



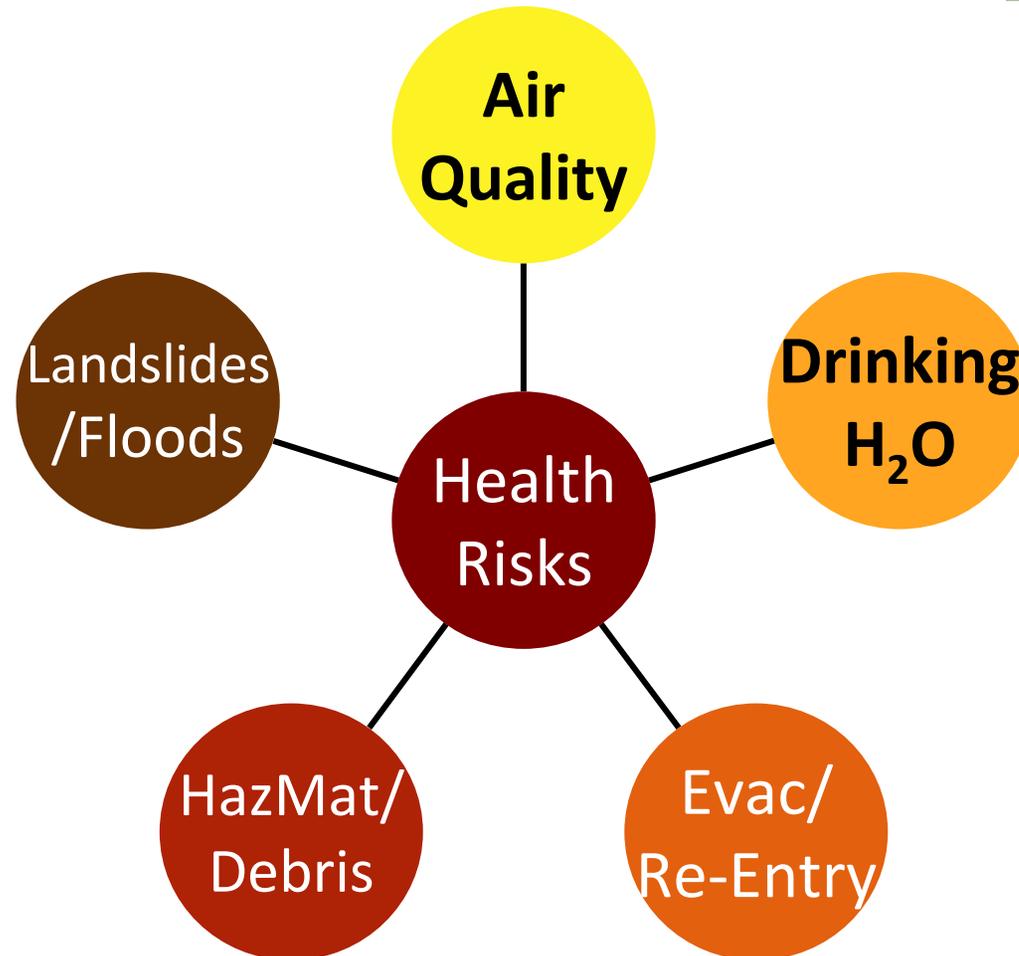
Wildfire Smoke Monitoring:



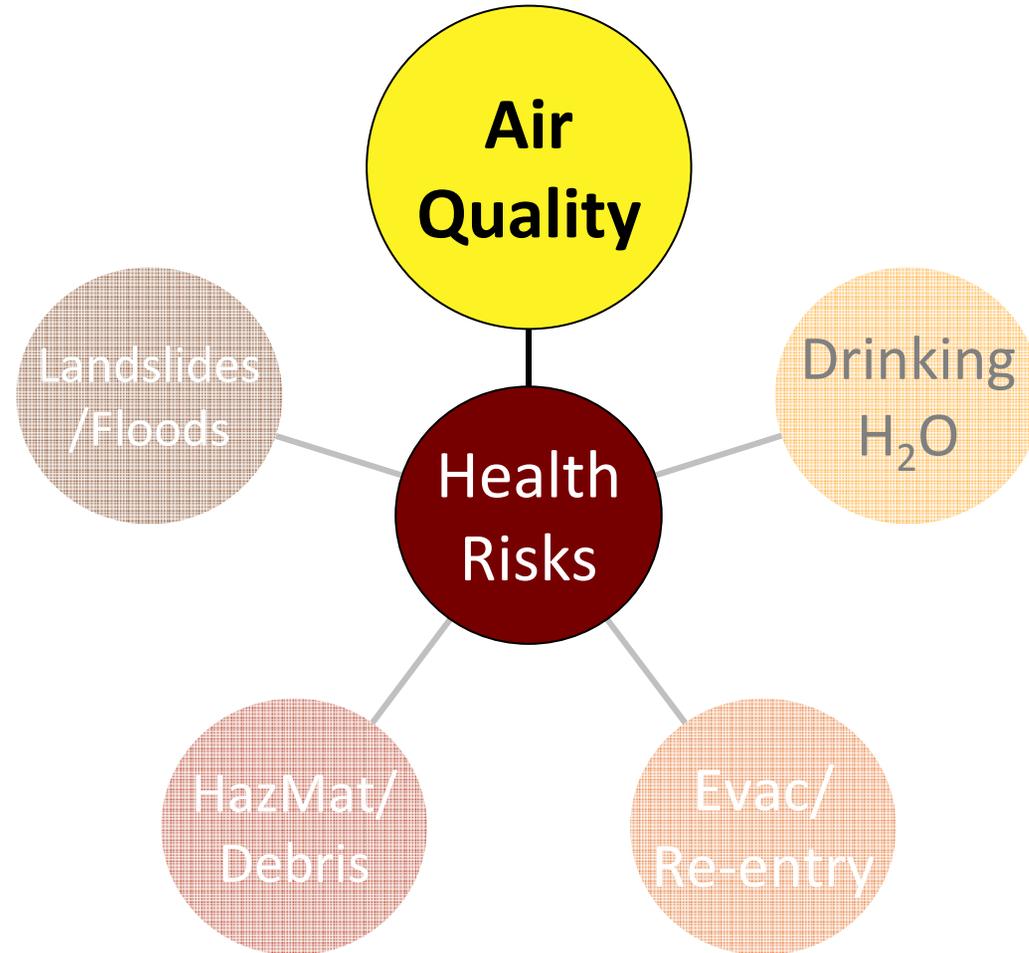
Strategies to Lessen the Public Health Impact of Wildfire Smoke

Shelley DuTeaux, PhD MPH
California Air Resources Board
Office of Emergency Response

Public Health Issues with Fires



Response Phase



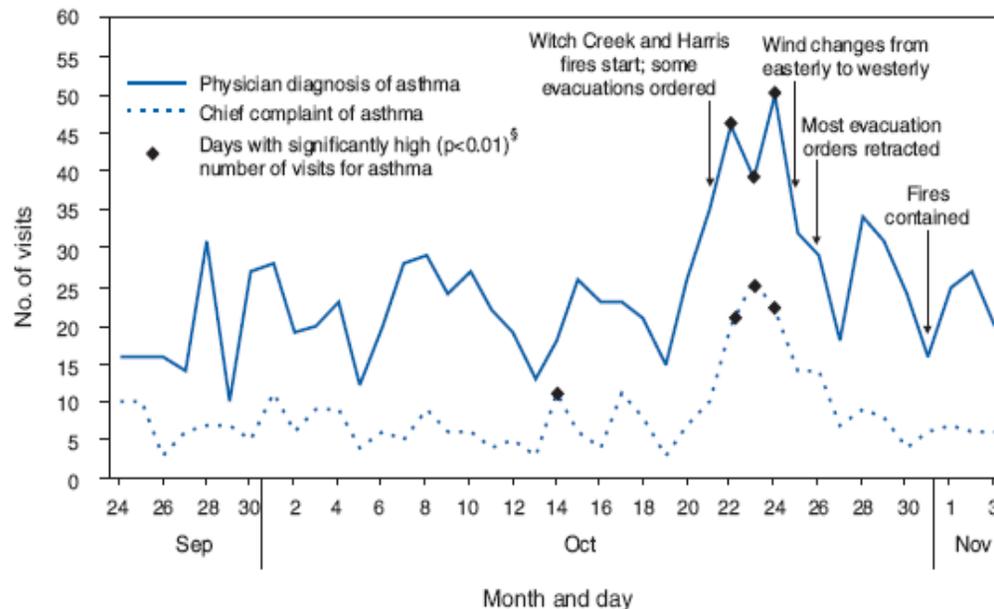






Wildfire Smoke Health Impact

FIGURE 2. Number of emergency department visits, by chief complaint* and diagnosis† of asthma — six hospitals, San Diego, California, September 22–November 17, 2007



Source: Centers for Disease Control, *Morbidity and Mortality Weekly Report*, July 11, 2008, 57(27);741-747.

Strategies to Lessen Public Health Impact

- Use met forecasts and fire behavior to map strategies for public health actions
 - Ex: Location of shelters
- Collect actionable data to feed to Health Officer / APCO
 - Ex: Monitor smoke in downwind communities
 - Ex: Inform public health messaging / warnings

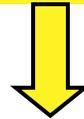
Strategies to Lessen Public Health Impact

- Use met forecasts and fire behavior to map strategies for public health actions
 - Ex: Location of shelters
- Collect actionable data to feed to Health Officer / APCO
 - Ex: Monitor smoke in downwind communities
 - Ex: Inform public health messaging / warnings

Air Monitoring



**Air quality impact
(presumed)**



**County/District requests
assistance**



**State/District deploys
and provides data**



**Public Health actions:
warnings, cancellations**



Layered Approach



Mobile Samplers

Numerous short term samples
Easily moved; Quick reaction to community needs



Portable Samplers

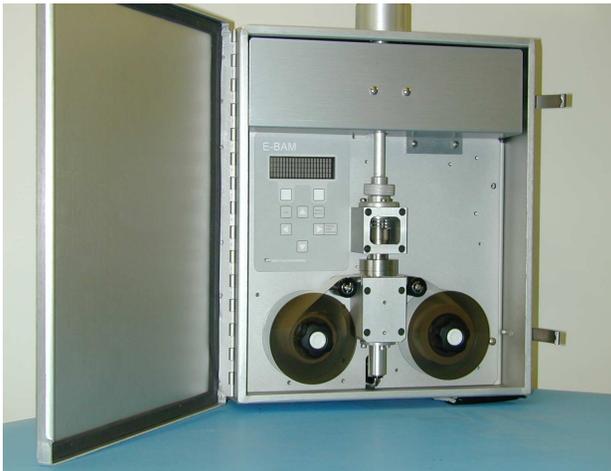
Automated, hourly average
Data available near real-time



Network Monitors

Operated for regulatory compliance
Slower turn-around; Already analyzed filters can provide background data

Electronic β -Attenuated Monitor (EBAM)



- Tape sampler
- ^{14}C source
- PM 2.5
- 16.7 liters/min
- Optional telemetry & meteorology
- Portable
- CARPA Preferred Practice



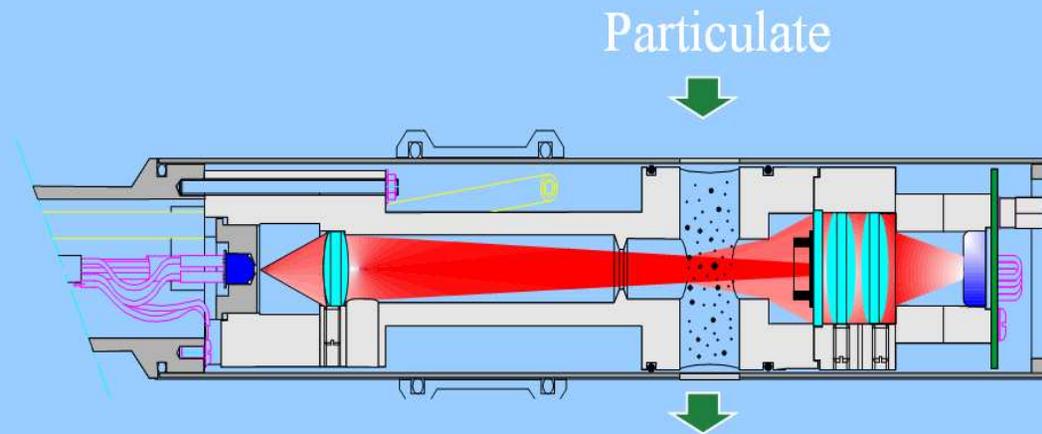
Casella MicroDust

- Mobile resource (ARB)
- PM 2.5
- Sampling hours – days
- Direct data download



Casella MicroDust, *cont*

Particulate introduced to sample volume



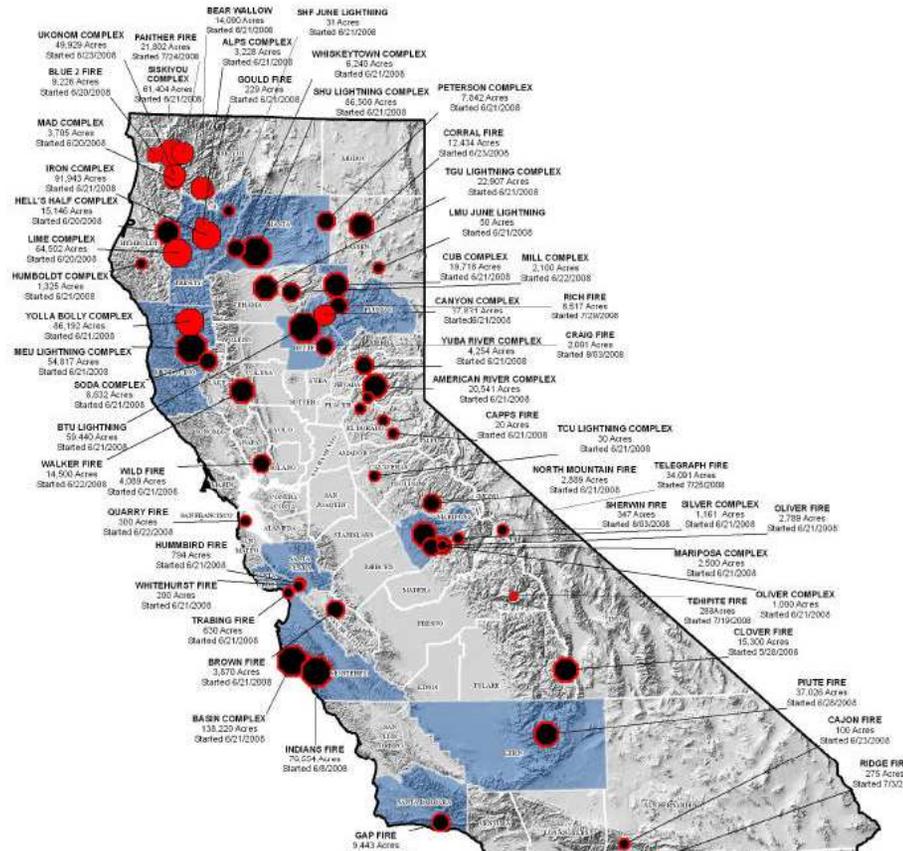
- Beam is scattered due to the effects of diffraction, refraction and reflection.
- Intensity of Infra red signal is measured by detector.





CALIFORNIA WILDFIRES ~ FEMA EM - 3287-CA

Total Incidents from 6/22/08 - 8/11/08



Fire Incidents by Acreage and Containment
57 Incidents For a Total of 1,157,930 Acres Burned

Active Fires ~ 11	Contained Fires ~ 46
● 20 - 1,500 (1)	● 20 - 1,500 (18)
● 1,501 - 10,000 (2)	● 1,500 - 10,000 (14)
● 10,001 - 50,000 (4)	● 10,001 - 50,000 (9)
● 50,001 - 91,943 (4)	● 50,001 - 162,818 (5)

Note: Fire Incidents that have been removed, or included into a different incident have been omitted from map.

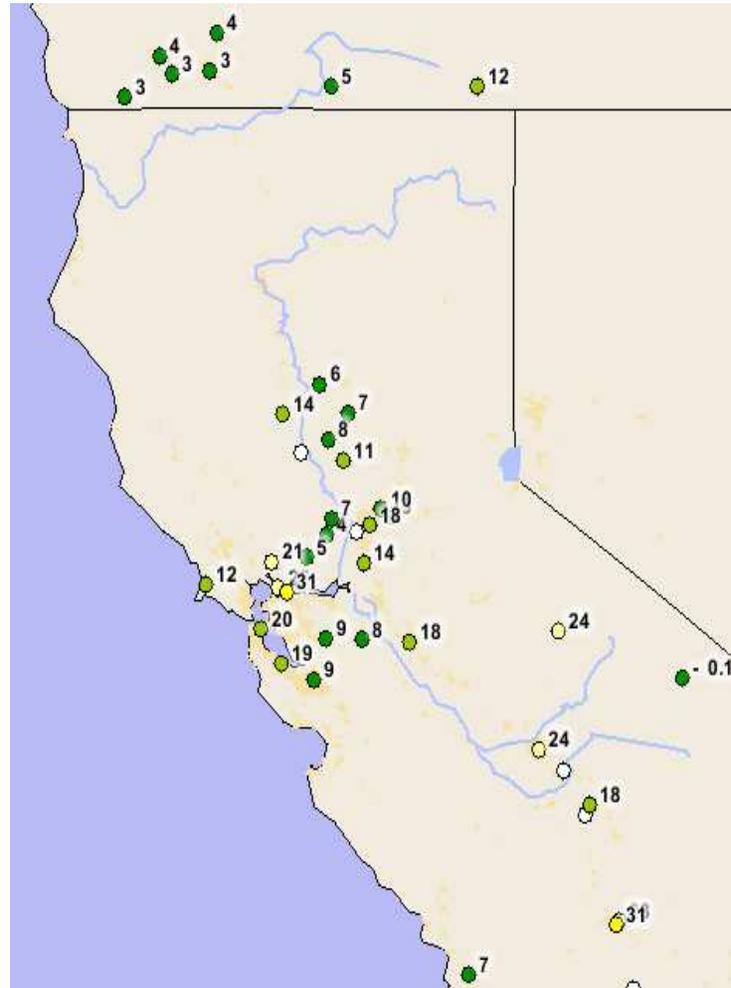
Presidentially Declared County - EM-3287

Source: FamWeb's 2009

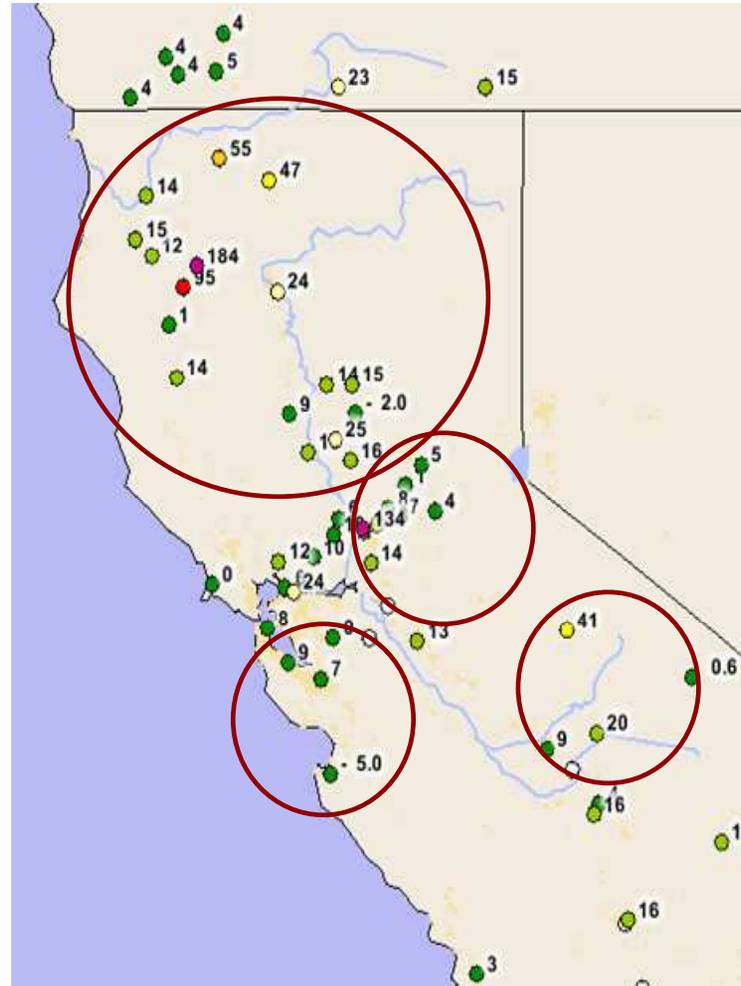


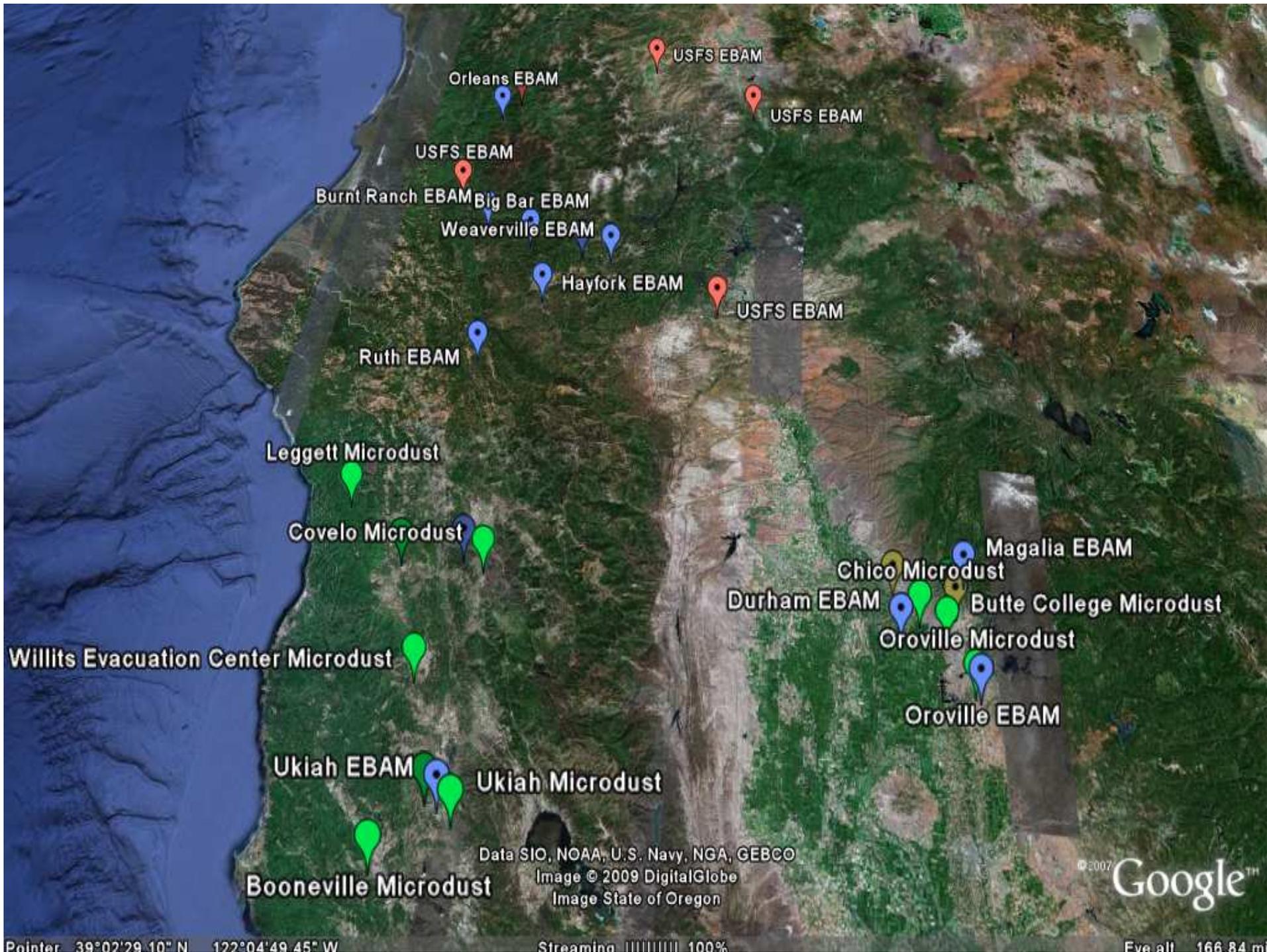
Created by OES - GIS, Kris Higgs
August 11, 2008 Source: FAMWEB 2009
www.pucdave.fires.2008.Statewide_Calendar

Monitoring Efforts – June 2008

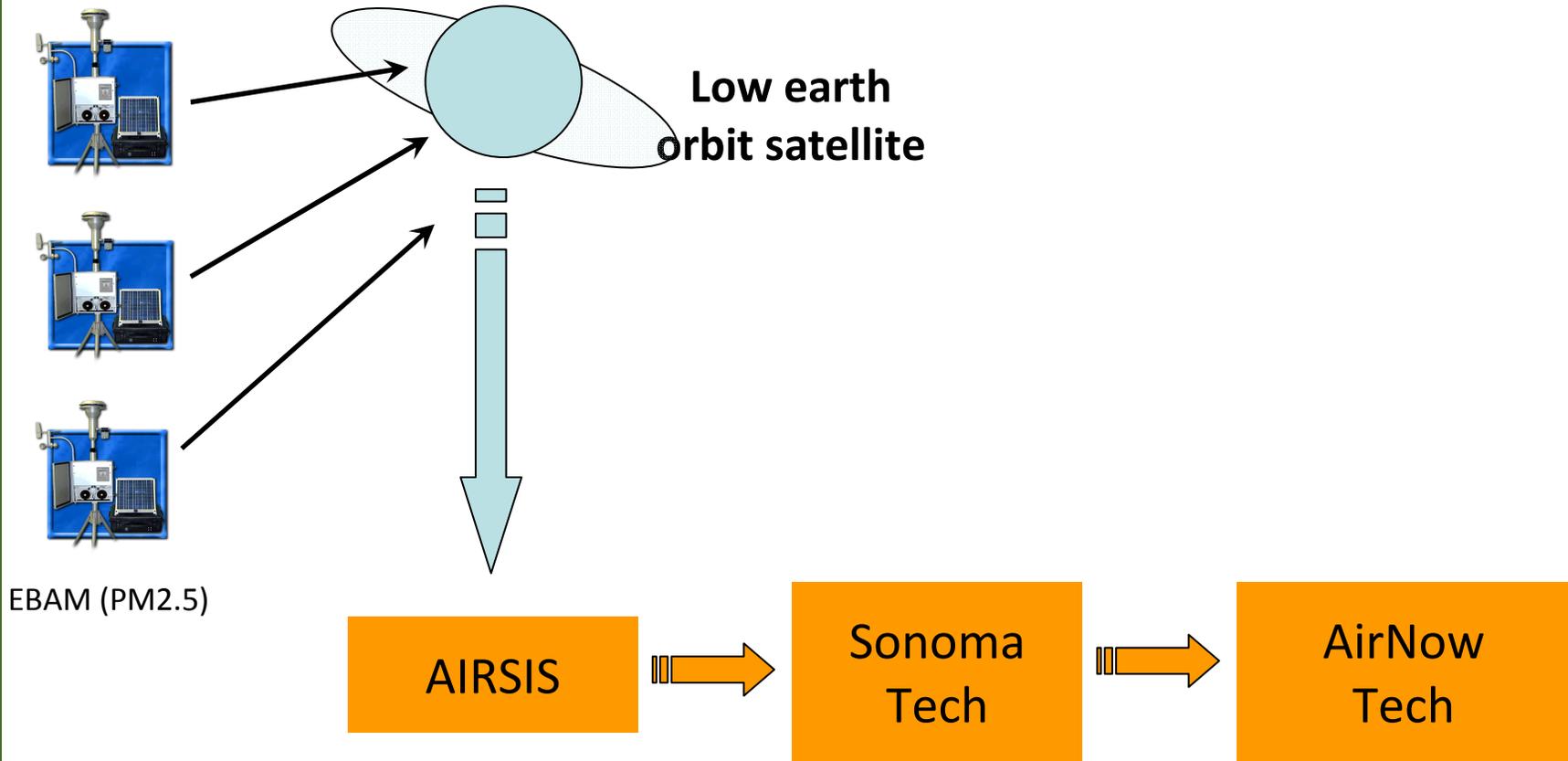


Monitoring Efforts – Late July 2008

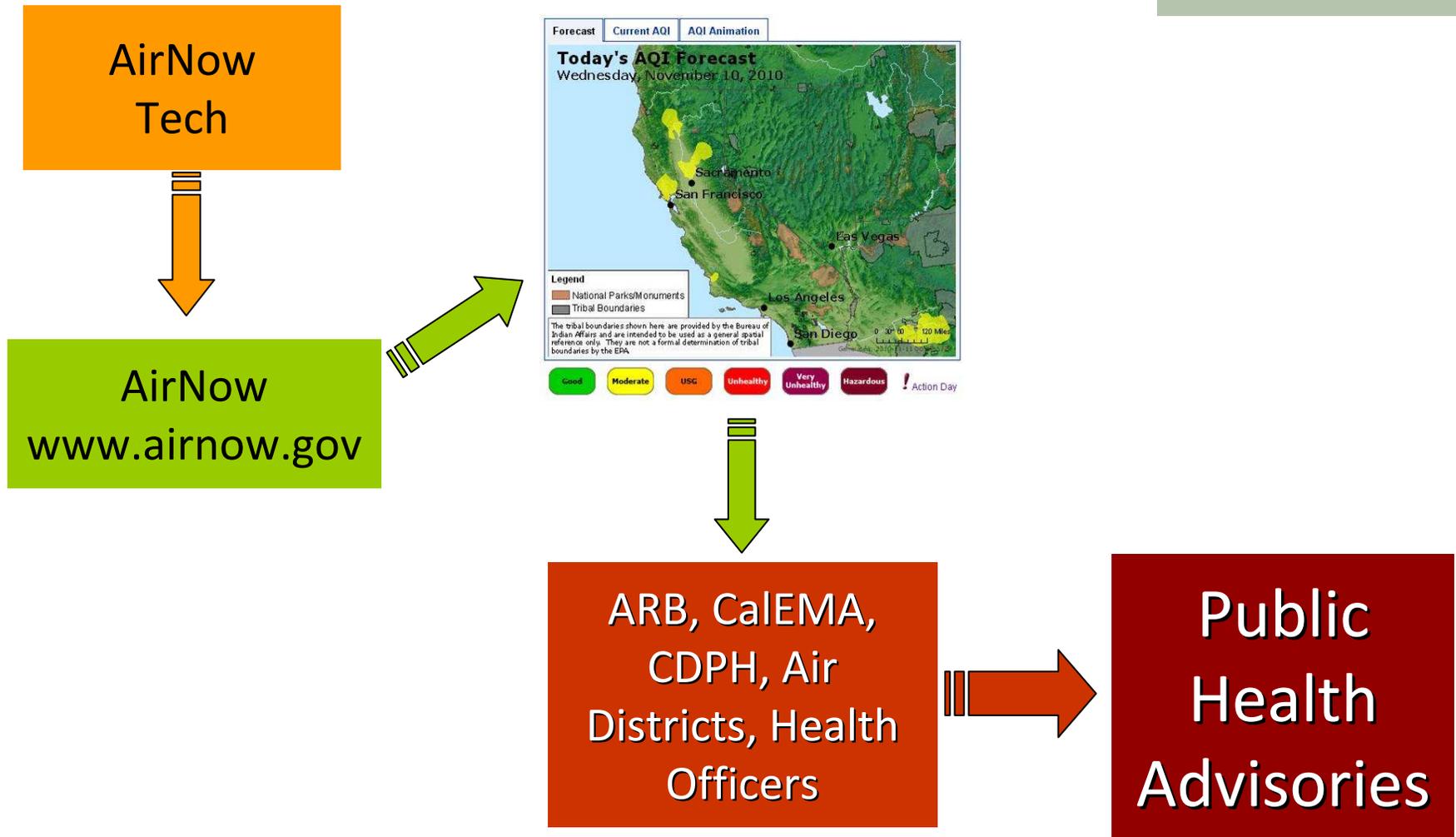




Data Management



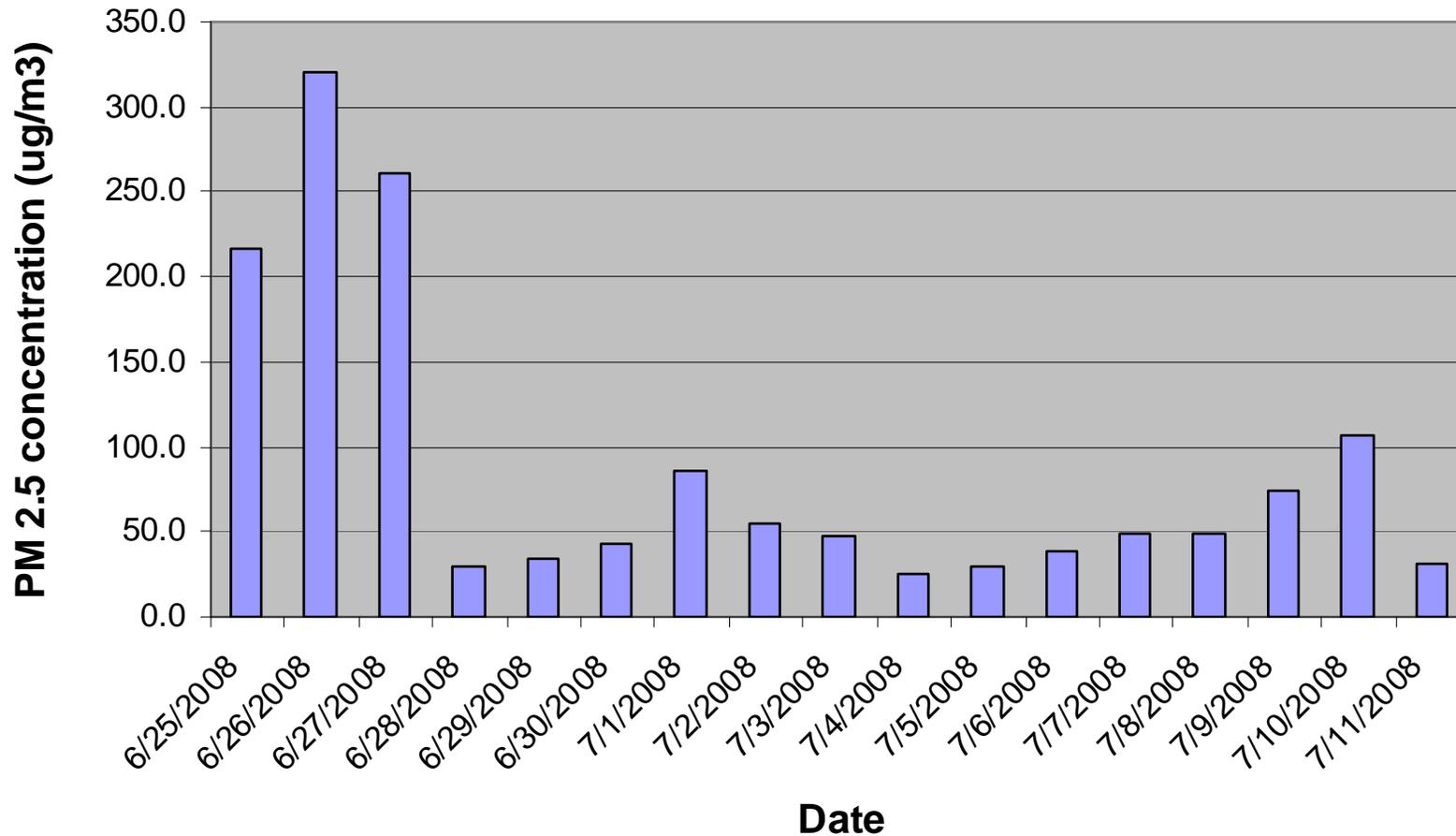
Data Management, *cont*



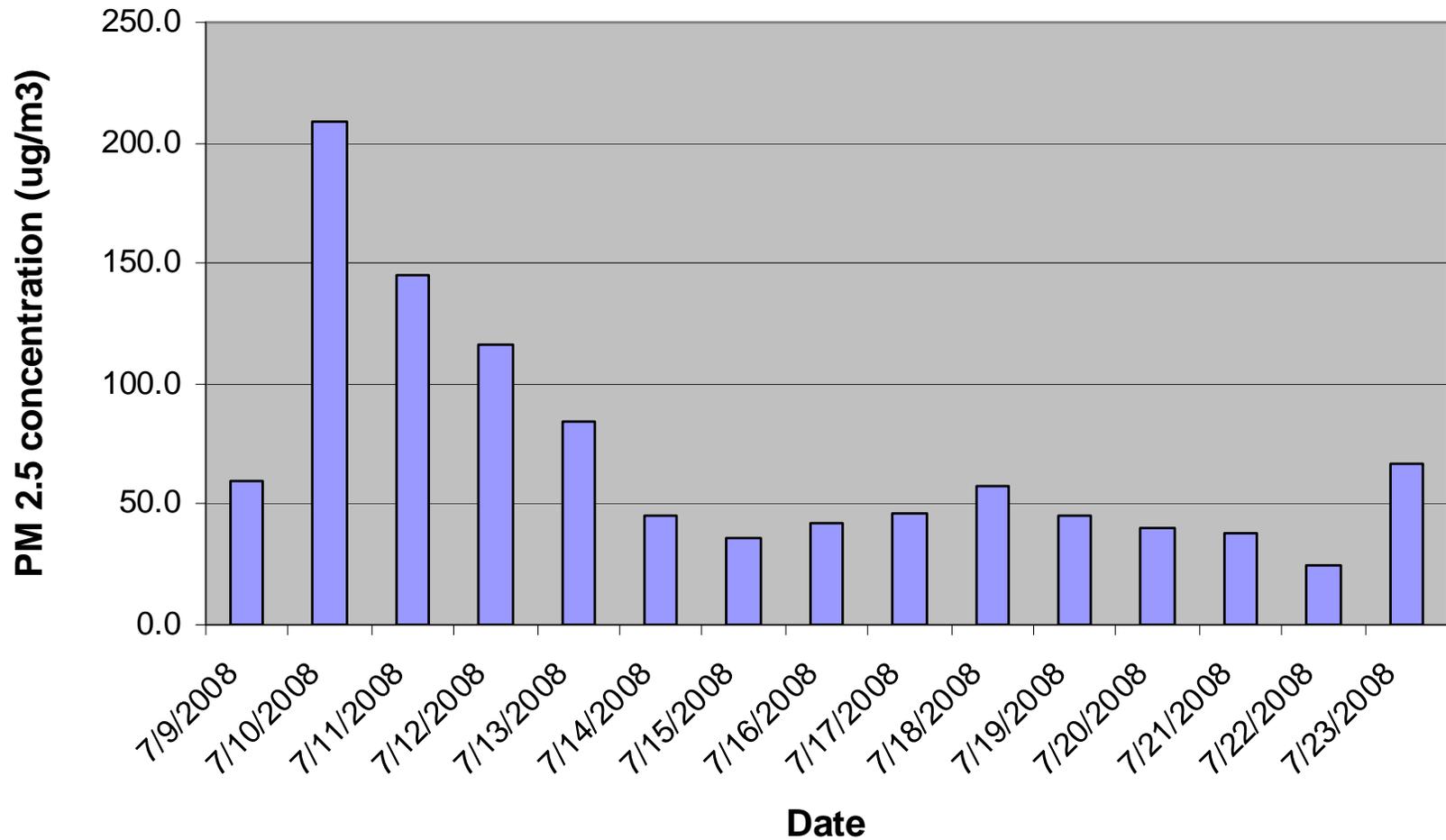
2008 Lightning Strike Complex



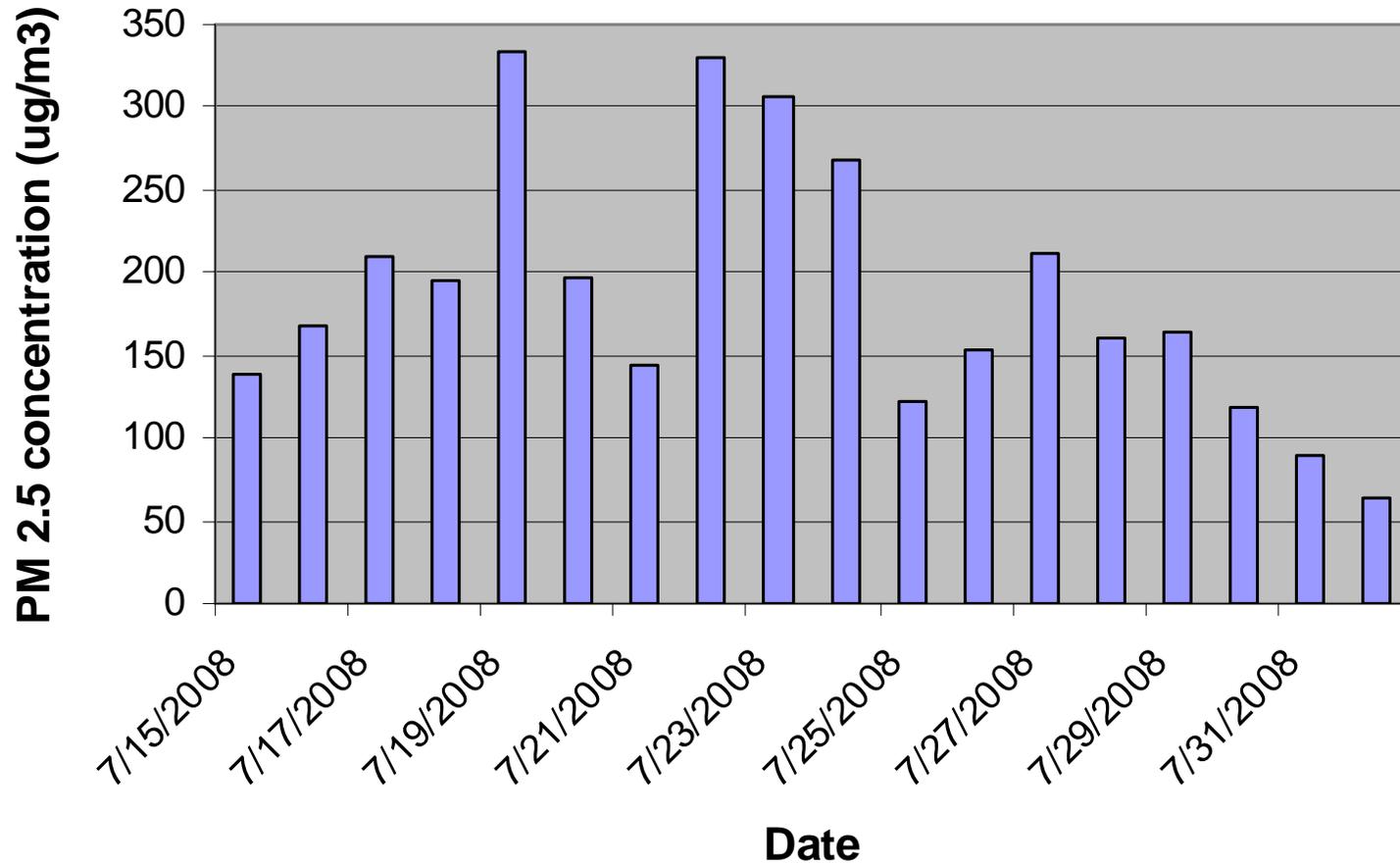
Mendocino County air quality (24hr avg)



Butte County air quality (24hr avg)



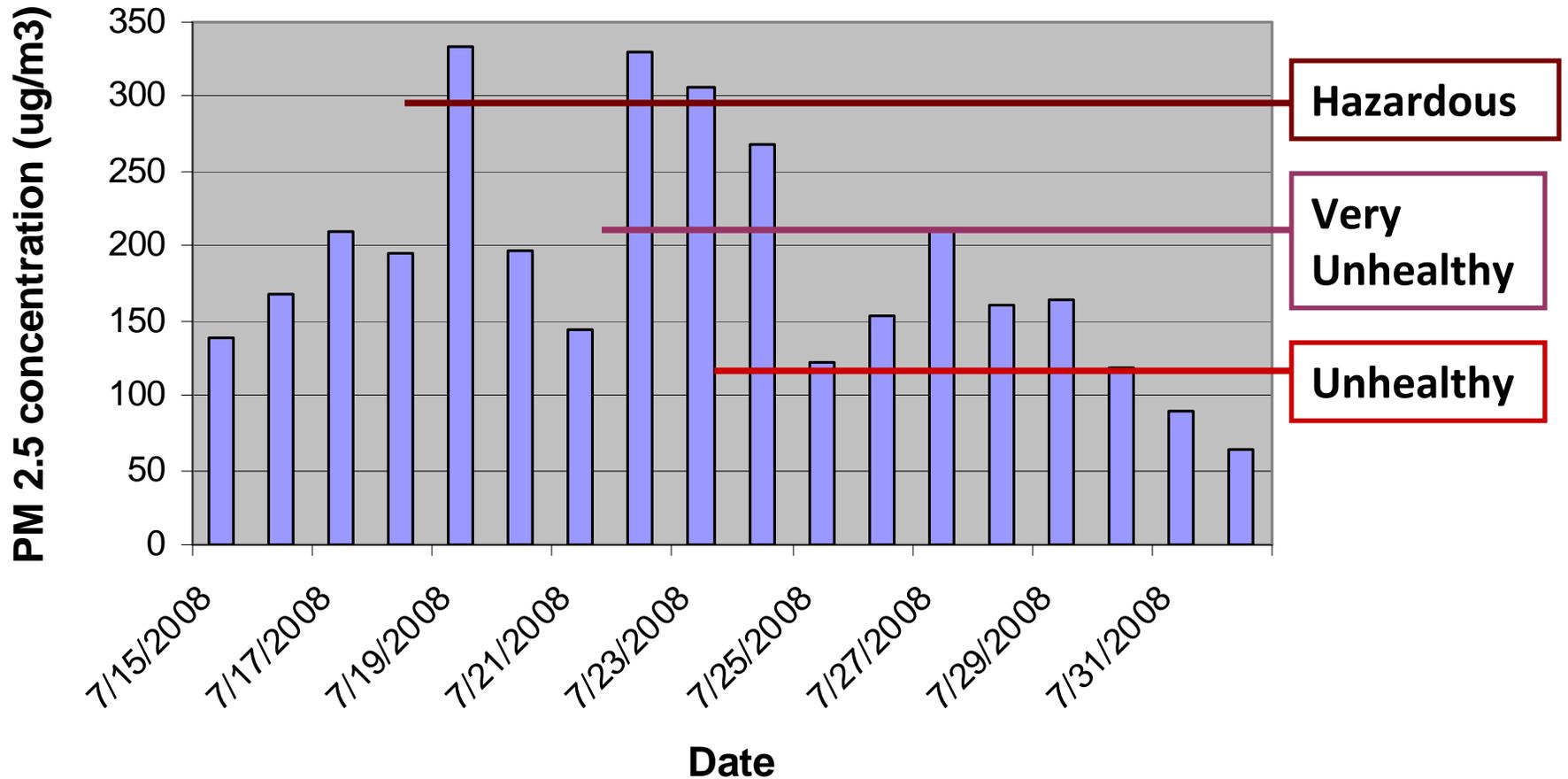
Trinity County air quality (24hr avg)



AQI Values	PM 2.5 (ug/m³; 24hr avg)	Health Effects
Good (0 to 50)	0-15	None expected
Moderate (51 to 100)	16-35	Possible aggravation of heart, lung disease
Unhealthy for Sensitive Groups (101 to 150)	36-65	Increased likelihood of respiratory or cardiac symptoms, especially in sensitive persons
Unhealthy (151 to 200)	66-150	Increased aggravation of CVD; premature mortality; general population respiratory effects
Very Unhealthy	151-250	Significant aggravation of heart, lung disease; premature mortality; significant respiratory effects
Hazardous	>250	Serious aggravation of heart, lung disease; premature mortality; serious respiratory effects

Wildfire Smoke Guide (Rev. 2008); www.arb.ca.gov/carpa/docs/docs.htm

Trinity County air quality (24hr avg)



Air Quality Alert

North Coast Unified Air Quality
Management District
2300 Myrtle Avenue, Eureka, CA 95501
Telephone (707) 443-3093 FAX (707) 443-3099
<http://www.ncuaqmd.org>



Hazardous Conditions Air Quality Alert Issued 7-23-08 4:00 PM

For the following areas:

Trinity County: Hayfork, Hyampom & Weaverville

Smoke Levels in these areas has been classified as **HAZARDOUS**. Smoke in these areas is creating a health hazard. People are recommended to avoid any outdoor activity.

If you have symptoms that may be related to excess smoke exposure, including repeated coughing, shortness of breath or difficulty breathing, wheezing, chest tightness or pain, palpitations, nausea or unusual fatigue or lightheadedness, contact your health care provider immediately.

Recommendations for limiting smoke exposure:

- Stay in a "clean room" at home. A clean room is a room where there are no indoor sources of smoke or particle sources, an air cleaner is used, and/or an air conditioner is used in re-circulate mode.
- Keep doors and windows sealed at much as possible. Take precautions against Heat Stroke.
- Avoid using exhaust fans (kitchen, bathroom, etc) as they draw smoke from the outside into your home.
- Keep the garage-to-home door closed.
- If you use an air conditioner, use it in re-circulate mode.
- Avoid other sources of pollutants, such as tobacco smoke, frying or broiling foods, burning candles, vacuuming, using paints, solvents, cleaning products and adhesives.
- Use groceries that don't require cooking.
- When smoke conditions improve, air out your house.

For 24-hour Air Quality Advisory Information, call toll-free at (866) 287-6329 and press (5) on your touch tone phone. For additional local information, please visit the North Coast Unified Air Quality Management District's Website at www.ncuaqmd.org. Please visit the CAPCOA website at www.airquality.org/smokeimpact for additional health information.

NORTH COAST UNIFIED AIR QUALITY MANAGEMENT DISTRICT (707) 443-3093

State Emergency Proclamation



Office of the Governor

ARNOLD SCHWARZENEGGER
THE PEOPLE'S GOVERNOR

"WHEREAS the wildfires in Humboldt County and throughout California have generated unprecedented smoke conditions, creating unhealthy air and posing a continuing danger to people; and

WHEREAS the Hoopa, Karuk, and Yurok Tribal Nations have declared local emergencies for their reservations in and near Humboldt County as a result of the fires and the unhealthy air caused by the fires and smoke; and

...

NOW, THEREFORE, I, Arnold Schwarzenegger, Governor of the State of California, in accordance with the authority vested in me by the state Constitution and statutes, including the California Emergency Services Act, and in particular, section 8625 of the California Government Code, HEREBY PROCLAIM A STATE OF EMERGENCY to exist within the County of Humboldt.

California Environmental Protection Agency

 Air Resources Board

```
graph TD; A[Actions based on AQ data] --> B[Public Health warnings/cancellations]; A --> C[Local & tribal emergency declarations]; A --> D[Clean air shelters; portable HVACs]; A --> E[Distribute particulate respirators];
```

Actions based on AQ data

Public Health warnings/
cancellations

**Local & tribal
emergency
declarations**

**Clean air
shelters;
portable
HVACs**

**Distribute
particulate
respirators**

State Level Guidance



Wearing a special mask called a "**particulate respirator**" can help protect your lungs from wildfire smoke.

Choose a mask that has the word "**NIOSH**" and either "**N95**" or "**P100**" printed on it. These are sold at many hardware and home repair stores and pharmacies.

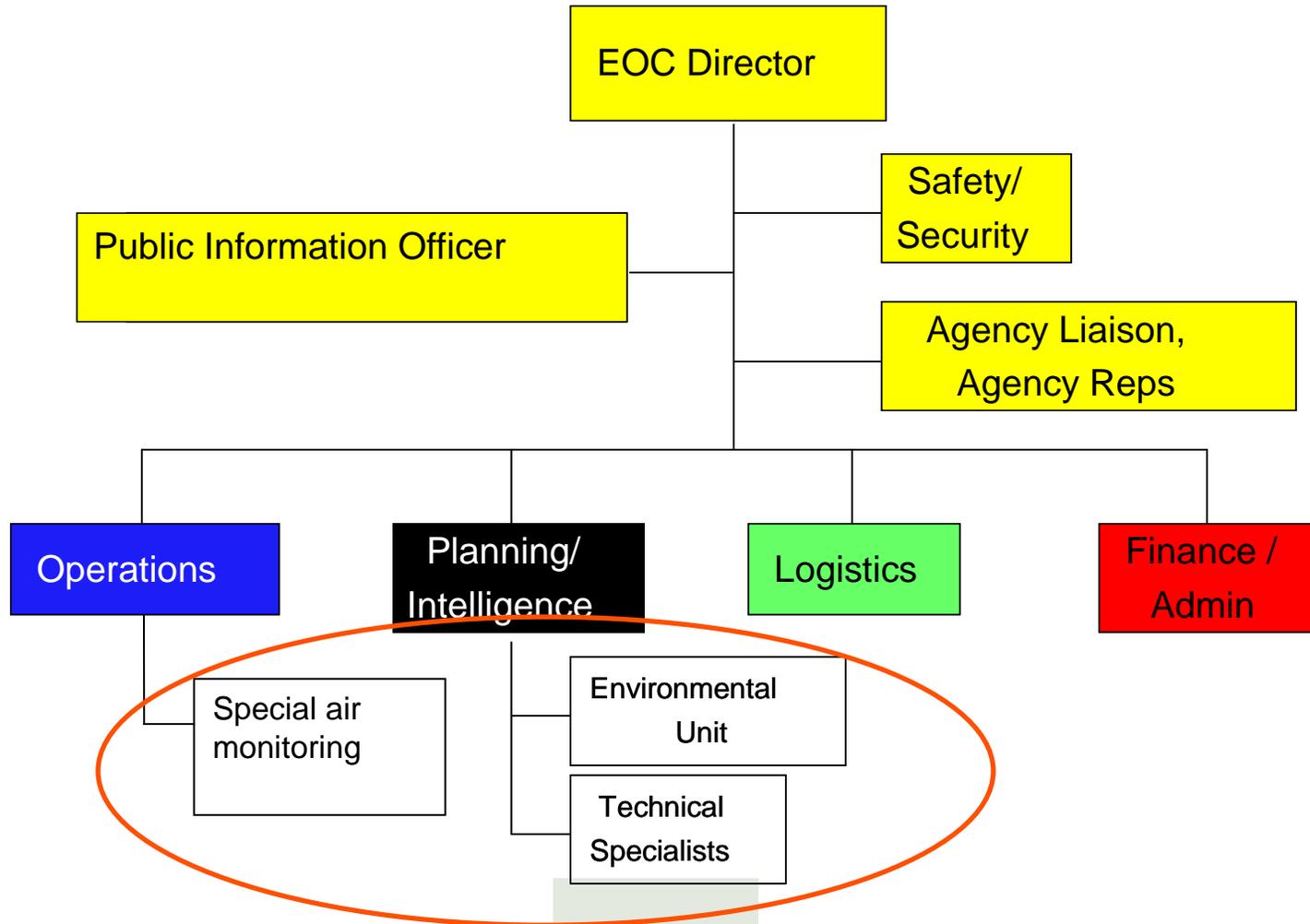
Straps must go above and below the ears.

From the Wildfire Smoke Guide (Rev. 2008); www.arb.ca.gov/carpa/docs/docs.htm



Lessons Learned

1. Integrate Emergency Air Monitoring into IC/EOC



2. Be Consistent in Public Health Messages

- ✓ Consistency with tribal, local, statewide public health actions and messaging
- ✓ What if local officials disagree?
- ✓ Don't wait for the public to come to you

Wildfire Smoke

A Guide for Public Health Officials

Revised July 2008



www.arb.ca.gov/carpa/carpa.htm

3. Strengthen Interagency Cooperation

- ✓ Cooperative agreement with US Forest Service
- ✓ Shared interagency sampling and monitoring plan
- ✓ Having Health Officers and Air Districts work together
- ✓ Train together



3. Strengthen Interagency Cooperation, *cont*

California Air Response Planning Alliance (CARPA)

2010 Training Summit

Dec 15-16, 2010

- ✓ Hands-on skills for emergency air monitoring, data analysis and interpretation, and messaging
- ✓ Lessons learned from the Graniteville train derailment, the 2008 fires, and the San Bruno Natural Gas Explosion

www.carpasummit.com

Shelley DuTeaux
Health Assessment Specialist
CARB Office of Emergency Response
sduteaux@arb.ca.gov
(916) 206-1771 – cell

Greg Vlasek
Chief, CARB Office of Emergency Response
gvlasek@arb.ca.gov
(916) 838-0872 – cell

CalEMA Warning Center
(800) 852-7550