CoreLogic®

U.S. Wildfire Catastrophe Model

Quantifying the loss potential of wildfires in high risk states

A Comprehensive Analytic View of Risk

Wildfires, by nature, have the potential to cause major loss and disruption to properties in both rural areas and urban boundaries. Damage caused by wildfires can be catastrophic and can have both a human and financial impact. Development sprawl and the increase in vacation properties being built in rural areas are key reasons why this peril has increasing importance to insurers and other stakeholders.

2017 saw major wildfire losses particularly in the Napa/Sonoma area and in Southern California with insured losses above $12 billion combined. These catastrophic losses underscore the need to have a comprehensive probabilistic model that quantifies risk potential to support risk transfer requirements and capital adequacy for insurers. For mortgage lenders, it is important to know which properties could be impaired by wildfire events.

CoreLogic® has quantified the number of residential properties alone that are at High or Very High risk to wildfire across the U.S. This determined states to focus on. The following states are included in the model: Arizona, California, Colorado, Florida, Idaho, Montana, New Mexico, Nevada, Oklahoma, Oregon, Texas, Utah, Washington and Wyoming. In subsequent releases of this model additional states will be added.

Comprehensive Wildfire Model Methodology

The U.S. Wildfire Model includes robust hazard definition, comprehensive agents of damage, local vulnerability functions, variable import resolution, detailed financial modeling, flexible reporting, and expert review. Both burn and smoke damage is accounted for, and more than 3.5 million stochastic events are incorporated. Model terrain and environmental data is at a resolution of 30m x 30m.

Key Benefits

- A full simulation model for wildfire risk
- Accounts for both burn and smoke damage
- Supports a full range of structure types and accounts for roof types and perimeter clearance
- Adjustable Hazard to account for variations in fuel loads
- Validated with claims data from historical events

Wildfire Hazard Model

The major parameters that govern the behavior and severity of wildfire include:

- Available fuels
- Physical setting (topography)
- Weather (humidity, prevailing winds, etc.)

Data is drawn from a number of sources including but not limited to the U.S. Forest Service, U.S. Geological Survey (USGS), National Centers for Environmental Information (formerly National Climatic Data Center) and the California Department of Forestry and Fire Protection. Climate change modeling has been applied to the data.

The hazard can be adjusted by location to account for higher or lower than average risks in a given year that might be caused by drought, exceptional rainfall or recent burns.

Ignition Sources

The wildfire ignition model incorporates aspects of the physical environment and human environment. This model relates fire ignitions from all sources (natural and man-made) to spatial annual ignition rates.

Primary agents of damage from wildfires are the direct action of lightning, spontaneous combustion, fauna and flora interacting with power lines, bonfires, hot exhaust systems of cars parked over grass, sparks from chimneys, and fireworks.

Burn Module

Propogation of a wildfire in space and time is dependent on the available fuel load, prevailing weather conditions including humidity and winds and the topography of the area. The model utilizes the Scott & Burgan 40 dynamical fuel models.

These conditions among others are explictly modeled in the hazard. The result is a probabilistic distribution of fire losses given a specific ignition. For extreme events, wildfire burn can penetrate deep into urban areas such as what occurred in Santa Rosa, California, in 2017.

Fire Supression Module

The fire suppression model allows for the inclusion of mitigating effects of water supplies and access to the firefighting resources including aerial bombardment with water and/or fire-retardant agents. A highly granular level representation of these resources is included in this part of the model.

Smoke Plume

Smoke footprints are based on a Gaussian Plume model and are used to model smoke, ash and odor damage.

Structure Vulnerabilities

CoreLogic uses an engineering approach, claims data, and expert opinion to develop vulnerability functions within the model. The model incorporates vulnerability curves prepared from claims data and historical database of events.

A comprehensive set of generic and U.S. residential, commercial, industrial and specialized structure types are supported including the ISO Fire Classes for Residential and Commercial buildings.

Secondary structural features are incorporated into the damage module vulnerabilities, namely roof type (Based on UL 790 (ASTM E 108)), fire resistive siding, external automatic sprinklers, and the lean, clean and green, non-combustible and reduced-fuel brush clearance zones and the full or partial mitigation of the property overall.

Smart defaults for structural features are available for certain areas by keying off the building codes.

Financial Modeling

Insurance conditions at structure, site and policy levels are fully supported along with sub-limits based on almost any user-specified criteria such as location. Smoke damage is modeled as a sub-peril and can have its own limit and deductible. The full range of reinsurance contracts including facultative, per risk, proportional and non-proportional excess of loss treaties is supported. All results are fully correlated using our unique copula based correlation methodology using several parameters. A day-stamped Year Loss Table is created that can be used to generate loss metrics including clustering of events occurring in the same area at the same time.

Global Catastrophe Modeling Platform

Available through a suite of catastrophic risk management products from CoreLogic, the U.S. Wildfire Model is included in the global multi-peril catastrophe modeling platform, RQE® (Risk Quantification & Engineering). RQE is a statistically-robust simulation platform delivering high confidence outputs. As one of the most comprehensive full simulation catastrophe modeling solutions available in the market, CoreLogic offers a wide range of analytics outputs allowing for the accurate assessment of catastrophe exposure, both gross and net of reinsurance contracts that can used to inform underwriting decisions, pricing, diversification, portfolio accumulations and capital requirements. Modeling services (employing models such as the U.S. Wildfire Catastrophe Model) are also available through our Corelogic Risk Management Consulting unit

Future Plans

CoreLogic will continue to expand wildfire coverage to non-modeled states in future releases with the aim of covering the entirety of the United States.

Why Consider CoreLogic?

Increasingly, catastrophic events are challenging the P&C insurance industry to revisit existing catastrophic risk management and loss adjustment strategies by improving the overall understanding of all natural hazards. CoreLogic is dedicated to the science of understanding natural hazard risk and is focused on delivering decision support data and insights to the insurance industry. With a staff of Ph.D.-level scientists and engineers, we have taken risk assessment a step further by developing a proprietary methodology that enables a more granular level of risk management control and reporting. Catastrophe Risk Management from CoreLogic offers a comprehensive look at risk by evaluating probable events and verifying current- and post-event impacts.

FOR MORE INFORMATION PLEASE CALL 848-205-6901

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