Thomas Smith January 27th, 2025

The causes of Los Angeles' wildfires are complex and may have equally difficult and complicated solutions

January 2025 saw devastating wildfires across Los Angeles County with 28 deaths, thousands of structures destroyed, and damages estimated in the tens of billions of dollars. **Thomas Smith** *looks at California's changing history of fire regimes, which in combination with climate change, extreme fire weather, and a multitude of potential fire ignition sources, have led to greater and greater fire risk. Just as the reasons behind LA's wildfires are complex, he writes, so are the solutions, which will require collaboration on multiple fronts between policymakers, communities, and scientists.*

This month, a series of devastating wildfires (Figure 1) across Los Angeles County have destroyed homes, claimed lives, and led to mass evacuation orders on a scale not witnessed in the county's history. Although wildfires in California rarely struggle to make the news, this destructive episode serves as a sober reminder of the "wicked problem" we face when climate change, urban growth, and fire ecology collide in the American West.

Figure 1 – Fire hotspots (red and orange) detected by NASA satellites on 9 January 2025

Note: The satellite imagery, from NASA's Terra satellite shows the thick smoke plumes driven over the city from multiple wildfires at the wildland-urban interface.

Wicked problems – a term used by social scientists – relate to issues which are characterized by numerous interdependent factors, changing conditions, and contested definitions of both the problem and potential solutions. In the case of LA's fires, urban development, land management practices, climate change, infrastructure vulnerabilities, and socio-economic factors collide to create a complex risk environment that presents significant challenges for effective disaster prevention and management policies.

California's long history of fire ecology

Fires are not new to Southern California. Long before modern settlement, fire was central to the region's ecological balance, which had adapted to fire. Native plant communities—such as chaparral, coastal sage scrub, and certain pines—have historically relied on periodic, low-intensity fires for regeneration. Indigenous communities in the region also set controlled burns to clear dense undergrowth, reduce pest populations, and maintain an ecologically rich mosaic on the landscape. The advent of a "stop all fire" approach by the US Forest Service at the start of the twentieth century, and the coincidental discouragement of traditional fire use, led to a change in the fire regimes of California. With fewer ignitions and the adoption of total fire suppression, the landscape evolved so that fuel accumulated where once it would have been managed by fire. This in turn led to a fire regime characterised by less frequent, but more severe fires, carried by higher fuel loads and only burning in extreme fire weather conditions, when fire suppression is ineffective.

Climate change and extreme fire weather

The conditions that allow a fire to explode—"fire weather"—depend on temperature, relative humidity, wind speed, and recent rainfall (or lack thereof). Much like in Canada and Siberia, climate

change is stacking the deck for more frequent and intense episodes of extreme fire weather in Southern California. Prolonged droughts and record-high temperatures dry out vegetation, priming it to burn at the slightest ignition. When the Santa Ana winds begin to blow in autumn and winter, any spark—whether from a downed power line or a stray ember—can set off a rapidly spreading blaze. While fire weather is predicted to become more extreme across all of the year in California, over the past four decades we have already seen a 20 percent shift in fire weather indices during the autumn months, due to warming temperatures and declining precipitation. Coupled with the autumnal Santa Ana winds (which played an important role in the recent wildfire outbreak), we should expect that near-future climate change will further amplify the number of days with extreme fire weather during the late autumn months.

Complexity of ignition sources

The region surrounding Los Angeles has its own set of complex ignition sources. Aging electrical infrastructure—exemplified by outdated power lines and transformers—is frequently implicated when equipment sparks or fails. Utilities struggle to maintain or replace this equipment, and the costs of upgrading the grid are immense. Meanwhile, social factors come into play as well: in some instances, wildfires have been deliberately set by arsonists, illustrating that the causes of fires can be rooted in crime, mental health issues, and socio-economic challenges. Early investigations point to New Year's Eve fireworks as a potential ignition for the LA Palisades Fire, further highlighting the complexity at play, where both systemic infrastructure issues and individual human actions contribute to the outbreak of fires.

"Palisades Fire" (CC BY-NC 2.0) by CAL FIRE_Official

Land abandonment at the wildland-urban interface

An important dynamic that played a significant role in this year's Los Angeles fires is how the outer edges of the city blend into wildland zones – the wildland-urban interface (WUI). Historically, some

agricultural areas served as a buffer zone by creating breaks in the flammable shrubland. But in many places, farmland has been abandoned or converted into suburbs, effectively removing that buffer. Southern California, in particular, has lost ~90 percent of its agricultural buffer zone in recent decades. This means that what used to be a belt of irrigated crops—potentially a firebreak—has turned into a sprawling patchwork of homes, roads, and powerlines, all of which can fuel or spark a wildfire. With the lack of progress in effective mitigation of climate change in the coming decades, we must address these land-use problems to avoid a perfect storm of fuel and climate-driven wildfires.

Vulnerability of residential buildings

While individuals are often encouraged to create "defensible space" around their properties, enforcement of fire-resilient measures can be uneven. Programs such as "Firewise" communities—where residents collaborate to reduce wildfire risks through structural and landscape modifications—have seen only limited adoption. Many older (and even some newer) homes in Los Angeles still feature flammable roofing, siding, and guttering, making them highly susceptible to ember intrusion. Without strong building codes and robust enforcement, entire neighbourhoods remain at risk, further exacerbating the destructive potential of an encroaching wildfire.

One of the most frightening aspects of the January 2025 wildfires in LA is how quickly the wildland fires transformed into an urban firestorm. Once flames and embers jump from brushland to built-up areas, the dense clustering of homes, businesses, and industrial sites acts like a tinderbox. The result can be catastrophic, as seen in some Los Angeles suburbs this month, where thousands of structures were consumed in a matter of hours.

Misinformation, climate denial, and the politics of wildfire

Finally, the challenge of addressing wildfires is not just about climate change and land management—it is also entangled with political narratives and misinformation. As LSE Department of Geography and Phelan US Centre Centennial Professor, Laura Pulido, explores in her analysis of wildfire rumours during the 2020 Oregon fires, extreme fire events can become a flashpoint for wider socio-political anxieties. In some rural communities, the wildfires were not attributed to rising temperatures and prolonged drought—both well-documented climate-driven factors—but instead were falsely blamed on political activists, with conspiracy theories fuelling public distrust and hampering emergency response efforts. This fusion of climate denial and misinformation highlights another dimension of wildfire as a "wicked problem." In Los Angeles, where fire risk is escalating alongside climate change, the politicization of disaster response could further complicate efforts to implement evidence-based fire mitigation strategies. If climate denial and misinformation continue to shape how we talk about wildfires, then addressing the root causes of what makes them worse will become even more difficult.

LA's fires are a wicked problem which demands multifaceted solutions

Los Angeles' wildfires exemplify a classic wicked problem. They emerge from an intricate web of ecological, infrastructural, social, and climatic factors, all playing out in real time. Traditional top-down policies or single-agency responses cannot address the roots of the issue, which lie in long-standing land-use patterns, inadequate infrastructure, climate change impacts, and inconsistent enforcement of fire-safe regulations. To truly break the cycle of destruction, policymakers, communities, and scientists must collaborate on multiple fronts: from upgrading power grids and enacting stricter building codes to restoring traditional landscape management practices in fire-adapted areas and fostering resilience through local action. Only by recognising the complexity of these challenges—and the need for integrated, adaptive responses—can Los Angeles chart a safer path forward in the face of its evolving wildfire threat.

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About the author

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Thomas Smith is Associate Professor in Environmental Geography in the Department of Geography and Environment at LSE. His first wildfire experience was in Banff National Park in Alberta, Canada, June 2009. At the time he was a first-year PhD student using monitoring equipment to investigate air pollution in London. As part of a large team of scientists he flew to Alberta to assist with a monitoring campaign investigating a series of prescribed (purposely set) forest fires. This experience changed my outlook on how he wanted to focus my research. Since that trip, he's investigated smoke emissions from wildfires in Canada, Australia, the UK, Indonesia, Malaysia, and Brunei. He also works on fire behaviour modelling, with a particular focus on developing a fire danger rating system for the UK. The outputs of his research inform national and global greenhouse gas emissions accounting, air quality forecasts, and land management best practice guidance.

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