NSCAPCD Camp Wildfire Response November, 2018

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Air Quality Monitoring

“Every person who prepares is one less person who panics in a crisis”

-Mike Adamson, British Red Cross

Recent Wild Fire Impacts in N. Sonoma County

- 2017 Tubbs, Pocket, and Nuns Wild Fires
  - October 8th- October 31st,2017
  - Local impacts included significant structural damage and smoke
  - District data impacted from October 9th-October 16th (~8 days)
  - Max hourly concentration of 356 ppm (PM10 BAM 1020- Cloverdale)
- 2018 Camp Wild Fire
  - November 8th- November 25th, 2018
  - Local impacts were limited to smoke
  - District data impacted from November 8th-November 20th (~13 days)
  - Max hourly concertation of 403 ppm (PM10 BAM 1020- Guerneville)

District Concerns and Challenges

- Equipment and Coverage
  - Do we have the right equipment to capture these events?
  - Are there areas in the district that need more coverage that aren't already covered by existing network?
- Data Capture
  - Which data sources are the most accurate, and easily explained to the public?
  - Why is there so much data, and where is it all coming from?
- General Public Queries
  - How do we properly message the data that is being collected?
  - Are there policies or guidelines available to schools and places of employment that protect public health?

Camp Fire: Smoke in Sonoma County

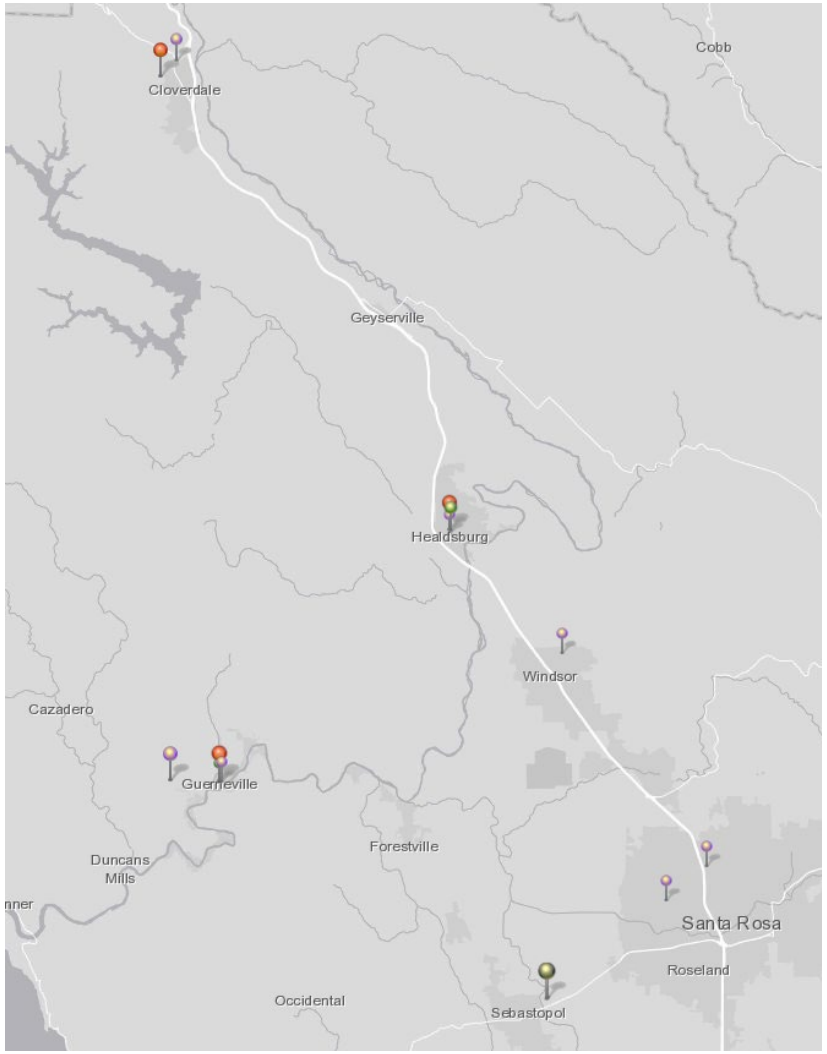
Healdsburg, California

Camp Wildfire: Smoke in Sonoma County

- Tools available for monitoring smoke impact:
  - Existing Network
    - PM_{10} –NSCAPCD
    - $PM_{2.5}$ –BAAQMD
  - Other Technology
    - PurpleAir Sensors
    - E-BAM's ($PM_{2.5}$)- CARB

Continuous Monitors & PurpleAir

- Current Network
  - BAM-1020 for PM_{10}, BAM-1020 for $PM_{2.5}$, and Ozone Analyzers
- Deployed at time of Smoke Event
  - 8 PurpleAir Sensors- readily available, soon after event started
    - 7 Outdoor across N. Sonoma County
    - 1 for indoor use in District Office
  - 2 E-BAM's for PM 2.5 provided by CARB
    - E-BAM's were placed near existing PM 10 monitors on November 19th



Existing Network

Advantages

- Sites are well established (over 20 years)
- Site locations provide for excellent coverage of jurisdiction
- AirVision allows staff to access hourly data remotely

Limitations

- District only monitors for PM_{10} and relied on BAAQMD's $PM_{2.5}$ monitor in Sebastopol during fire event
- Data that District collects is accessible to public in limited form
- AirNow does not have access to District generated data

PurpleAir

Advantages

- Easy to distribute and deploy
- Low Cost
- User-Friendly online web interface
- Near real time readings

Limitation

- Dust (soot) can settle inside device, causing Optical Particle Sensor (OPS) to drift over time [2]
- Aerosols (biomass burning, sea salt, fog) can cause higher counts due to limitations of OPS tech [3]
- Smoke composition and particle size may vary, causing lower/higher counts[3]
- Updates ~20 seconds, creating large data set

CARB Deployed E-BAM

Advantages

- No cost for District
- CARB provides easy set up options
- Access to data remotely

Limitations

- E-BAM's were not available for deployed until several days after event began
- Deployment logistics
- Pre-incident baseline not captured

Camp Wildfire: Smoke in Sonoma County

Cloverdale, California

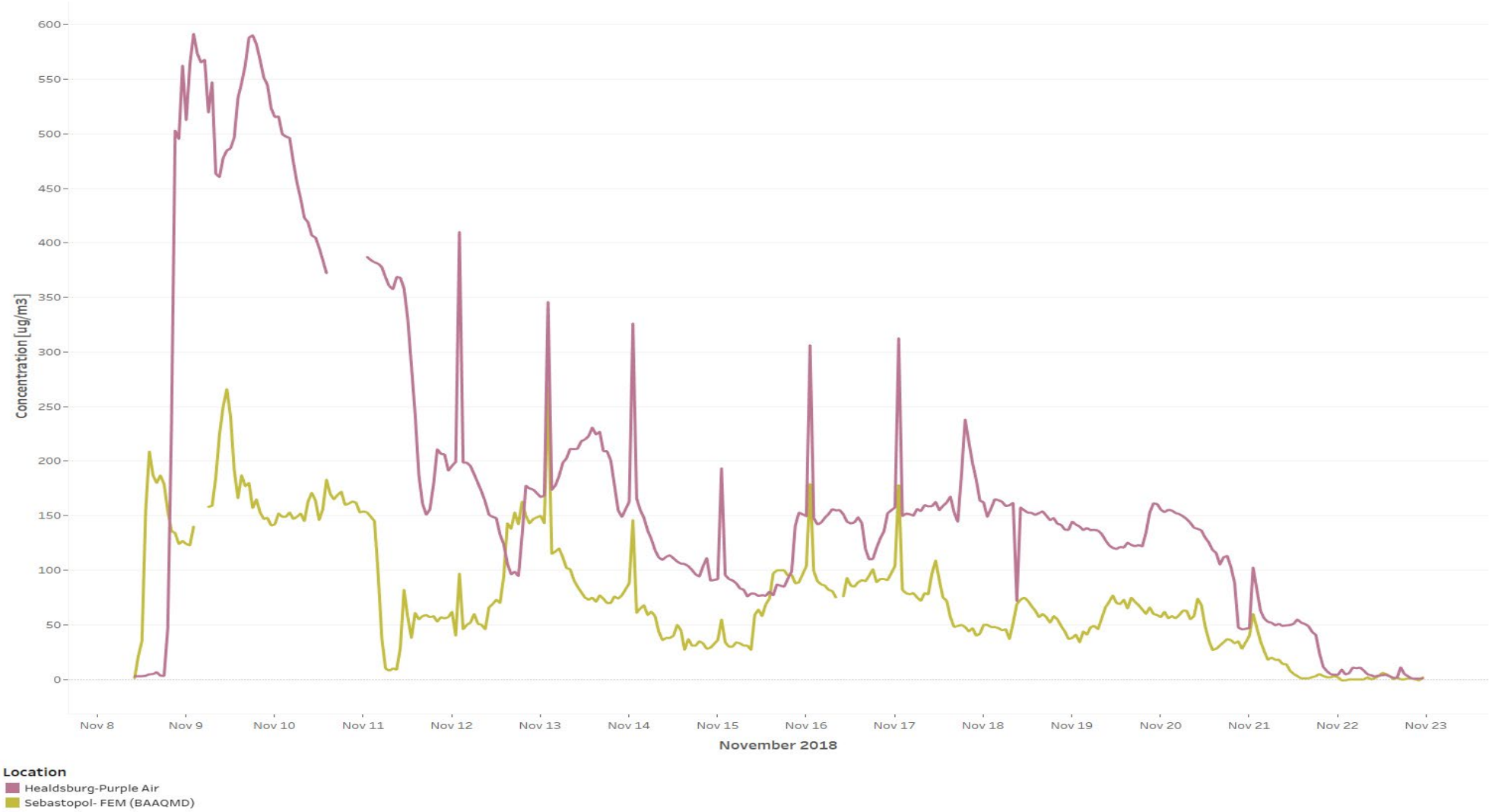
Data Collection & Analysis

- Data gathered from 4 different sources
  - BAAQMD
  - AirFire
  - PurpleAir
  - AirVison
- Finding Consistency for Comparison
  - By Measurement (PM_{10} vs. $PM_{2.5}$)
  - Time
  - Location
  - Source

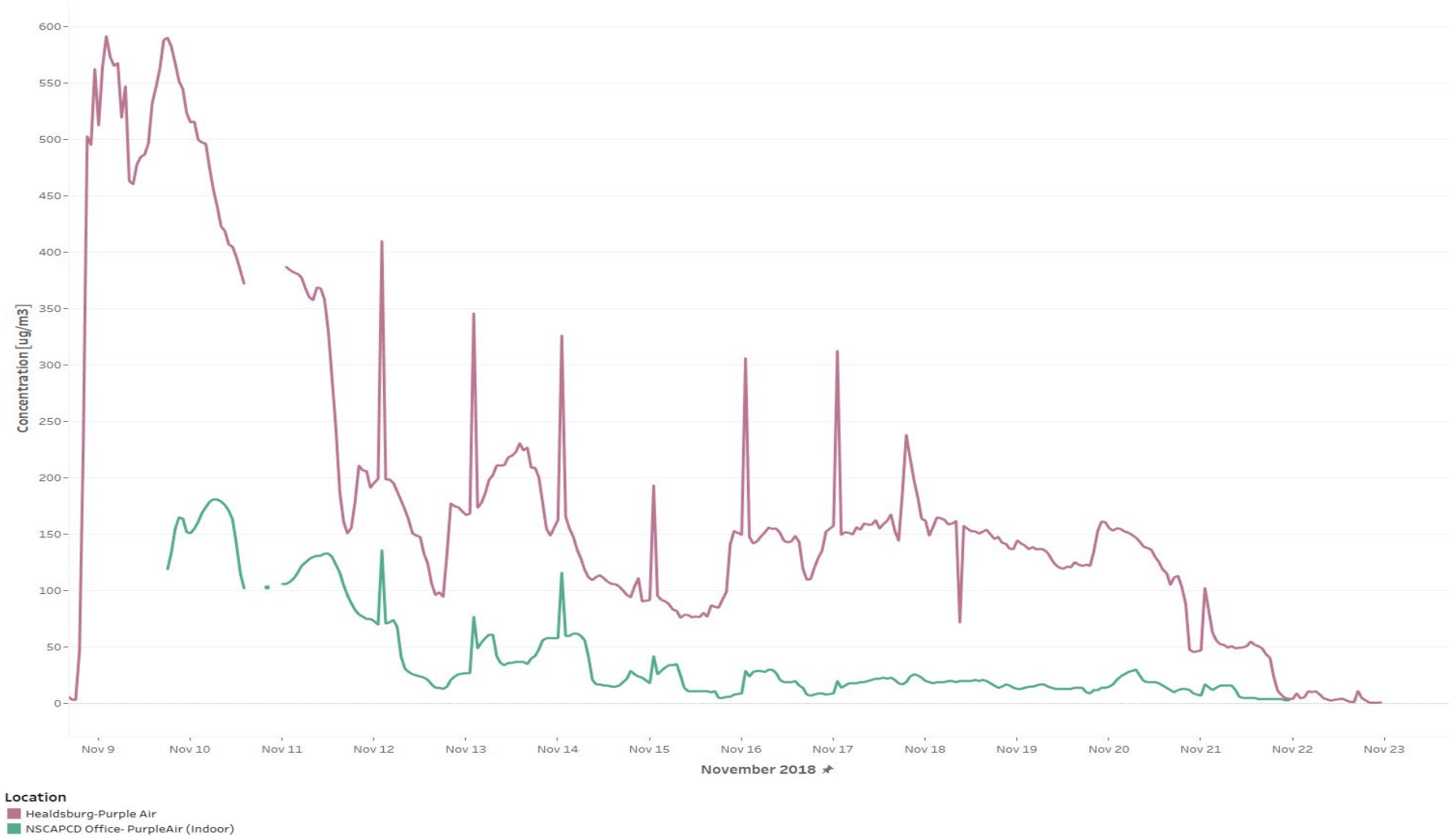
- Important questions:
  - How well are PurpleAir's performing during wildfire event?
  - Can we compare indoor vs. outdoor PurpleAir values?
  - Is PM_{10} still a relevant source of data during wildfire event?
  - Was there enough data from the E-BAM's deployed for comparisons to be made?
  - How can the District communicate findings to the public and decision makers?

PurpleAir vs. Sebastopol BAM-1020

Smoke Event Findings



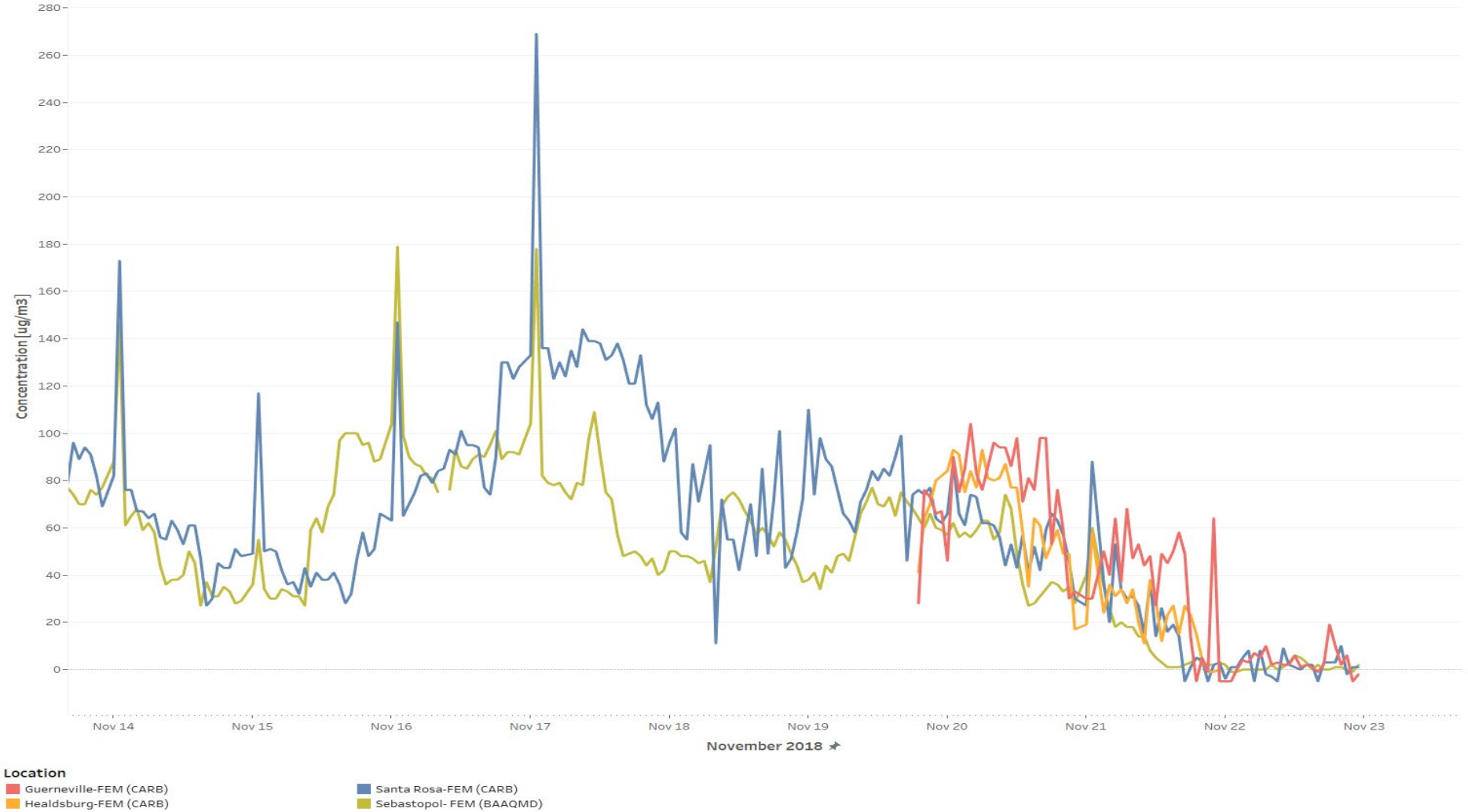
PurpleAir:
Outdoor vs. Indoor Use in NoSoCoAir Office



PurpleAir:
Indoor Use in NoSoCoAir Office

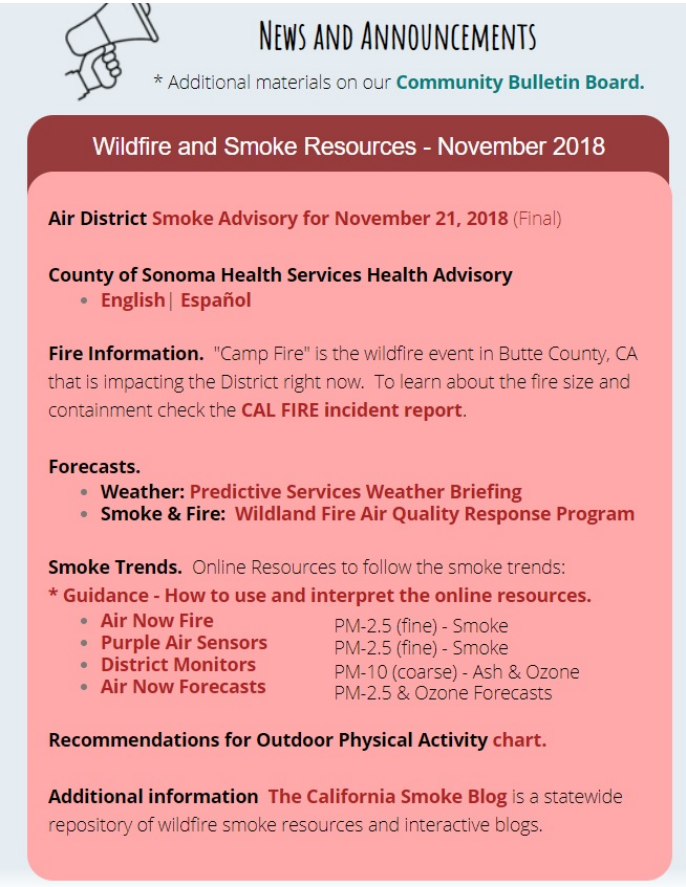
BAM Vs. E-BAM

Smoke Event Findings



Addressing Public Concern

- Phone/Email responses by staff
- Social Media postings
- Smoke Advisories
- Guidance Documents (handouts)
- Wildfire & Smoke Resources splash page on website
- Sonoma County Office of Education Meeting



NEWS AND ANNOUNCEMENTS

* Additional materials on our **Community Bulletin Board.**

Wildfire and Smoke Resources - November 2018

Air District Smoke Advisory for November 21, 2018 (Final)

County of Sonoma Health Services Health Advisory
- **English** | **Español**

Fire Information. "Camp Fire" is the wildfire event in Butte County, CA that is impacting the District right now. To learn about the fire size and containment check the **CAL FIRE incident report**.

Forecasts.
- **Weather: Predictive Services Weather Briefing**
- **Smoke & Fire: Wildland Fire Air Quality Response Program**

Smoke Trends. Online Resources to follow the smoke trends:
*** Guidance - How to use and interpret the online resources.**

Air Now Fire	PM-2.5 (fine) - Smoke
Purple Air Sensors	PM-2.5 (fine) - Smoke
District Monitors	PM-10 (coarse) - Ash & Ozone
Air Now Forecasts	PM-2.5 & Ozone Forecasts

Recommendations for Outdoor Physical Activity chart.

Additional information The California Smoke Blog is a statewide repository of wildfire smoke resources and interactive blogs.

Sonoma County Office of Education (SCOE) Meeting: December 5, 2018

Sonoma County Schools Air Quality Guidelines

Prepared in collaboration with the county's 40 school districts

Sonoma County Office of Education

HOW TO USE THIS CHART:

1. On days with questionable air quality, superintendents shall check purpleair.com at **5:00am**.
2. If the Air Quality Index (AQI) is listed at 275 or above, districts may cancel classes. The superintendent will notify the county superintendent, their district staff and families.
3. District/Site staff must be informed of any and all restrictions that are in place based on the AQI as noted on the table below.
4. Personnel: At an AQI of 275 or above, school is closed. Essential personnel (maintenance, administrative) may be called in to work.

AQI Index		Recommended Actions			
	School in Session?	Recess / Lunch	Physical Education	Athletic Practice & Training	Scheduled Sporting Events
GOOD (0-50)	Yes	No Restrictions	No Restrictions	No Restrictions	No Restrictions
MODERATE (51-100) Unusually sensitive people should consider reducing prolonged or heavy outdoor exertion	Yes	Ensure unusually sensitive individuals are medically managing their condition	Ensure unusually sensitive individuals are medically managing their condition.	Ensure unusually sensitive individuals are medically managing their condition.	Ensure unusually sensitive individuals are medically managing their condition.
UNHEALTHY FOR SENSITIVE GROUPS (101-150)[1] Everyone should limit prolonged or heavy outdoor activities, especially children, older adults, and people with heart or lung disease. All doors and windows must remain closed throughout the day.	Yes	On campus/indoor lunch strongly recommended for all high school students: Mandatory for Elem/Middle.	Reduce vigorous exercise to 30 min per hour. May move indoors or modify activity as necessary.	Reduce vigorous exercise to 30 min per hour of practice time with increased rest breaks and substitutions. May move indoors or modify activity as necessary.	Increase rest breaks and substitutions per CIF guidelines for extreme heat. May move indoors or modify activity as necessary.
UNHEALTHY (151-200) The following groups should avoid all physical outdoor activity: People with heart or lung disease, children and older adults. Everyone else should avoid prolonged or heavy exertion	Yes	All activities should be moved indoors as much as reasonably possible.	All activities should be moved indoors as much as reasonably possible.	All activities should be moved indoors as much as reasonably possible.	Event should be rescheduled or relocated.
VERY UNHEALTHY (201-300) Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors.	Yes (< 275) No (> 275) Classes cancelled at district's discretion	No outdoor activity. All activities should be moved indoors.	No outdoor activity. All activities should be moved indoors.	No outdoor activity. All activities should be moved indoors.	Event must be rescheduled or relocated.
HAZARDOUS (300-500) Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors.	No	No outdoor activity. Avoid any prolonged, moderate, or vigorous indoor activity.	No outdoor activity. Avoid any prolonged, moderate, or vigorous indoor activity.	No outdoor activity. Avoid any prolonged, moderate, or vigorous indoor activity.	No outdoor activity. Avoid any prolonged, moderate, or vigorous indoor activity.

1) **Sensitive Groups** include all children under age 18 and adults with asthma or other heart/lung conditions.

SCOE Meeting Summary

- District staff met with 15 school districts, SCOE, County Public Health Director, BAQMD
- SCOE considering change from PurpleAir to AirNow website; District slides used as technical sources.
- Nobody knew, or was able to establish, an appropriate AQI threshold to close schools.
- Statewide guidance is needed to help schools make the call on what to do.
- Student shelter-in-place at school preferable to school closure.
- District offered assistance interpreting air quality data in the future.

Future Plans

- Development of literature and recommendations for public use
- Establish a District monitoring action plan for wildfire events
  - Deployment of District and CARB E-BAM's
  - Ensuring existing network is up to state monitoring requirements for proper data capture
  - List of local and state contacts
  - Exceptional event information
- Expansion of monitoring network to include 2-3 $PM_{2.5}$ monitors for informational purposes
- Don't be as taken aback when another wildfire event occurs

Comments or Questions?

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