



Conifer Mountain CONIFER, COLORADO

FIREWISE COMMUNITY ASSESSMENT

Prepared by

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1) INTRODUCTION

A Fire Adapted Community is one that is able to withstand catastrophic loss from wildfires. The characteristics of a Fire Adapted Community include managed vegetation, fire resistant structures, an engaged community and a resilient economy. The goal of this assessment is to help Conifer Mountain to become part of a broader Fire Adapted Community.

The Firewise Communities/USA program is designed to provide an outline for preserving property, lives and the natural environment by creating fire adapted communities. The program can be tailored for adoption by any community and/or neighborhood association that is committed to ensuring its citizens maximum protection from wildland fire. The following community assessment is intended as a resource to be used by the Conifer Mountain's residents for creating a wildfire Safety Action Plan.

2) SITE DESCRIPTION

SOCIAL ENVIRONMENT

Community

Conifer Mountain is a residential community that straddles Black Mountain near Conifer, Colorado. The community is in the Front Range foothills, and varies from 8,000 to about 10,000 feet in elevation. The community consists of approximately 400 lots, with over 70% build out. Lot sizes vary from 2 to over 5 acres. The community is primarily owner-occupied. The community was platted in the 1970's.

Access into the community can be made from Kennedy Gulch Road on the Southeast, or through the King's Valley neighborhood on the South. There is no access from the West or North.

By covenant, only single family residences are permitted, with a minimum size of 1000 square feet. Current residence values (2015) range from \$270,000 to over \$1,000,000. The community is located within the 80433 zip code. Census data (2010) for the zip code indicates:

Median age	47 years
Race	96% White, 3% Hispanic
Residential occupancy	89%
Rental units	Less than 1%
Seasonal Home Use	6%
Average Household Size	2.45
Average home value (2015)	\$385,000 (Zillow)
Average family income (2013)	\$114,000 (Chamber of Commerce)

The estimated population of Conifer Mountain is about 800 persons. About 75% of the adult population in the census area works in the Denver Metro area.

Participation in the Homeowner's Association is limited to a small percentage of the residents. The broader community has a similar low level of participation in community events and projects.

Strengths

- High owner occupancy is tied to better care of homes and more care toward mitigation. Absentee owners tend not to mitigate properties.
- Higher than average home values and higher than average incomes tend to imply fiscal ability to maintain property.
- Existing Homeowner's Association makes participation in Firewise programs more likely.
- Larger lot size means most residents own their entire home ignition zones through zone 2 or zone 3.

Weaknesses

- High rate of commuters can be tied to lower community participation and lower compliance with mitigation requirements.

PHYSICAL ENVIRONMENT

Climate

Weather is typical of the higher elevations of the Front Range Foothills. Conifer averages 60 inches of snow per year, and 15 inches of precipitation. Conifer Mountain tends to have greater snowfall amounts than the average for Conifer due to the higher elevation and local terrain influences, with anecdotal estimates of 120 inches per year. Precipitation can vary greatly, however. During 2012 and 2013, dry conditions allowed numerous destructive fires in the area. These were followed by 2014, which was relatively wet and relatively free from wildfires.

Typically, June is the most active month for wildfires in the Foothills. Typically, significant snowfall can occur from November through April, and is most common during March and April. This is usually followed by a rainy season that lasts into or through May. June is generally warm and dry. July and August tend to have Monsoonal moisture, followed by a return to drier conditions in the fall.

June and August/September tend to be the periods of highest fire activity, although fires can occur at any time during the year. Lightning is common during the entire summer, and frequently hits on the higher ridges.

In addition to being semi-arid, the area is known for low average relative humidity and exceptional low relative humidity at times.

Two special climatic conditions need to be considered also:

Drought

Colorado has a history of wet and dry years. Often these variations last only a year or two. Recent, short term droughts have occurred in 1976-1977, 2002, and 2012-2013. Longer droughts have occurred in the 1930's and 1950's, prior to development of the Conifer Mountain community. A more significant drought occurred in the period from 1846 to 1854. During that time, when few Europeans were present in the area, wildfires were much more common.

Foehn Winds

Foehn winds are winds that blow downslope when a weather mass is forced over a mountain range. Of these winds occur as a mass of high pressure air subsides over the intermountain region. This air

warms significantly as it descends along the leeward side of the range. In the Rocky Mountains, these winds are often called Chinook Winds.

When the air blows down the leeward side, a process known as “adiabatic warming” causes the air to increase in temperature and become much drier. It was a Foehn wind that caused the rapid spread of the Lower North Fork Fire in 2012. This fire, located about 7 miles Southeast of Conifer Mountain, caused the destruction of over 20 homes and the loss of three lives. During the major run of the fire, the temperature rose to over 70 degrees (in March), with winds in excess of 70mph and Relative Humidity as low as 3%.

Topography

The community straddles Conifer Mountain, an extending ridge of Black Mountain. Topography in the community varies from rolling to steep hills. Adjacent topography is quite steep, with some adjacent slopes reaching 70°. The adjacent topography slopes down from the community on all sides but the Northwest. These slopes vary up to 2500’ feet in elevation change.

Vegetation

Vegetation in the Front Range varies by elevation.

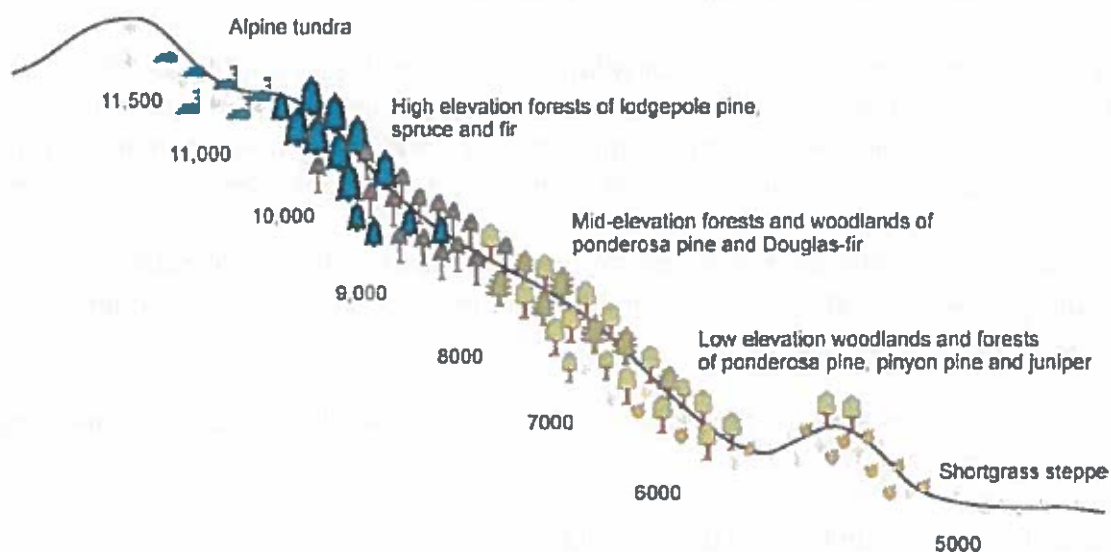


Figure 1b. Colorado forests' species composition change rapidly with changes in elevation, (Graphic created by Laurie Huckaby, Romme, et al., 2006).

Lower elevations have grasslands giving way to Juniper and Oak Brush. As the elevation increases, open Ponderosa stands predominate. Between 7,000’ and 8’000 feet this transitions to denser forest types. These types are present in the Conifer Mountain Community:

Mixed Conifer

Douglas Fir (*Pseudotsuga menziesii*) is the dominant species, with Ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*), limber pine (*Pinus flexilis*), Engelman spruce (*Picea engelmannii*), blue

spruce (*Picea pungens*) and quaking aspen (*Populus tremuloides*) occurring in varying numbers. In the community, these forests tend to be dense with heavy recruitment of reproduction trees.

Mixed Conifer forests in the Central and Southern Rocky Mountains are marked by a Median Fire Return Interval (MFRI) of between 5 and 120 years. The Median Fire Return Interval is the average length of time between fire occurrences in any given point in an ecosystem. Longer MFRI are common in wetter, higher elevation forests and shorter in drier mixed conifer.

Fire Behavior in mixed conifer forests before human settlement was low to moderate in intensity. Typically, the longer the interval, the higher the intensity.



Continuous stands of lodgepole pine in the community. These stands would contribute to extreme fire behavior.

Lodgepole Pine

Lodgepole pine grows in homogenous stands in some areas in the community. Lodgepole is a short lived species, with most trees dying off before reaching 120 years. Continuous stands of lodgepole pine usually indicate stand replacing events. These stand replacing events can include massive bug kill, wind throw or fire.

Pure stands of lodgepole pine tend to be dense, overgrown thickets. Lodgepole grows best in sun and tends to repopulate burned areas and openings. The tree is easily killed by fire. Lodgepole cones, however will open and release seeds soon after a fire passes through.

The MFRI for lodgepole pine stands varies from 60 to 300 years. Fires tend to be high intensity with rapid spread, often leading to complete mortality of the forest.

Quaking Aspen

Aspen is an early succession species. It populates open areas and grows quickly. It does not tolerate shade well, however and will eventually be choked out by conifer trees. Aspens spread by both seed and suckers. Aspen is easily killed by fire, but due to its ability to sucker, will return very quickly. Disturbance, such as fire, is required for aspen to regenerate (Bartos and Campbell, 1998)

Aspens do not carry fire, and in fact will retard the spread of fire due to the moisture in the leaves. Mixed forests of aspen and conifers are far less likely to become crown fires than stands of lodgepole or mixed conifers.

The presence of aspen through the mixed conifer forests, lodgepole stands and in pure aspen stands is another indicator of extensive previous fires.

Forest Health

The density of trees in the community is far higher than historically were present. Comparison to Aerial photographs from 1979 show that the pure aspen stands were much larger and more common. Succession from aspen to conifer is occurring at a rapid pace.

Mortality of conifers from overcrowding is evident, as taller trees choke out the sunlight to the smaller trees. While the forests have so far avoided the mass destruction from the Mountain Pine Beetle, some mortality from Spruce Bud Worm is evident. While common, it is well short of devastating.

There is less downed woody material than would be expected in a mature forest. While this helps in terms of reducing surface fire spread, it is another indicator of past, destructive fires.



An example of a shaded fuel break in the community. Fire intensity would be reduced.

Past Fire History

A number of fires have been recorded in the Front Range Foothills since the community was developed. Many were destructive fires near the community:

1998	Hi Meadow Fire	51 homes	3 miles away
2002	Hayman Fire	133 homes and 6 fatalities	13 miles away
2002	Black Mountain Fire		3 miles away
2002	Buffalo Creek Fire		8 miles away
2012	Lower North Fork Fire	22 homes and 3 lives	5 miles away
2013	Lime Gulch Fire		7 miles away

Aerial photography from 1979 also shows a distinct wildfire scar (approximately 40 acres) approximately 500' from the edge of the community.

Several of these fires demonstrated exceptional fire spread. The Buffalo Creek Fire burned 11 miles in 4 ½ hours. The Hayman Fire burned 19 miles in a single day. The Lower North Fork Fire made a run of 1.25 miles in 11 minutes.

Projected Fire Behavior

Projected fire behavior can be made from recent fire events in the area as well as computer modelling.

Fires in the fuel models present on conifer mountain will burn slowly in the absence of wind or steep slopes. Often, lightning starts burn a single tree or little more. Fires on the steeper slopes and during wind events, however will lead to high intensity fire.

Due to the density of trees in the community, fire will transition from a surface fire (burning forest litter and needles on the ground) to a crown fire (where the fire spreads through the tree tops) quite rapidly on steeper slopes and in windy conditions.

Modelling by Colorado State (COWRAP, 2014) indicates that the steep slopes above Mason Creek, Barney Gulch, the steeper drainages of North Turkey Creek and the upper slopes of Black Mountain at the North end of the community are assessed at Severe Risk of extreme fire behavior.

Computer modelling of a fire burning out of the Mason Creek Drainage using (assuming 30mph winds, relative humidity of 5% and short term drought conditions) provides an estimate of a fire spread exceeding 200 feet per minute and flame lengths of 60' to 150'. A fire under these conditions would run from Mason Creek to the ridgeline (Beas Dr./Edward Dr.) in 15 to 30 minutes.

Fire spread downhill would be slower.

Areas not in the path of a major fire run would be at risk of spot fires (small fires started by falling embers). Embers or firebrands can fall as much as 1 to 2 miles ahead of a crown fire. Embers that fell on the lower part of a slope can begin spreading uphill, and lead to another fire run.

Strengths

- Much of the surface is rocky and devoid of ground fuels, making fire breaks easy to construct and diminishing the spread of fire over wide areas.
- Aspen stands tend to be healthy, and aspen is prevalent throughout the community.
- There is little evidence of widespread tree disease at this time.

Weaknesses

- The area is a fire prone area, with two of three fuel models (aspen and lodgepole) that are characteristically fire-dependent.
- The combination of steep topography, heavy fuel loading, and weather conducive to major fires set up a high probability of destructive fires through the neighborhood.
- Given the right combination of conditions, a fire could burn through the entire community in a matter of a few hours.
- Fire exclusion over the past decades has increased the probability that any fire in the area will be high intensity crown fire.

BUILT ENVIRONMENT

Roads

Most roads are paved, two lane. All are accessible to fire apparatus. The community is primarily accessed by Kennedy Gulch Road, which forks to become Conifer Mountain Road, the primary access road throughout the community. The community can be accessed also through the Kings Valley neighborhood, from Leavenworth Drive, Baca Road and Kings Valley East. There is no access from The North or West. Most homes are close to roads, however some driveways are in excess of 500'.

Utilities

The area is served by above-ground electrical distribution. Some parts of the community have buried natural gas. Many homes have aboveground propane tanks.

Structures

All lots in the subdivision are residential, single family. Covenants allow a detached garage and one utility building per lot.

All homes have been built since the subdivision was platted in the 1970's. Nearly all are wood frame or log sided. All have non-flammable roofing. Most have wood siding, although some have stucco or fiber-board. Most have some type of deck and most are wood.

Mitigation

A survey of random homes showed that about 20% meet the minimum standards for mitigation of fuels around structures. Most homes do not. Recommendations for mitigation include:

Zone 1 – 30' out from all structures: All flammable vegetation removed, except specimen trees. (Specimen trees are single, old growth trees separated from all other flammable vegetation by 30')

Zone 2 – 30' to 100' (or more) from all structures: Trees should be limbed up to 6' to 8' from the ground, with all juniper and similar flammable "ladder fuels" removed from under trees.

Trees should be thinned so that the crowns are a minimum of 20' apart to prevent tree to tree ignition. Zone 2 is considered to extend 100' on flat ground or uphill from structures; on steep slopes, this should be extended out to 300'.

Zone 3 – From Zone 2 to property lines: Forest is thinned for forest health. Gaps or “shaded fire breaks” are built to reduce fire spread.



This home shows good mitigation while still maintaining some privacy and maintenance of the mountain lifestyle.

Strengths

- The lack of flammable roofing is the single most important factor in reducing structure ignition.
- Roads throughout the community can serve as fuel breaks. Homes interior to the road system are at a reduced risk.
- Homes that are mitigated stand as good examples for the community.
- The lack of livestock in the community reduces the complexity of community wide evacuation.

Weaknesses

- Above ground electrical utilities are the second most common cause of fires in the area after lightning.
- The majority of homes lack adequate fuel breaks around the home, and are at extreme risk.
- Most homes lack sufficient defensible space for firefighters to operate safely while protecting homes. Many would be written off due to firefighter safety concerns.

- The prevalence of flammable decks places most homes at risk of fires from firebrands as well as from a fire front.
- Evacuation of the community during a rapidly spread wildfire would be difficult due to the number of residents and the possibility of some areas becoming cut off by the fire.

RESPONSE ENVIRONMENT

Local Fire Protection

The community is served by Elk Creek Fire Department, a combination fire department serving portions of Park and Jefferson County. There is one volunteer fire station located in the community. That station is staffed by community volunteers. At the current time, there are three volunteers assigned to that station.

Elk Creek Fire Department has a staffed station located 10 minutes from the community. Two additional volunteer stations are within 20 minutes. Mutual aid from the surrounding communities can provide up to 12 apparatus within one hour.

This response would be sufficient to contain a ten acre fire within the community, or to protect 20 homes. Most fires could be effectively contained without loss. In the event of a high intensity wildfire as described above, no containment would be possible or attempted. All resources would be dedicated to evacuation of residents and protection of property if possible.

Aerial Resources

Within the region, there are helicopters and air tankers as well as spotter planes available during the normal fire season. Availability of these resources varies depending on weather, assignment to other fires, or pre-positioning to other areas in Colorado when the fire danger dictates. These resources can be effective in knocking remote fires down, and in slowing larger fires, when available.

Water Supply

Homes are all on wells, with no municipal water supply. There are no fire hydrants. There are three cisterns in the entire community, with a total water storage of 30,000 gallons. There are fire hydrants in the Kings Valley neighborhood on the South edge of Conifer Mountain, however they have limited capacity.

Strengths

- Local fire protection capability is better than many rural communities.
- Fires are routinely spotted when small due to the number of homes throughout the area.
- Aerial assets are within 30 minutes when located at Jeffco airport and Rampart.

Weaknesses

- Local resources would not be sufficient to protect 400 homes.
- During extreme fire events, resources would not likely be able to protect any of the homes.
- Water supply is insufficient for firefighting in the community. Additional water would have to be trucked uphill from the 285 corridor.

- Limited volunteer staffing at the Conifer Mountain Fire Station means that it will not respond reliably for all fires.

3) IMPORTANT CONSIDERATIONS

The Conifer Mountain subdivision is located in a wildfire environment. Wildfires will happen -- exclusion is not a choice. The majority of fires in the area are caused by lightning, which we cannot control. Power lines, discarded cigarettes, abandoned campfires and even shooting practice cause many of the remaining fires. The variables in a fire scenario are when the fire will occur, and where.

This assessment addresses the wildfire-related characteristics of the Conifer Mountain Subdivisions. 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.

Homeowners here already balance their decisions about fire protection measures against their desire to live in a wooded setting. It is important for them to understand the implications of the choices they are making. These choices directly relate to the ignitability of their homes during a wildfire as well as survival of the very forest they choose to live in.

Because the community shares the forest, each member of the community bears some of the responsibility for maintaining a natural environment. By excluding fire, we create an unhealthy forest. Mitigation measures are designed to not only make homes safer to live in, but to reduce the likelihood of complete loss of the forest. Trees in a well thinned forest are far more likely to survive and thrive after a fire, while overcrowded forests are more likely to be completely burned.

4) RECOMMENDATIONS

The following steps should be taken to reduce the risk to the community:

- Conforming defensible space is recommended for all homes. While many homes have a good start and are doing a great job maintaining, further education and/or assistance is needed for some homeowners. The guidelines for defensible space include a minimum of 30 feet free from flammable vegetation and 100 to 200 feet of thinning and reduction of ladder fuels such as shrubs and small trees.
- Shaded fuel breaks are recommended, particularly along the areas where the highest risk of high intensity fire entering the community exists.
 - Along the edge of Staunton State Park, below Mark's Drive, Sarah Lane and Elizabeth Lane

- Above Barney Gulch, below Mary Drive and Mary Trail.
 - Below Conifer Mountain Drive, Christopher Lane, Steven Lane, and Steven Way.
- Thinning of vegetation along the roadways that would be used as escape routes by homeowners and firefighters providing structure protection during an incident.
 - Reduce the flammability of homes by replacement of wood decks, flammable siding and other vulnerable aspects with less flammable alternatives.
 - The installation of additional water sources throughout the community would dramatically improve the ability to fight fires and protect homes in the neighborhood. The addition of 3 to 7 additional cisterns would be recommended.

5) NEXT STEPS

The Conifer Mountain Community should pursue Firewise Community Status. Elk Creek Fire District's Chief Bill McLaughlin, a Firewise Community Liaison, has completed this assessment for the community; which has been presented to the community.

The next steps are:

- Formation of a Firewise board or committee to help guide the community toward a safer environment.
- Develop a Firewise Action Plan, including proposed actions such as community slash collection.
- Invest a minimum of \$2.00 per capita toward reductions in fire threat. This can be in the form of direct investment or "in-kind" volunteer hours; including the cleanup around homes currently being done.
- Submit the application for recognition as a Firewise Community.
- Seek financial support for community wide mitigation efforts such as grants and tax incentives.
- Decide as a community whether to pursue joint efforts, such as slash collection and cistern installation.
- Decide as individual property owners whether to pursue improvements around the home.

6) CONCLUSION

Homeowners are reminded that street signs, address signs, road widths and fire hydrants do not keep a house from igniting. Each home owner's proper attention to their own home ignition zones does. Homeowners should identify the things that will ignite their homes and address those. In many cases these are the little things that are easy to do but you must stay diligent.

Weather is of great concern during wildfire season. Talk with local firefighters and they'll tell you that our fire season can be year round. However at such time as fire weather is severe, homeowners should remember not to leave flammable items outside. This includes rattan doormats, flammable patio furniture, firewood stacked next to the house, or other flammables.

Simple steps for getting started:

- **START!** Sometimes the task may seem overwhelming but doing something is better than nothing. Start close to the home and work outward, doing a little more each year.
- Clean pine needles and other debris from your gutters and roof top. Clean under your decks.
- Remove flammable vegetation at least 30 feet from your structures. Single, well pruned specimen trees can be left, if separated from the forest by 30 feet. Trim branches that overhang your roof.
- Each home should have a permanently posted, reflective address sign.
- Stack firewood at least 30 feet from your structure and keep flammable vegetation at least 15 feet from the wood pile.
- Thin trees to have at least 10 to 12 foot spacing between the crowns within the defensible space (typically 100 feet around your structure on flat land, further on the downhill side). An occasional clumping of 2 or 3 trees is acceptable and helps maintain a natural appearance.
- Remove shrubs and prune lower branches under trees in your defensible space. Typically prune branches up to 10 feet off the ground.
- Remove all slash from your property. Chipping, burning in season with a permit, or using slash removal sites.
- Move propane tanks at least 30 feet from your structures and keep vegetation at least 10 feet from your tank.
- Replace decking with less flammable alternatives when decking needs replacement.
- Remove dead trees from your property.
- Work with the Firewise Committee to:
 - a. Educate and convince other neighbors to get involved.
 - b. Assist those neighbors needing help.
 - c. Pool resources to accomplish larger tasks.

