

Smoke Action Team Explores Options to Reduce Air Particulate Matter at ICPs

Background

A conversation between a Wapiti Fire Plans Section Chief and a Regional Risk Management Officer about air quality conditions at Incident Command Posts (ICP) sparks the creation of a Smoke Action Team. Over the winter, the team researches options and formulates a plan for field testing them.



Smoke impacts at the 2024 Wapiti Fire Incident Command Post were similar to those on the Lynx and Rattlesnake fires.

Summary

Over the course of a career in wildland fire, the elevated level of particulate matter that personnel are exposed to appears likely to [increase the risk](#) for heart and lung disease, as well as certain cancers. For those working in ICPs, there are options to reduce this hazard.

To explore these options, in September 2025, the Smoke Action Team for the U.S. Forest Service Intermountain Region set up 11 portable “Air Scrubbers” in office trailers and office tents at the Incident Command Post for the Lynx and Rattlesnake fires in Washington state. (Air Scrubbers are portable filtration systems that pull in dirty air, run it through a multi-stage process, and expel clean, contaminant-free air. They are essentially fans with particle filters housed in a ruggedized case.)

The Incident Management Team’s (IMT) Safety Officer laid the groundwork prior to the Smoke Action Team’s arrival. The Safety Officer shopped the idea of Air Scrubbers to each of the office workspaces and relayed to the Smoke Action Team: “*I didn’t get any hard ‘No’s’ about the idea.*”

Smoke spiked overnight and throughout the morning each day of this 11-day deployment. Using smoke monitors, the team monitored both inside and outside air at camp. Outside smoke often reached “Very Unhealthy” on the Air Quality Index (AQI) for several hours, while in trailers with Air Scrubbers, air remained at “Good” or “Moderate” levels.

More than 100 personnel were working in ICP daily with 25 total offices (tents and trailers). There were not enough Air Scrubbers for each workspace. However, the facilities without them allowed for a comparison of the scrubbers’ effectiveness.

This field test showed that these Air Scrubbers were very effective at reducing fine particulate matter (PM2.5) concentrations in the office spaces—up to an 89 percent improvement over the outside air. Even in yurts, which are porous by nature, the AQI did not reach “Unhealthy” with a scrubber in use.



An Air Scrubber is a fan with a multi-layer particle filter system housed in a ruggedized case.

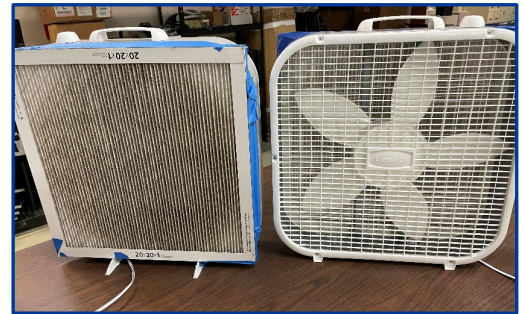
In addition, the Smoke Action Team found that some ICP personnel observed improvements in their respiratory irritation and decreases in the spread of camp crud.

Based on these results, the Smoke Action Team encourages the continued use of Air Scrubbers in ICPs and increasing the awareness and accessibility of this equipment as one part of an exposure reduction strategy.

Implementing Air Filtration

At the Lynx Fire, the Incident Management Team had limited ICP locations to choose from. Knowing it would be smoky (ICP was located down drainage of the Lynx Fire and diurnal winds often push smoke down drainage at night), they placed Air Scrubbers and box fan filters in their workspaces. Testing showed that Air Scrubbers were the most effective mitigation. Box fans with standard furnace filters attached also provided a significant benefit.

Not surprisingly, hard-sided trailers limit smoke better than tents/yurts—but filtration is still effective in both of these shelter types.



A box fan with attached filter can be effective if scrubbers are unavailable.

Air filtration Key Points:

- ❖ The Final Stage Filter in an Air Scrubber is generally [High Efficiency Particulate Air](#) (HEPA) rated, the highest level of certification.
- ❖ Air Scrubbers' most common use is in construction; they are often available from equipment rental shops.
- ❖ Standard 20-inch box fans can be bought at hardware stores, ordered via the cache (NFES #7172), or may even be part of the equipment an IMT brings to the fire.
- ❖ While box fans are not designed for drawing air through a filter, as long as the fan is newer than 2012, there is no concern for a motor fire. 20-inch x 20-inch filters can be purchased at hardware stores or in bulk.
- ❖ Filters for box fans use a "MERV rating"—MERV 13 or higher. A single filter can be effective, but assembling multiple filters in a cube with the fan on one side will [increase airflow](#).
- ❖ Voluntary respirator use (an N95 mask) is allowed in fire camp and can be used any time it is smoky or while longer-term solutions like scrubbers or box fans are assembled.

Lessons

The health profile of support personnel in ICP may make them more likely to experience adverse outcomes during smoke events. These employees do not have the same fitness and health screening requirements as line firefighters and may be more at risk of smoke exposure. Click this [EPA Wildfire Smoke and Health Factsheets link](#) to learn more about the effects of wildfire smoke and what groups are more at-risk.

Often the worst smoke, on the largest fire growth days, occurs early during the incident and/or prior to an IMT's arrival. Getting logistics for air quality mitigations in place quickly will reduce overall exposure. An Air Resource Advisor can help with this.

Consider ordering an Air Resource Advisor. They can set up air quality monitoring and mitigations at ICP and spike camps in addition to their role in monitoring air quality for public safety. See your geographic area mobilization guide for how to order one of these technical specialists. (Learn more about the Air Resource Advisor program by clicking on this [link](#).)

Air scrubbers work best. For box fans, the cheaper filters provide only modest benefit. It's more effective to use tighter-woven furnace filters ("MERV 13" rating, approximately \$30). But these can be more difficult to source.

Available Resources

- ❖ Video: Protecting Wildfire Personnel from Smoke [NWCG](#) – YouTube
- ❖ Federal Wildland Firefighter Health and Wellbeing Program: health.nifc.gov

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