

Occupational Hazard & Risk Control Tools in Wildland Fire

FEDERAL WILDLAND FIREFIGHTER **HEALTH AND WELLBEING** PROGRAM

Mitigations for Occupational Hazards in Wildland Fire

The wildland fire environment is dynamic and there is no one-size-fits-all solutions to mitigate its hazards. However, these hazards can be minimized through the hierarchy of controls (Figure 1) from the National Institute for Occupational Safety and Health. The Hierarchy of Controls is a framework used to identify and rank safeguards to protect workers from hazards. The effectiveness of control measures is based on the amount of human interaction involved in implementation. For example, for personal protective equipment to be effective, it must be used correctly and consistently.

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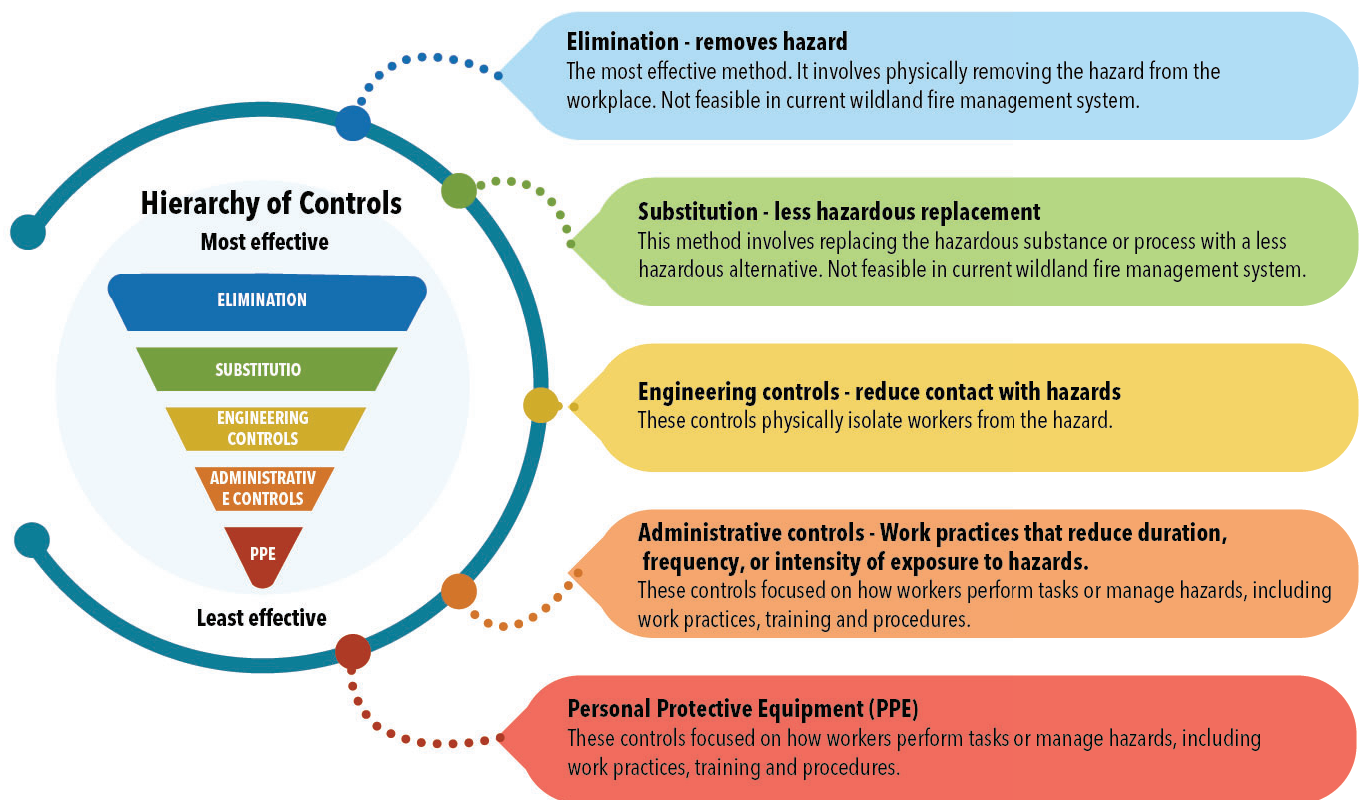


Figure 1 - Hierarchy of Controls

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Use the following exposure controls and mitigation strategies to inform risk-based decision making. These tools align with the specific hazards of wildland fire suppression and are meant to protect the health of wildland fire personnel. Some risk tradeoffs must be evaluated against other workplace hazards. Many controls are applicable to both suppression and prescribed fire operations.

Exposure Controls and Mitigations for 2026

Engineering Controls

Engineering controls can help reduce contact with hazards. In the wildland fire environment, consider whether you can implement the following engineering controls:

- Prior to establishing fire camps, staging areas, forward operating bases, or spike camps, consider historical smoke impacts and seek alternatives for heavily impacted areas. Consult with the interagency air quality response program (e.g., air resource advisors) and local subject matter experts (e.g., fire management officers) to identify fire camp locations where smoke is less likely to concentrate.
- If fire camps are experiencing prolonged smoke impacts, provide and promote adequate rest and recovery options from smoke exposure (e.g., clean air sleeping trailers, air purifiers, and hotel rooms). Use hotel rooms when conditions warrant and locations allow. Spike camps or forward operating bases should also be evaluated as alternatives. Order mobile sleeper units when fire camps are established for day and night shifts.
- Order mobile shower and laundry units for large incidents when fire camps are established.
- Provide and support the use of separate laundering facilities for contaminated personal protective equipment (e.g., washers and dryers at home units and on wildfire incidents).
- Heavy equipment with enclosed cabs can reduce exposure to smoke and ash for operators while increasing the scale of work performed and decreasing the number of personnel needed on the fireline, resulting in fewer firefighters exposed to these hazards.
- Maximize the use of hose lays, sprinklers, foam and retardant to minimize exposure to ground personnel.
- Increase use of unmanned aerial systems for firing, patrolling and monitoring operations.

Administrative Controls

Administrative controls involve changing work practices to reduce the duration, frequency or intensity of exposure to hazards.

- Provide education and information on the signs and symptoms of smoke impacts.
- Involve personnel in development of operational strategies or methods by creating opportunities to share feedback (e.g., during after action reviews); contribute ideas (e.g., during planning meetings); and participate in health initiatives.

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- Establish a plan before daily operations begin to rotate personnel in and out of high and unavoidable smoke exposure areas throughout and between work shifts. This can include rotating crews to different divisions when work assignments allow to provide time in better air quality conditions.
- When working or hiking in dust or ash, increase spacing between each person to reduce inhalation exposure for yourself and others nearby.
- Reduce time spent exposed to hazards during operational shifts:
 - o Minimize prolonged mop-up operations and avoid dry mopping. Use water to mitigate dust and ash. Be aware that creating steam may aerosolize particulates.
 - o Use fire behavior modeling and analytics specific to the fuel type (e.g., spotting potential); fire weather conditions (e.g., probability of ignition, forecasted winds and relative humidity); and values at risk to inform appropriate mop-up specifications.
 - o Patrols, unmanned aerial systems and infrared tools can be used as alternatives to prolonged mop-up.
 - o When keeping resources assigned to an incident for contingencies, stage personnel and use active patrols instead of continuous mop-up or other sustained interior work that may result in unnecessary exposure to hazards.
- Ensure environmental hazards and exposure are included in incident risk assessment processes and add them as a major risk influencer in the Incident Strategic Alignment Process if appropriate.