

2023 US Wildfire State of the Market

Executive Summary

While the number of acres burned in the 2022 wildfire season was consistent with the long-term average, concerns about potential damaging wildfires remain at an all-time high. The threat of damaging wildfires is on a steady increase due to climate change (increasing the likelihood of fires) and the continued expansion of homes into the wildland urban interface (increasing the likelihood of insured loss when a fire does happen). Recent years have experienced particularly devastating losses, shifting the view of wildfire risk and leading to changes in how it is managed and priced by insurers. The recent market dislocation signals a new focus on managing wildfire risk.

After years of profitability challenges, both primary and reinsurance carriers have been further burdened by the current inflationary environment. The cost and availability of reinsurance as a risk-financing mechanism have come under persistent pressure. Against this backdrop, leveraging technology to effectively understand and manage wildfire risk has become vital for insurance companies seeking to write profitable business in wildfire-prone areas. In view of these challenges, Gallagher Re offers its clients an array of analytical tools and insights to tackle the intricacies of pricing, underwriting and portfolio management in the midst of a rapidly transforming environment.





US Wildfire Overview: 2022

After a dynamic start, the 2022 US wildfire season ended near the long-term average in terms of acres burned and below average in terms of economic and insured loss. Alaska and portions of the Southwest experienced an active season, while the remainder of the nation saw below-average wildfire activity. California was below average with 363,939 acres burned in 2022. This followed the record years of 2020 and 2021 where 4.4 million acres and 2.6 million acres respectively were affected. A myriad of factors led to below-average financial loss from wildfire in 2022, including weather patterns, geography, exposure and availability of ignition sources. Sustained multiyear precipitation deficits across the West leading into 2022 constrained the availability of new fuel growth. Subsequently, regional precipitation events in the summer and fall locally suppressed fire activity and spread in the Southwest and West.

In New Mexico, the Calf Canyon/Hermits Peak Fire became the largest and most destructive in the state's recorded history. The merged fires affected 341,471 acres and destroyed at least 903 structures while damaging dozens of others. The fire, ignited from an escaped prescribed burn, generated an industry loss that approached USD250 million.

Fires across Florida, Mississippi, Alabama, Tennessee and Texas reinforce that wildfire risk is not only a concern in traditional wildfire-prone sectors of the country. The intensity and frequency of fires in these regions have been increasing, driven in part by climate change.

2022 US Wildfire Season by the Numbers

- 7.5 million acres burned; near the 10-year average of 7.3 million acres.
- 3.1 million acres of the annual total were burned in Alaska alone.
- 68,988 wildfires reported, more than the 58,985 fires reported in 2021.
- 2,717 structures destroyed, including 1,261 residences. California reported 772 destroyed structures.
- USD3.0 billion in economic loss, below the 20-year average of USD6.2 billion (USD 2023 inflated).
- USD500 million in insured loss, below the 20-year average of USD3.9 billion (USD 2023 inflated).

US Weather Influences on Wildfire Activity in 2022

- The western and central regions of the US were affected by unusually hot and dry weather conditions, with California experiencing its seventh warmest year on record since 1895.
- The West, Plains and Mid-South regions were severely impacted by a historic and multiyear drought, with drought conditions affecting at least 90% of the Western region by mid-July.
- An active North American monsoon brought welcomed rainfall to some areas of the Southwest.
- The atmospheric patterns observed in 2022 were significantly influenced by the ongoing La Niña cycle, contributing to the observed weather phenomena across the US.

Understanding Evolving Wildfire Risk

Numerous critical factors contribute to the evolving wildfire risk in California and other western states. The interplay between natural and human factors has resulted in a rising impact on the population and the insurance industry at large.

Climate change and shifting weather patterns have a significant impact on fuel and ignition sources, laying the groundwork for the increasing frequency and severity of wildfires. Additionally, continued building expansion into the wildland urban interface poses a higher likelihood of wildfires that jeopardize lives and lead to unprecedented levels of economic and insured loss. In the following sections, we delve deeper into each of these forces to provide a comprehensive understanding of the factors contributing to the growing wildfire risk.

> Western US: Peak Fire Season (May to November) Climate Normals Comparison 1991 to 2020 vs 20th Century Average

Climate Change

The continued influence of climate change amplifies the conditions that affect wildfire behavior and extends the season when large and damaging fires can occur, resulting in rising physical costs related to wildfires in the US. Long-term temperature and precipitation patterns across the Western US have trended toward warmer and drier conditions, particularly during the peak fire season months of May to November.

This has notably increased both the severity and duration of fire seasons. Year-to-year variability will persist and lead to seasonal high/low precipitation anomalies, frequently driven by large-scale oscillations such as La Niña or El Niño.



1991-2020 was both warmer and drier than average



Further, climate-driven warming causes vegetation to lose additional water through evaporation and transpiration (water transfer from the surface into the atmosphere). These conditions stress vegetation and increase the probability of ignition and the potential for fire to spread.

The fingerprints of climate change are simultaneously present in less traditional wildfire-risk areas east of the Rocky Mountains.

Emerging climate modeling studies suggest an increased fire risk coinciding with longer fire seasons across the Southeastern US. Amid enhanced greenhouse gas emissions and a warming climate, patterns of historical wildfire frequency and severity may no longer sufficiently predict today's risk.

Development in the Wildland Urban Interface (WUI)

Short-term weather patterns, together with long-term climatic trends, have a significant influence on ignition potential, fire spread and the amplification of conditions conducive for wildfire activity. The risk is further influenced by land management practices and expanding urban footprints, particularly within areas where structures exist in or near more densely vegetated areas, known as the wildland urban interface (WUI).

The developments in the WUI have increased dramatically in recent years. In California alone, there was a 39% increase in housing units in the WUI from 1990 to 2020, according to data from UW Madison SILVIS Lab. Throughout the neighboring US states, housing units in the WUI during the same period increased by 46%. Nearly 44 million units resided in the WUI by 2020, led by California with 5.1 million units. Accurately determining the geographical boundary of the WUI is critical to evaluating wildfire risk, particularly when considering risk selection and pricing. Both the spatial and temporal resolution of the boundary definition is critical, as risk declines significantly as distance from the WUI increases. The rapid pace of development means that this boundary is ever-evolving. **To provide the most granular resolution WUI possible, Gallagher Re develops its own internal WUI data sets based on current building stock data at a 30-meter resolution, exceeding publicly available data sources in resolution and recency.**



Fuels and Weather

The fire-specific characteristics of vegetation are a crucial element in not only how fast and how intensely a fire spreads, but also its ability to damage property and infrastructure. While at first glance fuels might appear to be a static component of wildfire risk modeling, factors like urban sprawl, wildfire fuel management, climate change and wildfire itself can change the fuel dynamics of a given region. **Gallagher Re's wildfire solutions incorporate the most recent fuel data sets assembled from a diverse range of data sources to give the most detailed and recent perspective of the condition of wildfire fuels to provide clients with the clearest picture of wildfire risk.**

Weather patterns can both increase and decrease fire risk. Drought conditions can encourage large fires and fire spread due to an abundance of drying grasses and shrubs, particularly in locations that lack appropriate fuel management and land-use planning. On the other hand, multiyear drought tends to limit fire occurrence and spread as the availability of fuels is reduced by a sustained lack of precipitation.

Looking ahead to 2023 and beyond, the peak fire season in the West will be influenced by a growth of new vegetation resulting from episodes of heavy rainfall and near-record snowpack during the first quarter of 2023, particularly in California. This abundance of new growth can conditionally increase fire risk, assuming the development of hot and dry weather in the summer and fall. Forecasts from the Climate Prediction Center (CPC) indicated ENSO-neutral or El Niño conditions were likely to continue for the remainder of 2023. Historically, El Niño patterns are associated with increased rainfall in the West, most notably during the cold season.

Insurance and Reinsurance Industry Dynamics

Wildfire has become a focus for insurers and reinsurers due to the size and scope of the events occurring in 2017 and 2018 as well as the concern about the increasing frequency of damaging wildfires. The historic wildfire activity in 2017 and 2018 had an immense impact on the insurance industry and has reshaped how companies view California from an underwriting and pricing perspective. With recent wildfire losses, California is now among the top four states in terms of total catastrophe loss over the past five years. Given the ever-present lurking potential for an industryaltering earthquake event in the state, it is now considered one of the most globally important geographies in terms of exposure for both insurers and reinsurers.

Given the increased level of scrutiny in this market, insurance companies are implementing changes to their non-renewal, rate and underwriting strategies to ensure a sustainable expected loss ratio as well as to manage the increasing costs of reinsurance. As a result, the exposure in the public insurance market has been growing.





The size and stability of a state's public insurance market represents the ability of insurers to understand and appropriately charge for risk. The California FAIR Plan provides insurance to those who are unable to purchase insurance in the traditional marketplace. More than 100,000 policies have entered the California FAIR Plan since 2019. The growth in the FAIR Plan's exposure indicates a change in appetite from the traditional insurance market which directly relates to the increasing risk of wildfire.

The reinsurance industry has also gone through a dramatic change since 2017. Historic levels of industry loss from wildfires, hurricanes and other natural catastrophes have led to a significant increase in reinsurance rates, higher retentions and contractual tightening over this time span. After the January 1, 2023 renewals, property reinsurance rates had increased by more than 60% since 2017, which has had an immediate impact on insurers' overall profitability and may translate to higher rates for policyholders.

Given the current environment of restricted capacity and high prices along with wariness around wildfire exposure from reinsurers, it is critical that carriers have a strong underwriting and portfolio management approach to wildfire. Carriers with strong wildfire pricing, underwriting and portfolio management strategies see additional capacity and lower prices than those with less developed approaches. **Gallagher Re can help our clients accurately assess the risk of wildfire at the policy level using our pricing, underwriting and portfolio management tools.**



How Gallagher Re is Helping Insurers Manage Wildfire Hazard and Concentration

Considering the dynamic nature of wildfire risk—which can vary significantly based on small changes in geography and result in high costs of risk transfer—Gallagher Re has developed specialized tools for individual risk selection and concentration management.

Specifically, the Gallagher Re wildfire score can aid in determining the appropriate price for wildfire risk and facilitate risk selection. **Proactive concentration management must be employed in tandem with risk selection during underwriting and portfolio management to ensure optimal results**. California has recently implemented regulations that require insurers using wildfire scoring models in rate filings to offer discounts for wildfire mitigation measures. Gallagher Re offers clients assistance in understanding how these regulations may affect their business.

Risk Selection

Gallagher Re has developed a wildfire hazard score which brings together vast quantities of data and scientific research to develop a scoring methodology that identifies the likelihood of a location to be affected by wildfire. As discussed above, Gallagher Re's wildfire score employs a high-resolution, location-specific WUI boundary that is updated frequently using current industry building stock.

The Gallagher Re Wildfire Hazard Score has performed extremely well in predicting the locations that are most likely to be exposed to wildfires and produce claims. Since developing the score in 2017, there has been no shortage of wildfire events and claims to validate the hazard score. Gallagher Re has gathered claims data representing over USD4 billion of incurred loss. The exhibit below shows that just over 40% of the building stock in California falls in moderate to extreme zones, yet those zones produce virtually all the damaged properties. Properties falling below that threshold in low to negligible zones are rarely damaged and when they are, it is often smoke damage or losses relating to evacuation rather than fire damage.

This score allows underwriters to make informed decisions about accumulations and portfolio management, underwriting and risk selection. With nothing more than a property address as input, the hazard score and supporting details can be returned via API directly into policy systems prior to binding quotes. In addition to scoring policies in the underwriting process, Gallagher Re offers batch processing of insured portfolios for strategic management of growth and profitability at the portfolio level.



Wildfire Risk Score on Damaged Properties in 2017

Concentration Management

Considering both the hazard of individual risks as well as the aggregation of exposure in high wildfire hazard areas is critical for effective portfolio management. A location may seem adequately priced based on its individual wildfire risk, but the impact on tail risk and increased financing costs are disproportionately high.

Gallagher Re has developed a proprietary metric called the Area Rating Factor (ARF). The ARF offers insight into the geographic areas that contribute to accumulations of risks and that are most likely to contribute to the largest modeled events that may drive reinsurance financing costs. Managing concentrations proactively prior to binding risks, using the ARF in conjunction with the wildfire risk score via API or underwriting dashboards, arms underwriters with a full view of the policy risk and its contribution to concentration costs.

The ARF is flexible and can be used for analyzing opportunities for growth, new business moratoriums or non-renewals. Given its census block granularity, the ARF allows clients to refine their wildfire exposure at a tactical level while efficiently growing a profitable portfolio. The ARF is a critical link between portfolio strategy and underwriting decisions, improving the efficiency of the UW process and reducing reinsurance costs.

Portfolio Management

- Review concentrations in areas with high wildfire potential
- Manage exposure across all WUI/intermix zones

Underwriting

- Integrate API into an internal system for risk selection
- Review individual risks for acceptability according to risk tolerances

Growth Opportunities

 Understand hazardous areas in conjunction with the current portfolio and opportunities for growth



Granular mapping of risks with Gallagher Re concentration metric, the Area Rating Factor.

Gallagher Re wildfire tools for risk selection and concentration management have been successfully deployed by insurers to enhance existing portfolio management and underwriting activities.

Mitigation

Quantification of the impact of any single mitigation activity is exceedingly difficult, although some measures have both demonstrable impact on historical loss data and can be effectively assessed without an on-site inspection. Providing solutions that help assess these features is critical to providing the appropriate discounts for wildfire mitigation measures, supported by sound research.

The state of California has recently developed regulations that require mandatory mitigation credits to be provided to insureds if a wildfire scoring mechanism is used in developing insurance premiums. Twelve distinct premium credits must be offered to applicants for specific property- or community-level mitigation measures. Gallagher Re assists clients in quantifying the implications of these credits and determining appropriate relativities for their portfolio.



Map of the Firewise communities in California

Firewise as a Mitigation Credit

The national Firewise USA® recognition program provides a collaborative framework to help neighbors in a geographic area get organized, find direction and take action to increase the ignition resistance of their homes and community, and to reduce wildfire risks at the local level. Any community that meets a set of voluntary criteria on an annual basis and retains an "In Good Standing Status" may identify itself as being a Firewise® Site.

Historical, scientific analysis of the resilience of these communities vs. other communities in peer-reviewed studies have demonstrated the efficacy of the program in moderating loss.

In a study by Kramer et al. in the International Journal of Wildland Fire, the presence of a Firewise community resulted in a change of roughly 5% decrease in the proportion of homes destroyed in a wildfire perimeter.

There are more than 600 designated communities in the state of California. Differentiating these communities' risk profiles requires a clear geographic boundary; however, there are no public sources with a comprehensive boundary for all Firewise communities. Gallagher Re has developed a boundary for each of the individual Firewise communities in California. This flag is available via our wildfire API to determine whether a location should qualify for the Firewise mitigation premium credit in the underwriting process. It can also be used to quantify the reduction in estimated losses from commercial wildfire models for the purpose of placing reinsurance.



Firewise community in South Lake Tahoe are highlighted in **Orange** versus those in **Blue** that are not located in a Firewise community

References

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[2] Maranghides, Alexander, and William Mell. "A case study of a community affected by the Witch and Guejito wildland fires." Fire technology 47 (2011): 379-420.

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