

**Exceptional Events Demonstration
for 2020 PM_{2.5} Wildfire Smoke
Impacts**

Yuba City-Marysville PM_{2.5} Nonattainment Area

**Feather River Air Quality Management District
and
California Air Resources Board**

January 2023

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Acronyms

| | |
|---------|---|
| AMSL | Above Mean Sea Level |
| AOD | Aerosol Optical Depth |
| APCD | Air Pollution Control District |
| AQMD | Air Quality Management District |
| AQS ID | U.S. EPA Air Quality System Identification |
| BLM | Bureau of Land Management |
| CAA | Clean Air Act |
| CalFire | California Department of Forestry and Fire Protection |
| CARB | California Air Resources Board |
| CBSA | Census Core-based Statistical Area |
| CFR | Code of Federal Regulations |
| CMAQ | Community Multiscale Air Quality |
| CMAS | Community Modeling and Analysis System |
| CO | Carbon Monoxide |
| DV | Design Value |
| EER | Exceptional Events Rule |
| EKA | NWS Eureka Forecast Office |
| F | Fahrenheit |
| FCCS | Fuel Characteristic Classification System |
| FEMA | Federal Emergency Management Agency |
| FEPS | Fire Emissions Production Simulator |
| FR | Federal Register |
| FRAP | Fire and Resource Assessment Program |
| GIS | Geographic Information System |
| HMS | (NOAA) Hazard and Mapping System |
| HYSPLIT | Hybrid Single Particle Lagrangian Integrated Trajectory |
| ISU | Iowa State University |
| M | meters |

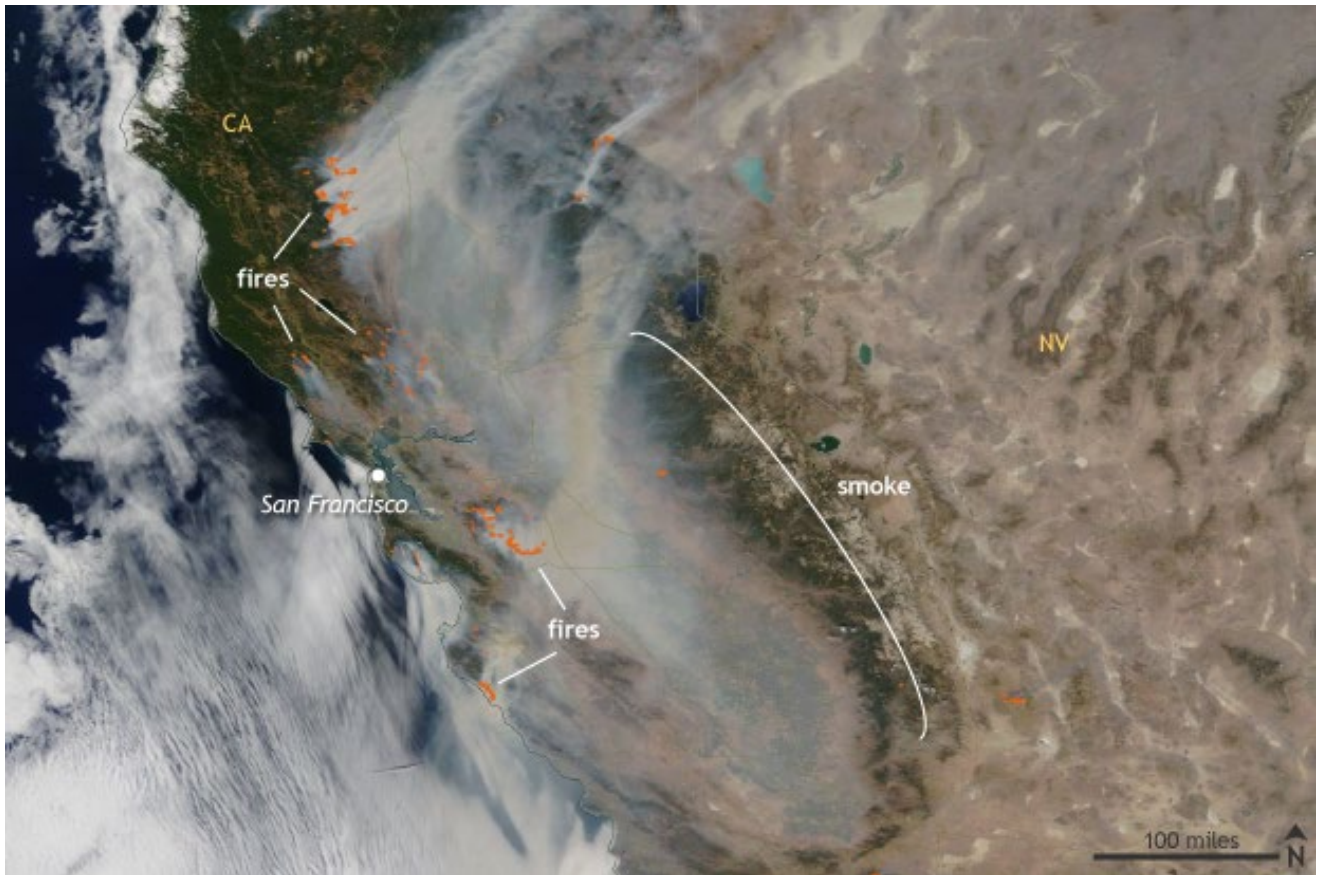
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|-------------------|--|
| MB | millibars |
| MODIS | Moderate Resolution Imaging Spectroradiometer |
| MPH | miles per hour |
| MSA | Metropolitan Statistical Area |
| NAAPS | Navy Aerosol Analysis and Prediction System |
| NAAQS | National Ambient Air Quality Standard(s) |
| NASA | National Aeronautics and Space Administration |
| NCAR | National Center for Atmospheric Research |
| NIFC | National Interagency Fire Center |
| NO | Nitrogen Oxide |
| NO ₂ | Nitrogen Dioxide |
| NOAA | National Oceanic and Atmospheric Administration |
| NO _x | Oxides of Nitrogen |
| NPP | National Polar-orbiting Partnership |
| NPS | National Park Service |
| NWCC | Northwest Interagency Coordination Center |
| NWS | National Weather Service |
| O ₃ | Ozone |
| PM | Particulate Matter |
| PM ₁₀ | Particulate Matter less than or equal to 10 microns in aerodynamic diameter |
| PM _{2.5} | Particulate Matter less than or equal to 2.5 microns in aerodynamic diameter |
| POC | Parameter Occurrence Code |
| ppm | parts per million |
| PQAO | Primary Quality Assurance Organization |
| PST | Pacific Standard Time |
| Q/D | Emissions divided by Distance |
| ROG | Reactive Organic Gas, used interchangeably with Volatile Organic Compound (VOC) in this report |
| SF2 | SmartFire2 |

| | |
|----------|---|
| SIP | State Implementation Plan |
| SMOKE | Sparse Matrix Operator Kernel Emissions |
| SPECIATE | U.S. EPA repository of organic gas and particulate matter speciation emission source profiles |
| SSEC | Space Science and Engineering Center |
| STO | NWS Sacramento Forecast Office |
| UNC | University of North Carolina |
| U.S. EPA | United States Environmental Protection Agency |
| USDA | United States Department of Agriculture |
| UTC | Coordinated Universal Time |
| UWM | University of Wisconsin, Madison |
| VOC | Volatile Organic Compound |
| WRCC | Western Regional Climate Center |

Overview/Introduction

During the summer of 2020, extreme fuel conditions in California created an extreme fire season. Almost all of Northern California and large portions of Southern California were affected (Figure 1), with smoke and haze lingering for weeks. As expected, numerous monitoring sites recorded elevated particulate matter (PM) concentration levels, with many days above the National Ambient Air Quality Standards (NAAQS) for both PM_{2.5} and PM₁₀. Ozone concentrations were also impacted, with levels above and beyond that normally seen during the summer high ozone season.

Figure 1: NASA MODIS Terra satellite image - August 21, 2020¹



I. NAAQS and Attainment Status

To protect public health and the environment, the U.S. Environmental Protection Agency (U.S. EPA) has set a NAAQS (or standard) for fine particulate matter (PM_{2.5}) that specifies the maximum allowed concentration to be present in outdoor ambient air. The national PM_{2.5}

¹ NOAA Climate.gov, Over a million acres burned in California in second half of 2020, <https://www.climate.gov/news-features/event-tracker/over-million-acres-burned-california-second-half-august-2020>, last accessed 10/20/21

standards, first being set in 1997, have been periodically reviewed and revised, resulting in stricter and more health protective standards set at lower and lower concentrations. Areas determined not to meet these standards are considered nonattainment areas. An annual, as well as a 24-hour PM_{2.5} standard were initially promulgated in 1997, and further revised as noted in Table 1. Due to its high population, urban density, and unique geography, California is home to a significant number of PM_{2.5} nonattainment areas.

Table 1: Primary PM_{2.5} NAAQS

| Final Rule/Decision | Level (µg/m ³ – micrograms per cubic meter) |
|---------------------|--|
| 1997 | Annual: 15.0 24-hour: 65 |
| 2006 | Annual: 15.0 (retained) 24-hour: 35 |
| 2012 | Annual: 12.0 24-hour: 35 (retained) |

The Yuba City-Marysville area, comprising all of Sutter County and a portion of Yuba County, was designated as a nonattainment area for the 2006 PM_{2.5} NAAQS. U.S. EPA approved a maintenance plan and request for redesignation to attainment effective January 8, 2015; a second maintenance plan is due January 8, 2023. The impacted site(s) and upcoming regulatory determination(s) are indicated in Table 2.

Table 2: PM_{2.5} nonattainment areas with upcoming regulatory determinations

| Nonattainment Area | PM _{2.5} NAAQS | Classification | Regulatory Determination | Impacted Site | AQS ID |
|----------------------|-------------------------|----------------|---|------------------|-------------|
| Yuba City-Marysville | 2006 | Maintenance | Attainment – 2 nd Maintenance Plan | Yuba City-Almond | 06-101-0003 |

II. Clean Air Act and Exceptional Event Rule Requirements

The Clean Air Act (CAA)² defines an exceptional event as:

1. The event affected air quality;
2. The event was not reasonably controllable or preventable;
3. The event was caused by human activity that is unlikely to recur at a particular location or was a natural event; and
4. There exists a clear causal relationship between the specific event and the monitored exceedance.

² CAA Section 319(b)

On October 3, 2016, the EPA finalized revisions to the “Treatment of Data Influenced by Exceptional Events”,³ also known as the Exceptional Events Rule (EER). These regulations govern exclusion of event-influenced air quality data from certain regulatory determinations of the U.S. EPA Administrator under the CAA. Regulatory determinations applicable under the revised EER are:

- An action to designate or redesignate an area as attainment, unclassifiable/attainment, nonattainment, or unclassifiable for a particular NAAQS;
- The assignment or re-assignment of a classification category to a nonattainment area;
- A determination regarding whether a nonattainment area has attained a NAAQS by its CAA deadline, including a “clean data determination”;
- A determination that an area has data for the specific NAAQS that qualify the area for an attainment date extension under the CAA provisions;
- A finding of SIP inadequacy leading to a SIP call; and
- Other actions on a case-by-case basis.

U.S. EPA regulations⁴ state that exceptional events demonstrations must address and include the following elements:

1. A narrative conceptual model;
2. A demonstration that the event was both not reasonably controllable and not reasonably preventable;
3. A demonstration that the event was a human activity unlikely to recur at a particular location or was a natural event; and
4. A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance.

III. Actions Requested

Although a significant number of PM_{2.5} nonattainment areas were impacted by the historic 2020 wildfires, not all areas have upcoming regulatory determinations applicable under the revised EER. The Feather River Air Quality Management District (FRAQMD or District) and California Air Resources Board (CARB) are submitting this Exceptional Event demonstration to U.S. EPA for days in the summer and fall of 2020 that impacted the PM_{2.5} nonattainment area of Yuba City-Marysville (Sutter County and a portion of Yuba County). These days, along with impacted days in 2021 that are addressed in a separate demonstration, will affect the upcoming attainment year determination for the area’s 2nd PM_{2.5} maintenance plan for the 2006 NAAQS (Figure 2, Table 3).

Note that design values for 2014 to 2016 are considered invalid due to incomplete 2014 data. U.S. EPA regulations require at least 75 percent data capture in each quarter for a design value to be valid. In 2014, the third quarter (July to September) had 70 percent data capture but since concentrations are typically low during this quarter, the resulting invalid 24-

³ 81 FR 68216

⁴ 40 CFR 50.14(c)(3)(iv)

hour design values are still considered representative and are used here to depict PM_{2.5} trends. The specific 2020 exceedances of the standard requested for concurrence at the Yuba City (Sutter County) monitor are listed in Table 4.

Figure 2: PM_{2.5} design values at Yuba City

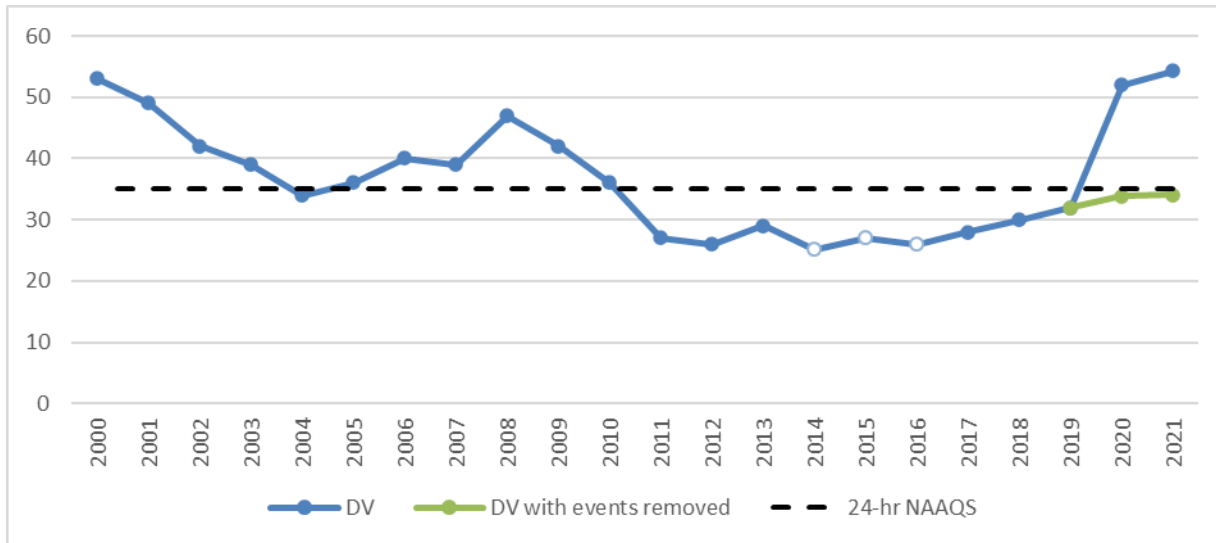


Table 3: PM_{2.5} design values with and without U.S. EPA concurrence (2020 and 2021 events)

a) Design Value without concurrence

| Site | 2019 | 2020 | 2021 |
|------------------|------|------|------|
| Yuba City-Almond | 32.0 | 52.0 | 54.3 |

b) Design Value with concurrence

| Site | 2019 | 2020 | 2021 |
|------------------|------|------|------|
| Yuba City-Almond | 32.0 | 33.8 | 34.1 |

Table 4: Summary of Yuba City 2020 PM_{2.5} requested exceedances

| Date | PM _{2.5} Concentration (µg/m ³) |
|-----------|--|
| 8/20/2020 | 131.2 |
| 8/21/2020 | 103.2 |
| 8/22/2020 | 86.3 |
| 8/23/2020 | 72.4 |
| 8/24/2020 | 84.8 |
| 8/25/2020 | 46.4 |
| 9/5/2020 | 45.2 |
| 9/6/2020 | 46.7 |
| 9/7/2020 | 48.5 |
| 9/8/2020 | 49.7 |
| 9/9/2020 | 50.4 |

| Date | PM _{2.5} Concentration (µg/m ³) |
|-----------|--|
| 9/10/2020 | 103.6 |
| 9/11/2020 | 122.8 |
| 9/12/2020 | 213.5 |
| 9/13/2020 | 252.9 |
| 9/14/2020 | 86.0 |
| 9/15/2020 | 70.4 |
| 9/30/20 | 62.3 |
| 10/1/20 | 67.7 |
| 10/2/20 | 87.9 |
| 10/3/20 | 91.1 |
| 10/4/20 | 53.8 |

Background

California is divided geographically into air basins to manage the air resources of the State on a regional basis. An air basin generally has similar meteorological and geographic conditions throughout. The State is currently divided into 15 air basins and further subdivided into 35 local air pollution control districts (APCD(s) or district(s)) or air quality management districts (AQMD(s) or district(s)).

Almost the entire State of California was impacted by wildfires from August to October of 2020. It is estimated that almost 95 percent of the population of the State experienced one or more days impacted by unhealthy smoke from these fires.

I. Regional Description

This demonstration covers the Yuba City-Marysville PM_{2.5} nonattainment area in the Feather River Air Quality Management District (FRAQMD or District) in the Sacramento Valley Air Basin (SVAB).

The SVAB is bounded on the north and west by the Coastal Mountain Range, on the east by the southern portion of the Cascade Mountain Range, and the northern portion of the Sierra Nevada Mountains. These mountain ranges reach heights in excess of 6,000 feet above mean sea level, with individual peaks rising much higher. The mountains provide a substantial barrier to both locally created pollution and the pollution that has been transported northward on prevailing winds. The air basin is shaped like an elongated bowl.

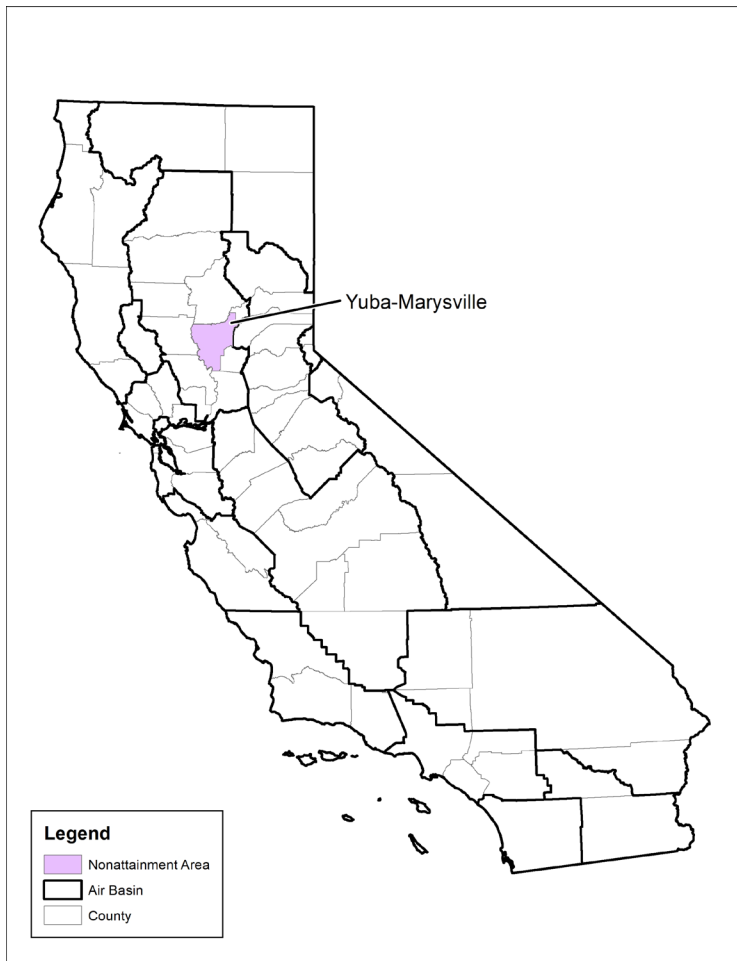
The FRAQMD includes both Sutter and Yuba counties and is located in the eastern central portion of the SVAB. The FRAQMD is bordered by Butte County to the north, Colusa and Yolo Counties to the west, and Sacramento and a portion of Placer County to the south, all in the SVAB. The FRAQMD is bordered to the east by the Mountain Counties Air Basin, specifically Sierra and Nevada Counties (Figure 3).

Although part of the FRAQMD is at elevations higher than 1,000 feet above sea level, the vast majority of its populace lives and works below that elevation. The four incorporated cities of Marysville (population just over 12,000), Wheatland (population just above 3,000), Yuba City (population approximately 65,000), and Live Oak (population of about 8,000) are located on the valley floor between 59-92 foot elevations and are located in the nonattainment area.

Summers are typically dry and warm. Most of the precipitation occurs during the winter months from December to March with an average rainfall of 21 inches. Average summer

temperatures range from an average high of 93°F to an average low of 60°F. Average winter temperatures range from an average high of 57°F to an average low of 39°F⁵.

Figure 3: Map of PM_{2.5} nonattainment areas with exceptional events addressed in this document



The Yuba City PM_{2.5} monitor was established in December 1998 and is located at 773 Almond Street in Yuba City, in Sutter County. The Yuba City monitor was placed to detect pollutant at neighborhood levels. The filter-based monitor was replaced with a continuous monitor in April 2020 and has served as a collocated FEM/FEM monitoring site since April 2021.

U.S. EPA designated the Yuba City-Marysville area as a nonattainment area for the 2006 24-hour PM_{2.5} standard. It was redesignated as attainment effective January 2015.

⁵ Climate data obtained from <https://wrcc.dri.edu/> covering 1981-2010 measurements from the Marysville station.

II. Overview of Monitoring Network

The CARB Primary Quality Assurance Organization (PQAO) is comprised of 32 of the 35 air districts in California. The three remaining districts, the Bay Area Air Quality Management District, San Diego County Air Pollution Control District, and South Coast AQMD, represent their own PQAOs.

California's ambient air monitoring network includes over 250 sites and more than 700 monitors, making it one of the most extensive in the world. Many regions in California are characterized by complex terrain, variable meteorological conditions, and diverse emission sources. A large monitoring network is critical for assessing the State's progress in meeting clean air objectives, understanding spatial and temporal variation in air pollutants, and evaluating pollutant exposure. Monitors are operated by CARB, local air districts, and other entities including the National Park Service, private contractors, and tribal authorities.

In the SVAB, there is one nonattainment area covered by this demonstration. The Yuba City-Marysville area in the Feather River AQMD has one PM_{2.5} regulatory monitor (Number 10 in Figure 4 and Table 5).

Figure 4: PM_{2.5} monitoring in Sacramento Valley Air Basin

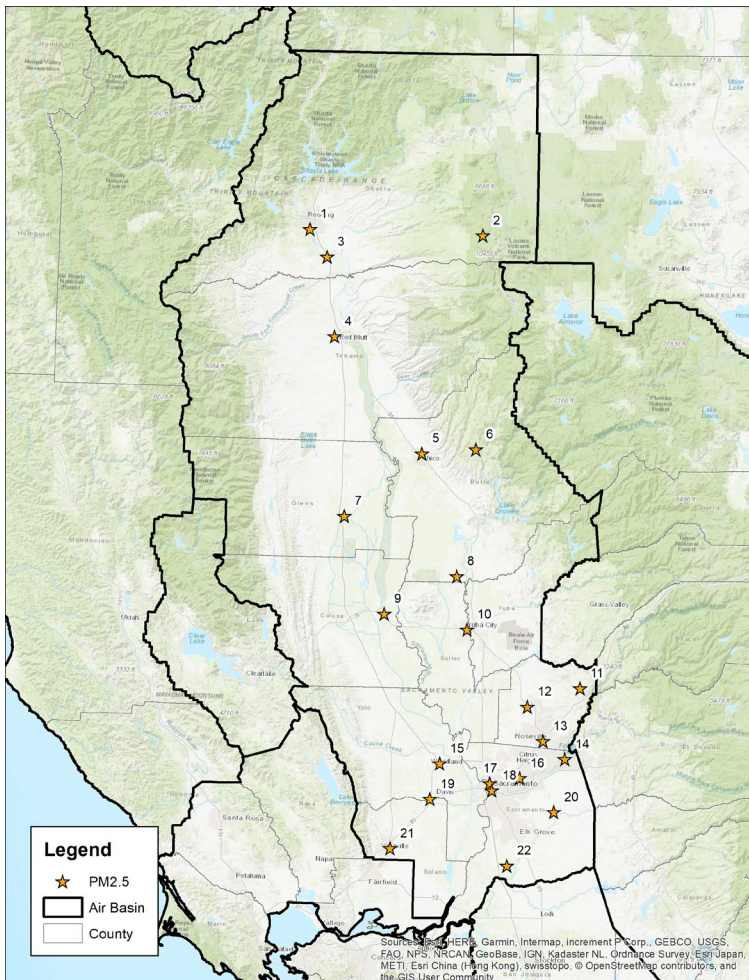


Table 5: PM_{2.5} Monitoring sites in Sacramento Valley Air Basin

| Number | County | Monitoring Site | AQS ID |
|--------|------------|--|-------------|
| 1 | Shasta | Redding-Health Dept | 06-089-0004 |
| 2 | Shasta | Lassen Volcanic Natl Park-Manzanita Lake | 06-089-3003 |
| 3 | Shasta | Anderson-North St | 06-089-0007 |
| 4 | Tehama | Red Bluff-Walnut St | 06-103-0006 |
| 5 | Butte | Chico-East Ave | 06-007-0008 |
| 6 | Butte | Paradise-Theater | 06-007-2002 |
| 7 | Glenn | Willows-N Colusa St | 06-021-0003 |
| 8 | Butte | Gridley-Cowee Ave | 06-007-4001 |
| 9 | Colusa | Colusa-Sunrise Blvd | 06-011-1002 |
| 10 | Sutter | Yuba City-Almond St | 06-101-0003 |
| 11 | Placer | Auburn-Atwood Ave | 06-061-0003 |
| 12 | Placer | Lincoln-Moore Rd | 06-061-2003 |
| 13 | Placer | Roseville-N Sunrise Blvd | 06-061-0006 |
| 14 | Sacramento | Folsom-Natoma St | 06-067-0012 |
| 15 | Yolo | Woodland-Gibson Rd | 06-113-1003 |
| 16 | Sacramento | Sacramento-Del Paso Manor | 06-067-0006 |
| 17 | Sacramento | Sacramento-Bercut Dr | 06-067-0015 |
| 18 | Sacramento | Sacramento-T St | 06-067-0010 |
| 19 | Yolo | Davis-UCD Campus | 06-113-0004 |
| 20 | Sacramento | Sloughhouse | 06-067-5003 |
| 21 | Solano | Vacaville-Ulatis Dr | 06-095-3003 |
| 22 | Sacramento | Elk Grove-Bruceville Rd | 06-067-0011 |

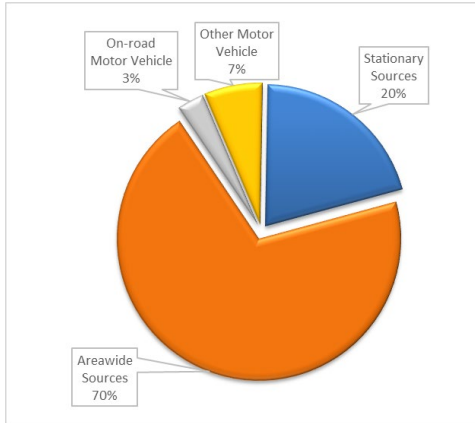
The ambient air monitoring networks in this area meets the minimum monitoring requirements for all criteria pollutants pursuant to Title 40, Part 58 of the Code of Federal Regulations (CFR), Appendix D. The monitoring network in each area is reviewed annually to fulfill the requirements defined in 40 CFR 58.10 to ensure the networks meet the monitoring objectives defined in 40 CFR 58, Appendix D. Data were collected and quality assured as per 40 CFR 58 and submitted to the Air Quality System (AQS).

III. Characteristics of Non-Event PM_{2.5} Formation

The area-wide and stationary source categories are the largest sources of anthropogenic PM_{2.5} emissions in Sutter County and Yuba County, respectively (Figure 5). Food and agricultural industrial processes, farming operations, and managed burning and disposal

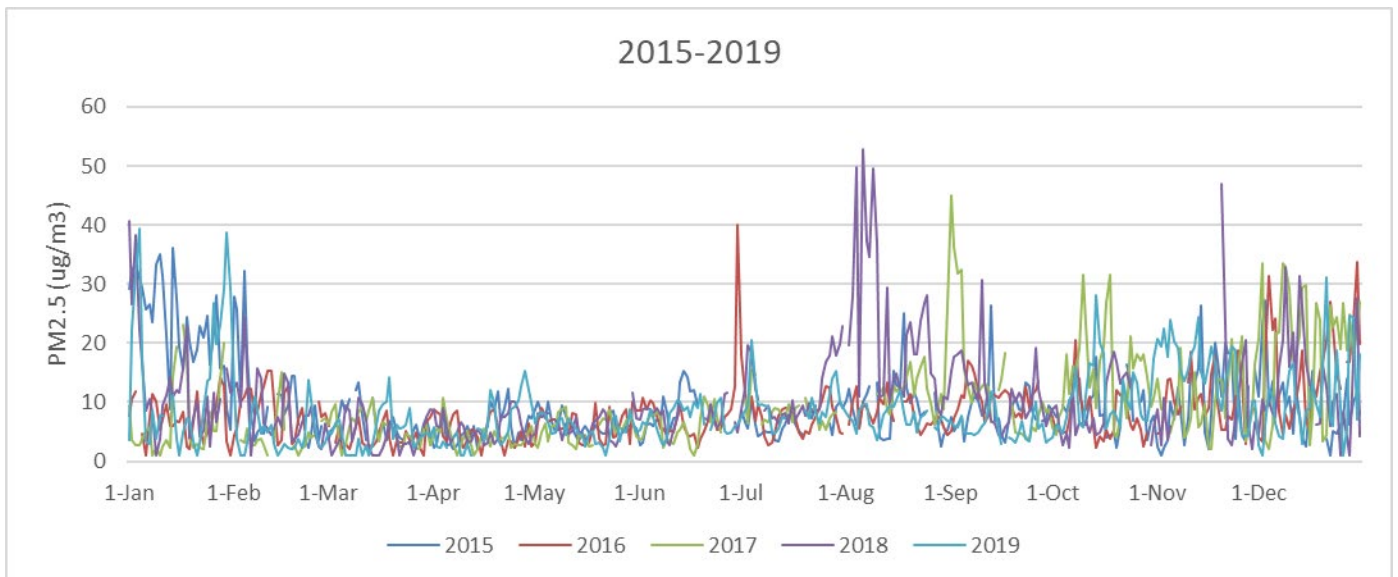
comprise the top three categories in the summer, with residential fuel consumption dominating in the winter months.

Figure 5: Sutter County and Yuba County anthropogenic daily summer 2020 PM_{2.5} emissions estimates.⁶



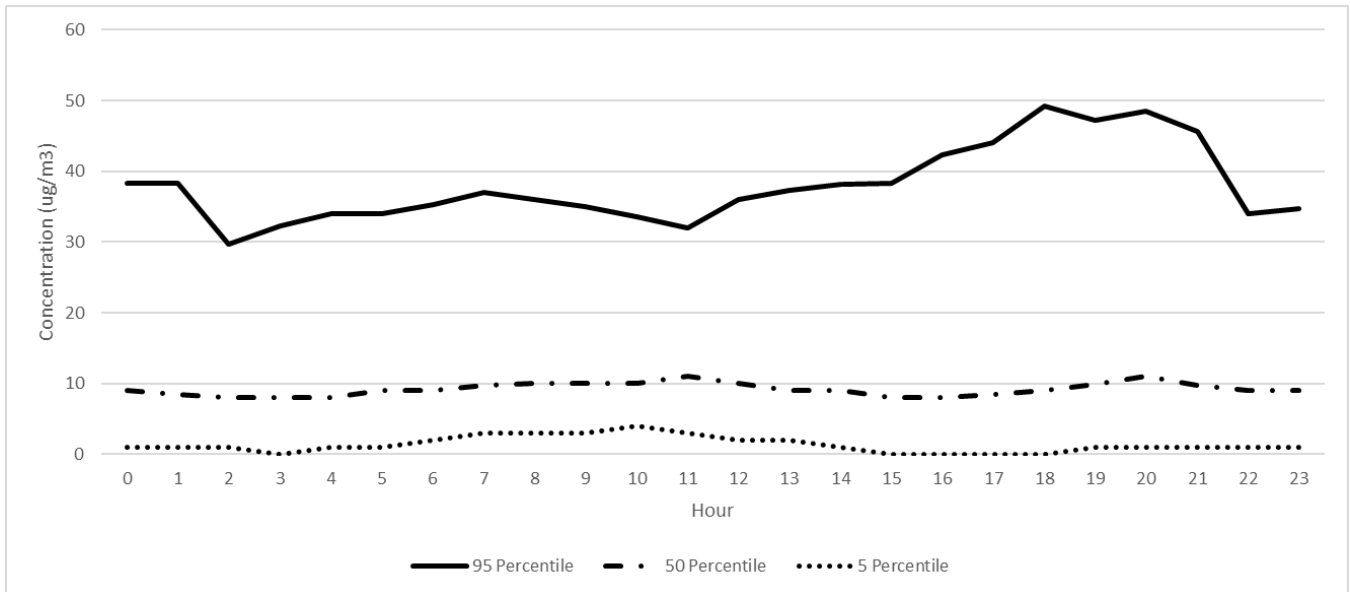
PM_{2.5} concentrations are fairly low throughout the year (Figure 6), with the highest PM_{2.5} values generally occurring in the winter months from November through February, when residential woodstove use is highest. Exceedances during the remainder of the year are due primarily to wildfire smoke. PM_{2.5} concentrations from July to September at the Yuba City monitor typically peak in the late afternoon to early evening (Figure 7) and are lowest in the early morning and the late evening.

Figure 6: Annual PM_{2.5} concentrations at the Yuba City monitor from 2015 through 2019.



⁶ CEPAM: Version 1.03 Planning Inventory Tool.
http://outapp.arb.ca.gov/cefs/2019ozsip/fcemssumcat_2019sip103.php

Figure 7: Typical 3rd Quarter (July to September) PM_{2.5} diurnal pattern at Yuba City (2015-2019)



IV. Characteristics of Event PM_{2.5} Formation

Although wildfires occur in California every year, the number of wildfires and the amount of acreage burned has increased substantially, from an annual average of less than 5,000 fires burning 200,000 acres,⁷ to a record 8,648 incidents and 4,304,379 acres burned in 2020.⁸ The impact of these wildfires on air quality has been dramatic. Smoke from large fires has caused extreme concentrations of both PM and ozone, especially in the western United States.⁹

Wildfires generate large amounts of directly emitted PM_{2.5}, which can contribute to elevated particulate levels in California. However, there are large variations in the amount of emissions (depending on the fuel type and combustion temperature), plume heights, smoke density, and meteorological conditions during different wildfires.

⁷ CalFire, *2017 Statistics and Events (5 year average)*, last accessed 8/20/21

⁸ California Department of Forestry and Fire Protection (CalFire); <https://www.fire.ca.gov/incidents/2020/>

⁹ Gong et al., 2017; Laing and Jaffe, 2019; Mass and Ovens, 2019; Jaffe et al., 2020

Narrative Conceptual Model

The Narrative Conceptual Model describes the events causing the exceedances or violations at the monitor and includes a discussion of how the events led to concentrations above the NAAQS during three periods in 2020: August 20 to 25, September 5 to 15, and September 30 to October 4.

I. Wildfire Information

The summer of 2020 saw the beginning of an extreme fire season, with numerous wildfires active during the time of the exceedances discussed in this demonstration (Figure 8, Table 6),¹⁰ although not all the active wildfires impacted the monitor on any given day.

Hot and dry conditions at the surface combined with mid-level moisture resulted in elevated instability. The ensuing thunderstorms ignited multiple wildfires, resulting in smoke that accumulated throughout northern and central California. The accumulating smoke layers made identification of the impact of just one particular wildfire difficult. The majority of these fires, and all of the fire complexes, occurred on wildland or in the urban/wildland interface.

The fires that had the most impact on the Yuba City monitor during the three event periods are discussed in more detail in this section.

¹⁰ CalFire 2020 Fire Siege Report, <https://www.fire.ca.gov/media/hsviuuv3/cal-fire-2020-fire-siege.pdf>, last accessed 9/23/2022

Figure 8: Active major wildfires, August to October 2020

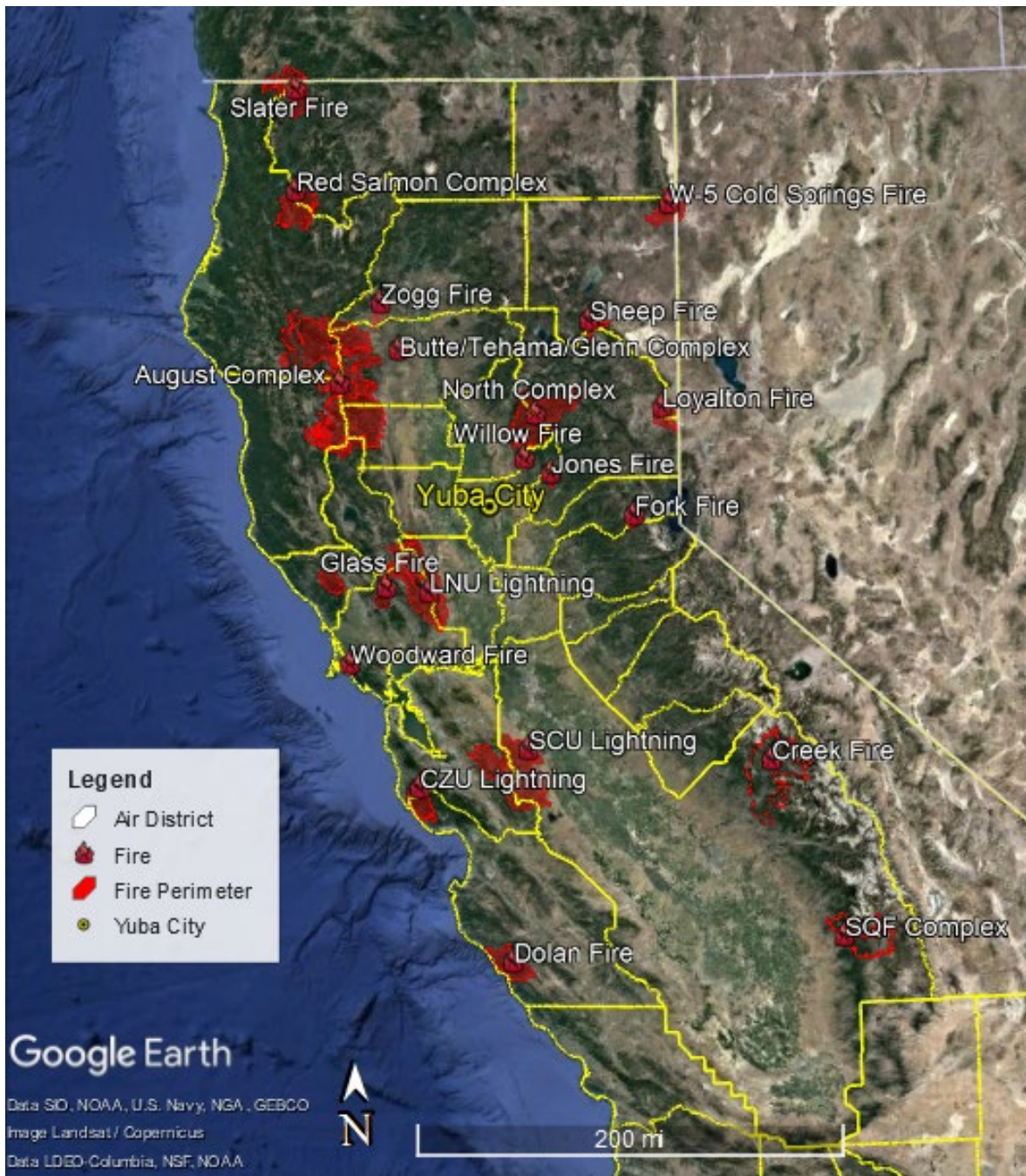


Table 6: Major wildfires active during 2020 events (in order of ignition)¹¹

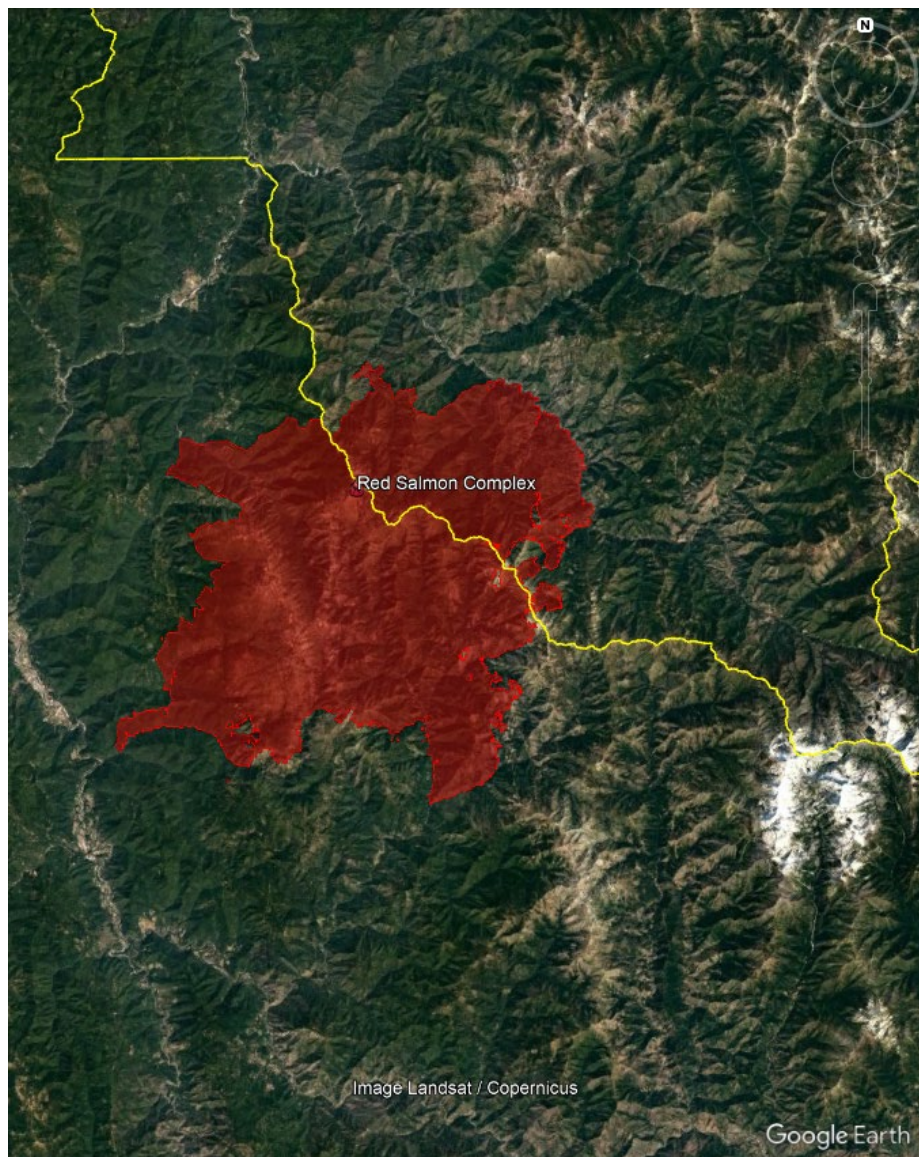
| Name | Source | Start | Containment | Lat | Long | Acres |
|--------------------------------------|-----------|-----------|-------------|--------|----------|-----------|
| Red Salmon Complex | Lightning | 7/27/2020 | 11/17/2020 | 41.168 | -123.407 | 144,698 |
| Loyalton Fire | Lightning | 8/14/2020 | 9/14/2020 | 39.702 | -120.144 | 47,029 |
| CZU Lightning Complex | Lightning | 8/16/2020 | 9/22/2020 | 37.172 | -122.223 | 86,509 |
| August Complex | Lightning | 8/16/2020 | 11/11/2020 | 39.776 | -122.673 | 1,032,648 |
| Jones Fire | Lightning | 8/17/2020 | 8/28/2020 | 39.292 | -121.100 | 705 |
| LNU Lightning Complex | Lightning | 8/17/2020 | 10/2/2020 | 38.482 | -122.149 | 363,220 |
| North Complex Fire | Lightning | 8/18/2020 | 12/3/2020 | 39.691 | -121.227 | 318,935 |
| Woodward Fire | UI | 8/18/2020 | 10/2/2020 | 38.018 | -122.837 | 4,929 |
| SCU Lightning Complex | Lightning | 8/18/2020 | 10/1/2020 | 37.439 | -121.304 | 396,624 |
| W-5 Cold Springs Fire | Lightning | 8/18/2020 | 9/14/2020 | 41.029 | -120.281 | 84,817 |
| Butte/Tehama/Glenn Lightning Complex | Lightning | 8/19/2020 | 10/9/2020 | 40.096 | -122.439 | 19,609 |
| SQF/Sequoia Complex | Lightning | 8/19/2020 | 1/6/2021 | 36.255 | -118.497 | 174,178 |
| Sheep Fire | Lightning | 8/22/2020 | 9/9/2020 | 40.274 | -120.281 | 29,570 |
| Creek Fire | UI | 9/4/2020 | 12/24/2020 | 37.201 | -119.272 | 379,895 |
| Slater Fire | UI | 9/8/2020 | 12/10/2020 | 41.869 | -123.450 | 157,229 |
| Willow Fire | UI | 9/9/2020 | 9/14/2020 | 39.364 | -121.324 | 1,311 |
| Glass Fire | UI | 9/26/2020 | 10/20/2020 | 38.563 | -122.498 | 67,484 |
| Zogg Fire | UI | 9/27/2020 | 10/16/2020 | 40.539 | -122.567 | 56,338 |

UI = under investigation

¹¹ CalFire 2020 Wildfire Activity Statistics. Accessed 7/20/2022. <https://www.fire.ca.gov/media/hsviuvv3/cal-fire-2020-fire-siege.pdf>; CalFire 2020 Incident Archive. Accessed 7/20/2022. <https://www.fire.ca.gov/incidents/2020/>; InciWeb. Accessed 7/20/2022. <https://inciweb.nwcg.gov/>

The Red Salmon Complex¹² (Figure 9), located 160-170 miles north-northwest of Yuba City, started with a lightning storm on July 27 in the Trinity Alps Wilderness Area. The fire burned in the Klamath, Six Rivers, and Shasta-Trinity National Forests in Humboldt, Siskiyou, and Trinity Counties, in rugged terrain amidst a mix of timber, grasses, and shrubs. The fire burned 144,698 acres before being officially contained on November 17, 2020.

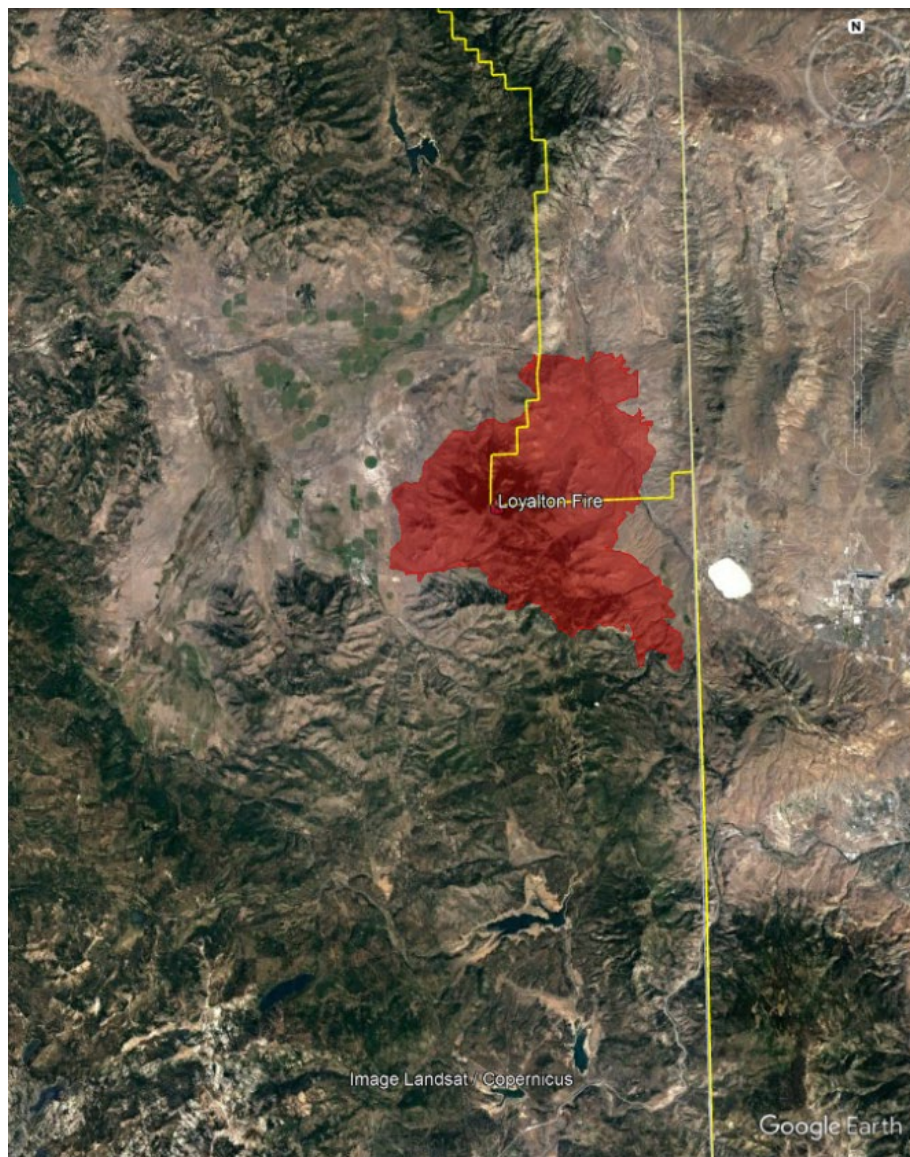
Figure 9: Red Salmon Complex Perimeter Map



¹² Salmon River Complex: <https://inciweb.nwcg.gov/incident/6891/>

Loyalton Fire¹³ (Figure 10), located 90 miles east-northeast of Yuba City, began due to a lightning strike on August 14, 2020 and actively burned in the Tahoe and Humboldt-Toiyabe Nation Forests in Lassen, Plumas, and Sierra counties, burning a mix of timber, sagebrush, and grasses. The fire burned 47,029 acres, and damaged 35 structures before being contained on September 14, 2020.

Figure 10: Loyalton Fire Perimeter Map



¹³ Loyalton Fire. <https://inciweb.nwccg.gov/incident/6975/>

CZU Lightning Complex¹⁴ fire (Figure 11) , located 140 miles south-southwest of Yuba City, started as many small fires including the Warnella fire and three fires that would become the norther edge of the CZU complex. The Northern edge fires merged, a few days after they began, due to changing wind patterns and quickly grew to over 40,000 acers. These fires began due to a lightning strike on August 16, 2020 and actively burned in Butano and Big Basin Redwoods state parks in San Mateo and Santa Cruz counties. The fires burned 86,509 acers, destroyed 1,490 structures, damaged an additional 140 structures, and lead to one confirmed fatality before being fully contained on September 22, 2020.

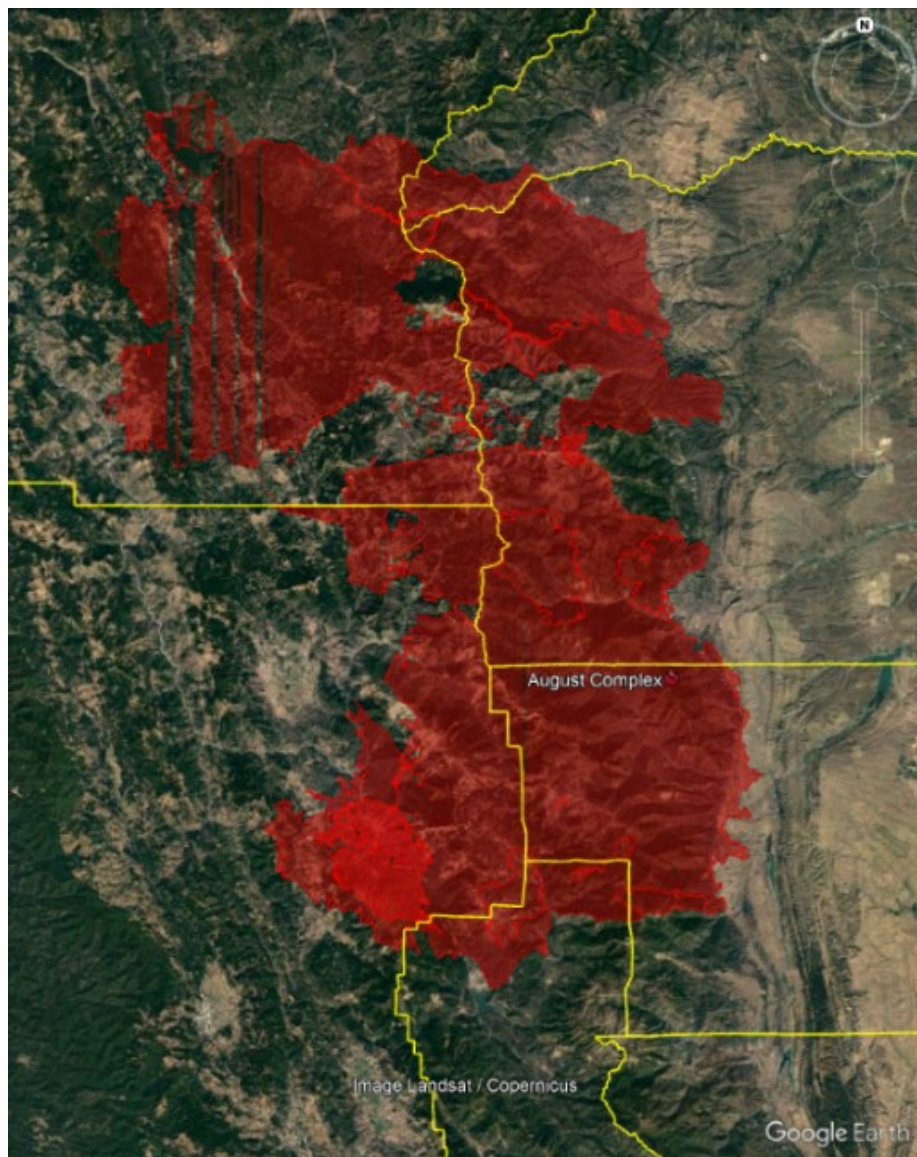
Figure 11: CZU Lightning Complex Fire Perimeter Map



¹⁴ CZU Lightning Complex (Including Warnella Fire). <https://www.fire.ca.gov/incidents/2020/8/16/czu-lightning-complex-including-warnella-fire/>

The August Complex¹⁵, located 60-100 miles northwest of Yuba City, started as 38 separate fires, most of which were small (Figure 12). The four main fires were the Doe, Tatham, Glade and Hull fires, which merged by August 30. The fires began during a lightning strike on August 16 and 17, 2020 and actively burned in Mendocino, Shasta-Trinity, and Six Rivers National Forests. The fires burned 1,032,648 acres, 935 structures, and caused one death before full containment on November 15, 2020. The August Complex fire was the largest fire complex in recorded California history¹⁶.

Figure 12: August Complex Fire Perimeter Map

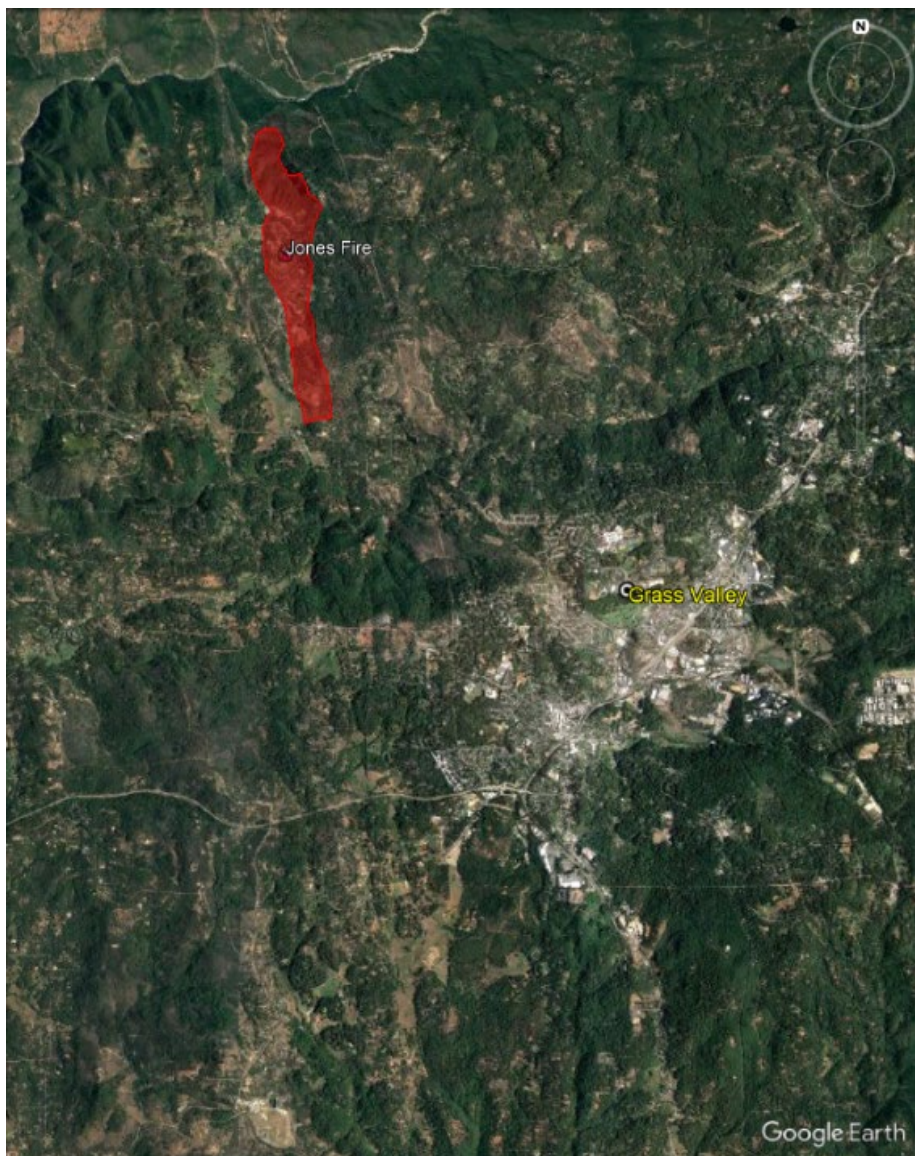


¹⁵August Complex, accessed 10/11/2021. <https://inciweb.nwcg.gov/incident/6983/>

¹⁶Top 20 Largest California Wildfires. Access 11/01/2021. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

Jones Fire¹⁷ (Figure 13) , located 30 miles east-northeast of Yuba City, began on August 17, 2020 during a lightning strike. The fire actively burned in a wildland urban interface zone within Nevada County. The fire burned 705 acres, destroying 21 structures, and damaging 3 before full containment on August 28, 2020.

Figure 13: Jones Fire Perimeter Map



¹⁷ Jones Fire. <https://www.fire.ca.gov/incidents/2020/8/17/jones-fire/>

The LNU Lightning Complex¹⁸ fire (Figure 14) , located 40 miles west-southwest of Yuba City, started as many small separate fires. The main fires were the Hennessey fire, which merged with the Gamble Green, Markley, Spanish, and Morgan fires burning 305,651 acres, as well as the Walbridge, and Meyers fires. These fires began due to lightning on August 16 and 17, 2020 and actively burned in six counties: Solano, Napa, Sonoma, Yolo, Lake, and Colusa. The fires burned on the hills surrounding several large cities including Napa, Fairfield, and Vacaville and burned 363,220 acres, 1,491 structures, and lead to six confirmed fatalities before full containment on October 2, 2020. The LNU lighting complex is the sixth largest California wildfire in recorded history¹⁹.

Figure 14: LNU Lightning Complex Fire Perimeter Map

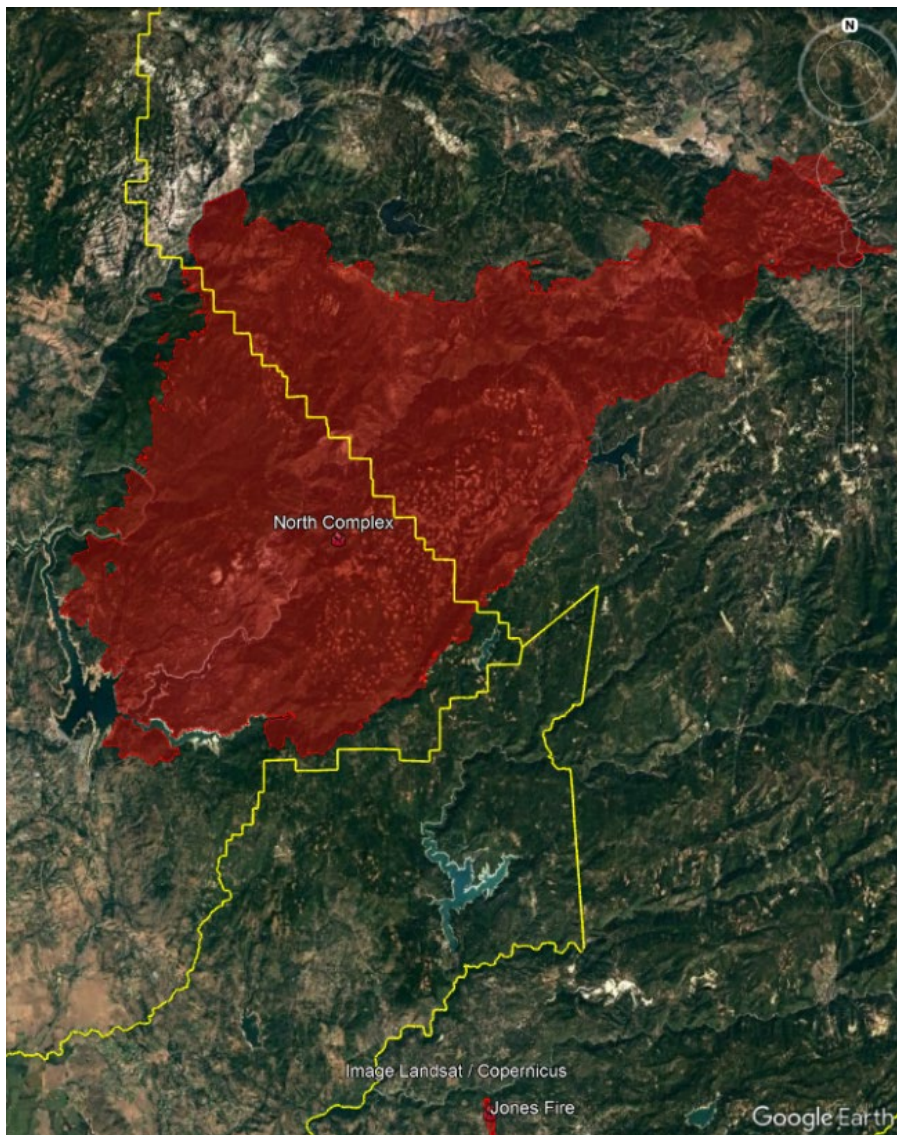


¹⁸ LNU Lightning Complex: <https://www.fire.ca.gov/incidents/2020/8/17/lnu-lightning-complex-includes-hennessey-gamble-15-10-spanish-markley-13-4-11-16-walbridge/>; Solano County 2020 LN Lightning Complex Fire. Accessed 10/11/2021. https://www.solanocounty.com/depts/rm/lnu_fire_cleanup_n_rebuilding/default.asp

¹⁹ Top 20 Largest California Wildfires. Access 11/01/2021. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

The North Complex Fire²⁰ (Figure 15) , located 30 miles northeast of Yuba City, began with a lightning storm on August 17, 2020 and actively burned in Plumas National Forest in Plumas, Butte, and Yuba Counties. By September 5, 2020 all the individual fires had been contained except for the Claremont and Bear fires. These two fires merged on September 5, 2020 and due to strong winds rapidly grew spreading to the Southwest and leveling the towns of Berry Creek and Feather Falls. The fires burned 318,935 acres, damaging or destroying 2,352 structures, and causing 15 fatalities before full containment on December 3, 2020. The North Complex Fire is the seventh largest California wildfire in recorded history²¹.

Figure 15: North Complex Fire Perimeter Map

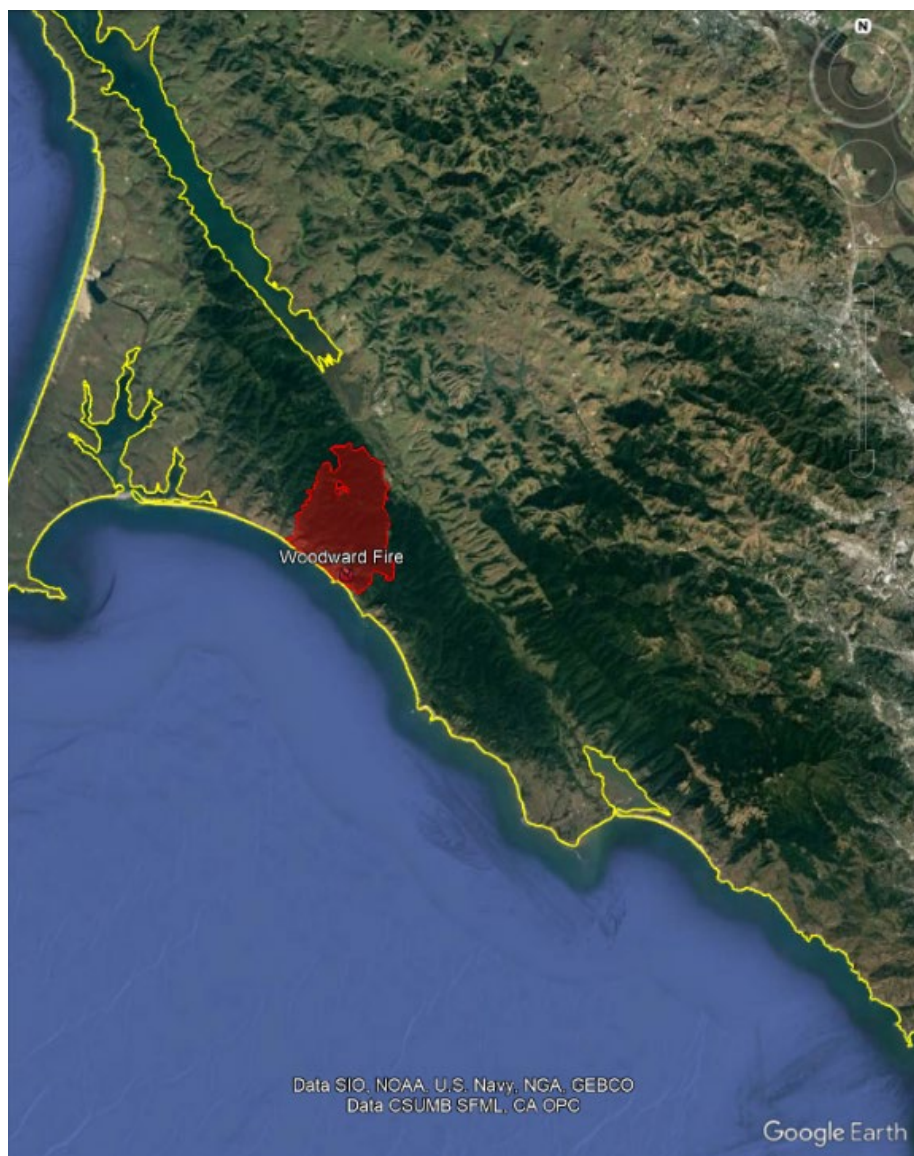


²⁰ North Complex Fire. <https://inciweb.nwcg.gov/incident/6997/>

²¹ https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

The Woodward Fire²² (Figure 16) , located 100 miles southwest of Yuba City, began during a lightning storm on August 17, 2020 and was initially named the 4-5 Fire and on August 18, 2020, a second fire initially named the 4-6 Fire was found nearby, these were later renamed to the Woodward Fire²³. These fires quickly grew due to winds and actively burned in the Point Reyes National Seashore. The fires burned 4,929 before full containment on October 1, 2020.

Figure 16: Woodward Fire Perimeter Map



²² Woodward Fire. <https://inciweb.nwcg.gov/incident/maps/7062/>

²³ National Park Service. Point Reyes – National Seashore California. https://www.nps.gov/pore/learn/management/firemanagement_woodwardfire.htm

The SCU Lightning Complex²⁴ (Figure 17) , located 110 miles south of Yuba City, began as the Deer, Canyon, and Santa Clara fires. By August 26, the Deer fire was fully contained, and the Canyon and Santa Clara fires had merged. These fires began during a lightning strike on August 18, 2020, and actively burned in the Diablo mountain range in Santa Clara, Alameda, Contra Costa, San Joaquin, and Stanislaus counties. The fires burned 396,624 acres, destroyed 222 structures, and damaged 26 before full containment on October 1, 2020. The SCU Lightning complex is the 4th largest California wildfire in recorded history²⁵.

Figure 17: SCU Lightning Complex Fire Perimeter Map

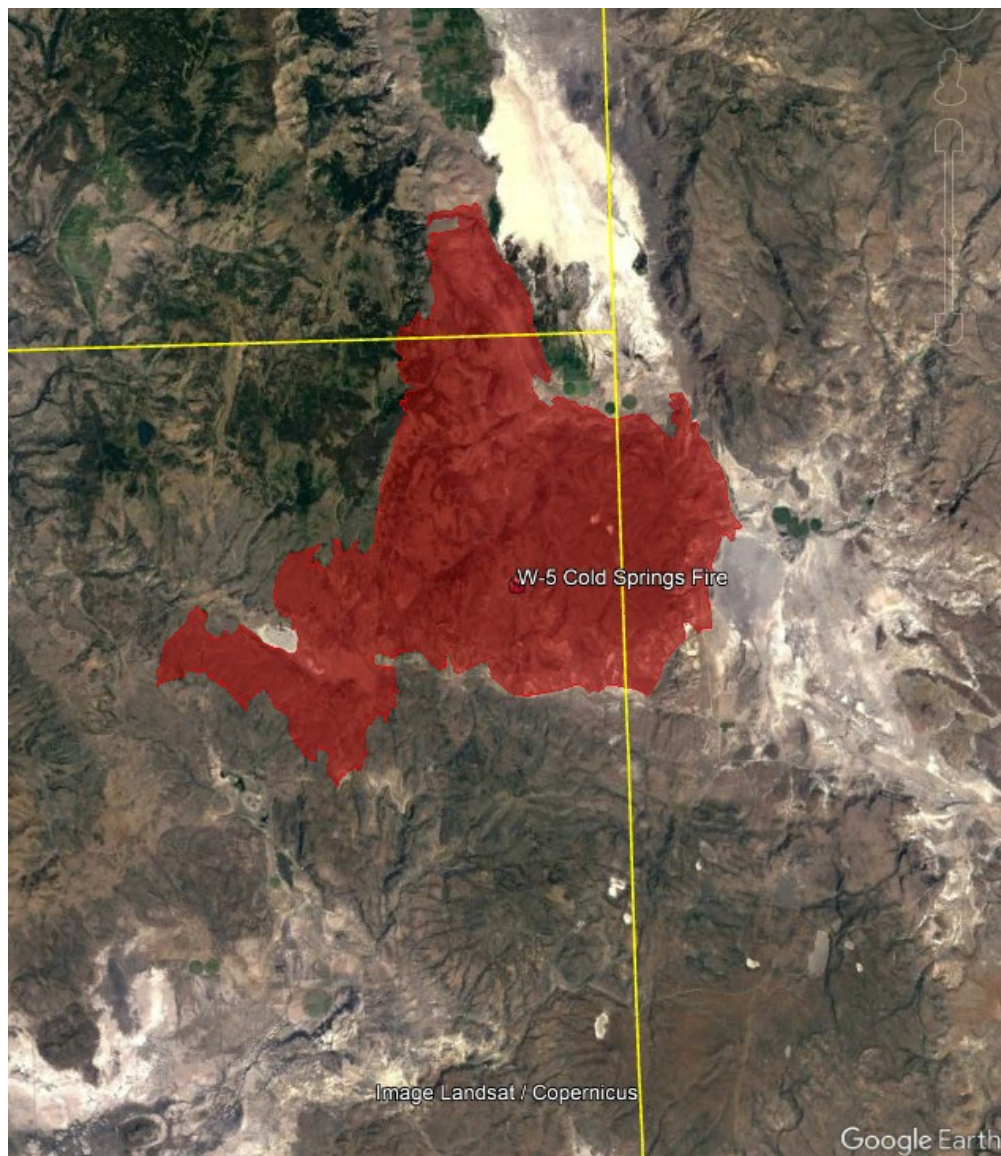


²⁴ SCU Lightning Complex. <https://www.fire.ca.gov/incidents/2020/8/18/scu-lightning-complex/>

²⁵ https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

The W-5 Cold Springs Fire²⁶ (Figure 18), located approximately 160 miles northwest of Yuba City, began on August 18, 2020, due to lightning and actively burned in Lassen County. The fire, which burned 84,817 acres in the Modoc National Forest, was fully contained by September 16, 2020.

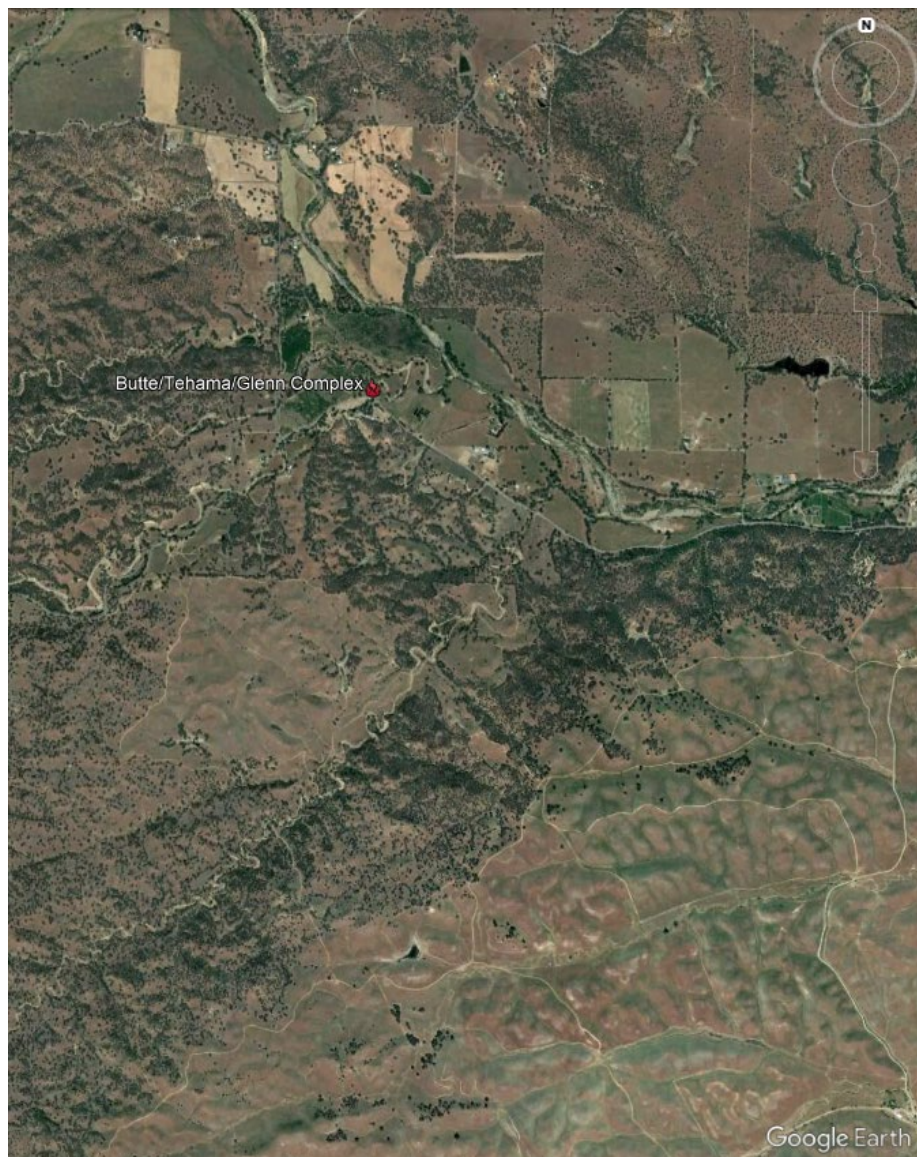
Figure 18: W-5 Cold Springs Fire Perimeter Map



²⁶ W-5 Cold Springs Fire: <https://inciweb.nwcg.gov/incident/7010/>

The Butte/Tehama/Glenn Lightning Complex²⁷ fire (Figure 19), located approximately 80 miles northwest of Yuba City, included the Elkhorn and Hopkins fires and began on August 19, 2020, due to lightning and actively burned in Tehama and Glenn counties. By September 9, the Elkhorn and Hopkins fires had merged with the August Complex, forming the North Zone of the August Complex, and dropping the Butte/Tehama/Glenn Fire from 66,959 acres to 19,069 acres. The Butte/Tehama/Glenn Lightning Complex was fully contained on October 9, 2020.

Figure 19: Butte/Tehama/Glenn Lightning Complex Fire Location Map²⁸

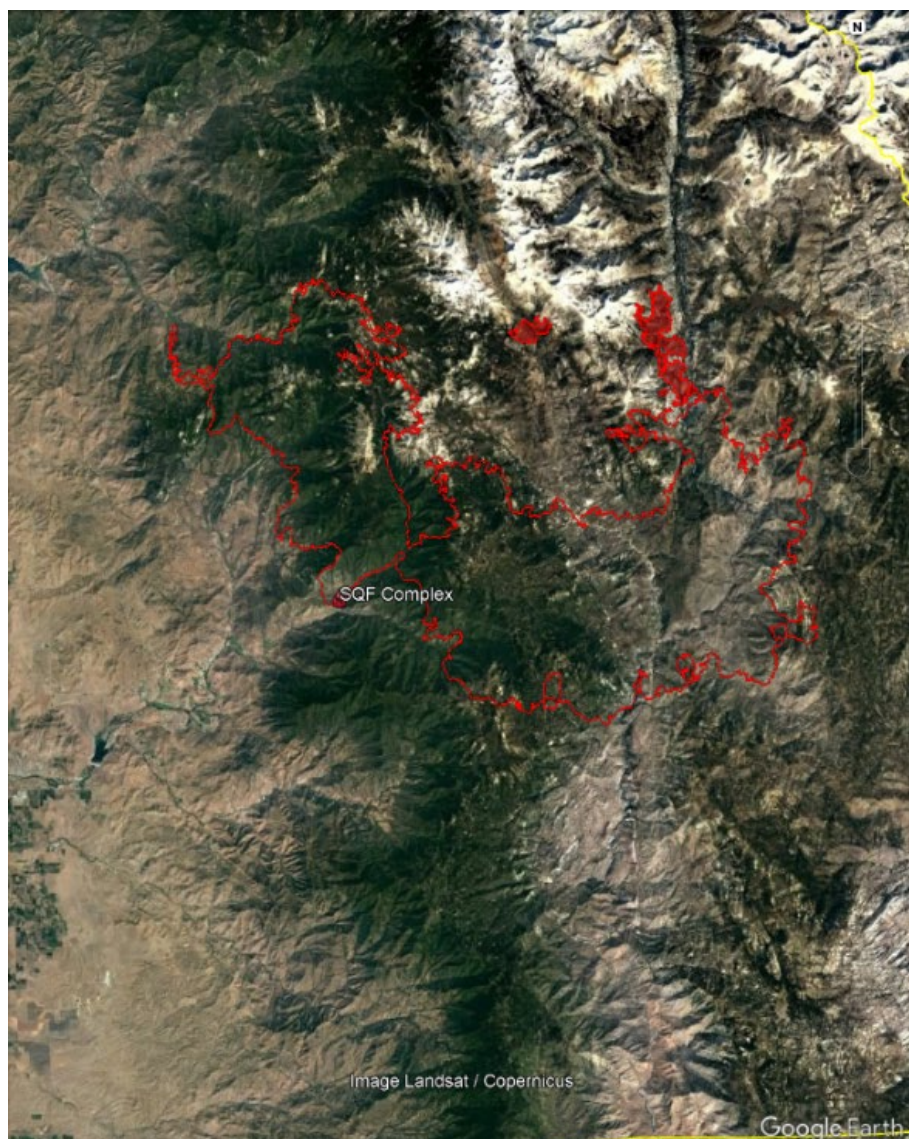


²⁷ Butte/Tehama/Glenn Lightning Complex. <https://data.statesmanjournal.com/fires/ca-fire/f6aba342-3b28-460b-a88a-96ccbdcb3c14/buttetehamaglenn-lightning-complex-tehamaglenn-zone/>

²⁸ Perimeter map unavailable

SQF Complex Fire²⁹ (Figure 20), located 260 miles southeast of Yuba City, began as the Castle and Shotgun fires during a lightning strike on August 19, 2020. The Castle fire actively burned in Sequoia National Forest and Giant Sequoia National Monument, Inyo National Forest, Sequoia National Park, lands managed by the Bureau of Land Management, State, County, and private lands with the Shotgun fire actively burning in the Golden Trout Wilderness and Sequoia National Forest. Although not close to the Yuba City monitor, smoke from these fires strongly contributed to the extensive layer of smoke that covered central and northern California. These fires burned 174,178 acres and destroyed 228 structures before full containment on January 5, 2021.

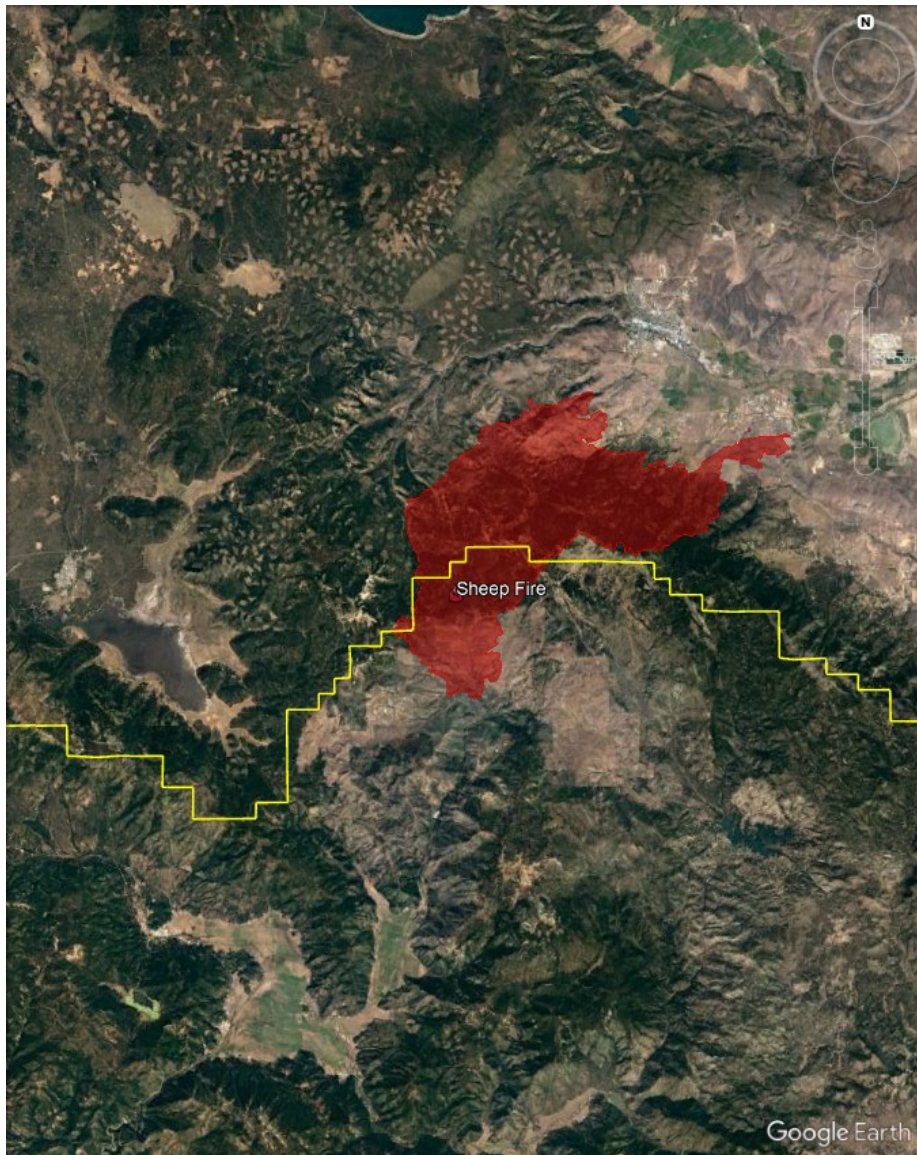
Figure 20: SQF Complex Fire Perimeter Map



²⁹ SQF Complex Fire. <https://inciweb.nwcg.gov/incident/7048/>

Sheep Fire³⁰ (Figure 21), located 90 miles north-northeast of Yuba City, began on August 22, due to lightning, and actively burned in Plumas and Lassen counties in the Lassen National Forest. The Sheep Fire was fully contained on September 9, 2020.

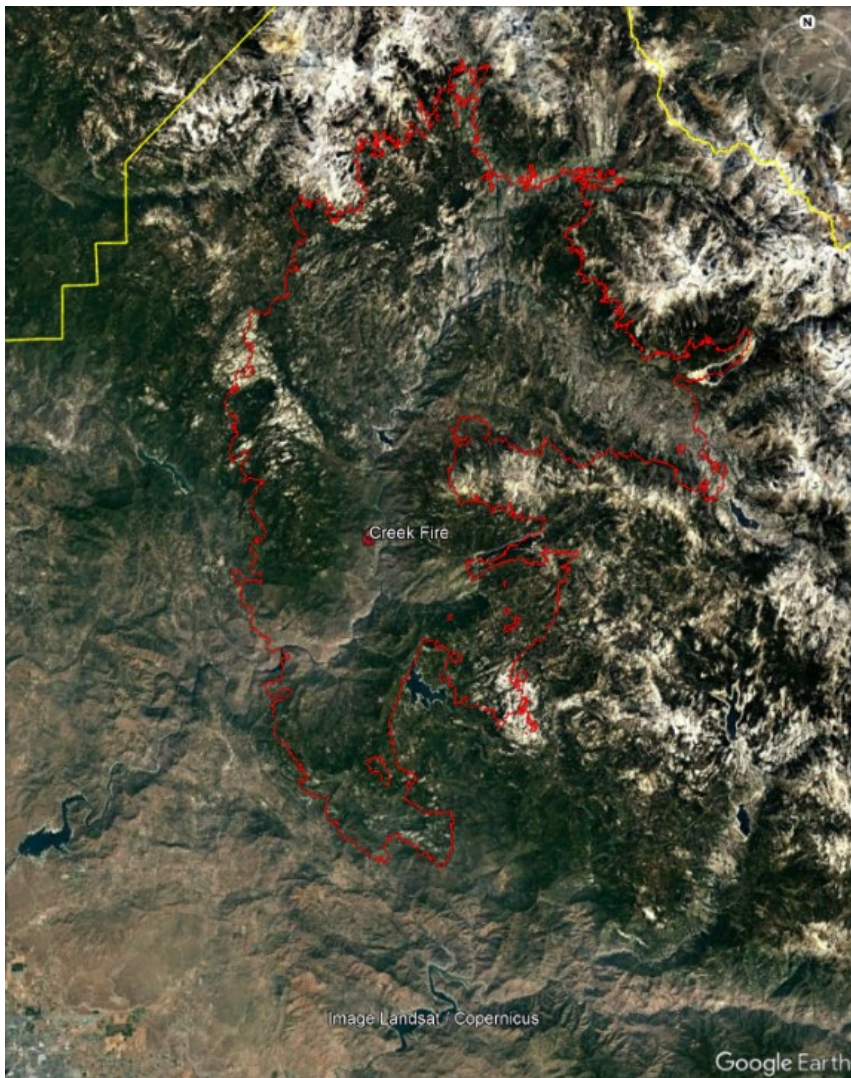
Figure 21: Sheep Fire Perimeter Map



³⁰ Sheep Fire: <https://inciweb.nwcg.gov/incident/7067/>

Creek Fire³¹ (Figure 22), located 170 miles southeast of Yuba City, began on September 4, 2020 with the source currently under investigation. Within the first four days of starting the Creek Fire grew anywhere between 20,000 to 50,000 acres due to the strong winds in the area. The fire activity burned in the Sierra National Forest in Fresno and Madera counties, burning 379,895 acres and destroying 853 structures, including many homes in Big Creek, before full containment on December 24, 2020. Although located some distance from the Yuba City monitor, the Creek fire was the fifth largest California wildfire and the second largest single California wildfire in recorded history³² and the smoke produced added considerably to the smoke layers covering central and northern California.

Figure 22: Creek Fire Perimeter Map

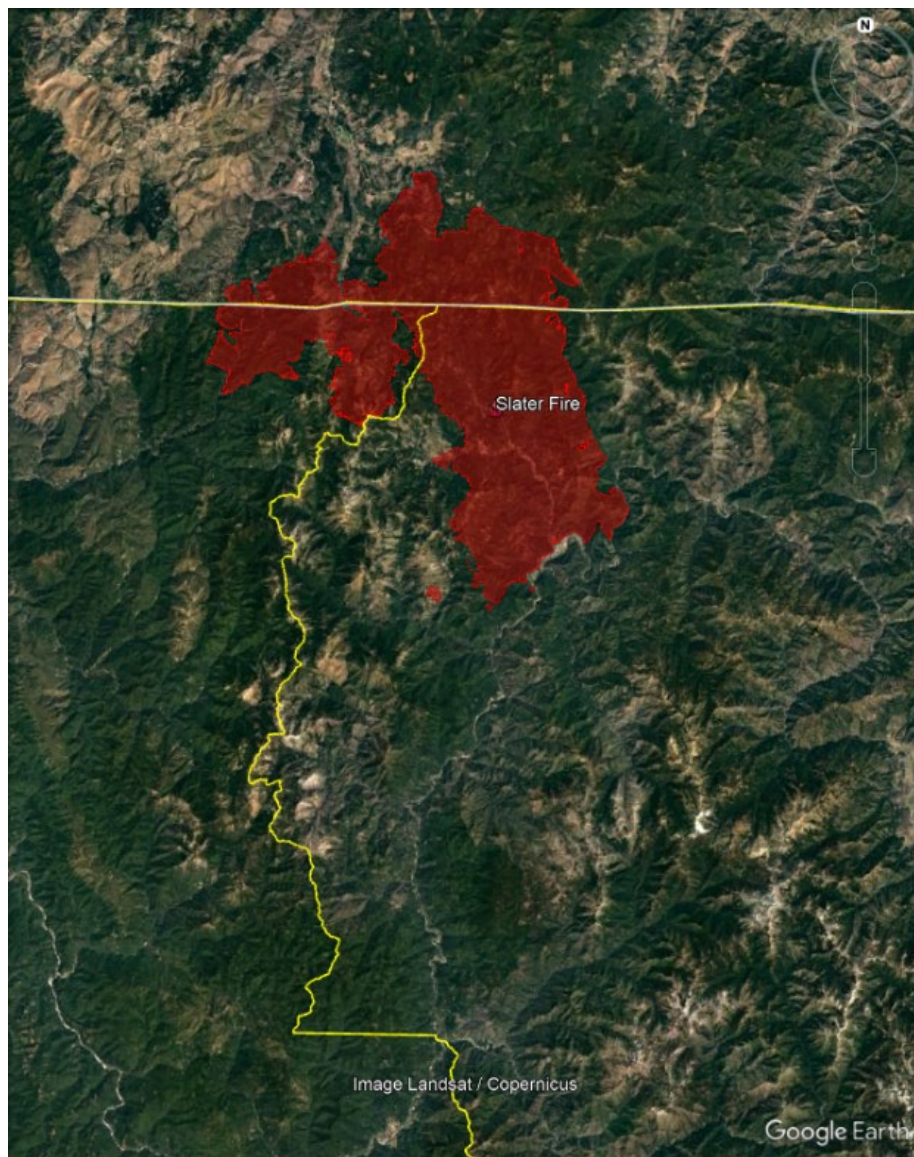


³¹Creek Fire. <https://inciweb.nwcg.gov/incident/7147/>

³²Top 20 Largest California Wildfires. Access 11/01/2021. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

The Slater Fire³³ (Figure 23) , which includes the Devil Fire, was located 200 miles north-northwest of Yuba City, and burned in the Klamath, Six Rivers and Rogue Siskiyou National forests in Siskiyou and Del Norte counties in California and Josephine County in Oregon. It began on September 8, 2020 (source currently under investigation) and burned 157,229 acres before full containment on December 10, 2020.

Figure 23: Slater Fire Perimeter Map



³³ Slater/Devil Fire. <https://inciweb.nwcg.gov/incident/7173/>

The Willow Fire³⁴ (Figure 24) , located 20 miles northeast of Yuba City, began on September 9, 2020. The source of the fire was not noted on the CalFire website nor in the 2020 Fire Siege Report.³⁵ The fire burned 1,311 acres in a predominately rural area in the foothills of the Sierra Nevada range before full containment on September 14, 2020.

Figure 24: Willow Fire Perimeter Map

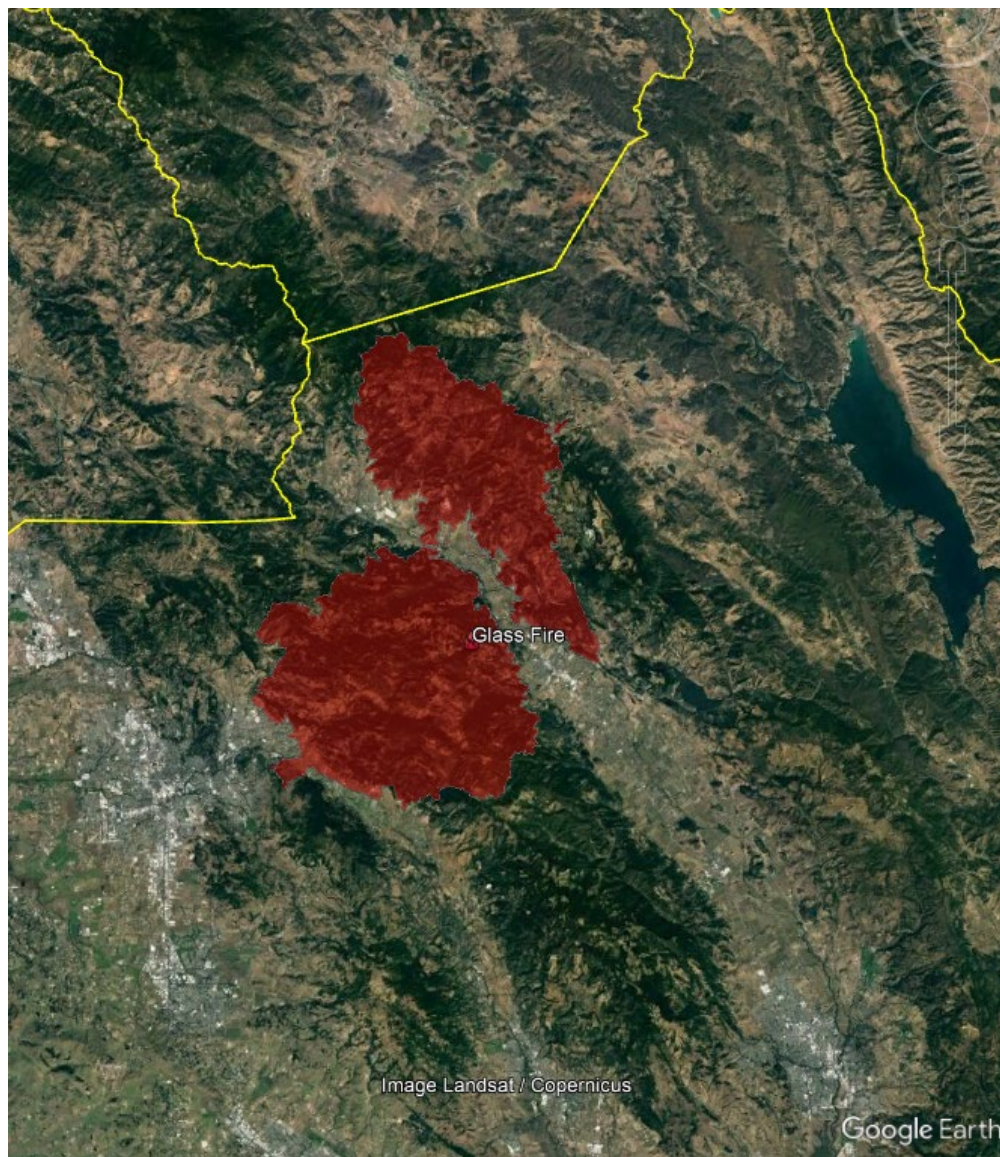


³⁴ Willow Fire. <https://www.fire.ca.gov/incidents/2020/9/9/willow-fire/>

³⁵ 2020 Fire Siege: <https://www.fire.ca.gov/media/hsviuuv3/cal-fire-2020-fire-siege.pdf>

The Glass Fire³⁶ (Figure 25) , located 60 miles southwest of Yuba City, began on September 27, 2020, with the source currently under investigation. The fire actively burned in Napa and Sonoma counties near several small communities. The fire burned 67,484 acres in a State Direct Protection Area, destroyed 1,555 structures and damaged an additional 282, before official containment on October 20, 2020.

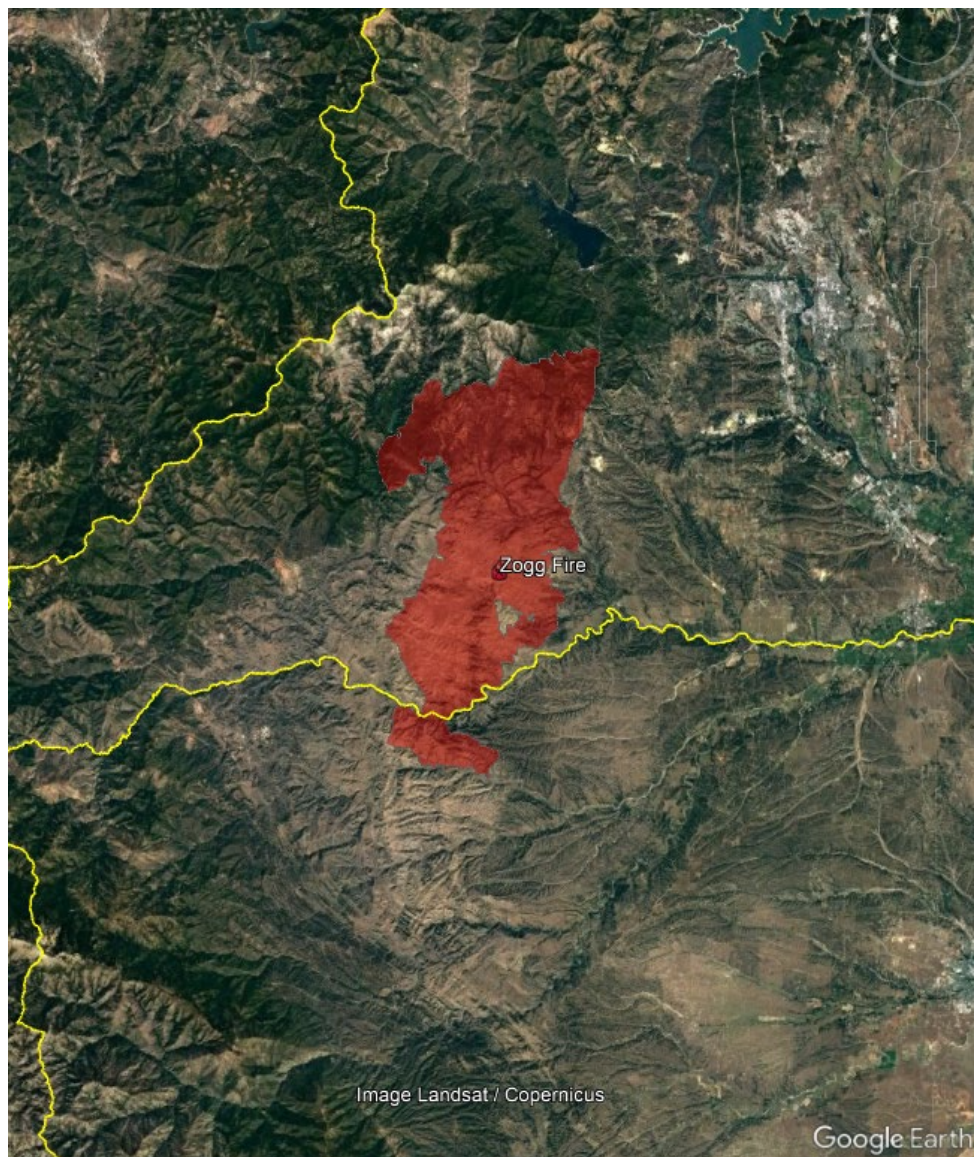
Figure 25: Glass Fire Perimeter Map



³⁶ Glass Fire <https://www.fire.ca.gov/incidents/2020/9/27/glass-fire/>; 2020 Fire Siege: <https://www.fire.ca.gov/media/hsviuuv3/cal-fire-2020-fire-siege.pdf>.

The Zogg Fire³⁷ (Figure 26) , located 100 miles north-northwest of Yuba City, began on September 27, 2020, with the cause still under investigation. The fire actively burned 56,388 acres in a rural area near the community of Ono and the Whiskey National Recreation Area in Shasta County with a small foray into Tehama County. It destroyed 204 structures and claimed the lives of four civilians before containment on October 16, 2020.

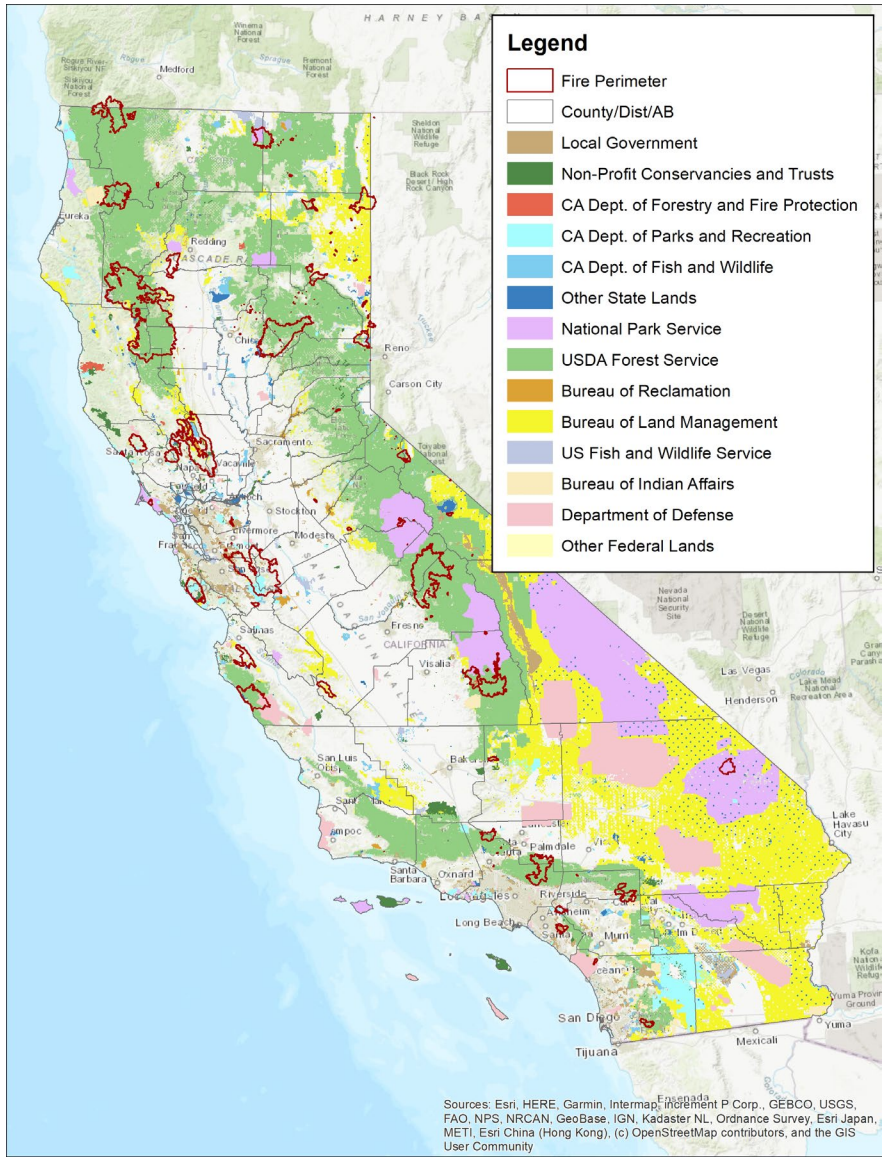
Figure 26: Zogg Fire Perimeter Map



³⁷ Zogg Fire. <https://inciweb.nwcg.gov/incident/7173/> ; 2020 Fire Siege: <https://www.fire.ca.gov/media/hsviuuv3/cal-fire-2020-fire-siege.pdf>.

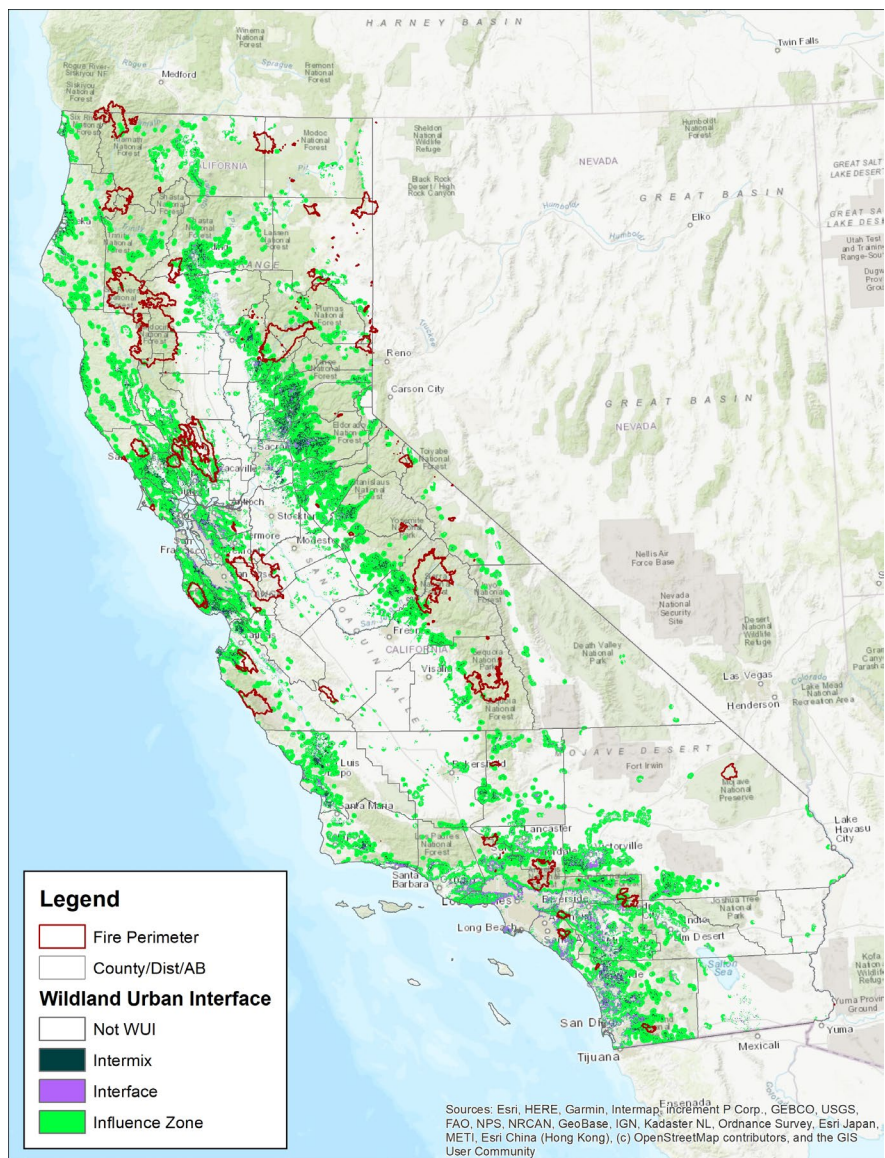
These fires occurred primarily in areas that meet the definition of wildland which is “an area in which human activity and development is essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.” Wildlands can include forestland, shrubland, grassland, and wetlands and includes lands that are predominantly wildland, such as land in the wildland-urban interface, as specified in the preamble of the Exceptional Events Rule.³⁸ Figure 27 and Figure 28 indicate these areas with the fire perimeters outlined in red.

Figure 27: California land ownership map with 2020 wildfire boundaries (red)



³⁸ 81 FR 68248

Figure 28: Wildland-urban interface map with 2020 wildfire boundaries (red)



II. Summary of Events

A series of large wildfires were ignited across California from mid-August to early November 2020. The majority of these fires occurred in the northern portion of the State and included the August Complex Fire, which burned 1,032,648 acres and resulted in one fatality, and the North Complex Fire, which burned 318,935 acres and resulted in fifteen fatalities. On August 22, 2020, a national disaster was first declared for the State of California.^{39 40}

³⁹ 85 FR 53428, *Presidential Declaration of a Major Disaster for the State of California*, dated 8/22/20

⁴⁰ FEMA, *California Wildfires and High Winds, DR-4558-CA*

The following section provides evidence of the impact of these exceptional events on the Yuba City PM_{2.5} monitor for three event periods:

- 1) August 20 to August 25,
- 2) September 5 to September 15, and
- 3) September 30 to October 4.

Although the Yuba City monitor was affected by smoke from wildfires at other times during the wildfire siege of 2020, only dates during these three time periods are being requested for concurrence under the Exceptional Events Rule at this time.

The evidence shows the source wildfires that collectively contributed emissions impacting the site in the Feather River AQMD in the Sacramento Valley Air Basin. These wildfires, as previously noted, primarily occurred on lands that meet the statutory definition of wildlands. Map locations and layers of the fire perimeters were obtained from CalFire, US Forest Service, and the Fire and Resource Assessment Program (FRAP).⁴¹

A. Tools

NOAA's HYSPLIT⁴² model was used to determine simple back-trajectories showing the path that an air parcel took for a specified period of time (here, 36 hours), starting at the monitor at times of peak concentrations on each day. Three height levels (red: 100 meters (m); blue: 500m; green: 1000m) were used to indicate transport near the surface and in the upper atmosphere. Additional trajectories can be found in Appendix III.

The HYSPLIT model was also used to indicate how emissions from the wildfires were transported toward the monitor (forward trajectory). Trajectories in this section are shown from the fire(s) estimated to have the highest contribution. The trajectories were initiated from each major fire at 12z (04PST). These model runs provide insight into the most likely center path a parcel of air (and smoke) from each fire would take in the 36 hours after the 12z start time. This provides a simplified understanding of smoke transport from a fire across the region, connecting these wildfires with smoke seen in satellite imagery, and indicating potential correlations at a site through analysis of parcel transport timing and backwards trajectories when they overlap. These forward trajectories, overlaid in Google Earth with satellite images from the MODIS⁴³ Aqua or Terra platforms and the Suomi National Polar-orbiting Partnership (Suomi NPP) satellite⁴⁴, provide a visual analysis of the smoke emitting from the fires and impacting the monitors. Additional trajectories can be found in Appendix III.

⁴¹ CalEPA/FRAP Fire Perimeters: <https://frap.fire.ca.gov/frap-projects/fire-perimeters/>

⁴² HYbrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT)

⁴³ UWM, SSEC, *MODIS Today*, last accessed 7/29/21

⁴⁴ NASA EOSDIS Worldview, <https://worldview.earthdata.nasa.gov/>, last accessed 9/19/22

Google Earth was used as a platform to combine the HYSPLIT back-trajectories and the NOAA Hazard and Mapping System (HMS) Fire and Smoke Product⁴⁵ smoke layers and fire locations. The back-trajectories for each monitor shown in the following sections traced back from the time of the maximum PM_{2.5} concentration in the maximum concentration hour. Back-trajectories from the hour of the maximum hourly PM_{2.5} concentration for all exceptional event dates that are requested in this document are included in Appendix III. HMS Smoke and Fire layers for each event day are included in Appendix IV.

The HYSPLIT trajectory model results, as well as satellite layers and HMS smoke plume and fire point analyses, show impacts from multiple California wildfires dispersed throughout the northern and central portions of the State. Although the model results can show potential influence from specific fires, they do not always show the cumulative effect of continuing wildfire emissions that impacted California from August through October.

B. Event Descriptions

a) August 20 to August 25, 2020

At the beginning of this event, and on the day of highest PM_{2.5} concentrations at Yuba City, a strong 500mb high pressure system was centered over the Great Basin area of Nevada and Utah (Figure 29). This system provided for hot, near-record high temperatures and periods of strong winds across northern California in the days leading up to this event. Relatively dry thunderstorms initiated multiple wildfires in very dry vegetation across northern and central California from August 16 to 18, which rapidly spread and grew in size due to strong winds and low humidity across much of the region. A 500mb low pressure and associated frontal system tracked towards southwestern Canada and northwestern United States during August 20 to 21 as the Great Basin high weakened, which provided for some cooling with the spreading dense smoke providing additional widespread cooling and poor air quality across much of northern California. The upper-level high pressure began to strengthen again over the southwestern United States leading to increasing temperatures except where inhibited by denser smoke.

Concurrently, the dense wildfire smoke from the numerous lightning-caused wildfires, which combined to form the August, LNU, SCU, CZU, and North Complexes as well as numerous individual fires such as the Jones Fire close to Yuba City, spread across the Sacramento Valley. The forward trajectories from these fires on August 20, seen in Figure 30, show the impact on the Yuba City monitor. This smoke limited daytime solar heating in some areas, leading to slightly lower temperatures across large portions of the impacted Sacramento Valley and Sierra Nevada Mountains. This widespread smoke and high temperatures continued through the end of the event period, though gusty winds and increased vertical mixing provided for a well-mixed boundary layer.

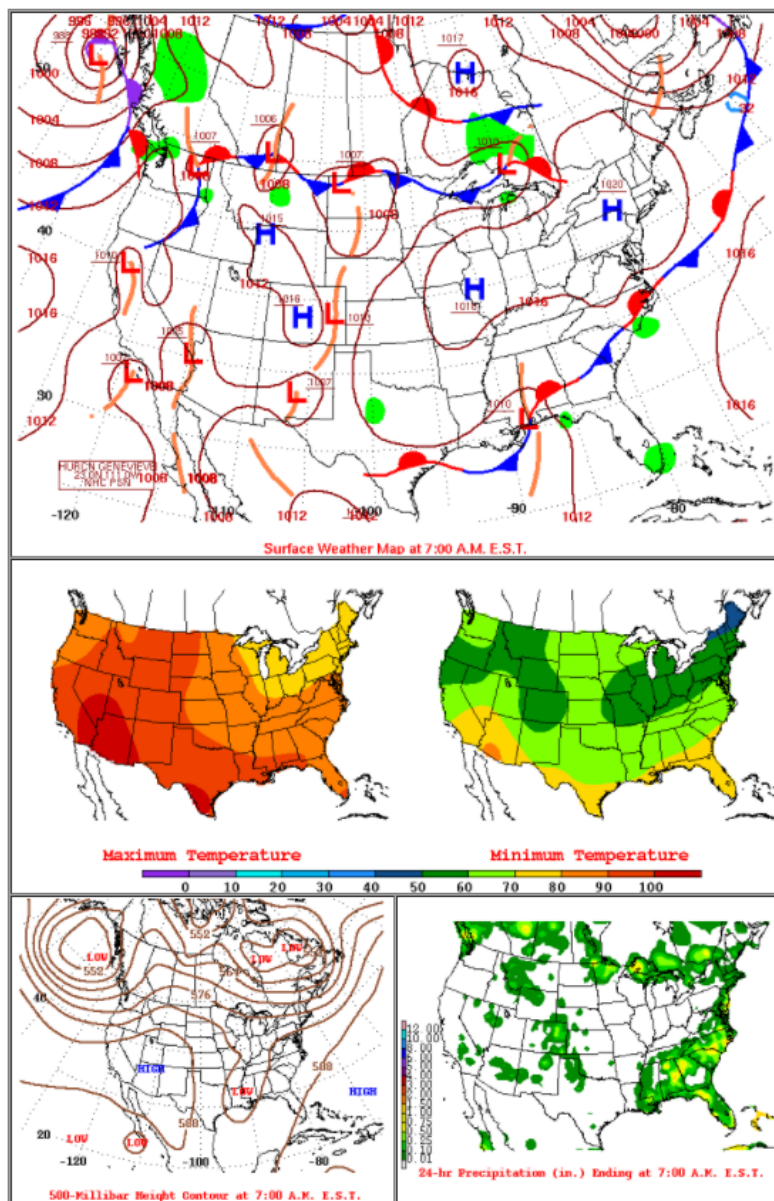
⁴⁵ HMS: <https://www.ssd.noaa.gov/PS/FIRE/smoke.html>

Additional weather maps, forward and backward trajectories, satellite images, and HMS smoke and fire layers for each day of this event period are included in Appendices II, III, and IV.

Figure 29: Meteorological conditions on August 20, 2020⁴⁶

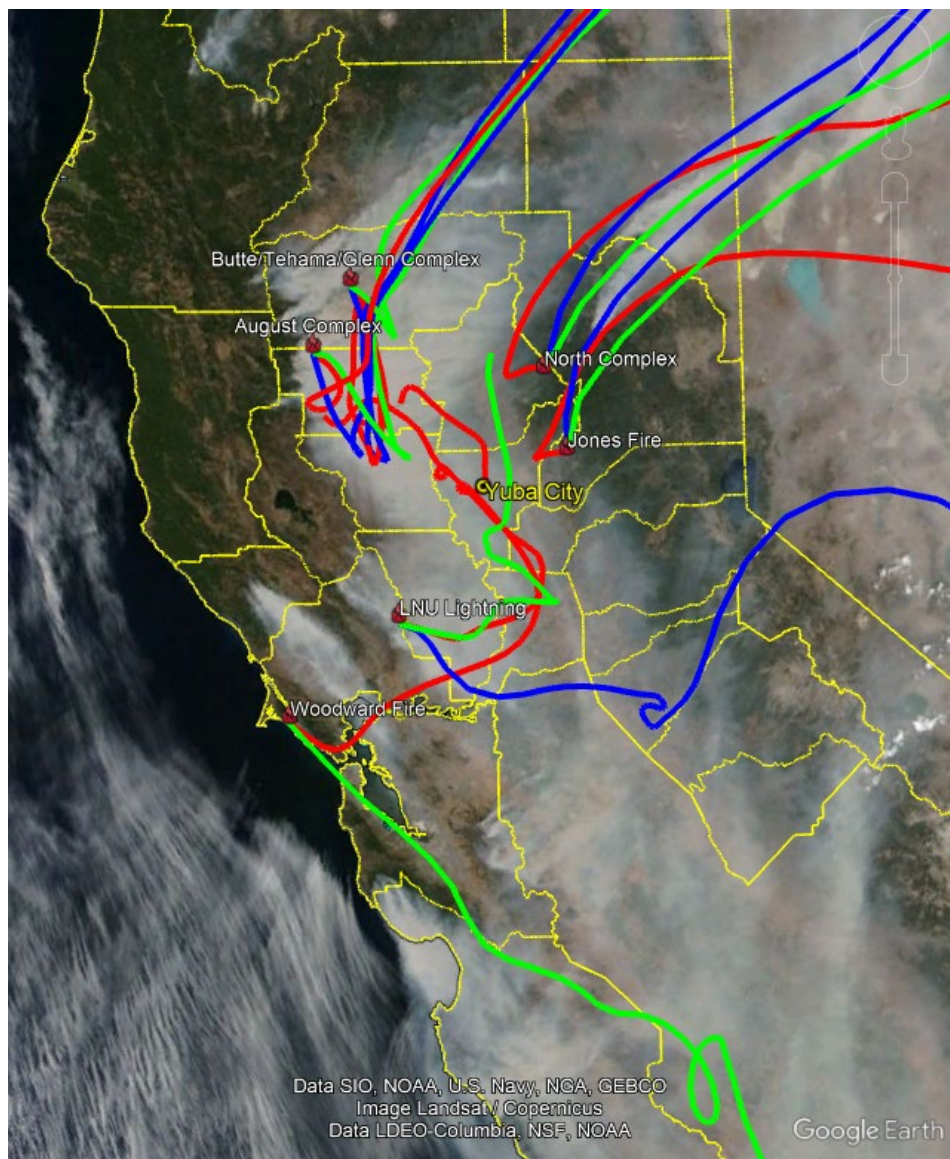
Daily Weather Maps

THURSDAY AUGUST 20, 2020



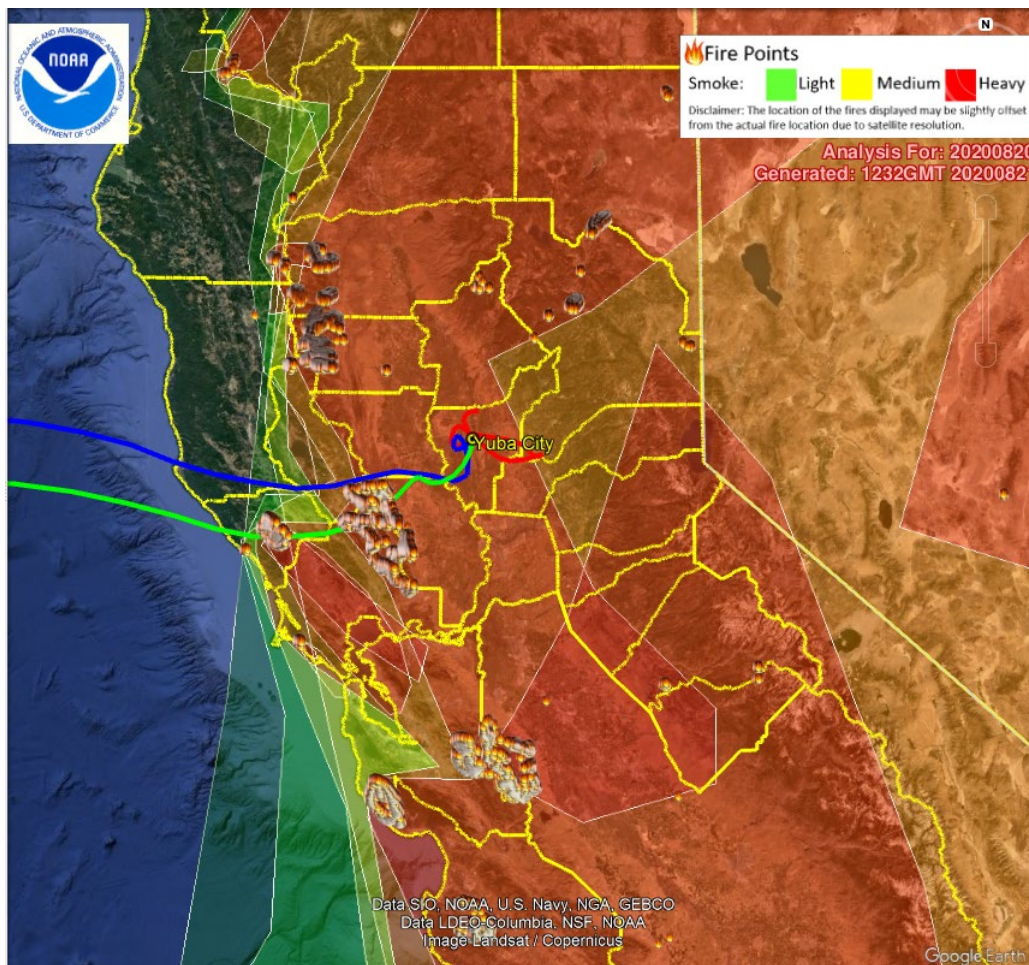
⁴⁶ NOAA NCEP Weather Prediction Center Daily Weather Maps: <https://www.wpc.ncep.noaa.gov/dailywxmap/index.html>

Figure 30: Forward trajectories 12z (4am PST) from fires (Suomi satellite image, August 20, 2020)



Thick smoke covered most of Northern California, as evidenced in Figure 30 above as well as the HMS smoke and fire layers in Figure 31. Back-trajectories, beginning at the time of the maximum PM_{2.5} concentrations at Yuba City on August 20, are overlaid on the HMS smoke and fire layers for the same day. The surface trajectory (red, 100m) indicates a more local smoke influence, while those higher in the atmosphere are more indicative of transport (blue, 500m; green, 1000m). All were influenced by the wildfire smoke emissions.

Figure 31: August 20, 2020, back trajectories from Yuba City monitor at time of maximum PM_{2.5} concentrations (13PST/21UTC) with HMS smoke and fire layers



b) September 5 to September 15, 2020

In the days prior to September 5, smoke and haze continued to impact air quality, but clear skies were observed in many areas amid record high temperatures. An upper level high pressure system strengthened near the Great Basin region (Additional weather maps, forward and backward trajectories, satellite images, and HMS smoke layers for each day of this event period are included in Appendices II, III, and IV.

Figure 32), with forecast models expecting the development of a strong surface pressure gradient bringing high winds and conditions favorable to wildfire development. North winds

were expected in the Sacramento Valley with downslope winds over the foothills⁴⁷. As the upper level high expanded into Northern California, record breaking temperatures continued, although these temperatures were slightly depressed due to increased smoke and haze from area wildfires. Widespread smoke continued across the Sacramento Valley and into the mountains (Figure 33), contributing to elevated PM_{2.5} concentrations across much of the region with concentrations peaking at 252.9 µg/m³ on September 13.

The upper level high over the Great Basin area moved slowly to the east as the week progressed and a surface low dropped into northern California,⁴⁸ bringing slightly cooler temperatures and strong variable winds. Wind advisories were issued for areas in the northern Sacramento Valley, along with Red Flag warnings. The advent of the weak weather system helped to clear out some of the smoke, but smoke and haze still continued to be an issue near the still burning wildfires.

The combined fires that made up the August and LNU Complexes, as well as the numerous other individual fires, contributed to emissions from the North Complex adding to the smoke impacting the Sacramento Valley (Figure 34), and directly impacting the monitor at Yuba City.

Additional weather maps, forward and backward trajectories, satellite images, and HMS smoke layers for each day of this event period are included in Appendices II, III, and IV.

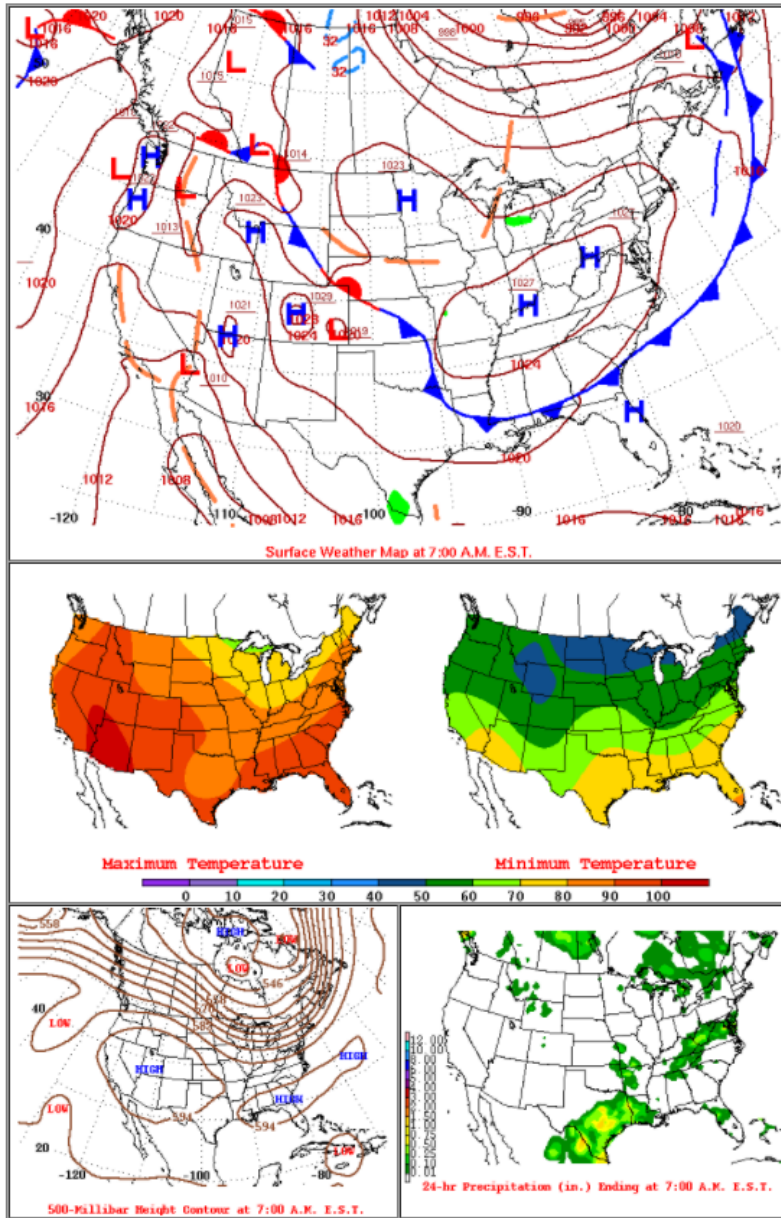
⁴⁷ Sacramento NWS Area Forecast Discussion: [September 5, 2020 435AM PDT](#)

⁴⁸ Sacramento NWS Area Forecast Discussion: [September 7, 2020 226PM PDT](#)

Figure 32: Meteorological conditions on September 5, 2020⁴⁹

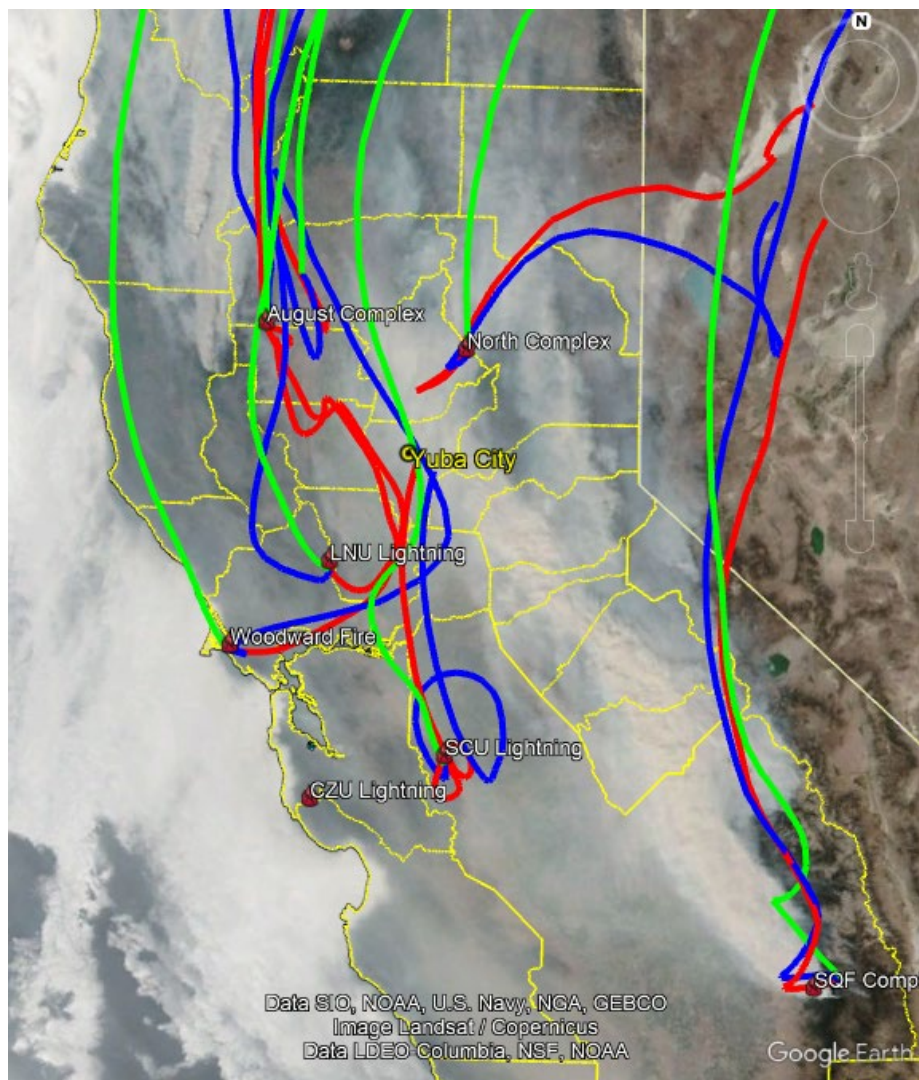
Daily Weather Maps

SATURDAY SEPTEMBER 5, 2020



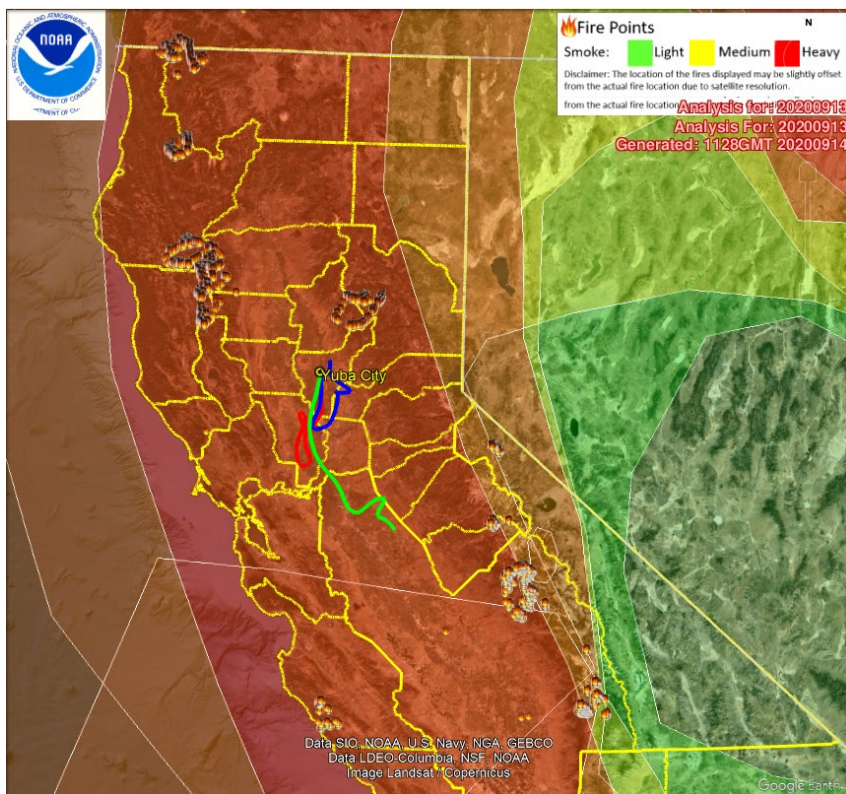
⁴⁹ NOAA NCEP Weather Prediction Center Daily Weather Maps: <https://www.wpc.ncep.noaa.gov/dailywxmap/index.html>

Figure 33: Forward trajectories 12z (4am) from fires (Suomi satellite image, September 13, 2020)



The back-trajectories for September 13 (September 14 at 03UTC), shown in Figure 34, are overlaid on the September 13 HMS smoke and fire layers, and again indicate that the surface trajectories (red, 100m), as well as those indicative of transport (blue, 500m; green, 1000m), were influenced by local wildfire smoke emissions.

Figure 34: September 13, 2020 , back trajectories from Yuba City monitor at time of maximum PM_{2.5} concentration (19PST/Sept 14 03UTC) with HMS smoke and fire layers



c) September 30 to October 4, 2020

At the start of this event period, a 500mb high pressure ridge remained entrenched over the western coast of the U.S., bringing above average temperatures, low winds, and strong inversions (Figure 35). These conditions allowed for the accumulation of smoke throughout northern California, with relief seen only when it gradually weakened after October 4 (see Appendix II). Smoke from several wildfires accumulated throughout the area (Figure 36), with the highest concentrations during this event occurring on October 3, with an hourly high of 133 $\mu\text{g}/\text{m}^3$ at midnight (or 08UTC) (Figure 37). Although some forward trajectories do not seem to impact Yuba City, they are estimates of the center of the path taken by smoke to the monitor and can vary depending on the meteorological data used in the analysis, but give a good estimation. Subsequent moderate flows from the north allowed the smoke to spread further south, with the NWS predicting smoke to remain for the next few days.⁵⁰

⁵⁰ Sacramento NWS Area Forecast Discussion: [October 3, 2020 0400AM PDT](#)

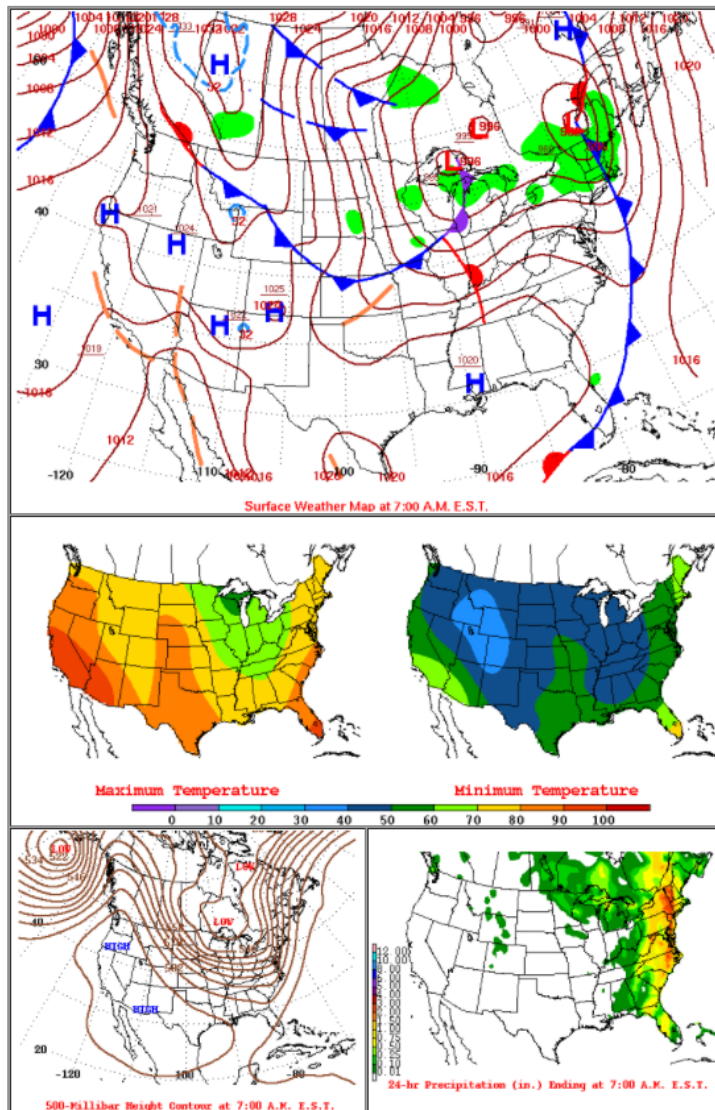
Eventually, the high pressure ridge moved to the east, although winds at the surface remained fairly light. Weak flow allowed for some dispersion of smoke after October 4, with PM_{2.5} concentrations decreasing at the Yuba City monitor, with some smoke remaining in the area and temperatures remaining high.

Additional weather maps, forward and backward trajectories, satellite images, and HMS smoke layers for each day of this event period are included in Appendices II, III, and IV.

Figure 35: Meteorological conditions on September 30, 2020⁵¹

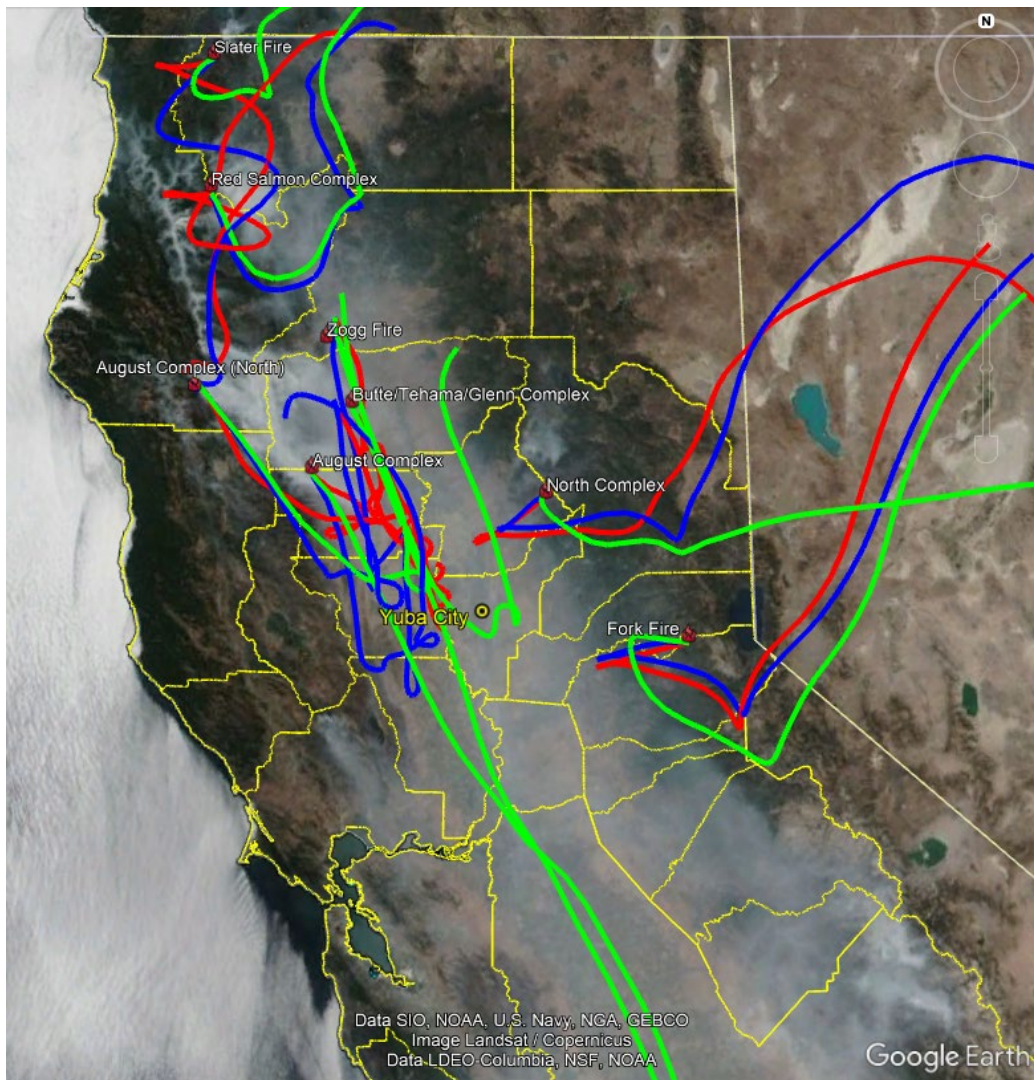
Daily Weather Maps

WEDNESDAY SEPTEMBER 30, 2020



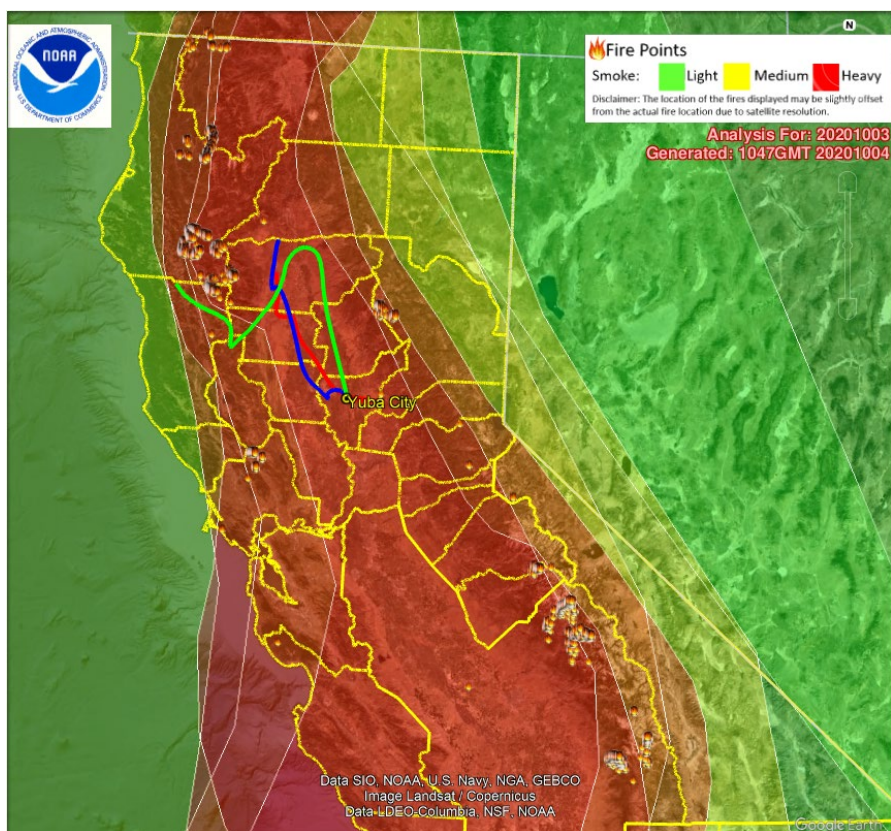
⁵¹ NOAA NCEP Weather Prediction Center Daily Weather Maps: <https://www.wpc.ncep.noaa.gov/dailywxmap/index.html>

Figure 36: Forward trajectories 12z (4am) from fires (Suomi satellite image, October 3, 2020)



Back trajectories at the hour of peak concentrations at the Yuba City monitor were overlaid on the HMS smoke and fire layers from the same day, October 3, 2020 (Figure 37). These trajectories indicated influence from all the fires contributing to the smoke overlaying the Central Valley, but particularly those in the northern and central part of the Sacramento Valley.

Figure 37: October 3, 2020, back trajectories from Yuba City monitor at time of maximum PM_{2.5} concentration (00PST/08UTC) with HMS smoke and fire layers



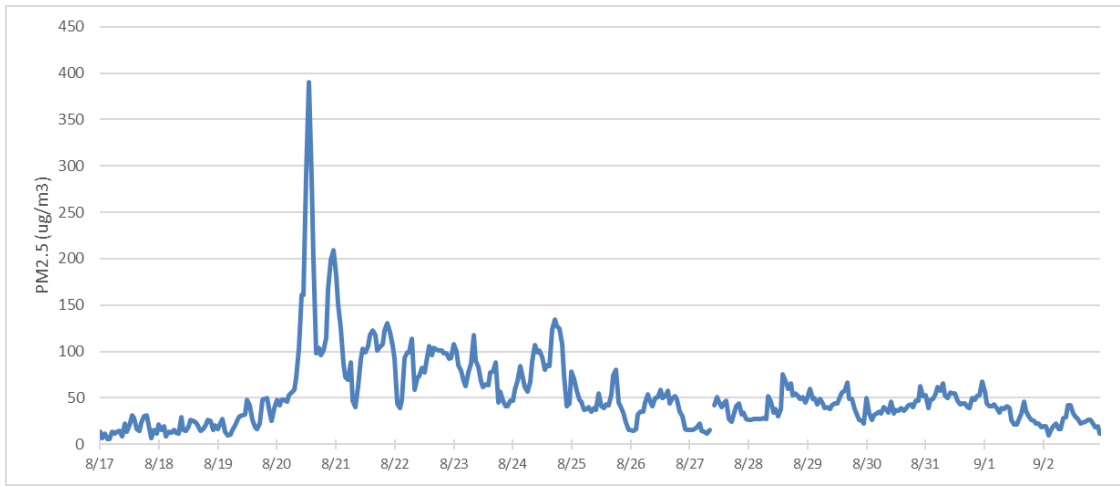
III. Event Related Concentrations and Long-Term Trends

Smoke impacts from different wildfires on the Yuba City site varied day to day. Variable winds transported wildfire smoke from the fires shown in previously shown Figure 8 and listed in Table 6, as well as other smaller fires. Elevated PM_{2.5} concentrations discussed in this section and ceilometer backscatter data and associated timing addressed in Section IV support the presence of wildfire smoke at the surface.

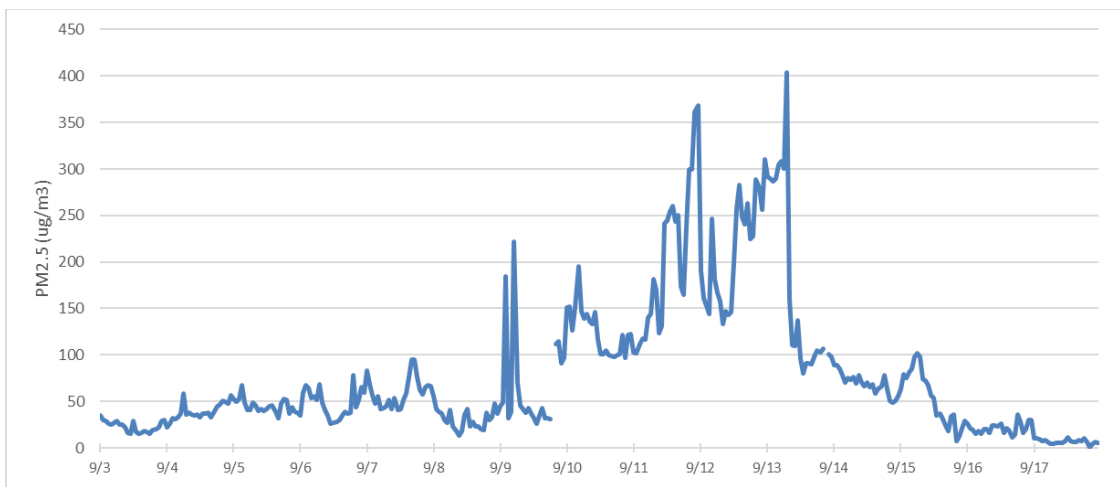
Figure 38 shows hourly PM_{2.5} concentrations at the Yuba City monitor for all three event periods. Although not every day during these events showed the extreme hourly spikes seen in the first event period on August 20, or in the second event period on September 12 and 13, the steady high hourly concentrations resulted in multiple exceedances of the daily PM_{2.5} standard as seen in Figure 39. The one spike in PM_{2.5} concentrations not attributable to wildfire smoke is seen on July 4, and hourly concentrations are indicative of firework emissions.

Figure 38: Yuba City 1-hour PM_{2.5} Concentrations during the three event periods

a) August 17 to September 2 (encompassing August 15 to 25)



b) September 3 to September 17 (encompassing September 5 to 15)



c) September 27 to October 7 (encompassing September 30 to October 4)

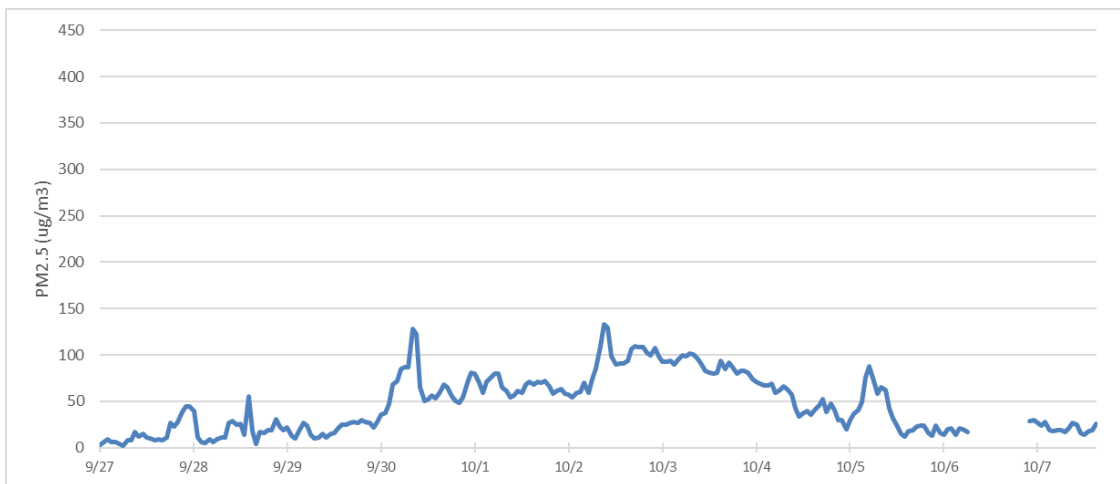
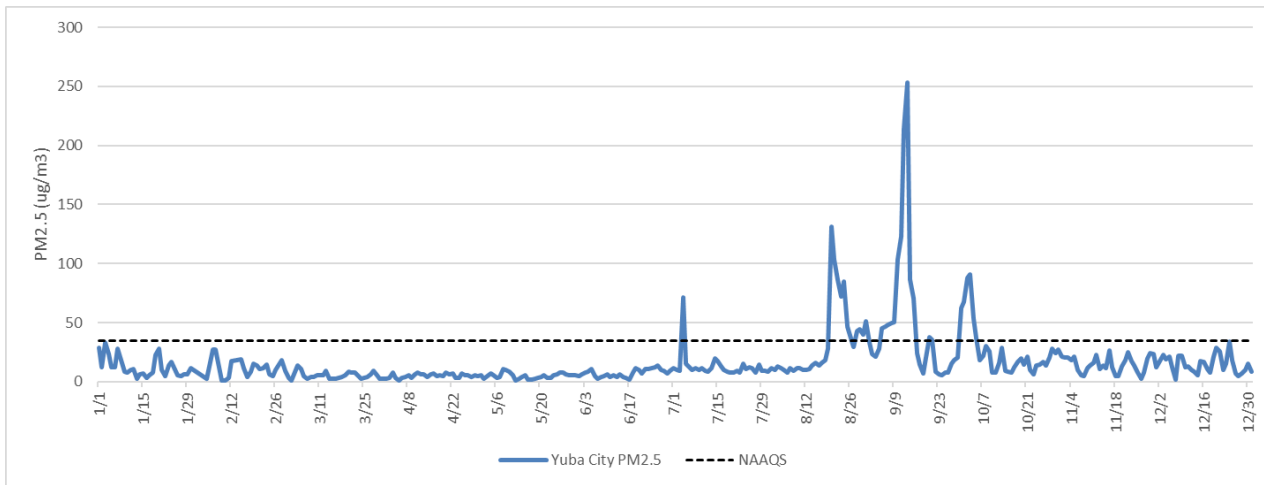
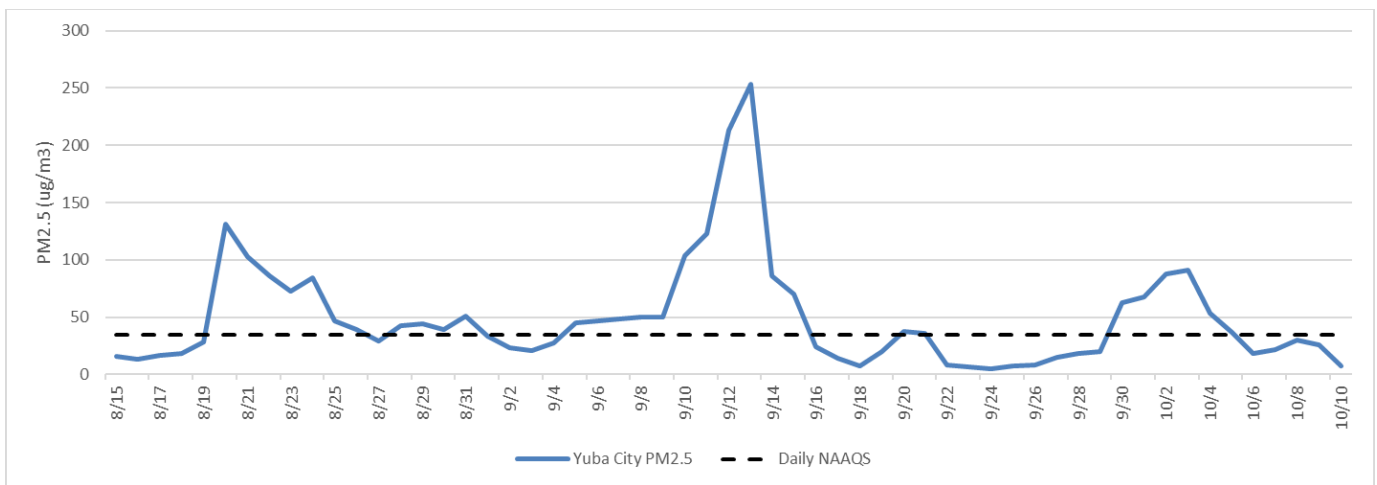


Figure 39: Daily PM_{2.5} Averages at Yuba City in 2020

a) January 1 to December 31, 2020



b) August 15 to October 10, 2020 (encompassing the three event periods)



Recent trends show a decrease in PM_{2.5} 24-hour design values at the Yuba City monitoring site as noted previously in Figure 2 and again in Figure 40 below. The 2020 design value did not follow this trend, rising well above the 24-hour standard. The annual PM_{2.5} 98th percentiles (Figure 41) have been relatively flat the past ten years, and generally below the standard, with only two years showing an increase, both due to the impacts of wildfire smoke. Exceedances during these two years (2011 and 2018) were not pursued as exceptional events due to a lack of regulatory impact at the time and not the case for the 2020 and 2021 exceedances. Concurrence of the exceptional event dates requested for both the 2020 and 2021 demonstrations will bring the area into attainment of the 2006 PM_{2.5} daily standard, aligning with historical trends.

Figure 40: PM_{2.5} design values at Yuba City

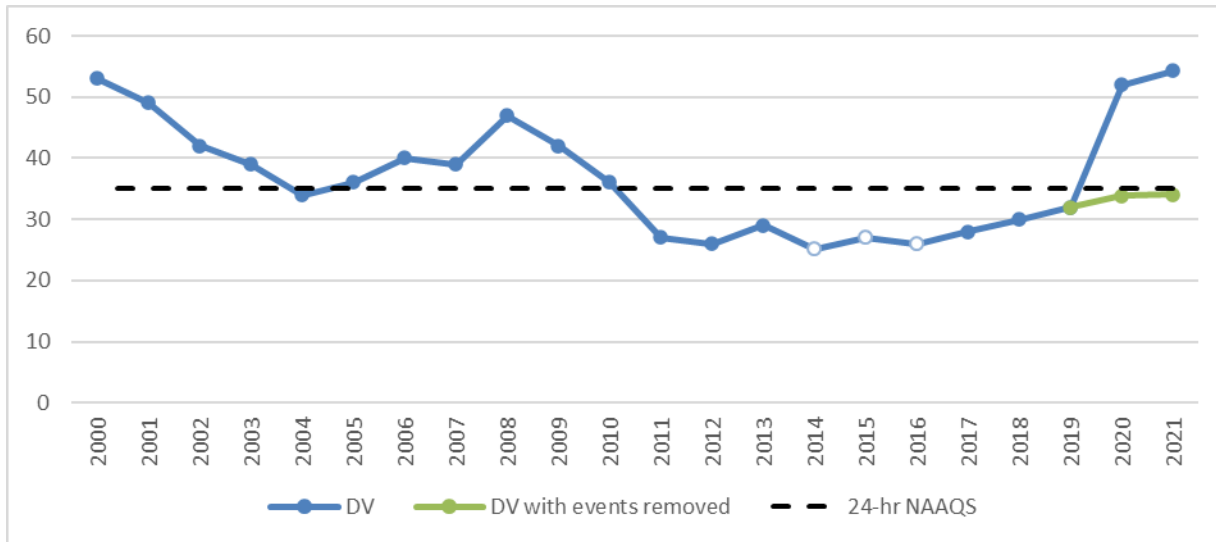
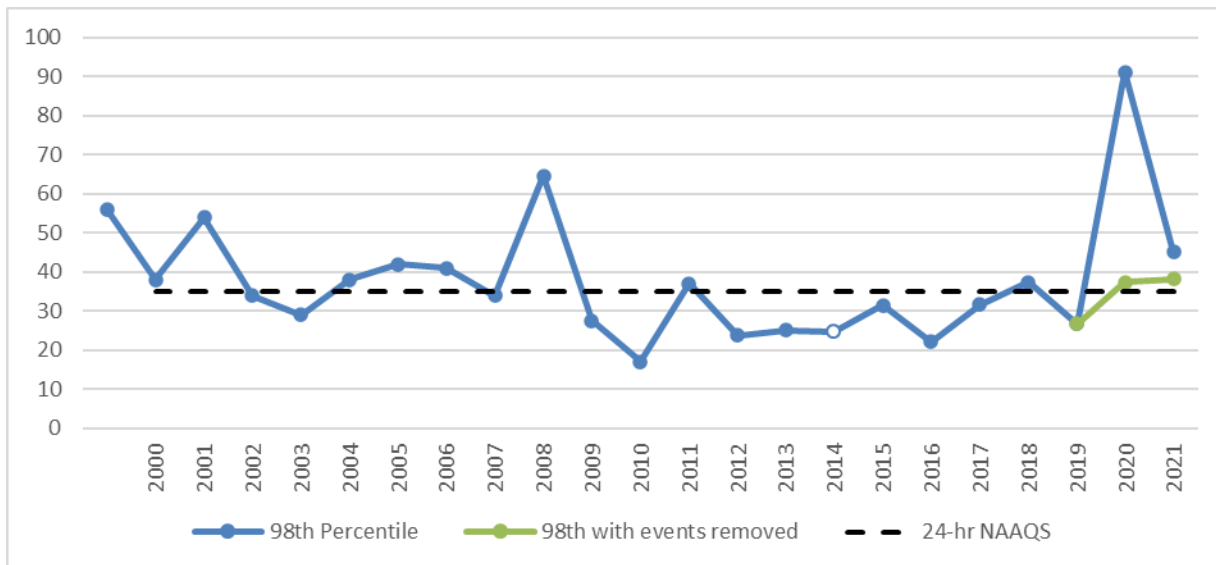


Figure 41: PM_{2.5} 98th Percentile Values at Yuba City



IV. Meteorological Conditions

Table 7 lists averages and standard deviations of daily temperatures and resultant wind speeds during the exceptional event periods (as outlined in Table 4), normal (non-event) days, and all combined days in August, September, and October 2020 at the Yuba City monitoring site. Further details of the meteorological conditions on each exceptional event day are included in Table 8. In general, days on which exceptional events occurred showed lower average temperatures in two of the three months (August and October), although missing data makes this difficult to say with certainty. All months showed slightly lower average wind speeds, which helped keep the area layered with smoke.

Table 7: Averages and Standard Deviations (SD) of Temperatures (°F) and Resultant Wind Speeds (mph) in 2020

| Exceptional Event Period | Temperature (F) | | Wind Speeds (mph) | |
|--------------------------|-----------------|------|-------------------|------|
| | Average | SD | Average | SD |
| August Event Days | 79.25 | 0.31 | 1.94 | 0.19 |
| August Normal Days | 81.75 | 1.44 | 2.60 | 0.21 |
| August All | 81.04 | 1.04 | 2.41 | 0.17 |
| September Event Days | 77.91 | 1.94 | 2.09 | 0.72 |
| September Normal Days | 75.76 | 0.81 | 2.79 | 0.48 |
| September All | 76.61 | 0.91 | 2.50 | 0.37 |
| October Event Days | 75.4 | 0.75 | 1.18 | 0.11 |
| October Normal Days | 67.9 | 1.32 | 2.99 | 0.49 |
| October All | 69.1 | 1.22 | 2.68 | 0.42 |

Table 8: Maximum Daily Values of PM_{2.5}, Temperature, and Resultant Wind Speed on Exceptional Event and Surrounding Days at Yuba City Monitoring Site.⁵²

a. August 17 to August 28 (Exceedance Days August 20 to August 25)

| Date | 8/17 | 8/18 | 8/19 | 8/20* | 8/21* | 8/22* | 8/23* | 8/24* | 8/25* |
|--|------|------|------|-------|-------|-------|-------|-------|-------|
| PM _{2.5} Hourly Max (µg/m ³) | 31 | 29 | 50 | 390 | 182 | 114 | 118 | 135 | 80 |
| PM _{2.5} Daily Average (µg/m ³) | 16.3 | 18.5 | 28.1 | 131.2 | 103.2 | 86.3 | 72.4 | 84.8 | 86.4 |
| Temperature (°F) | 98 | 106 | 102 | 88 | 94 | M | M | M | 94 |
| Wind Speed (mph) | 8.2 | 6.7 | 3.0 | 3.1 | 2.4 | M | M | M | 3.2 |

| Date | 8/26 | 8/27 | 8/28 |
|--|------|------|------|
| PM _{2.5} Hourly Max (µg/m ³) | 59 | 51 | 76 |
| PM _{2.5} Daily Average (µg/m ³) | 39.4 | 29.4 | 42.8 |
| Max Temperature (°F) | 94 | 94 | 93 |
| Wind Speed (mph) | 4.5 | 4.0 | 4.0 |

* Denotes Exceptional Event Dates Requested for Data Exclusion
M – missing data (unable to determine)

b. September 2 to September 18 (Exceedance Days September 5 to September 15)

| Date | 9/2 | 9/3 | 9/4 | 9/5* | 9/6* | 9/7* | 9/8* | 9/9* | 9/10* |
|--|------|------|------|------|------|------|------|------|-------|
| PM _{2.5} Hourly Max (µg/m ³) | 42 | 35 | 59 | 67 | 68 | 83 | 95 | 222 | 195 |
| PM _{2.5} Daily Average (µg/m ³) | 23.4 | 21.2 | 27.8 | 45.2 | 46.7 | 48.5 | 49.7 | 50.4 | 103.6 |
| Max Temperature (°F) | 89 | 92 | 94 | 102 | 109 | 100 | 91 | M | M |
| Wind Speed (mph) | 4.1 | 2.4 | 2.2 | 3.7 | 5.2 | 2.3 | 11.9 | M | M |

⁵² CARB Air Quality and Meteorological Information System (AQMIS), <https://www.arb.ca.gov/aqmis2/aqmis2.php>, last accessed 9/13/22

| Date | 9/11* | 9/12* | 9/13* | 9/14* | 9/15* | 9/16 | 9/17 | 9/18 |
|--|-------|-------|-------|-------|-------|------|------|------|
| PM _{2.5} Hourly Max (µg/m ³) | 241 | 368 | 404 | 107 | 102 | 54 | 36 | 13 |
| PM _{2.5} Daily Average (µg/m ³) | 122.8 | 213.5 | 252.9 | 86.0 | 70.4 | 24.1 | 14.4 | 7.4 |
| Max Temperature (°F) | 85 | 88 | 88 | 90 | 90 | 91 | 91 | 84 |
| Wind Speed (mph) | 2.4 | 3.3 | 2.8 | 2.5 | 2.8 | 2.4 | 5.4 | 4.6 |

* Denotes Exceptional Event Dates Requested for Data Exclusion

M – missing data (unable to determine)

b. September 27 to October 7 (Exceedance Days September 30 to October 4)

| Day | 9/27 | 9/28 | 9/29 | 9/30* | 10/1* | 10/2* | 10/3* | 10/4* |
|--|------|------|------|-------|-------|-------|-------|-------|
| PM _{2.5} Hourly Max (µg/m ³) | 45.0 | 55 | 30 | 128 | 81 | 133 | 107 | 81 |
| PM _{2.5} Daily Average (µg/m ³) | 15.0 | 18.5 | 20.3 | 62.3 | 67.8 | 87.9 | 91.2 | 53.8 |
| Max Max Temperature (°F) | 96 | 99 | 97 | 100 | 94 | 93 | 93 | 92 |
| Wind Speed (mph) | 11.4 | 8.5 | 2.2 | 5.4 | 2.5 | 2.4 | 2.1 | 2.8 |

| Day | 10/5 | 10/6 | 10/7 |
|--|------|------|------|
| PM _{2.5} Hourly Max (µg/m ³) | 88 | 24 | 30 |
| PM _{2.5} Daily Average (µg/m ³) | 37.2 | M | M |
| Temperature (°F) | 96 | 95 | 90 |
| Wind Speed (mph) | 3.5 | 2.1 | 3.8 |

* Denotes Exceptional Event Dates Requested for Data Exclusion

M – missing data (unable to determine)

Maximum daily temperatures were generally in the 90s throughout each of the events with several days over 100°F. Several days also showed some cooling into the 80s. Maximum daily resultant wind speeds remained light at 2-8 mph, rising only twice above 10 mph. Maximum PM_{2.5} concentration varied significantly, with daily averages during the exceedance days ranging from 45.2 µg/m³ to 252.9 µg/m³ and hourly maximums ranging from 67 µg/m³ to 404 µg/m³.

The weather data supports that PM_{2.5} directly related to wildfire smoke from the wildfires in California affected the Yuba City monitor. Unusual weather, other than the transport of wildfire smoke, was not a factor contributing to the exceptional event.

V. Air Quality/Health Advisories

The Feather River AQMD maintains a webpage⁵³ that keeps the public informed of wildfire smoke and air quality impacts as well as utilizing the AirNow Enviroflash Air Quality Notification System through their Air Quality Health Advisory webpage.⁵⁴ The District issued several air quality advisories covering all of the event periods. Copies of these are included in Appendix V. Health Advisories are widely distributed using social media, District website, both County OES social media and websites, faxed to all schools and public agencies in the

⁵³ Feather River AQMD, *Wildfire Smoke*, last accessed 8/27/21

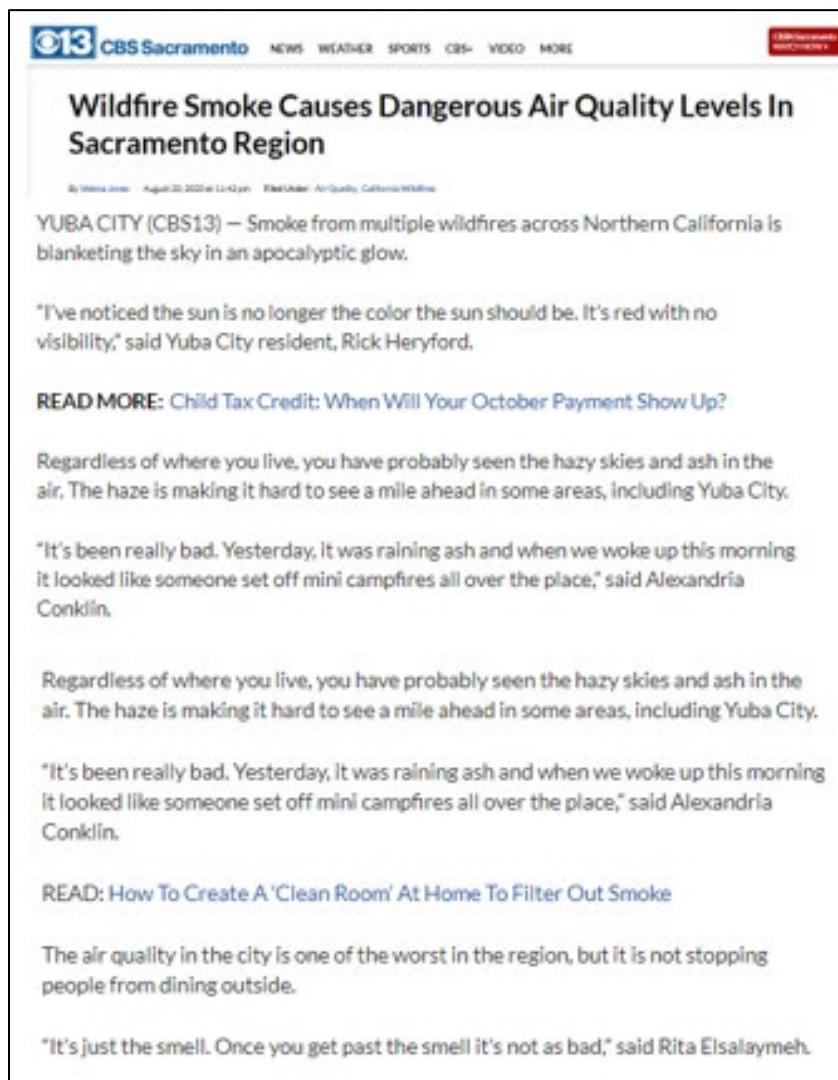
⁵⁴ Feather River AQMD, *Air Quality Health Advisory*, last accessed 9/30/22

two counties, and emailed to Enviroflash users. Health Advisories were in effect during all of the days requested for exclusion as exceptional events.

VI. Media Coverage

Media coverage of the wildfires that occurred throughout the State in 2020 was extensive. Subsequent coverage included the impacts of smoke in communities throughout the Sacramento Valley and the rest of the State. Two examples are given below, Figure 42 from local news media and Figure 43 from a Twitter post from the Feather River AQMD. Other examples can be found in Appendix VI.

Figure 42: Example of News Media Coverage



The image is a screenshot of a news article from CBS Sacramento. The article is titled "Wildfire Smoke Causes Dangerous Air Quality Levels In Sacramento Region" and is dated August 22, 2020. The article discusses the impact of wildfire smoke on air quality in the Sacramento region, including quotes from residents about the hazy skies and the smell of ash. The article also includes links to related content, such as "Child Tax Credit: When Will Your October Payment Show Up?" and "How To Create A 'Clean Room' At Home To Filter Out Smoke".

13 CBS Sacramento NEWS WEATHER SPORTS CBS- VIDEO MORE

Wildfire Smoke Causes Dangerous Air Quality Levels In Sacramento Region

By [Wesley Jones](#) August 22, 2020 at 11:42 pm Filed Under: Air Quality, California Wildfires

YUBA CITY (CBS13) — Smoke from multiple wildfires across Northern California is blanketing the sky in an apocalyptic glow.

"I've noticed the sun is no longer the color the sun should be. It's red with no visibility," said Yuba City resident, Rick Heryford.

READ MORE: [Child Tax Credit: When Will Your October Payment Show Up?](#)

Regardless of where you live, you have probably seen the hazy skies and ash in the air. The haze is making it hard to see a mile ahead in some areas, including Yuba City.

"It's been really bad. Yesterday, it was raining ash and when we woke up this morning it looked like someone set off mini campfires all over the place," said Alexandria Conklin.

Regardless of where you live, you have probably seen the hazy skies and ash in the air. The haze is making it hard to see a mile ahead in some areas, including Yuba City.


"It's been really bad. Yesterday, it was raining ash and when we woke up this morning it looked like someone set off mini campfires all over the place," said Alexandria Conklin.

READ: [How To Create A 'Clean Room' At Home To Filter Out Smoke](#)


The air quality in the city is one of the worst in the region, but it is not stopping people from dining outside.

"It's just the smell. Once you get past the smell it's not as bad," said Rita Elsalaymeh.

Figure 43: Example of Social Media Coverage

 Feather River AQMD
@FeatherRiverAir

The Air Quality Health Advisory has been extended through Sunday Aug 23. The Yuba/Sutter are is currently experiencing Unhealthy - Very Unhealthy AQI from wildfire smoke. Unhealthy AQI levels may continue through the weekend. For more information visit fraqmd.org



4:37 PM · Aug 20, 2020 · Twitter Web App

Clear Causal Relationship

This section addresses the “clear causal relationship” criterion as per U.S. EPA’s exceptional events guidance by providing 1) a comparison of the PM_{2.5} data requested for exclusion with historical concentrations at the air quality monitor, 2) demonstrating that the wildfire’s emissions were transported to the monitor, 3) show the emissions from the wildfire influenced the monitored concentrations.

This demonstration meets the purpose of U.S. EPA’s published guidance and provides the evidence needed to concur on all requested exceptional event dates in 2020.

The following sections reiterate or provide additional evidence to support the analysis for all requested exceptional event dates.

Evidence that the emissions from the wildfire affected the exceeding monitor.

This requirement is met through evidence shown in the Narrative Conceptual Model section as well as this section, through presentation of increased PM_{2.5} concentrations at the monitor and in the surrounding area. Additional news and social media accounts of smoke in the vicinity of the monitor can also be found in Appendix VI.

Evidence that the emissions were transported to the monitor.

This requirement is met through evidence given in the Narrative Conceptual Model section as well as Appendices II and III, using both backward trajectory analysis from the monitor at the hour of peak concentrations in each exceedance day as well as forward trajectories from individual wildfires. Satellite imagery, and HMS satellite-derived smoke layers, ceilometer data, and meteorological analyses, are also presented in Appendices II, III, and IV.

Additional evidence that the emissions caused the exceedance by reaching the ground and affecting the monitors.

This requirement is met through the PM_{2.5} concentration analyses, as well as indications of black carbon emitted by the wildfires. In addition, ceilometer data (Appendix IV) at the Yuba City airport shows wildfire smoke both aloft and at the surface, corroborating media reports of smoke at ground level as provided in Appendix VI.

I. PM_{2.5}

A. PM_{2.5} Regional Concentrations

The following figures show elevated PM_{2.5} concentrations at multiple sites across the Mountain Counties Air Basin (to the east of Yuba City) and throughout the Sacramento Valley Air Basin during the time of the exceptional events. These increased concentrations were a direct result of smoke and emissions from the wildfires in central and northern California. This supports that the wildfire smoke and emissions were widespread across the region and directly impacted monitors at the surface during the period.

Figure 44: Daily PM_{2.5} at selected sites in the Mountain Counties Air Basin

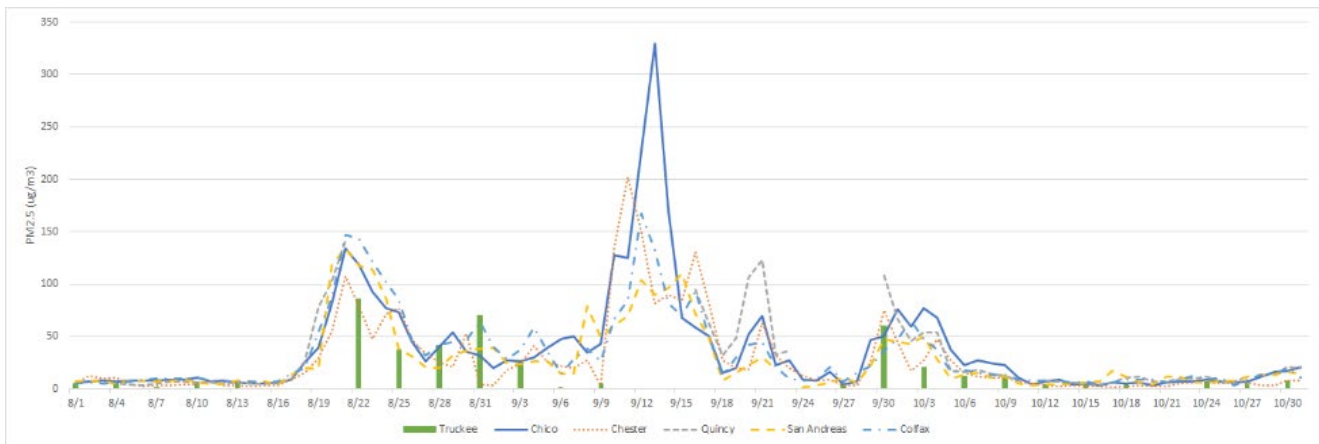
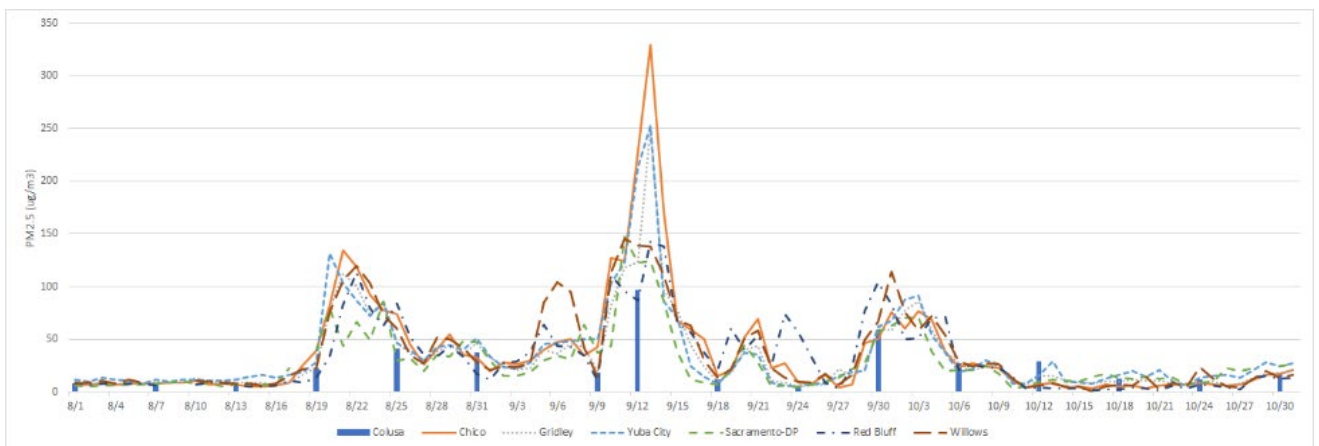


Figure 45: Daily PM_{2.5} at selected sites in the Sacramento Valley Air Basin



B. Historical PM_{2.5} Concentrations

Historically, PM_{2.5} concentrations at the Yuba City monitor fall well below the PM_{2.5} daily NAAQS (Figure 46). Concentrations above the standard and above the 98th percentile ranking, particularly during the 2nd and 3rd quarters, were the result of smoke from numerous wildfires, mostly in 2018 and 2020. The 2020 exceedance not attributable to wildfire smoke in this period was on July 4, and initial analysis indicates firework emissions were a major contribution. A closer look at third quarter data from 2015 to 2020 shows that all 2020 days requested for exclusion, and some not requested but not needed for this regulatory determination, are above the 98th percentile (Figure 47). The three event periods are denoted by gray boxes with the requested event dates circled.

Figure 46: Yuba City PM2.5 daily averages by day of year for 2015-2020

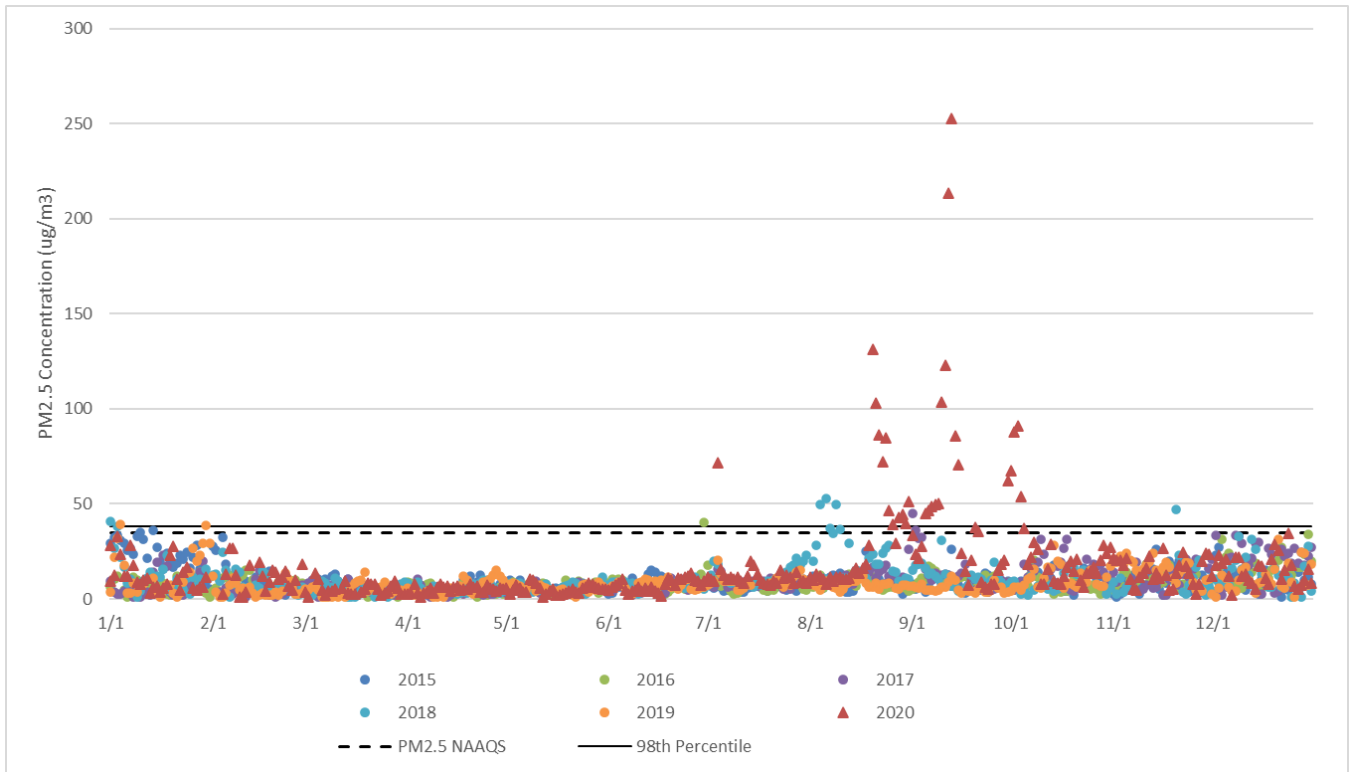
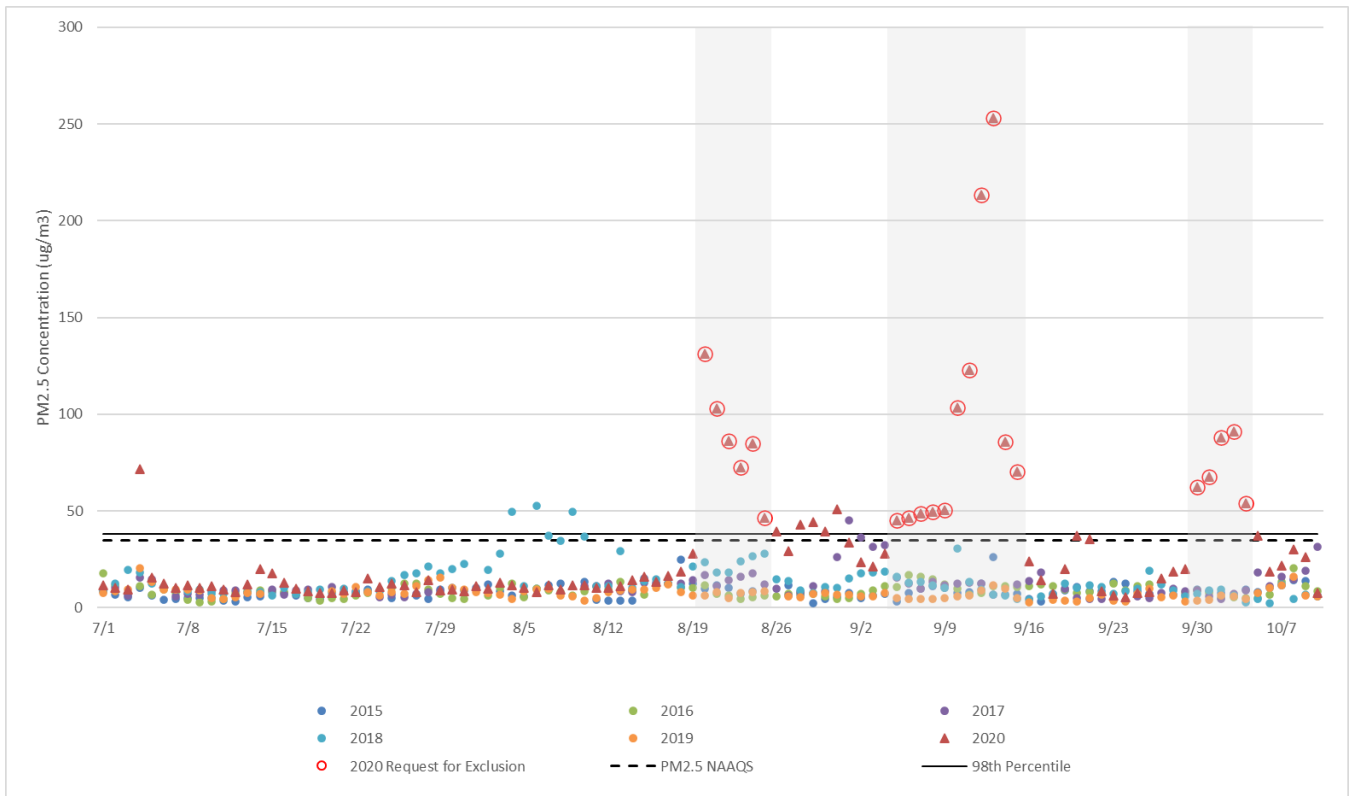


Figure 47: Yuba City PM2.5 daily averages from July 1 to October 10, 2015-2020



C. Diurnal Comparison

The following figures compare the daily diurnal pattern for the highest exceedance day in each event period with the hourly diurnal percentiles for PM_{2.5} for the third quarter (July to September) from the previous five years, 2015 to 2019. The remaining days are included in Appendix I. These figures show that during many of the days the pattern was unusual compared to the percentiles of a typical third quarter day with unusually timed peaks or spikes, with some days showing high concentrations throughout the day due to the ongoing presence of wildfire smoke. These diurnal figures support that the exceedance days were unusual compared to historical patterns and act as supporting evidence that wildfire emissions directly impacted PM_{2.5} concentrations at each site.

Figure 48: Percentiles for 3rd quarter PM_{2.5} for 2015-2019 compared with August 20, 2020

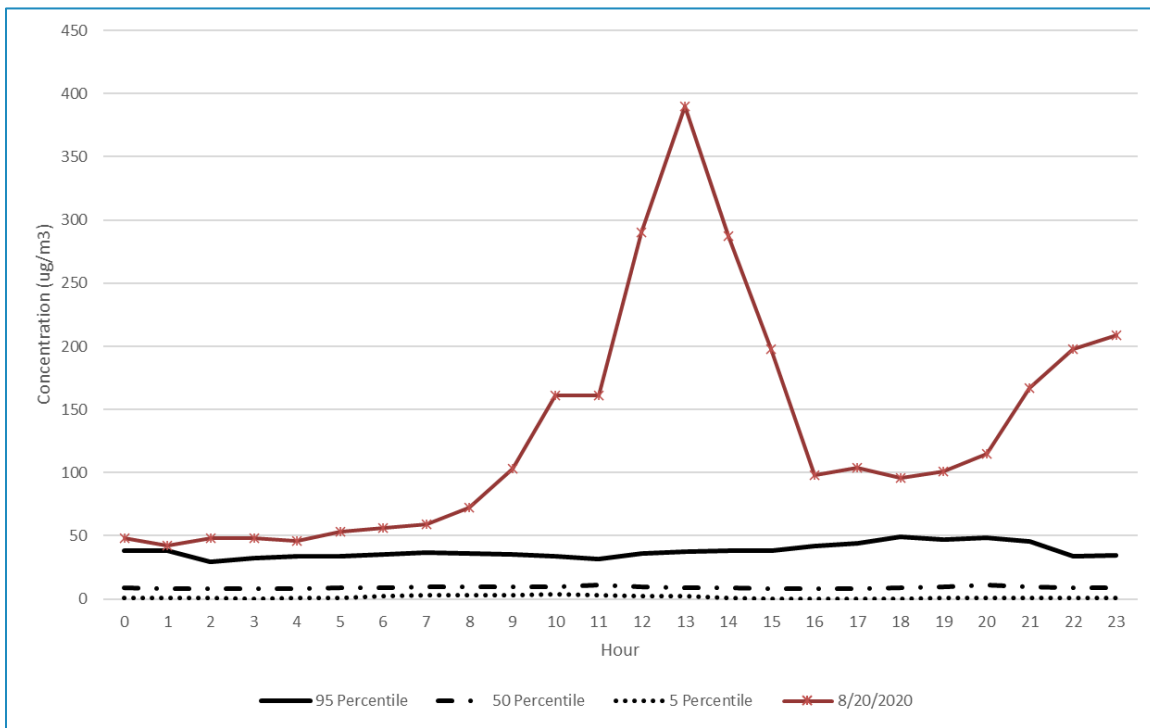


Figure 49: Percentiles for 3rd quarter PM2.5 for 2015-2019 compared with September 13, 2020

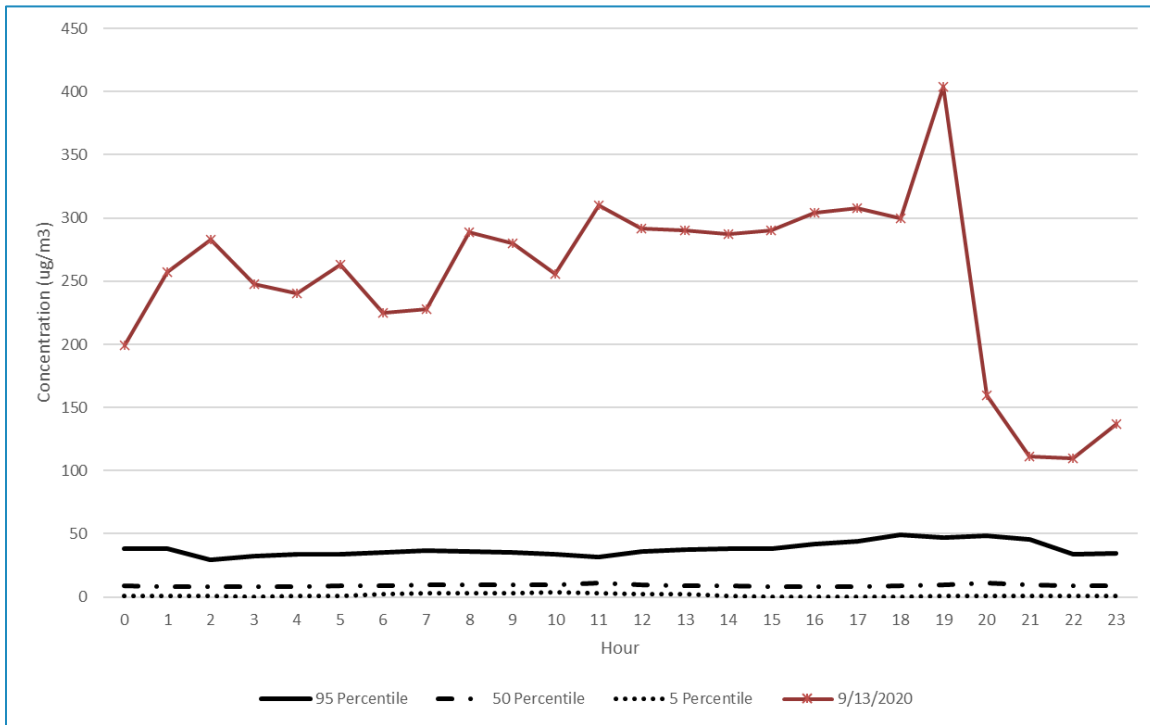
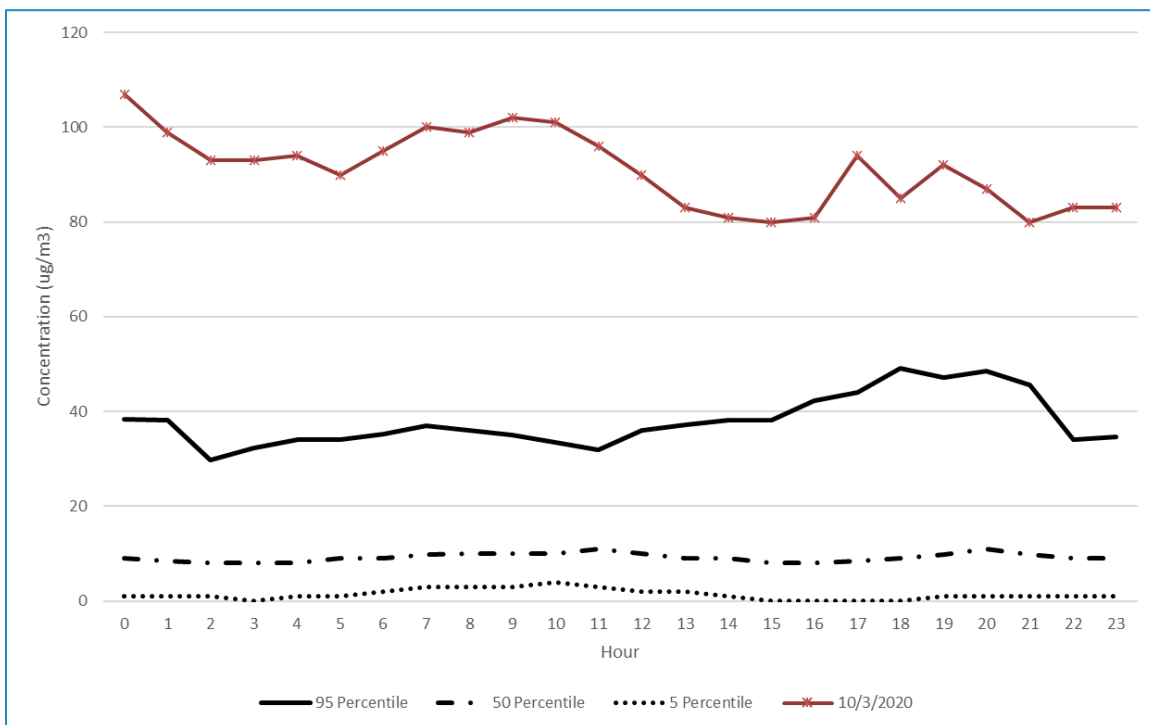


Figure 50: Percentiles for 3rd quarter PM2.5 for 2015-2019 compared with October 3, 2020



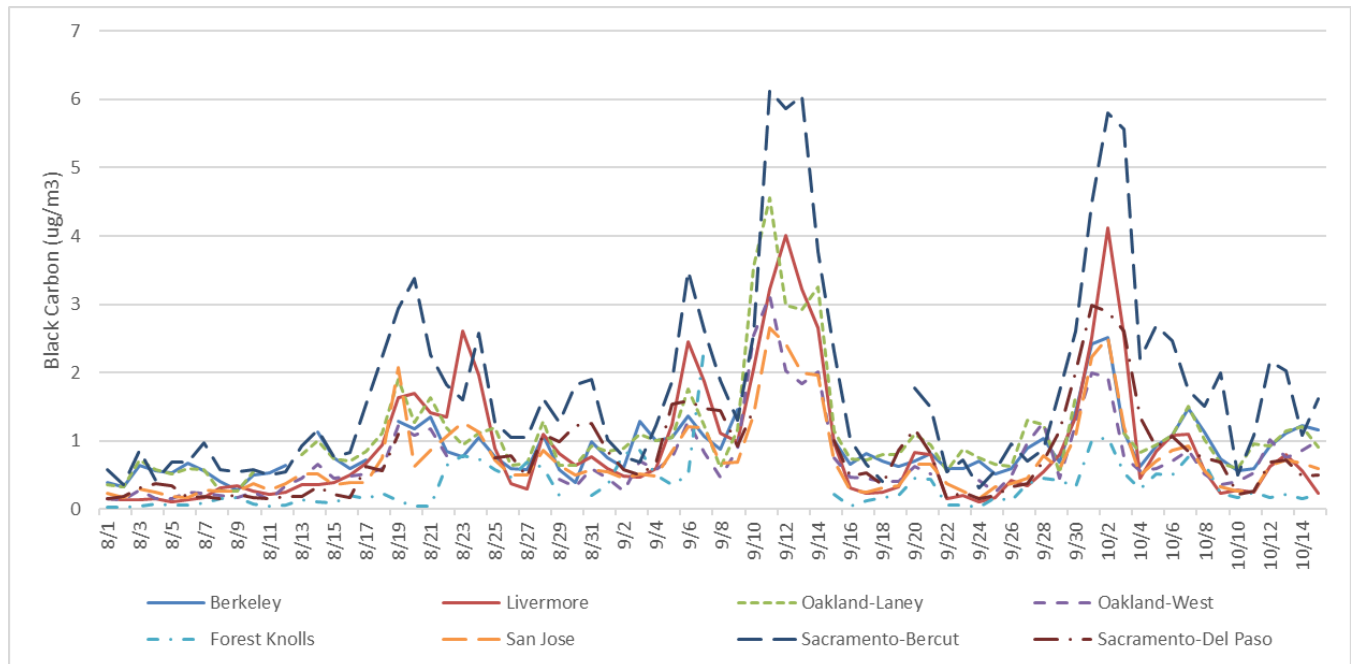
II. Biomass Burning Indicators

Levoglucosan, Mannosan, and Galactosan, organic compounds produced during biomass combustion, are commonly used as woodsmoke tracers. Sites with monitors that measure these compounds were placed at Portola in Plumas County in the MCAB and in Chico and Sacramento-T Street in the SVAB, to aid in the analysis of woodstove use. Unfortunately, these sites were established to track smoke from woodburning heating devices and do not consistently monitor during the summer months; in 2020, all speciated monitors were shut down and samples were not analyzed due to Covid-19 restrictions.

Fires that burn at relatively low temperatures and smolder in moist fuels are the most likely to produce black carbon and other toxic pollutants because they tend to burn less completely than hotter fires burning through dry fuels.

Wildfires are a major source of black carbon (BC) emissions in California, far surpassing vehicle emissions, wood stoves, industrial emissions, agricultural fires, and other sources of the pollutant.⁵⁵ BC is measured as a form of PM, with an increase in BC contributing to an increase in PM measurements. BC is monitored at several sites in northern California, with the closest two in Sacramento. All sites showed an increase in BC at the time of the three event periods (Figure 51), corresponding to previously presented increases in PM_{2.5}.

Figure 51: Daily average black carbon, August 1 to October 14



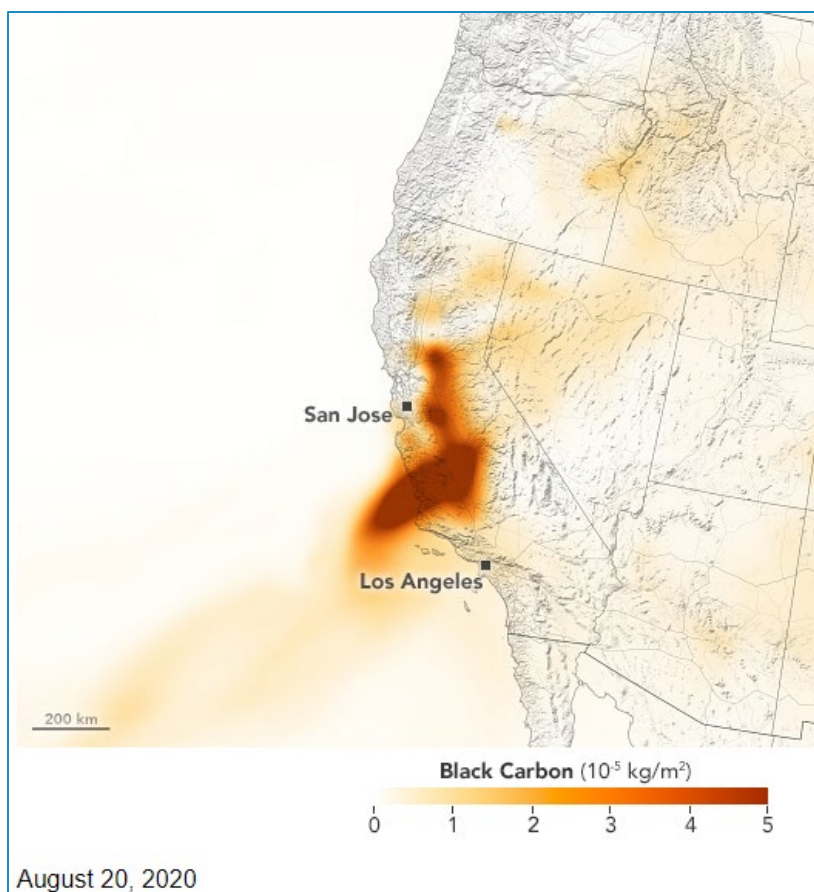
The figure below (Figure 52) shows plumes of black carbon associated with the CZU Lightning Complex, SCU Lightning Complex, LNU Lightning Complex, August Complex,

⁵⁵ Proposed Short-Lived Climate Pollutant Reduction Strategy (April 2016, page 49)
<https://ww2.arb.ca.gov/sites/default/files/2021-01/ProposedStrategy-April2016.pdf>

North Complex, Dolan, and other wildfires, early in the first event period on August 20. The map shows black carbon data from the GEOS-5 forward processing model, which assimilates information from several sources.⁵⁶ The map indicates a large amount of wildfire smoke in the Sacramento and San Joaquin Valleys where PM_{2.5} was also elevated during on this day and the days after. This supports the presence of wildfire smoke in large amounts spreading across the region, available to be transported and mixed to the surface, impacting monitors during the period.

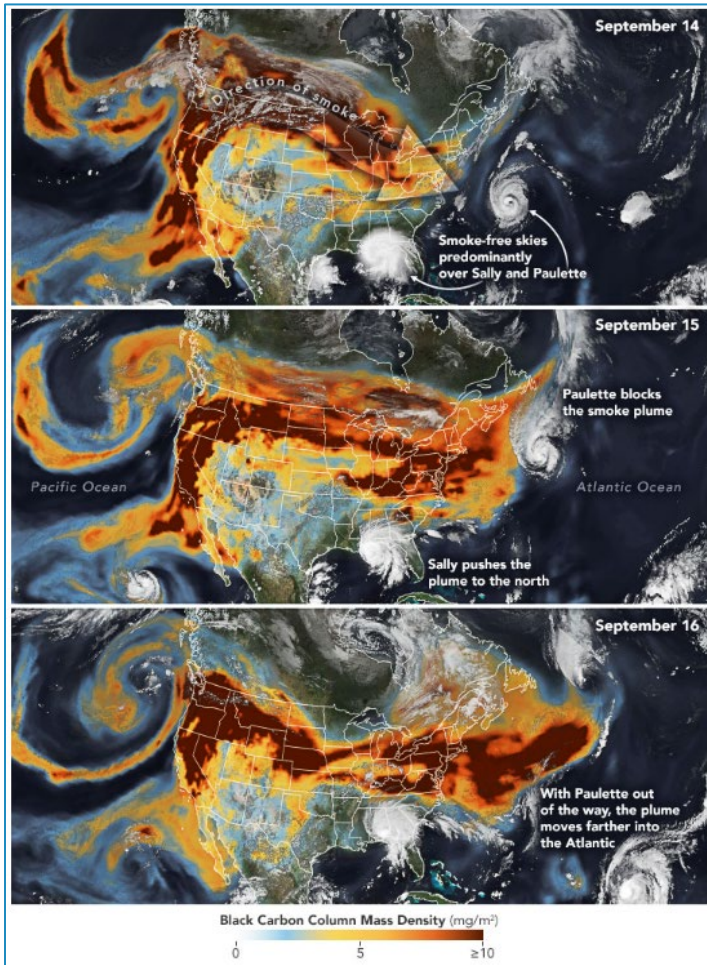
During the second event period, in early September, black carbon column mass density was tracked (Figure 53) as it eventually reached high in the atmosphere and was transported to the northeastern section of the U.S.

Figure 52: August 20, 2020, black carbon detected over California



⁵⁶ NASA, Earth Observatory, [Wildfire Smoke Shrouds the U.S. West, Plumes Tower Over California](#). (August 20, 2020) Retrieved September 27, 2021

Figure 53: September 14-16, 2020, black carbon mass density over California and the U.S. and Canada



III. Additional Supporting Ground-Level Evidence

A. Area Forecast Discussions

In the days prior to the first of the three wildfire smoke events noted in this document, Area Forecast Discussions issued by the National Weather Service (NWS) Sacramento Office (STO) were focused on high temperatures and the potential for thunderstorms. Although there were fires along the Oregon-California border, smoke impacts were primarily from the LNU, SCU, and CZU Lightning Complexes on the western side of the Central Valley, as well as the North Complex in the northern Sierras. The lightning-ignited wildfires in mid-August were discussed by the NWS Eureka Office (EKA) but smoke was not noted, with the exception of some lingering impacts from the Red-Salmon Complex in Humboldt County. The wildfires, and associated smoke, however, began to impact forecast discussions at STO early on August 19 with indications that the smoke would allow for cooler temperatures over portions of the forecast area. By that afternoon, the widespread smoke blanketing the central and

northern portions of the State were part of the discussions, again focused on temperatures and noting that the smoke would prevent temperatures from rising as previously expected.⁵⁷ A sampling of Area Forecast Discussions from the NWS Sacramento forecast office are included in Appendix II, with Figure 54 shown as an example. The impact of the smoke on air quality and visibility became more frequent.

Figure 54: NWS Area Forecast Discussion – August 20, 2020, 03:15 PDT

```
861
FXUS66 KSTO 201015
AFDSTO

Area Forecast Discussion
National Weather Service Sacramento CA
315 AM PDT Thu Aug 20 2020

.SYNOPSIS...
Hot and dry weather with areas of smoke persist for at least the
remainder of the week. Thunderstorm chances return to the Sierra
Nevada early next week.

&&

.DISCUSSION...
Numerous large wildfires depicted on IR satellite imagery across
NorCal. The strongest heat signatures currently for fires in the
CWA are occurring over western Stanislaus and western Glenn
Counties. Weather conditions remain warm and dry, though not as
extreme as early Wednesday. RH's along the western edge of the
Central Valley are in the teens and 20s (up around 10 percent
compared to 24 hours ago) and westerly wind gusts are considerably
lighter over most of that area. Coastal profiler data indicate the
marine layer remains shallow (under 1000 ft in depth), but that's
an improvement compared to yesterday and IR difference imagery
shows some areas of stratus along the coast.

High pressure retreats a bit today and Friday as a series of
short-waves pivot through the PacNW. This will bring minor
synoptic cooling to the region and maintain some onshore flow with
locally breezy conditions at times, especially in the afternoons
and evenings. RH's will remain low, but trend up slightly for most
areas.

Smoke from the numerous wildfires will continue to blanket the
region, so air quality will be a real problem through at least the
end of the week. The smoke will also continue to have significant
impact on temperatures, both highs and lows.
```

B. Smoke Indications

The smoke reaching the Yuba City monitor from late-August to early-October 2020, was primarily from wildfires in the western portion of the State, along with the North Complex fire in Plumas and Butte Counties. Smoke from these fires blanketed central and northern

⁵⁷ Iowa State University, Mesonet, [Area Forecast Discussions, AFDSTO 2020-08-19 20:57 UTC](#), last accessed 10/8/21

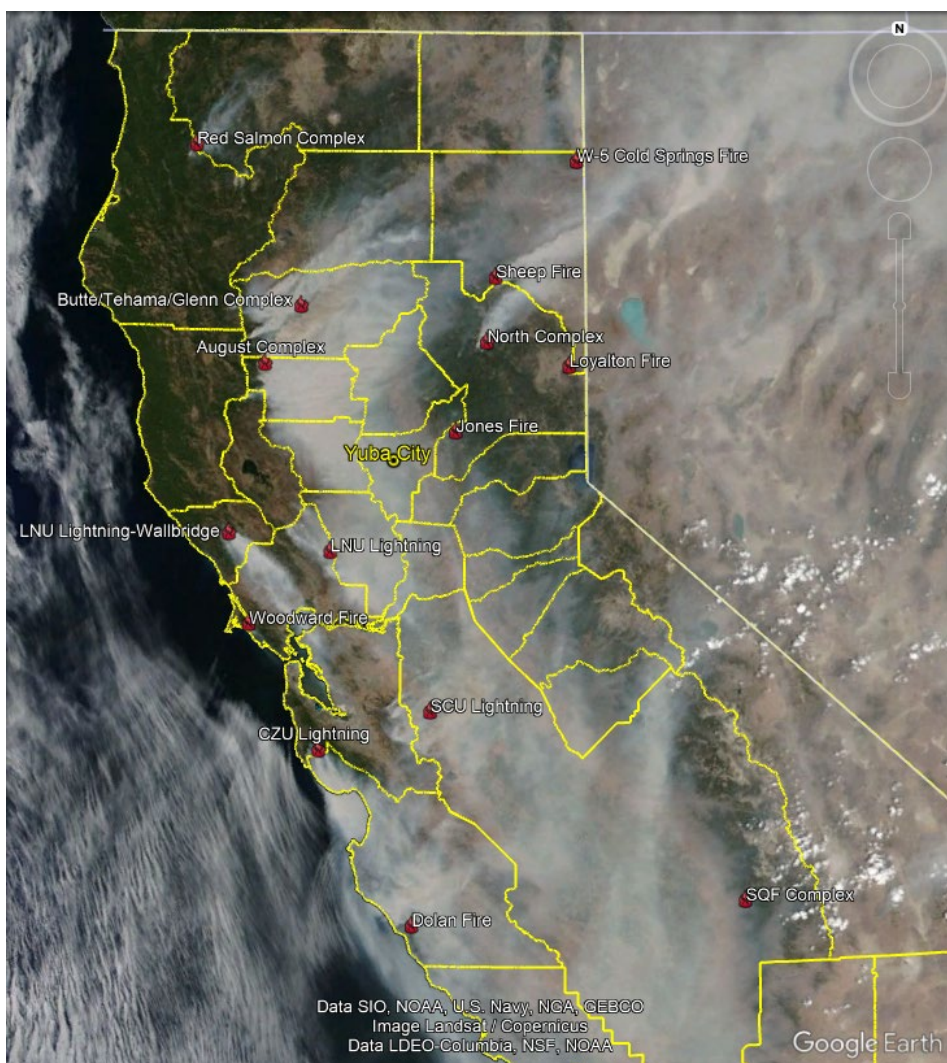
portions of California. Several tools are available to look at smoke in the areas that impacted the monitors.

d) Satellite Imagery

Google Earth was used as a platform to overlay locations of active wildfires with Suomi National Polar-orbiting Partnership (Suomi NPP) satellite⁵⁸ imagery (Figure 55). Additional imagery for each event day can be found in Appendix III. Note that an active wildfire does not necessarily denote visible smoke emissions.

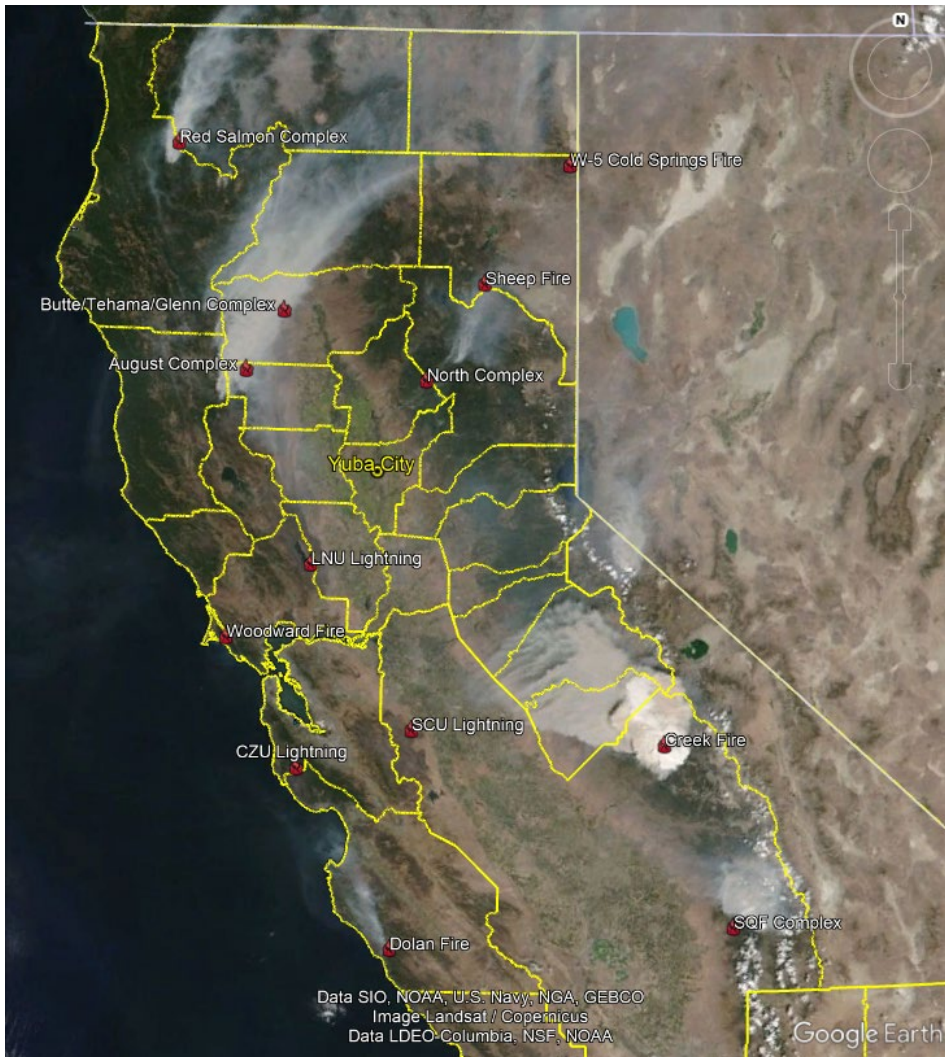
Figure 55: Satellite imagery for the first day of each event period

a) August 20, 2020



⁵⁸ NASA EOSDIS Worldview, <https://worldview.earthdata.nasa.gov/>, last accessed 9/19/22

b) September 5, 2020



c) September 30, 2020

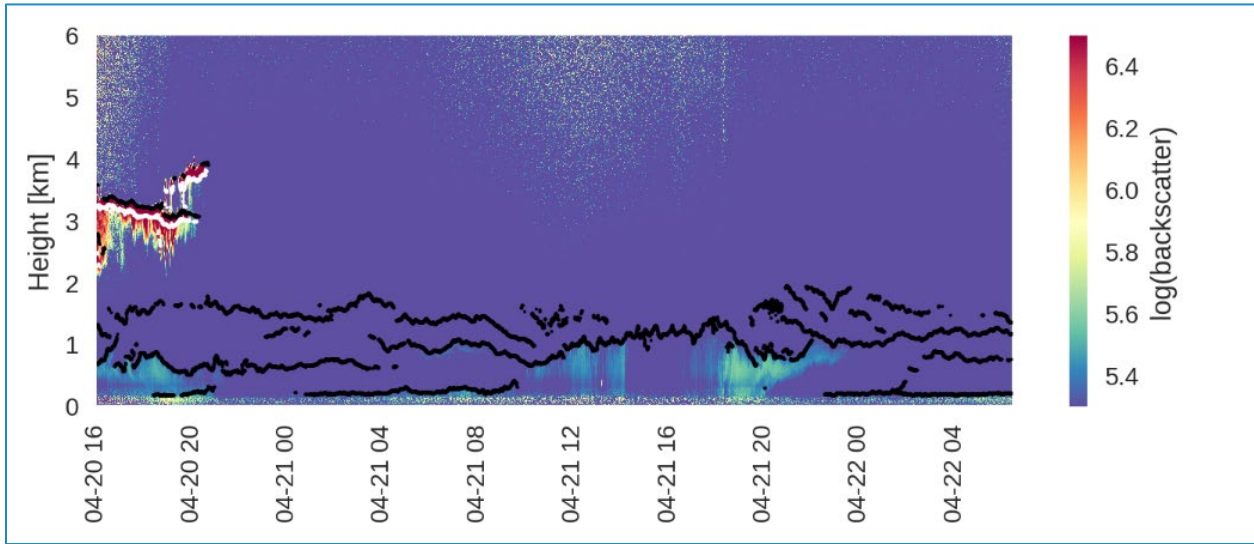


e) Ceilometer Data

A ceilometer is an automatic, active, remote-sensing instrument primarily for detecting the presence of clouds overhead and measuring the height of their bases.⁵⁹ LiDAR ceilometers are also able to detect aerosols such as wildfire smoke aloft, with the density of aerosols being relative to the measured backscatter values. The example in Figure 56 shows a ceilometer backscatter plot with clouds between 2-4km and otherwise clean air during the afternoon of April 20, 2020 to April 22, 2020.

⁵⁹ <https://glossary.ametsoc.org/wiki/Ceilometer>, accessed 10/19/21

Figure 56: Example of ceilometer data for April 20, 2020, from 4pm through April 22, 2020, 4am at Yuba City station.



During the first event of August 20 through 25 (Figure 57 and Appendix IV) the ceilometer data shows high density aerosol backscatter close to the ground and aloft within the atmosphere. Figure 57 indicates that there was well mixed wildfire smoke below 1km altitude (with some periods smoke reaching up to 3km altitude) on August 20, 2020, the day of maximum $PM_{2.5}$ concentration at the Yuba City monitor during this first event.

Figure 57: Ceilometer data for August 19, 2020, at 4pm through August 21, 2020, at 4am at Yuba City station.

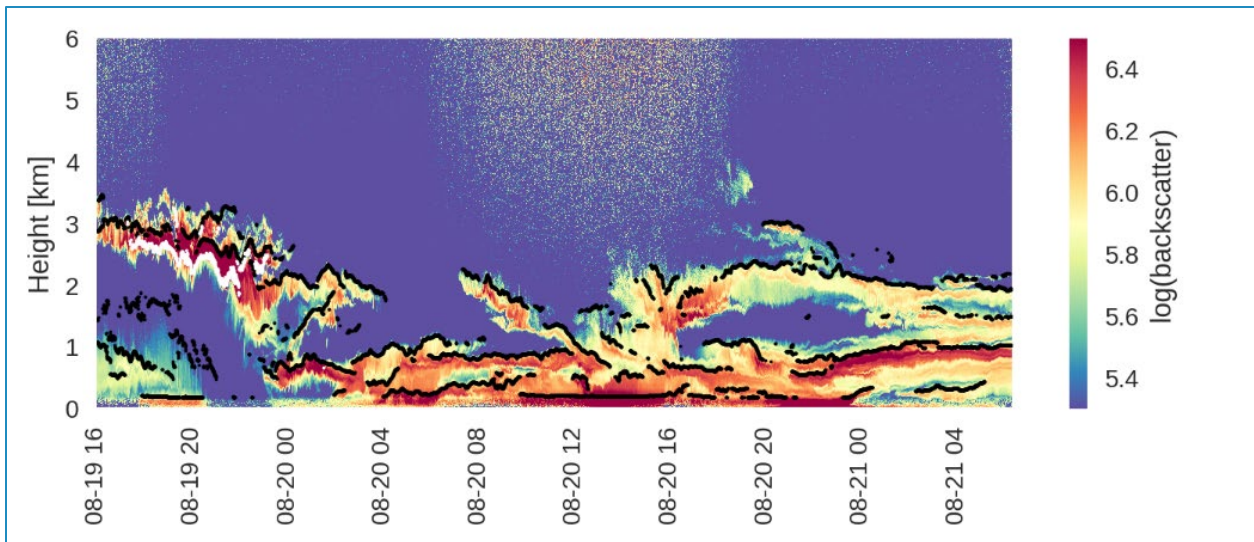
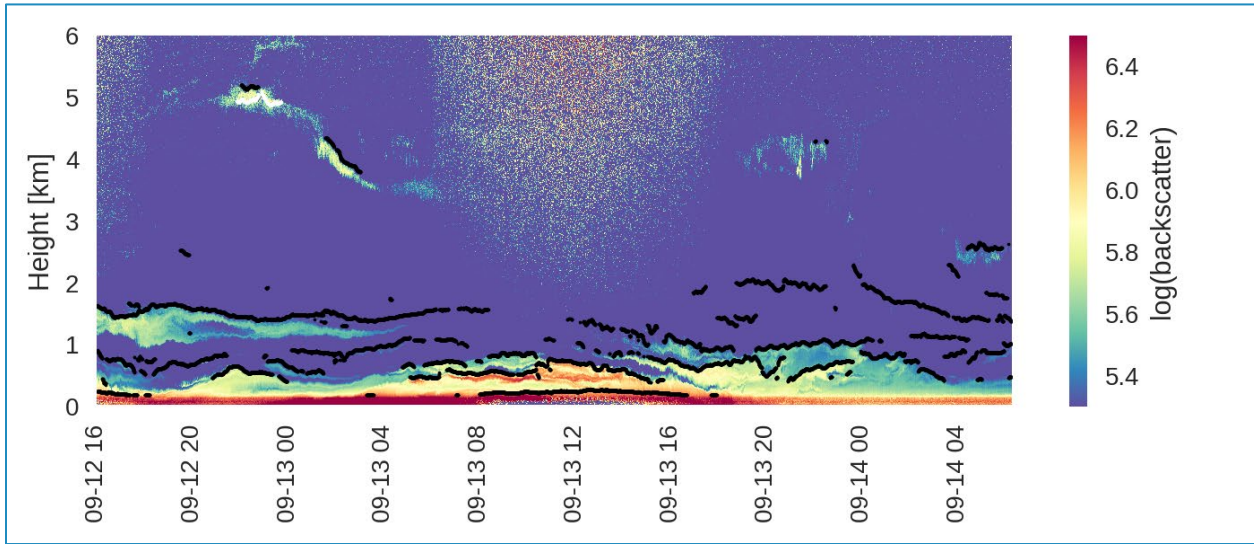


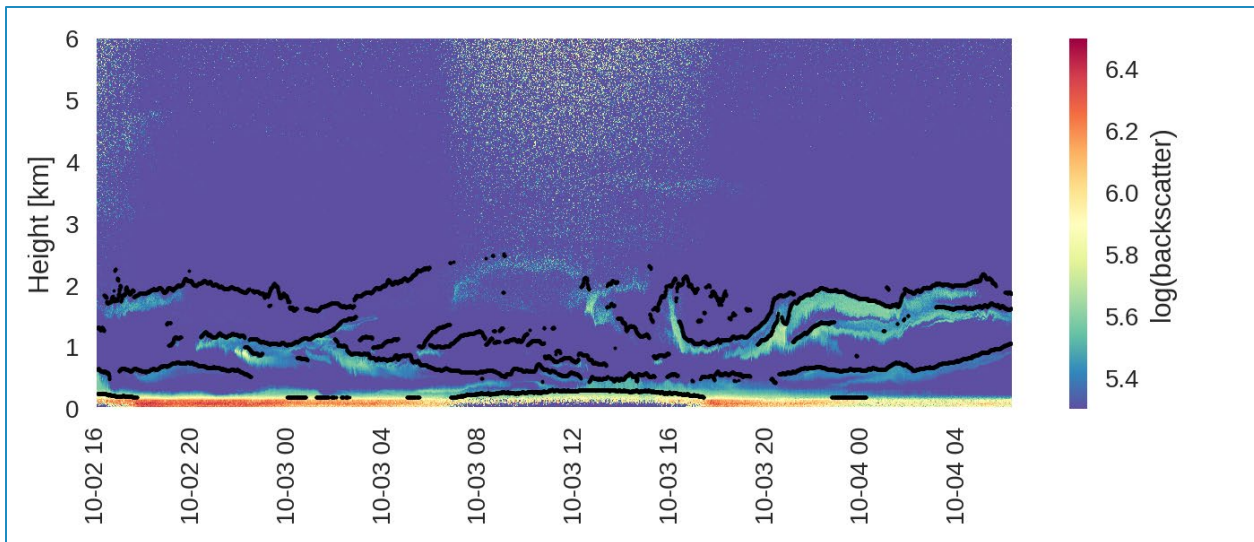
Figure 58, showing data from the second event period, and here September 12 through September 13, shows high density aerosol backscatter hugging the ground, with some mixing up to 1km. The density showed a decrease on the 14th and the 15th (Appendix IV) with that decrease reflected in the decreased concentrations seen at the monitor.

Figure 58: Ceilometer data for September 12, 2020, at 4pm through September 14, 2020, at 4am at Yuba City station.



The lower concentrations at the monitor for the third event, September 30 through October 4, 2020, were reflected in the ceilometer data for that period (Figure 59 and Appendix IV). Aerosol backscatter for October 2 through October 4, encompassing the highest concentration day of October 3, shows high densities very close to the surface, still impacting the Yuba City monitor, though with less mixing in the atmosphere above.

Figure 59: Ceilometer data for October 2, 2020, at 4pm through October 4, 2020, at 4am at Yuba City station.

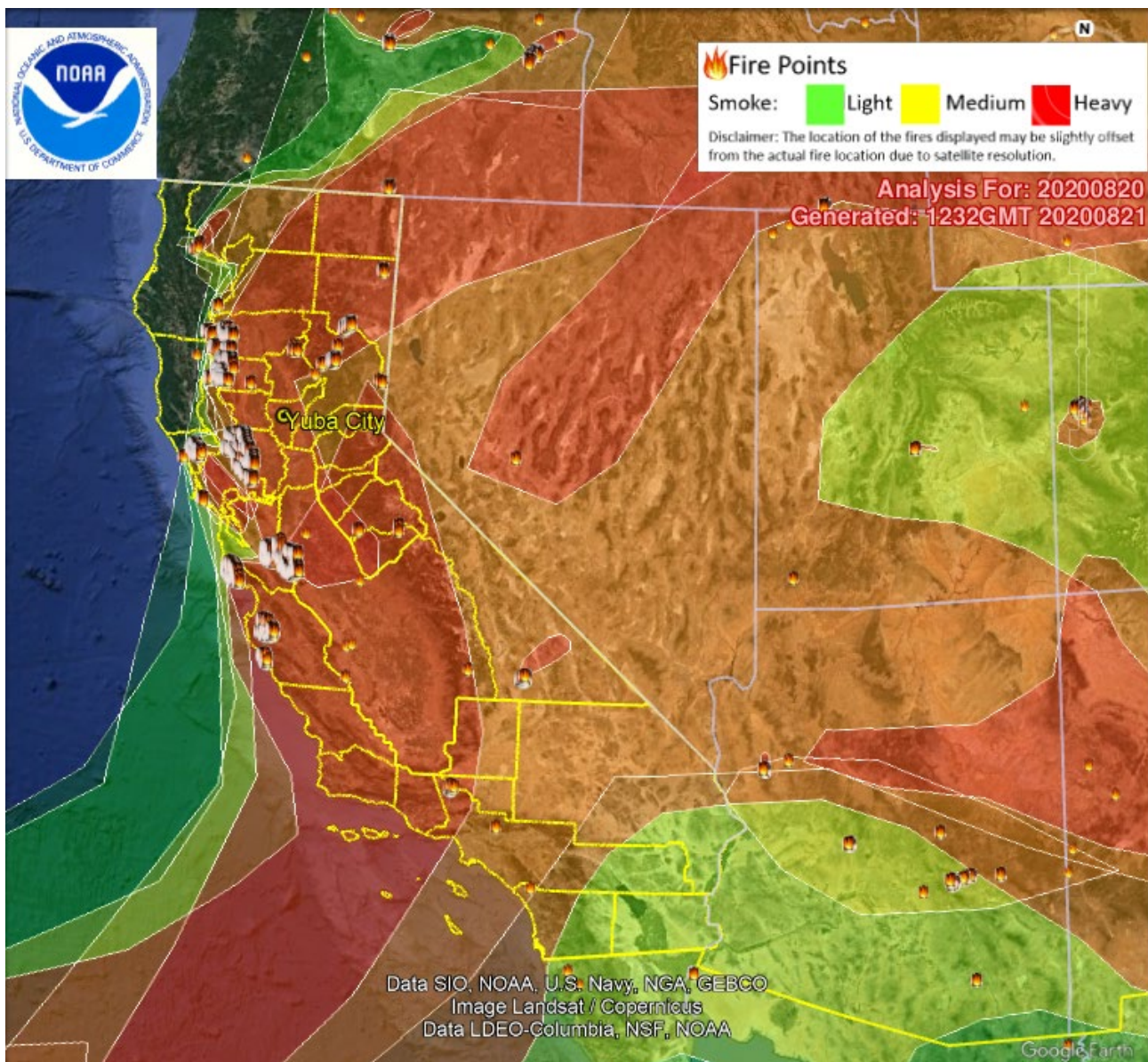


f) Hazard and Mapping System Smoke and Fire Layers

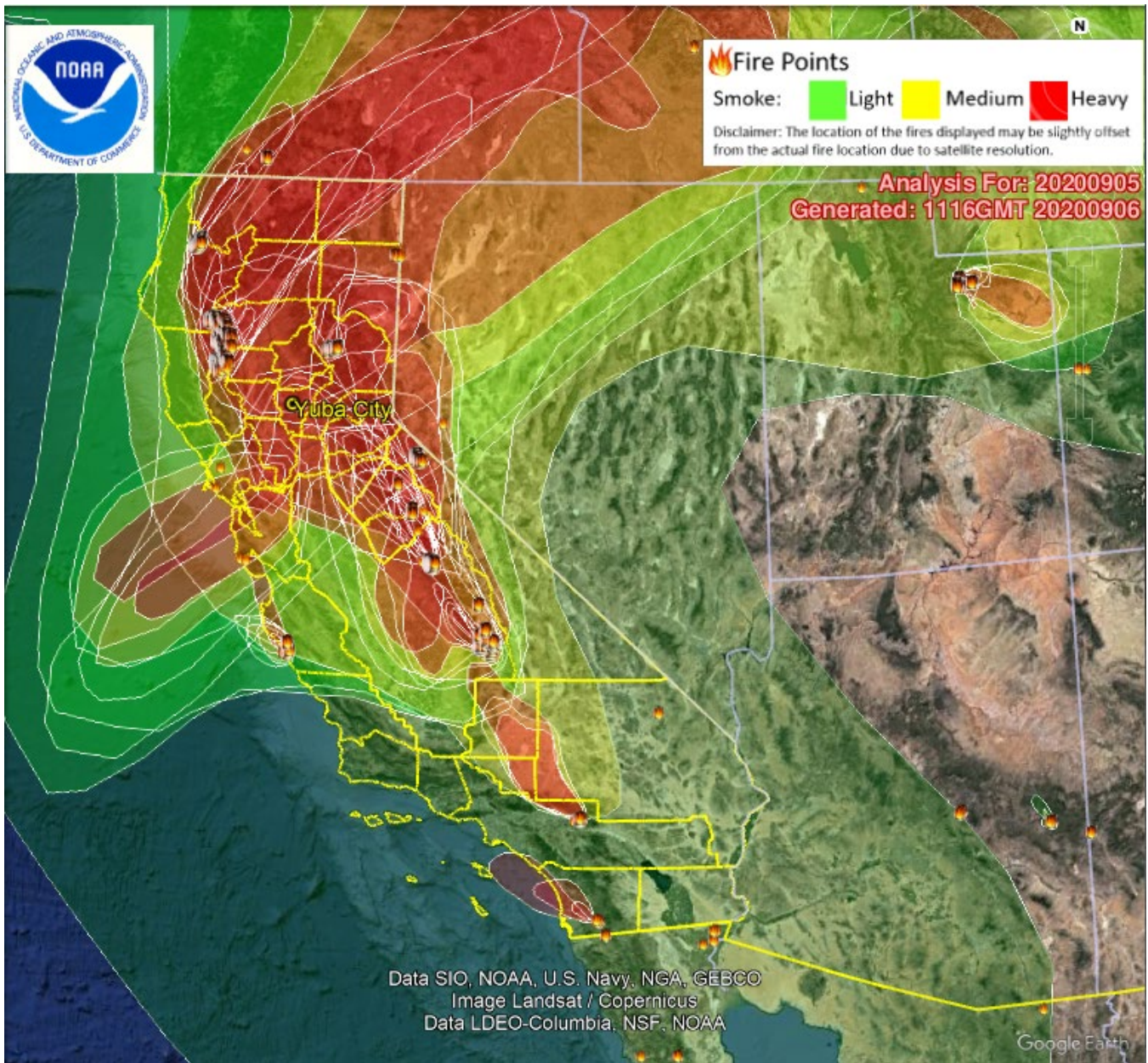
The NOAA Hazard and Mapping System (HMS) Fire and Smoke Product is an analysis of various satellite imagery to map out the scope and even to some extent thickness of smoke layers and indicate satellite-detected fire and heat spots. These products were extensively utilized in the Narrative Conceptual Model and Clear Causal Relationship sections of this document. The HMS smoke and fire layers for the days at the start of the three event periods are shown in Figure 60. HMS smoke and fire layers for other event days are included in Appendix IV.

Figure 60: HMS Smoke and Fire Layers for the first day of each event period

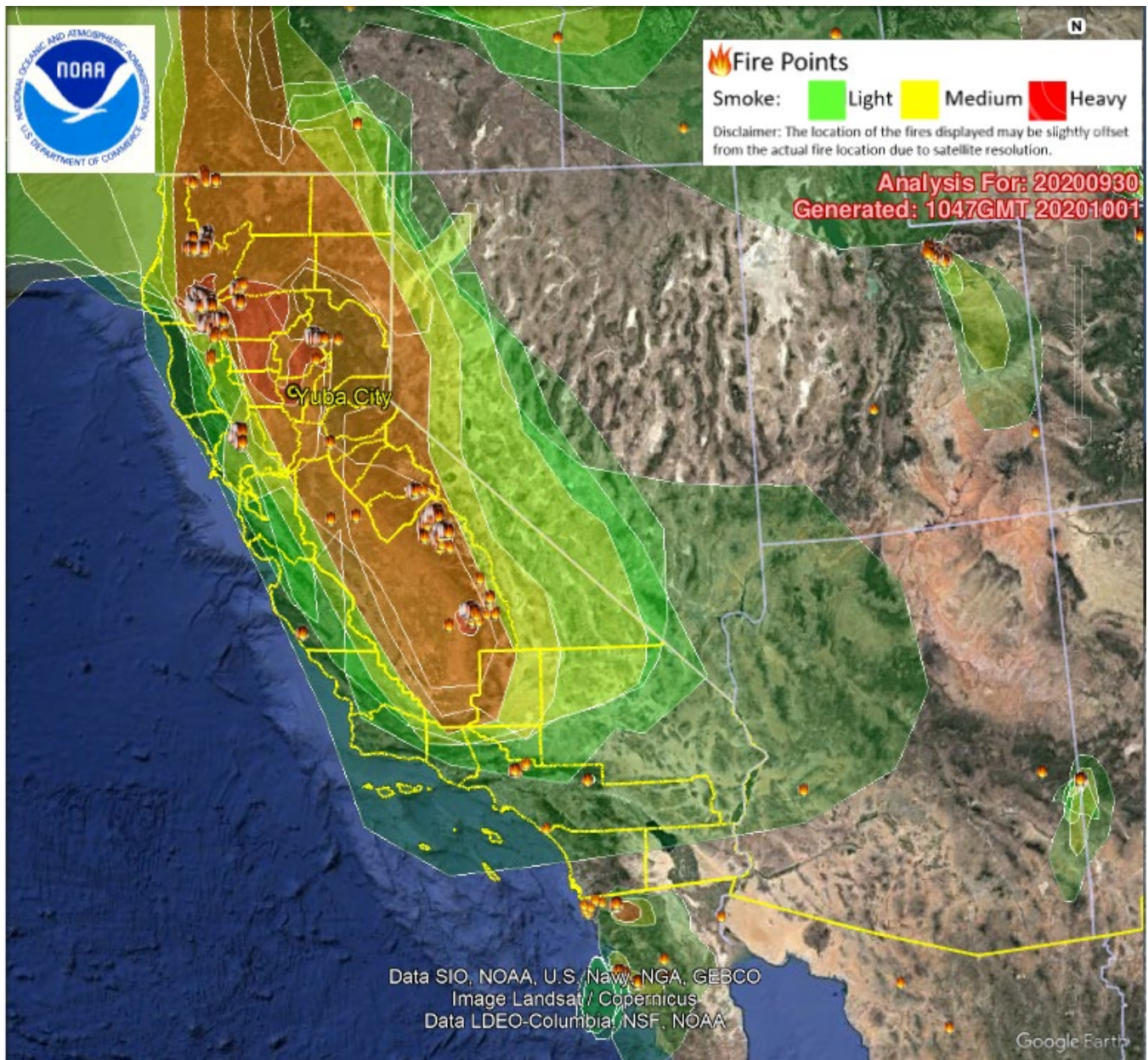
a) August 20, 2020



b) September 5, 2020



c) September 30, 2020



g) NOAA Smoke Text Product

NOAA Smoke Text Product⁶⁰ is a text-based analysis of satellite imagery. These products are used to give an overall view of smoke origins, current locations, and potential transport. Smoke Text Products are not available from May through August 2020, but those issued during the other event periods are in Appendix IV, with Figure 61 shown as an example.

⁶⁰ NOAA Hazard and Mapping System (HMS), *Fire and Smoke Text Product*, last accessed 7/29/21

Figure 61: NOAA Smoke Text Product – September 12, 2020 18UTC (10PST)

Saturday, September 12, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1746Z September 12, 2020

SMOKE:
Very Large Area from the Eastern Pacific, Western United States extending through the southwest and into the Southern Plains, northwest Gulf of Mexico and northeast towards the Upper Midwest...
The ongoing very large wildfires burning primarily in Washington, Oregon, and California were producing a very large area of moderate to high density smoke that was extending from as far east as portions of the Midwest US and then extending southwest through the Southern Plains and Southwest United States and then through the West Coast States from California north to Washington. The smoke then extended offshore into portions of the eastern and northeastern Pacific Ocean.

IV. Summary

Beginning in mid-August 2020, smoke from several large wildfires in northern and central California generated emissions that directly resulted in elevated PM_{2.5} concentrations at the Yuba City Monitor in the Feather River AQMD. Inspection of PM_{2.5} concentrations, satellite-derived smoke layers, and modeled trajectories indicate pathways for the transport of smoke from the wildfires in northern and central California.

All requested dates for exceptional events were in the 95th percentile or higher of the prior 5-year distribution of daily PM_{2.5} data. PM_{2.5} concentration data, area forecast discussions, satellite smoke products, black carbon, and ceilometer data all indicated periods of wildfire smoke aloft and at the surface during the requested event dates. Daily diurnal comparison graphs show many days with abnormal patterns and unusually timed peaks due to the impacts of wildfire emissions.

The comparisons and analyses provided in the Narrative Conceptual Model and Clear Causal Relationship sections of this demonstration support our conclusion that the numerous wildfire events affected air quality in such a way that there exists a clear causal relationship between the monitoring exceedances or violations as listed in Table 4 and thus satisfies the clear causal relationship criteria.

Natural Event/Human Activity Unlikely to Recur

The Background and Narrative Conceptual Model chapters of this document provide evidence that the event qualifies as a "Natural Event" as defined in 40 CFR 50.1(k). The fires that impacted the exceeding monitor at Yuba City occurred on wildlands that meet the definition in 40 CFR 50.1(n) and (o). When considering fire cause, "wildfires on wildland initiated by accident or arson are considered natural events, and on a case-by-case basis this treatment for wildfires may bear on the appropriate treatment of accidental and arson-set structural fires."⁶¹

U.S. EPA generally considers the PM emissions from wildfires on wildland to meet the regulatory definition of a natural event at 40 CFR 50.1(k), and accordingly, Feather River AQMD and CARB have shown that this event is a natural event and may be considered for treatment as an exceptional event.

⁶¹ 81 FR 68233, Footnote 35

Not Reasonably Controllable and/or Not Reasonably Preventable

The Background and Narrative Conceptual Model sections of this document provide evidence the wildfires impacting the PM_{2.5} monitor at Yuba City in the Feather River AQMD were natural events predominantly occurring on wildland. Feather River AQMD and CARB are not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually made would have been reasonable. Therefore, emissions from the wildfires were not reasonably controllable nor reasonably preventable.

Further, all open burning from agricultural and residential sources was prohibited during the dates requested for exclusion⁶².

⁶² California Air Resources Board, Agricultural and Prescribed Burn Monthly Decisions, <https://ww2.arb.ca.gov/ag-rx-burn-monthly-decisions>, last accessed 10/21/22.

Public Notification

As presented in the Narrative Conceptual Model chapter, the Feather River AQMD maintains a public alert system as well as publicly available information via their website to keep residents informed of potential wildfire smoke impacts. Examples of the information released to the public is included in Appendix V and VI.

Feather River AQMD will hold a 30-day public comment period to solicit public input regarding this demonstration. Notification of the public comment period will be posted on the Feather River AQMD website and emailed to interested stakeholders. Any comments received, and District responses, will be submitted to CARB and U.S. EPA at the end of the 30-day public comment period.

Summary/Conclusion

The wildfires in Table 9 below were discussed as part of the retroactive analyses as direct, significant contributors to the exceptional events being requested in this demonstration. These fires were all active producers of vast amounts of wildfire smoke and emissions and ultimately consumed over three million acres of wildlands in California.

Table 9: Total Acreage Consumed by Wildfire

| Fire Name | Acreage |
|--|-----------|
| August Complex | 1,032,648 |
| Butte/Tehama/Glenn (BTG) Lightning Complex | 19,609 |
| Creek Fire | 379,895 |
| CZU Lightning Complex | 86,509 |
| Glass Fire | 67,484 |
| Jones Fire | 705 |
| LNU Lightning Complex | 363,220 |
| Loyalton Fire | 47,029 |
| North Complex Fire | 318,935 |
| Red Salmon Complex | 144,698 |
| SCU Lightning Complex | 396,624 |
| Sheep Fire | 29,570 |
| Slater Fire | 157,229 |
| SQF Complex Fire | 174,178 |
| W-5 Cold Springs Fire | 84,817 |
| Willow Fire | 1,311 |
| Woodward Fire | 4,929 |
| Zogg Fire | 56,338 |

During the event periods of August 20 to August 25, September 5 to September 15, and September 30 to October 4, wildfires were particularly active, producing enormous amounts of wildfire smoke, blanketing vast portions of central and northern California and often settling into valleys and foothills when conditions allowed. Air quality monitors across the region showed elevated PM_{2.5} throughout the Sacramento Valley and Mountain Counties Air Basins, indicating smoke impacts at the surface. Biomass burning indicators such as black carbon further identified the wildfires as source of the emissions impacting surface sites. Ceilometer data detected wildfire smoke being transported aloft and at the surface. National Weather Service Area Forecast Discussions and Satellite Smoke products, as well as news and social media accounts, advised of widespread smoke across California impacting surface locations and regional weather.

This 2020 Feather River PM_{2.5} Exceptional Events Demonstration supports the criteria for an exceptional event as detailed in the 2016 Exceptional Events Rule.⁶³ This documentation used the following evidence to demonstrate the exceptional event:

- Ambient air monitoring data
- HYSPLIT forward and backward trajectory analyses
- Satellite imagery and narratives
- Statistical historical concentration comparisons
- Meteorological conditions
- Ceilometer data
- Air Quality District alerts and advisories
- NOAA and HMS smoke and fire products

This Exceptional Events Demonstration clearly demonstrates justification for exclusion of data as listed in Table 4 due to an exceptional event under 40 CFR 50.14(c)(3)(iv). The 2020 Feather River PM_{2.5} Exceptional Events Demonstration has provided evidence that:

- Describes the events causing the exceedance and a discussion of how emissions from the event led to the exceedance at each monitor;
- Demonstrates a clear causal relationship between the wildfire emissions and the PM exceedances at the Yuba City monitor for the requested dates;
- Shows that event-influenced concentrations were unusual and above normal historical concentrations;
- Demonstrates the event was neither reasonably controllable nor reasonably preventable; and
- Verifies the event was multiple wildfires, all natural events or human activity that is unlikely to recur at a particular location, all occurring predominantly on wildlands.

Table 10: Summary of Demonstration Criteria based on EER Requirements

| Demonstration Requirement | Reference | Page |
|--|---------------------------|----------------------------------|
| Narrative conceptual model | 40 CFR 5.014(c)(3)(iv)(A) | 12-34, Appendices I, II |
| Clear causal relationship | 40 CFR 50.14(c)(3)(iv)(B) | 54-71, Appendices III, IV, V, VI |
| Historical analysis | 40 CFR 50.14(c)(3)(iv)(C) | 9-11, 48-51, 55-58, Appendix I |
| Human Activity Unlikely to Recur or Natural Event | 40 CFR 50.14(c)(3)(iv)(E) | 9-34, 72, Appendix III |
| Not Reasonably Controllable and Not Reasonably Preventable | 40 CFR 50.14(c)(3)(iv)(D) | 12-34, 73 |

⁶³ 81 FR 68216

Table 11: Summary of Procedural Criteria Based on EER Requirements

| Procedural Requirement | Reference | Page/Section |
|---|------------------------|----------------------|
| Prompt Public Notification | 40 CFR 50.14(c)(1)(i) | 74, Appendices V, VI |
| Initial Notification of Potential Exceptional Event Process | 40 CFR 50.14(c)(2)(i) | Appendix I |
| Public opportunity to review and comment on demonstration | 40 CFR 50.14(c)(3)(v)] | 74 |

The Feather River AQMD recommends that CARB and U.S. EPA Region 9 concur with the 2020 Feather River PM_{2.5} Exceptional Events Demonstration and, pending the additional 2021 Feather River PM_{2.5} Exceptional Event Demonstration submission, exclude the requested data from comparison to the NAAQS.

References

Gong, X., A. Kaulfus, U. Nair, and D. A. Jaffe. 2017. Quantifying O₃ impacts in urban areas due to wildfires using a Generalized Additive Model. *Environ. Sci. Technol.* 51 (22):13216-13223. doi: 10.1021/acs.est.7b03130.

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Laing, J. R., and D. A. Jaffe. 2019. Wildfires are causing extreme PM concentrations in the western United States. *EM* July 2019.

Mass, C. F., and D. Ovens. 2019. The northern California wildfires of 8-9 October 2017: the role of a major downslope wind event. *Bull. Am. Meteor. Soc.* 100 (2):235-256. doi: 10.1175/bams-d-18-0037.1.

Larkin, N., Raffuse, S., Huang, S., Pavlovic, N., Rao, V., 2020. The comprehensive fire information reconciled emissions (CFIRE) inventory: Wildland fire emissions developed for the 2011 and 2014 US National Emissions Inventory. *J. Air Waste Manage.*

Larkin, N.K., O'Neill, S.M., Solomon, R., Raffuse, S., Strand, T., Sullivan, D.C., Krull, C., Rorig, M., Peterson, J., Ferguson, S.A., 2010. The BlueSky smoke modeling framework. *International Journal of Wildland Fire* 18, 906-920.

Appendices

I. Initial Notification and Air Quality Data

A. Initial Notification Information (INI) Form

INI form submitted to U.S. EPA Exceptional Event Tracking System (EETS) on April 25, 2022 (EETID 1779). U.S. EPA response received 6/27/22.⁶⁴

| <u>EE Initial Notification Summary Information</u> | | | | | | |
|--|--|----------|-------------|------------------|---------------------------------------|---|
| Submitting Agency: Feather River Air Quality Management District | | | | | | |
| Agency Contact: Sondra Spaethe, sspaethe@fraqmd.org | | | | | | |
| Date Submitted: April 22, 2022 | | | | | | |
| Applicable NAAQS: 2006 PM2.5 NAAQS | | | | | | |
| Affected Regulatory Decision ¹ : Attainment determination <i>(for classification decisions, specify level of the classification with/without EE concurrence)</i> | | | | | | |
| Area Name/Designation Status: Yuba City-Marysville, Maintenance Area | | | | | | |
| Design Value Period (list three year period): 2019, 2020, 2021 <i>(where there are multiple relevant design value periods, summarize separately)</i> | | | | | | |
| A) Information specific to each flagged site day that may be submitted to EPA in support of the affected regulatory decision listed above | | | | | | |
| Date of Event | Type of Event (high wind, volcano, wildfires/prescribed fire, other ²) | AQS Flag | Site AQS ID | Site Name | Exceedance Concentration (with units) | Notes (e.g. event name, links to other events) |
| 7/4/2020 | Wildfire | RH | 061010003 | Yuba City-Almond | 71.8 ug/m3 | Fireworks |
| 8/20/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 131.3 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/21/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 103.3 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/22/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 86.3 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/23/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 72.4 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/24/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 84.8 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/25/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 46.5 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/26/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 39.5 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/28/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 42.8 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/29/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 44.3 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/30/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 39.6 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 8/31/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 51.1 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 9/5/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 45.2 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 9/6/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 46.8 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 9/7/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 48.5 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |

⁶⁴ Email from G.Yoshimura, U.S. EPA, to S.Vanderspek, CARB. June 27, 2022.

| | | | | | | |
|-----------|----------|----|-----------|------------------|-------------|--|
| 9/8/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 49.7 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 9/9/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 50.5 ug/m3 | Wildfire smoke from August Complex, LNU, and other regional wildfires |
| 9/10/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 103.6 ug/m3 | Wildfire smoke from the North Complex, August Complex, and other regional wildfires. |
| 9/11/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 122.8 ug/m3 | Wildfire smoke from the North Complex, August Complex, and other regional wildfires. |
| 9/12/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 213.5 ug/m3 | Wildfire smoke from the North Complex, August Complex, and other regional wildfires. |
| 9/13/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 253 ug/m3 | North Complex, August Complex, and other regional wildfires |
| 9/14/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 86 ug/m3 | Wildfire smoke from the North Complex, August Complex, and other regional wildfires. |
| 9/15/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 70.4 ug/m3 | Wildfire smoke from the North Complex, August Complex, and other regional wildfires. |
| 9/20/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 37.4 ug/m3 | Wildfire smoke from the North Complex, August Complex, and other regional wildfires. |
| 9/30/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 62.3 ug/m3 | Wildfire smoke from the August Complex, Zogg Fire, and North Complex. |
| 10/1/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 67.8 ug/m3 | Wildfire smoke from the August Complex, Zogg Fire, and North Complex. |
| 10/2/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 87.9 ug/m3 | Wildfire smoke from the August Complex, Zogg Fire, and North Complex. |
| 10/3/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 91.2 ug/m3 | Wildfire smoke from the August Complex, Zogg Fire, and North Complex. |
| 10/4/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 53.8 ug/m3 | Wildfire smoke from the August Complex, Zogg Fire, and North Complex. |
| 10/5/2020 | Wildfire | RT | 061010003 | Yuba City-Almond | 37.2 ug/m3 | Wildfire smoke from the August Complex, Zogg Fire, and North Complex. |
| 7/28/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 47.5 ug/m3 | Dixie, Monument, McFarland, and other regional fires |
| 8/6/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 45.1 ug/m3 | Dixie, McFarland, and other regional fires |
| 8/7/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 89.9 ug/m3 | Dixie, McFarland, and other regional fires |
| 8/18/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 54.6 ug/m3 | Dixie, McFarland, and other regional fires |
| 8/19/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 57.6 ug/m3 | Dixie, McFarland, and other regional fires |
| 8/20/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 40.5 ug/m3 | Fawn Fire, Shasta County |
| 8/27/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 49.1 ug/m3 | Dixie Fire in Plumas/Butte Counties |
| 8/28/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 82.5 ug/m3 | Dixie, McFarland, and other regional fires |
| 8/29/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 70.8 ug/m3 | Dixie, McFarland, and other regional fires |
| 9/24/2021 | Wildfire | RT | 061010003 | Yuba City-Almond | 40 ug/m3 | Dixie, Monument, McFarland, and other regional fires |

B) Violating Sites Information

(listing of all violating sites in the planning area, regardless of operating agency, and regardless of whether or not they are impacted by EEs)

| Site/monitor (AQS ID and POC) | Design Value (without EPA concurrence on any of the events listed in table A above) | Design Value (with EPA concurrence on all events listed in table A above) |
|---------------------------------|---|---|
| Yuba City – Almond/061010003, 3 | 54 ug/m3 | 28 ug/m3 |

¹ designation, classification, attainment determination, attainment date extension, or finding of SIP inadequacy leading to SIP call

² Provide additional information for types of event described as "other"

C) Summary of Maximum Design Value (DV) Site Information (Effect of EPA Concurrence on Maximum Design Value Site Determination)

(Two highest values from Table B)

| Maximum DV site (AQS ID) <u>without</u> EPA concurrence on any of the events listed in table A above | Design Value | Design Value Site | Comment |
|--|--------------|--------------------|---------|
| Maximum DV site (AQS ID) <u>with</u> EPA concurrence on all events listed in table A above | 54 ug/m3 | Yuba City - Almond | |
| | 28 ug/m3 | Yuba City - Almond | |

D) List of any sites (AQS ID) within planning area with invalid design values (e.g., due to data incompleteness)

N/A

B. Yuba City AQS AMP350 Raw Data Report

PM_{2.5} Data is currently flagged with the REQEXC Code "rt-Wildfire-U.S."

| (88101) PM2.5 - Local Conditions | | | | | | | | | | | | | | | | | | | | | | | | | CAS NUMBER: | |
|--|---------|---------|---------|--------|--------|--------|--------|---------|---------|--------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------------------------------|---------|---------|---------|---------|-------------|--------|
| SITE ID: 06-101-0003 POC: 3 | | | | | | | | | | STATE: (06) California | | | | | | | | | | LATITUDE: 39.1387725442 | | | | | | |
| COUNTY: (101) Sutter | | | | | | | | | | AQCR: (028) SACRAMENTO VALLEY | | | | | | | | | | LONGITUDE: -121.61854899 | | | | | | |
| CITY: (86972) Yuba City | | | | | | | | | | URBANIZED AREA: (9340) YUBA CITY, CA | | | | | | | | | | UTM ZONE: | | | | | | |
| SITE ADDRESS: 773 ALMOND ST, YUBA CITY | | | | | | | | | | LAND USE: COMMERCIAL | | | | | | | | | | UTM NORTHING: | | | | | | |
| SITE COMMENTS: RELOCATED ABOUT 1 MILE NW OF THE YUBA CITY-AG BUILDING SITE. ARB SITE NAME (#) IS | | | | | | | | | | LOCATION SETTING: SUBURBAN | | | | | | | | | | UTM EASTING: | | | | | | |
| MONITOR COMMENTS: | | | | | | | | | | | | | | | | | | | | ELEVATION-MSL: 20 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | PROBE HEIGHT: | | | | | | |
| SUPPORT AGENCY: (0145) California Air Resources Board | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MONITOR TYPE: SLAMS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS | | | | | | | | | | REPORT FOR: AUGUST 2020 | | | | | | | | | | DURATION: 1 HOUR | | | | | | |
| PQAO: (0145) California Air Resources Board | | | | | | | | | | | | | | | | | | | | UNITS: Micrograms/cubic meter (LC) | | | | | | |
| MIN DETECTABLE: 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HOUR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DAY | 0000 | 0100 | 0200 | 0300 | 0400 | 0500 | 0600 | 0700 | 0800 | 0900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | OBS | MEAN |
| 1 | 9.0 | 7.0 | 7.0 | 8.0 | 5.0 | 7.0 | 7.0 | 8.0 | 11.0 | 10.0 | 12.0 | 38.0 | 12.0 | 13.0 | 16.0 | 19.0 | 12.0 | 12.0 | 10.0 | 14.0 | 10.0 | 10.0 | 8.0 | 10.0 | 24 | 11.46 |
| 2 | 15.0 | 9.0 | 7.0 | 7.0 | 6.0 | 4.0 | 5.0 | 10.0 | 7.0 | 8.0 | 10.0 | 11.0 | 12.0 | 15.0 | 14.0 | 11.0 | 12.0 | 11.0 | 11.0 | 13.0 | 10.0 | 13.0 | 11.0 | 10.0 | 24 | 10.08 |
| 3 | 7.0 | 7.0 | 6.0 | 5.0 | 6.0 | 6.0 | 11.0 | 13.0 | 16.0 | 16.0 | 19.0 | 23.0 | 25.0 | 18.0 | 19.0 | 17.0 | 22.0 | 15.0 | 13.0 | 15.0 | 11.0 | 8.0 | 6.0 | 8.0 | 24 | 12.96 |
| 4 | 11.0 | 7.0 | 5.0 | 2.0 | 3.0 | 5.0 | 8.0 | 12.0 | 15.0 | 16.0 | 17.0 | 15.0 | 16.0 | 20.0 | 19.0 | 13.0 | 16.0 | 17.0 | 14.0 | 11.0 | 11.0 | 9.0 | 12.0 | 10.0 | 24 | 11.83 |
| 5 | 9.0 | 7.0 | 7.0 | 4.0 | 4.0 | 6.0 | 6.0 | 11.0 | 11.0 | 13.0 | 18.0 | 14.0 | 20.0 | 20.0 | 16.0 | 13.0 | 12.0 | 14.0 | 13.0 | 8.0 | 6.0 | 7.0 | 5.0 | 4.0 | 24 | 10.33 |
| 6 | 6.0 | 4.0 | 6.0 | 5.0 | 5.0 | 5.0 | 4.0 | 7.0 | 7.0 | 14.0 | 11.0 | 10.0 | 12.0 | 13.0 | 11.0 | 8.0 | 6.0 | 12.0 | 9.0 | 8.0 | 8.0 | 7.0 | 8.0 | 6.0 | 24 | 8.00 |
| 7 | 49.0 | 12.0 | 7.0 | 5.0 | 4.0 | 4.0 | 16.0 | 12.0 | 15.0 | 18.0 | 5.0 | 11.0 | 9.0 | 10.0 | 9.0 | 8.0 | 11.0 | 15.0 | 10.0 | 9.0 | 7.0 | 10.0 | 13.0 | 9.0 | 24 | 11.58 |
| 8 | 10.0 | 11.0 | 8.0 | 8.0 | 9.0 | 9.0 | 10.0 | 9.0 | 13.0 | 14.0 | 12.0 | 8.0 | 11.0 | 8.0 | 7.0 | 7.0 | 9.0 | 6.0 | 10.0 | 11.0 | 13.0 | 9.0 | 8.0 | 6.0 | 24 | 9.42 |
| 9 | 17.0 | 11.0 | 9.0 | 11.0 | 11.0 | 9.0 | 14.0 | 12.0 | 13.0 | 10.0 | 16.0 | 13.0 | 15.0 | 12.0 | 10.0 | 9.0 | 8.0 | 9.0 | 12.0 | 10.0 | 8.0 | 17.0 | 10.0 | 24 | 11.54 | |
| 10 | 6.0 | 29.0 | 10.0 | 7.0 | 11.0 | 9.0 | 13.0 | 10.0 | 16.0 | 10.0 | 15.0 | 17.0 | 11.0 | 12.0 | 12.0 | 13.0 | 14.0 | 11.0 | 9.0 | 5.0 | 13.0 | 10.0 | 7.0 | 11.0 | 24 | 11.71 |
| 11 | 6.0 | 8.0 | 7.0 | 6.0 | 5.0 | 5.0 | 8.0 | 10.0 | 7.0 | 10.0 | 12.0 | 15.0 | 12.0 | 14.0 | 11.0 | 13.0 | 9.0 | 14.0 | 18.0 | 20.0 | 8.0 | 7.0 | 12.0 | 8.0 | 24 | 10.21 |
| 12 | 9.0 | 7.0 | 6.0 | 5.0 | 7.0 | 7.0 | 7.0 | 9.0 | 15.0 | 9.0 | AK | 25.0 | 24.0 | 12.0 | 11.0 | 7.0 | 8.0 | 8.0 | 9.0 | 8.0 | 10.0 | 11.0 | 8.0 | 15.0 | 23 | 10.30 |
| 13 | 6.0 | 5.0 | 9.0 | 6.0 | 6.0 | 9.0 | 18.0 | 28.0 | 10.0 | 12.0 | 10.0 | 10.0 | 8.0 | 8.0 | 6.0 | 23.0 | 10.0 | 8.0 | 8.0 | 6.0 | 22.0 | 16.0 | 16.0 | 8.0 | 24 | 11.17 |
| 14 | 17.0 | 25.0 | 15.0 | 12.0 | 15.0 | 10.0 | 17.0 | 14.0 | 16.0 | 12.0 | 13.0 | 11.0 | 10.0 | 11.0 | 12.0 | 13.0 | 8.0 | 7.0 | 10.0 | 14.0 | 23.0 | 18.0 | 20.0 | 16.0 | 24 | 14.13 |
| 15 | 17.0 | 11.0 | 6.0 | 12.0 | 8.0 | 28.0 | 50.0 | 30.0 | 15.0 | 12.0 | 30.0 | 18.0 | 11.0 | 21.0 | 14.0 | 16.0 | 6.0 | 7.0 | 8.0 | 13.0 | 12.0 | 8.0 | 21.0 | 12.0 | 24 | 16.08 |
| 16 | 14.0 | 29.0 | 6.0 | 21.0 | 8.0 | 13.0 | 12.0 | 12.0 | 8.0 | 10.0 | 29.0 | 19.0 | 22.0 | 6.0 | 10.0 | 15.0 | 19.0 | 8.0 | 15.0 | 12.0 | 9.0 | 13.0 | 8.0 | 9.0 | 24 | 13.63 |
| 17 | 14.0 | 7.0 | 12.0 | 6.0 | 6.0 | 14.0 | 12.0 | 14.0 | 15.0 | 9.0 | 22.0 | 14.0 | 20.0 | 31.0 | 28.0 | 17.0 | 15.0 | 23.0 | 30.0 | 31.0 | 17.0 | 7.0 | 16.0 | 12.0 | 24 | 16.33 |
| 18 | 21.0 | 16.0 | 19.0 | 9.0 | 14.0 | 13.0 | 16.0 | 13.0 | 12.0 | 29.0 | 16.0 | 15.0 | 19.0 | 26.0 | 25.0 | 23.0 | 20.0 | 15.0 | 17.0 | 21.0 | 26.0 | 25.0 | 16.0 | 20.0 | 24 | 18.58 |
| 19 | 17.0IT | 23.0IT | 27.0IT | 14.0IT | 10.0IT | 11.0IT | 16.0IT | 20.0IT | 27.0IT | 30.0IT | 31.0IT | 32.0IT | 48.0IT | 42.0IT | 26.0IT | 18.0IT | 17.0IT | 22.0IT | 48.0IT | 49.0IT | 50.0IT | 34.0IT | 25.0IT | 39.0IT | 24 | 28.17 |
| 20 | 48.0rt | 42.0rt | 48.0rt | 48.0rt | 46.0rt | 53.0rt | 56.0rt | 59.0rt | 72.0rt | 103.0rt | 161.0rt | 161.0rt | 290.0rt | 390.0rt | 287.0rt | 198.0rt | 98.0rt | 104.0rt | 96.0rt | 101.0rt | 115.0rt | 167.0rt | 198.0rt | 209.0rt | 24 | 131.25 |
| 21 | 182.0rt | 151.0rt | 125.0rt | 86.0rt | 73.0rt | 70.0rt | 88.0rt | 47.0rt | 40.0rt | 63.0rt | 92.0rt | 103.0rt | 99.0rt | 106.0rt | 118.0rt | 123.0rt | 118.0rt | 101.0rt | 105.0rt | 108.0rt | 123.0rt | 131.0rt | 121.0rt | 106.0rt | 24 | 103.29 |
| 22 | 92.0rt | 44.0rt | 39.0rt | 48.0rt | 93.0rt | 99.0rt | 99.0rt | 114.0rt | 59.0rt | 72.0rt | 74.0rt | 82.0rt | 77.0rt | 89.0rt | 106.0rt | 96.0rt | 104.0rt | 102.0rt | 101.0rt | 101.0rt | 98.0rt | 98.0rt | 92.0rt | 93.0rt | 24 | 86.33 |
| 23 | 108.0rt | 100.0rt | 85.0rt | 79.0rt | 68.0rt | 63.0rt | 77.0rt | 87.0rt | 118.0rt | 90.0rt | 83.0rt | 68.0rt | 62.0rt | 65.0rt | 64.0rt | 77.0rt | 78.0rt | 88.0rt | 45.0rt | 57.0rt | 47.0rt | 41.0rt | 41.0rt | 47.0rt | 24 | 72.42 |
| 24 | 47.0rt | 59.0rt | 69.0rt | 84.0rt | 71.0rt | 62.0rt | 57.0rt | 68.0rt | 89.0rt | 107.0rt | 99.0rt | 101.0rt | 94.0rt | 80.0rt | 85.0rt | 84.0rt | 124.0rt | 135.0rt | 128.0rt | 125.0rt | 108.0rt | 75.0rt | 41.0rt | 44.0rt | 24 | 84.83 |
| 25 | 78.0rt | 71.0rt | 58.0rt | 48.0rt | 46.0rt | 37.0rt | 38.0rt | 40.0rt | 35.0rt | 39.0rt | 37.0rt | 55.0rt | 41.0rt | 39.0rt | 43.0rt | 42.0rt | 54.0rt | 75.0rt | 80.0rt | 45.0rt | 41.0rt | 34.0rt | 23.0rt | 16.0rt | 24 | 46.46 |
| 26 | 16.0rt | 15.0rt | 17.0rt | 32.0rt | 35.0rt | 35.0rt | 45.0rt | 54.0rt | 45.0rt | 41.0rt | 50.0rt | 51.0rt | 59.0rt | 50.0rt | 52.0rt | 58.0rt | 44.0rt | 50.0rt | 52.0rt | 48.0rt | 35.0rt | 30.0rt | 17.0rt | 16.0rt | 24 | 39.46 |
| 27 | 16.0rt | 16.0rt | 17.0rt | 18.0rt | 22.0rt | 15.0rt | 14.0rt | 12.0rt | 16.0rt | AK | 42.0rt | 51.0rt | 46.0rt | 40.0rt | 45.0rt | 47.0rt | 27.0rt | 24.0rt | 31.0rt | 41.0rt | 44.0rt | 32.0rt | 34.0rt | 27.0rt | 23 | 29.43 |
| 28 | 26.0rt | 26.0rt | 27.0rt | 27.0rt | 27.0rt | 28.0rt | 27.0rt | 52.0rt | 46.0rt | 34.0rt | 38.0rt | 30.0rt | 39.0rt | 76.0rt | 69.0rt | 60.0rt | 66.0rt | 53.0rt | 55.0rt | 52.0rt | 49.0rt | 51.0rt | 45.0rt | 24 | 42.88 | |
| 29 | 50.0rt | 60.0rt | 49.0rt | 50.0rt | 43.0rt | 49.0rt | 44.0rt | 39.0rt | 40.0rt | 38.0rt | 42.0rt | 44.0rt | 44.0rt | 49.0rt | 56.0rt | 58.0rt | 67.0rt | 49.0rt | 49.0rt | 38.0rt | 33.0rt | 26.0rt | 25.0rt | 22.0rt | 24 | 44.33 |
| 30 | 50.0rt | 33.0rt | 26.0rt | 31.0rt | 33.0rt | 35.0rt | 33.0rt | 40.0rt | 37.0rt | 34.0rt | 46.0rt | 33.0rt | 37.0rt | 36.0rt | 39.0rt | 36.0rt | 38.0rt | 42.0rt | 43.0rt | 40.0rt | 47.0rt | 47.0rt | 63.0rt | 52.0rt | 24 | 39.63 |
| 31 | 53.0rt | 39.0rt | 48.0rt | 49.0rt | 55.0rt | 62.0rt | 58.0rt | 66.0rt | 53.0rt | 50.0rt | 56.0rt | 55.0rt | 55.0rt | 47.0rt | 43.0rt | 44.0rt | 44.0rt | 40.0rt | 39.0rt | 50.0rt | 48.0rt | 52.0rt | 53.0rt | 68.0rt | 24 | 51.13 |
| NO.: | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MAX: | 182.0 | 151.0 | 125.0 | 86.0 | 93.0 | 99.0 | 99.0 | 114.0 | 118.0 | 107.0 | 161.0 | 161.0 | 290.0 | 390.0 | 287.0 | 198.0 | 124.0 | 135.0 | 128.0 | 125.0 | 123.0 | 167.0 | 198.0 | 209.0 | | |
| AVG: | 33.10 | 28.74 | 25.39 | 24.29 | 24.35 | 25.26 | 28.45 | 29.32 | 29.16 | 31.60 | 36.93 | 37.55 | 40.29 | 43.35 | 41.65 | 38.58 | 35.19 | 35.77 | 35.26 | 35.13 | 34.42 | 32.65 | 32.13 | 31.23 | | |
| MONTHLY OBSERVATIONS: | 742 | | | | | | | | | | | | | | | | | | | | | | | | | |
| MONTHLY MEAN: | 32.90 | | | | | | | | | | | | | | | | | | | | | | | | | |
| MONTHLY MAX: | 390.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (***) indicates that the region has reviewed the value and does not concur with the qualifier. | | | | | | | | | | | | | | | | | | | | | | | | | | |

(88101) PM2.5 - Local Conditions

SITE ID: 06-101-0003 POC: 3

COUNTY: (101) Sutter

CITY: (86972) Yuba City

SITE ADDRESS: 773 ALMOND ST, YUBA CITY

SITE COMMENTS: RELOCATED ABOUT 1 MILE NW OF THE YUBA CITY-AG BUILDING SITE. ARB SITE NAME (#) IS

MONITOR COMMENTS:

STATE: (06) California

AQCR: (028) SACRAMENTO VALLEY

URBANIZED AREA: (9340) YUBA CITY, CA

LAND USE: COMMERCIAL

LOCATION SETTING: SUBURBAN

CAS NUMBER:

LATITUDE: 39.1387725442

LONGITUDE: -121.61854899

UTM ZONE:

UTM NORTHING:

UTM EASTING:

ELEVATION-MSL: 20

PROBE HEIGHT:

SUPPORT AGENCY: (0145) California Air Resources Board

MONITOR TYPE: SIAMS

COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS

POAQ: (0145) California Air Resources Board

REPORT FOR: SEPTEMBER 2020

DURATION: 1 HOUR

UNITS: Micrograms/cubic meter (LC)

MIN DETECTABLE: 2

NO. OF

| DAY | 0000 | 0100 | 0200 | 0300 | 0400 | 0500 | 0600 | 0700 | 0800 | 0900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | obs | MEAN | |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----|--------|--|
| 1 | 57.0rt | 44.0rt | 41.0rt | 41.0rt | 43.0rt | 39.0rt | 34.0rt | 39.0rt | 38.0rt | 41.0rt | 39.0rt | 26.0rt | 21.0rt | 21.0rt | 26.0rt | 33.0rt | 46.0rt | 36.0rt | 30.0rt | 26.0rt | 25.0rt | 22.0rt | 22.0rt | 18.0rt | 24 | 33.67 | |
| 2 | 19.0rt | 19.0rt | 10.0rt | 15.0rt | 19.0rt | 22.0rt | 17.0rt | 17.0rt | 28.0rt | 29.0rt | 42.0rt | 42.0rt | 33.0rt | 30.0rt | 27.0rt | 22.0rt | 23.0rt | 24.0rt | 26.0rt | 26.0rt | 23.0rt | 18.0rt | 19.0rt | 12.0rt | 24 | 23.42 | |
| 3 | 23.0rt | 15.0rt | 9.0rt | 14.0rt | 14.0rt | 14.0rt | 17.0rt | 11.0rt | 15.0rt | 28.0rt | 41.0rt | 24.0rt | 35.0rt | 30.0rt | 29.0rt | 26.0rt | 25.0rt | 27.0rt | 29.0rt | 25.0rt | 25.0rt | 22.0rt | 16.0rt | 15.0rt | 24 | 21.21 | |
| 4 | 29.0rt | 17.0rt | 15.0rt | 16.0rt | 18.0rt | 17.0rt | 15.0rt | 19.0rt | 20.0rt | 22.0rt | 29.0rt | 30.0rt | 22.0rt | 26.0rt | 32.0rt | 31.0rt | 33.0rt | 37.0rt | 59.0rt | 36.0rt | 38.0rt | 36.0rt | 35.0rt | 36.0rt | 24 | 27.83 | |
| 5 | 33.0rt | 37.0rt | 37.0rt | 38.0rt | 33.0rt | 38.0rt | 45.0rt | 47.0rt | 51.0rt | 50.0rt | 48.0rt | 57.0rt | 53.0rt | 50.0rt | 53.0rt | 67.0rt | 49.0rt | 41.0rt | 41.0rt | 49.0rt | 46.0rt | 40.0rt | 42.0rt | 40.0rt | 24 | 45.21 | |
| 6 | 42.0rt | 45.0rt | 46.0rt | 39.0rt | 32.0rt | 48.0rt | 53.0rt | 52.0rt | 37.0rt | 44.0rt | 39.0rt | 38.0rt | 35.0rt | 60.0rt | 67.0rt | 64.0rt | 54.0rt | 56.0rt | 52.0rt | 68.0rt | 49.0rt | 41.0rt | 35.0rt | 26.0rt | 24 | 46.75 | |
| 7 | 27.0rt | 28.0rt | 30.0rt | 35.0rt | 39.0rt | 37.0rt | 38.0rt | 78.0rt | 44.0rt | 52.0rt | 65.0rt | 60.0rt | 83.0rt | 68.0rt | 57.0rt | 48.0rt | 56.0rt | 42.0rt | 43.0rt | 45.0rt | 52.0rt | 42.0rt | 54.0rt | 41.0rt | 24 | 48.50 | |
| 8 | 42.0rt | 52.0rt | 59.0rt | 76.0rt | 95.0rt | 95.0rt | 76.0rt | 62.0rt | 58.0rt | 65.0rt | 67.0rt | 66.0rt | 56.0rt | 42.0rt | 39.0rt | 37.0rt | 30.0rt | 27.0rt | 41.0rt | 23.0rt | 18.0rt | 13.0rt | 18.0rt | 36.0rt | 24 | 49.71 | |
| 9 | 42.0rt | 23.0rt | 28.0rt | 23.0rt | 23.0rt | 20.0rt | 19.0rt | 38.0rt | 30.0rt | 33.0rt | 48.0rt | 37.0rt | 45.0rt | 49.0rt | 184.0rt | 32.0rt | 39.0rt | 222.0rt | 70.0rt | 46.0rt | 42.0rt | 38.0rt | 43.0rt | 37.0rt | 24 | 50.46 | |
| 10 | 32.0rt | 26.0rt | 35.0rt | 43.0rt | 32.0rt | 32.0rt | 31.0rt | AI | 112.0rt | 115.0rt | 91.0rt | 97.0rt | 151.0rt | 152.0rt | 126.0rt | 151.0rt | 195.0rt | 147.0rt | 139.0rt | 144.0rt | 136.0rt | 133.0rt | 146.0rt | 117.0rt | 23 | 103.61 | |
| 11 | 101.0rt | 101.0rt | 105.0rt | 100.0rt | 99.0rt | 98.0rt | 100.0rt | 101.0rt | 121.0rt | 97.0rt | 121.0rt | 122.0rt | 103.0rt | 102.0rt | 112.0rt | 118.0rt | 117.0rt | 140.0rt | 144.0rt | 181.0rt | 170.0rt | 123.0rt | 131.0rt | 241.0rt | 24 | 122.83 | |
| 12 | 244.0rt | 254.0rt | 260.0rt | 243.0rt | 250.0rt | 174.0rt | 165.0rt | 238.0rt | 299.0rt | 299.0rt | 361.0rt | 368.0rt | 190.0rt | 161.0rt | 153.0rt | 144.0rt | 246.0rt | 181.0rt | 167.0rt | 158.0rt | 133.0rt | 147.0rt | 143.0rt | 146.0rt | 24 | 213.50 | |
| 13 | 199.0rt | 257.0rt | 283.0rt | 248.0rt | 240.0rt | 263.0rt | 225.0rt | 228.0rt | 289.0rt | 280.0rt | 256.0rt | 310.0rt | 292.0rt | 290.0rt | 287.0rt | 290.0rt | 304.0rt | 308.0rt | 300.0rt | 404.0rt | 160.0rt | 111.0rt | 110.0rt | 137.0rt | 24 | 252.96 | |
| 14 | 96.0rt | 80.0rt | 91.0rt | 91.0rt | 90.0rt | 98.0rt | 105.0rt | 103.0rt | 107.0rt | AX | 101.0rt | 98.0rt | 89.0rt | 89.0rt | 85.0rt | 78.0rt | 70.0rt | 75.0rt | 73.0rt | 76.0rt | 69.0rt | 78.0rt | 70.0rt | 66.0rt | 23 | 86.00 | |
| 15 | 70.0rt | 65.0rt | 68.0rt | 59.0rt | 63.0rt | 66.0rt | 78.0rt | 63.0rt | 51.0rt | 49.0rt | 51.0rt | 56.0rt | 63.0rt | 79.0rt | 75.0rt | 81.0rt | 85.0rt | 98.0rt | 102.0rt | 98.0rt | 74.0rt | 72.0rt | 67.0rt | 57.0rt | 24 | 70.42 | |
| 16 | 54.0rt | 35.0rt | 37.0rt | 31.0rt | 24.0rt | 18.0rt | 34.0rt | 36.0rt | 7.0rt | 12.0rt | 21.0rt | 29.0rt | 26.0rt | 21.0rt | 19.0rt | 15.0rt | 18.0rt | 15.0rt | 20.0rt | 20.0rt | 16.0rt | 24.0rt | 24.0rt | 23.0rt | 24 | 24.13 | |
| 17 | 26.0rt | 16.0rt | 21.0rt | 18.0rt | 11.0rt | 14.0rt | 36.0rt | 28.0rt | 16.0rt | 20.0rt | 30.0rt | 30.0rt | 10.0rt | 10.0rt | 9.0rt | 7.0rt | 8.0rt | 6.0rt | 4.0rt | 4.0rt | 5.0rt | 5.0rt | 5.0rt | 7.0rt | 24 | 14.42 | |
| 18 | 11.0rt | 7.0rt | 6.0rt | 6.0rt | 8.0rt | 7.0rt | 10.0rt | 6.0rt | 1.0rt | 4.0rt | 6.0rt | 5.0rt | 4.0rt | 6.0rt | 6.0rt | 6.0rt | 7.0rt | 13.0rt | 11.0rt | 13.0rt | 11.0rt | 8.0rt | 9.0rt | 8.0rt | 24 | 7.46 | |
| 19 | 13.0rt | 8.0rt | 6.0rt | 1.0rt | 5.0rt | 9.0rt | 7.0rt | 10.0rt | 7.0rt | 6.0rt | 20.0rt | 31.0rt | 28.0rt | 24.0rt | 29.0rt | 36.0rt | 32.0rt | 26.0rt | 28.0rt | 33.0rt | 34.0rt | 28.0rt | 34.0rt | 31.0rt | 24 | 20.25 | |
| 20 | 41.0rt | 37.0rt | 30.0rt | 32.0rt | 32.0rt | 39.0rt | 34.0rt | 35.0rt | 37.0rt | 27.0rt | 24.0rt | 20.0rt | 23.0rt | 42.0rt | 44.0rt | 38.0rt | 42.0rt | 36.0rt | 44.0rt | 44.0rt | 50.0rt | 46.0rt | 53.0rt | 48.0rt | 24 | 37.42 | |
| 21 | 45.0rt | 43.0rt | 44.0rt | 42.0rt | 42.0rt | 40.0rt | 42.0rt | 48.0rt | 51.0rt | 40.0rt | 36.0rt | 38.0rt | 36.0rt | 39.0rt | 34.0rt | 36.0rt | 38.0rt | 36.0rt | 34.0rt | 24.0rt | 22.0rt | 22.0rt | 15.0rt | 9.0rt | 24 | 35.67 | |
| 22 | 16.0rt | 10.0rt | 6.0rt | 6.0rt | 4.0rt | 6.0rt | 8.0rt | 7.0rt | 6.0rt | 6.0rt | 4.0rt | 6.0rt | 12.0rt | 28.0rt | 33.0rt | 14.0rt | 8.0rt | 4.0rt | 5.0rt | 3.0rt | 5.0rt | 4.0rt | 4.0rt | 4.0rt | 24 | 8.71 | |
| 23 | 6.0rt | 3.0rt | -1.0rt | -2.0rt | -1.0rt | 1.0rt | 3.0rt | 6.0rt | 5.0rt | 5.0rt | 4.0rt | 4.0rt | 6.0rt | 20.0rt | 22.0rt | 15.0rt | 11.0rt | 11.0rt | 7.0rt | 4.0rt | 6.0rt | 10.0rt | 6.0rt | 1.0rt | 24 | 6.33 | |
| 24 | 1.0rt | 4.0rt | 3.0rt | 3.0rt | 3.0rt | 14.0rt | 8.0rt | 5.0rt | 5.0rt | 3.0rt | 2.0rt | 8.0rt | 8.0rt | 6.0rt | 7.0rt | 7.0rt | 5.0rt | 4.0rt | 7.0rt | 7.0rt | 5.0rt | 3.0rt | 4.0rt | 4.0rt | 24 | 5.38 | |
| 25 | 8.0rt | 4.0rt | 7.0rt | 5.0rt | 2.0rt | 5.0rt | 6.0rt | 7.0rt | 6.0rt | 5.0rt | 6.0rt | 8.0rt | 7.0rt | 7.0rt | 7.0rt | 4.0rt | 4.0rt | 6.0rt | 7.0rt | 16.0rt | 15.0rt | 17.0rt | 14.0rt | 11.0rt | 24 | 7.67 | |
| 26 | 11.0rt | 12.0rt | 7.0rt | 9.0rt | 6.0rt | 9.0rt | 5.0rt | 12.0rt | 10.0rt | 8.0rt | 9.0rt | 9.0rt | 8.0rt | 5.0rt | 2.0rt | 2.0rt | 5.0rt | 6.0rt | 7.0rt | 5.0rt | 7.0rt | 20.0rt | 18.0rt | 1.0rt | 24 | 8.04 | |
| 27 | 3.0rt | 6.0rt | 9.0rt | 6.0rt | 6.0rt | 4.0rt | 2.0rt | 8.0rt | 8.0rt | 17.0rt | 12.0rt | 15.0rt | 11.0rt | 10.0rt | 8.0rt | 9.0rt | 8.0rt | 11.0rt | 27.0rt | 23.0rt | 28.0rt | 39.0rt | 45.0rt | 45.0rt | 24 | 15.00 | |
| 28 | 40.0rt | 11.0rt | 6.0rt | 5.0rt | 9.0rt | 6.0rt | 9.0rt | 11.0rt | 11.0rt | 27.0rt | 29.0rt | 25.0rt | 26.0rt | AX | 14.0rt | 55.0rt | 18.0rt | HR | 4.0rt | 17.0rt | 16.0rt | 19.0rt | 19.0rt | 31.0rt | 22 | 18.55 | |
| 29 | 23.0rt | 19.0rt | 22.0rt | 13.0rt | 10.0rt | 18.0rt | 27.0rt | 24.0rt | 14.0rt | 10.0rt | 11.0rt | 15.0rt | 11.0rt | 15.0rt | 16.0rt | 21.0rt | 25.0rt | 25.0rt | 27.0rt | 28.0rt | 27.0rt | 30.0rt | 28.0rt | 27.0rt | 24 | 20.25 | |
| 30 | 22.0rt | 28.0rt | 36.0rt | 38.0rt | 47.0rt | 68.0rt | 72.0rt | 85.0rt | 87.0rt | 87.0rt | 128.0rt | 122.0rt | 65.0rt | 50.0rt | 52.0rt | 56.0rt | 53.0rt | 60.0rt | 68.0rt | 65.0rt | 55.0rt | 50.0rt | 48.0rt | 54.0rt | 24 | 62.33 | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | |

NO.: 30 30 30 30 30 30 30 29 30 29 30 30 29 30 30 30 29 30 30 29 30 30 30 30 30 30
 MAX: 244.0 257.0 283.0 248.0 250.0 263.0 225.0 238.0 299.0 299.0 361.0 368.0 292.0 290.0 287.0 290.0 304.0 308.0 300.0 404.0 170.0 147.0 146.0 241.0
 AVG: 45.87 43.53 45.20 43.13 43.27 43.97 44.03 49.10 52.37 51.07 57.37 59.87 51.73 52.83 55.13 51.43 55.13 59.31 53.87 57.03 45.47 42.10 42.53 44.30

MONTHLY OBSERVATIONS: 716 MONTHLY MEAN: 49.55 MONTHLY MAX: 404.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (***) indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

CAS NUMBER: 39.1387725442
LATITUDE: -121.61854899
LONGITUDE:
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 20
PROBE HEIGHT:

SITE ID: 06-101-0003 POC: 3

STATE: (06) California
AQCR: (028) SACRAMENTO VALLEY
URBANIZED AREA: (9340) YUBA CITY, CA
LAND USE: COMMERCIAL
LOCATION SETTING: SUBURBAN

COUNTY: (101) Sutter

CITY: (86972) Yuba City

SITE ADDRESS: 773 ALMOND ST, YUBA CITY

SITE COMMENTS: RELOCATED ABOUT 1 MILE NW OF THE YUBA CITY-AG BUILDING SITE. ARB SITE NAME (#) IS

MONITOR COMMENTS:

SUPPORT AGENCY: (0145) California Air Resources Board

MONITOR TYPE: SIAMS

REPORT FOR: OCTOBER 2020

DURATION: 1 HOUR

COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS

UNITS: Micrograms/cubic meter (LC)

PQAO: (0145) California Air Resources Board

MIN DETECTABLE: 2

HOURLY

Table with columns: DAY, HOUR, and 24 hourly observations (0100-2300) plus OBS and MEAN columns. Rows 1-31 show hourly data for October 2020.

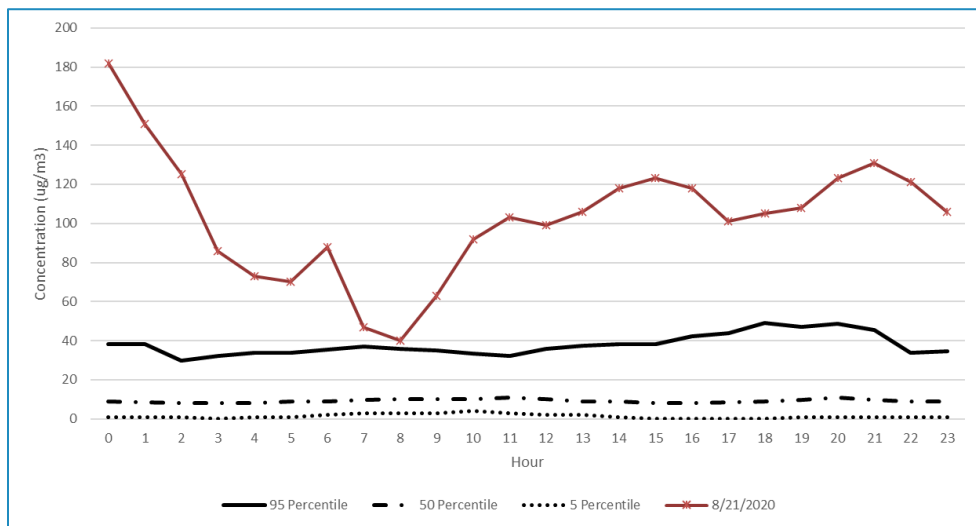
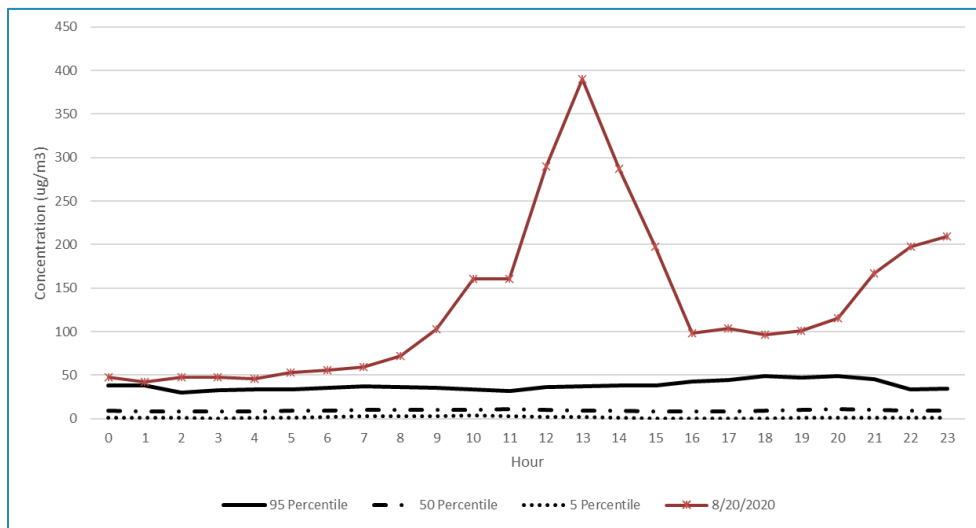
MONTHLY OBSERVATIONS: 696 MONTHLY MEAN: 25.51 MONTHLY MAX: 133.0

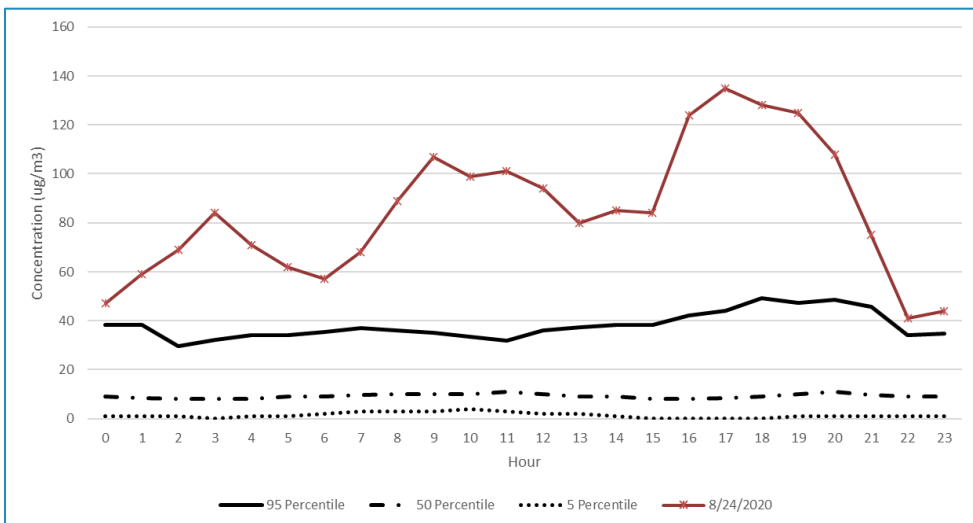
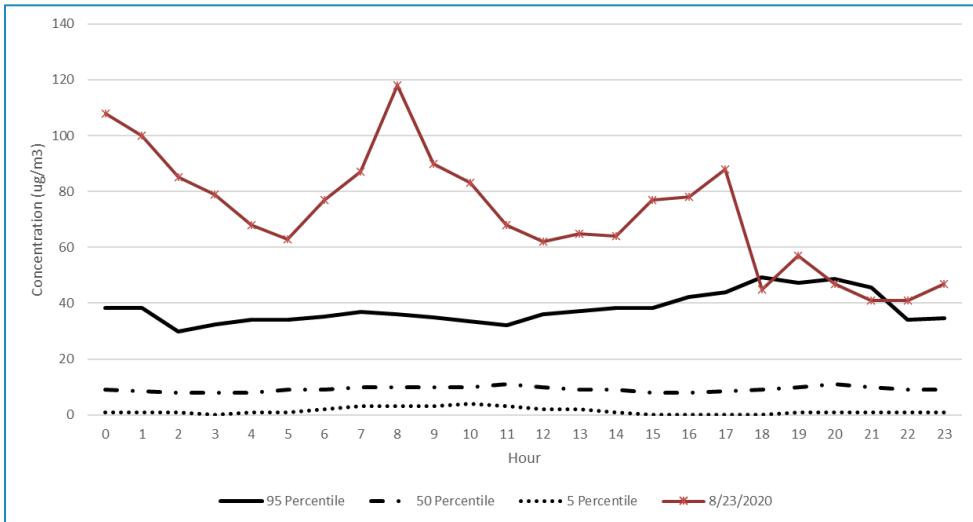
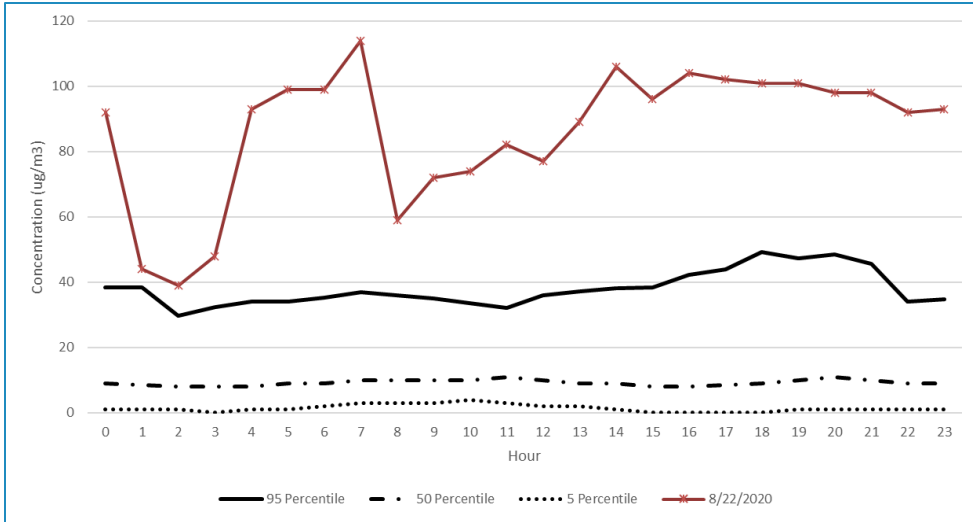
Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (***) indicates that the region has reviewed the value and does not concur with the qualifier.

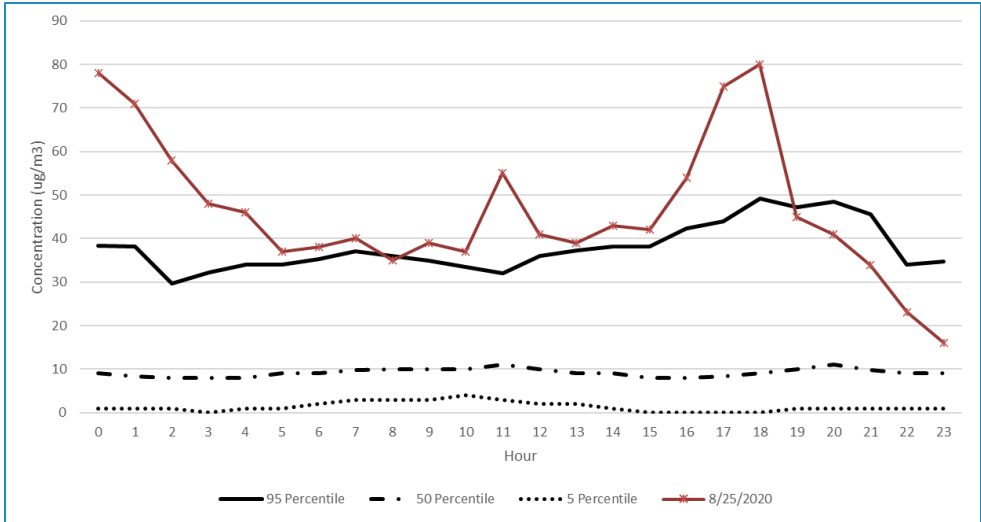
C. PM_{2.5} Diurnal Percentile Comparisons

Daily 1-hour PM_{2.5} mass concentrations were compared to the 5th, 50th, and 95th percentiles for data collected during the third quarter (July, August, September) from 2015 to 2019. Data for the first four days in October was considered more indicative of this time period than the 4th quarter (October, November, December) for purposes of this demonstration.

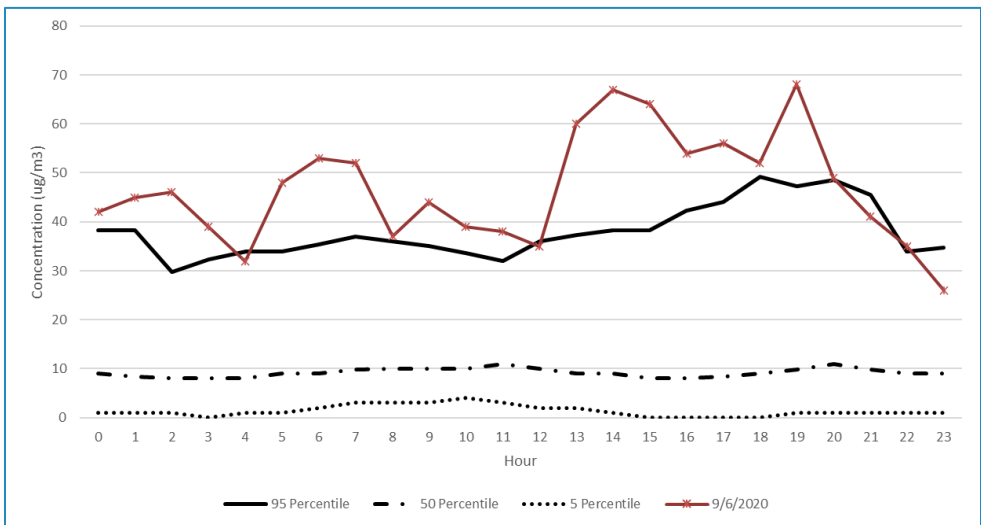
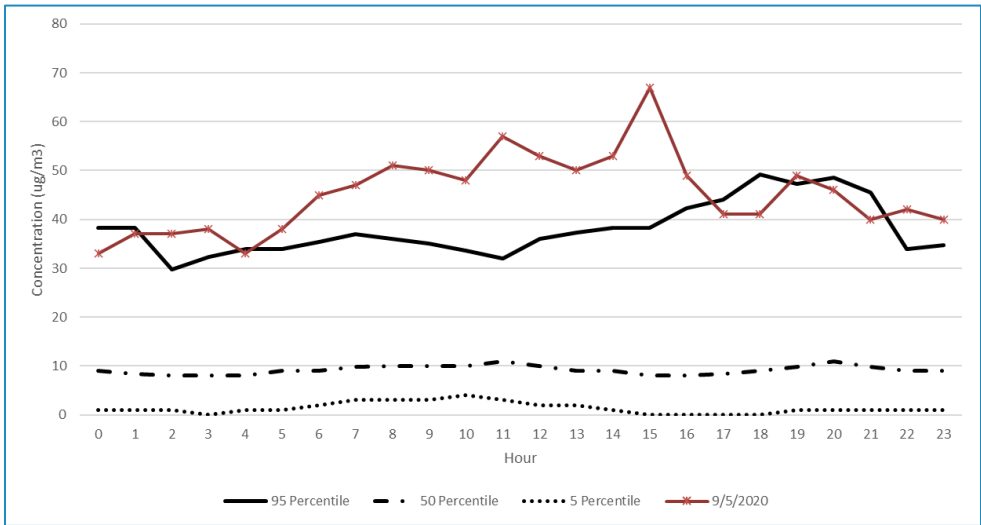
a) August 20-25, 2020

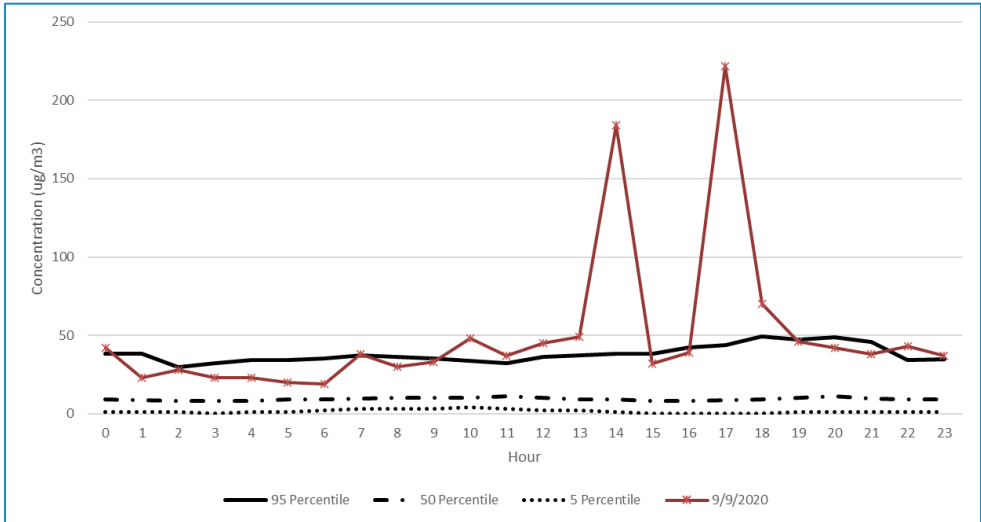
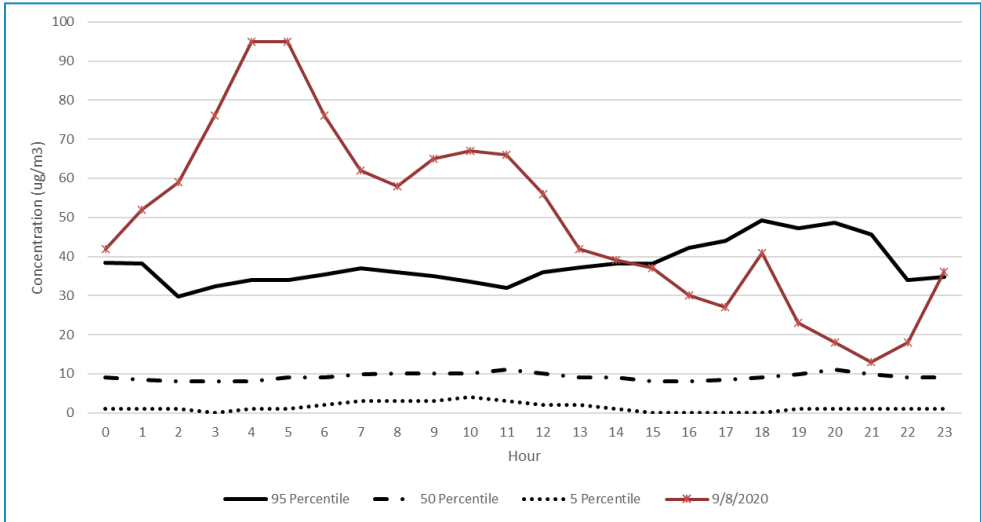
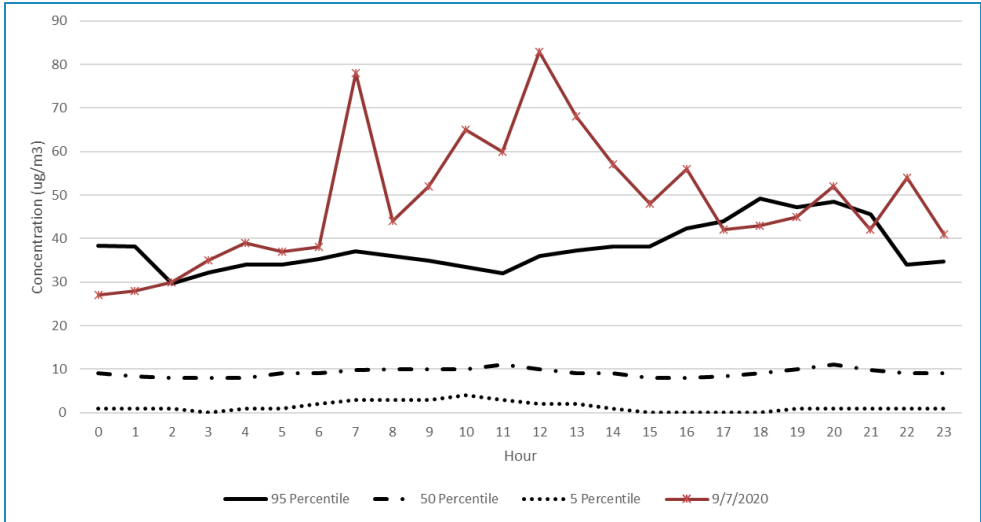


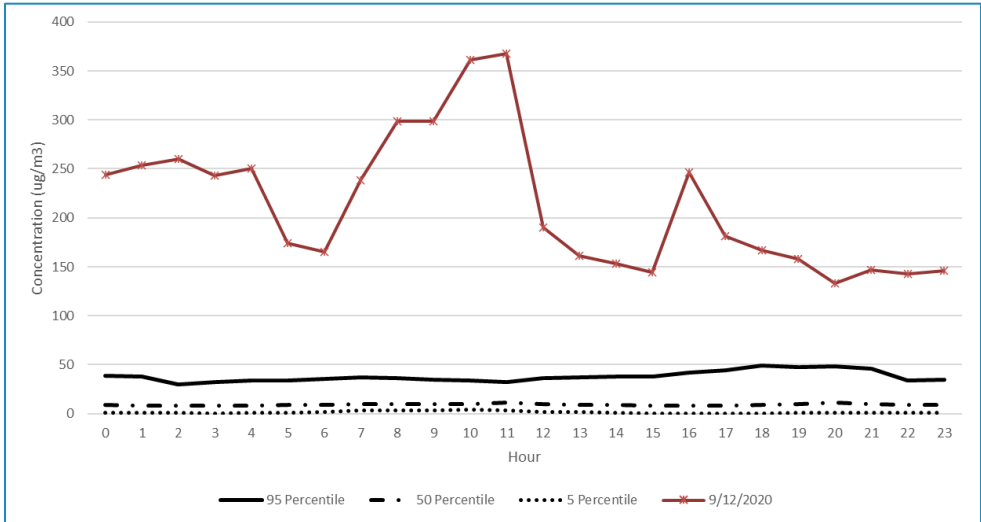
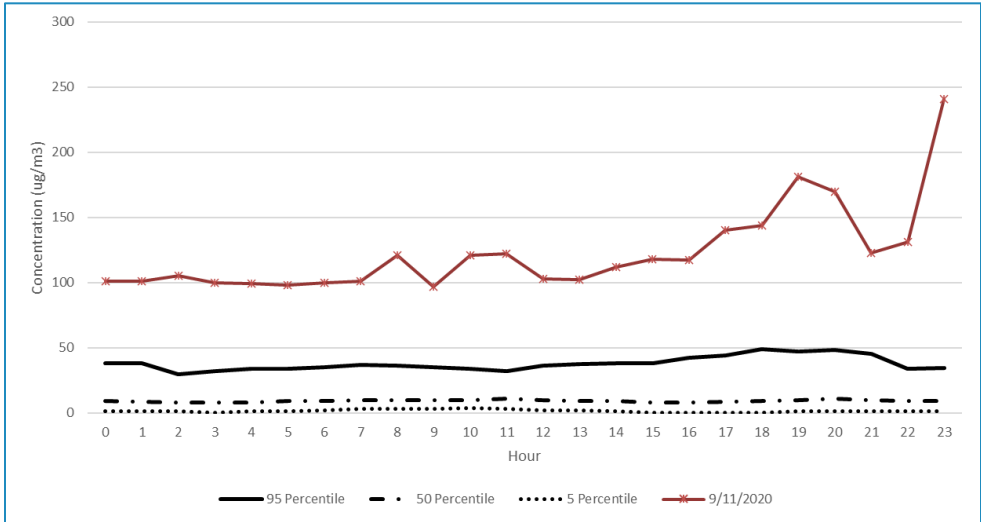
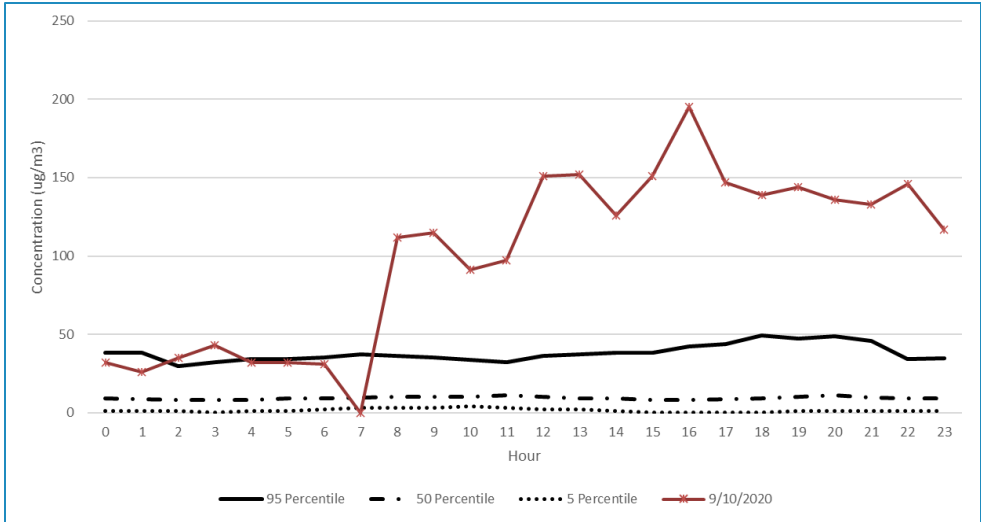


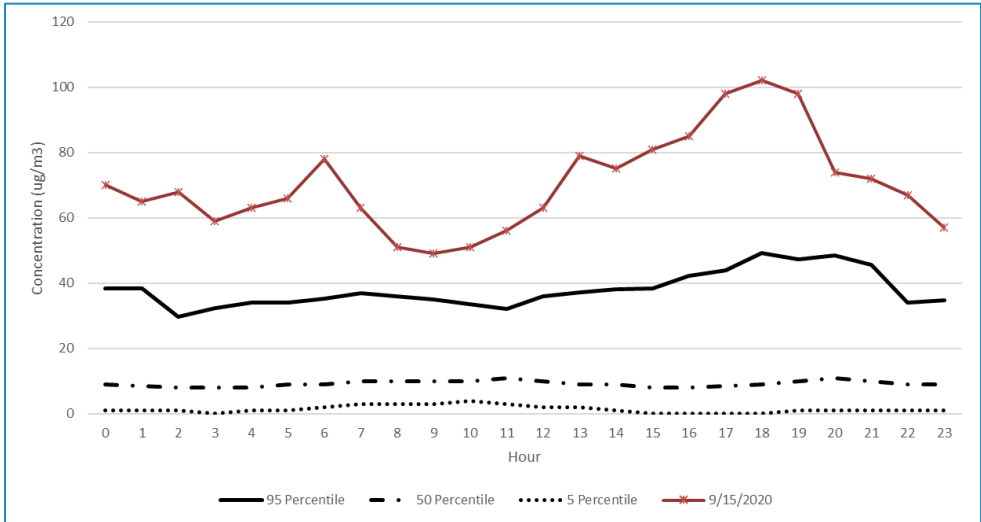
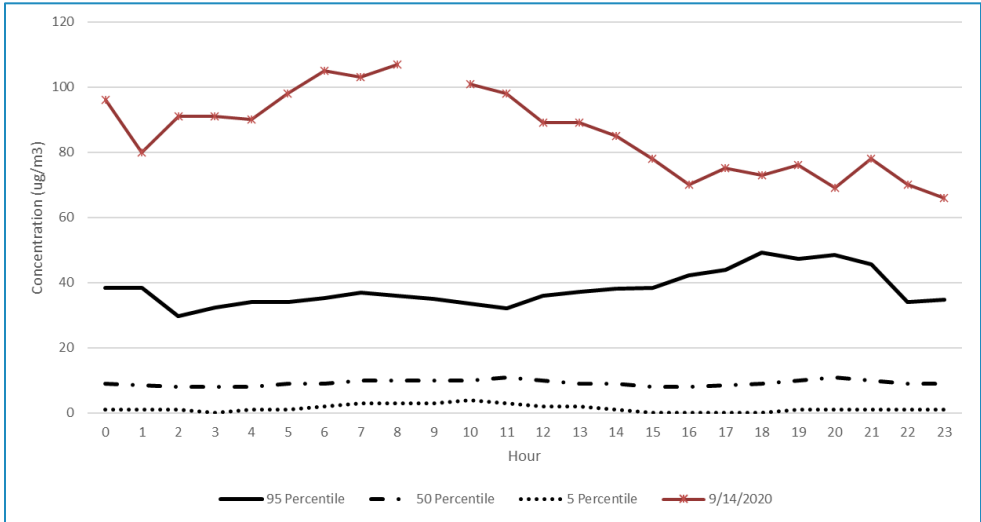
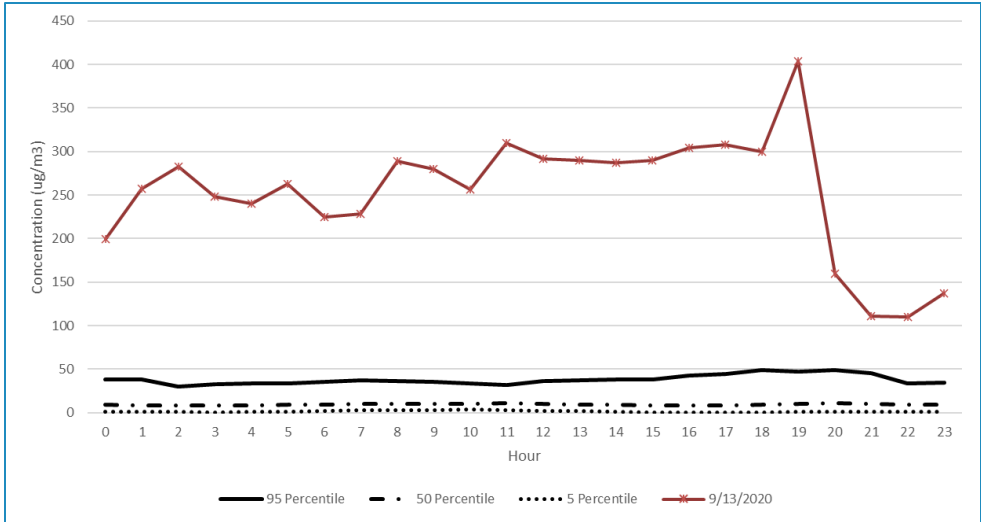


b) September 5-15, 2020

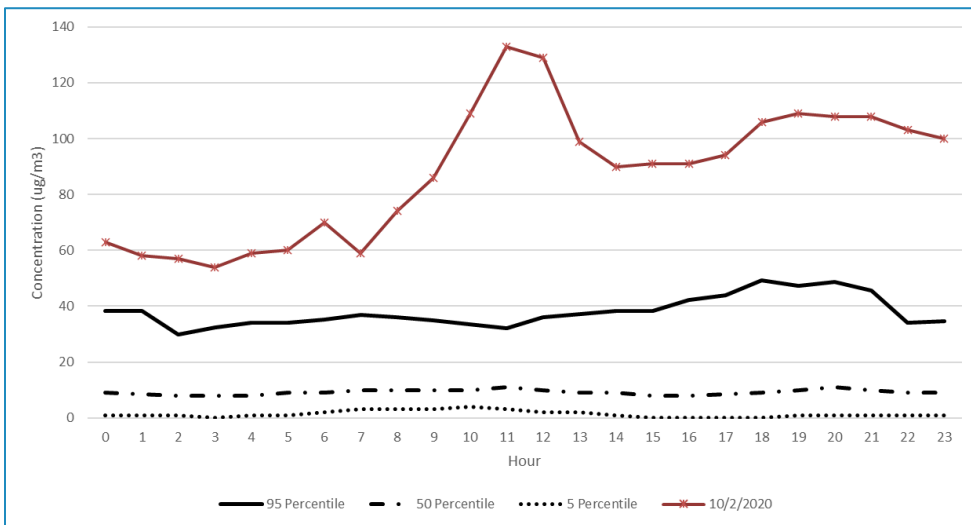
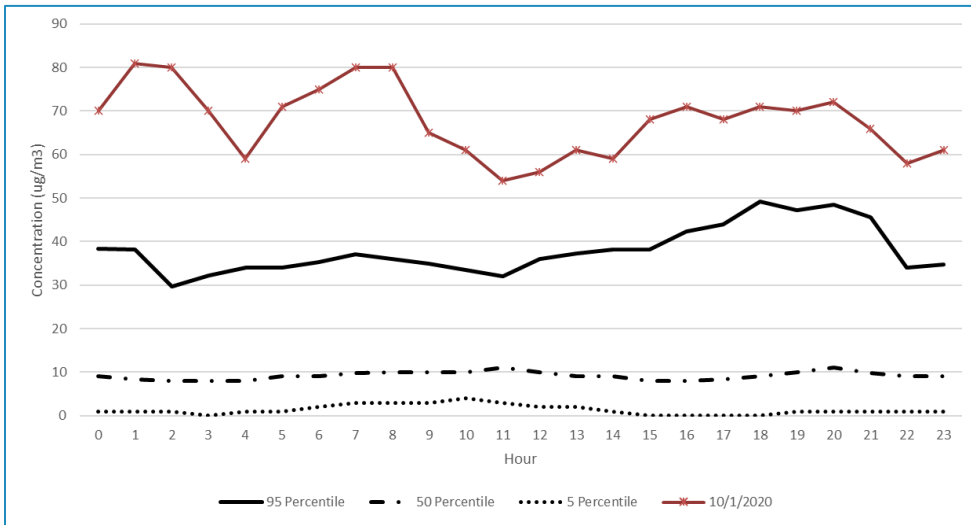
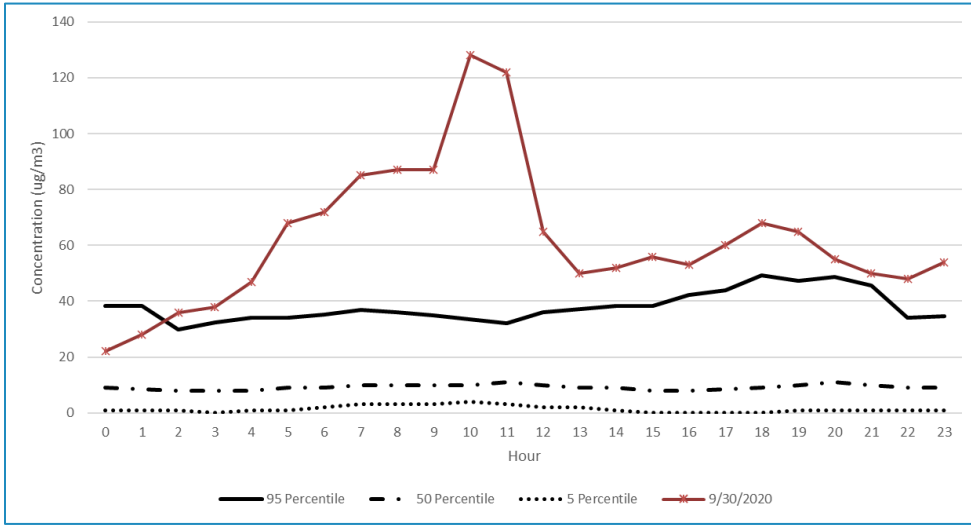


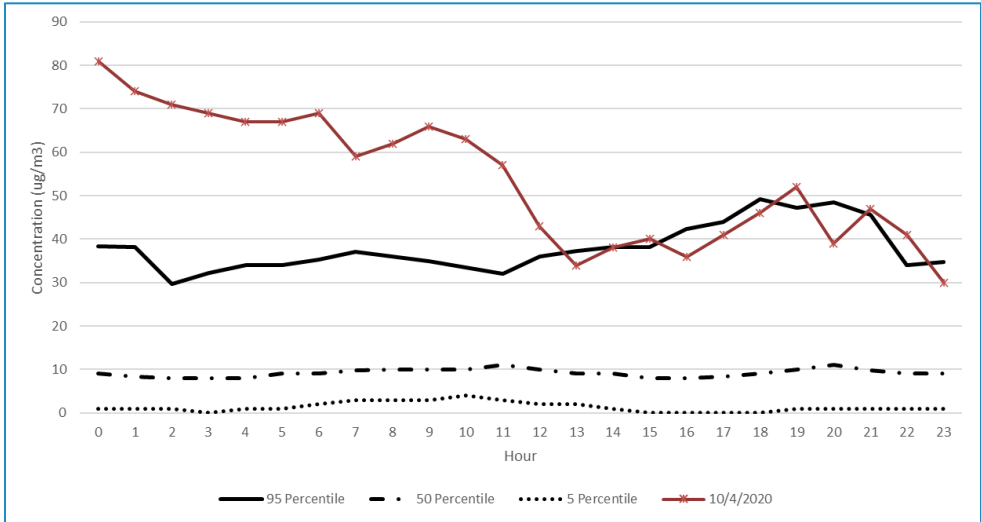
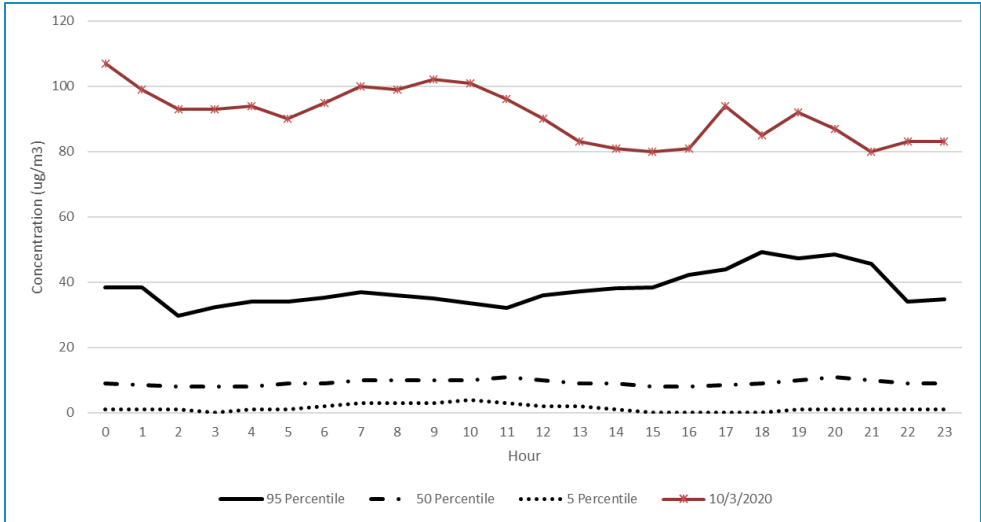






c) September 30-October 4, 2020





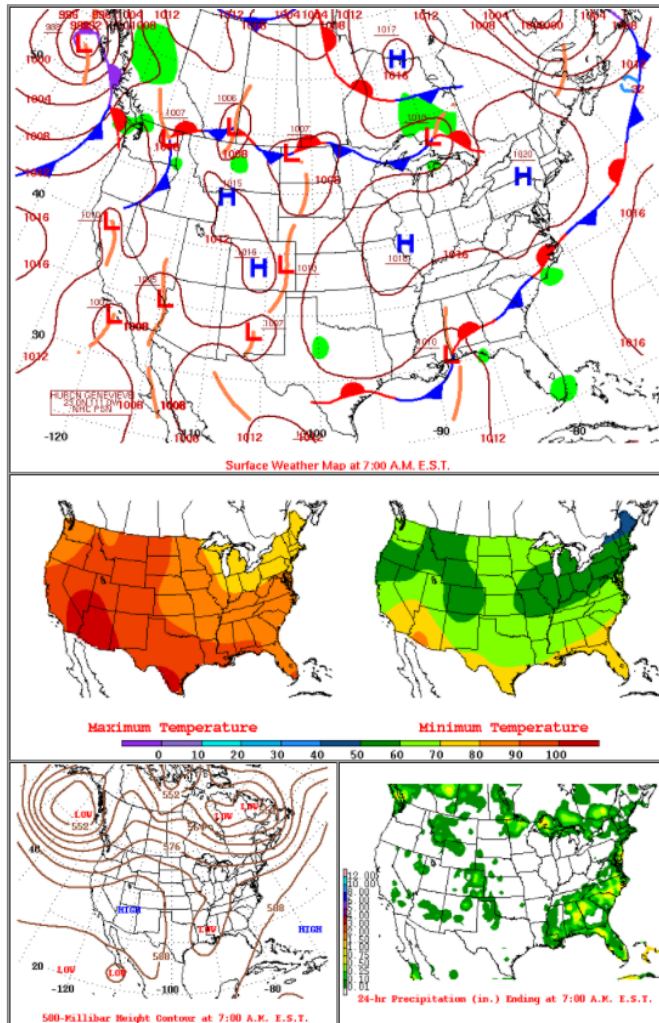
II. Meteorological Information

A. NWS Daily Maps

a) August 20-25, 2020

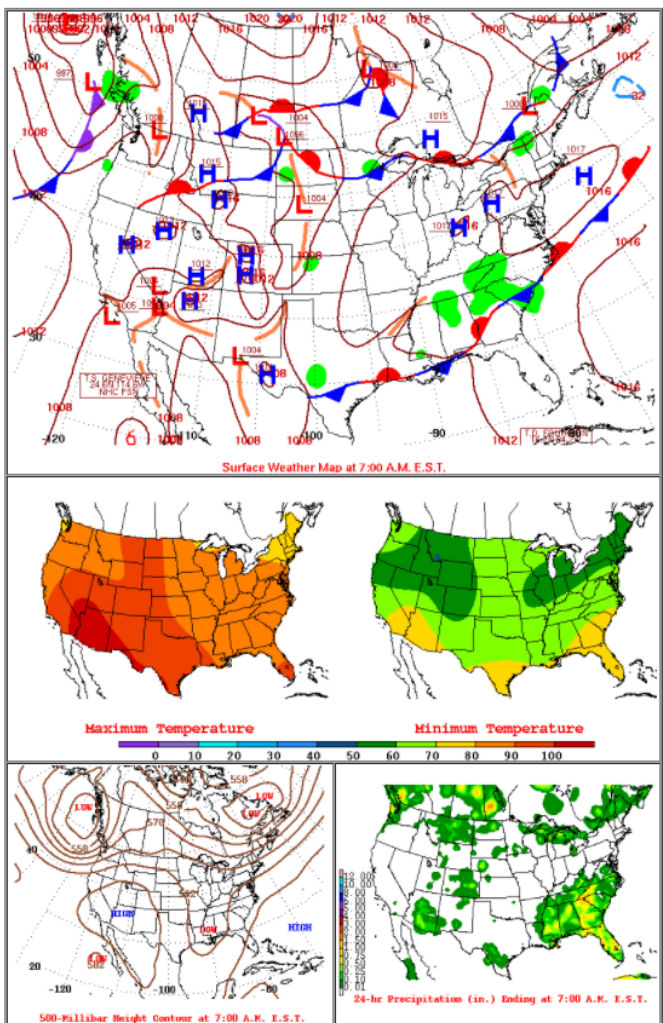
Daily Weather Maps

THURSDAY AUGUST 20, 2020



Daily Weather Maps

FRIDAY AUGUST 21, 2020

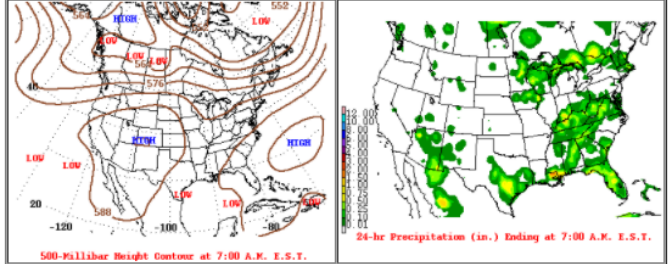
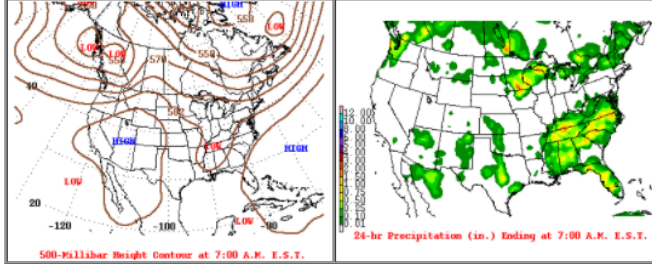
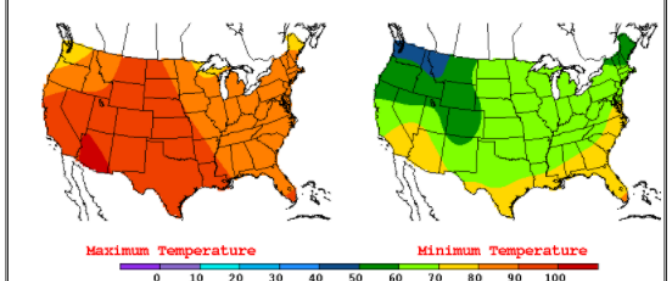
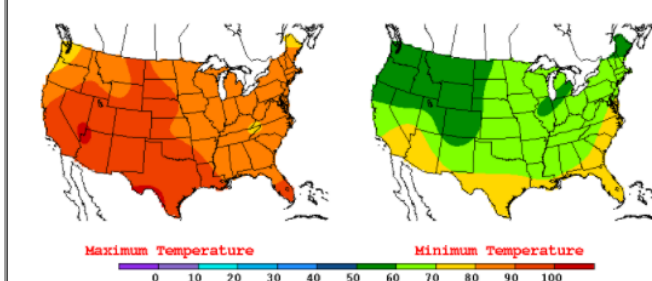
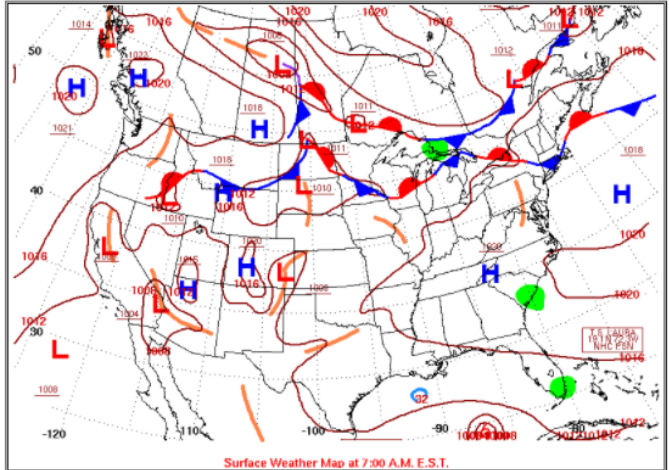
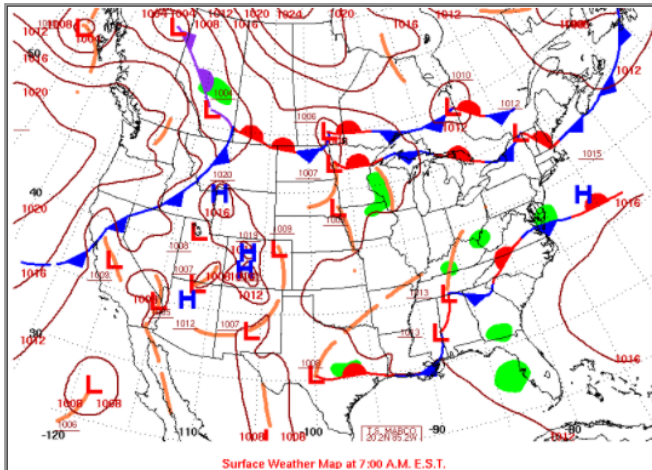


Daily Weather Maps

SATURDAY AUGUST 22, 2020

Daily Weather Maps

SUNDAY AUGUST 23, 2020

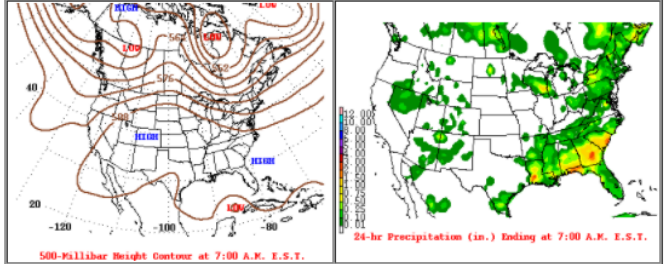
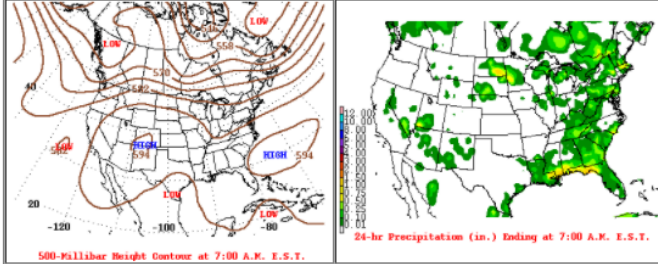
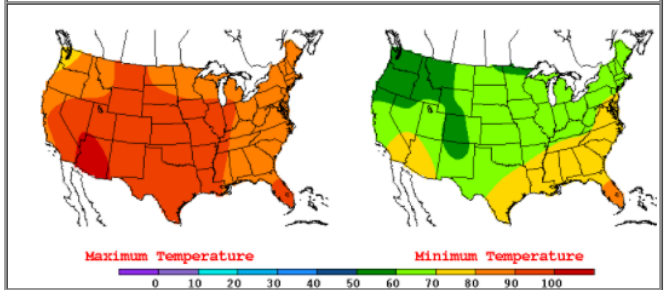
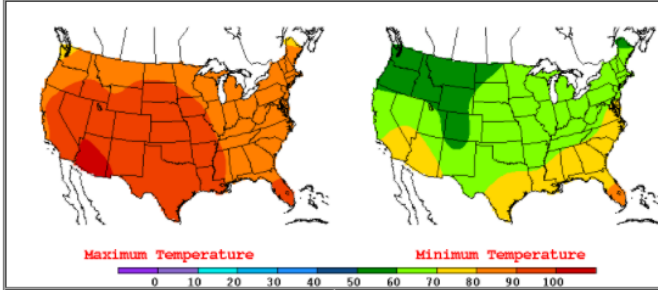
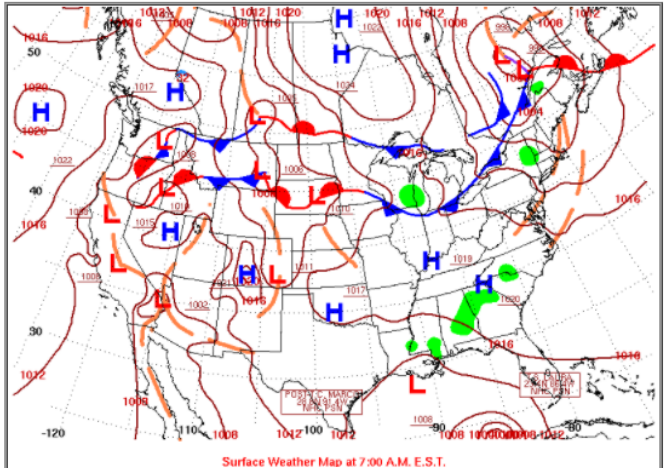
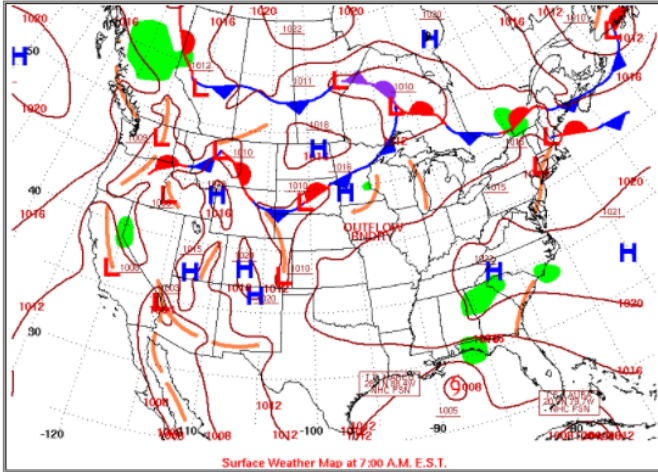


Daily Weather Maps

MONDAY AUGUST 24, 2020

Daily Weather Maps

TUESDAY AUGUST 25, 2020



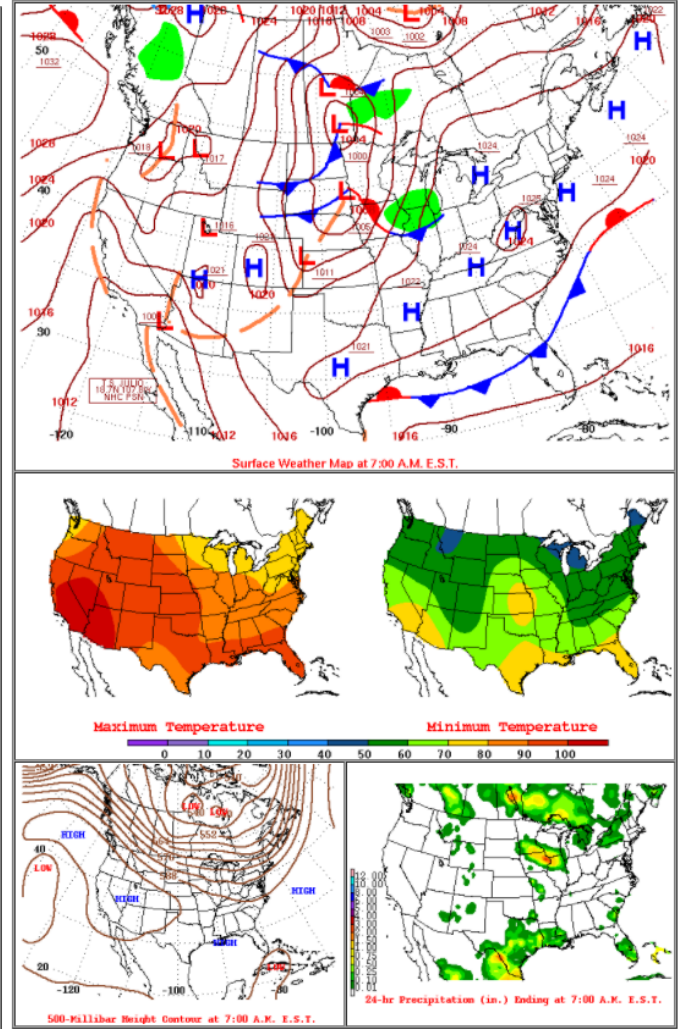
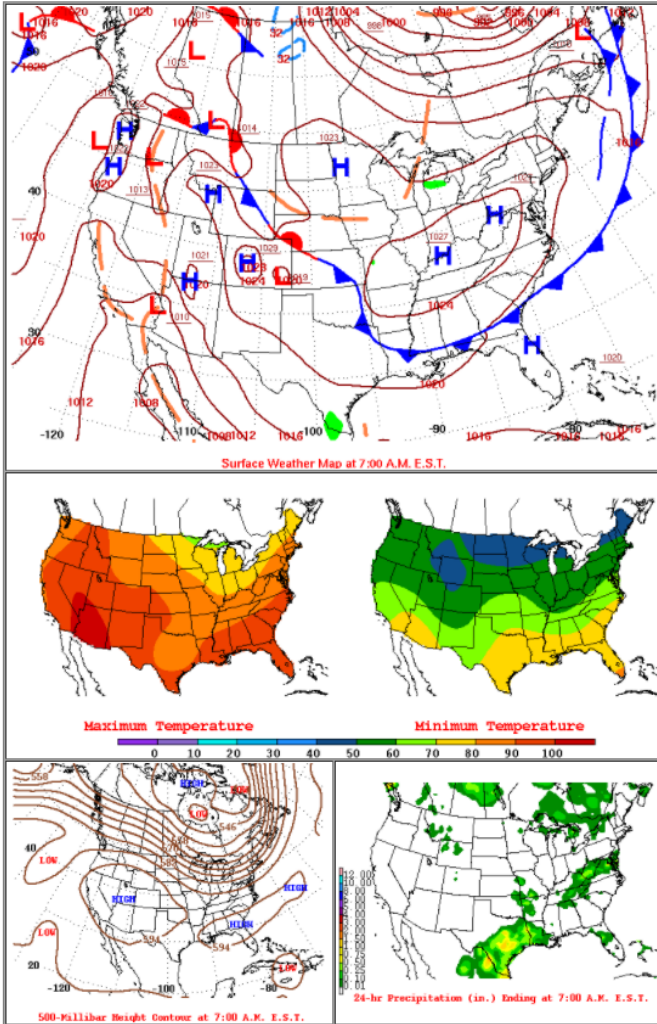
b) September 5-15, 2020

Daily Weather Maps

SATURDAY SEPTEMBER 5, 2020

Daily Weather Maps

SUNDAY SEPTEMBER 6, 2020

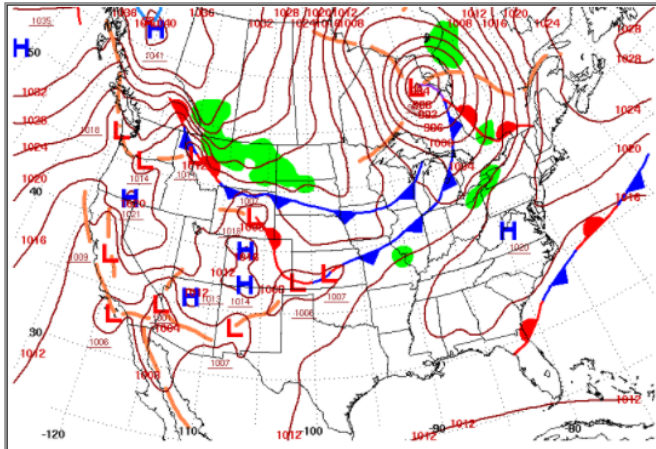


Daily Weather Maps

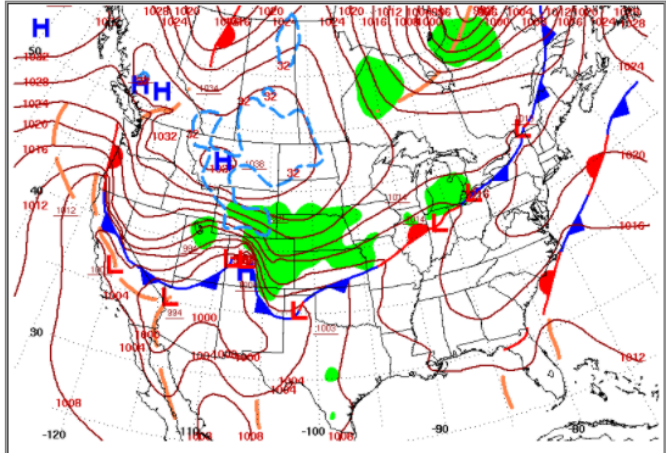
MONDAY SEPTEMBER 7, 2020

Daily Weather Maps

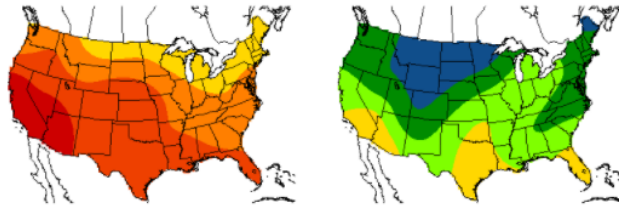
TUESDAY SEPTEMBER 8, 2020



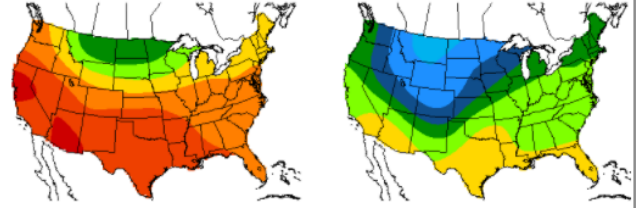
Surface Weather Map at 7:00 A.M. E.S.T.



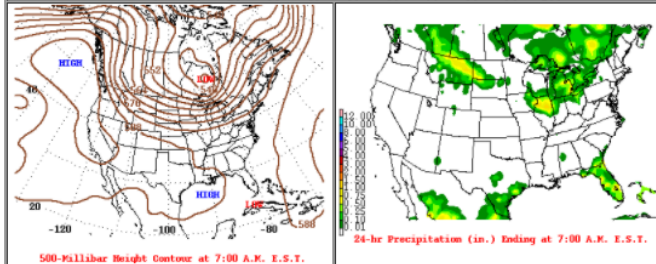
Surface Weather Map at 7:00 A.M. E.S.T.



Maximum Temperature Minimum Temperature

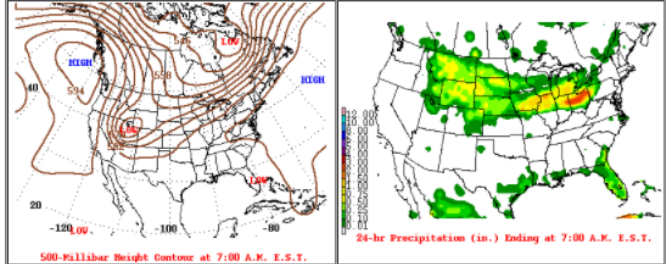


Maximum Temperature Minimum Temperature



500-Millibar Height Contour at 7:00 A.M. E.S.T.

24-hr Precipitation (in.) Ending at 7:00 A.M. E.S.T.

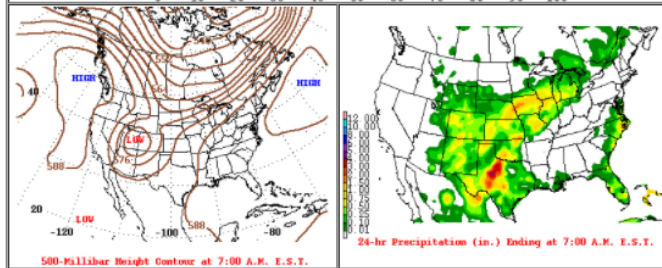
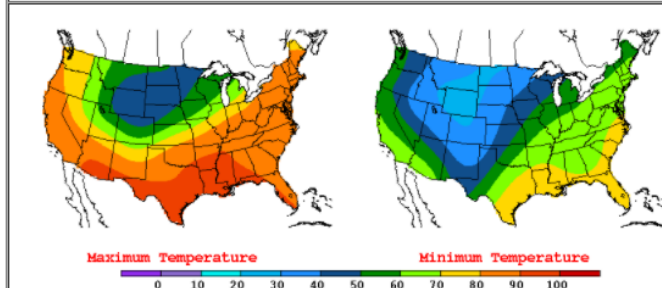
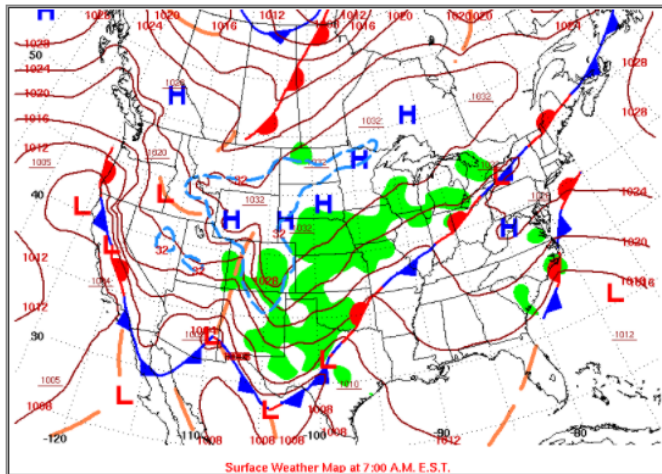


500-Millibar Height Contour at 7:00 A.M. E.S.T.

24-hr Precipitation (in.) Ending at 7:00 A.M. E.S.T.

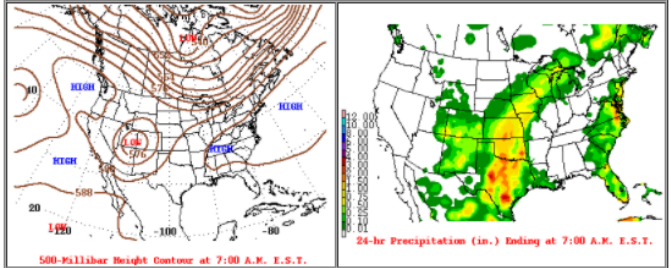
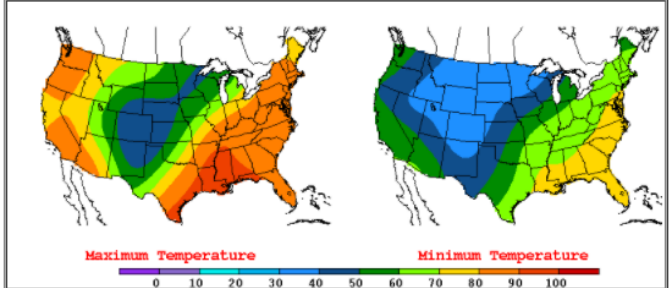
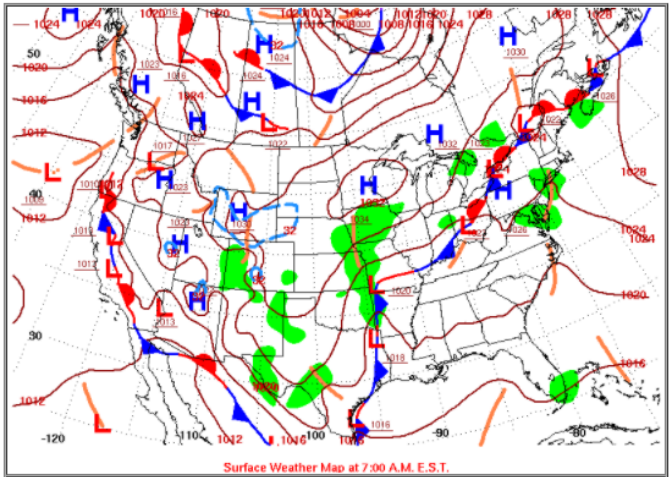
Daily Weather Maps

WEDNESDAY SEPTEMBER 9, 2020



Daily Weather Maps

THURSDAY SEPTEMBER 10, 2020

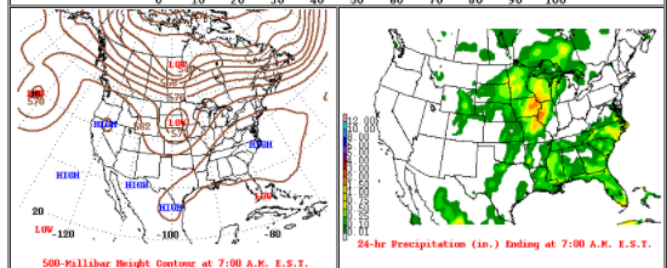
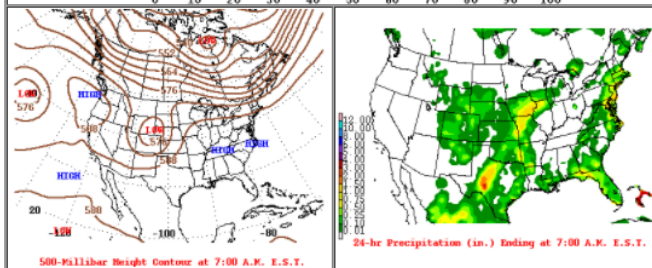
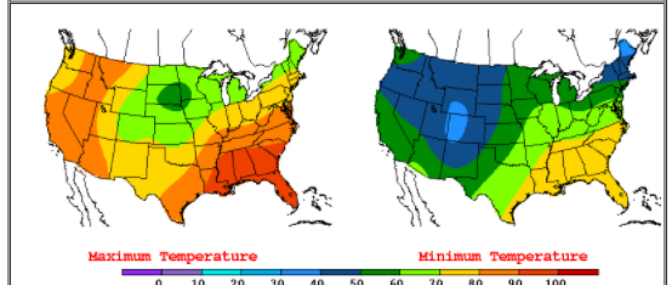
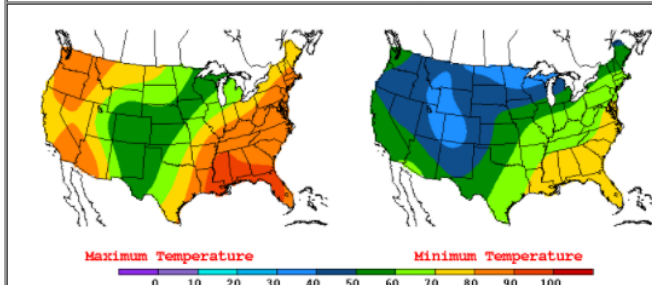
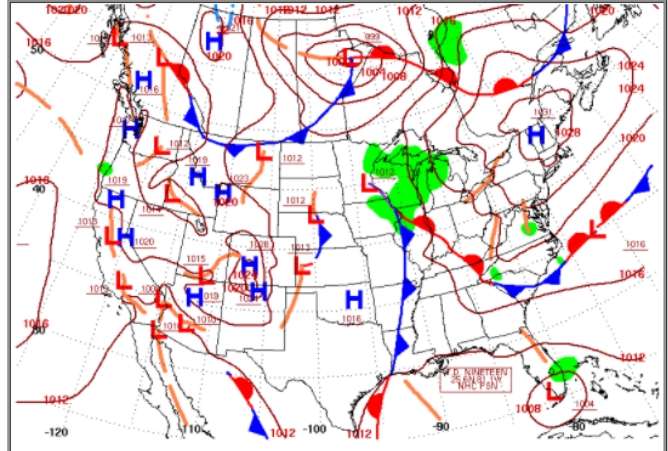
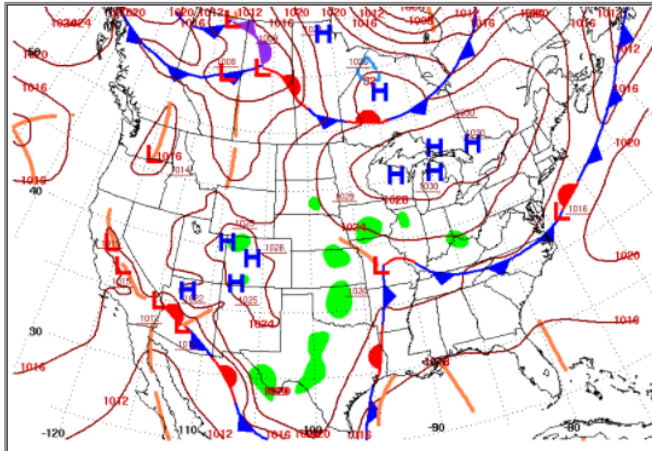


Daily Weather Maps

FRIDAY SEPTEMBER 11, 2020

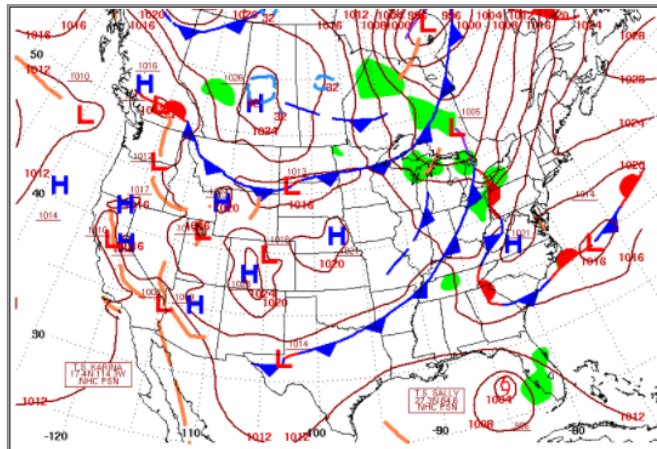
Daily Weather Maps

SATURDAY SEPTEMBER 12, 2020

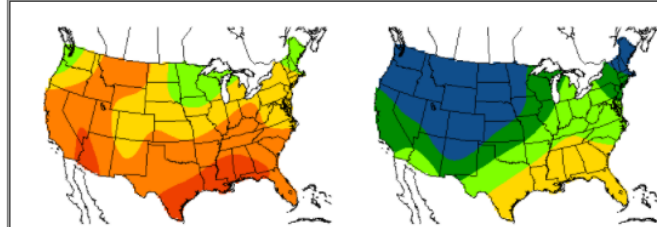


Daily Weather Maps

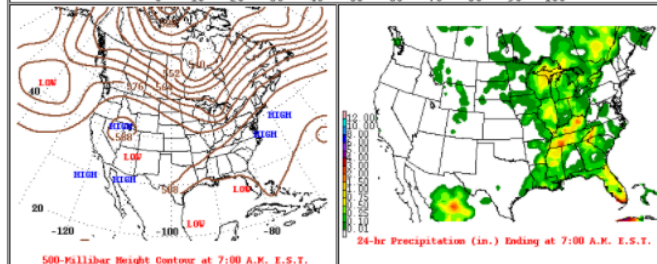
SUNDAY SEPTEMBER 13, 2020



Surface Weather Map at 7:00 A.M. E.S.T.



Maximum Temperature Minimum Temperature

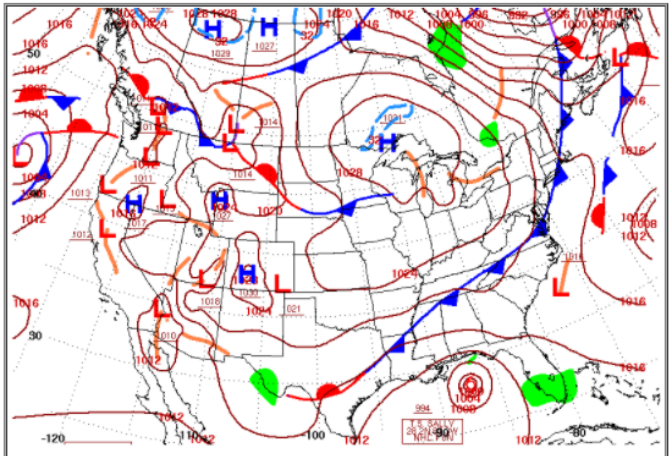


500-Millibar Height Contour at 7:00 A.M. E.S.T.

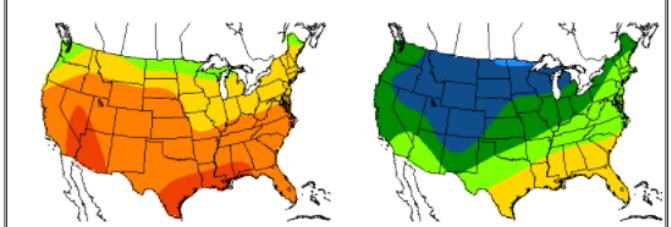
24-hr Precipitation (in.) Ending at 7:00 A.M. E.S.T.

Daily Weather Maps

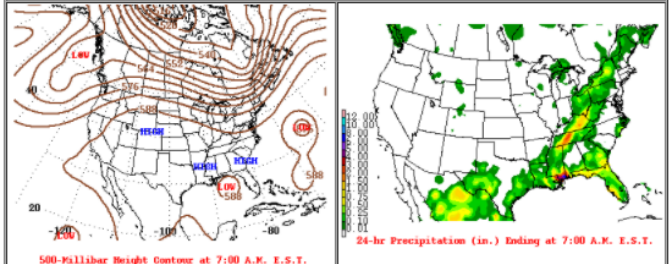
MONDAY SEPTEMBER 14, 2020



Surface Weather Map at 7:00 A.M. E.S.T.



Maximum Temperature Minimum Temperature

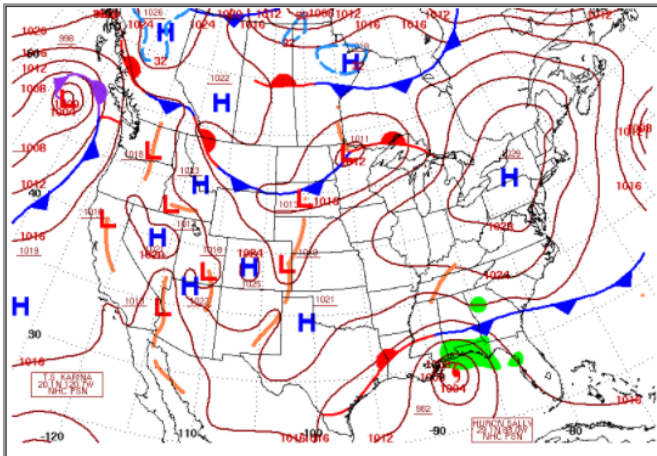


500-Millibar Height Contour at 7:00 A.M. E.S.T.

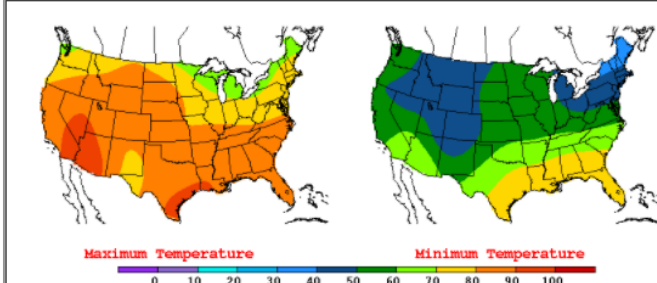
24-hr Precipitation (in.) Ending at 7:00 A.M. E.S.T.

Daily Weather Maps

TUESDAY SEPTEMBER 15, 2020

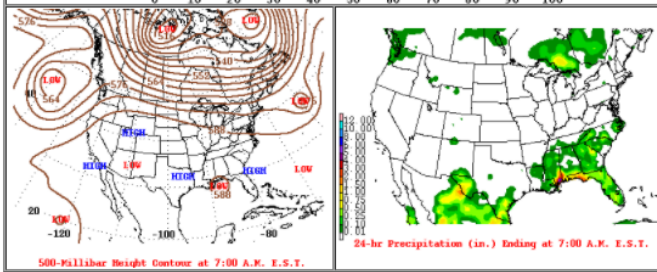


Surface Weather Map at 7:00 A.M. E.S.T.



Maximum Temperature

Minimum Temperature



500-millibar Height Contour at 7:00 A.M. E.S.T.

24-hr Precipitation (in.) Ending at 7:00 A.M. E.S.T.

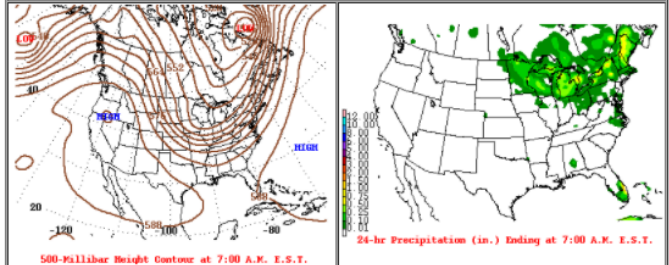
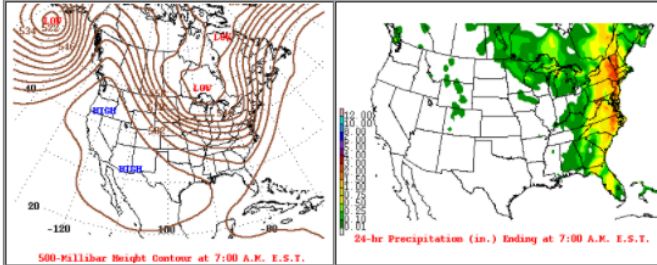
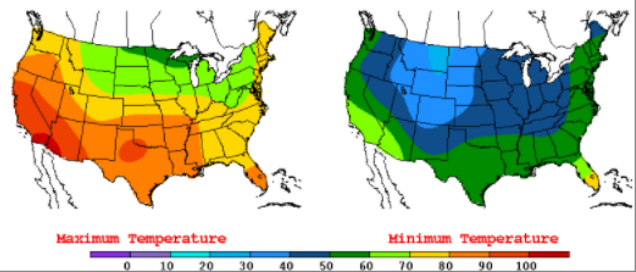
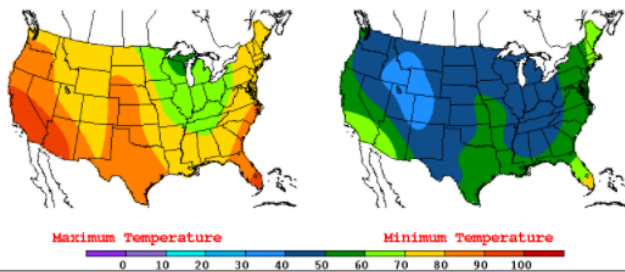
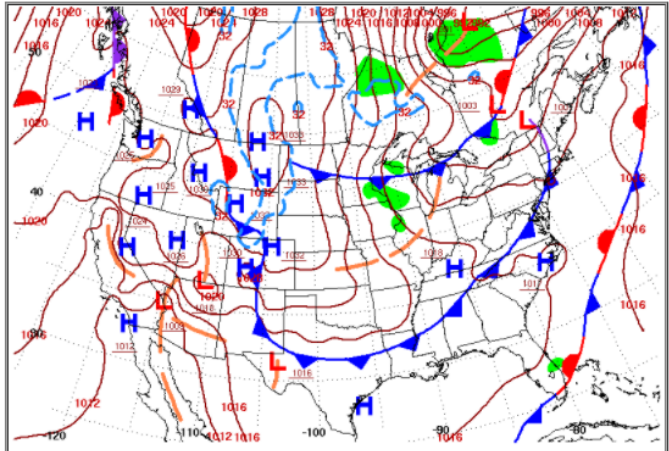
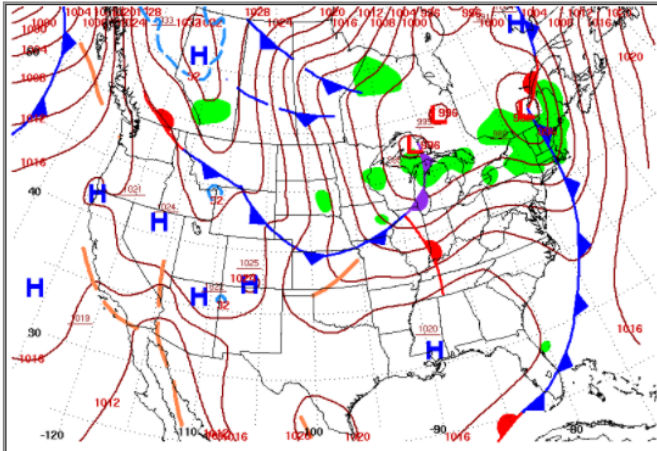
c) September 30-October 4, 2020

Daily Weather Maps

WEDNESDAY SEPTEMBER 30, 2020

Daily Weather Maps

THURSDAY OCTOBER 1, 2020

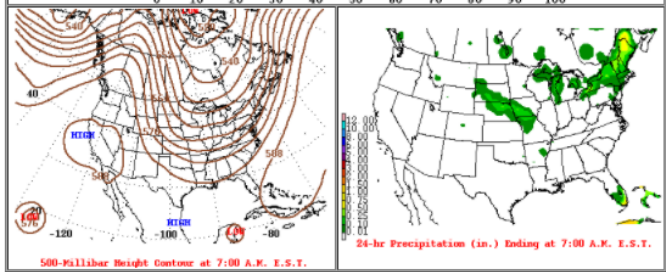
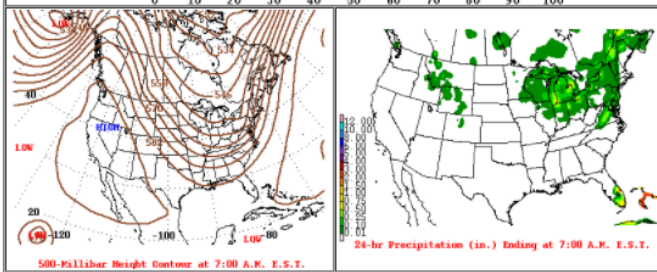
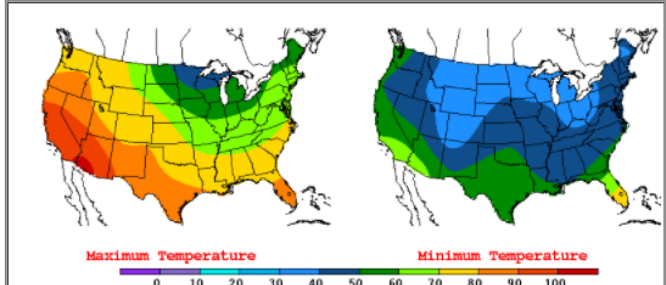
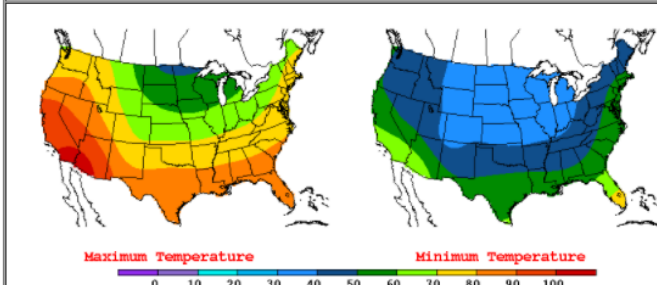
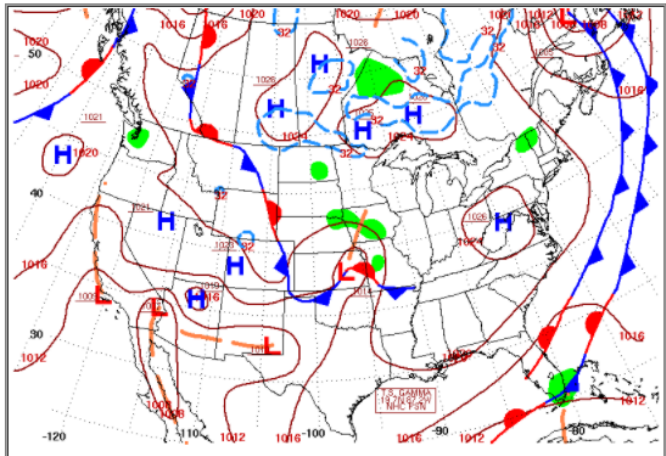
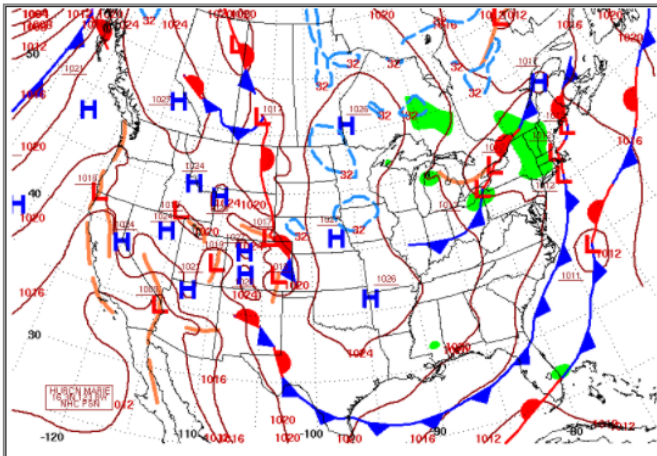


Daily Weather Maps

FRIDAY OCTOBER 2, 2020

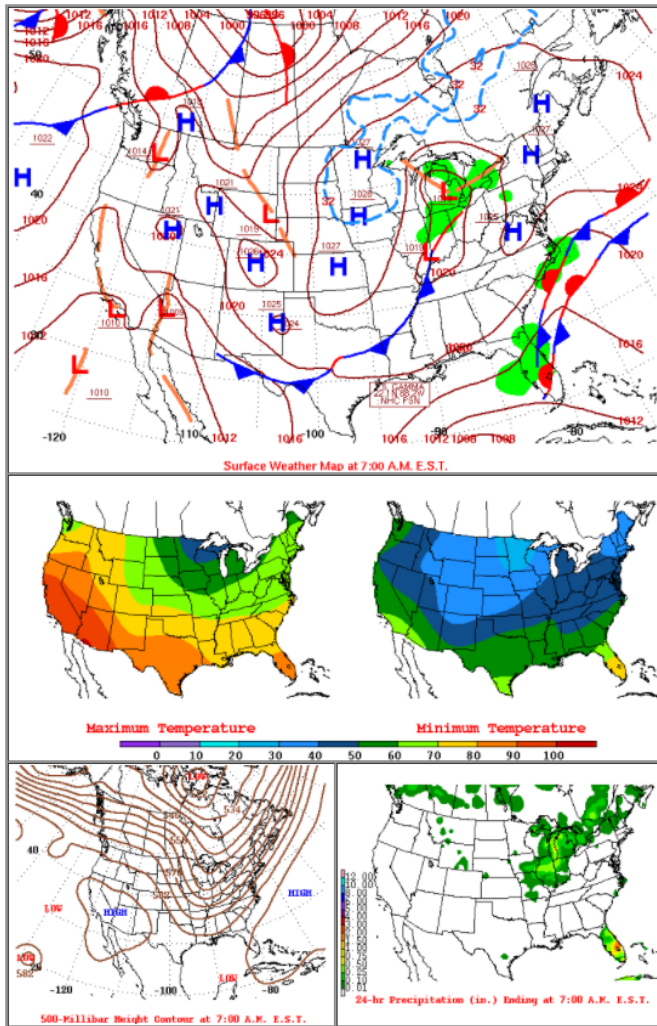
Daily Weather Maps

SATURDAY OCTOBER 3, 2020



Daily Weather Maps

SUNDAY OCTOBER 4, 2020



B. NWS Area Forecast Discussions

Excerpts from pertinent NWS Area Forecast Discussions (AFDs) are presented below, with discussions of the thunderstorms which began the wildfires, smoke impacts, and pertinent meteorological discussions highlighted, with most of the discussion on how the smoke will affect the record-breaking temperatures. The complete AFDs can be found on the Iowa State University Mesonet site.⁶⁵ Air Quality Alerts were not issued by the NWS Sacramento Forecast Office, although the Eureka Forecast Office issued several for their forecast area.

⁶⁵ Iowa State University, Mesonet, [NWS Text Products](#), last accessed 10/8/21

a) August 19-25, 2020

567

FXUS66 KSTO 192057

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

157 PM PDT Wed Aug 19 2020

.SYNOPSIS...

Prolonged heat wave continues today with a break in the extreme heat Thursday and Friday. Critical fire weather conditions will continue for parts of the region through tonight with areas of smoke.

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.DISCUSSION...

GOES-West visible satellite imagery reveals widespread smoke blanketing much of central and northern California as numerous wildfires impact the region. The complex presenting the greatest threats to life and property in the area is the the LNU Lightning Complex - comprised of several fires - which expanded and fanned into Yolo and Solano Counties last night as a result of the northwest winds. Residents are urged to listen to law enforcement for evacuation notices.

Winds are forecast to increase this afternoon, coinciding with peak heating while relative humidity values are at a minimum. Consequently, this combination will produce critical fire weather concerns for communities around the Delta, western portions of the Sacramento Valley, as well as the northern Sierra Nevada and foothills. Additionally, some locations will see poor overnight relative humidity recoveries. A Red Flag Warning remains in effect for these locations through 9 AM PDT Thursday.

Wildfire smoke will likely prevent temperatures this afternoon from realizing their full potential. As a result, highs have been trimmed by a few degrees for most locations today. The Excessive Heat Warning that has been in effect for the last 6 afternoons for the Sacramento and northern San Joaquin Valley is scheduled to expire at 9 PM PDT this evening. Upper level ridge that was responsible for the nearly week-long excessive heat will gradually shift southeastward through the end of the week. While temperatures are forecast to cool by several degrees from now through Saturday, we'll still remain at least 5-10 deg F above normal with temperatures in the upper 90s to low 100s in the Valley. If wildfire smoke persists over the area into the weekend, afternoon highs may need to be trimmed back a bit and overnight lows may require boosting. // Rowe

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.EXTENDED DISCUSSION (Sunday THROUGH Wednesday)...

Ridge of high pressure from the Desert SW strengthens over the weekend, resulting in a warming trend. Heights then lower slightly early next week as short wave troughing enters the PacNW. Highs will remain 5 to 10 degrees above normal through the extended period, with some moderate heat risk impacts. Forecast highs will be in the 97-102 range in the Valley, with mainly 80s and 90s for the mountains and foothills. Dry weather is expected through the period. However, guidance shows another tropical system off the Baja coast over the weekend, lifting NW early next week. Remnant moisture could be entrained in the upper level flow and drawn into NorCal, bringing the potential for thunderstorms. At this point, thunderstorms are expected over the higher elevations of the Sierra Nevada Sunday and Monday afternoon. Associated cloud cover and wildfire smoke could also impact temperature forecast early next week.

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861
FXUS66 KSTO 201015
AFDSTO
Area Forecast Discussion
National Weather Service Sacramento CA

315 AM PDT Thu Aug 20 2020

.SYNOPSIS...

Hot and dry weather with areas of smoke persist for at least the remainder of the week. Thunderstorm chances return to the Sierra Nevada early next week.

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.DISCUSSION...

Numerous large wildfires depicted on IR satellite imagery across NorCal. The strongest heat signatures currently for fires in the CWA are occurring over western Stanislaus and western Glenn Counties. Weather conditions remain warm and dry, though not as extreme as early Wednesday. RH's along the western edge of the Central Valley are in the teens and 20s (up around 10 percent compared to 24 hours ago) and westerly wind gusts are considerably lighter over most of that area. Coastal profiler data indicate the marine layer remains shallow (under 1000 ft in depth), but that's an improvement compared to yesterday and IR difference imagery shows some areas of stratus along the coast.

High pressure retreats a bit today and Friday as a series of short-waves pivot through the PacNW. This will bring minor synoptic cooling to the region and maintain some onshore flow with locally breezy conditions at times, especially in the afternoons and evenings. RH's will remain low, but trend up slightly for most areas.

Smoke from the numerous wildfires will continue to blanket the region, so air quality will be a real problem through at least the end of the week. The smoke will also continue to have significant impact on temperatures, both highs and lows.

Widespread triple digit heat forecast to return to the Central Valley over the weekend as the Southwest ridge rebuilds over NorCal. We'll also be keeping an eye to the south as moisture from Genevieve works its way around the periphery of the Southwest high potentially bringing another round of elevated convection as early as Sunday.

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.AVIATION...

General VFR conditions the next 24 hours, except for local MVFR/IFR conditions possible due to wildfire smoke. Winds remain under 10 knots except for through the Delta and over higher elevations.

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266

FXUS66 KSTO 212105 AAA
AFDSTO
Area Forecast Discussion...UPDATED
National Weather Service Sacramento CA

205 PM PDT Fri Aug 21 2020

.SYNOPSIS...

Hot weather and hazy conditions due to smoke likely persist into early next week. Chances for isolated thunderstorms with little to no rain return Sunday into Tuesday.

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.DISCUSSION...

Visible satellite imagery continues to show a blanket of smoke across interior Northern California as numerous wildfires burn across the state. Hot and dry weather will be seen this afternoon and again tomorrow as high pressure over the Four Corners region influences the area.

Lowered high temperatures slightly for this afternoon due to the continued smoky skies impacting diurnal heating. It does look like temperatures tomorrow will warm up a bit more with highs in the Valley expected to range from the mid 90s to low 100s. Similar temperatures (perhaps a few degrees cooler in some areas) will be seen through Monday and moderate heat risk is expected impacting groups sensitive to heat, including outdoor workers. On top of the heat, poor air quality looks to continue as long as smoke lingers in the Valley and mountains.

Models continue to point to another elevated convective event Sunday continuing through early next week as remnants of moisture from Genevieve move northward across California. Soundings indicate the potential for little to no rain with these storms and dry lightning and gusty, erratic winds would be the main impacts. While storms are more likely in mountain areas, isolated storms across the Valley are not out of the question Sunday into Monday. The potential for storms moves north and east late Monday limited to the Sierra and northern half of the CWA. Adjustments timing and locations likely as models continue to resolve this feature.

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.AVIATION...

MVFR visibilities and/or ceilings are forecast over the next 24 hours as a result of wildfire smoke. Local IFR conditions are possible at times. Winds will generally remain under 10 kt, except through the Delta and over the higher elevations.

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868

FXUS66 KSTO 222111

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

211 PM PDT Sat Aug 22 2020

.SYNOPSIS...

Smoke and haze from wildfires likely to continue to impact air quality and temperatures over interior Northern California this weekend. Thunderstorms with little to no rain possible Sunday into Tuesday. Near to slightly above normal temperatures next week.

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.DISCUSSION...

Smoky conditions continue to be apparent across interior NorCal this afternoon as wildfires burn across the state. Temperatures are still expected to be a few degrees warmer this afternoon than those of yesterday, although dense smoke may inhibit some locations from reaching these higher temps. Moderate to unhealthy air quality is seen across much of the state today, with this trend unfortunately also expected tomorrow. Also, some high clouds have begun to stream over the southern portion of the CWA this afternoon as the remnants of Genevieve make their way northward today and tonight.

The main story of the forecast will be thunderstorm chances beginning tomorrow and continuing through Tuesday morning. Upper moisture makes its way northward into the area tonight along with increasing instability. Models indicate potential for a storm or two mainly over the Sierra in the morning, with the better chances for more widespread convection in the afternoon, continuing overnight into Monday. Storms will have little to no rain as very dry low levels are noted on soundings. Main threats with storms will then be lightning which may create new fire starts and gusty, erratic winds which may impact ongoing fires. A Red Flag Warning has been issued for the entirety of interior NorCal due to this thunderstorm potential. Chances for storms continues Monday afternoon and evening, although instability looks to decrease in the southern Sacramento Valley hinting at better chances for continued storms in the northern portion of the CWA and higher elevations. The threat for storms does look to decrease overnight Monday into Tuesday morning as the upper low lifts to the northeast.

The above normal temperatures seen through the weekend and Monday return to near average values by Tuesday.

&&

.AVIATION...

MVFR/local IFR visibilities and/or ceilings are forecast over the next 24 hours as a result of wildfire smoke. Slant range visibility adversely affected by smoke. Winds will generally remain under 10 kt, except through the Delta and over the higher elevations.

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138

FXUS66 KSTO 232059

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

159 PM PDT Sun Aug 23 2020

..DISCUSSION...

A few high clouds are noted across Northern California via visible satellite early this afternoon, along with building cumulus over the Sierra south of I-80, and smoke across the area due to wildfires. Some weak echoes have begun to pop up in Mono/Alpine Counties with Sierra storms expected into the evening. Storms have been forming along the crest and pushing east with this trend expected to continue.

Main push of activity will be seen this evening into tomorrow as greater instability and moisture overspread NorCal. The 18Z sounding out of Oakland shows an extremely dry layer from the surface to around 800mb supporting little to no rainfall with any storm. Gusty winds still look to be the main threat with around 500J/kg of DCAPE and any lightning will have the potential to start new fires. The Red Flag Warning continues across the area to account for this potential. Hi-res guidance suggests most storms will push out of the area by tomorrow afternoon, with another line of storms tomorrow evening ahead of the main shortwave that moves across NorCal Monday night into Tuesday. From here, drier weather is expected although a shortwave Wednesday night into Thursday may bring additional storm development over far northern California. For now, any storms look to stay north of the CWA.

Hazy and smoky skies will continue for the next couple of days with temperatures expected to be slightly above average.

&&

.EXTENDED DISCUSSION (Thursday THROUGH Sunday)...

Dry weather and above normal temperatures are expected for the latter half of the week. NorCal will be in between the EPac trough and Four Corner's high pressure through Saturday. High pressure will have the most influence on Friday as it briefly expands northwest into NorCal bringing the hottest forecast temperatures of the week with Valley highs from the mid-90s to the low triple digits. This high begins to flatten as troughing strengthens again Saturday into the weekend which may bring back more average temperatures for late August.

&&

.AVIATION...

MVFR/local IFR visibilities and/or ceilings are forecast over the next 24 hours as a result of wildfire smoke. Slant range visibility adversely affected by smoke. Winds will generally remain under 10 kt, except gusts 25-30 kts through the Carquinez Strait after 05z. Vicinity thunderstorms are possible for the TAF sites, especially from Sacramento northwards, but confidence is on the lower end for this.

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363

FXUS66 KSTO 242207

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

307 PM PDT Mon Aug 24 2020

..DISCUSSION...

Activity across our area has diminished for the most part as the first short wave that brought some thunderstorms overnight pushes to the north. Our focus now will be shifting to the closed off low off the coast of Monterey. This will become an open wave overnight and push through NorCal tomorrow. This is going to keep thunderstorm chances in the forecast but they are not expected to be as widespread as last night and we are not expecting any activity in the Valley as mid-levels have dried some compared to last night. Where we will see thunderstorm chances will be in the Coastal Range and mainly the southern Cascade with the best chances late morning Tuesday into the early afternoon. Any thunderstorms that do develop are expected to produce little to no rain and potentially gusty winds.

We will then see a brief period of short wave ridging Tuesday evening into early Wednesday with dry weather. Another short wave trough push through NorCal on Wednesday. Higher moisture will still be in place and we do see some instability build in over the Coastal Range and southern Cascade. A few afternoon thunderstorms will be possible but they look to remain on the isolated side. Models then develop a closed off low on the back side of the short wave trough and that will help to push drier air into CA and diminish the thunderstorm threat.

Smoke from wildfires will continue to have a major impact on air quality across the region and you can expect this to continue for at least the next several days. It will also have some impacts on high temperature forecasts and will make it a challenge. Overall we will see highs a bit above average but where smoke is dense you can expect temperatures to be held down a few degrees.

-CJM

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.EXTENDED DISCUSSION (Friday THROUGH Monday)...

A closed off upper level low will be spinning off of the coast of the Bay Area for the start of the extended period. The closed off upper level low will dive south some by the end of this week which will allow slightly higher heights over us and a slight warm up with highs in the Valley pushing back to near 100. The extended

forecast gets a bit more interesting Sunday into early next week. Long range models dig a trough into the PacNW Sunday and into the Great Basin early next week. This could bring a north wind event to our area but looking at the WPC clusters there is a lot of uncertainty on the placement of this trough and a widespread in the ensembles. It is something that needs to be watched though. No precip is expected during the extended period.

-CJM

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.AVIATION...

Areas of MVFR conditions with local IFR possible for the next 24 hours due to wildfire smoke. Surface winds generally 12 knots or less except in the Delta vicinity where gusts up to 25 knots are possible.

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687

FXUS66 KSTO 252125

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

225 PM PDT Tue Aug 25 2020

.SYNOPSIS...

Smoke and haze from wildfires will continue to impact air quality and temperatures over interior Northern California for the next several days. Overall dry weather this week but a few late day storms will be possible over the mountains into mid-week. Slightly above average high temperatures.

&&

.DISCUSSION...

A short wave trough continues to make its way through NorCal this afternoon. This is kicking off showers and a few thunderstorms over NV and into far NE CA. We are seeing some instability over the Coastal Range and southern Cascade with meso-analysis showing about 500 j/kg of MLCAPE and about 1000 j/kg of MUCAPE. The majority of the forcing has pushed east and that will limit activity in our area but an isolated shower or t-storm will be possible over the next few hours over the Coastal Range and southern Cascade. Short wave ridging builds in overnight with dry conditions.

We will see another short wave trough track over the region tomorrow. Instability builds into the northern half of the area by the afternoon. Moisture will remain in place with Pwats between 0.75" and 1.25" but overall soundings are very dry even at the mid-levels. This will really limit any activity over the area but a few isolated storms can't be ruled out over the Coastal Range and southern Cascade. For both today and tomorrow if we see any thunderstorms develop they will carry a risk of gusty outflow winds and produce little to no rain.

Quieter weather settles in for the rest of the week as an upper level low develops off the coast of the Bay Area. That will keep our seasonally warm temperatures in place at least through Thursday. Temps warm a few degrees more for Friday as the upper level low pushes south and west just a bit allowing for slightly higher heights.

-CJM

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.EXTENDED DISCUSSION (Saturday THROUGH Tuesday)...

As we head into the weekend we will continue to see an upper level low closed off of the coast of the Bay Area. With a lack of moisture in place this upper level low will have little impact on our weather keeping things quiet. Highs for the weekend will be seasonably warm. The forecast does get a bit more interesting as we head into early next week. We will see a trough dig into the PacNW and then into the Great Basin in the Monday/Tuesday time range. Both the GEFS and EC ensemble are in better agreement with timing and location of this trough today but the WPC clusters still show a wide range of possibilities. Either way it is something to keep a close eye on as it could result in a north wind event for northern CA. Highs remain seasonably warm into early next week but could change depending on the trough placement.

-CJM

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.AVIATION...

Areas of MVFR conditions continue due to FU/HZ from wildfires with local IFR possible at times. Surface winds generally below 12 knots with the exception of the Delta vicinity where gusts up to 25 knots are possible.

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b) September 3-15, 2020

746

FXUS66 KSTO 032121

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

221 PM PDT Thu Sep 3 2020

.SYNOPSIS...

Smoke and haze from wildfires will continue to impact air quality and temperatures this week. Dry weather and above average temperatures expected through Friday. Record heat is possible over the Labor Day weekend into early next week.

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.DISCUSSION...

Mostly clear skies have been observed again this afternoon across much of central and northern California. Visible satellite imagery does reveal smoke impacting various communities in northern California, but does not appear to be as widespread compared to past days. Temperatures are generally running at or slightly ahead of what they were this time yesterday afternoon. By the time the afternoon concludes, expect highs to warm to the middle 80s around the Delta up to around 100 deg F near Redding. These values equate to about 2 to 5 deg F above normal.

&&

..AVIATION...

VFR conditions are expected to prevail at the terminals with local areas of MVFR/IFR at times in the vicinity of wildfire smoke. Surface winds generally below 12 kts, except for local gusts to 25-35 kts possible vicinity Delta.

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089
FXUS66 KSTO 042140
AFDSTO
Area Forecast Discussion
National Weather Service Sacramento CA

240 PM PDT Fri Sep 4 2020

.SYNOPSIS...

Dangerous, record-breaking heatwave will impact the region through the Labor Day weekend and into next week. Critical fire weather concerns will return late Monday night through early Wednesday with north Valley winds and downslope east winds over the foothills. **Smoke and haze from wildfires will continue to impact air quality.**

&&

.DISCUSSION...

Another day with mostly clear skies throughout the central and northern California interior. **There are some areas of smoke on visible satellite imagery, largely associated with the August Complex.** High temperatures this afternoon will max around in the 90s to low 100s in the Sacramento Valley, or about 3 to 8 deg F above normal. Unfortunately, today looks to be one of the the coolest days in the 7-day forecast...

A very strong and broad upper level ridge will strengthen over the southwestern United States over the next several days, bringing multiple days of excessive and likely record-breaking heat to many communities in California. Forecast models show geopotential heights at 500 mb rising to about 598 dm with 850 mb temps around 30 deg C on Sunday over the area, coinciding with peak heating. At the surface, this will easily translate to temperatures 15 to 20 deg F (or more) above normal with widespread triple digits. Overnight lows will remain mild with many locations only dropping to the 70s and even low 80s.

Putting this into perspective with climatology: the daily normal high in Downtown Sacramento for September 6 is 90 deg F, the daily September 6 record is 105 deg F, and the September monthly record is 109 deg F. The official forecast presently has 111 deg F for Sacramento. What's even more remarkable is that other guidance goes even hotter. Now, wildfire smoke could prevent maximum heating potential, but regardless, a late season heatwave will undoubtedly impact many with high to very high heat risk for the entire population. Consequently, the Excessive Heat Warning goes into effect at 11 am PDT Saturday for the entire Sacramento and northern San Joaquin Valleys, as well as the foothills and mountains below 5,500 ft elevation.

// Rowe

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.EXTENDED DISCUSSION (Tuesday THROUGH Friday)...

Guidance continues to show favor the track of trough dropping south through the eastern Great Basin and Rockies Tuesday and Wednesday. A track of this type is often too far east to deliver significant winds to NorCal. However, this situation is a bit different, as strong surface pressure gradient will be the driver of enhanced winds in the absence of upper level wind support. This gradient will develop from a strong surface high pressure system dropping south from Montana into the central Rockies, while surface low pressure system sits off the coast of northern California.

Current thinking is that we will see 10 to 20 mph winds across the Valley with gusts peaking around 30 mph. Downslope winds for the Sierra and foothills might be a touch stronger, as the gradient is a bit tighter there. Current forecast has gusts up to 40 mph for eastern Tehama and Butte counties, and western Plumas County (fire weather zones 266 and 268 / public zones 66 and 68); however, it's possible we could see gusts up to 50 mph for favored gaps and passes. Given that these winds will come after a prolonged heat event and humidity values are expected to be poor, we have issued a Fire Weather Watch for all of interior northern California from 5Z Tuesday (10PM Monday) through 15Z (8AM) Wednesday. High temperatures in the upper

90's to low 100's Tuesday and Wednesday will cool slightly back to low and upper 90's Thursday and Friday. Dry weather will prevail through the extended.

&&

.AVIATION...

VFR conditions are expected to prevail at the terminals with local areas of MVFR/IFR at times in the vicinity of wildfire smoke. Surface winds generally below 12 kts, except for local gusts to 25-30 kts possible vicinity Delta.

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712

FXUS66 KSTO 052050

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

150 PM PDT Sat Sep 5 2020

.SYNOPSIS...

Dangerous, record-breaking heatwave will impact the region through the Labor Day weekend and into next week. Critical fire weather concerns will return late Monday night through early Wednesday with north Valley winds and downslope east winds over the foothills. Smoke and haze from wildfires will continue to impact air quality.

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.DISCUSSION...

Strong high pressure will bring record heat to the interior valley the next couple of days with temperatures near 110 most locations to 114 over the north end of the valley. On Monday night a low pressure area moving south through the Eastern Great Basin and Rockies will result in strong surface high pressure developing over the Great Basin. This will bring breezy to locally windy conditions late Monday night and Tuesday and high fire danger to the region. The winds will decrease Tuesday night for most areas but will increase once again in the mountains and foothills for areas prone to easterly winds. Expect North to east winds for the valley around 10 to 20 mph with gusts up to 30 mph. Mountains and foothill winds around 20 to 30 mph with gusts up to 50 mph.

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.AVIATION...

Overall we will see VFR conditions except from KCIC north where MVFR/IFR will be possible due to wildfire smoke. Winds remain under 12 knots.

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018

FXUS66 KSTO 062112

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

212 PM PDT Sun Sep 6 2020

.SYNOPSIS...

Dangerous, record-breaking heatwave will impact the region through the weekend into Tuesday. Critical fire weather concerns will return Monday night through early Wednesday with north to east wind and low humidity. **Smoke and haze from wildfires will continue to impact air quality and temperatures.**

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.DISCUSSION...

Strong high pressure will bring record heat to the interior valley the today and Monday with temperatures 108 to 112 over the central valley. **Smoke, especially from the creek wildfire has been impacting some of the temperatures so far today. The thicker blanket of smoke is expected to continue to move northeast and east during the afternoon** clearing from the valley which will allow temperatures to rapidly heat up this afternoon.

On Monday night a low pressure area moving south through the Eastern Great Basin and Rockies will result in strong surface high pressure developing over the Great Basin. This will bring breezy to windy conditions late Monday night and Tuesday and high fire danger to the region. The good news is that it will also bring in some cooler air into the region. Have adjusted timing for Excessive Heat Warning as a result dropping the Warning late Monday evening for the mountains, central and north Sacramento valley and adjacent foothills late in the evening since it will be slow to cool off. Further south at this time will be borderline for the warning to continue so have kept it going for now. The bad news is that the cooler air will allow for stronger winds to develop on Tuesday. Expect northerly winds for the valley around 15 to 30 mph with gusts up to 35 mph. The strongest winds will be over the westside of the valley. Northeast to east winds for the Mountains and foothills around 15 to 35 mph with gusts up to 50 mph. Local favored locations will likely have stronger winds and the lighter winds are expected over portions of the lower elevations of the motherlode. The winds will decrease Tuesday night for most areas but will increase once again in the mountains and foothills for areas prone to easterly winds.

Lighter winds on Wednesday will remove the high fire danger. Temperatures will generally cool slightly over Tuesdays highs in the north and mountains with a little bit better cooling over the southern valley and delta areas.

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.AVIATION...

Mainly VFR conditions are expected at the TAF sites the next 24 hours but local MVFR will be possible at times due to wildfire smoke. Winds remain below 10 knots.

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327

FXUS66 KSTO 072126

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

226 PM PDT Mon Sep 7 2020

.SYNOPSIS...

Dangerous, record-breaking heatwave will impact the region into the evening. Critical fire weather concerns will return tonight into early Wednesday with gusty north to east wind and low humidity. **Smoke and haze from wildfires will continue to impact air quality and temperatures today and tonight.**

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.DISCUSSION...

Strong high pressure will bring record heat to the interior valley again today with temperatures 106 to 112 over the central valley. Today, the main smoke is from the wildfires in the coastal range and have been impacting some of the temperatures so far today.

Tonight a low pressure area will move south through the Eastern Great Basin and Rockies and result in strong surface high pressure developing over the Great Basin. This will bring breezy to windy conditions starting later this evening over the north. Very high fire danger will result due to the strong winds, low humidities and dry fuels.

The good news is that it will also bring in some cooler air into the region. The bad news is that the cooler air will allow for stronger winds to develop later tonight and on Tuesday. The current forecast has continued that trend and has increased the winds. The smoke and haze is expected to dramatically improve overnight and tomorrow morning as north to east winds pick up and push the smoke along and off the coast.

Expect northerly winds for the valley around 15 to 30 mph with gusts 25 to 40 mph. The strongest winds will be over the westside of the valley. Northeast to east winds for the Mountains and foothills around 15 to 30 mph with gusts 25 to 55 mph. Local favored locations will likely have stronger winds and the lighter winds are expected over portions of the lower elevations of the Motherlode.

The winds will decrease Tuesday night for most areas but will increase once again in the mountains and foothills for areas prone to easterly winds. Winds may also stay up a little bit over the westside of the valley.

Lighter northerly winds on Wednesday will remove the widespread high fire danger but locally some gusty winds may persist along the far westside of the valley during the day. Temperatures will generally cool slightly over Tuesdays highs in the north and mountains with a little bit better cooling over the southern valley and delta areas.

High pressure will continue on Thursday with better flow expected through the Delta. Winds will be southerly in the Sacramento valley and temperatures are expected to decrease slightly over Wednesdays highs.

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.AVIATION...

Areas of MVFR conditions will be possible the next 24 hours at TAF sites due to wildfire smoke, otherwise VFR conditions expected. Increasing north winds from north to south starting after 22z. Winds become strong out of the north after 15z gusting up to 35 knots.

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.STO WATCHES/WARNINGS/ADVISORIES...

Wind Advisory from midnight tonight to 6 PM PDT Tuesday for Carquinez Strait and Delta-Central Sacramento Valley-Motherlode-Mountains Southwestern Shasta County to Western Colusa County-Northeast Foothills/Sacramento Valley-Northern Sacramento Valley-Northern San Joaquin Valley-Shasta Lake Area / Northern Shasta County-Southern Sacramento Valley-West Slope Northern Sierra Nevada-Western Plumas County/Lassen Park.

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461

FXUS66 KSTO 082152

AFDSTO

Area Forecast Discussion
National Weather Service Sacramento CA

252 PM PDT Tue Sep 8 2020

.SYNOPSIS...

Critical fire weather concerns continue through Wednesday with gusty north to east winds and low humidity. Winds will generally peak this afternoon. Smoke and haze from wildfires will continue to impact air quality and temperatures.

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.DISCUSSION...

Gusty north to east winds continue this afternoon with strong surface pressure gradients. The RNO-SAC gradient peaked at an impressive 13.0 mb around noon, and is currently 12.5 mb. Northerly wind gusts of 30 to 45 mph have spread into the northern Sacramento Valley and surrounding foothill and mountain terrain.

Gusts have been up to 66 mph at Jarbo Gap and at Saddleback, 47 mph at Redding Airport, and 45 mph at Sacramento Executive Airport. Winds have peaked in most locations, but will stay quite gusty until early evening. A Wind Advisory remains in effect until 6 pm.

These winds have combined with the recent very dry and record hot weather to bring in critical fire weather conditions. In addition to strong winds, many locations have seen single digit relative humidity levels. This is some of the most extreme fire weather conditions that have been seen in recent years. The threat will last through Wednesday afternoon, though with decreased winds.

Surface gradients forecast to slacken a bit tonight allowing winds in the Central Valley to weaken, though breezy north winds will continue overnight along the western edge of the valley. Strong east gradient will continue to result in gusty winds over the foothills and west slopes of the northern Sierra, but likely not as strong as early this morning for most areas.

North and east winds decrease by Wednesday afternoon, but it will probably be until Thursday or Friday when onshore flow begins to spread higher RH inland.

Temperatures have today have been significantly lower today 7-13 degrees lower overall. Temperatures will cool further, with Valley highs by Thursday and Friday in the lower 90s. EK

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.AVIATION...

Generally MVFR conditions expected across the region due to wildfire smoke with local areas of IFR. Breezy north winds gusting up to 35 knots diminish to under 20 knots after 2z.

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.STO WATCHES/WARNINGS/ADVISORIES...

Wind Advisory until 6 PM PDT this evening for Carquinez Strait and Delta-Central Sacramento Valley-Motherlode-Mountains Southwestern Shasta County to Western Colusa County-Northeast Foothills/Sacramento Valley-Northern Sacramento Valley-Northern San Joaquin Valley-Shasta Lake Area / Northern Shasta County-Southern Sacramento Valley-West Slope Northern Sierra Nevada-Western Plumas County/Lassen Park.

Lake Wind Advisory from 6 PM to 8 PM PDT this evening for West Slope Northern Sierra Nevada.

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781
FXUS66 KSTO 092138
AFDSTO
Area Forecast Discussion
National Weather Service Sacramento CA

238 PM PDT Wed Sep 9 2020

.SYNOPSIS...

Critical fire weather concerns continue. Winds will decrease, but very dry conditions will persist. **Smoke and haze from wildfires will continue to impact air quality and temperatures.**

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.DISCUSSION...

Satellite imagery shows a HUGE amount of smoke across most of NorCal this afternoon as area wildfires continue to burn. IR imagery indicate intense burning is still occurring over portions of the August Complex, and over most of the perimeter of the Bear Fire. Radar and satellite are also picking up occasional column development on these two fires extending up through the thick overcast layer of smoke.

Very dry airmass remains in place across most of the region with widespread single digit and teens RH, especially across the northern half of the forecast area. Still seeing some local northeast gusts in the teens mph across the north, but onshore flow is attempting a comeback as the strong north and east surface gradients continue to relax and the marine layer deepens. We'll likely see better RH recovery (though still poor over most of the foothills and mountains) than the past few days, and lighter winds are expected, so the red flag will be allowed to expire at 5 PM.

A quieter weather pattern is expected for the remainder of the week as the upper ridge slowly weakens along the West Coast. Moderating RH is forecast to gradually spread inland. Ridge is forecast to begin shifting east over the weekend as an upstream trough over the eastern Pacific approaches bringing stronger onshore flow. **Widespread smoke will continue to affect temperatures the next several days.**

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.EXTENDED DISCUSSION (Sunday THROUGH Wednesday)...

Upper ridge will shift over the Great Basin Region Sunday, as trough approaches the West Coast. Trough will remain over NorCal through mid-week. This will shift pattern to on shore flow, which will bring increased moisture. However, there will also be an increase in southwest winds with possible fire weather concerns from Sunday afternoon through Wednesday. The strongest winds should be over the the upper foothills and mountains, where gusts from 30 to 40 mph will be possible. Brief gusty periods may also occur over the Valley mainly during the late afternoons. A few showers will also be possible over the northern Cascades and northern Sierra Tue/Wed.

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.AVIATION...

Elevated smoke ceilings around 4000 feet will continue for next 24 hours. Local low vis and ceilings near wildfires. Winds generally less than 10 mph, except southwest gusts to 20 mph near the Delta.

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815
FXUS66 KSTO 102124
AFDSTO

224 PM PDT Thu Sep 10 2020

.SYNOPSIS...

Smoke and haze from wildfires will continue to impact air quality and temperatures. Weak weather system will bring onshore flow and periods of gusty winds Sunday through early next week.

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.DISCUSSION...

Wildfire smoke continues to blanket much of California today as seen on visible satellite. Weak north winds have begun to thin out the smoke in some portions of the Valley, but overall smoke and haze are expected to impact NorCal at least through the weekend. The smoke is significantly impacting the temperature forecast for the area, and the models aren't able to capture this. Temperatures early this afternoon are around 5 to 10 degrees cooler than yesterday for many locations. Lowered today's high temperatures from this morning's forecast slightly due to the thick smoke lingering over the area. Also continued to keep high temperatures lower than model guidance tomorrow as smoke is expected to remain over much of the area. After that, there is too much uncertainty to consider adjusting temperatures. It all depends on fire activity, how much smoke is being produced, and how well the winds (near surface and aloft) are able to carry the smoke.

Other than the smoke, the weather pattern is expected to remain fairly quiet through most of the weekend as an upper ridge continues to weaken over the West Coast. This alone would create temperatures near to slightly above normal, but with the smoke, temperatures are likely to be near to slightly below normal.

An approaching trough will begin to push the upper ridge east this weekend, bringing the return of onshore flow. Relative humidity values will slightly increase as the onshore flow returns. As the trough moves inland Sunday, winds are expected to increase, especially over the Sierra. We could see some slightly increased southerly winds in the Valley, but west to southwest winds over the Sierra could be breezy with gusts possibly up to 20 to 30 mph over the higher elevations. This could be an interesting setup with possible localized fire weather concerns. This is discussed further below. HEC

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.EXTENDED DISCUSSION (Monday THROUGH Thursday)...

Pattern shift will occur early next week as an upper level trough approaches the West Coast, resulting in increased onshore flow to the region. These south/southwest winds may lead to periods of elevated and locally critical fire weather conditions, particularly in the foothills and mountains. Fortunately, this onshore flow will also be accompanied with increasing moisture and relative humidity values, and will provide better overnight recoveries to most locations. Can't rule out the slight chance of showers or even an isolated thunderstorm for the Northern Sierra and Coastal Range by Tuesday, but confidence remains low. The GFS is rather bullish when it comes to precipitation chances, amounts, as well as coverage, especially considering it is only September. Not necessarily sold on this solution at this point in time, largely because deterministic guidance can be overly ambitious with the handling of these early season systems. In fact, majority of GFS and ECMWF ensemble members remain dry. That said, will continue to monitor subsequent model runs and examine trends. //

Rowe

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.AVIATION...

MVFR visibilities and/or ceilings as a result of wildfire smoke will continue to impact the terminals over the next 24 hours. Can't rule out periods of IFR conditions. Winds will generally remain at or under 10 kt, except for developing afternoon and evening gusts up to 20 kt in the vicinity of the Delta.

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984

FXUS66 KSTO 112123

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

223 PM PDT Fri Sep 11 2020

.SYNOPSIS...

Smoke and haze from wildfires will continue to impact air quality and temperatures. Weak weather system will bring onshore flow and periods of gusty winds Sunday through early next week as well as a chance of showers to the northern counties Tuesday through Thursday.

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.DISCUSSION...

Widespread wildfire smoke continues to impact Northern California today. The smoke is much closer to the surface today than the past few days for much of interior NorCal, creating hazardous air quality. The temperatures are still being affected by the smoke, as well, which models are not picking up. Have continued to forecast high temperatures below forecast guidance through tomorrow. Temperatures are expected to peak in the 80s, possibly around 90 in the northern Sacramento Valley through the weekend.

An upper level trough begins to approach the coast Saturday, pushing the upper level ridge to the east. Even without wildfire smoke, this would cause temperatures to fall to near normal, but temperatures are expected to be near or below normal in smoke influenced areas.

The trough is expected to begin moving onshore Sunday. Ensembles indicate the main trough axis will slowly move through the Eastern Pacific through early next week with NorCal remaining in the lee side of the trough. Onshore flow is expected to return Sunday through next week, which will slowly bring more moisture into the area. However, the main impact with this trough is gusty afternoon and evening winds Sunday and Monday. The Valley could see southerly gusts up to 20 to 25 mph and the higher Sierra gusts up to 25 to 35 mph, locally higher at wind prone areas. These winds could bring potential fire weather concerns, especially since fuels remain extremely dry, but the increasing humidity will limit the concern for now. HEC

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.EXTENDED DISCUSSION (Tuesday THROUGH Friday)...

Upper level trough will slowly approach the West Coast heading into next week. Forecast guidance has been generally consistent from run-to-run with respect to the anticipated onshore flow that will return to the region. For the Sacramento Valley and northern Sierra, this will result in south/southwest winds that will peak during the afternoon and evening hours, then subside after sunset. Fortunately, this onshore flow will also be accompanied with a day-to-day and night-to-night uptick in relative humidity values. That said though, the timing of the afternoon breezes coinciding with the daily minimum relative humidity values may lead to brief periods of elevated and perhaps locally critical fire weather concerns.

Models have been hinting at some light precipitation chances as the upper low moves onshore, but the timing has been inconsistent from run-to-run. For now, leaving the NBM probability of precipitation untouched in the grids, which introduces the slight chance of light rain showers from Tuesday onward for the coastal range, the northern Sacramento Valley, as well as parts of the northern Sierra. Probability of thunder remains under 10 percent at this time, but will continue to keep a close eye on the trends as models get a better handle on the timing and placement of this system. // Rowe

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.AVIATION...

MVFR visibilities and/or ceilings as a result of wildfire smoke will continue to impact the terminals over the next 24 hours. Furthermore, can't rule out periods of IFR conditions. Winds will generally remain at or under 10 kt, except for developing afternoon and evening gusts up to 20 kt in the vicinity of the Delta.

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246

FXUS66 KSTO 122141

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

241 PM PDT Sat Sep 12 2020

.SYNOPSIS...

Smoke and haze from wildfires will continue to impact air quality and temperatures. Weak weather system will bring onshore flow and periods of gusty winds Sunday through early next week as well as a chance of showers to the northern counties mid-week. A Fire Weather Watch is in effect Monday for the southern Cascades and foothills due to gusty winds and low RH.

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.DISCUSSION...

Visible satellite this afternoon shows upper level wildfire smoke is not as prevalent over northern California, though smoke is still relatively thick near the surface. Air quality remains Unhealthy to Hazardous for most of the area according to AirNow. This smoke is still impacting temperatures somewhat with high temperatures at most locations a few degrees below forecast guidance. Highs this afternoon across the Valley will generally range from the mid 80s to low 90s, with mountain temperatures peaking in the 70s. Similar temperatures are expected Sunday.

An upper level trough approaching the West Coast today is pushing the upper level ridge east. Ensembles continue to indicate that the main axis of this trough will remain offshore through mid to late week, with NorCal remaining on the lee side tomorrow through early next week. The main impact will be breezy onshore winds and possibly cooler temperatures. Ensemble guidance has had a hard time with exact highs (with a range of roughly +/- 3 degrees) due to the wildfire smoke, although would trend towards normal to below normal temperatures due to the troughing and any smoke in the area.

Onshore winds will begin to increase in the afternoon and evenings tomorrow into early next week as the trough continues its slow progress towards the PacNW into NorCal. The strongest winds are expected Monday. The Valley could see southerly gusts anywhere from 20-25 mph, locally stronger in the Delta and its vicinity. In the high Sierra, southwest to westerly gusts up to 30-35 mph are possible with locally higher values in wind prone areas. Although the onshore flow should slowly increase humidity, these winds will bring some local fire weather concerns as fuels continue to be dry. A Fire Weather Watch has been issued for the southern Cascades and adjacent foothills Monday morning through 8pm Monday evening where minimum daytime relative humidity will remain in the teens and active wildfires could be impacted by the gusty winds.

Ensembles have backed off on the chance of precipitation on Tuesday as models slow the progress of the trough. Temperatures will remain near or slightly below normal with continued localized gusty south to west winds. HEC

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.AVIATION...

Widespread MVFR conditions continue next 24 hours due to wildfire smoke. Areas of IFR conditions with local LIFR possible at times. Surface wind gusts under 10 kts.

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199

FXUS66 KSTO 132135

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

235 PM PDT Sun Sep 13 2020

.SYNOPSIS...

Smoke and haze from wildfires will continue to impact air quality and temperatures. A weak weather system will bring onshore flow and periods of gusty winds beginning today through next week as well as a slight chance of showers in the northern counties late-week. A Red Flag Warning is in effect Monday for the southern Cascades and foothills due to gusty winds and low RH.

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.DISCUSSION...

Visible satellite is showing a stream of thick smoke moving through NorCal today originating from the SQF Complex wildfire in southern California. This smoke has kept much of the valley socked into smoke this morning. The valley is now beginning to clear as this stream is moving east into the foothills and Sierra. Expecting temperatures to behave similar to yesterday. Once the thicker smoke cleared in the afternoon, enough sun was able to penetrate through the smoke and raise surface temperatures to near model guidance forecast. So, temperatures are expected to peak in the upper 80s to low 90s across the Valley and foothills and 60s to 80s in the mountains.

Upper level ridging has been pushed over the Great Basin as an upper level trough begins to move onshore this afternoon. Ensemble guidance continues to indicate the main trough axis will slowly move through the eastern Pacific and form a closed low offshore through midweek. Northern California is expected to remain in the lee side of the trough with the main impact being a return of onshore flow and locally gusty winds in the afternoons and evenings this week. Winds are expected to be strongest today and tomorrow, mainly over the northern Sacramento Valley today and over the mountains. South to southwest winds in the Valley may gust up to 20-25 mph each afternoon with the strongest winds in the northern Sac Valley and the Delta. In the high Sierra, expect some west to southwest gusts up to 35 mph, with the stronger winds seen Monday afternoon. However, one caveat with the development of these winds is the wildfire smoke. If it is too thick, upper level winds may not be able to mix down to the surface, limiting the strength of near surface winds.

Although the onshore flow should slowly increase humidity, these winds will bring some local fire weather concerns as fuels continue to be dry and the areas where our wildfires are burning remain dry with poor overnight recoveries last night. Gusty winds are beginning to develop this afternoon, and GOES West satellite Fire Temperature RGB product is showing multiple wildfires flaring up along the edges, even with observed wind gusts only around 5 to 15 mph so far. The Fire Weather Watch has been upgraded for the southern Cascades and adjacent foothills for 11am through 8pm Monday where minimum daytime relative humidity will remain in the teens and active wildfires could be impacted by the gusty winds.

Another aspect with the upper trough is the stronger westerly winds aloft could possibly blow wildfire smoke to the east and begin to clear out parts of NorCal. However, this could also bring offshore smoke over the area initially, and smoke from active wildfires will continue to impact areas nearby. For now, still expecting haze and areas of smoke to remain over much of the forecast area through midweek.

Ensembles continue to slow the movement of the trough moving onshore, so precipitation chances have diminished over NorCal for Wednesday. Otherwise, temperatures are expected to remain near or slightly below normal this week under the influence of the trough and potential wildfire smoke. -HEC

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.AVIATION...

Widespread MVFR conditions continue for the next 24 hours due to wildfire smoke. Areas of IFR conditions with local LIFR possible at times. Southerly winds up to 15 knots, up to 30 knots vicinity of Carquinez Strait and Delta.

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708

FXUS66 KSTO 142136

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

236 PM PDT Mon Sep 14 2020

.SYNOPSIS...

A Red Flag Warning is in effect through 8 pm this evening for the southern Cascades and foothills due to gusty winds and low RH. A Delta breeze this evening will result in some minor clearing of Smoke and haze in the central and southern Sacramento and northern San Joaquin valleys this evening, but it will be short lived. The smoke and haze is expected to return Tuesday which will continue to impact air quality and temperatures. A weak weather system will bring bursts of onshore flow and periods of gusty winds through the Delta and higher terrain this week. On Thursday a cold front is expected to move across Northern CA bringing stronger winds, cooler air and a slight chance of showers and thunderstorms in the northern counties and mountains.

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.DISCUSSION...

A weather system off the Pacific Northwest Coast will influence our weather across NorCal this week. The first push of energy will arrive this afternoon/evening in the form of a return to onshore flow and the delta breeze. We may see some clearing in the Central and southern Sacramento and northern San Joaquin Valley as a result, but it will be short lived. In the higher terrain, the winds have increased, and we still have a pocket of low humidity values in the northern Sierra and Cascade mountains and Foothills. Therefore, a Red Flag warning remains in effect through 8 pm this evening. The weather system will park itself off the Pacific Northwest coast most of the week, finally moving inland toward the end of the week. As it moves ashore, a surface cold front will move through NorCal on Thursday, bringing breezy to locally gusty winds to much of the region. In addition, there will be a slight threat of showers and isolated Thunderstorms along and behind the front. The return of onshore flow will increase humidity across the region, so that will decrease the fire weather threat some.

Because of the return of onshore flow, the smoke will be fluctuating which will make the max temperature forecast in the valley tricky. The airmass supports highs in the valley at to slightly above normal, which is in the upper 80s for this time of year. With the expectation there will be periods of breezy winds each afternoon and evening the highs should reach their forecast High temperatures. Thursday and Friday, with the cold front, expect temperatures to cool to below average in the lower 80s Thursday and the upper 70s Friday throughout the valley.

Mead

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.AVIATION...

Widespread MVFR will continue for the TAF sites due to wildfire smoke with IFR possible at times. Visibility may improve to VFR for a time during the evening and overnight for the Sacramento area airports but MVFR conditions likely to return during the morning. Winds remain under 12 knots.

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861

FXUS66 KSTO 152128

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

228 PM PDT Tue Sep 15 2020

.SYNOPSIS...

Smoke and haze will continue to impact air quality and temperatures. A weather system off the PacNW coast will keep onshore flow and periods of gusty winds through the Delta and higher terrain this week. Stronger winds, cooler air, and a slight chance of showers and thunderstorms in the far northern counties and mountains possible late Thursday into Friday. Dry weather returns for the weekend.

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.DISCUSSION...

Onshore flow will create another delta breeze again this evening thanks to the weather system parked off the Pacific Northwest coast. Like last evening, likely just the central/southern Sacramento and northern San Joaquin will see the benefits of the winds improving smoke conditions. Northern Sacramento valley and the foothills will unfortunately stay in the muck. The Creek and western flank of the North fires are pretty active this hour, sending more smoke into the air. This weather scenario will be on repeat for tomorrow as well. This onshore flow is also bringing more moisture to the region, helping to increase humidity levels. This is good news for fire fighting efforts.

The weather system off the Pacific Northwest coast will deepen and eventually move across the NW CONUS Thursday and Friday. A cold front will swing through Northern California late Thursday and Friday, but the models have backed off on the winds associated with this frontal passage. Will likely see wind gust to 20 mph in the Valley Thursday evening, and up to 35 mph in the mountains. The cold front will also usher in a few days of cooling with high temperatures being below normal for this time of year by 6-12 degrees Friday. Winds will remain breezy over the Sierra/Southern Cascades Friday as the weather system and associated cold front slowly move east. Precipitation chances with this system remain limited mainly to the northern portion of the Sacramento Valley and the Coastal/Cascades and northern Sierra mountains. Best rain chances look to be late Thursday continuing through Friday. Thursday evening may see enough instability that an isolated thunderstorm will be possible.

Mead

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.EXTENDED DISCUSSION (Saturday THROUGH Tuesday)...

The upper level trough will be pushing off to the east for the start of the extended period. This will bring light northerly flow to the region for Saturday. Zonal flow to slight troughing will then set up for

the remainder of the period. This will keep quiet weather in place for NorCal. Highs will be warming back up to near average on Saturday and will remain there into next week.

-CJM

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.AVIATION...

Widespread MVFR conditions will continue for the TAF sites due to wildfire smoke with IFR conditions possible at times. Visibility forecast to improve to VFR this evening at the Valley TAF sites except for KRDD and KRBL where MVFR conditions may continue into evening. Winds generally under 12 knots.

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c) September 29-October 4, 2020

030

FXUS66 KSTO 292051

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

151 PM PDT Tue Sep 29 2020

.SYNOPSIS...

Above normal temperatures and very dry conditions will continue through much of the week. Areas of wildfire smoke will drift over interior Norcal for the next couple of days. A slight cooling trend is expected for the weekend, although temperatures remain slightly above normal.

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.DISCUSSION...

A high amplitude upper ridge remains across the area this afternoon and will persist through most of the week. This feature will bring above average temperatures to interior NorCal with highs running as much as 10 to 15 degrees above normal. Bumped up highs a bit today with the exception in the northern Sacramento Valley where the more dense smoke is confined due to the Zogg Fire. Valley highs this afternoon will be in the upper 90s with mountain temperatures generally in the 70s. Areas of moderate heat risk remain for the Valley and foothills before through Friday which may impact sensitive groups including outdoor workers.

Extremely dry conditions with poor overnight recoveries will be seen each day, although winds will generally be lighter for the rest of the short term forecast. The exception may be Wednesday night into Thursday where some breeze east winds are possible across the Sierra and eastern foothills.

With wildfires continuing to burn across Northern California, smoke will continue to impact temperatures, local visibility, and air quality. For current air quality information, check fire.airnow.gov.

.EXTENDED DISCUSSION (Saturday THROUGH Tuesday)...

The persistent ridge seen through the week finally begins to weaken and shift into the Great Basin Sunday as upper low approaches California then lingers along the coast early next week. Dry weather looks to continue with the main impact being a slight cooling trend, although temperatures remain slightly above average for early October. With wildfires continuing to burn, any smoke may impact temperatures for the extended.

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.AVIATION...

Mostly VFR conditions with some MVFR possible due to area wildfire smoke. Winds generally under 12 KTS with gusts to 20 kts possible through the Delta.

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497

FXUS66 KSTO 302052

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

152 PM PDT Wed Sep 30 2020

.SYNOPSIS...

Above normal temperatures and very dry conditions will be seen through Friday. Areas of wildfire smoke will impact interior NorCal for the next couple of days. Continued dry weather and a slight cooling trend is expected for the weekend, although temperatures remain slightly above normal.

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.DISCUSSION...

Hot, dry, and smoky conditions are seen this afternoon across Northern California as a high amplitude upper ridge continues to reside across the west coast. Smoke from area wildfires has reached most locations in NorCal this afternoon with air quality ranging from moderate to unhealthy. Even with this smoke, temperatures early this afternoon have already reached into the low 90s in the Valley, expected to peak into the mid and upper 90s before sunset. Similar temperatures are expected tomorrow and Friday with little change in the dominant upper ridge. Moderate heat risk will be seen across the Valley and foothills through Friday and groups sensitive to heat, including outdoor workers, should take precautions to stay cool.

Winds increase slightly this evening in the Southern Sacramento/Northern San Joaquin Valley with some gusts up to near 25 mph are possible through the evening. Over the northeast foothills and western slopes of the Sierra Nevada, some locally gusty winds are also possible later tonight into tomorrow. With these locally gusty winds and extremely dry conditions and poor overnight recoveries, there may be a brief period of increased fire weather concerns.

Ridging begins to weaken slightly on Saturday bringing onshore flow and slightly cooler temperatures, although highs will still be above average for early October.

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.EXTENDED DISCUSSION (Sunday THROUGH Wednesday)...

Persistent upper ridging over California finally begins to break down and move east into the Great Basin on Sunday due to a mesoscale low moving towards the west coast. Dry weather continues with slight cooling trend seen in temperatures through mid-week. Average temperatures in the low to mid 80s may be seen in the Valley by Wednesday.

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.AVIATION...

General VFR conditions except for some areas of MVFR/IFR conditions due to wildfire smoke. Surface winds generally under 12 kts except local gusts up to 20-25 kts possible through the Delta after 00z.

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800

FXUS66 KSTO 012118

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

218 PM PDT Thu Oct 1 2020

.SYNOPSIS...

Above normal temperatures and very dry conditions will be observed through Friday. **Areas of wildfire smoke will impact interior NorCal for the next couple of days.** Continued dry weather and a slight cooling trend is expected for the weekend, although temperatures remain above normal.

&&

.DISCUSSION...

Visible satellite imagery reveals yet another smoky afternoon for much of central and northern California as the region's wildfires continue to burn. In addition to the smoke, temperatures will soar to near-record levels for many communities by the time the afternoon wraps up. The October 1st record high for Downtown Sacramento is 101 deg F, and we're presently forecasting a high of 100 deg F. Redding, Red Bluff, Stockton, and Modesto will all similarly be within a few degrees of their respective daily record highs. For comparison, the normal October 1st high temperature for Sacramento is 84 deg F. A Heat Advisory is in effect for the Delta region through this evening as areas of high heat risk impact communities such as Vacaville and Fairfield.

Another stat worth mentioning: today Downtown Sacramento tied the record for the most number of 90 deg F days in a calendar year, which is 110 days (first set in 1984). While 90 deg F may not be considered an extremely hot threshold for Sacramento, it is certainly a stat worth acknowledging and recognizing. Over the present climatological normal period (1981 to 2010), the mean number of 90 deg F days per year for Downtown Sacramento is around 86. Meteorological summer (June-July-August) was the hottest on record for Downtown Sacramento, and the month of September was also the hottest on record for the city.

In addition to the above normal temperatures, offshore pressure gradients will allow dry northerly to easterly winds to continue through Friday. This will continue to bring locally breezy conditions to wind-prone areas (e.g., Jarbo Gap) along with moderate to poor overnight relative humidity recoveries.

Ridge begins to weaken over the weekend and into early next week. This will allow temperatures to moderate back to the middle 90s for Saturday, and 80s to low 90s by Sunday. That said, continued wildfire smoke may prevent afternoon highs from realizing their fullest potential.

// Rowe

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.AVIATION...

Widespread MVFR with local IFR conditions due to wildfire smoke expected across the Central Valley next 24 hours. Surface wind gusts generally under 12 kts except local north to east winds for the northern Sierra where gusts may exceed 20kt. &&

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FXUS66 KSTO 022124

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

224 PM PDT Fri Oct 2 2020

.SYNOPSIS...

Above normal temperatures and very dry conditions continue through early next week with **areas of wildfire smoke affecting portions of interior NorCal**. Cooling trend begins midweek.

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.DISCUSSION...

Visible satellite shows wildfire smoke and haze continuing to impact much of Northern California today. A steep upper ridge remains in place over the West Coast, creating well above normal temperatures and very dry conditions. Temperatures early this afternoon are around 2 to 10 degrees cooler than this time yesterday. The wildfire smoke will likely limit temperatures a few degrees below forecast guidance, but even with that temperatures are still expected to top around 10 to 20 degrees above normal today.

The upper level ridge axis will shift slightly to the east tomorrow, then broaden and shift over the Great Basin area by Sunday. Ridging is expected to remain in place through early next week. Temperatures are likely to be a few degrees cooler across the area tomorrow, cooling another 5 to 10 degrees for Sunday and Monday. However, temperatures Sunday into Monday will remain around 5 to 10 degrees above normal for early October, peaking in the upper 80s to low 90s across the Valley and foothills.

Winds under the ridge will remain fairly light and diurnally driven which will allow the wildfire smoke and haze to continue to linger across NorCal at least through the weekend. Also, relative humidities will remain very low across interior NorCal. Daytime RH forecast remains in the single digits to 20s with poor recoveries in the teens and 20s in parts of the Valley and foothills. HEC

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.AVIATION...

Going with some persistence forecasting since we won't see much change in terms of the weather pattern. **The question will be how the smoke pans out. Current thinking is that much the Valley and foothill locations will continue to see widespread MVFR conditions, with local IFR being possible**. Surface wind gusts generally under 12 kt except local southwest gusts 15-20 kt vicinity Carquinez Strait and west Delta after 06Z.

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287

FXUS66 KSTO 032033

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

133 PM PDT Sat Oct 3 2020

.SYNOPSIS...

Above normal daytime highs today, gradually cool to below normal by Thursday. Threat of widespread precipitation Friday into next weekend. **Wild fire smoke will continue to influence air quality and temperatures**.

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.DISCUSSION...

High pressure over the western states will gradually weaken over the next several days. Winds will continue to be light with weak flow through the Delta. As a result only minor changes in air quality should be expected the next couple of days for the interior and slightly cooler temperatures.

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.AVIATION...

Persistence forecast next 24 hours with widespread MVFR and local IFR conditions from wildfire smoke expected to continue across the Central Valley. Surface wind gusts generally under 12 kts.

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602

FXUS66 KSTO 042103

AFDSTO

Area Forecast Discussion

National Weather Service Sacramento CA

203 PM PDT Sun Oct 4 2020

.SYNOPSIS...

Above normal high temperatures gradually cool to below normal by Thursday. Threat of widespread precipitation Friday into next weekend. Wild fire smoke will continue to influence air quality and temperatures.

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.DISCUSSION...

High pressure over the western states will gradually weaken over the next several days. Winds will continue to be light with weak flow through the Delta although winds will likely increase just enough to help disperse some of the smoke within the valley. As a result expecting some improvement each day in air quality and little change in temperatures. Wednesday and Thursday we should start to see a cooling trend as a trough deepens over the west coast. Thursday should bring an increase in wind speeds over the interior that may cause some issues with the wildfires.

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.EXTENDED DISCUSSION (Thursday THROUGH Sunday)...

Cooler and a chance of wet weather possible late this week as a trough deepens in the Gulf of Alaska and infuses moisture into the system from Hurricane Marie. Models have reduced the chances of significant precipitation as it now moves the low down along the coast rather than pushing it inland Friday into Saturday. There are still some timing differences between the European and the GFS models and strength of the system.

Both the European and GFS bring a second trough over the region on Saturday and Saturday night with the European model indicating much more rainfall. Should the second one develop as strong as the European is indicating we may be thinking about some snow over the higher elevations of the Sierra Nevada. Breezy to windy northerly winds may develop on Sunday behind the weather system that could increase wildfire concerns if we dont get a decent amount of precipitation.

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.AVIATION...

Persistence forecast next 24 hours with areas MVFR and local IFR conditions from wildfire smoke expected to continue across the Central Valley. Surface wind gusts generally under 12 kts.

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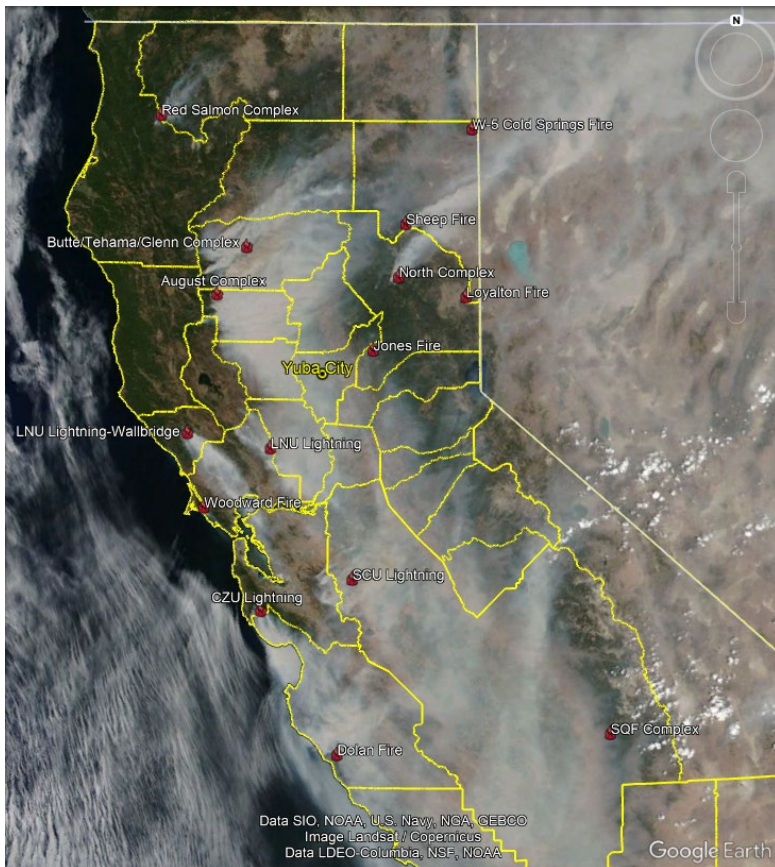
III. Transport

A. Daily Impacts from Active Wildfires

Google Earth application was used to overlay locations of the Yuba City monitor and wildfires active each day during each event period with images from the Suomi National Polar-orbiting Partnership (Suomi NPP) satellite.⁶⁶ These images show the smoke emissions from the active wildfires available for transport to the Yuba City monitor. Forward trajectories from each wildfire are shown in the Section B.

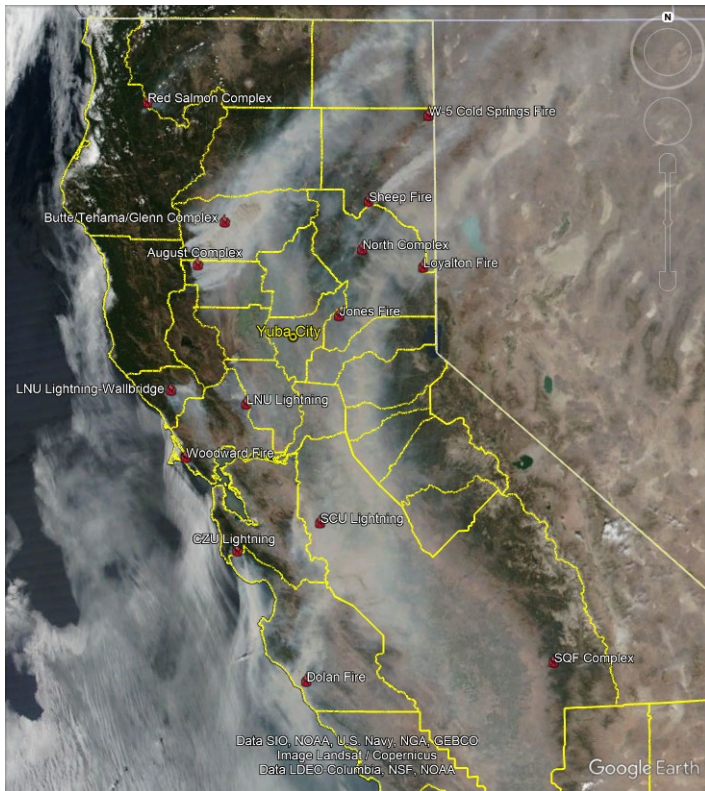
a) August 20-25, 2020

August 20, 2020

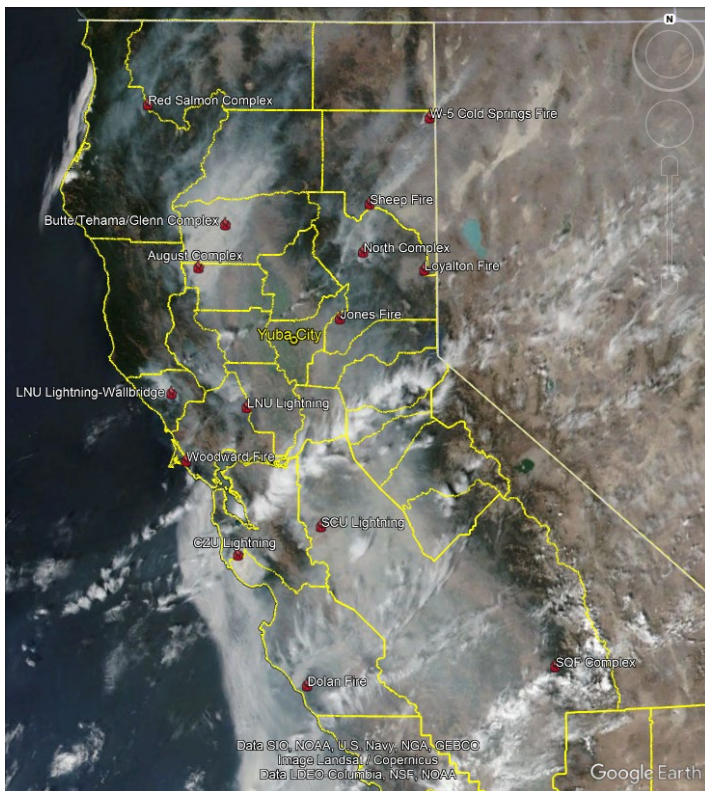


⁶⁶ NASA EOSDIS Worldview, <https://worldview.earthdata.nasa.gov/>, last accessed 9/19/22

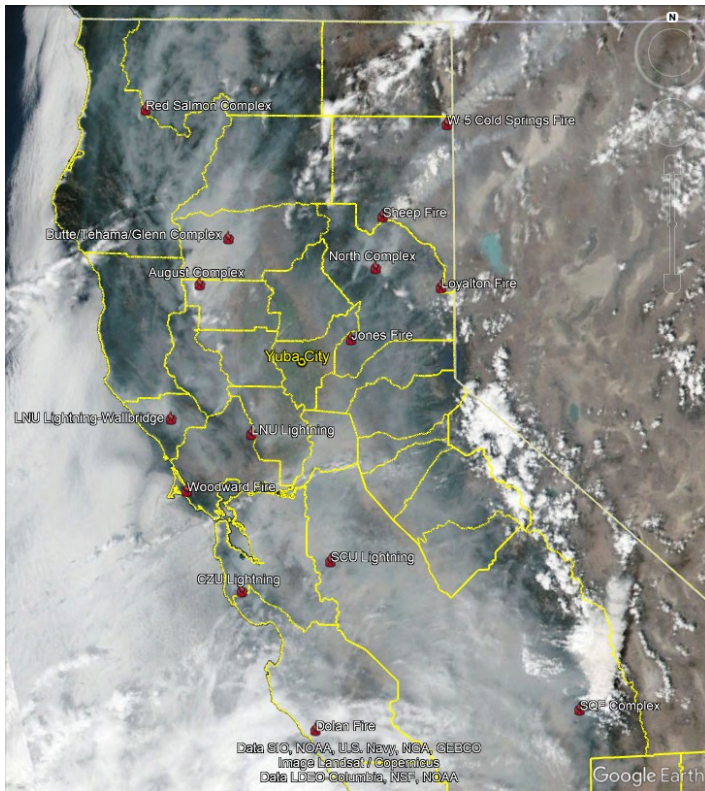
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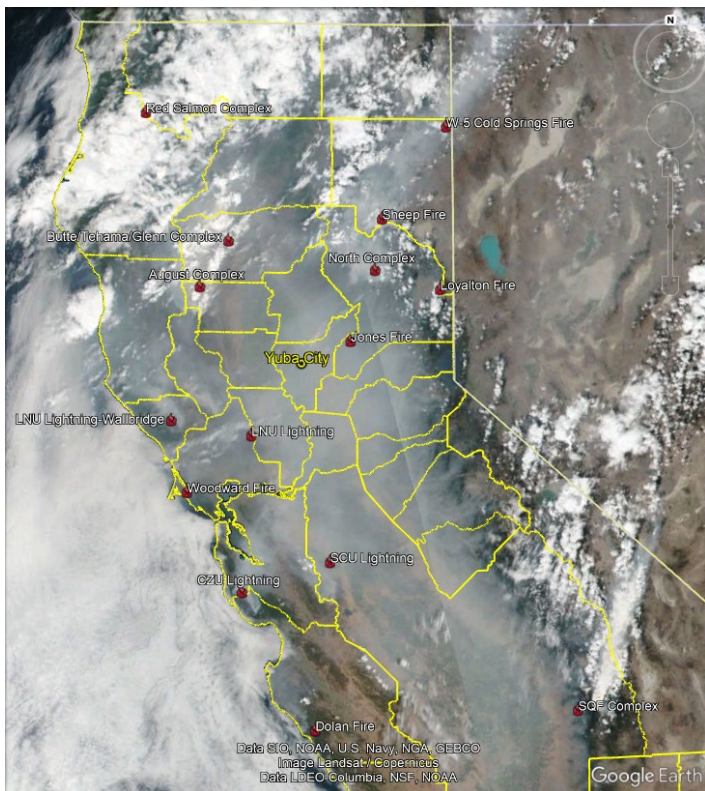
August 22, 2020



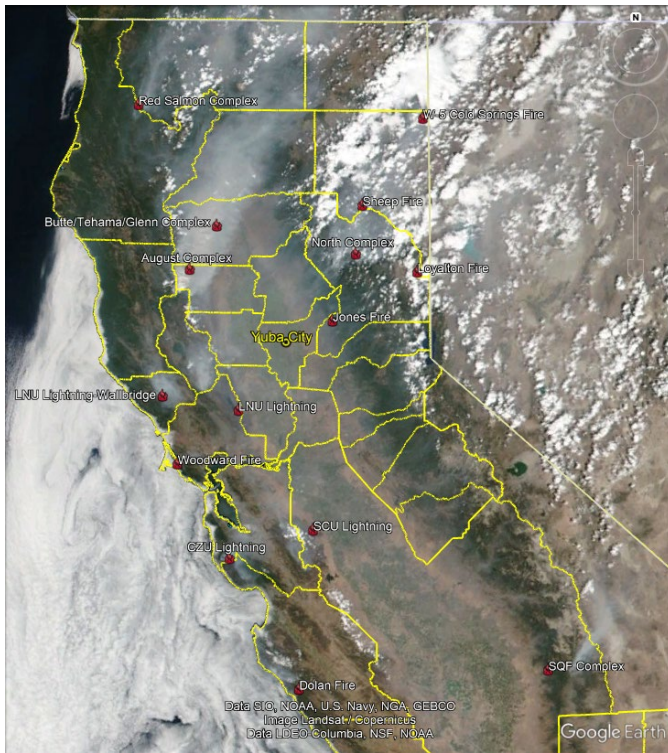
August 23, 2020



August 24, 2020

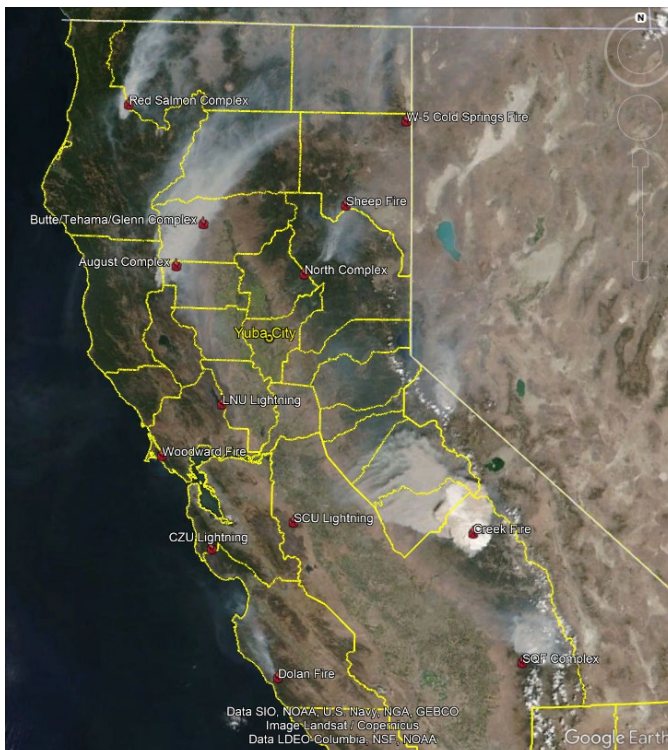


August 25, 2020

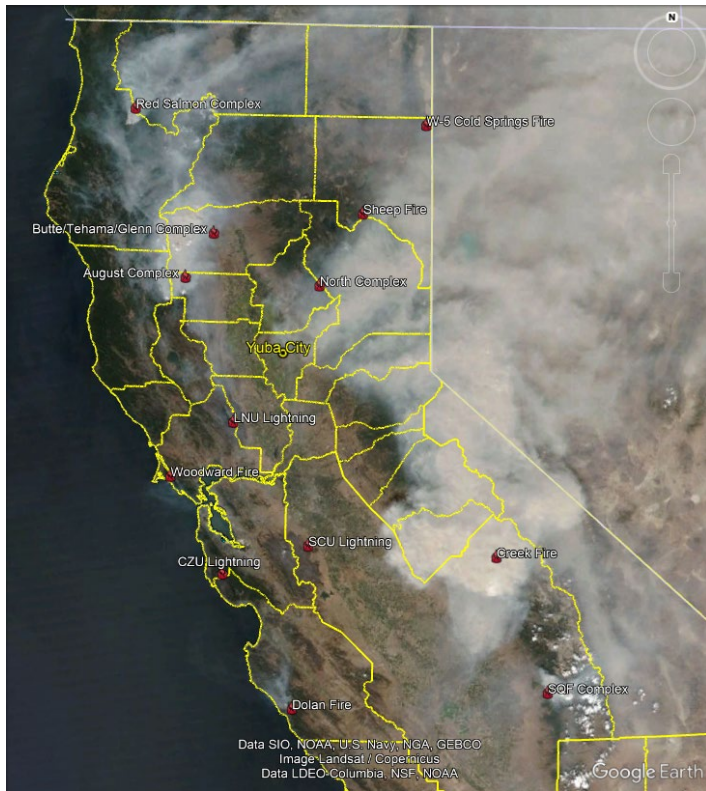


b) September 5-15, 2020

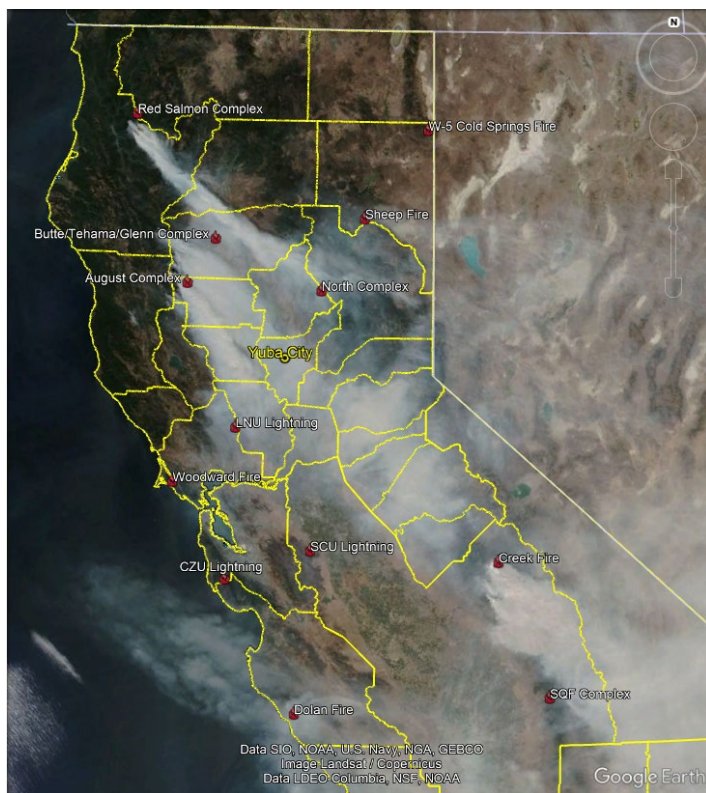
September 5, 2020



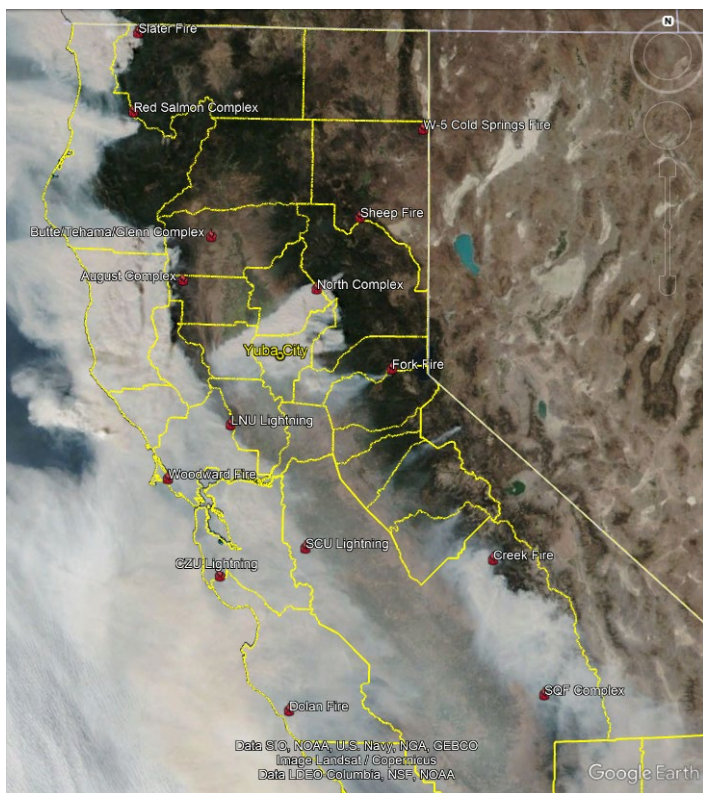
September 6, 2020



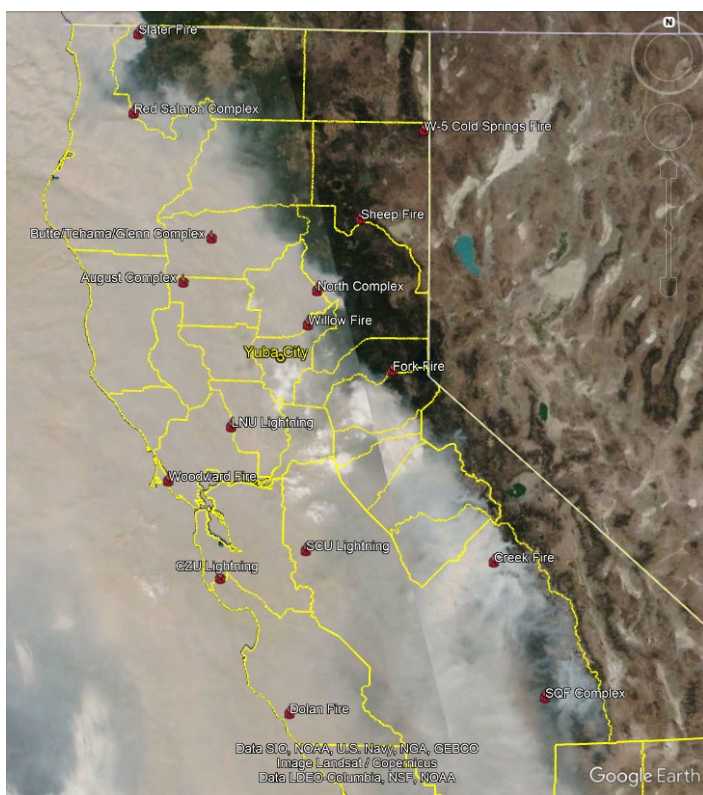
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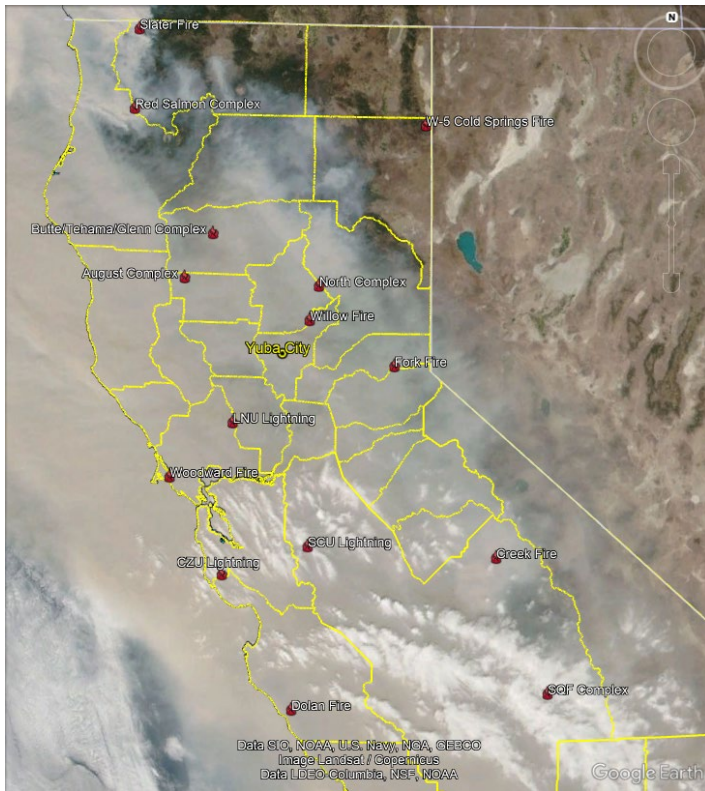
September 8, 2020



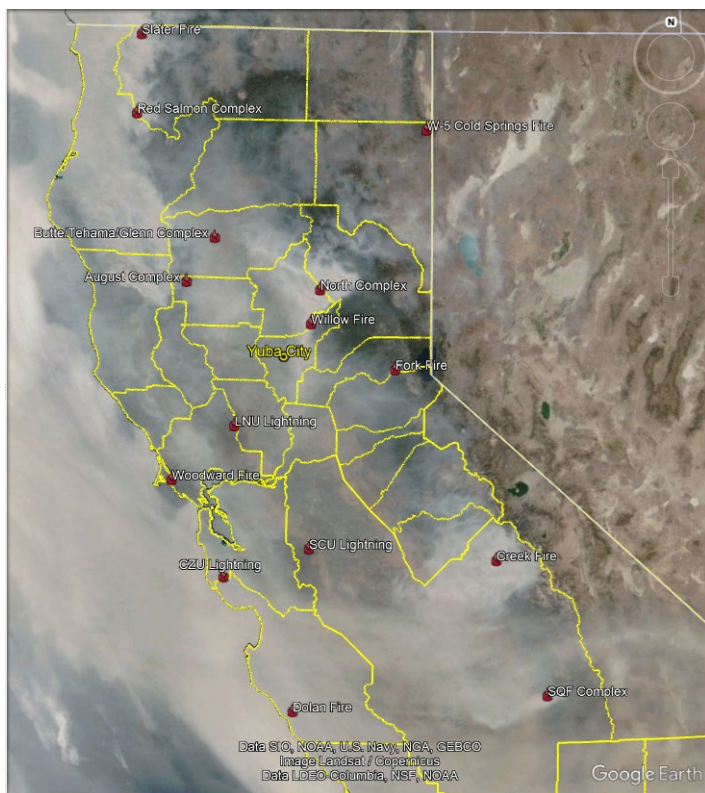
September 9, 2020



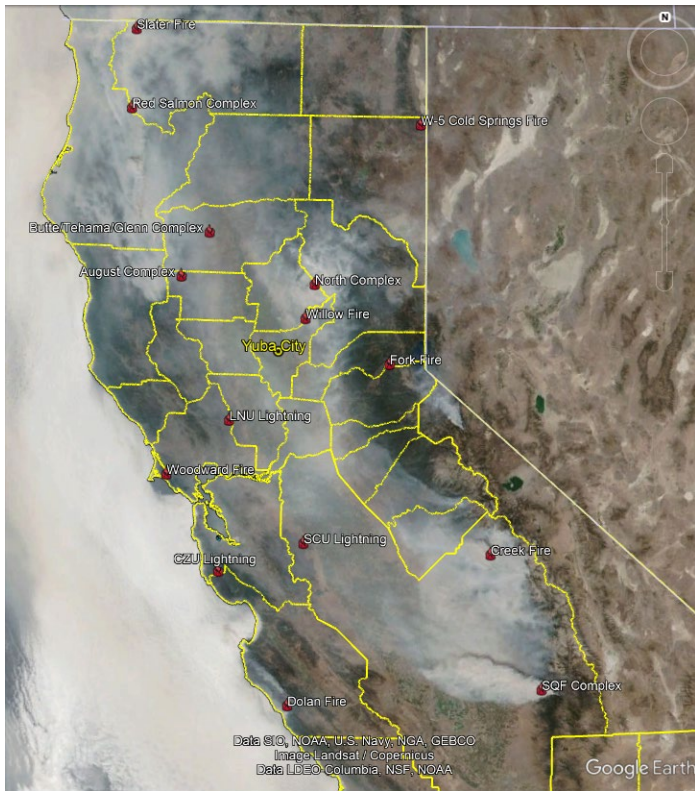
September 10, 2020



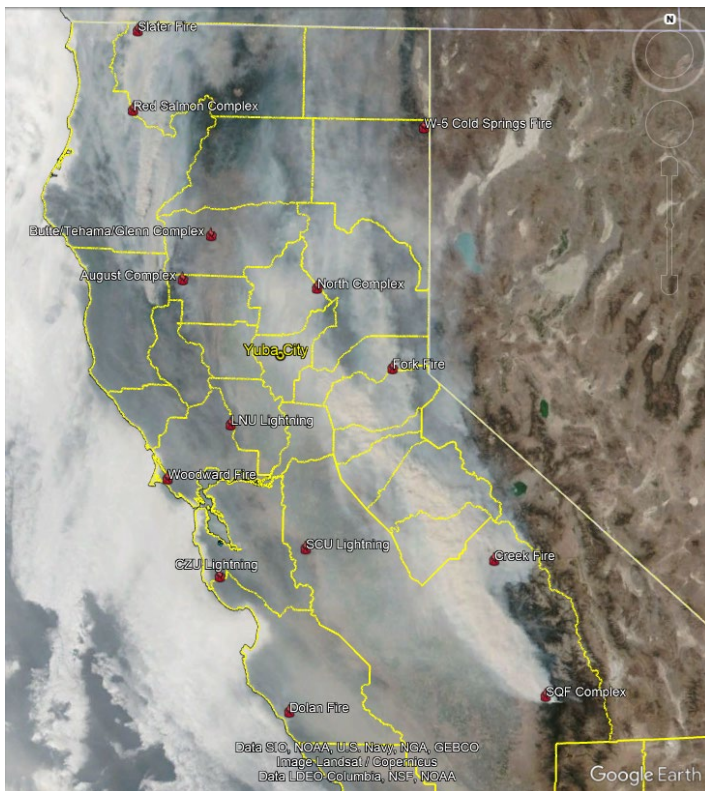
September 11, 2020



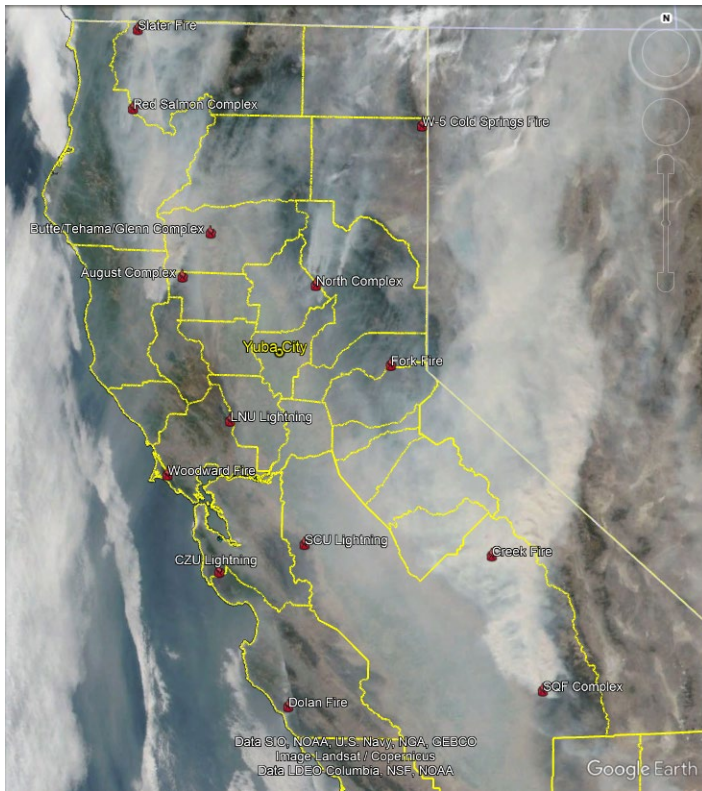
September 12, 2020



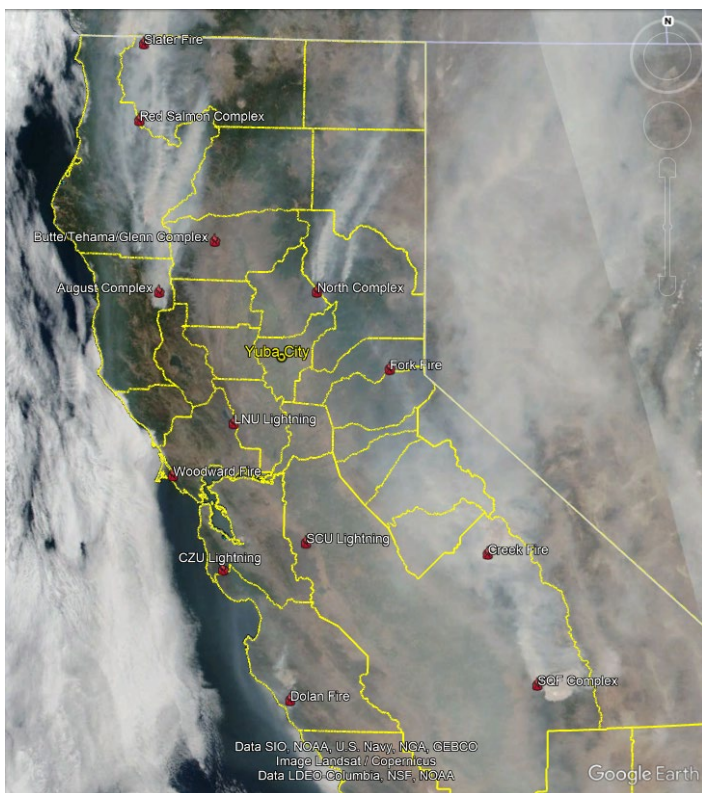
September 13, 2020



September 14, 2020



September 15, 2020



c) September 30-October 4, 2020

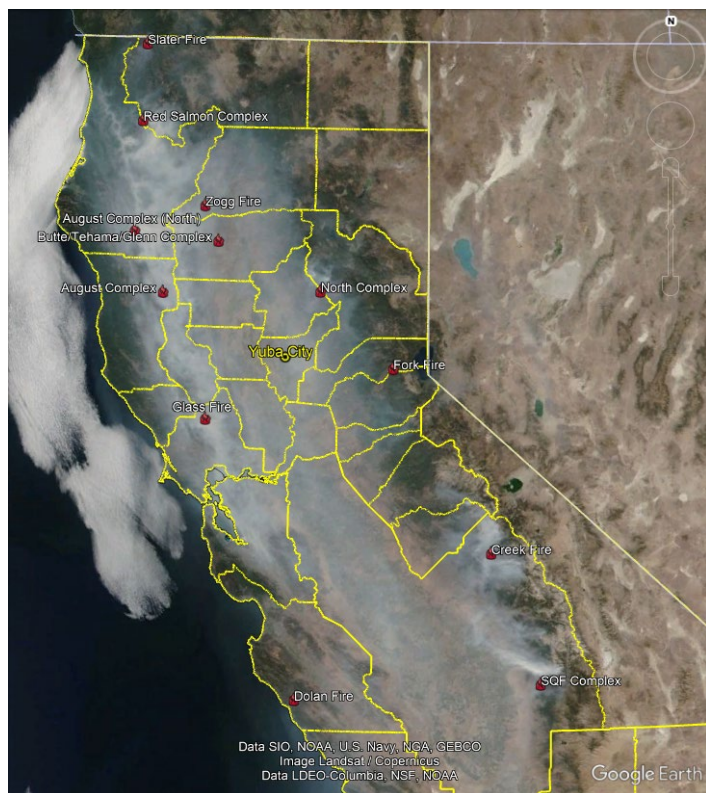
September 30, 2020



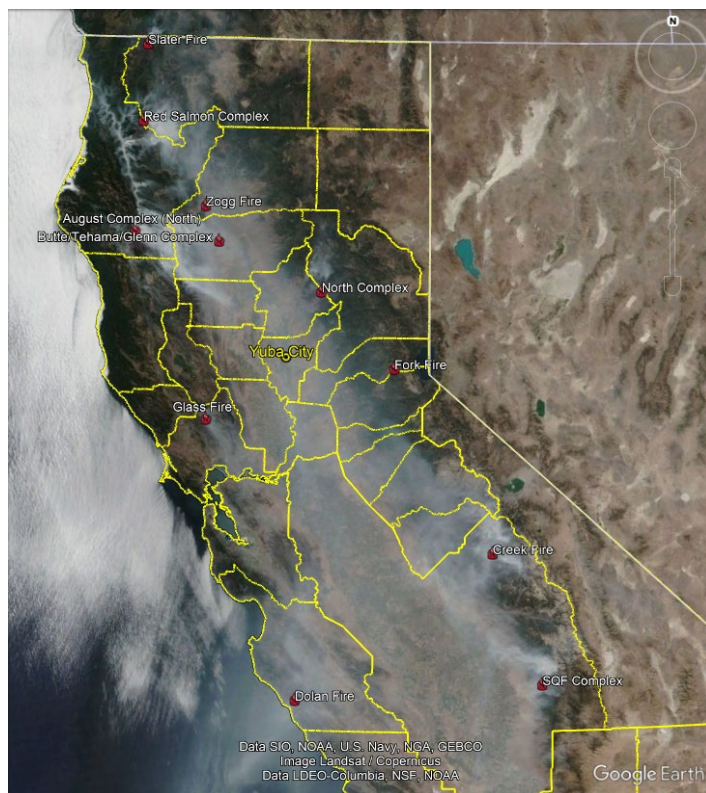
October 1, 2020



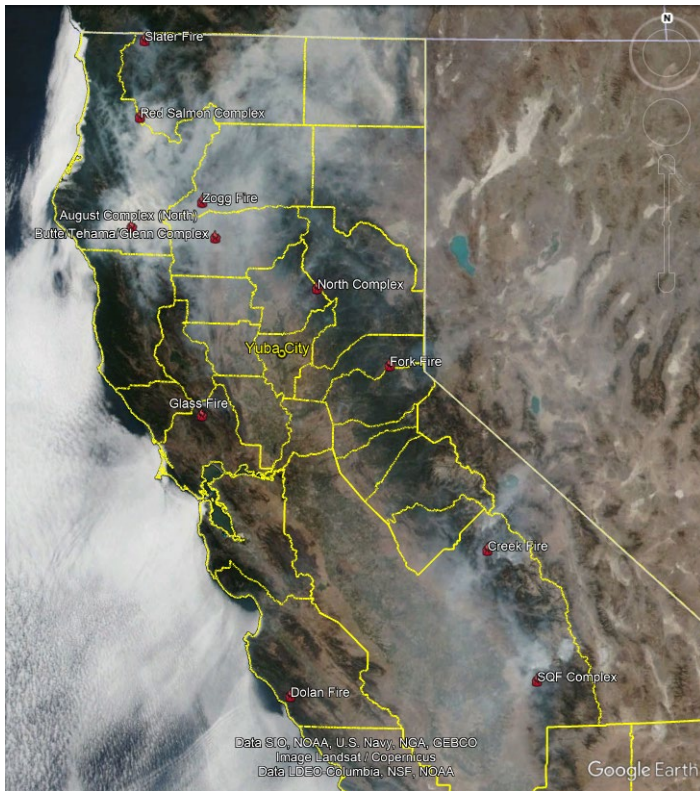
October 2, 2020



October 3, 2020



October 4, 2020



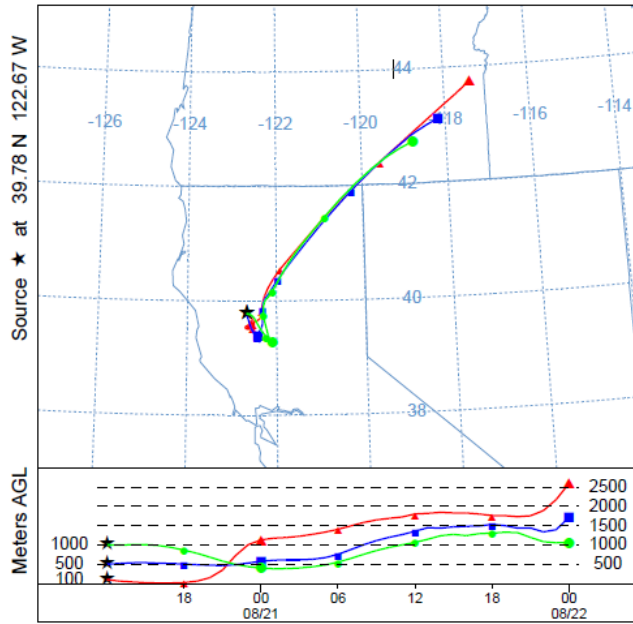
B. HYSPLIT Forward Trajectory (from Fires)

The forward trajectory tool of the HYSPLIT model was used to indicate how emissions from the wildfires were transported toward the monitors. The model was run from each major fire for 36 hours during the days of potential impact of the exceeding monitors starting at 1200 UTC (0400 PST). These model runs offer insight into the path a hypothetical parcel of air (or potential smoke) would take from each fire. This provides for a generalized understanding of smoke transport from a single fire across a region, connecting a specific wildfire with smoke in satellite imagery, and finding potential correlations at a site through analysis of the intersection of forward and backward trajectories.

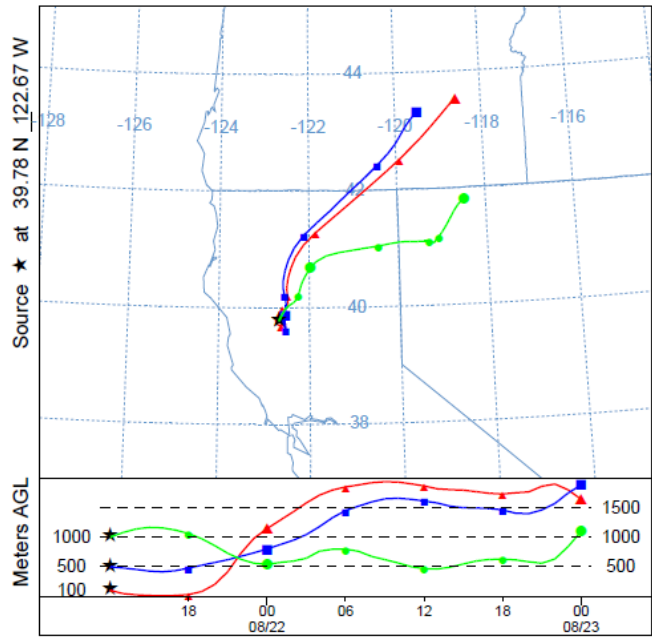
a) August Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|------------------------|---------|-------------|----------|-----------|-------------|
| August Complex | 8/16/20 | 11/11/20 | 39.776 | -122.673 | 1,032,648 |
| August Complex (North) | | | 40.230 | -123.430 | |

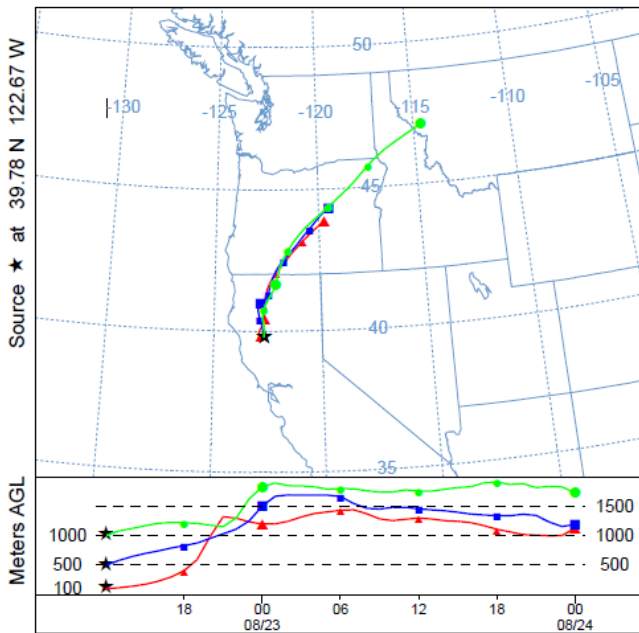
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



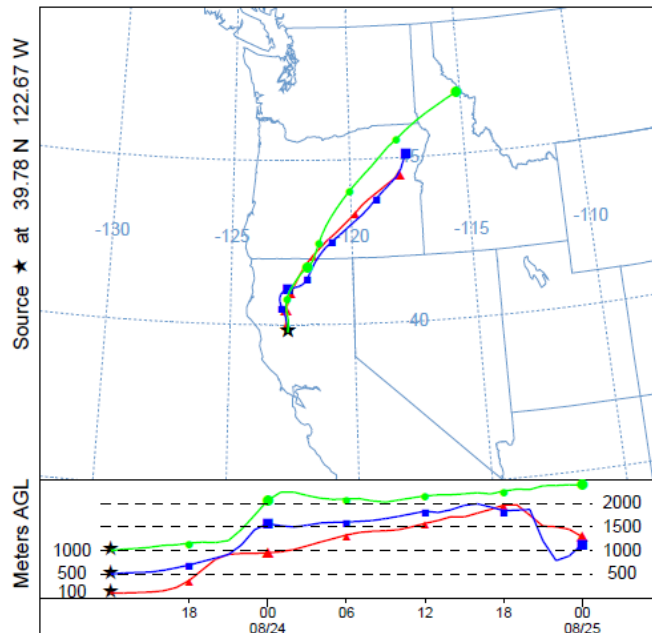
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



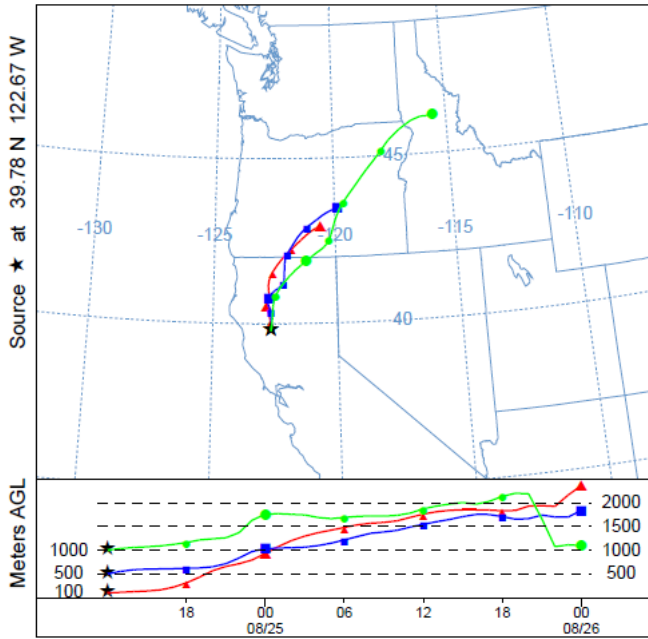
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



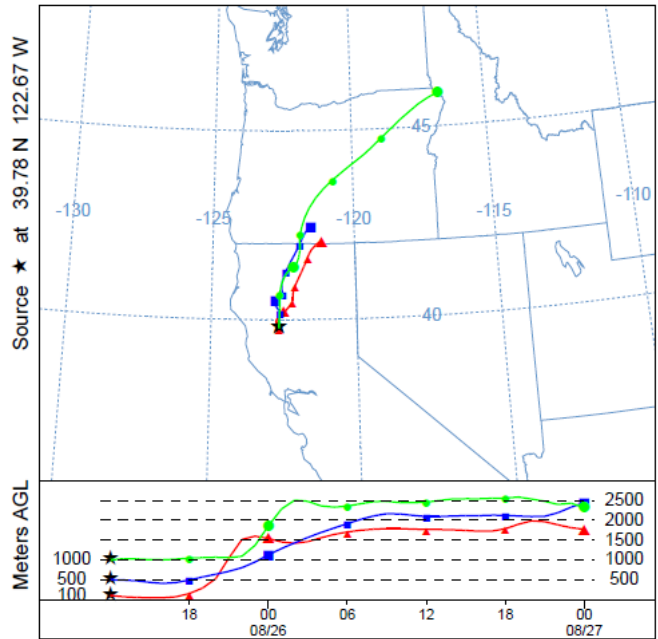
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



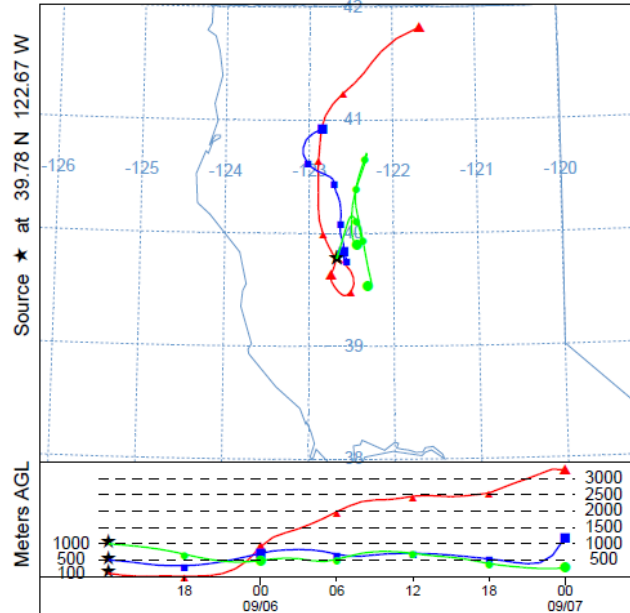
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



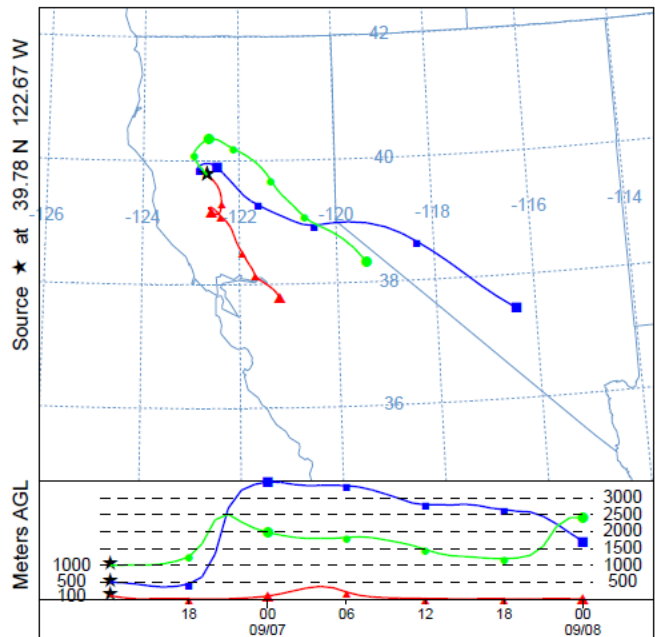
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



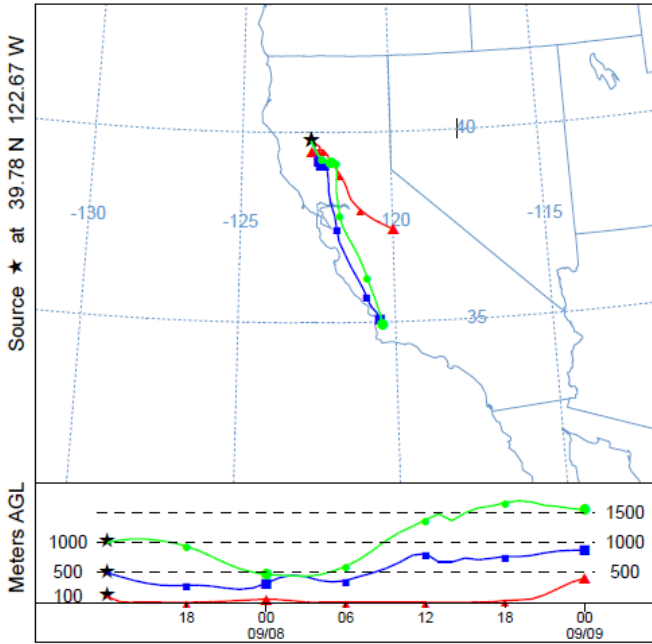
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



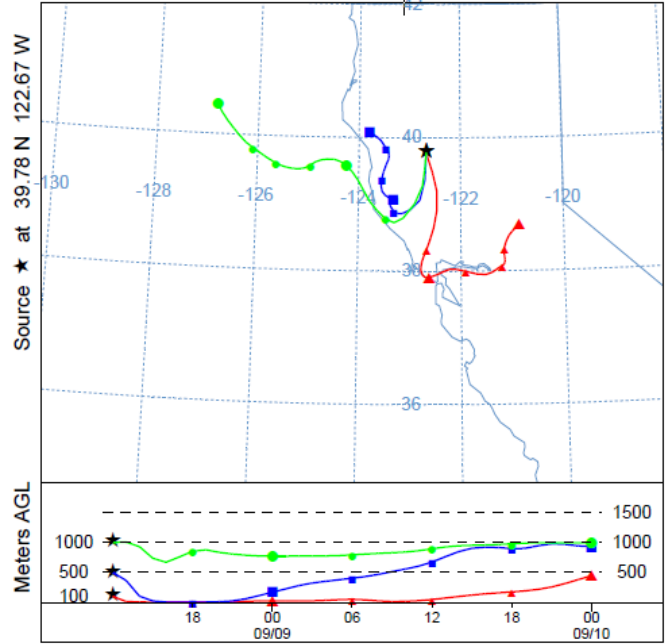
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



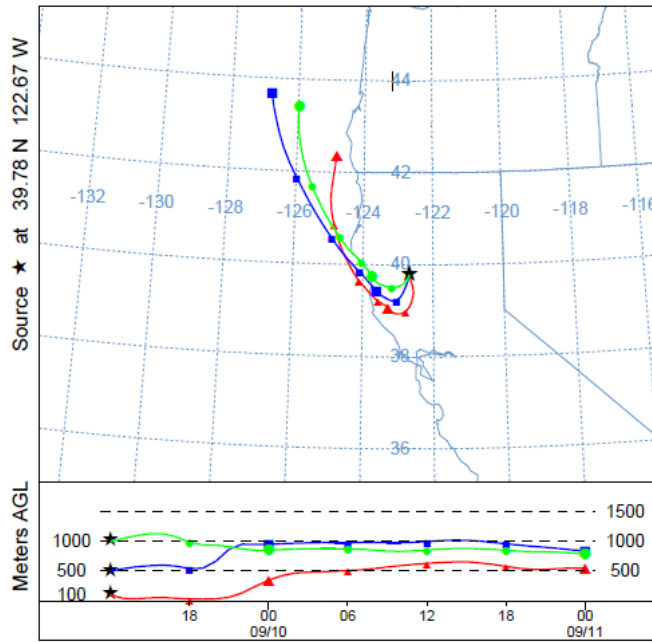
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



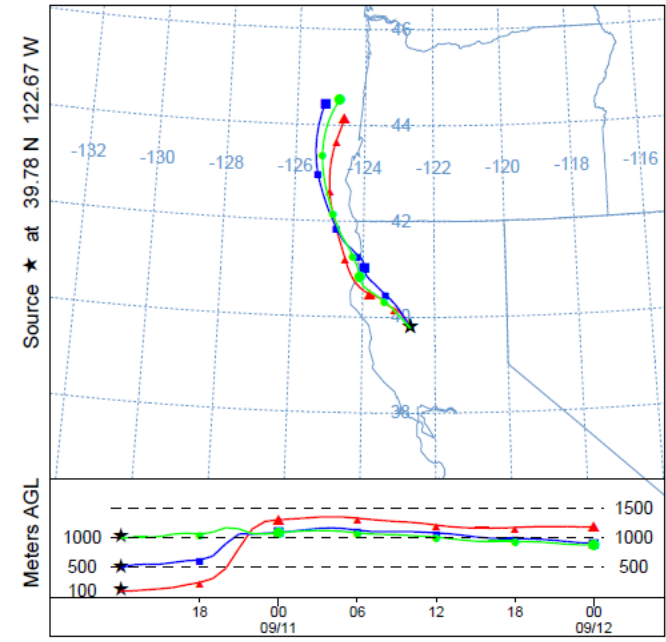
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



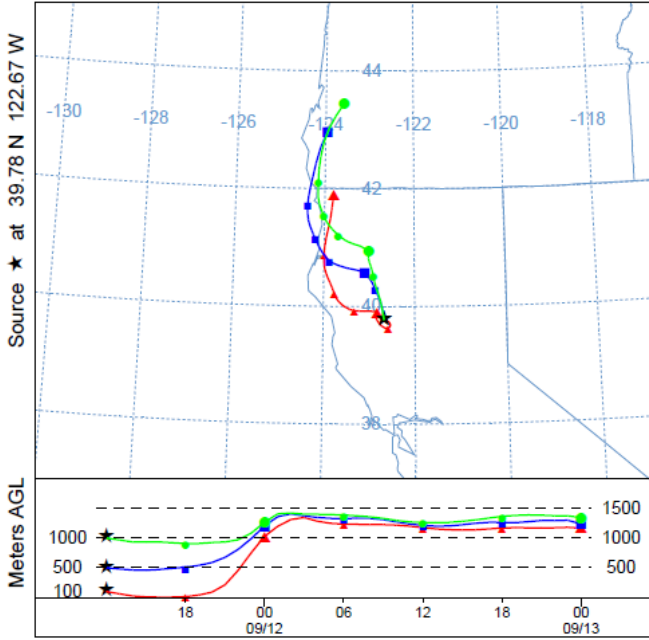
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



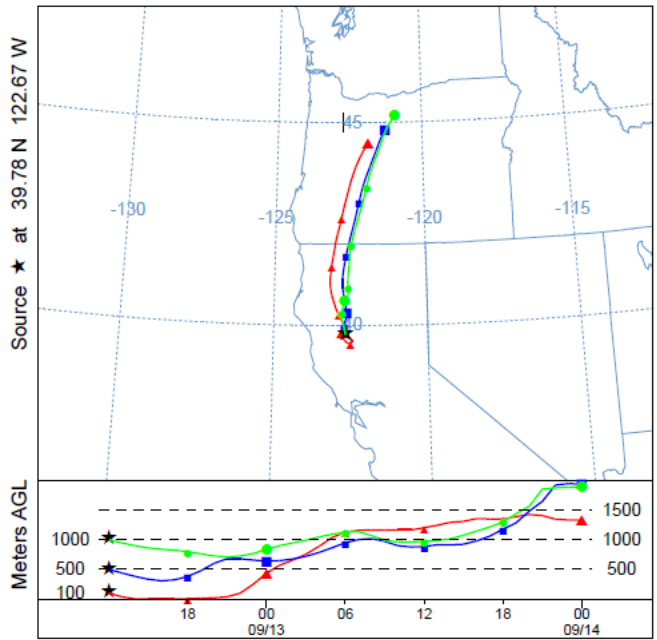
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



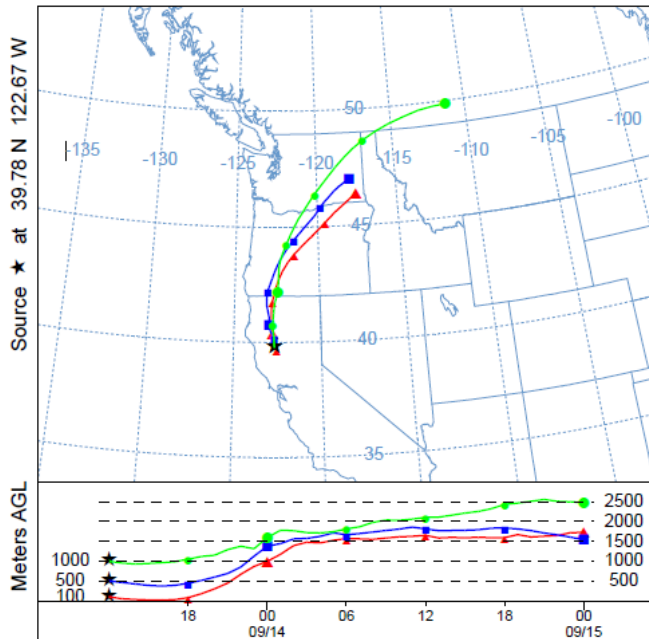
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



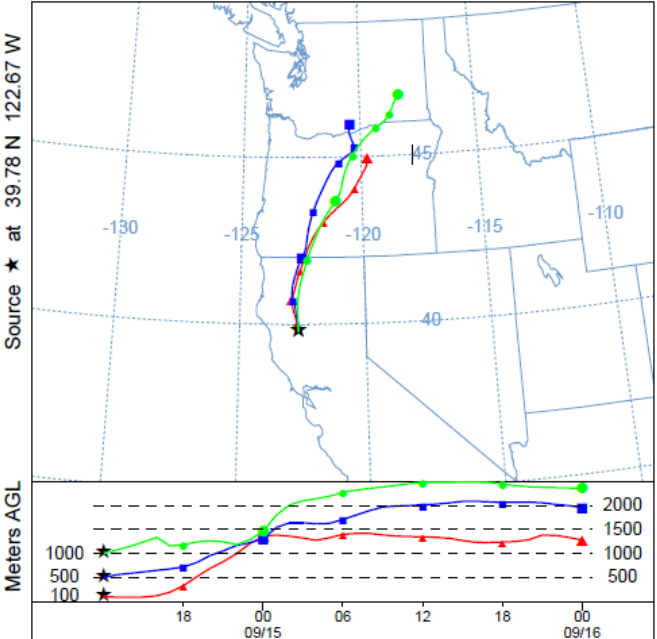
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



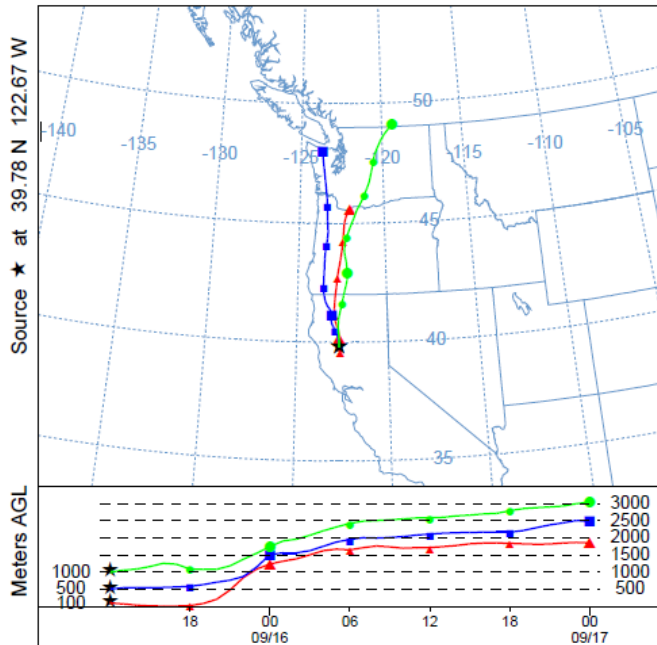
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



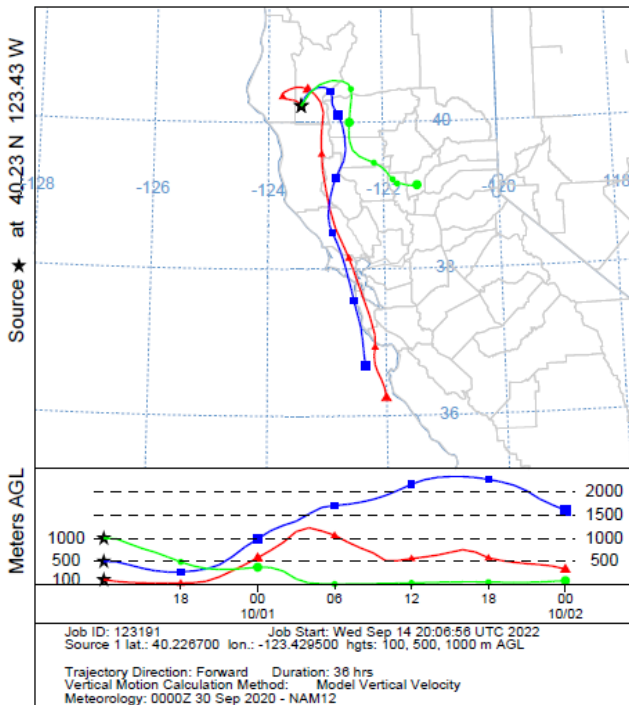
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



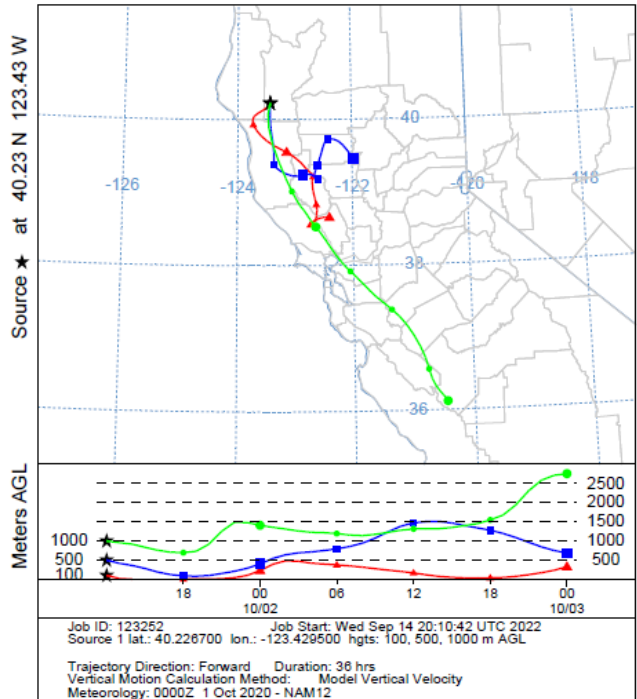
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



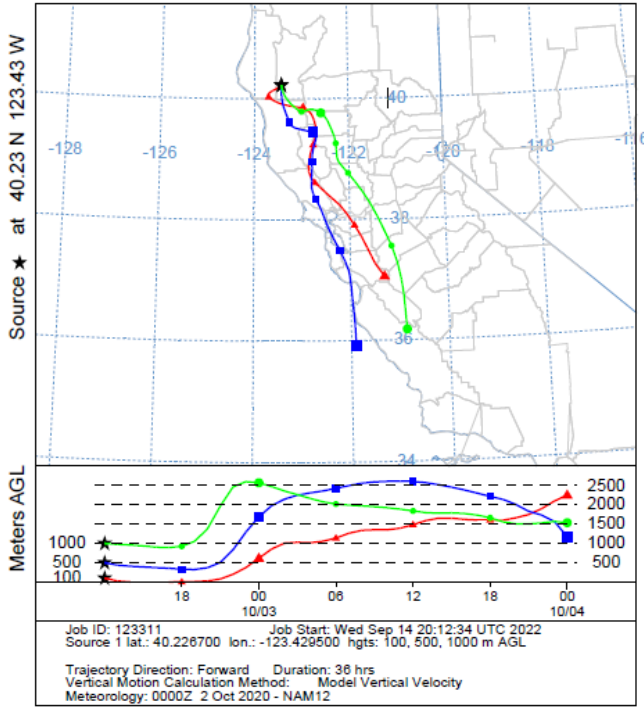
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



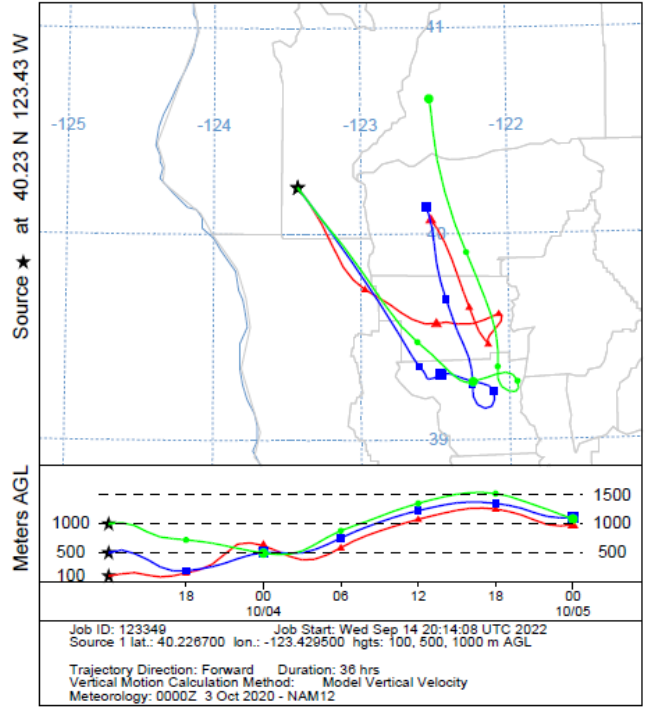
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



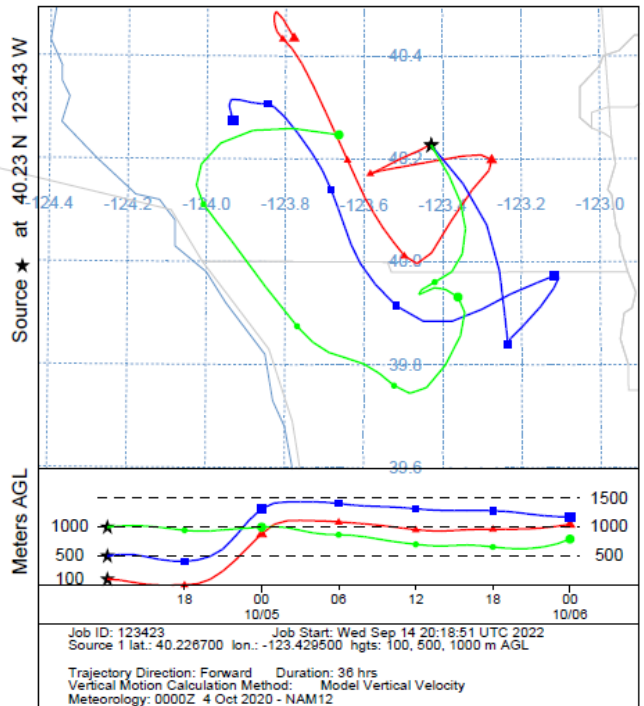
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



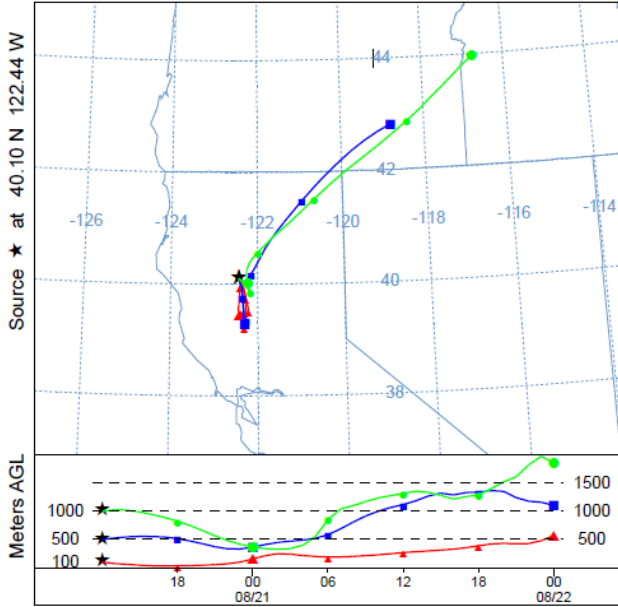
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 04 Oct 20
NAM Meteorological Data



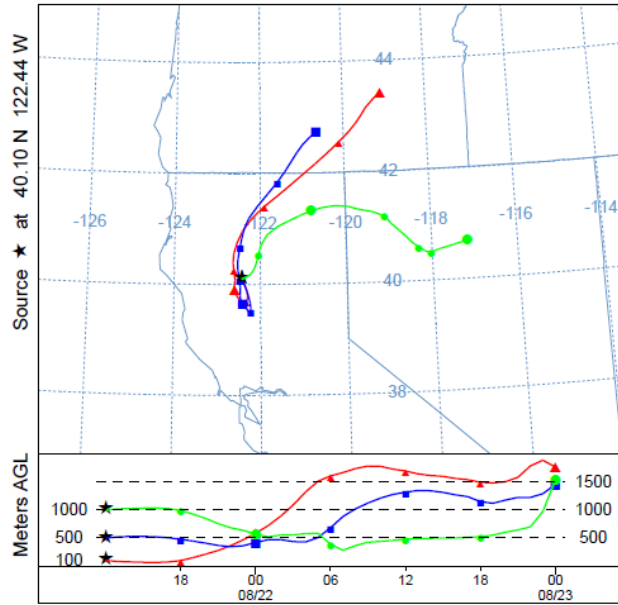
b) Butte/Tehama/Glenn Lightning Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|-------------------------|---------|-------------|----------|-----------|-------------|
| Butte/Tehama/Glenn Fire | 8/19/20 | 10/9/20 | 40.0957 | -122.4393 | 19,609 |

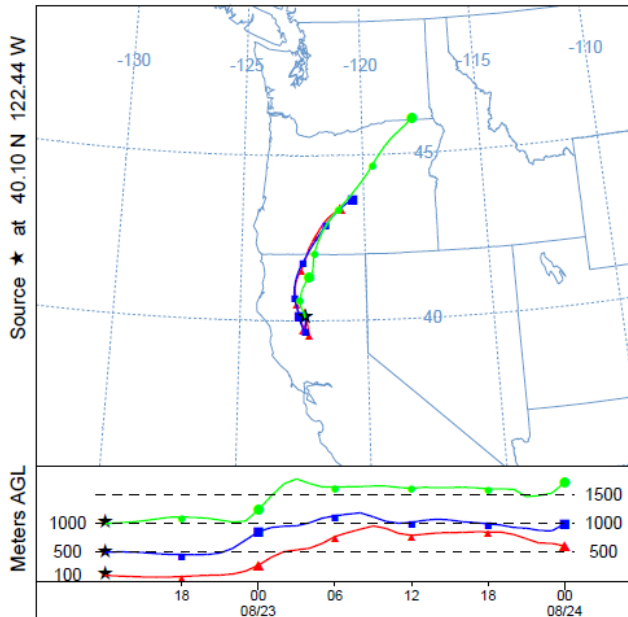
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



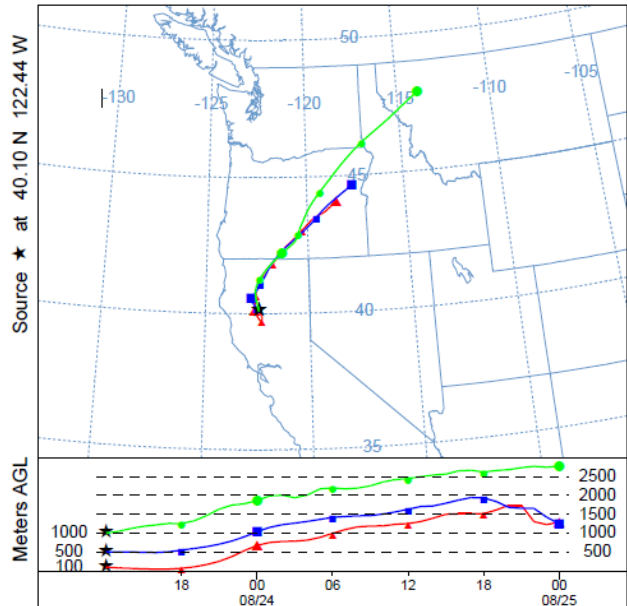
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



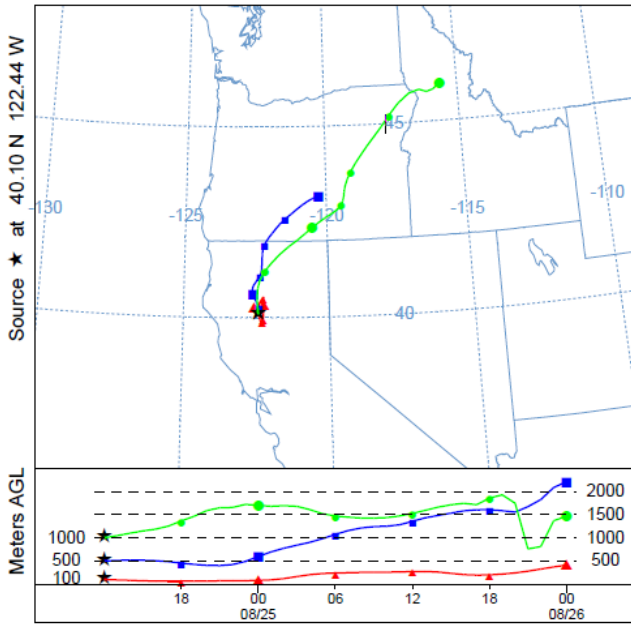
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



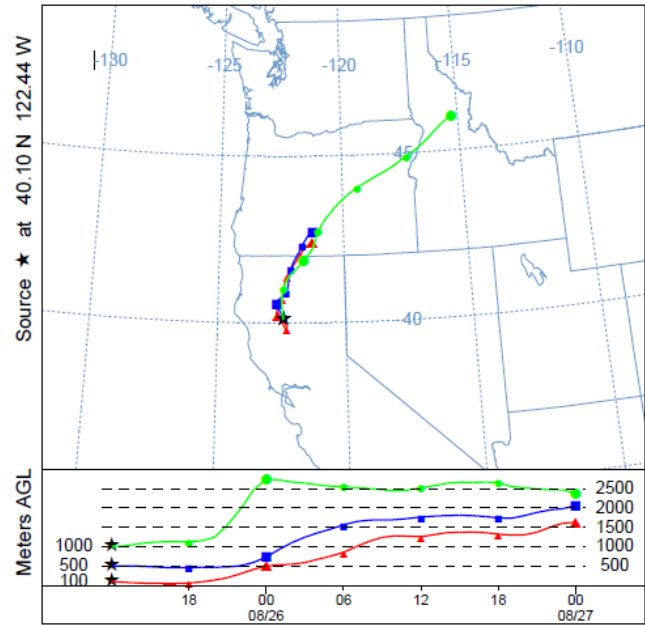
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



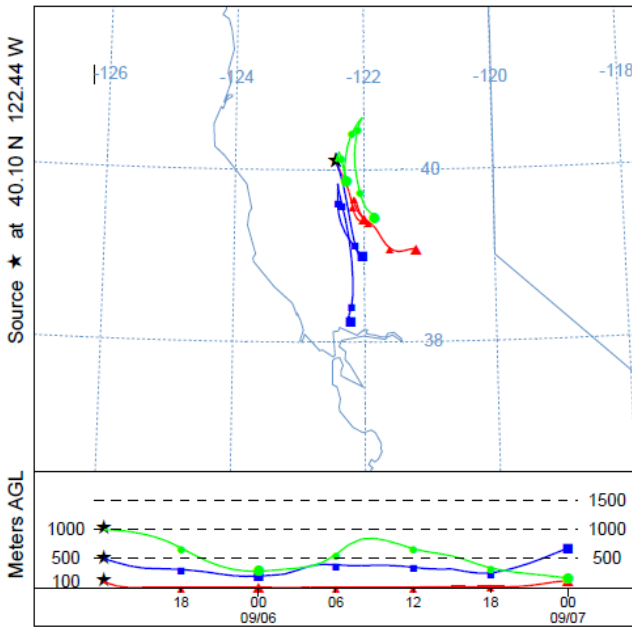
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



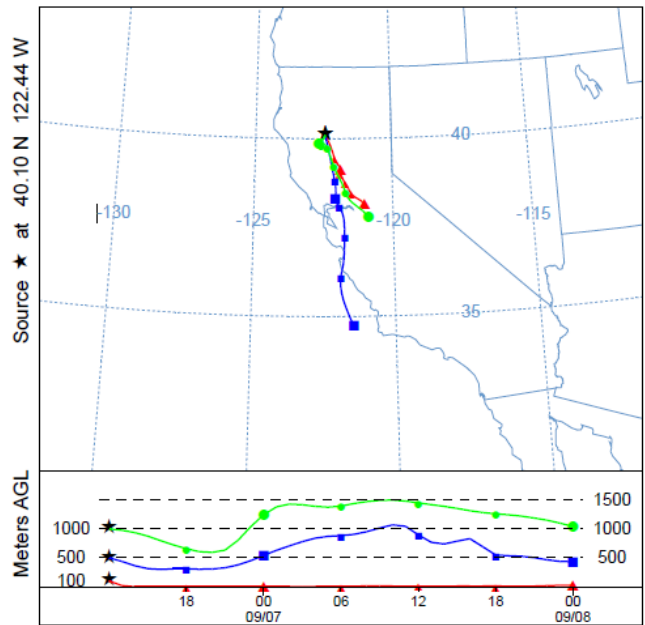
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



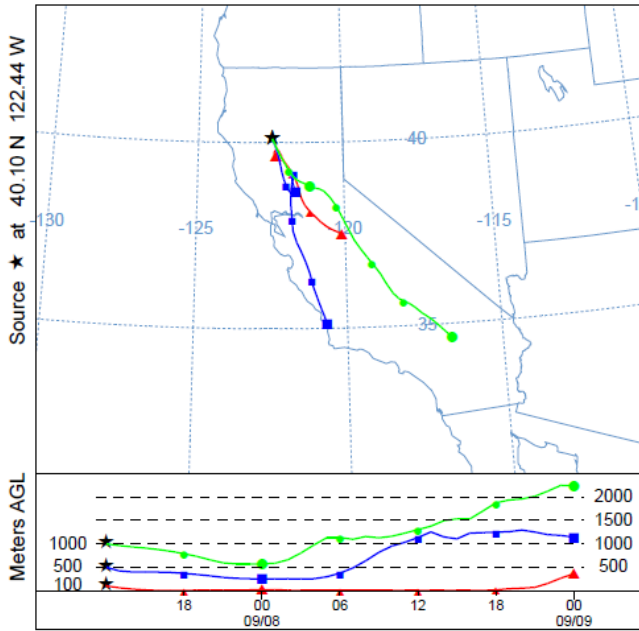
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



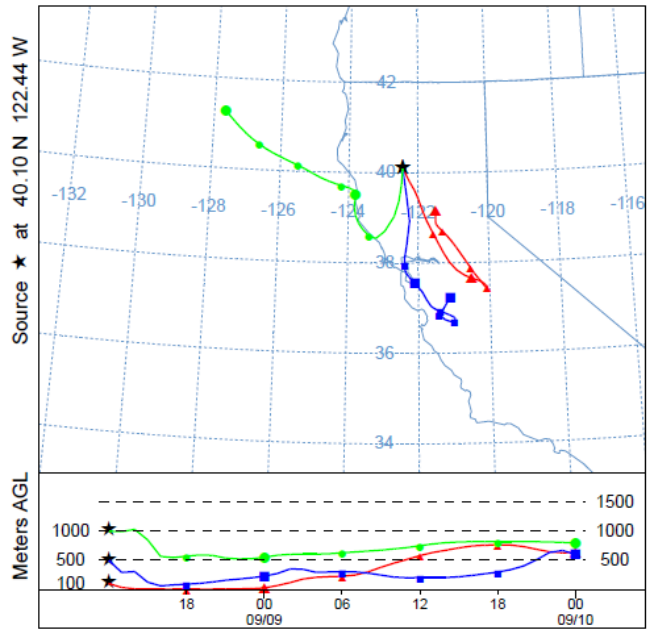
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



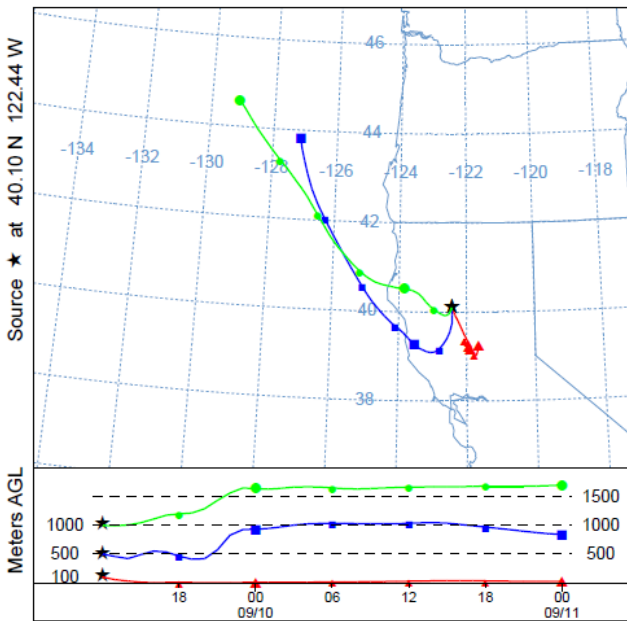
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



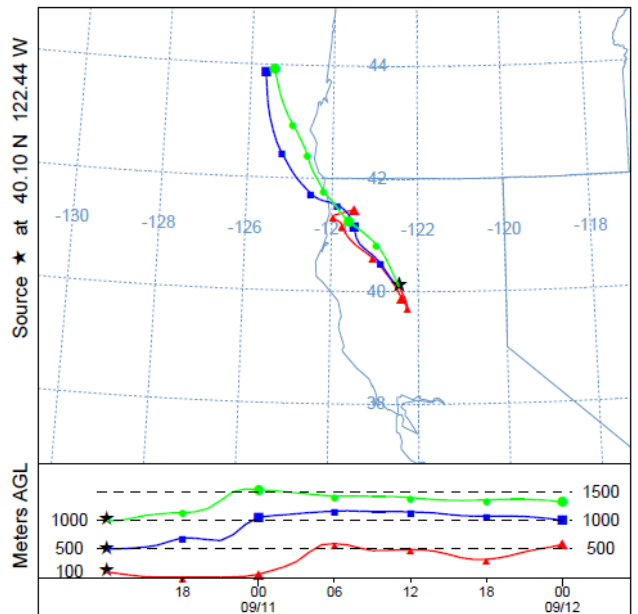
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



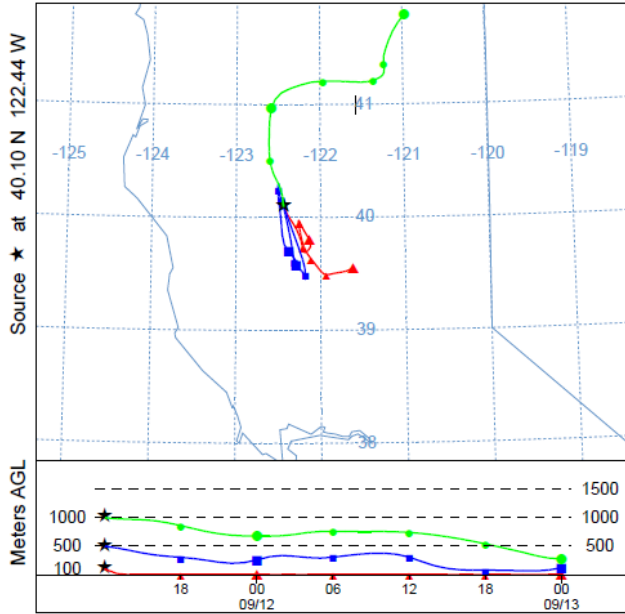
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



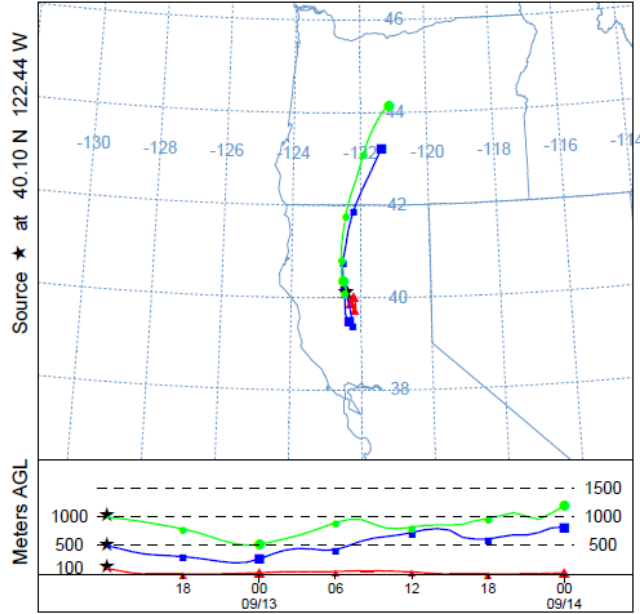
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



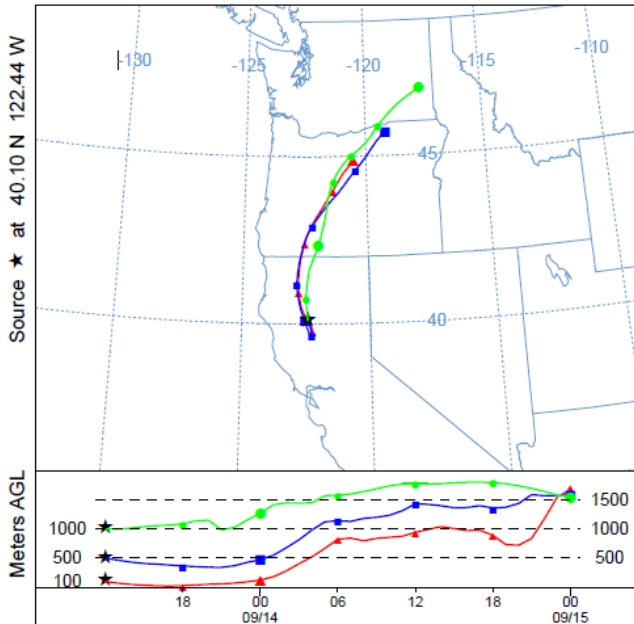
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



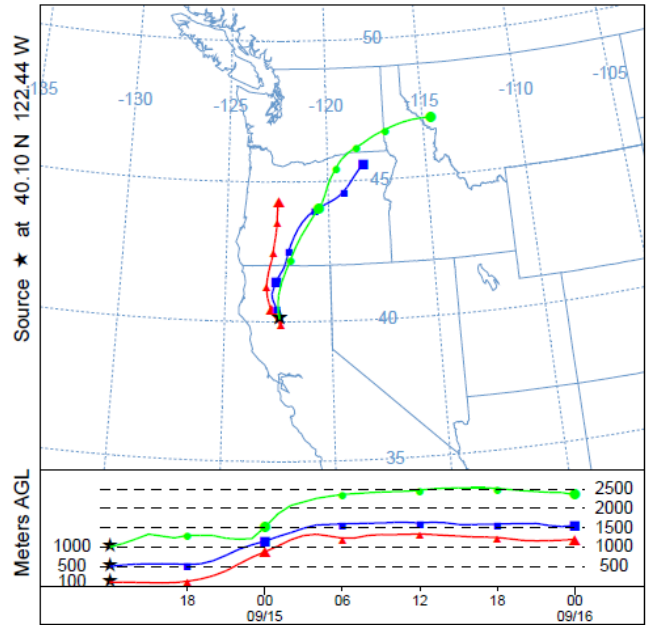
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



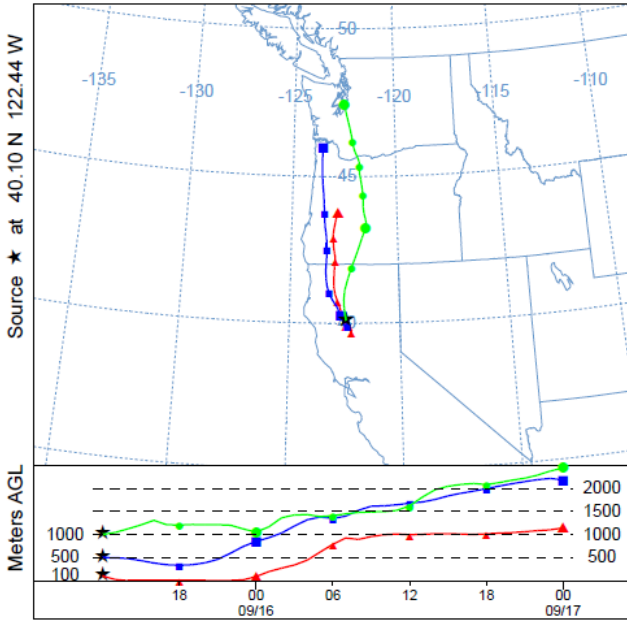
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



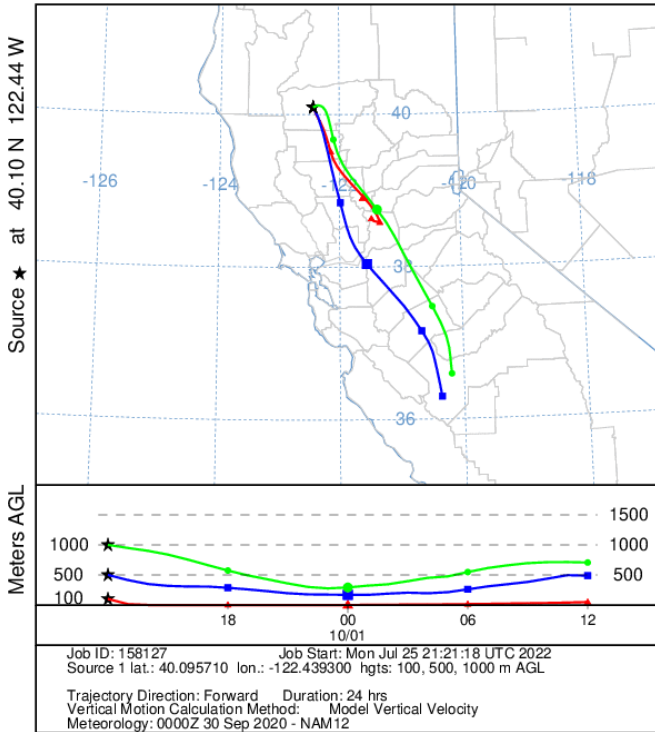
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



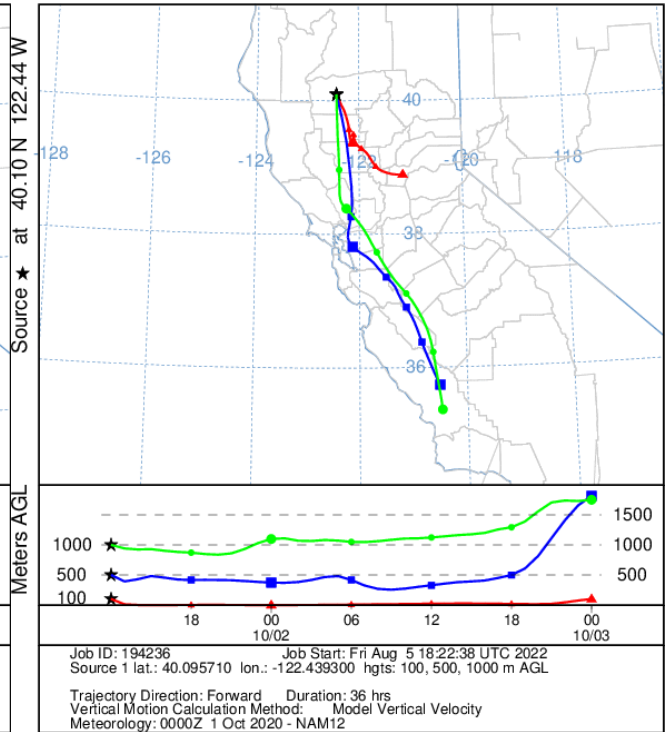
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



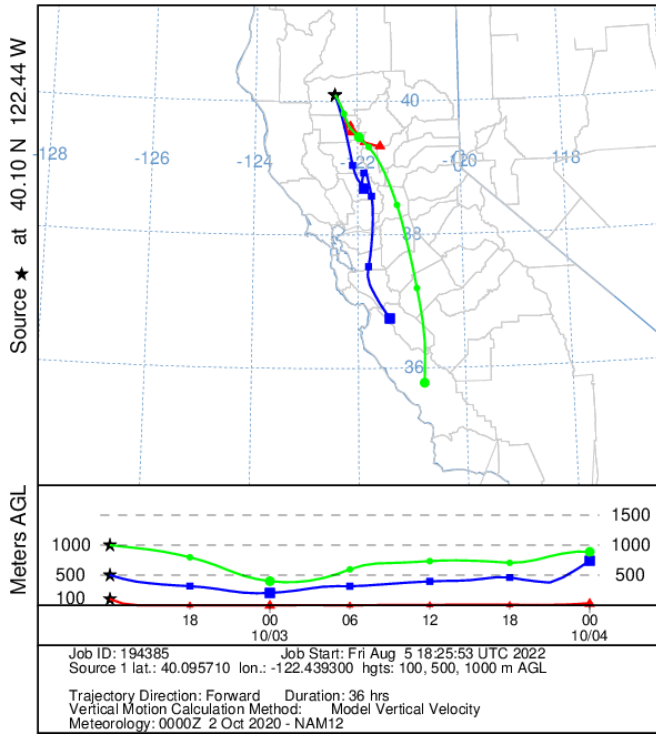
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



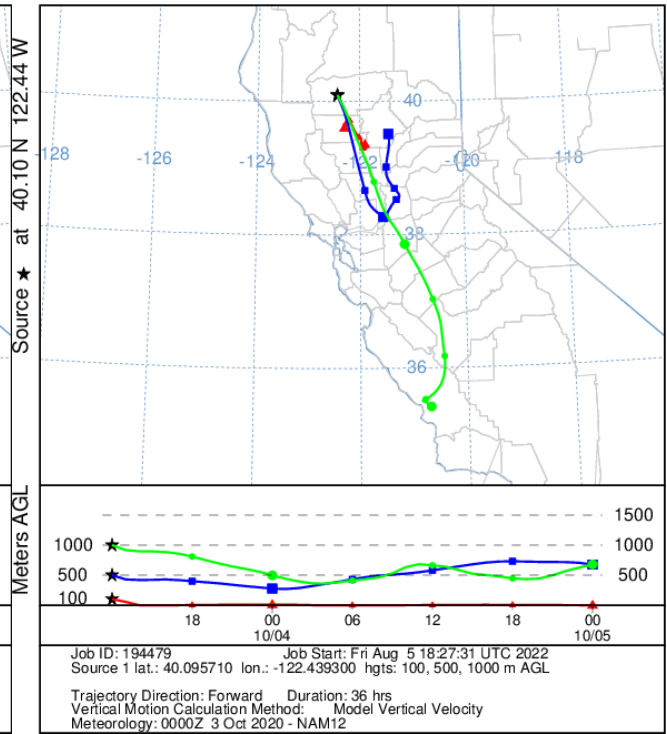
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



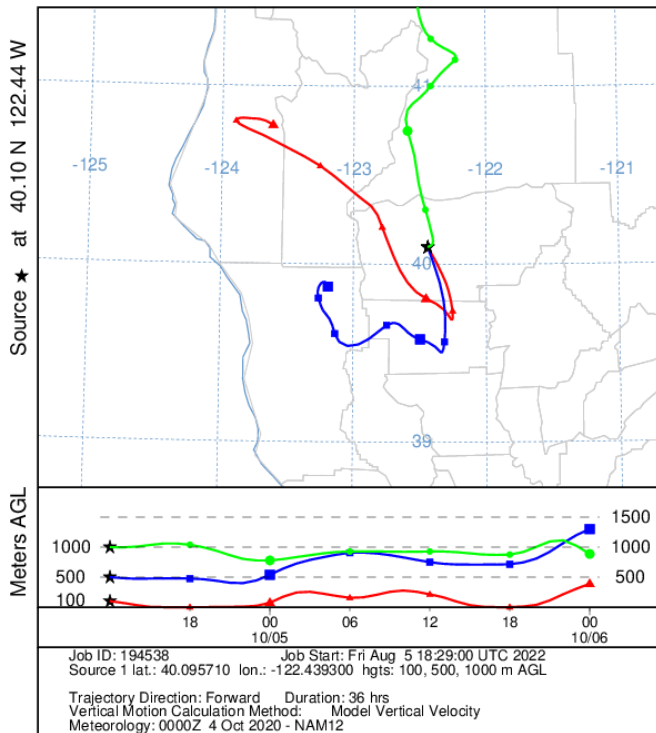
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



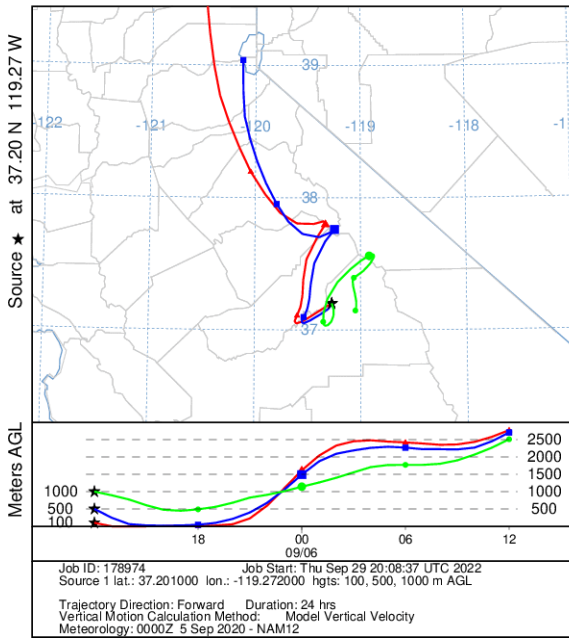
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 04 Oct 20
NAM Meteorological Data



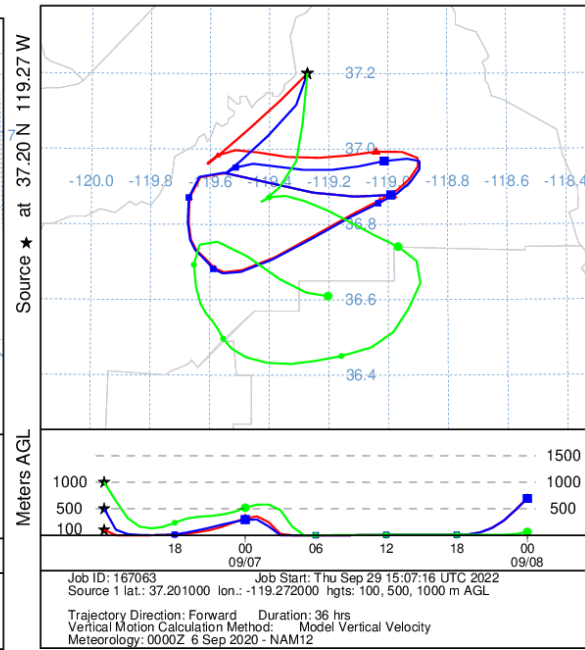
c) Creek Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|-------|--------|-------------|----------|-----------|-------------|
| Creek | 9/4/20 | 12/24/20 | 37.1915 | -119.2612 | 379,895 |

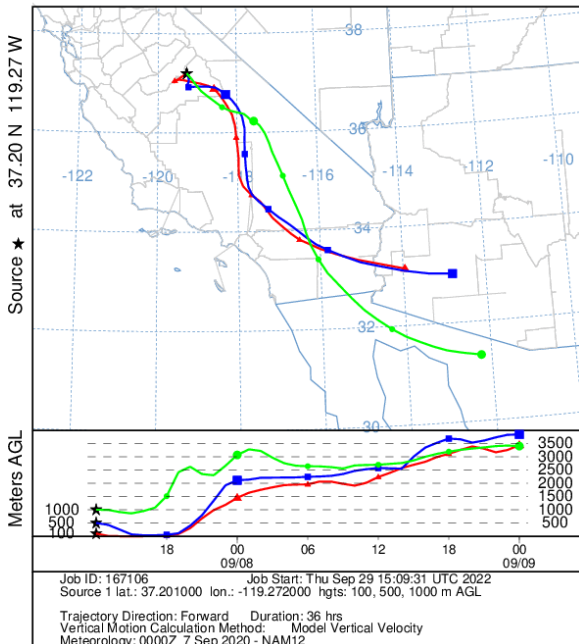
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Forward trajectories starting at 1200 UTC 05 Sep 20
NAM Meteorological Data



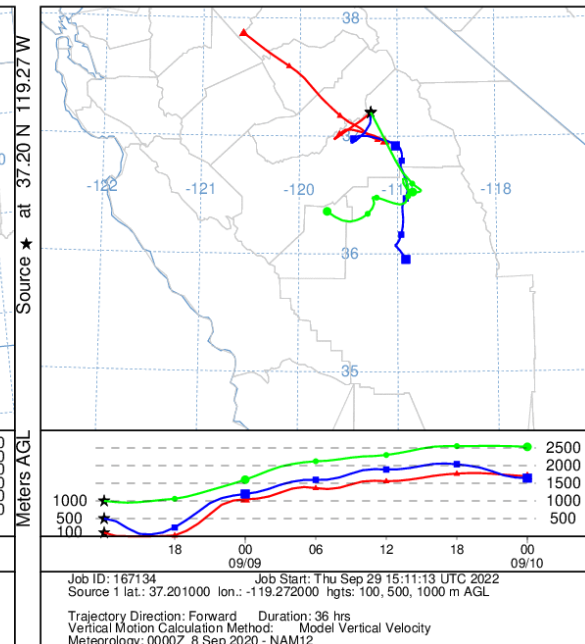
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Forward trajectories starting at 1200 UTC 06 Sep 20
NAM Meteorological Data



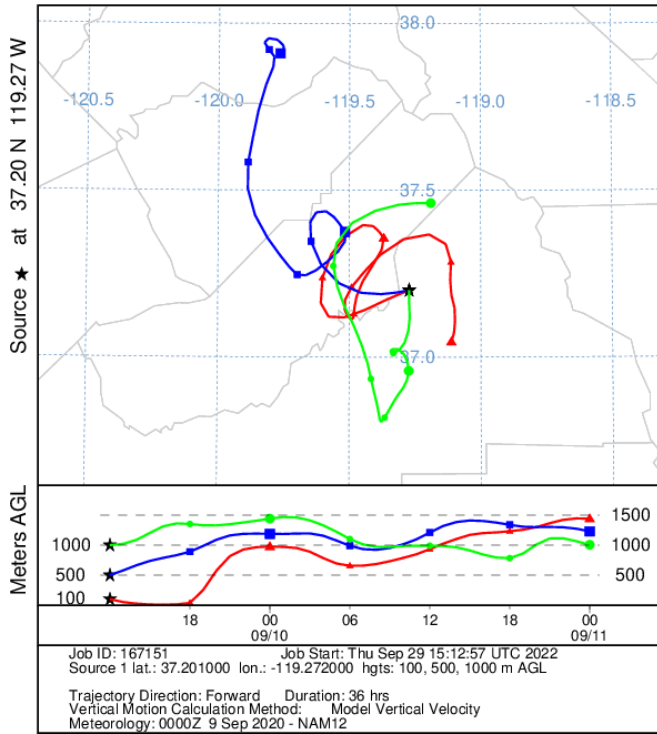
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Forward trajectories starting at 1200 UTC 07 Sep 20
NAM Meteorological Data



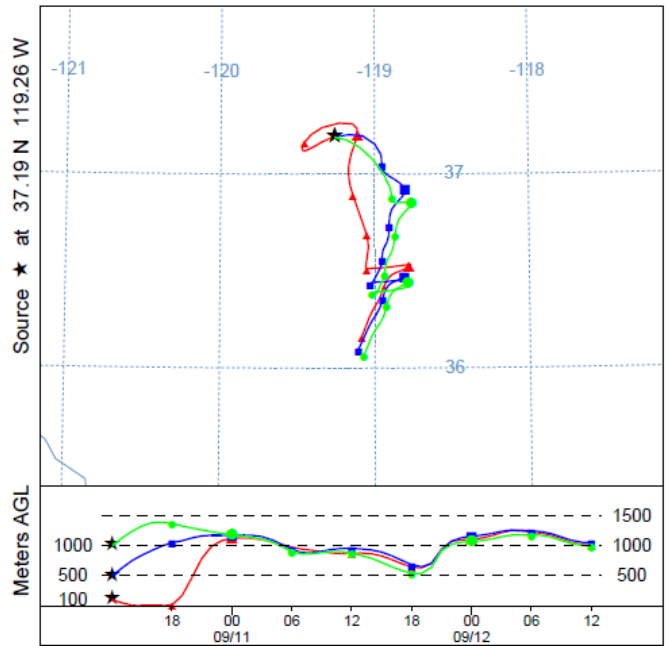
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Forward trajectories starting at 1200 UTC 08 Sep 20
NAM Meteorological Data



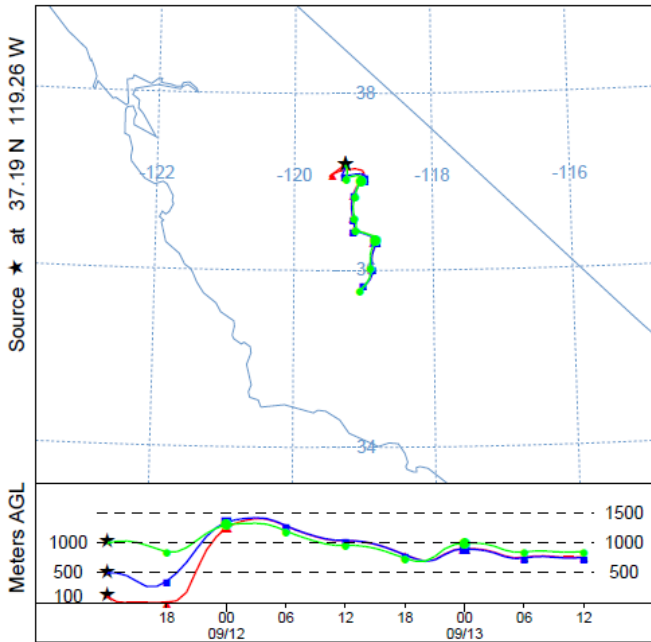
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 Forward trajectories starting at 1200 UTC 09 Sep 20
 NAM Meteorological Data



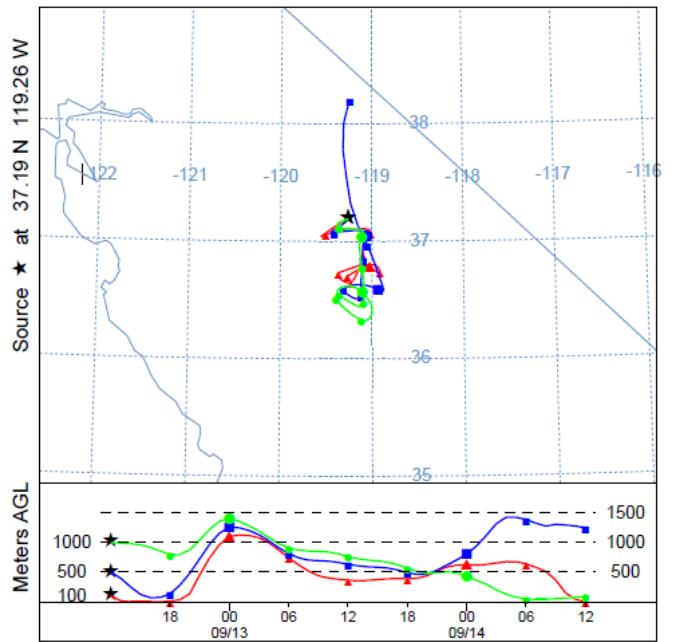
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 NAM Meteorological Data



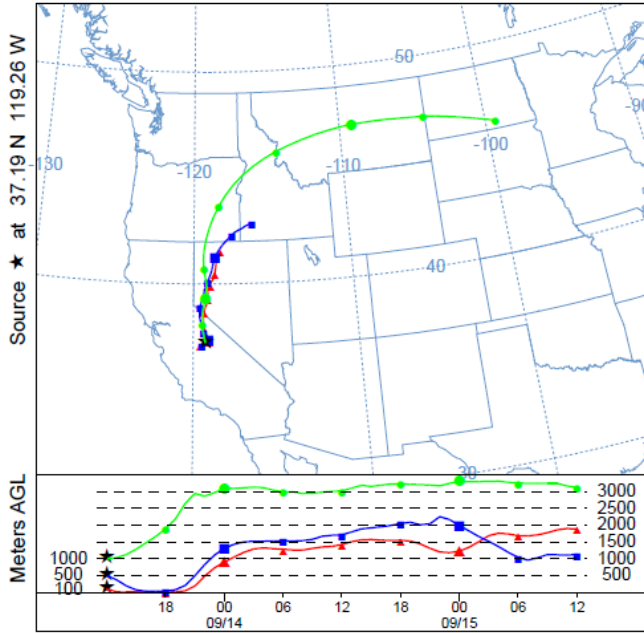
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 NAM Meteorological Data



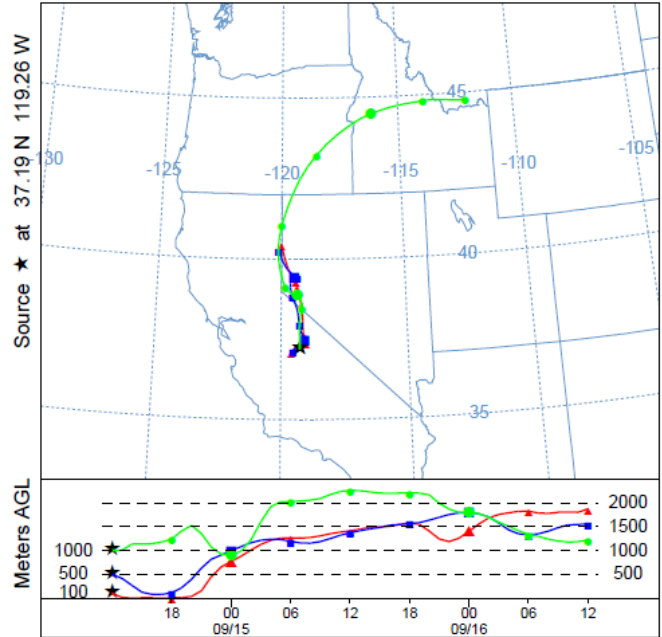
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 Forward trajectories starting at 1200 UTC 12 Sep 20
 NAM Meteorological Data



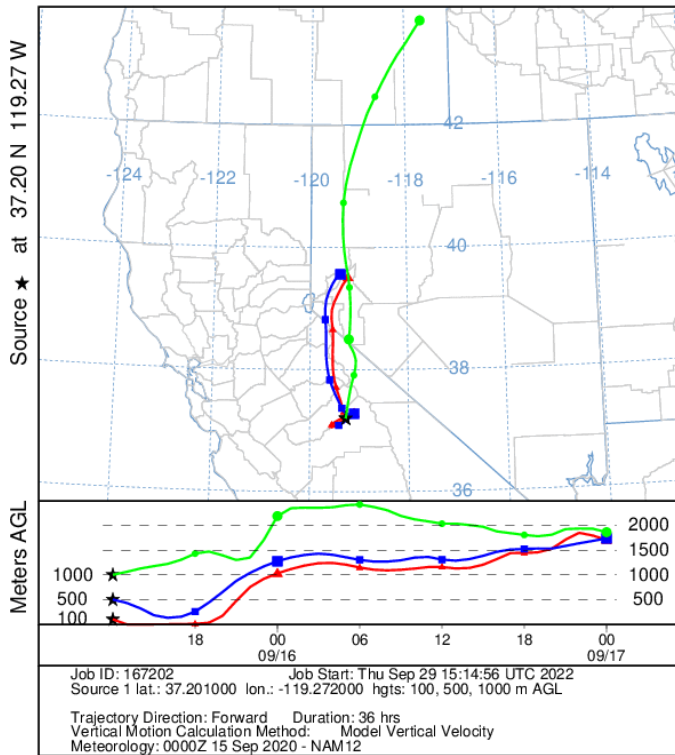
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 NAM Meteorological Data



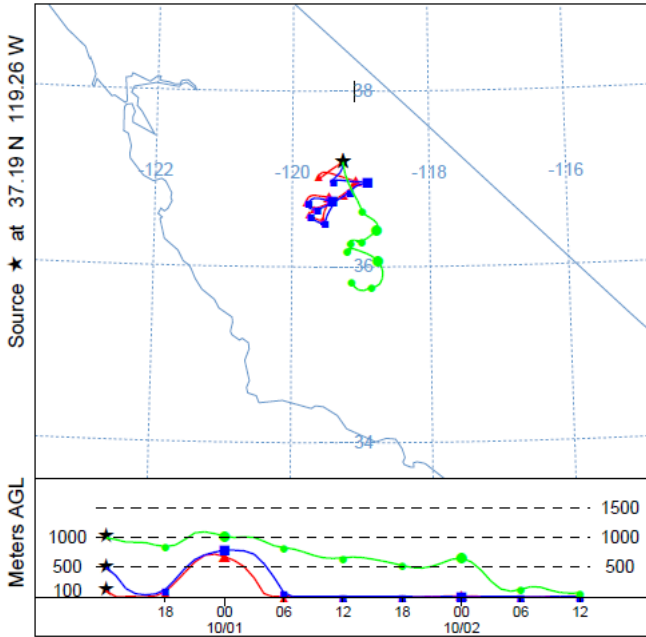
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 NAM Meteorological Data



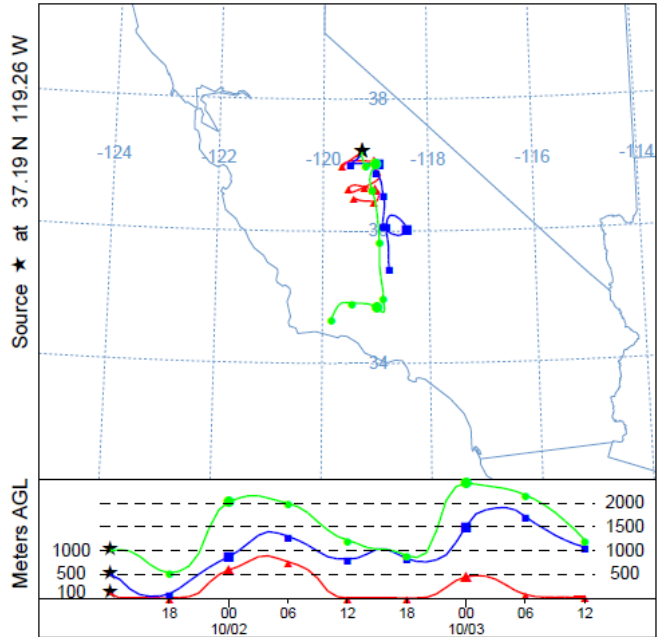
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 Forward trajectories starting at 1200 UTC 15 Sep 20
 NAM Meteorological Data



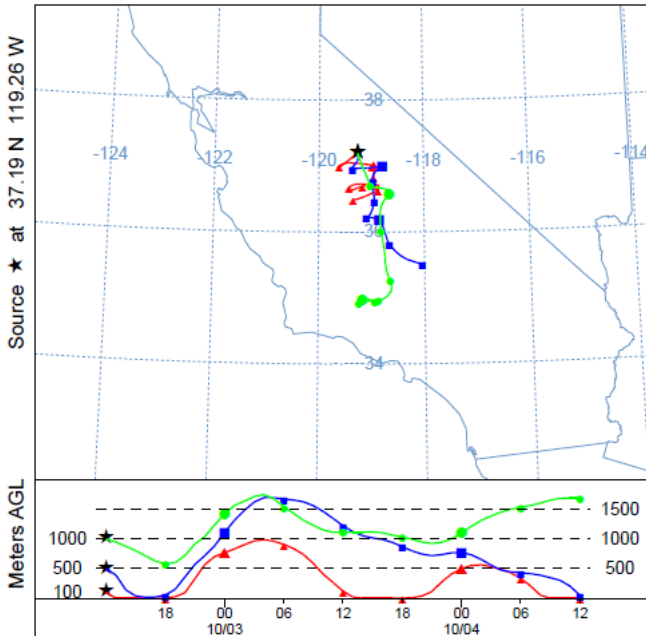
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



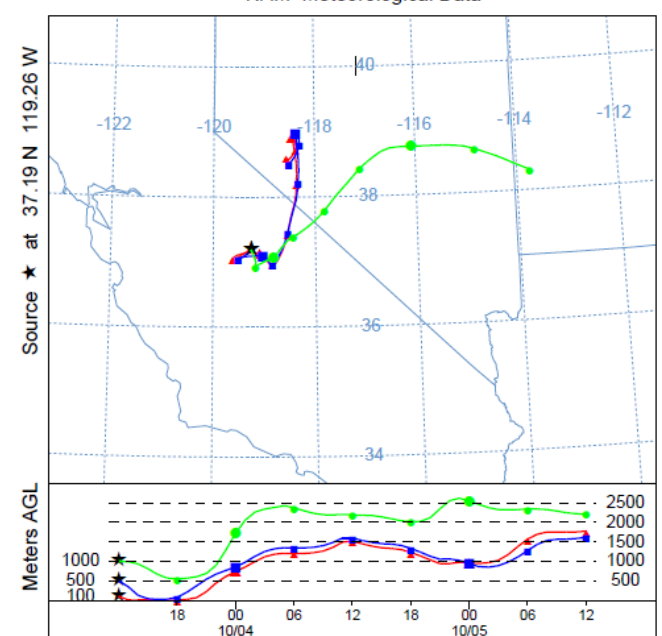
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



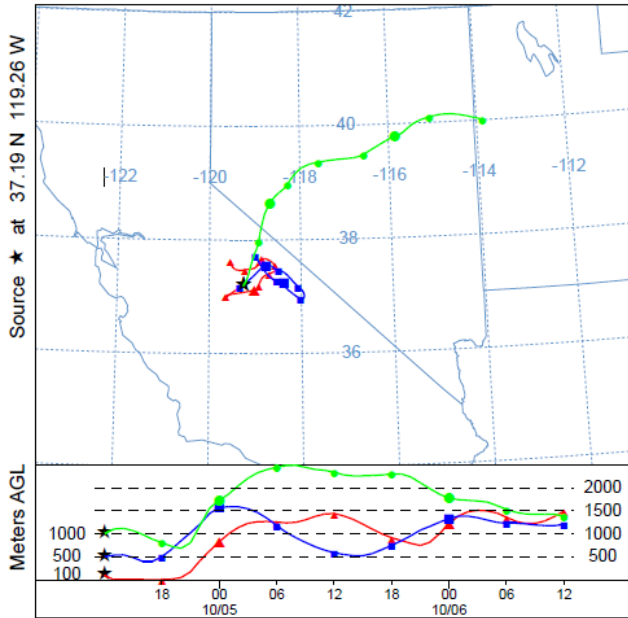
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 02 Oct 20
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 03 Oct 20
 NAM Meteorological Data



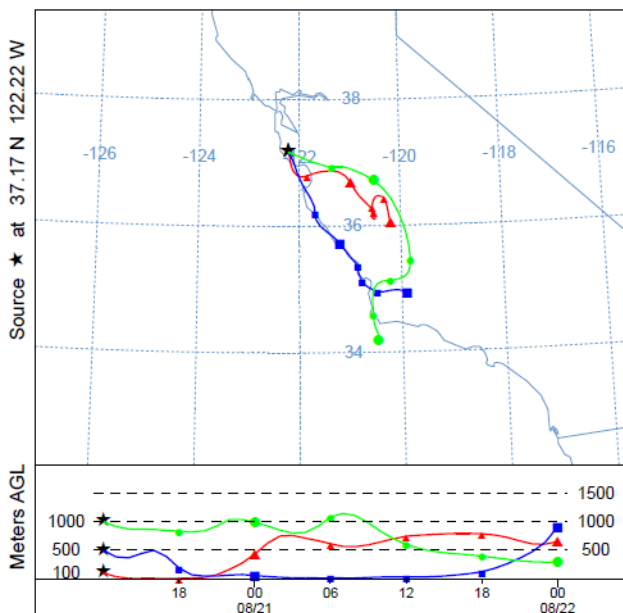
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 04 Oct 20
 NAM Meteorological Data



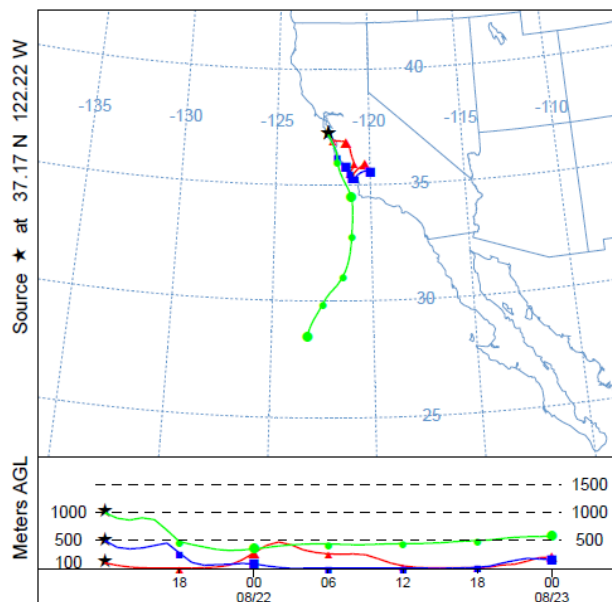
d) CZU Lightning Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|---------------|---------|-------------|----------|-----------|-------------|
| CZU Lightning | 8/16/20 | 9/22/20 | 37.1716 | -122.2228 | 86,509 |

NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 20 Aug **
 NAM Meteorological Data

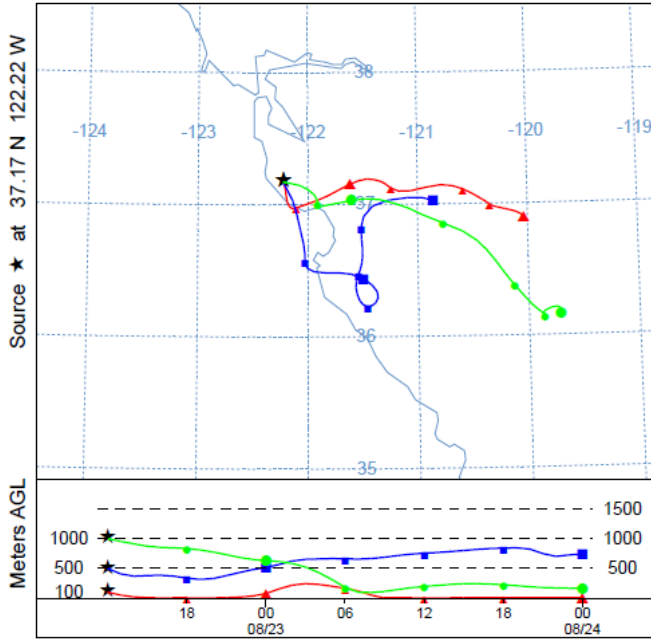


NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 21 Aug **
 NAM Meteorological Data

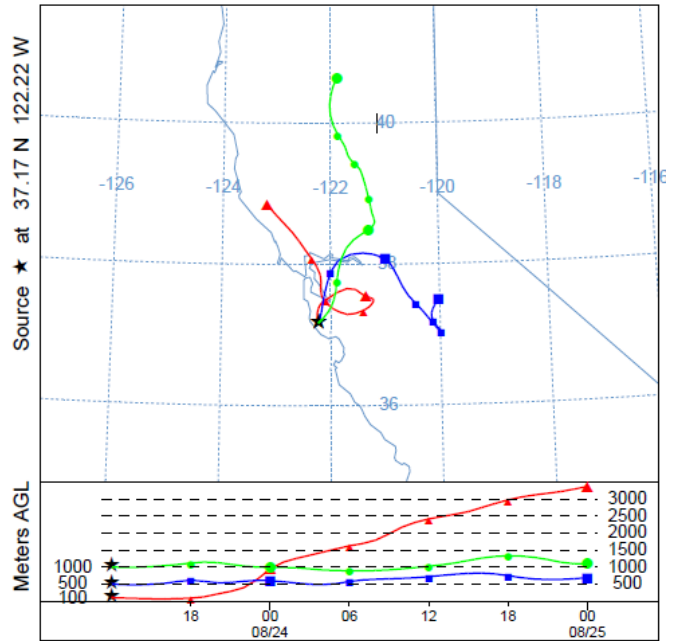


Forward trajectory path from CZU Lightning Complex starting 12z on August 20, 2020

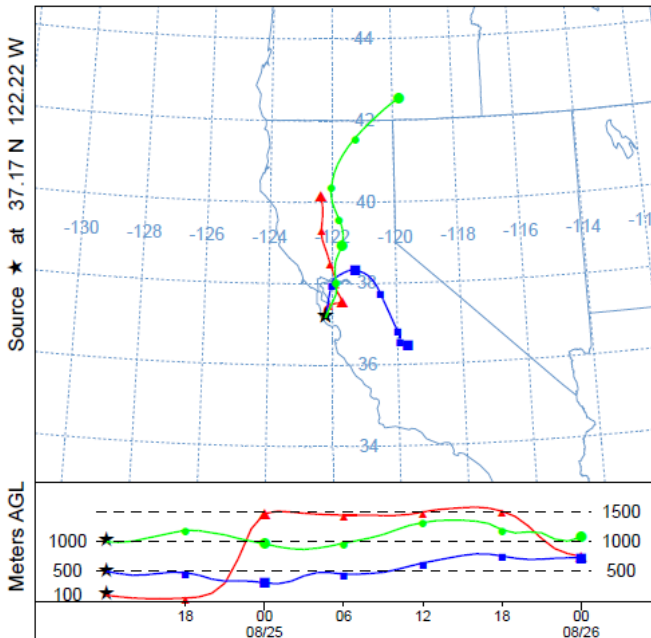
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



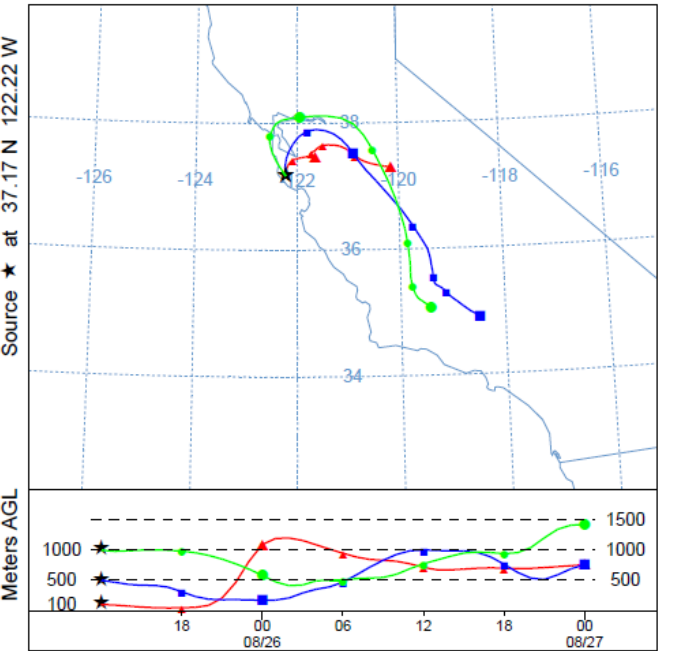
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



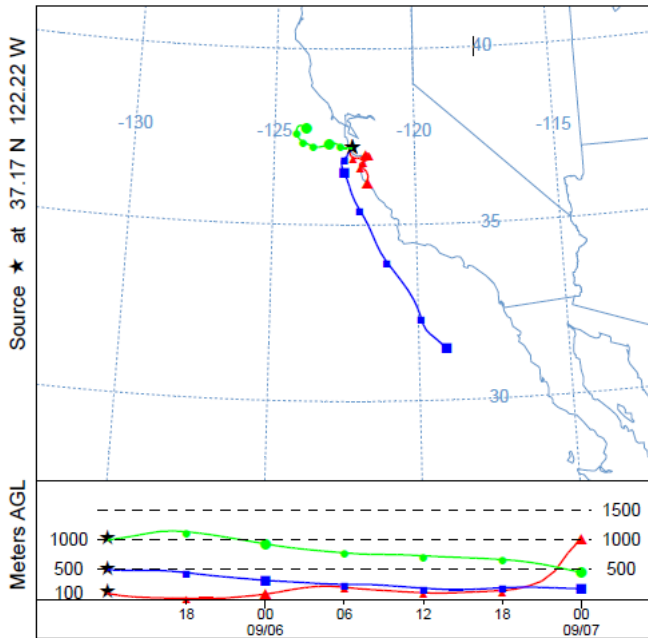
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 24 Aug **
NAM Meteorological Data



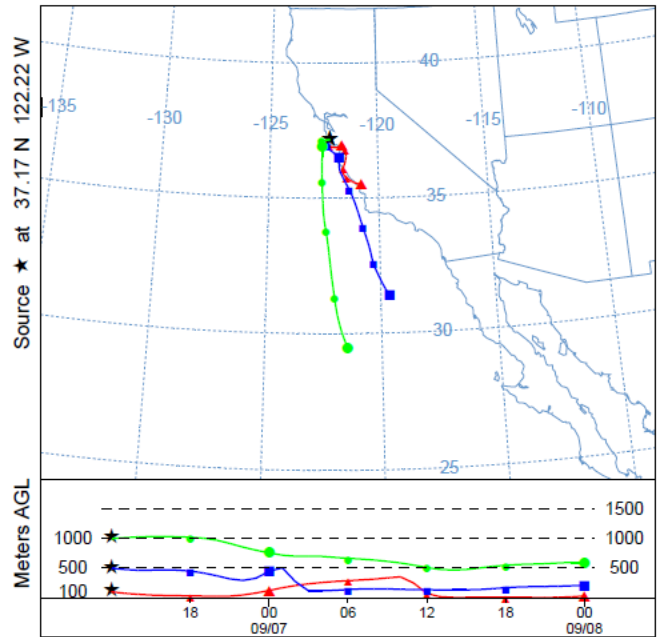
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 25 Aug **
NAM Meteorological Data



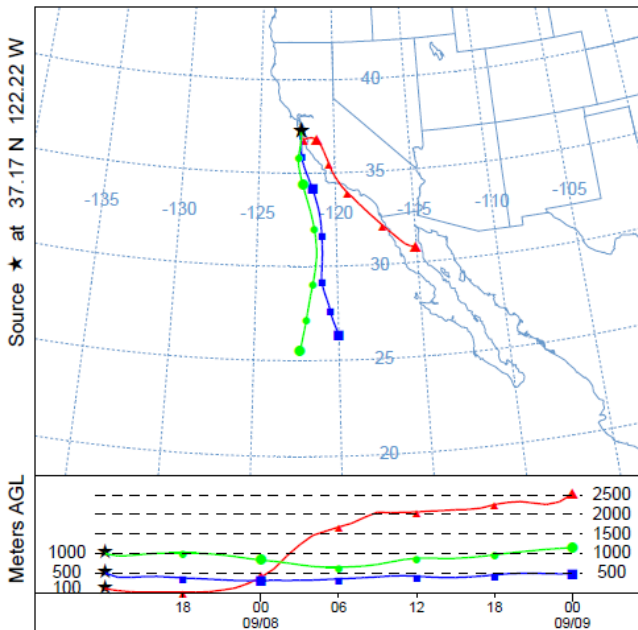
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



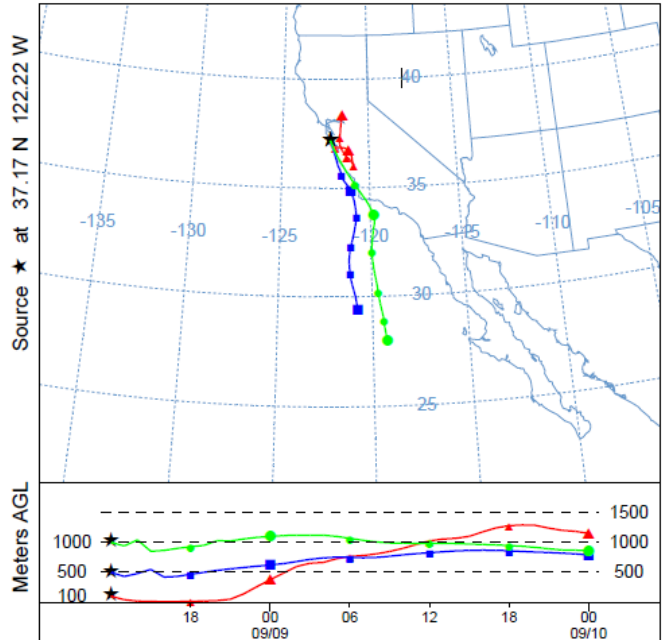
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



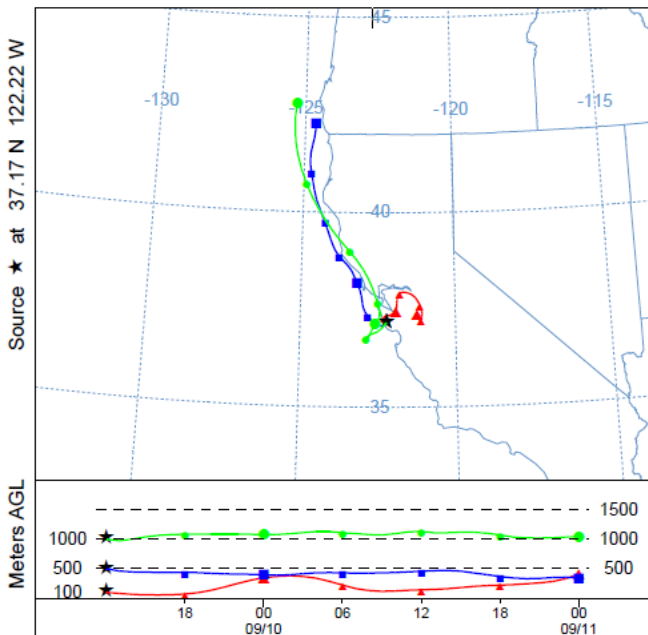
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



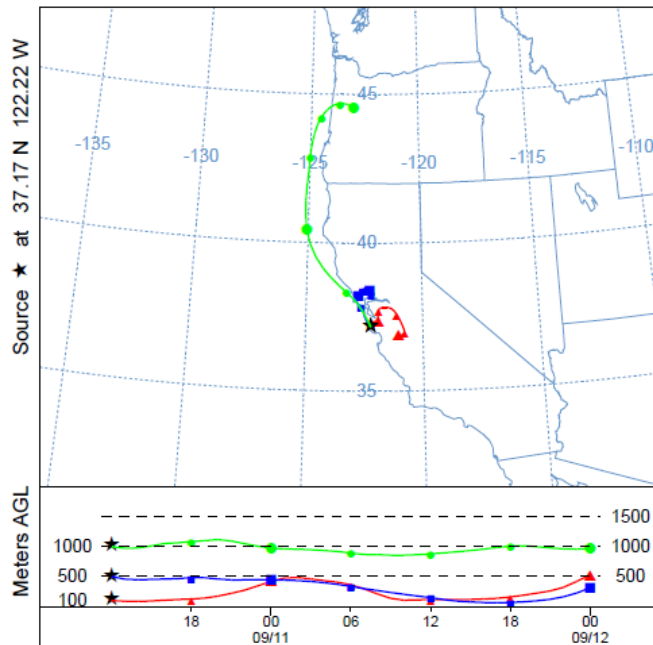
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



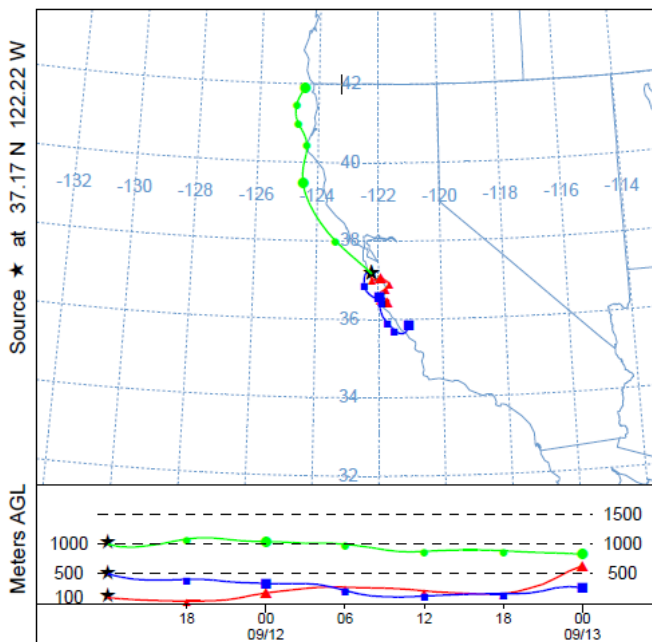
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



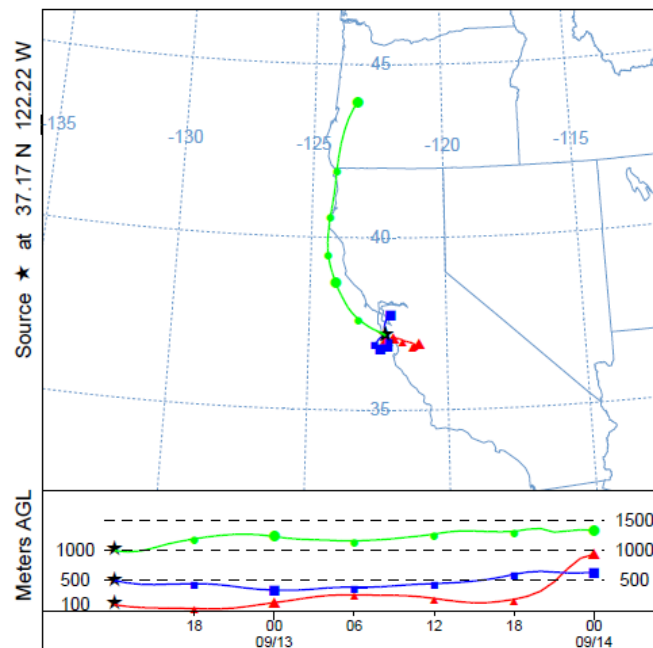
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



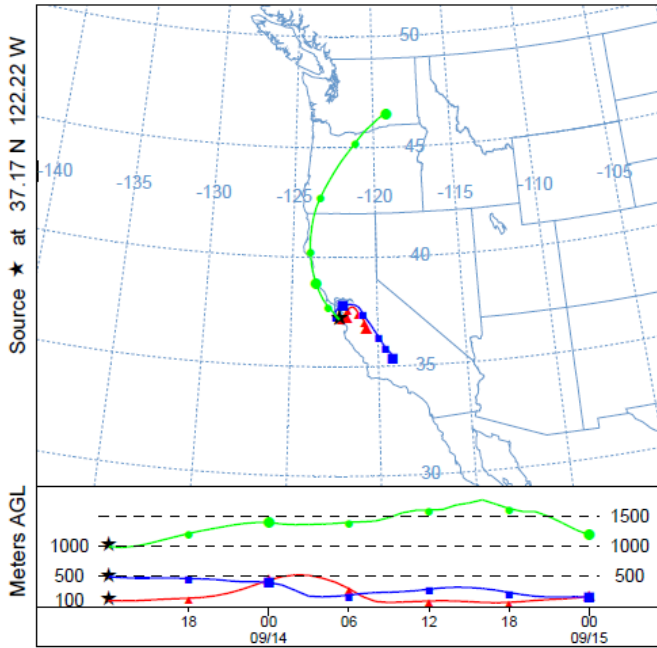
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



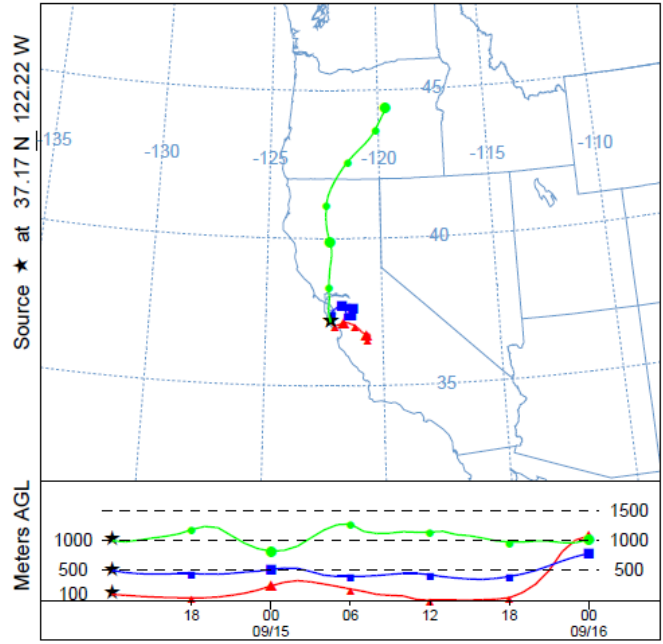
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



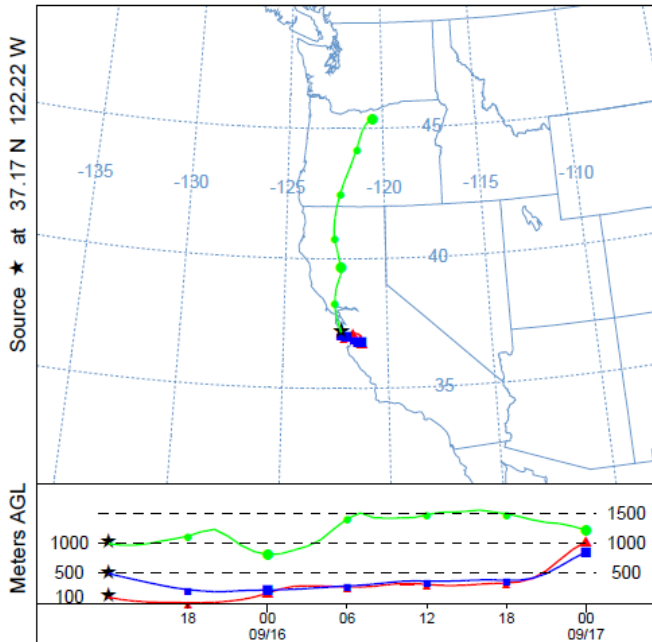
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



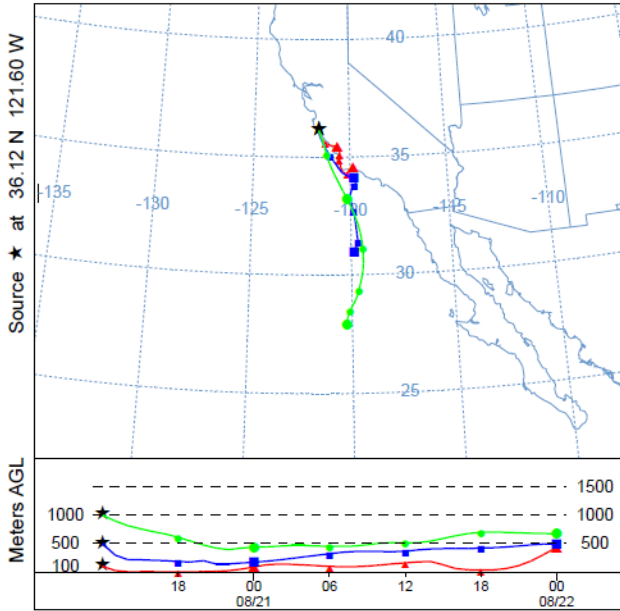
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



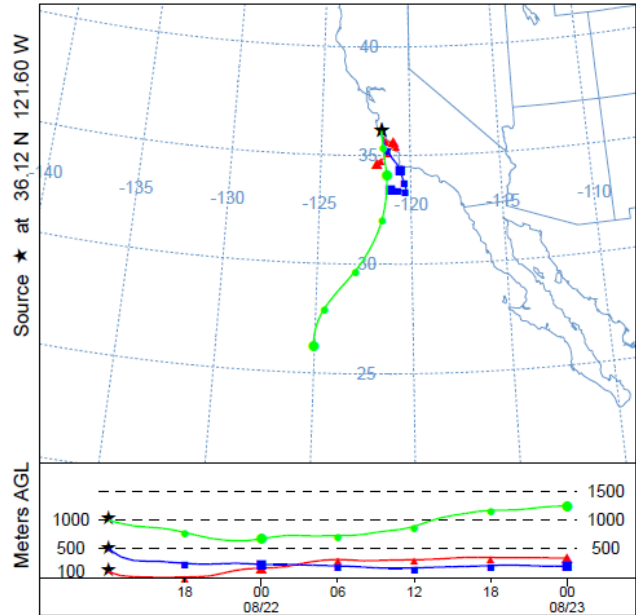
e) Dolan Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|-------|---------|-------------|----------|-----------|-------------|
| Dolan | 8/19/20 | 12/31/20 | 36.123 | -121.602 | 124,924 |

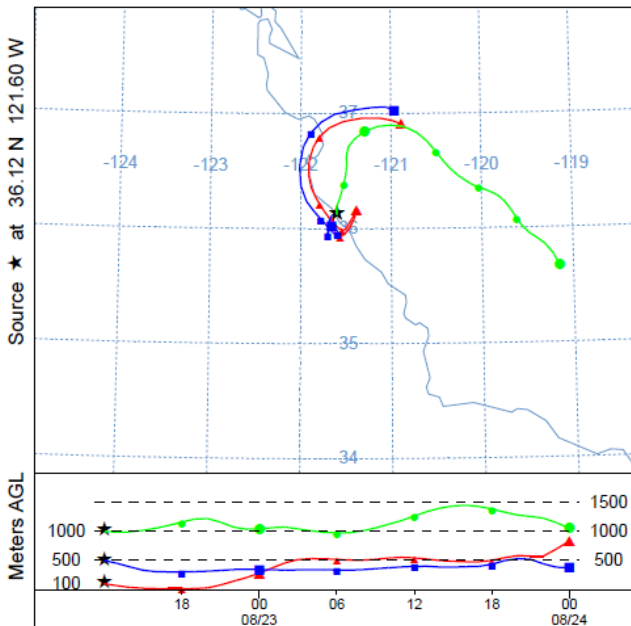
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



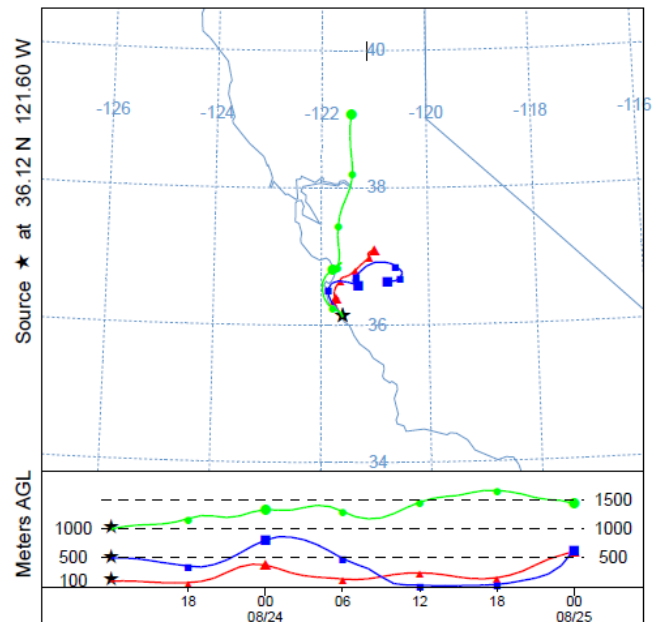
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



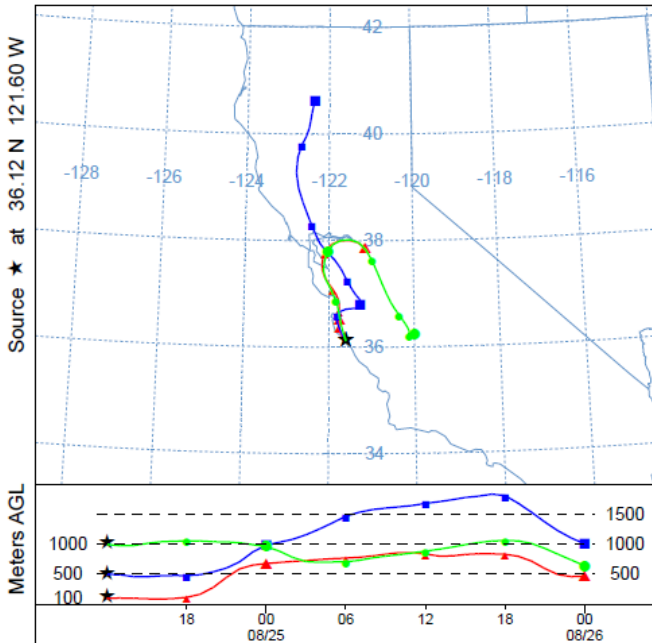
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



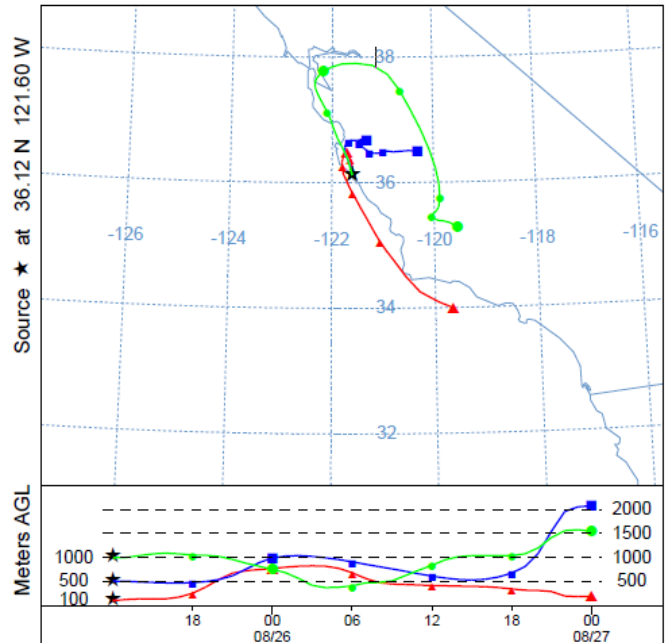
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



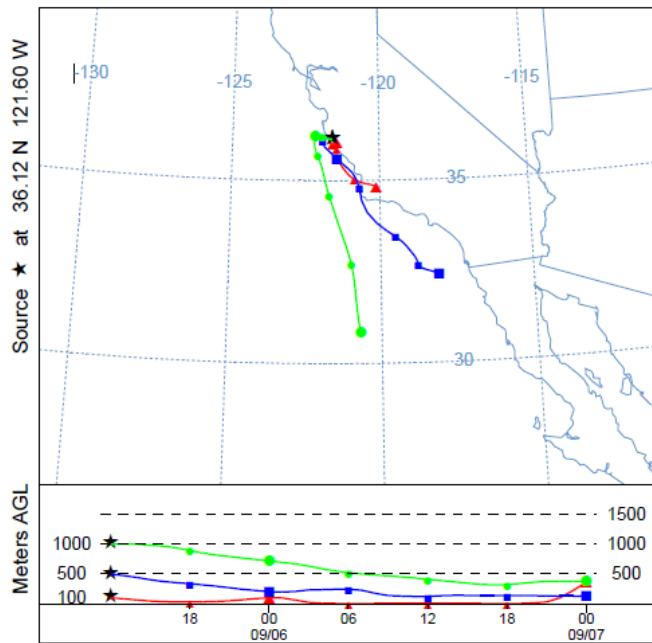
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



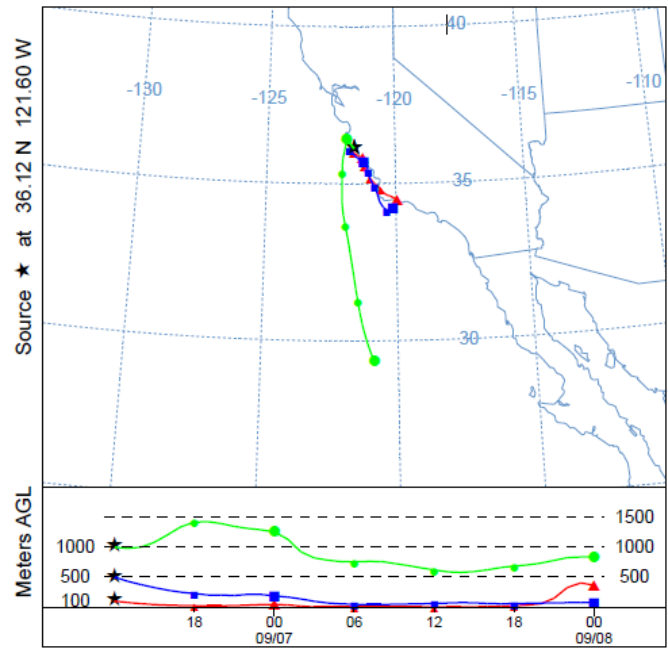
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



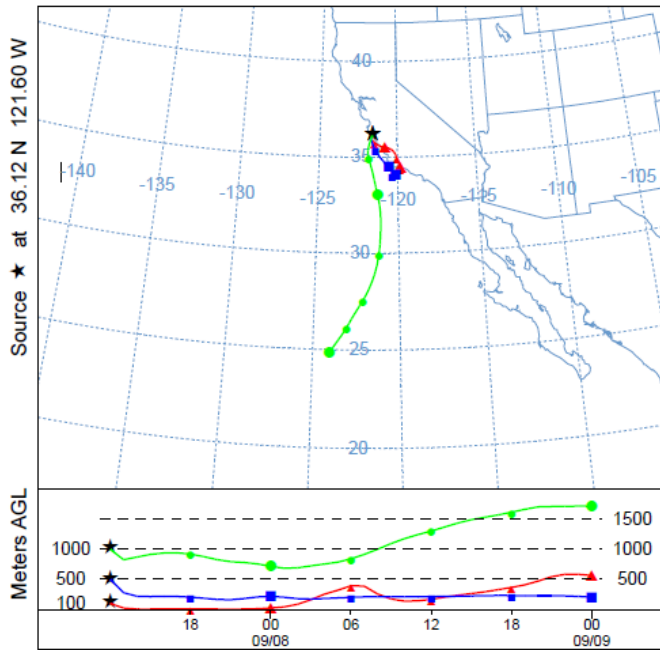
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



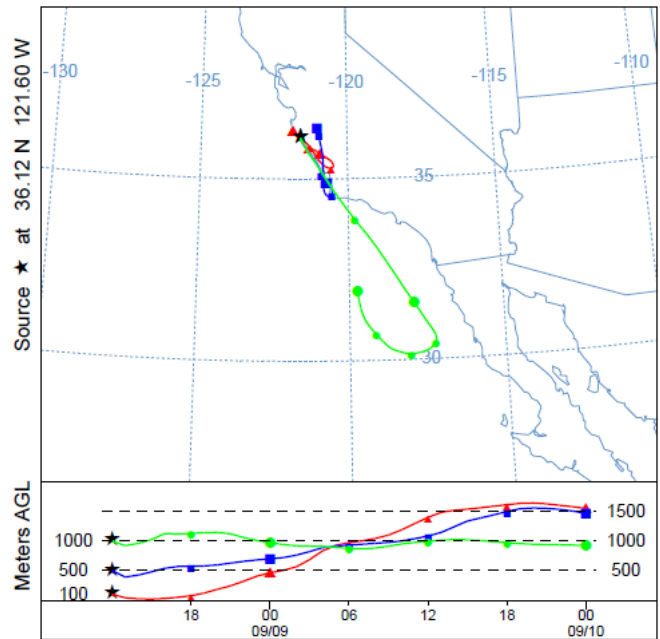
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



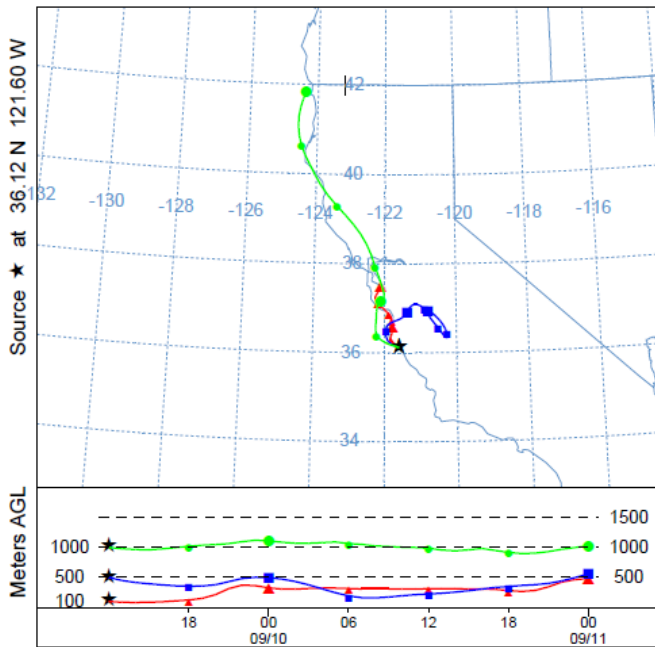
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 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



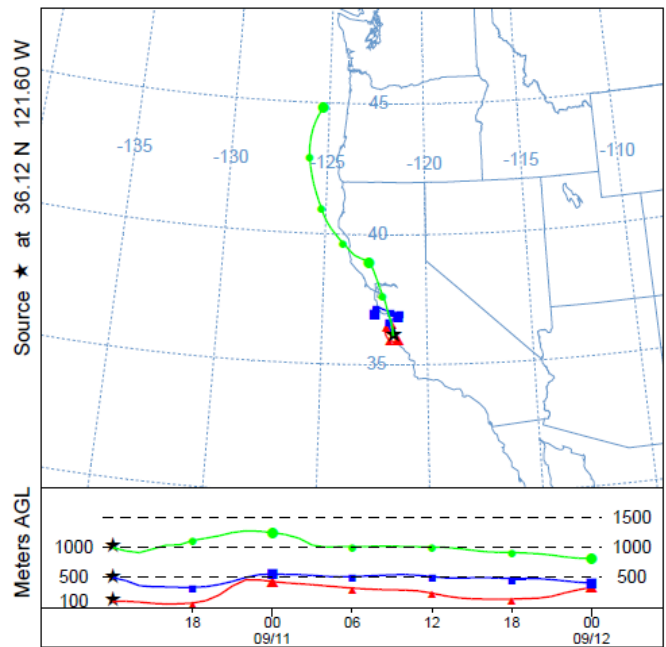
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



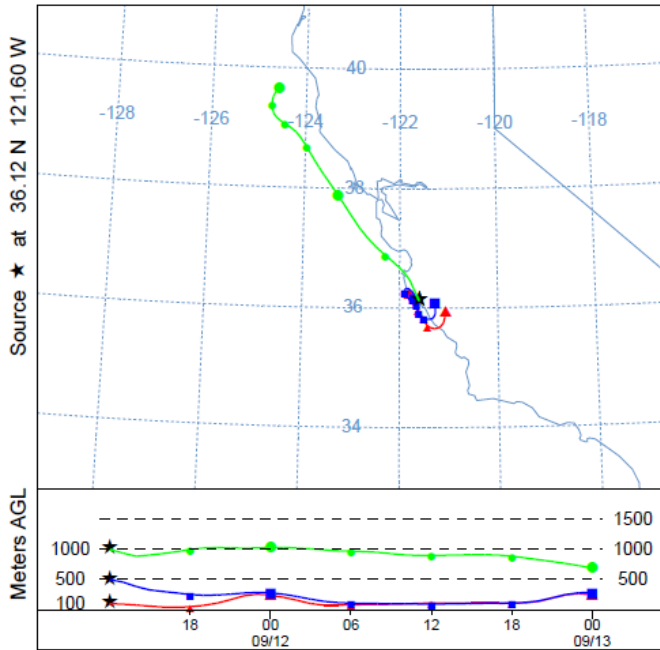
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



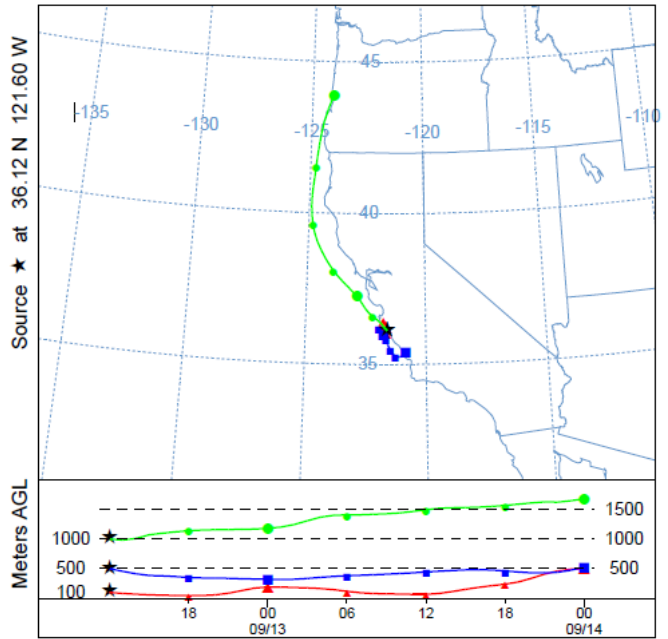
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 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



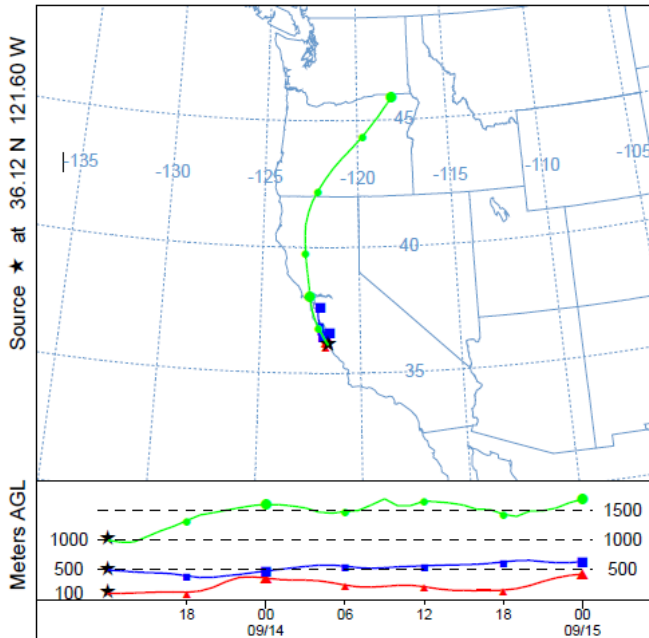
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 NAM Meteorological Data



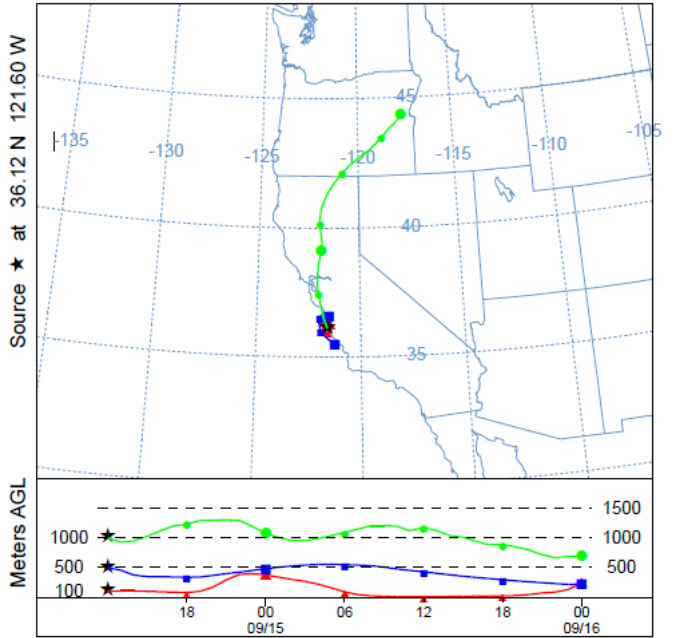
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



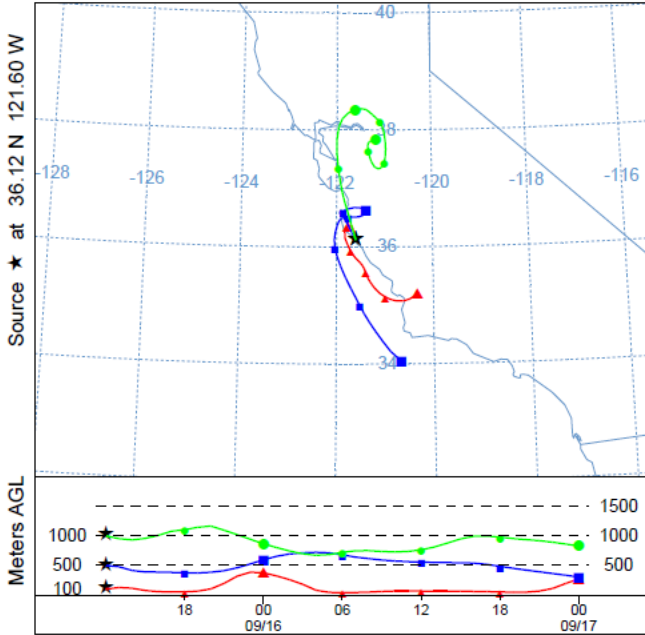
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 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



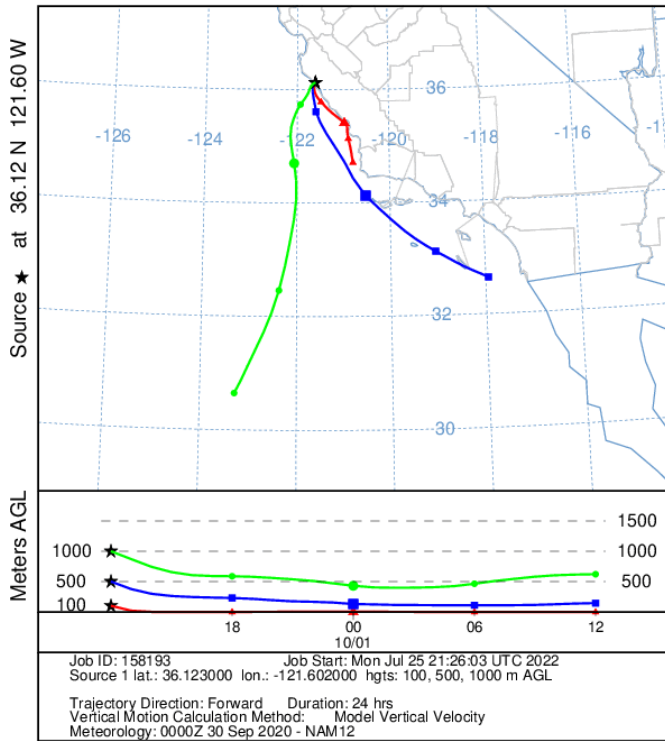
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 NAM Meteorological Data



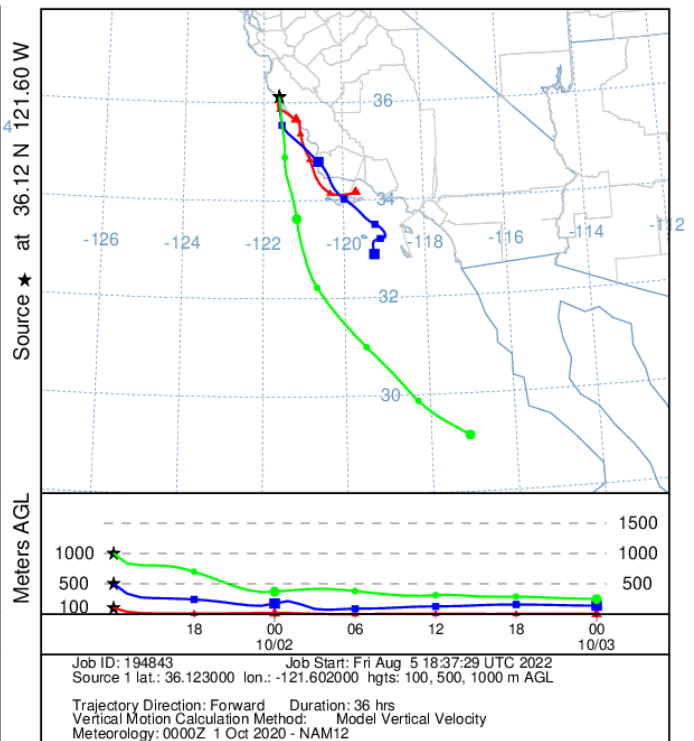
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



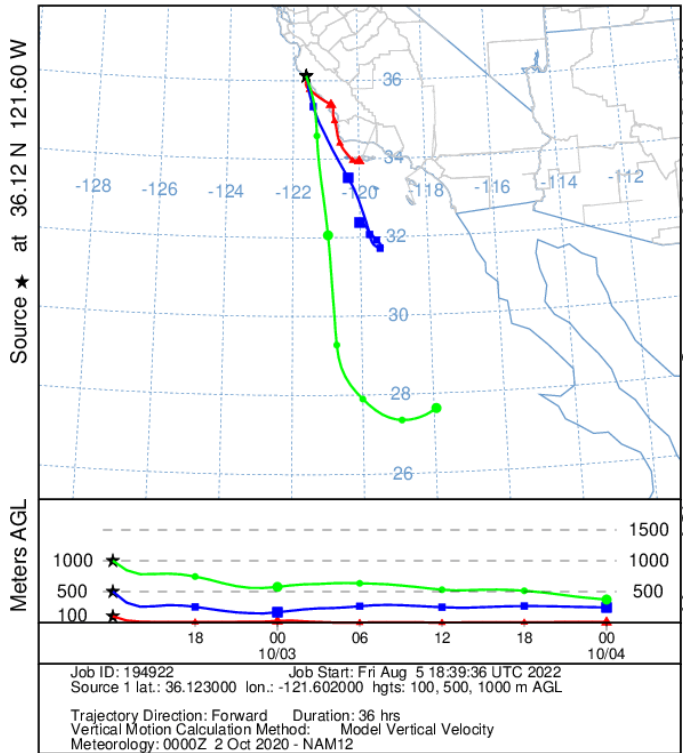
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



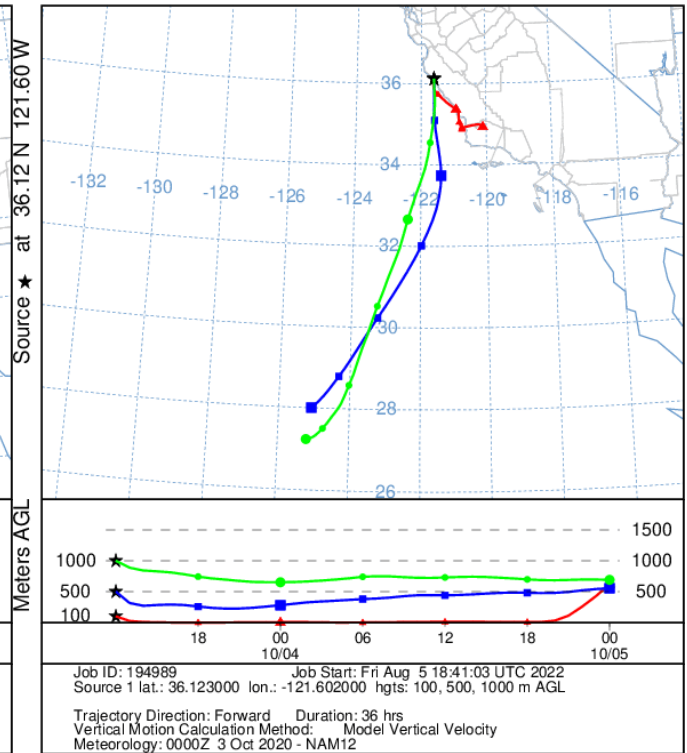
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



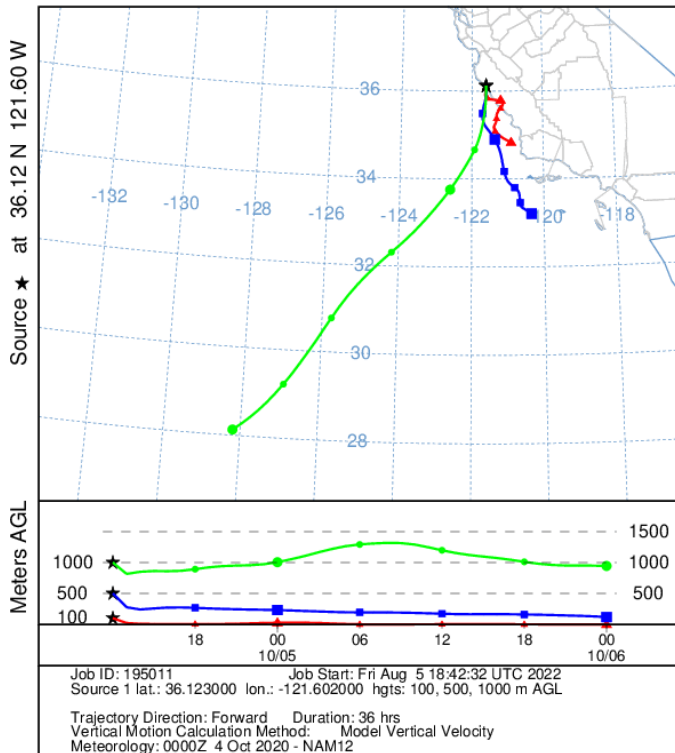
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



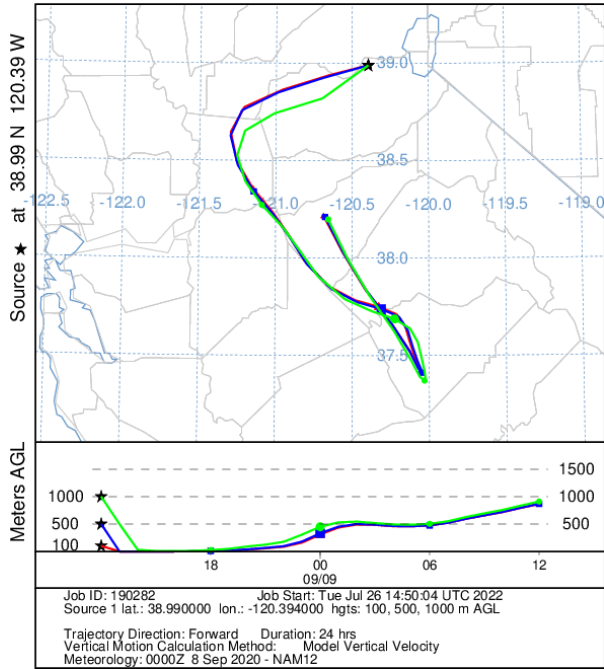
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 04 Oct 20
NAM Meteorological Data



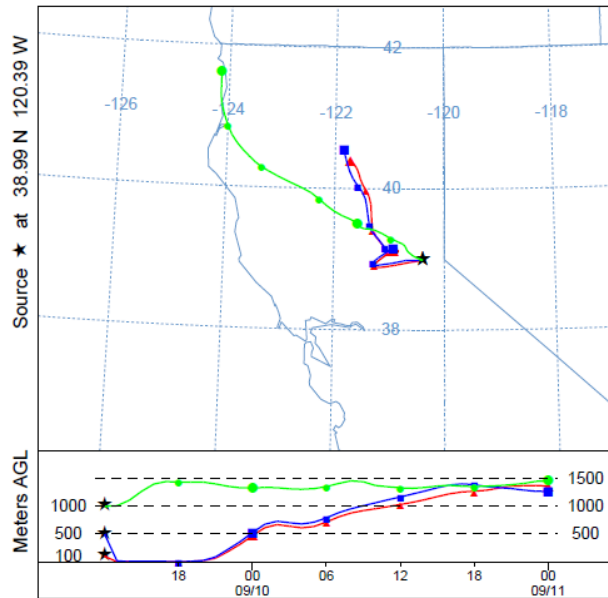
f) Fork Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|------|--------|-------------|----------|-----------|-------------|
| Fork | 9/8/20 | 11/9/20 | 38.990 | -120.394 | 1,673 |

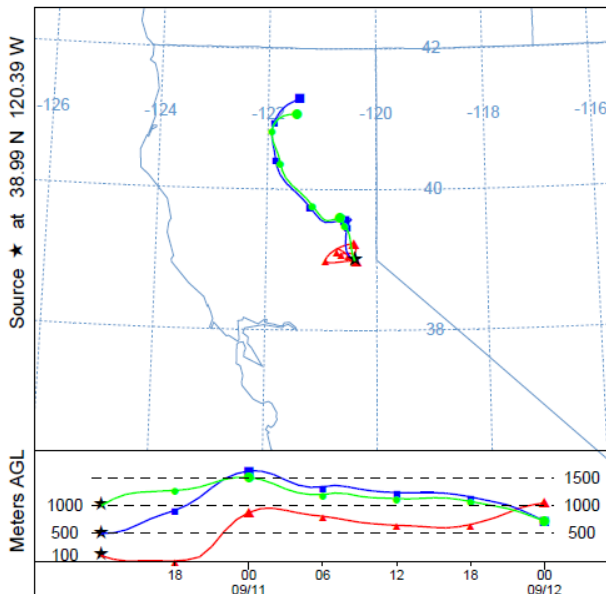
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 08 Sep 20
NAM Meteorological Data



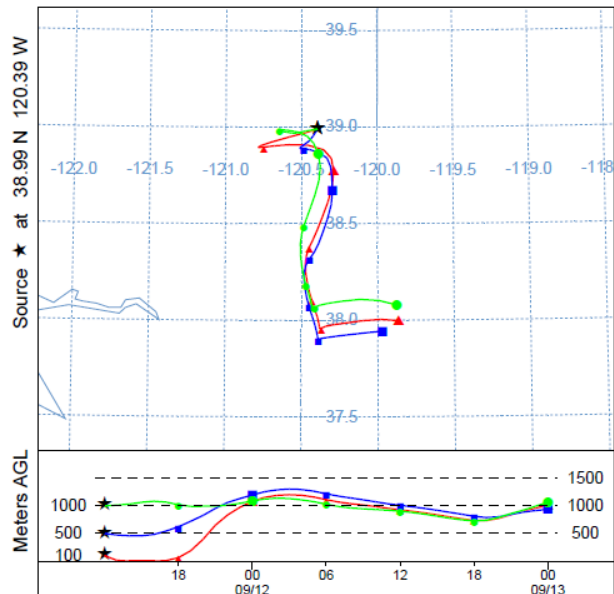
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 09 Sep **
NAM Meteorological Data



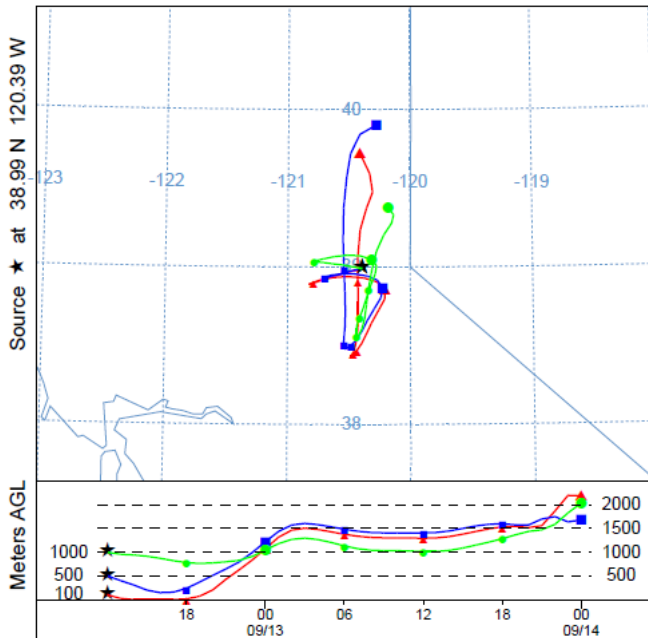
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Forward trajectories starting at 1200 UTC 10 Sep **
NAM Meteorological Data



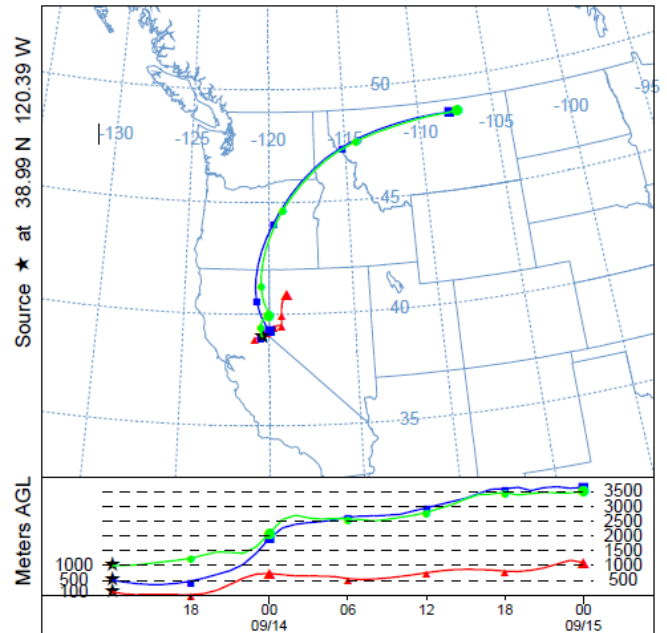
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 11 Sep **
NAM Meteorological Data



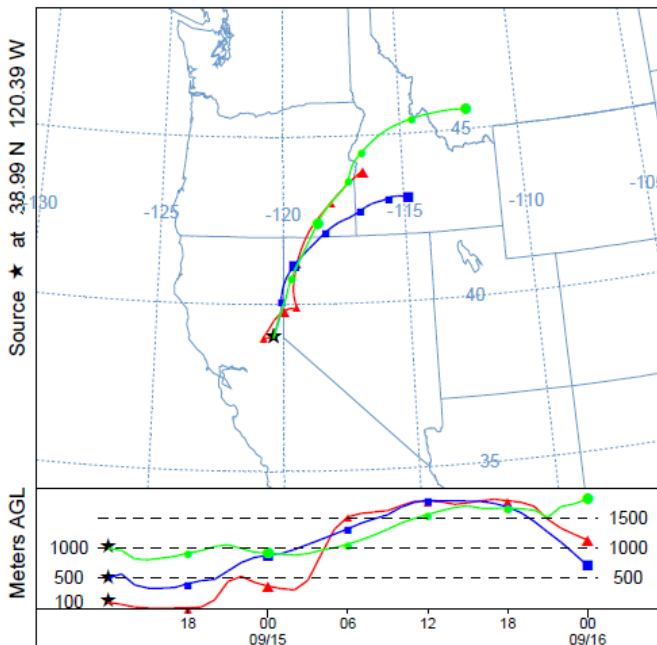
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



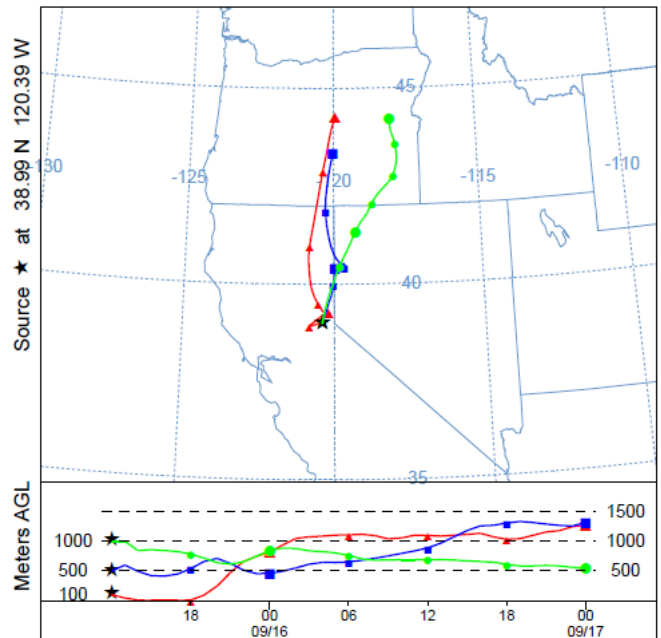
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



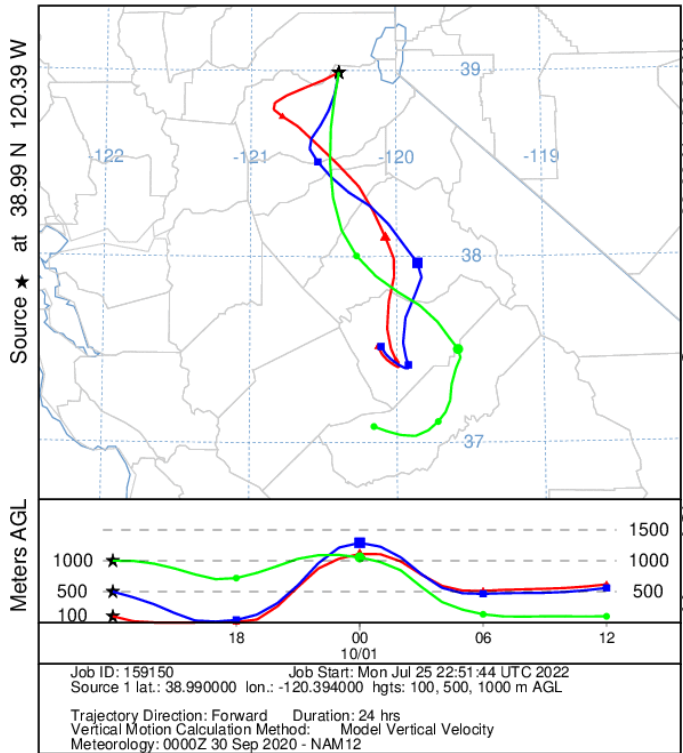
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



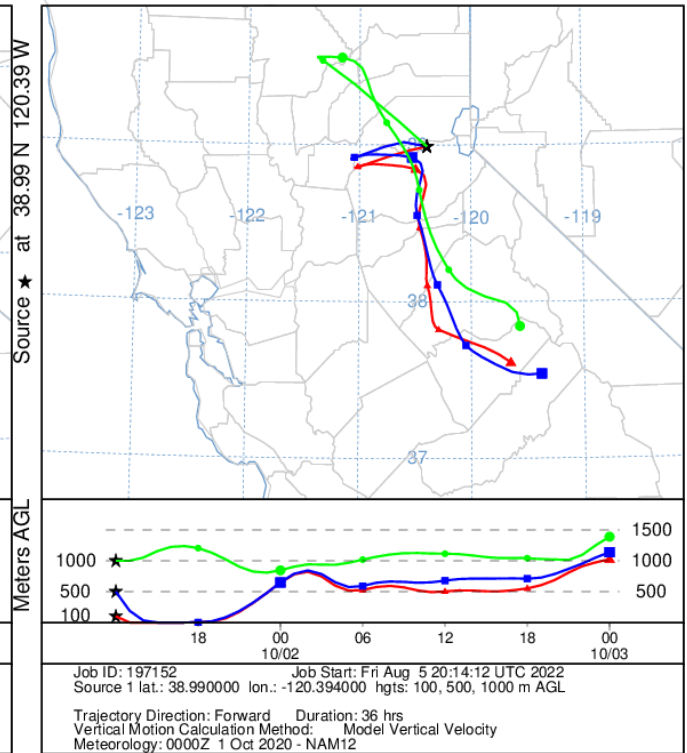
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



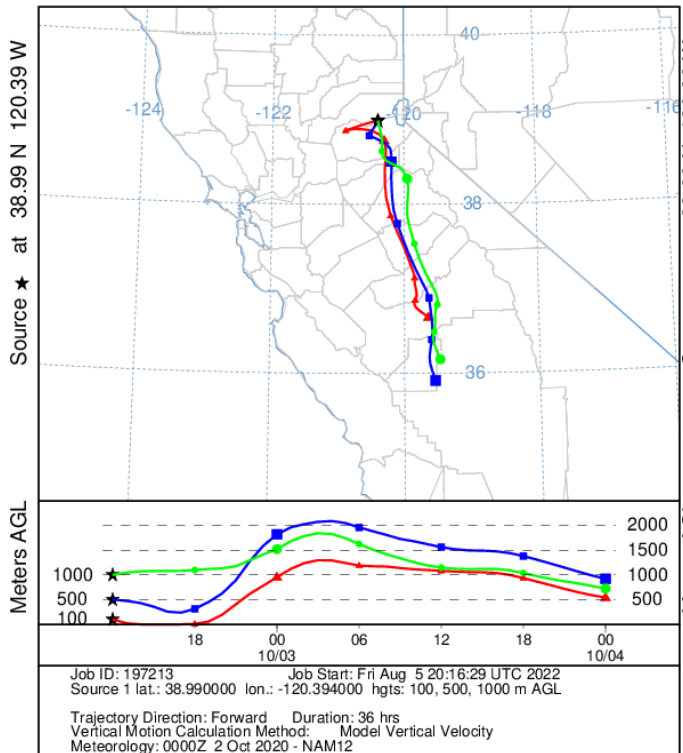
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 30 Sep 20
NAM Meteorological Data



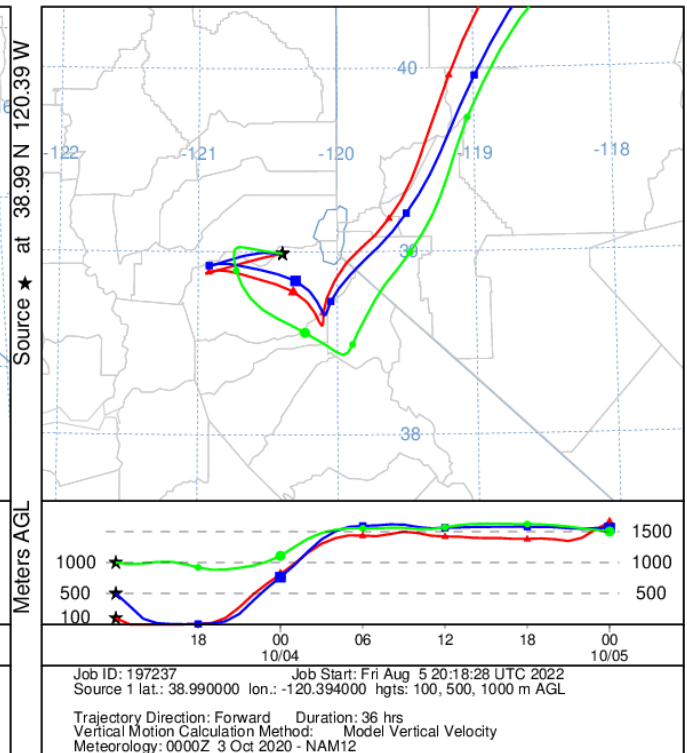
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 01 Oct 20
NAM Meteorological Data



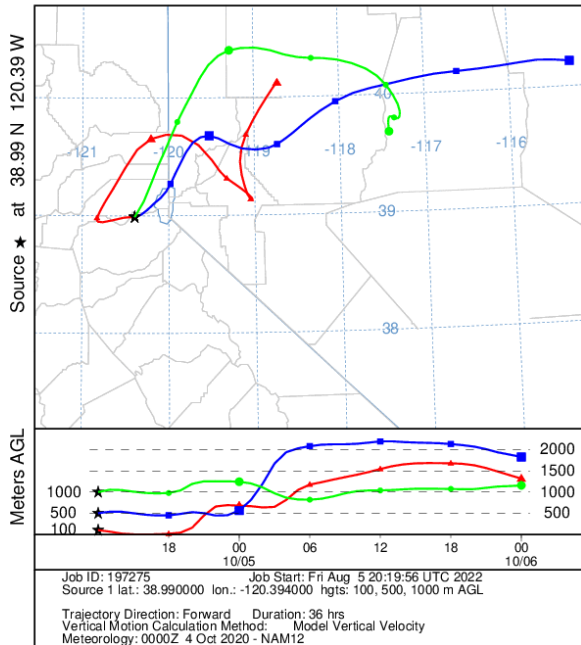
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



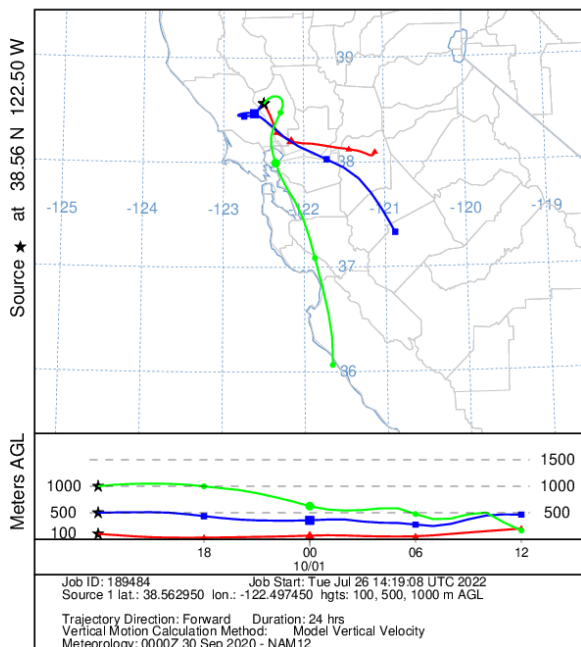
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 04 Oct 20
 NAM Meteorological Data



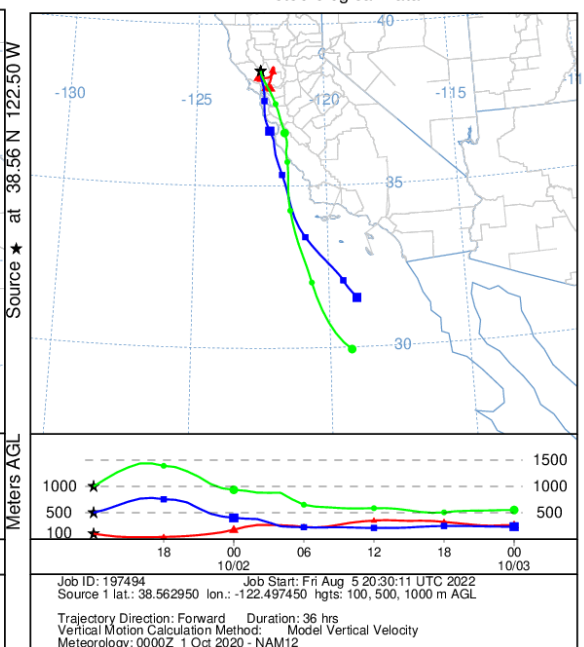
g) Glass Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|-------|---------|-------------|----------|-----------|-------------|
| Glass | 9/27/20 | 10/20/20 | 38.5630 | -122.4975 | 67,484 |

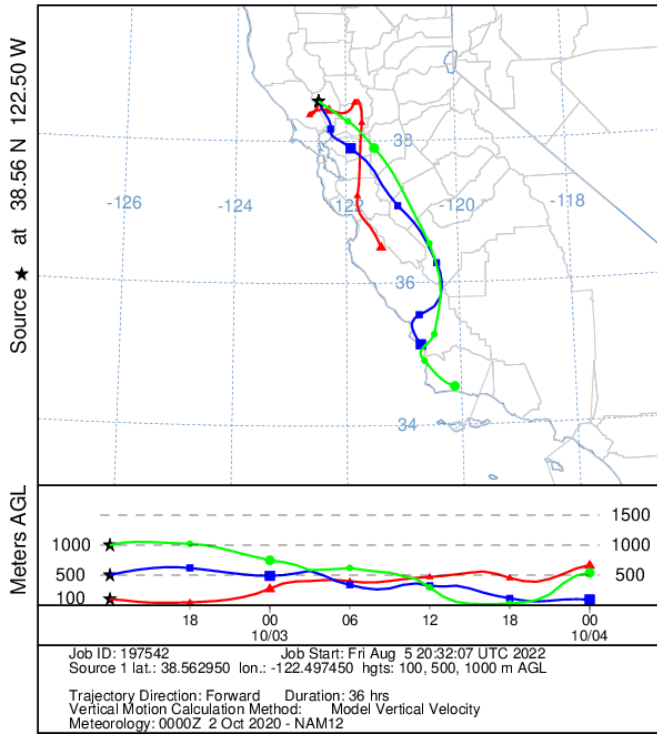
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



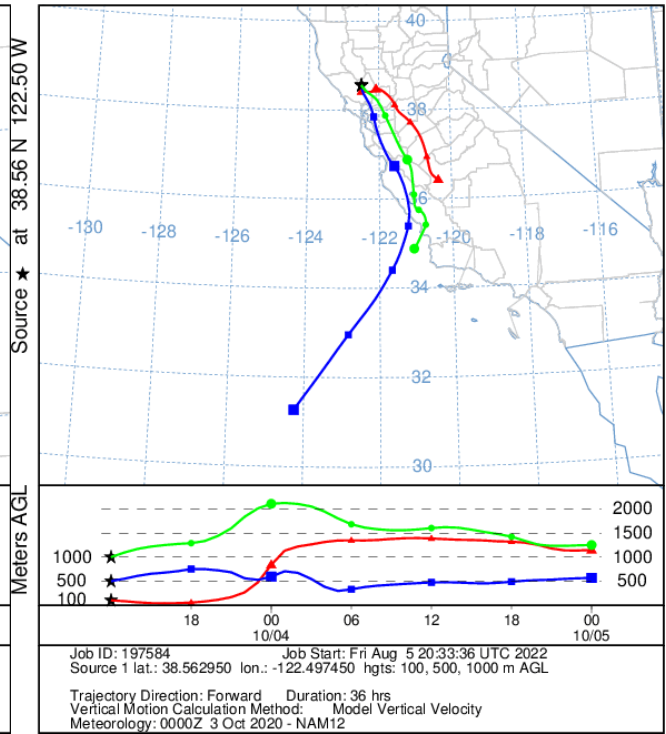
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



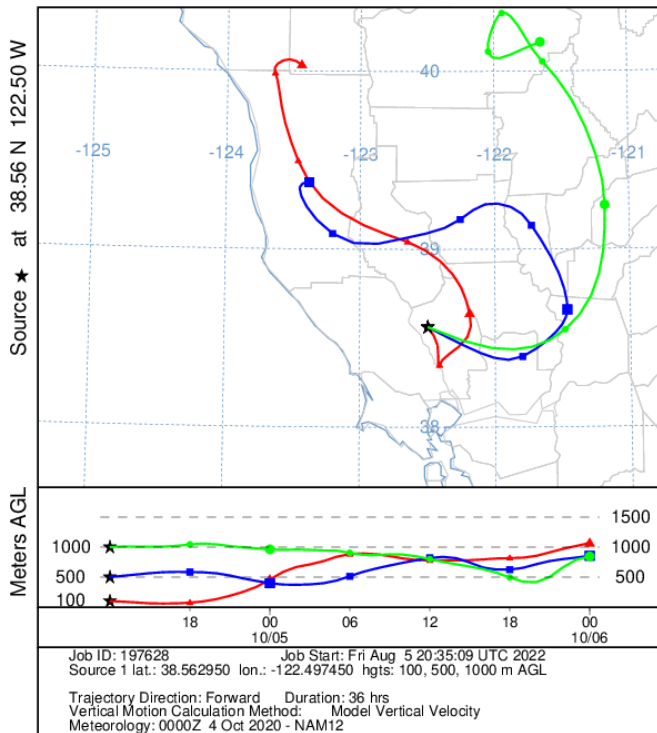
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



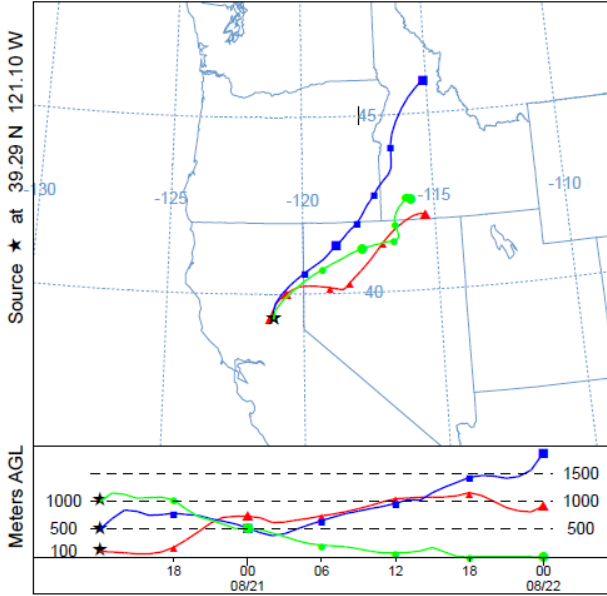
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 04 Oct 20
NAM Meteorological Data



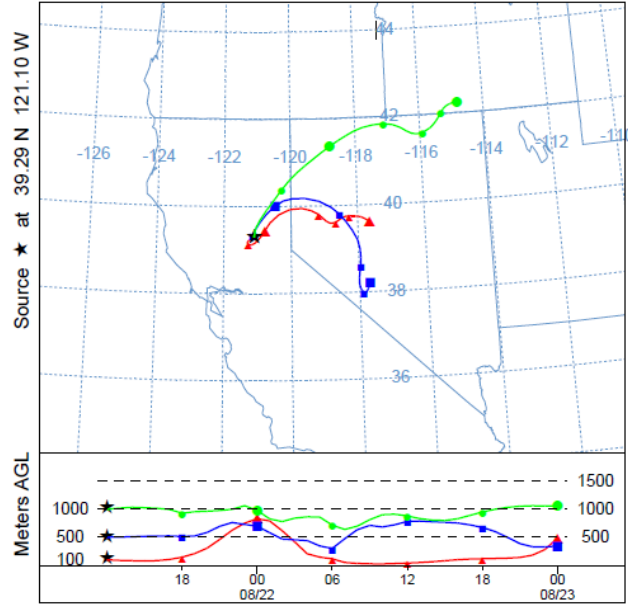
h) Jones Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|-------|---------|-------------|----------|-----------|-------------|
| Jones | 8/17/20 | 8/28/20 | 39.2924 | -121.1004 | 705 |

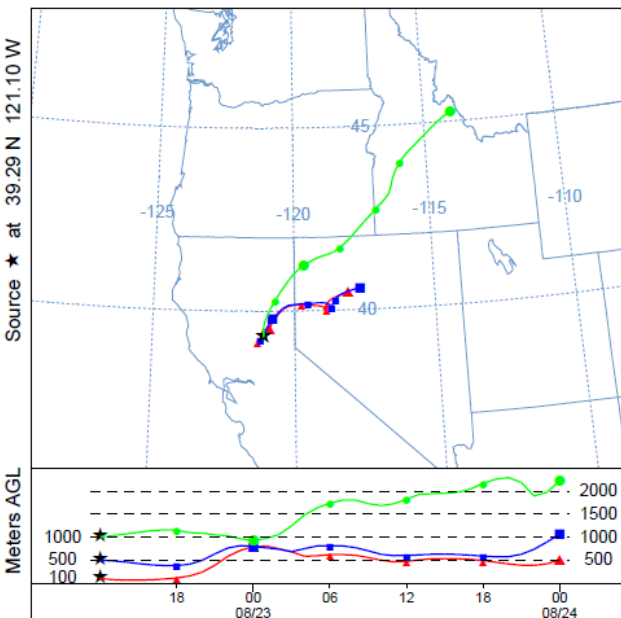
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



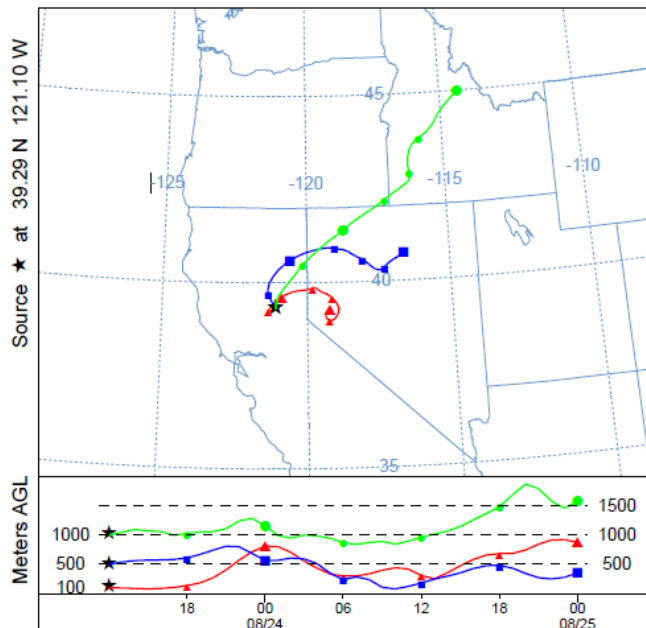
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



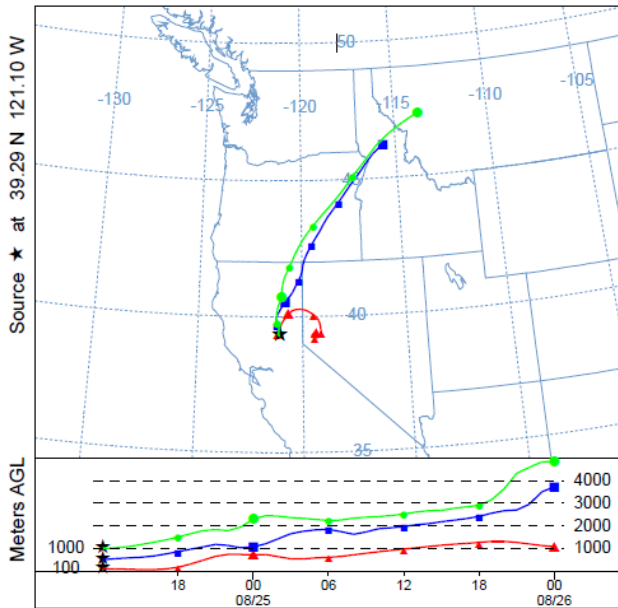
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



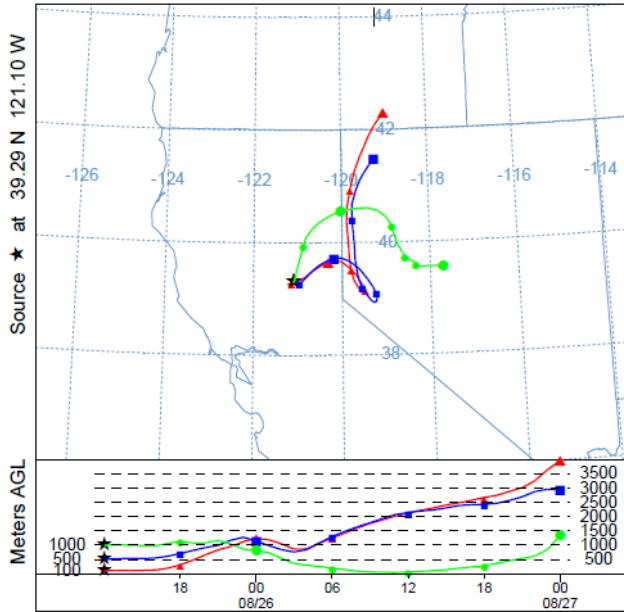
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 24 Aug **
NAM Meteorological Data



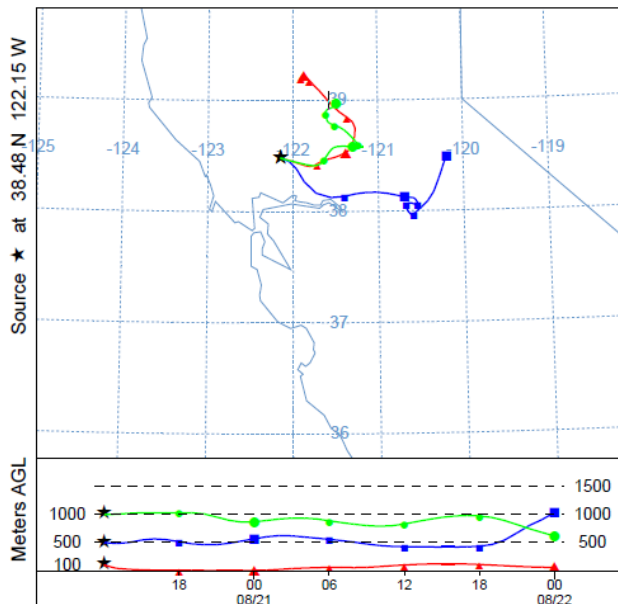
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 25 Aug **
NAM Meteorological Data



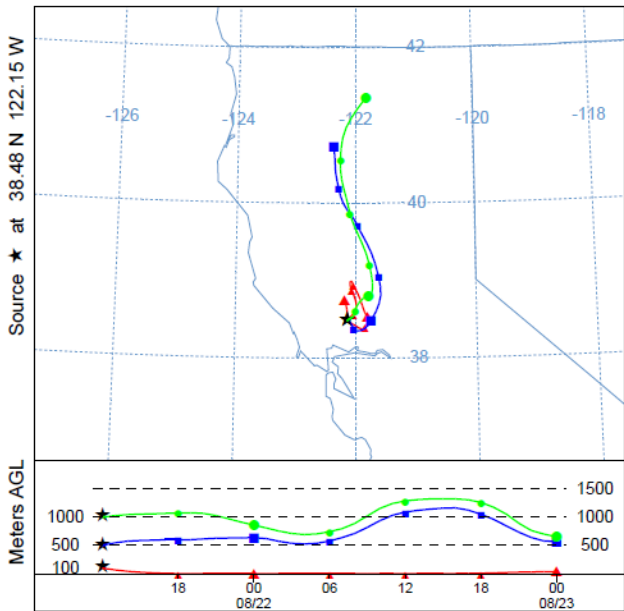
i) LNU Lightning Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|---------------|---------|-------------|----------|-----------|-------------|
| LNU Lightning | 8/17/20 | 10/2/20 | 38.4819 | -122.1486 | 363,220 |

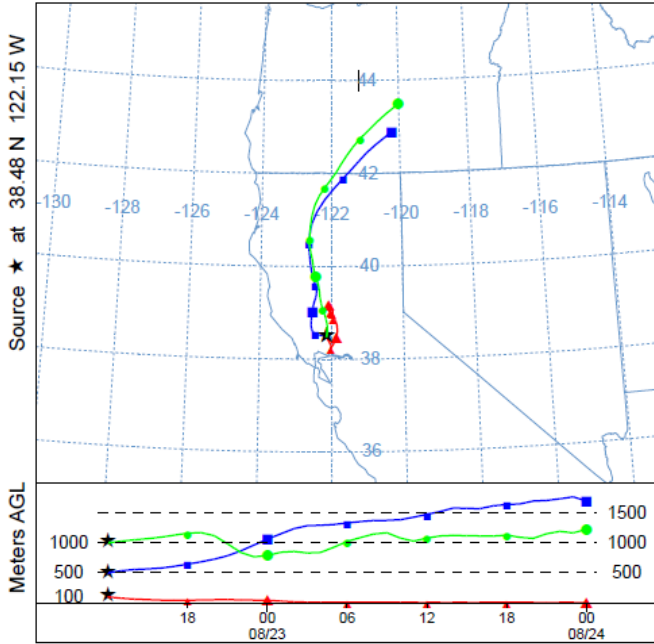
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



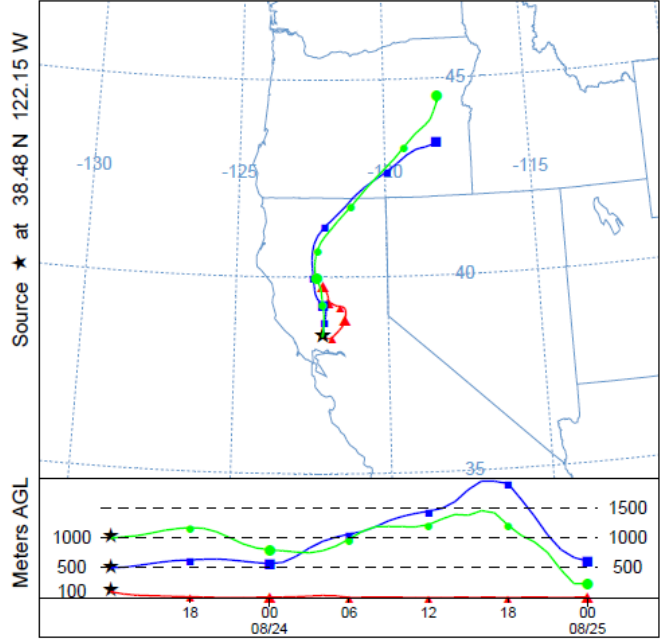
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



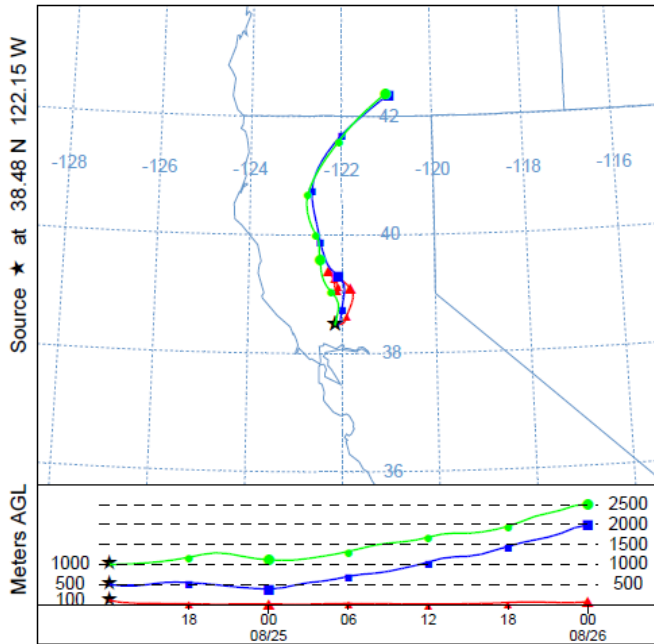
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 22 Aug **
 NAM Meteorological Data



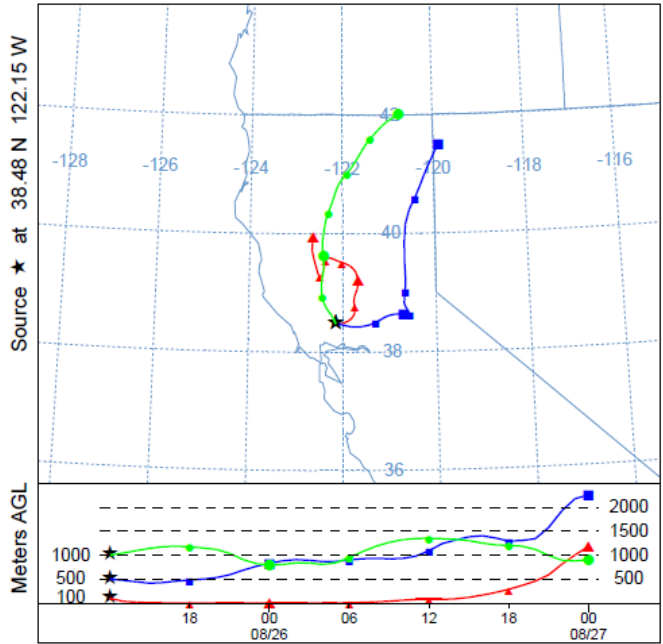
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 23 Aug **
 NAM Meteorological Data



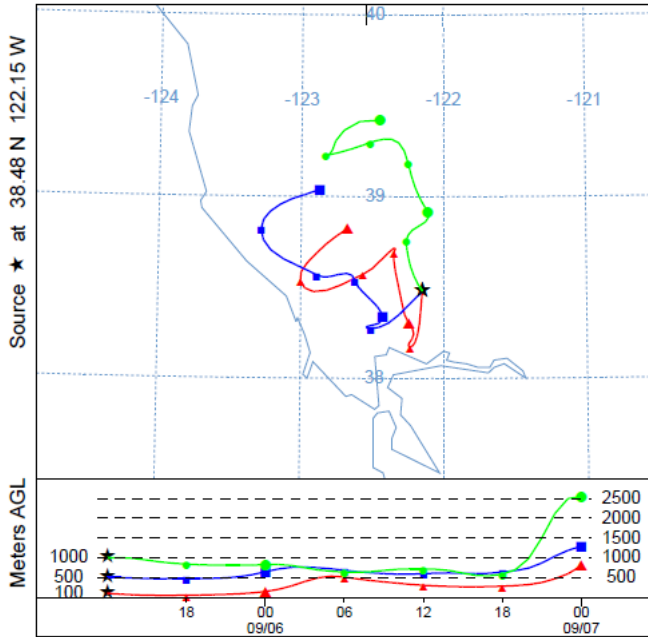
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



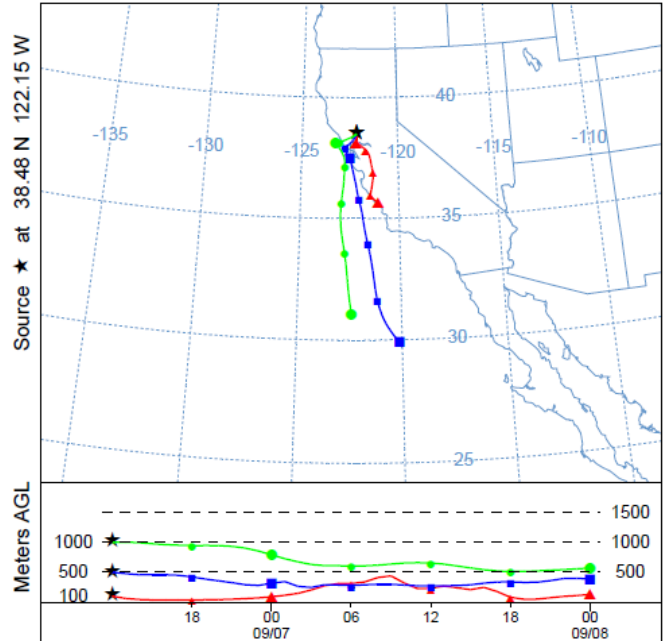
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



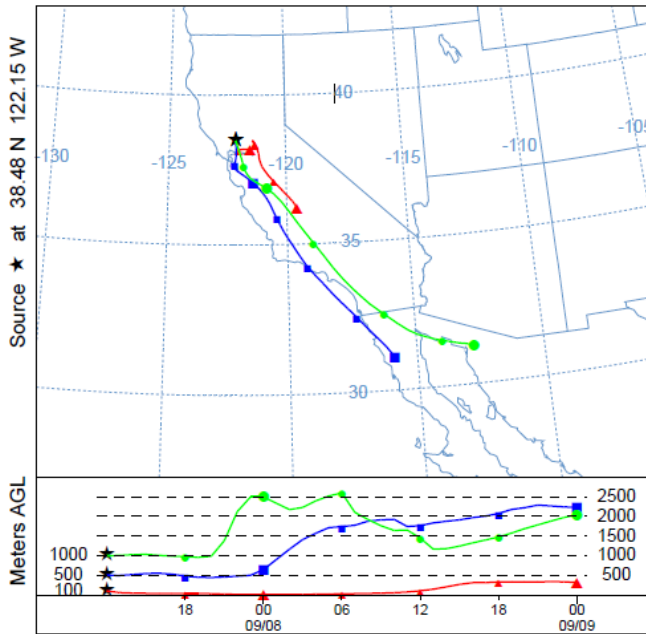
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



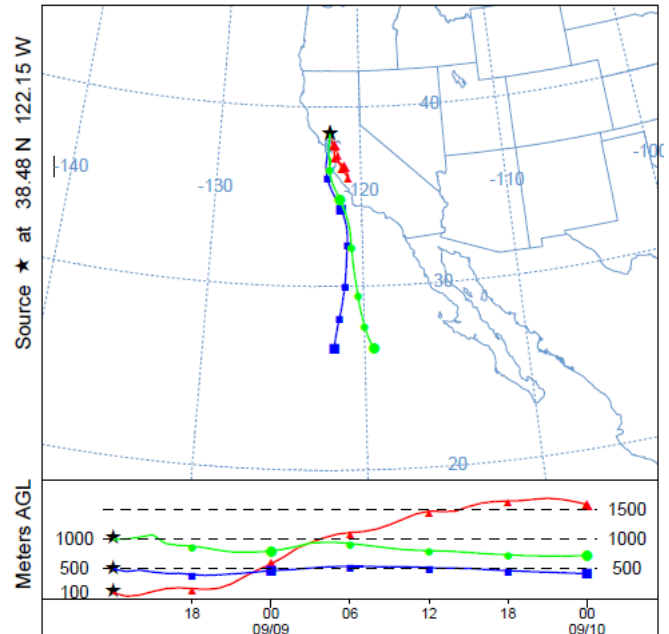
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



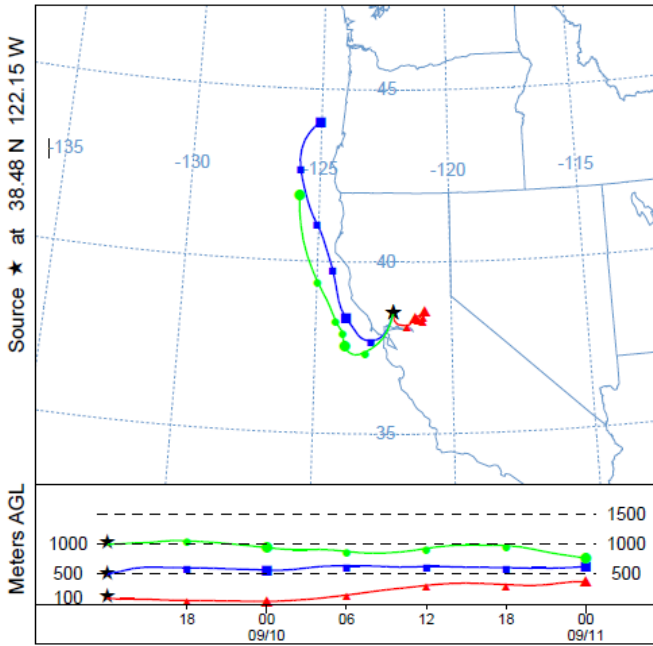
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



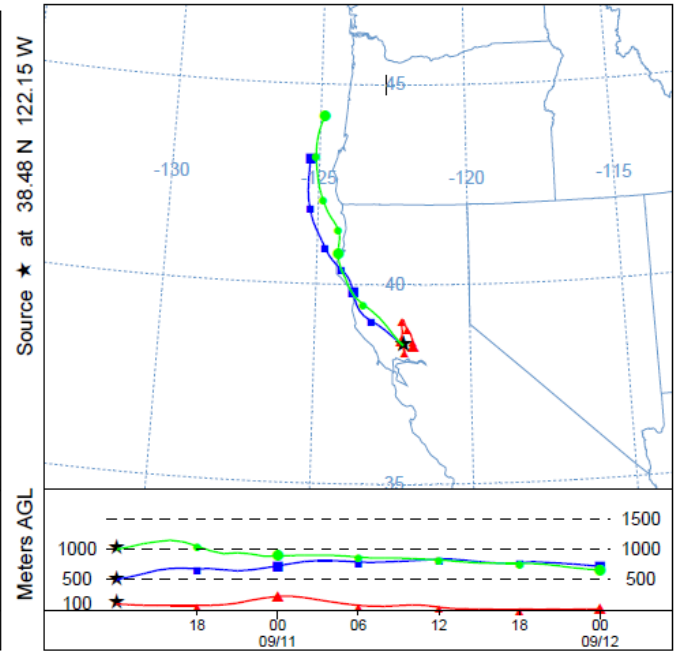
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



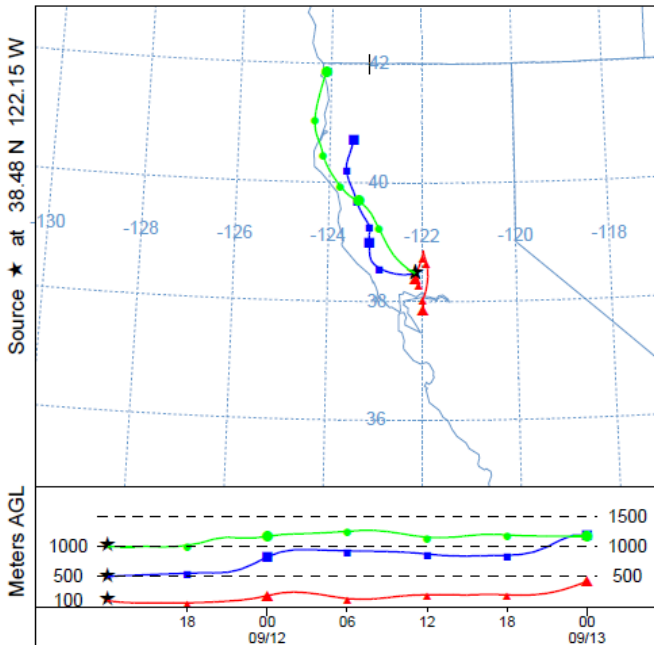
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



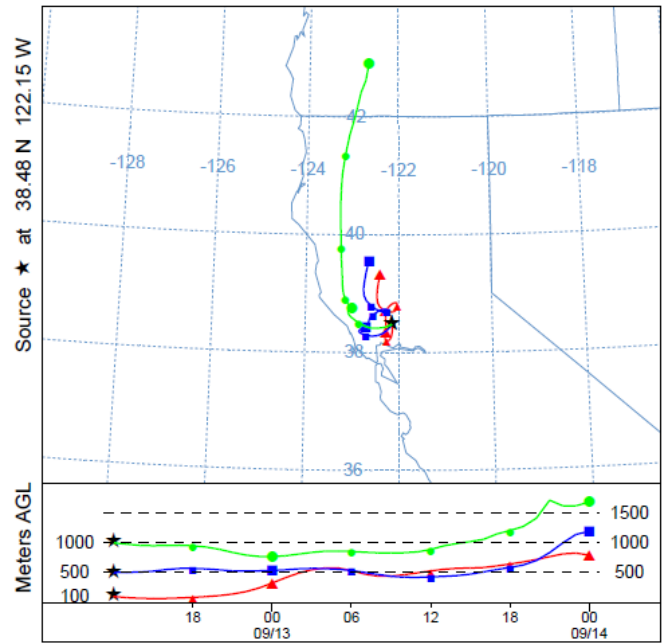
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



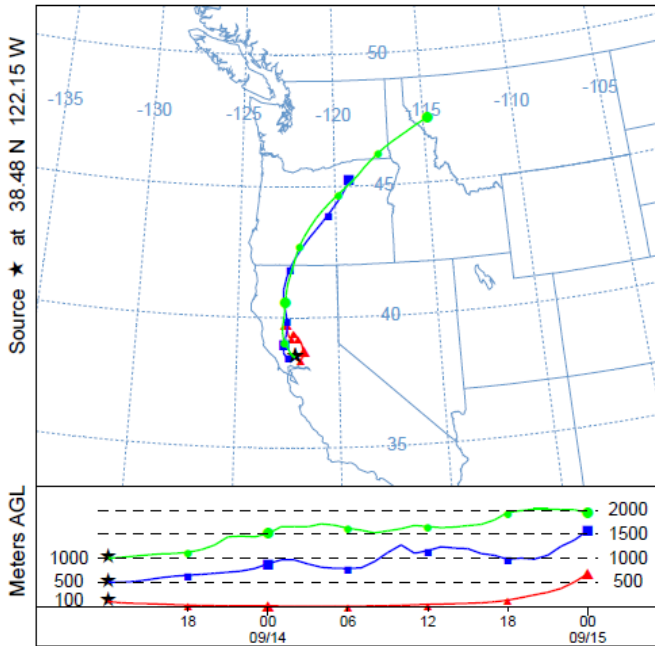
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



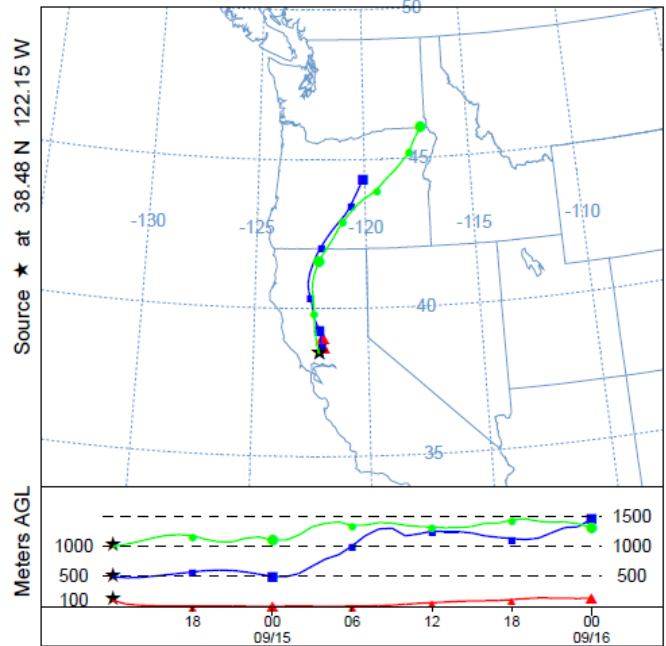
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



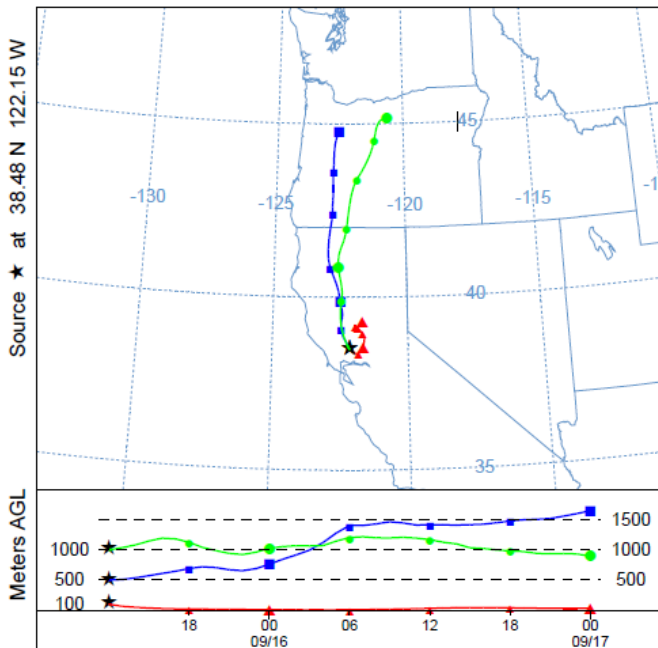
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



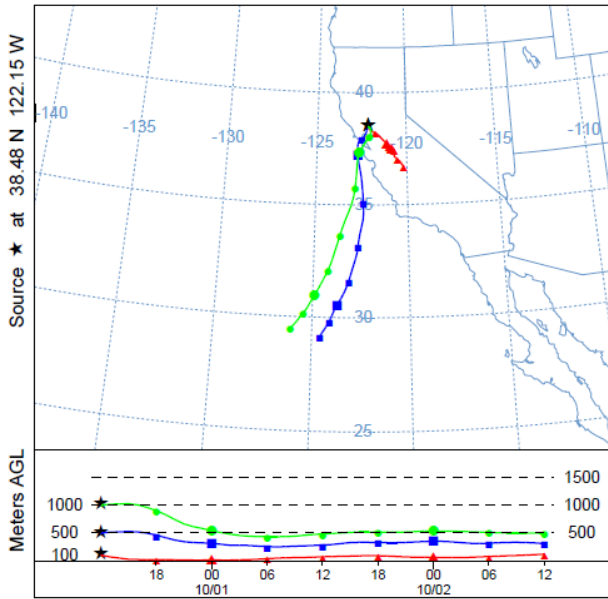
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



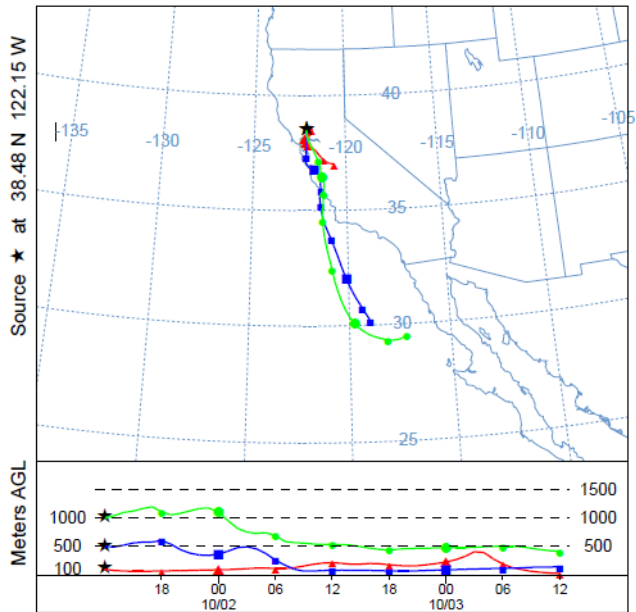
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 30 Sep 20
NAM Meteorological Data



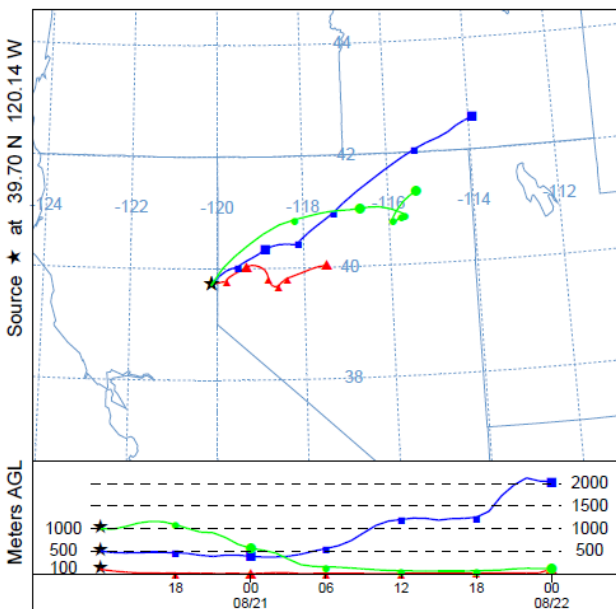
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 01 Oct 20
NAM Meteorological Data



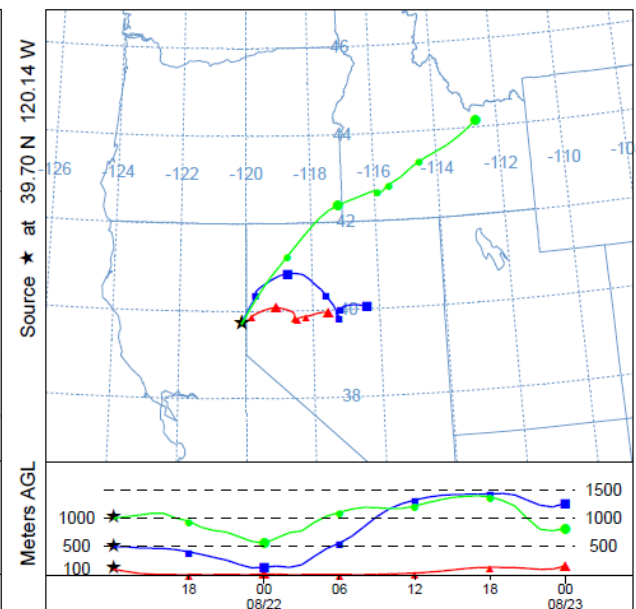
j) Loyalton Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|----------|---------|-------------|----------|-----------|-------------|
| Loyalton | 8/14/20 | 8/26/20 | 39.70244 | -120.1435 | 47,029 |

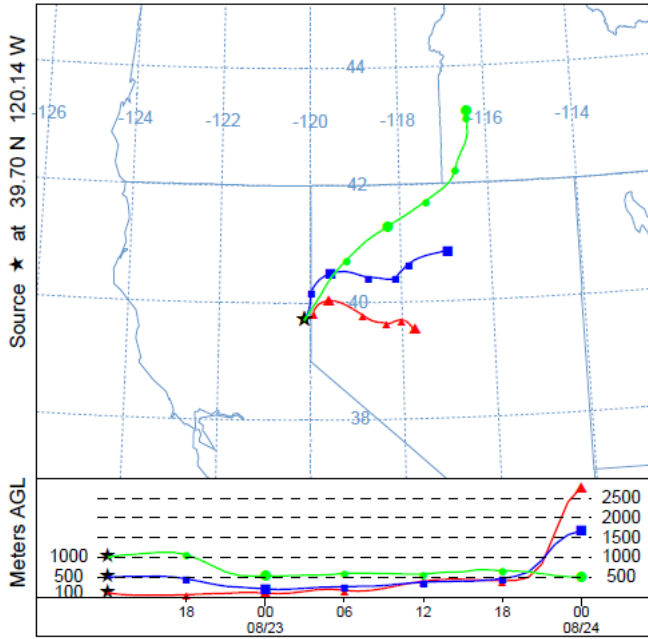
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



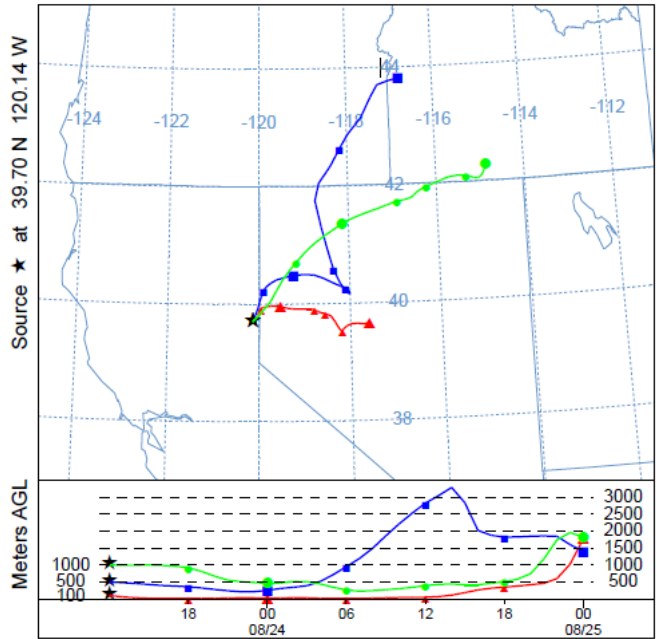
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



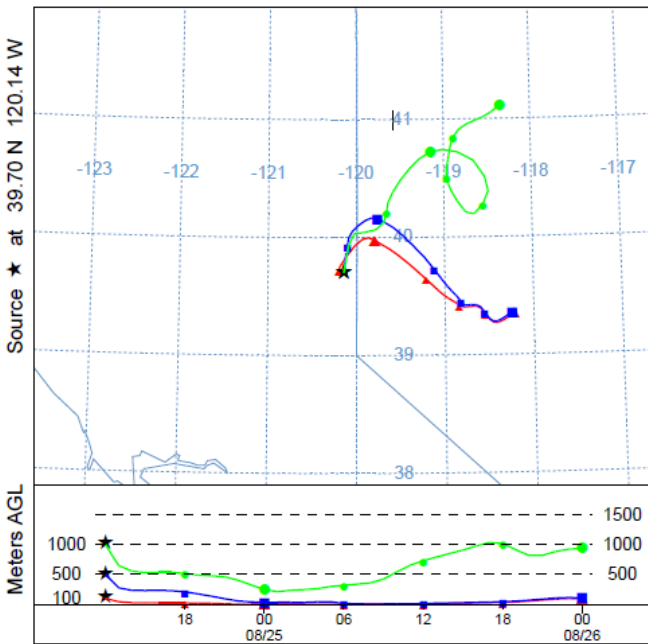
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 22 Aug **
 NAM Meteorological Data



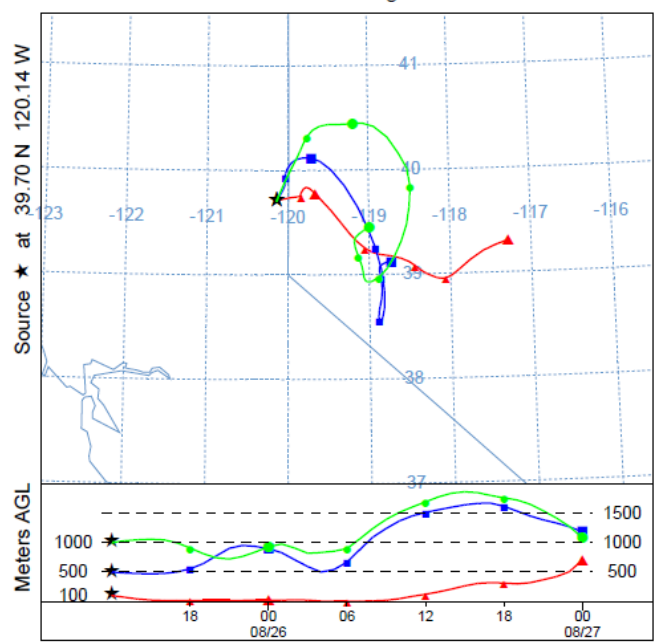
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 23 Aug **
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



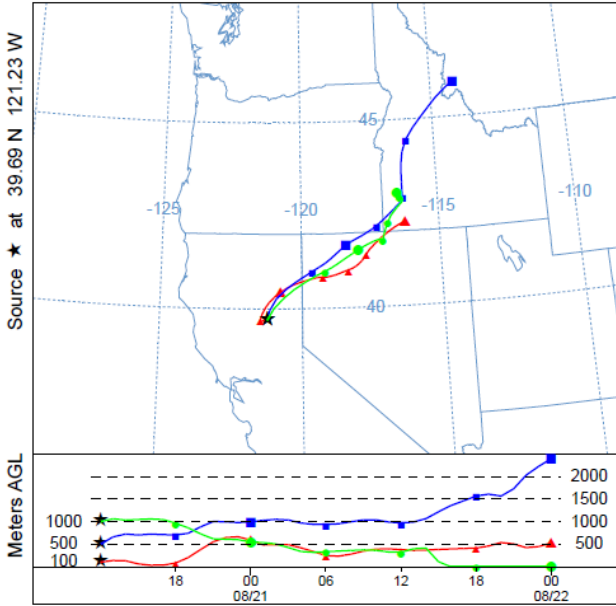
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



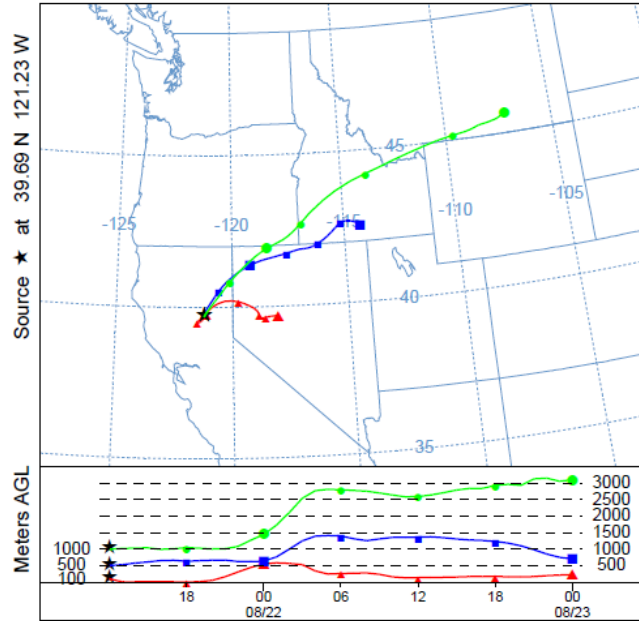
k) North Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|---------------|---------|-------------|----------|-----------|-------------|
| North Complex | 8/18/20 | 12/3/20 | 39.6907 | -121.2272 | 318,935 |

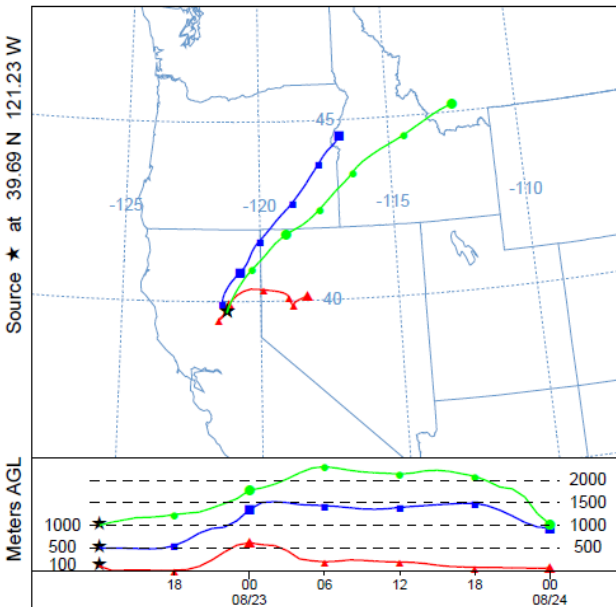
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



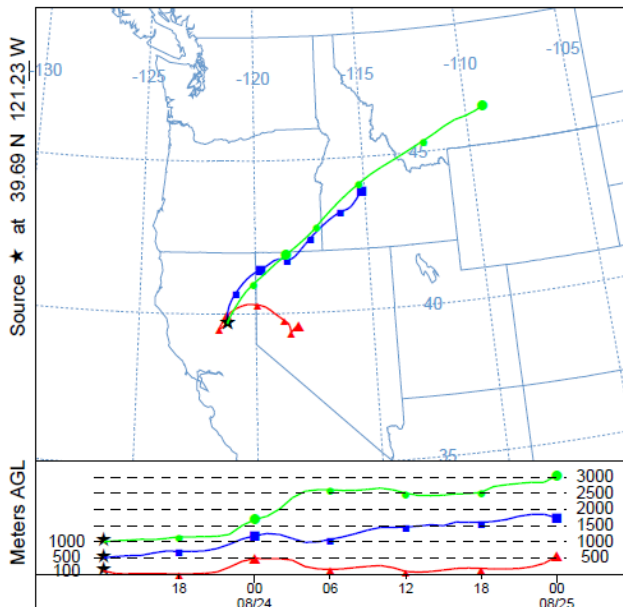
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



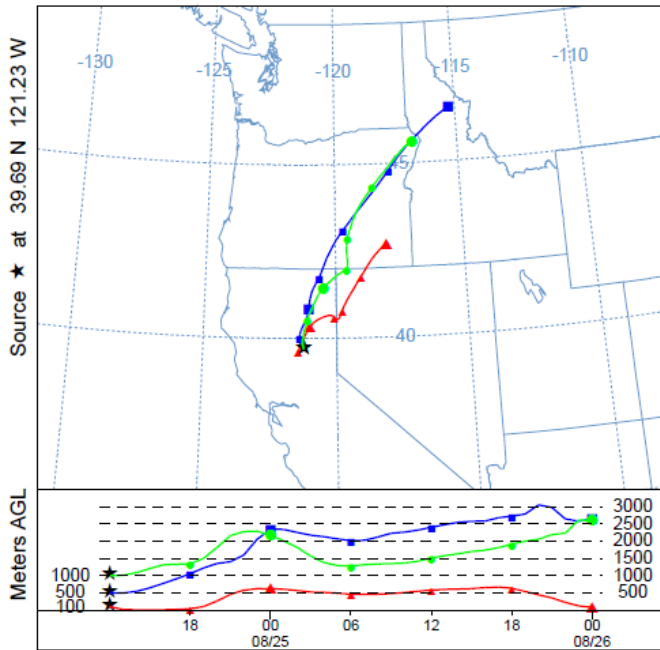
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



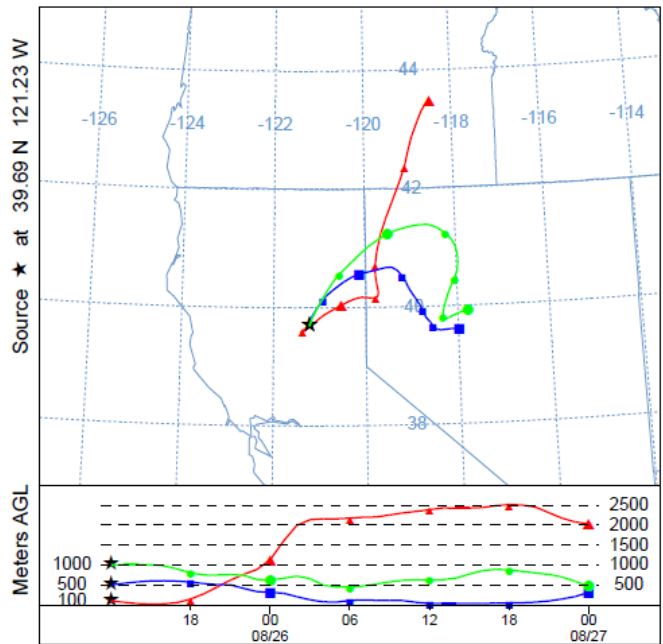
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



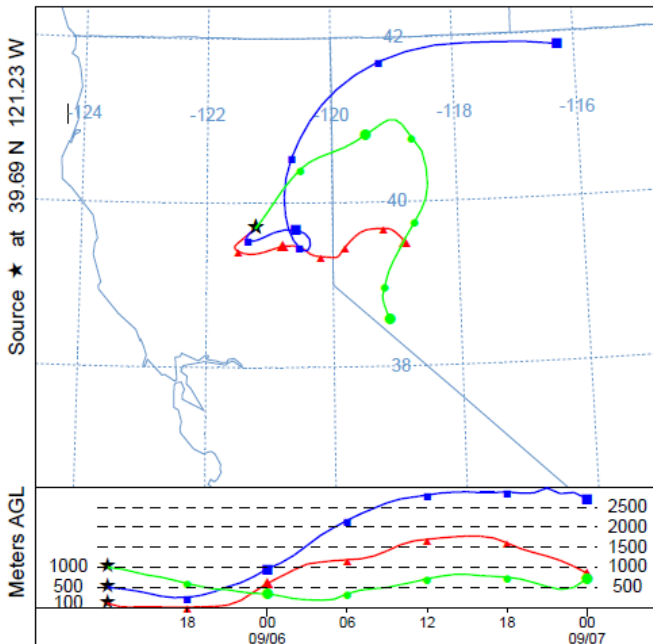
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



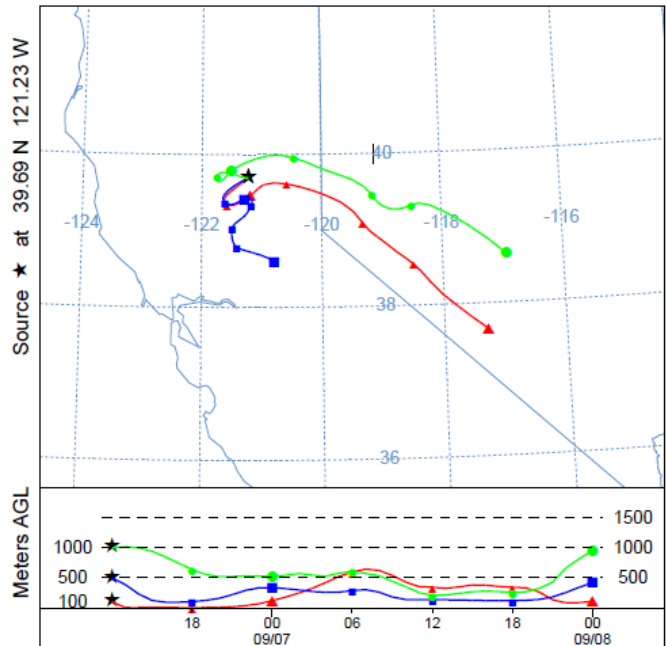
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



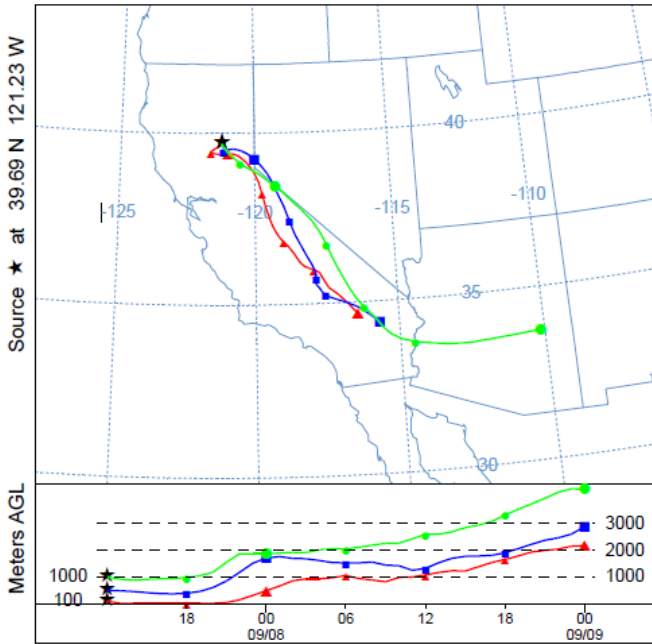
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



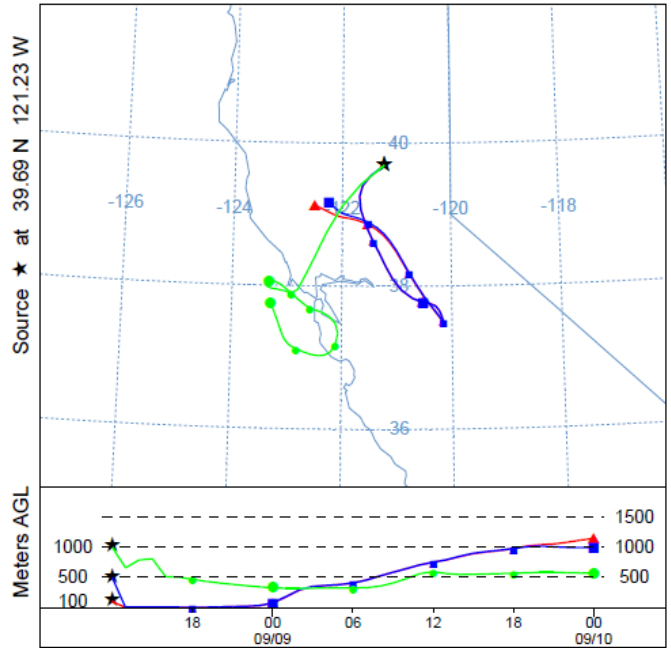
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



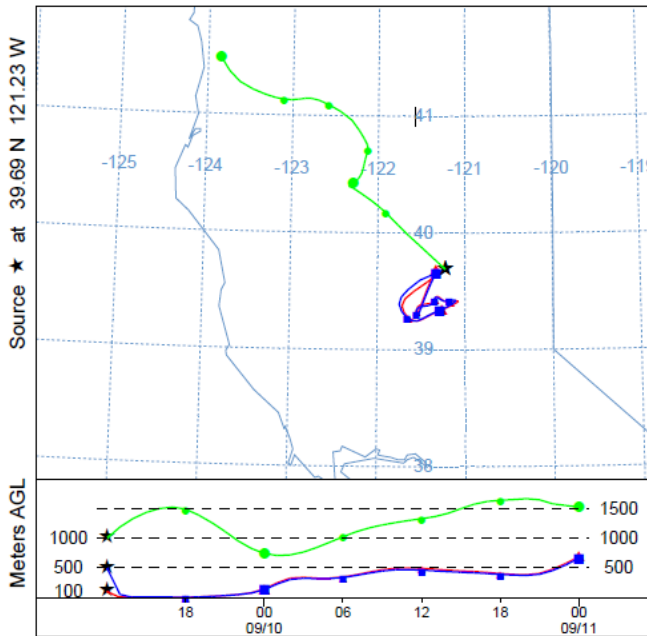
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



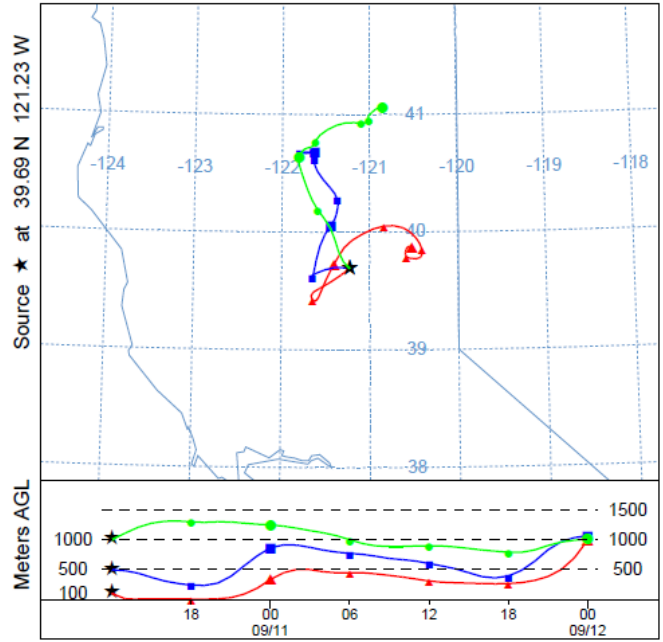
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



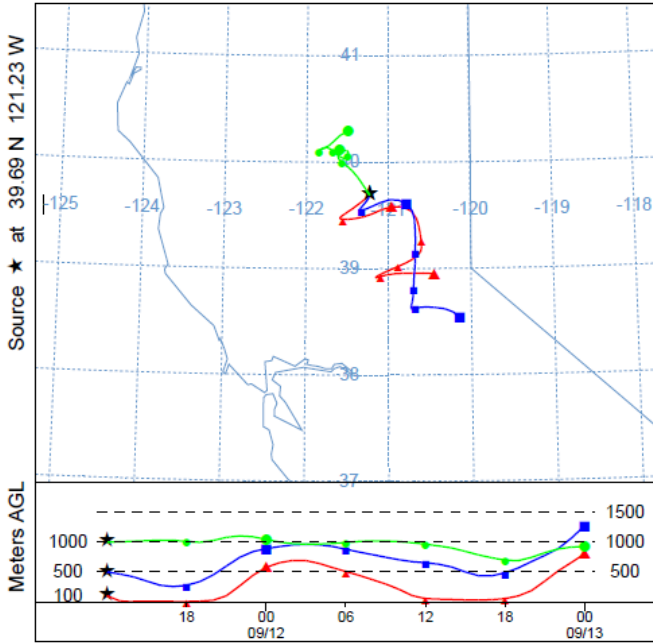
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



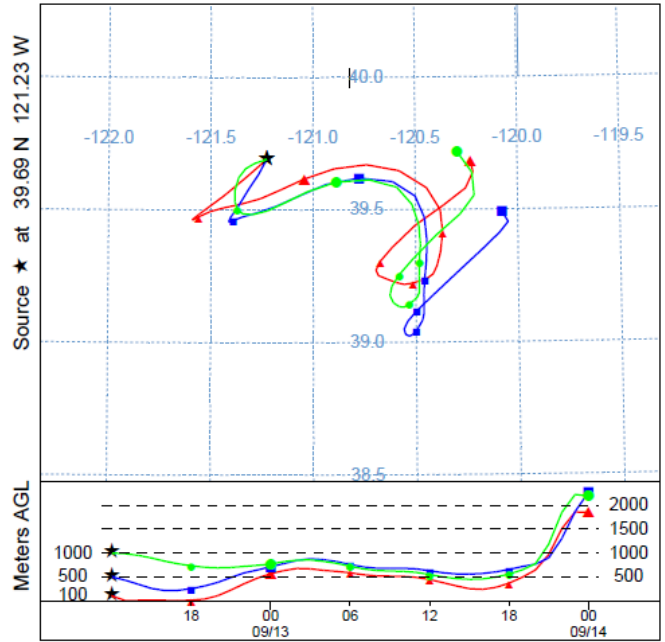
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 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



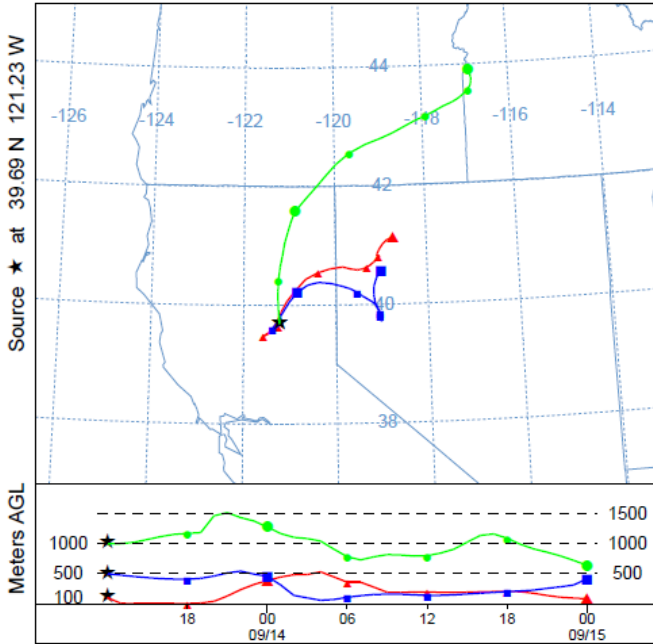
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



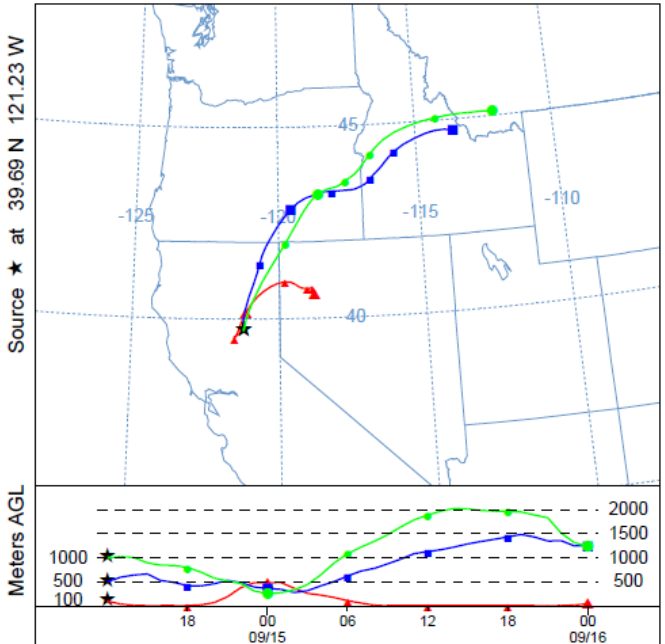
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



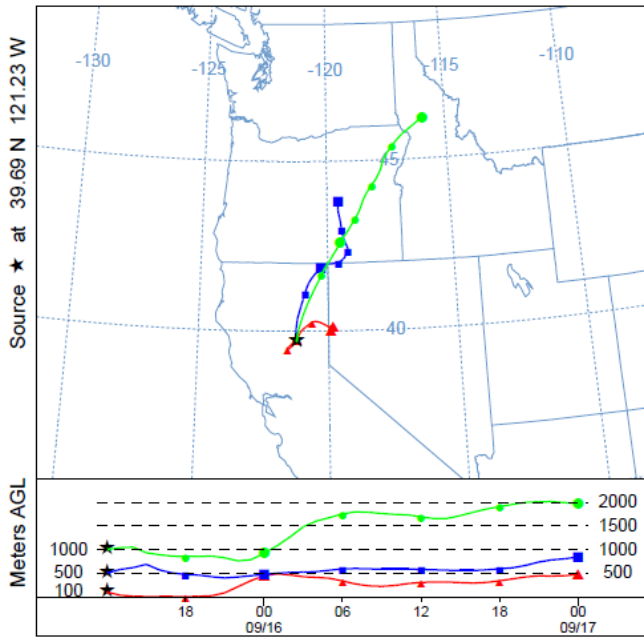
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



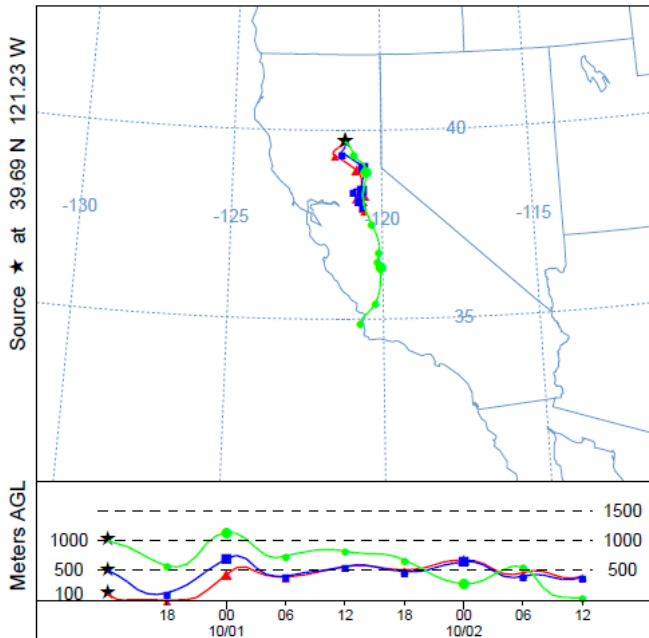
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



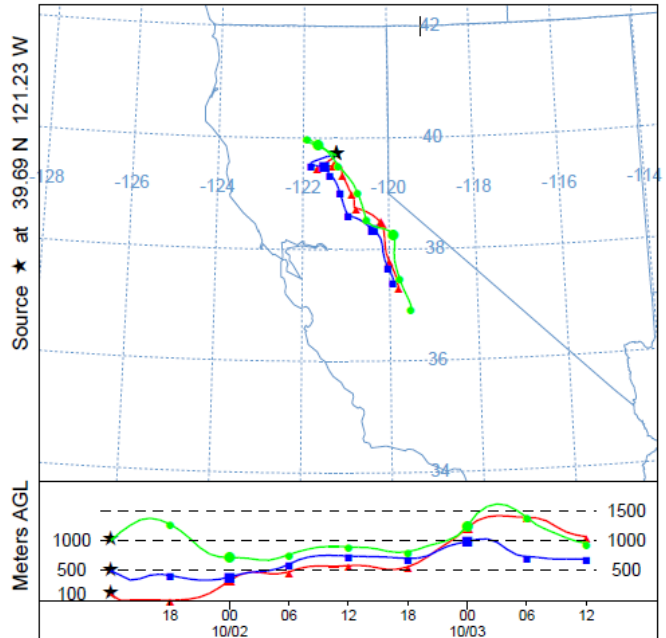
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



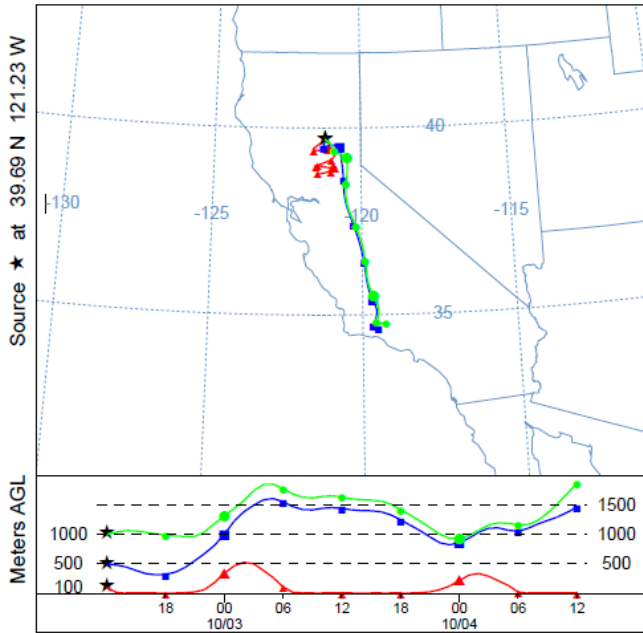
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



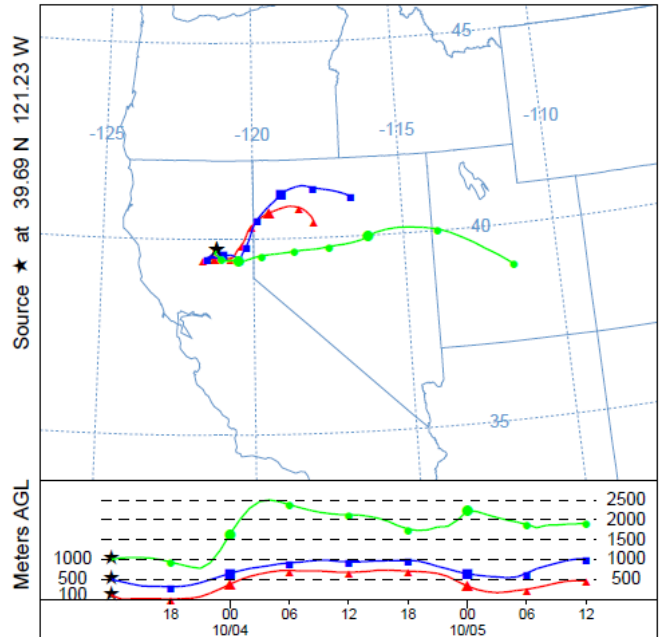
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



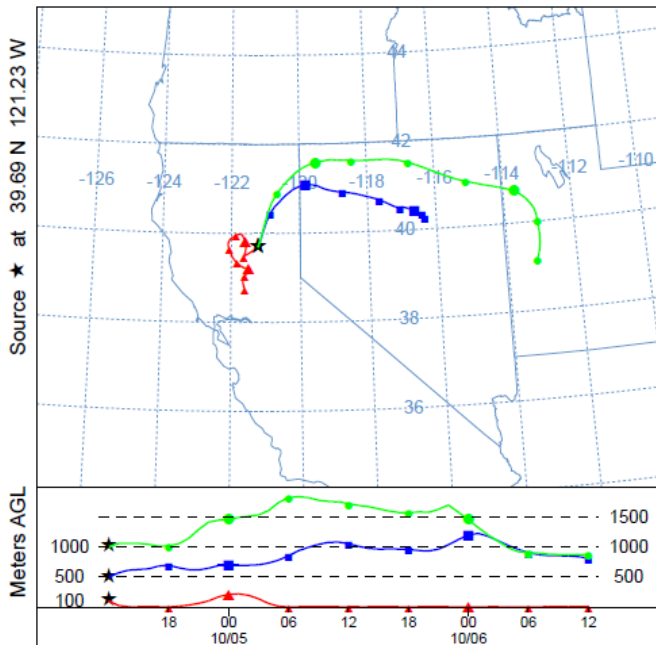
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 02 Oct 20
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 03 Oct 20
 NAM Meteorological Data



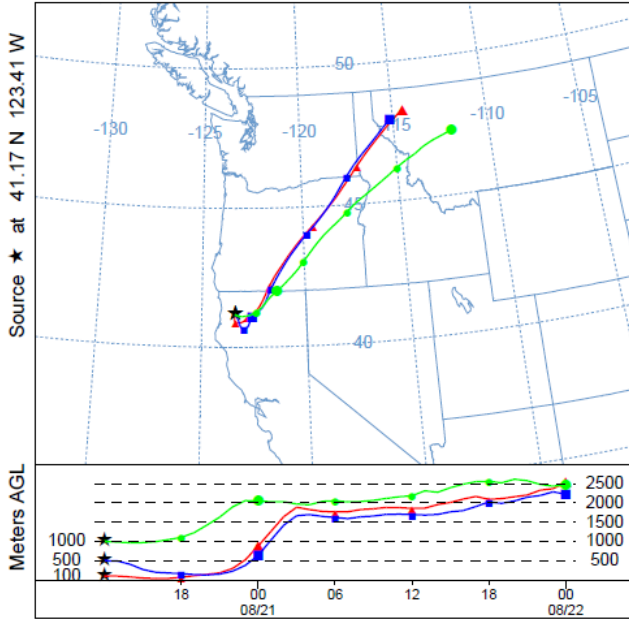
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 04 Oct 20
 NAM Meteorological Data



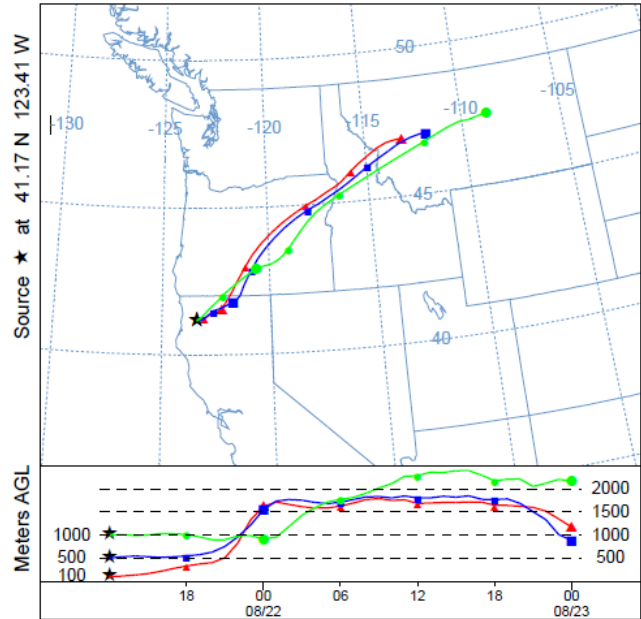
I) Red Salmon Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|--------------------|---------|-------------|----------|-----------|-------------|
| Red Salmon Complex | 7/27/20 | 11/17/20 | 41.1680 | -123.4070 | 144,679 |

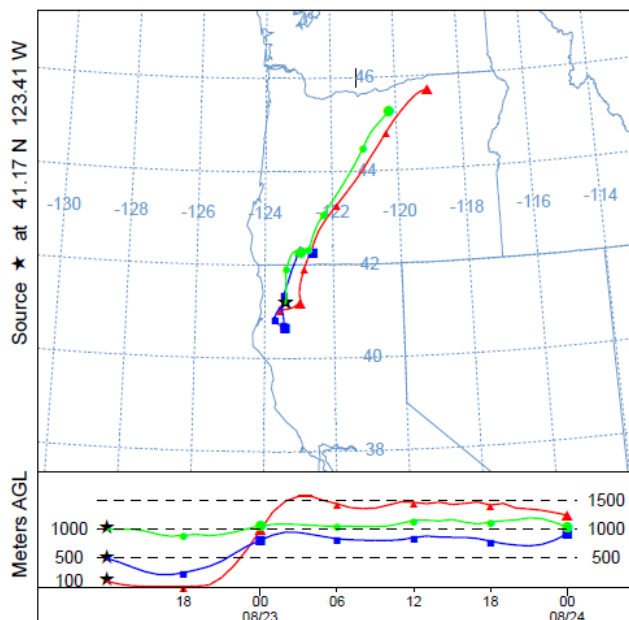
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



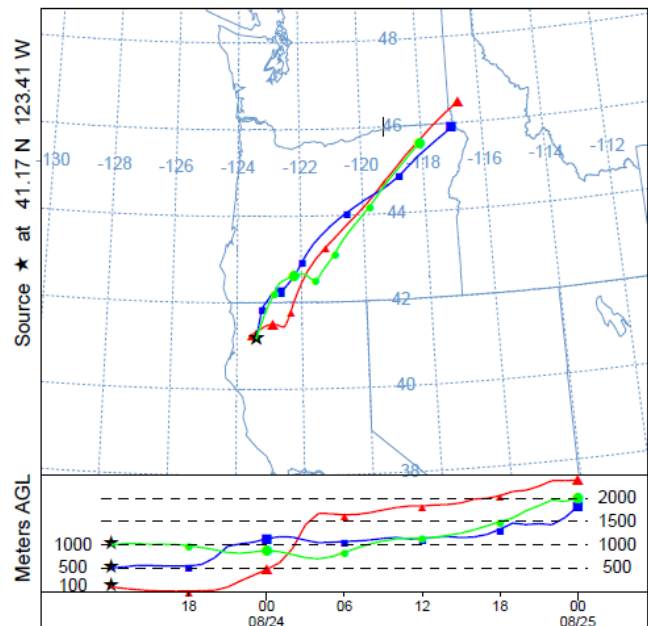
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



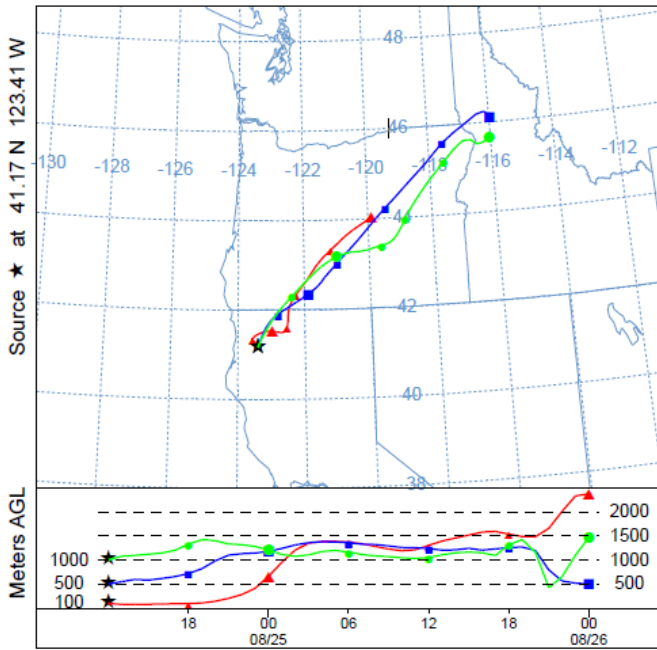
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



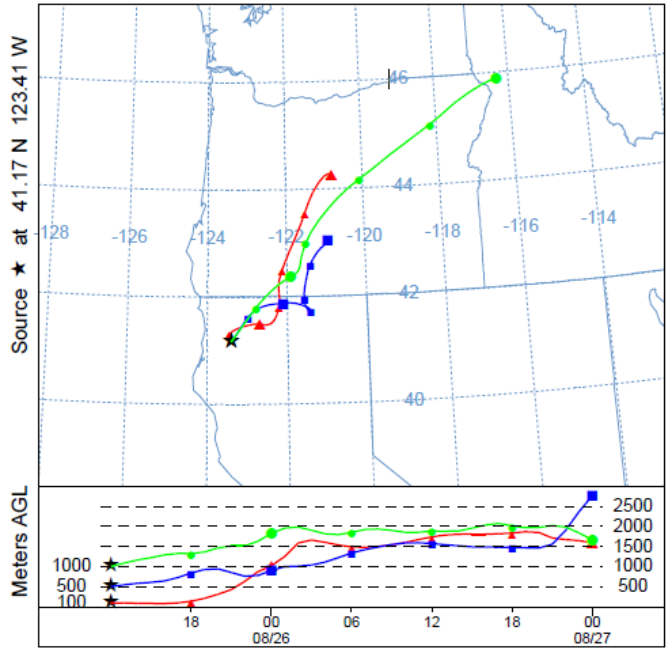
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



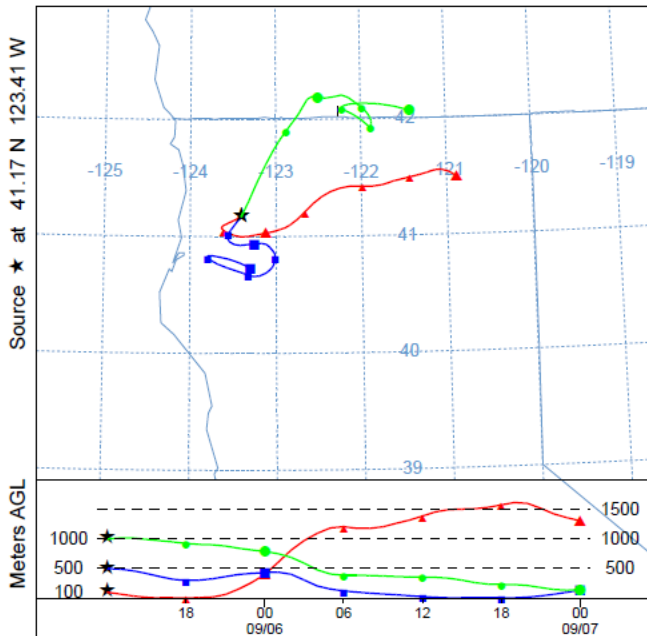
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



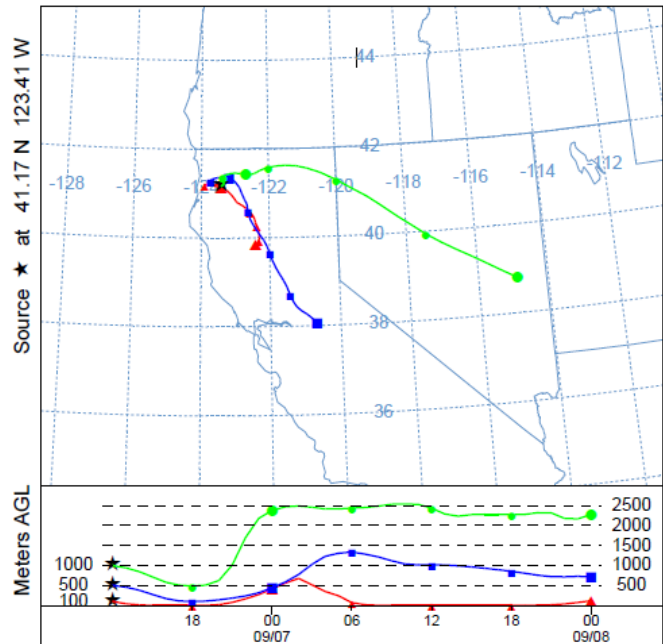
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



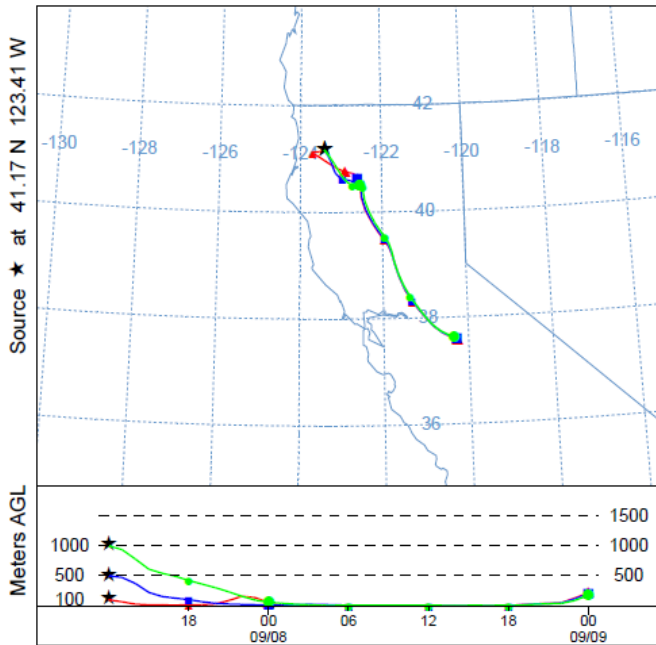
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



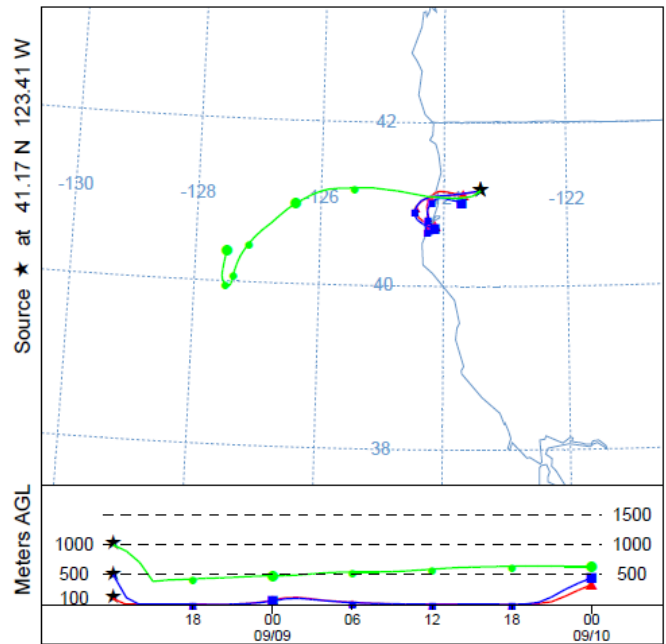
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



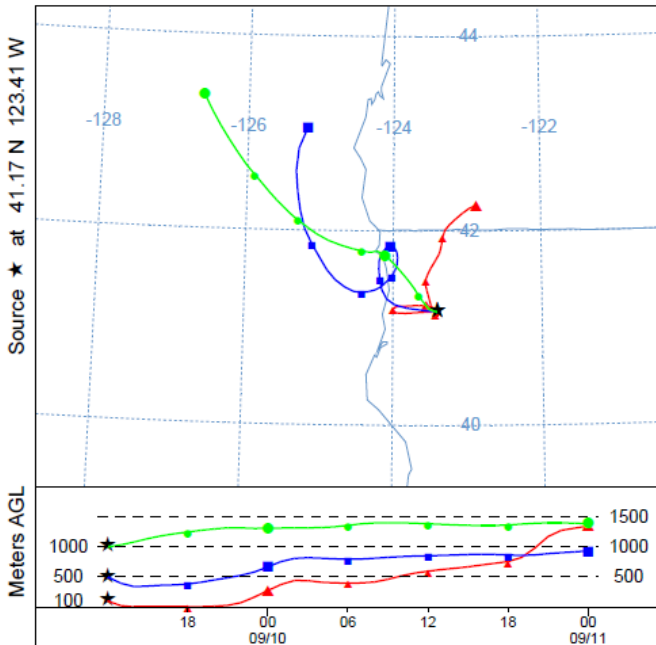
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



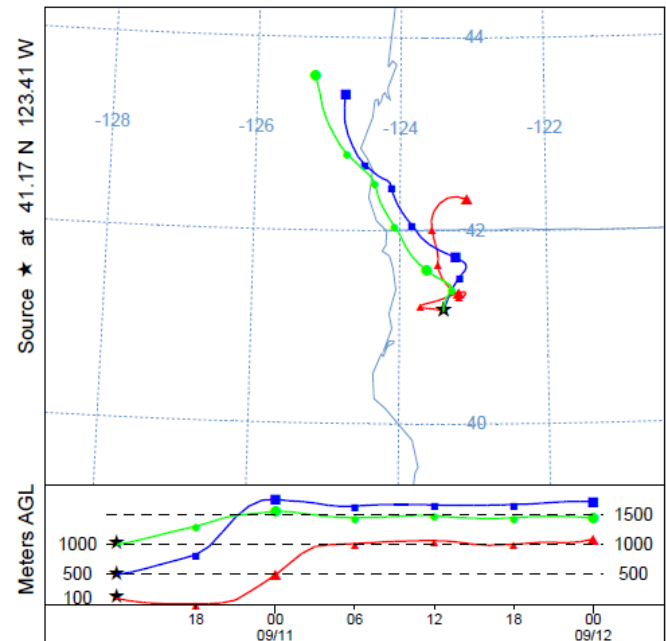
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



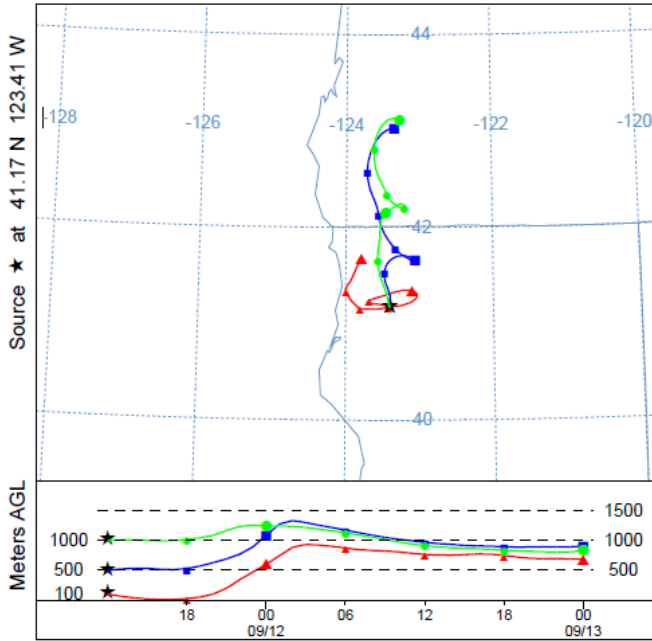
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



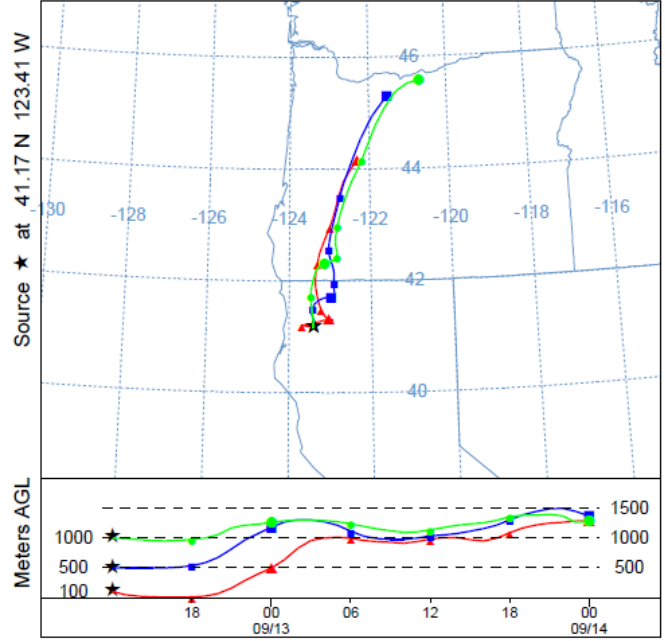
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



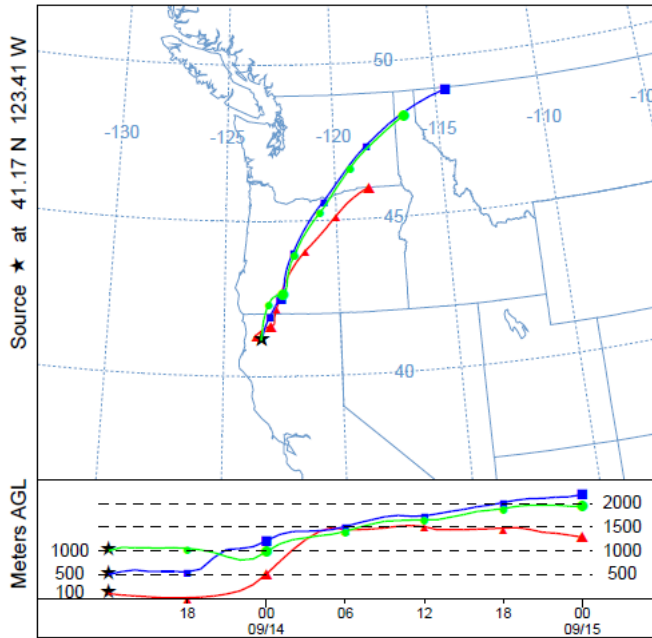
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



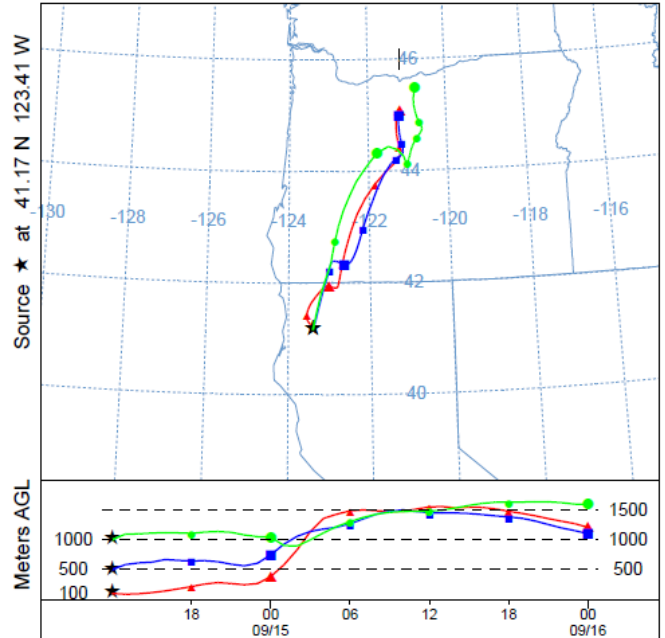
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



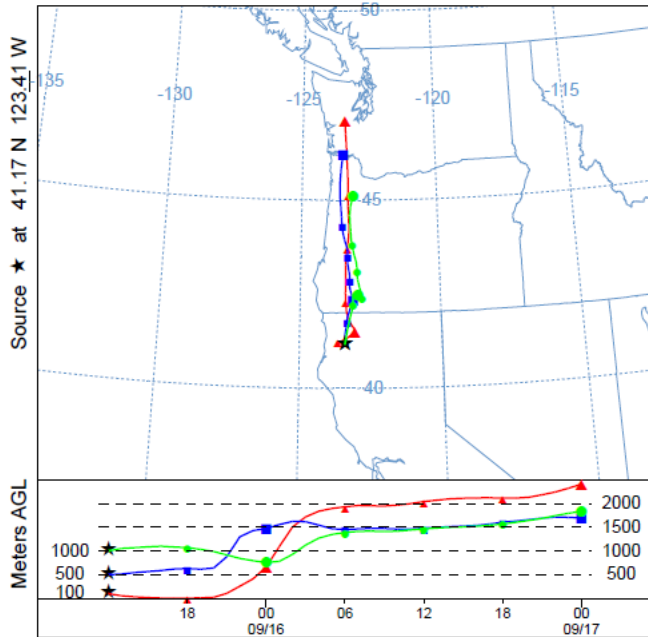
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



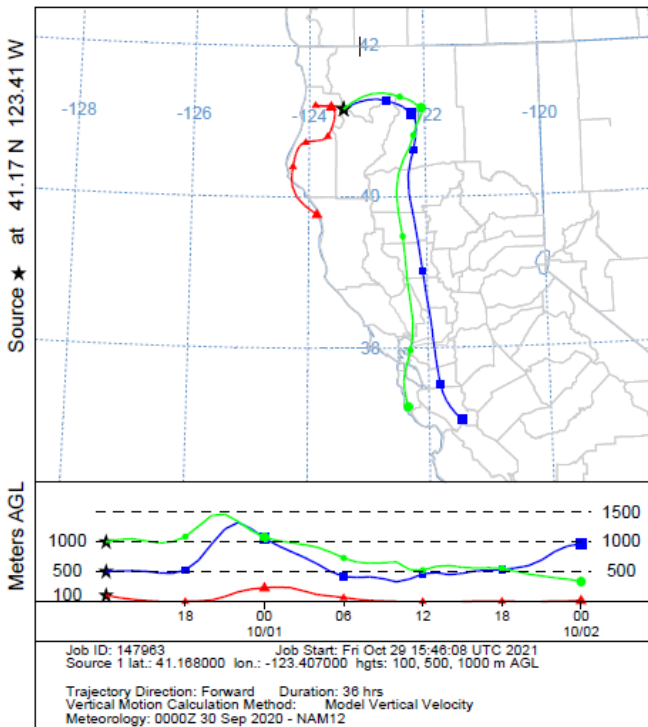
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



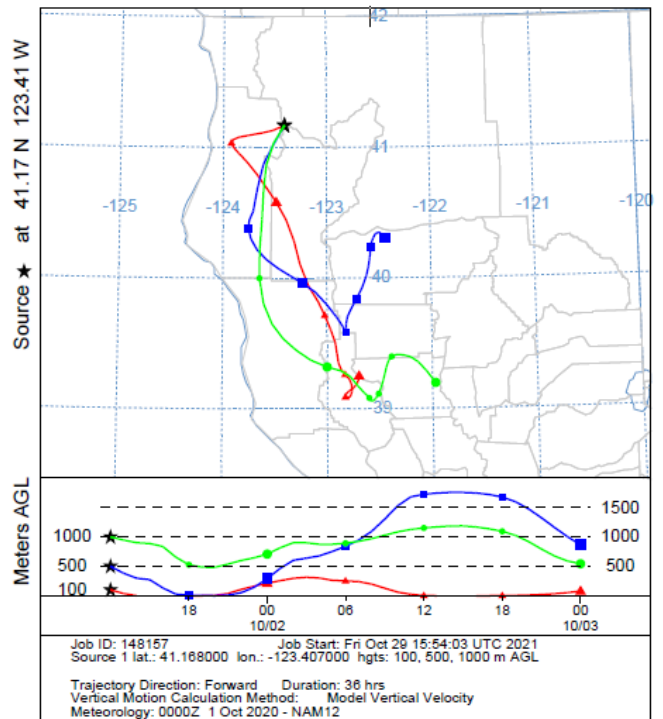
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



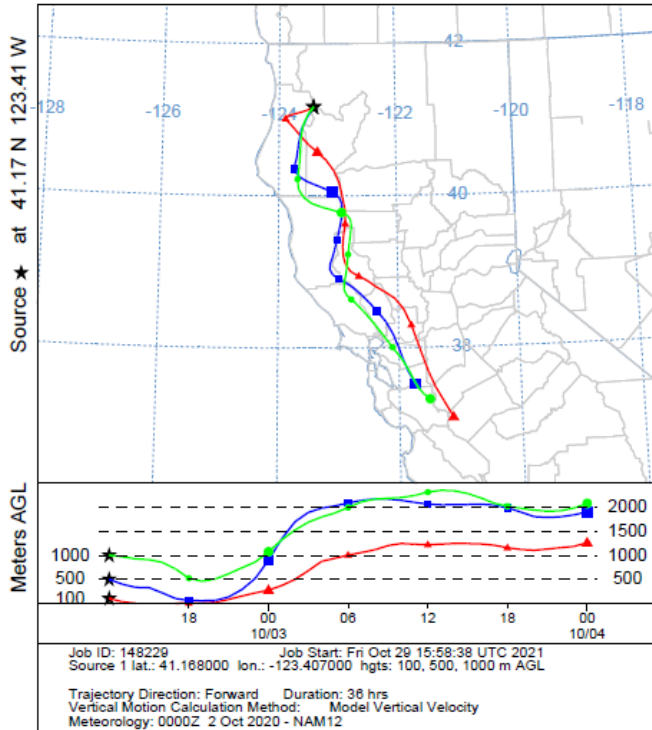
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



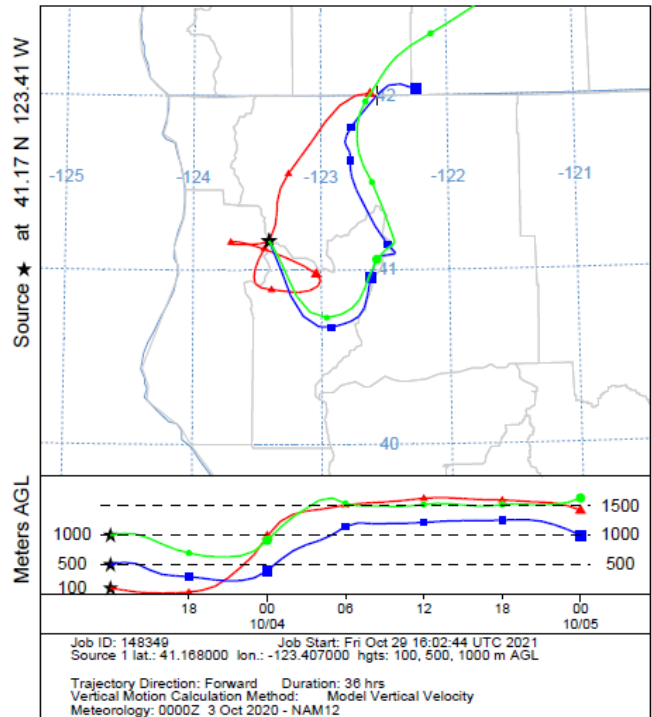
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



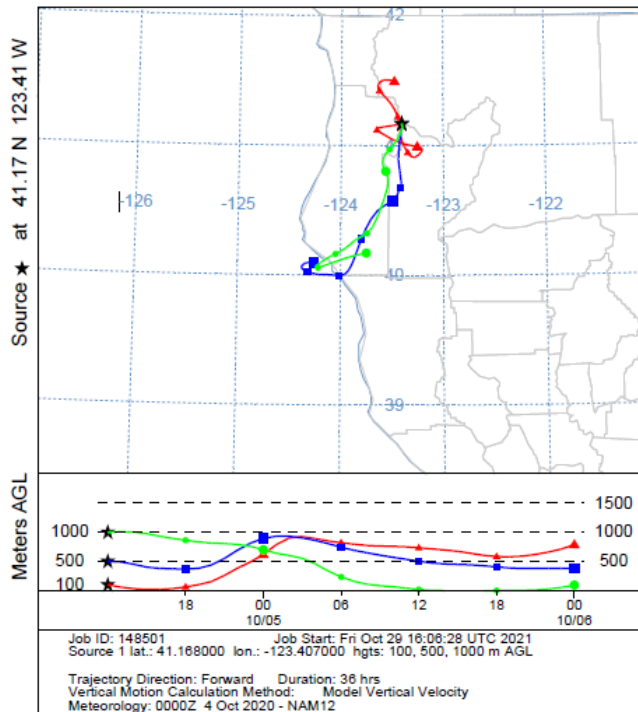
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 02 Oct 20
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 03 Oct 20
 NAM Meteorological Data



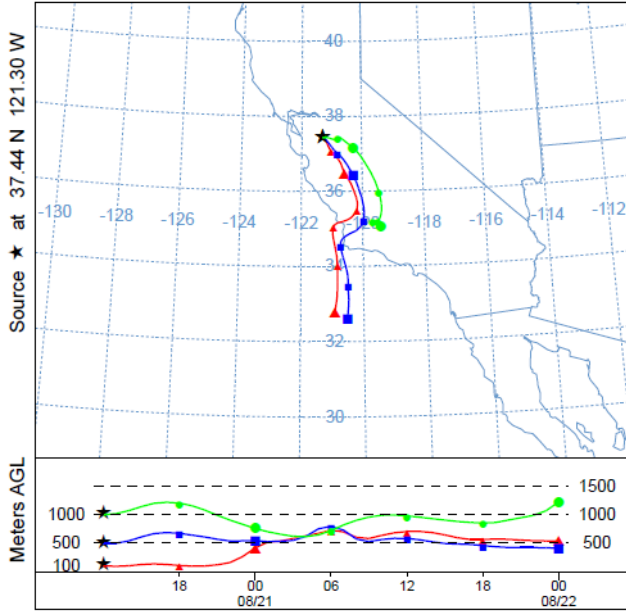
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 04 Oct 20
 NAM Meteorological Data



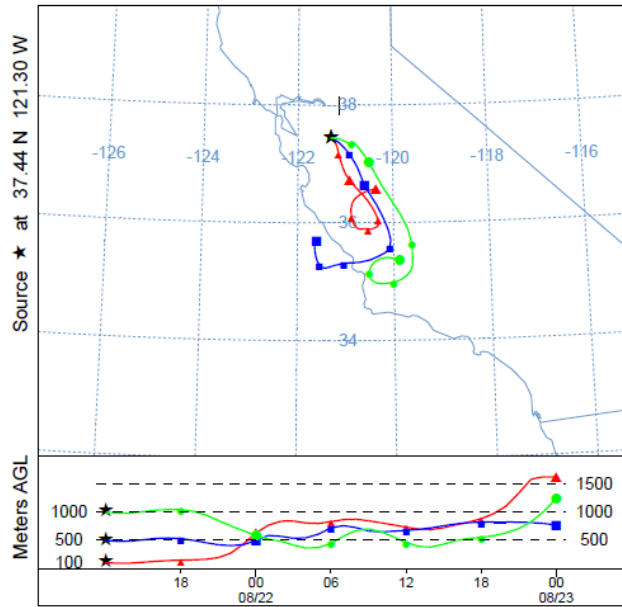
m) SCU Lightning Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|---------------|---------|-------------|----------|-----------|-------------|
| SCU Lightning | 8/18/20 | 10/1/20 | 37.4394 | -121.3044 | 396,624 |

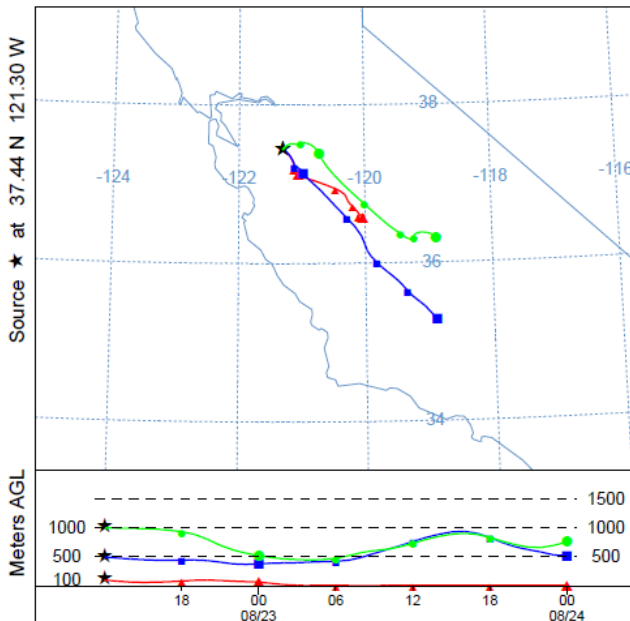
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



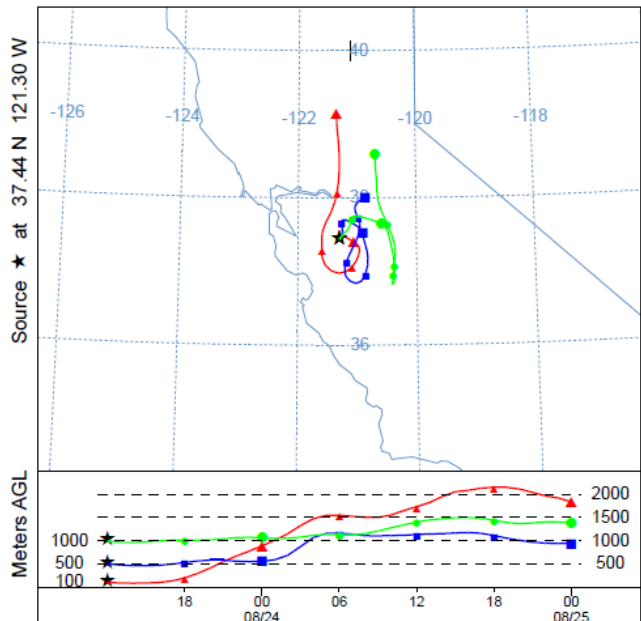
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



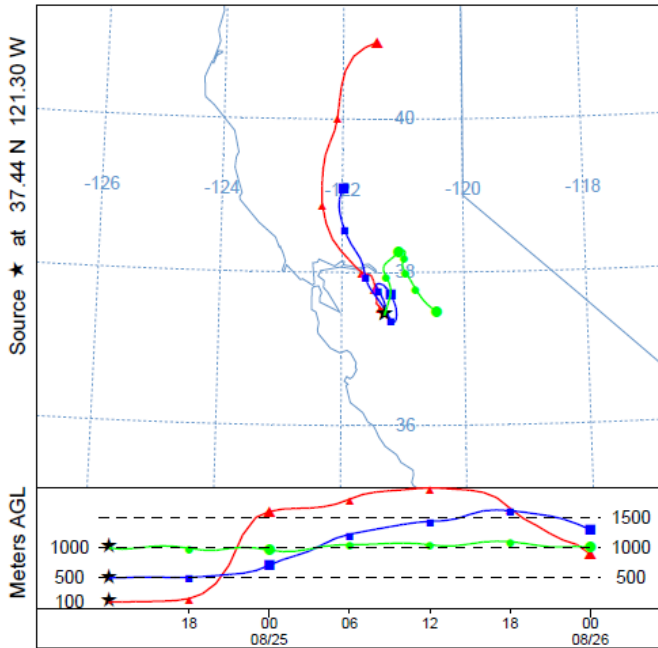
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



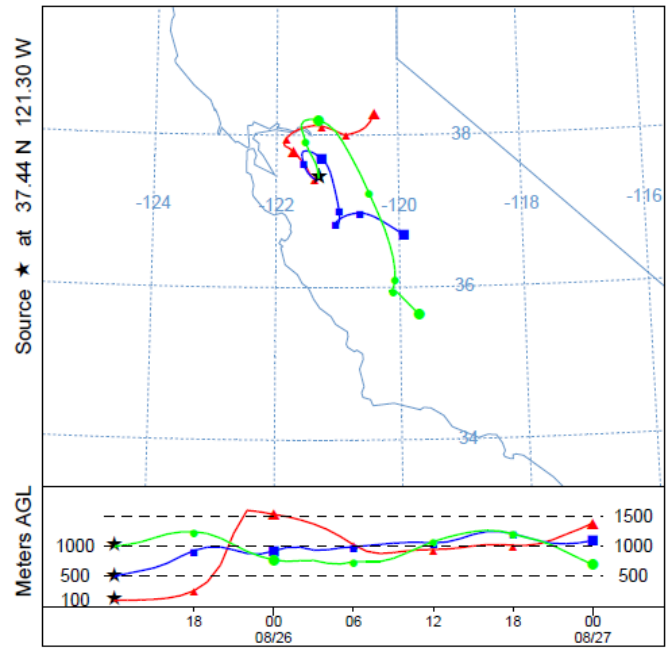
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



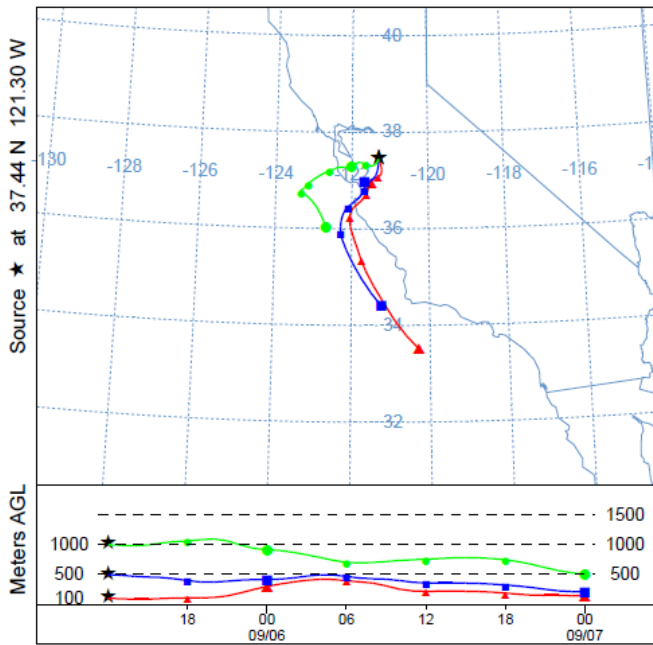
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



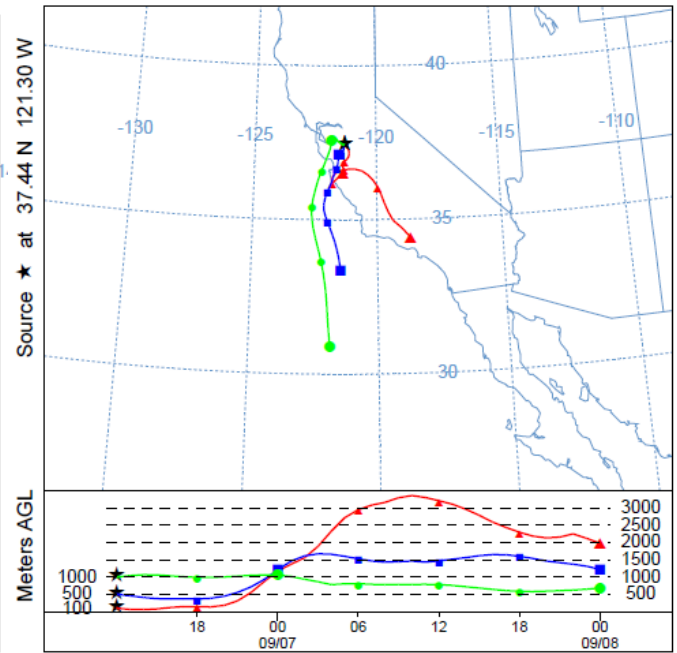
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



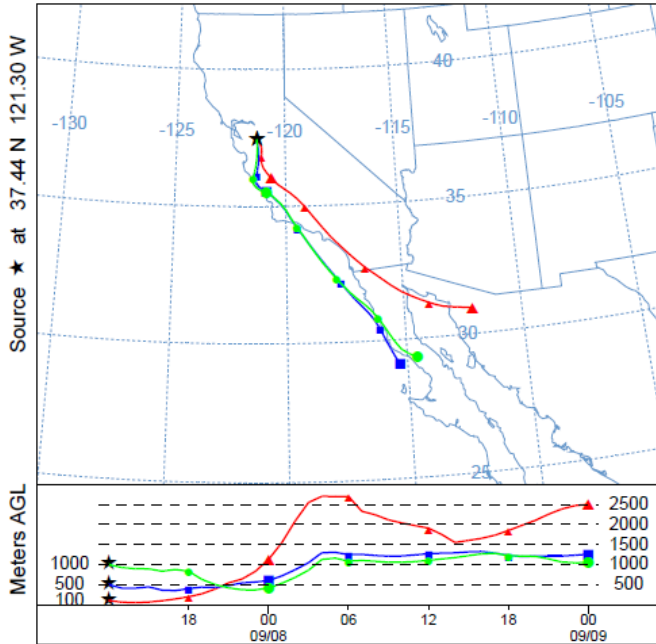
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



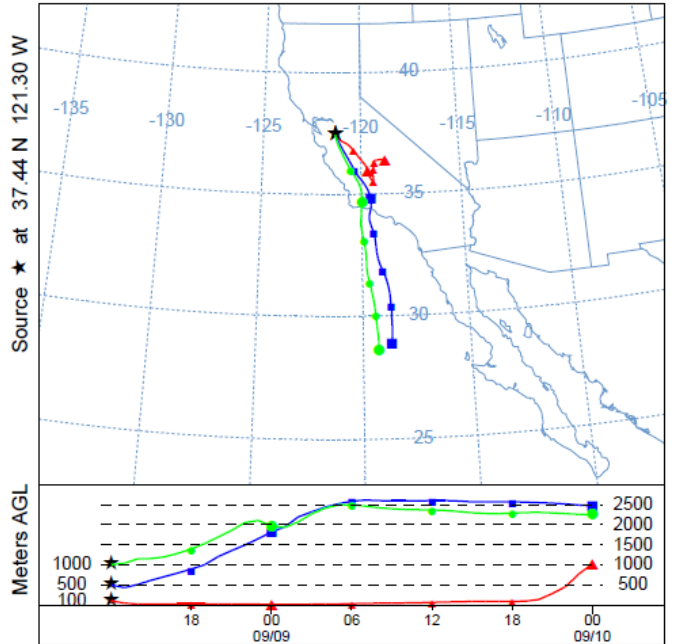
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



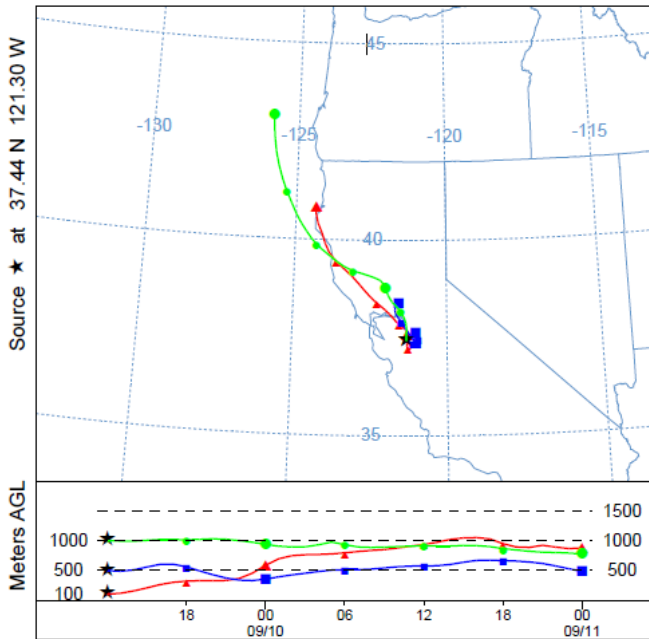
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



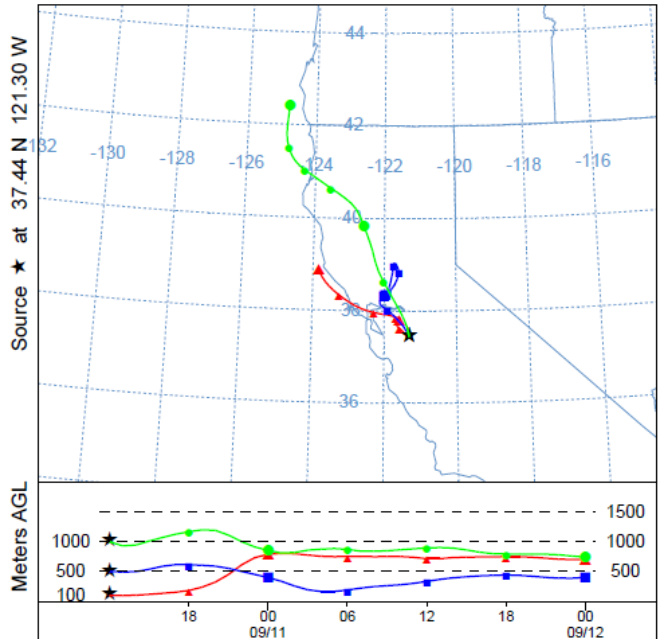
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



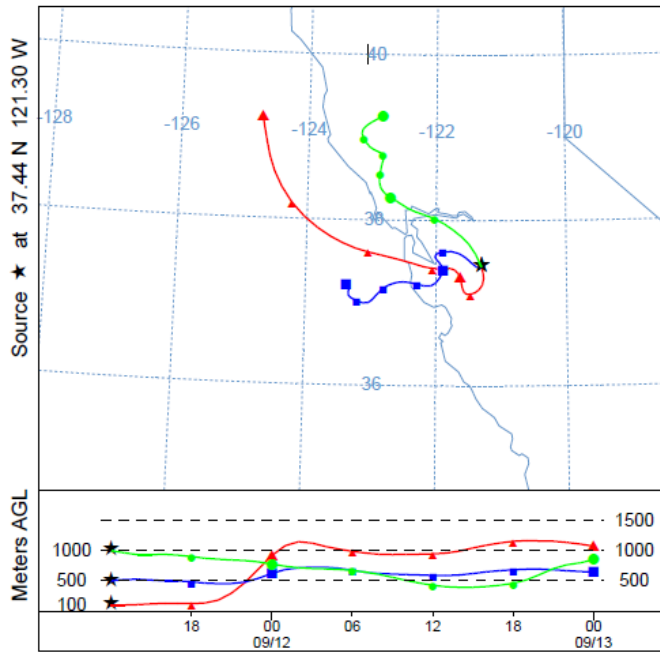
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



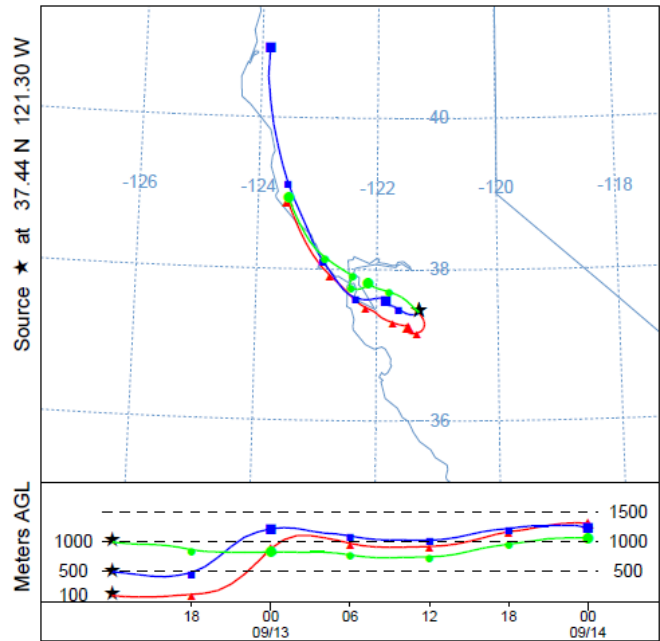
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



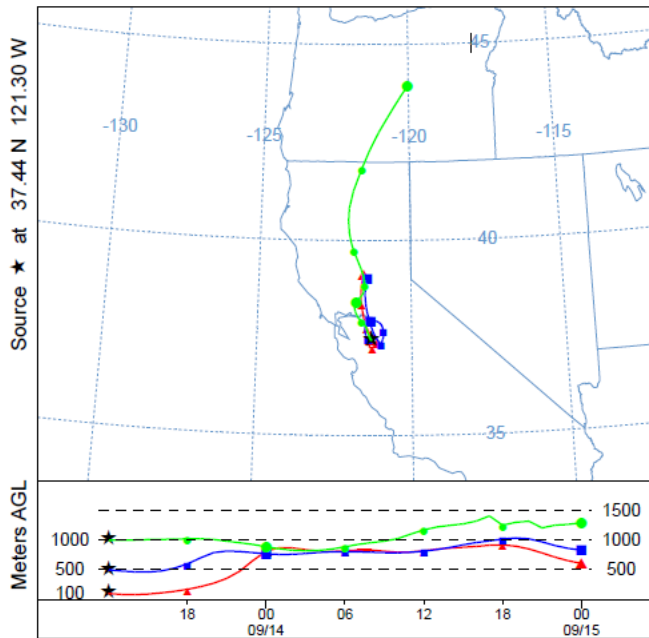
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



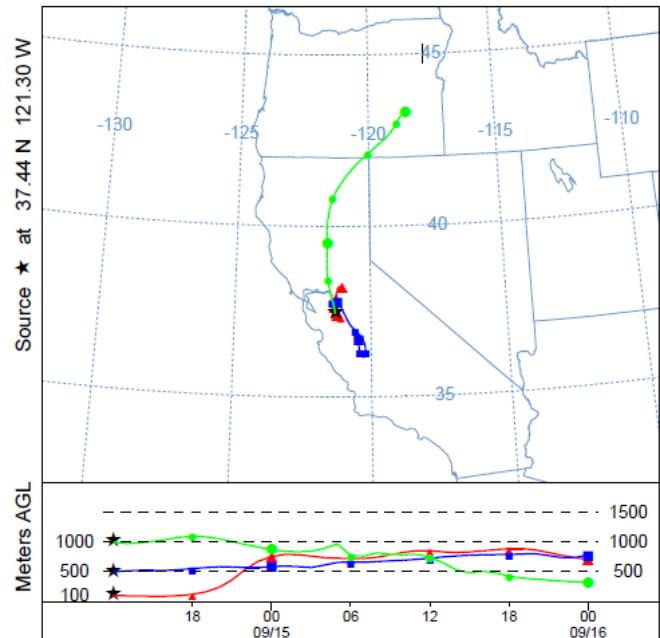
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



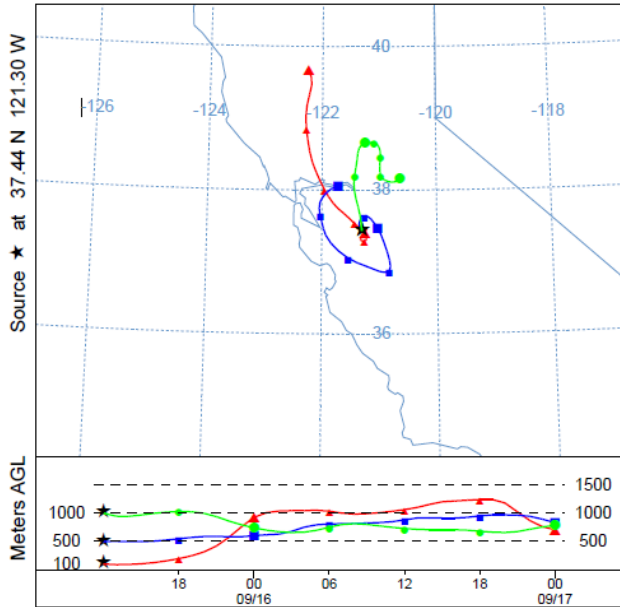
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



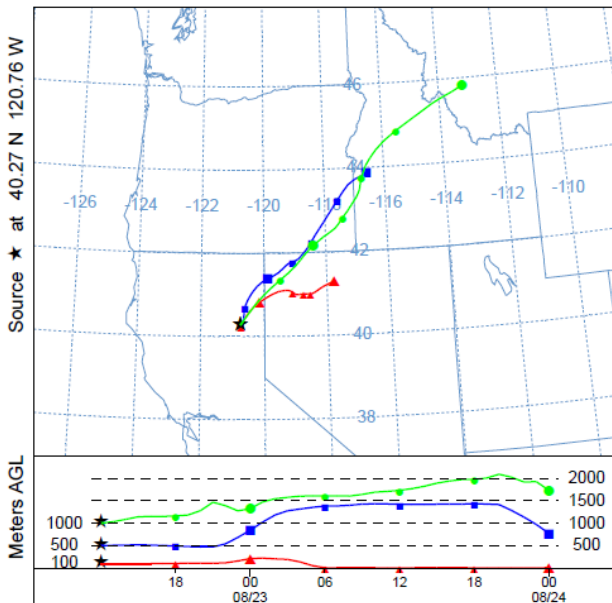
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



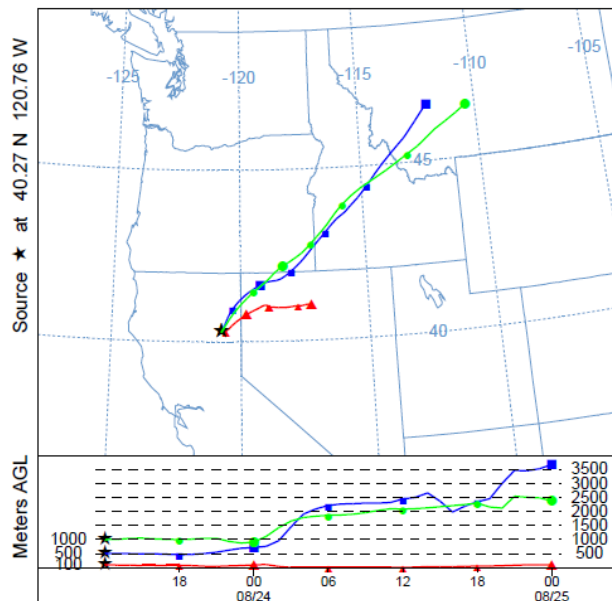
n) Sheep Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|-------|---------|-------------|----------|-----------|-------------|
| Sheep | 8/22/20 | 9/9/20 | 40.2740 | -120.7570 | 29,570 |

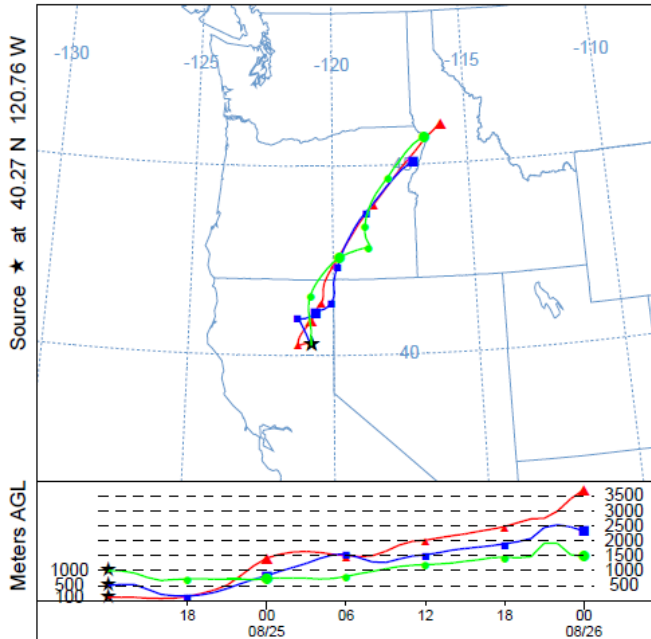
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 22 Aug **
 NAM Meteorological Data



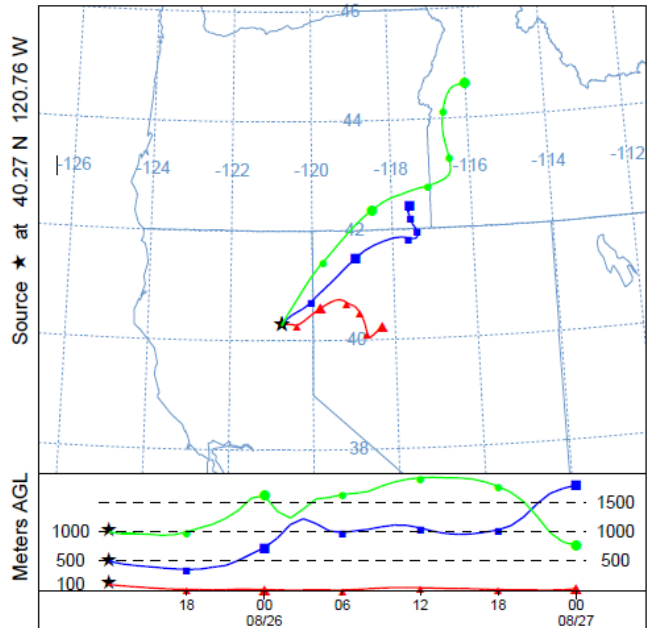
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 23 Aug **
 NAM Meteorological Data



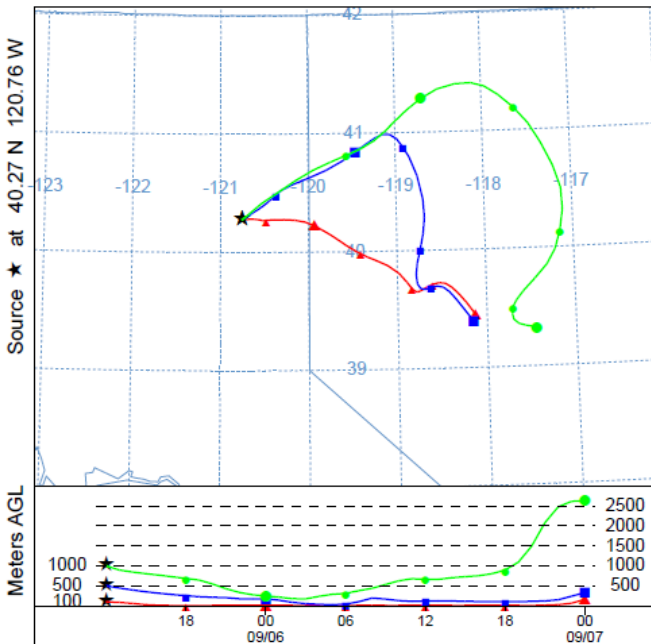
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



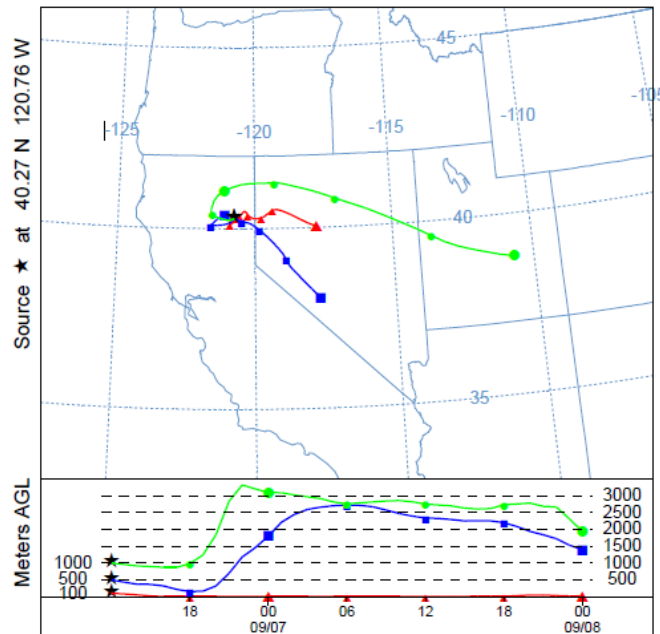
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



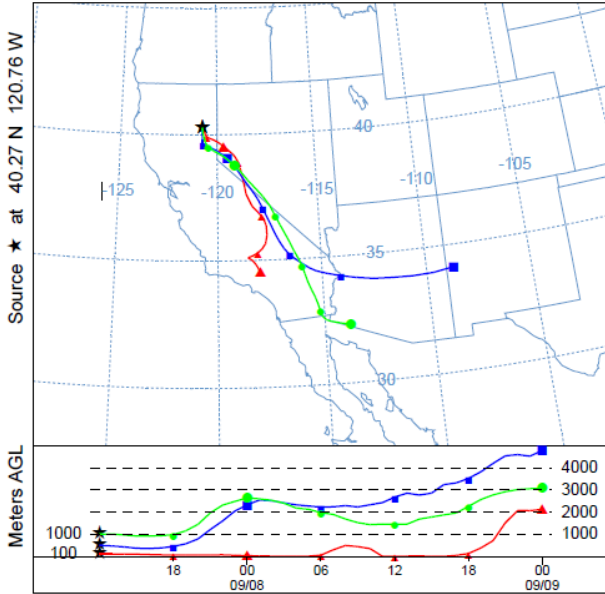
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



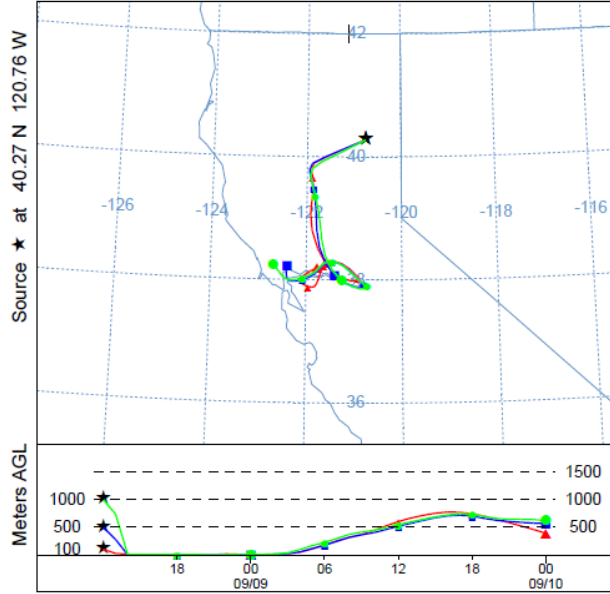
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 07 Sep **
NAM Meteorological Data



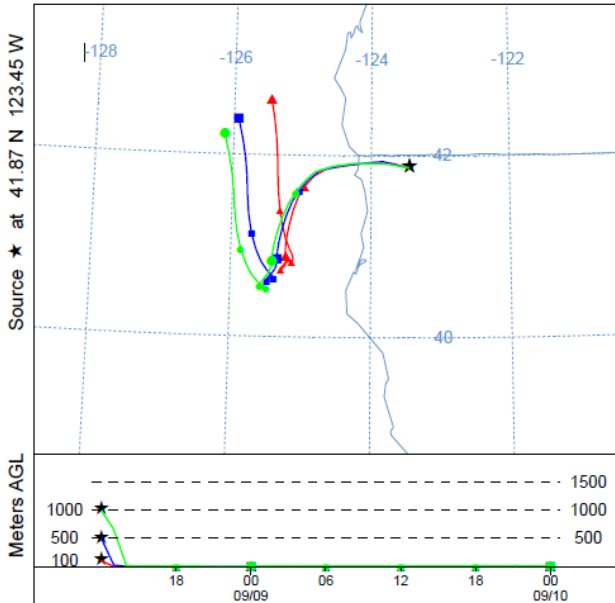
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 08 Sep **
NAM Meteorological Data



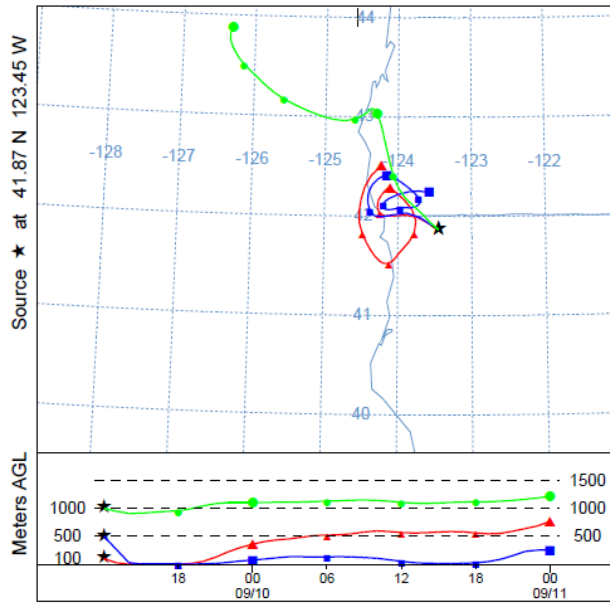
o) Slater Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|--------|--------|-------------|----------|-----------|-------------|
| Slater | 9/8/20 | 12/10/20 | 41.8689 | -123.4496 | 157,229 |

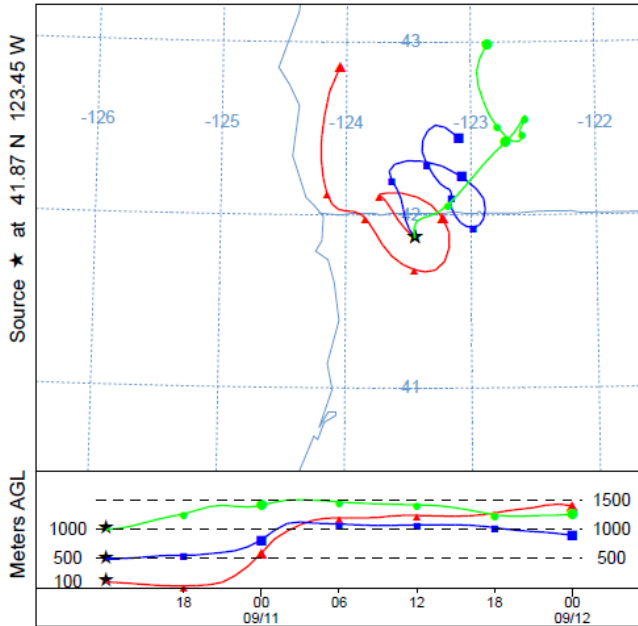
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 08 Sep **
NAM Meteorological Data



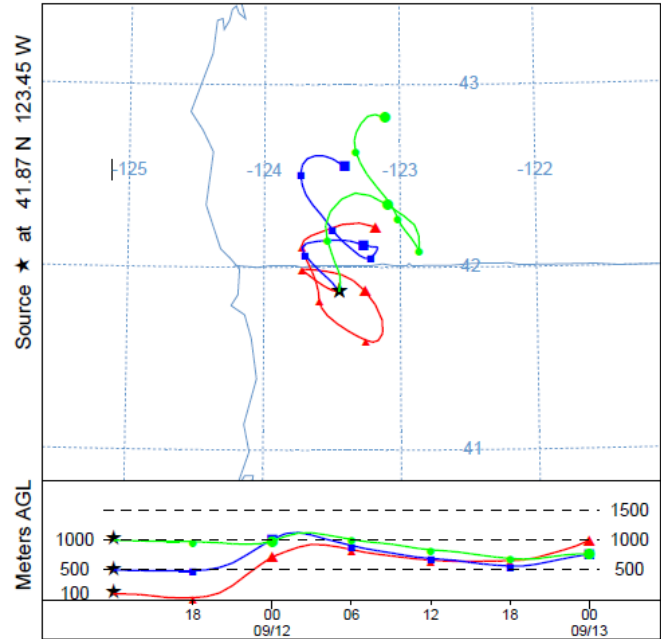
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 09 Sep **
NAM Meteorological Data



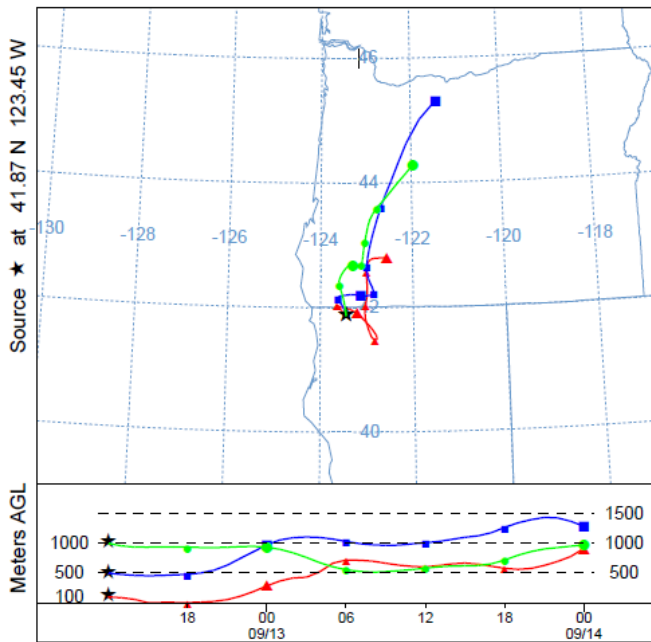
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



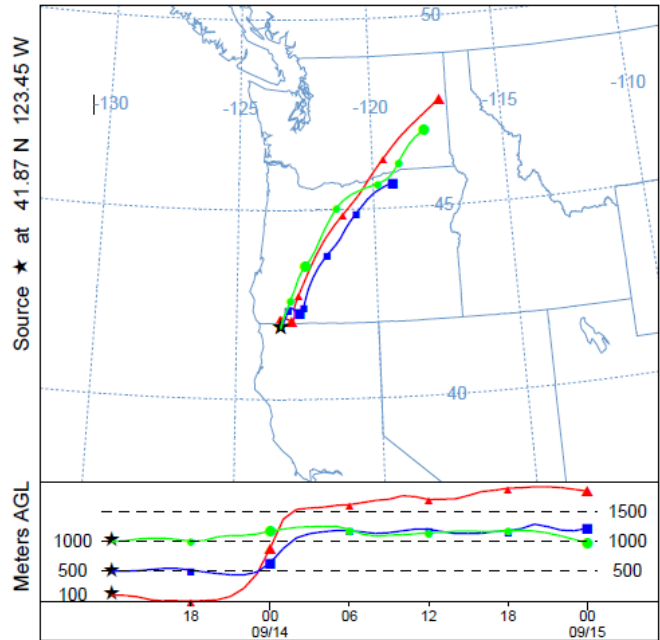
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



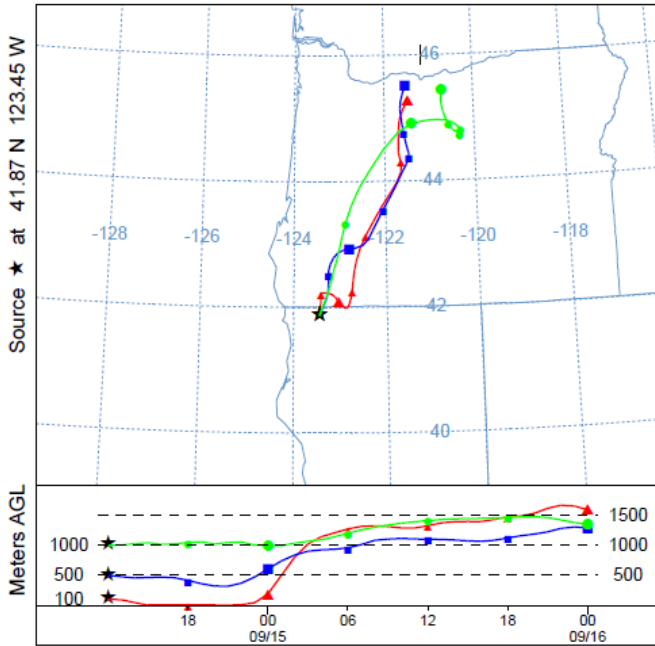
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



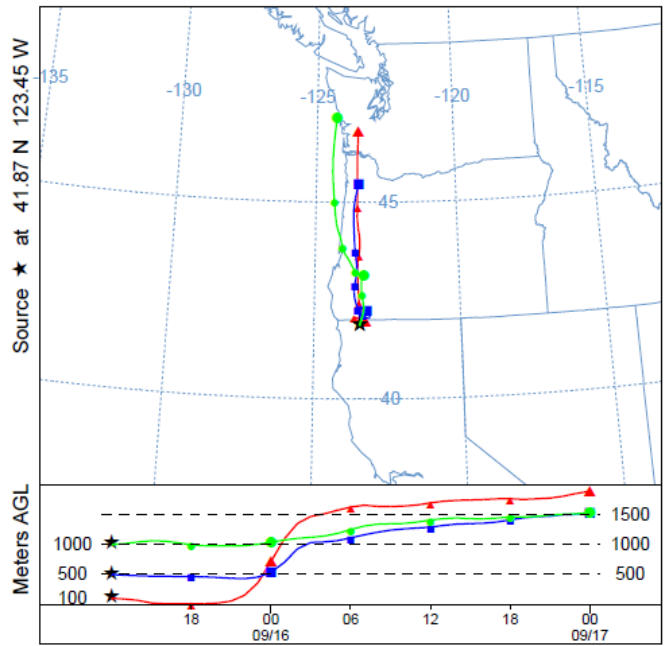
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



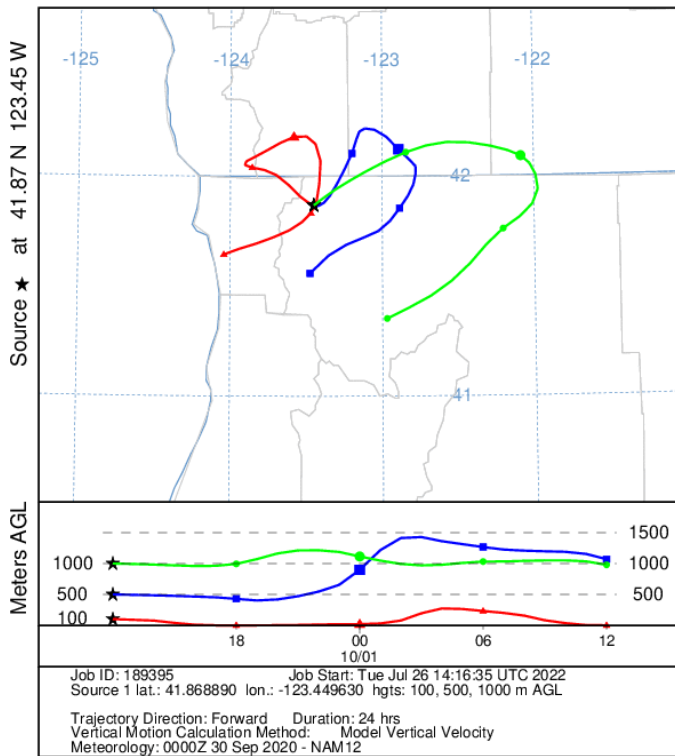
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 14 Sep **
NAM Meteorological Data



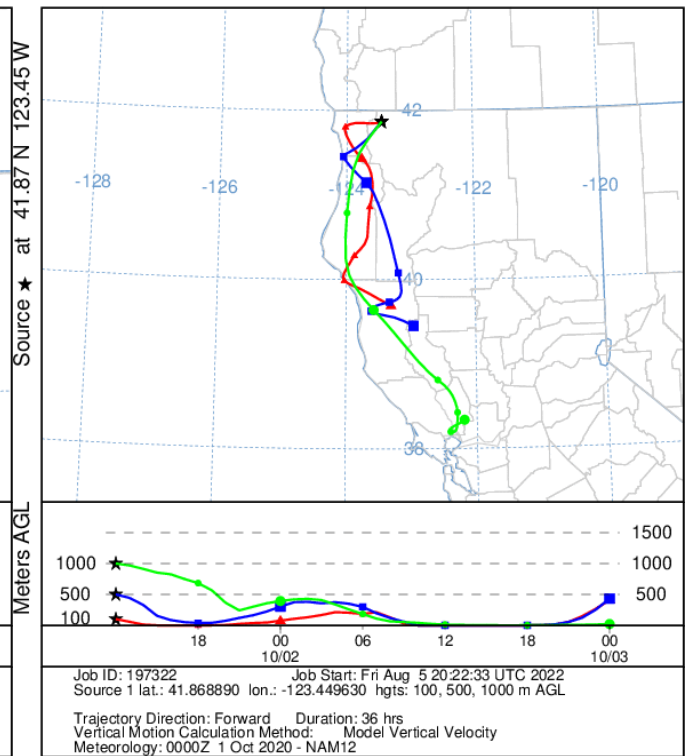
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 15 Sep **
NAM Meteorological Data



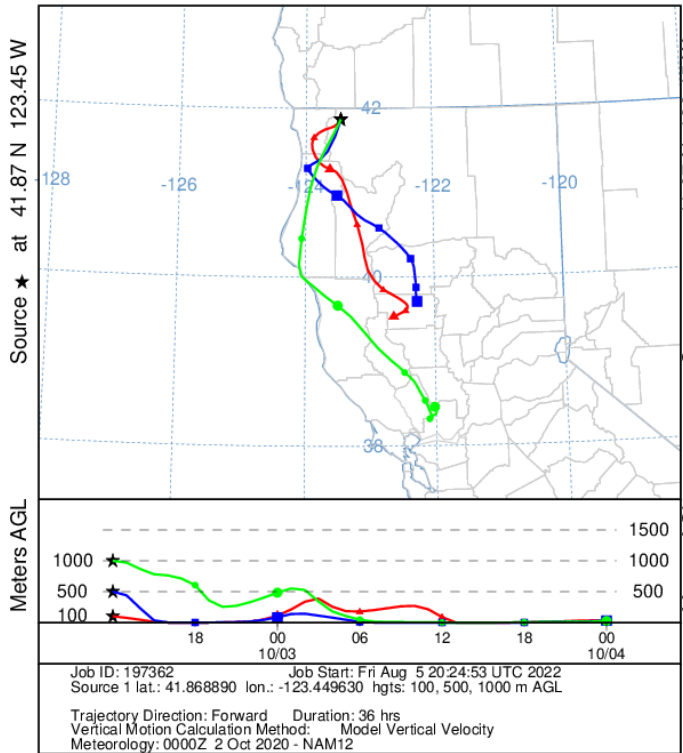
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 30 Sep 20
NAM Meteorological Data



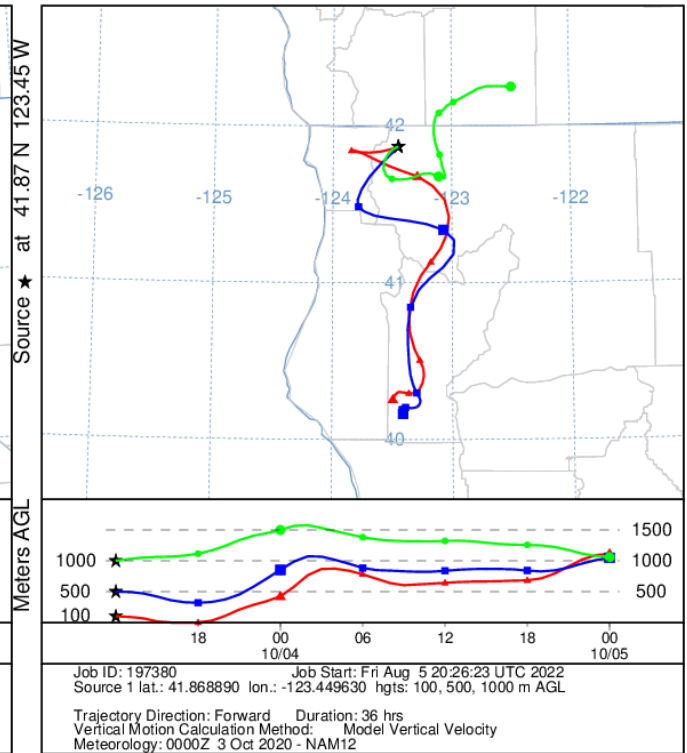
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 01 Oct 20
NAM Meteorological Data



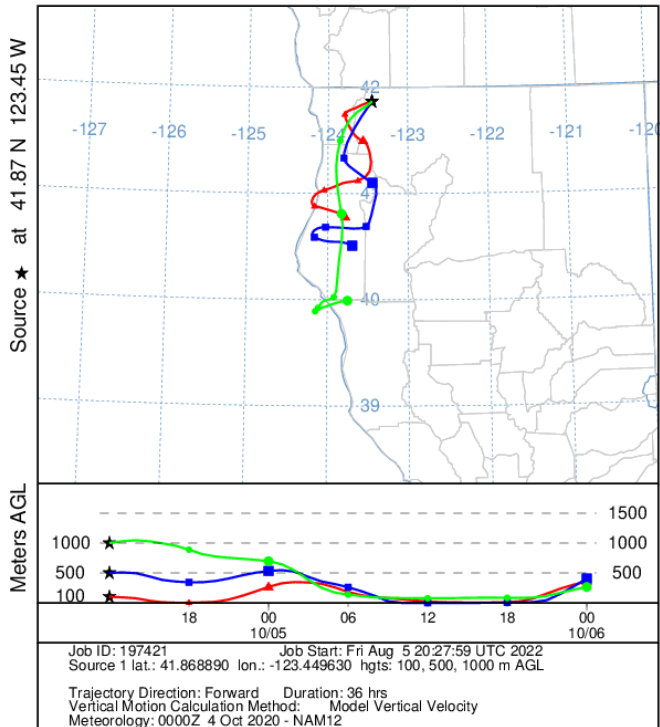
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



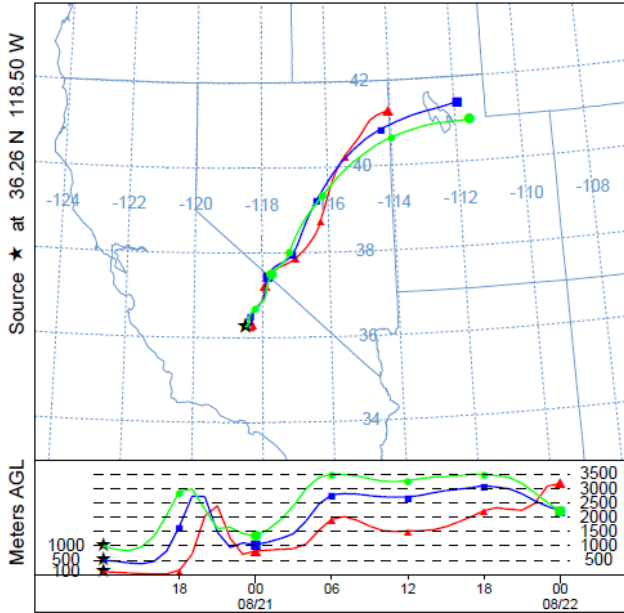
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 04 Oct 20
NAM Meteorological Data



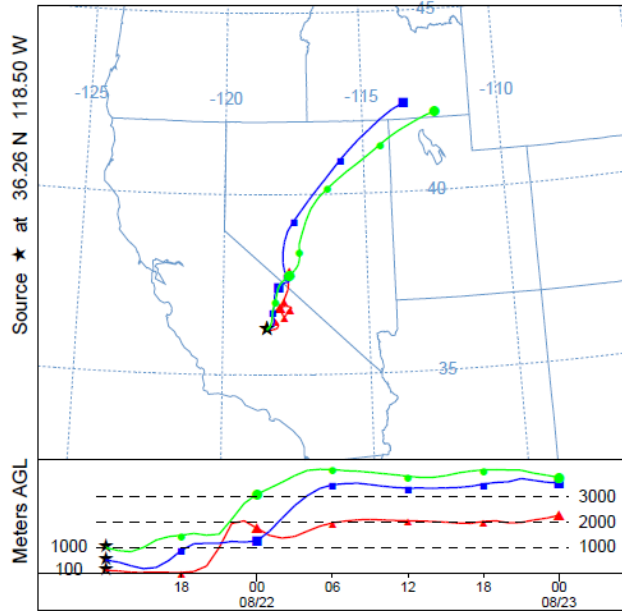
p) SQF Lightning Complex

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|---------------|---------|-------------|----------|-----------|-------------|
| SQF Lightning | 8/19/20 | 1/6/21 | 36.255 | -118.497 | 174,178 |

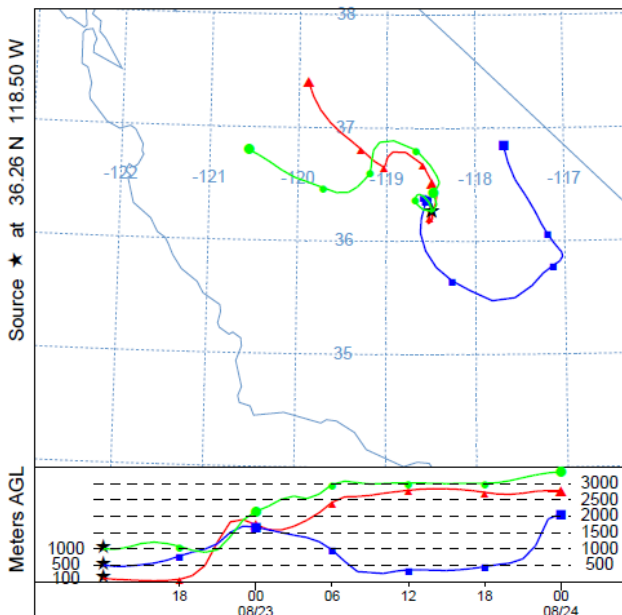
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



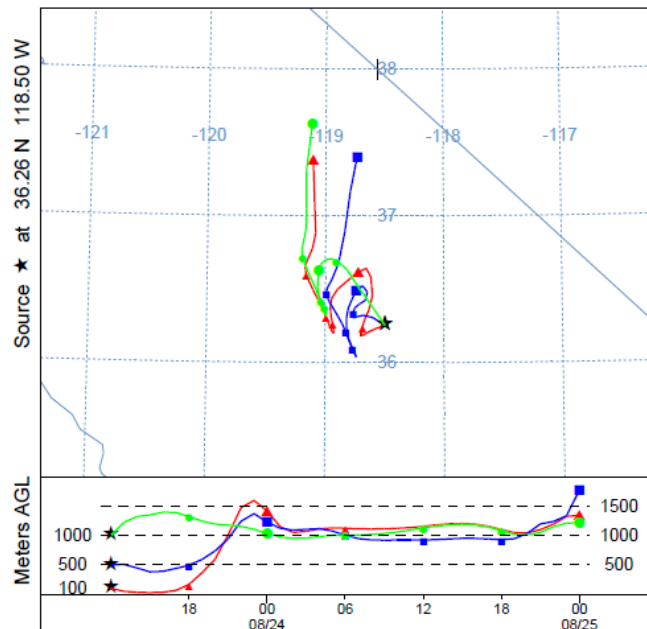
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



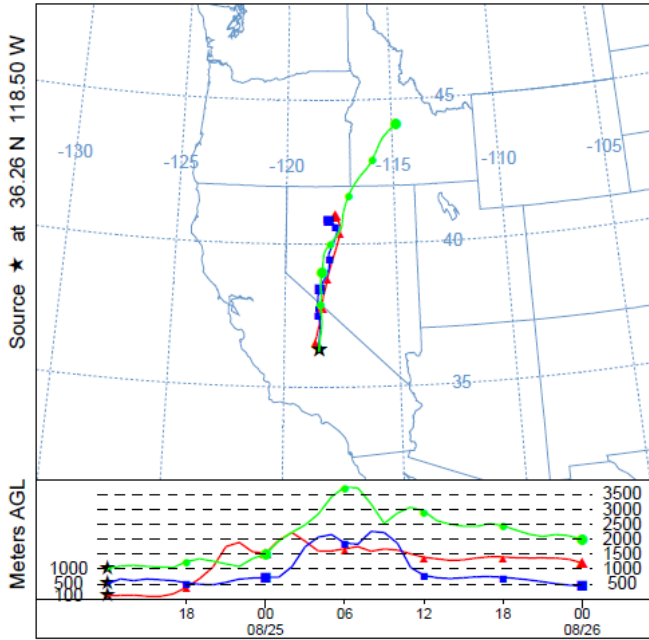
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



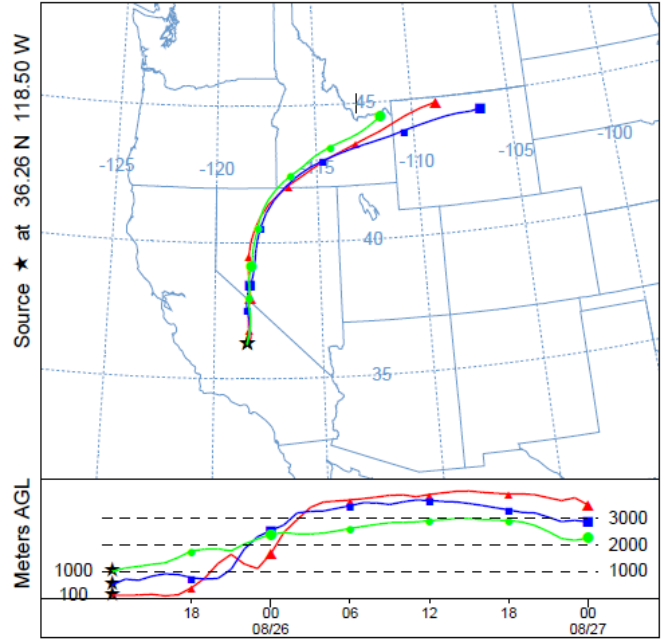
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



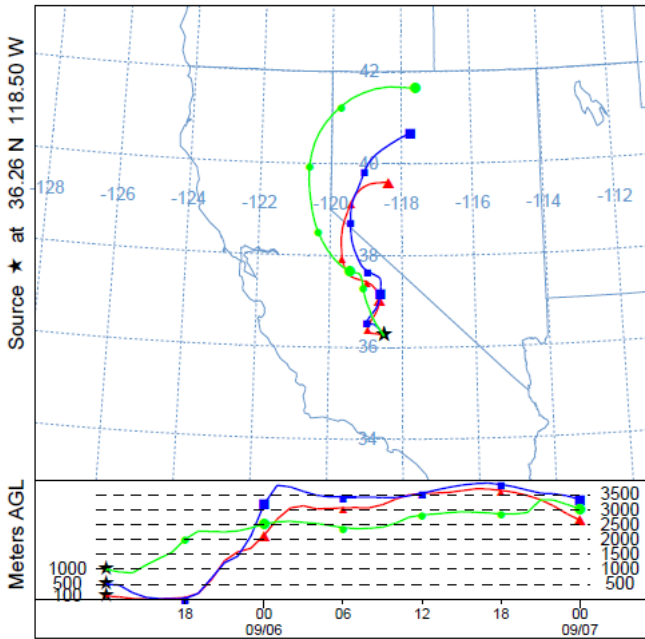
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



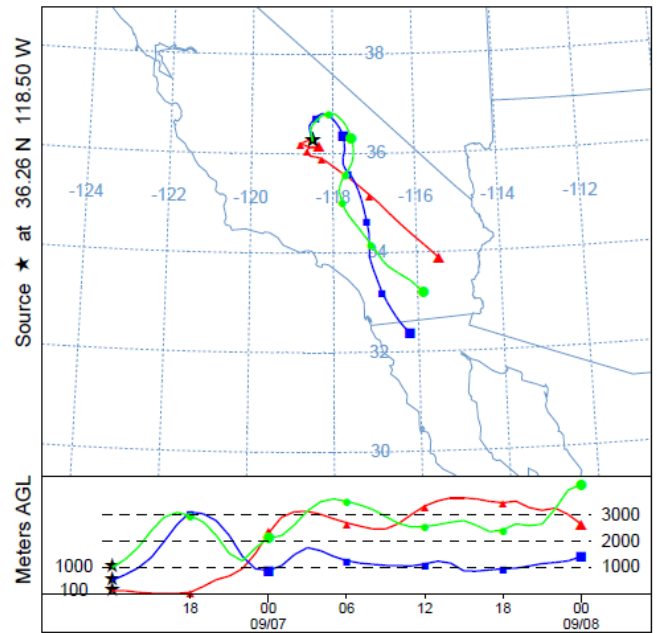
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



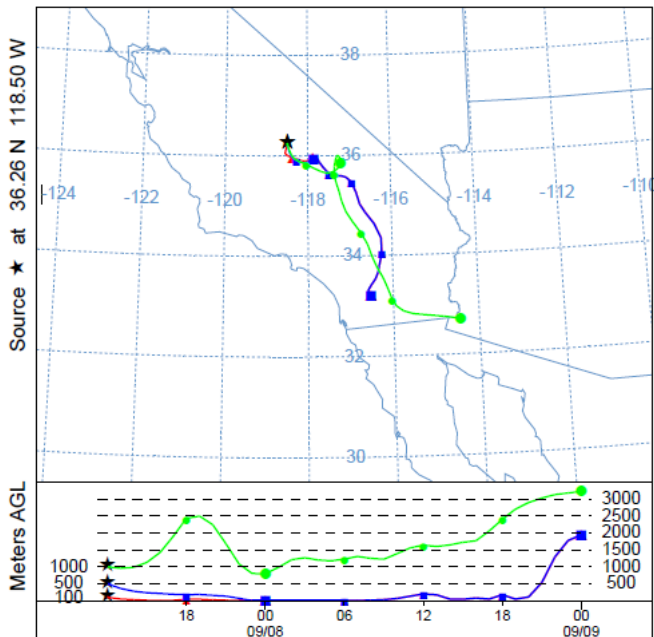
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



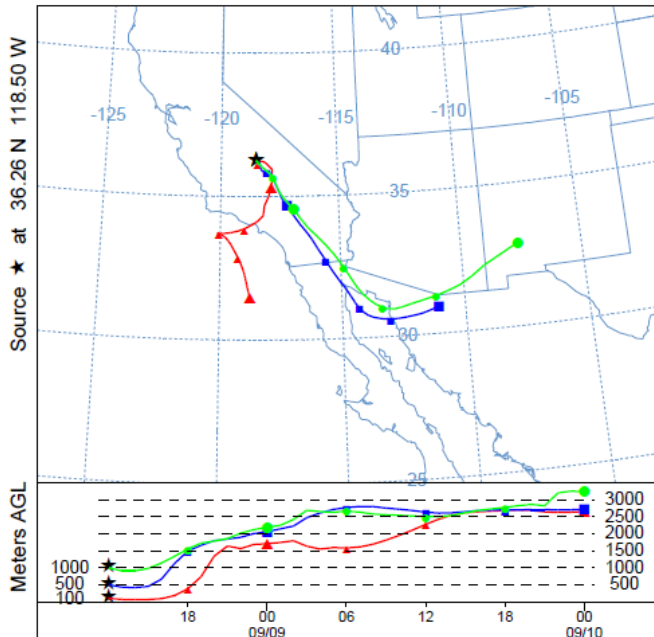
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



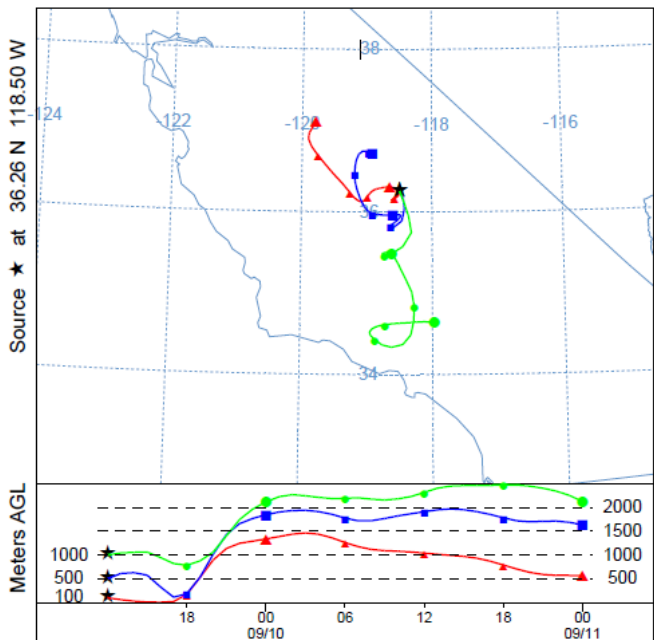
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



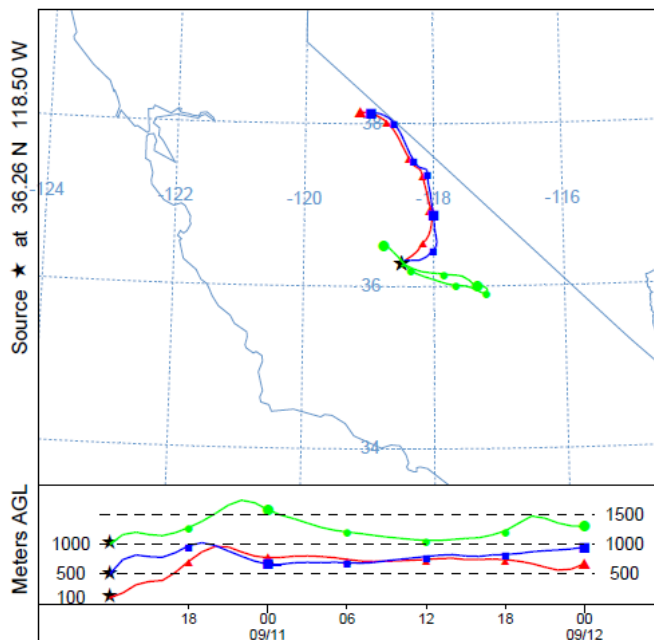
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



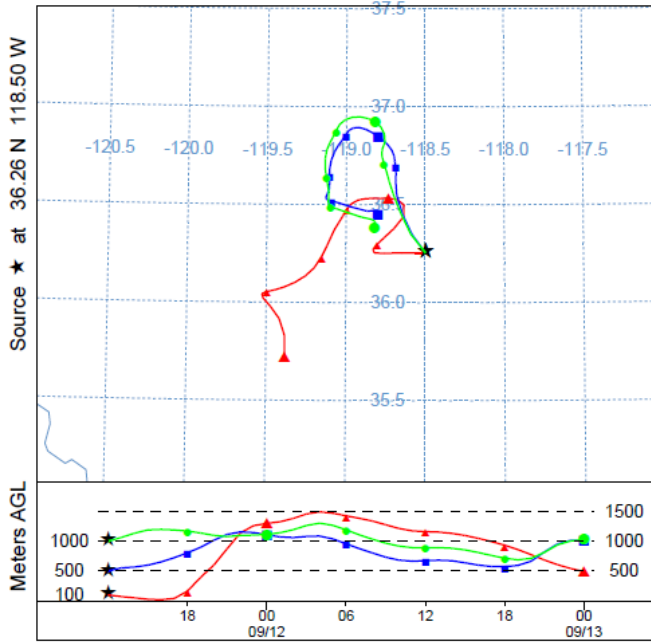
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



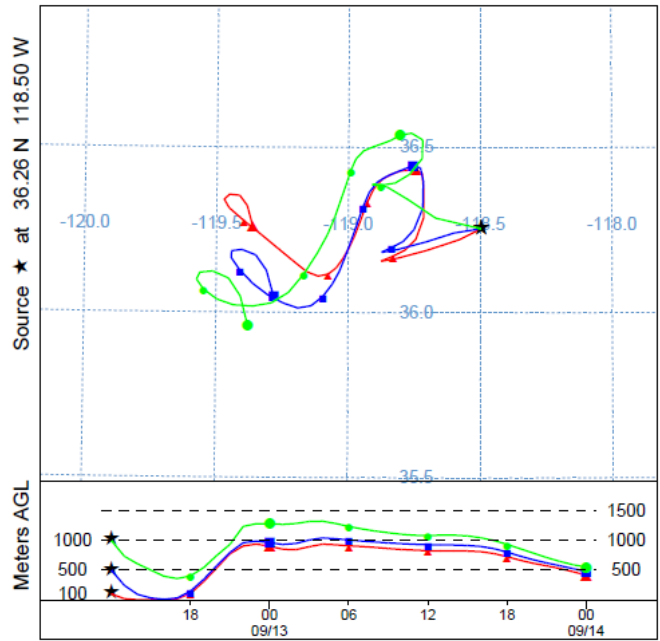
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



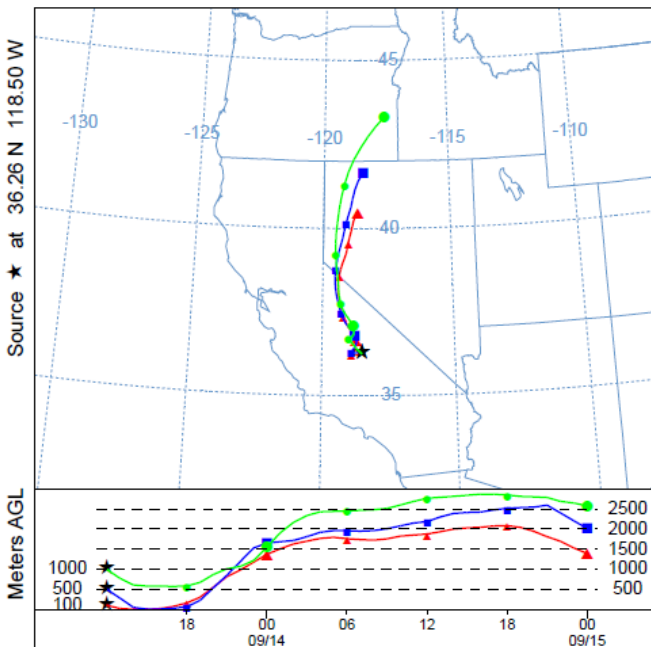
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



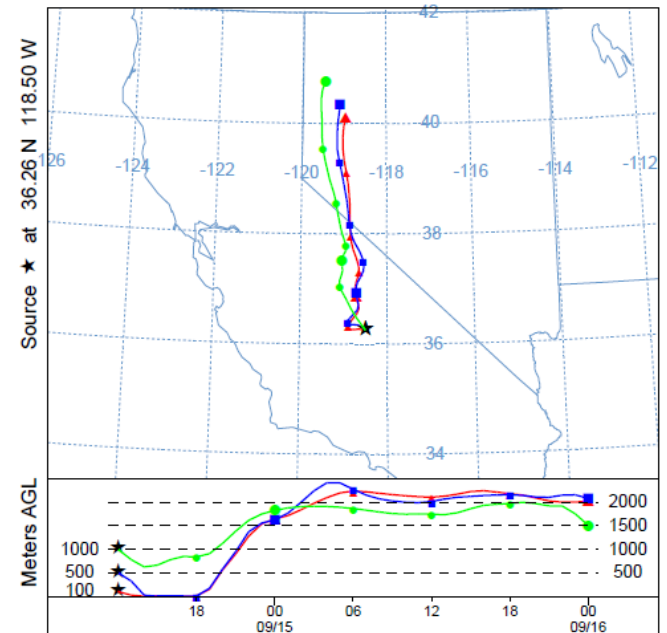
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



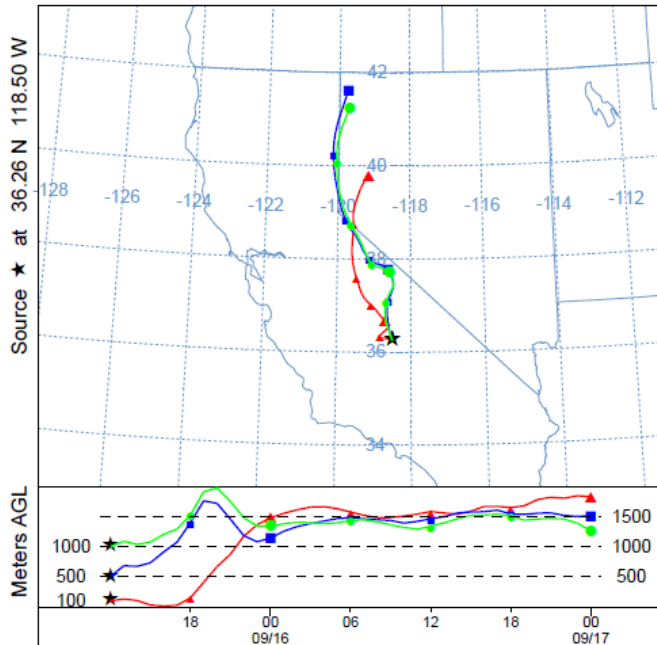
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



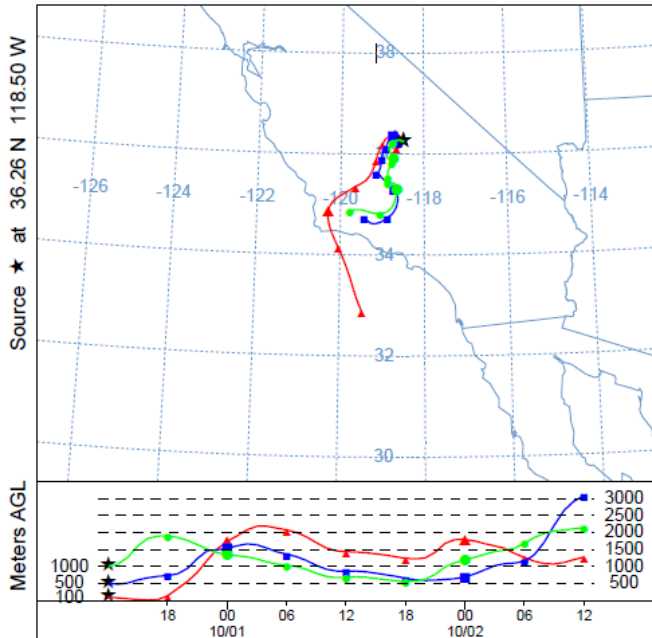
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



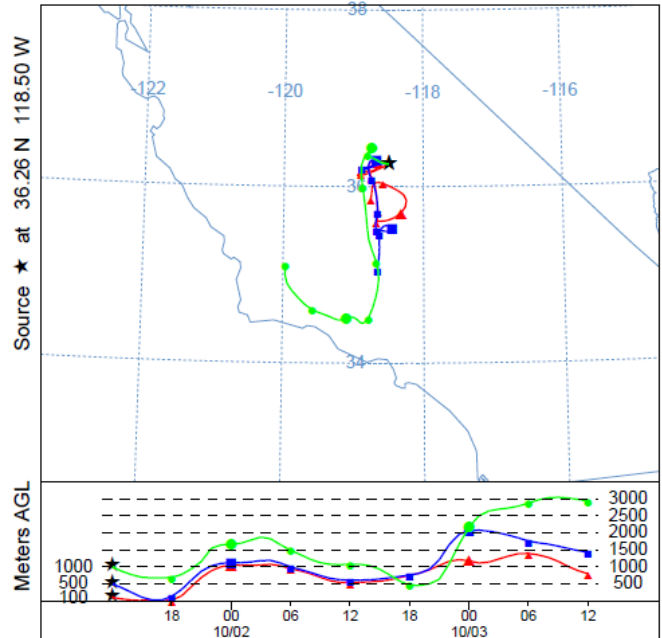
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



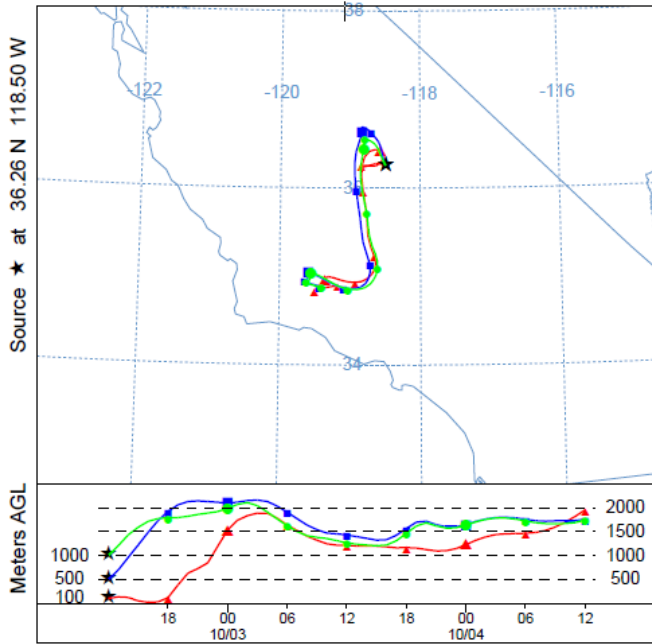
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



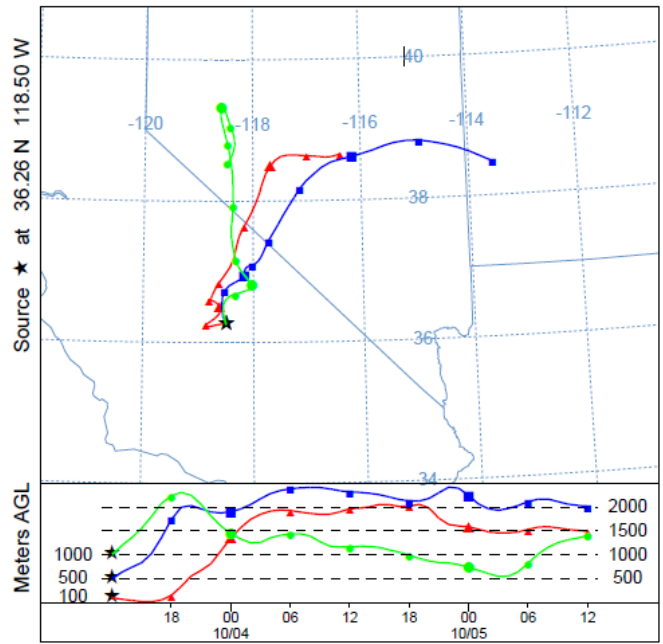
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 01 Oct 20
 NAM Meteorological Data



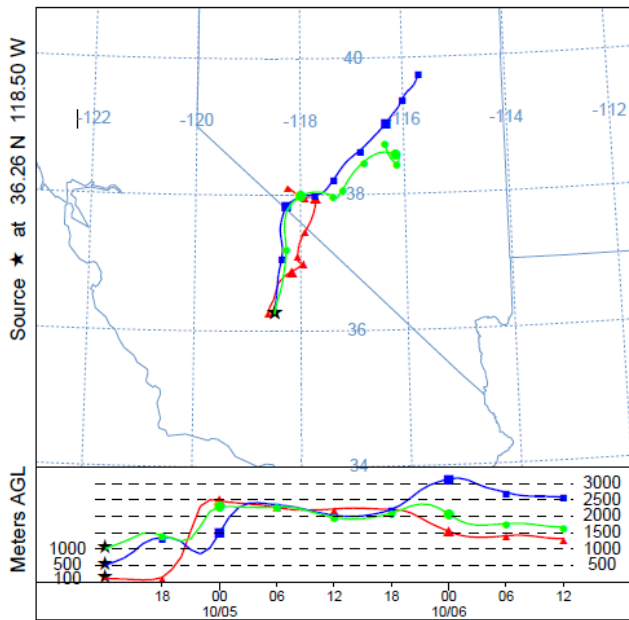
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 02 Oct 20
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 03 Oct 20
 NAM Meteorological Data



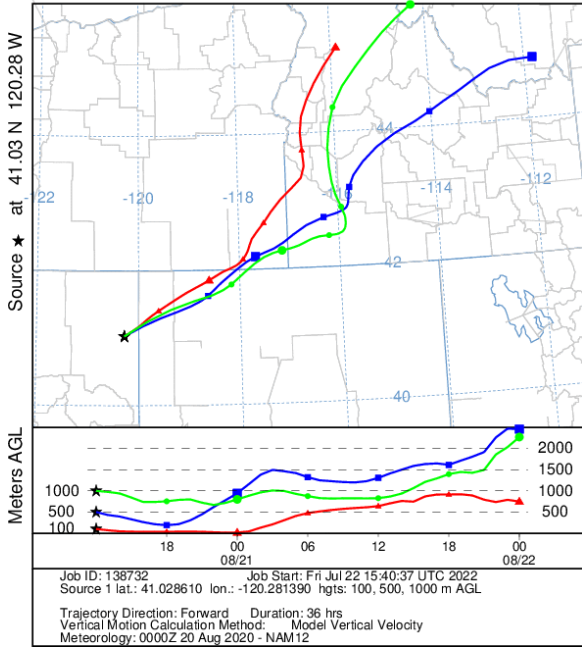
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 04 Oct 20
 NAM Meteorological Data



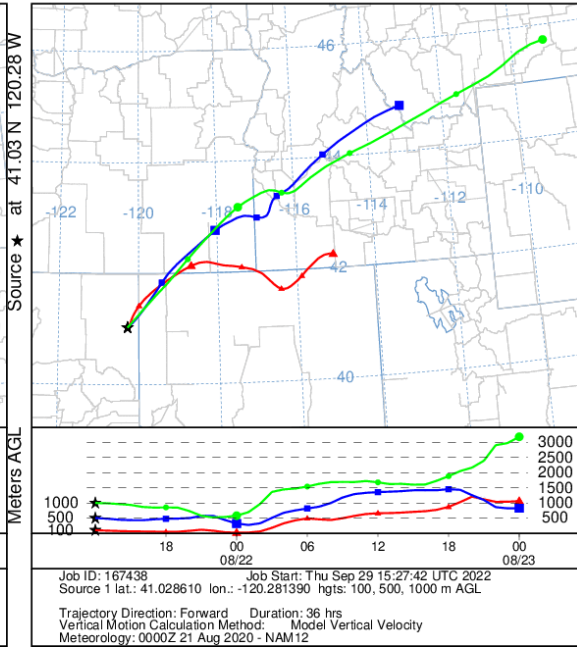
q) W-5 Cold Springs Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|------------------|---------|-------------|----------|-----------|-------------|
| W-5 Cold Springs | 8/18/20 | 9/16/20 | 41.0286 | -120.2813 | 84,817 |

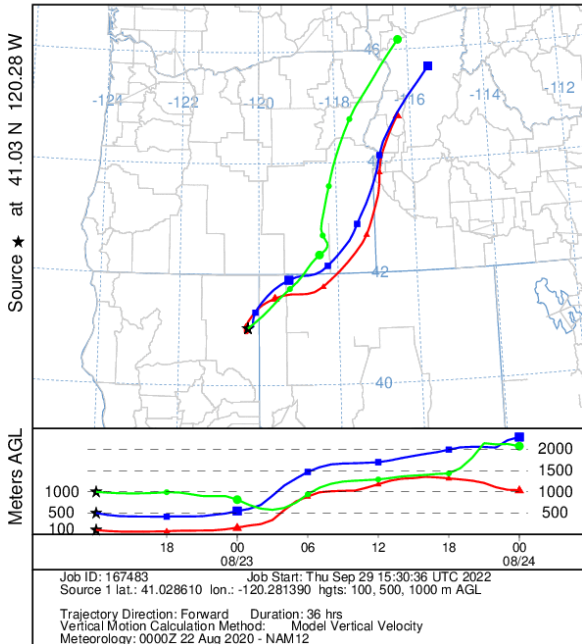
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug 20
NAM Meteorological Data



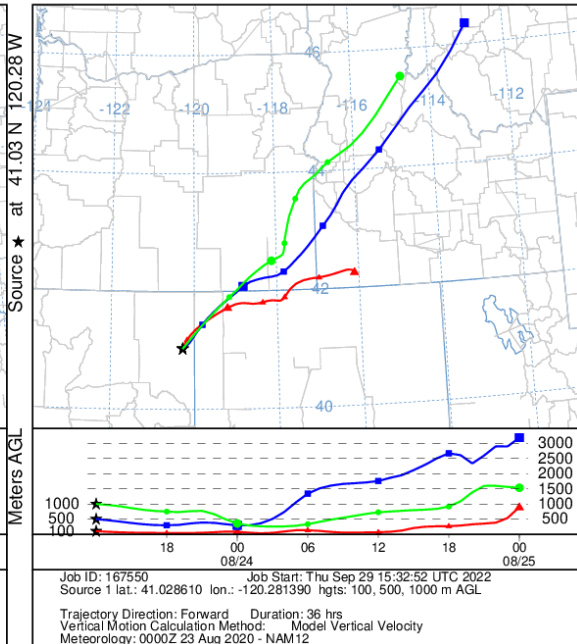
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug 20
NAM Meteorological Data



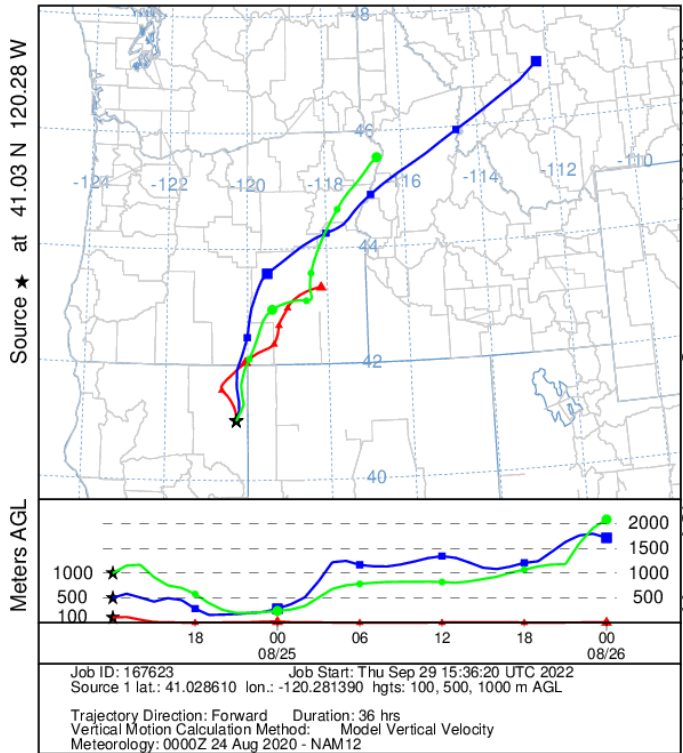
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug 20
NAM Meteorological Data



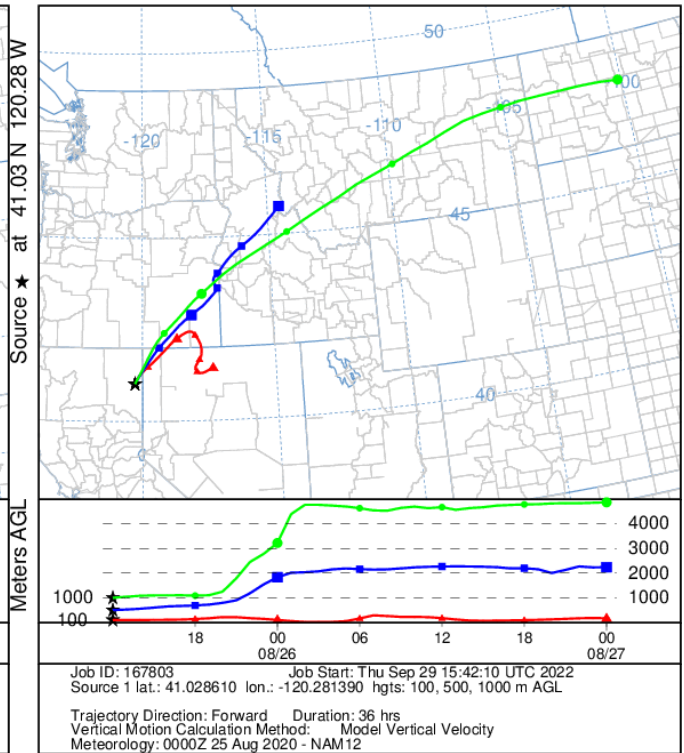
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug 20
NAM Meteorological Data



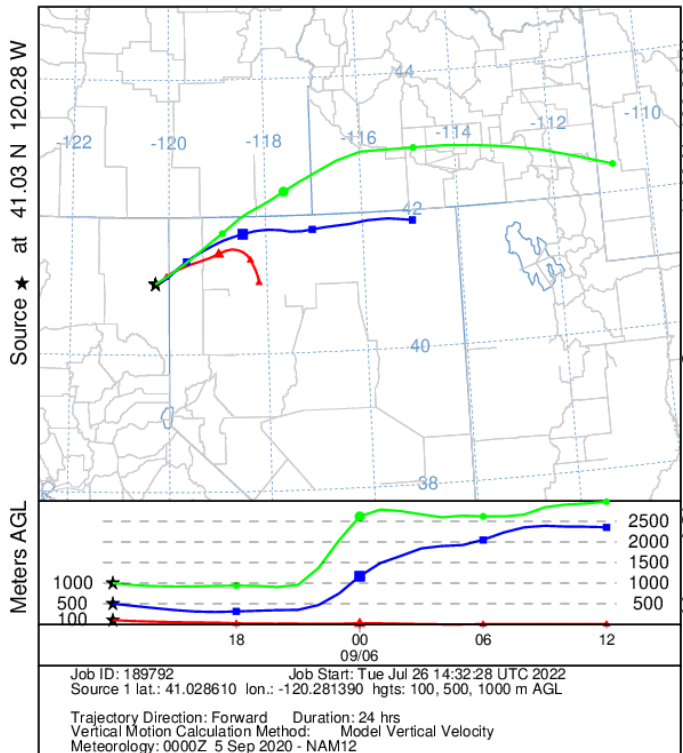
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 24 Aug 20
NAM Meteorological Data



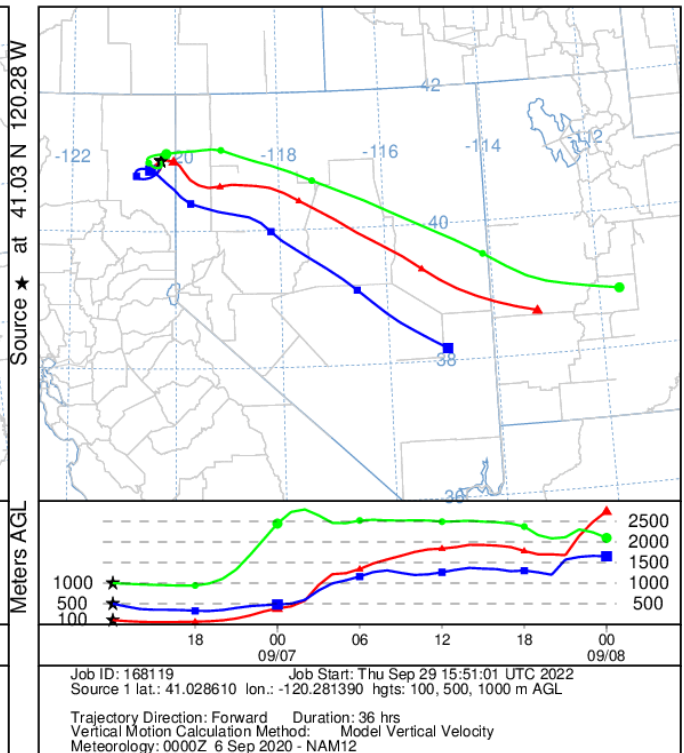
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 25 Aug 20
NAM Meteorological Data



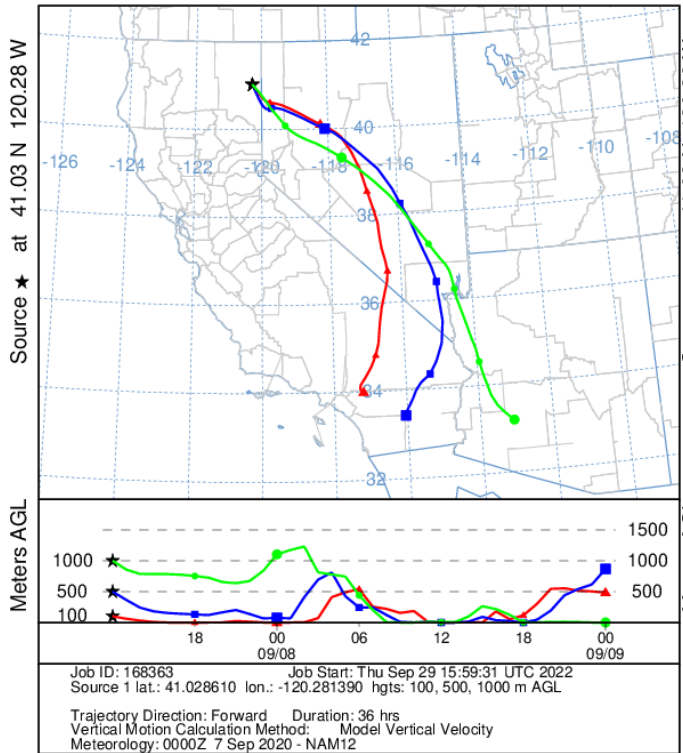
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 05 Sep 20
NAM Meteorological Data



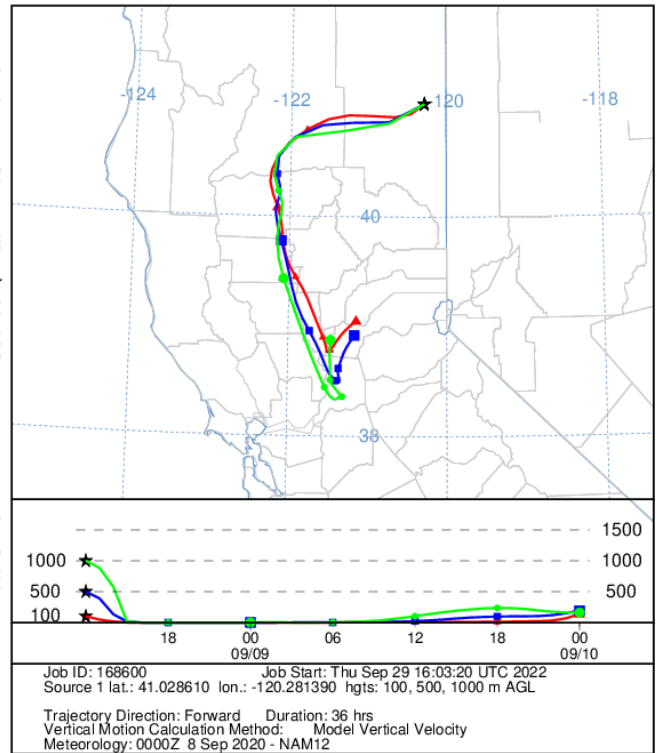
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 06 Sep 20
NAM Meteorological Data



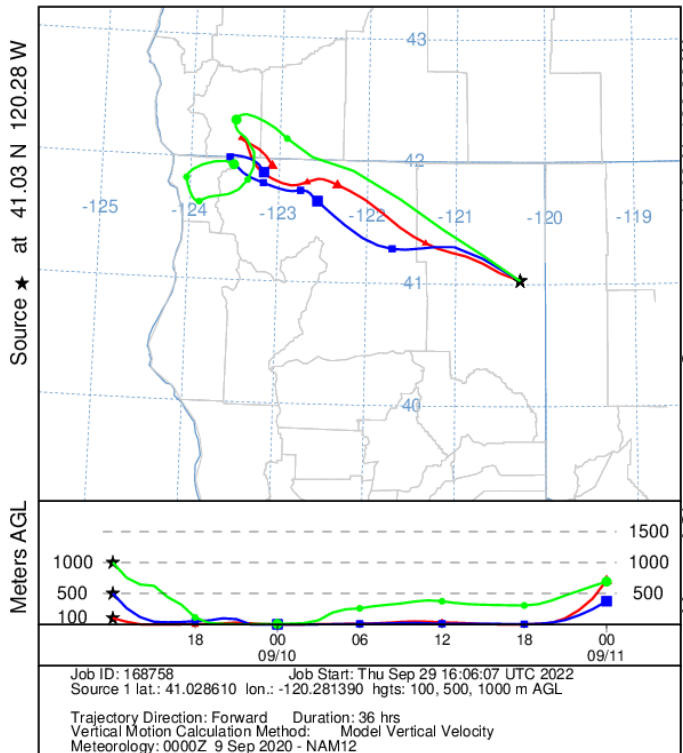
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 07 Sep 20
NAM Meteorological Data



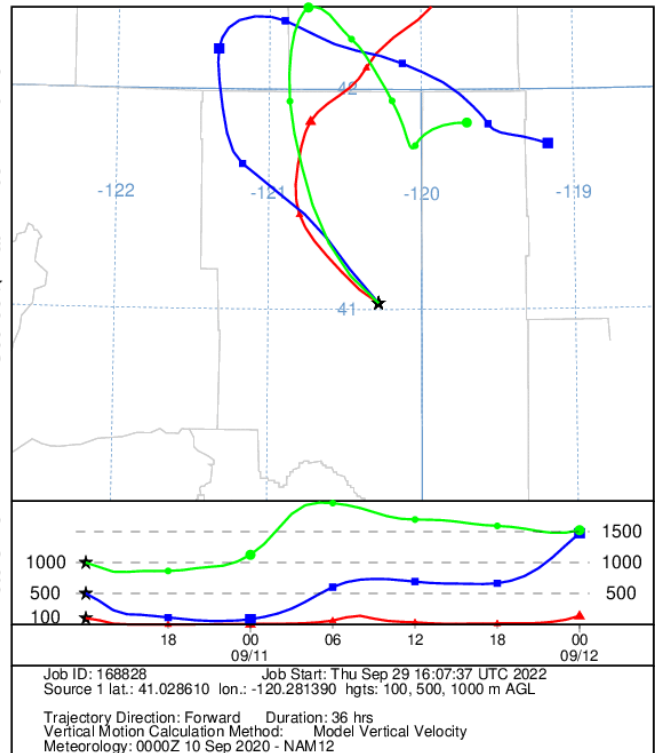
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 08 Sep 20
NAM Meteorological Data



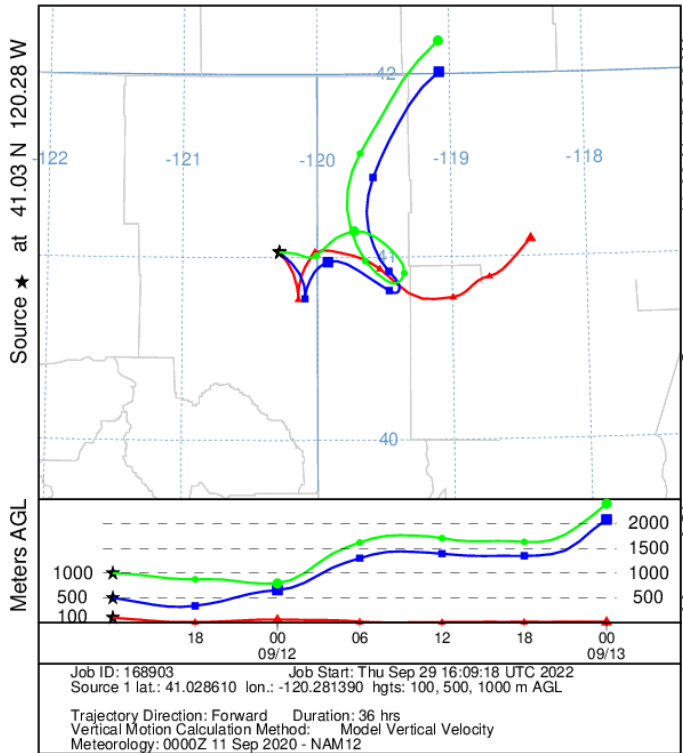
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 09 Sep 20
NAM Meteorological Data



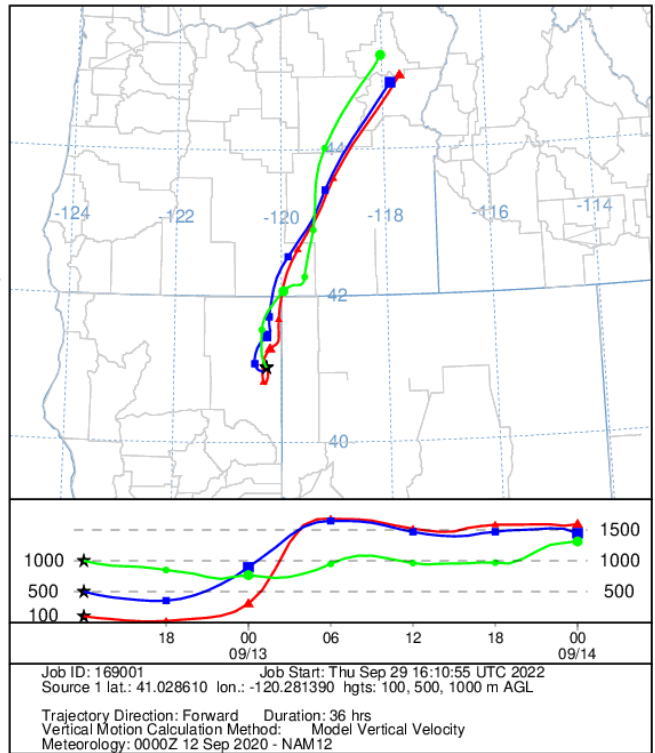
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 10 Sep 20
NAM Meteorological Data



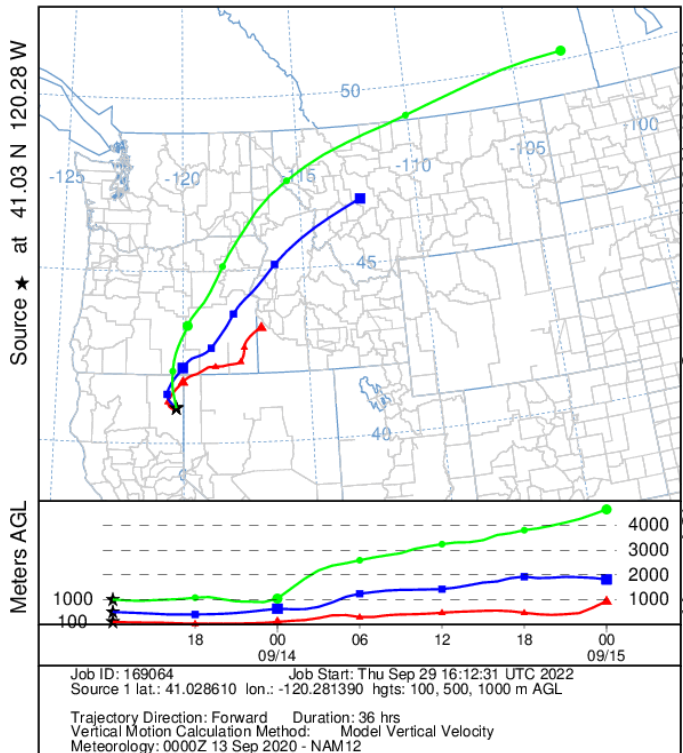
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 11 Sep 20
NAM Meteorological Data



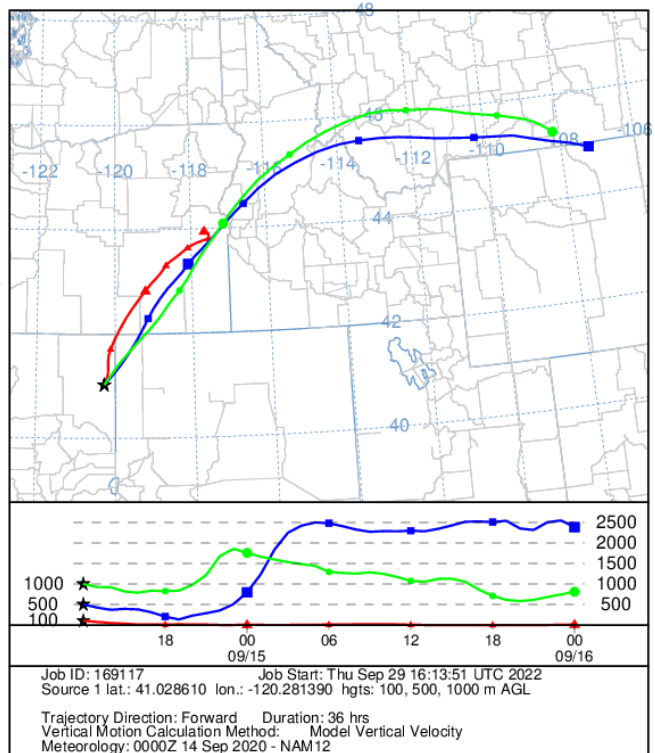
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 12 Sep 20
NAM Meteorological Data



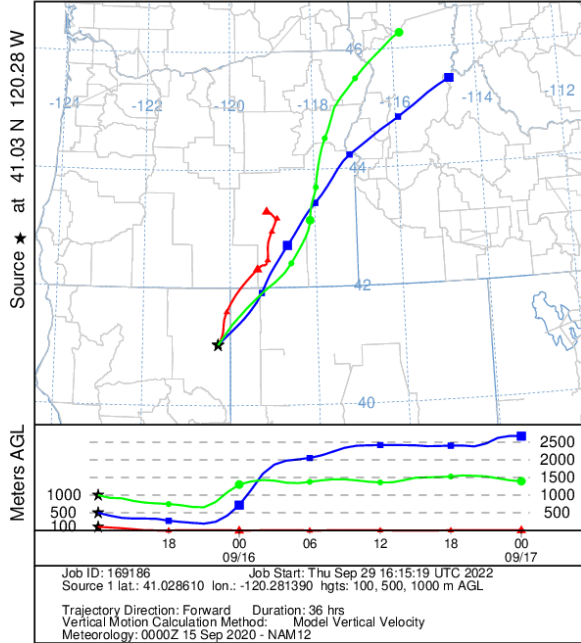
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 13 Sep 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 14 Sep 20
NAM Meteorological Data



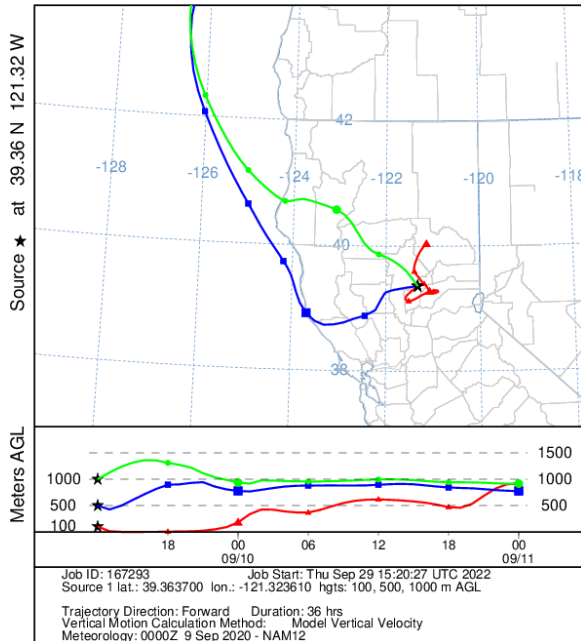
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep 20
 NAM Meteorological Data



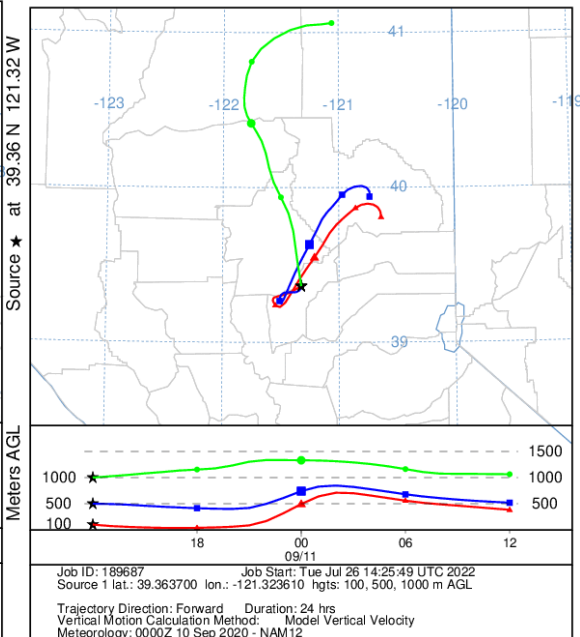
r) Willow Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|--------|--------|-------------|----------|-----------|-------------|
| Willow | 9/9/20 | 9/14/20 | 39.3637 | -121.3236 | 1,311 |

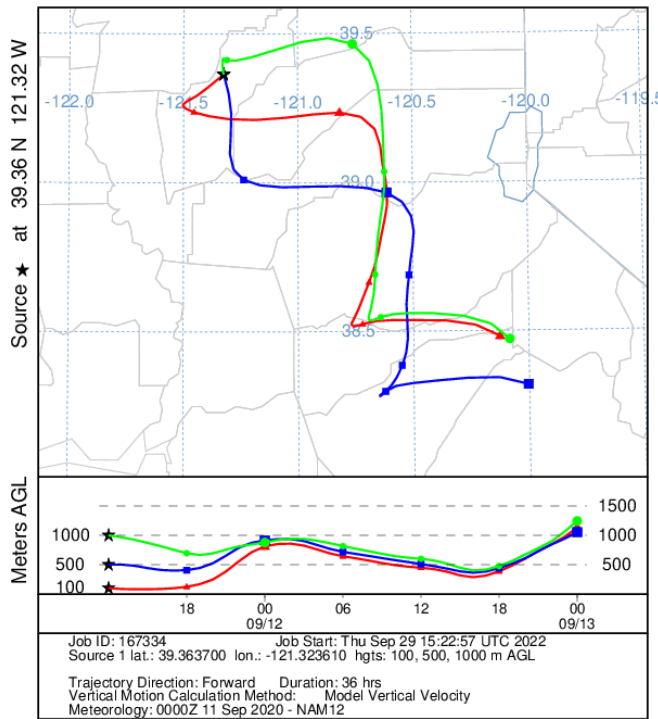
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep 20
 NAM Meteorological Data



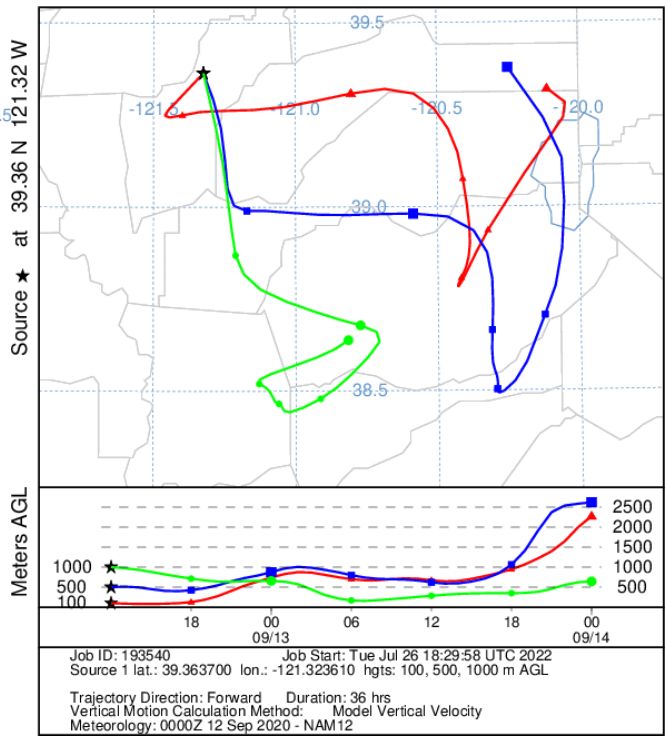
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep 20
 NAM Meteorological Data



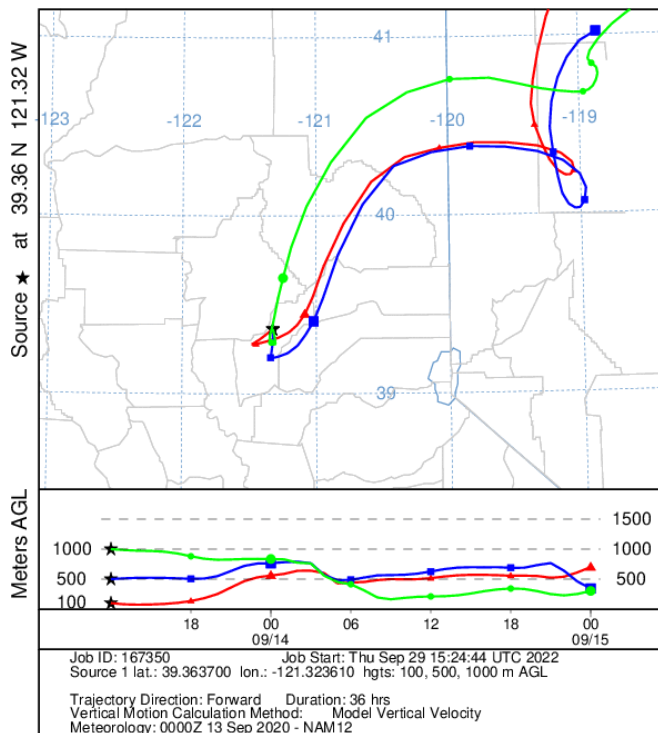
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 11 Sep 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 12 Sep 20
NAM Meteorological Data



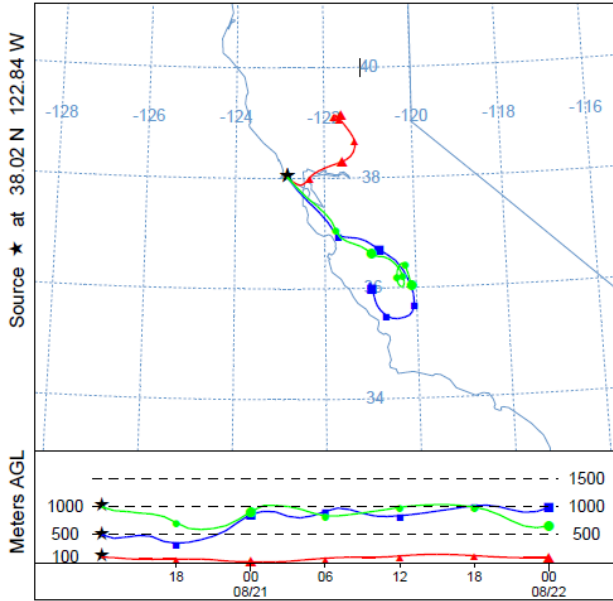
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 13 Sep 20
NAM Meteorological Data



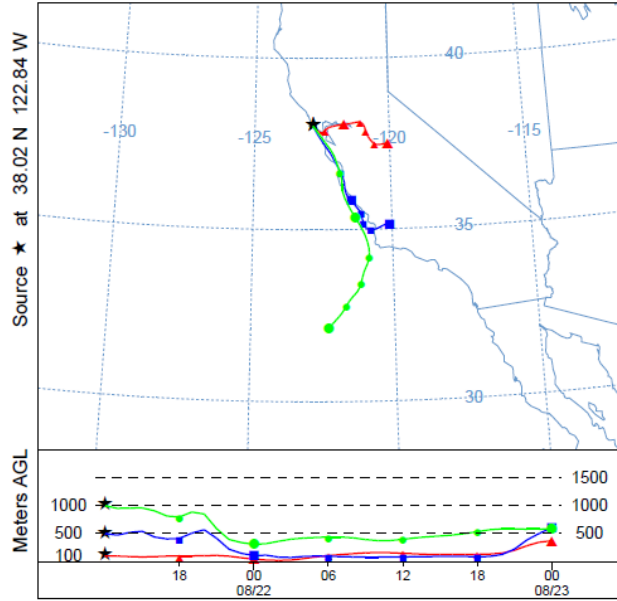
s) Woodward Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|----------|---------|-------------|----------|-----------|-------------|
| Woodward | 8/18/20 | 10/2/20 | 38.0181 | -122.8367 | 4,929 |

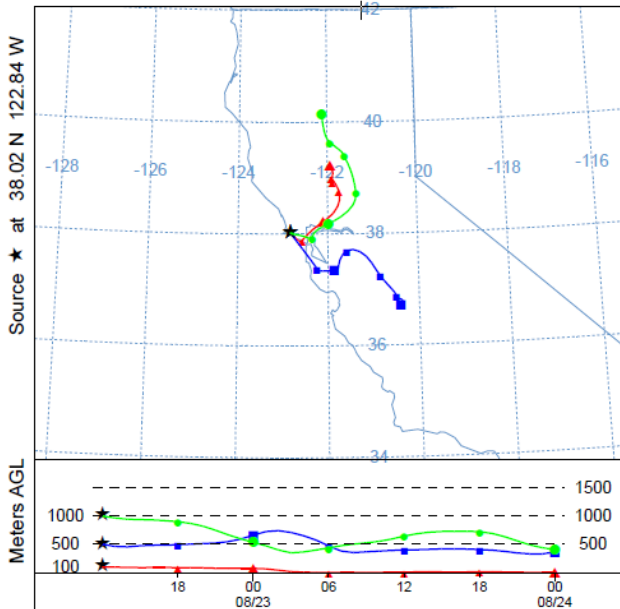
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 20 Aug **
NAM Meteorological Data



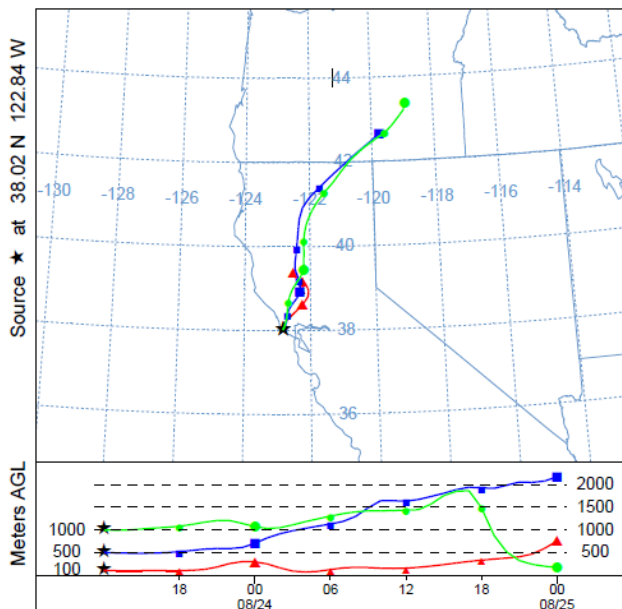
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 21 Aug **
NAM Meteorological Data



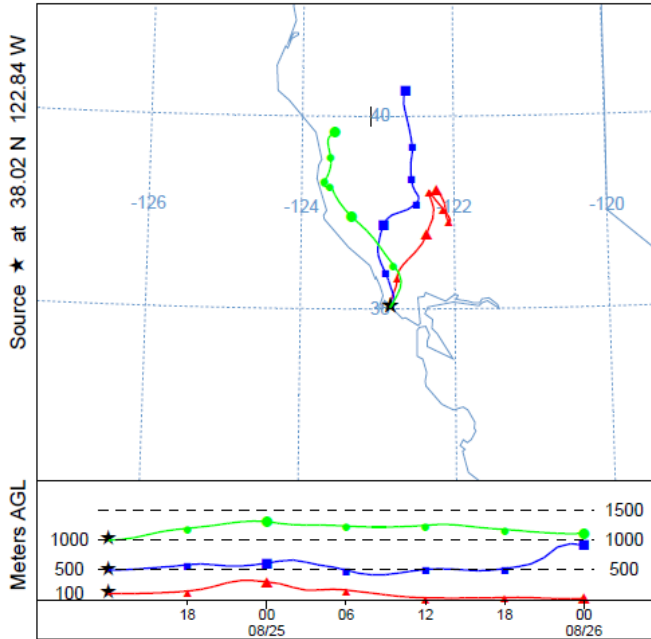
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 22 Aug **
NAM Meteorological Data



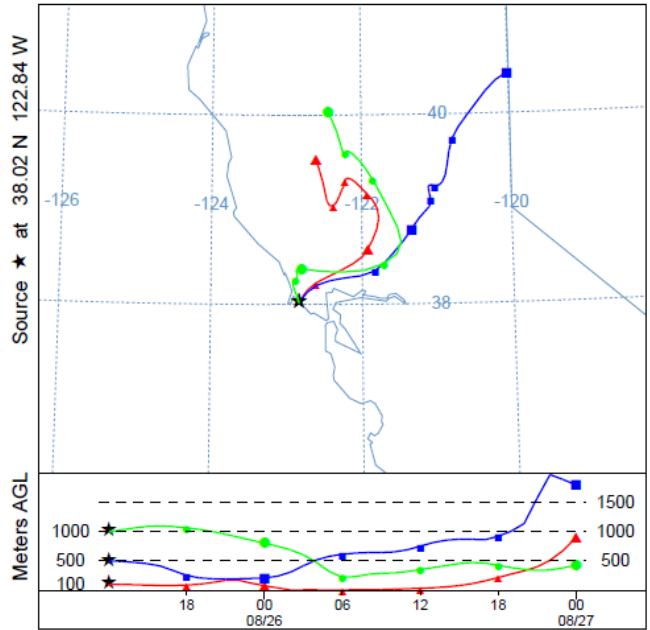
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 23 Aug **
NAM Meteorological Data



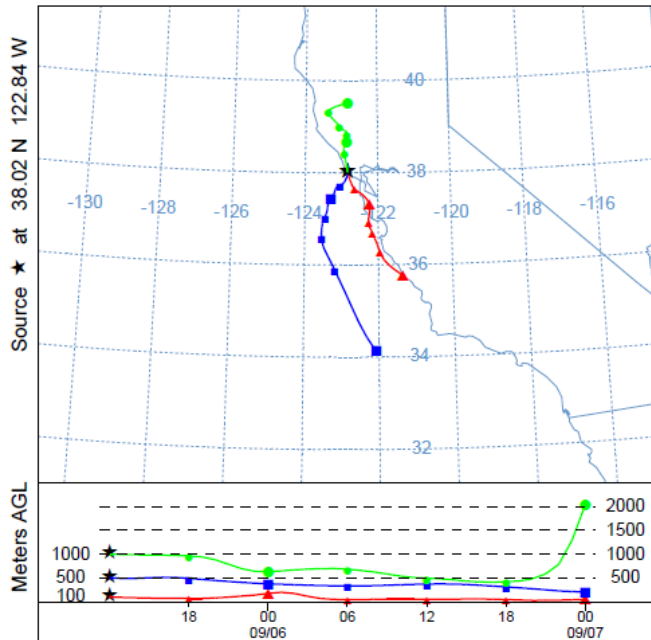
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 24 Aug **
 NAM Meteorological Data



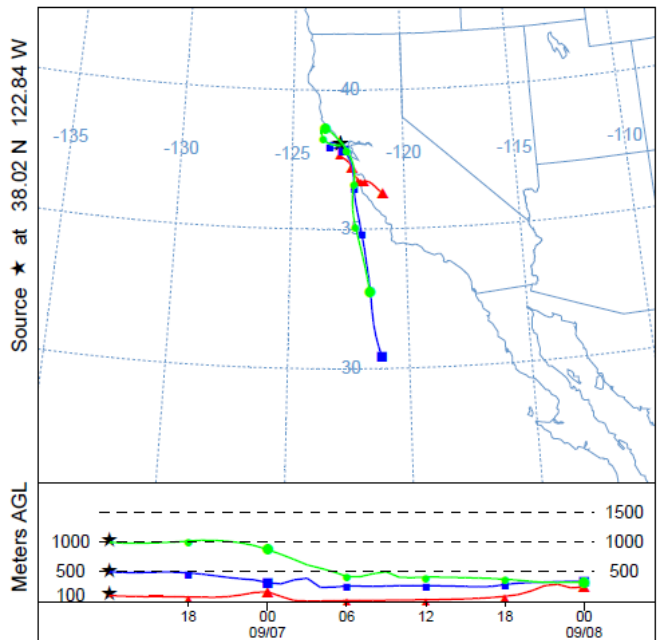
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 25 Aug **
 NAM Meteorological Data



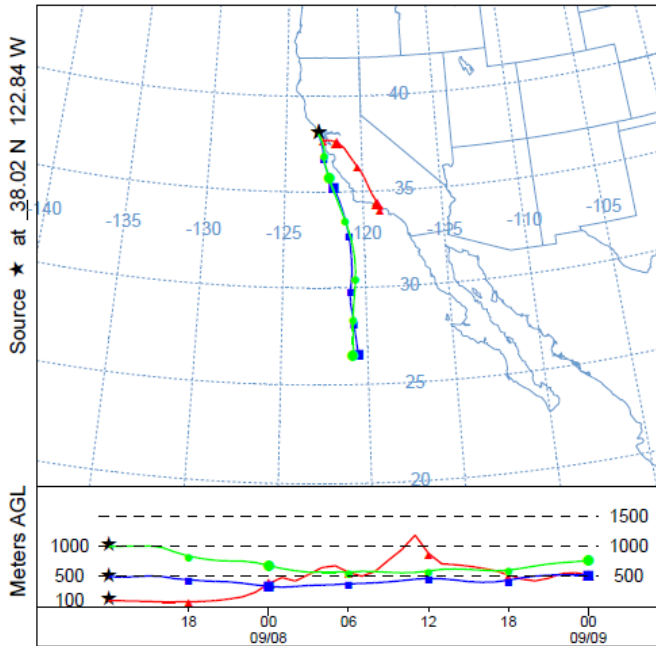
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 05 Sep **
 NAM Meteorological Data



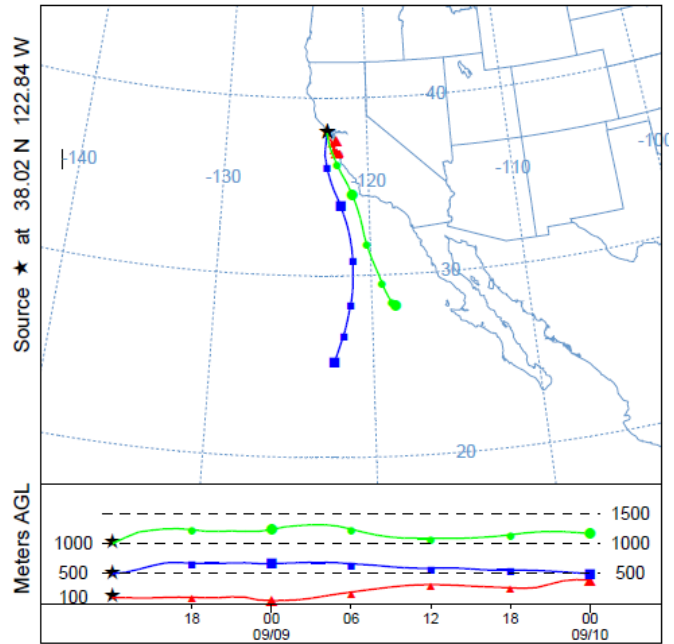
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 06 Sep **
 NAM Meteorological Data



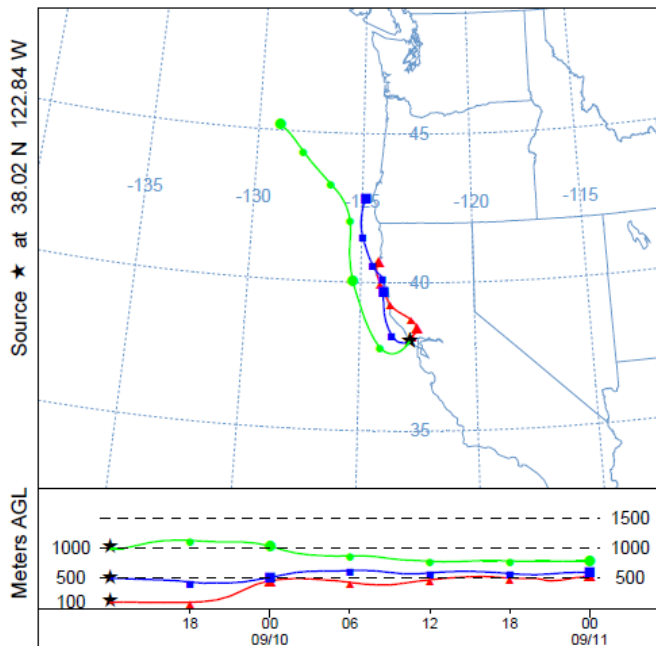
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 07 Sep **
 NAM Meteorological Data



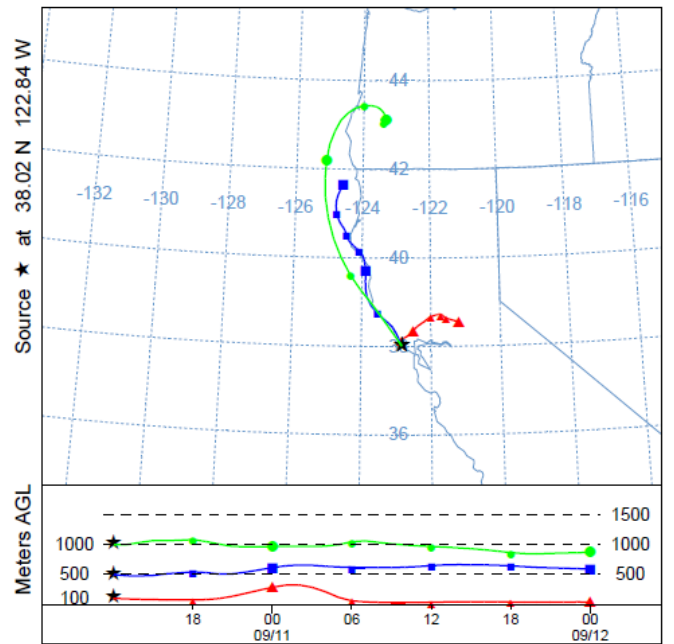
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 08 Sep **
 NAM Meteorological Data



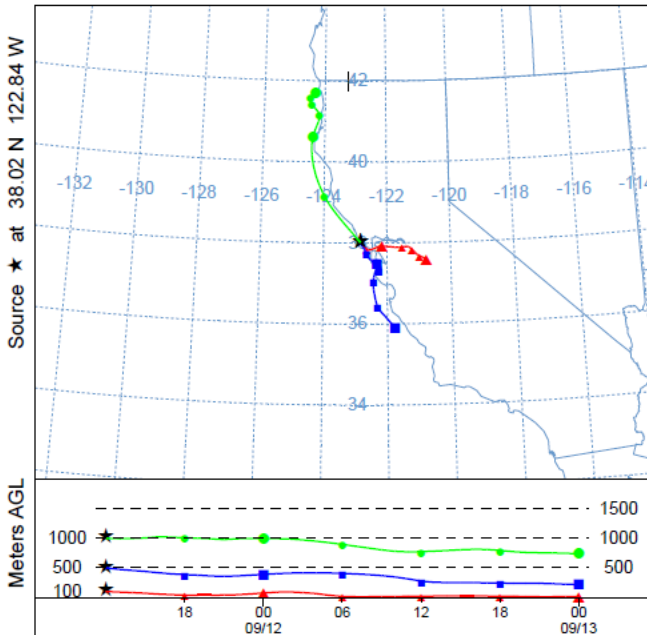
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 09 Sep **
 NAM Meteorological Data



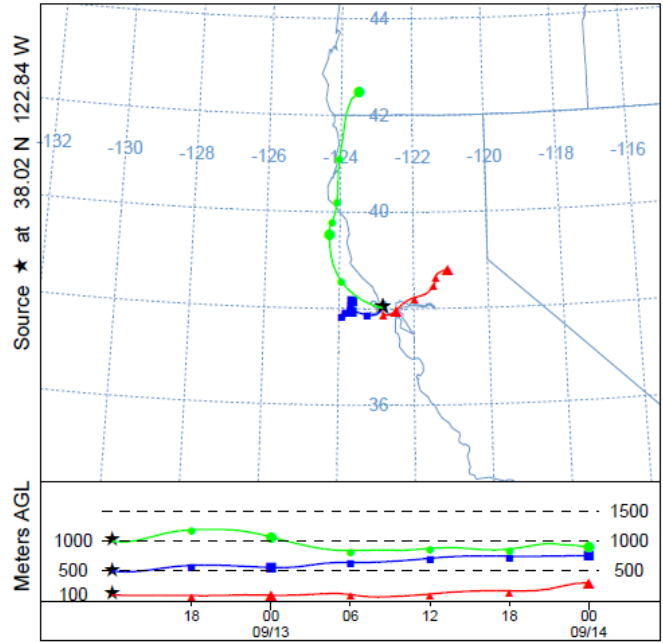
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 10 Sep **
 NAM Meteorological Data



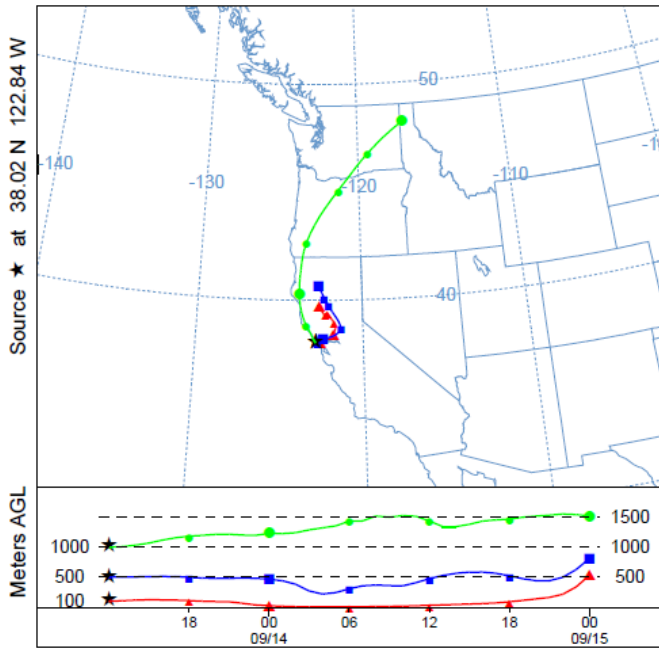
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 11 Sep **
 NAM Meteorological Data



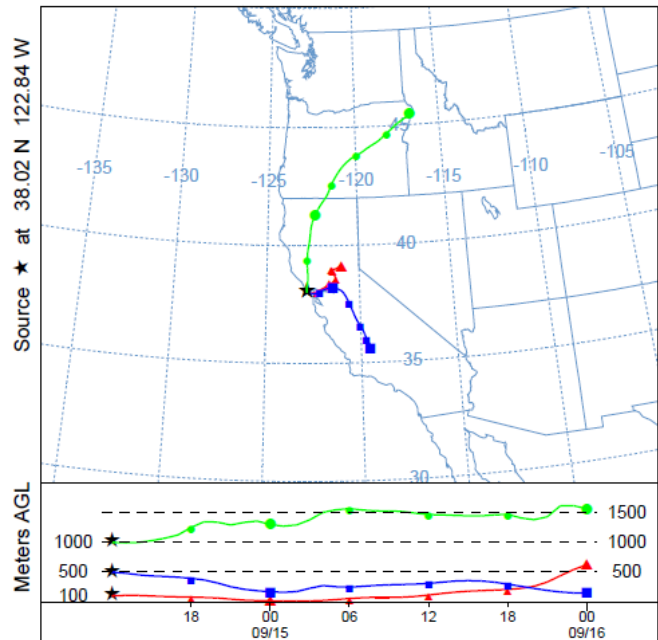
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 12 Sep **
 NAM Meteorological Data



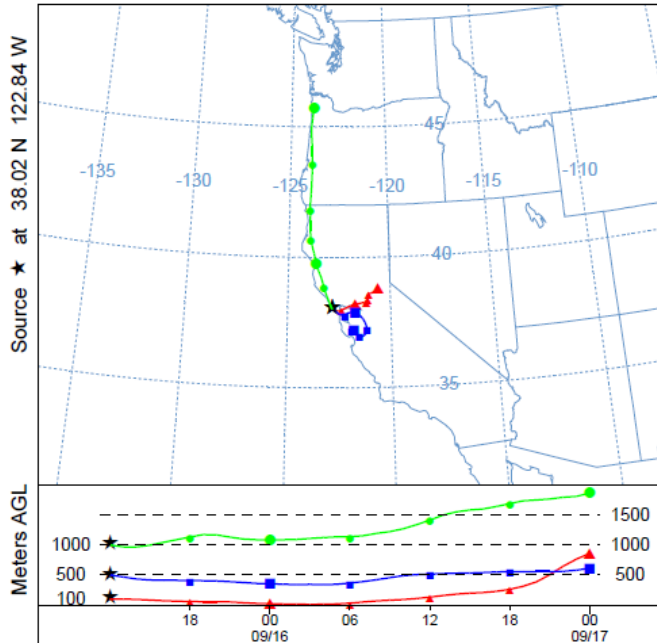
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 13 Sep **
 NAM Meteorological Data



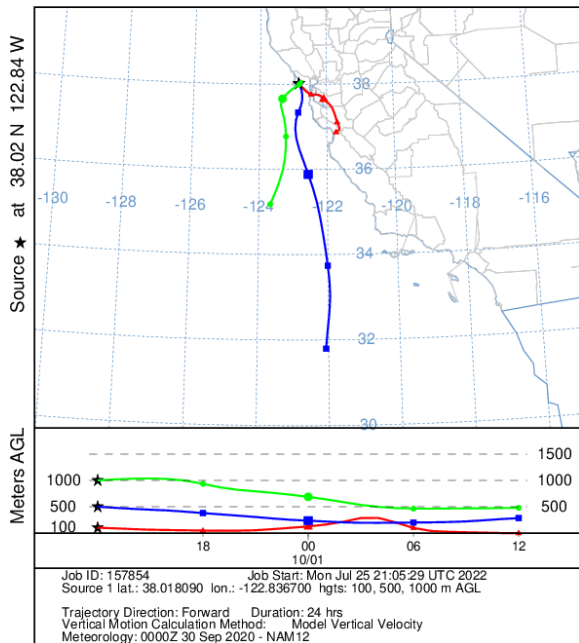
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 14 Sep **
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 15 Sep **
 NAM Meteorological Data



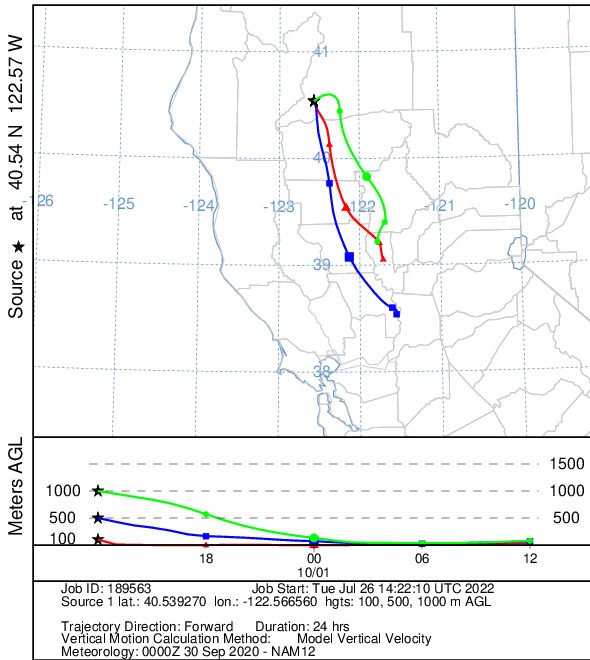
NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 30 Sep 20
 NAM Meteorological Data



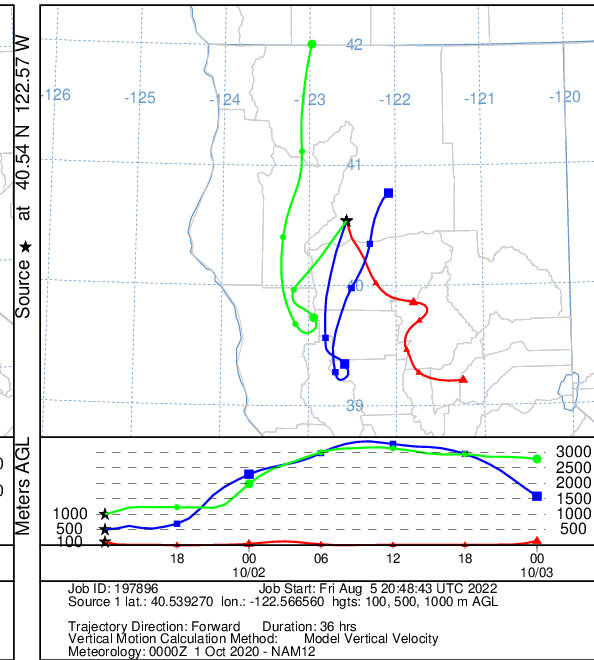
t) Zogg Fire

| Fire | Start | Containment | Latitude | Longitude | Total Acres |
|------|---------|-------------|----------|-----------|-------------|
| Zogg | 9/27/20 | 10/16/20 | 40.5393 | -122.5666 | 56,338 |

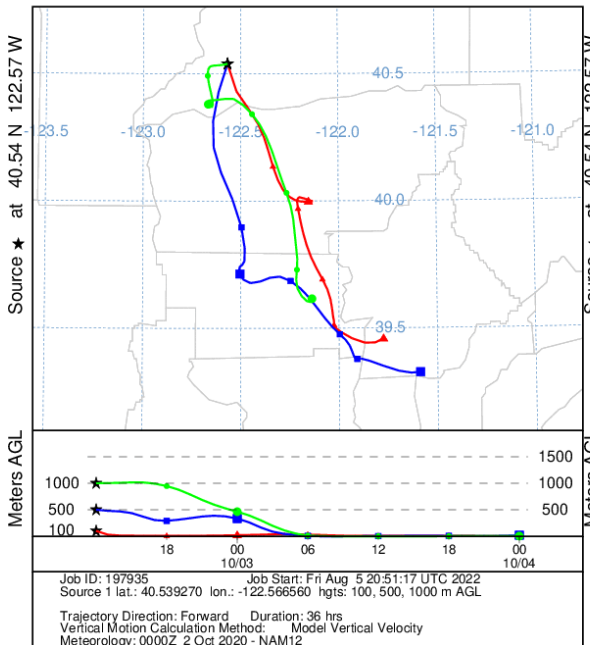
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 30 Sep 20
NAM Meteorological Data



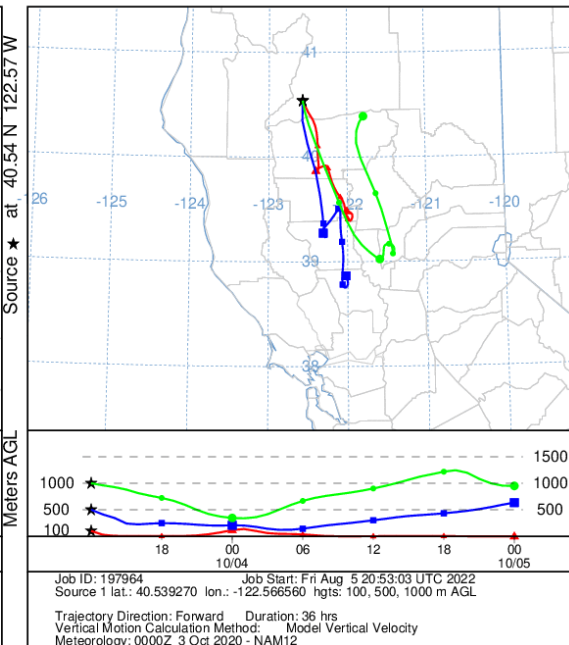
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 01 Oct 20
NAM Meteorological Data



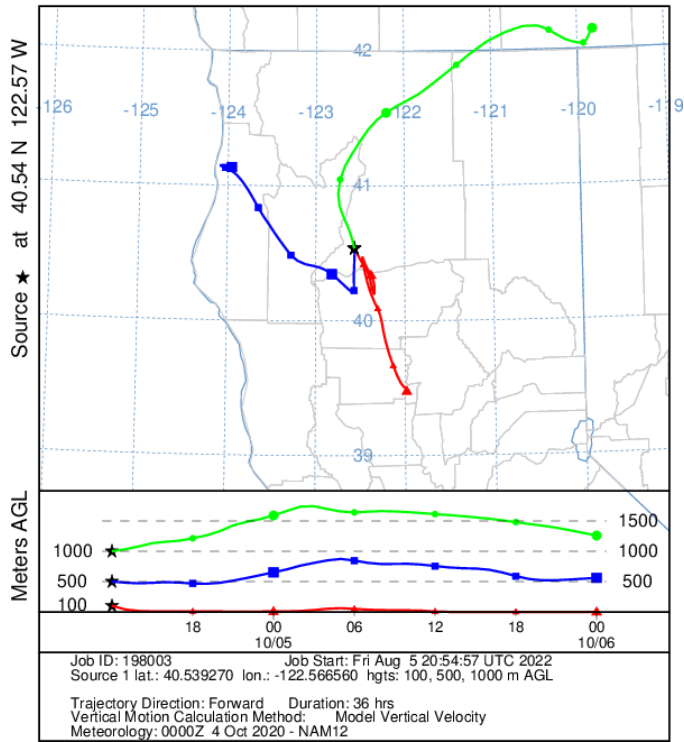
NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 02 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Forward trajectories starting at 1200 UTC 03 Oct 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
 Forward trajectories starting at 1200 UTC 04 Oct 20
 NAM Meteorological Data

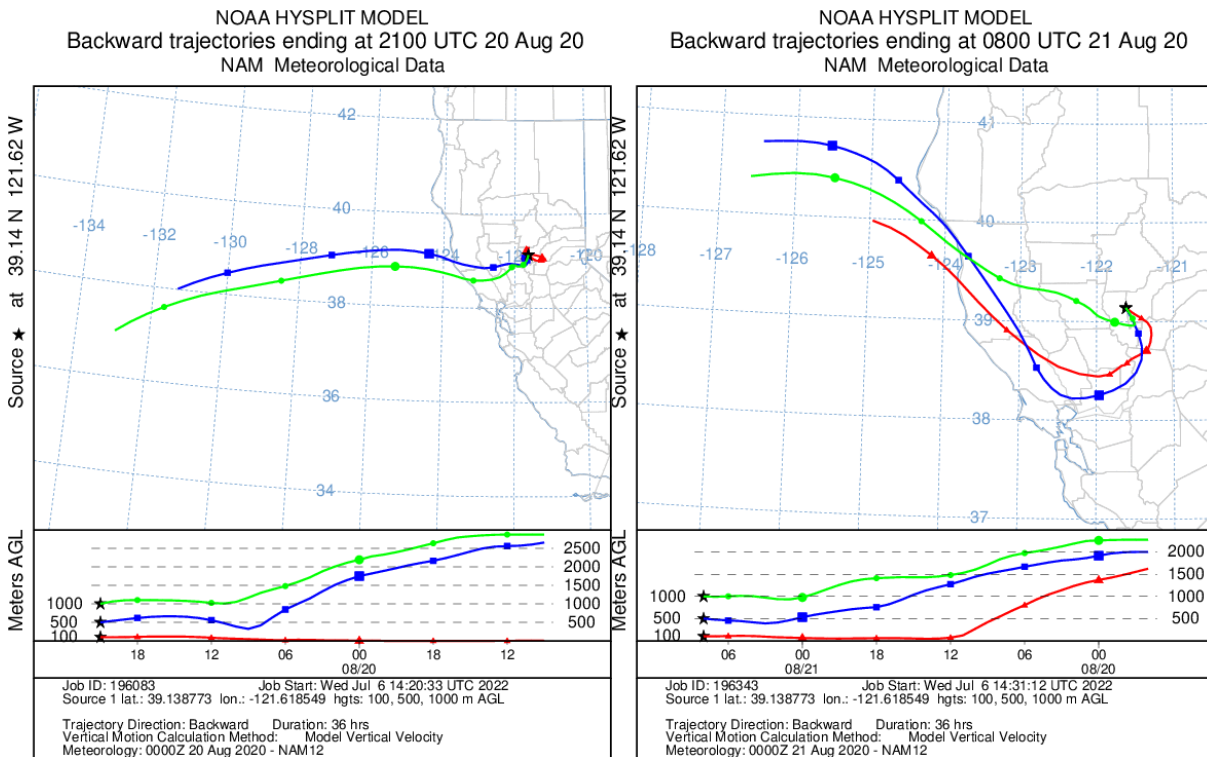


C. HYSPLIT Backward Trajectory (from Monitor)

NOAA's HYSPLIT⁶⁷ model was used to determine simple back-trajectories showing the path that an air parcel took for a specified period of time (here, 36 hours) before reaching the exceeding monitor at Yuba City at the hour of maximum concentration on the exceeding day. Three height levels (red: 100 meters (m), blue: 500m; green: 1000m) were used to indicate transport near the surface and in the mid to upper levels of the atmosphere. Tables indicate the maximum hour of the exceeding day. Both PST (Pacific Standard Time) and UTC (Universal Coordinated Time) are noted.

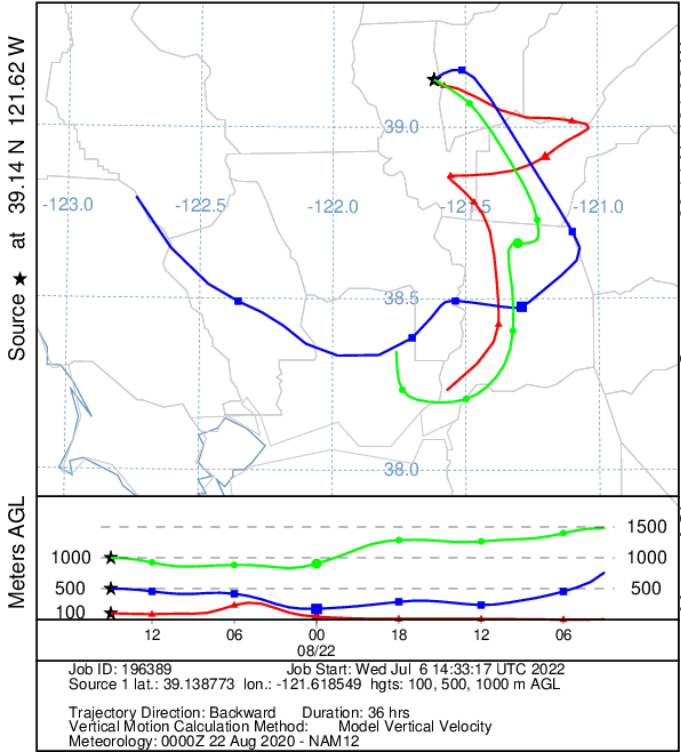
a) August 20-25, 2020

| Date (PST) | Daily Concentration ($\mu\text{g}/\text{m}^3$) | Max Hourly Concentration ($\mu\text{g}/\text{m}^3$) | Max Hour (PST) | DATE (UTC) | Max Hour (UTC) |
|------------|--|---|----------------|------------|----------------|
| 8/20/2020 | 131.2 | 390.0 | 13 | 8/20/2020 | 21 |
| 8/21/2020 | 103.2 | 182.0 | 00 | 8/21/2020 | 08 |
| 8/22/2020 | 86.3 | 114.0 | 07 | 8/22/2020 | 15 |
| 8/23/2020 | 72.4 | 118.0 | 08 | 8/23/2020 | 16 |
| 8/24/2020 | 84.8 | 135.0 | 17 | 8/25/2020 | 01 |
| 8/25/2020 | 46.4 | 80.0 | 18 | 8/26/2020 | 02 |

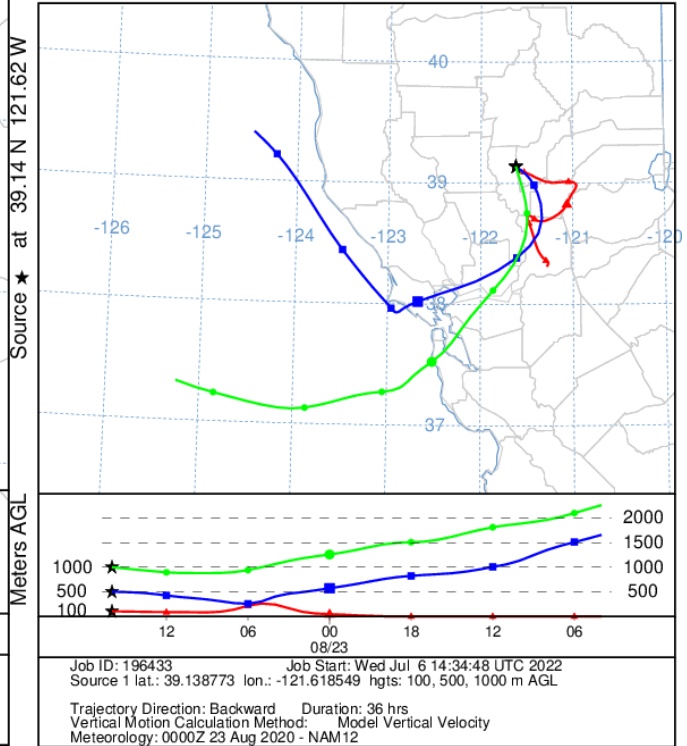


⁶⁷ Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT)

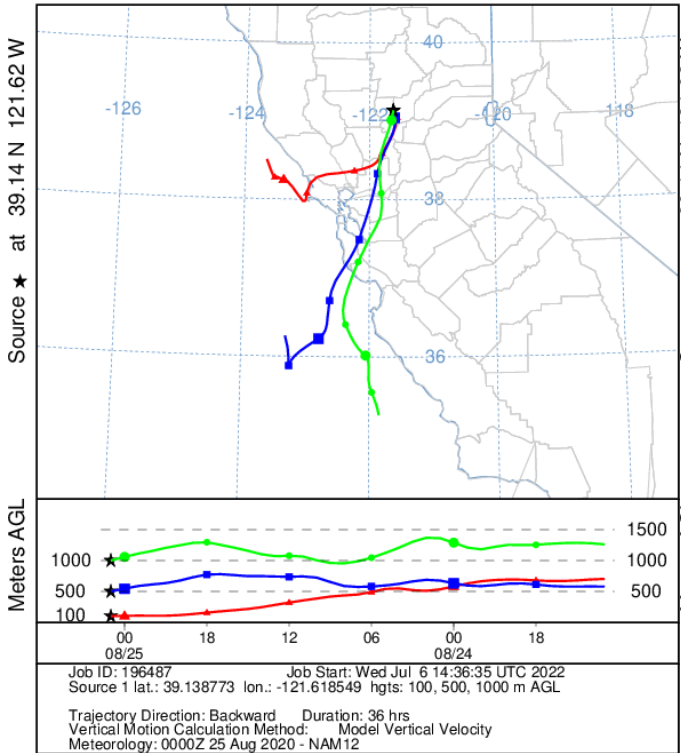
NOAA HYSPLIT MODEL
Backward trajectories ending at 1500 UTC 22 Aug 20
NAM Meteorological Data



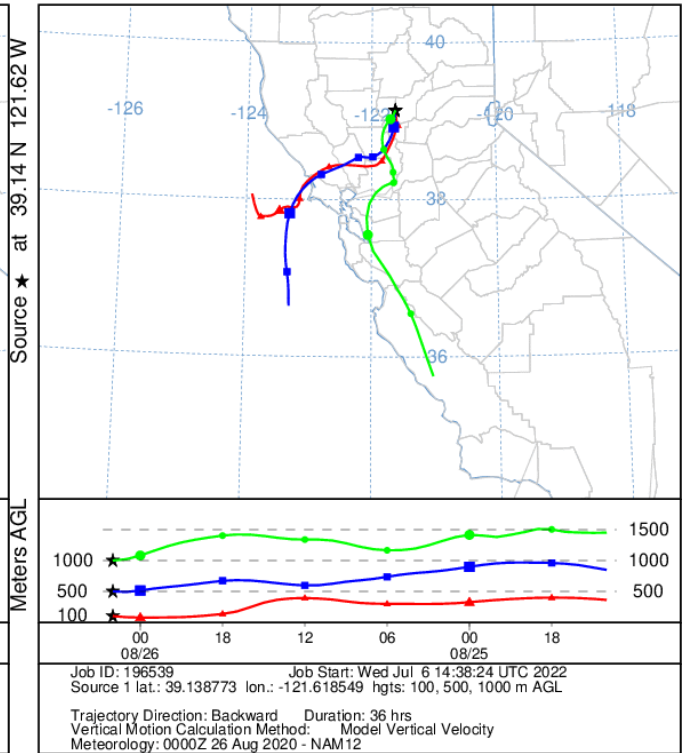
NOAA HYSPLIT MODEL
Backward trajectories ending at 1600 UTC 23 Aug 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Backward trajectories ending at 0100 UTC 25 Aug 20
NAM Meteorological Data



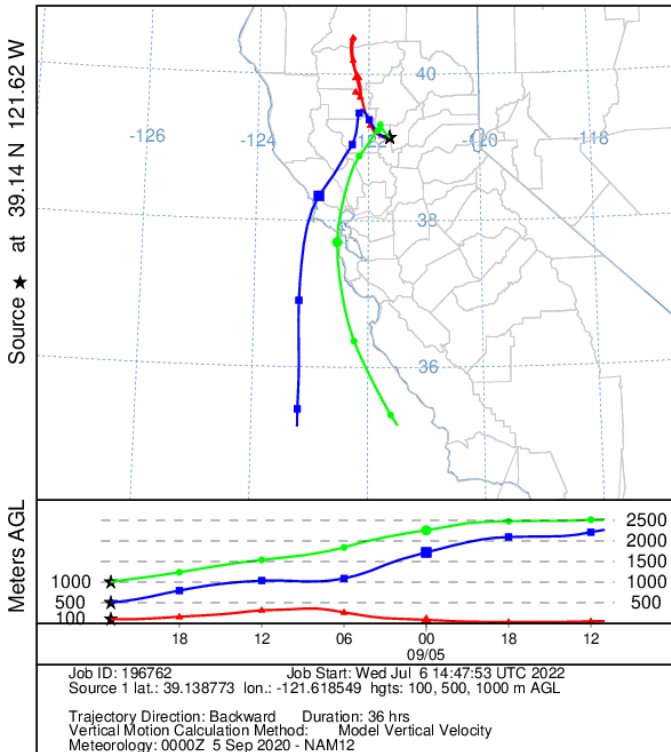
NOAA HYSPLIT MODEL
Backward trajectories ending at 0200 UTC 26 Aug 20
NAM Meteorological Data



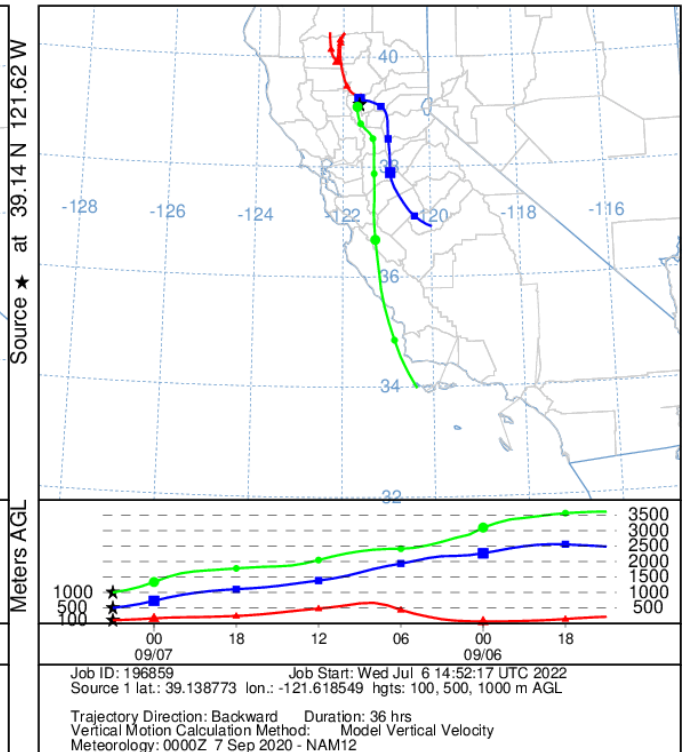
b) September 5-15, 2020

| Date (PST) | Daily Concentration ($\mu\text{g}/\text{m}^3$) | Max Hourly Concentration ($\mu\text{g}/\text{m}^3$) | Max Hour (PST) | DATE (UTC) | Max Hour (UTC) |
|------------|--|---|----------------|------------|----------------|
| 9/5/2020 | 45.2 | 67.0 | 15 | 9/5/2020 | 23 |
| 9/6/2020 | 46.7 | 68.0 | 19 | 9/7/2020 | 03 |
| 9/7/2020 | 48.5 | 83.0 | 12 | 9/7/2020 | 20 |
| 9/8/2020 | 49.7 | 95.0 | 04 | 9/8/2020 | 12 |
| 9/9/2020 | 50.4 | 222.0 | 17 | 9/10/2020 | 01 |
| 9/10/2020 | 103.6 | 195.0 | 16 | 9/11/2020 | 00 |
| 9/11/2020 | 122.8 | 241.0 | 23 | 9/12/2020 | 07 |
| 9/12/2020 | 213.5 | 368.0 | 11 | 9/12/2020 | 19 |
| 9/13/2020 | 252.9 | 404.0 | 19 | 9/14/2020 | 03 |
| 9/14/2020 | 86.0 | 107.0 | 08 | 9/14/2020 | 16 |
| 9/15/2020 | 70.4 | 102.0 | 18 | 9/16/2020 | 02 |

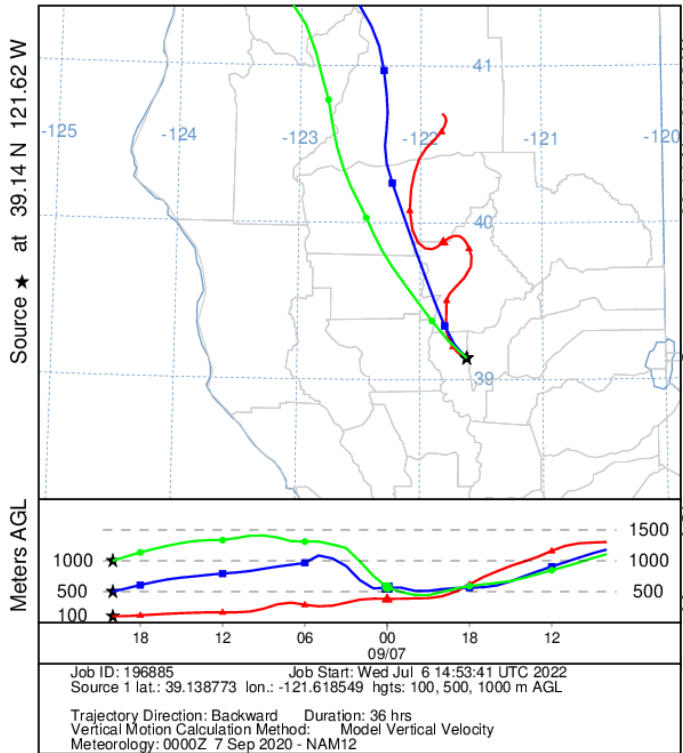
NOAA HYSPLIT MODEL
Backward trajectories ending at 2300 UTC 05 Sep 20
NAM Meteorological Data



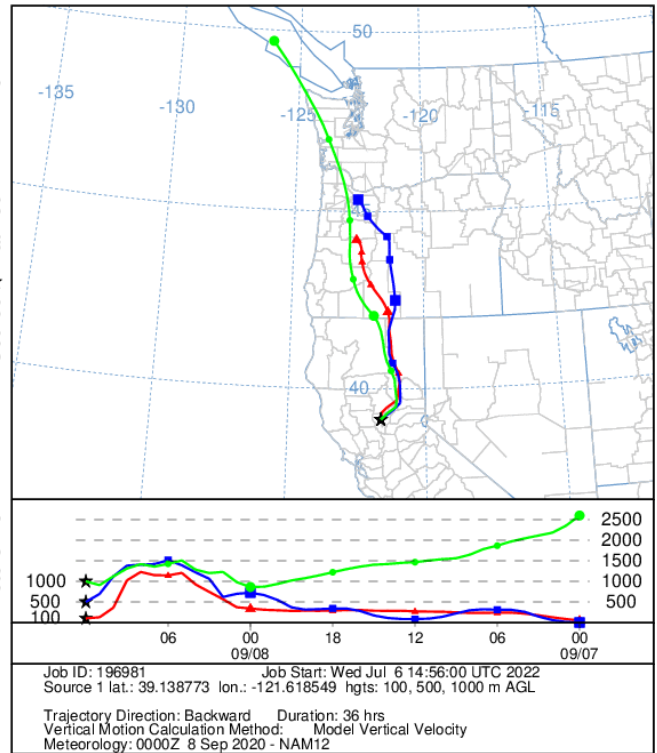
NOAA HYSPLIT MODEL
Backward trajectories ending at 0300 UTC 07 Sep 20
NAM Meteorological Data



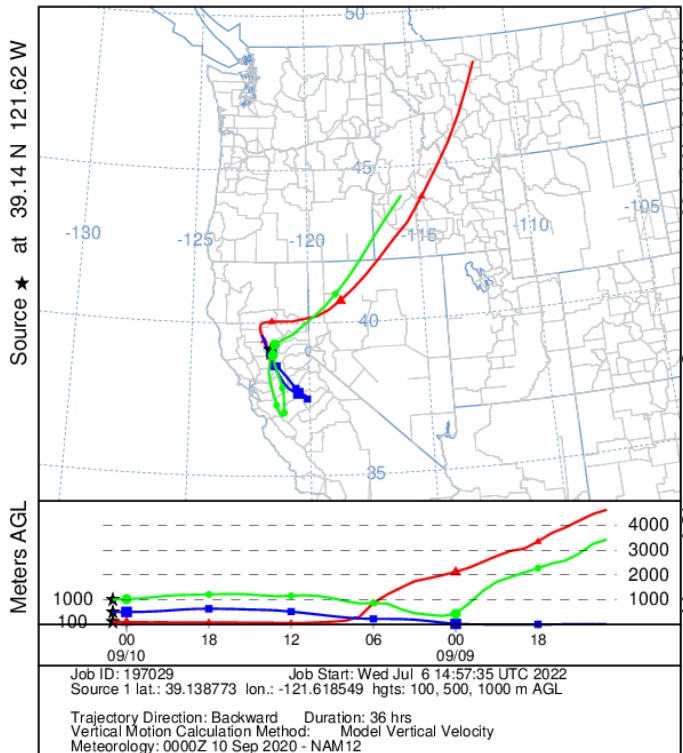
NOAA HYSPLIT MODEL
Backward trajectories ending at 2000 UTC 07 Sep 20
NAM Meteorological Data



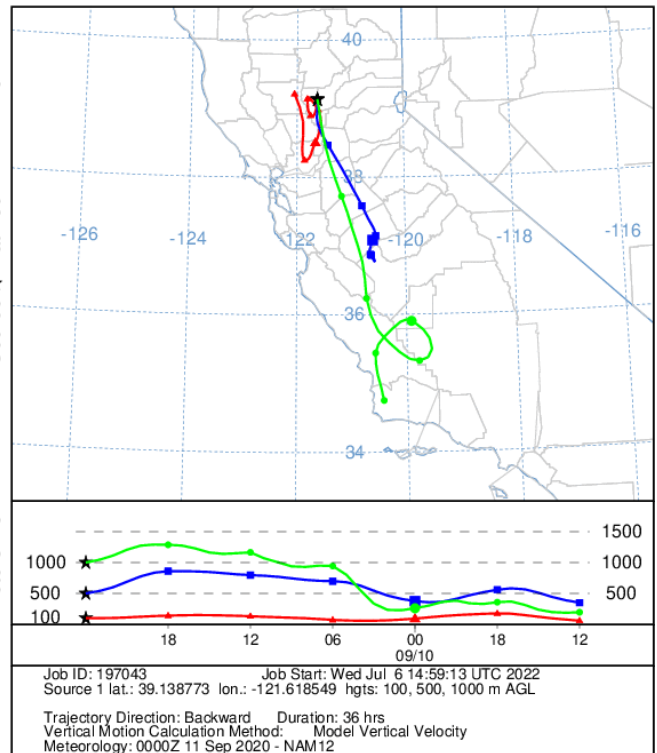
NOAA HYSPLIT MODEL
Backward trajectories ending at 1200 UTC 08 Sep 20
NAM Meteorological Data



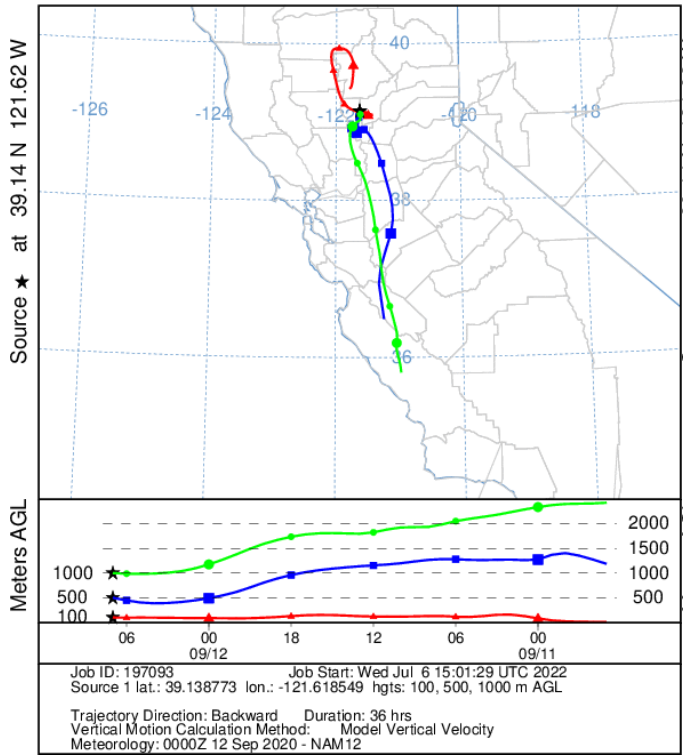
NOAA HYSPLIT MODEL
Backward trajectories ending at 0100 UTC 10 Sep 20
NAM Meteorological Data



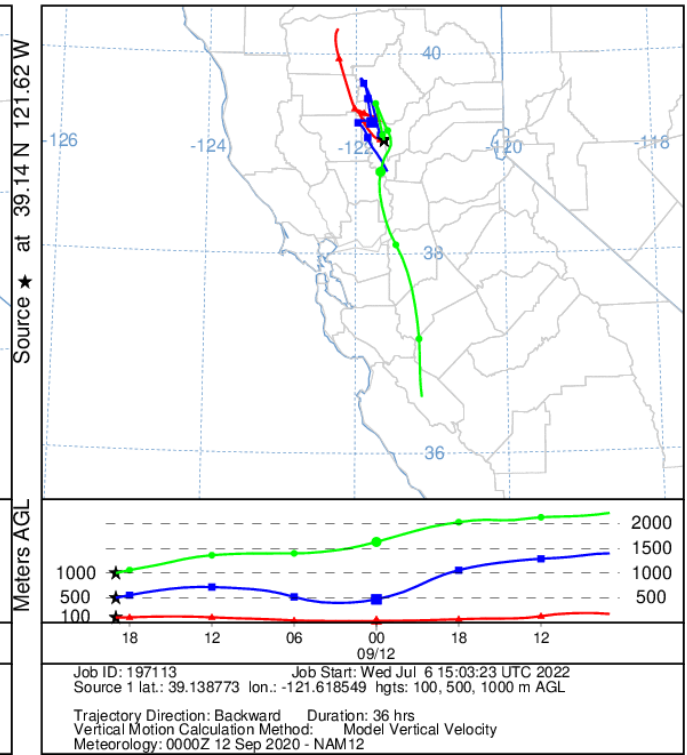
NOAA HYSPLIT MODEL
Backward trajectories ending at 0000 UTC 11 Sep 20
NAM Meteorological Data



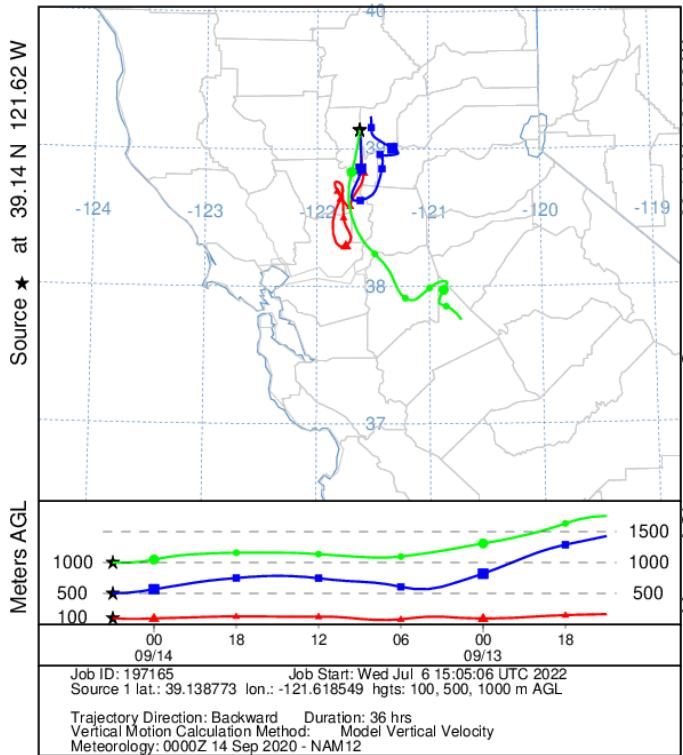
NOAA HYSPLIT MODEL
Backward trajectories ending at 0700 UTC 12 Sep 20
NAM Meteorological Data



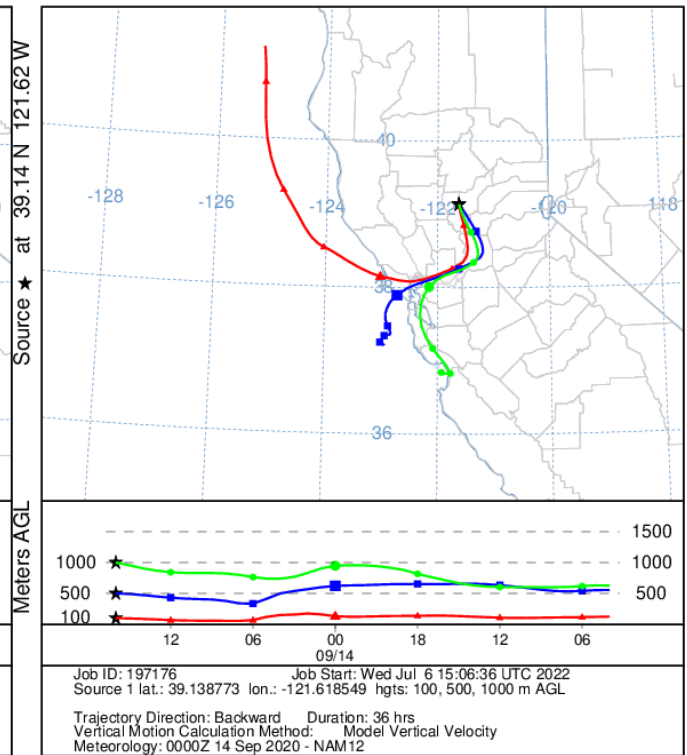
NOAA HYSPLIT MODEL
Backward trajectories ending at 1900 UTC 12 Sep 20
NAM Meteorological Data



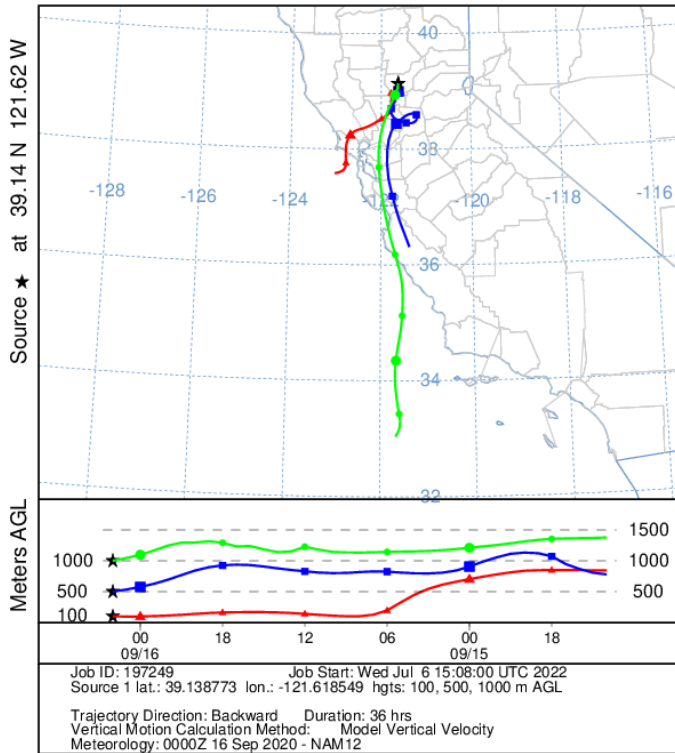
NOAA HYSPLIT MODEL
Backward trajectories ending at 0300 UTC 14 Sep 20
NAM Meteorological Data



NOAA HYSPLIT MODEL
Backward trajectories ending at 1600 UTC 14 Sep 20
NAM Meteorological Data



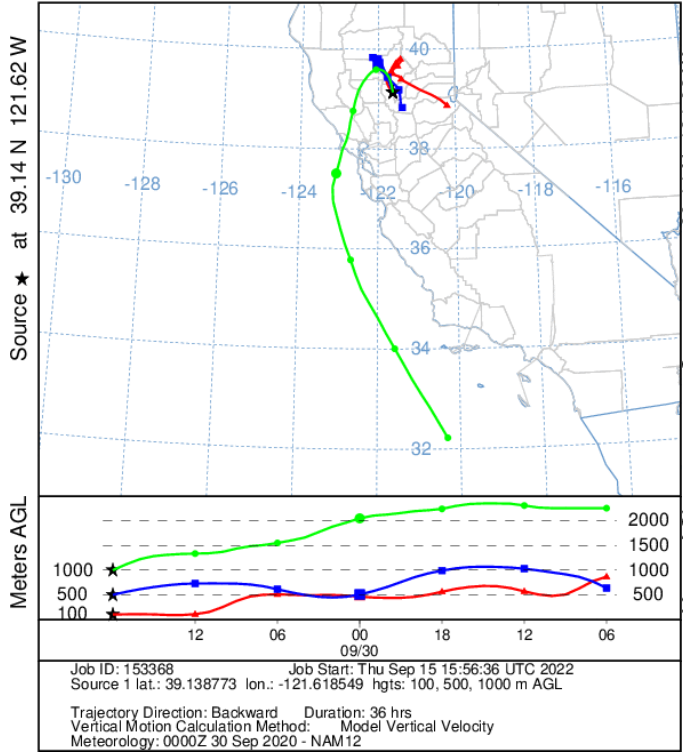
NOAA HYSPLIT MODEL
 Backward trajectories ending at 0200 UTC 16 Sep 20
 NAM Meteorological Data



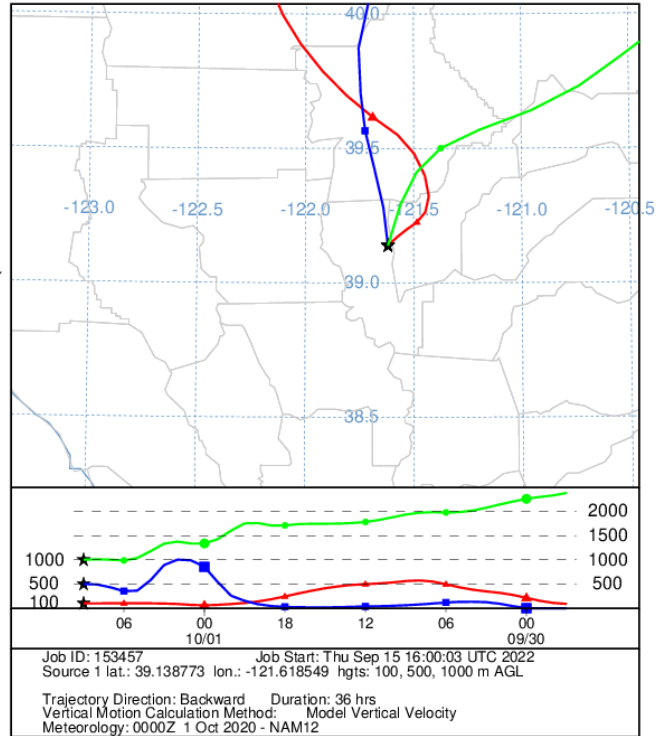
c) September 30–October 4, 2020

| Date (PST) | Daily Concentration ($\mu\text{g}/\text{m}^3$) | Max Hourly Concentration ($\mu\text{g}/\text{m}^3$) | Max Hour (PST) | DATE (UTC) | Max Hour (UTC) |
|------------|--|---|----------------|------------|----------------|
| 9/30/2020 | 62.3 | 128.0 | 10 | 9/30/2020 | 18 |
| 10/1/2020 | 67.7 | 81.0 | 01 | 10/1/2020 | 09 |
| 10/2/2020 | 87.9 | 133.0 | 11 | 10/2/2020 | 19 |
| 10/3/2020 | 91.1 | 107.0 | 00 | 10/3/2020 | 08 |
| 10/4/2020 | 53.8 | 81.0 | 00 | 10/4/2020 | 08 |

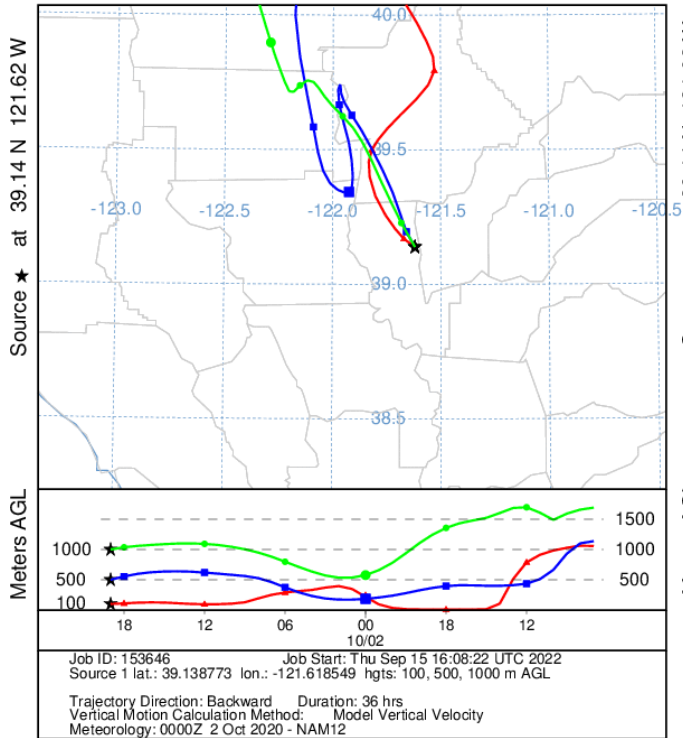
NOAA HYSPLIT MODEL
 Backward trajectories ending at 1800 UTC 30 Sep 20
 NAM Meteorological Data



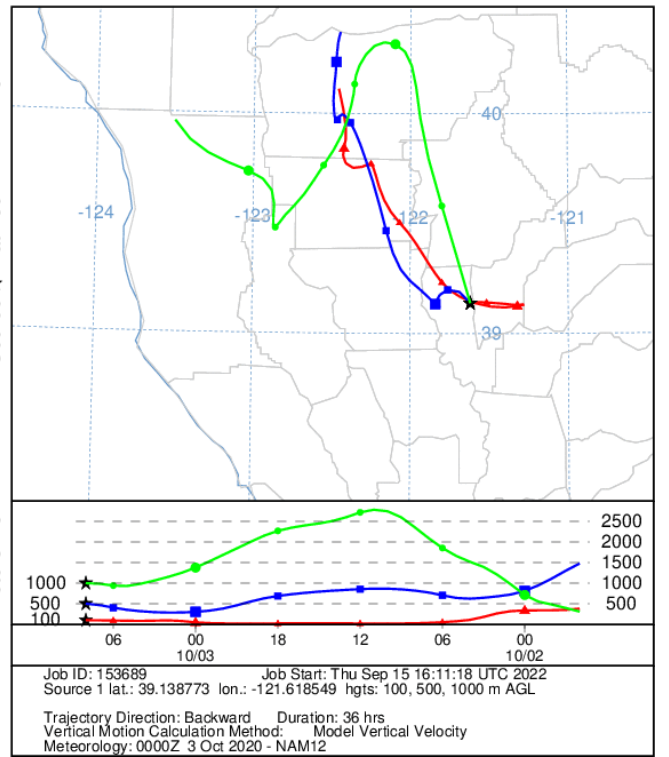
NOAA HYSPLIT MODEL
 Backward trajectories ending at 0900 UTC 01 Oct 20
 NAM Meteorological Data



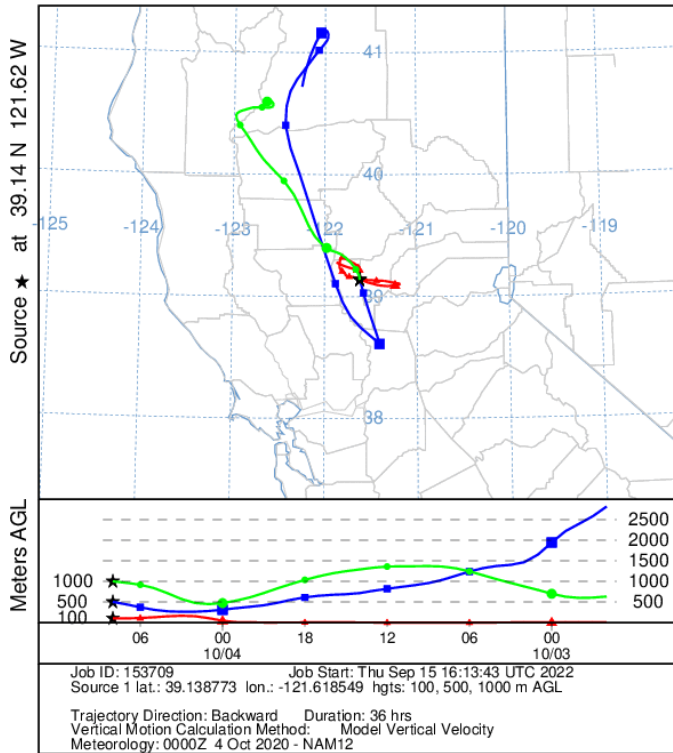
NOAA HYSPLIT MODEL
 Backward trajectories ending at 1900 UTC 02 Oct 20
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Backward trajectories ending at 0800 UTC 03 Oct 20
 NAM Meteorological Data



NOAA HYSPLIT MODEL
 Backward trajectories ending at 0800 UTC 04 Oct 20
 NAM Meteorological Data



IV. Smoke Impacts

A. NOAA Smoke Text Products⁶⁸

The NOAA Smoke Text Product is a text-based analysis of data from multiple satellites. These products are used to give an overall view of smoke origins, current locations, and potential transport, and can supplement information from other media. Observations are generally recorded twice each day, although not all are included here since they do not always provide new information. The majority of these reports highlight the large amounts of smoke issued on an almost daily basis and their impacts on California and the rest of the U.S. Individual areas at the county level are not specifically noted.

a) August 20-25, 2020

Smoke Text Product is unavailable for August 2020.

⁶⁸ NOAA Hazard and Mapping System (HMS), [Fire and Smoke Text Product](#), last accessed 8/31/21

b) September 5-15, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1630Z Saturday, September 5, 2020

Western/Central United States, Southwestern/South-Central Canada, and Northeastern Pacific Ocean...

Widespread large complex wildfire activity was observed in Northern and Central California as well as in north central Oregon, where moderate to heavy density smoke was observed progressing northward. Light to moderate density smoke was also observed off the Northwestern U.S. coast out over the Northeastern Pacific Ocean. Small complex fire activity was observed as well in Southeastern British Columbia Province. Smoke analysis was difficult in parts of Southwestern/South Central Canada and over Montana where a weather system was observed in satellite imagery this morning. A large region of moderate to heavy density smoke associated with the widespread large complex fire activity in the region was observed in parts of Central California in the Eastern San Joaquin Valley near the Sierra Nevada mountain range, most of Northern California, most of Central/Eastern Oregon, Eastern Washington State, most of Western/Northern/Central Idaho, and most of Montana.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1800Z Sunday, September 7, 2020

Western U.S. into Central U.S...

Heavy remnant smoke from yesterday's fires throughout California were moving east across Nevada, Utah, Colorado, and then moving SE into northern Texas and Oklahoma. The same California fires are still emitting moderate to extremely heavy smoke plumes that continue to move towards the east.

[...] Moderate to light density smoke also related to the widespread fire activity also extended off of the Pacific coast of California, over much of the western U.S. and across the northern and central plains prior to engulfing the Great Lakes region and Mississippi Valley.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1530Z Tuesday, September 8, 2020

SMOKE:

Western U.S. into Central U.S./Mississippi and Ohio Valley...

A large area of smoke originating primarily from wildfires in the western U.S (Washington/Oregon/California) dominates a large area west of the Appalachian Mountains with the exception of parts of northeast Nevada, northern/central Utah, most of Montana. Also northern/central Plains/Wyoming/Colorado and parts of northern Utah due to cloud cover. Large wildfires in northern Washington, western Oregon, and central-northern California could be observed emitting moderately dense to dense smoke which covers northern/central-eastern Washington, western Oregon, almost the entire state of California into the Pacific Ocean, western-southern Nevada, southern/central Arizona, central/northern New Mexico, a line from northern Mexico northeast into western Texas/Texas Panhandle and western Oklahoma including parts of the panhandle, southern/eastern Missouri, and a line from eastern Arkansas into central Mississippi and southern Alabama. Areas of light smoke extend further out from the areas above for hundreds of miles. The bulk of the moderate-to-heavy density smoke is dispersing eastward into the Southern/parts of Central Plains into the Ohio/Mississippi Valley following the flow across the region.

Smoke may spread farther north into parts of the central/northern Plains and northern/Ohio Valley/Great Lakes region, but cloud cover obscures the view.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 0230Z Wednesday, September 9, 2020

Western U.S. into Central U.S...

An extensive area of smoke originating primarily from wildfires in the western U.S (Washington/Oregon/California) dominates a majority of the country to the west of the Appalachian Mountains. Extremely dense smoke was observed emitting from fires in northern California, Oregon and Washington streaming westward off shore into the Pacific Ocean. The aforementioned heavy smoke extended from the Oregon coast south to the most northern portions of the Mexican border and encompassed much of California, western Oregon and edged into the borders of Nevada and Arizona. Widespread fire activity in the plains and Mississippi Valley was also producing scattered plumes of heavy density smoke that was partially obscured and interacting with a weather system to the west.

Associated moderate density smoke extended further into the Pacific and also extended into southwestern Canada, western Washington, Nevada, New Mexico, northwestern Mexico and the Baja Peninsula. Additional areas of moderate density smoke that was either transported via weather systems or remnant from previous days' activity was observed streaking from northern Mexico through Texas and into the central plains before the cloud cover obscured visibility. An additional wave of moderate density smoke was observed moving through the Mississippi Valley this evening after clearing the heavy cloud cover to the west. Widespread fire activity in the region may also be a contributing factor to the area of light to moderate density smoke in the area.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1530Z September 10, 2020

Western United States/Central United States/Eastern Pacific Ocean....

The large number of wildfires over the western United States continues to produce a large area of high density smoke that extends along coastal regions, and just inland of the entire western United States, from the northern Baja to the Pacific northwest. The high density smoke that extends offshore into portions of the northeast Pacific Ocean. Another area of lighter density smoke then extended from the southwest and into portions of the Central and Southern Plains.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1610Z September 11, 2020

Western U.S./Pacific...

Ongoing large wildfire complexes in California, Oregon, and Washington continued to produce very large areas of moderate to thick density plumes that cover most of the West and parts of the northeastern Pacific Ocean. The thickest plume areas were found from off the Oregon coast southeastward and covered much of California and Arizona, northwestern Mexico and adjacent Pacific coastal waters, and parts of Nevada and New Mexico.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1746Z September 12, 2020

Very Large Area from the Eastern Pacific, Western United States extending through the southwest and into the Southern Plains, northwest Gulf of Mexico and northeast towards the Upper Midwest....

The ongoing very large wildfires burning primarily in Washington, Oregon, and California were producing a very large area of moderate to high density smoke that was extending from as far east as portions of the Midwest US and then extending southwest through the Southern Plains and Southwest United States and then through the West Coast States from California north to Washington. The smoke then extended offshore into portions of the eastern and northeastern Pacific Ocean.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0200Z September 13, 2020

Eastern Pacific/Much of the Lower 48/Northwestern Mexico/Western Gulf of Mexico/Southern Canada...

The massive area of smoke from the major wildfires burning primarily in Washington, Oregon, and California continued to be visible over a huge area stretching from the eastern Pacific well off the West coast of the U.S. and off the Baja coast eastward and inland over the Western U.S. and across a good portion of the lower 48 and southern Canada to off the Northeast U.S. coast. Smoke also affected the western Gulf of Mexico and northwestern Mexico. The only areas which were relatively smoke free were parts of the Southeast, Middle Atlantic, and the Northeast, along with a swath of the Dakotas, western Nebraska, Colorado, and Wyoming. Very thick smoke was present over portions of the eastern Pacific, much of the Western U.S. along with the Southwestern and South Central U.S. with a narrow band of moderate density smoke extending as far to the northeast as the Great Lakes region. Additional somewhat smaller moderate to thick density smoke plumes were seen with wildfires scattered around southern British Columbia, Idaho, western Montana, and northeastern Utah.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1730Z September 13, 2020

Central and Western U.S./Pacific Ocean...

Ongoing large wildfire complexes in California, Oregon, and Washington continue to produce a very large plume that covers much of the central and western U.S. and the eastern Pacific Ocean. A light to moderate density plume extends from the Dakotas to the Great Lakes. Another light to moderate density plume covers Oklahoma northeastward to the Ohio Valley. The densest plumes over the western U.S. extend from the Northern Rockies to the Pacific Northwest, then southeastward through Oregon and California, then eastward over Arizona, New Mexico, and the Texas Panhandle. A plume ranging from light to heavy density is entrained into an upper level low pressure system over the northeastern Pacific Ocean. A light to moderate density plume extends southwest off the southern coast of California southwestward into the tropical Pacific east of Hawaii.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0200Z September 14, 2020

Wildfires in Oregon and California continued to emit huge quantities of very thick density smoke during the day. Somewhat smaller but still significant smoke plumes were also visible from wildfires in Washington, Idaho, western Montana, northeastern Utah, and northern Colorado. The result of this major wildfire activity occurring now for many days is an enormous area of smoke which covers a good portion of the eastern Pacific extending more than 1,500 miles off the West coast as well as much of the lower 48, southern Canada, and northwestern Mexico. Relatively smoke free parts of the lower 48 include a sliver encompassing southern Utah, northern Arizona, northern New Mexico, southern Colorado, northern Kansas, northern Missouri, and central Illinois. Also, the area from southern Texas eastward over much of the Southeast and northward from there to the Mid-Atlantic

appeared to be relatively free of smoke as well as northern New England. Very dense smoke is blanketing much of the eastern Pacific, as well as virtually all of California, Oregon, and Washington. The northern portion of this area of dense smoke extends up over Western Canada as far east as Manitoba and across the the northern third of the U.S. reaching as far east as the Great Lakes region. The southern branch of the dense smoke stretches northeastward from the Southwestern U.S. and Northwestern Mexico over the Central and South Central U.S. to as far east as the Ohio Valley.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1730z September 14, 2020

U.S./Southern Canada/Pacific...

Large wildfire complexes in Oregon and California continue to spread a very large area of smoke across the much of the U.S. and parts of southern Canada. A thin density plume is found extending from Newfoundland southwestward to New England, the Ohio/Tennessee Valley, and Kansas/Oklahoma. A moderate density plume is located over the Great Lakes, the Upper Mississippi Valley, the Northern Plains, the Northern Rockies, and a large part of British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario. Over the southern Rockies, Desert Southwest, northwestern Mexico, and into the subtropical Pacific extending several hundred miles offshore, a light to moderate density plume is detected. Over the northeastern Pacific, a light to moderate density plume is entrained into a low pressure system. The thickest plume is found extending from southwestern Manitoba westward to southeastern British Columbia, and continuing over eastern Washington, western Idaho, most of Oregon, a large part of California, and northwestern Nevada.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0206z September 15, 2020

U.S./Southern Canada/Pacific...

The large wildfires that continue to burn over California and Oregon have produced a tremendous area of smoke covers most of the United States and southern Canada. Within this tremendous area of smoke, a large area of high density smoke extended from portions of the Upper Midwest extending west through the Northern Plains, northern Rockies, Pacific Northwest, southern Canada and offshore into the northeast Pacific Ocean. The high density smoke then also extended through all the West Coast states from California to Washington and offshore into the eastern Pacific Ocean west of southern California.

c) September 30-October 4, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1730z September 30, 2020

California/Pacific NW/Western Canada/Alaskan Panhandle/Northeast

Pacific...

Major wildfires throughout central and northern California continue to produce moderate to thick smoke this morning. The region of light to moderate smoke, with a couple thick areas of smoke, blankets an area from southeastern Alaska to northwestern Montana and southern Alberta to central California and into the northeastern Pacific Ocean. The thickest smoke was observed emanating from the western flank of the SQF Complex, the Wolf, the August Complex and the Bear Fires. Much of the smoke was moving off the California coast and then mainly to the north-northeast along the eastern periphery of a cyclone in the Gulf of Alaska, with some drawn west into southeastern Alaska.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1800z October 1, 2020

California/Pacific NW/Western Canada/Northeast Pacific...

Wildfires throughout central and northern California continue to produce a large area of smoke that extends from California north through the entire West Coast and over the Pacific Northwest the smoke extended east into the Northern Rockies. The moderate density smoke within this plume was inland over California extending north northwest up the Pacific Coast into western Oregon, southwest Washington, and most of Idaho.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1720z October 2, 2020

Large wildfires continue to rage in California, Texas, and on the Colorado/Wyoming border. An area of dense smoke was observed over Northern California running South to Central California. A large area of moderate smoke covers most of California, Western Oregon, and Southern Washington. A second moderate density smoke band is observed in Northern Idaho running West across Northern Washington, and southwestern Canada. Light Density smoke covers most of California and Oregon, all of Washington and Southwestern Canada.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1810z October 3, 2020

California/Pacific NW/Western Canada/Northeast Pacific/Northwestern

Mexico...

Major wildfires throughout central and northern California continue to produce heavy smoke this morning. Moderate and heavy density smoke is observed over central California and covers most of northern California extending west offshore into the Pacific Ocean. An area of light density smoke covers all of California, southwestern Arizona, western and northern Nevada, most of Oregon, western Washington, and northwestern Mexico. The light density smoke extends approximately 700 miles off the coast over the open waters of the Pacific.

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1630Z October 4, 2020

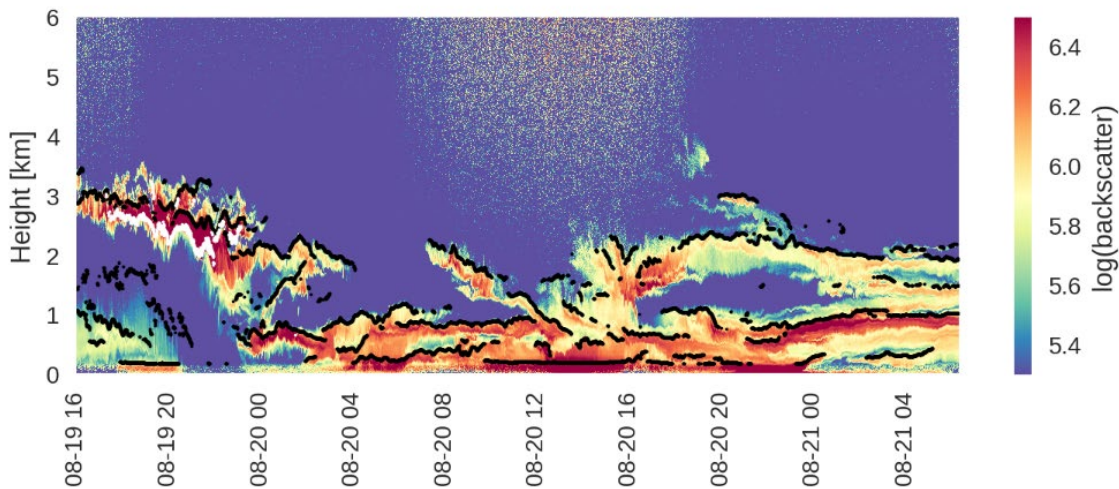
Widespread fire complex activity continues to be observed in parts of Northern/East-Central California and a large region of moderate to heavy density smoke was observed from the large fire complexes. Moderate to heavy density smoke was observed over most of Northern California as well as over most of the San Joaquin Valley and southward over Central California. Moderate to heavy density smoke was also observed both well to the Southwest of the California coast several hundred miles southwest offshore over the Eastern Pacific Ocean and as well as to the Northeast/East of the region over parts of the Inter Mountain West and Northern Rockies including Western Nevada, Southern Oregon, Eastern Washington State, North Idaho, Montana, and Wyoming. The smoke is progressing around a strong high pressure system present over the Western United States.

B. Ceilometer Data

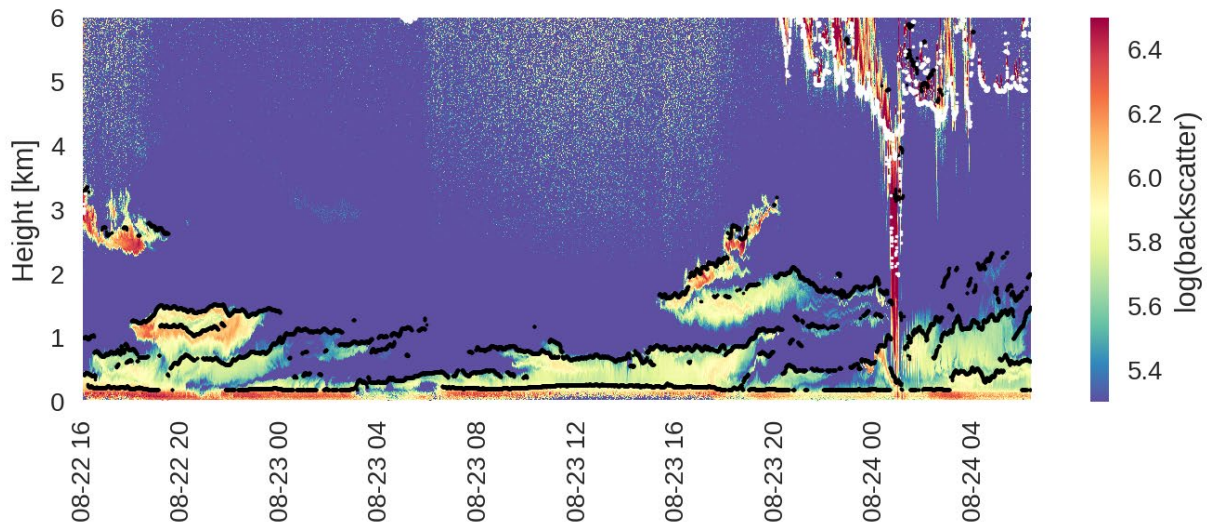
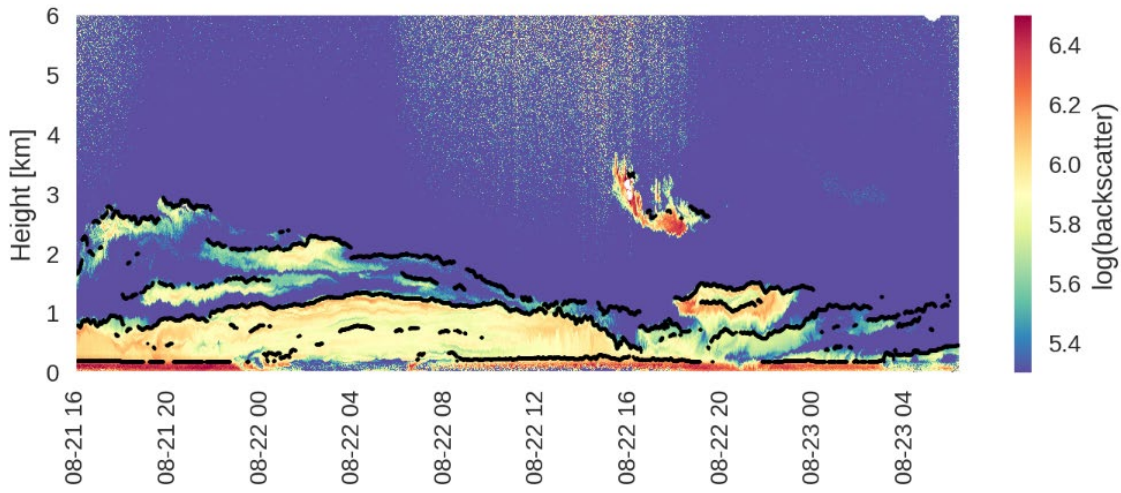
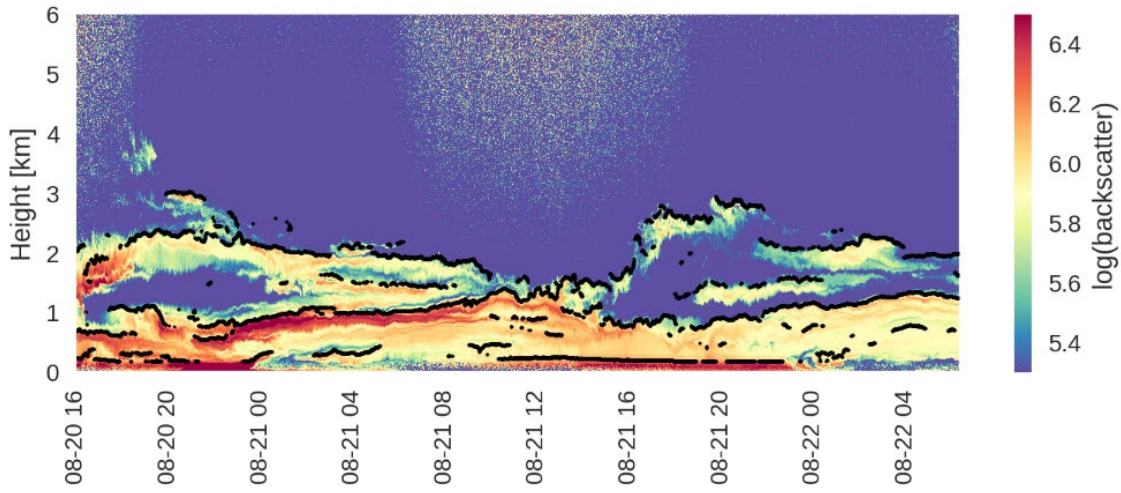
A ceilometer is an automatic, active, remote-sensing instrument primarily for detecting the presence of clouds overhead and measuring the height of their bases.⁶⁹ LiDAR ceilometers are also able to detect aerosols such as wildfire smoke aloft, with the density of aerosols being relative to the measured backscatter values. The previous example in Figure 56 shows a typical ceilometer backscatter plot with clouds between 2-4km during the afternoon of April 20 and otherwise clean air.

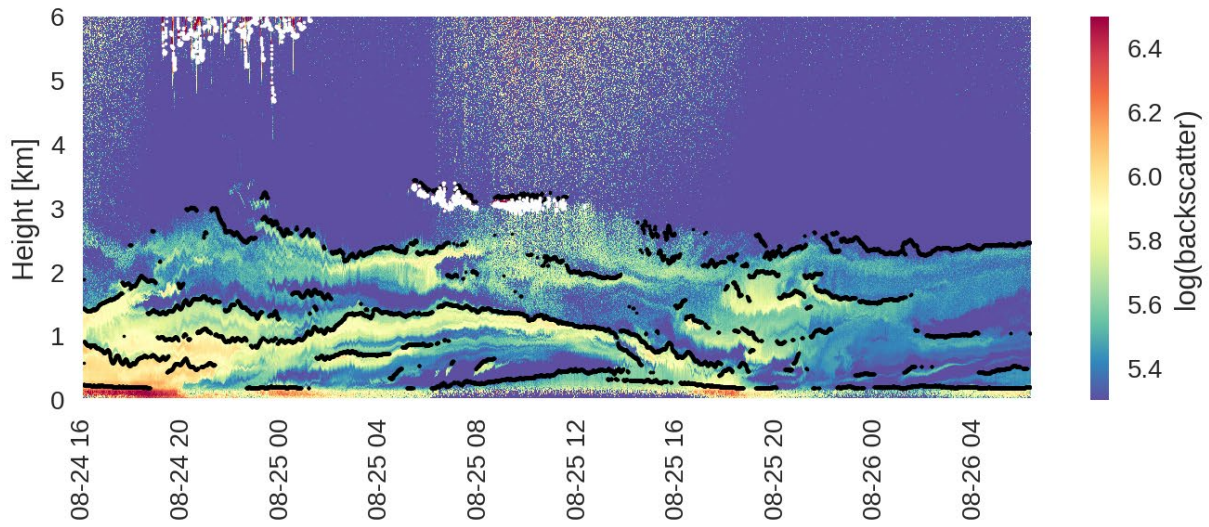
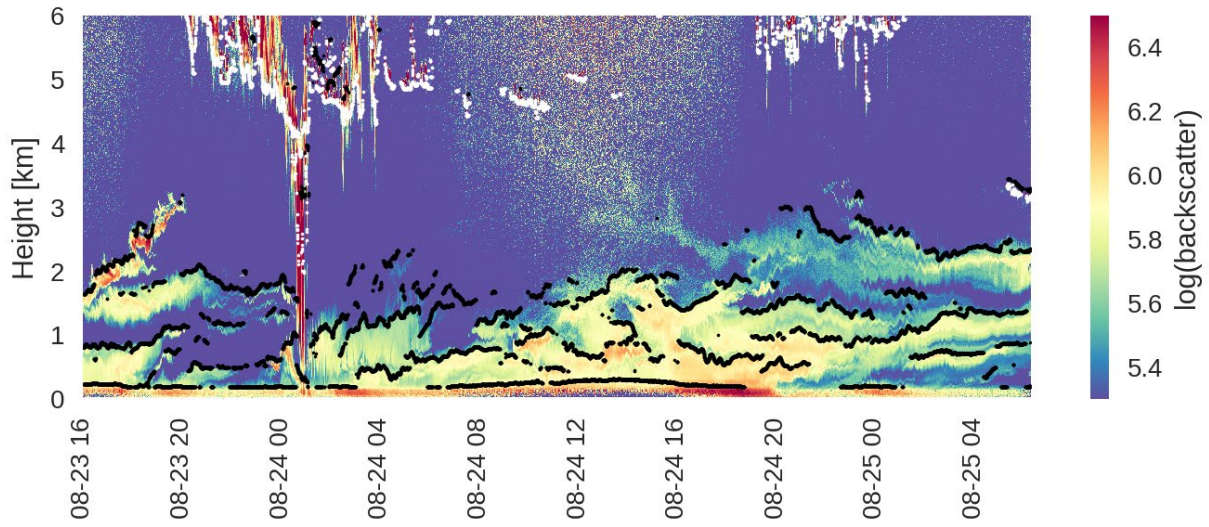
The following ceilometer data images indicate that there was well mixed wildfire smoke below 1km altitude (with some periods smoke reaching up to 3km altitude) at Yuba City during the three event periods. Some days show less smoke in the upper atmosphere, but all show smoke at surface level.

a) August 20-25, 2020

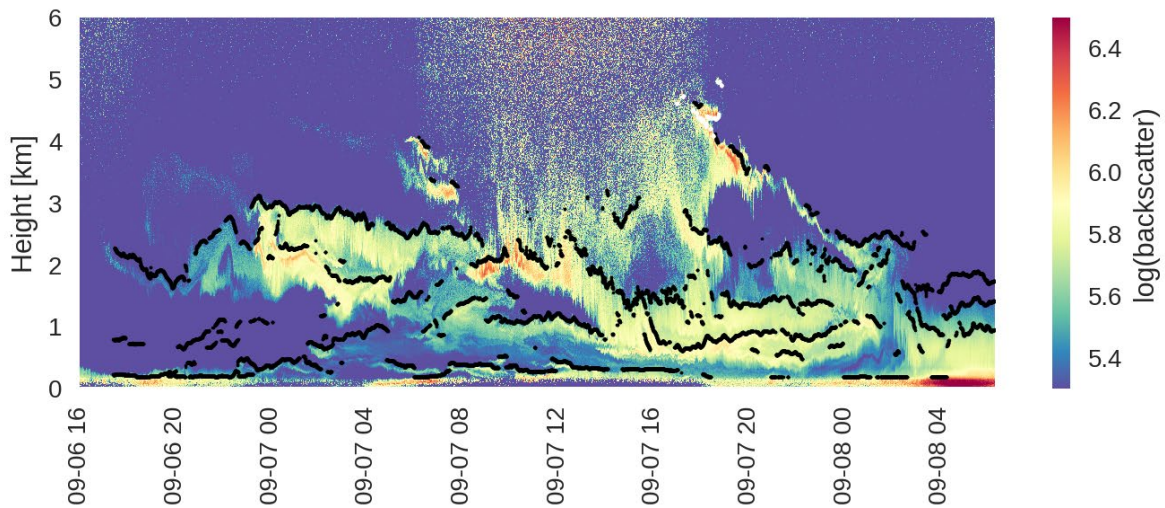
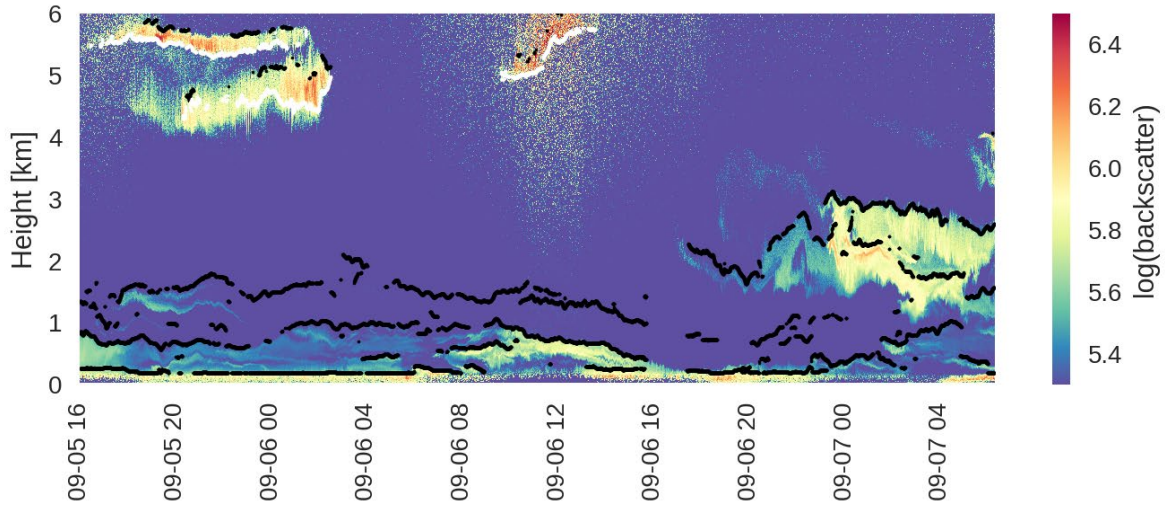
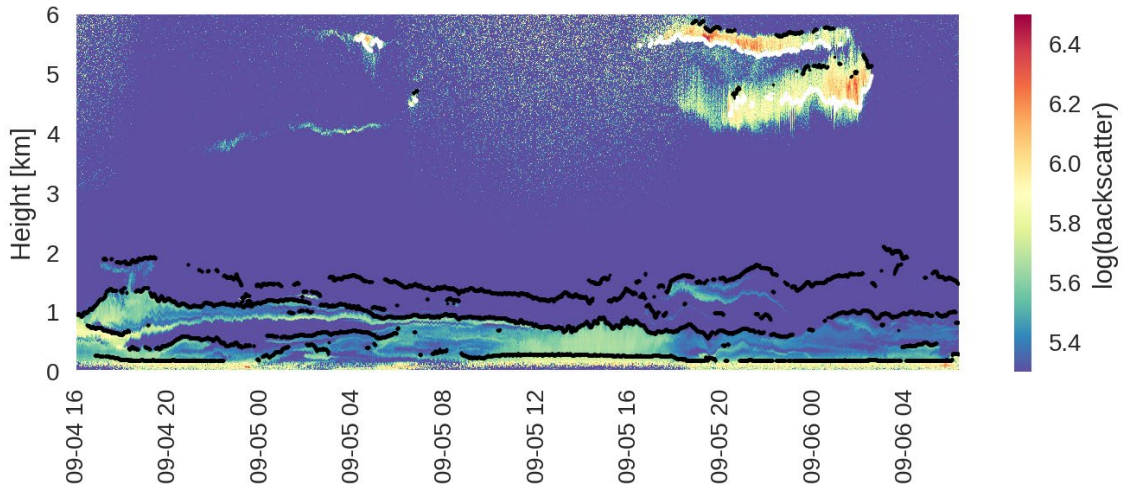


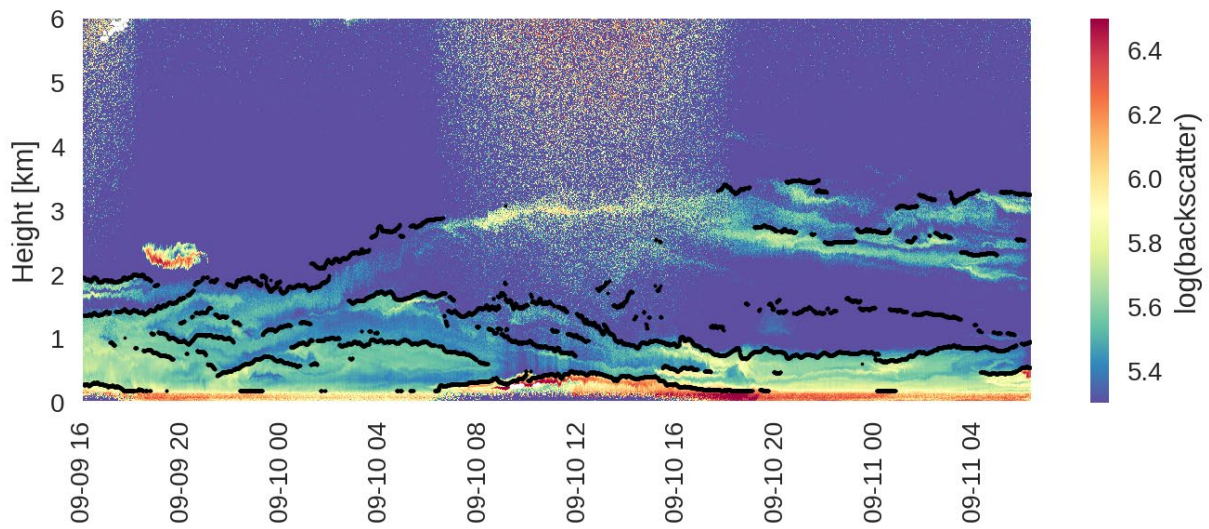
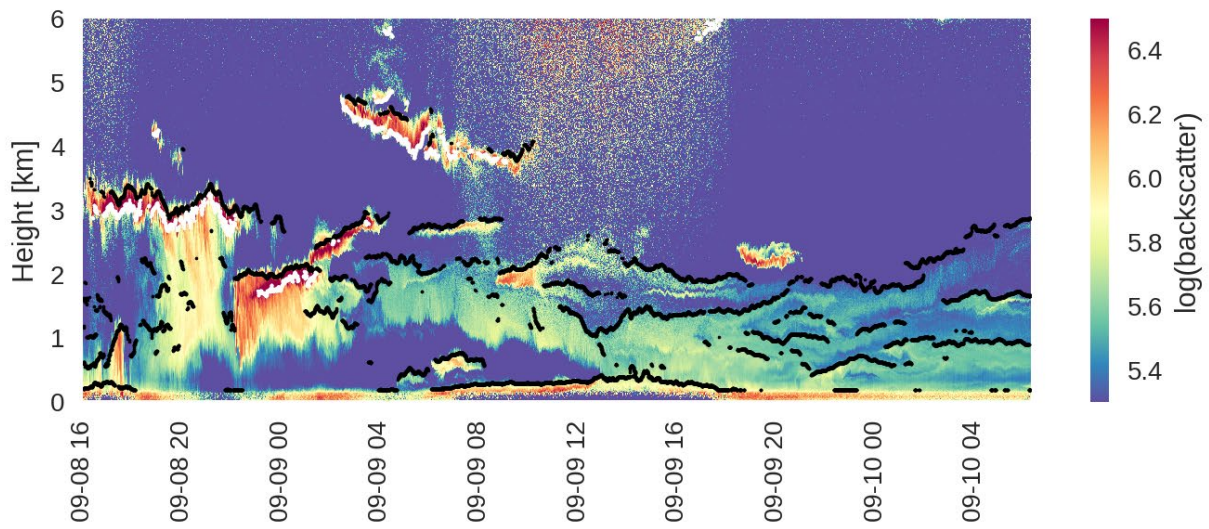
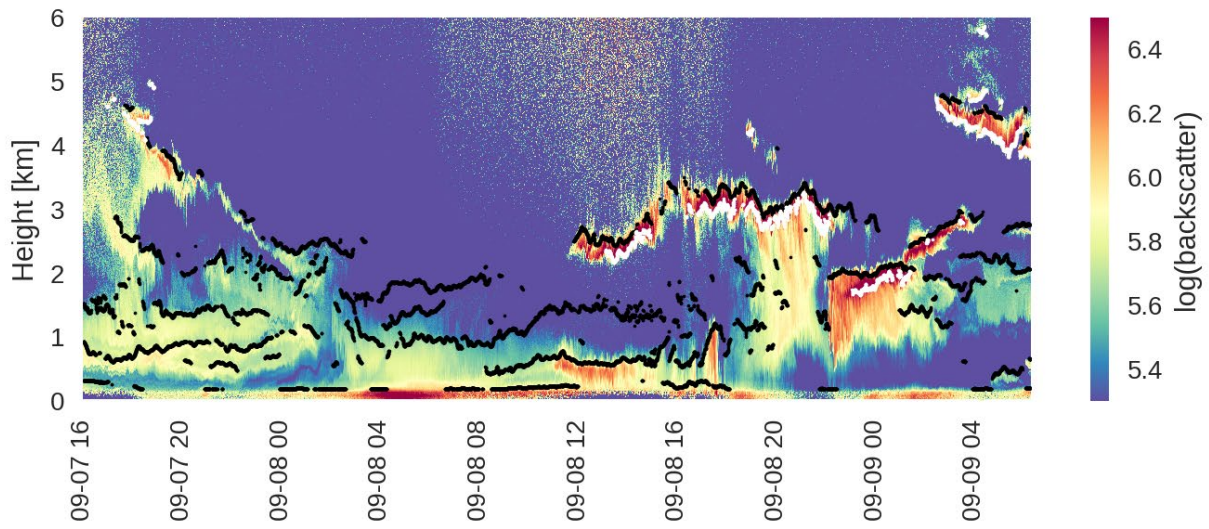
⁶⁹ <https://glossary.ametsoc.org/wiki/Ceilometer>, accessed 10/19/21

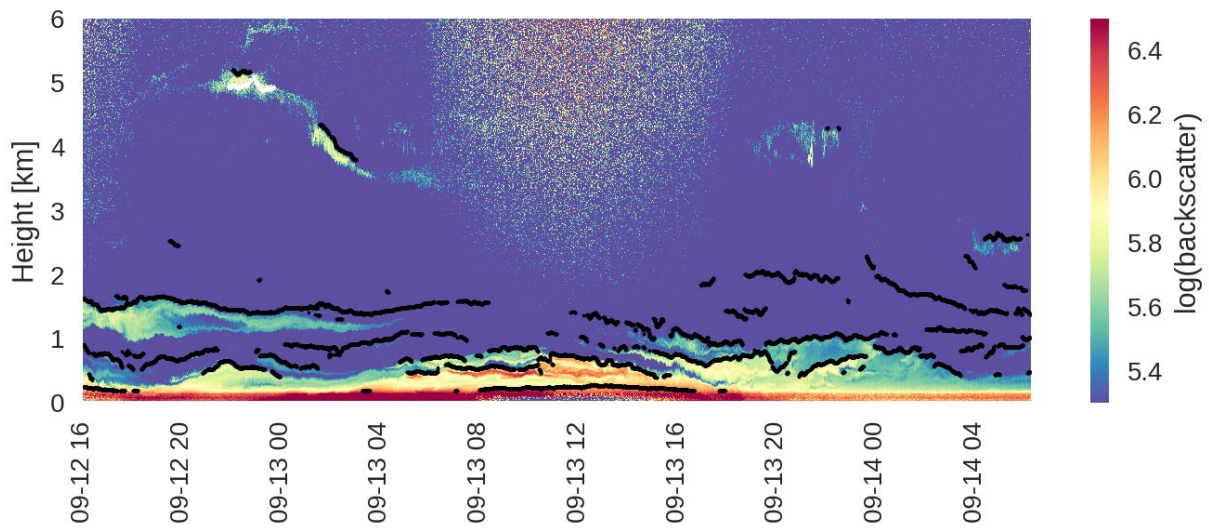
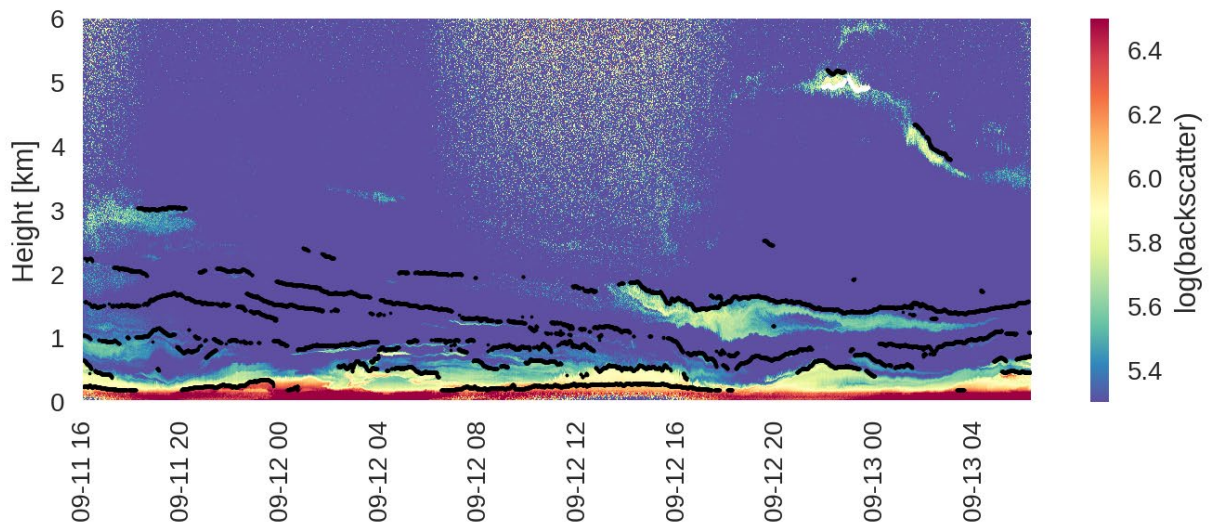
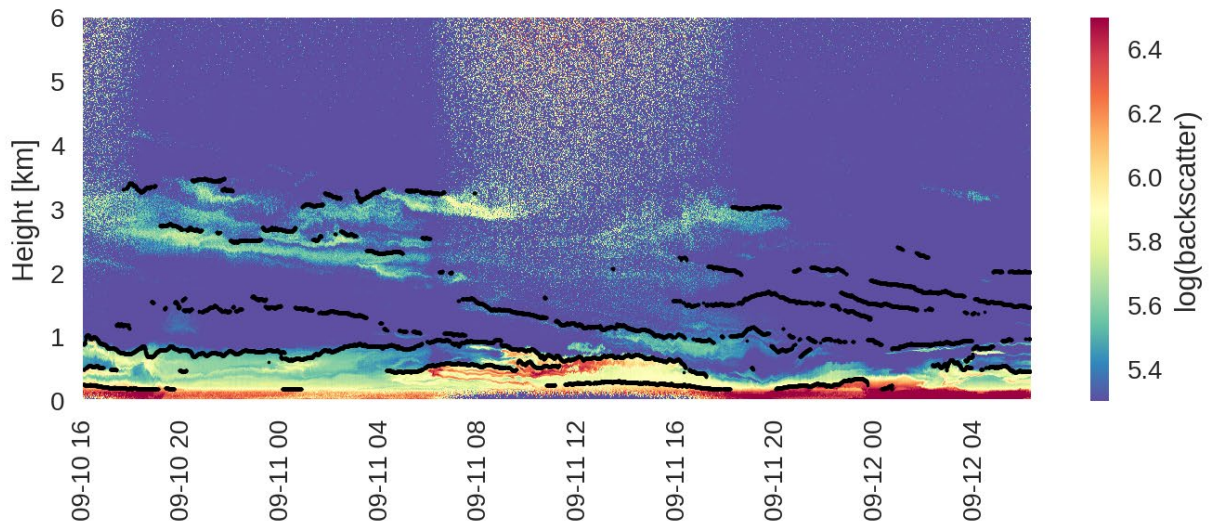


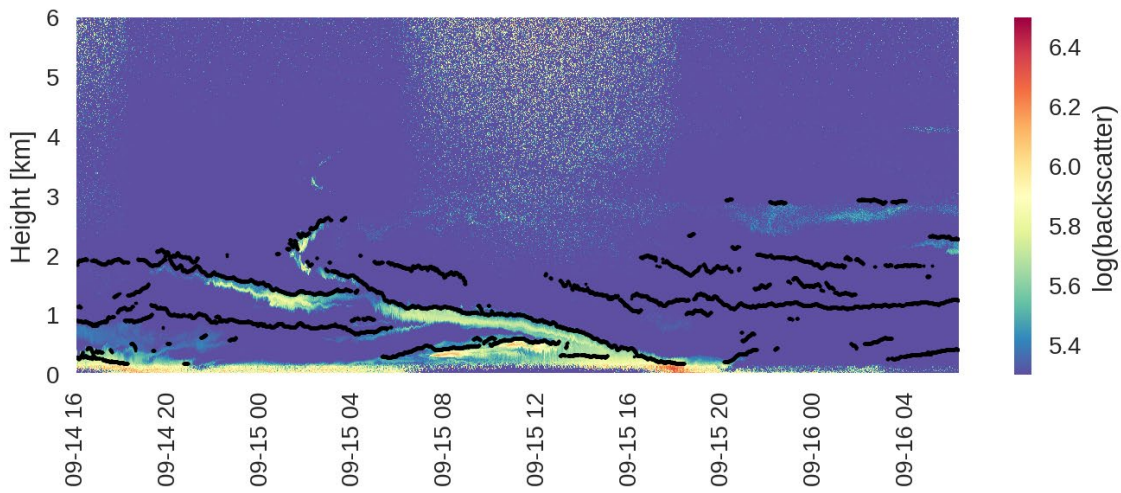
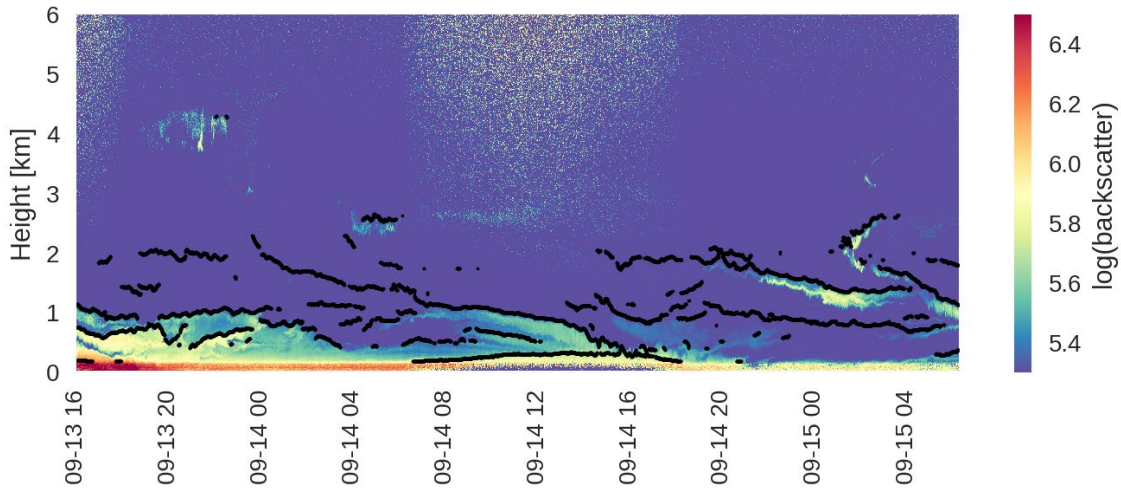


b) September 5-15, 2020

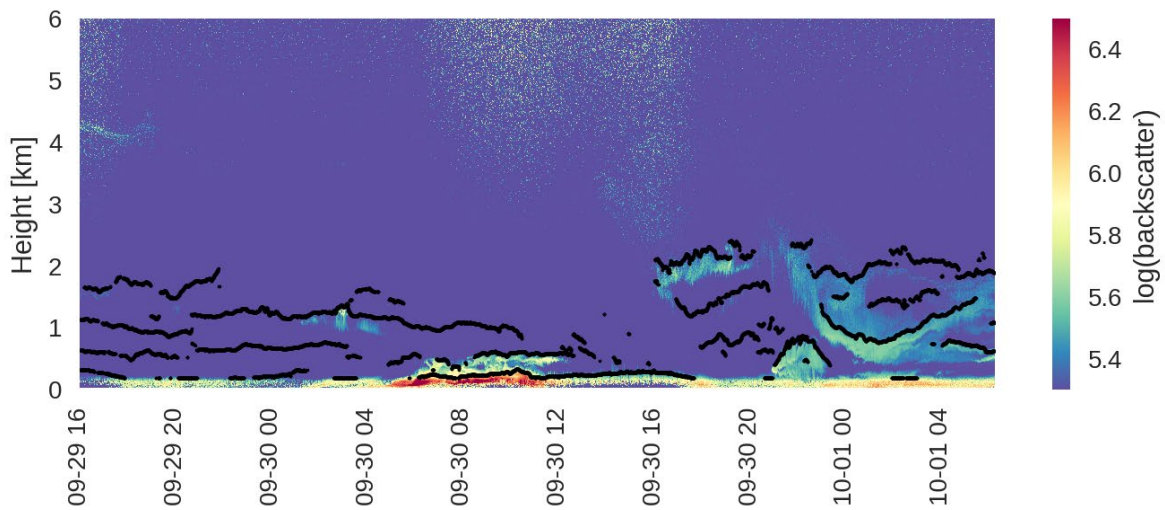


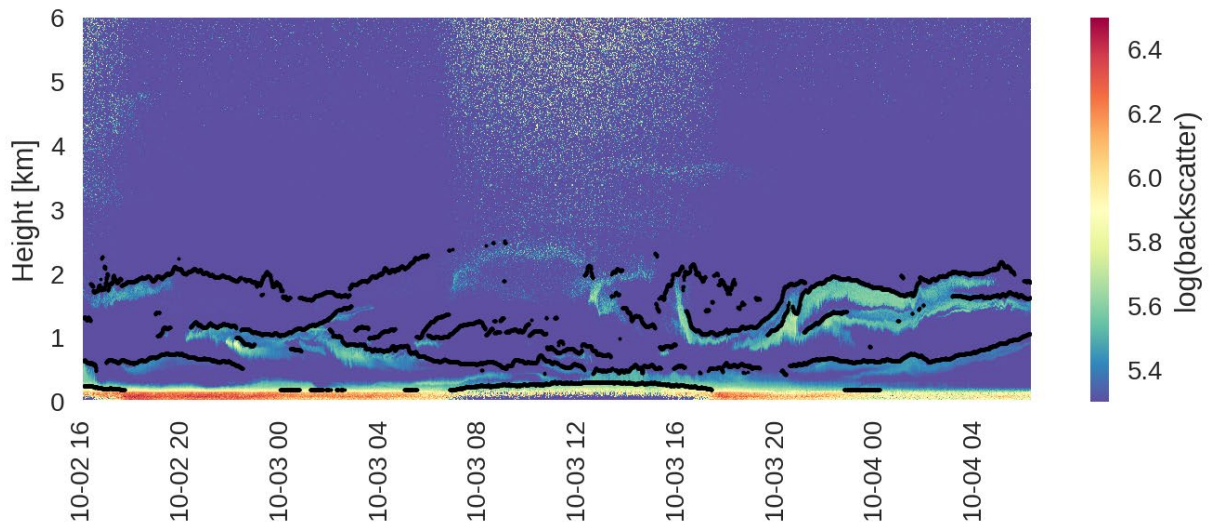
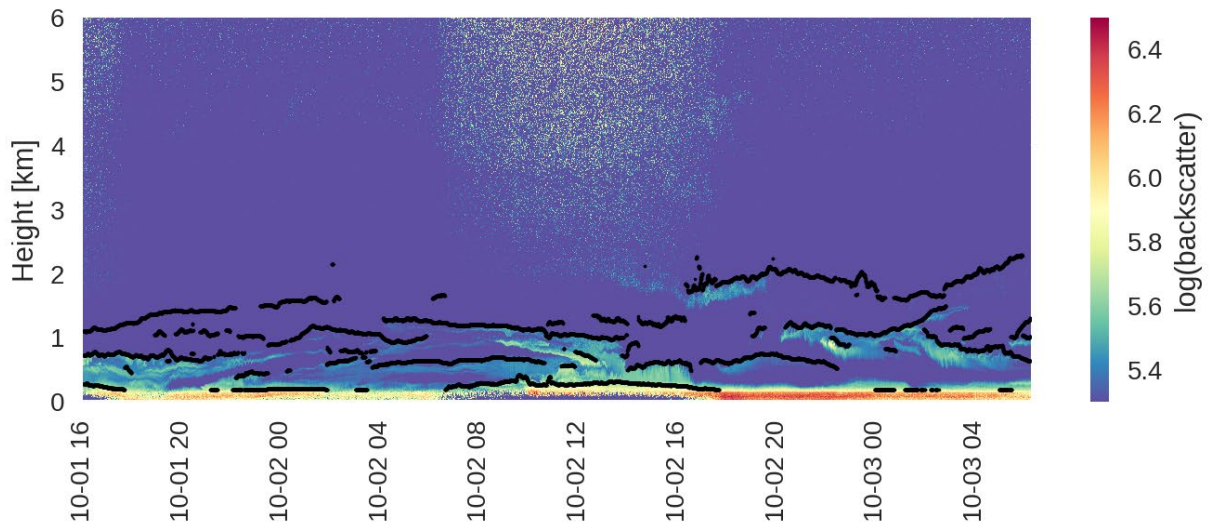
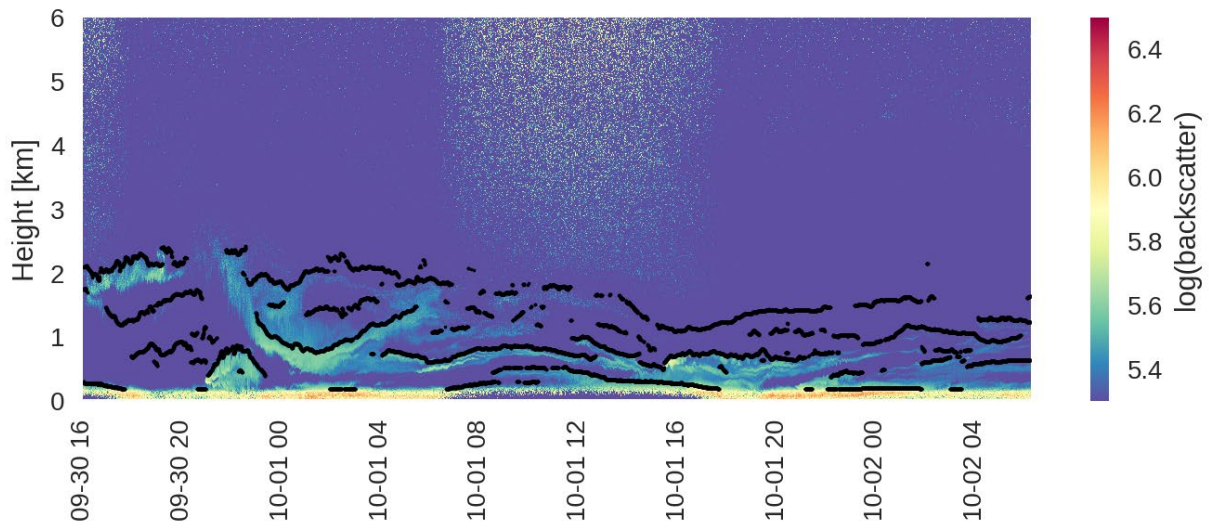


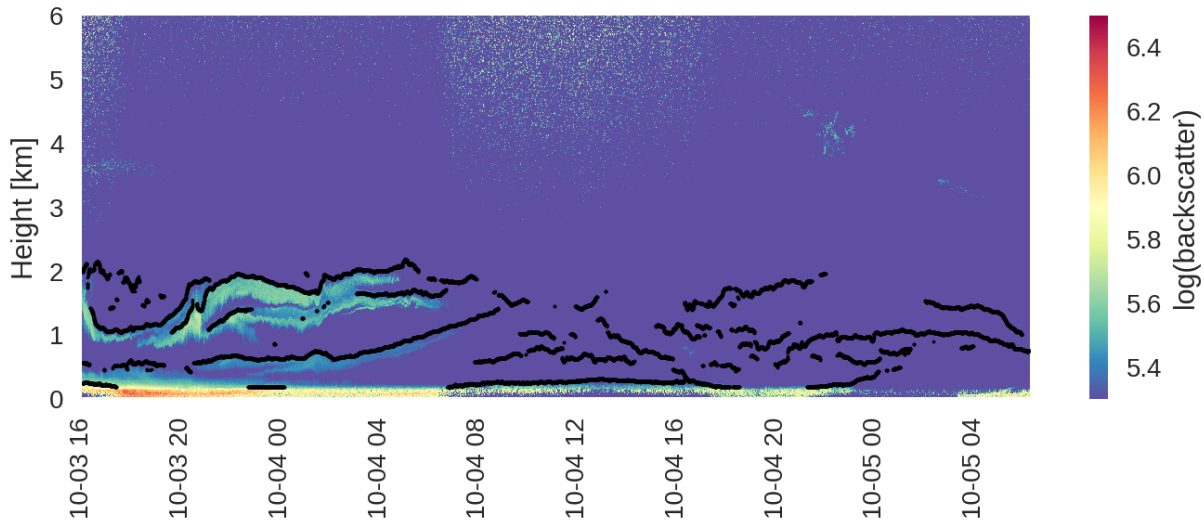




c) September 30-October 4, 2020



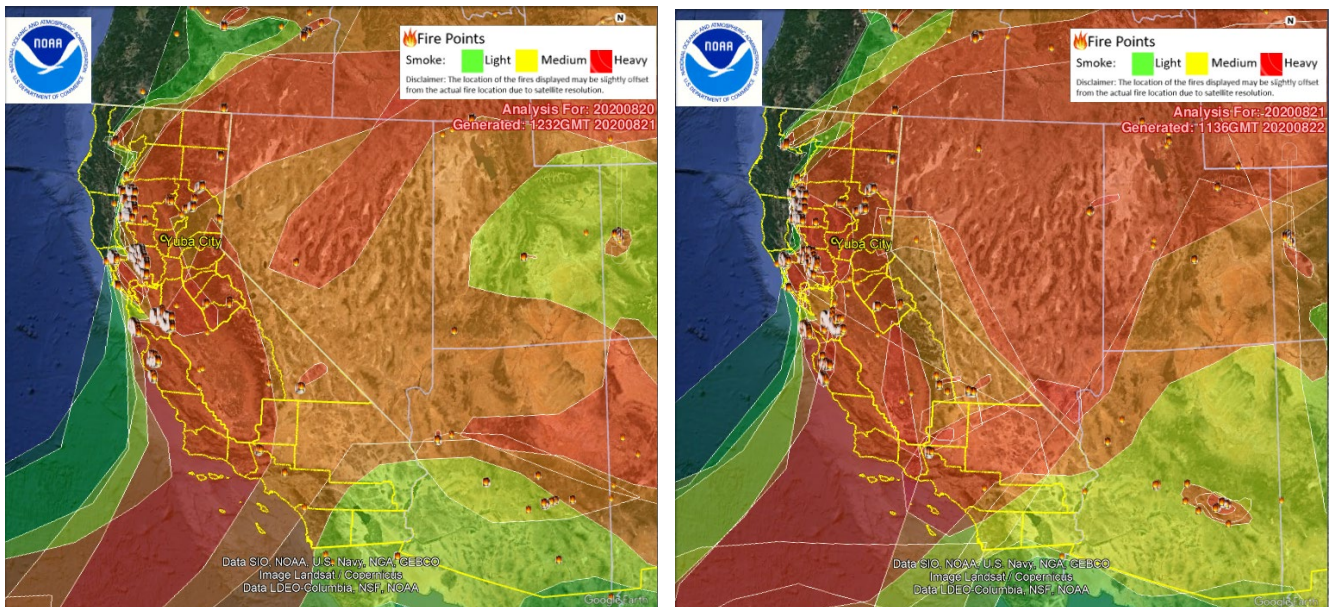


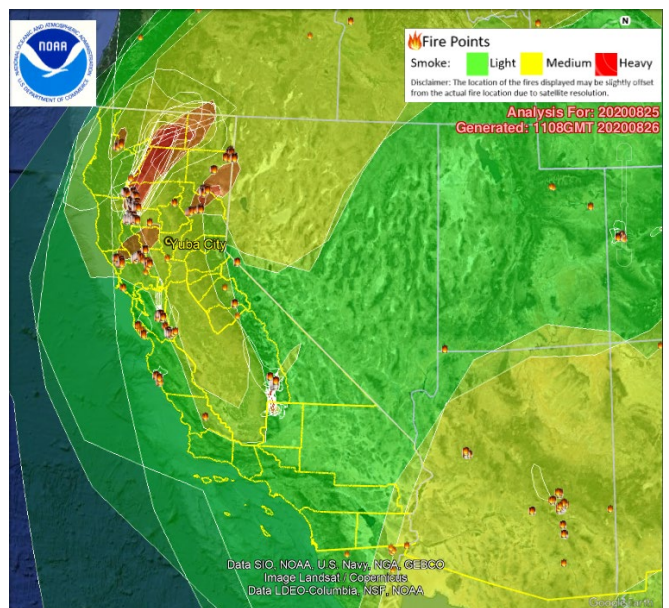
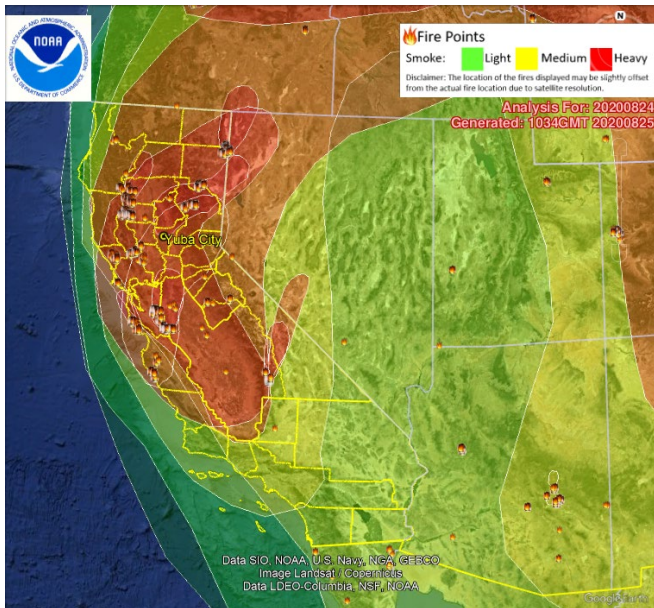
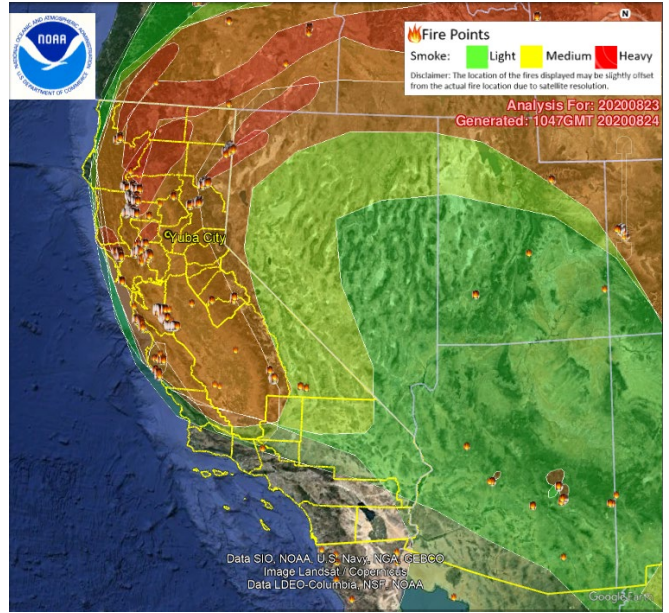
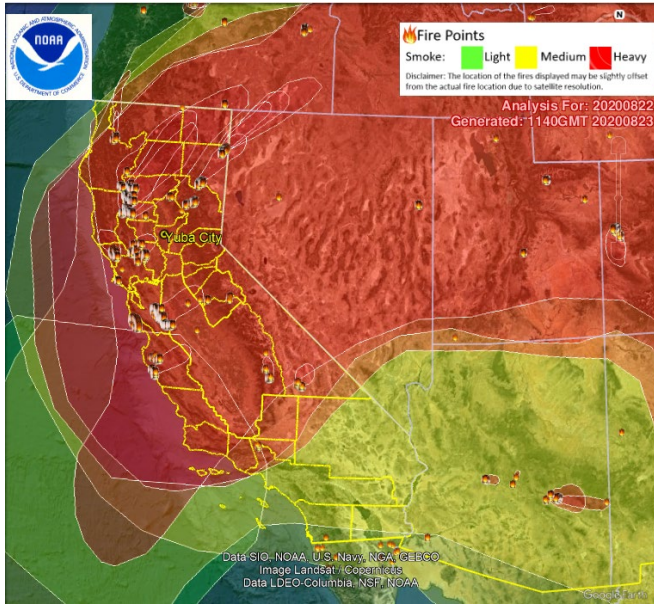


C. HMS Smoke Layers

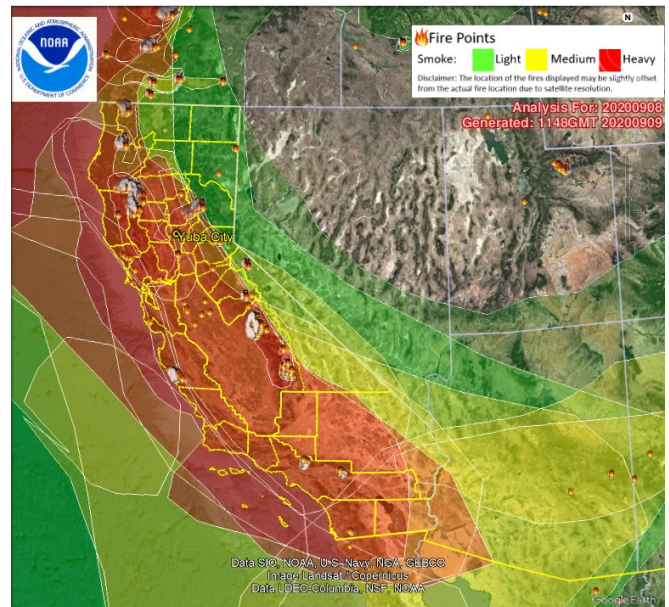
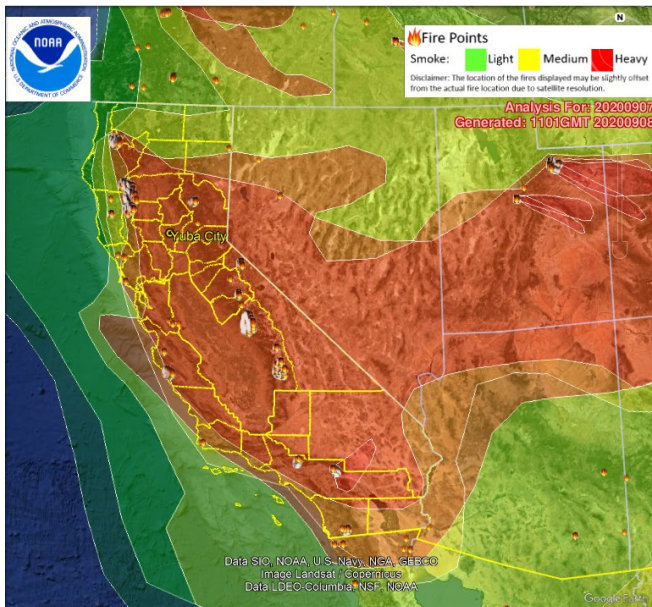
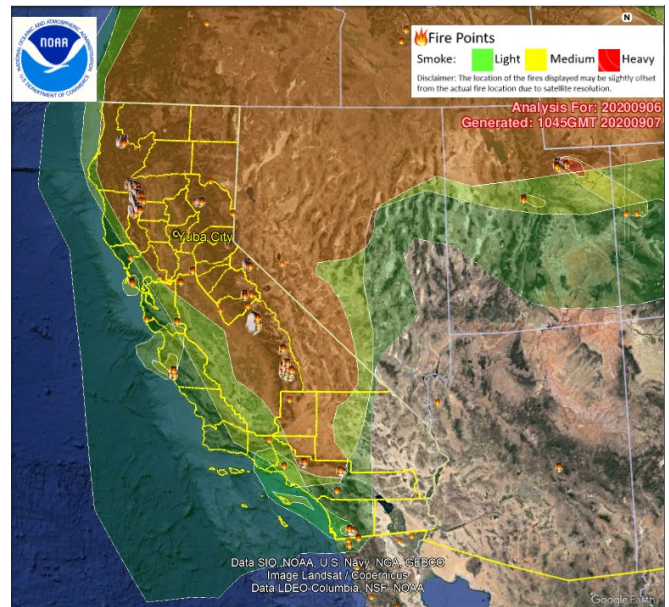
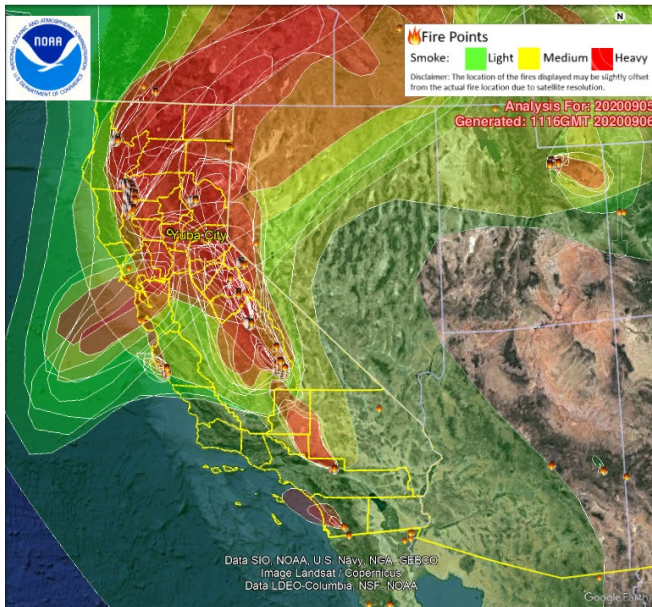
The NOAA Hazard and Mapping System (HMS) Fire and Smoke Product is an analysis of various satellite imagery to map out the scope and even to some extent thickness of smoke layers. Satellite fire detection is also included. The HMS smoke and fire layers for all event days are shown in the following sections.

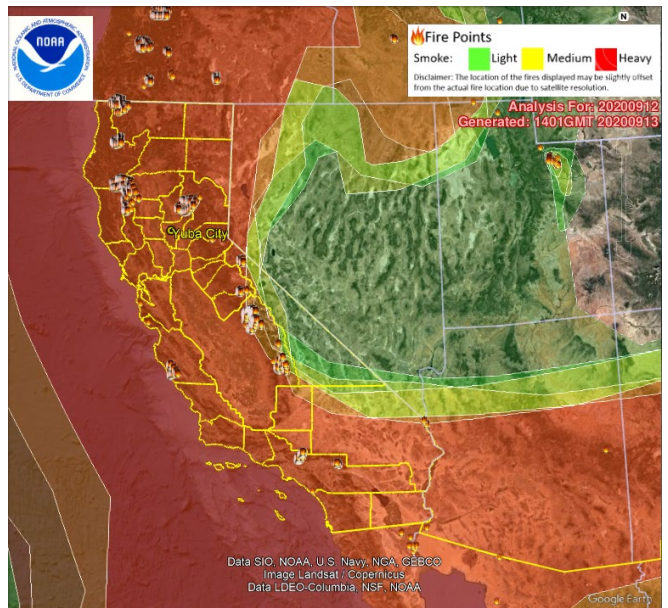
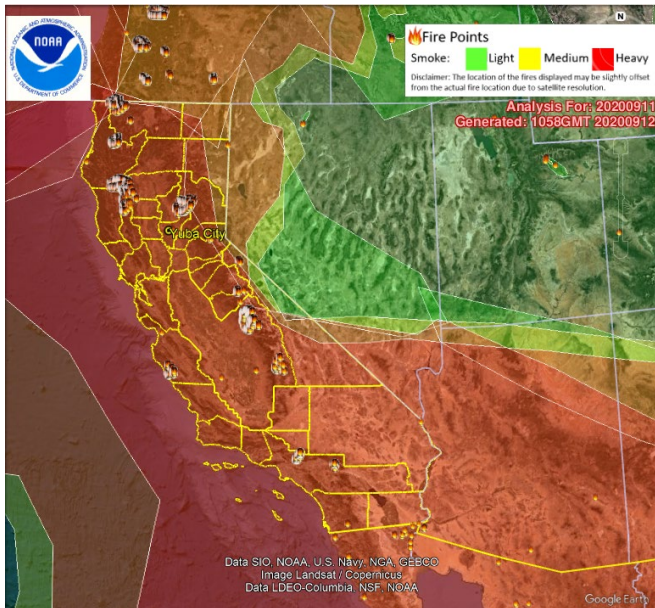
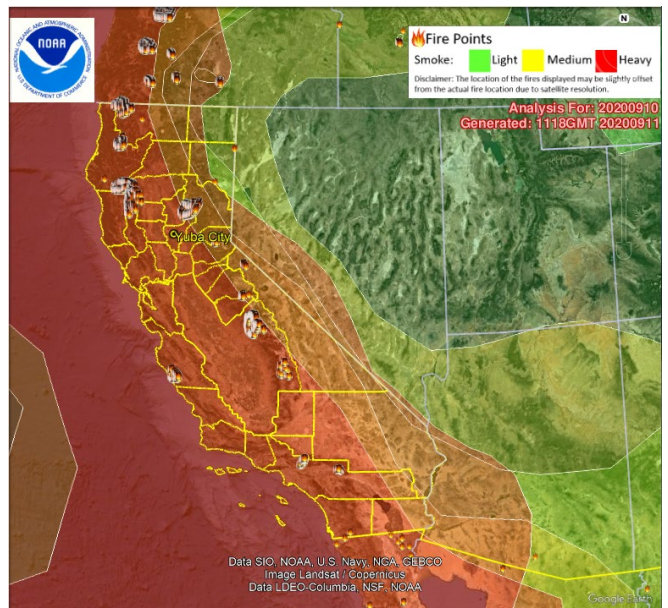
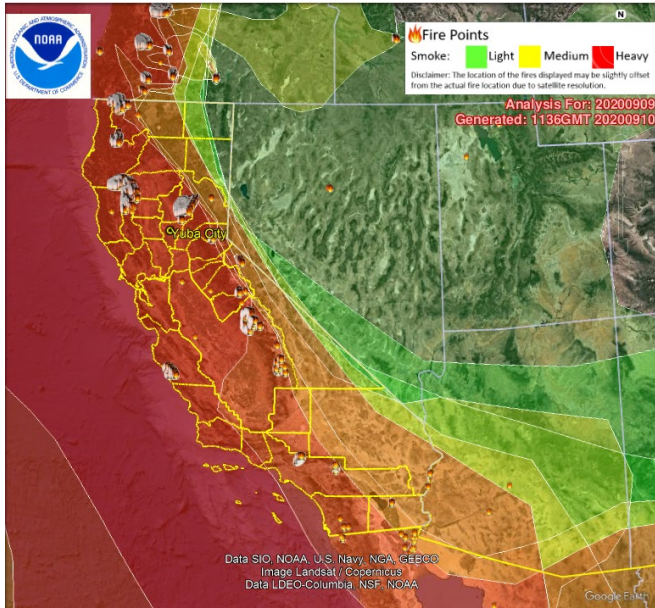
a) August 20-25, 2020

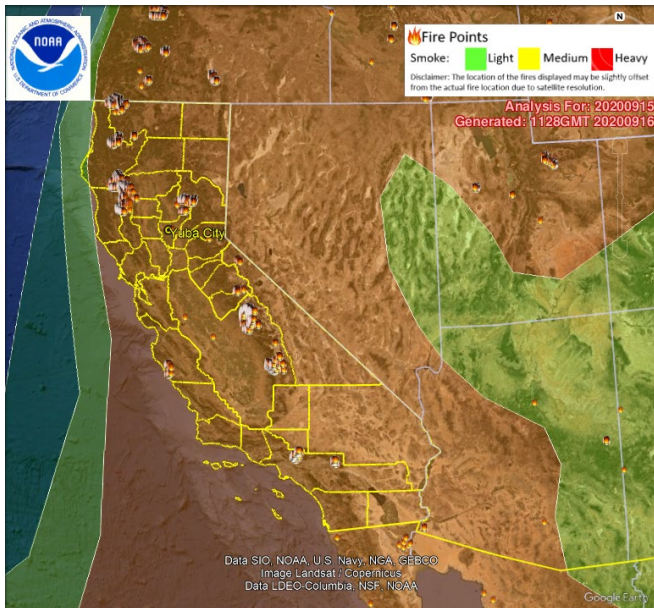
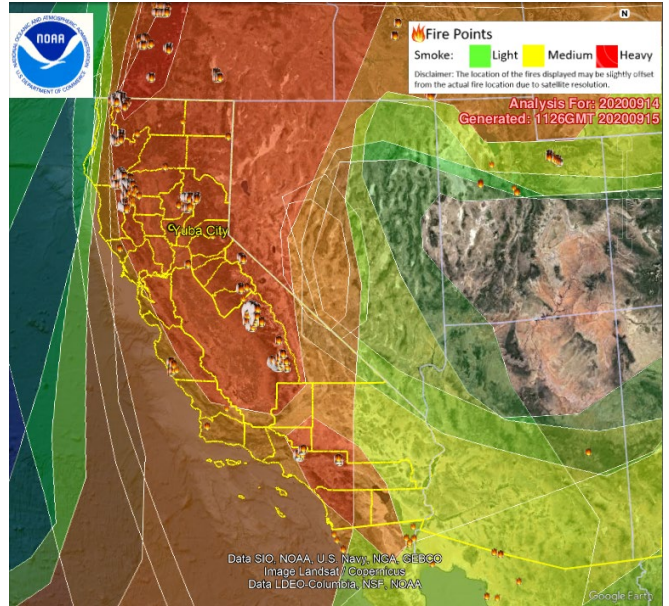
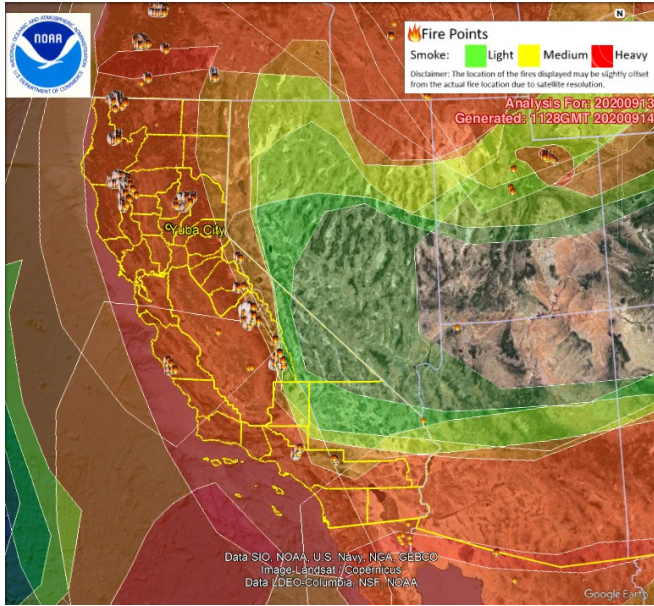




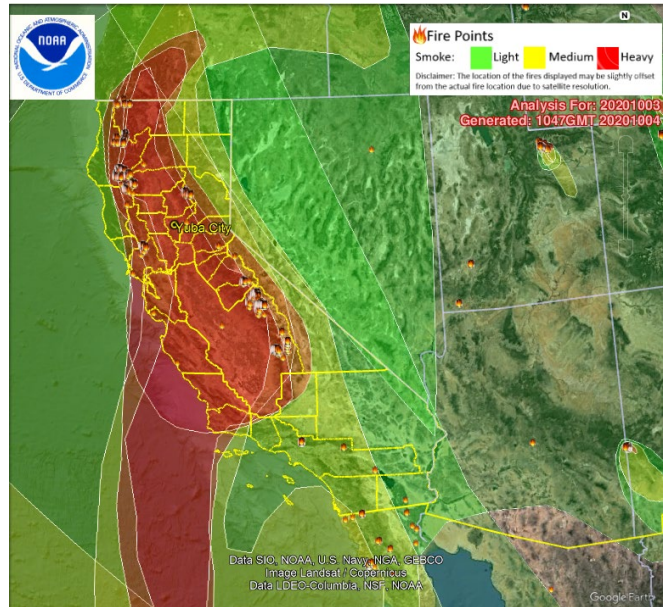
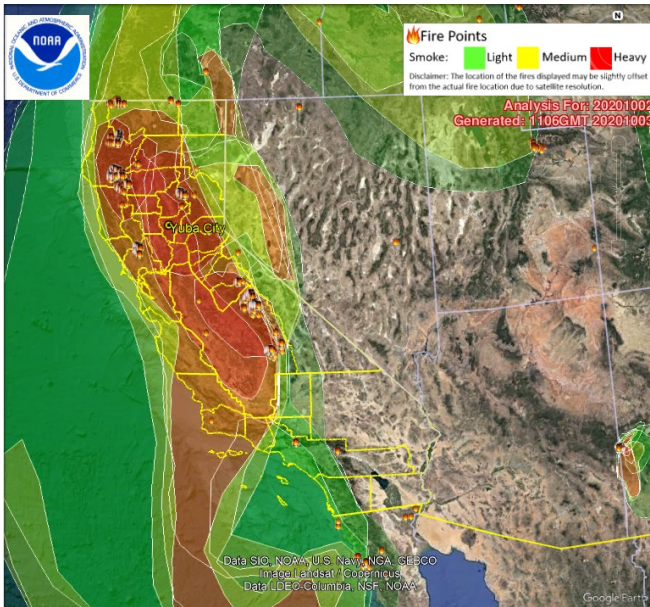
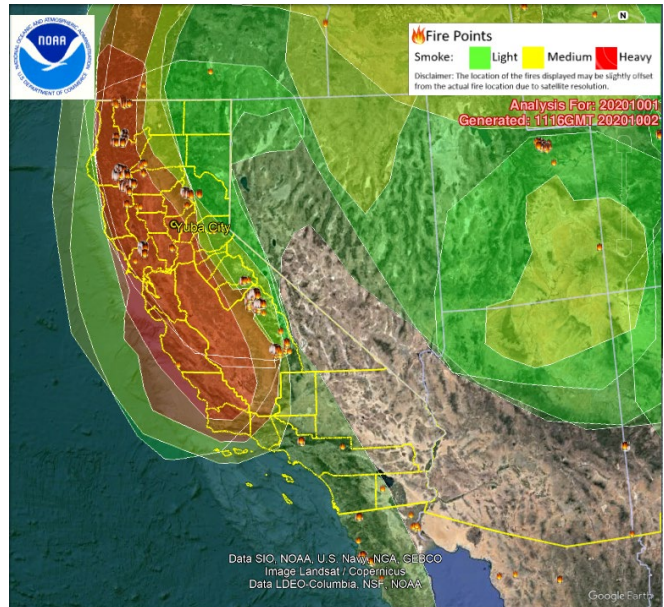
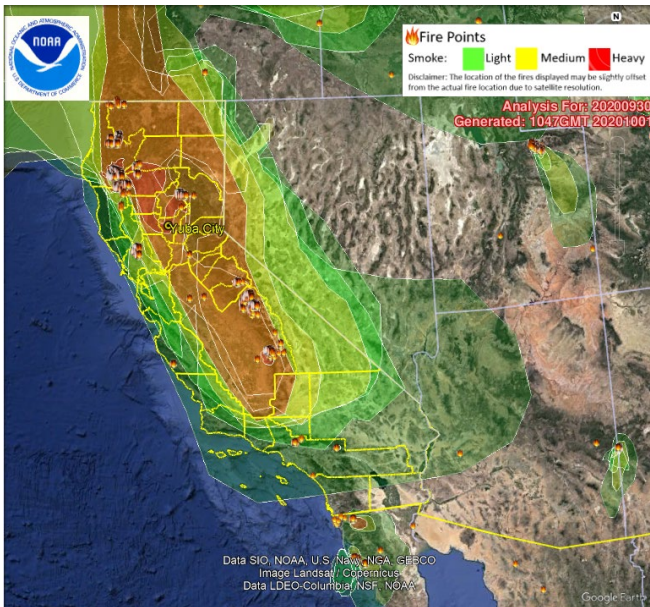
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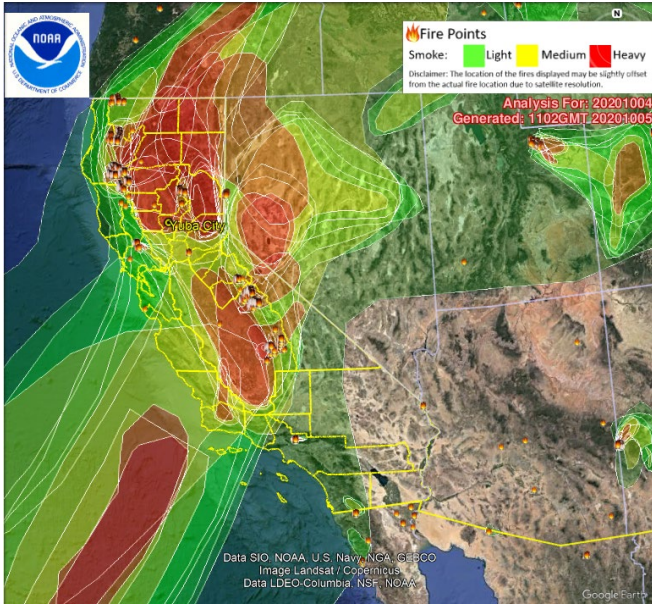






c) September 30-October 4, 2020





V. District Alerts/Advisories

The Feather River AQMD maintains a webpage⁷⁰ that keeps the public informed of wildfire smoke and air quality impacts as well as utilizing the AirNow Enviroflash Air Quality Notification System through their Air Quality Health Advisory webpage.⁷¹ The District issued several air quality advisories covering all of the event periods.

⁷⁰ Feather River AQMD, *Wildfire Smoke*, last accessed 9/30/22

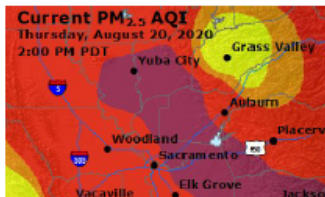
⁷¹ Feather River AQMD, *Air Quality Health Advisory*, last accessed 9/30/22



Air Quality Health Advisory
EFFECTIVE AUGUST 20 – AUGUST 23, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are issuing a joint air quality health advisory to notify the public of poor air quality conditions from wildfire smoke. The smoke impacting the area is from the August Complex, the LNU Lightning Complex, and other regional wildfires.

The current Air Quality Index levels are in the Unhealthy to Very Unhealthy range. Smoke from the fires may continue to cause unhealthy air quality in Yuba and Sutter counties through Sunday, August 23.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion.

Smoke density can vary widely from one local area to another and also with time of day. "Air quality conditions depend on a number of factors, which include proximity to the fire, wind speed and direction, and whether inversions are present," warns Christopher D. Brown, Air Pollution Control officer.

You can check current conditions online at www.airnow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fragmd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.

- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.

Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Minimize or avoid outdoor activity |
| 5 – 10 miles | Moderate outdoor activity | Stay inside or in a location with good air quality |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5 miles; from the intersection of Hwy 20 and Acacia Avenue to the South Butte is about 5.5 miles; and the distance between the 5th Street and 10th Street bridges is about 0.5 mile.

County officials will continue to monitor air quality in Sutter and Yuba County and provide updates on this advisory as needed. For current information, or to sign up for air quality alerts and forecasts, go to the Feather River Air Quality Management District website <http://www.fragmd.org/> or check the Sutter County and Sutter County Public Health Facebook pages or Yuba County website.

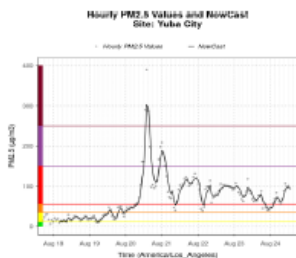


Air Quality Health Advisory
EFFECTIVE AUGUST 24 – AUGUST 26, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are issuing a joint air quality health advisory to notify the public of continuing poor air quality conditions from wildfire smoke. The smoke impacting the area is from the August Complex, the LNU Lightning Complex, and other regional wildfires.

The Air Quality Index levels are forecasted to be in the Unhealthy AQI range for fine particulate (PM2.5) and in the Unhealthy for Sensitive Groups AQI range for ozone for the Yuba/Sutter area Monday August 24 through Wednesday August 26.

Monitoring data from the past five days shows that air quality is generally better between 3-9 am and is generally worse in the afternoon, though AQI levels have mostly stayed in the Unhealthy range since August 20.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion.

Smoke density can vary widely from one local area to another and also with time of day. "Air quality conditions depend on a number of factors, which include proximity to the fire, wind speed and direction, and whether inversions are present," warns Christopher D. Brown, Air Pollution Control officer.

You can check current conditions online at www.airnow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fragmd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking

the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.
- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.

Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Minimize or avoid outdoor activity |
| 5 – 10 miles | Moderate outdoor activity | Stay inside or in a location with good air quality |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

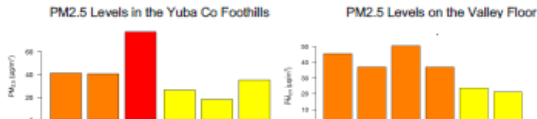
Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5



Air Quality Health Advisory
EFFECTIVE SEPTEMBER 4 TO SEPTEMBER 7, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are extending the air quality health advisory due to potentially poor air quality conditions from wildfire smoke. Intermittent smoke impacts may continue until the large regional wildfires are brought into containment. Higher temperatures this weekend may also lead to increased fire activity and smoke production.

Periods of lighter smoke impacts are expected Friday and Saturday as winds are predominately from the south. A forecasted shift to northwesterly winds may bring smoke back into the Yuba/Sutter region on Sunday. Moderate to Unhealthy for Sensitive Groups AQI levels for PM2.5 and ozone are forecasted through the holiday weekend.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion.

Smoke density can vary widely over short distances and due to changes in meteorological conditions. "Because smoke generation and weather are ever changing accurate predictions of smoke impacts are difficult, residents are encouraged to be aware of local conditions." warns Christopher D. Brown, Air Pollution Control Officer.

You can check current conditions online at www.fire.airnow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fragmd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.

- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.

Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Watch for changing conditions and moderate outdoor activity based on personal sensitivity |
| 5 – 10 miles | Moderate outdoor activity | Minimize or avoid outdoor activity |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5 miles; from the intersection of Hwy 20 and Acacia Avenue to the South Butte is about 5.5 miles; and the distance between the 5th Street and 10th Street bridges is about 0.5 mile.

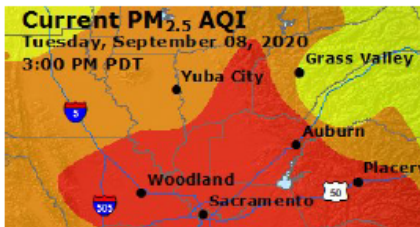
County officials will continue to monitor air quality in Sutter and Yuba County and provide updates on this advisory as needed. For current information, or to sign up for air quality alerts and forecasts, go to the Feather River Air Quality Management District website



Air Quality Health Advisory
EFFECTIVE SEPTEMBER 8 TO SEPTEMBER 10, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are extending the air quality health advisory due to potentially poor air quality conditions from wildfire smoke. High winds and low humidity have increased fire activity and smoke production. New fire starts are also possible during the red flag conditions.

Unhealthy to Unhealthy for Sensitive Groups AQI levels are expected through Thursday from PM2.5 in Yuba and Sutter counties. Moderate to Good AQI levels of ozone are forecasted during this time.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion. For those also affected by the PSPS making indoor accommodations not possible, please consider temporarily evacuating to a different area that can safely allow you to stay indoors until the PSPS resolves.

Smoke density can vary widely over short distances and due to changes in meteorological conditions. "Because smoke generation and weather are ever changing accurate predictions of smoke impacts are difficult, residents are encouraged to be aware of local conditions." warns Christopher D. Brown, Air Pollution Control Officer.

You can check current conditions online at www.fire.airnow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fragmd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.
- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.

Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Watch for changing conditions and moderate outdoor activity based on personal sensitivity |
| 5 – 10 miles | Moderate outdoor activity | Minimize or avoid outdoor activity |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

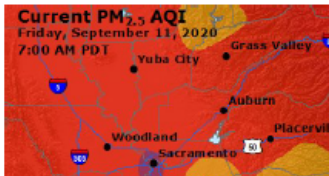
Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5 miles; from the intersection of Hwy 20 and Acacia Avenue to the South Butte is about 5.5 miles; and the distance between the 5th Street and 10th Street bridges is about 0.5 mile.



Air Quality Health Advisory
EFFECTIVE SEPTEMBER 10 TO SEPTEMBER 14, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are extending the air quality health advisory due to potentially poor air quality conditions from wildfire smoke. The red flag conditions earlier this week resulted in numerous new fire starts and invigorated existing fires. These include the North Complex in Yuba/Butte/Plumas counties as well as regional fires such as the August Complex in the Mendocino National Forest and the Creek Fire in Fresno County.

Unhealthy to Unhealthy for Sensitive Groups AQI levels are possible through Monday from PM2.5 in Yuba and Sutter counties. Ozone is expected to be in the Moderate to Good AQI range.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion. For those also affected by the PSPS making indoor accommodations not possible, please consider temporarily evacuating to a different area that can safely allow you to stay indoors until the PSPS resolves.

Smoke density can vary widely over short distances and due to changes in meteorological conditions. "Because smoke generation and weather are ever changing accurate predictions of smoke impacts are difficult, residents are encouraged to be aware of local conditions," warns Christopher D. Brown, Air Pollution Control Officer.

You can check current conditions online at www.fire.aimow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fraqmd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.

- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.

Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Watch for changing conditions and moderate outdoor activity based on personal sensitivity |
| 5 - 10 miles | Moderate outdoor activity | Minimize or avoid outdoor activity |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5 miles; from the intersection of Hwy 20 and Acacia Avenue to the South Butte is about 5.5 miles; and the distance between the 5th Street and 10th Street bridges is about 0.5 mile.

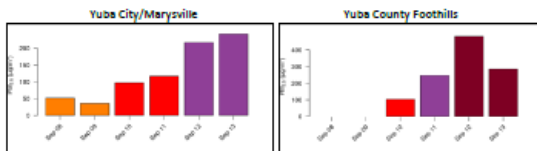
County officials will continue to monitor air quality in Sutter and Yuba County and provide updates on this advisory as needed. For current information, or to sign up for air quality alerts and forecasts, go to the Feather River Air Quality Management District website



Air Quality Health Advisory
EFFECTIVE SEPTEMBER 15 TO SEPTEMBER 17, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are extending the air quality health advisory due to poor air quality conditions from wildfire smoke. Very large wildfires continue to burn across the state and the smoke caused Hazardous AQI levels on Sunday in the Yuba/Sutter area. Southerly winds may bring some relief in the afternoons this week, however conditions will likely worsen overnight as winds die down.

Unhealthy AQI levels are expected Tuesday and Wednesday in Yuba and Sutter counties. Ozone is expected to be in the Moderate to Good AQI range. A weak front arriving on Thursday may bring some improvement to air quality conditions.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion. For those also affected by the PSPS making indoor accommodations not possible, please consider temporarily evacuating to a different area that can safely allow you to stay indoors until the PSPS resolves.

Smoke density can vary widely over short distances and due to changes in meteorological conditions. "Because smoke generation and weather are ever changing accurate predictions of smoke impacts are difficult, residents are encouraged to be aware of local conditions," warns Christopher D. Brown, Air Pollution Control Officer.

You can check current conditions online at www.fire.aimow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fraqmd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.
- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.




Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Watch for changing conditions and moderate outdoor activity based on personal sensitivity |
| 5 - 10 miles | Moderate outdoor activity | Minimize or avoid outdoor activity |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

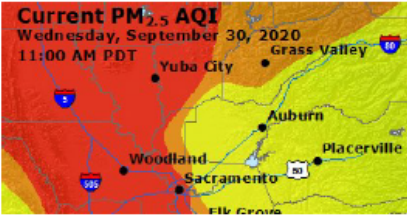
Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5

Air Quality Health Advisory
EFFECTIVE SEPTEMBER 30 TO OCTOBER 5, 2020

The Public Health Departments for Yuba and Sutter counties and the Feather River Air Quality Management District are issuing an air quality health advisory due to poor air quality conditions from wildfire smoke. Smoke is impacting the area from large regional wildfires including the August Complex in the Mendocino National Forest, the Zogg Fire in Shasta County, and the North Complex now primarily burning in Plumas County.

The forecast calls for Moderate to Unhealthy for Sensitive Groups AQI Wednesday through Monday. Ozone is expected to be in the Moderate to Good AQI range during this period. The return of southerly winds on Saturday may improve AQI conditions.



The Sutter and Yuba Public Health Departments advise residents with lung or heart disease, and the elderly to leave areas where levels of particulate matter are high. For everyone else, when you smell smoke, or see smoke around you, you should consider staying indoors and avoiding heavy exertion.

Smoke density can vary widely over short distances and due to changes in meteorological conditions. "Because smoke generation and weather are ever changing accurate predictions of smoke impacts are difficult, residents are encouraged to be aware of local conditions," warns Christopher D. Brown, Air Pollution Control Officer.

You can check current conditions online at www.fire.airnow.gov or www.sparetheair.com. Residents can also sign up for air quality forecasts and alerts at www.fragmsd.org that can be sent by email or text message. Residents that do not have internet access may also check particulate matter levels by listening to reports from local radio stations, local news, checking the local newspaper such as the Appeal-Democrat (during extended wildfire smoke impacts), or by using the distance/visibility table at the bottom of this advisory.

Residents who see or smell smoke should consider these precautionary measures:

- Healthy people should delay strenuous exercise, particularly when they can smell smoke.
- Children and elderly people should consider avoiding outdoor activities, particularly prolonged outdoor exertion. Parents of children involved in youth sports programs should consider whether their children be allowed to participate when smoke is in the air.
- People with health-related illnesses, particularly respiratory problems, should remain indoors.
- Keep windows and doors closed as much as possible. Use the recycle or recirculate mode on the air conditioner in your home or car.
- Masks, such as cloth masks worn to prevent the spread of the novel coronavirus, are not capable of filtering extra fine particles found in wildfire smoke.
- Do not rely on HEPA (N-95) respirators to do unnecessary outdoor activities.
- Keep airways moist by drinking lots of water. Breathing through a warm, wet washcloth can also help relieve dryness, but does not filter out the hazardous smoke particles.
- Avoid the fire areas and watch for emergency equipment.

Wildfire smoke may contain particulate matter, ozone, carbon monoxide, and toxic air contaminants. While all persons may experience varying degrees of symptoms, more sensitive individuals, such as the young, aged and those with respiratory conditions are at greatest risk of experiencing more aggravated symptoms. Symptoms may include, but are not limited to, coughing, watery and itchy eyes, and difficulty breathing. Persons experiencing questionable or severe symptoms should seek professional medical advice and treatment.

The following index may also assist in assessing the air quality based on the visibility in your area. To assess visibility:

- Face away from the sun. Determine visibility range by looking for targets that are at known distances (miles). You can use an electronic device map app or a map of the local area that has a mile scale.
- The visible range is the point where even high-contrast objects disappear.

| Distance you can see | Recommended action if you are a healthy adult, teenager, or other child | Recommended action if you are age 65 and over, pregnant, a young child or have asthma, respiratory illness, or lung or heart disease |
|----------------------|---|--|
| 10 + miles | Watch for changing conditions and moderate outdoor activity based on personal sensitivity | Moderate outdoor activity |
| 5 – 10 miles | Moderate outdoor activity | Minimize or avoid outdoor activity |
| Less than 5 miles | Minimize or avoid outdoor activity | Stay inside or in a location with good air quality |

Some examples of local distances: From the junction of Hwy 99 and Hwy 20 to the South Butte in the Sutter Buttes is about 11 miles; from the 10th Street bridge to Township Road is about 5 miles; from the intersection of Hwy 20 and Acacia Avenue to the South Butte is about 5.5 miles; and the distance between the 5th Street and 10th Street bridges is about 0.5 mile.

VI. Media Reports

Examples of traditional news and social media accounts of wildfires and smoke impacts, arranged by type of media and date. Due to the amount of information available, not all available articles are provided.

A. News Media and Other Information Sources

Democrat Appeal, Fires rage around region, https://www.appeal-democrat.com/news/fires-rage-around-region/article_4bfd7bba-e28e-11ea-9b7a-6fc012eb60a9.html, August 19, 2020, last accessed 9/30/22

On August 18, 2020, several fires exploded across northern California and scorched thousands of acres.

The Visible Infrared Imaging Radiometer Suite (VIIRS) on the NOAA-NASA Suomi NPP satellite captured a natural-color image (right) showing wildfire smoke blanketing the region. The red dots depict a "fire detection," a pixel in which the sensor and a computer algorithm indicated there was active fire. (The seam running diagonally through the August 18 image shows where two adjacent VIIRS swaths were stitched together to make one image.) The image on the left shows clear skies on August 14, before the fires had started.

August 18, 2020. (Click image for detailed view)

Many of the fires were sparked by intense lightning storms and moved rapidly due to an intense heatwave and sustained high winds. On August 18, the governor declared a statewide emergency. Thousands of people have evacuated some towns surrounding the San Francisco Bay Area as well as areas in and surrounding Santa Clara county.

CBS13 Sacramento, Wildfire Smoke Causes Dangerous Air Quality Levels in Sacramento Region, <https://sacramento.cbslocal.com/2020/08/20/wildfire-smoke-air-quality-sacramento-region/>, August 20, 2020, last accessed 10/26/21.

Appeal Democrat, Air quality health advisory extended, https://www.appeal-democrat.com/news/air-quality-health-advisory-extended/article_9c5822bc-e41f-11ea-a3ac-677b91b3a75f.html, August 21, 2020, last accessed 9/30/22

Appeal Democrat, Poor air quality could contribute to contracting COVID-19, https://www.appeal-democrat.com/news/poor-air-quality-could-contribute-to-contracting-covid-19/article_87a27e88-e421-11ea-964d-6fe986537bdf.html, August 21, 2020, last accessed 9/30/22

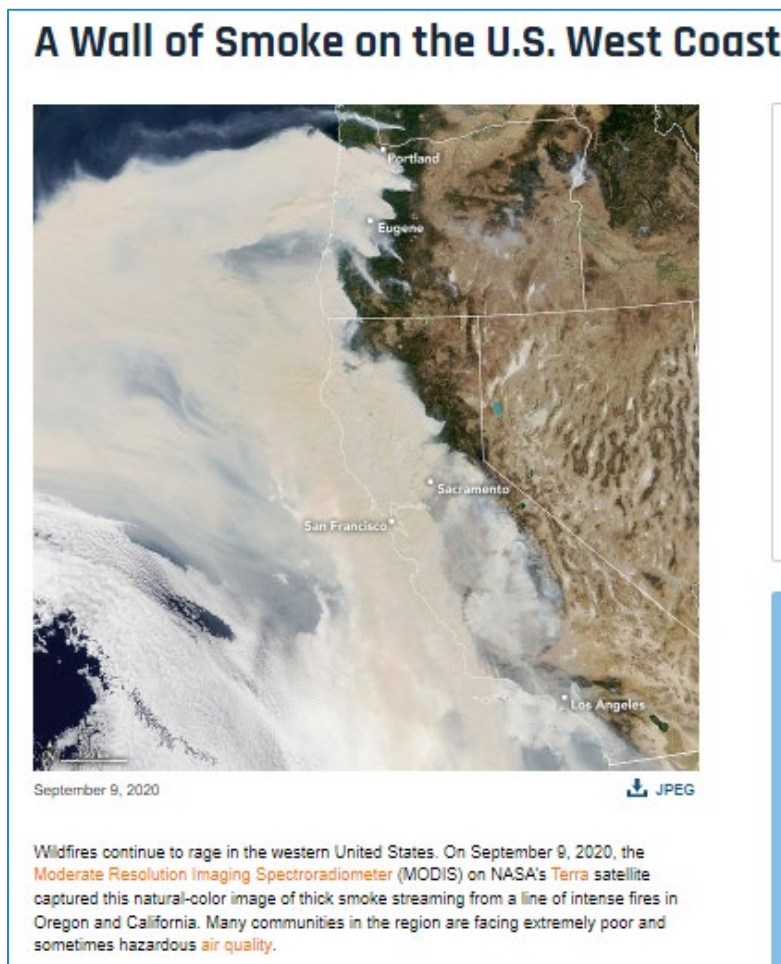
The Union, Firefighters make progress, but smoke still causing poor air quality at Lake Tahoe, <https://www.theunion.com/news/firefighters-make-progress-but-smoke-still-causing-poor-air-quality-at-lake-tahoe/>, August 21, 2020, last accessed 10/26/21.

Appeal Democrat, Smoke continues to have impact on Yuba-Sutter, https://www.appeal-democrat.com/news/smoke-continues-to-have-impact-on-yuba-sutter/article_ada7cd60-e67c-11ea-ac7d-d74f9018c26d.html, August 24, 2020, last accessed 9/30/22

CBS13 Sacramento, Experts Explain Why Air Quality And Smoke Levels Are Different Around Sacramento Region, <https://www.cbsnews.com/sacramento/news/air-quality-smoke-levels-different-sacramento-region/>, September 9, 2020, last accessed 9/30/22

CBS13 Sacramento, Wildfire Smoke Casts Ominous Orange Glow Across Northern California, <https://www.cbsnews.com/sacramento/news/norcal-apocalypse-orange-smoke-california-wildfires/>, September 9, 2020, last accessed 9/30/22

NASA Earth Observatory, A Wall of Smoke on the U.S. West Coast, <https://earthobservatory.nasa.gov/images/147261/a-wall-of-smoke-on-the-us-west-coast>, September 9, 2020, last accessed 9/30/22



Appeal Democrat, Fire conditions continue as hazy with unhealthy air quality in Yuba-Sutter, https://www.appeal-democrat.com/news/urgent/fire-conditions-continue-as-hazy-with-unhealthy-air-quality-in-yuba-sutter/article_adc1b5bc-f55a-11ea-8978-23c5db64aeb0.html, September 12, 2020, last accessed 9/30/22

San Francisco Chronicle, Foul air covers all of Northern California: 'It's smoke all over the place', <https://www.sfchronicle.com/bayarea/article/Weather-looks-good-but-you-can-t-see-it-through-15562135.php>, September 12, 2020, last accessed 10/19/21.

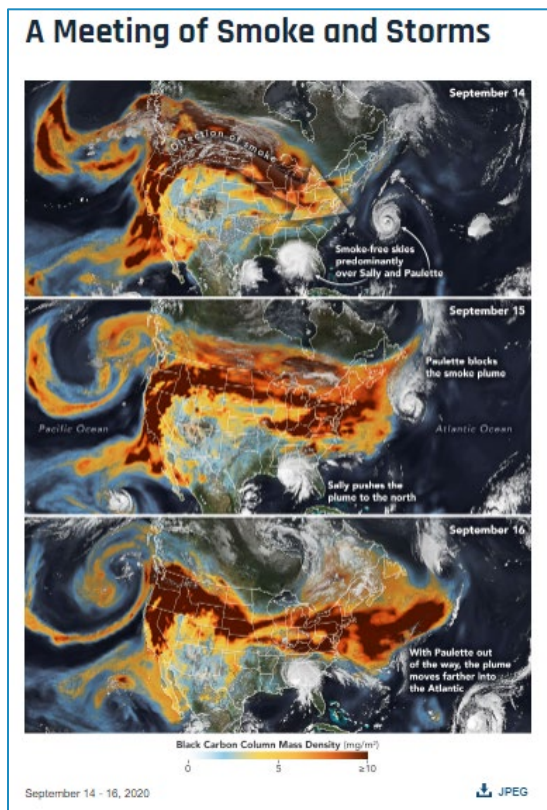
Washington Post, California's wildfire smoke plumes are unlike anything previously seen, <https://www.washingtonpost.com/weather/2020/09/12/california-wildfires-smoke-plumes/>, September 12, 2020, last accessed 10/19/21.

The Guardian, Smoke over Paradise stirs painful memories of California's deadliest fire, <https://www.theguardian.com/us-news/2020/sep/13/paradise-california-fire-wildfires>, September 13, 2020, last accessed 10/19/21.

AP News, Seeping under doors, bad air from West's fires won't let up, <https://apnews.com/article/portland-wildfires-health-washington-oregon-41d19571e31aa18ba762c4e5b0282e8f>, September 14, 2020, last accessed 10/26/21.

Wall Street Journal, Smoke and Winds worsen in Deadly West Coast Wildfires, <https://www.wsj.com/articles/fires-in-california-and-oregon-trump-to-visit-as-potentially-dangerous-winds-expected-monday-11600091189>. September 14, 2020, last accessed 10/26/21.

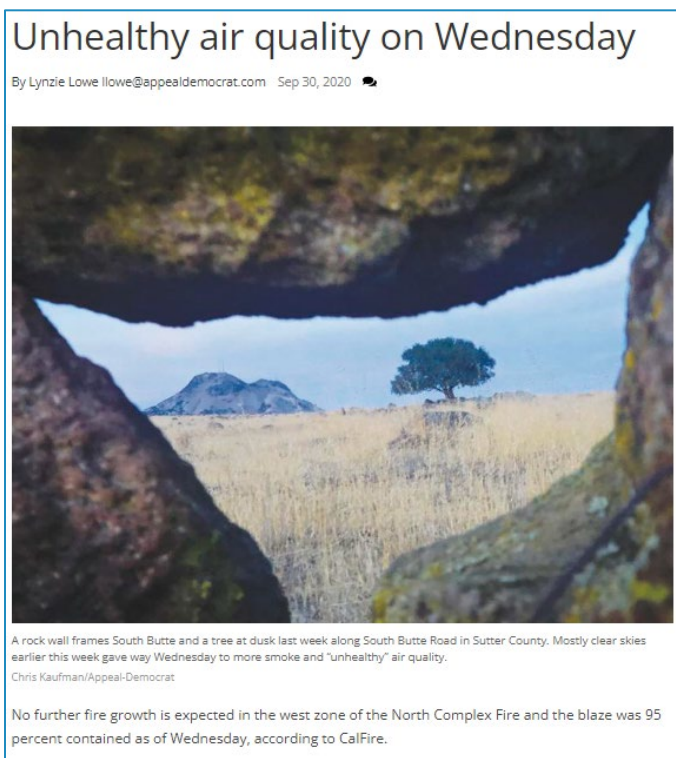
NASA Earth Observatory, A Meeting of Smoke and Storms, <https://earthobservatory.nasa.gov/images/147293/a-meeting-of-smoke-and-storms>, September 19, 2020, last accessed 9/30/22



Appeal Democrat, Smoke expected to continue impacting Yuba-Sutter region, https://www.appeal-democrat.com/news/urgent/smoke-expected-to-continue-impacting-yuba-sutter-region/article_90bd2c84-f6f5-11ea-b0c3-6b31e70ca2df.html, September 14, 2020, last accessed 9/30/22

The Union, Haze expected in South Lake Tahoe, Grass Valley, into Thursday, <https://www.theunion.com/news/haze-expected-in-south-lake-tahoe-grass-valley-into-thursday/#>, September 15, 2020, last accessed 10/19/21.

Appeal Democrat, Unhealthy air quality on Wednesday, https://www.appeal-democrat.com/news/unhealthy-air-quality-on-wednesday/article_be59df0e-0391-11eb-b0bd-a37bcfe26eb2.html, September 30, 2020, last accessed 9/30/22



Appeal Democrat, Yuba College cancels outdoor practices due to poor air quality, https://www.appeal-democrat.com/sports/yuba-college-cancels-outdoor-practices-due-to-poor-air-quality/article_2acf61de-039e-11eb-be96-ab931c489a7c.html, September 30, 2020, last accessed 9/30/22

Appeal Democrat, Regional fires limiting outdoor activity in Yuba-Sutter, https://www.appeal-democrat.com/news/regional-fires-limiting-outdoor-activity-in-yuba-sutter/article_7a2c1edc-044f-11eb-829e-dbf653e25674.html, October 1, 2020, last accessed 9/30/22

Regional fires limiting outdoor activity in Yuba-Sutter

Appeal Staff Report
Oct 1, 2020

For a second straight day, unhealthy air from regional fires was affecting outdoor activities, including the cancellation of Yuba College's outdoor conditioning work on Thursday, according to women's soccer coach Cristina Baggio.

Baggio, whose team practices Tuesdays and Thursdays in preparation for a January restart of fall sports, is hopeful that her team can return to phase one conditioning next week.

Air quality registered around 150 for a second straight day, which reads unhealthy for most people outdoors.

The National Weather Service is calling for heat- and smoke-related conditions through the weekend, with highs forecast anywhere from 10 to 15 degrees above normal.

The weather service expects the heat wave to peak today.

In the valley, temperatures are expected to reach low triple-digits, while the Sierra Nevada Foothills should prepare for breezy north to east winds ranging from 20-30 mph through the day.

The state grid operator is calling for a flex alert for a second straight day, asking customers to reduce power usage from 3 to 10 p.m., according to a tweet from Pacific Gas & Electric Marketing and Communications Principal Paul Moreno.

Moreno said there are many ways to reduce power and put less pressure on the state grid. Moreno recommends setting home air conditioners at 78 degrees or higher, using fans and avoiding using large appliances such as a washer/dryer, dishwasher and ovens during the flex alert.

Cal Fire's report on Thursday regarding some of the fires burning in Northern California:

- Zogg Fire, Shasta County, has burned 55,303 acres and is 26 percent contained. Four have died and evacuation orders remain in place.

- Glass Fire, burning in Napa and Sonoma County, is just 5 percent contained and has charred 56,781 acres as of Thursday. All evacuation orders remain in effect with additional orders in progress.

- The North Complex fire in Plumas County northeast of Oroville is 79 percent contained and has burned over 316,000 acres.

- The Lightning Complex burning in Butte, Tehama and Glenn County is 97 percent contained and has burned 11,609 acres.

- Both the LNU and SCU Lightning Complex fires are fully contained as of Thursday.

NASA Earth Observatory, California's Nightmare Fire Season Continues,
<https://earthobservatory.nasa.gov/images/147363/californias-nightmare-fire-season-continues>, October 1, 2020, last accessed 9/30/22

Appeal Democrat, Yuba College cancels outdoor practices due to poor air quality,
https://www.appeal-democrat.com/news/local-air-quality-worsens-high-heat-expected/article_12a0598c-0520-11eb-af8f-8b502c80cc85.html, October 2, 2020, last accessed 9/30/22

Appeal Democrat, Yuba-Sutter air expected to remain in unhealthy range through Monday,
https://www.appeal-democrat.com/news/yuba-sutter-air-expected-to-remain-in-unhealthy-range-through-monday/article_5aecc740-05dc-11eb-b3e7-d78c3ffadd42.html, October 3, 2020, last accessed 9/30/22

B. Social Media

 Feather River AQMD
@FeatherRiverAir

Today, Wednesday August 19, is a No Burn Day in Yuba and Sutter counties. There is an Air Quality Health Advisory in effect due to wildfire smoke. Visit fraqmd.org for more information.

 fraqmd.org
FRAQMD

10:58 AM · Aug 19, 2020 · Twitter Web App

<https://twitter.com/FeatherRiverAir/status/1296144565066326016>

 Butte County AQMD
@bcaqmd

The #AirNow Fire and Smoke Map is now showing official (circles) and unofficial (square) particulate / smoke readings for even better coverage in #buttecounty. Click on each point for air quality trends. #augustcomplex
fire.airnow.gov/?lat=39.705275...



9:44 AM · Aug 20, 2020 · Twitter Web App

<https://twitter.com/bcaqmd/status/1296488328959795201>



Feather River AQMD
@FeatherRiverAir

...

The Air Quality Health Advisory has been extended through Sunday Aug 23. The Yuba/Sutter are is currently experiencing Unhealthy - Very Unhealthy AQI from wildfire smoke. Unhealthy AQI levels may continue through the weekend. For more information visit fraqmd.org



4:37 PM · Aug 20, 2020 · Twitter Web App

<https://twitter.com/FeatherRiverAir/status/1296592187837177856>



Good Day Sacramento
@GoodDaySac

...

Wildfire Smoke Causes Dangerous Air Quality Levels In Sacramento Region



gooddaysacramento.cbslocal.com

Wildfire Smoke Causes Dangerous Air Quality Levels In Sacramento Region
Regardless of where you live, you have probably seen the hazy skies and ash in the air.

<https://twitter.com/GoodDaySac/status/1296701573159149568>

County of Nevada, CA
 August 20, 2020 · 🌐

Due to smoke from regional wildfires, air quality remains low. Please be safe when practicing outdoor activities. Read more in [California Department of Public Health's](#) advisory below.

"While cloth face coverings offer protection against COVID-19 virus spread, they do not provide protection against smoke particles. People who must be outdoors for long periods, in areas with heavy smoke, or where ash is disturbed, may want to wear an N95 respirator mask. Those with existing respiratory, lung or heart conditions should limit their exposure by staying indoors. Since wearing a respirator can make it harder to breathe, those with lung or heart conditions should check with their doctor before using one.

The best way to protect against the potentially harmful effects of wildfire smoke is to reduce wildfire smoke exposure, for example, by seeking cleaner air spaces and shelters."

California Department of Public Health ✓
 August 19, 2020 · 🌐

👮 Public Health Officials Urge Californians to Stay Indoors When Possible due to Unhealthy Air Quality in Wildfire Areas.

For more information 📄 <http://bit.ly/NR20-201>

<https://www.facebook.com/NevadaCountyCA/>

Feather River Air Quality Management District
 August 20, 2020 · 🌐

Today, Thursday August 20, is a No Burn Day in Yuba and Sutter counties. Air quality is currently in the Unhealthy for Sensitive Groups range for most of Yuba/Sutter. There is an Air Quality Health Advisory in effect. For more information visit www.fraqmd.org.

Current PM_{2.5} AQI
 Thursday, August 20, 2020
 8:00 AM PDT

CA 250 E 17 Miles
 Generated: 2020-08-20 14:27:13Z

<https://www.facebook.com/Feather-River-Air-Quality-Management-District>

 **NWS Sacramento** 
@NWSSacramento

Wildfire smoke will continue to affect most of interior [#NorCal](#) today. Check airnow.gov for the details on air quality at your location. [#CAwx](#)



5:45 AM · Aug 21, 2020 · TweetDeck

<https://twitter.com/NWSSacramento/status/1296790404550066179>

 **Feather River Air Quality Management District**
August 21, 2020 · 


Friday, August 21 is another No Burn Day in Yuba and Sutter counties. There is an Air Quality Health Advisory in effect. Unhealthy Air Quality Index levels are forecasted Friday, Saturday, and Sunday. <https://www.fraqmd.org/air-quality-health-advisory-august...>



FRAQMD.ORG
Air Quality Health Advisory August 2020
Air Quality Health Advisory August 2020
Air Quality Health Advisory for August 20 - 23
Air Quality Health Advisory August 18, 2020

<https://www.facebook.com/Feather-River-Air-Quality-Management-District>

County of Nevada, CA
August 22, 2020



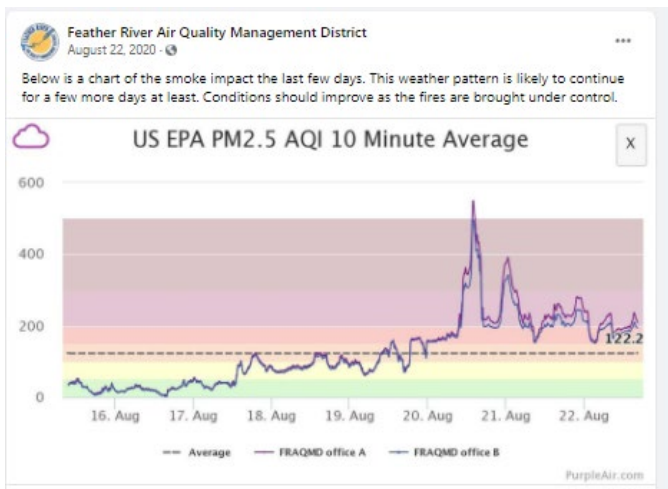
Nevada County Sheriff's Office
August 22, 2020

JONES INCIDENT - MORNING UPDATE - August 22, 2020

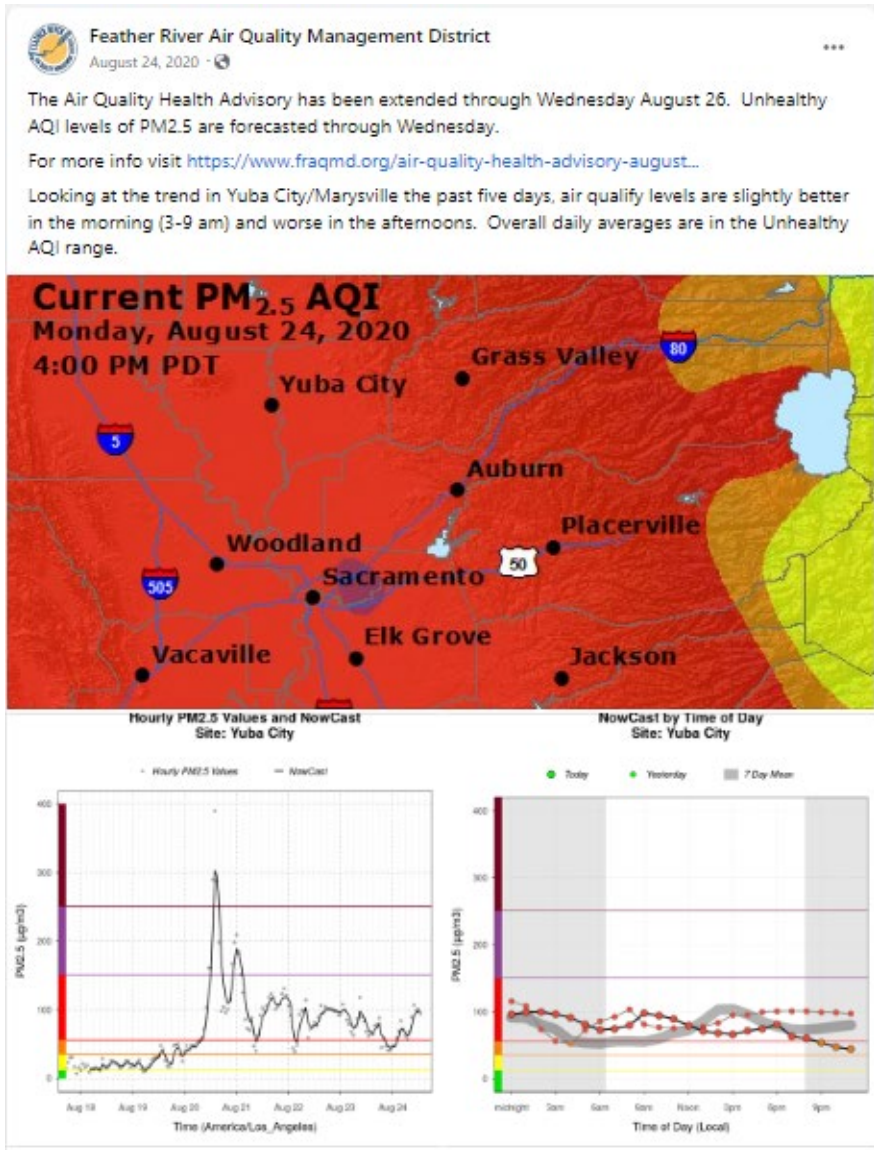
Acres: 705
Containment: 35%
Personnel Assigned: 145

Highway 49 will reopen to through traffic at 9:00am. Please be alert for fire equipment still in the area.

<https://www.facebook.com/NevadaCountyCA/>



<https://www.facebook.com/154994674537881/photos/a.555205747850103/3482311031806212/>



<https://www.facebook.com/Feather-River-Air-Quality-Management-District>

Feather River Air Quality Management District
September 4, 2020

Wildfire smoke impacts may continue to impact Yuba and Sutter counties through the holiday weekend. The forecast calls for Moderate AQI Friday and Saturday but USG is possible on Sunday when winds shift. The Air Quality Health Advisory has been extended until Monday Sept 7. Please visit www.fraqmd.org for more info.

FRAQMD.ORG
FRAQMD
Public Notices for Stationary Source Permits Public Notice for permit 23030H accepting public comments until August 8, 2020. Read more »

<https://www.facebook.com/Feather-River-Air-Quality-Management-District>



NWS Sacramento
@NWSSacramento



Wildfire smoke is blanketing portions of NorCal this afternoon as several wildfires continue to burn. #cawx #ForkFire #NorthComplex #BearFire #AugustComplex



3:33 PM · Sep 8, 2020 · TweetDeck

<https://twitter.com/NWSSacramento/status/1303461538158632960>



Feather River AQMD
@FeatherRiverAir



The Air Quality Health Advisory has been extended through Thursday due to continuing wildfire smoke impacts. Expect Unhealthy to USG AQI levels in Yuba/Sutter.



fraqmd.org
Air Quality Health Advisory August 2020

4:24 PM · Sep 8, 2020 · Twitter Web App

<https://twitter.com/FeatherRiverAir/status/1303474422850879488>



Feather River Air Quality Management District

September 8, 2020 · 🌐

...

Today, Tuesday September 8, is a No Burn Day in Yuba and Sutter counties.

👍 1

<https://www.facebook.com/Feather-River-Air-Quality-Management-District>



NWS Sacramento ✓

@NWSSacramento

...

This is also valid in interior [#NorCal](#). Smoke from both the August Complex and the Bear Fire/North Complex is now being pushed back into the Valley from the north. Expect darkening skies and falling ash. [#CAwx](#) [#CAfire](#)



NWS Bay Area 📡 ✓ @NWSBayArea · Sep 9, 2020

As the winds weaken aloft, gravity will take over as the primary vertical transport of the smoke.

Suspended smoke will descend closer to the surface and could lead to darker skies and worsening air quality today. This is beyond the scope of our models so we rely on your reports!

2:29 PM · Sep 9, 2020 · TweetDeck

<https://twitter.com/NWSSacramento/status/1303807872237670400>



Feather River Air Quality Management District

September 9, 2020 · 🌐

...

Current Air Quality information and smoke advisories are available online at www.fraqmd.org and fire.airnow.gov



FRAQMD.ORG

FRAQMD

Public Notices for Stationary Source PermitsPublic Notice for permit 23030H accepting public comments until August 8, 2020.[Read more >](#)



👍 1

1 Share

<https://www.facebook.com/Feather-River-Air-Quality-Management-District>

NWS Sacramento
@NWSSacramento

That's not clouds you are looking at! It's smoke from all the wildfires. The loop shows the total smoke through a vertical integrated column. #CAwx



5:05 AM · Sep 10, 2020 · TweetDeck

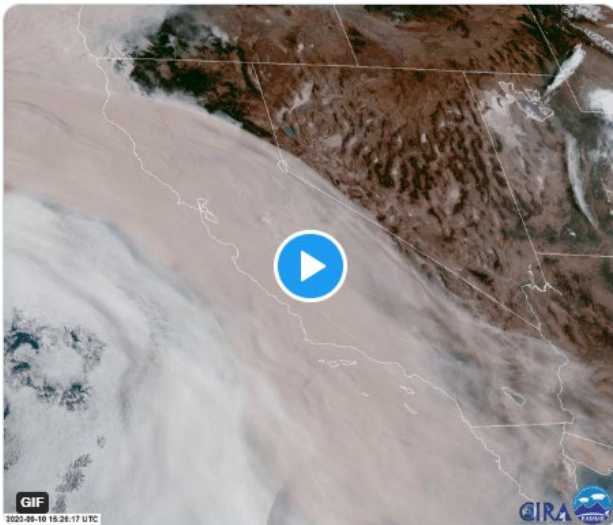
<https://twitter.com/NWSSacramento/status/1304028242387460098>

NWS Sacramento
@NWSSacramento

🌩️ Smoke over #NorCal can be seen from space this morning. Hazy skies will continue as area wildfires continue to burn.

Air quality info: airnow.gov

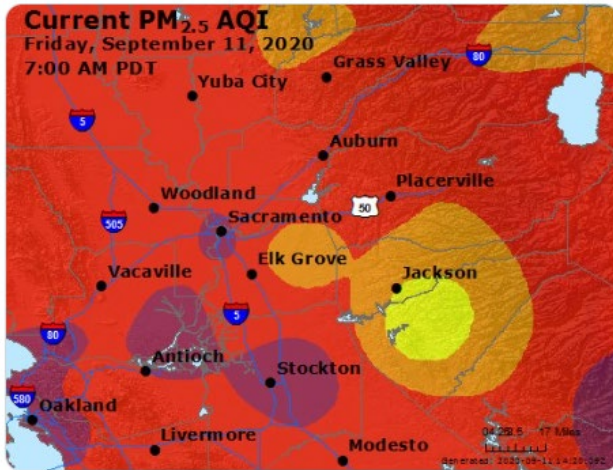
Wildfire info: bit.ly/2Fj6pEQ #CAwx #CAfire



9:23 AM · Sep 10, 2020 · TweetDeck

<https://twitter.com/NWSSacramento/status/1304093204409540610>

The Air Quality Health Advisory has been extended through the weekend due to continuing impacts from wildfire smoke. AQI levels this morning are mostly in the Unhealthy range for Yuba/Sutter. fraqmd.org/air-quality-he...



7:49 AM · Sep 11, 2020 · Twitter Web App

<https://twitter.com/FeatherRiverAir/status/1304431870969409537>

County of Nevada, CA
September 12, 2020

Air quality continues to be unhealthy in Nevada County today due to regional wildfires. Try to stay out of the smoke and stay healthy by:

- Minimize outdoor activities even if you are healthy;
- Stay indoors with doors and windows closed as much as possible; run the air conditioner on the "recirculate" setting if that is an option;
- People with asthma should follow their asthma management plan;
- People with heart disease, respiratory conditions or chronic health issues should stay indoors;
- Contact your doctor if you have symptoms of cough, shortness of breath, chest pain, or severe fatigue;
- Keep airways moist and stay hydrated by drinking plenty of water;
- Avoid breathing additional smoke, such as from cigarettes or barbecues.

12pm Saturday Forecast

US National Weather Service Sacramento California
September 12, 2020

Smoke will continue across portions of NorCal today.

<https://www.facebook.com/NevadaCountyCA/>

US National Weather Service Sacramento California
September 12, 2020

Smoke will continue across portions of NorCal today.

11am Saturday Forecast
Near Surface Smoke

<https://www.facebook.com/NWSSacramento>

US National Weather Service Sacramento California
September 12, 2020

What a normal California September day would look like without wildfire smoke.

September 12th, 2019 September 12th, 2020

Redding Redding
Sacramento Sacramento
San Francisco San Francisco

NASA Terra/Modis - Corrected Reflectance (1000 C600)
NWS Sacramento

<https://www.facebook.com/NWSSacramento>

Feather River Air Quality Management District
September 12, 2020

Overnight we have seen significant smoke impacts in parts of the District, sometimes exceeding the AQI index. Please see EPA's guidance for these situations - <https://www.airnow.gov/.../extremely-high-levels-of-pm25/>

AIRNOW.GOV
Extremely High Levels of PM2.5: Steps to Reduce Your Exposure | AirNow.gov
AirNow and the U.S. Forest Service have launched a pilot project to show data from low-cost sensors on the Fire and Smoke Map. The goal of the project is to provide additional air quality information during wildfires —...

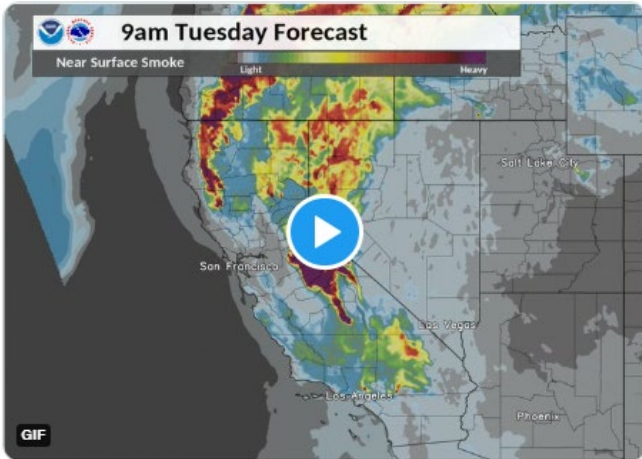
<https://www.facebook.com/Feather-River-Air-Quality-Management-District>



NWS Sacramento
@NWSSacramento

...

Did you notice some improvement in the smoke this morning? Delta breeze last evening helped bring some clearing to the Central Valley. The smoke will move back in this morning, then back out this evening. It'll be an ebb and flow with the smoke this week. #CAwx #smokyskies



9:27 AM · Sep 15, 2020 · TweetDeck

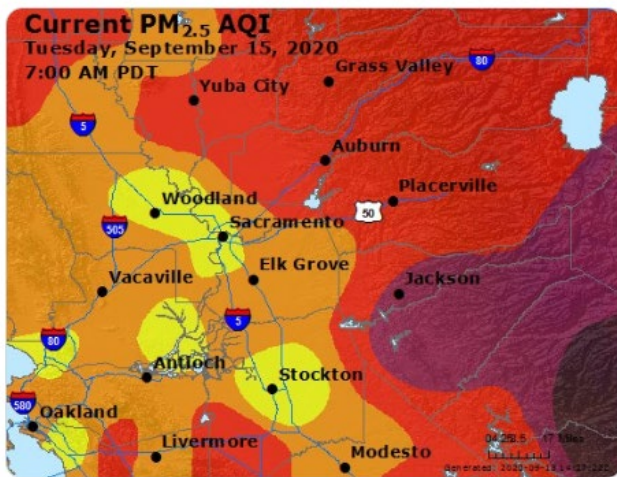
<https://twitter.com/NWSSacramento/status/1305906167365869569>



Feather River AQMD
@FeatherRiverAir

...

The Air Quality Health Advisory has been extended through Thurs Sept 17. Smoke impacts may be greatest overnight/morning while afternoon breezes may give some relief. AQI levels currently USG to Unhealthy in Yuba/Sutter fraqmd.org/air-quality-he...



7:51 AM · Sep 15, 2020 · Twitter Web App

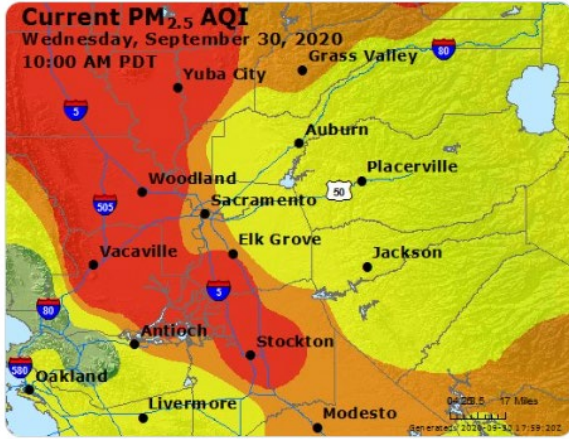
<https://twitter.com/FeatherRiverAir/status/1305881826586587137>



Feather River AQMD
@FeatherRiverAir

...

Smoke is impacting the area from large regional wildfires.
The forecast calls for Moderate to USG AQI Wednesday to Monday. Ozone is expected to be in the Moderate to Good AQI range during this period. The return of southerly winds on Saturday may improve AQI conditions.



11:24 AM · Sep 30, 2020 · Twitter Web App

<https://twitter.com/FeatherRiverAir/status/1311371234320379904>

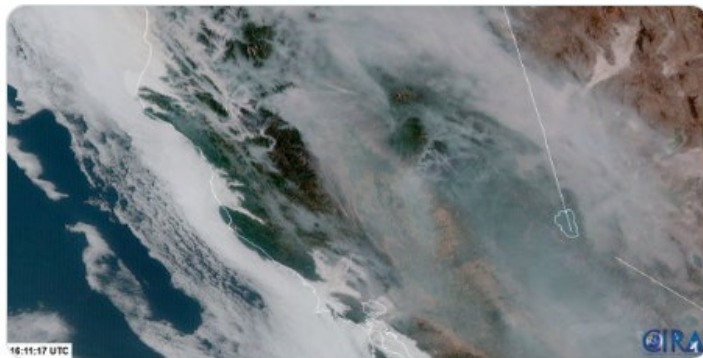


Butte County AQMD
@bcaqmd

...

Unhealthy #AQI conditions possible again today in #Chico, #Oroville, South Butte Co, and #Paradise. Smoke from #NorthComplex is funneling down the Feather River drainage and exiting around Butte Valley. This pattern may continue for a few more days.

fire.airnow.gov/?lat=39.705275...



9:50 AM · Sep 30, 2020 · Twitter Web App

<https://twitter.com/bcaqmd/status/1311347825607811073>



NWS Sacramento
@NWSSacramento

...

Check out the latest [#smoke](#) forecast for [#interior](#) [#NorCal](#). North to northwest winds should usher in more [#smoke](#) to the area today and tonight. [#CAwx](#) [#CAFire](#)



9:52 AM · Oct 1, 2020 · TweetDeck

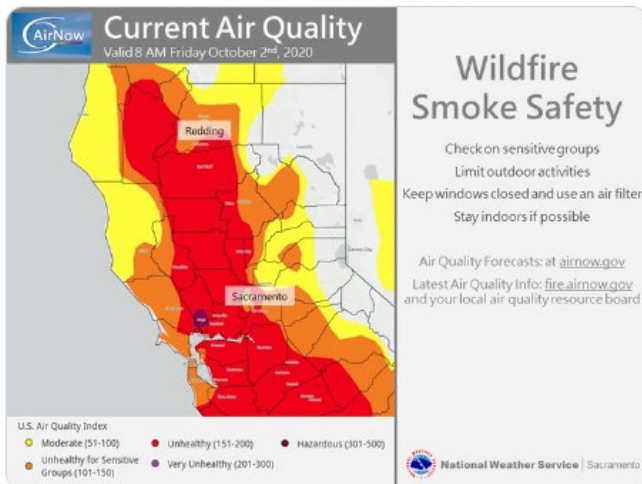
<https://twitter.com/NWSSacramento/status/1311710513609367552>



NWS Sacramento
@NWSSacramento

...

Wildfire smoke continues to create Unhealthy air quality for much of interior [#NorCal](#) this morning. To check the current air quality or the air quality forecast for your area, visit airnow.gov. [#CAwx](#)



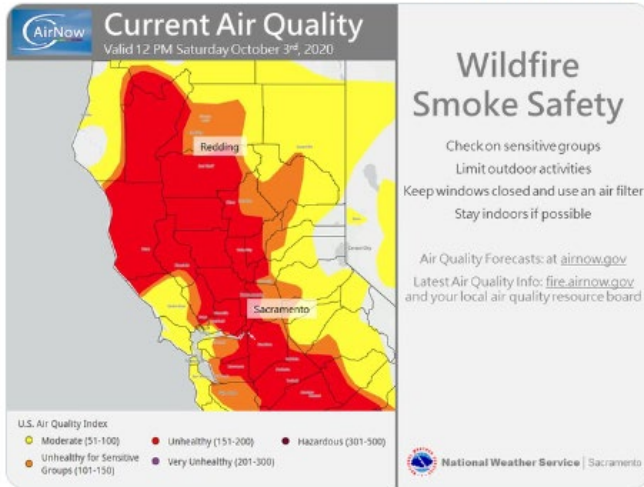
9:10 AM · Oct 2, 2020 · TweetDeck

<https://twitter.com/NWSSacramento/status/1312062503816364033>



...

Unfortunately, the air quality has not changed much in the past few days for most of interior [#NorCal](#) as wildfire smoke continues to impact the area. To view the air quality at your location, visit airnow.gov. [#CAwx](#)



1:42 PM · Oct 3, 2020 · TweetDeck

<https://twitter.com/NWSSacramento/status/1312493127630872577>