

C L E A R C R E E K T A H O E



# Community Wildfire Protection Plan

*Prepared For:*

Clear Creek Tahoe Community Association  
3745 Golf Club Drive | Carson City NV | 89705



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## Introduction

Clear Creek Tahoe [CCT] is a private residential and golf course community comprised of 384 predominantly custom home sites, nestled within the natural forested landscape of the eastern flank of the Sierra Nevada mountains and centrally located between Lake Tahoe, CA, and Carson City, NV. Located in Douglas County, NV, the property is bordered by Old Clear Creek Road to the north; Carson Valley to the east; Jacks Valley Ranch to the south; and the Humboldt-Toiyabe National Forest to the west.

Of Clear Creek Tahoe's total 2,136 acres, 853 are held in conservancy. The areas designated for Forest and Range/Conservation are generally located on the outer edges of the north, east and west sides of the property, and comprise approximately 53% [over half] of the community's total acreage. Further, Clear Creek Tahoe is situated in the midst of over 6 million acres of national forest land.

At this point, 296 homesites have been sold, with approximately 150 in active design or construction, and 40 homes completed. Clear Creek Tahoe on-site Club amenities include an 18-hole golf course and practice facility; pro shop and golf simulator; club house with fitness center and spa; four guest cottages; pool with grille, tennis and pickleball courts; and several miles of maintained hiking and biking trails.

The primary objective of this project is to amalgamate prior works and studies with more recent reports and fire plans, [ie] Nevada Division of Forestry's Community Wildfire Risk Assessment for Clear Creek Tahoe [completed April 2022], and Clear Creek Tahoe's own comprehensive Fire & Emergency Response Plans [revised August 2022].

As rapid development continues at Clear Creek Tahoe, with growing numbers of residents, members, guests and construction visitors on site daily, this project will focus on proactive mitigation of wildfire hazards including current open space fuel types and planted landscapes at Clear Creek Tahoe. The community involvement and review involved in the approval of this current document is expected to achieve the requirements for a Community Wildfire Protection Plan [CWPP].

Field assessments were completed and treatment recommendations developed for implementation over a one-to-five-year planning horizon.

Several key goals were identified during the development of this project and include the following:

- Protect lives and property from wildland fire;
- Increase resident and public understanding of living in a fire-adapted ecosystem;
- Raise community awareness of the issues of living in the wildland urban interface of western Nevada and promote support for the recommended measures to reduce wildfire risk;
- Identify and prioritize areas for hazardous fuels reduction treatments; and
- Implement a fire fuels maintenance program.

## **Collaborations**

One of the most essential elements of this CWPP is the collaboration between several entities which addresses our wildfire risk and promotes action through comprehensive planning and prioritization. This collaboration includes the East Fork Fire Protection District [EFFPD], Nevada Division of Forestry [NDF], US Forest Service [USFS], the Washoe Tribe, private land owners, the Clear Creek Tahoe Community Association [CCTCA], The Nature Conservancy [TNC], and Douglas County stakeholders.

As a specific company with legal obligations in this area with respect to wildland fire and fuels management, NVEnergy is also included as a stakeholder within this CWPP. NVEnergy proactively thins and clears vegetation around its above-ground equipment on Tribal and other privately owned lands surrounding CCT. While Clear Creek Tahoe's power infrastructure is mostly underground, the community still benefits from a strong working partnership with NVEnergy by ensuring that vegetation and other fuels are regularly cleared around above-ground transformers on site; maintaining situational awareness of NVEnergy activities near CCT through cameras and other communications; and holding annual meetings to discuss ongoing local fuels mitigation efforts.

This collaborative planning will continue to increase "buy in" for wildfire risk reduction efforts and build relationships between the stakeholders. Continued planning will increase resource sharing and cooperation while empowering our community to move forward to reduce wildfire risk. Clear Creek Tahoe will continue to include several community engagement activities throughout the year which include as many collaborators as possible.

# Community Descriptions & Natural Environment

## Climatic Factors, Topography & Exposure

Average temperatures at Clear Creek Tahoe range from a high of 40°F and a low of 20°F in December to a high of 86°F and a low of 54°F in July. At 5,500 – 5,800 feet elevation, CCT receives approximately 28.7” precipitation annually. Most moisture at CCT falls in the form of snow and sleet during winter months, then transitions to rain in the early spring. While spring, summer and fall months are relatively dry with isolated thunderstorms, Douglas County often experiences “dry” lightning storms. Along with more extensive drought periods noted over the past several years, which stresses vegetation and limits water resources, these climatic factors may contribute to a higher frequency of wildfire ignitions throughout the calendar year.

The densely forested terrain is steep and varied in and around the CCT Community. Slopes range between 10% - 20% within the community and increase to greater than 60% around the site’s perimeter. The variable landform at CCT is saddled within two mountain peaks to the east and west, with a broad east trending ridgeline at the west and central portions of the property. The topography of the saddle gently rises and descends from the southern edge of the site into an open, alpine meadow, after which the landform continues to ascend up to US Highway 50.

Mountain to valley wind patterns, particularly on the east side of the Sierras, strongly influences fire behavior. The predominant wind direction is downslope from the south and southwest. According to the US National Weather Service, afternoon downslope winds and cross valley winds can frequently exceed 20 miles per hour.

Fire intensity and spread rate depends on the fuel type and condition [ie] live vs. dead fuels, weather conditions prior to and during an ignition, and the topography. Generally, the following relationships hold between fire behavior, fuel, weather, and topography:

- Fine fuels ignite more easily and spread faster with higher intensities than coarser fuels. For a given fuel type, the more there is and the more continuous it is, the faster a fire spreads and the higher the intensities. Fine fuels take a shorter time to burn out than coarser fuels.
- Weather conditions affect the moisture content of 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 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, topography and terrain features such as narrow draws and saddles, can influence fire spread and intensity. In general, the steeper the slope, the faster a fire spreads uphill and with greater intensity.

## **Home Ignition Zone**

Clear Creek Tahoe is located in a wildfire environment that is similar to most of western Nevada and the Great Basin. It is not a matter of “if” a wildfire will occur, it’s when, where, and how intense and severe the wildfire will be. This assessment addresses CCT’s wildfire-related characteristics, ignition potential and the community’s exposure to wildfire, both in terms of individual homes, and even more so in reference to neighborhoods, associated open space and the community as a whole.

Per the Douglas County Community Wildfire Risk/Hazard Assessment Project plan prepared by Resource Concepts, Inc. for The Nevada Fire Safe Council, ignition risks for wildfires fall into two categories: lightning and human caused. Human caused ignitions can come from a variety of sources [ie] fires started along highways and roads from burning material thrown out of vehicle windows or ignited during auto accidents, off-road vehicles, arcing power lines, agricultural fires, ditch burning, debris burning in piles or burn barrels, burning matches, target shooting, and fireworks, to name a few. Douglas County records for 201 fire incidents that include the ignition source showed that 162 were due to natural causes (lightning) and 39 were human caused.

If a home is impinged upon by an exterior fire, it burns because of its interrelationship with the surrounding landscape, the house or structure construction, and its immediate physical surroundings, which is termed the “home ignition zone.” To reduce the potential for a home ignition, homeowners should focus on mitigating wildfire’s possibility to consume the home. While there are no guarantees, altering a wildfire’s path and intensity through vegetation management and fuels reduction can minimize potential loss of life or property. Proactive removal of flammable vegetation adjacent to the home and reducing the volume and density of the vegetation around a structure prevents direct flame contact. CCT homeowners and the Clear Creek Tahoe Community Association [CCTCA] have the ability to take specific actions to protect their homes and CCT from wildfire.

## Wildland Fire History & Characteristics

From north of Reno NV, to south of Topaz Lake on the Nevada - California border, western Nevada has experienced numerous, severe wildfires along the eastern slopes of the 52-mile long Carson Range, collectively referred to as the “Sierra Front,” over the past 42 years. The combination and interaction of topography, weather, vegetation and periods of drought results in the potential for ignition, both human caused and lightning, has and will continue to result in large wildfire events that exhibit extreme fire behavior. Numerous homes and other structures were saved by emergency responders and a well-designed subdivision.

A majority of these wildfires ignited when conditions were extreme: hot, dry and windy with a high potential for lightning. Consequences are numerous, including loss of life, property loss and lowered property values, high fire suppression costs, economic losses, and lengthy and costly post-fire rehabilitation. Environmental impacts can also be extensive including increased soil erosion, flooding, water quality impacts, loss of wildlife habitat and aesthetics, and overall watershed degradation.

Douglas County records show that between 1980–2003 there were 236 wildfire ignitions with a total of 48,005 acres burned. Carson City Records show that between 1980–2003 there were 156 wildfire ignitions with a total of 8,356 acres burned.

Other notable area wildfires near Clear Creek Tahoe are identified in Table 1.

**Table 1. Notable Wildfires Along the Sierra Front near Clear Creek Tahoe**

| Year | Name of Wildfire         | Location of Ignition  | Acres Burned |
|------|--------------------------|-----------------------|--------------|
| 1987 | Acorn Fire               | Woodfords, CA         | 6,600        |
| 1996 | Autumn Hills Fire        | Kingsbury Grade       | 3,800        |
| 2002 | Cannon Fire              | Walker, CA            | 24,000       |
| 2002 | Gondola & Showers Fires  | South Lake Tahoe, CA  | 964          |
| 2003 | Highway 50 Fire          | South Carson City     | 510          |
| 2004 | Waterfall Fire           | West Carson City      | 8,723        |
| 2011 | Ray May 1 & 2 Fires      | Pine Nut Range        | 3,895        |
| 2012 | Topaz Ranch Estates Fire | Wellington            | 7,152        |
| 2013 | Bison Fire               | Gardnerville          | 25,733       |
| 2016 | Little Valley Fire       | West Washoe Valley    | 2,291        |
| 2020 | Numbers Fire             | Gardnerville          | 18,342       |
| 2021 | Jacks Valley 2 Fire      | Northern Jacks Valley | 285          |
| 2021 | Tamarack Fire            | Alpine County, CA     | 68,637       |
| 2021 | Caldor Fire              | El Dorado County, CA  | 221,835      |
| 2022 | Cemetery Fire            | Genoa                 | 4            |
| 2022 | Lebo Springs Fire        | East Douglas County   | 27.5         |



## **Common Areas, Trails & Open Space**

Common areas within Clear Creek Tahoe with dense ladder fuels and dead and/or unhealthy trees have been cleared or thinned by the Nevada Division of Forestry over the past 5 years. The community's Developer and the CCTCA routinely monitor the condition of problematic trees and vegetation on club-owned property and community-owned property, respectively, and the foliage is removed promptly. New lot owners are required to clear trees and vegetation on their property that pose a fire hazard as soon as they close escrow, regardless of when they plan to build on their homesites.

Undeveloped open space throughout the community and undeveloped lots are generally characterized by mountain forest and shrub vegetation found throughout the eastern slopes of the Sierra Nevada mountains, and irrigated planted landscaping. Further, the 853 acres placed into permanent conservation easement with The Nature Conservancy, which surround the residences, golf course and club amenities, presents another level of concern. If these conservation areas are left in a natural unmanaged condition, where fuel loading and continuity are allowed to increase and accumulate, then this acreage represents a high fire hazard, introducing off-site fire ignitions into and through the developing residential community and club properties.

Roughly 33 miles of maintained walking/hiking trails in and around Clear Creek Tahoe can be used by fire crews approaching a fire incident on foot; however, the trails are not suitable for development to allow ready access by emergency fire suppression equipment to combat fire.

## **Golf Course Open Space**

Clear Creek Tahoe's 18-hole golf course runs throughout the heart of the community, and is maintained year-round, even during its winter dormancy. The course's irrigated and manicured tees, fairways and greens provide effective fuel breaks within the CCT Community, and have the ability to stop the advancement of fire through some interior portions of the community. Like roadways, they further serve to provide defensive anchor points for fire suppression once fire has been introduced into the community.

Hazard and out-of-bound areas that are adjacent to and surround the irrigated golf links mostly consist of native mountain shrub vegetation and seeded adapted herbaceous understory species with volunteer native shrub species where construction disturbance occurred. CCT's golf course maintenance staff tends to these areas year-round to help ensure that any plants and vegetation between the course and private lots and streets does not grow unchecked, thereby creating an additional risk of dead or flammable fuels.

## Design Review & Fuel Modification Zones

Per Clear Creek Tahoe’s Design Review standards, landscaping for private homes must be designed using a pre-determined list of plants and trees that are chosen [in part] for their fire and drought resistance natures. Many private lots in Clear Creek Tahoe abut a Fuel Modification Zone. Fuel Modification areas exist in open space, between private lots and open space areas considered to be potential fire sources. These zones are intended to retard the spread of wildfires and to protect the adjacent areas which may be club-owned, CCTCA-owned and/or other privately owned lots. Typically fuel modification includes thinning, pruning, and removal of dead, downed material that may serve as fuel in a wildfire. The Fuel Modification Zone is subdivided into the following four subareas:

### Zone A: Private Landscape

On lots which are adjacent to the Fuel Modification Zone, there is a setback of 30 feet measured toward the interior of the lot from the property line adjacent to the Fuel Modification Zone.

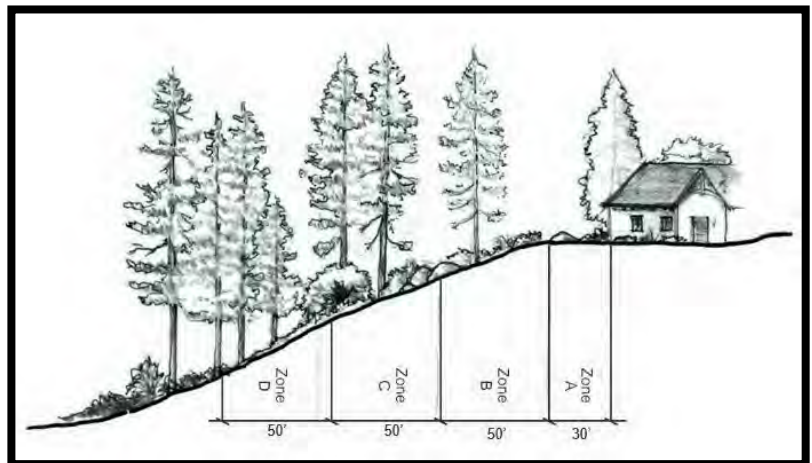
### Zone B: Noncombustible Zone

The purpose of this zone is to provide an area in which fire-resistant plant materials are planted as a fire break. Highly combustible vegetation is removed and may be replaced with fire resistant species chosen from the approved plant palette. The wet zone is a minimum of 50 feet wide.

### Zone C and D: Thinning Zones

The purpose of these zones, both 50 feet wide, is to reduce the amount of vegetative fire fuels in an ongoing, periodic maintenance program. Highly combustible vegetation is removed, and existing remaining vegetation is thinned and pruned up off of the ground.

In Zone C, all highly flammable plant species are removed and 50% of remaining vegetation is thinned and pruned. In Zone D, all highly flammable plant species are removed and 50% of remaining vegetation is thinned.



*Fuel Modification Zone*

## Community Fuel Types

There are three main vegetation types in the Clear Creek Tahoe community, including sagebrush/bitterbrush, cheatgrass, and mixed conifer. The sagebrush/bitterbrush and cheatgrass types are considered high fuel hazards and the mixed conifer is considered a medium/high hazard fuel type. Aspen groves and other deciduous trees are also located along Clear Creek and throughout the community.

### Sagebrush | Bitterbrush

Sagebrush [*Artemisia tridentata*] and Bitterbrush [*Purshia tridentata*] are found all over CCT in lower elevation sites or south- and west- facing slopes where lower levels of precipitation and soil moisture prevail. In terms of wildland fire, the diverse assemblage of native shrubs, grasses, and wildflowers found in these natural sagebrush communities compose the 'fuel' for wildland fires.

If left undisturbed for long periods of time [i.e.] 30 to 50 years without the occurrence of fire to remove or setback shrub density and canopy expanse, the elevated shrub canopy in these native plant communities will increase to the extent where the shrub component will readily carry fire under benign weather and wind conditions. Fuel loading levels occurring in over- mature sagebrush stands can become very high and result in extreme fire behavior when ignition occurs. Selective thinning, trimming and removal of dead woody biomass in these plant communities will help to mitigate wildfire risk over time.

### Cheatgrass

A non-native invasive annual grass, Cheatgrass (*Bromus tectorum*) is present throughout the undisturbed shrublands in the community. These highly flammable annual plants increase the wildland fuel hazard exponentially in a wet year with higher than normal precipitation. They also pose the risk of replacing the dominant native shrub vegetation with flashy annual grasses and weeds following a wildfire.

### Conifers

One of the main ecological features of Clear Creek Tahoe is the abundance of Conifer trees (*Pinophyta*) throughout the community. In 2016, the Nevada Division of Forestry thinned the entire site, with the exception of the easement areas that are in permanent conservation through The Nature Conservancy. Those areas, as well as the Humboldt-Toiyabe National Forest which abuts the community on the western and southern sides of CCT, remain densely populated with conifers, other deciduous trees, and overgrown ground fuels. As these areas have not yet been treated, fuel loads are extremely high and present a high hazard rating in the NDF's Community Wildfire Risk Assessment.

Like the rest of the vegetation in and around Clear Creek Tahoe, conifers are made more flammable under drought conditions. A worst-case scenario would be if a wildfire were to ignite in these areas from ground fuels and erupt quickly into a crown fire, so that there would effectively be fire spreading on the ground and in the tree canopies at the same time. According to the National Park Service website, crown fires are the most intense type of fire and often the most difficult to contain, and need strong winds, steep slopes, and a heavy fuel load to continue burning. All of these factors are present at CCT at any given time.

Year-round thinning, trimming and removal of dead trees, along with slash pile burns in the winter, are effective methods to mitigate these fuel hazards.

## Community Wildfire Fuels Assessment

### Assessment Findings

The Clear Creek Tahoe community was field assessed on April 12, 2022, by Nevada Division of Forestry Firefighter Cole Brandeburg.

- The report’s Suppression Assessment section included factors on road width and accessibility for ingress and egress; water supply and infrastructure; local response resources and community governance; etc.
- The Surrounding Environment Assessment section included factors on vegetation; adjacency to wildlands; defensible space; geographic & topographic features; etc.
- The Structures Assessment section included factors on roofing & siding materials, debris; ventilation; building setbacks; utilities; non-combustible zones, etc.

#### Total Assessed Rating

**107 - High**

#### Suppression Rating

Moderate Hazard

#### Surrounding Environment Rating

High Hazard

#### Structures Rating

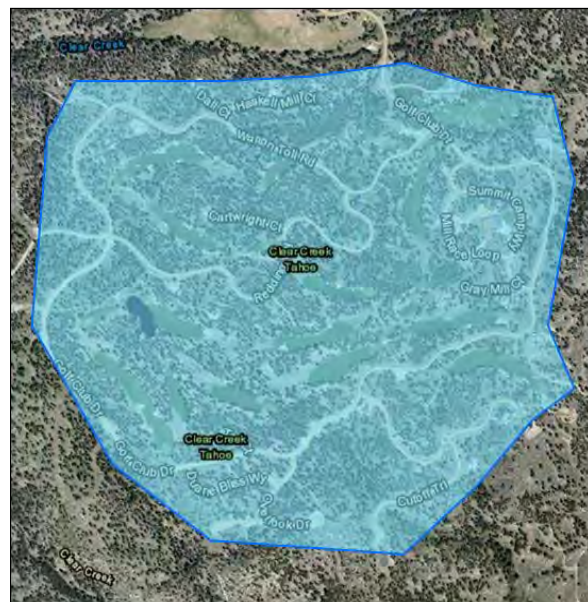
Moderate Hazard

#### Fire Protection District

East Fork Fire

#### Firedshed(s)

Carson Valley-Carson River



## Water Sources & Infrastructure

The gathered data and information was recorded and shared with Clear Creek Tahoe Director of Security for use with ongoing mitigation efforts and planning for recertification as a Firewise community. Clear Creek Tahoe's infrastructure, design guidelines, and evacuation and fire plans have all been developed with fire mitigation and suppression efforts at the forefront, and the following protocols and procedures are already in place:

- Fire hydrants are installed throughout the Clear Creek Tahoe community, and are spaced no less than 500 feet apart. Per EFFPD, fire hydrant requirements are 1500 gpm over two hours.
- Fire sprinkler systems are required for every residence and community building on the property, either by code requirements or those of the CCTCA.
- A 5-million-gallon pond is located between the 11<sup>th</sup> green and the 12<sup>th</sup> tee box, southwest of the pump station at 187 Redding Way. The volume may vary due to the season and the previous winter's snowpack, but this water source is large enough to be used for fire suppression teams on the ground and in the air.
- An approximately 60,000-gallon swimming pool is located at the Summit Camp family campus at 3230 Summit Camp Way.
- Irrigation sources run along all completed paved roads inside the community, as well as throughout the golf course, and are in use daily from April through October. From November through March, they are not in service or pressurized. During the height of the fire season between March and September, at least one water tanker truck waters the vegetation along the slopes of the streets daily from early morning through the afternoon.
- If a fire starts on site during construction hours, this truck can easily be sent wherever needed to wet perimeter areas and help slow fire spread until first responders arrive. Currently the roadside irrigation lines are run manually by contractor employees, and depending on the location of the fire, these lines could also be used to reduce the possibility of fire spread.
- Utilities are all underground, posing a lower risk of fire ignition from equipment malfunction sparks.
- CCT Security patrols all streets within the community 24/7, with special focus on construction sites during normal business hours to ensure cul-de-sacs and other streets are clear for emergency vehicle access.

- Structures are designed and built with ignition-resistant exterior roofing and siding, enclosed eaves and good access to constructed dwellings, in accordance with Chapter 5 of the Wildland Urban Interface Code. Landscaped road medians, community entrances, and developed residential lots all appear to be well maintained from the perspective of regular maintenance of high fire fuel hazards and invasive weeds.
- CCT Design Review standards for defensible space require that all residential designs must include between 30 and 200 feet of vegetative clearance around the home, depending on the type and density of the vegetation and the slope of the homesite. Specific distances relative to each homesite are determined in the design phase of construction.
- CCT's landscape design and review requirements exceed Douglas County standards in order to promote forestry health and plant selection, minimizing fire risk while adhering to CCT's aesthetic guidelines. East Fork Fire Protection District assists by taking part in landscape design and access plan reviews in order to ensure compliance with wildfire standards, in coordination with CCT Design Review.
- The overall design of the Clear Creek Tahoe community incorporates good vehicle and foot access in the larger designed open spaces with developed trails. Well maintained landscaping along these corridors creates an effective fuel break and greatly improves the ability of emergency personnel to respond quickly and effectively to wildfire. However, the same community design also includes numerous wilderness slopes within the permanent conservation easement, between residential lots with no emergency fire equipment access or no apparent fuels maintenance within these confined spaces.
- The planted landscape is irrigated and comprised of a variety of tree species, native and adapted shrubs and grasses. The areas of integration of the planted landscape with native vegetation characterize a high fuel hazard throughout the community.

## **Recommended Treatments & Projects**

The following recommended treatments and/or projects are appropriate for fuels reduction throughout Clear Creek Tahoe. Implementation of these fuels reduction treatments will reduce the threat of wildfire, but not entirely eliminate the dangers. Additionally, ongoing oversight is required to maintain treatment effectiveness, as well as maintaining the community's Firewise Community status.

## **Hand Thinning & Maintenance**

Hand thinning involves the use of manual labor and hand tools, including shears, loppers, hoes, handsaws, weed-eaters, chainsaws, etc. to cut, trim and remove vegetation from a specific site. Typically, a treatment area is designated, vegetation is modified and the resulting biomass is hauled off site or piled and burned. Currently Clear Creek Tahoe is utilizing hand thinning and ongoing maintenance to maintain common areas, roadway medians and entryways.

Hand thinning as a treatment is typically used on slopes too steep for mechanized equipment; or areas too small, inaccessible, rocky or sensitive for other treatment types. Typically, shrubs and/or trees are selectively marked for trimming or removal to maintain aesthetics or ecosystem values while still reducing the threat of wildfire. Examples of treatment areas include pockets of vegetation around homes, steep slopes along conservation lands, roadways and trails and identified areas of the golf courses. Ongoing maintenance is required to ensure the effectiveness of any fuels treatment. A maintenance schedule should be developed in accordance with the vegetation type and desires of the community. Appendix A contains procedures and Best Management Practices (BMPs) for Hand Thinning methods.

## **Mechanical**

There are a variety of mechanical treatments available for larger scale treatment areas or areas that lend themselves to equipment access. A trail corridor is an example where mechanical treatments could be used to create a shaded fuel break. A “brush mower” can be utilized in conjunction with a tractor for smaller areas or a “masticator” mounted on a track hoe are commonly used in western Nevada. There are numerous cutting heads for this equipment, customized for the vegetation type. There is no disposal of woody biomass, rather it is spread on site and serves as a mulch. Design of a treatment area includes clear marking of the grass, shrubs or trees to be removed while retaining healthier vegetation in a mosaic pattern which leaves “shrub islands”. Utilizing mechanized equipment to reduce fuels and modifying vegetation allows the maintenance of a natural appearance on the landscape. Appendix A contains recommended BMPs for mechanical treatments.

## **Herbicide**

A common problem throughout much of northern Nevada is the spread of annual grasses, particularly cheatgrass, a highly invasive grass that becomes very flammable. Cheatgrass greens up early in the spring and dries early typically occupying sites that have been disturbed either through development or previous wildfire.

A second challenge is noxious weed infestations which often follow cheatgrass or will invade disturbance areas. Impacts from noxious weeds are numerous, including hazardous to pets, livestock and wildlife. They are also highly flammable; and can result

in negative economic impacts. In an effort to control and manage both annual grasses and noxious weeds, the use of specific herbicides followed by re-seeding with native or “adapted” plant species, has become an effective treatment tool.

Ultimately, the goal is to reduce the annual grass and noxious weed seed bank in a given area and replace with fire resistant species. Pre-emergent herbicides are effective when used properly, particularly in a community setting. Depending upon the extent of the infestation, treatment may require multiple applications over several years. Once re-seeded, the landscape will be returned to a productive, fire-resistant condition. Chemical control of annual grasses and noxious weeds including safety procedures are contained in Appendix B, while recommended management practices for seeding disturbed sites are outlined in Appendix C.

### **Fuel Break Design & Maintenance**

A fuel break may take many forms, but typically existing vegetation is reduced in a manner that slows and/or retards the spread of wildfire. In some cases, fire breaks are constructed where vegetation is completely removed down to bare ground, often tilled along highway right of ways. While bare ground is an effective fuel break it is not always aesthetically acceptable within a community.

An effective alternative is a shaded fuel break that breaks up fuel continuity, increases spacing between plant species and will slow the spread of a wildfire. The design and location of a shaded fuel break should be incorporated into the topography of the treatment area, of sufficient width for the vegetation type, while maintaining access for maintenance. A fuel break can be designed for any scale from a property line boundary to a landscape level crossing multiple land ownerships. Ongoing maintenance of a fuel break is necessary and can be accomplished by mechanical treatment, livestock grazing or hand thinning.

### **Public Education & Signing**

While Clear Creek Tahoe has already achieved its certification as a Firewise Community, much more needs to be done to maintain this status and more importantly, to promote buy-in from all stakeholders to continue efforts to harden the community against wildland fire. Protecting the community is more than just on-the-ground vegetation treatments and their associated maintenance. The past few years have shown that most of the west has, and will continue to have, wildfires that burn hundreds of thousands of acres every year.

Clear Creek Tahoe residents are aware that they live in an environment that is susceptible to wildfire hazards; further, residents also understand the risk of wildfire and that during wildfire season and periods of drought, it is everyone’s responsibility to be respectful and cautious while using fire or heat producing equipment.



To this end, the CCTCA is already proactively educating residents through notifications in the HOA newsletter, holding informational speakers series events with local fire agencies, and hosting regional training exercises with numerous fire, police and emergency management agencies at Clear Creek Tahoe. Further, a sign warning of high fire danger areas inside the community has been installed just inside the main gates, in sight of every driver entering the community.

## **Recommendations & Priorities**

The overall goal for Clear Creek Tahoe is to create a sustainable balance that will allow residents to live safely while maintaining environmental, quality of life, and recreational opportunities in the Wildland Urban Interface setting. It is important for individual homeowners and the CCT community together, to balance fire protection measures against certain flammable components, primarily vegetation. These choices directly relate to the ignitability of their home ignition zones during a wildfire incident.

The CCTCA has already begun a proactive and collaborative approach to building trust and understanding between involved homeowners, the club, and local and state fire officials. For CCT to maintain and advance its efforts as a Firewise Community, an ongoing commitment is required from all stakeholders for the CCTCA to ensure that mitigation activities continue over time in a prioritized manner.

Overall recommendations for Clear Creek Tahoe include:

- Living vegetation and fuel conditions are continually changing depending upon annual moisture and growing conditions. The CCTCA must make a long-term commitment to vegetation management, fuel reduction and public education. Management of native and planted vegetation throughout the community is necessary to keep plants healthy and resilient to wildfire.
- Cheatgrass and annual fuels should be assessed annually and treated as necessary. Shrublands should be assessed on a three to five-year cycle depending upon annual growing conditions.
- Annual fine fuels [ie] cheatgrass, etc., are highly flammable and should be replaced over time with perennial bunchgrasses and wildflowers.
- Breaking up any continuous fuel beds by modifying the spatial arrangement of the dominant and/or mature shrubs to create openings or a “mosaic” landscape.
- Prioritized treatment projects to be managed by a qualified wildland fire specialist.

The Clear Creek Tahoe community design proves good access for emergency fire suppression equipment for on-site areas owned by the CCTCA and the club; however, the areas within the permanent conservation easement can only be accessed by limited-improved trails that are not accessible by ground fire suppression equipment.

To the extent possible, the trail system within Clear Creek Tahoe should be critically reviewed to identify existing trails that can be upgraded to allow access by emergency fire equipment throughout the community's open spaces. This recommendation will not only improve fire agency responses for controlling future wildfire within the community, but adding controlled-vehicle access will also have the indirect effect of reducing future fuels management costs through enhanced contractor access.

### **Specific Treatment Recommendations & Priorities**

Treatment recommendations for Clear Creek Tahoe were identified through the field assessment surveys, discussions with wildfire officials and professionals, and coordination with the community CCTCA. It should be noted that the USDA Ecological Site Description for Clear Creek Tahoe [F022AY116NV/PIJE/ ARTRV/ACOCO] is listed as an incomplete draft and offers no relevant information for this project.

Generally, the most hazardous fuel conditions throughout Clear Creek Tahoe are within the steeper draws, drainage channels and forested areas along the permanent conservation easement areas in the west and southern perimeters of the community. These hazards are found abutting property lines that have not historically burned or been modified for development. These areas act as "wicks," a continuous fuel bed that can carry a wildland fire into or out of the community.

**Table 2.**

**Recommended Treatments in Clear Creek Tahoe**

| Priority | Treatment Descriptions  |
|----------|---|
| 1        | <p>Maintain landscape plantings to create a shaded fuel break through tree thinning and pruning. Reduce shrub densities to create interspaces and replace cheatgrass with perennial bunch grasses in the fall after herbicide treatment according to Appendices B &amp; C BMPs. Maintain access corridors for emergency response vehicles.</p> <p>Initiate discussions with adjacent property owners to design, construct, and maintain a fuel break along western property line. During the interim, seek off-site landowner permission to install a temporary fire break, with a minimal width of 100 feet, per Appendix A BMPs.</p>  |
| 1        | <p>The areas surrounding Units 1A, 3B and 6 to the west, and Units 3C, 3A and 1B to the south are heavily vegetated with limited access. Fuel continuity is continuous and is immediately adjacent to existing development. Thin native vegetation below homes and along drainage channels to create interspaces and break up the continuous fuel bed per Appendix A BMPs. Expand maintenance and ongoing thinning of planted landscape at the bottom of the drainage to improve plant health and reduce fuel loading. Remove dead biomass annually to the extent possible.</p> <p>Seed prior to brush treatment with fire resistant grass species, and/or seed interspaces in the fall following treatments per Appendix C BMPs.</p> <p>Explore opportunities to improve access to the area including trail construction and/or vehicle access roadways. Future development and/or recreational access should incorporate fuel breaks and access for emergency vehicles.</p> |
| 1        | <p>The western and southern permanent conservancy land is primarily native vegetation that requires thinning to reduce fuel loading and fuel continuity. Masticate and/or hand treat shrubs to create interspaces two times the height of remaining shrubs per Appendix A BMPs. Treatments should parallel the access road and trail consistent with topography up to 30 feet laterally.</p> <p>Seed prior to shrub thinning treatment with fire resistant grass species, and/or seed interspaces in the fall following treatments per Appendix A BMPs.</p> <p>Utilize BMPs consistent with visual aesthetics and the riparian vegetation in the channel. Dead and down riparian vegetation should be removed.</p>  |
| 2        | <p>Access roads, vehicle roadways and trails are bordered by irrigated landscape plantings. Tree and shrub densities increase overtime as they mature requiring trimming and thinning to maintain fuel loading. Regularly assess understory fuel loading levels and remove fine- fuels when continuity is high per Appendix A BMPs. Expand landscape maintenance utilizing BMPs particularly on slopes and within draws or drainages. Remove dead biomass annually.</p>   |

**Table 2. Recommended Treatments in Clear Creek Tahoe [Continued]**

| Priority | Treatment Descriptions  |
|----------|---|
| 2        | <p>The western community boundary borders public lands managed by BLM. Initiate discussions with BLM to design and implement a shaded fuel break to protect homes and prevent wildfire from moving through the community. These discussions should include development of annual fire breaks along this property boundary until a permanent fuel break is constructed.</p> <p>Thin native vegetation below trail and along drainage channel to create interspaces and break up the continuous fuel bed (Appendix A BMPs). Seed prior to treatment and/or seed interspaces during fall months following treatment (Appendix C BMPs).</p> <p>Expand maintenance and thinning of planted landscape to improve tree health and reduce fuel loading. Remove dead biomass annually.</p> |
| 2        | <p>Existing trails and access roadways pose opportunities for replacing cheatgrass and increasing access for emergency vehicles. Future development should incorporate fuel breaks and access for emergency fire equipment.</p> <p>Install wildfire hazard signs and smoking prohibited signs along the trail system in pedestrian use areas.</p> <p>Upon area buildout, remove cheatgrass and invasive annuals utilizing herbicide (Appendix B). Replant with fire resistant bunch grasses per Appendix C BMPs.</p>  |
| 2        | <p>Golf course open spaces represent a mix of native and irrigated landscape plantings. Selectively masticate and hand treat native vegetation to thin plant densities, reduce fuel loading and create interspaces (Appendix A BMPs). Seed prior to treatment and/or seed interspaces in the fall following treatment per Appendix C BMPs.</p> <p>Increase frequency of planted landscape maintenance, including trimming, thinning and removal of dead biomass annually. Utilize BMPs consistent with golf course operations and aesthetics.</p>   |
| 3        | <p>Throughout the community, there is a high density of annual grasses including cheatgrass. Apply herbicide to reduce cheatgrass competition (Appendix B BMPs) cheatgrass and re-seed with fire resistant species per Appendix C BMPs.</p> <p>Explore opportunities for ongoing vegetation maintenance through annual short-term livestock grazing [ie] sheep and goats. Maintain fuel loading and shrub interspace by annual trimming and removing of dead biomass.</p>   |

## Cost Estimates

The costs of mitigation and fuel reduction for the various identified treatment areas are affected by several variables including fuel type, fuel density, slope, surface obstructions (rock) and access. Equipment and labor mobilization can be reduced by keeping the project areas connected and as large as possible.

Current cost estimates average around \$6,000 per acre for northwestern Nevada, and include any mixture of the following treatments:

- Mechanical Thinning
- Hand Thinning & Removal
- Hand Pile & Burn
- Prescribed Burn
- Mastication
- Chipping [material stays in place]

It is important to note that the above treatment costs are only the costs of actual treatment. Many projects, particularly on public lands, also have associated costs for planning, resource surveys, environmental analysis, administration and project management which may raise project costs by 30 to 50 percent.

**Table 3. Contractors and Agencies Specializing in Fire Fuels Reduction Projects**

| Vendor   Agency              | Contact           | Contact Number |
|------------------------------|-------------------|----------------|
| NV Energy                    | Mark Regan        | 775   430.0902 |
| Wilderness Forestry Inc      | Bill Steward      | 775   815.0743 |
| Nevada Division of Forestry  | Eric Roussel      | 775   684.2500 |
| East Fork FPD                | Tod Carlini       | 775   782.9048 |
| Tahoe Douglas FPD            | Mark Novak        | 775   588.3591 |
| North Tree Enterprises, Inc. | Michael Armstrong | 831   582.3400 |
| North Lake Tahoe FPD         | Forest Schafer    | 775   831.0351 |
| Healthy Trees                | Tom Henderson     | 775   224.3827 |
| Reno Green Landscaping       | Carrie Owen       | 775   360.2133 |
| Cross Check Services Inc.    | David Mercer      | 530   581.4225 |

## Conclusions

Clear Creek Tahoe provides good access through maintained roadways, access roads, and open areas including the golf course and trail systems. Between East Fork FPD and Carson City FD, there are 6 fire stations located between 0.9 miles [EFFPD Station 15] and 8.3 miles [CCFD Station 51] from the community. It should be noted that Station 15 is currently being renovated to house 2 full-time career teams of 5 wildland firefighters staffing Type 5 and Fuels Management apparatus. During the fire season, 5 additional seasonal personnel are added. This will provide suppression services in close proximity to CCT 10 hours a day, 7 days a week, during this period. These crews are currently funded by NVEnergy and are available based on NVEnergy prescribed work locations within the District and region.

Water sources and fire hydrants meet or exceed criteria for communities of this size and configuration. Structures are well constructed and utilize fire resistant building materials. Public facility, roadways and landscape maintenance is ongoing throughout the year and provides residents with a high quality of life both aesthetically and functionally. While there are never any guarantees, Clear Creek Tahoe is well positioned to make considerable progress toward further hardening the community and mitigating wildland fire risk, from a wildfire protection and Firewise Community perspective.

Like the rest of western Nevada and the west itself, Douglas County NV, has seen multiple large wildland fires over the past 50 years and most certainly will experience wildland fire in the future. A worst-case wildland fire scenario that would affect Clear Creek Tahoe may include:

High west- to southwest winds are coupled with extremely low fuel moisture levels in areas with sagebrush | bitterbrush plant communities that result in a rate of fire spread exceeding 30 mph. Heavily forested areas are ignited by fire starts in untreated undergrowth and vegetation along the ground, which could then easily spread quickly to form a crown fire in dense trees.

Firebrands and embers are picked up and spread up to a mile ahead of the actual flame front, igniting spot fires where they land. Vegetated open spaces in developed residential communities become receptive fuel beds and can quickly spread wildfire throughout the development, threatening homes and infrastructure. Topography and prevailing westerly winds increase wildfire risks, considering these exposure, topography and climatic factors found at CCT.

Fire fuels [aka vegetation] management is an effective measure for Clear Creek Tahoe's ongoing efforts to reduce the risk of wildfire ignitions and to reduce the intensity and spread of a wildfire should it occur. Effectiveness of any fuels management treatment is directly correlated to the ongoing maintenance of the fuels management treatment. All of the plant communities identified in this document will continue to grow and mature recreating fuel beds that over time become increasingly flammable and receptive to ignitions; however, it is imperative to continue to foster an ongoing commitment by residents and property owners, the CCTCA and the Clear Creek Tahoe community at large to manage their native vegetation open spaces and planted landscapes.

Annual grasses, including cheatgrass, are fine fuels and highly receptive to wildfire ignitions once dry in late spring. Annual grasses are common throughout much of the open spaces, along trails and in disturbed areas, and play a key role in the overall fire hazard risk. Annual grasses require perennial assessment and ongoing treatment and removal to reduce wildfire hazards. It is recommended that shrub communities and planted landscapes be reevaluated every five years with treatments planned and implemented on a regular basis.

Complete elimination of the risk of wildfire is not possible given the multitude of environmental conditions in and around Clear Creek Tahoe, but active vegetation management greatly reduces risk. The treatment recommendations developed in this assessment report should be considered as way points for the community to continue to re-address and advance its efforts to mitigate wildfire risk. Long-term community safety from wildfire requires a permanent commitment to public education, the enforcement of fire safe guidelines, defensible space, and annual attention to fuels management.



**CLEAR CREEK**  
TAHOE

## Appendix A | Hand & Mechanical Best Management Practices

### Hand Thin, Pile, and Haul

#### *Shrub or Brush Reduction*

Hand tools such as weed-eaters, Pulaski's, chainsaws, saws, etc. should be used to remove individual shrubs and reduce the fuel load by creating space between the remaining shrubs equal to approximately twice the remaining shrub height. Creating a mosaic of "shrub islands" and meandering interspaces will result in a natural appearance. Individual desirable shrubs to remain on site should be clearly marked by the Project Manager prior to initiation of work. Care should be taken to avoid cutting or any disturbance within flagged areas that are designated as desirable shrub islands to be retained.

Biomass generated from hand thinning shrubs should be moved to temporary pile locations approved by the Project Manager in preparation for chipping or grinding or removal from the community. Chipped or ground biomass should be immediately blown into chip vans and hauled to designated areas for disposal. Upon completion of chipping and hauling, all paved or concrete surfaces should be thoroughly cleaned to remove all remaining dirt and vegetative litter.

### Mechanical Treatments

#### *Mastication*

There are two basic types of masticators commonly used that are distinguished by their masticating heads (rotary head and horizontal drum) which are further differentiated by their base machines (integrated or boom-mounted). An integrated masticator is best for small areas with limited access while a boom-mounted masticator works well for larger acreages. Either type of masticator could be used to selectively remove individual shrubs and retain adequately spaced shrub islands. Areas considered for mastication treatment should be evaluated prior to treatment for safe operation of the masticator equipment. Individual desirable shrubs and shrub islands to remain on site should be clearly marked by the Project Manager prior to initiation of work. Care should be taken to avoid cutting or any disturbance within flagged areas that are to remain on site.

#### *Mowing*

In larger, gentle terrain sites, with little or no surface rock, and where either the native shrub component is not present or the existing shrubs are also identified for removal, tractor-mounted blade or frail mowers can be utilized to remove standing understory fuels. While permanent fuel breaks are being constructed, this equipment can also be used to establish a temporary fire



breaks during periods of high weed production and fire risk. Temporary fire breaks should be a minimum of 100 feet in width and can be established either along access points to aid in fire suppression or at developed property lines to provide a defensible space for the purposes of assisting fire suppression measures.

Careful timing of mechanical treatments should include the following considerations:

- Mechanical vegetation treatments should not occur during fire season and should only be done when fuel moisture is high. Sparking can occur if rocks are hit by steel blades or with the masticator.
- Heavy equipment should not be operated under saturated soil conditions.
- Vegetative chips and debris following mechanical treatment typically remain on the ground. However, to the extent this debris can be raked and removed off-site, this added action represents a BPM for temporary fire breaks.

### ***Mulching***

Following seeding, disturbed areas exceeding either a 1/2 acre in size or having a width greater than 200 feet, should be mulched to reduce site erosion, dust, and wind-shear damage during the seedling establishment phase. Mulching seeded sites can also aid in soil moisture retention during the seedling establishment period.

The selected mulching treatment will depend on conditions of the individual project site, including soil texture and slope or gradient. Popular mulching methods adapted to conditions in the Clear Creek Tahoe community are discussed below. Some sites may require an integration of alternative soil mulching methods to obtain site stability. All small-grain straw used onsite as mulch must be certified as weed-free by the originating state.

### ***Small-Grain, Weed-Free Straw Crimping***

On flat or gentle terrain with soil textures that allow successful crimping to a depth of 2 – 4 inches, the broadcast of small-grain, certified weed free straw represents a preferred mulching treatment where the method is suited. The straw is loosely blown on the seeded site at a uniform application rate of two dry tons per acre. After straw application, either a slotted disk or regular disk plow (adjusted to a near-vertical disk position) is utilized to crimp or punch the straw into the ground to an effective anchoring depth of 2 to 4 inches. The goal of this mulching treatment is to have 4 to 6 inches of straw stubble vertically protruding from the soil surface. The distance between plow disks, or the crimped straw much rows, should be no greater than 6 to 8 inches. The direction of straw crimping shall be as close to the slope contour as possible.

***Hydromulching***

Hydromulching represents a commonly used mulching method on flat or gentle terrain with slopes less than 20 percent. This method involves spraying a mixture of reclaimed water, fiber mulch, and tackifier over previously seeded sites. Often a green dye is added to the fiber mix to assist in assuring uniform coverage of the mulch fiber. Application rates in the range of 2,000 to 3,000 pounds of wood fiber and 75 pounds to 100 pounds of tackifier per acre are typical. However, the Manufacturer's installation instructions for the fiber mulch and tackifier must be followed closely to assure proper installation. When this mulching method is used, care should be exercised to not unnecessarily spray and cover existing shrubs and grasses identified for retention with the fiber and tackifier solution.

***Weed-Free Straw Plus Netting***

An application of small grain, weed-free certified straw, applied at a rate of two dry tons per acre, can be loosely blown on moderate slopes of less than 45 percent and temporary secured in place by commercially available biodegradable netting. Installation and securing of this temporary mulch treatment should closely follow the Manufacturer's recommendations for the selected netting product.

***Erosion Control Blank and/or Wattling Products***

Temporary soil stabilization of seeded slopes greater than 45 percent require engineered and designed products of which there are many commercial sources. The Manufacturer's specifications should be used to select the engineered mulch product and the Manufacturer's instructions should be relied on to install the selected product.

## Appendix B | Herbicide Best Management Practices

Current research indicates the most effective method today to stabilize and initiate the conversion process from cheatgrass-dominated sites to perennial plant species is to first apply a preemergent herbicide treatment that prevents the germination of cheatgrass or similar grasses for a period of 12 to 18 months. During this weed suppression period, the treated area is seeded to establish a competitive stand of adapted perennial grass species. Once the perennial bunchgrass community is established to a density where it can out-compete cheatgrass, the fire-return levels go down, and natural plant succession processes can again proceed to allow the voluntary reintroduction of native shrub species back into the post-treatment plant community.

Preemergent herbicides that have been tested and proven effective in preventing the germination of cheatgrass for a 12 to 18 month period, includes: Plateau, Landmark XP, and Matrix SG manufactured by the BASF Corp., Bayer Corp Science LP, and DuPont, respectively. Other soil active preemergent herbicides made also be available that provides a similar level of cheatgrass control; however, these alternative herbicides have not been as thoroughly tested and reported in their ability to control cheatgrass germination in the environments located in western Nevada.

*Use of herbicide products must explicitly follow the Manufacturer's instructions as stated on the EPA registered label, including the specified product application rate.* Herbicide application should be performed by a Certified (and bonded) Applicator authorized by the State of Nevada Department of Agriculture. The Contractor must strictly follow ALL recommendations, restrictions, conditions, procedures and precautionary measures as stated on the EPA registered label and the supplemental labeling that addresses use on pasture and rangelands. Applicators and handlers must wear protective clothing as stated on the herbicide label.

If the Manufacturer's label instructions are followed closely, these herbicide products are designed not to cause mortality to existing and established perennial plant species. Accordingly, these products can be applied in areas where preexisting perennial plants are desired to be maintained. Withstanding this flexibility, care should be exercised when using these products for unnecessarily spraying established perennial plants that are identified for retention due to the plant damage that can result under certain conditions.

The application period should be carefully scheduled to occur in the fall, within six (6) weeks before the expected date when the soil freezes, and within two to three (2-3) weeks of normal predicted rainfall of a minimum of ½ inch. This application should not occur prior to October 1.

Since these herbicide products remain active in the soil and preventing new plant germination for a 12 to 18 month period following application, post-treatment seeding is delayed (and the treated ground is left fallow) of one complete year. Post-treatment seeding is instigated the following fall prior to frozen soil conditions. See Appendix C for further BMPs relating to seeding disturbed sites.

## Appendix C | Glossary of Selected Wildfire Management Terms

**Annual Grass Treatment:** The purpose of this treatment is to reduce the volume of flashy fuels associated with annual grass growth (e.g., cheatgrass and Medusahead grass). Fuel reduction can be accomplished by hand or mechanical treatment of plant biomass or herbicide treatment. Preemergent herbicides can be applied near residential areas at the proper rates and following all label instructions to inhibit seed germination. After plants have started growth, mowing or weed-eating and removal of annual grasses before seed maturity reduces the amount of fine-fuels during the summer fire season, limits seed production, and reduces the potential for annual grass germination in the following year.

**Defensible Space:** Defensible space is defined as a minimum of a 30 foot area around houses and other structures where vegetation has been significantly modified or removed. The purpose of creating defensible space is to reduce the risk of losing homes and other property improvements to wildfire.

**Extreme Fire Behavior:** 'Extreme' implies a level of fire behavior that ordinarily precludes methods of direct control action. One or more of the following factors are usually involved: high fuel loading, high rate of spread, prolific crowning and/or spotting, presence of fire whirls, and/or strong convection column. Predictability is difficult because such fires often exercise influence on their environment and behave erratically and dangerously.

**Fine-Fuels:** Fast-drying fuels, generally with a comparatively high surface area to volume ratio, which are less than ¼ inch in diameter and have a time lag of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

**Fire Behavior:** The manner in which a fire reacts to the influences of fuels, weather, and topography.

**Firebrands:** Pieces of burning material carried on the wind ahead of an advancing wildfire that can ignite spot fires up to a mile removed from the flame front.

**Fire Break:** A strip of land cleared of brush, trees, and fine-fuels down to the mineral soil.

**Fire Frequency:** The number of times that fires occur within a defined area and time.

**Fire Hazard:** Vegetative factors that can affect the intensity and rate a fire spreads as well as urban factors that can facilitate or inhibit public safety and the containment of a fire in an interface area.

**Fire Regime:** A term used by fire ecologists to describe the recurrence and intensity of fire relative to a specific plant community.

**Fire Return Interval (or fire interval):** The time period between fires in a defined area, usually at the scale of a plant stand or a small landscape area.

**Fire Risk:** Potential ignition sources and factors that facilitate ignition of wildfires.

**Flashy Fuels:** Fuels such as grass, weeds, leaves, pine needles, duff and litter. Flashy or flash fuels ignite readily and are consumed rapidly when dry. Also called fine-fuels.

**Fuel Bed:** The array and composition of fuels in terms of fuel loading, depth, and particle size in a natural setting.

**Fuel Break:** Fuel breaks are constructed in strategic locations where a cover of dense, heavy, or flammable vegetation has been permanently modified to a lower fuel volume or reduced flammability. Fuel break construction may include removing, controlling, and replacing highly flammable vegetation with more fire-resistant species. Locating fuel breaks require strategic planning and regular maintenance is required to maintain their effectiveness over the long-term.

**Fuel Loading:** The amount of fuels present expressed quantitatively in terms of weight per unit area.

**Fuel Reduction Treatment:** This treatment involves strategically locating blocks of land near or within communities where flammable vegetation has been permanently modified to a lower fuel volume or reduced flammability.

**Fuel Type:** An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

**Home Ignition Zone:** Coined by Jack Cohen, US Forest Service Fire Scientist, the home ignition zone concept represents the area surrounding a home that rarely exceeds 200 feet in radius distance. The construction and flammability of structures and vegetative fuels within this radial distance largely determines whether a constructed home will survive a wildfire event or not.

**Occluded Interface:** This condition is usually within communities or cities where there are small islands of wildland fuels such as parks or open space. There is a clear boundary between the community and the wildland vegetation.

**Shaded Fuel Break:** A shaded fuel break is created by altering surface fuels, and increasing the height of the base of the live crown, and opening the canopy by removing a portion of the woody plants in the treatment area. This type of fuel break spans a wide range of understory and overstory prescriptions. Construction methods include thinning, mechanical biomass removal, and the potential use of prescribed fires.

**Wildland Urban Interface [WUI]:** The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.