

Wildfire Resiliency Score

Sub-Factor Analysis



PROPERTY GUARDIAN
A Green Shield Company

Understanding What Drives Exposure & Survival (Executive Summary)

Overview

This study asks a practical question for underwriting and portfolio teams: when we score properties with **Property Guardian's Wildfire Resiliency Score**, which parts of the score explain (1) whether a property is exposed to wildfire, and (2) whether it survives once exposed?

The key takeaway is a two-stage model of wildfire risk:

- **Stage 1 — Exposure ("Will fire reach this property?"):** Driven primarily by area-level conditions (Community + Region).
- **Stage 2 — Survival ("If fire reaches it, will it burn?"):** Driven primarily by property-level parcel conditions (defensible space, vegetation and lot characteristics, immediate surroundings).

That distinction matters because it shows the Wildfire Resiliency Score doesn't just label risk, it helps teams separate location-driven exposure from property-driven survivability, enabling more confident selection, pricing, and mitigation decisions.

Study Design

We analyzed **529 properties** located within 5 km of wildfire perimeters (a conservative "nearby" definition where exposure is plausible). We then evaluated outcomes in two ways:

1. **Exposure analysis (full sample):** Whether a property fell inside an impact zone.
2. **Survival analysis (fire-exposed subset):** For properties matched to confirmed damage inspection records (DINS), whether the structure was destroyed vs. survived once directly impacted.

To validate results, we used standard statistical tests and models (including logistic regression) to determine which sub-factors are most predictive at each stage.

What We Found

1. The Score Clearly Differentiates Exposure Across Risk Tiers.

In the full 529-property sample:

- **High risk:** 65.3% impact rate (32/49); 51.0% destruction rate (25/49)
- **Moderate risk:** 20.7% impact rate (75/363); 12.9% destruction rate (47/363)
- **Low risk:** 0.0% impact rate (0/117); 0 destroyed

In other words, High-risk properties were ~3x more likely to be impacted than Moderate, and Low-risk properties showed a credible "floor" of zero observed exposure in this near-perimeter cohort.

"Wildfire risk is a two-step problem: first, whether the fire reaches the neighborhood, and then whether the home survives. This study shows our Resiliency Score captures both realities: area-level factors explain exposure, and parcel conditions explain survivability. That's exactly the kind of evidence underwriting and portfolio teams can use to make smarter, more defensible decisions."

— **Pat Blandford**,
Founder & CEO, Property Guardian

Authors

James Jirsa, Head of Analytics & AI
MS Applied Mathematics, DePaul University
MS Business Analytics, University of Notre Dame

Delaney Blandford
BS, University of Notre Dame

Request the methods appendix or a walkthrough:

analytics@propertyguardian.com

What We Found (Cont)

2. Exposure Is Driven by Area-Level Factors (Community + Region).

When predicting whether wildfire reaches a property, the strongest signals come from Community and Region sub-scores — factors that reflect broader wildfire likelihood and spread dynamics. Property-specific sub-factors (Structure + Parcel) are far less informative at this stage because they don't determine whether a wildfire enters the area.

3. Survival Is Driven by Parcel Conditions Once a Property Is Exposed.

Among wildfire-exposed properties with confirmed DINS outcomes, the pattern flips:

- Parcel score becomes the dominant predictor of destruction, while Community and Region lose predictive power for survival after exposure.
- Practically: each 0.10 worsening in parcel score corresponds to ~2.9x higher odds of destruction.
- A property with poor parcel conditions (0.80) faces ~100+ times higher odds of destruction than one with good parcel conditions (0.35).

Observed outcomes align with the model:

- Parcel 0.41–0.60: **43.3%** destroyed
- Parcel 0.61–0.80: **74.7%** destroyed
- Parcel >0.80: **100%** destroyed (small sample)

Why This Matters for Underwriting & Portfolio

This analysis supports using the Wildfire Resiliency Score as a decision-ready framework for both portfolio and property-level workflows:

- **Better geographic selection:** Use Community + Region to avoid high-exposure areas and manage aggregation.
- **Meaningful differentiation within wildfire-prone areas:** Use Parcel to separate “likely to survive” from “likely to burn” when wildfire arrives, supporting tighter eligibility, clearer pricing steps, and fewer blanket declines.
- **Actionable mitigation leverage:** Parcel conditions are not just predictive — they're improvable. The data suggests that moving from poor to strong parcel conditions can reduce destruction odds dramatically, providing a measurable rationale for mitigation requirements, credits, and recommendation programs.

Scope & What's Next

This study is based on a limited number of confirmed damage matches, which constrains power for smaller effects (e.g., structure hardening signals that appear directionally helpful but weren't statistically strong in this sample). Future analyses can expand across additional seasons and events, and further decompose parcel drivers to pinpoint which mitigation actions deliver the biggest resilience gains.

