Issue Brief

HOW OFTEN HAVE HYDRANTS RUN DRY? EVIDENCE FROM RECENT MAJOR WILDFIRES

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Motivation

In the aftermath of the multiple devastating fires that burned in Los Angeles in January 2025, news narratives quickly emerged that fire hydrants and the associated water supply system distribution infrastructure underperformed. In particular, there was a striking similarity in headlines across many media platforms in the early hours and days of the fire, when international attention on the crisis was highest, declaring that "fire hydrants ran dry" or that "water supply failed."

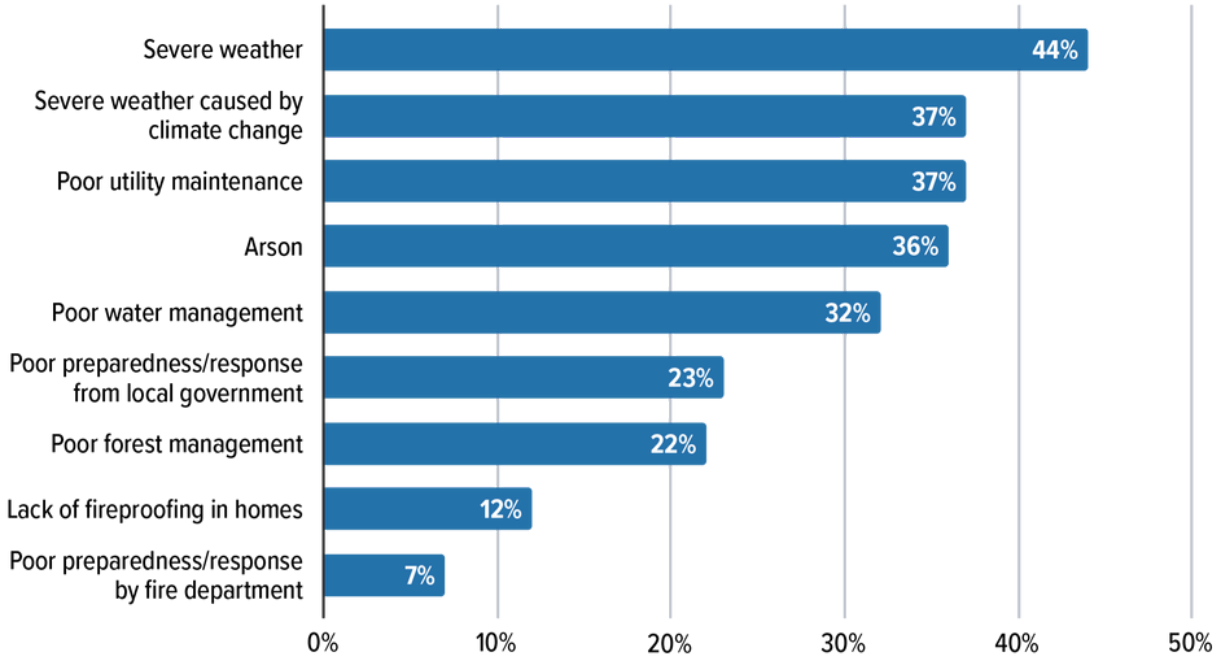
Most of the earliest stories implied that hydrants having low water pressure was an unusual if not unprecedented situation. The stories focused almost solely on the water system serving the city of Los Angeles—the Los Angeles Department of Water and Power (LADWP)—rather than the two other water systems serving the area hit by the largest of the fires, the Palisades Fire, or any of the eight water systems serving the area affected by the Eaton Fire.[2]

We do not exhaustively chronicle those headlines here as there is no need to do so; simply Google the term "hydrants run dry" and you will have a hard time finding a story that does not center around the Palisades Fire in the first few pages of your search.

This coverage and the associated unprecedented narratives around water supply management in the early days of a wildfire have had a lingering effect on public and policymaker perceptions regarding the Palisades Fire specifically, and wildfires more broadly. The issue has prompted investigations at both the state and congressional levels.[3]

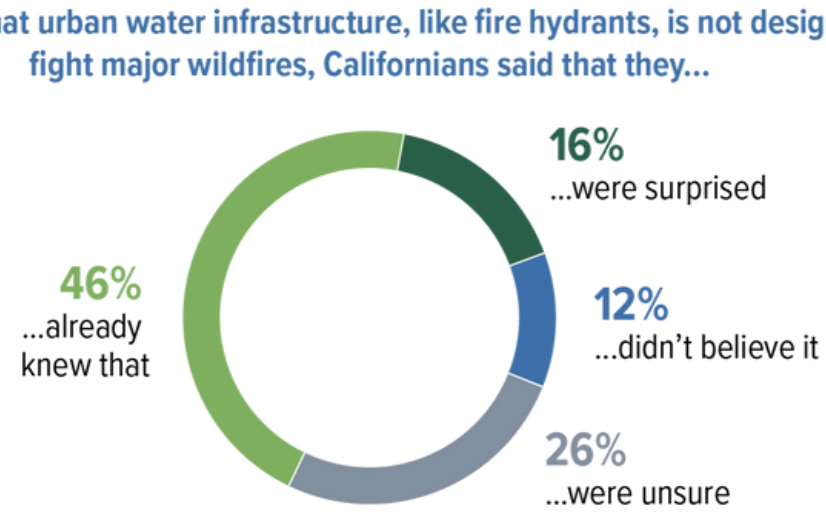
The level of skepticism regarding water system competency in wildfires remains high for both the LA-area and state general publics (see Figure 1 below). Moreover, local, state, and federal policymakers have expressed expectations for more resilient water distribution system infrastructure to fight wildfires.

Figure 1. Local and State Resident Attitudes About Which Factors Contributed Most to 2025 L.A. Wildfires



Source: University of Southern California, LABarometer Wildfire Survey of 2,000 L.A. County adults, conducted February–March 2025

Figure 2. Level of Resident Knowledge About Water Systems' Role in Fighting Wildfires



Source: Probolsky Research survey of 1,000 likely Primary Election voters in California, November 2025

Methodology and Major Takeaways

Given the ways that news headlines have affected public perception, in this brief we set out to document the extent to which "hydrants ran dry" and water systems experienced pressure issues in major wildfires in the last decade in the U.S. West. We look at both recent major wildfires in California as well as Colorado, Oregon, and Hawaii.

We ask and answer the questions:

- Do fire hydrants "run dry" in other major wildfires?
- How often have the hydrants "run dry" in these major wildfires?
- How were these events characterized in media reporting on the fires?

The methodology is simple by design. A list of major U.S. wildfire events was developed based on reported incidents in the past decade and a systematic search was then done for each incident. Structured search terms—*"hydrants ran dry," "hydrant supply," "hydrant pressure loss," "water pressure drop," "negative system pressure," "water system failure,"* and simply *"hydrant"*—were each combined with the fire name in a web search query to identify relevant mentions. Resulting contemporaneous news coverage, incident reporting, after-action reports from utilities and fire agencies, and academic or technical summaries were then reviewed to characterize hydrant performance and system pressurization during each event.

We find that the Palisades Fire is not at all unique among major wildfires in having the "hydrants run dry." This includes a comparison to the Eaton Fire which occurred at the same time in a different part of Los Angeles. Rather, fire hydrant performance in the Palisades seems to represent the rule rather than exception. Hydrants "running dry" simply appears reflective and emblematic of broader water demand and pressure stresses on water supply systems that have also typically occurred in previous wildfires. We explain how this works, including that hydrants themselves are simply reliant on water systems for their supply, in other reports.[4]

The only apparent, factual difference between the Palisades Fire and its recent comparators is that hydrant performance did not necessarily make the headlines of news stories covering the other fires.[5]

While this remains an active area of research for us, some of our other published research and a segment of the media reporting in days and weeks following the fires' onset helps explain the reasons for these differences in the headlines between the Palisades and other recent major fires.[6]

We will also be exploring the information environment which led to a "dry hydrant" narrative and paths forward in a subsequent workshop of our Water Supply + Wildfire Research and Policy Coordination Network, which was formed in early 2025.[7]

A summary of key quotes in media stories on major previous wildfires regarding water system pressure and hydrants is shown in Table 1.

Table 1. Summary of Water System Performance During Urban Wildfires (2017–2025)

Wildfire	Year	Location	Water System Performance
Tubbs	2017	Napa, CA; Sonoma, CA	"…the enormous water demand created in battling the fire led to **negative pressure in some parts of the water system**. This allowed chemicals from the melted plastics to be drawn into the water system and spread." [8]
Thomas	2017-2018	Ventura, CA; Santa Barbara, CA	"The **system lost pressure** because water was being drained at a tremendous rate due to the extent of the firefighting response and leaks at residential properties damaged by the fire." [9]
Camp	2018	Butte, CA	"It is reported that a **negative pressure event** occurred during the fire in the municipal water system, resulting in exposed empty pipes into which toxic smoke and debris was siphoned. The negative pressure was due to the intense consumption of water by firefighting efforts."[10]
Woolsey	2018	Los Angeles, CA; Ventura, CA	"In the hills and canyons of Malibu and Topanga, the Woolsey Fire had strained the limited water delivery system, **draining hydrants and leaving firefighters begging for pressure.**"[11]

Table 1 (cont'd). Summary of Water System Performance During Urban Wildfires (2017–2025)

Wildfire	Year	Location	Water System Performance
Almeda	2020	Jackson, OR; Medford, OR; Phoenix, OR	"As the fight against the Almeda Fire continued into the evening hours on September 8, 2020, firefighters ran into a worst-case scenario: **no water was coming out of the fire hydrants**. "You take the hose off the hydrant, and **you open the hydrant, and nothing comes out."** [12]
Marshall	2021-2022	Boulder, CO	"Both Louisville and Superior experienced significant infrastructure damage, including power loss and **water pressure reductions**… Louisville experienced **low water pressure at hydrants** in use by firefighters." [13]
Dixie	2021	Butte, CA; Lassen, CA; Plumas, CA; Shasta, CA; Tehama, CA	"The Doyle FPD station also has a 27,000-gallon underground water tank for refilling fire engines and water tenders but there is **no central water system for fire hydrants within the community.**" [14]
Lahaina	2023	Maui, HI	"Firefighters **could not find hydrants with enough water pressure**, residents' own hoses were **going dry** as they struggled to keep their homes from burning." [15]
Eaton	2025	Los Angeles, CA	**Fire hydrants are reported "not working," and having "poor water pressure"** due to high demands. "This massive amount of water loss, coupled with damage or electricity loss to some of the area's water system infrastructure, **resulted in a loss of hydrant pressure."** [16]

Fire-by-Fire Results Summary

To expand on the summary table and further support our findings, we briefly outline the facts as publicly reported in each fire below.

We start with the 2017 Tubbs Fire, which was the first documented case in the U.S. where it was widely recognized that a wildfire caused widespread chemical contamination in the water supply distribution system—not just the source water as had been studied for decades prior—after a wildfire. [17]

This case influenced the increased focus on the interaction between water distribution systems and urban wildfires in following events. During the fire, there was a “dramatic drop in pressure due to the excessive demand on the system relative to the available water supply.” [18]

From the 2018 Thomas and Woolsey Fires, similar stories emerged: power failures and overwhelming demand created cascading conditions that left fire hydrants supplying far less water than expected. The power outages during the Thomas Fire left water pumping stations inoperable so water couldn’t reach the hydrants, leading them to lose water pressure. [19]

During the Woolsey Fire, there were localized water outages and low pressure due to system breaks and leaks, leading to the need for backup generators to keep the system operational. [20]

During the 2018 Camp Fire in Northern California and the Almeda Fire in Oregon, there were low or negative pressure events as a result of damage to the distribution system.[21]

The Camp Fire was covered exhaustively and is notorious for having wiped out the town of Paradise, including its water and sanitation systems. But it is local news coverage from the smaller Oregon fires which is most evocative on hydrant performance, without expressing surprise regarding this phenomenon. Despite reporting that "you open the hydrant, and nothing comes out ” this did not make the headlines of stories or cause any reported outrage.[22]

During the Marshall Fire in Colorado several years later, which affected several neighboring water systems, operators even released untreated reservoir water into the distribution system as a measure of last resort to keep hydrants usable long enough for firefighters to slow the fire front.[23]

The decision underscores how fully the system had been overwhelmed by pressure loss.

The 2023 fires in Maui, including in Lahaina, offer another more recent example. Residents attempting to defend homes with garden hoses inadvertently diverted pressure from hydrants. At the same time, collapsed plumbing caused thousands of unintentional leaks which contributed to low pressure systemwide.[24]

A firefighter described that "there was just no water in the hydrants" and the network simply could not keep up once fire began consuming buildings.[25]

Finally, the 2025 Eaton Fire in the Altadena area of Los Angeles occurred at the same time as the Palisades Fire and affected up to eight water supply systems. While media coverage on hydrant performance and pressure issues was scant, a recent "after action report" by the independent Fire Safety Research Institute reads just as easily as if it could be discussing the Palisades Fire as the Eaton Fire. It details fire hydrants across the different system areas in the Eaton burn area "not working," and having "poor water pressure" due to high demands. It also cites "a loss of hydrant pressure. […] Multiple LAC [Los Angeles County] resources experienced impactful water supply issues during different times of the incident." [26]

Caveats and Nuances

It is important to note that there are examples of wildfires where reporting does not include this language regarding hydrant failure, such as the 2021 Dixie Fire. This is not necessarily because hydrants performed better, but because the circumstances were fundamentally different. In more rural areas without few or no hydrants, the primary fire suppression techniques differ. In more urban areas, wildfires can spread through densely built neighborhoods where publicly regulated water supply systems and their supported hydrants exist, so firefighting relies heavily on pressurized infrastructure. In contrast, more rural fires typically burn with limited or no hydrants, requiring reliance on water tenders, natural water sources, aerial equipment, and portable pumps.

In the Dixie Fire, much of the affected area had no hydrants at all. Water came from tenders, creeks, and portable pumps rather than municipal hydrant networks.[27]

The absence of "hydrants ran dry" reporting reflects an absence of hydrants. Similarly, suppression tactics noted for the recent 2025 Lee Fire in Colorado and the 2025 Dragon Bravo Fire in Arizona relied only on wildfire fighting assets typical for a wildland context: engines, crews, water tenders, dozers, aerial resources, and containment lines.[28]

Concluding Thoughts

Urban water supply systems are not designed for and have not been expected or legally required to remain pressurized under extreme wildfire-fighting demand that is combined with widespread infrastructure damage. During large, fast-moving urban wildfire, it follows that they should not be expected to perform beyond their mandated design. We explain reasons for this status quo and potential paths forward extensively in other recent and ongoing research.[29]

This current reality, which the Palisades Fire is only one non-exceptional example of, is affirmed by the consistent phrasing used which we observe across reporting on other major wildfires from “low pressure” to “system failures” to “hydrants unable to supply water.”

These patterns suggest, absent dramatic changes in our infrastructure and management, that future wildfires will continue producing similar or worse accounts. The phenomenon of “hydrants running dry” and other water supply challenges is not a rare anomaly, but rather, an expected operating condition because of a mismatch between extreme fire behavior and urban water system design and capabilities.

Given this reality, we suggest that better questions than “why did the hydrants run dry?” include:

- Where should we invest in more wildfire resilience, and where do water systems fit in?
- What, if anything, we can do about this mismatch that perpetuates across water systems and events, especially as urban wildfires become more frequent and destructive?
- How can we pay for whatever resilience measures we implement?

It makes more sense, in light of the evidence here and now in many other places, to ask the questions that matter rather than continue to act, whether in good faith or ill, like hydrants running dry is a unique and easily fixable problem. We continue to explore better solutions in this space through our research and policy coordination network and welcome more constructive thinking and action from others.

Endnotes

[1] For any questions, please contact Greg Pierce at: gpierce@luskin.ucla.edu. We also thank Lauren Dunlap and Jason Islas for editorial and design assistance.

[2] For more on which systems were affected in Los Angeles, see Greg Pierce et. al., *How have the LA Fires affected water systems in LA County?* Luskin Center for Innovation, May 2025.

[3] California Environmental Protection Agency et al., *Palisades Fire and Water Supply Analysis*, November 20, 2025.

[4] Luskin Center for Innovation, "Do Urban Water Supply Systems Put Out Wildfires?" 2025.

[5] To underline this point, Palisades is not the only fire where not all available, major supply sources were unavailable due to other considerations for water supply storage. For instance, in the Tubbs Fire, "Two of the 10 tanks were not fully operational on the first night of the fire. One of those tanks, a 500,000-gallon reservoir located near the top of Fountaingrove Parkway, was undergoing seismic repairs at the time." See Kevin McCallum, "Santa Rosa stumped by hilltop water system overwhelmed in Tubbs fire," *The Press Democrat*, July 21, 2018.

[6] See Gregory Pierce, Edith de Guzman, and Megan Mullin, "Redefining Expectations for Urban Water Supply Systems to Fight Wildfires," *Nature Water*, 2025, 1–3, https://doi.org/10.1038/s44221-025-00405-y and Melissa Goldin and Brittany Peterson, "For LA water issues, misinformation spreads nearly as fast as the wildfires," *AP News*, January 15, 2025.

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[8] Matt Weiser, "After Deadly Wildfire, a New Problem for Santa Rosa: Contaminated Water," *The New Humanitarian*, April 3, 2018.

[9] City of Ventura, *Thomas Fire Emergency Operations Center After Action Review*, December 4, 2017.

[10] Plastics Pipe Institute, *Investigation of Benzene in Drinking Water Following the "Camp Fire" in Paradise, CA*, 2020.

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[12] Josh Shelton, "FireWatch: When the wells ran dry on the day of the Almeda Fire," *KDRV NewsWatch 12*, September 8, 2021.

[13] Corona Environmental Consulting LLC, *City of Louisville: Marshall Fire Water System Recovery Summary Report*, February 3, 2025.

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[15] Robert B. Sowby and Braxton W. Porter, "Water Supply and Firefighting: Early Lessons from the 2023 Maui Fires," Water 16, no. 4 (2024): 600, https://doi.org/10.3390/w16040600.

Endnotes

[16] Steve Kerber et. al., *Southern California Fires Timeline Report*, UL Research Institutes and Fire Safety Research Institute, November 20, 2025.

[17] Jodi Helmer, "Wildfires Can Spark Widespread Contamination of Public Water Supplies," *NRDC*, October 22, 2020.

[18] City of Santa Rosa, *Post-Fire Water Quality Investigation: Analysis of Cause of Water Contamination*, March 22, 2018.

[19] Sarah Parvini and Dakota Smith, "Some fire hydrants didn't work because of power outages, firefighters say," *Los Angeles Times*, December 5, 2017.

[20] County of Los Angeles, *After Action Review of the Woolsey Fire Incident*, November 17, 2019.

[21] Plastics Pipe Institute, *Investigation of Benzene in Drinking Water Following the "Camp Fire" in Paradise, CA*, 2020 and Faith Kerns, "Wildfire is a growing threat to the West's water systems," HighCountryNews, August 19, 2025.

[22] Josh Shelton, "FireWatch: When the wells ran dry on the day of the Almeda Fire," *KDRV NewsWatch 12*, September 8, 2021.

[23] Corona Environmental Consulting LLC, *City of Louisville: Marshall Fire Water System Recovery Summary Report*, February 3, 2025.

[24] Robert B. Sowby and Braxton W. Porter, "Water Supply and Firefighting: Early Lessons from the 2023 Maui Fires," *Water* 16, no. 4 (2024): 600, https://doi.org/10.3390/w16040600.

[25] Mike Baker et. al., "As Inferno Grew, Lahaina's Water System Collapsed," *New York Times*, August 13, 2023.

[26] Steve Kerber et. al., *Southern California Fires Timeline Report*, UL Research Institutes and Fire Safety Research Institute, November 20, 2025.

[27] Lassen County Fire Protection Districts, *MSR and SOI June 2020*, June 2020.

[28] IcniWeb, "Lee Fire Update Friday August 29 2025 08 29 2025" and Faith Kerns, "Wildfire is a growing threat to the West's water systems," *HighCountryNews*, August 19, 2025.

[29] See Gregory Pierce et. al., "Redefining Expectations for Urban Water Supply Systems to Fight Wildfires," Nature Water, 2025, 1–3, https://doi.org/10.1038/s44221-025-00405-y; Luskin Center for Innovation, "Do Urban Water Supply Systems Put Out Wildfires?" 2025.; Erik Porse et. al., "Adapting urban water supply infrastructure and policies for wildfire in the 21st century," *Environmental Research Letters* 20, no.12, https://iopscience.iop.org/article/10.1088/1748-9326/ae1a9a; University of California Agriculture and Natural Resources, "Water Systems and Wildfire: Understanding Capacities and Limitations," September 29, 2025 (full report forthcoming January 2026).