



Wildfire Mitigation in a Changing Climate

As the climate warms, wildfires are becoming more commonplace, widespread and fierce. In many areas, they are also now a year-round threat. Understanding exactly how wildfires spread is critical in helping to prevent them.

There are three main ways that wildfires can spread:

1. Radiation of Heat
2. Convection
3. Firebrands

Preparing for a Wildfire

Through these mechanisms, a wildfire will compromise the weakest link in a property's defense measures. There are three core defense strategies that are critical in protecting against this threat:

- Selection of **non-flammable building materials** for the roofing and siding of your structures.
- Proper management of the **defensible areas** around each structure.
- Use of a **temporary surfactant** such as [Barricade® Gel](#) that is applied just before the onslaught of the fire.

It is also important for your organization to build relationships with community partners. This may include: first responders, police, forest service and park rangers, arborists or tree services. By educating them about your organization and engaging them in your emergency procedures, they will be better positioned to protect your property and your people in the event of a wildfire.

Non-flammable Building Materials

When selecting materials for your organization's structures, it is important to select ones that are non-flammable. For siding, material options may be composite, hardy board or cement. For roofing materials, asphalt shingles or metal are recommended. Wood shake or shingles should never be used on any structure in or near forests and or grasslands, even if provided with a fire-resistive treatment.

Management of the Defensible Areas

A defensible area is the space around structures where vegetation and other fuels should be pruned, reduced and/or removed. Experts recommend dividing that area into three defensible zones, each of which should be maintained in different ways to reduce the potential spread of fire. This applies both to preventing wildfires from spreading toward the structures on the property, and also to preventing any eventual fires spreading from the structures towards the woodlands. Creating a series of management areas in which different treatment techniques are applied provides protection without simply denuding the terrain. The three zones and their relevant management strategies are defined as follows:

Zone 1

Zone 1 is the primary protection area; it includes each building, and everything that is found within 15 feet of the most exterior edges of the extended structure. During a drought, it may be a good idea to extend this zone to 25 or even 50 feet.

The extended structure encompasses the furthest edge of the structure's eaves, plus any attached structures, including decks. Remove any easily combustible vegetation (i.e., dead or dry vegetation, oily vegetation and all woody plants) from this zone. Green grass is only a concern when it becomes too tall. It is also important to consider the following:

- **Chimneys/Flues:** In addition to maintaining the clear space around the building as described above, all vegetation that is within 10 feet of a chimney outlet should be removed through a scheduled maintenance program. It is also important to install approved spark arrestors on all wood-stove flues and fireplace chimney openings. These should be constructed of 12-gauge or heavier welded or woven wire mesh with openings no larger than 0.5 inches.
- **Utilities:** Make sure that all new gas, telephone, electric or other utility feeds are placed underground whenever practical. If at all possible, work with your utilities and contractors to ensure that any existing above-ground utilities should have long-range plans for conversion to underground feeds. It's also important to clear any significant amounts of combustible vegetation from under and around any overhead lines and poles.
- **Flammables and Combustibles:** Locate LP tanks at least 25 feet from any structure, and make sure it can easily be located and identified by firefighters. Align the tank so that a fireball emitting from the end will not be directed at a building if it explodes, and clear combustible vegetation around it to a distance of at least 5-10 feet.

Zone 2

Zone 2 is the transition between Zones 1 and 3. The primary goal in management within this zone is fuel reduction. The largest single factor in determining the size of this zone is the slope or grade of the land, as well as where the structure is situated on this slope. In times of severe drought, consider extending this zone to allow for a greater window of safety. Mow grass regularly and keep vegetation to a low height to prevent the build up of combustible fuels.

Typically, the fuel reduction area extends from the edge of Zone 1 outward so that it encompasses a total of 75 to 125 feet from the structure. Where it overlaps the primary protection area of adjacent structures, those primary protection areas prevail. In Zone 2, it is not necessary to remove all vegetation as you would in zone 1. Instead, focus on removing dead, dry and oily vegetation, as well as any woody plants and trees that are stressed (e.g., diseased or insect infested), dying or dead. Prune and thin other trees and shrubs to reduce the potential fire load. It is also important to prune trees along main roads and emergency vehicle access trails into the property.

In addition to the priorities outlined above, you can also use methods such as grazing, mowing, mulching, composting and controlled burns to help manage and reduce fuel loads. Do not enact controlled burns without the guidance of qualified personnel, e.g., United States Forest Service (USFS) or local fire department firemen, and then only under controlled conditions with appropriate controls. It's also critical to be judicious in the use of mulching, as piles of mulch are like piles of hay, i.e., subject of spontaneous combustion if piled too high. In addition, mulch is still potential fuel.

Zone 3

Zone 3, the final area, is relatively loosely defined and extends from the edge of Zone 2 to the property lines. Here, the most important thing is to manage the forest or woodland so that good tree health can be maintained. Remove dead or dying trees and bushes; as well as those that are infected by insects or diseased. Thinning may be advisable for proper vegetation management, or to provide adequate access roads for emergency vehicles and personnel. Tree spacing will vary according to the species of tree. Typically, we do not recommend pruning

in this zone unless it is needed to provide adequate visibility from access roads or for similar needs. Consider using grazing animals, such as goats and cattle, to reduce or remove low lying vegetation.

Responding to a Wildfire

Water Supply

When responding to a wildfire, it will be essential that you have a proper water supply. Be sure you identify the following about your water supply beforehand:

- Where does your water come from?
- How many gallons of water is held in your water source?
- How is your water source replenished?
- If there are alternative sources of water available, have you tapped into making it accessible?
- If your water source is a well, what is the power supply?
- If your water source is electrical, what is your back up power supply in the case it goes down?
- Do you have a map of your property that marks where the hydrants, water source(s), electrical and gas shut offs are?

If your water source is a hydrant, ask yourself the following questions:

- What was the last flow test?
- What was the GPM (gallons/minute)?
- Are there hoses on site? Are the hoses in workable order? Are they near the hydrant and easily accessible?
- Are the hydrants located near structures and strategically throughout the property? Are some of the hydrants on the perimeter and some on the exterior?

Shelter

If a wildfire is to approach your property and someone needs to take shelter, take these safety measures:

- Spread surfactant gel around the location
- Make sure the shelter is sealed appropriately to prevent smoke from getting in
- To provide a clean source of air, use a charcoal air filtration system
- Follow your emergency action plan and ensure that you have:
 - An alternative power supply
 - A food and water supply
 - Transportation to exit the area