

Mitigation measures

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Exterior Sprinkler Systems for Fighting Wildfire



Soaking the house and landscape

Sacramento County, CA

Communities and homeowners in wildfire-prone areas are learning how exterior sprinkler systems can be an important component of wildfire mitigation. Research has found that, when properly installed and maintained, these systems are very effective in protecting structures, trees and vegetation within the sprinkler area.

A useful exterior sprinkler system must have a reliable source of water to keep fire at bay. It is possible, in some cases, to use water from a municipal supply system, but low volume, pressure, or uncertain reliability during a wildfire are potential issues. Check with your local fire department for more information.

Sometimes people draw water directly from a river, lake, pond or swimming pool. Another option is to install a large storage tank or cistern to provide the needed quantity of water.

Fire-resistant foam or gel application systems are an alternative that gener-

ally require a smaller volume of water.

Water pressure for exterior sprinkler systems is often provided by a propane fueled engine that is directly coupled to a water pump. Gasoline-powered pumps are another option, but they are typically less reliable because of clogging issues associated with the long-term storage of gasoline. Some engines are designed to be powered by both fuel sources.

Another option is installation of a propane-fueled electrical generator with enough power to drive a high-capacity electric water pump. A generator is also useful during any power outage.

Professional assistance with the design and installation of engines, pumps, generators, storage tanks, piping, hose connections and sprinkler heads is strongly recommended, and required in many jurisdictions.

Some systems are mounted on the roof or under the eave at the edge of the roof. Other designs involve sprinklers directed at and away from the home from multiple locations. These are often mounted on sturdy poles. It is important that water reach all vulnerable areas for the system to have maximum effect. The most threatening wildfires occur during high-wind events, so design a system that anticipates how the distribution of water droplets may be influenced by elevated wind speeds.

A variety of new “smart home” devices use cell phone connections to control lights, cameras, thermostats and many other home systems. With this technology, remote activation of an exterior sprinkler system is now possible. Automatic activation systems, using sensors that detect heat or flame, are also available. Overcoming reliability issues will require careful design and continuing innovation.



5,000 gallon water storage tank

It is important, of course, to protect all the system components from damage by fire or any other source.

Because wildfire can bring extreme conditions it is critically important to address three elements of effective, “Firewise” wildfire damage prevention. Sprinklers should be considered as a complementary strategy, rather than a replacement for

the standard practices.

First - The first wildfire mitigation element is the creation and maintenance of concentric zones of defensible space around the home.

In this zone, the goal is to eliminate anything combustible within 5 to 10 feet of the home. Wood decks, firewood, patio furniture, welcome mats, fences and many other items can ignite and cause a total loss of the structure. Leaves or other debris on roofs and in gutters, or tree branches that overhang the roof and chimney all need to be eliminated.

The next zone, within 30 feet from the home, may include some fire-resistant vegetation that retains moisture and needs minimum maintenance. Any small trees and shrubs in this zone should be surrounded by areas of noncombustible materials.

Auxiliary structures such as a detached garage, pump house, or utility shed should be at least 50 feet from the home. Potentially more if the structure is used for the storage of combustible materials.

The zone extending at least 100 feet from the home should exclude large trees and other vegetation that could pose a fire risk. If the home is on a slope, it may be necessary to maintain a fire-resistant landscape for 200 to 400 feet down the hill. Many owners of larger properties in wildfire hazard severity zones work hard to create and maintain a park-like setting in the acres that surround their buildings.

Second - The next element in damage prevention is the use of non-flammable building materials in new construction or retrofitting an older structure to meet current standards. Non-combustible roofing, siding, and fire-resistant tempered glass windows or shutters can provide excellent protection from wildfire.

Third - A final, critically important

element of wildfire mitigation is prevention of ember ignition of the structure. Wind-driven embers are the primary cause of home ignition during wildfire events as swarms of sparks and small embers find a way into the building through vents, cracks, or other small openings. It is important to close off every opportunity for embers or larger firebrands. Vents need to have louvers and tight screening, or a way to close them off entirely when fire threatens the structure. Other cracks or small gaps must also be filled or closed off in some fashion, and anything on or around the home that could be ignited by embers must be removed.

It is challenging to make a property completely immune to damage from an extreme wildland fire. Perhaps impossible to keep

a home or other building constantly and completely free of leaves, needles, twigs and other debris. Therefore, a well-designed exterior sprinkler system (or a foam or gel alternative) may be an excellent investment for people who live in high-hazard areas.

A final consideration: If roads are blocked, or for any other reason evacuation is not possible, a well maintained “Firewise” property and thoroughly wetted, fire-resistant structure and nearby landscape may provide a lifesaving “shelter-in-place” alternative. As a wildfire expert with the Country Fire Authority of Victoria, Australia put it: “People protect houses and houses protect people.”



More information:

National Fire Protection Association / Firewise USA
www.nfpa.org

Insurance Institute for Business & Home Safety
<https://disastersafety.org>

External Sprinkler Systems and Defensible Space: Lessons Learned from the Ham Lake Fire and the Gunflint Trail
https://www.wildfiretoday.com/documents/Outdoor_sprinkler_systems