

**Burning Tree Ranch
Community Wildfire Protection Plan**

September 2017



Submitted by

The Burning Tree Ranch Homeowners Association

In collaboration with

**The Colorado State Forest Service,
The Douglas County Wildfire Mitigation Staff,
And The Franktown Fire Protection District**

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**Community Wildfire Protection Plan (CWPP)
for the
Burning Tree Ranch Homeowner's Association (BTR HOA)**

1.0 Executive Summary

1.1 The major fire management concern for Burning Tree Ranch is that approximately three quarters of the area is rated as medium to high existing fuels hazard, consisting primarily of Gambel Oak and scrub on dry, South and West facing slopes, intermixed with pines. The area has a history of wildfire occurrence as depicted in the subdivision's name. The oak and scrub has a high proportion of dead material present, as much as 40% in some locations, making this combination highly flammable and providing the ladder fuels that would quickly lead to crowning fires amongst the pines. Clearly stated, the fuels potential present could lead to a fast moving, uncontrollable, catastrophic wildfire that could devastate the subdivision, destroying structures and the aesthetic value of the area. Recovery from such a catastrophic wildfire would most probably take more than a generation.

1.2 CWPPs are authorized and defined in Title I of the "Healthy Forests Restoration Act" (HFRA) which was signed into federal law in 2003. This act emphasizes community planning by extending a variety of benefits to communities with wildfire protection plans in place. Simply stated, an approved CWPP is now a prerequisite for obtaining federal wildfire mitigation grants. It may also provide access to other grants for improved safety in the wildland urban interface.

1.3 This CWPP belongs exclusively to Burning Tree Ranch; however, at a minimum the HFRA requires that local government (Douglas County), the local fire authority (Franktown Fire Protection District) and a state forestry representative (Franktown District Forester, Colorado State Forest Service) collaborate in the development of and concur with the plan. This plan satisfies both the spirit and the letter of the guidelines set forth in the HFRA of 2003.

1.4 The overarching goals of a CWPP are to protect lives first, property second and everything else third. This CWPP provides the basis for setting implementation priorities. Our first priority of the protection of lives is supported by adequate access and egress routes and a mature "Reverse 911" notification system. The sole life-safety recommendation of this plan, the formation of an HOA Fire Mitigation Committee has been established, and first steps to identify, assist and coordinate the safe evacuation of residents needing assistance, has been implemented. An Emergency Evacuation Committee will be created to additionally identify homeowners with animals and create an evacuation plan that addresses those circumstances.

1.5 The second priority is the protection of property, or more specifically of homes and other structures in the subdivision. Inherent in the protection of property is the protection of the intrinsic and aesthetic values of the area and the environment that supports a diversity of wildlife. The following recommendations are presented in order.

- Evaluation of structures and property for wildfire defensibility/survivability.
- Targeted thinning and treatment of property in order to achieve the maximum possible protection within limited budgets.
- Homeowner reduction of structure ignitability in conjunction with routine maintenance and repair activities.

1.6 The BTR CWPP was implemented in 2008, following BTRHOA Board approval, and disseminated to owners of each lot, who signed an affirmation that they received a copy. Since its implementation, the CWPP has been twice updated, with this revision being the second. Portions of the CWPP have been implemented quickly and economically, while other portions, such as major tree and brush thinning and removal are on-going efforts, taking many years, subject to the availability of funds. This CWPP provides the basis for setting implementation priorities.

2.0 Introduction

2.1 The major fire management concern for Burning Tree Ranch is that approximately three quarters of the area is rated as medium to high existing fuels hazard, consisting primarily of Gambel Oak and scrub on dry, South and West facing slopes, intermixed with pines. The area has a history of wildfire occurrence as depicted in the subdivision's name. The oak and scrub have a high proportion of dead material present, as much as 40% in some locations, making this combination highly flammable and providing the ladder fuels that would quickly lead to crowning fires amongst the pines. Clearly stated, the fuels potential present could lead to a fast moving, uncontrollable, catastrophic wildfire that could devastate the subdivision, destroying structures and the aesthetic value of the area. Recovery from such a catastrophic wildfire would most probably take more than a generation. Regrowth of the large Ponderosa pine cover that we so highly value would require several generations.

2.2 Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the "Healthy Forests Restoration Act" (HFRA) which was signed into federal law in 2003. This act emphasizes community planning by extending a variety of benefits to communities with wildfire protection plans in place. Simply stated, an approved CWPP is now a prerequisite for obtaining federal wildfire mitigation cost sharing grants and targeted Colorado state income tax deductions. It may also provide access to other grants for improved safety in the wildland urban interface for HOA Members.

2.3 The purpose of the Burning Tree Ranch CWPP is to address the specific concerns affecting Burning Tree Ranch as they relate to wildfire management. The primary factor contributing to the wildfire risk is the significant amount of Gambel Oak and other scrub growth that constitute a high fuel hazard within the community. This document attempts to address this issue. This plan represents a comprehensive program for the protection of life and property in Burning Tree Ranch, within budgetary constraints.

2.4 This plan provides a brief discussion of the community concerns and needs and is intended to be a resource document and data base for additional more detailed information. For the sake of brevity, when at all possible this plan has incorporated existing publications as appendices.

2.5 A major result from this undertaking continues to be the education of Burning Tree Ranch residents about the risks of wildfire and how they can be reduced both by individual and Homeowner's Association actions. Additionally, this process has provided the HOA and its members with a much better understanding of where to use our limited resources so that residents can live in relative safety. It is almost certain that we will develop a more cohesive community as a result.

2.6 Timing for implementation and/or how projects will be funded are not explicitly presented. However, suggestions for both are presented. Efforts such as evaluating individual properties

and structures were done relatively quickly, and continue as needed with the assistance of the Colorado State Forest Service. Thinning and/or removal of brush and trees has occurred on a substantial number of properties within Burning Tree Ranch, since the implementation of this CWPP, and remains an on-going effort, along with routine maintenance. While grant funding has been made available to the HOA and to individual lot owners since inception of the CWPP in 2008, the bulk of the costs for accomplishing this work must be borne by the individual landowners. The HOA has functioned, and shall continue to serve as the requestor and administrator of grant funding. This plan will provide better opportunities for obtaining matching grants for wildfire mitigation.

3.0 Community Description

Burning Tree Ranch is located in the USGS Ponderosa Park, CO Quadrangle. The approximate center point of the subdivision is at 39° 23' N latitude and 104° 43' W longitude. The subdivision's area is approximately 402 acres including a 35-acre Douglas County held open space and rights of way. There are 68 individual lots averaging 5 acres in area of which all are built out. It is located in Section 36 of Township 7 South, Range 66 West of the 6th Principal Meridian. Elevation varies from approximately 6300 to 6500 feet above sea level. The subdivision lies within the Cherry Creek watershed. Slopes are moderate (6 to 20%) predominately facing south or west. The subdivision is located approximately one road mile northeast of the intersection of Colorado State Highways 83 and 86 at the unincorporated village of Franktown, Colorado. The subdivision is zoned Rural Residential (RR) and is surrounded by other Rural Residential subdivisions composed of similarly sized lots and open spaces. The Burning Tree Ranch subdivision is governed by a voluntary HOA, served by a Board of Directors who maintain, update, and disseminate the subdivision's Protective Covenants, Architectural Control Guidelines, and Policies and Procedures which address fire mitigation, fire prevention, and safety. A Fire Mitigation Committee reports to the HOA Board, and is tasked with maintaining the CWPP, organizing and/or providing on-going education to residents, securing and/or communicating grant funding availability to residents, and completing and providing required reporting when grant funding is awarded. The Committee and the HOA board maintain an open dialog and work closely with the Colorado State Forest Service, the local fire department, and other county agencies to stay abreast of current issues, such as status of beetle kill in the community, availability of resources for training, inspection of properties, emergency evacuation, and firefighting resources.

3.1 WUI Boundary

Please refer to the WUI map on Page 6. The smaller WUI boundary includes the Burning Tree Ranch subdivision proper and is the focus of this CWPP. The larger WUI boundary includes the communities of Burning Tree Ranch subdivision, Kelty Farms, Timber Pointe, Timber Ridge, Pine Mor, Cleveland Subdivision, and other private properties south to State Highway 86. The WUI boundary was extended to include adjacent communities for ease of communities being able to come together through the CWPP process to work towards common goals including reducing hazardous fuels and reducing structural ignitability. Adjacent communities were also included as the fuel type is fairly contiguous across these communities. State Highway 86 serves as a fuel break along the southern border as does State Highway 83 along the western border. North of Burning Tree Ranch the fuel transitions to mostly grass. The eastern border continues with pine, but the decision was made to use Tanglewood Road as the boundary, another road to act as a possible fuel break.

WUI Boundary



The Franktown area has been settled since the late 1850's and "Frankstown" served as the first county seat for Douglas County. The automated records of the Franktown Fire Protection District only extend back to 2001 and reflect only minor 2 to 3 acre fires in the development. However, local tradition and long term residents claim that the reason for the development being named Burning Tree Ranch and the roads bearing the names of Burning Tree Drive/Trail, Burning Ridge Drive/Court and Burnt Oak Drive/Trail goes back to at least two considerable fires that occurred in the first half of the previous century. Additionally, there are recollections from a previous, adjacent property owner of a fire during the 1970's that was the result of an uncontrolled trash fire. Supposedly, Burnt Oak Drive was so named because when the right-of-way was cleared essentially all of the slash was burnt oak snags and

stumps. This is creditable as there is evidence of previous fires present throughout the development. These fires occurred prior to the plat approval by Douglas County in January 1979 and the subsequent development starting in the 1980's.

The Burning Tree Fire started on March 24th, 2011 and burned approximately 1600 acres. No structures were lost. The fire was believed to be human caused and was started on a "red flag" warning day where winds sustained 25-30mph with gusts up to 50mph. 8,500 homes were evacuated and large animal evacuations occurred. The fire was a fast burning fire in tall dry grasses, some oak and a few spotty pines.

5.0 Local Preparedness and Firefighting Capability

5.1 Burning Tree Ranch is served by three Franktown Fire Protection District (FFPD) fire stations located within 5 road miles. Primary response is provided by FFPD Fire Station Number 181 located in Franktown south of the intersection of Colorado State Highways 83 and 86, approximately 1.25 road miles from the subdivision. This fire station is manned on a 24/7 basis and is fully equipped to fight structure and wildland fires. Equipment located at this station includes:

- Engine 181 (pumper)
- 2 Brush Truck (equipped for wildland fires)
- 1 Small Chassis Attack Truck (SCAT) (multi-role unit equipped for off-road wildland fires)
- 2 Medics (Paramedic ambulances)
- 2 Tenders (3,300 gallon water tankers)

5.2 Also located within 5 road miles of the subdivision are FFPD Stations 183 and 184. Station 184 is also manned 24/7 and has the following equipment:

- Engine 184 (pumper)
- 1 Brush Truck (equipped for wildland fires)
- 1 Medic (Paramedic ambulance)
- 1 Tender (3,300 gallon water tanker)

5.3 Station 183 is an all volunteer station and has the following equipment:

- Engine 183 (pumper)
- 1 Tender (3,300 gallon water tanker)

5.4 Additionally there is a 20,000 gallon fire protection water cistern located in the Douglas County open space in the north east corner of the development in the vicinity of the intersection of Burning Ridge Drive and Burning Tree Trail.

6.0 Community Values at Risk

Structural values as well as intrinsic values are at severe risk in the event of a catastrophic wildfire. Although homes and outbuildings could be rebuilt, utility systems replaced and roads repaired, the intrinsic and aesthetic values of living in a Ponderosa pine and Gambel oak forest that supports a diversity of wildlife would be lost for more than a generation. Furthermore, erosion of the fragile decomposed limestone soils resulting after a catastrophic wildfire would modify the existing landscape and result in major expense to protect the existing road and drainage infrastructure.

7.0 Community Fuel Hazard Assessment

7.1.0 The Burning Tree Ranch subdivision is characterized by a mix of fuel types including a typical Front Range ponderosa pine overstory with a Gambel oak understory, large openings with prairie grass and Gambel oak combinations, Prairie grass oak combination with ponderosa pines lining long dry draws. There are also several additional shrub types including: Sumac, Mountain Mahogany, Choke Cherry, and Snowberry. The Land Cover Map, located in Appendix I, is essentially the vegetation type on the ground at a 30 meter pixel resolution. This map displays the vegetation/fuel type over the WUI boundaries to display the spatial relationship and potential vegetation influences as it pertains to wildland fire.

7.1.1 A number of lots contain a significant amount of dead oak. Some of the oak, alive and dead is the tallest and largest diameter oak seen in Douglas County. Many residents have thinned out a portion of the oak, and removed dead limbs and trunks. It is clear that those who have thinned understand the concepts used in thinning Gambel oak. Some residents have chosen to remove the oak all together. Gambel oak is present in varying age and size classes.



Figure1. Large Gambel oak with mixed oak and scrub understory providing ladder fuels.

7.1.2 Ponderosa pines are healthy and well formed. In many areas there is a significant amount of natural regeneration that has occurred. Most of the sapling regeneration appears to be healthy, and is in need of thinning out. Many of the pines have limbs that go all the way to the ground and are in contact with ground fuels or grasses. These lower limbs on older trees pose a significant hazard in the way they act as ladder fuels. There are a variety of age

classes present in the pines also. There was no dwarf mistletoe observed, and only a couple of scattered beetle killed trees.

7.1.3 Hazard levels are also directly proportional to the density and continuity of the fuel type or types present. Without the presence of breaks in the density or continuity of the fuel to act as speed bumps for an approaching fire, fires can quickly gain momentum and increase the burning intensity leaving homes and property vulnerable. Most of the lots within the community have a combination of fuel types present and differing hazard levels. Since 2008, many homeowners have created defensible space on their properties by removing some stands of trees, Gambel Oak, and/or other shrubbery. Defensible space was also created through the center of the subdivision with the HOA/ CSFS co-sponsored, BTR-community-wide project to mow and remove trees and shrubs located in the bridle path that runs through there. The HOA funds the annual mowing of this bridle path to maintain this defensible space.



Figure 2. Prairie grass-Gambel oak combination with Ponderosa pine lining the draw edge. Note the high proportion of dead oak fuels.



Figure 3. Ponderosa pine with oak and scrub understory providing ladder fuels.

7.1.4 The ponderosa pine ecosystem present has evolved with fire. Ponderosa pine has thicker bark and can survive a lower intensity fire. These lower intensity fires were the types of fires that would have kept Gambel oak from being present in the density it is today. The fact that the area has not experienced a wildfire event in over 40 years has allowed the oak to grow to the existing densities.

7.1.5 The most hazardous fuel type present is a Gambel oak understory with a ponderosa pine overstory. The presence of the Gambel oak understory acts as a ladder and allows for fire to easily move from the ground into the tree crowns. Once in the tree crowns fire is much harder to control. Degree of hazard present is directly proportional to the amount of this fuel type present. If most of the property is covered with this fuel type it is more hazardous than if only a small patch of this fuel type occurs.



Figure 4. Mixed Ponderosa pine – oak with oak and scrub understory providing ladder fuels. This is the most hazardous fuel type present.



Figure 5. Ponderosa pine with oak understory. Note the high proportion of dead oak ladder fuels.



Figure 6. Gambel oak thicket with a high proportion of dead materials present.

7.1.6 The second most hazardous fuel type is Gambel oak. The oak present is large, tall, dense and contains a significant amount of dead material. Oak can burn hot and fast. It can also burn, and not consume all the fuel, leaving it a hazard for re-burn. Intermixed with the oak on some lots is a significant amount of dead mountain mahogany.

7.1.7 The least hazardous fuel type present is that of the grass or grass with scattered brush or tree mix. Grasses are a flashy fuel and can produce dangerous flame lengths and move quickly. Grass fires are easier to fight and catch than crown fires. Grass areas with scattered vegetation, where the grass and a scattered clumps of oak or trees would burn, but not cause the fire to spread to additional areas of brush and trees and or structures, are included in this category.

7.2 Topography

7.2.1 Topography throughout the subdivision consists of gentle to moderate slopes. Most of the subdivision slopes are less than twenty percent. There are a few scattered steeper areas within the subdivision boundaries, especially the slopes in and out of the draws. Hazard levels are directly proportional to increasing topography. The steeper the slope, the more hazardous the property. Steeper slopes will need a larger area, usually in width, for modification of the vegetation (density and continuity reductions) to have an effect. Fire increases with intensity and speed as it burns uphill. It preheats the fuels in front of it. See the Slope Analysis map, Appendix I.



Figure 7. Typical moderate slope conditions.

7.3.1 Strategies to reduce hazard levels

The main concept in reducing fuel hazard levels is to reduce the density and the continuity of the fuel present. Significant strides have been and continue to be made in this community to reduce the fuel hazard levels. Even a small amount of work can make a meaningful difference in mitigating fire risk. There are existing openings and breaks in the vegetation that can be easily increased and have a significant effect on the fire behavior. Continued removal of the dead material present within the community will also have a significant effect on potential fire behavior.

7.3.2 General Vegetation Treatment Recommendations to Reduce Hazardous Fuel Loads

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.

Property owners often 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.



Mosaic clumps in Gambel oak

- 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.



Thinning within a Gambel oak clump

- 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.



Ladder fuel removal



Space between tree crowns

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 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 (Figure 8) 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.

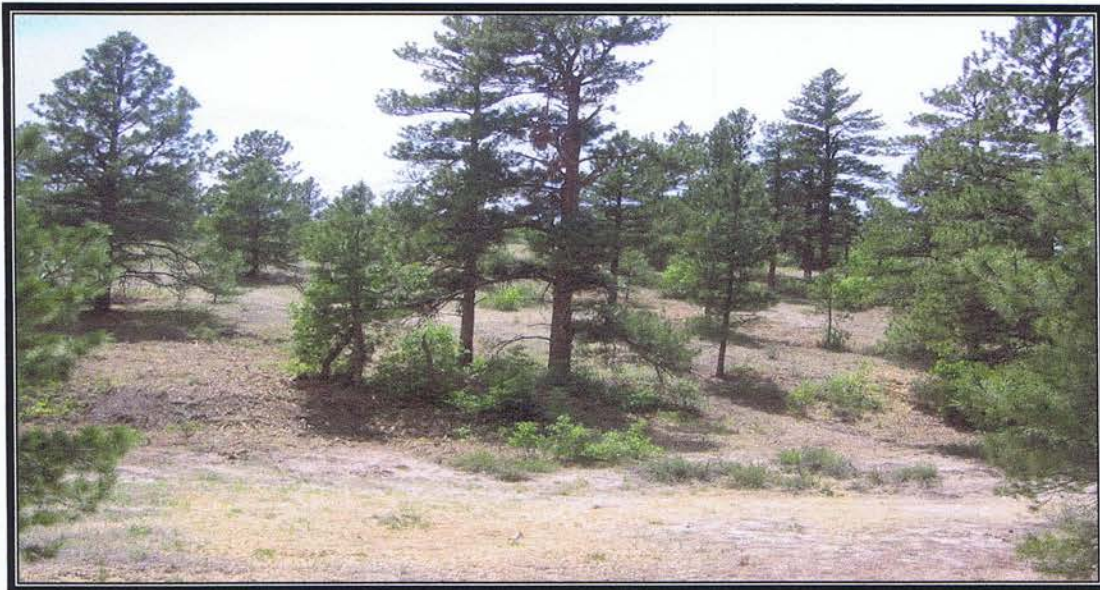


Figure 8. Removal of dead materials in the Open Space to reduce fuel density.

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.



Clumping of Gambel oak



Gambel oak clumps with residual trees

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.

7.3.3 Other brush. Other brush should be thinned also so that the density and continuity are reduced as well as ladder fuels removed. Mountain Mahogany is browse for deer. Dead material should be removed to promote new growth.

7.4 Fuel Hazard Assessment Map

7.4.1 The assessment map, Figure 9 below, was produced on a generalized scale, and is from the 2006 aerial photos. The assessment is based upon the aerial photo information, roadside inspection of the entire subdivision and ground-truth inspection of a number of individual properties to validate the photo and roadside information. Scale of severity or amount of hazard is dependent on the amount of the fuel type or types present. As it stands, approximately one third of the community falls under the category of high hazard. Approximately two thirds of the community contains a moderate or high hazard rating.

7.4.2 This is the most basic level assessment. At the request of the HOA, the Douglas County Wildfire Mitigation Staff has initiated a detailed lot by lot assessment of 42 individual properties within the subdivision that responded to a request for access. The results of this project were published and distributed under separate cover. Additional ground verification of fuel density, size, and live and dead ratios, for individual properties, is recommended and available at no cost through the Wildfire Mitigation Staff at the Douglas County Building Division.

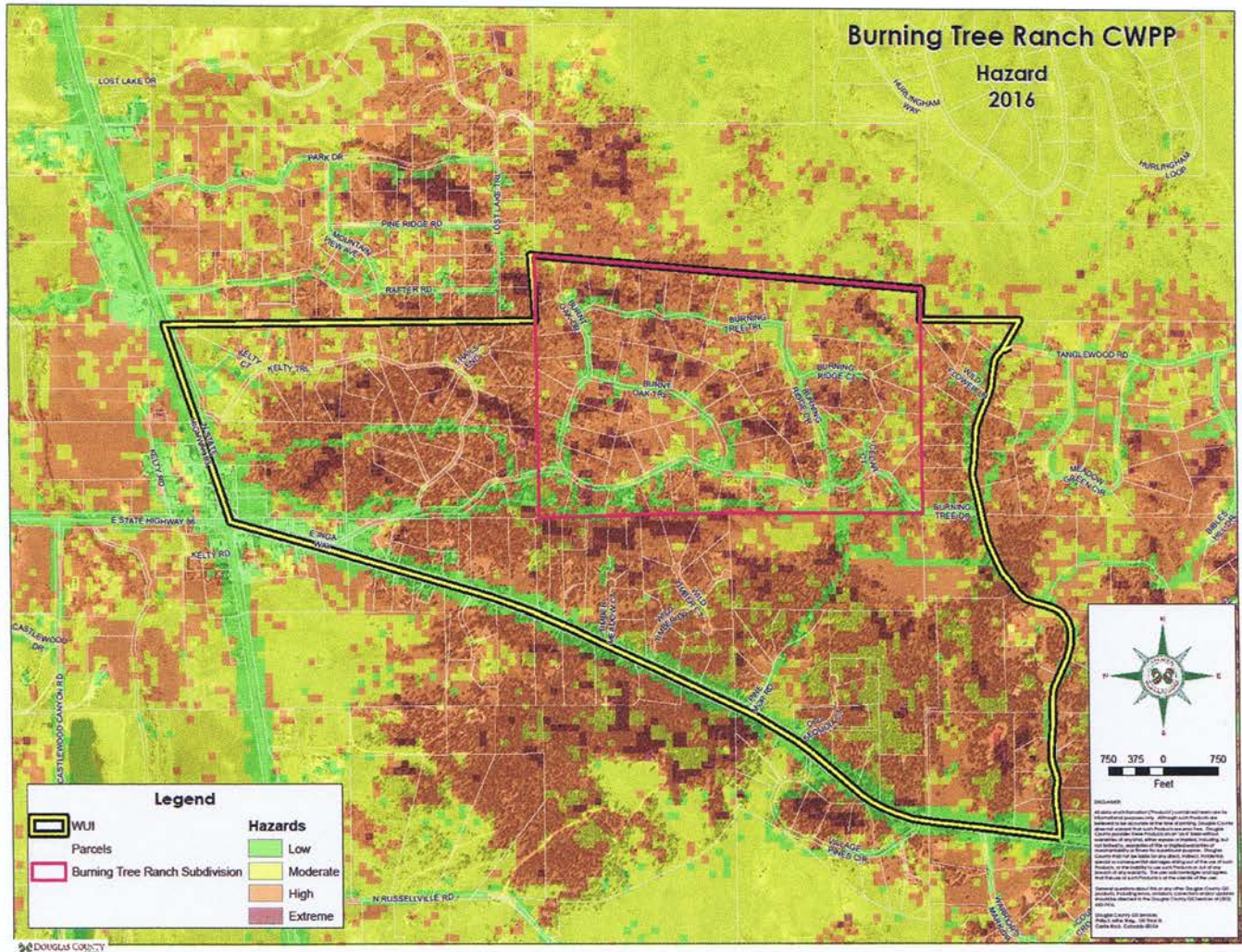
7.4.3 Hazard Assessment Category Definitions

HIGH: High fuel hazard areas are characterized by horizontal and vertical fuel continuity in high density. Basically, heavy oak layer located underneath heavy pines with very little openings throughout the vegetation. The oak stems are touching the pine limbs, and the pine limbs are touching the limbs of other trees.

MEDIUM: Medium fuel hazard areas are comprised of vegetation that may contain horizontal or vertical continuity or a combination of both. Openings, or breaks in the density of the fuel continuity are present in differing sizes, some which may influence fire behavior, some may not.

LOW: Low hazard areas are characterized by mostly grass with scattered and somewhat isolated brush (mostly Gambel oak) or trees.

Figure 9: The Hazard map was taken from the Douglas County CWPP. The hazard analysis consist of weighted relationship between hazards, values and risk factors. The most heavily weighted category is that of fuel hazard. The map also displays the surrounding hazard level to consider outside influence of fire potential.



8.0 Priorities

The Burning Tree Ranch priorities for protection are to protect lives first, property second, and everything else third. The protection of life must be paramount in all considerations under this plan. Protection of life is best accomplished by assuring adequate access and egress routes, for the community and individual properties, and homeowner education and evacuation preparation. Protection of property through the development of adequate defensible space by clearing and thinning to reduce the existing fuels hazard burden is the second priority. Most of the residents of Burning Tree Ranch were attracted to the community by its location, aesthetic value and the environment. Inherent in the protection of the properties are the protection of both the area's aesthetic value and the environment which supports a diversity of wildlife. Protecting this environment from the destruction of vegetation, erosion and loss of wildlife that results from wildfires by thinning and the removal of ladder fuels is the third priority of the community.

Based upon the documented hazard assessment prepared by Douglas County, geographic area priority of action must go to those projects and properties that present the highest density of "high fuels hazards". The work shall focus on the reduction of the fuels in these areas. First priority must go to those properties in the north central portion of the subdivision bounded by Burnt Oak Drive on the West, Burnt Oak Trail on the South, Burning Ridge Drive on the East and the subdivision's boundary on the North. The second priority must be southwest corner of the subdivision, bounded by the West boundary, the western two-thirds of the South boundary, Burnt Oak Drive on the East, and Burning Tree Drive on the North. These areas are shown on the BTR HOA Work Priorities Map in Appendix I.

9.0 Life Safety

9.1 The most important element in the protection of life is individual and family education and preparation. Attached at Appendix II is a summary "Wildfire Evacuation Preparation Guidelines ". This listing is not intended to be all inclusive, but rather to outline the concerns and needs of first responders and serve as a basis for individual planning and preparation. Families should review and discuss these guidelines and other source materials in preparing their individual evacuation plans.

9.2 More than adequate access and egress to/from Burning Tree Ranch to the east and the west is provided by Burning Tree Drive which is a county owned and maintained all-weather road. Access to individual lots is by means of private driveways. The moderate slopes within the community eliminates the need for steep and/or sharply winding drives that would hamper access either for evacuation or by fire equipment. Additionally, the moderate slopes and firm soil conditions provide limited off-road trafficability to all but the heaviest fire fighting equipment.

9.3 The Douglas County Sheriff's Department has a mature "Reverse 911" notification system through CODERED that provides emergency notification to homeowners in case of evacuation, current or potential life threatening event via their hard wired telephone or cell phone. The EPN message will include the time sensitivity of the evacuation order. The Douglas County Sheriff's office encourages all homeowners to register their devices with CODERED at douglascountycodered.com. **9.4** The Sheriff's Access and Functional Needs Registry is a voluntary data base containing information concerning individuals who may require assistance in the event of an evacuation. This information is kept confidential and will be forwarded to local emergency service agencies through the 911 Dispatch Center in the

event of an evacuation. Individuals may self-enroll in this registry by contacting the Emergency Management Office at 303 660 7589 or going to the Sheriff's Office website at dcsheriff.net/sheriffs-office/get-registered.

9.5 The existing Fire Mitigation Committee, a subcommittee of the BTR Board, currently oversees safety as a component of its fire prevention and mitigation plan. An additional measure the BTR HOA Board is considering is the formation of an Evacuation Committee. The members of this committee will check on Access and Functional Needs Registry residents to assure evacuation of residents with disabilities, and coordinate with emergency services personnel. The HOA requests that Access and Functional Needs Registrants also notify the HOA Secretary of their status. This information shall be kept confidential. Lastly, they will be talking to residents with large animals requiring evacuation.

10.0 Protection of Property

Two factors are the primary determinants of a structure's ability to survive a wildfire. These are the quality of the defensible space surrounding it and the ignitability of the structure's exterior materials, principally the roofing materials.

10.1 Defensible Space

10.1.1 Since the inception of this CWPP in 2008, substantial work to create defensible space has occurred on a majority of the properties in Burning Tree Ranch. However, much work remains to be done, both in the form of initial work, and through on-going maintenance on individual properties and in the easements used as bridle paths.

10.1.2 Defensible space is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. It also reduces the chance of a structure fire moving from the building to the surrounding forest. Defensible space is an effort to reduce structure ignitability but is not a guarantee a structure will survive during a wildfire. Defensible space also provides room for firefighters to do their jobs. Defensible space does not have to be sterile bare earth or rock. Innovative landscaping using native, low fire hazard and low water demand vegetation to include mowed grasses can provide the necessary buffer.

10.1.3 A detailed discussion of defensible space zones is attached in Appendix IV-1 through IV-3, taken from the CSFS Quick Guide Series: Fire 2012-1 "Protecting Your Home from Wildfire: *Creating Wildfire-Defensible Zones*". Examples of defensible space development are attached at Appendix III-2, Colorado State Forest Service Fact Sheet "Defensible Space".

Minimum recommendations for defensible space are identified in CSFS fact sheet *Creating Wildfire-Defensible Zones* (Appendix III-1). 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.

10.1.4 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.

10.1.5 Completion of the development and maintenance of Zones 1 and 2 is critical to the protection of both lives and property. Completion of the development of Zone 3 in conjunction with Zones 1 and 2 is critical to the protection of the aesthetic value of the area and the environment.

10.1.6 Zone 1 development immediately adjacent to structures usually requires the use of labor intensive and expensive hand removal techniques for clearing and thinning. Zone 2 development can usually be accomplished through a mix of hand removal techniques and more efficient equipment based techniques where the terrain affords access. Equipment based techniques are less labor intensive and therefore tend to be more economical. An ideal

piece of equipment is the more environmentally sensitive track or skid-steer mounted masticator, or forestry mulcher, that can remove, chip and spread the slash for both dead and overgrown Gambel Oak stands. Zone 3 development can usually be almost entirely equipment based.

10.1.7 Recommended Priorities for the Development of Defensible Space: Priority must go to the development of Zones 1 and 2 in respective order. The next priority should go to clearing and thinning along drives to assure easy access, then to development of Zone 3. Just as a mitigation plan is unique for each individual property, based upon structures, slopes, vegetation, resources available, etc..., so is the work prioritization plan.

10.2 Structure Ignitability

10.2.1 The ignitability of a structure's exterior materials is the other determining factor to the structure's ability to potentially survive a wildfire. Noncombustible materials such as masonry, brick, concrete, tile, metal, asphalt-fiberglass and fiber-cement are far superior to wood or wood shake siding and roofing. The four areas of greatest concern are the roofing materials, the siding materials, the windows, and screening of vents (attic, exhaust fan, fresh air intake, etc...). Replacement of any of the first three materials is a major expense, and usually can only be accomplished in conjunction with major repair and/or renovation activities. Assuring adequate screening of all vents to eliminate the potential for wind-born embers entering attic spaces or ducting can be economically accomplished in conjunction with routine maintenance activities. CSFS Fact Sheets on roofing, siding and windows are attached at Appendix IV – 1 through 3 respectively.

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 structure's 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>

10.2.2 Roofing materials are the most sensitive in determining a structure's survivability. A structure's roof usually represents the single largest surface subject to the accumulation of windborne embers from a wild fire and subsequent ignition. Wood shake/shingle roofing is the most vulnerable to fire due to its tendency to dry severely in the low humidity conditions. In fact some insurance companies will not insure Colorado homes with shake roofs and most charge a premium for insuring them. The safest roofing materials are the noncombustibles or Class A roofing materials such as concrete, tile, metal, and fiber-cement which are closely followed by asphalt-fiberglass three tab shingles. Fortunately, homes in Burning Tree Ranch that have had wood shake roofs replaced them with Class A roofing materials.

10.2.3 Siding materials are subject to direct flame contact and radiant convective heating with resultant ignition from wild fire. As with roofing materials, the safest are the noncombustibles, masonry, brick, concrete, stucco and fiber-cement. Acrylic stucco (EFIS – Exterior Insulating

Finish System) and vinyl siding systems while not being combustible tend to fail and fall away from the structure due to the heating from a fire. Unfortunately in excess of 50 percent of the structures in Burning Tree Ranch have either total or partial wood siding.

10.2.4 Windows are the weak points in the “skin” of a structure. Windows in good repair that provide an adequate seal to winter drafts help delay fire intrusion. The safest windows are solid (wood) frame with exterior metal cladding, thermopane (dual pane) Low-E glass.

11.0 Past Mitigation Activities

11.1 Since the implementation of this CWPP in 2008, the BTR HOA has been actively engaged in promoting fire safety within the subdivision. These activities have included: proactively procuring HOA grant funding, and communicating the availability of individual grant funding to residents which monetarily assists homeowners with costly fire mitigation expense; providing regular education to residents via e-mail communications, dedicated fire prevention/mitigation meetings, and securing guest speakers to attend annual HOA meetings; coordinating and funding special fire mitigation projects, such as the clearing of the bridle path through the middle of the subdivision, and annual mowing of the bridle path. In addition, some adjacent homeowners have worked cooperatively to accomplish clearing, thinning and chipping. These individual efforts have lead to areas of great contrast in locations where adjacent homeowners have not been able to coordinate efforts, as reflected in the cover photo. Lastly, many homeowners have made great strides in their personal efforts to mitigate their properties against fire risk. In combination, all of these activities have created a subdivision that is very close to meeting the requirements to be categorized as a “firewise community”, a status the HOA Board is promoting to reach during 2018.

11.2 Education efforts initiated with the development of this CWPP have built an awareness of the nature of the hazard facing the community and the standards to which the mitigation work needs to be done in order to be effective. Part of the initiation of the community plan was to work with Douglas County to accomplish mitigation of the 32 acre county held open space that was completed in June 2008.

The 2011 Burning Tree fire burned across the open space parcel with differing intensity, scorching and killing trees and Gambel oak. The parcel underwent an additional treatment in 2016, essentially removing all Gambel oak with the exception of some larger stems on the west side of the parcel.



In 2016 the parcel was treated again, removing essentially all the Gambel oak on the west side of the drainage with the exception of a few larger stems, and removal of additional pines in the drainage.



2016 Prior to Treatment 1



After Treatment 1



After Treatment 2

It is estimated that approximately 90 per cent of the homeowners have moved from awareness to action and are in varying stages of defensible space development either by their own efforts or through the use of contractors. More are preparing to initiate development. Continued educational efforts and successful completion of individual property based mitigation is expected to build momentum and engage remaining homeowners into action.

12.0 Community Action Plan

The Burning Tree Ranch HOA action plan set forth in 2008 was met as planned through ongoing education, completion of actionable individual property assessments, completion of demonstration projects during 2009, and completion of an HOA sponsored project to upgrade the existing bridle trail easements. As of this writing, the BTR HOA Board and Fire Mitigation Committee have agreed to begin an annual slash pick-up and/or chipper program in 2018, and are exploring the remaining requirements to qualify BTR as a "firewise community." Additionally, during 2018 the HOA will establish an Emergency Evacuation Committee which will be tasked with exploring the development of a formal emergency evacuation plan for the subdivision. Lastly, the HOA Board will continue to work closely with county and forestry officials to maintain a current CWPP, and ensure that BTR residents are kept up-to-date about grant funding opportunities, and fire-related issues affecting our community.

12.1 Homeowner Education: The Burning Tree Ranch HOA has strived to ensure that education about fire prevention, mitigation, and safety is a top priority for BTR residents, through e-mail communications, newsletters, its website, and meetings with members of the fire department, Colorado State Forest Service, and other Douglas County agencies. Continued education is and will remain the top priority of this plan. The primary objective of the education plan is to maintain 100% homeowner awareness and to motivate 100% of the members to move from awareness to positive action. Educational efforts shall be continued through the use of the HOA website as a point from which to disseminate information, targeted mailings and the integration of educational presentations at general membership gatherings and target-specific meetings.

12.2 Property Assessments: In 2008 the Douglas County Wildfire Mitigation Staff initiated a detailed lot by lot assessment of 42 properties within the subdivision, and has completed additional assessments as requested since that time. They continue to work closely with the community in assessing risk and making recommendations for reducing that risk.

Attached as Appendix V is a Homeowner's Assessment Checklist which the individual homeowner may either complete themselves, request assistance in completion from the HOA Wildfire Mitigation Committee, or complete in conjunction with property inspections completed by the Douglas County Wildfire Mitigation Staff and/or the Franktown Fire Protection District. This checklist provides actionable feedback on the tasks required to successfully mitigate their property.

12.3 Demonstration Site: The HOA submitted a grant request to the CSFS Franktown District Forester for the completion of one demonstration site property during 2009. The property owner was provided with the 50% cost share. Since that time, numerous residents have availed themselves of funding to assist with the expense of mitigation work completed on their properties.

12.4 Fire Protection Cistern Maintenance: The HOA worked with Douglas County and the Franktown Fire Protection District to resolve the issues concerning access maintenance and general maintenance of the fire protection cistern located in the county held open space, assuring that it was returned to serviceability.

12.5 Bridle Trails: Burning Tree Ranch has an approximately 6.25 mile network of undeveloped bridle trail easements that extend throughout the development. The HOA applied for and received grant funding to upgrade the easements.

Identified below is the First Priority, which also functions as a firebreak through some of the densest brush in the development and as alternate evacuation and access route. This work was primarily machine-based, utilizing a masticator or similar equipment. The locations of these trail segments are shown on the BTR HOA Work Priorities Map in Appendix I. The priorities for the completion of this work, based upon the existing fuels hazards were:

- First Priority: The 0.7 mile long, 30 foot wide central reach of approximately 2.5 acres that extends from Burning Tree Drive, west of the intersection with Burning Ridge Drive to Burnt Oak Drive south of the intersection with Burning Tree Trail. (Completed)
- Second Priority: The 0.7 Mile long, 20 foot wide West boundary reach of approximately 1.7 acres.
- Third Priority: The 0.6 mile long, 20 foot wide western two thirds of South boundary reach of approximately 1.4 acres.

13.0 Monitoring and Adapting

The HOA Board of Directors (BOD) has established a standing Wildfire Mitigation Committee. This committee is responsible for continued coordination of mitigation efforts, the homeowner education program and for conducting an annual review of this plan to determine the need for revision. The Wildfire Mitigation Committee is also tasked with providing the BOD with an annual recommendation for any desired or necessary modifications. Once the recommendation is approved for adoption by the BOD, it will be briefed to the membership at the annual meeting. Community members are encouraged to provide ongoing feedback and input to the Wildfire Mitigation Committee and the BOD concerning all wildfire mitigation activities. The committee shall also be responsible for nominating proposed grant projects to the BOD. The committee shall prepare and submit grant requests and manage and administer approved grants.

14.0 Conclusion

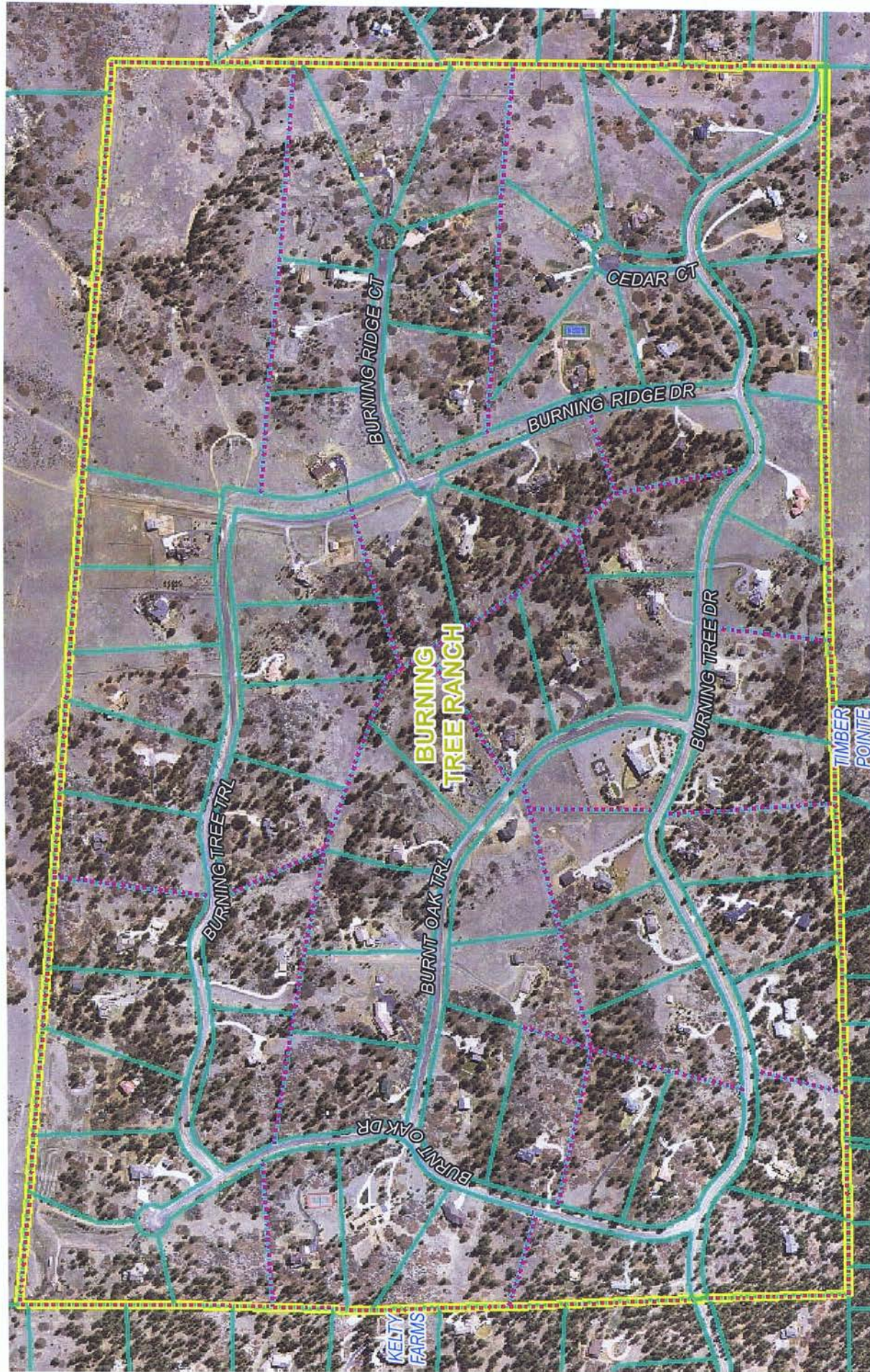
This plan provides the roadmap to continued mitigation and education activities for the Burning Tree Ranch Community that fits the needs of the community. This plan has assessed the community hazards, and prioritized future activities and projects based upon those hazards. Completion of this plan also makes the Burning Tree Ranch Community a competitive applicant for grant funding to complete projects identified in the Community Action Plan. The residents of Burning Tree Ranch remain committed to their mitigation efforts and activities. Burning Tree Ranch remains committed to continued coordination with the CSFS Franktown District Forester, the Douglas County Wildfire Mitigation Staff and the Franktown Fire Protection District.

This CWPP fulfills the requirements set forth in the 2003 HFRA. The collaborative process undergone to prepare this plan satisfies both the letter and the spirit of the law.

BTR HOA CWPP
Appendix I
Maps

- I -1 Burning Tree Ranch Community Base Map
- I -2 Burning Tree Ranch HOA Work Priorities Map
- I -3 Burning Tree Ranch Contour Map
- I -4,5 Burning Tree Ranch Land Cover Maps (2)
- I -6,7 Burning Tree Ranch Slope Analysis Map (2)
- I -8 Burning Tree Ranch Hazard Map

Burning Tree Ranch Subdivision: Base Map



Legend

- PARCEL BOUNDARIES
- BURNING TREE RANCH / BRIDLE TRAIL (Approximate)
- WUI BOUNDARY

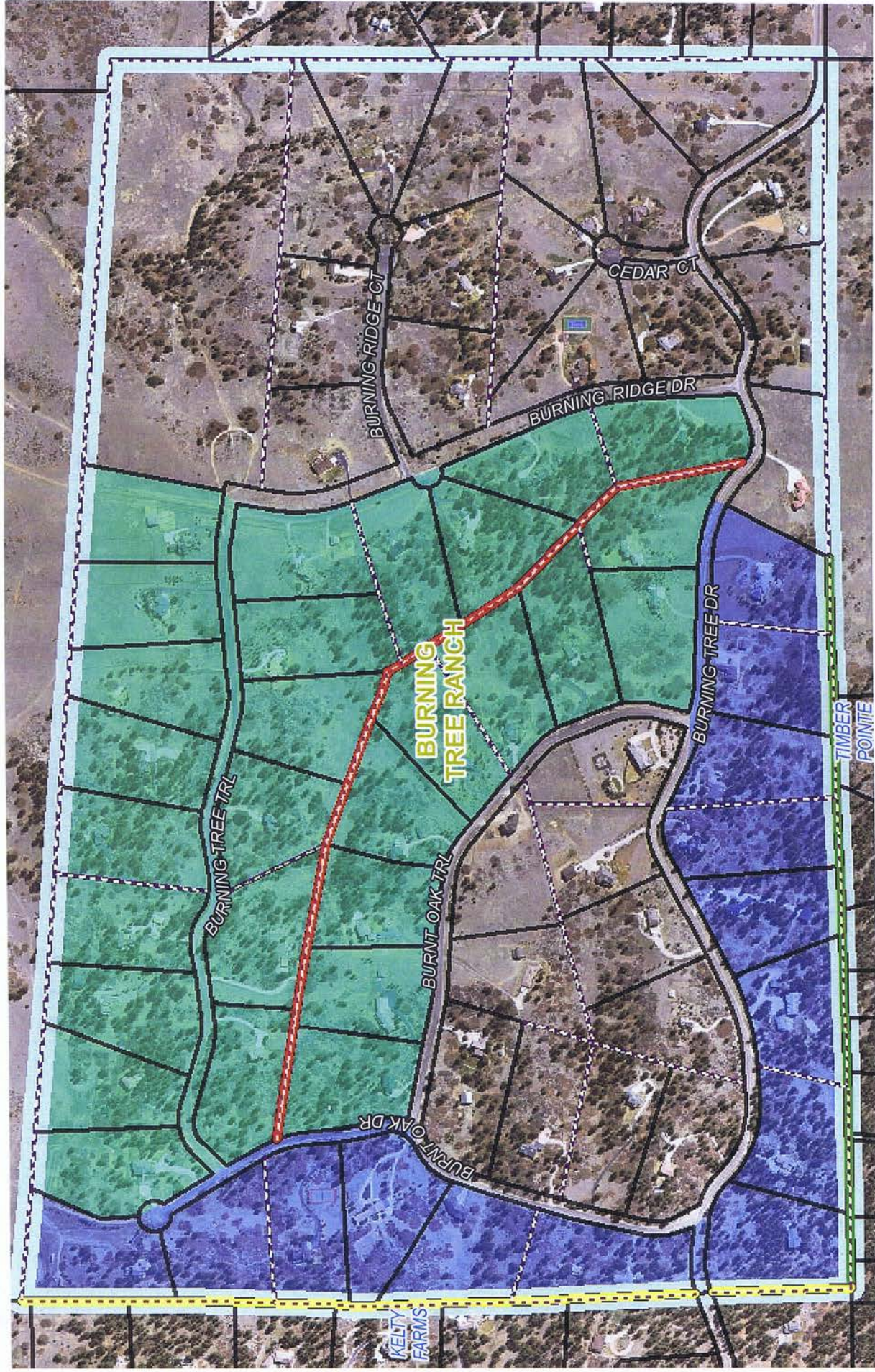
Scale: 1 inch equals 600 feet
0 300 600 Feet

Vicinity Map

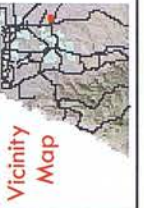
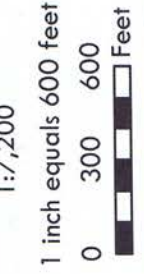
DOUGLAS COUNTY
COLORADO

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IMAGERY DATE 2006

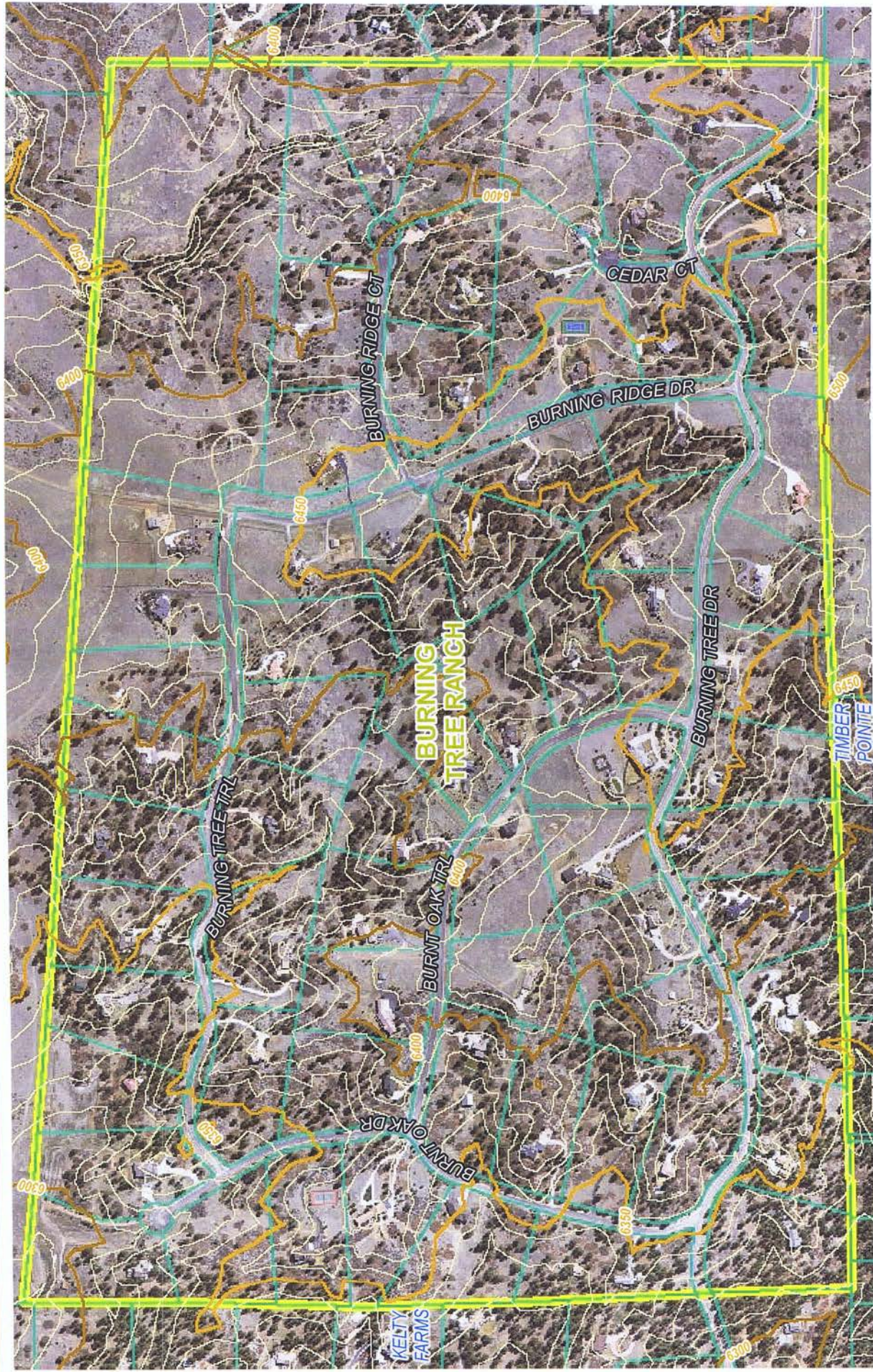
Burning Tree Ranch Subdivison: Work Priorities Map



Legend



Burning Tree Ranch Subdivision: Contour Map

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1:7,200

1 inch equals 600 feet

0 300 600

Legend

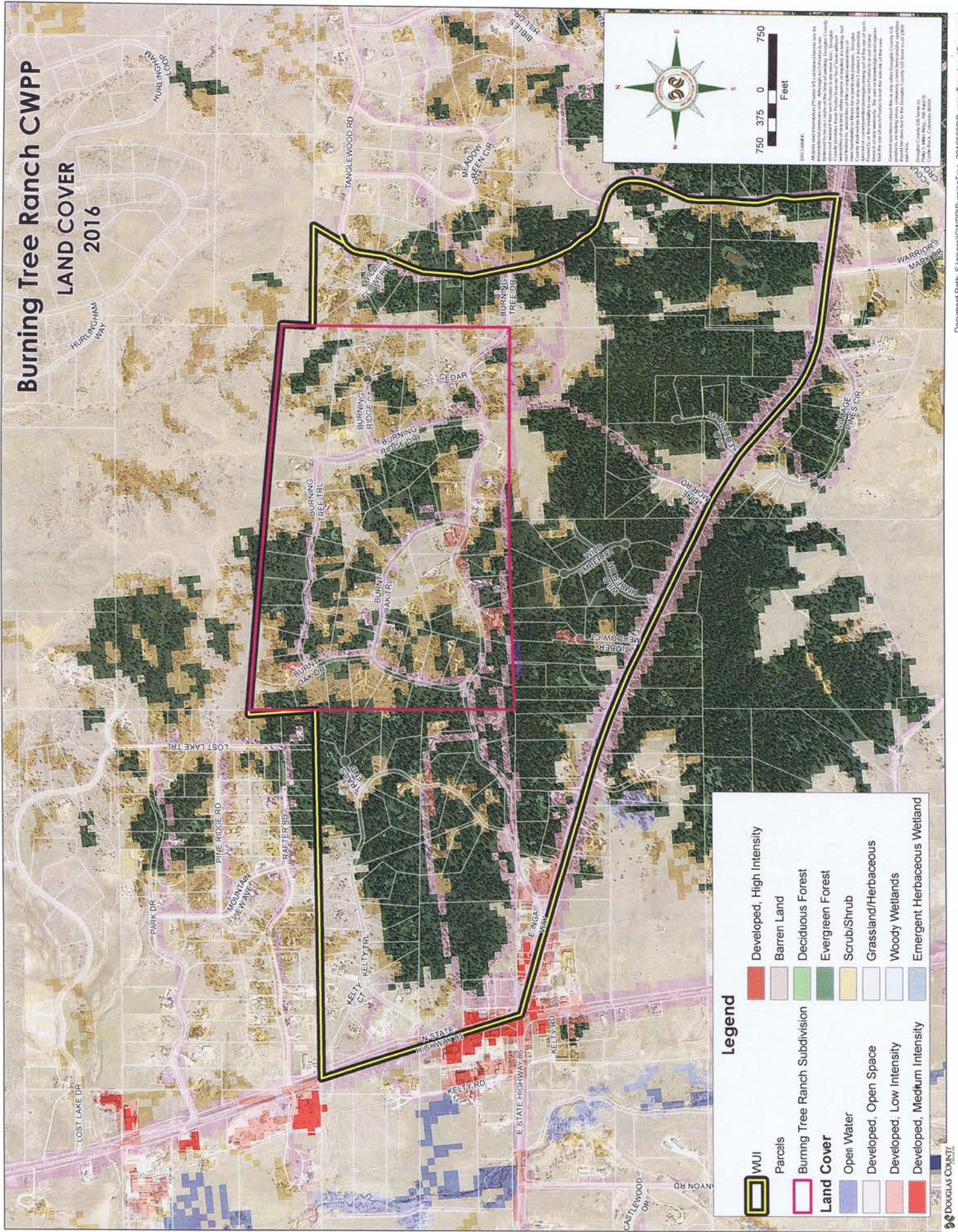
-  PARCEL BOUNDARIES
-  BURNING TREE RANCH / WUI BOUNDARY
- Interval
- 10 Ft
- 50 Ft
- 100 Ft
- CONTOUR LINE ELEVATIONS
- IMAGERY DATE 2006
CONTOUR DATE 1996



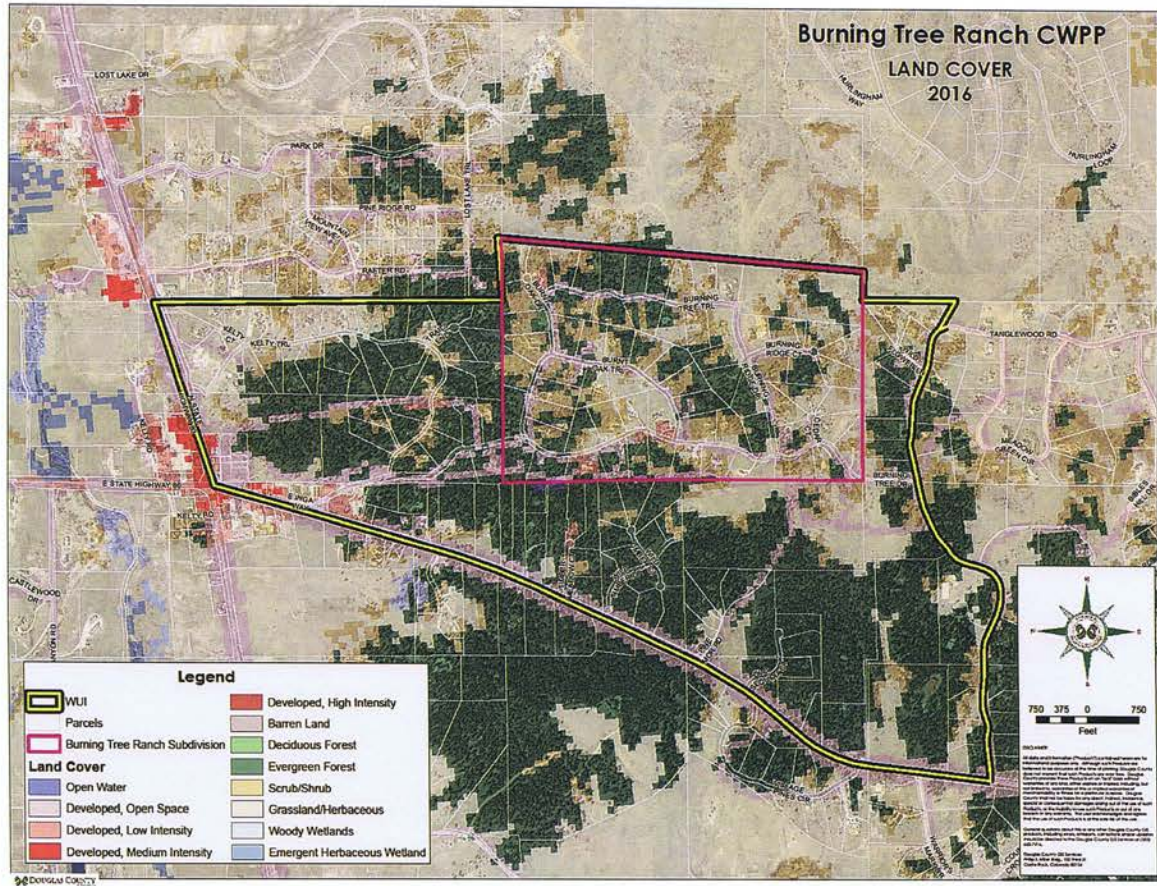
Burning Tree Ranch CWPP

LAND COVER

2016

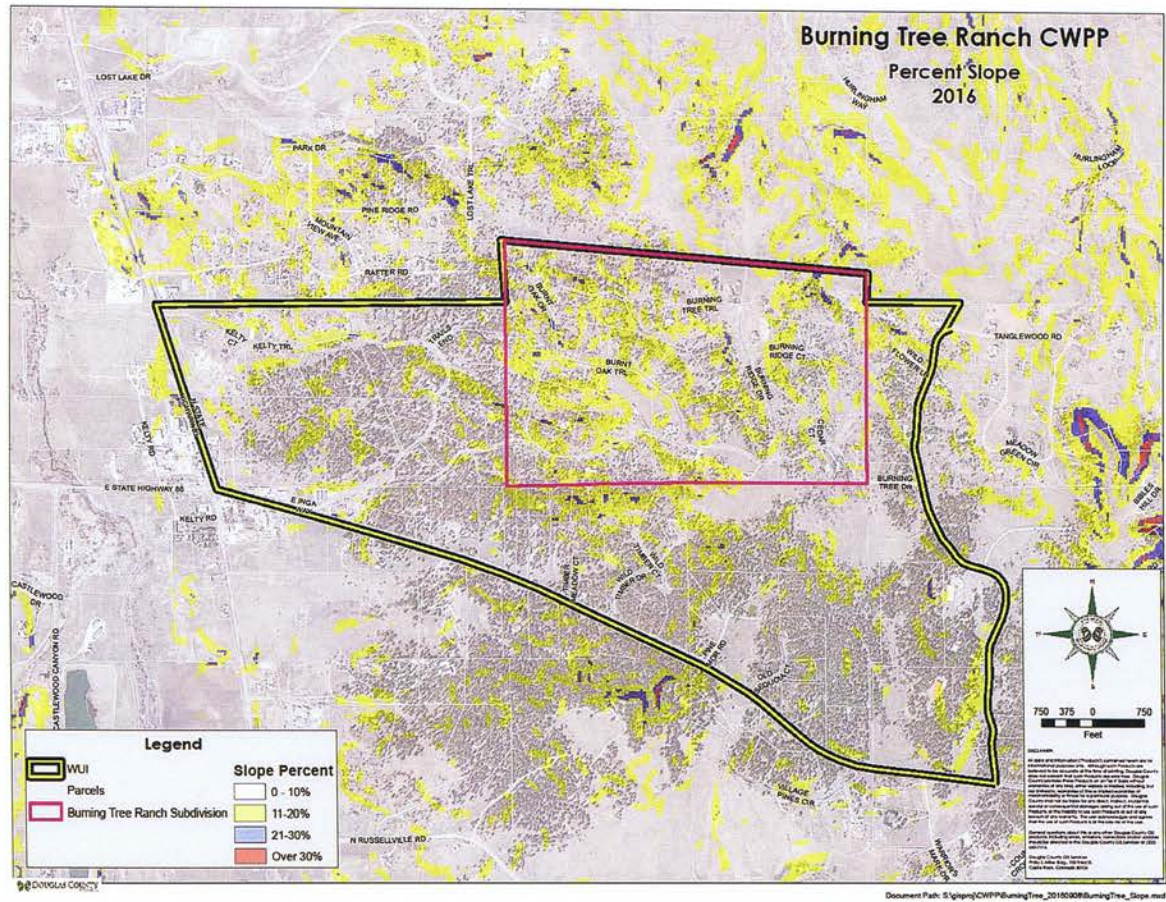


Land Cover Map



The Land Cover Map is essentially the vegetation type on the ground at a 30 meter pixel resolution. This map displays the vegetation/fuel type over the WUI boundaries to display the spatial relationship and potential vegetation influences as it pertains to wildland fire.

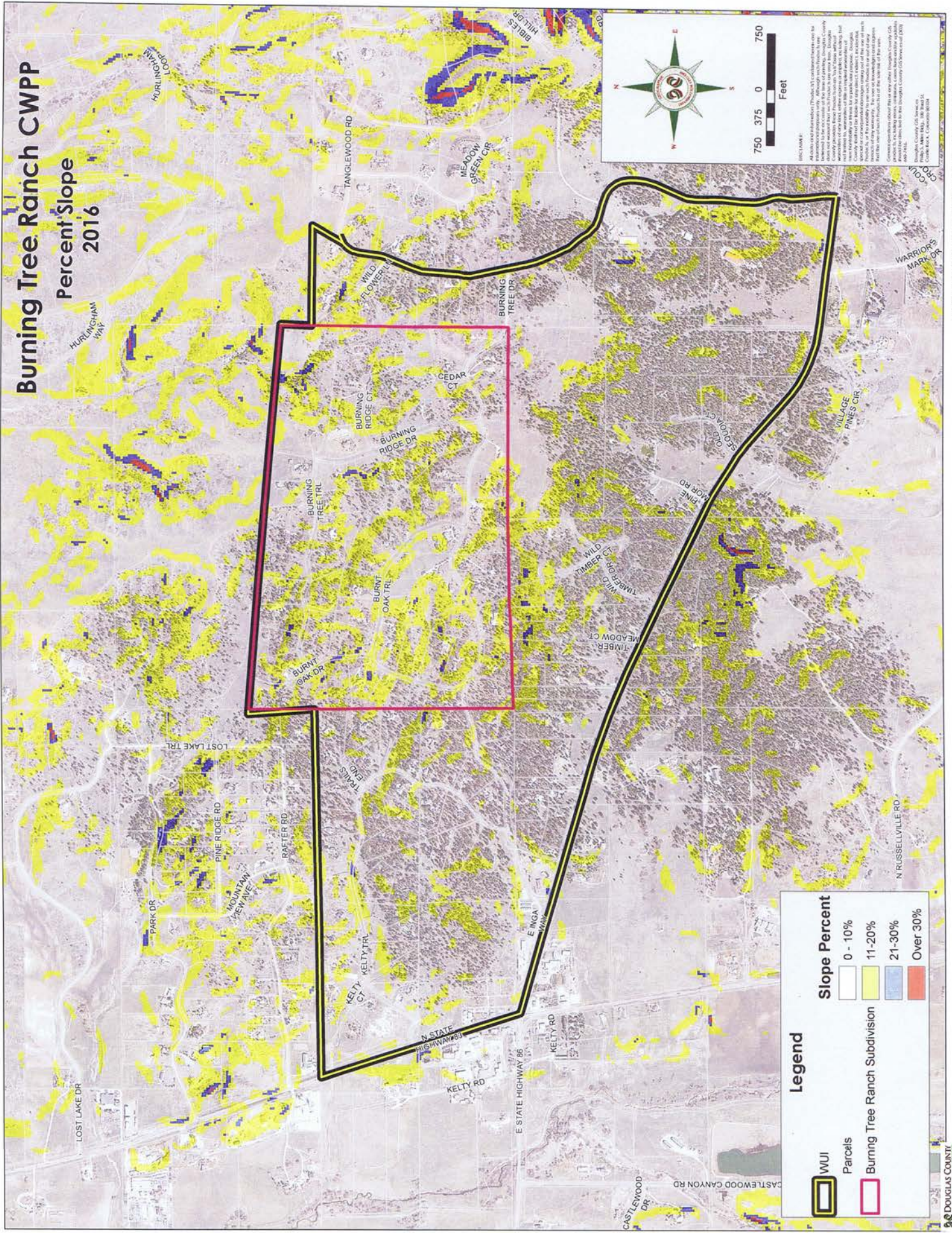
Slope Map



The slope map reflects the topography throughout the subdivision, raising awareness to the extent of slopes, changes in slopes and how they relate to potential fire behavior. Fire will burn uphill more quickly, preheating fuels in front of it. Fire can also move quickly up draws, especially if pushed with wind.

Burning Tree Ranch CWPP

Percent Slope
2016



WUI

Parcels

Burning Tree Ranch Subdivision

Slope Percent

0 - 10%

11-20%

21-30%

Over 30%

750 375 0 750
 Feet
 N
 E
 S
 W

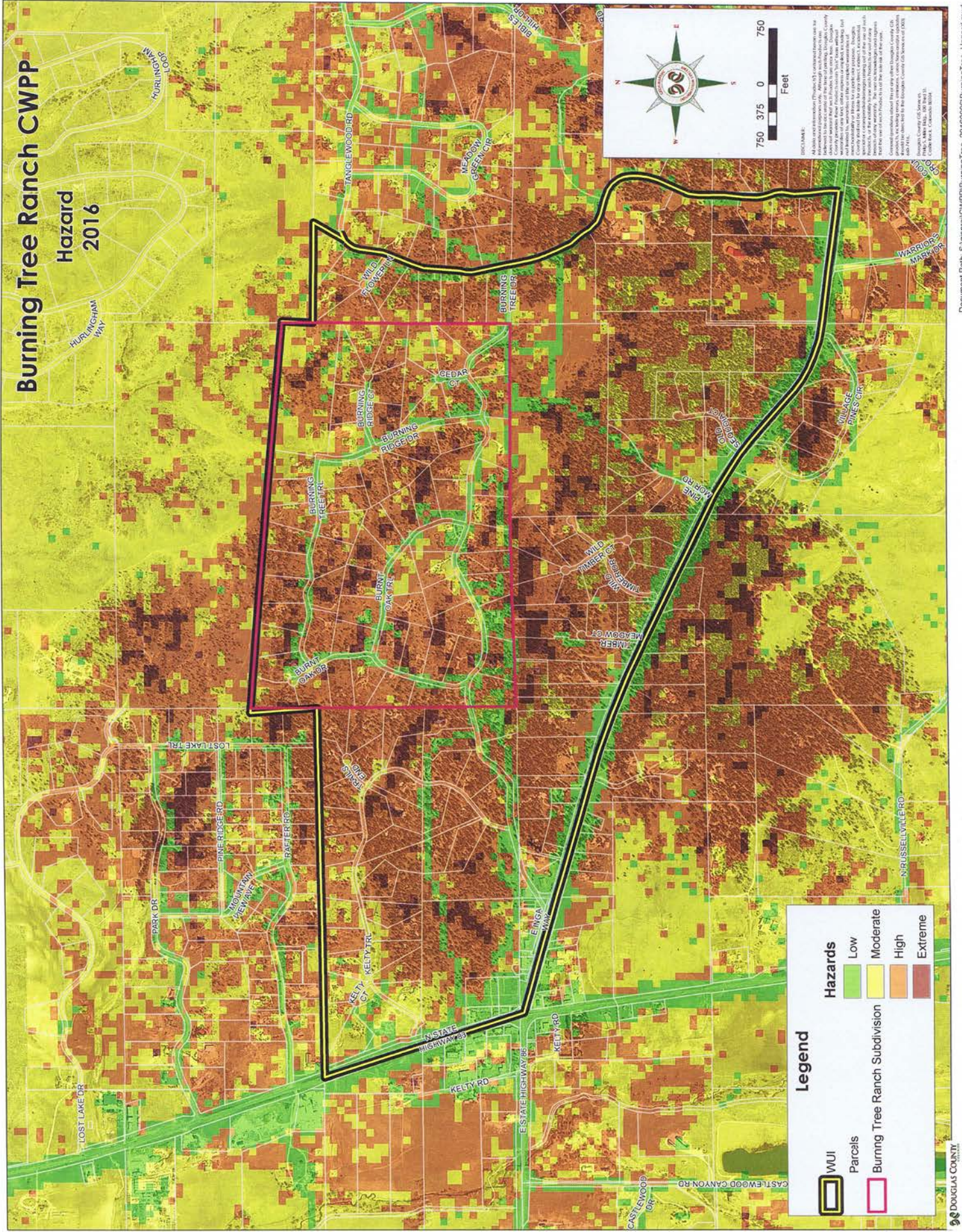
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Douglas County GIS Services
 1700 N. 1st St., Suite 100
 Douglas, AZ 85601

Burning Tree Ranch CWPP

Hazard

2016



Evacuation:

- Notification of mandatory evacuation in the event of wildfire will be made by "Reverse 911" and media releases by the Douglas County Sheriff's Department
- Unless stated otherwise in the "Reverse 911" notification, homeowners should evacuate within 30 minutes of notification.
- Routes:
 - Primary – Burning Tree Dr to CO SH 86
 - Secondary – Burning Tree Dr to Tanglewood Dr to CO SH 86

Preparation of property prior to any fire incident:

- Establish and discuss a Family Evacuation Plan
- Ensure all vents (attic, exhaust and fresh air intake) have screens over them.
- Keep roofs and gutters clean of debris (leaves, pine needles, etc...)
- Keep fire wood stacked at least 30 feet away from any structure.
- Have any areas near the home that would collect leaves, needles, or debris cleaned out at all times (inside corners on attached decks, for example).
- Follow CSFS standards for defensible space and general vegetation mitigation.
- Ensure all drives and access trails are unobstructed.

Preparation of property in the event of evacuation,(if time allows, otherwise get out) listed in order of priority:

- Turn natural gas service off at the meter.
- Leave all interior and exterior lights on.
- Remove all light weight curtains and shades.
- Close all windows, exterior doors, and heavy weight curtains/shades.
- Close all interior doors
- Turn off any fans or blowers (Central HVAC, attic fans, etc...)
- Leave garden hoses attached to exterior hose bibs.
- Leave ladders out and accessible to the firefighters.
- Remove pets and livestock.
- Remove vehicles from the property or park in an enclosed garage or barn facing out with the windows closed and the keys in ignition.
- Leave main doors into structures unlocked.
- Mechanically disengage automatic garage door openers so that the doors may be manually opened from the outside.
- Leave all gates open.
- Remove any combustible exterior furnishings from decks and patios. Either place a minimum of 50 feet from structures or move inside.
- Remove all bulk flammable materials (propane tanks, fuel cans, etc...) from the property or place in the open at least 50 feet from any structure and/or brush.
- Remove keepsakes and/or valuables.

BTR HOA CWPP
Appendix III
Defensible Space

- III – 1 CSU Pub 6.302 Creating Wildfire Defensible Zones (6 pages)
- III – 2 CSFS Fact Sheet: Defensible Space (2 pages)



FORESTRY

Creating Wildfire-Defensible Zones no. 6.302

by F.C. Dennis¹

Quick Facts...

Wildfire will find the weakest links in the defense measures you have taken on your property.

The primary determinants of a home's ability to survive wildfire are its roofing material and the quality of the "defensible space" surrounding it.

Even small steps to protect your home and property will make them more able to withstand fire.

Consider these measures for all areas of your property, not just the immediate vicinity of the house.

Fire is capricious. It can find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. While you may not be able to accomplish all measures below (and there are no guarantees), each will increase your home's, and possibly your family's, safety and survival during a wildfire.

Start with the easiest and least expensive actions. Begin your work closest to your house and move outward. Keep working on the more difficult items until you have completed your entire project.

Defensible Space

Two factors have emerged as the primary determinants of a home's ability to survive wildfire. These are the home's roofing material and the quality of the "defensible space" surrounding it.

Use fire-resistive materials (Class C or better rating), not wood or shake shingles, to roof homes in or near forests and grasslands. When your roof needs significant repairs or replacement, do so with a fire-resistant roofing material. Check with your county building department. Some counties now restrict wood roofs or require specific classifications of roofing material.

Defensible space is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. It also reduces the chance of a structure fire moving from the building to the surrounding forest. Defensible space provides *room for firefighters to do their jobs*. Your house is more likely to withstand a wildfire if grasses, brush, trees and other common forest fuels are managed to reduce a fire's intensity.

The measure of fuel hazard refers to its continuity, both horizontal (across the ground) and vertical (from the ground up into the vegetation crown). Fuels with a high degree of both vertical and horizontal continuity are the most hazardous, particularly when they occur on slopes. Heavier fuels (brush and trees) are more hazardous (i.e. produce a more intense fire) than light fuels such as grass.

Mitigation of wildfire hazards focuses on breaking up the continuity of horizontal and vertical fuels. Additional distance between fuels is required on slopes.

Creating an effective defensible space involves developing a series of management zones in which different treatment techniques are used. See Figure 1 for a general view of the relationships among these management zones. Develop defensible space around each building on your property. Include detached garages, storage buildings, barns and other structures in your plan.

The actual design and development of your defensible space depends on several factors: size and shape of buildings, materials used in their construction, the slope of the ground on which the structures are built, surrounding topography,

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Putting Knowledge to Work

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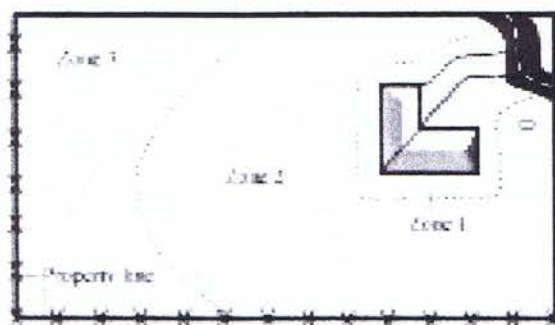


Figure 1: Forested property showing the three fire-defensible zones around a home or other structure.

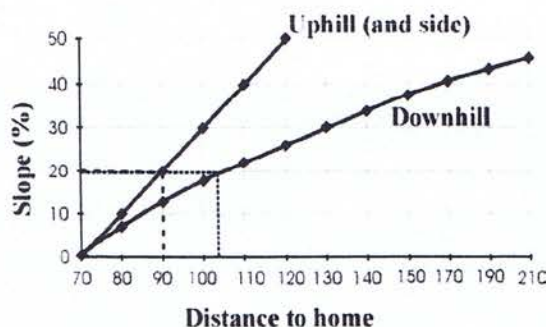


Figure 2: This chart indicates the *minimum recommended* dimensions for defensible space from the home to the outer edge of Zone 2. For example, if your home is situated on a 20 percent slope, the minimum defensible space dimensions would be 90 feet uphill and to the sides of the home and 104 feet downhill from the home.

and sizes and types of vegetation on your property. These factors all affect your design. You may want to request additional guidance from your local Colorado State Forest Service (CSFS) forester or fire department. (See the Special Recommendations section of this fact sheet for shrubs, lodgepole pine, Engelmann spruce, and aspen.)

Defensible Space Management Zones

Zone 1 is the area of maximum modification and treatment. It consists of an area of 15 feet around the structure in which all flammable vegetation is removed. This 15 feet is measured from the outside edge of the home's eaves and any attached structures, such as decks.

Zone 2 is an area of fuel reduction. It is a transitional area between Zones 1 and 3. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend *at least* 75 to 125 feet from the structure. See Figure 2 for the appropriate distance for your home's defensible space. Within this zone, the continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. These actions help eliminate the continuous fuel surrounding a structure while enhancing homesite safety and the aesthetics of the property.

Zone 3 is an area of traditional forest management and is of no particular size. It extends from the edge of your defensible space to your property boundaries.

Prescriptions

Zone 1

The size of Zone 1 is 15 feet, measured from the edges of the structure. Within this zone, several specific treatments are recommended.

Plant nothing within 3 to 5 feet of the structure, particularly if the building is sided with wood, logs or other flammable materials. Decorative rock, for example, creates an attractive, easily maintained, nonflammable ground cover.

If the house has noncombustible siding, widely spaced foundation plantings of low growing shrubs or other "fire wise" plants are acceptable. Do not plant directly beneath windows or next to foundation vents. Be sure there are no areas of continuous grass adjacent to plantings in this area.

Frequently prune and maintain plants in this zone to ensure vigorous growth and a low growth habit. Remove dead branches, stems and leaves.

Do not store firewood or other combustible materials in this area. Enclose or screen decks with metal screening. Extend the gravel coverage under the decks. Do not use areas under decks for storage.

Ideally, remove all trees from Zone 1 to reduce fire hazards. If you do keep a tree, consider it part of the structure and extend the distance of the entire defensible space accordingly. Isolate the tree from any other surrounding trees. Prune it to at least 10 feet above the ground. Remove any branches that interfere with the roof or are within 10 feet of the chimney. Remove all "ladder fuels" from beneath the tree. Ladder fuels are vegetation with vertical continuity that allows fire to burn from ground level up into the branches and crowns of trees. Ladder fuels are potentially very hazardous but are easy to mitigate. No ladder fuels can be allowed under tree canopies. In all other areas, prune all branches of shrubs or trees up to a height of 10 feet above ground (or 1/2 the height, whichever is the least).

Zone 2

Zone 2 is an area of fuel reduction designed to reduce the intensity of any fire approaching your home. Follow these recommended management steps.

Thin trees and large shrubs so there is at least 10 feet between crowns. Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree (Figure 3). On steep slopes, allow more space between tree crowns. (See Figure 4 for *minimum recommended* spacing for trees on steep slopes.) Remove all ladder fuels from under these remaining trees. Carefully prune trees to a height of at least 10 feet.

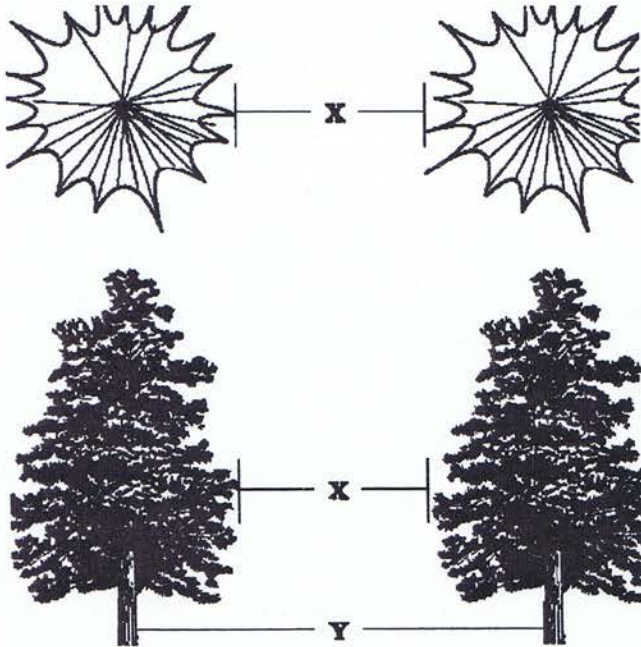


Figure 3: X = crown spacing; Y = stem spacing. Do not measure between stems for crown — measure between the edges of tree crowns.

Small clumps of 2 to 3 trees may be occasionally left in Zone 2. Leave more space between the crowns of these clumps and surrounding trees.

Because Zone 2 forms an aesthetic buffer and provides a transition between zones, it is necessary to blend the requirements for Zones 1 and 3. Thin the portions of Zone 3 adjacent to Zone 2 more heavily than the outer portions.

Isolated shrubs may remain, provided they are not under tree crowns. Prune and maintain these plants periodically to maintain vigorous growth. Remove dead stems from trees and shrubs annually. Where shrubs are the primary fuel in Zone 2, refer to the Special Recommendations section of this fact sheet.

Limit the number of dead trees (snags) retained in this area. Wildlife needs only one or two snags per acre. Be sure any snags left for wildlife cannot fall onto the house or block access roads or driveways.

Mow grasses (or remove them with a weed trimmer) as needed through the growing season to keep them low, a maximum of 6 to 8 inches. This is extremely critical in the fall when grasses dry out and cure or in the spring after the snow is gone but before the plants green up.

Stack firewood and woodpiles uphill or on the same elevation as the structure but at least 30 feet away. Clear and keep away flammable vegetation within 10 feet of these woodpiles. Do not stack wood against your house or on or under your deck, even in winter. Many homes have burned from a woodpile that ignited as the fire passed. Wildfires can burn at almost any time in Colorado.

Locate propane tanks at least 30 feet from any structures, preferably on the same elevation as the house. You don't want the LP container below your house — if it ignites, the fire would tend to burn uphill. On the other hand, if the tank is above your house and it develops a leak, LP gas will flow downhill into your home. Clear and keep away flammable vegetation within 10 feet of these tanks. Do not screen propane tanks with shrubs or vegetation.

Dispose of slash (limbs, branches and other woody debris) from your trees and shrubs through chipping or by piling and burning. Contact your local CSFS office or county sheriff's office for information about burning slash piles. If neither of these alternatives is possible, lop and scatter slash by cutting it into very small pieces and distributing it over the ground. Avoid heavy accumulations

% slope	Tree Crown Spacing	Brush and Shrub Clump Spacing
0 - 10 %	10'	2 1/2 x shrub height
11 - 20%	15'	3 x shrub height
21 - 40%	20'	4 x shrub height
> 40%	30'	6 x shrub height

Figure 4: Minimum tree crown and shrub clump spacing.

Tree Diameter (in inches)	Average Stem Spacing Between Trees (in feet)
3	10
4	11
5	12
6	13
7	14
8	15
9	16
10	17
11	19
12	21
13	23
14	24
15	26
16	28
17	29
18	31
19	33
20	35
21	36
22	38
23	40
24	42

Figure 5: Minimum tree spacing for Zone 3.

of slash. Lay it close to the ground to speed decomposition. If desired, no more than two or three small, widely spaced brush piles may be left for wildlife purposes. Locate these towards the outer portions of your defensible space.

Zone 3

This zone is of no specified size. It extends from the edge of your defensible space to your property lines. A gradual transition into this zone from defensible space standards to other management objectives you may have is suggested. Typical management objectives for areas surrounding homesites or subdivisions are: provide optimum recreational opportunities; enhance aesthetics; maintain tree health and vigor; provide barriers for wind, noise, dust and visual intrusions; support limited production of firewood, fence posts and other forest commodities; or grow Christmas trees or trees for transplanting.

Specific requirements will be dictated by your objectives for your land and the kinds of trees present. See Figure 5 for the *minimum* suggested spacing between "leave" trees. Forest management in Zone 3 is an opportunity for you to increase the health and growth rate of the forest in this zone. Keep in mind that root competition for available moisture limits tree growth and ultimately the health of the forest.

A high canopy forest reduces the chance of a surface fire climbing into the tops of the trees and might be a priority for you if this zone slopes steeply. The healthiest forest is one that has multiple ages, sizes, and species of trees where adequate growing room is maintained over time. Remember to consider the hazards of ladder fuels. Multiple sizes and ages of trees might increase the fire hazard from Zone 3 into Zone 2, particularly on steep slopes.

A greater number of wildlife trees can remain in Zone 3. Make sure that dead trees pose no threat to power lines or fire access roads.

While pruning generally is not necessary in Zone 3, it may be a good idea from the standpoint of personal safety to prune trees along trails and fire access roads. Or, if you prefer the aesthetics of a well-manicured forest, you might prune the entire area. In any case, pruning helps reduce ladder fuels within the tree stand, thus enhancing wildfire safety.

Mowing is not necessary in Zone 3.

Any approved method of slash treatment is acceptable for this zone, including piling and burning, chipping or lop-and-scatter.

Special Recommendations

Tree spacing guidelines do not apply to *mature* stands of aspen trees where the recommendations for ladder fuels have been complied with. In areas of aspen regeneration and young trees, the spacing guidelines should be followed.

Brush and shrubs

Brush and shrubs are woody plants, smaller than trees, often formed by a number of vertical or semi-upright branches arising close to the ground. Brush is smaller than shrubs and can be either woody or herbaceous vegetation.

On nearly level ground, minimum spacing recommendations between clumps of brush and/or shrubs is 2 1/2 times the height of the vegetation. Maximum diameter of clumps should be 2 times the height of the vegetation. As with tree crown spacing, all measurements are made from the edges of vegetation crowns (Figure 3).

For example: For shrubs 6 feet high, spacing between shrub clumps should be 15 feet or more apart (measured from the edges of the crowns of vegetation clumps). The diameter of shrub clumps should not exceed 12 feet (measured from the edges of the crowns). Branches should be pruned to a height of 3 feet.

Grasses

Keep dead, dry or curing grasses mowed to less than 6 inches. Defensible space size where grass is the predominant fuel can be reduced (Figure 5) when applying this practice.

Windthrow

In Colorado, certain locations and tree species, including lodgepole pine and Engelmann spruce, are especially susceptible to damage and uprooting by high winds (windthrow). If you see evidence of this problem in or near your forest, or have these tree species, consider the following adjustments to the defensible space guidelines. It is highly recommended that you contact a professional forester to help design your defensible space.

Adjustments: If your trees or homesite are susceptible to windthrow and the trees have never been thinned, use a stem spacing of diameter plus five instead of the guides listed in the Zone 3 section. Over time (every 3 to 5 years) *gradually* remove additional trees. The time between cutting cycles allows trees to “firm up” by expanding their root systems. Continue this periodic thinning until the desired spacing is reached.

Also consider leaving small clumps of trees and creating small openings on their lee side (opposite of the predominant wind direction). Again, a professional forester can help you design the best situation for your specific homesite and tree species. Remember, with species such as lodgepole pine and Engelmann spruce, the likelihood of a wildfire running through the tree tops or crowns (crowning) is closely related to the overabundance of fuels on the forest floor. Be sure to remove downed logs, branches and *excess* brush and needle buildup.

Maintaining Your Defensible Space

Your home is located in a forest that is dynamic, always changing. Trees and shrubs continue to grow, plants die or are damaged, new plants begin to grow, and plants drop their leaves and needles. Like other parts of your home, defensible space requires maintenance. Use the following checklist each year to determine if additional work or maintenance is necessary.

% slope	D-space size (uphill, downhill, sidehill)
0 - 20 %	30'
21 - 40%	50'
> 40%	70'

Figure 6: Minimum defensible space size for grass fuels.

Defensible Space and FireWise Annual Checklist

- ☐ Trees and shrubs are properly thinned and pruned within the defensible space. Slash from the thinning is disposed of.
- ☐ Roof and gutters are clear of debris.
- ☐ Branches overhanging the roof and chimney are removed.
- ☐ Chimney screens are in place and in good condition.
- ☐ Grass and weeds are mowed to a low height.
- ☐ An outdoor water supply is available, complete with a hose and nozzle that can reach all parts of the house.
- ☐ Fire extinguishers are checked and in working condition.
- ☐ The driveway is wide enough. The clearance of trees and branches is adequate for fire and emergency equipment. (Check with your local fire department.)
- ☐ Road signs and your name and house number are posted and easily visible.
- ☐ There is an easily accessible tool storage area with rakes, hoes, axes and shovels for use in case of fire.
- ☐ You have practiced family fire drills and your fire evacuation plan.
- ☐ Your escape routes, meeting points and other details are known and understood by all family members.
- ☐ Attic, roof, eaves and foundation vents are screened and in good condition.



FIREWISE is a multi-agency program that encourages the development of defensible space and the prevention of catastrophic wildfire.

Stilt foundations and decks are enclosed, screened or walled up.

- ☐ Trash and debris accumulations are removed from the defensible space.
- ☐ A checklist for fire safety needs inside the home also has been completed.

This is available from your local fire department.

References

Colorado State Forest Service, Colorado State University, Fort Collins, CO 80523-5060; (970) 491-6303:

- *FireWise Construction — Design and Materials*
- *Home Fire Protection in the Wildland Urban Interface*
- *Wildfire Protection in the Wildland Urban Interface*
- *Landowner Guide to Thinning*

Colorado State University Cooperative Extension, 115 General Services Bldg., Fort Collins, CO 80523-4061; (970) 491-6198; E-mail: resourcecenter@ucm.colostate.edu:

- 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*
- 7.205, *Pruning Evergreens*
- 7.206, *Pruning Shrubs*
- 7.207, *Pruning Deciduous Trees*

**Colorado
State
FOREST
SERVICE**

This fact sheet was produced in cooperation with the Colorado State Forest Service.

¹Wildfire Hazard Mitigation Coordinator,
Colorado State Forest Service.

Colorado State University, U.S. Department of Agriculture, and Colorado counties cooperating. Cooperative Extension programs are available to all without discrimination. No endorsement of products mentioned is intended nor is criticism implied of products not mentioned.



Defensible space

Your first defense against wildfire is to create and maintain a defensible space around your home. This does **not** mean your landscape must be barren. A defensible space is an area, either man-made or natural, where the vegetation is modified to slow the rate and intensity of an advancing wildfire. It also creates an area where fire suppression operations can occur and helps protect the forest from a structure fire.



A disaster waiting to happen.



This home is more easily defensible.

Defensible Space

Wildfire hazards can be effectively reduced by following these defensible space guidelines developed by the Colorado State Forest Service. (Also see Cooperative Extension Fact Sheet 6.302.)

- ❑ The dimensions of a defensible space are subjective and depend on site characteristics, but typically a defensible space, on flat ground, extends a minimum of 75 feet around a home. This distance should be extended if the structure is located on a slope.

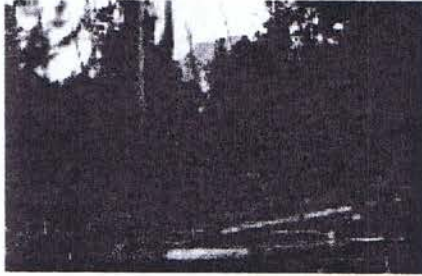


- ❑ Thin out continuous tree and brush cover around structures. The initial 15 feet around a structure should consist of an area in which all flammable vegetation is removed.
- ❑ Beyond the initial 15 feet, trees should be thinned to 10-12 foot crown spacing. Occasionally, clumps of 2 or 3 trees are acceptable for a more natural appearance if additional space surrounds them.
- ❑ Mow dry grass and weeds to a height of 6 inches or less for a distance of 30 feet from all structures.



- ❑ Prune tree branches within the defensible space up to a height of 10 feet above the ground.
- ❑ Dispose of all slash and debris left from thinning by either chipping, hauling away or piling and burning (check with your local fire department for burning restrictions).

- ❑ Remove shrubs and small trees, or other potential "ladder" fuels from beneath large trees. Left in place, these fuels can carry a ground fire into the tree crowns.



- ❑ Trim branches which extend over roof eaves.



- ❑ Remove branches within 15 feet of chimneys.

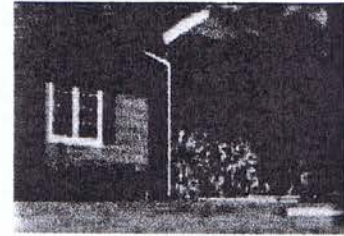
- ❑ Maintain the defensible space annually by removing debris, shrubs and other vegetation which has accumulated during the year.



- ❑ Clean pine needles, leaves and other debris from roofs and gutters. This will eliminate an ignition source for firebrands, especially during hot, dry weather.



- ❑ Stack firewood and wood piles at least 30 feet from any structure. Clear away flammable vegetation within 10 feet of these wood piles. (Many



This home might not survive a wildfire.

homes have survived as a fire passed, only to burn later from a wood pile that ignited after the firefighters left.)

- ❑ Place liquefied petroleum gas (LPG) tanks and fuel storage containers at least 30 feet from structures.



Clear flammable vegetation from within 10 feet of all such tanks.



Remember, after you have established your **FireWise** environment, you must maintain it regularly. If you have any questions about creating or maintaining defensible space around your home contact your local fire department or Colorado State Forest Service district office.

BTR HOA CWPP
Appendix IV
Structure Ignitability

- IV – 1 CSFS Fact Sheet: Roofing (2 pages)
- IV – 2 CSFS Fact Sheet: Siding (2 pages)
- IV – 3 CSFS Fact Sheet: Windows (2 pages)

Roofing Materials



General

No material is "fire proof;" however, proper use and assembly of fire-rated building materials can reduce a fire's spread and extend the amount of time it takes for a home to ignite and burn. (Structural assembly is the process of layering materials when building exterior walls and roof.)

Your roof is vulnerable to wildfire because it is the largest surface area of your home. The exposed, uneven surface of a roof can easily trap hot, wind-blown embers. Simple roof forms are easier to protect than complex ones due to less surface area and intersections, which may create heat traps. Use class A or B roofing materials to reduce risk.

Wood shakes and shingles

The thin physical make-up and surface structure of wood shakes and shingles are readily combustible and conducive to fire spread.



Asphalt shingles

Asphalt shingles are the most economical in terms of cost and life expectancy. Mineral reinforced asphalt shingles have a Class C rating and are gradually being replaced by fiberglass reinforced asphalt shingles, which are Class A or B materials.



Metal: sheets and shingles

Metal roofing is sturdy, lightweight, and non-combustible. However, it requires a gypsum underlayment for a class A assembly rating.

Metal roofing comes in the form of galvanized steel with paint; aluminum with paint; stainless steel; and, copper. It is also manufactured in the form of imitation wood shingles.



Fiber-cement shingles

These synthetic cement shingles are manufactured with either a fiberglass or wood mixture and are less brittle than solid cement shingles. They are a non-combustible material, but require an underlayment for a Class A assembly rating.

Membrane roofs

These hard or semi-solid materials (i.e. hot tar and rubber) are applied to flat roofs and are slightly combustible. However, they are often used in conjunction with other materials, such as cement, and can be applied over a gypsum underlayment for a Class A assembly rating.

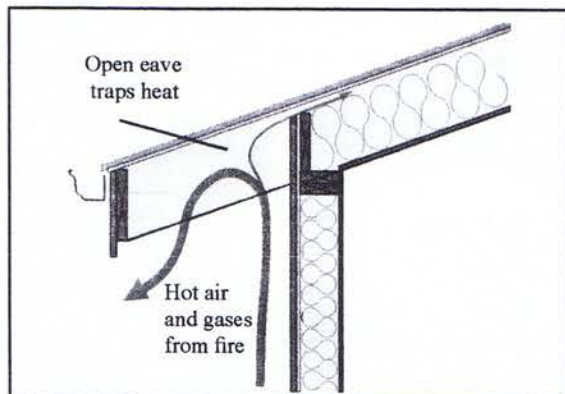
Tile, clay tile, concrete and slate shingles

These thick noncombustible materials can be manufactured to look like wood shingles. They have a Class A rating and provide the best protection against fire.

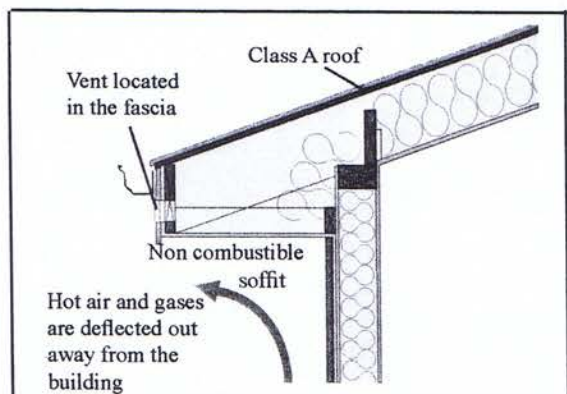


Eaves and soffits

Enclose open eaves with a flat soffit to deflect burning embers and gasses.



Open eave with no soffit



Fully enclosed soffit with isolated vent

The combined use of fire-rated building materials, assembly, and design will give your home a chance of surviving a wildfire.

Ratings are based on assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

- A (the best –2 to 4 hrs)
- B (1 hr)
- C (20 min)

Material Classification

Class A

Brick	Concrete
Tile	Slate
Clay	Asphalt
Metal	Fiber-cement

Class B

Pressure-treated shakes and shingles

Class C

Wood shakes and shingles
Plywood
Particleboard

Material Class is categorized by composition or resistance to fire (combustible or noncombustible). Class A has the highest resistance, Class C has the least resistance.

However, Class A materials generally need an underlayment of additional materials to give it an *A rating*. This is because Class A materials conduct heat beyond the exterior.

References

For additional information on protecting your homesite, see:

- 6.302, *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*

For more information or assistance contact your local fire department, or the Colorado State Forest Service.

Siding

App IV-2



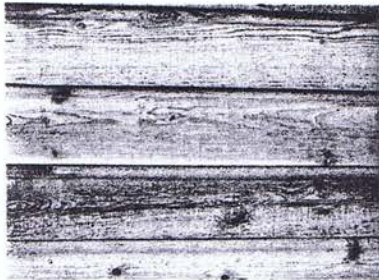
General

No material is "fire proof." However, the proper use and assembly of fire-rated building materials can reduce a fire's spread and lengthen the amount of time it takes for a home to ignite and burn. Structural assembly is the process of layering materials when building exterior walls and roof.

Your home's exterior walls and siding are most susceptible to radiant heat and open flame. Typically, the corners of your home are the weakest part of the structure. This is due to high surface to volume ratios. It is recommended that Class A or B *rated* siding materials be used.

Wood panels and boards

Wood panels and boards are readily combustible, and conducive to fire spread. A fire can burn through these materials to the underlying structure in less than 10 minutes. A gypsum underlayment can increase burn time to a one-hour rating.



"Real" Stucco

This noncombustible, one-hour rated material is a cement and gypsum mixture. It is applied in two or three coats and reinforced with metal mesh.

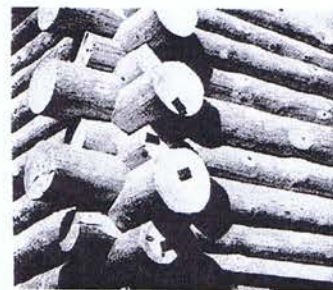
Synthetic stucco, exterior insulating finish system (EIFS)

Synthetic stucco is an acrylic cement finish on fiberglass mesh. This material is noncombustible and has no rating by itself.

This product is interesting because it significantly delays fire due to the insulation quality of the rigid foam and the fact that the system does not ignite; it actually fails and falls away. In moderate to high fire hazard situations this product works well.

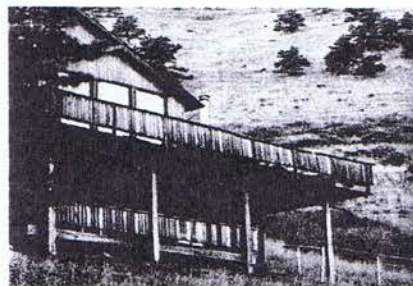
Heavy timber or log construction

The low surface-to-volume ratio of heavy timber takes longer to burn; this makes it a practical choice in medium to high fire risk areas. The minimum thickness for log construction is six inches for the frame and exterior siding, and three inches for steps and decking.



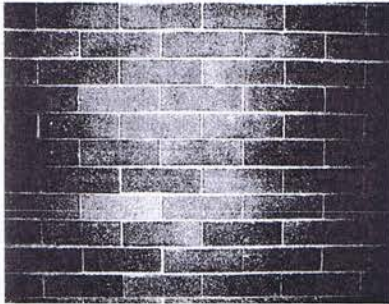
Concrete synthetic stone

This noncombustible synthetic stone is reinforced with fiberglass and metal mesh, and has a one-hour rating.



Brick, stone and block

These permanent, noncombustible materials usually have a two-hour rating, and are the best to use in regard to fire.



Material **Class** is categorized by composition, or resistance to fire (combustible or noncombustible). Class A has the highest resistance; class C has the least resistance.

Ratings are based on the assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

A (the best – 2 to 4 hrs)

B (1hr)

C (20 min)

Material Classification

Class A/B

- Brick
- Stone
- Block
- Concrete synthetic stone
- Metal
- Stucco
- Synthetic stucco
- Fiber cement panels, boards, shingles
- Heavy timber log (minimum of six-inch diameter)

Class C

- Wood panels and boards

However, Class A materials generally need an underlayment of additional materials to give it a class A *rating*. This is because Class A materials conduct heat beyond the exterior.

The combined use of fire-rated building materials, design, and assembly gives your home a better chance of surviving a wildfire.

References

For additional information on protecting your homesite, see Colorado State University Cooperative Extension Fact Sheets:

- 6.302, *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 Hazards*

For more information or assistance contact your local fire department or the Colorado State Forest Service.



August 2005

Windows and Glass



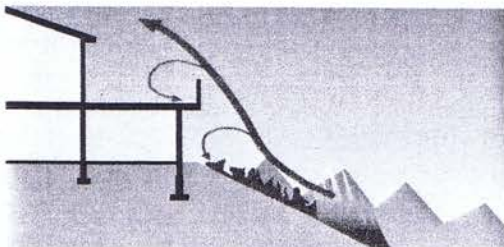
General

No material is "fire proof." However, the proper use and assembly of fire-rated building materials can reduce a fire's spread, and extend the amount of time it takes for a home to ignite and burn.

Windows are the weakest component of your home in relation to wildfire. Glass can fracture within five minutes in direct heat. If the glass breaks and dislodges, your home's interior is vulnerable to fire. Keep the following in mind when building or remodeling your home:

Large vs. small windows

If fractured glass stays in place during a fire it can continue to shield hot gasses and open flame from entering your home. However, radiant energy can eventually ignite materials behind the window even with glass in place. Windows smaller than 2'x 2' will hold fractured glass in place better than larger windows.



Small and large windows

Thermopane or double glazed windows

Thermopane or double-glazed glass will last twice as long as conventional glass windows (ten minutes). The same effect of convective and radiant energy apply, but, because there are two layers, the second pane is protected until the glass on the first has completely failed and fallen away.

Low E and tempered glass

Tempered glass is resistant to high impact and high heat, while Low E (low emissivity) glass stops the transfer of radiant heat beyond its exterior. The combination of the two provides the best protection in a wildland fire.

Glass block

Glass block is also a good alternative. Though not as visually appealing, this fire resistive glass has the highest rating (90 minutes).



Other:

- Solid in-pane shutters can offer an additional 10-20 minutes of protection
- Solid aluminum frames are best. Upgrade frames when windows are upgraded to better insure glass stability and hold during a wildfire.

Windows and glass do not have "Material Classification" labels that other building materials have, but the same concept applies. Understand the difference between material *Class* and *Rating*, and use this knowledge when upgrading around your home.

Ratings are based on the assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

- A (the best – 2 to 4 hrs)
- B (1hr)
- C (20 min).

Material Classification (in general)

Class A

- Inorganic materials (metal, brick, tile etc.)

Class B

- Whole wood materials (usually pressure treated, or thick diameter)

Class C

- Reconstituted wood (plywood, particle board, hardboard etc.)

Material **Class** is categorized by composition, or resistance to fire (combustible vs noncombustible). Class A has the highest resistance; Class C has the least resistance.

However, Class A materials generally need an underlayment of additional materials to obtain class A *ratings*. This is because Class A materials conduct heat beyond the exterior.

The combined use of fire-rated building materials, design, and technique will give your home a fighting chance to survive a wildfire.

References

For additional information on protection your homesite, see:

- 6.302, *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 Hazards*

For more information or assistance contact your local fire department, or the Colorado State Forest Service.



August 2005

**Burning Tree Ranch
Homeowner's Wildfire Assessment Checklist**

Date: _____

Owner: _____

Address: _____

BOLD FACE RESPONSES INDICATE ACTION IS RECOMMENDED.

1. Topography:

Orientation of Long Axis of Home: N-S E-W Other: _____
% Slope w/in 75 ft of Residence Zone 2 Distance (Fig 2 CSU Pub 6.302)
N side: +/- _____
S side: +/- _____
E side: +/- _____
W side: +/- _____

2. Site Natural Vegetative Cover:

Gambel Oak/Scrub	_____ % Dense	Medium Open	_____ % Dead
Ponderosa Pine	_____ % Dense	Medium Open	_____ % Dead
Grass	_____ %		

Dense: Most tree branches in contact. Few openings in canopy

Medium: Approximately 50% of branches in contact

Open: Few branches in contact. Some clumped trees, but most trees are isolated.

3. Access and Signage:

Driveway length, measured from road.	_____ ft.	
Narrowest driveway width. (min 12 ft.)	_____ ft.	
Lowest driveway overhead clearance. (min 12 ft.)	_____ ft.	
Is residence clearly visible from road?	YES	NO
Is the address clearly displayed and visible from road?	YES	NO
Is the driveway entrance clearly addressed?	YES	NO
Is a turn-around area adequate for a fire engine available? (minimum 20 ft. by 40 ft. hammerhead)	YES	NO

4. Residence:

Roofing Materials:

Shake, A-F Shingle, Tile/Concrete, Metal, Other: _____

Siding Materials:

Brick/Masonry, Stucco, **Wood**, Vinyl, EFIS, Fiber-Cement, Other: _____

Are there tree branches overhanging the roof? **YES** NO

Are there tree branches within 15 ft. of any chimney? **YES** NO

Are the roof and gutters clear of leaves and debris? YES **NO**

Do all wood burning chimneys have screens or spark arrestors? YES **NO**

Decks and balconies:

Are there above ground decks or balconies? YES NO

If yes, are they enclosed?	YES	NO
Are there combustible materials underneath the decks?	YES	NO
Are there trees within 10 ft. of the deck/balcony?	YES	NO

5. Outbuildings:

YES NO

Barn? Approx size: _____

Shed? Approx size: _____

Orientation of Long Axis: _____ N-S E-W Other: _____

Roofing Materials:

Shake, A-F Shingle, Tile/Concrete, Metal, Other: _____

Siding Materials:

Brick/Masonry, Stucco, **Wood**, Vinyl, EFIS, Fiber-Cement, Other: _____**6. Utilities/Hazards:**

Are utilities above or below ground? _____

Location of natural gas shut-off/meter. _____

Location of electrical service shut-off. _____

Is there a propane tank? YES NO

Location of tank? _____

Is it at least 30 ft. from any structure? YES NO NA

Is the tank buried? YES NO NA

Has all brush been removed 10 ft around it? YES NO NA

Is there an automatic shut-off valve? YES NO NA

Is there a firewood stack? YES NO

Is it 30 ft from any structure? YES NO NA

Has all brush been removed 10 ft around it? YES NO NA

Are there any other hazards on the property? _____

7. Defensible Space (see Note 1 & 2 below):**Zone 1:**

Is the initial 15 ft. beyond the structure's eave line free of brush, shrubs and trees? YES NO

If it is impractical to remove all trees within 15 ft of the structures, the building footprint shall be extended to include excepted trees. Excepted trees must have their limbs pruned to a height of 10 ft above ground and have all ladder fuels removed.

Zone 2:

Are the grasses mowed to a height of 6 inches or less out to the Zone 2 distance from para 1 above? YES NO

Have all ladder fuels been removed? YES NO

Have all trees had their branches pruned up to a height of 10 ft? YES NO

Have trees been thinned to a crown spacing of 10 – 12 ft, with the exception of occasional clumps of 2 to 3 trees? YES NO

Have all dead scrub and trees been removed? YES NO

Have all oak and scrub clumps been reduced to a diameter of no more than twice the scrub height? YES NO

Has the clear distance between oak and scrub clumps been increased to a minimum of two and one half times the scrub height? YES NO

Have all oak and scrub clumps been thinned to a stem spacing of 5 to 6 ft, so that the space between stems may be maintained by mowing? YES NO

Has all slash from thinning and pruning and any dead leaves or pine needles been removed? YES NO

Zone 3:

Have all dead scrub and trees been removed? YES NO

Have all ladder fuels been removed? YES NO

Have all oak and scrub clumps been reduced to a diameter of no more than twice the scrub height? YES NO

Has the clear distance between oak and scrub clumps been increased to a minimum of two and one half times the scrub height? YES NO

Has all slash from thinning and pruning been removed? YES NO

Remarks/Recommendations: _____

Notes:

1. Refer to CSU Pub 6.302 Creating Wildfire Defensible Zones available at Appendix IV or at www.csfs.colostate.edu.

2. The presence of combustible roofing and/or siding materials necessitates comprehensive defensible space development and maintenance. Replacement of these materials with noncombustible materials during major maintenance or remodeling is recommended.

Assessment Conducted By: _____