Risk navigator

Wildfire awareness toolkit

Primary casualty

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About Markel's Risk Solution Services team

Risk Solution Services provides technical insight related to existing and potential insured risk at Markel. The team partners with our customers, claims, and underwriters to educate on both current and future risk trends and supports our clients with a broad offering of risk management solutions.

E-mail our team at risksolutions@markel.com.

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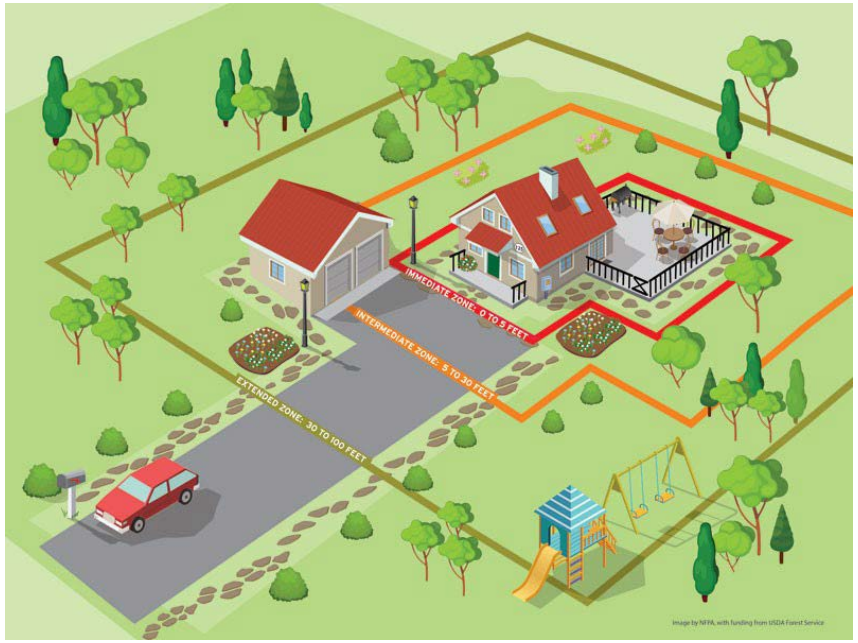
Primary threats to property during a wildfire

Research around property destruction vs. property survival in wildfires point to embers and small flames as the main way that the majority of properties ignite in wildfires. Embers are burning pieces of airborne wood and/or vegetation that can be carried more than a mile through the wind can cause spot fires and ignite structures, debris, and other objects.

There are methods for property owners to prepare their structures to withstand ember attacks and minimize the likelihood of flames or surface fire touching the structure or any attachments. Experiments, models, and post-fire studies have shown homes ignite due to the condition of the home and everything around it, up to 200 feet from the foundation. This is called the home ignition zone (or referred to in this document as the structure ignition zone).

Structure ignition zone

The concept of the structure ignition zone was developed by retired USDA Forest Service fire scientist Jack Cohen in the late 1990s, following some breakthrough experimental research into how structures ignite due to the effects of radiant heat. The structure ignition zone is divided into three zones.



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Immediate zone

The structure and the area 0-5 feet from the furthest attached exterior point of the structure; defined as a non-combustible area. Science tells us this is the most important zone to take immediate action on as it is the most vulnerable to embers. START WITH THE STRUCTURES then move into the landscaping section of the immediate zone.

- Clean roofs and gutters of dead leaves, debris, and pine needles that could catch embers.
- Replace or repair any loose or missing shingles or roof tiles to prevent ember penetration.
- Reduce embers that could pass through vents in the eaves by installing 1/8 inch metal mesh screening.
- Clean debris from exterior attic vents and install 1/8 inch metal mesh screening to reduce embers.
- Repair or replace damaged or loose window screens and any broken windows. Screen or box-in areas below patios and decks with wire mesh to prevent debris and combustible materials from accumulating.
- Move any flammable material away from wall exteriors – mulch, flammable plants, leaves and needles, firewood piles – anything that can burn. Remove anything stored underneath decks or porches.

Intermediate zone

5-30 feet from the furthest exterior point of the structure. Landscaping/hardscaping - employing careful landscaping or creating breaks that can help influence and decrease fire behavior

- Clear vegetation from under large stationary propane tanks.
- Create fuel breaks with driveways, walkways/paths, patios, and decks.
- Keep lawns and native grasses mowed to a height of 4 inches.
- Remove ladder fuels (vegetation under trees) so a surface fire cannot reach the crowns. Prune trees up to 6-10 inches from the ground; for shorter trees do not exceed 1/3 of the overall tree height.
- Space trees to have a minimum of 18 feet between crowns with the distance increasing with the percentage of slope.
- Tree placement should be planned to ensure the mature canopy is no closer than 10 feet to the edge of the structure.
- Tree and shrubs in this zone should be limited to small clusters of a few each to break up the continuity of the vegetation across the landscape.

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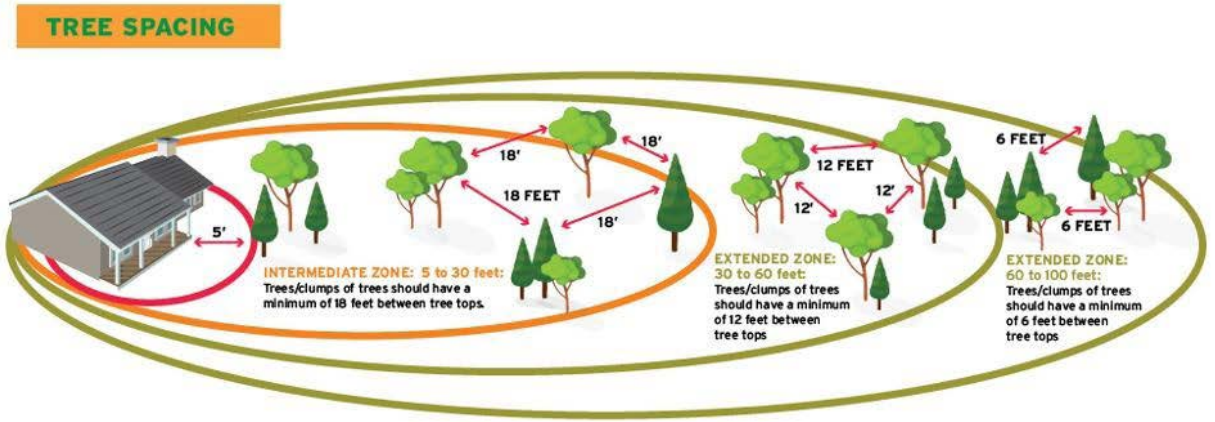

Extended zone

30-100 feet, out to 200 feet. Landscaping – the goal here is not to eliminate fire but to interrupt fire's path and keep flames smaller and on the ground.

- Dispose of heavy accumulations of ground litter/debris.
- Remove dead plant and tree material.
- Remove small conifers growing between mature trees.
- Remove vegetation adjacent to storage sheds or other outbuildings within this area.
- Trees 30 to 60 feet from the structure should have at least 12 feet between canopy tops*
- Trees 60 to 100 feet from the structure should have at least 6 feet between the canopy tops*

*The distances listed for crown spacing are suggested based on NFPA 1144. However, the crown spacing to reduce/prevent crown fire potential could be significantly greater due to slope, the species of trees involved, and other site specific conditions. Check with your local forestry professional to get advice on what is appropriate for your property.

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Self-assessment checklist

The full wildfire damage mitigation self-assessment checklist can be downloaded here.

Property construction and materials

Are class A fire-rated roof covering materials (e.g., tile, slate, asphalt) being used?

If fire resistant roofing material is used, are gaps capable for allowing ember intrusion completely sealed?

Is all exposed wood and fabrics (e.g., siding, fencing, decking, awnings, lawn furniture) treated with a fire-retardant chemical material providing a one-hour fire resistance?

Are the supports for elevated structures constructed of brick, concrete, or protected steel with two hours' fire resistance?

Are all eaves, soffits, decks, and other structure openings enclosed or boxed in with fine wire mesh (1/8 inch metal screen)?

Are all vents, crawl spaces, and the space underneath porches and decks covered with fine wire mesh (1/8 inch metal screen)?

Are all glass windows and doors equipped with multi-pane or tempered safety glass, and/or protected from radiant heat with fireproof shutters?

Are all chimneys equipped with spark arrestors?

Do combustible attachments such as wooden fences to the building provide a separation with a masonry or metal barrier so they are not directly attached to the building?

Have all gaps (e.g. between roof and the fascia) below doors been sealed or equipped with fire-resistant weather stripping?

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Are non-flammable interior window coverings used?

Are automatic gas shut-off valves installed?

Are windows equipped with fine mesh wire screens?

Landscaping

Zone 1 A minimum 30-foot ignition zone

Are all combustible materials (leaves, pine needles, vines, shrubs, and other debris) cleared away from fences, roofs, gutters, decks, stairs, and foundations?

Have branches and shrubs within 15' of chimneys, stove pipes, and power lines been cleared?

Has any bark, wood chips, or mulch next to any structures been cleared to a distance of 5' or greater?

Do you trim overhead tree branches so there are not any tree limbs within 15' of the ground?

Is there a 15' space maintained between tree crowns?

Are any highly flammable vegetation (e.g., pine, eucalyptus, juniper, fir trees) kept a minimum of 30' from any structure?

Have all plants that could transfer fire from the ground into treetops been cleared or removed?

Is outdoor furniture cushions, brooms, or other flammable items properly stored when not in use?

Are grass and weeds regularly trimmed to less than 4" to prevent rapid spread of fire and high flames?

Have shrubs been trimmed to maintain a distance of 2X the height of shrubs between each shrub or so their diameter does not to exceed 15'?

Zone 2 From 30 to at least 100 feet from structures

Has flammable vegetation been reduced as much as possible?

Are there adequate fuel breaks such as driveways, gravel walkways, and lawns?

Have tree limbs been pruned 6 to 10 feet from the ground?

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Zone 3 100 to 200 feet from structures
Has all vegetation been thinned to remove underbrush and keep tall trees from touching canopies?
Is all fire wood stacked at least 100 feet from structures?

Water sources
Have all water sources such as hydrants, ponds, swimming pools, and wells been clearly identified with signage, and are sources easily accessible to firefighters?
Are fire hoses available for water sources?
Are pumps accessible and operational?
Are alternative power sources, such as a generator, available for electric pumps?
Is a fire truck or tanker on site and in good working condition?
Are buildings protected by an external sprinkler system?
Are all fire sprinkler systems functioning and checked annually?

General prevention/mitigation
Are proper receptacles available for disposing of ashes?
Is there a policy not to operate welders, mowers, or any other equipment that creates sparks during high risk conditions?
Are all vehicle parking areas free of tall, dry grass where catalytic converters could ignite flash fuels?
Are all combustible and flammable liquids stored in UL approved safety containers?
Are gas grills and propane tanks kept at least 15 feet away from any structure when in use?
Is there a policy to restrict the use of grills during potentially dangerous fire weather conditions?
Is there a fire extinguisher or hose nearby when grills are in use?

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Are firefighting tools (e.g. rakes, buckets, saws, shovels, axes) to control small fires readily available?

Are all fire extinguishers available, mounted, identified, inspected, and serviced annually?

Are driveways accessible and cleared of flammable vegetation and wide enough for emergency vehicles?

Is the property entrance address a contrasting color and clearly visible from the road?

Are leaf blowers available for clearing leaves and pine needles from decks, roofs, and surrounding areas?

Are rain gutters cleared of flammable debris?

Have you completed a Firewise assessment of your property?

Are gas powered equipment (e.g. lawn mowers, generators, etc.) equipped with spark arrestors?

Are all chimneys and fireplaces inspected and cleaned at least annually?

Are fireplace dampers kept closed when not in use?

Are all trash and recycle bins equipped with self-closing lids and placed away from combustible materials, including buildings?

Are bridge weight limits posted to ensure safe passage of firefighting equipment?

Do you maintain any fire retardant products, such as paints, foams and gels, etc.?

Evacuation protocol

Have evacuation routes been identified and marked to support an effective evacuation effort?

Are route maps posted for each site, including alternate routes?

Has staff been trained by local authorities on emergency procedures for offsite trips such as trail rides and hikes to avoid closed-in box canyons?

Does everyone have a clear understanding of evacuation alarms?

Are specific accountabilities assigned to staff so everyone works collectively to achieve a positive outcome of protecting lives and property?

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Are emergency agencies such as local fire department, Red Cross, FEMA, etc. aware of your evacuation site locations?

Has your local fire department been invited out as part of your camp training?

Have you considered forming a cooperative agreement with another site to share resources and serve as an evacuation site?

Are designated meeting areas established to account for all participants and staff?

Protecting business personal property

Has key equipment such as computers and vital records been identified for evacuation?

For business continuity planning, is information backed up and/or stored remotely?

Have photographs or videos been taken of valuables including artwork, paintings, antiques, and other expensive items to substantiate possible insurance claims?

Managing horses and other livestock

Have you pre-planned for evacuation of horses, livestock, and other animals/reptiles that may be on premises?

If an evacuation becomes evident

Is there a means for identifying the location and direction of the fire event understanding that this can quickly change direction and speed?

Will senior staff clearly explain evacuation procedures to campers, and arrange for communication with families?

Will staff be able to identify special medical needs, and gather emergency equipment and necessities including trauma supplies, first-aid kits, face masks, etc.?

Will there be enough designated vehicles to evacuate everyone safely?

Are safe driving practices reinforced with all drivers designated for evacuation?

Will staff be equipped with emergency communications equipment, e.g., cell phones (with car charges), walkie-talkies, colored smoke canisters, etc.?

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Has authority having jurisdiction been consulted for proper emergency communication procedures and resources?
Has staff been instructed to gather key equipment, vital records, food, and water for evacuation?
Has staff been instructed to disconnect and move portable LP gas tanks to a safer location such as a gravel lot, etc.?
Are procedures in place to warn firefighters of underground fuel storage or LP gas tanks before evacuating?
Is a system in place to ensure all windows, skylight vents, and doors (including garage doors) are closed and not locked when evacuating?

Budget

Is your budget designed to address the above corrective actions prior to the start of wildfire season?

References:

- National Fire Protection Association (NFPA) www.nfpa.org/Public-Education/By-topic/Wildfire/Preparing-homes-for-wildfire
- Federal Emergency Management Agency (FEMA) https://www.fema.gov
- Prepare Your Organization for a Wildfire - playbook
- The Insurance Institute for Business & Home Safety (IBHS) - Wildfire - https://disastersafety.org/wildfire/

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