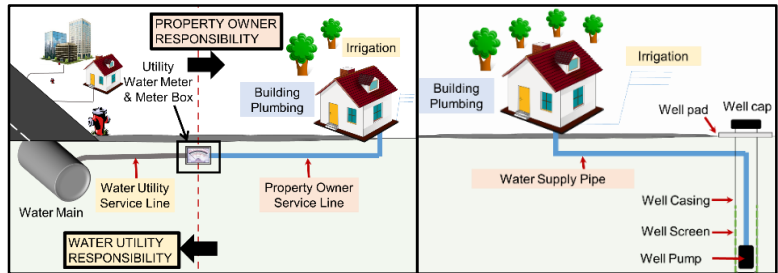


After a Wildfire:

Water Safety Considerations Inside Buildings



Damage and Chemical Water Contamination Caused by Wildfires

Wildfires can directly contaminate water systems that deliver water to buildings as well as the building's own plumbing. This can pose an immediate health and safety risk to water users. Drinking water can become chemically contaminated, sometimes exceeding hazardous waste limits. Boiling the water will **NOT** protect users from the chemical contamination and may increase chemical exposure. An inspection of property and building water system components is needed before trying to use the water. If a water utility delivers water to the property, the utility system may also be damaged including the service line and water meter. Water utilities should initiate rapid inspections, testing, and inform you of the results. Private wells should also be inspected and tested.

Signs of contamination can include the loss of water pressure, discolored water, heat damage to water systems inside and outside buildings; broken, melted, and leaking pipes, valves, tanks, water meters, irrigation system components, and yard hydrants. Heat damage to the building structure may indicate plumbing damage. Chemical contamination can occur due to the water system and the heating or burning of the water system materials themselves, including plastics. If the water system lost pressure, microorganisms and chemicals can enter the system.

Persons impacted by wildfire should seek specific advice from their local health department.

A Water System Damage Inspection Should Be Conducted and Include:

- The water meter box.
- The irrigation system.
- Above ground piping or structures, including outdoor spigots.
- The point of entry, where the water supply line enters the building.
- The whole building water treatment system, if one exists.
- The plumbing pipes inside the building.
- The water heater.
- The tubing that connects the fixtures to the plumbing.
- The fixtures like faucets, showerheads, toilets, etc.
- Point of use water treatment systems on faucets, showerheads, and under sinks
- Appliances such as dishwasher, washing machine, dryer, humidifier, HVAC furnace, etc.
- Wiring and electrical components.
- Evidence of melted plastic components.
- Briefly turning on an exterior faucet to see if water is not flowing or you hear air escaping from the system. This may indicate pressure loss.
- Fire sprinkler system. Also, pay attention to any ash, soot, or wildfire debris near the water system, whether this has entered any part of the water system, and any other damage related to the fire.

Repairs should be completed by a licensed and bonded contractor with plumbing expertise. The contractor should follow appropriate protocols for repressurizing the system, avoiding backflow or cross-connections, disinfecting the water lines, and confirming the quality of water by certified testing before putting the system back online.

Using Water

Use a different water source, such as bottled water, until water testing proves the water is safe for all uses. The installation of external water tanks with periodic deliveries is sometimes preferred, but this requires confirming that the indoor plumbing is not contaminated. If the source of the contamination can be determined, isolate it. If the

water system needs to be flushed, contain the runoff if possible. You can also direct it to avoid erosion and minimize spreading contamination. Before using the water, verify that there is no microbiological or chemical contamination.

If the building uses a septic tank, care must be taken not to flood the septic system with flushing water. This can irreparably damage the septic system requiring repair or replacement.

What Should the Water Be Tested For and Where?

- Volatile organic compounds or VOCs such as US EPA Method 524.2. The methods used should include chemicals found in past wildfires: Acetone, benzene, chlorobenzene, ethyl benzene, ethyl-*tert*-butyl ether (ETBE), methylene chloride, methyl ethyl ketone (MEK), methyl-*tert*-butyl ether (MTBE), naphthalene, styrene, tetrahydrofuran (THF), *tert*-butyl alcohol (TBA), toluene, vinyl chloride monomer (VCM), and total xylenes. Laboratories should also examine the water for other chemicals listed in the method.
- Semi-volatile organic compounds or SVOCs such as SW-845 US EPA Method 8270E.
- Consider coliform bacteria, but this may or may not be necessary.
- At a minimum, water samples should be representative of the 1) property service line, 2) indoor cold water piping system, and 3) and indoor hot water piping system. Hot water does not flow through cold water pipes. The number of locations to test depends on building size, plumbing layout (e.g., manifold), and other factors.

Before sampling, the water **MUST** stagnate or be still. This allows chemicals to leach from damaged plumbing into the water. If the stagnation time is not long enough, the laboratory will be unable to detect contamination. Proper sampling procedures and equipment are necessary. 72 hours was the Tubbs Fire and Camp Fire stagnation period.

Using Your Water While You Wait for Test Results

Avoid drawing the potentially contaminated water into the building until you are certain it is not contaminated. If contamination is present, water use may contaminate plumbing. "Certified" in-home water treatment devices are not designed to make water with heavy or even hazardous waste levels of contamination safe to drink. Knowing the range of chemicals present and their concentrations is critical to deciding if the water can be treated. Devices must be installed properly. When in-building water treatment devices have been used for utility drinking water compliance purposes, periodic (i.e., monthly) chemical testing has been recommended by state agencies to determine that they are operating as expected.

What Laboratory Should I Use?

Contact the health department for a list of approved water testing laboratories. Laboratories typically provide results within 3 to 14 days, although faster turnaround times increase cost.

What Do I Do If I Have No Water?

If you have a usable drinking water storage tank, safe drinking water can be hauled to the property by a licensed vendor. This water however **MUST** be tested to determine if it is safe. Contact the health department for the list of approved vendors.

Acknowledgement and Resources

Persons impacted by wildfire should seek specific advice from their local health department as they have direct experience about the situation and health threats in their community. This work was partially supported by US EPA grant R836890 and Purdue University. As more information about wildfire caused contamination becomes available this guidance may be revised. Additional resources include:

- Wildfire caused widespread drinking water distribution network contamination, 2020, <https://doi.org/10.1002/aws2.1183>
- Drinking water contamination from the thermal degradation of plastics: implications for wildfire and structure fire response, 2020, <https://doi.org/10.1039/D0EW00836B>
- Water safety attitudes, risk perception, experiences, and education for households impacted by the 2018 Camp Fire, California, 2021, <https://doi.org/10.1007/s11069-021-04714-9>