



LOS ANGELES CITY FIRE DEPARTMENT

Holdover Fires Fact Sheet

Background Information on Holdover Fires

About a Holdover Fire

A holdover fire is a deep-rooted smoldering fire that remains dormant or smoldering — without visible flames or spread — for some time after its initial ignition. It can remain undetected or only partially suppressed before re-igniting or flaring up again under favorable conditions. In wildland and forest fire contexts, this often occurs when surface flames die out but smoldering combustion continues deep underground. Once conditions warm, dry, or oxygen becomes available, the smoldering fire may reignite surface fuels, and the fire “returns.”

Deep, Woody Root Systems Act as Hidden Fuel Reserves

Chaparral species such as manzanita, chamise, ceanothus, and scrub oak have large lignified root systems that reach deep into the soil to access groundwater — sometimes as far as 15 to 25 feet below the surface. After a surface fire, these roots can continue smoldering underground long after the visible flames are extinguished. Because chaparral roots are woody and resinous, they burn slowly and retain heat for long durations. This slow, oxygen-limited combustion can move through the soil and re-emerge days or even weeks later when the surface dries and winds increase.

Detection Is Extremely Difficult

Holdover fires in chaparral are extremely difficult to detect using traditional infrared or aerial imaging. In these ecosystems, smoldering can occur deep below the surface—often well beyond the detection range of thermal sensors.

Thermal imaging cameras detect infrared radiation (in the 8–14 μm range) emitted from surface heat, not from subsurface combustion. For heat to be detected, it must conduct through the soil and radiate outward. In dry, mineral-rich, or ash-covered soils—which act as natural insulators—only the upper inch or two may show measurable temperature differences, making deeper heat pockets virtually invisible to detection equipment.

Challenging Terrain and Access

Chaparral grows in steep, rugged topography — canyons, ridges, and inaccessible slopes — where digging or trenching to expose smoldering roots is nearly impossible. Ground crews must rely on indirect suppression methods, such as cold trailing or mop-up using hand tools and water drops. However, with root systems running many feet deep, it is nearly impossible to fully extinguish all underground heat pockets.

Risk Under Wind and Heat

When surface conditions dry out and strong winds return, latent heat from smoldering roots can reignite fine surface fuels. This is particularly dangerous in chaparral because fuels are continuous and volatile, allowing a single flare-up to spread rapidly upslope. Reignitions can occur days or even weeks after containment.

Southern California Holdovers

In areas like the Angeles National Forest and the Santa Monica Mountains, post-incident analyses have found that small flare-ups days later often trace back to root-based smoldering in manzanita or chamise stands. These “sleeper fires” can appear 10 to 20 days after initial containment, especially following wind events or extreme drying.

Chaparral in Southern California

Chaparral is Southern California’s signature ecosystem: a dense, woody shrubland uniquely adapted to the region’s Mediterranean climate of hot, dry summers and mild, wet winters. Found across the foothills and mountain slopes from Malibu to San Diego, chaparral species such as chamise, manzanita, and ceanothus have deep root systems that allow survival through drought and rapid regrowth after fire. These same adaptations, however, make chaparral highly flammable and capable of sustaining smoldering combustion below the surface long after flames are extinguished. The combination of resin-rich vegetation, rugged terrain, and prolonged dry seasons makes chaparral both ecologically vital and a central challenge in Southern California’s wildfire management.

Conclusion

Holdover fires are deep-rooted, smoldering fires that can remain undetectable for days or weeks, particularly in chaparral with extensive woody root systems. On January 7, an unprecedented wind event far exceeding typical Santa Ana conditions contributed to the rapid spread and reactivation of a holdover fire, even after aggressive, fully executed suppression efforts. This fire highlights the unpredictable nature of holdover fires despite the Department’s thorough and timely response. The Los Angeles City Fire Department remains committed to rapid detection, containment, and public safety, recognizing that holdover fires are an inherent risk of managing wildland fire in Southern California.