Differentiating Catastrophic Wildfire Risk

Lessons from the 2025 Los Angeles Fires

Executive Summary

One year after the January 2025 Los Angeles wildfires, the scale of loss from the Palisades and Eaton fires remains profound. Thousands of homes were destroyed, lives were lost, and entire communities were permanently altered by events that unfolded in a matter of days.

Coinciding with those extremely destructive events a third fire, the Sunset fire, ignited on January 8. Located between the Palisades and Eaton fires, the Sunset fire ignited and was suppressed while both the other events were still actively unfolding. As it occurred in the same regional drought conditions and within the same operational window, Sunset provides a natural point of comparison. Despite its proximity in time and space, the Sunset fire remained small and non–destructive. The divergence in outcomes was not driven by weather alone, but by differences in fuel continuity, landscape context, and the ability of suppression resources to interrupt fire momentum before urban conflagration thresholds were crossed.

Delos analysis showed these events reinforce a central principle of modern wildfire risk assessment: extreme losses are not driven solely by ignition probability or parcel-level conditions, but by whether a fire is able to scale into a fast-moving, resource-overwhelming event.

The Sunset fire demonstrates how smaller, fragmented wildland fuel patches and expansive firefighter access can dramatically limit fire growth, while the Palisades and Eaton fires illustrate the consequences of large, continuous fuel blocks intersecting dense development under extreme wind.

Importantly, the LA fires also highlighted meaningful differences in how wildfire models interpret risk. While some approaches emphasize historical burn patterns or localized structure features, Delos' model, for example, focuses on the underlying fundamentals of fire behavior: fuel structure, ember production, wind alignment, access, and suppression feasibility. The performance of the model during the 2025 fires reinforced the importance of this framework and underscored the risk of drawing broad conclusions from outcomes without accounting for the physical processes that govern fire spread. In an environment of increasingly volatile wildfire behavior, models grounded in fire dynamics, rather than proxies, are better positioned to distinguish between fires that are dangerous and fires that are catastrophic.

From an insurance perspective, more reliable underwriting models directly translate into broader access to affordable coverage, while allowing public resources to be concentrated where wildfire risk is genuinely extreme.

Palisades and Eaton:
When Scale Becomes the Risk

The Palisades and Eaton fires ignited on January 7, 2025, during a severe Santa Ana wind event with gusts approaching 100 mph. Both fires rapidly transitioned from wildland ignitions into urban conflagrations, ultimately destroying more than 16,000 structures combined. From a risk modeling standpoint, these events shared several defining characteristics:

Large, continuous wildland fuel beds extending into steep, difficult-to-access terrain

Long fire-free intervals, particularly in the Palisades, where significant portions of the landscape had not burned for nearly a century

High potential ember production, driven by mature shrublands and heavier tree cover

Suppression constraints, including difficult access, grounded aircraft, and rapid perimeter expansion that exceeded initial response capacity

Once these fires reached sufficient scale, loss outcomes became dominated by structure-to-structure spread rather than wildland exposure. In this regime, parcel-level vegetation management and individual homeowner actions offer diminishing marginal benefit.

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Sunset: A Fire That Never Found Momentum

The Sunset fire, which ignited on the evening of January 8, provides a clear counterexample. Despite occurring under the same regional drought conditions, the fire burned roughly 40 acres and was largely contained within hours, with evacuations lifted around midnight. Several factors explain this outcome:

Small, fragmented wildland fuel patches limited the fire's ability to build momentum

Lower wind speeds relative to the Palisades and Eaton events

Greater road density and firefighter access, allowing rapid perimeter engagement

Pre-positioned resources, already mobilized due to the larger fires burning nearby

The Delos wildfire model predominantly classifies the Sunset area as moderate hazard. This is not because ignition is unlikely, but because the landscape does not support sustained, fast-moving fire behavior capable of overwhelming suppression resources. Reduced fuel continuity stymies the initial stages of fire growth and increases the probability that firefighters can successfully intervene before structural exposure escalates.

Kenneth and Hurst: Fuel History Matters

Two other LA county fires,the Kenneth and Hurst fires, further illustrate how fuel structure and burn history influence outcomes. Both ignited under challenging conditions yet resulted in no structure losses. A key commonality is that each burned in landscapes that had already experienced multiple fires in the past two decades.

Kenneth Fire: Previously burned in the 2005 Topanga and 2018 Woolsey fires

Hurst Fire: Previously burned in the 2008 Sayre and 2019 Saddle Ridge fires, with additional overlap from earlier events

Delos fuel mapping shows these areas have lower shrub height and reduced tree cover compared to Palisades and Eaton, materially reducing ember generation potential. This proved especially important for the Hurst fire, which ignited the night of January 7th during a period of high winds yet was contained before structures were impacted.
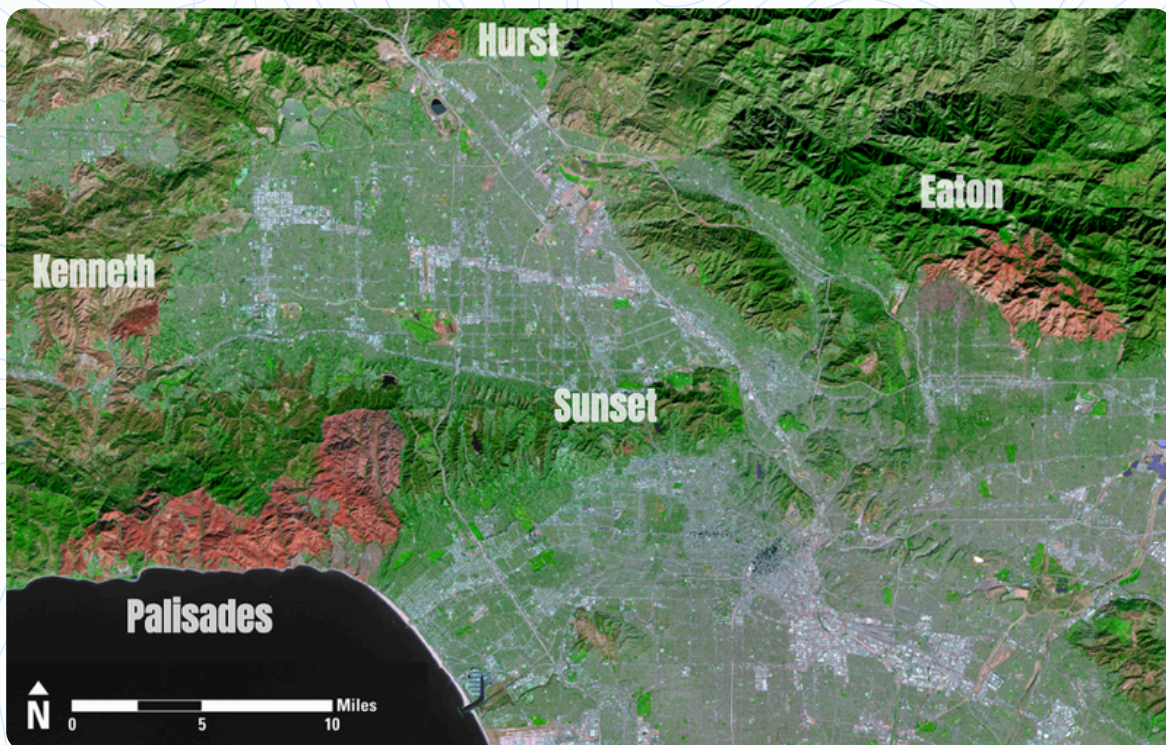
Proximity of LA Fires

Image credit: Landsat

The Role of Structure Hardening

The January 2025 fires made clear that structure hardening is valuable but not universally effective. It is highly dependent on where and how it is applied. From Delos' analysis, structure and parcel-level mitigation matters and is particularly impactful when it is applied comprehensively and in contexts where background fire behavior allows it to influence outcomes.

In high-density communities adjacent to large, continuous fuel blocks, the dominant exposure pathway once a fire reaches scale is often structure-to-structure ignition. In these settings, initial ignitions at the community edge are frequently driven by embers produced by wildland fuels, but as multiple structures become involved, fire spread through interior neighborhoods is increasingly governed by convection, radiant heat, and direct flame contact. Once these structure-to-structure pathways dominate, individual parcel-level actions provide limited protection, and even neighborhood-scale mitigation can be surmounted as firefighting resources are overwhelmed by numerous simultaneous structure fires.

Edge properties in these communities play a disproportionate role. When well hardened, they can act as shields that interrupt ember-driven ignition and delay or prevent fire spread into interior neighborhoods. When they are not, they often become the initial ignition source, after which losses propagate inward through direct structure-to-structure spread rather than continued wildland ember exposure.

Across many wildfire settings, particularly at the wildland–urban interface and along community edges, ember intrusion remains a primary driver of structure ignition, making structure-level hardening one of the most consistently effective mitigation strategies before and during the earliest stages of community exposure. Measures such as screened or ember-resistant vents, guarded gutters, enclosure of eaves and other vulnerable openings, and the use of noncombustible ground coverings, such as gravel, within the immediate five-foot buffer around the structure directly target these early ignition pathways. Critically, these measures function as a system: partial implementation offers limited protection if other vulnerabilities remain. A home with cleared gutters but open vents, or with enclosed eaves but mulch up against the siding, remains highly susceptible to ignition. When applied comprehensively, however, these features can materially reduce ignition probability and slow fire entry into communities, particularly before structure-to-structure spread becomes dominant.

Where mitigation shows the greatest return on investment for the individual homeowner is in moderate baseline risk environments and in lower-density developments intermixed with wildland vegetation. As ember attack rather than structure to structure spread is the dominant loss driver in these settings, changes made by individual homeowners can provide more significant benefits regardless of the actions taken on neighboring properties. However, even greater benefits can be achieved through coordinated action across scales. Hardened homes reduce ignition probability; parcels are maintained to support defensibility; neighborhoods ensure adequate water supply, fire truck turnarounds, and access; and community edges incorporate fuel reduction zones, fire breaks, or irrigated greenbelts that reduce ember exposure and fire intensity.

At the landscape scale, ignition reduction programs, active fuel management, prescribed fire, and deliberately managed wildfires all play a role in moderating future fire behavior and altering landscape-scale risk. When actions at the home, neighborhood, and landscape scales are aligned, they can meaningfully reduce loss potential and improve suppression success.

In these settings, homes that demonstrate comprehensive, structure-level ember mitigation are increasingly distinguishable from a loss perspective. With precise wildfire models these characteristics can expand eligibility for private insurance, reduce reliance on residual market mechanisms, and support a more stable insurance market in wildfire-exposed regions.

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Implications for Insurers

For the insurance industry, the key lesson from the past year is that wildfire risk cannot be inferred from proximity to wildland vegetation alone. The critical differentiator is whether a landscape supports fires that can scale beyond initial attack and trigger urban conflagration. The Sunset fire succeeded because it never crossed that threshold. Palisades and Eaton failed because they did.

Delos' experience of zero wildfire losses across a 25,000-policy portfolio at the time of the LA fires provided not only validation of the underlying modeling approach, but also increased confidence among capacity partners in the model's ability to consistently differentiate between catastrophic and manageable wildfire risk. In the months following the fires, Delos incorporated lessons from observed fire behavior, suppression outcomes, and fuel quantification into its wildfire model, enabling a more precise distinction between landscapes capable of catastrophic fire growth and those where suppression remains viable.

As a result of these validating events, Delos was able to expand underwriting eligibility to approximately 270,000 additional homes in Southern California that had previously been considered uninsurable by much of the private market. Importantly, this expansion did not reflect a relaxation of risk standards, but rather a higher-resolution understanding of where wildfire risk is materially lower.

Increased availability of affordable private insurance in these regions carries broader systemic benefits. Each policy written in the private market represents a policy that does not need to rely on the FAIR Plan. Based on Delos' analysis, a substantial portion of FAIR Plan–insured properties – potentially as many as 50% – may be eligible for coverage through Delos under current underwriting criteria. Over time, expanded private-market participation allows public resources and last-resort mechanisms to be more effectively concentrated in the truly highest-risk areas, where continuous fuels and extreme fire behavior make private coverage structurally challenging. From both a solvency and public policy perspective, improving risk differentiation is essential to stabilizing California's insurance ecosystem.

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As wildfire behavior continues to evolve, distinguishing between fires that are dangerous and fires that are catastrophic will remain central to sustainable underwriting. The experience of 2025 demonstrates that models capable of capturing fuel continuity, ember dynamics, access, and suppression feasibility can do more than avoid insurance losses, they can expand availability, reduce reliance on public backstops, and help restore function to an insurance market under strain.

Southern California counties where Delos expanded underwriting eligibility in 2025

Conclusion

The January 2025 LA fires reinforce a simple but often overlooked truth: not all wildfires are created equal. Differences in fuel continuity, landscape scale, access, and wind-driven fire behavior determine whether an ignition is contained quickly or escalates into catastrophic loss. These distinctions are both real and increasingly measurable.

These events also serve as a cautionary reminder that not all wildfire models interpret risk through the same lens. Approaches that rely too heavily on historical fire occurrence, parcel-level variables, or simplified hazard indicators risk drawing the wrong lessons from complex fire outcomes. By contrast, models that prioritize the fundamentals of fire offer a more durable foundation for risk assessment. This means explicitly accounting for how fuels burn, how embers are generated and transported, and when suppression is likely to fail within a holistic, data-driven model framework.

As modeling, data resolution, and operational understanding continue to improve, insurers, regulators, and communities are better positioned to identify where risk truly concentrates. Recognizing where that line exists, and grounding decisions in the physics of fire, rather than broad generalization, creates a path toward more resilient communities, more functional insurance markets, and a future in which wildfire risk is managed with precision rather than broad retreat.

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