

Angel Fire, New Mexico

Wildland Urban Interface Community Wildfire Protection Plan



Prepared for:
Angel Fire, New Mexico

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

**Village of Angel Fire
Community Wildfire Protection Plan**

We the undersigned approve the Village of Angel Fire Community Wildfire Protection Plan

Organization: Village of Angel Fire

Signature: _____ Date: _____

Name and Title: Mr. Larry Leahy, Mayor

Organization: Village of Angel Fire Fire Department

Signature: _____ Date: _____

Name and Title: Mr. Orlando Sandoval, Fire Chief

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

Signature: _____ Date: _____

Name and Title: Mr. Ernie Lopez, Cimarron District Forester

TABLE OF CONTENTS

Executive Summary.....	1
Summary.....	5
The National Fire Plan.....	5
Purpose of the Angel Fire CWPP.....	6
Collaboration: The Village, Agencies and Stakeholders.....	7
Fire Hazard Ratings.....	10
Current Risk Situation	15
Action Plan	19
Public Information and Involvement.....	19
Reducing Structure Ignitability.....	21
Fuels Treatment	26
Evacuation Planning.....	35
Fire Department Capacity.....	37
Code Implementation Options	39
Community Description.....	41
Fire Regime and Condition Class	52
Fire Behavior Potential.....	55
Glossary.....	56
Appendix A – Fire Behavior Potential Analysis Methodology	
Appendix B - Communities	
Appendix C – Public Survey Results	
Appendix D – Excerpts From the Angel Fire Village Code	
Appendix E – Selected References	

TABLE OF FIGURES

Figure 1. Community Hazard Ratings.....	12
Figure 2. Areas of Special Interest Ratings.....	14
Figure 3. USFS Fire History 1970-2008.....	17
Figure 4. Comparison of Adjacent Lots.....	28
Figure 5. Fuel Break Project in Valley of the Utes.....	28
Figure 6. Treated and Untreated Areas in Taos Pines.....	28
Figure 7. Completed Projects In and Near the Village.....	29
Figure 8. Recommended Fuels Treatments.....	31
Figure 9. Example of a Shaded Fuel Break.....	33
Figure 10. Greenbelts Within the Village.....	34
Figure 11. Fire Department Firefighters and Equipment.....	38
Figure 12. Fire Regime/Condition Class.....	53

INDEX OF TABLES

Table 1. Priority Rankings for Communities.....	13
Table 2. Priority Rankings for Areas of Special Interest.....	13
Table 3. Wildfire in the Village of Angel Fire, 2004-2008.....	16
Table 4. Condition Class Description.....	54

EXECUTIVE SUMMARY

This Community Wildfire Protection Plan (CWPP) covers the Village of Angel Fire, which has been identified by the New Mexico State Forestry Division as one of the communities in the State at highest risk from wildland fire. Having this CWPP in place will enable the Village to compete more effectively for Federal and State grants which can assist in implementing the many projects described herein.

The Village of Angel Fire has already taken many actions to mitigate the hazards and risks associated with wildland fire and to encourage its citizens to create defensible space. These include the adoption of ordinances and codes for new construction, the implementation of a slash removal program, and the placement of power lines underground. In addition, the Village has supported the Fire Department's participation in the New Mexico Resource Mobilization Plan for Wildland-Urban Interface Fires, which ensures that its firefighters will be experienced and ready in the event that a wildland fire does occur.

The goal for the Village, as stated in a stakeholder meeting by Mayor Larry Leahy, is to be "Safer, Healthier, and More Beautiful," and the recommended actions in this report will help move the Village toward this goal. They are derived from wildland fire experience, scientific knowledge and models, data collected from the Village landscape, and information gathered during numerous meetings and conversations with Village officials, citizens and other interested stakeholders. The actions in this plan are designed to take place during the next ten years.

During the preparation of this Plan, thirteen "Communities" and four "Areas of Special Interest" were delineated and rated based on a number of factors. Each community represents certain dominant hazards from a wildfire perspective. The overall hazard ranking of these communities is determined by considering the following variables: fuels, topography, structure ignitability, availability of water for fire suppression, egress and navigational difficulties, as well as other hazards, both natural and man-made.

Of the thirteen Communities, three were rated as being "Very High Hazard," four were rated as "High Hazard" and six were rated as "Moderate Hazard". The communities are ranked in priority order for attention and treatment in the report, and the top three are Vail Loop, Back Basin, and El Camino Real.

The Action Plan focuses on five areas which are described in detail in the report:

- Public Information and Involvement;
- Reducing Structure Ignitability;
- Fuels Treatment;
- Evacuation Planning; and
- Fire Department Capacity.

The recommended actions in each area are summarized here:

Public Information and Involvement Action Items

1. Educate homeowners and potential contractors (home-building, forest thinning, etc.) about forest health and fire prevention.
2. Coordinate with community groups and area Firewise organizations to promote fire prevention, fuels treatment and defensible space.
3. Create a group to develop fire prevention and hazard reduction messages and methods to promote community awareness and minimize the effects of a wildfire on the economy and environment.
4. Conduct fire prevention campaigns during times when fire danger is high. Use newspapers, radio messages and signs to alert visitors and residents alike.

Reducing Structure Ignitability Action Items

1. Expand the current Wildland Urban Interface provisions to existing structures. Develop construction standards to reduce the vulnerability of wooden decks, especially on slopes. Implement the provisions in the highest hazard and risk areas first. Thin vacant lots adjacent to existing structures where needed to provide adequate defensible space.
2. Pursue state and federal grants that can support defensible space projects on both public and private lands. Landowners and local government can provide cost share support.
3. Expand the slash disposal service to encourage homeowners to reduce wildland fuels on undeveloped lots and to install and maintain defensible space around structures. Implement incentives for slash fees to support thinning.

Fuels Treatment Action Items

1. Expand the current Wildland Urban Interface provisions to existing undeveloped lots. Treat the highest hazard and risk areas first. Consider requirements that emphasize thinning along roadways and property lines and might not require thinning entire lots.
2. Conduct fuels reduction projects within or adjacent to the Village of Angel Fire based on the community hazard rating and fire behavior analysis sections of this plan.
3. Pursue state and federal grants that can support fuels reduction projects on both public and private lands within the Village. Landowners and local government can provide cost share support.
4. Work with the Association of Angel Fire Property Owners (AAFPO) Amenities Committee to conduct demonstration fuels reduction projects on the open space “green belt” trails throughout the Village that they maintain.

5. Continue to participate in the Taos Canyon Collaborative Forest Restoration Program (CFRP) Coalition as described in its Memorandum of Understanding between Taos Pueblo, the Village of Angel Fire, Rocky Mountain Youth Corps, National Renewable Energy LLC, H.R. Vigil Small products, Urban Interface Solutions, and Amigos del Bosque, LLC.
6. Actively participate in the planning, evaluation and monitoring of all federal, state, tribal and CFRP fuels treatment projects to assure agencies are working together to conduct high priority projects that are effective and benefit the Village.
7. Consider supporting the USDA-Forest Service, Carson National Forest prescribed burn and wildfire use programs, provided that community concerns for safety and smoke management are understood and followed.
8. Encourage the New Mexico Department of Game and Fish (NMDGF) to participate in the Angel Fire Community Wildfire Protection Plan implementation to provide a wildlife management perspective.

Evacuation Planning Action Items

1. Establish signs identifying evacuation routes. Routes could be color coded to simplify instructions to the public.
2. Thin vegetation along roadways and at intersections where possible to create the greatest potential for visibility during a wildfire. Refer to the fuels treatment section of this Plan for more information.
3. Advise the public about evacuation routes and the pre-identified safety zones at the airport, community center and golf course.
4. Use radio stations to disseminate emergency information and advise the public of their importance as a primary source of information.
5. Ensure that area radio stations are aware of their importance as disseminators of emergency messages, and regularly review and update procedures for authorizing such messages.
6. Investigate the potential use of warning systems such as emergency sirens, mass notification systems (such as "Reverse 911), helicopter-mounted public address systems, etc.
7. Involve the Village Police Department, Colfax County Sheriff's Department, State Police, and other cooperators in reviewing current Emergency Operating Plans and conducting field exercises.
8. Create handouts or messages advising the public about how to prepare for an evacuation. Consider emphasizing that when getting ready to evacuate, people should remember the "5 P's: Pictures, Pets, Papers, Pills and Phones."

Fire Department Capacity Action Items *[Please note that a separate review and recommendations report is being delivered about the Fire Department operations. The items noted here are specific to wildland fire needs.]*

1. Improve the fire department's Insurance Services Organization (ISO) rating. Improved firefighter response, fire equipment such as a ladder truck, additional fire stations and additional water delivery and storage capacity should improve the fire department's Insurance Services Organization (ISO) rating. An improved ISO rating will increase annual fire department funding and reduce homeowner insurance rates.
2. Establish a position knowledgeable in forestry or natural resources to implement and enforce WUI ordinances, obtain and manage WUI and hazardous fuels reduction grants, coordinate fire prevention activities and public involvement such as the Firewise communities program, and coordinate cooperators actions (including Forest Service, NM State Land Office, Taos Pueblo, and local Colfax County groups).
3. Encourage the cross-training of area fire departments, local government officials and state and federal agencies using the Incident Command System (ICS) to manage an emergency incident
4. Maintain the Enchanted Circle annual operating plan to coordinate area wildfire management. An annual operating plan has been prepared cooperatively with local, state, and federal government agencies.
5. Participate in interagency fire incidents to increase experience. Continue to participate in the New Mexico Resource Mobilization Plan to gain experience conducting wildfire suppression in wildland urban interface communities.
6. Conduct local, effective, and certified wildland fire trainings. Maintain wildland firefighter qualifications.
7. Consider developing a regional training center. Reach out to regional cooperators such as the Enchanted Circle, Raton Fire Department and Colfax and San Miguel County Fire Departments.
8. Continue to improve water storage and delivery systems. Complete development of one million gallon storage tank and connect the new storage into the existing water delivery system. Study how power outages or other problems during a wildland fire would affect water delivery.

Implementing these actions will take the Village of Angel Fire a long ways toward being "Safer, Healthier and More Beautiful." It will take work, but as long as landowners, homeowners, the Resort and Village officials remain focused on the long term, and committed to the outcome, this vision can become a reality.

SUMMARY

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

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

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

1. **Identifying and prioritizing fuels reduction opportunities across the landscape.** See the *Fuels Treatment* section on pages 26-35 of this document.
2. **Addressing structure ignitability.** See the *Reducing Structure Ignitability* section on pages 21-25 and the community descriptions in Appendix B of this document.
3. **Collaborating with stakeholders.** See pages 7-10 of this document.

Special thanks and recognition go to the Angel Fire Community Development Office and the Angel Fire Fire Department for providing oversight and guidance to this project.

THE NATIONAL FIRE PLAN

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



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

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

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

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

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

PURPOSE OF THE ANGEL FIRE CWPP

The purposes of the Angel Fire CWPP are to:

1. Identify and rate areas of the Village at risk
2. Reduce fuel hazards and prevent fires
 - a. Consider fuels treatment prescriptions and locations
 - b. Consider wildland urban interface codes and the Firewise Communities Program
3. Promote firefighter and public safety
4. Increase fire department capacity
5. Improve the Municipality’s position as it competes for grants

COLLABORATION: THE VILLAGE, AGENCIES AND STAKEHOLDERS

The Village of Angel Fire CWPP was developed in a collaborative process by engaging interested parties, forming a stakeholder group to assist in developing the plan and holding public meetings to identify community priorities.

The Village of Angel Fire prepared the CWPP through a contract with The Placitas Group and Anchor Point Group to conduct stakeholder and public meetings, complete a Community Risk Assessment, and write the plan. Mr. Mark Rivera, the Director of the Village's Community Development Office, led the effort to develop the CWPP and provided contract oversight. Fire Chief Orlando Sandoval was also directly involved and provided detailed technical guidance.

Outline of the process

- Engaged stakeholders, February, May and June, 2009
- Established a Community Base Map and On-Line Public Survey, March, 2009
- Conducted Community Risk Assessment field work, April, 2009
- Developed an Initial CWPP Outline and Draft Action Plan, May, 2009
- Held two public meetings to establish community priorities and obtained citizen recommendations, May and June, 2009
- Developed Draft CWPP, June, 2009
- Completed Final CWPP, July, 2009

Engaging Stakeholders

An extensive list of potential Interested Parties was developed, including a wide range of people interested and aware of the issues surrounding wildfire management in the Village of Angel Fire. These Interested Parties were sent a letter of invitation from the Mayor of Angel Fire to attend the first meeting. Many of them were visited in-person or via telephone to explain the CWPP process and encourage their participation. Meeting announcements were published in the local newspaper. The agencies, groups, and individuals that participated in the three stakeholder meetings included:

- The Mayor, Village Administrator, and Directors of the Public Works and Community Development Departments;
- The Village Fire Chief and Fire Marshal;
- A member of the Village Planning and Zoning Committee;
- The Municipal Fire Chief from Red River, and Volunteer Chief from Moreno Valley;



- State agencies including New Mexico State Forestry, the State Land Office, Cooperative Extension Service (New Mexico State University) and New Mexico Game and Fish;
- Federal government agencies including USDA-Forest Service, Carson National Forest, Camino Real Ranger District, and the Bureau of Land Management,
- Other private groups including the Association of Angel Fire Property Owners (AAFPO), Taos Pines Firewise Communities/USA, Colfax County Coalition of Firewise Communities, Amigos del Bosque Collaborative Forest Restoration Program group, Vermejo Park Ranch, National Renewable Energy LLC, and
- Interested citizens, including private loggers and business owners.

The first meeting of Stakeholders was held in Angel Fire, New Mexico on February 23, 2009 and was attended by 30 people. Mayor Larry Leahy provided opening remarks and the group was provided an overview of the proposed Angel Fire CWPP process. Stakeholders provided information on issues and concerns, existing plans and information, community values and current projects. A separate evening meeting was held for Fire Department members and was attended by 15 firefighters. Meeting notes were documented. Stakeholders discussed the following issues and concerns:

- Fire has a natural role in the environment. People who live and/or own property in this environment are concerned about wildfire.
- The goal of this fire planning process should be to minimize the effects of wildfire on peoples' lives, property, the Village economy and the local environment.
- Since the Osha/Zia wildland urban interface fire in 1998, the Village of Angel Fire has implemented a number of programs to require defensible space fuels reduction for new construction, support slash disposal, improve wildfire training for firefighters, and increase water storage capacity to improve fire protection. These efforts should continue.
- Reducing structural ignitability is very important to reduce property loss. Many residents have completed fuels reduction projects however many part-time residents and undeveloped lots are untreated and pose a threat to their neighbors. People want to be treated fairly.
- Area residents realize that fuels reduction projects to reduce potential for crown fires must occur on a variety of ownerships. Areas and projects should be prioritized and should tie in together. Project treatment prescriptions should be flexible and customized to the site, treatments should be sensitive to concerns for wildlife and water quality, and projects should be monitored.
- Evacuation during an emergency is a great concern for the public. Angel Fire needs to mark evacuation routes and to consider an evacuation warning system.
- The fire department needs critical equipment, including a ladder truck and fire engine, to meet minimum fire protection standards and improve community insurance ratings. The fire department responds to an average of more than 450 incidents each year. This year's workload has greatly increased.

- The “Firewise Communities USA” program has strong support in the area. Angel Fire should provide information to citizens about fire protection and forest health.

Additional stakeholder meetings were held on May 20 and June 12 to review and validate documents and graphics.

Community Meetings

The Village of Angel Fire and The Placitas Group participated in two community events to gain public input on issues and concerns, and feedback on community hazard ratings and draft action plan proposals for the Angel Fire CWPP. Meetings were held at the Angel Fire Community Center from 5:30 p.m. to 7:00 p.m. on Wednesday, May 20, 2009 and during the Association of Angel Fire Property Owners (AAFPO) annual meeting from 1:00 p.m. to 6:00 p.m. on Saturday, June 13, 2009. E-mail notices were sent to all Stakeholders and announcements were submitted to the local weekly newspaper.

Several Stakeholders and ten members of the public attended the meeting held in May, 2009. Thirty members of the public stopped by and many more browsed the Angel Fire CWPP display at the AAFPO Weekend event. Maps of the community hazard ratings and handouts on the proposed Action Plan, including location of strategic fuels treatments, were provided to the attendees. The public had an opportunity to ask questions and make comments. The attendees were provided fire prevention and home protection zone information materials including the New Mexico State Forestry “Living with Fire” newspaper. Attendees were also provided a survey and an email address to make written comments after the meeting.

In general people were supportive of their fire department and the idea of working to reduce the threat from wildfires near communities. The public was interested in fire prevention and creating a “home protection zone” or defensible space around their community and homes. One couple fretted that the Angel Fire CWPP would make them “cut all their trees”. Several people made the statement that they had done their defensible space work but were concerned that adjoining undeveloped lots were untreated and posed a hazard. A few residents experienced wildland urban interface fires when they lived in California. This experience made them very concerned that Angel Fire have an effective evacuation plan and that residents can be easily notified when there is a need.

On-Line Public Survey

An on-line survey consisting of 23 questions was developed and publicized through newspaper articles and e-mails to stakeholders, and presented at the public meetings. Despite this, only 21 people filled out surveys, which are summarized in Appendix C. Contact information for the respondents, several of whom expressed interest in participating in future wildland fire meetings, and the surveys themselves have been given to Village officials.



Development of a Draft CWPP

A draft CWPP was developed and provided to Stakeholders. Potential signers of the CWPP were contacted via telephone to encourage their review and participation. They were also queried as to their process for approving the final plan.

Final CWPP

The term “Community Wildfire Protection Plan” was first defined in the Healthy Forests Restoration Act (HFRA) in 2003. It was meant as a process where communities could engage adjacent federal land management agencies to address the threat to communities posed by wildfire and provide guidance to the agency to conduct fuels treatments to protect communities. The New Mexico Fire Planning Task Force adopted this CWPP process for all areas of the state to obtain a consistent approach to identify communities at risk and plan for fire in the wildland urban interface. As defined in HFRA, for a CWPP to be valid it must be approved by the local government (Village of Angel Fire City Council and/or Mayor), local fire official (Village Fire Chief) and the state agency responsible for forest fires (New Mexico State Forestry). Federal agencies such as the USDA-Forest Service, the Bureau of Land Management, and the Natural Resources Conservation Service were engaged and given an opportunity to participate. In addition, local governments in Colfax and Taos Counties were asked to join in the development and adoption of the CWPP.

A CWPP is critical for communities to remain competitive for future state and federal grants for wildfire protection and management. It is also seen as a living document that will be monitored and modified as action plan items are completed and new opportunities arise. Participation by cooperators including the New Mexico State Forestry and the USDA-Forest Service will also be critical to the success of this plan.

FIRE HAZARD RATINGS

For the purposes of this report the following definitions apply:

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

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

Figures 1 and 2 display the “Communities” and the “Areas of Special Interest” in the Village Wildland Urban Interface area. Each community represents certain dominant hazards from a wildfire perspective. The overall hazard ranking of these communities is

determined by considering the following variables: fuels, topography, structural ignitability, availability of water for fire suppression, egress and navigational difficulties, as well as other hazards, both natural and manmade. The methodology for this assessment uses a community hazard rating system called the Wildfire Hazard Rating System (WHR) developed specifically to evaluate communities within the WUI for their relative wildfire hazard.¹ The WHR model combines physical infrastructure such as structure density and roads, and fire behavior components like fuels and topography, with the field experience and knowledge of wildland fire experts. For more details on the rating of each of the communities and ASI's, as well as the specific recommendations for each area, please see Appendix B.

Areas of Special Interest (ASI) are generally places that have some development, but have been determined not to be an actual community due to the lack of values at risk. The fuels in the areas may be hazardous, but in the absence of homes or structures, they are not defined as communities by HFRA standards. Additionally, the recommendations for the *communities* are intended to protect the values at risk. While many of the recommendations for the ASIs may reduce potential fire behavior, they are also geared toward healthy forest management practices.

Instead of hazard and risk ratings, the ASIs are given relative physical hazard ratings. There are three categories: low, moderate, and high. These ratings are based on the mean fireline intensity for the modeled area. A more detailed description of this methodology can be found in Appendix A. It is important to note that these ratings **are not** equivalent to the community ratings because the methods used are not comparable. Community ratings are based on a built environment in the context of the physical environment. A rigorous field evaluation and ground-truthing of fuels and structures is conducted to determine the community ratings. This level of detailed evaluation cannot be completed for ASIs because the infrastructure and actual structures such as homes simply do not exist to the same extent. If mitigation work within an ASI is intended, a more thorough assessment and forest management plan is recommended.

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

Figure 1. Community Hazard Ratings

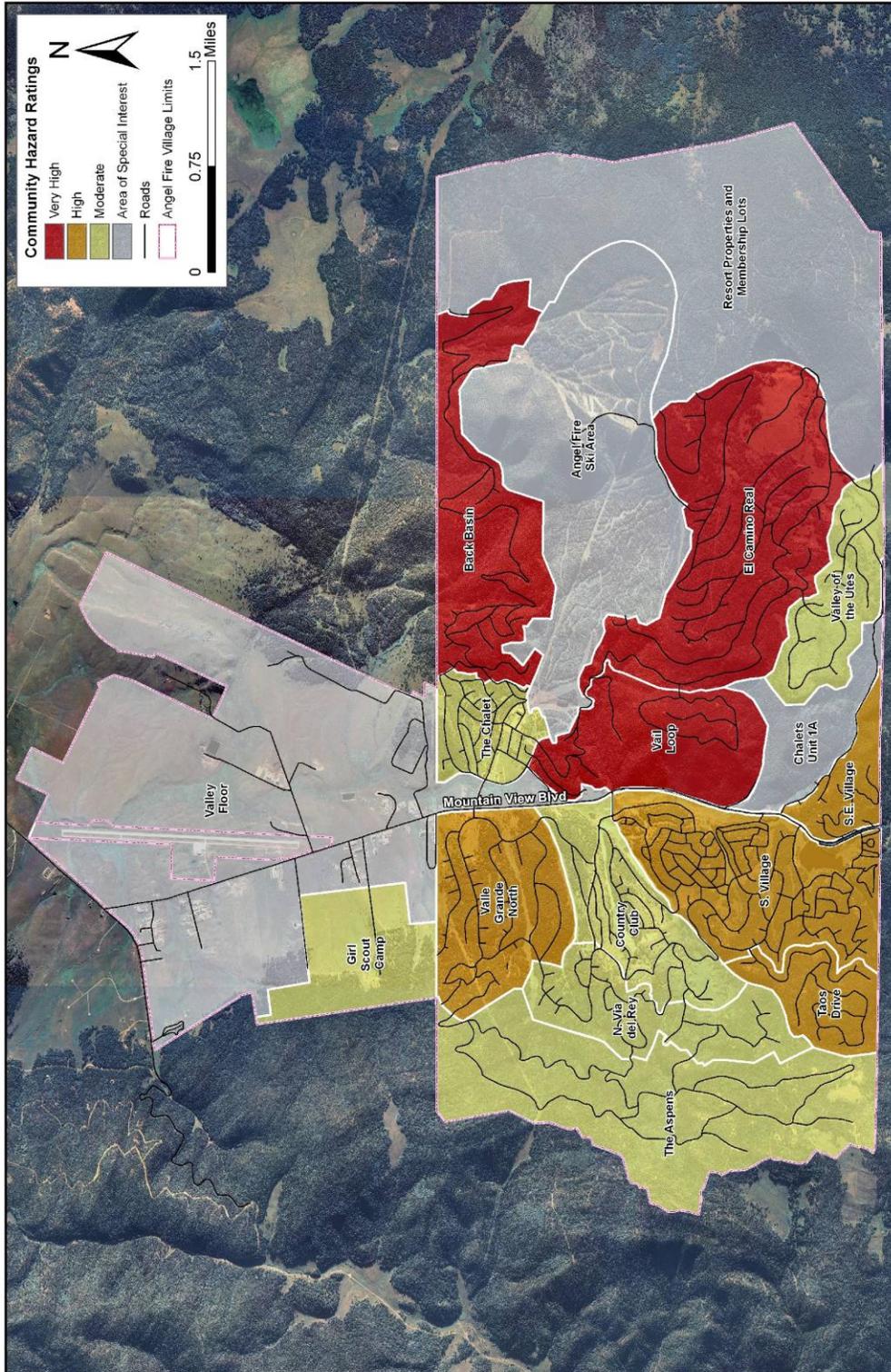


Table 1. Priority Rankings for Communities in the Village of Angel Fire (refer to Figure 1 on previous page)

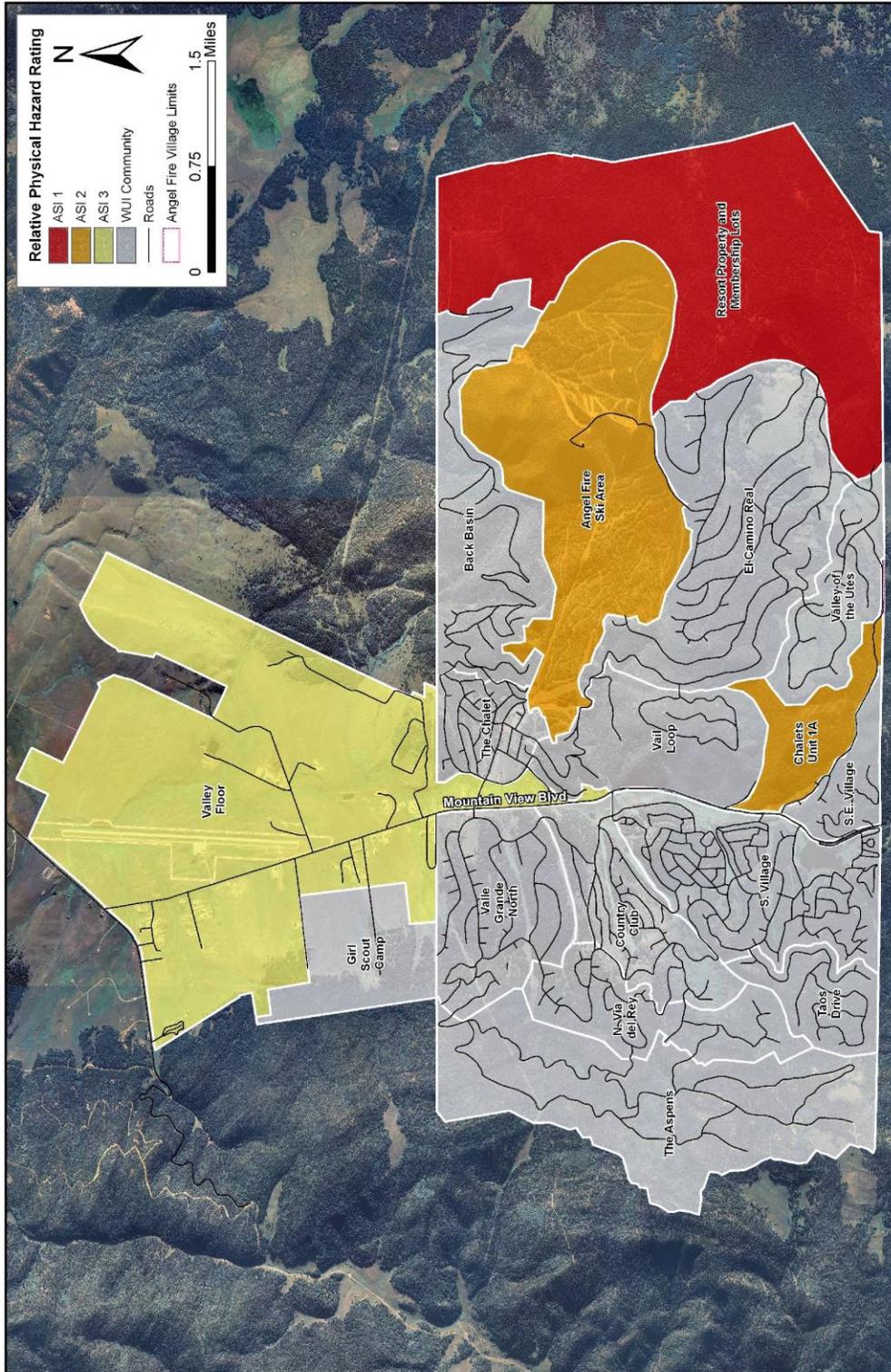
Priority Ranking	Community Name	Hazard Rating
1	Vail Loop	Very High
2	Back Basin	Very High
3	El Camino Real	Very High
4	Taos Drive	High
5	South Village	High
6	South East Village	High
7	Valle Grande North	High
8	The Aspens	Moderate
9	North Via del Rey	Moderate
10	Country Club	Moderate
11	The Chalet	Moderate
12	Valley of the Utes	Moderate
13	Girl Scout Camp	Moderate

Communities in the Angel Fire Community Wildfire Protection Plan with a ranking of very high or high should be considered as ranking high for the purpose of conforming to the reporting requirements for the New Mexico Fire Planning Task Force.

Table 2. Priority Rankings for the Areas of Special Interest (refer to Figure 2 on the next page)

Priority Ranking	Area of Special Interest	Relative Physical Hazard Rating
1	Angel Fire Ski Area	Moderate
2	Chalets Unit 1A	Moderate
3	Resort Property & Membership Lots	High
4	Valley Floor	Low

Figure 2. Areas of Special Interest Ratings



CURRENT RISK SITUATION

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

General Fire Occurrence Information

Angel Fire CWPP Stakeholders described an intense wildfire that occurred in the mid-1970's within the current boundaries of the Village of Angel Fire on the southeast side, now known as the Valley of the Utes. This fire burned more than 500 acres in the area and the old fire scar is evident from the resulting stand of aspen trees.

Four large wildland urban interface fires have occurred in the Colfax and Taos County areas since 1996. One of these fires occurred within the Village of Angel Fire boundary. All of these fires indicate a potential for large fires in the Village of Angel Fire region. The fires include:

- 1996- Hondo Fire, 7,600 acres, Town of Red River evacuated for three days.
- 1998- Osha/Zia Fires, 200 acres, Village of Angel Fire evacuates western neighborhoods.
- 2002 – Ponil Fire, 92,194 acres, fire in Colfax County threatens Ute Park, NM.
- 2003 – Encebado Fire, 5,400 acres, Taos Pueblo watershed damaged, major electric transmission lines serving Angel Fire threatened.



Village of Angel Fire Wildfire Incidents

The Village of Angel Fire, Fire Department provided five years of incident data from the period of 2004 to 2008. Fifty-five (55) wildfire related incidents were derived from this data and portrayed in Table 3: Wildfire in the Village of Angel Fire, NM, 2004-2008. The data indicates that the Angel Fire Fire Department has to respond to wildfire incidents and that the risk of wildfire exists in and near the community. The incident data only covers five years and is considered a small sample. In addition, some of the categories may overlap, some of the incidents may have been reported by state or federal agencies, and the individual incident data lacks details such as acres burned, fire cause and forest cover type burned.

Table 3. Wildfire in the Village of Angel Fire, NM, 2004-2008

Authorized burning	2
Authorized controlled burning	3
Brush or brush-and-grass mixture fire	1
Cultivated vegetation, crop fire, other	1
Forest, woods or wildland fire	27
Grass fire	3
Natural vegetation fire, other	10
Outside rubbish fire, other	4
Outside rubbish, trash or waste fire	2
Prescribed fire	2

New Mexico State Forestry Fire Occurrence

New Mexico State Forestry provided a summary of their wildfire occurrence data for Colfax and East Taos counties from 2003 to 2006 for fires on non-municipal, non-federal lands. The data indicates that wildfires are common in the region around the Village of Angel Fire. The data described 148 wildfire incidents over the four year time period.

Details include:

- 85% of the wildfire incidents were caused by lightning and only 15% were human caused.
- 65% of the fires occurred in the mixed conifer and ponderosa pine forest cover types. These forest cover types are represented by fuel models similar to those found within the Village of Angel Fire.
- Two of the fires in the mixed conifer and ponderosa pine forest cover types were over 50 acres in size and two were between 300 and 400 acres in size.

Fire Occurrences for the Camino Real District of the Carson National Forest

Fire occurrences for the Camino Real District of the Carson National Forest were calculated from the USDA Forest Service Personal Computer Historical Archive for the thirty eight year period from 1970-2008. This calculation does not include any data from state, county or private lands. The data have been processed and graphed using the Fire Family Plus software program and are summarized below- see Figure 3.

Residential development in the WUI is increasing in the study area. As the density of structures and the number of residents increases, potential ignition sources will multiply. Unless efforts are made to mitigate the increased likelihood of human ignition spreading to the surrounding wildland fuels, the probability of a large wildfire occurrence will continue to increase.

Figure 3. USFS Fire History 1970-2008

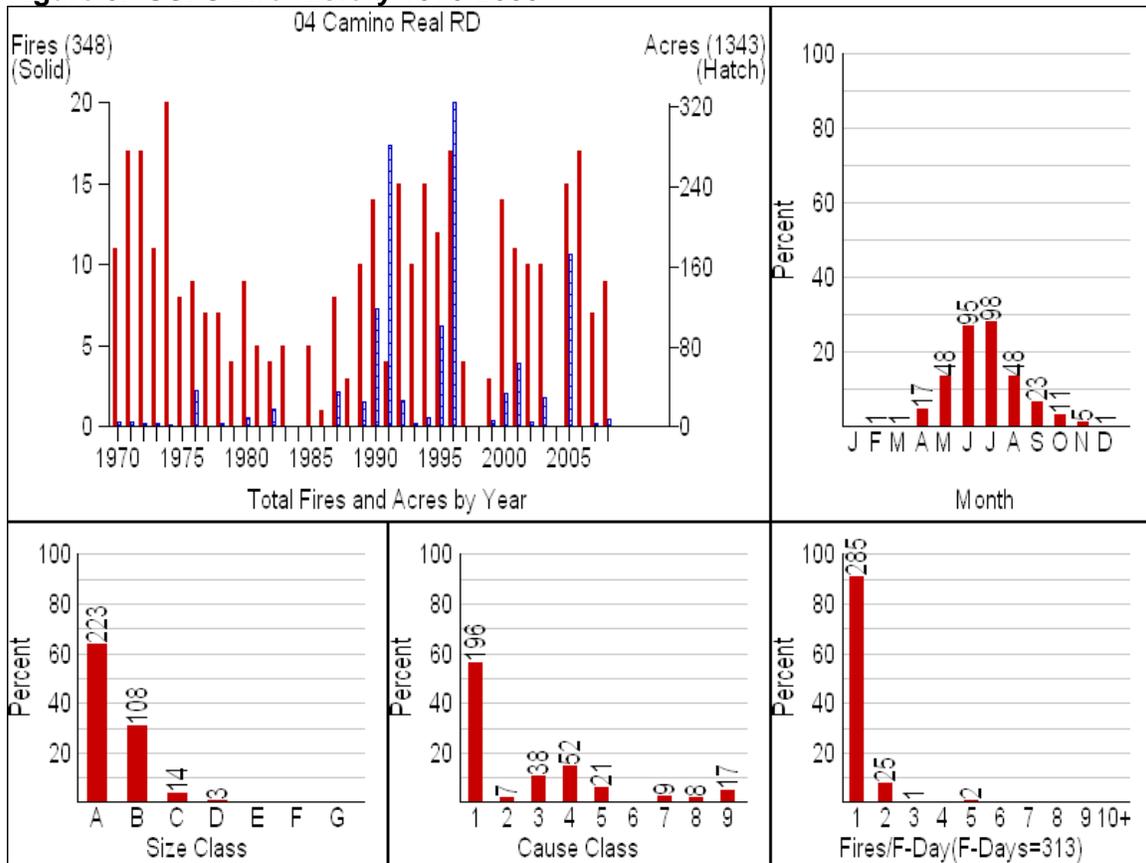


Figure 3a (upper left above) shows the number of fires (red bars) and the total acres burned (blue hatched bars) in the district each year. The number of fires decreased between 1973 and 1983, and then began to increase again into the mid 90's. Only 3 fires went over 100 acres during this period.

Figure 3b (upper right above) shows the percentage and number of fires occurring in each month of the year. The most active fire months are June and July, with May and August tied for second. Fire occurrences were also relatively common in the fall, with September and October both reporting a fair number of fires. It is worth noting that there have been fires reported in every month except January. This is a good reminder that any time there is no snow cover; there is a possibility of wildfire in this area.

Figure 3c (lower left above) shows the size class distribution of fires. Approximately 95% of the reported fires (331 of 348) were less than ten acres in size. This statistic reflects the fact that throughout the western US, the vast majority of fires are controlled during initial attack. The size classes used in the graphic are shown below.

Size Classes:

- A: \leq 0.25 acres
- B: 0.26 to 9.9 acres
- C: 10 to 99.9 acres
- D: 100 to 299 acres
- E: 300 to 999 acres
- F: 1000 to 4999 acres
- G: \geq 5000 acres

Figure 3d (lower middle above) shows the number of fires caused by each factor. As shown in this graph, the most common cause for ignitions is lightning (56%); the next most common cause is campfires (15%). Human causes represent the rest of the ignitions. It should be noted that the numbers for human starts are likely to be conservative, since this data is only for national forest areas lacking the concentrated development and other human-related risk factors present in the portions of the study area where private land is dominant.

Cause Classes:

- 1 - Lightning
- 2 - Equipment Use
- 3 - Smoking
- 4 - Campfire
- 5 - Debris Burning
- 6 - Railroad
- 7 - Arson
- 8 - Children
- 9 - Miscellaneous

Figure 3e (lower right above) shows the number of fire starts for each day that a fire start was recorded. Most fires (285) occurred on days that only had one fire start. Less than 9% of fire days had two or more fire starts in the thirty eight year period. These statistics suggest that multiple start days are a rare occurrence, compared to fire days with a single ignition.

ACTION PLAN

The Action Plan is the heart of the Angel Fire Community Wildfire Protection Plan (CWPP). It details the prioritized actions that the Village and cooperators want to take to reduce the risk of wildfire damage to people, property and the environment. It will require a high level of commitment to accomplish the tasks shown in this action plan.

Projects described in the action plan should be accomplished, substantially initiated or “on-going” over the next ten years.

Angel Fire can learn from other communities, such as Ruidoso, NM and Prescott, AZ, which have developed innovative ways to fund programs and projects such as those mentioned here. Using temporary crews (funded by grants and/or proceeds from reimbursable fire suppression activities) to provide defensible space around homes and/or thin trees in public areas is just one example of such a program. A self-sustaining program of fire hazard reduction is very possible to develop.

The Village of Angel Fire will take the lead in monitoring the progress of the proposed projects. Prioritization should not be restrictive; if an opportunity arises to accomplish a lower priority project the Village should take advantage of the situation.

The CWPP is a living document to be periodically adjusted to reflect lessons learned and new ideas.

The major topics in the Action Plan below are:

- **Public Information and Involvement**
- **Reducing Structure Ignitability**
- **Fuels Treatment**
- **Evacuation**
- **Fire Department Capacity**

PUBLIC INFORMATION AND INVOLVEMENT

Angel Fire has accomplished several tasks thus far to reduce the hazard and risks from wildfire. The goal for the community is to be “safer, healthier and more beautiful”. However, public education and involvement efforts must be continuous, reminding residents and visitors to be mindful of their fire environment at all times.

Reaching Angel Fire’s non-resident land- and home-owners can be challenging. One method that has proven to be effective in the past is to use the U. S. Mail. Another is to enclose notices in utility bills and other correspondence that the Village mails out. Putting articles in the local newspaper (the Sangre de Cristo Chronicle) is another method, since many non-residents subscribe to the paper.



In addition, Angel Fire attracts large numbers of visitors during ski season and during special events. One of the recommendations below is to create a group to develop methods and messages for those times when fire danger is high and **everyone** needs to be aware of the hazards.

Finally, the Village should continue to use the national Firewise program, which is a multi-agency effort designed to educate homeowners, community leaders, planners, developers, and others to protect people, property, and natural resources from the risk of wildland fire before a fire starts (<http://www.firewise.org/>). The Firewise program provides information and resources to all communities and interested people at little to no cost.

The Firewise program has a special program called Firewise Communities/USA whose approach emphasizes community and individual responsibility. In order to be designated as a formal “Firewise Communities/USA participant,” a community must:

1. Organize (with a Board of Directors and President);
2. Invest at least \$2 per capita in Firewise projects per year (including equipment and volunteer hours);
3. Complete a community assessment;
4. Create a plan; and
5. Hold a Firewise Day each year.

The community must submit an application to be designated, and it must be approved by the State Forester or designated representative each year. For more information about this specific program, please go to <http://www.firewise.org/usa/index.htm>.

The Colfax County Coalition of Firewise Communities (CCCFC), a private, non-profit organization, has been developed to support seven local communities surrounding Angel Fire, NM, to promote the Firewise program, increase fire department fire protection capacity, and provide fire prevention education. There are seven communities in the vicinity which are designated as Firewise Communities/USA participants: Elk Ridge, Hidden Lake, Santa Fe Trail Ranch, Taos Pines Ranch, Ute Park, Vermejo Park Ranch and Cimarron.

Visit these web sites for a list of public education materials. These are suitable for firefighters and homeowners alike:

- <http://www.nwcg.gov/pms/pubs/pubs.htm>
- <http://www.firewise.org>
- <http://www.firesafecouncil.org/homeowner/index.cfm>
- Colfax County coalition of Firewise Communities at <http://web.me.com/ohjammer/CCCFC/Welcome.html>
- <http://www.emnrd.state.nm.us/FD/index.htm>
- <http://www.fs.fed.us/r3/carson/>

Public Information and Involvement Action Items

1. Educate homeowners and potential contractors (home-building, forest thinning, etc.) about forest health and fire prevention. Programs should provide the public with information about mechanical and prescribed fire fuels treatments. Workshops should include information on how to create defensible space and promote the safe use of chainsaws (professional instruction and Personal Protective Equipment [PPE]).
2. Coordinate with community groups and area Firewise organizations to promote fire prevention, fuels treatments and defensible space. Provide Firewise fire prevention materials to encourage all homeowners and landowners to take responsibility and implement defensible space practices. Consider pursuing the development of a Firewise Communities/USA organization within the Village of Angel Fire.
3. Create a group to develop fire prevention and hazard reduction messages and methods to promote community awareness and minimize the effect of a wildfire on the economy and environment.
4. Conduct fire prevention campaigns during times when fire danger is high such as during the spring when fires can start in dry fuels and spread rapidly in windy conditions. Create fire prevention messages in the local newspaper and on the radio to raise public awareness of the danger of wildfires. Increase fire department and law enforcement presence when risks are high. Use signs such as the Village marquee, Smokey Bear signs, and NM Department of Transportation mobile warning devices to warn visitors and residents alike of high to extreme fire danger.

REDUCING STRUCTURE IGNITABILITY

Structures are vulnerable to ignition during a wildfire from both firebrands *and* radiant and convective heat. Reducing structure ignitability is accomplished by considering construction techniques and materials and by reducing fuels in zones around a structure to create a defensible space. This defensible space can improve a structure's resistance to wildfire and provide firefighters a safe area in which to defend the structure during a wildfire.

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

The Village of Angel Fire currently has Wildland Urban Interface provisions within the Village Code, (9-7-13) that reduces structure ignitability in new construction by



prohibiting wooden roofs and requiring the reduction of wildland fuels adjacent to the structure. The code also recognizes importance of access and water availability. The Village of Angel Fire currently operates a slash disposable service that picks up homeowner-created slash and processes the slash into chips at the recycling center.

There are many aspects of Angel Fire that mitigate the risk of wildland fire. First, the Village requires that all new construction have defensible space. It cannot be reiterated enough – defensible space saves homes. It is perhaps the best action homeowners can take to prevent the loss of their houses. Second, wooden roofing materials such as cedar shake roofs are prohibited. Local building codes require Class A (high fire resistance) roofing materials such as metal or asphalt composite shingles. Metal roofs are the most popular roofing material in Angel Fire and are more resistant to fire impingement than asphalt and especially cedar shake roofs. Third, all of the utilities are located below ground. This greatly diminishes the risk of a wildfire starting from a downed power line. Fourth, there is water supply available for all the communities via hydrants (even if sparsely located). Across the western United States, many communities within the wildland urban interface lack these critical elements. It is because of these characteristics that many of the communities were not designated with higher hazard and risk ratings.

An additional concern for the Village of Angel Fire to consider is the risk of a wildfire starting from a house fire. Without adequate defensible space, a residential structure fire could transfer into the wildlands surrounding the house. Because of the high density of the forest, if the appropriate conditions exist, fire could spread into adjacent trees and potentially move into surrounding communities and unoccupied areas. Defensible space not only protects homes from wildfire, but it also protects the forest from ignitions starting in structures.

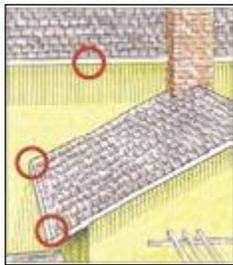
Reducing Structure Ignitability Action Items:

1. Expand the current Wildland Urban Interface provisions to existing structures. Develop construction standards to reduce the vulnerability of wooden decks, especially on slopes. Implement the provisions in the highest hazard and risk areas first. Thin vacant lots adjacent to existing structures where necessary to provide needed defensible space. Use the list in Table 1 (page 13) as a guide to the order in which neighborhoods should be treated.
2. Pursue state and federal grants that can support defensible space projects on both public and private lands. Landowners and local government can provide cost share support.
3. Expand the slash disposal service to encourage homeowners to reduce wildland fuels on undeveloped lots and to install and maintain defensible space around structures. Implement incentives for slash fees to support thinning.

The following recommendations apply to all structures which could be threatened by wildfire.

To improve life safety and preserve property, every home in the Village must have compliant, effective defensible space. This is especially important for homes with wood roofs and homes located on steep slopes, in chimneys, saddles, or near any other topographic feature that contributes to fire intensity. These recommendations are intended to give homeowners enough information to immediately begin making their home fire-safe or improve existing home mitigation efforts. Defensible space must be maintained throughout the year. Key characteristics are:

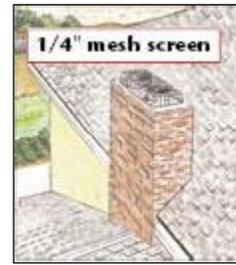
- ✓ **Firewood is staked on a side contour, at least 30 feet away from structures.**
- ✓ Trees and shrubs are properly thinned and pruned within the defensible space. Slash from the thinning has been disposed of properly.
- ✓ Roof and gutters are clear of debris. Branches overhanging the roof and chimney are removed.
- ✓ Chimney screens (1/2" mesh or smaller) are in place and in good condition.
- ✓ An outdoor water supply is available, complete with a hose and nozzle that can reach all parts of the house. Fire extinguishers are checked and in working condition. Hand tools such as shovels and rakes are easily accessible.
- ✓ The driveway is wide enough. The clearance of trees and branches is adequate for fire and emergency equipment. (Check with your local fire department.)
- ✓ Road signs and the house number are posted and easily visible.
- ✓ Attic, roof, eaves, and foundation vents are screened and in good condition. Stilt foundations and decks are enclosed, screened or walled up where feasible.
- ✓ Propane tanks should be located at least 30' from all structures. The area around the tank must be free of combustible material such as yard debris, weeds, etc.
- ✓ Power poles have vegetation cleared away in a 5 foot radius.
- ✓ The defensible space is constantly maintained:
 - Mow non-irrigated grass to a low height. Mow early in the morning, avoiding times of wind, and avoiding rocks because a grass fire could ignite from a spark.
 - Remove any branches overhanging the roof or chimney. Trim away branches within 10 feet.
 - Remove all debris and cuttings from the defensible space.



Clean Gutters and Roof

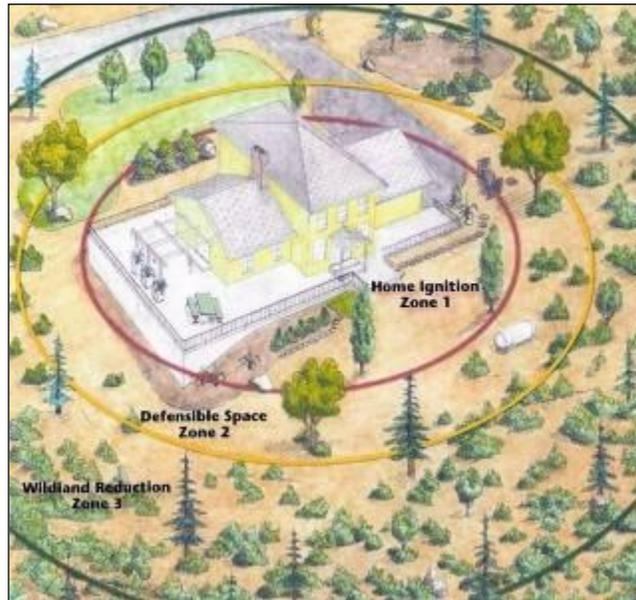


Enclose Decks

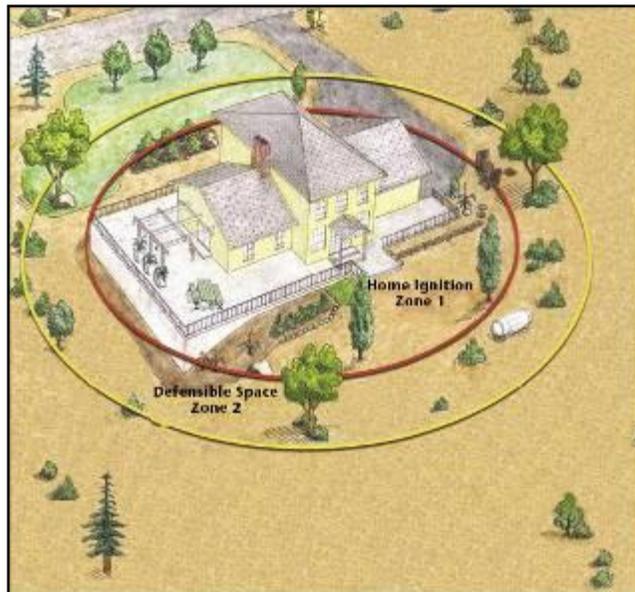


Maintain Chimneys

Defensible Space Zones (Timber and Brush Lands)²



Defensible Space Zones (Grass Lands)



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

² A Homeowner's Guide to Fire Safe Landscaping (2008), www.firesafecouncil.org

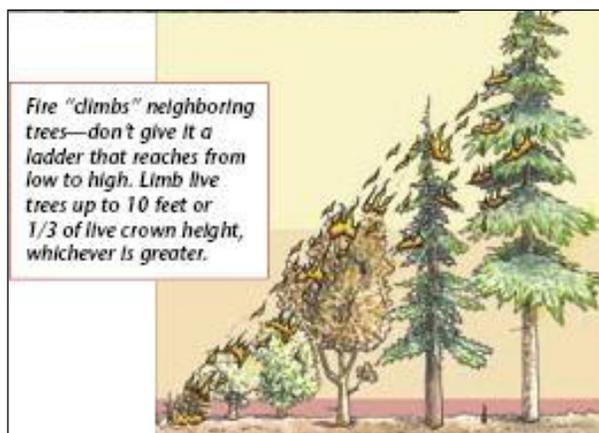
ZONE 2 Defensible Space (10 to 100 feet from the home – on steep slopes or areas of high winds the Defensible Space will need to be expanded to 150 feet) suggests thinning trees and large shrubs so there is at least 10 feet between tree tops (crowns). Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree. On steep slopes or areas subject to high winds, allow at least 1.5 times more space between tree crowns. Remove all ladder fuels from under these remaining trees. Prune all trees to a height of at least 10 feet, or 1/3 of the live crown height. Small clumps of 2 to 3 trees may be occasionally left but leave more space between the crowns of these clumps and surrounding trees. Isolated shrubs may remain, provided they are not under tree crowns. Remove dead stems from trees and shrubs annually. Where shrubs are the primary vegetation in Zone 2, refer to the “Brush and Shrubs” section below.³

ZONE 3 Wildland Reduction, a/k/a Extended Defensible Space (beyond 100-150 feet), suggests a much more limited thinning and pruning to the standards in zone 2. The goal in this zone is to improve the health of the wildlands, which will also help to slow the approaching wildfire.

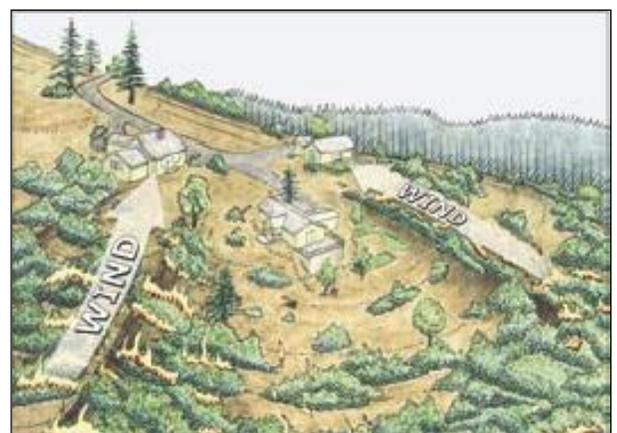
BRUSH AND SHRUBS

Brush and shrubs are smaller than trees, often formed by a number of vertical or semi-upright branches arising close to the ground. On nearly level ground (increase 1.5 times for slope and windy areas), minimum spacing recommendations between clumps of brush or shrubs is 2 1/2 times the height of the vegetation. Maximum diameter of clumps should be 2 times the height of the vegetation. All measurements are made from the edges of vegetation crowns.

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



Eliminate Ladder Fuels



Increase Defensible Space in Windy and Steep Areas

³ <http://www.ext.colostate.edu/PUBS/natres/06302.html>, referenced 9/10/07

FUELS TREATMENT

Fire has a natural role in the environment. Unfortunately, today's forest fuels are often not totally "natural" due to years of fire suppression. At the same time, more people now live in this environment. In general, people are concerned about forest practices (i.e., cutting trees) but they are willing to consider the benefits to prevent catastrophic fires and improve forest and watershed health.

Reducing and modifying fuels within and adjacent to the community can reduce the threat of a catastrophic wildland urban interface fire. A community may be *affected* by a wildfire but fuels treatments can help a community survive without major damage.

Fuels treatment projects should be within or adjacent to the Village of Angel Fire and other nearby Colfax County communities to have the greatest protective effect. Projects near high risk communities should be given priority over more distant ones. They should be coordinated between agencies and landowners, and where possible the projects should be geographically connected. All projects should be evaluated and monitored after completion.

Thinning prescriptions should be flexible and customized to the site conditions. Wildlife is very important to local residents, and all prescriptions should consider potential effects on and trade-offs for wildlife. The New Mexico Department of Game and Fish (NMDGF) has participated in the development of the Angel Fire Community Wildfire Protection Plan and can be consulted in future planning for implementation of thinning within the Village. The NMDGF has participated in similar projects in Northern New Mexico and has encouraged monitoring of the effectiveness of treatments to reduce forest fuels and promote long-term forest health.

Prescriptions should encourage diversity of tree species and allow non-uniform stand structure and distribution. Pruning trees in areas away from structures and outside defensible space zones should be examined to determine effectiveness.

Thinning projects should optimize use of small diameter wood materials to encourage a local forest industry. A viable forest industry will create additional opportunities to efficiently manage future forest and watershed health projects.

The USDA-Forest Service recognizes that fire can be used to reduce fuels and promote forest health. Forest plans are being modified to adopt "Wildfire Use" techniques that will allow natural fires to burn under prescription (i.e., predetermined conditions) during moderate fire danger conditions such as after the establishment of the monsoons. Locally, people may be concerned with the safety of prescribed fire and the potential smoke accumulation in the Angel Fire and Moreno Valley so it will be important to

maintain open communications between the Carson National Forest and local government officials.

Fuels Treatments Action Items

1. Expand the current Wildland Urban Interface provisions to existing undeveloped lots. Treat the highest hazard and risk areas first. Consider requirements that emphasize thinning along roadways and property lines and might not require thinning entire lots.
2. Conduct fuels reduction thinning projects within or adjacent to the Village of Angel Fire based on the community hazard rating and fire behavior analysis sections of this plan.
3. Pursue state and federal grants that can support fuels reduction projects on both public and private lands within the Village. Landowners and local government can provide cost share support.
4. Work with the owner of Angel Fire Resort (currently Angel Fire Corporation) and the Association of Angel Fire Property Owners (AAFPO) Amenities Committee to conduct demonstration fuels reduction projects on the open space “green belt” trails throughout the Village that they maintain. These demonstration projects can help the public: 1) understand the need to mitigate fire danger caused by dense forest fuels; and 2) see and appreciate what properly thinned forests look like.
5. Continue to participate in the Taos Canyon Collaborative Forest Restoration Program (CFRP) Coalition as described in its Memorandum of Understanding between Taos Pueblo, the Village of Angel Fire, Rocky Mountain Youth Corps, National Renewable Energy LLC, H.R. Vigil Small products, Urban Interface Solutions, and Amigos del Bosque, LLC.
6. Actively participate in the planning, evaluation and monitoring of all federal, state, tribal and CFRP fuels treatment projects to assure agencies are working together to conduct high priority projects that are effective and benefit the Village.
7. Consider supporting the USDA-Forest Service, Carson National Forest prescribed burn and wildfire use programs, provided that community concerns for safety and smoke management are understood and followed.
8. Encourage the New Mexico Department of Game and Fish (NMDGF) to participate in the Angel Fire Community Wildfire Protection Plan implementation to provide a wildlife management perspective.



Figure 4. Existing lot with defensible space adjacent to an area with a large amount of hazardous fuels

Completed, Ongoing and Planned Projects in the Area

The Village of Angel Fire completed a hazardous fuels reduction project in 2006 on approximately 125 acres along Mountain View Boulevard in the southern portion of the Village. In addition, the State Land Office, USDA Forest Service and NM State Forestry have all completed projects around the Village of Angel Fire in recent years. Some of these projects are shown on Figure 7 on the next page.



Figure 5. New Mexico State Land Office, Valley of the Utes fuel break project, June, 2009. This project is located on a ridge to the south of the Valley of the Utes subdivision. It connects to a previous fuel treatment project to the west and has an anchor point at Mountain View Boulevard

Figure 6. Photo showing an untreated (left) and treated (right) area along a boundary line in a fuel break project designed by New Mexico State Forestry at the Taos Pines Ranch



Summary of Fuels Treatment Recommendations for Angel Fire

An overview map of the specific recommendations is given in Figure 8. The recommendations fall into two general categories: road treatments and shaded fuel breaks. A description of each of these two categories follows.

Road Treatments

The term “treatment” encompasses a large range of mitigation activities. Treatments can refer to thinning on either side of a road, thinning downhill, road grading, increasing the road width, and other general maintenance. Recommendations generally occur along roads for easier implementation of the proposed treatment, and because roads are often strategic points for fire suppression activities. Most importantly, work conducted along roads is related to life safety, which is the number one priority. Improving road conditions through general maintenance and vegetation management allows for safer evacuation in the event of a wildfire, not to mention everyday use.

A treatment that is recommended along a road that is a major access/egress route consists of several components. These include:

- ✓ Maintaining the road surface, whether it is dirt or paved;
- ✓ Ensuring that the road is wide enough for traffic to pass in either direction;
- ✓ Clearing overhead obstructions that may inhibit fire apparatus from responding;
- ✓ Removing vegetation on either side of the road to limit the spread of the fire, reduce the impact of smoke on visibility, clearing any debris that could cut-off road access; and
- ✓ Installing reflective signage that marks the escape route.

Treatments are also recommended along roads that are not significant evacuation routes. However, most roads may be evacuation routes for a few people. The rationale behind treatments along non-major access/egress routes is to break-up the fuel continuity. Roads are typically free of vegetation, so they automatically act as a small fuel break. By clearing the fuels both downhill and uphill of the road, the fuel break is extended beyond the bounds of the road and requires fewer acres to be treated.

For specific descriptions of each of the recommendations, please reference Appendix B, which gives a more detailed account of the proposed treatments for individual communities.

Shaded Fuel Breaks

One of the most effective forms of landscape scale fuels modification is the fuel break (sometimes referred to as “shaded fuel break”). A fuel break is an easily accessible strip of land of varying width, depending on fuel and terrain, in which fuel density is reduced, thus improving fire control opportunities. Vegetation is thinned, removing diseased, fire-weakened, and most standing dead trees. Thinning should select for the more fire-resistant species. Ladder fuels, such as low limbs and heavy regeneration, are removed from the remaining stand. Brush, dead and down materials, logging slash, and other heavy ground fuels are removed and disposed of to create an open park-like appearance. The use of fuel breaks under normal burning conditions can limit the uncontrolled spread of fires and aid firefighters in slowing the spread rate. Under extreme burning conditions, where spotting occurs for miles ahead of the main fire, and probability of ignition is high, even the best fuel breaks are not effective. Nonetheless, fuel breaks have proven to be effective in limiting the spread of crown fires.⁴

Factors to be considered when determining the need for fuel breaks in mountain subdivisions include:

- The presence and density of hazardous fuels
- Slope
- Other hazardous topographic features
- Crowning potential
- Ignition sources

Increasing slope causes fires to move from the surface fuels to crowns more easily, due to preheating. A slope of 30% causes the fire-spread rate to double when compared to the fire-spread rate (with the same fuels and conditions) on flat ground. Chimneys, saddles, and deep ravines are all known to accelerate fire spread and influence intensity. Communities with homes located on or above such features, as well as homes located on summits and ridge tops, are good candidates for fuel breaks. Crown fire activity values for Angel Fire were generated by the FlamMap model and classified into four standard ranges. In areas where independent and dependent crown fire activity is likely to exist, fuel breaks should be considered. If there are known likely ignition sources present in areas where there is a threat of fire being channeled into communities, fuel breaks should be considered.

Fuel breaks should always be connected to a good anchor point, like a rock outcropping, river, lake, or road. The classic location for fuel breaks is along the tops of ridges, in order to stop fires from backing down the other side or spotting into the next drainage. This is not always practical from a WUI standpoint, because the structures firefighters

⁴ Frank C. Dennis, “Fuel break Guidelines for Forested Subdivisions” (Colorado State Forest Service, Colorado State University, 1983), p. 3.

are trying to protect are usually located at the tops of ridges or mid-slope. Mid-slope positioning is considered the least desirable for fuel breaks, but it may be easiest to achieve as an extension of defensible space work or off existing roads and escape routes. One tactic would be to create fuel breaks on slopes below homes located mid-slope and on ridge tops, so that the area of continuous fuels between the defensible space of homes and the fuel break is less than ten acres. Another commonly employed tactic is to position fuel breaks along the bottom of slopes. It would make sense to locate fuel breaks mid-slope below homes to break the continuity of fuels into the smaller units mentioned above, even though this position is considered the least desirable from a fire suppression point of view.



Figure 9. Example of a shaded fuel break in the mixed conifer forest cover type located on an undeveloped lot in the Taos Drive area, Angel Fire, NM

Fuel breaks are often easiest to locate along existing roadbeds (see the description of road treatments on page 30 of this report). The minimum recommended fuel break width is usually 200 feet. As spread rate and intensity increases with slope angle, the size of the fuel break should also be increased, with an emphasis on the downhill side of the roadbed or centerline employed. The formulas for slope angles of 30% and greater are as follows: below road distance = $100' + (1.5 \times \text{slope } \%)$, above road distance = $100' - \text{slope } \%$. Fuel breaks that pass through hazardous topographic features should have these distances increased by 50%.⁵ Since fuel breaks can have an undesirable effect on the aesthetics of the area, crown separation should be emphasized over stand density levels. In other words, isolating groupings rather than cutting for precise stem spacing will help to mitigate the visual impact of the fuel break.

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

It is important to consider that fuel breaks must be maintained to be effective. Thinning usually accelerates the process of regenerative growth. The effectiveness of the fuel

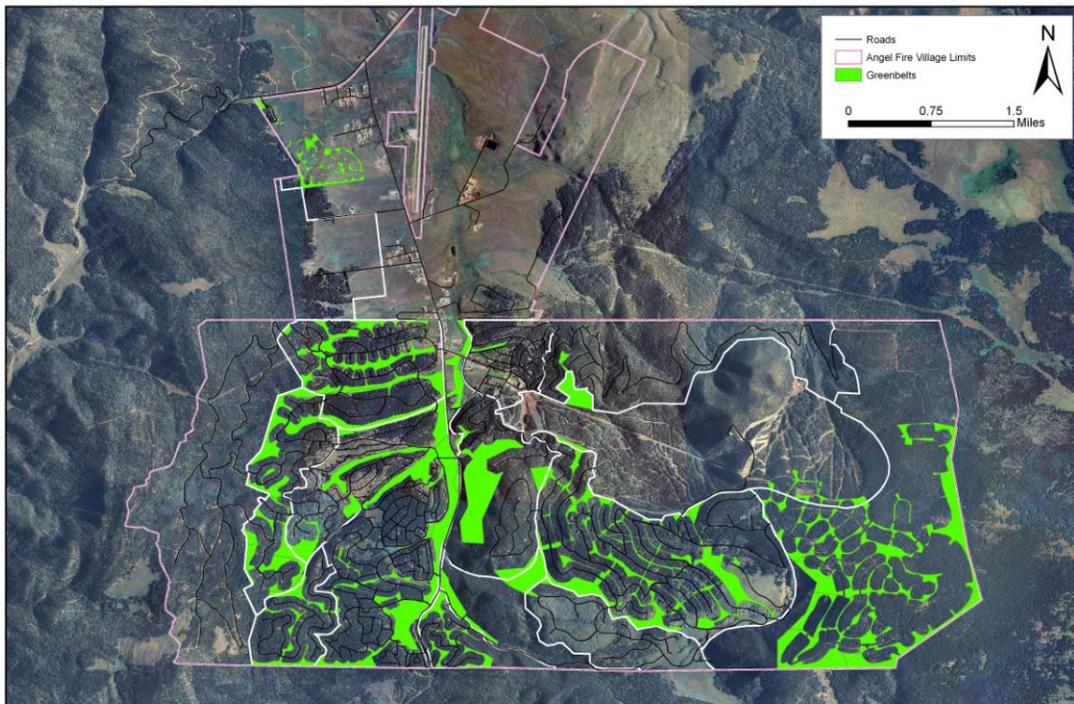
⁵ Frank C. Dennis, "Fuel break Guidelines for Forested Subdivisions" (Colorado State Forest Service, Colorado State University, 1983), p. 11.

break may be lost in as little as three to four years if ladder fuels and regeneration are not controlled. One of the most difficult issues in establishing and maintaining fuel breaks is securing the cooperation and participation of landowners.

Greenbelts and Vacant Lots

The Village of Angel Fire has many open areas within the Village boundary. These open areas, referred to as ‘greenbelts’ are managed jointly by the owner of Angel Fire Resort (currently Angel Fire Corporation) and the Association of Angel Fire Property Owners (AAFPO). There are different types of greenbelt use, including specific areas only available to those living in The Aspens neighborhood, and others known as common use greenbelts. Common use greenbelts can be used for hiking, skiing and mountain biking only. No motorized vehicles are allowed on these properties. These open areas are a resource for recreation, and should be managed so they are maintained.

Figure 10. Greenbelts within the Village of Angel Fire



In addition to providing areas for recreation, the less forested greenbelts can also be useful for determining the placement of landscape scale fuels treatments. Many of the greenbelts offer areas that are fairly open and which can act as natural fuel breaks. In addition, they provide anchor points from which to begin fuels reduction projects. Future mitigation should consider strategically using these areas as fuel breaks because the dominant vegetation is grasses and forbs. Therefore, fire intensity is reduced as it moves into these areas. Management practices that focus on keeping the areas as open grasslands by removing conifer regeneration and not allowing slash and other woody

debris to be stored in the greenbelts should be encouraged. A more detailed survey and assessment by a natural resource professional as part of an overall forest management plan is necessary to properly achieve these goals.

The majority of the area within the Village has been partitioned into individual lots for sale. These lots vary in size from less than an acre to over five acres. In some places, a single landowner has purchased several lots to create a larger, single ownership plot. However, many of the lots, (whether sold or not), are vacant. This poses an interesting challenge for those that have completed defensible space and are adjacent to the unoccupied lots. Although an individual may have completed mitigation work on his or her property, the abundance of fuels on the adjacent property can diminish or completely destroy the effectiveness of any defensible space efforts. It is imperative that individuals who own lots, but have not yet built homes, manage their forested land. Clearing out understory vegetation and creating more open stands will improve the survivability of his or hers neighbors' homes while generating a more healthy forest.

This is not to say that the entire lot needs to have a forest management plan. The current Village ordinance requires that when a new house is built, a swath 60 - 120 feet wide be thinned (depending on lot size), starting at the neighbors' property and working in. This same ordinance would be sufficient for undeveloped lots. Increasing the amount of thinned forest along property borders is a manageable goal for the landowner and is valuable to the person living next door. This same philosophy holds true for lots that are owned by the Resort; they should also be thinned and managed along property boundaries to assist homeowners that have completed or are working on defensible space. The Angel Fire Fire Department and New Mexico State Forestry are resources that may be helpful to create and implement a strategic plan that treats these lots most effectively.

EVACUATION PLANNING

Planning for evacuation is extremely important. When discussing wildfire, many people focus only on the potential loss of homes, other structures and trees. The greatest potential loss, however, is the loss of human life. Sometimes people don't have time to leave (i.e., the fire is approaching too quickly), sometimes they refuse to leave until it's too late, and sometimes there are problems on the roads themselves (too many cars, cars which break down, RV's which block roads, etc.). It is critical for the Village and individual residents to carefully think through and plan for different evacuation scenarios.

Angel Fire has many unpaved roads and cul-de-sacs, poor street address labeling, and numerous landowners and visitors who visit infrequently and are unfamiliar with the road network. During a wildfire when physical conditions are poor (smoke, ash and poor visibility along roadways and intersections) and peoples' emotions are high, you have

the ingredients for disaster. Everything the Village and the residents can do to prepare for an evacuation will be time and money well spent.

Evacuation Planning Action Items

1. Establish signs identifying evacuation routes. Routes could be color coded to simplify instructions to the public.
2. Thin vegetation along roadways and at intersections where possible to create the greatest potential for visibility during a wildfire. Refer to the fuels treatment section of this Plan for more information.
3. Advise the public about evacuation routes and the pre-identified safety zones at the airport, community center and golf course.
4. Use radio stations to disseminate emergency information and advise the public of their importance as a primary source of information. Most people still have radios in their cars which work even if the power goes out. In addition, small, inexpensive radios are available which are “hand-cranked” and require no power or batteries. An Emergency Operations Plan has been adopted and has provisions for using local and statewide media to aid in emergencies, including evacuations.
5. Ensure that area radio stations are aware of their importance as disseminators of emergency messages, and regularly review and update procedures for authorizing such messages.
6. Investigate the potential use of warning systems such as emergency sirens, mass notification systems (such as “Reverse 911”), helicopter-mounted public address systems, etc.
7. Involve the Village Police Department, Colfax County Sheriff’s Department, State Police, and other cooperators in reviewing current Emergency Operating Plans and conducting field exercises.
8. Create handouts or messages advising the public about how to prepare for an evacuation. Consider emphasizing that when getting ready to evacuate, people should remember the “5 P’s: Pictures, Pets, Papers, Pills and Phones.”

FIRE DEPARTMENT CAPACITY

A separate report is being prepared about the Angel Fire Fire Department and its overall operations. The action items listed here are specific to wildland fire operations and are also mentioned in the specific report.

Fire Department Capacity Action Items

1. Improve the fire department's Insurance Services Organization (ISO) rating. Improved firefighter response, fire equipment such as a ladder truck, additional fire stations and additional water delivery and storage capacity should improve the fire department's Insurance Services Organization (ISO) rating. An improved ISO rating will increase annual fire department funding and reduce homeowner insurance rates.
2. Establish a position knowledgeable in forestry or natural resources to implement and enforce WUI ordinances, obtain and manage WUI and hazardous fuels reduction grants, coordinate fire prevention activities and public involvement such as the Firewise communities program, and coordinate cooperator actions (including Forest Service, NM State Land Office, Taos Pueblo, and local Colfax County groups).
3. Encourage the cross-training of area fire departments, local government officials and state and federal agencies using the Incident Command System (ICS) to manage an emergency incident. ICS can be used in other emergencies such as during floods, ice-storms and hurricanes and in non-emergencies such as Fourth of July and Labor Day celebrations.
4. Maintain the Enchanted Circle annual operating plan to coordinate area wildfire management. An annual operating plan has been prepared cooperatively with local, state, and federal government agencies. Annual Operating Plans can be utilized to address the following:
 - fire prevention
 - public education
 - encouragement of defensible space preparation
 - public information during incidents
 - evacuation planning and coordination
 - fuels treatments
5. Participate in interagency fire incidents to increase experience. Continue to participate in the New Mexico Resource Mobilization Plan to gain experience conducting wildfire suppression in wildland urban interface communities.

6. Conduct local, effective, and certified wildland fire trainings. Maintain wildland firefighter qualifications.
7. Consider developing a regional training center. Reach out to regional cooperators such as the Enchanted Circle, Raton Fire Department and Colfax and San Miguel County Fire Departments.
8. Continue to improve water storage and delivery systems. Complete development of one million gallon storage tank and connect the new storage into the existing water delivery system. Study how power outages or other problems during a wildland fire would affect water delivery.

Figure 11. Fire Department Firefighters and Equipment in 2008 (www.afgov.com)



CODE IMPLEMENTATION OPTIONS

Jack Cohen, a research scientist with the USDA Forest Service, is one of the nation's foremost experts in how homes burn during wildland fires. He has studied many fires where numerous homes were lost, including the Cerro Grande Fire in Los Alamos, New Mexico, the Hayman Fire in Colorado, and the Aspen Fire in Summerhaven, Arizona. In addition, he has conducted his own experiments to study how homes ignite during a wildfire. His research has been critical in helping people mitigate the risk to their homes. Several of his papers are reproduced in Appendix E.

In his paper "Thoughts on the Wildland-Urban Interface Fire Problem," (2003), Dr. Cohen states "My research results indicate that the big flames of high intensity wildland fires do not directly ignite homes at separation distances beyond 100 feet...The research suggests that if the big flames are not igniting the destroyed homes, then relatively low ignitions must be the ignition sources. ***Thus, a home's characteristics, its exterior materials and design, in relation to the immediate area around a home within 100 feet principally determine the home ignition potential. I call the home and its immediate surroundings the home ignition zone***" [emphasis added].

Dr. Cohen continues, "Thus a home's location does not necessarily determine its vulnerability to wildland fire; the condition of a home's ignition zone determines its vulnerability. ***Where home ignition zones overlap property boundaries, the fire dynamics do not change, but the social dynamics do. In this case the community must collectively reduce their ignition potential to prevent a wildland-urban fire disaster***" [emphasis added].

There are varying opinions among experts about exactly what should happen within certain distances of homes, and how to define and identify each "zone." In general it is agreed that certain critical actions must be taken within 30 feet of the home, and vegetation treatment of some kind should occur within a radius of 100-300 feet from the home depending on the vegetation type, slope of the land and the architecture/construction of the home itself.

This CWPP has given detailed descriptions of these recommended actions on pages 23-25. These recommendations have been compiled from a variety of sources. In addition, examples of brochures from a variety of localities (including the 2008 version of the New Mexico Living With Fire) are included in Appendix E.

Angel Fire currently has described "Fuel Modification Areas" in the Village Code in section 9-7-13. This section of the code applies to new construction only. There is also a "Statement of Nuisance Conditions" in section 9-6-1 of the Village Code. Both of these can be found in Appendix D of this document.

Options which the Village might consider with regard to the Village Code are:

1. Take no action
2. Amend the "Fuel Modification Area" section (9-7-13) to clarify some of the requirements (e.g., change the 20 foot area to 30 feet [currently there is no mention of what happens between 20 feet and 30 feet from the structure; this appears to be a typographical error] and change B(4) to clarify what is meant by vegetation under trees shall be maintained no *less* than 6 feet tall).
3. Revamp the current section 9-7-13 zone 3 to extend to 100 feet (up to 300 feet for the steepest slopes) or the property line to reflect the current research results about the importance of this distance. Consider changing the tree spacing requirements to basal area measurements and/or distances between the crowns of the trees (instead of the current spacing between stems).
4. Extend the current (or amended) requirements of 9-7-13 to existing structures.
5. Require owners of vacant properties adjacent to existing (and proposed) structures to take action on their own properties if the needed defensible space crosses the property boundary (i.e., the home is closer than 100 - 300 feet to the boundary). It appears that this could be done by changing either section 9-6-1 (nuisance) or 9-7-13 (fuel modification).
6. Require owners of vacant properties adjacent to existing roads to take action to reduce the hazard to fellow citizens in the event an evacuation is necessary. The roads to be treated can be found in Appendix B of this CWPP.
7. Consider adopting the International Urban-Wildland Interface Code, sponsored by the International Code Council. If the Village is interested in investigating the entire code, a free copy may be obtained by Government agencies by calling 1-800-423-6587, Ext. 3264, or visiting www.iccsafe.org.

COMMUNITY DESCRIPTION

Study Area Overview

Angel Fire was established in 1967 and incorporated with the state as a municipality in 1986 (Village of Angel Fire website, www.afgov.com). The municipal boundary has expanded and now covers 28.9 square miles or 18,496 acres, making it one of the largest communities in terms of land area in the state. The 2000 U.S. Census population for year-round residents is 1,024 (U.S. Census 2000, estimate). Angel Fire is a vacation destination area with a ski resort, hence the seasonal population varies throughout the year. The Fire Chief estimates that in addition to the year-round residents, Angel Fire's population grows to 5,000 to 6,000 seasonal residents and up to 20,000 visitors during height of ski season or special summer events.

The Village of Angel Fire is located in the southwest corner of Colfax County, which has a population of 14,189 (U.S. Census 2000, estimate). The other nearby municipalities include Cimarron, Eagle Nest, Raton, Red River, and Taos. The municipal boundary adjoins Taos County to the west and is about 10 road miles north of Mora County to the south. Angel Fire shares a boundary on the southwest, west and northwest with the Carson National Forest. State land managed by the State Land Office is located on the southeast boundary of the Village.

Angel Fire is part of the Moreno Valley, or "dark valley" and is situated in the Sangre de Cristo Mountains. Elevation in the area ranges from 8,382 ft to 10,677 ft. "Summer high temperatures average in the high 70's and winter temperatures average in the mid-thirties during the day and drop into the teens at night. The average annual snowfall is 140 inches in the valley and 210 inches at the ski area" (Village of Angel Fire website, www.afgov.com).

The "Comprehensive Wildlife Strategy for New Mexico" developed by the New Mexico Department of Game and Fish in 2006 describes the Village of Angel Fire area as forested and located in the Southern Rocky Mountain Ecoregion, and represented by the Rocky Mountain Montane Mixed Conifer Forests and Woodlands Terrestrial Habitat Type. These mixed conifer forests include tree species such as ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii*), and various true fir and spruce species (*Abies spp.* and *Picea spp.*). Gambel oak (*Quercus gambelli*) and aspen (*Populus tremuloides*) often are prominent following disturbances such as fire (Comprehensive Wildlife Strategy for New Mexico, New Mexico Game and Fish, 2006).

There are hundreds of wildlife species represented in the Southern Rocky Mountains Ecoregion, Rocky Mountain Mixed Conifer Forests and Woodlands Terrestrial Habitat Types. Of these, 83 are listed as "Species of Concern" (<http://www.bison-m.org>) in the

Colfax County area. Threatened and Endangered species that may occur in the Colfax County area include the Mexican spotted owl, southwestern willow flycatcher, piping plover, black-footed ferret, black-tailed prairie dog and the Arkansas River shiner. In this habitat type, “prioritized conservation actions” to manage for wildlife concerns include promoting natural fire regimes and forest and watershed health, conducting thinning to open dense stands and reduce stand replacing fires, and promoting local zoning to reduce the threat of wildfire from homes in the WUI (Comprehensive Wildlife Strategy for New Mexico, New Mexico Game and Fish, 2006).

Angel Fire is situated in the Cieneguilla Creek Drainage Basin in the southwest of the Moreno Valley. Cieneguilla Creek is listed on the “2000-2002 State of New Mexico list for Assessed Stream and River Reaches” as not meeting state water quality standards for turbidity (Vegetation Management, Angel Fire, NM, for FEMA, URS Group, Gaithersburg, MA, 2004). Best management practices should be used to reduce erosion potentially caused by forestry projects.

Fire scars made by fires that occurred in the early 1970’s are visible on the southwest side of Angel Fire. More people now live in this environment, and the Village of Angel Fire has been recognized as a high risk wildland urban interface area in New Mexico. New Mexico State Forestry originally identified the area as one of the “20 Communities at Risk” in 2001. The New Mexico Fire Planning Task Force recognizes Angel Fire as a “Community at Risk” with a risk level of “high,” and it is included at a general level by a Community Wildfire Protection Plan (CWPP) developed by the Enchanted Circle fire protection organization. With this document, Angel Fire will be one of only a handful of communities in the state that have developed an intensive CWPP covering only lands within the municipal boundary.

Emergency Response Services

The Village of Angel Fire Fire Department (AFFD) provides all risk emergency response services within the municipal boundary and a portion of the unincorporated areas of the County approximately 10 miles north towards Eagle Nest and approximately 10 miles south to the Colfax/Mora County boundary. Services include wildland fire and structural fire prevention and suppression, emergency medical services, hazardous materials mitigation and search and rescue. AFFD recently added a new fire station northeast of Monte Verde Lake and now operates two main fire stations and one substation. Most of the municipality is served by water systems with fire hydrants. Recent water storage capacity has been added to the community and will improve peak demand fire water flows.

The AFFD has approximately 25 firefighters. As of July 1, 2009 there are seven “career” firefighters that are full-time employees of the Village of Angel Fire. In addition to the Fire Chief, these career employees include two Officers and four members all of whom are

qualified as firefighters and Emergency Medical Technicians (EMT's), including two Paramedics, two Intermediate EMT's and one Basic EMT.

There are 19 volunteer members including three Officers and a Chaplin. Most of these members are qualified as firefighters and EMT's. A few members are Emergency Vehicle Operators (EVO's) only. The Chaplin provides support to the firefighters and EMS personnel as well as victims' assistance and community support. These volunteers bring a unique variety of professional experiences to the fire department as business owners, contractors, engineers, computer specialists, inventors and race car drivers.

AFFD has recently been awarded \$108,000 for a Staffing for Adequate Fire and Emergency Response (SAFER) grant by the U.S Department of Homeland Security for hiring a firefighter/EMT to enable the community to provide safer fire response. The grant was awarded January 2009 and will be implemented over the next five years. It has a cascading match requirement, providing mostly grant dollars the first year and requiring the local government to provide all the funds in the final year. AFFD is the only fire department in New Mexico to receive a SAFER grant award in 2009.

AFFD has one "Class A" or Type 1 engine, three "Initial Attack" or Type 6 engines and one Type 2 Water tender. In addition the fire department has one heavy rescue.

AFFD provides Emergency Medical Service (EMS) including initial assessment and care, and transport to medical facilities. Many of Angel Fire's residents are older adults or retirees over the age of 50. This population has increasing medical care needs. AFFD provides EMS service with three ambulances capable of "Advanced Life Support" (ALS). The nearest emergency medical facilities and hospital is located 25 mile or 40 minutes away in Taos, NM via NM Highway 64.

The Insurance Service Office (ISO) conducted a formal review of AFFD in November, 2007 and determined the community was a split PPC Class 7/9. The Class 7 rating was an improvement from the previous rating of Class 8 issued in July 2004. The ISO review showed that the community could progress to a PPC Class 5, in part by adding engines with pumping capacity and a ladder truck for multi-storied buildings. The report also suggested other improvements would be required including additional firefighters per response, a fire station for better coverage and response time, a training center with a classroom and increasing community water storage and delivery systems (Angel Fire ISO Rating November, 2007). Many of these improvements such as the addition of a fire station (Station #2) have been recently completed or are in progress.

Summary of Angel Fire Fire Department Incidents from 2004 to 2008

Emergency Medical:	1,245
Structural Fire/Hazardous Materials:	324
Wildland Fire:	55
Rescue/Public Assist:	<u>47</u>
Total:	1,671

The fire department has been exceptionally busy during the 2008/2009 winter season. The EMS and structural fire calls have jumped at least three to four times from recent history. Incidents normally increase during the winter season because of the increased activity at the ski resort, however AFFD members could not find a correlation related to just this ski season. All types of incidents have increased including structure fires, vehicle accidents and home health emergencies.

Even as the workload increases the fire department is continually challenged to recruit and train volunteer members to respond to fire and EMS incidents. AFFD works with fire departments in Colfax and Taos County fire districts, especially the fire districts in the "Enchanted Circle". These fire departments back up AFFD for EMS and mutual aid on fires, particularly in the area of providing mobile water when necessary.

The AFFD mission statement is: "To provide a professional, courteous service to the community of Angel Fire and surrounding area through fire prevention education, prompt quality emergency medical services and the conservation of life and property in the safest manner possible." During this project, AFFD members often expressed the desire to be part of an organization that strives for excellence. They want to obtain the highest state and national qualifications and be recognized as the best in EMS, structural fire and wildland fire. AFFD members want to become self-sufficient with fire, rescue and medical equipment.

The Village of Angel Fire also has a Police Department with a mission to serve and protect while upholding the highest level of professionalism and courtesy, providing a safe environment for the citizens of Angel Fire.

New Mexico State Forestry's Cimarron District, located at Ute Park, NM provides fire suppression response for wildland fires on non-municipal and non-tribal state and private lands in Colfax County and maintains Joint Powers Agreements for wildfire suppression and resource mobilization with the Village of Angel Fire. New Mexico State Forestry participates in initial attack and provides support for extended attack incidents.



The USDA Forest Service, Carson National Forest, Camino Real Ranger District administers a large portion of the forested lands adjoining Angel Fire. The Carson National Forest provides initial attack fire suppression resources and they can mobilize a significant number of resources for extended attack wildfire suppression through their local, regional and national interagency dispatch centers. Other federal agencies such as the Bureau of Land Management have initial attack resources in the nearby Taos, NM area. All the federal land management agencies and New Mexico State Forestry participate in interagency dispatch and mobilization.

Over the years the Angel Fire Fire Department has been very resourceful in responding to wildfire incidents. The AFFD has had great success participating in training and earning national wildfire qualifications.

Wildland Urban Interface (WUI)

The Village of Angel Fire experienced a WUI fire in 1998 when the Osha/Zia fire burned approximately 200 acres on the Carson National Forest and across the western municipal boundary. Citizens were impacted during an evacuation of the western neighborhoods.

Since that fire a number of actions have taken place to strengthen community fire protection. Fire department personnel have obtained wildland fire qualifications to meet national standards, the Village has obtained a grapple truck to dispose of homeowner slash, the Solid Waste Transfer Station operates a wood chipper to process wood material into chips and mulch, the Village has adopted an ordinance (9-7-13) addressing defensible space and lot thinning, and the Village has completed a fuel treatment along NM Highway 434 using a Federal Emergency Management Agency (FEMA) hazard mitigation grant. The Village also has ordinances to limit open burning and fireworks and to prohibit improper handling of fire. The Village can impose fire restrictions when there is high fire danger during drought conditions (Village Ordinance, Fire Hazards, 4-2-1 et.seq.)

Water in WUI fires can often be a limiting factor in fire protection. The Village of Angel Fire relies on water wells with backup generators. The water production capacity can just meet peak demand. Water storage capacity is currently being improved with the development of a one million gallon storage tank. Water delivery systems are also being planned to take best advantage of this water storage. Improved water delivery and storage capacity should improve the fire department's Insurance Services Organization (ISO) ranking. An improved ISO rating will increase annual fire department funding and may reduce homeowner insurance rates.

Angel Fire consists of a commercial business zone (primarily in the non-forest valley floor), the Resort along the eastern edge of the valley and forest, and approximately 1,791 residences (U.S Census 2000, estimate) and 7,000 undeveloped lots (mostly in

the forest area). Housing density is considered high compared to other New Mexico communities and is estimated to be 61 units per square mile or nearly 1 unit per acre (U.S Census 2000, estimate). Lot sizes range from ¼ acre to 1 acre. There are some lots up to 40 acres in size. Many of the year-round single family residences have completed defensible space work. The local homeowners who have conducted defensible space work feel threatened by neighboring homes and unoccupied lots that have not been treated. These lots are owned primarily by absentee landowners, seasonal residents and the Angel Fire Resort.

The Angel Fire Public Improvement District has been working to open up undeveloped lots by providing improved roads, and water and sewer service. More than 850 lots will be developed in several "PID" areas during the summer of 2009. These areas will be located in very desirable areas and will increase interest in development with the community.

Village ordinances require defensible space be created during new home construction. Ordinances have also been implemented to disallow flammable wood shake roofs. The Village of Angel Fire Zoning Commission has paid close attention to improving neighborhood emergency vehicle access.

Critical Infrastructure at risk from a wildfire within Angel Fire is fairly well protected within the municipality. However, the Kit Carson Electric Cooperative power line that supplies Angel Fire from the east was threatened in the Carson National Forest during the Encebado Fire at Taos Pueblo, NM in 2003.

Firewise Communities

The Village of Angel Fire is interested in becoming a Firewise community and supporting the fire prevention and fuels reduction efforts of area "Communities at Risk" (CARs).

Surrounding communities in Taos and Colfax Counties have identified more than 70 CARs from wildfire. Neighboring CARs with high risk include Black Lake, Cimarron, Hidden Lake, Taos, Taos Pueblo, Taos Pines, Ranchos de Taos, Red River, and Ute Park (New Mexico Communities at Risk Report, NM Fire Planning Task Force, www.nmforestry.com).

The recent fires in Taos and Colfax counties were a call to action to address Northern New Mexico's WUI fire problem. The Taos Pines sub-division, near Angel Fire, has been designated as a "Firewise Community." Their Firewise effort emphasizes voluntary action through education, better home construction standards, and the creation of community fuel breaks and defensible space around homes. The Taos Pines experience shows it takes a consistent and prolonged effort to promote fire prevention and hazard reduction. Another organization, the Colfax County Coalition of Firewise Communities (CCCFC), a private, non-profit organization, has been developed to



support seven local communities surrounding Angel Fire to promote the Firewise program, increase fire department fire protection capacity, and provide fire prevention education. See their website at <http://web.me.com/ohjammer/CCCFC/Welcome.html>.

Commerce and Infrastructure

The Village of Angel Fire economy is dominated by tourism, and the Angel Fire (Ski) Resort is a major employer not only during the winter season but throughout the year. Local industry includes retail, construction, financial/real estate, professional and government/education (US Census 2000, estimate).

Other significant local area tourism attractions include the Angel Fire Resort golf course, Carson National Forest, Philmont Boy Scout Ranch, Red River Ski Area, City of Taos, Taos Pueblo, and the Vietnam Veterans Memorial and Eagle Nest Lake, which are both New Mexico State Parks.

The "Girls Scouts of New Mexico Trails" owns Camp Elliot Barker for summer camping activities in the northwest area of Angel Fire. The 536 acre ranch was originally formed in 1962 by Elliot Barker, the New Mexican outdoorsman and author. The camp is currently closed for property improvement (www.nmgirlscouts.org).

The Angel Fire community was originally developed as a rural ski resort area. The municipality was created 23 years ago but the village is still greatly influenced by the resort company. The municipality took control of the infrastructure originally put in place by the resort developer. Original infrastructure such as roads, water and sewer were not necessarily installed "to code" and the community has had to rebuild infrastructure.

The resort underwent bankruptcy and the Association of Angel Fire Property Owners (AAFPO) was formed in 1995. AAFPO is charged with the responsibility of overseeing the relationship between the Resort and the Angel Fire Property Owners, particularly in regards to the Property Owners' dues payments and the use of amenities. In addition, AAFPO is charged with the enforcement of the various restrictive covenants of the subdivision within the Angel Fire Resort including review all building plans in the Resort to make sure that the plans meet all the requirements of the restrictive covenants as well as restrictions on tree cutting and lot clearing (Association of Angel Fire Property Owners (AAFPO) website: www.aafpo.org). AAFPO tree cutting restrictions have been implemented in harmony with updates to the Village of Angel Fire ordinances for tree thinning and development of defensible space.

The median household income with earnings is \$48,250 compared to the state median of \$43,900. The median income for all households in New Mexico is \$34,333. About 6.7% of families in Angel Fire are below the poverty line (U.S Census, 2000).

Angel Fire CWPP Stakeholders recognized that hazardous fuels thinning projects to reduce fire danger should optimize use of small diameter wood materials to encourage a local forest industry. A viable forest industry will create additional opportunities to efficiently manage future forest and watershed health projects. Use of small diameter forest products by local forest industries can reduce forest thinning costs, treat more acres, employ local people and increase the local tax base. There is currently a roundwood manufacturer in Raton which produces posts and poles, bark for landscaping, and chips for use in a nearby pellet manufacturing plant. Other companies are planning to produce pellets and firewood as well as produce up to 10 mega watts of electricity. There are a few small saw log and round wood operations that produce rough sawn lumber, house logs and southwest house construction specialty items such as vigas and latillas. There is still a small forestry workforce that retains the skills and equipment needed to harvest forest products and thin trees to reduce fire hazard and promote forest health.

The threat from wildfire is real and people realize they have been fortunate that no firefighters or members of the public have been hurt or killed in wildfire incidents. The Angel Fire CWPP Stakeholders suggested that Angel Fire residents strive to create a community that can withstand a wildfire. The message to the community could be to learn to live with fire. In a recreation/tourist economy citizens and visitors can be scared away by over emphasis of threats to safety. Publicity surrounding wildfires and the resulting smoke can keep people from visiting. The Encebado fire in 2003 on Taos Pueblo had a negative effect on the Village's economy.

History and Lifestyle

Angel Fire is part of the Moreno Valley, or “dark valley” and is situated in the Sangre de Cristo Mountains along the route used by Native Americans for trade between the Taos Pueblo and the Plains Indians including the Ute tribe. The “Valley of the Utes”, in Angel Fire, was a Native American summer camp. It is lore that the Utes witnessed forest fires and named the area in their language “fire of the gods and angels”. Spanish Franciscan friars experienced the natural phenomenon and revised the name to “the place of the fire of the angels”. The legend continued when explorer Kit Carson claimed to see the light above the Agua Fria Peak and the Valley of the Utes. Carson is said to have shortened the name of the area to “Angel Fire”. In 1954, the LeBus family established a ranch near Monte Verde Lake and eventually owned much of the land now covered by the Angel Fire Resort. In the 1960's the LeBus family envisioned the ski resort and adopted the name of Angel Fire (“Lure, Lore and Legends”, Martin Andrews, Moreno Valley Writers Guild, 1997).

The area surrounding Angel Fire has a rich history. In 1841 Charles Beaubien and Guadalupe Miranda applied for the Beaubien-Miranda Mexican Land Grant. The grant was 1.7 million acres and was recognized amid protests that it was greater than the maximum 92,000 acres allowed at the time. After the Mexican-American War, the United

States Congress validated the grant in 1860 even though it was controversial. Beaubien named Lucien Bonaparte Maxwell as the heir and successor to the grant. During the 1860's Maxwell opened up the grant to establish the communities of Rayado and Cimarron. The area was primarily used for cattle grazing but the discovery of gold in 1867 on Baldy Mountain created an influx of fortune seekers. The mining community of Elizabethtown was established in the northern Moreno Valley and reached a population of 7,000. Colfax County was established in 1869 and named after President Grant's Vice-President, Schuyler Colfax. Maxwell sold the grant in 1870 and inevitably the confusion over land ownership and the numerous settlers came into sometimes violent conflict known as the Colfax County War. Attorney Frank Springer, co-founder of the CS Ranch (with brother Charles), was a central figure in resolving the 17 year conflict ("Lure, Lore and Legends", Jack C. Urban, Moreno Valley Writers Guild, 1997).

The early 1900's saw the establishment of the National Forests. Early forest managers promoted silvicultural practices, including timber harvesting, to regulate forest growth and succession. There were a number of small sawmills that harvested the National Forests and the private forest lands. Many of the forests standing today are the second or even third growth from the original harvests. Early land managers used aggressive fire suppression to protect natural resources. This fire suppression policy, along with changes brought on by forest management and grazing practices, resulted in changes to the natural fire regime. In the early 1900's old timers could put a fire out with a gunny sack. Today's fires are often so intense firefighters cannot go near the flames. During hot, dry, windy days with extreme fire danger, mechanical equipment and aircraft that drop fire retardant are only marginally effective

These days, many residents and visitors are attracted to Angel Fire and the Moreno Valley by the trees, and their first reaction is to resist cutting them. However, property owners are interested in being good neighbors. They want to be good caretakers or stewards of the land, and can be influenced to thin trees to reduce fuels and increase forest health. Residents and private businesses feel they have a responsibility to act to protect their community and leave a legacy of good natural resource management for future generations. Many residents have relocated from California where they had first-hand experience with large wildland urban interface fires. Many residents have expressed their concerns for public safety and the need for the community to mitigate fire danger and plan for evacuation if a fire occurs.

Angel Fire residents place a high value on their "view shed". Stakeholders believe the area's economy would be greatly impacted by a large and intense wildfire. Tourism and home values are very important economic factors for the community.

Environment

Natural fires in ponderosa pine forests historically occurred in frequent cycles every 10 to 35 years. In general, these fires were not very intense and their burns created a



mosaic pattern of fire effects. Over the years the natural fire regime has been altered and fire behavior has generally changed from lower intensity ground fires to more intense, stand replacing crown fires. Intense crown fires damage soil and replace stands of trees across a wide landscape. These fires can be very detrimental to wildlife. Land managers are now concerned that massive loss of habitat could shift wildlife use.

Fires in the mixed conifer type generally have a longer “fire-return” interval than ponderosa pines, and are often more intense.

During the Angel Fire Community Wildfire Protection Plan process, stakeholders and the general public supported long term solutions to improve forest and watershed health and reduce forest fuels by mechanical thinning and prescribed burns. Angel Fire CWPP participants understand that fire has a natural role in the environment. Fire scars made by fires that occurred in the early 1970’s are visible on the southwest side of Angel Fire.

Area residents realize that fuels treatments must occur on a variety of ownerships, across many landscapes throughout the entire watershed. Projects should be prioritized and tie-in together, and they should be evaluated and monitored. Thinning prescriptions should be flexible and customized to the site conditions. Prescriptions should encourage diversity of tree species and allow non-uniform stand structure and distribution. Through public involvement, local support, and a regional perspective, the fuels reduction and other mitigation elements described in this document can and should enhance and protect the values of the study area.

The USDA Forest Service recognizes that fire must be used to reduce fuels and promote forest health. Forest plans are being modified to adopt “Wildfire Use” techniques that will allow natural fires to burn under prescription (i.e., predetermined conditions) during moderate fire danger conditions such as after the establishment of the summer monsoon rains. Locally, people may be concerned with the safety of prescribed fire and the potential impact on tourism from accumulation of smoke in the Angel Fire and Moreno Valley. If the Carson National Forest hopes to succeed in their strategy to restore forest health by re-establishing natural fire, it will be absolutely critical to maintain open communications with local government officials and the community.

Large stands of aspen trees are a treasured resource for the visual landscape around Angel Fire. These aspen trees in the area are becoming over mature. Cutting in aspen areas or thinning in conifers can be designed to encourage aspen regeneration. Aspen can provide a natural fuel break in non-extreme fire danger conditions.

Overly dense forests have resulted in increased incidents of insects and disease in the general area of Angel Fire. Insects such as aspen web worm are present and can repeatedly defoliate and weaken aspen trees. The spruce budworm has defoliated, weakened and eventually killed trees, especially Douglas fir, throughout the area. Mistletoe in ponderosa pine and Douglas fir trees, and broom rust in spruce trees are

common. These diseases can weaken the trees and eventually cause mortality. Small outbreaks of bark beetles have caused rapid mortality in ponderosa pine trees. Defoliated and dead trees seriously affect the view shed and can impact tourism. Large pesticide aerial spray projects have been tried in the past but are not considered effective over large landscapes. Forest managers now believe reducing forest densities and restoring the natural fire regime is the most effective way to promote forest and watershed health.

The Natural Resources Conservation Service (NRCS) mapped the area soils in 1982. The most common soils include the Eto and Frolic series. The Eto Series is a well drained soil on the mountainsides formed in colluvium and alluvium of sandstone and shale. The Frolic Series is a deep and moderately well drained soil associated with riparian habitats (Vegetation Management, Angel Fire, NM, for FEMA, URS Group, Gaithersburg, MA, 2004).

The Village of Angel Fire completed a hazardous fuels reduction project in 2006 on approximately 125 acres along New Mexico Highway 434 in the southern portion of the Village. The project was funded through the Federal Emergency Management Agency (FEMA), Hazard Mitigation Program, and required the development of an Environmental Assessment (EA) to analyzed potential impacts. The project EA determined that establishment of a manual fuel break would not result in any significant impacts to existing land use, water resources, air quality, cultural resources or biological resources include federally threatened and endangered wildlife species (Vegetation Management, Angel Fire, NM, for FEMA, URS Group, Gaithersburg, MA, 2004). The EA determination applies to the specific project. Similar projects might be conducted in future without significant impact.

FIRE REGIME AND CONDITION CLASS

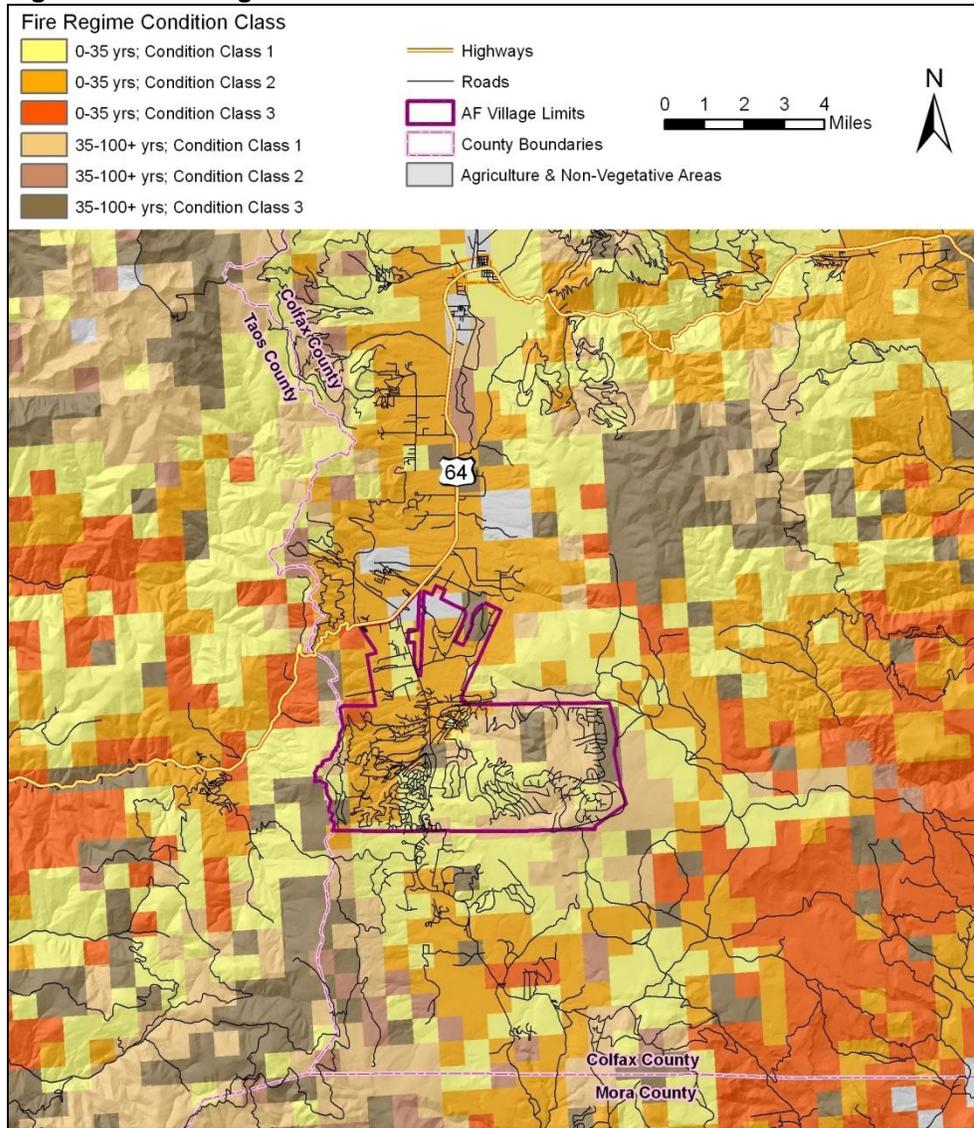
The Fire Regime Condition Class (FRCC) is a landscape evaluation of expected fire behavior as it relates to the departure from historic norms. The data used for this study is from a national level map. The minimum mapping unit for this data is 1 square kilometer. FRCC is not to be confused with BEHAVE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

The FRCC is an expression of the departure of the current condition from the historical fire regime. It is used as a proxy for the probability of severe fire effects (e.g., the loss of key ecosystem components - soil, vegetation structure, species, or alteration of key ecosystem processes - nutrient cycles, hydrologic regimes). Consequently, FRCC is an index of hazards to the status of many components (e.g., water quality, fish status, wildlife habitats, etc.). Figure 12 displays graphically the return interval and condition class of the study area.

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

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

Figure 12. Fire Regime/Condition Class

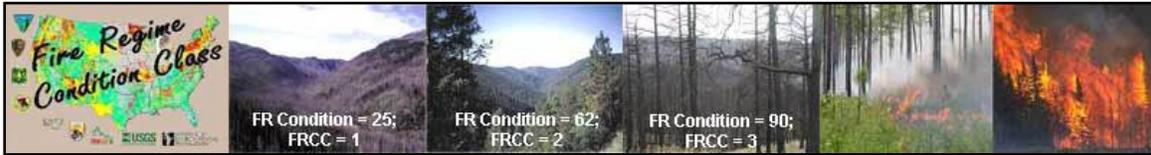


In Angel Fire, the valley floor, the west side of the study area and the lower elevations towards the west, are classified under Condition Class 1. By definition, historic fire regimes are within the historical range of variability. Fires would be expected to be moderate and in line with historical burn parameters. Grasses burn more often but have less intensity since the thatch layer is burned off regularly. Ponderosa Pine fires would likely be mixed fire intensity with some group torching but no major crown fire runs. The higher elevations on the west side are in Condition Class 2 and some Condition Class 3. Consequently, wildfires are likely to be larger, more severe, and have altered burn patterns, as compared with those expected under historic fire regimes.

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

Table 4. Condition Class Descriptions⁶

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



⁶ Fire Regime Condition Class, website, <http://www.frcc.gov/>, July 2005.

FIRE BEHAVIOR POTENTIAL

Because much of the information contained in the report is extensive and/or technical in nature, detailed discussions of the fire behavior potential are contained in *Appendix A: Fire Behavior Potential Analysis Methodology*. In this Appendix are descriptions of the methodology used to evaluate the threat represented by physical hazards such as fuels, weather, and topography to Values at Risk in the study area, and the results of the models of their effects on fire behavior potential. A detailed description of each standardized, nationally recognized fuel model found in the study area is included.

GLOSSARY

The following definitions apply to terms used in the Village of Angel Fire Community Wildfire Protection Plan.

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

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

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

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

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

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

Chain: A unit of linear measurement equal to 66 feet. One mile of linear distance equals 80 chains. One acre is equal to 10 square chains.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Ladder Fuels: Naturally occurring fuels that allow flames to move upward from grasses to bushes to trees.

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

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

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

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

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

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

Understory Vegetation - the smaller vegetation (shrubs, seedlings, saplings, small trees) within a forest stand, occupying the vertical zone between the overstory and the herbaceous plants of the forest floor.

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

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

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