

State of California Department of Insurance
ATTN: Smoke Claims and Fire Damage Task Group
300 South Spring Street, Los Angeles, CA 90013

October 16, 2025

Dear Deputy Commissioner Cignarale and Commissioner Lara,

Thank you for the opportunity to share our field experiences and research discoveries with the Smoke Claims and Fire Remediation Task Force on October 13. We have included a [link](#) to our presentation PDF. Since the Task Force's inception, we have hoped that rapid, evidence-based recommendations could be developed and shared to reduce the uncertainty faced by property owners and insurance companies as they work to restore smoke- and fire-contaminated buildings. A brief summary of the information we provided is included below.

In August 2025, we created and shared a technical document addressing building environmental testing after fires:

After the Wildfire: Considerations for Building Environmental Testing (September 9, 2025). Part of the *Resilience to Emergencies and Disasters (RED) Series*, Purdue University, West Lafayette, Indiana. Prepared by Whelton, A.J., Bollens, E., and Ferrarezzi, C.G. DOI: [10.5703/1288284317911](https://doi.org/10.5703/1288284317911).

This document was developed from years of experience and direct interactions with households affected by the Eaton Fire, Palisades Fire, and other events, as well as reviews of hundreds of home testing reports provided by building owners. Prior to its public release, the document underwent peer review by our scientific and engineering colleagues. It represents part of our broader effort to establish evidence-based decision-making for post-fire building environmental testing — a need not currently met by existing industry practices, academic literature, or publicly available guidance.

As emphasized during the meeting, our firsthand experience shows that contractors working in the Eaton and Palisades Fire areas have adopted widely divergent testing and remediation approaches. Many, despite explicit [guidance](#) from local public health authorities regarding specific contaminants of concern, have chosen not to test for lead or asbestos — focusing instead only on combustion byproducts such as ash, soot, and char. This disconnect between identified public health threats and the actions taken to restore buildings highlights the urgent need for testing and remediation decisions to be firmly grounded in guidance from public health

authorities and established knowledge of hazards from prior urban and wildland fires. Further, as we all recognize, combustion byproducts have no health based regulatory standards – thus their testing has little value to understanding what level of worker safety is needed to conduct building sampling and remediation. Additional observations and recommendations are included in our technical document.

Finally, based on our studies and direct interactions with hundreds of residents and property owners, we have found that insurance companies are not consistently covering critical aspects of fire recovery, including:

1. Thorough, science-based **environmental testing**,
2. **Remediation** of non-structural contamination and impacts, and
3. **Loss of use** for properties that remain unsafe or unrepaired.

As a result, **residents and businesses are often forced to either risk their health and the health of their employees by returning to contaminated spaces without proper clearance or to incur significant personal expenses to make their properties habitable.** These gaps disproportionately affect vulnerable populations, including children, the elderly, and individuals with disabilities, and impose severe financial strain on those with limited resources. Without consistent standards and insurance coverage, communities may face long-term consequences, including declining property values, reduced financial security, and perceptions of these communities as unsafe.

We appreciate the Department of Insurance’s leadership and commitment to advancing science-based recovery standards. As our research continues, we will share new findings and lessons learned with the Task Force and the public to support informed, equitable, and health-protective recovery practices.

Sincerely,

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9-9-2025

After a Wildfire: Considerations for Building Environmental Testing

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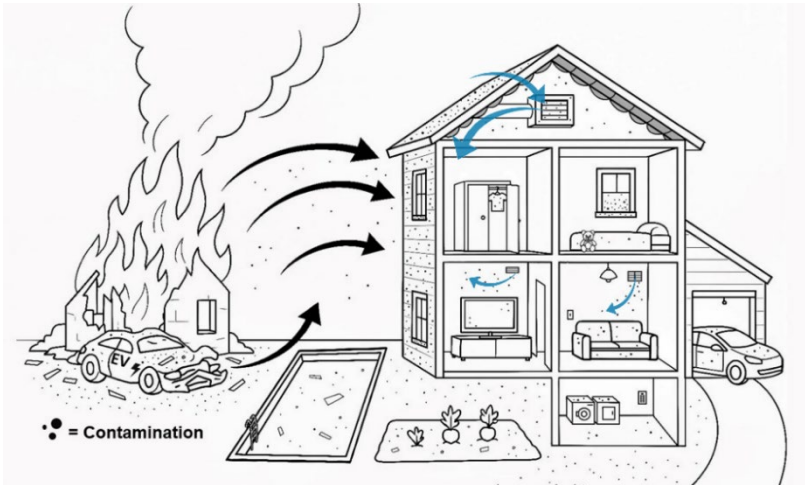
Recommended Citation

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After a Wildfire:

Considerations for Building Environmental Testing



Overview

1. Damage & building contamination
2. What & where are the contaminants?
3. Role of sampling & testing in restoration, damage identification, and remediation
4. Sampling & testing is conducted to understand the damage
5. Who should conduct testing & what is their scope?
6. What should be tested for & where?
7. FAQs
8. Remediation & post-remediation
9. Acknowledgement & additional information

1. Damage and Building Contamination

Wildfires can directly and indirectly make buildings unsafe by introducing physical, chemical, and microbiological pollutants. These pollutants can pose an immediate and long-term [health](#) and safety risks to building users. Particles, gases, and vapors are often released and created from burning structures, vehicles, and other items. Microorganisms can grow due to the presence of water due to pipe breaks and leaks, fire-fighting activities, local climate, and other conditions. Before entering a fire-impacted building, proper inspection and testing are highly recommended.

Signs of contamination being present can include broken and melted building components and systems, dust, debris, ash, and soot deposits on floors, walls, ceilings, personal items, inside HVAC components, corroded metals, electrical system malfunctions, and discolored interior and exterior walls. Indirect damage indicators can be odors and illness symptoms. Not all damage may be visible (i.e., in wall cavities, attics, drywall, personal items).

Persons impacted by wildfire should seek advice from their health department and competent professionals. The property should not be entered without proper safety equipment and protocols to protect against hazards and spreading contamination to their vehicles, other residences, and other people.

Following A Structural Assessment, A Building Inspection Should Be Conducted and Include:

- The building exterior
- Natural gas system
- The garage, attic, crawlspace
- The heating ventilation and air conditioning (HVAC) units and associated components
- All ceilings, walls, floors, shelves in every room, including hallways and closets
- Electrical system including the breaker box, wiring, and electrical components (i.e., switches, outlets).
- Personal electronic items (i.e., TV, personal devices, stereo, DVD, VCR, etc.)
- Personal items
- Plumbing fixtures
- Other fixtures (i.e., cabinets, lights, etc.)
- Furniture (i.e., couches, mattresses, etc.)
- Appliances such as microwave, oven, dishwasher, washing machine, dryer, humidifier, etc.
- Pools and spas
- Fire sprinkler system

At a minimum, persons conducting the assessment should wear proper safety [equipment](#) including a properly fitted respirator (P100+OV/AG elastomeric air purifying respirator with organic vapor and acid gas cartridges), safety goggles (ANSI Z87.1 D5), chemical-resistant gloves, long sleeves, long pants, sturdy shoes, disposable Tyvek suit, and shoe covers to limit exposure and contamination spread. Inspections should be carried out with more than one individual. Conditions may be present where greater levels of protection are necessary.

2. What and Where are the Contaminants?

Contamination can be in solid form or present as vapors and aerosols. Sometimes particles are visible, but sometimes particles will be too small to be seen with the naked eye. Contamination may be on the surface of objects, and it may have also penetrated inside of objects.

3. Role of Sampling and Testing in Restoration, Damage Identification, and Remediation

Restoration is a general [industry](#) term that is defined as returning a property to a “*pre-loss condition by the removal of damaging residues or odor to remedy damage or distress.*” To restore something, the damage must first be identified. Here, damage refers to reduced or loss of the appearance, functionality, safety, or value of an asset. In this document, we focus on sampling and testing activities to identify environmental contaminants for a fire or smoke impacted building. Remediation is the act of removing *specific environmental contaminants* from a property to return it to safe use. Remediation can include source removal (i.e., particulates on hard surfaces, replacement soft HVAC ductwork, upholstery furniture, soft goods, etc.), extracting contamination from materials (i.e., VOCs in wood studs, walls, etc.), and other practices. The fire and smoke damage [industry](#) defines “cleaning” as removing residues or contaminants. The [USEPA](#) uses the terms “remediation” and “cleanup” interchangeably. To add context, fire and smoke damaged buildings can present life-threatening and life-altering contaminant hazards (i.e., asbestos, lead, benzene, etc.). As people often associate “cleaning” their homes as an activity without fear of major contaminant exposure-caused injuries (i.e., mesothelioma, metal poisoning, cancer), the word remediation is used here for fire and smoke damaged properties to reduce the potential for confusion.

4. Sampling and Testing is Conducted to Understand the Damage

A primary objective of sampling and testing is to identify the type, location, and magnitude of environmental hazards. This information is then used to determine which remediation activities are needed to return the property to pre-loss conditions. Here, sampling and testing are linked activities. Sampling involves the collection of evidence, and testing is the examination of environmental samples. Sampling and testing approaches should also consider determining if there is localized or widespread contamination damage for the building (i.e., at a single windowsill, skylight, or inside the HVAC system, interior rooms, attic, spread throughout the home, etc.). The type of contaminants that are screened for should be appropriate for the specific building space and materials and consider specific warnings by health officials. *After remediation, sampling and testing should also be conducted to confirm hazards were removed.*

5. Who Should Conduct Testing and What is Their Scope?

A competent professional should evaluate the potential property damage and then conduct sampling. Based on hundreds of residential property investigation reports we reviewed after wildfires, there is wide variability in knowledge and approaches across companies. Problems identified in the reports were that some companies that conducted testing generated uninterpretable information, failed to collect samples or controls correctly, used the wrong testing methods, compared their results to inappropriate exposure standards, and misreported test results to the property owner. Possible professionals that might have the necessary expertise to conduct a property investigation include licensed professional engineers, certified industrial hygienists, or other credentials following appropriate ASTM, NIOSH, USEPA, and/or equal practices.

Before a contract is initiated, property owners can request that companies declare the estimated type, number, and location of samples to be collected, testing methods that will be used by the lab, how results will be reported (i.e., ug/ft² vs. ug/ 100 cm², etc.), indoor environmental exposure standards they will use for comparison, and whether the final report will take a position about remediation recommendations. The identification of control samples and date of final report delivery should also be included in the scope of work contract. Visual observations including either images or video should be recorded and may help describe sampling site conditions. Samples should be analyzed and validated by skilled laboratories. All results should be quantitative, not presence/absence responses.

6. What Should Be Tested for and Where?

- **Data Collection and Reporting:** The number and location of samples collected per property will depend on property impacts, characteristics, and activities carried out on property since the fire. Contaminants identified by local and state officials should be included in property screening. At a minimum, garage, attic, and crawlspace samples should be collected, along with surface floor and windowsill samples of each bedroom and living area. Additional locations to consider should include the HVAC furnace and ducting, hallway floors, kitchen countertops, any areas frequented by children, elderly or other vulnerable populations, and any areas where there is a desire to retain valuable or irreplaceable objects. Samples

should be collected in interior parts of the building as well as the outer parts of the building (i.e., interior windowsills, floors). “Control” samples should not be collected from within a fire damaged property. These samples can often be unopened sampling containers (i.e., trip blanks) and field blanks. Chain-of-custody forms are needed for samples collected.

- **Surfaces.** At a minimum, surface dust in buildings should be screened for [RCRA8](#) metals and asbestos, due to existing regulatory thresholds which indicate a health risk exists. The *Resources Conservation and Recovery Act (RCRA)* metals are designated by federal law as knowingly toxic (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Lead, for example, has explicit federal [limits](#) of 5 µg/ft² for floors, 40 µg/ft² for windowsills, and 100 µg/ft² for window troughs, and other metals may exist in surface dust at concentrations where manipulation is likely to cause conditions that exceed state or federal airborne permissible exposure limits (PELs). Contaminant loadings are comparable when reported in ft², 100 cm², or equivalent. Results reported as “ug/wipe” are uninterpretable unless the report explicitly defines what surface area each wipe represents in ft² and cm². Comparison of indoor metal concentrations as mg/kg or ppm to residential soil standards is inappropriate, and bulk samples of walls or other construction material are not sufficient to assess surface dust risk.

USEPA Method [6020B](#) (and USEPA Method [7174B](#) for mercury) should be considered for sample analysis. Because other metals may also be present, testing for the [CAM-17](#) metals (California Administrative Manual) may be more appropriate. In addition to the RCRA8 metals, CAM-17 also includes antimony, barium, beryllium, cobalt, copper, molybdenum, nickel, thallium, vanadium, and zinc. Screening for lithium and manganese may be advisable as they are released in large quantities from some [batteries](#) and consumer [products](#). USEPA Method 6010D has been used by some for metals analysis, and while it generally has higher reporting levels, it may also be sufficient for evaluation. Asbestos should be screened for when structures, or those impacted nearby, are known or suspected to contain asbestos containing items.

- Like metals, semi-volatile organic compounds (SVOC) are often found on surfaces. SVOCs include polycyclic aromatic hydrocarbons (PAH), perfluoroalkyl substances (PFAS/PFOS), polychlorinated biphenyls (PCB), dioxins, and furans. PFAS and PCBs, for example, often have clear points of origination, compared to dioxins and furans. PFAS is frequently present in non-PHOS CHEK fire retardant foam and artificial turf. PCBs are present in some older electrical and hydraulic equipment. PAHs have often been associated with incomplete combustion. PAHs can be screened using USEPA Method SW-846 [8270D/E](#), and USEPA Method SW-846 [8082A](#) for PCBs.
- Ash, soot, and char are often referred to as combustion byproducts (CBP) and are particulates. There are no health-based human exposure standards for these materials. Testing for these materials alone, in a wildfire impacted building, is like confirming the sky is blue. By not testing for metals and asbestos for example, which have health-based regulatory exposure limits, property inhabitants may be led to believe the property is safe, become exposed, and spread contamination when it poses a serious health risk.
- For surface sampling, samples should be collected individually, not as composites. This is because (1) if one area of a home is contaminated the person conducting the sampling may transfer that contamination elsewhere in the home (i.e., wipe samples), and (2) composite samples prevent the property owner from finding the location with the highest contaminant levels in the home. For example, this can prompt the highest lead level detected to be lower than a regulatory threshold prompting the need for abatement.
- **Air.** Volatile organic compounds (VOC) are a class of chemicals released from and created during and after fires involving structures and personal items. VOCs can penetrate walls, floors, insulation, HVAC ducts, furniture, soft goods, including plastics, and other building contents. Some VOCs can transform into other chemicals during their time inside the building. Some, but not all VOCs that pose a health risk, can contribute to an odor. Odors can be caused by the human olfactory system being exposed to one or more chemicals at the same time. The presence or absence of an odor for a fire-impacted building does not mean the chemical exposures are safe. VOC testing can sometimes help identify causes of odors and illnesses before and after initial remediation activities have been conducted. Consider sampling with USEPA Method Toxic Organics [\(TO\)-15](#) and include screening of all 100+ chemicals. USEPA Method TO-11A may also be used in addition to, but not in place of, the TO-15 method. Other air sampling methods may be needed upon investigation. While some fire-related chemicals may not be on the TO-15 list, currently, this list seems

to be the most inclusive and many have federal and state indoor air regulatory limits.

Before indoor air sampling, the air **MUST** stagnate and be still. This allows VOCs to release from surfaces and items into the air, where they will accumulate and be sampled. The HVAC system should be off, and all windows/doors closed for 72 hours. Air sampling time, or the duration by which air is drawn into the sampling container, should be 24 to 72 hours duration. If the sampling time is not long enough, the sample collected may not accurately represent the indoor exposure. Consumer-grade VOC sensors and handheld photoionization [detectors \(PID\)](#) have little to no value assessing whether indoor air poses an immediate or long-term health risk after a fire. Instead, the specific chemicals should be identified, quantified, so the health risk can be properly assessed.

- Other gases. A variety of gases are generated during fires and some can remain indoors at levels that pose health risks (i.e., hydrogen [cyanide](#)).
- **Other Factors and Other Samples.** If significant water impacts occurred (i.e., firefighting, plumbing leaks/breaks, etc.), a microbial growth survey that includes testing may be necessary. Destructive sampling is sometimes conducted whereby a specific piece of the building (i.e., wallboard) or personal items (i.e., clothing, etc.) are removed and analyzed for specific pollutants at a laboratory. Invasive video and imaging techniques can also be conducted (wall and ceiling cavities, etc.). The decision to conduct this testing should be on a case-by-case basis informed by other property damage factors. Other utilities (i.e., property domestic plumbing, sewer, electrical, natural gas, pools and spas) may also need to be evaluated for health and safety risks.

7. Frequently Asked Sampling and Testing Questions

- ***Should I enter or live in my home if I haven't had it tested yet?*** Generally, no, but this depends on the damage to the property. Advice is recommended from competent professionals first. A property three miles away from a fire may have smoke entry, whereas a partially burned structure or home adjacent to a fire-damaged property may have much higher amounts of chemicals and hazards. Contaminated standing homes have sometimes caused people to become ill, requiring emergency department visits. Beyond environmental hazards, other hazards may exist (i.e., leaking natural gas pipes, damaged electric vehicle batteries, broken glass, nails, structural failure, exposed electrical wires, mold), and homes adjacent to burned structures or partially burned homes may have structural, electrical, and environmental safety risks as well.
- ***Is the presence or absence of one metal contaminant an indicator for all other chemicals?*** No. We have found no evidence to support this claim.
- ***Is the presence or absence of one VOC in indoor air an indicator for all other chemicals?*** No. We have found no evidence to support this claim.
- ***Does combustion byproduct (CBP) testing alone determine if the property is safe?*** No. Testing should include chemical specific screening. We have found no relationships between CBP and health-based regulatory exposure standards. In the past, CBP results have been used to inform theories about whether fire-caused contamination penetrated the interior rooms rather than just reaching exterior windows and doors, but CBP has no health-based indoor exposure standards. In contrast, lead, asbestos, and some VOCs do have such standards.
- ***Which contaminants could most influence the remediation activities selected?*** Lead and asbestos have federal exposure limits and require specific worker safety actions. The health consequences of their exposure can also be significant. By federal law, the removal of lead and asbestos from contaminated buildings requires abatement, a specialized training, site safety, and worker safety requirements. Initially, these contaminants may drive the decision making, though the presence of other contaminants (i.e., VOCs, SVOCs) could also influence sampling, testing, and even building remediation decisions.
- ***Is smelling my contaminated clothing a good way to assess its safety?*** No. Odors are often detected inside fire-impacted buildings because of a chemical exposure. Some VOCs are harmful at levels you can detect by odor, but other VOCs are harmful when odor is not detected. If the home is contaminated with metals or asbestos, smelling the contaminated items can cause exposures.

- **If we ask someone to “remediate” without testing, what will the harm be?** First, if hazardous levels of chemicals exist (i.e., lead, asbestos, VOCs, etc), exposures could prompt acute and even long-term health impacts to the workers. Contamination may be spread and left behind which the building inhabitants then encounter. The approach may also violate state and federal worker safety laws. Workers are required to be protected from hazards. To protect them, the hazards must be known. If they do not have the right training for remediation (i.e., lead, asbestos, etc.), are not wearing the property personal protective equipment, or have the proper controls to prevent contamination spreading through the building, they may harm themselves and the building inhabitants. Sampling and testing is critical to not just the property owner, but the workers who are potentially exposed to those hazards.
- **Should my fire-impacted clothes be chemically tested?** This may depend on whether your insurance company requires such testing to determine the need for replacement, or if other testing already proposed or conducted will indicate whether the clothing is contaminated. Different materials (i.e., synthetics, cotton, silk, linen, leather, suede, wool, etc.) respond differently when contaminated by fire contaminants (i.e., lead vs. VOC vs. SVOCs). The type and amount of contamination for the exposure, and duration before remediation, can impact whether the items will be salvageable.
- **Should I “clean” my home if I haven’t had it tested yet?** Because damaged buildings can have life-threatening or life-altering hazards, feedback from competent professionals before doing anything is recommended. If contamination is found, remediation professionals skilled at removing the specific contaminants, *without spreading them throughout the property or harming building inhabitants*, should be engaged.

8. Remediation and Post-Remediation Testing

Remediation actions needed will depend upon the property damage. If the fire directly damaged the structure, remediation actions may be more involved than in buildings farther away because the contaminant levels inside the structure were much greater. Wet wiping all surfaces, use of high-efficiency particulate air (HEPA) filters for vacuuming floors and indoor air, as well as activated carbon scrubbers for indoor air may be able to remove light levels of contamination. If contaminants penetrated drywall and personal items (i.e., mattresses, pillows, clothing, paintings, upholstery furniture, rugs, etc.) specialized decontamination methods (and subsequent contamination testing of the items) may be needed or the items should be discarded. Using a HEPA filter vacuum cleaner on carpets, rugs, and upholstery, for example, has shown less than adequate lead removal effectiveness with detectable lead remaining. In contrast, HEPA filter devices are generally considered effective for lead dust on hard surfaces. Testing to assess remediation effectiveness is recommended and should be conducted by a contractor that did *not* conduct the remediation. Containment methods should be used to avoid the cross-contamination of rooms, such as plastic sheeting, air pressure, clean room booties, etc. Improper remediation activities can introduce new VOCs that accumulate in indoor air and cause illness. VOC contamination can remain indoors for more than four months.

9. Acknowledgement and Additional Information

Information provided here is intended as a public resource that can facilitate discussion and understanding. As more information about wildfire caused contamination becomes available, this guidance may be revised. Special thanks are extended to property owners and companies after the 2023 chemical disaster in East Palestine, Ohio and 2025 Los Angeles area fires who shared their experiences with the authors. Thanks are also extended to K. Wayne at Purdue University for assistance on the visual representation.

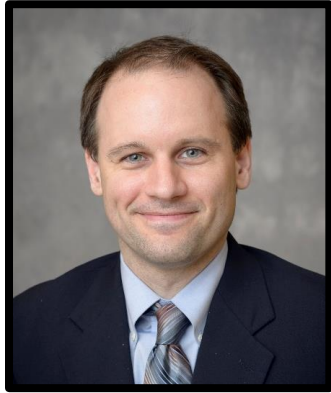
Persons impacted by wildfire should seek additional advice from their local health department as they have direct experience about the local situation and post-fire health threats in their community. Hazard identification continues to be a [challenge](#) for emergencies and disasters that affect buildings. Future work may indicate building sampling and testing practices should be modified to account for new contaminants (i.e., chromium-6, other SVOCs). These conditions may require the use of different sample collection and laboratory analysis methods.

Additional emergency and disaster response and recovery information for other residential and commercial property and municipal issues can be obtained at the [Center for Plumbing Safety](#). This includes information about environmental health risks posed by fires and recommendations for recovery. This work was partially supported by funding from U.S. National Science Foundation grant [2327139](#) and Purdue University. Links to sampling and testing literature were included in the document. Other types of fires or contamination incidents such as man-made chemical incidents (i.e., vehicle fires, train derailments, petroleum fires) that contaminate buildings would have additional considerations than described here.

Some additional resources are shown below.

- Institute of Inspection Cleaning and Restoration Certification (IICRC). *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration*. January 2025. Las Vegas, NV USA.
- U.S. National Academies of Sciences, Engineering, and Medicine. [The Chemistry of Urban Wildfires](#). 2022. Washington, D.C. USA.
- Yiin et al. 2002. [Environ. Health Perspect.](#)
- Laguerre and Gall. 2023. [Environ. Sci. Technol.](#)
- Li et al. 2023. [Sci. Advances](#).
- Noh et al. 2023. [Environ. Sci. Technol. Letters](#).
- Dresser et al. 2024. [ACS ES&T Air](#).
- Reid et al. 2024. [ACS ES&T Air](#).
- Coelho et al. 2024. [Environ. Sci.: Wat. Res. Technol.](#)
- Jung et al. 2024. [Sci. Tot. Environ.](#)
- Deelepojananan et al. 2025. [Environ. Sci. Technol.](#)
- Toland et al. 2025. [Sustain. Cities Soc.](#)

Recommendations for Post-Fire Building Sampling, Testing, and Remediation



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LightBox and Resident impacted
by the Palisades Fire, California

Prepared for:
Smoke Claims and Remediation Task Force, California Department of Insurance

October 13, 2025

Special thanks to....

- ♥ Households and business owners who participated and encouraged their community to participate in surveys and shared their experiences with us
- ♥ Households and business owners from prior disasters and chemical incidents who have shared their experiences and insights
- ♥ Faculty, students, and staff at participating institutions who volunteered their time
- ♥ Community groups such as Pali Strong and Eaton Fire Residents United who encouraged people to participate

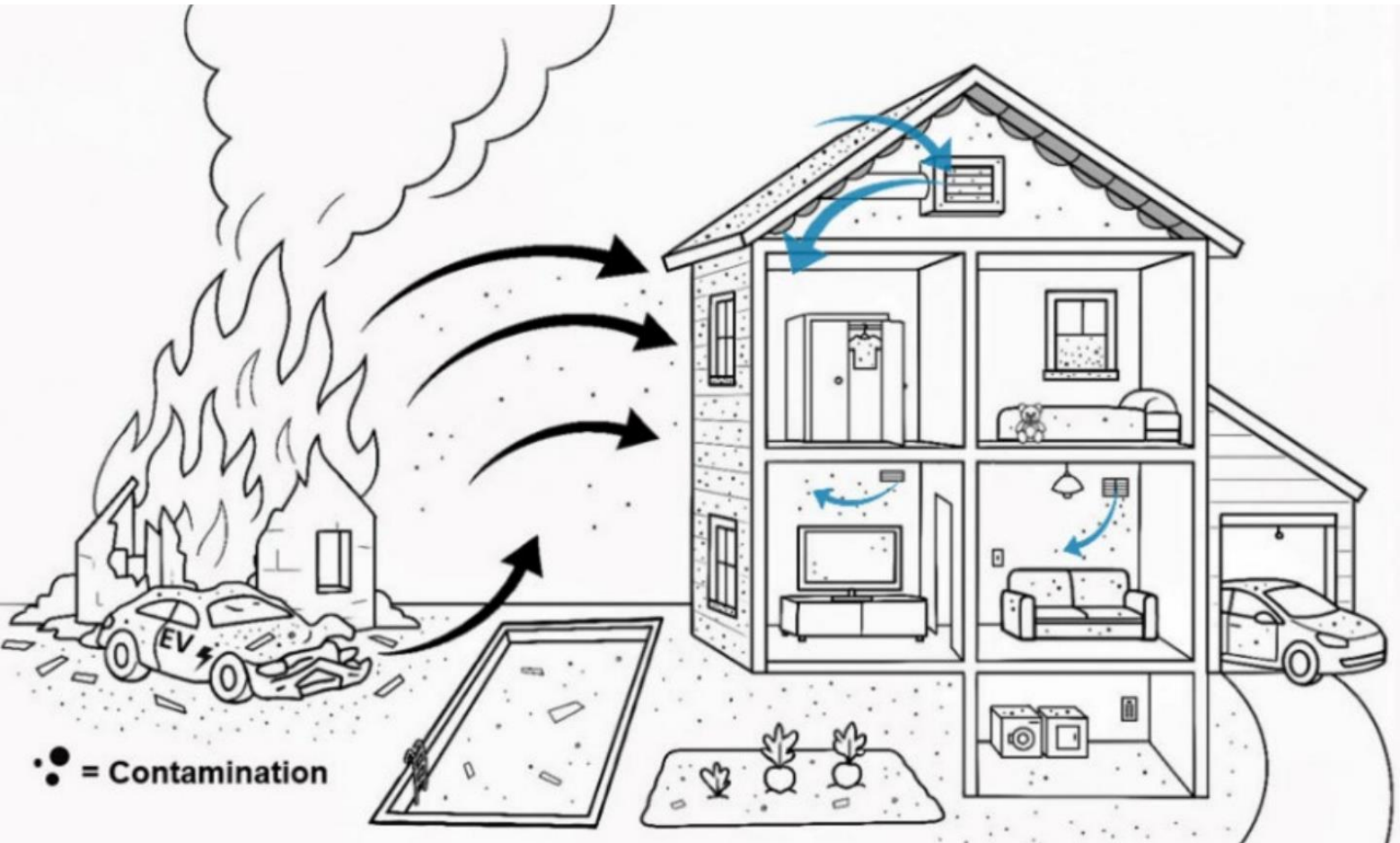
Key Definitions

Restoration: Returning a property to a “pre-loss condition by the removal of damaging residues or odor to remedy damage or distress.”

Remediation: The act of removing specific environmental contaminants from a property to return it to safe use.

Cleaning: Removing residues or contaminants *BUT cleaning should be without fear of major contaminant exposure-caused injuries (i.e., mesothelioma, metal poisoning, cancer).* **So, remediation is used here.**

Fire damage can be physical and contamination in nature



Damage

Physical damage

Contamination damage

- Chemical
- Microbiological

Risks

- Occupational Health
- Public Health
- Environmental

NEWS RELEASE



313 N. Figueroa Street, Room 806 | Los Angeles, CA 90012 | [\(213\) 288-8144](tel:(213)288-8144) | media@ph.lacounty.gov

For Immediate Release:

February 11, 2025

Public Health Advisory Noted for Those Residing Near Burned Structures in Palisades and Eaton Areas

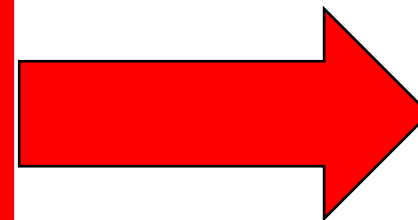
The Los Angeles County Department of Public Health is reminding residents about the dangers associated with fire debris and issuing a **Public Health Advisory** for individuals residing within **250 yards of a burned structure or parcel** within or near the **Palisades and Eaton burn areas**.

The Los Angeles County Department of Public Health is reminding residents about the dangers associated with fire debris and issuing a **Public Health Advisory** for individuals residing within **250 yards of a burned structure or parcel** within or near the **Palisades and Eaton burn areas**.

Residents in these areas may face an increased risk of exposure to hazardous substances from ash, soot, and fire debris before the completion of **Phase 1 (hazardous materials removal)** and **Phase 2 (fire debris removal)**. Exposure to these materials may lead to **physical health symptoms** ([American Chemical Society, EST Air, 2025, 2, 13-23](#)) and may pose long-term health impacts.

Fire debris from burned structures can contain a variety of harmful substances, including:

- **Asbestos** from older building materials
- **Heavy metals like lead**
- **Hazardous chemicals** from household products
- **Fine particulate matter** created by the fire

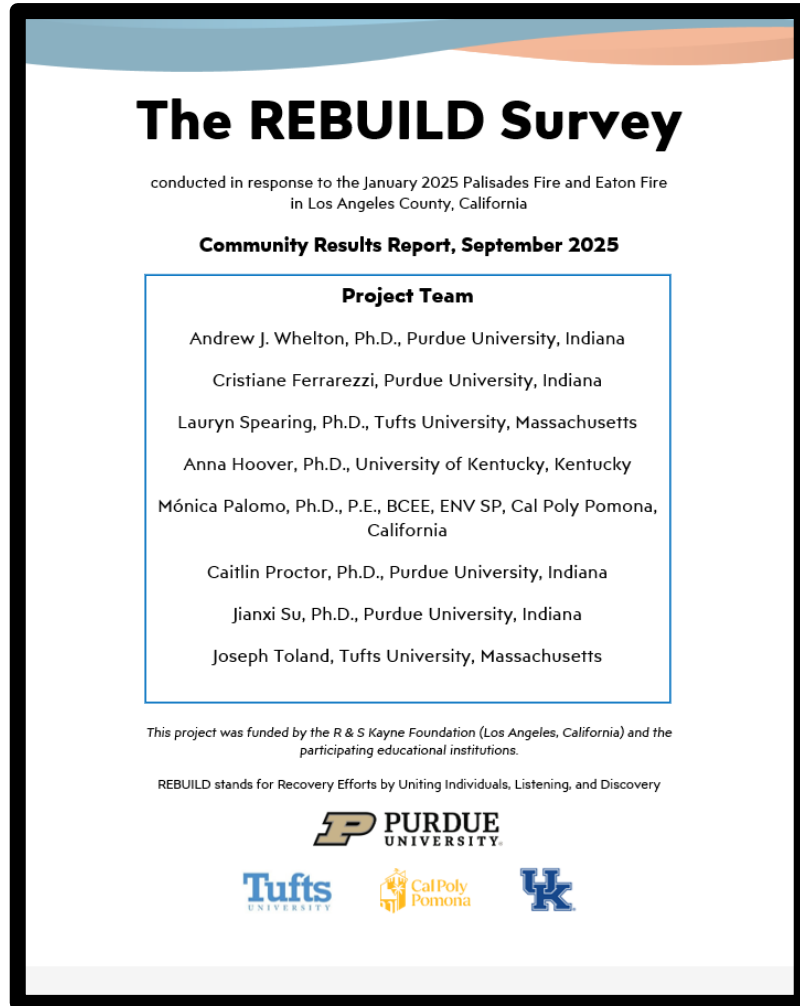


Explicit warning:

- **Asbestos**
- **Heavy metals like lead**
- **Particulate**

Strong winds and weather fluctuations may **increase both the exposure risk and the affected distance**.

Report is freely available
www.PlumbingSafety.org



Some perspective: The REBUILD Household Survey

After the January 2025 Eaton Fire and Palisades Fire, L.A. County, California

Whelton et al (2025).

Access FREE here → <https://docs.lib.purdue.edu/red/2/>

1,229 responses

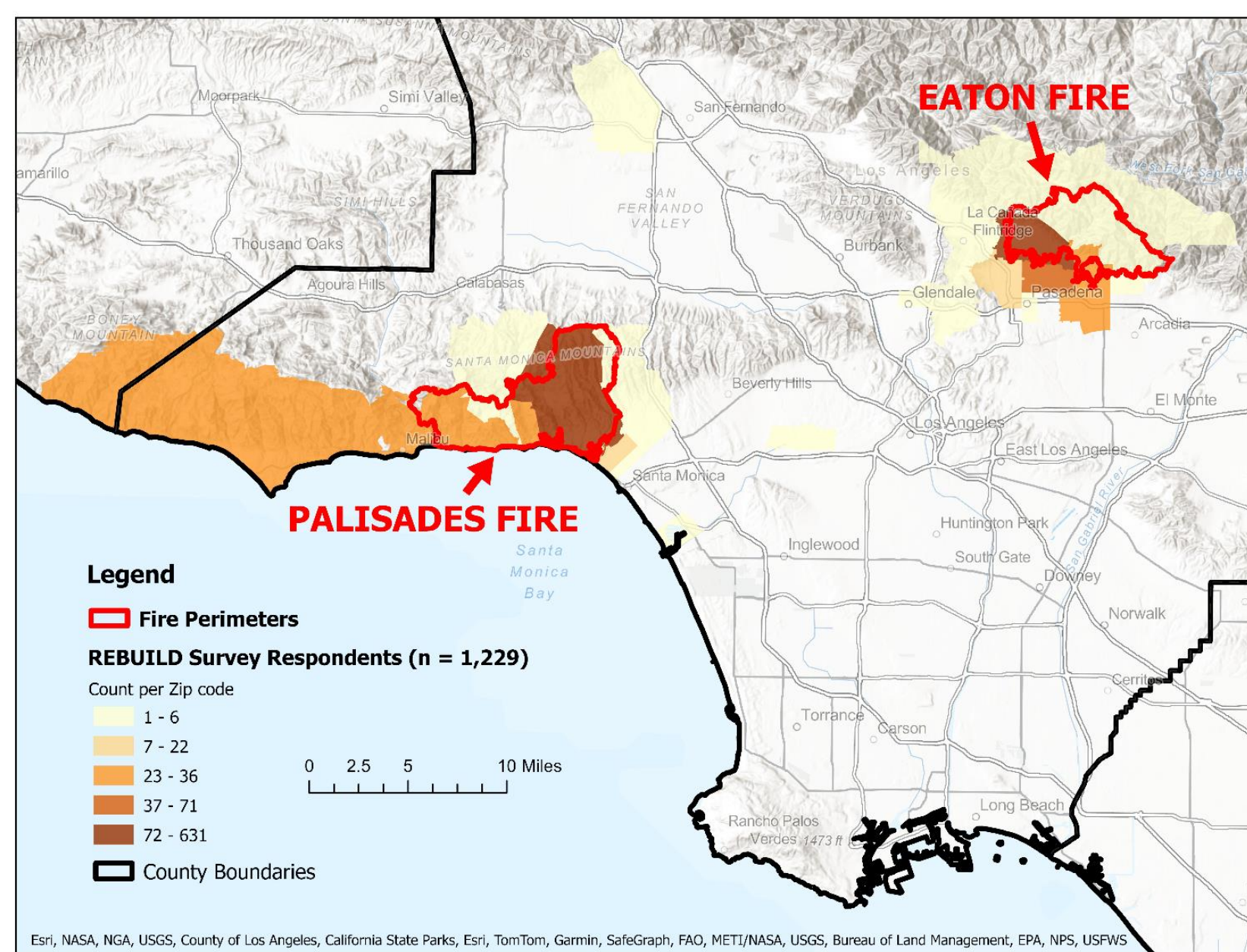
When mapped by
zipcode, **most
households** lived
INSIDE a fire
perimeter:

94.2 %

Palisades Fire
vs. **73.4 %**
Eaton Fire

Nearly all had
insurance

98.8 % Palisades vs.
99.0 % Eaton Fires



Ash and Debris



Rank	Palisades Fire	Eaton Fire
1	On the floor	On the floor
2	Windowsills	Windowsills
3	Other	Attic
4	Garage	Other
5	Attic	Garage
6	HVAC filter	HVAC filter

Combustion byproduct testing (ash, soot, and char) will not determine if lead or asbestos contaminants are present.

Property Testing and Insurance

“ Was environmental testing conducted on your property for fire-related contamination? – The REBUILD Survey n= 1,073 ”

Palisades Fire

44% Yes

39% No, but want it

11% No

6% Not sure

Eaton Fire

36% Yes

49% No, but want it

9% No

6% Not sure

***Policyholders
wanted testing, but
were not getting it***

“ Do you believe your insurance company will provide you enough money to rebuild your home to what it was before the fire? – The REBUILD Survey n= 541 ”

***Policyholders were
financially stressed***

Palisades Fire

20.5%

Eaton Fire

17.8%

Property Remediation

Respondents explained what was done with a variety of their household items

Clothing	Pet bedding or pet crate
Pillows	Children's plastic toys
Mattresses	Electronics
Stuffed animals	Appliances
Window blinds	Fruit from outdoor plants
Carpets	Fruit from indoor plants
Rugs	Other
HVAC filter	

Most common actions:

Discarded pillows, mattresses and fruit

Cleaned clothing, and appliances

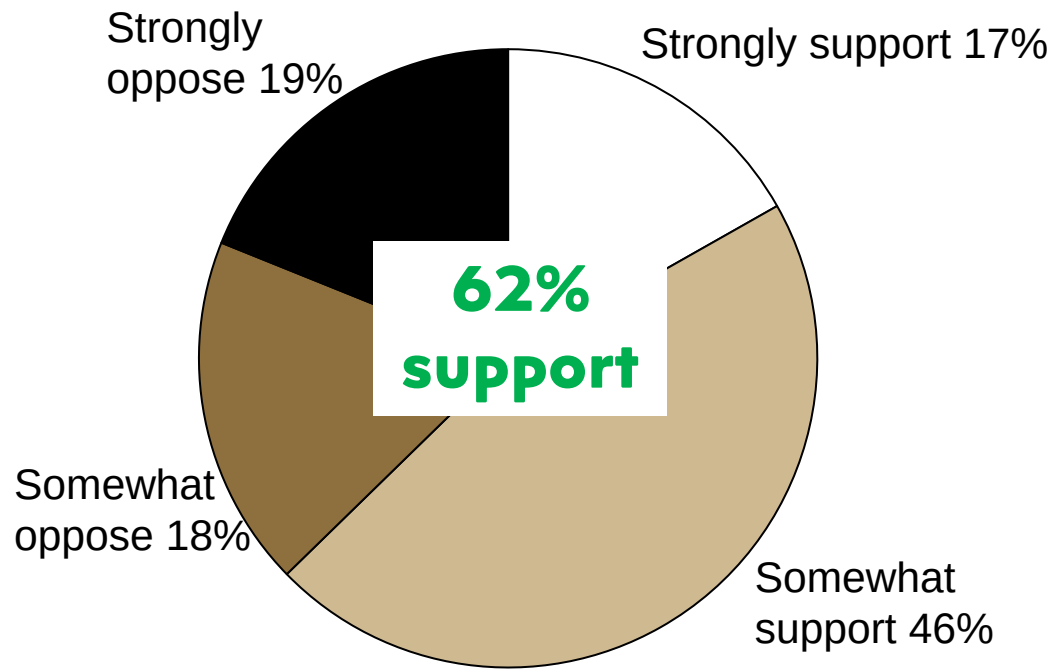
n= 524



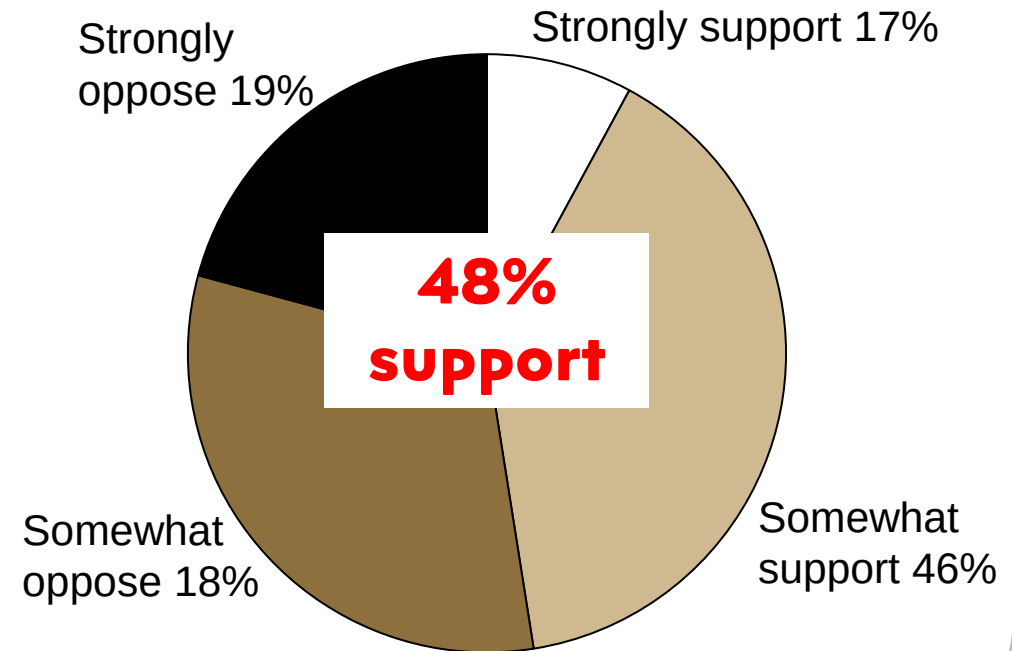
Insurance

“ As the region rebuilds, policy makers should allow insurance companies to increase their rates for fire insurance if this enables them to offer insurance for everyone? – The REBUILD Survey ”

Palisades Fire



Eaton Fire



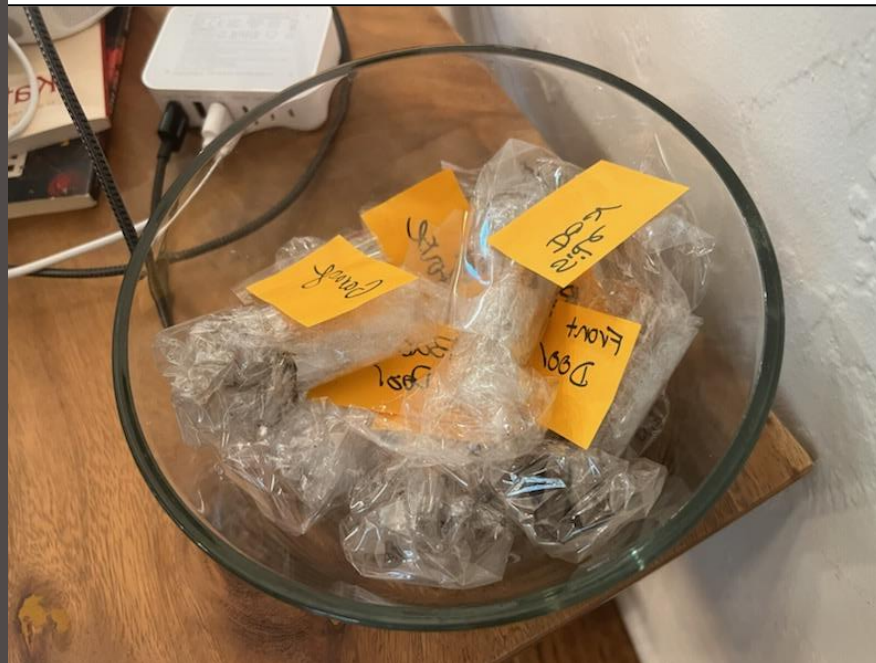
n= 995

Environmental Test Result Study for Households Impacted by the 2025 Eaton Fire and Palisades Fire

Andrew Whelton, Ph.D., Cristiane Ferrarezzi

Created as a direct result of households asking for assistance navigating the complexity of home environmental testing and guidance provided by contractors.

- Households can participate and upload their reports here: **Home Environmental Test Result Study**.
- Results are being compiled, anonymized, and summarized. We are individually interacting with households about their reports and company experiences.



Preliminary Results: Information provided to households not easily understandable, sampling, testing, and recommendations vary widely

- Dissimilar reporting of metal surface loading: $\mu\text{g}/\text{wipe}$ OR $\mu\text{g}/\text{sqft}$ OR $\mu\text{g}/100\text{cm}^2$
- Indoor wipe samples for lead, no lead detected, but they recommended “remediate”
- Any indoor detection of a metal led to “remediate.” None exceeded an exposure standard.
- Used beryllium (Be) worker safety guideline of “ $0.2 \mu\text{g}/100\text{cm}^2$ – ACGIH”. Infants and members of the public are NOT workers. No Be general standard.
- Company explained results in one lab report, but for another home and lab report just says the property isn’t unsafe
- “Deodorization” recommended but not explained
- Conflict, Pb surface standard: $5 \mu\text{g}/\text{sqft}$ = USEPA vs. $10 \mu\text{g}/\text{sqft}$ = CDPH
- Skip testing of garage, attic, or crawlspace – where contamination sometimes the highest
- Picked 8 specific primary and secondary VOCs claiming to be smoke related. If 1 VOC present, but not another – VOC present is claimed to not be smoke related.
- Recommended all soft goods be discarded or sign liability waiver. Other consultants said soft items should be “cleaned” by policyholder instead..
- Insurance adjusters and consultants not wearing proper PPE or preventing contamination spread when visiting a property

Some insurance adjusters and consultants ...

... recommended policyholders “smell” their impacted items. If no odor, told assume it’s safe.

... not wearing proper PPE or preventing contamination spread when visiting a property.

NEW: Household Recovery Decisions

Helps establish a basic understanding

Developed from our response to the East Palestine chemical disaster and January wildfires.

- Environmental sampling and testing focus.
- Accessible to property owners and officials.
- Includes discoveries from 100s of home environmental testing reports and in 1-on-1 meetings.
- Valuable for inspection, testing and sampling companies as well as insurance companies.

Whelton, Bollens, Ferrarezzi (2025).

Access FREE here → <https://docs.lib.purdue.edu/red/1/>



PURDUE UNIVERSITY

After a Wildfire:

Considerations for Building Environmental Testing

Overview

1. Damage & building contamination
2. What & where are the contaminants?
3. Role of sampling & testing in restoration, damage identification, and remediation
4. Sampling & testing is conducted to understand the damage
5. Who should conduct testing & what is their scope?
6. What should be tested for & where?
7. FAQs
8. Remediation & post-remediation
9. Acknowledgement & additional information

1. Damage and Building Contamination

Wildfires can directly and indirectly make buildings unsafe by introducing physical, chemical, and microbiological pollutants. These pollutants can pose an immediate and long-term [health](#) and safety risks to building users. Particles, gases, and vapors are often released and created from burning structures, vehicles, and other items. Microorganisms can grow due to the presence of water due to pipe breaks and leaks, fire-fighting activities, local climate, and other conditions. Before entering a fire-impacted building, proper inspection and testing are highly recommended.

Signs of contamination being present can include broken and melted building components and systems, dust, debris, ash, and soot deposits on floors, walls, ceilings, personal items, inside HVAC components, corroded metals, electrical system malfunctions, and discolored interior and exterior walls. Indirect damage indicators can be odors and illness symptoms. Not all damage may be visible (i.e., in wall cavities, attics, drywall, personal items).

Persons impacted by wildfire should seek advice from their health department and competent professionals. The property should not be entered without proper safety equipment and protocols to protect against hazards and spreading contamination to their vehicles, other residences, and other people.

Following A Structural Assessment, A Building Inspection Should Be Conducted and Include:

- The building exterior
- Natural gas system
- The garage, attic, crawlspace
- The heating ventilation and air conditioning (HVAC) units and associated components
- All ceilings, walls, floors, shelves in every room, including hallways and closets
- Electrical system including the breaker box, wiring, and electrical components (i.e., switches, outlets).
- Personal electronic items (i.e., TV, personal devices, stereo, DVD, VCR, etc.)
- Personal items
- Plumbing fixtures
- Other fixtures (i.e., cabinets, lights, etc.)

- Furniture (i.e., couches, mattresses, etc.)
- Appliances such as microwave, oven, dishwasher, washing machine, dryer, humidifier, etc.
- Pools and spas
- Fire sprinkler system

At a minimum, persons conducting the assessment should wear proper safety [equipment](#) including a properly fitted respirator (P100+OV/AG elastomeric air purifying respirator with organic vapor and acid gas cartridges), safety goggles (ANSI Z87.1 D5), chemical-resistant gloves, long sleeves, long pants, sturdy shoes, disposable Tyvek suit, and shoe covers to limit exposure and contamination spread. Inspections should be carried out with more than one individual. Conditions may be present where greater levels of protection are necessary.

Center for Plumbing Safety at Purdue University, West Lafayette, Indiana USA
Date: Sept. 9, 2025; Authors: Whelton, A.J., Bollens, E., Ferrarezzi, C.G. (awhelton@purdue.edu)

1

After the Fire: Considerations for Building Environmental Testing

1. Damage & building contamination
2. What & where are the contaminants?
3. Role of sampling & testing in restoration, damage identification, and remediation
4. Sampling & testing is conducted to understand the damage
5. Who should conduct testing & what is their scope?
6. What should be tested for & where?
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8. Remediation & post-remediation
9. Acknowledgement & additional information

Observations and Impacts as a Result of Current Insurance Practices

Based on our studies and direct interactions with hundreds of residents and property owners, insurance companies are *not* consistently covering:

- Thorough, science-based **environmental testing** of fire-impacted properties
- **Remediation** of non-structural impacts and contamination resulting from the peril of fire
- **Loss of use** for properties not yet repaired to their pre-peril condition

This forces residents and businesses to either: (a) **risk their health and the health of their employees** in returning without appropriate remediation and clearance testing; or (b) **incur significant personal expenses**, often to the point of economic hardship, to restore a property damaged by a peril for which they had purchased insurance coverage.

This impacts vulnerable populations the most. Children, disabled, and elderly persons are most at risk for many of the contaminants of concern, and those of limited financial means are all but forced to return to a property even if it is not fit for normal use.

This may have long-term community consequences. If properties are not remediated, a perception will develop that these communities are unsafe, driving down property values, impacting financial security, and pressuring collateral holders.

Thank You

Questions?

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Presentation to be posted at www.PlumbingSafety.org

9-19-2025

Community Survey Report: The REBUILD survey conducted in response to the January 2025 Palisades Fire and Eaton Fire in Los Angeles County

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10.5703/1288284317912

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Authors

Andrew J. Whelton, Cristiane Ferrarezzi, Lauryn Spearing, Anna Hoover, Mónica Palomo, Caitlin Proctor, Jianxi Su, and Joseph Toland

The REBUILD Survey

conducted in response to the January 2025 Palisades Fire and Eaton Fire
in Los Angeles County, California

Community Results Report, September 2025

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*This project was funded by the R & S Kayne Foundation (Los Angeles, California) and the
participating educational institutions.*

REBUILD stands for Recovery Efforts by Uniting Individuals, Listening, and Discovery



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Project Overview

In response to the January 2025 wildfires in the Los Angeles, California area, we conducted an online community survey to support household and business response and recovery. The survey was called the *Recovery Efforts by Uniting Individuals, Listening, and Discovery (REBUILD)* study.



The purpose of our study was to better understand household experiences and needs for communities impacted by the Eaton Fire and Palisades Fire. The survey included questions about evacuation experiences, health impacts, insurance, property damage, testing, remediation, opinions about responding organizations, and rebuilding actions, among other topics. The research plan was reviewed by the Human Subjects in Research Ethics Boards at our universities (Purdue University protocol IRB-2025-387). The survey was deployed via Qualtrics in both English and Spanish. The survey was active from April 3 to June 17, 2025 and was completed by 1,229 adult residents who were affected by the wildfires. This study was funded by the R & S Kayne Foundation as part of the CAP.LA initiative as well as by the participating educational institutions.

About Us: We are a team of researchers from Purdue University (West Lafayette, Indiana), Tufts University (Medford, Massachusetts), Cal Poly Pomona (Pomona, California), and the University of Kentucky (Lexington, Kentucky).

Who Responded to the Survey?

Survey respondents came from a range of sociodemographic groups.

**The number of respondents to these questions were 464 (Palisades Fire) and 762 (Eaton Fire). This total number of respondents is less than the overall 1,229 survey responses because three respondents did not respond to this question.*

PNTS = Prefer not to say. Percent responding values were rounded to the nearest whole number.

Race	Palisades Fire (%)	Eaton Fire (%)
American Indian, Native American, Alaska Native	< 2	< 2
Asian	8	8
Black, African American	0	5
Latinx	1	3
White, Caucasian	85	71
Other	< 2	< 2
PNTS	< 2	< 2
Selected multiple	7	13

Gender	Palisades Fire (%)	Eaton Fire (%)
Male	35	29
Female	63	69
Nonbinary/ PNTS	2	< 2

Age	Palisades Fire (%)	Eaton Fire (%)
18 to 24 years	0	0
25 to 34 years	1	2
35 to 44 years	10	22
45 to 54 years	18	25
55 to 64 years	28	24
>65 years	42	27
PNTS	1	1

Education	Palisades Fire (%)	Eaton Fire (%)
Some high school or less	0	0
High school diploma or GED	1	1
Some college, but no degree	5	5
Associates or technical	1	4
Bachelor's degree	30	34
Graduate or professional	63	56
PNTS	1	1

Since January 2025, our team has visited the impacted areas multiple times. Survey data analysis is ongoing, and additional results will be shared once complete. In addition to the REBUILD survey, team members have supported other community efforts. Project contacts and additional study information for the REBUILD survey are provided at the end of this report.

Tips on Interpreting the Results

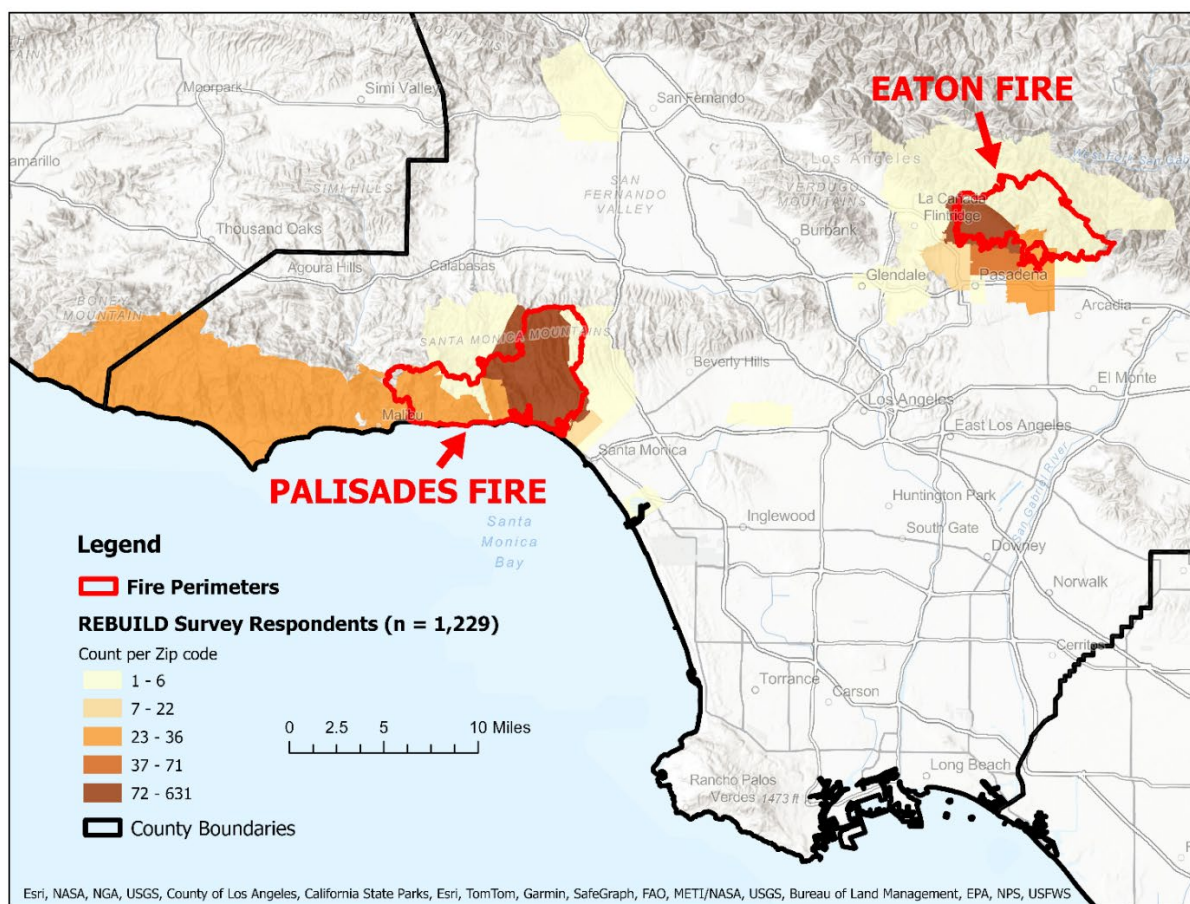
We recommend caution when interpreting results for subgroups with small sample sizes. Not all households responded to every question due to the survey design. For example, households that did not have a pool, did not see the pool-related questions. The total number of survey respondents was 1,229. Results for each question represent only the number of households responding to that question. For instance, $n = 452$ would indicate 452 households responded to a specific question.



Pools were sometimes impacted by fire debris, but not all properties had a pool.

Household Impacts

The map below shows the number of participating households by zip code within and outside the fire perimeters. Fire perimeters are from the California Department of Forestry and Fire Protection (CalFire). Some of the fire burned and destroyed properties are located outside these fire perimeters.



Most of the households had their residential home inside a fire perimeter (n= 1,226)

94.2 % Palisades vs. **73.4 %** Eaton Fires

Nearly all households had insurance before the fires (n= 924)

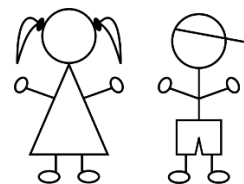
98.8 % Palisades vs. **99.0 %** Eaton Fires

About two thirds of the households had pets (n= 1,206), which is similar to the 66% 2023 U.S. national average reported by the American Pet Products Association.

60.5 % Palisades vs. **69.5 %** Eaton Fires

Less than half of the households had children (n= 973), which is similar to the 2024 U.S. Census national average of 39%.

35.2 % Palisades vs. **41.1 %** Eaton Fires



Evacuation & Displacement

Nearly all the respondents had household properties located in either mandatory or voluntary evacuation areas.

“ Was your home in an area under a mandatory or voluntary evacuation condition?” **”**
– The REBUILD Survey

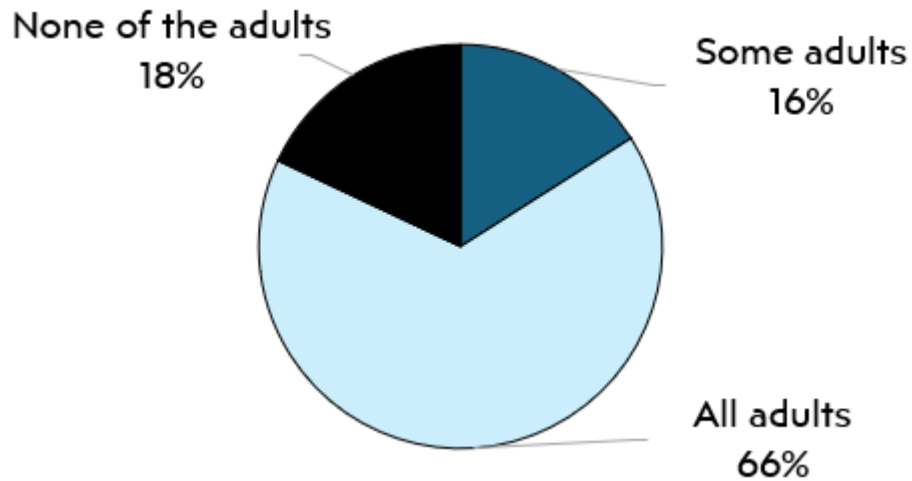
Condition	Palisades Fire (%)	Eaton Fire (%)
Yes, my home was under an evacuation condition	99.3	86.2
No, my home was not under an evacuation condition	0.4	8.2
I do not know	0.2	5.6

The number of households that responded was 1,218.

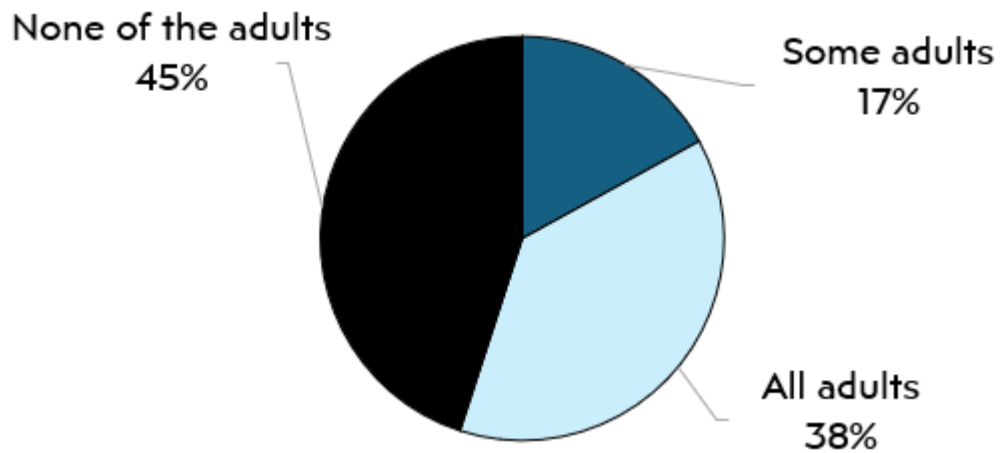


A substantial number of households with a phone reported never receiving an emergency evacuation message: About 45% for the Eaton Fire; about 18% for the Palisades Fire (n= 1,202).

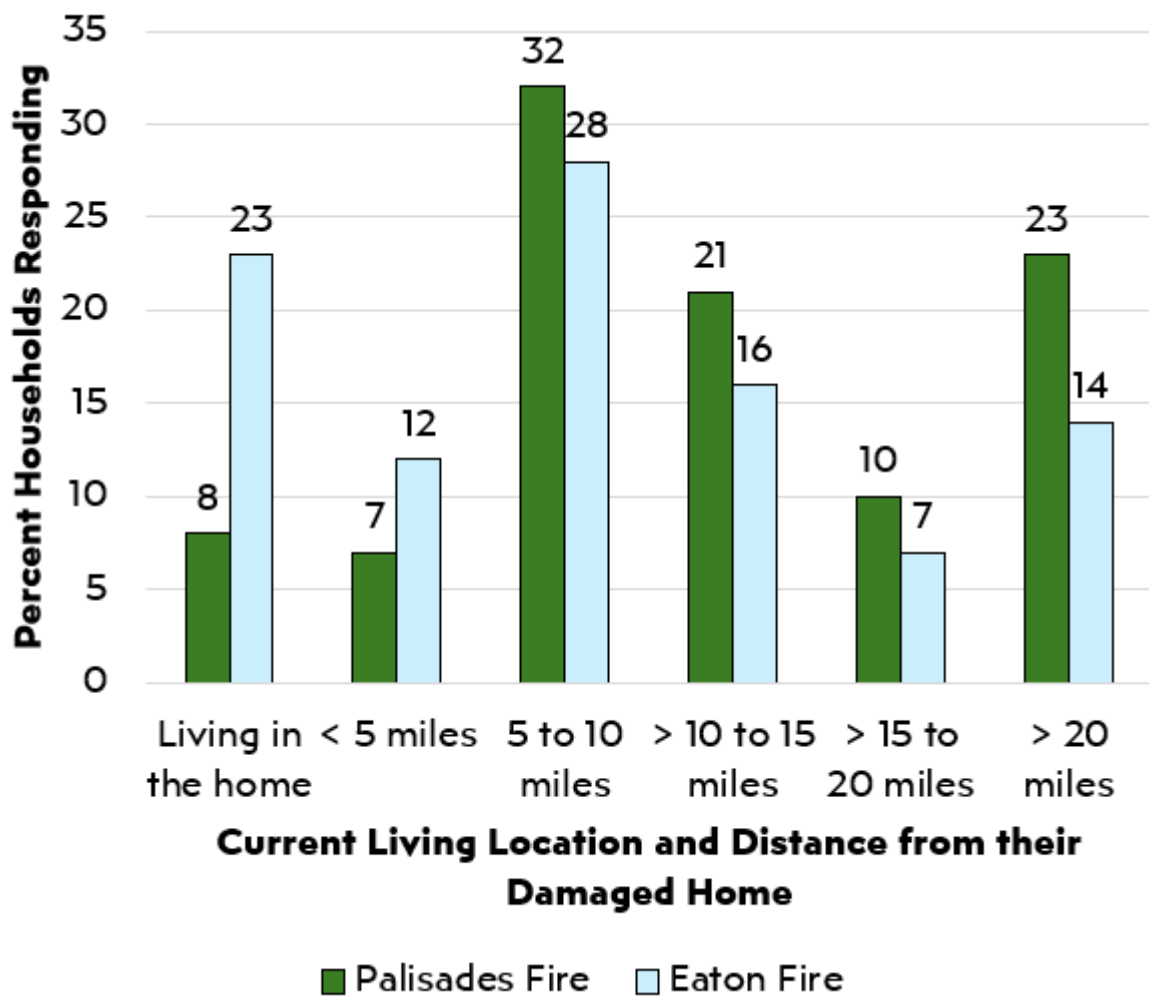
Palisades Fire respondents who received an emergency evacuation message



Eaton Fire respondents who received an emergency evacuation message



At the time of the survey, many people were still living away from their property. More households that responded to this survey and were impacted by the Palisades Fire (92%) were living away from their home than households impacted by the Eaton Fire (77%). This difference may be due to sampling differences of the populations responding to the survey or other reasons. Additional analysis will be completed at a later date.



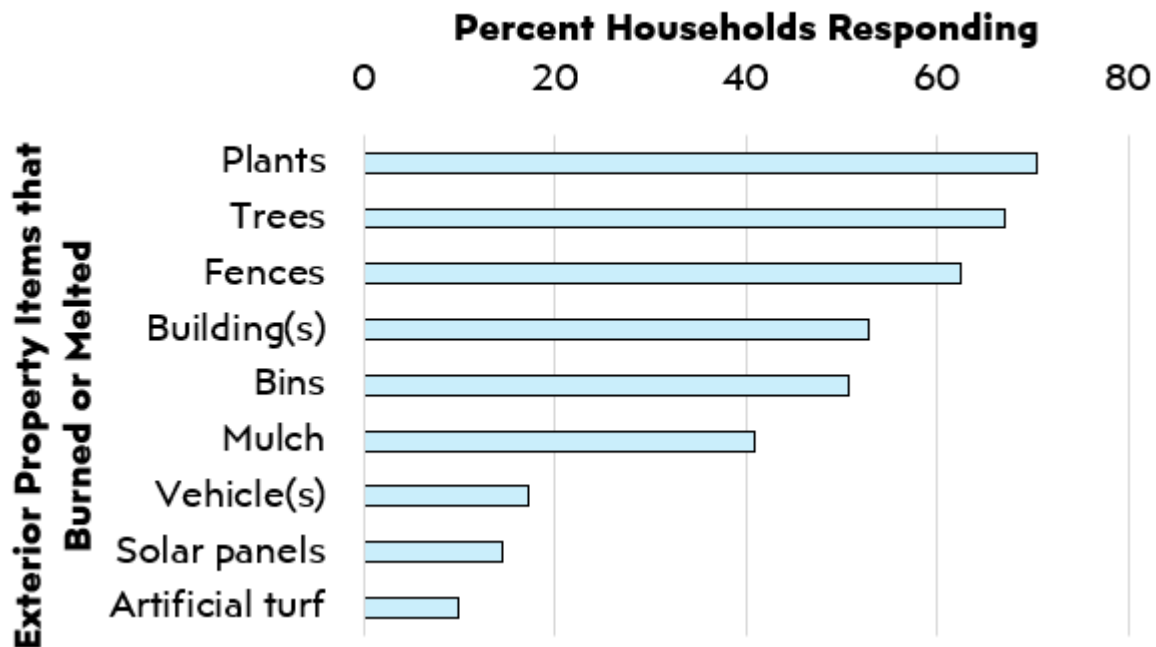
The number of households that responded was 978. On the following page, the condition of each home for respondents is described. Conditions are: Burned and fully destroyed; Partially burned, not destroyed; Not burned, not destroyed.

Property Impacts

Households impacted by both fires reported similar levels of home structure damage (n= 1,229).

Condition of Home	Palisades Fire (%)	Eaton Fire (%)
Burned and fully destroyed	45.9	42.8
Partially burned, not destroyed	13.1	9.8
Not burned, not destroyed	41.0	47.4

Plants, trees, and fences were the most commonly melted or burned exterior property features in both fires (n= 523).



*Bins represent those that pertain to trash, recycling, waste, and carts

Households reported finding ash in various locations inside their homes (n= 1,167). There were several popular locations in standing homes where ash was observed:

Rank	Palisades Fire	Eaton Fire
1	On the floor	On the floor
2	Windowsills	Windowsills
3	Other**	Attic
4	Garage	Other**
5	Attic	Garage
6	HVAC filter	HVAC filter

HVAC represents heating, ventilation, and air conditioning. If respondents did not have certain home features listed above, those features were not selected in the survey.

**Persons responding to the “other” category included details such as: everywhere, throughout the house, on bricks on fireplace, walls, rafters, insulation, shelves, beds, furniture, mattresses, clothes, under skylights, countertops, toilet below exhaust fans, inside walls, in bedding, electrical sockets, appliances, toilets, inside clothes dryer, doorway entries, closets, drawers, HVAC ducts, basement/cellar, carport, crawl space, etc.

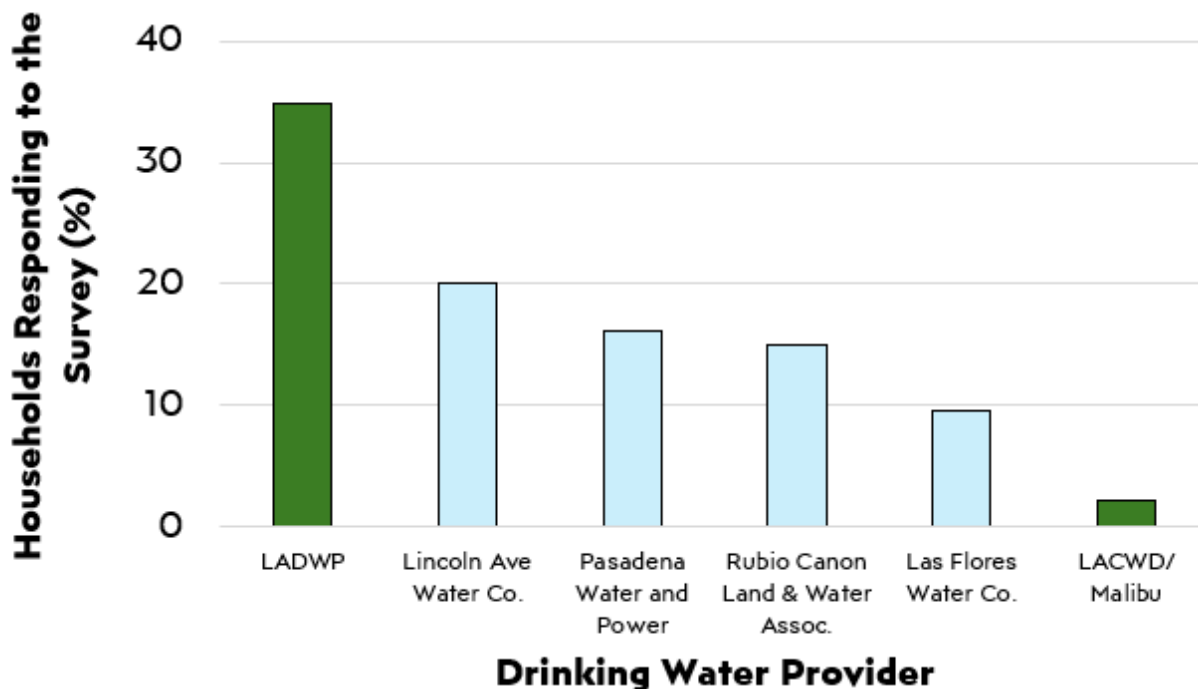


Ash was found by some property owners at their standing homes, inside their windows.

Tip: Combustion byproduct testing (ash, soot, and char) would not determine if lead or asbestos contaminants were present in this material unless contaminant specific testing for those contaminants was carried-out.

Environmental Safety Concerns

The majority of the households received water from six of the 11 drinking water providers impacted by the fires (n= 1,206).



Dark green shading represents a drinking water provider impacted by the Palisades Fire. Light blue shading represents a provider impacted by the Eaton Fire. LADWP stands for Los Angeles Department of Water and Power. LACWD stands for Los Angeles County Water District. Less than 1 % of the households received water from the Kinneloa Irrigation District and the Las Virgenes Municipal Water District. About 1.1% of the households received drinking water from another provider not listed as a selection choice. Households who did not know who their drinking water provider represented 0.6 %.

The 11 drinking water utilities impacted by the Eaton Fire and Palisades Fire served different size customer populations. Damage to each water system affected different portions of their customers. Water systems that serve large populations generally have more personnel to respond to and recover from wildfires than systems that serve smaller populations.

Fire and Water Utility Name	Number of Customers	Total Customers Impacted (%)
Eaton Fire		
Kinneloa Irrigation District	1,953	7
Las Flores Water Company	4,847	58
Rubio Cañon Land & Water Association	9,600	>50
Sierra Madre – City Water Dept.	11,000	Not reported
Lincoln Avenue Water Company	16,126	57
Monrovia – City Water Dept.	37,931	Not reported
City of Arcadia	51,361	Not reported
Pasadena Water & Power	161,162	4
Palisades Fire		
Los Angeles CWWD 29 & 80-MALIBU	32,792	7
Las Virgenes Municipal Water District	72,602	0.5
Los Angeles – City Dept. of Water & Power	3,856,043	1.1

Information prepared by N. Zavodny and A.J. Whelton, Purdue University

Most households noted that drinking water safety warnings had been lifted at the time the survey was completed (n= 1,118).

Response	Palisades Fire (%)	Eaton Fire (%)
Yes, advisory was still in place	8.2	5.9
Yes, but advisory no longer in place	68.6	70.5
No	9.8	11.9
Other	13.4	11.7

To expedite drinking water utility wildfire disaster response and recovery, a free playbook was published in 2024. This playbook provides evidence-based guidance for what decisions were needed to rapidly find and repair the damaged water system infrastructure and protect the population from harm.

Concept of Operations (CONOPS) Plan for Water Distribution System Testing and Recovery. By: Whelton, A.J., Isaacson, K., Shah, A.D. 2024. Water Research Foundation. Denver, Colorado USA. Freely available at [“https://www.waterrf.org/resource/concept-operations-conops-plan-water-distribution-system-testing-and-recovery”](https://www.waterrf.org/resource/concept-operations-conops-plan-water-distribution-system-testing-and-recovery)

Guidance for inspecting, testing, and repairing fire-impacted building plumbing is also available.

After a Wildfire: Water Safety Considerations Inside Buildings. Jan. 12, 2025. By: Whelton, A.J., Purdue University, Center for Plumbing Safety. West Lafayette, Indiana USA. Freely available at <https://www.PlumbingSafety.org>

Mental Health Impacts

Months after the fires, respondents reported that they experienced anxiety, stress, or depression related to concerns about fire-damage to...
(n= 1,073).

Response	Palisades Fire (%)	Eaton Fire (%)
Outdoor air	75.4	84.0
Soil	72.9	84.9
Indoor air	68.7	74.6
Natural places like parks, hiking spots	70.4	77.3
Drinking water	51.2	60.3

More than three of every four households were concerned that debris removal operation pollution would affect the safety of schools. Most households **disagreed** that debris removal operations around schools is safe: Palisades Fire (77.8%) and Eaton Fire (79.7%) (n= 1,073).

Response	Palisades Fire (%)	Eaton Fire (%)
Strongly disagree	54.7	52.8
Somewhat disagree	23.1	26.9
Neither agree or disagree	13.4	12.1
Somewhat agree	6.2	6.6
Strongly agree	2.5	1.6

More than three in four households either **strongly disagreed** **or somewhat disagreed** that it was safe for their pets to go on a walk or play in the yard around their home (n= 681)

82.6 % Palisades vs. 76.2 % Eaton Fires

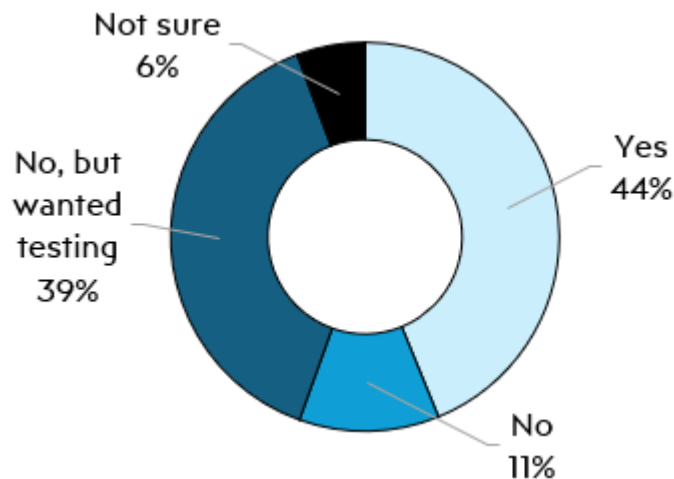
The health and safety of pets are important. Scientific studies indicate that post-traumatic stress disorder (PTSD) levels can be higher for pet owners immediately after a disaster, but lower several years later. The loss of and need for veterinary services after a wildfire can also pose challenges immediately after a disaster.



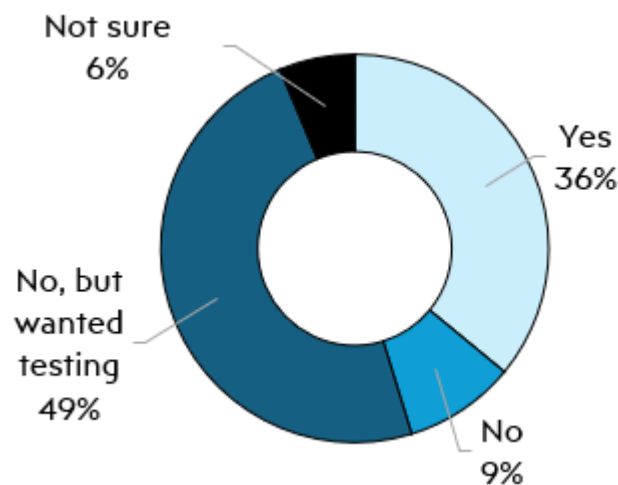
Property Testing & Remediation

Air, water, or soil testing was conducted for less than half of responding households. About 38.6 % (Palisades Fire) and 48.5 % (Eaton Fire) of the households wanted testing but did not receive it (n= 1,073).

Palisades Fire



Eaton Fire



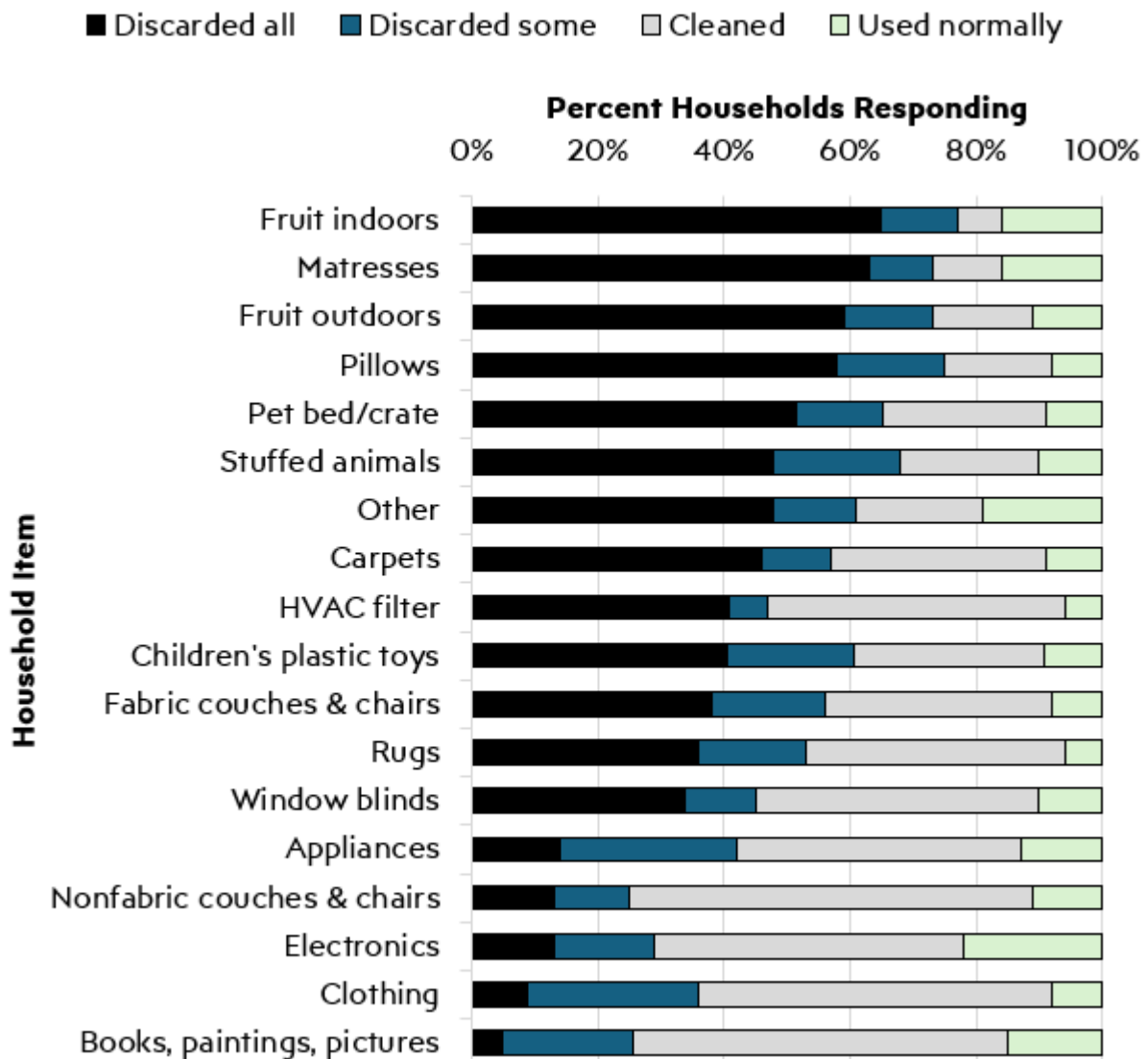
Respondents explained what was done with a variety of household items, such as:

- Clothing
- Pillows
- Mattresses
- Stuffed animals
- Window blinds
- Carpets
- Rugs
- HVAC filter
- Pet bedding or pet crate
- Children's plastic toys
- Electronics
- Appliances
- Fruit from outdoor plants
- Fruit from indoor plants
- Other

Many respondents threw away household items.



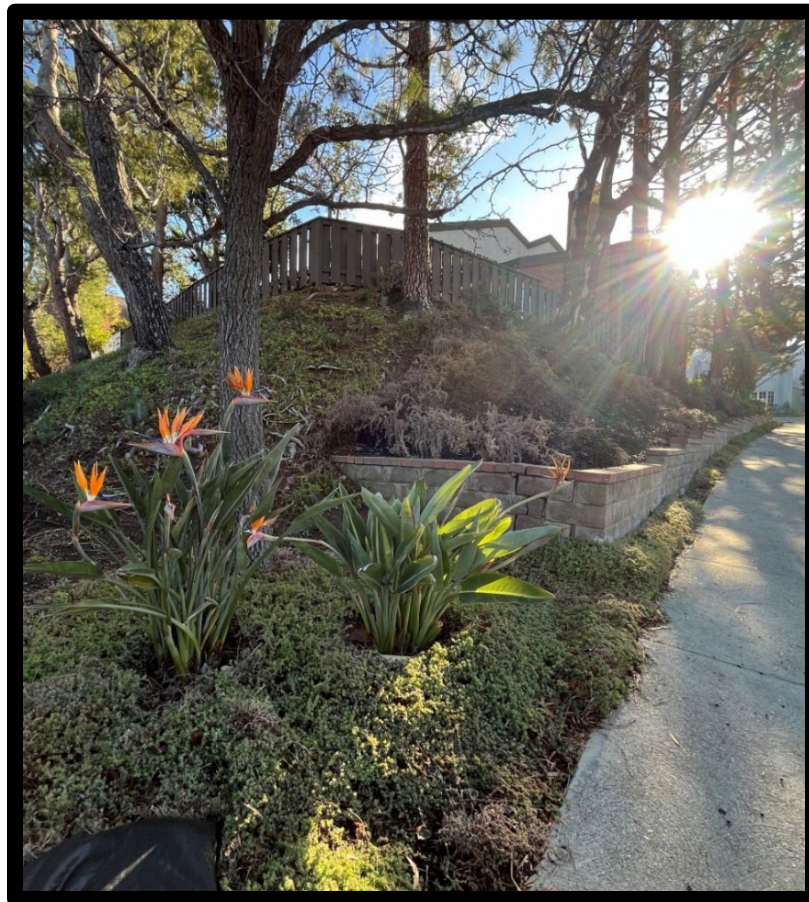
For standing homes and partially burned or destroyed homes, households often discarded mattresses and pillows rather than cleaning or reusing them, while clothing, and appliances were more often cleaned. Indoor and outdoor fruit were also commonly discarded. Results of households impacted by the Palisades Fire are shown below. Households impacted by the Eaton Fire had similar responses. In total, 524 households responded to this question.



Guidance for inspecting, sampling, and testing fire-impacted homes is also available.

After a Wildfire: Considerations for Building Environmental Testing. Sept. 9, 2025. By: Whelton, A.J., Bollens, E., Ferrazzi, C. Purdue University, West Lafayette, Indiana USA. Freely available at <https://docs.lib.purdue.edu/red/1/>

Respondents expressed concern about the safety of their fire-impacted plants, fruit trees, and gardens. Respondents indicated that some of these materials were heat damaged, coated in ash, and had fire-debris on the soil.



Trust & Looking to the Future

Home environmental safety was an important concern. With this in mind, we examined household perceptions of trust about information from different organizations (n = 981).

“ Since the fire, how trustworthy has information been about home environmental safety from ...? ”
– The REBUILD Survey

The choices were:

- Federal agency officials
- Local elected officials
- Colleges/Universities
- L.A. County DPH
- Local safety officials
- Local media
- State elected officials
- Water utilities
- State agency officials
- National media
- Social media

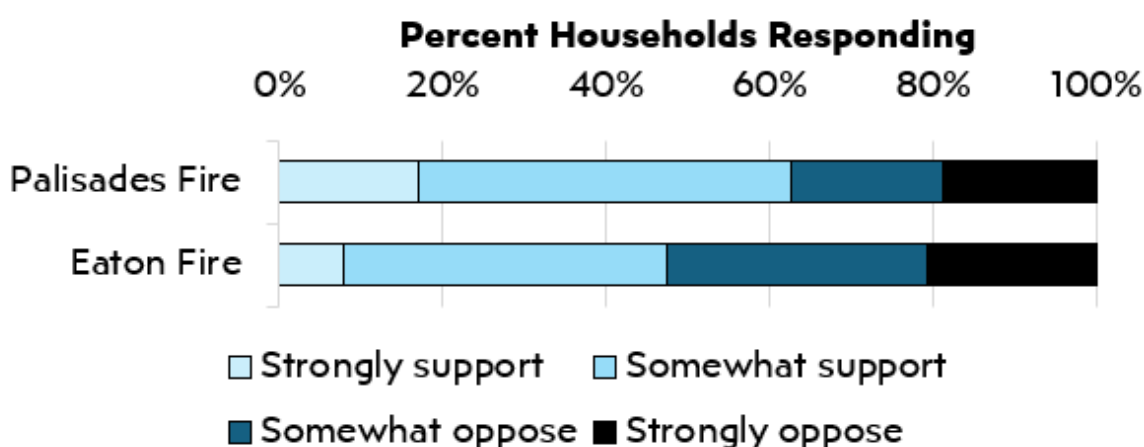
Of these choices, the top four organizations that households trusted “to a great extent” or “somewhat” were fairly similar.

Palisades Fire	Eaton Fire
Local elected officials (58.2%)	Colleges/Universities (64.4%)
Federal agency officials (55.8%)	L.A. County DPH (58.6%)
L.A. County DPH (53.3%)	Local elected officials (55.2%)
Colleges/Universities (52.7%)	Local media (54.0%)

DPH stands for the Department of Health

Insurance & Rebuilding

More than half of the households impacted by the Eaton Fire oppose allowing insurance companies to increase their rates for fire insurance if this enables them to offer insurance for everyone, while more households impacted the Palisades Fire support this action (n= 996).



“ Do you believe your insurance company will provide you enough money to rebuild your home to what it was before the fire? ”

– The REBUILD Survey

Less than one in four households believe they will be provided enough money to rebuild their home (n= 541):

20.5 % Palisades vs. 17.8 % Eaton Fires

“ Please, rank your preference on actions to rebuild fire resilient homes (from most to least preferred). – The REBUILD Survey ”

1. Additional space between the rebuilt home and the property line
2. Bury power lines underground instead of being above ground
3. Fire-resistant materials in rebuilt homes
4. Ignition resistant exterior on rebuilt homes
5. Remove non-native grasses and eucalyptus trees that propagate fire faster than native California plants
6. Triple-pane windows in rebuilt homes for improved fire protection
7. Unvented attics which moves the thermal (boundary to the roof line and does not have vented attics)

The top choice for households impacted by either wildfire was Choice 2, **bury power lines underground** (n= 998):

54.3 % Palisades vs. 66.3 % Eaton Fires

Within those responses we found that households with one or more children more frequently (71.2%) ranked burying power lines underground as their top choice compared to households with no children (56%) who ranked that option as their top choice (n= 998).

Conclusion

Evacuation and Displacement: A significant number of households impacted by the fires reported that they did not receive an evacuation warning on their phone, even while their homes were in a mandatory or voluntary evacuation area. Most households had not returned to living in their fire-impacted home when they completed the survey.

Property Impacts: The most frequently reported exterior items damaged on the property included plants, trees, fences, and buildings. The least often reported items were vehicles, solar panels, and artificial turf. Floors and windowsills were the most common places where ash was reported by households with standing homes.

Environmental Safety Concerns: At the time the survey was completed, nearly three in four households had their drinking water advisories lifted. Safety concerns for soil, outdoor air, and indoor air were much greater than drinking water concerns for each fire-impacted community. Drinking water infrastructure testing, decontamination, and public assurance actions by the drinking water providers likely contributed to the lower household safety concerns observed.

Mental Health Impacts: More than two of every three households believed they had experienced anxiety, stress, or depression associated with damage and environmental threats caused by the fires. More than three of every four households expressed school safety concerns associated with debris removal operation pollution. Household perceptions about the safety of their pets outdoors underscored the continued safety concerns of their environment.

Property Testing and Remediation: A substantial number of households wanted, but had not yet obtained, home environmental testing. Indoor and outdoor fruit as well as mattresses and pillows were the most frequently discarded items.



Trust and Looking to the Future: Across both fires, Colleges/Universities and the Los Angeles County Department of Public Health were the most trustworthy sources of information about home environmental safety.

Insurance and Rebuilding: Less than one in four households, for both fire impact areas, expect their insurance company will provide them enough money to rebuild their home like it was before the fire. For households impacted by either fire, the top ranked rebuilding action towards fire resilient homes is for power lines to be buried underground, not be present above ground.

Context & Recommendations

The following context and recommendations are provided:

1. There are a high number of respondents that expressed safety concerns for outdoor air, soil, and indoor environments. These concerns were frequently associated with anxiety, stress, and depression. Many did not have environmental testing conducted but still wanted this type of support. Safety concerns related to debris removal operations near schools were also expressed. An example of property owner information and soil safety challenges encountered during the fire recoveries is described in the Appendix at the end of this document.

Recommendation: Environmental testing services to identify hazards are needed and should be made readily available to households. Testing data should be transparently and rapidly shared with the public in a context that empowers household decision-making. A list of environmental contractors who conduct soil sampling can be found on the [City of Los Angeles website](#). Property safety and environmental testing decisions should consider the potential health and economic impacts to property owners.

2. For the indoor environment, at the time this report was released, some of the authors had been meeting with households since the fires. That unfunded effort involves reviewing hundreds of home environmental testing reports, property remediation actions, and communications between households, insurance companies, and their consultants. That community-researcher collaboration prompted the development and release of property owner guidance for the environmental testing of fire-impacted buildings. In addition to property owners, this

guidance can assist health officials, insurance companies, and consultants involved in the building environmental sampling, testing, and remediation sector better understand challenges and solutions.

Recommendation: Households and health officials should review the new guidance about home environmental testing. See: After a Wildfire: Considerations for Building Environmental Testing. Sept. 9, 2025. By: Whelton, A.J., Bollens, E., Ferrazzi, C. Resilience for Emergency and Disasters (RED) Series. Purdue University, West Lafayette, Indiana USA. Freely available at <https://docs.lib.purdue.edu/red/1/>

3. The burden to understand property contamination and restore properties to safe use has been shifted to each property owner, and many have full-time employment (data not shown). Each property owner faces an array of recovery topics to navigate. These include, but are not limited to, environmental safety inside and outside their homes or on damaged properties, insurance company and consultant interactions, school selection and attendance decisions, environmental safety of schools, parks, and other natural areas, pet safety, travel to and from their damaged properties, financial decisions, health concerns, among other challenges. Most respondents were not living at their property months after the fires. In comparison to persons who have a home or mortgage, persons who rented their homes prior to the fires seemed to have less support available. Evidence indicates that a global approach to leading and supporting wildfire recovery is lacking for these fires. This is likely contributing to uncertainty and possibly mental and financial stress to property owners.



Recommendation: Local and state leadership on wildfire recovery and rebuilding is recommended to shift the burden away from property owners having to become their own experts on a diverse array of technical topics. More access to actionable information should be made available by local and county agencies.

4. There is a significant number of households who expect that they will not receive enough money from their insurance company to rebuild their homes. [Media](#) reports indicate insurance claim denials are not isolated. [Legal](#) action against the California FAIR Plan also indicates problems with adequately addressing contaminated properties and health risks. The gap in funds needed for rebuilding compared to the funds households expect receive is not [new](#) for California wildfires. But this gap potentially threatens rapid and complete recovery. As property owners deal with the costs of rebuilding, this challenge may spill over into [economic](#) impacts on business. Media reports also indicate that insurance policies for some property owners were [cancelled](#) in the days leading up to the fires.

Recommendation: Insurance, consumer, and business leaders, advocacy organizations as well as insurance regulators should rapidly and transparently investigate the reasons behind claim delays and denials. Reasons for gaps in property damage claim payouts and monies needed to rebuild should be identified. Recommendations on how insurance companies as well as government agencies and policyholders can better prepare for and avoid these outcomes should be developed.

5. [Burying](#) powerlines underground is the top rebuilding survey recommendation by households in both fire impacted areas. [Media](#) reports indicate this action is being publicly discussed. This action has been conducted after past wildfires [elsewhere](#) in California.

Recommendation: Elected leaders and agencies should pursue options that allow for burying powerlines, while also not shifting the financial burden on the households who are trying to rebuild.

6. In the face of [wildfire](#), there remains to be problems with notifying communities that they should evacuate or should be ready to evacuate. The notification [breakdown](#) in Los Angeles County, which is also reported by respondents in the present study, is not unique to these fires or county. Due to the potential for loss of life and injury to community members and first responders, actions should be taken to address the wildfire evacuation notification issues.

Recommendation: As wildfires are continuing to occur, elected leaders and agencies should rapidly investigate and resolve the underlying reasons for the evacuation alert failures to community member phones. Rectifying these issues may assist communities in their awareness and response to other incidents. Evidence that the problems are corrected would be that nearly all households receive evacuation alerts, in some manner, in the face of an incident.



Special Note: Comparing Results Here to Other Fires

Study results here describe household experiences, perceptions, and needs. Because some actions after these fires differed from those of prior fires, there may be challenges with direct comparisons of survey results to those prior events. For example, concerns about residential soil safety here may or may not be like those of prior wildfires. Here, soil testing after debris removal was not required by either Los Angeles County or the State of California. In contrast, it was required by Ventura County after the 2024 Mountain View Fire and Butte County after the 2018 Camp Fire. There are likely also other differences with environmental testing after prior fires that differ from the fires considered in this study. Those factors may have impacted the household experiences, perceptions, and needs expressed in this survey.

Acknowledgement

Special thanks are extended to all the households who helped design the study as well as those who participated in the study. Their contributions have helped other households, policy makers, and researchers better understand the challenges faced after wildfire. Through their time dedicated to this survey, they have helped identify needs and opportunities for improvement so that leaders can better advocate and respond. Appreciation is also extended to Eaton Fire Residents United, Pali Strong, and several drinking water providers for sharing the survey in the communities. Dr. Chhandosi



Roy and Brianne Gilbert from the Thomas and Dorothy Leavy Center for the Study of Los Angeles at Loyola Marymount University are also thanked for their efforts. The team also thanks Nikki Zavodny for drinking water system information and Yao Chen for qualitative information analysis. Appreciation is extended to Yao Chen at Purdue University for her efforts. The design of this Community Survey Report was inspired by past efforts of Professor Lauryn Spearing at Tufts University and Professor Katie Dickinson at University of Colorado Boulder in [their studies](#) responding to natural and man-made disasters. Additional thanks are extended to students for assisting and those students, faculty and staff continuing to assist in data analysis, interpretation and reporting.

Ongoing Community Support Work

Additional survey results will be shared in the coming months. A variety of other wildfire support efforts are ongoing, and their results will also be shared.

The After the Fires Webinar Series: To help households better understand new wildfire recovery developments, research discoveries, and make recovery decisions, a webinar series kicked off August 2025. Information about the topics, dates, and times can be found at the Purdue University website [here](#).

Home Environmental Testing Report Study: To help households make home testing and remediation decisions, Purdue University researchers have been reviewing home testing reports and providing 1-on-1 consultations at no charge since the fires. Households impacted by the 2025 Palisades Fire and Eaton Fire who wish to participate can submit their testing reports to the secure website at Purdue University [here](#). New building environmental testing guidance was created and is [here](#). At the time this report was finalized, this project was unfunded. Persons and groups that wish to support this effort can visit [here](#).

The Los Angeles (L.A.) Pools Study: To help property owners make pool testing and recovery decisions a team of university researchers conducted a rapid response field study. Results were [publicly shared](#). This effort involved contributions by 10 environmental engineering, science, and public health professionals from five organizations.

The Soils Study: To help property owners make soil testing and recovery decisions a team of university researchers are conducting a residential soil sampling study. This effort, led by University of California Los Angeles is analyzing and sharing results publicly with support from Loyola Marymount University and Purdue University. More information about this can be found [here](#).

About Us

Purdue University (West Lafayette, Indiana) led the REBUILD survey and is a land-grant university. The university is a public research institution that discovers and disseminates knowledge at scale. More than 105,000 students study at Purdue across modalities and locations, including nearly 50,000 in person on the West Lafayette campus. The Center for Plumbing Safety within Purdue drives to improve the health and safety of communities worldwide through the development and sharing of actionable knowledge.

Tufts University (Medford, Massachusetts) is a private university that prepares exceptional students in diverse fields for lives of learning and leadership. There are more than 13,000 undergraduate, graduate, and law students including those supported in the Fletcher School of Law and Diplomacy.

University of Kentucky (Lexington, Kentucky) is a land-grant institution whose mission is to educate, innovate, heal, and serve. This public university has 35,000 undergraduate and graduate students.

Cal Poly Pomona (Pomona, California), also known as California State Polytechnic University Pomona, is a public polytechnic research university with approximately 24,000 undergraduate and graduate students. Cal Poly Pomona was founded on the belief that education offers the greatest opportunity and has long been the gateway to opportunity for generations.

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We will continue to share information and study results at our website:

www.PlumbingSafety.org

Appendix

Itemized list of events and information related to soil safety before, during, and after the REBUILD survey was open for data collection.

Prior to the 2025 REBUILD survey opening

- May 2019, representative from the U.S. Environmental Protection Agency (EPA) [claimed](#) to the U.S. Federal Emergency Management Agency (FEMA) that removing 6 inches of soil from wildfire impacted properties “should be sufficient to abate the immediate threats.”
- From 2017 to 2024, the California Department of Resources Recycling and Recovery (CalRecycle) wildfire soil testing [experiences](#) showed that 16% to 32% of the residential properties can remain contaminated (above cleanup goals) after fire debris and 6 inches of soil is removed. Soil testing has been an [integral](#) part of identifying the existence of unsafe wildfire impacted soils in California so that health hazards can be removed and enhance economic vitality to [restore](#) contaminated land. Following prior soil contamination discoveries in California, additional soil was removed from those properties often referred to as “re-scraping” to restore the property. No relationship was found where a single metal contaminant serves as an indicator for all other metals that may be on the property above a cleanup goal.
- In the past, soil testing after California wildfires has been carried-out regardless of who manages the wildfire debris removal operations: federal, state, and county agencies. CalRecycle has historically been California’s authority for wildfire property cleanup.
- September 2020, representatives from CalRecycle [informed](#) the U.S. Federal Emergency Management Agency that removing 6 inches of soil from properties after a wildfire will not abate the immediate threats based on their experience and evidence.

- In 2023, representatives from the U.S. Army Corps of Engineers stated during their Maui wildfire cleanup that they expected 20% of the properties to fail soil testing after 6 inches of soil is removed and those properties would have to be re-scraped to remove the remaining contamination.
- After the 2024 Mountain View Fire in Ventura County, with support from CalRecycle, residential property debris removal and soil testing was carried-out. As a condition of rebuilding, property owners needed to prove to the County that their soil did not exceed specific cleanup goals.
- In January 2025, the Palisades Fire and Eaton Fire occurred in Los Angeles County.
- In February 2025, representatives from the U.S. Federal Emergency Management Agency and U.S. Army Corps of Engineers stated to California that they would not conduct soil testing after debris removal for either the Palisades Fire or Eaton Fire. They also claimed that scraping 6 inches of soil would remove all the contamination and cited the May 2019 U.S. Environmental Protection Agency claim.
- On March 5, the first rebuilding permits for the Palisades Fire area were issued by the City of Los Angeles.

During the period when the REBUILD survey was open

- On April 10, Los Angeles County contractor soil testing results indicated elevated lead levels on properties downwind of the Eaton Fire.
- On April 11, the first permit for the Eaton Fire area was issued by Los Angeles County.
- On May 3, the *Los Angeles Times* reported 2 of the 10 (20%) properties visited impacted by the Eaton Fire, and scraped by federally managed cleanup crews, still had lead levels exceeding the California standard. For the Palisades Fire, none of the 10 properties visited exceeded state lead soil standards after debris removal.

- On May 8, Los Angeles County contractor soil testing results [showed](#) 27% of soil samples collected from 30 properties scraped by federally managed crews had lead levels exceeding the California soil standard. The contractor did not know why this occurred. One theory was that “ash ... blew from adjacent parcels into the scraped area.” The number of properties that exceeded the California soil standard was not reported.
- On May 14, 12 environmental engineering and science professionals from 10 organizations [encouraged](#) the State of California to rapidly provide Los Angeles County technical and financial soil testing assistance similar to the 2024 Ventura County Mountain View Fire model.
- On May 22, Los Angeles County [announced](#) a lead only residential soil sampling program for property owners downwind of the Eaton Fire. This program was still accepting requests at the time this report was finalized. Property owners can submit a soil sample they collect to a commercial laboratory for analysis. This program does not follow established CalRecycle standards for residential property sampling and testing. The Los Angeles County program involves commercial laboratories providing the test results directly to the property owner, and Los Angeles County receives zip code level data.

After the close of the REBUILD survey

- On August 7, the *L.A. Times* [reported](#) that debris removal contractors working for the U.S. Army Corps of Engineers left contamination on some residential properties, among other things.
- During the week of August 18, a Residential Soil Evaluation guidance document was issued by the representatives from the California Department of Substances Control (DTSC) for the January 2025 Los Angeles area fires. In discussions with DTSC, their soil cleanup levels [deviated](#) from some past wildfire approaches where CalRecycle cleanups considered the economic value of leaving contaminated soil on residential properties. While soils may pass the DTSC health-based screening levels, some of those same soils may or may not be



classified as a hazardous waste under *California Code of Regulations* if they are moved offsite because waste management cleanup goals are much lower than the DTSC screening levels. Seven DTSC cleanup goals are less stringent than prior wildfire cleanups (barium, chromium, copper, lithium, nickel, selenium, zinc); mercury was omitted by DTSC where it was recommended for soil testing and cleanup for prior fires, and DTSC's thallium cleanup goal was more stringent for these 2025 Los Angeles area fires than some prior fires.

- On August 25, a University of Southern California led study [reported](#) that 41% of their 2,964 residential property soil samples had lead levels equal to or exceeding California's soil standard of 80 mg/kg. Less than 1% of the soil samples received were defined as hazardous waste (a level of 1,000 mg/kg or greater). The USC study was ongoing, and researchers were continuing to receive soil samples submitted to them by property owners.
- On August 25, a University of California Los Angeles soil testing [study](#) of 474 residential properties indicated that 48% of the properties scraped by federally managed cleanup crews exceeded California's lead standard. An interactive online [map](#) was made available. The UCLA study was ongoing, and soil collected from additional properties was being analyzed for more metals than lead. The researchers were continuing to visit properties, collect and analyze soil samples.
- At the time this report was finalized, the final Los Angeles County contractor soil testing report was not made publicly available.