

Pine Ridge

A Community in The City of Castle Pines
Douglas County, Colorado



Community Wildfire Protection Plan

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1. Introduction

The Healthy Forest Restoration Act (HFRA) signed into law in December of 2003, directs federal, state and county agencies to collaborate with communities and interest groups in developing a Community Wildfire Protection Plan (CWPP). A CWPP specifically identifies strategies that reduce wildfire fuels and the risk of home ignitions, while improving forest health and fire fighting response capabilities. A CWPP improves opportunities for obtaining Federal wildfire mitigation grants and may also provide access to other potential grants for improved safety in the wildland urban interface. This CWPP belongs to PineRidge Homeowners Association (HOA) and will serve as a guide in the management of the property to meet specific objectives that are consistent with the principles of good forest stewardship. It is a living document and will be reviewed annually and modified when required. The objectives are:

- To mitigate wildfire hazard on the property by treating the accumulation of fuels in Gambel oak and ponderosa pine in the open space and on individual lots.
- To minimize the activity of destructive forest insects and diseases.
- To maintain and improve the health and vigor of individual trees and the open space as a whole.

2. Community Description

The Community's Wildland Urban Interface (WUI) is broken into a primary and secondary boundary. See Figure 1 for the WUI Map.

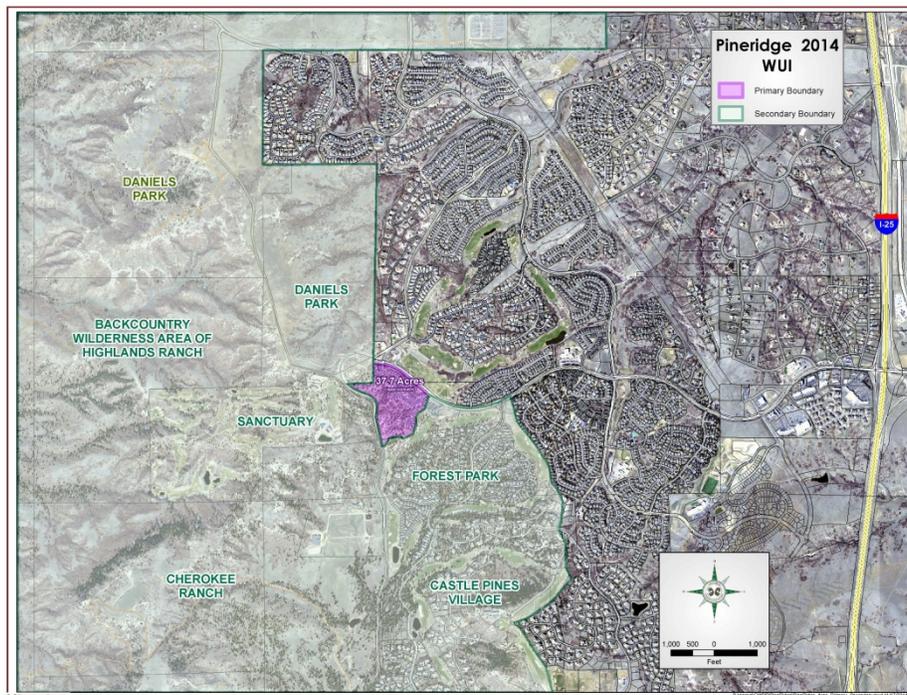


Fig. 1: PineRidge Primary and Secondary WUI Map, Refer to Appendix A for full page version

The primary WUI area is comprised of the PineRidge community and open space. This encompasses about 37.7 acres.

The secondary WUI is comprised of the Backcountry Wilderness Area of Highlands Ranch, Daniels Park (Denver Mountain Park), The Sanctuary Golf Course, Forest Park and Castle Pines Village communities.

Purpose of defining a primary and secondary WUI: The purpose in defining a Primary WUI and a Secondary WUI is to define and weight the wildfire hazard based the type and continuity of natural fuels and their proximity to the values at risk within the area that this CWPP is developed for. The primary WUI contains the values at risk as defined by this CWPP and treatment recommendations that will have be most effective in the community.

The Secondary WUI is designated as an area of concern due to the fuel models and terrain contained within it and the fact that adjoining lands have fuel models that can rapidly transport fire into the Primary WUI without any substantial fuel reduction to interrupt the progress of the fire as it approaches the values at risk. This can allow embers from a fire to loft from the secondary WUI and land into the area of the primary WUI.

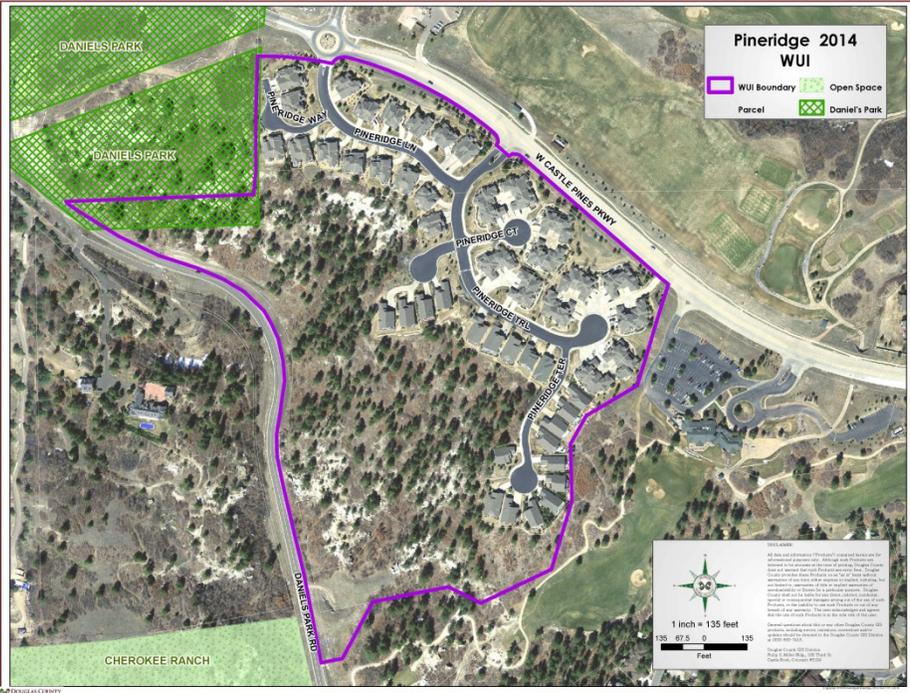


Fig. 2: PineRidge Primary WUI Map, Refer to Appendix A for full page version

General: PineRidge is a small, relatively new housing development that was originally in unincorporated Douglas County. In 2008 the City of Castle Pines incorporated and now the community is within the incorporated limits. There are a total of 100 residences, consisting of 20 single-family patio homes, 16 duplex units and 12 four plex units. The residences are built in close proximity to one another on small lots and are consolidated in the northeast corner of the development. The southwest corner of the development, which is contiguous to the residences, is comprised of approximately 22 acres of forested open space. Figure 3 shows the general location of the community.

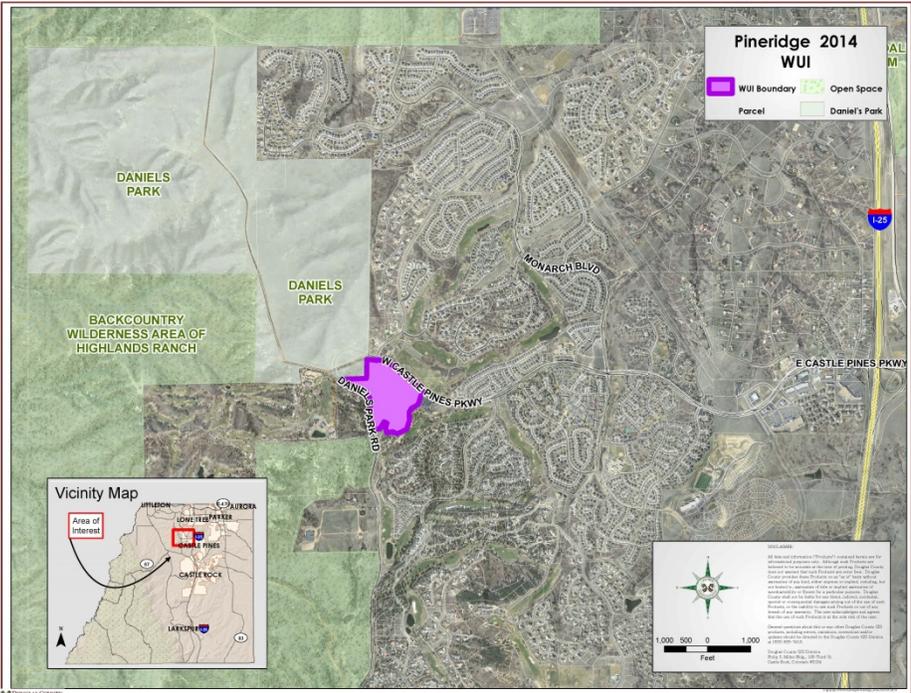


Fig. 3: PineRidge Area Map, Refer to Appendix A for full page version



Example of duplexes in PineRidge



Single family homes adjoining open space

In addition to the Ridge of Castle Pines North Golf Course, PineRidge is adjacent to: the Sanctuary Golf Course overlooking the Plum Creek valley, historic Daniels Park - home to a herd of buffalo and the Tall Bull Memorial Grounds, 3,100 acres of the Cherokee Ranch, and 8,000 acres of Highlands Ranch open space. There are pine covered hills, dramatic rock outcroppings, and panoramic mountain views that include Pikes Peak and Devils Head.

PineRidge is a unique community governed by three separate HOAs,

- Villa/Carriage HOA represents residents of the multi-family units duplexes and four plexes.
- Lifestyle HOA represents the single family patio homes.
- PineRidge HOA represents all residents with regard to streets and open space.

This CWPP was commissioned by the PineRidge HOA for the 22 acres of forested open space that borders the community on two sides and to provide wildfire hazard reduction information for the homeowners within the community. While the open space contains large rock outcroppings, ponderosa pines and Gamble oak, the residences are situated next to each other on relatively small lots. The CWPP addresses an overall working wildfire mitigation plan for the open space as well as information for individual homeowners. It preserves many of the beautiful ponderosa pine for all residents to enjoy, while reducing the wildfire threat by removing ladder fuels and keeping Gamble oak to a minimum.

Vegetation/Fuels: While the home sites are small, landscaping is fairly dense between homes for privacy.



Example of dense landscaping between homes

The 22 acres of forested open space south and west side of the community contain abundant vegetation and wildfire fuels on steep terrain. The open space is dominated by Gambel oak and mountain mahogany with a low density, healthy stand of ponderosa pine. This creates a two level forest - the most hazardous type – with oak, pine regeneration, and other shrubs, growing beneath a pine canopy and producing ladder fuels the tree crowns.

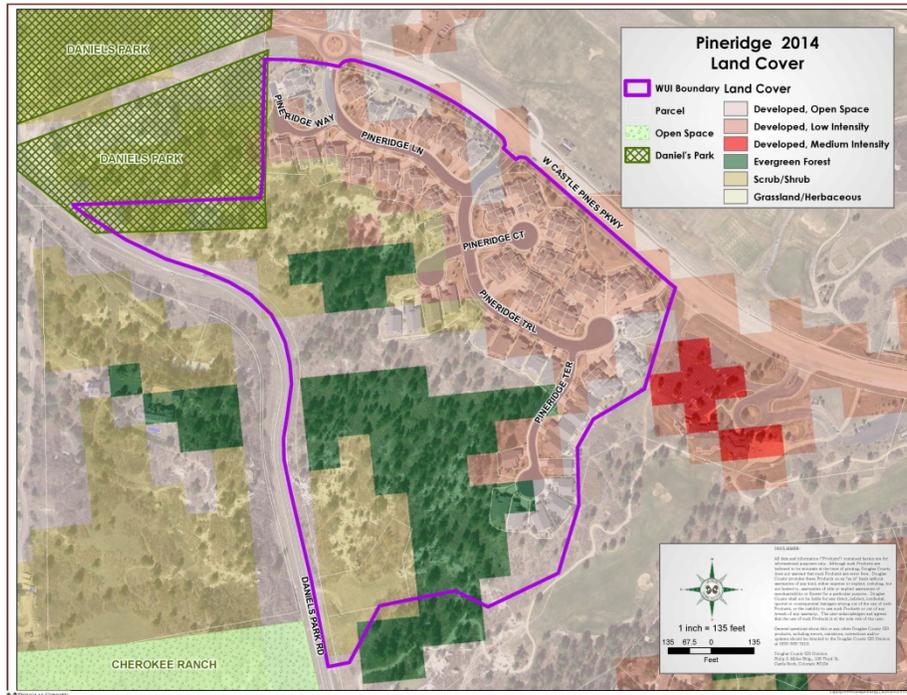


Fig. 4: PineRidge Vegetation Map, Refer to Appendix A for full page version

3. Community Risk Assessment

Current Vegetation Conditions for Douglas County

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. Many areas also contain unnatural accumulations of Gambel oak. The oak is dead, decadent, and contiguous. In its current condition the oak does not provide good wildlife habitat or forage and some densities are difficult for large ungulates to move through. The oak also acts as a ladder fuel carrying fires from the ground into the tops of the trees creating a crown fire situation which is difficult to control due to high flame lengths and fast rates of spread.

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-European ponderosa pine stand along Front Range



Open, park like 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, including the PineRidge community.

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.

PineRidge 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 A.

Other fuels

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.

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.

Wildfire Risk to PineRidge:

The community risk analysis began with using the Douglas County wildfire hazard assessment model that was developed in 2010 as part of the Douglas County CWPP process. This model was used to create a wildfire hazard map for the entire county. 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 PineRidge community is contained within the Castle Pines North community group.

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 as they were not part of this assessment.

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 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 wildfire hazard potential map showed an area of “high hazard” with areas of “extreme hazard” mixed in for the PineRidge area (see Figure 5). Note: There are gaps in the spatial data which shows a “low” hazard in the middle of the open space. This is a glitch in the data that could not be fixed, however, the hazard is high in this area.

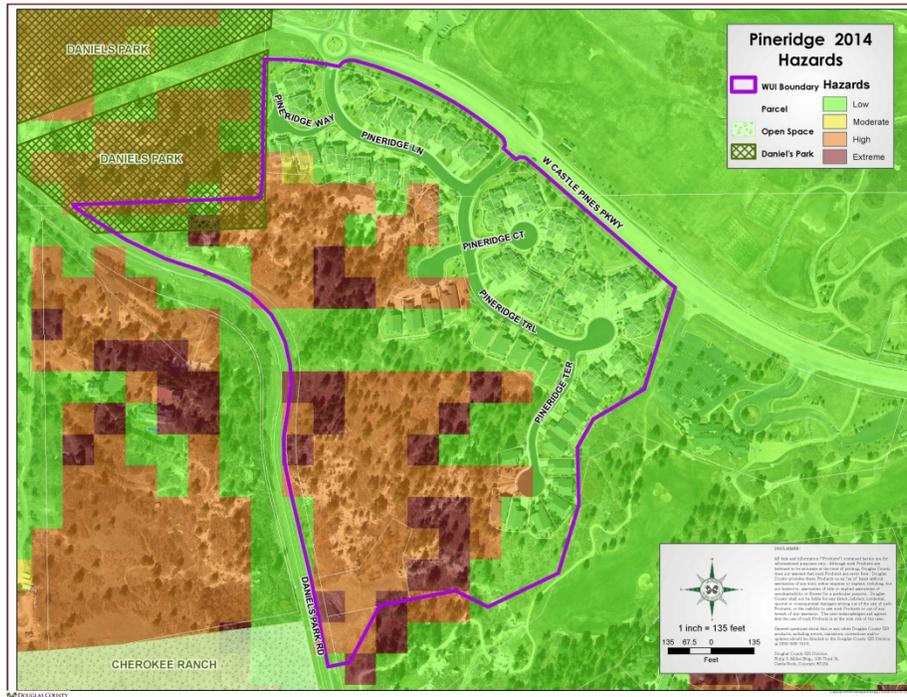


Fig. 5: PineRidge Wildfire Hazard Map, Refer to Appendix A for full page version

Factors influencing this 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; meteorological considerations such as extreme dryness combined with high winds; and the density of homes in the area, which can serve as an ignition point. **Fuel reduction treatments were not factored into this assessment due to the broad scale of the assessment, however, the treatments that have occurred in the open space has reduced ladder fuels, broken up contiguous oak, and reduce the areas where a surface fire can transition into a crown fire.** Once fire is in the crowns (or tops of trees) it is difficult to control the fire.

In addition to the hazardous fuel densities, the steep terrain with numerous ravines, cliffs and rock outcroppings, contributes to the high wildfire risk to PineRidge. The slopes, some as much as 25%, can cause the fire spread rate to double. The homes built at the top of ridges and slopes are most at risk. High winds, sometimes 60 mph, are not uncommon.

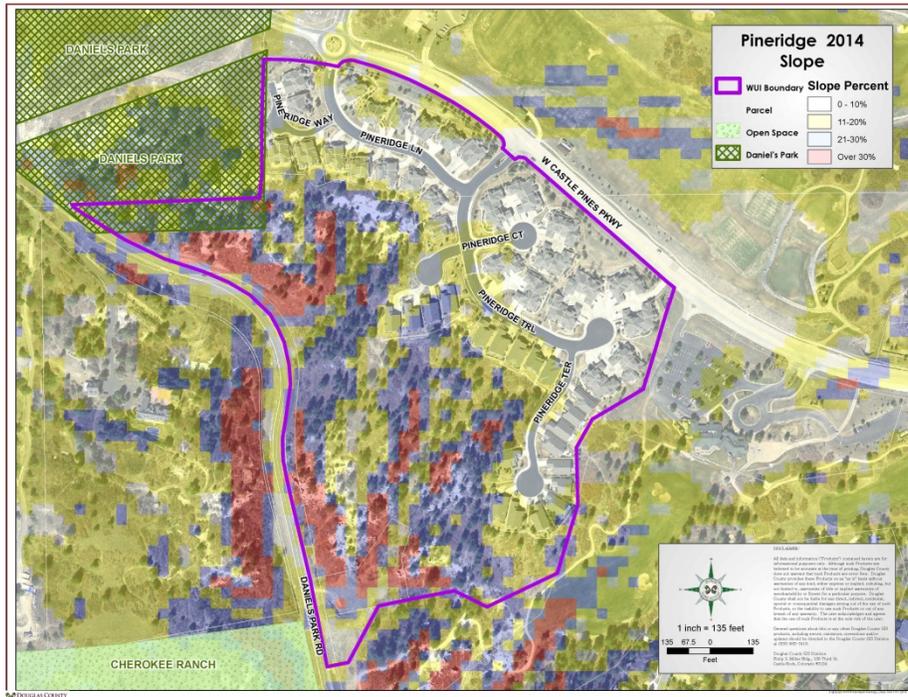


Fig. 6: PineRidge Slope Map, Refer to Appendix A for full page version

Embers generated during a wildfire can travel up to two miles ahead of the flame front due to high winds and steep topography. These embers can land on dense landscaping and flammable parts of a home (ex. deck, fences) and cause homes to ignite. Given the close proximity of homes to one another home to home ignition is a threat in PineRidge. When one home catches on fire the heat and embers generated can cause homes in close proximity to one another to ignite. This occurred in the 2012 Waldo Canyon Fire in Colorado Springs and can happen in a dense, urban community setting like PineRidge.

Risk of Ignition

Wildfires are caused by both human and natural ignitions. Types of human ignitions include unattended or abandoned campfires, vehicle fires, cigarettes, arson fires, and sparks or arcs from power lines or transformers. The most typical natural ignition source is lightning. PineRidge is at high risk for a human caused fire, primarily due to the number of vehicles on Daniels Park Road, picnickers using Daniels Park, and cigar and cigarette use on adjacent golf courses.

Community Values at Risk

Homes: In PineRidge there are 100 residences, consisting of 20 single patio homes, 16 duplex units and 12 four plex units. The residences are built in close proximity to each other with minimal spacing between buildings sometimes as narrow as ten feet. The lots are small and consolidated in the northeast corner of the community. Twenty two acres of forested open space border a little more than 50% of the homes and units on the south and west; all located at the top of forested steep terrain. PineRidge is a relatively new covenant controlled community constructed with fire resistive materials; Class C or better. The homes are fueled by natural gas thereby eliminating

propane tank storage and stacks of firewood. Covenants are strictly enforced. Nothing is to be stored in the open space, yards or on decks and patios. Fire of any kind in the open spaces is strictly prohibited. Torches, open fires, chimeneas and fire pits are not permitted anywhere within the community.

Native Ecosystems: 75-125 year old forest with stately pines and native shrubs and abundant wildlife. There are intermittent wildlife trails throughout the property, mostly mule deer and elk. A herd of 500 elk travel freely between PineRidge, The Sanctuary, The Ridge and Cherokee Ranch. There have been numerous sightings of black bear and mountain lion. Coyote, red fox, porcupine and cottontail rabbits are also frequent habitants.

Businesses: The Ridge is the premier public golf course in Colorado and The Sanctuary, a private golf course is known for its charitable events. A wildfire could cause significant damage to the courses, the clubhouses, and overall business for both locations.

Historic Daniels Park: Daniels Park Road was once an old stagecoach route that ran along the first territorial road in Colorado. Tall Bull Memorial Grounds located at the north end is a special haven and Native American meeting site for many years.

4. Local Preparedness and Firefighting Capability

- The Castle Pines North Area which includes the Pine Ridge Subdivision lies within the boundaries of South Metro Fire Rescue Authority (SMFRA) www.southmetro.org.
- SMFRA is a special district which provides an all risk emergency responses. The district operates from 17 staffed stations located throughout the district with approximately 83 operations personnel on duty 24 hours a day 7 days a week. There are additional support staff in preparedness, training, fleet, dispatch, and administrative roles. Automatic Aid agreements are in place with all neighboring jurisdictions to provide assistance whenever it is needed.
- 911 calls are routed through Douglas County Sheriff's office to the Metropolitan Area Communications Center (METCOM) www.metcom911.org. METCOM dispatches and handles all communications for SMFRA.
- Code Red (reverse 911) is available to the Castle Pines North area via the Douglas County Sheriff's communications center. Incident Commanders can request a reverse 911 call to residents in the area; the 911 operator will give instructions to the residents at the time of the call including best evacuation routes from the area.
- Initial response to a Wildland Urban Interface incident will consist of the following staffed apparatus:
 - (2) Type 1 Engines
 - (2) Type 3 Engines
 - (2) Type 6 Engines
 - (2) Advanced Life Support Ambulances

- (1) Water Tender
- (1) Compressed Air Foam Tender
- (2) Battalion Chiefs

Additional apparatus may be requested and assigned based upon information gathered from initial information including 911 calls and/or current weather and fuel conditions (i.e. Red Flag Warning days).

- All SMFRA personnel are provided at least 8 hours of annual Wildland Fire refresher training. In addition, SMFRA has a specially trained Wildland Fire Team which consists of approximately 50 individuals. These personnel are trained to specialize in Wildland Fire incidents.
- Water Sources: PineRidge is serviced by a central water system with multiple hydrants throughout the community.

5. 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 have been designed to raise awareness and move those who are aware to action to reduce hazardous fuel loads within the home ignition zones and beyond. 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. SMFRA also addresses development in wildfire hazard areas with code adoption and enforcement within their department boundaries.

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 travel up to two miles ahead of the flame front and 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.



In PineRidge dense vegetation around homes and homes in close proximity to each other increase the potential for structures to ignite. When one home catches on fire the heat and embers generated can cause homes in close proximity to one another to ignite. This occurred in the 2012 Waldo Canyon Fire in Colorado Springs and can happen in a dense, urban community setting like PineRidge.

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.

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 eve 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 Colorado State Forest Service (CSFS) fact sheet *Creating Wildfire Defensible Zones*. Defensible space should be encouraged around all structures.

Douglas County Wildfire Mitigation Staff, CSFS, South Metro Fire Rescue Authority personnel, 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.

When designing defensible space on an individual property several factors must be considered: size of structure, construction materials, slope, and vegetation. Defensible space recommendations may be modified for individual home sites based upon the factors listed above. Adjoining landowners and property owners will need to work together to achieve the defensible space recommendations due to the small lot size in PineRidge.

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. This zone is where **residents** can focus their efforts. Recommendations include but are not limited to:

- Remove all flammable vegetation within 30 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. This zone is where the **HOA** can focus efforts on the open space. 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. This zone is where the **HOA** can focus efforts on the open space. 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*

6. CWPP History/Past Mitigation Efforts

CWPP/Firewise Communities USA History: On a sunny fall day in late October of 2003, high winds blew down a tree in neighboring Cherokee Ranch that landed on power lines and sparked a wildfire. This fire eventually destroyed nearly 1,000 acres. The location was typical Douglas County open space, i.e. a ponderosa canopy with a heavy gamble oak under story and sloping terrain. Weather conditions were extremely conducive for a rapidly growing fire. The temperature was in the 80's with a relative humidity of 10%, and the winds of 20-30 were gusting to 40 mph.

As smoke filled the sky and fire came within a few hundred feet of PineRidge, all residents were evacuated along with 3,000 others from Castle Pines North and neighboring Castle Pines Village. Fortunately a cold weather front moved into the area that night, changing the conditions and the fire was contained.

Soon after that terrifying day, PineRidge gathered for a potluck "So Glad We Didn't Burn" party. As stories, experiences, and fears were recounted, the realization of how lucky we were to still have our homes and 22 acres of incredibly beautiful open space, prompted commitment and action. Several residents participated in the first mitigation project done by the builder Genesee and were familiar with the original Colorado State Forest Service plan and work done in 2002. A committee was formed to research the various elements of fire mitigation and create an immediate and comprehensive plan (CWPP).

The Castle Pines North Master Homeowners Association held a forum featuring South Metro Fire & Rescue and the promotion of "fire wise communities". At this meeting, members of a PineRidge Fire Mitigation Committee learned of a public outreach program developed by the Douglas County Wildfire Mitigation Staff. Through this program, committee members met with wildfire mitigation specialists and CSFS to assess the PineRidge property, to outline a plan, and to define a process for implementing the plan. The specialists from CSFS also helped the committee in submitting a grant application for funding. PineRidge was subsequently awarded a grant, thereby enabling the overall plan to be completed in one stage. Throughout the process, the

committee held several meetings and distributed email messages and newsletters to inform residents and neighboring communities of the process in developing a fire wise community. The fire mitigation efforts of PineRidge were featured in several articles in The Connection; a local community newspaper for Castle Pines North.

Wildfire Mitigation Plan:

A basic requirement for a CWPP is that it be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties. The CWPP for PineRidge expanded on a basic Wildfire Mitigation Plan written by CSFS in 1999 for the PineRidge developer, Genesee Homes. Before turning over the property to the homeowners and the PineRidge HOA in 2002, Genesee performed the mitigation work as outlined in the initial plan and created a 50 foot defensible zone in the forested open space adjacent to residences. Working with CSFS and Douglas County Fire Mitigation Specialists, the plan was revised in 2005 and the PineRidge HOA applied for and was awarded a grant from CSFS to implement the revised plan and further reduce wildfire fuel hazards. Additional collaboration with South Metro Fire and Rescue defined an aspect map, a risk assessment, and a detailed scope of work.

With assistance from CSFS, Douglas County Fire Mitigation Specialists and South Metro Fire and Rescue, a detailed scope of work integrating prescribed treatments for all three management zones were incorporated into a Request for Proposal. In the process of interviewing contractors, different approaches for reducing hazardous wildfire fuels were evaluated. It was determined that a dual approach, a mechanical bull hog for large accessible areas, along with hand work for the detailed areas, would be the most successful. The bull hog handles standing trees up to 8" in diameter, cutting and grinding into mulch quickly in a single process. It is efficient and cost effective. Not only would hazardous wildfire fuels be reduced, but also, the treated areas would be aesthetically pleasing and park-like. It was determined that herbicides would not be used at this time. Herbicides are a permanent treatment and costly; they are best applied when regenerative growth is identified as detrimental. Contractors were evaluated, selected and work was to begin in November 2006, however, a severe winter with heavy snows prohibited any actual fuel reduction until spring of 2007.

In April 2007, PineRidge held a meeting for neighboring communities to describe information gathered and experiences encountered while putting the plan into operation. The meeting included a presentation and demonstration of the mechanical equipment and processes to be used by the contractors. Representatives from various entities were invited, they were; Douglas County Emergency Preparedness, South Metro Fire & Rescue, Douglas County Fire Mitigation Specialists, Colorado State Forest Service, Horticare, Inc., Castle Pines North (CPN) Metro District, Denver Parks, Cherokee Ranch, The Sanctuary Golf Course and The Ridge of Castle Pines North Golf Course. Two representatives from each of the HOAs in all of Castle Pines North and the Castle Pines Village Management were invited to attend.

As the actual thinning and mulching work progressed and the visible results began taking shape; the contractor was hired to provide additional work on adjacent grounds by several entities, including: CPN Metro District, Douglas County Operations, and The Ridge of Castle Pines North Golf Course. Castle Pines North Metro District contributed \$300 to mitigate the approximate one acre of easement they have at the south end of the 22 acres.

After the 2007 project, the 22 acres were monitored annually to determine the extent of ladder fuels and regeneration. Each year the Board budgeted and reserved \$5000 for fire mitigation maintenance.

All 22 acres were again mitigated in July 2013, shortly after the nearby Black Forest Fire destroyed over 500 homes and killed two people. A committee was formed; residents Gregg Marquardt, Frank Kellen, Lloyd Saenger and headed by Barb Saenger. CSFS and Douglas County Fire Mitigation Specialist were able to assist us once again. The 22 acre open space was toured by the committee, CSFS, and Douglas County to get an overall view of the property and what had changed. The Gamble oak was healthy with very little dead. Previously treated areas of oak were obvious because of the height difference of the regrowth. It was decided to do a similar scope of work, concentrating more along perimeters with a heavy focus on the north boundary behind the duplexes and along streets. Nine ponderosa trees were tagged for removal to help thin, one at the south border had a fungus. Once again our open space looked park like. On completion, Douglas County Commissioners toured and reviewed PineRidge as an excellent example of aesthetic residential fire mitigation. PineRidge was again featured in the local newspaper "The Connection".

The primary difference between the two mitigation projects was the condition of the Gamble oak. The first project in 2007 removed approximately 70% vegetation of mostly 50 year old dead scrub oak. The 2013 project removed approximately 65% vegetation of mostly healthy oak, whose limbs were more flexible and not easily cut at the surface. Creating irregular clumps of oak and selecting different heights of oak made for a more natural look.



2013 treatment: ladder fuel removal



2013 treatment: ladder fuel removal



2013 treatment: oak clumping and ladder fuel removal

In 2013 The Ridge at Castle Pines North Golf Course also permitted mitigation work on its property bordering the Lifestyle homes along the 18th fairway. Their parameters were that mitigation was to be along the property boundaries and not to be visible from the golf course. Five homeowners worked with the Fire Mitigation Committee and the contractor to mark the area behind each home that met everyone's requirements. This additional work added \$800 to the contract and The Ridge generously contributed half of that amount. The Metro District also contributed \$300 to mitigate their half acre of easement at the southern boundary drainage area.

The contractor subsequently submitted a quotation to maintain the mitigation on an annual basis for either half or all the open space. Because of the steepness and rock outcroppings, the maintenance needs to be done with their masticating equipment instead of smaller machines they generally use. The Board took this under advisement.

Efforts over the years to reduce the fire hazards in the open space have reduce the potential of a surface fire transitioning to a crown fire by removing ladder fuels, breaking up stands of contiguous oak, and keeping oak 10 feet back from residual trees. There are areas within the open space that cannot be treated due to slope/rock and fire hazards will still exist, but efforts have been made to reduce the hazards in close proximity to homes and where slope allows.

A map of the open space treatment areas is shown in Figure 7

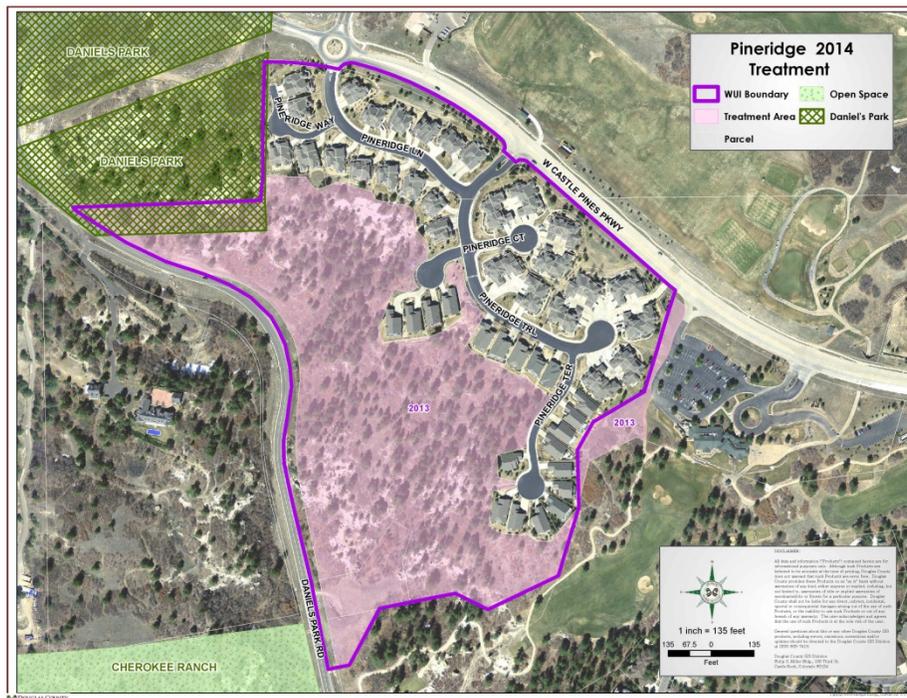


Fig. 7: PineRidge Open Space Treatment Map, Refer to Appendix A for full page version

7. Community Action Plan

Purpose: Two important objectives of a Community Wildfire Protection Plan are to identify hazardous wildfire fuels and develop a strategic plan of treatment priorities to reduce the risk of potential home ignitions. The purpose of hazardous fuel reduction is to interrupt fire momentum and reduce potential for fire to spread into tree canopies and Gambel oak tops. The extent of hazardous fuel reduction depends on height and density of vegetation, steepness of slope, and distance from structures.

The top two priorities for future fuel treatments will focus on maintaining treatments completed in the open space and private landowners reducing hazardous fuels on their property. Methods of treatment will include hand thinning, mastication, chipping, and pruning.

Maintaining or improving the aesthetics of a neighborhood is a primary consideration in prescribing fuels reduction treatments. The visual impact of fuels reduction can be eased with irregular cutting patterns and isolated groupings that create natural mosaics based on the vertical arrangement and horizontal continuity of the existing landscape. Crown separation is emphasized over stand density; and attractive, defensible space is preferred over precise stem spacing. Working with the topography and mimicking natural growth patterns is the basis for developing a plan that not only reduces hazardous fuels, but also improves forest health, wildlife habitats, and overall good forest stewardship along with maintaining the aesthetic representation of the community.

Identification and Treatments: To aid in the process of identifying fuel reduction treatments and priorities, the open space was divided into three Management Areas.

Management Area #1: A 50 foot strip along the residences had been mitigated in the past. This zone was increased to a 50-100 foot strip and re-mitigated. Ongoing maintenance will include: mowing oak sprouts to remove ladder fuel potential, maintain openings between oak clumps, and maintaining no oak within 10 feet of the dripline of residual trees. Remove deadwood in the residual oak clumps. Thin dense pine regeneration to maintain 10 feet between tree crowns.

Management Area #2: Daniels Park Road. The road presents a limited natural fuel break that can easily be expanded to create an open park-like appearance. Fuel density has been reduced, thus improving fire control opportunities. All dead oak has been removed from the 50 to 100 foot strip of open space along the road. Vegetation has been thinned, ladder fuels, low limbs and heavy regeneration removed. Oak has been broken up into clumps. Ongoing maintenance will include: mowing oak sprouts to remove ladder fuel potential, maintain openings between oak clumps, and maintaining no oak within 10 feet of the dripline of residual trees. Remove deadwood in the residual oak clumps. Thin dense pine regeneration to maintain 10 feet between tree crowns.

Management Area #3: Interior balance of open space. The primary goal in the remaining space is to maintain fuel reduction treatments. Steep ravines and large rock outcroppings are located throughout the interior open space and cannot be treated. Oak has been removed past the drip line of the tree. Clumps of pines have been thinned to remove suppressed trees and create positive crown spacing. Crown separation should be emphasized over stand density levels and isolating groupings rather than cutting for precise stem spacing. Ongoing maintenance will include: mowing oak sprouts to remove ladder fuel potential, maintain openings between oak clumps, and maintaining no oak within 10 feet of the dripline of residual trees. Remove deadwood in the residual oak clumps. Thin dense pine regeneration to maintain 10 feet between tree crowns.

Recommended Guidelines for PineRidge Residents

Homeowners can also take steps on their properties to promote reduce wildfire hazards.

From the CSFS Quick Guide – Creating Wildfire Defensive Zones

- Install nonflammable ground cover and plant nothing within the first 5 feet of the house and deck. This critical step will help prevent flames from coming into direct contact with the structure. This is particularly important if a building is sided with wood, logs or other flammable materials. Decorative rock creates an attractive, easily maintained, nonflammable ground cover.
- If a structure has noncombustible siding (i.e., stucco, synthetic stucco, concrete, stone or brick), widely spaced foundation plantings of low-growing shrubs or other fire-resistant plant materials are acceptable. However, do not plant directly under windows or next to foundation vents, and be sure areas of continuous grass are not adjacent to plantings. Information on fire-resistant plants is available on the CSFS website at www.csfs.colostate.edu.
- Prune and maintain any plants to prevent excessive growth. Also, remove all dead branches, stems and leaves within and below the plant.
- Irrigate grass and other vegetation during the growing season. Also, keep wild grasses mowed to a height of 6 inches or less.
- Do not store firewood or other combustible materials anywhere within 30 feet of the home. Keep firewood at least 30 feet away from structures, and uphill if possible.
- Enclose or screen decks with 1/8-inch or smaller metal mesh screening (1/16-inch mesh is preferable). Do not use areas under decks for storage.
- Remove any branches that overhang or touch the roof, and remove all fuels within 10 feet of the chimney.
- Remove all pine needles and other debris from the roof, deck and gutters.
- Rake pine needles and other organic debris at least 10 feet away from all decks and structures.
- Remove slash, wood chips and other woody debris from Zone 1.

8. Implementation and Management Schedule

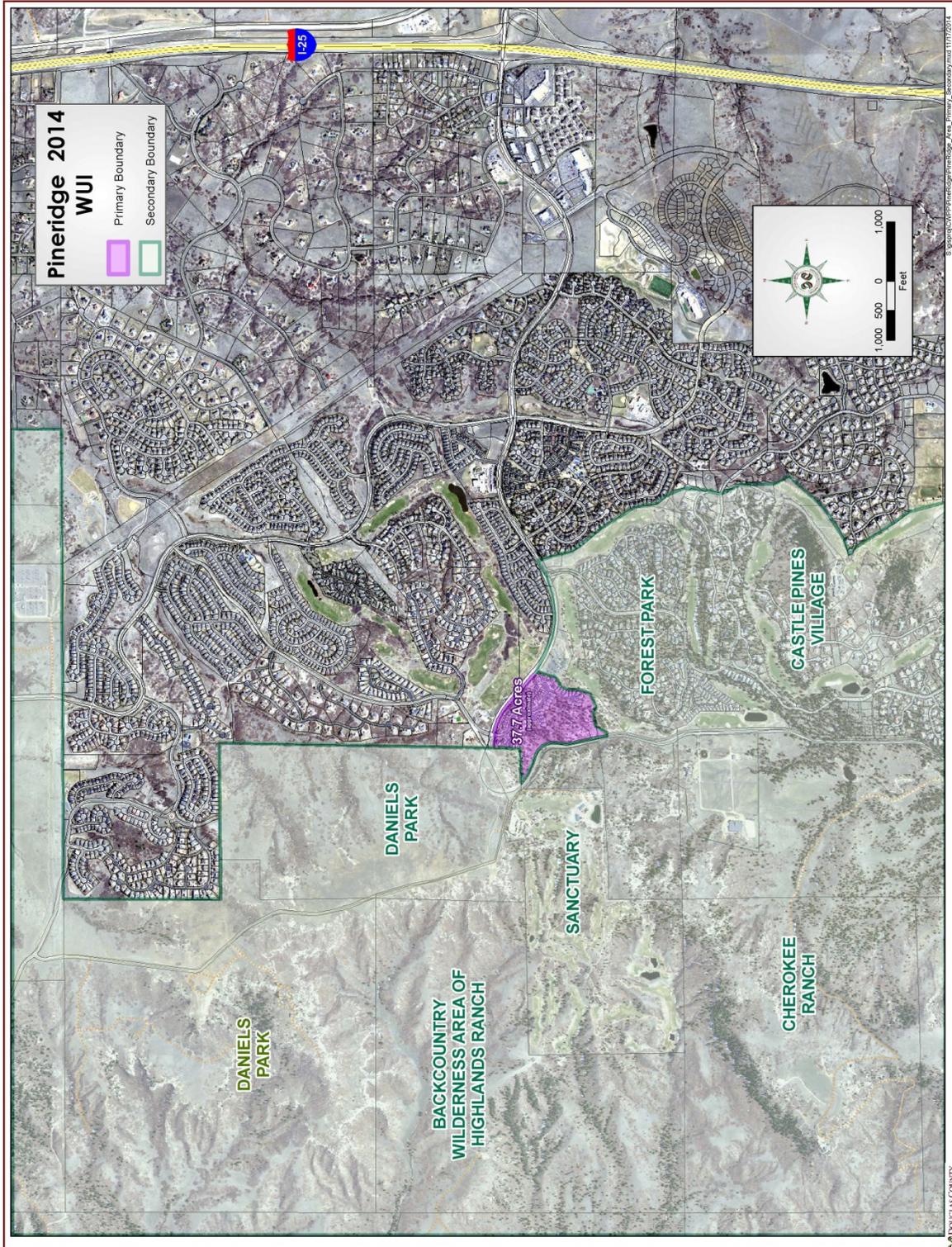
Hazardous wildfire fuel reduction must be maintained to be effective. Gambel oak is notorious for re-sprouting quickly after being cut. The overall effectiveness of a treated area may be lost in as little as three to four years if ladder fuels and regeneration are not controlled. Assessing and maintaining wildfire fuels in the open space, as well as multi-family and individual residences, will include the following steps:

- Annual maintenance of the oak will occur in the open space areas starting in 2015 to keep ladder fuels and oak regeneration to a minimum.
- In addition to reducing fuels, ponderosa pine trees are inspected and a significant number are sprayed each year to protect against bark beetle. Herbicides are applied to noxious weeds and landscaping with native plants and grasses is encouraged.
- Each year at the annual homeowners meeting for PineRidge, fire mitigation and this CWPP will be an agenda item. Time will be spent reevaluating the CWPP, as well as educating new homeowners on defensible space requirements and maintaining clean and uncluttered patios and decks.
- PineRidge HOA board and Architectural Review Committee will encourage the use of fire wise recommendations as outlined in educational fact sheets from the Colorado State Forest Service {refer to Appendix B}. This would include items such as: replacing wood railings on decks with metal or composite materials, re-roofing and residing with upgraded fire retardant materials, landscaping with defensible space around residences, etc.
- Consider re-instating Firewise Communities USA status.

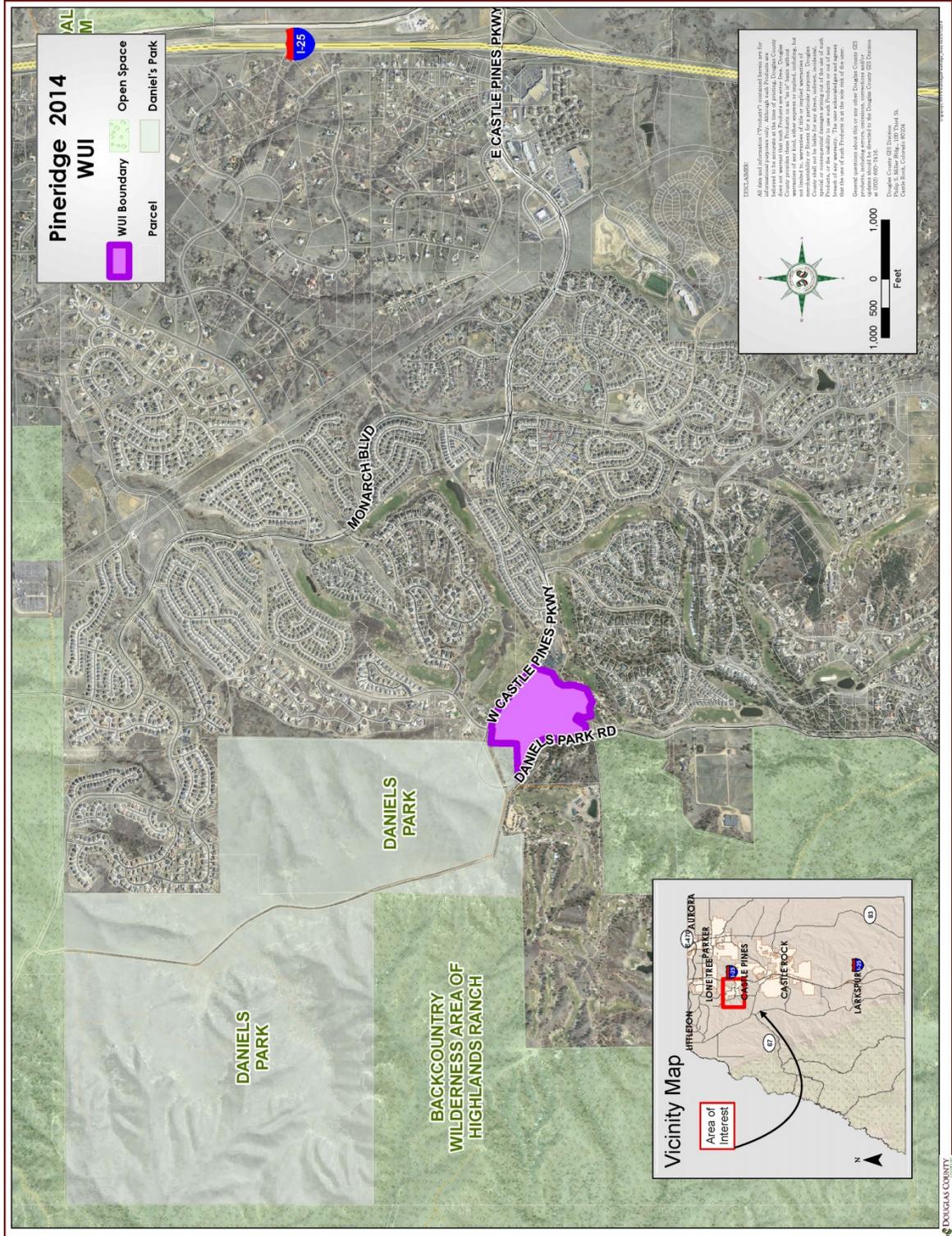
Funding: A minimum of \$5,000 will be budgeted each year for fire mitigation maintenance. Additional grants will be pursued to help offset the maintenance costs.

9. Summary and Conclusion

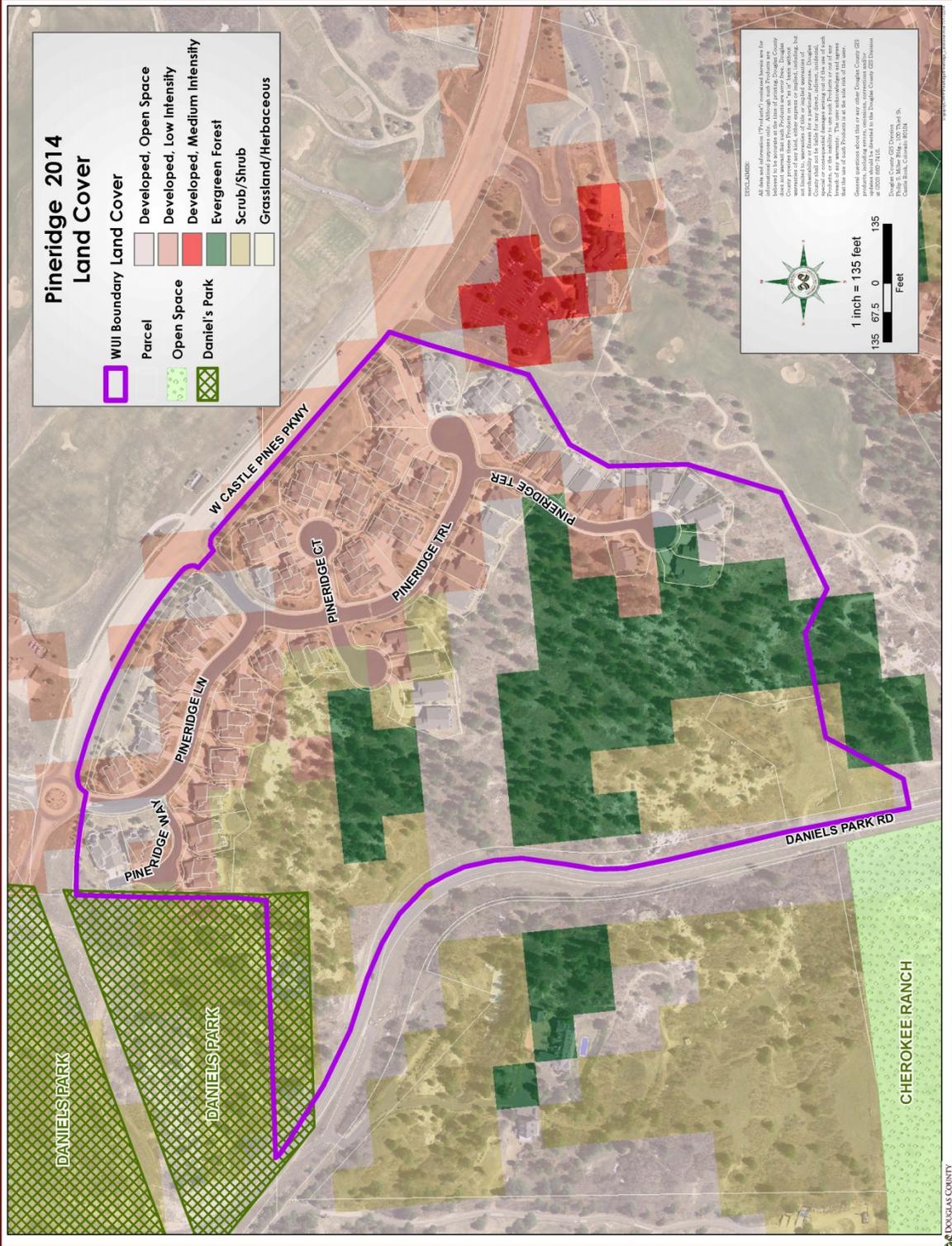
The PineRidge CWPP is a living document that will be modified as needed. As new processes and products become available, they will be researched and evaluated to determine what works best for PineRidge. A significant learning lesson throughout the development and the initial implementation of this plan is the availability of an incredible amount of expertise and assistance to communities that are willing financially and technically commit to good forest stewardship. Increasing awareness and vegetative management not only maintains a healthy ecosystem, but also improves aesthetics and increases property values.



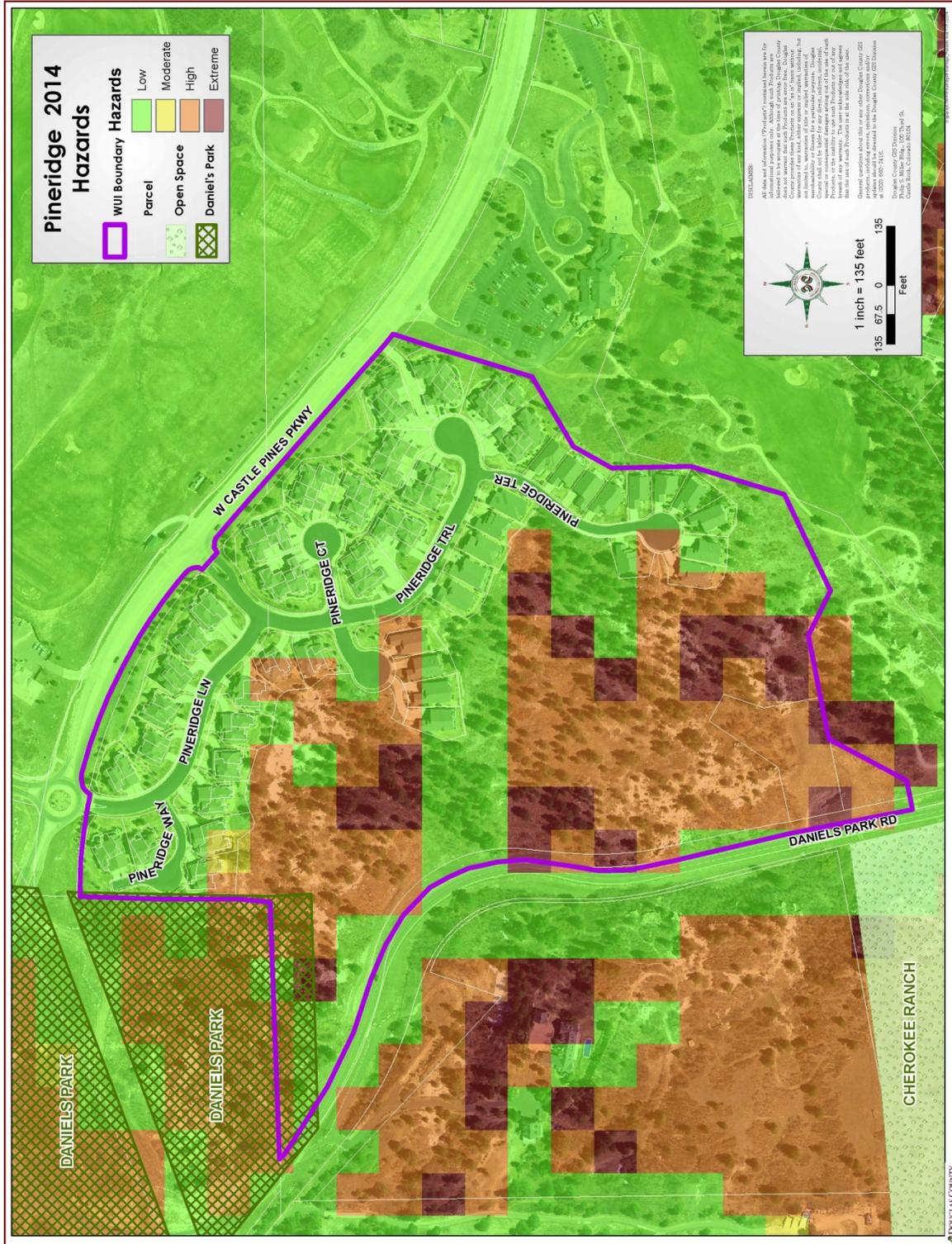
APPENDIX A PINERIDGE AREA MAP



APPENDIX A PINERIDGE VEGETATION MAP



APPENDIX A PINERIDGE WILDFIRE HAZARD MAP



Fuel Model Map Information

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.

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

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.

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. Nonburnable areas can serve as potential anchors for fuel breaks.

Appendix B

Firewise Education Resources

Websites

- **Douglas County Emergency Management**
Code Red, Emergency Preparedness
www.dcsheriff.net/emergencymanagement
- **Douglas County Wildfire Mitigation**
Douglas County CWPP, Mitigation Information
www.douglas.co.us/building/wildfire
- **Colorado State Forest Service**
Wildfire Mitigation Publications
<http://csfs.colostate.edu/pages/wf-publications.html>
- **South Metro Fire Rescue Authority**
www.southmetro.org
- **Rocky Mountain Insurance Information Association**
www.rmiaa.org
- **Grant Database**
<http://nrdb.csfs.colostate.edu>
- **Pikes Peak Wildfire Prevention Partners (Black Forest Fire Video)**
www.ppwpp.org
- **Firewise**
www.firewise.org
- **Fire Adapted Communities (Waldo Canyon Video, Home Ignition Assessment)**
www.fireadapted.org
- **Ready Colorado (Disaster Preparedness)**
www.readycolorado.com

Book

Surviving Wildfire: Get Prepared, Stay Alive, Rebuild Your Life (A Handbook for Homeowners)
by Linda Masterson, 2012

Video

The Fire Line: Wildfire in Colorado www.denverpost.com/fireline