

WILDFIRE MITIGATION PLAN

For Jeff and Steph Lynch
639 Arroyo Chico, Boulder
Docket: SPR - 11 - 0018
Inspection date: 5/12/2011

Prepared for:

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PURPOSE OF A WILDFIRE MITIGATION PLAN

The purpose of a Wildfire Mitigation Plan is to give guidelines for reducing wildfire hazards around a home or other structures through fuels reduction. It is a document to inform urban interface home owners of the dangers and responsibilities of living in the interface. This plan will help outline initial and ongoing fuels reduction needed to create and maintain an effective wildfire defensible space. However, having a wildfire mitigation plan, implementation of a defensible space thinning, and following all the recommendations as outlined in this plan **does not guarantee that your home will survive a wildland fire; however, in combination they will give your home the best potential probability to survive a wildland fire.**

SITE LOCATION AND PROPERTY DESCRIPTION

The property is located in Section 16, Township 1N, Range 71W, in Boulder County, Colorado. It is located within the Four Mile Fire Protection District. The lot is 5 acres in size and has a modest ~30 percent slope with a southwest aspect. The site is at ~6,600 feet in elevation and located in a chimney which is relatively dry. Arroyo Chico to the south and rock outcrop to the northeast will create a small barrier that may help slow the spread of a surface fire on the site.

CURRENT AND FUTURE PLANS FOR THE SITE

A 3,372 sq.ft. house with an attached garage is proposed for the site. Currently there are no existing structures located on the site at this time.

CONSTRUCTION DESIGN AND MATERIALS

The proposed house will have a moderately complex design with a moderately complex roofline and will be oriented with a southwest aspect. Buffer material around the structure will be of crushed gravel. **The overall design of the structure greatly influences how it will withstand a wildfire. Complex building forms create heat traps, areas where the walls and roof members intersect with one another creating eddies where hot air and embers from a fire can collect. It is important to keep these areas clear of combustibles such as needles and brush.**

The roofing material will consist of asphalt. Soffit material will be of cement board. **Falling embers and fire brands from a wildfire can land on a roof and ignite the roof, either by directly heating the roofing material, or by igniting light fuels (pine needles) that have collected on the roof. It is recommended to place screening over gutters and/or make a yearly check to keep gutters and roofs clear of leaves and needles.**

The exterior wall material is to be stucco. The structure will have 25 medium sized windows. Windows will be double glazed with Low E-coating and tempered glass where required. Frames will be made of aluminum clad. Exterior doors are to be fire-rated, and made of solid core aluminum clad that is not less than 1-3/4 inches thick. There will be no window wells present on the structure at this time. **All operable windows must be provided with screening that is constructed of either aluminum, galvanized steel, copper or of an approved material that when exposed to flame for 15 seconds, will not burn through or melt, and remains intact. Windows are one of the weakest parts of a structure with regards to wildfire. They often crack and fail before the structure itself ignites, providing a direct path for embers and radiant heat to reach the interior. It is best to minimize the number of windows, especially on the downhill side of the structure. Fire typically burns uphill faster and will create a great deal of radiant heat.**

A deck will be constructed of concrete pavers. The deck will be enclosed. **Decks must be kept clean and free of combustible materials. Keep debris such as pine needles, wood, and vegetation away from deck. Each year rake pine needles and other combustible material from underneath decks and overhangs.**

UTILITIES

The propane tank will be located ~60 feet to the west of the structure. Utilities will be buried from a pole located ~150 feet from the structure. The septic field will be located approximately 30 feet to the northwest residence. A well will be located approximately 120 feet to the southwest of the structure. **Propane tanks above ground must not have anything combustible around them (such as firewood, or wooden fencing) or above them (such as overhanging tree limbs).** Slash pile and wood piles should be at least 30 feet from the tank. Maintain a 10-foot vegetation free zone around the propane tank.

DIRECTIONS AND EVACUATION ROUTES TO AND FROM PROPERTY

To reach the property from Boulder travel west on Boulder Canyon to Four Mile Canyon on to Arroyo Chico. Emergency evacuation from this property is dependent on the location of a fire at a given time. Two main evacuation routes could be east on Four Mile Canyon to Boulder Canyon and on to the city of Boulder or west on Four Mile Canyon into the town of Gold Hill.

DRIVEWAY ACCESS FOR EMERGENCY VEHICLES

Construction use on the driveway will create additional site disturbance and soil compaction. It will require the removal of a few trees. The driveway is ~12 feet wide with a vertical clearance of 13'6" and a grade that is less than 12 percent. The driveway is ~80 feet in length with a turnaround located near the structure. **On longer driveways, pull-outs and turn-arounds are essential for emergency vehicles to be able to turn around or pass safely on any road or driveway.**

EMERGENCY WATER SUPPLY FOR FIRE FIGHTING

The emergency water source will be from a community cistern. The landowners will be contributing to the community cistern fund. Contact the Four Mile Fire Protection District (303-444-0882) for more information and specific details.

FUELS REDUCTION

All trees to be removed are marked with blue spray paint. All trees that are to remain within zones 1 and 2 will be unmarked and need to be pruned to a height of 6 ft or 1/3 the height of the tree, whichever is less. If the property is less than 1 acre it may not have zones marked due to boundary interference. Harvested wood that remains on site should be stacked at least 30 feet from the house and at the same elevation when possible. Slash from the harvest will be buried. Note that if you decide to burn piles, you must obtain a valid Open Burning Permit from the Boulder County Environmental Health Department (303-441-1180) and notify your local fire protection district.

FOREST COMPONENT AND HEALTH

The site has a dominant overstory consisting of ponderosa pine (*Pinus ponderosa*) with a ponderosa pine and Rocky Mountain juniper (*Juniperus scopulorum*) component. The understory consists of a dense cover of native grass and shrubs. The forested area is considered Fuel Model 9. This model is best represented by closed canopy stands of ponderosa pine and mixed conifer. Understory may consist of small trees and shrubs, grasses and moderate concentrations of down, dead woody litter. High amounts of needle litter may be present. This model can exist from the foothills to subalpine.

Common Types/Species The predominant tree species is ponderosa pine. This type may include some scattered Douglas-fir, Rocky Mountain juniper, and aspen. Shrub species may include wax currant, Rocky Mountain maple, mountain mahogany, and buck brush. Montane grasses and forbs are also included in this model.

Fire Behavior Fire runs through surface litter, torching of individual trees is possible. Under high burning conditions, crown fires can be encountered.

There were some signs of Dwarf mistletoe noted on the property at the time of the inspection. Information pertaining to this can be found in this mitigation package.

DEFENSIBLE SPACE MANAGEMENT

There are three defensible space zones to be created around the structure(s) on the site. Please note that it is possible that one or more of these zones will cross over the subject property onto adjacent properties. Property boundaries must be respected; mitigation work is not required beyond immediate boundaries. However, landowners are encouraged to contact and work with neighbors if property lines limit the ability to mitigate within the prescribed area. **Defensible space is a benefit, not only to the individual but also to the community as a whole.**

Zone 1 - Starts at the foundation and extends out 15 feet in all directions from the outside edge of the structure(s). Zone 1 is broken down into three segments:

Zone 1A - Consists of the structure(s) and the area immediately adjacent to and surrounding the structure(s) on all sides. **A five-foot wide, non-flammable strip must be created using over a weed barrier material. This strip will also extend back under, and out to, two feet past the drip line of any decks.**

Zone 1B - Extends out from Zone 1A to 10 feet from the structure. **In this zone, all highly flammable vegetation such as ground juniper should be removed.** Ground juniper contains a high oil content. This in combination with the dead material that builds up underneath the shrub produces very flammable vegetation. Any large dead woody material on the ground must also be removed. Firewise plants should be used for landscaping and re-vegetation. Grasses should be irrigated when possible and mowed to a maximum height of 6 to 8 inches twice per growing season to a distance of 30 feet from the structure.

Zone 1C - This zone extends out from Zone 1B to 15 feet from the structure. **All understory trees (ladder fuels) must be removed as marked.** These are small seedling and sapling size trees that can be ladders for fire to get in the crowns of the larger trees. A few of the larger, healthy trees can to be retained for screening. All remaining trees in this zone must be pruned to a height of 10 feet. They must be well spaced so that the crowns are not touching (10 foot minimum crown spacing). No trees should overhang the house or decks, unless approved by Boulder County or CSFS as "part of the structure" with additional fuels reduction around those trees to insure the defensible space integrity. **Trees should be at least 15 feet away from the house on all sides, and a minimum of 20 feet from chimneys.**

Zone 2 - This zone extends out from Zone 1C, and acts as a transition zone between the heavily thinned areas near the house to the existing forest setting. It extends down slope between 100-170 feet depending upon slope steepness. Zone 2 also extends on either side of the structure a minimum of 100 feet and behind the house between 70-100 feet assuming no boundary restrictions. Tree spacing begins as in Zone 1C and gradually decreases as you approach the outer edge of the zone. Thinning and crown spacing becomes greater in areas of steep slopes. Ladder fuels and poor quality, suppressed and/or diseased trees, 6 to 8 inches in diameter, make up the majority of the removals. The remaining mature trees must be pruned to a height of 10 feet at the intersection of Zones 1 and 2 with limbing reduced in height to 6 feet as you approach Zone 3. If there are any questions pertaining to slope and the changes in thinning spacing and distance regulations please refer to <http://www.ext.colostate.edu/pubs/natres/pubnatr.html> and find the *Quick Facts 6.302 Creating Wildfire Defensible Space*.

Zone 3 - This zone extends out from Zone 2 to the edge of the property. It may extend out to areas that are not part of the immediate mitigation efforts. In this zone, a few thicker clumps of trees are acceptable, as well as some unpruned trees near the outer edge. Thinning in this zone adds some protection, but is aimed more at forest health. Trees that are of poor quality or form, or have insect or disease infestations, should be removed retaining the larger, healthier trees. Snags, 2 to 4 per acre, can be retained for wildlife. Slash in this zone can be lopped and scattered and/or piled for wildlife use. Large amounts of slash should be disposed of by chipping, hauling to an approved site, or burning. Burn permits can be obtained from Boulder County.

OTHER DEFENSIBLE SPACE RECOMMENDATIONS

As detailed in fact sheet 6.302, *Creating Wildfire Defensible Zones*, an important factor that determines a structure's ability to survive wildfire is defensible space. Defensible space is a maintained area around a structure where fuels (flammable materials) are modified to slow the possible spread of wildfire to the structure, as well as from the structure to the surrounding areas. Defensible space provides a place where structure protection and fire suppression operations may occur. Wildfire hazard mitigation work breaks up fuel continuity, potentially decreasing a wildfire's intensity, and for more effectiveness should be completed beyond a home's defensible space, zone 1 and 2, area into zone 3.

In addition to the above recommendations, several other measures can be taken to make your home more fire safe and add an additional measure of safety for your family. While not required through site plan review, the following measures should be undertaken to maintain the home and defensible space in the future.

- Keep firewood at least 30 feet away from buildings; clear weeds and grass from around wood piles
- When possible, create and maintain an irrigated green space in zone 1 and/or 2; keep grasses mowed at least 6" to 8" in height
- Place and maintain screens and spark arresters on chimneys
- Place and maintain screens on soffit vents, roof vents, and attic openings
- Place shutters, fire curtains or heavy drapes on windows.
- Enclose sides of stilt foundations and decks.
- Place placards on garages if storing flammable materials inside.
- Install and test smoke detectors.
- Remove unnecessary accumulations of debris and trash from yards
- Connect, and have available, a minimum of 50 feet of garden hose with an adjustable nozzle
- Keep tools such as shovels, rakes, ladders, and axes available and ready for use
- Create reflective easy to see signs for driveways and property addresses
- Avoid storing combustibles under decks such as wood piles, scrap lumber, and fuels
- Maintain your defensible space yearly; contact your local forester for a 5-year maintenance inspection
- Have an emergency evacuation plan in place (included in wildfire mitigation plan)
- Be aware of fire danger; your nearest fire danger sign is located at your fire station or check the Boulder Fire Weather website at www.crh.noaa.gov/bou
- Establish an escape route and safety zone with the aid of your local fire protection district
- Check with appropriate highway agencies to make sure load limits are posted on bridges and for the appropriate protocol for posting load limits for bridges on private property.



Annual Fire Safety Checklist

- Thin trees and brush properly within defensible space.
- Remove trash and debris from defensible space.
- Remove needles and pine cones from window wells.
- Clear leaves and debris from the roof and gutters of structures.
- Remove branches that overhang a chimney or roof.
- Stack firewood uphill from a home or on a contour at least 30 feet away from structures.
- Clear weeds and grass from around wood piles.
- Check and maintain screens on soffit vents, roof vents, and attic openings.
- Remove any combustibles from under decks, porches or entrances ways.
- Clear vegetation from around fire hydrants, cisterns, propane tanks, etc.
- Make sure that an outdoor water supply is available with a hose, nozzle and pump.
- Make sure address signs are still clearly visible from the street or road.
- Make sure that driveways are wide enough for fire trucks and equipment.
- Practice a family fire drill and evacuation plan.

Evacuation Tips

- If a wildfire is threatening your area, listen to the radio for updated reports and evacuation information.
- Confine pets to one room and make plans to take care of them in the event of evacuation.
- Arrange for temporary housing with a friend or relative whose home is outside the threatened area. Leave a note in a prominent place in your home that says where and how you can be contacted.
- If your home is threatened by wildfire, you will be contacted and advised by law enforcement officers to evacuate. If you are not contacted or you decide to stay and help defend your home, evacuate pets and family members who are not needed to protect your home.
- Remove important documents, mementos, etc. from the possible fire area.
- Choose an evacuation route away from the fire if possible. Watch for changes in the speed and direction of the fire and smoke.

Take a disaster supply kit containing:

- Drinking water.
- A change of clothing and footwear for each family member.
- Blanket or sleeping bag for each person.
- First-aid kit and prescription medications.
- Emergency tools including a battery-powered radio, flashlight and extra batteries.
- Extra set of car keys and credit cards, cash or traveler's checks.
- Extra pairs of eyeglasses or other special items for infants, elderly or disabled family members.

Defending Your Home

Whether you choose to stay to defend your home or to evacuate, complete as many of the following preparations as possible.

- **DO NOT JEOPARDIZE YOUR LIFE. NO MATERIAL ITEM IS WORTH A LIFE.**
- Wear fire-resistant clothing and protective gear.
- Remove combustible materials from around structures.
- Close or cover outside vents and shutters.
- Position garden hoses to reach the entire house, but do not turn the water on until it is needed. Hoses should have an adjustable nozzle.
- Place large, full water containers around the house. Soak burlap sacks, small rugs or large rags in the containers.
- Place a ladder against the roof of the house on the opposite side of the approaching wildfire. Place a garden hose near the ladder, prepared as described previously.
- Place portable pumps near available water supplies, such as pools, hot tubs, creeks, etc.
- Close all windows and doors. Do not lock them.
- Close all inside doors.
- Turn on a light in each room and all outside lights. Leave them on even during daylight hours.
- Fill tubs, sinks and similar containers with water.
- Shut off gas supplies to structures at outside meters. Shut off propane supplies at the outside meter of the tank.
- Remove curtains made of lace, nylon or other light materials. Close blinds, heavy drapes and fire resistant window covers.
- Move overstuffed furniture into the center of the house, away from windows and sliding doors.
- Cars should be parked in the garage, facing out. Close the windows of the vehicle but do not lock the doors. Leave the keys in the ignition.
- Close the garage door but leave it unlocked. Disconnect automatic garage door openers.

For additional copies of these checklists, visit www.colostate.edu and search for wildfire, view the Colorado State Cooperative Extension fact sheet at <http://www.ext.colostate.edu/PUBS/NATRES/06304.html>, or contact the local Cooperative Extension office usually listed under the county government section of your local phone book.

(Information provided by Colorado State University Cooperative Extension and the Colorado State Forest Service.)

Safety Zone Guidelines

A Safety Zone is an area that in the event of a wildland fire you could survive the passing fire without the aid of a fire shelter. A natural safety zone could be an area already burned clean by the fire (in the black), rock areas where flashy fuels are absent, or large bodies of water. A manmade safety zones could be pre-constructed sites such as clear cuts. It should be close enough to your home to consider escape time to reach the safety zone. They should not be located upslope or downwind of the fire or in heavy fuels.

1. Avoid locations that are downwind from the fire.
2. Avoid locations that are in chimneys, saddles, or narrow canyons.
3. Avoid locations that require a steep uphill escape route.
4. Take advantage of heat barriers such as lee side of ridges, large rocks, or solid structures.
5. Burn out safety zones prior to flame front approach.
6. For radiant heat only, the distance separation between you and the flames must be at least four times the maximum flame height. This distance must be maintained on all sides, if the fire has ability to burn completely around the safety zone. Convective heat from wind and/or terrain influences will increase this distance requirement.

Calculations Assuming No Slope and No Wind

<u>Flame Heights</u>	<u>Distance separation</u>	<u>Area in Acres</u>
10 feet	40 feet	1/10 acre
20 feet	80 feet	1/2 acre
50 feet	200 feet	3 acres
75 feet	300 feet	7 acres
100 feet	400 feet	12 acres
200 feet	800 feet	50 acres

Note: Distance separation is the radius from the center of the safety zone to the nearest fuels. When fuels are present that will allow the fire to burn on all sides of the safety zone this distance must be doubled in order to maintain effective separation in front, to the sides, and behind the person.

Area in Acres is calculated to allow for distance separation on all sides for a three person family and a vehicle. One acre is approximately the size of a football field or exactly 208 feet x 208 feet.

Example: Given a fire with 10 foot flame heights (no wind or slope). You would need a minimum of 40 feet between you and the flames. So your total safety zone should be 80 feet x 80 feet. If you are settled into the middle of the safety zone you will have a minimum distance of 40 feet to each edge of the zone.

DEFINITIONS

Aspect – Exposure. The direction a slope faces.

Canopy – The cover of branches and foliage formed collectively by crowns of adjacent trees.

Crown – Branches and foliage of a tree.

Dominant fuel type – Matter that would carry a fire, found on the ground.

Duff – a layer of accumulated dead organic matter (pine needles).

Eddies – Small wind occurrences that are separate from normal wind flows.

Fuel Model – A number system that identifies the types of fuels found on the property that will directly influence fire behavior.

Fire danger - An assessment of both fixed and variable factors of the fire environment, which determine the ease of ignition, rate of spread, difficulty of control, and the fire impact.

Fire hazard - The potential fire behavior for a fuel type, regardless of the fuel type's weather-influenced fuel moisture content or its resistance to fireguard construction. Assessment is based on physical fuel characteristics, such as fuel arrangement, fuel load, condition of herbaceous vegetation, and presence of elevated fuels.

Fire management - The activities concerned with the protection of people, property and forest areas from wildfire and the use of prescribed burning for the attainment of forest management and other land use objectives, all conducted in a manner that considers environmental, social and economic criteria.

Fire risk - The probability or chance of fire starting determined by the presence and activities of causative agents.

Fuel continuity – The proximity of fuels to each other. Helps determine if a fire can sustain itself.

Forest health - A forest condition that is naturally resilient to damage; characterized by biodiversity, it contains sustained habitat for timber, fish, wildlife, and humans, and meets present and future resource management objectives.

Ladder fuels - Fuels that provide vertical continuity between the surface fuels and crown fuels in a forest stand, thus contributing to the ease of torching and crowning.

Limb (verb) –To remove the branches from a tree.

Overstory – The tree species that forms the uppermost forest layer (dominant and co-dominant).

Slash – The residue left on the ground as a result of forest and other vegetation being altered by forest practices or other land use activities.

Snag – Standing dead tree, often used by wildlife such as woodpeckers, owls, and other various mammals.





Understory – Plants that grow underneath the overstory species.





Wildland urban interface – a popular term used to describe an area where various structures (most notably private homes) and human developments meet or are intermingled with forest and other vegetative fuel types.

Property of
Jeff and Steph Lynch
693 Arroyo Chico
SPRW - 11 - 0018



Legend

-  Zone 1
-  Zone 2
-  Driveway
-  Property Boundary

-  Septic field
-  Propane
-  Well
-  House



Wildfire Mitigation Plan
FIELD DATA FORM

Inspection Date: 5/12/11

Landowner name: Jeff and Steph Lynch

Mailing address: 639 Arroyo Chico

City, State, Zip: Boulder, CO 80302

Site address: Same

Phone number: 303 440-6541

Road access: off of 4-mile Canyon Rd (Directions from main access road)

Docket Number: SPRW-11-0018 (SPR, LU, Etc.)

Section: SW 1/4 of section 16

Township: 1 North

Range: 71 West of 6th P.M.

Elevation: 6600 (feet)

Lot size (acres): 5 (Acres)

Driveway length: 80' (Actual length in feet from road to home)

Driveway trees removed: few (few/many/none)

Number of Structures: 1 (All structures to be present)

Existing Structures: None (House/barn/garage/etc.)

New Structure: 1 (House/Barn/new addition/etc..)

Structure aspect: SW (Main entrance direction)

Structure SQR. FT.: 3372 (Total square feet of structure)

House design: Simple (simple/complex)

Home buffer material: Crushed Gravel (Stone/crushed gravel/decorative stone)

Roof Design: Simple (simple/complex)

Roof material: Asphalt (Asphalt shingles/concrete tiles/metal)

Soffits type: Cement Board (Plywood/hardboard/cement board)

Siding material: Stucco (Cement/hardboard/log/stucco/stone/wood)

Windows (#): 25 (approximate number of windows)

Windows Size: medium (On average: small/medium/large)

Windows Frames: Aluminum clad (Wood/aluminum/aluminum clad)

Window Construction: Low E II (Tempered glass/e-coating/etc.)

Window wells: None (Number and location if present)

Door Material: Aluminum clad (Wood/steel/fiberglass/composite)

Deck material: Concrete Pavers (Wood/composite materials)

Deck Description: Enclosed (Enclosed/open underneath or overhead)

Deck support type: Concrete (Timber posts/logs/steel/concrete/stone)

Deck buffer material: — (Crushed rock/gravel)

Deck weed barrier: — (Fiberglass/polyester)

Garage if detached: 698 (Total square feet)

Utility Location: Pole 150' away - underground (Pole/buried: Direction from structure)

Leach field: 30' NW (Distance from house, and direction)

Cistern size: 1500 (gallons)

Cistern: 50' SW (Distance from house, and direction)

Cistern Type: Domestic water (Domestic Cistern or Fire Cistern)

Making a donation to community cistern : yes Did (Yes or No)

Have you talked to the local fire department : NO (Yes or No)

Are you required to have a sprinkler system : NO (Yes or No)

Water supply: well (Well or main line)

Well (if applicable): 120' SW (Distance from house, and direction)

Propane or natural gas: Propane

Propane Tank location: 60' W (Distance from house and direction)

Slash disposal: buried (Chipped/hailed/burned/lop-scatter)

Can you provide a copy of a map with locations : NO (Yes or No)

This part will be filled out by the inspecting forester

FPD:

FOUR MILE

Dominant fuel type:

GRASS : SHRUB

(Grass/forbs/shrubs/slash/etc)

Dominant overstory:

PONDEROSA PINE

Co-dominant overstory:

JUNIPER

Fuel model type:

9

Aspect:

SW

(Direction of slope)

Slope:

30% +

Building site:

CHIMNEY

(Chimney/saddle/valley/ridge/mid-slope)

Site moisture:

DRY

Natural fire barrier:

Arroyo Chico Road to South; Rock outcrop to the NE

Insect & Disease Diagnosis:

D. Mistle toe