Mountain Rim Fire Safe Council
San Bernardino Mountains, CA

Community Wildfire Protection Plan
2017

ANCHORPOINT
WILDLAND FIRE SOLUTIONS

2131 UPLAND AVENUE
BOULDER, CO 80304
www.anchorpointgroup.com

RPC 3(e)(iii)

TABLE OF CONTENTS

FIGURES

MUTUAL AGREEMENT PAGE

The Community Wildfire Protection Plan developed by the Mountain Rim Fire Safe Council for the San Bernardino Mountain Rim Communities:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the San Bernardino Mountains have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reductions treatments and recommends the types and methods of treatment that will aid in protecting San Bernardino Mountain Rim Communities.
- This plan recommends measures to reduce ignitability of structures throughout the area addressed by the plan.

The following entities attest that the standards listed above have been met and mutually agree with the content of this Community Wildfire Protection Plan:

Arrowbear Lake Fire Department, by Isaiah Hall, Fire Chief

Running Springs Fire Department, by George Corley, Fire Chief

San Bernardino County Fire, by Kathleen Opliger, Assistant Chief

12/18/17

CAL FIRE, San Bernardino Unit, by Glenn Barley, Unit/Fire Chief

USDA Forest Service, San Bernardino National Forest, by Dan O'Connor, Forest/Fuels Prevention Officer

11/13/17

USDA Forest Service, San Bernardino National Forest, by Jody Noiron, Forest Supervisor

EXECUTIVE SUMMARY

This Community Wildfire Protection Plan (CWPP) provides a comprehensive, scientifically-based, analysis of wildfire-related hazards and risks in the Mountain Rim Fire Safe Council Wildland-Urban Interface (WUI) area. The analysis strives to follow the standards for CWPPs that have been established by the Healthy Forests Restoration Act (HFRA) and the California Department of Forestry and Fire Protection (CAL FIRE).

This report is the result of an area-wide fire protection planning effort that includes extensive field data, a compilation of existing documents and a scientific analysis of the fire behavior potential of the study area. It is a result of a collaborative effort with the agencies listed on page 6.

Disclaimer

Recommendations in this document are not prescriptive, but are intended to assist in the identification of possible solutions or actions to reduce the impact of wildfire on values at risk. The views and conclusions in this document are those of Anchor Point and the project stakeholders and should not be interpreted as representing the policies of any governmental entity, fire agency or signatory entity. The methodology used is proprietary and as such may not match other existing hazard and risk ratings. In the event the language in this document conflicts with any regulatory documents, policies or local laws, this document does not supersede those documents.

Take Home Message

This CWPP provides an analysis of mitigation strategy and tactics designed to protect Values at Risk on which a significant wildfire would have an impact. These values include: life safety, homes and other property, infrastructure, recreation, lifestyle and environmental resources. Recommendations for mitigation efforts address five broad categories including: public education, structural ignitability/defensible space, water supply, access/evacuation, and re-vegetation with fire tolerant, native plants. Recommendations in this CWPP should be brought to the local community involved with the project to ensure the project is valuable and viable for the area. Additional projects are also encouraged, especially as previous recommendations are completed.

HOW TO USE THIS DOCUMENT

It is important to note many of the recommendations for defensible space, extended defensible space and fuelbreaks are generalized by design. All specific reduction prescriptions should be developed with the consultation of a representative of CAL FIRE (all areas), San Bernardino County Fire Department (Crestline and Green Valley Lake areas), local fire departments, or a qualified fire mitigation specialist, forester and/or landscape architects, depending on vegetation and treatment.

General defensible space recommendations are included, but will likely be modified based on a structure's topographic location, surrounding vegetation and predicted fire behavior. It should also be acknowledged that areas with very small lot sizes and an unusual density of detached single-family homes exist in the study area. These areas present a unique challenge to creating adequate defensible space. Where cooperation between adjacent property owners is not possible, adequate defensible space may not be created. Cooperation between property owners will be a critical component of any fuels reduction project in these neighborhoods.

Communities in this CWPP have been rated for overall hazard and risk. This rating alone, however, may not capture the mitigation needs of the community. At a minimum, it is necessary to review the individual community narrative, as well as the accompanying graphics, to understand some of the specific information that went towards forming the rating.

INTRODUCTION

This CWPP was developed by Mountain Rim Fire Safe Council (MRFSC) with guidance and support from the Running Springs Fire Department (RSFD), Arrowbear Lake Fire Department (ALFD), San Bernardino County Fire (SBCF), California Department of Forestry and Fire Protection (CAL FIRE), and the United States Department of Agriculture Forest Service (USFS). Information in this plan will be provided at the level of specificity determined by the community and appropriate agencies.

The process of developing a CWPP can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the WUI. It can also lead community members through valuable discussions regarding management options and implications for the surrounding watershed.

The assessment portion of this document estimates the hazards and risks associated with wildland fire in proximity to WUI areas. This information, in conjunction with identification of the Values at Risk defines communities for the purposes of this document and allows prioritization of mitigation efforts. From the analysis of this data, solutions and mitigation recommendations are offered that will aid homeowners, land managers, MRFSC and other interested parties in developing short-term and long-term mitigation efforts.

For the purposes of this report the following definitions apply:

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

Hazard is the combination of the WHR ratings of the WUI neighborhoods and the analysis of the fire behavior potential, which in the case of this report is derived from FRAPP data. Hazard attempts to quantify the severity of undesirable outcomes to the Values at Risk.

Values at Risk are the intrinsic values identified by citizens as being important to their way of life in the study area (e.g., life safety, property conservation, access to recreation, cultural sites and wildlife habitat.)

This document has the following primary purposes:

1. Provide a scientifically-based analysis of wildfire related hazards and risks in the WUI areas of the MRFSC.
2. Support the continuation and potential expansion of wildfire mitigation efforts currently underway and encourage the continued maintenance of completed projects.
3. Create a CWPP document that conforms to the standards established by HFRA and CAL FIRE.

The National Fire Plan and the Healthy Forest Restoration Act

In 2000 more than 8,000,000 acres burned across the United States, marking one of the most devastation wildfire seasons in American history. One high-profile incident, the Cerro Grande fire at Los Alamos, N.M., destroyed more than 235 structures and threatened the U.S. Department of Energy's nuclear research facility.

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

The second report, titled "Managing the Impacts of Wildfire on Communities and the Environment: A Report to the President in Response to the Wildfires of 2000," was issued by the U.S. Bureau of Land Management (BLM) and the U.S. Department of Agriculture's Forest Service (USFS). It became known as the National Fire Plan (NFP). This report, and the ensuing Congressional appropriations, ultimately required actions to:

- Respond to severe fires
- Reduce the impacts of fire on rural communities and the environment
- Ensure sufficient firefighting resources

Congress increased its specific appropriations to accomplish these goals. In 2002 there was another severe wildfire season with more than 7,000,000 acres burned and 1,200 homes destroyed. In response to public pressure, Congress and the Bush administration continued to designate funds specifically for actionable items such as preparedness and suppression. That same year the Bush administration announced the Healthy Forests Initiative, which enhanced measures to restore forest and rangeland health and reduce the risk of catastrophic wildfires. In 2003 the Healthy Forests Restoration Act (HFRA) was signed into law.

Through this piece 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 blend well with the established need for community wildfire protection in the study area. The spirit of HFRA and the NFP is reflected in the MRFSC CWPP.

This CWPP strives to meet the requirements of HFRA by:

1. Identifying and prioritizing fuels reduction opportunities across the landscape
2. Addressing structural ignitability
3. Addressing community fire-suppression capabilities
4. Collaborating with stakeholders

COLLABORATION: COMMUNITY AND AGENCIES

Organizations involved in the development of the Mountain Rim CWPP are listed below with their roles and responsibilities.

Mountain Rim Fire Safe Council

Primary development of the CWPP, community risk and value assessment, development of community protection priorities and establishment of fuels treatment project areas and methods.

County of San Bernardino, Fire and Public Works

Development of the CWPP, community risk and value assessment, development of community protection priorities, and establishment of fuels treatment project areas and methods.

CAL FIRE

Aids in the planning process and approval of the CWPP process and minimum standards. Provides input and expertise on forestry, fire, fuels, and FireWise concepts. Provides information support for hazard assessment and defensible space. Operates a pre-fire engineering program to reduce or eliminate fire hazards and risks by removing or reducing the heat source, modifying or reducing fuels through the afore mentioned hazard assessment and defensible space assistance programs and modifying acts or omissions that allow the heat source to contact ignitable fuels.

USDA Forest Service

Provides input and expertise on federal lands, forestry, fire and fuels.

Running Springs Fire Department; Arrowbear Lake Fire Department

Provides local information and expertise. This includes community risk and value assessment, development of community protection priorities, and establishment of fuels treatment project areas and methods. Assists with establishing priorities for fuel reduction and grant expenditure.

GOALS AND OBJECTIVES

Strategic goals for this project include the following:

1. Enhance life safety of the residents, patrons and responders
2. Mitigate undesirable fire effects to property and infrastructure
3. Maintain and enhance existing mitigation efforts

To accomplish these goals the following objectives have been identified for this report:

1. Establish an approximate level of risk (the likelihood of a significant wildfire event in the study area)
2. Provide a scientific analysis of the fire behavior potential of the study area
3. Group densely populated areas into “communities” that represent relatively similar hazard factors.
4. Identify and quantify factors that limit (mitigate) undesirable fire effects to the Values at Risk
5. Recommend actions that will reduce hazards to the Values at Risk
6. Evaluate existing mitigation efforts

Identify potential escape routes, safety zones, and evacuation points for community members. Other desired outcomes include:

1. Promote community awareness: Quantifying the study area’s hazards and risk from wildfire will facilitate public awareness and assist in creating public action to mitigate the defined hazards.
2. Improve wildfire prevention through education: Community awareness through education will help reduce the risk of unplanned human-caused ignitions. Education can limit injury, property loss and even unnecessary death.
3. Facilitate and prioritize appropriate hazardous fuel removal projects: Organizing and prioritizing fuel management actions will provide stakeholders with the tools and knowledge to ensure projects are valuable and viable for the local community.
4. Promote improved levels of response: The identification of specific community planning areas and their associated hazard and risk rating will improve the focus and accuracy of pre-planning and facilitate the implementation of cross-boundary, multi-jurisdictional projects.

For specific recommendations regarding MRFSC goals and objectives please see Defensible Space and General Recommendations page 35.

STUDY AREA OVERVIEW

The San Bernardino mountain rim communities represent residential and business interests located in the densely populated WUI within a 110-square mile area of the San Bernardino National Forest. The MRFSC serves unincorporated communities and neighborhood areas along Rim of the World Scenic Highway (SR-18) and the interior communities including but not limited to Crest Forest, Crestline, Valley of Enchantment, Twin Peaks, Lake Arrowhead, Cedar Glen, Blue Jay, Skyforest, Rim Forest, Running Springs, Smiley Park, Fredalba, Arrowbear Lake and Green Valley Lake.

Vegetation in and around the communities of the study area is primarily mixed conifer forest with incense cedar, white fir, black oak, canyon live oak, ponderosa pine, sugar pine, and big-cone Douglas fir. Annual and perennial grasses occupy the mountain valleys with areas of chaparral and oak woodland on the drier southern aspects. The foothills below the study area contain heavy fuel loads of primarily chaparral.

With increasing population growth and corresponding degradation of existing infrastructure, MRFSC recognizes a significant potential for complex problems associated with the mission of achieving fire safety throughout the mountain communities, healthy forest management initiatives, and a need to balance this mission with environmental concerns.

Communities

The study area has been divided into five "communities" which comprise the most densely populated portions of the WUI (Figure 1). These communities are not based on political or traditional neighborhood boundaries, but rather on factors relating to wildfire propagation and impacts. Of these five, the Lake Arrowhead area has been covered by a previously produced CWPP, which is available for review at www.ie-cwpp.org. The remaining four communities; Crestline/Crest Forest, Running Springs, Arrowbear Lake and Green Valley Lake are the focus of this document.

Areas of Special Interest

The study area has one area of special interest; the 500 acre Longpoint Ranch (Figure 2). The ranch is positioned at the top of steep slopes and drainages extending from the edge of San Bernardino up to the study area. Considering its key strategic position, wildfire mitigation planning on the ranch land is critical not only to successful protection of the ranch but also the entire Running Springs community.

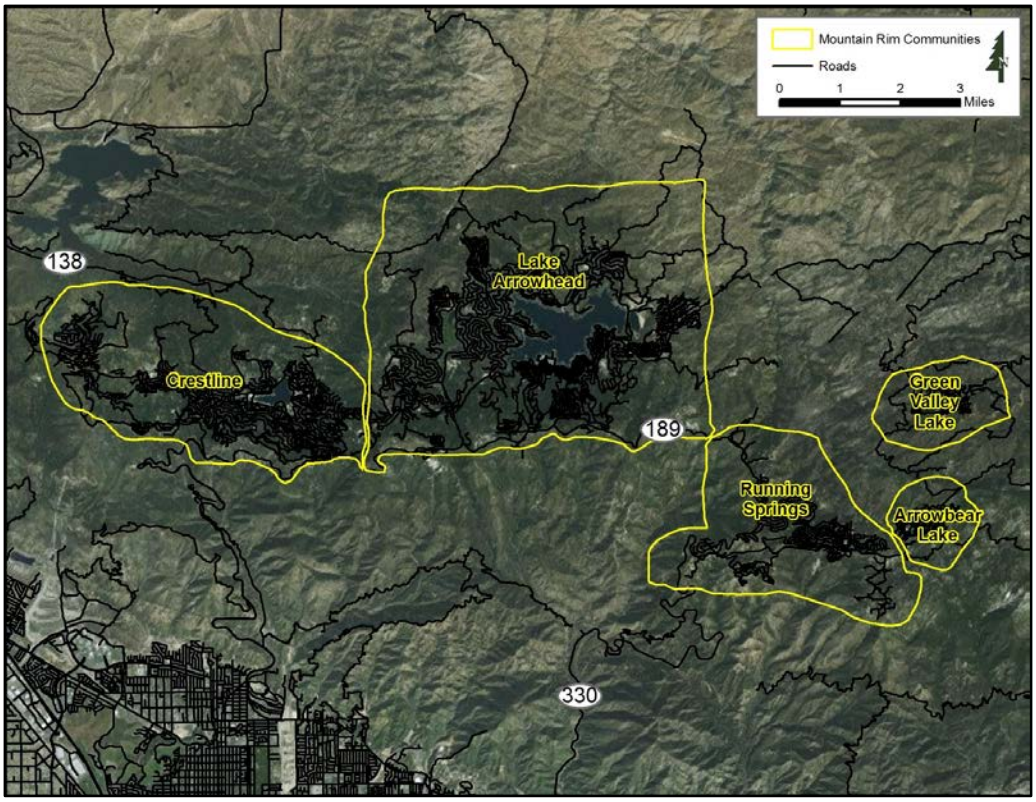


Figure 1 Communities of Interest

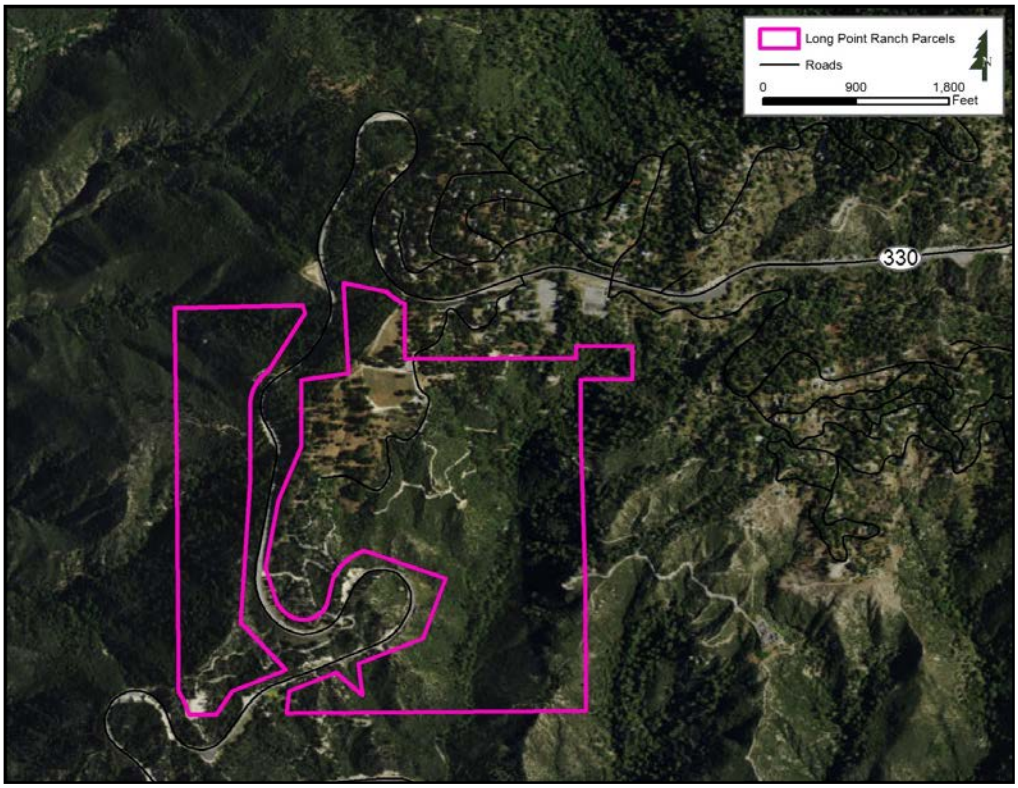


Figure 2 Longpoint Ranch area of special interest

VALUES AT RISK

Life Safety and Homes

The San Bernardino Mountain Rim Communities consist of approximately 38,000 parcels. An estimated 40% of the homes in these communities are used as full-time residences. The rest are used as part-time vacation homes and rentals. The estimated full-time population is 35,000; however, especially in the summer months, an additional 50,000 people may be staying at the various camps, conference centers and other resort lodging.

Commerce and Recreation

The San Bernardino Mountains are a playground for millions of people living in the Los Angeles area. In addition to the obvious economic value of the hotels and restaurants, there are numerous summer camps and conference centers in the study area. During the warm months, thousands flock to the area for day trips and weekends away from the heat of the city. Lake Arrowhead and nearby Big Bear Lake are destinations for both southern California locals and vacationers from far away. Lake Arrowhead is one of the most popular fishing destinations in southern California.[1]
Springs on the Longpoint Ranch are a significant source for Arrowhead Mountain Spring Water which is owned by the Nestle Company. Estimated annual sales of Arrowhead Mountain Spring Water are over $546,000,000.[2]

Skiing has become a popular winter activity since the first lift was built in the San Bernardino Mountains at Snow Valley in 1924. The Snow Valley Ski Resort is at the edge of the study area WUI and vulnerable to fires occurring inside the study area. Over $1,000,000 was invested into Snow Valley in 2015. [3] The Snowdrift Snow Tubing Park is located on National Forest land inside the study area WUI on CA-18. Bear Mountain and Snow Summit Ski Resorts are approximately 15 miles to the east of the study area. The primary access from the west to these resorts is through the study area.

Environmental Resources

The San Bernardino Mountains are considered to be a sky island (a mountain region whose plants and animals vary dramatically from those in the surrounding desert lands). The San Bernardino Mountains support some 1,600 species of plants.[4] There are about 440 species of wildlife that inhabit these mountains including endangered species such as the San Bernardino flying squirrel, California spotted owl, mountain yellow-legged frog and Andrew's marbled butterfly. [5] Although the grizzly bear population was eradicated over 100 years ago, black bears are reasonably common in the higher elevations.

The importance of the water supply in the San Bernardino Mountains cannot be overstated. The east branch of the California Aqueduct system passes through the San Bernardino Mountains and feeds Silverwood Lake, which is just outside the study area.[6] The San Bernardino Mountains contain the headwaters of the massive Santa Ana Watershed. The Santa Ana river basin is one of the largest in California and the largest on the South Coast. It covers approximately 2,650 square miles in parts of four California counties and extends from the San Bernardino Mountains to the Pacific coast.[7] Fires in and near the study area could result in further pollution (through erosion

and siltation) of what is already a pollution impaired waterway and have ecological impacts far away from the study area

The area also has significant archaeological/cultural resources which are part of the environment and require special protection and consultation with tribes before implementing ground disturbing projects.

CURRENT RISK SITUATION

The WUI area is shown in Figure 3. Most of the areas covered by the communities of interest, are in the high and very high wildfire hazard severity zones as defined by the CAL FIRE Fire and Resource Assessment Program (FRAP) Figure 4.[8] In Figure 5, the expected return interval for wildfire, expressed as "fire rotation", from the FRAP analysis. Return interval is the amount of time predicted between serious fire events for a given area; however, it does not suggest that fires cannot occur sooner as this prediction is based on long term history. If two fires occurred in the same area 10 years apart and another fire did not occur for 200 years the area would be classed as a 100-year return interval (or fire rotation class high, 100-300 years). Most of the communities of interest are in the high to very high fire rotation class.

During the summer months, thousands of people travel to this area to recreate in the San Bernardino Mountains. This high level of human activity during the most active time of the year for ignitions increases the risk of fire occurrence in this area.

This area has a very active fire history. Figure 6 shows the major fire perimeters since 2000. Major fires that have impacted the study area since 2000 include Grand Prix (2003), Old (2003), Slide (2007) and Grass Valley (2007). These fires burned over 192,000 acres within a period of five years. During the time this report was being written (summer of 2016) the Pilot and Blue Cut fires burned 44,384 acres in the San Bernardino Mountains in and near the study area WUI.

California is in the fifth year of a historic drought that will continue to increase the likelihood and intensity of ignitions as long as it persists. According to a report released by NOAA in July of 2016, "The abnormally dry and warm conditions have stressed vegetation (satellite-based Vegetation Health Index [VHI], Stressed Vegetation Index, Drought Risk Index), with about 40 percent of the pastures and rangeland rated in poor to very poor condition in California and Oregon, and contributed to a constant wildfire threat."[9] The impacts of drought also result in increased bark beetle activity and tree mortality which increases fire risk.

Based on the fire history, condition of the fuels and the CAL FIRE assessment, the study area should be considered at a very high risk for continued ignitions.

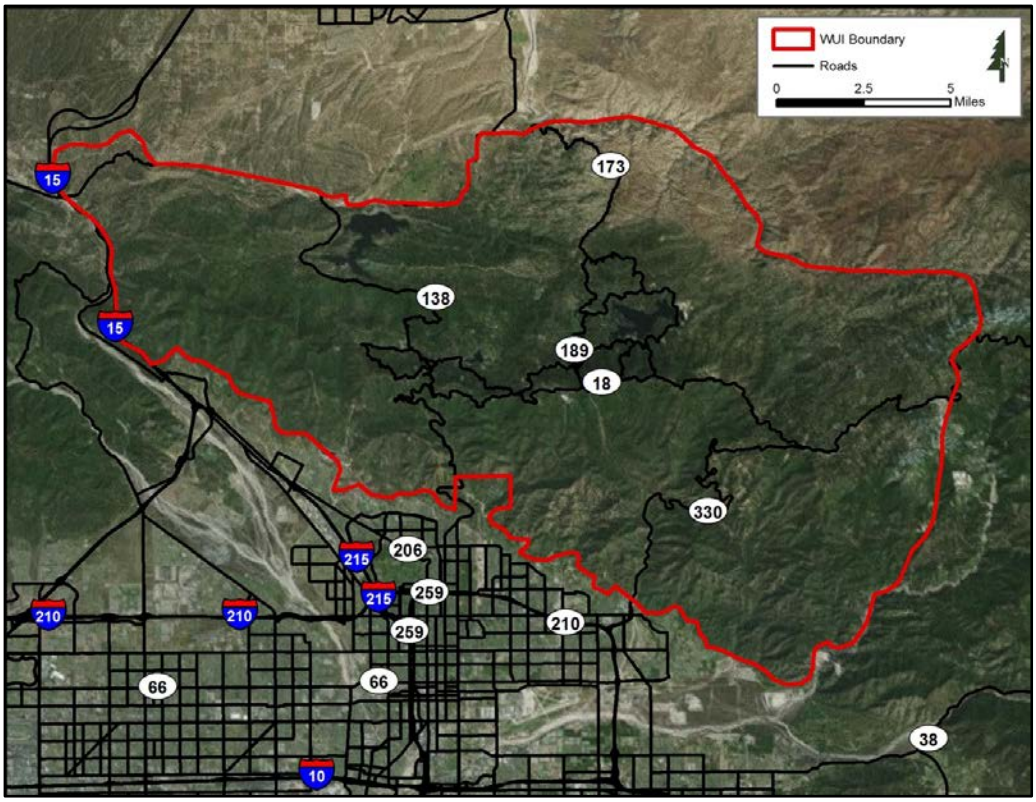


Figure 3 Mountain Rim WUI area

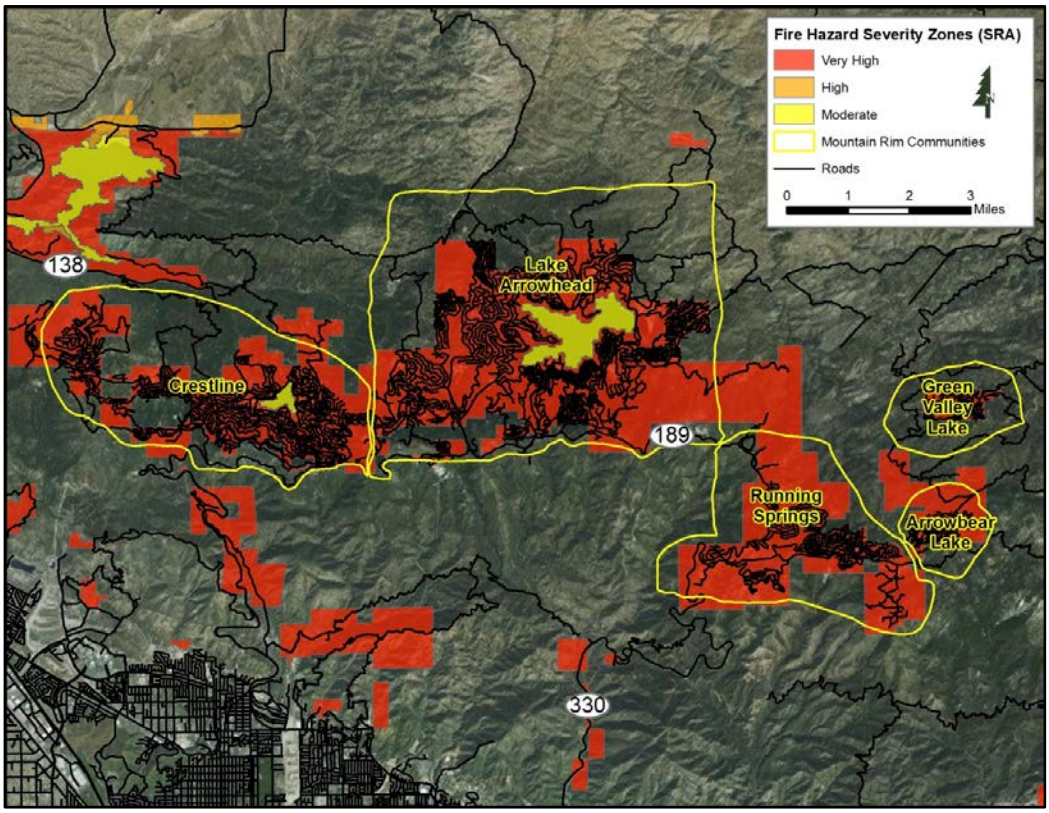


Figure 4 FRAP Hazard Severity Zones with Communities of Interest Boundaries

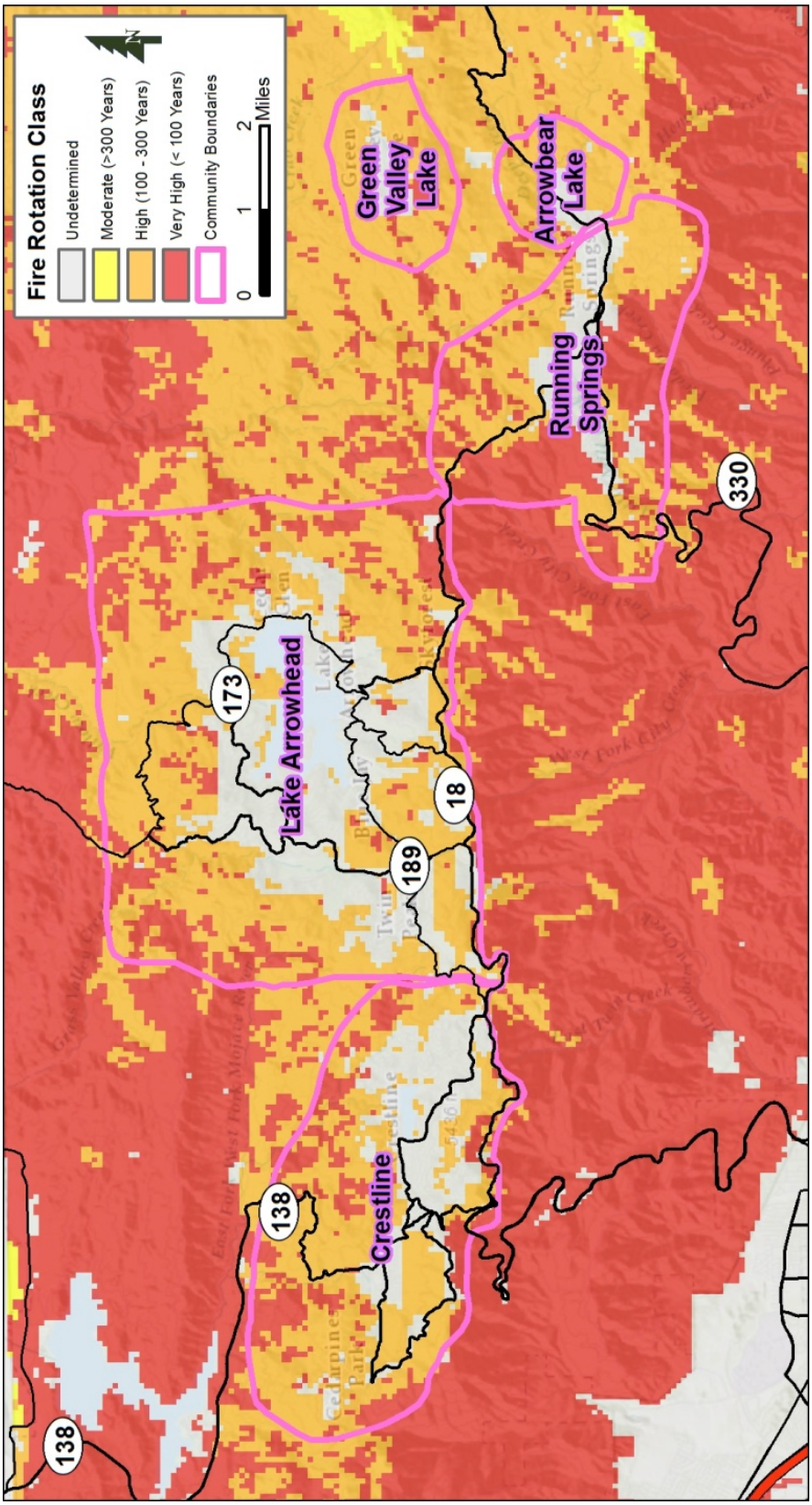


Figure 5 FRAP Fire Rotation Class (return interval)

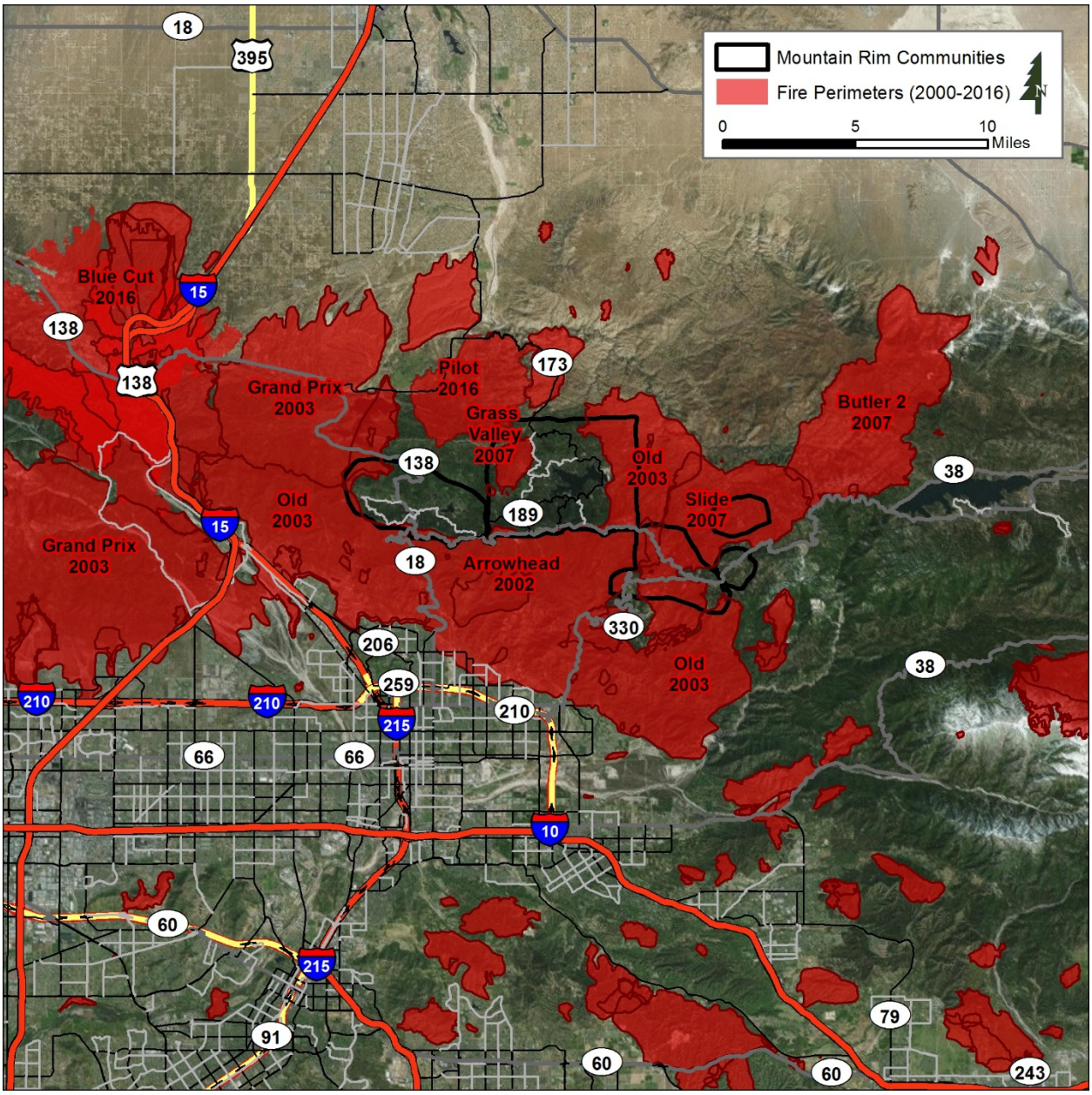


Figure 6 Fire History

FIRE BEHAVIOR DISCUSSION

As previously discussed the San Bernardino Mountains have a very active fire history. Fires have been frequent and destructive and the potential for damage to life, property and the environment is increasing as the population of and visitation to this area increases.

Fuels

Vegetation in and around the communities of the study area is primarily mixed conifer forest with incense cedar, white fir, black oak, canyon live oak, ponderosa pine, sugar pine, and big-cone Douglas fir. Annual and perennial grasses occupy the mountain valleys with areas of chaparral and oak woodland on the drier southern aspects. The foothills below the study area contain heavy fuel loads of primarily chaparral.

The fuels throughout the study area have been modified by fires, ornamental plantings near structures and ongoing fuels reduction programs by CAL FIRE and local fire departments. There are also significant areas of bug kill trees remaining in some of the forest environment, causing higher fuel loadings. These factors have created a patchwork of variable combustibility.

Fuels outside the Mountain Rim communities have in general not been mitigated since the Old, Grass Valley and Slide fires modified the vegetation in 2003 and 2007. There are various levels of re-growth within the burn area, with some areas covered with grass but most having at least some timber regeneration or shrub components. The re-vegetation pattern is largely dictated by aspect, topography and maintenance cutting. These differences in fuel, in conjunction with weather and topography, also drive the fire behavior. The vegetation in areas not affected by the Slide, Grass Valley and Old fires retain high density fuel beds.

Weather

In Southern California, fire activity peaks from late spring through fall, when the influence of moist maritime air is diminished. Fall brings the greatest potential for offshore wind events, and fuels are also usually at their driest levels. There is normally little fire activity from winter to early spring due to a generally increased maritime influence and cold temperatures, though fires are possible at any time when offshore wind events occur. [10]

The most troublesome fire weather events are caused by the Santa Ana winds that occur most commonly in the fall but which are possible any time of year. These strong winds are warm and dry out the vegetation ahead of them. This can last through the night, which keeps temperatures high, relative humidity low and fires burning actively.

Even typical summer weather conditions can support large fire growth, with or without extreme winds. High daytime temperatures and low relative humidity levels are common beginning in June and typically lasting through October.

Topography

The elevation varies from approximately 5,000 to over 7,000 feet within the community boundaries. The area is mountainous, with steep slopes, narrow canyons and complex topography. Many homes are built on these steep slopes and in the narrow canyons. The terrain to the south slopes steeply toward the urban edge of Highland and San Bernardino, CA. A fire will move faster as it goes up steeper slopes. Steep slopes present in, and especially to the south, of the study area increase the potential for ignited rolling-material to start spot fires (new fires started outside of the main fire perimeter). Spot fires make fire suppression increasingly difficult and allow the main fire to expand at a faster rate. Slopes in the study area are as high as 55 degrees, greater than 100% slope.

Narrow, steep chutes funnel the winds and further increase the rate of spread of a fire. There are major north-south canyons (such as Waterman Canyon and the Little Mill Creek drainage) as well as other, smaller drainages below and within, the study area that will increase and funnel any winds, including Santa Ana winds. Structures lying immediately above these drainages are at an increased risk.

FRAP Fire Threat Analysis

Figure 7 shows the outputs of the CAL FIRE FRAP Fire Threat analysis. According to CAL FIRE, "Fire Threat is a combination of two factors: 1) fire frequency, or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined to create 4 threat classes ranging from moderate to extreme… Fire threat can be used to estimate the potential for impacts on various assets and values susceptible to fire. Impacts are more likely to occur and/or be of increased severity for the higher threat classes."[11]

Most of the area inside and immediately surrounding the communities of interest that is not part of a densely developed population center is in the Very High or Extreme category. Almost all of the terrain immediately to the south of the communities is also classed as Very High to Extreme. This area has steep and complex topography which represents a direct threat to the communities of the study area. The FRAP analysis only considers vegetative fuels and does not consider the density and flammability of the structures themselves. Although this will be discussed in more detail later in this document, in the communities there are areas where the density and type of construction represents a significant addition to the fuel load. For these reasons, any fire occurring in or near the communities should be considered to have significant destructive potential.

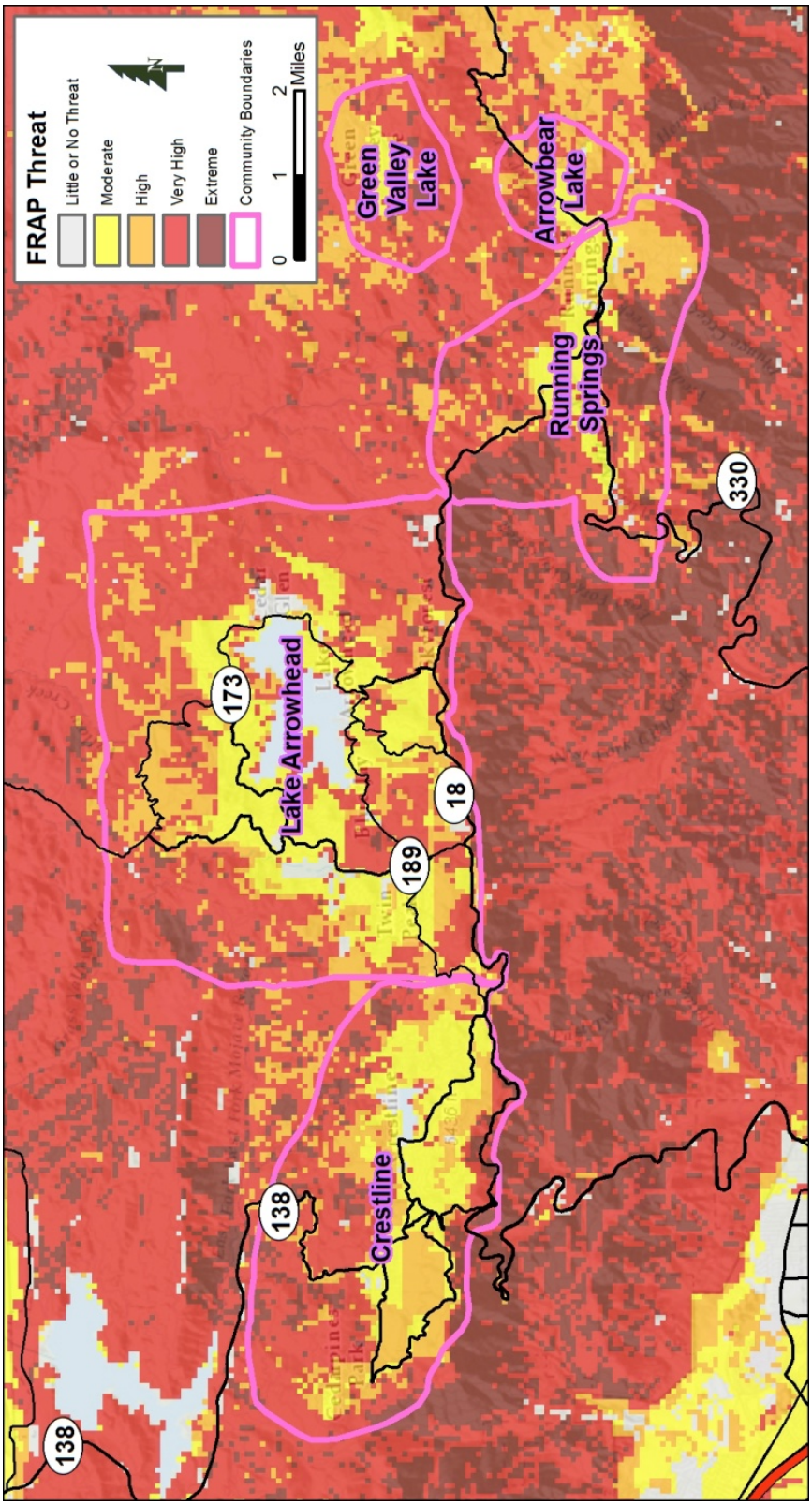


Figure 7 FRAP Fire Threat

FIREFIGHTING CAPABILITIES AND LOCAL PREPAREDNESS

The communities of the study area are serviced by the following state and local fire departments, CAL FIRE, San Bernardino County Fire Department, Running Springs Fire Department and Arrowbear Lake Fire Department. Initial response to all fire, medical and associated emergencies is the responsibility of local responders. In the case of Running Springs and Arrowbear Lake their respective fire departments would be first in. Lake Arrowhead, Crestline and Green Valley Lake are covered by the San Bernardino County Fire Department. Wildland fire responsibilities within the San Bernardino National Forest (BDF) are managed by the USDA Forest Service (USFS). Fire protection in all designated State Responsibility Areas (SRA) is handled by CAL FIRE. In high severity periods agreements with the California Military Department allow for California National Guard resources to provide aid in wildfire response including their Modular Airborne Fire Fighting System (MAFFS), helicopters, support personnel, communications equipment and other resources.[12]

In addition to providing fire suppression resources, the above departments and agencies cooperate in vegetative treatments and wildfire response planning through mutual aid agreements. MRFSC and the Mountain Area Safety Taskforce (MAST) are also actively working to prevent catastrophic wildfire. MAST is a coalition of local, state and federal government agencies, private companies and volunteer organizations in San Bernardino and Riverside counties that are partners in wildfire prevention.

All of the agencies in the study area have automatic mutual aid agreements with the USFS whose jurisdiction overlaps and surrounds the communities in the study area.[13]
The San Bernardino Unit of CAL FIRE maintains 13 fire stations, one air attack/helitack base and three conservation camps in San Bernardino County. CAL FIRE maintains three fire stations within the study area. The Crestline Station is a state-owned facility that seasonally houses a Type 3 fire engine. CAL FIRE also has Type 3 engines co-located with the US Forest Service at Sky Forest (seasonal) and with the Running Springs Fire Department at Station 51 (year-round). The Pilot Rock Conservation Camp, also located in Crestline, is home to four, type-one hand crews. CAL FIRE supplies mutual aid to local responders in the study area through the California Master Mutual Aid Agreement. CAL FIRE also maintains an agreement with federal wildfire agencies (such as the USDA Forest Service) to exchange fire protection services. The goal of this agreement is to have the closest agency respond to a wildfire, regardless of jurisdiction. This arrangement also allows CAL FIRE to access federal and state resources throughout the U.S. when CAL FIRE resources are stretched thin or depleted.[14] In addition to suppression resources CAL FIRE provides personnel to develop pre-fire management solutions and implement cooperative projects to reduce the potential of wildfire losses within the study area.

The San Bernardino County Fire Department has 11 fire stations located in the communities of the study area. Stations 24, 25, 28 and 29 are located in Crestline, stations 26 and 30 are located in Twin Peaks, stations 91, 92, 93, 94 are located in Lake Arrowhead and station 95 is located in Green Valley Lake. Stations 24, 28, 29 and 93 are currently inactive. Calls in the county response area are handled from the other seven stations. San Bernardino County Fire has a

comprehensive automatic aid system with state and local firefighting resources through the *2014 San Bernardino County Fire and Rescue Mutual Aid Operational Plan*.
The Running Springs Fire Department maintains two stations. The department is a combination department with nine full-time staff and 30 paid-call firefighters. The response area is approximately 52 square miles in and around the town of Running Springs.

Arrowbear Lake is a volunteer fire department with one fire station. The department has approximately 15 volunteer firefighters servicing the community of Arrowbear Lake.

Recommendations

CAL FIRE is recognized nationally for its high level of training and equipment; however local departments in the study area may not have the benefit of the same levels of training and equipment as CAL FIRE and the San Bernardino County Fire Department. Some, perhaps all, of the recommendations below may already be in practice by these larger departments, therefore the recommendations in this document focus on maintenance of policy for those entities as well as providing a guideline of minimum standards for smaller local organizations operating in the WUI.

Training/Equipment

- Require or continue to require S130/190 for all firefighters
- Require or continue to require the annual refresher or certification for all firefighters, similar to how CAL FIRE annually certifies their fire season readiness with their Fire Preparedness Exercise every spring.
- Maintain training opportunities sponsored, or funded, by state and federal and local resources.
- Seek agreements that allow for cooperative training between local firefighters and county, state and federal responders.
- Encourage personnel to take additional beneficial courses including; S-215 *Fire Operations in the Urban Interface*, S-290 *Intermediate Fire Behavior*, L-380 *Fireline Leadership* as well as I-200 *Basic ICS.*
- Encourage personnel to seek higher qualifications and participate in out-of-district assignments.
- Ensure all firefighters have adequate wildland PPE including radios and new generation fire shelters.
- Be sure enough additional PPE is on hand to outfit new recruits.
- Pursue grants and other funding opportunities to purchase additional wildland PPE and apparatus, such as the FEMA Assistance to Firefighters Grant Program.[15]
- Acquire additional wildland fire packs that are fitted for new generation fire shelters and retire from service any wildland fire pack designed for the older fire shelters as these are not compatible with new generation shelters.

Apparatus

- Purchase at least one Type-3 wildland engine per department that would be available for regional dispatch.

COMMUNITY IGNITABILITY ANALYSIS

Purpose

The purpose of this section is to examine the communities of the study area in greater detail. As mentioned previously, this document has divided the densely populated areas of the WUI into five communities based on wildfire propagation and potential impacts; Crestline/Crest Forest, Lake Arrowhead, Running Springs, Arrowbear Lake and Green Valley Lake. The community boundary map shown on page 13 has been reproduced below (Figure 8) for easy reference. Since Lake Arrowhead has already been covered by a previously produced CWPP, this discussion will focus on the remaining four communities. Two of these communities were found to represent Extreme hazard (Green Valley Lake and Arrowbear Lake) and two, Very High Hazard (Crestline/Crest Forest and Running Springs). It is important to remember these communities are rated relative to what is customary for this type of interface. While adhering to proven methodology, an attempt is made to approach each community as a unique entity with its own characteristics, so that the most accurate, safe and useful assessments possible are provided.

Community Assessment Methodology

The community level methodology for this assessment uses a Wildfire Hazard Rating (WHR) that was developed specifically to evaluate communities within the Wildland Urban Interface (WUI) for their relative wildfire hazard.[16] The WHR model combines physical infrastructure such as structure density and roads, and fire behavior components such as fuels and topography, with the field experience and knowledge of wildland fire experts. It has been proven and refined by use in rating thousands of neighborhoods throughout the United States. Much of NFPA 1144 has been integrated into this methodology to ensure compatibility with national standards. Additionally, aspects of NFPA 1142 regarding water supply for rural and suburban firefighting are included in the assessments by looking at proximity and capacity of the water supply.

Many knowledgeable and experienced fire management professionals were queried about specific environmental and infrastructure factors and wildfire behavior and hazards. Weightings within the model were established through these queries. The model was designed to be applicable throughout the western United States.

The model was developed from the perspective of performing structural triage, also known as prioritizing, on a threatened community in the path of an advancing wildfire with moderate fire behavior. The WHR survey and fuel model's ground-truthing are accomplished by field surveyors with WUI fire experience. The rating system assigns a hazard rating based on five categories: topographic position, fuels and fire behavior, construction and infrastructure, suppression factors, and other factors including frequent lightning, railroads, campfires, etc.

The rankings are also related to what is customary for the area. For example, a high-hazard area on the plains of Kansas may not look like a high-hazard area in the Sierra Nevada. The system creates a relative ranking of community hazards in relation to the other communities in the study area. It is designed to be used by experienced wildland firefighters who have a familiarity with structural triage operations and fire behavior in the interface.

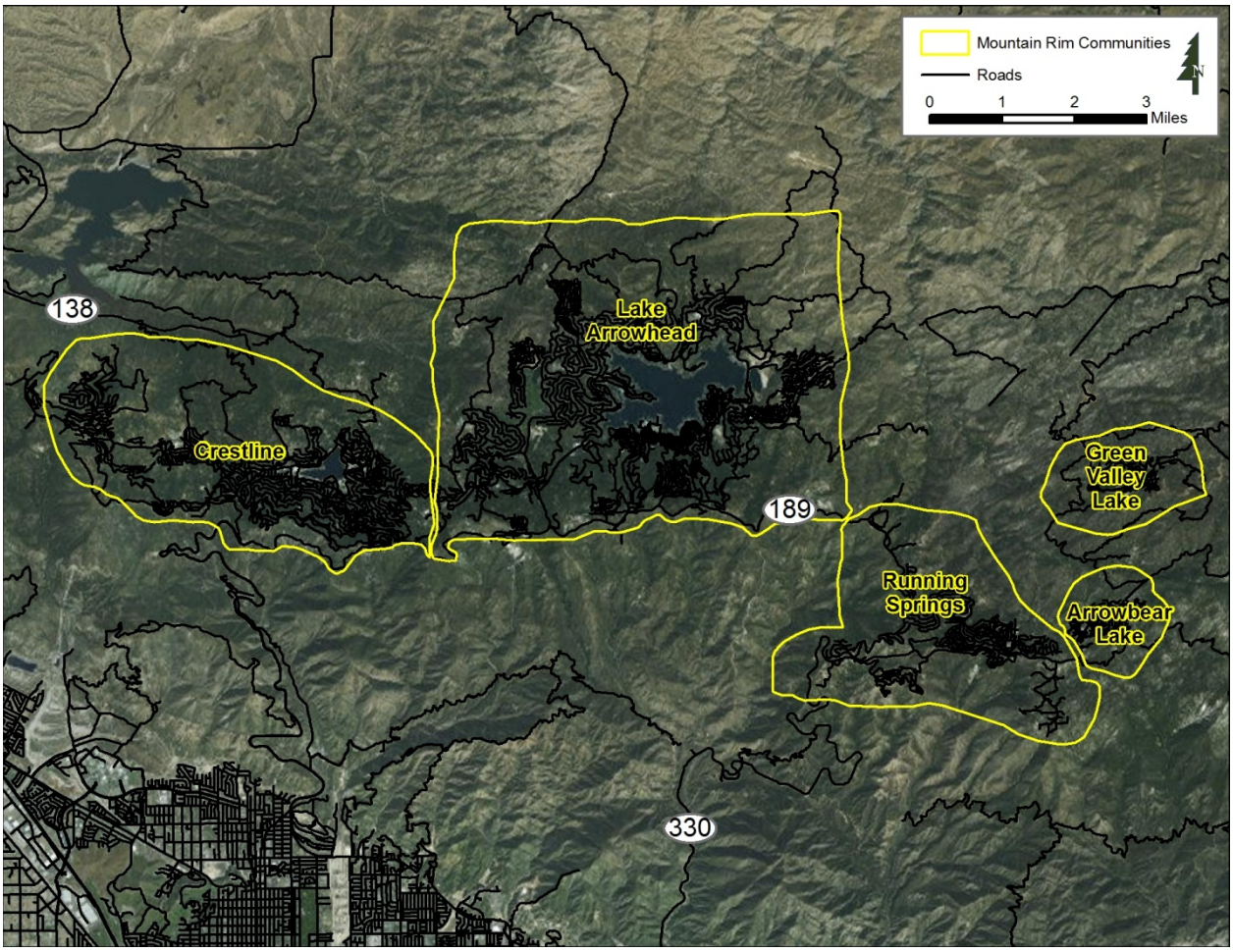


Figure 8 Communities of the study area

COMMUNITY IGNITABILITY DISCUSSION – GREEN VALLEY LAKE

Figure 9 Green Valley Lake and homes

Hazard Rating:	**Extreme**
Permanent Population:	300 (approximate)
Utilities Above or Below Ground:	Above ground
General Construction:	Primarily combustible siding with asphalt shingle roofs
Average Lot Size:	< 1 acre
Dual Access Roads:	No
Road Widths, Slope and Surface:	Some inadequate, see text
Home Addresses:	Inconsistent, see text
Water Supply:	Hydrants, variable pressure
Proximity to Fire Stations:	One paid-call station in the community

About the Community

The community of Green Valley Lake is located approximately six miles from CA-18. Access is one way in and out on a paved road of adequate width. This road is through heavy loads of timber fuels and native vegetation grows right up to the shoulder. Access inside the community is on paved and improved-dirt roads. There are some narrow access roads and driveways. Some properties do not have adequate turnarounds for fire apparatus. Street signage is generally present and reflective; however home address markers are inconsistent. Most are non-reflective and many are not easily visible from the street.

The permanent population is approximately 300 and there are 1,512 parcels inside the community boundary as defined for this report. There are a large number of vacation homes. Approximately five out of six homes are unoccupied most of the year.[17] Most homes are built on

small lots (25’ x 100’). The dominant construction type is flammable siding with an asphalt shingle roof. There are many homes with flammable decks and projections. Some of these are located on slopes above heavy fuel loads. Most homes have none or inadequate defensible space. There are no landscape scale fuelbreaks visible in or around the community.

The community is located at approximately 7,000 feet making it the highest community in the study area. Although the terrain is not as steep as some of the other communities, significant slopes exist and many homes are constructed mid-slope in heavy fuel beds. The topography is complex with many gullies and drainages.

Fuels are heavy loads of conifer with a moderately heavy surface fuel load of needle cast. In some areas, the shrub understory is thick and heavy. The 2007 Slide fire burned into this community and in the burn area fuels are primarily grasses and shrubs. In the burn area the fuel load is lighter, but still fairly continuous.

Utilities are above ground and fires have been reported from downed power lines. The community has fire hydrants that are fed by tanks and managed by the Green Valley Lake Water Company. Green Valley Lake itself could also be used as a dip site for aerial resources. The San Bernardino County Fire Department maintains a paid-call fire station in the community. Mutual aid is available; however, the relatively long single access could limit outside response depending on the intensity and position of the fire.

Like most of the San Bernardino Mountains this community attracts large numbers of people from the Los Angeles area for vacations and weekend getaways. The population can swell to over 4,000 on holiday weekends.[18] The community is also surrounded by national forest with heavy loads of timber fuels. Camp fires in the forest are a serious potential threat considering the fuel loading and condition resulting from five years of serious drought. Like the rest of the study area, this community is susceptible to powerful Santa Ana winds in the fall and winter.

Recommendations

- Pursue funding for a parcel level analysis of this community. The complexity of the area should be examined in detail to maximize the effect of mitigation recommendations. This is a high priority recommendation.
- Thin vegetation for at least 100 feet from the pavement along both sides of the access road to shaded fuel break standards.
- Replace any remaining shake siding and roofs on homes and outbuildings with fire resistive materials.
- Work with property owners to provide reflective address markers visible from the road for all homes.
- Work with all property owners, especially non-resident owners, to create at least Zone 1 defensible space treatments and preferably Zone 1 and 2 defensible space treatments for all the homes in the community (see *Defensible Space and General Recommendations*).
- Work with property owners adjacent to national forest lands to create defensible space to their property lines. If this could be accomplished MRFSC could request fuels reduction

on forest lands under the Good Neighbor Authority that could be used to create a shaded fuelbreak bordering the community (see *Landscape Scale Recommendations*).

- Collaborate with the utility provider and the fire department to maintain above ground power lines in the community free from flammable vegetation underneath.
- Encourage property owners, especially non-resident owners, to pre-plan defense of their home with the fire department.
- Test all hydrants on an annual basis.

COMMUNITY IGNITABILITY DISCUSSION – ARROWBEAR LAKE

Figure 10 Arrowbear Lake homes

Hazard Rating:	**Extreme**
Permanent Population:	736 (approximate)
Utilities Above or Below Ground:	Above ground
General Construction:	Primarily combustible siding with asphalt Shingle roofs
Average Lot Size:	< 1 acre
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Some inadequate, see text
Home Addresses:	Inconsistent, see text
Water Supply:	Hydrants, variable pressure
Proximity to Fire Stations:	One volunteer station in the community

About the Community

The community of Arrowbear Lake is located on CA-18 between Running Springs and the Green Valley Lake turnoff. The community is bordered on the north and south by the San Bernardino National Forest. Access is west from Hwy 330 to San Bernardino or east on CA-18 to Big Bear on paved two-lane highways of adequate width. CA-18 travels through heavy loads of timber fuels with a shrub understory. Access inside the community is on paved and improved-dirt roads. There are many narrow access roads and driveways. Most properties do not have adequate turnarounds for fire apparatus. Street signage is generally present and reflective; however, home address markers are inconsistent. Many properties do not have visible address markers. Most that do are non-reflective and many are not easily visible from the street.

The permanent population is approximately 736 (2000 census. Arrowbear Lake did not participate in the 2010 census) and there are 2,608 parcels inside the community boundary as

defined for this report. Most of these parcels were sold initially as 25-foot-wide "tent camping" lots. Most of these have been combined; however, lots of more than 10,000 square feet (approximately 0.22 acres) are uncommon and there are many lots between 6,000 and 2,500 square feet (approximately 0.13 to 0.06 acres). This unusually high density of detached single-family cabins makes the homes themselves a likely carrier of fire through house to house transmission. Approximately half of the homes are vacation homes and unoccupied most of the year.[19] The dominant construction type is small mountain cabin with flammable siding and an asphalt shingle roof. Most homes have some sort of flammable decks and projections. These open wooden decks and projections would act as a trap for embers and heat generated by fires burning up the slopes below. There are many structures located mid-slope above heavy fuel loads. Most homes have none or inadequate defensible space. There are no landscape scale fuel breaks visible in or around the community.

Elevations range from approximately 5,900 to 6,500 feet in this community. The terrain both north and south of CA-18 is complex with significant slopes, steep gullies and drainages. Many slopes inside and adjacent to this community exceed 25%.

Fuels are heavy loads of conifer with a moderately heavy surface fuel load of needle cast. In some areas, there is a heavy shrub understory. Some mountain meadows exist with primarily grasses and shrubs as the natural fuel bed; however, the fuel load in general is heavy and continuous throughout this community. Arrowbear Creek has a heavy load of riparian vegetation which is less hazardous than the dominant timber and shrub fuels in and around this community due to the type and moisture content of the vegetation.

Utilities are above ground and there is a complex network of aerial power lines. The community has fire hydrants. The water system is fed by four reservoirs and five wells and managed by the Arrowbear Park County Water District, which also maintains the volunteer fire department and station.[20] Arrowbear Lake itself is a very small lake and frequently dries up during drought seasons. It is unreliable as a dip site for aerial resources. Mutual aid is available from the San Bernardino County Fire Department, CAL FIRE and Running Springs Fire Department through the California Master Mutual Aid Agreement.

Like most of the San Bernardino Mountains this community attracts large numbers of people from the Los Angeles area for vacations and weekend getaways. The community is also surrounded by national forest with heavy loads of timber fuels. Camp fires in the forest are a serious potential threat considering the fuel loading and condition resulting from five years of serious drought. Like the rest of the study area, this community is susceptible to powerful Santa Ana winds in the fall and winter.

Recommendations

- Pursue funding for a parcel level analysis of this community. The complexity of the area should be examined in detail to maximize the effect of mitigation recommendations. This is a high priority recommendation.

- Thin vegetation for at least 100 feet from the pavement along both sides of CA-18 through this community to shaded fuel break standards. Implement roadside thinning wherever possible along the access roads to homes both north and south of CA-18.
- Replace any remaining shake siding and roofs on homes and outbuildings with fire resistive materials.
- Work with property owners to provide reflective address markers visible from the road for all homes.
- The small lots sizes will make defensible space challenging, if not impossible if property owners do not cooperate. MRFSC should work with property owners, especially non-resident owners) to implement defensible space on a neighborhood basis rather than on a parcel basis (see *Defensible Space and General Recommendations*).
- Work with property owners adjacent to national forest lands to create defensible space to their property lines. If this could be accomplished MRFSC could request fuels reduction on forest lands under the Good Neighbor Authority that could be used to create a shaded fuelbreak bordering the community (see *Landscape Scale Recommendations*).
- Collaborate with the utility provider and the fire department to maintain above ground power lines in the community free from flammable vegetation underneath.
- Encourage property owners, especially non-resident owners, to pre-plan defense of their home with the fire department.
- Encourage property owners to enclose decks to reduce the possibility of trapping embers. Encourage the replacement of wooden decks and projections with fire resistive materials.
- Test all hydrants on an annual basis.

COMMUNITY IGNITABILITY DISCUSSION – CRESTLINE/CREST FOREST

Figure 11 Crestline homes

Hazard Rating:	**Very High**
Permanent Population:	10,770 (2010 census for Crestline/Crest Forest)
Utilities Above or Below Ground:	Above ground
General Construction:	Primarily combustible siding with asphalt Shingle roofs
Average Lot Size:	< 1 acre
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Some inadequate, see text
Home Addresses:	Inconsistent, see text
Water Supply:	Hydrants
Proximity to Fire Stations:	3 San Bernardino County FD stations, 1 CAL FIRE station, 1 CAL FIRE conservation camp

About the Community

For the purposes of this report this community includes Crestline, Crest Forest, Twin Peaks, Cedarpines Park and other adjacent populated areas. This is the most densely populated community in the study area. This community is located along CA-18 and CA-138. It is the westernmost community in the study area. Access is from the south on CA-18 to San Bernardino or north on CA-138 to I-15 on paved two-lane highways of adequate width. CA-18 and CA-138

travel through heavy loads of timber fuels with a shrub understory. Both roads are winding mountain roads and CA-18 is steep going south from this community as it drops over 4,000 feet to Highland and San Bernardino. Access inside the community is on paved and improved-dirt roads. There are many narrow access roads and driveways. Many properties do not have adequate turnarounds for fire apparatus. Street signage is generally present and reflective; however, home address markers are inconsistent. Many properties do not have visible address markers. Most that do are non-reflective and many are not easily visible from the street.

The permanent population is approximately 10,770 (2010 census) and there are 13,513 parcels inside the community boundary as defined for this report. Approximately 40% of the homes are vacation homes and unoccupied most of the year.[21] The dominant construction type is flammable siding and an asphalt shingle roof. Many homes have some sort of flammable decks and projections. These open wooden decks and projections would act as a trap for embers and heat generated by fires burning up the slopes below. There are many structures located mid-slope above heavy fuel loads. Many homes have none or inadequate defensible space. There are no landscape scale fuel breaks visible in or around the community.

Elevations in the community range from approximately 4,500 to 5,500 feet. The terrain is complex with significant slopes, steep gullies and drainages. There are slopes of up to 50 degrees south of CA-18 leading directly into this community.

The dominant natural fuels are heavy loads of conifer with a moderately heavy surface fuel load of needle cast. In some areas, there is a heavy shrub understory. Small areas exist where grasses and shrubs are the dominant natural fuel bed. The fuel bed is heavy in most of the community; however, there are some areas, especially along CA-18, where development has removed most of the natural fuels around the structures. The national forest lands to the south of CA-18 have heavy loads of natural fuels. Fuels here are primarily timber at the higher elevations changing to shrub dominant (mostly chaparral) at the lower elevations.

Utilities are above ground and there is a complex network of aerial power lines. The community has fire hydrants. The water system is managed by Crestline-Lake Arrowhead Water Agency and Crestline Village Water District[22] Lake Gregory is a relatively large mountain lake inside the community and is reliable as a dip site for aerial resources. There are three San Bernardino County Fire Department fire stations, one CAL FIRE station and one CAL FIRE conservation camp, which is home to four hand crews, in the Crestline community.

This community attracts large numbers of people from the Los Angeles area for vacations and weekend getaways. This community has an unusually high concentration of summer camps and conference centers. Visitors can easily outnumber residents in the summer months. Camp fires in the forest are a serious potential threat considering the fuel loading and condition resulting from five years of serious drought. Like the rest of the study area, this community is susceptible to powerful Santa Ana winds in the fall and winter.

Recommendations

- Pursue funding for a parcel level analysis of this community. The complexity of the area should be examined in detail to maximize the effect of mitigation recommendations. This is a high priority recommendation.
- Thin vegetation for at least 150 feet from the pavement along the steep south side of CA-18 through this community to shaded fuelbreak standards. Implement roadside thinning wherever possible along the access roads to homes north of CA-18.
- Thin vegetation for at least 100 feet from the pavement along both sides of CA-138 to shaded fuel break standards to protect this important evacuation route.
- Replace any remaining shake siding and roofs on homes and outbuildings with fire resistive materials.
- Work with property owners to provide reflective address markers visible from the road for all homes.
- Work with all property owners, especially non-resident owners, to create at least Zone 1 defensible space treatments and preferably Zone 1 and 2 defensible space treatments for all the homes in the community (see *Defensible Space and General Recommendations*).
- Collaborate with the utility provider and the fire department to maintain above ground power lines in the community free from flammable vegetation underneath.
- Encourage property owners, especially non-resident owners, to pre-plan defense of their home with the fire department.
- Work with summer camps and conference centers to pre-plan their properties with the fire department for structure defense and visitor evacuation.
- Encourage property owners to enclose decks to reduce the possibility of trapping embers. Encourage the replacement of wooden decks and projections with fire resistive materials.
- Test all hydrants on an annual basis.

COMMUNITY IGNITABILITY DISCUSSION – RUNNING SPRINGS

Figure 12 Running Springs homes

Hazard Rating:	**Very High**
Permanent Population:	4,862 (2010 census)
Utilities Above or Below Ground:	Above ground
General Construction:	Primarily combustible siding with asphalt Shingle roofs
Average Lot Size:	< 1 acre
Dual Access Roads:	Yes
Road Widths, Slope and Surface:	Some inadequate, see text
Home Addresses:	Inconsistent, see text
Water Supply:	Hydrants
Proximity to Fire Stations:	Combination fire department with 2 stations

About the Community

For the purposes of this report this community includes Running Springs, Fredalba, Smiley Park and other adjacent populated areas. This community is located along CA-18 and CA-330. Access is from the south on CA-330 to San Bernardino or north on CA-18 to Crestline (west) or Big Bear (east) on paved two-lane highways of adequate width. CA-18 and CA-330 travel through heavy loads of timber fuels with a shrub understory. Both roads are winding mountain roads and CA-330 is steep going south from this community as it drops over 4,000 feet to Highland and San Bernardino. Access inside the community is on paved and improved-dirt roads. There are many narrow access roads and driveways. Many properties do not have adequate turnarounds for fire apparatus. Street signage is generally present and reflective; however, home address markers are inconsistent. Many properties do not have visible address markers. Most that do are non-reflective and many are not easily visible from the street.

The permanent population is approximately 4,862 (2010 census) and there are 4,260 parcels inside the community boundary as defined for this report. Approximately 47% of the homes are vacation homes and unoccupied most of the year.[23] The dominant construction type is flammable siding with an asphalt shingle roof. Many homes have some sort of flammable decks and projections. These open wooden decks and projections would act as a trap for embers and heat generated by fires burning up the slopes below. There are many structures located mid-slope above heavy fuel loads. Many homes have none or inadequate defensible space. There is a fuelbreak and helicopter LZ in the Smiley Park neighborhood that is maintained by the neighborhood. There is another fuelbreak located on the 500 acre Longpoint Ranch that is maintained by the property owner.

The Running Springs community is located at approximately 6,000 feet. The terrain is complex with significant slopes, steep gullies and drainages. There are slopes of up to 50 degrees and major drainages south of CA-330 and CA-18 leading directly into this community. Smiley Park is on the leading edge of the national forest lands to the south and 36 of the 80 homes here in 2007 were lost during the Slide fire. The entire community of Running Springs lost 180 homes to the Slide fire.[24]

The dominant natural fuels are heavy loads of conifer with a moderately heavy surface fuel load of needle cast. In some areas, there is a heavy shrub understory. The fuel bed is heavy and continuous in most of the community. The national forest lands to the south of CA-330 and CA-18 have heavy loads of natural fuels. Fuels here are primarily timber at the higher elevations changing to shrub dominant (mostly chaparral) at the lower elevations below and south of this community.

Utilities are above ground and there is a complex network of aerial power lines. The community has fire hydrants. The water system is managed by Running Springs Water District. Smiley Park is on its own water system and maintains and tests its own fire hydrants. Other hydrants in this community are tested on a regular basis by the Running Springs Fire Department.[25] The Running Springs Fire Department is a combination paid/paid-call department and maintains two stations in this community. Mutual aid is available from the San Bernardino County Fire Department, CAL FIRE and Arrowbear Lake Fire Department through the California Master Mutual Aid Agreement.

This community attracts large numbers of people from the Los Angeles area for vacations and weekend getaways. This community has an unusually high concentration of summer camps and conference centers. Visitors can easily outnumber residents in the summer months. Camp fires in the forest are a serious potential threat considering the fuel loading and condition resulting from five years of serious drought. Like the rest of the study area, this community is susceptible to powerful Santa Ana winds in the fall and winter.

The Rimwood Ranch subdivision is different from the rest of Running Springs. Lots here are larger, with an average size of five acres. Homes are more modern construction, but still are primarily flammable siding with asphalt shingle roofs. The terrain within this neighborhood is generally flatter; however, slopes and drainages still exist. Fuels are moderately heavy timber loads, but the understory is generally lighter than in other parts of Running Springs. This neighborhood is one way in and out and is surrounded by national forest. Due to these factors, its

position and fire history, this neighborhood has a high fire danger; however, mitigation within this neighborhood should focus on ember protection and structure hardening.

Recommendations

- Pursue funding for a parcel level analysis of this community. The complexity of the area should be examined in detail to maximize the effect of mitigation recommendations. This is a high priority recommendation.
- Thin vegetation for at least 150 feet from the pavement along the south sides of CA-330 and CA-18 where they border the steep slopes and national forest lands to the south to shaded fuelbreak standards. Implement roadside thinning wherever possible along the access roads to homes.
- Thin vegetation for at least 100 feet from the pavement along both sides of CA-330 and CA-18 within this community to shaded fuelbreak standards to protect this important evacuation route.
- Replace any remaining shake siding and roofs on homes and outbuildings with fire resistive materials.
- Work with property owners to provide reflective address markers visible from the road for all homes.
- Work with all property owners, especially non-resident owners, to create at least Zone 1 defensible space treatments and preferably Zone 1 and 2 defensible space treatments for all the homes in the community (see *Defensible Space and General Recommendations*).
- Collaborate with the utility provider and the fire department to maintain above ground power lines in the community free from flammable vegetation underneath.
- Encourage property owners, especially non-resident owners, to pre-plan defense of their home with the fire department.
- Work with summer camps and conference centers to pre-plan their properties with the fire department for structure defense and visitor evacuation.
- Encourage property owners to enclose decks to reduce the possibility of trapping embers. Encourage the replacement of wooden decks and projections with fire resistive materials.
- Continue hydrant testing on an annual basis.

DEFENSIBLE SPACE AND GENERAL RECOMMENDATIONS

The State of California created literature regarding creating defensible space in the different ecosystems that present wildfire hazards in the state. This information is targeted toward protecting homes in the interface. It should be used to supplement the information contained in this report and is included as Appendix A. Some of this information will not be directly applicable to the Mountain Rim communities due to the various ecosystems that are represented; however, this information is valuable and well-reviewed.

In addition to California Public Resource Code 4291, all properties in the Mountain Rim communities must comply with the San Bernardino County Fire Hazard Abatement Ordinance, to achieve defensible space. The complete text of this ordinance in included with this report as Appendix B San Bernardino County Fire Hazard Abatement Ordinance.

Along with the removal of flammable fuels and the creation of non-combustible buffers around the structures, ignition resistant re-vegetation should be considered at least as far as the 100-foot perimeter of the reduced fuels zone (Zones 1 and Zone 2).[26] In areas where it is practical and desirable, replanting with fire-wise native species and practices will provide the following benefits:

- Reduce the ability of invasive and flammable species to return.
- Protect bare soils from erosion.
- Promote natural beauty and ecological stability without sacrificing adequate wildland fire protection.

Examples of fire-wise planting practices would be to space trees widely to interrupt the continuity of aerial fuels, plant low-fuel volume shrubs (usually no greater than 18 inches in height) and integrate decorative rocks and non-combustible natural features into the landscape architecture design. Deep watering trees through the summer /fall or dry winters will keep trees alive and deter bark beetles. Emphasis should be placed on the use of native drought-resistant plants and irrigation systems in newly planted areas. Existing native plants are fire adapted and do not have to be replaced in order to reduce the fire risk. They just have to be maintained at a "natural" fuel level and arrangement. Healthy, well-irrigated plants are less flammable and irrigation systems can be used to reduce the intensity and spread of surface fires. Vegetation within a fire-wise landscape must also be maintained to continue to provide protection from undesirable fire effects. On-going maintenance should include the removal of dead material, weed control, cutting of grasses to six inches or less in height, and tree and shrub pruning as necessary to prevent the buildup of ladder fuels and fuel jackpots that could contribute to spotting during fires.

The single most important recommendation in this report is for all new structures in the study area to be built in accordance with California's Wildland-Urban Interface Code and for existing structures to be fire hardened to the greatest extent practical.
Structure hardening is critically important in areas where the homes were built as vacation cabins on very small lots and house to house transmission could become the primary carrier of fire. This is without a doubt a monumental task considering the age, variable materials and condition of the

homes in this area. The authors and stakeholders of this report recognize the difficulty involved in coordinating the large number of owners, many who do not live in the area full time; however, structure hardening will produce the greatest benefits for the protection of life and the conservation of property from the effects of wildfire. MRFSC and fire departments should assist property owners in obtaining grants to aid with outfitting existing homes with ignition resistant siding and roofs. Further information regarding California's Wildland-Urban Interface Code can be found on this website:http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_codes

The general measures listed below should be noted and practiced through the study area. Some of these recommendations may already be in place on some properties.

1. Remain aware of the current fire danger in one's area.
2. Clean roofs and gutters at least twice a year.
3. Don't store combustibles or firewood under decks or wooden projections.
4. Maintain an irrigated greenbelt around buildings.
5. Maintain and clean spark arresters on any chimneys.
6. Connect and have available a minimum of 50 feet of garden hose near all buildings to extinguish small fires before they spread. For large buildings two or more hoses may be required to provide adequate coverage.
7. Trees, large shrubs and other vegetation along roads and driveways should be thinned as necessary to maintain a minimum of 15 feet of vertical clearance for emergency vehicle access. Ladder fuels (low-lying branches that allow fire to climb from the ground into trees) should be removed to a height of at least eight feet above the ground. This includes both conifers and deciduous trees.
8. Maintain the defensible space around buildings by:
    a. Mowing grass and weeds to a height of six inches or less
    b. Removing any branches overhanging roofs or chimneys.
    c. Remove all trash, debris and cuttings from the defensible space.

For more information, please see Appendix A Creating Defensible Space.

MRFSC Community Outreach Programs and Objectives

MRFSC has identified the following specific actions to improve community awareness and reduce hazards of wildfire. Pursing the planning and funding of these activities is strongly recommended.

Fire Safe Events

- Plan a community event in the spring (May) to promote Wildfire Awareness Week
- Host an annual Pine Cone Festival to reach the public in a festival environment that promotes awareness and support of fire prevention and fire safe communities
- MRFSC participation in other local events and festivals for community outreach
- Increase MRFSC exposure through participation in local community organizations

Annual Community Chipper Days

- Encourage property owners to reduce fuels on their parcels by offering both curbside and drop off chipping between May and October. Grant funding will be critical to initiate and sustain this program

Abatement Assistance

- Work with the county to assist low-income households with compliance
- Educate property owners on the value of compliance to life safety, property conservation and environmental health

House Numbering

- As has already been noted in the *Community Ignitability Discussion* section of this report, all of the communities of the study area would benefit from improvements in address numbering and marker visibility. MRFSC would work with property owners and residents on a neighborhood by neighborhood basis to accomplish this
- Seek a partnership with major home improvement entities such as Home Depot and Lowe's for funding and outreach
- Grant funding will be critical to initiate and sustain this program

Smoke Detectors and CO Alarms

- Every home should have properly placed smoke detectors and CO (Carbon Monoxide) alarms
- MRFSC would work with suppliers for training and donation of units
- Grant funding will be critical to initiate and sustain this program

Publicity, Social Media and Internet

- Maintain a vital website
- Develop and implement a web-based interactive map for all regional CWPPs
- Keep the MRFSC Facebook page updated and informative
- Frequently publish articles and pursue paid advertising to fund this effort
- Publish a “Living With Wildfire” periodical
- Grant funding will be critical to initiate and sustain these programs

Other Educational and Informational Programs

- Gold-spotted Oak Borer Beetle (GSOB) “burn it where you buy it” campaign
- Polyphagous Shot-Hole Borer Beetle awareness and informational program
- Adopt-A-Hydrant program
- Development of a public evacuation map
- Development of pet evacuation handouts
- Develop a HAM radio operator program and expand the current loaner program for new recruits
- Work with the county and MAST to develop an informational low power FM radio station
- Update the CWPP every two years to create a living document
- Update MRFSC goals and objectives every two years

LANDSCAPE SCALE RECOMMENDATIONS

When most people think of a fuelbreak they envision a line usually 10 to 30 feet wide where all vegetation has been removed to mineral soil (Figure 13); however, the concept of a fuelbreak can describe any area where fuels have been manipulated to strategically reduce the spread and intensity of wildfire. Since the concept of a fuelbreak is more nebulous than the specific definitions of "fireline" and "firebreak" as used by wildland firefighters, the effectiveness of fuelbreaks has been the subject of debate among fire scientists and forest managers for many years. When a fuelbreak is discussed in this report the reference is to a "shaded fuelbreak" which is applicable to forested areas such as the study area. Unlike firebreaks, which imply the removal of all vegetation down to mineral soil, shaded fuelbreaks are created by altering the surface fuels, increasing the height to the base of the live crown and opening the canopy by removing trees.[27] It is important to note the purpose of a fuelbreak is not to stop a fire, but to give firefighters a higher probability of successfully attacking the fire.[28] Once installed, fuelbreaks require regular maintenance to ensure they will perform the task of altering the behavior of fire entering the treated area.

There is much discussion as to how far fuels modifications must extend for fuelbreaks to be effective. It is generally acknowledged that 200 feet is a minimum width for a shaded fuelbreak to be operationally safe for firefighters. In this report when distances are given they are intended as minimums. Depending on the fuels and topography larger treatment areas may be necessary. The recommendations in this report are general in nature and the specific design of any fuelbreak should be referred to qualified experts familiar with both the vegetation and fire behavior of the area.

Appendix A of this report discusses defensible space extensively and specifically. For the purposes of this report when we use the term "linked defensible space" it is meant to refer to extending Zone 2 (30 to 100 feet from the structure, also known as the "reduced fuel zone") and Zone 3 (forest health maintenance extending from 100 feet from the structure to the property line, where such distances exist) treatments (depending on parcel size) so they overlap between parcels forming a continuous buffer of modified fuels around a perimeter.

Figure 13 Firebreak in Mendocino County

Green Valley Lake Linked Defensible Space

The project area includes the privately-owned parcels adjacent to the national forest lands surrounding the perimeter of this community. It is approximated in yellow in Figure 14; however, a parcel level analysis should be conducted to determine the appropriate project dimensions.

Recommendations

Work with property owners adjacent to national forest lands to create defensible space to their property lines. If this could be accomplished MRFSC could request fuels reduction on forest lands under the Good Neighbor Authority that could be used to create a shaded fuelbreak bordering the community.

Green Valley Lake Access Road Fuels Reduction

The project area that has been selected for fuels treatment follows the primary access for this community and is highlighted in green in Figure 14**.** The project also includes the portion of Crab Flats Road immediately to the west of this community to provide a fuelbreak for fires moving east toward the community.

Recommendations

Fuels reduction to shaded fuelbreak standards should be conducted to a minimum of 100 feet from each side of the road to provide protection to the only access into the community. This project also serves as a fuelbreak to slow the spread and reduce the intensity of ignitions moving toward the northern portion of Running Springs during Santa Ana wind events. At the end of the Crab Flats Road portion of this project consider creating a safety or deployment zone for firefighters at the junction of the dirt roads intersecting Crab Flats Road from the east. With the proper fuels treatment, this junction should serve as an anchor point for the fuelbreak.

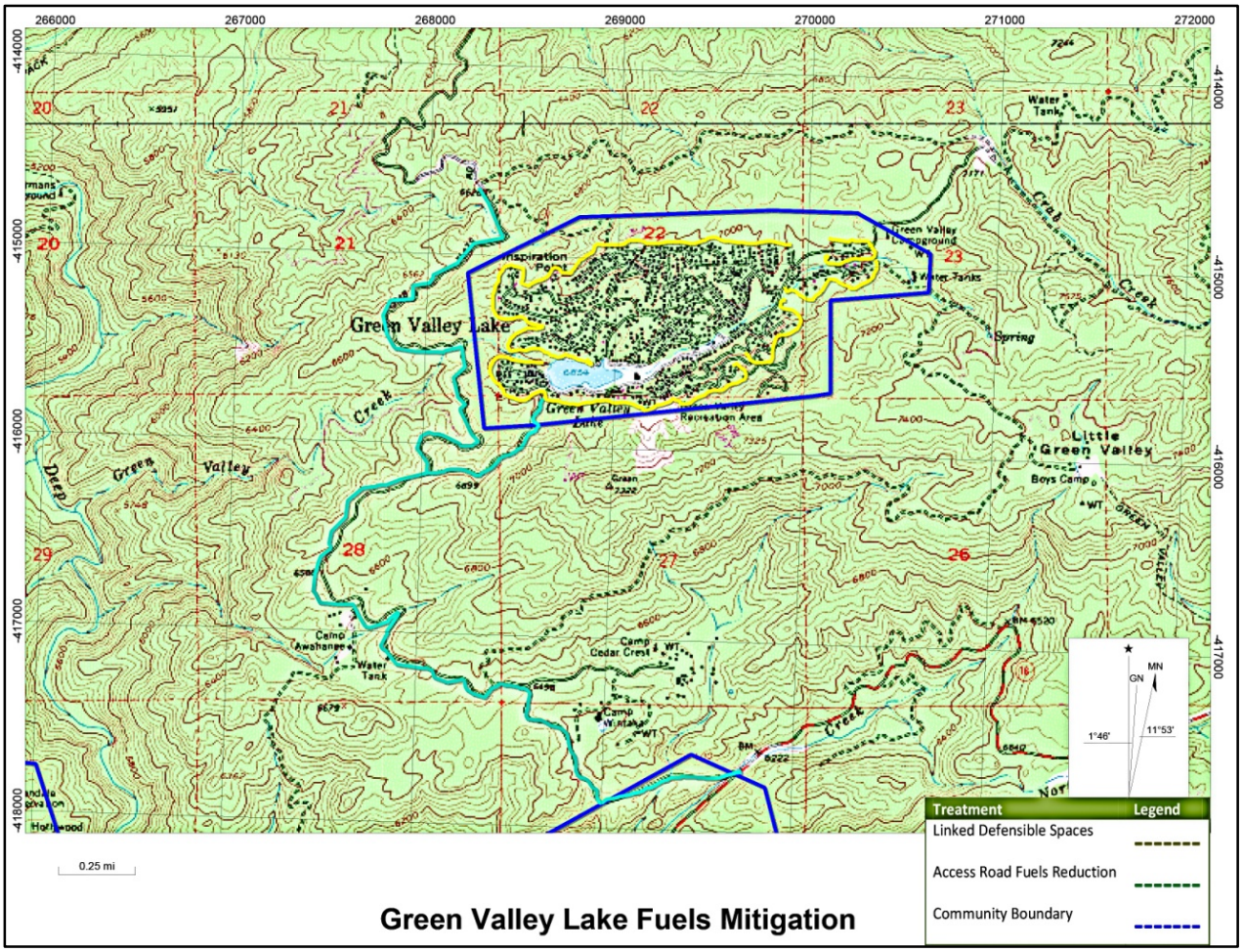


Figure 14 Green Valley Lake Landscape Fuels Mitigation

Arrowbear Lake Linked Defensible Space

The project area includes the privately-owned parcels adjacent to the national forest lands surrounding the perimeter of this community. It is approximated in yellow in Figure 15; however, a parcel level analysis should be conducted to determine the appropriate project dimensions.

Recommendations

Work with property owners adjacent to national forest lands to create defensible space to their property lines. If this could be accomplished MRFSC could request fuels reduction on forest lands under the Good Neighbor Authority that could be used to create a shaded fuelbreak bordering the community.

Arrowbear Lake Access Road Fuels Reduction

The project area focuses treatments along CA-18 which divides the north and south portions of this community. It is anchored on the south end at the entrance road to Camp Conifer (as labeled on the USGS 7.5-minute topo) and on the north at Arrowbear Lake. The project dimensions are highlighted in green in Figure 15**.** This project is designed to protect access through the community.

Recommendations

Fuels reduction to shaded fuelbreak standards should be conducted to a minimum of 100 feet from each side of the road to provide protection to the access through this community. For this project to be successful cooperation with the private landowners adjacent to CA-18 will be necessary. This project could be used as a cooperative effort to create defensible space on those parcels. Consider creating a safety zone for firefighters at the Arrowbear Lake end of this project. A deployment zone should also be considered to anchor the southern end of this fuelbreak.

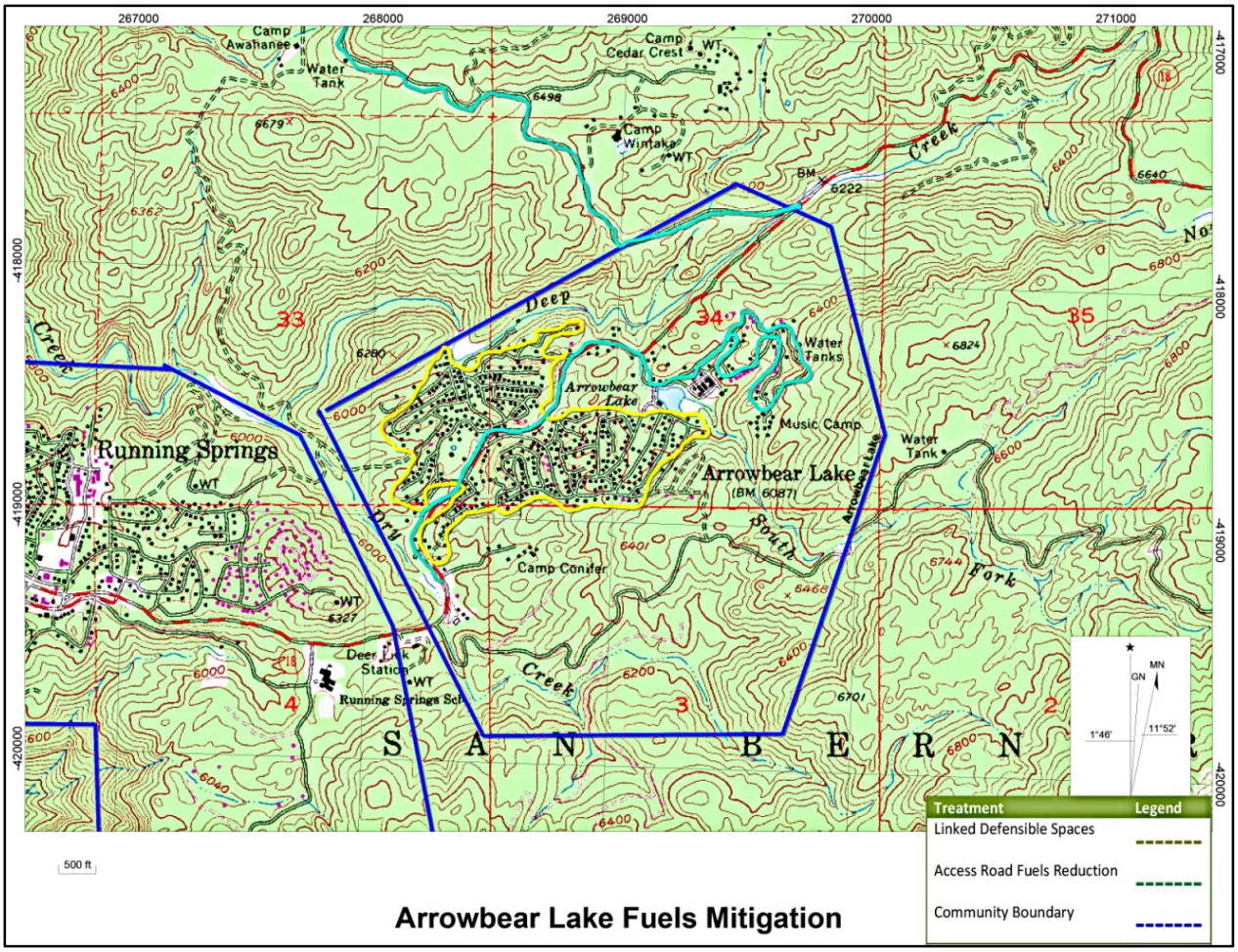


Figure 15 Arrowbear Lake Fuels Mitigation

Smiley Park Linked Defensible Space

Most of the homes on the southern edge of Smiley Park already have adequate defensible space thanks to previous BLM fuel reduction grants and an NRCS fuels reduction grant, however there are some parcels, particularly some undeveloped parcels, where native fuels have been unaltered since the 2007 Slide fire. The Slide fire removed a significant portion of the heavy fuels in this area; therefore, most of the treatment that would be required on these parcels would involve mowing grasses to a height of six inches or less and thinning native shrubs.

Recommendations

For all parcels that do not already have adequate defensible space, modify the vegetation in at least Zone 1 and Zone 2 to defensible space standards (see *Defensible Space and General Recommendations*). For undeveloped parcels Zone 1 should be considered to extend from the property line closest to the access road toward the opposite property line for 30 feet and Zone 2 should extend from the end of Zone 1 to a distance of 100 feet or to the property line if that distance is less.

Smiley Park has a good fuelbreak to the south of the properties (Figure 16) and CAL FIRE will be planting some trees in the spring of 2017 to try to convert this into a shaded fuelbreak. Linked

defensible spaces combined with this fuelbreak will aid significantly in protecting life and property from ignitions moving up the steep slopes from the south. There is also a helicopter landing zone in Smiley Park large enough to accommodate Type 1 ships that also serves as an anchor for the west end of the fuelbreak. The area in and around this landing zone, as well as the fuelbreak, should be reviewed for maintenance cutting on an annual basis. A planned extension to the existing fuelbreak and the installation of water tanks at the terminus is a priority (Figure 17). Grant funding should be researched to aid the HOA with the completion of this important project. Currently, the HOA is working with NRCS and CAL FIRE to maintain this fuelbreak.

Figure 16 Smiley Park Fuelbreak (view from LZ)

Figure 17 Planned terminus of the Smiley Park fuelbreak with water tanks

Crestline Riparian Corridor Restoration

The downtown area of Crestline between Pioneer Camp Road and Lake Drive has a perennial stream which encourages dense growth of riparian understory and in some areas larger shrubs and trees. There are over two hundred homes scattered throughout this area including some manufactured homes. Areas of dense vegetation that currently exist are known for camps of homeless individuals which adds to the risk of ignitions occurring from concealed camp fires and smoking near vegetation.

Zoning changes included in the Community Plan Update propose allowing for a more flexible mix of residential and commercial uses for this area. Also proposed is a Mountain Village Overlay to guide development and uses. The overlay proposed will allow businesses to have common open areas as well as shared parking, thus providing for some larger areas of defensible space around the structures and encourages limited fencing around multiple parcels in lieu of the current fencing around single parcels. This change would improve operational safety for firefighters in the event of a wildland fire in this area.

It has also been suggested the stream corridor be made into a “River Walk” type area with a walking trail or sidewalk. This plan calls for the restoration of the stream bed to a more natural and open ecosystem. Encouraging this approach of creating open areas and access ways along the stream corridor and restoring it to a more open and natural ecology would improve firefighter and resident safety through this densely developed area. Creation of open areas and restoration would also improve visibility and security for the residents. This effort should be supported and grant funding pursued to ensure the execution of the stream corridor restoration.

ACCESS/EGRESS ROUTES

The main access and evacuation routes into and from the communities of the study area are shown in Figure 18**.** For Crestline, the most direct routes are to use either CA-18 east to San Bernardino or CA-138 north to I-15. For Lake Arrowhead use either CA-18 west to San Bernardino or CA-18 east to CA-330 south to San Bernardino. For Running Springs the most direct route is to use CA-330 to San Bernardino. For Green Valley Lake and Arrowbear Lake use CA-18 either west to CA-330 and San Bernardino or east to Big Bear. Depending on conditions and the direction of the fire CA-138, CA-189 and CA-173 within and around the Lake Arrowhead area could also be useful alternatives to the most direct routes. CA-173, between Lake Arrowhead and Hesperia, is not a viable evacuation route and is currently closed to the public. If the status of this unpaved state highway changes, its relevancy for evacuation should be re-evaluated.

In the past evacuation of residents during major fires has been generally smooth and efficient; however as noted earlier in this report visitors can greatly outnumber residents especially during holidays and weekends in the summer. The recommendations below are suggested to enhance safe evacuation for both residents and guests as well as improve access safety for firefighting resources.

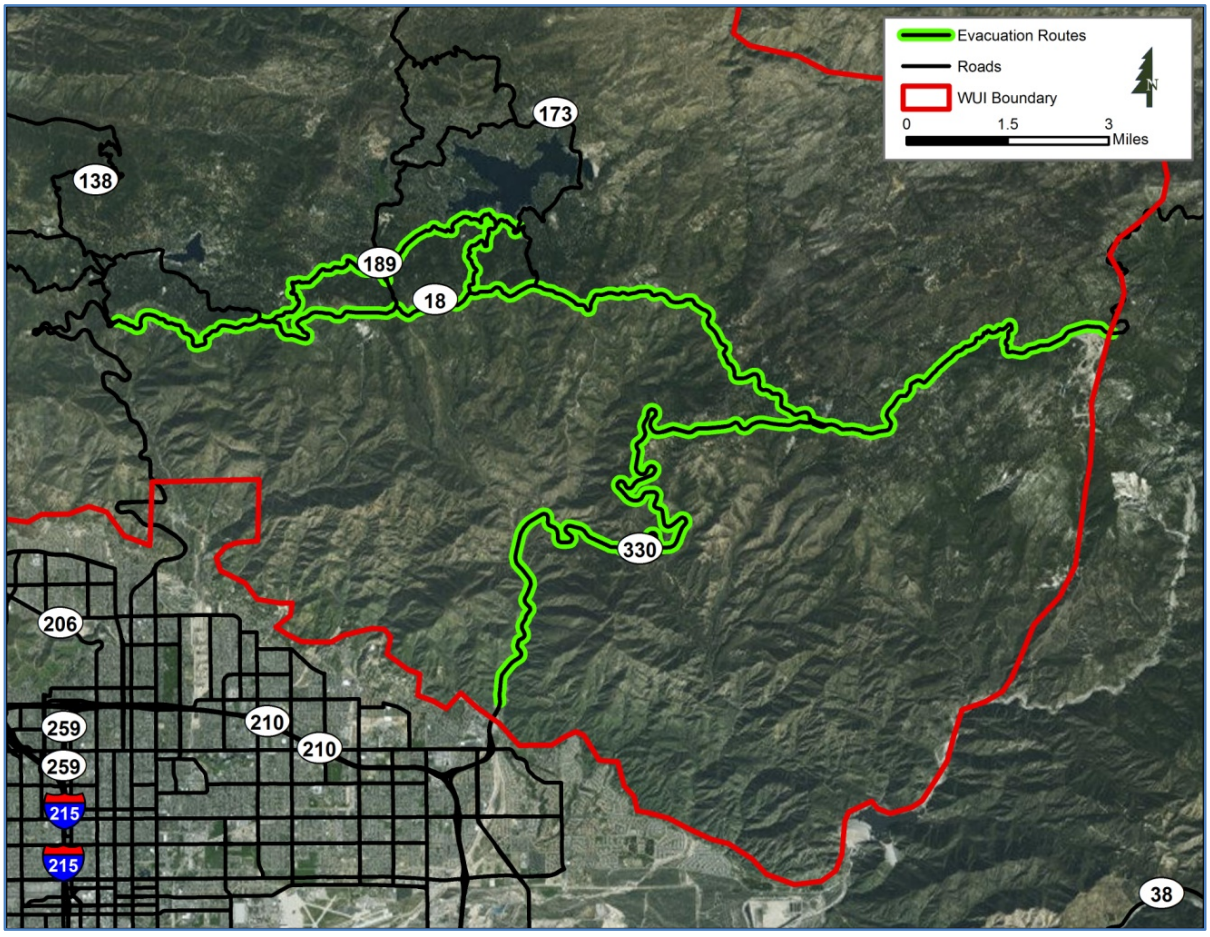


Figure 18 Access and evacuation routes

Recommendations

Fuels reduction along major access routes through the communities has already been discussed both in the *Landscape Scale Recommendations* and the *Community Ignitability Discussion* sections of this report. Please see those sections for details.

In all of the communities of the study area missing or inadequate address markers is an issue. Many homes do not have an address marker visible from the street and those that do are of all types (some homemade) with no particular order or system. While some residents may consider reflective address signage to be unattractive, it is essential for quick and effective response. The value to responders, especially at night and under difficult conditions, is not to be underestimated. This is especially true during large wildland fires where poor addressing will create an additional challenge for outside responders who do not have local knowledge and training on local access. Reflective address markers for all homes and businesses in the study area is a high priority. Work with property owners and state, county and local fire departments to create and implement a consistent system of reflective address markers. See the *MRFSC Community Outreach Programs and Objectives* section of this report for additional recommendations.

Although local residents are very familiar with access and egress routes into their communities, visitors can easily become lost especially in areas with a high density of side streets and twisty mountain roads. Consider the use of color and shape coded routes leading from the major highways in and out of the communities to easily identified landmarks such as Lake Arrowhead, Lake Gregory, Rim of the World High School, etc. These routes should serve the dual purpose of helping visitors find major landmarks in the study area as well as facilitating evacuation. The signs should not be marked as evacuation routes. Instead directions could be given something like this, “Visitors in the Lake Arrowhead area should follow the yellow diamond signs to CA-330 to return to San Bernardino.” The signs should also show the destination of the route. Avoid the use of red or green as those colors could cause confusion with other road signs. Simple, solid-colored geometric figures such as circles, triangles, diamonds and stars should be effective and attention getting (Figure 19**)**.

Figure 19 Example of possible color and shape route signage

Create mobile device friendly PDF maps showing the routes from conference centers and summer camps to town centers and major gathering places where visitors could connect with the color/shape signed routes described above.

Print public education brochures that show the routes mentioned above. Distribute these brochures to hotels, camps and conference centers in the area and encourage their use for both emergency and non-emergency purposes. Ground truthing should be done initially and periodically to ensure the accuracy of these brochures as well as the PDF maps.

PLANNING RECOMMENDATIONS

This CWPP serves as an overview of the hazards and risks of wildland fire in the communities of the study area, however this is a very complex area and finer lever analysis, such as enhanced fire behavior and individual community level analysis may lead to more specific tactical action items and is therefore recommended.

Run time to arrival scenarios for first responders in all the communities is also recommended to determine if further recommendations for responders should be considered.

Responder pre-attack planning for all summer camps and conference centers that do not already have a plan in place is recommended. These plans should be reviewed every two to five years to ensure they are still relevant and accurate.

Shelter in Place and Community Meeting Centers

There are several ways of protecting the public from an advancing wildfire. The preferred method is evacuation and involves relocation of the threatened population to a safer area. Another possibility is to instruct people to remain inside their homes or public buildings until the danger passes. This concept is controversial regarding wildfire in the United States, but not for hazardous materials incident response where time, hazards, and sheer logistics often make evacuation impossible. This concept is the dominant modality for public protection from wildfires in Australia where fast moving, non-persistent fires in light fuels make evacuation impractical. The success of this tactic depends on a detailed preplan that takes into account the construction type and materials of the building used, topography, depth and type of the fuel profile, as well as current and expected weather and fire behavior.

In communities where shelter-in-place tactics are not possible and escape routes are easily compromised, potential safety zones should be identified. Areas that are to be considered should be large enough to hold all of the intended residents and still represent a minimum buffer of 1.5 times the average fuel height. For safety zones to be effective, trigger points must be established at which fire resources would prepare the area and notify residents.

As previously mentioned, evacuations in this area have been very effective and the preferred method of protecting the lives of citizens. This report also highlights, however the growing number of visitors to camps and conference centers as well as absentee homeowners who may only visit the area a few times a year (usually in the summer when the fire danger is at its highest) and may be as unfamiliar with alternatives to the major roads in and out of the communities as vacationers. Due to these factors preplanning of community meeting centers that could be used as staging areas for coordinating evacuation, dissemination of information regarding the fire and as contingency citizen safety zones in the event evacuation becomes impossible or too hazardous is also recommended. These facilities could double as safety zones and staging areas for firefighting resources. The San Moritz Lodge, the abandoned Mountain Education Center and the Rim of the World High School are a few examples of properties that may be suitable for this purpose (Figure 20 and Figure 21).

Figure 20 The Mountain Education Center


Figure 21 The San Moritz Lodge property

Areas of Special Interest

The study area has one area of special interest; the 500 acre Longpoint Ranch (Figure 22). The ranch parcels are on both sides of CA-330; however development is primarily east and south of CA-330. This is a working ranch which is one of the sources of Arrowhead Mountain Spring Water. The ranch is positioned at the top of steep slopes and drainages extending from the edge of San Bernardino up to the study area (Figure 23). The most prominent of these is the Little Mill Creek drainage. There are four homes on the ranch, stables and other structures. The 2007 Slide fire burned through the ranch. Considering its key strategic position, wildfire mitigation planning on the ranch land is critical not only to successful protection of the ranch but also to homes in Running Springs immediately to the north.

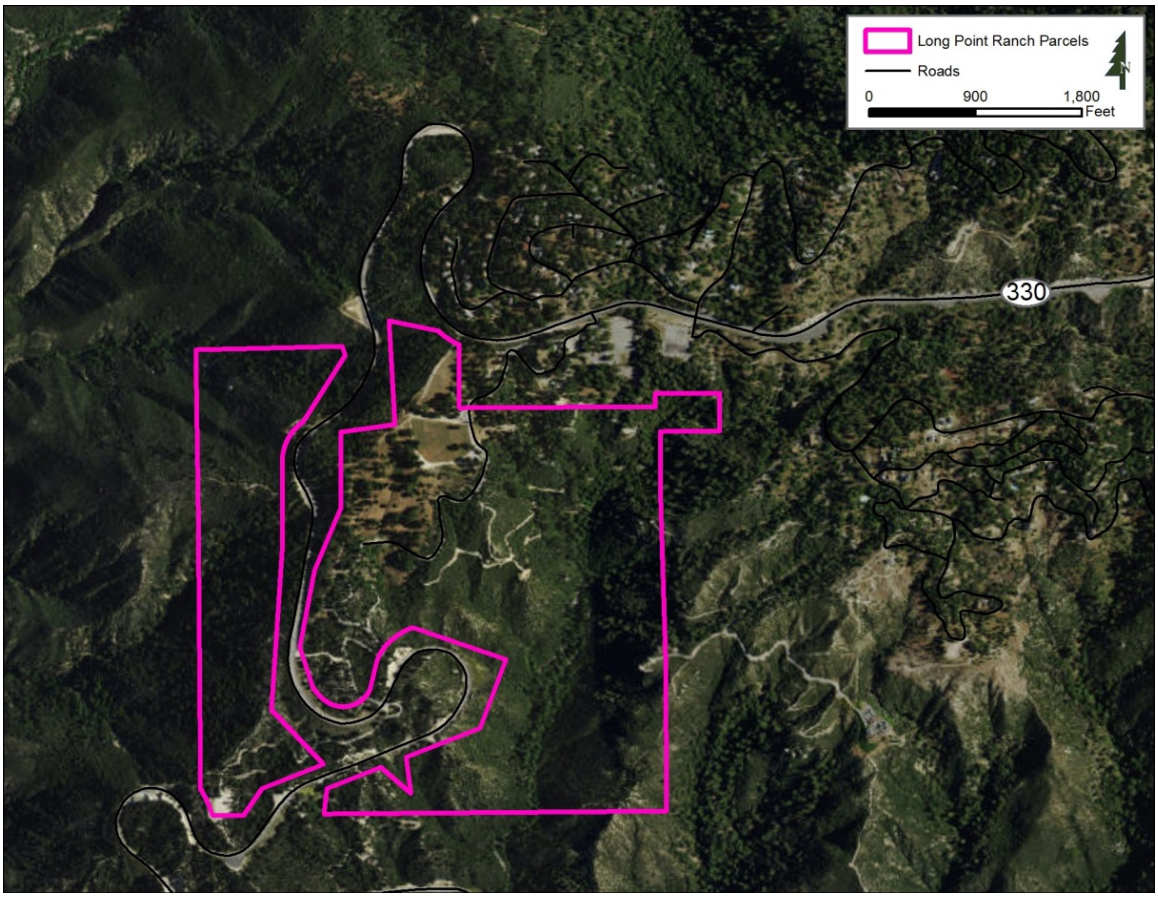


Figure 22 The Longpoint Ranch


Figure 23 Canyons below the Longpoint Ranch

Recommendations

The owner of the ranch developed a fuelbreak on the ranch property after the Slide fire. The fuelbreak is anchored at the ranch road on the north end and at Rocky Point on the south end. It is visible in Figure 24. MRFSC and fire suppression resources should work with the property owner to keep this fuelbreak maintained.

Collaborate with the property owner to treat fuels along the existing ranch roads to shaded fuelbreak standards for a distance of at least 150 feet downhill and 70 feet uphill from roads that traverse the ranch property above steep slopes.

Consider the possibility of locating a helicopter landing zone similar to the one in Smiley Park on the ranch property for rapid deployment of firefighting resources.

Investigate the possibility of locating a cistern or tanks for firefighter use on the ranch property. There are some clearings on the ranch property that may be large enough to be maintained as safety zones or at least deployment zones for firefighters. Consider working with the ranch owner to pre-plan and maintain these areas.

Figure 24 Longpoint Ranch fuelbreak

GRANT RESOURCES

One of the biggest obstacles to overcome when trying to implement CWPP recommendations and wildfire mitigation projects is funding. A certified CWPP opens a multitude of funding sources to complete work outlined in the plan. For many mitigation projects, federal, state and county funds are available to begin treatments. The list below is not inclusive, but rather serves as a starting point for the most commonly available sources of funding and outreach.

Federal Emergency Management Agency (FEMA)

- **Assistance to Firefighters Grant Program**
  - Purpose: to improve firefighting operations, purchase firefighting vehicles, equipment and personal protective equipment; fund fire prevention programs; and establish wellness and fitness programs.
  - Necessary information includes a DUNS number, Tax ID number and Central Contractor Registration
  - **https://www.fema.gov/welcome-assistance-firefighters-grant-program**
- **SAFER: Staffing for Adequate Fire and Emergency Response**
  - Purpose: to provide funding directly to fire departments and volunteer firefighter interest organizations in order to help them increase the number of trained, "front line" firefighters available in their communities. The goal of SAFER is to enhance the ability of local fire departments to comply with staffing, response and operational standards established by NFPA and OSHA.
  - **https://www.fema.gov/staffing-adequate-fire-emergency-response-grants**
- **Fire Prevention and Safety Grants (FP&S)**
  - Purpose: FP&S Grants are part of the Assistance to Firefighters Grants and are under the purview of the Grant Programs Directorate in FEMA. Their purpose is to support projects that enhance the safety of the public and firefighters from fire and related hazards.
  - **https://www.fema.gov/fire-prevention-safety-grants**
- **Hazard Mitigation Assistance Grant Program (HMA)**
  - Purpose: to provide grants to state and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of HMA is to reduce the loss of life and property due to natural disasters and enable mitigation measures to be implemented during the immediate recovery from a disaster.
  - **https://www.fema.gov/media-library-data/1441133724295-0933f57e7ad4618d89debd1ddc6562d3/FEMA_HMA_Grants_4pg_2015_508.pdf**

- **Pre-Disaster Mitigation Grant Program (PDM)**
  - Purpose: to provide funds to states, territories, Tribal governments, communities, and universities for hazard-mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces the overall risks to the population and structures.
  - **https://www.fema.gov/pre-disaster-mitigation-grant-program**

CAL FIRE grants

- **SRA Fire Prevention Fee Grant (SRAFPF)**

  Purpose: provides funding for projects related to fuel (vegetation) hazard reduction, fire prevention education and training, and fire prevention planning. Projects funded by the SRAFPF will reduce the risk of fire ignition and spread in and adjacent to communities, educate owners of habitable structures about wildfire risks, or allow for strategic, long-term planning to reduce the risk of wildfire to communities in the SRA throughout the State
- **California Forest Improvement Program (CFIP)**
  Purpose: encourage private and public investment in, and improved management of, California forest lands and resources. This focus is to ensure adequate high quality timber supplies, related employment and other economic benefits, and the protection, maintenance, and enhancement of a productive and stable forest resource system for the benefit of present and future generations.

- **http://www.fire.ca.gov/grants**

Natural Resources Conservation Grants

- **Environmental Quality Incentives Program (EQIP)**

  Purpose: provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland. EQIP may also help producers meet Federal, State, Tribal, and local environmental regulations.

Firewise Communities

- Purpose: a multi-agency organization designed to increase education of homeowners, community leaders, developers, and others regarding the Wildland-Urban Interface and the actions they can take to reduce fire risk to protect lives, property and ecosystems.
- **http://www.firewise.org**

National Volunteer Fire Council

- Purpose: to support volunteer fire protection districts. Includes both federal and non-federal funding options and grant writing help.

- **http://www.nvfc.org/**

National Resources Conservation Service Emergency Watershed Protection Program

- Purpose: to undertake emergency measures including the purchase of flood plain easements for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed.
- **https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ewp/**

USFS Cooperative Forestry Assistance

- Purpose: to assist in the advancement of forest resources management, the control of insects and diseases affecting trees and forests, the improvement and maintenance of fish and wildlife habitat, and the planning and conduct of urban and community forestry programs.
- **http://www.fs.fed.us/cooperativeforestry/programs/loa/**

REFERENCES/CITATIONS

[1] Tetley, Rhea-Frances (2005). Lake Arrowhead. Images of America. Arcadia Publishing. ISBN 0-7385-2918-4., P.41.
[2] http://www.sbdcnet.org/small-business-research-reports/bottled-water-industry
[3] http://snow-valley.com/about_us.html
[4] https://en.wikipedia.org/wiki/San_Bernardino_Mountains
[5] Ibid
[6] https://en.wikipedia.org/wiki/California_Aqueduct
[7] https://en.wikipedia.org/wiki/Santa_Ana_River
[8] http://www.fire.ca.gov/fire_prevention/fhsz_maps_sanbernardinosw
[9] https://www.ncdc.noaa.gov/sotc/drought/201607#det-reg
[10] Wachter, Brent. "Weather and climatology: Evaluating large scale trends in weather, fuels, and fire occurrence." National Advanced Fire Resource Institute, NWCG S-495. Tucson. 15 April 2010.
[11] http://frap.cdf.ca.gov/data/frapgisdata/select.aspx
[12] http://calfire.ca.gov/communications/downloads/fact_sheets/CoopResponse.pdf
[13] http://www.sbcounty.gov/Uploads/SBCFire/content/pdf/Mutual-Aid-Manual-with-Zone11.pdf
[14] Ibid
[15] https://www.fema.gov/welcome-assistance-firefighters-grant-program
[16] White, C. "Community Wildfire Hazard Rating" from Wildfire Hazard Mitigation and Response Plan, Colorado State Forest Service, 1986. Revised 2006, Ft. Collins, CO.
[17] http://www.sbsun.com/general-news/20140308/home-burglary-soars-350-percent-in-green-valley-lake
[18] Ibid
[19] https://www.trulia.com/real_estate/Arrowbear_Lake-California/community-info/
[20] http://www.arrowbearwater.org/about-us-1.html
[21] http://www.city-data.com/housing/houses-Crestline-California.html
[22] http://www.clawa.org/ssl/docs/agencyhistory/agencyhistory.pdf
[23] http://www.city-data.com/housing/houses-Running-Springs-California.html
[24] http://www.arrowbearwater.org/hmp.html
[25] http://www.runningspringswaterdistrict.com/
[26] Zone 1 extends from the structure out to 30 feet and Zone 2 extends from 30 feet from the structure to 100 feet or the property line if that distance is less than 100 feet.
[27] James K. Agee, Benii Bahro, Mark A. Finney, Philip N. Omi, David B. Sapsis, Carl N. Skinner, Jan W. van Wagtendonk, and C. Philli Weatherspoon, "The Use of Fuelbreaks in Landscape Fire Management", http://www.qlg.org/pub/miscdoc/agee.htm
[28] Ibid

Appendix A Creating Defensible Space

Purpose

Throughout this report, the focus has been on the importance and effectiveness of creating and maintaining defensible space. This appendix contains information produced by the state of California focused on creating defensible space in the different ecosystems that pose wildfire hazards in the state. This information should be used to supplement the information contained within the body of the report. There will be some crossover of information and techniques regarding how to protect homes from wildfire. Some of the information in this appendix will not be directly applicable to communities of the Mountain Rim WUI due to various ecosystems addressed by this literature and some of the specific challenges related to these communities. This information, however, is valuable and well-reviewed.

General Guidelines for Creating Defensible Space

State Board of Forestry and Fire Protection (BOF)
California Department of Forestry and Fire Protection

Adopted by BOF on February 8, 2006
Approved by Office of Administrative Law on May 8th, 2006

Contents

A. Purpose of Guidelines

Effective defensible space

Recent changes to Public Resources Code (PRC) 4291 expand the defensible space clearance requirement maintained around buildings and structures from 30 feet to a distance of 100 feet. These guidelines are intended to provide property owners with examples of fuel modification measures that can be used to create an area around buildings or structures to create defensible space. A defensible space perimeter around buildings and structures provide firefighters a working environment that allows them to protect buildings and structures from encroaching wildfires as well as minimizing the chance that a structure fire will escape to the surrounding wildland. These guidelines apply to any person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material, and located within a State Responsibility Area.

The vegetation surrounding a building or structure is fuel for a fire. Even the building or structure itself is considered fuel. Research and experience have shown that fuel reduction around a building or structure increases the probability of it surviving a wildfire. Good defensible space allows firefighters to protect and save buildings or structures safely without facing unacceptable risk to their lives. Fuel reduction through vegetation management is the key to creating good defensible space.

Terrain, climate conditions and vegetation interact to affect fire behavior and fuel reduction standards. The diversity of California's geography also influences fire behavior and fuel reduction standards as well. While fuel reduction standards will vary throughout the State, there are some common practices that guide fuel modification treatments to ensure creation of adequate defensible space:

- Properties with greater fire hazards will require more clearing. Clearing requirements will be greater for those lands with steeper terrain, larger and denser fuels, fuels that are highly volatile, and in locations subject to frequent fires.

- Creation of defensible space through vegetation management usually means reducing the amount of fuel around the building or structure, providing separation between fuels, and or reshaping retained fuels by trimming. Defensible space can be created removing dead vegetation, separating fuels, and pruning lower limbs.

- In all cases, fuel reduction means arranging the tree, shrubs and other fuels sources in a way that makes it difficult for fire to transfer from one fuel source to another. It does not mean cutting down all trees and shrubs, or creating a bare ring of earth across the property.

- A homeowner's clearing responsibility is limited to 100 feet away from his or her building or structure or to the property line, which ever is less, and limited to their land. While individual property owners are not required to clear beyond 100 feet, groups of property owners are encouraged to extend clearances beyond the 100 foot requirement in order to create community-wide defensible spaces.

- Homeowners who do fuel reduction activities that remove or dispose of vegetation are required to comply with all federal, state or local environmental protection laws and obtain permits when necessary. Environmental protection laws include, but are not limited to, threatened and endangered species, water quality, air quality, and cultural/archeological resources. For example, trees removed for fuel reduction that are used for commercial purposes require permits from the

California Department of Forestry and Fire Protection. Also, many counties and towns require tree removal permits when cutting trees over a specified size. Contact your local resource or planning agency officials to ensure compliance.

The methods used to manage fuel can be important in the safe creation of defensible space. Care should be taken with the use of equipment when creating your defensible space zone. Internal combustion engines must have an approved spark arresters and metal cutting blades (lawn mowers or weed trimmers) should be used with caution to prevent starting fires during periods of high fire danger. A metal blade striking a rock can create a spark and start a fire, a common cause of fires during summertime.

Vegetation removal can also cause soil disturbance, soil erosion, regrowth of new vegetation, and introduce non-native invasive plants. Always keep soil disturbance to a minimum, especially on steep slopes. Erosion control techniques such as minimizing use of heavy equipment, avoiding stream or gully crossings, using mobile equipment during dry conditions, and covering exposed disturbed soil areas will help reduce soil erosion and plant regrowth.

Areas near water (riparian areas), such as streams or ponds, are a particular concern for protection of water quality. To help protect water quality in riparian areas, avoid removing vegetation associated with water, avoid using heavy equipment, and do not clear vegetation to bare mineral soil.

B. Definitions

Defensible space: The area within the perimeter of a parcel where basic wildfire protection practices are implemented, providing the key point of defense from an approaching wildfire or escaping structure fire. The area is characterized by the establishment and maintenance of emergency vehicle access, emergency water reserves, street names and building identification, and fuel modification measures.

Aerial fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush. Examples include trees and large bushes.

Building or structure: Any structure used for support or shelter of any use or occupancy.

Flammable and combustible vegetation: Fuel as defined in these guidelines.

Fuel Vegetative material, live or dead, which is combustible during normal summer weather. For the purposes of these guidelines, it does not include fences, decks, woodpiles, trash, etc.

Homeowner: Any person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material, and located within a State Responsibility Area.

Ladder Fuels: Fuels that can carry a fire vertically between or within a fuel type.

Reduced Fuel Zone: The area that extends out from 30 to 100 feet away from the building or structure (or to the property line, whichever is nearer to the building or structure).

Surface fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branches and downed logs.

C. Fuel Treatment Guidelines

The following fuel treatment guidelines comply with the requirements of 14 CCR 1299 and PRC 4291. **All persons using these guidelines to comply with CCR 1299 and PRC 4291 shall implement General Guidelines 1., 2., 3., and either 4a or 4b., as described below.**

General Guidelines:

1. Maintain a firebreak by removing and clearing away all flammable vegetation and other combustible growth within 30 feet of each building or structure, with certain exceptions pursuant to PRC §4291(a). Single specimens of trees or other vegetation may be retained provided they are well-spaced, well-pruned, and create a condition that avoids spread of fire to other vegetation or to a building or structure.

2. Dead and dying woody surface fuels and aerial fuels within the Reduced Fuel Zone shall be removed. Loose surface litter, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches, shall be permitted to a depth of 3 inches. This guideline is primarily intended to eliminate trees, bushes, shrubs and surface debris that are completely dead or with substantial amounts of dead branches or leaves/needles that would readily burn.

3. Down logs or stumps anywhere within 100 feet from the building or structure, when embedded in the soil, may be retained when isolated from other vegetation. Occasional (approximately one per acre) standing dead trees (snags) that are well-space from other vegetation and which will not fall on buildings or structures or on roadways/driveways may be retained.

4. Within the Reduced Fuel Zone, one of the following fuel treatments (4a. or 4b.) shall be implemented. Properties with greater fire hazards will require greater clearing treatments. Combinations of the methods may be acceptable under §1299(c) as long as the intent of these guidelines is met.

4a. Reduced Fuel Zone: Fuel Separation

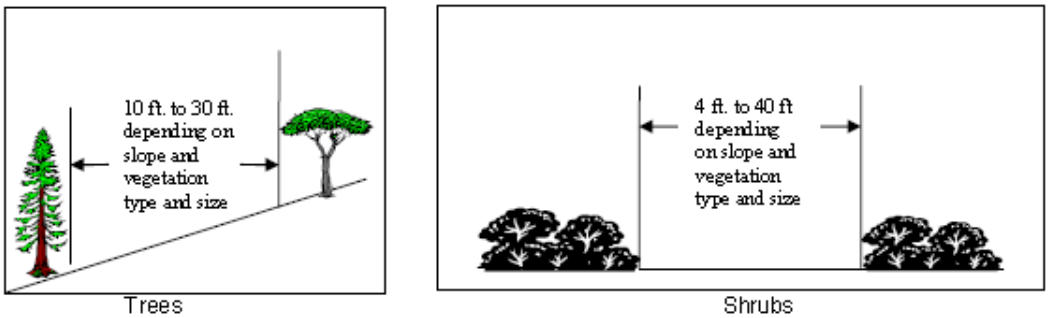
In conjunction with General Guidelines 1., 2., and 3., above, minimum clearance between fuels surrounding each building or structure will range from 4 feet to 40 feet in all directions, both horizontally and vertically.

Clearance distances between vegetation will depend on the slope, vegetation size, vegetation type (brush, grass, trees), and other fuel characteristics (fuel compaction, chemical content etc.). Properties with greater fire hazards will require greater separation between fuels. For example, properties on steep slopes having large sized vegetation will require greater spacing between individual trees and bushes (see Plant Spacing Guidelines and Case Examples below). Groups of vegetation (numerous plants growing together less than 10 feet in total foliage width) may be treated as a single plant. For example, three individual manzanita plants growing together with a total foliage width of eight feet can be "grouped" and considered as one plant and spaced according to the Plant Spacing Guidelines in this document.

Grass generally should not exceed 4 inches in height. However, homeowners may keep grass and other forbs less than 18 inches in height above the ground when these grasses are isolated from other fuels or where necessary to stabilize the soil and prevent erosion.

Clearance requirements include:

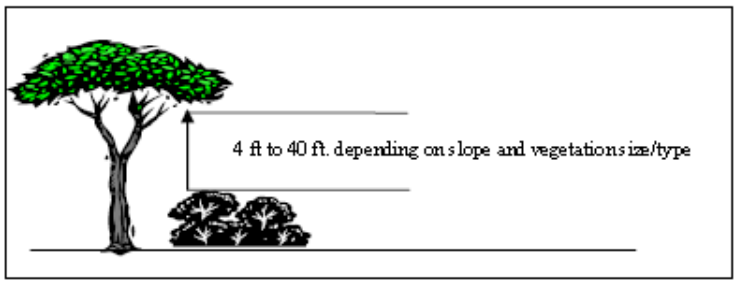
- Horizontal clearance between aerial fuels, such as the outside edge of the tree crowns or high brush. Horizontal clearance helps stop the spread of fire from one fuel to the next.



Trees Shrubs

Horizontal clearance between aerial fuels

- Vertical clearance between lower limbs of aerial fuels and the nearest surface fuels and grass/weeds. Vertical clearance removes *ladder fuels* and helps prevent a fire from moving from the shorter fuels to the taller fuels.



Vertical clearance between aerial fuels

Effective vertical and horizontal fuel separation
Photo Courtesy Plumas Fire Safe Council.

Plant Spacing Guidelines Guidelines are designed to break the continuity of fuels and be used as a "rule of thumb" for achieving compliance with Regulation 14 CCR 1299.		
Trees	**Minimum horizontal space from edge of one tree canopy to the edge of the next**	
	Slope	Spacing
	0% to 20 %	10 feet
	20% to 40%	20 feet
	Greater than 40%	30 feet
Shrubs	**Minimum horizontal space between edges of shrub**	
	Slope	Spacing
	0% to 20 %	2 times the height of the shrub
	20% to 40%	4 times the height of the shrub
	Greater than 40%	6 times the height of the shrub
Vertical Space	**Minimum vertical space between top of shrub and bottom of lower tree branches:** 3 times the height of the shrub	

Adapted from: Gilmer, M. 1994. California Wildfire Landscaping

Case Example of Fuel Separation: Sierra Nevada conifer forests

Conifer forests intermixed with rural housing present a hazardous fire situation. Dense vegetation, long fire seasons, and ample ignition sources related to human access and lightning, makes this home vulnerable to wildfires. This home is located on gentle slopes (less than 20%), and is surrounded by large mature tree overstory and intermixed small to medium size brush (three to four feet in height).

Application of the guideline under 4a. would result in horizontal spacing between large tree branches of 10 feet; removal of many of the smaller trees to create vertical space between large trees and smaller trees and horizontal spacing between brush of six to eight feet (calculated by using 2 times the height of brush).

Case Example of Fuel Separation: Southern California chaparral

Mature, dense and continuous chaparral brush fields on steep slopes found in Southern California represents one of the most hazardous fuel situations in the United States. Chaparral grows in an unbroken sea of dense vegetation creating a fuel-rich path which spreads fire rapidly. Chaparral shrubs burn hot and produce tall flames. From the flames come burning embers which can ignite homes and plants. (Gilmer, 1994). All these factors results in a setting where aggressive defensible space clearing requirements are necessary.

Steep slopes (greater than 40%) and tall, old brush (greater than 7 feet tall), need significant modification. These settings require aggressive clearing to create defensible space, and would require maximum spacing. Application of the guidelines would result in 42 feet horizontal spacing (calculated as 6 times the height of the brush) between retained groups of chaparral.

Case Example of Fuel Separation: Oak Woodlands

Oak woodlands, the combination of oak trees and other hardwood tree species with a continuous grass ground cover, are found on more than 10 million acres in California. Wildfire in this setting is very common, with fire behavior dominated by rapid spread through burning grass.

Given a setting of moderate slopes (between 20% and 40%), wide spacing between trees, and continuous dense grass, treatment of the grass is the primary fuel reduction concern. Property owners using these guidelines would cut grass to a maximum 4 inches in height, remove the clippings, and consider creating 20 feet spacing between trees.

4b. Reduced Fuel Zone: Defensible Space with Continuous Tree Canopy

To achieve defensible space while retaining a stand of larger trees with a continuous tree canopy apply the following treatments:

- Generally, remove all surface fuels greater than 4 inches in height. Single specimens of trees or other vegetation may be retained provided they are well-spaced, well-pruned, and create a condition that avoids spread of fire to other vegetation or to a building or structure.
- Remove lower limbs of trees ("prune") to at least 6 feet up to 15 feet (or the lower 1/3 branches for small trees). Properties with greater fire hazards, such as steeper slopes or more severe fire danger, will require pruning heights in the upper end of this range.

Defensible Space retaining continuous trees

Photo Courtesy Plumas Fire Safe Council.

Defensible space with continuous tree canopy by clearing understory and pruning

Authority cited: Section 4102, 4291, 4125-4128.5, Public Resource Code. Reference: 4291, Public Resource Code; 14 CCR 1299 (d).

Appendix B San Bernardino County Fire Hazard Abatement Ordinance

REPORT/RECOMMENDATION TO THE BOARD OF SUPERVISORS
SAN BERNARDINO COUNTY, CALIFORNIA
AND RECORD OF ACTION

October 7, 2008
Continued from Tuesday, September 23, 2008, Item 83

FROM: **DENNIS HANSBERGER, Third District Supervisor**
Board of Supervisors

SUBJECT: **2nd Reading/Final Adoption - ORDINANCE PERTAINING TO THE ABATEMENT OF FIRE HAZARDS AND HAZARDOUS TREES AND FIRE ACCESS ROAD OBSTRUCTIONS**

RECOMMENDATION(S)
Adopt **Ordinance No. 4058** amending Sections 23.0301, 23.0304, 23.0307 and 23.0308 of Chapter 3 of Division 3 of Title 2 of the San Bernardino County Code relating to abatement of fire hazards and hazardous trees and fire access road obstructions.
(Presenter: Peter S. Brierty, Assistant Chief/Fire Marshal, 909-936-5533)

BACKGROUND INFORMATION
The proposed ordinance amending relating to abatement of fire hazards and hazardous trees and fire access road obstructions had its first reading on September 23, 2008. The recommendation before the Board of Supervisors today will adopt this ordinance on the consent calendar.

SUPERVISORIAL DISTRICT(S)
All

Page 1 of 1

cc: w/ Ordinance
Co. Fire-Brierty
BOS 3rd-Hansberger
Co. Counsel-Messer
CAO-Thies
File-SDD-Fire Districts-SBCFPD
ed 10/8/08
Ordinance No. 4058
ITEM 107

Rev 0708R1

Record of Action of the Board of Supervisors

APPROVED (CONSENT CALENDAR)
COUNTY OF SAN BERNARDINO
Board of Supervisors

MOTION	AYE 1	AYE 2	SECOND 3	ABSENT 4	MOVE 5

DENA M. SMITH, CLERK OF THE BOARD

BY _____

DATED: October 07, 2008

ORDINANCE NO. 4058

AN ORDINANCE OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AMENDING SECTIONS 23.0301, 23.0304, 23.0307 AND 23.0308 OF CHAPTER 3 OF DIVISION 3 OF TITLE 2 OF THE SAN BERNARDINO COUNTY CODE, RELATING TO ABATEMENT OF FIRE HAZARDS AND HAZARDOUS TREES AND FIRE ACCESS ROAD OBSTRUCTIONS.

The Board of Supervisors of the County of San Bernardino, State of California, ordains as follows:

SECTION 1. Section 23.0301 of Chapter 3 of Division 3 of Title 2 of the San Bernardino County Code is amended, to read:

23.0301 Duty to Abate Fire Hazards or Hazardous Trees.

Every owner or person in control of any land or interest therein in the unincorporated area of the County of San Bernardino shall abate all fire hazards and hazardous trees from such land and from all sidewalks, parkways, road easements and all other easements on such land. All such fire hazards and hazardous trees are declared to be a public nuisance for which the costs of abatement may be specially assessed pursuant to Government Code Section 25845. To provide firefighters defensible space and to minimize the spread of fire within one hundred (100) feet of a building or structure and pursuant to the California Public Resources Code Section 4291, every owner and person in control of any buildings or structures in, upon, or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material within the unincorporated area of the County of San Bernardino shall at all times do the following:

(a) Maintain a firebreak by removing and clearing away, for a distance of not less than thirty (30) feet on each side of the building or structure or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. Single specimens of trees or other vegetation may be retained provided they are well-spaced, well-pruned as defined in section 23.0304 for mountain areas in this chapter, and create a condition that avoids spread of fire to other vegetation or to a building or structure.

(b) Provide a fuel break within thirty (30) feet to one hundred (100) feet of a building or structure by disrupting the vertical and/or horizontal continuity of flammable and combustible vegetation with the goal of reducing fire intensity, inhibiting fire in the crowns of trees, reducing the rate of fire spread, and providing a safer environment for firefighters to suppress wildfire and provide structure protection in and around wildland urban interface communities. Additional fire protection or firebreak shall be made by the removal of brush, flammable vegetation, or combustible growth that is located within one hundred (100) feet from the building or structure or to the property line or at a greater distance if provided by law.

(c) Property owners who do fuel reduction activities that remove or dispose of vegetation should make every effort to properly reuse and/or recycle the resultant materials either on site or at an appropriate off site facility, without creating additional fire hazards and are required to comply with all federal, state or local environmental protection laws and obtain permits when necessary. Environmental protection laws include, but are not limited to, threatened and endangered species, water quality, air quality, and cultural/archeological resources.

SECTION 2. Section 23.0304 of Chapter 3 of Division 3 of Title 2 of the San Bernardino County Code is amended, to read:

23.0304 Mountain Area Fire Hazard Abatement.

(a) "Mountain Area" means that portion of the unincorporated area of the County of San Bernardino located within the Fire Safety Overlay of the General Plan, whether publicly or privately owned, and does include National Forest land.

(b) Flammable vegetation which constitutes a fire hazard in the "Mountain Area" means:

(1) All foliage and branches within six (6) feet from the ground on trees over twelve (12) feet in height that stand within one hundred (100) feet of structures. Limbs should be cut no less than one quarter (¼) inch from the trunk of the tree to preserve the health of the tree.

(2) All trees that are within thirty (30) feet of structures that are

(2) Combustible rubbish, waste or discarded materials.

(3) Leaves, needles or other dead vegetative growth on roofs or structures.

(d) When neighboring persons or properties are especially vulnerable to the effects of fire, including, but not limited to schools, hospitals, mobilehome parks, residential occupancies, it is the responsibility of the property owner to adhere to the provisions of this section when flammable vegetation stands within one hundred (100) feet, measured on the ground, of all neighboring structures. Additional clearance may be required at the discretion of the County Fire Chief/Fire Warden or their designee on buildings listed above that may be used as evacuation centers, medical facilities and/or places of public gatherings and/or critical infrastructure.

SECTION 3. Section 23.0307 of Chapter 3 of Division 3 of Title 2 of the San Bernardino County Code is amended, to read:

23.307 Enforcement.

For the purpose of enforcing this chapter, the County Fire Chief/Fire Warden may designate any person as his/her deputy in the performance of the duties enjoined upon him or her by this chapter. In addition, each of the following officers within the County of San Bernardino is hereby designated to perform the same duties within the territory of the political subdivision which they serve. Whenever the term "County Fire Chief" is used in this chapter, the following officers are included in the meaning of such phrase, except that the County Fire Chief/Fire Warden shall coordinate all such officers in the performance of these duties:

(a) The Deputy Director of Code Enforcement, Fire Hazard Abatement Program and their designees.

(b) The San Bernardino County Land Use Services Director or designee.

(c) Other officers hereafter designated by the Board of Supervisors or the County Fire Chief/Fire Warden.

SECTION 4. Section 23.0308 of Chapter 3 of Division 3 of Title 2 of the San Bernardino County Code is amended, to read:

23.0308 Notice and Order to Abate.

(a) It shall be the duty of the County Fire Chief/Fire Warden or any designated person, whenever such officer deems it necessary to enforce the provisions of this chapter, to issue a "Notice and Order to Abate" by any or all of the following methods:

(1) By mailing a notice to the owner at the address shown on the latest tax roll.

(2) By personal service to the owner as shown on the latest tax roll.

(3) By posting the property.

(b) The form "Notice and Order to Abate Fire" shall include, at a minimum, the following information:

(1) List of hazards.

(2) List of locations.

(3) Due date by which abatement must be completed.

(4) Appeal rights.

(5) Landowner's name and address (situs and assessor's).

(6) Parcel number of affected property.

(c) The Notice and Order to Abate shall be placed in the mail by the issuing agency at least thirty (30) days prior to the "due date" for abatement on the notice.

(d) A ten (10) day extension for compliance is sent when the owner has removed greater than 51% of the fire hazard and notified the agency that the hazard has been abated, but nevertheless the agency determines the fire hazard still exists. A ten (10) day extension for compliance shall be placed in the mail by the issuing agency at least ten (10) calendar days prior to the "due date" for abatement on the notice.

(e) Compliance will be considered "In-Progress" and the Non-Compliance Notice and Order will be held in abeyance if the responsible property owner contracts with

State or Federal agencies or non profit organizations, such as Forest Care or Fire Safe Councils, that are approved by the County Fire Chief/Fire Warden as capable of providing compliance through said contract.

SECTION 5. This ordinance shall take effect thirty (30) days from the date of adoption.

PAUL BIANE, Chairman
Board of Supervisors

SIGNED AND CERTIFIED THAT A COPY
OF THIS DOCUMENT HAS BEEN DELIVERED
TO THE CHAIRMAN OF THE BOARD

DENA M. SMITH, Clerk of the
Board of Supervisors

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, DENA M. SMITH, Clerk of the Board of Supervisors of the County of San Bernardino, State of California, hereby certify that at a regular meeting of the Board of Supervisors of said County and State, held on the 7th day of October, 2008, at which meeting were present Supervisors: Mitzelfelt, Biane, Hansberger and Gonzales, and the Clerk, the foregoing ordinance was passed and adopted by the following vote, to wit:

AYES: SUPERVISORS: Mitzelfelt, Biane, Hansberger, Gonzales

NOES: SUPERVISORS: None

ABSENT: SUPERVISORS: Ovitt

IZ3606v
MM:jaf

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Board of Supervisors this 7th day of October, 2008.

DENA M. SMITH, Clerk of the
Board of Supervisors of the
County of San Bernardino,
State of California

Deputy

Approved as to Form:
RUTH E. STRINGER,
County Counsel

By: _____
Kenneth C. Hardy
Deputy County Counsel

Date: 9/30/08

DZ3606v
MM:jaf