

An aerial photograph of a wildfire. The fire is concentrated in a forested area, with numerous bright orange and yellow flames visible. Thick plumes of white and grey smoke rise from the fire, drifting across the landscape. The surrounding terrain is a mix of green forest and brown, charred ground. The overall scene is dramatic and highlights the scale of the fire.

Risk Management of Wildfire Smoke

Science of Wildfire Smoke

Science of Wildfire Health Impacts

How to Protect Participants

Risk Assessment of Wildfire Smoke

Strategies for Field Mgmt



Wildfire
Smoke
Constituents

100s of individual compounds

Carbon Monoxide

Formaldehyde

Benzene

Nitrous Oxides

Visible portion of smoke =
Particulates

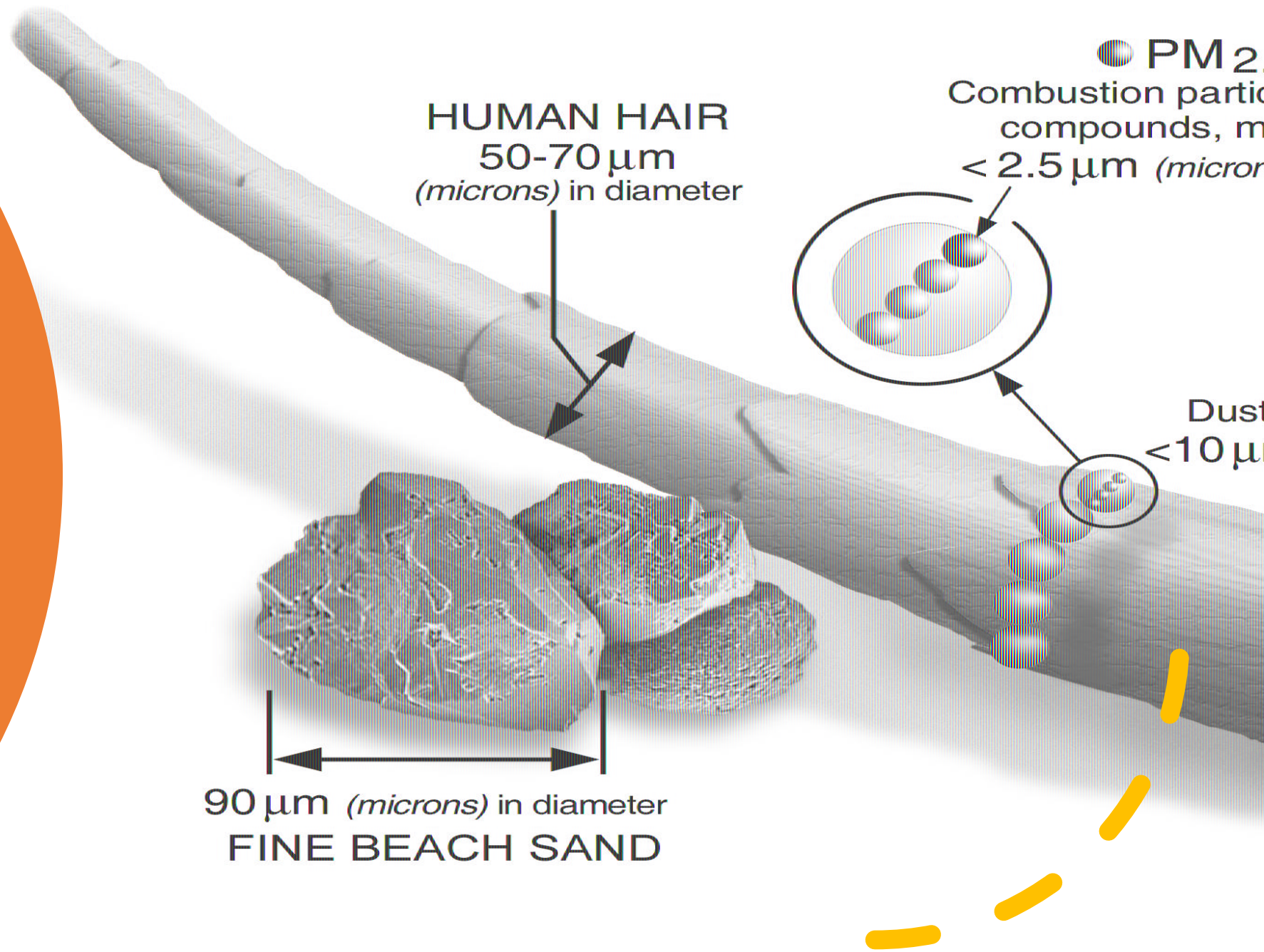


Wildfire
Smoke
Constituents

90% of particulates
emitted by wildfires
are 2.5 microns in
diameter or smaller



Wildfire Smoke Constituents



AQI (US)	PM2.5 ($\mu\text{g}/\text{m}^3$)	Remark
0-50	0-12	Good
51-100	12-35	Moderate
101-150	35-55	Unhealthy for Sensitive Individuals
151-200	55-150	Unhealthy
201-300	150-250	Very Unhealthy
>300	>250	Hazardous

U.S. AQI

vs

India NAQI

AQI (US)	PM2.5 ($\mu\text{g}/\text{m}^3$)	Remark	NAQI (India)	PM2.5 ($\mu\text{g}/\text{m}^3$)	Remark
0-50	0-12	Good	0-50	0-30	Good
51-100	12-35	Moderate	51-100	30-60	Satisfactory
101-150	35-55	Unhealthy for Sensitive Individuals	101-200	60-90	Moderate
151-200	55-150	Unhealthy			
201-300	150-250	Very Unhealthy	201-300	90-120	Poor
>300	>250	Hazardous	301-400	120-250	Very Poor
			401-500	>250	Severe

SECTION 2: Health Effects of Fire & Smoke

-



Positioning Wildfire Smoke Health Risk



Health problems linger for Seeley Lake residents months after Rice Ridge Fire

KTMF News Anchor Feb 12, 2019 Updated Aug 14, 2019

It's been nearly 19 months since the Rice Ridge Fire tore through the small town of Seeley Lake.

Today, residents are still feeling the effects from that wildfire's smoke.

The megafire was sparked by lightning in July 2017 and burned more than 160,000 acres.

And with the flames came the smoke for months.

At Monday night's community council meeting in Seeley Lake, residents were given a deeper look at data collected from a study conducted by University of Montana researchers.

They studied the lung function, blood pressure, heart rate and behavior of 95 men and women from Seeley Lake.

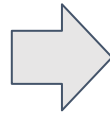
They found that the majority of people continue to experience decreased lung capacity with men suffering from the problem worse than women.



Body's response to particulates

- Body responds by releasing the same immune cells deployed to attack viruses
- But immune cells can't break down the particulate matter
- Results in **inflammation**

- Macrophage inhibition



[Toxicol Appl Pharmacol. 2011 Dec 1; 257\(2\): 182-188.](#)

PMID: [2194541](#)

Published online 2011 Sep 16. doi: [10.1016/j.taap.2011.09.003](#)

Why is Particulate Matter Produced by Wildfires Toxic To Lung Macrophages?

[Lisa M. Franzi](#), [Jennifer M. Bratt](#), [Keisha M. Williams](#), and [Jerold A. Last](#)*

- Primary toxicological concern: concentration x duration
- Concentration is affected by proximity and by breathing rate

Other than particulates...

Burning biomass may release

- volatile organic compounds
- carbon monoxide
- polycyclic aromatic hydrocarbons
- carcinogens
- fungal particles
- ozone

Wilderness-Urban Interface (WUI) burns may release urban chemicals

Free radical and ozone activation by light

Prescribed Wildfire vs Natural Wildfire

EPA Releases Report Comparing Air Quality and Public Health Impacts from Prescribed Fire and Wildfire Smoke

September 30, 2021

Contact Information

U.S. EPA Press Office (press@epa.gov)

WASHINGTON - Today, the U.S. Environmental Protection Agency (EPA) in collaboration with the U.S. Forest Service (USFS), the U.S. Department of Interior (DOI) and the National Institute of Standards and Technology (NIST) released a report comparing the air quality and health impacts of smoke from prescribed fire, which is used as a land management tool, with wildfire. The “Comparative Assessment of the Impacts of Prescribed Fire Versus Wildfire (CAIF): A Case Study in the Western United States” report found that while a prescribed fire can reduce the overall size of a future wildfire and the associated smoke emissions and smoke-related health impacts, smoke is still emitted. As a result, using prescribed fire is not without risk as it can result in smoke related air quality and public health impacts, but at a much smaller scale compared to a wildfire.

Risk Factors

Age:

< 18 or > 65

Has:

COPD, asthma, bronchitis, or other lung diseases

chronic heart disease

diabetes

pregnancy

low socioeconomic status

people of color

outdoors worker (often glossed as “responder”)

Short-Term Health Effects: Science

Asthma-related ER visits in the US were 17% higher than expected during Canadian wildfires, new CDC study finds

By Jacqueline Howard, CNN

Updated 2:39 PM EDT, Thu August 24, 2023

Sub-Daily Exposure to Fine Particulate Matter and Ambulance Dispatches during Wildfire Seasons: A Case-Crossover Study in British Columbia, Canada

Jiayun Yao,¹ Michael Brauer,¹ Julie Wei,² Kimberlyn M. McGrail,¹ Fay H. Johnston,³ and Sarah B. Henderson^{1,4}

¹School of Population and Public Health, University of British Columbia, Vancouver, British Columbia, Canada

²British Columbia Emergency Health Services, Vancouver, British Columbia, Canada

³Menzies Institute for Medical Research, University of Tasmania, Hobart, Tasmania, Australia

⁴Environmental Health Services, British Columbia Centre for Disease Control, Vancouver, British Columbia, Canada

Short-Term Health Effects: Advocacy

“Particle pollution triggers asthma attacks, heart attacks and strokes—and can kill. Studies of children in California found that children who breathed the smoky air during wildfires had more coughing, wheezing, bronchitis, colds, and were more likely to have to go to the doctor or to the hospital for respiratory causes, especially from asthma.”

American Lung Association, <https://www.lung.org/blog/how-wildfires-affect-health>

“The lungs of mice when exposed to wildfire... PM 2.5 [particles] showed significant damage, as measured by histologic evaluation of inflammatory cell influx.”

Environmental Health Perspectives, California Wildfires of 2008: Coarse and Fine Particulate Matter Toxicity, 2009, Vol. 117 (6):893-897.

From Honn:

<https://web.archive.org/web/20130419012403/http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/hidd-en-health-costs-of-forest-fires.html>

Short-Term Health Effects: Reassurance

“The scientific evidence does not indicate that particles generated from wildfire smoke are more, or less, toxic than particles emitted from other sources.”

(EPA’s Wildfire Smoke: A Guide For Public Health Officials, 2021, citing U.S. EPA 2009; DeFlorio-Barker et al. 2019).

“Although a large population can be exposed to smoke during a wildfire event, most healthy adults and children will recover quickly from wildfire smoke exposure.”



(EPA’s Wildfire Smoke: A Guide For Public Health Officials, 2021)

https://www.airnow.gov/sites/default/files/2021-09/wildfire-smoke-guide_0.pdf

Short Term Health Effects: Revisitation

PAPER • OPEN ACCESS

Wildfire smoke exposure and emergency department visits in Washington State

Annie Doubleday^{3,1} , Lianne Sheppard^{1,2}, Elena Austin¹ and Tania Busch Isaksen¹ 

Published 25 May 2023 • © 2023 The Author(s). Published by IOP Publishing Ltd

[Environmental Research: Health, Volume 1, Number 2](#)

Citation Annie Doubleday *et al* 2023 *Environ. Res.: Health* 1 025006

DOI 10.1088/2752-5309/acd3a1

In stratified analyses, we observed elevated odds for respiratory visits among ages 19–64, for asthma visits among ages 5–64, and mixed risk estimates for cardiovascular visits by age group. This study provides evidence of an increased risk of respiratory ED visits immediately following initial wildfire smoke exposure, and increased risk of cardiovascular ED visits several days following initial exposure. These increased risks are seen particularly among children and younger to middle-aged adults.

Short-Term Health Effects: Revisitation

Article | [Open access](#) | [Published: 05 March 2021](#)

Wildfire smoke impacts respiratory health more than fine particles from other sources: observational evidence from Southern California

[Rosana Aguilera](#) , [Thomas Corringham](#), [Alexander Gershunov](#) & [Tarik Benmarhnia](#)

[Nature Communications](#) **12**, Article number: 1493 (2021) | [Cite this article](#)

Short-Term Health Effects: Mortality

“A recent EPA study estimated annual mortality in the US due to exposure to smoke of 1500-2500.”

- (<https://www.wildlandfiresmoke.net/smoke-ready>) IWFAQRP





Science of The Total Environment

Volumes 610–611, 1 January 2018, Pages 802-809



The health impacts and economic value of wildland fire episodes in the U.S.: 2008–2012

Neal Fann^a  , Breanna Alman^a, Richard A. Broome^b,
Geoffrey G. Morgan^c, Fay H. Johnston^d, George Pouliot^e, Ana G. Rappold^e

Long-Term Health Effects

Long-term cardiovascular disease & respiratory complications

Neurological complications

Cancer (carcinogens)

Heavy metal Poisoning (mercury)

For children, possible stunting of lung development and downstream respiratory problems

“An article by the American Thoracic Society found that with an increase of 10 micrograms per cubic meter of particles over two years, the risk of dying was increased by 32% for people with diabetes, 28% for people with COPD, asthma and pneumonia, 27% for people with congestive heart failure and 22% for people with inflammatory diseases”

Am J Respir Crit Care Med. 2006, 173 (6): Reduction in Fine Particulate Air Pollution & Mortality, Extended Follow-Up of the Harvard 6 Cities Study.

Long-Term Effects

“The limited number of epidemiologic studies that have specifically examined the cumulative effect of wildfire smoke exposure on health have been studies of wildland firefighters. There is initial evidence that continuous occupational wildland fire smoke exposure (i.e., over multiple days) may have a cumulative effect on lung function, with some studies observing a progressive decline during burn seasons. However, it is unclear if this decline persists across off-seasons and it is difficult to compare a wildland firefighter’s occupational exposure and resulting health effects to those experienced by the general population.”

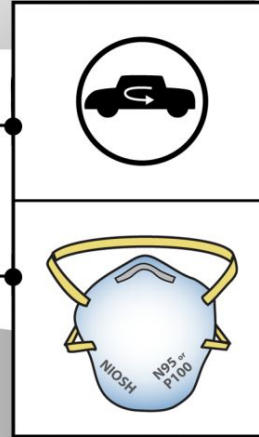
(EPA’s Wildfire Smoke: A Guide For Public Health Officials, 2021, citing Adenota 2016).

EPA Reduce health risks in areas with wildfire smoke:

Follow these tips, especially if someone in your family (including you!) has heart or breathing problems, is an older adult or child, or is pregnant.

DO

- Stay inside
- Pay attention to local advisories and check air quality (airnow.gov)
- Set car A/C on recirculate (to keep smoke out)
- Keep a supply of medicine and non-perishable food
- Use a well-fitted N95 or P100 respirator if you go outside when it is smoky
- Prepare to evacuate if smoke levels get too high



KEEP AIR CLEAN

Close windows and doors.
Close fresh intake on A/C units.
If your home is too warm, try to stay with friends or relatives.

Use a portable air cleaner with HEPA filters properly sized for a specific room.

DON'T

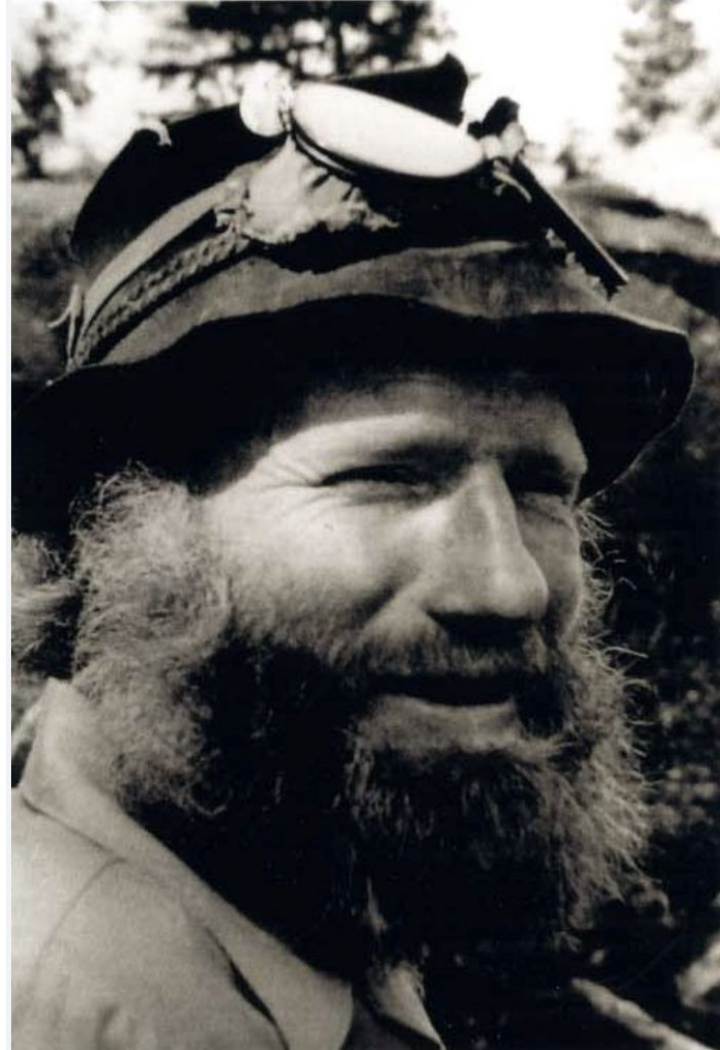
- X** Play or exercise outdoors
- X** Fry or broil foods, which can add particles to indoor air
- X** Use a fireplace, gas logs or gas stove
- X** Smoke indoors
- X** Vacuum, it can stir up dust



Medical Screening



Unsoeld Variant



What About Masks?



Masks: 2021's Essential Hiking Gear | Appalachian Trail Conservancy

[Visit](#)

Respirator Masks

- wear a **particulate respirator mask**, also known as an N95 or P100 mask, with two straps, that is NIOSH-certified
- One-strap masks, surgical masks, and bandanas (wet or not) do NOT filter out the tiny particulate matter present in wildfire smoke.
- particulate respirator masks **must fit tightly to work properly, so they actually make breathing more difficult**

Problematic Groups for Respirator Use

- Children! Respirators are not sized for children and therefore won't be as effective
- People with previous respiratory issues including asthma
- People who are not physically fit may experience difficulty going about daily tasks due to reduced oxygen intake.
- People with heart or lung disease should consult with their doctor before using a respirator.
- Whitewater activities
- Not recommended for those who already have trouble breathing, or for use while engaged in strenuous physical activity.

•

When to get rid of a mask

- Discard the respirator when: (1) it becomes more difficult to breathe through it, or (2) if the inside becomes dirty. If necessary, use a fresh respirator each day.
- Keep your respirator clean and dry. Be sure to read and follow the manufacturer's recommendations on use and storage
- How long to use masks? In some cases — like when the conditions are hazardous — it may be best to use it once and toss it. N95 masks are not meant to be reused, and with each use or clean, they become less effective.



Action Steps



Track Fires



Assess Risk



Plan



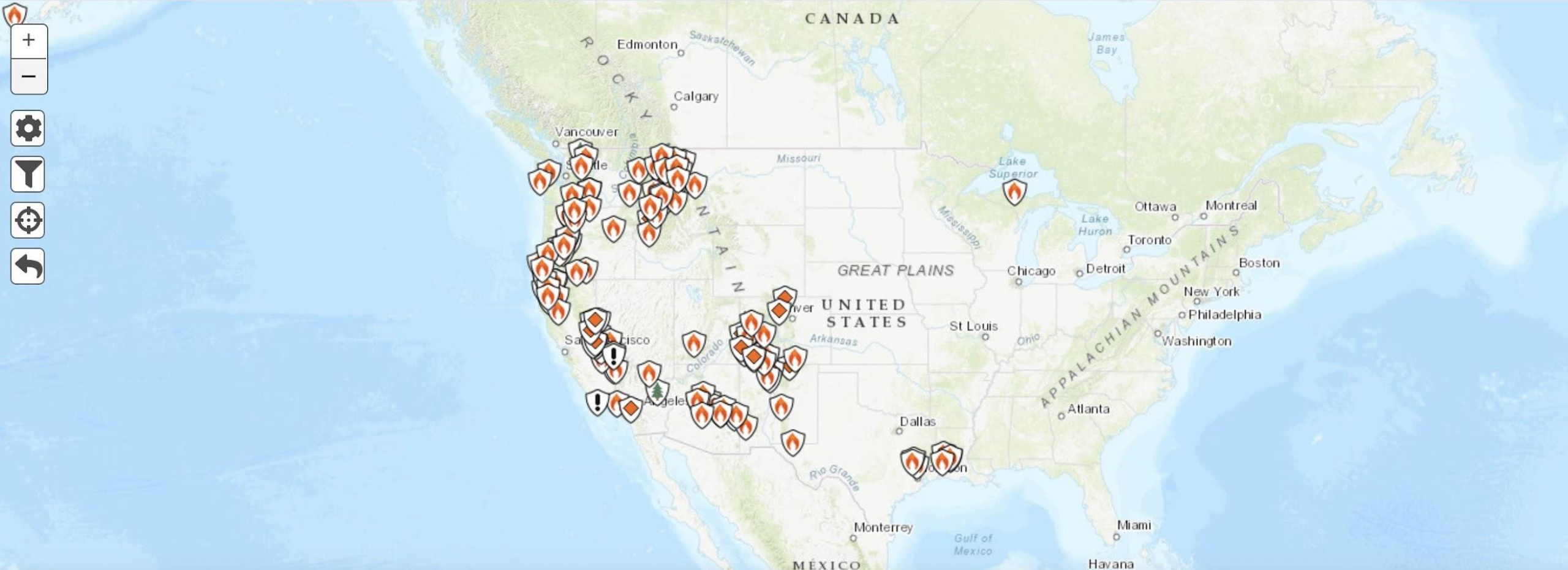


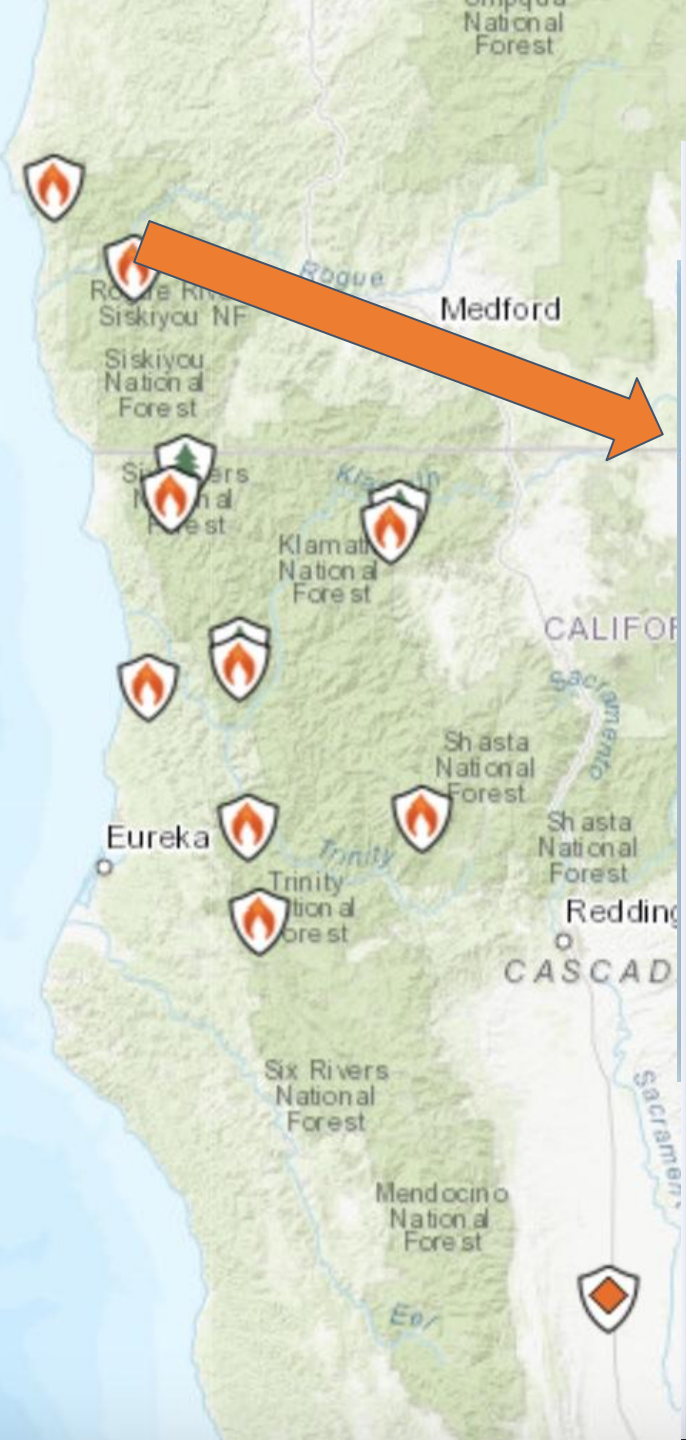
Inciweb



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Outlook

<p>Planned Actions</p>	<p>Evaluate conditions and only engage in suppression repair where it is safe and effective to do so.</p>
	<p>12 Hours: High pressure builds into the area today bringing mostly sunny sky with subtle warming and drying. Fire behavior remains limited to isolated areas of smoldering heavy fuels. Sheltered areas under timber canopy are retaining heat, especially in large fuels, and heavy fuel concentrations.</p> <p>24 Hours: Above average temperatures with additional drying and breezy northeast wind flow pattern is likely to continue as high pressure builds into the area. Sheltered surface fuels will remain damp, while exposed fine fuels will respond to with limited drying, soils remain wet. Isolated heavy fuels continue to retain heat due to long-term dryness. Fire behavior will consist of isolated smoldering with limited smoke production.</p>
<p>Projected Incident Activity</p>	<p>48 Hours: Continued warm and dry, moderate north-northeast winds, and a generally clear sky. Limited surface drying in exposed surface</p>

Current Weather

<p>Weather Concerns</p>	<p>Tuesday: 10/17: High pressure began to build into the region on Tuesday. Localized areas of low clouds and fog were observed across the region early in the morning. Otherwise, it was sunny with warming temperatures. Temperatures were mainly 60-70 degrees with a few locations pushing past 70. Relative humidity was 55-65 percent. Winds were northeast 8-12 mph with a few gusts to 15.</p> <p>Wednesday and Thursday: 10/18-19: High pressure will continue to strengthen across the region on Wednesday and Thursday. This will allow temperatures will rise to above normal with afternoon highs from the mid-60s to mid-70s. Relative humidity will be from 35-50 percent. Winds will be light, less than 10 mph, and mainly out of the northeast.</p> <p>Friday: 10/20: High pressure will begin to bend down as a weather system moves into the eastern Pacific. Temperatures will begin to cool down and relative humidity increase. Afternoon high temperatures will begin to cool off, with highs from the upper-50s to mid-60s. Relative humidity will be 50-60 percent. Winds</p>
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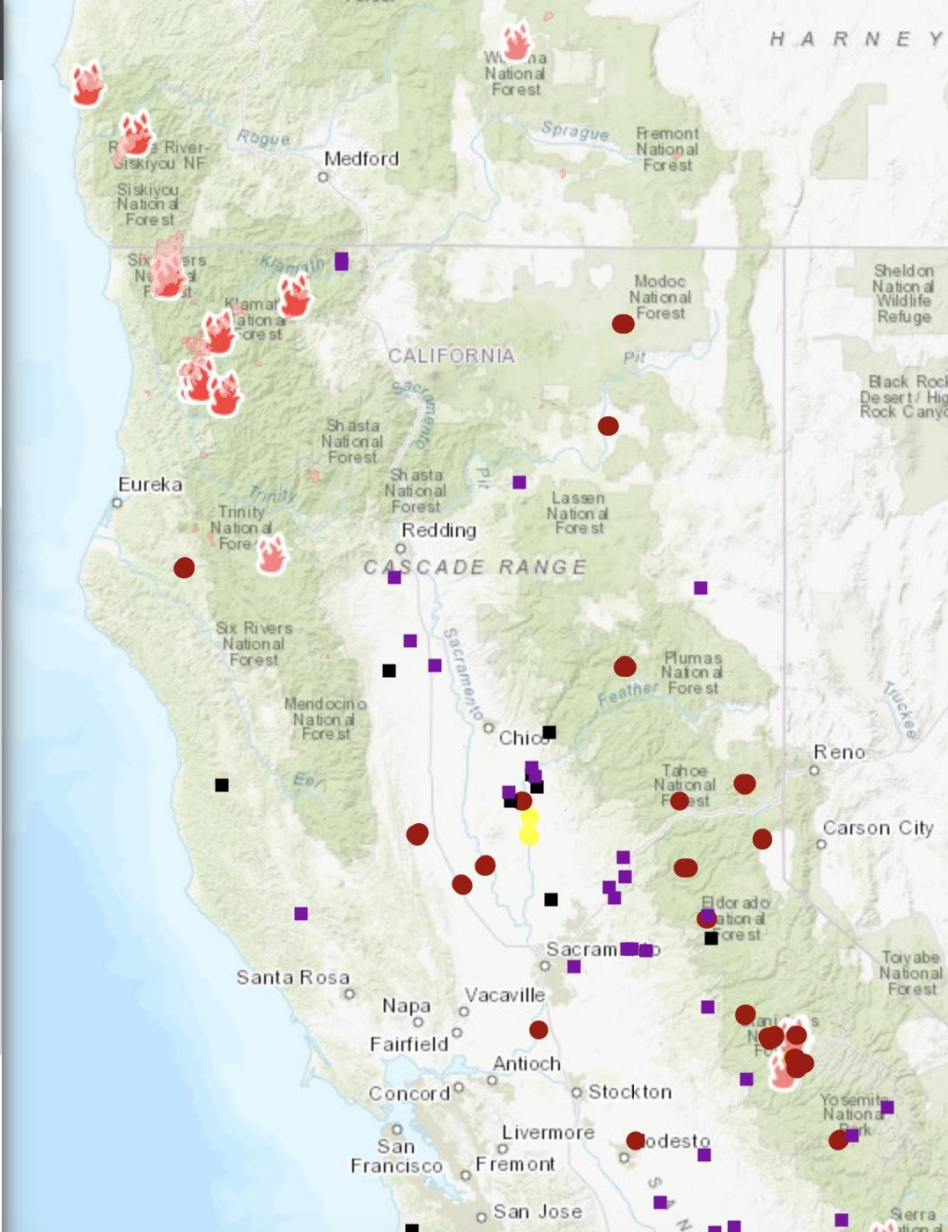


maps.wildfire.gov

Intterra

Legend

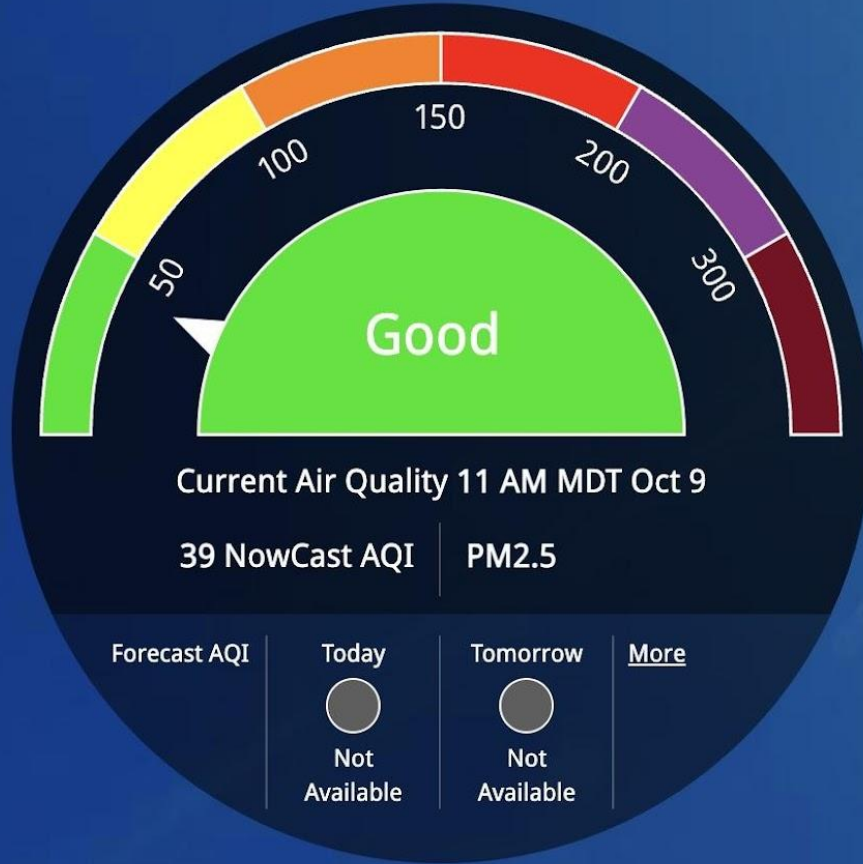
- Emerging WF < 24 hours
 - Emerging WF < 24 h...
- Emerging WF > 24 hours
 - Emerging WF > 24 h...
- Satellite Fire Detections
 - 12 Hour MODIS
 - 0-12 Hours
 - 24 Hour MODIS
 - 12-24 Hours
 - 48 Hour MODIS
 - 24-48 Hours
 - 12 Hour VIIRS
 - 0-12 Hours





Wildfire Smoke

54°F



ZIP Code, City, or State

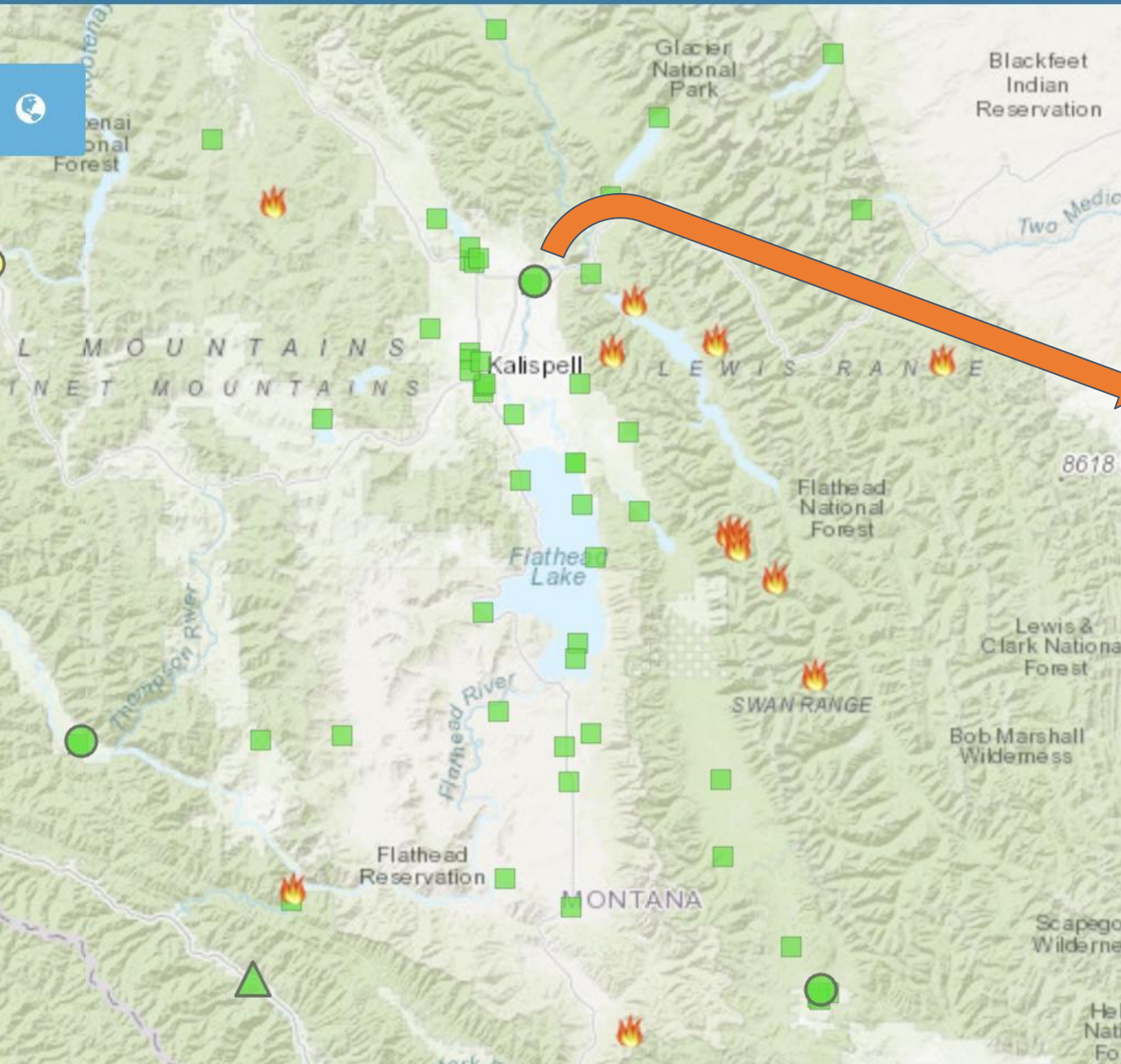
Missoula, MT

Missoula Reporting Area

Fire & Smoke Map

Monitors Near Me

Recent Trends



fire.airnow.gov

Columbia Falls

Near: [Columbia Falls, Montana](#)

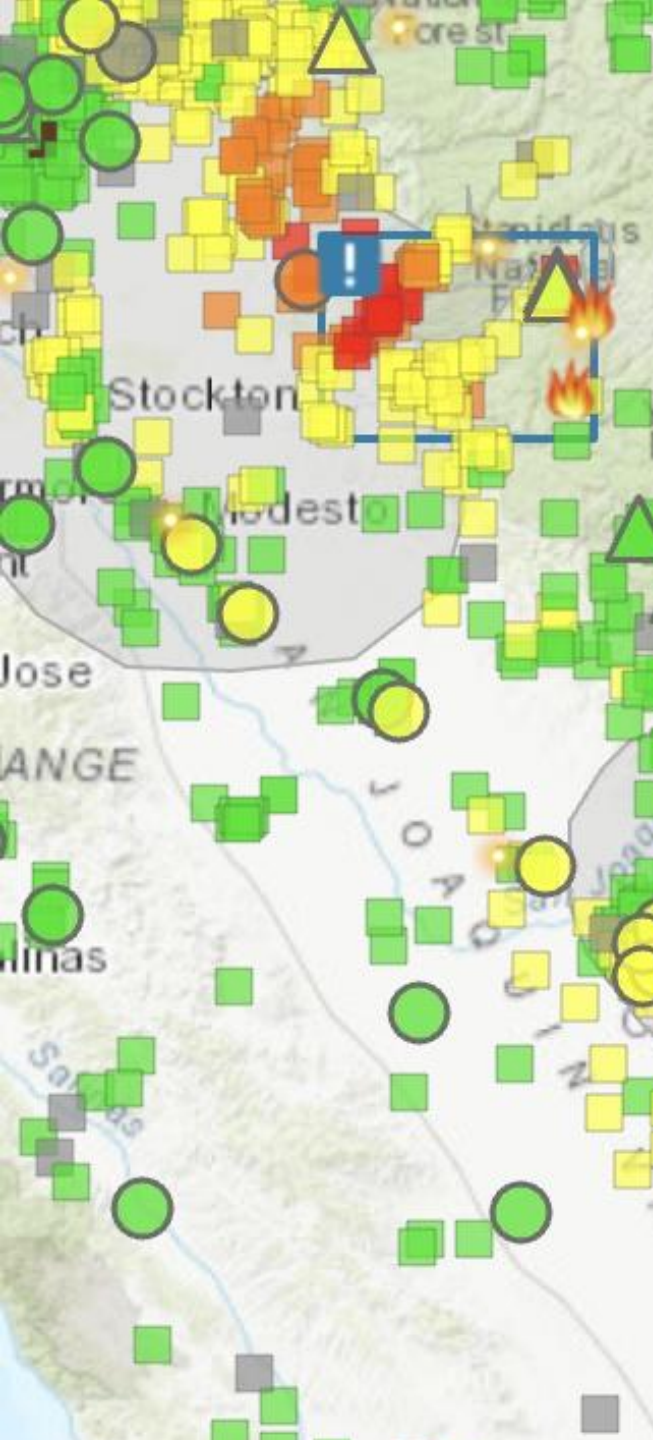
PERMANENT PM2.5 MONITOR DISCLAIMERS

GOOD

PM2.5 NowCast AQI: 25
As Of 09/13/2023 11am MDT [HISTORY](#)

Good time to go outdoors.

Current	Trend	Actions



Angels Camp

Heavy smoke and **VERY UNHEALTHY** air quality improving to **MODERATE** by the evening

Today's Forecast

24-HR AQI: ● **USG: Unhealthy for Sensitive Groups**

Smoke continuing. *VERY UNHEALTHY gradually improving by the late afternoon. Overall USG conditions with breaks of MODERATE at times*



Morning



Afternoon



Evening



Night

Tomorrow's Forecast

24-HR AQI: ● **Moderate**

Smoke continuing. *MODERATE overall with smoke and USG conditions thru the morning/early afternoon*



Morning



Afternoon



Evening



Night

Extended Forecast

24-HR AQI: ● **Moderate**

Smoke continuing. *Stagnate air will be with us thru the week, so expect periods of heavy smoke, particularly in the mornings. Should have overall MODERATE conditions and periods of USG/UNHEALTHY conditions throughout the week.*

Air Quality Index (AQI)

- Good
- Moderate
- USG: Unhealthy for Sensitive Groups
- Unhealthy
- Very Unhealthy
- Hazardous

Actions to Protect Yourself

- None
- Unusually sensitive individuals should consider limiting prolonged or heavy exertion
- People within Sensitive Groups should reduce prolonged or heavy exertion
- People within Sensitive Groups should avoid all physical outdoor activity
- Everyone should avoid all physical outdoor activity
- Everyone should avoid any outdoor activity

Air Resource Advisors

U.S. Interagency Wildland Fire Air Quality Response Program

Wildfire Smoke Outlook | [View All](#)

[Español](#) [English](#) [Default Colors](#) | [ColorVision Assist](#) [pdf](#) [jpg](#)

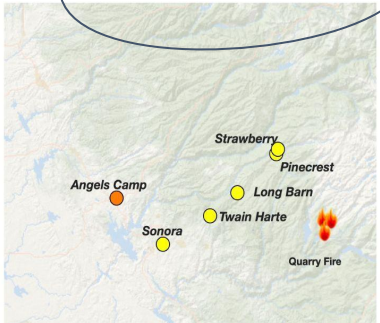
Smoke Outlook 10/18 - 10/19

Central Sierra Nevada Quarry Fire

Issued: 2023-10-18 09:14 (MDT) U.S. Interagency Wildland Fire Air Quality Response Program
By: Jill Webster, Air Resource Advisor, (jill.webster@usda.gov)

Fire
Warmer, dryer, and stagnate weather conditions will persist thru tomorrow. Dry interior fuels continue to burn. Heavy fuels on the north aspect of the fire are burning, backing toward Lily Creek. Minor firing operations will proceed as conditions permit, but significant fire growth isn't expected. For more information regarding planned actions see [2023-STF-Quarry Fire](#) on Inciweb.

Smoke
Pockets of unburned and smoldering fuels continue to produce smoke. Highest smoke concentrations generally occur overnight in low lying areas and drainages. Smoke drained into foothill locations in the early morning, so folks in Sonora and Angels Camp are waking up to smoke. Air quality in these areas should gradually improve as the day goes on. A stagnate air mass over us for the next few days will prevent complete clearing, so periods of smoke will be with us a bit longer. Expect overall MODERATE air quality with brief periods of USG to VERY UNHEALTHY. Stay alert to changing conditions and plan outdoor activities for when the smoke has lifted and cleared.



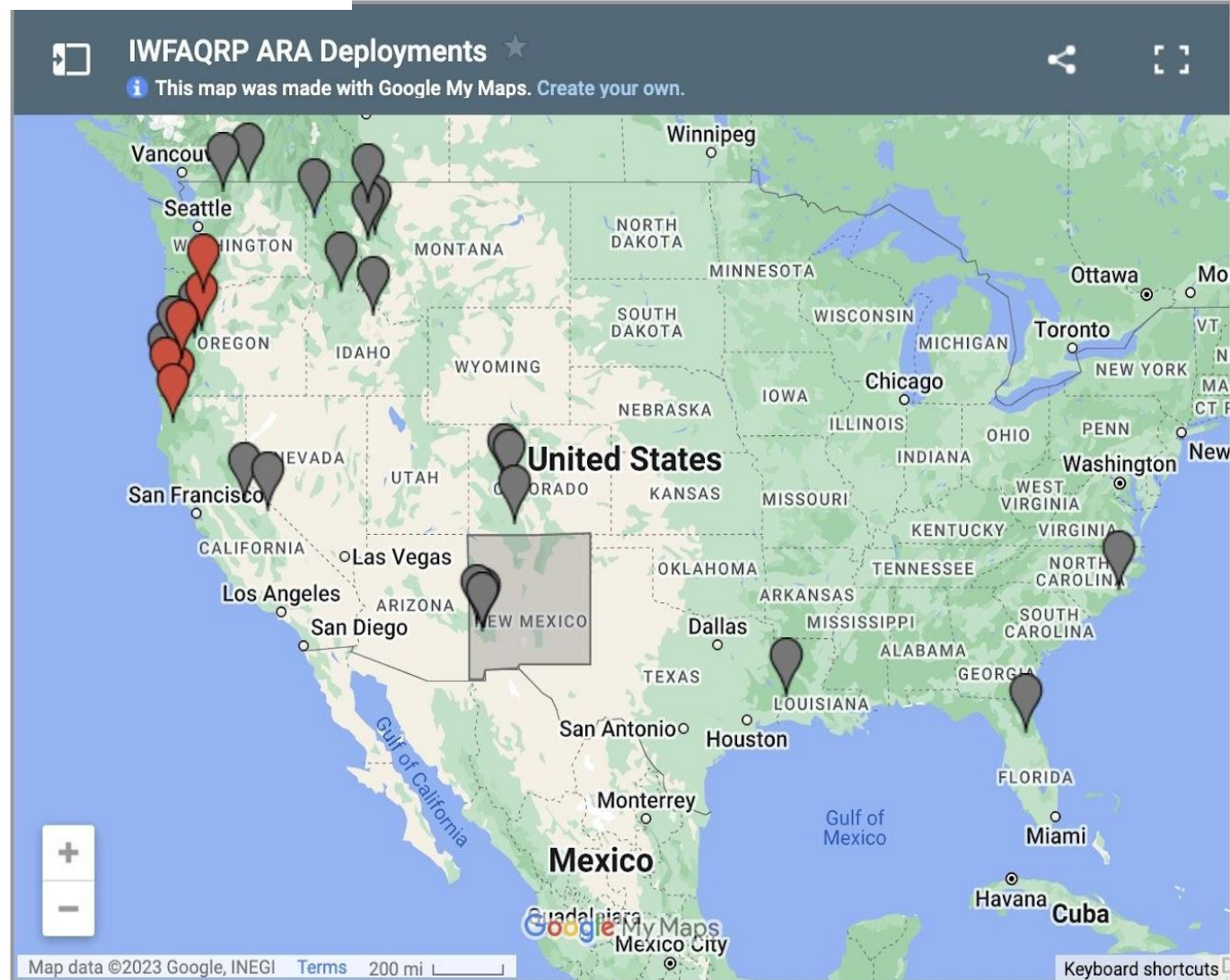



Current Deployments

- Lookout Fire, OR
- Smith River Complex, OR
- Six Rivers Lightning Complex, CA
- Tiger Island Fire, LA
- Happy Camp Complex/Klamath NF, CA
- Camp Creek Fire, OR

Completed Deployments

- Cowtrack Fire, CA
- Rx SERAL, CA
- Rx GMUG, CO
- Pass Fire, NM
- Major Fire, FL
- Great Lakes Fire, NC
- Pasture Fire, NM
- Colt Fire, MT



No ARA? How to fill in the gap...



AIR ▾

CLEANUP & RECLAMATION ▾

ENERGY ▾

MINING ▾

WATER ▾

TANKS, WASTE & RECYCLING ▾

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Smoke Forecasts

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Program Overview

During periods of air quality impacts due to wildfire smoke, Montana DEQ provides smoke forecasts, with the most recent postings listed below. The goal with each post is to identify the source(s) of smoke and project the impacts and duration based on current and projected fire behavior and meteorology. We use current and previous monitor data, fire data, current and future (modeled) meteorology from sources like the National Weather Service, satellite observations, smoke-specific models, web cams, low-cost sensors, and other available resources to compile the information. Each post will have a discussion, with graphics and links to other resources with more information. [Today's Air](#) will be the source of the most up to date air quality information.



Today's Air

SMOKE FORECASTS CONTACTS

Main Line
(406) 444-3490

Meteorological Services & Smoke Forecasting
(406) 444-0283

Email / Text Updates

Sign up for email or SMS text updates for each DEQ Smoke Forecast published on DEQ's webpage.

1. Subscription Type

Email ▾

★Email

Hi, I can help answer your questions!



AIR ▾

CLEANUP & RECLAMATION ▾

ENERGY ▾

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WATER ▾

TANKS, WASTE & RECYCLING ▾

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Smoke Forecasts Feed

[Smoke Forecast for Tuesday, September 12, 2023 12:00 PM](#)

9/12/2023 | Tags: **Smoke Forecast 2023**

Fire activity and smoke production have been minimal of late thanks to the anomalously wet pattern over the last few weeks. Behind a weak cool front some Canadian wildfire smoke will impact the eastern half of Montana starting Wednesday.

[Smoke Forecast for Monday, September 11, 2023 12:15 PM](#)

9/11/2023 | Tags: **Smoke Forecast 2023**

Recent rainfall and cooler temperatures have kept Montana wildfire activity in check. A moderating trend combined with mainly dry weather could result in a slight uptick of fire activity this week.

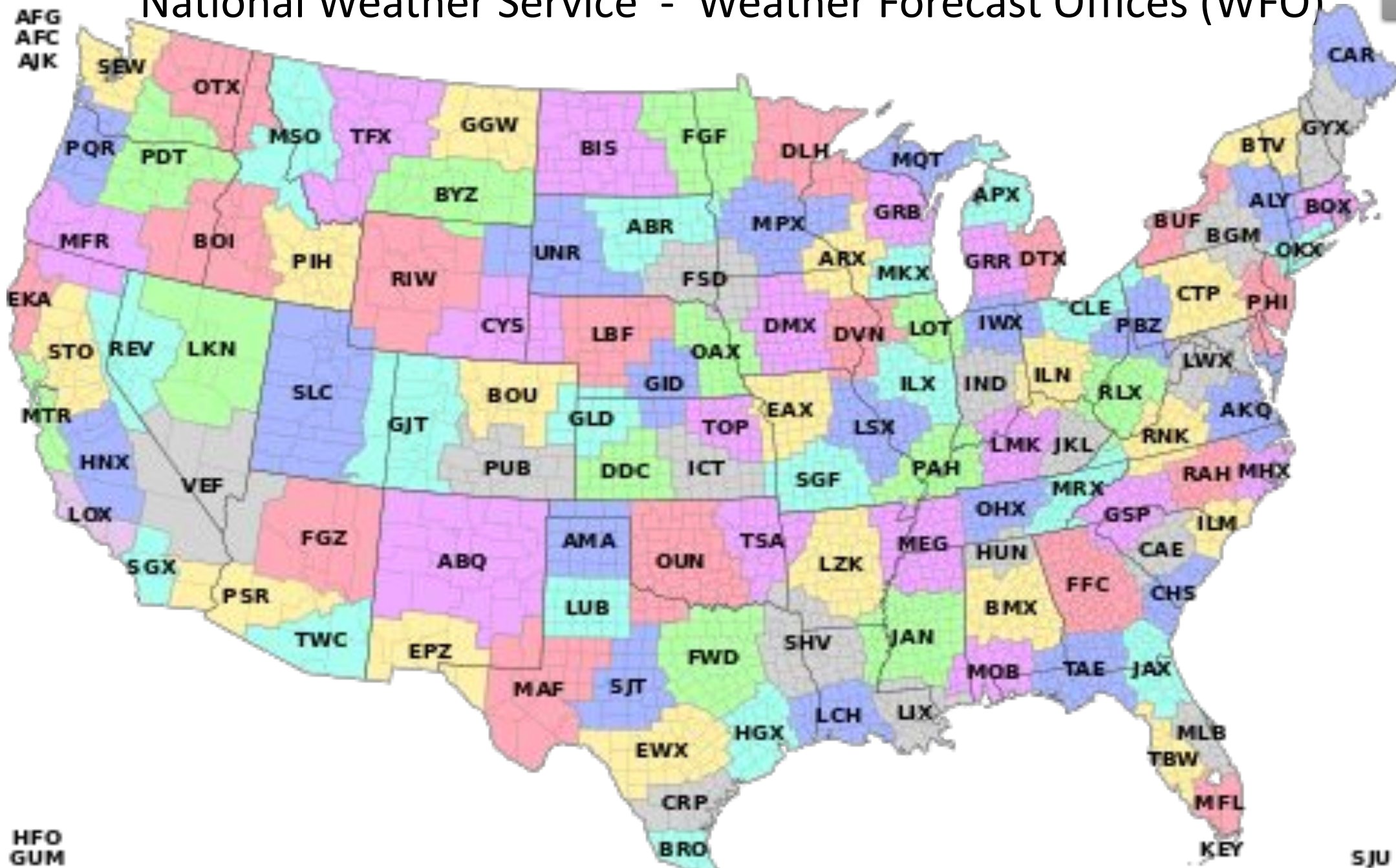
[Smoke Forecast for Friday, September 8, 2023 12:00 PM](#)

9/8/2023 | Tags: **Smoke Forecast 2023**

There is still some surface smoke over the eastern edge of the state because of Canadian wildfires. The relatively cool, wet pattern continues to suppress

Hi, I can help answer your questions

National Weather Service - Weather Forecast Offices (WFO)



-31%

Temtop LKC-1000E AQI Monitor PM2.5 PM10 Formaldehyde Temp Humidity AQI Detector



\$95.99 ~~\$139.99~~

Size : LKC-1000E

LKC-1000E

Subtotal: \$95.99

Welcome simply read and read Customer

ADD TO CART Type here

Buy with shop Pay

Wynd Air Quality Tracker

★★★★☆ (20)

Monitor your air quality on the go with the Wynd Air Quality Tracker. It senses airborne particulate matter—including dust, allergens, and industrial pollution—in real time.

The Tracker connects to the free Wynd app (for iOS and Android), so that you can learn more about what's in the air around you. Using the built-in clip, the Tracker can attach onto clothes or other objects.

Please note that the Tracker does not come with the Wynd Purifier.

From **\$7.13/mo** with [shop Pay](#) [View sample plans](#)

Quantity

1

Color



\$79

Help

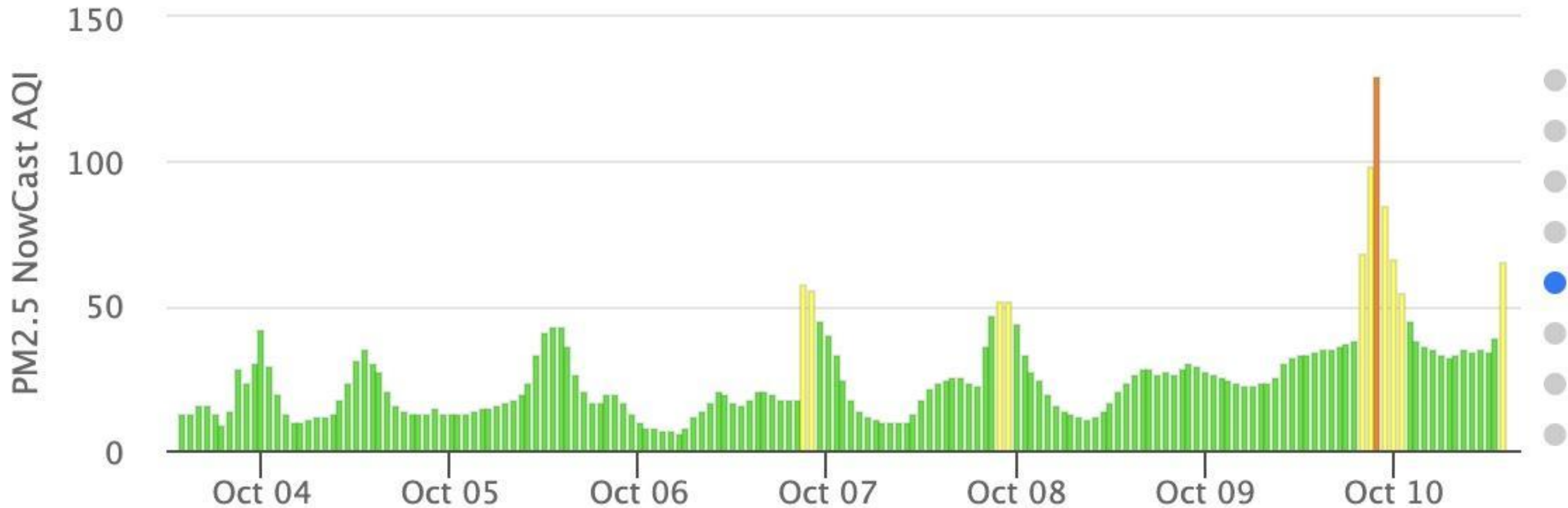


Recent History

NowCast AQI

Hourly Concentration

10 min



Visual estimation of AQI

5-3-1 Online Map Tool

Is it smoky outside? Protect your health.
Use the **5-3-1** Visibility Method

During fires if you can see* about:
*when humidity is low

5 miles

3 miles

1 mile

and you are:

An Adult
A Teenager
An Older Child

or you are:
Age 65 and Over
A Young Child
Pregnant

or you have:
Asthma
Respiratory Illness
Lung or Heart Disease

Check visibility often.

Reduce outdoor activity.

Minimize outdoor activity.

Stay inside.

Stay inside.

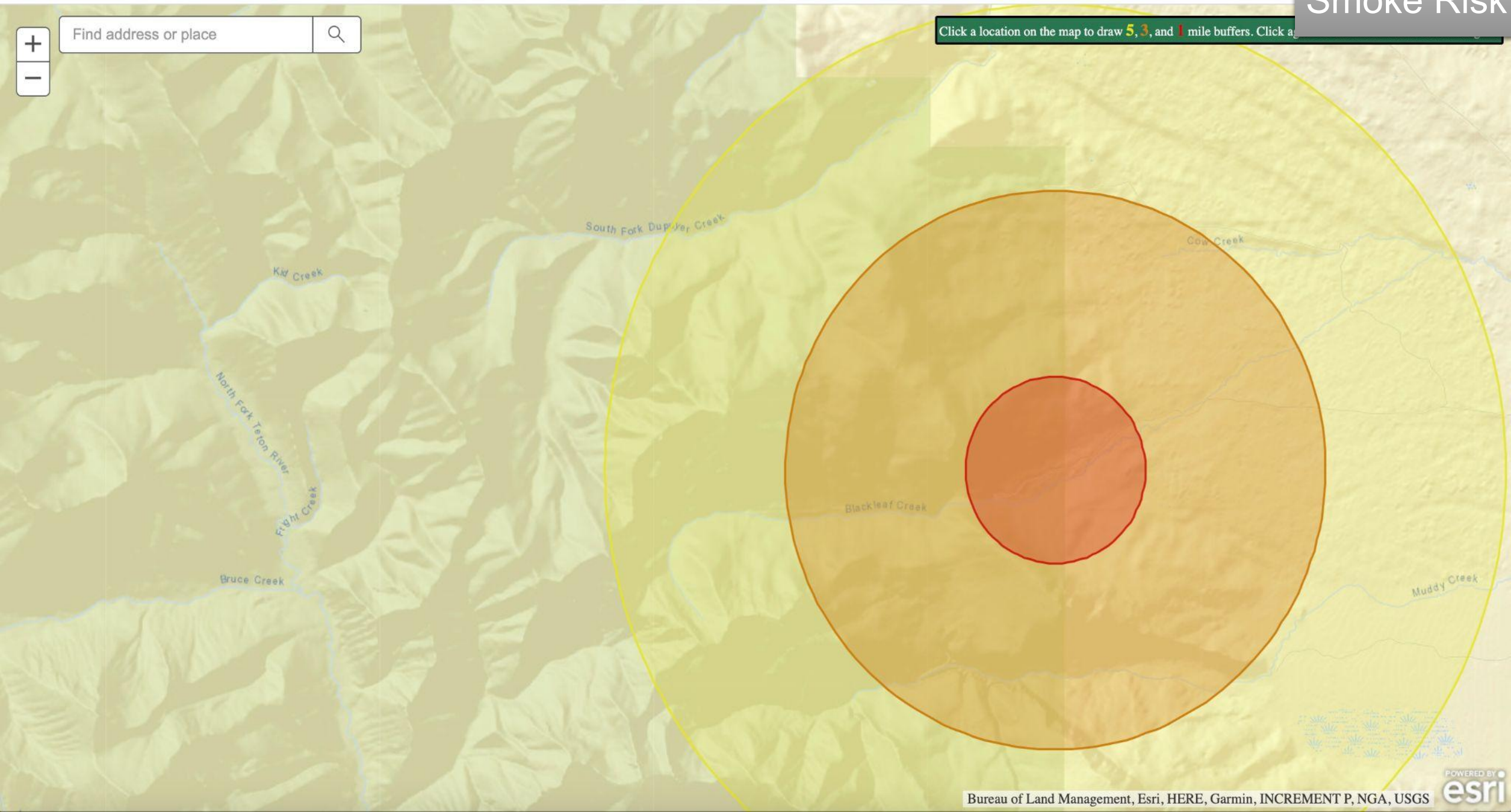
 NEW MEXICO ENVIRONMENTAL PUBLIC HEALTH TRACKING

<https://nmtracking.doh.nm.gov/environment/air/FireAndSmoke.html>



Smoke Risk

Click a location on the map to draw 5, 3, and 1 mile buffers. Click a



Wildfire Smoke Plan



**SONOMA COUNTY
REGIONAL PARKS**



**OUTWARD BOUND
CANADA**

	Good - Low Risk	Moderate - Mod. Risk	Unhealthy for Sensitive Groups	Unhealthy - High Risk	Very Unhealthy	Hazardous
PM2.5	0-12	12-35	35-55	55-150	150-250	>250
AQI	0-50	51-100	101-150	151-200	201-300	>300
Postpone, cancel, relocate, or reduce activity levels if....			Contact sensitive participants about heightened risk. Forecast = > 1 week of continuous exposure	Contact all participants about heightened risk -----> Forecast = > 6 days of continuous exposure	-----> Forecast = > 5 days of continuous exposure	-----> Forecast = > 3 days of continuous exposure
Decision maker? In consult with...?						
Communi-cation	Devices for field communication? Frequency? How to explain what you based your decision on? How to communicate with participants who already may be traveling to the site? Pre-program comms: refunds? rescheduling?					

	Good - Low Risk	Moderate - Mod. Risk	Unhealthy for Sensitive Groups	Unhealthy - High Risk	Very Unhealthy	Hazardous
PM2.5	0-12	12-35	35-55	55-150	150-250	>250
AQI	0-50	51-100	101-150	151-200	201-300	>300
Field Observation	Distant smoke or column >5mi. Light smoke smell. Smoke may be visible in air. Can see 5+ miles away.		Moderate smoke smell; Smoke on the horizon; visibility diminished; smoke column > 3 mi away	Visibility diminished to 3 miles; mod - heavy smoke smell; fire not local threat		Heavy smoke, unable to see more than 1 mile. Fire < 2mi away
Evacuate all?				>72 hrs; forecast - no improvement	>48 hrs; forecast - no improvement	>24 hrs; forecast - no improvement
Duration			>72 hrs?	>48 hrs?	>30 hrs?	>24 hrs?
Recommendations	Everyone: Continue as scheduled	Unusually Sensitive groups: consider limiting prolonged or vigorous activities. Everyone else: no changes	Sensitive Groups: should be medically managing their condition. Avoid prolonged or heavy activity. Encourage mask use? <u>Consider evacuation?</u> Everyone Else: Continue work even if modified.	Sensitive Groups: avoid all physical outdoor activity <u>Masks? Evac?</u> Everyone Else: Reduce prolonged or heavy exertion. ✔ Walking w/o pack ✘ Backpacking	Everyone: avoid all physical outdoor activity <u>Masks? Evac?</u> ✔ Educational activities	Everyone: Field operations should be suspended. No activity unless evacuating. Masks required for duration of evacuation.

Fundamental Inevitability of Fire

wildland fire
smoke exposure
human health
environmental justice

