



TAMPING DOWN WILDFIRE THREATS

HOW INSURERS CAN MITIGATE RISKS AND LOSSES

Tamping down wildfire threats: How insurers can mitigate risks and losses

Wildfire risk is complicated – and not just in terms of predicting, preparing for, and mitigating damage. Wildfires play a complex role in overall climate risk that insurers need to understand and to develop new strategies to address as the impacts of climate change continue to evolve.

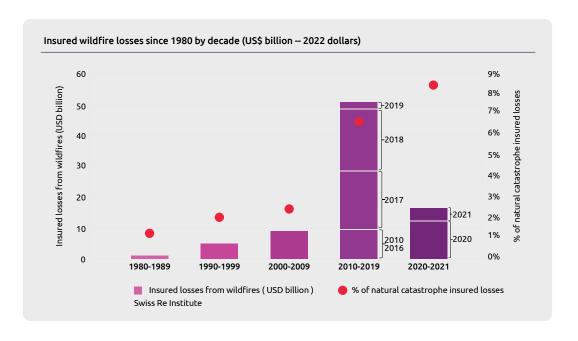
Insured wildfire losses are on the rise, but insurers' appetite for writing coverage in fire-prone areas has declined in recent years; however, ceasing to insure complex risks isn't a strategy for long-term success. What's needed instead is risk reduction, pre-emptive damage mitigation, and a deeper understanding of the evolving nature of this hazard.

Insurers are well positioned to lead the way, but to do so they have to augment their traditional strengths with the capabilities offered by new data and analytical tools.

Wildfire risk is chaotic and interconnected

Most fires don't threaten populated areas, but when they do, they become very costly. Insured wildfire damage in 2021 was \$5 billion, marking the seventh straight year such losses surpassed \$2 billion. Before 2015, only four years were recorded in which aggregated wildfire-related insured losses topped \$2 billion.¹

As shown in the chart below, insured wildfire losses have been rising in absolute terms and as a percentage of total insured natural catastrophe losses, which also are on the rise. Swiss Re estimates global insured losses from natural catastrophes in the first half of 2022 at USD35 billion, 22% above the average of USD29 billion for the past 10 years.²



Wildfires are not just more destructive than in the past: they now behave differently:

- Eight of the 10 most destructive fires in California have happened in the past five years.
- In 2017, the Tubbs and Thomas fires were severe wind-driven urban conflagrations a new phenomenon for the state.
- The 2018 Camp Fire in the Sierra Nevada showed that such fires can happen in different geographies.
- In 2020, multiple fires were ignited by "dry lightning" events.

In other words, three out of the last five years witnessed some kind of novel fire behavior. This presents a challenge for insurers.

"Traditionally, insurers of properties in wildfire-affected areas have bought data from third-party modelers. Understandably, insurers require multiple years of loss history for the model to justify major changes that affect their underwriting or pricing."

Kevin Stein

CEO, Delos Insurance

The result is an average update cycle of three to five years.

"Given what has happened in California over the past five years," Stein explains, "if you're using a third-party data model at the tail end of its cycle, it doesn't capture the exposure on the ground because the peril has fundamentally changed."

This can significantly affect the insurer's exposure.

Delos takes a different approach. As a managing general agent with catastrophe and climate modeling built into its underwriting and pricing process, Stein says, "We can modify our portfolio strategy or pricing within six weeks of a new type of behavior surfacing."



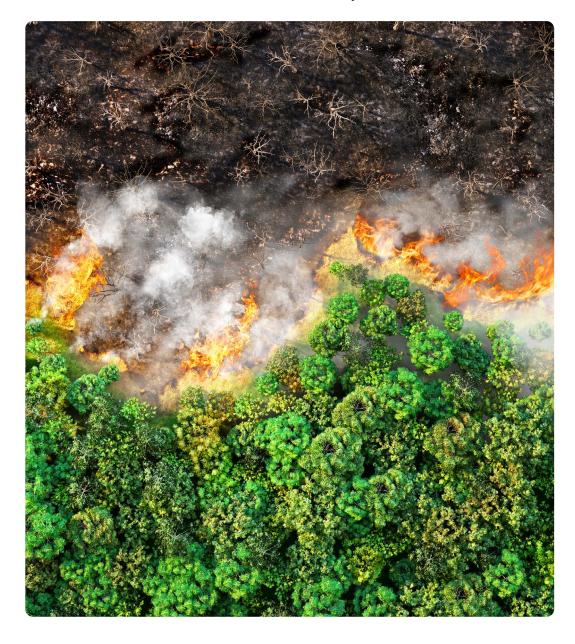
In addition to damaging property and putting lives directly at risk, wildfires add carbon to the atmosphere, contributing to longer-term weather extremes and affecting conditions in various parts of the globe. Pyrocumulonimbus clouds attending massive wildfires are becoming more common.³ Also known as "fire-breathing dragon clouds," they can create their own weather systems. Rain may fall, which could help squelch the blaze – but lightning and powerful winds, that increase the fire's intensity while driving it toward new sources of fuel, are also likely.⁴

Wildfires also destabilize soil, increasing the potential for landslides and mudflows when dry seasons end and rain and snow come, potentially causing damage downhill from burn sites – some of it insured, some not. Particles from wildfires travel great distances and can cause health issues far from where they originated. Recent research at the University at Albany has found that more frequent and intense western wildfires are affecting air quality as far away as the East Coast.

Research also suggests that wildfire emissions may affect El Niño and La Niña events⁸ – temperature conditions in the Pacific Ocean that influence formation of Atlantic

hurricanes. La Niña is characterized by coolerthan-average water in the central Pacific, during which time the Atlantic hurricane season tends to be more active. Hurricane losses are on the rise generally, and Atlantic hurricanes in recent years have involved more severe inland flooding, as exhibited during Ida in 2021° and Ian in 2022 1°.

Further illustrating the interconnectedness of wildfire and hurricane risk, the 2022 Chipola Complex in Florida's panhandle burned over 34,000 acres, with three simultaneous blazes¹¹ fueled by dead trees and other vegetation left behind by 2018's Hurricane Michael.



Wildfire timing, size, and costs are shifting

A dozen European countries have suffered through major blazes in 2022, with thousands forced to evacuate homes and businesses. ¹² France, Spain, and Portugal have been fighting fires, and in Greece the first few months of the year saw 30 forest fires – a massive increase from the usual four – that burned over 1,000 hectares of land, compared to a past average of 37.5. ¹³

In the US, fires are starting earlier, inflicting greater losses, occurring in more states, and taking more time to suppress. While California's 2022 fire season has been quieter than in recent years – thanks mainly to positive wind conditions — an unusually high number of wildfires have been burning in the Pacific Northwest, Intermountain West, and Canada. In British Columbia, there have been more than 1,700 wildfires in 2022.

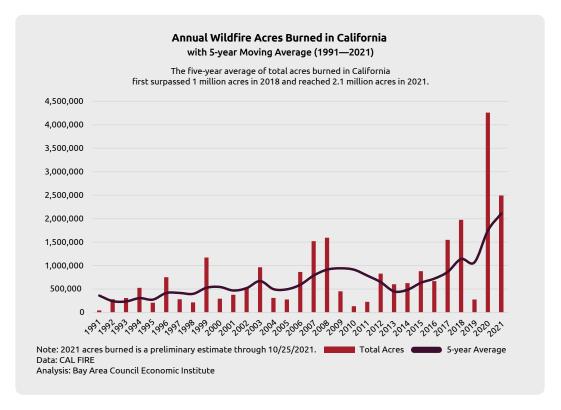
Wildfire isn't just an issue for states like California that are typically associated with out-of-control burning. Minnesota, for example, came in at number eight among the National Interagency Fire Center's top 10 states for wildfires, ranked by number of fires and number of acres burned for 2021.17 Georgia was number

seven, just behind Oregon. North Carolina, Montana, and Florida were three, four, and five, respectively. California topped the list, followed by Texas.

While as many as 90% of wildfires are caused by people, according to the U.S. Department of Interior, Insurance Information Institute (Triple-I) Non-resident Scholar Craig Clements says it's clear that the increasingly costly wildfire activity of recent years is being driven by climate-related factors. 18

"Warm temperatures and drier atmospheric conditions affect the fuel," says Clements, a professor of meteorology at San José State University and director of the Wildfire Interdisciplinary Research Center. "If you get an ignition, these conditions make the fires burn more rapidly, more intensely, and harder to put out."

Add to this the trend of more people moving into vulnerable areas and you have a truly complex challenge – involving both climate dynamics and socio-economic behavior – when it comes to reducing wildfire risks and losses. "In 2021, we saw \$20 billion of economic losses due to wildfire, with only \$5 billion of those insured," says Triple-I CEO Sean Kevelighan. "We're trying to help people understand this issue, particularly because populations are growing in high-risk areas."



Better mitigation is a starting point

From an insurance perspective, wildfire is an interdependent risk – meaning damage faced by homeowners doesn't just depend on their own decisions to invest in protection, but also on their neighbors making similar investments. Even the most well-prepared home can fall victim to embers scaterred from ill-prepared structures nearby. This can make it hard to insure homes in fire-prone areas. To borrow a term from epidemiology, what's needed is something like "herd immunity" from fire.

Since 2008, California has had rules about keeping a certain amount of space around homes clear of trees and brush, as well as what materials people can use for their roofs, siding, vents, decks, and fences. Those requirements have made a big difference, according to a National Bureau of Economic Research study: homes built to the newer standard are 40% more likely to survive a major wildfire.¹⁹

The Insurance Institute for Home and Business Safety (IBHS) has created a wildfire-mitigation designation program called Wildfire-Prepared Home that focuses on three vulnerable areas: the roof, specific building features, and defensible space. Currently available only in California—where increasing numbers of insurers have begun offering discounts for such pre-emptive mitigation efforts ²⁰— the program provides an excellent example of the insurance industry using its knowledge and expertise to drive behavioral changes that are needed to significantly reduce risk.

In recent testimony before the U.S. House of Representatives Committee on Financial Services Subcommittee on Housing, Community Development, and Insurance²¹, IBHS president and CEO Roy Wright called adoption rates for existing wildfire codes and standards "even lower than the shamefully low adoption rates for modern versions of the International Residential Code, and far more sporadic in their usage."

A study by Marsh McLennan and the Nature Conservancy emphasizes the role of fire buffers – areas of reduced fuel that might include parks and sports fields – in reducing wildfire risks and costs.²² When combined with improved building codes and incorporated into structures like community-based catastrophe insurance programs, buffer zones can help communities capture the financial benefits of risk reduction and may help make insurance more available and affordable.²³

Wildfire Defense Systems (WDS), of Bozeman, MT, provides private firefighting for insurance companies. Unlike public firefighters, whose main objectives are to save lives and bring the wildfire under control, WDS aims to prevent insured clients' homes from burning down. WDS crews work far from the active fire, preparing the homes its clients insure. CEO David Torgerson emphasizes the company's focus on mitigation. "It's not a first responder service," Torgerson says. "We do things like fuel mitigation, embers, leaves, sprinkler systems, retardant fire lines outside of the property on natural vegetation, fireblocking gel sprayed on the property. We take a lot of firewood piles and move them 100 feet away from the property."24

While every bit helps, mitigation on the scale needed to make a difference requires money. The infrastructure law²⁵ President Biden signed in 2021 includes \$3.3 billion for critical wildfire risk-reduction efforts; \$5 billion for utilities and grid operators to bury power lines and install fire-resistant technologies, among other measures; and \$3.5 billion to help homeowners make energy-efficiency and fire-resistance improvements.

"To strengthen the resilience of vulnerable homes and communities, adoption and enforcement of wildfire codes and standards must increase."

Roy WrightPresident and CEO,
IBHS

Uncomplicate claims management

Claims management can be complicated in the best of times, as insurers balance efficiency and customer experience. After a catastrophe strikes, the impact of any inconvenience for the policyholder is multiplied by the emotional stress of the event and its aftermath. A well- or poorly-designed automated claims system at such times can make all the difference. Similarly, the "human touch" can be a blessing or a curse, depending on the quality of the contact.

Many InsurTechs offer solutions to streamline the process and use the data these systems generate to inform decision making. All have benefits and limitations. Artificial intelligence and machine learning can be particularly valuable in managing disaster claims, given the vast amount of data involved in massive loss-creating events.

The pandemic underscored the value of "remote adjusting" solutions to address the lack of property access many adjusters faced due to travel restrictions. Crawford & Co. was well positioned for this, having previously acquired a majority stake in WeGoLook, whose platform allowed Crawford to send one of 46,000 "lookers" to claim sites to record video for professional adjusters to survey damages. The lookers follow a script telling them exactly what to photograph and from which angles.²⁶

"What we are seeing now is an acceleration of adoption of these tools," said Ken Tolson, U.S. president of Crawford Claims Solutions. "Up until now, a lot of people have tinkered with it, but never really embedded it into their claims processes." ²⁷

Parametric insurance holds promise

Parametric insurance is gaining attention with regard to weather and climate-related risks, including wildfire. Unlike traditional indemnity insurance, parametric structures cover risks without the complications of sending adjusters to assess damage after an event. Instead of paying for damage that has occurred, it pays out if certain agreed-upon conditions are met, regardless of damage. For example, a parametric policy for wildfire might pay out when a certain threshold of "acres burned" is exceeded.

Parametric insurance typically is used as a complement to – not a substitute for – indemnity coverage. Speed of payment and



reduced administration costs can ease the burden on insurers and policyholders, and provide the liquidity that businesses, families, and communities need for post-catastrophe resilience

To date, there are not many examples of parametric coverage for wildfire risk, says Jonathan González, CEO and co-founder of parametric insurance platform Raincoat. "There's a big opportunity in insurance and reinsurance, with rising global temperatures and wildfire seasons becoming more intense, especially in the U.S., Australia, Brazil, and Indonesia," González says. "Wildfire tends to be more difficult to model and detect in real time, compared to hurricanes and earthquakes. We expect to develop more solutions that address this peril in the coming years."

A study by The Nature Conservancy and insurance and reinsurance broker Willis Towers Watson found that residential insurance premiums in wildfire-prone areas could decline 41% when ecological forestry techniques – such as forest thinning and prescribed burning – are combined with parametric insurance. ²⁹ Risk reduction through ecological forestry would reduce claims, creating more insurance capacity for vulnerable regions, and parametric coverage would let funds flow more quickly to property owners, facilitating their recovery.

Only

35% of insurers have adopted advanced tools – such as machine-learningbased pricing and risk models

Data is the key

"Risk prevention based on data and behavioral science is at the top of the agenda for future-focused insurers," says Seth Rachlin, Global Insurance Industry Leader, at Capgemini, adding that relatively few insurers are "on course to achieve climate resiliency." Climate resilience requires a sophisticated data strategy, yet only 35% of insurers surveyed by Capgemini in a recent report³⁰ said they have adopted advanced tools – such as machine-learning-based pricing and risk models – that Capgemini calls "critical to unlocking new data potential and enabling more accurate risk assessments."

Such tools certainly exist to address wildfire risk. Using aerial imagery, land-based sensors, and sophisticated prediction tools and capabilities, San José State's Dr. Clements and his team study conditions that lead to catastrophic fires and the behavior of large blazes to understand how extreme fires spread and who's most at risk.³¹

"For the first time we can look at the wind field around the fire, the plume dynamics using radar, and the fire progression at high resolution," Clements said after several days of monitoring the Mosquito Fire in El Dorado and Placer Counties, Calif., in 2022. "Those three observations have never been used together on any fire anywhere in the world."

Such data offers opportunities for safer, more efficient, and effective fire suppression. It also can help inform emergency preparation, land-use policy, and risk management. However, insurers' reliance on historical loss data and traditional catastrophe models limits its understanding of evolving climate risks. Insurers tend to use models that ingest data from two primary sources: the U.S. Census Bureau data and the U.S. Forest Service.³³

Bob Frady, vice president of data and analytics company Guidewire and founder of its Hazard Hub subsidiary, says most insurers are using "exceptionally blunt tools to gauge wildfire risk." The quality of available tools has increased markedly over the past 20 years, but a lot of insurers aren't using them.³⁴

Frady says the industry has done pretty well at identifying areas in which the risks are too daunting to insure, those prone to the sort of all-engulfing blazes he calls "Bambi fires." Where insurers may not have done as good a job, he says, is in identifying communities that have an "excessive risk from vegetation layers, not just from trees." Within such

areas, he says, there are some neighborhoods that are "great risks" for insurers to write coverage for, where homes are built to withstand fires and the owners have cleared out the vegetation. Because even the largest wildfires are still relatively small – compared to events like hurricanes – Frady says, "You can always cherry-pick the best risks, if you have the right tools."

Zesty.ai makes a similar pitch to insurers. The company has been gathering data and using it to train machine learning models to better assess climate-related risks like wildfire. "We take satellite imagery, we take building permit data, we take local weather station data, and we are using artificial intelligence to explain the impact of climate risk to every single property," says CEO Atilla Toth.³⁵ The company uses this data to generate a score that assesses wildfire risk on a property-by-property basis.

"In the past, risk has been explained at the regional level," Toth says. "But with the advent of Big Data, and aerial imagery and other data sources that can be analyzed with artificial intelligence, we can build models that are very precise and look at risk at the individual property level." 36

GIA Map is a startup that helps auto, home, and commercial property insurers measure and manage exposure using geospatial data. Founded by two insurance industry veterans, GIA Map incorporates clients' book-of-business data with natural hazard and geospatial data to inform decision making.

CEO David Jowell, with 30 years' insurance experience that includes managing catastrophe risk exposure for Kemper and Travelers, emphasizes the importance of data relevance. "Just because you have 1,000 points of data doesn't mean those 1,000 points of data are relevant to the insurance underwriting decision-making process," he says. "As a matter of fact, that might actually lead to paralysis where you have too much information."

For example, GIA Map points out that on its website, ZIP codes aren't geographic boundaries: "They are a collection of routes used for postal delivery. When used in data analysis, they often mask real insights."

In Conclusion: Complex risks demand coordinated solutions

As wildfires and other climate-related catastrophes become more frequent, more severe, and harder to predict, global insurance demand is likely to increase. The insurance industry, with its long experience in assessing, quantifying, and pricing all kinds of perils, must be involved in helping to manage these evolving risks, both for the protection of the clients it serves as well as for its own vitality and growth.

But the industry's traditional focus on risk transfer is no longer sufficient:

- Because wildfire is an interdependent risk – meaning possible damages and protection against them depends on the actions of others, too – insurers should take action to incent mitigation efforts by policyholders and communities.
- New technologies and tools should be embraced to improve claims management.

- In addition to serving as financial first responders, insurers should also use their unique position in the global economy to inform public policy, promote and facilitate constructive partnerships, and drive behavioral change.
- Further, community-based catastrophe insurance programs perhaps using captive models and/or combinations of indemnity and parametric policies could make coverage more available and affordable to all participants. By reducing claims costs, such programs might also increase insurers' capacity to cover communities that don't lend themselves to the same approach.

Key ingredients for all of these actions are timely and relevant data, accompanied by rigorous analytics. Future-focused insurers should put these front and center as they help build a case for ever-increasing climate resiliency.

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Dr. Seth Rachlin leads Capgemini's global insurance industry strategy and manages its relationships with the insurance technology ecosystem. Seth has 25+ years of experience in innovation at the intersection of insurance and technology.

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