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Essential Elements
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Wildfire Risk in the United States

In recent years, wildfires have produced severe and significant damage across the United States. These fires—caused by lightning, human activity, downed power lines, or planned fire projects that become uncontrolled—can have significant and lasting impacts on the surrounding population, wildlife, and landscape. According to a 2019 study, 4.5 million U.S. homes were identified at high or extreme risk of wildfire, with more than 2 million in California alone.[1]

Where and When Do Wildfires Occur?

Wildfire seasons vary by area and are generally delineated by the date of the first large wildfire to the date of the last large wildfire. While summer has historically been the peak season for wildfires, climate risk factors including rising temperatures, inconsistent periods of precipitation, and prolonged droughts have extended the typical wildfire season and contributed to wildfires occurring year-round.[2] For the western U.S. where recent significant wildfires have occurred, August through November is a critical period due in part to the threat of offshore winds.

It is possible for wildfires to break out anywhere if conditions permit. They are most prevalent in rural areas with prolonged dry seasons yet dense vegetation. These factors, along with high winds, enable wildfires to spread and can lead to catastrophic events in the surrounding areas. In the U.S., several states have provided these ideal conditions, and have seen some of the highest levels of wildfire activity. California has experienced the highest frequency of wildfires in the U.S. In 2019, California saw 8,194 wildfires followed by Texas, which saw 6,892.

Rising Wildfire Damage and Property/Casualty Costs

Over the past 10 years, the U.S. has experienced an average of 64,100 wildfires annually. With the expansive potential for destruction caused by wildfires, it is not surprising that property/casualty insurance issuers have seen an increase in home and property damage claims caused by wildfires. While fire and smoke damage are a primary concern related to insurance coverage from wildfires, damages also result from fire extinguishing methods, which is generally covered under standard insurance plans.

In June 2019, the American Academy of Actuaries released an issue paper which provides an in-depth analysis of the 2017 and 2018 California wildfires, the damage they caused, mitigation and prevention efforts of wildfires, and the importance of developing recognized and standardized methodology for wildfire modeling. The paper suggests that, while historical wildfire damage and loss is widely used by insurers in ratemaking, it is likely that the

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long-term average of past losses might not accurately reflect the increasing wildfire risk and could even lead to rate instability if there were loss spikes such as in 2017 and 2018.[3]

According to the Insurance Information Institute, the greatest property damage resulting from wildfires occurs in California, due to its continually expanding Wildland-Urban Interface (WUI), which includes areas of land that were once uninhabited but are now developing into populated areas directly adjacent to combustible vegetation.[4] With this expanding WUI in wildfire-prone areas, the risk for human ignition of wildfires increases, and, according to the Department of the Interior, as many as 90 percent of wildfires are caused by humans.[5]

Top 10 Costliest Wildland Fires in the United States (1)
($ millions)

Rank	Date	Name, Location	Estimated insured loss	
			Dollars when occurred	In 2019 dollars (2)
1	Nov. 8-25, 2018	Camp Fire, CA (3)	$8,500-$10,500	$8,700-$10,700
2	Oct. 8-20, 2017	Tubbs Fire, CA (3)	7,500-9,700	7,800-10,100
3	Nov. 8-22, 2018	Woolsey Fire, CA (3)	3,000-5,000	3,100-5,100
4	Oct. 8-20, 2017	Atlas Fire, CA (3)	2,500-4,500	2,600-4,700
5	Dec. 4-23, 2017	Thomas Fire, CA (3)	1,500-3,500	1,600-3,600
6	Oct. 20-21, 1991	Oakland Hills Fire, CA	1,700	2,900
7	Oct. 21-24, 2007	Witch Fire, CA	1,300	1,600
8	July 23-Aug. 30, 2018	Carr Fire, CA (3)	1,000-1,500	1,000-1,500
9	Oct. 25-Nov. 4, 2003	Cedar Fire, CA	1,060	1,400
10	Oct. 25-Nov. 3, 2003	Old Fire, CA	975	1,300

Source: Insurance Information Institute

Importance of Wildfire Modeling

Like other extreme events simulation models, there are many complexities associated with wildfire modeling and predictive analytics for assessing future wildfire damages and losses, there are currently no generally accepted modeling standards for wildfire.

The National Interagency Fire Center (NIFC) compiles and publishes nationwide wildfire statistics, which help to demonstrate areas that are prone to wildfires; however, assessing wildfire risk and potential damage remains difficult due to changing climate conditions, WUI expansion, and the element of human influence on ignition and mitigation.

Impact on insurers is even harder to predict as losses can be further affected by regulatory rulings on policy coverage or by amplified construction costs after a large event. Some of these uncertainties are addressed by catastrophe modeling, which can help insurers to set adequate premiums and manage their risk accumulation to ensure solvency.

Ways to Address Wildfire Risk

As wildfire risk continues to grow, it is important to increase awareness of this risk among consumers, to implement better prevention and mitigation techniques, and to facilitate the availability of insurance coverage. To raise awareness, providing resources to educate consumers who are buying a new home can be an initial step to avoid the risk. For prevention and mitigation, enforcing building code standards and encouraging regular inspections can help consumers in high-risk communities to reduce potential damages. And to facilitate availability of coverage, establishing generally recognized standards for catastrophe modeling can promote more transparency into model assumptions and more accurate assessment of wildfire risk. As a result, the insurer could have better insights into their risk accumulation and potentially prevent solvency issues related to wildfire. Furthermore, more accurate evaluation of risk leads to adequate wildfire pricing, which encourages broader insurance coverage and availability.

As the WUI continues to expand in wildfire prone areas, it is increasingly important for generally recognized standards for wildfire models, as well as better implementation of ways to prevent and mitigate risk. Improvement of such standards could include transparency in modeling assumptions, enforcement of building code standards that diminish fire hazards, and incorporate wildfire mitigation credits into insurance rating plans.

Additional Resources from the American Academy of Actuaries

American Academy of Actuaries' Extreme Events and Property Lines Committee Issue Paper on Wildfires: Lessons Learned from the 2017–2018 California Events

The Extreme Events and Property Lines Committee Responses to NAIC's Catastrophe Risk Subgroup's Request for Additional Information About Wildfires

Wildfire Presentation to the NAIC

References

1 *Verisk 2019 Wildfire Risk Analysis*, Verisk, 2020.

2 Ibid.

3 *Wildfire: An Issue Paper*, American Academy of Actuaries' Extreme Events and Property Lines Committee, 2019.

4 "Background on: Wildfires," Insurance Information Institute, 2018.

5 "7 Burning Questions: Wildfires & Public Lands," U.S. Department of Interior, 2017.