none"> <li>▪ 12 sets of personal protective equipment and shelters</li> </ul>	<ul style="list-style-type: none"> <li>▪ Annual NWCG training</li> <li>▪ NWCG engine boss</li> </ul>
Carlsbad Caverns NPS	<ul style="list-style-type: none"> <li>▪ Seasonal crew to staff engines fall through winter months</li> <li>▪ One Type 6 engine</li> </ul>	<ul style="list-style-type: none"> <li>▪ No training specified</li> </ul>
Carlsbad Interagency Fire Organization	<ul style="list-style-type: none"> <li>▪ No specified equipment needs</li> </ul>	<ul style="list-style-type: none"> <li>▪ No specified training needs</li> </ul>

A common need among fire authorities is strategically located water sources throughout their extended response areas. Many county FDs and all municipal FDs have hydrant systems. However, some county FDs such as Happy Valley, Joel, Otis and Sun Country do not have a reliable or extensive hydrant system. Queen stores several thousand gallons of water at the station but has no water sources elsewhere in their response area.

A recommendation is that all FDs review their water needs and current water sources. Identify areas where water is not readily available in their districts. Strategically located water sources should be identified throughout a response area and mapped. These sites might include dry hydrant developments serviced by a well or surface water suitable for drafting. Ranches and farms may be a source for water. Water sources need to be checked on an annual basis to ensure that dry hydrants are functioning properly, to assess the need for access maintenance at surface drafting sites, and to verify accessibility onto private land.

All fire districts need continual wildfire training. All of the districts have firefighters trained in basic wildfire skills. However, a higher level of training at the NWCG Firefighter 1 and engine boss levels is needed. One issue is the physical fitness test required for red card certification. The red card certification should not be mandatory except for firefighters that want to be certified. Another issue is that volunteer firefighters have difficulty during the week attending training classes and exercises because of work obligations. Weekend training is more convenient than training held on week days. The county is fortunate to have the Permian Basin Regional Training Center to provide the necessary training.

### 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 CFDs should work with WUIs and communities in obtaining grant funding for CWPP recommended projects.

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. 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 16 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 Protecting Act (NEPA) requirements and other agency-specific necessities need to be satisfied before fuel treatments occur on federal lands.

**Table 16. Recommend Vegetation-Fuels Management Schedule**

Wildland-Urban Interface	Proposed Fuels Treatments	Schedule
Artesia	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> </ul>
Atoka	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-way</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> </ul>

Wildland-Urban Interface	Proposed Fuels Treatments	Schedule
	<ul style="list-style-type: none"> <li>▪ Salt cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing</li> <li>▪ Ongoing</li> </ul>
Carlsbad	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad right-of-ways</li> <li>▪ Salt cedar abatement</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> </ul>
Carlsbad Caverns	<ul style="list-style-type: none"> <li>▪ Defensible space around staff housing</li> <li>▪ Fuel breaks along access road</li> <li>▪ Reduce herbaceous fuel load on west slope leading to parking lot</li> </ul>	<ul style="list-style-type: none"> <li>▪ By 2010</li> <li>▪ By 2011</li> <li>▪ By 2012</li> </ul>
Cottonwood	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-way</li> <li>▪ Salt cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> <li>▪ Ongoing</li> </ul>
Happy Valley	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-ways</li> <li>▪ Salt cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> <li>▪ Ongoing</li> </ul>
Hope	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Fuel break along riparian area</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> </ul>
Joel	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> <li>▪ BLM treatments</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ Ongoing</li> <li>▪ By 2010</li> </ul>
Loco Hills	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-way</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> </ul>

Wildland-Urban Interface	Proposed Fuels Treatments	Schedule
	<ul style="list-style-type: none"> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> <li>▪ BLM treatments</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing</li> <li>▪ By 2010</li> </ul>
La Huerta	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Salt cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> <li>▪ BLM treatments</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> <li>▪ Ongoing</li> <li>▪ By 2010</li> </ul>
Loving	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-way</li> <li>▪ Salt Cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> <li>▪ Ongoing</li> </ul>
Malaga	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-way</li> <li>▪ Salt cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> <li>▪ BLM treatments</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> <li>▪ Ongoing</li> <li>▪ By 2010</li> </ul>
Otis	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Mow along roads</li> <li>▪ Railroad track right-of-way</li> <li>▪ Salt cedar abatement</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> <li>▪ BLM treatments</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ Ongoing</li> <li>▪ Ongoing</li> <li>▪ By 2010</li> </ul>
Queen	<ul style="list-style-type: none"> <li>▪ Defensible space</li> <li>▪ Weed abatement</li> <li>▪ Church camp road</li> <li>▪ Fuel breaks on roads</li> <li>▪ Mow along roads</li> <li>▪ Fuel breaks around community</li> <li>▪ Manage FRCC 2/3 land to FRCC 1</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> <li>▪ Annually</li> <li>▪ By 2010</li> <li>▪ By 2012</li> <li>▪ Annually</li> <li>▪ 2012</li> <li>▪ Ongoing</li> </ul>
Riverside	<ul style="list-style-type: none"> <li>▪ Defensible space</li> </ul>	<ul style="list-style-type: none"> <li>▪ See Table 14</li> </ul>



Wildland-Urban Interface	Proposed Fuels Treatments	Schedule
	<ul style="list-style-type: none"><li>▪ Weed abatement</li><li>▪ Mow along roads</li><li>▪ Railroad track right-of-way</li><li>▪ Salt cedar abatement</li><li>▪ Manage FRCC 2/3 land to FRCC 1</li></ul>	<ul style="list-style-type: none"><li>▪ Annually</li><li>▪ Annually</li><li>▪ By 2010</li><li>▪ Ongoing</li><li>▪ Ongoing</li></ul>
Sun Country	<ul style="list-style-type: none"><li>▪ Defensible space</li><li>▪ Weed abatement</li><li>▪ Mow along roads</li><li>▪ Manage FRCC 2/3 land to FRCC 1</li></ul>	<ul style="list-style-type: none"><li>▪ See Table 14</li><li>▪ Annually</li><li>▪ Annually</li><li>▪ Ongoing</li></ul>
Waste Isolation Pilot Plant	<ul style="list-style-type: none"><li>▪ Mow along roads</li><li>▪ Weed abatement</li><li>▪ Manage FRCC 2/3 land to FRCC 1</li></ul>	<ul style="list-style-type: none"><li>▪ Annually</li><li>▪ Annually</li><li>▪ Ongoing</li></ul>
White's City	<ul style="list-style-type: none"><li>▪ Defensible space</li><li>▪ Weed abatement</li><li>▪ Mowing along roads</li><li>▪ Salt cedar abatement</li><li>▪ Manage FRCC 2/3 land to FRCC 1</li><li>▪ BLM treatments</li></ul>	<ul style="list-style-type: none"><li>▪ See Table 14</li><li>▪ Annually</li><li>▪ Annually</li><li>▪ Ongoing</li><li>▪ Ongoing</li><li>▪ By 2010</li></ul>



## 6 EMERGENCY OPERATIONS

### 6.1 Fire Authority Response

Wildfire suppression in Eddy County is provided by county FDs, municipal FDs, WIPP, NPS, and CIFO. Each fire authority has its primary area of response. The IJPA specifies IA zones and mutual aid as appropriate. Coordination among the fire authorities occurs regularly. The White's City VD and NPS have an MAA to provide wildfire suppression support on NPS land and the White's City WUI.

IA on a wildfire is the first responding force after a wildfire is reported to dispatch by calling 911. An extended attack (EA) occurs when fire escapes IA and additional forces are needed for suppression or the fire threatens important values such as structures. IA responding authority to a wildfire depends on fire location. The county FDs provide structure and wildfire protection services for unincorporated communities and on private lands, respectively. The municipal FDs provide structure and wildfire protection for incorporated lands. CIFO has wildfire responsibility on federal, state lands, and private lands. WIPP is responsible for IA on their property. NPS is responsible for fires on their lands.

The risk of large-scale wildfire exists throughout the county, but it is more prevalent in the Queen WUI because of fuel load and continuity (Map 4). 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 such as Queen WUI and Carlsbad Caverns. 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.

### 6.2 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 for preparing for an evacuation is presented on Eddy County Office of Emergency Management's website ([www.cavemen.net/ecourt/emergprepindex.htm](http://www.cavemen.net/ecourt/emergprepindex.htm)) and Firewise ([www.firewise.org](http://www.firewise.org)).

Families can take several steps to prepare for a wildfire event to improve safety and county 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 ingress. House numbers and street signs should be readily visible. Hand tools such as rakes and shovels should be available 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 or Eddy County Sheriff orders a community to evacuate because of threatening wildfire, residents should leave in an orderly manner.

The State Police or Sheriff 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 should be left on to allow firefighters to find homes at night. Families should take important papers, documents, medicines, pets, food, water, 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 (Table 17). The appropriate CFD 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 and newspaper releases, and distributed door-to-door.

**Table 17. Evacuation Routes for Eddy County Wildland-Urban Interface**

Wildland-Urban Interface	Primary Evacuation Route	Secondary Evacuation Route
Artesia	US Highways 285, 82	Several country roads
Atoka		Several country roads
Carlsbad	US Highways 285, 62, 180	Several country roads
Carlsbad Caverns	State Road 7	Several country roads
Cottonwood	US Highway 285	Several country roads
Happy Valley	State Highway 137 County Road 401	Several country roads
Hope	US Highway 82	County Road 5 and others
Joel	US Highway 180 State Highway 137	Several country roads
La Huerta	US Highway 180 Several county roads	Several country roads
Loco Hills	US Highway 82	Several county roads
Loving	US Highway 285	Several county roads
Malaga	US Highway 285	Several county roads
Otis	US Highway 285	Several county roads
Queen	State Highway 137	Unnamed unimproved jeep trail
Riverside	US Highway 82	Several county roads

Wildland-Urban Interface	Primary Evacuation Route	Secondary Evacuation Route
Waste Isolation Pilot Plant	Jal Highway Louis Whitlock	Several county roads
White's City	US Highway 180	Several unnamed dirt roads

The main evacuation routes for all communities are paved and maintained U.S. or state roads. There are several county roads in all of the WUIs that are suitable for secondary evacuation routes. However, Queen and Carlsbad Caverns need to identify suitable secondary evacuation routes. Both areas have access to unimproved, unnamed roads. A recommendation is to survey these roads and judge their suitability for evacuation. Selected roads then need to be upgraded to enable rapid evacuation in the event of a wildfire. Because there are many small, unincorporated communities and isolated residents throughout the county, evacuation routes should be identified that would be suitable for various groups. All county residents should have information on primary and secondary evacuation routes.

## **7 EDDY COUNTY CWPP MONITORING AND EVALUATION**

### **7.1 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, 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.

### **7.2 Sustaining CWPP Efforts**

A CWPP can serve as the foundation for a safer and healthier WUI 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.

Proactive WUI communities can seek support and guidance through a variety of local, state, and federal resources identified in this report including the NMSFD, CFDs, MFDs, and CIFO. The Firewise program is an excellent source for information on ways to help WUI communities reduce wildfire risks and hazards ([www.firewise.org](http://www.firewise.org)).

### **7.3 CWPP Oversight, Monitoring, and Evaluation**

As wildfire hazard reduction efforts are implemented over time and the characteristics of the WUI change, communities 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 WUI communities.

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## **APPENDIX A MAPS**

- Map 1. Eddy County CWPP Land Ownership
- Map 2. Eddy County CWPP Vegetation (Acres)
- Map 3. Eddy County CWPP Infrastructure
- Map 4. Eddy County CWPP Wildland-Urban Interface
- Map 5. Eddy County CWPP Fire Behavior Fuel Model
- Map 6. Eddy County CWPP Historic Reference Fire Regime (Acres)
- Map 7. Eddy County CWPP Fire History 2003–2007
- Map 8. Eddy County Ignition Risk Potential
- Map 9. Eddy County CWPP Fire Regime Condition Class (Acres)
- Map 10. Eddy 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	
<b>A. Means of Access</b>		
1. Ingress and egress		
a. Two or more roads in/out	0	_____
b. One road in/out	7	_____
2. Road width		
a. $\geq 7.3$ m (24 ft)	0	_____
b. $\geq 6.1$ 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. $\leq 91.4$ 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. $\geq 91.4$ 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>B. Vegetation (Fuel Models)</b>		
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	_____
<b>C. Topography Within 91.4 m (300 ft) of Structure(s)</b>		
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)		

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Element	Points										
<b>D. Additional Rating Factors (rate all that apply)</b>											
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 _____										
<b>E. Roofing Assembly</b>											
1. Class A roof	0 _____										
2. Class B roof	3 _____										
3. Class C roof	15 _____										
4. Nonrated	25 _____										
<b>F. Building Construction</b>											
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 _____										
<b>G. Available Fire Protection</b>											
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 _____										
<b>H. Placement of Gas and Electric Utilities</b>											
1. Both underground	0 _____										
2. One underground, one aboveground	3 _____										
3. Both aboveground	5 _____										
<b>I. Totals for Home or Subdivision (Total of all points)</b>											
<table border="0" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Hazard Assessment</th> <th style="text-align: left; border-bottom: 1px solid black;">Total Points</th> </tr> </thead> <tbody> <tr> <td>Low hazard</td> <td>&lt;40</td> </tr> <tr> <td>Moderate hazard</td> <td>40-69</td> </tr> <tr> <td>High hazard</td> <td>70-112</td> </tr> <tr> <td>Extreme hazard</td> <td>&gt;112</td> </tr> </tbody> </table>		Hazard Assessment	Total Points	Low hazard	<40	Moderate hazard	40-69	High hazard	70-112	Extreme hazard	>112
Hazard Assessment	Total Points										
Low hazard	<40										
Moderate hazard	40-69										
High hazard	70-112										
Extreme hazard	>112										
(NFPA 1144, 2 of 2)											

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## APPENDIX C QUESTIONNAIRE

### Questionnaire for Eddy County Community Wildfire Protection Plan

February 2008

Eddy County Office of Emergency Management contracted with Walsh Environmental Scientists and Engineers LLC to develop the Eddy 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 <b>community</b> do you live in or are you closest to? (please write in)	
2. How great of <b>risk</b> does wildfire pose to your community?	<input type="checkbox"/> Extreme Risk <input type="checkbox"/> Moderate Risk <input type="checkbox"/> Low Risk <input type="checkbox"/> No Risk
3. What areas are at <b>extreme fire hazard</b> and pose a risk to homes or property?	<input type="checkbox"/> Forestlands <input type="checkbox"/> Grasslands <input type="checkbox"/> Shrublands <input type="checkbox"/> Juniper Stands <input type="checkbox"/> Other Areas: _____  <b>Location:</b>
4. What is the best way to mitigate or reduce wildfire hazards?	<input type="checkbox"/> Increase number of fire department personnel <input type="checkbox"/> Reduce vegetation (grasses, trees, etc.) on public lands by controlled burns <input type="checkbox"/> Reduce vegetation (grasses, trees, etc.) on public lands by mechanical treatments <input type="checkbox"/> Increase firefighting equipment (more trucks, water tenders, etc.) <input type="checkbox"/> Increase water availability <input type="checkbox"/> Encourage private landowners to reduce fuels and develop defensible spaces around structures



5. What <b>recent actions</b> have been taken to reduce the risk of wildfire to your community?	<input type="checkbox"/> None that I am aware of. <input type="checkbox"/> If you know of actions that have been taken, please explain:
6. What <b>fire education programs</b> have occurred in your community?	<input type="checkbox"/> None that I am aware of. <input type="checkbox"/> If you know of programs that have occurred, please explain:
7. Is the community <b>prepared</b> to combat wildfire?	<input type="checkbox"/> No, if not, why: <input type="checkbox"/> Yes, if so, why: <input type="checkbox"/> I do not know
8. What <b>actions</b> 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:**

Eddy County Emergency Management 324 S. Canyon St., Ste. B Carlsbad, NM 88220 575-628-3973 (fax) E-mail: MVilla@eddyoem.com	Walsh Environmental 4888 Pearl E. Circle, Suite 108 Boulder, CO 80301-2475 303-443-0367 (fax) E-mail: jbarker@walshenv.com
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## APPENDIX D QUESTIONNAIRE FEEDBACK SUMMARY

### Questionnaire Summary

Questionnaires were provided to the public at public meetings convened on February 6, 2008 and on Eddy County’s website. Eight questionnaires were received as of April 16, 2008. The following tables summarize the responses of the 8 questionnaires

#### Questionnaire Summary

Question		Number of Response
2. How great of risk do wildfires pose to your property and community?	Extreme	5
	Moderate	2
	Low	1
	None	
3. What areas do you think are at extreme fire hazard and pose a risk to homes or property?	Forestlands	5
	Grasslands	4
	Shrublands	2
	Woodlands	2
	Other	
4. What do you think would be the best way to mitigate or reduce these hazardous?	Prescribed fire	3
	Mechanical control	6
	Fuel breaks	2
	Increase Equipment	3
	Increase Volunteers	3
	Increase available water	3
	Develop Defensible Space	7
	Firewise Education	3
	Evacuation Routes	2
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 visa versa? See Table A.	No	2
	Yes	6
6. Have there been recent fire education programs in your community? See Table B	No	7
	Yes	1
7. Do you think that the community in which you live is prepared to combat wildfire? See Table C	No	2
	Yes	4
	I do not know	2
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	Roadways were cleaned
2	3	Letters were sent out explaining fire danger
3	1	Carlsbad SWCD salt cedar and weed abatement program on Pecos River
4		
5		

**Table B. Summary of Responses to Question Number 6**

Comment	Number Received	Comment
1	1	VFD monthly meetings and training sessions
2		
3		
4		
5		
6		

**Table C. Summary of Responses to Question Number 7**

Comment	Number Received	Comment
1	1	No, Firefighters are too old
2	1	Yes, a large number of Queen is involved with FD.
3	1	Yes, BLM is helpful with grass fires
4	1	Yes, the VFDs and mutual aid agreements are helpful
5		

**Table D. Summary of Responses to Question Number 8**

Comment	Number Received	Comment
1	1	Mowing along roads
2	1	Queen needs a 911 system
3	1	Mowing along roads
4	1	Fire danger signs along roads
5	1	BNSF railroad needs to clear fuels on right-of-way
6	1	County code enforcement department needs to work with private landowners to reduce fuels
7	1	The county needs to be proactive in using prescribed fire to reduce fuel loads with careful planning

## APPENDIX E LIST OF PREPARERS

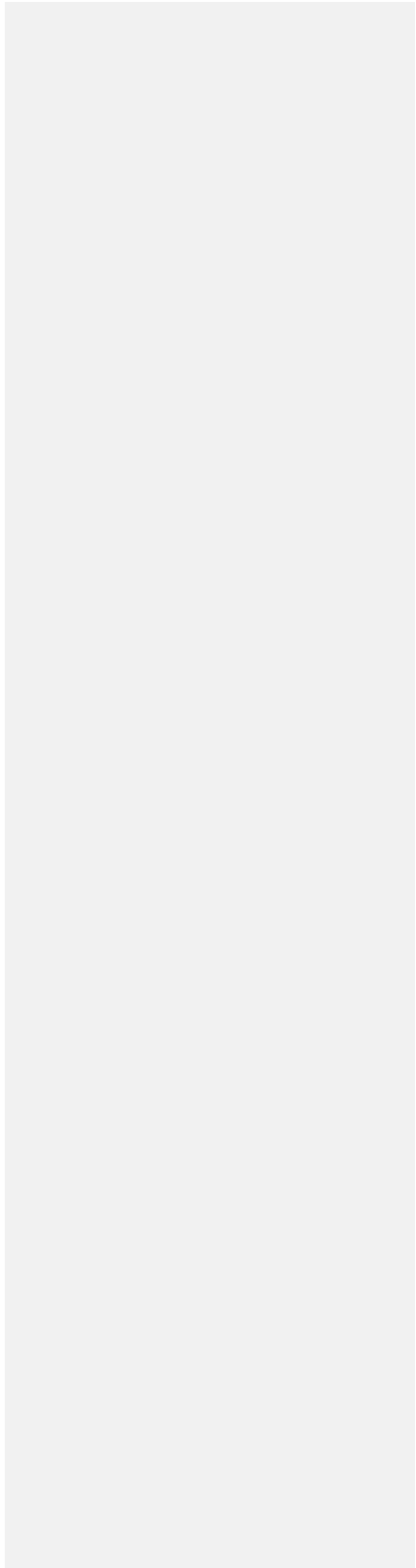
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Margaret Carew, GIS Specialist	Walsh Environmental Scientists and Engineers, LLC
Stan Spencer, Principal Scientist	Walsh Environmental Scientists and Engineers, LLC
Eric Lenderman, Editor	Walsh Environmental Scientists and Engineers, LLC

## APPENDIX F LIST OF ORANIZATION REPRESENTATIVES REQUESTED TO REVIEW DRAFT CWPP

Review	Organization
Lila Mohesky-Roybal	Carlsbad Caverns NPS
Travis Neopl	Carlsbad Caverns NPS
John A. Montoya	Carlsbad Caverns NPS
Robby Harris	Carlsbad Fire Department
Carol Telles	USFS
Ty Bryson	Carlsbad Interagency Fire Organization
Alan Fiala	NM State Parks - SE Region
Steve Massey	Eddy County
Greg Sahd	DOE - WIPP
Eddie Tudor	NMSFD Capitan District
Robert Brader	Eddy County Fire
Joel Arnwine	Eddy County OEM
Ronnie Houghtaling	Atoka FD
Josh Whitmire	Cottonwood FD
Darren Lane	Happy Valley FD
Alvy Williams	Joel FD
High Avant	La Huerta FD
Sonny Hope	Loco Hills FD
Roy Burkham	Malaga FD
David Looney	Otis FD
Jimmy Funk	Queen FD
Tom Navarrette	Riverside FD
Mary Posey	Sun Country FD
Mark Maciha	White's City Fire District



Review	Organization
Paul Ritter	Hope FD
Dennis Onsurez	Loving FD
Mike Reynolds	Carlsbad FD
Kevin Hope	Artesia FD







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



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