

MARSH RISK CONSULTING

CAT Topics – Wildfire

Wildfires or wildland fires are a natural hazard that poses a threat to both lives and property, can be difficult to control, and can cause wide-ranging destruction.

The following is a brief synopsis of historical wildfire events, a high-level view of wildfire science, and a discussion of the tools available to mitigate this threat.

History

Wildfire is not a hazard or phenomena unique to North America, though each year there are numerous reports about such events in states like California. Major wildfires have occurred throughout the world in Australia, France, Germany, Greece, Indonesia, Italy, Poland, and Russia. The consequences are typically measured in terms of hundreds or thousands of buildings destroyed, number of lives lost, and millions of dollars in property damage and resources spent fighting the wildfire.

Notable global wildfire incidents include:

- **October 1871: Peshtigo, Wisconsin, US** — Wildfire destroyed approximately 3.8 million acres and some 1,500 people were killed in one of the worst forest fires in US history.

- **October 1991: Oakland County, California, US** — Oakland Hills Fire was believed to have been caused by a grass fire that destroyed 1,520 acres and nearly 3,800 residential structures, and killed 25 persons. The estimated cost was nearly US\$1.5 billion.
- **February 2009: Victoria, Australia** — An estimated 400 individual bushfires destroyed 3,500 structures and killed 173 persons. It was the highest loss of life from bushfire in Australian history.
- **March 2010: Western Russia** — Several hundred individual wildfires caused an estimated US\$15 billion in damage.
- **May 2016: Alberta, Canada** — The Fort McMurray Wildfire destroyed at least 2,400 homes and buildings. With estimated losses of around CDN\$4 billion, it is the costliest disaster in Canadian history.
- **November 2018: Butte County, California, US** - The Camp Fire was the deadliest and most destructive in California history. It caused at least 86 fatalities and destroyed 18,804 structures. It was also the world's costliest natural disaster in 2018 and is the most destructive wildfire in history with total damage of US\$16.5 billion.

The Science of Wildfire

Devastating wildfires have common characteristics. They can occur whenever there has been unusually warm or hot temperature for an extended period of time combined with low humidity and lack of rain. This combination of weather conditions

leads to dry brush, trees, and grass, making the area more susceptible to fire from natural or human-initiated causes.

Wildfires are usually driven by strong surface winds. Adding to the phenomena, a wildfire also creates its own weather atmosphere as it burns. The hot flames and gases rise rapidly from the fire and displace the relatively cooler surrounding air. This displacement leads to surface wind patterns that can blow at speeds of 70 miles per hour—near-hurricane force.



Fire approaches a gift shop in Yellowstone National Park on September 7, 1988. (National Park Service photo)

This creates a fast moving fire front that consumes the dry brush and any other combustible material, including structures.

Wildfire Assessment and Mitigation Strategies

As population centers expand and more people build homes at the edge of forest or wildland areas, there are more people and structures at risk. Some estimates show the number of persons exposed to wildland fire doubled from 1970 to 2000.

The Insurance Services Office (ISO) has created a model for assessing the wildfire risk to an area. The model for the United States combines satellite images and information regarding soil conditions, land slope, vegetation, and access roads. This model, according to ISO reports, classified 97.5% of the area burned in the 2003 San Bernardino fire as having fuels (e.g., tall grass, trees, dense brush, and forest) conducive to and favorable for wildfire conditions.

Many major US municipalities offer wildfire risk maps that identify areas at risk to wildfire. These include the Association of Bay Area Governments (ABAG) in California, as well as local and state agencies in Colorado, Oregon, and Florida, among others. Various international agencies also promulgate wildfire risk maps and mitigation guidelines. Among these are the European Forest Fire Information System (EFFIS), Fire Protection Association of Australia, Russian Federal Forestry Agency (FFA), and Italy's Central Functional Centre.

MODELING WILDFIRE

Leading natural hazard catastrophe modeling organizations offer software-based analysis of portfolio locations to determine probabilistic risk of wildfire loss. The current models are developed for California locations and include:

- USGS data for fuels.
- Historical event and ignition locations.
- Estimated wind speeds and direction.
- Human fire fighting intervention (fire breaks).
- Structure vulnerability and construction.



Little is left of this home near San Bernardino, CA following wildland fire in October 2003. (FEMA photo/Kevin Galvin)

Wildfire mitigation strategies focus on creating awareness of wildfire conditions and prevention of dry vegetation and fuels in close proximity to inhabitable structures, especially when such conditions persist.

Awareness efforts focus on alerting persons to the need for extreme caution with cigarettes, campfires, trash burning, and any other flame or fire use during periods when the wildfire danger is extremely high. Bans are typically issued for open flames when the potential conditions exist.

Prevention, aside from controlling open flames, focuses on removing the fuel near structures. Creating a defensible space, as it is called, helps reduce possible fire travel from burning brush to the structure and allows fire fighting personnel to make a defensive stand to protect the structure. Many organizations in wildfire-prone areas maintain such a space regularly as best practice.

The National Fire Protection Association (NFPA) addresses wildfire danger and prevention with Standard 1144, "Standard for Reducing Structure Ignition Hazards from Wildland Fire," which organizations in wildfire-prone areas should review and seek to implement well in advance of a wildfire event.

A primary focus of such efforts should be best practice defensible space creation activities such as the following:

- Conducting a structure assessment per NFPA 1144, which at a minimum includes:
 1. Identification and documentation of wildland fire hazards in the ignition zone(s) for each structure within wildland fire hazard areas.

2. Determination of mitigation measures for vegetation, other combustibles, and the structure, including the periodic maintenance associated with such measures.
 3. Establishment of priorities relative to mitigating wildland fire risks.
 4. Evaluation of the site for conflagration hazards associated with the property to provide information for fire operations strategies.
- Using fire resistant roofing material.
 - Clearing dead leaves and twigs from roof and gutters.
 - Keeping wood piles and other combustibles at least 30 feet from the structure.
 - Providing noncombustible surfaces and planting low-growing herbaceous vegetation within 5 feet of the structure.
 - Removing tall grass and dead plant material within 30 feet of the structure.

Organizations located in an area susceptible to wildfire should have an emergency evacuation plan along with a business contingency plan. Many times there is only a few hours advance notice of evacuation during a wildfire event. It may also be several days before authorities allow access to a fire zone following evacuation. In the event of building damage, the resumption of operations may be delayed.

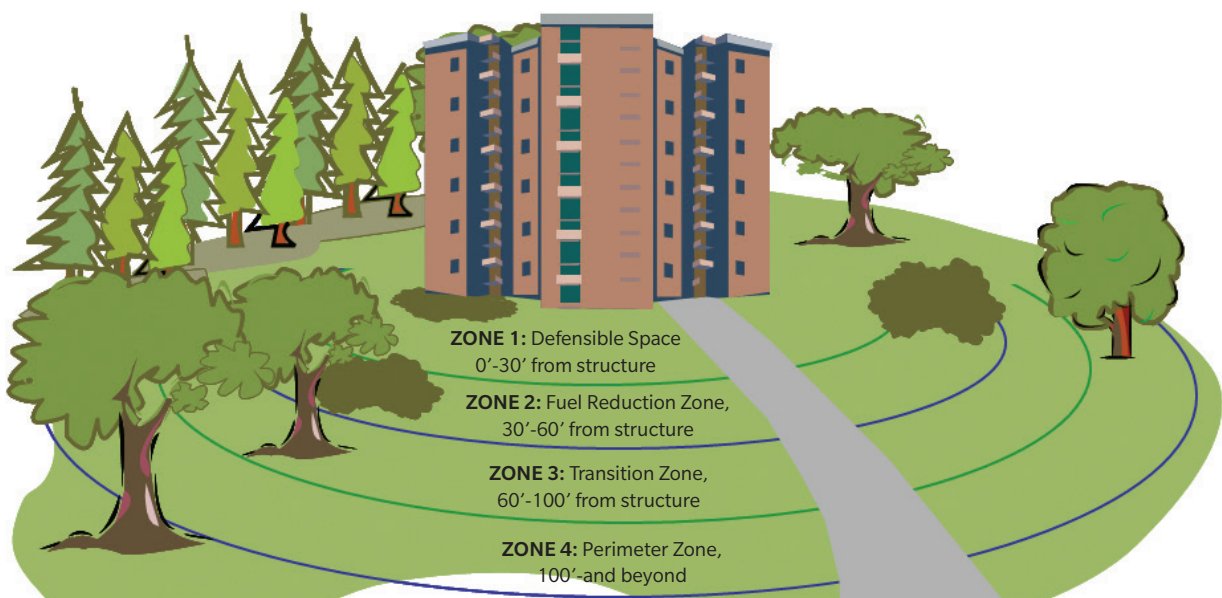
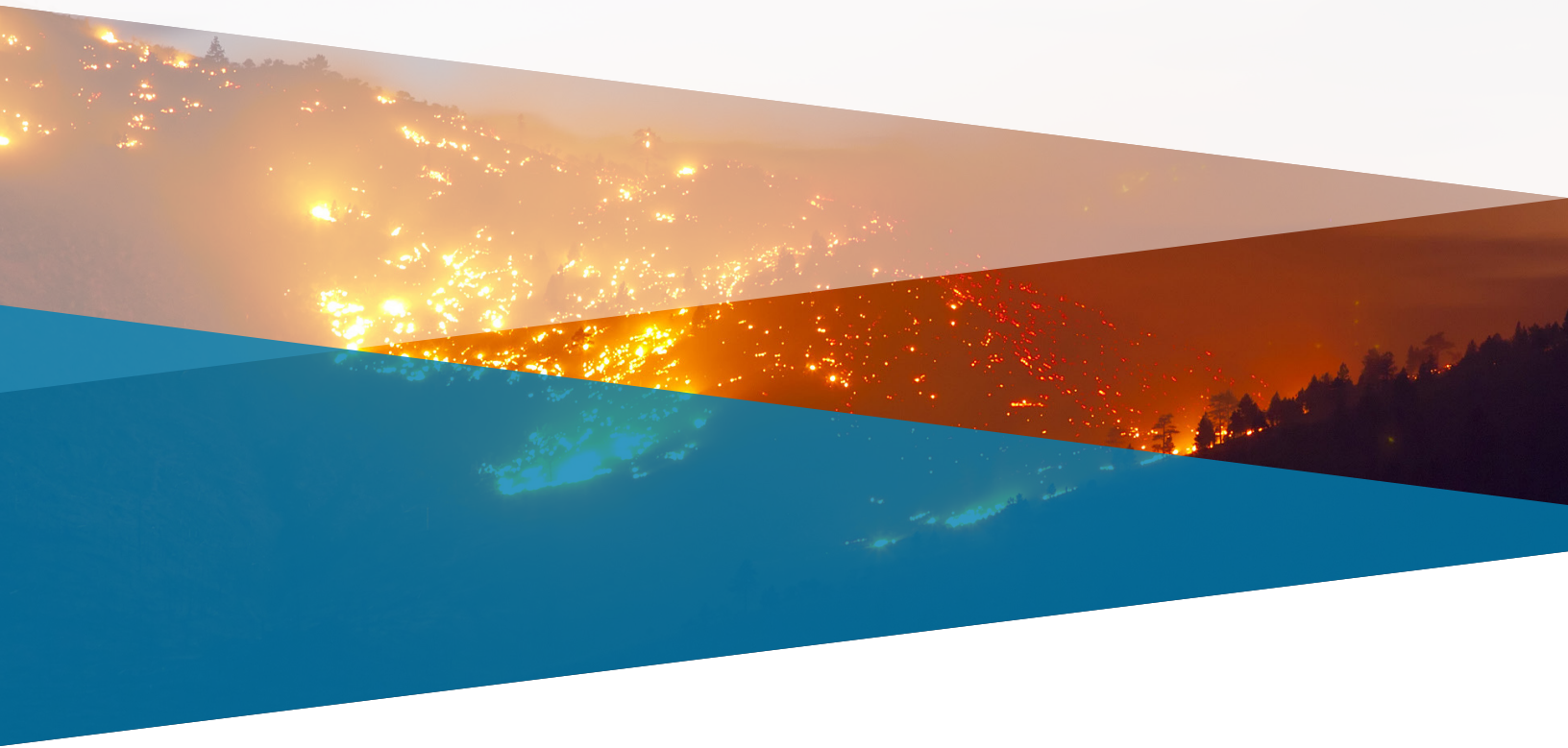


Illustration of Defensible Space (from Wildfire Risk Reduction in Florida, Florida Department of Agriculture and Consumer Services)



For additional information about wildfire exposures and the best practice mitigation solutions that Marsh Risk Consulting can provide, please contact your local Marsh representative or:

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You can find further insight on wildfire exposures and related solutions on: www.marsh.com or www.marshriskconsulting.com.

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