

Community Wildfire Protection Plan

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Prepared For

The Town of Palmer Lake

By

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And

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Warning and Disclaimer: The degree of protection from wildfire hazards intended to be provided by this plan is considered reasonable for planning purposes, and is based on accepted forestry and fire science methodology. This plan is intended to aid the community in minimizing the dangers, costs and impacts from wildfire hazards. Fire is a natural force and historical part of the ecosystem. Therefore, unforeseen or unknown wildfire conditions or natural or man-made changes in conditions such as climate, vegetation, fire breaks, fuel materials, fire suppression or protections devices, and ignition sources may contribute to future damages to structures and land uses even though properly permitted within designated wildfire hazard areas.

INTRODUCTION AND ACKNOWLEDGEMENTS

The Palmer Lake Community Wildfire Protection Plan (CWPP) is a broad plan focused on the protection of residents, structures and scenic environment of neighborhoods from catastrophic wildfires. The CWPP represents a collaboration of Colorado State Forest Services, Palmer Lake Volunteer Fire Department, Town of Palmer Lake, local, state and federal agencies. The CWPP is intended as a *living document* and will be updated as wildfire mitigation and firefighting methodologies and support technologies change. This CWPP follows the guidelines set forth in the *Health Forest Restoration Act of 2003* and the *Colorado State Forest Service Minimum Standards for Community Wildfire Protection Plans* (See **Appendix C**).

ACKNOWLEDGEMENTS

Special thanks for support and materials for this Community Wildfire Protection Plan go to:

- Palmer Lake Volunteer Fire Fighters
- Palmer Lake Town Staff
- Colorado State Forest Service
- USDA Forest Service
- El Paso County
-

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- Southern Rockies Conservation Alliance
- El Paso County Office of Emergency Management
- The many residents of the Town of Palmer Lake who took time from their busy schedules to guide this document to its completion

EXECUTIVE SUMMARY

The Palmer Lake Community Wildfire Protection Plan (CWPP) is sponsored by the Palmer Lake Volunteer Fire Department (VFD) and Town for the safety of life and protection of property in neighborhoods throughout the town and immediate vicinity. Participation in the establishment of this CWPP was a broad stakeholder group including Colorado State Forest Service (CSFS), USDA Forest Service (USFS), El Paso County Department of Environmental Services (EPCO), Southern Rockies Conservation Alliance (SRCA, a non-governmental Organization {NGO}), and residents of the town. Development of this CWPP focused primarily on wildfire hazard identification, fuel mitigation and emergency response. The fuel mitigation focused on specific wildfire risk areas with heavy fuel densities and terrains that could be used for wildfire prevention, coupled with close attention paid to upholding ecological values. Wherever possible, other values such as wildlife habitat enhancement, forest health restoration, improved aesthetics and increased property values will be factored in.

The Palmer Lake area is no stranger to wildfires and the need for wildfire prevention and protection. The proximity of Iron Mountain Fire (2002, 1,800 acres), the Buffalo Creek Fire (1996, 11,000 acres), High Meadows Fire (2000, 12,000 acre) and the Hayman Fires (2002, 138,000 acres) emphasized the fact that wildfires “*can happen here!*” The Fire Department and Town staff recognized the importance of developing a program to address the wildfire risk to the community. It began by investigating funding sources for fuel treatments and development of a long range plan for wildfire protection.

The Town has significant areas outside of their boundaries that could pose a potential wildfire fire threat to the community. These areas are described as the Wildland Urban Interface (WUI) area, and consist of all lands bounded by USFS lands to the west, Douglas County Open Space to the north, and unincorporated El Paso County. With this CWPP, care was taken to propose and provide mitigation within the Town to provide fuel breaks to lower the risk of spreading wildfire and to protect residents from potential wildfire intrusion from the various risk sections of the adjoining WUI. Two main areas with varying degrees of mitigation were identified within the communities. Mitigation for these areas will be reviewed annually for scheduling with full completion to take from twelve to twenty years, depending on availability of funds from multiple sources.

Four primary strategies are employed to achieve mitigation: 1) Each neighborhood or community providing fuel mitigation treatment to HOA owned land and critical private parcels; 2) Encouragement and support of private land owners doing their own wildfire fuel mitigation; 3) Working with the Town and other stakeholder agencies to require developers of stand-alone, undeveloped areas within zones surrounding the communities to mitigate their land before building occurs; and 4) support of on-going fuel treatment projects on federal, state and county properties.

This CWPP identifies the response, both from professional agencies and volunteer groups that may be employed for wildfire protection or fire suppression, arresting wildfires threatening areas within or outside the town. The VFD has the primary responsibility for protecting life and property in the Town in the event of a wildfire. If a wildfire event is beyond their resource capability, the Town is party to a mutual aid agreement for support from other El Paso and Douglas County based fire departments.

The Palmer Lake CWPP also discusses direct communication and informational efforts to notify residents and keep them apprised of emergency wildfire situations directly affecting them. Communication and support of the general public is available and determined by different intensities of identified emergencies.

The implementation of this plan takes place over multiple years, limited for the most part by the available funding that can be directed to the various efforts within the plan. Risk priorities as well as development locations and densities will be reviewed annually and used in scheduling fuel mitigation events. Projects deemed to have the most significant wildfire prevention impact will be given priority.

This CWPP is a “*living*” document that will be evaluated and maintained annually as a responsibility of the VFD. Each individual project identified within this plan has a measured baseline; i.e., current condition description of its “*before*” profile that will be used to evaluate the effectiveness of any fuel reduction project performed on it during the plan year. Consequently, this plan may be amended and edited annually to assure that it stays viable and achieves its original intent. Annual meetings should be held with stakeholder agencies to review the progress and effectiveness of this CWPP. A general public meeting should also be conducted annually to review the progress of the CWPP and receive public input.

GOALS, PLAN COMPONENTS & ON-GOING MAINTENANCE OF PLAN

Primary Purpose

The Palmer Lake Community Wildfire Protection Plan (PLCWPP) was developed for the safety of life and protection of property from wildfire emergencies within the boundaries of the Town and the adjacent surrounding areas while upholding the ecological values of the community.

The plan was developed by a broad stakeholder group identified in the *Foreword* section of this document. The PLCWPP addresses the areas of wildfire hazard mitigation and emergency response to the impact of widespread wildfires. The plan has three major focus areas: fuel mitigation, emergency response and the influencing and obtaining of private, state or federal assistance. In addition, the plan contains administrative detail for plan implementation and monitoring and also sets forth tactics for amending the plan on an on-going basis as circumstances and changing conditions may require.

Goals and Objectives of the Plan

Fuel Mitigation:

- To identify and categorize wildfire fuels and the prioritization of those fuels for mitigation across the landscape.
- Treat fuels in a manner consistent with restoring forest health and improving the currently decadent wildlife habitat.

Emergency Response:

- To detail wildfire response, community preparedness and infrastructure protection.
- To outline professional and community volunteer communication linkages and response to widespread wildfire emergencies.
- To detail traffic egress/ingress for emergency residential evacuations and emergency equipment and professional services entry.
- To recommend water supplies for future construction/installation.
- To delineate community and public communication and information systems' usage for and during emergency events.

Private, State and Federal Assistance:

- To influence where and how private, county, state and federal agencies implement fuel reduction by proposing alternative locations and methods for treatment on lands in the CWPP zones.
- To assist in the acquisition of private, local, state and federal funds for the Town for wildfire hazard(s) mitigation and response related projects.

Administration and Plan Maintenance:

- Define implementation plans, schedules and monitoring.
- Set forth on-going plan maintenance and plan updating strategies.

Plan Components

The PLCWPP provides four primary sections plus reference information. Geographical and ecological background along with forest management and wildfire history is detailed in Chapter 3. Chapters 4, 5 and 6 cover, respectively, hazards assessment, ingress/egress, and the resources for addressing wildfires. Chapter 7 identifies communication and information support for the residents in and around the Town in the event of a wildfire emergency. Finally, Chapter 8 is the implementation plan of the

Community Wildfire Protection Plan, detailing public education, fuel treatment - mitigation priority, timeline and funding methods, and support systems additions and funding.

A wide variety of conservation, property mitigation, vegetation and services reference material can be found in the appendices of this document.

Maintenance of the Plan

The overall goal of maintaining the PLCWPP is accomplished through annually monitoring plan-effectiveness and by adjusting the plan to account for current changes in wildfire hazard conditions, response capabilities, technologies and ancillary circumstances. The PLCWPP is meant to be a “*living document*” which is updated periodically to assure consistency in both wildfire prevention and planned response to wildfire situations both in Town’s wildland/urban interface areas and outside the community.

Each year, at least three months prior to the Public Hearing for the approval of the Town’s budget, the board of trustees may formally request its VFD to conduct a CWPP performance review to include both an overall plan evaluation of the CWPP for the past wildfire season as well as any proposed changes to the CWPP for the following year. This schedule may be adjusted to allow conformance with the Town’s budget cycle. The overall evaluation and recommended changes to the CWPP will be presented and addressed prior to the budget adoption meeting. Changes will be formally incorporated into the CWPP and furnished to all stakeholders by January of the following year. These changes should also be reflected in the Town’s budgets for the following year.

Between the aforementioned VFD meeting and the formal updating of the CWPP each year, the VFD or its representative(s) will meet with key stakeholders representing primary professional forest management, fire prevention and emergency services management to review proposed CWPP changes and updates. Once the Town board and the key stakeholders are in agreement to the proposed changes and updates to the PLCWPP, those changes and updates will be available for public perusal and comment; either at a pre-announced public meeting or through the Town website (www.ci.palmer-lake.co.us).

Formal CWPP evaluation will be done in conjunction with PLVFD personnel. A sample “Evaluation and Monitoring Worksheet” is attached as **Appendix A** and addresses the following issues:

- 1) *Implementation*: Will track the CWPP project(s) as laid-out for the year and assess the success level of execution;
- 2) *Execution of project*: What issues occurred that either aided or impeded the project?
- 3) *Maintenance Needs Monitoring*: Evaluates, determines and prioritizes areas that have been treated in the past, but are in need of maintenance treatments to maintain effectiveness as originally intended.

Lessons learned from monitoring and data collection will be useful for modifying project plans to better meet PLCWPP goals and objectives.

BACKGROUND AND HISTORY

Geographic and Ecological Location

Town of Palmer Lake was founded in 1871 and incorporated in 1889. Its population is approximately 2,000 people. Palmer Lake is a "Statutory" town with a Mayor-Council form of government. It is located at the base of the foothills at an elevation of 7,225 feet above sea level. The community is bisected by Colorado State Highway 105. (See Figure 1, Vicinity Map). Located approximately 60 miles from downtown Denver to the northeast and 20 miles from Colorado Springs to the south, Palmer Lake's major residential development started in the late 1800's as a resort community for Colorado Springs residents. Many structures in the town are over 100 years old.

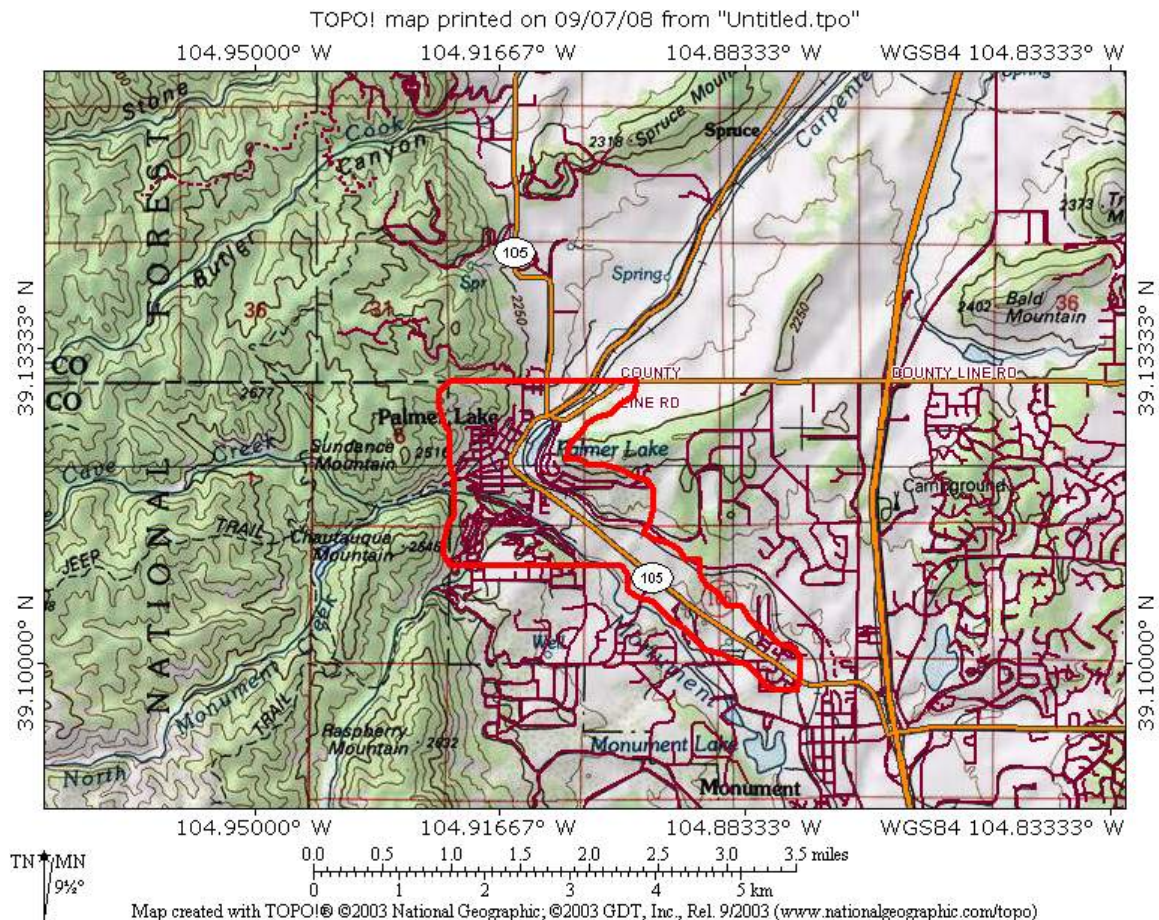


Figure 1. Vicinity Map

Palmer Lake is a classic wildland urban interface community with high density residential communities surrounded by large lot holdings. To the east, Palmer Lake rises up to Ben Lomand Mountain. To the southeast, the community's lowest elevation is 6,940. Average elevation is approximately 7,000 feet, varying greatly from gentle slopes to areas over 100% slopes along the west side of Town. Limited areas are considered accessible by forestry equipment. Vegetation consists of dense stands of Gamble oak, three-leaf sumac, mountain mahogany, ponderosa pine, Douglas-fir and prairie grasses.

The area within the boundaries of Palmer Lake is predominantly historic timber and grazing lands as part of early ranching and logging in the region. The area was first visited by the Stephen Long expedition in 1820. Heavy usage is evident given the presence of old ranch trails and logging stumps. The fire regime for the area historically created a diverse mosaic of plant communities that may have burned on a ten to fifty year cycle. Evidence of this mosaic can be seen in historic 1800's photos of the area. Wildfires have been suppressed over the past 100 years. Palmer Lake has grown steadily with significant in-fill growth taking place over the last ten years.

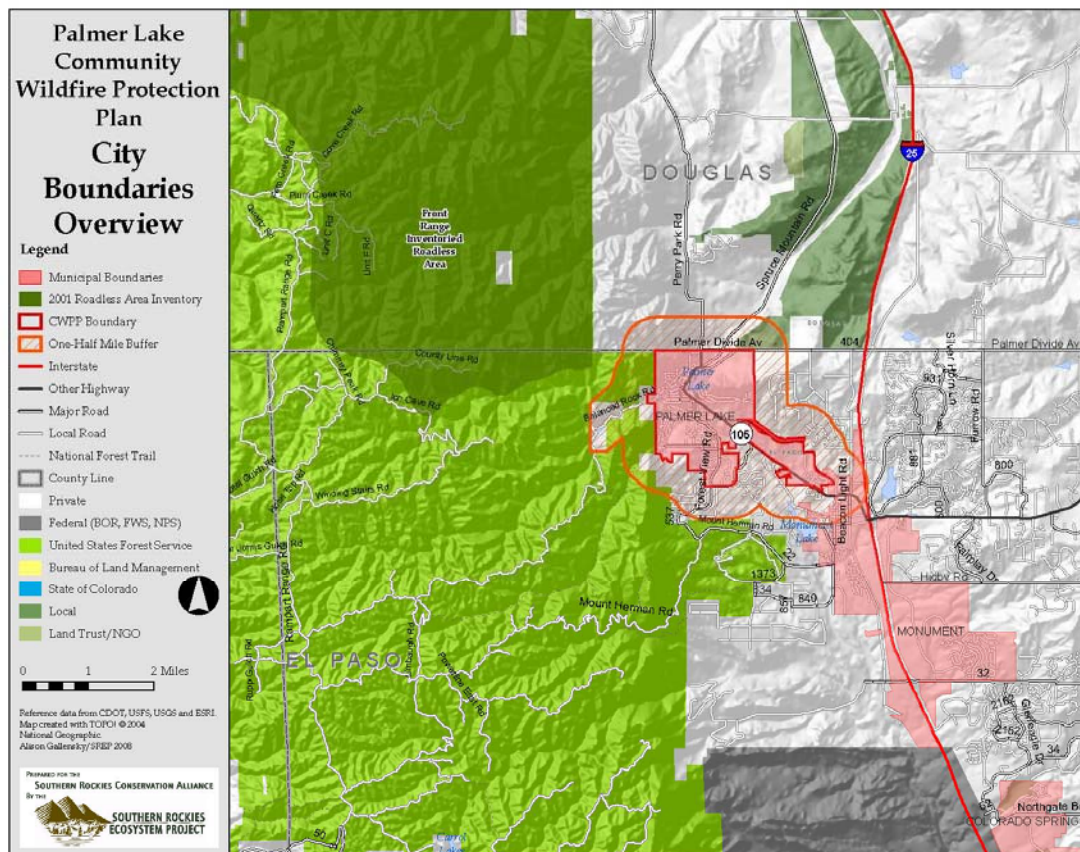


Figure 2, Map and Town Boundaries

The Palmer Lake Volunteer Fire Department (PLVFD) recently celebrated its 70th anniversary. The department got its start in the mid-1930's. Back then, the department's equipment consisted of a hand-drawn hose cart stored at an automotive garage in the center of town. When a fire started, volunteers passing by the garage would pick up the cart on the way to the fire.

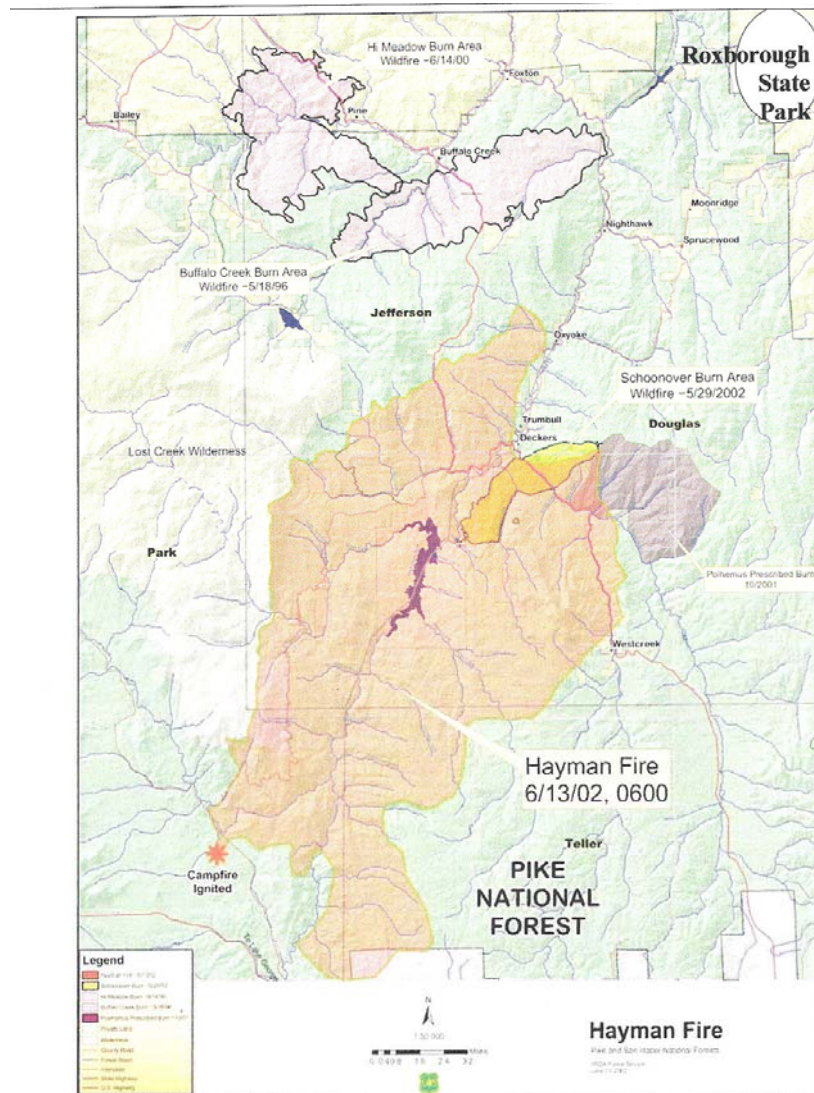
Over the next several years, the department evolved. A modified 1927 Dodge became the department's first fire truck. In 1937, the department officially began, with a new fire truck and a new station built on the corner of Middle Glenway and Valley Crescent, where the station still stands today.

In the early days of Palmer Lake, the fire department was one of the few community organizations in town. As a result, many of the Town's traditional celebrations had their beginnings with the fire department. The annual chili supper and Christmas Star lighting ceremony and Yule Log Hunt were all conducted by the town's fire department when it began in

the 1930's. The department still oversees those operations today. It has since added the responsibility of conducting the town's July 4th fireworks display every year.

The department is the only true volunteer department still operating in the Tri-Lakes area today. None of its 32 volunteers are paid and the department is governed by the Palmer Lake Town Council. The department now has a paid EMT-paramedic and provides ambulance service to the town.

Wildfire mitigation, the responsibility of the PLVFD, began in earnest several years ago after acquisition of a small wood chipper. Chipping of slash piles is done by town staff as time allows. A number of large, landscape scale fires had occurred in mountains since 1996 increasing the awareness of wildfire risks to Palmer Lake. (Figure 3, Wildfire History) The town was alerted for possible evacuation during the Hayman Fire of 2002. The area is very prone to lightning caused fires.



Map 1: Since 1996, four large fires have grown to within ten miles of Roxborough State Park's boundaries. <<http://www.fs.fed.us/r2/psicc/hayres/maps/index.htm>>

Figure 3, Major Fires Since 1996.

Several fuel treatment projects were spearheaded by members of the PLVFD with primary focus on improving safety along community roadways. The town recently began budgeting funds annually for fire mitigation. In 2008, the town budgeted funds to develop its Community Wildfire Protection Plan (CWPP) with additional funding provided from a grant through the Colorado State Forest Service (CSFS). A professional forester was engaged to complete the plan by September 2008.

Transportation planning has been an on-going function of the town. All Access points within the community connect to State Highway 105. All roads within the community are operated and maintained by the town's Public Works Department. Roadway surfaces are currently a mix of paved and gravel all-weather surfaces. Dust abatement is done regularly. Road widths are sufficient to allow two full lanes of travel in each direction. Road side ditches line all roadways and are mowed regularly by the town.

All properties in Palmer Lake utilize the town's central water and sewer systems. The town's water system, in some areas, is over 100 years old. The town has gone to great lengths to identify existing water mains. Neighboring communities also have hydranted water supplies well within water shuttling range of Palmer Lake (Forest View Acres Water District, Town of Monument). Overhead power lines, operated by Intermountain Rural Electric Association, provide power to homes.

Wildfire History

Over the past 100 years, Palmer Lake has avoided major wildfires. Small lightning and human caused fires have been typically suppressed quickly. Evidence was found in the community in the form of fire scarred logging stumps. It is estimated low intensity ground fires burned through the area with return intervals ranging from every 10 to 25 years. The remaining "stump record" indicates that pre-European ponderosa stands consisted of large, well spaced trees, pruned up by regular fires. The existing forest is considered a "second growth" forest impacted by 100 years of wildfire suppression. This has resulted in stands of dense ponderosa pines prone to greater risk of high intensity crown fires. The following photos were taken by William Henry Jackson in the early 1870's.



Figure 4, Foothills west of Palmer Lake, 1872, Photo by W. H. Jackson, USGS



Figure 5, Town of Palmer Lake, 1871, Photo by W. H. Jackson, USGS

Wildland Urban Interface (WUI) Impact Areas

With the high potential of ground lightning ignition, railroad fires and recreation/residential related fire starts, the forest and homes in Palmer Lake are at increased risk of loss by wildfires. It should be remembered that wildfires can also spread from the community into the surrounding areas.

The Wildland Urban Interface (WUI) for Palmer Lake was set after meeting with local fire officials and CWPP partners. Three zones were established to allow prioritization of treatment areas that may impact the community. These are shown on Figure 6. WUI/CWPP Zones. These zones were set to aid federal, state, local, county and municipal agencies in targeting planning and funding for areas within one-half mile of wildland interface communities like Palmer Lake.

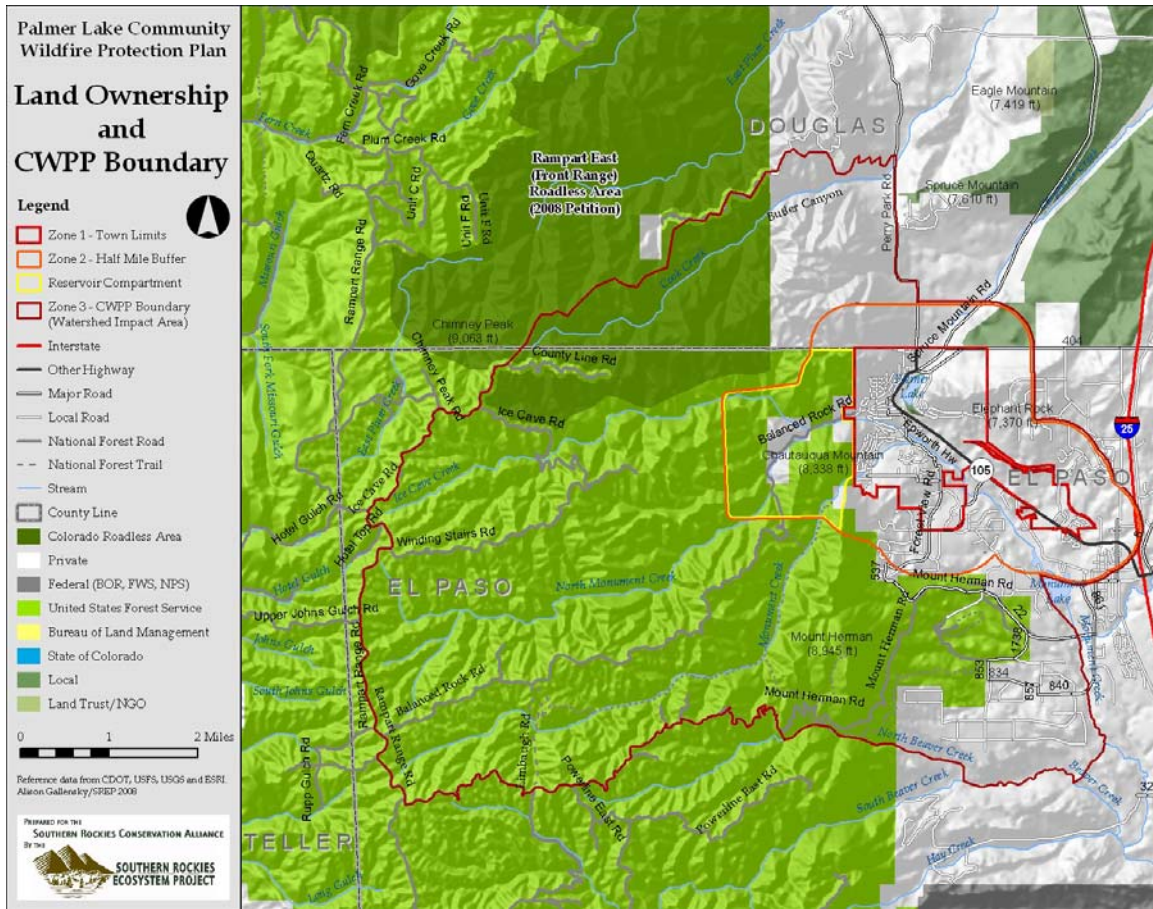


Figure 6. Land Ownership and CWPP Boundary

Zone 1

Zone 1 is the town shown in Figure 7. It consists of the community and is approximately 2296 acres in size. The Town also owns two reservoir sites in the canyon west of the community. These provide much of the water supply for residents of the town.

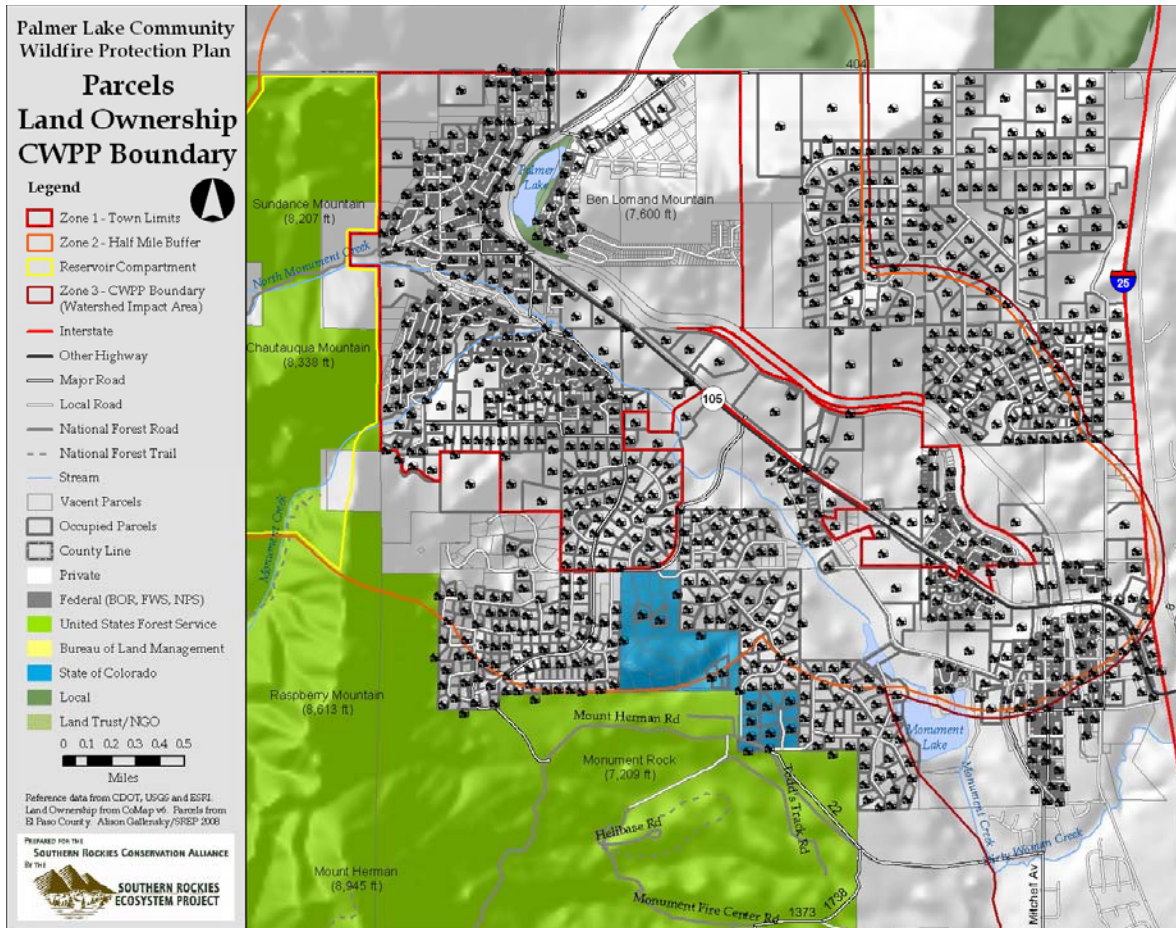


Figure 7, Parcels and Land Ownership in CWPP Zone 1 (Town limits)

Fuel treatment projects have been on-going on private lots since 2002. Homeowners and property owners have been encouraged to implement Firewise guidelines around all structures through educational efforts of the PLVFD and Colorado State Forest Service.

Senate Bill 100, passed in 2005 by the Colorado State Legislature, now allows for homeowner mitigation in communities that previously prohibited cutting of trees. Called SB-100, it is attached as Appendix B.

More specific wildfire mitigation planning for Zone 1 is covered in Chapter 4.

Zone 2

Zone 2 is the adjoining Wildland Urban Interface. This zone is approximately ½ mile wide and approximately 4,361 acres. The major owners within this zone are a mix of private owners and Pike National Forest. The entire western boundary of the town abuts the National forest. A special zone is shown as the Reservoir Compartment. This area includes the town's reservoirs and critical water supplies.

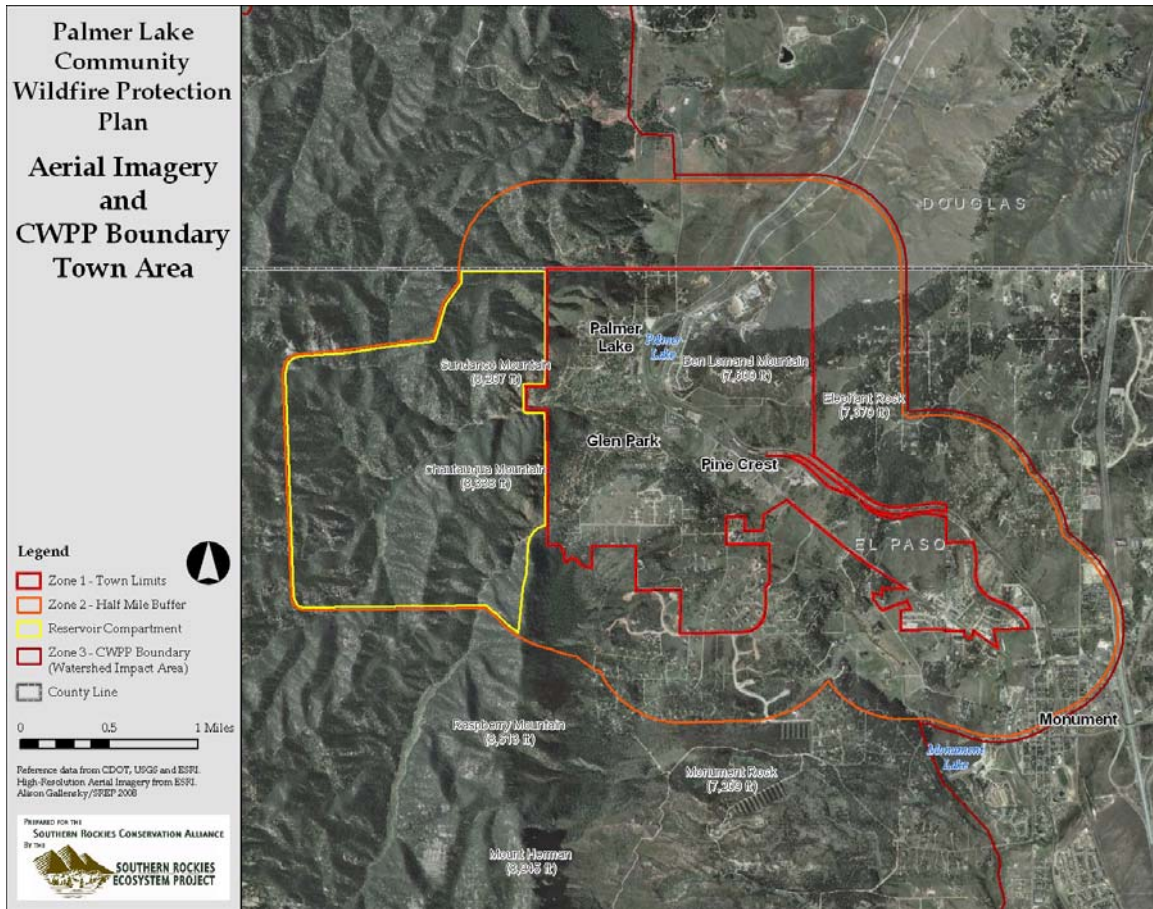


Figure 8, Zone 2 and Reservoir Compartment.

Zone 2 is the area of critical treatment for protection of structures and reservoirs in the town. Funding should be prioritized in these areas.

Zone 3

This zone was set to allow federal and state decision makers to concentrate efforts necessary to protect critical watersheds. It is also the area where fuel treatments should be concentrated to reduce the impacts of watershed and landscape scale wildfire events. It is estimated at 23,211 acres.

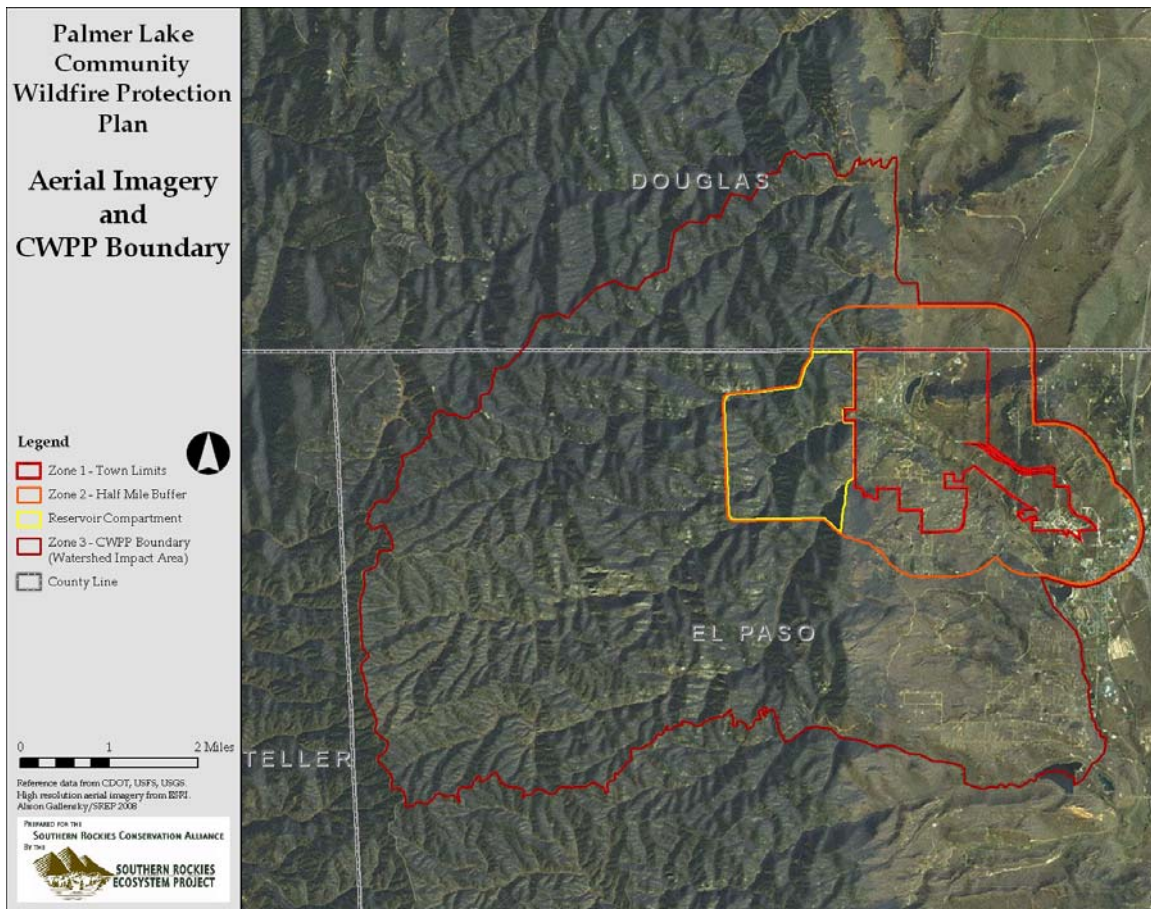


Figure 9, Zone 3 and CWPP Boundary (Watershed Impact Area).

It should be noted that a minimum of four water providers could be severely impacted by major wildfire events in the zone. These may include the Town of Palmer Lake, Forest View Acres Water District, Town of Monument and the City of Colorado Springs.

Zone Totals

The estimated entire area covered by this CWPP can be summarized as follows:

Zone 1- 2,296 acres
Zone 2- 4,361 acres
Zone 3- 23,211 acres

Total acres = 29,868 acres

Note: All Zone boundaries and acreages are approximate and are intended as a guide only.

WILDFIRE HAZARD ASSESSMENT

This section of the Community Wildfire Protection Plan addresses the identification and the prioritization of fuel mitigation treatments for high risk wildfire hazards impacting the Town of Palmer Lake as well as a brief assessment of vegetation fuels currently within the proposed fuel treatment areas. The three main components affecting wildfire behavior are fuel, weather and topography.

Vegetation Mapping

The vegetation types found in the District are shown in Figure 10 .

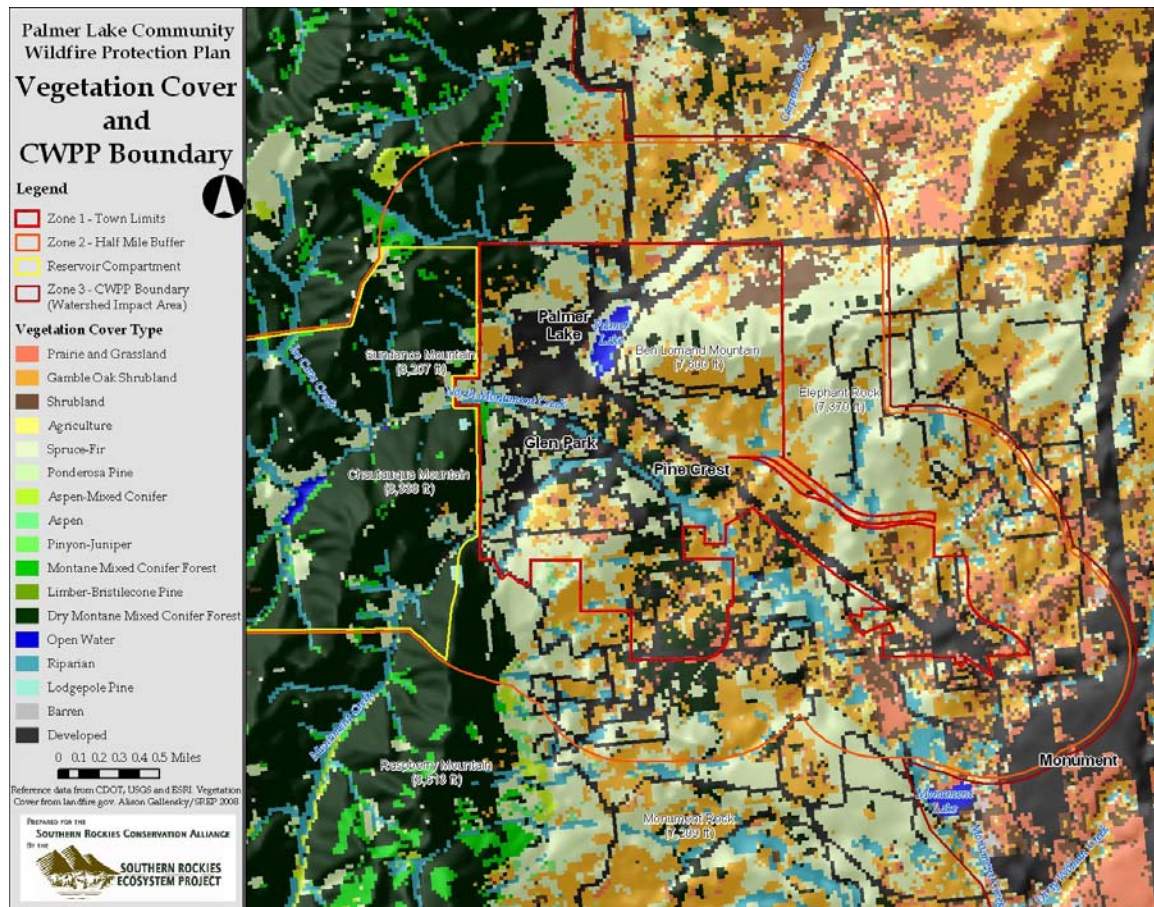


Figure 10, Vegetation Cover

Areas shown as dark gray contain the heaviest fuels; primarily conifer forests of ponderosa pine and Douglas-fir. North slopes tend to have a higher percentage of Douglas-fir, with south slopes covered by ponderosa pines. Gambel oak (scrub oak or oakbrush) are continuous in some areas of the town. The hillside above town (the Star) is a mix of gambel oak, mountain mahogany and other shrubs and occasional Rocky Mountain junipers.

Topography

Much of the town is hilly or mountainous terrain. Topography has a major impact on fire behavior since fires tend to burn faster up hill. General topography of the District is shown in Figure 11.

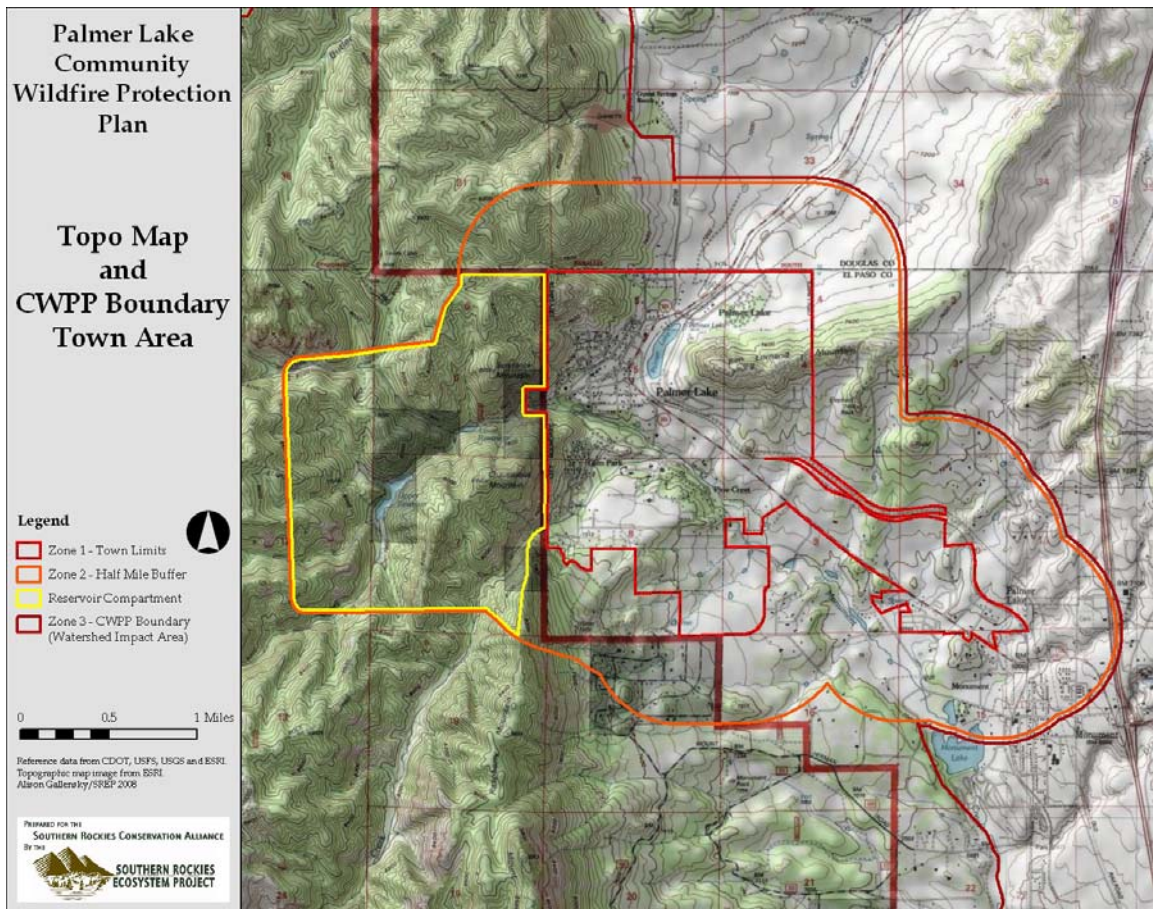


Figure 11, Topography

Slope and aspect will also affect fire behavior. Slopes are shown in Figure 12 and aspects in Figure 13. When slope is combined with aspect, fire behavior can be more erratic on warmer, drier southern exposures.

Slope will also have a major impact on treatment potential and costs. More economical mechanical treatments (mastication) are often limited to slopes less than 40 percent. If limited to hand treatments (chainsaw crews, slash dragging and chipping), costs can be two to three times the cost of mechanical treatment.

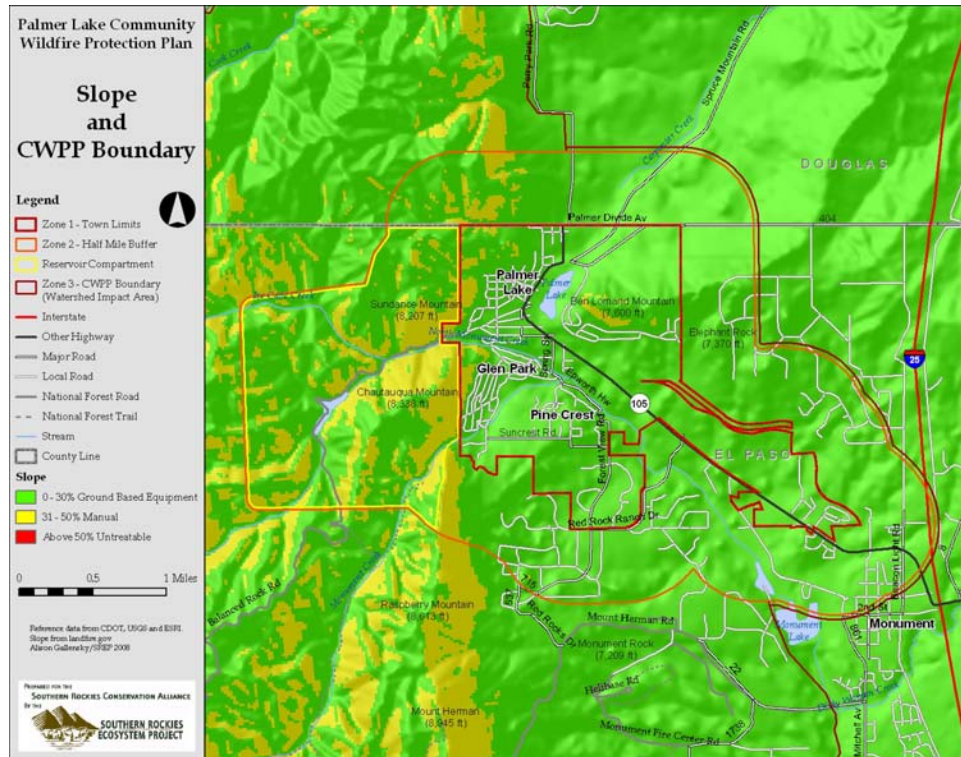


Figure 12, Slope Map of CWPP Area

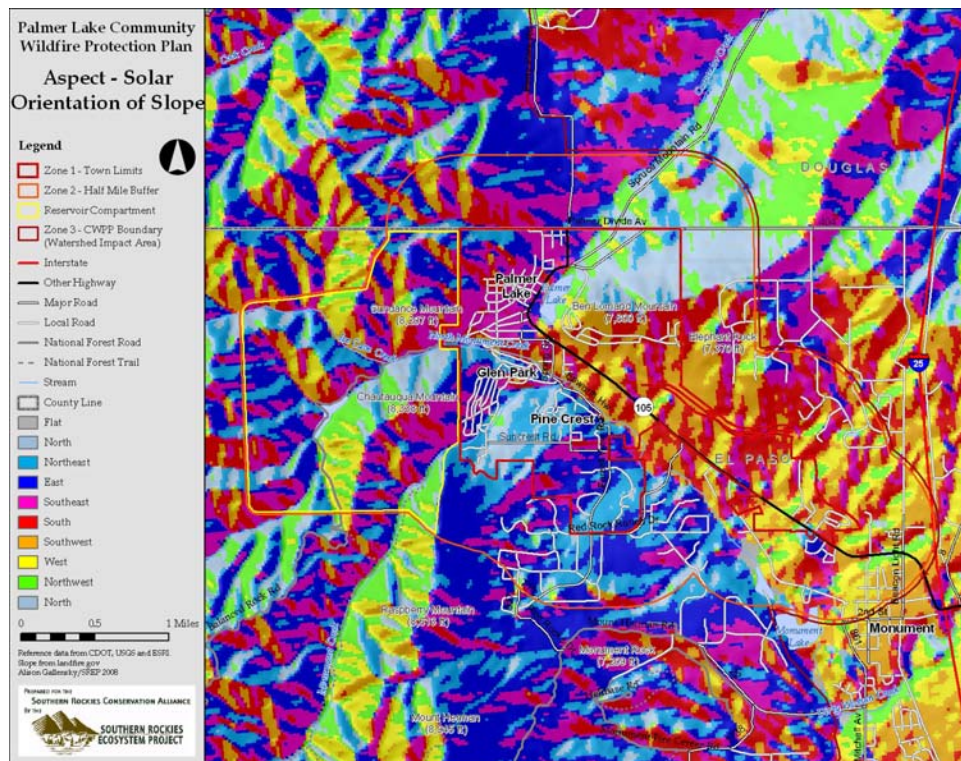


Figure 13, Aspect, Solar Orientation

The aerial photo in Figure 14 shows areas of forest, brush and prairie fuels in relation to residential properties.

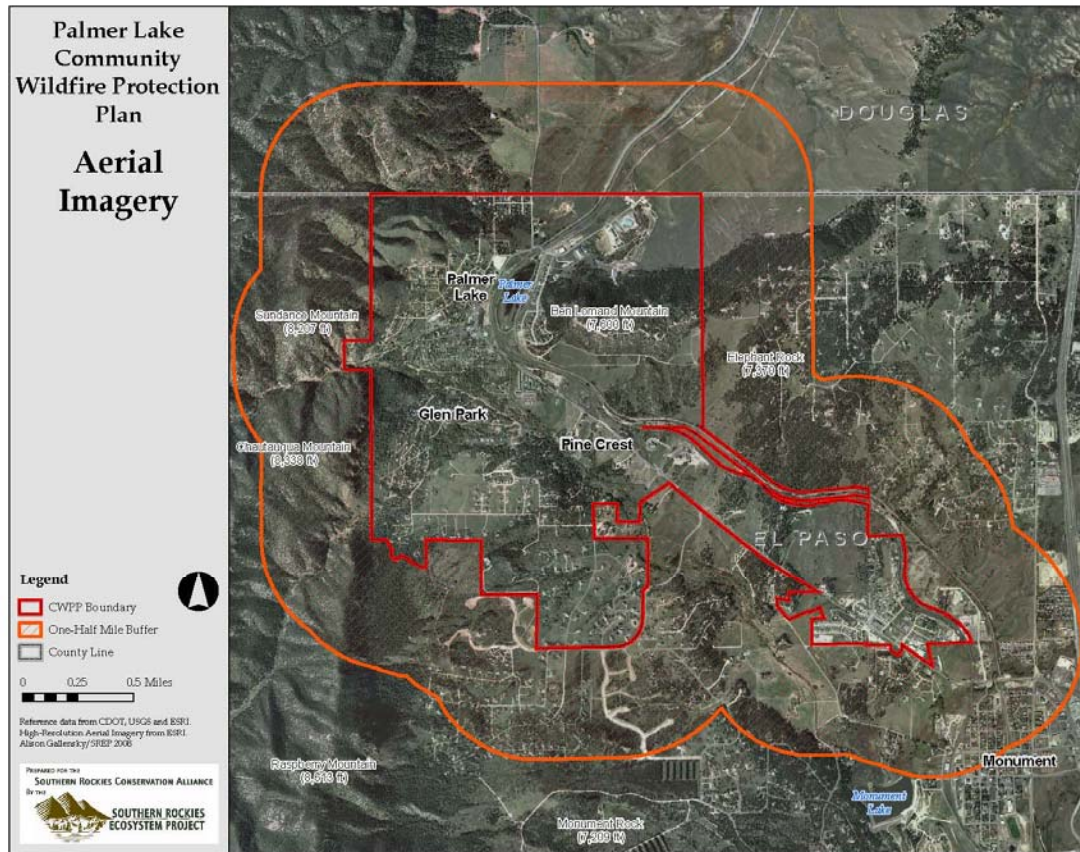


Figure 14, Aerial photography.

Fuel Treatment Priorities

The following is a list of recommended priorities for fuel treatments within Palmer Lake:

1. Ingress/Egress Routes- Evacuation will be critical. Many roadways were found to be narrow and with significant fuel volumes along their routes.
2. Individual structures- No amount of fuel treatments around residential areas will be effective if homes are not defensible. All residents are responsible for development of both defensible space and home ignition around their structures.
3. Potential Refuge Zones and Staging Areas- Evacuation may not always be possible. Zones of heavily treated fuels in close proximity to roadways should be created to allow either residents or fire fighters time to make sound decisions. In some communities, this can be as simple as regular mowing. In others, heavy fuel volumes should be treated along roadways or key intersections. These pre-determined zones may also allow for more orderly evacuation and ingress of fire fighting resources. Currently, the only area considered to be an adequate refuge zone is the Highway 105 right-of way.
4. Areas with heavy concentrations of homes- Residential areas, subdivisions and enclaves of homes will need to treat areas beyond a normal home ignition zone; especially in areas with heavy fuels. Treatment goal will be to reduce crown fire potential, lower fire

intensity such that limited manpower and resources can protect higher numbers of homes. Fire should be considered as a tool for protecting communities.

5. Areas with lower concentrations of homes- Each residence will typically have sufficient area to complete both a defensible space and home ignition zone. The goal should be the same as Number 4 above and allow for fire use for protecting structures.
6. Reservoir watersheds- All lands around the two town owned reservoirs are owned by USFS. All areas of the watersheds should be treated to create buffers that will allow fires to burn at lower intensities and reduce potential runoff.
7. Rural areas/Ranches- Owners will need to complete defensible space and ignition zones around all structures, including barns and outbuildings. A backup water supply is recommended.

Negotiations should be undertaken with private land owners adjacent to road rights of way areas as well as private lands in general to build fuel breaks with widths as specified by the Colorado State Forest in its *Fuelbreak Guidelines for Forested Subdivisions* (See Appendix B).

“Connections” that utilize natural areas with light or no fuel content (e.g., rock ridges, riparian, etc.) should be exploited wherever possible. These may also be fuel treatments that “connect” to more widespread thinned areas that have already had potential wildfire fuels mitigated. This type of fuel treatment is recommended in areas of heavy home development/structures to assist in home defense without destroying the environmental esthetics of the area. (See Appendix B, *Fuelbreak Guidelines for Forested Subdivisions*, for descriptions and rationale for building fuel breaks.)

For undeveloped areas within the town, such as specific areas within dense, untreated forests, potential mitigation would cover a much broader expanse of land than the wildfire fuel treatments considered for protecting developed properties. An example of fuel treatments proposed by this plan is shown in Figure 15.



Figure 15, Sample fuel treatment done on USFS lands.

Compartments

This Community Wildfire Protection Plan divides Palmer Lake into five compartments. Within each compartment, “*connection*” fuel treatments should be prioritized by wildfire impact risk and assigned a label, identifying the compartment area, and the mitigation priority.

Compartments are recommended as a planning tool to lay out fuel treatments that can either contain fire or prevent spread to other compartments. Clusters of homes, key roads and topographic features were used for establishing all five compartments.

Compartment 1

This area is the main part of town, including many historic structures. Topography is more gentle and rolling. Fuels vary from open meadows to brush, and timber stands mixed with gambel oak. Lower density ponderosa pine stands were noted on the northwest half of the compartment. Housing and building density is high with many properties unable to create adequate home ignition zones. The highest priority within Compartment 1 is along all roadways.

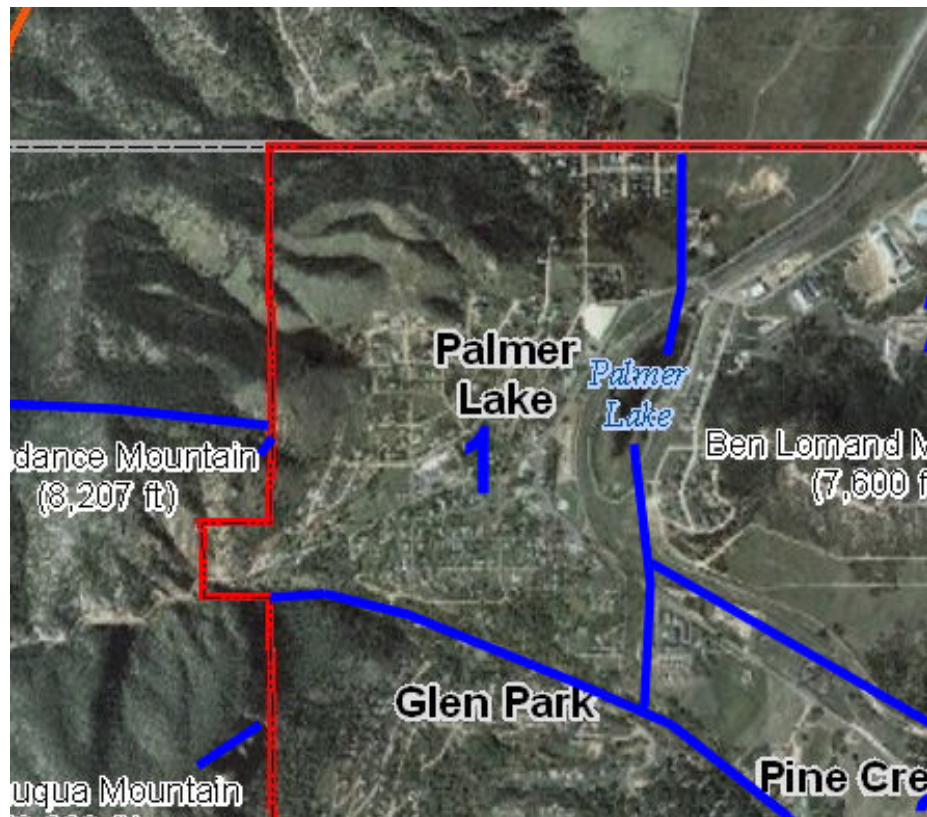


Figure 16, Compartment 1

Shake roofs, on-lot storage areas, firewood piles and general debris around structures will be at risk from fire brands (embers) lofted into the area from wildfires up to one mile away. Community cleanup and “junk ordinances” could aid in cleaning up residential “jackpots” of fuel. Fire hydrants currently serve the area for fire protection. However, water main sizes may be an issue.

Compartment 2

This area consists of residential and light industrial uses. Ben Lomand Mountain is the major fuel component in Compartment 2. Mountain pine beetles (MPB) are currently building to damaging levels on the mountain. MPB killed trees will continue to increase the volume of heavy fuels in close proximity to homes. Use of Colorado state statutes pertaining to "Pest Control" may be appropriate, if within the town limits, to develop ordinances mandating MPB control. Fire hydrants are in place throughout the compartment.

Future development is possible in the area. However, inadequate access will be a hindrance to development. Wildfire risk is high due to potential railroad fire starts.



Figure 17, Compartment 2

Compartment 3

This area consists of primarily rural properties and pocket of residential and commercial areas. All are concentrated along State Highway 105. The primary fuel type is meadow grasses. Mowing will be the primary need for protection of structures. Limited areas of gambel oak and scattered pines are present and can be treated at the time of further development expansion.

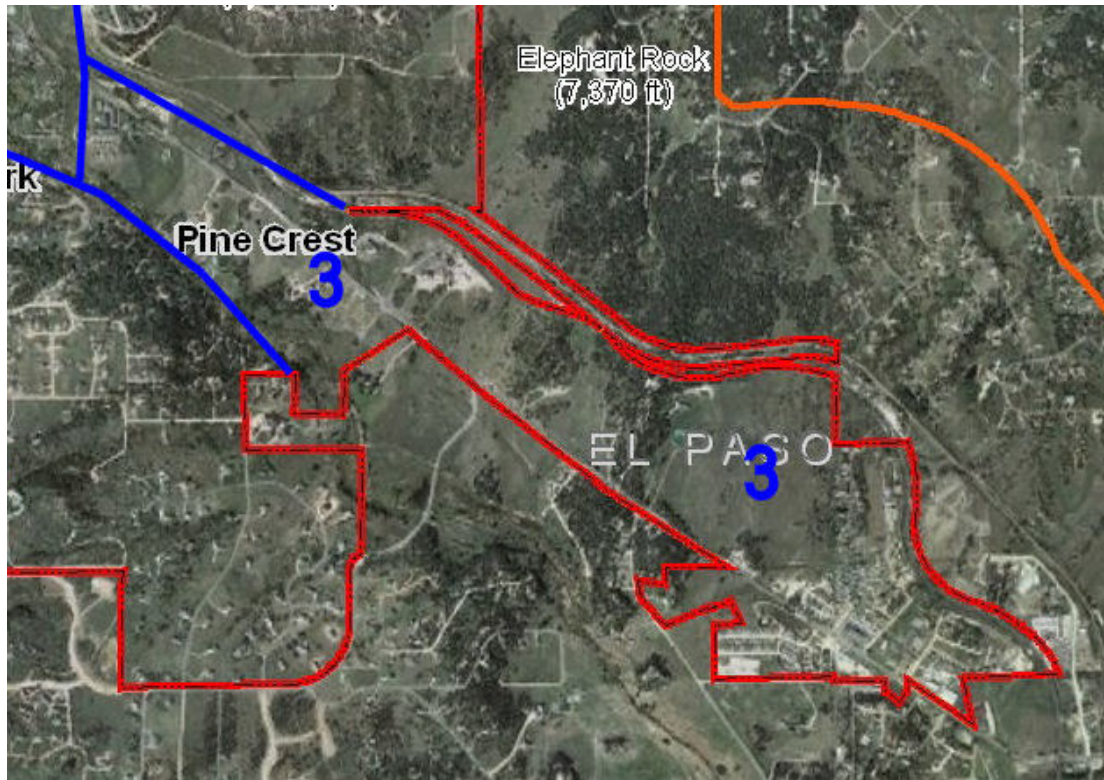


Figure 18, Compartment 3

Compartment 4

This area is described as “The Glen”. Topography is rugged and steep in portions of the community. Homes are of moderate to high density. Numerous historic cabins are densely packed together with narrow, winding roadways. Road right-of-way treatments will be one of the highest priorities for the town. Lot sizes will also limit the ability of individual homeowners to provide their own defensible spaces.

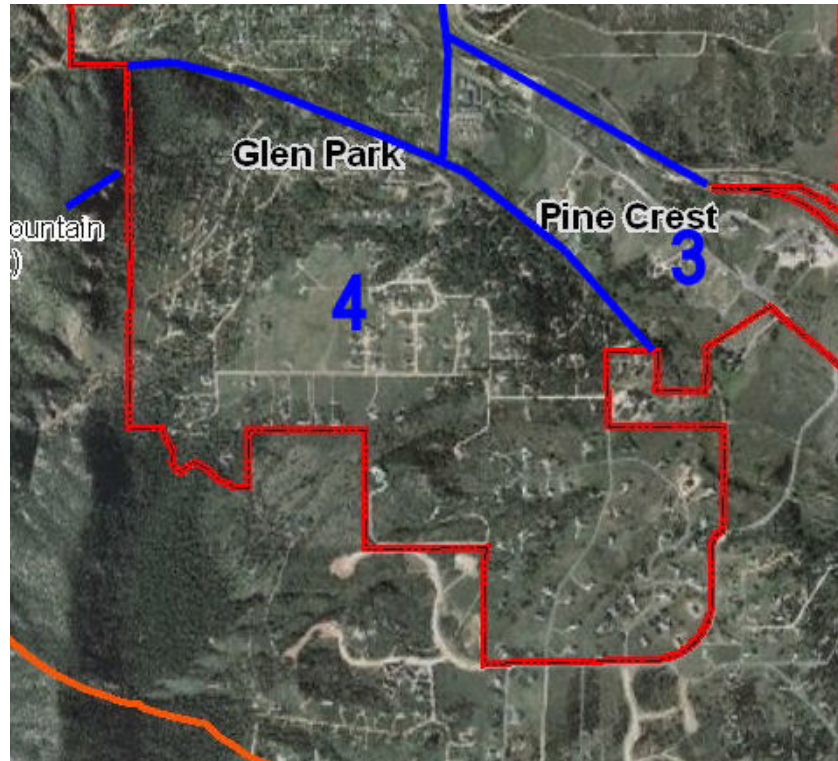


Figure 19, Compartment 4

Compartment 5

This area is the reservoir area and part of the town's water supply network. Two reservoirs are located on North Monument Creek. Both are surrounded by untreated national forest lands. A major wildfire in the upper reaches of the watershed will have a significant impact on water quality and life expectancy of the impoundment structures. Fuel treatments are totally reliant on USFS funding at this time. However, funds recently appropriated by the state of Colorado are often earmarked for treatment of watersheds as a high priority.

It is recommended that fuel treatments follow guidelines used for the South Platte watershed in the Cheeseman Reservoir area. If grant funding is obtained, CSFS staff can assist in developing "Good Neighbor" agreements with the US Forest Service to allow a municipality like Palmer Lake to treat fuels appropriately.

Two issues may affect timing for treatments in the national forest. These are:

1. Potential Roadless Area designation- Can restrict ability to access the area using more economical treatment methods.
2. Endangered Species- The area west of Palmer Lake may be potential Mexican spotted owl habitat. This can be an impediment if significant areas must be set aside for non-treatment.

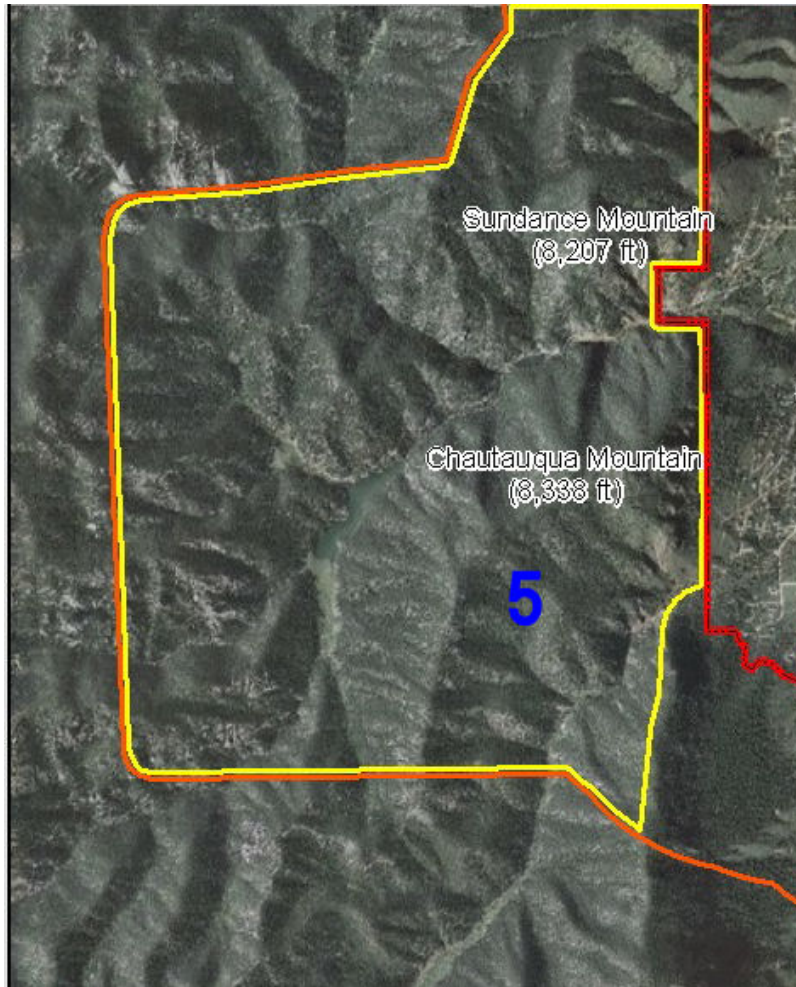


Figure 20, Compartment 5, Reservoirs

Three Proposed Mitigation Strategies

The PLCWPP recommends three strategies for effecting fuel mitigation for proposed projects. The application of a specific strategy will have to be based upon the ownership and developed or undeveloped aspects of the property proposed for mitigation. The basis of any strategies will be two-pronged: cost and legal.

Road Rights of Way

For properties on which Palmer Lake possesses rights of way, open spaces or on properties directly owned by an HOA, mitigation work may be funded by the town and/or the HOA. This funding will either come from direct funding or through State or Federal grant monies applied for and received by the town or others.

Private Homeowner and Landowner Properties

The town neither has auspices nor declaration of use of private properties within its boundaries. Therefore, fuel mitigation on private properties, although highly encouraged by the PLVFD, is the responsibility of the property owner. However, the town can provide information and services to assist property owners in their mitigation efforts. These information and services will consist of references, Firewise planning details and planning

guides, occasional Firewise training classes, continuation of the current chipping program, development of possible slash disposal site or other disposal method (See Appendix D , *Firewise Household Tips, Property Mitigation and Protection*).

In private lands adjacent to a road right of way that has had fuel mitigation performed to form a fuel treatment, owners are encouraged to work with the town in “*feathering*” the mitigated fuel treatment into their private property to attain a wider fuel treatment as recommended by Colorado State Forest Service.

Undeveloped, Publicly-owned Properties

The town should work with NGOs, State and Federal agencies to treat lands adjacent to private land that pose a threat to structures and public safety. The town should strongly consider adoption of ordinances to require property owners and land developers to *pre-mitigate* fuels on high risk wildfire properties to be developed. This *mitigation* is envisioned to be required prior to allowing the building of structures to proceed (See Chapter 8, *Implementation Plan*). There appears to be some degree of acceptance of developers to this community protection strategy since some developers have seen the marketability of treated properties. The town should assess potential in-fill areas that may be planned in these currently undeveloped but prime real estate areas (See Chapter 8, *Implementation*).

Type of Mitigation Used for Projects

The type of mitigation or method of fuel mitigation deemed appropriate for a specific area will be chosen when the area is assessed and base-lined prior to mitigation being performed. As indicated in Appendix B, *Fuelbreak Guidelines for Forested Subdivisions*, care will be closely given to assure environmental aesthetics of the immediate and surrounding area of mitigation projects.

Scheduling

The scheduling for specific mitigation projects will be based on four factors and periodically reviewed by stakeholder agencies party to this Community Wildfire Protection Plan:

- 1) Hazard risk priority for the mitigation project;
- 2) Cost of the project and manner of funding to be used;
- 3) Environmental conditions required for mitigation; e.g., moisture levels, air quality management, endangered species, etc.
- 4) Timing of “*tie-in*” projects impacting terrain identified for fuel reduction; e.g., development activity, and USFS or adjacent private property projects.

The time schedule associated with imminent, planned fuel mitigation projects should be posted in the community affected. Written notification may also be used and take the form of announcements in newsletters, flyers, direct mailings or combinations of any of these mediums.

Emergency Egress

Multiple ingress and egress points are critical to public safety. Egress is needed for residents to evacuate and ingress required for emergency services. The need for multiple egress points in insuring adequate and timely evacuations has been shown in research studies by Professor Thomas Cova at the University of Utah. His team's research has shown that a minimum of four egress points are needed for a community the size of The Glen or Oakdale Drive neighborhood. (*Public Safety in the Urban-Wildland Interface: Should Fire-prone Communities Have a Maximum Occupancy?* Thomas J. Cova, Natural Hazards Review, August, 2005). It is also important to note that "bottlenecks" may occur within the community if all traffic is directed to only one entrance.

A recent quote by Jack Cohen, Fire Scientist with the USDA Forest Service noted that, "Long evacuation routes are NO evacuation routes." (Personal quote made at the 2006 National Wildland/Urban Interface Fire Education Conference, 11-4-06, Denver, Co.)

It is recognized nationally, that most civilian fatalities occur during evacuations. This is also confirmed by studies of evacuation fatalities in Australia. Residents either become trapped by a fast moving fire, or wait too long to evacuate. It is recognized that if smoke and flames are already present, it may already be too late to evacuate. It can be expected that residents attempting to leave the community will clog existing roadways and impede access by emergency service providers.

The more recently built out areas of the Town have more direct ingress/egress routes that connect cleanly to State Highway 105 (Hwy 105). Neighborhoods located on the north side of downtown are good examples of straight and direct routing to main collector roads. All neighborhoods located along the south Hwy 105 corridor have reasonably good routing for evacuation.

Several routes lead through and out of town to Interstate I-25. These are State Highway 105, Douglas County 105, Spruce Mountain Road and County Line Road. These are shown in **Figure 21**. It should be noted that State Highway 105 is a possible alternate I-25 route. If multiple incidents occur, the Colorado State Highway Patrol and Colorado Department of Transportation (CDOT) should be contacted to assist in reducing conflicts.



Figure 21, Main Evacuation Routes

The County Line Road access could be impeded by a stopped train. If an evacuation is ordered, Palmer Lake will contact El Paso County Dispatch to notify the Burlington-Northern & Santa Fe Railroad to request that they clear the tracks and prevent further blockage. A decision will have to be made if State Highway 105, Spruce Mountain Road or DC 105 are alternate safe routes.

Creating secondary access out of older neighborhoods may not be possible or practical. Therefore, it is critical that all roadways be heavily treated to reduce fuel volumes along major ingress/egress routes. It may be possible, in the interim, to create small staging areas (see **Figure 22**, Potential Evacuation Routes, Staging Areas and Safety Zones) that can allow for residents to remain temporarily when emergency services may be trying to enter the community. Efforts should be made to work with the El Paso County to see if alternate access is possible into areas with limited access. All other existing roads to the southwest and west are too steep and fuel lined to be considered.

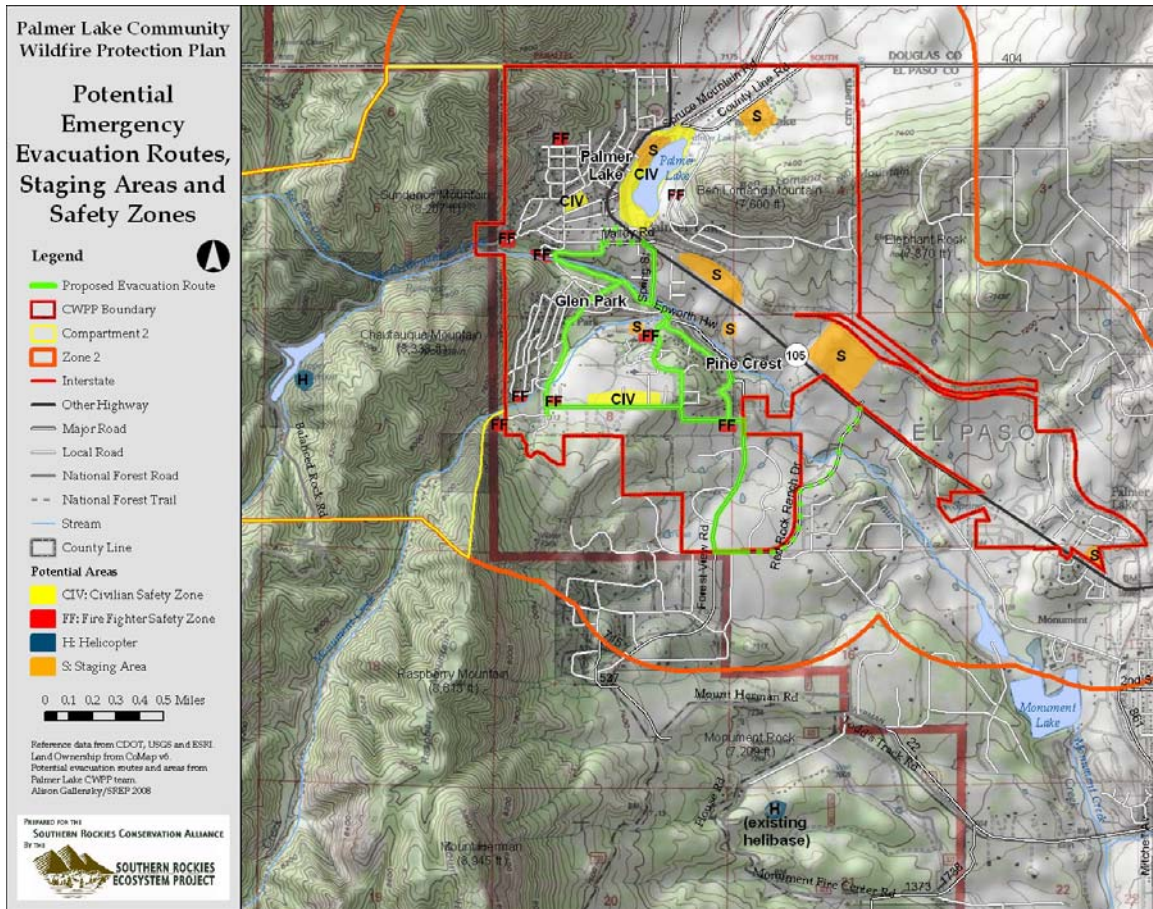


Figure 22, Potential Evacuation Routes, Staging Areas and Safety Zones

Palmer Lake was originally designed in the 1870's to have multiple egress points. However, the urban layout used was not necessarily suited to the terrain. Narrow road right-of-ways, tight curve radii, and steep grades are now inadequate for modern vehicle usage. The Town's residences were primarily used as either summer cabins or weekend retreats. Over the past 100 years many of these lots and cabins have been converted to full time residences.

The most problematic area of Town is described as "The Glen". Narrow, one-way roads with steep grades with blind curves could create potential bottlenecks during evacuation of these neighborhoods. Routes leading to the north lead into areas of potentially heavy traffic in the west-central part of Town. Spring Street, a northeast egress route, also connects into South Valley Road from the west-central part of Town. The only southern route out of the area is via Forest View Road to Red Rock Ranch Drive that connects to Hwy 105. The Glen is shown in Figure 23.



Figure 23. The Glen

A second neighborhood of concern is the area east of Centennial Park and El Paso County Park (Santa Fe Trail Head), and west of Ben Lomand Mountain. Currently, there is only one way in and out of this neighborhood via Oakdale Drive to County Line Road. Any opportunity to create a second route into the area will involve either construction of a grade separated crossing of the railroad right-of-way, or development of a route over the northeast side of Ben Lomand Mountain. This is shown in **Figure 24**.

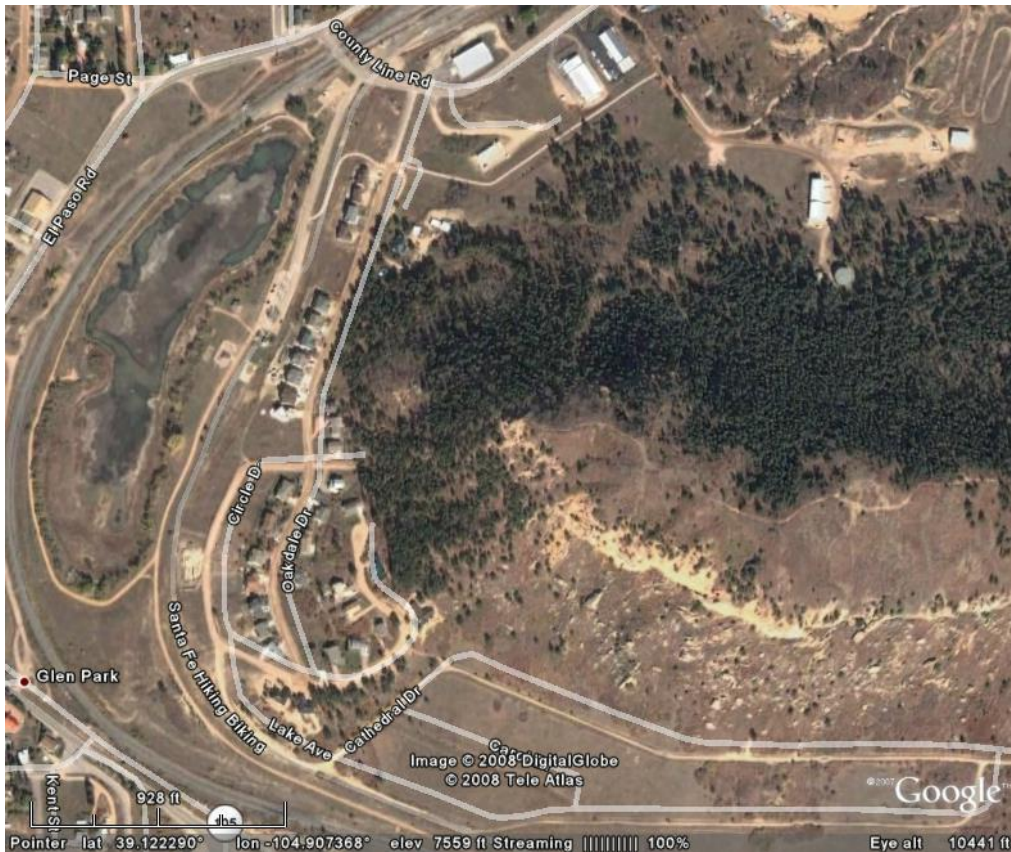


Figure 24, Oakdale Drive Neighborhood

Civilian Staging Areas

Figure 22 shows areas that could serve as potential staging areas for civilians to temporarily escape from a fast moving wildfire in areas with heavier fuels (trees, brush, etc.). These are areas with light fuels (primarily grasses) and good distances from heavy fuels. Civilian staging areas are intended to aid emergency responders in directing evacuees to the safest evacuation route for the wildfire event. Staging of evacuation can also create opportunities to allow additional responding outside resources to access the area safely. The following is a list of recommendations for implementing future civilian staging areas:

1. Areas shown on **Figure 22** may not be suitable for all wildfire events. Each area should be assessed using NWCG (National Wildfire Coordinating Group) Safety Zone Guidelines when possible. The ability to “burn out”, grade, or mow fine fuels to improve utilization should be determined prior to establishment as a civilian staging area.
2. Right-of-ways leading to designated areas should be mowed regularly to a maximum grass height of six inches.
3. Routes to temporary staging areas should be treated to reduce fuel volumes. Given the narrow Town owned right-of-ways, cooperation will be required with private owners along key routes.
4. Signage is suggested. Signage used in canyon areas where flash flooding is common can be used as an example.
5. Education is critical. Mailings, web site maps, utility bill enclosures, and flyers can be used to alert affected owners of problem areas.
6. Cooperator agreements should be considered with landowners adjacent to potential Civilian Staging Areas for timely mowing of fields and meadows.

7. Publicly owned properties should be mowed as determined by the Fire Department.
8. The Palmer Lake Elementary School is listed as a potential staging area. Meetings should be held annual with Palmer Lewis School District 38. Concerned parents attempting to pick up their children at the school will add to the confusion of an evacuation effort. A cooperative effort between the Town and the School District is recommended so parents are aware of how children will be evacuated to a safe area utilizing district resources.
9. Pets and animals will be an area of concern for some residents. Livestock (horses, cattle, llamas, alpacas, donkeys, etc.) are typically loaded into trailers which have the potential to further clog roadways. These can be staged in the same areas for later transport to safe zones well outside of the affected area. Kennels, veterinarian clinics or other boarding facilities should have a pre-plan for their animals.

Fire Fighter Safety Zones

Areas have been identified on **Figure 22** that may allow fire fighters to remain within or adjacent to affected neighborhoods. All are event driven and should be assessed for suitability by the responding fire teams. NWCG Safety Zone Guidelines and LCES (Lookouts, Communications, Escape Routes, and Safety Zones) Checklist should be followed.

Fire Fighter Staging Areas

Areas have been identified on **Figure 22** that can be used for staging of fire fighting resources and Incident Command Posts (ICP). All meet the following criteria:

1. Meet guidelines for NWCG Safety Zones.
2. Located within built or heavily maintained environments.
3. Good access to main collector routes identified in **Figure 21, Main Evacuation Routes**.
4. All weather driving surfaces with adequate turning radii.
5. Hydrants are within reach of drivable surfaces.
6. Do not contain significant natural or man-made hazards.
7. Could also serve as civilian safety zones.

Addresses of the Staging areas are as follows:

S-1, Town Shop, 195 Spruce Avenue
 S-2, Centennial Park, across from 304 W. Highway 105
 S-3, Red Barn, 300 General Palmer, off Highway 105
 S-4, Living Word Chapel, 350 E. Highway 105
 S-5, MTI/Inn at Palmer Divide, 421/423 E. Highway 105
 S-6, Pinz Bowling Alley, 855 Highway 105

Helicopter Landing Areas

Two areas were identified for use by helicopters. These have been used by the Monument Fire Center in the past and listed as current resources through USFS Pueblo Dispatch. The first is at the Fire Center and within one minute's flight time of the Town. The second is at the Upper Reservoir.

Shelter In Place (SIP)

Limited access and sub-standard egress routes in heavy fuel areas may force homeowners to consider shelter-in-place ("SIP") as their only alternative during a major wildfire event. All residents should make plans to evacuate immediately when advised by emergency services personnel to do so. However, in the event homeowners are trapped and unable to escape, the home may be the next safest place to stay. Many fatalities occur during the process of evacuation; especially when homeowners wait too long to evacuate. Even when SIP conditions

are met, evacuation orders from fire authorities should be followed. The decision to shelter in place should be made by the fire management team and not individual homeowners, and all orders from authorities should be followed.

It is important to understand that all the requirements for shelter in place must be met well in advance of a wildfire. It is not possible or safe to attempt to create stand alone conditions during a wildfire. To do so is unwise, and could compromise the safety of the homeowner and firefighters. Furthermore creation of stand alone conditions requires a great deal of advance planning and coordination between the landowners, fire professionals and resource advisors. The landowner should also be aware of both physical and mental scars that may be caused by exposure to an extreme fire event.

This recommendation to shelter-in-place should only be followed by individuals who have taken precautionary measures prior to a wildfire event. These can be summarized as follows:

1. Has the structure been determined in advance to be “Stand Alone” by the local fire authority?
2. Is the fire management team aware that shelter in place conditions have been met, and are they aware that residents are being sheltered?
3. Are building materials fire resistant enough to prevent combustion from a flame front or firebrand storm?
4. Is the property defensible with minimal resources?
5. Can the property (ecosystem) actually benefit from fire, or suffer little harm?
6. Can fire be used by professionals in the defense of the property?
7. Are the adjacent properties treated as well?
8. Is the community treated to reduce fire intensity?
9. Have the surrounding areas, including public lands been treated to reduce fire intensity? Are watersheds feeding the community treated?
10. Are there adequate safety zones on the property?
11. Can safety zones within the community be accessed safely during a major fire event?
12. Are driveways and roadways safe for travel during a major event?
13. Are there multiple routes to the safety zone?
14. Has the property owner received formal fire training, and understand fire behavior? Is the owner aware of how conditions can change and hazards that may exist before, during and after the fire? Does the owner have appropriate Personal Protective Equipment (PPE)?
15. Are backup fire prevention/suppression measures in place? In the event of power loss or public water system failure? Examples: Foams, gels, fire retardant systems.
16. Is the person healthy and both physically and mentally fit? Is the person aware of all health and safety risk; both short and long-term?
17. Are sufficient supplies (food, water, medical supplies) on hand for at least a 72 hour period? Roadways may be impassable after the fire due to tree fall, downed power lines, washed out culverts, hazardous materials, etc.

This list is not all-inclusive. It should be noted that individuals who take responsibility for their properties are still dependent on the actions of others. Fuel treatments for the surrounding area are totally dependent on the neighbors, surrounding community, and contiguous forested areas.

Shelter-in-place Structures as Fire Fighter Safety Zones

If sufficient numbers of homeowners within neighborhoods create easily defensible structures, then fire fighting resources can remain in place longer and with a higher degree of safety. Pre-designated “safe” homes can allow for fire frontal passage and deployment back into neighborhoods to check on structures and perform “mop-up” operations. Ideally, all homes are safety zones and fire fighters can focus on protecting natural resources.

It should be noted that no homes within the Palmer Lake community have been identified as either SIP or Safety Zones.

SERVICES, INFRASTRUCTURES, WILDLAND FIRE REPONSES

This section of the Palmer Lake CWPP details professional and voluntary resources available to respond to emergencies associated with wildland fires impacting Town residents and structures. Professional responders are always the front line in addressing wildfire, rescue and medical emergencies.

Professional Wildland Fire Response Services

For wildland fire emergencies endangering residents, the first line of responders are Palmer Lake Fire Department Volunteers. If PLVFD finds that the fire is beyond their capability to suppress, the Incident Commander on-scene will request additional assistance. Assistance will be available through Automatic Response and Mutual Aid agreements from both within and outside El Paso County. Palmer Lake VFD will coordinate and administrate these services.

It should be noted the Town of Palmer Lake currently has a Local Emergency Operations Plan (LEOP) in place for 2008 and is on file at the Town Hall.

El Paso County Emergency Services

El Paso County Sheriff's Office, under the *El Paso County Office of Emergency Management* division, provides the umbrella incident management and agencies coordination structure to the response and recovery from a wildland fire event(s) endangering El Paso County. Every wildland fire emergency incident that occurs in El Paso County utilizes the *Incident Command System (ICS)* during response and recovery activities, employing multi-agency operational structures.

The Office of Emergency Management's mission is to ensure that local governments within El Paso County have the operational capability to survive a disaster, and to manage and conduct essential emergency functions. This capability of managing a survivable crisis includes the ability to direct, control, manage, and coordinate emergency operations within jurisdictions in cooperation with other local governments and liaison with the State and Federal government. To accomplish this, it maintains and develops a capability built on people (volunteers), communications equipment and plans.

Emergency Operations Center

An Emergency Operations Center (EOC) is one of the jurisdiction's specialized facilities to include personnel and equipment that is specifically designated for use in emergency situations. It is a public resource that serves as:

1. A command center with communications equipment.
2. An operations center for government officials, volunteers and special agencies.
3. An information center that analyzes and disseminates information.

The county office responsible for the EOC's operations is the Office of Emergency Management (OEM). This office develops exercises to test staff and communications to ensure the facility and its plans are functional.

Community Emergency Response Team (recommended)

FEMA has established programs for training of local residents in dealing with multi-hazards. This program, CERT (Community Emergency Response Team), is recommended and can be set up and organized under PLVFD and EPC-OEM. These voluntary groups are only used when professional first responders cannot respond and then can only be activated by authorization of the Emergency Services Manager or the Chief of the local Fire Protection District.

El Paso Sheriff's Office Wildland Fire Crew (EPSOWF)

EPSOWF provides engine crews and Type II hand crews for all ranges of wildland fire suppression from initial attack to mop-up, prescribed burns, and urban interface protection. In addition to fire suppression activities, the crew provides public services in the form of training and education. Each fire department is responsible for "red card" and wildland fire training activities for each fire department throughout the county. They also assist the US Forest Service, BLM, CSFS, Department of Defense (DOD, Air Force, Army), and National Park Service.

Mutual Aid and Automatic Aid

In the event of a wildland fire, PLVFD operates under a mutual aid agreement for providing equipment and personnel assistance, if able and available, among its fire fighting agencies (see Appendix I). The agreement encompasses fire departments from El Paso, Douglas and Teller Counties, City of Colorado Springs, US Air Force Academy, and Fort Carson Fire Departments. As resources begin to deplete and the situation is recognized to be one that could be disastrous, municipal and county officials will become involved. At that time, EPOEM shall confer and determine what special provisions need to be made or what special action needs to be taken. At this point, the need for the Emergency Operations Center (EOC) will be considered.

For wildland fire only, mutual aid from local government fire suppression resources can be requested through the Designated Dispatch Center from the on-scene Incident Commander. Requested fire suppression resources would be from entities within El Paso County, Douglas County or from Teller County. Out of county local government resources will be coordinated and placed by either the Incident Commander, Colorado State Forest Service Fire Duty Officer and/or County Office of Emergency Management.

The following is a list of commonly requested resources that are available through El Paso County Public Works (DOT) and other County resources:

MCP	Dump Trucks	Wildfire Cache	Transport	Sandbags
Dozers	Portalets	Trailers – Flat-	Vehicles	GIS Support
Graders	Event Tents	bed & Cargo	Portable	Barricades
Water Tenders	Radio Cache	Generators	Lighting	Feeding
Sheltering	Animal Rescue	Fuel Trucks	HazMat Trailer	Support
Support	Team	Snowmobiles	Message Signs	Cranes

El Paso County has four primary resource policies: 1) Firefighting operations will be coordinated by the fire district or city department within their jurisdiction; 2) Mutual Aid from other than El Paso County fire agencies will be activated by on-scene Incident Command as necessary and out of county resources will be activated by the OEM Division of El Paso County Sheriff's Office; 3) County Commissioners may request State assistance; and, 4) Local and State Civilian Fire Fighting Forces may be augmented by Federal Agencies.

Palmer Lake Volunteer Fire Department

Palmer Lake Volunteer Fire Department (PLVFD) is the first responder to a sighted or reported wildland fire threatening the environs surrounding and interior to the Town. PLVFD has one station: Station 1 located at 42 Valley Crescent. The overall equipment resources of PLVFD are:

Equipment-

Type 1 Engine- 1
Type 4 Engine- 1
Type 6 Engine- 2

In the event PLVFD personnel and equipment resources become exhausted, first reinforcement mutual aid calls are Tri-Lakes Fire Protection District, Larkspur Fire Protection District followed by other County Fire Departments and El Paso County Wildland Team.

PLVFD established first thrust strategy for fighting wildland fires endangering the Town is *direct suppression*. If suppression is not an option, then a defensive posture will be taken. Engines will be stationed at the most defensible structures first. Structure prep should include closing up structures, placing hose lines into use and removal of fuels around homes. Black lining (burning out) should be accomplished quickly and safely.

Emergency Medical Services

PLVFD provides first response emergency medical services to the Town. The list below is the breakdown of the PLVFD emergency personnel resources and staff.

32 Volunteer Fire Fighters as of January 2008

Water Resources

Palmer Lake currently has emergency water supplies located throughout the Town. There is one other water district adjacent to the Town. Other supplies may be available if needed through the use of small bodies of water close to or in the Town. A map of water storage facilities will be added upon update of the CWPP.

Civilian Staging/Fire Fighter Safety Zones/Staging Areas

During emergency situations, it may be necessary for residents and emergency services providers to reach a safe place that is outside of the affected part of the community. PLVFD, in conjunction with other wildfire authorities, recommends establishment of Civilian Staging areas outside the communities. These can be used as reasonably safe areas where little or no wildfire risk exists in close proximity to either natural (vegetation) or man-made (homes) fuels. These may serve two purposes. The first is as a refuge from any wildfire threat. The second is as staging areas to allow timely and orderly evacuation of residents. It should be noted that many of the civilian fatalities from wildfires are caused during evacuations in which residents become trapped and overrun by fire. Once residents are evacuated, these Civilian Staging Areas may be used by firefighters for staging areas or fire fighter safety zones for marshalling resources within the community.

All neighborhoods and communities should learn their quickest routes to Colorado Highway 105. This will have to serve as the major refuge zone and staging area for residents. For these to be

effective, signage/posting will be needed. An annual educational campaign should be established. Posting on these locations will be essential. Mail kiosks can also be used as posting places.

Internal Volunteer Services and Communications

PLVFD does not currently support any volunteer and paid groups, other than Town staff, that can be used in communication support or augmentation of professional first-responders within neighborhoods in the event of a wildfire emergency. It is strongly recommended that the Board of Trustees implement operating agreements with PLVFD that allow for use of Homeowner Association (HOA) properties and facilities during emergency situations.

The most frustrating issue for residents during wildfire events is a lack of information. Local media cannot always be relied on for timely and accurate information. Residents may be away from the community at the outbreak of an emergency and require information necessary to protect family members and pets still at home. Possible information sources are El Paso County web sites. The El Paso County Sheriff's Office (EPSO) may also have an emergency phone line set up to provide information.

The Town board and its managers should develop an emergency response plan for interaction with emergency services providers. This needs to be developed prior to emergencies and allow access for Town Board or designated representatives to the Incident Command Center or Outpost. In effect, this representative could provide accurate and timely information for distribution over existing community networks (web site, phone trees, and office staff).

Critical Utilities

In the event of a wildland fire that would impact the Town, PLVFD or EP-OEM Incident Command dispatcher would notify critical utilities for their support. Specifically, emergency involvement of utility support would focus on two areas: 1) Safety of the public and emergency response personnel and 2) Direct support of mitigating the emergency event. EP-OEM, through its dispatcher, is able to provide direct contact with the railroad in the event trains should be stopped to allow evacuation of civilians.

Public and Emergency Response Personnel Safety

Beyond the direct emergency, event-damaged or event-threatened gas services and electrical distribution facilities can pose significant safety issues to the public and emergency response personnel. Direct intervention for disconnection, reconstruction or rerouting would be directed by:

Natural Gas Services:	<i>Aquila</i> Emergency Service Telephone Number: (800) 303-0357
Electrical Power Services:	<i>Intermountain Rural Electric Association</i> Emergency Service Telephone Number: (303) 688-3100

Direct Support

Direct support for water and communication resources in support of an emergency event would be directly provided or directed by:

Water:

Water Districts:

- 1) *Town of Palmer Lake Utility Department*
- 2) *Forest View Acres Water District*
- 3)

Wire-line Communications:

Qwest Communications:

Emergency Service Telephone Number: (800) 573-1311 or
1-800-603-6000

Comcast

Emergency Service Telephone Number: (303) 930-2000

Any communication for support by utilities in an area impacted by an emergency wildfire event must be authorized by the on-scene Incident Command. Any work performed in an impacted area can be requested only by on-scene Incident Command through the Designated Dispatch Center.

Post-Fire Remediation

In the event a large wildland fire should burn significant acres above or in the community, the Town will need to immediately direct efforts to reclaim or stabilize areas above homes. Burned areas will be prone to mud slides, debris flows or rock fall hazards. These can have an impact on surviving residences and the Town's road network. The de-nuding of slopes may release sediments and ash into existing drainage ways resulting in clogged culverts and overtopping of roadways by storm flows. If flows are heavy and concentrated enough, road surfaces can be washed away. An alert system similar to that used in the Hayman Fire Burn area may be required to warn residents of impending storms that have the potential to cause severe run-off. The PLVFD and Town Staff should be prepared to:

1. Immediately retain the services of an engineer or geologist to assess potential storm and debris flows after a wildfire of significant size.
2. Establish a stand-by contractor list of licensed and insured heavy equipment operators for clearing of roads, cleaning of culverts and construction of potential diversions or road repairs. This could be coordinated through El Paso DOT and Colorado DOT.
3. Hire a reclamation contractor to stabilize areas above homes and critical infrastructure with a combination of temporary and permanent erosion control measures. This can be coordinated through El Paso County, Natural Resource Conservation Service (NRCS) and local soil conservation district.

Post-fire issues can linger on for many years after fire occurrence. The Town should annually assess its risks and budget accordingly for remediation.

Insect and Disease Prevention and Control

The area contains stands of ponderosa pines that will be susceptible to Mountain Pine Beetle (MPB) infestation. Mountain Pine Beetle is active in the area, although the activity seems to be confined to individual trees or small pockets of trees at this writing. Ben Lomand Mountain is currently experiencing the highest outbreak of MPB (see Figure 25). The threat of increased activity is always present. Vigilance will be necessary on the part of Town residents to regularly inspect trees on private lots and greenbelt areas for any signs of infestation. Large groups of dead trees can contribute to fuel loading in the community and should be removed in a timely manner to prevent spread. No general, area wide preventive spraying program is recommended

at this time for prevention of MPB. Should an outbreak occur in the area, homeowners should be advised to preventively spray mature pines. Mountain pine beetle information is available at www.csfs.colostate.edu.



Figure 25, Mountain Pine Beetle infestation on Ben Lomand Mountain, 2008

Severe infections of Dwarf Mistletoe (DMT) have been found throughout the community. Mistletoe is a parasitic plant that infects pines, and results in the debilitation and slow death of the trees. Trees infected with the parasite can result in increased fire hazards. There are several strategies to control mistletoe infections, and advice from a professional forester should be sought if a landowner has mistletoe infected trees. DMT information is available at www.csfs.colostate.edu.

Spruce Budworm and Douglas-fir Tussock moth are now building to damaging levels in the Front Range Foothills. Spruce budworm damage was noted as heavy in some areas of the District. If not controlled, trees will be weakened and susceptible to attack by bark beetles. This will also contribute to fuel loading.

Builders who remove trees for lot clearing and subsequent home construction should remove all lot clearing slash within six weeks of cutting to prevent use of fresh slash by Ips Engraver Beetles (Ips) as brood wood. Ips generally attack trees weakened by lightning strikes, root damage during construction or transplanting. Ips activity is currently heavy in the Palmer Divide area due to dry summer weather. Regular preventive spray applications to high value, stressed trees should be done until the stressing agent is eliminated. The most effective prevention for harmful insects is always a good program of forest management and thinning. Properly thinned trees will be less susceptible to insects, and thinned stands are more likely to survive a wildfire without serious damage.

Gambel oak is prone to periodic outbreaks of defoliating insects. These outbreaks tend to be cyclical and do not generally cause oak loss. Often time, by the time damage is noted, the insects have completed their life cycles and spraying is ineffective.

Weed Control

Virtually all areas of the Town are infested with noxious weeds that are displacing native plants and degrading wildlife habitat. Noxious weeds can also contribute to wildfire spread. Town residents should begin an annual control program of mowing and spraying. If spraying is not possible, biological control agents (typically host specific insects), should be introduced to lower the rate of spread.

Poison ivy may be found throughout drainage ways in open space areas. This plant will pose a hazard to firefighters during hand line construction. Smoke from burning poison ivy can also be toxic if inhaled or exposed to eyes. Control will be difficult when found growing intermixed with other native plants. A program to reduce and contain poison ivy is strongly recommended.

Specific forest management recommendations and other natural resource concerns are beyond the scope of this document. Residents are encouraged to contact a professional forester or resource professional specific to their situation.

PUBLIC NOTIFICATION, COMMUNICATION AND SUPPORT

Communications to the general public are classified in two categories: 1) Warnings or emergency information broadcast to the public of specific hazards, such as single or multiple wildfires threatening the communities and 2) Informal informational services and event notifications under non-threatening conditions.

Warnings and Hazard Notification to the General Public

Warning notifications concerning a specific wildfire or wildfires directly threatening communities can be authorized only by Palmer Lake Volunteer Fire Department, EPOEM El Paso County Emergency Management Coordinator (EPOEM) or the El Paso County Sheriff. Such a warning can be issued in a variety or combination of methods and will generally contain *action* information for residents. An *action* information or direction may contain preparatory information for residents concerning potential or upcoming evacuation of the area. Or, it may be an immediate, “*act now*” request for evacuation due to a wildfire condition that is deemed to have imminent impact to the area. Authorization, *official* warnings may come from:

- 1) GEOCAST- through El Paso County Sheriff's Office (AKA: Reverse 911)

Services Communications and Support Systems

Non-threatening Conditions

Informational notifications of are done for public meetings, events and general services conduct or schedule information. Several mediums are used for general public informational notifications including Board of Town Trustees notice of meetings, general letter mailing, flyer posting and utility bill inserts. The Town's web site is also used for general information (www.ci.palmer-lake.co.us).

Wildfire Condition

In the event of an actual wildfire impacting the community, updated residential wildfire event information should be posted periodically on County and Town websites. Updated information is generally available on messages recorded and made available on event-established, dial-up telephone line(s) by the El Paso County Sheriff's Office. The Town should consider a similar arrangement referring residents to the appropriate information outlet. The telephone numbers of phone lines are established for each event, with the numbers announced to the public via printed or announced public broadcast mediums. Periodic updates regarding emergency events are also generally broadcasted via AM radio, on the official emergency public broadcast radio stations for El Paso County.

El Paso County OEM is currently investigating use of the 211 Network as a tracking tool for evacuees and their families.

IMPLEMENTATION PLAN

Chapter 8 provides a summary of actions of the PLCWPP. These actions are designed to address four broad subject areas to enhance residents' safety and diminish wildfire potential in the PLCWPP area and its adjacent environs as identified in Chapter 4, *Wildfire Hazard Assessment*. The actions to be taken in the public education arena are intended to better prepare residents for helping themselves and nurturing their family's safety needs in times of crisis as well as providing them knowledge to reduce the structural ignition potential of their homes and those of their neighbors. The actions set forth in the Fuels Treatment category are both short term and long term.

Based upon forestry and fire sciences, the Fuels Treatment actions address the mitigation of wildfire fuels in Palmer Lake and adjacent privately owned lands. The general periods identified for developing fuel treatments in these high wildfire risk areas are to be based upon both risk potential and funding availability. The priorities associated with these wildfire risk mitigation areas can be found in Chapter 4, *Wildfire Hazard Assessment*. The third area addressed by this implementation plan is the communication, support and information services used to provide added knowledge and information to be used in planning for wildfires as well fighting them in the event one or more should occur in the Town and its neighborhoods. The final broad focus area, Mitigated Areas Perpetuation, addresses maintaining fuel mitigated areas once the areas have had wildfire fuels initially reduced as well as on-going town administrative actions associated with the Community Wildfire Protection Plan.

Public Education

The town has moderate residential turn-over and influx. Based upon average monthly real estate listings weighted against average home sale time period or "*life on market*," Palmer Lake may experience up to 15% change to its profile of residents during the year. Many of these "*new*" residents of town may not be initially familiar with living in a high wildfire risk area. The Public Education actions of this Community Wildfire Prevention Plan are planned to educate these newcomers as well as increase the knowledge of the current residential base in areas of family safety, Firewise strategies and construction and landscaping materials that are more resistant to ignition than wood or other commonly used building and landscaping products.

- Topics for public education will vary depending on seasonal or wildfire risk conditions, input or requests from town residents and the availability of qualified instructors or presenters. The public education topical areas include but are not limited to:
 - Structural construction materials or design considerations
 - Home safety and home fire warning and fire suppression equipment
 - Home risk self-assessment and structural wildfire risk reduction
 - Residential fuel reduction strategies
 - Landscaping for wildfire protection; xeriscaping
 - Living adjacent to wildlands
 - Home property fuel mitigation strategies and methods
- Public Education programs will use professionally developed instruction collateral material developed from resources recognized for their experience and expertise including,
 - National Firewise Communities USA
 - American Planning Association
 - United States Forest Service
 - Colorado State Forest Service
 - Colorado State University Cooperative Extension
 - El Paso County
 - Private Consultants

- **Upon publication of the 2008 Community Wildfire Protection Plan for Palmer Lake, the PLVFD should develop an annual schedule that is published and periodically recapped in the town newsletters and web sites. Also, see Appendix D, *Firewise Household Tips, Property Mitigation and Protection*.**
- Coordinate volunteer firefighter training with other agencies and NGOs (non-governmental organizations). Work with BLM, USFS, Fort Carson, US Air Force Academy, Tri-Lakes Fire Department and Colorado State Forest Service to provide fire experience for slash pile burning and prescribed fire.
- Involve the public in as many phases of planning as possible for all burning operations to teach the general public that smoke in the air can be a good sign of fuel hazards being reduced. Also teach the economy of scale for fuel treatment costs utilizing fire as a management tool for both fuel reduction and ecosystem restoration. Good communication with PLVFD on all agency or NGO burns should be done well in advance.

Although several public meetings have been held to inform and/or assess the opinions of the general public on *Firewise* and wildfire issues, the 2008 baseline for this implementation plan area is being considered zero. Annual performance assessment of public training will be based upon the public education training and informative session attendance as well as comments and reactions from the general public. For overall impact of the wildfire protection plan program, training session attendance should be totaled annually and expressed as a percentage of town total residents. This percentage should be trended year after year for evaluation and public education course management purposes.

Fuels Treatment

Earlier in Hazard Assessment, Chapter 4, potential wildfire fuel treatment areas were identified in three groupings: 1) *Road Rights of Way and Safety Zones*; 2) *Open Space Lands*; 3) *Private Homeowner and Landowner Properties* and 3) *Undeveloped, Privately-owned Properties*. The implementation actions set forth in this Plan address each of these individual areas separately.

Road Rights of Way and Safety Zones

Fuel treatments provide quick, safe access for wildfire defensive positions and wildfire suppression; as such, they are necessarily linked with roads systems. Where possible, potential fuel treatments proposed in this Plan have been connected with town, El Paso County and state roads and time-established trails within the town's less developed areas. The potential fuel treatments will provide good access and defensive positions for firefighting equipment and support vehicles. In addition to creating defensive gaps of potential wildfire fuel and affording good access, potential fuel treatments are proposed in this plan to create "*compartments*" within neighborhoods that break up large tracts of dense fuel, thus limiting uncontrolled spread of wildfire. The planned fuel treatments and the "*compartments*" they enclose can be seen on the individual Compartment maps, Chapter 4, *Hazard Assessment*.

Adequately designed Refuge/Staging Zones can aid both resident and firefighters. These will need to be monitored throughout the growing season for potential wildfire risks. Once constructed, the primary need will be mowing.

Implementation Actions

- Mitigate existing and proposed road areas within the right of way associated with the road. Generally, in all established and planned roads within Palmer Lake, this action creates a fuel gap of 20-60 feet; i.e., 10-30 feet either side of the centerline of the road. Although Colorado State guidelines for fuelbreaks are generally 300 feet or greater, depending on fuel density and

slope, this Community Wildfire Protection Plan initially establishes a break of 60 feet since it can be addressed quickly within the road right of way, followed later by working with adjacent landowners to encourage widening the fuel gaps by encouraging “feathering” of the fuel treatments into their private land. The Town Boards should:

- Work with PLVFD and CSFS to assess and cooperate on joint fuel mitigation projects;
- Review prioritization of fuel mitigation projects and schedule projects annually based upon funding and the identified risk priority of the projects;
- Take action to establish a separate budgeting category (2009 and yearly beyond) to identify “direct” budgeted dollars to be directed at road right of way mitigation projects and mitigation projects associated with established and recognized trails and lands within town properties;
- Detail and file for particular Federal grants awarded annually for fuel mitigation and wildland fire protection support. Funding may be channeled through CSU/CSFS as “sub-awards”;
- Develop and update annually, a long-range (five to twelve year) schedule of wildfire fuel mitigation projects and post the schedule on the town websites for public access.
- Inspect all treated areas periodically to determine need for re-treatment and/or on-going maintenance.

Town Properties

The town has the opportunity to use its properties to demonstrate good property management and ecosystem restoration. Greenbelt areas away from main roadways and safety zones can either help or hinder individual homeowner actions. Where possible, town properties should be treated to a higher level than that on private property; especially where no defensible space can be created by individuals due to property size, ownerships or absentee landowners. On-going maintenance by outside contractors or in-house staff will be important to provide risk reduction for adjacent home sites.

Implementation Actions

The PLVFD will need to work closely to insure that treatment projects allow for some level of privacy protection currently provided by the over-grown and declining gambel oak plant community. Visual sensitivity will be important. The PLVFD should:

- Work with wildfire professionals to lay out treatment areas on town properties by advising the town council and appropriate town commissions of all activities. Coordination with adjacent property owners will be necessary.
- The same items noted under Fuel Treatments and Staging Areas will apply.

State and Federal Properties

The town has the opportunity to use state and federally managed properties to demonstrate good property management and ecosystem restoration. Publicly managed areas away from main roadways and refuge/staging zones can either help or hinder individual homeowner actions. Where possible, state and federal properties should be treated to a higher level than that on private property; especially where no defensible space can be created by individuals due to lot size, terrain, differing or absentee ownerships, etc. On-going maintenance by outside contractors or in-house staff will be important to provide risk reduction for adjacent home sites.

Implementation Actions

The Town Board and Fire Department staff will need to work closely to insure that treatment projects allow for some level of privacy protection currently provided by the over-grown and declining gambel oak and conifer plant community. Visual sensitivity will be important. The PLVFD should:

- Work with wildfire professionals to lay out treatment areas on state and federal properties by advising the neighborhood of all activities. Coordination with adjacent property owners will be necessary.
- The same items noted under Fuel treatments and Refuge/Staging Zones will apply.
- Work with wildlife professionals to aid in fuel treatments that will not affect potential threatened or endangered (T&E) species. Or the reverse: that T&E species regulations will not prohibit or deter homeowners fire mitigation efforts.
- Roadless Area rules currently proposed for implementation by USFS should provide exemptions for areas considered as Wildland Urban Interface areas shown in the PLCWPP as Zones 1-3.

Private Homeowner and Landowner Properties

Wildfire fuel mitigation on private properties is the responsibility of the property owner. The town can provide information and services to assist property owners in their mitigation efforts. Land owners adjacent to town properties will be encouraged to work with the town in extending mitigated fuelbreaks into their private property. Such potential action is deemed to benefit both the town and the individual landowner(s).

Implementation Actions

- PLVFD should work with private property owners within the boundaries of CWPP area to support them in mitigation efforts by:
 - Providing resource and education help as indicated in the “*Public Education*” actions, above;
 - Continue to assist in tracking “*in kind*” private fuel mitigation work on private property;
 - Administer certain support projects; e.g., periodic *slash* removal;
 - Continue to support funding for the Town slash chipping and yard waste disposal site;
 - Formalize acceptance of the North Group Wildfire Mitigation regulations as part of town building and land development codes. Specifically, modifications should be made to all plans that allow for implementation of Defensible Spaces. These should utilize the services of Palmer Lake fire fighters, CSFS or approved professional foresters. Note: The recent passage of Colorado State Statutes that must allow for homeowner defensible spaces shall be incorporated into any new guidelines. (see Appendix B, SB-100 Wildfire Mitigation)
 - Continue to encourage replacement of wood shake-shingle roofs by allowing as many materials as possible. Alternatives that maintain the aesthetic values currently established, while providing a “Class A” level of protection are critical.
 - Provide information for wildfire planning or Firewise events or activity affecting the homeowner;
 - Provide volunteer notification and limited assistance of homeowners during an emergency event.
 - Homeowners should be encouraged to pursue cost share opportunities to implement defensible space and wildfire hazard reduction projects on their properties.

Undeveloped, Privately-owned Properties

With a high percentage of the town already developed, areas of undeveloped land lie to the east and north of the Highway 105 corridor. (See Chapter 4, *Hazard Assessment* and Appendix A, *Hazard Reduction Mitigation Projects*). These areas are heavily covered with dense, untreated brush and, in many situations, also present rough, sloping terrain. Consequently, these areas present huge fuel beds for wildfires and present the town with its most significant threats for wildfires. The undeveloped, and generally privately-owned, areas may require the town to take more aggressive action on its properties in order to address fuel reduction.

Implementation Actions

- The town and PLVFD should work with private property owners of undeveloped lands bordering on the town to discuss, assess, and plan potentially joint mitigation efforts. Concurrently, the town can pursue collaboration with El Paso County officials to assist and support efforts to reduce Palmer Lake wildfire exposure by addressing undeveloped areas. Such actions will include efforts to:
 - Assess timing of in-fill development in currently undeveloped areas and working with them, in conjunction with the county, to effect guideline driven fuel mitigation on their targeted properties prior to structure construction;
 - Encourage and stimulate El Paso County authorities to effect changes in ordinances and statutes to require developers to mitigate the areas being developed prior to any construction;
 - Initiate further discussion with owners of small horse parcels, to assess potential individual and joint wildfire mitigation efforts on common interest areas.

Communication, Support and Information Services

Communication, support and information services, both with professional firefighting- emergency services agencies and with the general public, is instrumental in nurturing wildfire preventive action as well as protection in the event of a wildfire emergency (See Chapter 6, *Public Notification, Communication and Support*). Actions designated below are targeted at raising public awareness, providing preventive and protection/fire suppression support, and recognizing efforts that have and will be taken relative to wildfire fuel mitigation in and around the town.

Implementation Actions

- Implementation actions are recommended to:
 - Notify public of wildfire preventive actions being taken by using the town's newsletters and Websites, distributed flyers, direct mailing, or combinations of the aforementioned media.
 - Recognize implemented projects in the Newsletters and on the town websites;
 - Identify, schedule and fund wildfire protection ancillary projects; e.g., Remote Automated Weather System (RAWS), improved communications, signage, etc.

Mitigated Areas Perpetuation

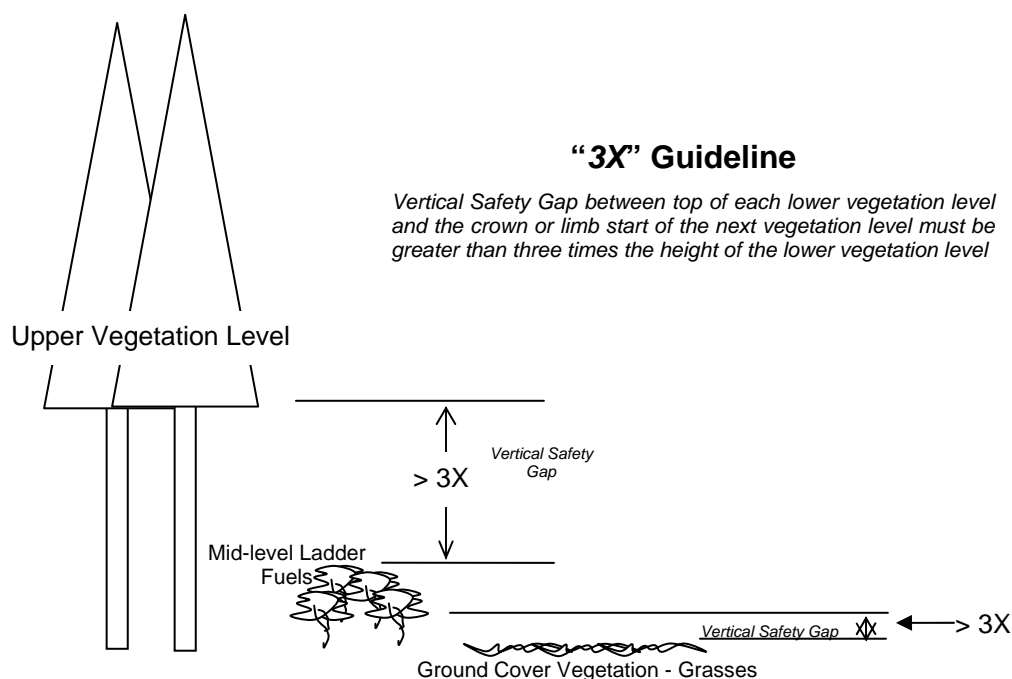
The focus of this broad section of the Implementation Plan is twofold: 1) to address the guidelines for assessing when to maintain fuel areas that have already had fuel reduction efforts applied and 2) to set forth a checklist of administrative actions that should be followed by the town.

Implementation Actions

- Existing wildfire fuel treatments and private land areas that have been mitigated need to be maintained to be effective. In order to evaluate effectively when maintenance of mitigated areas is needed, a forestry "3X" guideline, described below, exists. This guideline is applicable to both private property and all greenbelt/open space properties. To maintain mitigated areas, private property owners and the town should:
 - Assess mitigated property periodically and determine the relationship of the property's vegetation growth against the maintenance guideline for the mitigated property;
 - Apply trimming and cutting maintenance on the previously mitigated property if current vegetation growth falls below the "3X" guideline.

Previously Mitigated Property/Fuelbreak Maintenance
“3X” Guideline

Three layers or vertical levels of growth generally constitute vegetation in a mitigated area: 1) Grasses which constitute the bottom or lower level of growth; 2) Brush or small tree stock that comprise the mid-level, commonly referenced as the primary “*ladder fuel*” level and, 3) Tree crowns, the upper or most vertical level of the mitigated area. The height of each respective level of vegetation is that level’s “X.” The gap between a lower vegetation level’s top and the start of the crown (or bottom limb) level of the next level of vegetation is the safety gap. Whenever the gap level closes to less than three times the height of the next lower level of vegetation (i.e., less than “3X”), maintenance trimming needs to be effected to bring the mitigated area back within the safety guidelines (i.e., more than “3X”).



Source: “Living with Fire, A Guide for the Homeowner”, USDA Forest Service.

- The town should implement the following administrative actions:
 - Establish a separate town budget category, which denotes funds for CWPP planned actions (For ledgering and future financial analysis, sub-categories should underpin the category to track expenditures for town property, privately owned property support functions and town initiated work with undeveloped parcels of privately or publicly owned land);
 - Detail a chronological schedule for filing for Federal grants applicable to mitigation and Firewise work as these may become available;
 - Budget specific town funds for “*direct*” funded wildfire fuel mitigation on road/trail rights of ways and town owned property;
 - Contact and begin discussion with private property owners adjacent to town properties for potential individual and joint wildfire mitigation efforts on common interest areas;
 - Sponsor regular wildfire prevention training for residents in conjunction with PLVFD and CSFS;
 - Assess timing of and maintain a schedule of land development action in currently undeveloped areas;

- Schedule appropriate, periodic general public updates of CWPP planned work;
- Establish and maintain baseline information for proposed areas of mitigation;
- Evaluate planned CWPP projects for effectiveness and amend CWPP annually to keep plan and actions current and appropriate for changing environmental and development conditions.

Palmer Lake Community Wildfire Protection Plan Evaluation and Monitoring

Evaluator: _____

Date: _____

Treatment Area: _____

Description/Location: _____

Implementation Monitoring:

Was the project treatment area part of the CWPP? YES _____ NO _____

What is the project treatment area's assigned priority (1-4)? _____

What resources are being protected by this project?

Transportation Routes? _____

Refuge Zones? _____

Homes? _____

Neighborhood? _____

Community Infrastructure? _____

Was the project completed as scheduled? YES _____ NO _____

What problems were encountered? _____

Baseline Monitoring

Have "before" and "after" photos been taken? YES _____ NO _____

By whom? _____

Effectiveness Monitoring

Was the prescription met for:

Fuel Treatment
Habitat Restoration
Aesthetics
Privacy/screening
Forest Health

Yes	No

Resprouting/regrowth was: Excellent _____ Good _____ Fair _____ Poor _____ Not present _____

Did erosion occur? Yes _____ No _____

Invasion by noxious weeds? Yes _____ No _____

Was sufficient moisture available for plant growth?

Validation Monitoring

What is the variance from the estimated cost (amount over or under budget)? _____

Was the site accessible as anticipated? Yes _____ No _____

Was the prescription accurate in terms of treatment method? Yes _____ No _____

Are contractors available to provide competitive bids? Yes _____ No _____

Trend Monitoring

Have costs increased over past years? Yes _____ No _____ By what percentage (up or down)? _____

How did the weather pattern/moisture levels affect the treatment areas? _____

Have any wildfires occurred in or near the treatment areas? Yes _____ No _____

Has community perception of fuel treatments changed? Positive? _____ Negative? _____

How quickly did wildlife return to the areas? Immediately _____ Slowly _____ Never _____

Other comments:



Fuelbreak Guidelines for Forested Subdivisions & Communities

By

Frank C. Dennis



Knowledge to Go Places

This publication was developed for use by foresters, planners, developers, homeowners' associations and others. Implementation of these measures cannot *guarantee* safety from all wildfires, but will greatly increase the probability of containing them at more manageable levels.



Inadequate fire planning can result in loss of life or property and costly suppression activities.



Colorado's forested lands are experiencing severe impacts from continuing population increases and peoples' desire to escape urban pressures. Subdivisions and developments are opening new areas for homesite construction at an alarming rate, especially along the Front Range and around recreational areas such as Dillon, Vail, and Steamboat Springs.

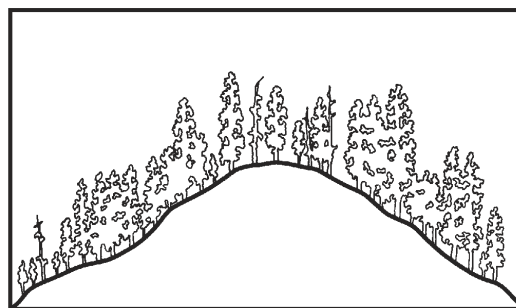
But with development inevitably comes a higher risk of wildfire as well as an ever-increasing potential for loss of life and property. Methods of fire suppression, pre-suppression needs, and homeowner and fire crew safety must all be considered in the planning and review of new developments as well as for the "retrofitting" of existing, older subdivisions.

Fuelbreaks should be considered in fire management planning for subdivisions and developments; however, the following are guidelines **only**. They should be customized to local areas by professional foresters experienced in Rocky Mountain wildfire behavior and suppression tactics.

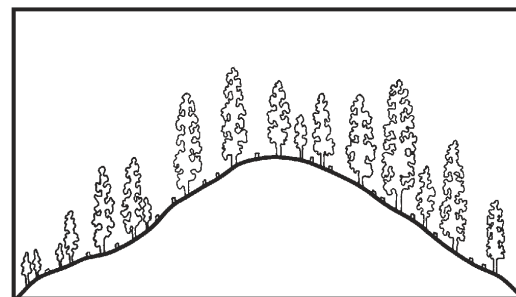
Fuelbreak vs Firebreak

Although the term fuelbreak is widely used in Colorado, it is often confused with firebreak. The two are entirely separate, and aesthetically different, forms of forest fuel modification and treatment.

- A firebreak is strip of land, 20 to 30 feet wide (or more), in which all vegetation is removed down to bare, mineral soil each year prior to fire season.



Above, cross section of mixed conifer stand before fuelbreak modification. Below, after modification.



- A fuelbreak (or shaded fuelbreak) is an easily accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced, thus improving fire control opportunities. The stand is thinned, and remaining trees are pruned to remove ladder fuels. Brush, heavy ground fuels, snags, and dead trees are disposed of and an open, park-like appearance is established.

The following is a discussion of the uses, limitations, and specifications of fuelbreaks in wildfire control and fuels management.

Fuelbreak Limitations

Fuelbreaks provide quick access for wildfire suppression. Control activities can be conducted more safely due to low fuel volumes. Strategically located, they break up large, continuous tracts of dense timber, thus limiting uncontrolled spread of wildfire.

Fuelbreaks can aid firefighters greatly by slowing fire spread under normal burning conditions. However, under extreme conditions, even the best fuelbreaks stand little chance of arresting a large



Before and after photos of a forest stand thinned to reduce fuel loads.

fire, regardless of firefighting efforts. Such fires, in a phenomenon called “spotting,” can drop firebrands 1/8-mile or more ahead of the main fire, causing very rapid fire spread. These types of large fires may continue until there is a major change in weather conditions, topography, or fuel type.

It is critical to understand: A fuelbreak is the line of defense. The area (including any homes and developments) between it and the fire may remain vulnerable.

In spite of these somewhat gloomy limitations, fuelbreaks have proven themselves effective in Colorado. During the 1980 Crystal Lakes Subdivision Fire near Fort Collins, crown fires were stopped in areas with fuelbreak thinnings, while other areas of dense lodgepole pine burned completely. A fire at O’Fallon Park in Jefferson County was successfully stopped and controlled at a fuelbreak. The Buffalo Creek Fire in Jefferson County (1996) and the High Meadow Fire in Park and Jefferson Counties (2000) slowed dramatically wherever intense forest thinnings had been completed. During the 2002 Hayman Fire, Denver Water’s entire complex of offices, shops and caretakers’ homes at Cheesman Reservoir were saved by a fuelbreak with no firefighting intervention by a fuelbreak.



Burned area near Cheesman Reservoir as a result of the Hayman Fire. Note the unburned green trees in the middle right of the photo, a treated fuelbreak.

The Need For A Fuelbreak

Several factors determine the need for fuelbreaks in forested subdivisions, including: (1) potential problem indicators; (2) wildfire hazard areas; (3) slope; (4) topography; (5) crowning potential; and (6) ignition sources.

Potential Problem Indicator

The table below explains potential problem indicators for various hazards and characteristics common to Colorado’s forest types. All major forest types, except aspen, indicate a high potential for wildfire hazard.

Fuel Type	Characteristics			Hazards			
	Aesthetics	Wildlife	Soil	Wildfire	Avalanche	Flood	Climate
Aspen	2	3	3	2	4	3	2
Douglas-fir	2	2	3	5	2	2	3
Greasewood-Saltbrush	4	2	2	2	1	3	3
Limber-Bristlecone Pine	3	2	4	3	4	2	5
Lodgepole Pine	2	2	3	5	4	2	4
Meadow	5	4	4	2	3	4	3
Mixed Conifer	2	1	1	5	3	1	3
Mountain Grassland	5	3	4	3	3	2	4
Mountain Shrub	3	5	4	4	2	2	3
Piñon-Juniper	2	3	4	4	2	3	2
Ponderosa Pine	2	3	1	5	2	2	3
Sagebrush	4	4	3	3	3	2	3
Spruce-Fir	2	3	3	4	5	3	4

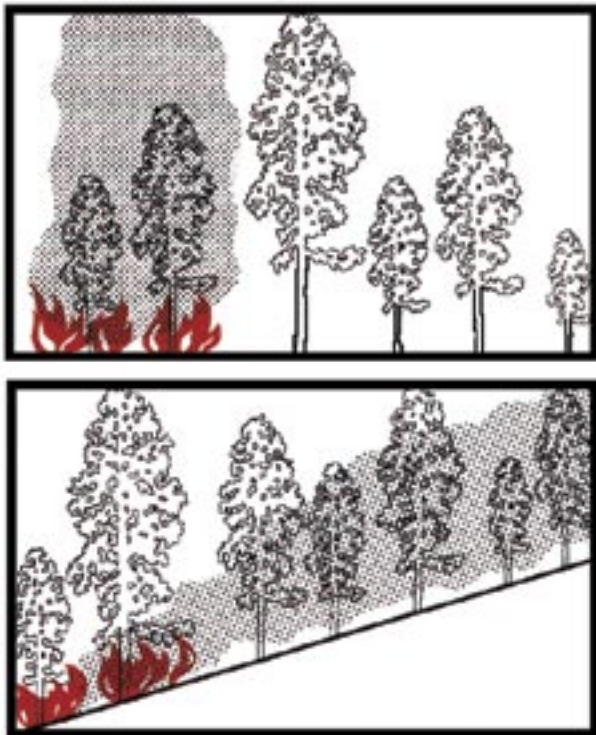
Legend: 5 – Problem may be crucial; 4 – Problem very likely; 3 – Exercise caution; 2 – Problem usually limited; 1 – No rating possible

Wildfire Hazard Maps

The Colorado State Forest Service (CSFS), numerous counties and some National Forests have completed wildfire hazard mapping for many areas within Colorado, particularly along the Front Range. These maps typically consider areas with 30 percent or greater slope; hazardous fuel types; and hazardous topographic features such as fire chimneys. Wildfire Hazard Ratings may be depicted in several ways. Whatever system is used, areas rated moderate or higher should be considered for fuel modification work.

Slope

Rate of fire spread increases as the slope of the land increases. Fuels are preheated by the rising smoke column or they may even come into contact with the flames themselves.



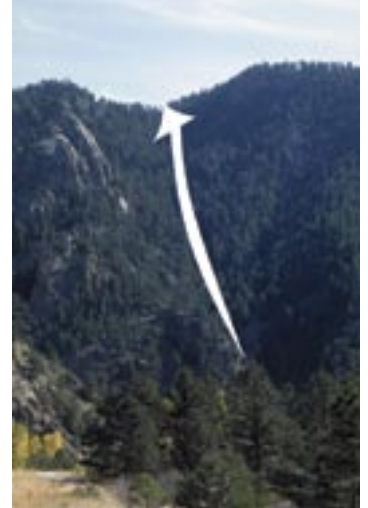
Fire effects, flat vs steep terrain. Note preheating of fuels on steep ground from passage of smoke column.

At 30 percent slope, rate of fire spread doubles compared to rates at level ground, drastically reducing firefighting effectiveness. **Areas near 30 percent or greater slopes are critical and must be reviewed carefully.**

Topography

Certain topographic features influence fire spread and should be evaluated. Included are fire chimneys, saddles, and V-shaped canyons. They are usually recognized by reviewing standard U.S.G.S. quad maps.

- Chimneys are densely vegetated drainages on slopes greater than 30 percent. Wind, as well as air pre-heated by a fire, tends to funnel up these drainages, rapidly spreading fire upslope.



Chimney.



Saddle.

- Narrow, V-shaped valleys or canyons can ignite easily due to heat radiating from one side to the other. For example, a fire burning on one side of a narrow valley dries and preheats fuels on the opposite side until the fire “flashes over.” The natural effect of slope on fire then takes over and fire spreads rapidly up drainage and uphill along both sides of the valley.



Flashover in V-shaped valley.

Crowning Potential

An on-site visit is required to accurately assess crowning potential. A key, below, helps determine this rating. Fuel modification is usually unnecessary if an area has a rating of 3 or less.

Crowning Potential Key

	Rating
A. Foliage present, trees living or dead — B	
B. Foliage living — C	
C. Leaves deciduous or, if evergreen, usually soft, pliant, and moist; never oily, waxy, or resinous.	0
CC. Leaves evergreen, not as above — D	
D. Foliage resinous, waxy, or oily — E	
E. Foliage dense — F	
F. Ladder fuels plentiful — G	
G. Crown closure > 75 percent	9
GG. Crown closure < 75 percent	7
FF. Ladder fuels sparse or absent — H	
H. Crown closure > 75 percent	7
HH. Crown closure < 75 percent	5
EE. Foliage open — I	
I. Ladder fuel plentiful	4
II. Ladder fuel sparse or absent	2
DD. Foliage not resinous, waxy, or oily — J	
J. Foliage dense — K	
K. Ladder fuels plentiful — L	
L. Crown closure > 75 percent	7
LL. Crown closure < 75 percent	4
KK. Ladder fuels sparse or absent — M	
M. Crown closure > 75 percent	5
MM. Crown closure < 75 percent	3
JJ. Foliage open — N	
N. Ladder fuels plentiful	3
NN. Ladder fuels sparse or absent	1
BB. Foliage dead	0

The majority of dead trees within the fuelbreak should be removed. Occasionally, large, dead trees (14 inches or larger in diameter at 4 1/2 feet above ground level) may be retained as wildlife trees. If retained, all ladder fuels must be cleared from around the tree's trunk.

Ignition Sources

Possible ignition sources, which may threaten planned or existing developments, must be investigated thoroughly. Included are other developments and homes, major roads, recreation sites, railroads, and other possible sources. These might be distant from the proposed development,

yet still able to channel fire into the area due to slope, continuous fuels, or other topographic features.

Fuelbreak Locations

In fire suppression, an effective fire line is connected, or "anchored," to natural or artificial fire barriers. Such anchor points might be rivers, creeks, large rock outcrops, wet meadows, or a less flammable timber type such as aspen. Similarly, properly designed and constructed fuelbreaks take advantage of these same barriers to eliminate "fuel bridges." (Fire often escapes control because of fuel bridges that carry the fire across control lines.)

Since fuelbreaks should normally provide quick, safer access to defensive positions, they are necessarily linked with road systems. Connected with county-specified roads within subdivisions, they provide good access and defensive positions for firefighting equipment and support vehicles. Cut-and fill slopes of roads are an integral part of a fuelbreak as they add to the effective width of modified fuels.

Fuelbreaks without an associated road system, such as those located along strategic ridge lines, are still useful in fire suppression. Here, they are often strengthened and held using aerial retardant drops until fire crews can walk in or be ferried in by helicopter.

Preferably, fuelbreaks are located along ridge tops to help arrest fires at the end of their runs. However, due to homesite locations and resource values, they can also be effective when established at the base of slopes. Mid-slope fuelbreaks are least desirable, but under certain circumstances and with modifications, these too, may be valuable.

Fuelbreaks are located so that the area under management is broken into small, manageable units. Thus, when a wildfire reaches modified fuels, defensive action is more easily taken, helping to keep the fire small. For example, a plan for a subdivision might recommend that fuelbreaks break up continuous forest fuels into units of 10 acres or less. This is an excellent plan, especially if defensible space thinning is completed around homes and structures, and thinning for forest management and forest health are combined with the fuelbreak.

When located along ridge tops, continuous length as well as width are critical elements. Extensive long-range planning is essential in positioning these types of fuelbreaks.

Aesthetics

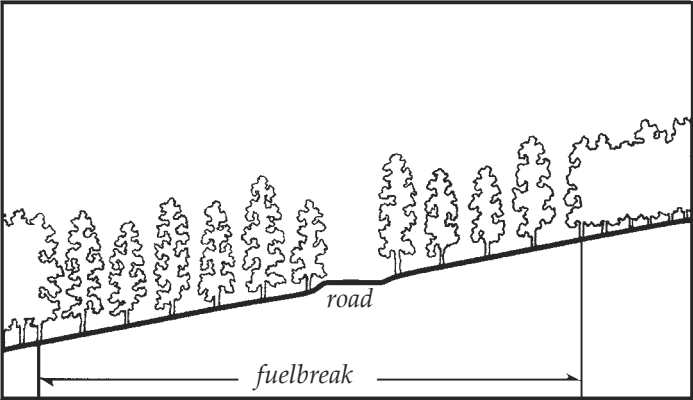
Improperly planned fuelbreaks can adversely impact an area’s aesthetic qualities. Careful construction is necessary when combining mid-slope fuelbreaks with roads involving excessive cut-and-fill.



These photos, far- and near- views of the same site, illustrate that forest can be thinned without impacting aesthetics.

Care must also be taken in areas that are not thinned throughout for fuel hazard reduction. In such cases the fuelbreak visually sticks out like a “sore thumb” due to contrasting thinned and unthinned portions of the forest. (Especially noticeable are those portions of the fuelbreak above road cuts).

These guidelines are designed to minimize aesthetic impacts. However, some situations may require extensive thinning and, thus, result in a major visual change to an area. Additional thinning beyond the fuelbreak may be necessary to create an irregular edge and to “feather,” or blend, the fuelbreak thinning into the unthinned portions of the forest. Any thinning beyond the fuelbreak improves its effectiveness and is highly recommended.



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

**Constructing the Fuelbreak
Fuelbreak Width and Slope Adjustments**

Note: Since road systems are so important to fuelbreak construction, the following measurements are from the toe of the fill for downslope distances, and above the edge of the cut for uphill distances.

The minimum recommended fuelbreak width is approximately 300 feet for level ground. Since fire activity intensifies as slope increases, the overall fuelbreak width must also increase. However, to minimize aesthetic impacts and to maximize fire crew safety, the majority of the increases should be made at the bottom of the fuelbreak, below the road cut.

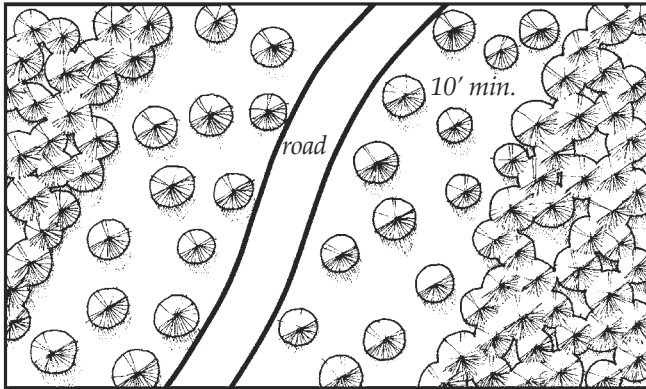
Widths are also increased when severe topographic conditions are encountered. Guidelines for fuelbreak widths on slopes are given below:

Fuelbreak Width/Slope			
Percent Slope (%)	Minimum Uphill Distance (ft)	Minimum Downhill Distance (ft)	Total Width of Modified fuels (ft)*
0	150	150	300
10	140	165	303
20	130	180	310
30	120	195	315
40	110	210	320
50	100	225	325
60	100	240	340

*As slope increases, total distance for cut-and-fill for road construction rapidly increases, improving fuelbreak effective width.

Stand Densities

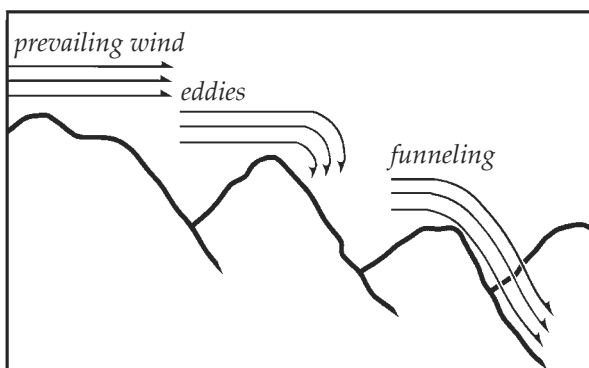
Crown separation is a more critical factor for fuelbreaks than a fixed tree density level. A *minimum* 10-foot spacing between the edges of tree crowns is recommended on level ground. As slope increases, crown spacing should also increase. However, small, isolated groups of trees may be retained for visual diversity. Increase crown spacing around any groups of trees left for aesthetic reasons and to reduce fire intensities and torching potential.



Plan view of fuelbreak showing minimum distance between tree crowns.

In technical terms, a fuelbreak thinning is classified as a heavy “sanitation and improvement cut, from below.” Within fuelbreaks, trees that are suppressed, diseased, deformed, damaged, or of low vigor are removed along with all ladder fuels. Remaining trees are the largest, healthiest, most wind-firm trees from the dominant and co-dominant species of the stand.

Because such a thinning is quite heavy for an initial entry into a stand, prevailing winds, eddy effects, and wind funneling must be carefully evaluated to minimize the possibility of windthrow. It may be necessary to develop the fuelbreak over several years to allow the timber stand to “firm-up” — this especially applies to lodgepole pine and Engelmann spruce stands.



Topography affects wind behavior – an important consideration during fuelbreak construction.

Area-wide forest thinnings are recommended for any subdivisions. Such thinning is not as severe as a fuelbreak thinning, but generally should be completed to fuelbreak specifications along the roads (as outlined on page 6.) In addition, “defensible space thinnings” are highly recommended around all structures (see CSU Coop. Extension Fact sheet 6.302, *Creating Wildfire-Defensible Zones*).

Debris Removal

Limbs and branches left from thinning (slash) can add significant volumes of fuel to the forest floor, especially in lodgepole pine, mixed-conifer, or spruce/fir timber types. These materials can accumulate and serve as ladder fuels, or can become “jackpots,” increasing the difficulty of defending the fuelbreak during a wildfire. **Slash decomposes very slowly in Colorado and proper disposal is essential.** Proper treatment reduces fire hazard, improves access for humans and livestock, encourages establishment of grasses and other vegetation, and improves aesthetics.

Three treatment methods are commonly used. These are lopping-and-scattering, piling and burning, and chipping. Mulching of small trees and slash using equipment similar to Hydro-axes or Timbcos equipped with mulching heads are becoming a popular method of treatment. Size, amount, and location of slash dictates the method used, in addition to cost and the final desired appearance. The method chosen will also depend on how soon an effective fuelbreak is needed prior to construction in new developments.



Lop and scatter: slash should be no deeper than 12" above ground surface.



Chipping is the most desirable, but also the most expensive method of slash disposal.



Piled slash can be burned but only during certain conditions, such as after a snowfall.

Fuelbreak Maintenance

Following initial thinning, trees continue to grow (usually at a faster rate). The increased light on the forest floor encourages heavy grass and brush growth where, in many cases, where little grew before. The site disturbance and exposed mineral soil created during fuelbreak development is a perfect seed bed for new trees that, in turn, create new ladder fuels. Thus, in the absence of maintenance, fuelbreak effectiveness will decrease over time.



Fuelbreak maintenance is essential. Ingrowth, shown above, will minimize the effectiveness of this fuelbreak within a few years.

Fuelbreak maintenance problems are most often the result of time and neglect. Misplaced records, lack of follow-up and funding, and apathy caused by a lack of fire events are some of the major obstacles. In addition, the responsibility for fuelbreak maintenance projects is often unclear. For example, control of a fuelbreak completed by a developer passes to a homeowner's association, usually with limited funds and authority to maintain fuelbreaks.

If fuelbreak maintenance is not planned and completed as scheduled, consider carefully whether the fuelbreak should be constructed. An un-maintained fuelbreak may lead to a false sense of security among residents and fire suppression personnel.

Conclusion

An image of well-designed communities for Colorado includes:

- Forested subdivisions where the total forest cover is well-managed through carefully planned, designed, and maintained thinnings. This contributes to reduced wildfire hazards and a much healthier forest — one that is more resistant to insects and disease.
- A system of roads and driveways with their associated fuelbreaks that break up the continuity of the forest cover and fuels. These help keep fires small, while also providing safer locations from which to mount fire suppression activities. In addition to allowing fire personnel in, they will allow residents to evacuate if necessary.
- Individual homes that all have defensible space around them, making them much easier to defend and protect from wildfire, while also protecting the surrounding forest from structure fires.

Creation of such communities is entirely feasible if recognition of the fire risks, a spirit of cooperation, an attitude of shared responsibility, and the political will exists.

*Colorado's mountains comprise diverse slopes, fuel types, aspects, and topographic features. This variety makes it impossible to develop general fuelbreak prescriptions for all locations. **The previous recommendations are guidelines only.** A professional forester with fire suppression expertise should be consulted to "customize" fuelbreaks for particular areas.*

Colorado State Forest Service

Minimum Standards for Community Wildfire Protection Plans (CWPP)*

1. Participants

- Local government, local fire authority, and a representative of the Colorado State Forest Service must agree on the CWPP.
- In addition to the above, the core planning team should include relevant federal land management agency representatives and community members.
- Input from interested non-governmental stakeholders must be sought as community protection priorities are being set and treatment areas and methods are planned.

2. Plan Components

- Community Wildfire Protection Plans must include the following components:
 - A definition of the community's wildland-urban interface (WUI), preferably outlined on a map with an accompanying narrative.
 - A discussion of the community's *preparedness* to respond to wildland fire.
 - A community risk analysis that considers, at a minimum, fuel hazards, risk of wildfire occurrence and community values to be protected – both in the immediate vicinity and the surrounding zone where potential fire spread poses a realistic threat.
 - Identification of fuels treatment priorities, including locations on the grounds and preferred methods of treatment.
 - Recommendations regarding ways to reduce structural ignitability.
 - An implementation plan.

3. Level of Specificity

- A CWPP may be developed for any level of “community,” (e.g., homeowner's association, mountain town, county, metropolitan city, or fire protection district).
- Risks must be assessed, and treatment priorities implemented, that will protect the community.
- The plan must be diversely collaborative.
- County level plans can be used as an umbrella for plans in smaller communities, but should not be considered a substitute. A county plan must identify specific projects and implementation methods and must reflect collaborative input from a variety of stakeholders.

4. Adapting Existing Plans and Combining Related Plans

- If a community has an existing plan that already meets the majority of the CWPP criteria, it is preferable to work with the community to adapt that plan to meet the remainder of the criteria. However, plan adaptations must be collaborative as described in (1) above and include stakeholder representation. This is particularly important if the adaptation involves establishing fuels treatment priorities.
- Communities are encouraged to combine CWPPs with related documents such as FEMA All-Hazard Mitigation Plans where appropriate.

* Minimum standards are to be used in combination with the national publication titled, “Preparing a Community Wildfire Protection Plan: A Guide for Wildland Urban Interface Communities.” Maximum flexibility should be sought in meeting individual community needs.

Appendix **E**^D

Firewise Household Tips, Property Mitigation and Protection

HOUSEHOLD TIPS

1. Keep a clearing of at least 30 feet around your house for fire fighting equipment.
2. Space the trees you plant carefully.
3. Remove "ladder fuels". They link the grasses and the tree tops.
4. Create "fuel break" - - - driveways, gravel walkways, or lawns.
5. Maintain your irrigation system regularly.
6. Prune tree limbs so the lowest is between 6' - 10' from the ground.
7. Remove leaf clutter from your roof and yard.
8. Mow regularly.
9. Remove dead or overhanging branches.
10. Store firewood away from your house.
11. Refuel garden equipment carefully.
12. Maintain garden equipment regularly.
13. If you smoke, use your ashtray.
14. Store and use flammable liquids properly.
15. Dispose of cuttings and debris promptly, according to local regulations.
16. Observe local regulations regarding vegetative clearances and fire safety equipment requirements.
17. Check your generator and/or hose to be sure it is in good repair.
18. Don't keep combustible materials under decks or elevated porches.
19. Make trellises of non-flammable metal.
20. Have at least two ground-level doors as safety exits.
21. Keep at least two means of escape (either a door/window) in each room.
22. Mark your driveway and access roads clearly.
23. Keep ample turnaround space near your house for fire equipment.
24. Prevent sparks from entering your house by covering vents with wire mesh no larger than 1/8".
25. When possible, use construction materials that are fire-resistant or non-combustible.

The following Construction and Landscaping information was reproduced from information produced by Firewise Communities, www.firewise.org, 1 Batterymarch Park, Quincy, MA 02269.

Firewise Construction

To create your Firewise structure, remember that the primary goals are fuel and exposure reductions.

- Use construction materials that are fire-resistant or noncombustible whenever possible.
- Consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, or cement and concrete products for roof construction.
- Construct a fire-resistant sub-roof for added protection.
- Use fire resistant materials such as stucco or masonry for exterior walls. These products are much better than vinyl which can soften and melt.
- Consider both size and materials for windows; smaller panes hold up better in their frames than larger ones; double pane glass and tempered glass are more effective than single pane glass; plastic skylights can melt.
- Prevent sparks from entering your home through vents, by covering exterior attic and under floor vents with wire mesh no larger than 1/8 of an inch.
- Keep your gutters, eaves and roof clear of leaves and other debris.

- Clear dead wood and dense vegetation within at least 30 feet from your house, and move firewood away from your house or attachments like fences or decks.

Any structure attached to the house, such as decks, porches, fences and sheds should be considered part of the house. These structures can act as fuses or fuel bridges, particularly if constructed from flammable materials. Therefore, consider the following:

- If you wish to attach an all-wood fence to your home, use masonry or metal as a protective barrier between the fence and house.
- Use non-flammable metal when constructing a trellis and over with high-moisture, fire-resistant vegetation.
- Prevent combustible materials and debris from accumulating beneath patio deck or elevated porches; screen underneath or box in areas below the deck or porch with wire mesh no larger than 1/8 of an inch.

To create a landscape that will make your home less vulnerable to wildfire, the primary goal is fuel reduction. Think of the area around your home in zones. Zone 1 is closest to the structure, Zone 4 is the farthest away.

- Zone 1 This well-irrigated area encircles the structure for at least 30 feet on all sides, providing space for fire suppression equipment in the event of an emergency. Plants should be limited to carefully spaced fire resistant tree and shrub species.
- Zone 2 Fire resistant plant materials should be used here. Plants should be low-growing, and the irrigation system should extend into this section.
- Zone 3 Place low-growing plants and well spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.
- Zone 4 This furthest zone from the structure is a natural area. Thin selectively here and remove highly flammable vegetation.

Also remember to:

- Carefully space the trees you plant.
- Take out the “ladder fuels” – vegetation that serves as a link between grass and tree tops. These fuels can carry fire from vegetation to a structure or from a structure to vegetation.
- When maintaining a landscape:
 - Keep trees and shrubs pruned. Prune all trees six to 10 feet from the ground.
 - Water and maintain your lawn regularly.
 - Mow dry grass and weeds..
 - Dispose of cuttings and debris promptly.
- Landscape with less-flammable plants: Contact your local state forester, county extension office or landscape specialist for plant information.

For more information visit these helpful websites:

- USDA Forest Service, www.fs.fed.us
- US Dept of the Interior: www.doi.gov/bureau.html
- National Assoc of State Foresters: www.stateforesters.org
- National Fire Protection Assoc: www.nfpa.org
- US Fire Administration: www.usfa.fema.gov
- Federal Emergency Management Agency: www.fema.gov
- Firewise Communities: www.firewise.org

- Colorado State Forest Service: www.colostate.edu/depts/CSFS
-

Free public information brochures:

Free brochures on home preparation for wildfire and emergency conditions are also available at the Phillip S Miller Library in Castle Rock.

- *Emergency Preparedness Guide*, published by Douglas County
- *It Could Happen to You!, How to Protect Your Home!*, USDA Forest Service
- *Wildfire Are You Prepared*, American Red Cross, Federal Emergency Management Agency and United States Fire Administration

The following is an excerpt from Colorado Revised Statute 38-33.3- 106.5, passed in 2005 by the Colorado State Legislature. It is also referred to as SB-100 governing Homeowner Associations and allowed resident activities. This Section (e) refers specifically to homeowner ability to perform fire mitigation when HOA rules may prohibit it.

SB-100 language

C.R.S 38-33.3-106.5 (a.k.a. SB-100) states: “ *Notwithstanding any provision in the declaration, bylaws, or rules and regulations of the association to the contrary, an association shall not prohibit any of the following:*

(e) The removal by a unit owner of trees, shrubs, or other vegetation to create defensible space around a dwelling for fire mitigation purposes, so long as such removal complies with a written defensible space plan created for the property by the Colorado State Forest Service, an individual or company certified by a local government entity to create such a plan, or the fire chief, fire marshal, or fire protection district within whose jurisdiction the unit is located, and is no more extensive than necessary to comply with the plan. The plan shall be registered with the association before the commencement of work. The association may require changes to the plan if the association obtains the consent of the person, official or agency that originally created the plan. The work shall comply with applicable association standards regarding slash removal, stump height, revegetation, and contractor requirements.”