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Wildfire Impact Assessments

Lessons from the 2025 LA Fires

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Agenda

1. Introduction
2. Technical Guide for Wildfire Impact Assessments, 2025 Edition
3. Snapshot of the Eaton Fire
4. Applying the Technical Guide to Real-Life Situations
5. Restoration and Remediation
6. Post-Restoration Verification

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Technical Guide for Wildfire Impact Assessments

- Forensic Investigations and Exposure Assessments
- Composition and Distribution of Wildfire Smoke
- Inspection and Sampling
- Microscopical and Analytical Methods
- Data Interpretation
- Restoration Specifications

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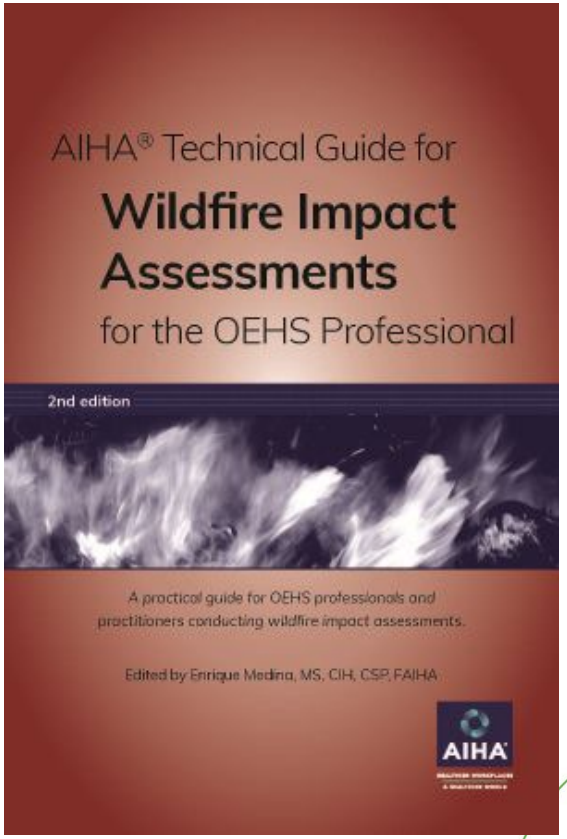

Wildfire Smoke Components

Combustion Byproducts (CBP)

- Char: Organic residue of incomplete combustion of plants
- Ash: Inorganic residue of complete combustion
- Soot: Condensed products of pyrolysis of organic compounds
- Signature Particles: burnt soil, burnt pollen, minerals

Other Potential Contaminants

- Volatile Organic Compounds
- Semi-VOCs
- Polyaromatic Hydrocarbons (PAHs)
- Metals
- High pH

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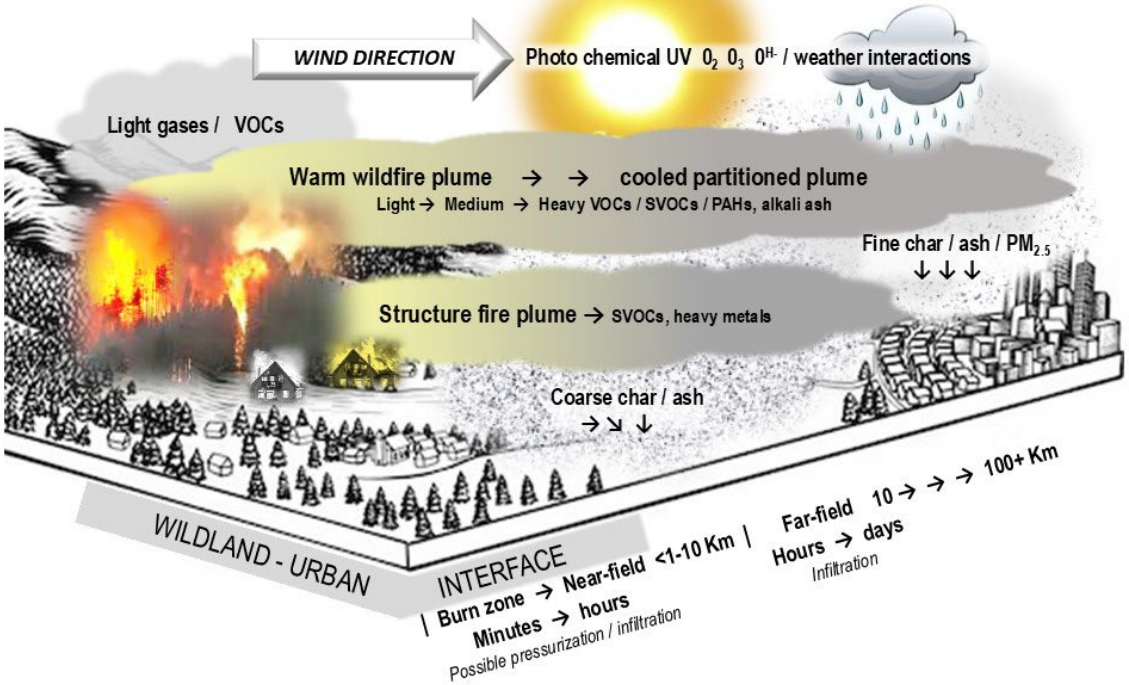
Conceptual Model of Time and Distance



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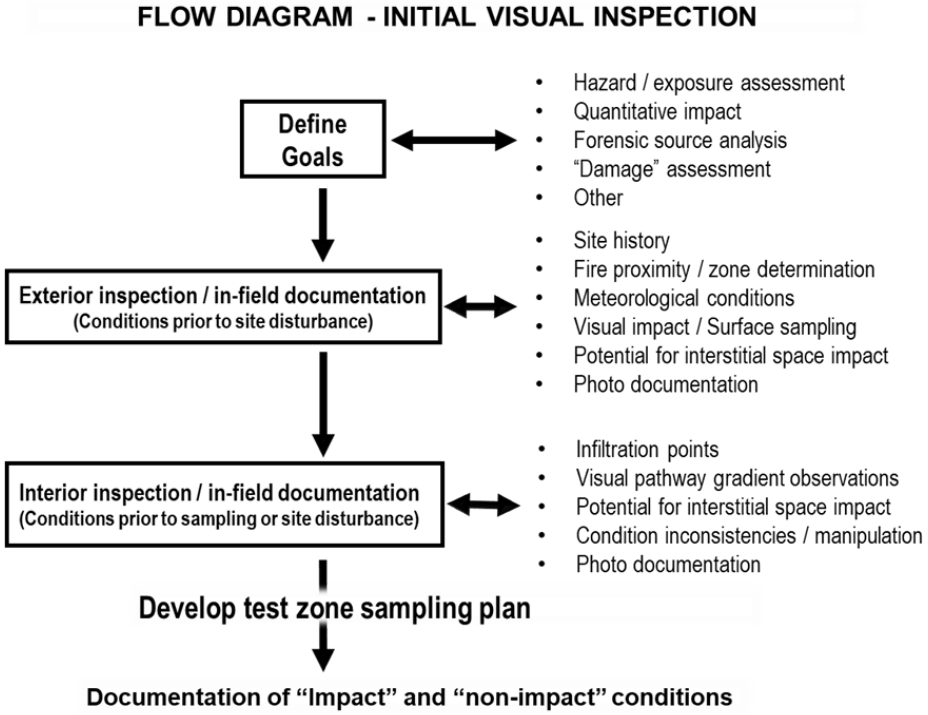
Initial Inspection and In-field Testing



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Initial In-field Testing

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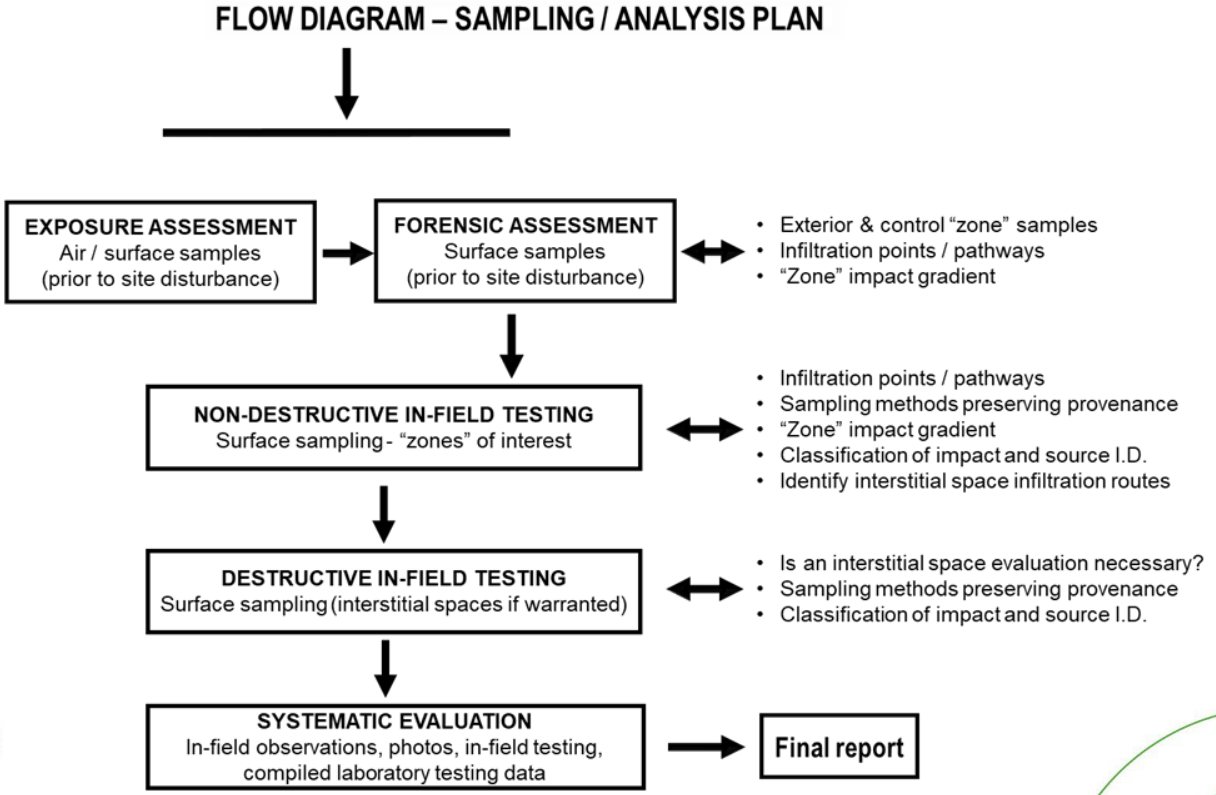
- Testing surfaces for CBP residue
- At Entry Points (doors, windows, attic vents)
- At interior spaces
- White Glove or Low lint paper wipes (Kimwipes)
- Dry Sponge
- Also used in Post-restoration Verification

Sampling and Analysis



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Surface Sampling Techniques

- Tapelift – maintains the structure, composition and spatial integrity of the particles
- Wipes – Standardized sampling area. Best for metals, PAHs
- Micro-vacuuming – Cover large areas for bulk sampling
- Bulk – collect sections of material for analysis.

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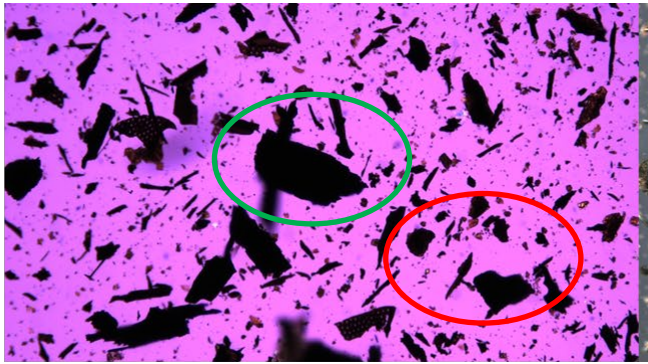
Optical Microscopy Capabilities

Transmitted light brightfield



Transmitted polarized light

Reflected light darkfield

The particles in the green oval are char particles. The particles in the red oval are iron oxide corrosion. These appear black and can only be differentiated as orange in the RLDF illumination mode.

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Data Interpretation

- Exposure assessments and forensic impact evaluations often require different statistical approaches.
- Distribution of settled particulate data following a fire often deviates from the “bell-shaped” normal distribution.
- Using Mean or Average values can lead to errors.
- Probability inference model evaluates differences in distribution rather than differences in mean values.

Restoration Specifications

- The impact investigation report typically includes restoration specifications.
- Prescriptive Specifications: Detail the required procedures and the preferred methods for performing the work.
- Performance-based Specifications: Describe the desired outcomes of a project rather than the step-by-step methods used to achieve them.
- Post-Restoration Evaluation and Verification: incorporate pre-established clearance criteria into the restoration specifications to demonstrate and confirm cleaning effectiveness.

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Professional Judgment

- Background Effects
- Confounders
- Uncertainties
- Wildland Fires
- Wildland-Urban Interface Fires
- Urban Firestorms

- Combustion particles from occupant activities (fireplace, candles, BBQ)
- VOCs in household products
- Outdoor sources
- Unrelated to the Wildfire Event
- Sampling & Analytical Error
- Exposure Reference Values

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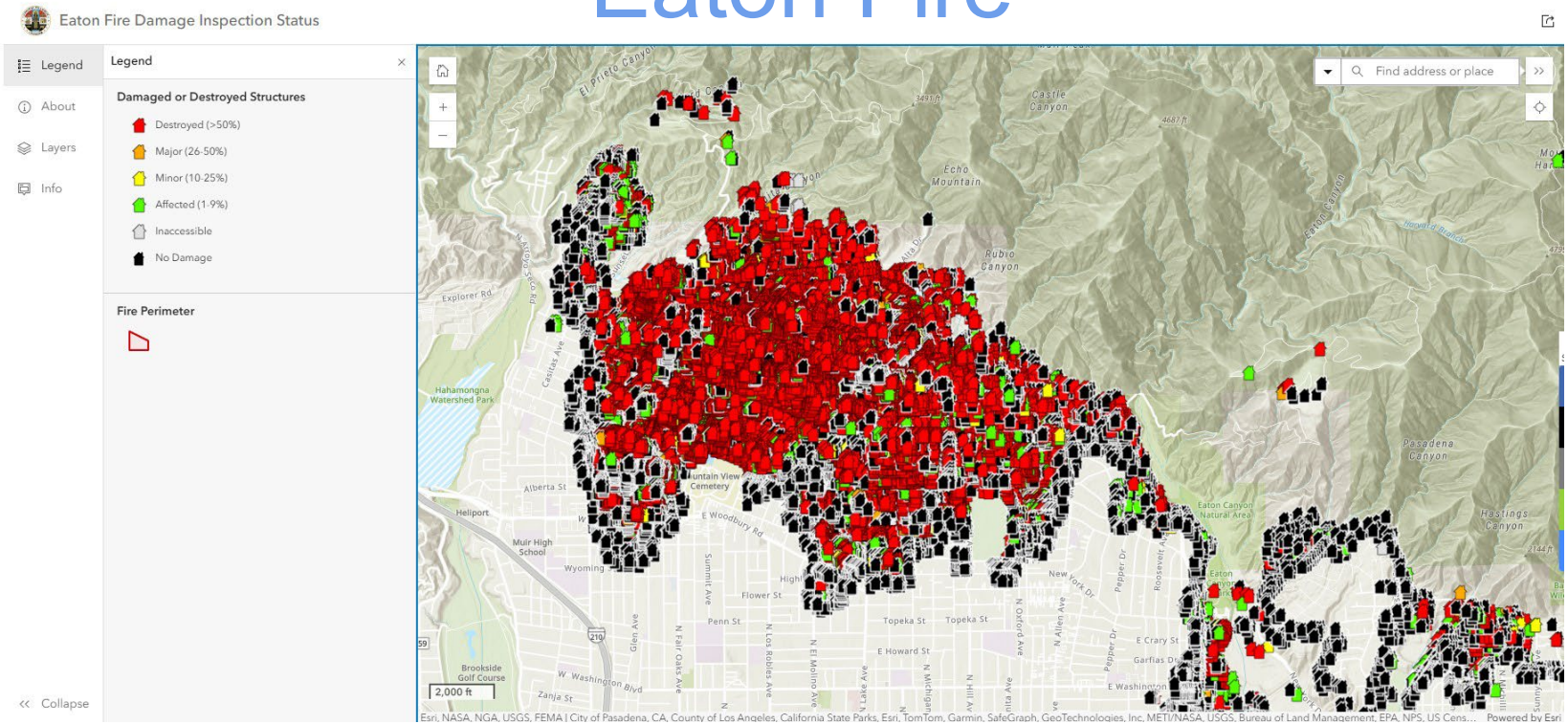
Eaton Fire



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Eaton Urban Firestorm

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Burn Zone Impacts

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Thermal Effects

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Proximity to Burned Structures

- Heat
- Fire storm winds
- Fire Debris
- Structural Materials
- Burned Contents
- Household HazMats
- Chemical Contaminants

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Smoke Infiltration Points

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Testing for Indoor Contaminants

Impact Assessments Include Testing for:

- Ash, Soot and Char (ASC)
- CAM 17 metals
- Semi-Volatiles (SVOCs)
- Some VOCs
- pH

Thousands of samples from over 150 homes have found:

- ASC is the best indicator of contamination
- Lead at Detection Levels
- Lead & Arsenic in Soil
- No elevated VOCs or SVOCs
- No elevated pH

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Air Monitoring

Direct Reading Instruments

- Ultrafine Particulates
- Volatile Organic Compounds
- Initial Screening
- PPE selection
- Soon after the fire
- Subject to dilution, half-life, background effects

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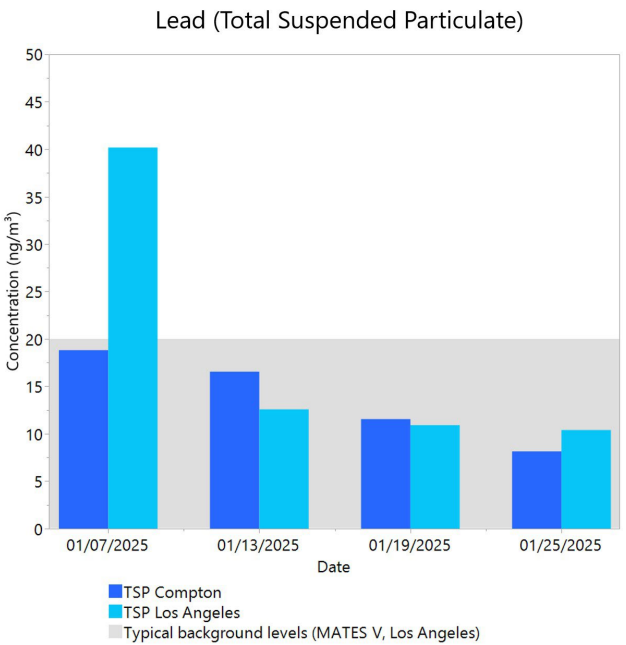
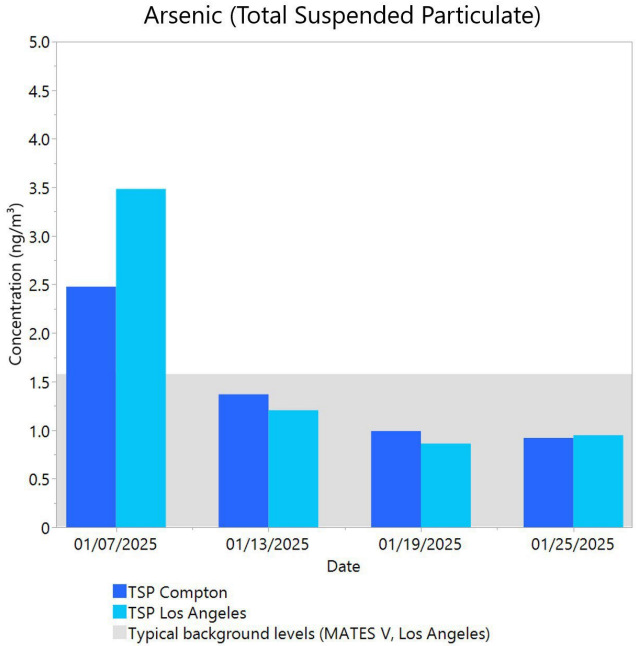
Regional Air Toxics Network

- Lead measurements at seven locations in the Basin
- Lead, arsenic, and other air toxic metals also measured at several Los Angeles sites





From: "Understanding Air Quality After the LA Fires". CARB Webinar, February 10, 2025.

Exterior Sampling

- CAM 17 Metals
- Lead in Soil
  - EPA RSL = 400 mg/kg
  - OEHHA Residential Soil Screening Level = 80 mg/kg
- Pre-1978 housing with LBP
- Legacy Pollutants

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Hazardous Debris Removal

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Debris Recovery: Phase I and Phase II

Phase I

- U.S. Environmental Protection Agency
  - Household hazardous materials
  - Removed by hand by experts trained to work with chemicals
  - The first step in the recovery process

Phase II

- U. S. Army Corps of Engineers
  - Bulk debris, soil, ash
  - Materials removed with heavy equipment
  - Occurs after a property is Phase I complete

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Demolition Worker Hazards

- Safety Hazards
- Trips and Falls
  - Punctures and Cuts
  - Falling Objects
- Lead
- Asbestos
- PAHs

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Restoration Guidelines

- Restorer Qualifications
- Restoration Work Plan
- Work Area Isolation & Containment
- PPE
- Cleaning Methods
- Odor Treatment
- Contents Restoration
- Removal and Replacement of Contents and Personal Property Beyond Restoration
- Attics and HVAC Systems
- Post-Restoration Evaluation
- Post-Restoration Verification

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Attics and HVAC Restoration

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Post-Restoration Verification

- Verify the successful restoration and return of the structure, systems, or contents as close as possible to a pre-loss condition.
- Performed by an independent, third-party OEHS professional.
- For Restoration or Exposure Assessment
- Surface and bulk sampling for wildfire combustion residue, metals, PAHs
- Pre-established clearance criteria with pass/fail metrics.
- Resolution of all recognized health and safety hazards.

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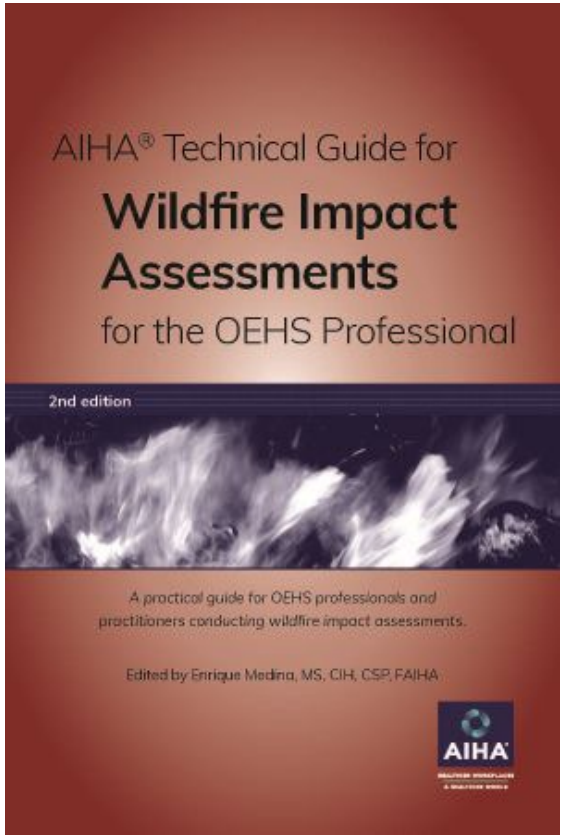
AIHA Technical Guide for Wildfire Impact Assessments for the OEHS Professional 2nd Edition, 2025



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Questions & Comments?

Thank You!

For your attention and time

Contact

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