NSCAPCD Camp Wildfire Response
November, 2018
Lilian R. Turcios
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 concentration 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
    • $\text{PM}_{10}$ – NSCAPCD
    • $\text{PM}_{2.5}$ – BAAQMD
  • Other Technology
    • PurpleAir Sensors
    • E-BAM’s ($\text{PM}_{2.5}$) - 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 19$^{th}$
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

Introduction of air purifier

Rain
BAM Vs. E-BAM
Smoke Event Findings

[Graph showing concentration over time with labels for different locations and dates]
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
### 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

**How to Use This Chart:**
1. On days with questionable or unhealthy air quality, superintendents shall check purdueair.com at 6:00am.
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 staff must be informed of any and all restrictions that are in place based on the AQI as noted on the chart below.
4. Personnel at an AQI of 275 or above, school is closed. Essential personnel (maintenance, administrative) may be called in to work.

<table>
<thead>
<tr>
<th>AQI Index</th>
<th>School in Session?</th>
<th>Recess/Lunch</th>
<th>Physical Education</th>
<th>Athletic Practice &amp; Training</th>
<th>Scheduled/Recess Events</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOOD (0-50)</strong></td>
<td>Yes</td>
<td>No Restrictions</td>
<td>No Restrictions</td>
<td>No Restrictions</td>
<td>No Restrictions</td>
</tr>
<tr>
<td><strong>MODERATE (51-100)</strong></td>
<td>Yes</td>
<td>Reduce exposed sensitive individuals are meeting individual health needs</td>
<td>Reduce exposure's effects on individuals who are already ill</td>
<td>Individuals are managing their condition</td>
<td>Individuals are managing their condition</td>
</tr>
<tr>
<td><strong>UNHEALTHY FOR SENSITIVE GROUPS (101-200)</strong></td>
<td>Yes</td>
<td>All activities should be avoided</td>
<td>Reduce exposure's effects on individuals who are already ill</td>
<td>Individuals are managing their condition</td>
<td>Individuals are managing their condition</td>
</tr>
<tr>
<td><strong>UNHEALTHY (201-300)</strong></td>
<td>Yes</td>
<td>All activities should be avoided</td>
<td>All activities should be avoided</td>
<td>All activities should be managed</td>
<td>All activities should be managed</td>
</tr>
<tr>
<td><strong>VERY UNHEALTHY (301-500)</strong></td>
<td>Yes</td>
<td>All activities should be avoided</td>
<td>All activities should be avoided</td>
<td>All activities should be managed</td>
<td>All activities should be managed</td>
</tr>
<tr>
<td><strong>Hazardous (501-600)</strong></td>
<td>No</td>
<td>All activities should be avoided</td>
<td>All activities should be avoided</td>
<td>All activities should be managed</td>
<td>All activities should be managed</td>
</tr>
</tbody>
</table>

1. Sensitive persons include: children under 14, adults with respiratory or heart diseases, the elderly, and individuals with special medications.

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**Sonoma County Office of Education**

**SCOE**

**Meeting:** December 5, 2018
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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