UCLA Luskin Center for Innovation
UCLA Latino Policy & Politics Institute

Do Urban Water Supply Systems Put Out Wildfires?

FREQUENTLY ASKED QUESTIONS

WHY DID WE WRITE THIS GUIDE?

The January 2025 wildfires devastated Los Angeles, claiming lives, homes, jobs, and whole communities. As the fires raged, discussions erupted across social and mainstream media, questioning whether water supply systems could have been more prepared to fight the fires. This FAQ provides clear, accurate answers to the most common questions we heard from the public, media, and policymakers about fire hydrants, firefighting, water infrastructure, and more. Our goal is to offer a better understanding of how water systems work, address common concerns, and provide useful information that can help communities stay informed and prepared, and advocate for change. We seek to answer these questions in ongoing research, as they have not been well studied and explained in clear language. Feel free to contact us with additional questions that we can help answer.

SECTION 1

UNDERSTANDING WILDFIRES AND URBAN WATER SYSTEMS

What are wildfires, and how are they different from urban fires? Q

A

Takeaway: Wildfires are unplanned fires that burn vegetation. They become urban wildfires when they also burn homes and other structures.

Wildfires — unplanned fires that burn vegetation in open lands — are a natural part of many ecosystems. In fact, many types of ecosystems depend on fire to regrow vegetation, protect against disease, reduce competition among plant species, and more. Areas throughout California are naturally fire-prone just as many are in earthquake zones.

Increasingly, wildfires are moving into urbanized areas, as people have increasingly moved into high wildfire-risk areas. Ultimately, many wildfires become **urban wildfires** because homes and other structures themselves turn into fuel for the fire. These are different from typical urban fires that involve just a few buildings or structures and are much easier to put out.

What are urban water systems, and how do I know if I am served by one? Q

A

Takeaway: Urban water systems are agencies responsible for supplying high-quality, affordable water in urban areas. In LA, you can tell if one serves you using this tool.

Urban water systems are agencies that supply water to homes, businesses, schools, and other customers in or near cities, including for everyday firefighting. They do this

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by securing a water source, treating this water, and then distributing this water to users through a complex series of pipes and other plumbing. Their core responsibility is to provide a sufficient supply of high-quality water at an affordable price, meeting essential needs for drinking, cooking, bathing, and more. There are about 200 urban water systems in Los Angeles County alone, and they range in size, shape, and complexity. A system can serve from 25 people in a mobile home park to the 4 million served by the Los Angeles Department of Water and Power.

Urban water systems are owned by different types of organizations — public, private, and mixed — and are only physically connected to each other at one or a handful of points (called **interties**). Not everyone living in an urban area is served by an urban water system. For instance, some residents in Los Angeles are not served by water systems but rather rely on a private well for water. You can tell by typing your address into this mapping tool.

Q Who is involved in helping put out wildfires in my area?

A

Takeaway: Fire departments coordinate firefighting efforts, which can include firefighters from across the state, country, and beyond. Urban water systems' only role is providing water.

Local urban fire agencies, often called fire departments, organize firefighting efforts. Fire departments are usually run by local governments (cities or counties) or quasi-governmental agencies known as "special districts." They employ firefighting personnel, vehicles (both ground and air), and specialized equipment stationed throughout urban areas ready for deployment in the event of an urban fire.

Urban firefighting agencies are not designed to fight wildfires on their own. The role of urban water systems in firefighting is to provide a supply of water to firefighters through their pipes, tanks, hydrants, and other infrastructure. Urban firefighting is designed to fight fires in single or multiple connected dwellings using on-the-ground resources such as fire hydrants and firetrucks. These systems are not designed to fight large-scale wildfires involving entire blocks or neighborhoods. Government agencies such as the California Department of Forestry and Fire Protection (CAL FIRE) or the U.S. Forest Service are designed to fight wildfires using both on-the-ground and aerial methods such as dropping water and fire retardant from airplanes. In the event of a severe urban or wildfire, firefighters from neighboring agencies and across the state, country, and even other countries may join the effort.

ADDITIONAL RESOURCES

- U.S. Department of Agriculture: General wildfire information and resources
- Ready.gov: Wildfire preparedness information
- UC Agriculture and Natural Resources: Fire resources and information
- CAL FIRE: Wildfire information/tracking and partnering agencies
- Los Angeles Fire Department: Website
- Los Angeles County Fire Department: Website
- UCLA Luskin Center for Innovation: Los Angeles County Water Systems Governance Map
- UCLA Latino Policy and Politics Institute: Community resources

SECTION 2

THE RELATIONSHIP BETWEEN WATER SUPPLY AND FIREFIGHTING

Are urban water systems designed to fight wildfires? Q

A

Takeaway: No, they are not — they must provide a water supply that meets fire flow requirements. While some provide additional capacity, there is no requirement to do so.

Urban water supply systems are not designed to fight large wildfires or large-scale fires that start in wildland areas and spread to urban areas. They have not been expected to do so in the past, but these systems have gotten more attention recently as wildfires have affected urban areas more frequently. The expectation for urban water systems is to provide enough water to fight smaller-scale urban structural fires that are not fueled by wildland vegetation.

A key concept in firefighting water supply is **fire flow** — the amount of water a system is expected by regulators to provide to fight urban fires. The piped water infrastructure of the urban system is engineered to be sufficiently **pressurized** to ensure adequate fire flow for urban firefighting. Pressurization is achieved either by gravity (for example, using elevated reservoirs that push water downward) or electric pumps that push water through the system.

In some fire-prone areas, urban water supply systems may provide some additional capacity to fight wildfires, but the role of this water supply is usually limited. There are no government-mandated guidelines for urban water systems to provide large-scale wildfire support.

Where do firefighters get water during a wildfire in an urban area? Q

A

Takeaway: Firefighters get water primarily from nearby urban water systems (usually via hydrants). They may supplement from other sources, but they very rarely have a separate supply network to draw from.

Firefighters primarily rely on urban water systems in the immediate area during a wildfire. They typically draw from **fire hydrants**, which connect directly to underground water pipelines. In some cases, they may also access nearby open-air reservoirs, water tanks, or interties with neighboring water systems, though these options are not always available.

In nearly all cases, firefighters *do not have a separate water supply network* to draw from. Where hydrants may not be accessible, they may bring their own supply via **water tenders:** large trucks that transport water to fire sites. When water pressure runs low, firefighters may *draw from alternative sources*, such as swimming pools or emergency tanker trucks delivering water from parts of the system with more pressure. **Aerial firefighting efforts** may pull water from lakes, reservoirs, or even the ocean, depending on the fire's location and available resources. All of these methods may also rely on the use of fire retardants in addition to water.

How important is water supply in fighting active wildfires? Q

A

Takeaway: Water is one component of a larger firefighting toolbox, and while it is important, firefighting depends heavily on fire departments' capacity to fight fire.

We all understand that water can help put out fires, whether it's a small campfire or a large wildfire. And while water provided by urban water systems is used to fight wildfires, firefighting uses a variety of methods.

Active fighting of wildfires depends heavily on the capacity of fire departments' person-power, equipment, and supplies, as well as weather conditions that enable them to use equipment safely (especially by air, which may be particularly affected by winds). The importance of water supply should thus be considered relative to the entire toolbox of ways to fight urbanized wildfires, including managing wildland areas, making homes more fire-safe, and investing more in firefighting forces to provide enough people and resources to deploy a variety of techniques, including building fire lines.

Could we ever store enough water to stop urban wildfires completely? Q

A

Takeaway: No — no urban water system could provide enough water to stop the largest and most extreme of wildfires (like the January 2025 LA fires). Stopping fires of this magnitude requires thinking beyond water.

No. Most wildfires barely make the news because firefighting efforts are successful in controlling the vast majority of fires. However, in the case of fires like the January 2025 LA fires, no urban water system can be expected to be able to give firefighters full control. All experts with experience in urban water systems or wildfire fighting have said it is likely that no amount of water or any urban water system currently existing in the world could have stopped the fires completely, particularly under the high wind conditions early on in the firefight. We can increase the capacity of our urban water systems to better fight wildfires, and every bit of water can potentially help limit or slow the spread of a wildfire. But we cannot rely too heavily or exclusively on urban water systems to put out wildfires in the future.

Was water being withheld during LA's wildfires? Q

A

Takeaway: No — urban water systems consistently do everything in their power to support wildfire fighting efforts, going beyond their mandates and capacity.

No. There is no evidence of water supply being withheld by urban water systems (or other government agencies or politicians) during wildfire fighting efforts. All urban water systems work to have as much supply capacity as they can, including for fighting fires. But water systems also need to meet other societal goals and mandates, including ensuring that all water is healthy to drink and affordable and managing use when water is scarce. They also have to weigh the risk of what might be a once-in-a-lifetime event against the major cost of preparing for it. For example, the Santa Ynez Reservoir did not have water in it during the January 2025 LA fires because a cover that protects the water from local pollution and helps to ensure the water is safe to drink was being repaired.

During a wildfire, urban water systems do their best to put all available resources to work supporting firefighting efforts, with employees putting themselves at physical risk to maintain or repair systems. These costly, time-intensive efforts go beyond written expectations and regulations and often go uncompensated and under-recognized.

ADDITIONAL RESOURCES

- UCLA Luskin Center for Innovation report: "Wildfire and Water Supply in California: Advancing a Research and Policy Agenda" (Pierce, Roquemore, and Kearns, 2021)
- *Water* journal article: "Water Supply and Firefighting: Early Lessons from the 2023 Maui Fires" (Sowby and Porter, 2024)

SECTION 3

ALL ABOUT FIRE HYDRANTS

How do fire hydrants work? Q

A

Takeaway: Fire hydrants allow firefighters to draw water from the water system's underground infrastructure; they do not have their own water supply.

Fire hydrants draw on the water supply from the rest of the urban water system infrastructure underground. They do not contain their own water and very rarely draw on separate supplies of water. Public fire hydrants are located at the end of the physical line of the urban water system, usually just before underground water pipes connect the public system to pipes on private property. During a fire, firefighters bring fire hoses to the site of the fire, manually unscrew the fire hydrant outlet, and then connect a hose to the hydrant. The hose can then spray water onto the fires.

Why do we have fire hydrants? Q

A

Takeaway: Fire hydrants provide much more water per second than any other part of the urban water system, allowing a fire to be put out more quickly.

Fire hydrants are specifically designed and maintained to provide fire flow for urban fires, but not for wildfires. Fire flow means the water supply comes out at a much higher pressure (more water at a higher speed) than you get from a tap at home. In other words, they provide a lot more water more quickly than any other part of the urban water system, enabling firefighters to put out fires more quickly.

Are fire hydrants available everywhere? Can my neighborhood get more fire hydrants to be better prepared? Q

A

Takeaway: Fire hydrants are typically only available within the territory of an urban water system. Private hydrants can be installed by permit but must use a private water supply.

No. Urban water systems place fire hydrants throughout their service territory in the public right-of-way, typically on sidewalks, to support firefighting efforts. You will see them on nearly every block in a typical residential or commercial neighborhood. They are usually located at regular intervals throughout the system, but the location also varies depending on how many buildings or people there are in the area, the pressure of the system, the importance of certain buildings or facilities, as well as the requests of firefighters.

There generally are no fire hydrants placed outside areas that urban water systems serve. As an individual, you can obtain a government permit to construct and provide your own water supply to a fire hydrant on private property. If you are not served by an urban water system, you are responsible for providing your own water supply, power, and infrastructure — including fire hydrants — to help fight fires.

Why did some fire hydrants run out of water when we needed them most? | Q

A

Takeaway: When fire hydrants have low water pressure, it is likely because many people are using water at the same time to protect property, damaged pipes are leaking water, and/or electric power service is interrupted.

Fire hydrants rarely "run out of water." The water used from hydrants during urban fires is the same as your drinking water supply. Building codes can be used to ensure that fire hydrants supply water when and where it is needed. For example, LA codes specify hydrant type, spacing, pressure, and connections. LA County codes are similar. However, during wildfires, fire hydrants do often start to flow at less-than-ideal rates. This happens when parts of the urban water system supporting them either have much higher demands on parts of the local water supply system than normal, have to draw on more distant water supplies, fail to maintain sufficient pressure to provide supply for desired fire flow, or a combination of these factors.

A lot of the strain on fire hydrants during wildfires is due to residents in the area leaving on hoses or sprinklers (automatic roof sprinklers are increasingly required for insurance purposes) or even operating their own fire hydrants to try to protect their property. While this is understandable, the high simultaneous use of water places extreme strain on urban water systems, particularly in areas where water must be pumped uphill — as is the case in mountain or canyon areas.

An additional strain can come from pipes damaged by the fire, which can leak water heavily, reducing flow and pressure for other parts of the system. Electric power service to maintain pressure is also often compromised during wildfires, and urban water systems are forced to rely on backup generators (or, less commonly, batteries) for limited power in key parts of the system.

ADDITIONAL RESOURCES

- KDRV News: FireWatch: When the wells ran dry on the day of the Alameda Fire (Shelton, 2021)
- National Fire Protection Association (NFPA): Fire Hydrants and Water Flow
- U.S. Fire Administration: Water Supply Systems and Evaluation Methods (See Chapter 3)

SECTION 4

PROVIDING WATER SUPPLY IN TOUGH TERRAIN

How quickly can we move water to where a wildfire is? Q

A

Takeaway: When water is above or level with a fire, it can get to the fire quickly. But when water is below a fire, it is slower and more difficult to transport, making faraway water sources irrelevant.

It depends. Water is heavy and hard to move. The terrain of the wildfire and the location of a system's water supply relative to the fire both affect how quickly we can move water to a wildfire. If there is water supply directly uphill from (or above) the location of a wildfire, systems use gravity to quickly move water through their pipes to hydrants where it is needed. If the area impacted by a wildfire is flat, we can also move water quickly using pressure and power supply to maintain supply and pressure for firefighting efforts.

But water is very difficult to move uphill or over significant distances, especially in steep or mountainous terrain where urban wildfires often originate. To move water uphill requires high pressure and substantial electric power. Water also moves upward more slowly, so it can't come from as far away in time to fight a wildfire. This means that having water supply in the general region of a fire rather than in hyperlocal proximity can be insufficient to fight specific wildfires, especially in the crucial early stages.

Is it more difficult to fight a wildfire with water in hilly and mountainous terrain? Q

A

Takeaway: Yes, it is more difficult because water must be pumped uphill — particularly where there is limited or no natural water supply.

Yes, it is much more difficult to fight a wildfire with water in populated areas with hilly and mountainous terrain — the environments where all of the January 2025 LA fires originated, and most of the firefighting occurred. This is especially true if (as in the case of the LA fires) the area does not have an abundant natural water supply (lakes, rivers, or groundwater). It is also difficult terrain in which to store and maintain water in artificial reservoirs. In other words, all water has to be pumped uphill. And as we explain above, moving water uphill quickly in wildfire events becomes more difficult due to very high demand and damage to water and power infrastructure.

ADDITIONAL RESOURCES

- *The New York Times* interactive news article: Wildfires Are Revealing the Limits of Our Hydrant Systems (Smith, Weingart, and Kim, 2025)
- *Water* journal article: "Water Supply and Firefighting: Early Lessons from the 2023 Maui Fires" (Sowby and Porter, 2024)
- *AWWA Water Science* journal article: "The Marshall Fire: Scientific and policy needs for water system disaster response" (Whelton et al., 2023)

SECTION 5

IMPROVING WATER SUPPLY SYSTEMS FOR WILDFIRE RESPONSE

What can be done to improve water systems so they help fight wildfires? Q

A

Takeaway: Better public infrastructure or private investments could help water systems provide adequate fire flow. However, other interventions are needed, as no amount of water can stop large-scale wildfires.

Better-designed and equipped water systems can help us fight wildfires more effectively. With sufficient funding, water systems could increase local water supply (more water overall to fight fires), water infrastructure (tanks, hydrants, generators, shutoff valves, etc.), and power supply and infrastructure to maintain water pressure (generators, batteries, etc.) to improve their firefighting capabilities. Policymakers could require or support private property owners to make investments — such as roof sprinkler systems, prefilled tanks, and private hydrants — to help fight fires without harming public supply systems' functioning during fire events. However, there are cost, safety, and health tradeoffs with each of these measures that also need to be considered. Researchers and policymakers need to study all of these technologies to enable better preparations.

At the same time, there are few, if any, cheap and easy answers to make water systems more effective in fighting fires. And at the end of the day, no amount of water supply can prevent or end the scale of the January 2025 LA fires, and we have to consider the full range of fire preparedness measures that can help us avoid future tragedies of this sort. This includes not only upgrades to urban water systems, but practices such as home hardening, defensible space, and other measures to make developed areas more fire-ready.

How much should we invest in greater urban water system capacity to fight wildfires? Q

A

Takeaway: Investing heavily in water systems' ability to help fight fires may not be as cost-effective or impactful as investments in other preparedness measures. Funds need to be balanced strategically among all the tools in the firefighting toolbox.

Enabling water supply systems to help better fight fires would be expensive, and the cost-effectiveness of this strategy has to be considered. We can't pay for more of everything. We need to weigh the value of water supply compared to the entire toolbox of ways to fight urban wildfires. The toolbox extends far beyond water to managing wildland areas, making homes more fire-safe, and investing more in firefighting forces. Water systems in fire-prone areas need to coordinate with local, state, and national firefighting agencies to identify fire risks and possible firefighting strategies for meeting those needs.

Who would have to pay for better wildfire protection in my community? Q

A

Takeaway: Funds for better wildfire protection may not inherently come from those who will benefit from protection. It's necessary to have hard conversations and make tough choices to ensure that the financial burden is distributed equitably.

Expanding water supply, equipment, and personnel to better combat wildfires requires significant investment, which may not always align with when and where fires break out. Given the complexities of government funding, there is also a risk that costs may be passed on to those who receive little direct benefit. It is crucial to ensure that the financial burden is distributed equitably, considering the ability to pay and the different protection needs of those paying.

Could someone hack or sabotage the water system during a wildfire? Q

A

Takeaway: Urban water systems are not easily sabotaged due to underground infrastructure, components requiring manual operation, and heightened vigilance during fires.

Very few of the firefighting-related parts of urban water system infrastructure can be hacked or sabotaged remotely. Most urban water system infrastructure is underground, most components require manual operation to change how they work, and operating fire hydrants requires considerable manual work by firefighters.

Individuals could conceivably try to come to an active fire site and physically sabotage parts of the water system, but damaging infrastructure would typically require specialized equipment. Firefighting scenes are often chaotic, but if firefighters and law enforcement in the area become aware of intruders, they stop them, as in the case of firefighting impersonators in the January 2025 LA fires. In the future, if we look to make urban water systems more automated for firefighting purposes, this may increase the risk of hacking or sabotage (although it is still low, given the vigilance maintained during these events).

Beyond fighting fires in the moment, how can we help limit urban wildfires for future generations? Q

A

Takeaway: We can limit future wildfires by preventing further climate change — a major driver of increasingly frequent and intense wildfires.

Climate change is intensifying the risk of urban wildfires worldwide. Rising temperatures and prolonged droughts combined with strong winds — especially in regions like coastal California — are creating conditions for more frequent and severe fires. Anything we can do to help prevent further climate change will, in turn, help prevent or limit future urban wildfires.

ADDITIONAL RESOURCES

- *Global Change Biology* journal article: Increasing Hydroclimatic Whiplash Can Amplify Wildfire Risk in a Warming Climate (Swain et al., 2025)
- *PNAS* journal article: Impact of anthropogenic climate change on wildfire across western US forests (Abatzoglou and Williams, 2016)
- *Earth's Future* journal article: Observed Impacts of Anthropogenic Climate Change on Wildfire in California (Williams et al., 2019)

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