Community Wildfire Protection Plan

January 14, 2020

Prepared By

Roxborough Park Foundation Fire Mitigation Committee

In Cooperation With:
West Metro Fire Protection District
Douglas County Sheriff's Office of Emergency Management
Colorado State Forest Service

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Acceptance

The Roxborough Park Foundation Community Wildfire Protection Plan (CWPP) was developed in accordance with the guidelines set forth by the Healthy Forests Restoration Act of 2003 and the Colorado State Forest Services' Minimum Standards for CWPP's.

This CWPP is a collaborative effort to guide our stewardship management activities, including wildfire protection. The activities recommended in this plan are appropriate to meet our objectives and will benefit the natural resources and reduce the risk from wildland fire. This plan is voluntary, and where possible, we intend to apply the recommended practices, thus improving our community and increasing public safety.

The Roxborough Park Foundation Community Wildfire Protection Plan has been reviewed and approved by the Members of the Fire Mitigation Committee and CWPP Committee.

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Brian Lence, General Manager — Date
Roxborough Park Foundation

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Meg Halford, Supervisory Forester — Date
Colorado State Forest Service

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Scott Rogers, Acting Fire Chief — Date
West Metro Fire Protection District

Roxborough Park CWPP Updates/Amendments		
Change	**Date**	**Comments**
Original	**April-2007**	**Approved at Board of Directors meeting April 2007**
Updated	**January 14, 2020**	**Approved by the General Manager, Roxborough Park Foundation**

Foreword

The experience of the last several fire seasons, sustained drought conditions and ever-increasing number of homes constructed in the Wildland-Urban Interface (WUI) make future wildfires in Roxborough Park Foundation (RPF) and Douglas County forested areas, a near certainty. All residents and property owners of the Roxborough Park community have a responsibility to understand their linkage to their personal safety, that of their neighbors and our firefighters.

Accordingly, it is vitally important that each individual home and property owner understand and apply principles and guidelines in the Colorado State Forest Service Publication Wildfire Defensible Spaces, FIRE 2012-1, and other Firewise recommendations found at www.firewise.org. However, principles, standards and techniques in various wildfire publications are useless without a key factor, the human will to make a change in the WUI environment.

To make this change, three key principles can be examined: Community, Consensus, and Collaboration, or, the three C's.

Community:

- Responsibility- individual and collective.
- Entire areas mitigated and forests restored to healthy conditions.
- Overall reduction in unnatural fuel volumes.
- Risk Management as opposed to an unrealistic expectation of risk elimination.

Consensus:

- Standards for fuel reduction intended to protect RPF properties.
- Adoption of an overall Plan (CWPP) to address and manage wildfire risks.
- Breaking through deeply held cultural values and beliefs that prevent RPF from becoming more adapted to fire as a natural part of the ecosystem.
- Definition of a healthy forest, using the best science available, and development of an acceptable "aesthetic" based on this science.
- Wildfires will happen. It is not a matter of "if", but "when".
- There are no guarantees with wildfire due to many variables; both human and natural.
- Strive to become a Fire ADAPTED community. See **Appendices**

Collaboration:

- Partnering with organizations that can have a positive impact on the life, property and natural resources of the RPF community.
- Working together to take advantage of any outside financial assistance or programs.
- Empathy with different standards.
- Getting past "no" and/or willful ignorance.

The Three C's are vital to building common interest, understanding and action; and necessary to protect the values that make the RPF community unique.

Introduction

Roxborough Park Foundation was impacted by the 2002 Hayman Fire. While the fire did not reach RPF, it did raise awareness of the wildfire risk to the community. It is suspected the outcome would not have been the same if the fire had burned into the community on the first day. The presence of significant ladder fuels, in the form of dense, continuous Gambel oak could have spelled disaster. The RPF must continue to focus on hazard ignition zones and defensible space for all residences to help reduce fuels and help to improve the chance of structures not igniting in the event of a wildland fire. (i.e. Reduce its ladder fuels and increase shrub clump separation to survive a high intensity wildfire).[1]

The community, to be proactive, formed a Fire Mitigation Committee in 2002. In late 2006 the committee and RPF board of directors interviewed and hired a forestry consultant to begin development of a Community Wildfire Protection Plan (CWPP). The plan was developed and approved by the Roxborough Park Foundation Board in April 2007. Objectives of the plan are:

- To protect life, property and natural resources of Roxborough Park.
- To protect lifestyle and shared community values.
- To restore and protect the ecosystems of Roxborough Park.
- To protect homeowner access to affordable insurance.
- To reduce wildfire risks in Roxborough Park.
- To develop partnerships with those that can have an influence on the wildfire risk to Roxborough Park and its native plant community.
- To provide for the safety of firefighters and allow them to be more effective in protecting us.

Since its inception the Fire Mitigation Committee has been very active in the Roxborough Park community. A recap of some of the activities are:

- Initiated a slash disposal program,
- Achieved/maintains recognition as an NFPA Firewise Community since 2007.
- Meets monthly to review progress against the CWPP 5-year plan.
- Holds annual Firewise Day and/or other community Firewise education events.
- Manages work with professional mitigation providers in the RPF common areas.
- Initiated a seasonal in-house mitigation crew to maintain previously mitigated common areas.
- Provides home inspections as requested by residents as related to private resident mitigation efforts.

[1] Black Forest Fire Assessment Report. Pikes Peak Wildfire Prevention Partners, 2014, www.ppwpp.org

- Established an annual Chip & Haul program to encourage residents to mitigate their property.
- Develops Firewise education articles for the monthly community e-publication.
- Applied for and received a $90,000 matching grant from the Colorado State Forest Service. The grant was implemented in 2019. 23 RPF homeowners participated removing 983 cubic yards of vegetation. In addition, 8.5 acres of common space were mitigated.
- In conjunction with Douglas County Office of Emergency Management, organized a 2019 RPF community evacuation drill. The event included West Metro Fire Department and 107 residents driving 4 egress routes.
- During the evacuation drill participated in a NFPA Research Foundation research project to develop tools that improve community evacuation in emergencies.
- Produced, updated and published an evacuation guide with color-coded maps showing all 5 emergency egress routes.

CWPP Process

The minimum requirements for a CWPP as described in the Healthy Forest Restoration Act of 2003 are:

1. **Collaboration**: A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.

2. **Prioritized Fuel Reduction**: A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.

3. **Treatment of Structural Ignitability**: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.[2]

The CWPP process will cover:

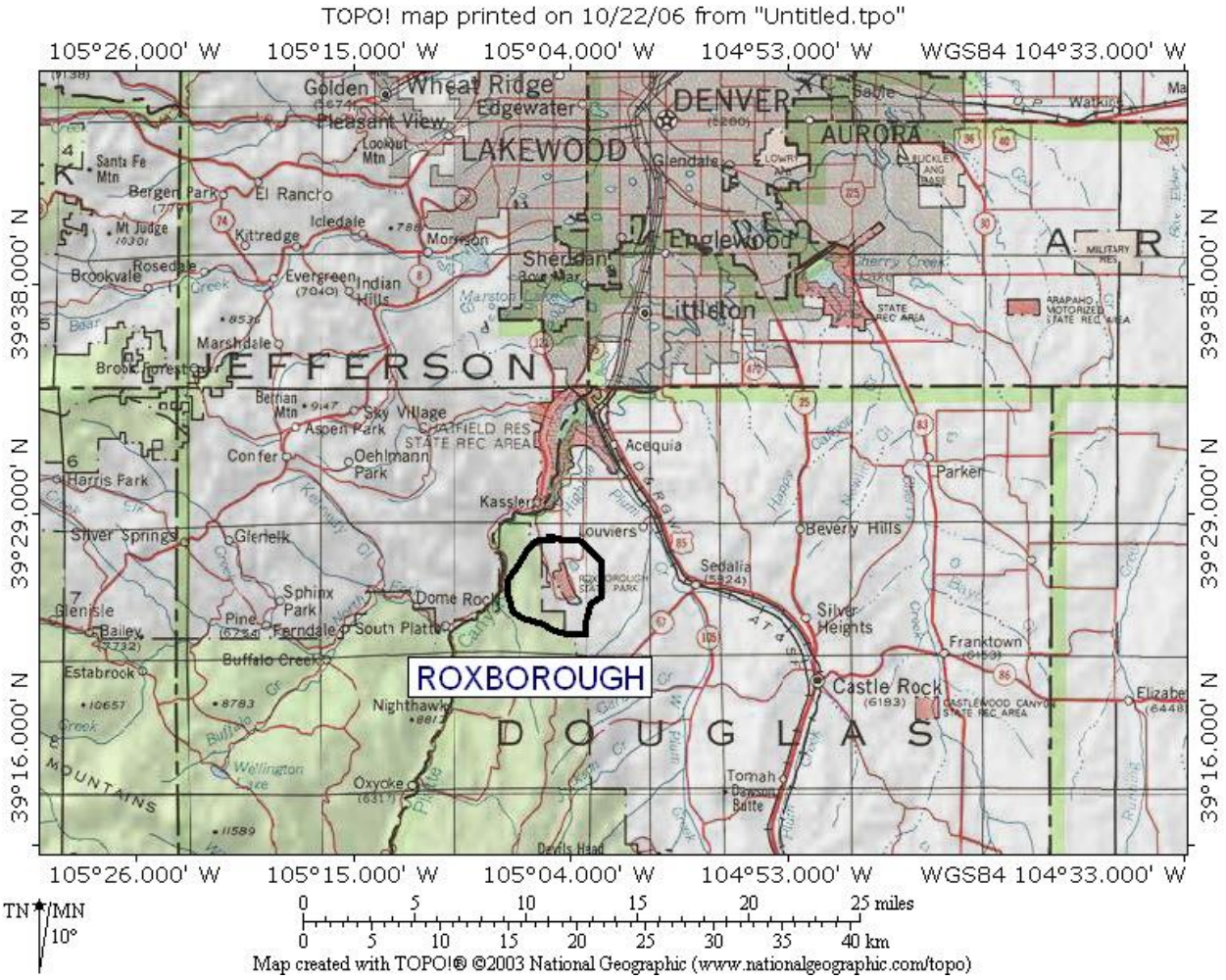
- **Assessment:**
  - Carry out a general community assessment and an analysis of community fire mitigation capacity;
- **Education and Preparedness:**
  - Develop community education and preparedness initiatives about wildfire behavior and mitigation;
- **Mitigation planning**
  - Engage in community wildfire mitigation planning;

[2] Preparing a Community Wildfire Protection Plan, National Association of State Foresters, et al, March 2004.

- **Implementation**
  - Implement risk reduction and community protection activities;
- **Monitoring and Sustainability**
  - Commit to project implementation monitoring and building sustainable community capacity.

Community Identification and Description

Location and General Description



Vicinity Map showing location of Roxborough Park

Roxborough Park is a Rocky Mountain Foothills community located in the northwest portion of unincorporated Douglas County, Colorado. The 2,220-acre community is subdivided into 1,058 lots, with the initial filing started in the mid 1970's. Lot sizes range from multi-family housing to 2.5 acres. At the time of adoption of the 2007 CWPP, over 900 homes had been constructed. Today the community has grown to almost 1,000 homes.

The east central portion of Roxborough Park accommodates a 220-acre golf course with several man-made bodies of water.

Roxborough Park abuts the South Platte Ranger District of the Pike National Forest on the northwest and is surrounded by Roxborough State Park on three sides of the southern half of the community. Privately-owned mining land abuts on its northeastern border. Ravenna, a golf course community, wraps the northern section of the community.

The community lies within the Upper South Platte Watershed, a critical HUC 12 watershed, and is identified as an area within the Denver Water Zone of Concern (ZOC).

Multiple lot types were developed. Most of the lots are heavily vegetated with Gambel oak. Other lot types were patio homes and townhomes.

Roxborough Park Plat Map

Updated Community Mission and Priorities for RPF

Mission

- Develop, maintain and update short and long-term common space mitigation plans as per the CWPP.
- Make recommendations, propose and monitor fire mitigation and emergency preparedness action in RPF.
- Maintain awareness of the impact of individual home-owner mitigation efforts on the safety of the entire community.
- Make recommendations to increase and improve residential fire mitigation practices.
- Promote community wide Firewise education programs and events including awareness of Evacuation Routes, etc.
- Manage annual common area mitigation efforts utilizing professional companies and seasonal RPF crews.
- Work with the RPF maintenance department to continue the annual Chip and Haul program.
- Develop partnerships with those that can have an influence on the wildfire risk to RPF and its native plant community.
- Provide for the safety of firefighters and allow them to be more effective in protecting us.
- Strive to become a “Fire Adapted Community”.

Priorities

- Clear Governance standards, written records and actions in accordance with stated Mission
- Fire Mitigation
    - Encourage and educate residents on effective private property mitigation efforts.
    - CWPP—maintain, update and implement RPF common area annual mitigation efforts.
    - Maintain NFPA Firewise Community Status.
- Budget Sustainment
    - Work with RPF Board to maintain an effective budget level for mitigation efforts and community education.
    - Apply for mitigation grants from State and Federal sources as they become available.
- Develop and implement community wide Firewise education.
- Improve safety, security, appearance, and value of our community.

Community Assessment

Community Values at Risk

The number one asset of the community is the native vegetation, which provides two values. The first is the aesthetic value. The second, property value, is directly related to lot costs and home resale values for forested properties. Other less tangible values include wildlife habitat, view corridors, and privacy.

Roxborough Park is a guarded entry community with controlled access. This includes the private road system, owned by RPF. Assets include:

- The Community Center, maintenance building, recycling center, vehicles and equipment.
- A guarded entry with monumentation and landscaping.
- Roadways within platted acres.
    - Street signs
    - Mailbox units
    - Culverts and roadside ditches
- Community Open Space and other land
    - Haney Park
    - Deidre Meyers Park
    - Schmidt Nature Park
- 12-mile community trail system
- Drainage improvements.
- Electrical system
    - Below ground with above ground transformer and lot services.
- Utility pedestals for telephone and natural gas to individual lots.

Wildland Urban Interface Boundary

The wildland urban interface (WUI) boundary is defined as the area where a wildfire would be a threat to the community. The boundary, shown as a red outlined area on the map below, was set at a distance of one (1) mile and consists of light to heavy fuels. Distances are based on the likelihood of embers generated in these zones that can impact RPF.[3]

Ninety-eight percent of wildfires are typically contained or controlled within the first or second burning period.[4] The Black Forest Fire fits into the remaining two percent of fires that exceeded the suppression capacity of fire service control due to extreme

[3] Framework for Addressing the National Wildland Urban Interface Fire Problem – Determining Fire and Ember Exposure Zones using a WUI Hazard Scale, NIST Technical Note 1748, January 2013, A. Maranghides, W. Mell http://dx.doi.org/10.6028/NIST.TN.1748

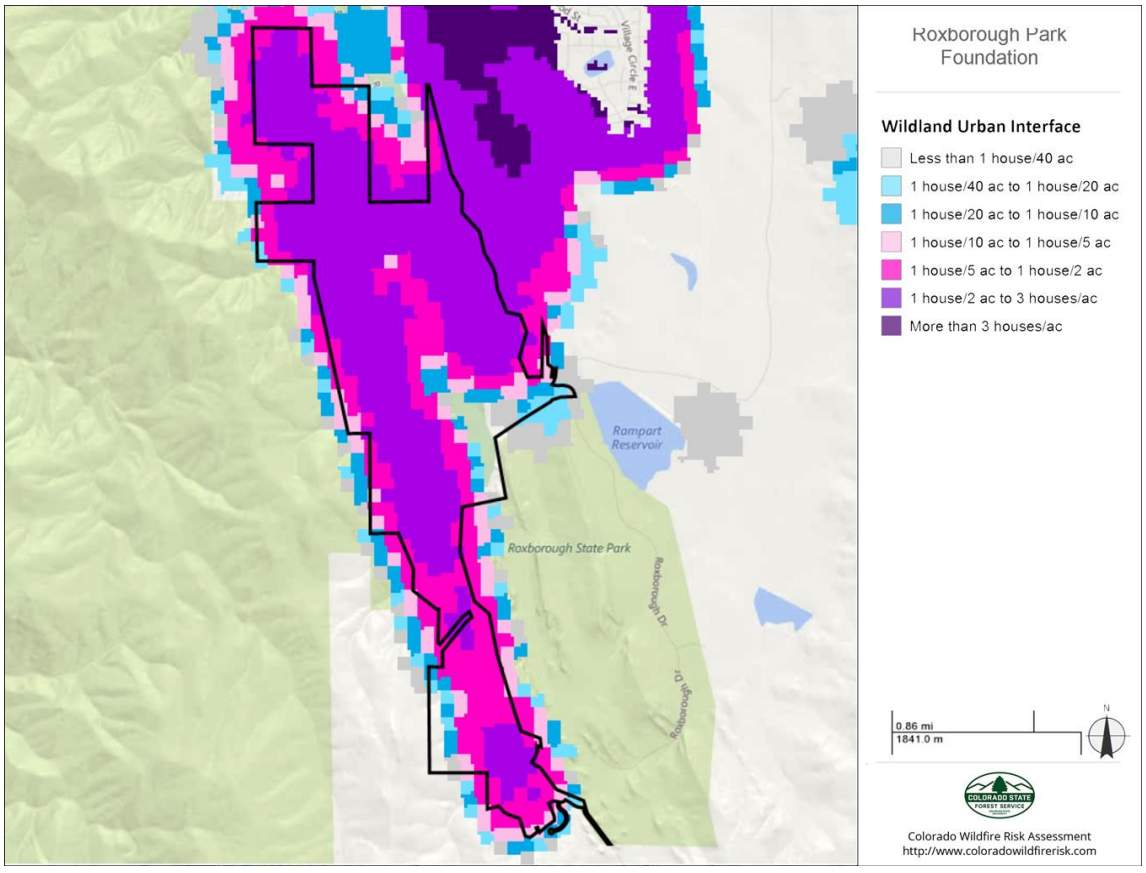
[4] *Assessing Wildfire Hazards in the Home Ignition Zone*, NFPA, 2010, Publication FWC93710PKD

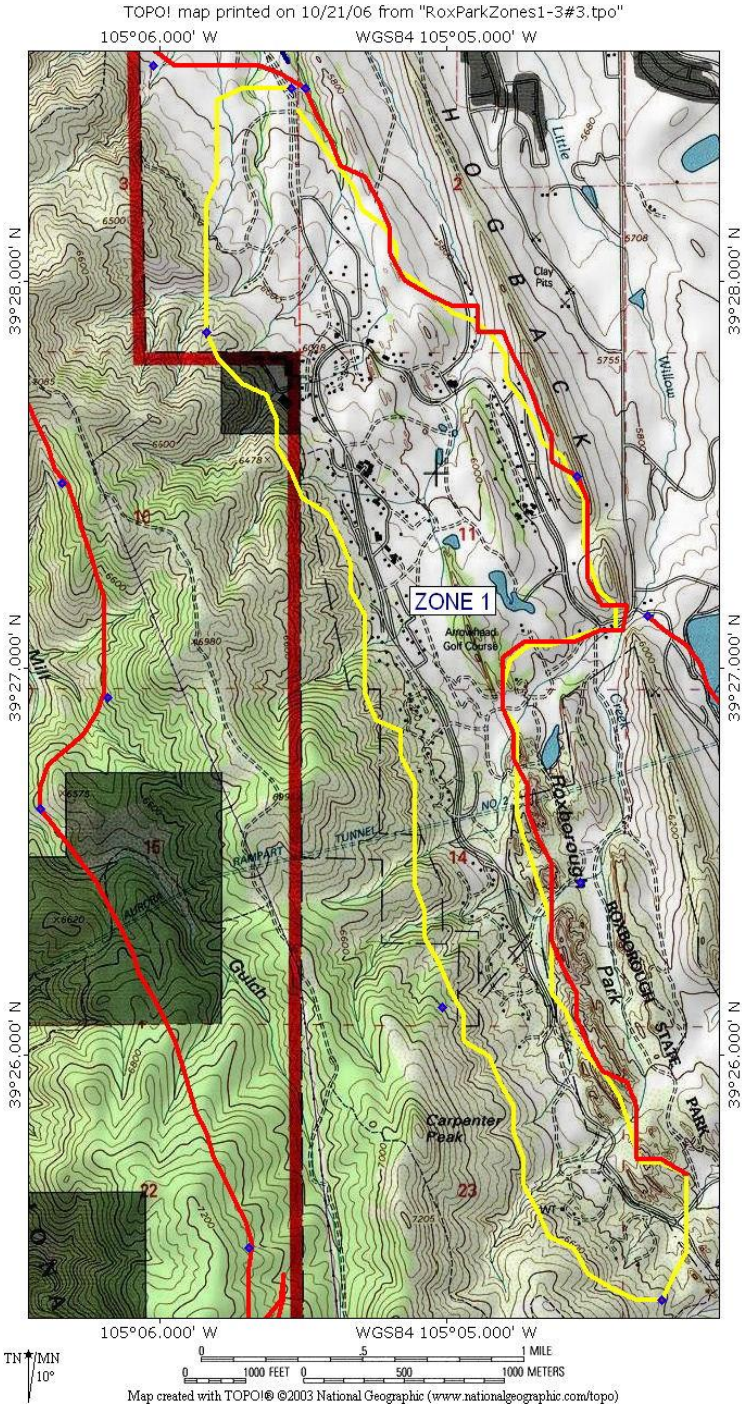
weather and fuel conditions. Most of the homes and structures were lost during this "convergence of conditions" of fuel, weather and topography within the first 24 hours of the fire.

Other observations of the fuels in the zone surrounding RPF are:

- Large, un-thinned, decadent forests and Gambel oak plant community will exacerbate fire behavior.
- Limited fuel treatments implemented by homeowners can be easily overwhelmed due to untreated fuels on surrounding properties.
- Unmitigated fuels in Roxborough State Park can threaten civilian evacuation, and firefighter access and safety. It should be noted that Roxborough State Park has completed a forest mitigation management plan.
- Aerial resources may be of limited value for reducing rate of fire spread due to extreme fire behavior and high winds.
- Density of the tree canopy provides challenges for the effective placement of retardant by some of the delivery systems in use.
- Homes and structures not being "hardened" enhances chances of structure ignitability.

Roxborough Park Foundation WUI Boundary





Topographic Map of Roxborough and Surrounding Area

The area is dominated by *Gambel Oak*, and areas of dense Douglas-fir and Ponderosa Pine forest. A severe wildfire within the WUI boundary would threaten the community for many years with the threat of flash flooding and erosion. Natural Resources Conservation Service Soil data show that 70.5% of the soil in the community has **moderate to high susceptibility to damage by wildfire**.

Wildfire Risk Analysis

Vegetation is dominated by a maturing Gambel oak plant community with small areas of dense Douglas-fir forest and Ponderosa Pine with a high percentage of closed crowns, and dense DF regeneration in the understory. The CO-WRAP risk summary report is attached as an Appendices.

Fuel models for RPF are:

- Anderson: Fuel Model 1:Short Grass; Fuel Model 2:Open scrub lands and pine stand; Fuel Model 4:Mature Brush; Fuel Model 5:Young Brush [5]
- NFDRS Models **U** and **L, Fuel Model O:** Brush like fuels within open stands of pines.[6]

Untreated Gambel Oak in Roxborough Park

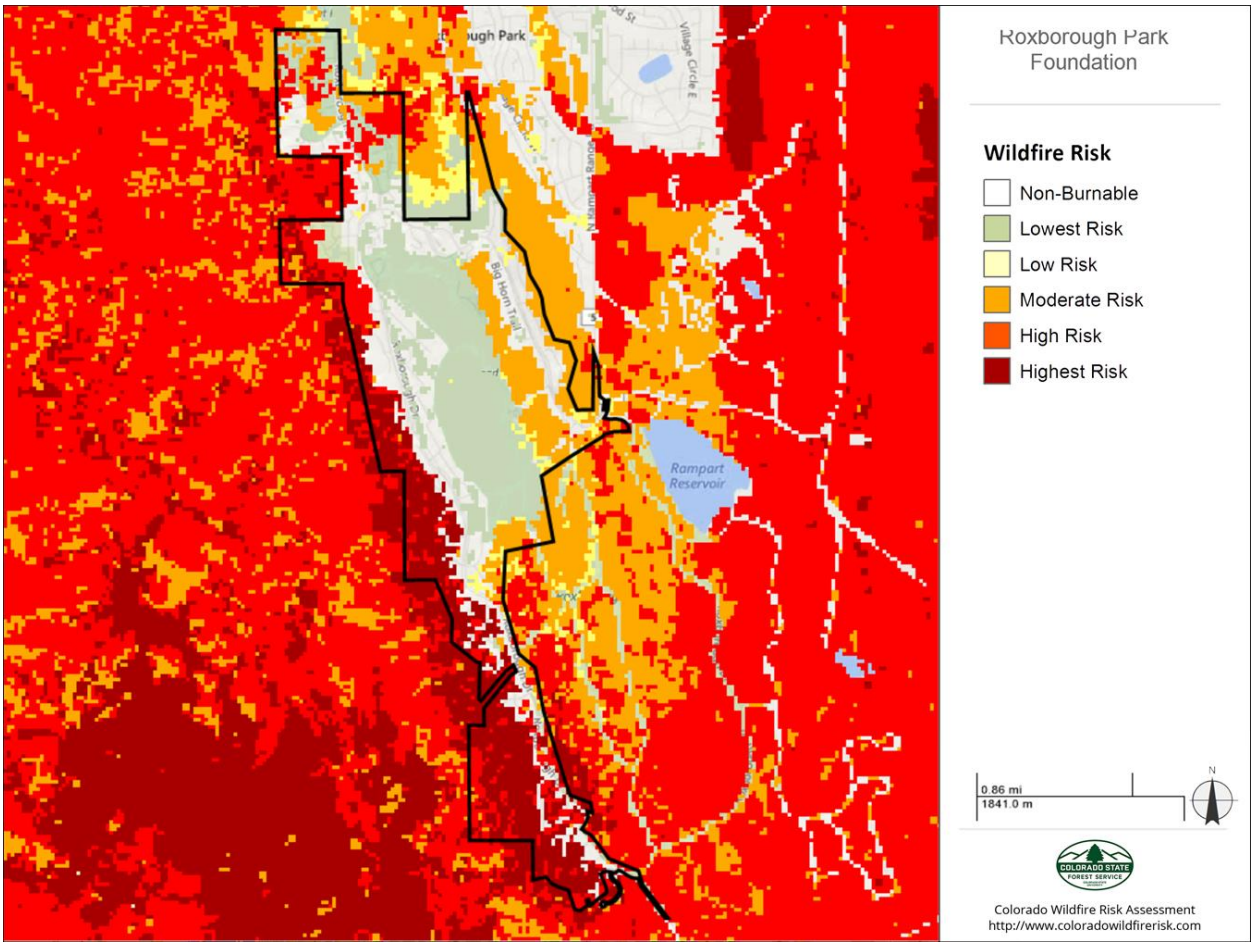
[5] *Aids to Determining Fuel Models For Estimating Fire Behavior*, Hal E. Anderson, USDA Forest Service General Technical Report INT-122, April 1982.
[6] *Gaining an Understanding of the National Fire Danger Rating System (NFDRS)*, PMS 932/NFES 2665, National Wildfire Coordinating Group (NWCG), 2002.

Mature Oak and grasses in Roxborough Park Common Area

Mitigated Oak between native grasses and Douglas Fir in Roxborough Park

A mix of Douglas Fir, Ponderosa Pine and Brush in Roxborough Park

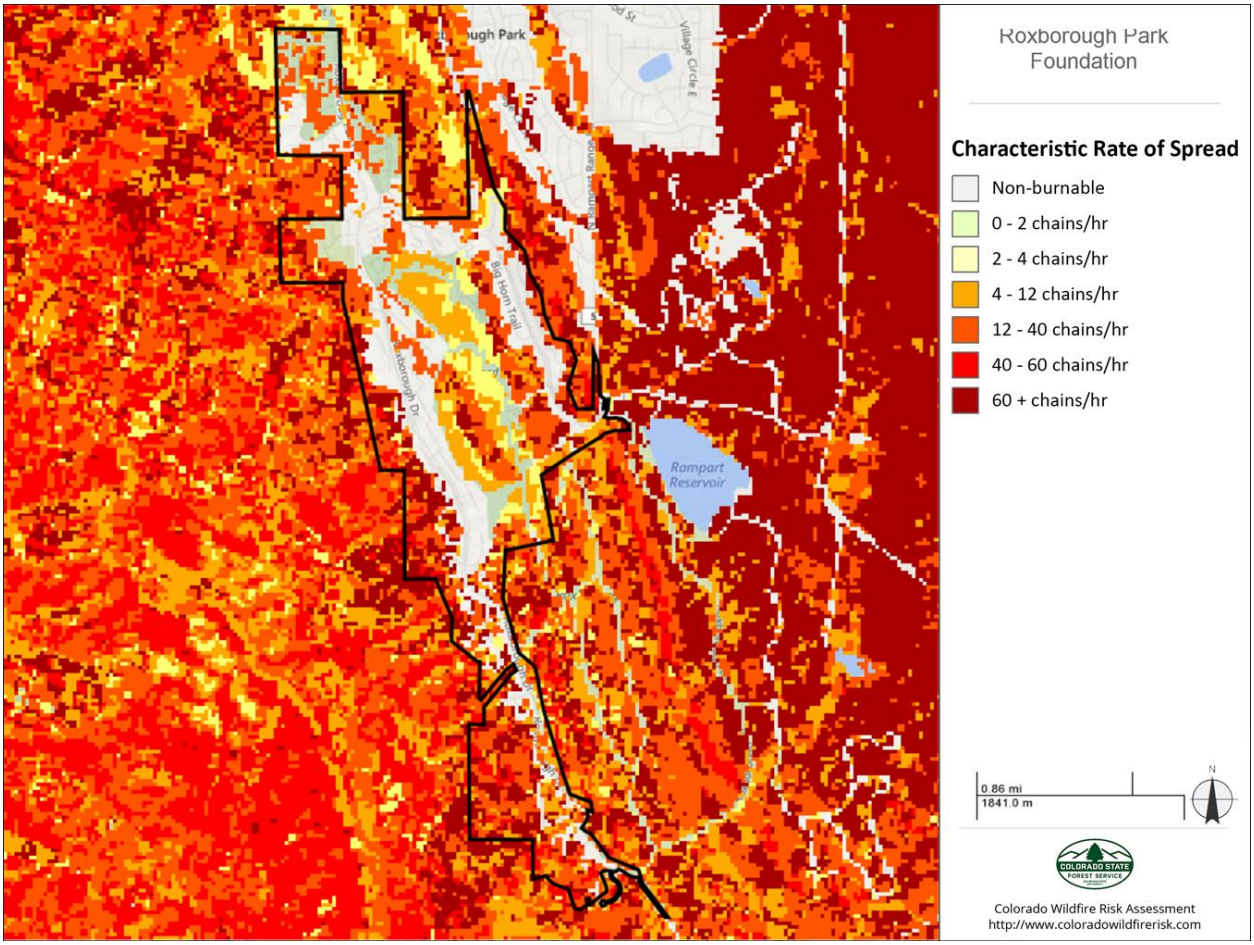
The wildfire intensity map represents the Colorado Wildfire Risk Assessment Portal (CO-WRAP) analysis of the potential wildfire intensity in and around RPF. Wildfire risk is the chance that a fire might start or spread into the area. Most of the community is at a “Moderate” to “High” risk for wildfire occurrence and intensity.



Wildland Urban Interface Risk for RPF and Surrounding Area (CO-WRAP)

When interpreting CO-WRAP data, it should be noted that CO-WRAP predictions are based on the average of historical weather over time. Thus, CO-WRAP does not predict fire behavior on any given day, and weather conditions at the time of a fire greatly influence actual fire behavior and spread. For example, both the Waldo Canyon and Black Forest fires burned during the most severe fire weather and not on average days. The effect of weather conditions on fire behavior is further explained in the section on fire behavior.

These fuels have high rates of spread under relatively mild weather conditions.



Characteristic Rate of Wildfire Spread (1 Chain = 66 feet)

Local topography further aggravates fire behavior and control. Prevailing west winds are funneled through the communities involved. Slopes range from 10 to over 100 percent with most hillsides ranging from twenty to thirty percent.

Note: Rate of spread shown on these maps is under normal burning conditions. During the Black Forest Fire, burning conditions were considered extreme, with spread rates over 100 chains per hour.

Local Preparedness to Respond

Roxborough Park is in the West Metro Fire Protection District (WMFPD). The closest station is WMFPD Station 15, located at 6220 Roxborough Park Road, Roxborough, CO 80125, with a potential response time to the area of 2-12 minutes.

Emergency response and capabilities are covered in the CWPP for Douglas County and will not be repeated here. The Douglas County CWPP is available at www.csfs.colostate.edu .

Douglas County

Douglas County has detailed plans and agreements in place to respond to a wildfire anywhere within the County.

Inter-jurisdictional Cooperation

First responders and community leaders recognize that wildland fire does not respect jurisdictional boundaries, and that large fires can only be managed by pooling resources. As a result, Douglas County enjoys general good cooperation among its many firefighting entities.

Standardized Command and Control

All County fire departments use the Incident Command System (ICS) and National Incident Management System (NIMS) as a tool to manage interagency response operations. ICS/NIMS clarify roles and responsibilities in many common situations, such as when one area belongs to two overlapping jurisdictions, or when an area is not part of a fire protection jurisdiction.

Mutual and Automatic Aid

County fire departments have executed several agreements to provide mutual and automatic aid to each other upon request. Groups of neighboring departments have also set up local automatic aid agreements, so that all departments in that group are dispatched to any fire in any of their jurisdictions.

The Douglas County Sheriff's Office participates in the 2019 Annual Wildfire Operating Plan (AOP) for Douglas County Colorado. The Plan, updated annually, describes how County agencies coordinate wildfire suppression activities with those within local, State and Federal agencies: Colorado Division of Fire Protection and Control (DFPC), and federal agencies (USFS, BLM, NPS) . It outlines rules and procedures for requesting mutual aid, ordering out-of-county resources, radio communications, and air operations.

An Expanding Hierarchy of Resources

The responsibility for wildfire suppression initially rests with the jurisdiction where the wildfire starts. The Douglas County Sheriff is responsible for suppression of wildfires that occur on unincorporated, non-federal land that is outside a fire protection district.

If a wildland fire grows beyond a local fire protection district's ability to control, the Sheriff may appoint an incident management team to provide command and

control over the fire response. At that point, the Sheriff also may assume financial responsibility for firefighting expenses, on behalf of Douglas County.

If the fire exceeds the County's capability to control, the Sheriff can request assistance from the Colorado Department of Public Safety, under terms of the Emergency Fire Fund (EFF) Agreement. When EFF is implemented, DPS assumes responsibility and authority for all suppression activity until the fire has been controlled and management of the fire has been returned to the county.

County Support to Wildfire Responses

Douglas County has a mature system for mobilizing County and community resources to support a wildfire response.

Public Notification and Warning

The Sheriff's Office has several methods to notify and warn people who are threatened by an approaching wildfire:

• Automated telephone, cell phone, email notification and social media (i.e. twitter)

Enrolling in the Code Red program (reverse 911) is greatly encouraged by RPF.

• Local news media announcements

• When possible door-to-door warnings

Evacuation and Sheltering

An Incident Commander may request evacuation of specified neighborhoods, or closure of certain roads; the actual evacuation is the responsibility of the Sheriff.

The Douglas County Emergency Operations Center coordinates evacuation and sheltering for displaced persons, as well as their service animals, pets, and livestock.

Emergency Evacuation

NOTICE TO EVACUATE. In case of a fire or other emergency, the primary notification to evacuate will be issued by the Douglas County Sheriff by means of a reverse emergency notification system. Residents should follow directions provided in the recorded message. Other notifications may come from local TV and Radio stations.

Evacuation Route. The primary evacuation routes will be to Rampart Range Road, Waterton Canyon Road and CO Hwy 67. An alternate route is Rampart Range Rd to Titan Rd to HWY 85. Also, Old Douglas County Road 5 (south evac route) through Roxborough State Park.

Evacuation Plan. It is important to note that the fatalities in both the Waldo Canyon and Black Forest Fires were of residents who did not evacuate in time. In the event of a fire, the Douglas County Sheriff, in cooperation with WMFPD, will determine the best evacuation routes and procedures based on expected fire behavior. Residents should heed the evacuations instructions given by the Sheriff without delay! If a fire is threatening the area, it is not necessary to wait for an evacuation order to leave.

It is vitally important that residents are prepared to evacuate long before a fire or other disaster. Just as fire mitigation should be completed long before a fire threatens, a personal plan for evacuation should be prepared before it is needed. A personal evacuation plan should consist of:

- Papers, photos computer drives, prescriptions and other important items should be stored and ready to take a moment's notice.
- Be sure to have a bag packed with a change of clothes and personal items packed and ready.
- Keep a complete inventory, including photos of your home contents, of items in the home stored in a safe location if need to document insurance claims. Be sure your insurance coverage is adequate.
- Have a plan to shelter pets and livestock.
- Have a communication plan for all members of your family to stay in contact. Have an agreed upon meeting place, such as a friend's home, for family members in case you are separated.

Emergency notification calls are not automatically routed to cellular phones. Residents who rely only on cellular phones should register their land line and cell phones at: http://www.dcsherrif.net/ to be certain of notifications.

The Douglas County Disaster Preparedness booklet is also an excellent resource for homeowners to use in developing an evacuation plan.

Risk of Ignition and Wildfire Occurrence

Reconstruction of fire history and forest dynamics in the South Platte Watershed, reveals (i) an average fire interval of about fifty years during the period 1300-1880, but no major fires between 1880 and 2002; (ii) a mix of non-lethal surface fire and lethal, stand

replacing fire in the historic burns (mixed severity fire regime); and (iii) a striking increase in forest density from 1900-2002.

The extent of the high-severity Hayman burn in 2002 was unprecedented in the last 700 years, in part because of the dense forest conditions that had developed during the twentieth century, and in part because of the extreme drought and fire weather conditions that existed in 2002. Similar drought conditions contributed to the Waldo Canyon fire a decade later.

Population, growth and infrastructure developed within the WUI has significantly increased the wildland fire risk. Homes and structures are now considered a part of the "Fuels Complex" where homes ignited by firebrands or spot fires now quickly spread to neighboring homes, structures, forests and neighboring communities.

Low fuel moistures and relative humidity are common in the area, as are periods of high winds. When dry and windy conditions coincide, the stage is set for large wildfires. Human population is increasing in the area. All recent large fires were caused by humans. Numerous fires are ignited each year by lightning. Except for portions of Florida, this area has some of the highest occurrence of lightning in the continental US.

Fires originating in or near communities are the most immediate concern, but fires starting well beyond the boundaries of the planning area can have profound effects upon the communities. Rapid rates of spread and long-distance spotting are the norms for fires in the vicinity. Areas classified as high to moderate fuel loading are the most worrisome.

Natural fires were typically caused by lightning. Aboriginal use of fire in the area is unknown. Human activities, both accidental and intentional, remain as the highest risk for fire starts. Public roadways create exposures from auto accidents, disabled vehicles, cigarettes, and right-of-way maintenance activities. Internal RPF exposures to fire can be from maintenance equipment, barbeque grills, unsupervised youth, and burning structures.

Fuel Hazards

Factors Affecting Homes in the Wildland/Urban Interface

The overall risk to the community from wildland fire is moderate to high. This section will discuss the factors considered that led to the overall rating. There are currently approximately 165 structures in the Wildland/Urban Interface (WUI). However, all of the approximately 1,000 homes in RPF have various risks of being destroyed by a wildfire. The amount of risk depends on the vegetative fuels, topography, weather events, and the construction of the home itself. It is important to understand these conditions and factors in order to make appropriate decisions about vegetative fuels reductions.

Fire Behavior at any time is dependent on three factors: weather, topography and fuels.

Weather: Weather influences fire behavior as both a long term and transient phenomenon. Long term weather trends such as extended drought increase the possibility of ignition and increase the rate of fire spread.

Topography: Topography includes the degree of slope and the shape of the terrain. Hot gases rise in front of the fire along the slope face, pre-heating the vegetation above a fire. As slope increases the effect of the preheating and increased spread increases, and fires may move up to four times faster with flames twice as long than a fire on level ground.

Fuels: The two fuel types in a WUI are vegetative and structural. Vegetative fuels consist of living and dead trees, bushes, and grasses. Typically, grasses ignite more easily and burn more quickly but with less intensity than trees. Fires can move quickly through grass and herbaceous vegetation, and these smaller fuels are often the kindling that moves fires to larger size fuels.

Fire intensity and spread rate depend on the fuel type and condition (live/dead), the weather conditions prior and during ignition, and the topography. Generally, the following relationships hold between the fire behavior and the fuel, weather and topography.

- Fine fuels ignite more easily and spread faster with higher intensities than coarser fuels. For a given fuel, the more there is and the more continuous it is, the faster the fire spreads and the higher the intensities. Fine fuels take a shorter time to burn out than coarser fuels.
- The weather conditions affect the moisture content of the dead and live vegetative fuels. Dead fine fuel moisture content is highly dependent on the relative humidity and the degree of sun exposure. The lower the relative humidity and the greater the sun exposure, the lower will be the fuel moisture content. Lower fuel moistures produce higher spread rates and fire intensities.
- Wind speed significantly influences the rate of fire spread and fire intensity. The higher the wind speed, the greater the spread rate and intensity.
- Topography influences fire behavior principally by the steepness of the slope. However, the configuration of the terrain such as narrow draws, saddles and so forth can influence fire spread and intensity. In general, the steeper the slope, the higher the uphill fire spread and intensity.

How Structures Catch Fire

There are three ways that a wildfire can transfer itself from natural vegetation, or burning homes, to other homes. They are through radiation, convection, and firebrands.

Radiation: Wildfires can spread to a home by radiating heat in the same way a radiator heats rooms in the wintertime. Radiated heat can ignite combustible materials from a distance of 100 feet.

Convection: Direct contact with flames, or the wildfire's convective heat column—the hot air and gasses rising from the flames may also ignite a home. This will most likely occur

when trees or brush near a structure ignite and the flames touch a flammable part of the structure.

Firebrands: Firebrands are burning materials that detach from a fire during strong convection drafts in the burning zone. During wildfires embers and small flames are the main way that the majority of homes ignite. In most cases, the flame front passes quickly, but a shower of burning embers, or firebrands, impinges on the structure for some time before and after the flame front passes. Firebrands are most often the cause of home loss. Firebrands can be carried long distances, more than a mile, by the winds associated with a wildfire. Many homes in the community are particularly vulnerable to firebrands.

Home construction and Vulnerability to Wildfire:

Roxborough Park is in a wildfire environment. Wildfires will happen, exclusion is not a choice. The variables in a fire scenario are when the fire will occur, and where. This assessment addresses the wildfire-related characteristics of RPF. It examines the area's exposure to wildfire as it relates to ignition potential. The assessment does not focus on specific homes but examines the community as a whole.

A house burns because of its interrelationship with everything in its surrounding home ignition zone (the house and its immediate surroundings). To avoid a home ignition, a homeowner must eliminate the wildfire's potential relationship with his/her house. This can be accomplished by interrupting the natural path a fire takes. Changing a fire's path by clearing a home ignition zone is an easy-to-accomplish task that can result in avoiding home loss. To accomplish this, flammable items such as dead vegetation must be removed from the area immediately around the structure to prevent flames from contacting it. Also, reducing the volume of live vegetation will affect the intensity of the wildfire as it enters the home ignition zone.

The assessment addresses the ease with which home ignitions can occur under severe wildfire conditions and how these ignitions might be avoided within the home ignition zones of affected residents. Roxborough residents can reduce their risk of destruction during a wildfire by taking actions within their home ignition zones. This zone principally determines the potential for home ignitions during a wildland fire; it includes a house and its immediate surroundings within 0 to 200 feet.

The result of the assessment is that wildfire behavior will be dominated by the residential characteristics of this area. The good news is that by addressing community vulnerabilities, residents will be able to substantially reduce their exposure to loss. Relatively small investments of time and effort will reap great rewards in wildfire safety.

The construction materials, location and even the shape of a structure influence its vulnerability to wildfire.[7] It is not the intent of this CWPP to suggest extensive alterations to homes that already exist in the community. Understanding how home construction affects the vulnerability of the structure to a wildfire helps residents plan defensible space

[7] Slack, Peter, (2000): *Firewise Construction: Design and Materials.* Colorado State Forest Service.

projects to compensate for construction differences and taking measures to harden their homes to help reduce ignitability. When remodeling or home improvement projects are done, plans can be made to help reduce the ignitability of the buildings.

Prescriptions for wildfire Hazard Reduction

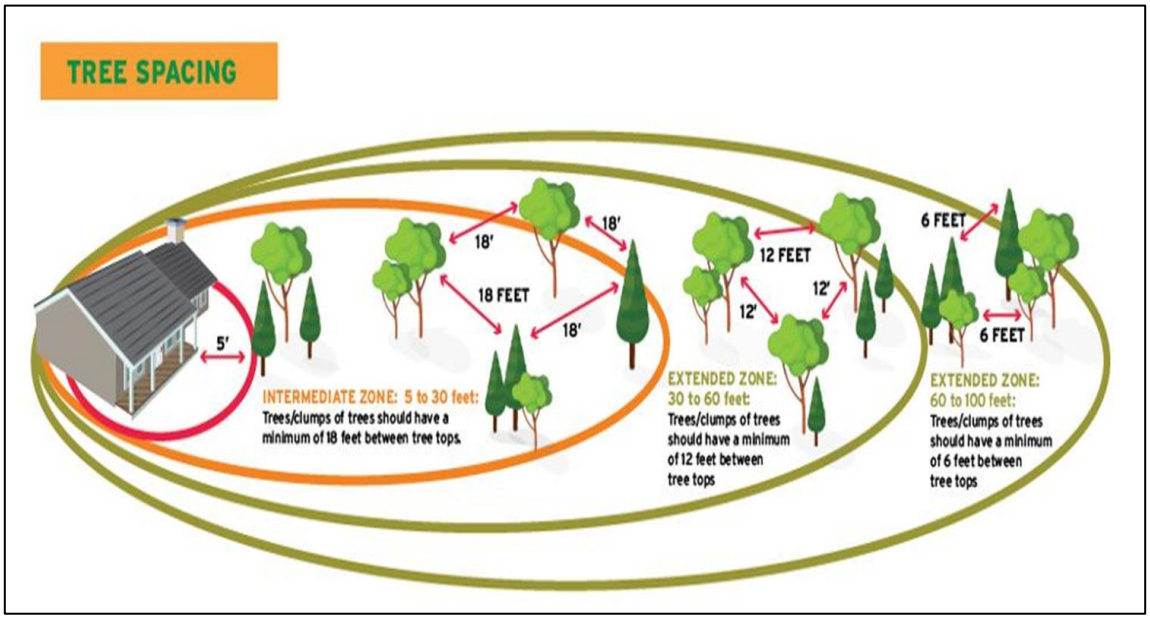
In a broad sense there are two generalized categories of mitigation. First is defensible space thinning in the Home Ignition Zone around structures to increase the chance that the structure will survive a wildfire. Second, is fuel break thinning away from structures to reduce severe fire behavior and give firefighters a safer place to work and possibly halt an approaching wildfire. Both approaches require thinning of the canopy and removal of ladder fuels. The approach will vary depending of the forest conditions existing on the area in question.

The Home Ignition Zone

The term “home ignition zone” (HIZ) is defined as a structure and the surrounding vegetation. A structure’s vulnerability to wildfire depends on the surrounding vegetation, including landscaping, and the structure itself.

Protecting Homes in the HIZ: Thinning around homes is different than thinning for fuel breaks. Thinning in the HIZ is designed to protect structures from the heat of wildfires. Defensible space includes both thinning around structures to reduce the heat from burning vegetation and reducing flammability of the structures to protect them from wind borne embers, radiation and convective heat. Further information about increasing the survivability of structures is found on the CSFS web site at:

https://csfs.colostate.edu/wildfire-mitigation/



Defensible Space

Defensible space is defined as an area around a structure where existing vegetation is modified to slow the rate and intensity of an advancing wildfire. This includes selective removal of trees around structures in two or three concentric management zones. On slopes, increase the width of each zone on the downhill side. Fuels are reduced according to prescriptions for each zone.

Zone One: **0-5ft.** This is the closest zone and includes the structure itself. The management goal is to reduce or eliminate most large trees or shrubs within this zone so that the convective heat will not ignite the structure. A few tall trees may be left in zone one if the lowest branches are pruned so that they are well above a fire-resistant roof. It is best to limit this to one or two trees near a structure. Treat such trees as part of the structure and create 30 feet of space outside the tree.

Combustible structures attached to your home such as fences, sheds, decks, etc. should be considered part of your home as they may burn igniting the home. Cover gable vents and openings with 1/8" screen to reduce firebrands.

Most importantly, the area from 0-5 feet should be of noncombustible materials. No bark mulch or combustible materials. Decorative gravel, rock, concrete, should be considered to help prevent low intensity fires from igniting the home.

While it is necessary to remove combustible material in zone one within five feet of foundations and under decks, it is not necessary to do so elsewhere. Needles on the

forest floor act as mulch retaining moisture in the soil, reduce erosion, and add organic matter to the soil as they decay.

If regeneration of new trees is an objective, however, it is desirable to expose some bare soil since this will promote seed germination and establishment. *Raking up pine needles is not a substitute for thinning and ladder fuel removal.*

Immediate Zone two: **5-30 ft.** The width of zone two depends on the slope around the house. If the average slope angle is less than 5%, zone two extends out 30-50 feet from zone one (with a desired 100 feet total distance around the house). As slopes increase, increase the width of zone two on the downhill side of the house, and increase the spacing between tree crowns.

The main fuels reduction guideline for zone two is to thin the trees to an average spacing of 18-feet crown separation. Clumps of two or three trees may be retained in this zone if the space between the clump and the adjoining trees is at least 20 feet. All ladder fuels under trees should be removed. The branches of large trees should be pruned to a height of 10 feet above ground, but small trees should have at least two-thirds of the green needles remaining.

Firefighters must be able to escape quickly if conditions suddenly deteriorate. Zone two should extend along both sides of driveways for a width of 30 feet from each edge of the drive. This is important to allow safe access and egress for emergency vehicles. Adequate clearance should be maintained to allow access for large structural fire trucks. Twelve feet of horizontal clearance and 13 feet of vertical clearance should be maintained. At the end of driveways, adequate room for a large fire engine to turn around should be maintained.

Extended Zone three: **30 ft. to boundary of property.** The guideline for zone three is to thin the forest primarily to improve forest health. Spacing is less critical in this area but spaces should be made in the canopy. A useful rule of thumb is that a tree should receive sunlight from all four sides.

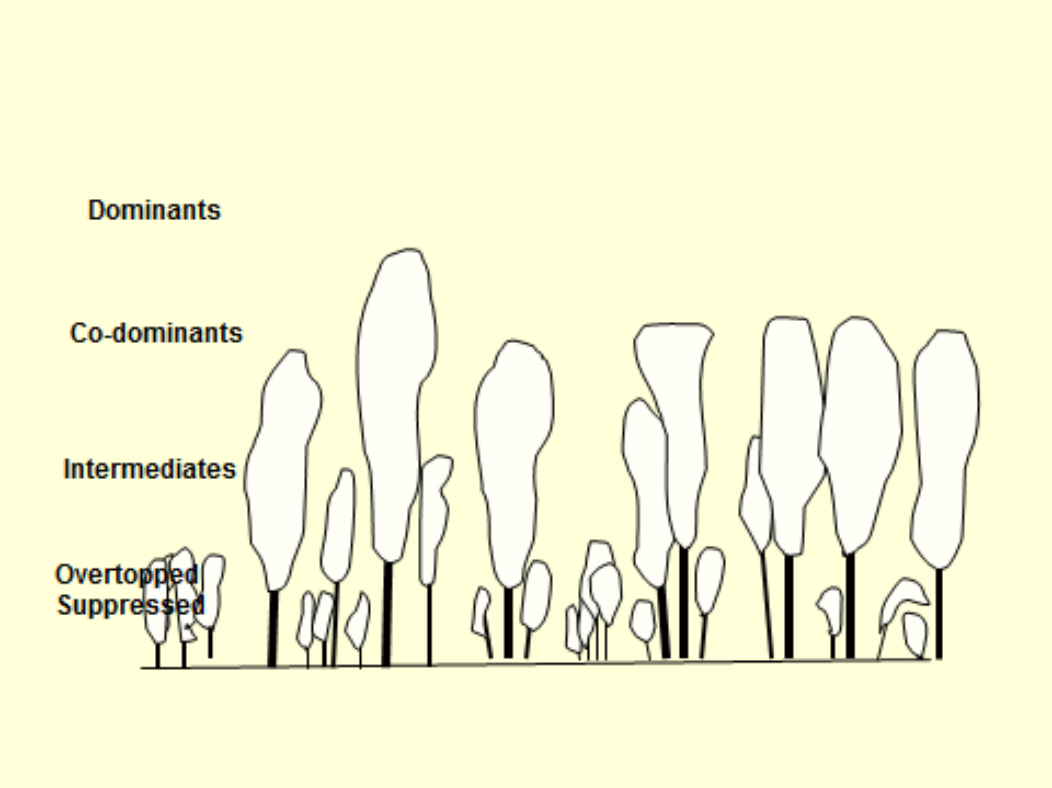
Note: See *Roxborough Park Design Review Guidelines* for current guidance. These will be updated periodically to reflect new science, technology, fire department, and insurance company guidance.

Thinning and Fuel Reduction

Foresters use many methods of thinning depending on the specific objectives of the landowner. Fuel break thinning is most often accomplished by a process called thinning from below. Trees are usually removed or remain based on their height in the canopy.

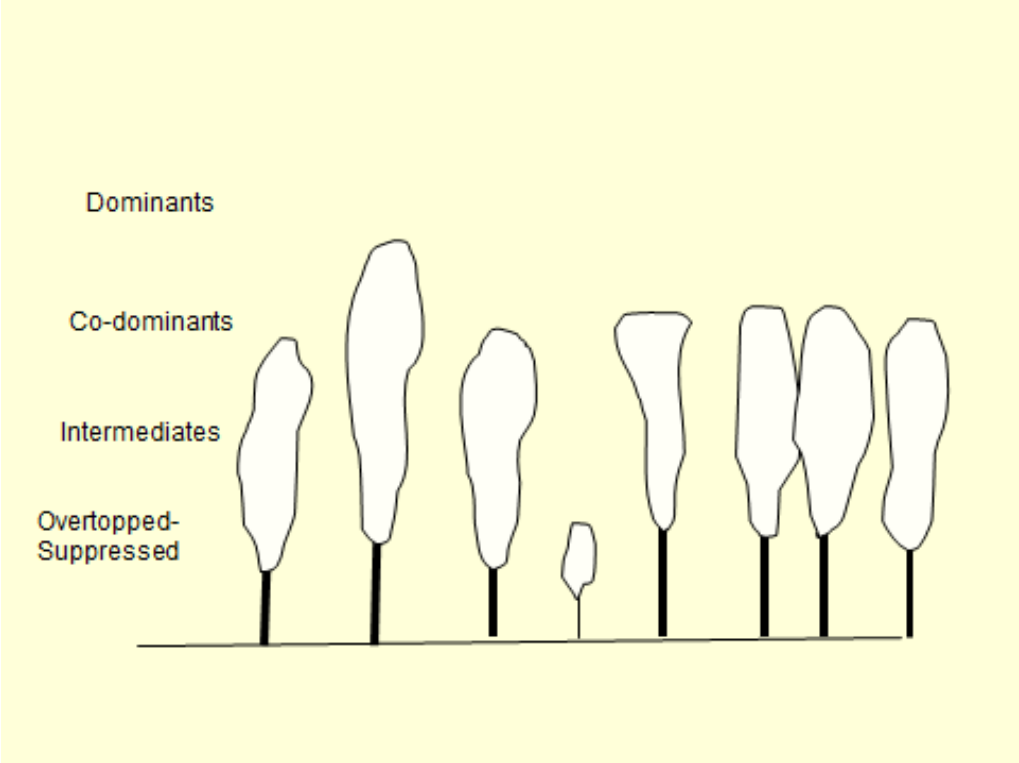
Thinning from below on Roxborough Park common areas. These trees were thinned in 2019 and will be maintained.

For simplicity, trees can be divided in four levels in the forest canopy. The largest trees at the highest level of the canopy are called dominants. These are usually the most vigorous since they have the largest root systems, most leaf area and receive the most sunlight. Next are the co-dominant trees generally the same height and diameter, but not overtopped by other trees, including dominants. Intermediate trees occupy the middle level of the canopy but tend to be crowded and of smaller diameter. They are less vigorous with smaller root systems and fewer leaves as the result of crowding by the dominant and co-dominant trees. At the lowest level of the forest canopy are the overtopped trees. These are completely shaded by the dominant and co-dominant trees.



Crown Fire Prone Stand Structure

Thinning from below removes all the overtopped and most of the intermediate trees. It is essential when thinning for fuel breaks to remove ladder fuels and create enough openings in the forest canopy to reduce the crown fire risk. Thinning from below is desirable in fuel reduction projects because it: 1) leaves the most vigorous trees on the site; 2) creates openings in the forest canopy by removing the less vigorous co-dominants and intermediate trees; and 3) eliminates ladder fuels by removing the overtopped trees, shrubs, and pruning lower limbs of remaining trees.



Stand Structure for Reduced Crown Fire Potential

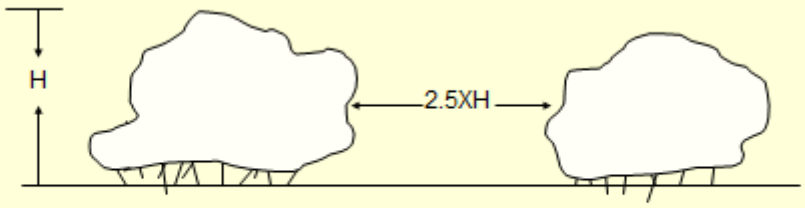
Gambel Oak Fuel Treatments

Gambel oak is the primary fuel in RPF. Oak clump thinning and clump separation are the two best practices for managing wildfire risks in this vegetation type. The diagrams below suggest a minimum of 2.5 times the oak height as the minimum clump separation. This must be increased as slope increases. A chart is available in *CSU Defensible Space guidelines 2012-1*.

Rule of Thumb

- Horizontal distance
  - Provide separation 2.5 times the height of the remaining shrubs.
  - Example: Scrub oak clumps, six feet tall, should have separation between clumps of 12 feet.

2.5 X Horizontal Separation



Managed Gambel oak clumps in Roxborough Park 2019.

Managed Gambel oak clumps in Roxborough Park 2019.

Managed Brush and Oak in Roxborough Park 2019.

Maintenance

Survivable space, fuel break thinning, or any type of forest management does not end when the initial project is finished. Continual maintenance is an essential part of any forest management program. Even in well managed forests trees will die, storms and wind will damage trees, and new trees will germinate.

Oak brush re-sprouts quickly and aggressively after initial treatment and must be maintained by re-mowing the new growth every 2-3 years. This will not eradicate the oak, however long-term maintenance will help slow the aggressive re-sprouting, help maintain the low-height, maintain openings and the efficacy of the initial treatment. Landowners within the community must stay committed to long-term maintenance.

Trees should be inspected every spring for any sign of damage from winter or spring snows or wind. Prune any broken branches if they are not too high in the tree, and trees bent by heavy winter snows should be removed. Check for any signs of insect activity or disease.

Late October is the best time to inspect trees for attack by mountain pine beetles. Beetles have finished attacking trees at this time, and there is adequate time to cut and treat the tree before the adult beetles fly the next July.

At five years check the canopy closure, especially in zones one and two. Remove any trees necessary to maintain openings in the canopy. Do any additional pruning or removal of trees and shrubs to eliminate ladder fuels.

After ten years, dense thickets of young trees (regeneration) may have become established, and these will need to be thinned. Not all regeneration should be cut since trees of various ages are important for forest diversity. Young trees in openings with adequate room to grow should remain. Regeneration that is likely to become ladder fuel or crowded by other trees should be cut. Depending on their objectives, landowners may want to consider removing some of the larger trees to make room for the younger ones.

Implementation and Monitoring

Implementation

Attached as an Appendices is the RPF 5 Year Wildfire Mitigation Plan which identifies all the RPF common space mitigation projects. In addition to the projects, approximately 65% of home sites are rated as high or extreme wildfire hazard and are in critical need of defensible space improvement.

Monitoring

Monitoring is an important part of follow-up to the implementation of projects. Roxborough Park recommends that participants establish, where interest is expressed by the communities, a collaborative multiparty monitoring process. This process should address reporting of accomplishments, need for maintenance of treated areas, tracking of burned areas and the positive and negative ecological and social effects of the projects. This can be incorporated into the RPF Firewise Community annual reporting, and/or become a budget line item as an annual reminder to the entire community. In-kind tracking will be one way to gauge levels of participation.

Monitoring in the RPF Community Wildfire Protection Plan calls for an annual field review by the partners (participants) of accomplishments and the need for maintenance. Based on this review, it calls for needed adjustments in the next year's plan, as appropriate. It also calls for a determination of the interest and a meeting by the partners for monitoring the ecological and social effects of projects. Finally, once 80% of the identified project areas have been completed, RPF may want to consider updating the CWPP. At this point, the community will be substantially fire adapted, and may call for completely different fire suppression strategies.

Roxborough Park Foundation Community Action Plan

During the CWPP process, the following actions were suggested:

- Provide operational authority to WMFPD and DCSO for use of the RPF emergency water supplies or open spaces. This can be in the form of an agreement authorized by the RPF board of directors.
- Regularly update the existing community evacuation map for distribution to all residents, on an annual basis. Provide opportunity for residents to drive the egress routes.
- Monitor evacuation route signs at the five EEE's from Roxborough Park.
- Develop a template for installation and maintenance of community street signs, and mail kiosks to prevent damage by wildfire.
- Coordinate with Roxborough State Park on joint fuel treatment projects along the southern boundary of RPF, including participation in possible grant funding.
- Coordinate with large-lot owners in the Foxcroft Lane, and Red Fern, Indian Paint areas for possible joint fuel treatment projects.
- Implement at least two demonstration fuel treatments or forestry projects on private lots.
- Establish community guidelines for Firewise construction, landscaping, and forestry practices in coordination with all RPF committees. These should be updated as needed.

The following are actions the community can incorporate into its routine budget categories to manage wildfire risks. These are broken down into categories that allow for annual planning and budgeting (See Appendices RPF 5 Year Work Plan and Budget).

Seasonal

- Mowing:
    - Roadsides and roadside ditches- Monthly or as warranted by fire danger.
    - Re-inspect all intersection sight distances for cleared sight triangles.
    - Clear all grasses and fine fuels 3-5 feet from around street signs and mailbox kiosks using weed eaters or non-selective herbicides.
    - Open Spaces- Twice per year
        - First mowing mid-summer after wildflower bloom and before grass curing (browning).
        - Second mowing in the fall after grass curing (to reduce wildfire rate of spread during fall/winter fire season, and allow new, green re-growth in the spring).

- ❖ Common Area and Entry Landscaping:
    - Spring cleanup to remove all dead materials (twigs, leaves, needles, etc.).
    - Remove storm damaged trees and branches.
    - Mid-summer re-inspection to again remove fine fuels within 5-10 feet of all combustible materials.
- ❖ Education/Awareness:
    - Spring alerts/mailings for:
        - Emergency notification system signups and updates.
        - Family evacuation plans.
        - Home inventories.
        - Home assessments by local fire agencies.
    - Early to mid-Summer:
        - Firewise classes with emphasis on structural ignitability and forest health.
- ❖ Implementation
    - Expand resident participation in the Chip and Haul program.
    - Coordinate/facilitate property to property (neighborhood) fuel treatment projects.
    - Utilize a seasonal work crew to maintain previously mitigated areas
    - Work with professional mitigation companies on common areas per the CWPP work schedule

Annual

- ❖ Renew Firewise Community status
    - Firewise Day, meeting or special event.
- ❖ Continue to encourage neighboring property owners to implement lot-to-lot mitigation projects that enhance all home ignition zones (HIZ).
- ❖ Review CWPP to determine annual project needs.
- ❖ Apply for grant funding as available.
- ❖ Contact all partners to update any wildfire mitigation needs related to critical infrastructure.
- ❖ Utility pedestal clearances inspected to reduce loss or damage by wildfire.
- ❖ Inspect all fuel treatment areas to identify any maintenance needs, such as dead tree removal, storm damage cleanup, or insect/disease control.
- ❖ Meet with Roxborough State Park to coordinate fuel treatment projects.
- ❖ Continue community wide educational programs through classes, meetings and annual events. Topics may include:
    - Evacuation Planning.
    - Code Red/ 911 program signup (target of 100% participation).
    - Forest Health and related topics.

- Noxious Weed prevention and control.
- Wildlife habitat restoration.
- Insurance coverage for “being made whole again” in the event of home loss.
- Special Needs Populations.
- Evacuation Planning for Pets and Livestock.

Every Three/Five/Ten Years

- Inspect all fuel treatments for:
  - Tree crown closure in all areas
    - Shaded Fuel Breaks and Zone 2: 10 feet between crowns (20 feet between crowns of tree clumps).
    - Forest Health Thinning Zone 3: 3-5 feet between crowns and/or to allow full sun to tree crowns for optimum tree growth/health.
  - Seedling tree invasion/encroachment
    - Mow or cut seedling and sapling size trees when located within the drip line of mature trees, or not in full sun locations.
    - Where trees establish in open areas, thin out trees to promote full crown development, and reduce crowning potential.
    - Prune as necessary to reduce torching potential.

Summary

This plan is intended as a guide to help reduce losses from catastrophic wildfire. The CWPP is a living document that allows for flexibility. Adjustments, based on new science and technologies, can be adopted without need for plan modification, so long as the intent of the CWPP is met.

Roxborough Park is a special community and provides a unique living environment. Wildfires are inevitable and a part of the Gambel oak ecosystem. It is not a matter of “if”, but “when”. It takes a community that is resolved to work together to manage this risk. Responsibility begins with every property owner, supported by community wide mitigation efforts.