
COMMUNITY WILDFIRE PROTECTION PLAN 2016

LOS ALAMOS, NEW MEXICO



LOS ALAMOS



North
Mesa
Stables

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STATEMENT OF PURPOSE

In response to Cerro Grande and other large wildland fires in the spring and summer of 2000, the Departments of Agriculture and Interior developed the National Fire Plan. Under the guidelines set forth in the National Fire Plan and the Healthy Forests Restoration Act of 2003, this Los Alamos Community Wildfire Protection Plan (CWPP) emphasizes:

- A long-term commitment to maintaining the essential resources for implementation
- Landscape-level vision for restoration of fire adapted ecosystems
- The importance of using fire as a management tool
- Continuing to improve collaboration among the multiple land management agencies within and surrounding Los Alamos County
-

The original Los Alamos CWPP, approved in 2009, initiated long term planning to reduce the threat of catastrophic wildfire; to protect the lives and safety of citizens and firefighters; to protect residential and commercial infrastructure; and to promote ecosystem health. This updated CWPP addresses changes in the community, in the local fire regime, and in the current climate over the past five years. This plan re-evaluates risks based on those changes, and creates a new, prioritized implementation strategies for the wildland/urban interface in Los Alamos. The plan redefines the forested area that, with an uncontrolled ignition, has the potential to threaten life and property in Los Alamos and White Rock, as well as Los Alamos National Laboratory (LANL). It assesses the wildfire risk of individual neighborhoods, and describes priority actions for the reduction of fuels through forest thinning, prescribed fire, and mitigation actions within home ignition zones.

Rather than a standing document designed to last ten years, this CWPP will adhere to the principles of adaptive management. The plan will be reviewed annual in November and revised based on changes in climate, residential and commercial development, and unexpected delays in implementation, citizen response and available funding.

STAKEHOLDER ENGAGEMENT: PUBLIC MEETINGS, CORE TEAM MEETINGS AND COMMUNITY PRIORITIES

The Core Team met regularly to discuss the specifics of the CWPP update. Additionally, A public meeting was held on April 20th, 2015 with local stakeholders, County officials, and the public to discuss the 2016 update and learn about the progress made since 2009 to reduce wildfire risk in the community. Input was garnered from meeting attendees regarding:

- Areas, neighborhoods, and projects the county should prioritize
- Progress made by residents, residents' neighbors, adjacent landowners, and the county since 2009 to address wildfire risk
- Feedback on what should be considered for the 2016 CWPP update

Feedback gained from the public meeting was incorporated in this 2016 CWPP update.

FUEL MANAGEMENT GOALS OF THE LOS ALAMOS CWPP

- To the extent feasible, reduce the risk to human health, human safety, to homes, other structures in Los Alamos and LANL from future forest fires by reducing hazardous fuels on county and federal lands within and adjacent to the wildland urban interface, along highways, forest roads, and trails
- Minimize the risk of crown fires entering Los Alamos, White Rock, LANL, important natural areas such as Bandelier National Monument and Santa Fe National Forest
- Reduce the fire risk from firebrands in Los Alamos neighborhoods
- Improve conditions for suppression efforts in the event of a wildfire
- Utilize the opportunities and progress made in the wake of the Cerro Grande and Las Conchas fires to continue active management of fuel loads on wildlands, to foster interagency cooperation, to promote forest health, improve watershed conditions, and to increase public awareness of and involvement in protection against wildland fire

MITIGATION ACTION PLAN SUMMARY

1. Maintain fuel reduction projects on public lands, on all jurisdictions through mechanical and hand thinning.
2. Where and when appropriate, continue prescribed burning through broadcast and pile burn operations on public lands on all jurisdictions.
3. Provide education to homeowners on the home ignition zone through site visits, home assessments, and public information campaigns.
4. Continue community outreach through public schools, local nature centers, and service learning projects, print media, and social media.
5. Seek grant funding to support homeowner defensible space and fuels reduction projects.
6. Continue to engage with adjacent land management agencies through the Interagency Wildfire Management Team.
7. Work with communities in the County and New Mexico State Forestry to achieve Firewise designation.
8. Develop a plan for post-fire recovery. Post fire recovery plan should include a section on restoring rangelands and grasses using native species to reduce erosion potential.
9. Conduct an evacuation drill within the County that includes a test of the County's reverse 911 system.
10. Develop an evacuation plan for the County. The evacuation plan should include an appendix on evacuating pets and livestock.

COMMUNITY AND ECOLOGICAL CHANGES SINCE 2009

1. The commercial district of Los Alamos has expanded along the south rim of Los Alamos Canyon and to the east on the mesa between Los Alamos and Pueblo canyons.
2. The community population is stable and little new home construction has taken place. New residents live in existing housing that was mostly constructed from 1946 through the 1970s.

With transfers from the Department of Energy and purchase of parcels from the United State Department of Agriculture Forest Service, Los Alamos County acquired about 1,500 acres of undeveloped land.

ECOLOGICAL CHANGES AND CHANGES IN WILDLAND FIRE FUELS

1. In June 2011, the Las Conchas fire burned over 100,000 acres to the south, west, and north of Los Alamos. Ignited by a fallen power line, the fire burned 43,000 acres during the first 12 hours. The fuel treatments of the previous decade allowed fire crews to push the fire around the borders of Los Alamos and Los Alamos National Laboratory, effectively using the Cerro Grande burn scar as a massive firebreak.
2. Precipitation patterns in the Los Alamos area have been altered by global changes in climate and by the presence of the huge, contiguous burn scars to the west of the community. While total annual precipitation stays at about 18 inches, the delivery pattern has changed. Prolonged dry periods are interrupted by locally intense storms that on average should occur only once every 50 to 100 years, but now occur each year.
3. Overall mean temperature has increased by at least one degree F, and summer high temperatures average 2 degrees F above normal.
4. Mortality from drought stress and/or continues to hit pockets of ponderosa pine, particularly on south-facing slopes and at lower canyon elevations.
5. Mortality in Douglas fir at the lower elevations—within the town site—continues and the number of standing dead has increased significantly.
6. Of the 1,200 acres that were mechanically thinned from 2003 to 2015, about 675 acres have been treated with prescribed fire (see Map 1):
 - 98 acres of broadcast burning
 - 579 acres of pile burning
 - More than 6,000 piles burned
 - Approximately 12,000 tons of fuel removed
7. Slash from the 2001-2002 piñon die-off in the White Rock area is half decayed and is unlikely to carry fire. Red-needled piñon, once a significant fire threat, are scattered.

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8. Significant grasslands are developing on the western edge of the developed area.

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INTRODUCTION AND BACKGROUND

Description of Los Alamos County

Los Alamos County, New Mexico contains two communities, Los Alamos and White Rock, with more than 8,000 residences, seven schools, a hospital, and other infrastructure to support a population of more than 18,000; a branch campus of a state university; state highway links between the Jemez Mountains and the Rio Grande Valley; internationally significant historic sites related to the development of the first atomic weapons during World War II; hundreds of cultural sites of the Ancestral Pueblo people; almost 150 miles of recreational trails; and the Los Alamos National Laboratory, a scientific facility that employs over 7,000 people and holds hundreds of structures.



Los Alamos, NM

Sitting on the eastern flank of the Jemez Mountains, the town site of Los Alamos has one of the largest wildland-urban interfaces in New Mexico. The town site is located on the boundary of the Pajarito Plateau and the foothills of the Sierra de Los Valles, which is the easternmost extension of the Jemez range. Neighborhoods are built on finger mesas that are separated by deep canyons carved into soft volcanic rock. This disjointed, linear arrangement of housing creates an unusually high proportion of homes located at the border of forest or woodland.

Eight miles to the southeast and about 1,000 feet lower in elevation, the community of White Rock sits on the canyon rim above the Rio Grande. White Rock is surrounded by piñon-juniper woodland, and some portions of the community, notably Pajarito Acres and La Senda, are built in the heart of dense stands of this forest type. White Rock has a different but equally extensive wildland-urban interface as the town site.



White Rock, NM

Most of the relatively level land on the mesa tops and in the foothills is privately owned. However, only about six percent of the land within the County is in private land; the remainder of the land is managed by various local and federal agencies. The Incorporated County of Los Alamos as open space manages the canyons in between the mesa tops, as well as the majority of the town's western perimeter. The western and northern perimeters of the town site neighbor the Santa Fe National Forest. A few miles further south and southwest, Bandelier National Monument holds several major forested drainages that head in the high Jemez Mountains and flow to the Rio Grande. Los Alamos National Laboratory, heavily forested with ponderosa pine in the higher elevations and piñon-juniper in the lower country, lies to the south of downtown and Western Area along a shared border.

The eastern border of the County lies mainly against the San Ildefonso Pueblo. Ponderosa pine forest dominates the foothills of the Sierra De Los Valles and this plant community extends into the town site. The finger mesas reach eastward toward the Rio Grande Valley and slope gently away from the mountain front. Because the mesas are at a lower elevation than the mountain front, piñon-juniper woodland dominates the mesa tops. The steep-walled canyons between the mesas hold a mix of vegetation communities. The drier, south-facing slopes hold sparse piñon-juniper woodlands. The more moist north-facing slopes support a mixed conifer community that includes ponderosa pine, limber pine, and Douglas fir. Lower elevation canyon bottoms are dotted with ponderosa pine, and the narrower upper canyon bottoms are lined with mixed conifer.

Fire Ecology of Ponderosa Pine Forests

Los Alamos is located in a ponderosa pine forest. Ponderosa pine (*Pinus ponderosa*) is the most common and widespread pine in North America. Ponderosa forests developed in this part of the Southwest about 8,000 years ago as the climate warmed at the end of the last ice age. These forests were open with individual trees, or small clumps of trees, spread widely apart. Tree densities were from about 50 to 150 trees per acre. Locally, ponderosa forests occur from about 7,000 to about 8,500 feet above sea level.



Fire is a keystone ecological process in these forests: if fire is removed, the system collapses. Ponderosa pine is a fire-adapted species with thick, scaly bark that insulates the tender growing tissue beneath. The trees are self-pruning, losing their lower branches so that a fire burning on the ground does not have a “fuel ladder” to climb into the crowns. The species has long needles, which protect the growing branch tips from drying out.

Open stand of ponderosa pine dominate the vegetation in and around Los Alamos

Prior to about 1890, ponderosa pine forests had the highest fire frequency of all forest types found

in the Jemez Mountains. But these fires were much different than what we see today. Frequent low intensity surface fires burned through the grassy understory of these open forests about every seven to ten years. These fires, mostly ignited by the abundant lightning that occurs during the spring and summer months, kept the forests open by thinning out young trees. They also consumed old wood and needles on the forest floor, recycling nutrients, especially nitrogen, in the process. Plant species, wildlife habitat opportunities and food sources for animals and birds were numerous.

Due to the combined effects of overgrazing, high-grade logging, fire suppression, and a highly variable climate, the forests became much denser, choked with ground, ladder, and crown fuels in a continuous blanket across the landscape. Locally, tree densities increased from 50 to 150 trees per acre to between 400 and 1,300 trees per acre or more. Dead fuel loads have increased from a few tons per acre to as much as 20 tons per acre of needles, branches, and logs.

These largely human-induced changes in the composition and structure of the ponderosa pine ecosystem resulted in changes to ecosystem processes, most notably the role of fire. When coupled with a warmer, drier climate, crown fires became increasingly frequent, larger, and more destructive, leading up to the Cerro Grande fire in 2000 and the Las Conchas fire of 2011.

Local Fire History

Strong evidence for the past role of fire in the Los Alamos area is held in its place names. Two prominent landscape features to the west of the town site are named for fire. Burnt Mountain overlooks the North Community, and although the event that gave the feature its name is unrecorded, the name has been in use since at least the 1950s. In addition, a canyon, ridge, trail, and housing area share the name Quemazon, which translates from Spanish as “burned.” In this instance, the name has been in use for over a century.

A period of large, fast-moving crown fires in ponderosa pine forest around Los Alamos County began in 1954 with the Water Canyon fire. Within hours after it started, the fire raced through the trees from the south and threatened the town site. The Water Canyon fire was significant for being the first to require the evacuation of Los Alamos. The 15,000 acre La Mesa fire in 1977 spread rapidly from Santa Fe National Forest, across Bandelier National Monument toward Los Alamos. Many considered this fire a wakeup call for changing fire behavior in the area, but little effort went into prevention of another such event. Nineteen years later, the 1996 Dome fire created another threatening smoke column on the southern horizon of Los Alamos. The extreme fire behavior exhibited by this blaze did serve as motivation to begin fuel treatments in the area. Two years later, the Oso fire burned north of town. The fires in the late 1990s were dwarfed by the 43,000-acre Cerro Grande fire. On May 10, 2000, the fire entered the town site and destroyed more than 400 homes. The unthinkable happened again in June 2011 when Los Alamos was evacuated for a third time as the Las Conchas fire burned 148,000 acres to the west and north of town.

The well-documented high frequency of lightning strikes in the Jemez Mountains has played a role in the fire frequency of the Los Alamos area. However, all of the large fires occurring over the past 50 years were human caused.

History of Fuels Treatment in Los Alamos

In response to the 1977 La Mesa fire the Santa Fe National Forest initiated construction of fuel breaks along New Mexico Highway 501 and behind Arizona Avenue in North Community.



North Community in Los Alamos following the Cerro Grande Fire

The Western Area Perimeter Master Plan, included in the 1987 Los Alamos County Comprehensive Plan, acknowledged the need for a fuel break development in this highly vulnerable and dense area of ponderosa pine forest. In 1995, the Forest Service conducted a prescribed burn in the foothills west of Los Alamos that was met with a vocal outcry from residents. In 1996, Forest Service community liaison Robert Remillard documented his recommendations for fuel mitigation measures on Department of Energy (DOE) and County lands between the National Forest boundary and residential neighborhoods of the town site in a document titled Western Perimeter Tract Fuels Management Recommendations. His recommendations included identifying fire access roads, areas for priority treatment, recommendations for clearing around structures, and a combination of fuel treatments including expansion of existing firebreaks and creation of shaded fuel breaks, followed by slash pile burning and understory broadcast burns along the Western Perimeter area of the town site. The portion of this work on Forest Service administered lands was already underway and was

completed in 1998. As Remillard noted, “The problem is not one of finding new solutions to an old problem, but of implementing known solutions”. (Simpson, 1996)



Prescribed burn in the Western Perimeter, 1996

In April 1996, the Dome fire burned 16,000 acres on the Santa Fe National Forest and Bandelier National Monument south of LANL. Dry conditions led to a one-day run of 6,000 acres. The fire spread rate and intensity of the Dome fire convinced resource specialists that fuel breaks alone would not be sufficient to protect the Lab and town from a crown fire. The Dome fire demonstrated that crown fires, which burn through the crowns of trees rather than through surface fuels such as grass or litter, are extremely difficult and dangerous to suppress. If a fire

can be kept on the ground, fire suppression crews have a chance of controlling it. Once a ground fire transitions into a crown fire, most suppression actions are ineffective.

The Dome fire led to an effort to consolidate suppression actions. Claudia Standish of the Forest Service developed an Inter-Agency Fire Management Plan that outlined cooperative arrangements for communication and fire suppression between the LAFD, the County, LANL, Forest Service and Park Service. The report made recommendations for fuel mitigation efforts. The Inter-Agency Wildfire Management Team (IWMT) was formed in May 1996 and began regular bi-weekly meetings.

Land and fire managers from the LAFD, the Santa Fe National Forest, Bandelier National Monument, and Los Alamos National Laboratory (LANL) addressed this issue in the late 1990s.



The Fuel Mitigation/Forest Restoration Project greatly reduced fuel loads at the wildland urban

William Armstrong (1998, 1999) of the Santa Fe National Forest modeled fuel in the Sierra De Los Valles and predicted a 38% chance of a crown fire reaching the town site or LANL structures over the ensuing five years. Other modelers outlined the scenario: a lightning or human caused ignition expanding into a fire that would maintain itself for several days in the heavy surface fuels, and then intensify with increasing wind speed. Using low branches and small trees as a ladder, this fire would jump into the tree crowns and be pushed by the prevailing southwest winds, enter the town site (Balice et al., 1999).

In January 1998, the Santa Fe National Forest began studying the advisability of treating portions of the Española Ranger District adjacent to Los Alamos to reduce the risk of catastrophic forest fires. In early 2000, the Forest Service prepared to release the results of that study as the Valle Fuels Management Project Environmental Assessment. The plan was approved for release on May 2, 2000 (Bandelier National Monument and Santa Fe National Forest, 2001).

Within Los Alamos, a fuel reduction program in Pueblo Canyon was initiated by LAFD under the direction of the Fire Marshal. Known as the Pueblo Shelf Project, the 10-acre effort removed small diameter trees and ladder fuels in the canyon below Ridgeway and Urban Streets. This project was directly responsible for a change in fire behavior during the Cerro Grande event that dropped the fire to the ground and saved as many as 400 homes. Also in 1998, the Department of Energy treated about 8 acres on the North Slope of Los Alamos Canyon directly below the Ridge Park neighborhood.

On May 4, 2000, a Bandelier National Monument crew ignited a prescribed fire on the slopes of the highest peak in the monument, Cerro Grande. Unexpected conditions blew the fire across established fire lines and into the Santa Fe National Forest. Persistent spring winds carried the fire northeast, and on May 10, 2000, with wind gusts up to 70 miles per hour, the fire reached the Los Alamos town site. Over the next 16 hours, over 400 families lost their homes to the wildfire. The Cerro Grande fire burned a large portion of the Valle study area in which the Forest Service planned fuels management actions. Since virtually all of the area proposed for treatment was burned, the Environmental Assessment was never issued.

On June 26, 2011 Las Conchas wildfire began. The fire started when a tree fell on a power line. On the first day the fire had reached 43,000 acres. Las Conchas Fire, a fire driven by high winds by June 30 increased to 103,000 acres which is over 160 square miles. The fire was contained on August 3, 2011 after burning more than 150,000 acres.

Fuel Treatment Summary (See Map 2 and Map 3)

Los Alamos County Open Space:

Community planning after the Cerro Grande fire resulted in the *Los Alamos County Long-Term Recovery, Redevelopment, and Hazard Mitigation Plan* (2001). This document identified the development of a fuels modification program for unburned County lands as the highest priority item. As a result of this recommendation, the Federal Emergency Management Agency (FEMA) provided a grant to Los Alamos County for the establishment of a fuel mitigation project. The FEMA grant enabled the County to immediately begin fuel reduction, proceed at a faster pace, and treat a larger area than it could have otherwise.

Initiated in December 2000, the Los Alamos Fuel Mitigation/Forest Restoration Project (FMFR), under the direction of LAFD, was designed to reduce the risk of crown fire entering the community of Los Alamos, restore forest health and wildlife habitat, and improve the County Trail Network. Through December 2008, the project treated about 1,200 acres. The majority of the work was mechanical thinning with material hauled away, masticated or chipped on site. Hand treatment was completed on steep slopes and in areas inaccessible to mechanized equipment. Pile burning and broadcast burning were implemented on about 400 acres. (See Hogan and Martin, 2009.) Prescribed fire continued as a tool to treat a total of 680 acres through 2015 with about 6,000 piles burned and 98 acres of broadcast burning.

Bandelier National Monument:

A revised fuel reduction plan, the Valles II Project, was developed in 2003 by Bandelier National Monument and Santa Fe National Forest personnel. To supplement the plan, Bandelier fire staff released their Fire Management Plan in 2005. Implementation began in 2005. In the upper Frijoles watershed at Bandelier, thinning was accomplished along New Mexico Highway 4 and Forest Road 289 in preparation for prescribed burning on the mesa to the west of Frijoles Canyon. In November 2007, Bandelier fire staff implemented a long-anticipated and necessary burn in the Upper Frijoles Watershed that reduced extreme fuel loads on about 1,500 acres. A 100-acre broadcast burn in Frijoles Canyon near the visitor center was carried out in fall 2008.

During the winter of 2008-2009, pile burning on the monument took place in the upper Frijoles watershed.

This work was critical during the first 24 hours of the Las Conchas fire when fuel breaks created under the 2005 plan were used to anchor backfire operations that steered the blaze away from LANL and the town of Los Alamos. To meet the new conditions, Bandelier fire management staff began the process to revise their fire management plan in 2013 and anticipate completion of the document in 2016.

Santa Fe National Forest:

On the Santa Fe National Forest, mechanical thinning along the north side of Arizona Avenue took place in 2004, and cut, pile, and burn operations continued below Barranca Mesa through 2009. Mechanical thinning and firewood collection reduced fuels in the American Springs area on the national forest and about 300 acres were broadcast burned in 2007.

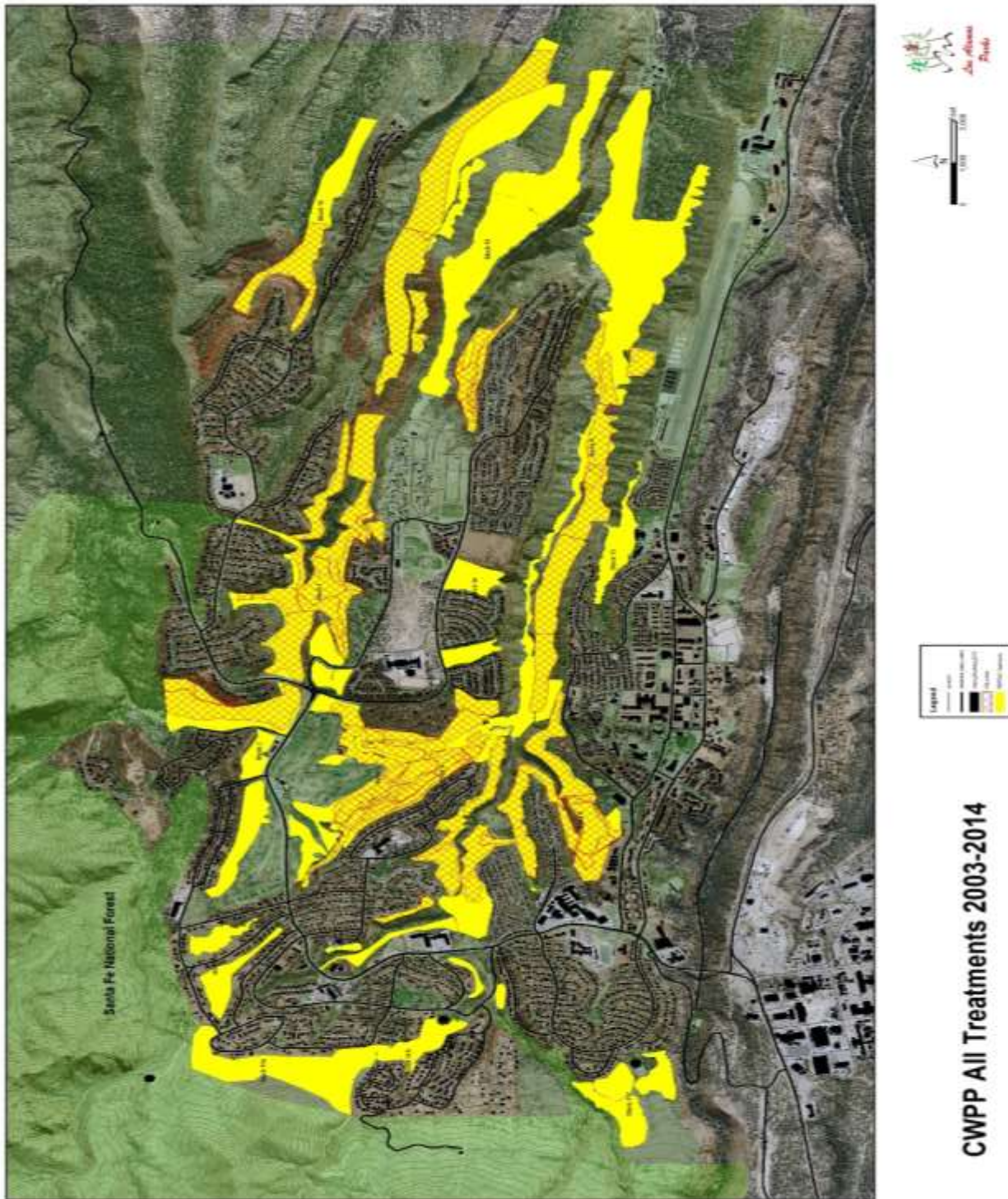
Los Alamos National Laboratory (LANL):

LANL initiated fuel reduction with a small project in Los Alamos Canyon immediately adjacent to residences along the canyons' north rim in 1998. In 2002, LANL implemented a large-scale thinning project in the southern half of the County adjacent to White Rock. Thinning on several hundred acres in the interior of the laboratory was implemented from 2001 to 2004 as part of the Cerro Grande Rehabilitation Project. In 2007, LANL accomplished a fuel reduction project on a critical parcel in Los Alamos Canyon below Fairway Drive. LANL reduced fuels on about 15 acres in Los Alamos Canyon adjacent to Ridgeway Drive. Fuel reduction in DP Canyon began in 2009. From 2010 to 2013, firebreaks were created around much of the perimeter of the laboratory.

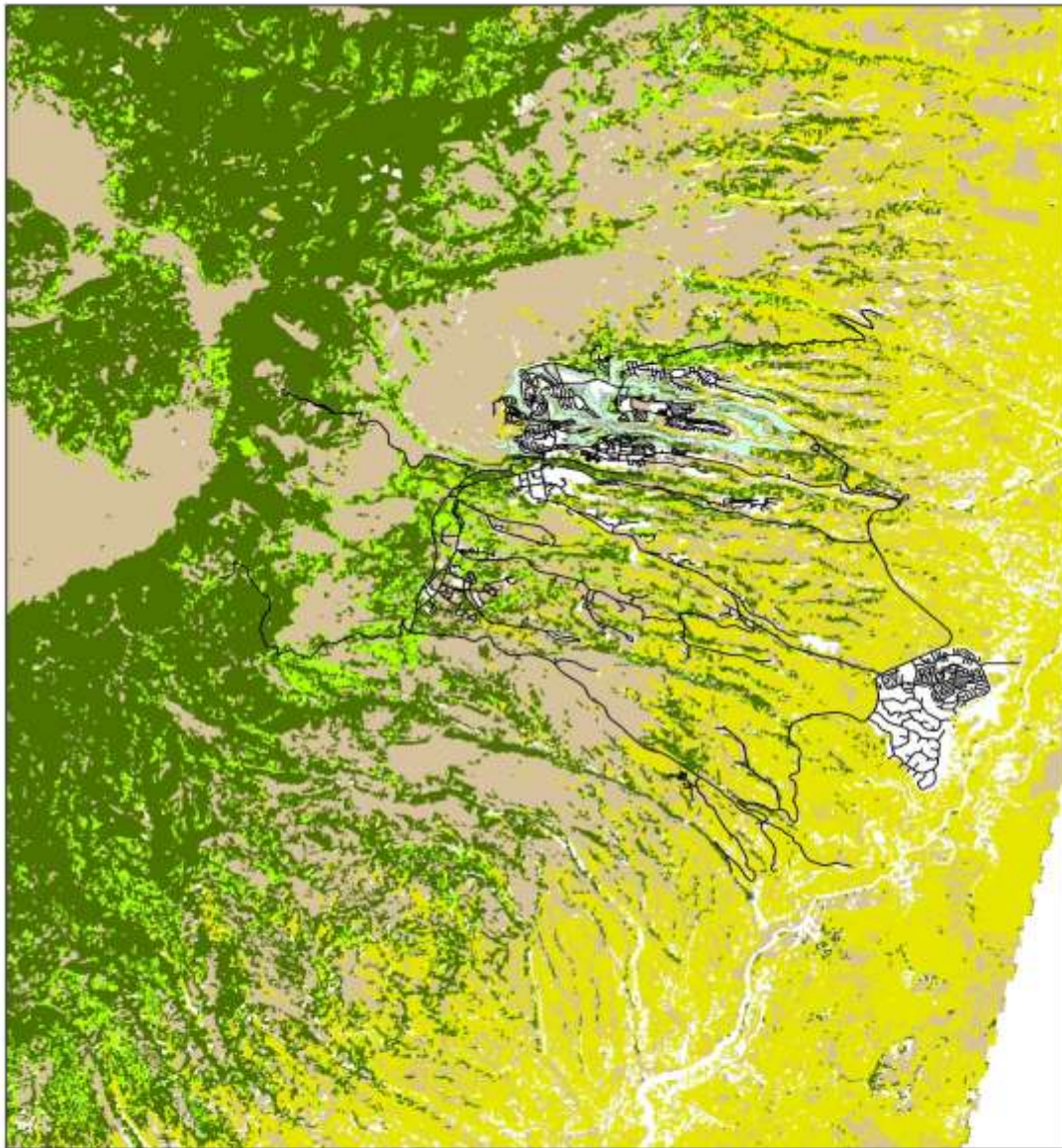
San Ildefonso Pueblo:

Pueblo fuel reduction projects were implemented in the New Mexico Highway 4 corridor as well as in canyon areas of middle Los Alamos County.

MAP: CWPP All Treatments 2003-2014



Map: Los Alamos County Community Wildfire Protection Plan Vegetative Fuel Types



Los Alamos County Community Wildfire Protection Plan Vegetative Fuel Types

0 8,250 16,500 Feet

Legend

- Grassland
- Piñon-Juniper
- Ponderosa Pine, treated
- Ponderosa Pine, untreated
- Mixed Conifer
- Mixed Conifer, treated



BASELINE ASSESSMENT OF FIRE HAZARDS AT THE WILDLAND URBAN INTERFACE IN LOS ALAMOS COUNTY

Defining the Wildland Urban Interface

The wildland urban interface (WUI) is the zone where two classes of flammable materials meet: the natural landscape and structures. In the WUI, structures and vegetation are sufficiently close so that a wildland fire could spread to structures or a structure fire could ignite vegetation.

In Los Alamos County, geography, vegetation patterns, and the ponderosa pine ecosystem combine to create a widespread WUI. Due to the interlacing neighborhoods, forest, extensive winding canyon rims, frequent lightning strikes and high winds, the entire community lies within the WUI. Ninety percent of the County is undeveloped land and much of this land has the potential source for a fire that moves into the urban area.

For this CWPP, the boundaries of the WUI are drawn to include surrounding areas where fuel buildup and fire could threaten the community. As demonstrated in the La Mesa, Dome, Oso, Cerro Grande and Las Conchas fires, wind-driven wildfire spreads from southwest to northeast and can cover several miles in a single day. Thus, heavily forested land to the south, southwest and west of the urbanized area of Los Alamos are included in the WUI (see Map 4).

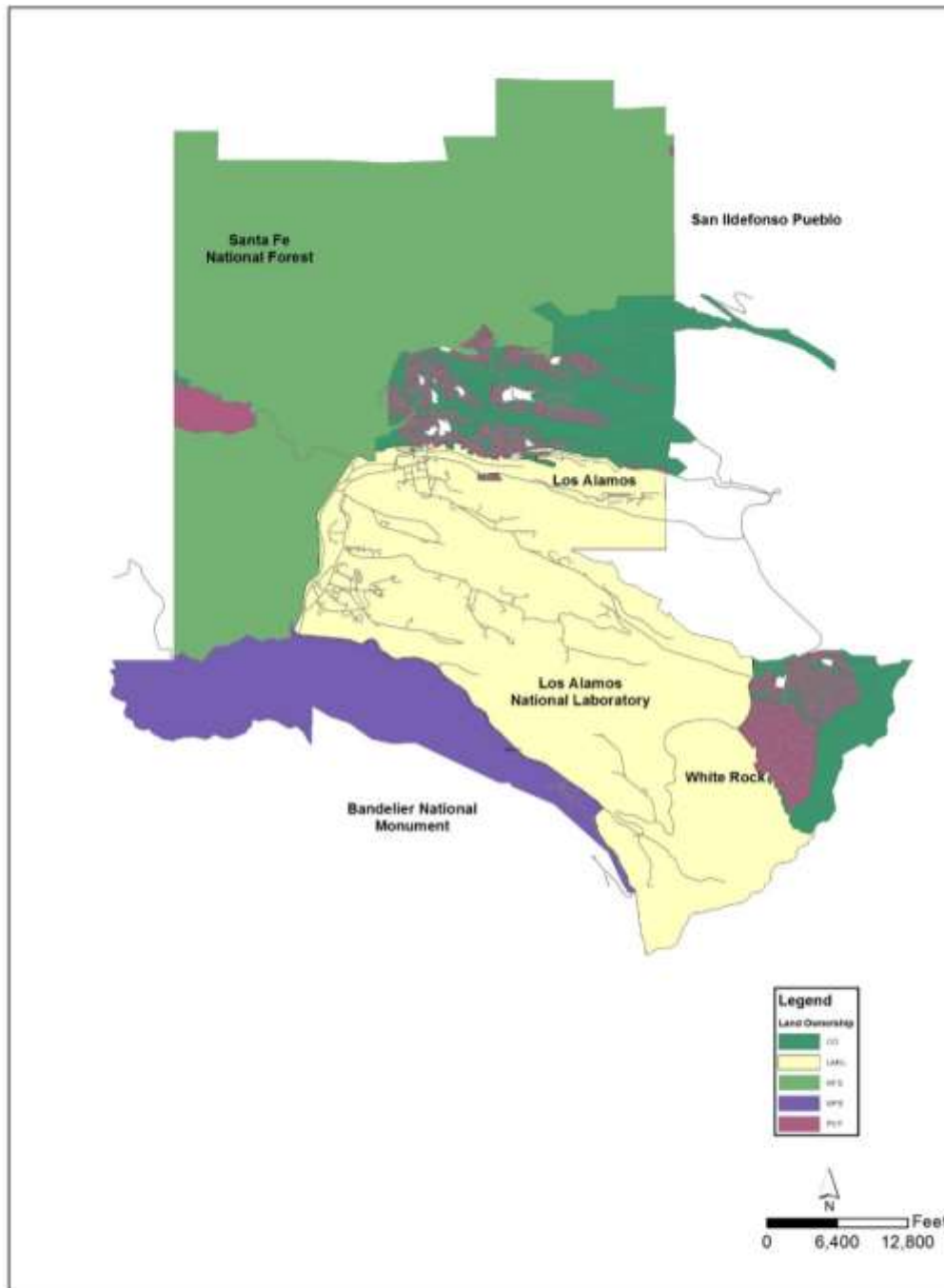
Baseline conditions of the wildlands, urbanized areas of Los Alamos County have been thoroughly studied and documented. The following assessments are broken down to present conditions that were used in formulating priority treatment areas. Implementation actions will be applied within the treatment areas, plans for reducing structural ignitability and strengthening preparedness.

Assessment of Current Conditions: Wildland Fuels

This overview of the characterization of existing wildland conditions in Los Alamos County looks at the three components of wildland fire behavior: fuels, weather, and topography. Data was drawn from the Fuel Mitigation/Forest Restoration Project by the United States Geological Survey (USGS); the Southwest Environmental Consultants' (SEC) report on defensible space in Los Alamos; from the Bandelier National Monument Fire Plan and from Geographic Information System (GIS) analysis by the Los Alamos County Parks Division (see Map 5).

To make sense of the data, a variety of methods can be used to assess fire hazard or to make general predictions about fire behavior. A computer simulation was used to predict future forest conditions and visually display the effects of past forest restoration treatments. A fire model was used to generate scenarios of fire threat based on present conditions. Fire predictions were generated by Behave Plus3 and by the Forest Vegetation Simulator, both of which are commonly used fire modeling applications produced by the USDA Forest Service. Also, GIS was used to synthesize a variety of data and generate maps of areas of greatest potential threat from wildland fire.

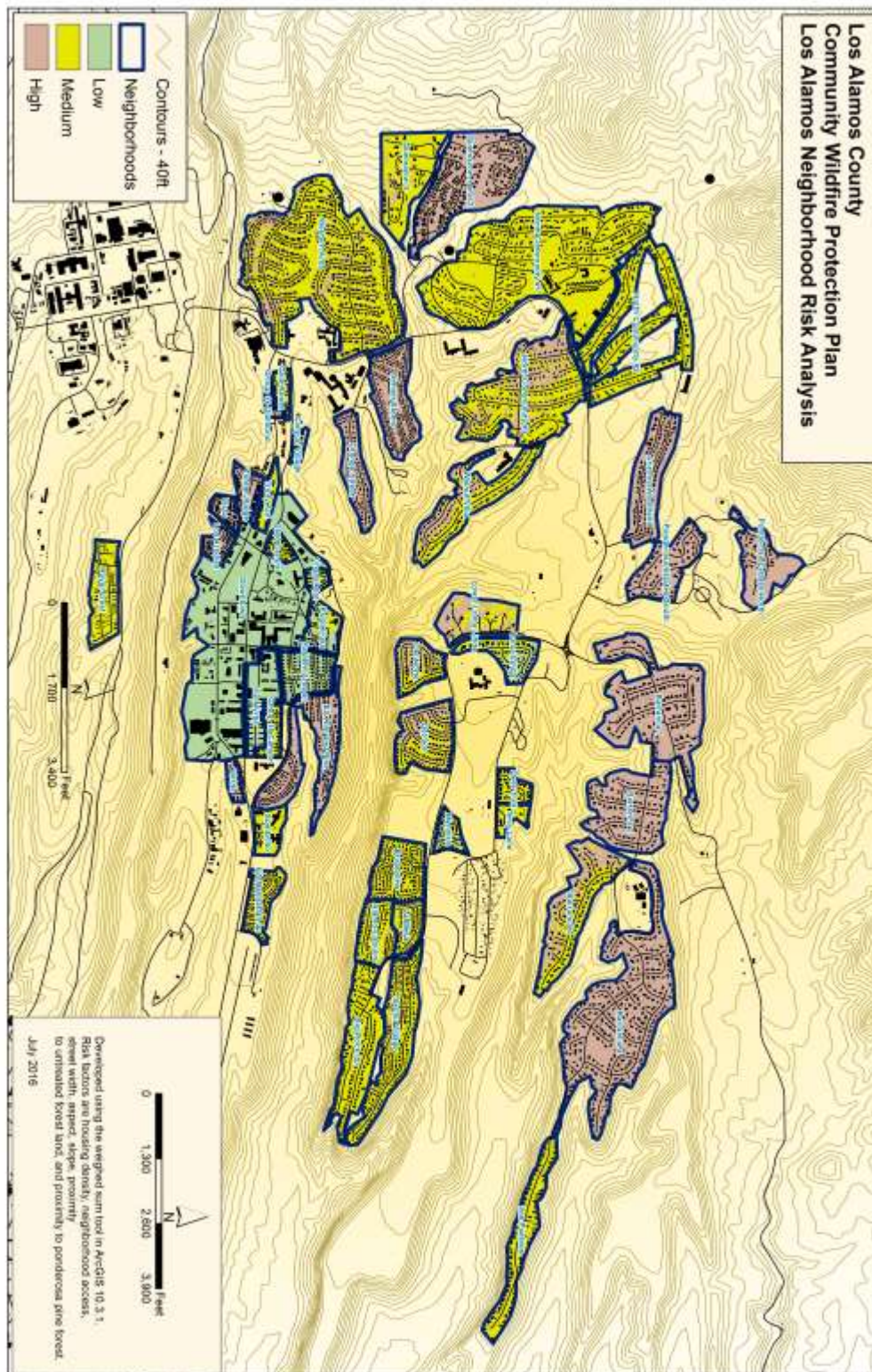
Map: Los Alamos County Community Wildfire Protection Plan Jurisdictions



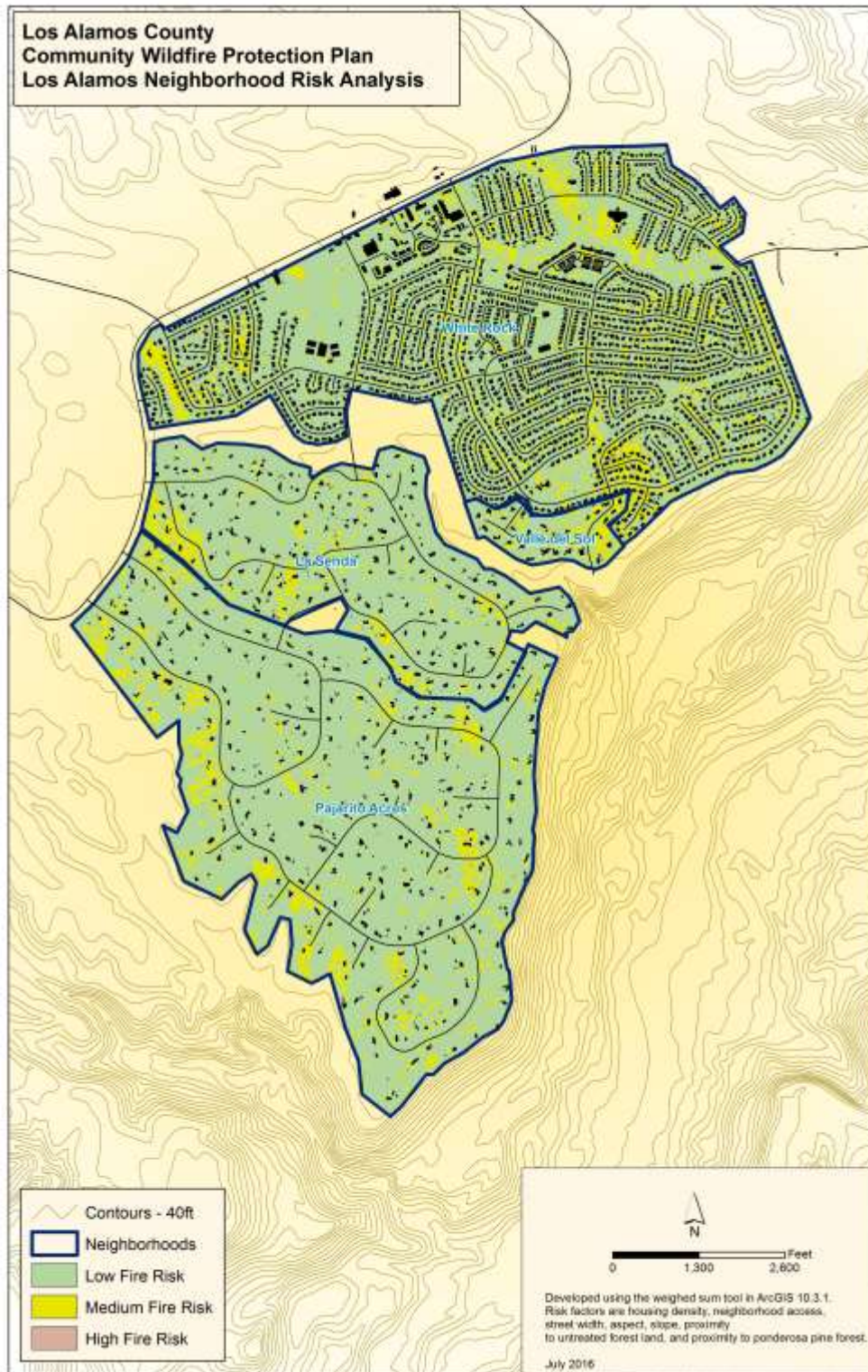
**Los Alamos County
Community Wildfire Protection Plan
Jurisdictions**



Map: Los Alamos County Community Wildfire Protection Plan Los Alamos Neighborhood Risk Analysis



Map: Los Alamos County Community Wildfire Protection Plan White Rock Neighborhood Risk analysis



Assessment Criteria: Vegetative Fuels

Conditions of Existing Plant Communities in Los Alamos

Los Alamos County supports five distinct fire affected ecosystems. Each plant association type offers distinct characteristics of potential fire intensity, fire rate of spread, and probability of fire ignition. The extent of each of these plant communities was mapped, placed in GIS, and used in fire hazard modeling. Additional details on vegetation characteristics in Bandelier National Monument can be found in the Bandelier Fire Management Plan (2013); for LANL lands, see Balice, et. al. (1997); and for County open space, see Hogan and Martin (2009).



Two types of ponderosa pine forest. Above, a thinned forest stand in Pueblo Canyon holding about 80 trees per acres; below, an untreated dog-hair thicket with as many as 800 trees per



successfully treated densely forested areas further from the town site but no less critical in terms of landscape-scale fuel management.

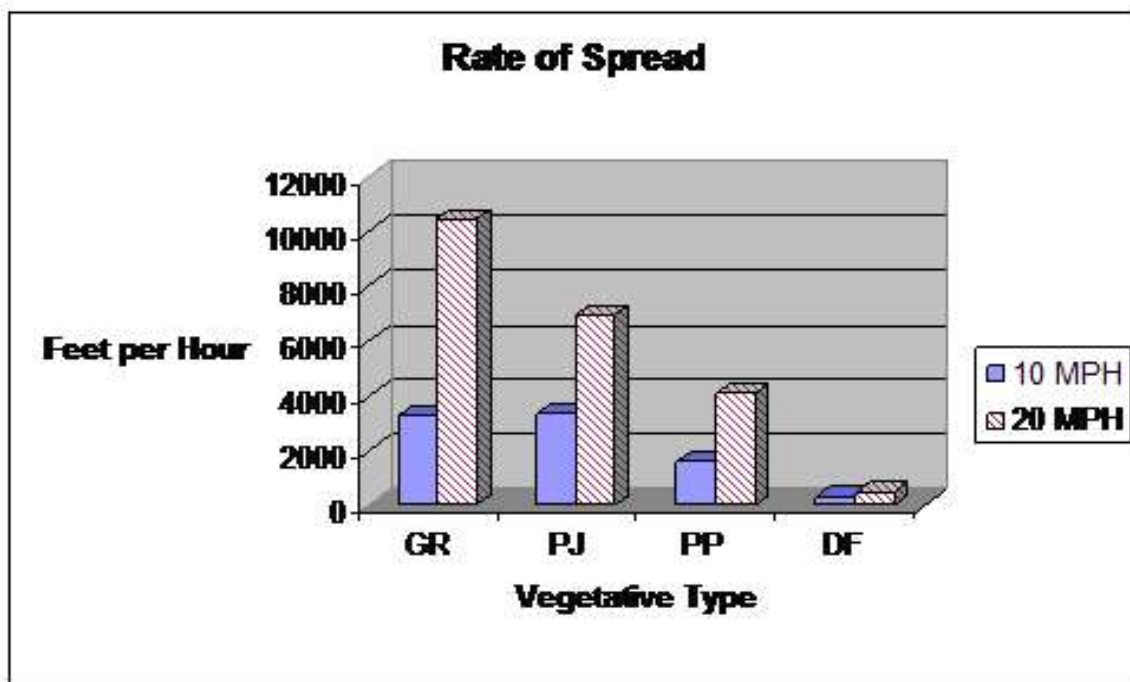
Key Point: Changes in forest structure from wildfire or thinning operations have altered the type of wildfire Los Alamos will see in the future. In contrast to pre-existing conditions that would support a crown fire, fast moving, low intensity, low flame length fires will likely be experienced in the treated and burned areas. However, crown fire remains possible in areas that have not yet received treatment

Fire Behavior Characteristics in Ponderosa Pine Forests

As shown above, historical ponderosa pine forests were open stands with a grassy understory. These forests were transformed into dense stands with high fuel load that are prone to crown fire. Over the past twelve years, the LAFD Fuel Mitigation/ Forest Restoration (FMFR) Project greatly reduced fuel loads on forest stands that lie immediately adjacent to housing areas. Both the Forest Service and the National Park Service have

There are currently two types of ponderosa pine forest in the Los Alamos area with vastly different fire hazard characteristics. Untreated ponderosa pine stands around Los Alamos present a high fire risk. Surface fires in these stands display short flame length, low rate of spread, but high heat output. Stand density often exceeds 1,000 stems per acre; also, ladder fuels are abundant. Concentrations of dead and down woody debris contribute to torching of trees and spotting. These factors would readily carry a wind-driven fire into the tree crowns. The canopy of these dense stands is often continuous, which would allow fire to spread through tree crowns. Fuel treatments on County lands have eliminated all but a few small stands of high-density forest. Existing high-density stands are found in Los Alamos and Rendija canyons.

Computer models can compare the predicted rate of spread and flame length for treated and untreated forest stands. For wind speeds up to 60 mph, the models predict that burning surface fuels would have a flame length less than the crown base height, which would likely keep fire out of the tree crowns. Compared to untreated forest, the rate of spread of a surface fire would increase but the intensity of the fire is greatly reduced. Untreated forest areas in the town site exhibit a possible rate of fire spread of 800 feet per hour, and a flame length of 17 feet. Large amounts of woody debris, dense pine stands, and the universal presence of ladder fuels account for the high flame length. Most areas were classified in Fuel Model 9.



Areas that received mechanical treatment during the County's FMFR Project and other thinning projects have modified fire characteristics. The stated objectives of the FMFR Project were to reduce the threat of crown fire in Los Alamos by reducing stand density and reducing ladder fuels by increasing the crown base height, which is the distance of the lowest flammable material above the surface. Pretreatment tree density in the project area ranged from 200 to 800 trees per acre. After thinning, that number was reduced to between 60 and 80 trees per acre. The average crown base height was raised from 8 feet to more than 20 feet.

Due to the reduction of canopy cover, thinned stands of ponderosa pine are more open, warmer, windier, and slightly drier than untreated stands. The open canopy encourages the growth of grasses and forbs. Open forest structure with a heavy understory of grass leads to quickly spreading surface fires. However, the fires burn with lower intensity than fires that involve denser stands and a large volume of woody debris

Desired Future Conditions: Desired future conditions for this forest community exhibits ponderosa pine as the dominant tree overstory, but encompassing both a wide range of cover values (from open savanna with approximately 5% mature tree cover to nearly closed canopy) and mixed age structure (i.e. seedlings, mid-story trees, overstory trees, dead snags, and dead and down logs). Trees in excess of several hundred years would be scattered throughout with understories of grass-forb, shrub, and other tree species variable depending on aspect, elevation, and time since last fire. Overstory tree canopy cover and understory ladder fuels would generally be broken and patchy, effectively mitigating opportunities for continuous crown fire runs, while allowing limited torching of closed canopy patches. Accumulations of surface fuels (litter, duff, slash, logs, etc.) would be consumed periodically by low intensity, surface fire avoiding widespread damage to soils, mature canopy root systems, and perennial herbaceous cover.

Fire Behavior Characteristics in Mixed Conifer Forests:

The high peaks to the west, and many of the north facing slopes in the canyons, support mixed conifer forest. Because of their aspect, these mixed conifer stands receive reduced direct sunlight and are less arid than adjacent forests. Douglas fir, ponderosa pine, and South-western limber pine grow with Gambel oak and aspen. The stands are often dense. In lower canyons, the Douglas fir component is susceptible to drought and the species has seen almost 100 percent mortality over the past ten years. Historically, high-elevation mixed conifer forests burned in mosaic patterns with crown fire taking out large patches of forest during different events. This was demonstrated locally by the Thompson Ridge fire in 2013 that burned in a mosaic pattern of high to low intensities.

Fire frequency is variable and ranges from 12 to 300 years. Fire return interval for town site mixed conifer, primarily on north aspects of the interior canyons, ranged from 12 to 25 years from the 1600s until 1883, which marked the last recorded fire at all sample sites. Overstocking and buildups of large woody debris have created high fire hazards in most of the mixed conifer stands in the Los Alamos area. Fuel loads have increased due to drought related Douglas fir mortality and infestations of insects, particularly the spruce budworm. The high elevations areas of Bandelier National Monument sustain mixed conifer stands as do the upper reaches of canyons on LANL lands.



Typical mixed conifer stand with continuous fuels from ground to tree canopy

Most of the mixed conifer stands on north facing slopes within the town site have undergone hand thinning operations followed by pile burns. Behave Plus simulations indicate low rates of spread and low flame lengths can be expected from ignitions in treated areas. Untreated mixed conifer stands are classified in Fuel Model 10. Fires burning in surface litter spread with moderate intensity and speed. Because of the presence of high surface woody fuel loads, torching, spotting and crown fire is more frequent than in ponderosa pine stands.

Desired future conditions: Desired future conditions for most mixed conifer forests exhibit several species sharing dominance and with a full range of age classes. Trees in excess of several hundred years would be scattered throughout with understories of grass forb, shrub, and other tree species variable depending on aspect, elevation, and

time since last fire. Over story tree canopy cover and understory ladder fuels would be broken and patchy, effectively mitigating

opportunities for continuous crown fire runs, while allowing limited torching of canopy patches. Accumulations of surface fuels (litter, duff, slash, logs, etc.) would be consumed periodically by low intensity, surface fire avoiding widespread damage to soils, mature canopy root systems, and perennial herbaceous cover.

Fire Behavior Characteristics in Mid-Elevation Grasslands:

Much of the area within the perimeters of the Dome, Cerro Grande, and Las Conchas fires has been converted to open grasslands with an oak and New Mexico locust over story. These open areas often support about 70 percent ground cover in the form of with bunch grasses and forbs dominated by slender wheatgrass, little bluestem, and mountain muhly. The grasslands are concentrated to the west of the town site where they cover about 10,000 acres and along the southern boundary of the County in Bandelier National Monument and adjacent areas of LANL. The fire regime of these areas was radically altered. Formerly this area was covered with dense timber that supported crown fire. Currently, the primary fire threat is from flashy fuels that would generate much shorter flame lengths but the rate of spread along the surface is greatly increased. BehavePlus modeling predicts in moderate winds a flame length of 8 feet with a rate of spread of more than 7,000 feet per hour.



Grasslands within the Cerro Grande Fire Perimeter

Desired future conditions: The return of ponderosa pine forests in these areas will take many decades. To insure the recreation of healthy pine stands showing the desired characteristics detailed above, these areas should experience periodic fire disturbance.

Fire Behavior Characteristics in Piñon-Juniper Savannas and Woodlands:

The lower portions of the major canyons extending from the Sierra

de Los Valles and the town of White Rock are located on extensive plains covered with piñon- juniper savanna or woodland. Drought conditions in 2001 and 2002 caused 98 percent mortality in piñon in many areas, leaving areas of the landscape covered in juniper savannah. The vegetation community is characterized by an over story of piñon pine and one seed juniper with a groundcover of perennial grasses and forbs. Dominant shrubs are wavy leaf oak, mountain mahogany, and big sagebrush.

The historical frequency and type of fire in this woodland is not clearly understood. In general, the plant community is classified as Fuel Model 6. Surface fire is carried through the shrubs, but the fuel continuity is sparse. Under low wind speeds fire will not carry, but high winds may push fire through low canopy.

About 600 acres of woodlands at Bandelier, LANL and County lands has seen ecological restoration or fuel reduction projects. In each case, most of the standing dead piñon, some juniper has been lopped and scattered on the surface or masticated and scattered on site.



Piñon-juniper woodlands cover much of the lower elevations in Los Alamos

Desired Future Conditions: Woodland areas exhibit tree dominated communities with canopy coverages generally exceeding 30%; herbaceous under- stories are sparse with fire return intervals in excess of 25 years.

Assessment Criteria: Topography

Terrain

Key point: Terrain factors influencing fire behavior cannot be modified. In conjunction with the urban structure of Los Alamos about one of every seven houses in Los Alamos lies on a canyon edge, slope is a critical criterion for evaluating fire risk.

Topography is a primary component of wildfire behavior patterns. Steep terrain, canyons, aspect, and elevation range all play a role in the direction and rate of spread of a wildfire. Fires often run rapidly up steep slopes and are often pushed up or down canyons by daily cycles of wind direction. Because Los Alamos and White Rock are dissected by numerous canyons, fire hazards for neighborhoods is strongly influenced by their distance from steep canyons. (See Map 6.)

Forested Areas Inaccessible To Firefighters

Key point: Despite active maintenance of fire access roads and trails, difficult terrain makes direct suppression attack impossible on a wildfire ignition in many locations in Los Alamos.

Although Los Alamos and White Rock are laced with an extensive road and trail network, many locations within the county are inaccessible by vehicle or difficult to reach on foot. Due to steep terrain without escape routes, suppression of a wildfire ignition in many canyon areas would put firefighters at great risk. Inaccessible areas adjacent to structures are a priority for treatment

Assessment Criteria: Weather and Climate

Climate

Key point: Continuing climate changes increase the likelihood of wildfire in Los Alamos. Although Los Alamos and White Rock sit at about 7,300 and 6,300 feet above sea level respectively, the climate of both sites is generally warm and dry. Precipitation averages about 18 inches per year in the town site, and about 8 inches per year in White Rock. Fire risk is influenced by characteristically dry periods from April to July. The majority of large fires have occurred in these months. Following the dry spring, seasonal wind patterns bring moisture to the area in July and August. Daily heating and rising air along the mountain fronts combine with this moisture to produce frequent thunderstorms. The summer storms provide the area with more than 50 percent of its annual precipitation.

Drought is a recurring climate condition in New Mexico. The increase in large fires in the past two decades is related to extended dry periods. Recent climate data suggests long-term drought conditions will continue in the southwest, increasing fire risk and altering fire behavior. Historically, large wildfires in northern New Mexico occur in mid- to-late spring (with a peak in June) and are driven by prevailing spring winds out of the southwest. With each passing cold front, spring winds blow strongly and can reach up to 70 mph. Thus, housing areas with forested terrain to the southwest are most vulnerable to direct fire spread and to showers of firebrands.

Prevailing Winds

Key point: Fuel treatments on all jurisdictions should pay special attention to the prevailing wind direction, especially during the critical spring and summer months of southwest to northeast. The most recent examples of a wind-driven fire, the Cerro Grande and Las Conchas fires, moved steadily to the northeast, and at times advanced as much as two miles an hour in that direction. The wind factor is complicated by the concentration of dense forest areas to the south and west of Los Alamos. As a result, fires originating in the forests southwest of the town site and White Rock have the potential to be readily driven into the community.

Assessment Criteria: Fire Ignition Risk

Key point: The Jemez Mountains have an unusually high number of lightning strikes each year, but human caused fires have burned more acres. Studies of lightning strikes in the Jemez Mountains reveal between 9,000 and 23,000 strikes per year in the range. The highest risk is from June 12 to July 4 when frequent dry storms develop before there is enough atmospheric moisture to produce precipitation. More than 5,000 historic fires have been mapped in the range since 1909. Since 1977, five fires have burned more than 5,000 acres and the largest fire, Las Conchas, burned over 155,000 acres. Despite the abundance of lightning, these five largest fire were human-caused.

Results: Wildland Fire Hazard Rating from GIS Analysis

Using GIS mapping of open space data, aerial photographs, and GIS spatial data, forested and woodland areas in Los Alamos and White Rock were assessed for four characteristics and rated for the risk factor for each of the characteristics. The data were generated with a pixel size of 20 feet. Analysis was done in ArcGIS 10.2 using the weighted overlay function in Spatial Analyst. Wildlands were rated for fuel model, aspect, slope, and inaccessibility to fire suppression equipment. The resulting map indicates areas adjacent to the town site and White Rock where additional fuel reduction treatments are required.

Map: Los Alamos CWPP Los Alamos Wildland Risk Analysis



PRIORITY WILDLAND AREAS

- 1) Los Alamos Canyon: Western area south of large water tank, the south-facing slope on Department of Energy property
- 2) Between Walnut Street and south side of the golf course
- 3) DP Canyon between DP Road and New Mexico 502
- 4) Rendija Canyon on the north side of Barranca Mesa on Forest Service and County owned lands
- 5) North of Arizona Avenue and west of Ponderosa Estates
- 6) School Canyon from its confluence with Pueblo Canyon and Cerro Grande fire burned area

Assessment of Current Conditions: Structural Ignitability

Assessment Criteria: Neighborhoods

Key point: The original design of the government-built houses and street layout in Los Alamos make it expensive for homeowners to reduce the fire hazard in some neighborhoods.

Because most of Los Alamos was built by the Atomic Energy Commission (AEC) in the 1940s and 1950s, neighborhoods in Los Alamos have characteristic housing styles, densities, construction materials, and road widths. Based on these characteristics and neighborhoods' relation to the surrounding forest land, the town site and White Rock were divided into distinct neighborhood districts. Assessment criteria were analyzed on the neighborhood level. The following factors were rated for each neighborhood in the town site and in White Rock.



Housing density is high in many of the government-built neighborhoods in Los Alamos

Accessibility based on street width, number of access roads, and cul-de-sac length. Most streets in Los Alamos and White Rock are 24 feet or wider. Streets less than 24 feet are generally congested with parked vehicles, creating difficult access for firefighters. All neighborhoods in Los Alamos include cul-de-sacs with narrow turning areas, and only four streets are cul-de-sacs with more than 200 foot areas.

Housing density and average distance between structures. The cliff-and-canyon topography of Los Alamos places severe constraints on the availability of land for development. As the town grew after World War II, this was immediately apparent in the urban design of the many community additions constructed by the AEC. Houses are tightly packed on the streets of many of the older neighborhoods. Throughout the Eastern and Western areas, and North Community the distance between houses is consistently less than 40 feet. More recent developments—notably the Quemazon Communities and Hawks Landing—also exhibit densely packed homes. Fire in structures 50 feet or less from adjacent structures is likely to generate sufficient radiant heat to ignite the second structure. Thus, housing density plays an important role in the calculation of fire hazard in Los Alamos neighborhoods.

Structural ignitability based on dominance of flat roofs and flammable building materials. Los Alamos was built as a government town with an eye toward economy. Thus, many government-built housing areas have flat roofs that can act as repositories for firebrands during a wildfire.

Assessment Criteria: Defensible Space

Key point: The average fire hazard rating for Los Alamos in 2007 was 71, which NFPA considers a high risk rating. In a 2003 study, the average risk rating for Los Alamos was 81. In 2007, the Los Alamos County Defensible Space Project summarized data collected at about 40 random intersection points within the County. The objective of the study was to determine a fire risk rating for houses in the wildland-urban interface zone. Using the risk rating value generated by the form, intersection ratings were developed by averaging the rating of each subject house.

Of 16 intersections evaluated in Los Alamos, six were rated high, four high-moderate (scores in the upper 60s), five moderate, and one low. In the previous study, the same intersections rated 14 high and two moderate.

The average intersection rating in White Rock in 2007 was 43, which is considered a moderate risk. In the 2003 study, White Rock received a rating of 63, which is also in the moderate category.

Many of the treatments of homes during the Defensible Space project have not been maintained of the past ten years. Also, about 30% of the population of Los Alamos is new since the Cerro Grande fire and did not receive the educational components of defensible space provided immediately post fire. Thus there is a strong need for a new emphasis on homeowner responsibility education.

Assessment Criteria: Torching Trees and Firebrands

Key point: Most neighborhoods in Los Alamos and White Rock have several streets that will be exposed to showers of firebrands when a wildfire occurs.

Fire Scientist Jack Cohen toured Los Alamos the week following the Cerro Grande fire. His findings were not unlike those he found after dozens of fires in the previous years: direct flame contact from crown fire was not the principle cause of the loss of homes, but rather the shower of

wind-driven firebrands from burning trees or nearby houses (Cohen, 2000). Using fire models for 30 mph winds and crown and stand data for County open space areas, many neighborhoods could be exposed to firebrands during moderate-intensity fires.

RESULTS: IDENTIFYING HIGH RISK NEIGHBORHOODS

Key point: In Los Alamos, neighborhoods with a high percentage of perimeter lots remain in the high risk category. The risk in reconstructed neighborhoods in North Community is moderate. Fire risk in White Rock is low, but remains moderate in Pajarito Acres and La Senda.

With the exception of the Denver Steels neighborhood, all roadways in Los Alamos County are more than 20 feet wide, which is considered adequate access for fire protection vehicles. All roads are paved and signed, and response times for the fire department are within industry best practice. However, the risk factor is increased, in many neighborhoods that are located on mesas with only one access road.

In all neighborhoods many wildland fire risk factors cannot be changed. All of the high-rated intersections involved perimeter lots. Most are adjacent to steep slopes and ponderosa pine forests. With the existing lot sizes common in Los Alamos, a 300-foot vegetation-free buffer is not possible.

The neighborhood design of all of the government built neighborhoods in North Community and the Western Area exerts a huge influence on the urban fire risk factors. These neighborhoods have houses spaced less than 40 feet apart. Most houses are constructed with at least partial wood siding, no enclosed eaves, and flat roofs.

In areas with new construction, particularly in the Cerro Grande burned area, the revised building code and undergrounded utilities help lower the rating one level, from high to moderate or moderate to low. Out of sixteen intersections, six had at least one newly constructed or remodeled house and all the intersections dropped at least one rating level between the 2003 and 2007 surveys.

In White Rock, the 2003 study was done during drought conditions when dead piñons carried highly flammable red (dried) needles. When these needles dropped to the ground, the fire hazard risk was reduced. On perimeter lots and in the Pajarito Acres and La Senda neighborhoods, needle drop accounts for the reduction in risk rating.

Neighborhood Wildfire Hazard Rating From GIS Analysis

Using GIS mapping of intersection, open space data, aerial photographs, site visits, and AEC historical documents, each neighborhood in Los Alamos and White Rock was assessed for eight characteristics and rated for the risk factor for each of the characteristics. The data was generated with a pixel size of 20 feet. Analysis was done in ArcGIS 10.2 using the weighted overlay function in Spatial Analyst.

Each neighborhood was rated for street width, access to fire suppression equipment, the defensible space category, proximity to slopes greater than 20 percent, aspect, distance from

untreated forest lands, and probability of experiencing wind-driven firebrands. The neighborhoods with greatest risk of wildfire, should be the initial focus of continued efforts for treatments and improvements on private land, particularly in relation to the home ignition zone. Neighborhoods rated extreme and severe should receive priority.

Neighborhood risk ratings did not change from 2009 to 2015 due to the fact that neighborhood risk ratings are primarily determined by static factors such as topography and ingress and egress etc. In order to comply with New Mexico State Forestry’s “communities at risk” classification system, risk ratings from 2009 were converted into a three-class system of low, medium and high. Because risk ratings were assessed using a GIS model at the pixel level scale, some neighborhoods have a mixture of two or more risk ratings. However, to comply with New Mexico State Forestry’s rating system, the majority risk rating was assigned to these “blended” neighborhoods. For example, Barranca 3 has sections that are high risk and others that are medium but it was assigned a high-risk rating. Another change from 2009 is that more accurate neighborhood delineations were used to assign boundaries, although it should be noted again that the rating system remained the same. CWPP Priority rankings for neighborhoods did change based on fuels reduction treatments that have occurred since 2009.

Priority Treatment Areas: Neighborhoods

Community name		2015 priority ranking	2015 hazard rating	Changes since 2009
5	Timber Ridge	1	High	
6	Vista	2	High	
7	Los Arboles	3	High	
10	Lower Loma Linda	4	High	South portion burn in 2011
12	Ponderosa Estates South	5	High	West side burn in 2014
13	Ponderosa Estates North	5	High	West side burn in 2014
29	Walnut Villa	6	Medium	Mitigation thinning in Walnut Canyon in 2012
18	Del Norte	7	High	
19	Del Sol	8	High	
20	Quemazon 3	9	Medium	Pueblo Bowl mitigation thinning in 2012 & pile burn in 2015
2	Denver Steels	10	High	
3	Orange Street	11	High	Prescribed burn to the south in 2015
51	Pajarito Acres	12	Low	
15	Barranca 2	13	High	Parts of Bayo Canyon and Gonzales Rd from 2009-2015
14	Barranca 1	14	High	Parts of Bayo Canyon and Gonzales Rd from 2009-2015
4	Group 16 Diamond	15	High	

8	EA Rim and Pine	16	High	
9	Verde	17	High	
11	Arizona Woodland	18	High	
16	Barranca 3	19	High	Prescribed burn in parts of Bayo Canyon and Gonzales Rd from 2009-2015
17	Barranca 4	20	High	Prescribed burn in parts of Bayo Canyon and Gonzales Rd from 2009-2015
1	Quemazon 1 and 2	21	High	Pueblo Bowl mitigation thinning in 2012 & pile burn in 2015
23	North Community #3	22	Medium	School Canyon burn in 2011
31	Deer Trail	23	Medium	
32	Terry Lane	24	Medium	
38	Royal Crest	25	Medium	Mitigation thinning in 2016
24	Gold Street	26	Medium	
26	Group 16 Canyon 1	27	Medium	
33	Broad View	28	Medium	
34	La Mesa	29	Medium	
36	Tskimu Village	30	Medium	
27	Sombrillo	31	Medium	
35	Alamo-Capulin	31	Medium	
28	EA Manhattan Lp	32	Medium	
37	Big Rock Lp	32	Medium	
21	North Community #1	33	Medium	
30	North Community #2	34	Medium	
25	Trinity Apt.	35	Medium	
22	Western Area	36	Medium	
39	Los Pueblos	37	Medium	Prescribed burn in parts of Bayo Canyon and Gonzales Rd from 2009-2015
40	2400 Central	38	Medium	
42	Ponderosa	39	Low	
46	Loma Linda	40	Low	
48	White Rock	41	Low	
50	La Senda	42	Low	
49	Valle del Sol	43	Low	
47	Mendius	44	Low	
41	Canyon Village	45	Low	Prescribed burn in 2015
44	Eastern Area #1	46	Low	
45	Iris Myrtle	47	Low	

43	Downtown	48	Low	
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EXISTING PROTECTION CAPABILITIES

Suppression Capabilities:

Interagency Wildfire Management Team

Following the Dome fire in 1996, local land management agencies realized the potential benefits of coordinated planning for wildfire, sharing equipment and personnel resources, and simply communicating on a regular basis. Representatives from all jurisdictions in Los Alamos County formed the Interagency Wildfire Management Team (IWMT) and began bi-weekly meetings that have continued through the present. The multi-agency team, which includes citizens from the community, continues to identify, discuss, and address issues pertaining to wildfire mitigation and management in the Los Alamos region. The emphasis of the team is to take hands-on action needed to protect human life, improve firefighting safety, improve firefighting access, protect property, and maintain forest health (see IWMT Charter in Appendix C).

Fire Protection Resources

The Los Alamos County Fire Department (LAFD) is nuclear-grade municipal fire department with multiple disciplines that includes wildland fire and wildland-urban interface suppression. LAFD serves in fire protection for both the community and the laboratory.

Out of five fire stations, LAFD deploys six front line compressed air foam Type 1 engines, 1 Smeal 105-foot aerial device, six ambulances, five CAF Type 1 tenders, five type 6 CAFs brush patrols (mini-tenders), and one rescue truck and an aircraft rescue truck

Fire Protection Personnel

The LAFD has 130 combat firefighters assigned to three shifts at five stations. Supervision is provided by eight Chief Officers and a Training Captain.

When fully staffed during fire season, the Interagency Fire Center at TA-49 and Bandelier National Monument are host to:

- A Type 3 interagency helicopter with crew with a total staff of nine Forest Service and National Park Service firefighters.
- A Type 6 wildland fire engine with a National Park Service crew of five firefighters
- A Fire Management Officer, Assistant Fire Management Officer, Fire Program Assistant and Fire Ecologist are on duty year-round.
- A fire effects monitoring staff is available during fire season. Most are firefighter qualified or higher.

Training

All uniformed LAFD members are certified in:

- IS-700.a – NIMS An Introduction
- IS – 800B – National Response Framework, An Introduction

- IS – 100.a – Introduction to Incident Command System
- IS – 200.a – ICS for Single Resources in Initial Action Incidents
- IS – 804 – Emergency Support Function (ESF) #4 – Firefighting

Chief Officers have advanced certification;

- ICS – 300 – Intermediate ICS (B/C and Above)
- ICS – 400 – Advanced ICS (A/C and above)

Initial Wildland training consists of the following courses:

- ICS 100 – Introduction to ICS
- L-180 – Human factors on the Fire Line
- S-190 – Introduction to Wildland Fire Behavior
- S-130 – Fire Fighting Training
- S-133 – Look up, Look down, Look around

Refresher training consists of the following course:

- RT-130 – Annual Fire Line Safety Refresher and Shelter Deployment

Specific Requirements: NFPA 1051, NWCG, and Skills Crosswalk Wildland Training for Structural Firefighters

Fire adapted communities and Firewise communities

The National Cohesive Wildland Fire Management Strategy, a “strategic push to work collaboratively among all stakeholders and across all landscapes” developed in 2014 lists creating fire adapted communities as one of three primary goals along with resilient landscapes, and safe and effective wildfire response. Fire adapted communities (FAC) is a conceptual framework for engaging community stakeholders at various scales from the individual homeowner to businesses to reduce wildfire risk. FAC concepts are useful for helping communities reframe how they think about wildfire.

In the West, wildfire is a natural – and ecologically necessary – component of fire adapted ecosystems. Acknowledging this fact is an important component to becoming a more fire adapted community and a good starting point for education and outreach to community members. The figure represented here outlines the various elements that make a community fire adapted.

Firewise Communities is a recognition program administered



by the National Fire Protection Association that began in 2002. Firewise emphasizes fuels reduction and steps homeowners can take to reduce their individual wildfire risk. For example, landscaping practices to reduce flammable materials close to the home and standards for pruning trees and bushes. Firewise.org contains several resources for homeowners, such as an online toolkit and checklist for steps to reduce wildfire risk. Firewise recognition is achieved after a community completes a 5-step process:

1. Obtain a wildfire risk assessment as a written document from your state forestry agency or fire department.
2. Form a board or committee, and create an action plan based on the assessment.
3. Conduct a “Firewise Day” event.
4. Invest a minimum of \$2 per capita in local Firewise actions for that year.
5. Submit an application to your Firewise liaison.

Firewise recognition is an important tool in the ongoing process to be fire adapted. Many communities working to be fire adapted begin by becoming recognized as a Firewise community. In summary, “Firewise is a designation, fire adapted is a lifestyle” (Nystrom, 2016).

Water Pressure

An important improvement to the water delivery system has increased the capability of Los Alamos to suppress large-scale fire. A 7.75 million gallon water tank was relocated to high ground in North Community to provide adequate pressure in water lines.

Emergency Management:

- In 2003 Los Alamos County added an emergency management coordinator to its staff. The manager coordinates activities that facilitate preparation for, response to, recovery from, and mitigation against disasters, both naturally occurring and man-made. Protection capabilities include:
- Hazard Mitigation Plan, adopted by the County Council in March 2006. The plan evaluates all potential hazards in the County and ranks wildfire at the top. The plan recommends continuing fuel mitigation projects and developing a 20-year plan for managing fuels on County-owned open space.
- Emergency Operations Plan, adopted by the County Council in March 2006. The plan includes details on evacuation of the town under various scenarios such as wildfires at specific locations. It divides the community into zones, each with specific routes and sequence for evacuation.
- Emergency Alert Advisory Radio. To facilitate emergency public warning and notification, the County completed the installation of an Emergency Alert Advisory Radio system in 2006. Los Alamos Emergency Management Radio operates 24/7 from two transmit sites (White Rock and the town site), and includes National Weather Service information as well as local traffic advisories and community announcements.
- Emergency Telephone Notification. Fast and targeted emergency notification is a critical public safety tool. This system places telephone calls to inform citizens and first responders of pending dangers and public safety issues. It allows the Office of

Emergency Management to efficiently identify, notify and provide instructions to citizens in minutes. It permits notification to highly targeted areas. Public safety officials can map the affected area, record a message and send it.

- Training. During 2007 and 2008, all command level staff for both the Los Alamos Police Department and the Los Alamos Fire Department completed ICS 300 AND ICS 400 advance-level Incident Command courses.

County Code and Homeowner Responsibility

Building Code

In the aftermath of the Cerro Grande fire, the Los Alamos Fire Department brought the County Council a proposal to adopt the Uniform Fire Code section related to Wildland/Urban Interface Code. Despite the recent losses due to fire, a surprising number of the public opposed the changes. The Council supported the fire department and adopted a modified version of the code (see Appendix B).

The revised building code took effect in 2001 and provided a framework for creating ignition resistant structures. All neighborhoods within the town site of Los Alamos were zoned as Class I with the strictest construction requirements. The code required all new construction to have Class A roof covering; eave, soffit protection; exterior wall flame resistance; window, door, and skylight requirements. Neighborhoods in White Rock were zoned as Class II, with similar but less restrictive construction requirements.

Homeowner Responsibility for Home Ignition Zone

Home ignitions can be prevented by reducing home ignitability. Most houses destroyed by wildfires are ignited by firebrands and not by direct flame contact. The home ignition zone is the area around a house where falling firebrands could lead to a structure ignition. Coincident with the County's and other land management agencies' continued work to reduce fuels must be the realization by homeowners that their land and property are their responsibility. Not only do they need to protect their own safety and belongings, but they must be responsible neighbors, and not unduly put firefighters at risk by expecting their house to be defended against fire under all circumstances.



Rather than exposed eaves, the current interface code requires new construction to include eave protection from firebrands.

MITIGATION IMPLEMENTATION PLAN

Key point: This CWPP acknowledges that wildfire is a part of the landscape of Los Alamos. Surrounded by ponderosa pine forest, it is not possible to exclude fire. However, by careful management of forest ecosystems and with thoughtful homeowner preparation, we can choose the type of fire that we will face in the future. The following strategies are designed to reduce the threat of crown fire in surrounding forests and reduce the structural ignitability of the buildings within the community.

Implementation Strategies

Implementation Strategies: Wildland

Continue appropriate mechanical or hand thinning operations on untreated lands within the CWPP boundary. Treatment is required not only in areas immediately adjacent to urban areas, but also the nearby forested areas that lead or might directly carry fire to urban developments. Fuel treatments, create areas that will be less likely to sustain a crown fire that enters or originates within it.

Much of this type of work is required outside the immediate interface area. Also, as Los Alamos County continues to acquire forested parcels of land through purchase, exchange, or land transfer from the Department of Energy and USDA Forest Service, these parcels will need to undergo fuel reduction treatment.

Actions:

- Continue fuel reduction treatments on County-owned lands.
- Reduce fuel loads, stand densities, raise live crown base, create new and reinforce existing fuel breaks to the west and southwest of the community, the direction from which wildland fires are most likely to approach Los Alamos.
- Continue initial entry into areas with heavy accumulations of dead and down wood and burn the material when conditions are appropriate.



Pile burning operations in Pueblo Canyon December 2007

Remove pockets of high fuel loads: Passive management of public lands for the past 100 years has resulted into accumulations of fuel up to 20 tons per acre. Initial fuel treatments in these areas require the removal of huge amounts of material. Although many of the forested areas in Los Alamos County have been thinned, these initial entries are faced with large volumes of dead and down timber lie scattered on the surface. Although not a threat for a crown fire, the fuel jackpots could be the source of firebrands carried into neighborhoods by high winds.

Actions:

- Continue to concentrate treatments on areas with heavy ground fuel loads that are inaccessible to fire vehicles.
- Pile material and burn the piles when it is safe to do so, preferably during cool, wet periods.

Continue hand thinning and pile burning: Not all of the rugged canyons within Los Alamos have received fuel reduction treatments. Steep canyons such as Barranca and its tributaries remain a threat to housing above.

Actions:

- Identify steep slopes below housing areas with heavy standing or dead and down fuel loads.
- Treat with hand thinning crews and pile and burn the slash under safe conditions.
- In areas pre-treated by thinning, pile burning, or other operations, continue broadcast burning according to federal agency-approved prescribed fire standards.

Continue broadcast burns: Once forests have been pre-treated by thinning and the removal of ladder fuels, continued fire resistance requires periodic burning of ground fuels and litter accumulation. Low intensity surface fire releases nutrients into the system and provides a natural mechanism for reducing the number of ponderosa pine seedlings and saplings per acre. Adult ponderosa pines are adapted to such fires and are not harmed by them. Native shrubs benefit from period burning and rapidly re-grow by sprouting from extensive roots. Fire provides a safe, cost-effective, and ecologically sound mechanism to maintain fire resistance for the long-term.

Actions:

- Establish a plan for periodic, routine broadcast burning on all priority treatment areas.

Provide public information for all burning operations through all possible means. The sight of wildland smoke still elicits an emotional response in many Los Alamos residents. Fire and police dispatch receive dozens of calls when prescribed fire operations take place within sight of the community. Fire managers should provide updated information on burn operations through every possible outlet.

Actions:

- Provide burn day information through print and broadcast media, County and Los Alamos National Laboratory Intranets, doorknob hangers, commercial area bulletin boards, road signs, and overpass banners

While pursuing an active burn program, mitigate the impacts of smoke on neighborhoods and individuals. Smoke from burning operations impacts the health and comfort of County residents. This is particularly true during initial entry burns where downed logs and stumps are often pitch laden and produce disproportionate volumes of smoke.

Actions:

- Provide adequate warning of upcoming burns to smoke-affected residents via a phone or email list.
- When burning within 200 yards of houses, limit the number of piles or acres burned in one day to limit smoke production.
- Rotate the burn areas through the season so that individual Neighborhoods are not exposed to smoke more than two consecutive days or for more than five days over a fall and winter burn season.
- Regularly inspect and maintain designated fire access roads and trails.



Much of the forested area of Los Alamos is isolated and far removed from paved roads. Access to these areas is by unpaved roads or by trail. In many areas, fire or insect-killed trees regularly fall across the access corridors. To maintain access at all times, the roads and trails should receive regular inspection and maintenance.

Actions:

- Establish a periodic inspection routine, particularly before and during the fire season.
- Maintain the surface of the roads and trails, clearly mark them, and keep them clear of obstructions.
- Provide trail and road maps to public safety personnel.
- Provide field training for safety personnel to acquire knowledge of the location and names of County roads and trails.

Implementation Strategies: Community

Develop a program for assessing and treating problems within individual home ignition zones.

Actions:

- Offer home ignition zone assessments to all homeowners in high and moderate hazard areas.
- Develop strategies for assisting elderly or indigent homeowners with correcting problems within the home ignition zone.
- Provide information on wildfire protection for homeowners through real estate agents and insurance companies.
- Develop active participation in homeowner associations and neighborhood groups.
- Generate and distribute a list of available services and providers for fuel reduction work.
- Offer tax break incentives for retrofits with ignition resistant building materials for homes in the high and moderate risk areas.
- Work with local youth-oriented agencies and groups to develop a paid work force for providing services in home ignition zones.
- Encourage cleanup of debris piles accumulating along property lines: Many Los Alamos residents dump yard waste over their back fences onto County-owned land. These debris piles are often the largest pockets of fuel in the canyons within the town site.

Actions:

- Monitor the boundary between open space and private land. Enforce the County code in reference to unlawful accumulation of flammable debris.
- Provide residents with prompt removal of slash and debris from County-approved private fuel mitigation projects.

Implementation Strategies: Interagency

Continue Interagency Wildfire Management Team and interagency cooperation efforts.

Continue to engage land management agencies in community based fire protection: Jurisdictions within the Los Alamos region must continue to ensure that a landscape scale approach to fuel management is taken. The broad outlook provided by this CWPP should be reviewed bi-annually to adapt it to changing environmental, climatic, and management conditions. The strategies for planning, prioritizing, and implementing positive steps toward continuing fire protection should reflect changes in the landscape.

Action:

- The CWPP should be reviewed bi-annually in November and in June.

Utilize mechanisms already in place and generate new agreements to achieve fuel load reduction across jurisdictional boundaries.

Actions:

- Use the existing resource order system to provide all jurisdictions with proper staff to implement individual components of fuel reduction projects.
- Expand the interagency fire suppression agreements to fuel reduction projects as staff and funding permit.

Institutionalize continued fuel management on Los Alamos County lands: Continued protection of life and property from wildfire requires a long term commitment on the part of the community. Maintenance burning should be a part of the responsibilities of the County as a land manager. Private owners should revisit the issues in the home ignition zone annually, and make a commitment to annual maintenance to reduce the likelihood of a home ignition. A funding commitment must accompany the commitment to on-the-ground fuel reduction.

Action:

- Establish a single point of contact with adequate time and funding for effectively implementing fuel management on Los Alamos County lands and advising private owners on reducing the ignition potential around their homes.

A. Recommended Implementation Actions

Hand thinning remaining pockets of overstocked forest stand: Small pockets of un-thinned forest remain on County owned land. Candidates for thinning projects can be found in the priority treatment areas of this CWPP, Los Alamos and Rendija canyons.

Broadcast burning: Maintenance treatments are required to continue the fuel reduction benefits of thinning projects. The most effective and beneficial method of maintaining treated blocks is broadcast burning. Initial treatments prepare stands for the reintroduction of fire: stem densities are greatly reduced, ladder fuels removed, and dead and down material collected and piled. Under specific weather conditions, wildland firefighters use drip torches to ignite surface fuels. Pine litter, grasses, and dead and down wood are consumed. Some mature trees are scorched, but usually none are killed in the burning operation.

Pile burning: In steep sided, narrow, and inaccessible canyons, fuel loads of live or dead and down wood can exceed 20 tons per acre. Material can be cut, piled, and then under prescribed conditions burned on site. Standing dead ponderosa pines and Douglas firs are felled and the branches lopped and piled. Small diameter boles are bucked and added to the piles. Large boles are bucked and scattered. Large snags are left for wildlife habitat. Small live Douglas firs and ponderosa pines are thinned to open up the stands and reduce ladder fuels. Piles are sometimes covered with heavy waxed paper to keep them dry. The pile burning prescription calls for fall and winter burning.

Specific Implementation Actions: Wildland Treatments

Los Alamos Canyon below the town site from the Los Alamos Reservoir to DP Canyon: Los Alamos Canyon holds dense mixed conifer stands that could be a source of firebrands during a

wind-driven wildfire. Portions of the canyon could be treated mechanically, but much of the steep terrain would require hand treatment.

North aspect of Rendija Canyon below Barranca Mesa: A 35 acre parcel of the Santa Fe National Forest has been slated for purchase by the County of Los Alamos as part of the San Ildefonso land settlement case; an additional 100 acres is slated for transfer from the DOE to the County of Los Alamos. These parcels are densely forested and lie directly below homes on Barranca Mesa. Presently caught between owners, only limited treatments have been done on this critical parcel. About 10 acres of this parcel could be treated mechanically, but the remainder requires hand thinning. Pile burning and a broadcast burn on the lower slopes should follow thinning operations.

North of Arizona Avenue and west of Ponderosa Estates: This area of the Santa Fe National Forest has been slated for treatment for about 10 years but has not yet been completely thinned. The area should be hand thinned, and materials piled and burned when appropriate.

School Canyon from its confluence with Pueblo Canyon to the Cerro Grande burned area: This small but densely forested canyon has significant Douglas fir mortality. Hand thinning and pile burning should be implemented.

Specific Implementation Actions:

Home Ignition Zones

Critical to the success of the Los Alamos CWPP is the acceptance of responsibility for the Home Ignition Zone (HIZ) by individual homeowners. Although ultimately up to the individual, the community can provide education about increasing structural resistance to firebrands, and provide services that benefit a segment of the community by reducing the threat to HIZ.

In 2002 and 2003, Los Alamos County offered a Defensible Space program. About 1,500 homes received some defensible space work. An opinion survey three years later indicated that most participants felt they would benefit from periodic reevaluations of their property. Also, many respondents indicated that due to health issues, they were unable to maintain the gains that the program had made on their property. To create fire-resistant neighborhoods, mechanisms need to be in place to continually educate, reevaluate, and perform work in the home ignition zone.

About 1,700 homes in Los Alamos border open lands. These homeowners would benefit from periodic home ignition zone (HIZ) inspections. Many willing homeowners are physically unable to perform the work necessary to maintain an ignition resistant property. Also, about one in five families in Los Alamos arrived after the Cerro Grande fire and are not fully aware of the continuing likelihood of wildfire entering the community. The community should institutionalize continuing assessments of HIZs, and where work is desired but not possible, provide service or incentives to accomplish the work.

Provide Homeowner Risk Assessments for HIZ: Homeowners frequently request that the County provide a service for regular evaluation of HIZ. Such a service would benefit the entire community by providing a means to assist homeowners and to monitor conditions within

neighborhoods. Focus first on providing the service to priority neighborhoods, then offer evaluations throughout the community.

Continue Annual Spring Cleanup Days: Since 2002, the County has sponsored clean up days that in part focuses on reducing fire threat. This includes providing refuse pickup, work gloves, and volunteer assistance on projects.

Provide On-Site Organized Chipping of Large Woody Debris: To effectively encourage homeowners to reduce fuels on their properties, the County should provide a mobile chipping service. The chipper would visit neighborhoods either on request or as part of a rotating schedule. Chips would be distributed to the homeowners for erosion control, or used on County projects.

Sponsor Fuel Reduction Services for the Elderly and Infirm: To assist those who are willing but physically unable to perform fuel reduction work on their property, the County should provide or support some type of coordination services of volunteers from the community.

Priority Neighborhoods

Upper/Lower Loma Linda: The portion of this neighborhood south of San Ildefonso Road (lower Loma Linda) holds some of the densest stands of ponderosa pine in the Los Alamos town site. Homeowners have been reluctant to address the issue of defensible space, but may be more inclined to look at the home ignition zone. Each homeowner should be offered an assessment. In upper Loma Linda, homeowners should be presented with the concept of the home ignition zone.

Southwest downtown: Los Arboles, Timber Ridge: These high housing density neighborhoods are located on the north rim of Los Alamos Canyon. Steep terrain and untreated forests lie directly below. Wildfire in the canyon or on the slopes would quickly pass into the neighborhoods. HIZ evaluations are essential in this area.

Ponderosa Estates: The newer house construction in Ponderosa Estates is a great asset to the HIZs in the neighborhood. However, the subdivision has an average ponderosa pine stem density over 200 trees per acre. HIZ assessments, particularly related to vegetation and debris management, should be offered to all residents.

Quemazon: This is a new neighborhood on the edge of forested lands. Most houses were built under the new wildland interface code regulations. HIZ assessments should concentrate on fuel continuity, vegetation management, and the condition of the many flat roofs in the area.

Del Norte and Del Sol: These two subdivisions on North Mesa are surrounded on three sides by forested land. Many houses are located on the rim of Pueblo Canyon. The primary threat from wildfire lies in firebrands. HIZ assessments should be offered to all residents.

Pajarito Acres and La Senda: This large lot subdivision is located entirely within piñon-juniper woodland. Many of the piñons are insect killed. Because the lots are large, each property owner is faced with a large volume of potential fuel to remove. The neighborhood would benefit from

an assistance program for fuel removal and transport. HIZ assessments should be offered to all residents.

Denver Steels: Because the AEC established the neighborhood as temporary housing in the mid-1940s, the Denver Steel area has a high housing density, narrow streets, and one access/egress road. A defensible space approach would benefit the neighborhood, specifically for the estimated 60 homes on the edge of the surrounding forest. Backyard cleanup, enforcement of the County code in relation to increasing fire hazard by improper disposal of yard waste, and careful management of vegetation should be implemented for at least the perimeter houses.

Barranca Mesa #2: Because this area lies above untreated forest lands in Rendija Canyon, HIZ assessments should be offered to all residents. Wood piles, building materials, and fuel continuity with the surrounding forest lands should be addressed on each property.

Barranca Mesa #1: About 60 percent of the homes in this neighborhood border forested lands. The primary wildland fire threat is from firebrands. HIZ assessments should be done with respect to vegetation and debris management, building materials, and disrupting fuel continuity.

Big Rock Loop/San Ildefonso: The southern edge of this neighborhood lies on the rim of Pueblo Canyon. Firebrands from a wildfire in the ponderosa pine or mixed conifer forests below are the primary threat. HIZ assessments related to firebrands should be offered to all residents.

Walnut/Villa: These two streets lie on a narrow finger of land surrounded on three sides by ponderosa pine forest. Mitigation work has reduced fuel loads, but torching trees and fast moving surface fire may present a future threat to the neighborhood. Many residents store firewood or other materials in their backyards; also, many throw yard waste over their back fences onto open space. The neighborhood would benefit from HIZ assessments, enforcement of the County code in relation to increasing fire hazard by improper disposal of yard waste, and from upgrades to government era wood siding on many homes.

Education and Outreach

Service Learning Activities with Los Alamos Youth Groups: Each year the Los Alamos County Parks Division partners with the Volunteer Task Force to conduct service learning projects focused on fire ecology and fuel reduction. Participants include sixth and eighth grade students in the Los Alamos Public Schools; the YMCA Youth Environmental Service Corps; the YMCA Youth Conservation Corps; scout groups; and others. Projects are developed that provide real service work in the outdoors and relate to fuel reduction, ecological monitoring, and trail maintenance. About 800 students per year participate in the programs. Under the CWPP, these activities should continue.

Annual Tour of Demonstration Houses: Many community residents have re-built or remodeled homes to reflect the principles of reducing the fire threat within HIZ. Once a year, several of these homes should be identified as models and the owners asked to participate in a community tour of construction



techniques, building materials, and vegetation manipulation. The focus would be to look at the alternatives to making a house fire resistant: improving the HIZ is a series of tradeoffs.

Develop and Distribute Brochures for New Residents: Many community residents arrived after the Cerro Grande fire which served as a wake-up call. Many newcomers are often unaware of the community's location on the wildland-urban interface. This segment of the population should be made aware of the likelihood of wildland fire and the basic precautions needed to protect their homes from it. Information packets could be provided through realtors, banks, and other public sources. The information could also serve as a reminder for long-time residents.

Bandelier Fire Management Newsletter: Bandelier Fire Staff participates in community events and education and outreach opportunities through Los Alamos County, local schools, and other local organizations.

Public Tours of Burn Units: Annually offer public tours of burn units immediately following treatment. Insure that the local press is invited and attends the tour.

MONITORING

Rigid fire and fuel management plans often result in dire consequences. Thus, any plan for community wildfire protection must be constantly re-evaluated. Changes in environmental, political, or social factors can redirect the focus of management strategies over the course of a single year. Rather than a standing document, this CWPP will adhere to the principles of adaptive management. The plan will be reviewed bi-annually and revised based on changes in climate, environmental developments, residential and commercial development, and unexpected delays in implementation, citizen response, and available funding

Bi- Annual Re-Evaluation

At the Bi-annual meetings specifically the one in November the IWMT will cover this CWPP and will consider the following:

- Update risk assessment with new data, new development, or changing conditions
- Re-assess priority treatments and revise prioritization based on existing conditions
- Document completed project areas, homeowner assistance contacts, education programs
- Monitor conditions of fire roads, trails, and pre-established fire lines
- Track grant opportunities and funding
- Review emergency management procedures in light of community changes

Following the meeting, drafting of an update will be assigned to the Fire Department. IWMT will issue an update to jurisdictional managers and County officials by February 1. If substantial changes are proposed, a public meeting will be held before the start of the next fire season, preferably by March 15.

Ecological Monitoring

In the scientific community of Los Alamos, there is never a lack of data. Monitoring forest and fuel conditions is regularly accomplished on all jurisdictions. For all fuel reduction

implementation actions, monitoring will focus on meeting the cultivation of forest lands within the County. Those standards are set forth by the operations in the “Silvicultural Standards”.

Ecological Monitoring Capabilities:

- Bandelier National Monument: Bandelier staff includes a fire ecologist and a fire effects monitoring staff. This vegetation monitoring program uses the best available information (such as data collected on-site, scientific journals, and knowledge from resource specialists) to formulate realistic objectives for desired future resource conditions. It involves Monument staff at many levels, as well as local scientists from universities or cooperating/neighborhood agencies. Data is used to evaluate if fire and resource management objectives are being met.
- Los Alamos National Laboratory: Over the past decade, LANL ecologists have collected and reported on baseline data for laboratory lands. Fire managers continue to collect new data for establishing fuel management objectives.

Annual Review of Monitoring Results

Monitoring results from all jurisdictions will be presented for review at the fall meeting of the East Jemez Resource Council, a multi-jurisdictional group of land managers focused on landscape-scale management strategies for the eastern Jemez Mountains. This group will make recommendations for adaptive management strategies to the IWMT for inclusion in the bi-annual update of the CWPP.

APPROVALS

I approve this Community Wildfire Protection Plan for the County of Los Alamos:

Troy Hughes
Fire Chief, Los Alamos County

Date

Kristin Henderson
Chairman
Los Alamos County Council

Date

Todd Haines
District Forester
EMNRD Forestry Division

Date

Appendix A: Community Wildfire Protection Plan Planning Process

The 2015 CWPP update was developed collaboratively with members of the CWPP core team, County residents, and other stakeholders. A project website was established (www.forestguild.org/losalamoscwpp) to announce meetings and share drafts of the 2015 update. The CWPP core team led the collaborative effort and was comprised of County officials, adjacent land management agencies, residents, and other stakeholders. Table 5 below lists members of the core team who were invited to core team meetings. It should be noted that not all members of the core team were able to meet in person. Residents and other stakeholders were also provided with options other than meetings to provide input to the CWPP update.

Name	Position	Affiliation
Lenny Ortiz	Vegetation Management Coordinator	Jemez Mountains Electrical Cooperative
Beverly Simpson	Emergency Manager	Los Alamos County
Samuel Martinez	Electrical Lineman supervisor	Los Alamos County
Eric Peterson	Open Space Specialist	Los Alamos County
Jeff Humpton	Parks Superintendent	Los Alamos County
Eric Edmonds	Risk Management	Los Alamos County
Julie Williams	Public Relations	Los Alamos County
Stephen Rinaldi	Fire Marshall	Los Alamos County Fire Department
Dan McCarn	Citizen	N/A
Marla Rodgers	Fire Management Officer	National Park Service
Todd Haines	Bernalillo District forester	New Mexico State Forestry
Carlos Valdez	County Extension Agent	New Mexico State University
James R. Mountain	Governor	San Ildefonso Pueblo
Daniel Denipah	Forestry Division	Santa Clara Pueblo
Michael Feulner	Wildland Captain	Santa Fe County Fire Department
Richard Sack	Assistant Fire Management Officer	Santa Fe National Forest
Jon Boe	Fire Management Officer	Santa Fe National Forest
William Armstrong	Fuels Specialist	Santa Fe National Forest

The core team convened several meetings to discuss progress since the 2009 CWPP, identify priority action items for the 2015 update, and to review drafts of the final document. Table 6 below provides an overview of all core team and public meetings convened for the 2015 CWPP update.

Date	Meeting	# of Participants	Representation
1/28/16	Public meeting	6	Forest Stewards Guild, Los Alamos County Fire Department, Los Alamos County Open Space, residents.
3/6/16	Core team meeting	8	Forest Stewards Guild, Los Alamos County Fire Department, Los Alamos County Open Space, Santa Fe National Forest, Los Alamos County, New Mexico State Forestry.
4/20/16	Public meeting	9	Forest Stewards Guild, Los Alamos County Fire Department, Los Alamos County, National Park Service.
7/6/16	Core team meeting	8	Forest Stewards Guild, New Mexico State Forestry, New Mexico State University Extension Services, Los Alamos County Open Space, Los Alamos County Fire Department, Los Alamos County, National Park Service,
7/14/16	Public meeting	6	Forest Stewards Guild, Los Alamos County Open Space, Los Alamos County Fire Department, Los Alamos County, residents.
8/16/16	Core team meeting	TBD	TBD

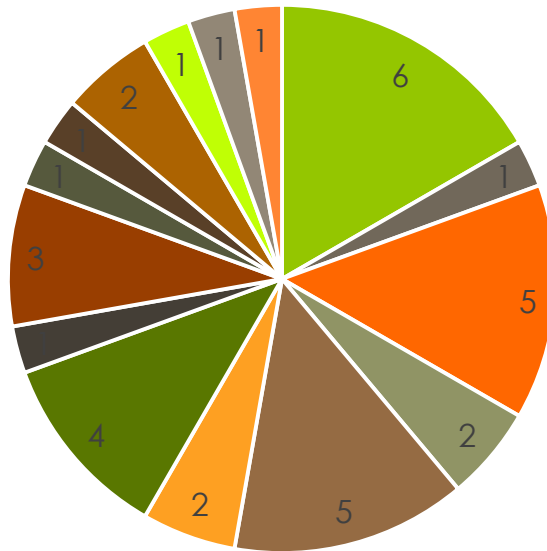
In addition to meetings, core team members and members of the public were invited to complete a survey that helped inform priorities and action items for the 2015 update. A similar survey was used in the 2009 CWPP. Many questions were repeated in 2015 to track changes in resident involvement in wildfire preparedness and perceptions regarding various fuel management practices. A paper and digital version of the survey were made available to residents. Paper copies of the survey were distributed at the April and July public meetings. The survey was posted online using Google forms. A link to the online survey was provided on the project website, the County Open Spaces Facebook page, the Los Alamos Daily Post, and distributed to various email lists available to core team members. Survey questions and results are included below.



Los Alamos Daily posting about resident survey

What neighborhood and/or community do you live in?

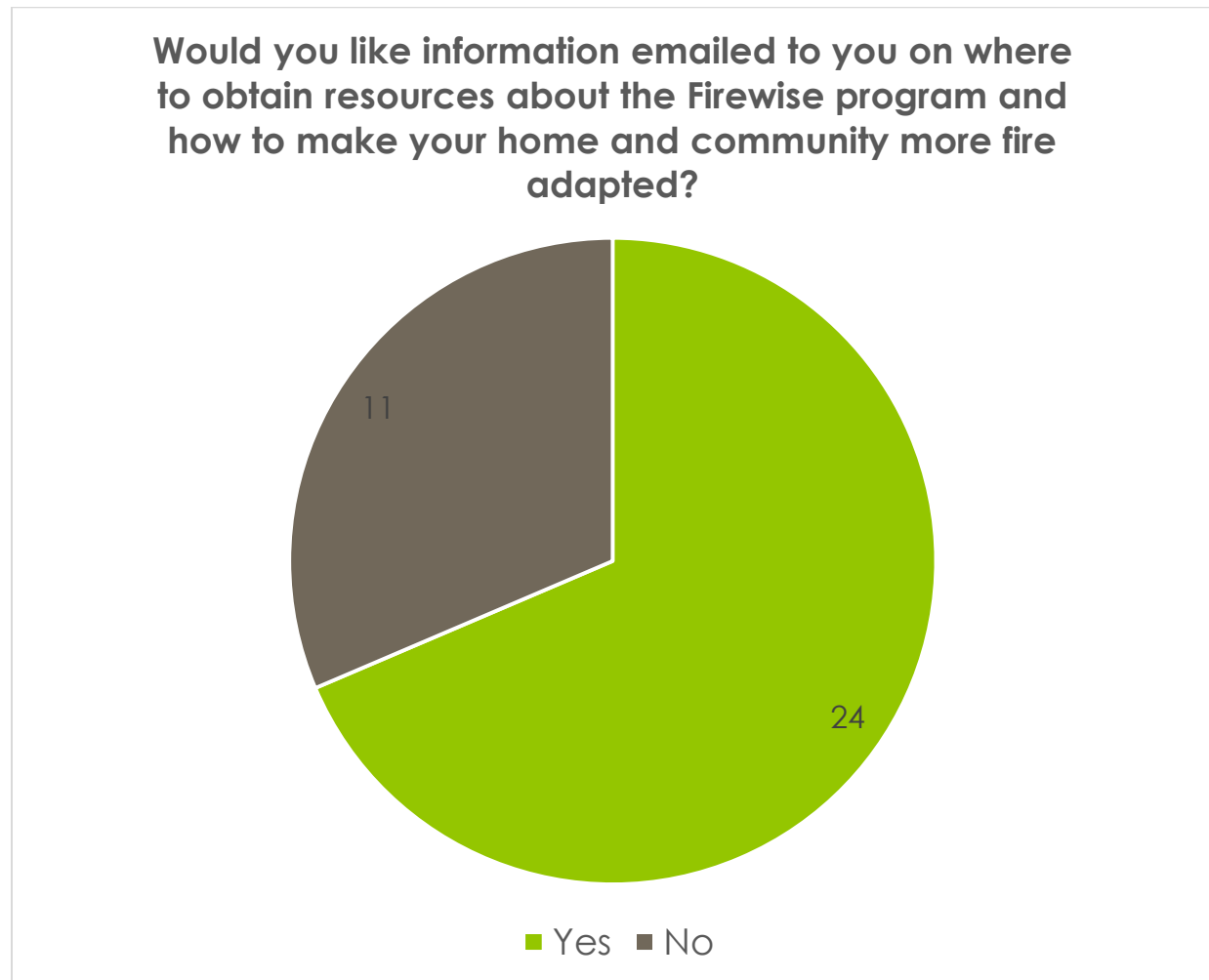
What neighborhood and/or community do you live in?



- White Rock
- Barranca Mesa
- North Community
- North Mesa
- Quemazon
- Nickel st canyon side
- Timber Ridge, Los Alamos
- Downtown
- Near High School
- Eastern
- Western Area
- Walnut area
- La Senda
- Western Area
- Los Arboles Condominiums

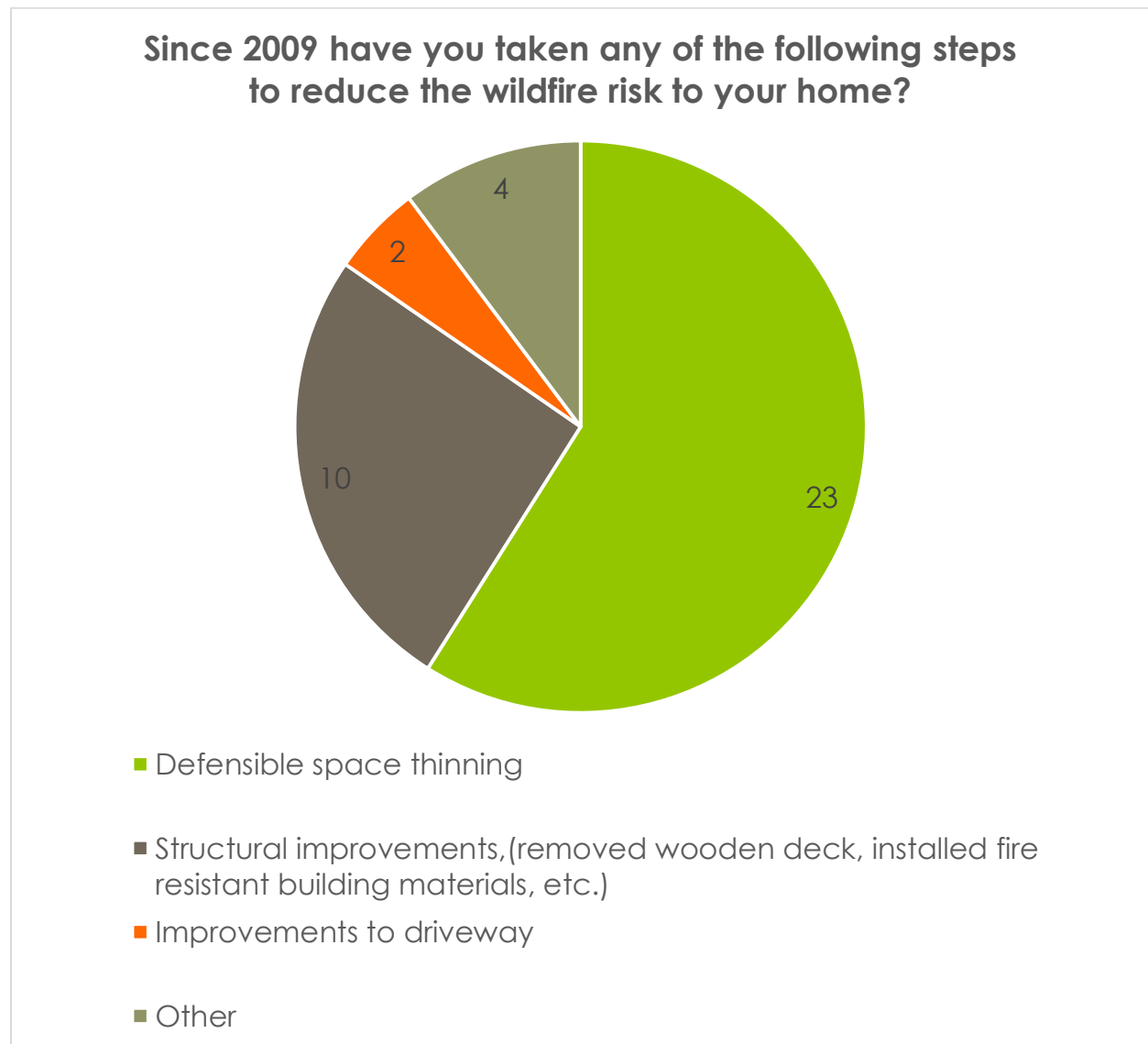
Total number of responses: 36

Would you like information emailed to you on where to obtain resources about the Firewise program and how to make your home and community more fire adapted?



Total number of responses: 35

Since 2009 have you taken any of the following steps to reduce the wildfire risk to your home?

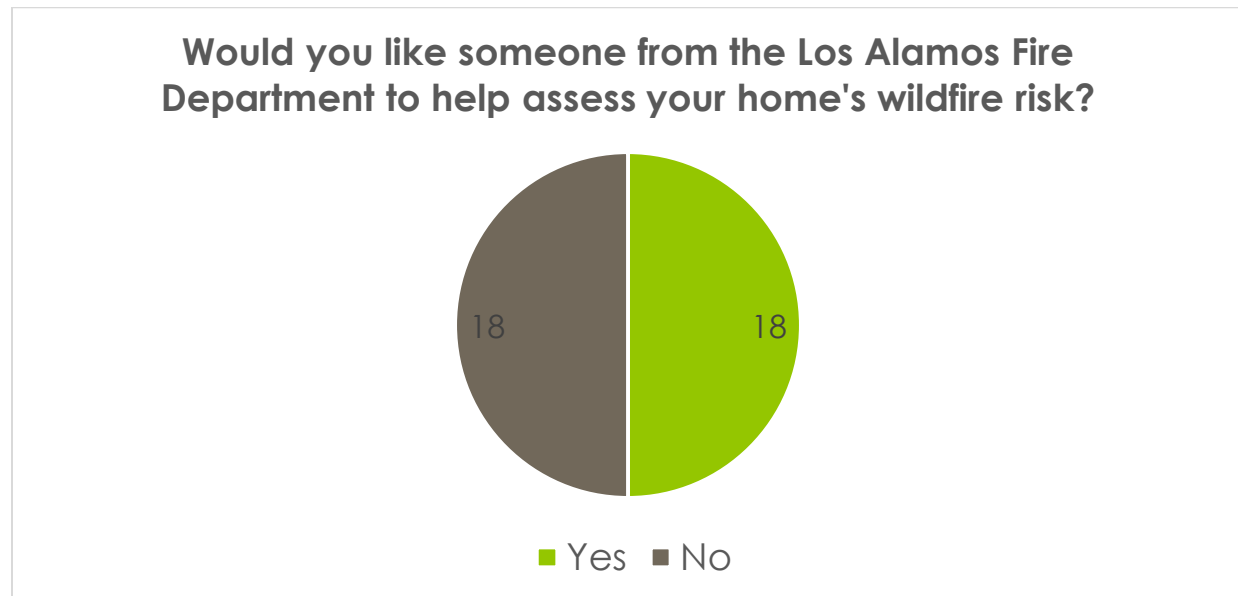


Other responses:

- Generally improving / ongoing maintenance of grounds
- Metal roof and glass sky lights, but still wooden deck
- New to LA [Los Alamos]
- I just moved here. Hired a crew to trim trees; do a lot of clearing.

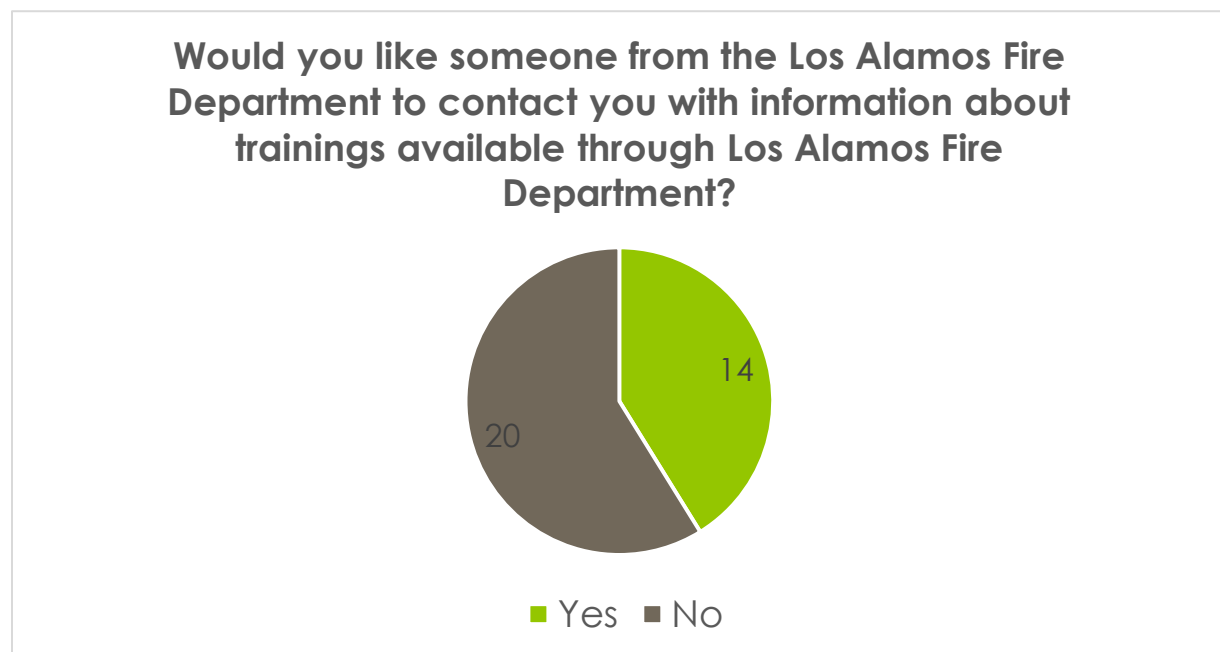
Total number of responses: 28

Would you like someone from the Los Alamos Fire Department to help assess your home's wildfire risk?



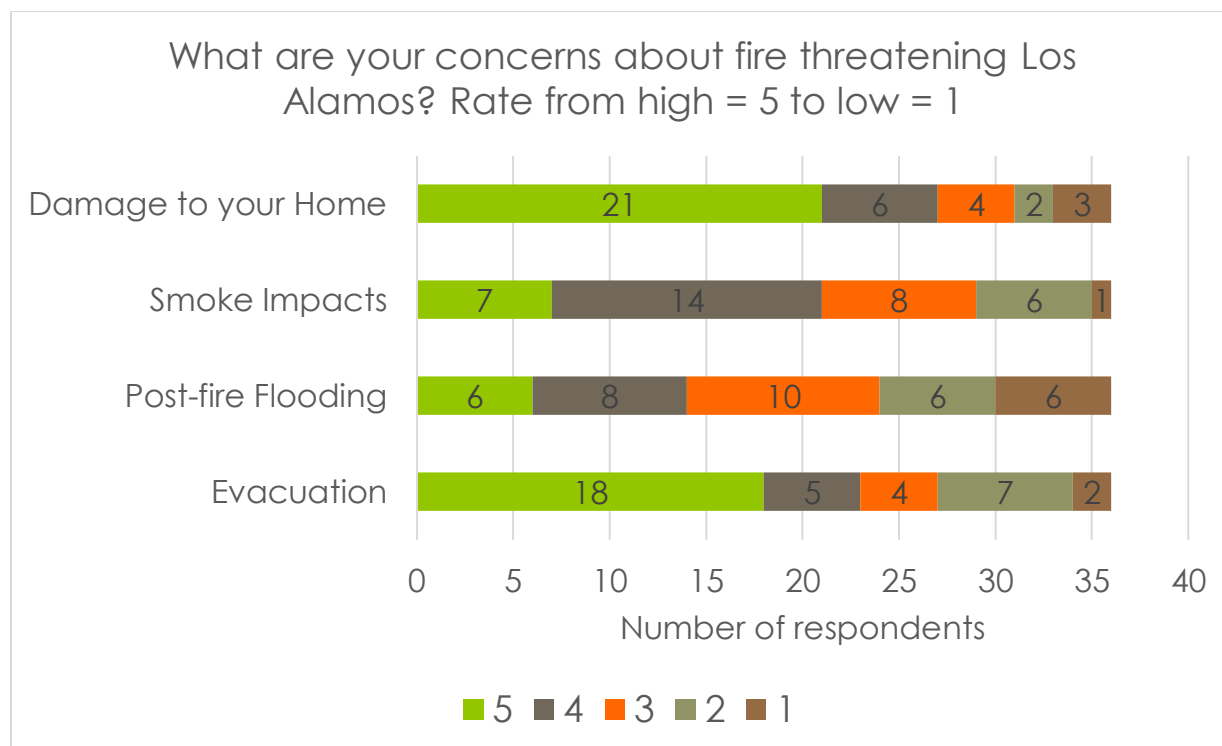
Total number of responses: 36

Would you like someone from the Los Alamos Fire Department to contact you with information about trainings available through Los Alamos Fire Department?



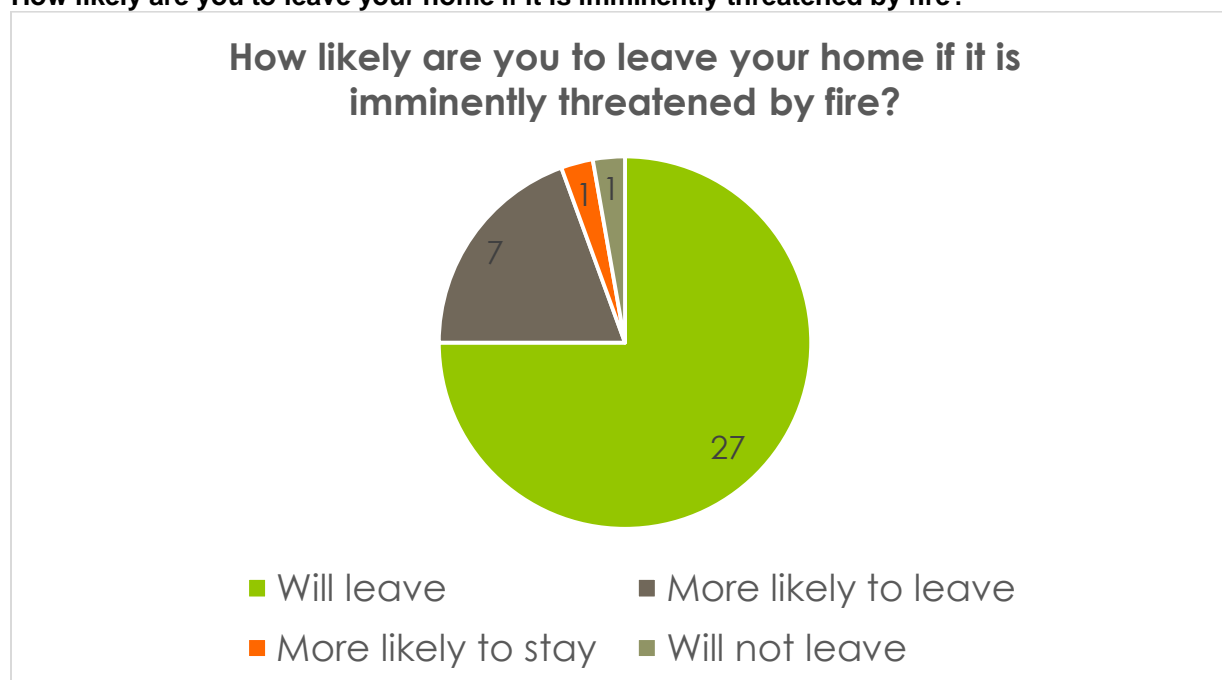
Total number of responses: 34

What are your concerns about fire threatening Los Alamos? Rate from high = 5 to low = 1.



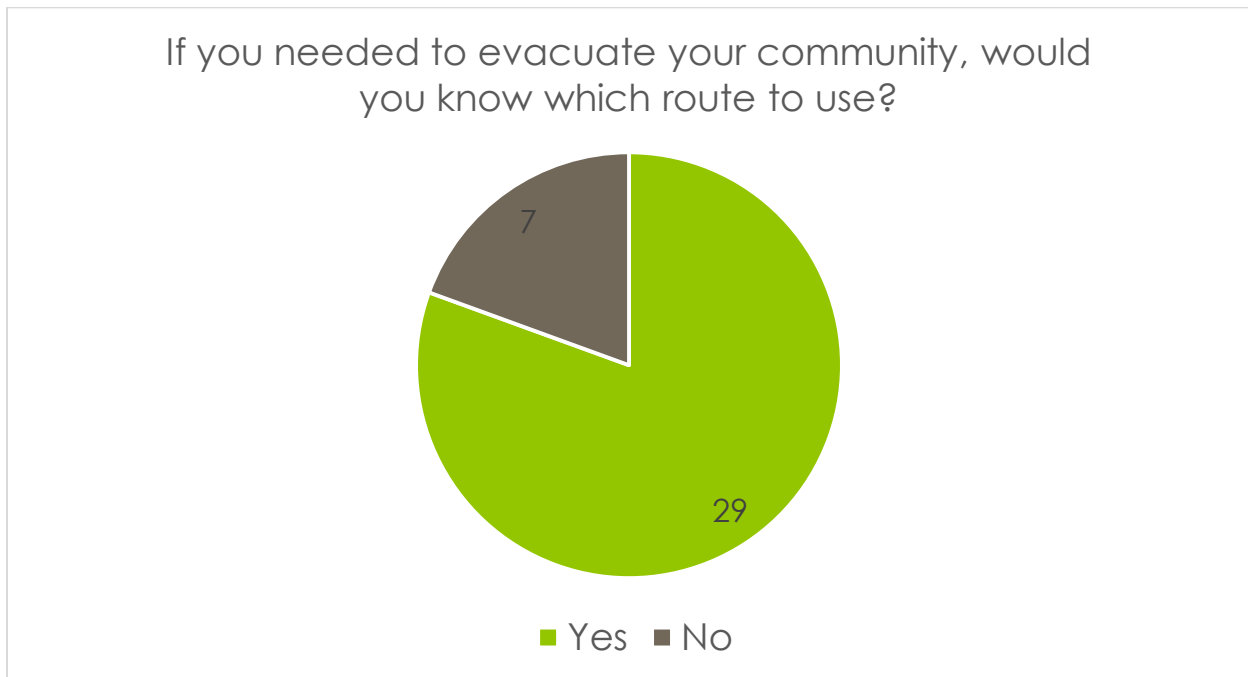
Number of responses: 36

How likely are you to leave your home if it is imminently threatened by fire?



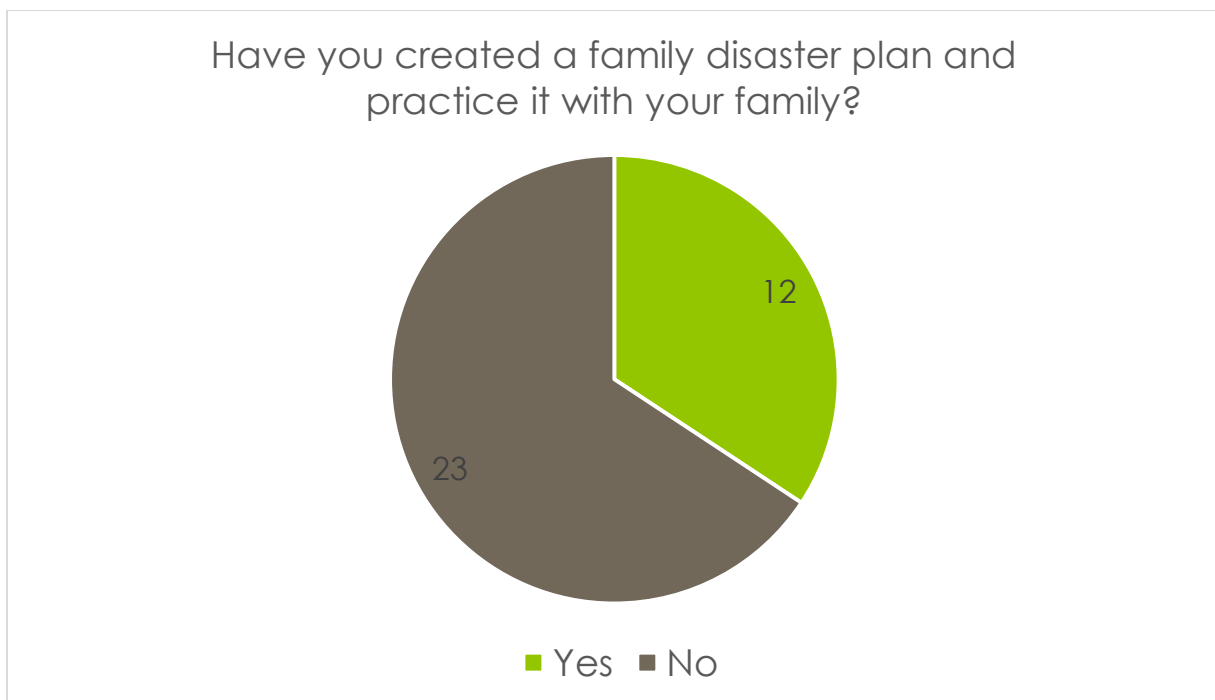
Number of responses: 36

If you needed to evacuate your community, would you know which route to use?



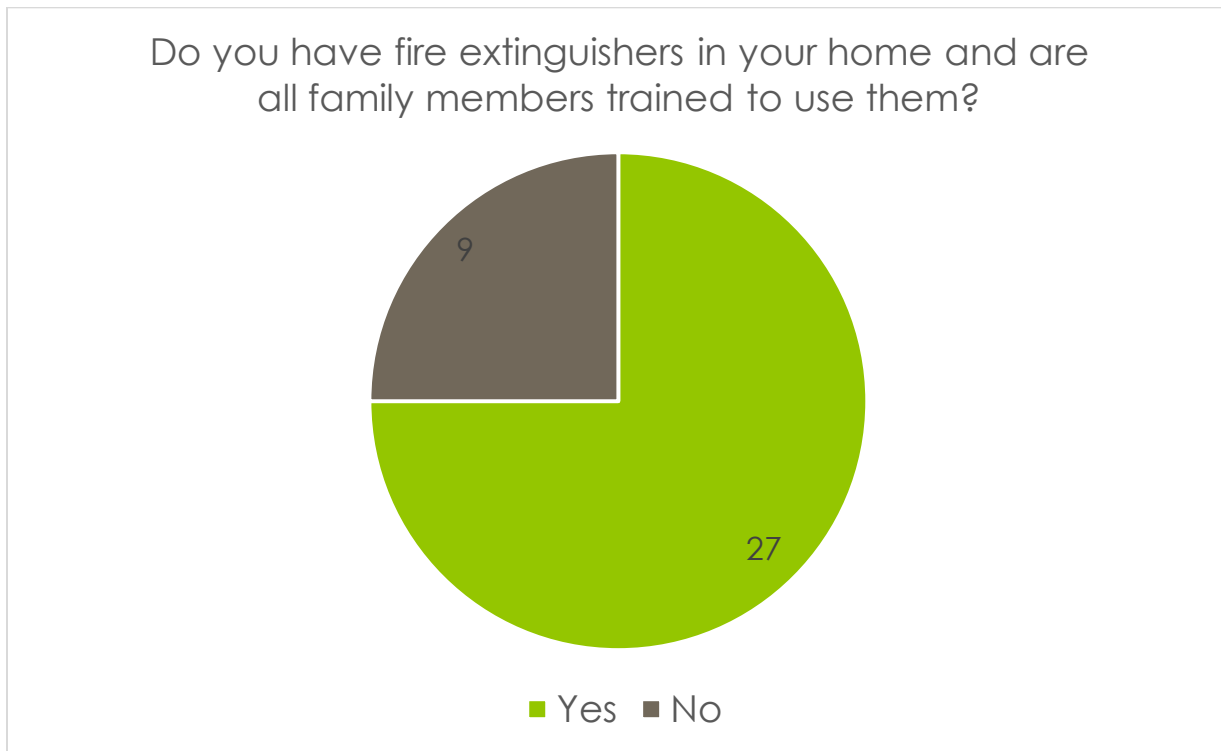
Number of responses: 36

Have you created a family disaster plan and practice it with your family?



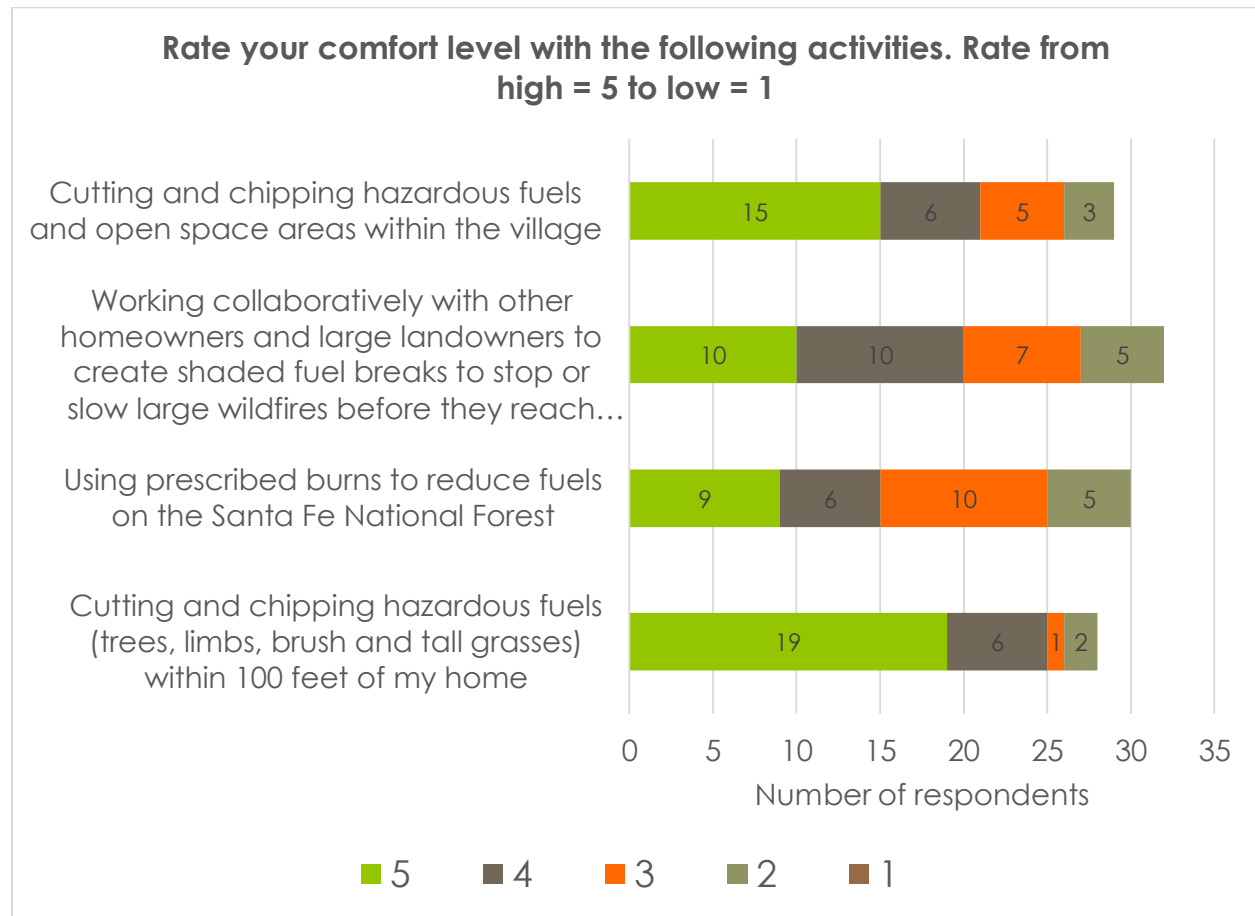
Number of responses: 35

Do you have fire extinguishers in your home and are all family members trained to use them?



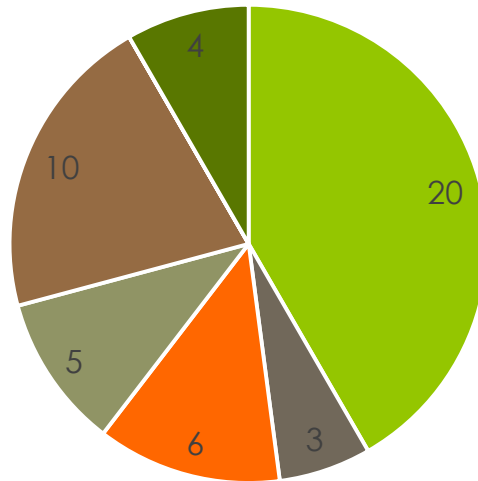
Number of responses: 36

Rate your comfort level with the following activities. Rate from high = 5 to low = 1



Under which of the following conditions would you be willing to do mitigation work on your property? (Please check all that apply).

Under which of the following conditions would you be willing to do mitigation work on your property?
(Please check all that apply).



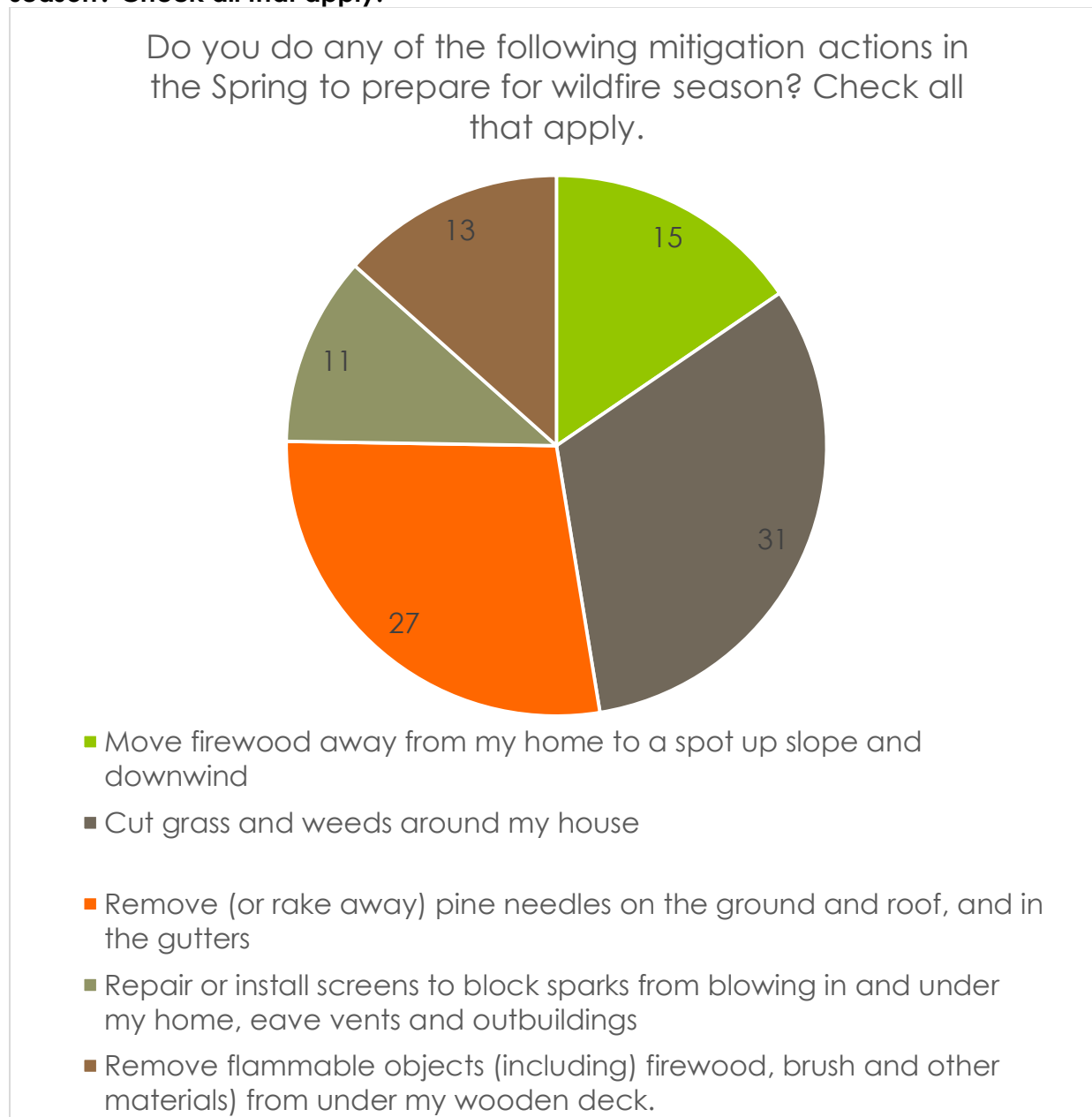
- I would do mitigation work regardless of what anyone else does
- Only if the work would be fully funded by government or private agencies.
- Only if the work would be cost shared with government or private agencies
- Only if other landowners and managers, such as open space or local government agencies, are doing work on their land.
- Only if I can be convinced the work will improve the survivability of my home
- Under no circumstance
- Other

Other responses:

- I am a small person. I do not feel safe cutting down trees. I personally cannot afford to have a professional cut down my trees.
- Not sure, I want to protect my home and some funding would be great.
- In the urban landscape there is really nothing that can be done to my home/neighborhood.
- I live in a development of 31 homes in a Homeowners Association. Landscaping, etc. is done by the Association.

Number of responses: 36

Do you do any of the following mitigation actions in the Spring to prepare for wildfire season? Check all that apply.



Number of responses: 34

What do you think it means to be a Fire Adapted Community? What can Los Alamos County do to become more fire adapted?

- A critical awareness of how fast fire may alter day-to-day issues.
- For the community, local agencies and individuals to be prepared for wildfires and to know what to do if there is one that threatens the community. Work to keep open spaces clear of hazardous fuel. To work with other agencies outside of the community regarding what needs to be done and what they can do to help be more fire adapted.

- Making any necessary changes to help reduce the spread of fires
- Do our part to prevent fires spreading (they're going to happen)
- I am not sure, but I think a "Fire Adapted Community" works consistently to remove flammables near homes....and businesses.
- A Fire Adapted Community is one in which the resident and the county government work together to make houses less likely to burn in the event of a fire.
- Fire adapted I would say means having plans in place to handle fire related emergencies. Los Alamos made huge strides after the Las Conchas fire. I'm not sure what else could be done.
- We desperately need policies that require neighbors to not allow junk to accumulate in their yards; need codes for removal of dead trees.
- My assumption is that Fire adapted means we expect there to be fires and we are prepared for them.
- I'm guessing that it has something to do with planning to make houses in the wildland interface more resilient, using defensible space, etc. and convincing everyone with a vulnerable property to improve it.
- There are yards in town that should be sited to be cleaned up, raked, mowed....
- More thinking and prescribed burning in open space.
- I've never heard that term. I think Los Alamos County does a good job of mitigating fuel for fire.
- I don't know.
- Unknown.
- Risks vary by neighborhood. The pertinent information should be disseminated to neighborhoods.
- Fire adapted would mean as many precautions as can be taken are taken to reduce the ability of a fire to spread toward feelings in the event if a fire. Examples include thinning trees within probably 100 feet of home, storing firewood out other possible wildfire kindling away from house a bit, and having an evacuation plan in the event that it needs to happen. There might even be some 'idiot training' on campfires and how to properly build, monitor, and extinguish fits personally made for everyone. Maybe even quick tidbits could be thrown in at events like gardens concerts or a weekly tip in the news paper or both to confine the spread of knowledge.
- I don't want to be "contacted" but having information provided via a common network would be great. We need knowledge but do not want to be "forced".
- more thinning, more prescribed fire.
- I like to think of it as being Fire Preparedness Adapted Community. To this end, ongoing communication and education with ready access to resources (as necessary) to facilitate being defensible and prepared in the event of a fire
- Absolutely
- Passing an ordinance to require everyone to remove dead tree branches as well as do other fire mitigation on their properties.
- A community that is aware of the risks, willing to mitigate those risks to a degree and be prepared to handle fires when they happen. Total elimination of fire risk is not interchangeable with Fire Adapted.
- Another Firewise workshop

What are priority actions Los Alamos County should include in the 2015 CWPP update?

- Elderly & Animal Evacuation
- To review the plan on a yearly basis.
- Maintenance of one's personal property-maintaining a cleaned yard and no trash or piles in yards
- ???
- Communication.
- Los Alamos County should include FREE residential fire safety inspection and plan development.
- Thinning in the canyons that intrude into neighborhoods
- I don't know.
- I'm new, so I don't know what previously was done in the county. Will learn

- Keep up the undergrowth clearing along side NM4 and along the canyon edge of Potrillo where it abuts the Pajarito Acres territory.
- Helping pets by having a fire evacuation plan in place perhaps with a shelter in Santa Fe. We were out of town during the last evacuation and had to figure out where to place the dogs, who to move them etc. from a distance.
- Was I supposed to move my grill propane tank somewhere when evacuated?
- A post-fire evacuation mental health plan to assist with triggered traumatic memories of past fires or deal with new losses for adults, kids, and families.
- A post-fire evacuation mental health plan to assist with triggered traumatic memories of past fires or deal with new losses for adults, kids, and families.
Include a go to place during evacuations for information (have the website, FB page, or whatever planned out).
Make sure individuals understand that if they stay behind during an evacuation, it puts fire fighters in greater harm. It also leaves you neighbors' homes in greater fire risk as lives are a higher priority than property.
Send out an annual Fire Season brochure/ email/ FB post/ newspaper (something) reminding residents in the spring to do specific fire prevention and to make plans to implement in the event of an evacuation. Identify the required/ valuable evacuation items before the emergency happens (include a standard checklist in the brochure). When traveling during fire season, these items should be gathered for easy grab-and-go transport should the need arrive. Have neighbors' contact information with you when you travel.
- Prescribed burn schedule and funding
- Not sure
- ?
- Unknown
- Make preventative measures known to citizens in various parts of town.
- Is there an actual map of Los Alamos' "areas" (like "northern area" or "Barranca area")? If so, that may be helpful for new residents or residents who have moved and don't know the lingo. Then include appropriate evacuation routes based on area.
- Make it simple, easy to understand
- Assurance of all residents able of receiving emergency alerts
- Continued vigilance in mitigating at-risk-fuel buildup in canyons, continued communications on fire prevention and preparedness, assuring evacuation procedures are in place and communicated.
- Ban all outdoor fires of any kind in all locations in the county, every spring, all season until fuel moisture contents are high enough to make fire unlikely.
- Ensure a balance between natural beauty and fire risk. Work diligently to remove risks associated with above ground power lines. On Barranca mesa alone, there are countless trees that grow into power lines. I believe the solution is to bury those lines. This could be coupled with large scale improvements to the water distribution and sewer systems that the community seems to need.
- Bike trails (paved, gravel) can be great fire breaks, and greatly improve our community beyond the fire prevention.
- Reduction of fuels in open space/canyons
- Evacuation planning. Neighborhood meetings on Firewise items.

Do you have any other comments, questions, or concerns regarding the 2015 Los Alamos County CWPP update?

- Evacuation of 250-400 equines and other large animals.
- No
- Have not read it. I am working on information I learned after the Cerro Grande Fire .
- Los Alamos is drying out, daily. You can look in every direction and see dead, near dead and drying trees. Los Alamos County MUST begin removing these trees, immediately!
- I was responsible; got a licensed chimney sweep to clean and take care of chimney etc. that previous owners neglected. I do NOT allow old firewood to accumulate all over the yard. My

irresponsible neighbors are allowing their pile to grow; they have dead tree branches all over the front yard; trash; debris, and huge dead tree.

- Keep me posted and let me know how I can help!
- Great work.
- No
- ?
- No
- Let homeowners know what they can do. Publicize the dangers and mitigation measures. Ensure that the surrounds are addressed well by responsible agencies.
- As far as fire extinguishers go, are apartment properties required to have them? I don't believe Mountain Vista apartments have extinguishers, or if they do, I'm unaware of where they are located.
- Nope
- Though unfortunate we learned lessons the hard way in the Cerro Grande fire but we learned. I feel more comfortable knowing that my community is not complacent in taking practice steps to prevent a repeat of Cerro Grande and standing ready should another fire encroach on the town.
- n/a
- The county is far too lax in permitting outdoor fires and fireworks.
- Most limiting fire mitigation for me, and likely others, is difficulty in dealing with branches/vegetation debris. I would love to see a large community chipper/shredder that county brings around to perimeter neighborhoods and runs for residents, or smaller chipper/shredder/mulchers that can be rented/borrowed from county. I want my vegetation as mulch...don't want to send it to county. Likewise, I don't like getting mulch from county since it can be contaminated by plants (from experience-Virginia creeper and others) and pesticides.
- Evacuation of livestock.

Appendix B: INTERAGENCY WILDFIRE MANAGEMENT TEAM CHARTER

MARCH 19, 2008

The Interagency Wildfire Management Team (IWMT) was formed in April 1996 in the wake of the Dome Fire, initially to address recovery actions that needed to take place that fiscal year. Since then its scope and membership have grown.

The IWMT serves as a crosscutting team to identify, discuss and coordinate issues pertaining to wildfire mitigation and management of the Los Alamos region. The goal is to work together to optimize efficiency and effectiveness of management activities that are implemented within and between agencies. The emphasis of the team is to take hands-on action needed to protect human life, improve fire-fighting safety, improve fire-fighting access, protect property, reduce fuels and fire hazards, conduct public outreach activities, and maintain forest health.

Membership is open to any interested land-management entity with a responsibility for managing wildland fire, as well as private citizens and interested individuals.

Charter members include:

- Los Alamos County
- Los Alamos National Laboratory
- Bandelier National Monument
- Santa Fe National Forest
- Department of Energy
- State of New Mexico
- San Ildefonso Pueblo
- Santa Clara Pueblo

The IWMT does not receive special funding and is not a funding or decision-making entity. Members take recommendations of the IWMT back to their home organization for implementation. The Laboratory management, through the Operations Working Group, sanctioned the IWMT as a Laboratory committee in 1997.

The IWMT is currently chaired by Deputy Chief Justin Grider, of the Los Alamos County Fire Department. The IWMT meets every other week. These meetings, which are open to the public, are held in Los Alamos at the Mesa Public Library every other Wednesday at 10:00 am.

Appendix C: ARTICLE IV. LOS ALAMOS COUNTY CODE. WILDLAND-URBAN INTERFACE AREAS

Sec. 22-131. Classifications.

- (a) The Los Alamos town site, as shown on a map attached to Ordinance No. 85-291 as attachment A, is designated as an extreme urban-wildland interface area.
 - (b) All lands within the zoning authority of the county that are not within an extreme urban-wildland interface area are designated as a moderate urban-wildland interface area.
- (Ord. No. 85-291, § 3, 2-13-2001)

Sec. 22-132. Application of requirements.

- (a) Class I ignition-resistant construction requirements apply to all new and relocated structures, and to construction of building additions or modifications, within an extreme urban-wildland interface area.
 - (b) Class II ignition-resistant construction requirements apply to all new and relocated structures, and to construction of building additions or modifications, within a moderate urban-wildland interface area.
- (Ord. No. 85-291, § 2, 2-13-2001)

Sec. 22-133. Construction requirements.

- (a) Class I ignition-resistant construction requirements are as follows:

1. Roofs shall have a class “A” roof covering.
2. Eaves and soffits shall be protected on the exposed underside by materials no less protective than materials with a class II flame spread classification, determined in accordance with chapter 10. Fascia’s are required and must be protected on the backside by materials no less protective than materials with a class II flame spread classification, determined in accordance with chapter 10, or minimum two-inch nominal dimension lumber.
3. Gutters and downspouts shall be constructed of non-combustible material.
4. All exterior walls of buildings or structures, with the exception of heavy timber or log wall construction, shall be constructed with materials no less protective than materials with a class II flame spread classification, determined in accordance with chapter 10.
5. Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be constructed of materials no less protective than materials with a class II flame spread classification, determined in accordance with chapter 10, except that wood products may be used for decking if a fire retardant material is properly applied and reapplied as necessary such that the wood decking, as treated, meets the class II flame spread classification.
6. Skylights shall be constructed of materials as provided in chapter 10, except that no plastic skylights shall be permitted.
7. Exterior doors shall be approved non-combustible construction, or have a fire protection rating of not less than 20 minutes, or solid core wood not less than 1 3/4-inch thick, except that exterior doors may contain double pane safety windows or glazing.
8. Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches each. Such vents shall be covered with non-combustible, corrosion-resistant mesh with openings not to exceed one-fourth inch.
9. Detached accessory structures located less than 20 feet from a building containing habitable space shall have exterior finish constructed of materials no less protective than materials with

-
- a class II flame spread classification, determined in accordance with chapter 10.
- (b) Class II ignition-resistant construction requirements are identical to class I ignition-resistant construction requirements except:
1. Roofs shall have a covering no less protective than a class B roof covering.
 2. Eaves, fascia's, and soffits not protected by materials at least as protective as materials with a class II flame spread classification, determined in accordance with chapter 10, shall be enclosed with solid materials with a minimum thickness of three-fourths inch.
 3. Exposed rafter tails must be constructed of heavy timber.
- (Ord. No. 85-291, § 4, 2-13-2001; Ord. No. 459, 3-25-2001; Ord. No. 85-294, 5-15-2001)

APPENDIX D: SILVICULTURAL STANDARDS FOR THE WILDLAND-URBAN INTERFACE GOALS

1. Reduce the threat of wildland fire in Los Alamos County through a combination of forest thinning, disposal of burnable materials, and prescribed fire.
2. Improve overall forest ecosystem health.
3. Maintain diversity of plant and animal species while reducing the invasion of alien species.
4. Maintain scenic beauty, visual screening, and appropriate vegetation at the interface.

OBJECTIVES

1. Reduce fuel ladders by maintaining average crown base heights to between 15-20 feet or higher.
2. Maintain average crown bulk density to $<.02-.05\text{kg/m}^3$.
3. Maintain average crown spacing from less than a few feet to a minimum of 15-20 feet.
4. Maintain canopy cover to less than 30%.
5. Maintain SDImax to 15-20% or less.
6. Maintain dead fuel loading to less than 5 tons/acre.
7. Carefully manage the snag component, especially adjacent to homes.
8. Encourage deciduous species along drainages to break up fuel continuity.
9. Protect old growth ponderosa pine.

CUTTING TECHNIQUES

- Stumps should be cut as close to the ground as possible.

UTILIZATION

- To the extent possible, all wood products from thinning or maintenance operations should be utilized. Dependent on the location, this may be through firewood
- Collection, small-diameter stem harvest and removal, or when appropriate, timber harvesting.

SLASH TREATMENT

- Whenever possible, slash material should be mechanically treated on site.
- Mastication: In areas accessible to mechanized tree harvesting equipment, small diameter material should be ground and left on site.
- Lop and scatter: This may be appropriate in piñon-juniper woodlands with light slash where future burning will not take place.
- In hand-thinned area where material cannot be safely removed, pile burning is appropriate.

APPENDIX E: LIST OF REFERENCED DOCUMENTS

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