



RCVFD Home Mitigation and Evacuation

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DISCLAIMER

Nothing can guarantee that your home will survive a wildfire. There are too many variables. The steps outlined in this presentation have shown in many areas around the country, even in cases of severe fire behavior, to increase the chances of your home survival. Other factors like slope and home condition will greatly determine how effective this information can be utilized.

This presentation in no way is meant to replace an in-person home evaluation. The presentation is intended to act as an introduction to the principles and concepts that a home evaluation from a certified mitigation specialist would present. In Larimer County, you can contact Larimer County Emergency Services for more information about their program.



What can I do before a fire?

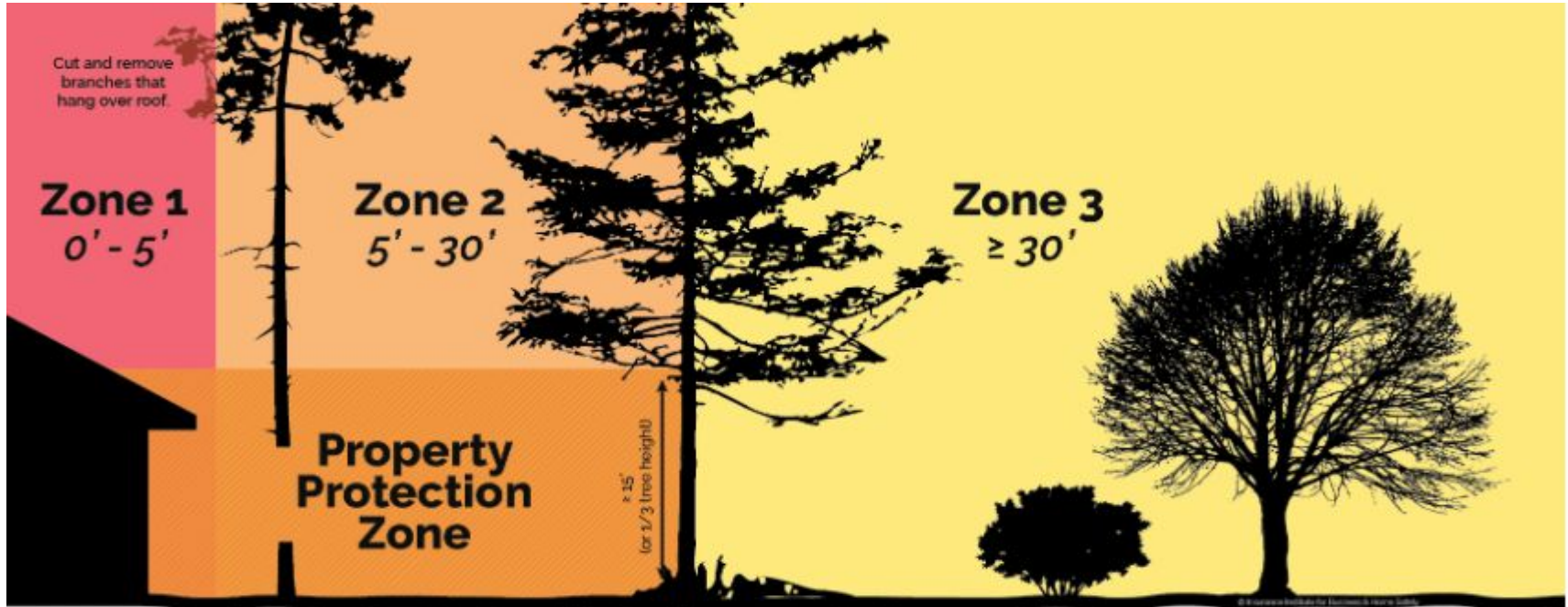
There are proven steps that residents and whole communities can take before a fire to improve the odds of wildfire survival.

- Evaluate and Improve Your Home Ignition Zone (HIZ). Start at the Home and Work Outwards.
- Write and Post an Evacuation Plan. Get Your Go Bag Together.
- Improve Access to Your Neighborhood & Home. Know the alternate routes out of your neighborhood and the condition.





The Home Ignition Zone (HIZ)



The goal is to give the home the best chance of survival without firefighter intervention

Image IBHS



Home Ignition Zone: But First A Word About Heat

Radiation: Heat energy released in all directions from a burning object. In most cases, radiant heat from a wildfire will not ignite materials on homes at distances greater than 30 feet from the house. Increases in slope below the home increase this distance

Conduction: The process by which heat is transferred through direct contact.

Convection: The transfer of heat by the movement of rising hot air or gasses. . Heat transfer through convection tends to move upward. During wildfires, burning materials on the forest floor preheat the leaves and branches of shrubs and trees above the fire. The vertical air currents can also lift burning materials. The floating embers, also called firebrands, can settle in unburned areas ahead of the fire and start small fires. This is called spotting and can result in rapid advancement of the fire.



Home Ignition Zone: The Big Picture

- Remove sources of nearby radiant heat that could cause home damage.
- Harden the home to prevent the entry of embers that could extend to flammable materials in or around the home.
- Reduce the tree canopy spacing at the 5-100ft distance to encourage fire to drop to scattered small fuels on ground without the radiant energy to damage the home.
- Provide for a science-based approach that allows for a balanced natural landscape while increasing chances for home survival without firefighters being present



PHOTO: YELLOWSTONE NATIONAL PARK, PHOTOGRAPHER UNKNOWN.



Zone 1 0-5 ft The Ember Aware Zone





Zone 1 0-5 ft The Ember Aware Zone

Prepare for embers from a mile or more in this zone. Maintaining this zone will reduce the chance that fire will ignite near your building and lead to a direct flame contact exposure.

1. Install hard surfaces in this zone (such as a concrete walkway) or use [noncombustible](#) mulch products (such as rock mulch).
2. Regularly water your lawn and plants to prevent dry vegetation in this area.
3. Remove dead plant material from plants.
4. Remove plants adjacent to [combustible](#) siding and foundation vents, as well as plants under or next to windows and under-eave vents or in interior corners.
5. Remove pine cones and needles near building, gutters and on/under decking
6. Do not store combustibles under the deck.
7. Check the common 20 areas for ember ignition



1. Roofs
2. Roof openings
3. Roof debris
4. Skylights
5. Spark arrester
6. Windows
7. Vents
8. Rain gutters

9. Siding and trim
10. Woodpiles
11. Patio furniture
12. Decks
13. Porch and deck accessories

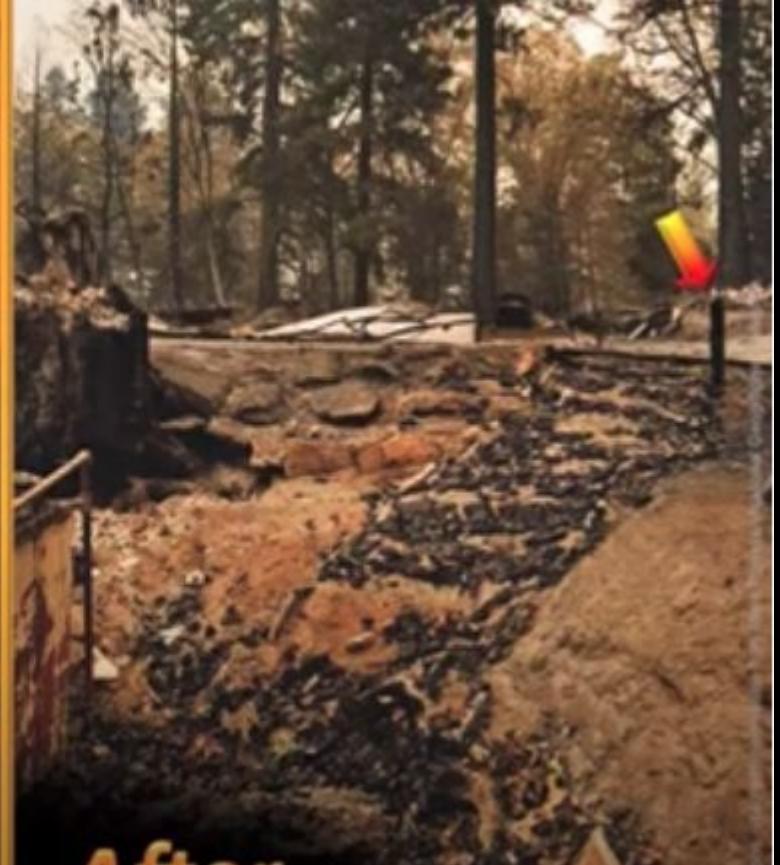
14. Flowerboxes
15. Eaves
16. Flowerbeds
17. Vehicles
18. Garage door
19. Garbage cans and recycling bins
20. Fences



Zone 1 0-5 ft

Materials
under deck
stairs not
cleaned out.

These smaller
fuels ignited by
embers led to
stair tread
ignition and
resulted in
home loss.





Structure Evaluation: Materials in the 0-5 ft Zone





Structure Evaluation: Materials in the 0-5 ft Zone



Remove and store
all combustibles
including patio
furniture, awnings,
cushions,
doormats, flower
pots with
woodchips....





Structure Evaluation: Materials/Opening in the 0-5 ft Zone



Close all openings with min 1/2 in plywood. Don't forget about the garage and outbuildings





Structure Evaluation: “Fuel” 0-5 ft Zone

Shut off your propane tank.



Lots of people feel the need to chainsaw right before they leave but forget to put fuel and oils away.





Structure Evaluation: The Progression to Ignition



The woodshed was clear and raked, but at the far side is a kindling box, filled with scrap wood,

The kindling could ignite the woodshed which could ignite the house.

This is an example of a horizontal ladder fuel.





Zone 2 5-30 ft

You don't need to remove all plants and trees in this zone. Removal of low branches and correct spacing is important.

1. Remove all dead and dying plant material, including that hidden deep in shrubs and trees.
2. Clear vegetation from under and around large stationary propane tanks.
3. Its okay to use organic mulch like wood chips in this zone, as long as its no more than 3 inches deep.
4. Mow annual grasses and weeds to a 2-4 inch height. Consider mowing around wildflowers!
5. Limb up trees 6 feet or more from the ground 11 feet is even better – but not more than 1/3 of a tree's height (to maintain tree's health).
6. Choose which trees/shrubs you especially want to save for shade, wildlife value, visual appeal etc. (see below for help in choosing). Remove enough of the trees and shrubs between those specimens to break up a path for fire – both horizontal and vertical.
7. Create a "scattered" landscape – lots of space between trees and shrubs in the first 30 ft, still some space but not quite as much out to 100 ft (200 ft if your property is steep). Tree placement should be planned to ensure the mature trees are not closer than ten feet to the edge of the structure.
8. Keep shrubs away from the area under trees so they don't become "ladder fuels", bringing fire to trees overhead. Flames from a shrub can reach 3-4 times the height of the shrub.
9. Prune limbs and branches to a minimum height of 6 feet off the ground, 11ft is even better. For shorter trees, pruning should not exceed 1/3 of the tree height.



Zone 3 >30 ft

Maintaining plants in this zone will help slow down and reduce the energy of the wildfire, slowing its advance to your building. Tree and brush spacing should force any fire in the tops of the trees, brush, or shrubs to drop to the ground.

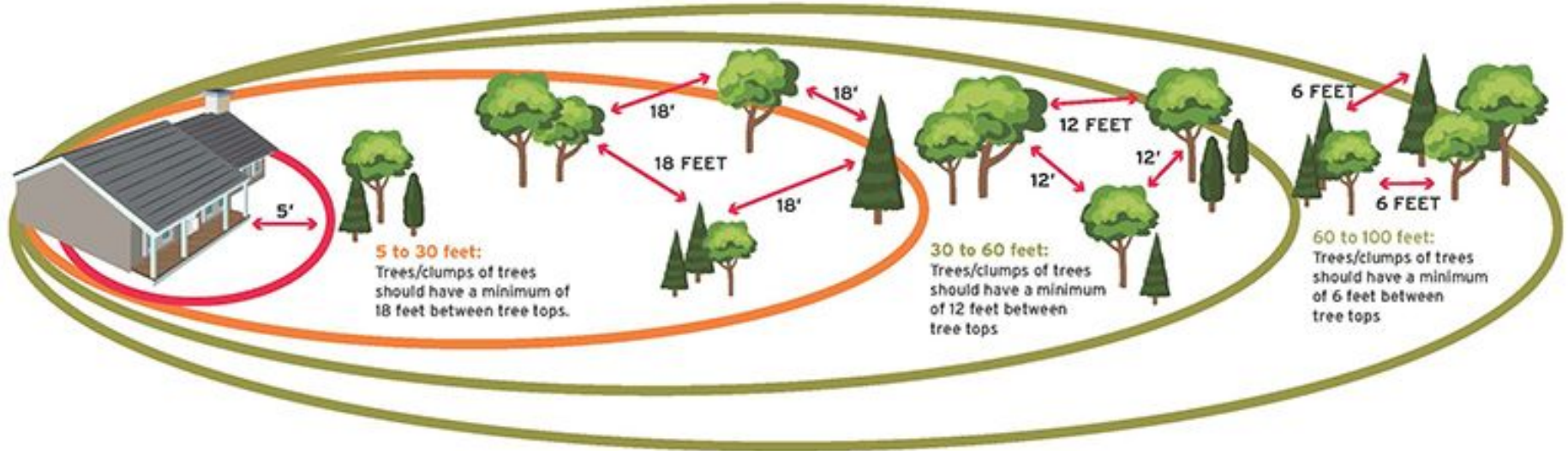
The rate of spread and flame length of a wildfire is affected by slope. A steeper slope will result in a faster-moving fire with longer flame lengths.

1. Remove dead plant material and tree branches from vegetation on a regular maintenance schedule.
2. Create islands or groupings of vegetation.
3. Remove lower tree branches.
4. Maintain trees with a minimum horizontal spacing of 10 feet between crown edges.



NFPA Recommended Tree Spacing

TREE SPACING



Slope below your home changes everything. Fire can move faster uphill, and flame tops would be pointed directly at the house increasing pre-heating effects as well as greater impact during the event.



Methods Used To Improve All HIZ Zones

Clear - Clear pine needles, pine cones, dead plants, weeds next to house to ensure there will not have anything to ignite

Store Away - Furniture cushions, decorations, potted plants, door mats

Screen and Seal - Use a 1/8 in screen for eaves vents, good quality caulk, and at least 1/2 in plywood to seal up basement vents and other ground level openings. Walk around the entire house. Address rotting or decaying wood items.

Rake - Rake pine needles, or organic mulch within the 5 ft zone away from the house

Trim - Trim away tree branches large shrubs that stick into the 5ft zone.

Remove - Remove wood piles, rotting stumps, logs, bark, vehicles, gas cans and other combustibles within the 30 ft zone

Close If an evacuation is ordered close all windows and doors. Block off pet doors, close garage door.

Water and Fill If time allows water, leave hoses attached, fill buckets and garbage containers with water.



Home Ignition Zone

Some Reasons It's Not 100%

Your structure's inherent resistance to fire and embers is not something we've discussed. For example, if your home has a dry wood shake roof most likely the embers will extend to the home regardless of pine needles in the 5ft zone.

Materials and their subsequent assembly have a fire rating and are tested for their flame spread rate (fsr). ½ OSB has a very high fsr while something like brick has very low fsr. A newer building constructed using today's building code has a much better chance of survival than a very old building possibly made with materials that support flame spread.

More information on construction materials and assemblies can be found at Colorado State Forest as well as

http://www.lasfm.org/doc_flamespread.html#:~:text=The%20scale%20is%20divided%20into,tile%20are%20Class%20I%20materials.



EVACUATION

Preparation and Leaving Your
Home



EVACUATION: NOCO ALERTS AND LETA

Please make sure you are signed up

- NOCOAlert is a county-wide emergency alert system.
- The emergency alert system is still funded and maintained by LETA. NOCOAlert has a dedicated website, www.nocoalert.org,
- You can register multiple devices (cell phones, emails etc) and sign up for several different locations that are important to you (i.e. your child's school or your elderly parent's house)





EVACUATION: The Grab and Go Bag

Grab and Go Bag Essentials:

1. Important documents (bank, IRS, trust, investment, insurance policy, birth certificates, medical records, property deeds, titles) ATM, credit and debit cards
2. Medications and Prescription glasses
3. Driver's license, Passport
4. Computer and or backup files Inventory of home contents (consider making a video inventory now, prior to an emergency) Photographs of the exterior of the house and landscape
5. Address book, Cell phone charger, Flashlights and batteries
6. Personal toiletries Enough clothing for 3-5 days (some suggest grabbing dirty laundry because that's what you wear)
7. Family heirlooms, photo albums and videos



EVACUATION: LISTS

Life Safety is everyone's no. 1 priority. While insurance policies can replace items, you are not replaceable.

The best list is the one you make for yourself and have posted in a visible location. Some residents suggest having a few lists based on how much time you have to leave. For example:

- Immediate (Grab and Go Bag)
- 2-4 hrs to prepare
- >24 hrs



EVACUATION: PREPARE INSIDE THE HOME

- Close all interior doors.
- Leave a light on in each room.
- Remove lightweight, non-fire-resistant curtains and other combustible materials from around windows.
- Close fire-resistant drapes, shutters, and blinds.
- Turn off all pilot lights. Shut off propane at the tank
- Move overstuffed furniture, such as couches and easy chairs, to the center of the room.



EVACUATION: PREPARE THE OUTSIDE OF THE HOME

- Place combustible patio furniture in the house or garage.
- Move propane grills away from the house. Remove extra fuel bottles
- Shut off propane at the tank or natural gas at the meter.
- Close all exterior vents, doors, and windows.
- Prop a noncombustible ladder against the house to provide firefighters with easy access to the roof.
- Make sure that all garden hoses are connected to faucets and attach nozzles.
- Leave exterior doors and gates unlocked. Turn on outside lights.
- If available and if there's time, cover attic openings, and vents with plywood that is at least one-half inch thick.
- Fill trash cans and buckets with water and place where firefighters can find them. If you have a cistern, a sign with quantity and location is helpful



EVACUATION: PREPARE THE VEHICLE

- If you can lift your garage door manually, place vehicle in the garage pointing out with the keys in the ignition and disconnect the electric garage door opener. If not, park in your driveway facing out.
- Roll up the car windows.
- Close the garage door, but leave it unlocked.
- Place essential items in the car.
- If you do not drive, make other arrangements for transportation in advance.



EVACUATION: WHAT TO WEAR AND TOOLS

- Wear only cotton or wool clothes. Wear long pants, long-sleeved shirt or jacket, a hat, and good quality hiking boots or hiking shoes.
- Carry gloves, a handkerchief or mask to cover your face.
- Bring water to drink.
- Keep your cell phone, a flashlight, and portable radio with you at all times. Tune in to a local radio station and listen for instructions.
- Consider trees or large branches may be blocking your exit. A tree saw or chainsaw might be helpful. Additionally consider bolt cutters and/or a wire cutting tool



Larimer County Open Fire Ban effective Aug 2020

The fire ban includes:

- No open fires, no open burning.
- No welding, or operating acetylene or other torch.
- No smoking in the open, including trails, parks and open spaces or outside of buildings.
- No Fireworks or fireworks displays produced by combustion, detonation or deflagration.
- No incendiary devices, including sky lanterns, exploding ammunition, exploding targets, and tracer ammunition.
- No fires in permanently constructed outside stationary masonry or metal fireplaces.
- Charcoal and wood pellet grills.

Source <https://www.larimer.org/spotlights/2020/08/18/larimer-county-open-fire-ban-effect>



Some Selected Sources

<https://disastersafety.org/wildfire/defensible-space/>

<https://www.livingwithfire.com/wp-content/uploads/2018/10/Evacuation-Checklist-2020-one-page.pdf>

<https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire>

<https://www.readyforwildfire.org/prepare-for-wildfire/go-evacuation-guide/pre-evacuation-preparation-steps/#:~:text=Shut%20all%20windows%20and%20doors,away%20from%20windows%20and%20doors.>

<https://www.larimer.org/wildfire-resources>

<https://www.rcvfd.org/emergency-preparedness/wildfire-home>

<https://www.fs.fed.us/nwacfire/home/pre-evav.htm>

https://www.firesafemarin.org/images/documents/resources/evac/FIRESafe_MARIN_Evacuation_Checklist.pdf

http://www.lasfm.org/doc_flamespread.html#:~:text=The%20scale%20is%20divided%20into,tile%20are%20Class%20I%20materials.