Planning for Growth in High Wildfire Risk Zones: A Risk Accumulation Model for the Homeowners Insurance Market

Dr. Ellie Graeden (Talus Analytics LLC)
Clark Woodward (RedZone, LLC)

Wildfires can cause hundreds of millions of dollars in damage within limited geographic areas, exposing insurance companies to multiple large losses—and potential insolvency—during bad wildfire years. Not unexpectedly, large losses have led insurers to "cut and run" leaving homeowners with limited and often extremely expensive options. To insure a large portfolio of properties while limiting exposure to extreme losses, organizations must diversify liability by limiting accumulation of highly-correlated risks. There is currently not an established, statistically robust method to limit the accumulation of correlated wildfire liability based on quantitative geospatial information about wildfire risk. Here, we describe a method to delineate the continental US into accumulation zones based on localized fire risk. We interpret local burn probability as a proxy for the annual burn correlation between nearby locations, and use a watershed algorithm to separate contiguous regions of relatively high burn probability, bounded through regions of relatively low burn probability. Using these accumulated risk zones, we can then predict probable maximum losses (PMLs) within each zone based on the Large Fire Simulator (FSIM) data and estimate the annual-loss correlation between neighboring zones. These calculations can be used to identify regions of accumulated correlated liability and to estimate their overall exposure to large losses during bad fire years, which allows insurers to identify regions where they can increase liability with only minimal increase in overall exposure to extreme losses, and where decreasing liability will substantially decrease exposure to extreme losses.