

Community Wildfire

Protection Plan

September 19, 2007

Prepared For

Woodlands Homeowners Association
And
Escavera Homeowners Association

By

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

INTRODUCTION AND ACKNOWLEDGEMENTS

The Woodlands-Escavera Community Wildfire Protection Plan (CWPP) is a broad plan focused on the protection of residents, structures and scenic environment of Woodlands and Escavera communities from catastrophic wildfires. The CWPP represents a collaboration of Colorado State Forest Services, Castle Rock Fire Rescue Department, Woodlands Homeowners Association, Escavera Homeowners Association and its Fire Mitigation Committee. The CWPP is intended as a *living document* and will be updated as wildfire mitigation and firefighting methodologies and support technologies change. The Woodlands-Escavera CWPP is sponsored by the Castle Rock Fire Rescue Department. This CWPP follows the guidelines set forth in the *Health Forest Restoration Act of 2003* and the *Colorado State Forest Service Minimum Standards for Community Wildfire Protection Plans* (See Appendix H).

ACKNOWLEDGEMENTS

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

- Castle Rock Fire Rescue Department
- Castle Rock GIS Department
- Colorado State Forest Service
- Castle Rock Recreation Center
- Woodlands HOA
- Escavera HOA

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- Intermountain Rural Electric Association
- Douglas County Public Library
- The many residents of Escavera and Woodlands who took time from their busy schedules to guide this document to its completion

EXECUTIVE SUMMARY

The Woodlands-Escavera Community Wildfire Protection Plan (CWPP) is sponsored by Castle Rock Fire Rescue Department for the safety of life and protection of property in Woodlands and Escavera neighborhoods and their immediate vicinity. Participation in the establishment of this CWPP was a broad stakeholder group including Colorado State and Town of Castle Rock agencies. Development of this CWPP focused primarily on wildfire hazard identification, fuel mitigation and emergency response. The fuel mitigation focused on specific wildfire risk areas with heavy fuel densities and terrains that could be used for protection and wildfire prevention advantage, coupled with close attention paid to upholding ecological values. Wherever possible, other values such as wildlife habitat enhancement, forest health restoration, improved aesthetics and increased property values will be factored in.

The Castle Rock area is no stranger to wildfires and the need for wildfire prevention and protection. The proximity of Cherokee Fire (2003, 1,200 acres), the Buffalo Creek Fire (1996, 11,000 acres), Hi Meadow Fire (2000, 12,000 acre) and the Hayman Fires (2002, 138,000 acres) emphasized the fact that wildfires “*can happen here!*” In 2006, the Castle Rock Fire Rescue Department (“CRFRD”) recognized the importance of developing a program to address the wildfire risk to the community. It began by investigating funding sources for fuel treatments and development of a long range plan for wildfire protection. The CRFRD has been guided by a committee of concerned residents of the Woodlands and Escavera neighborhoods that has formed a “Fire Mitigation Committee” to advise the Woodlands and Escavera Homeowners Association Board of Directors. Some of the committee members have worked in the past with CRFRD personnel to address the wildfire issue on their individual properties.

The Woodlands and Escavera neighborhoods (“the HOA’s”) have two significant areas outside of their boundaries that could pose a potential wildfire fire threat to the community. These areas termed in total as the *Wildland Urban Interface* (WUI) area consist of all lands bounded by Interstate 25 to the west, Founders Parkway to the east, Metzler Ranch to the north and Colorado Highway 86 to the south. With this CWPP, care was taken to propose and provide mitigation within the neighborhoods to provide fuel breaks to lower the risk of spreading wildfire and to protect residents from potential wildfire intrusion from the various risk sections of the adjoining WUI. Five Compartments with varying degrees of mitigation were identified within the community. Mitigation for these areas will be reviewed annually for scheduling with full completion to take from seven to twelve years, depending on availability of funds from multiple sources. Maintenance of previously treated areas should be scheduled as needed to keep fuel treatments effective.

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

This CWPP identifies the response, both from professional agencies and volunteer groups that may be employed for wildfire protection or fire suppression, arresting wildfires threatening areas within or outside the HOA’s. Castle Rock Police, in conjunction with CRFRD have the primary responsibility for protecting life and property in the HOA’s in the event of a wildfire incident. If a wildfire event is beyond their resource capability, the Town (inclusive of CRFRD) is party to a mutual aid agreement for support from other Douglas County fire departments.

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

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

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

GOALS, PLAN COMPONENTS & ON-GOING MAINTENANCE OF PLAN

Primary Purpose

The Woodlands-Escavera CWPP was developed for the safety of life and protection of property from wildfire emergencies within the boundaries of the HOA's and the adjacent surrounding areas while upholding the ecological values of the community.

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

Goals and Objectives of the Plan

Fuel Mitigation:

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

Emergency Response:

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

Private, State and Federal Grants:

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

Administration and Plan Maintenance:

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

Plan Components

The Woodlands-Escavera CWPP provides four primary sections plus reference information. Geographical and ecological background along with forest management and wildfire history is detailed in Chapter 3. Chapters 4 and 5 cover, respectively, hazards assessment and Emergency Egress. Chapter 6 covers the resources for addressing wildfires. Chapter 7 identifies communication and information support for the residents in and around the HOA's in the event of a wildfire emergency. Finally, Chapter 8 is the implementation plan of the Community Wildfire Protection Plan, detailing public

education, fuel treatment - mitigation priority, timeline and funding methods, and support systems additions and funding.

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

Maintenance of the Plan

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

Each year, at least three months prior to the Annual meeting of the Woodlands and Escavera memberships, the boards may formally request its Wildfire Mitigation Committee to conduct a CWPP performance review to include both an overall plan evaluation of the CWPP for the past wildfire season as well as any proposed changes to the CWPP for the following year. This schedule may be adjusted to allow conformance with each HOA’s budget cycle. The overall evaluation and recommended changes to the CWPP will be presented and addressed at the Annual membership meeting. Changes will be formally incorporated into the CWPP and furnished to all stakeholders by January of the following year. These changes should also be reflected in the HOA budgets for the following year.

Between the aforementioned Wildfire Mitigation Committee meeting and the formal updating of the CWPP each year, the HOA boards or their representative(s) will meet with key stakeholders representing primary professional forest management, fire prevention and emergency services management to review proposed CWPP changes and updates. Once the HOA boards and the key stakeholders are in agreement to the proposed changes and updates to the Woodlands-Escavera CWPP, those changes and updates will be available for public perusal and comment; either at a pre-announced public meeting or through the HOA websites.

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

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

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

Background and History

The **Town of Castle Rock** is a home rule municipality that is the county seat of Douglas County, Colorado, United States. Castle Rock is located about 35 miles south of Denver and 40 miles north of Colorado Springs on the Interstate 25 corridor just east of the front range of the Rocky Mountains. The town is the center of the burgeoning urbanization of the county. Castle Rock is named after a small prominent butte just north of the town, clearly visible from Interstate 25. Public access is provided to climb to the top of the rock. Castle Rock is on East Plum Creek, a small stream which periodically floods. As of 2005, the city is estimated to have a total population of 35,745.^[1] Castle Rock is now the 19th most populous municipality in the State of Colorado. (Source: Wikipedia)

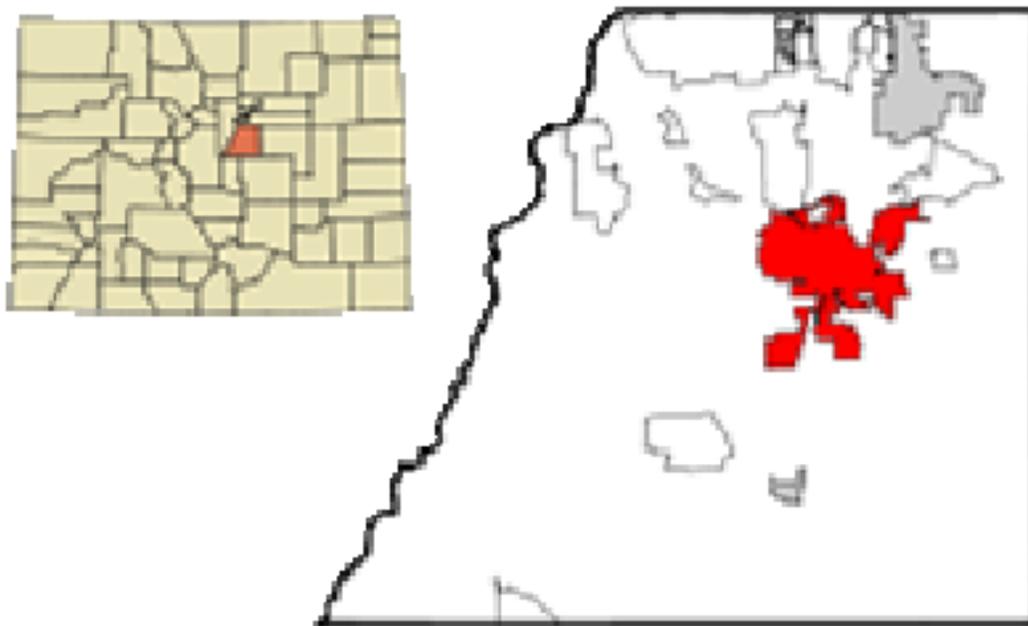


Figure 1, Castle Rock and Douglas County

History

Castle Rock was founded in 1874 when the eastern Douglas County border was redrawn to its present location. Castle Rock was chosen as the county seat because of its central location.

The region in and around Castle Rock was originally home to Native Americans of the Arapahoe and Cheyenne tribes. They occupied the land between the Arkansas and South Platte Rivers. White settlers were drawn by rumors of gold and by land opened through the Homestead Act of 1862.

One of the first settlers in the area near today's Castle Rock was the original homesteader, Jeremiah Gould. He owned about 160 acres to the south of "The (Castle) Rock." At that time, the settlement consisted of just a few buildings for prospectors, workers, and cowboys. In 1874 Jeremiah Gould donated 120 acres to the new town that was also now home to the Douglas County government. For the beginning the six streets named Elbert, Jerry, Wilcox, Perry, Castle and Front were laid out to build the actual town of Castle Rock. The Courthouse Square was

defined and about 77 lots, each 50 by 112 feet, were auctioned off for a total profit of \$3,400.00 - a lot of money at that time!

It was not gold that put Castle Rock onto the map. The discovery of Rhyolite stone made the reason to build a settlement that would become Castle Rock.

A new train depot brought the Denver and Rio Grande Railway to the area. The depot building now houses the Castle Rock Historical Museum on Elbert Street, where visitors can see history of how Castle Rock changed over the years. Castle Rock currently encompasses about 35 square miles, with a population of more than 42,000 ^[2] in town and 70,000 in the surrounding area. (Source: Wikipedia)

Fire/EMS (Source: CRFD Web Site)

The Castle Rock Fire and Rescue Department (CRFD) protects the life and property of all residents in a 75-square-mile area including the Town of Castle Rock and the Castle Rock Fire Protection District in Douglas County. Founded in 1892, the department has 70 (68 uniformed staff) career personnel and volunteer personnel who staff four fire/rescue stations 24 hours a day to provide fire and medical services to the community. The department has 15 apparatus including one ladder truck, three engines and four medic units.



Members responded to a bus rollover on August 5, 2007.

A full-service, "all-hazards" organization, CRFD provides fire prevention/inspection services, fire suppression (structural, wildland and vehicle), advanced life support emergency medical services (paramedic ambulance transportation), public and risk reduction education, hazardous materials response and mitigation and technical rescue (trench, confined space, building collapse and water rescue) services. In 2006, the Department responded to 3,525 calls for service, an increase of 96 calls compared to 2005.

CRFD is the EMS provider for the Town and Fire Protection District, including emergency medical transport. Paramedics staff all fire engines and ambulances. The average response time is five minutes and 50 seconds.

The Castle Rock Fire and Rescue Department offers many important and life-saving tips so homeowners may ensure their safety at home.

Operations Division

Staffed by one division chief, three battalion chiefs, 12 lieutenants, and 45 firefighters, all of whom are paramedics or EMTs, the Operations Division delivers direct emergency and non-emergency services 24 hours a day, seven days a week to residents of Castle Rock and surrounding areas.

Operating out of four stations, the Division is organized into three separate shifts. A, B, and C shifts work a Berkley schedule: 24 hours a day every other day for three days before taking four days off -- equaling a 56-hour work week. A battalion chief, who oversees the lieutenants and their crews operating out of each station, commands each shift.

The Operations Division responds to fires, medical emergencies, auto accidents, odor investigations, natural or LPG gas leaks and, in conjunction with the Special Operations Command, to hazardous materials incidents, technical rescue (high/low angle rope rescue, trench rescue, confined space rescue, building collapses), and wildland fires.

The Operations Division manages the delivery of emergency medical services (EMS) including the Ambulance Budget, EMS training program, and EMS certifications.

The Division Chief is also designated as the Privacy Officer. An in-house Continuing Education program provides CEU's for department paramedics and EMTs. Public education for CPR and AED programs is coordinated through the Division.

An ongoing commitment is also made to community relations and public education including station tours, in-school programs, block and birthday parties, and car seat safety inspections. The Division also oversees the Explorer Program and assists the Support Services Division with maintenance.

The Operations Division also manages communications and information systems, including 800 and VHF radio communications, cellular, paging, and satellite communications, computer records management systems (RMS), Computer Aided Dispatch (CAD) response programming, and mobile data systems. The Fire and Rescue Department is dispatched by the Douglas County Sheriff's Office under the United Fire Dispatch Authority.

Wildland Fire Team

The highly trained and dedicated Wildland Fire Team played an important role in containing the Hayman Fire in 2002, and is committed to reducing wildfire loss through suppression, fuel management and education. The Wildland Fire Team assists in the wildfire mitigation program, Firewise, and is working to help Castle Rock become a Firewise Community.

The Team cooperates with the United States Forest Service (USFS) as well as the Colorado State Forest Service (CSFS), and trains in accordance with, and meets the qualifications required by the National Wildfire Coordinating Group (NWCG)/National Interagency Incident Management System (NIIMS).

The firefighters assigned to the Wildland Fire Team have been deployed to wildland fires throughout the West, including Well (2004), Picnic Rock (2004), Hayman North, Hi-Meadow, Bobcat, Schoonover, Cone Mountain, Topaz Mountain, Los Alamos, Mesa Verde, Turkey Creek, and Snaking. The team has assisted on initial attack incidents within Douglas County, including the Pike National Forest.

Typically, members of the Wildland Fire Team respond in Type 6 Engines (brush units) or Type 1/2 Engines for structural protection. The Team is also available to respond in a Type 3 Engine.

In addition to fire suppression, team members stress education to promote safety in wildland areas.

Support Services Division

The Support Services Division fights fire through education and prevention. It coordinates and manages the fire prevention program, plan review, community relations and public education, and inspection services. This Division also coordinates and manages the Fire and Rescue Department's fleet and facilities.

The Division is also responsible for recruiting and testing new employees as well as promotional testing, and administering the Candidate Physical Ability Test (CPAT) program.

Risk management is another area of emphasis and includes managing programs such as workers compensation, risk management, accident investigation, and the compliance program.

The Deputy Chief also serves as the organization's Chief Financial Officer (CFO) and manages the budget and spending programs.

The Division is staffed by one Deputy Chief/Fire Marshal, one Lieutenant, one Support Services Technician, and two Inspector/Investigators.

Firewise

The Castle Rock Fire and Rescue Department is developing a Firewise Program for the residents of the Town of Castle Rock and the Fire Protection District.

Firewise is designed to assist homeowners to effectively mitigate their property from the threat and conditions of wildfire through identification, recommendation, and implementation of proper risk reduction efforts. The Fire and Rescue Department works together with homeowner's associations, as well as individual property owners in high wildfire risk areas. For additional information on the Firewise Program, please visit the official <http://www.firewise.org/>.

Inspector/Investigator Paul Russell is the Fire Education officer and can be reached at 303.660.1066.

Woodlands-Escavera CWPP Pilot Project

The Woodlands-Escavera CWPP Pilot Project was initiated to assist the Woodlands and Escavera neighborhoods in development of a community based wildfire protection plan following Colorado State Forest Service (CSFS) criteria. Key members of each community were contacted and a Firewise Committee formed with representatives from each community. (See Figure 2)

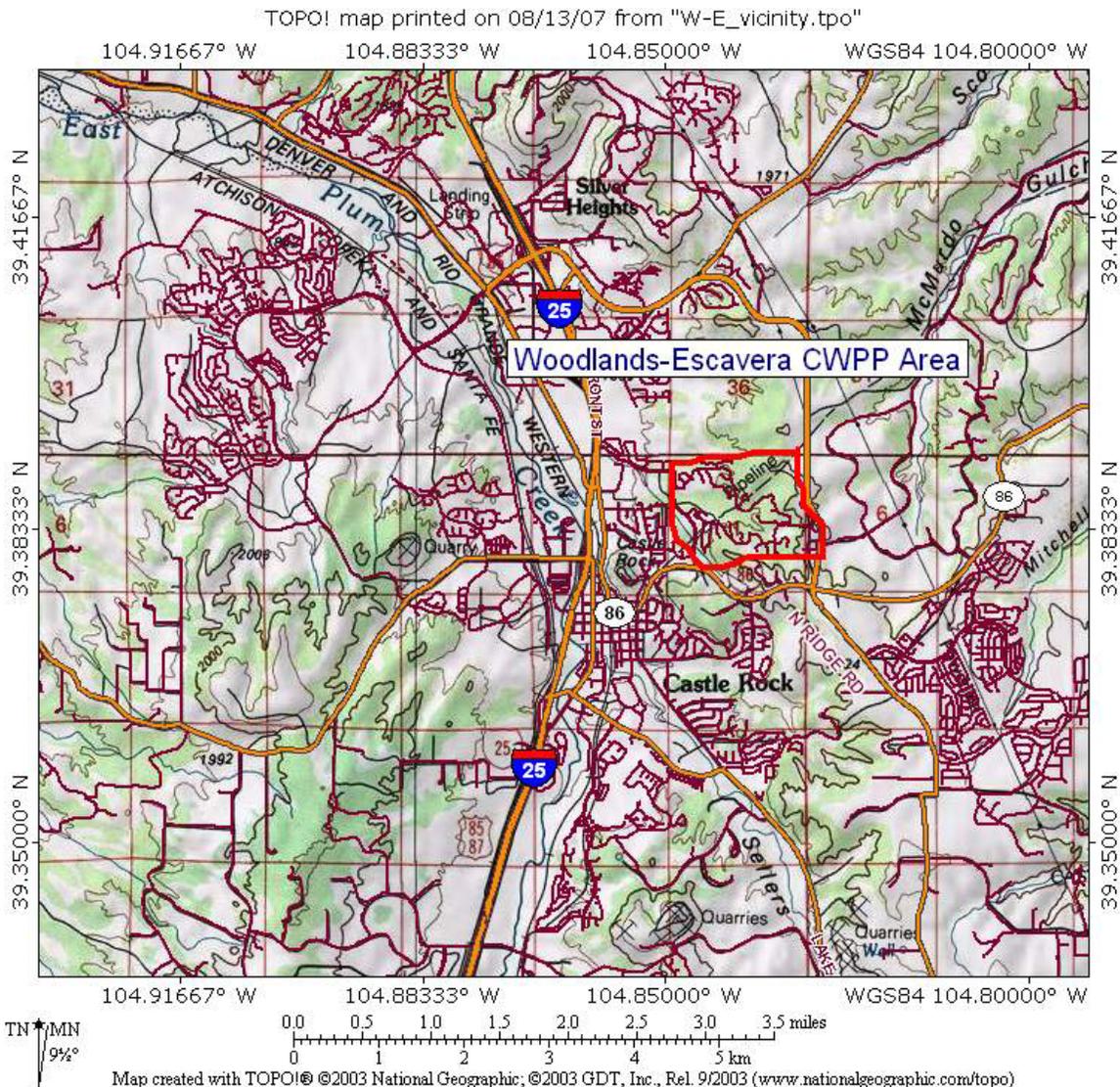


Figure 2, Woodlands-Escavera Vicinity Map

The neighborhoods are a mix of “Interface” (abutting wildland fuels) and “Intermix” (surrounded by wildland fuels) homes located in heavy gambel oak and scattered ponderosa pine. Open spaces surround or run through each neighborhood. Open spaces are owned by the Town of Castle Rock, Woodlands HOA, Escavera HOA and Villages at Castle Rock #4 Metropolitan District. The northern and southern portions of the neighborhoods abut unincorporated properties in Douglas County. The Woodlands-Escavera neighborhoods are shown in Figure 3 . A portion of the CWPP area (“Woodlands Bowl”) is protected by a Conservation Easement held by the Douglas Land Conservancy.

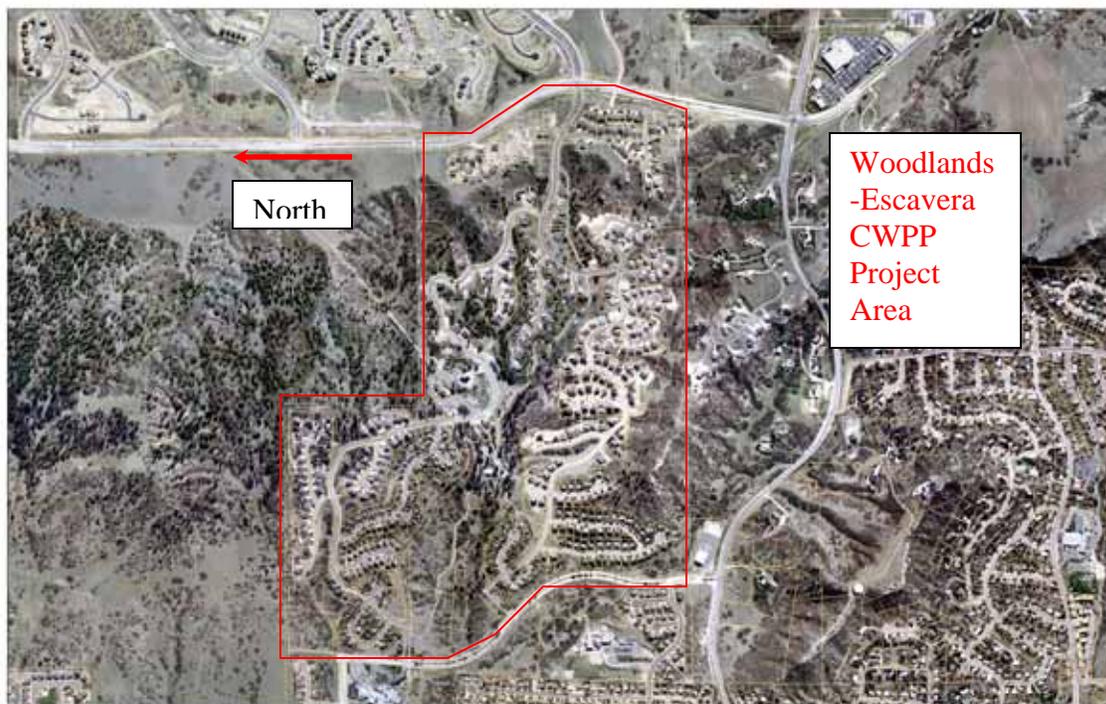


Figure 3, CWPP Area

Woodlands Neighborhood

The Woodlands was developed in the early 1980's with initial construction started in approximately 1983. Two separate areas were developed along Woodlands Boulevard. The economic downturn hit by the mid-1980's and development slowed. An economic upturn in the early 1990's saw completion of the existing platted neighborhoods. All homes are "single family detached" housing typically on small, suburban lots. The community is almost at 100% build-out.

The community is a "Covenant Controlled Community" under governed by the Colorado Common Interest Ownership Act (CCIOA). An elected board of directors oversees administration of the Woodlands Homeowners Association (W-HOA) and also serves as its Architectural Control Committee (ACC). In 2005, the Colorado State Legislature passed SB-100 (See Appendix B) that allows homeowners to perform wildfire mitigation in covenant controlled communities. The law established a procedure for homeowners to follow under which wildfire mitigation must be allowed by the HOA.

Escavera Neighborhood

The Escavera community was developed in the early 2000's as a master planned community. Several product types were established. The eastern and southern parts of the community are higher density single family detached housing set on more typical residential lots in an interface arrangement. The western and northern portions of the community are larger lot custom homes set in an intermix arrangement. Both housing types are surrounded by common areas owned by the Escavera Homeowners Association (E-HOA), Town of Castle Rock or W-HOA. The community is at approximately 80% build-out.

The community is administered by an elected board of directors and is also governed by CCIOA. Its ACC is administered by a Landscape Architect with the landscape and planning firm of Norris Design, Inc. SB-100 also impacts the E-HOA and allows for homeowner wildfire mitigation.

Forest and Fuels History

Portions of the site are historic woodlands with scattered brush species (gambel oak, chokecherry, wild plum, current, etc.). Low intensity fires burned periodically through the area that occurred every 20 to 50 years. Fire starts were typically set by lightning or indigenous peoples. Ponderosa pine stands were kept clear of heavy fuel volumes, a mosaic was created based on irregular fire starts, and allowed for a greater diversity of plant species.

Once European settlers arrived in the area, much of the timber was harvested for use by local communities as lumber and fuel wood. It is suspected fires may still have occurred from escaped camp fires and related human activities. Land clearing for agricultural uses often used fire to remove stumps and brush species.

In the early 1900's, fires were found to be destructive by users of the land, and were often suppressed. By the 1930's, a policy of suppressing all fires became prevalent throughout the country. There was little understanding or appreciation for fire's role in the ecosystem. This policy of total fire suppression, as we know today, has resulted in heavy volumes of fuel that have accumulated over the past 80-100 years. Much of the native areas we see today can no longer be considered as being truly "natural" from a true historical perspective.

The population has expanded into these fire prone areas at a time when fuel levels have reached potentially destructive levels. Thus, the "Wildland Urban Interface" (WUI) has developed where lives and homes are increasingly placed at risk.

More recent events have added to the fuel loading in the Woodlands-Escavera neighborhoods. First, the gambel oak (scrub oak or oak brush) is very mature. Historically, fires burned through the area on a regular basis, and prevented oak from reaching sizes seen today. One hundred plus years of fire suppression has prevented periodic lower intensity wildfires from burning and renewing the gambel oak plant community. Wildfires typically burned irregularly creating a mosaic of plant diversity across the landscape. This was also better for wildlife that depends on a variety of plants for survival. Much of the diversity that existed before European settlers arrived in the 1800's has been replaced with what is seen today.

Second, the hard freeze that occurred in May 2001 took a heavy toll on gambel oak that had started to leaf out across Douglas County. The deep freeze severely damaged many plants, resulting in much of the "stag heading" seen now. The fact that the freeze happened to over mature plants didn't help. Their ability to rebound is not like that of younger, more vigorous plants.

Third, the drought arrived as the straw that broke the camel's back. In some areas of the community, gambel oak has died back so severely there may be no choice but to cut it and re-invigorate new growth. Fortunately, the roots needed for good re-sprouting appear to be healthy.

Finally, the fire danger in the area has risen significantly due to this increase of readily available fuel. When fires start, they will burn hotter with increased flame lengths that place the entire forest and homes at risk.

WILDFIRE HAZARD ASSESSMENT

This section of the Community Wildfire Protection Plan addresses the identification and the prioritization of fuel mitigation breaks for high risk wildfire hazards impacting Woodlands-Escavera (“W-E”) neighborhoods as well as a brief assessment of vegetation fuels currently within the proposed fuel treatment areas. The addressed wildfire hazard areas identify both developed areas in the neighborhoods and those areas immediately outside of the W-E CWPP boundaries in the Wildland Urban Interface areas described in Chapter 3, *Background and History*.

Methodology and Strategies

The developed portion of W-E CWPP area contains major “*refuge zone*” areas (see Figure 5): Founders Parkway roadway and medians; and Woodlands Boulevard roadway and medians. The Town of Castle Rock Recreation Center could also be considered a refuge zone. A smaller refuge zone is the small neighborhood park and detention pond area located on Black Pine Drive. Extending away from the major “*refuge zones*” are various mixtures of heavily developed areas and scattered undeveloped areas. All of these zones vary in the concentration of vegetation stands from significantly mitigated common areas to dense stands of ground, ladder and crown fuels.



Figure 5, Refuge Zones and Egress Routes.

Two primary decision considerations were used in the methodology for identifying potential fuel treatments within the developed areas of the CWPP: established road (both paved and rough) rights of way, and “*connections*”. For proposed fuel treatments tying to roads, mitigation widths of sixty (60) feet were considered for ease of use since that footage corresponded with road rights of way; i.e., thirty (30) feet either side of the centerline of the designated road. It should be noted that the 60 feet is for ease in assisting quicker access since it corresponds with most road rights

of way. It should also be noted that negotiations should be undertaken with private land owners adjacent to road rights of way areas as well as private lands in general to build fuel breaks with widths as specified by the Colorado State Forest in its *Fuelbreak Guidelines for Forested Subdivisions* (See Appendix G). For ease of planning in this Community Wildfire Protection Plan, wildfire fuel treatments in unimproved areas such as paved paths or trails or across solid stands of vegetation, were also preliminarily considered to be sixty feet wide for ease in estimating acreage. The length of the proposed fuel treatment, coupled with the width of the break and the density/types of vegetation were used to calculate the estimated costs of mitigation associated with each proposed fuel treatment / mitigation project area. An additional factor of ten percent was added to the acreage to account for measurement discrepancies.

“*Connection*” is a term for wildfire fuel treatments used with this Community Wildfire Protection Plan to describe fuel treatments that “*connect*” natural areas with light or no fuel content (e.g., rock ridges, riparian, etc.) or fuel treatments that “*connect*” more widespread thinned areas that have already had potential wildfire fuels mitigated. “*Connection*” breaks were proposed in areas of heavy home development/structures to assist in home area protection without destroying the environmental esthetics of the area. (See Appendix G, *Fuelbreak Guidelines for Forested Subdivisions*, for descriptions and rationale for building fuel treatments.)

For undeveloped areas within the CWPP area, such as specific areas within dense, untreated forests, potential mitigation would cover a much broader expanse of land than the wildfire fuel breaks considered for protecting developed properties.

Compartment Locating and Project Labeling

This Community Wildfire Protection Plan divides the Woodlands-Escavera neighborhoods into five compartments (see Figure 6), utilizing roadways and property ownerships. Within each compartment, sub-compartment treatment areas and “*connection*” fuel treatments are prioritized by wildfire impact risk and assigned a label, identifying the compartment area, the sub-compartment or connection break, and the mitigation priority. The fire hazard class will use the five-classifications used by the Colorado State Forest Service (See Appendix C, *Fire Hazard Classes and Fuel Models*).

Compartments will be identified as Compartments A-E. Sub-compartment or mitigation projects will carry a number designation. Mitigation priority levels will range from the highest to lowest on a 1 (highest) through 4 (lowest) priority rating. Hence, a mitigation area will carry a designation such as: “A-2-1” ...meaning the mitigation areas is within Compartment A; it is specifically project area 2 within the compartment; and is a project priority #1. The compartment boundaries are shown on the detail map below.



Figure 6. Compartments

Three Proposed Mitigation Strategies

The W-E Community Wildfire Protection Plan employs three strategies for effecting fuel mitigation for the identified and proposed projects. The application of a specific strategy is based upon the

ownership and developed or undeveloped aspects of the property proposed for mitigation. The aspects forming the basis of these strategies are two-pronged: cost and legal.

Road Rights of Ways and Town Land

For properties on which the Town of Castle Rock (CR) possesses rights of way or on properties directly owned by the Town (Open Space), mitigation work will be funded through grants received by the Town. This funding will either come from State or private grant funding or through Federal grant monies applied for and received by the Town.

Private Homeowner and Landowner Properties

Woodlands and Escavera HOA's neither have auspices nor declaration of use of private properties within its boundaries. Therefore, fuel mitigation on private properties, although highly encouraged by the HOA's and CRFD, is the responsibility of the property owner. However, the HOA's and CRFD will provide information and services to assist property owners in their mitigation efforts. These information and services will consist of references, Firewise planning details and planning guides, occasional Firewise training classes, a mitigation slash pile disposal site (currently within Town limits), and periodic provision of free mulch from the slash disposal site (See Appendices C and G, *Firewise Household Tips, Property Mitigation and Protection*).

On private lands adjacent to neighborhoods, lands or a road right-of-ways that have been mitigated to form a fuel treatment, owners are encouraged to work with W-E HOA's in "feathering" the mitigated fuel treatment into their private property to attain a wider fuel treatment as specified by Colorado State Forest Service (See Appendix C, *Fire Hazard Classes and Fuel Models*).

Woodlands HOA or Escavera HOA Properties

The HOA's will work on mitigating its properties as moneys become available. The W-E HOA's should strongly encourage the Town Council to enact ordinances to require property owners and land developers to *pre-construction-mitigate* fuels on high risk wildfire properties to be developed. This *mitigation* is envisioned to be required prior to allowing the building of structures to proceed (See Chapter 8, *Implementation Plan*). There appears to be some degree of acceptance of developers to this community protection strategy since some developers have agreed in principle and have indicated such to the CRFD. Both the HOA's and CRFD will work to assess potential in-fill areas that may be planned in these currently undeveloped but prime focus areas (See Chapter 8, *Implementation*).

Proposed Wildfire Fuel Treatment Areas

As indicated at the beginning of this chapter, the neighborhoods are divided into five compartments for the process of locating and defining potential wildfire fuel treatment needs. This information is shown below using compartment maps for the reader to reference and detailed on a compartment by compartment basis using the three character alphanumeric label (as specified in the second paragraph of this chapter) to designate project location, specific fuel treatment, and mitigation priority. Also shown is the location description, estimated mitigation acreage of the proposed fuel treatment and broad, estimated cost of the project. By using the maps, the reader should also be able to gain a sense of how fuel treatments were laid-out to develop wildfire limiting sub-compartments within the compartment.



Figure 7, Compartment A (Woodlands)



Figure 8, Compartment B (Woodlands)



Figure 9, Compartment C (Escavera)



Figure 10, Compartment D (Escavera)



Figure 11, Compartment E (Escavera)

Fuel Reduction Project Prioritization

The risk priority associated with each of the mitigation projects proposed in this plan was established by basing the decision on a number of factors.

- 1) The individual area and structures protected (Density of homes and structures);
- 2) Type and density of vegetation (Ignition and spread components);
- 3) Slope of area to be mitigated and slope of area to be protected (Spread component);
- 4) Position of area to be protected in relation to significant wildland urban interface areas; e.g., abutting heavily-treed forest land, fine fueled grassland or contiguous private undeveloped land (Buffer zoning);
- 5) Wildfire characteristics of each area learned from fire modeling experience;
- 6) Area presenting large impact in potential wildfire reduction;
- 7) Area heavily impacted from lightning activity.

Type of Mitigation Used for Projects

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

Vegetation Analysis

Current analysis of the density and varieties of vegetation is an integral part of deciding when to schedule projects. The aerial digital map below depicts the vegetation in W-E HOA area and its surrounding wildland urban interface from a 2004 photo flyover. Due to its age, it needs to be updated with the latest flyover information prior to final scheduling of a mitigation project. Vegetation mapping has been kept simple and follows old Colorado State Forest Service Fuel Mapping categories (See **Appendix C**). Expected fire behavior is shown in the Appendix for each of the fuel types ranging from Low to Extreme. These will be augmented by USDA Forest Service **National Fire Danger Rating System (NFDRS) designations** (General Technical Report INT-39).

NOTE: The CSFS fuel rating is not a currently accepted fuel modeling system. It is used here to simplify fuels for persons with no background or exposure to more complicated fuels

classifications. The old CSFS system using X, A, B, and C is very simplified, but adequate for homeowners and community leaders to make decisions based on a more familiar “Low to Extreme” type modeling system. Some in the fire industry are also using “Andersons Aids for Determining Fuel Models for Estimating Fire Behavior.” All three are shown in the chart below.

The classifications used here are as follows:

Old CSFS	NFDRS	Anderson	Description
O			Low Hazard or non-flammable areas. This includes bodies of water, road surfaces, well mowed greenbelts and golf course areas.
X	B, F	6	Heavy gambel Oak. (a.k.a. scrub oak, oak brush), mountain mahogany and other shrub species mixes. This fuel type is dominant in the entire community. (NFDRS Fuel Model B if untreated. Fuel Model F if mature.)
A	B, L, T	1	Light fuels like natural prairie grasses with a mix of rabbit brush. This type predominates in the east Compartment E. (NFDRS Fuel Model L. Areas with more than 1/3 rd rabbit brushed cover should be Fuel Model T.)
B	E, R	5	Medium fuels like those found along the edge of meadows with invading pines and other shrub mixes. (NFDRS Fuel Model E after leaf drop and Fuel Model R after trees have leafed out.)
C	G, H, U	2, 8	Heavy conifer tree areas found in pockets in the West and South Compartment. These tend to be predominantly Douglas-fir growing on north facing slopes. (NFDRS Fuel Model G if untreated with down fuels and dwarf mistletoe. Treated stands, thinned and ladder fuels removed, could be considered as Fuel Model H.)

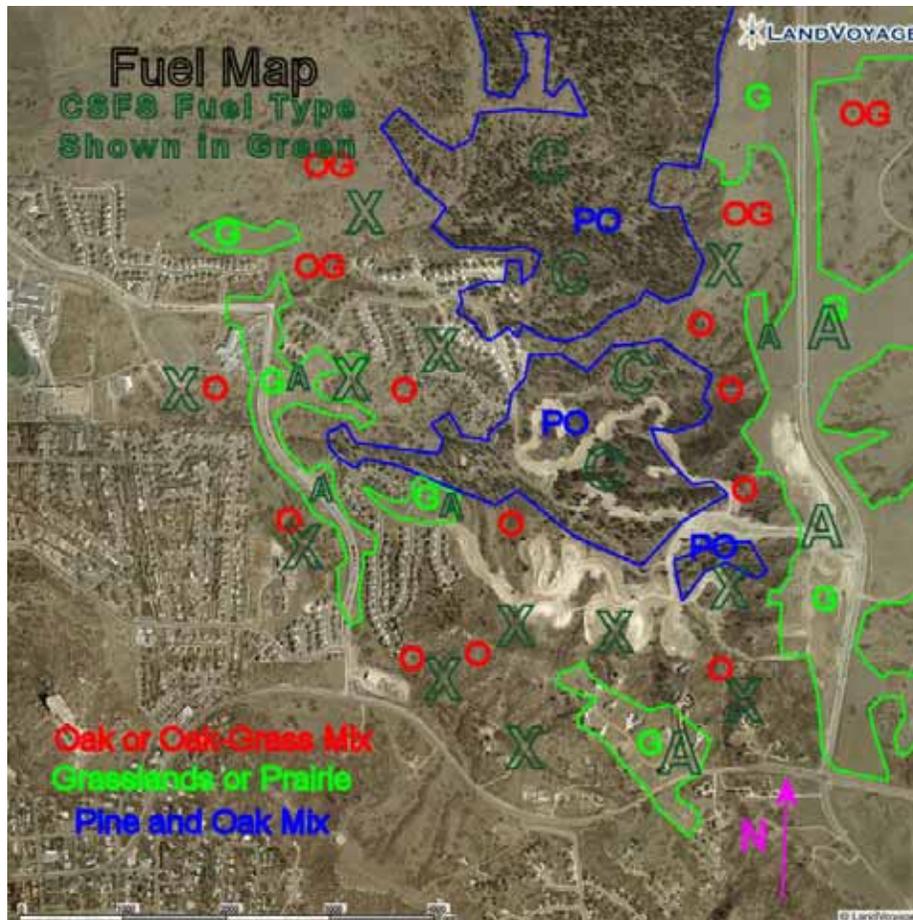


Figure 12. Fuel Mapping

Scheduling

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

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

The time schedule associated with imminent, planned fuel mitigation projects will be posted on the HOA websites. Written notification may also be used and may take the form of announcements in the HOA newsletters, local newspapers, flyers, direct mailings or combinations of any of these mediums.

Structural Ignitability

A number of homes in the Woodlands HOA have wood shake roofs. Homeowners should be encouraged to change these to a Class A roofing material less prone to ignition. These homes will also pose a threat to neighboring homes. Fire brands, or embers, can easily ignite shake roofs well away from a wildfire front. Currently, there are no incentives to encourage shake roof

owners to change, other than increased insurance costs. It may be possible that in the future, homeowner insurance will be difficult to obtain for shake roofs due to fire and hail exposure. There are currently no restrictions by the HOA requiring shake replacement should a homeowner decide to change out a shake roof to a more fire and hail resistant material.

All homeowners, even those well away from native vegetation, should learn measures to protect their homes from fire brands. Fire brands can be lofted high into the air and carried up to a mile, placing all homes in the communities at risk. Prevention measures can be as simple as regular mowing of high grasses or by periodic irrigation. Landscaping using Firewise plants (CSU Extension Publication 6.305) is recommended in all areas. Junipers and other flammable vegetation are readily ignited by fire brands lofted into the neighborhood.

Susceptibility to wildfire for all homes is the responsibility of each homeowner. Efforts must be focused on educating owners of their risk. It is not anticipated that any regulatory action will apply to existing homes.

Slash Disposal

A major impediment to homeowner mitigation is disposal of the biomass once a decision has been made to begin mitigation. Castle Rock currently participates with Douglas County in the operation of a "Slash-Mulch Site", located at the Town maintenance yard off Caprice Drive. This works for homeowners that have pickups or trailers to haul to the slash site. Other programs may be necessary to allow for timely mitigation. Some of these might include:

1. Regularly scheduled slash chipping days where homeowners place the slash at curb-side for treatment by a contractor. HOA's can be used to administer this type of program which may be funded by the end users.
2. Regular slash pickups by disposal contractors that charge based on the volume removed.
3. Neighborhood or block projects where each homeowner chips in to rent a chipper or hire a contractor to process slash.

All owners are encouraged to retain the chipped material on their properties as mulch in their landscaping. This will avoid having material end up in landfills.

Architectural Control

In 2005, the Colorado State Legislature passed SB-100 spelling out actions allowed by homeowners in covenant controlled communities. One of these measures was the allowance for homeowner mitigation where strict controls may have inhibited homeowner ability to reduce wildfire risks. The section of SB-100 pertinent to wildfire mitigation is attached as Appendix B.

Each HOA will maintain control of its resident's projects under the requirement for submittal of a plan prepared by a qualified professional forester, CSFS forester, or the Fire Department. Approval cannot be unreasonably withheld.

Emergency Egress

Evacuation of residents and access by emergency services can be critical during major wildfire events. Panicking residents who are unfamiliar with smoke and flames may actually complicate safe evacuation. It is recommended that residents become familiar with all three main egress routes from the communities. These are shown in Figure 13.



Figure 13, Emergency Egress Routes

Egress Routes

Three main routes lead out of the neighborhoods. These are Saddleback Drive, Ridgetrail Drive and Black Pine Drive. It is anticipated that Town of Castle Rock Police will be available to direct residents in the right direction for safe evacuation. However, it should be noted that individuals tend to use the route they use routinely and do not always become familiar with other routes. These routes are analyzed as follows:

1. Saddleback Drive (see Figure 14)- This roadway winds through the west portion of the Woodlands from Woodlands Blvd. and connects to Black Pine Drive in Escavera. It is of sufficient width to allow for two full lanes of travel, with parking along each side. Sight distances at all interior intersections appear to be adequate. All are properly posted with metal street name signage and cross-street movements controlled by stop signs. Direction of evacuation will be incident dependent. The section of Saddleback through Escavera is of adequate width, but is winding and has limited sight distances at the crests of hills. Sections of Saddleback that have heavier fuels along its route have been listed as "priority 1" for fuel treatments in Appendix A (A-6-1, A-13-1, A-16-1, C-2-1, C-4-a).



Figure 14, Saddleback Drive

2. Ridgetrail Drive (see Figure 15)- This roadway winds through the east portion of the Woodlands from Woodlands Blvd. and also connects to Black Pine Drive in Escavera. It has several areas of concern, the first being fuels along its connection at Woodlands Blvd. This area of concern is listed as a “priority 1” treatment area in Appendix A (B-2-1). Street signage and intersection sight distances are adequate at all intersections. Again, direction of travel during a wildfire event will be incident dependent. The second area of concern is the roadway section of Ridgetrail in Escavera. It is a potential bottleneck with no clear direction given for emergency egress. This can be handled by:
 - a. Clearly marking all dead end streets as “No Outlet” or “Dead End”.
 - b. Placing evacuation signage (MUTCD compliant) using placards and directional arrows with blue background (standard color for evacuation signage). Existing Street and Stop sign posts can be used for sign installation.



Figure 15, Ridgetrail Drive

3. Black Pine Drive (see Figure16)- This roadway is the main collector road in Escavera and connects to Founders Parkway. It is wide and well posted at all intersections. It is also posted on one side as “No Parking- Fire Lane”. This roadway can handle at least three lanes of travel if needed. All fuels are well away from the road edge.



Figure 16, Black Pine Drive

Interior Roadways

All interior subdivision roadways are paved and generally in good condition. All are well signed and meet Town of Castle Rock signage criteria. All cul-de-sac turn-arounds are of sufficient radii to allow for fire apparatus turning movements. Street widths are adequate except for Foxfield Drive (see Figure 17). This street is narrow, winding and susceptible to blockage. The original street design may have called for “parking- one side only.” This recommendation has not been followed and now allows for parking on both sides of the street. Foxfield will become blocked very easily during an emergency condition. This street should be considered for evacuation signage or installation of “one-side only” parking.



Figure 17, Foxfield Drive

In summary, overall access to the neighborhoods is good. The concerns raised above can be addressed at minimal expense to either community.

SERVICES, INFRASTRUCTURES, WILDLAND FIRE RESPONSES

This section of W-E CWPP details professional and voluntary resources available to respond to emergencies associated with wildland fires impacting W-E residents and structures. Professional responders are always W-E front line in addressing wildfire, rescue and medical emergencies. The Escavera community has trained neighbor emergency notification through its Castle Rock Police Department Neighborhood Watch program. FEMA has established programs for training of local residents in dealing with multi-hazards. This program, CERT (Community Emergency Response Team), is recommended and can be set up and organized under CRFRD. These voluntary groups are only used when professional first responders cannot respond and then can only be activated by authorization of the Emergency Services Manager or the Chief of the local Fire Protection District.

Professional Wildland Fire Response Services

For wildland fire emergencies endangering W-E, the first line of professional responders is Castle Rock Fire Rescue Department (CRFRD). If CRFRD finds that the fire is beyond their capability to suppress, the Incident Commander on-scene will request additional assistance. Assistance will be available through Mutual Aid agreements from both within and outside Douglas County. Castle Rock Fire Rescue Department will coordinate and administrate these services. CRFRD resources are covered in Chapter 3.

Douglas County Emergency Services

Douglas County Sheriff's Office, under the *Douglas County Emergency Services* division, provides the umbrella incident management and agencies coordination structure to the response and recovery from a wildland fire event(s) endangering Douglas County. Every wildland fire emergency incident that occurs in Douglas County utilizes the *Incident Command System (ICS)* during response and recovery activities, employing multi-agency operational structures as set forth in the *Douglas County Incident Management Guidelines and Standards*. The *Incident Management Guidelines and Standards* can be found in total at:

http://www.douglas.co.us/emergencymanagement/Incident_Management_Team.html

In the emergency event of a wildland fire, Douglas County operates under a mutual aid agreement for providing equipment and personnel assistance, if able and available, among its fire fighting agencies. The agreement encompasses, in addition to Castle Rock Fire Rescue, Larkspur Fire Protection District, South Metro Fire Rescue, County of Douglas, Franktown Fire, Jackson 105 Fire, City of Littleton, Mountain Communities Fire, Parker Fire, West Metro Fire Rescue, Cunningham Fire Department and West Douglas Fire.

As resources begin to deplete and the situation is recognized to be one that could be disastrous, municipal and county officials will become involved. At that time, the Multi-Agency Coordination Group (MAC Group, reference: *Douglas County Incident Management Guidelines and Standards*) shall confer and determine what special provisions need to be made or what special action needs to be taken. At this point, the need for the Emergency Operations Center (EOC) will be considered. EOCs locations for Douglas County are pre-established by the *Incident Management Guidelines and Standards*. The locations, in order of the listed priority, may change if the facility is not adequate for the situation. The EOC locations are shown in the following table.

Emergency Operation Center Locations, Douglas County

- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Douglas County Sheriff's Office
Robert A. Christensen Justice Center
4000 Justice Way
Castle Rock 2. Park Meadows Center
9350 Heritage Hills Circle
Littleton 3. Highland's Ranch Community Assoc.
48 West Springer Drive
Highlands Ranch | <ul style="list-style-type: none"> 4. Parker Police Department
19600 East Parkersquare Drive
Parker 5. Roxborough Park Metro District
6222 North Roxborough Park Road
Roxborough 6. Larkspur Fire Station 161
9375 South Spruce Mountain Road
Larkspur |
|--|---|

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

The following is a list of commonly requested resources that are available through Castle Rock Public Works or Douglas County Public Works:

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

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

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

Emergency Medical Services

CRFRD provides first response emergency medical services to W-E. This is noted in Chapter 3.

Water Resources

Water and sewer service is provided by the Town of Castle Rock. For direct suppression and wildfire defensive use within the “built” areas of Castle Rock, hydrants are located throughout the community, generally spaced on 500 feet intervals. These are supplied by tanks located in and around Castle Rock. Under widespread wildfire conditions, hydrant pressures will obviously vary.

Portions of the water system are looped. However, a number of dead-end lines exist. Town water tanks are typically maintained at a minimum water level during the wildfire season to insure adequate fire flows for structural protection. The Town has numerous on-going projects to update and upgrade its water delivery system. A list of these projects is available on the Town of Castle Rock web site at www.ci.castlerock.co.us under the Utilities Department.

Refuge Zones/Staging Areas

During emergency situations, it may be necessary for residents and emergency services providers to reach a safe place that is outside of the community. CRFRD, in conjunction with other wildfire authorities, recommended establishment of Refuge Zones outside the community. These can be used as reasonably safe areas where little or no wildfire risk exists in close proximity to either natural (vegetation) or man-made (homes) fuels. These may serve two purposes. The first is as a refuge from any wildfire threat. The second is as staging areas to allow timely and orderly evacuation of residents. It should be noted that many of the civilian fatalities from wildfires are caused during evacuations in which residents become trapped and overrun by fire. Once residents are evacuated, these safety zones may be used by firefighters as staging areas for marshalling resources within the community. These are shown on maps found in Chapter 4.

For these to be effective, signage/posting will be needed. An annual educational campaign should be established. Posting on the HOA web sites will be essential. Mail kiosks can also be used as posting places.

One staging area for emergency services personnel has been established. This is on Black Pine at the neighborhood park and detention pond. While residents may be evacuated to Founders Parkway or Woodlands Boulevard, this one interior area has good clearance to allow its use by firefighters with full personal protective equipment (PPE).

Internal Volunteer Services and Communications

Woodlands and Escavera HOAs currently support a number of volunteer and paid groups that can be used in communication support or augmentation of professional first-responders within W-E neighborhoods in the event of a wildfire emergency. The most important are the W-E boards of directors and their Community Managers. It is strongly recommended that each Board implement operating agreements with Castle Rock Fire Rescue Department that allow for use of W-E HOA properties and facilities during emergency situations. A sample agreement is included in **Appendix F**.

The most frustrating issue for residents during wildfire events is a lack of information. Local media cannot always be relied on for timely and accurate information. Residents may be away from the community at the outbreak of an emergency and require information necessary to protect family members and pets still at home. Possible information sources are the W-E HOA

and the CRFRD web sites. The Douglas County Sheriff's Office (DCSO) or CR Police may also have an emergency phone line set up to provide information.

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

Critical Utilities

In the event of a wildland fire that would impacts W-E, CRFRD or DCESM Incident Command dispatcher would notify critical utilities for their support. Specifically, emergency involvement of utility support would focus on two areas: 1) Safety of the public and emergency response personnel and 2) Direct support of mitigating the emergency event.

Public and Emergency Response Personnel Safety

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

Natural Gas Services: *Aquila*
Emergency Service Telephone Number: (800) 303-0357

Electrical Power Services: *Intermountain Rural Electric Association*
Emergency Service Telephone Number: (303) 688-3100

Direct Support

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

Water: *Castle Rock Utilities Department*
Office: 720-733-6000

Wire-line Communications: *Qwest Communications:*
Emergency Service Telephone Number: (800) 573-1311 or
1-800-603-6000

Comcast
Emergency Service Telephone Number: (303) 930-2000

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

Post-Fire Remediation

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

1. Immediately retain the services of an engineer or geologist to assess potential storm and debris flows after a wildfire of significant size.
2. Establish a stand-by contractor list of licensed and insured heavy equipment operators for clearing of roads, cleaning of culverts and construction of potential diversions or road repairs.
3. Hire a reclamation contractor to stabilize areas above homes and critical infrastructure with a combination of temporary and permanent erosion control measures.

Post-fire issues can linger on for many years after fire occurrence. The W-E HOA's should annually assess their risks and budget accordingly for remediation.

Insect and Disease Prevention and Control

Both neighborhoods contain stands of ponderosa pines that will be susceptible to Mountain Pine Beetle (MPB) infestation. No infested trees were noted during the CWPP adoption process. However, vigilance will be necessary on the part of each HOA to regularly inspect trees on private lots and greenbelt areas for any signs of infestation. Large groups of dead trees can contribute to fuel loading in the community and should be removed in a timely manner to prevent spread. No infections of Dwarf Mistletoe (DMT) have been found in either community. No general, area wide preventive spraying program is recommended at this time for prevention of MPB. Should an outbreak occur in the area, homeowners should be advised to preventively spray mature pines.

Builders who remove trees for lot clearing and subsequent home construction should remove all lot clearing slash within six weeks of removal to prevent use of fresh slash by Ips Engraver Beetles (Ips) as brood wood. Ips generally attack trees weakened by lightning strikes, root damage during construction or transplanting. Regular bark applications of high value, stressed trees should be preventively sprayed until the stressing agent is eliminated.

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

Weed Control

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

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

PUBLIC NOTIFICATION, COMMUNICATION AND SUPPORT

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

Warnings and Hazard Notification to the General Public

Warning notifications concerning a specific wildfire or wildfires directly threatening the Woodlands and Escavera neighborhoods can be authorized only by the Castle Rock Fire Rescue Department Chief(s), Castle Rock Police Department, Douglas County Emergency Services Coordinator or the Douglas County Sheriff. Such a warning can be issued in a variety or combination of methods and will generally contain *action* information for residents. An *action* information or direction may contain preparatory information for residents concerning potential or upcoming evacuation of the area. Or, it may be an immediate, “*act now*” request for evacuation due to a wildfire condition that is deemed to have imminent impact to the area. Authorization, *official* warnings may come from:

- 1) Emergency Preparedness Network (AKA: Reverse 911)*
- 2) 850 AM radio, KOA*

Services Communications and Support Systems

Non-threatening Conditions

Informational notifications to Woodlands and Escavera residents are done for public meetings, events and general services. Several mediums are used for general public informational notifications including Board of Director notices of meetings, general letter mailing, flyer posting and mailings, and each community’s website posting on www.msioha.com.

Neighborhood Watch

Escavera has a very active Neighborhood Watch program administered by the Castle Rock Police Department. This group can be activated via email or phone trees to provide information to neighbors. Woodlands has had similar programs in the past and should be considered for re-activation. Additional training can also be provided to block captains in recognizing wildfire risks around homes.

Wildfire Condition

In the event of an actual wildfire impacting the communities, updated residential wildfire event information should be posted periodically on the HOA websites. Updated information is generally available on messages recorded and made available on event-established, dial-up telephone line(s) by the Town of Castle Rock and Douglas County Sheriff’s Office. The telephone number(s) of phone line(s) for such use are established for each specific event. The numbers are usually announced to the public via printed or announced on public broadcast mediums. Periodic updates regarding emergency events are also generally broadcasted via 850 AM KOA radio, the official emergency public broadcasted radio station for Douglas County.

IMPLEMENTATION PLAN

Chapter 8 provides a summary of actions of the Woodlands-Escavera Community Wildfire Protection Plan. These actions are designed to address four broad subject areas to enhance residents' safety and diminish wildfire potential in W-E CWPP area and its adjacent environs as identified in Chapter 4, Wildfire Hazard Assessment. The actions to be taken in the public education arena are intended to better prepare residents for helping themselves and nurturing their family's safety needs in times of crisis as well as providing them knowledge to reduce the structural ignition potential of their homes and those of their neighbors. The actions set forth in the Fuels Treatment category are both short term and long term. Based upon forestry and fire sciences, the Fuels Treatment actions address the mitigation of wildfire fuels in W-E neighborhoods and adjacent privately owned lands. The general periods identified for developing fuel treatments in these high wildfire risk areas is to be based upon both risk potential and funding availability. The priorities associated with these wildfire risk mitigation areas can be found in Chapter 4, *Wildfire Hazard Assessment*, and Appendix A, *Hazard Reduction Mitigation Projects*. The third area addressed by this implementation plan is the communication, support and information services used to provide added knowledge and information to be used in planning for wildfires as well fighting them in the event one or more should occur in the W-E neighborhoods. The final broad focus area, Mitigated Areas Perpetuation, addresses maintaining fuel mitigated areas once the areas have had wildfire fuels initially reduced as well as on-going W-E HOA administrative actions associated with the Community Wildfire Protection Plan.

Public Education

The W-E communities have moderate residential turn-over and influx. Based upon average monthly real estate listings weighted against average home sale time period or "life on market," W-E communities may experience up to 10% change to its profile of residents during the year. Many of these "new" residents of Woodlands and Escavera may not be initially familiar with living in a high wildfire risk area. The Public Education actions of this Community Wildfire Prevention Plan are planned to educate these newcomers as well as increase the knowledge of the current W-E residential base in areas of family safety, Firewise strategies and construction and landscaping materials that are more resistant to ignition than wood or other commonly used building and landscaping products.

- Topics for public education will vary depending on seasonal or wildfire risk conditions, input or requests from W-E's general public and the availability of qualified instructors or presenters. The public education topical areas include but are not limited to:
 - Structural construction materials or design considerations
 - Home safety and home fire warning and fire suppression equipment
 - Home risk self-assessment and structural wildfire risk reduction
 - Residential fuel reduction strategies
 - Landscaping for wildfire protection; xeriscaping
 - Living adjacent to wildlands
 - Home property fuel mitigation strategies and methods

- Public Education programs will use professionally developed instruction collateral material developed from resources recognized for their experience and expertise including,
 - National Firewise Communities USA
 - American Planning Association
 - United States Forest Service
 - Colorado State Forest Service
 - Colorado State University Cooperative Extension
 - Castle Rock Fire Protection District
 - Douglas County

- Private Consultants
- Upon publication of the 2007 Community Wildfire Protection Plan for W-E, the Wildfire Committees for each neighborhood will develop an annual schedule that is published and periodically recapped in the HOA newsletters and web sites. Also, see Appendix E, *Firewise Household Tips, Property Mitigation and Protection*.

Although several public meetings have been held to inform and/or assess the opinions of the general public on *Firewise* and wildfire issues, the 2007 baseline for this implementation plan area is being considered zero. Annual performance assessment of public training will be based upon the public education training and informative session attendance as well as comments and reactions from the general public. For overall impact against the wildfire protection plan program, training session attendance should be totaled annually and expressed as a percentage of W-E total residents. This percentage should be trended year after year for evaluation and public education course management purposes.

Fuels Treatment

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

Road Rights of Way and Safety Zones

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

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

Implementation Actions

- Mitigate existing and proposed road areas within the right of way associated with the road. Generally, in all established and planned roads within W-E, this action creates a fuel gap of 60-120 feet; i.e., 30 feet either side of the centerline of the road. Although Colorado State guidelines for fuelbreaks are generally 300 feet or greater, depending on fuel density and terrain slope, this Community Wildfire Protection Plan initially establishes a break of 60 feet since such can be addressed quickly within the road right of way, followed later by working with adjacent landowners to encourage widening the fuel gaps by encouraging "*feathering*" of the fuel treatments into their private land. The W-E HOA Boards will:
 - Work with Castle Rock Fire Protection District, Douglas County Land Conservancy, and CSFS to assess and cooperate on joint fuel mitigation projects;
 - Review prioritization of fuel mitigation projects and schedule projects annually based upon funding and the identified risk priority of the projects;

- Take action to establish a separate budgeting category (2008 and yearly beyond) to identify “*direct*” budgeted dollars to be directed at road right of way mitigation projects and mitigation projects associated with established and recognized trails and lands within W-E HOA properties;
- Detail and file for particular Federal grants awarded annually for fuel mitigation and wildland fire protection support. Funding may be channeled through CSU/CSFS as “sub-awards”;
- Develop and update annually, a long-range (five to twelve year) schedule of wildfire fuel mitigation projects and post the schedule on the HOA websites for public access.
- Inspect all treated areas periodically to determine need for re-treatment and/or on-going maintenance.

Woodlands-Escavera Properties

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

Implementation Actions

The Wildfire Committees and Design Review Committee (or Architectural Control Committee) will need to work closely to insure that treatment projects allow for some level of privacy protection currently provided by the over-grown and declining gambel oak plant community. Visual sensitivity will be important. The HOA Boards will:

- Work with wildfire professionals to lay out treatment areas on HOA properties by advising the DRC/ACC of all activities. Coordination with adjacent property owners will be necessary.
- The same items noted under Fuel Treatments and Refuge Zones will apply.

Private Homeowner and Landowner Properties

Wildfire fuel mitigation on private properties is the responsibility of the property owner. Having no authority over private lands, W-E HOA’s will provide information and services to assist property owners in their mitigation efforts. Land owners adjacent to HOA properties will be encouraged to work with HOA’s in extending mitigated fuelbreaks into their private property. Such potential action is deemed to benefit both the HOA’s and the individual landowner(s).

Implementation Actions

- W-E HOA’s and/or Castle Rock Fire Protection District will work with private property owners within the boundaries of CWPP area to support them in mitigation efforts by:
 - Provide resource and education help as indicated in the “*Public Education*” actions, above;
 - Continue to assist in tracking “*in kind*” private fuel mitigation work on private property;
 - Administer certain support projects; e.g., periodic *slash* removal;
 - Continue to support funding for the Douglas County/Town of Castle Rock slash and yard waste disposal site;
 - Formalize Design Review processes and Design Guideline modifications that allow for implementation of Defensible Spaces. These shall utilize the services of Castle Rock fire fighters, CSFS or approved professional foresters. Note: The recent passage of Colorado State Statutes that must allow for homeowner defensible spaces shall be incorporated into any new guidelines. (see Appendix B, SB-100 Wildfire Mitigation)

- Continue to encourage replacement of wood shake-shingle roofs by allowing as many materials as possible. Alternatives that maintain the aesthetic values currently established, while providing a “Class A” level of protection are critical.
- Provide information distribution of wildfire planning or Firewise events or activity affecting the homeowner;
- Provide volunteer notification and limited assistance of homeowners during an emergency event.

Undeveloped, Privately-owned Properties

With over eighty-five percent of W-E lots developed, areas of undeveloped land lie to the north of the W-E area (See Chapter 4, *Hazard Assessment* and Appendix A, *Hazard Reduction Mitigation Projects*). These areas are heavily covered with dense, untreated brush and, in many situations, also present rough, dramatically sloping terrain. Consequently, these areas present huge fuel beds for wildfires and present W-E with its most significant threats for wildfires. The undeveloped, and generally privately-owned, areas may require W-E communities to take more aggressive action on their properties in order to address fuel reduction.

Implementation Actions

- The W-E HOA's and/or Castle Rock Fire Protection District will work with private property owners of undeveloped lands bordering on W-E to discuss, assess, and plan potentially joint mitigation efforts. Concurrently, W-E HOA's will pursue collaboration with Town agencies and Douglas County officials to assist and support efforts to reduce W-E wildfire exposure by addressing undeveloped areas. Such actions will include efforts to:
 - Assess timing of in-fill development in currently undeveloped areas and working with them, in conjunction with the Town of Castle Rock, to effect guideline driven fuel mitigation on their targeted properties prior to structure construction;
 - Encourage and stimulate Castle Rock authorities to effect changes in ordinances and statutes to require developers to mitigate the areas being developed prior to any construction;
 - Initiate further discussion with owners of small horse parcels (to the south), to assess potential individual and joint wildfire mitigation efforts on common interest areas.

Communication, Support and Information Services

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

Implementation Actions

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

Mitigated Areas Perpetuation

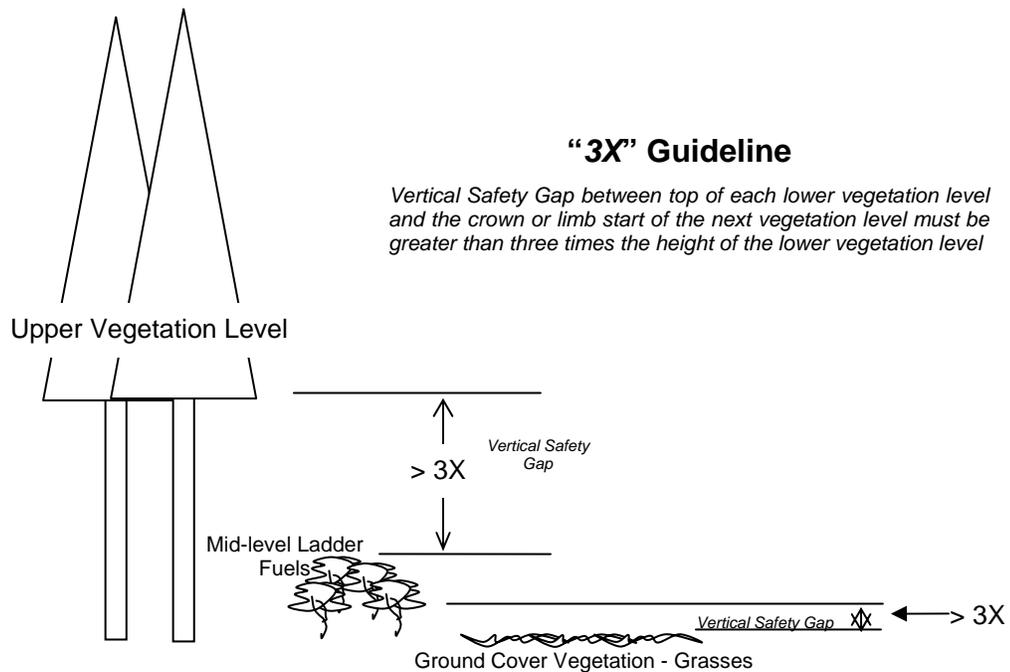
The focus of this broad section of the Implementation Plan is twofold: 1) to address the guidelines for assessing when to maintain fuel areas that have already had fuel reduction efforts applied and 2) to set forth a checklist of administrative actions that need to be followed by the W-E HOA's.

Implementation Actions

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

Previously Mitigated Property/Fuelbreak Maintenance "3X" Guideline

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



- The W-E HOA Boards will implement the following administrative actions:
 - Establish a separate HOA budget category, which denotes funds for CWPP planned actions (For ledgering and future financial analysis, sub-categories should underpin the category to track expenditures for HOA property, privately owned property support functions and HOA work with undeveloped parcels of privately or publicly owned land);
 - Detail a chronological schedule for filing for Federal grants applicable to mitigation and Firewise work as these may become available;
 - Budget specific HOA funds for “*direct*” funded wildfire fuel mitigation on road/trail rights of ways and HOA owned property;
 - Manage contact and begin discussion with private property owners adjacent to W-E neighborhoods for potential individual and joint wildfire mitigation efforts on common interest areas;
 - Sponsor regular wildfire prevention training for residents in conjunction with CRFRD;
 - Assess timing of and maintain a schedule of land development action in currently undeveloped areas;
 - Schedule appropriate, periodic general public updates of CWPP planned work;
 - Continue to identify and schedule wildfire protection ancillary projects; e.g., Remote Automated Weather System (RAWS), improved emergency communications, emergency and wildfire protection signage, etc.
 - Establish and maintain baseline information for proposed areas of mitigation;
 - Evaluate planned CWPP projects for effectiveness and amend CWPP annually to keep plan and actions current and appropriate for changing environmental and development conditions.

Appendix A
Compartments
And Sub-compartments

Compartment Notes:

1. Treatment Area Numbering- Each of the five compartments is divided into sub-compartments with the first character as a letter and second character as the sub-compartment. The third character is level of priority for treatment, ranging from 1 (highest) to 4 (lowest). Unit # A-1-1 is in Compartment A, sub-compartment 1, with priority level 1. Priorities are based on:
 - a. Priority 1- Transportation routes for homeowner evacuation (egress) and emergency services ingress.
 - b. Priority 2- Homes backing to or inter-mixed with heavy fuels.
 - c. Priority 3- Homes backing to lighter fuels or smaller pockets of fuels.
 - d. Priority 4- Residential lots- Considered Homeowner responsibility for Defensible Space and Home Ignition Zone.
2. Fuel Type is based on five simple types used in the past by Colorado State Forest Service. These are: 1) "X" for brush species; 2) "A" for light fuels such as grasses; 3) "B" for medium fuels with younger trees; and 4) "C" for heavy timber. Combinations of the above are used to show fuel mix. Residential areas are treated as fuel type A due to formal landscaping, irrigation, and normally higher level of maintenance. National Fire Danger Rating System (NFDRS) fuel model equivalents are listed in Chapter 4 under Vegetation Analysis. No areas are listed as "O", meaning non-flammable areas.
3. Treatment Cost per acre is based on equivalent projects in similar fuel types within Douglas County.
4. Treatment types are either by hand or mechanical. Hand treatments are typically done by individuals cutting one stem at a time. Mechanical treatments are done by machine on a multi-stem basis. Estimated cost for homeowner treatments is for chipping of material by a hired contractor. Mowing is to a maximum height of six inches. A maximum height of four inches is recommended around structures.

Compartments



E

C

D

A

B

**Compartment A
Fuel Treatments**

1

Appendix A
9/4/2007

Unit #	Priority	Fuel Type	Treatment costs/acre	Description
A-1-	2	X	\$1800	Heavy oak intermixed with grasses. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
A-2-	4	A	\$250	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.
A-3-	3	A	\$250	Primarily range land. Mowing needed on seasonal basis.
A-4-	2	X	\$1200	Heavy oak intermixed with grasses. Area below homes. Primary treatment is mechanical, with hand treatment below homes.
A-5-	4	A	\$250	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.
A-6-	1	X	\$1800	Heavy oak along major interior collector roadway. Combination of hand and mechanical treatments.
A-7-	4	A	\$250	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.
A-8-	3	X	\$800	Residential area divided by greenbelt with heavy oak. Hand treatment and cleanup on all lots to reduce structural ignitability.
A-9-	4	A	\$500	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.
A-10-	2	X	\$1800	Heavy oak intermixed with grasses. Area below homes. Primary treatment is mechanical, with hand treatment below homes.
A-11-	2	XC	\$1800	Heavy oak intermixed with grasses and pines. Treat ladder fuels. Area below homes. Primary treatment is mechanical, with hand treatment below homes.
A-12-	3	X	\$800	Residential area divided by greenbelt with heavy oak. Hand treatment and cleanup on all lots to reduce structural ignitability.

**Compartment A
Fuel Treatments**

2

Appendix A
9/4/2007

A-13-	1	X	\$1200	Heavy oak along major interior collector roadway. Combination of hand and mechanical treatments.
A-14-	4	XC	\$1500	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.
A-15-	2	XC	\$1200	Overhead Power line easement. Mechanical
A-16-	1	C	\$1800	Light thinning of understory trees and ladder fuels treatment.
A-17-	4	XC	\$1200	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.

Compartment 15 A



**Compartment B
Fuel Treatments**

1

Appendix A
9/4/2007

Unit #	Priority	Fuel Type	Treatment costs/acre	Description
B-1-	2	X	\$1800	Heavy oak intermixed with grasses. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
B-2-	1	X	\$1800	Heavy oak intermixed with grasses. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
B-3-	2	XC	\$2500	Heavy oak intermixed with grasses and pines. Treat ladder fuels. Area below homes. Primary treatment is mechanical, with hand treatment below homes.
B-4-	4	X	\$1800	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability. Shake Roofs Present.
B-5-	3	A	\$500	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability. Shake Roofs Present.
B-6-	4	A	\$500	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability. Shake Roofs present.
B-7-	2	X	\$1800	Heavy oak intermixed with grasses. Area below homes. Combination of hand and mechanical treatments.
B-8-	4	A	\$800	Residential area divided by greenbelt with heavy oak. Hand treatment and cleanup on all lots to reduce structural ignitability.
B-9-	4	A	\$500	Residential area divided by greenbelt with heavy oak. Hand treatment and cleanup on all lots to reduce structural ignitability.
B-10-	2	XB	\$1800	Heavy, continuous oak. Portions machine operable for mechanical treatments. Prioritize areas behind homes with hand treatments.
B-11-	2	X	\$1800	Heavy oak intermixed with grasses and pines. Treat ladder fuels on conifers. Primary treatment is mechanical, with hand treatments along trail.

**Compartment B
Fuel Treatments**

B-12-	2	X	\$800	Heavy, continuous oak. Portions machine operable for mechanical treatments. Prioritize areas behind homes with hand treatments.
B-13-	4	XA	\$1200	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability.
B-14-	3	A	\$800	Residential area. Est. cost is slash cleanup on all lots to reduce structural ignitability. Mow grasses twice annually.
B-15-	2	XC	\$2500	Scattered pines and pine clumps with oak understory. Mechanical and hand treatment to break up fuel continuity and remove ladder fuels.
B-16-	3	XA	\$1200	Native grass and shrub mix. Hand treat ladder fuels. Mow grass areas twice per year.
B-17-	3	XC	\$1800	Residential area surrounded by oak. Hand treat all oak areas. Limited mechanical treats possible on green belt areas.



**Compartment C
Fuel Treatments**

1

Appendix A
9/4/2007

Unit #	Priority	Fuel Type	Treatment costs/acre	Description
C-1-	4	XC	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
C-2-	1	XC	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
C-3-	4	XC	\$2500	Heavy oak intermixed with grasses and pines. Treat ladder fuels. Area below homes. Primary treatment is mechanical, with hand treatment below homes.
C-4-	1	X	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
C-5-	2	XC	\$1800	Power line easement area with oak and pine understory. Mechanically treat understory. Hand prune ladder fuels
C-6-	2	XC	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
C-7-	2	XC	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
C-8-	3	XC	\$800	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
C-9-	2	XC	\$2500	Heavy oak with scattered pines. Steep slopes above home sites. Mechanical treatments on all slope areas to residential property lines.
C-10-	2	XC	\$2500	Heavy, continuous oak. Portions machine operable for mechanical treatments. Prioritize areas behind homes with hand treatments. Connect treatments to rock outcroppings and grasslands above.

**Compartment C
Fuel Treatments**

2

Appendix A
9/4/2007

C-11-	2	X	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.

**Compartment D
Fuel Treatments**

1

Appendix A
9/4/2007

Unit #	Priority	Fuel Type	Treatment costs/acre	Description
D-1-	2	XC	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
D-2-	4	XA	\$1200	Residential area with oak below homes. Hand treat oak clumps. Cost is homeowner slash disposal.
D-3-	3	XA	\$2500	Heavy oak intermixed with grasses above homes in greenbelt. Primary treatment is mechanical, with hand treatment above homes.
D-4-	3	XA	\$2500	Heavy oak intermixed with grasses above homes in greenbelt. Primary treatment is mechanical, with hand treatment above homes.
D-5-	4	XA	\$800	Residential area with oak below homes. Hand treat oak clumps. Cost is homeowner slash disposal.
D-6-	2	XC	\$2500	Heavy oak intermixed with grasses and scattered pines below homes. Multiple ownerships. Combination of hand and mechanical treatments.
D-7-	3	XA	\$1800	Heavy oak intermixed with grasses above homes in greenbelt. Primary treatment is mechanical, with hand treatment above homes.
D-8-	2	XA	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.
D-9-	2	XA	\$2500	Heavy oak with scattered pines. Steep slopes above home sites. Mechanical treatments on all slope areas to residential property lines.
D-10-	2	XC	\$2500	Heavy oak intermixed with pines and grasses below homes in greenbelt. Primary treatment is mechanical, with hand treatment below homes.
D-11-	3	XC	\$2500	Heavy oak intermixed with grasses and scattered pines. Area below homes. Multiple ownerships. Combination of hand and mechanical treatments.

**Compartment D
Fuel Treatments**

2

Appendix A
9/4/2007

D-12-	2	X	\$1800	Heavy continuous oak on steep hillside. Mechanical treat operable areas and hand treat along pathway. Prune ladder fuels on scattered conifers. Connect to grasslands above.



Compartment

56

D



2

3

1

4

5

Compartment

E

58

Appendix B

Senate Bill SB-100 Wildfire Mitigation

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

SB-100 language

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

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

Appendix C
Fire Hazard Classes
And
Fuel Models

Appendix C Fire Hazard Classes and Fuel Models

Fire Behavior Vegetation Characterizing Fire Hazard Classes*

HAZARD CLASS	EXPECTED FIRE BEHAVIOR	VEGETATION (FUELS)
0	None	None (Open water, bare rock, cultivated fields etc.)
X Severe Hazard (Brush)	Flames 5-20' high, of brief duration; high spread rates, at least 40 acres/hr; humans can not safely pass through flames but can occupy burned area within about 15 minutes; short range spotting from blowing embers common.	Dense to moderately dense flammable vegetation <= 10' high, including Gamble Oak, Big Sagebrush, conifer reproduction; abundant litter and/or herbaceous fuel, scattered conifer stand may be present.
A Low Hazard	Flames <= 5' high, higher flare-ups rare; duration of highest flames brief; fire spread slow to fast, 1-40 acres/hr; humans can usually run through flames without serious injury and can occupy just-burned areas; spotting generally rare short range.	Grass, weeds, brush <= 1' high, dead wood in contact with ground; open conifer stand may be present; includes aspen, cottonwood, willow, grasslands, brush other than oak, sage or ceanothus.
B Moderate Hazard	Intermittent flare-ups occurring up to many feet above tree tops; short and medium range spotting common; behavior between flare-ups as in Class-A; passing through fire front sometimes possible but chancy; parts of burned area can be occupied within half hour.	Medium density conifer stands; surface fuel mainly herbage and litter; some patches of reproduction and dead wood; becomes Class-C if slash is present.
C Severe Hazard (Trees)	Flareups higher than tree tops frequent to continuous; spread rates of up to several hundred acres per hour possible; fire front impassable; spotting several hundred yards common, possibly up to 1 mile or more; just burned areas untenable for >= an hour.	Dense conifer stands with any surface fuel; medium density stands with Class-X fuels or much dead wood from blowdown. Insect activity, or logging.

0 Hazard = No Hazard or Limited Hazard

X Hazard = Severe Wildfire Hazard (Brush)

A Hazard = Low Wildfire Hazard for Grass, Timber and Brush

B Hazard = Moderate Wildfire Hazard for Grass, Timber Brush

C Hazard = Severe Wildfire Hazard (Trees)

* Courtesy of the *Colorado State Forest Service*

National Fire Danger Rating Fuel Models

Each weather station can have up to four fuel models that represent the vegetation in the area of the station. A total of twenty fuel models are available to choose from. It is unlikely that more than two or three models will be appropriate for any one station.

Fuel Model	Description
A	Represents grasslands vegetated by <u>annual</u> grasses and forbs. Some brush or trees may be present but occupy a small portion of the area. [Cheatgrass]
L	Represents grasslands vegetated by <u>perennial</u> grasses and forbs. Species are coarser and amounts heavier than those in fuel model A. Some shrubs and trees may be present but occupy a small portion of the area. [Fescue, Wheatgrass]
S	Represents alpine tundra or deep layer of lichens and moss. Some grasses and low shrubs may be present. Fires are low intensity, but difficult to extinguish.
C	Represents open pine stands. Perennial grasses, needle litter and branch wood significantly contribute to the fuel loading. [Longleaf, Ponderosa, and Sugar Pine]
T	Represents shrubs that burn easily and are not dense enough to shade out grasses and other herbaceous plants. The shrubs must occupy at least one-third of the site. [Sagebrush]
N	Represents the sawgrass prairies of south Florida.
B	Represents mature, dense brush 6 feet or more in height. Much of the aerial fuel is dead. Foliage burns readily. Fires are typically intense and fast spreading. [Chaparral]
O	Represents dense, brush-like fuels of the Southeast. Most of the aerial fuel is live. Typically over 6 feet tall. Burns actively except during growing season. [Pocosin]
F	Represents mature oakbrush stands.
Q	Represents Alaskan black spruce. Forest floor is a deep layer of moss and lichens. Also contains some needle litter and branch wood, with nonflammable shrubs.
D	Represents the palmetto-gallberry understory, pine overstory association of the southeast coastal plains. Has a high moisture of extinction. [Southern Rough]
H	Represents healthy stands of short-needled conifers with sparse undergrowth and a thin layer of ground fuels. [White Pine, Spruces, Firs, Larchs]
R	Represents hardwood areas after canopies leaf out in the spring. An "off-season" substitute for fuel model E. Best during the summer in all hardwood and mixed conifer-hardwood stands where more than half of the overstory is deciduous.
U	Represents closed stands of western long-needle pines. Ground fuels

	are primarily litter and small branch wood. [Jeffery, Sugar, and Red Pines of the Lake States]
P	Represents closed stands of southern long-needle pines. A thick layer of lightly compacted needle litter is the primary fuel. High moisture of extinction. [Loblolly Pine]
E	Represents hardwood and mixed conifer-hardwood stands <u>after leaf fall</u> . Fuel is primarily loose hardwood leaf litter. [Oak and Hickory]
G	Represents dense conifer stands where there is a heavy accumulation of litter and downed woody material. Typically overmature and suffering insect and disease damage. Undergrowth is variable and restricted to openings. [Spruce-Fir, Lodgepole Pine]
K	Represents light slash from thinnings and partial cuts in conifer stands. Slash is typically scattered under an open canopy. Applies to hardwood slash and southern pine clearcuts where the fuel loading is relatively light.
J	Represents medium slash from clearcuts and heavily thinned conifer stands. Needles are still attached to branches. Material is typically less than 6" diameter.
I	Represents heavy slash loading from conifer clearcuts. Needles are still attached to the branches.

Common Terms - National Fire Danger Rating System (NFDRS)

Ignition Component (**IC**) - Related to the probability of a firebrand producing a fire that will require suppression action. It is mainly a function of the 1 hour time lag (fine fuels) fuel moisture content and the temperature of the receptive fine fuels. IC has no units. A percentage of probability from 1-100.

Spread Component (**SC**) - A rating of the forward rate of spread of a head fire. It integrates the effect of wind, slope, and fuel bed and fuel particle properties. The daily variations are caused by the changes in the wind and moisture contents of the live fuels and the dead fuel timelag classes of 1, 10, and 100 hr.

Energy Release Component (**ERC**) - Based upon the estimated potential available energy released per unit area in the flaming zone of a fire. It is dependent upon the same fuel characteristics as the spread component (SC). The day to day variations of the ERC are caused by changes in the moisture contents of the various fuel classes, including the 1000 hour time lag class. ERC is derived from predictions of the rate of heat release per unit area during flaming combustion and the duration of the burning. Expressed in BTU's per square foot.

Burning Index (**BI**) - A measure of fire intensity. BI combines the Spread Component and Energy Release Component to relate to the contribution of fire behavior to the effort of containing a fire. BI has no units, but in general it is 10 times the flame length of a fire.

Fire Load Index (**FL**) - A rating of the maximum effort required to contain all probable fires occurring within a rating area during the rating period. It is the cumulative index of the NFDRS. It is designed to combine the projections of fire occurrence and behavior into a single number that

can be related to the total fire suppression job. The meaning of FL has been left to the user. By itself, it does not tell the user much about the nature of the fire management problem. One needs to examine the individual components and indices that are the basis for the FL. It ranges over a scale of 1-100 and has no units.

Staffing Level (SL) - A component of the NFDRS relating to the level of fire management staffing. Staffing levels are from 1-5 with 1 being the lowest and 5 the highest.

Adjective Rating (R) - A public information component of the NFDRS specific to the rating of fire danger. Adjective ratings are: low(L), moderate(M), high(H), very high(V) and extreme(E).

Keetch-Byram Drought Index (KBDI) - A number between 0-800 representing the amount of moisture in the top 8 inches of soil. Zero is saturated, 800 is maximum drought stress. It is calculated from recent precipitation measurements in relation to the average annual precipitation. It is important to note that the KBDI is customized for each geographic area and that often the scale shows less of a range in variation.

Fire Danger Rating - A fire management system that integrates the effects of selected fire danger factors into one or more qualitative or numerical indices of current protection needs.

Haines Index - A national fire-weather index based on the stability and moisture content of the lower atmosphere and their direct relationship to the growth of large fires. The index is from 1-6 with 1 being the lowest potential for large plume-dominated fires, while 6 is the highest potential for plume-dominated fires.

Lightning Activity Level (LAL) - A numerical rating from the lowest of 1 to the highest of 6, keyed to the start of thunderstorms and the frequency and character of cloud-to-ground lightning forecasted or observed on a rating area during a rating period.

National Fire Danger Rating System (NFDRS) - A multiple index system developed to provide information about current and predicted fire danger conditions.

Remote Automated Weather Station (RAWS) - A special remote fire weather observation station which takes timed measurements of the various weather factors used to calculate fire danger and behavior. These stations usually transmit data via satellite telemetry to the National Interagency Fire Center for distribution to fire managers nation-wide.

Appendix D
Evaluation and Monitoring
Sample Form

Woodlands or Escavera Home Owners Association Community Wildfire Protection Plan Evaluation and Monitoring

Evaluator: _____

Date: _____

Treatment Area: _____

Description/Location: _____

Implementation Monitoring:

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

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

What resources are being protected by this project?

Transportation Routes? _____

Refuge Zones? _____

Homes? _____

Neighborhood? _____

Community Infrastructure? _____

Was the project completed as scheduled? YES _____ NO _____

What problems were encountered? _____

Baseline Monitoring

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

By whom? _____

Effectiveness Monitoring

Was the prescription met for:

- Fuel Treatment
- Habitat Restoration
- Aesthetics
- Privacy/screening
- Forest Health

Yes	No

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

Did erosion occur? Yes _____ No _____

Invasion by noxious weeds? Yes _____ No _____

Was sufficient moisture available for plant growth?

Validation Monitoring

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

Was the site accessible as anticipated? Yes _____ No _____

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

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

Trend Monitoring

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

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

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

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

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

Other comments:

Appendix E

**Firewise Household Tips
And
Property Mitigation and Protection**

Appendix E

Firewise Household Tips, Property Mitigation and Protection

HOUSEHOLD TIPS

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

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

Firewise Construction

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

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

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

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

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

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

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

Also remember to:

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

For more information visit these helpful websites:

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

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

Free public information brochures:

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

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

Appendix F

Permission for Homeowners Association Property Use During a Declared Emergency

Permission For Property Use During A Declared Emergency

During a Douglas County emergency incident impacting Woodlands and/or Escavera, use of Woodlands and/or Escavera Home Owners Association (W-E HOAs) property by professional emergency personnel may be required for emergency or fire fighting activities. Emergency uses would include any or all of the following activities: mechanical fuel mitigation, firing of vegetation, fire fighting staging activities, emergency materials and supplies storage, surface water access and usage, establishment of a temporary heliport, or other usage appropriate to resolving the emergency situation at hand. For an emergency impacting Woodlands and/or Escavera and requiring W-E HOA land use for fighting or resolving the emergency, the W-E HOA boards have pre-approved and granted property use permission to the emergency event incident commander.

The property use permission document should be signed by the Woodlands or Escavera HOA board members is included in this Community Wildfire Protection Plan as an annual update to the CWPP. The pre-approval/property emergency-use authorization will be updated annually at the time of the annual Community Wildfire Protection Plan review and update. The aforementioned, signed emergency property-use authorization document will be provided for filing with the Douglas County Emergency Services Director, Colorado State Forest Service (Franktown District), and the Castle Rock Fire Protection District Chief.

DECLARED-EMERGENCY USAGE PERMISSION

For

_____ **Home Owners Association**

This document authorizes emergency resolution use of _____ Home Owners Association (___HOA) property in the event of a Douglas County emergency event impacting the community of _____ or its surrounding area. This authorization is granted to the incident commander of the emergency for usage by professional emergency agencies and their personnel.

HOA Property Description or Designation Usage Authorized:

Section 1: (This area will list the legal descriptions of all _____HOA-owned land parcels, if available)

Approved Emergency Usage Activities Authorized:

1. Fuel Mitigation
2. Firing
3. Staging, Storage and/or Emergency Management Activities
4. On-Site Water Usage
5. Ancillary use as deemed appropriate by the Incident Commander or the Douglas County Emergency Services Director

This document is duly signed and grants permission for the above described use of ___HOA owned property during an emergency by firefighting and emergency personnel under the command of the emergency incident commander.

Signed this ____ day of _____, _____ by _____ HOA Board of Directors:
(number) (month) (year)

President

Vice President

Secretary

Treasurer

Assistant Secretary

Appendix G

**Fuel Break Guidelines
For
Forested Subdivisions**



Fuelbreak Guidelines for Forested Subdivisions & Communities

By

Frank C. Dennis



Knowledge to Go Places

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



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



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

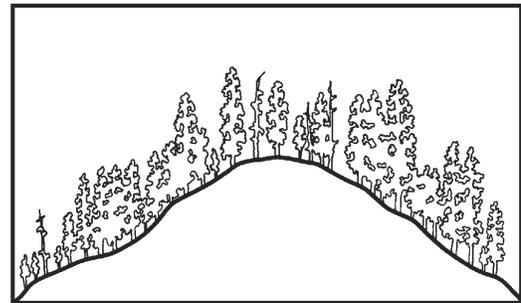
But with development inevitably comes a higher risk of wildfire as well as an ever-increasing potential for loss of life and property. Methods of fire suppression, pre-suppression needs, and homeowner and fire crew safety must all be considered in the planning and review of new developments as well as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

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

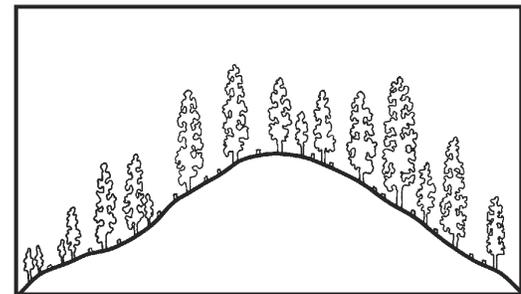
Fuelbreak vs Firebreak

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

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



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



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

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

Fuelbreak Limitations

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

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



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

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

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

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



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

The Need For A Fuelbreak

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

Potential Problem Indicator

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

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

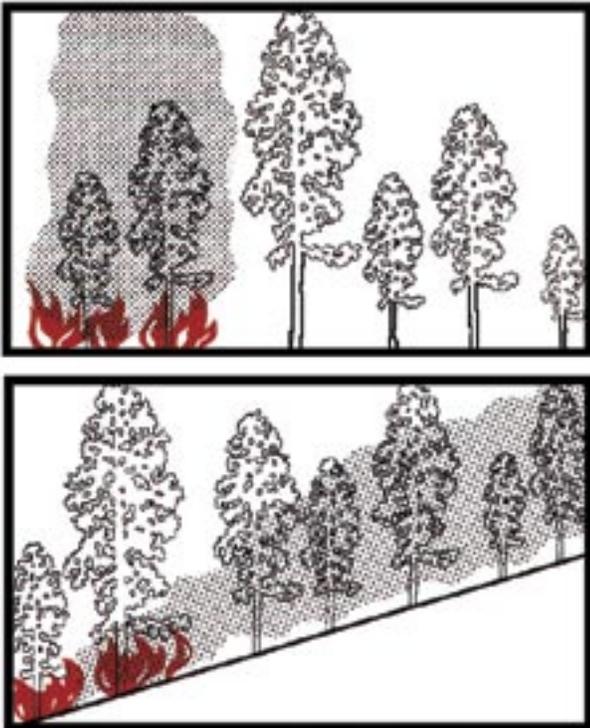
Legend: 5 – Problem may be crucial; 4 – Problem very likely; 3 – Exercise caution; 2 – Problem usually limited; 1 – No rating possible

Wildfire Hazard Maps

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

Slope

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



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

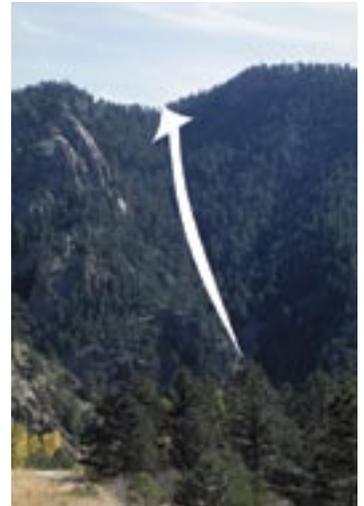
At 30 percent slope, rate of fire spread doubles compared to rates at level ground, drastically reducing firefighting effectiveness. **Areas near 30 percent or greater slopes are critical and must be reviewed carefully.**

Topography

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

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

- Saddles are low points along a main ridge or between two high points. Like chimneys, they also funnel winds to create a natural fire path during a fire's uphill run. Saddles act as corridors to spread fire into adjacent valleys or drainages.

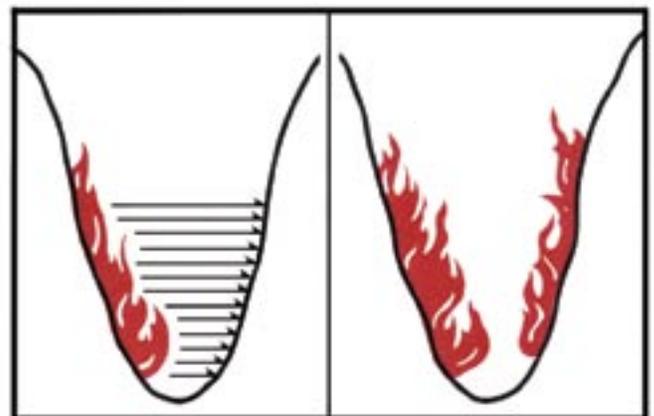


Chimney.



Saddle.

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



Flashover in V-shaped valley.

Crowning Potential

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

Crowning Potential Key

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

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

Ignition Sources

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

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

Fuelbreak Locations

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

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

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

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

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

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

Aesthetics

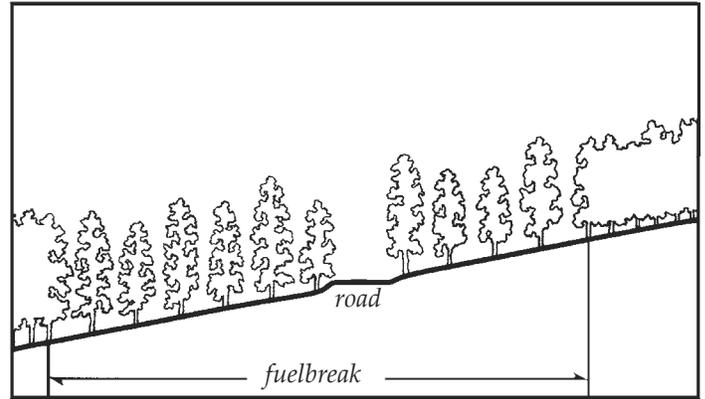
Improperly planned fuelbreaks can adversely impact an area's aesthetic qualities. Careful construction is necessary when combining mid-slope fuelbreaks with roads involving excessive cut-and-fill.



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

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

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



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

Constructing the Fuelbreak

Fuelbreak Width and Slope Adjustments

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

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

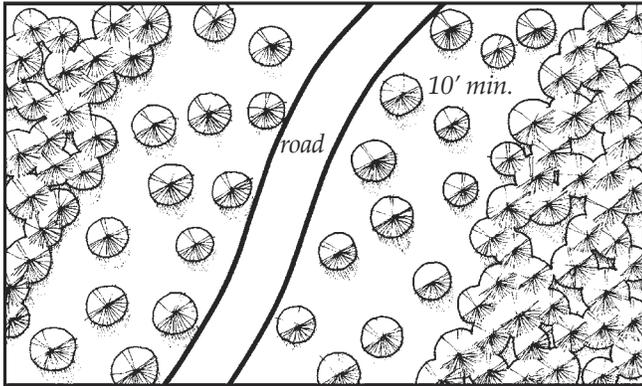
Widths are also increased when severe topographic conditions are encountered. Guidelines for fuelbreak widths on slopes are given below:

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

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

Stand Densities

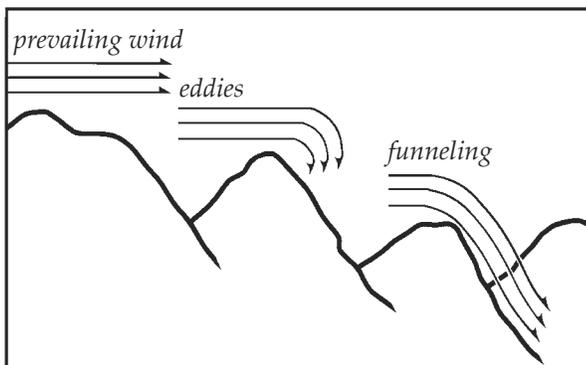
Crown separation is a more critical factor for fuelbreaks than a fixed tree density level. A *minimum* 10-foot spacing between the edges of tree crowns is recommended on level ground. As slope increases, crown spacing should also increase. However, small, isolated groups of trees may be retained for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



Plan view of fuelbreak showing minimum distance between tree crowns.

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

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



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

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

Debris Removal

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

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



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



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



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

Fuelbreak Maintenance

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



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

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

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

Conclusion

An image of well-designed communities for Colorado includes:

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

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

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

**Appendix H
Colorado State Forest Service
Minimum Standards For
Community Wildfire Protection Plans
(CWPP)**

Appendix H

Colorado State Forest Service

Minimum Standards for Community Wildfire Protection Plans (CWPP)

1. Participants

- The core planning team must include local government, local fire authority, local CSFS representative and representatives of relevant federal land management agencies.
- Planning activities that involve assessing community risks and values, identifying community protection priorities, or establishing fuels treatment project areas and methods MUST involve diverse representation from interested non-governmental stakeholders.

2. Plan Components

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

3. Level of Specificity

- A CWPP may be developed for any level of "community," from a homeowner's association or mountain town to a county or metropolitan city.
- Information contained in the plan should be at a level of specificity appropriate to the size of the community being addressed. For example, data used to develop a community risk analysis or identify fuels treatment priorities for a small town would need to be at a finer scale than that used for a county.
- County level plans can be used as an umbrella for plans in smaller communities, but should not be considered a substitute. A county plan will not provide the detail needed for project level planning.

4. Adapting Existing Plans and Combining Related Plans

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

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

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