

A satellite-style image of the San Francisco Bay Area. The coastline is visible, and a large, dense plume of grey smoke or haze is seen drifting from the inland areas towards the water. The text is overlaid on this image.

2019 NACAA Spring Membership Meeting

Responding to the Wildfire Smoke Public Health Crisis: Lessons Learned on Protecting Our Future

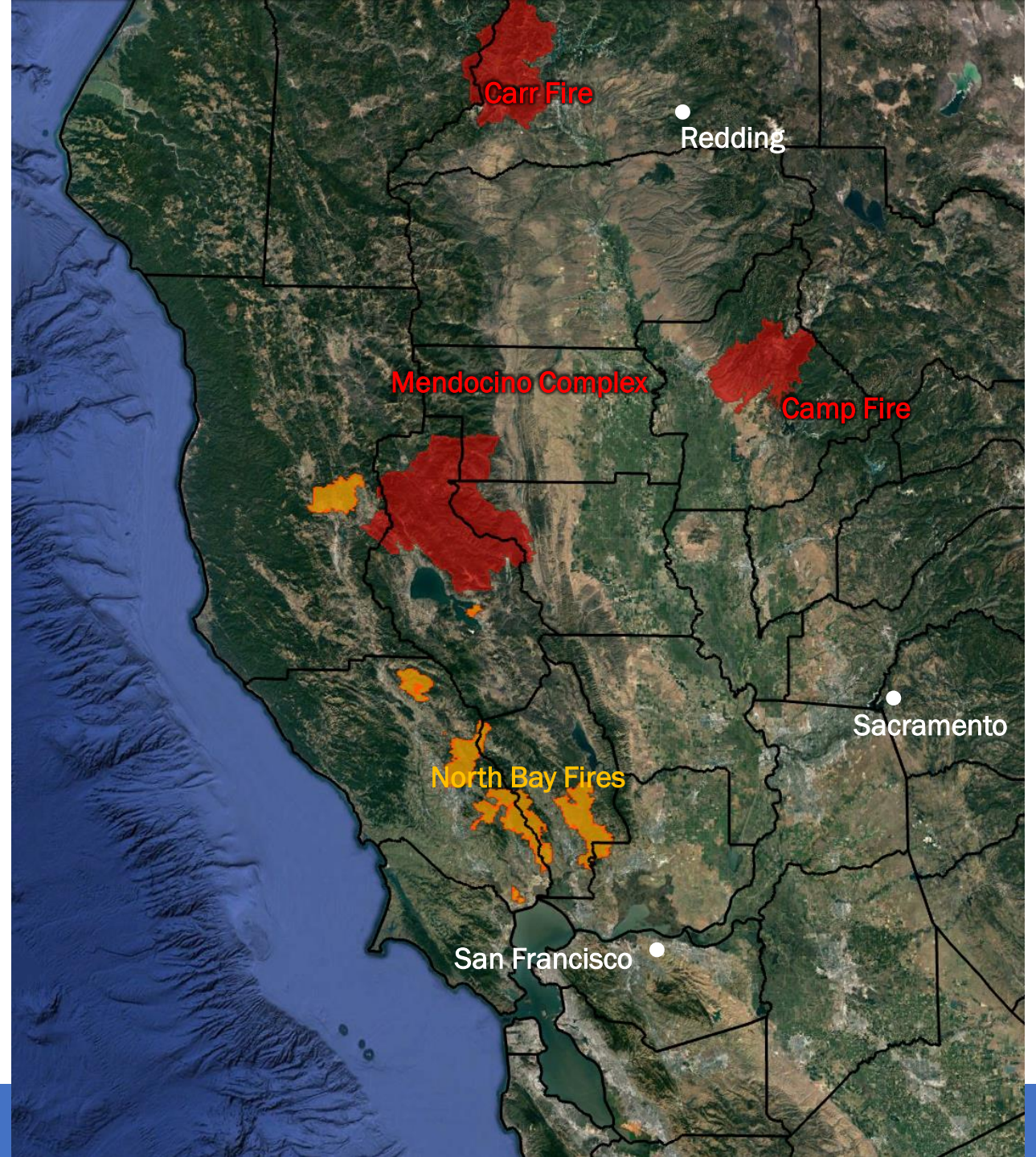
Jack Broadbent, Executive Officer
Bay Area Air Quality Management District

April 29, 2019

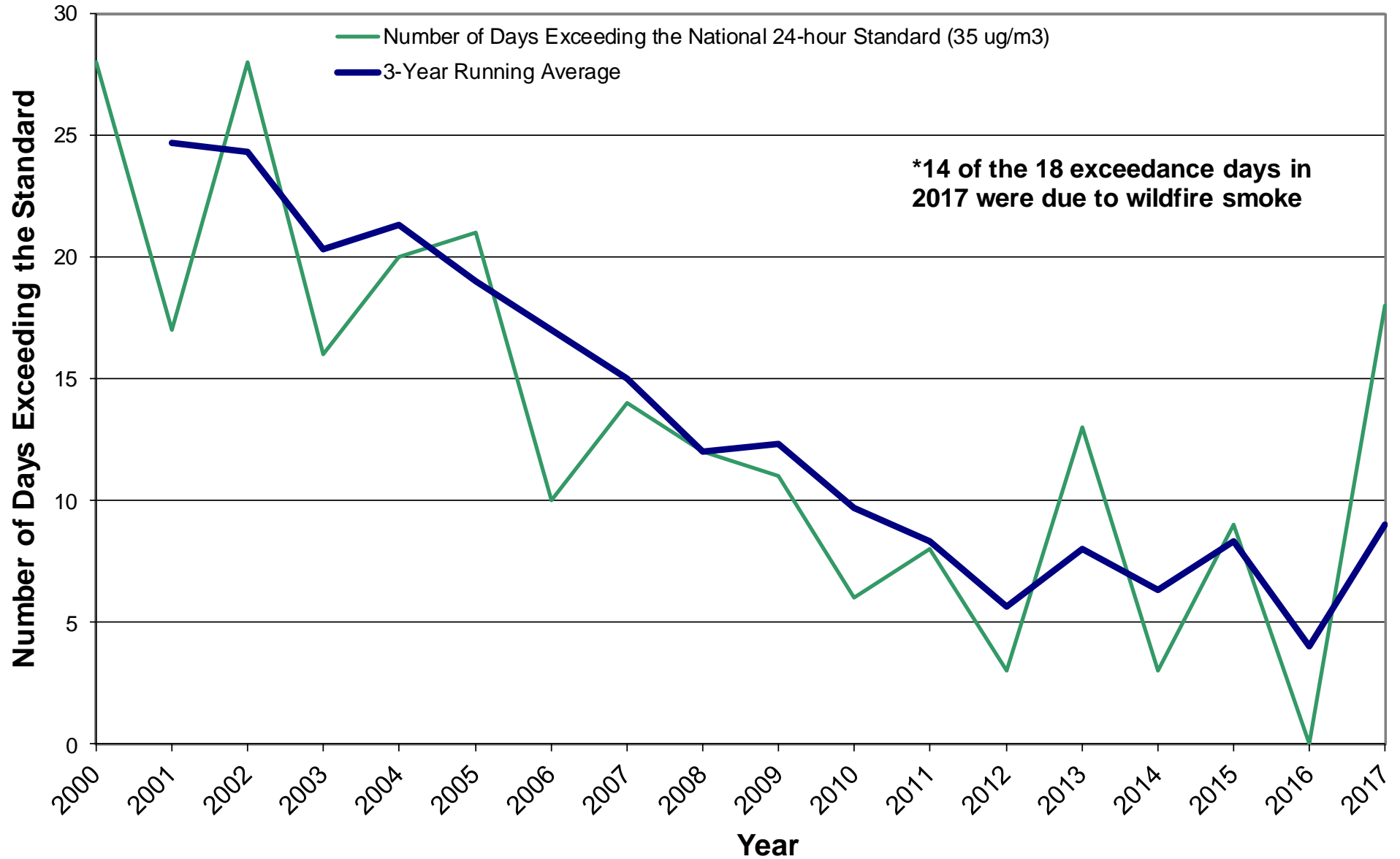


2017 and 2018 Wildfires in Northern California

- 2017 Napa, Sonoma and Mendocino
- 2018 Carr, Mendocino Complex and Camp



Bay Area PM_{2.5} Exceedance Trends

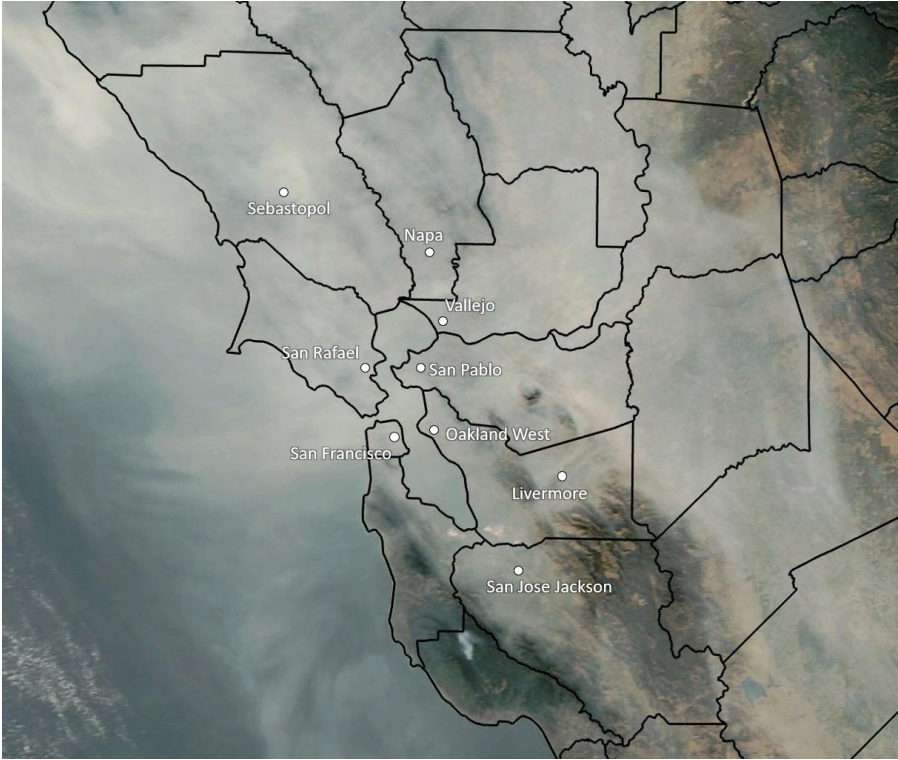


Sonoma/Napa Fires

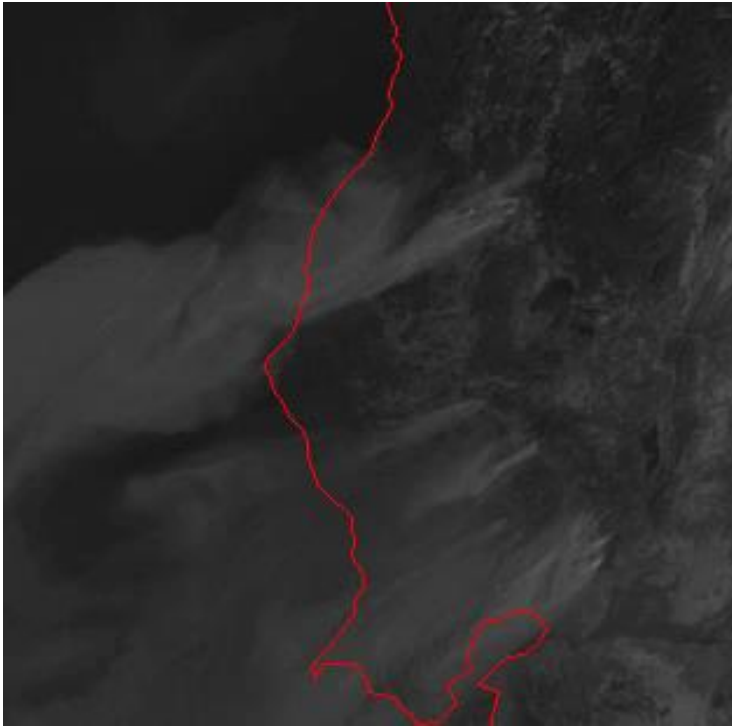


GOES-16 visible satellite loop from Thursday 10/12/2017

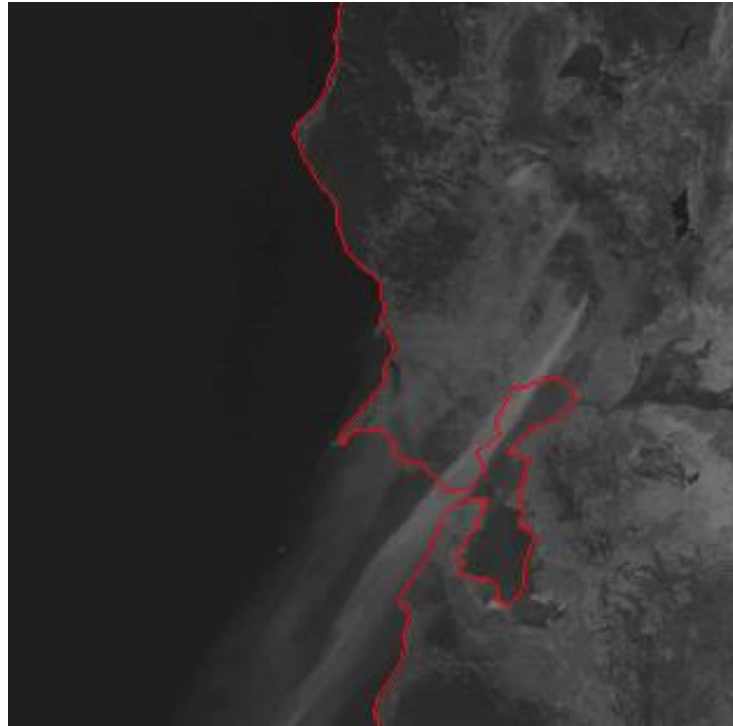
Camp Fire



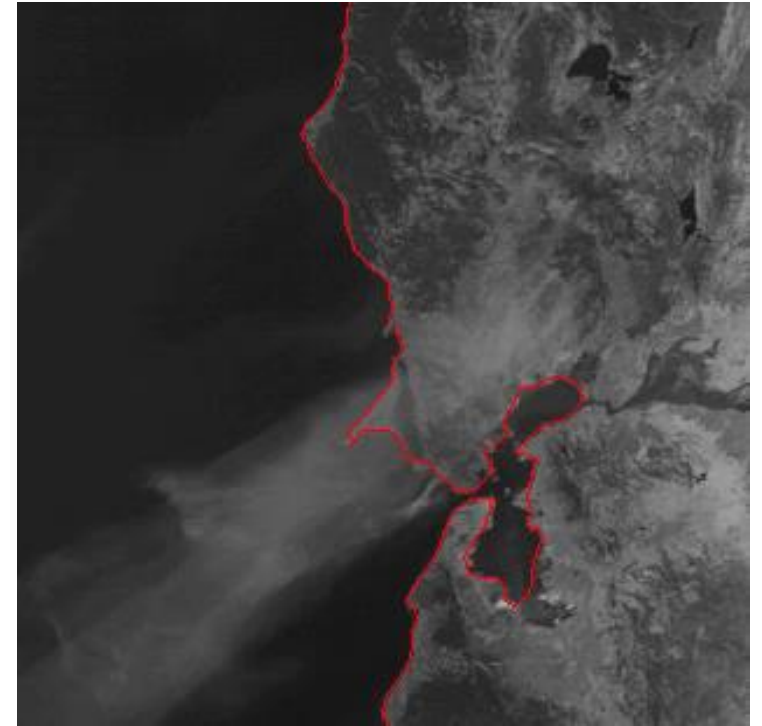
North Bay Fires: GOES-16 Imagery



Monday 10/09/2017

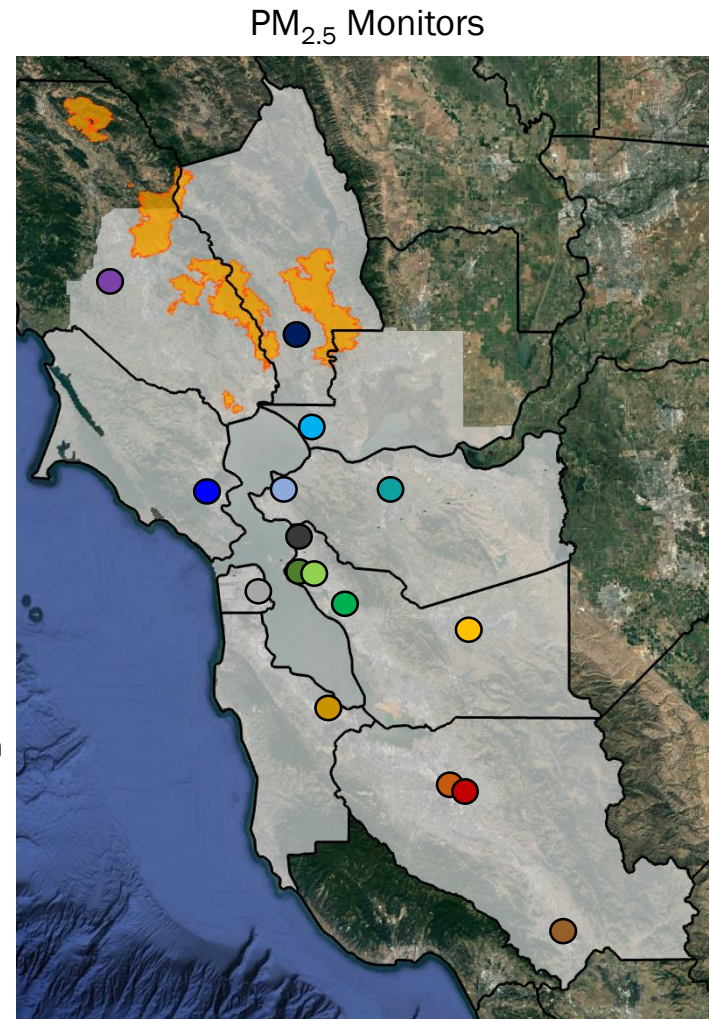
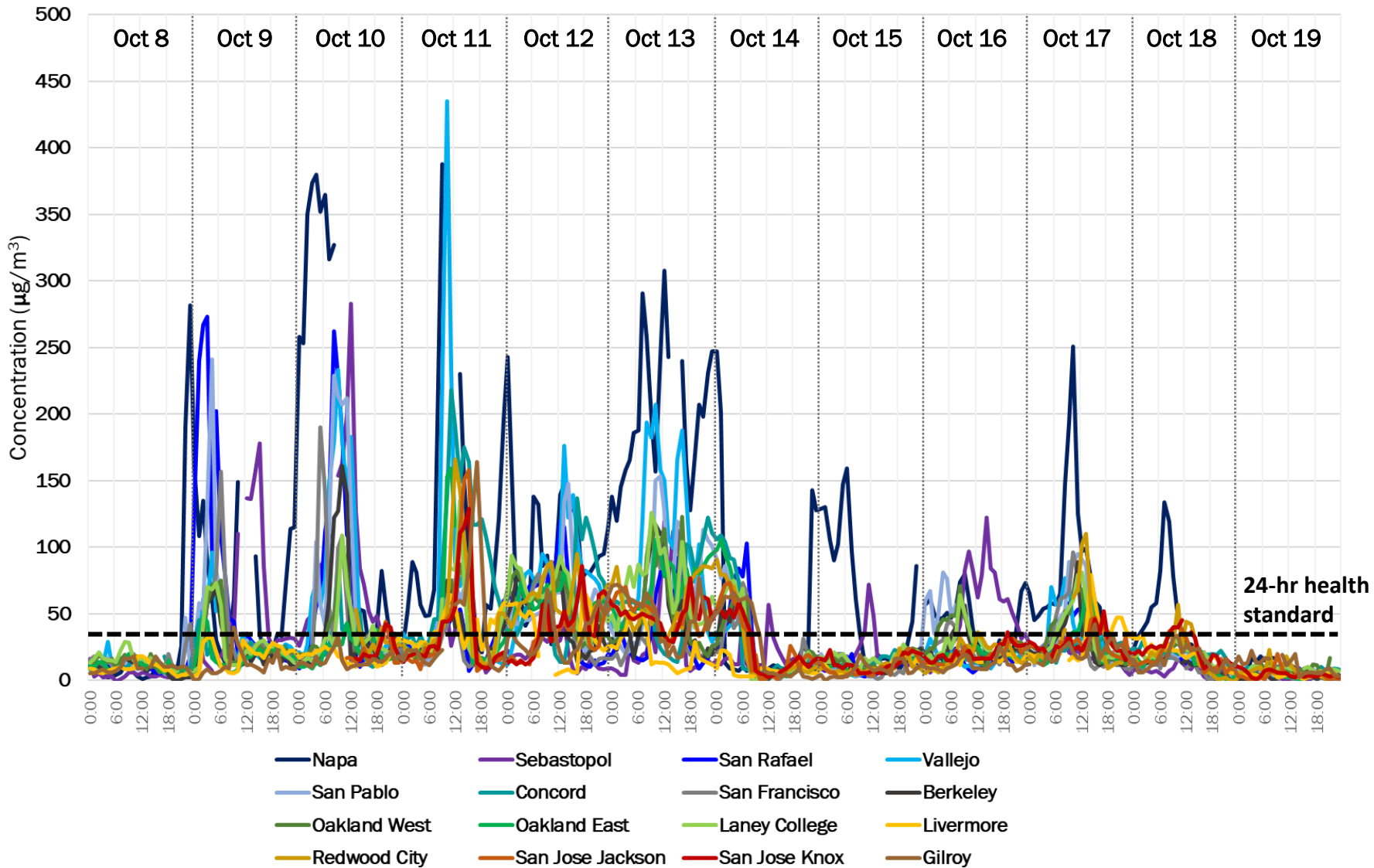


Thursday 10/12/2017



Saturday 10/14/2017

Hourly PM_{2.5} Concentrations During the North Bay Fires



Substantial variability in hourly concentrations over time and distance as smoke plumes pivoted across the Bay Area over several days (cool colors farther north, warm colors farther south)

Localized Fire Impacts Seen on October 12, 2017 –



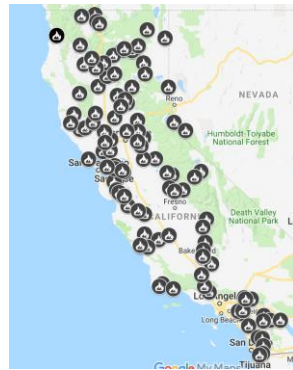
Station	24-hour Avg. Concentration ($\mu\text{g}/\text{m}^3$)	1-hour Max. Concentration ($\mu\text{g}/\text{m}^3$)
Sebastopol	20	46
Napa	113	323
Vallejo	80	176
San Rafael	56	120
San Pablo	59	148
Oakland West	55	82
San Francisco	50	88
Livermore	34	64
San Jose Jackson	34	80



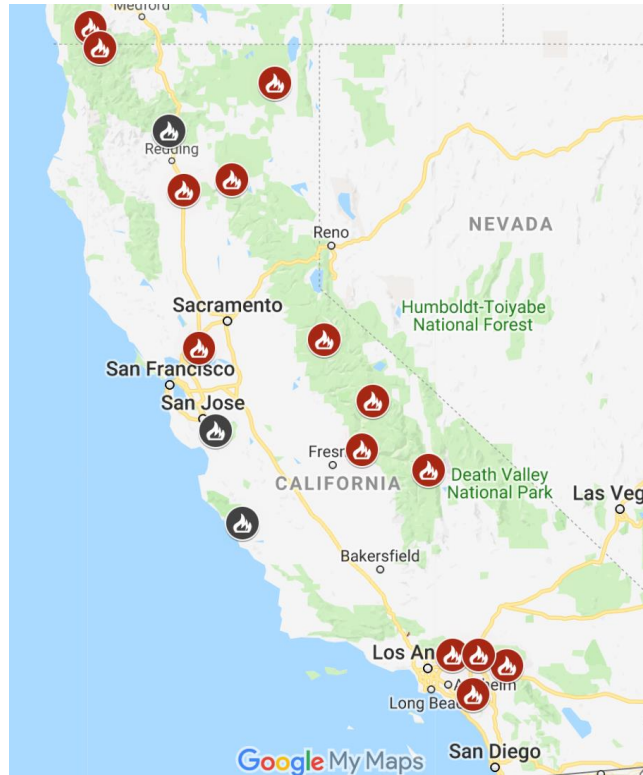
Summer 2018 California Fires



August 2018



September 2018



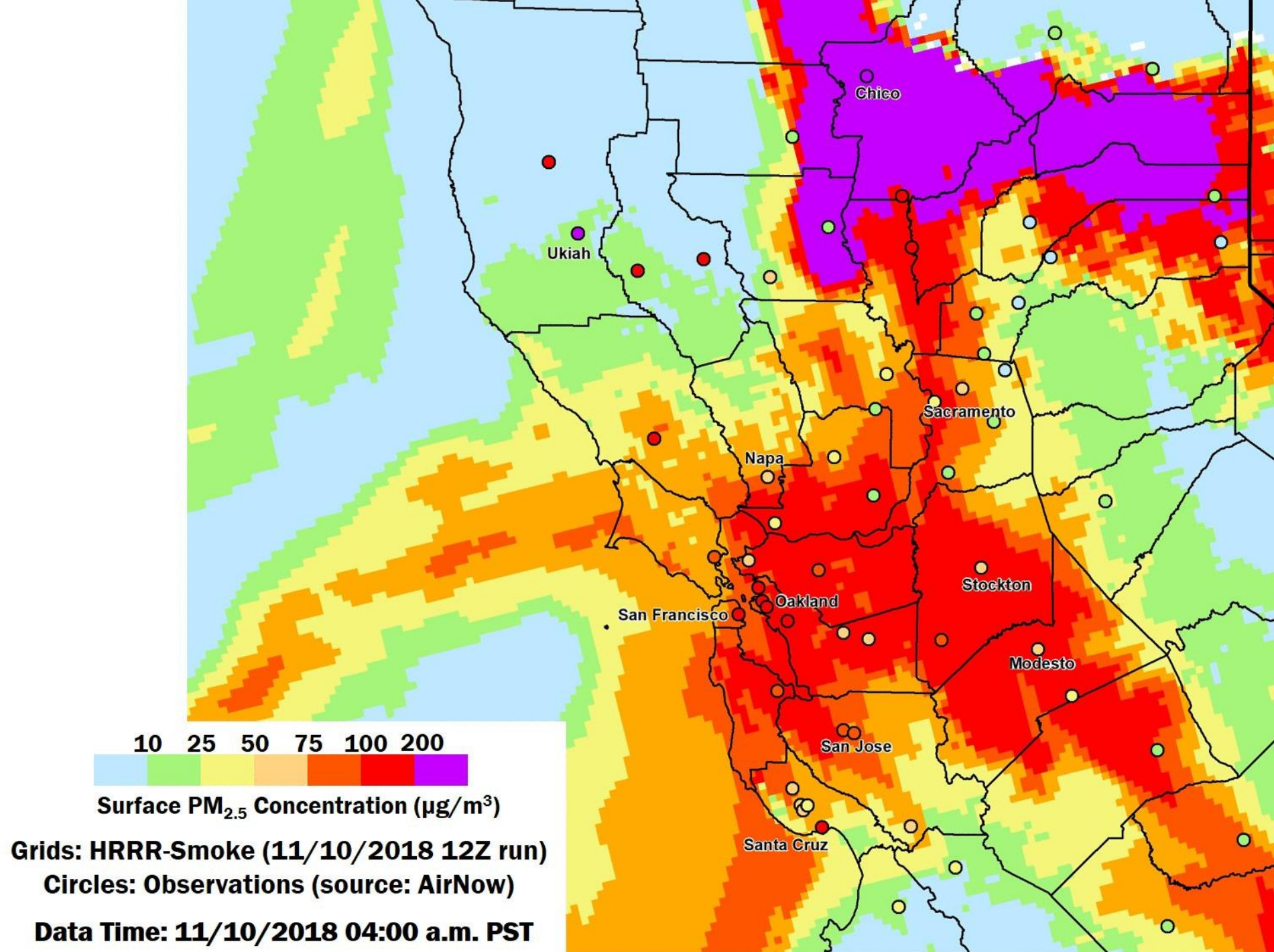
Active CalFire Incidents 2018



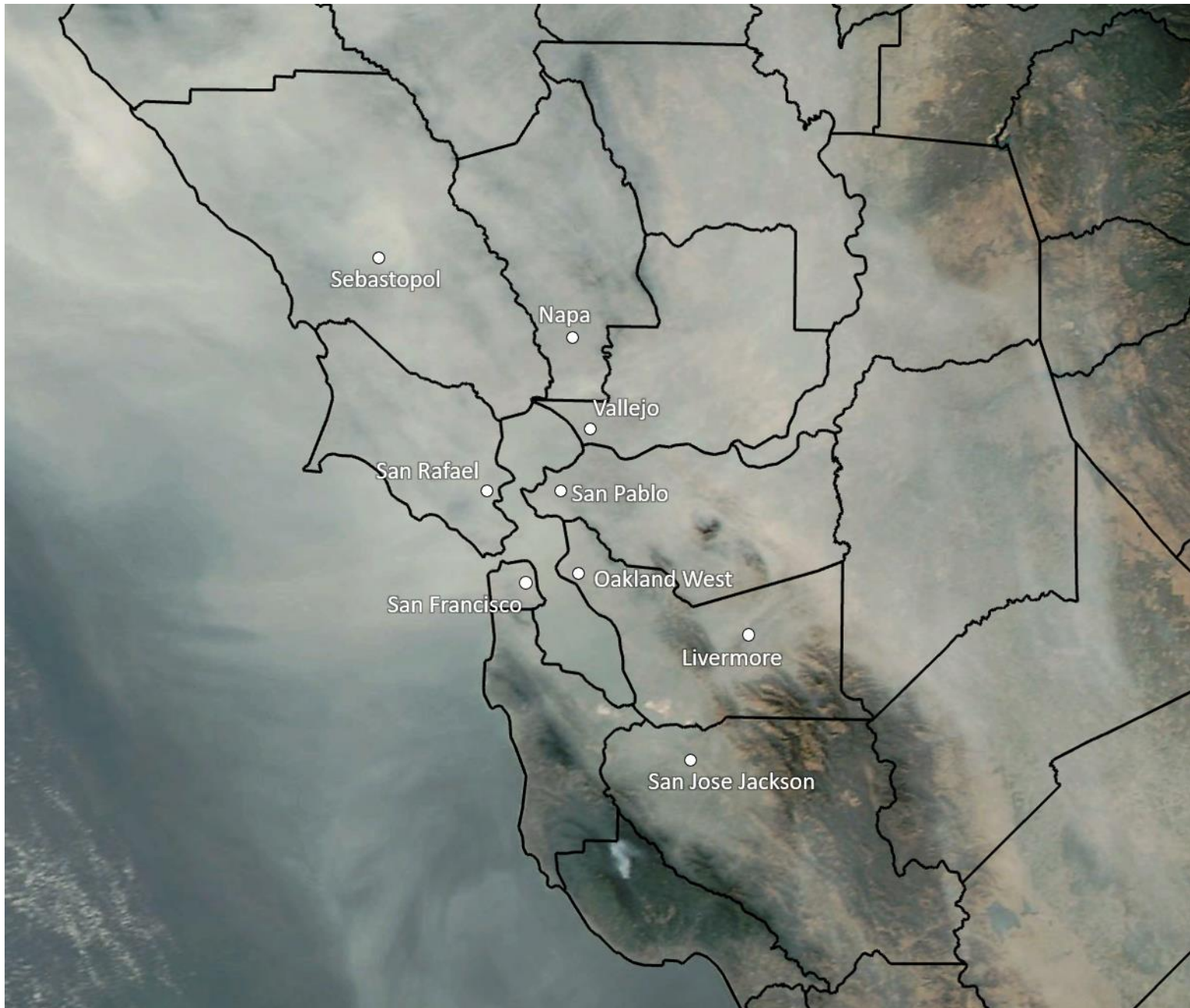
Statewide Incidents Summer 2018

Camp Fire: GOES-16 Imagery (November 8-12, 2018)





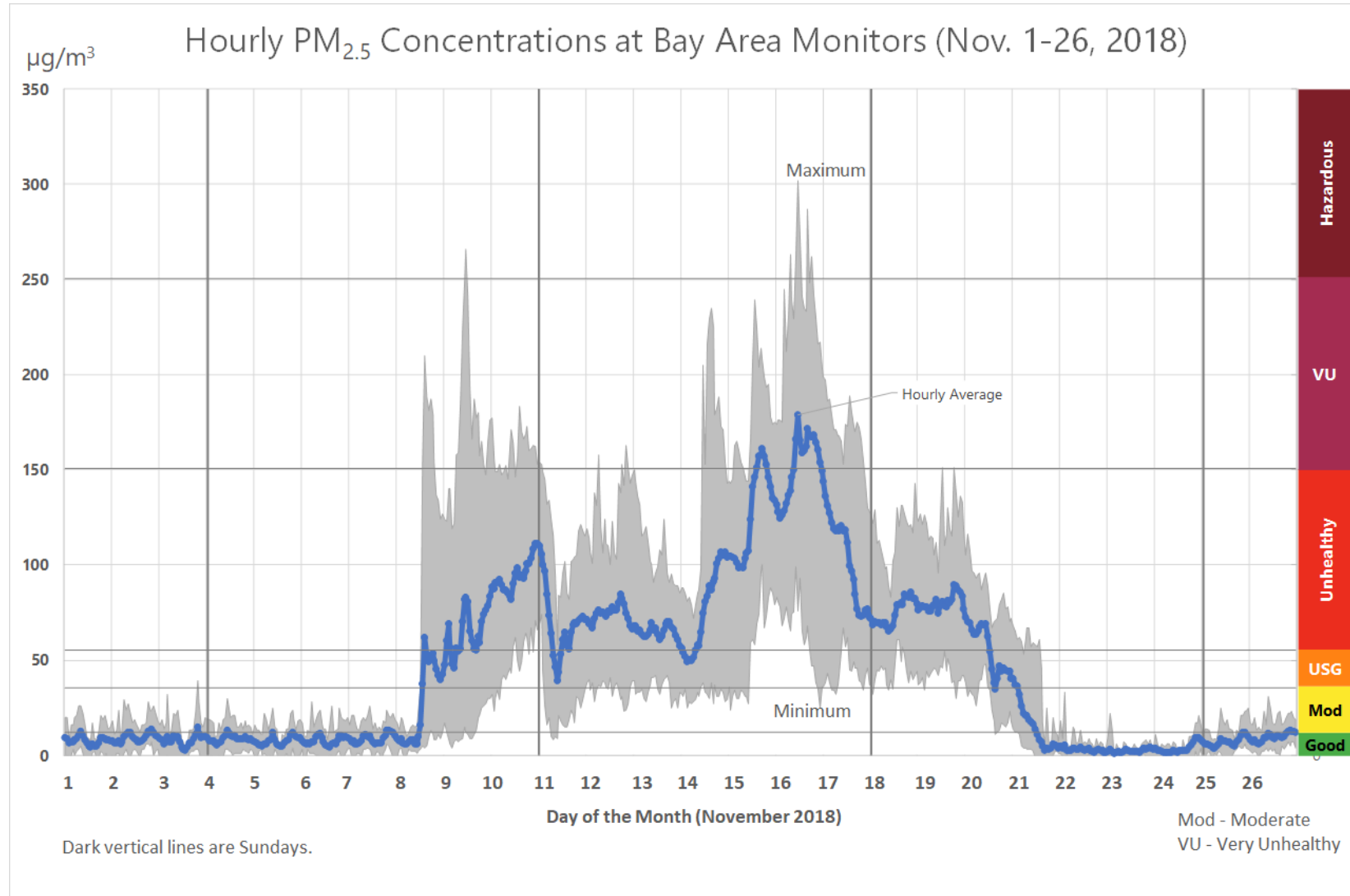
Camp Fire Impacts November 16, 2018



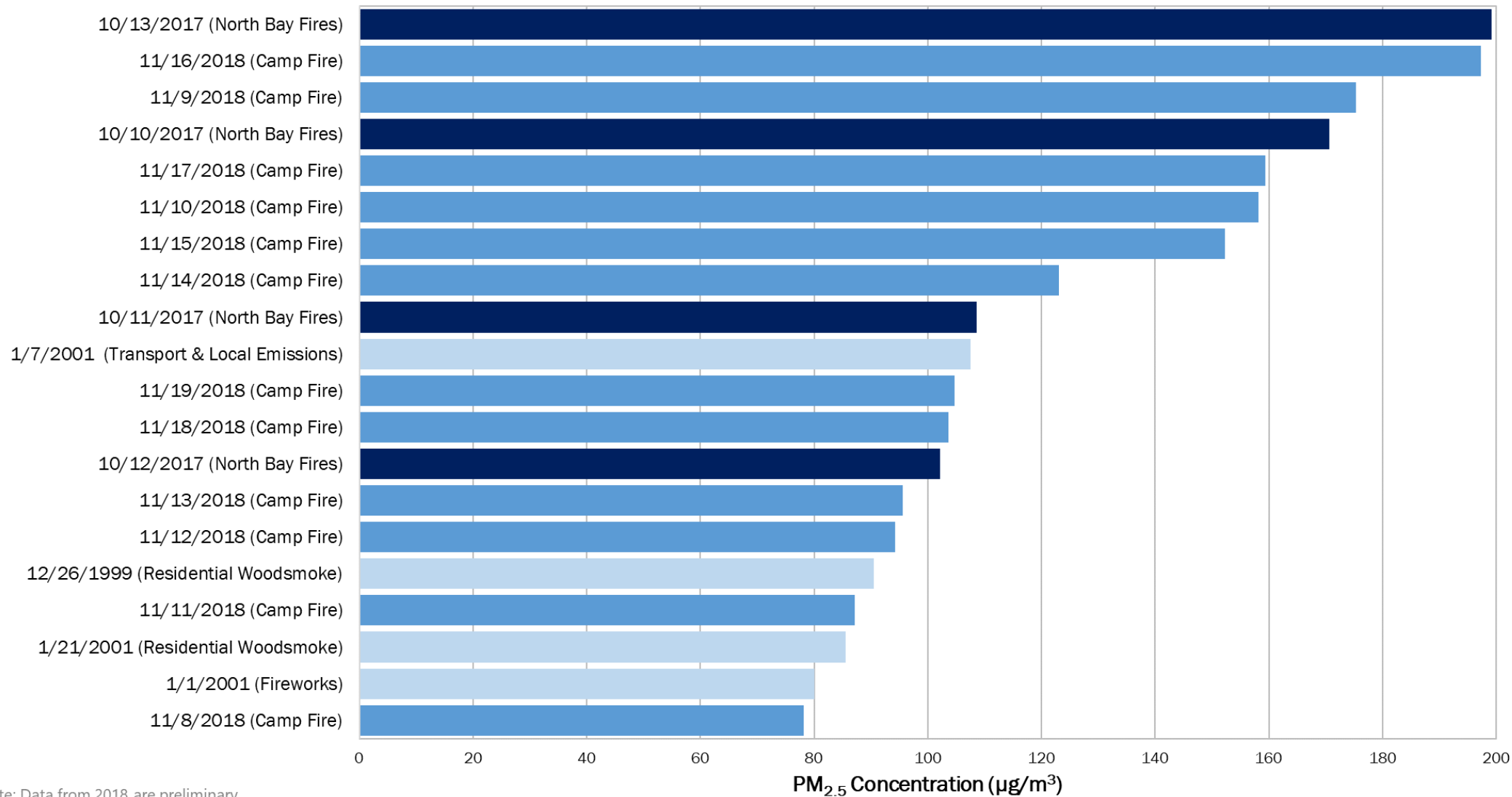
Station	24-hour Avg. Concentration ($\mu\text{g}/\text{m}^3$)	1-hour Max. Concentration ($\mu\text{g}/\text{m}^3$)
Sebastopol	89	104
Napa	118	154
Vallejo	197	245
San Rafael	168	218
San Pablo	195	301
Oakland West	169	210
San Francisco	178	241
Livermore	172	287
San Jose Jackson	131	151



PM2.5 Concentrations



16 of Top 20 PM_{2.5} Days in the Bay Area Caused by Wildfires (since 1999)



Note: Data from 2018 are preliminary.

North Bay Fires (2017)
 Camp Fire (2018)
 Non-Wildfire



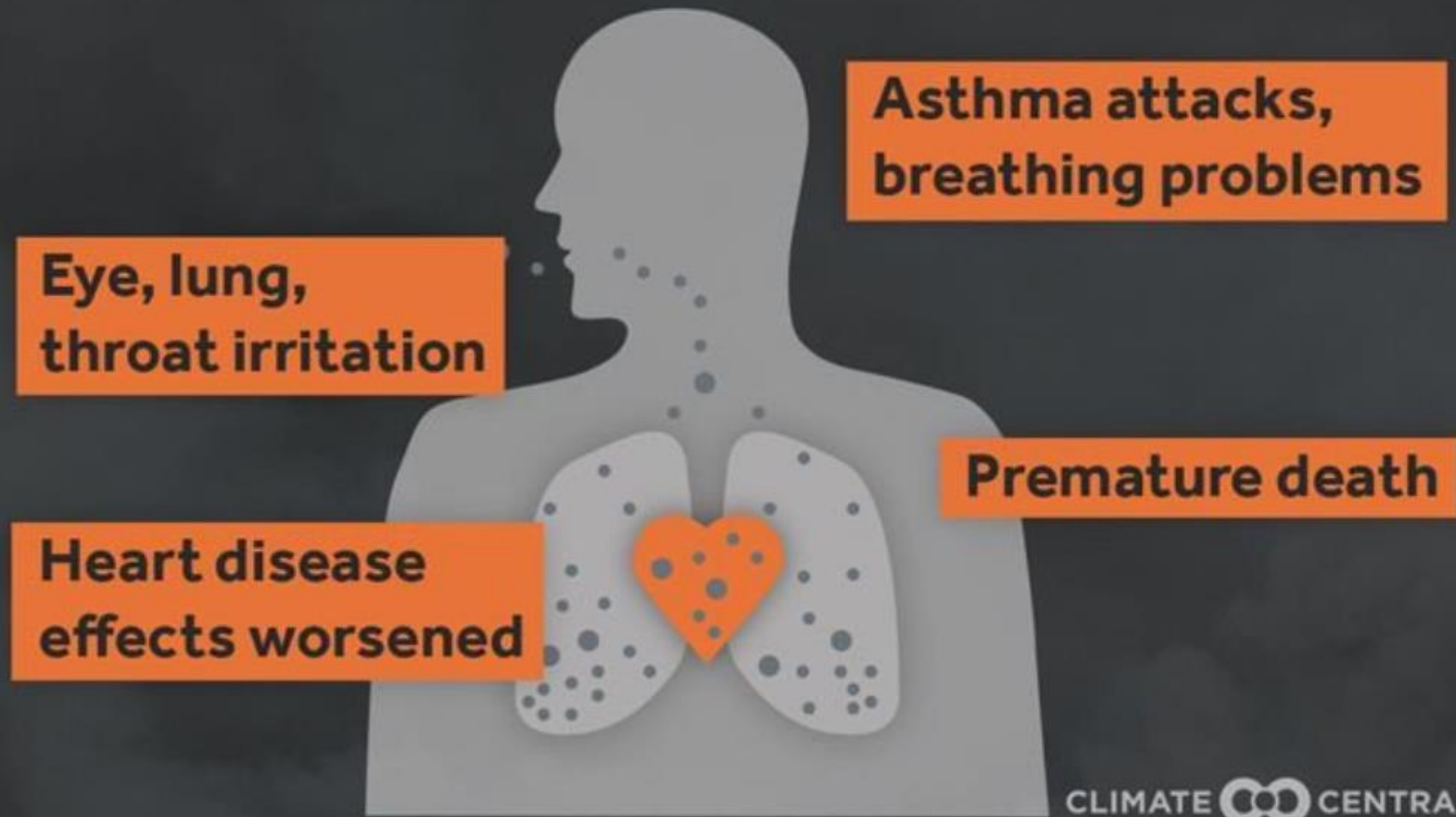
Health Messaging

- Keep children indoors and limit their activity
- Everyone stay indoors, windows & doors closed
- Utilize a “clean” room if available
- Limit outdoor activities
- No outdoor exercising
- If necessary, find a clean air space:
 - > local library
 - > shopping mall
 - > theater

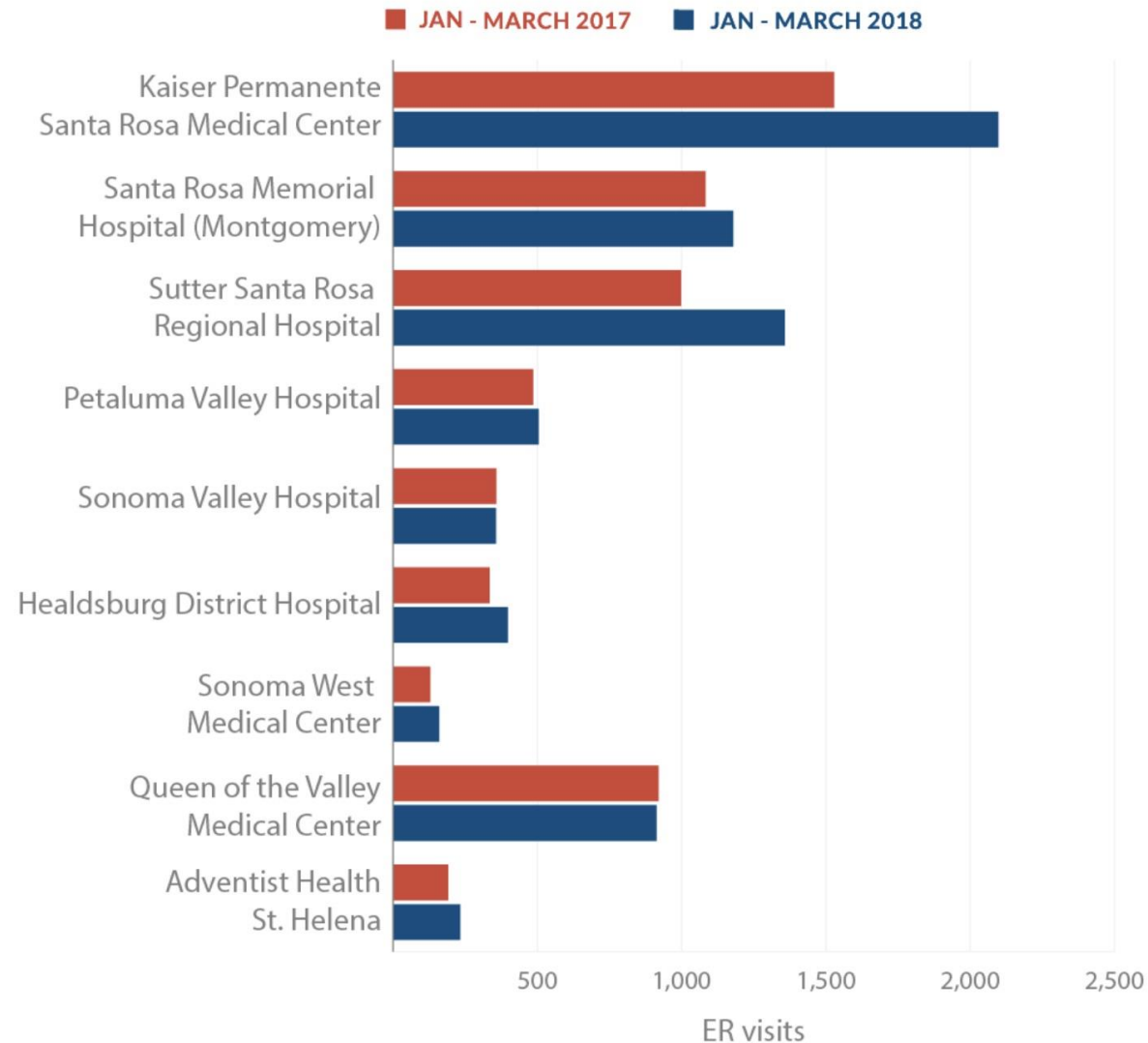


WILDFIRE POLLUTION HARMS HEALTH

Fine particle (PM_{2.5}) effects



Emergency Room Visits Before and After the Tubbs Fire (Sonoma County Respiratory Visits)



Source: California Office of Statewide Health Planning and Development, Reveal analysis
Credit: Gabriel Hongdsusit/Reveal



Board of Directors Regular Meeting



BAY AREA AIR QUALITY MANAGEMENT DISTRICT

SMOKE ADVISORY, SPARE THE AIR
 FOR IMMEDIATE RELEASE: October 10, 2017
 CONTACT: Ralph Borrmann - 415-760-XXXX

Air District Issues Smoke
 North Bay still impacted by heavy smoke

HEALTH ADVISORY, SPARE THE AIR ALERT
 CONTACT: Media Office - 415.749.4900

Air District Issues Health Advisory and Spare the Air Alert
 Residents throughout the Bay Area urged to protect their health and avoid heavy smoke impacts

San Francisco - Today, the Bay Area Air Quality Management District is issuing a health advisory for the North Bay. Due to active wildfires and changing wind patterns, air quality will be very unhealthy throughout the Bay Area. Due to active wildfires and changing wind patterns, air quality will be very unhealthy throughout the Bay Area. Due to active wildfires and changing wind patterns, air quality will be very unhealthy throughout the Bay Area.

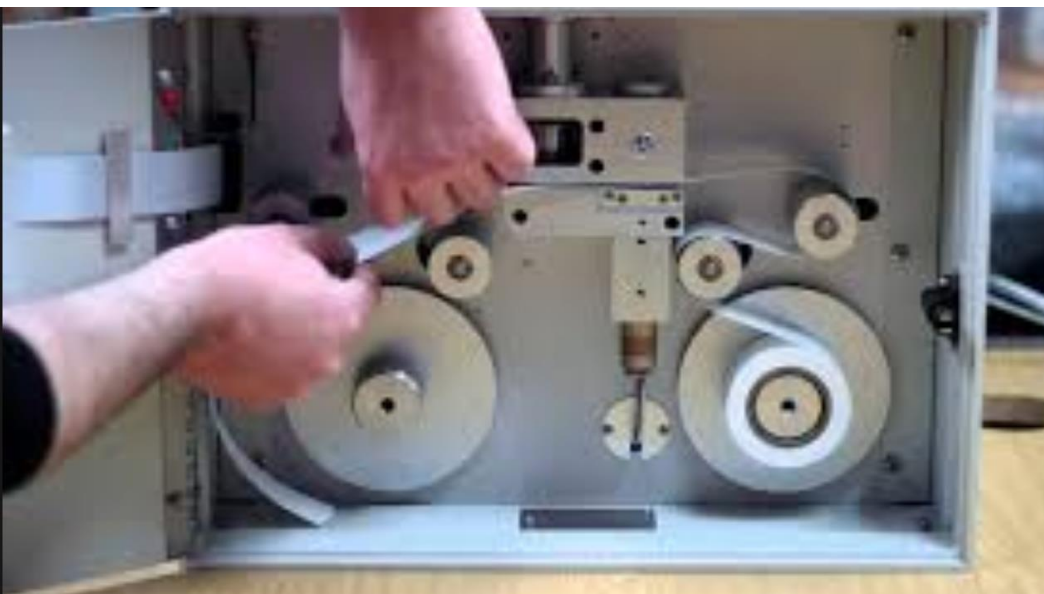
Very unhealthy air quality from wildfires and changing wind patterns could be expected for many days to come. Outside of the active fire areas, air quality may improve at times or get worse, very quickly. It is imperative that Bay Area residents protect their health, especially in Napa and Sonoma counties. It is recommended that residents impacted by wildfire smoke seek shelter in buildings with filtered air OR move to areas outside the region less impacted by wildfire smoke until smoke levels subside.

In other parts of the Bay Area, residents should protect themselves from the impacts of heavy smoke. It is recommended that parents and school administrators check air quality readings before allowing children to practice outdoor sports while air quality is unhealthy. Check here for real-time air quality readings: <http://aqm.baaqmd.gov>

Check here for real-time air quality readings



301 – 500	Hazardous
201 – 300	Very Unhealthy
151 – 200	Unhealthy
101 – 150	Unhealthy for Sensitive Groups
51 – 100	Moderate





Clean Air Shelters

Limit infiltration from outdoors

Limit indoor air pollution

Clean indoor air (existing central air, HEPA, electrostatic precipitator)

The diagram illustrates a clean air shelter as a house-like structure. Outdoor particles (represented by small circles) are shown entering the shelter through three main pathways: mechanical ventilation (a fan on the roof), natural ventilation (an open window on the left), and infiltration (a crack in the wall on the right). Fresh air is shown entering through the roof fan. Inside the shelter, the air is cleaned by an 'Air Cleaner' unit. Indoor particles are shown being captured by the cleaner. The diagram is labeled with 'Outdoor particles', 'Fresh air', 'Fan', 'Outdoor particles entry by Mechanical Ventilation', 'Outdoor particles entry by Natural Ventilation', 'Outdoor particles entry by Infiltration', and 'Indoor particles'.

Outdoor particles

Fresh air

Outdoor particles

Outdoor particles

Outdoor particles

Outdoor particles entry by Mechanical Ventilation

Outdoor particles entry by Natural Ventilation

Outdoor particles entry by Infiltration

Indoor particles

Air Cleaner

Chen 2011, Atmospheric Environment <https://doi.org/10.1016/j.atmosenv.2010.07.045>

BC Centre for Disease Control

Provincial Health Services Authority





BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT