

Community Wildfire Protection Plan
Spruce Mountain Estates
Douglas County, Colorado



July 8, 2015

Introduction

This Community Wildfire Protection Plan (CWPP) covers the Spruce Mountain Estates neighborhood and some additional adjoining properties (see map), hereinafter referred to as the **Community**. The Community is located on the east side of Douglas County 105 (aka South Perry Park Road) approximately two miles north of the southern boundary of Douglas County. The Core Team that developed the plan includes representatives from the Colorado State Forest Service, the Douglas County Wildfire Mitigation Staff, and individual property owners of the community. The CWPP team held its first meeting March 13 2013 and was formed in part due to the assessment that the Community is at very high to extreme exposure to fire risk.

The document was made available to property owners of the community for comments, and those comments were considered in the creation of this final document. This document does not explicitly or implicitly require any action or obligation of any property owner of the Community. All recommendations for fire mitigation are completely voluntary.

The mission statement of the CWPP team is as follows:

The mission of the Spruce Mountain Estates Community Wildfire Protection Plan is to reduce the wildfire risk in our community. This will be accomplished by identifying potential wildfire hazards, prioritizing those hazards as they relate to public safety and community values, establish solutions to mitigate those hazards, and to promote, implement and evaluate those solutions over time.

Description of the Community

Spruce Mountain Estates is a neighborhood of 84 rural residential properties comprising approximately 160+ total acres of privately owned land. All but 12% of the properties have been developed. Some homeowners own additional lots. There are absentee landowners in the community. A typical property consists of a single-family home on about two acres. A large proportion of properties have one or more outbuildings such as detached garages, barns, run-in sheds for horses, chicken coops, etc. In addition to a population of approximately 250 people, the community has a considerable number of pets and livestock including dogs, cats, horses, chickens etc. Approximately half of the properties are within a homeowners association. The covenants of that association do not provide the basis for mandating fire mitigation work.

Spruce Mountain Estates is served by one unpaved primary road (Yarnell Drive off Hwy 105) that is maintained by Douglas County. County maintained paved roads branching off Yarnell Drive serve the rest of the community. Primary evacuation routes are to the west on

Yarnell Drive onto Hwy 105 and to the east through a private property owned by Spruce Mountain Ranch. A map of the evacuation routes is included in Attachment A.

Below is a map of Spruce Mountain Estates.



The topography and vegetation in the community vary considerably. The southern portion of the community contains gradual to moderate sloping grasslands with scattered ponderosa pine and Gambel oak.

The middle and northern portions of the community contain moderate to steep slopes with areas of Gambel oak, ponderosa pine, and Douglas fir. There are three main vegetation types in this area of the community. One vegetation type consists of stands of pure ponderosa pine with a thick understory of Gambel oak. In many instances the Gambel oak has frost killed tops. Frequently there are situations in which Gambel oak is acting as a ladder fuel beneath ponderosa pine..





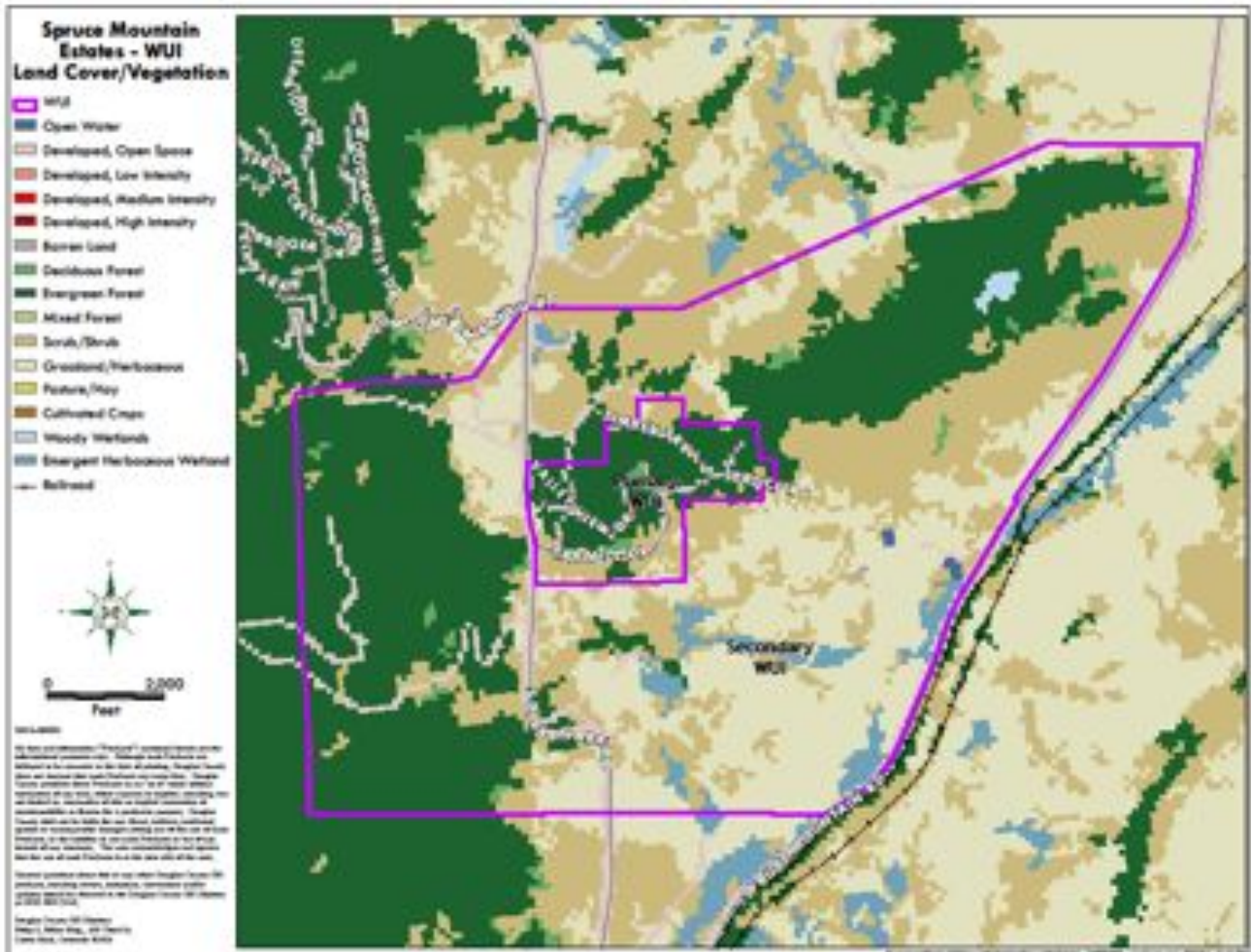
The second vegetation type is made up of ponderosa pine overstory with minimal oak in the understory.



The last vegetation type is made up of a mixed conifer forest comprised primarily of ponderosa pine and Douglas fir. Generally in these stands ponderosa pine is the dominant species with Douglas fir being co-dominant and/or suppressed. Much of the suppressed Douglas fir is dense, small diameter regeneration that is poorly formed. Oak is also found acting as a ladder fuel. This cover type is found primarily on north and northwest facing slopes.



Below is a map of the community marked to show the types of vegetation.



Description of the area surrounding the Community

Spruce Mountain Estates sits east of Highway 105, with access to it from Yarnell Drive. Spruce Mountain Open Space lies to the north and east of the community. There is a large acreage, Spruce Mountain Ranch, that abuts the Open Space on the east side. The south has large acreage properties.

Medium to large acreage properties are in the foothills to the west of Highway 105 including the gated community of Woodmoor Mountain. All the surrounding properties contain a range of topographic features and vegetation similar to that described for this community.

Of particular note and importance is the fact that the Spruce Mountain Open Space (893 acres.) is heavily forested through much of its acreage and is quite popular for day-use hiking, bicycling, and horseback riding. In 2010 Douglas County initiated a forest health improvement and hazardous fuels reduction project on the property. This will be an on-going activity well into the future.

Of further note and importance is that, beyond the foothills to the west, Pike National Forest begins with many areas that are extremely steep and heavily forested.

Spruce Mountain Estates Wildland Urban Interface

A Wildland–Urban Interface (WUI) refers to the zone of transition between unoccupied land and human development. Communities that are within the zone or within 0.5 miles (0.80 km) of the zone may also be included. These lands and communities adjacent to and surrounded by wildlands are at risk of wildfires. There are primary and secondary WUIs.

Primary WUI:

The boundaries of the Spruce Mountain Estates Primary Wildland Urban Interface (WUI) area are the boundaries that form the Spruce Mountain Estates subdivisions and contain all the platted lots and roadways therein.

Secondary WUI:

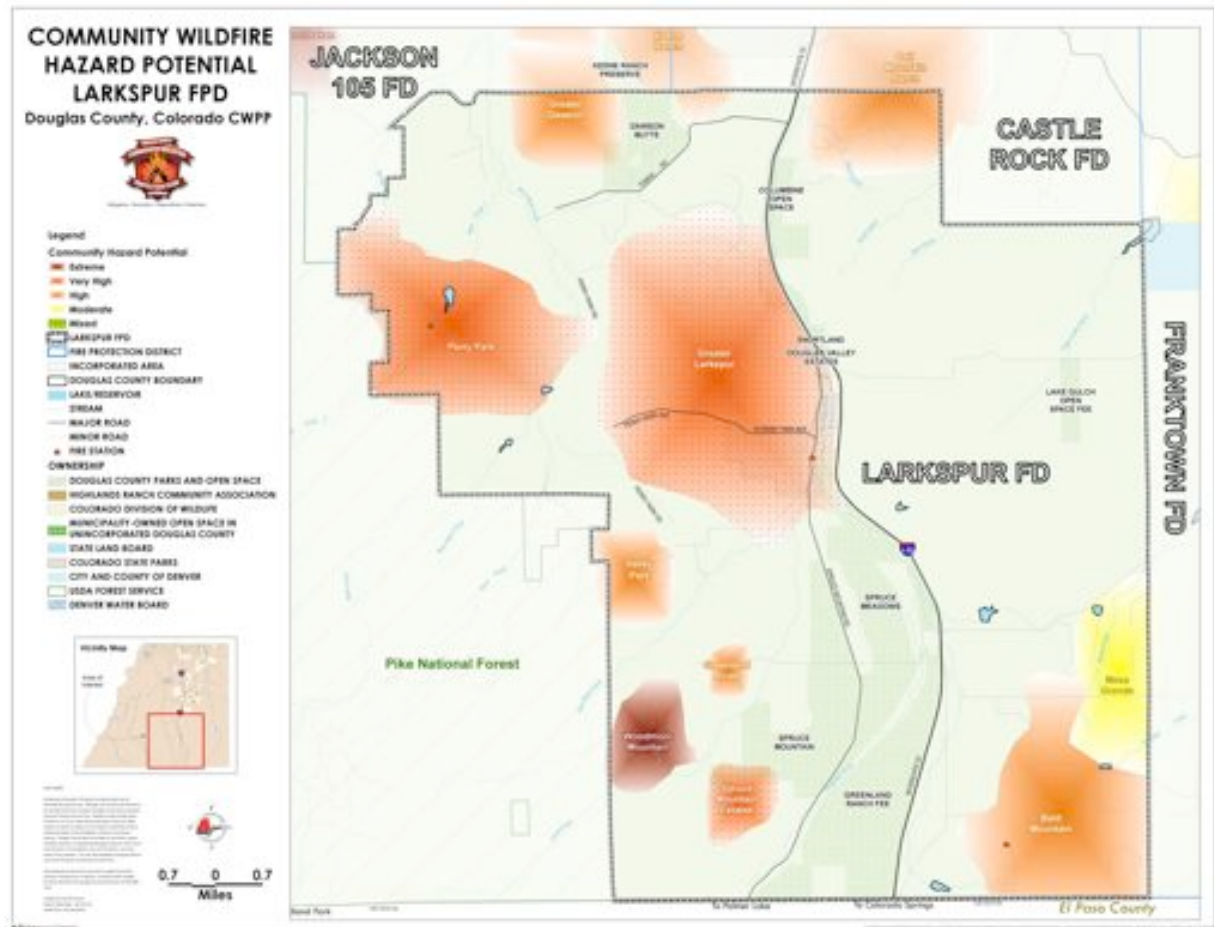
The boundaries of the Spruce Mountain Estates Secondary Wildland Urban Interface (WUI) area contain: to the north and east of Spruce Mountain Estates, a substantial portion of the Douglas County Spruce Mountain Open Space; to the east and south of Spruce Mountain Estates, the Spruce Mountain Properties, Inc. parcels and a portion of the Lin-Sal Land & Cattle Co. Ltd. parcel; the East boundary is formed by Spruce Mountain Road; to the west, the boundary extends from Perry Park Road to the east boundaries of the Jaworski property, the Manning property, the Swank Family properties, and from Cook Creek on the north to the southern boundary of the Sierra Pines LLC parcels on the south.

Below is a map of the Primary and Secondary WUIs.



Community Wildfire Hazard Potential

The following map describes the community wildfire hazard potential for the Larkspur Fire Protection District.



Fire History of the Spruce Mountain Estates

Recent fire history includes three fires:

- The first, according to the Larkspur Fire Protection District, occurred in 1993 near the end of Yarnell Drive. The fire covered several acres before it was extinguished
- In 2002, Colorado experienced its largest recorded wildfire, the Hayman Fire. While that fire did not reach the community, the Spruce Mountain area came under a Pre-Evacuation order.
- Spruce Mountain Estates was again placed under a Pre-Evacuation order during the devastating Waldo Canyon fire in 2012

Preparedness to Respond to Wildland Fires

The Larkspur Fire Protection District (LFPD) encompasses approximately 110 square miles of land in south-central Douglas County which is located about one-half way between the Denver metropolitan area and the Colorado Springs metropolitan area.

The west boundary of the LFPD is shared with approximately thirteen miles of the eastern boundary of the Pike National Forest and the east boundary of the District lies three to five miles east of I-25. The southern line of Douglas County is the south boundary of the District while the north boundary of the District follows along Dakan Road and crosses I-25 at the 176.5 mile marker. Thirteen miles of Interstate-25 bisects the District north to south.

Our community recognizes the need to identify water resources and will continue to support these efforts.



Population

The population of the district resides within a mix of the Town of Larkspur, rural subdivisions, 35-acre parcels, and ranches. Within the LFPD there are approximately 6450 residents living in 2186 residences with an assessed value of \$143,296,280.

Stations

The Larkspur Fire Protection District (LFPD) operates a total of three fire stations.

- Station 161 is the main station and is located at 9414 S. Spruce Mountain Road and is within the Town of Larkspur. This station is manned by career staff 24 hours per day, seven days a week.
- Station 162 is located within the Perry Park subdivision at 5672 Red Rock Drive. This station is also manned by career staff 24 hours per day, seven days a week.
- Station 164 is located in the southeastern part of the District at 15205 Furrow Road and is a volunteer response station.

Personnel

The LFPD has a total of 22 career staff and 39-44 volunteer fire fighters. The LFPD administrative staff includes:

- Chief -1
- EMS Division Chief - 1
- Fire Marshal - 1
- Training Lt. - 1
- Administrative Assistant - 1

LFPD Volunteers

The LFPD utilizes 3 shifts to provide fire fighting and medical coverage for the district 24 hours per day, 7 days per week. Each LFPD career shift staff includes:

- On duty Lt. - 1
- Full time Fire Fighters – 4 (Includes 2 paramedic/firefighters)
- Part time Fire Fighters – 1
- Volunteer Division Chief - 1
- Volunteer Lt. – 3
- Volunteer Fire Fighters – 35-40

Volunteer fire fighters are required to work shifts with the career staff for a total of 24 hours per month.

Wildland Qualifications

All wildland fire positions within the LFPD are qualified per NWCG standards, including prerequisite NWCG courses and the completion of an NWCG task book as appropriate for the position.

NWCG positions held by LFPD personnel include:

- ICT4-3
- ENGB-6
- DOZB -1
- CRWB-1
- FFT1 -3
- FFT2 – 12
- TNSP-1

LFPD Personnel Trainee Wildland Fire positions include:

- TEN-4
- ENGB-2
- DOZB-3
- FFT1-4
- FOBS-2
- FIRB-1

All LFPD career and volunteer fire fighting personnel (whether they have achieved an NWCG qualified position or not) have taken the NWCG courses; S-130, Firefighter Training and S-190, Introduction to Wildland Fire Behavior. These are a mandatory part of the curriculum to become a fire fighter at the LFPD. All fire fighting personnel are also required to take the annual wildland fire refresher course. This is mandatory every year prior to the start of the wildland fire season. All fire personnel that desire to listed within the federal ROSS system and be eligible for fire deployments, must also successfully complete the appropriate NWCG Work Capacity test each year.

In addition, the LFPD is a cooperating agency with the Colorado Division of Fire Protection and Control and as such is listed within the federal dispatch system for deployment to wildland fires outside of the LFPD. When requested by the Federal Dispatch Center in Pueblo, Colorado, the LFPD will send engines and personnel to wildland fires in areas outside of the LFPD. Often this is to fires in other states. The LFPD has been deployed to Florida, Texas, California, Utah, Nevada, Montana, Oregon, and Wyoming as well as to various locations within Colorado. These experiences are brought back to the LFPD and enhance the ability of the LFPD to fight wildland fire within our District.

Apparatus & Equipment

The LFPD has a variety of apparatus and equipment well suited to the task of engaging wildland fire. Depending on the location and tactics employed, the LFPD will make use of the apparatus best suited for the task at hand. The following is a listing of the various apparatus and equipment that the LFPD has available.

- Type I Engines – 4
- Type 6 Engines – 4
- Type T1 Tactical Water Tenders – 1
- Type S2 Support Water Tenders – 2
- ALS Medic Units – 3
- Administrative Vehicles – 2
- Support Vehicles – 2
- ATVs – 3
- Portable Water Tanks – 4 (2500 gallons to 3000 gallons each).
- Mark 3 Portable Pump – 1
- Small portable pumps – 2
- Drip torches – 7

Engines are equipped with wildland fire hand tools and hose as required per typing, at a minimum. All LFPD personnel are equipped with appropriate personal protective equipment (PPE) for fighting wildland fire.

Community Values

Some of the major factors that have drawn the residents to want to live in Spruce Mountain Estates are...

- Quiet/ Peaceful/Tranquility
- Natural Setting/Environment/Trees/Wildlife
- Gorgeous area/Great views
- Fresh air/Away from Pollution/Gentle breezes
- Wildlife
- Friends and Neighbors
- Relatively remoteness/Absence of high traffic and congestion
- Access to open space
- Peaceful stargazing/No light pollution
- Surrounded by mountains
- Land/Acreage
- Away from Springs area
- Aesthetic beauty of the community
- Good neighborhood/Sense of pride in our property

Human life and lives of animals and pets are a top priority. Protection of homes and personal property are second. Protection of the natural environment around our homes and the associated rural lifestyle are third.

Assessment of Fire Risk

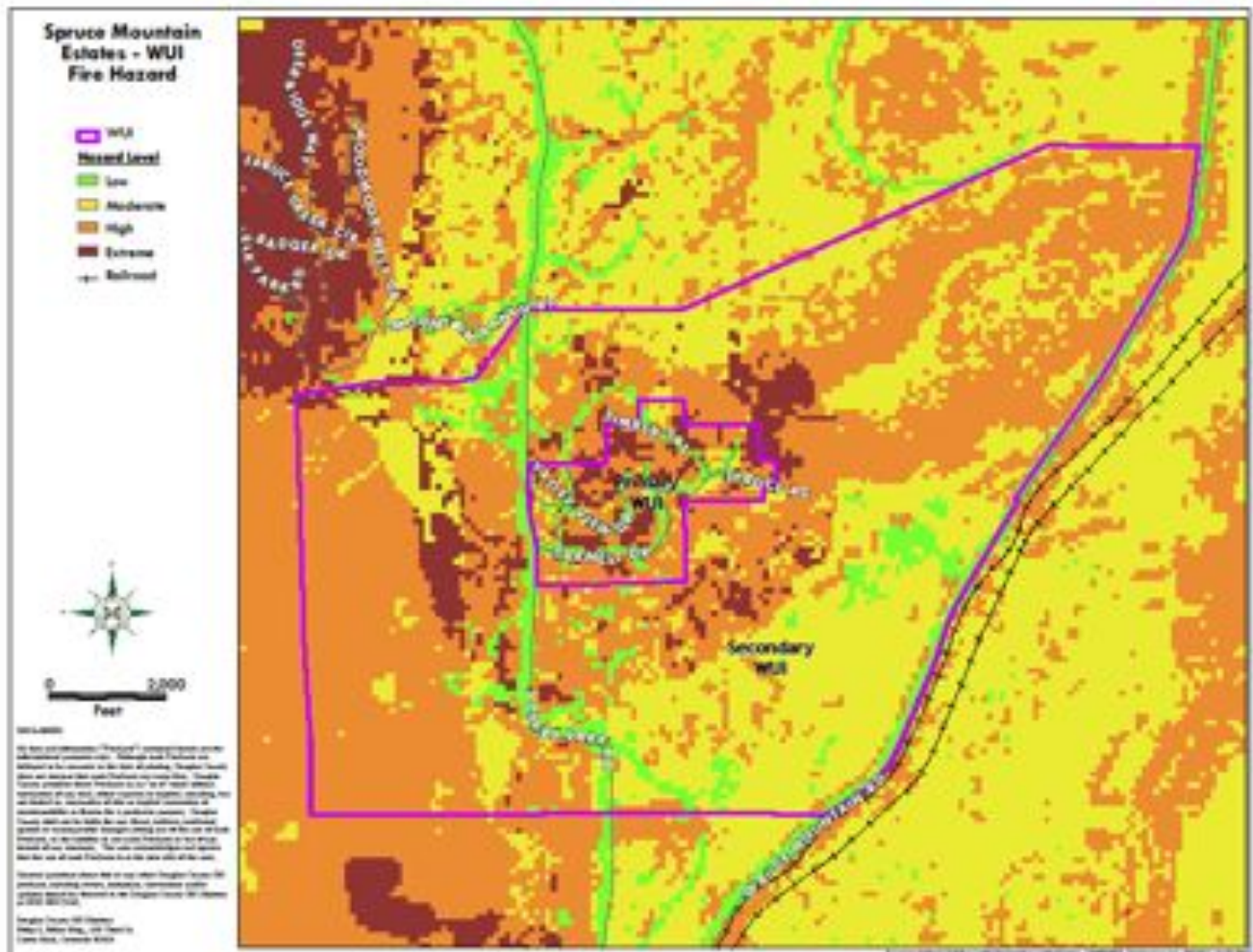
The Douglas County Wildfire Risk Assessment map rates the Spruce Mountain Estates area at “Very High” risk for wildfire overall with certain areas within the community rated at “Extreme” risk. The map in Exhibit 11 documents those risk assessments. Factors influencing that assessment include significant stretches of unbroken Gambel oak; Gambel oak acting as ladder fuels under large ponderosa pines; dense pine forests in certain areas combined with steep topography; proximity to Spruce Mountain Open Space; and meteorological considerations such as extreme dryness combined with high winds.

The risk analysis began with using the Douglas County wildfire hazard assessment model and was refined with community specifics regarding access, building materials, defensible space and water supply. The model consists of a weighted overlay of hazards, values, and risks of wildfire. For the purpose of the Douglas County model hazard is defined as the composite of resistance to controlling a wildland fire based on flame length and response time, its values and its ignition risk. Communities were then identified around concentrations of address points. The Douglas County model is a birds-eye view and should not be used to make a determination regarding an individual lot. Most of the lots within the community have a combination of fuel types present and differing hazard levels. Additional items such as exterior building materials, and defensible space should be taken into consideration for lot-level assessments.

Values are items to be protected in the event of a wildland fire. They are items that would pose significant consequences especially economic if they were lost or damaged in a

wildland fire. Values included items such as structures, major power lines, publicly owned lands, developed infrastructure including major water treatment plants. Ignition risks included items such as roads and trails, lightning strikes, anything that would contribute as an ignition source for a fire.

The wildfire hazard potential map showed an area of “High hazard” with areas of “Extreme hazard” mixed in. The heaviest weighted input to the model is fuel hazard. Fuel hazard is also the item that can be most easily altered in terms of reducing hazards, and ultimately reducing the hazard ranking. It is more difficult to change the composition or location of structures, or the presence of other values that were part of the model.



The homes within Spruce Mountain Estates are a mixture of both older and newer construction materials. Homes that were built in the 70s and early 90s typically have wood siding present. Homes that were built during the late 2000s are comprised of more stucco and stone, log, composite siding and decking materials. Roofing material present in the community is asphalt composition, tile, and metal.

There is a differing amount of defensible space present on lots throughout the community.

Current Vegetation Conditions

In low elevation areas (5,500-8,000 feet) along the Front Range ponderosa pine forests have become very dense in comparison to pre-European settlement due to a combination of grazing, logging, and fire exclusion. The increase in dense, homogeneous forests in these areas have resulted in many stands of trees that are approximately the same age and size and are now stressed from competition for resources. These conditions combined with the building of homes and structures in this zone have increased risk from wildfire.

Ponderosa pine historically has grown in open, park like stands with 20-50+ trees per acre. Ponderosa pine is a shade intolerant species, which means that it needs full sun in order to grow successfully. Fire is a natural part of the ecosystem and frequent fires (every 25-50 years) were common in this area. These fires were typically low intensity surface fires that would burn in the understory of the forest consuming grasses, needles, duff, and smaller trees/regeneration. Low intensity surface fires provide a good seedbed for natural regeneration from the mature ponderosa pine overstory.



Pre-settlement ponderosa pine forest on the Front Range



Open stand of ponderosa pine

With the increase in settlement in the area fires have been actively suppressed for over 100 years. In addition, active forest management has not been common place. These two factors have led to natural regeneration and oak growing unchecked and is now in dense, overcrowded stands that are competing for limited resources. These dense stands result in low growth rates, poorly formed trees and poor forest health. Many areas have smaller

trees growing up underneath larger trees, bending to gain sunlight, are snowbent, and have branches only on one side of the tree due to limited sunlight from competition. Instead of having 20-50 trees per acre there are areas of 100 trees per acre. These conditions combined with the building of homes and structures in this area have increased the risk from wildfire.

In addition to the increase in fire risk, trees are more susceptible to insect attacks due to the poor forest health conditions. Trees are stressed due to competition which makes them vulnerable to bark beetle attacks, primarily ips beetle. Ips beetle is not as aggressive as mountain pine beetle and typically attacks smaller diameter trees that are stressed from competition, drought, and poor growing conditions.

Fire Behavior

Wildland fires have been studied in great detail to help predict fire behavior. Predicting a fire's intensity, rate of spread, duration, direction and spot-fire production is important for firefighter safety and is the basis for tactical decisions made during the suppression of a fire.

Three factors affect wildland fire behavior in the WUI:

1. Fuels: The type, continuity and density of surrounding vegetation and, sometimes, flammable structures, provide fuel to keep the fire burning.
2. Weather: Wind, relative humidity and atmospheric stability all affect potential fire behavior.
3. Topography: The steepness and direction of slopes, and building-site location in relation to topography are features that affect fire behavior.

The only factor that we can have direct influence over is fuel. Fuels are defined as anything that burns in a fire!

Wildland fuels are divided into four categories:

1. Grass
2. Brush or shrubs
3. Timber
4. Woody debris

All plants can burn under extreme conditions, such as drought; however, plants burn at different intensities and rates of consumption. The type and density of a specific plant determines how it will burn. Some vegetation rarely burns, while other vegetation burns at different times of the year; and some can burn almost anytime. The amount of moisture in the fuels is the biggest factor affecting flammability.

Grasses: Grass primarily exists in two conditions – green and cured. When grass is green, moisture content is high enough to prevent or decrease fire spread. Firefighters sometimes use green meadows and lawns as safety zones. As the year progresses, plants enter a dormant state and the residual surface vegetation dies. Cured grass has the potential to promote extreme fire rates of spread (ROS); grass fuels have the highest potential ROS of

any fuels. Another hazard associated with cured grass is the potential for a rapid decrease in fuel moisture; the ability of air to circulate through standing grass allows the grass to dry rapidly and can result in sudden changes in fire behavior.

Brush: Brush fires spread slower than grass fires, but burn at a higher intensity. The most common flammable brush species in Colorado are oak brush and sagebrush. Brush is least flammable in late spring when new growth occurs.

Timber: Timber burns in two manners – surface fires and crown fires. Surface fires consume fuels on the forest floors without burning trees, although trees may burn individually, which is called torching. Crown fires occur when entire stands of trees are totally consumed. These fires are the most intense, but tend to move less rapidly than other types of fires. Coniferous trees are more susceptible to crown fire than deciduous trees. Torching and crown fires are the major source of ember production, which can start new fires (spot-fires) in vegetation and structures downwind.

Woody debris: Dead logs, branches and sticks on the ground surface are referred to as woody debris. Debris can be a result of human activity such as thinning, or natural processes such as wind-throw or beetle-killed trees that have fallen to the ground. Fires in these fuels vary greatly, but can produce high-intensity, slow-moving fires that are very difficult to control. Colorado's mountain pine beetle epidemic will result in a major increase in woody debris over large areas.

Complexes: More than one fuel component is present in most wildland areas. Areas containing these fuel complexes are more common than those represented by a single fuel component.

Structures: The effect of a burning structure can significantly impact fire behavior. Structures burn with extreme intensity, often launching large burning embers over long distances.

Spruce Mountain Estates contains three of the four wildland fuel categories: grass, brush, and timber. Fuel models have been developed for these categories which describe standard fire behavior and a fuel model map for the CWPP area has been developed that shows the models present for the area. The map and detailed description of the fuel models for the area can be found in Appendix B.

Weather: Weather is the major factor that affects fire behavior and is highly variable in terms of time, intensity and location.

Wind: Surface winds are the most important element in determining fire direction and rate of spread. Wind pushes flames into adjacent fuels, facilitating rapid ignition, and tends to be the common theme in large fire events. High-velocity, warm, dry, down-slope winds, such as a Chinook, can cause fuels to dry rapidly, resulting in extreme fire behavior.

Relative Humidity (RH): RH is a measure of how much moisture is in the air compared to the maximum amount of moisture the atmosphere can hold at that temperature. RH has a major influence on the moisture content of dead fuels. The smaller the dead fuel, the faster it will react to a change in the RH. Cured grass can dry out in less than 15 minutes when a

dry air mass moves into an area. Firefighters generally monitor RH on an hourly basis when fighting a fire.

Temperature: Before combustion can occur, fuels must reach ignition temperature (approximately 450° F); fuels heat up and reach ignition temperature more quickly on hot days. In addition, when fuels are preheated, fire expends less energy and will burn at a higher intensity.

Topography

Slope: Defined as the angle of the ground relative to the horizon, slope commonly is measured in degrees or as a percent. On calm days, heated air, including flames, rises and preheats the fuels upslope, which causes an increase in fire spread. On gentle slopes, this has little effect on fire behavior, but on steep slopes, the effect can be significant. During summer months, preheating generally causes winds to blow upslope. The combined effect of slope and wind results in rapid fire spread.

Aspect: Aspect is the direction the slope faces. South and southwest aspects are warmer and drier than north and northeast aspects. South, southwest and west aspects generally have lighter fuels and are more susceptible to fast-moving fires. North, northeast and east aspects tend to have heavier fuels and, under normal conditions, have slow-moving surface fires. Under extreme conditions, these aspects can burn with high intensity and fires can be difficult or impossible to control.

Climate: Fire seasons in Colorado's high country and on the Western Slope tend to last from late spring until mid-autumn. Fire seasons on the Front Range and Eastern Plains tend to be split, with most large fires occurring in the spring or fall. It's important to keep in mind that these are generalizations and that large fires can occur anytime conditions are right.

General Vegetation Treatment Recommendations to Reduce Hazardous Fuel Loads

The main concept in reducing fuel hazard levels is to reduce the density and the continuity of the fuels present. Significant strides can be made in the community to reduce the fuel hazard levels with a small amount of work. There are existing openings and breaks in the vegetation that can easily be increased and have a significant effect on the fire behavior. Removing the dead material present within the community will also have a significant effect on potential fire behavior.

To decrease the risk of insect and disease infestations, tree removal and thinning of forest stands is recommended. Thinning will reduce competition and will ultimately increase the overall health of the forest. Fortunately, removing fuels for fire risk reduction and for forest health can often be achieved simultaneously in ponderosa pine systems.

The following recommendations are for areas where the vegetative fuel is contiguous or in large contiguous patches across the lot, parcel or the landscape and outside of the home ignition zone. Although these recommendations are for larger lot owners, the

recommendations are applicable across the landscape. Conceptually, the goals should be to reduce the continuity and the density of the fuels across the landscape.

These recommendations are not intended to eliminate the ability of fire to burn across the landscape. They are recommendations that if implemented correctly will slow the rate of spread and the burning intensity of a wildfire, prevent catastrophic loss and aid in the ability of firefighting efforts.

It is important to note that these are general guidelines: topography and the spatial arrangement of fuels across the landscape must be taken into consideration and prescriptions adjusted accordingly. It is suggested large landowners consider meeting with a professional forester to design a long term plan that meets the needs and management goals of the landowner while accomplishing mitigation goals.

Grasses

Grass fuel types can be very dangerous. Fire can spread quickly through dry grass and wind can increase the rate of spread as witnessed in the Burning Tree fire in March 2011. Recommendations for grass fuel types include:

- Mow grasses around structures or any infrastructure that property owners would want to protect in the event of a wildland fire. Recommended grass heights around structures are four inches.
- Mow along property boundaries, especially if the property is adjacent to a road or other hazardous fuel loads. It is more difficult for fire to burn and carry in low grasses.

Gambel Oak

For those areas of contiguous Gambel oak recommendations include reducing the continuity and the density of the oak. With breaks in the oak burning intensity may be reduced.

- Break large clumps into smaller clumps and increase the spacing between clumps. We recommend following the CSFS Guidelines for Oak Management and provide a minimum clump spacing of 2 ½ times the height of the clump between clumps on a relatively flat ground. If the clumps are on a hillside spacing should increase based on the topography present. The larger the clump size the larger the spacing required between clumps. Oak clumps can be distributed across the landscape in any pattern or shape or size as long as the spacing guidelines are implemented correctly. The goal is to create a mosaic pattern throughout the stand and not have clumps evenly spaced.
- Thin stems within the clumps. Stems should be spaced a minimum of three to five feet apart and stems should be pruned a minimum of two to three feet above the ground to eliminate contact with ground fuels.

- Remove concentrations of dead material within clumps.
- Areas where Gambel oak is treated will need to be re-treated every 5-7 years. When Gambel oak is disturbed intense sprouting occurs and the oak must be maintained to prevent the oak from re-establishing in dense levels that were present on the property prior to treatment.



Ponderosa pine or mixed conifer

For a pure ponderosa pine stand or mixed conifer forest recommendations include reducing the density and continuity of the crown fuels (tops of trees) and ladder fuels through thinning and pruning to prevent the spread of crown fire and the potential for catastrophic loss and mortality. Keep in mind Douglas fir is a shade tolerant species and will grow well on north facing slopes and needs shade for establishment and early growth. Reducing the density and continuity of the crown fuels can be implemented in creative ways that will not leave a uniform appearance. Recommendations for thinning include:

- Creating and maintaining minimum ten-foot crown spacing between trees or small clumps of trees with a minimum twenty-foot crown spacing between clumps of trees on relatively flat ground. Crown spacing should increase with increasing topography and clumps should be approximately three to five trees based on tree size and distribution across the landscape.
- Remove ladder fuels from underneath residual trees.



For forest health recommendations include trying to increase and maintain size and age class diversity to promote forest structure diversity and heterogeneity. Recommendations include the following:

- Favor well-formed regeneration and saplings where they are more open grown and the young trees are not acting as ladder fuels.
- Remove suppressed and poorly formed trees, reducing competition for the healthiest and most vigorous trees as the residual stand is a continuing seed source for future generations of trees.
- Remove concentrations of dead and down material with the exception of two to three snags per acre for wildlife. A few down logs may also be left, the key is to reduce or eliminate any heavy concentrations of fuels.

- Options may also include creating openings of at least an acre for natural regeneration if there is a viable seed source close by or to create some openings for immediate or future plantings.

Forest health and restoration prescriptions in ponderosa pine stands are often described by reducing density based on basal area (BA) targets in addition to crown spacing and age class diversity targets. Recommended BA targets for forest health in Front Range ponderosa pine are an average across the landscape of 40 to 60 BA or approximately 30 to 50 trees per acre for each forested acre. To be a true restoration prescription treatments should be followed by implementing prescribed fire activities in the stand.

Fuelbreaks are often implemented in ponderosa pine or mixed conifer stands. Recommendations for installing fuelbreaks can be found in the CSFS publication *Fuel Break Guidelines for Forested Subdivisions and Communities*. Fuelbreaks are a fire suppression tool often strategically located along ridges, roads, or in many cases property boundaries. Within a fuelbreak the density and continuity of the vegetation is significantly reduced to:

- Drop a crown fire to a ground fire where suppression crews can suppress the fire.
- Drop fire retardant and reinforce the fuelbreak for suppression operations. Trees are spaced far enough apart enough for the fire retardant to drop through the space between tree crowns and land on the ground.
- Suppression crews often perform burnout operations from fuelbreaks, using the fuelbreak as an anchor.

Fuelbreaks are recommended at a minimum width of 300 feet on flat ground. The distance of a fuelbreak should increase with increasing topography (slope).

Gambel oak understory with ponderosa pine

Where Gambel oak is found in the understory with a ponderosa pine overstory component the emphasis should be on reducing the density and the continuity of the fuels. Create openings or breaks in the vegetation large enough to affect the fire behavior and reduce potential for fire to spread. In this fuel type ladder fuel elimination and reduction is key to accomplishing this goal. Eliminating and or reducing the ladder fuels will have the greatest impact on the ability of fire to spread from the ground into the crowns of trees and potentially across the landscape.

With understory and overstory fuels combinations there are several ways to modify the density and the continuity of the fuels loading across the parcel or landscape. The key concepts are to reduce the continuity and density of the fuels.

Clumping-This option includes maintaining an understory and overstory component, for example, oak under pines, and creating openings of significant size between the clumps of oak and pines. With this option the recommendations include:

- Removing concentrations of dead woody material.
- Prune pines to a height approximately ten feet above the ground and thin oak stems to create and maintain a three to five foot stem spacing between stems and limb stems to a height two to three feet above the ground, making stems “tree-like.”
- Remove lower growing oak sprouts.

Clumps must be separated enough that if fire spreads from the ground fuels into the tree crowns of that clump that clump may be lost, but the fire will not spread to another clump.

Understory vegetation treatment-This option includes removing oak under pines past the dripline (the extent of the branches) of the trees a minimum of ten feet on relatively flat ground. Where the ground is steeper, removing oak up to twenty feet past the dripline is recommended. Prune pines to a height approximately ten feet above the ground.

Where oak is not growing under trees but is open grown, small clumps of oak can remain. Spacing recommendations are located in CSFS Guidelines for Oak Management fact sheet. Oak clump thinning and removal of dead material is also recommended.



Overstory component treatment: understory retention

Landowners may want to remove overstory vegetation, such as pines and retain oak. For this type of treatment recommendations include:

- Removing overstory pine component where understory oak is targeted for retention.
- Outside of oak target retention areas follow one of the above desired target prescriptions.

Areas where Gambel oak is treated it will need to be re-treated every 5-7 years. When Gambel oak is disturbed intense sprouting occurs and the oak must be maintained to prevent the oak from re-establishing in dense levels that were present on the property prior to treatment.

Recommendations for Reducing Structural Ignitability

Reducing structural ignitability and preventing the loss of property in the event of a wildland fire is a high priority in Douglas County. Efforts to reduce structural ignitability can be separated into regulations governing development designs, building materials and vegetation management (defensible space around structures). Public education campaigns designed to raise awareness and move those who are aware to action to reduce hazardous fuel loads within the home ignition zones and beyond complement the regulatory efforts. The county has taken steps to address development in wildfire hazard areas by developing and adopting codes and regulations through the land use and building processes. Most of the codes and regulations focus on hazardous fuels reduction, defensible space, and the prohibition of wood shake roofs in a wildfire hazard area.

In order to identify and understand methods for increasing a structure's ability to survive a wildfire it is important to first understand how structures burn during a wildland fire. Homes ignite and burn by meeting the parameters for ignition and combustion (Cohen 2008). Homes in the WUI are fuel. Structures may be ignited by firebrands, which are embers that are lofted through the air from a moving flame front or by radiant or convection heating. Firebrands can ignite structures by landing on flammable materials either *on* or *surrounding* a structure. Firebrands are particularly detrimental to structures with flammable building materials including wood shake roofs. Accumulations of flammable materials in roof valleys, in gutters, or directly adjacent to the structure can significantly increase a structure's vulnerability.

The two main factors affecting a structures ability to survive a wildfire are the exterior building materials and the amount of defensible space surrounding the structure within 100 feet to 200 feet of the structure, known as the *Home Ignition Zone* (Cohen 2008). The home ignition zone typically is located on private property, which requires property owners to recognize the hazards, take ownership and responsibility of the hazards, and mitigate the hazardous fuels to a level that will increase the survivability of the structure.

All building permits are subject to the mitigation standards, which are the basic tools that require implementation of defensible space around newly permitted structures. If a wildfire hazard assessment is generated at the time of building permit application it identifies the minimum defensible space requirements that must be met at the time of final inspection for a Certificate of Occupancy (C.O.) for occupiable structures and a Certificate of Completion for accessory structures.

Construction materials typically found for new residential construction are fairly fire resistive and include stucco and stone combination or a cement siding product for exterior

construction materials. Roofing materials are typically asphalt composition or concrete tile as Douglas County prohibits wood shake roofs in a wildfire hazard area.

Building Materials

- Replace older shake roofs with those of a higher fire resistive rating including asphalt composition, tile or metal roof assembly
- Replace wood siding with a more fire resistive cement product including cement, stucco, cement plank siding, stone or masonry
- Screen attic, roof, foundation and eave vents openings with 1/8" metal screens
- Enclose areas under decks completely
- Windows should be double-paned or tempered glass

For more information visit <http://www.firewise.org>

Defensible Space

Where regulation is not applicable, educational campaigns are encouraged to be in place to raise awareness and encourage homeowners to implement defensible space standards as identified in CSFS fact sheet *Creating Wildfire-Defensible Zones*. Defensible space should be encouraged around all structures.

Douglas County Wildfire Mitigation Staff, CSFS, fire district representatives, and private consultants offer on-site consultations for wildfire hazard assessments and site specific defensible space recommendations. Defensible space is the area around a structure where the vegetative fuels have been modified to slow the rate of spread of a wildfire towards the structure, and away from the structure if the structure is on fire. The primary purpose of defensible space is to improve the structure's ability to survive a wildfire in the absence of firefighter intervention. Firefighters may use defensible space to work to protect a structure during a wildland fire event. Defensible space is an effort to reduce structure ignitability but is not a guarantee a structure will survive during a wildfire.

Minimum recommendations for defensible space are identified in CSFS fact sheet *Creating Wildfire-Defensible Zones*. Minimum defensible space recommended by the CSFS are 100-200 feet from a structure on a flat lot. Defensible space should increase with increasing topography as fire moves easily uphill preheating vegetative fuels. Defensible space consists of three zones: Zone 1 is closest to the structure and is the most heavily modified zone. Recommendations include but are not limited to:

- Remove all flammable vegetation within 15 feet of the structure
- Remove any tree branches hanging over structures that will drop needles or other debris onto roofs, gutters, or decks
- Do not plant vegetation underneath eaves or roof lines

Zone 2 is where the vegetation is modified to reduce the intensity of an oncoming fire, or create speed bumps through the vegetation approaching the structure. Recommendations in this zone include but are not limited to:

- Remove all ladder fuels
- Provide a minimum crown spacing between trees of 10 feet between crowns on a flat lot
- Prune trees to a height approximately 10 feet above the ground
- Provide a minimum shrub spacing of 2 ½ times the height of the shrub between shrubs
- Prune shrubs to remove contact with ground fuels
- Keep grasses mowed
- Remove all dead material

Zone 3 is a transition zone toward a more traditional vegetation management style to meet landowner objectives while working with principles of stewardship. Recommendations include but are not limited to:

- Thinning to remove suppressed and overstocked trees while promoting and maintaining healthy vigorous trees
- Limit vegetation combinations that contain ladder fuels to isolated clumps.
- Reduce shrub densities to promote healthy growth and reduce density and continuity through the zone.
- Snags (dead standing trees) should only remain if they do not pose a safety hazard

Firewood should be stacked along the contour or above the structure, but not below. Firewood should be stacked a minimum of 30 feet from the structure and should be separated from other flammable vegetation. Flammable vegetation and other materials should not be stored under decks. It is also important to reduce hazardous fuels and create defensible space along driveways to improve firefighter access to your home and to maintain your escape route.

Technical Guides

- *Quick Guide: Creating Wildfire-Defensible Zones*
- **6.303** *Fire Resistant Landscaping*
- **6.304** *Forest Home Fire Safety*
- **6.305** *Firewise Plant Materials*
- **6.306** *Grass Seed Mixes to Reduce Wildfire Hazard*
- **6.311** *Gambel oak Management*
- *Fuelbreak Guidelines for Forested Subdivisions and Communities*

Fire Mitigation Activities to Date

The Larkspur Fire Department has been providing educational materials to the community and responding to fires for years. They have also conducted assessments of individual properties at the owner's request. The CWPP team was formed in February 2013 and held meetings in March, April, June, July 2013. In January 2014 the committee met to work on finalization of the CWPP for February 2014. A neighborhood bar-b-que was held on July 20, 2013 to review the slash pickup program scheduled for August with an additional pickup in October.

Recognizing the values placed on human life and that of pets and livestock, an evacuation plan was made an early priority. The evacuation plan included as Appendix A will be distributed to the community via email in 2015.

A grant application for \$4,600 was submitted and awarded in July, 2013. An additional \$1,600 was awarded in September, 2013. The grant was awarded by the Colorado State Forest Service. The funds were used to subsidize fire mitigation work in the community. This work took two forms. \$3,000 of the funds was designated for two demo sites in the community. This work consisted of creating defensible space around the homes and outbuildings, eliminating ladder fuels (typically understory oak beneath ponderosa pines), and thinning oak into clumps with fire breaks between the clumps. The work was all performed to Colorado State Forest Service Standards. The remainder of the funds was expended on a slash to mulch conversion project. This entailed picking up large slash piles on a total of twenty-one properties. Approximately 42 acres were treated, 925.25 volunteer hours contributed to slash to mulch project, and approximately 480 cubic yards of slash mulched.

In 2014, the grants for slash removal and continued demo site work were repeated. The completion of one demo project was reimbursed for \$1000. A grant of \$1600 was awarded to the community for slash removal. 160 cubic yards of slash was removed. 493.5 volunteer hours were contributed for properties comprising approximately 26 acres.

The community has committed to continuing its fire mitigation work with the Larkspur Fire Department, Douglas County and the State of Colorado.

Fuel Treatment Priorities

The top two priorities for future fuel treatments will focus on private landowners reducing hazardous fuels on their property and continuation of the community-wide slash to mulch program. Treatment recommendations for private landowners include: reducing ladder fuels, creating defensible space, breaking up stands of contiguous Gambel oak, and thinning dense stands of ponderosa pine trees to increase spacing between tree crowns (min 10 feet) and reduce completion between trees. Methods of treatment will include hand thinning, mastication, chipping, and pruning.

With all treatments maintenance is an ongoing need especially when treating Gambel oak due to the vigorous resprouting. When the oak starts to resprout new shoots are tender

and removable with lawn mowers and weed eaters. It's important to take care of that before they become big and sturdy and have to be removed expensively again with a masticator. Based on what has been seen in other areas if you cut off the early shoots for two or three years, the roots die and the scrub oak stops coming up.

Spruce Mountain Open Space Projects

Spruce Mountain Estates is contiguous to the Douglas County Spruce Mountain Open Space. Spruce Mountain Open Space is a large forested open space property, 1,416 acres. The property is a high-use recreation area for hikers, bikes, and equestrian enthusiasts. The property is owned and managed by Douglas County and held in conservation easement with the Douglas Land Conservancy and the Colorado State Forest Service. The property under conservation easement with the CSFS is a part of the Forest Legacy Program. The intent of the program is to keep a working forest a working forest, practice sound stewardship and prevent fragmentation. Forest stewardship activities for the property are identified in a 10 year stewardship plan. Due to the proximity of some of the dense vegetation in relationship to the community and values at risk, Douglas County completed a hazardous fuels reduction project on two forested pieces of open space abutting the community along with a Dwarf Mistletoe buffer project in 2011 and a five acre demonstration site in 2013. The mesa top has had several fuels reduction and forest health projects completed on it since 2005. The map below shows the open space treatment areas in relation to the community.

Next Steps/Implementation Plan

The next steps for fire mitigation work in the community include the following activities:

1. Complete Spruce Mountain Community Fire Mitigation Program grant requirements each year and apply for applicable CSFS grants. [Ongoing]
2. Encourage participation of homeowners on mitigation efforts so that slash placed by the roadside on their properties can be safely picked up by a contracted hauler. [Ongoing]
3. Homeowners of the two demo sites to follow the mitigation plans according to the Site Prescription Guidelines given by CSFS Franktown. [Completed, December 2013]
4. Establish an emergency plan and inform the community residents accordingly. This effort would be done in conjunction with Larkspur Fire Department and the Douglas County Office of Emergency Preparedness. [Completed, July 2015, see Appendix A]
5. Institute a review of our existing covenants to insure they are consistent with this CWPP plan and with Firewise recommendations. [Fall 2015]
6. Consider establishing a permanent committee chair for fire mitigation in the community. This individual will be responsible for maintaining awareness of the need for fire mitigation, providing community education, and developing and implementing future projects. [Fall 2015]
7. Continue focused mitigation work on homeowner properties. As homeowners not involved in mitigation efforts become aware of work being done in the community they may be encouraged to actively and voluntarily participate in treating their properties. Grant funding, if available, will be sought to continue this work. [Ongoing]
8. Consider conducting an evacuation drill. Timing for this has to be determined with a commitment from homeowners to participate as well as require support from several county agencies. [Discuss at 2016 CWPP Committee Meeting]
9. Make the slash pickup a perennial activity. [Ongoing]
10. Under the direction of the CWPP Committee chair, continuing education on fire mitigation with an emphasis on maintenance will be provided through neighborhood meetings, website and emails. Use county and state resources to aid in these activities. [Ongoing]
11. Contact absentee landowners to participate in this program. [January 2016]
12. Ensure that the Architectural Review Committee have the guidelines for Firewise recommendations and the recommendations of this CWPP Plan to encourage defensible space and lot fire mitigation. [January 2016]

Signatures

The Spruce Mountain Estates Community Wildfire Protection Plan was collaboratively developed. Interested parties, including homeowners, Larkspur Fire Protection District, Douglas County Wildfire Mitigation Staff, and the Colorado State Forest Service participated in and provided input to the process.

The CWPP identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect Spruce Mountain Estates and surrounding areas. It also recommends measures to reduce the ignitability of structures throughout the area.

The following community representatives have reviewed and support this Community Wildfire Protection Plan.



Joseph Adams, Committee Chair,
Spruce Mountain Neighborhood CWPP
Committee

7.8.2015

Date



Carol Liebner, President
Spruce Mountain Estates (Filing 2) HOA

7-8-15

Date



Randal R. Johnson, Fire Marshall
Larkspur Fire Protection District

7-8-15

Date



Kristin Garrison, District Forester
Colorado State Forest Service

7-8-15

Date

Appendix A

Spruce Mountain Estates Emergency Preparedness Plan

A Committee of residents of Spruce Mountain Estates, in concert with state and county resources and our local fire district, have developed this Community Wildfire Protection Plan (CWPP).

For emergency preparedness, this document will answer four important questions:

1. In the event of an emergency that required evacuation, how would you be notified?
2. In the event that Yarnell exit to DC 105 was blocked or impassable, how would you get out?
3. If an evacuation were ordered, what can you do to assure the safety of your livestock and/or pets?
4. If you have to evacuate, what should you be sure to take with you?

How would you be notified of a need to evacuate?

The Douglas County Sheriff has an Emergency Management Staff that is responsible for coordinating notification. While they use many avenues to inform the public such as alerts to the media, the fastest and most assured way to be alerted is through the County's Emergency Notification System ("Code Red"). In order to be sure you receive an evacuation communication, you should register with the County on this system. This can be done easily through the following link:

<http://douglascountycodered.com>

If you have a landline telephone, you are automatically included in notifications, but you are encouraged to also register additional numbers (e.g., cell phones, work numbers, pagers, etc.) as well. You may also receive texts and emails if you wish.

If you are not comfortable using the computer, please contact a member of the CWPP Committee, and they will help you get signed up.

You might also be contacted via a house-to-house search by Douglas County Sheriff personnel. However, that might occur later than you would want it to happen. Register on the system today.

In case of a fire, there are two types of notifications you can receive::

5. Pre-evacuation notice: Residents in an affected area are advised to make immediate plans for the evacuation and care of family members and animals. The Douglas County Sheriff's Office urges residents to gather important documents, medications, and important personal effects so that they will be immediately available should conditions deteriorate. Residents must maintain situational awareness. If you are in danger, DO NOT WAIT for an evacuation order. Take the initiative to leave immediately if local conditions warrant such action.
6. Evacuation Notice: Residents are to leave the affected area immediately, following established evacuation routes or alternate routes. In most cases, you would be directed by personnel from the Douglas County Sheriff's Office.

The Office of Emergency Management has a preparedness guide available on their website. Paper copies are also available at their office in the Justice Center in Castle Rock. Their telephone number is 303-660-7589.

If the Yarnell exit to DC 105 was blocked or impassable, how would you get out?

For Spruce Mountain Estates, the Yarnell exit to Douglas County 105 would be the primary escape route. However, if that way was blocked or impassable, there is another exit that could be opened in the case of an emergency. - the road across Spruce Mountain Ranch, accessible via the gate at the Eastern end of Spruce Rd.

It is highly advised to familiarize yourself and your family with the location of this alternate exit.

If an evacuation were ordered, what can you do to assure the safety of your pets?

So if you evacuate and stay with family, friends, or a motel for a few days., what do you do with your pets? Planning for pet evacuations, like planning for your family should begin far in advance of an emergency situation. Assemble a pet emergency evacuation kit to take with you that includes crates, pet food, leashes, bowls, medication and the animals' veterinary records. Make plans in advance for the sheltering of your pet by identifying friends or family outside of the evacuation area who can shelter your pets. Locate pet-friendly hotels and motels or boarding kennels or make arrangements with your veterinarian for safe housing for your pets during an emergency. Douglas County has a program in partnership with Elbert County called the Douglas/Elbert County Animal Response Team or DECART who can provide shelter for animals in emergencies if you have no other options for housing your pet. The DECART provides those in need of assistance during times of evacuation by providing shelter, food and veterinary care for large and small domesticated animals. Animal emergency sheltering locations are primarily the Douglas County Fairgrounds at 500 Fairgrounds Dr., Castle Rock, CO 80104 or the Elbert County Fairgrounds at 95 Ute Ave., Kiowa, CO 80117. The DECART can be contacted at DECART@douglas.co.us or by calling 303-814-4356.

If you have to evacuate, what should you make sure you take with you? What other considerations should you be concerned about?

Be sure to take your personal medications with you. It is also a good idea to take important documents with you including photos and/or video of your home to help with an insurance claim or keep them in a safe deposit box off site. Have a plan in advance where you will meet up with family members if your home is not accessible, and be sure to register anyone with access and functional needs with the Sheriff so they can be assisted in an evacuation.

Conclusion

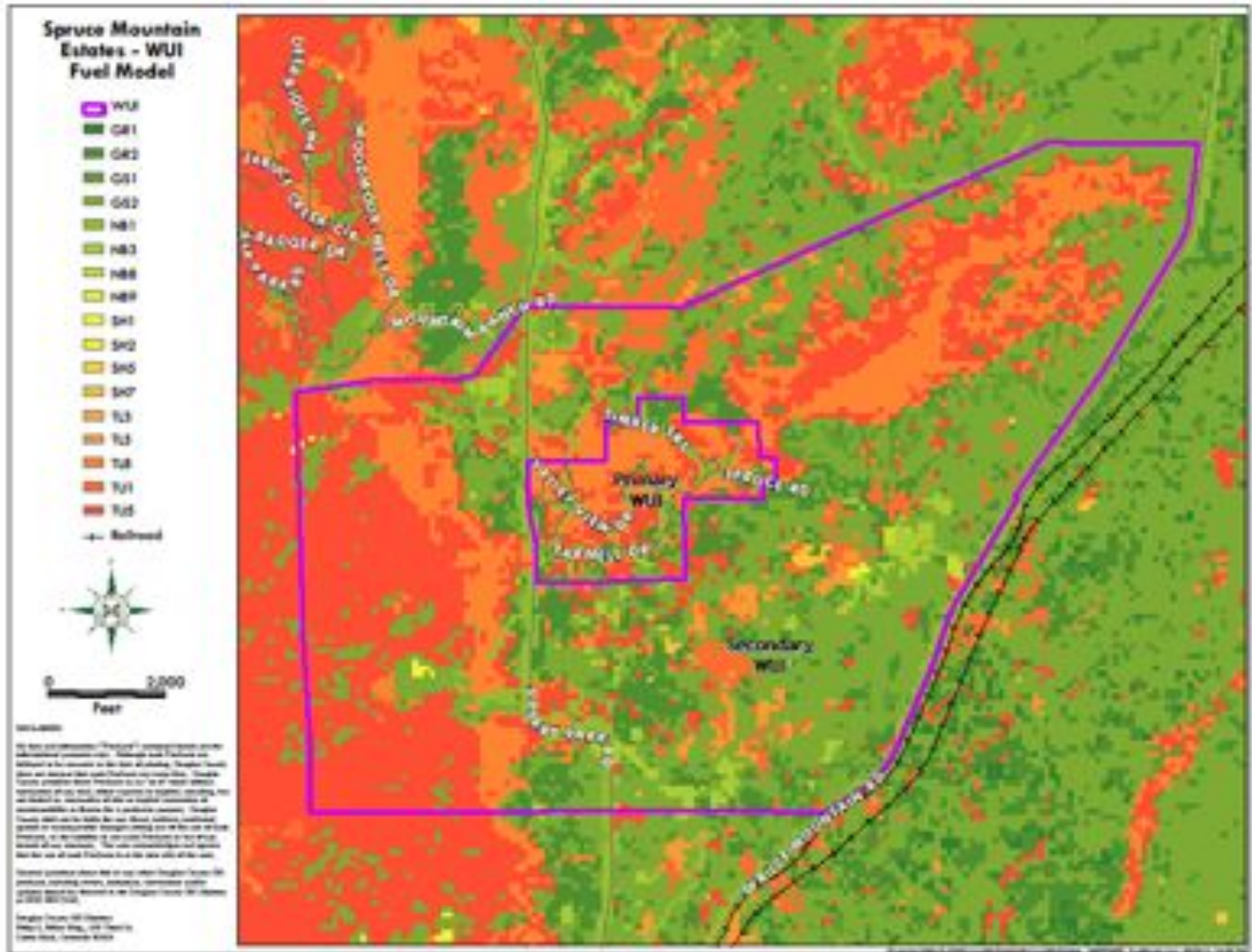
Please act on this information now as appropriate and keep this document in an accessible place for future reference. It will also be available on the Spruce Mountain Estates website (sprucemountainestates.net). As our Community Wildfire Protection Plan is updated, we will send you additional information.

Spruce Mountain Estates Evacuation Routes



Appendix B

Spruce Mountain Area Fuel Model Map/Description



The Fuel Model Map breaks the vegetation down into standard fire behavior models that are then used with Rothermel's (1972) surface fire spread model. These are surface fire spread models, the vegetation that will carry a surface fire and not a crown fire. The fire behavior model is broken into Grass, Grass-Shrub, Shrub, Timber Litter, and Timber- Understory. These categories are then further broken down by increasing complexity.

Grass models are for an arid to semiarid climate that is rainfall deficient in the summer and the extinction moisture content (dead moisture content) is 15 percent. Grasses are dynamic as their moisture contents change during the season and they can exhibit different fire behavior.

Fire moves quickly through grass and can easily spread to adjacent more complex fuel types making suppression operations more difficult and complex.

GR1 - Grass is short, patchy, and possibly heavily grazed. Spread rate is moderate; flame length low. Grasses in this category may not carry a fire as rapidly as grasses in the other grass models.

GR2 - Moderately coarse continuous grass, average depth about 1 foot. Spread rate high; flame length moderate. In this type of grass fuel model fire will move more quickly and burn more intensely.

The **Grass-Shrub** category is a mixture of grass and shrubs up to 50 percent shrub cover. The models are for an arid to semiarid climate that is rainfall deficient in the summer and carries an extinction moisture content of 15 percent. In this case it is the grass-shrub model combined that contributes to fire spread. Grass-Shrub fuel models are dynamic with the function of moisture content.

Fire may burn quickly through the Grass-Shrub models with varying intensity and increase spreading, making suppression operations more complex. This type of model contributes to fire spreading into ladder fuels, and adjacent to a significant amount of crown fuels (trees) in the communities modeled.

GS1- Shrubs are about a foot high, low grass load, Spread rate moderate; flame length low.

GS2- Shrubs are 1-3 feet high, moderate grass load. Spread rate high; flame length moderate.

For the **Shrub** category shrubs cover at least 50 percent of the site; grasses are sparse to nonexistent. The models are for an arid to semiarid climate that is rainfall deficient in the summer with an extinction moisture content of 15 percent.

SH1 - Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate very low; flame length very low.

SH2- Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuel present. Spread rate low; flame length low.

SH5- Heavy shrub load, depth 4 to 6 feet. Spread rate very high; flame length very high.

SH7- Very heavy shrub load, depth 4 to 6 feet. Spread rate lower than SH5, but flame length similar. Spread rate high; flame length very high.

Areas of heavier shrub loads may tend to experience higher burning intensities and may be more difficult to control.

Timber Litter can be described as dead and down woody fuel (litter) beneath the forest canopy.

TL3- Moderate load conifer litter. Spread rate very low; flame length low. The fuel bed is not composed of broadleaf or long-needle pine litter and does not include coarse fuels.

TL5-High load conifer litter, light slash or mortality fuel. Spread rate low; flame length low. The fuelbed is not composed of broadleaf or long-needle pine litter and does not include coarse fuels.

TL8-Moderate load and compactness may include small amounts of herbaceous load. Spread rate moderate; flame length low. The fuelbed is composed of long needle pine litter.

Timber Understory can be described as grass or shrub mixed with litter from the forest canopy.

Models are for a semiarid to subhumid climate with a moisture extinction of 20 percent.

Timber Understory models are those that pose a significant threat of a ground fire spreading to a crown fire.

TU1-Fuelbed is low load of grass and/or shrub with litter. Spread rate low; flame length low.

TU5-Fuelbed is high load conifer litter with shrub understory. Spread rate moderate; flame length moderate.

Nonburnable areas are those that are insufficient to carry wildland fire under any condition.

NB1-Urban or suburban development; insufficient wildland fuel to carry wildland fire.

NB3-Agricultural field, maintained in nonburnable condition.

NB8-Open water

NB9-Bare ground

Nonburnable areas can serve as potential anchors for fuel breaks.