California's zombie fires leave destructive legacy

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In October 1991, a grass fire was reported in Northern California near the Caldecott Tunnel on a slope in the Berkeley Hills. The fire was small, but five years of drought had primed the eucalyptus and Monterey pines for the blaze. It was nighttime before firefighters finished checking for hot spots and counted themselves lucky it had not been windier.

By noon the next day, that luck had run out.

As a Diablo wind rose, fallen embers that had seemed dead the previous evening suddenly came alive. Mop-up crews who had come back to make one last check and retrieve their fire hoses watched in astonishment as flaming pine needles went flying and trees exploded into one of the deadliest wildfires ever in California.

Mark Hoffman, 71, was a lieutenant in the Oakland fire department when the so-called Tunnel fire swept through, destroying nearly 3,500 homes and killing 25 people. He thought of the fire recently, almost exactly 34 years later, after authorities in Los Angeles attributed the Palisades fire to remnants of an earlier blaze that firefighters thought had been extinguished.

"It was like, 'Oh, no — that again,'" Hoffman said.

They're called holdover fires, rekindled fires, reignitions — even zombie fires. The culprits of many major fires in California are varied and well known: utility-company equipment failures, lightning strikes, arsonists, homeless people or hunters who lit campfires that spun out of control. But some of the most destructive fires in the state's history were blazes that were assumed to have died but then came roaring back to life hours or even days later.

Experts in wildfire management say these rekindled fires have become increasingly common in California and elsewhere. The phenomenon has been the subject of lawsuits and raised questions about the thoroughness of the efforts of firefighters to completely extinguish wildfires. It has also prompted a wave of new firefighting

technology.

One of the reasons they keep happening, fire experts said, is that climate change has made megafires more common and windstorms wilder. As immense wildfires cast embers for miles, flaming debris is harder to trace and extinguish. Under the right conditions, a weak firebrand or ember can become lodged in vegetation for days, weeks or months undetected, and the smoldering fire it ignites can be kindled to life by wind, in the same way a person can lean in and blow on a dying campfire to relight it.

“Extreme winds can reignite smoldering things that normally wouldn’t reignite,” said David Calkin, a fire management expert who is a former supervisory research forester at the Rocky Mountain Research Station of the U.S. Forest Service in Missoula, Montana, a long-standing fire research institution.

The wildfire on Jan. 7 in Pacific Palisades, one of Los Angeles’ wealthiest enclaves, killed 12 people and leveled more than 6,800 structures, most of them homes. The fire, federal prosecutors said, was a holdover from an 8-acre brush fire that had been intentionally set early on Jan. 1 along a hiking trail in the Santa Monica Mountains nearby.

Jonathan Rinderknecht, 29, a former resident of Pacific Palisades who federal officials say was on that trail near his old home shortly after New Year’s Eve, has been charged with destruction of property by means of fire and faces up to 20 years in federal prison if convicted.

Prosecutors said he had been fascinated with fire imagery and set the Jan. 1 fire with a lighter. A shard of burning wood fell deep into vegetation and became lodged in a dry root about 20 feet south of where firefighters were working to stop the fire’s progress, officials said. Unseen by firefighters or the public, officials said, that firebrand lay smoldering for a week, even as mop-up crews extinguished the flames and returned over the next 36 hours to look for hot spots.

On the morning of Jan. 7, as a powerful windstorm gusted, investigators and prosecutors contend, the buried ember began to smoke and then caught fire.

Legal experts say it could be difficult to hold Rinderknecht liable for the Palisades fire, based on the initial Jan. 1 fire, in which no one was injured and no structures were damaged. But fire experts say the notion that the first fire caused the second is not far-fetched.

The 2023 fire in Maui, which killed at least 102 people and leveled the historic resort

town of Lahaina, Hawaii, erupted after doused embers from a fire near a power pole reignited.

In 2022, the largest and most destructive fire in New Mexico history was partially traced to embers under a heap of leftover debris from a controlled “pile burn” during the winter. Those remnants had been dormant for three months and repeatedly snowed on, but a stiff April wind revived them and muscled them toward another nearby wildfire, according to subsequent investigations. That blaze, known as the Calf Canyon/Hermits Peak Fire, burned 341,471 acres in the southern Sangre de Cristo Mountains that year.

Calkin, the fire management expert, said at first he had doubted the almost immediate speculation that the Palisades fire had stemmed from the earlier Jan. 1 brush fire. Urban firefighters in places like Los Angeles generally mop up carefully after fires because they must protect so many people near their wild lands.

But he changed his mind after he traveled to Los Angeles and saw the trailhead — the dry chaparral, the wind-scoured slopes, the neighboring and chronically fire-prone communities of Malibu and Topanga Canyon.

“It seemed like they’d been dodging a bullet for a while and just got hit with a howitzer instead of a rifle,” Calkin said. “I thought about what a 100-mile wind can do.”

Firefighting experts are acutely aware of the rising threat of hidden embers.

James Urban, an assistant professor of fire protection engineering at Worcester Polytechnic Institute in Massachusetts, said smoldering fires in certain natural materials, including decaying roots, spongy wood and peat bogs, can go undetected for months, only to be rekindled by a windstorm. He said new technology was being used to fight the phenomenon. One research project he’s working on with the U.S. Forest Service aims to upgrade computer models to better predict the threat of flying and smoldering firebrands. Elsewhere, tech startups spot and chase down rogue embers with autonomous helicopters and drones.

Los Angeles fire officials said that after the Palisades fire they had repeatedly “cold-trailed” the perimeter of the Jan. 1 fire, feeling for residual heat with their hands and digging out live spots. At a community meeting in January after the Palisades fire, Joe Everett, an assistant Los Angeles fire chief whose family had been fighting fires in Pacific Palisades for generations, told residents that hose lines had been kept on site for days.

“That fire was dead out,” Everett told Palisades residents on Jan. 16, referring to the New Year’s Day blaze. If investigators were to find that the Palisades fire arose from old embers, he added, “it would be a phenomenon.”

Investigators learned, of course, that the fire was not completely dead. Stricken residents have questioned whether firefighters did all that they could to make sure the first fire was extinguished. Some have sued, adding zombie fire embers to a list of other hazards they say the city and state created by inadequately preparing for or responding to the Palisades fire. Those plaintiffs say the department could have used thermal imaging cameras to check the site for hot spots but did not.

The interim fire chief, Ronnie Villanueva, said in a statement that even thermal imaging would have been of limited use. Chaparral of the sort where the embers landed have roots that extend up to 25 feet under the ground, he said, and the cameras cannot sense pockets of heat for more than a couple of inches near the surface.

“Holdover fires can be nearly impossible to detect with infrared imaging, as smoldering often occurs deep below the surface, especially in chaparral terrain where dense root systems conceal residual heat,” Villanueva said. “Under extreme winds, low humidity and prolonged drought, these fires can reignite despite full suppression and containment efforts.”

Kenny Cooper, the special agent in charge of the Los Angeles field office of the Bureau of Alcohol, Tobacco, Firearms and Explosives, said that his office could find no reason to believe that firefighters could have stopped the New Year’s Day fire from erupting into the Palisades blaze days later.

“With my past experience with wildland fires, like, lightning strikes can hit a tree and get down into the roots and smolder undetected for days and days,” Cooper told reporters at a news conference announcing the arrest of Rinderknecht. “It’s nothing any suppression unit, or a fire department, can really proactively prevent.”