Final Rabbit, Reche, and Highland Wildfires Ozone Exceptional Events Demonstration

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1. Glossary

µg/m^3 - micrograms (one-millionth of a gram) per cubic meter air

AOD - Satellite aerosol optical depth

Analogmod – South Coast AQMD Analog Forecast Model

AQS - Air Quality System

Basin - South Coast Air Basin

CANSAC - California and Nevada Smoke and Air Committee

CO - Carbon monoxide

CFR - Code of Federal Regulations

CTM - Chemical transport model

DRI - Desert Research Institute

EPA - Environmental Protection Agency

FRM - Federal Reference Method

GAP - Gap Analysis Project

HMS - Hazard Mapping System

HYSPLIT - Hybrid Single Particle Lagrangian Integrated Trajectory Model

MAE - Mean absolute error

MAIAC - Multi-Angle Implementation of Atmospheric Correction

MDA8 - Maximum Daily Maximum 8-Hour Average

MET - Meteorological

MSE - Mean squared error

NAM - North American Mesoscale Forecast System

NAAQS - National Ambient Air Quality Standard

NAQFC - National Oceanic and Atmospheric Administration National Air Quality Forecast Capability

NOx - Nitrogen oxides

NOAA - National Oceanic and Atmospheric Administration

NWS - National Weather Service

O3 - Ozone

PM2.5 - Particulate matter less than 2.5 micrometers in diameter

PBL – Planetary Boundary Layer

POC - Parameter Occurrence Code (Used to uniquely identify a monitor if there is more than one device measuring the same pollutant at a site)

ppm - Part per million

ppb - Part per billion

PST - Pacific Standard Time

Q/D - Emissions divided by distance

RMSE - Root mean square error

South Coast AQMD - South Coast Air Quality Management District

USGS - U.S. Geological Survey

UTC - Universal Time Coordinated

VOC - Volatile organic compounds

WRF - Weather Research and Forecasting model

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4. Executive Summary

Three wildfires, the Rabbit, Reche, and Highland Fires, started in Riverside County on July 14, 2023, burning 8142 acres of wildland over two days, causing air pollution impacts in the South Coast Air Basin and Coachella Valley. There is no reasonable way to directly control or prevent all wildland fires and so their air pollution impacts are excluded when comparing measured concentrations with national ambient air quality standards if they meet certain criteria. This exceptional events demonstration requests U.S. EPA to exclude ozone measured at Palm Springs – Fire Station, in the Coachella Valley, on July 14 and July 15, 2023 from regulatory calculations, and provides the data needed for U.S. EPA to concur upon the wildfire exceptional event. The wildfires are exceptional events because they meet criteria specified by the U.S. EPA exceptional events rule in the Code of Federal Regulations 40 CFR §50.14. This demonstration provides the following elements required by the rule.

Regulatory Significance: Exclusion of the Palm Springs July 14 and 15, 2023 ozone measurements affects two regulatory decisions on attainment of the 1997 8-hour ozone national ambient air quality standard (1997 NAAQS), for which the Coachella Valley is classified as Extreme nonattainment with an attainment date of no later than June 15, 2024, with Palm Springs – Fire Station having the highest ozone design value in the Coachella Valley. First, upon U.S. EPA concurrence of either July 14 or July 15, 2023 and exclusion of the data, the 4th highest MDA8 ozone in 2023 is 0.084 ppm, below the level of the 1997 NAAQS, and thus a one-year extension of the attainment date can be granted by U.S. EPA under 40 CFR § 51.1307 if additional planning requirements are satisfied. Second, without data exclusion, the 2022 through 2024 design value at Palm Springs calculated from final 2022 and 2023 data and preliminary 2024 data available as of August 9, 2024 exceeds the 1997 NAAQS. However, upon U.S. EPA concurrence of both July 14 and July 15 and exclusion of the data the design value meets the 1997 NAAQS, and thus planning requirements including requirements to submit attainment demonstrations may be suspended under 40 CFR § 51.918. For these two reasons, EPA concurrence of this Exceptional Event demonstration would have significant regulatory implications.

Public notification of the event and mitigation: Although the wildfire-affected data should be excluded from regulatory calculations, it is important to mitigate air quality impacts and public exposure to pollution due to the wildfire. Within hours of the fires starting, South Coast AQMD issued smoke advisories and distributed them widely on the South Coast AQMD homepage, the South Coast AQMD smart phone app, emailed using the U.S. EPA Enviroflash system, through a press release, and as Air Quality Alerts by the San Diego National Weather Service Forecast Office. South Coast AQMD also provided forecasts of air quality index (AQI), real-time location-specific AQI, and push notifications when air quality reached pre-defined levels.

Narrative conceptual model: This demonstration provides a narrative conceptual model that describes the wildfires and how emissions led to the exceedances on July 14 and 15.

Clear causal relationship and conclusion: This demonstration provides clear causal evidence that wildfire emissions were transported to the monitor location, that the emissions affected the monitor, and that the emissions caused the ozone exceedances. The evidence provided includes analysis of the following data: HYSPLIT trajectory modeling; comparison of the July 14 and 15 concentrations with historical concentrations; PM2.5, carbon monoxide, nitrogen oxide, wind speed and direction, and temperature measurements; wildfire emission rates divided by distance to Palm Springs; Hazard Mapping System smoke location polygons; visible imagery and aerosol optical depth from satellite measurements; and animation sequences from the South Coast AQMD real-time AQI map.

This demonstration additionally provides evidence showing that the wildfires were caused by human activity that is unlikely to recur or a natural event, that the wildfires were not reasonably controllable or preventable, and documentation of submission of an Initial Notification of Potential Exceptional Event to U.S. EPA and that affected data was flagged in EPA's Air Quality System (AQS). Finally, this demonstration provides documentation that the State followed the public comment process and that the comment period was open for a minimum of 30 days.

5. Introduction

The Rabbit, Reche, and Highland Wildfires all started on July 14, 2023 in Riverside County within the jurisdiction of the South Coast Air Quality Management District (South Coast AQMD). This document provides evidence that smoke from the fires influenced ozone (O3) concentrations at the Palm Springs monitoring station on July 14 and 15, 2023. Per Code of Federal Regulations 40 CFR §50.14, "A State, federal land manager or other federal agency may request the Administrator to exclude data showing exceedances or violations of any national ambient air quality standard that are directly due to an exceptional event from use in determinations" of regulatory decisions including attainment status. Note that data excluded under the Exceptional Events Rule are not deleted; they are simply left out of regulatory calculations. This document is an exceptional events demonstration and provides evidence that wildfire smoke from the Rabbit, Reche, and Highland Wildfires caused increased ozone concentrations leading to exceedances of the 1997 O3 8-hour National Ambient Air Quality Standard (NAAQS) (NAAQS ozone 8-hour 1997 Standard). This demonstration follows Environmental Protection Agency (EPA) guidance for preparing exceptional events demonstrations, which can be found in Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

The Coachella Valley, shown in Figure 1 along with the location of Palm Springs, is classified as Extreme nonattainment for the ozone 8-hour 1997 NAAQS with an attainment date of no later than June 15, 2024. With concurrence by EPA on either July 14 or July 15, 2023, as specified in this exceptional events demonstration, the affected data could be excluded from regulatory calculations and the 4th highest of the daily maximum of 8-hour average ozone (MDA8) in the Coachella Valley in 2023 would be below the level of the

ozone 8-hour 1997 NAAQS. Thus, a one-year extension can be granted by the EPA upon concurrence of the exceptional events demonstration and satisfaction of other planning requirements per 40 CFR § 51.1307. Additionally, the 2022 through 2024 O3 8-hour (1997) design value for the Coachella Valley calculated from final 2022 and 2023 data and preliminary 2024 data available as of August 9, 2024 is 0.09 ppm (part per million), which exceeds the O3 8-hour (1997) NAAQS. Upon concurrence of the exceptional events demonstration and exclusion of both July 14 and 15, the fourth highest MDA8 in 2023 would be 0.083 ppm, and the 2022-2024 design value before rounding would be 0.084 ppm. Thus, the Coachella Valley could meet the NAAQS ozone 8-hour 1997 Standard upon EPA concurrence of the exceptional events demonstration assuming that the fourth highest MDA8 in 2024 remains at 0.087 ppm, and planning requirements including requirements to submit attainment demonstrations may be suspended under 40 CFR § 51.918. Because of this, EPA concurrence of this Exceptional Event demonstration would have significant regulatory implications.

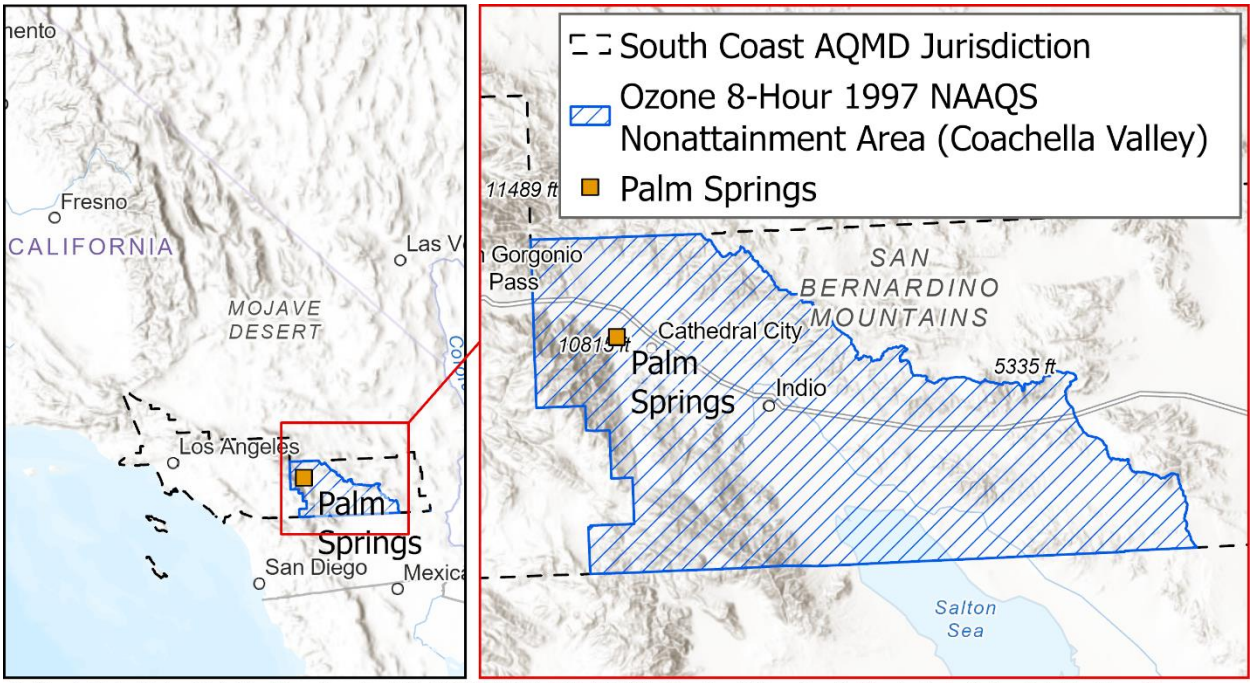

Figure 1: Location of Palm Springs and boundary of the nonattainment area for the Ozone 8-hour 1997 NAAQS in the Coachella Valley.

Table 1 provides a listing of the requirements of an exceptional events demonstration and indicates in which sections each of those requirements are addressed. Sections 5 through 11 of this document provide the narrative conceptual model. Sections 11 through 27 provide evidence of the clear causal relationship between the Rabbit, Reche, and Highland Wildfires and the ozone exceedances at the Palm Springs station on July 14-15, 2023. Evidence that the regulatory significant exceedances were caused by a natural event is presented in Section 28. Evidence that the exceptional event was not reasonably

controllable or preventable is presented in Section 29. Information about the public comment process related to this exceptional event demonstration is presented in Section 30. References are provided in Section 31, and additional supporting documentation is provided in Sections 32 through 40, which comprise the appendices. The Exceptional Events Demonstration Development Tool was used to draft much of this document, particularly most of the figures and tables in Sections 8, 11.7, 12, 13, 14, 15, 16, 24, 25, 37, 38, and 39.

Table 1: Listing of exceptional events demonstration requirements and corresponding location within this document where each requirement is addressed.

Requirement Summary	Requirement	Relevant Regulation and Guidance	Main Document Sections	Appendix Sections
Regulatory Significance	Show that the event is regulatory significant	Sections 1-2 of Guidance	6	33
Submission of Initial Notification of Potential Exceptional Event and flag the affected data in EPA's Air Quality System (AQS)	"A State shall notify the Administrator of its intent to request exclusion of one or more measured exceedances of an applicable national ambient air quality standard as being due to an exceptional event by creating an initial event description and flagging the associated data that have been submitted to the AQS database and by engaging in the Initial Notification of Potential Exceptional Event process"	40 CFR §50.14(c)(2)(i), Section 1 of Guidance	6	33
Narrative Conceptual Model	"A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s);"	40 CFR §50.14(c)(3)(iv), Section 2 and Appendix A1 of Guidance	5, 6, 7, 8, 9, 10, 11	32, 33, 34, 35, 36

Requirement Summary	Requirement	Relevant Regulation and Guidance	Main Document Sections	Appendix Sections
Prompt public notification of the event	"All States and, where applicable, their political subdivisions must notify the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard."	40 CFR §50.14(c)(1)(i)	9	35
Mitigation	"A State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards."	40 CFR §51.930	9	35
Historical Analysis	"Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times"	40 CFR §50.14(c)(3)(iv), Section 3.2 of Guidance	12	37
Historical Analysis	Determine Tier 1 vs Tier 2	Section 3.4.1 of Guidance	12	37
Emissions divided by distance (Q/D) Analysis	Determine Tier 2 vs Tier 3	Section 3.5.1 of Guidance	13, 14	38, 39

Requirement Summary	Requirement	Relevant Regulation and Guidance	Main Document Sections	Appendix Sections
Tier 1: evidence of clear causal relationship that wildfire emissions were transported to monitor location	"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 or violation;"	40 CFR §50.14(c)(3)(iv), Section 3.4 of Guidance	11, 15, 16, 17, 18, 19, 20, 21, 22, 23	

Requirement Summary	Requirement	Relevant Regulation and Guidance	Main Document Sections	Appendix Sections
Tier 2: evidence of clear causal relationship that the fire emissions affected the monitor	"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 or violation;"	40 CFR §50.14(c)(3)(iv), Section 3.5 of Guidance	11, 13, 14, 23	38, 39
Tier 3: additional evidence of clear causal relationship that the fire emissions caused the ozone exceedances	"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 or violation;"	40 CFR §50.14(c)(3)(iv), Section 3.6 of Guidance	24, 25, 26	
Clear Causal Conclusion Statement	Clear causal summary statement	Section 3.7 of Guidance	27	
Human activity that is unlikely to recur or natural event	"A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event."	40 CFR §50.14(c)(3)(iv), Section 4 of Guidance	8, 28	34
Not Reasonably Controllable or Preventable	"A demonstration that the event was both not reasonably controllable and not reasonably preventable;"	40 CFR §50.14(c)(3)(iv), Section 5 of Guidance	8, 29	34

Requirement Summary	Requirement	Relevant Regulation and Guidance	Main Document Sections	Appendix Sections
Public Comment Process	"Document that the State followed the public comment process and that the comment period was open for a minimum of 30 days, which could be concurrent with the beginning of the Administrator's initial review period of the associated demonstration"	40 CFR §50.14 (c)(3)(v)	30	40

Table 2 shows a summary of the exceedances of the NAAQS ozone 8-hour 1997 Standard that occurred during the Rabbit, Reche, and Highland Wildfires. As discussed in Section 6, only the exceedances at the Palm Springs monitoring station are regulatory significant. However, analyses for the Banning station are also included throughout this document for two reasons: 1) the Banning station is located between the fires and the monitor and 2) to provide better context for the exceedances at Palm Springs.

Table 2: Summary of regulatory significant exceedances during the Rabbit, Reche, and Highland Wildfires.

Date	Site Name	Full AQS ID	MDA8 Concentration (ppm)
2023-07-14	Palm Springs - Fire Station	840060655001	0.093
2023-07-15	Palm Springs - Fire Station	840060655001	0.086

Note: MDA8 is the maximum daily 8-hour average, see Overview of Ozone (O3) Air Quality in the United States for more details.

6. Regulatory Significance

This section addresses Section 2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Per 40 CFR 50.14(a)(1)(i), the Exceptional Event Rule applies to data showing an exceedance of a standard which may affect regulatory determinations regarding attainment designation status or other action. A site is in violation of the NAAQS ozone 8-hour 1997 Standard if the monitored design value before rounding for that site exceeds 0.084 ppm. The design value is calculated by averaging the fourth highest of the maximum daily 8-hour average ozone concentrations measured at each site in three consecutive years, with the designation area's design value being the maximum value among all the sites.

The Coachella Valley is classified as Extreme nonattainment for the NAAQS ozone 8-hour 1997 Standard with an attainment date of no later than June 15, 2024. With concurrence by EPA on this exceptional events demonstration, the affected data could be excluded from regulatory calculations and the 4th highest of the maximum daily 8-hour average ozone in the Coachella Valley in 2023 would be below the level of the NAAQS ozone 8-hour 1997 Standard. Thus, a one-year extension can be granted by the EPA upon concurrence of the exceptional events demonstration and satisfying additional planning requirements per 40 CFR § 51.1307.

For the most recent validated data spanning from 2021 to 2023, the Palm Springs site in Riverside County (Coachella Valley), CA reported the highest value in the Coachella Valley,

with a design value of 0.09 ppm. On July 14 and July 15, 2023, this site recorded two exceedances of the ozone 8-hour 1997 NAAQS with the monitored values of 0.093 ppm and 0.086 ppm, respectively (Table 3). These exceedances were influenced by the Rabbit/Reche/Highland Wildfire event. Table 4 shows the ranking of the top MDA8 concentrations for 2023 at Palm Springs. The concentrations for July 14 and 15 were the top two concentrations for all of 2023 at Palm Springs. Table 4 shows that with EPA concurrence on either July 14 or July 15 of the Rabbit/Reche/Highland Wildfire event and exclusion of one of the two days, the new 4th highest MDA8 in 2023 would be 0.084 ppm. The 4th highest MDA8 in the Coachella Valley for 2023 would thus be below the level of the NAAQS ozone 8-hour 1997 Standard after rounding, with EPA concurrence, and Coachella Valley would then be eligible for a one-year extension of the attainment date under 40 CFR § 51.1307. Therefore, the Rabbit/Reche/Highland Wildfire event is of regulatory significance because a one-year extension may be granted upon EPA concurrence of the event. Section 33 shows the Initial Notification for Exceptional Events submitted December 20, 2023.

Table 3: Summary of NAAQS ozone 8-hour 1997 Standard Exceedances covered by this exceptional events demonstration.

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)
2023-07-14	wildfire	RT	060655001 /POC 1	Palm Springs	0.093 ppm	Rabbit/Reche/ Highland Wildfires
2023-07-15	wildfire	RT	060655001 /POC 1	Palm Springs	0.086 ppm	Rabbit/Reche/ Highland Wildfires

Note: POC is the Parameter Occurrence Code and is used to uniquely identify a monitor if there is more than one device measuring the same pollutant at a site.

Table 4: Top 2023 MDA8 Ozone Concentrations at Palm Springs.

Rank	Rank after event exclusion	Date	Concentration (ppm)	Part of Rabbit, Reche, Highland Wildfires Event
1	-	2023-07-14	0.093	Yes
2	-	2023-07-15	0.086	Yes
3	1	2023-04-28	0.086	No
4	2	2023-06-29	0.085	No
5	3	2023-08-04	0.084	No
6	4	2024-08-24	0.083	No
7	5	2024-08-28	0.083	No

Figure 2 and Figure 3 show the output from EPA's Exceptional Events Design Value Tool for the Palm Springs station for 2021-2023 without and with excluding data from July 14-15, 2023, respectively. Without any exclusions, the 4th highest value for 2023 is 0.085 ppm. After excluding one of these days, the 4th highest value becomes 0.084 ppm; exclusion of both days leads to a 4th highest value of 0.083 ppm.

Exceptional Events Design Value Tool

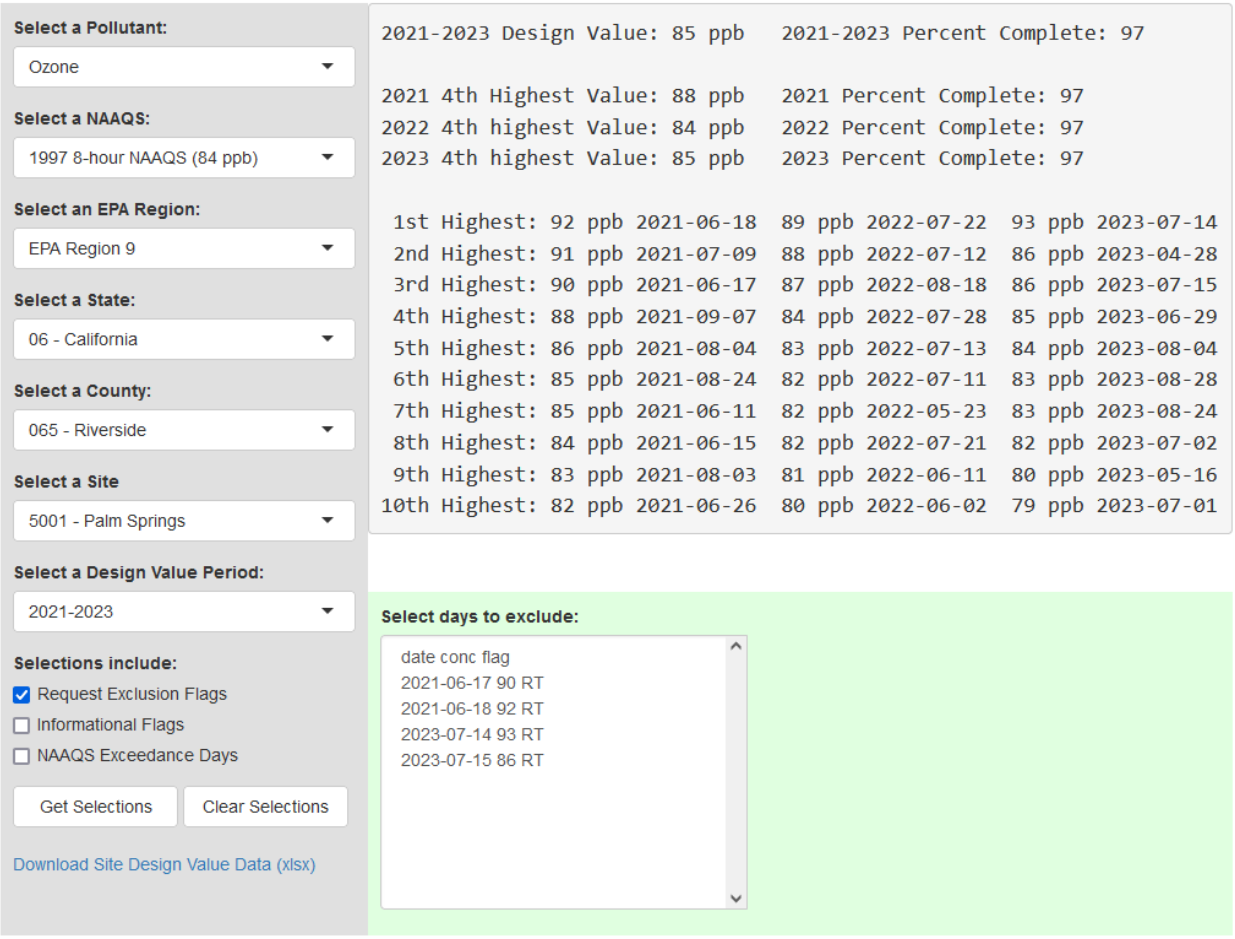

Figure 2: Output from EPA's Exceptional Events Design Value Tool with no data exclusions, generated July 31, 2024.

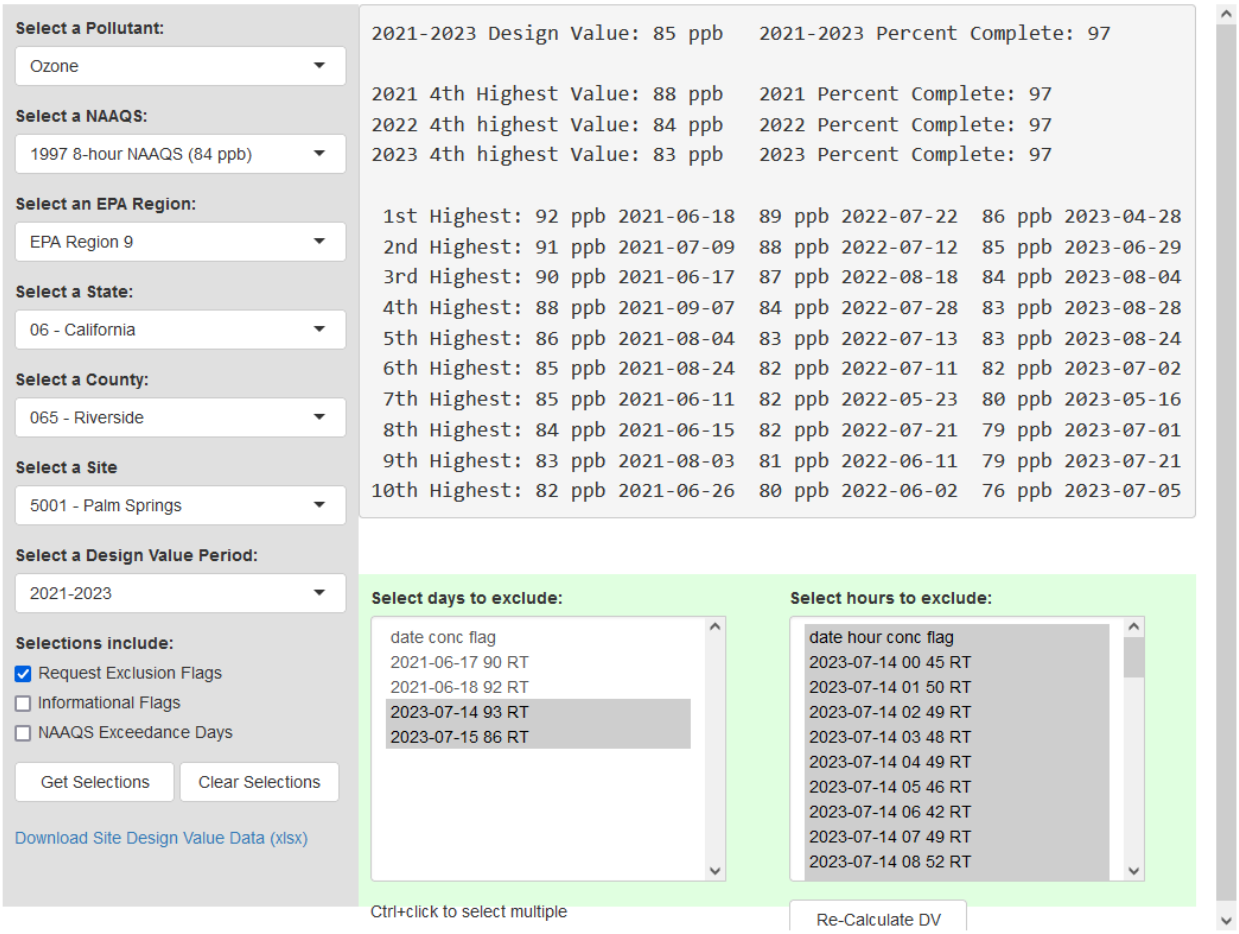

Figure 3: Output from EPA's Exceptional Events Design Value Tool excluding data for July 14 and 15, 2023, generated July 31, 2024.

Additionally, without exclusion of data affected by this exceptional event, the 2022 through 2024 NAAQS ozone 8-hour 1997 Standard design value for the Coachella Valley calculated from final 2022 and 2023 data and preliminary 2024 data available as of August 9, 2024 is 0.09 ppm, exceeding the NAAQS ozone 8-hour 1997 Standard. This design value is determined from final 2022 and 2023 fourth highest MDA8 of 0.084 ppm and 0.085 ppm in 2022 and 2023 respectively (Figure 2) and from fourth highest MDA8 of 0.087 ppm in 2024 determined from preliminary data shown in Table 5. Upon concurrence of the exceptional events demonstration, the affected data could be excluded, the fourth highest MDA8 in 2023 would be 0.083 ppm (Figure 3), and the 2022-2024 design value before rounding would thus be 0.084 ppm. Thus, the Coachella Valley could meet the NAAQS ozone 8-hour 1997 Standard upon EPA concurrence of the exceptional events demonstration assuming that the fourth highest MDA8 in 2024 remains at 0.087 ppm, and planning requirements including requirements to submit attainment demonstrations may be suspended under 40 CFR § 51.918. The data from both July 14 and 15, 2023 at Palm

Springs are thus regulatory significant. Note that Figure 3 shows the 2021-2023 design value but the regulatory significance discussed in this paragraph is that, assuming that the fourth highest MDA8 in 2024 remains at 0.087 ppm, the 2022-2024 design value would meet the standard after exclusion of July 14 and 15, 2023.

Table 5: Top 2024 MDA8 Ozone Concentrations at Palm Springs from preliminary data as of August 9, 2024.

Rank	Date	Concentration (ppm)
1	2024-07-08	0.091
2	2024-07-09	0.090
3	2024-06-06	0.087
4	2024-07-31	0.087
5	2024-07-23	0.086
6	2024-07-17	0.085
7	2024-07-11	0.083

7. Area Description for Coachella Valley[1]

This section addresses Section 2 and Appendix A1, A of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

The Coachella Valley is located in the desert portion of Riverside County in the Salton Sea Air Basin and within the South Coast AQMD's jurisdiction (Figure 4). It is the most populated area in this desert region. It encompasses several communities including Palm Springs, Desert Hot Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, Coachella, Thermal, and Mecca. Figure 5 provides a map of the area and the surrounding topography. Coachella Valley covers approximately 2,000 square miles and has a population of close to half a million people, including wintertime "snowbirds". The Banning Pass (San Gorgonio Pass) is the west-east pass between the San Bernardino Mountains to the north and the San Jacinto Mountains to the south with a 2,600 ft elevation and 2-3 miles width. These mountains form the western boundary of the northwest-

[1] Adapted from Request to Reclassify Coachella Valley for the 2008 8-Hour Ozone Standard and the Updated Motor Vehicle Emissions Budgets (Chapter 3).

southeast oriented Coachella Valley. The valley runs approximately 45 miles from the north end of the Salton Sea to Desert Hot Springs. The lack of summertime precipitation, coupled with the surrounding vegetated mountains creates conditions conducive to wildfires during the summer months.

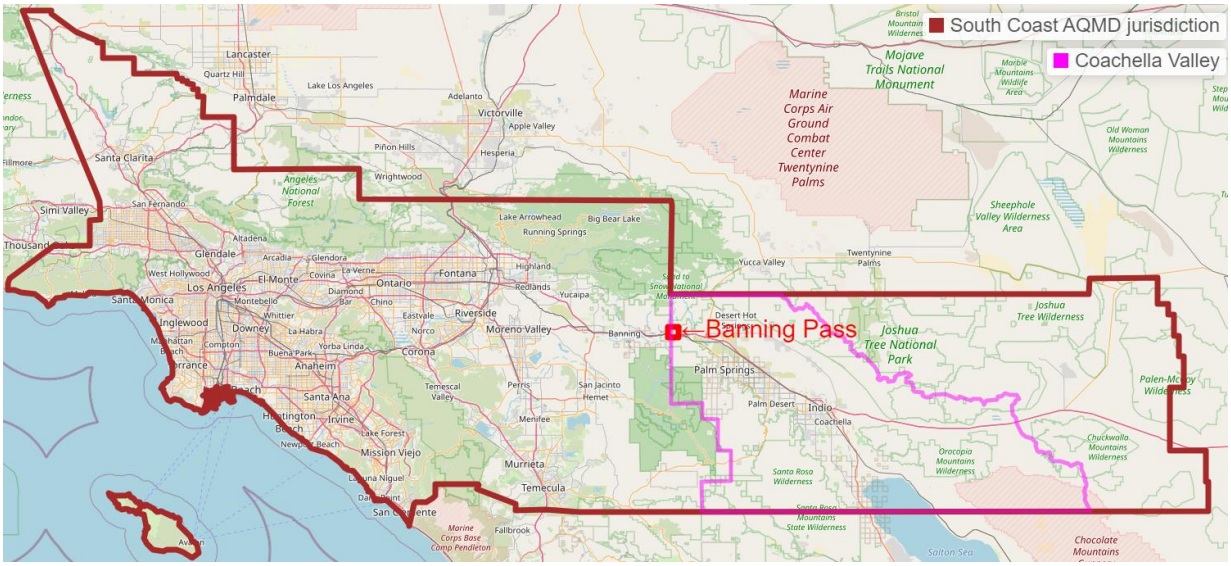

Figure 4: Map showing South Coast AQMD jurisdiction (maroon), the Coachella Valley (magenta) and Banning Pass (red).

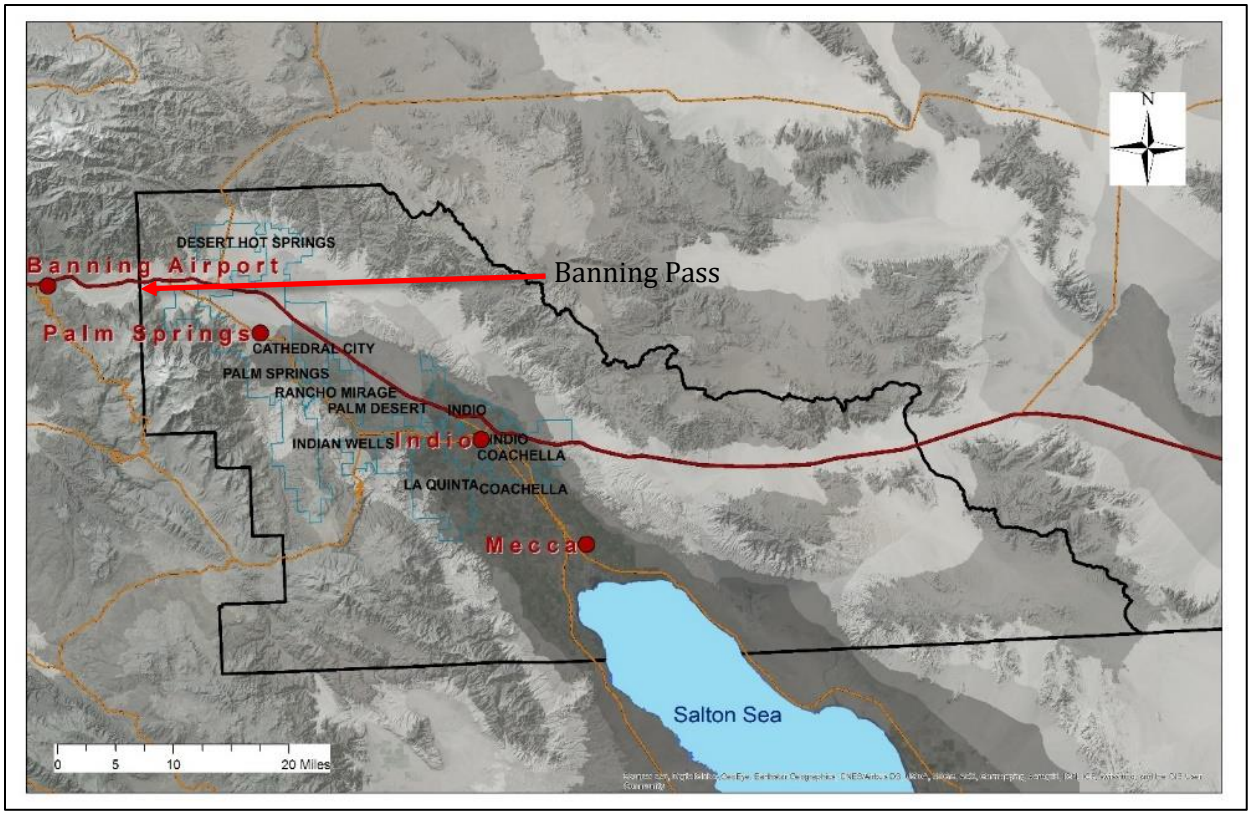

Figure 5: Topography and planning area boundary of the Coachella Valley.

The Coachella Valley is located downwind of the South Coast Air Basin (Basin), which is also within the jurisdiction of South Coast AQMD. The combination of topography, emissions, and climate of Southern California makes the South Coast Air Basin an area of high air pollution potential. Additionally, the region experiences more days of sunlight than any other major urban area in the nation except Phoenix, Arizona. This abundant sunlight triggers the photochemical reactions that produce ozone and secondary PM2.5. Ozone levels in the Coachella Valley are impacted by pollutants directly transported from the South Coast Air Basin as well as pollutants formed in the atmosphere through photochemical reactions from precursors emitted upwind. Local pollutants emitted within the Coachella Valley have limited impact on the ozone levels in the Coachella Valley.

This section addresses Section 2 and Appendix A1, B of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

This section describes typical concentrations, emissions sources, seasonal and diurnal ozone patterns under typical (non-event) circumstances. The role of meteorology on ozone formation and transport to Palm Springs in the Coachella Valley and sites typically upwind thereof, and non-event comparisons between nearby monitors are described.

7.1. Transport from Upwind Areas and Ozone Formation[2]

Ozone in the Coachella Valley is both directly transported from the South Coast Air Basin and formed photochemically from precursors emitted upwind and within the Coachella Valley. The precursors are emitted in the greatest quantity in the coastal and central Los Angeles County areas of the South Coast Air Basin. The Basin's prevailing sea breeze causes polluted air to be transported inland. As the air is being transported inland, ozone is formed, with peak concentrations occurring in the inland valleys of the Basin. Ozone and its precursors from these upwind areas mostly enter the Coachella Valley through the Banning Pass. Emissions estimated for the 2022 Air Quality Management Plan were 361.8 and 259.27 tons per day in the Basin for VOC and NOX, respectively, and 11.71 and 13.68 tons per day in the Coachella Valley for 2023, demonstrating that precursor emissions were much higher in the Basin than in the Coachella Valley[3]. Ozone levels in the Coachella Valley are therefore mostly due to emissions upwind of the area, with a much smaller influence from sources within. As the air is transported further inland into the Coachella Valley through the Banning Pass, ozone concentrations typically decrease due to dilution, but can remain high enough to exceed ozone standards.

[2] Adapted from Chapter 3 of South Coast AQMD Staff Report of November 2022 (Request to Reclassify Coachella Valley for the 2008 8-Hour Ozone Standard and the Updates Motor Vehicle Emissions Budget).

[3] From 2022 Air Quality Management Plan Attachment A "2023 Annual Average Emissions by Source Category in South Coast Air Basin" "2023 Annual Average Emissions by Source Category in Coachella Valley" available at https://www.aqmd.gov/home/air-quality/air-quality-management-plans/air-quality-mgt-plan

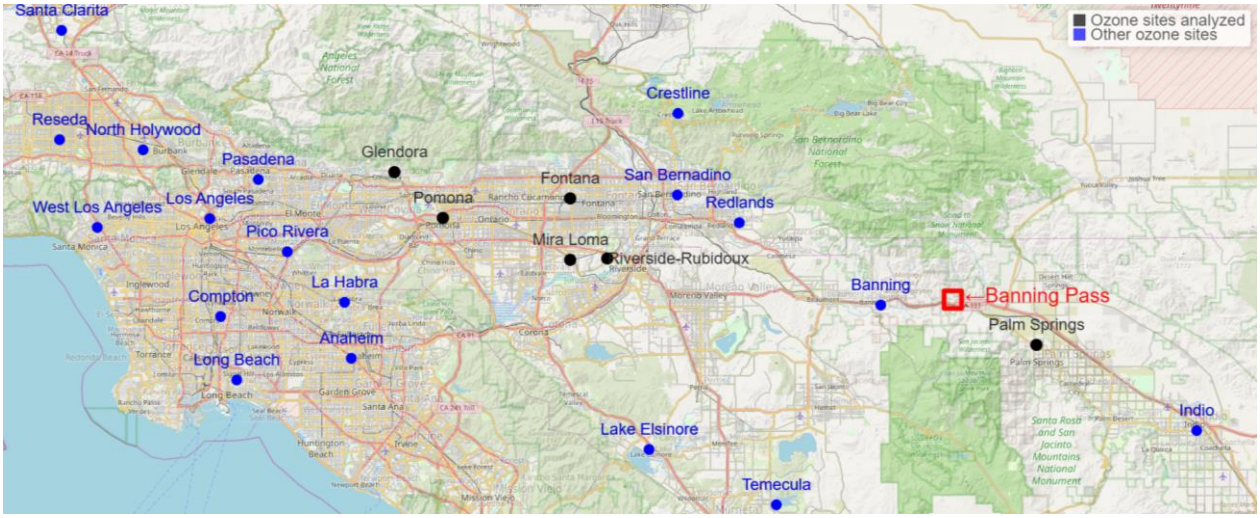

Figure 6: Map showing all ozone monitors within South Coast AQMD's jurisdiction.

Figure 6 shows the locations of all ozone monitors within the South Coast Air Basin in 2024. Data from some of these ozone monitors is analyzed in section 11, including analyses showing that transport of ozone from upwind monitored locations did not cause the exceedances on July 14 and 15. Figure 7 shows diurnal ozone profiles at various stations along the corridor from Los Angeles County into Riverside County and then into the Coachella Valley, along the typical transport path due to westerly winds in the Basin and subsequent transport into the Coachella Valley through the Banning Pass during the 2021-2023 May–October smog seasons. At stations near where most ozone precursors are emitted (source region), ozone peaks occur just after mid-day on average. This peak corresponds to the peak of incoming solar radiation and therefore the peak of ozone production via chemical reactions. Ozone peaks near the emissions source region are not as high as those further downwind, due to the time required for ozone to form. From Los Angeles to Banning, ozone peaks occur later in the day as ozone and ozone precursors are transported downwind and ozone-forming reactions continue. At Palm Springs and Indio, ozone concentrations mostly plateau below the levels measured in Banning, between late morning and early evening. This suggests there is little additional ozone buildup downwind of Banning in the Coachella Valley itself. Any new ozone formed within the Coachella valley is approximately counter-balanced by enhanced atmospheric dispersion caused by intense daytime heating.

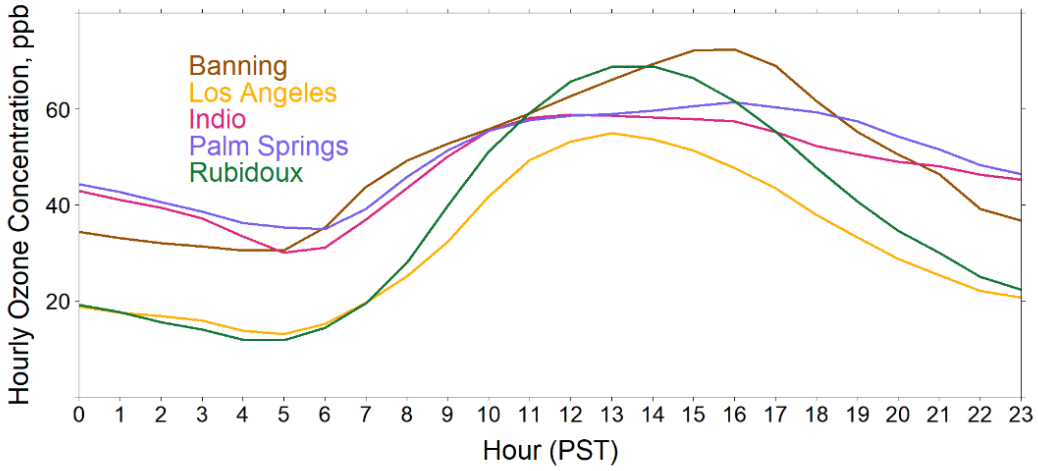

Figure 7: Average Hourly Profile of 3-Year (2021–2023 May–October) Ozone Concentrations along the Ozone Precursor Transport Route into the Coachella Valley

Palm Springs also shows higher morning ozone concentrations when compared to the concentrations in the morning in the South Coast Air Basin closer to the main emissions source areas (i.e., Los Angeles and Rubidoux). The stations in the Basin have more local NOx emissions (mostly from mobile sources) that titrate ozone during nighttime whereas the Coachella Valley has limited local NOx emissions to titrate the ozone at night.

7.2. Meteorology and Emissions

Ozone concentrations are heavily dependent on meteorological conditions. High ozone concentrations and the number of days exceeding the federal ozone standards are greatest in the late spring and summer months, with no exceedances of any ozone standard during the winter in the Coachella Valley. Ozone concentrations are a strong function of season for several reasons. First, the rate of the reactions that produce ozone in the atmosphere proceeds faster at higher temperatures. Second, elevated temperatures lead to increased precursor concentrations – the chemicals that react together to form ozone - by hastening the evaporation of VOCs into the air. Third, ozone concentrations are also dependent on sunlight intensity and duration, which are stronger during the summer months. Finally, the stability of the atmosphere also influences ozone concentrations as strong inversions limit mixing with the upper atmosphere, leading to elevated concentrations at the surface. The temperature inversion typically forms above the planetary boundary layer (PBL) during daytime creating a "cap" that limits vertical mixing. The depth of the mixed layer within the PBL controls the amount of dilution and thus is one factor that determines ozone concentrations. The mixed layer is deeper when there is more atmospheric turbulence generated due to heating of the surface and due to wind shear caused by high winds.

Year-to-year changes in meteorology can alter transport patterns, leading to changes in precursors and upwind ozone entering the Coachella Valley. Elevated temperatures and

reduced atmospheric mixing can also contribute to additional ozone formation. In addition, the North American Monsoon, which can increase humidity and afternoon thunderstorms in the Coachella Valley between July and September can also affect ozone concentrations.

Biogenic VOC emissions (those emitted by vegetation) may also exhibit large year-to-year variations. Vegetation is a large source of VOCs, especially during summer months. Vegetative growth is highly dependent on rainfall during the winter and spring, which exhibits significant year-to-year variations throughout California. Crops can be grown from January through December in Riverside, upwind of the Coachella Valley, based on data from www.almanac.com. This long growing season indicates that biogenic VOC emissions can be high year-round.

7.3. Non-Event Pollutant and Meteorology Trends

"Non- event" refers to May 30 - August 29 from 2019-2023, except for July 14 and 15, 2023, even though there may be other wildfire smoke impacted days within that historical period. Section 11, titled "Interactions of Wildfire Emissions, Meteorology, and Pollutant Concentrations," contains more information on non-event pollutant and meteorology relationships, such as pollution roses, ozone vs temperature, carbon monoxide (CO) : nitrogen oxides (NOx) ratios and particulate matter less than 2.5 micrometers in diameter (PM2.5) measured with regulatory monitors and PurpleAir sensors, in Palm Springs.

8. Wildfire Description for Rabbit, Reche, and Highland Wildfires

This section addresses Sections 2, 4, and Appendix A1, C of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

The Rabbit, Reche, and Highland Wildfires all started near the Coachella Valley on July 14, 2023. These fires contributed significantly to the ozone exceedances of the NAAQS ozone 8-hour 1997 Standard measured at the Banning Airport and Palm Springs – Fire Station monitoring stations during July 14 2023 through July 15, 2023.

The locations of the Rabbit, Reche, and Highland Wildfires are shown in Figure 8. Burn perimeters are from the National Interagency Fire Center.

Figure 8: Map of fire and monitor locations. The red polygons are fire perimeters.

Figure 9 shows the land use types within the burn areas of the Rabbit, Reche, and Highland Wildfires. Parcel-level land use data were obtained from the Southern California Association of Governments 2019 Annual Land Use map service, updated in 2021. The areas within the burn areas are predominantly vacant, open space, and recreation with some industrial, transportation, communications, and utilities use. However, not all areas designated as industrial or transportation, communications, and utilities are developed. See aerial imagery in Figures 10 through 12. Wildfires that predominantly occur on wildland, which is predominantly vacant land where structures, if any, are widely scattered, are considered natural events per 40 CFR 50.1(k) (n), and (o). Thus, the Rabbit, Reche, and Highland Wildfires can be considered natural events. See section 28 for additional details.

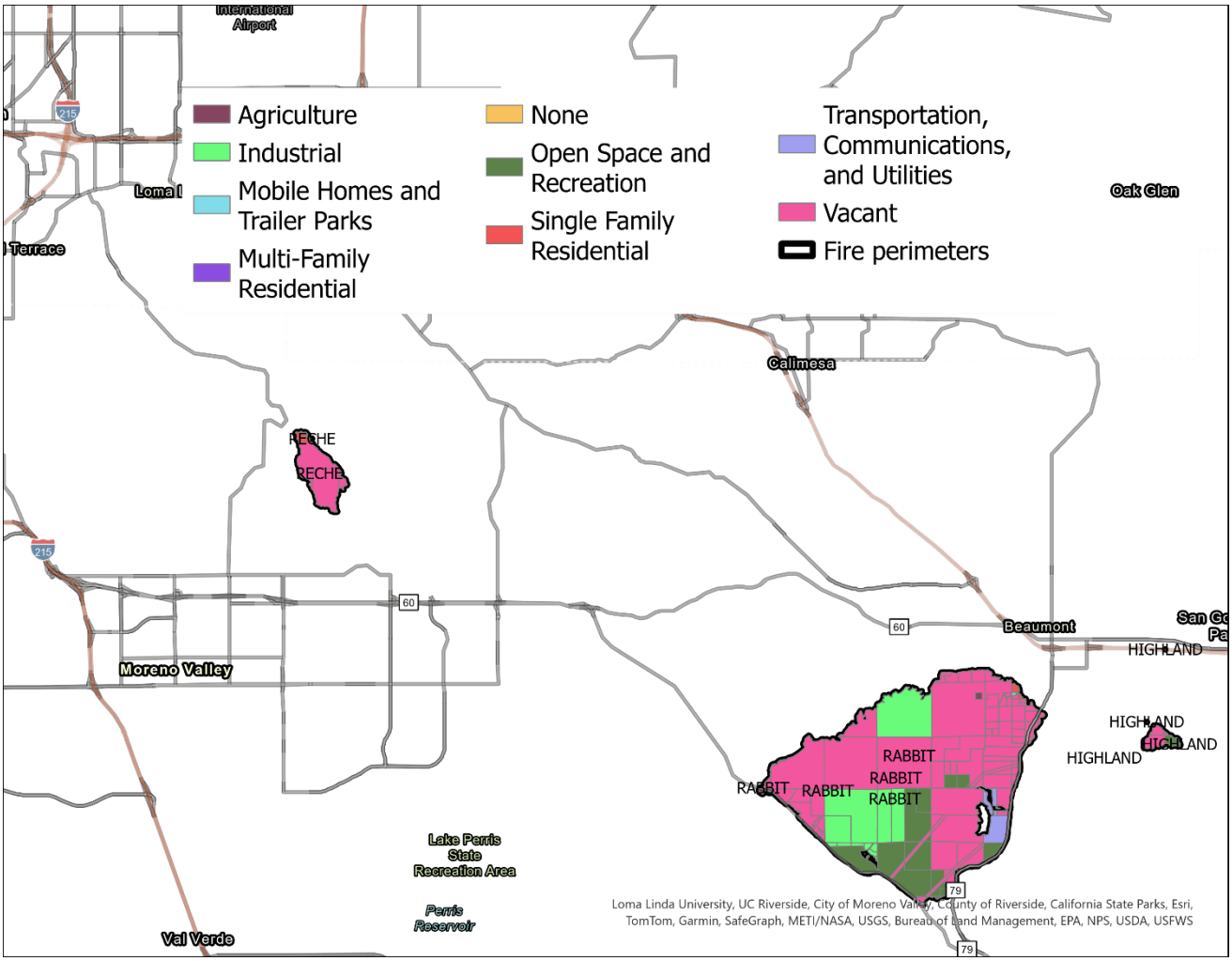

Figure 9: Land-use types within the burn areas of the Rabbit, Reche, and Highland Fires.

8.1. Highland Fire

A wildfire called the Highland Fire was first reported on July 14, 2023 at 14:57 Local Time, which is 13:57 Pacific Standard Time (PST). The fire burned 105 acres before being extinguished on July 17, 2023. The fire was reported at 33.907342 degrees latitude and -116.946498 degrees longitude. As of July 24, 2024, the Cal Fire Highland Fire Incident Report lists the cause of the Highland Fire as under investigation. Further details about the Highland Fire can be found in Section 34.1.

As shown in Figure 10, the Highland Fire was a wildfire that occurred on areas classified as vacant and open space and recreation. This satisfies the US E.P.A. criteria of a wildfire occurring on wildland, see Section 4.2 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations and 40 CFR 50.1(k) (n), and (o). Figure 10 shows the burn perimeter for the Highland Fire

overlaid on Esri World Imagery; the blue areas represent Protected Areas as defined by the U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2022. The protected areas are dedicated to the preservation of biological diversity and to other natural, recreation and cultural uses.

Figure 10: Burn perimeter for the Highland Fire.

The Highland Fire burned a total of 105 acres. Table 6 shows the daily progression of the Highland Fire, and more information can be found at https://www.fire.ca.gov/incidents/2023/7/14/highland-fire.

Table 6: Fire progression summary for the Highland Fire.

Date	1-Day Growth (acres)	Notes	Fire Website
2023-07-14	105	Last status update of 2023-07-14 indicated 105 acres had been burned (fire started on 2023-07-14).	https://www.fire.ca.gov/incidents/2023/7/14/highland-fire and https://www.fire.ca.gov/incidents/2023/7/14/highland-fire/updates/3fcb3b8a-3a74-42bc-9531-c4249fe2b146
2023-07-15	0	Last status report for 2023-07-15 indicated 150 acres had been burned. However, the reports from July 16 and 17 indicate 105 acres, suggesting that the 150 was a typographical error and should have been 105 and that the fire did not grow after July 14.	https://www.fire.ca.gov/incidents/2023/7/14/highland-fire and https://www.fire.ca.gov/incidents/2023/7/14/highland-fire/updates/b77a178e-ead1-4191-b2e5-5929399d4a17

8.2. Rabbit Fire

A wildfire called the Rabbit Fire was first reported on July 14, 2023 at 15:30 Local Time, which is 14:30 PST. The fire burned 8,283 acres before being extinguished on July 22, 2023. The fire was reported at 33.889467 degrees latitude and -117.070916 degrees longitude. As of July 24, 2024, the Cal Fire Rabbit Fire Incident Report lists the cause of the Rabbit Fire as under investigation. Further details about the Rabbit Fire can be found in Section 34.2.

As shown in Figure 11, the Rabbit Fire was a wildfire that occurred primarily on areas classified as vacant and open space and recreation with subsets of the burn area classified for industrial and transportation, communications, and utilities. However, the majority of the fire occurred on undeveloped land and according to the Cal Fire Rabbit Fire Incident Report, no structures were destroyed. Images taken by the Desert Sun show the area impacted by the fire to be open, undeveloped land, see Sections 10 and 36. KTLA quoted Capt. Richard Cordova with Cal Fire/Riverside County Fire as saying "The only good news about that fire is that it's an open area, so there are no homes, so we have no evacuation orders or warnings put in place," see Sections 10 and 36. Therefore, the majority of the Rabbit fire was a wildfire occurring on wildland, see Section 4.2 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations and 40 CFR 50.1(k) (n), and (o). Figure 11 shows the burn perimeter

for the Rabbit Fire overlaid on Esri World Imagery; the blue areas represent Protected Areas as defined by the U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2022.

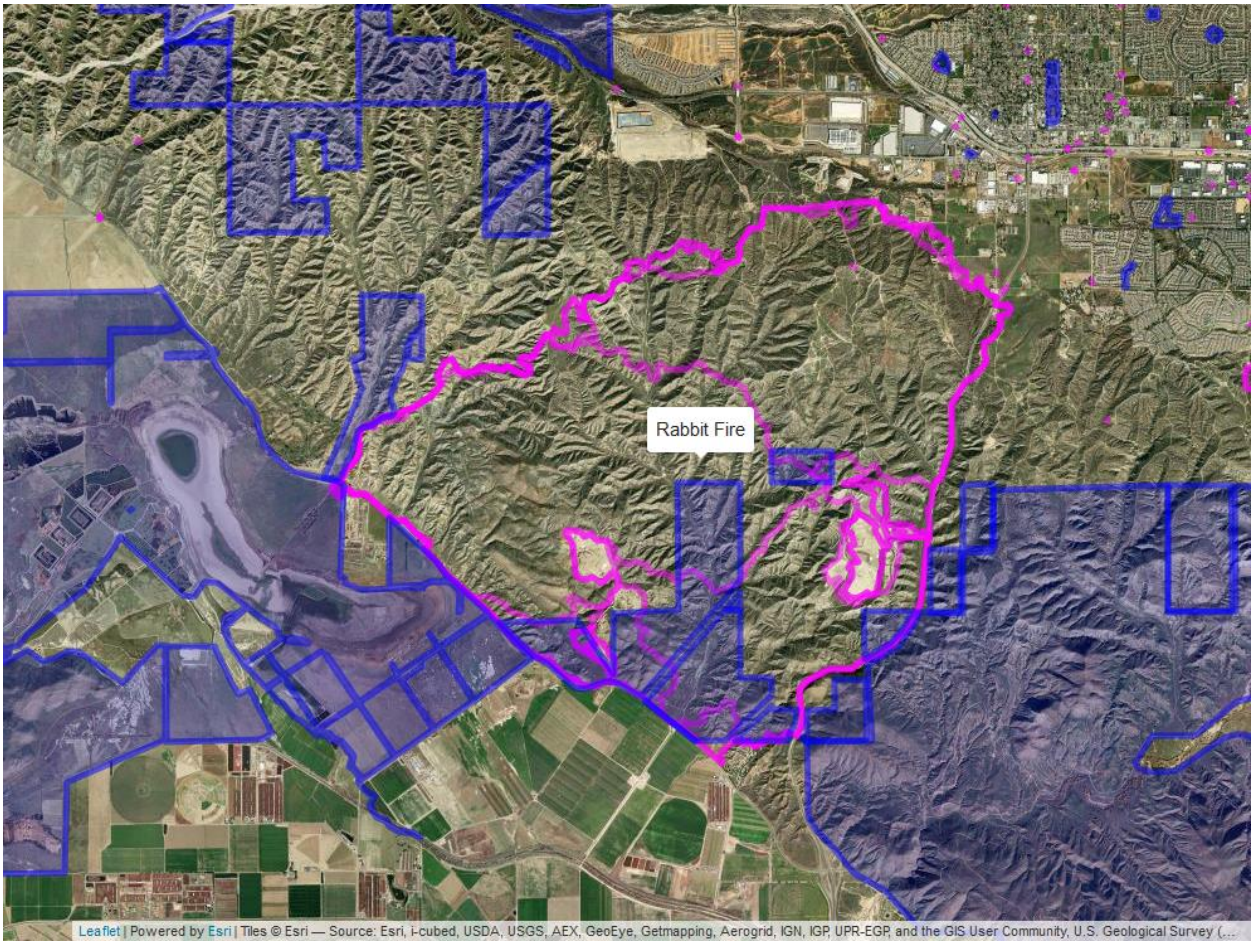

Figure 11: Burn perimeter for the Rabbit Fire.

The Rabbit Fire burned a total of 8,283 acres. Table 7 shows the daily progression of the Rabbit Fire, and more information can be found at https://www.fire.ca.gov/incidents/2023/7/14/rabbit-fire.

Table 7: Fire progression summary for the Rabbit Fire.

Date	1-Day Growth (acres)	Notes	Fire Website
2023-07-14	2,815	Last status update of 2023-07-14 indicated that 2,815 acres had burned (and fire started on 2023-07-14).	https://www.fire.ca.gov/incidents/2023/7/14/rabbit-fire and https://www.fire.ca.gov/incidents/2023/7/14/rabbit-fire/updates/4d6594c1-f46d-489f-a06a-21cb91473ee1
2023-07-15	4,785	Last status report for 2023-07-15 indicated that 7,600 acres had burned. Subtracting acres from previous day (7600-2815) gives 4,785 acres.	https://www.fire.ca.gov/incidents/2023/7/14/rabbit-fire and https://www.fire.ca.gov/incidents/2023/7/14/rabbit-fire/updates/a3bcfd1a-3bad-4153-9ef4-a9792e935700

8.3. Reche Fire

A wildfire called the Reche Fire was first reported on July 14, 2023 at 12:58 Local Time, which is 11:58 PST. The fire burned 437 acres before being extinguished on 2023-07-21. The fire was reported at 33.9835 degrees latitude and -117.2169 degrees longitude. As of July 24, 2024, the Cal Fire Reche Fire Incident Report lists the cause of the Reche Fire as under investigation. Further details about the Reche Fire can be found in Section 34.3.

As shown in Figure 9, the Reche Fire was a wildfire that occurred primarily on areas classified as vacant with a small subset of the burn area classified as single family residential. NBC Los Angeles News described the area as "lightly populated with both single-family houses and mobile homes." NBC Los Angeles News also reported that "[a]t least one home and outbuildings" were in the path of the fire (see news article "Crews work to get handle on Reche Fire in Moreno Valley" by NBC Los Angeles and Section 36). However, the majority of the Reche fire was a wildfire occurring on wildland, see Section 4.2 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations and 40 CFR 50.1(k) (n), and (o). Figure 12 shows the burn perimeter for the Reche Fire overlaid on Esri World Imagery; the blue areas represent Protected Areas as defined by the U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2022.

Figure 12: Burn perimeter for the Reche Fire.

The Reche Fire burned a total of 437 acres. Table 8 shows the daily progression of the Reche Fire, and more information can be found at https://www.fire.ca.gov/incidents/2023/7/14/reche-fire.

Table 8: Fire progression summary for the Reche Fire.

Date	1-Day Growth (acres)	Notes	Fire Website
2023-07-14	437	Fire started and grew to 437 acres on 2023-07-14.	https://www.rvcfire.org/incidents/fact-sheets/RECHE-07-2023 and https://www.fire.ca.gov/incidents/2023/7/14/reche-fire
2023-07-15	0	Fire did not expand from size on 2023-07-14 and was 50% contained in last update from 2023-07-15.	https://www.rvcfire.org/incidents/fact-sheets/RECHE-07-2023 and https://www.fire.ca.gov/incidents/2023/7/14/reche-fire

9. Public Notification during Event

This section addresses Sections 2 and 6.1 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Air agencies are required to "notify the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard," see 40 CFR 50.14(c)(1)(i) and Section 6.1 of Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations. South Coast AQMD meets this requirement by issuing daily forecasts (www.aqmd.gov/forecast) and air quality advisories (www.aqmd.gov/advisory) along with providing real-time location-specific air quality index values on the South Coast AQMD webpage (www.aqmd.gov/aqimap) and mobile app (www.aqmd.gov/mobileapp). Push notifications can also be configured by app users when air quality reaches pre-defined levels. The forecasts for July 14-15, 2023 are shown in Section 35. See also Final Particulate Matter Exceptional Events Mitigation Plan for the South Coast Air Basin and Coachella Valley for more information about how South Coast AQMD implements the mitigation requirements of 40 CFR §51.930; note that this mitigation plan is for particulate matter as no mitigation plan is currently required for ozone in Coachella Valley, but the majority of these measures apply to both particulate matter and ozone.

South Coast AQMD primarily relies on the daily forecast for communicating expected ozone concentrations to the public and only issues ozone advisories for extreme multi-day events as portions of the South Coast AQMD jurisdiction (i.e., the Inland Empire region of the South Coast Air Basin) observe over 100 ozone exceedances per year. The threshold for issuing an ozone advisory also depends on the time of year and the recent history of ozone advisory issuance. For example, an advisory is typically issued for the first major ozone

event of the season to remind residents to check the daily/hourly forecast and reeducate the public on how to protect their health during poor air quality. To avoid possible public apathy inherent in over-messaging, South Coast AQMD staff will try to reserve advisories for the two to four most significant ozone events of the year. Table 9 shows a chart for AQI from AQI Basics | AirNow.gov. South Coast AQMD may issue an ozone advisory when several consecutive days of Unhealthy or Very Unhealthy AQI in the jurisdiction are anticipated, and these tend to coincide with prolonged heat waves. Because of widespread areas of Unhealthy and Very Unhealthy AQI predicted in the South Coast Air Basin, South Coast AQMD staff issued an ozone advisory on July 13, 2023 in effect for July 14-18 for large portions of the South Coast Air Basin and the Coachella Valley (which includes Palm Springs), see the advisory press release and the National Weather Service (NWS) Air Alert. While the advisory did include the Coachella Valley, Unhealthy or Very Unhealthy AQI levels were only expected in the South Coast Air Basin. The forecasted MDA8 for Coachella Valley for July 14, 2023 was 0.084 ppm (Unhealthy for Sensitive Groups) and the observed MDA8 was 0.093 ppm. For July 15, 2023, the forecasted MDA8 was 0.068 ppm (Moderate) and the observed MDA8 was 0.086 ppm.

Table 9: AQI Basics for Ozone and Particle Pollution. Source: AQI Basics | AirNow.gov.

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Within hours of the fires starting, South Coast AQMD issued smoke advisories on both July 14 and 15, 2023 (in effect July 14-16). The advisory issued July 14 stated that air quality levels may reach Unhealthy for Sensitive Groups to Unhealthy AQI levels in areas impacted by wildfire smoke, while the advisory issued July 15 indicated AQI may reach Unhealthy to Hazardous levels. The advisories issued by South Coast AQMD were 1) posted on the South Coast AQMD homepage, 2) accessible through the South Coast AQMD smart phone app, 3) emailed to subscribers using the U.S. E.P.A. Enviroflash system, 4) provided to local media outlets in the form of a press release, 5) widely reported by local news media as shown in Section 10, and 6) distributed as Air Quality Alerts by the San Diego National Weather

Service Forecast Office on both July 14 and July 15. The advisories included information about the health impacts of air pollution and recommendations for minimizing personal exposure, e.g., staying inside with windows closed. The Press Releases of the advisories are shown in Section 35 and are also archived by South Coast AQMD.

10. News Articles

This section addresses Sections 2, 3, and 5 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations. See Appendix 36 for screenshots of the news articles discussed below.

The Reche fire was first reported around 1 PM on July 14, 2023 near the border of San Bernardino and Riverside Counties according to NBC Los Angeles News. Additionally, "[a]t least one home and outbuildings" were in the path of the Reche Fire and that the area was "lightly populated with both single-family and mobile homes".

The Desert Sun presented several images of the Rabbit fire and firefighting efforts, including an image of ground-level smoke near Beaumont, CA.

KTLA mentioned the advisory issued by the South Coast AQMD and reported that "Heavy smoke from all three wildfires in the area has created extremely poor visibility and air quality for residents."

A Patch news article summarizes several fires burning in Southern California in mid-July, 2023, including the Rabbit, Reche, and Highland fires. The article also mentions the smoke advisory issued by South Coast AQMD.

On July 17, 2023, the Desert Sun reported that "Winds will continue to push any remaining smoke from the Rabbit Fire toward the eastern part of the county, including the Coachella Valley, and may result in unhealthy air quality levels for sensitive groups."

11. Interactions of Wildfire Emissions, Meteorology, and Pollutant Concentrations

This section addresses Section 2, 3.4.2, and 3.5.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

11.1. Pollution Timeseries with Wind Vectors at Banning and Palm Springs

Banning is about 8 miles east of the largest (Rabbit) fire, or 1 hour of travel time given the 8 mph surface winds measured that afternoon (see Figure 8 and Sections 24 and 25). As seen in Figure 13, PM2.5 at Banning rose by 2PM PST on July 14 and continued to rise into the night, consistent with smoke transport.

Palm Springs is a further 18 miles to the east-southeast of Banning. Eight mph winds would typically require about two more hours of travel time to reach there. CO levels in Palm Springs started rising between 3 and 4 PM PST and continued to rise into the night, which is also consistent with the expected time of smoke impacts. Ozone rose significantly during that same period. After peaking at 4 PM PST, ozone levels dropped as dusk approached due to the lack of photochemical activity, despite the presence of added precursors. Since NOx remained elevated throughout the night, most remaining ground level ozone would have been titrated.

Forward HYSPLIT[4] trajectory analysis shows direct smoke transport to the Palm Springs area from 4 PM PST on July 14 to 2 AM PST on July 15. The CO and NOx concentrations began to rise around 4 PM PST and peaked at 2 AM PST before gradually declining. The ozone concentrations rose sharply at 4 PM PST on July 14 and remained elevated through the afternoon and then decreased due to a lack of photochemical activity. Forward HYSPLIT trajectory analysis also shows that there was recirculation within and near the Coachella Valley bringing smoke transport to the Palm Springs area again from 4 AM to 6 AM PST on July 15, which is consistent with the MDA8 period starting at 7 AM PST. Section 12.1 demonstrates that a 7 AM PST start time for an MDA8 is highly atypical. Backward trajectories demonstrate smoke transport to the Palm Springs area for 19 of the 25 hours from 2 PM PST on July 14 through 2 PM PST on July 15. Summaries of the HYSPLIT trajectory analysis are included in Table 10 (forward trajectory) and Table 11 (backward trajectory) and in the narrative below. Section 15 and 16 contain more detailed information about the HYSPLIT analysis.

The 4 PM PST rise in CO, NOx, and ozone on July 14, 2023 is consistent with forward HYSPLIT trajectories that indicate smoke transport from the Reche and Highland Fires arriving in the Palm Springs area, as discussed in Sections 15.1 and 15.3. As shown in Table 10 and Table 11, HYSPLIT analyses show transport during the majority of hours between 4 PM on July 14 and 2 PM on July 15.

[4] https://www.ready.noaa.gov/HYSPLIT.php

Table 10: Hour-by-hour summary of the forward HYSPLIT analysis. All times are in PST.

Forward Launch Times	Smoke Arrival Time to Palm Springs Area	Fire Source	Supporting Section	Comment
12:00 and 14:00 on July 14	16:00 on July 14	Reche, Highland	15.1, 15.3	O3, NOx, CO increase
13:00, 15:00, 16:00 on July 14	17:00 on July 14	All	15.2, 15.4, 15.5	Elevated O3, NOx, CO
15:00, 16:00 on July 14	18:00 on July 14	All	15.4, 15.5	Elevated O3, NOx, CO
17:00 on July 14	19:00 on July 14	All	15.6	Elevated O3, NOx, CO
17:00, 18:00, 19:00 on July 14	20:00 on July 14	All	15.6, 15.7, 15.8	Elevated NOx, CO
18:00, 19:00 on July 14	21:00 on July 14	All	15.7, 15.8	Elevated NOx, CO
18:00, 19:00, 20:00 on July 14	22:00 on July 14	All	15.7, 15.8, 15.9	Elevated NOx, CO
19:00, 20:00 on July 14	23:00 on July 14	All	15.8, 15.9	Elevated NOx, CO
19:00, 20:00 on July 14	00:00 on July 15	All	15.8, 15.9	Elevated NOx, CO
20:00 on July 14	01:00 on July 15	Highland, Rabbit	15.9	Elevated NOx, CO
20:00, 22:00, 23:00 on July 14	02:00 on July 15	Highland, Rabbit	15.9, 15.11, 15.12	Peak NOx, CO
-	03:00 on July 15	none	-	-
12:00 on July 14	04:00 on July 15	Reche	15.1	Re-circulating smoke
12:00 on July 14	05:00 on July 15	Reche	15.1	Re-circulating smoke
12:00 on July 14	06:00 on July 15	Reche	15.1	Re-circulating smoke
-	07:00 to 13:00 on July 15	None	-	-
17:00 on July 14	14:00 on July 15	Rabbit	15.6	

Table 11: Hour-by-hour summary of the backward HYSPLIT analysis. All times are in PST.

Time of trajectory passing near burn areas	Smoke Arrival Time to Palm Springs Area	Fire Source	Supporting Section
14:00 on July 14	15:00 on July 14	Highland	16.3
Between 14:00 and 15:00 on July 14	16:00 on July 14	Highland	16.4
Between 15:00 and 16:00 on July 14	17:00 on July 14	Highland	16.5
Between 15:00 and 17:00 on July 14	18:00 on July 14	All	16.6
Between 14:00 and 18:00 on July 14	19:00 on July 14	All	16.7
Between 17:00 and 19:00 on July 14	20:00 on July 14	Rabbit, Highland	16.8
Between 15:00 and 20:00 on July 14	21:00 on July 14	Rabbit, Highland	16.9
Between 17:00 and 21:00 on July 14	22:00 on July 14	All	16.10
Between 19:00 and 22:00 on July 14	23:00 on July 14	All	16.11
Between 20:00 and 23:00 on July 14	00:00 on July 15	Rabbit, Highland	16.12
Between 16:00 and 19:00 on July 14	01:00 on July 15	Rabbit, Highland	16.13
Between 16:00 and 20:00 on July 14	02:00 on July 15	Highland	16.14
Between 16:00 and 19:00 on July 14	03:00 on July 15	Rabbit, Highland	16.15
Between 16:00 and 19:00 on July 14 and 02:00 on July 15	04:00 on July 15	Rabbit, Highland	16.16
Between 19:00 and 20:00 on July 14	06:00 on July 15	Highland	16.18
16:00 on July 14	07:00 on July 15	Rabbit, Highland	16.19
16:00 on July 14	10:00 on July 15	Rabbit, Highland	16.22
Between 16:00 and 20:00 on July 14	11:00 on July 15	Rabbit, Highland	16.23
16:00 on July 14	13:00 on July 15	Rabbit, Highland	16.25

The west-southwest surface winds at Banning and northwest winds at Palm Springs continued through the night of July 14 - 15. A surface wind reversal happened at both sites after daybreak on July 15, with light east winds continuing through mid-afternoon. Palm Springs ozone spiked in the morning and the highest 8-hour average on July 15 was during the 7AM- 2PM period and not the customary afternoon hours that are typically associated with photochemical ozone production. See Section 12.1 for further information about typical diurnal patterns for ozone at Palm Springs. Figure 15 shows running 8-hour average concentrations for Palm Springs. This graph indicates that without the 7 and 8 AM PST measurements, the site would not have exceeded the NAAQS on July 15, which is atypical for the diurnal pattern at this site. It is very likely that recirculation in the Coachella Valley of precursors emitted from the fires resulted in ozone formation after sunrise on July 15. Though vertical wind measurements are not made in the area, it is very likely that ozone formed from precursors released the previous day remained in the overnight residual layer, and then mixed down to the surface when the nocturnal inversion broke.

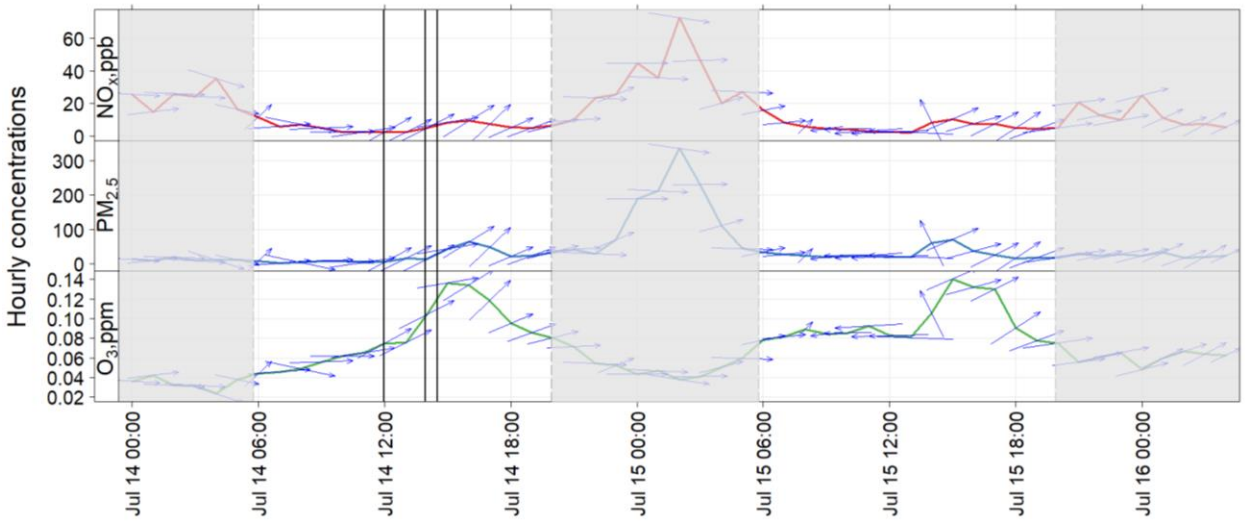

Figure 13: NOx, PM2.5 and O3 timeseries from July 14-15, 2023 in Banning, overlaid with wind vectors. Solid vertical black lines on July 14 are fire start times. Nighttime hours are shaded grey. CO is not measured here. Times are shown in PST.

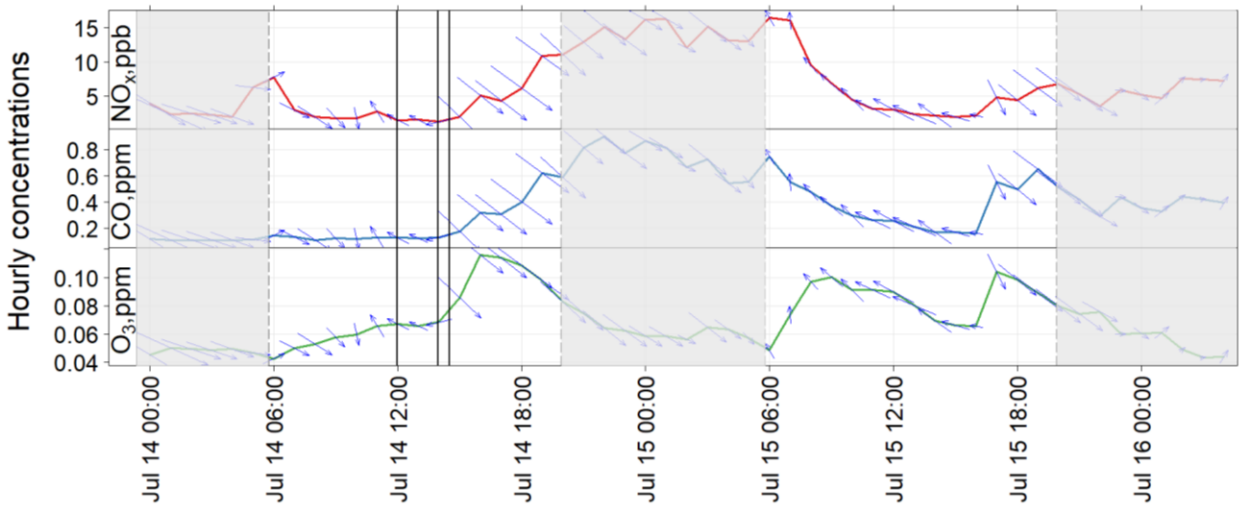

Figure 14: NOx, CO and O3 timeseries from July 14-15, 2023, in Palm Springs, overlaid with wind vectors. Solid vertical black lines on July 14 are fire start times. Nighttime hours are shaded grey. Hourly PM2.5 measurements are not made here. Times are shown in PST.

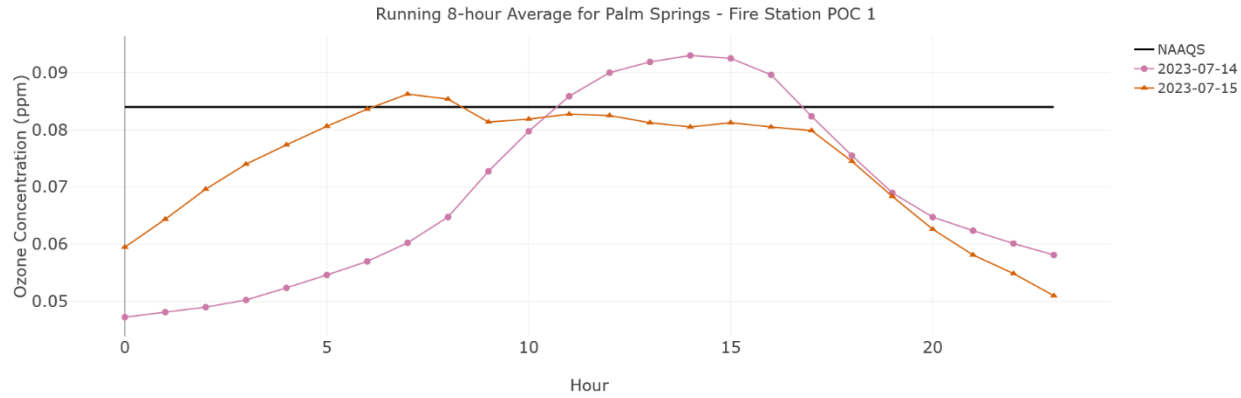

Figure 15: Running 8-hour average ozone concentrations for Palm Springs monitor. Hour is in PST.

Additional evidence to support this is found in the timing of an ozone increase at a higher elevation ozone monitor in Joshua Tree National Park- Black Rock, located over 1000m higher than and 28km northeast of the Palm Springs ozone monitor. Figure 16 shows the site locations, and Figure 17 shows the measured ozone concentrations.. Even though at a lower concentration than Palm Springs, the uncharacteristic ozone increase on the morning of July 15 at the higher elevation sites is consistent with a residual plume aloft overnight. It is also seen on the morning of July 16th but not observed on other days, when ozone peaks at both sites are more consistent with afternoon photochemical ozone production and overnight decline. A comparison of ozone at Palm Springs and Joshua Tree National Park-Black Rock is provided in Figure 17, to demonstrate that they normally measure similar ozone levels and did not deviate outside the historical norms during the fire event. This is consistent with both sites being impacted by smoke from the same wildfires.

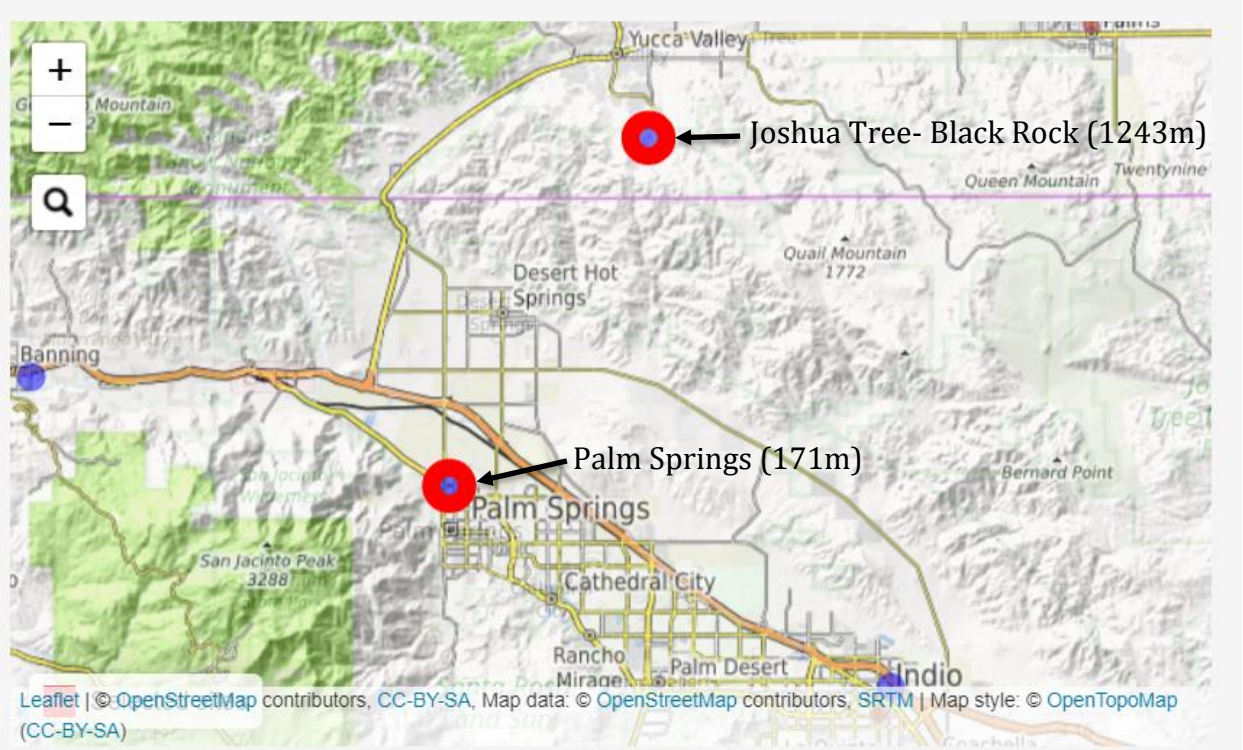

Figure 16: Locations of Palm Springs and Joshua Tree National Park- Black Rock ozone monitors.

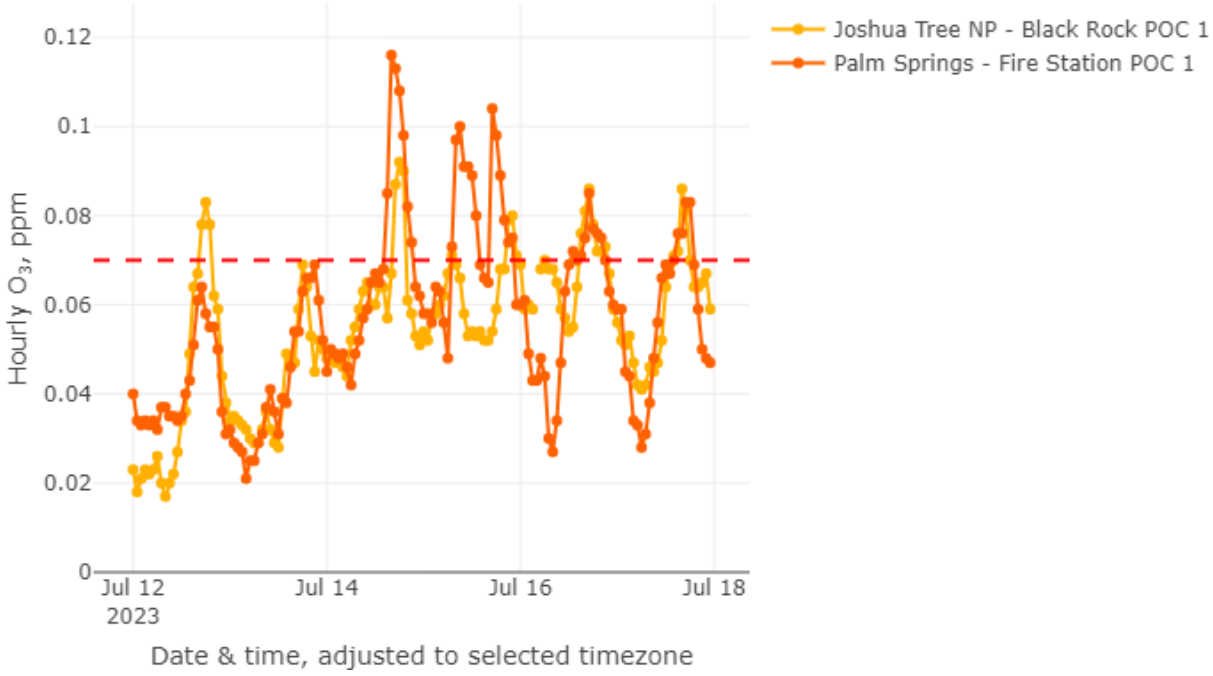

Figure 17: Timeseries highlighting the uncharacteristic morning ozone increase on July 15.

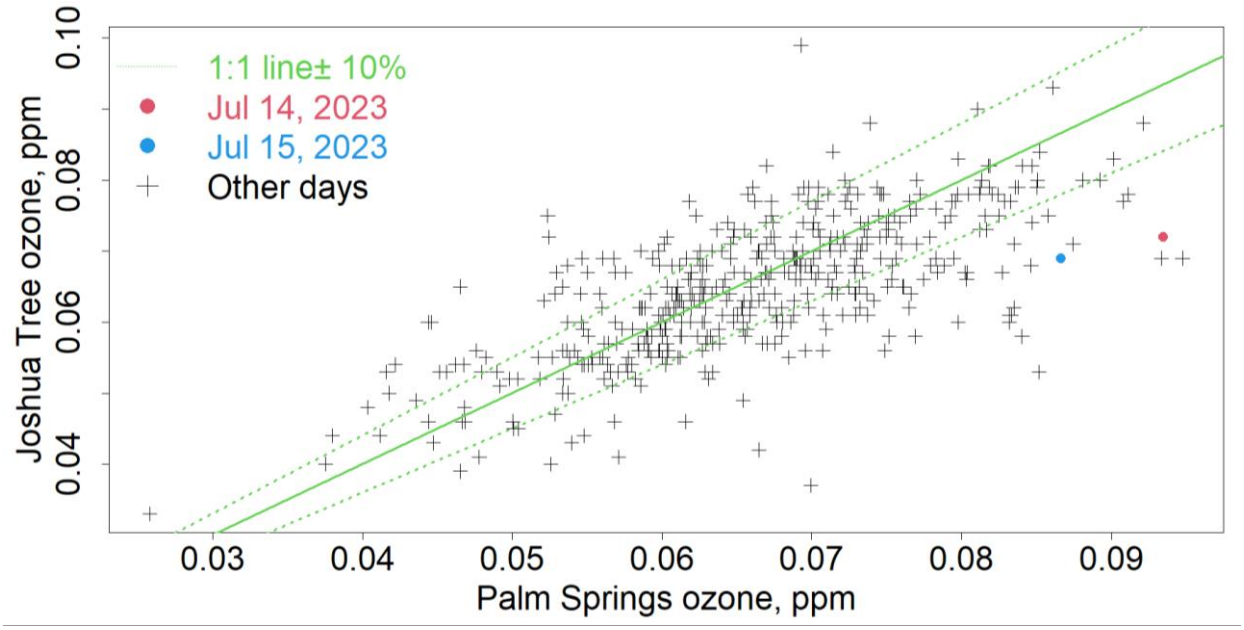

Figure 18: Comparison of ozone at Palm Springs and Joshua Tree National Park- Black Rock between June-August, 2019-2023

During the morning of July 15, Banning ozone also exhibited similar behavior but not as pronounced as Palm Springs, and the MDA8 at Banning did not encompass morning hours.

Light east winds continued throughout the morning in Palm Springs, gradually flushing out pollution through mid-afternoon. Ozone appears to decline slower than CO and NOx, possibly because measured ozone is the sum of the residual ozone being flushed out, and any photochemically produced ozone formation that commences concurrently in the morning. Palm Springs winds then shifted to northwesterly, causing an increase in CO, NOx and ozone. The late afternoon ozone rebound could be a mixture of the same ozone plume recirculating back from west to east, as well as typical afternoon photochemical production given the very hot temperatures (max 116ºF; see Sections 24 and 25) and the wildfire smoke in the eastern South Coast Air Basin. Northwest winds on the afternoon of July 15 place Palm Springs downwind of the South Coast Air Basin, which contained significant levels of smoke due to smoke production on July 15.

11.2. PM2.5 Federal Reference Method Data at Palm Springs

Figure 19 shows that the FRM (Federal Reference Method) PM2.5 concentration at Palm Springs of 26.2 µg/m^3 on July 14, 2023 was the highest such measurement for the May 30 to August 29 period for the years 2019-2023. A PM2.5 measurement of 26.2 µg/m^3 is atypical for this site, which suggests an atypical emissions source, such as the nearby Rabbit, Reche, and Highland Wildfires. The second highest PM2.5 concentration observed on July 23, 2023 was the result of a regional windblown dust event, when PM10 and PM2.5 concentrations at several sites in the Coachella Valley were elevated. As this is FRM data,

hourly concentrations are not available. However, concentrations likely would have been low in the morning and then increased in the afternoon as the smoke entered the Palm Springs area, similar to the nearby PurpleAir sensors shown in Figure 21. None of the other data in Figure 19 is known to have been influenced by wildfires. There was no FRM PM2.5 measurement at Palm Springs on July 15, 2023.

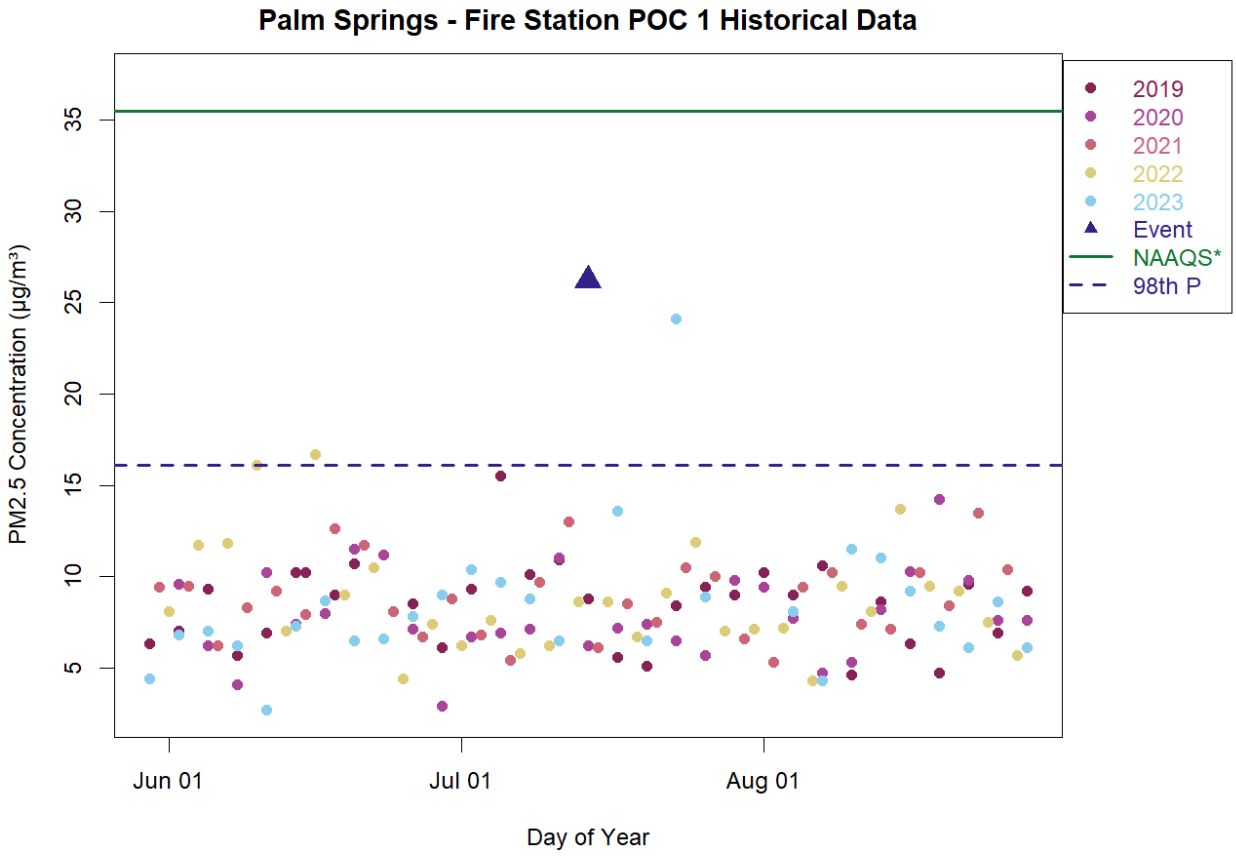

Figure 19: Five-year May 30 to August 29 timeseries of PM2.5 for Palm Springs POC 1.

Note that 'Event' in the legend refers to the Rabbit, Reche, and Highland Wildfires. The NAAQS for daily PM2.5 is 35 µg/m^3, but with rounding, a value of 35.4 µg/m^3 attains the standard (see National Ambient Air Quality Standards for Particulate Matter). '98th P' refers to the 98th percentile of the data shown.

11.3. PM2.5 Sensors Close to Palm Springs

Since continuous regulatory PM2.5 measurements were not available at Palm Springs, PurpleAir sensor archives within 7 miles were queried to confirm if PM2.5 levels during the event were elevated over their historical norms. Only two nearby PurpleAir sensors had at least three years of historical data (locations shown in Figure 20), and EPA's PurpleAir calibration formula was applied to their hourly data. Figure 21 shows how the PM2.5 levels on July 14 and 15 (red trace) compared against the historical 5th to 99th percentiles

between June-August in the past few years. Not only are the event concentrations very much higher than their historical high values, but their temporal pattern is very similar to CO measured at Palm Springs (Figure 14). This is also consistent with the presence of smoke. The PurpleAir PM2.5 concentrations increase sharply starting at 4PM and 6PM PST on July 14th at the Movie Colony and Cathedral Cove sites, respectively. This timing is consistent with smoke transport times of 2-4 hours from the fires. PM2.5 levels remain elevated above their historical norms until 10AM PST on July 15th and rise again from 5-6PM PST on July 15th. This is coincident with the 5PM increase of CO at Palm Springs. The elevated PM2.5 overnight and in the morning of July 15th provides strong evidence that smoke recirculated in the Coachella Valley overnight and in the morning, continuing to impact the Palm Springs area and thus providing the precursors needed for ozone formation at sunrise on July 15.

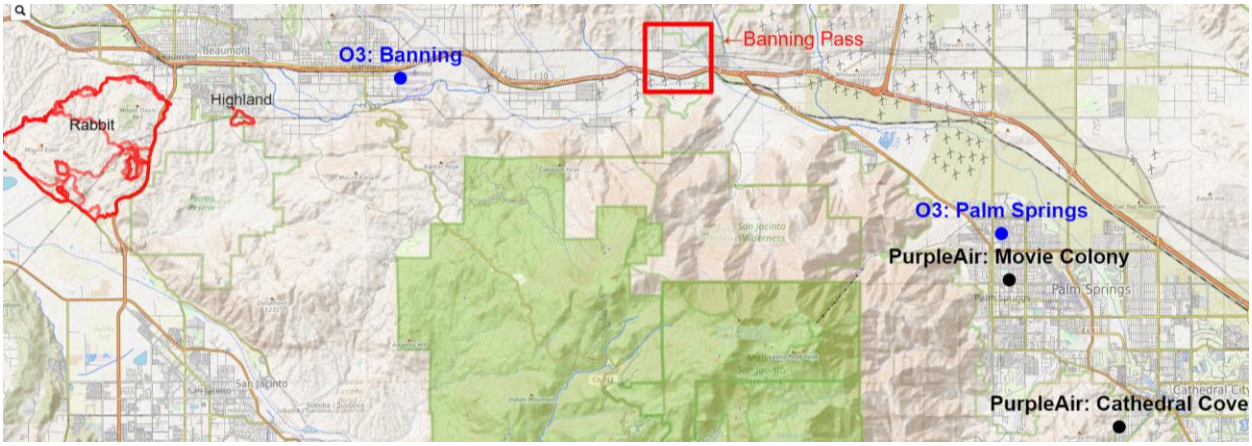

Figure 20: Locations of PurpleAir PM2.5 and permanent ozone monitors used in this analysis.

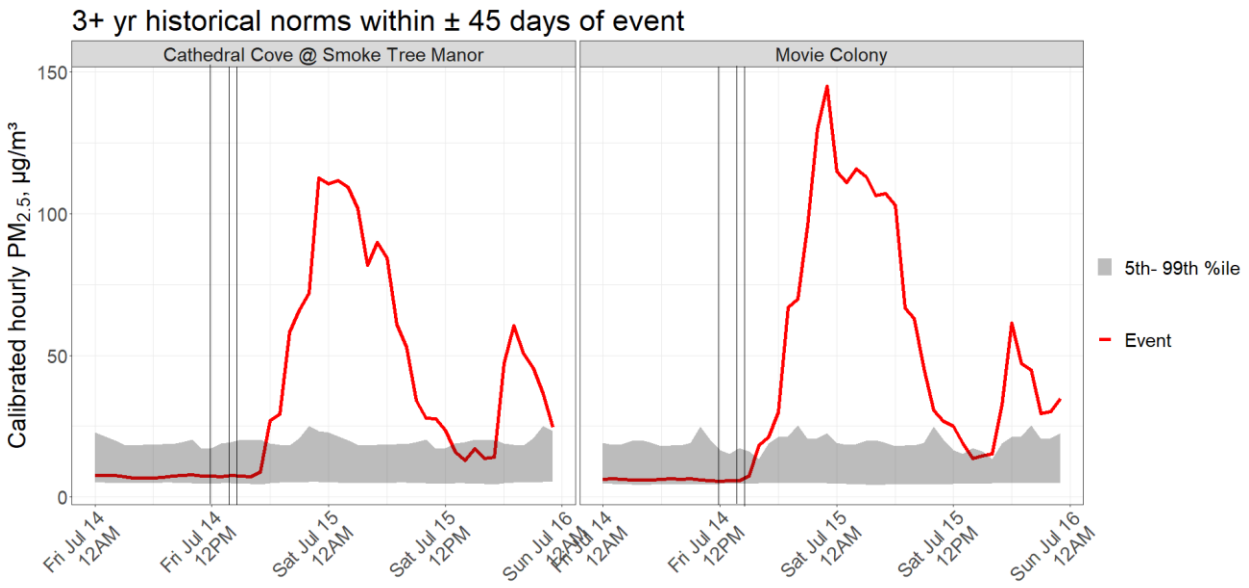

Figure 21: Calibrated PurpleAir sensor PM2.5 data close to Palm Springs. 5th to 99th percentiles are based on data within ±45 days of the event. The Cathedral Cove and Movie Colony sites are 7 and 2 miles south-southeast of the Palm Springs monitor, respectively. Times are in PST. Solid vertical black lines on July 14 are fire start times.

11.4. Event vs Non-Event Pollutant Trends at Palm Springs

For most of the two-day period, Palm Springs surface winds were northwesterly, which is consistent with onshore flow being channeled by the San Jacinto mountains (Figure 22). The elevated ozone during the morning of July 15 during the wind reversal at both sites can be seen (red petals during winds with an easterly component).

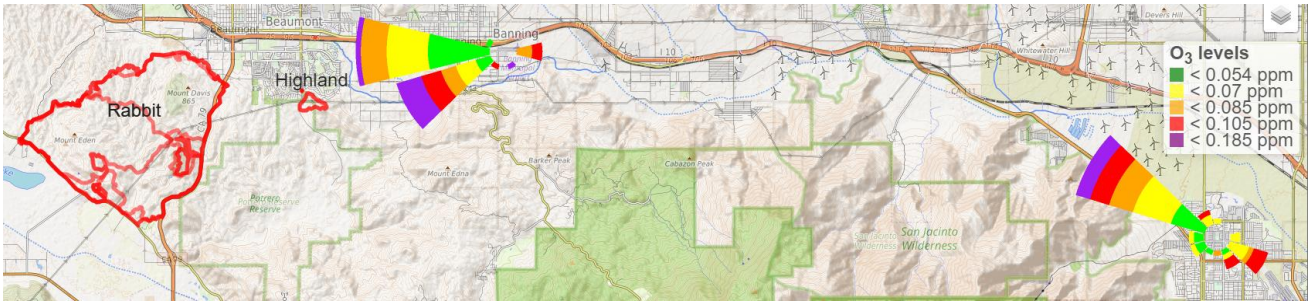

Figure 22: Ozone pollution roses from July 14-15, 2023, in Palm Springs (right) and Banning (left) on a map showing fire locations (red polygons on the left).

Figure 23 shows ozone pollution roses constructed with all data from June-August 2019-2023, excluding July 14th and 15th, 2023. The main differences from Figure 22 are the absence of hourly ozone > 0.105 ppm (purple petals), and the near absence of elevated (> 0.085 ppm) concentrations during east wind events. These differences further confirm how this smoke event caused Palm Springs' ozone patterns to deviate from its norms.

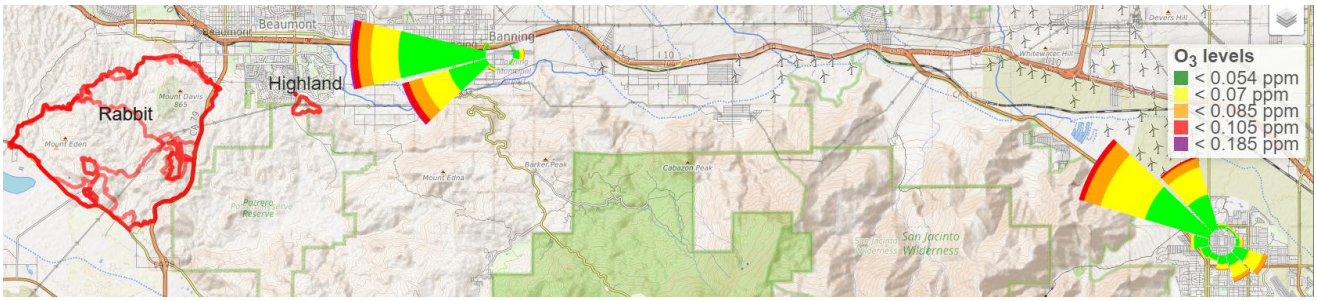

Figure 23: Non-event ozone pollution roses from all of June-August 2019-2023, excluding July 14-15, 2023 in Palm Springs (right) and Banning (left).

Figure 24 compares CO levels measured on July 14 and 15 2023 with those measured in June through August of 2019-2023. The figure shows event CO levels between the evening of July 14 through late morning on July 15, and at night on July 15th were the highest or second highest hourly maxima recorded in the 5-year June-August diurnal distribution. Since typical concentrations are far below those measured on July 14 and 15, it is unlikely that anthropogenic emissions caused the high CO concentrations. This provides strong evidence that a large emission source such as a wildfire caused the high CO concentrations at Palm Springs. The event CO: NOx ratios (Figure 25) are also elevated above 5-year normals between June-August at higher CO and NOx levels but are mostly between the 20:1 and 100:1 ratio (light blue and green dashed lines). Per EPA guidance the CO:NOx ratios for high temperature fossil fuel combustion sources is approximately 4, ranges from 10-20 for agricultural burning, and is above 100 for biomass burning[5]. This 100:1 ratio threshold may not be applicable in regions with high anthropogenic NOx levels such as the South Coast Air Basin and the Coachella Valley. However, the increased CO: NOx ratio during the event is very likely caused by the presence of wildfire smoke that influenced CO and NOx measurements.

[5] EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

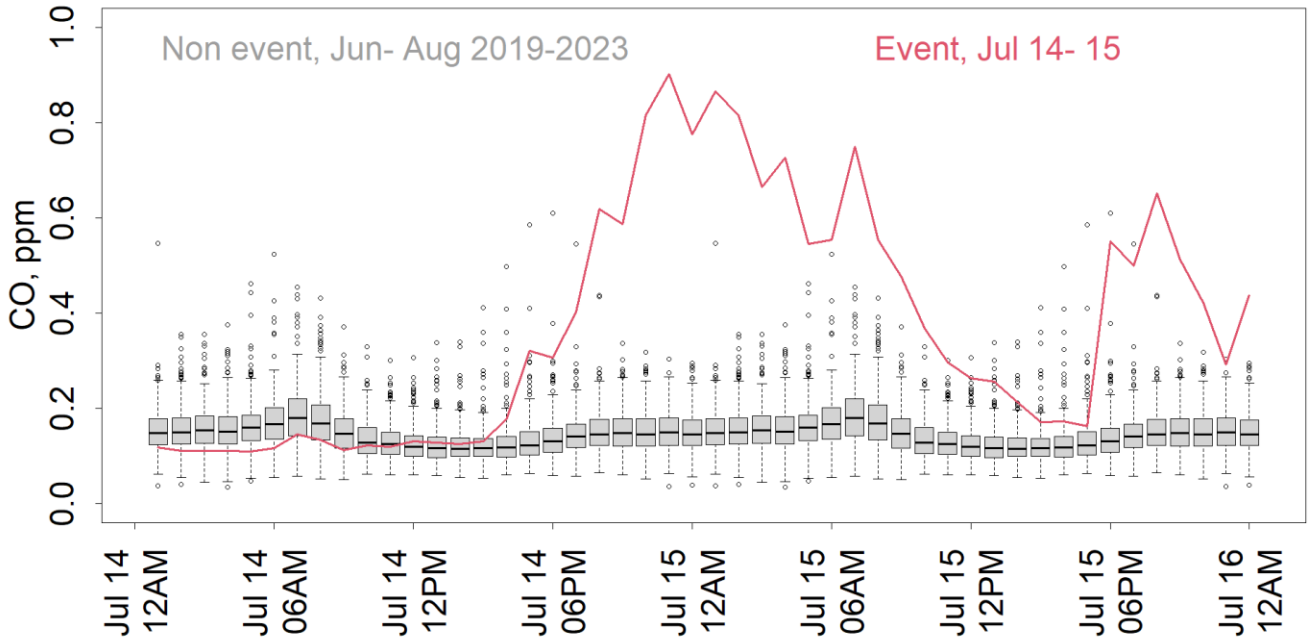

Figure 24: Event vs non-event diurnal profiles of Palm Springs CO. Boxes= interquartile ranges and whiskers = 1.5x interquartile range. Local time in figure is 1 hour ahead of PST.

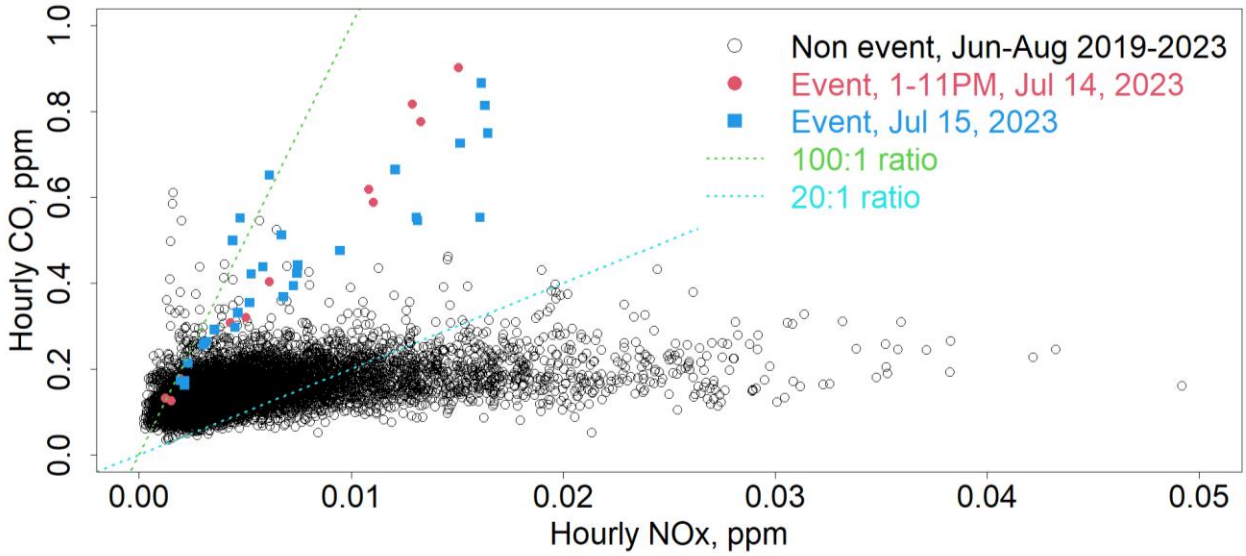

Figure 25: CO vs NOx ratios from event and non-event days at Palm Springs.

Figure 26 shows the ozone daily AQI values for 2023 by day of week for the Palm Springs monitor from EPA's Single-year Tile Plot – for Exceptional Events Analysis tool. July 14 and

15, 2023 are two of only three days in 2023 to be in the Unhealthy AQI category. July 15 is the only Saturday to reach the Unhealthy AQI category. No data in the plot are in the Very Unhealthy or Hazardous AQI categories. This shows that ozone concentrations were unusually high on July 14 and 15, 2023.

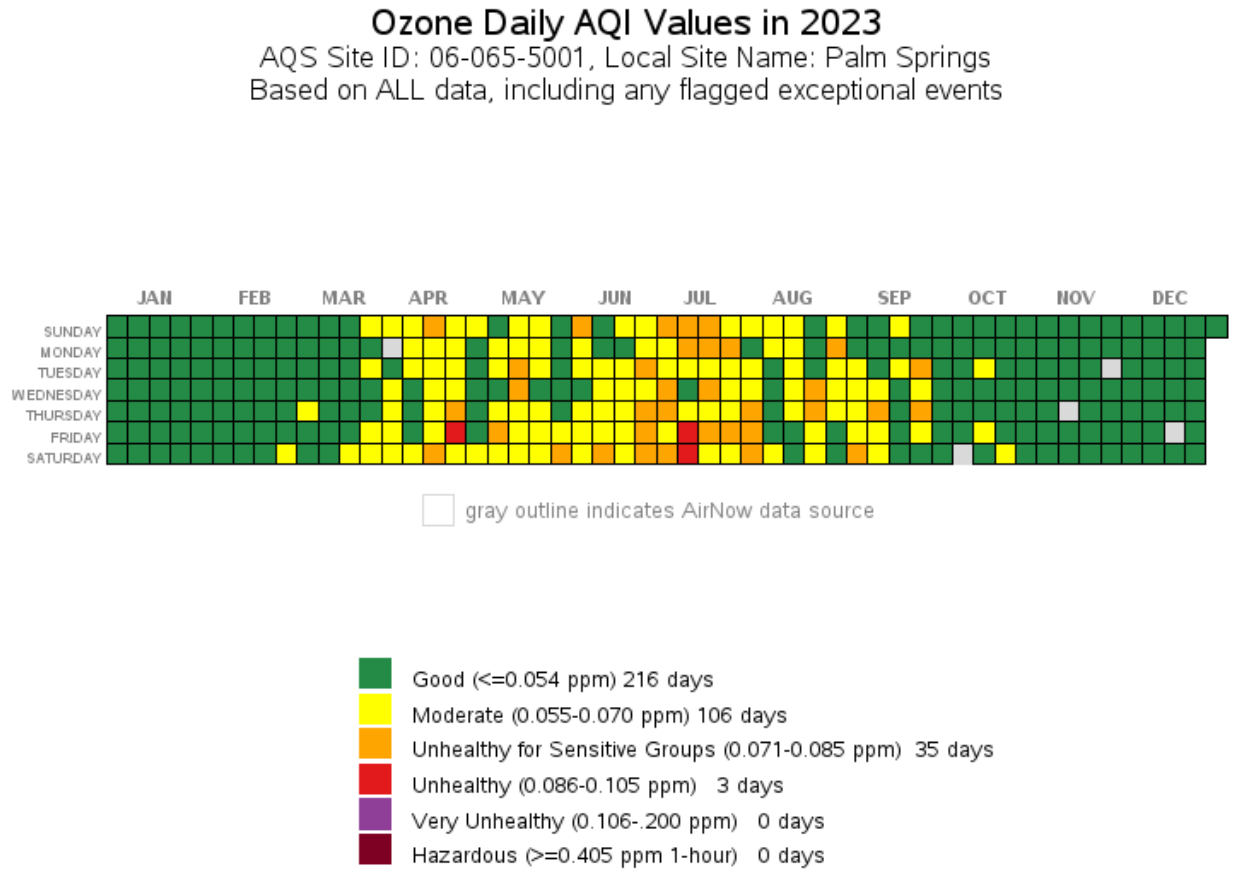

Figure 26: Single-year Tile Plot – for Exceptional Events Analysis, generated July 31, 2024.

11.5. Historical Ozone vs Temperature Relationship at Palm Springs

Figure 27 shows the weekday/ weekend differences between MDA8 O3 vs average temperature between 6AM and 5PM PST, over 5 years within the ±45 day period centered on the event. Ozone on Friday July 14, 2023 is the second highest of the historical concentrations on weekdays, whereas the highest weekday MDA8 was only 0.001 ppm more, despite the temperature being 4°F warmer. July 15, 2023 is the highest weekend concentration recorded. This demonstrates that ozone was unusually high on both days for

the temperatures recorded and thus it is unlikely that typical processes that cause high ozone such as increased VOC emissions or increased reaction rates due to high temperatures alone were the cause of the high ozone concentrations measured on those days.

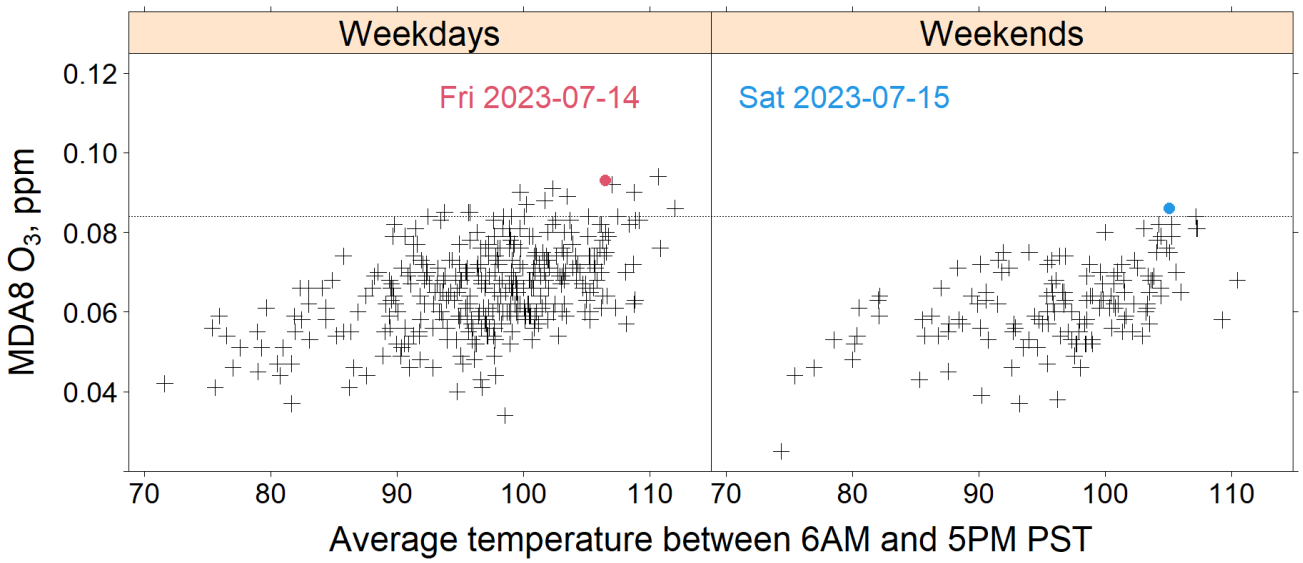

Figure 27: Historical (5-years, within ±45 days of the event) and event ozone vs daytime average temperature relationships by day-of-week at Palm Springs.

11.6. Ozone Levels at Other Monitors in the Palm Springs Region

The purpose of this section is to provide information about ozone concentrations in the region of Palm Springs during the event as context for the narrative conceptual model. Figure 28 shows the daily concentrations of several ozone monitors in the Palm Springs region. Increases in MDA8 concentrations at Banning and Palm Springs coincide with the timing of the Rabbit, Reche, and Highland Wildfires starting on July 14, 2023. Other monitoring sites in the vicinity except Banning did not measure exceedances during the Rabbit, Reche, and Highland Wildfires. Figure 29 shows the locations of sites considered in Figure 28.

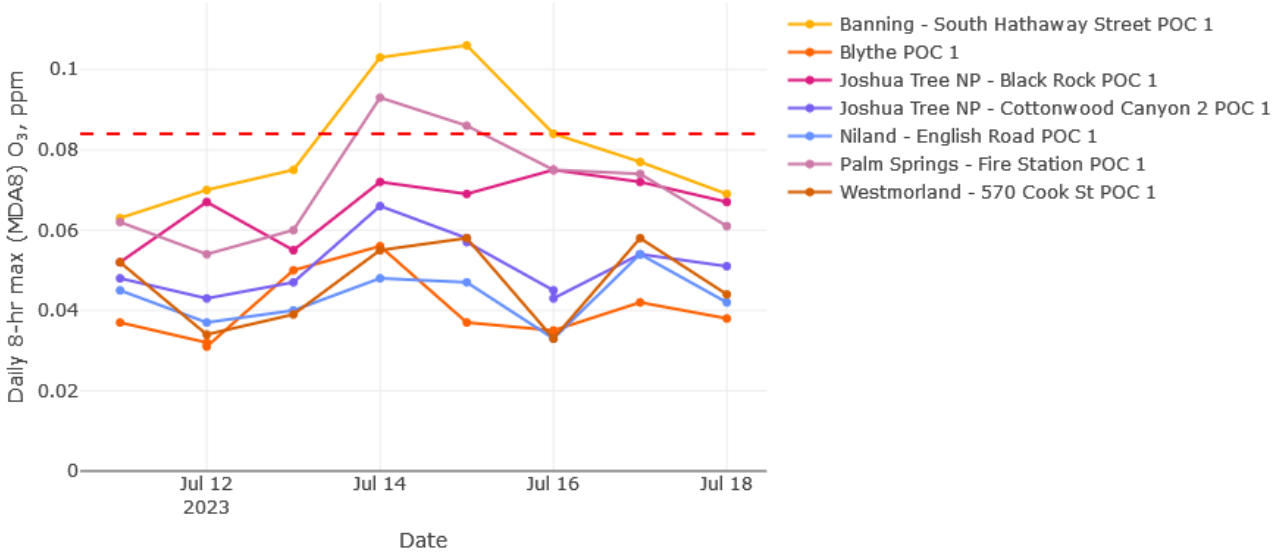

Figure 28: MDA8 O3 Concentrations at several stations in the Palm Springs region.

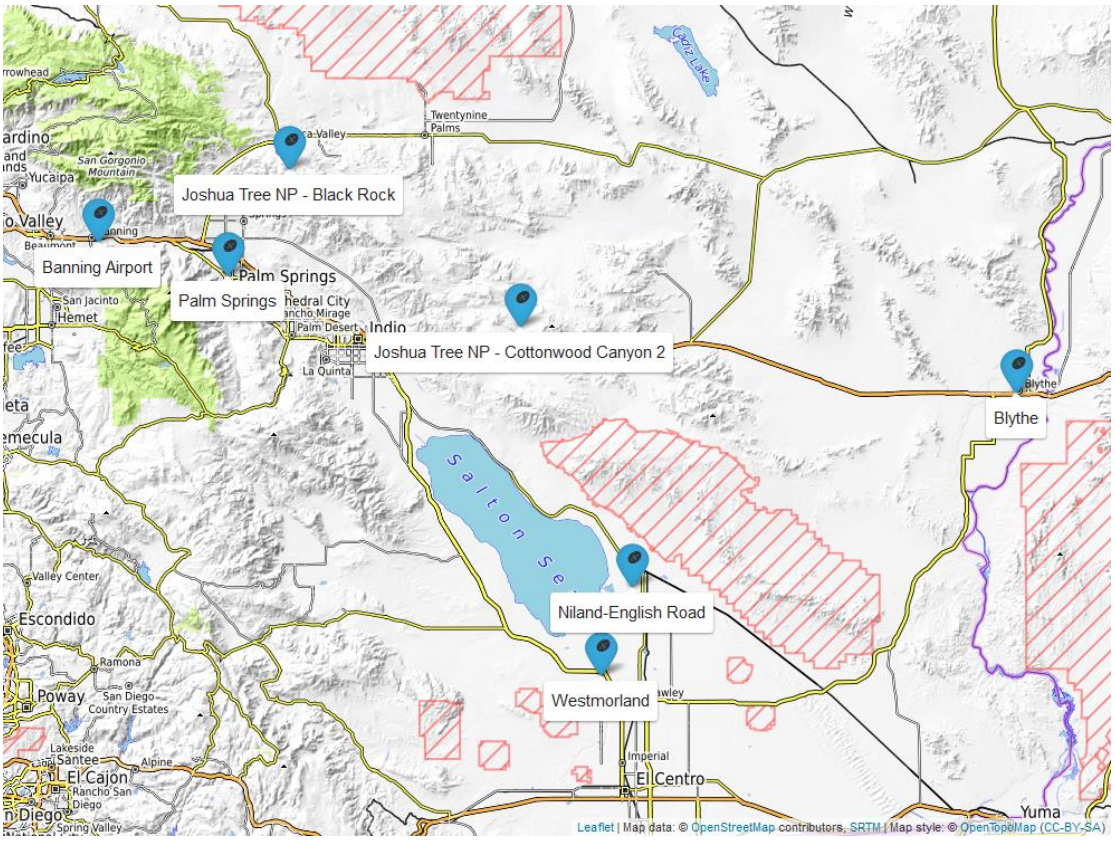

Figure 29: Stations included in Figure 28.

Figure 30 and Figure 31 show the ozone AQI values by site on July 14 and 15, 2023 for the Palm Springs monitor from EPA's Concentration Map – for Exceptional Events Analysis tool. July 14 and 15, 2023 are two of only three days in 2023 to be in the Unhealthy AQI category. Several monitors in the Riverside and neighboring San Bernardino Counties were in the Very Unhealthy or Hazardous AQI categories.

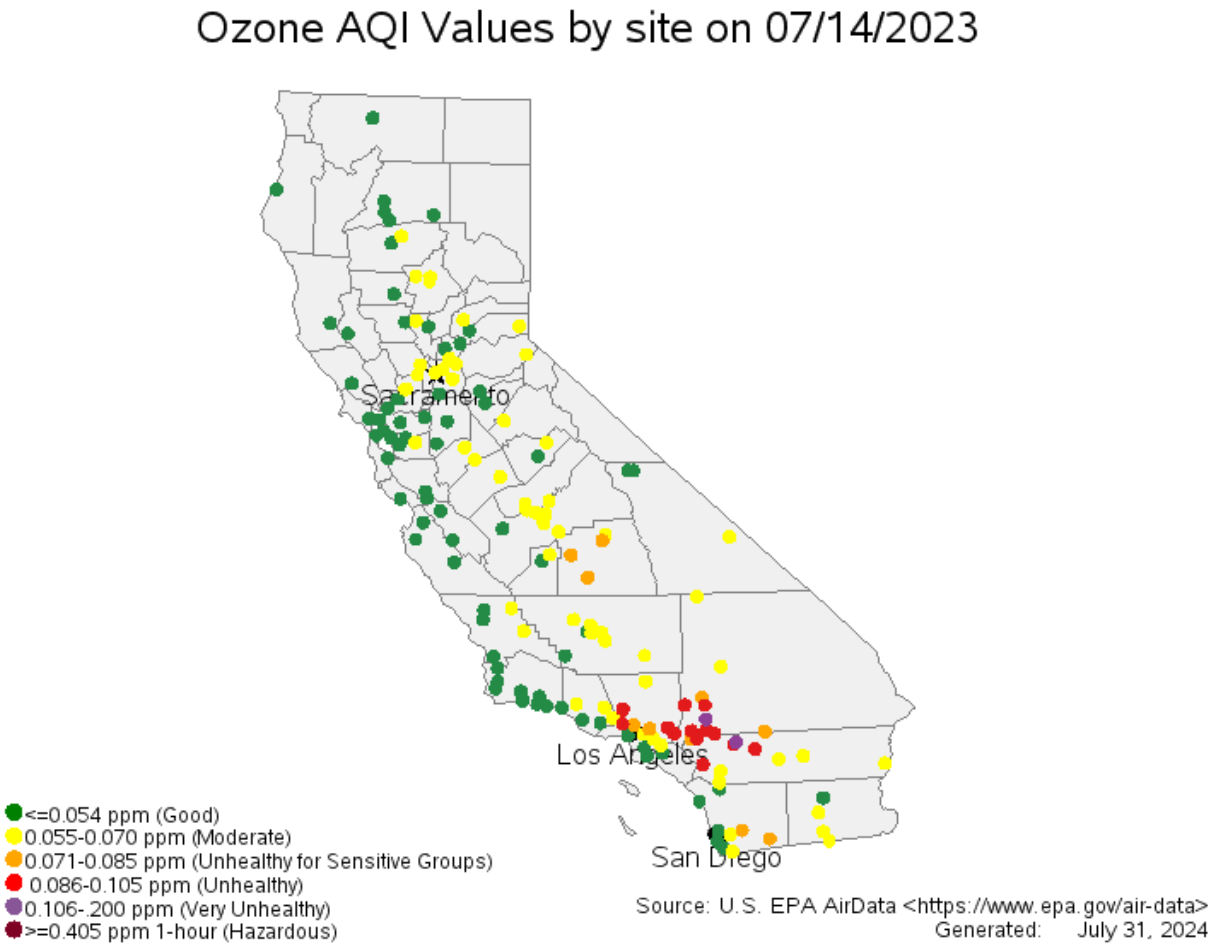

Figure 30: Ozone AQI Map – for Exceptional Events Analysis, for July 14, 2023 in California, generated July 31, 2024.

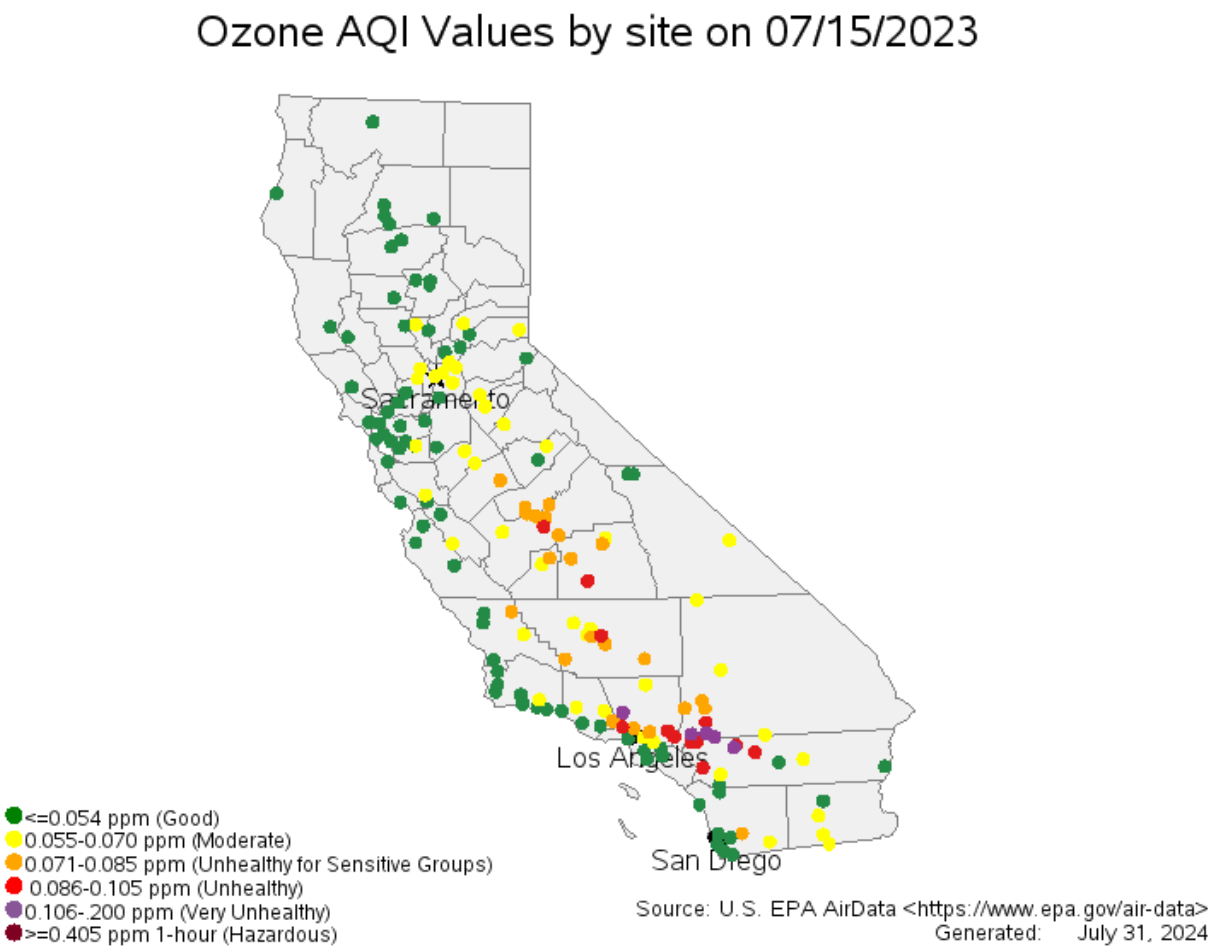

Figure 31: Ozone AQI Map – for Exceptional Events Analysis, for July 15, 2023 in California, generated July 31, 2024.

11.7. Influence of Background Ozone from the South Coast Air Basin at Palm Springs

Evidence in this demonstration clearly shows that smoke was transported from the wildfires to Palm Springs but the magnitude of the amount of ozone produced due to the fires at Palm Springs depends on the amount of wildfire emissions and other factors. Background ozone[6] produced due to anthropogenic emissions in the South Coast Air Basin upwind of the fire was moderately high on July 14 and 15 and thus this demonstration

[6] Background ozone in this context is defined as the ozone entering the Coachella Valley from the South Coast Air Basin in the absence of wildfire emissions

provides evidence that fire emissions caused the ozone exceedances at Palm Springs rather than the background ozone transported from the South Coast Air Basin. This section presents analyses comparing Palm Springs ozone with background ozone measured in the Basin to address this part of the clear causal relationship. The section compares ozone downwind of the fire at Palm Springs and Banning Airport, against upwind ozone measured at (from west to east): Glendora, Pomona, Mira Loma, Fontana and Riverside-Rubidoux (black dots in Figure 6). These sites were selected since they routinely experience elevated ozone and were upwind of the fires. Ozone sites in Crestline, Redlands and San Bernardino were not used since they do not lie along the Basin-to-Palm Springs transport path and/or may have had some smoke impacts.

Distributions of MDA8 ozone at Palm Springs were compared against these five background stations in the South Coast Air Basin, accounting for winds that transport ozone from the Basin to Palm Springs, winds in the opposite direction, and mixed winds. Wind flows were determined by vector averaging daytime (6AM to 5PM PST) hourly wind directions at Banning. Palm Springs was considered to lie downwind of the Basin if winds from 210- 330 degrees blew for at least 8 hours in this 12-hr period, at an average of > 5 mph. Palm Springs was deemed to lie upwind of the Basin on a particular day if winds blew from 30 to 150 degrees for at least 8 hours. Winds were considered "mixed" during all other combinations of speeds, directions, and durations.

Figure 32 compares the ozone MDA8 distributions at each site, differentiated by wind flows. It can be seen from the rightmost box and whiskers in each panel that Palm Springs median and 99th percentile ozone is always lower than the Basin, with non-overlapping interquartile ranges when Palm Springs is upwind of the Basin and during mixed flows. Palm Springs was downwind of the Basin on July 14, 2023, and recorded the second highest concentration measured under such wind conditions (0.093 ppm), which is also higher than its 99th percentile of 0.09 ppm (center panel). Although Glendora and Fontana recorded higher concentrations that day, they were both below their respective 99th percentiles. This suggests that even when upwind sites record higher ozone levels, it is very unusual for Palm Springs to record ozone levels as high as that observed on July 14, 2023.

Since Banning winds on July 15, 2023 were initially easterly and switched to westerly later in the day, the overall flow was classified as mixed. The left panel of Figure 32 confirms that Palm Springs saw a record high ozone level of 0.086 ppm, which is 0.01 ppm higher than the previous maximum for a "mixed" wind flow regime. Ozone at all other Basin sites on this day were below their 99th percentiles, except for Fontana which tied its 99th percentile of 0.111 ppm. Therefore, Palm Springs ozone on July 15, 2023 under this wind flow regime is without historical precedent. This demonstrates that it is unlikely that transport of ozone from the background stations caused the high ozone measured on July 14 and 15, 2023 since ozone concentrations were at a higher percentile in the historical distribution at Palm Springs than at the background stations on those days.

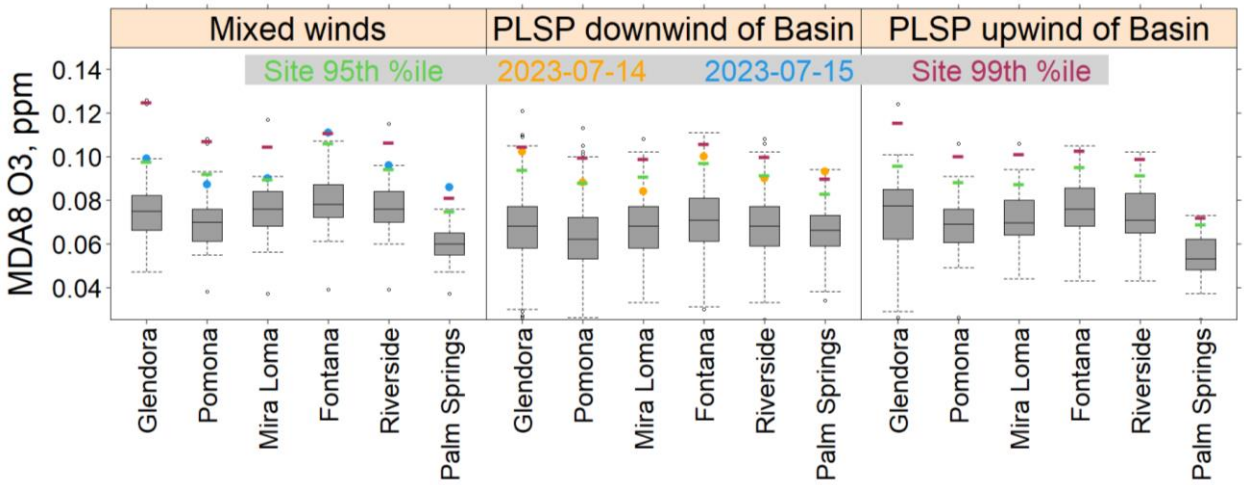

Figure 32: Basin and Palm Springs MDA8 ozone by wind flows in past 5 years within ±45 days of exceedance event. Sites are ordered west to east.

The diurnal profiles of ozone at two upwind stations, Los Angeles – North Main Street and Riverside – Rubidoux, was compared with ozone downwind of the fires at Palm Springs and Banning Airport to further determine whether transport of background ozone could have caused the high ozone measured at Palm Springs. Figure 33 shows the hourly ozone measured at each station. On July 14, ozone starts to increase first at Los Angeles – North Main Street and Riverside – Rubidoux, while the downwind ozone at Banning Airport and Palm Springs remains lower until about 1 PM PST. Then, concentrations spiked first at Banning Airport at 2 PM PST and at Palm Springs at 3 PM PST, increasing to levels greater than the upwind ozone concentrations. The majority of anthropogenic ozone precursor emissions are located in the South Coast Air Basin so it is unusual for ozone to be higher at Palm Springs than at sites in the Basin as there is no anthropogenic source that could drive such an increase. It is very likely that a large emission source such as the wildfires located between the background sites and the impacted sites caused ozone to increase starting at 2 PM PST. This timing is consistent with the start of the Reche Fire (about noon PST). The 0.05 ppm ozone increase at Palm Springs from 2 to 4 PM PST is much more rapid than the rate of increase at Riverside – Rubidoux. This is not consistent with transport of ozone from Riverside – Rubidoux to Palm Springs since the rate of increase should be similar if transport drove the Palm Springs concentration. The rapid ozone increase at Palm Springs and Banning Airport is consistent with a large increase in ozone precursor emissions such as from wildfires.

On the morning of July 15, the ozone at Banning Airport and Palm Springs spiked rapidly before ozone at Riverside – Rubidoux spiked. This is inconsistent with transport of ozone from the South Coast Air Basin to Palm Springs and possible transport patterns are discussed in detail in Section 11.1.

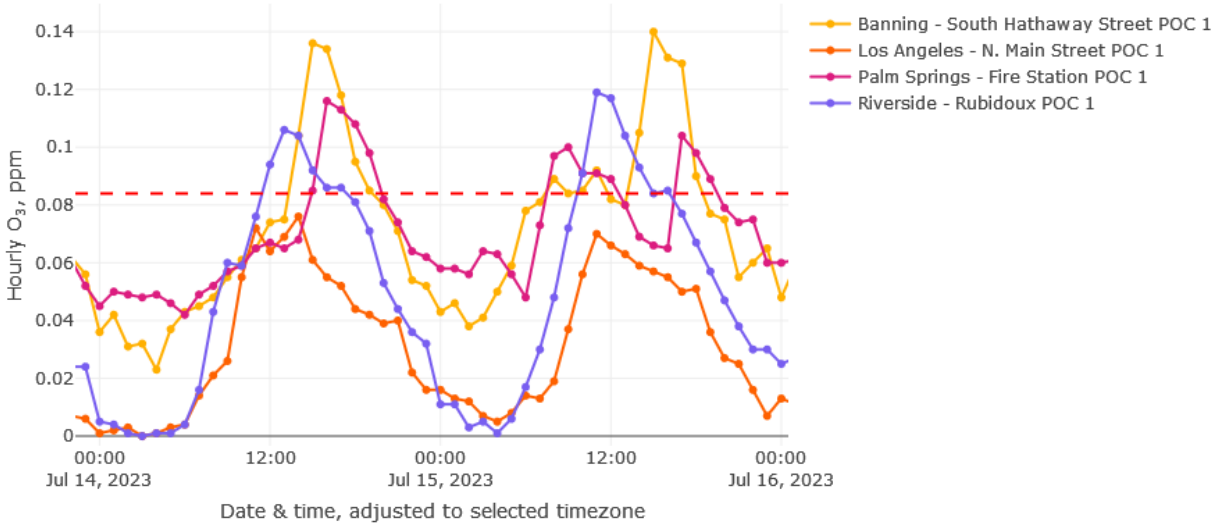

Figure 33: Hourly O3 timeseries for Los Angeles, Riverside, Banning, and Palm Springs for July 14-15, 2023. Times are in PST.

Figure 34 and Figure 35 show typical diurnal patterns of ozone at Los Angeles – North Main Street and Riverside – Rubidoux in the past 5 years along with July 14 and 15, 2023 data. The measurements on both July 14 and 15 at Los Angeles – North Main Street are almost all within the 95% interval of past measurements, indicating that while ozone was high on those days it was not unusually high. This is consistent with minimal wildfire smoke impacts at Los Angeles – North Main St., demonstrating that this site is a reasonable choice as a "background" site. Figure 35 shows that at Riverside – Rubidoux, the data on July 14 was also mostly within the 95% interval of past measurements, again indicating that ozone was high in the Basin but not unusually high. However, on July 15 ozone spiked above the 99% interval of past measurements in the morning, indicating that those measurements were unusually high. This is consistent with the analysis of Figure 33 and the trajectory analysis in Figure 36 and Figure 37, which showed that smoke was transported to the west towards Riverside after winds shifted on July 15. See Section 15 for more information about the HYSPLIT analysis. The ozone spike at Riverside – Rubidoux provides evidence that the emissions from the fire were transported towards Riverside that morning. Thus, the ozone spike at Palm Springs on July 15 was likely not caused by transport of ozone from the Basin but rather due to emissions from the wildfires.

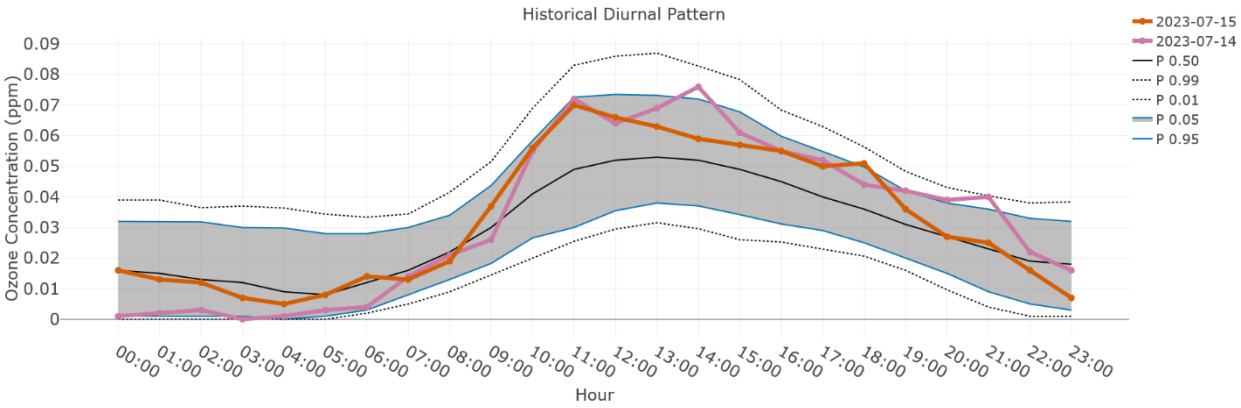

Figure 34: Hourly data for July 14-15, 2023 overlaid on the 5-year diurnal pattern for the same time of year (May 30 to August 29) at Los Angeles – N. Main Street POC 1. Times are in PST.

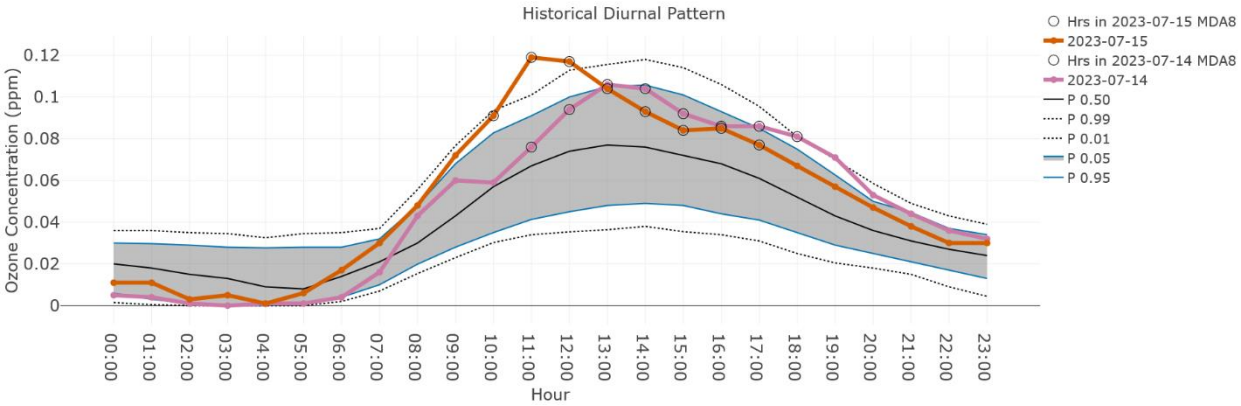

Figure 35: Hourly data for July 14-15, 2023 overlaid on the 5-year diurnal pattern for the same time of year (May 30 to August 29) at Riverside - Rubidoux POC 1. Times are in PST.

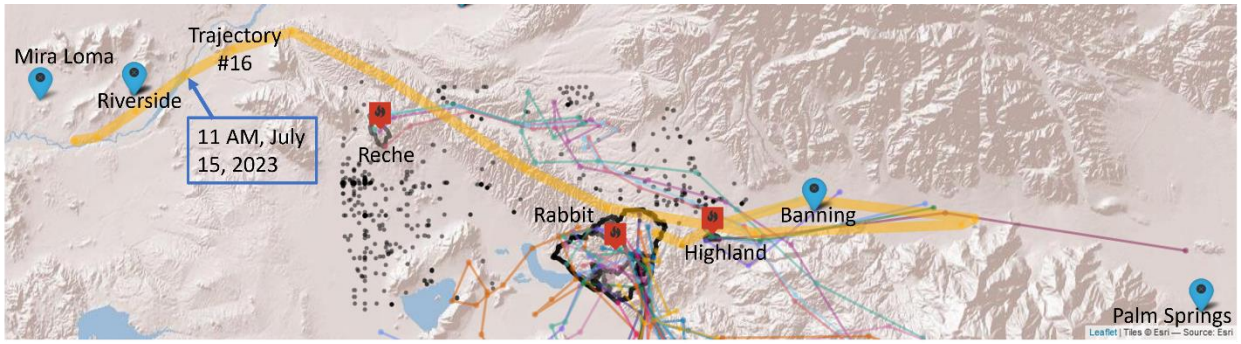

Figure 36: Forward trajectory analysis launched from the Rabbit Fire burn area at 23:00 PST on July 14, 2023. Trajectory #16 is highlighted.

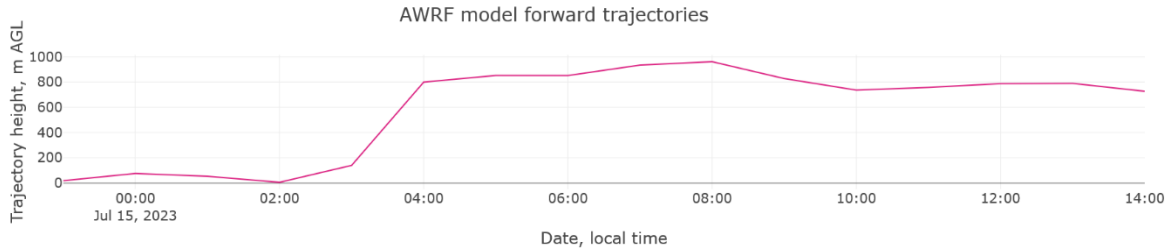

Figure 37: Time-height plot for trajectory #16, which is highlighted in Figure 36.

Additionally, section 26.3 presents analysis of the difference between Palm Springs and background ozone, accounting for meteorological factors that influence ozone concentrations at Palm Springs, to demonstrate that ozone transport from the Basin likely didn't cause the high ozone observed at Palm Springs on July 14 and 15, 2023 and that ozone at Palm Springs likely would not have exceeded 0.083 ppm on both days without wildfire impacts.

12. Historical Analysis for Rabbit, Reche, and Highland Wildfires

This section addresses Sections 3.2, 3.4, and 3.5 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

This section analyzes ozone concentrations during the Rabbit, Reche, and Highland Wildfires in comparison with other measurements during the same time of year across multiple years. The same time of year is taken to be the first day of an ozone exceedance for this event minus 45 days to the last day of an ozone exceedance plus 45 days, i.e., May 30 to August 29 for the years 2019 to 2023.

12.1. Historical analysis for Palm Springs - Fire Station POC 1 for Rabbit, Reche, and Highland Wildfires

Figure 38 shows that the ozone concentrations measured during July 14-15, 2023 were similar to concentrations during past wildfires. Historical exceedances of the 8-hour 1997 ozone NAAQS that occurred during known wildfire events with possible smoke influence are denoted. A table of these past events with possible influence is shown in Section 37. However, there is a decreasing trend in the 4th highest MDA8 values over the past several

years due to aggressive NOx and volatile organic compounds (VOC) controls in upwind areas, see Figure 39. Therefore, a comparison of the 2023 data to previous years introduces some bias.

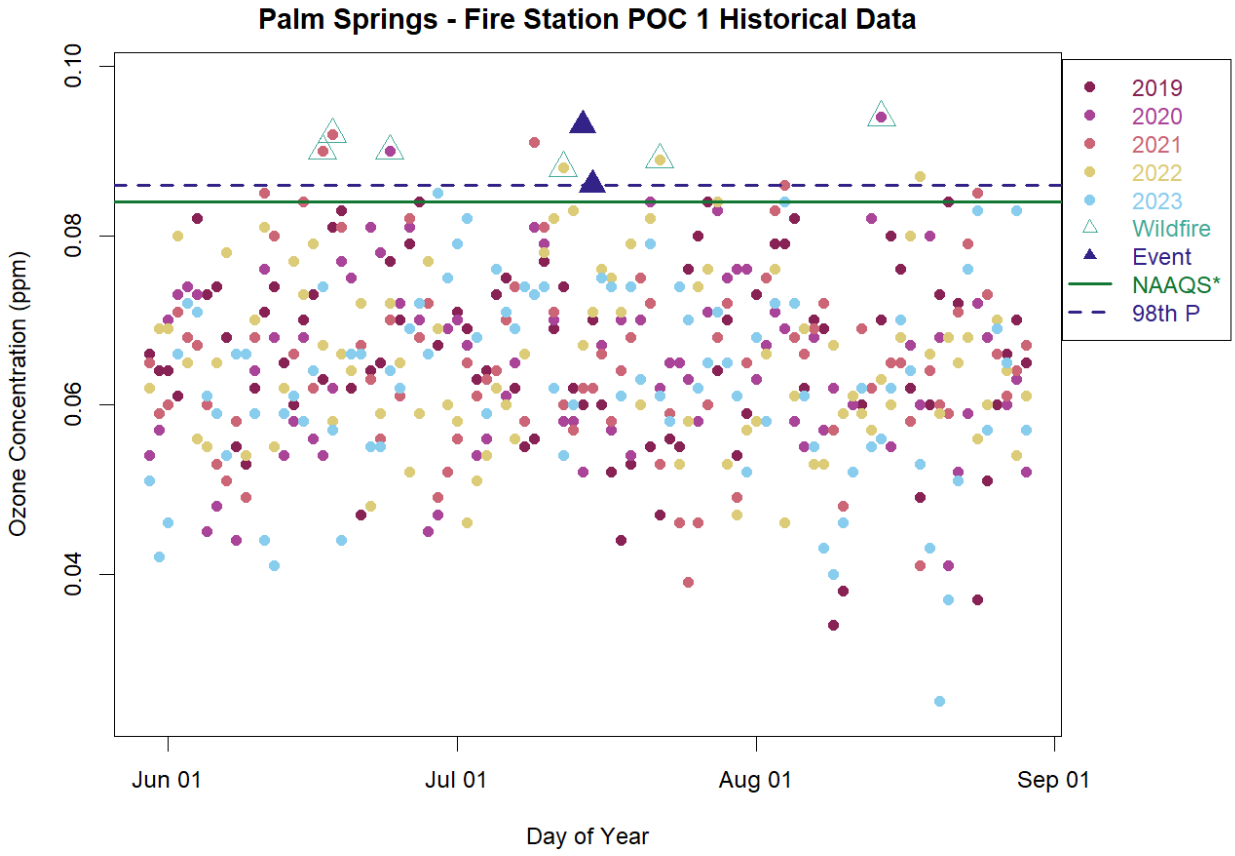

Figure 38: Five-year May 30 to August 29 timeseries for Palm Springs POC 1.

Note that 'Event' in the legend refers to the Rabbit, Reche, and Highland Wildfires. The NAAQS is 0.08 ppm, but with rounding, a value of 0.084 ppm attains the standard (see Eight-Hour Average Ozone Concentrations). '98th P' refers to the 98th percentile of the data shown.

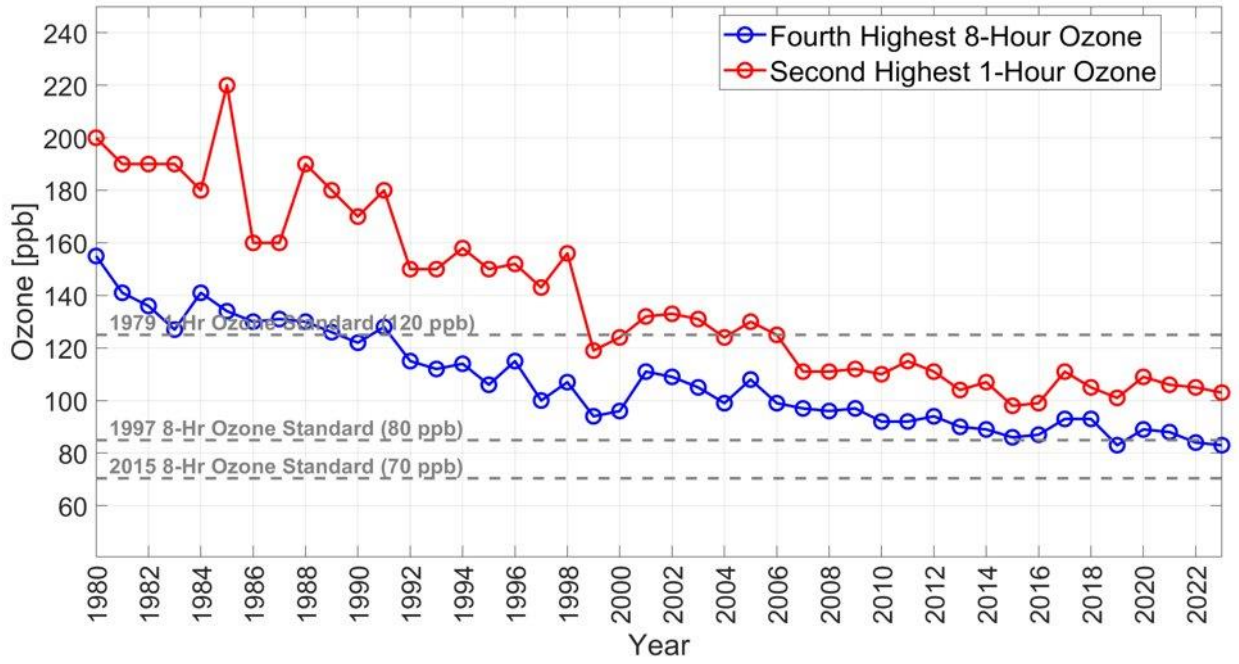

Figure 39: Long term ozone trend in Coachella Valley. July 14-15, 2023 were excluded.

Table 12 presents statistics for ozone concentrations at Palm Springs POC 1 for May 30 to August 29 for the years 2019 to 2022 and separately for 2023. All the exceedances of the 8-hour 1997 ozone NAAQS at Palm Springs POC 1 during the Rabbit, Reche, and Highland Wildfires have higher concentrations than the non-event 95th percentile for May 30 to August 29 for 2023 (0.081 ppm). The lowest event-related ozone exceedance (0.086 ppm) is not at least 0.005 ppm higher than the non-event related concentration (0.091 ppm) for the same time of year, indicating that a tier 1 analysis is insufficient for this exceptional events demonstration (see Section 3.4.1 of Guidance on the Preparation of Exceptional Events Demonstration for Wildfire Events that May Influence Ozone Concentrations). The downward trend in ozone over time shown in Figure 39 is consistent with the decrease in median values in the last two columns of Table 12.

Table 12: Statistics for ozone (ppm) at Palm Springs POC 1 during May 30 to August 29. The columns labeled with an 'e' do not include ozone exceedances of the 8-hour 1997 ozone NAAQS during past events with possible wildfire influence.

Statistic	2019 - 2022	2023	2019 - 2022 e	2023 e
Minimum	0.034	0.025	0.034	0.025
Maximum	0.094	0.093	0.091	0.085
Median	0.065	0.064	0.065	0.062
Mean	0.065	0.063	0.065	0.063
Standard deviation	0.011	0.012	0.010	0.012
95th Percentile	0.083	0.083	0.082	0.081
99th Percentile	0.090	0.087	0.085	0.084

Table 13 shows the percentile rankings of each exceedance of the NAAQS ozone 8-hour 1997 Standard at Palm Springs - Fire Station POC 1 for May 30 to August 29 for the years 2019 to 2023 with and without data exclusions.

Table 13: Percentiles for each ozone exceedance of the 8-hour 1997 ozone NAAQS during the Rabbit, Reche, and Highland Wildfires.

Date	Concentration (ppm)	Percentile Ranking (no data excluded)	Percentile Ranking (events excluded)
2023-07-14	0.093	99.8	100.0
2023-07-15	0.086	97.8	99.1

Figure 40 shows the hourly data for July 14 and 15, 2023 overlaid on the 5-year diurnal pattern for the same time of year for Palm Springs – Fire Station POC 1. The hours used in the MDA8 ozone calculation are highlighted with black circles. For July 14, 2023, six of the eight hours used for the MDA8 calculation were at or above the 95th percentile, of which, four were above the 99th percentile. The O3 concentration was 0.014 ppm above the 99th percentile for hour 16:00 and 0.010 ppm above the 99th percentile for hour 17:00. These were also the second and third highest O3 measured at Palm Springs since May 2012 (one hour in 2020 was higher), and the second highest O3 measured for hour 16:00 and the highest for hour 17:00 since 2012. The O3 concentration was 0.007 ppm above the 99th percentile for hour 18:00 and 0.002 ppm above the 99th percentile for hour 19:00. For July 15, 2023, seven of the eight hours used for the MDA8 calculation were above the 95th percentile, of which, six were above the 99th percentile. For hours 07:00 through 12:00, the

O3 measurements were 0.008, 0.026, 0.020, 0.007, 0.005, and 0.003 ppm above the 99th percentile, respectively. The 08:00 and 09:00 hours were the highest measured for those hours of the day since 2008, when monitoring began at Palm Springs. Thus, the hourly measurements were exceptionally high on July 14 and 15, 2023 compared with the prior 15 years. This is especially true for the morning O3 spike on July 15, since O3 has never spiked to such magnitude at those hours since monitoring began at Palm Springs. For context, the sample sizes for the historical diurnal pattern are shown in

Figure *41*.

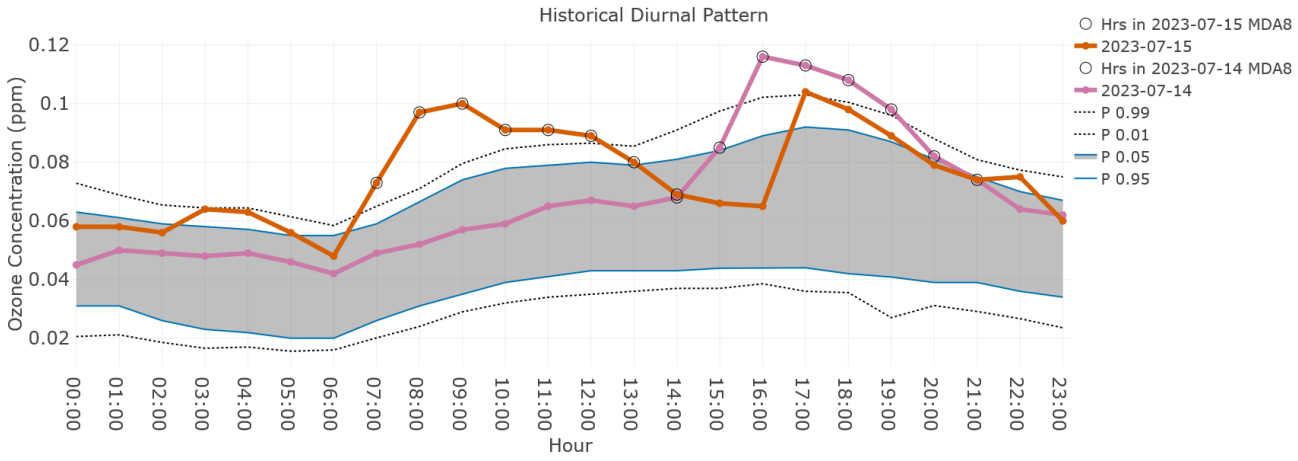

Figure 40: Hourly data for July 14-15, 2023 overlaid on the 5-year diurnal pattern for the same time of year (May 30 to August 29) at Palm Springs – Fires Station POC 1. Local time in figure is 1 hour ahead of PST.

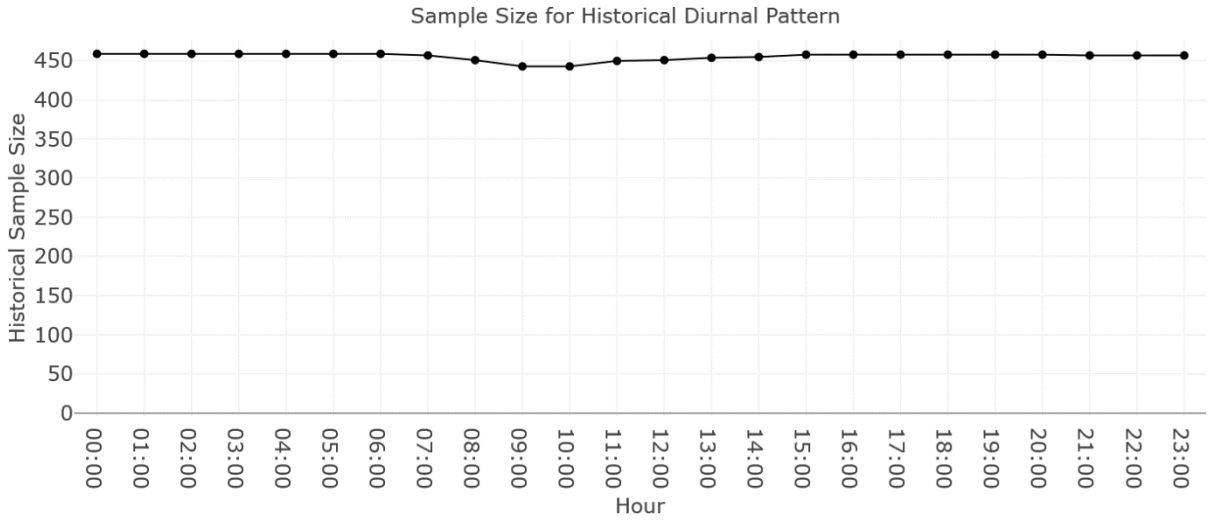

Figure 41: Hourly sample size for the 5-year diurnal pattern for May 30 to August 29 at Palm Springs, shown in Figure 40. Local time in figure is 1 hour ahead of PST.

Figure 42 shows the historical pattern for the time of the first hour used in the MDA8 calculation and notes the corresponding times for July 14 and 15, 2023. The most common first hour of the MDA8 8-hour time window is noon local standard time, which is 11:00 PST. For July 14, 2023, the first hour of the MDA8 calculation was 2 PM and is well-within the distribution. The Rabbit, Reche, and Highland Wildfires all started in the afternoon on July 14, 2023, so an afternoon start time for the MDA8 is consistent with both the typical non-event pattern and fire influence. On July 15, 2023, however, the start time for the MDA8 was 7 AM local standard time (6:00 PST), at the edge of the historical distribution. This is consistent with smoke transport and co-pollutants (see Sections 11 and 15-15.6) and is less consistent with the typical diurnal pattern.

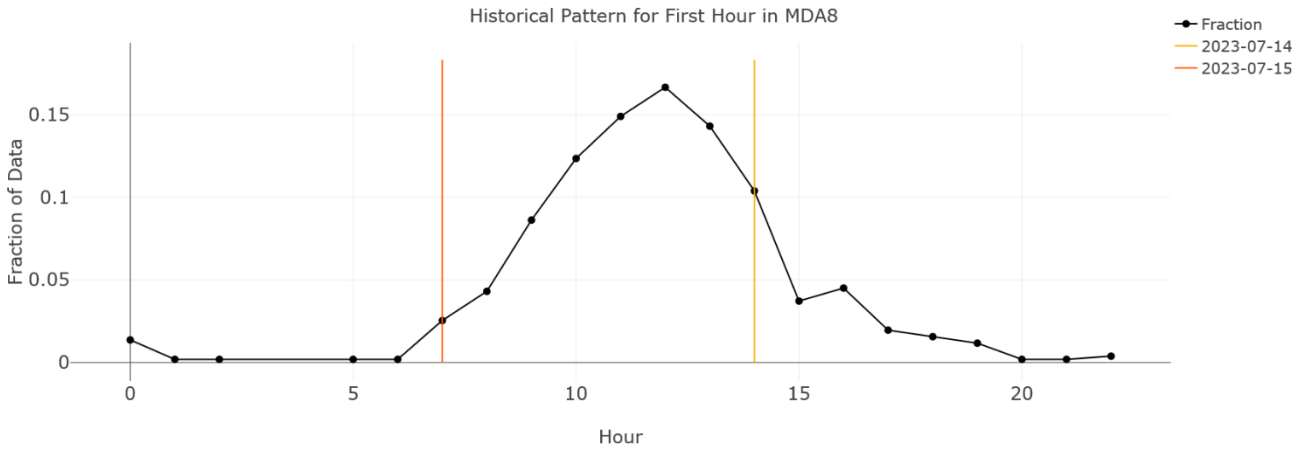

Figure 42: Historical pattern for the time of the first hour used in the MDA8 calculation and the corresponding times for July 14 and 15, 2023 at Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

Figure 43 shows the ozone daily AQI values for 2019 to 2023 for the Palm Springs monitor from EPA's Multiyear Tile Plot – for Exceptional Events Analysis tool. July 14 and 15, 2023 are two of only three days in 2023 to be in the Unhealthy AQI category. No data in the plot are in the Very Unhealthy or Hazardous AQI categories.

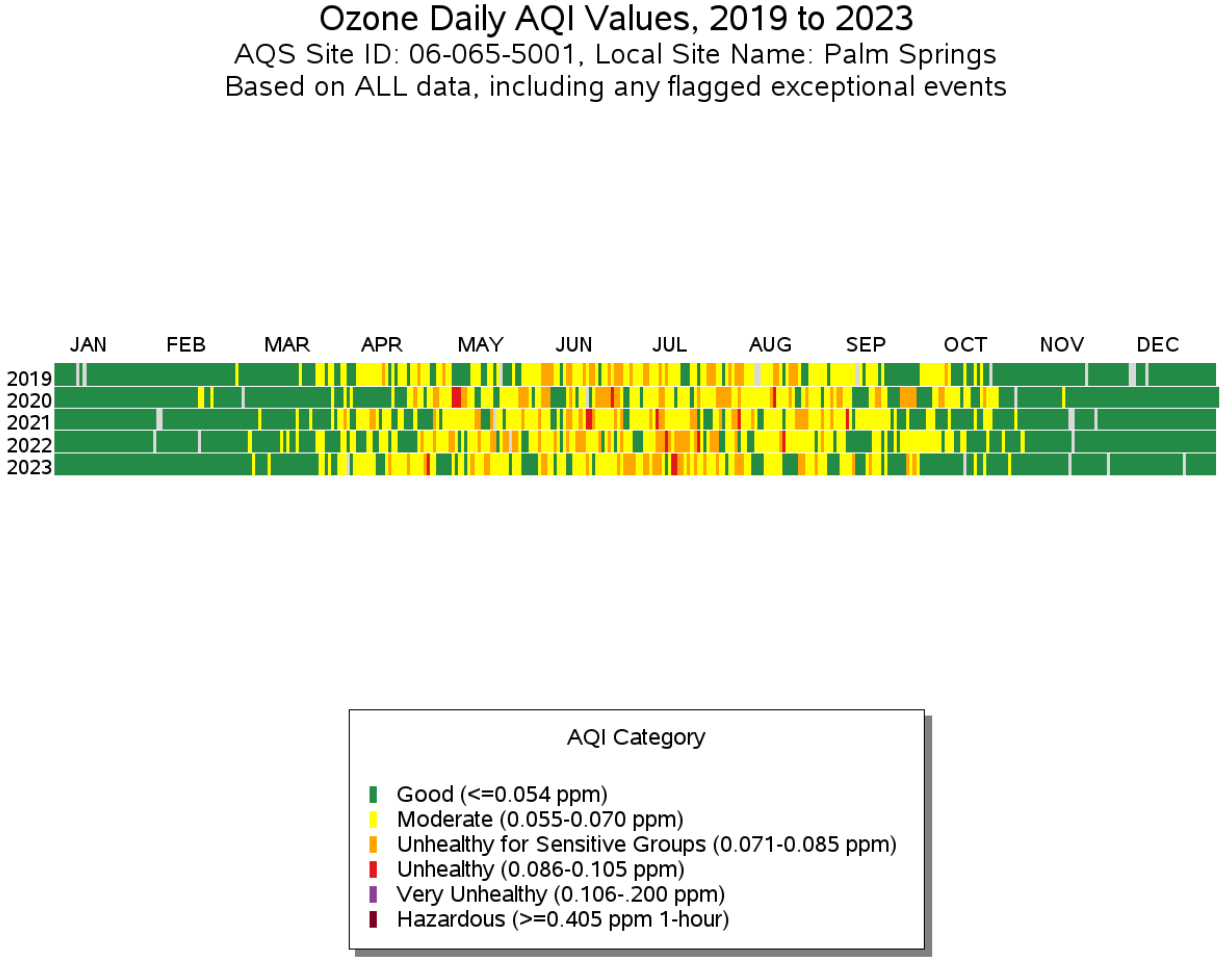

Figure 43: Multiyear Tile Plot – for Exceptional Events Analysis, generated July 31, 2024.

12.2. Historical analysis for Banning - South Hathaway Street POC 1 during Rabbit, Reche, and Highland Wildfires

Figure 44 shows that the ozone concentrations measured during July 14-15, 2023 were similar to concentrations during past wildfires and similar to the highest non-event concentrations. Past exceedances of the NAAQS ozone 8-hour 1997 Standard that occurred during known wildfire events with possible smoke influence are denoted on the figure. A table of these past events is shown in Section 37.

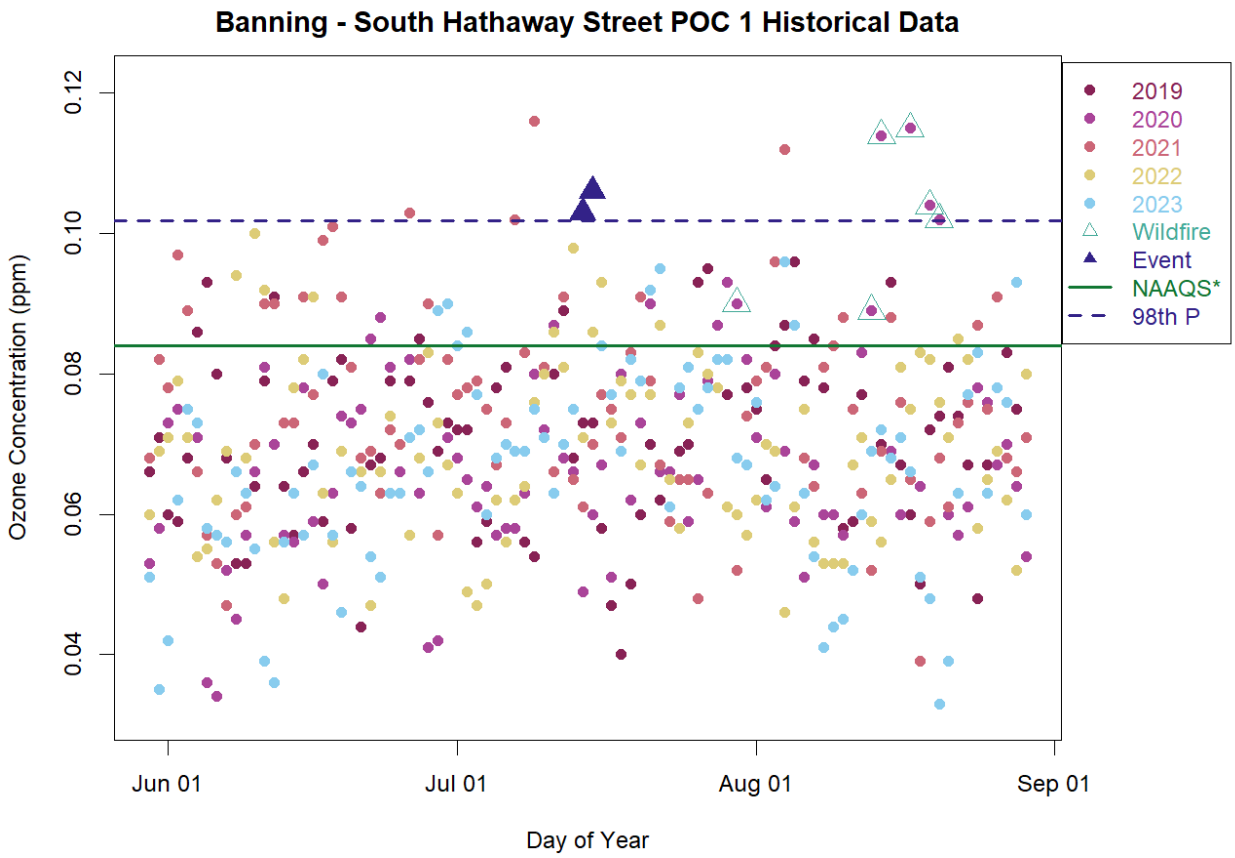

Figure 44: Five-year May 30 to August 29 timeseries for Banning - South Hathaway Street POC 1.

Note that 'Event' in the legend refers to the Rabbit, Reche, and Highland Wildfires. The NAAQS is 0.08 ppm, but with rounding, a value of 0.084 ppm attains the standard (see Eight-Hour Average Ozone Concentrations). '98th P' refers to the 98th percentile of the data shown.

Table 14 presents statistics for ozone concentrations at Banning - South Hathaway Street POC 1 for May 30 to August 29 for the years 2019 to 2022 and separately for 2023.

Table 14: Statistics for ozone (ppm) at Banning - South Hathaway Street POC 1 during May 30 to August 29. The columns labeled with an 'e' do not include ozone exceedances of the 8-hour 1997 ozone NAAQS during past events with possible influence.

Statistic	2019 – 2022	2023	2019 – 2022 e	2023 e
Minimum	0.034	0.033	0.034	0.033
Maximum	0.116	0.106	0.116	0.096
Median	0.070	0.068	0.070	0.067
Mean	0.071	0.067	0.071	0.066
Standard deviation	0.014	0.015	0.013	0.014
95th Percentile	0.093	0.092	0.093	0.090
99th Percentile	0.107	0.103	0.103	0.095

Table 15 shows the percentile rankings of each exceedance of the NAAQS ozone 8-hour 1997 Standard at Banning – South Hathaway Street POC 1 for May 30 to August 29 for the years 2019 to 2023 with and without data exclusions.

Table 15: Percentiles for each ozone exceedance of the NAAQS ozone 8-hour 1997 Standard *during the Rabbit, Reche, and Highland Wildfires.*

Date	Concentration (ppm)	Percentile Ranking (no data excluded)	Percentile Ranking (events excluded)
2023-07-14	0.103	0.985	0.989
2023-07-15	0.106	0.991	0.993

Figure 45 shows the hourly data for July 14 and 15, 2023 overlaid on the 5-year diurnal pattern for the same time of year for Banning – South Hathaway Street POC 1. The hours used in the MDA8 ozone calculation are highlighted with black circles. For July 14, 2023, six of the eight hours used for the MDA8 calculation were at or above the 95th percentile, of which, two were above the 99th percentile. For July 15, 2023, five of the eight hours used for the MDA8 calculation were above the 95th percentile, of which, four were above the 99th percentile. For context, the sample sizes for the historical diurnal pattern are shown in

Figure *46*.

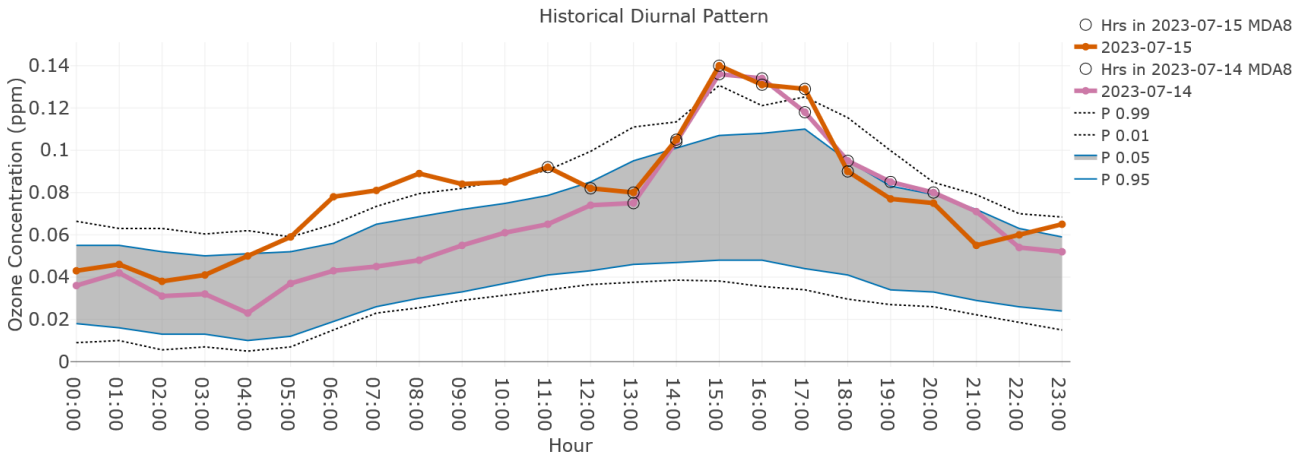

Figure 45: Hourly data for July 14-15, 2023 overlaid on the 5-year diurnal pattern for the same time of year (May 30 to August 29) at the Banning – South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

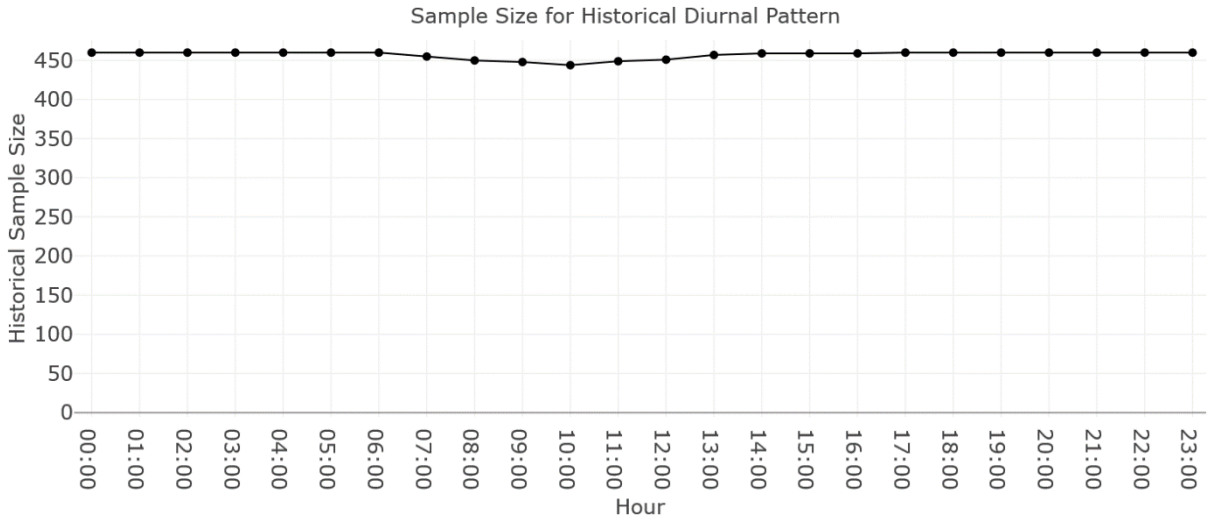

Figure 46: Hourly sample size for the 5-year diurnal pattern for May 30 to August 29 at Banning, shown in Figure 45. Local time in figure is 1 hour ahead of PST.

Figure 47 shows the historical pattern for the time of the first hour used in the MDA8 calculation and notes the corresponding times for July 14 and 15, 2023. The most common first hour of the MDA8 8-hour time window is 11 AM local standard time, which is 10:00 PST. For July 14, 2023, the first hour of the MDA8 calculation was 2 PM and is well-within the distribution. The Rabbit, Reche, and Highland Wildfires all started in the afternoon of July 14, 2023, so an afternoon start time for the MDA8 is consistent with both the typical non-event pattern and fire influence. On July 15, 2023, the start time for the MDA8 was noon local standard time (11:00 PST), matching the historical distribution.

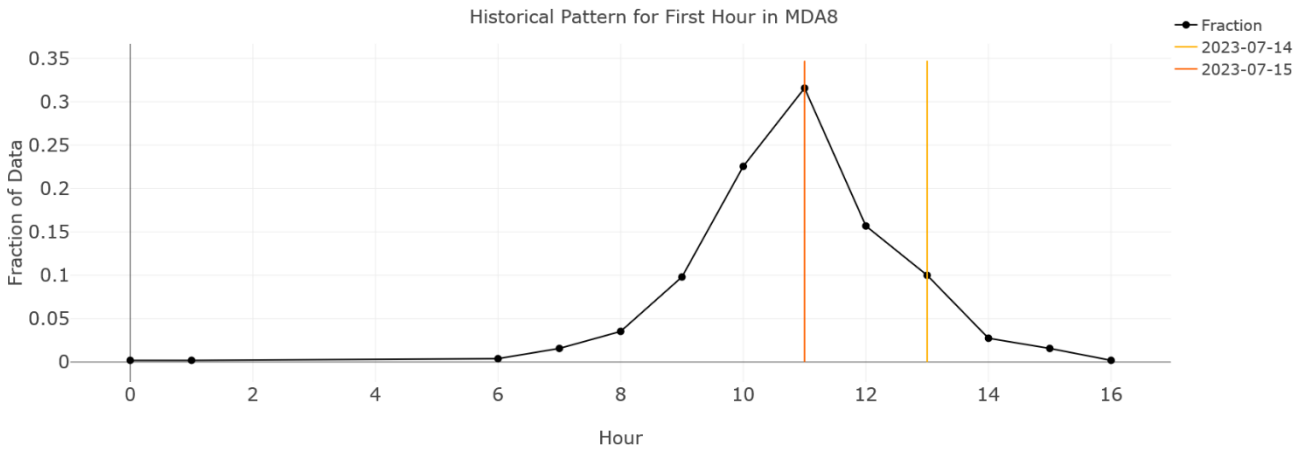

Figure 47: Historical pattern for the time of the first hour used in the MDA8 calculation and the corresponding times for July 14 and 15, 2023 at Banning – South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

13. Q/D Analysis for July 14, 2023

The emissions over distance (Q/D) analysis is based on Section 3.5.1 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations, referred to below as 'EPA Guidance'. Higher emitting fires further away are less important, and lower emitting fires closer to the monitor might contribute more ozone. The Q/D value is part of determining which tier of evidence is required for an exceptional event.

13.1. Q/D Analysis for Banning – South Hathaway Street POC 1 Station for July 14, 2023

Table 16 shows the aggregate Q/D analysis for the Banning – South Hathaway Street POC 1 Station for July 14, 2023 using the method described in Step 7 of Section 3.5.1 of the EPA Guidance where distance is the weighted distance. The emissions data and Q/D analysis for individual fires is given in Section 38. Q/D values are all less than 100, so a tier three analysis is needed for this station for this exceptional events demonstration. As shown in Figure 8, the fire locations and the Banning Station are in an area of complex topography. Any air parcels traveling from the fire toward the Banning Station would likely have limited horizontal dispersion along the transport path, so the Q/D analysis likely underestimates the smoke impacts at the Banning Station.

Table 16: Aggregate Q/D values for the exceedance of the 8-hour 1997 ozone NAAQS at Banning - South Hathaway Street POC 1 on July 14, 2023.

Q/D Date	Date Metric	Sum Q (tons/day)	Distance (km)	Q/D	Q/D > 100
2023-07-13	Prior Date	0			No, zero emissions
2023-07-14	Date of First Hour	487	18	28	No
2023-07-14	Date of Last Hour	487	18	28	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Sum Q (tons/day) is the total emissions of all included fires for the date shown in the 'Q/D Date' column. Distance (km) is the weighted distance between the fires and the monitoring station.

13.2. Q/D Analysis for Palm Springs - Fire Station POC 1 Station for July 14, 2023

Table 17 shows the aggregate Q/D analysis for the Palm Springs - Fire Station POC 1 Station for July 14, 2023 using the method described in Step 7 of Section 3.5.1 of the EPA Guidance where distance is the weighted distance of all relevant fires. The emissions data and Q/D analysis for individual fires is given in Section 38. Q/D values are all less than 100, so a tier three analysis is needed for this station for this exceptional events demonstration. As shown in Figure 8, the fire locations and the Palm Springs Station are separated by a steep, narrow canyon. Any air parcels traveling through the canyon would have limited horizontal dispersion along the transport path, so the Q/D analysis likely underestimates the smoke impacts at the Palm Springs Station.

Table 17: Aggregate Q/D values for the exceedance of the NAAQS ozone 8-hour 1997 Standard at Palm Springs – Fire Station POC 1 on July 14 2023.

Q/D Date	Date Metric	Sum Q (tons/day)	Distance (km)	Q/D	Q/D > 100
2023-07-13	Prior Date	0			No, zero emissions
2023-07-14	Date of First Hour	487	47	10	No
2023-07-14	Date of Last Hour	487	47	10	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to

the day before the ozone exceedance. Sum Q (tons/day) is the total emissions of all included fires for the date shown in the 'Q/D Date' column. Distance (km) is the weighted distance between the fires and the monitoring station.

14. Q/D Analysis for July 15, 2023

The Q/D analysis is based on Section 3.5.1 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations, referred to below as 'EPA Guidance'.

14.1. Q/D Analysis for Banning - South Hathaway Street POC 1 Station for July 15, 2023

Table 18 shows the aggregate Q/D analysis for the Banning - South Hathaway Street POC 1 Station for July 15, 2023 using the method described in Step 7 of Section 3.5.1 of the EPA Guidance where distance is the weighted distance. The emissions data and Q/D analysis for individual fires is given in Section 39. Q/D values are all less than 100, so a tier three analysis is needed for this station for this exceptional events demonstration.

Table 18: Aggregate Q/D values for the exceedance of the NAAQS ozone 8-hour 1997 Standard at Banning - South Hathaway Street POC 1 on July 15, 2023.

Q/D Date	Date Metric	Sum Q (tons/day)	Distance (km)	Q/D	Q/D > 100
2023-07-14	Prior Date	487	18	28	No
2023-07-15	Date of First Hour	693	15	45	No
2023-07-15	Date of Last Hour	693	15	45	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Sum Q (tons/day) is the total emissions of all included fires for the date shown in the 'Q/D Date' column. Distance (km) is the weighted distance between the fires and the monitoring station.

14.2. Q/D Analysis for Palm Springs - Fire Station POC 1 Station for July 15, 2023

Table 19 shows the aggregate Q/D analysis for the Palm Springs - Fire Station POC 1 Station for July 15, 2023 using the method described in Step 7 of Section 3.5.1 of the EPA

Guidance where distance is the weighted distance. The Q/D analysis for individual fires is given in Section 39. Q/D values are all less than 100, so a tier three analysis is needed for this station for this exceptional events demonstration.

Table 19: Aggregate Q/D values for the exceedance of the 8-hour 1997 ozone NAAQS at Palm Springs - Fire Station POC 1 on July 15, 2023.

Q/D Date	Date Metric	Sum Q (tons/day)	Distance (km)	Q/D	Q/D > 100
2023-07-14	Prior Date	487	47	10	No
2023-07-15	Date of First Hour	693	45	16	No
2023-07-15	Date of Last Hour	693	45	16	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Sum Q (tons/day) is the total emissions of all included fires for the date shown in the 'Q/D Date' column. Distance (km) is the weighted distance between the fires and the monitoring station.

Since none of the days and sites met the Q/D thresholds (which is the key factor #1 for, Tier 2 demonstrations), key factor #2 criteria was not evaluated.

15. HYSPLIT Forward Trajectories Report for July 14-15, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

The National Oceanic and Atmospheric Administration's (NOAA) Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) was run with high resolution meteorological data to track smoke transport from the fires (forward trajectories). Spatial resolution even as high as 4km is unable to resolve the terrain around Banning Pass due to the 2-4 km width of the pass and steep mountains on both sides exceeding 10,000 ft in elevation. Therefore, a high spatial resolution meteorological model was required. Pertinent model inputs were:

- Meteorology: archives of the Weather Research and Forecasting (WRF) model from the California and Nevada Smoke and Air Committee (CANSAC), operated by Desert Research Institute (DRI)
    - 1.33km horizontal spacing
    - Time resolution: 1 hour

    - Used only the first 12 hours from each new WRF initialization, from 0Z on July 14, 2023 through 12Z on July 15, 2023.

- New HYSPLIT trajectories are launched every hour.
- Trajectory length: 24 hrs.

Forward trajectories before noon PST on July 14, 2023 (as the first fire started) and after 11 PM PST on July 15, 2023 were not considered.

Forward trajectories were launched from all grid cells in the native WRF meteorological models that fell within the fire perimeters, starting at half the PBL height. This assumes the buoyant smoke plume is dispersed within the boundary layer and is more realistic than assuming that the plume rises to a fixed height every hour. Trajectories were terminated if they approach within 3m above the ground, as proceeding hours of the simulation are highly uncertain[7]. In reality, it is unlikely that all particulate mass would be deposited if an air parcel impacted the ground, but since HYSPLIT is unable to resolve further trajectory locations, these trajectories were terminated.

It must be noted that when HYSPLIT is run in trajectory mode, it only tracks the location of the plume centerline and not the vertical (σ_z) and lateral (σ_y) dispersion thereof. During convective hours or periods of light winds, the respective dispersion coefficients could cause the plume to spread substantially from its center. As such a HYSPLIT trajectory passing within 2-3 WRF grid cells or a few WRF vertical layers (which have varying heights) of a particular location could still potentially impact a particular location. Given the large number of trajectories, an interactive map was created to manually select pertinent trajectories based on their starting hour. This allows for better visualization of relevant information. Relevant maps and the trajectory height above ground level are below, and a summary table is provided in Section 11.1.

15.1. HYSPLIT Forward Trajectories for July 14, 2023 launched at 12:00 PST

The Reche Fire started shortly before 12:00 PST and all four of the trajectories launched from the Reche Fire burn area passed within approximately 10-15 km of the Palm Springs monitor around 16:00 PST at altitudes of 28 m AGL and lower, see Figure 48 and Figure 49. This timing corresponds to the increase of CO and NOx shown in Figure 14. The timing of the arrival of the trajectories at 16:00 is also consistent with the abrupt increase of ozone at Palm Springs from 0.85 ppm at 15:00 to 0.116 ppm at 16:00, see Figure 40. Trajectory #4 looped back to within 10-11 km of the Palm Springs monitor on the morning of July 15 during 04:00 to 06:00 at altitudes of 806 – 862 m AGL (see Figure 50), and Figure 14 shows

[7] HYSPLIT cheat sheet:
https://www.ready.noaa.gov/documents/ppts/Cheat_Sheet_2020.pdf

that CO and NOx were still elevated during this time. Note that the colors for the trajectories do not match between the maps and time-height plot.

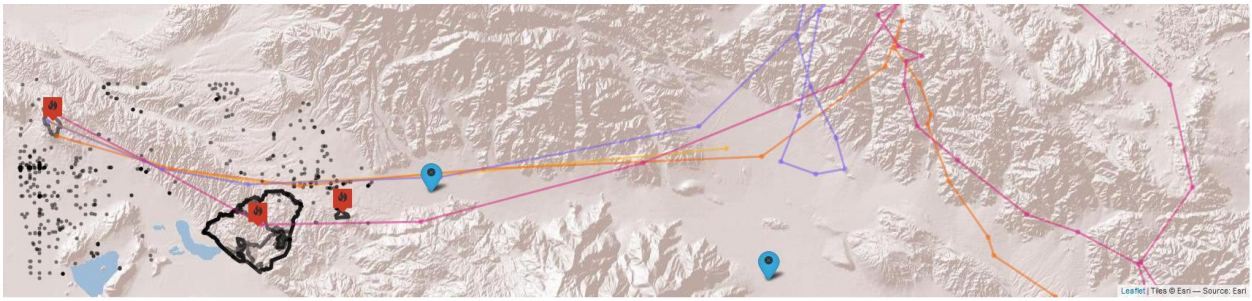

Figure 48: Forward HYSPLIT trajectories launched at 12:00 PST on July 14, 2023.

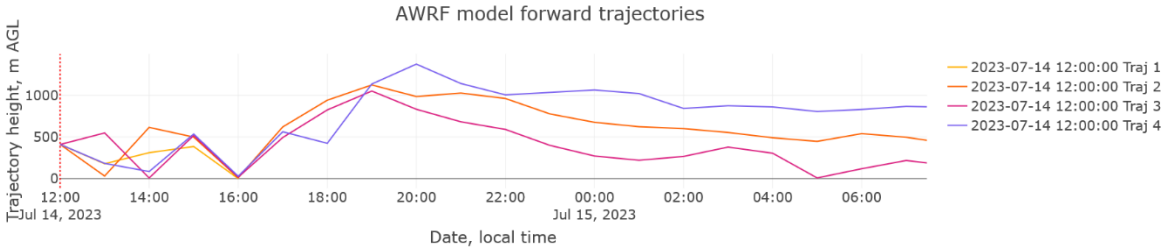

Figure 49: Time-height plot for forward HYSPLIT trajectories launched at 12:00 PST on July 14, 2023.

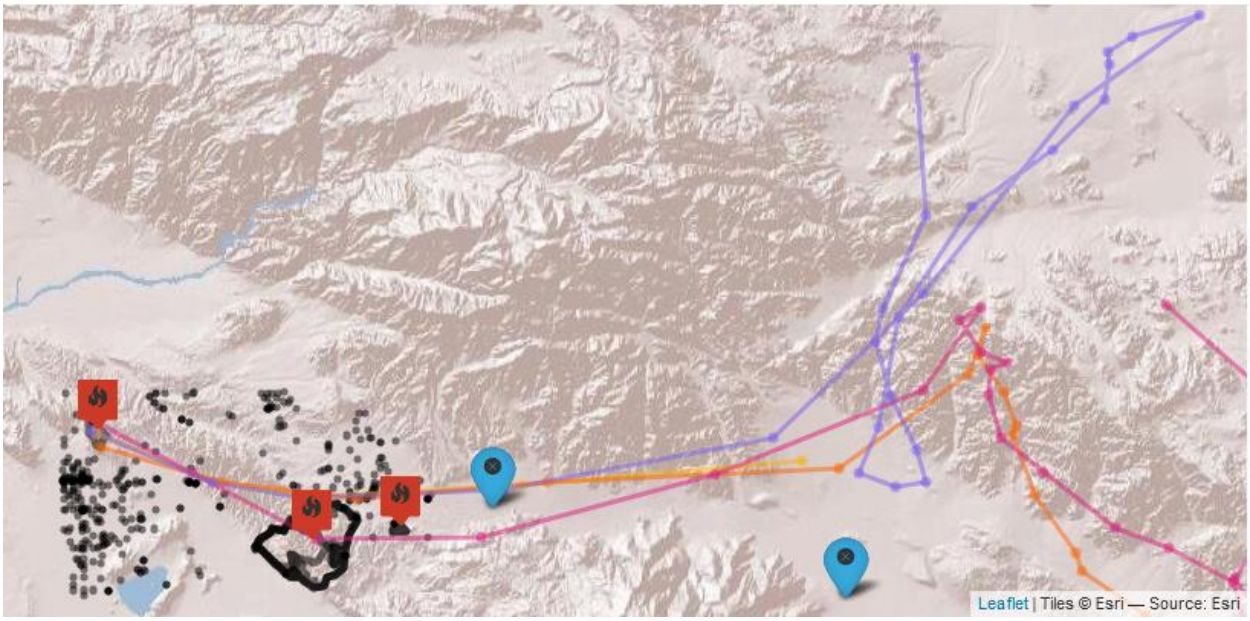

Figure 50: Forward HYSPLIT trajectories launched at 12:00 PST on July 14, 2023, regional view.

15.2. HYSPLIT Forward Trajectories for July 14, 2023 launched at 13:00 PST

The Reche Fire started before 13:00 PST and three of the trajectories launched from the Reche Fire burn area ended at the ground within approximately 10-14 km of the Palm Springs monitor around 17:00 PST, Figure 51 and Figure 52. This timing is consistent with elevated concentrations of CO and NOx shown in Figure 14 and elevated ozone concentrations shown in Figure 40. Note that the colors for the trajectories do not match between the maps and time-height plot.

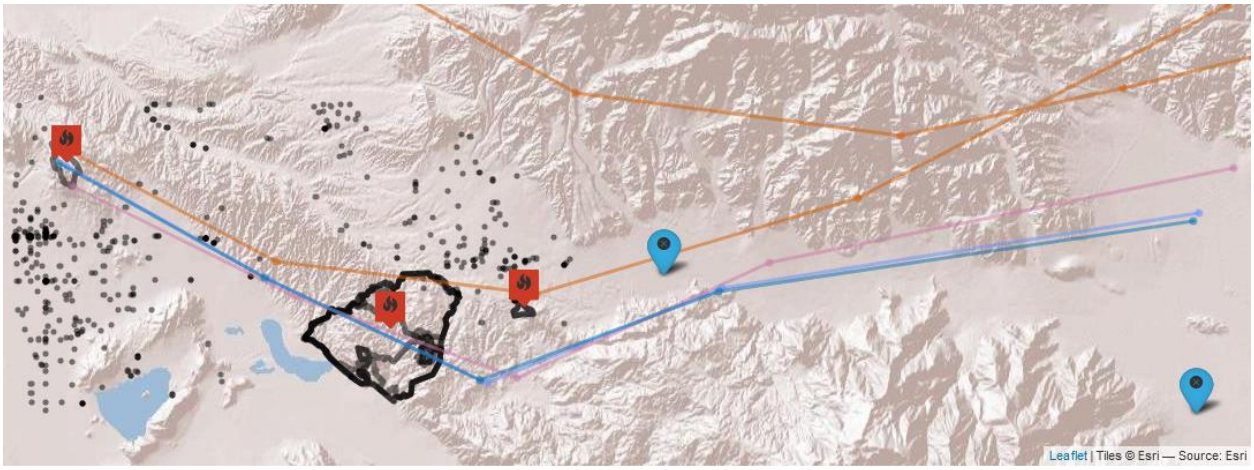

Figure 51: Forward HYSPLIT trajectories launched at 13:00 PST on July 14, 2023.

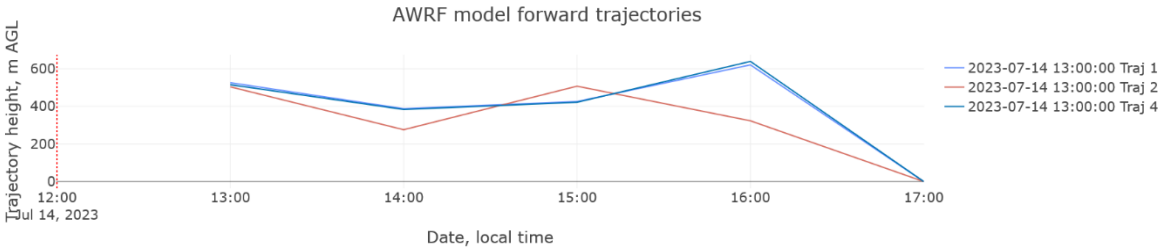

Figure 52: Time-height plot for forward HYSPLIT trajectories launched at 13:00 PST on July 14, 2023.

15.3. HYSPLIT Forward Trajectories for July 14, 2023 launched at 14:00 PST

The Highland and Reche Fires had both started by 14:00 PST, and five of the trajectories launched from the Highland Fire burn area ended at the ground within 5 km of the Palm Springs monitor around 16:00 PST, see Figure 53 and Figure 54. This timing corresponds

to the increase of CO and NOx shown in Figure 14. The timing of the arrival of the trajectories at 16:00 is also consistent with the abrupt increase of ozone at Palm Springs from 0.85 ppm at 15:00 to 0.116 ppm at 16:00, see Figure 40. Note that the colors for the trajectories do not match between the map and time-height plot.

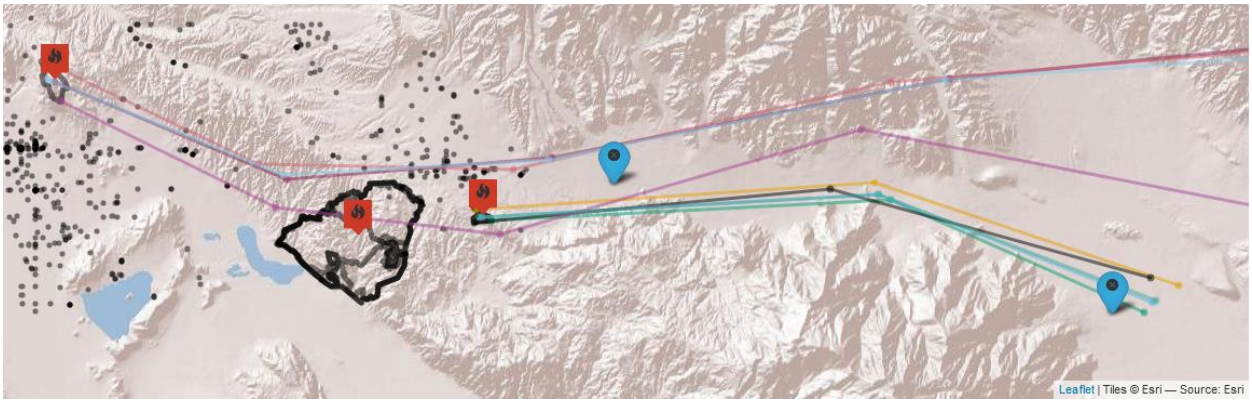

Figure 53: Forward HYSPLIT trajectories launched at 14:00 PST on July 14, 2023.

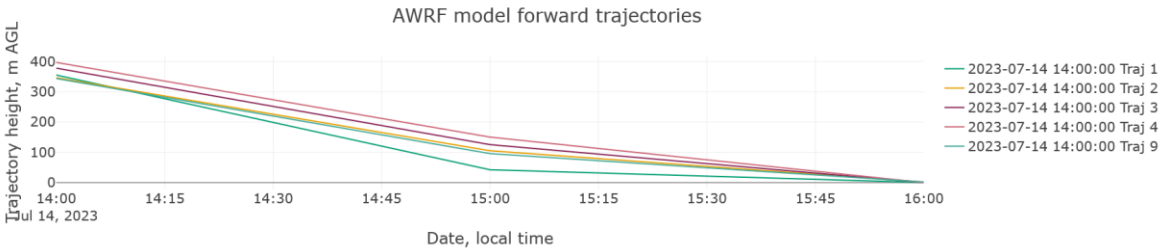

Figure 54: Time-height plot for forward HYSPLIT trajectories launched at 14:00 PST on July 14, 2023.

15.4. HYSPLIT Forward Trajectories for July 14, 2023 launched at 15:00 PST

The Highland, Rabbit, and Reche Fires had all started by 15:00 PST. All forward trajectories launched at 15:00 from the Highland, Rabbit, and Reche Fires passed within 18 km of the Palm Springs Monitor, with most of them passing at a distance between 6-18 km and several terminating at the ground, see Figure 55 and Figure 56. Most of them passed closest to the Palm Springs monitor at either 17:00 or 18:00 PST. One trajectory from the southern edge of the Rabbit Fire passed within 1.3 km of the Palm Springs monitor between 17:00 and 18:00 PST at an altitude between 1037 and 25 m AGL, see Figure 57. Arrival of the trajectories at 17:00 and 18:00 PST is consistent with elevated concentrations of CO, NOx

and ozone, see Figure 14. Note that the colors for the trajectories do not match between the maps and time-height plots.

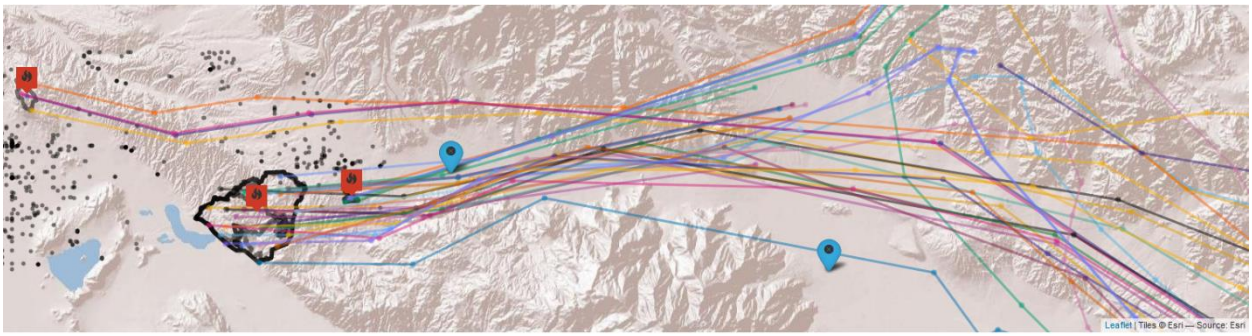

Figure 55: Forward HYSPLIT trajectories launched at 15:00 PST on July 14, 2023.

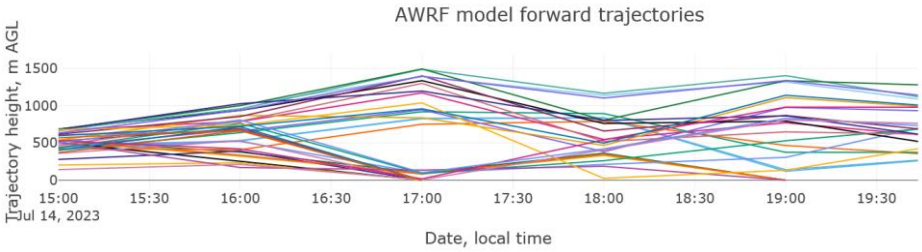

Figure 56: Time-height plot for forward HYSPLIT trajectories launched at 15:00 PST on July 14, 2023.

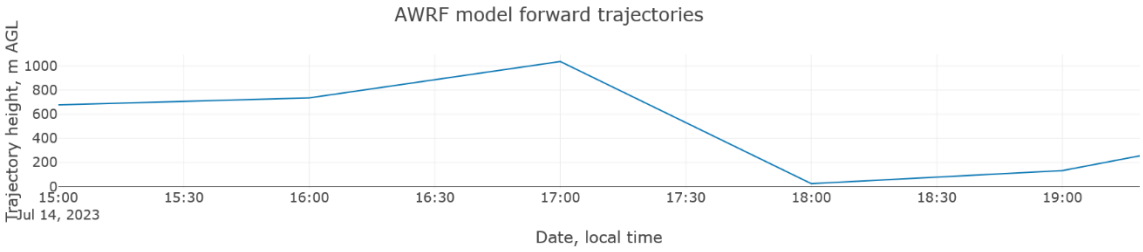

Figure 57: Time-height plot for the forward HYSPLIT trajectory launched at 15:00 PST on July 14, 2023 that passed closest to the Palm Springs monitor.

15.5. HYSPLIT Forward Trajectories for July 14, 2023 launched at 16:00 PST

All forward trajectories launched at 16:00 from the Highland, Rabbit, and Reche Fires passed within 18 km of the Palm Springs Monitor, see Figure 58. Five trajectories passed

within 7 km at altitudes between 538 and 0 m AGL between 17:00 and 18:00 PST, see Figure 59. Arrival of the trajectories between 17:00 and 18:00 PST is consistent with elevated concentrations of CO, NOx and ozone, see Figure 14. Note that the colors for the trajectories do not match between the map and time-height plot.

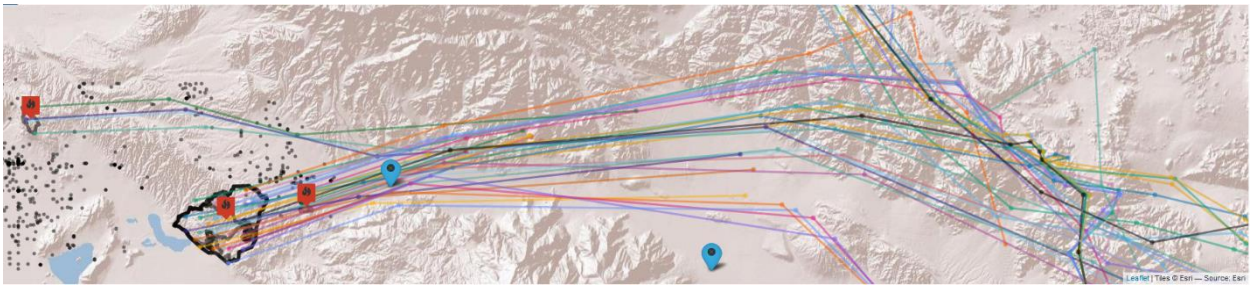

Figure 58: Forward HYSPLIT trajectories launched at 16:00 PST on July 14, 2023.

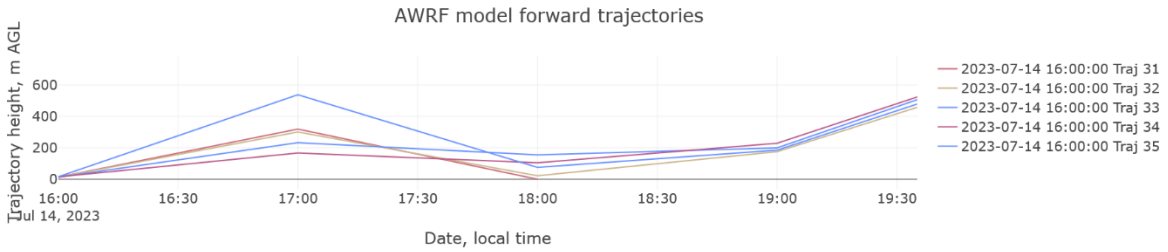

Figure 59: Time-height plot for the five forward HYSPLIT trajectories launched at 16:00 PST on July 14, 2023 that passed closest to the Palm Springs Monitor.

15.6. HYSPLIT Forward Trajectories for July 14, 2023 launched at 17:00 PST

Most of the forward trajectories launched at 17:00 from the Highland, Rabbit, and Reche Fires passed through or near the Banning Pass and came within 15 km of the Palm Springs monitor, see Figure 60. The trajectories passed closest to the Palm Springs monitor at either 19:00 or 20:00 PST. The heights of the trajectories that went through or near the Banning Pass were between 474 and 0 m AGL during 19:00 and 20:00 PST and are shown in Figure 61. Arrival of the trajectories between 19:00 and 20:00 PST is consistent with elevated concentrations of CO, NOx and ozone, see Figure 14.

Two trajectories (#29 and #20) circled the Coachella Valley, travelling past the Palm Springs Monitor to the northern edge of the Salton Sea, and then travelling back north near the Palm Springs Monitor, see Figure 62 and Figure 63. The time-height plot for these two trajectories is shown in Figure 64. At 14:00 on July 15, Trajectory #29 was within 4 km of the Palm Springs monitor at an altitude of 94 m AGL. At 14:00 on July 15, Trajectory #20 was approximately 10.4 km from the Palm Spring monitor at an altitude of 446 m AGL. The

PBL in the Coachella Vally at 14:00 on July 15 was approximately 1 km, so this is well within the mixing layer during a convective hour. Note that the colors for the trajectories do not match between the maps and time-height plots.

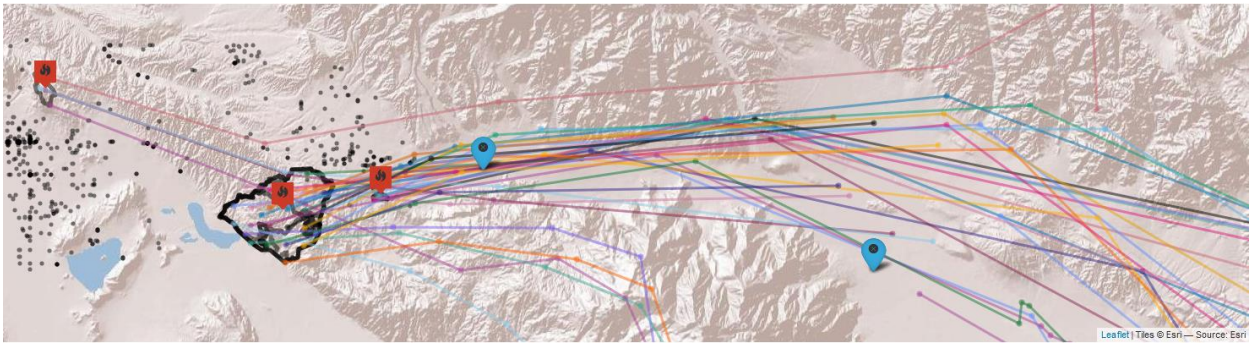

Figure 60: Forward HYSPLIT trajectories launched at 17:00 PST on July 14, 2023.

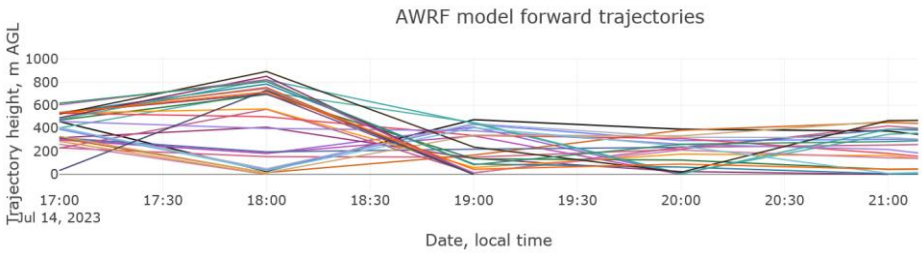

Figure 61: Time-height plot for the forward HYSPLIT trajectories launched at 17:00 PST on July 14, 2023 that passed in or near Banning Pass toward the Palm Springs area.

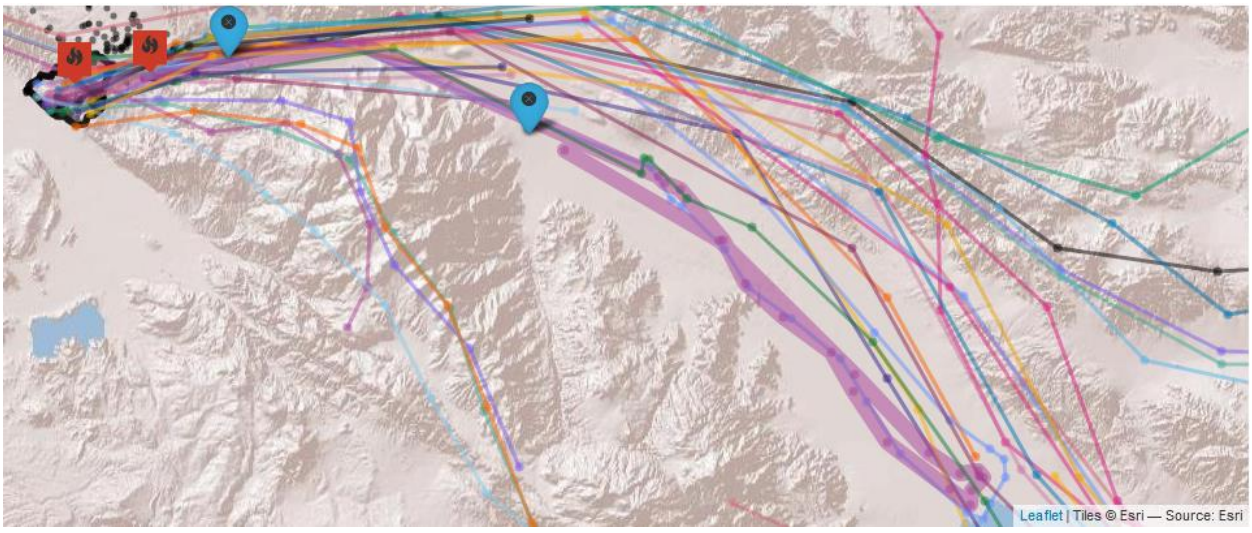

Figure 62: Forward HYSPLIT trajectories launched at 17:00 PST on July 14, 2023, regional view with Trajectory #29 highlighted.

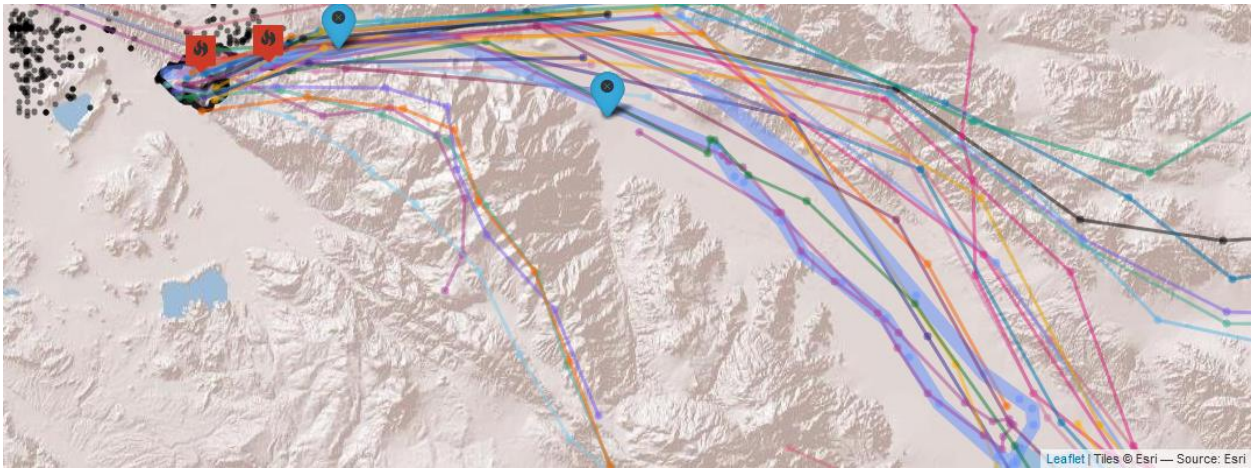

Figure 63: Forward HYSPLIT trajectories launched at 17:00 PST on July 14, 2023, regional view with Trajectory #20 highlighted.

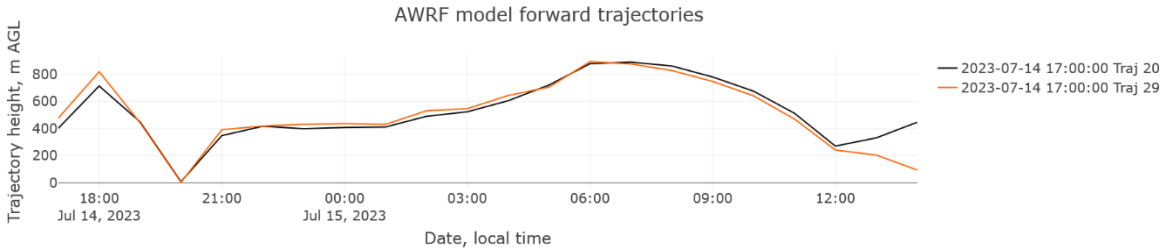

Figure 64: Time-height plot for the forward HYSPLIT trajectories #20 and #29 launched at 17:00 PST on July 14, 2023.

15.7. HYSPLIT Forward Trajectories for July 14, 2023 launched at 18:00 PST

Fourteen of the forward trajectories launched at 18:00 from the Highland, Rabbit, and Reche Fires passed through or near the Banning Pass and came within 10 km of the Palm Springs monitor, see Figure 65. The closest trajectory passed within 0.2 km of the Palm Springs monitor. The trajectories passed closest to the Palm Springs monitor between 20:00 and 22:00 PST. The heights of the trajectories that went through or near the Banning Pass into the Palm Springs area were between 479 and 0 m AGL during 20:00 and 22:00 PST and are shown in Figure 66. Arrival of the trajectories between 20:00 and 22:00 PST is

consistent with elevated concentrations of CO and NOx, see Figure 14. Note that the colors for the trajectories do not match between the map and time-height plot.

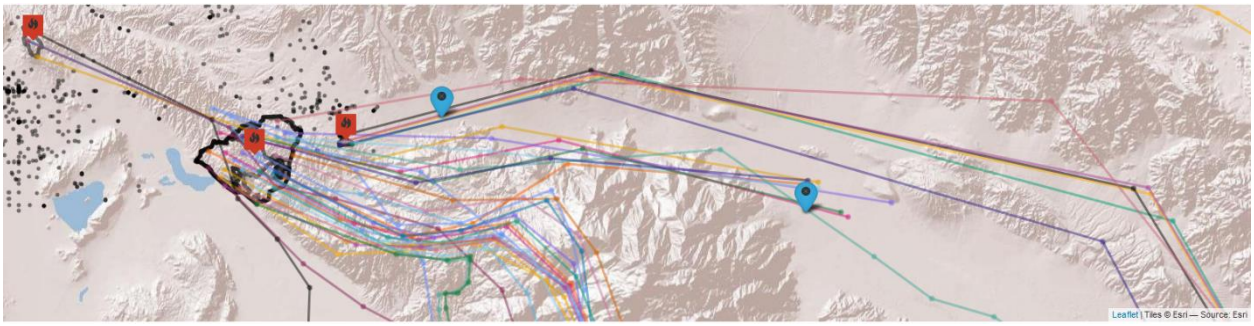

Figure 65: Forward HYSPLIT trajectories launched at 18:00 PST on July 14, 2023.

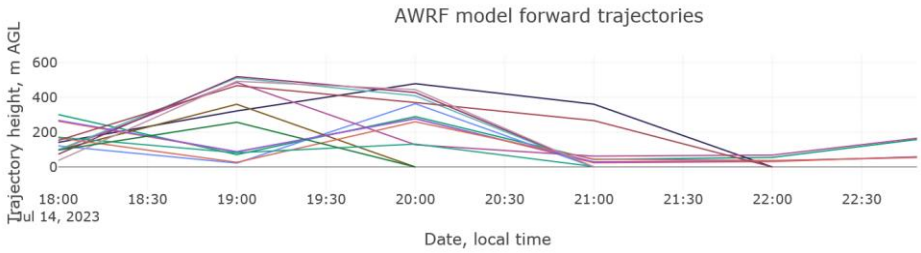

Figure 66: Time-height plot for the forward HYSPLIT trajectories launched at 18:00 PST on July 14, 2023 that passed in or near Banning Pass toward the Palm Springs area.

15.8. HYSPLIT Forward Trajectories for July 14, 2023 launched at 19:00 PST

Most of the forward trajectories launched at 19:00 from the Highland, Rabbit, and Reche Fires passed through or near the Banning Pass and came within 15 km of the Palm Springs monitor, and most of those ended due to being below 3 m AGL, see Figure 67. The closest trajectory passed within 0.2 km of the Palm Springs monitor. The trajectories passed closest to the Palm Springs monitor between July 14 at 20:00 PST and July 15 at 00:00 PST. The heights of the trajectories that went through or near the Banning Pass into the Palm Springs area were between 570 and 0 m AGL during July 14 at 20:00 PST and July 15 at 00:00 PST and are shown in Figure 73. Arrival of the trajectories between 20:00 PST and July 15 at 00:00 PST is consistent with elevated concentrations of CO and NOx, see Figure 14. Note that the colors for the trajectories do not match between the map and time-height plot.

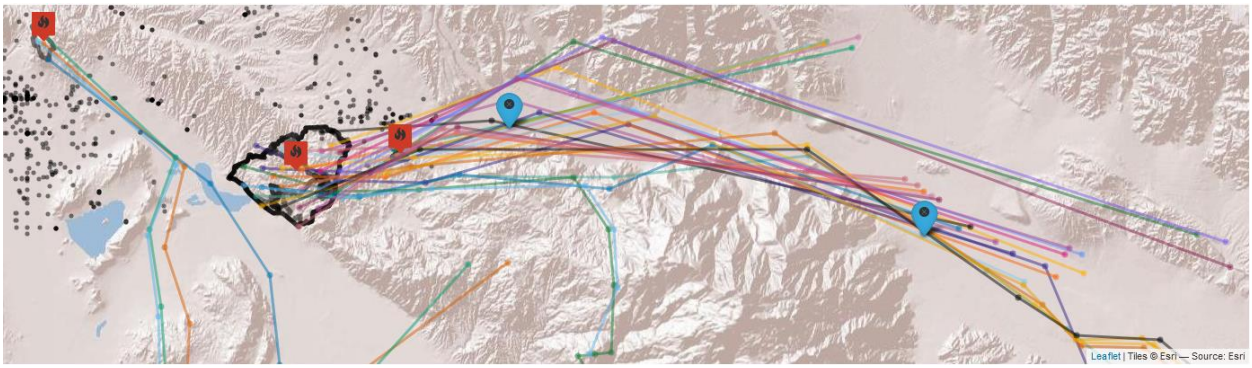

Figure 67: Forward HYSPLIT trajectories launched at 19:00 PST on July 14, 2023.

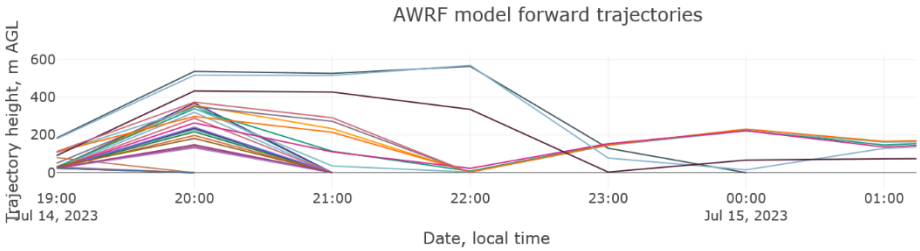

Figure 68: Time-height plot for the forward HYSPLIT trajectories launched at 19:00 PST on July 14, 2023 that passed in or near Banning Pass toward the Palm Springs area.

15.9. HYSPLIT Forward Trajectories for July 14, 2023 launched at 20:00 PST

Twelve of the forward trajectories launched at 20:00 PST from the Highland and Rabbit, Fires passed through or near the Banning Pass and came within 15 km of the Palm Springs monitor, and most of those ended due to being below 3 m AGL, see Figure 69. Seven trajectories passed within 0.6 km of the Palm Springs monitor. The trajectories passed closest to the Palm Springs monitor between July 14 at 22:00 PST and July 15 at 02:00 PST. The heights of the trajectories that went through or near the Banning Pass into the Palm Springs area were between 230 and 0 m AGL during July 14 at 22:00 PST and July 15 at 02:00 PST and are shown in Figure 70. Arrival of the trajectories between July 14 at 22:00 PST and July 15 at 02:00 PST is consistent with elevated concentrations of CO and NOx. Both CO and NOx concentrations peak at 02:00 PST on July 15, see Figure 14. Note that the colors for the trajectories do not match between the map and time-height plot.

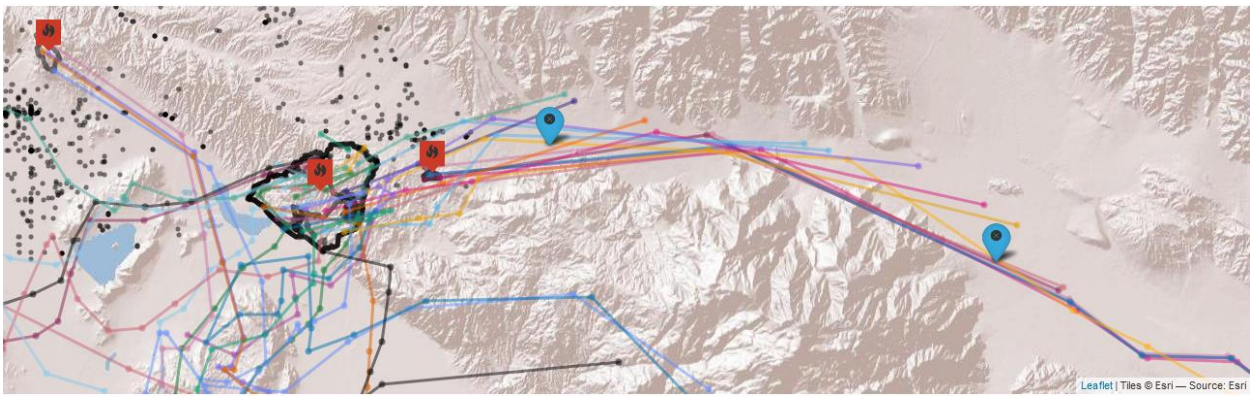

Figure 69: Forward HYSPLIT trajectories launched at 20:00 PST on July 14, 2023.

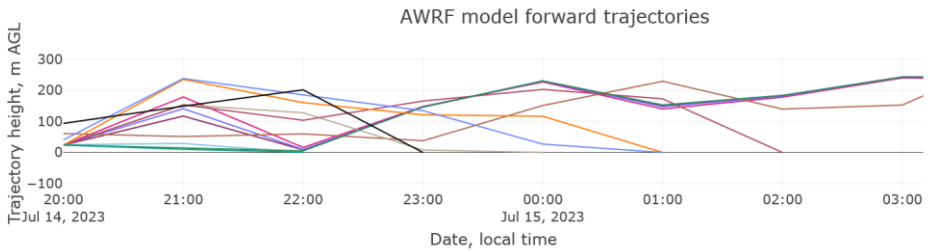

Figure 70: Time-height plot for the forward HYSPLIT trajectories launched at 20:00 PST on July 14, 2023 that passed in or near Banning Pass toward the Palm Springs area.

15.10. HYSPLIT Forward Trajectories for July 14, 2023 launched at 21:00 PST

None of the trajectories launched at 21:00 PST from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.11. HYSPLIT Forward Trajectories for July 14, 2023 launched at 22:00 PST

Three of the forward trajectories launched at 22:00 PST from the Highland Fire passed through the Banning Pass and came within approximately 4 km of the Palm Springs monitor, and all of them ended due to being below 3 m AGL, see Figure 71 and Figure 72. The trajectories arrived to the Palm Springs area at 02:00 PST on July 15, which is consistent with elevated concentrations of CO and NOx. Both CO and NOx concentrations peak at 02:00 PST on July 15, see Figure 14. Note that the colors for the trajectories do not match between the map and time-height plot.

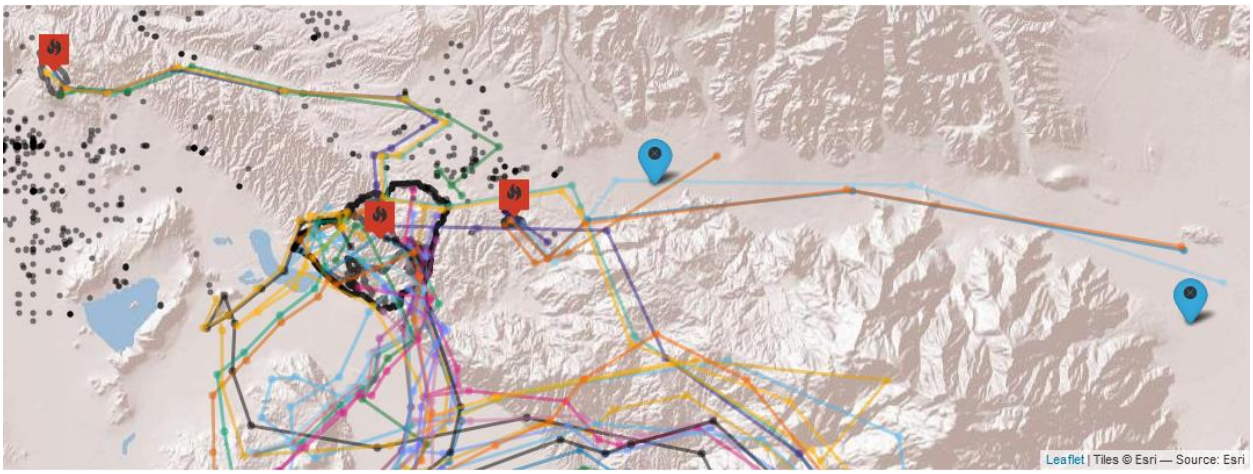

Figure 71: Forward HYSPLIT trajectories launched at 22:00 PST on July 14, 2023.

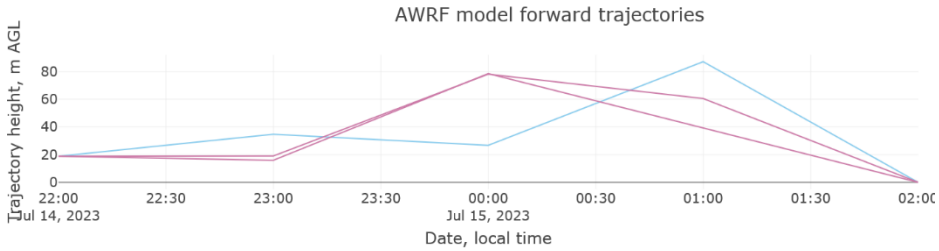

Figure 72: Time-height plot for the forward HYSPLIT trajectories launched at 22:00 PST on July 14, 2023 that passed through Banning Pass toward the Palm Springs area.

15.12. HYSPLIT Forward Trajectories for July 14, 2023 launched at 23:00 PST

One of the forward trajectories launched at 23:00 PST from the Highland Fire passed through the Banning Pass and reached the ground 4.8 km from the Palm Springs Monitor at 02:00 PST on July 15, see Figure 73 and Figure 74. This is consistent with elevated concentrations of CO and NOx. Both CO and NOx concentrations peak at 02:00 PST on July 15, see Figure 14. Note that the colors for the trajectories do not match between the map and time-height plot.

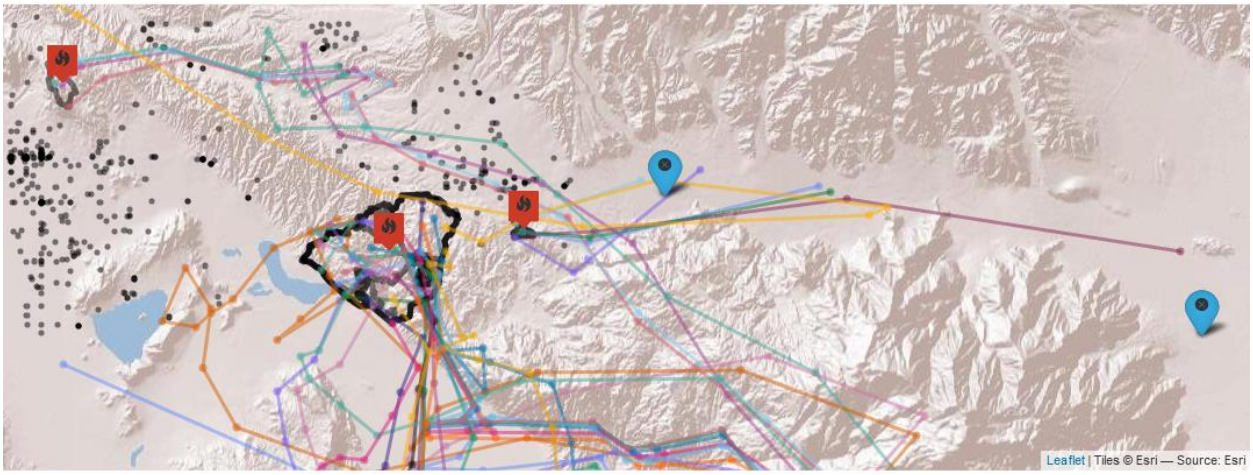

Figure 73: Forward HYSPLIT trajectories launched at 23:00 PST on July 14, 2023.

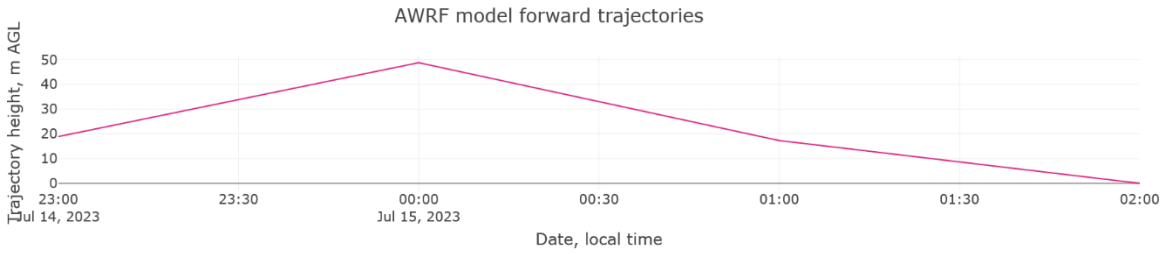

Figure 74: Time-height plot for the forward HYSPLIT trajectory launched at 23:00 PST on July 14, 2023 that passed through Banning Pass toward the Palm Springs area.

15.13. HYSPLIT Forward Trajectories for July 15, 2023 launched at 00:00 PST

None of the trajectories launched at 00:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.14. HYSPLIT Forward Trajectories for July 15, 2023 launched at 01:00 PST

None of the trajectories launched at 01:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.15. HYSPLIT Forward Trajectories for July 15, 2023 launched at 02:00 PST

None of the trajectories launched at 02:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.16. HYSPLIT Forward Trajectories for July 15, 2023 launched at 03:00 PST

None of the trajectories launched at 03:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.17. HYSPLIT Forward Trajectories for July 15, 2023 launched at 04:00 PST

None of the trajectories launched at 04:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.18. HYSPLIT Forward Trajectories for July 15, 2023 launched at 05:00 PST

None of the trajectories launched at 05:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.19. HYSPLIT Forward Trajectories for July 15, 2023 launched at 06:00 PST

None of the trajectories launched at 06:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.20. HYSPLIT Forward Trajectories for July 15, 2023 launched at 07:00 PST

None of the trajectories launched at 07:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.21. HYSPLIT Forward Trajectories for July 15, 2023 launched at 08:00 PST

None of the trajectories launched at 08:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.22. HYSPLIT Forward Trajectories for July 15, 2023 launched at 09:00 PST

None of the trajectories launched at 09:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.23. HYSPLIT Forward Trajectories for July 15, 2023 launched at 10:00 PST

None of the trajectories launched at 10:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.24. HYSPLIT Forward Trajectories for July 15, 2023 launched at 11:00 PST

None of the trajectories launched at 11:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.25. HYSPLIT Forward Trajectories for July 15, 2023 launched at 12:00 PST

None of the trajectories launched at 12:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

15.26. HYSPLIT Forward Trajectories for July 15, 2023 launched at 13:00 PST

None of the trajectories launched at 13:00 PST on July 15 from the Reche, Rabbit, or Highland Fires reached the Palm Springs area.

16. HYSPLIT Back Trajectories Report for July 14-15, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

HYSPLIT was run to track the paths traversed by air parcels arriving at monitoring sites (back trajectories) with the same meteorological inputs and model setup explained in Section 15.

A common practice is to start HYSPLIT back trajectories at 50m above monitors. However the nighttime PBLs on both days dropped to 30m for several hours, making it a hard choice to justify. We also started back trajectories from half the PBL height at the same locations but these simulations were not considered further since deep daytime mixing heights (up to 1450m) resulted in unrealistic trajectory release heights. While a freshly released plume may be capable of mixing throughout the PBL (allowing the use of 0.5xPBL release heights for forward trajectories starting at the fires), there is no guarantee that the plume would have consistently dispersed several hundred meters vertically from its centerline, during the relatively short travel distance between the fires and monitor. As such back trajectories were all started at 15m above the locations of a 3 x 3 WRF grid around the Palm Springs ozone monitor, at Palm Springs airport, and at two PurpleAir sensors close to Palm Springs (see Figure 20). Further, additional trajectories were also launched from several WRF grid

cells to the north of the Palm Springs monitor, opposite the entrance to Banning Pass, to allow for uncertainties in WRF's handling of accelerating gap winds.

16.1. HYSPLIT Back Trajectories for July 14, 2023 launched at 13:00 PST

The Reche Fire was first reported at 11:58 PST. None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 13:00 PST reached the Reche fire burn area.

16.2. HYSPLIT Back Trajectories for July 14, 2023 launched at 14:00 PST

The Reche and Highland fires were both burning by 14:00 PST. None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 14:00 PST reached the burn areas.

16.3. HYSPLIT Back Trajectories for July 14, 2023 launched at 15:00 PST

The Reche, Rabbit, and Highland Fires had all started by 15:00 PST. One of the trajectories launched from the northern Coachella Valley came within 10 km of the Highland Fire burn area at an altitude of 886 m AGL area at 14:00, shortly after the fire was first reported. The trajectories are shown in Figure 75 and Figure 76. Note that the colors for the trajectories do not match between the map and time-height plot.

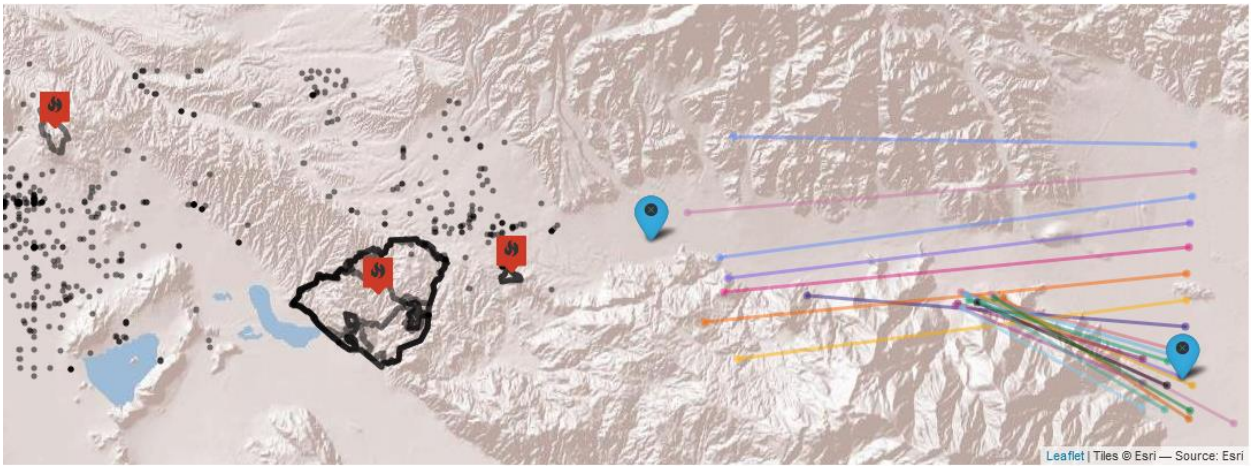

Figure 75: Backward HYSPLIT trajectories launched from northern Coachella Valley at 15:00 PST on July 14, 2023.

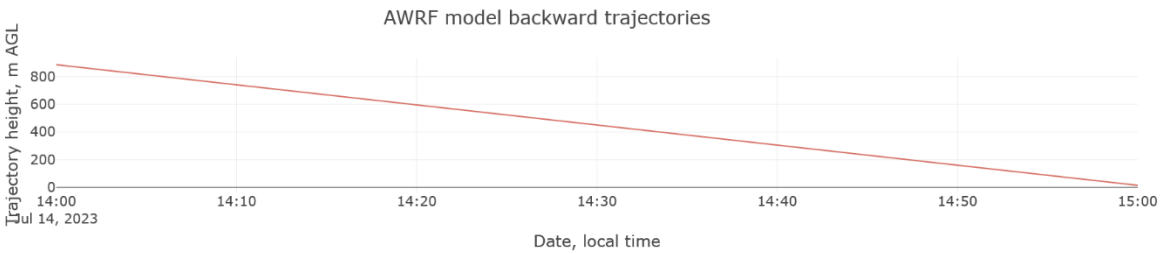

Figure 76: Time-height plot for the backward HYSPLIT trajectory launched at 15:00 PST on July 14, 2023 that passed closest to the Highland Fire in Figure 75.

16.4. HYSPLIT Back Trajectories for July 14, 2023 launched at 16:00 PST

One of the trajectories launched from the northern Coachella Valley came within 6 km of the Highland Fire burn area between 15:00 and 14:00 PST. The map and time-height plot of this trajectory are shown in Figure 75 and Figure 77, respectively. Note that the colors for the trajectories do not match between the two figures.

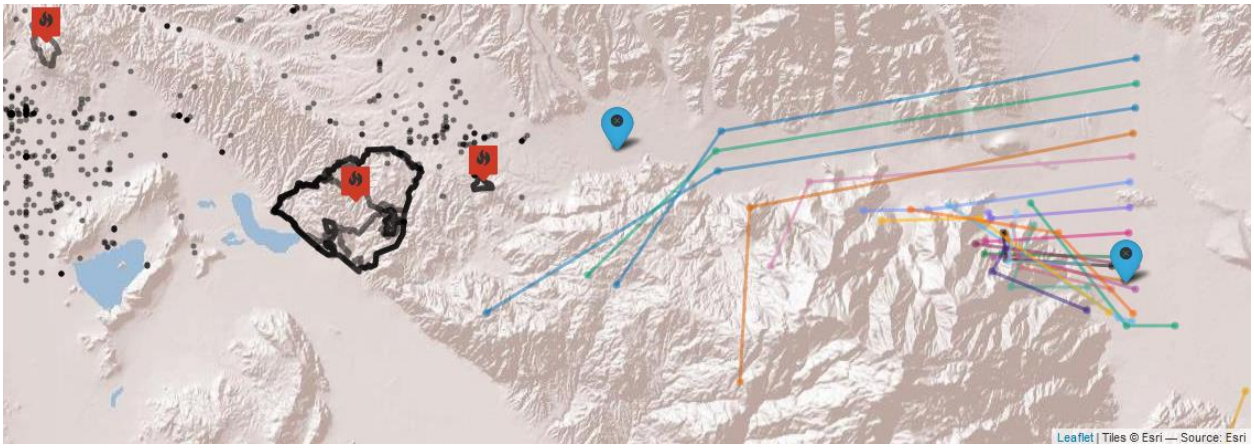

Figure 77: Backward HYSPLIT trajectories launched from northern Coachella Valley at 16:00 PST on July 14, 2023.

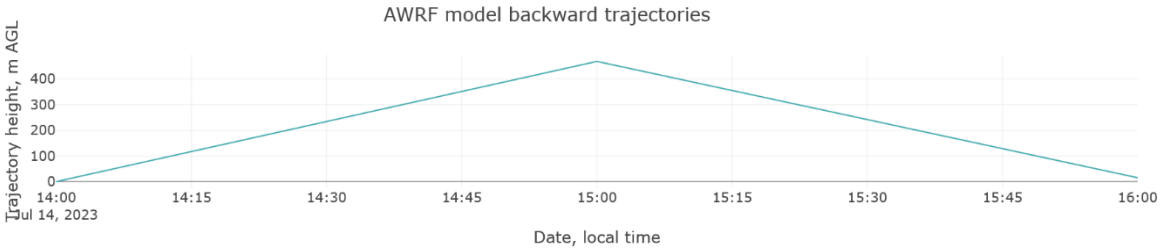

Figure 78: Time-height plot for the backward HYSPLIT trajectory launched at 16:00 PST on July 14, 2023 that passed closest to the Highland burn area.

16.5. HYSPLIT Back Trajectories for July 14, 2023 launched at 17:00 PST

One of the trajectories launched from the northern Coachella Valley came within 5 km of the Highland Fire burn area between 15:00 PST and 16:00 PST. The map and time-height plot of this trajectory are shown in Figure 79 and Figure 80, respectively. Note that the colors for the trajectories do not match between the two figures.

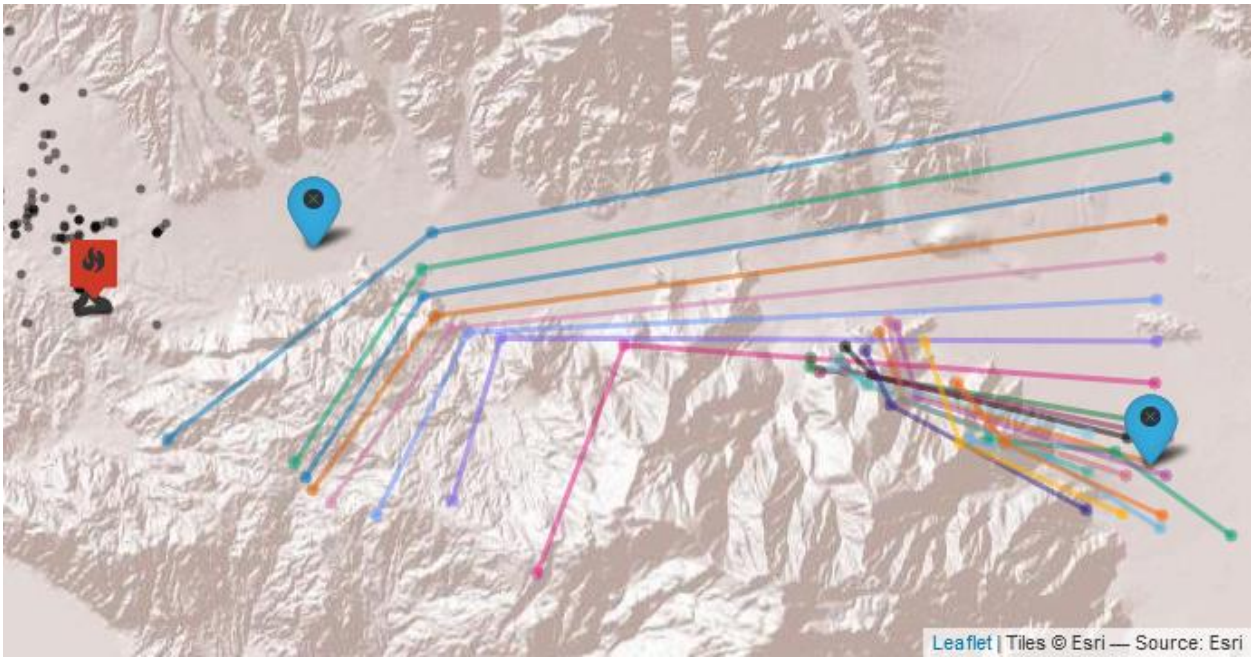

Figure 79: Backward HYSPLIT trajectories launched from northern Coachella Valley at 17:00 PST on July 14, 2023.

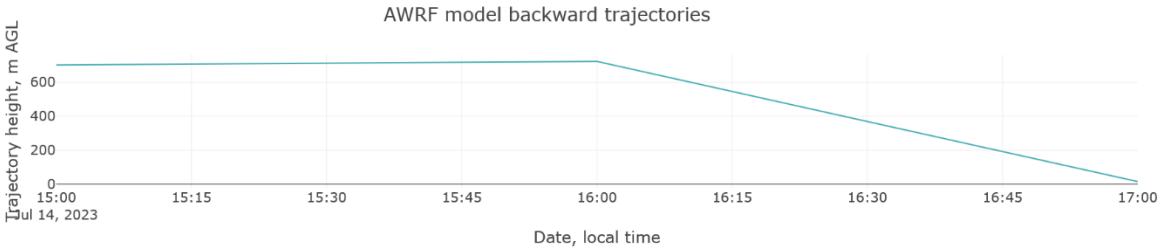

Figure 80: Time-height plot for the backward HYSPLIT trajectory launched at 17:00 PST on July 14, 2023 that passed closest to the Highland burn area.

16.6. HYSPLIT Back Trajectories for July 14, 2023 launched at 18:00 PST

Trajectory #10 launched from the northern Coachella Valley came within 4 km of the Reche Fire burn area at 15:00 PST, within 4 km of the Rabbit Fire burn area at 16:00 PST, and within 6 km of the Highland Fire between 16:00 and 17:00 PST. Trajectory #9 passed over the edge of the Rabbit Fire burn area between 16:00 and 17:00 PST. Trajectory #4 passed over the Rabbit Fire burn area between 15:00 and 16:00 PST. Trajectories #3, #5, #6, #7, and #8, all passed within 4 km to the south of the Rabbit Fire burn area. Trajectories #3, #4, #5, #6, #7, #8, and #9 all passed within 8 km to the south of the Highland Fire burn area. The map and time-height plots of these trajectories are shown in Figure 81, Figure 82, and Figure 83, respectively. Note that the colors for the trajectories do not match between the figures.

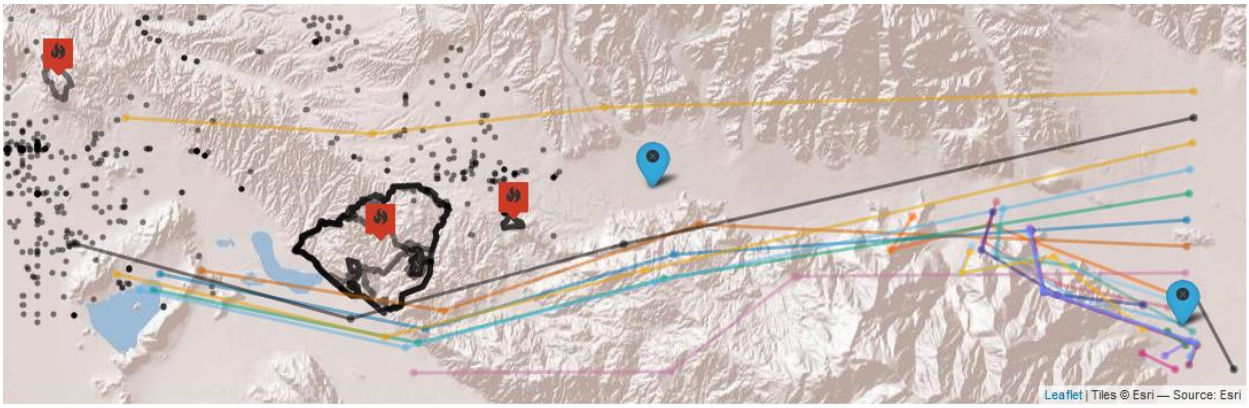

Figure 81: Backward HYSPLIT trajectories launched from northern Coachella Valley at 18:00 PST on July 14, 2023.

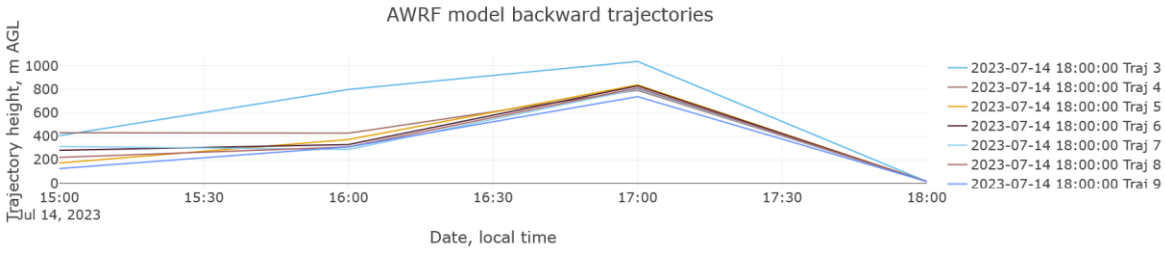

Figure 82: Time-height plot for the backward HYSPLIT trajectories launched at 18:00 PST on July 14, 2023 that passed south of the Highland burn area.

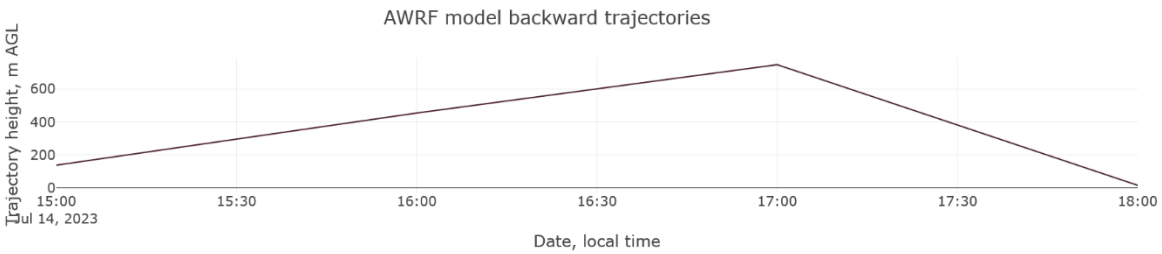

Figure 83: Time-height plot for the backward HYSPLIT trajectory launched at 18:00 PST on July 14, 2023 that passed north of the Highland Fire burn area (#10).

16.7. HYSPLIT Back Trajectories for July 14, 2023 launched at 19:00 PST

Trajectories #9 and #10 launched from the northern Coachella Valley came within 3 km of the Reche Fire burn area at 14:00 PST, within 7 km of the Rabbit Fire burn area at 16:00 PST, and within 10 km of the Highland Fire between 16:00 and 18:00 PST. Trajectory #8 passed within 0.2 km of the northern edge of the Rabbit Fire burn area between 16:00 and 17:00 PST and within 4 km to the north of the Highland Fire between 17:00 and 18:00 PST. Trajectory #7 passed over the Rabbit Fire burn area at 17:00 PST and over the Highland Fire burn area between 17:00 and 18:00 PST. Trajectories #4, #5, and #6 all passed over the Rabbit Fire burn area between 16:00 and 17:00 PST and passed within 1.2 km to the south of the Highland Fire burn area between 17:00 and 18:00 PST. The map and time-height plots of these trajectories are shown in Figure 84, Figure 85, and Figure 86, respectively. Note that the colors for the trajectories do not match between the figures.

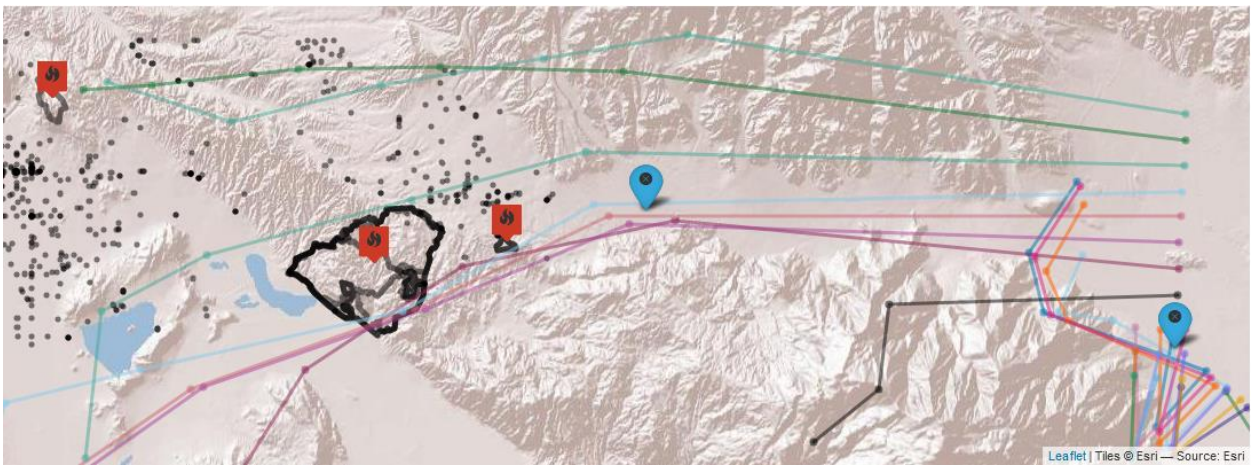

Figure 84: Backward HYSPLIT trajectories launched from northern Coachella Valley at 19:00 PST on July 14, 2023.

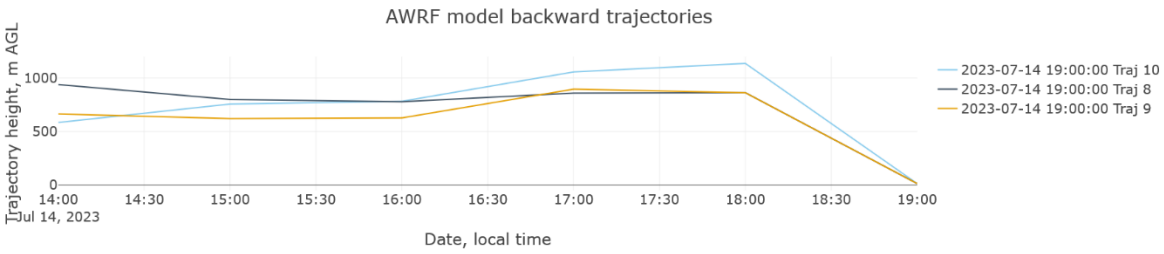

Figure 85: Time-height plot for the backward HYSPLIT trajectories launched at 19:00 PST on July 14, 2023 that passed north of the Highland Fire burn area.

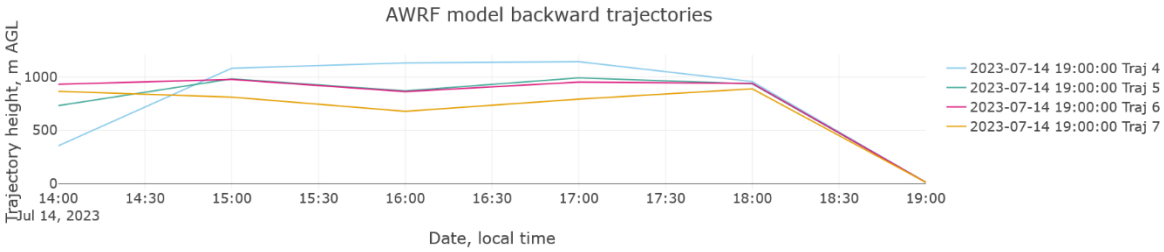

Figure 86: Time-height plot for the backward HYSPLIT trajectories launched at 19:00 PST on July 14, 2023 that passed over the Rabbit Fire burn area.

16.8. HYSPLIT Back Trajectories for July 14, 2023 launched at 20:00 PST

Trajectory #4 passed over the Rabbit Fire burn area at 17:00 PST and within 1.3 km of the Highland Fire between 18:00 and 19:00 PST. Trajectory #5 remained within 5 km of the Rabbit Fire burn area between 15:00 and 18:00 PST and passed within 5.3 km to the north of the Highland Fire at 19:00 PST. Trajectory #6 passed within 8 km of the Highland Fire burn area at 18:00 PST. The map and time-height plot of these trajectories are shown in Figure 87 and Figure 88 respectively. Note that the colors for the trajectories do not match between the figures.

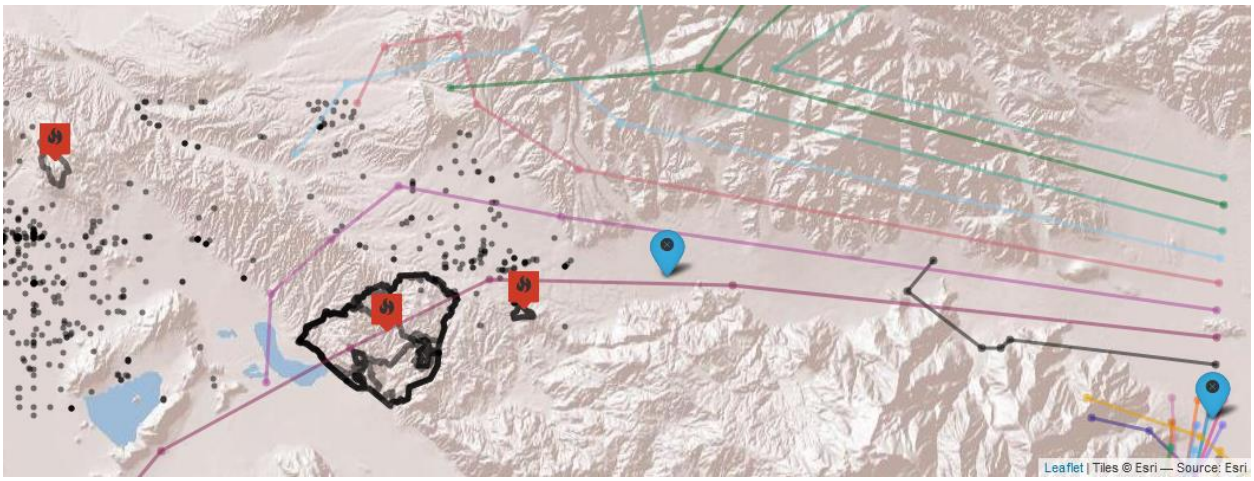

Figure 87: Backward HYSPLIT trajectories launched from northern Coachella Valley at 20:00 PST on July 14, 2023.

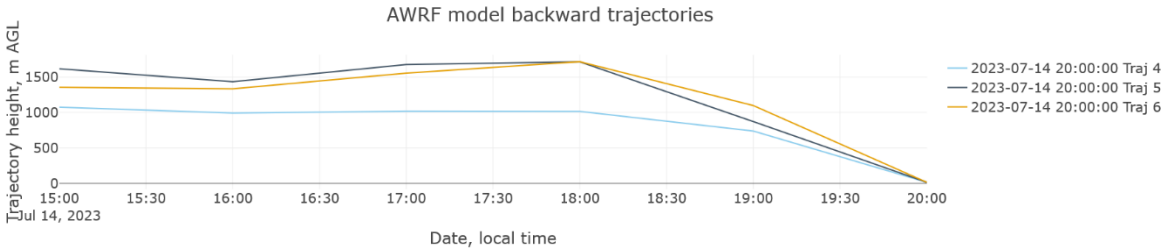

Figure 88: Time-height plot for the backward HYSPLIT trajectories #4, #5, and #6 launched at 20:00 PST on July 14, 2023.

16.9. HYSPLIT Back Trajectories for July 14, 2023 launched at 21:00 PST

Trajectory #4 remained within approximately 4.2 km of the Rabbit Fire burn area during 15:00 to 18:00 PST and then passed within approximately 3 km of the Highland Fire burn area between 18:00 and 19:00 PST. Trajectories #5, #6, #7, and #8 all passed within 4 km of both the Rabbit and Highland Fire burn areas between 19:00 and 20:00. The map and time-height plot of these trajectories are shown in Figure 89 and Figure 90 respectively. Note that the colors for the trajectories do not match between the figures.

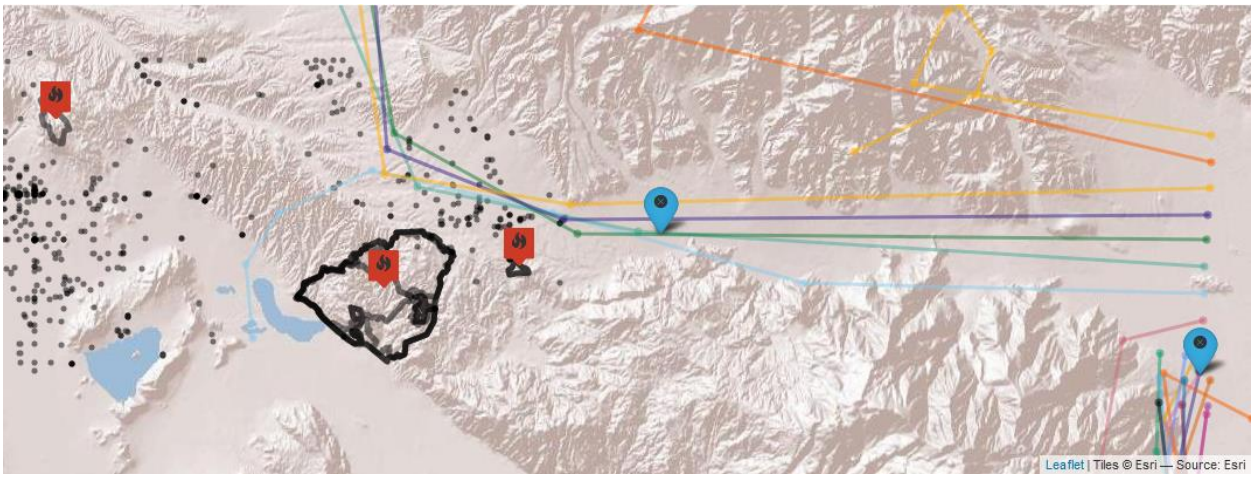

Figure 89: Backward HYSPLIT trajectories launched from northern Coachella Valley at 21:00 PST on July 14, 2023.

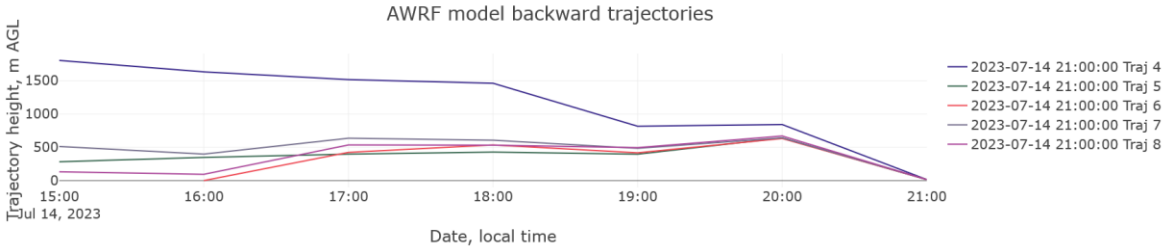

Figure 90: Time-height plot for the backward HYSPLIT trajectories #4, #5, #6, #7, and #8 launched at 21:00 PST on July 14, 2023.

16.10. HYSPLIT Back Trajectories for July 14, 2023 launched at 22:00 PST

Trajectory #6 passed within approximately 8 km of the Reche Fire burn area between 18:00 to 19:00 PST, passed directly over the Rabbit Fire burn area at 20:00, and then passed within 0.2 km of the Highland Fire burn area between 20:00 and 21:00 PST. Trajectory #4 passed directly over the Rabbit Fire burn area between 17:00 and 18:00 and then passed within 1 km of the Highland Fire burn area between 18:00 and 19:00 PST. Trajectory #7 passed directly over the Rabbit Fire burn area and within 1.2 km of the Highland Fire burn area between 20:00 and 21:00 PST. Trajectories #5, #8, and #9 all passed within 5.2 km of both the Rabbit and Highland Fire burn areas between 20:00 and 21:00 PST. The map and time-height plot of these trajectories are shown in Figure 91 and Figure 92, respectively. Note that the colors for the trajectories do not match between the figures.

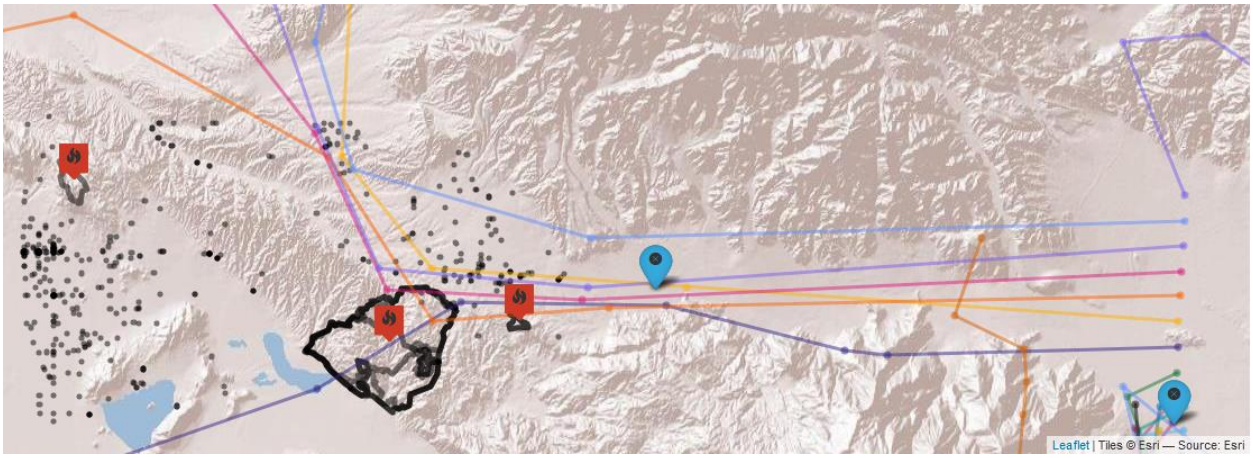

Figure 91: Back HYSPLIT trajectories launched at 22:00 PST on July 14, 2023.

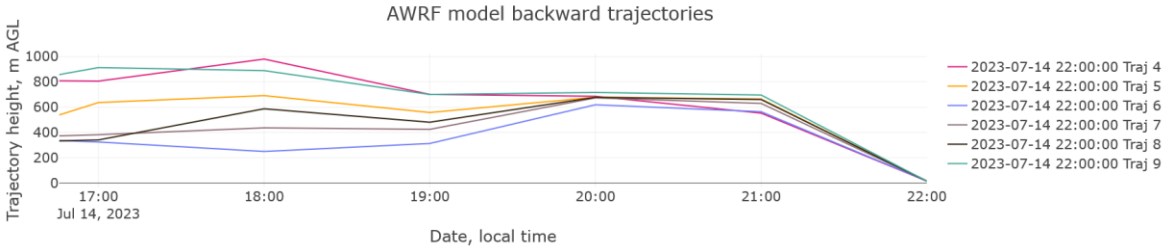

Figure 92: Time-height plot for the backward HYSPLIT trajectories #4, #5, #6, #7, #8, and #9 launched at 22:00 PST on July 14, 2023.

16.11. HYSPLIT Back Trajectories for July 14, 2023 launched at 23:00 PST

Trajectories #5 and #6 both passed within 10 km of the Reche Fire burn area between 19:00 and 20:00 PST then passed within 4 km of both the Rabbit and Highland Fire burn areas between 21:00 and 22:00 PST. Trajectories #4 and #7 passed within 9 km of both the Rabbit and Highland Fire burn areas between 19:00 and 22:00 PST. The map and time-height plot of these trajectories are shown in Figure 93 and Figure 94, respectively. Note that the colors for the trajectories do not match between the figures.

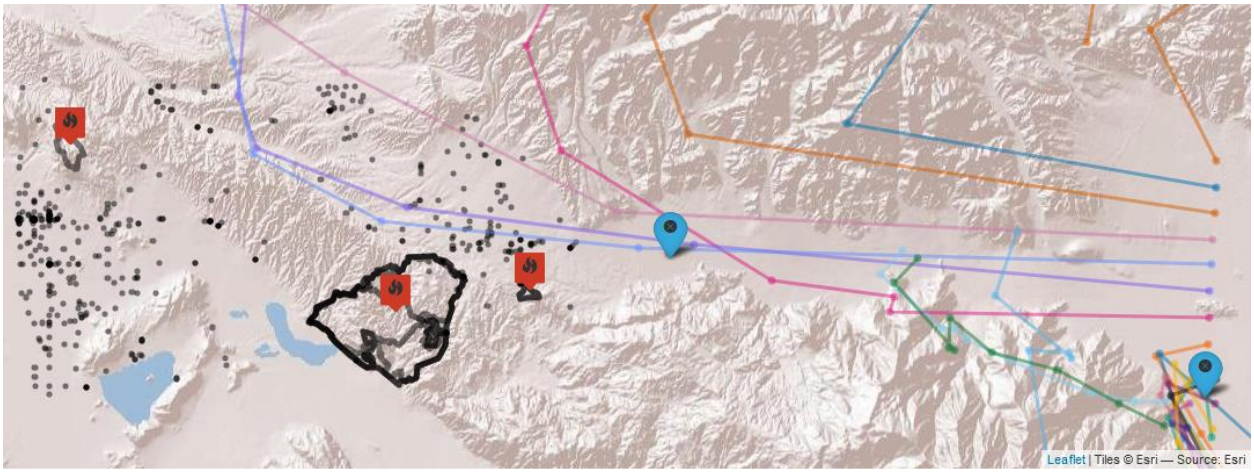

Figure 93: Back HYSPLIT trajectories launched at 23:00 PST on July 14, 2023.

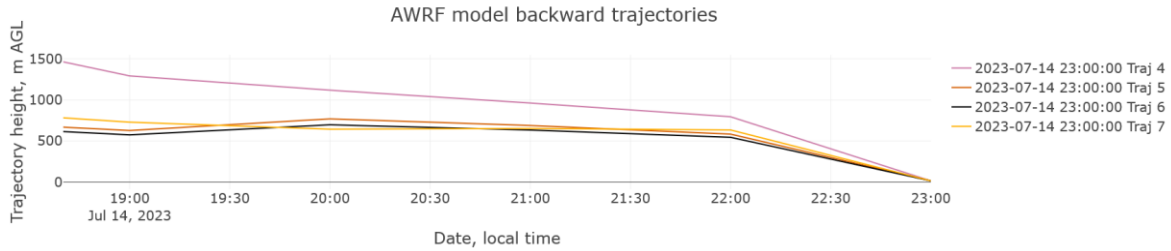

Figure 94: Time-height plot for the backward HYSPLIT trajectories #4, #5, #6, and #7 launched at 23:00 PST on July 14, 2023.

16.12. HYSPLIT Back Trajectories for July 15, 2023 launched at 00:00 PST

Trajectories #5 and #6 both passed within 9 km of both the Rabbit and Highland Fire burn areas between 20:00 and 23:00 PST. The map and time-height plot of these trajectories are shown in Figure 95 and Figure 96, respectively. Note that the colors for the trajectories do not match between the figures.

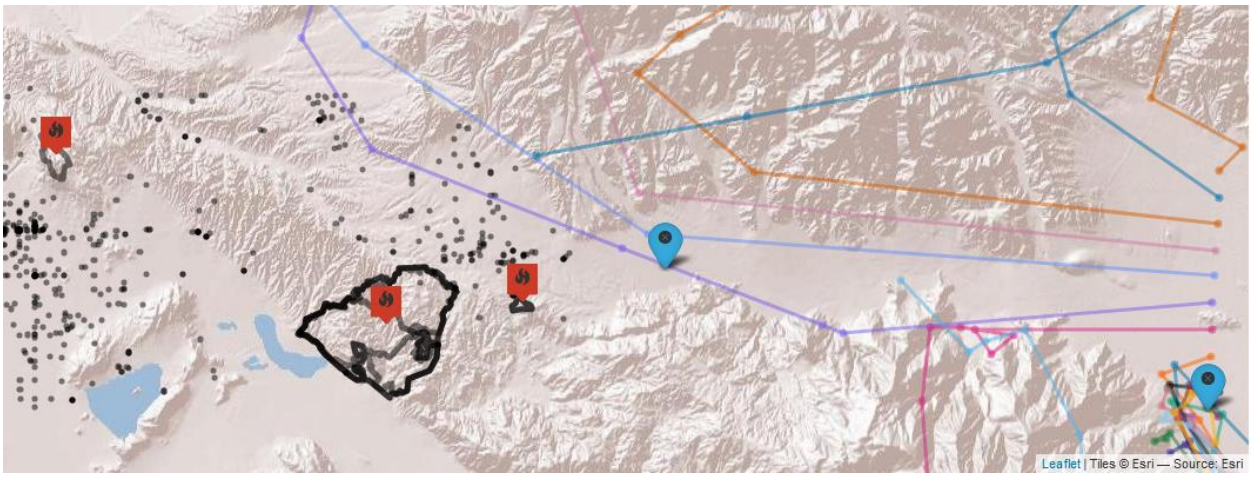

Figure 95: Back HYSPLIT trajectories launched at 00:00 PST on July 15, 2023.

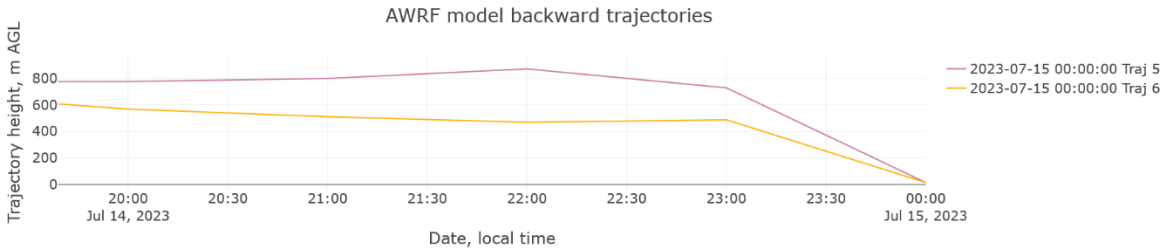

Figure 96: Time-height plot for the backward HYSPLIT trajectories #5 and #6 launched at 00:00 PST on July 15, 2023.

16.13. HYSPLIT Back Trajectories for July 15, 2023 launched at 01:00 PST

Trajectory #5 remained within 4.2 km of the Rabbit Fire burn area from 16:00 to 18:00 on July 14 and then passed within 4 km of the Highland Fire burn area between 18:00 and 19:00 on July 14. The map and time-height plot of this trajectory are shown in Figure 97 and Figure 98, respectively. Note that the colors for the trajectories do not match between the figures.

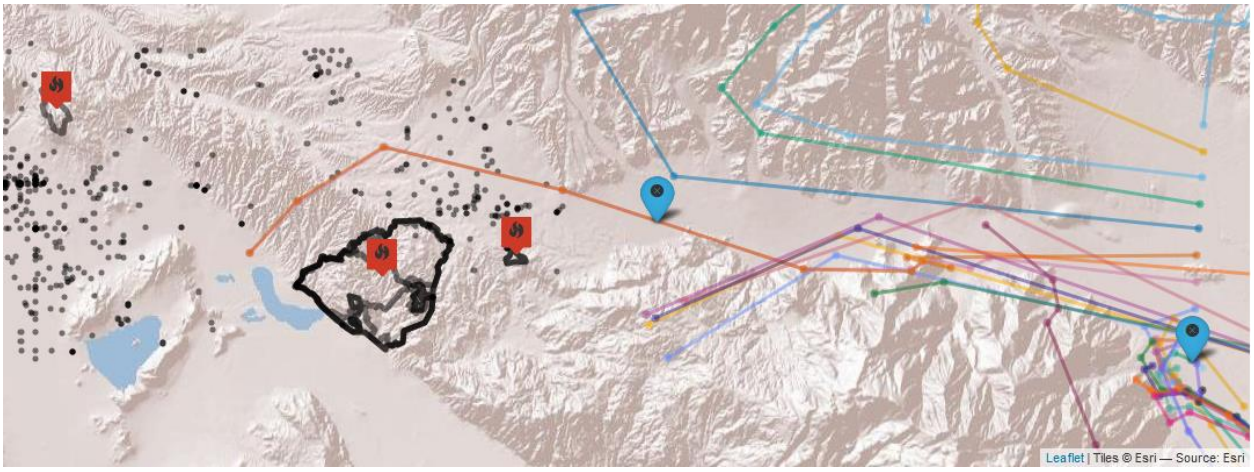

Figure 97: Back HYSPLIT trajectories launched at 01:00 PST on July 15, 2023.

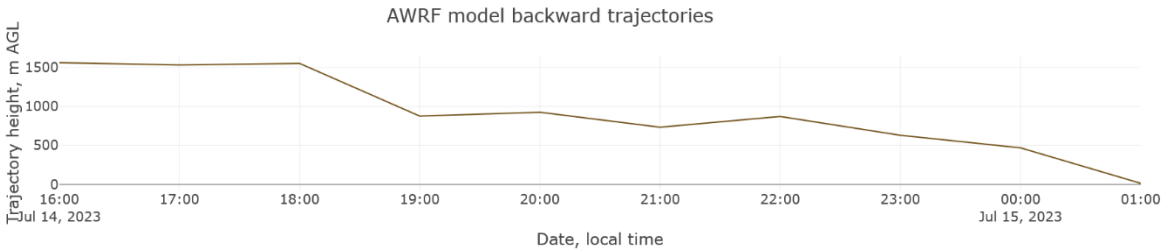

Figure 98: Time-height plot for the backward HYSPLIT trajectory #5 launched at 01:00 PST on July 15, 2023.

16.14. HYSPLIT Back Trajectories for July 15, 2023 launched at 02:00 PST

Trajectories #2, #15, and #21 came within 7.5 km of the Highland Fire burn area at 16:00 on July 14, passed through Banning Pass, and circled within the Coachella Valley. Trajectories #4 and #5 passed within 9.5 km of the Highland Fire burn area between 19:00 and 20:00 PST. The map and time-height plot of this trajectory are shown in Figure 99 and Figure 100, respectively. Note that the colors for the trajectories do not match between the figures.

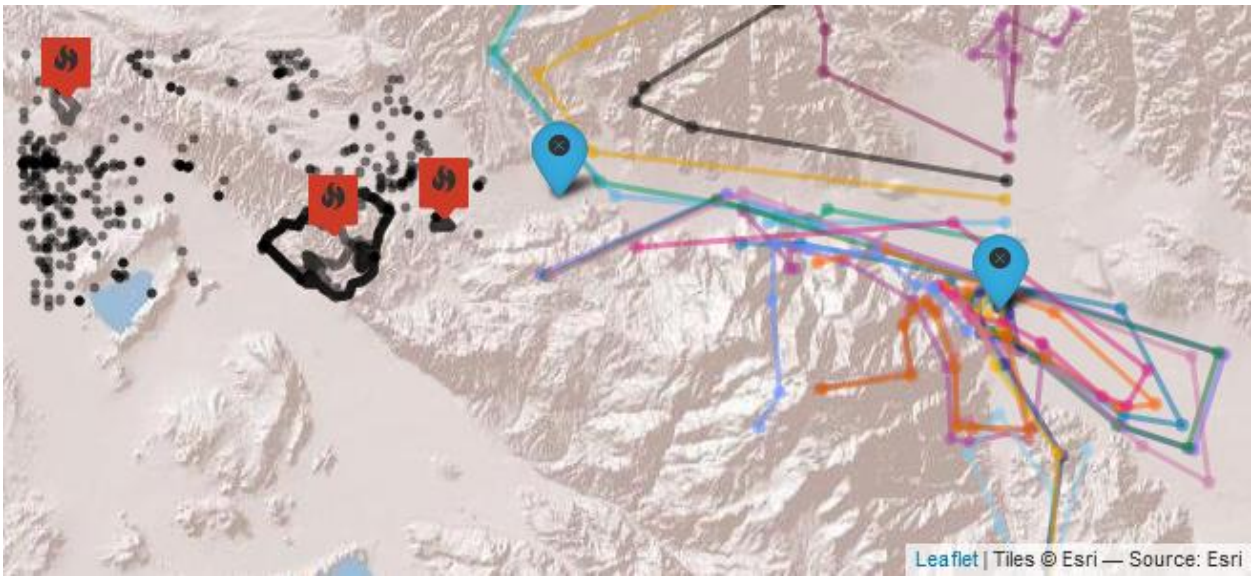

Figure 99: Back HYSPLIT trajectories launched at 02:00 PST on July 15, 2023.

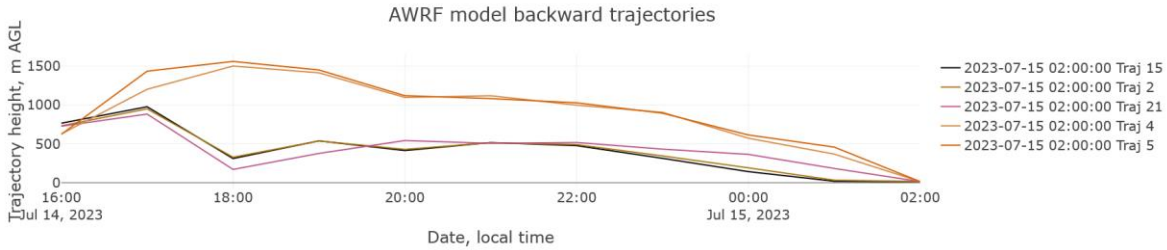

Figure 100: Time-height plot for the backward HYSPLIT trajectory #2, #4, #5, #15, and #21 launched at 02:00 PST on July 15, 2023.

16.15. HYSPLIT Back Trajectories for July 15, 2023 launched at 03:00 PST

Trajectories #18, #19, and #20 remained within 6 km of the Rabbit Fire burn area during 16:00 and 18:00 PST on July 14, and then passed within 3 km of the Highland Fire burn area between 18:00 and 19:00 PST on July 14.The map and time-height plot of this trajectory are shown in Figure 101 and Figure 102, respectively. Note that the colors for the trajectories do not match between the figures.

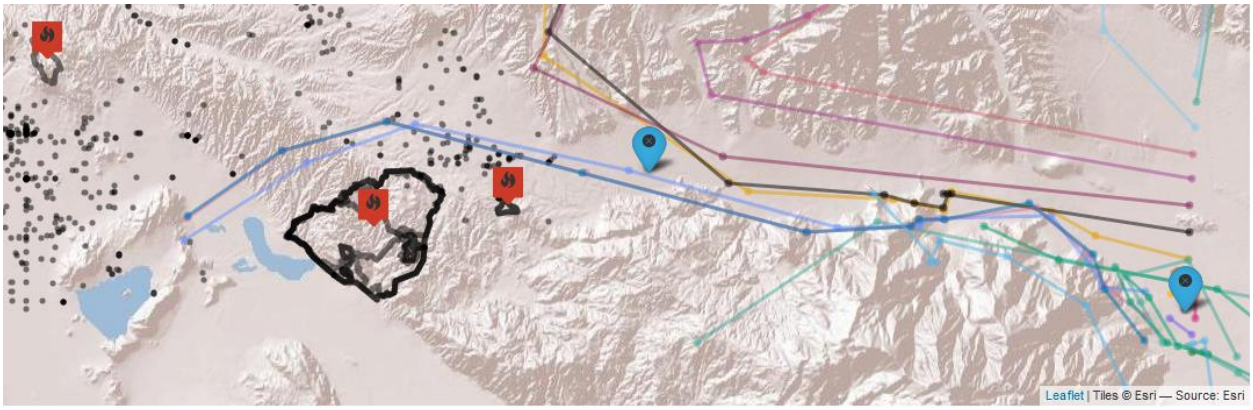

Figure 101: Back HYSPLIT trajectories launched at 03:00 PST on July 15, 2023.

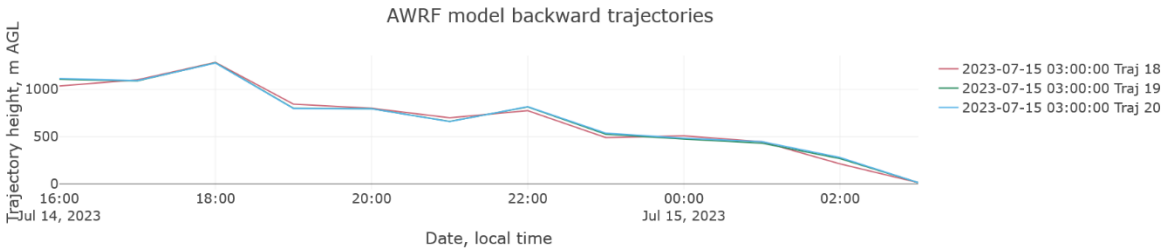

Figure 102: Time-height plot for the backward HYSPLIT trajectory #18, #19, and #20 launched at 03:00 PST on July 15, 2023.

16.16. HYSPLIT Back Trajectories for July 15, 2023 launched at 04:00 PST

Trajectory #3 remained within 4 km of the Rabbit Fire burn area during 16:00 and 18:00 PST on July 14, and then passed within 4 km of the Highland Fire burn area between 18:00 and 19:00 PST on July 14. Trajectory #4 passed within 3.2 km of the Highland Fire burn area at 02:00 on July 15. The map and time-height plot of this trajectory are shown in Figure 103 and Figure 104, respectively. Note that the colors for the trajectories do not match between the figures.

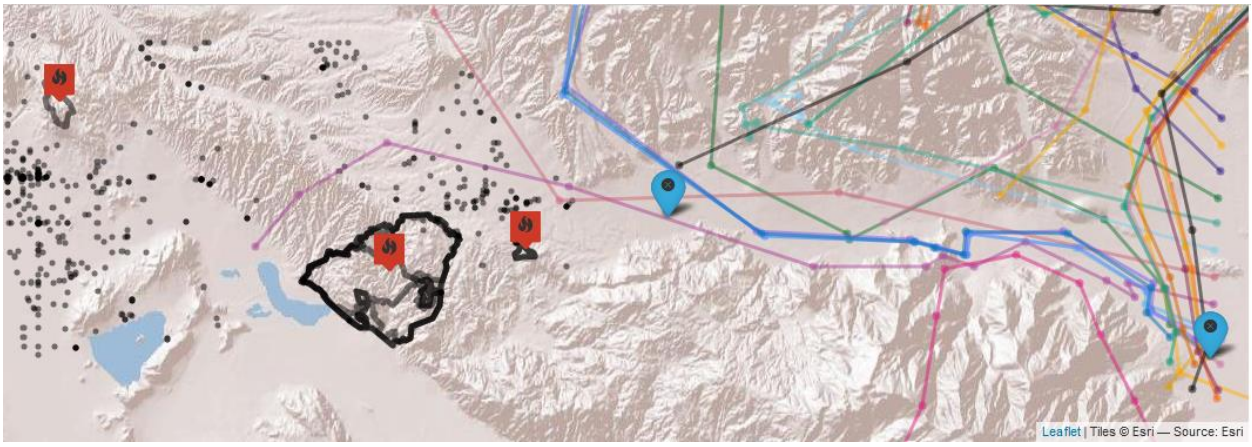

Figure 103: Back HYSPLIT trajectories launched at 04:00 PST on July 15, 2023.

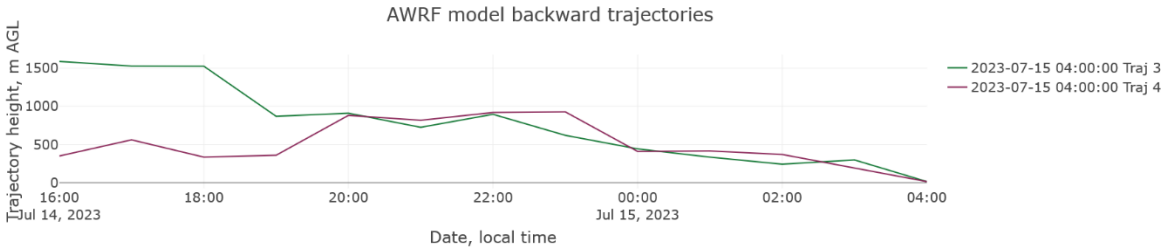

Figure 104: Time-height plot for the backward HYSPLIT trajectory #3 and #4 launched at 04:00 PST on July 15, 2023.

16.17. HYSPLIT Back Trajectories for July 15, 2023 launched at 05:00 PST

None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 05:00 PST passed within 10 km of the burn areas.

16.18. HYSPLIT Back Trajectories for July 15, 2023 launched at 06:00 PST

Trajectory #11 passed within 8.2 km of the Highland Fire burn area between 19:00 and 20:00 PST on July 14. The map and time-height plot of this trajectory are shown in Figure 105 and Figure 106, respectively. Note that the colors for the trajectories do not match between the figures.

Figure 105: Back HYSPLIT trajectories launched at 06:00 PST on July 15, 2023.

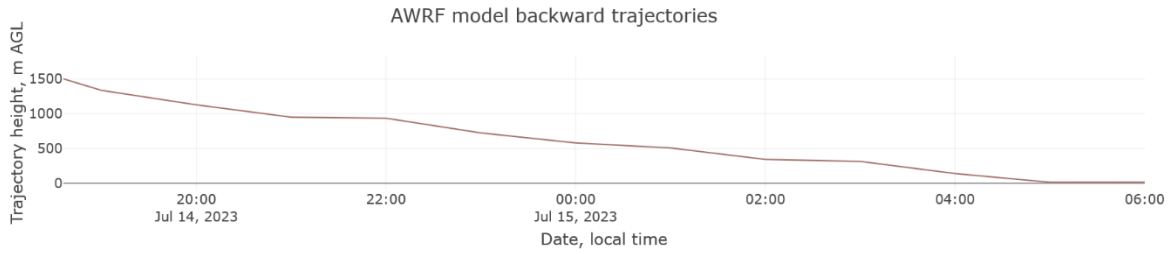

Figure 106: Time-height plot for the backward HYSPLIT trajectory #11 launched at 06:00 PST on July 15, 2023.

16.19. HYSPLIT Back Trajectories for July 15, 2023 launched at 07:00 PST

Trajectory #8 passed within 9 km of both the Rabbit and Highland Fire burn areas at 16:00 on July 14. The map and time-height plot of this trajectory are shown in Figure 107 and Figure 108, respectively. Note that the colors for the trajectories do not match between the figures.

Figure 107: Back HYSPLIT trajectories launched at 07:00 PST on July 15, 2023.

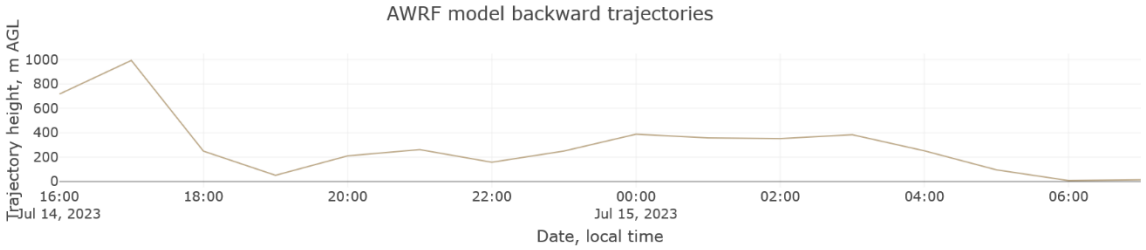

Figure 108: Time-height plot for the backward HYSPLIT trajectory #8 launched at 07:00 PST on July 15, 2023.

16.20. HYSPLIT Back Trajectories for July 15, 2023 launched at 08:00 PST

None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 08:00 PST passed within 10 km of the burn areas.

16.21. HYSPLIT Back Trajectories for July 15, 2023 launched at 09:00 PST

None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 09:00 PST passed within 10 km of the burn areas.

16.22. HYSPLIT Back Trajectories for July 15, 2023 launched at 10:00 PST

Trajectory #16 was within 4.5 km of the Highland Fire burn area and within 8 km of the Rabbit Fire burn area at 16:00 on July 14, see Figure 109. Trajectory #2 was approximately 9 km from both the Rabbit and Highland Fire burn areas at 16:00 on July 14, see Figure 110. The time-height plot of this trajectory is shown in Figure 111. Note that the colors for the trajectories do not match between the maps and time-height plot.

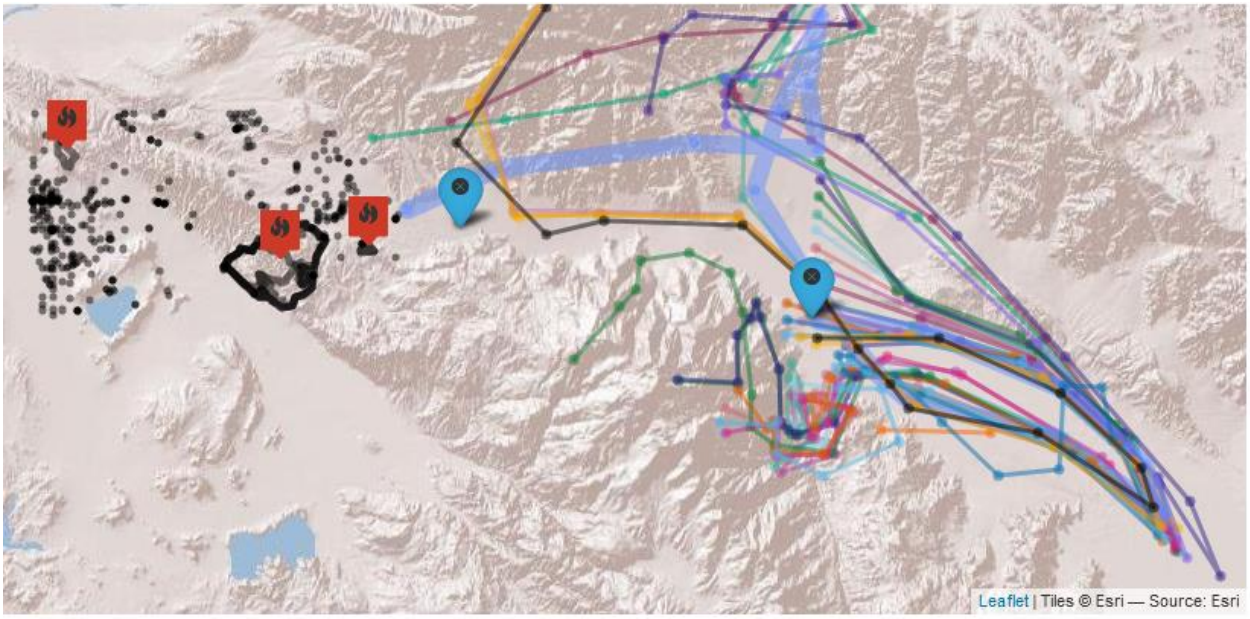

Figure 109: Back HYSPLIT trajectories launched at 10:00 PST on July 15, 2023 with Trajectory #16 highlighted.

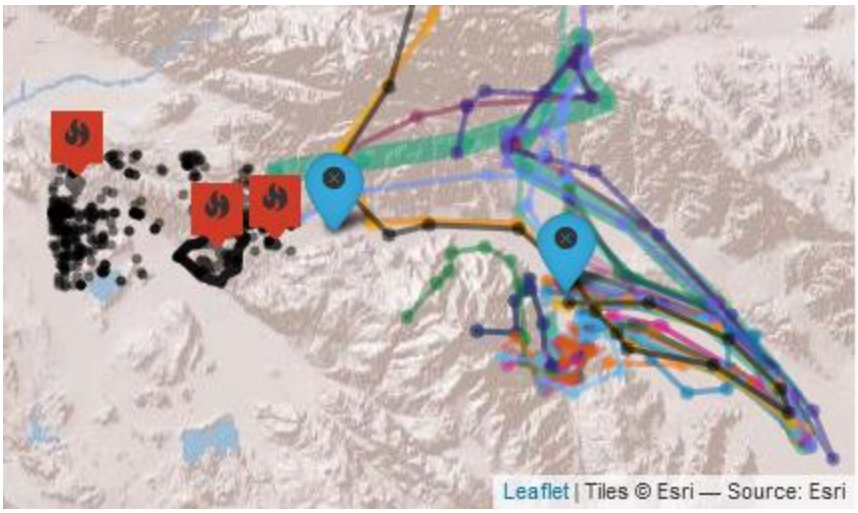

Figure 110: Back HYSPLIT trajectories launched at 10:00 PST on July 15, 2023 with Trajectory #2 highlighted.

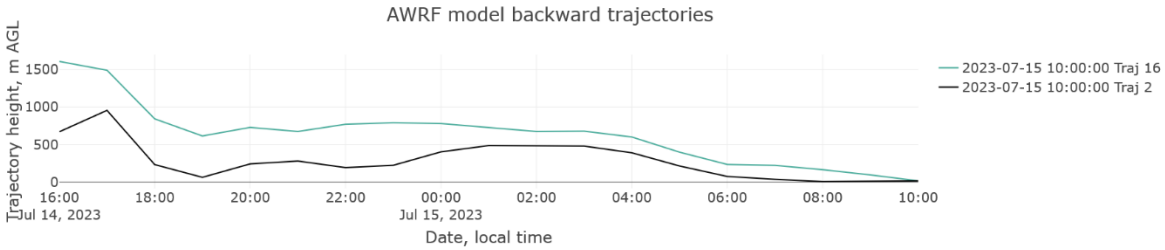

Figure 111: Time-height plot for the backward HYSPLIT trajectory #2 and #16 launched at 10:00 PST on July 15, 2023.

16.23. HYSPLIT Back Trajectories for July 15, 2023 launched at 11:00 PST

Trajectory #10 was within 9 km of the Rabbit Fire burn area from 16:00 to 19:00 on July 14 and within 7 km of the Highland Fire burn area between 19:00 and 20:00 on July 14. The map and time-height plot of this trajectory are shown in Figure 112 and Figure 113, respectively. Note that the colors for the trajectories do not match between the figures.

Figure 112: Back HYSPLIT trajectories launched at 11:00 PST on July 15, 2023 with Trajectory #10 highlighted.

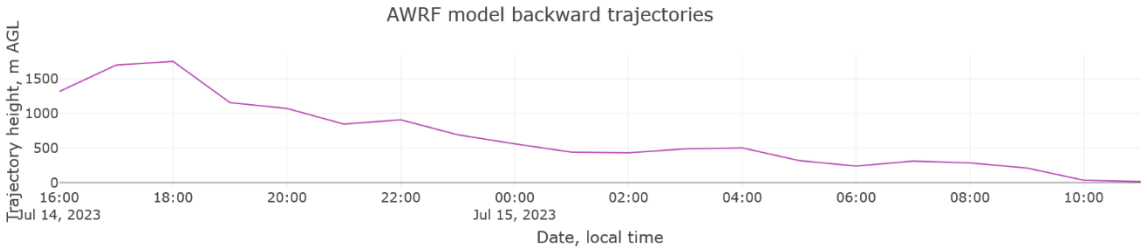

Figure 113: Time-height plot for the backward HYSPLIT trajectory #10 launched at 11:00 PST on July 15, 2023.

16.24. HYSPLIT Back Trajectories for July 15, 2023 launched at 12:00 PST

None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 12:00 PST on July 15 passed within 10 km of the burn areas.

16.25. HYSPLIT Back Trajectories for July 15, 2023 launched at 13:00 PST

Trajectory #11 was approximately 3 km from the Highland Fire burn area and 7.3 km from the Rabbit Fire burn area at 16:00 PST on July 14, see Figure 114. Trajectory #3 was within 9 km of both the Rabbit and Highland Fire burn areas at 16:00 PST on July 14, see Figure 115. The time-height plot of these trajectories are shown in Figure 116. Note that the colors for the trajectories do not match between the maps and time-height plot.

Figure 114: Back HYSPLIT trajectories launched at 13:00 PST on July 15, 2023 with Trajectory #11 highlighted.

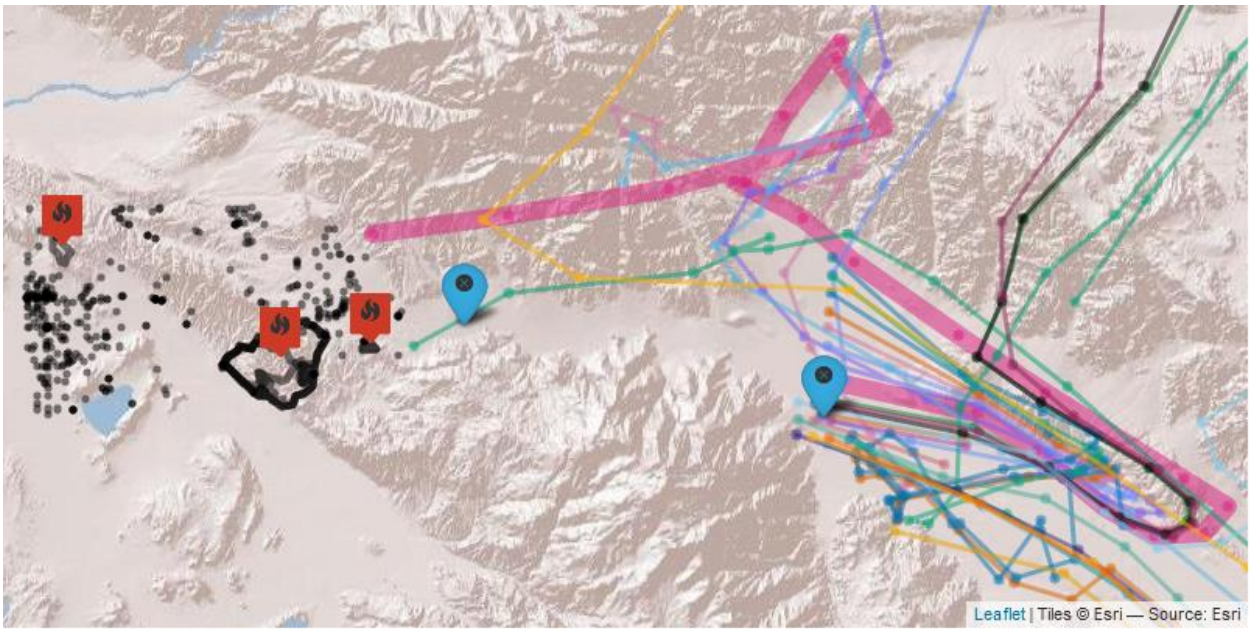

Figure 115: Back HYSPLIT trajectories launched at 13:00 PST on July 15, 2023 with Trajectory #3 highlighted.

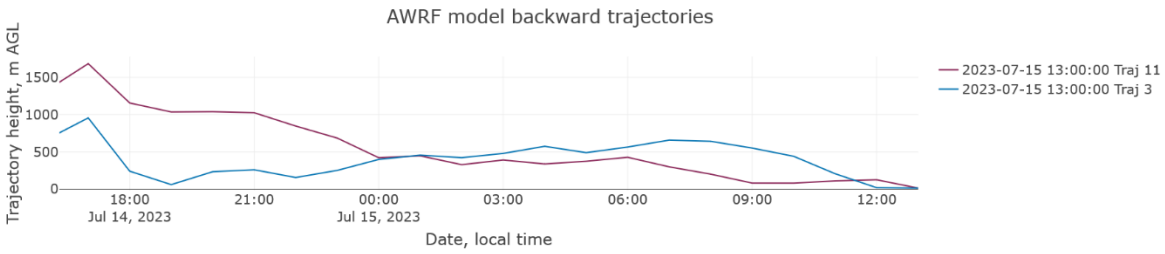

Figure 116: Time-height plot for the backward HYSPLIT trajectory #3 and #11 launched at 13:00 PST on July 15, 2023.

16.26. HYSPLIT Back Trajectories for July 15, 2023 launched at 14:00 PST

None of the HYSPLIT back trajectories launched from the vicinity of the Palm Springs monitor at 14:00 PST on July 15 passed within 10 km of the burn areas.

17. HMS Report for July 14, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

On July 14, 2023, the Hazard Mapping System (HMS)[8] polygons, labeled as light density during 02:00 PM to 06:00 PM Local Standard time[6], which is 01:00 PM to 05:00 PM PST overlapped both the HMS fire detections for the Rabbit, Reche, and Highland Wildfires and the Palm Springs Station (Figure 117). The burn perimeters reported by the National Interagency Fire Center[9] align with the HMS fire detections. This alignment is consistent with the fires influencing the Palm Springs station, contributing to the observed enhancement in ozone levels on July 14, 2023.

[8] Hazard Mapping System Fire and Smoke Product.

[9] National Interagency Fire Center Event Polygon.

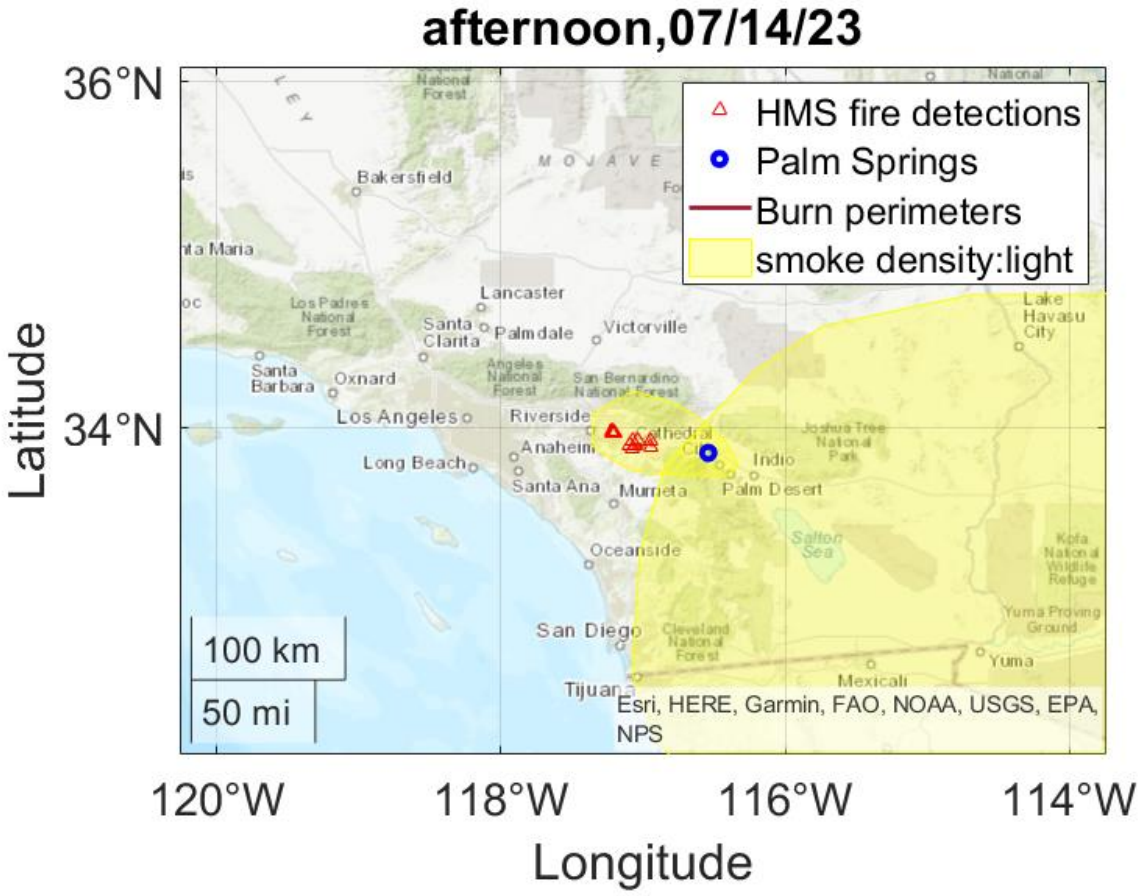

Figure 117: HMS smoke polygon with light density and HMS fire pixels (red triangles) in the afternoon (from 02:00 PM to 06:00PM Local Standard time[6], which is 01:00 PM to 05:00PM PST) of 07/14/23. The dark red polygons represent the burn perimeters for the dates of 07/14/23 and 07/15/23, reported by the National Interagency Fire Center. The blue circle indicates the Palm Springs AQS station.

18. Satellite Report for July 14, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Figure 118 shows a NASA Worldview visible satellite image taken on July 14, 2023. The Aqua satellite passes overhead at approximately 1:30 PM Local Standard time[10], which is 12:30 PST, approximately 1.5 hours after the Reche Fire started and before the Highland

[10] Earth Observing System, Key Aqua Facts.

and Rabbit Fires started. This image is too early in the fire progression to show smoke impacts on the Palm Springs station.

Figure 118: NASA Worldview visible satellite image for July 14, 2023.

Note: The orange dots in the black rectangle indicate Fires and Thermal Anomalies related to the Reche Fire. The blue star indicates the approximate location of the Palm Springs monitor. The plume in the blue dashed rectangle south of Palm Springs is likely clouds given that the same plume does not appear in the concurrent Satellite aerosol optical depth (AOD) *image and it does not appear to originate from any known fire locations.*

19. AOD Report for July 14, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Figure 119 shows the NASA Worldview Multi-Angle Implementation of Atmospheric Correction (MAIAC) Aerosol Optical Depth image taken on July 14, 2023. The Aqua satellite, which contains the MAIAC instrument, passes overhead at 1:30 PM Local Standard time[11], which is 12:30 PST, approximately 1.5 hours after the Reche Fire started and before the Highland and Rabbit Fires started. This image is too early in the fire progression to show smoke impacts on the Palm Springs station.

[11] Earth Observing System, Key Aqua Facts.

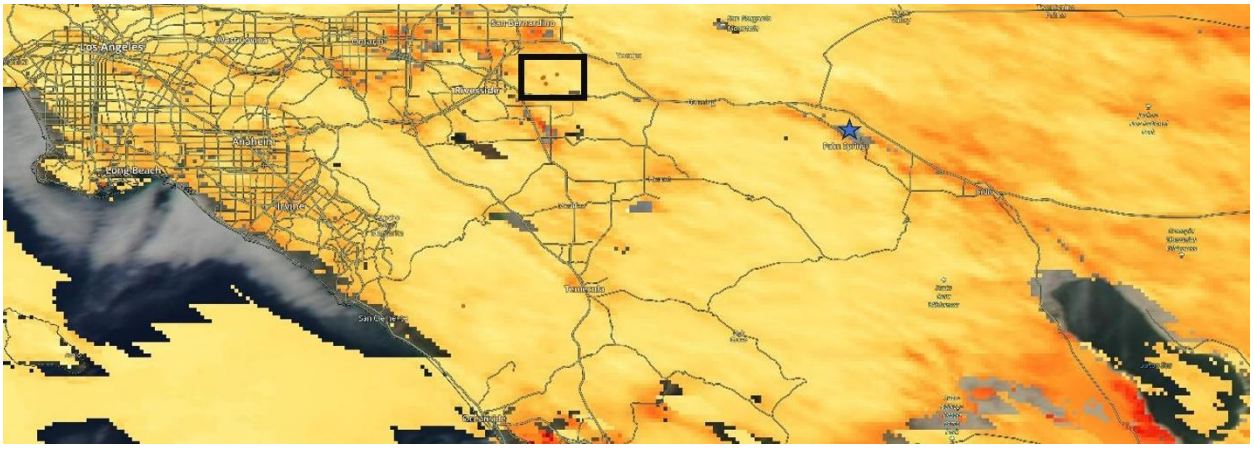

Figure 119: NASA Worldview MAIAC Aerosol Optical Depth image for July 14, 2023.

Note: The orange dots in the black rectangle indicate Fires and Thermal Anomalies related to the Reche Fire. The blue star indicates the approximate location of the Palm Springs monitor.

20. HMS Report for July 15, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

On July 15, 2023, the burn perimeters reported by the National Interagency Fire Center[12] aligns with the Hazard Mapping System (HMS)[13] satellite product (Figure 120). HMS polygons categorized as heavy density and medium density do not cover the Palm Springs Station. However, the HMS polygons with light density do overlap with the Palm Springs Station, indicating a potential impact of smoke in that area. The HMS polygons are drawn from satellite imagery collected throughout the day during the periods of 02:00 AM – 08:00 AM, 01:00 PM – 04:30 PM, and 01:00 PM – 05:00 PM Local Standard time[6], for light, medium, and heavy smoke, which are 01:00 AM – 07:00 AM, 12:00 PM – 03:30 PM, and 12:00 PM – 04:00 PM PST on July 15, 2023.

[12] National Interagency Fire Center Event Polygon.

[13] Hazard Mapping System Fire and Smoke Product.

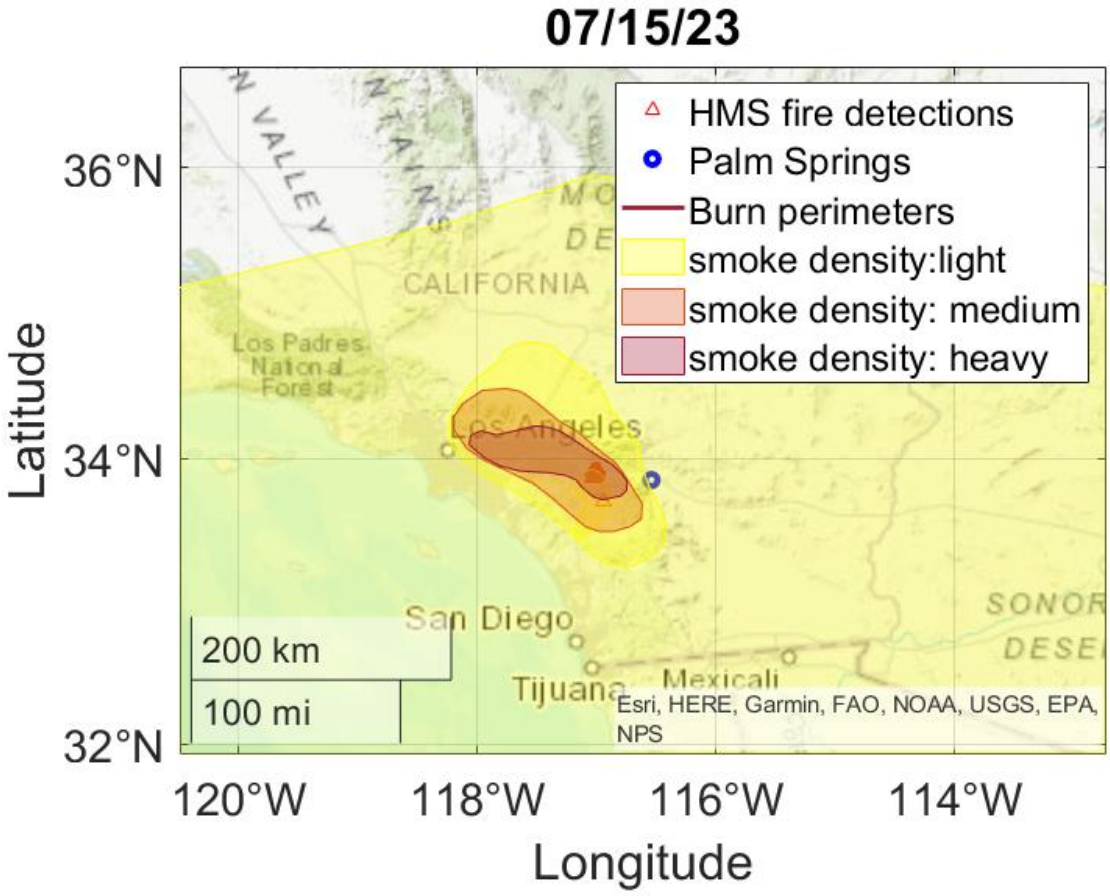

Figure 120: HMS smoke polygons for light, medium and heavy density and HMS fire pixels (red triangles) during the periods of 02:00 AM – 08:00 AM, 01:00 PM – 04:30 PM, and 01:00 PM – 05:00 PM Local Standard time[6], respectively, which are 01:00 AM – 07:00 AM, 12:00 PM – 03:30 PM, and 12:00 PM – 04:00 PM PST on July 15, 2023. The dark red polygons represent the burn perimeters for the dates of 07/14/23 and 07/15/23, reported by the Interagency Fire Center. Blue circle indicates the location of the Palm Springs AQS station.

21. Satellite Report for July 15, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Figure 121 shows a NASA Worldview visible satellite image taken on July 15, 2023 and indicates smoke in the vicinity of the Reche, Rabbit, and Highland Fires. There are no obvious smoke plumes near the Palm Springs station, however, the Aqua satellite passes overhead at 1:30 PM Local Standard time[14], which is 12:30 PST, and the HYSPLIT analysis

[14] Earth Observing System, Key Aqua Facts.

(see Sections 15-15.6) shows that some HYSPLIT trajectories for other times are consistent with transport from the fires to the Palm Springs monitor. See Sections 8 and 11 for more information about the status of the fires, winds, and pollutant concentrations around 1:30 PM.

Figure 121: NASA Worldview visible satellite image for July 15, 2023.

Note: The black rectangle encompasses the burn areas for the Reche, Rabbit, and Highland Fires. The orange dots in the black rectangle indicate Fires and Thermal Anomalies related to the Rabbit Fire. The blue star indicates the approximate location of the Palm Springs monitor.

22. AOD Report for July 15, 2023

This section addresses Section 3.4.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Figure 122 shows the NASA Worldview MAIAC Aerosol Optical Depth image taken on July 15, 2023 and indicates high AOD values in the vicinity of the Reche, Rabbit, and Highland Fires and somewhat elevated AOD values in the Coachella Valley. The Aqua satellite, which contains the MAIAC instrument, passes overhead at 1:30 PM Local Standard time[15], which is 12:30 PST, and the HYSPLIT analysis (see Sections 15-15.6) indicates that air parcels arriving at the Palm Springs monitoring station around that time predominantly originated from the southeast of the monitor, bringing residual smoke that lingered in the Coachella Valley from July 14, 2023 back towards the monitor.

[15] Earth Observing System, Key Aqua Facts.

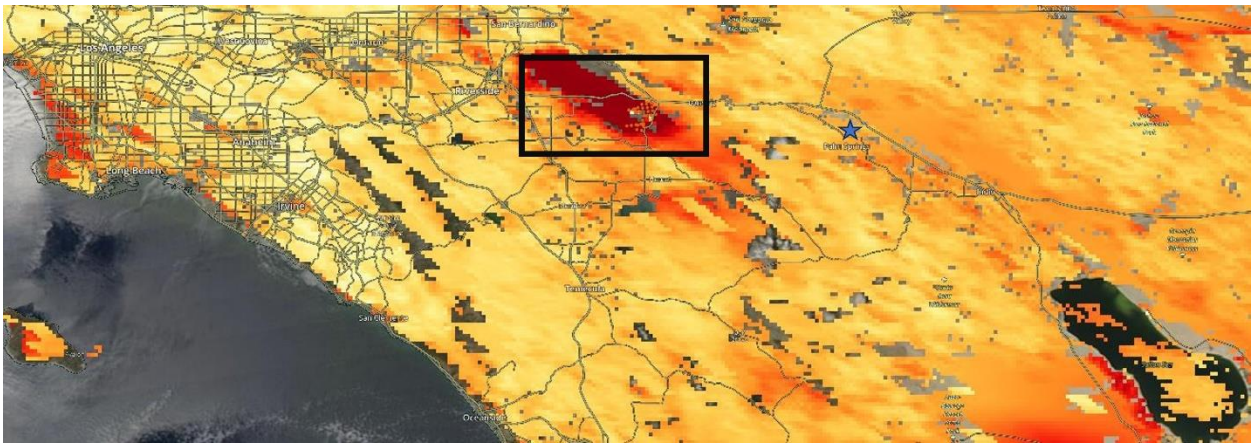

Figure 122: NASA Worldview MAIAC Aerosol Optical Depth image for July 15, 2023.

Note: The black rectangle encompasses the burn areas for the Reche, Rabbit, and Highland Fires. The orange dots in the black rectangle indicate Fires and Thermal Anomalies related to the Rabbit Fire. The blue star indicates the approximate location of the Palm Springs monitor.

23. PM2.5 Animated Map Report

This section addresses Section 3.4.2 and 3.5.2 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

Figure 123 and Figure 124 show snapshots from animations of the PM2.5 concentration determined from the South Coast AQMD Real-Time AQI map for July 14, 2023 12 PM Local Time (11:00 PST) through July 16, 2023, 12 PM (11:00 PST). The concentration map is made using a method that combines regulatory monitor measurements, PurpleAir sensor measurements, and the National Oceanic and Atmospheric Administration National Air Quality Forecast Capability (NAQFC) PM2.5 model forecast[16]. The full animations are available in the supplement at https://www.aqmd.gov/home/air-quality/exceptional-events/rabbit-reche-highland-wildfires-ozone-exceptional-events-demonstration

Figure 123 demonstrates that PM2.5 concentrations increased near Banning Airport starting at 3 PM (14:00 PST) on July 14. Concentrations remained elevated near Banning and concentrations in the Northern Coachella Valley east of Banning, near the Palm Springs monitoring site, increased after 4 PM (15:00 PST). This provides evidence that smoke from the fires was transported through the Banning Pass into the Northern Coachella Valley. PM2.5 concentrations increased from north to south in the Coachella Valley through the evening of July 14 and then concentrations peaked in Banning and at the Mecca (Saul Martinez) monitoring site in the southern Coachella Valley after midnight on July 15. PM2.5

[16]See Information and FAQs about AQI and Responsive high-resolution air quality index mapping using model, regulatory monitor, and sensor data in real-time.

concentrations in the Coachella Valley then decreased on the morning of July 15th, with concentrations decreasing below about 35 μg m^{-3} after 8 AM (7:00 PST).

The PM2.5 concentration in between regulatory monitors is determined using an interpolation of the bias of the NAQFC model as determined using regulatory monitor PM2.5 measurements and PurpleAir sensor measurements, and as a result, the PM2.5 in Figure 123 has higher uncertainty away from the regulatory monitors. It is likely that PM2.5 concentrations were higher in the Northern Coachella Valley than indicated in Figure 123 between 4 PM (15:00 PST) and the morning of July 15 since the two nearest PM2.5 monitors to the Coachella Valley, at Banning Airport and Mecca (Saul Martinez), both measured large PM2.5 spikes greater than 50 μg m^{-3} during this time. Figure 123 indicates that PM2.5 was transported from the north near the Banning Airport monitor to the south near Mecca (Saul Martinez). Overall, Figure 123 provides evidence that wildfire smoke was transported to the Palm Springs monitoring site after about 4 PM (15:00 PST) on July 14, with smoke impacts continuing at Palm Springs through the morning of July 15.

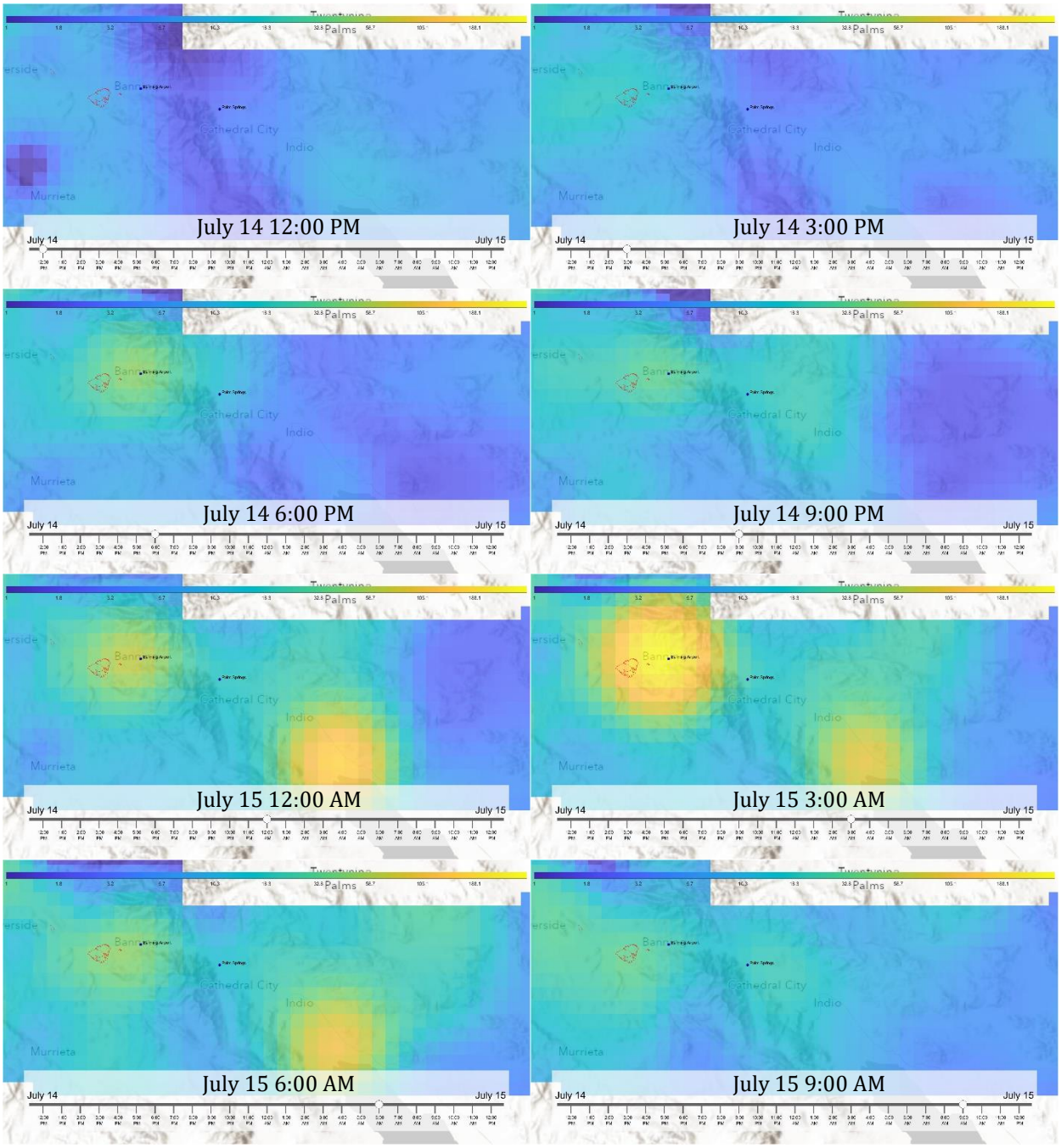

Figure 123: PM2.5 concentration in µg m^{-3} from the South Coast AQMD Real-Time AQI map shown as snapshots from a movie over the time period from July 14 2023, 12 PM Local Time through July 15 2023, 12 PM. Local time in figure is one hour ahead of PST. The Banning Airport and Palm Springs monitoring sites are shown. Red polygons are fire perimeters. The full movie is available in the supplement at https://www.aqmd.gov/home/air-quality/exceptional-events/rabbit-reche-highland-wildfires-ozone-exceptional-events-demonstration

Figure 124 demonstrates that PM2.5 concentrations increased near the fire perimeter and near the Banning Airport monitoring site in the early afternoon on July 15, after the concentrations had decreased from the previous night (see Section 23). PM2.5 concentrations subsequently increased near the Palm Springs monitoring site after about 5 PM on July 15, indicating that smoke was transported from the fires into the Northern Coachella Valley. PM2.5 concentrations remained high near the fire, at Banning Airport, and in the Northern Coachella Valley near Palm Springs through the evening of July 15 and the morning of July 16, and increased in the Southern Coachella Valley, indicating that smoke was transported from north to south in the Coachella Valley on the evening of July 15 and the following morning. In summary, Figure 124 provides evidence that smoke was transported from the fires into the Northern Coachella Valley through the Banning Pass, and to the Palm Springs monitoring site on the afternoon of July 15 and through the night of July 15 into the following morning.

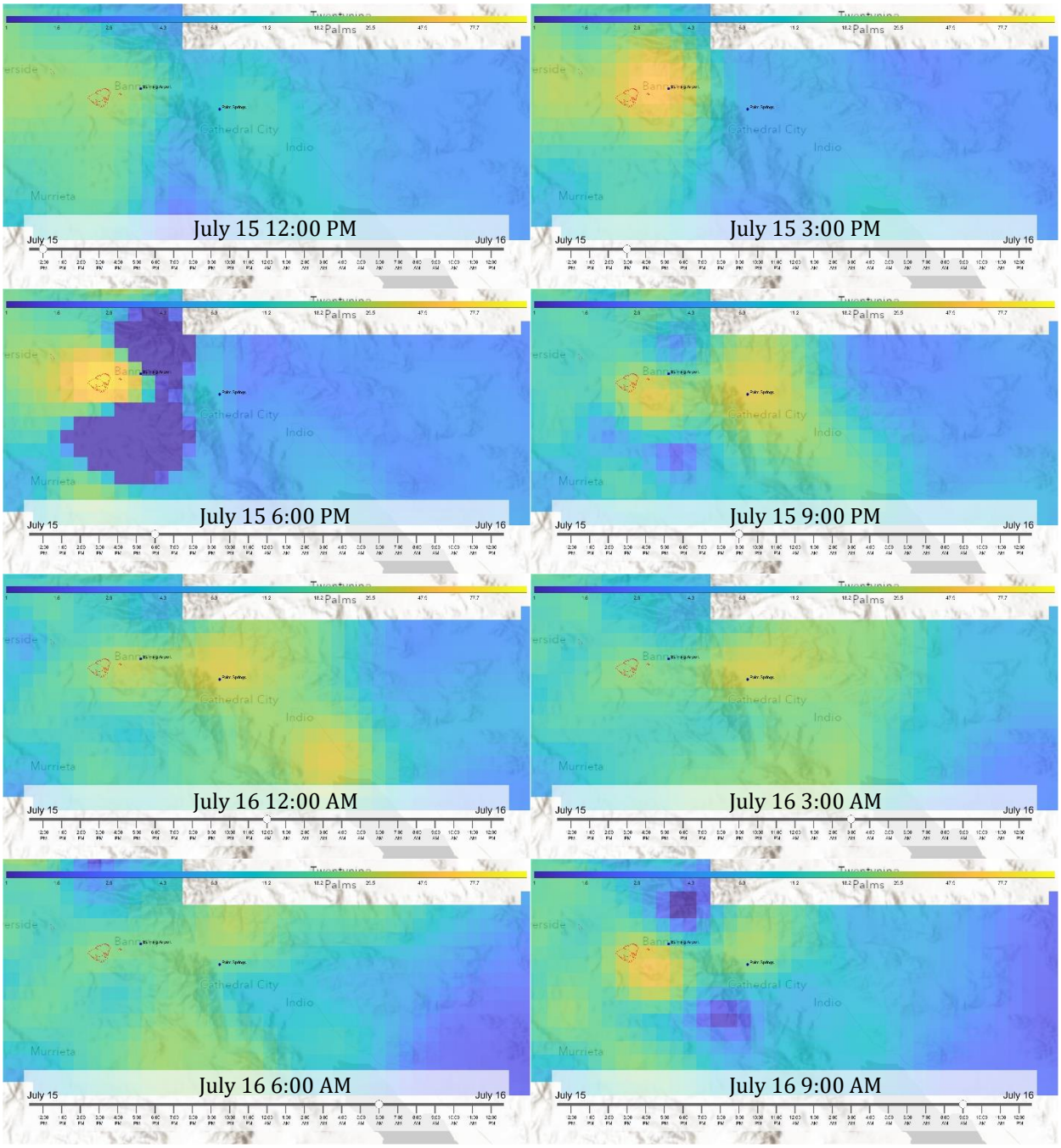

Figure 124: PM2.5 concentration in µg m^{-3} from the South Coast AQMD Real-Time AQI map shown as snapshots from a movie over the time period from July 15 2023, 12 PM Local Time through July 16 2023, 12 PM. Local time in figure is one hour ahead of PST. The Banning Airport and Palm Springs monitoring sites are shown. Red polygons are fire perimeters. The full movie is available in the supplement at https://www.aqmd.gov/home/air-quality/exceptional-events/rabbit-reche-highland-wildfires-ozone-exceptional-events-demonstration

24. Meteorology Time Series Plots at Banning and Palm Springs for July 14, 2023

This section addresses Section 3.6.3 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

This section shows time series charts of wind speed, wind direction, temperature, and solar radiation for July 14, 2023. The data presented here are discussed and explained in Section 11.

24.1. Meteorology Time Series Plots at Banning for July 14, 2023

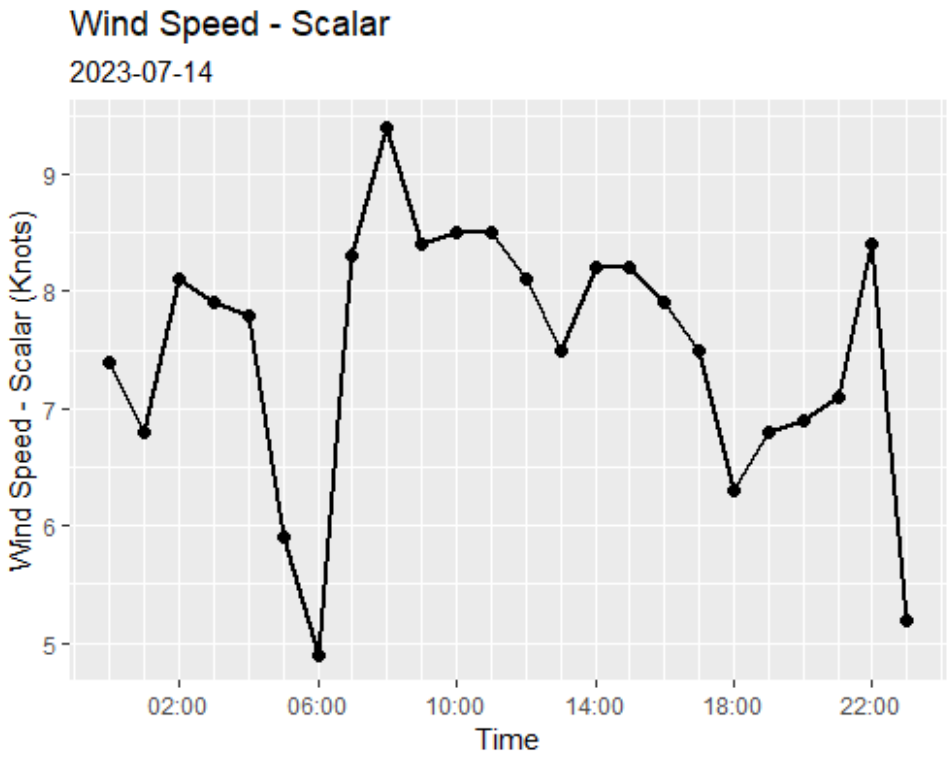

Figure 125: Time series for Scalar Wind Speed for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

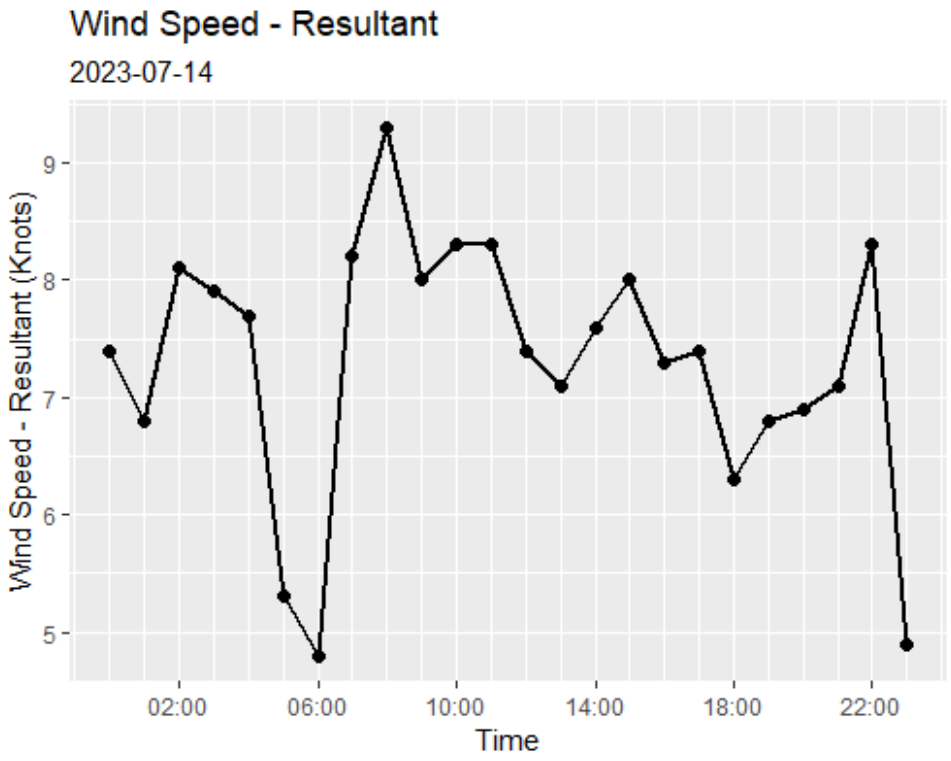

Figure 126: Time series for Resultant Wind Speed for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

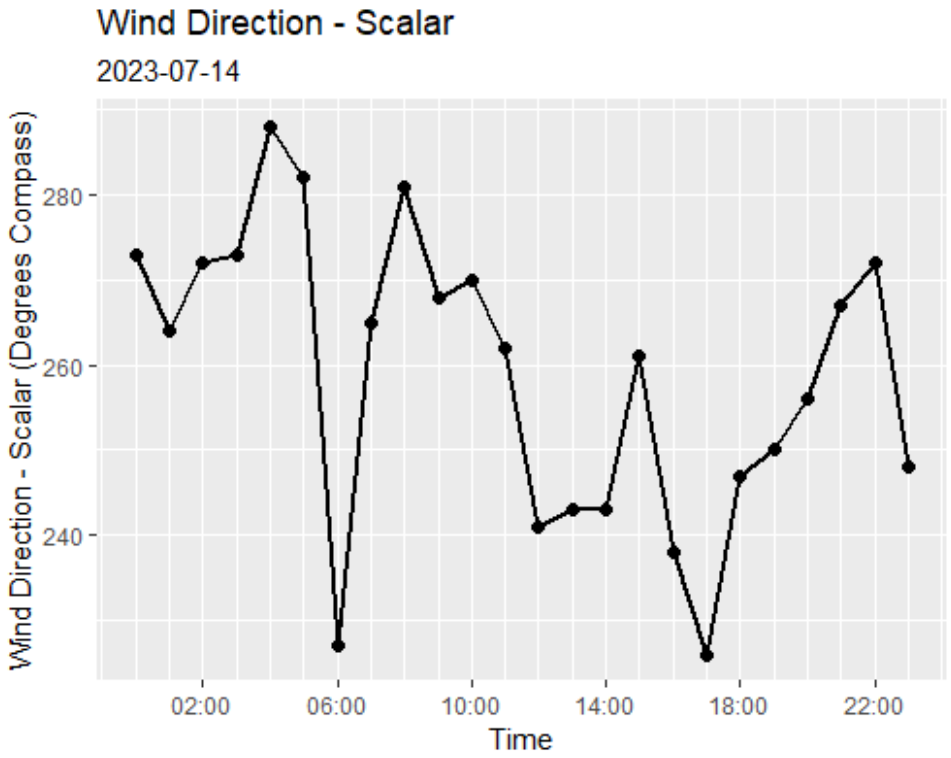

Figure 127: Time series for Scalar Wind Direction for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

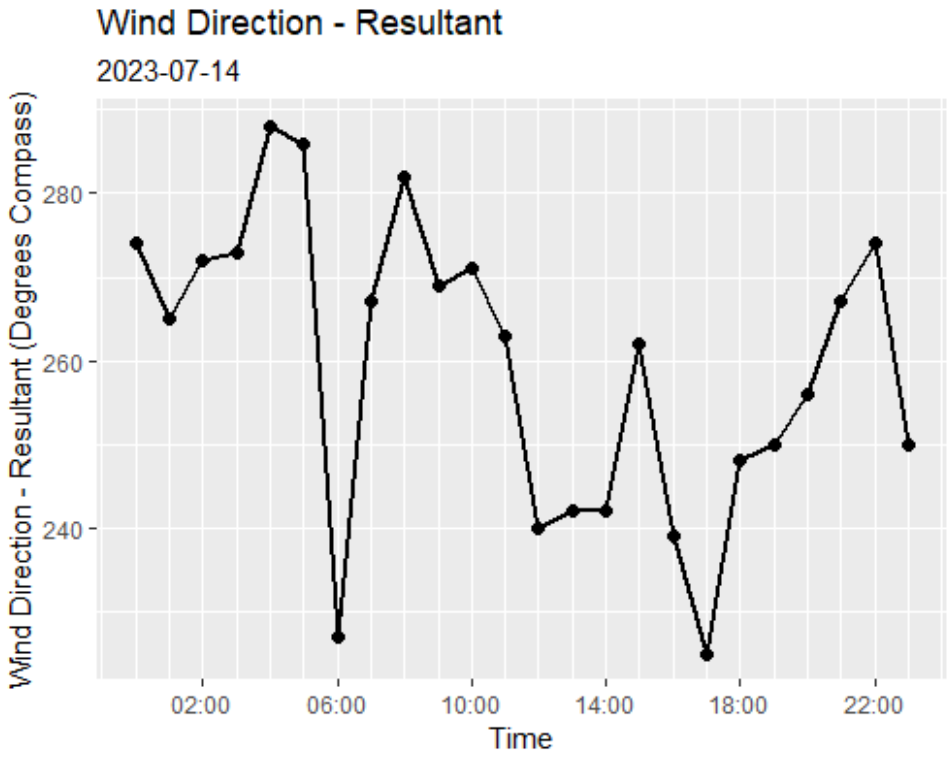

Figure 128: Time series for Resultant Wind Direction for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

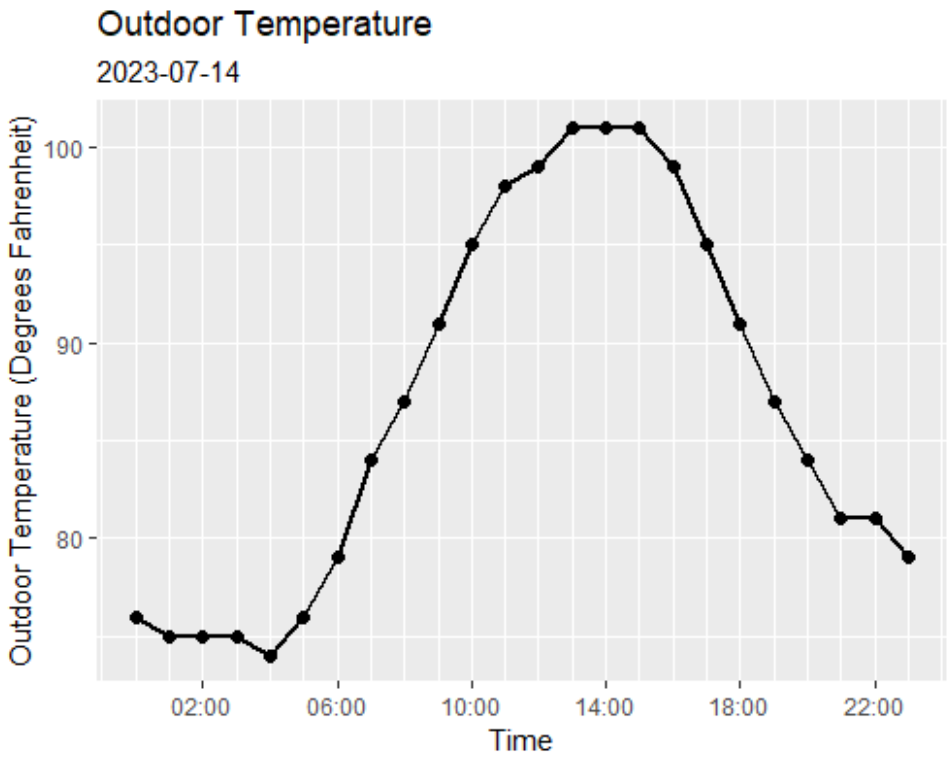

Figure 129: Time series for Outdoor Temperature for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

24.2. Meteorology Time Series Plots at Palm Springs - Fire Station POC 1 for July 14, 2023

In the hours after the fires commenced, winds with a westerly component averaged about 8 mph at both sites, see Figure 132 and Figure 133. It was a very hot day with Palm Springs recording a maximum hourly temperature of 114ºF, see Figure 134.

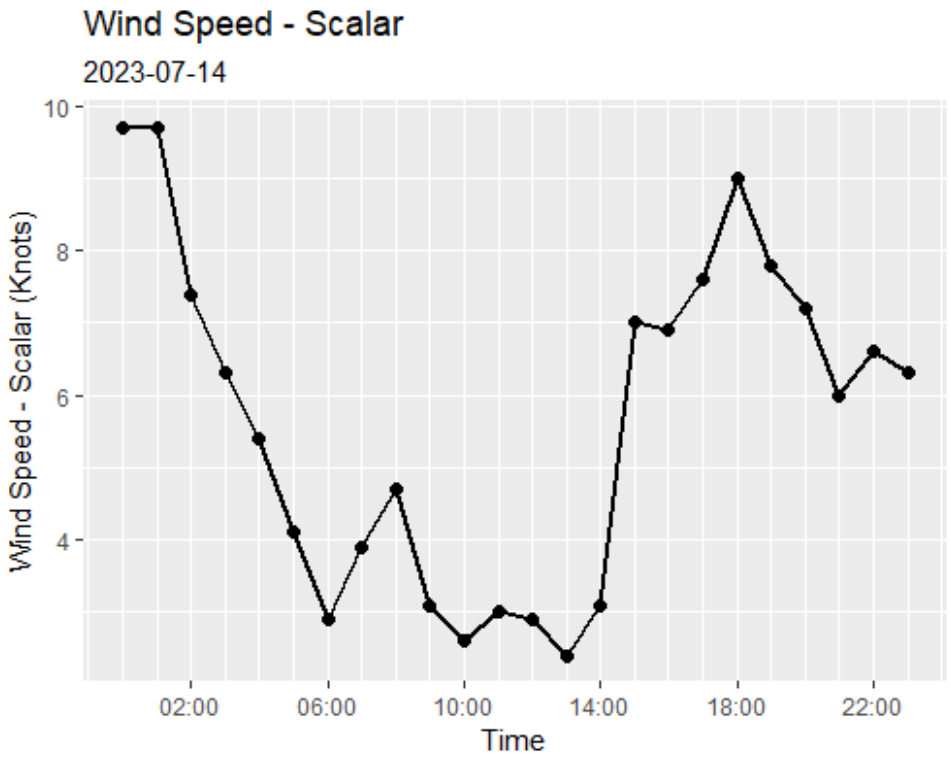

Figure 130: Time series for Scalar Wind Speed for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

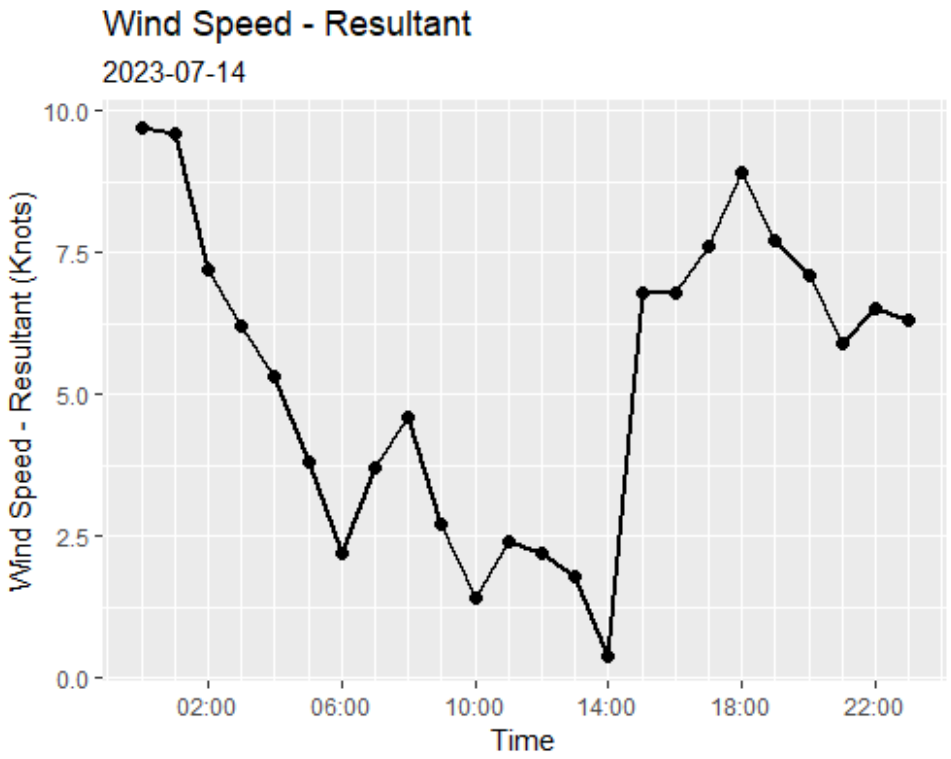

Figure 131: Time series for Resultant Wind Speed for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

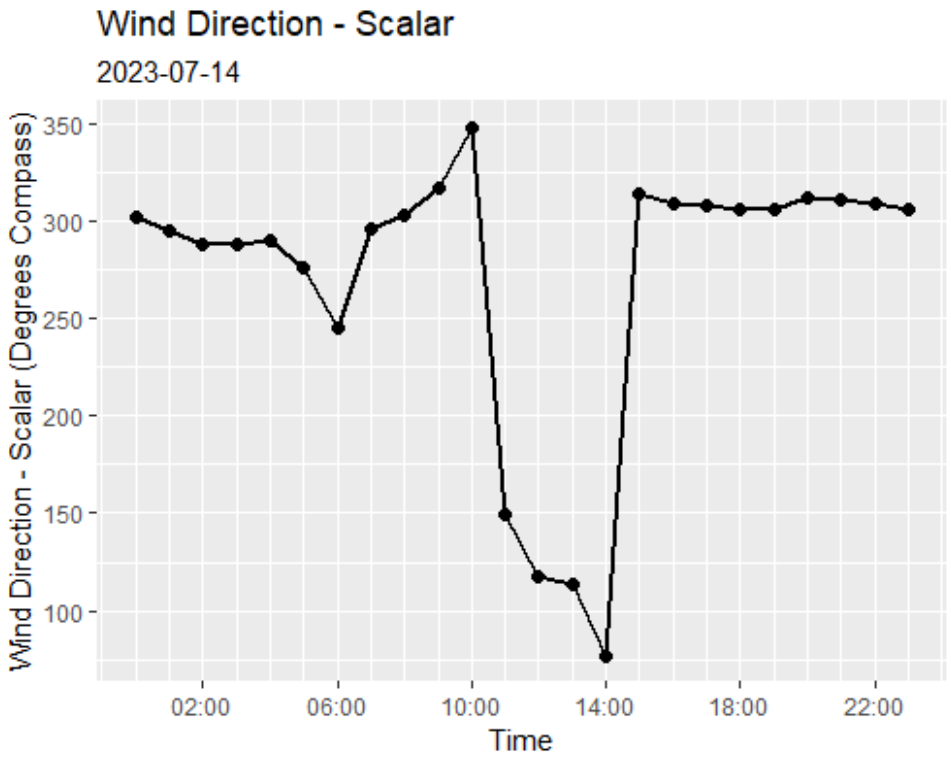

Figure 132: Time series for Scalar Wind Direction for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

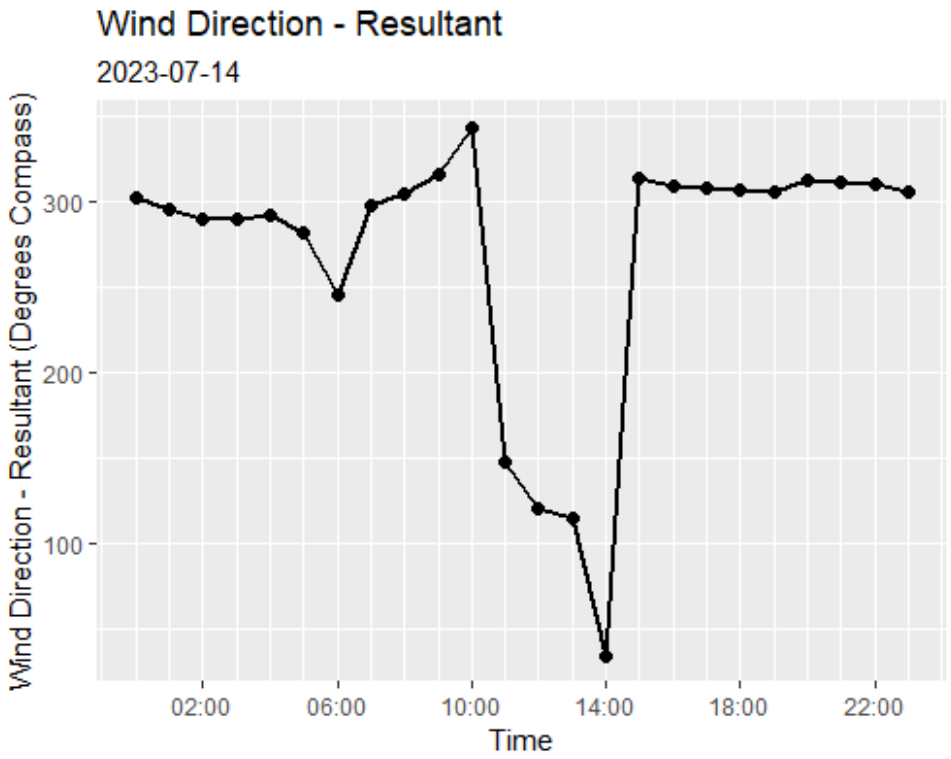

Figure 133: Time series for Resultant Wind Direction for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

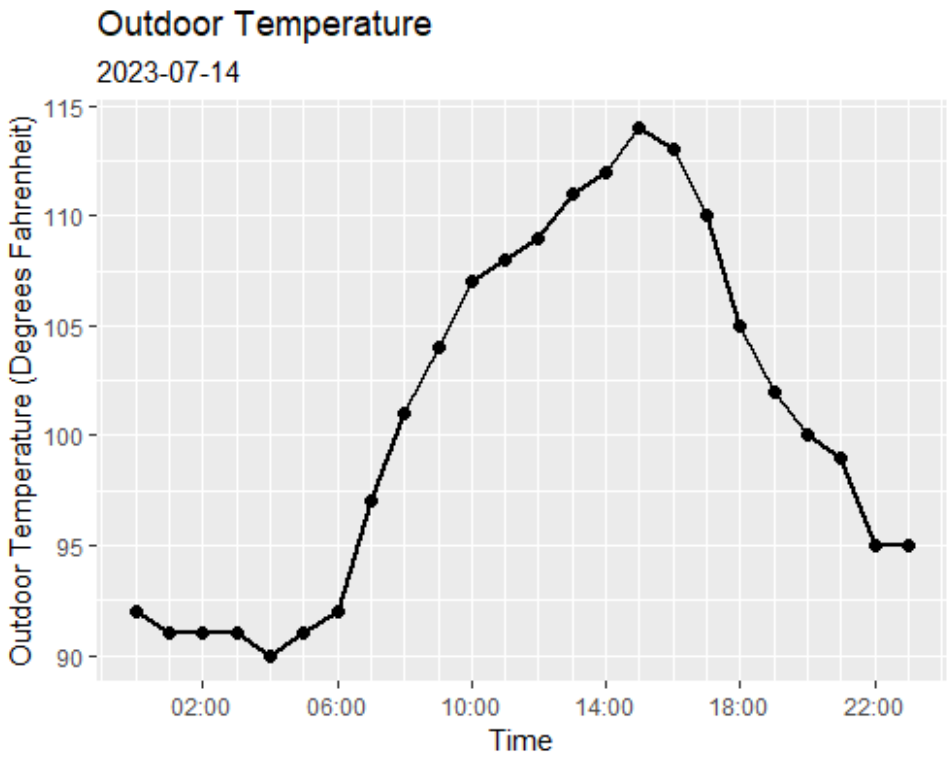

Figure 134: Time series for Outdoor Temperature for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

25. Meteorology Time Series Plots at Banning and Palm Springs for July 15, 2023

This section addresses Section 3.6.3 of the Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

This section shows time series charts of wind speed, wind direction, temperature, and solar radiation for 2023-07-15. Winds were light all day at both sites, with Palm Springs averaging about 5 mph, see Figure 135 and Figure 140. Palm Springs saw a wind reversal between 7AM and 5PM, where northwest winds switched to southeast before turning back, see Figure 142 and Figure 143. Winds were about 2 mph stronger at Banning and the wind reversal only happened between 9AM and 2PM, see Figure 137 and Figure 138. It was another very hot day with Palm Springs experiencing a maximum hourly temperature of 116ºF, see Figure 144.

25.1. Meteorology Time Series Plots at Banning for July 15, 2023

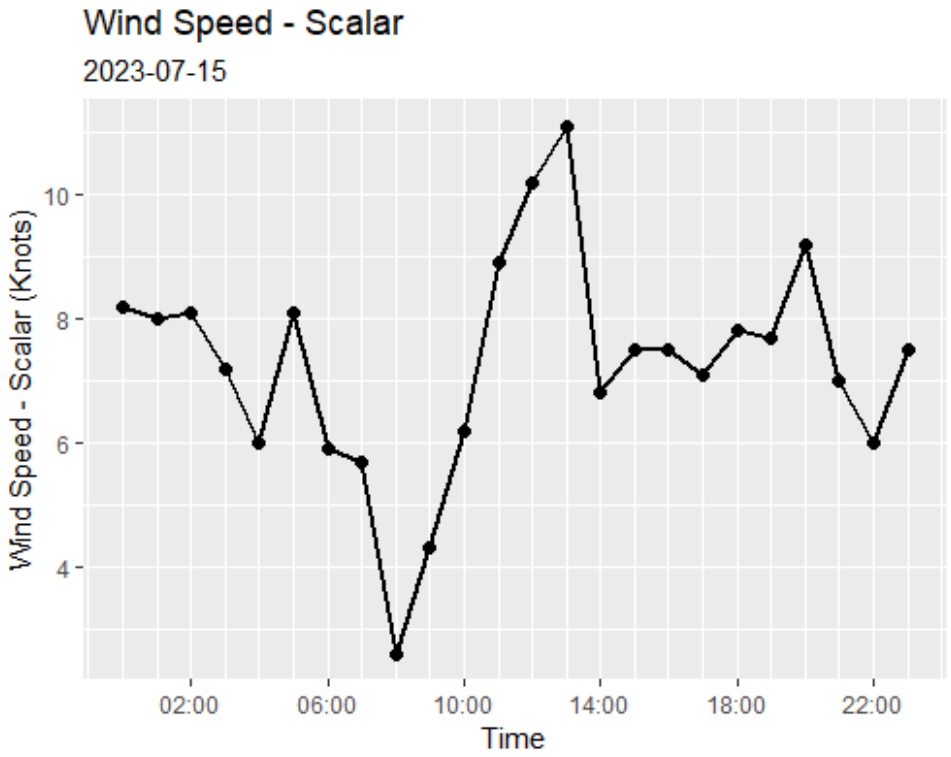

Figure 135: Time series for Scalar Wind Speed for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

Figure 136: Time series for Resultant Wind Speed for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

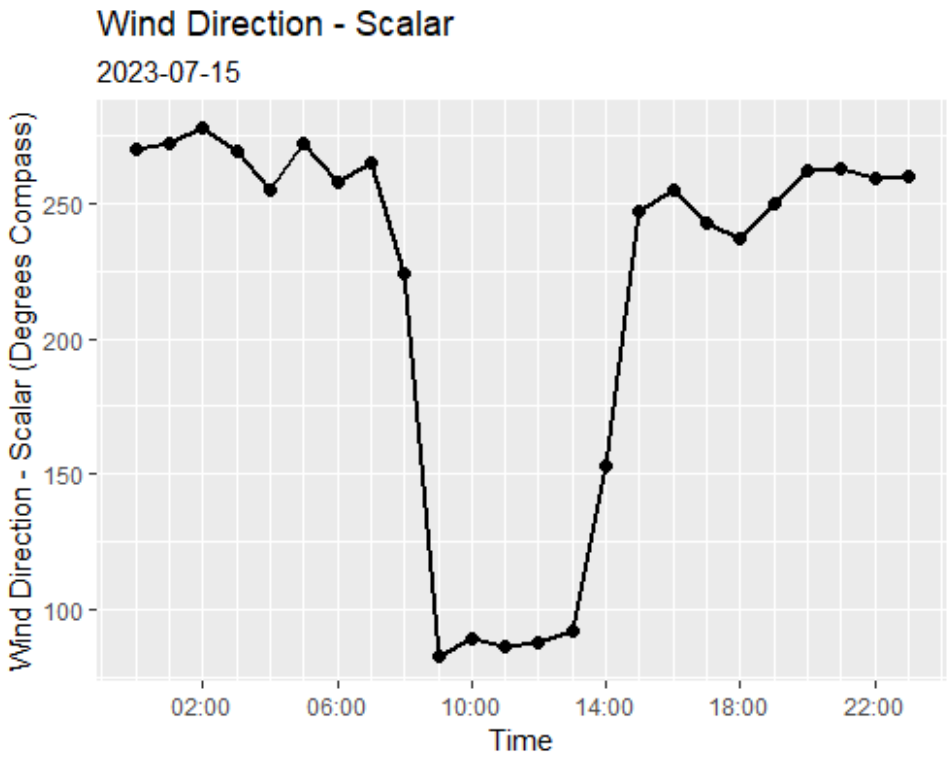

Figure 137: Time series for Scalar Wind Direction for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

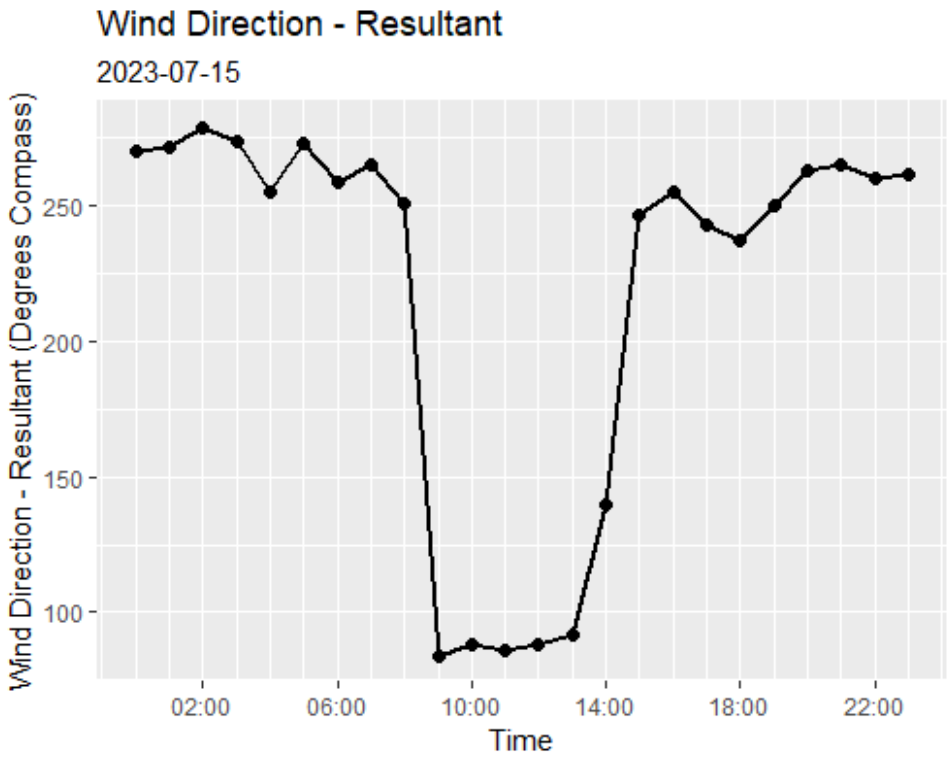

Figure 138: Time series for Resultant Wind Direction for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

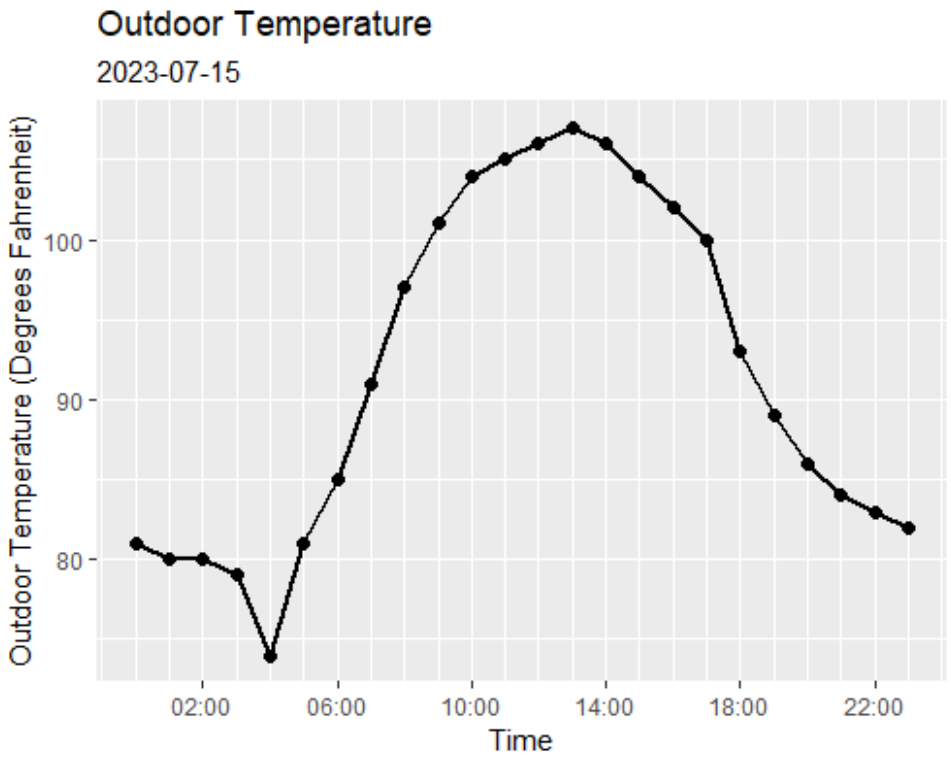

Figure 139: Time series for Outdoor Temperature for Banning - South Hathaway Street POC 1. Local time in figure is 1 hour ahead of PST.

25.2. Meteorology Time Series Plots for Palm Springs - Fire Station POC 1 Station

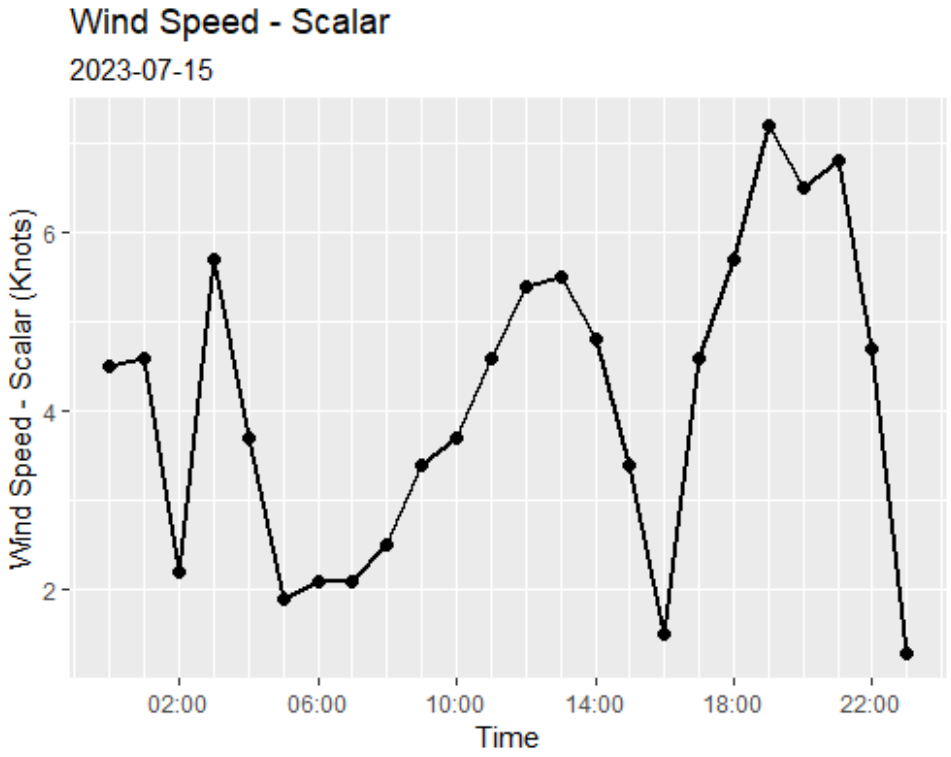

Figure 140: Time series for Scalar Wind Speed for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

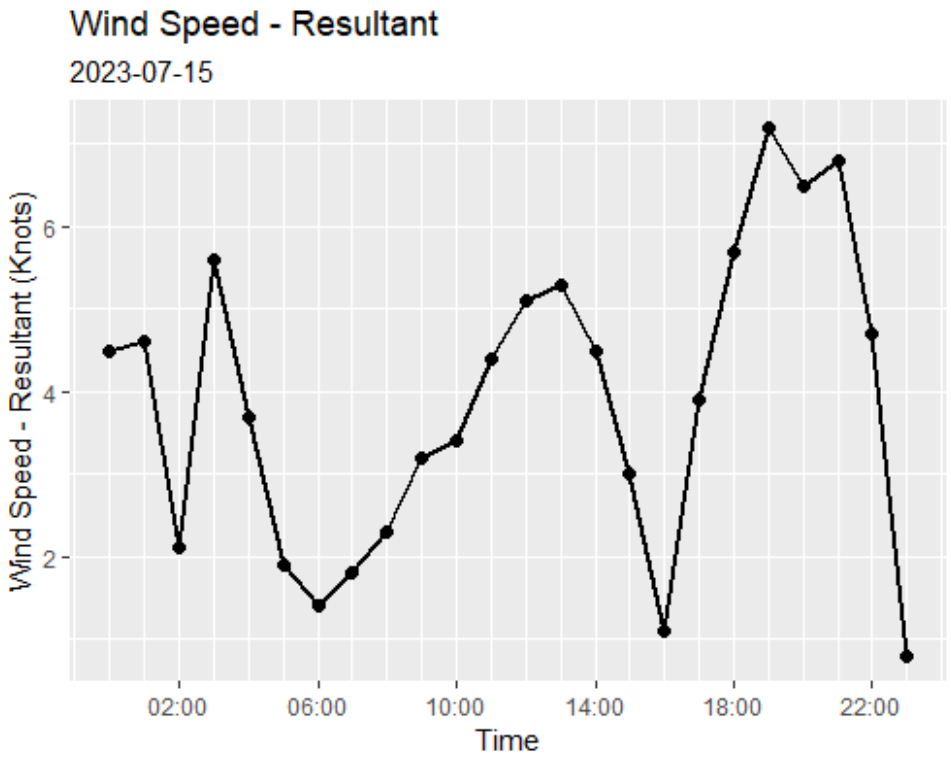

Figure 141: Time series for Resultant Windspeed for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

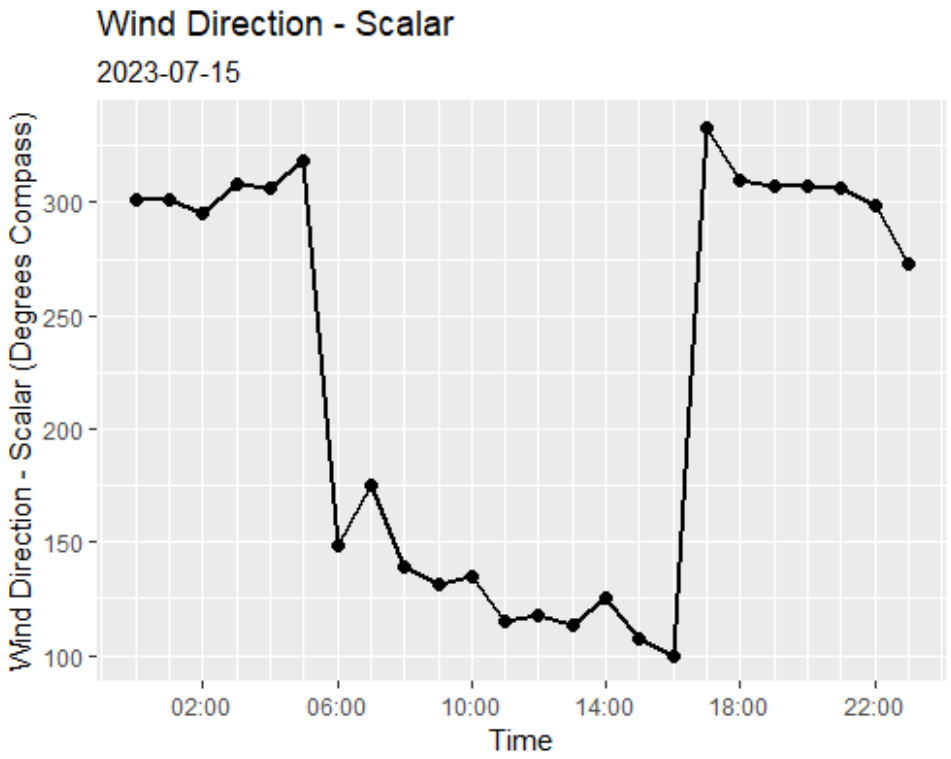

Figure 142: Time series for Scalar Wind Speed for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

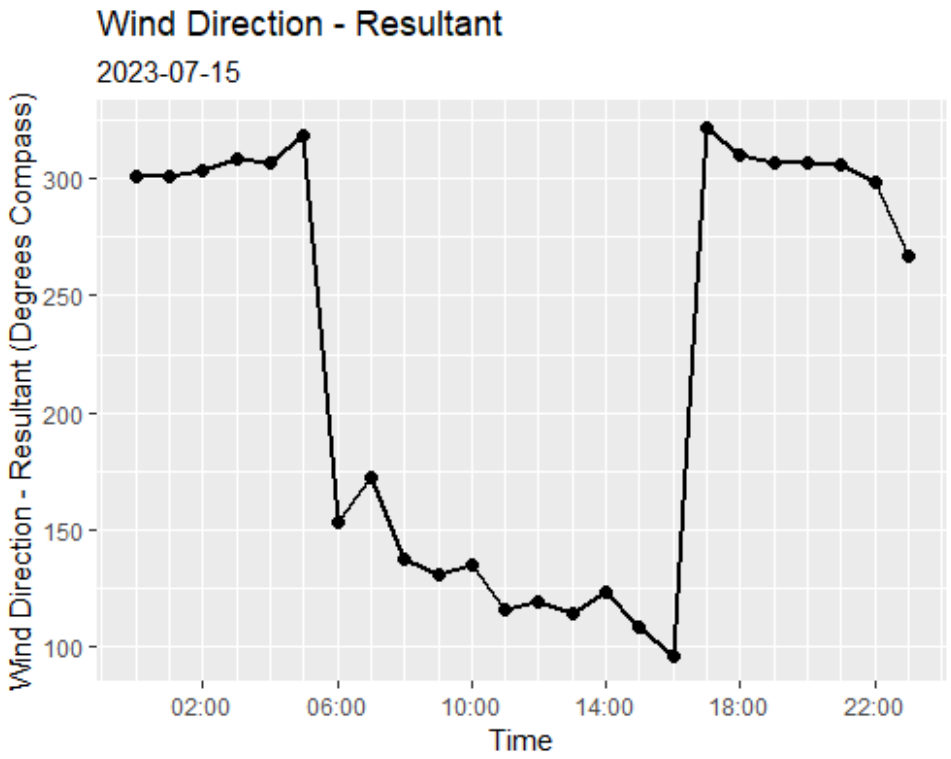

Figure 143: Time series for Resultant Wind Direction for Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

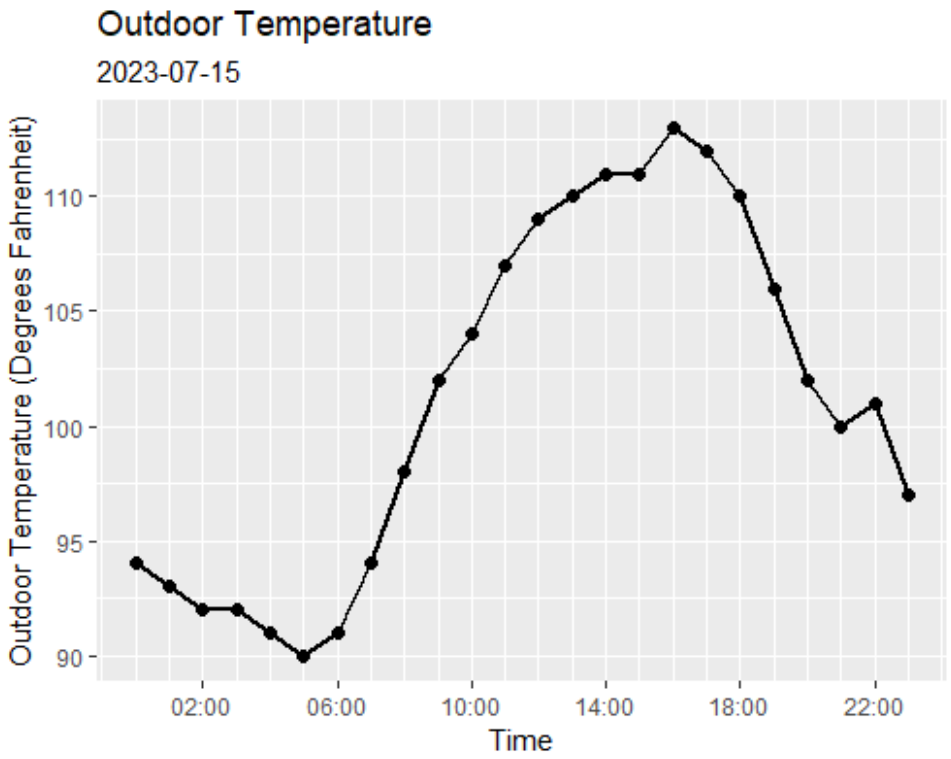

Figure 144: Time series for Outdoor Temperature Palm Springs - Fire Station POC 1. Local time in figure is 1 hour ahead of PST.

26. Matching Day Analysis

Page 27 of Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations (Section 3.6.4) suggests a Matching Day Analysis to support the clear causal relationship between the wildfire and the O3 exceedance. This section presents the Matching Day Analysis for the Rabbit, Reche, and Highland Wildfires.

26.1. Method

With years of forecasting experience, staff at South Coast AQMD have observed that the production of ozone or other pollutants is similar on days with similar meteorological conditions including sunlight, temperature, wind, and other factors. On this basis, the Analog Forecast Model (Analogmod) developed by South Coast AQMD staff in 2020, compares meteorological indicators on a forecasted day with historical meteorological fields produced by the North American Mesoscale Forecast System (NAM). The gridded NAM meteorological fields are separated into four regions: the South Coast Air Basin, the Coachella Valley portion of Salton Sea Air Basin, the Antelope Valley portion of Mojave Desert Air Basin, and the Mojave Desert Air Basin, to represent all areas in the forecast domain (see Figure 145). Analogmod identifies the five days in the historical training data with most similar

meteorology to the forecasted day; these five days are called analog days. Analog day identification for each station uses the two-dimensional meteorological field from the region where the station is located. The historical training dataset spans from 2016 until the day before the forecast day. The mean squared error (MSE, Equation 1) between gridded meteorological fields on the prediction day and all past days are computed for twelve meteorological (MET) variables. Two auxiliary variables are also calculated: the average measured NO2 concentration for each day of the week in each region, as a proxy for day of week emission variations, and a binary variable that is one if the forecasted day is a holiday and zero otherwise. The squared differences of the auxiliary variables between the prediction day and past days are computed in a manner similar to the MET variables except that auxiliary variables don't need to be averaged over the MET grid. Ten total MET and auxiliary variables are used for each pollutant, with each variable weighted by a factor of 0, 1, 5 or 10, depending on its relative importance in the forecast. The weighted MSE for all ten variables are summed and the combination of different weighted factors for each variable are all calculated for final evaluation.

$$weighted\ MSE = \sum_k^m \left(\frac{f_k}{n} \times \sum_{i,j}^n \left(y_{i,j,k} - x_{i,j,k}\right)^2\right) + \sum_l^p (f_l \times (s_l - t_l)^2) \quad \text{Eq. 1}$$

where weighted MSE is weighted mean square error for certain combination of the different weighting factors, f_k is the weighting factor for meteorological variable (k) and f_l the weighting factor for auxiliary variable (l), with the possible values of 0, 1, 5 or 10, m and p are the total number of the meteorological and auxiliary variables, respectively, with $m + p = 10$ for Analogmod, $y_{i,j,k}$ is the historical prediction of the meteorological variable (k) for the grid cell (i,j) and $x_{i,j,k}$ is the prediction on the forecast day, n is the total number of grid cells, s_l is the historical prediction of the auxiliary variable (l), and t_l is the prediction on the forecast day. The twelve MET variables that are used in Analogmod are listed in Table 20.

Table 20: Meteorological variables used in Analogmod. Different combinations of variables are used for each pollutant in addition to auxiliary variables for day of week emission variation and holiday indicator.

MET Variable	**Description**
VRATE_planetaryboundarylayer	Ventilation Rate in the planetary boundary layer (Product of mixing height and horizontal wind speed)
VGRD_planetaryboundarylayer	V direction wind speed in the planetary boundary layer
UGRD_planetaryboundarylayer	U direction wind speed in the planetary boundary layer
TMP_2maboveground	Temperature 2 m above ground level
RH_2maboveground	Relative humidity 2 m above ground level
Days Since Rain	Number of days since more than half of all grid cells had greater than 0.1 inches of rain
HPBL_surface	Planetary boundary layer height
TMP_850mb	Temperature at 850 mb level
DSWRF_surface	Downward shortwave radiation flux

SOILM_0M2mbelowground	Soil moisture 0.2 m below ground level
GUST_surface	Surface wind gust
FRICV_surface	Surface friction velocity

Five historical days with the lowest weighted MSE are identified as analog days. The mean concentration of MDA8 O3, 24-hour PM2.5, 24-hour PM10, 1-hour daily maximum NO2, and MDA8 CO for these five analog days is then calculated to produce the final prediction at every measurement station. These predictions are compared to the air quality measurements at each monitoring station in the training data set and the weighting factors that maximize model performance are selected. Moreover, a separate set of weighting factors is determined for each monitoring station and each pollutant and used operationally for predictions.

Once the weighting factors are determined, the equation can be used to forecast air quality for the following day by identifying the five days with the lowest weighted MSE (comparison of the forecasted day meteorology and the historical meteorology in the training data set). The average of the concentration measured on the analog days is used for the prediction. This is repeated for each pollutant and measurement station.

This operational approach has been in use for daily air quality forecasts since 2020. As the training dataset removes the smoke-impacted days, Analogmod makes a concentration prediction without smoke influence. Therefore, the differences between the pollutant prediction and the measurement comprise both the model bias and the impact from additional sources not accounted for in the model, such as smoke.

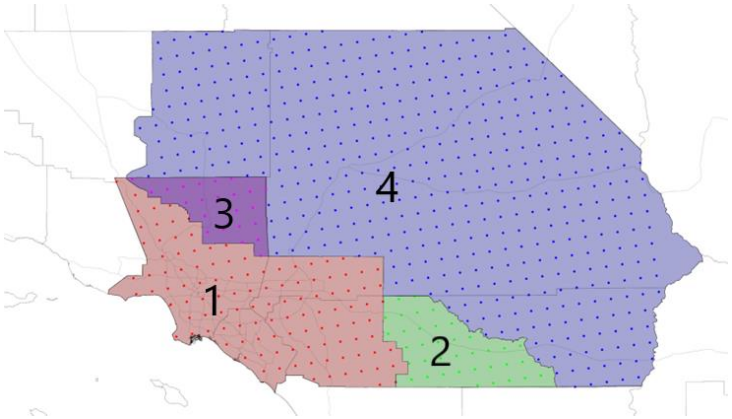

Figure 145: Regions of the Analogmod forecasting domain: 1. South Coast Air Basin, 2. Coachella Valley portion of Salton Sea Air Basin, 3. Antelope Valley portion of Mojave Desert Air Basin, and 4. Mojave Desert Air Basin. The dots represent the center of NAM grid cells with resolution of 12 km × 12 km.

To analyze model performance, the data spanning from 2019 to 2023, including a subset of data limited to summertime from 2019 to 2023 are used. Evaluation metrics for the model performance include the Spearman correlation coefficient, Pearson correlation coefficient, root mean square error (RMSE), and mean absolute error (MAE). Spearman's rank

correlation coefficient evaluates the relationship between two variables, ranging from -1 to 1. A coefficient of -1 or +1 indicates a perfect monotonic relationship, which can be either linear or non-linear, while 0 indicates no relationship. The Pearson correlation coefficient has a similar interpretation but only measures linear correlation. Both RMSE and MAE evaluate the accuracy of model predictions, with lower values indicating better performance. RMSE is more sensitive to large discrepancies between predicted and actual values than MAE. The Spearman correlation coefficients and Pearson correlation coefficients are calculated using the "corr" function in MATLAB. The RMSE is determined using Equation 2 and the MAE is computed using Equation 3:

$$RMSE = \sqrt{\frac{\sum_{i=1}^{n}(y_i - x_i)^2}{n}} \quad i = 1,2,3 \dots n \qquad \text{Eq. 2}$$

$$MAE = \frac{\sum_{i=1}^{n}|y_i - x_i|}{n} \quad i = 1,2,3 \dots n \qquad \text{Eq. 3}$$

where RMSE is root mean square error, MAE is mean absolute error, n is the number of data points, x_i is observed data and y_i is predicted data.

The model uncertainty is estimated by bootstrapping sampling, i.e., resampling the absolute error 20,000 times with replacement and calculating the mean for each iteration. The "bootci" function in MATLAB is used for the estimate.

26.2. Results for Palm Springs – Fire Station POC 1 Station

Figure 146 shows the time series comparing observed and predicted daily maximum 8-hour average ozone concentration using Analogmod from 2019 to 2023, indicating that Analogmod effectively captures the seasonal trends at Palm Springs – Fire Station. The relationship between observation and simulation shows that the data points primarily align along the 1:1 line (Figure 147), with Spearman correlation coefficient of 0.88 and Pearson correlation coefficient of 0.87 (p=0.00, Table 21), indicating excellent linear correlation and low systematic bias between model predictions and observations. Figure 148 and Figure 149 zoom in on summertime values (June, July, and August) from 2019 to 2023. The Spearman correlation coefficient (0.54) and Pearson correlation coefficient (0.59) also demonstrate good model performance during the summertime period from 2019 to 2023. Notably, the red squares marked in Figure 149 show deviations from the 1:1 line on July 14 and July 15, 2023, suggesting that Analogmod significantly underestimated the ozone concentrations on these two days.

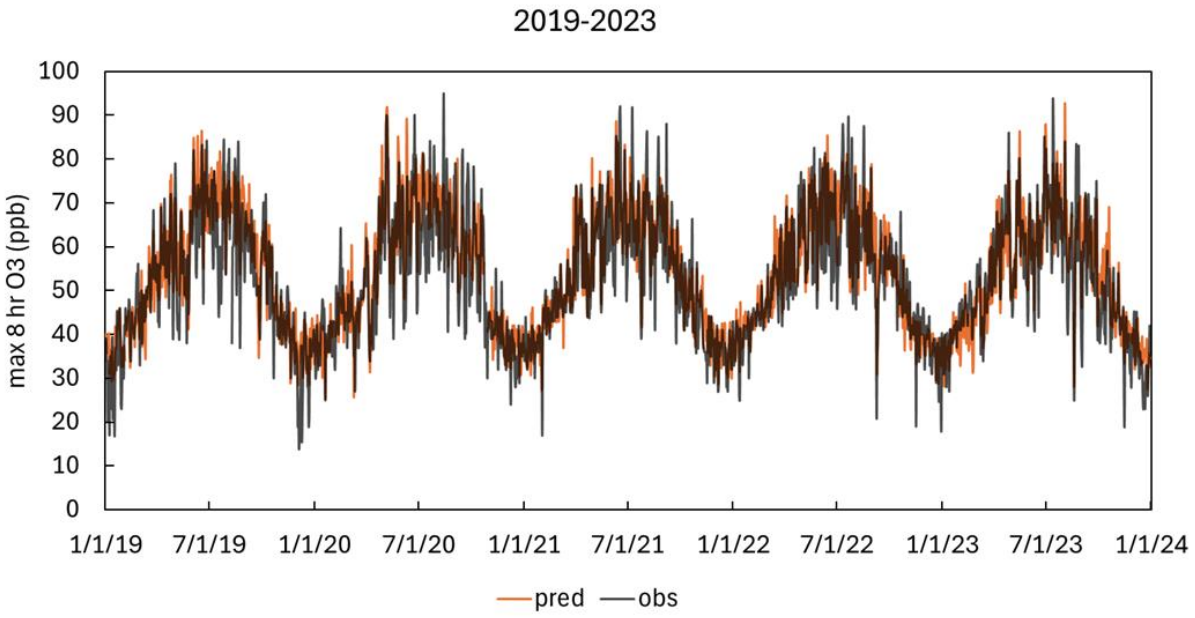

Figure 146: Time series of comparison between observed and predicted daily maximum 8-hour average ozone concentration (ppb) at Palm Springs, from Analogmod from 2019 to 2023.

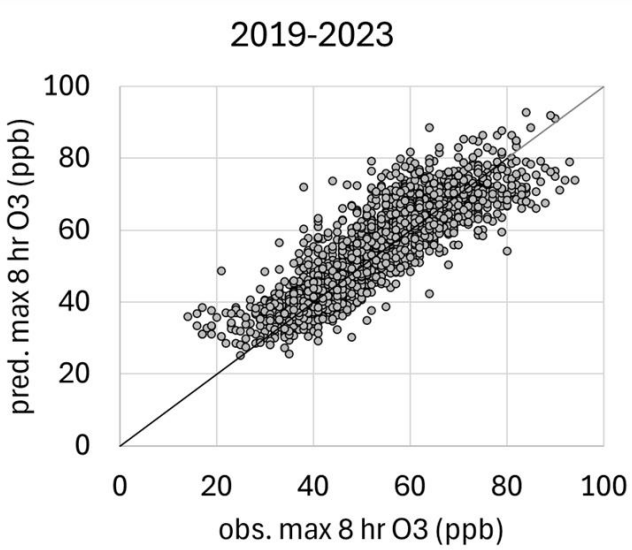

Figure 147: The relationship between observed and Analogmod prediction of daily maximum 8-hour average ozone concentration (ppb) at Palm Springs – Fire Station from 2019 to 2023. The black line is a 1:1 line.

Table 21: Statistical summary of Analogmod performance and uncertainty estimation, at Palm Springs – Fire Station.

		2019 to 2023	**Jun, Jul, Aug from 2019 to 2023**
Spearman correlation coefficient		0.88 (p=0.00)	0.54 (p<0.01)
Pearson correlation coefficient		0.87 (p=0.00)	0.59 (p<0.01)
Root Mean Square Error (ppb)		7.4	9.4
Mean Absolute Error (MAE, ppb)		5.6	7.5
Bootstrap 95% CI for MAE (ppb)	lower	5.4	7.0
	upper	5.8	8.1
Bootstrap 99% CI for MAE (ppb)	lower	5.3	6.9
	upper	5.9	8.3

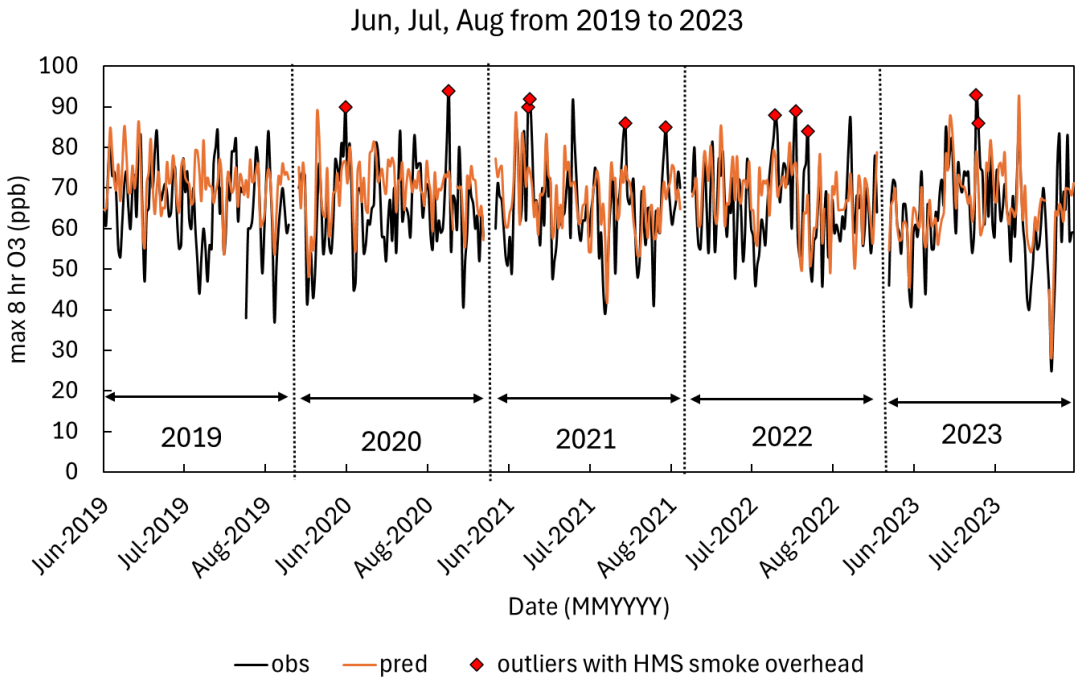

Figure 148: Similar to Figure 146, but only for June, July, and August from 2019 to 2023. The outliers with HMS smoke overhead are marked as red diamonds.

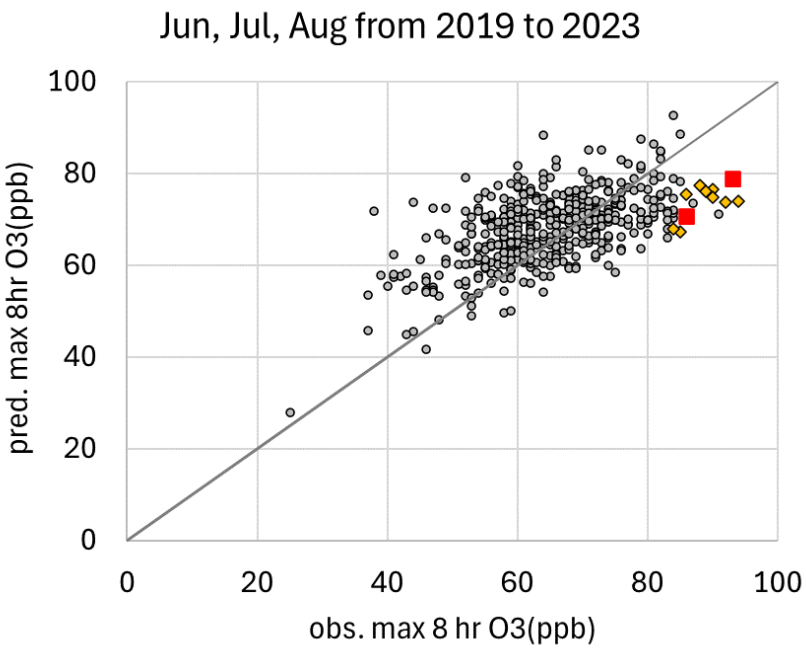

Figure 149: Similar to Figure 147, but only for June, July, and August from 2019 to 2023. The outliers with HMS smoke overhead are marked as orange diamonds and the data points for July 14 and July 15, 2023 are marked as red squares.

To further evaluate the model performance, the RMSE and MAE were computed for the 5-year simulation (see Table 21). To estimate uncertainty of MAE, 95% and 99% confidence intervals (CI) were calculated using bootstrapping (i.e. "bootci" function in MATLAB mentioned above) for both the 5-year data and summertime 5-year data. The MAE was 5.6 ppb for the 5-year data (bootstrap 95% CI 5.4 to 5.8 ppb and 99% CI 5.3 to 5.9 ppb) (using the built-in Matlab function of "bootci" with the default value of 95% CI) and the RMSE was 7.4 ppb; For the summertime data, the MAE was 7.5 ppb (95% CI 7.0 to 8.1 ppb and 99% CI 6.9 to 8.3 ppb) and RMSE was 9.4 ppb, indicating a marginally greater error during the summer months compared to the overall 5-year period. This is to be expected based on the higher concentrations measured during the summer months, as RMSE and MAE are scale-dependent metrics, which can be affected by the magnitude of the numbers in the data, i.e. a larger magnitude of data generally leads to higher values for both RMSE and MAE. The model performance of Analogmod compares favorably to the National Oceanic and Atmospheric Administration (NOAA) National Air Quality Forecast Capability (NAQFC), which uses a bias corrected chemical transport model (CTM) to make predictions. The NAQFC RMSE at Palm Springs – Fire Station is 7.15 ppb and MAE is 5.46 ppb for the data from 2019 to 2023; summertime RMSE and MAE at Palm Springs – Fire Station are 9.30 ppb and 7.31 ppb, respectively.

An alternative version of Analogmod that excludes days with smoke overhead indicated by the Hazard Mapping System (HMS) from the training data was also evaluated. This exclusion is regardless of the ozone concentration on the days with smoke influence. By excluding days with smoke overhead, Analogmod is effectively trained to predict concentrations that are expected in the absence of wildfire smoke. It was found that a total of 178 days are excluded at Palm Springs – Fire Station from 2019 – 2023, 9.8% of all of the days, and that most of the excluded days occur in June through September. HMS often indicates smoke overhead due to distant fires that only produce light smoke in the Coachella Valley and for which the smoke may not reach ground level. This light smoke is not expected to impact ozone significantly. The model performance is slightly worse than the Analogmod that doesn't remove days with HMS smoke overhead (RMSE is 9.6 ppb during summer months). Since performance is worse and a significant amount of summer ozone data is removed due to HMS smoke, it was decided that the original Analogmod that doesn't remove HMS smoke days should be used for the matching day analysis so that more of the summertime data could be used. Additionally, since ozone concentrations are increased due to smoke impacts the Analogmod predictions that don't remove HMS smoke days provide a conservative prediction of the non-smoke-impacted concentration.

The model error, defined as the difference between prediction and observation, is computed to check if the errors for July 14 and 15 are significantly different from other days in the dataset. A histogram of model error for the 5-year analysis is thus examined. It is shown that the model errors follow a normal distribution with some deviation from normality in the tails, suggested by a quantile-quantile plot (see Figure 150). For July 14, 2023, the error is 14.0 ppb, which is the 98.6th percentile of the whole dataset. For July 15, 2023, the error is 15.2 ppb, which is the 98.9th percentile of the whole dataset.

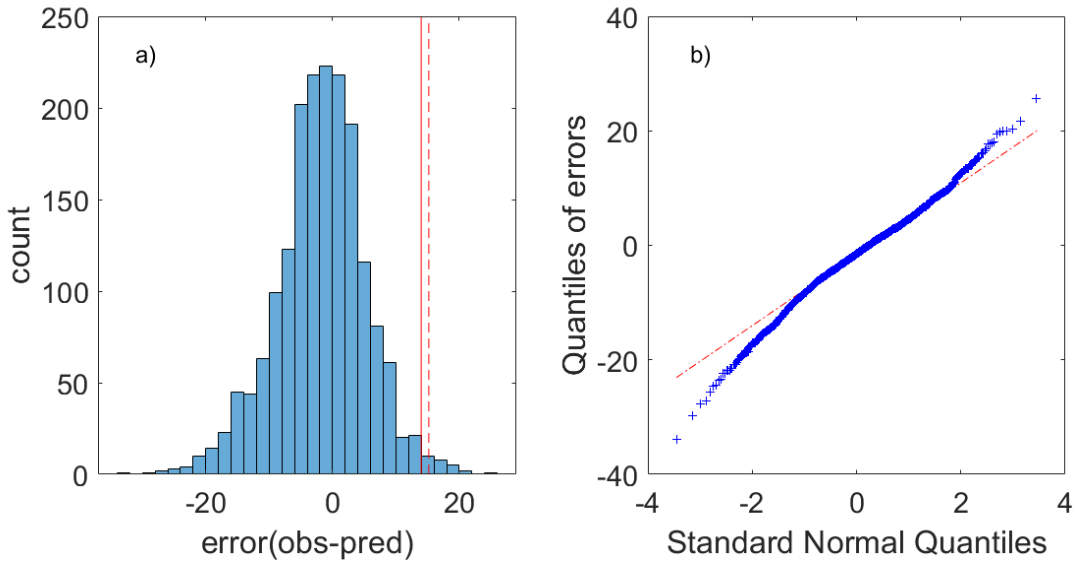

Figure 150: a) Histogram of model error (defined as the difference between prediction and observation) for the Palm Springs – Fire Station data from 2019 to 2023. The solid red line represents the model error on July 14, 2023 and the dashed line represents the model error on July 15, 2023. b) Quantile-quantile plot of error against a normal distribution. The red reference line passes through the first and third quartiles of the data.

The histogram for the 5-year summer-only analysis shows that model error also follows a normal distribution, suggested by quantile-quantile plot (see Figure 151). For July 14, 2023, the error was 14.0 ppb, which is the 97.4th percentile in the 5-year summer-only dataset. For July 15, 2023, the error was 15.2 ppb, which is the 98.0th percentile in the 5-year summer-only dataset. The high model error for these two days, beyond what is inherent in the model, indicates a potential contribution from additional pollution sources.

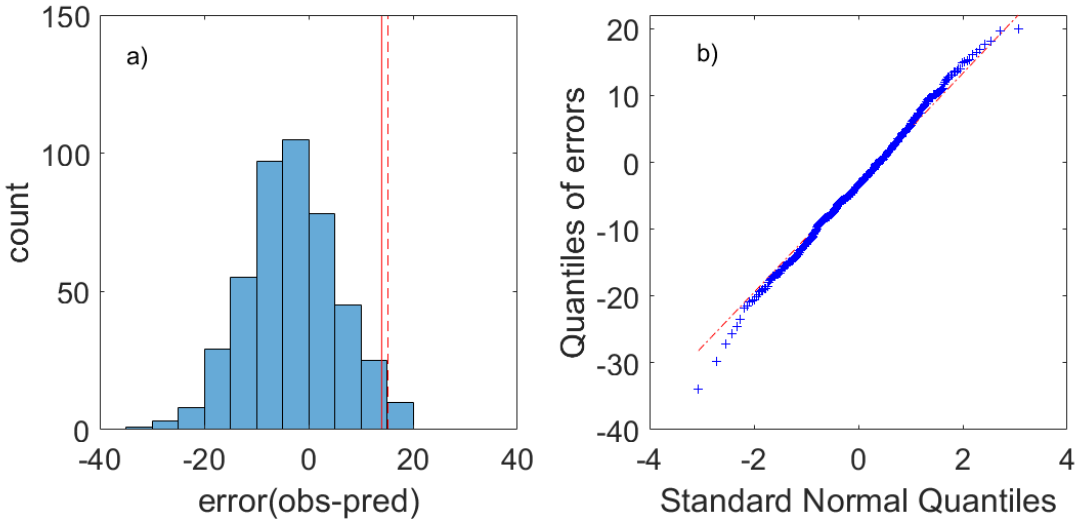

Figure 151: Similar to Figure 150 but for June, July, and August, 2019-2023.

Figure 152 presents the daily maximum 8-hour average ozone observations and simulations in the period when those fires occurred. The upper limit of the bootstrap 99% CI of MAE during summertime, 8.3 ppb, is represented as the error bar of model simulation in the figure. The ozone levels from July 14 to July 17 are higher than the model prediction plus the upper 99% CI of MAE, which is consistent with the presence of added ozone precursors from wildfire smoke. Based on Figure 151, there are a 2.6% and 2.0% chance of observing a model error larger than those on July 14 and 15, 2023 on a single day, respectively, also indicating that unusual conditions not accounted for by the model such as presence of wildfire smoke likely contributed to the high observed ozone on those days. The Rabbit, Reche, and Highland fires all started on July 14. On July 17, 2023, the Highland Fire was extinguished, and the Rabbit Fire was 45% contained. The Reche Fire was extinguished on July 21 and the Rabbit Fire was extinguished on July 22, though the major smoke impacts had subsided well before these extinguishment dates.

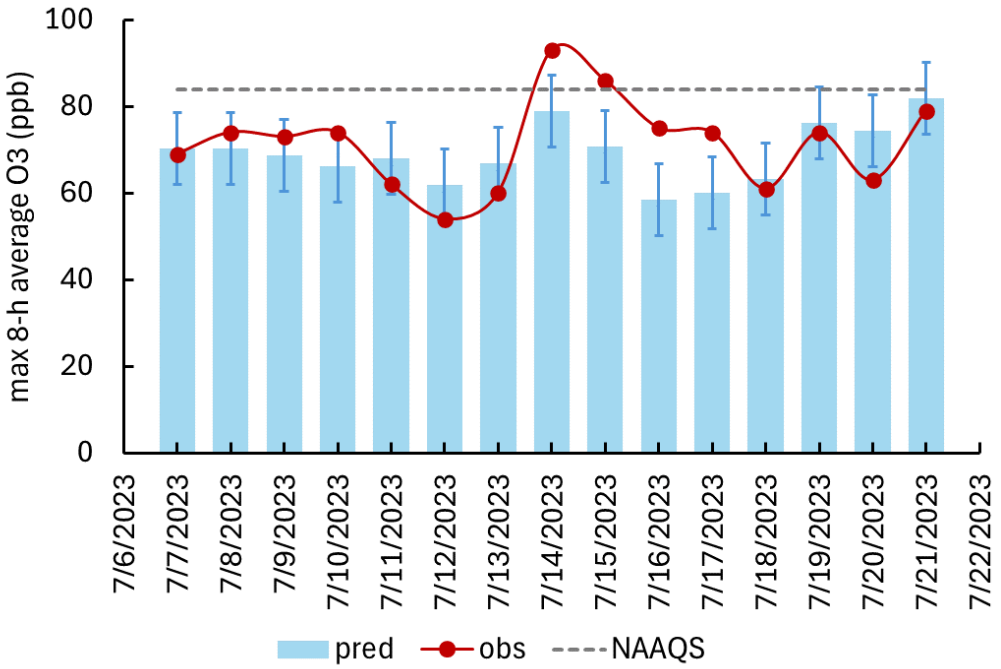

Figure 152: Observed and predicted maximum 8-hour average ozone (ppb) using Analogmod. The error bars represent the upper 99% confidence interval of mean absolute error (8.3 ppb). The dashed line indicates the 1997 NAAQS for daily maximum 8-hour average ozone.

26.3. Matching Day Enhancement

Ozone concentrations follow typical spatial patterns depending on meteorology and emissions. During days with onshore wind flow, the ozone that forms in the South Coast Air Basin is transported to the east into the Coachella Valley through the Banning Pass with dispersion and chemical reactions that occur tending to reduce ozone concentrations. As a result, the ozone in Coachella Valley is related to the ozone in the South Coast Air Basin, with Coachella Valley typically having lower ozone concentrations than the South Coast Air Basin during onshore wind flow. The typical spatial patterns can be analyzed to estimate how much ozone was contributed by the Rabbit, Reche, and Highland fires on July 14 and 15. This is helpful since ozone concentrations were generally high throughout the South Coast AQMD jurisdiction on July 14 and 15, and the analysis helps to identify how much ozone could be attributed to fires.

South Coast AQMD staff analyzed the enhancement of ozone, which is the difference between the ozone at Palm Springs – Fire Station and the background ozone, which is defined here as the average of ozone at stations west of the smoke impacts from the Rabbit, Reche, and Highland fires. For this analysis the background ozone was taken to be the average of ozone measured at the Glendora, Fontana – Arrow Highway, Mira Loma – Van Buren, Pomona, and Riverside – Rubidoux stations. For the enhancement analysis, Analogmod was used to identify the matching days for Palm Springs – Fire Station as described in section 26.1, and

then the predicted ozone was calculated at Palm Springs – Fire Station and at all of the background stations, but the matching days for Palm Springs – Fire Station were used for all stations instead of the station-specific matching days. Then the predicted ozone was used to calculate the enhancement using Eq. 2:

$$enhancement = O3(PLSP) - [O3(GLEN) + O3(FONT) + O3(MLVB) + O3(POMA) + O3(RIVR)]/5 \quad \text{Eq. 2}$$

where $O3(PLSP)$, $O3(GLEN)$, $O3(FONT)$, $O3(POMA)$, $O3(RIVR)$, and $O3(MLVB)$ are the observed or predicted ozone at Palm Springs – Fire Station, Glendora, Fontana, Pomona, Riverside – Rubidoux, and Mira Loma – Van Buren, respectively.

The performance of Analogmod for predicting the enhancement was analyzed using the same metrics as the Analogmod for concentrations described in section 26.1. The performance metrics, shown in Table 22, were comparable to the performance for the concentration predictions shown in section 26.2. The correlation coefficients and the scatter plot in Figure 153 demonstrate that the predicted enhancement is well correlated with observations and that Analogmod predictions of enhancement have low bias relative to observations.

Table 22: Statistical summary of Analogmod performance and uncertainty estimation for enhancement, at Palm Springs – Fire Station.

	2019 to 2023	**Jun, Jul, Aug from 2019 to 2023**
Spearman correlation coefficient	0.62 (p=0.00)	0.63 (p<0.01)
Pearson correlation coefficient	0.68 (p=0.00)	0.62 (p<0.01)
Root Mean Square Error (ppb)	8.0	10.2
Mean Absolute Error (MAE, ppb)	5.8	7.9

Figure 153 shows a scatter plot comparing observed and predicted enhancement for data within 45 days of July 14 in each year between 2019 – 2023. July 14 and 15 and other wildfire events are indicated on the figure. On July 14, Analogmod predicted a negative enhancement -11.6 ppb), which corresponds with lower ozone at Palm Springs than at the background stations, but higher ozone was observed at Palm Springs than at background (enhancement of +0.2 ppb). This provides evidence that another factor such as wildfire emissions contributed to greater than predicted enhancement at Palm Springs. On July 15, the predicted enhancement was -15.6 ppb but the observed enhancement was -10.6 ppb. This again provides evidence that another factor such as wildfire emissions likely contributed to the greater than predicted enhancement at Palm Springs on July 15. The July 14 observed enhancement is unusually high when compared with past days when Analogmod predicted an enhancement near -11.6 ppb, especially when considering that

many other days with high positive enhancements were influenced by wildfires as shown on Figure 153.

South Coast AQMD staff analyzed subsets of the data presented in Figure 153 to estimate how unusual the errors (observed – predicted) of enhancement were. The vertical shaded swaths in Figure 153 show the two subsets of data that were analyzed, one for July 14 and the other for July 15, where the subsets are 4 ppb wide and are centered on the predicted enhancement for each day. Figure 154 shows histograms of the errors of enhancement for the two subsets along with vertical red lines showing the errors on July 14 and 15. The histograms demonstrate that the error in the enhancement for July 14 was in the upper tail of the error distribution (percentile of the error was 83%). The interpretation is that the ozone enhancement was unusually high for the meteorology that occurred that day, and thus the ozone at Palm Springs was unusually high even given that background ozone in the basin was also high. The magnitude of the error, 11.8 ppb, also supports the clear causal relationship between the wildfire smoke and the observed ozone concentration of 93 ppb. If the wildfire had not occurred then the observed enhancement likely would have been closer to the -11.6 ppb predicted by Analogmod and the ozone concentration at Palm Springs would likely have been closer to 81.2 ppb (93 ppb – 11.8 ppb), below the level of the NAAQS ozone 8-hour 1997 standard.

For July 15 the percentile of the error was 67%. This error is not unusual compared with the historical data. However, the predicted and observed enhancement for July 15 are similar to what was predicted and observed during the Ranch 2 wildfire on August 14, 2020, when Palm Springs was impacted by wildfire smoke. This provides evidence that wildfire impacts can produce a range of enhancements, and in some cases the enhancements are of the same magnitude as the typical errors of the Analogmod model. This data is consistent with the clear causal relationship between the wildfire smoke and the ozone concentration observed on July 15. If the wildfire had not occurred then the observed enhancement likely would have been closer to the -15.6 ppb predicted by Analogmod and the ozone concentration at Palm Springs would likely have been closer to 81 ppb (86 ppb – 5 ppb), below the level of the NAAQS ozone 8-hour 1997 standard. Other evidence such as the timing of the ozone spike in the morning, discussed in section 12.1, provides strong evidence that the ozone on July 15 was affected by wildfire smoke. Additionally, the MDA8 ozone on July 15 occurred in the morning because of the wildfire smoke impacts, while typically ozone would be highest in the afternoon at Palm Springs. Analogmod may have worse performance when ozone doesn't follow the typical diurnal pattern and so it is likely that the uncertainty in the predictions is higher for July 15.

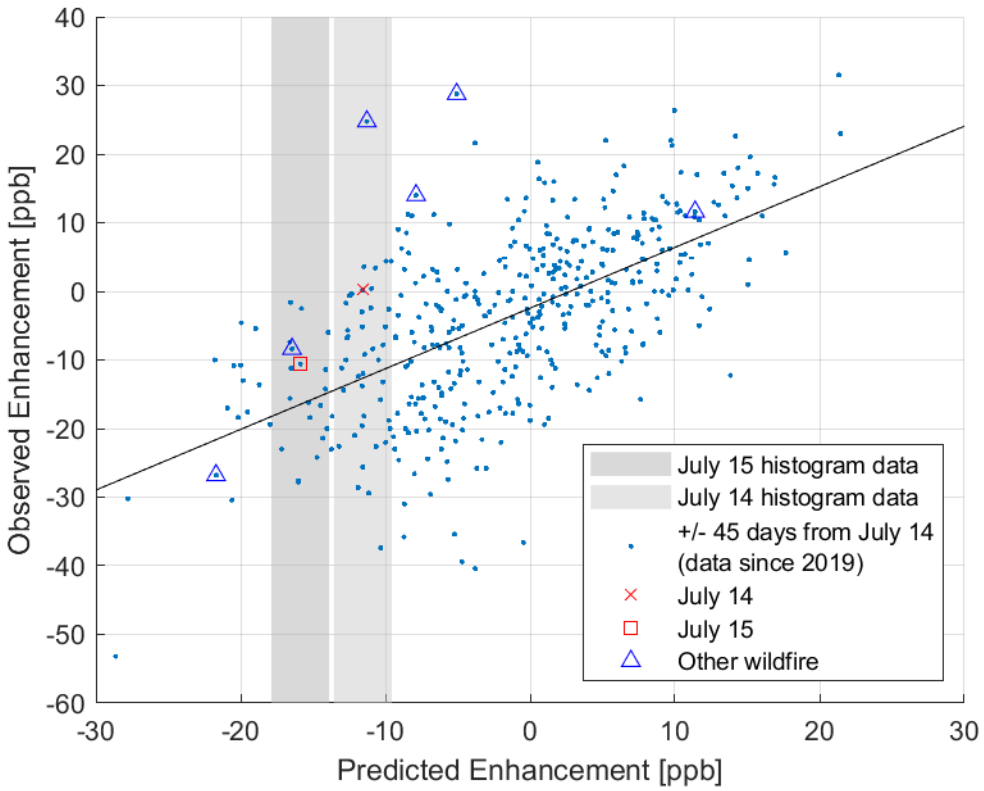

Figure 153: Scatter plot of observed vs. predicted enhancement. The background ozone is the average of Glendora, Fontana – Arrow Highway, Mira Loma – Van Buren, Pomona, and Riverside – Rubidoux. Black line is a regression line. The vertical swaths indicate the data that was used to create the histograms in Figure 111. The swaths are two subsets of data that were analyzed, one for July 14 and the other for July 15, where the subsets are 4 ppb wide and are centered on the predicted enhancement for each day.

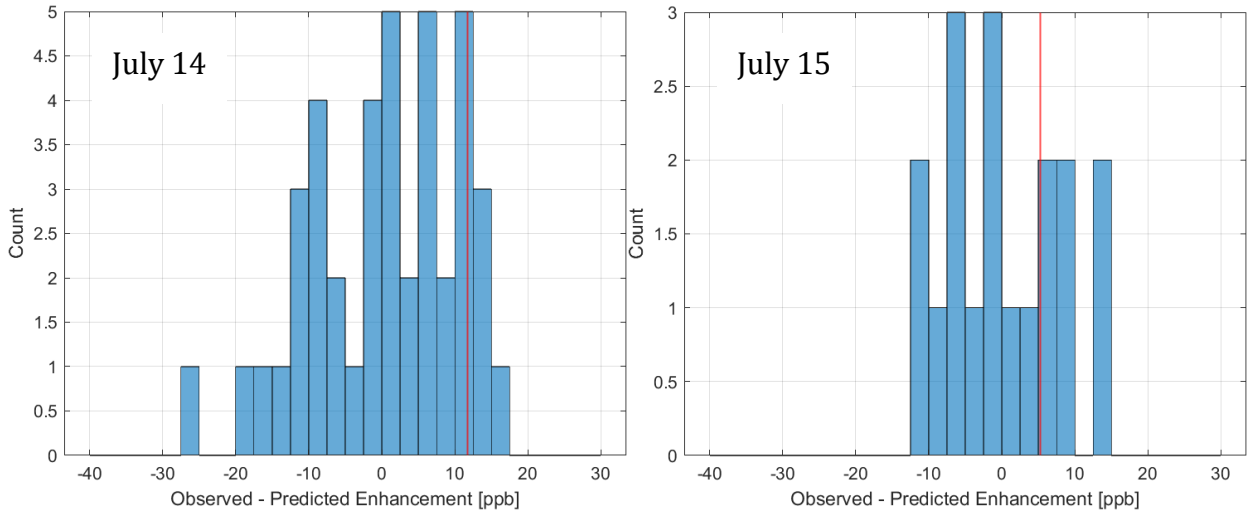

Figure 154: Histograms of model error (observed – predicted) of the enhancement for July 14, 2023 (left) and July 15, 2023 (right). The vertical red line is the model error on July 14 and 15.

27. Clear Causal Conclusion

On July 14, 2023 through July 15, 2023 wildfires occurred that generated ozone precursors resulting in elevated concentrations at the monitor locations shown in Table 2 in Section 5, and these monitored ozone concentrations were above the 97th percentile of measurements for the same season across five years if no past events are excluded and above the 99th percentile if past wildfire events are excluded from the calculation, see Section 12. Meteorological conditions were consistent with elevated ozone concentrations, but the measured ozone concentrations were even higher than anticipated. The comparisons and analyses, provided in Sections 11-26 of this demonstration support South Coast AQMD's position that the wildfire event affected air quality in such a way that there exists a clear causal relationship between the Rabbit, Reche, and Highland Wildfires and the monitored ozone exceedances shown in Table 2 in Section 5 and thus satisfies the clear causal relationship criterion of the Exceptional Event Rule.

28. Human Activity that is Unlikely To Recur or Natural Event

Based on the documentation provided in Section 8 of this report, the Rabbit, Reche, and Highland Wildfires event can be considered to be wildfires under the Exceptional Event Rule because all three were unplanned wildfires occurring primarily on wildland with unknown causes. Cal Fire lists the cause of each as under investigation. The Highland Fire occurred on predominantly wildland, since the majority of the burn area is on land classified as vacant, open space and recreation. The Rabbit Fire predominantly occurred on wildland as well, since most of the burn area is on land classified as vacant, open space and recreation with subsets of the burn area classified for industrial and transportation, communications, and utilities. The Reche Fire occurred predominantly on wildland, since most of the burn area is on land classified as vacant with a small subset of the burn area classified as single family residential. The U.S. E.P.A. generally considers the emissions of ozone from wildfires on wildland to meet the regulatory definition of a natural event according to 40 CFR 50.1(k); natural events are defined as events 'in which human activity plays little or no direct causal role.' This wildfire event occurred on wildland as shown in Section 8 and accordingly, South Coast AQMD has shown that the event is a natural event.

29. Not Reasonably Controllable or Preventable

Based on the documentation provided in Section 8 of this submittal, an unplanned ignition of unknown origin that is under investigation caused the wildfire event on wildland. The South Coast AQMD is not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually performed would have been reasonable. Therefore, emissions from this wildfire were not reasonably controllable or preventable.

30. Public Comment

Under 40 CFR §50.14(c)(3)(iv), South Coast AQMD's demonstration to justify data exclusion must include the completion and documentation of the public comment process described in 40 CFR §50.14(c)(3)(v).

The Rabbit, Reche, and Highland Wildfires Ozone Exceptional Events Demonstration Draft was posted online for public comment at https://www.aqmd.gov/home/air-quality/exceptional-events/rabbit-reche-highland-wildfires-ozone-exceptional-events-demonstration on September 12, 2024. Email announcements were sent on September 27, 2024 and October 2, 2024 to approximately 2,500 recipients who had signed up to receive emails from South Coast AQMD. The public comment period closed October 27, 2024, and no comments were received.

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32. Appendix Introduction

Sections 33 through 40 provide supporting evidence for the exceptional events demonstration and comprise the appendix of this document.

33. Initial Notification and AMP360 Report Showing Request Exclusion Data Qualifiers Appendix

Figure 155 shows the Initial Notification for Exceptional Events submitted December 20, 2023, which U.S. EPA requires the State to submit under the Exceptional Events Rule.

EE Initial Notification Summary Information

Submitting Agency: South Coast Air Quality Management District
Agency Contact: Scott Epstein, Program Supervisor, Air Quality Assessment, sepstein@aqmd.gov
Date Submitted: December 20, 2023
Applicable NAAQS: Ozone 8-Hour 1997
Affected Regulatory Decision[1]: Attainment Designation for Ozone 8-Hour 1997 Standard in Riverside County (Coachella Valley), CA
(for classification decisions, specify level of the classification with/without EE concurrence)
Area Name/Designation Status: Riverside County (Coachella Valley), CA/Nonattainment
Design Value Period (list three year period): 2021-2023
(where there are multiple relevant design value periods, summarize separately)

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)
6/17/2021	wildfire	RT	060655001/POC 1	Palm Springs	0.090 ppm	Arizona Telegraph/Mescal Wildfires
6/18/2021	wildfire	RT	060655001/POC 1	Palm Springs	0.092 ppm	Arizona Telegraph/Mescal Wildfires
7/14/2023	wildfire	RT	060655001/POC 1	Palm Springs	0.093 ppm	California Rabbit/Reche/Highland Wildfires
7/15/2023	wildfire	RT	060655001/POC 1	Palm Springs	0.086 ppm	California Rabbit/Reche/Highland Wildfires

B) Violating Sites Information
(listing of all violating sites[3] in the planning area, regardless of operating agency, and regardless of whether or not they are affected by EEs)

Site (AQS ID)	2021-2023 Design Value (without EPA concurrence on all events listed in table A above)	2021-2023 Design Value (with EPA concurrence on all events listed in table A above)
Palm Springs (060655001)	0.09 ppm	0.08 ppm

[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"

[3] Note if violating monitor is a near-road monitor

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)

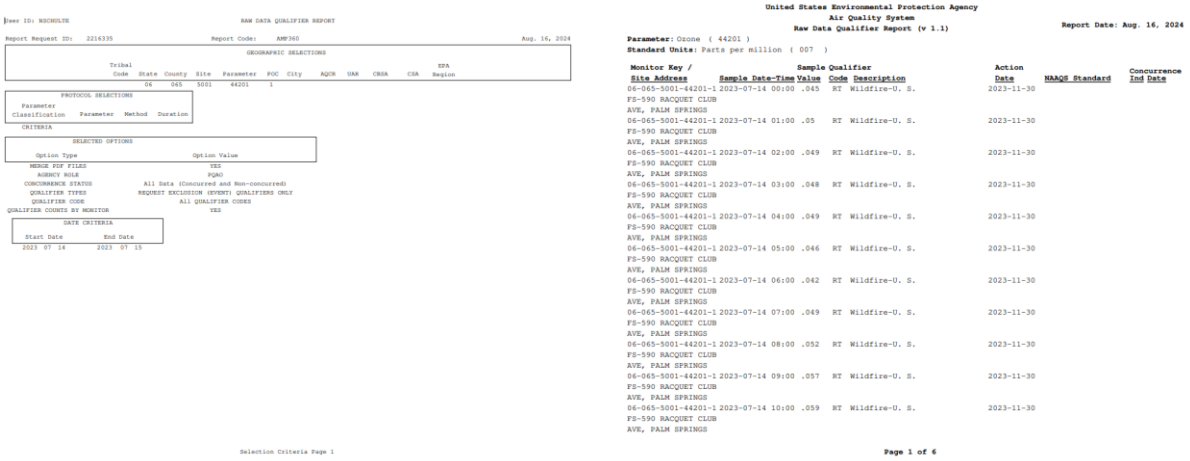
2021-2023 Maximum Design Value Site (AQS ID) **without EPA concurrence** on any of the events listed in table A above	Design Value 0.09 ppm	Area maximum site Palm Springs (060655001)	Comment
2021-2023 Maximum Design Value Site (AQS ID)) **with EPA concurrence** on all events listed in table A above	Design Value 0.08 ppm	Area maximum site Palm Springs (060655001)	Comment Design value is 0.08 ppm with EPA concurrence on only the Arizona Telegraph/Mescal Wildfire event. If data from the Telegraph/Mescal Wildfire event is not removed, the 2023 4th highest 8-hr daily max ozone is 0.083 ppm with EPA concurrence on the California Rabbit/Reche/Highland Wildfire event and so the California Rabbit/Reche/Highland Wildfire event is regulatory significant.

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

Indio (060652002/POC 1)

Figure 155: Initial Notification for Exceptional Events submitted December 20, 2023.

Figure 156 shows screenshots from an AMP360 report from EPA air quality system (AQS), showing that sample data on July 14 and 15, 2023 at Palm Springs – Fire Station has been flagged with RT qualifiers to request exclusion of the data, as required by the Exceptional Events Rule.



User ID: NSCHULTE RAW DATA QUALIFIER REPORT

Report Request ID: 2216335 Report Code: AMP360 Aug. 16, 2024

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	06	065	5001	44201	1						

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA			

SELECTED OPTIONS

Option Type	Option Value
MERGE PDF FILES	YES
AGENCY ROLE	PQAO
CONCURRENCE STATUS	All Data (Concurred and Non-concurred)
QUALIFIER TYPES	REQUEST EXCLUSION (EVENT) QUALIFIERS ONLY
QUALIFIER CODE	All QUALIFIER CODES
QUALIFIER COUNTS BY MONITOR	YES

DATE CRITERIA

Start Date	End Date
2023 07 14	2023 07 15

Selection Criteria Page 1

United States Environmental Protection Agency
Air Quality System
Raw Data Qualifier Report (v 1.1)

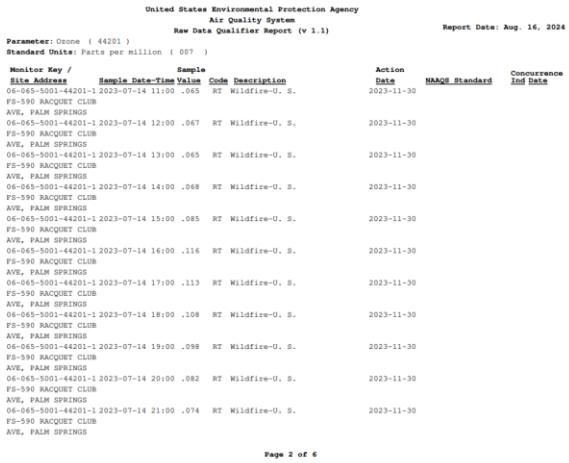
Report Date: Aug. 16, 2024

Parameter: Ozone (44201)
Standard Units: Parts per million (007)

Monitor Key / Site Address	Sample Date-Time	Value	Qualifier Code	Qualifier Description	Action Date	NAAQS Standard	Concurrence Ind	Concurrence Date
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 00:00	.045	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 01:00	.05	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 02:00	.049	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 03:00	.048	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 04:00	.049	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 05:00	.046	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 06:00	.042	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 07:00	.049	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 08:00	.052	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 09:00	.057	RT	Wildfire-U. S.	2023-11-30			
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 10:00	.059	RT	Wildfire-U. S.	2023-11-30			

Page 1 of 6

Figure 156: AQS AMP360 report screenshots showing that sample data on July 14 and 15 2023 at Palm Springs – Fire Station has been flagged with RT qualifier codes to request exclusion of the data.



United States Environmental Protection Agency
Air Quality System
Raw Data Qualifier Report (v 1.1)
Report Date: Aug. 16, 2024

Parameter: Ozone (44201)
Standard Units: Parts per million (007)

Monitor Key / Site Address	Sample Date-Time	Value	Code	Description	Action Date	NAAQS Standard	Concurrence Ind Date
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 11:00	.065	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 12:00	.067	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 13:00	.065	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 14:00	.068	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 15:00	.085	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 16:00	.116	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 17:00	.113	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 18:00	.108	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 19:00	.098	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 20:00	.082	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 21:00	.074	RT	Wildfire-U. S.	2023-11-30		

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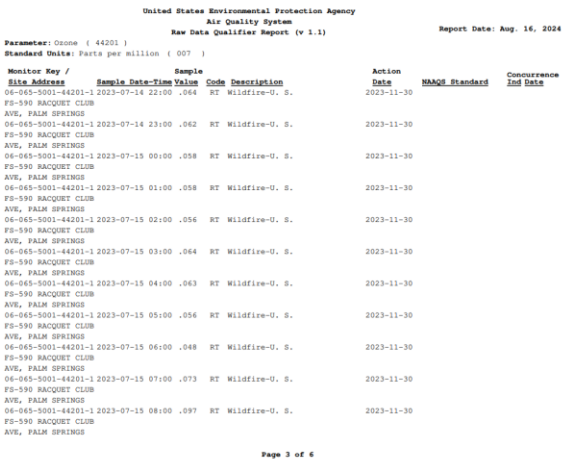

United States Environmental Protection Agency
Air Quality System
Raw Data Qualifier Report (v 1.1)
Report Date: Aug. 16, 2024

Parameter: Ozone (44201)
Standard Units: Parts per million (007)

Monitor Key / Site Address	Sample Date-Time	Value	Code	Description	Action Date	NAAQS Standard	Concurrence Ind Date
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 22:00	.064	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-14 23:00	.062	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 00:00	.058	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 01:00	.058	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 02:00	.056	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 03:00	.064	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 04:00	.063	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 05:00	.056	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 06:00	.048	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 07:00	.073	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 08:00	.097	RT	Wildfire-U. S.	2023-11-30		

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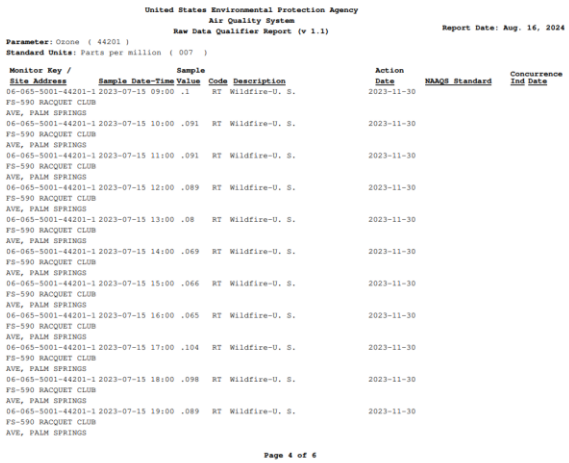

United States Environmental Protection Agency
Air Quality System
Raw Data Qualifier Report (v 1.1)
Report Date: Aug. 16, 2024

Parameter: Ozone (44201)
Standard Units: Parts per million (007)

Monitor Key / Site Address	Sample Date-Time	Value	Code	Description	Action Date	NAAQS Standard	Concurrence Ind Date
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 09:00	.1	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 10:00	.091	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 11:00	.091	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 12:00	.089	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 13:00	.08	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 14:00	.069	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 15:00	.066	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 16:00	.065	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 17:00	.104	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 18:00	.098	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 19:00	.089	RT	Wildfire-U. S.	2023-11-30		

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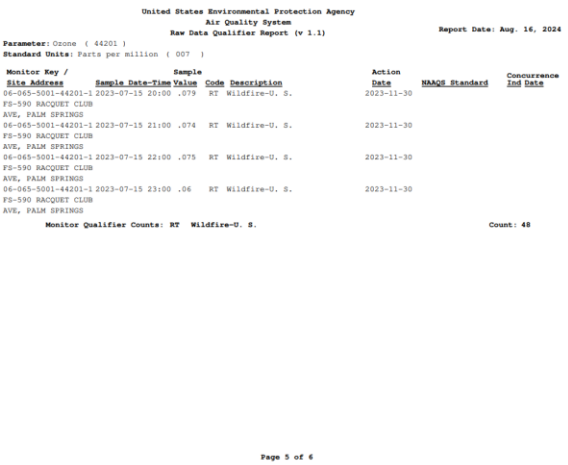

United States Environmental Protection Agency
Air Quality System
Raw Data Qualifier Report (v 1.1)
Report Date: Aug. 16, 2024

Parameter: Ozone (44201)
Standard Units: Parts per million (007)

Monitor Key / Site Address	Sample Date-Time	Value	Code	Description	Action Date	NAAQS Standard	Concurrence Ind Date
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 20:00	.079	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 21:00	.074	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 22:00	.075	RT	Wildfire-U. S.	2023-11-30		
06-065-5001-44201-1 FS-590 RACQUET CLUB AVE, PALM SPRINGS	2023-07-15 23:00	.06	RT	Wildfire-U. S.	2023-11-30		

Monitor Qualifier Counts: RT Wildfire-U. S. **Count: 48**

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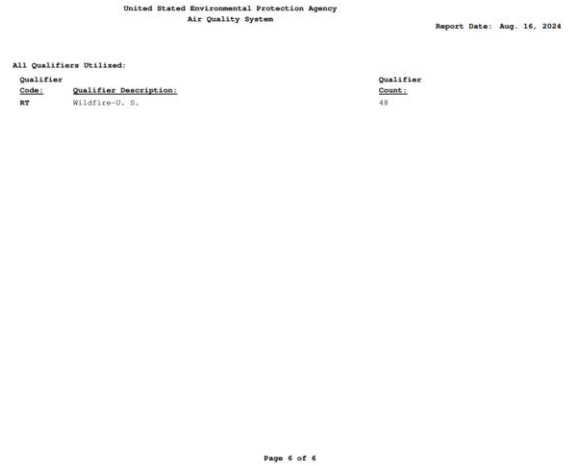

United Stated Environmental Protection Agency
Air Quality System
Report Date: Aug. 16, 2024

All Qualifiers Utilized:

Qualifier Code:	Qualifier Description:	Qualifier Count:
RT	Wildfire-U. S.	48

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Figure 156 continued: AQS AMP360 report screenshots showing that sample data on July 14 and 15 2023 at Palm Springs – Fire Station has been flagged with RT qualifier codes to request exclusion of the data.

34. Wildfire Description Appendix

34.1. Highland Fire

Cal Fire lists the cause of the Highland Fire as under investigation, see Figure 157. The Riverside County Fire Incident Update Sheet for the Highland Fire does not list a cause for the fire, see *Figure 158.*

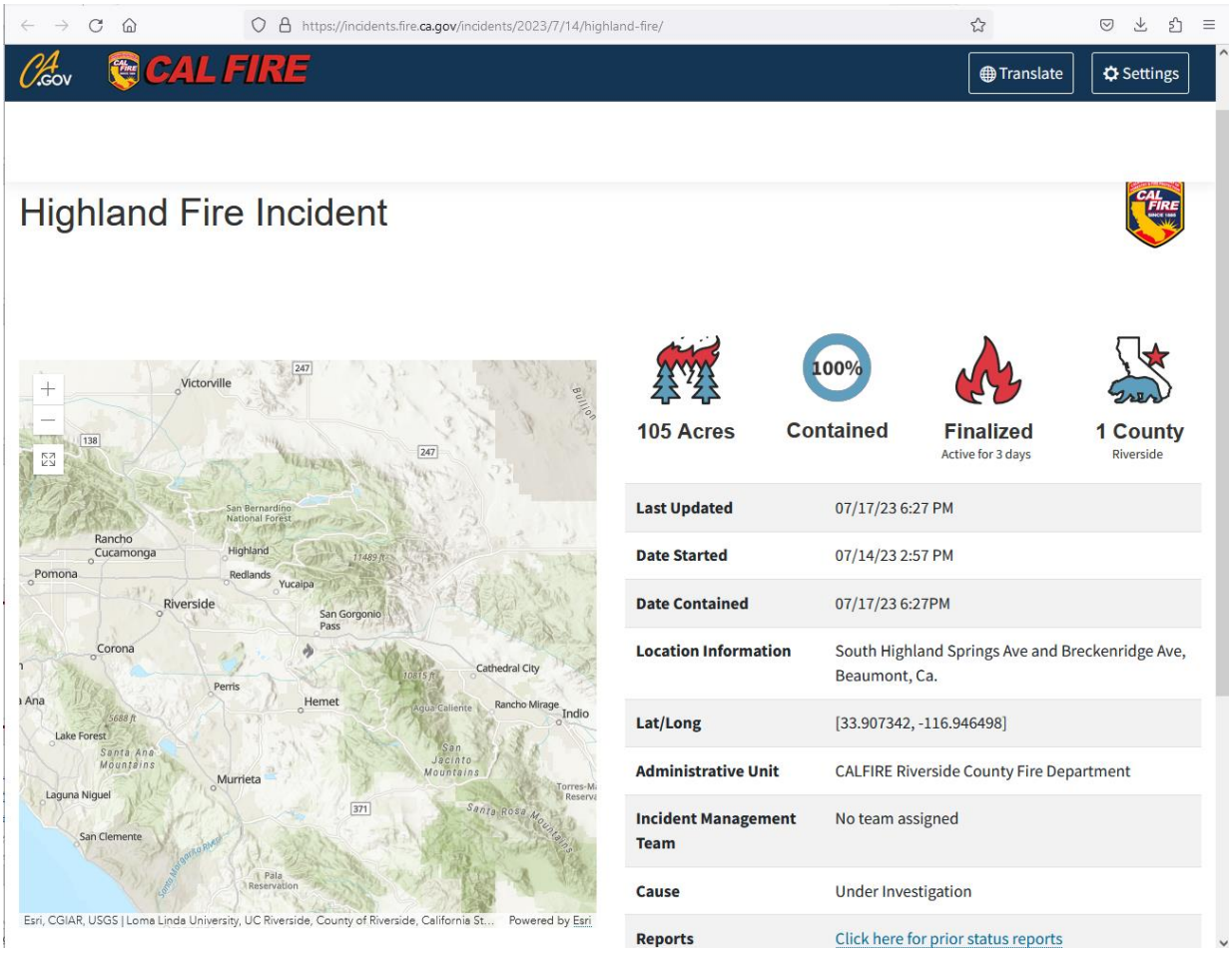

Figure 157: Cal Fire Incident Summary for the Highland Fire Incident.

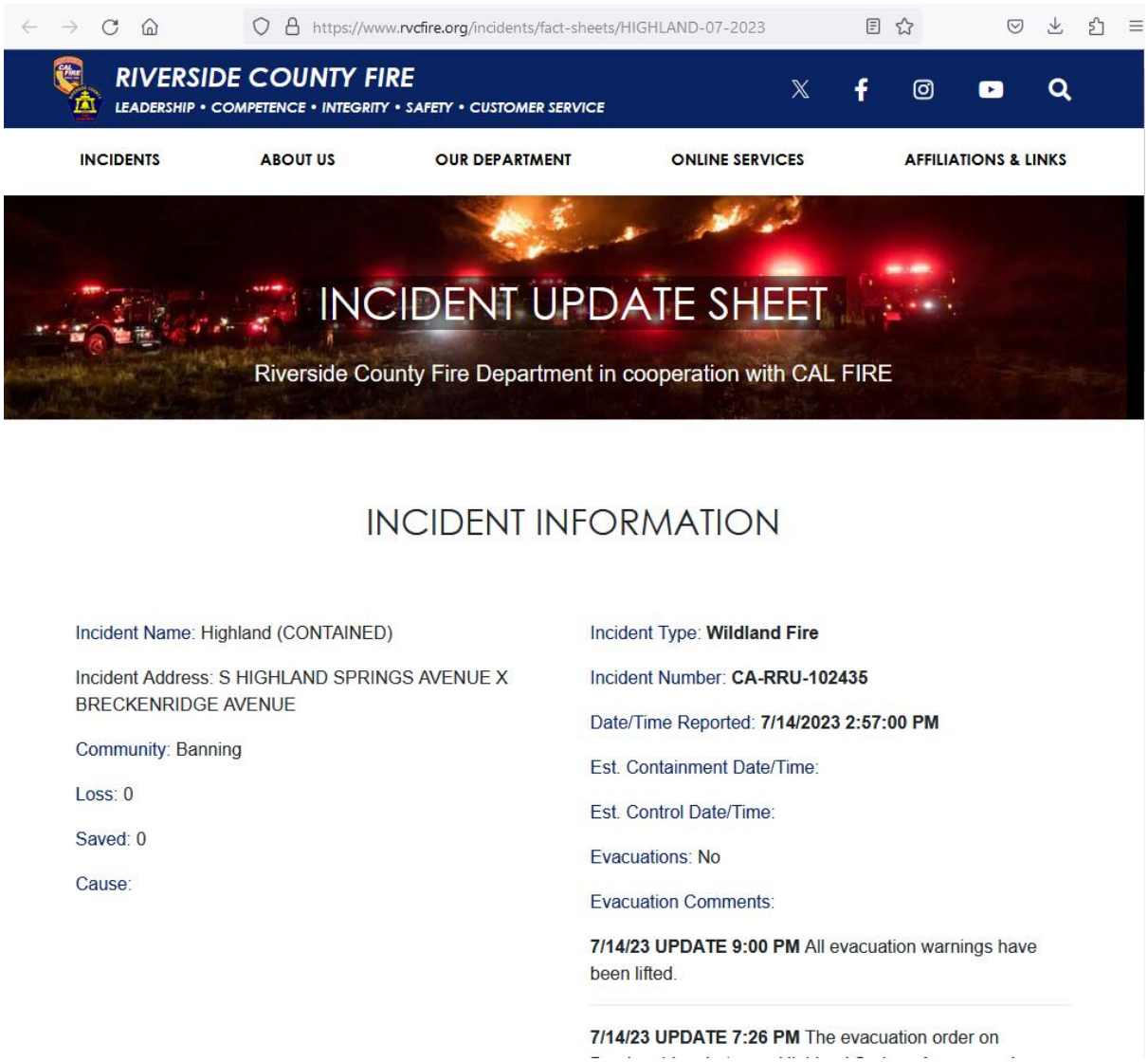

Figure 158: Riverside County Fire Incident Update Sheet for the Highland Fire.

34.2. Rabbit Fire

Cal Fire lists the cause of the Rabbit Fire as under investigation, see Figure 159.

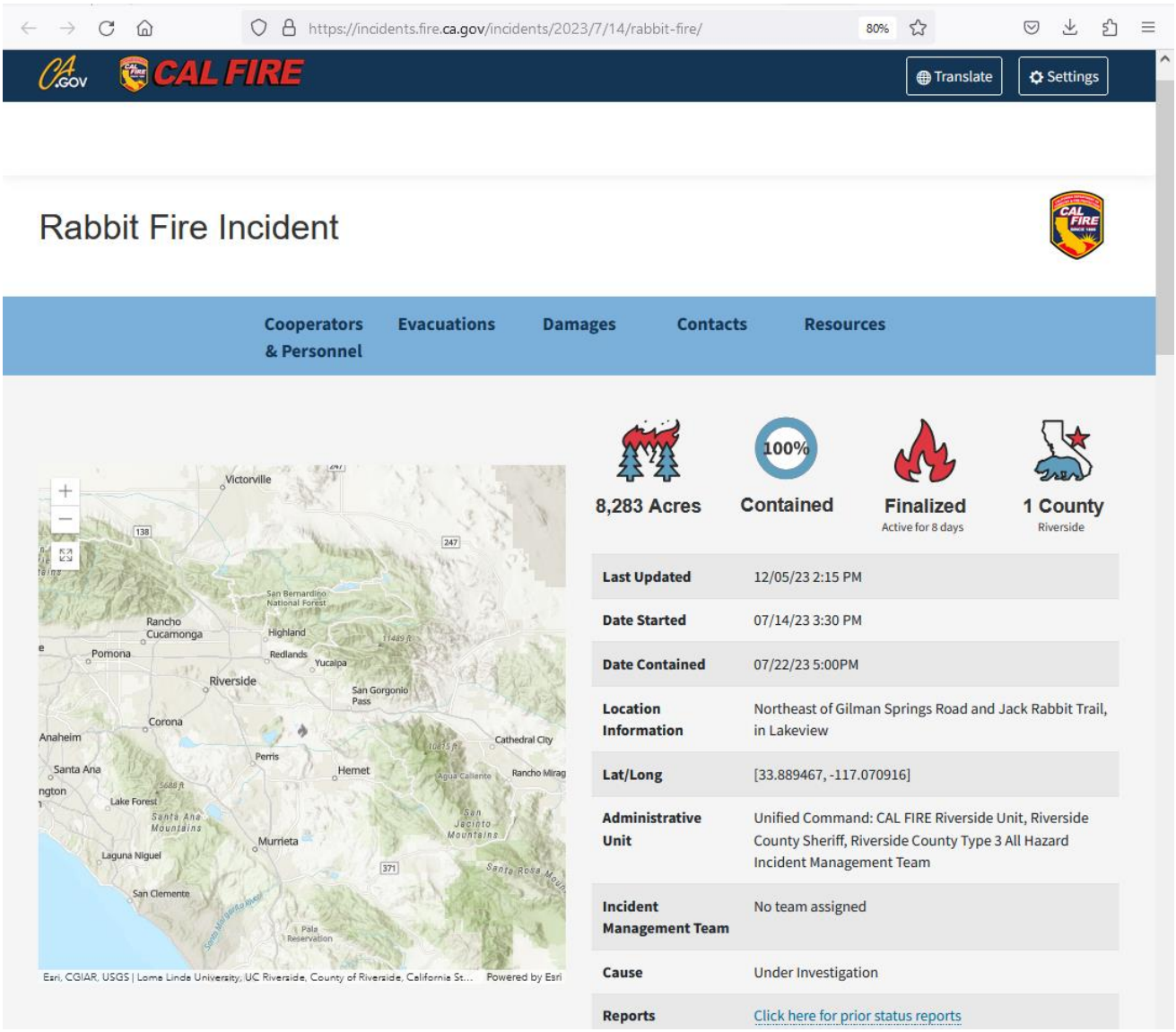

Figure 159: Cal Fire Incident Summary for the Rabbit Fire Incident.

34.3. Reche Fire

Cal Fire lists the cause of the Reche Fire as under investigation, see Figure 160.

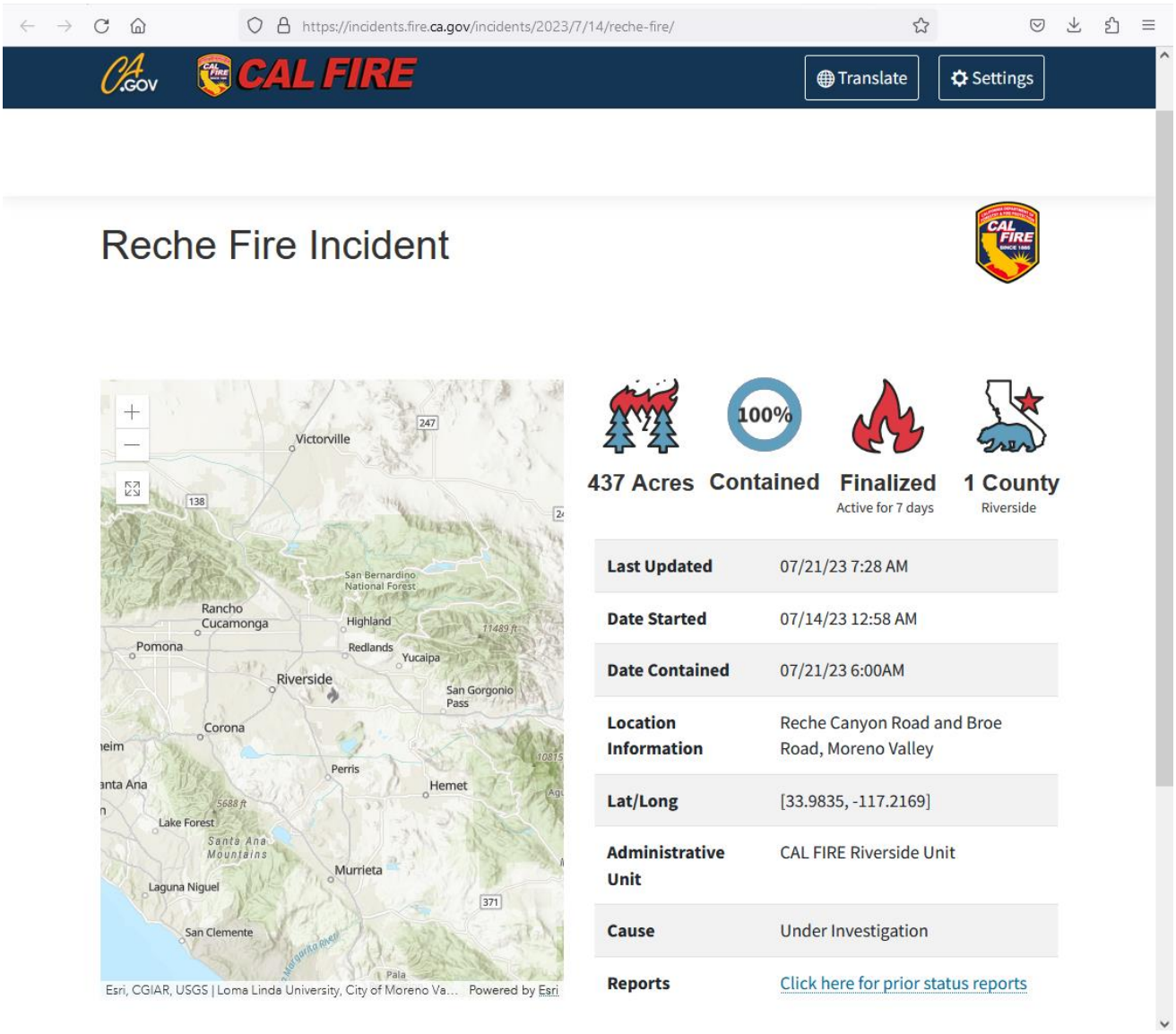

Figure 160: Cal Fire Incident Summary for the Reche Fire Incident.

35. Public Notification during Event Appendix

35.1. Forecasts

The screenshots in Figure 161 through Figure 164 show the forecast issued by South Coast AQMD for July 14-15, 2023. When these forecasts were issued, they were posted on the South Coast AQMD Air Quality Forecasts page and available on the South Coast AQMD Mobile App.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
DAILY AIR QUALITY FORECAST
VALID: FRI., JUL. 14, 2023

SRA NUMBER	AREA	1-HR OZONE PPB	8-HR OZONE PPB	8-HR CO PPM	24-HR PM10 UG/M3	24-HR PM2.5 UG/M3	1-HR NO2 PPB	MAX AQI
Los Angeles County: South Coast Air Basin								
1	Central LA Co	61	55	0.5	26	17	34	61
2	NW Coastal LA	52	45	0.4	25	13	15	53
3	SW Coastal LA	43	36	0.2	25	11	14	46
4	S Coastal LA	52	47	0.3	23	10	27	44
5	Southeast LA Co	62	55	0.4	25	12	28	51
6	W San Fernando Vly	89	79	0.4	25	14	24	129
7	E San Fernando Vly	89	76	0.4	27	17	28	118
8	W San Gabriel Vly	76	66	0.4	29	17	23	87
9	E San Gabriel Vly	98	82	0.5	31	14	34	140
10	Pomona Walnut Vly	95	81	0.6	35	13	41	136
11	S San Gabriel Vly	65	60	0.4	28	14	24	67
12	S Central LA Co	57	51	0.4	25	13	19	53
13	Santa Clarita Vly	112	96	0.3	27	12	27	177
15	San Gabriel Mts	108	92	0.5	32	13	33	166
Los Angeles County: Mojave Desert Air Basin								
14	Antelope Vly	76	67	0.3	32	7	26	90
Orange County: South Coast Air Basin								
16	N Orange Co	62	55	0.2	37	11	15	51
17	Central Orange Co	60	52	0.3	18	10	14	48
18	N Coastal Orange Co	39	38	0.3	25	7	24	35
19	Saddleback Vly	57	48	0.2	37	13	25	53
20	Central Coastal	37	36	0.3	31	9	24	38
21	Capistrano Vly	46	43	0.3	36	10	27	42
Riverside County: South Coast Air Basin								
22	Norco/Corona	96	81	0.4	52	13	30	136
23	Metro Riverside Co	109	92	0.5	57	15	35	166
24	Perris Vly	106	88	0.4	44	12	33	156
25	Lake Elsinore	104	91	0.4	37	7	27	164

SRA NUMBER	AREA	1-HR OZONE PPB	8-HR OZONE PPB	8-HR CO PPM	24-HR PM10 UG/M3	24-HR PM2.5 UG/M3	1-HR NO2 PPB	MAX AQI
26	Temecula Vly	76	68	0.3	40	10	24	93
27	Anza Vly	88	80	0.2	45	10	19	133
28	Hemet/San Jacinto	96	84	0.4	39	11	32	147
29	Banning	117	97	0.3	34	11	29	179
	Riverside County: Salton Sea Air Basin							
30	Coachella Vly	109	84	0.2	53	22	13	147
	Riverside County: Mojave Desert Air Basin							
31	E Riverside Co	78	65	0.2	30	14	14	84
	San Bernardino County: South Coast Air Basin							
32	NW San Bernardino Vly	104	89	0.5	32	15	35	159
33	SW San Bernardino Vly	98	83	0.5	50	15	38	143
34	C San Bernardino Vly	113	98	0.5	37	14	41	182
35	E San Bernardino Vly	113	99	0.5	44	12	34	185
36	W San Bernardino Mtns	116	103	0.4	35	14	38	195
37	C San Bernardino Mtns	119	106	0.4	37	9	39	201
38	Big Bear Lake	91	82	0.4	36	7	33	140
	San Bernardino County: Mojave Desert Air Basin							
39	Phelan	104	88	0.4	34	7	40	156
40	Hesperia	109	95	0.4	35	10	41	174
41	Trona	73	68	0.2	32	8	15	93
42	Victorville	94	83	0.4	35	10	42	143
43	Yucca Vly	93	75	0.2	29	13	21	115
44	Barstow	70	66	0.3	35	9	38	87
45	Twentynine Palms	75	65	0.2	28	15	20	84

AIR QUALITY FORECAST

ON FRI., JUL. 14, 2023, THE SOUTH COAST AIR QUALITY
MANAGEMENT DISTRICT PREDICTS THE AIR QUALITY WILL BE ...

MODERATE in the following area(s):

Antelope Valley	AQI:	90	Ozone
Coastal Area	AQI:	53	PM2.5
Inland Orange County	AQI:	53	PM2.5
Metropolitan Area	AQI:	61	PM2.5
Northern Mojave Desert	AQI:	93	Ozone

UNHEALTHY FOR SENSITIVE GROUPS in the following area(s):

Big Bear Lake	AQI:	140	Ozone
Central Mojave Desert	AQI:	115	Ozone
Coachella Valley/Low Desert	AQI:	147	Ozone
San Gabriel Valley	AQI:	140	Ozone
Temecula/Anza Area	AQI:	133	Ozone

UNHEALTHY in the following area(s):

Banning Pass Area	AQI:	179	Ozone
Hemet/Elsinore Area	AQI:	164	Ozone
Riverside Valley	AQI:	166	Ozone
San Bernardino Valley	AQI:	185	Ozone
San Fernando/Santa Clarita Valleys	AQI:	177	Ozone
San Gabriel Mountains	AQI:	166	Ozone
Victor Valley	AQI:	174	Ozone

VERY UNHEALTHY in the following area(s):

San Bernardino Mountains	AQI:	201	Ozone

WEATHER FORECAST

Friday will be about 2 degrees warmer than Thursday in coastal areas and valleys, while the Inland Empire will be about 6 degrees warmer. West winds will mostly be under 10 mph, except afternoon gusts can reach 25 mph. Since humidities will be extremely low, this combination will result in almost critical fire danger.

Inversion Base: 1500 FT | Breaking Temperature: 86 DEG F
Inversion Breaking: YES | Maximum Mixing HEIGHT: 1882 FT

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AIR QUALITY FORECAST RULE IMPLICATIONS
--------------------------------------------------------------------------

Area 40 - South Coast Air Basin:    NO-BURN
Area 53 - Mojave Desert Air Basin:  BURN
Area 55 - Salton Sea Air Basin:     MARGINAL-BURN
     Burning is prohibited in source/receptor area 30
Beach Fire Ring Wood Burning:  Allowed in All Areas

Residential Wood Burning:  Allowed in All Areas

Coachella Valley Rule 403.1 Wind Forecast:  Winds Above 25 MPH
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ATTENTION ALL SCHOOLS AND INDUSTRIES

THIS IS THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
NO AIR POLLUTION OR HEALTH ADVISIORY EPISODES ARE PREDICTED
FOR FRIDAY, JULY 14, 2023 IN THE SOUTH COAST AIR BASIN.
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Figure 161: Forecast issued by South Coast AQMD for July 14, 2023.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

AIR QUALITY FORECAST

Forecast Valid Friday, July 14, 2023

Issue Date: Thursday, July 13, 2023

Area	Forecast Area	AQI	AQI Description	Pollutant	Cleanest Time of Day *
1	Central Los Angeles County	61	MODERATE	PM2.5	Similar all day
2	Northwest Coastal Los Angeles Co.	53	MODERATE	PM2.5	Similar all day
3	Southwest Los Angeles County Co.	46	GOOD	PM2.5	Similar all day
4	South Coastal Los Angeles Co.	44	GOOD	Ozone	Similar all day
5	Southeast Los Angeles Co.	51	MODERATE	Ozone	Similar all day
6	West San Fernando Valley	129	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 12 PM
7	East San Fernando Valley	118	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 11 AM
8	West San Gabriel Valley	87	MODERATE	Ozone	Similar all day
9	East San Gabriel Valley	140	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 1 PM
10	Pomona/Walnut Valley	136	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 1 PM
11	South San Gabriel Valley	67	MODERATE	Ozone	Similar all day
12	South Central Los Angeles Co.	53	MODERATE	PM2.5	Similar all day
13	Santa Clarita Valley	177	UNHEALTHY	Ozone	Cleanest from 6 AM to 11 AM
14	Antelope Valley	90	MODERATE	Ozone	Similar all day
15	San Gabriel Mountains	166	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
16	North Orange County	51	MODERATE	Ozone	Similar all day
17	Central Orange County	48	GOOD	Ozone	Similar all day
18	North Coastal Orange County	35	GOOD	Ozone	Similar all day
19	Saddleback Valley	53	MODERATE	PM2.5	Similar all day
20	Central Coastal Orange County	38	GOOD	PM2.5	Similar all day
21	Capistrano Valley	42	GOOD	PM2.5	Similar all day
22	Corona/Norco Area	136	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 12 PM
23	Metropolitan Riverside County	166	UNHEALTHY	Ozone	Cleanest from 6 AM to 1 PM
24	Perris Valley	156	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
25	Lake Elsinore Area	164	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
26	Temecula Valley	93	MODERATE	Ozone	Similar all day
27	Anza Area	133	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 1 PM
28	Hemet/San Jacinto Valley	147	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 12 PM
29	Banning/San Gorgonio Pass	179	UNHEALTHY	Ozone	Cleanest from 6 AM to 1 PM
30	Coachella Valley	147	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 11 AM
31	East Riverside County	84	MODERATE	Ozone	Similar all day
32	Northwest San Bernardino Valley	159	UNHEALTHY	Ozone	Cleanest from 6 AM to 1 PM
33	Southwest San Bernardino Valley	143	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 1 PM
34	Central San Bernardino Valley	182	UNHEALTHY	Ozone	Cleanest from 6 AM to 1 PM
35	East San Bernardino Valley	185	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
36	West San Bernardino Mountains	195	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
37	Central San Bernardino Mountains	201	VERY UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
38	East San Bernardino Mountains	140	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 1 PM
39	Phelan	156	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
40	Hesperia	174	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
41	Trona	93	MODERATE	Ozone	Similar all day
42	Victorville	143	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 12 PM
43	Yucca Valley	115	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 4 PM
44	Barstow	87	MODERATE	Ozone	Similar all day
45	Twentynine Palms	84	MODERATE	Ozone	Similar all day

* The **Cleanest Time of the Day** is based on forecasts of below-average AQI for PM2.5 and Ozone. These forecasts do not include PM10. They may differ from the actual AQI and users should also check the current AQI measurements at http://www.aqmd.gov/aqimap to plan outdoor activities.

What To Do When Air Pollution Reaches Unhealthy Levels

In areas with **UNHEALTHY FOR SENSITIVE GROUPS** air quality (AQI of 101 to 150), sensitive or susceptible persons, including children, older adults and those with heart or lung disease, should minimize outdoor activity.

In areas with **UNHEALTHY** air quality (AQI of 151 to 200) or an **Ozone HEALTH ADVISORY Alert** (AQI of 132 to 200 for 1-hour ozone), everyone should discontinue prolonged, vigorous outdoor exercise lasting longer than one hour. Examples of the kinds of outdoor activities that should be avoided are calisthenics, basketball, running, soccer, football, tennis, swimming laps, and water polo. Susceptible persons, such as those with heart or lung disease, should avoid outdoor activity entirely.

In areas with **VERY UNHEALTHY** air quality (AQI of 201 or above) or an **Ozone STAGE-1 Alert** (AQI of 201 or above for 1-hour ozone), everyone should discontinue all vigorous outdoor activities regardless of duration.

Detailed Air Quality Forecasts Including Wildland & Agricultural Burn Forecasts: http://www.aqmd.gov/forecast

Daily Air Quality Forecasts and Advisories by Email -- Subscribe or Modify Settings at: http://www.airalerts.org

AQMD Web Site for Current AQMD Air Quality Measurements, Forecasts and Advisories: http://www.aqmd.gov/
or by **Telephone** with our Interactive Voice Response System: **1-800-CUT-SMOG** (1-800-288-7664)

Contact AQMD: 1-800-CUT-SMOG or (909) 396-2000 **Forecast Area Map:** http://www.aqmd.gov/ForecastAreas

Figure 162: Cleanest time of day forecast issued by South Coast AQMD for July 14, 2023.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
DAILY AIR QUALITY FORECAST
VALID: SAT., JUL. 15, 2023

SRA NUMBER	AREA	1-HR OZONE PPB	8-HR OZONE PPB	8-HR CO PPM	24-HR PM10 UG/M3	24-HR PM2.5 UG/M3	1-HR NO2 PPB	MAX AQI
Los Angeles County: South Coast Air Basin								
1	Central LA Co	85	69	0.6	28	19	30	97
2	NW Coastal LA	56	51	0.3	29	12	19	50
3	SW Coastal LA	41	38	0.2	28	10	15	42
4	S Coastal LA	58	51	0.2	29	10	27	47
5	Southeast LA Co	72	63	0.5	29	13	26	77
6	W San Fernando Vly	96	87	0.4	29	16	22	154
7	E San Fernando Vly	102	87	0.5	30	20	27	154
8	W San Gabriel Vly	102	85	0.4	31	21	24	150
9	E San Gabriel Vly	117	103	0.5	29	16	32	195
10	Pomona Walnut Vly	124	106	0.6	38	15	37	201
11	S San Gabriel Vly	85	73	0.5	31	15	24	108
12	S Central LA Co	72	60	0.3	28	13	18	67
13	Santa Clarita Vly	106	100	0.4	32	15	21	187
15	San Gabriel Mts	108	98	0.4	37	16	28	182
Los Angeles County: Mojave Desert Air Basin								
14	Antelope Vly	86	70	0.4	40	8	16	100
Orange County: South Coast Air Basin								
16	N Orange Co	74	62	0.2	43	12	14	74
17	Central Orange Co	63	54	0.3	29	11	13	50
18	N Coastal Orange Co	45	43	0.3	30	8	23	40
19	Saddleback Vly	67	58	0.3	43	15	18	61
20	Central Coastal	44	40	0.3	31	9	18	38
21	Capistrano Vly	46	42	0.3	36	10	17	42
Riverside County: South Coast Air Basin								
22	Norco/Corona	105	95	0.4	57	17	23	174
23	Metro Riverside Co	114	109	0.5	64	19	31	204
24	Perris Vly	100	92	0.4	44	18	32	166
25	Lake Elsinore	107	102	0.4	34	9	17	192

26	Temecula Vly	83	72	0.3	43	13	17	105
27	Anza Vly	75	80	0.2	49	10	15	133
28	Hemet/San Jacinto	89	84	0.4	38	16	33	147
29	Banning	103	82	0.3	31	12	33	140
	Riverside County: Salton Sea Air Basin							
30	Coachella Vly	84	68	0.2	60	22	14	93
	Riverside County: Mojave Desert Air Basin							
31	E Riverside Co	45	44	0.2	37	9	14	41
	San Bernardino County: South Coast Air Basin							
32	NW San Bernardino Vly	116	106	0.5	32	19	32	201
33	SW San Bernardino Vly	111	99	0.5	56	18	33	185
34	C San Bernardino Vly	113	105	0.5	37	19	36	200
35	E San Bernardino Vly	114	108	0.5	44	15	33	203
36	W San Bernardino Mtns	105	97	0.4	35	14	33	179
37	C San Bernardino Mtns	117	102	0.4	36	11	34	192
38	Big Bear Lake	87	82	0.4	36	8	33	140
	San Bernardino County: Mojave Desert Air Basin							
39	Phelan	107	96	0.4	37	8	31	177
40	Hesperia	103	91	0.4	36	12	34	164
41	Trona	71	63	0.2	33	8	14	77
42	Victorville	93	84	0.4	40	12	32	147
43	Yucca Vly	86	71	0.2	35	12	23	101
44	Barstow	78	66	0.3	45	13	41	87
45	Twentynine Palms	67	64	0.2	36	11	21	80

SRA NUMBER	AREA	1-HR OZONE PPB	8-HR OZONE PPB	8-HR CO PPM	24-HR PM10 UG/M3	24-HR PM2.5 UG/M3	1-HR NO2 PPB	MAX AQI

AIR QUALITY FORECAST

ON SAT., JUL. 15, 2023, THE SOUTH COAST AIR QUALITY
MANAGEMENT DISTRICT PREDICTS THE AIR QUALITY WILL BE ...

GOOD in the following area(s):

Coastal Area	AQI:	50	PM2.5

MODERATE in the following area(s):

Antelope Valley	AQI:	100	Ozone
Coachella Valley/Low Desert	AQI:	93	Ozone
Inland Orange County	AQI:	61	Ozone
Metropolitan Area	AQI:	97	Ozone
Northern Mojave Desert	AQI:	87	Ozone

UNHEALTHY FOR SENSITIVE GROUPS in the following area(s):

Banning Pass Area	AQI:	140	Ozone
Big Bear Lake	AQI:	140	Ozone
Central Mojave Desert	AQI:	101	Ozone
Temecula/Anza Area	AQI:	133	Ozone

UNHEALTHY in the following area(s):

Hemet/Elsinore Area	AQI:	192	Ozone
San Bernardino Mountains	AQI:	192	Ozone
San Fernando/Santa Clarita Valleys	AQI:	187	Ozone
San Gabriel Mountains	AQI:	182	Ozone
Victor Valley	AQI:	177	Ozone

VERY UNHEALTHY in the following area(s):

Riverside Valley	AQI:	204	Ozone
San Bernardino Valley	AQI:	203	Ozone
San Gabriel Valley	AQI:	201	Ozone

WEATHER FORECAST

Major heat concerns continue with temperatures running 10- 15 degrees
above normal, except closer to the coast where a light marine push will
work as a natural air conditioner. The Inland Empire, mountains and
deserts will continue to see dry air, and afternoon winds gusting to 25mph.

Inversion Base: 752 FT	Breaking Temperature: 92 DEG F
Inversion Breaking: NO	Maximum Mixing HEIGHT: 1773 FT

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--------------------------------------------------------------------------
AIR QUALITY FORECAST RULE IMPLICATIONS
--------------------------------------------------------------------------

Area 40 - South Coast Air Basin:    NO-BURN
Area 53 - Mojave Desert Air Basin:  BURN
Area 55 - Salton Sea Air Basin:     BURN
Beach Fire Ring Wood Burning:  Allowed in All Areas

Residential Wood Burning:  Allowed in All Areas

Coachella Valley Rule 403.1 Wind Forecast:  Winds Above 25 MPH
--------------------------------------------------------------------------




ATTENTION ALL SCHOOLS AND INDUSTRIES

THIS IS THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
NO AIR POLLUTION OR HEALTH ADVISIORY EPISODES ARE PREDICTED
FOR SATURDAY, JULY 15, 2023 IN THE SOUTH COAST AIR BASIN.
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Figure 163: Forecast issued by South Coast AQMD for July 15, 2023.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

AIR QUALITY FORECAST

Forecast Valid Saturday, July 15, 2023

Issue Date: Friday, July 14, 2023

Area	Forecast Area	AQI	AQI Description	Pollutant	Cleanest Time of Day *
1	Central Los Angeles County	97	MODERATE	Ozone	Similar all day
2	Northwest Coastal Los Angeles Co.	50	GOOD	PM2.5	Similar all day
3	Southwest Los Angeles County Co.	42	GOOD	PM2.5	Similar all day
4	South Coastal Los Angeles Co.	47	GOOD	Ozone	Similar all day
5	Southeast Los Angeles Co.	77	MODERATE	Ozone	Similar all day
6	West San Fernando Valley	154	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
7	East San Fernando Valley	154	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
8	West San Gabriel Valley	150	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 12 PM
9	East San Gabriel Valley	195	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
10	Pomona/Walnut Valley	201	VERY UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
11	South San Gabriel Valley	108	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 7 PM to 10 PM
12	South Central Los Angeles Co.	67	MODERATE	Ozone	Similar all day
13	Santa Clarita Valley	187	UNHEALTHY	Ozone	Cleanest from 6 AM to 11 AM
14	Antelope Valley	100	MODERATE	Ozone	Similar all day
15	San Gabriel Mountains	182	UNHEALTHY	Ozone	Cleanest from 6 AM to 11 AM
16	North Orange County	74	MODERATE	Ozone	Similar all day
17	Central Orange County	50	GOOD	Ozone	Similar all day
18	North Coastal Orange County	40	GOOD	Ozone	Similar all day
19	Saddleback Valley	61	MODERATE	Ozone	Similar all day
20	Central Coastal Orange County	38	GOOD	PM2.5	Similar all day
21	Capistrano Valley	42	GOOD	PM2.5	Similar all day
22	Corona/Norco Area	174	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
23	Metropolitan Riverside County	204	VERY UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
24	Perris Valley	166	UNHEALTHY	Ozone	Cleanest from 6 AM to 11 AM
25	Lake Elsinore Area	192	UNHEALTHY	Ozone	Cleanest from 6 AM to 10 AM
26	Temecula Valley	105	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Similar all day
27	Anza Area	133	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 1 PM to 4 PM
28	Hemet/San Jacinto Valley	147	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 11 AM
29	Banning/San Gorgonio Pass	140	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 12 PM
30	Coachella Valley	93	MODERATE	Ozone	Similar all day
31	East Riverside County	41	GOOD	Ozone	Similar all day
32	Northwest San Bernardino Valley	201	VERY UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
33	Southwest San Bernardino Valley	185	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
34	Central San Bernardino Valley	200	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
35	East San Bernardino Valley	203	VERY UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
36	West San Bernardino Mountains	179	UNHEALTHY	Ozone	Cleanest from 6 AM to 11 AM
37	Central San Bernardino Mountains	192	UNHEALTHY	Ozone	Cleanest from 6 AM to 12 PM
38	East San Bernardino Mountains	140	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 6 AM to 1 PM
39	Phelan	177	UNHEALTHY	Ozone	Cleanest from 7 AM to 12 PM
40	Hesperia	164	UNHEALTHY	Ozone	Cleanest from 7 AM to 12 PM
41	Trona	77	MODERATE	Ozone	Similar all day
42	Victorville	147	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 7 AM to 11 AM
43	Yucca Valley	101	UNHEALTHY FOR SENSITIVE GROUPS	Ozone	Cleanest from 4 PM to 7 PM
44	Barstow	87	MODERATE	Ozone	Similar all day
45	Twentynine Palms	80	MODERATE	Ozone	Similar all day

* The **Cleanest Time of the Day** is based on forecasts of below-average AQI for PM2.5 and Ozone. These forecasts do not include PM10. They may differ from the actual AQI and users should also check the current AQI measurements at http://www.aqmd.gov/aqimap to plan outdoor activities.

What To Do When Air Pollution Reaches Unhealthy Levels

In areas with **UNHEALTHY FOR SENSITIVE GROUPS** air quality (AQI of 101 to 150), sensitive or susceptible persons, including children, older adults and those with heart or lung disease, should minimize outdoor activity.

In areas with **UNHEALTHY** air quality (AQI of 151 to 200) or an **Ozone HEALTH ADVISORY Alert** (AQI of 132 to 200 for 1-hour ozone), everyone should discontinue prolonged, vigorous outdoor exercise lasting longer than one hour. Examples of the kinds of outdoor activities that should be avoided are calisthenics, basketball, running, soccer, football, tennis, swimming laps, and water polo. Susceptible persons, such as those with heart or lung disease, should avoid outdoor activity entirely.

In areas with **VERY UNHEALTHY** air quality (AQI of 201 or above) or an **Ozone STAGE-1 Alert** (AQI of 201 or above for 1-hour ozone), everyone should discontinue all vigorous outdoor activities regardless of duration.

Detailed Air Quality Forecasts Including Wildland & Agricultural Burn Forecasts: http://www.aqmd.gov/forecast

Daily Air Quality Forecasts and Advisories by Email -- Subscribe or Modify Settings at: http://www.airalerts.org

AQMD Web Site for Current AQMD Air Quality Measurements, Forecasts and Advisories: http://www.aqmd.gov/
or by **Telephone** with our Interactive Voice Response System: **1-800-CUT-SMOG** (1-800-288-7664)

Contact AQMD: 1-800-CUT-SMOG or (909) 396-2000 **Forecast Area Map:** http://www.aqmd.gov/ForecastAreas

Figure 164: Cleanest time of day forecast issued by South Coast AQMD for July 15, 2023.

35.2. Advisories

The screenshots in Figure 165 through Figure 167 show the press release for the ozone advisory issued by South Coast AQMD on July 13, 2023 and the press releases for the wildfire smoke advisories issued on July 14-15, 2023. The press releases of the advisories are also archived by South Coast AQMD.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ANNOUNCEMENTS

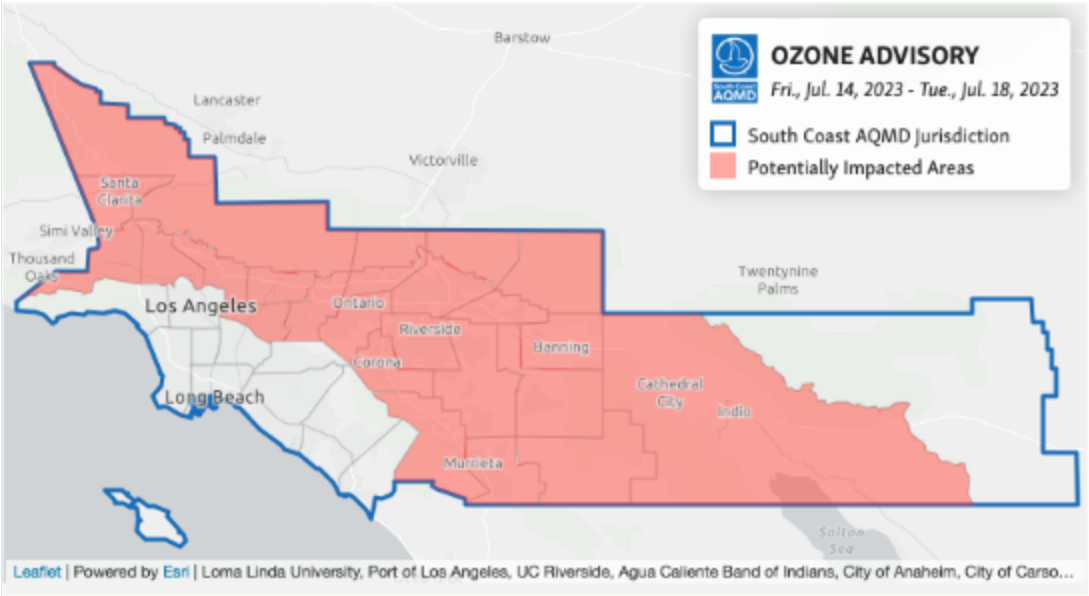
www.aqmd.gov @SouthCoastAQMD

FOR IMMEDIATE RELEASE: July 13, 2023
MEDIA CONTACT:
Bernard Parks, (909) 396-3127, Cell: (909) 414-6309
Connie Mejia, (909) 396-3456, Cell: (909) 215-5601
press@aqmd.gov

South Coast AQMD Issues Ozone Advisory Due to Heat Dome

Valid: Friday, July 14 through Tuesday, July 18, 2023

This advisory is in effect from 10 a.m. Friday through 8 p.m. Tuesday. South Coast AQMD will issue an update if additional information becomes available.



Forecasted Air Quality Impacts

- A multi-day extreme ozone (smog) event is expected due to the heat wave affecting the region.

- AQI will likely reach the **Unhealthy** or higher level in inland areas of the South Coast Air Basin and in the Coachella Valley at times Friday though Tuesday
- Ozone may reach the **Very Unhealthy** Air Quality Index (AQI) in the Lake Arrowhead area, the San Bernardino Valley, and nearby areas

Excessive Heat Warnings and Heat Advisories

- The persistently high ozone levels are in part caused by high temperatures that increase ozone formation rates and emissions of chemicals leading to ozone formation
- The National Weather Service (NWS) has issued Excessive Heat Warnings and Watches for parts of the South Coast Air Basin and the Coachella Valley
- Temperatures will be highest over the weekend, with highs in the 100s in the Inland Empire and 110s in the Coachella Valley
- For more information about NWS Warnings and Watches see https://www.weather.gov/sgx/ and https://www.weather.gov/lox/

Health Effects of Ozone

- Ozone air pollution can cause respiratory health problems, including trouble breathing, asthma attacks, and lung damage
- Research also indicates that ozone exposure can increase the risk of premature death
- Children, older adults, pregnant people, and people with preexisting lung problems such as asthma may be more sensitive to the health effects of ozone

To view current air quality in your neighborhood, download the South Coast AQMD app or visit www.aqmd.gov/AQImap.

Detailed Forecast

Daytime	AQI levels will increase after sunrise, peak in the mid-afternoon, and then decrease. AQI is predicted to reach the **Unhealthy** category in large portions of the region with localized areas reaching the **Very Unhealthy** category.

Early morning and overnight	AQI is predicted to be in the **Good** to **Moderate** categories overnight and in the early morning hours each day.

South Coast AQMD is the regulatory agency responsible for improving air quality for large areas of Los Angeles, Orange, Riverside and San Bernardino counties, including the Coachella Valley. For news, air quality alerts, event updates and more, please visit us at www.aqmd.gov, download our award-winning app, or follow us on Facebook, Twitter and Instagram.

###

Figure 165: Press release for the ozone advisory issued on July 13, 2023.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ANNOUNCEMENTS

www.aqmd.gov @SouthCoastAQMD

FOR IMMEDIATE RELEASE: July 14, 2023
MEDIA CONTACT:
Bernard Parks, (909) 396-3127, Cell: (909) 414-6309
Connie Mejia, (909) 396-3456, Cell: (909) 215-5601
press@aqmd.gov

South Coast AQMD Issues Smoke Advisory Due to Moreno Valley Fire

Valid from July 14, 2023 to July 15, 2023

This advisory is in effect from Friday 4:00 p.m. through Saturday 4:00 p.m. South Coast AQMD will issue an update if additional information becomes available.

Current Conditions

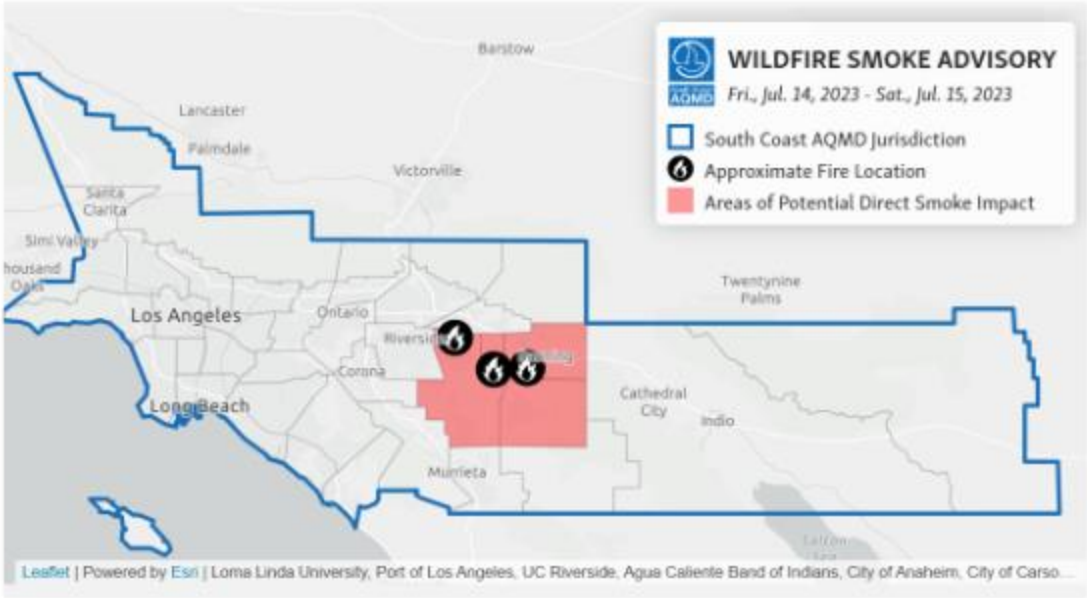
- Three wildfires are actively burning and producing smoke in Riverside County as of Friday at 4:50 PM:
    - The Reche Fire is currently 340 acres
    - The Highland Fire is currently 150 acres
    - The Rabbit Fire is currently 600 acres
- Visit the Cal FIRE/Riverside County Fire Department Twitter page for more details
- Winds are currently transporting smoke towards the east and southeast into the Moreno Valley, Beaumont, and Banning area

Conditions may change quickly due to fire activity and weather. Download the South Coast AQMD app or visit www.aqmd.gov/AQImap to view current air quality in your neighborhood.

Forecasted Smoke and Air Quality Impacts

- Hot and dry conditions will continue throughout the day on Friday and during the day on Saturday
- Winds from the west will continue to push smoke towards the east and may result in Air Quality Index levels that are **Unhealthy for Sensitive Groups** or worse in areas impacted by smoke
- Light and variable winds during the overnight hours may result in the highest AQI levels in areas immediately adjacent to the fires

- Note that AQI levels may reach the **Unhealthy** category in the afternoon hours from high levels of ozone (smog) due to the current heat wave and are largely unrelated to the fires. See South Coast AQMD Ozone Advisory.



Detailed Forecast

Friday Afternoon	Winds from the west with gusts to 25 mph will continue to push smoke towards the east, affecting neighborhoods in the Moreno Valley, Beaumont, and possibly Banning. Ozone (smog) levels will also be elevated due to the heat wave affecting the region.
Friday Evening/Saturday Morning	Light and variable winds may lead to increased smoke concentrations in areas immediate adjacent to the fires
Saturday	If the fires are still producing smoke, winds from the west with gusts to 30 mph in the afternoon will continue to push smoke to the east. Ozone (smog) levels will also be elevated in the afternoon hours.

If you are in an area impacted by smoke:

- Limit your exposure by remaining indoors with windows and doors closed or seeking alternate shelter.
- Avoid vigorous physical activity.

- Run your air conditioning and/or an air purifier. If possible, do not use swamp coolers or whole house fans that bring in outside air.
- Avoid burning wood in your fireplace or firepit and minimize sources of indoor air pollution such as candles, incense, pan-frying, and grilling.
- If you must be outside, a properly fit N95 or P100 respirator may provide some protection.

For more information, visit www.aqmd.gov/smokesafety.

South Coast AQMD is the regulatory agency responsible for improving air quality for large areas of Los Angeles, Orange, Riverside and San Bernardino counties, including the Coachella Valley. For news, air quality alerts, event updates and more, please visit us at www.aqmd.gov, download our award-winning app, or follow us on Facebook, Twitter and Instagram.

###

Figure 166: Press release for the wildfire smoke advisory issued on July 14, 2023.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ANNOUNCEMENTS

South Coast AQMD

www.aqmd.gov @SouthCoastAQMD

FOR IMMEDIATE RELEASE: July 15, 2023
MEDIA CONTACT:
Bernard Parks, (909) 396-3127, Cell: (909) 414-6309
Connie Mejia, (909) 396-3456, Cell: (909) 215-5601
press@aqmd.gov

South Coast AQMD Extends Smoke Advisory Due to Moreno Valley Fire

Valid from July 15, 2023 to July 16, 2023

This advisory is in effect from Saturday 10:00 a.m. through Sunday 4:00 p.m. South Coast AQMD will issue an update if additional information becomes available.

Current Conditions

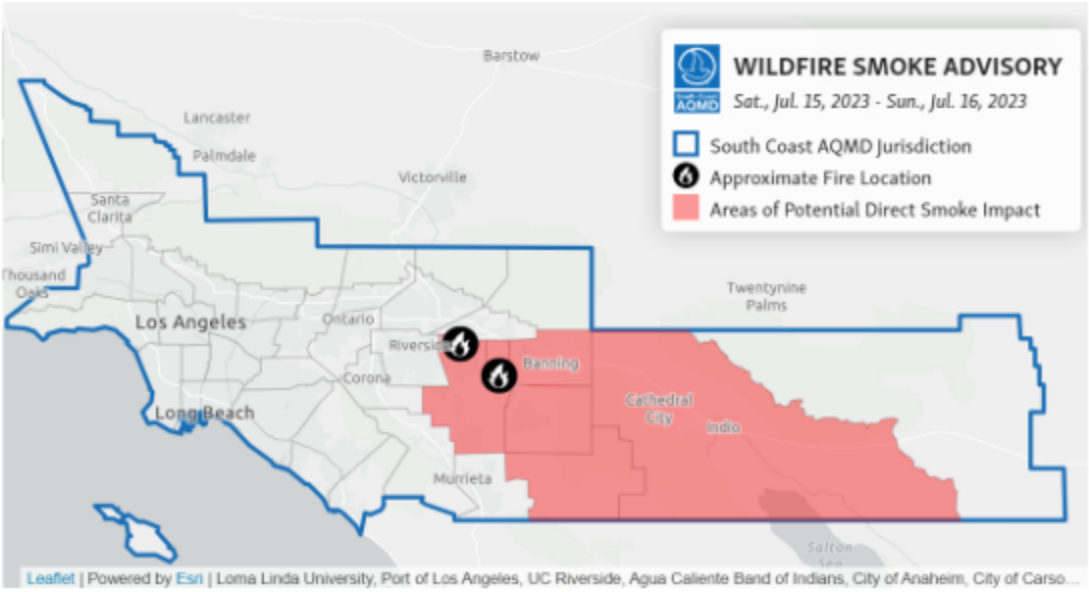
- Two large wildfires are actively burning and producing smoke in Riverside County as of Saturday at 9:40 AM:
    - The Rabbit Fire is currently 4,500 acres
    - The Reche Fire is currently 437 acres
- Visit the Cal FIRE/Riverside County Fire Department Twitter page for more details
- Winds are currently transporting smoke towards the east and southeast into the Moreno Valley, Hemet, Beaumont, Banning, and the Coachella Valley
- Air quality index values reached **Hazardous** levels immediately adjacent to the fire in the overnight hours

Conditions may change quickly due to fire activity and weather. Download the South Coast AQMD app or visit www.aqmd.gov/AQImap to view current air quality in your neighborhood.

Forecasted Smoke and Air Quality Impacts

- Hot and dry conditions will continue throughout the day on Saturday and into Sunday
- Winds from the west will continue to push smoke towards the east and may result in Air Quality Index levels that are **Hazardous** in areas impacted by smoke

- Light and variable winds during the overnight hours may result in the highest AQI levels in areas immediately adjacent to the fires
- Note that AQI levels may reach the **Unhealthy** category in the afternoon hours from high levels of ozone (smog) due to the current heat wave and are largely unrelated to the fires. See South Coast AQMD Ozone Advisory.



Detailed Forecast

Saturday	Winds from the west will continue to push smoke towards the east, affecting neighborhoods in the Hemet area, Idyllwild, San Gorgonio Pass and Coachella Valley. Ozone (smog) levels will also be elevated due to the heat wave affecting the region.
Saturday Evening/Sunday Morning	Light and variable winds may lead to increased smoke concentrations in areas immediate adjacent to the fires
Sunday	If the fires are still producing smoke, winds from the west will continue to push smoke to the east. Ozone (smog) levels will also be elevated in the afternoon hours.

Page 3 of 3

If you are in an area impacted by smoke:

- Limit your exposure by remaining indoors with windows and doors closed or seeking alternate shelter.
- Avoid vigorous physical activity.
- Run your air conditioning and/or an air purifier. If possible, do **not** use swamp coolers or whole house fans that bring in outside air.
- Avoid burning wood in your fireplace or firepit and minimize sources of indoor air pollution such as candles, incense, pan-frying, and grilling.
- If you must be outside, a properly fit N95 or P100 respirator may provide some protection.

For more information, visit www.aqmd.gov/smokesafety.

South Coast AQMD is the regulatory agency responsible for improving air quality for large areas of Los Angeles, Orange, Riverside and San Bernardino counties, including the Coachella Valley. For news, air quality alerts, event updates and more, please visit us at www.aqmd.gov, download our award-winning app, or follow us on Facebook, Twitter and Instagram.

# # #

Figure 167: Press release for the wildfire smoke advisory issued July 15, 2023.

36. News Articles Appendix

Figure 168 shows a news article from NBC Los Angeles on July 14, 2023 describing the Reche Fire. Figure 169 shows images of the Rabbit fire and firefighting efforts reported by the Desert Sun. Figure 170 shows an article by KTLA about the Rabbit Fire. Figure 171 shows a Patch news article summarizing several fires burning in Southern California in mid-July, 2023, including the Rabbit, Reche, and Highland fires. Figure 172 shows a news article from the Desert Sun on July 17, 2023 reporting the forecast that "Winds will continue to push any remaining smoke from the Rabbit Fire toward the eastern part of the county, including the Coachella Valley, and may result in unhealthy air quality levels for sensitive groups."

A brush fire erupted today in a canyon north of Moreno Valley during the first day of a scorching heat wave and threatening residential properties as crews deployed to the location.

A brush fire erupted Friday in a canyon north of Moreno Valley during the first day of a scorching heat wave and threatening residential properties as crews deployed to the location.

The blaze was reported about 1 p.m. in the area of Reche Canyon Road and High Country Drive, near the boundary separating Riverside and San Bernardino counties, according to the Riverside County Fire Department.

The fire had burned some 437 acres with 60% containment as of Sunday.

The agency said that multiple engine and hand crews from Riverside County and Cal Fire-San Bernardino County were sent to the location and encountered flames moving at a moderate rate through medium brush.

At least one home and outbuildings were in the path of the brusher, which was moving to the southeast amid light winds, according to reports from the scene.

The area is lightly populated, with both single-family houses and mobile homes.

Cal Fire air tankers and water-dropping helicopters were summoned to make runs on the blaze.

An evacuation order that had been placed south of Reche Canyon Road, from Reche Vista Drive to Locust Avenue, was later reduced to a warning. A Care & Reception Center is being established at Valley View High School, 13135 Nason Street, Moreno Valley 92555.

California Highway Patrol officers were conducting traffic control in the area due to the large amount of public safety equipment. It was not immediately clear whether Reche Canyon Road might be shut down.

Details about the cause were not immediately available.

CAL FIRE/Riverside County Fire Depar... · Jul 14, 2023

@CALFIRERRU · **Follow**

Replying to @CALFIRERRU

#RecheFire [UPDATE] The fire is 340 acres and 0% contained. All evacuations and warning remain in place.

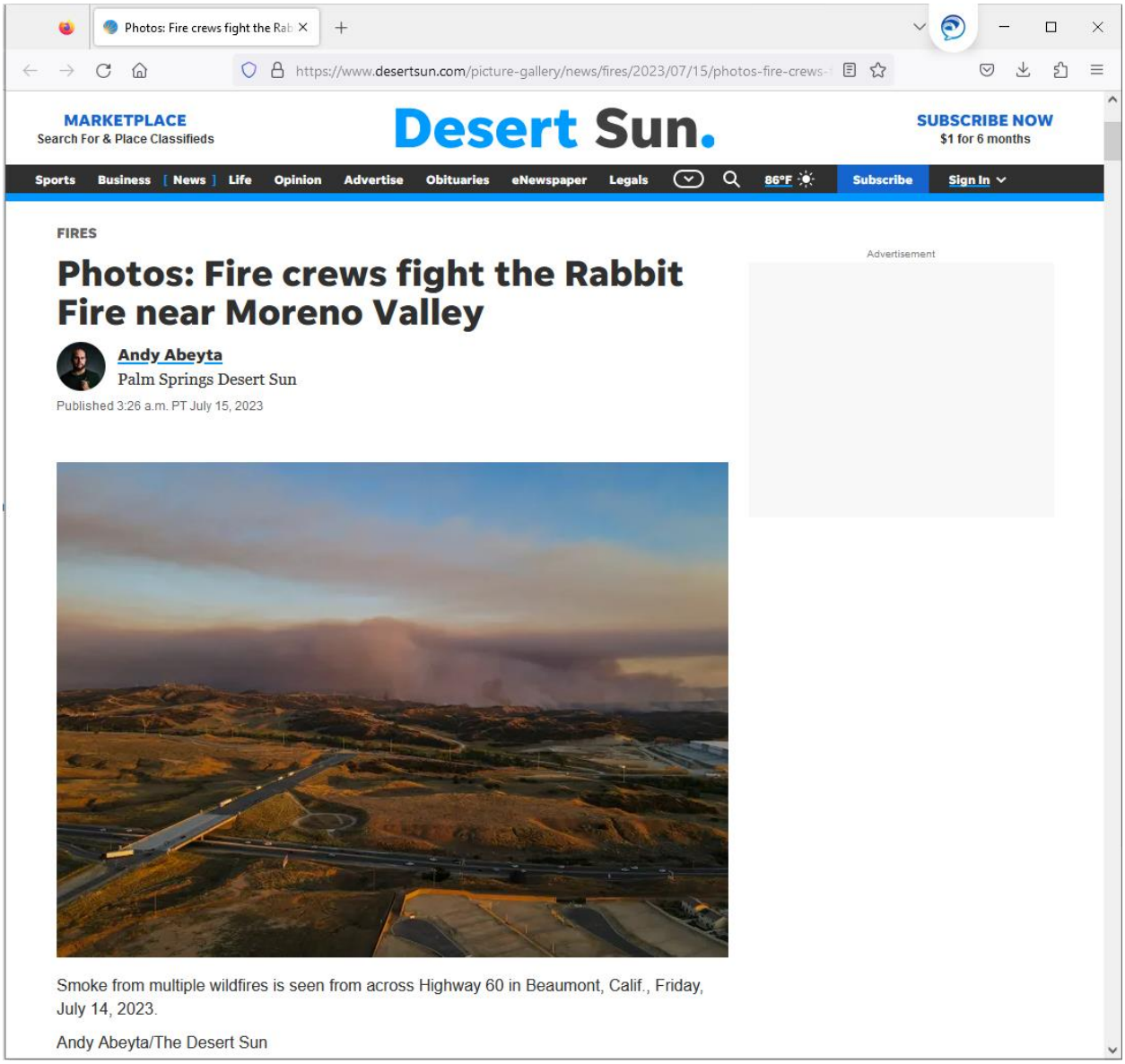
CAL FIRE/Riverside County Fire Department

@CALFIRERRU · **Follow**

This article tagged under:

CALIFORNIA WILDFIRES • MORENO VALLEY

Figure 168: July 14, 2023 NBC Los Angeles News article "Crews work to get handle on Reche Fire in Moreno Valley". Accessed May 10, 2024.


Photos: Fire crews fight the Rab
https://www.desertsun.com/picture-gallery/news/fires/2023/07/15/photos-fire-crews-
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FIRES
Photos: Fire crews fight the Rabbit Fire near Moreno Valley
Andy Abeyta
Palm Springs Desert Sun
Published 3:26 a.m. PT July 15, 2023
Advertisement
Smoke from multiple wildfires is seen from across Highway 60 in Beaumont, Calif., Friday, July 14, 2023.
Andy Abeyta/The Desert Sun

A truck driver surveys the land across from Gillman Springs Road while waiting to see if he can safely get his truck out after waiting out the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Burned hillsides are seen from Gillman Springs Road after the Rabbit Fire passes through in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Fence posts remain on fire after the Rabbit Fire passes through in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Riverside County Fire engine turns around to head back and fight the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A hillside burns as fire crews keep an eye on the progress of the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Cal Fire helicopter drops down to refill its water tank from Mystic Lake while fighting the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A hillside burns as the Rabbit Fire slowly progresses in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A fire engine is seen on hand to stop the Rabbit Fire from crossing Gillman Springs Road in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Vegetation stands tall as flames from the Rabbit Fire rise in the background in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A firefighter walks down Gillman Springs Road while working to contain the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A line of fire engines work to contain the Rabbit Fire from crossing Gillman Springs Road in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Firefighter Danny Solis works to help contain the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Flames are seen on a hillside along Gillman Springs Road at the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Vegetation burns along Gillman Springs Road as a part of the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Firefighters walk down Gillman Springs Road while fighting the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Riverside County Fire engine pulls away from the Rabbit Fire on Gillman Springs Road in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A firefighter wets a utility pole to try to keep it safe from the Rabbit Fire along Gillman Springs Road in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A firefighter keeps his eyes on the Rabbit Fire while working with a crew to stop it at Gillman Springs Road in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Cal Fire helicopter drops a tank of water on the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Firefighters keep their eyes on the Rabbit Fire while working to keep it from crossing Gillman Springs Road in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Cal Fire helicopter heads to drop a tank of water on the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Cal Fire helicopter drops water on the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A Cal Fire helicopter flies over the Rabbit Fire on a sighting run before dumping more water in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

The hills burn in the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

A hillside is seen in flames as a part of the Rabbit Fire in Moreno Valley, Calif., Friday, July 14, 2023.

Andy Abeyta/The Desert Sun

Figure 169: July 14, 2023 Desert Sun news article "Photos: Fire crews fight the Rabbit Fire near Moreno Valley." Accessed May 9, 2024.


Fast-moving wildfire breaks out
https://ktla.com/news/local-news/fast-moving-wildfire-erupts-in-riverside-county/
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Watch Live
News
Weather
Morning News
Video
Shows
More
Search
LOCAL NEWS
WATCH: Massive wildfire grows to 4,500 acres in Riverside County
by: Vivian Chow
Posted: Jul 14, 2023 / 04:20 PM PDT
Updated: Jul 15, 2023 / 06:53 AM PDT
ONSCENE.TV
I'M LAUREN LYSTER WE THANK YOU
KTLA
0:12 / 0:42
SHARE
This is an archived article and the information in the article may be outdated. Please look at the time stamp on the story to see when it was last updated.
Firefighters are battling a large and rapidly spreading wildfire that erupted in Moreno Valley on Friday.
Named the "Rabbit Fire," the brush fire is located near the intersection of Alessandro Boulevard and Jack Rabbit Trail in the community of Lakeview.
As of 6 a.m. Saturday morning, the blaze had scorched 4,500 acres near Moreno Valley, with other nearby fires burned a combined 500 acres in other parts of the Inland Empire.
MOST POPULAR
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6 3 dead after grisly murder-

The “Rabbit Fire” was initially reported as 20 acres with a rapid rate of spread just shortly before 4 p.m.

The flames later spread to around 600 acres by 6 p.m. before exploding to 1,500 acres around 7 p.m., Cal Fire officials confirmed.

By 7:30 p.m., the fire grew to around 2,815 acres and by 11 p.m., the fire grew to 3,000 acres.

Located in a grass and brush-heavy area, a private ranch property is being threatened by the moving flames. Fire crews have surrounded the property with flame retardant.

“All of a sudden, I see this puff of smoke come up and all chaos broke loose,” said Emmanuel Castro, a Moreno Valley resident. “The whole hill caught on fire then across the street and then it jumped to my lawn. My horse was over there pasturing and I had to save my horse.”

Firefighters are responding to a wildfire that erupted in Moreno Valley on July 14, 2023. (OnScene.TV)

1 / 18

Evacuations ordered as Highland Fire threatens homes in Beaumont

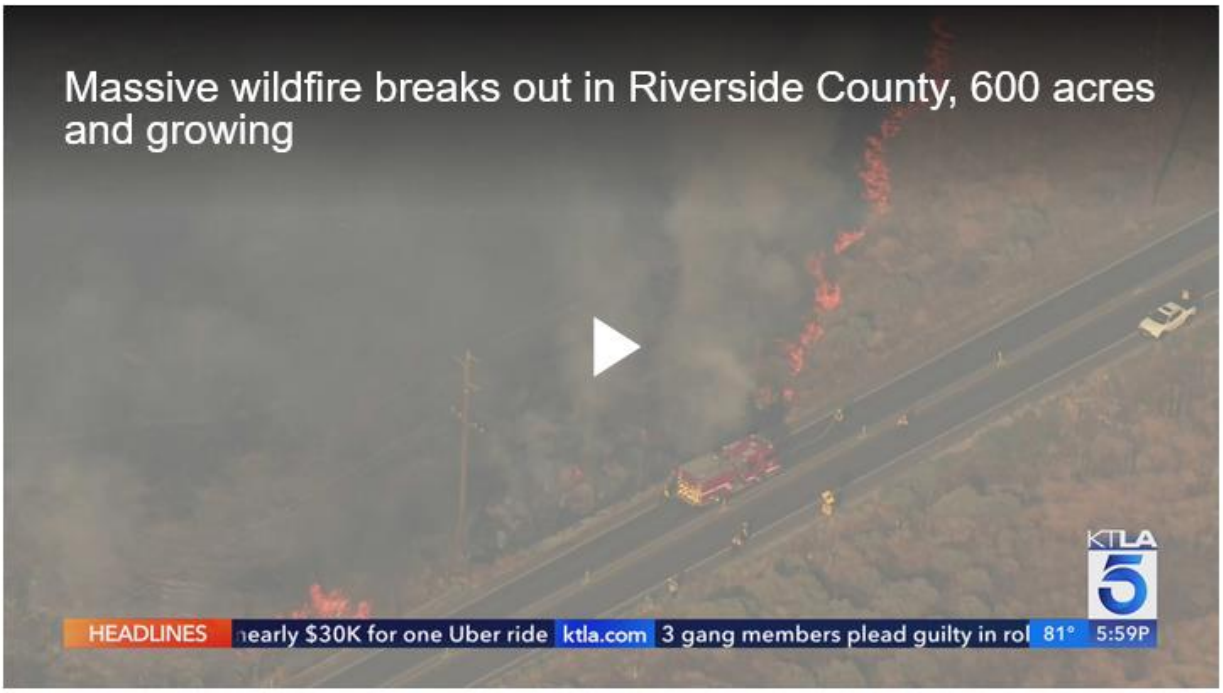
Multiple road closures are in place including Gilman Springs from Alessandro Boulevard to Highway 79, Bridge Street from Gilman Springs Road to Ramona Expressway and on Highway 79 near Lambs Canyon from Gilman Springs to California Avenue.

Air tankers along with ground crews and fire engines from Cal Fire and Riverside County are working to extinguish the massive blaze.

“Unfortunately, the Rabbit incident continues to burn,” said Capt. Richard Cordova with Cal Fire/Riverside County Fire. “The only good news about that fire is that it’s an open area, so there are no homes, so we have no evacuation orders or warnings put in place.”

The Rabbit Fire is located near multiple brush fires that broke out in the Inland Empire on Friday afternoon including the Reche Fire and the Highland Fire.

Heavy smoke from all three wildfires in the area has created extremely poor visibility and air quality for residents. A smoke advisory was issued by the South Coast AQMD for the Moreno Valley area.



The advisory will be in effect from Friday 4 p.m. through Saturday 4 p.m.

Air quality impact levels could reach the unhealthy category in the afternoon hours from winds and "high levels of ozone (smog) due to the current heat wave," officials said.

Those living in an area impacted by smoke should:

-Limit your exposure by remaining indoors with windows and doors closed or seeking alternate shelter.
-Avoid vigorous physical activity.
-Run your air conditioning and/or an air purifier. If possible, do not use swamp coolers or whole-house fans that bring in outside air.
-Avoid burning wood in your fireplace or firepit and minimize sources of indoor air pollution such as candles, incense, pan-frying, and grilling.
-If you must be outside, a properly fitted N95 or P100 respirator may provide some protection.

Excessive heat warnings and heat advisories are also in effect for the Inland Empire as temperatures over the weekend are expected to reach highs of 100s and will peak in the 110s in the Coachella Valley.

All wildfire impacts and closures can be found here. Updated air quality impacts can be found here. All heat advisories and weather warnings can be found here.

This developing story will be updated.

Figure 170: July 14, 2023 KTLA article "WATCH: Massive wildfire grows to 4,500 acres in Riverside County." Accessed May 9, 2024.

SoCal Fires Latest: 5th Brush Fire

https://patch.com/california/across-ca/socal

Patch

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Crime & Safety

SoCal Fires Latest: 5th Brush Fire Breaks Out, 2 Injured

Three of the fires — Gavilan, Reche and Highland — were at least 50 percent contained, while the 7,600-acre Rabbit Fire was at 10 percent.

Anna Schier and Peggy Spellman Hoey, Patch Staff

Posted Sun, Jul 16, 2023 at 9:41 am PTUpdated Mon, Jul 17, 2023 at 9:04 am PT

A firefighter watches flames approach Gilman Springs Road during the Rabbit Fire late Friday, July 14, 2023, in Moreno Valley, Calif. (Eric Thayer/AP Photo)

RIVERSIDE COUNTY, CA — Firefighters on Sunday battled triple-digit temperatures and four wildfires that ravaged thousands of acres across Riverside County.

Three of the fires — Gavilan, Reche and Highland — were at least 50 percent contained, while the largest — the Rabbit Fire — raged at only 10 percent containment, forcing ongoing evacuations.

"That is our most active fire and our largest fire and the fire that's staffed with the most amount of resources and equipment," Commander Josh Janssen said in a video posted by the Cal Fire/Riverside County Fire Department Twitter account.

At 7,600 acres, the Rabbit fire — initially reported Friday afternoon in the unincorporated community of Lakeview — was the only wildfire with outstanding evacuation orders as of mid-day Sunday.

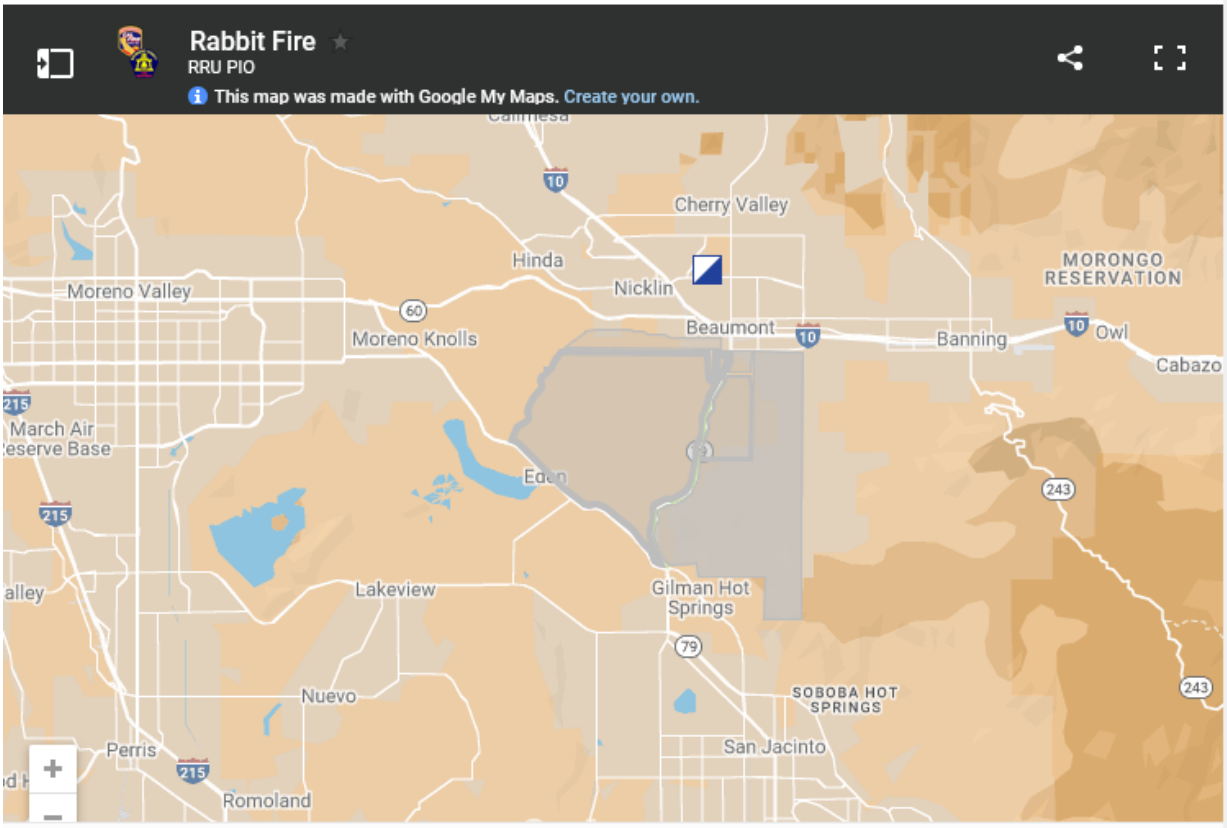
High temperatures, steep terrain and difficult access proved challenging to the more than 800 emergency personnel responding to the blaze, according to authorities.

"It's just an inferno," Axel Sanchez, who works at Mr. Taco in Beaumont, told the Los Angeles Times. "Ash is raining down, and people are coming in here covered in ash."

About 152 structures are threatened by the fire, according to a CalFire update Sunday.

Janssen said firefighters are working to strengthen containment lines, especially at the head of the blaze, where there are several housing communities. Flames were on the outer rim of the subdivision between Highland Springs Avenue to the west and Sunningdale Street to the east briefly prompting evacuation orders Friday.

Areas placed under evacuation order included northeast of Gilman Springs Road, east of Jack Rabbit Trail, west of California Avenue, and west of Beaumont Avenue.



Full containment was not expected until Wednesday, and 152 structures were threatened, authorities said.

There have been two reports of injuries due to the fires. A woman was severely burnt on Gilman Springs Road near where the fire began and was airlifted to a burn center, the Los Angeles Times reported.

A man was burned in the blaze Friday, according to officials. Reports indicated he may have been in or near a vehicle that caught fire. The victim, whose name was not disclosed, was taken to Riverside University Health System-Medical Center in Moreno Valley for treatment.

The newest fire — Gavilan — broke out Saturday afternoon in Lake Matthews, and had expanded to 338 acres as of early Sunday afternoon, but remained 50 percent contained. An evacuation order was downgraded to a warning late Saturday.

All evacuation orders and warnings for the Reche and Highland fires had been lifted by mid-day Sunday, as had related road closures.

The 437-acre Reche Fire in Moreno Valley was 60 percent contained Sunday, after being reported Friday.

The Highland Fire was only 105 acres and started Friday afternoon in Beaumont. As of 8:40 p.m. Saturday, the fire was 70 percent contained by lines of cleared vegetation, and that containment number held steady Sunday.

A fifth brush fire was reported Sunday evening in the densely populated area of Woodcrest in Riverside. Several palm trees had caught fire as flames spread from nearby vegetation. As of 6:30 p.m., it was not clear how many acres had burned.

All of the fires remain under investigation Sunday.

As a result of the fires, the South Coast Air Quality Management District issued a smoke advisory that was later extended through at least noon Monday.

City News Service contributed to this report.

Figure 171: July 14, 2023 Patch article "SoCal Fires Latest: 5th Brush Fire Breaks Out, 2 Injured." Accessed May 10, 2024.

FIRES

Rabbit Fire near Beaumont grows to over 8,200 acres amid heat, air quality warnings

Janet Wilson
Palm Springs Desert Sun

Published 10:52 a.m. PT July 17, 2023 | **Updated 10:28 p.m. PT July 17, 2023**

The Rabbit Fire near Beaumont, the largest wildfire burning in Riverside County, continued to smolder Monday in heavy, dry brush amid searing summer temperatures.

All of the Coachella Valley is under an excessive heat alert this week, with dangerously hot conditions and high temperatures, and smoke could continue to impact some areas.

The Rabbit blaze was 45% contained as of 8 p.m., according to CalFire, and had grown to 8,283 acres. Fire crews worked much of the day to build containment lines. They're up against extreme heat, low humidity, and steep terrain that's tough to access, hampering suppression efforts. But progress has been made.

"That is due to all of the efforts of all of our firefighters. They've done an outstanding job of strengthening our control lines," said CalFire Riverside County Chief Josh Janssen, who mentioned the work overnight Sunday let them re-open northbound Highway 79. "We're focusing our efforts today on that southbound portion of the 79 to get that re-opened ... and then being poised and ready for any new incidents that may occur in the county."

The southbound portion of State Route 79 will reopen starting 4 a.m. on Tuesday, according to the California Highway Patrol.

The wildfire was burning in a northeast direction Monday morning, off Gilman Springs Road and Jack Rabbit Trail in Lakeview. More than 1,400 personnel and numerous air tankers from across the state are battling the stubborn inferno, with full containment not expected until July 21.

One civilian injury was reported on Friday, and 152 structures remained under threat, as do area radio repeaters towers and natural gas and petroleum pipelines. Numerous evacuation orders or warnings remain in effect, as do closures on California Avenue, County Landfill Road, Jack Rabbit Trail and Bridge Street. Highway 79 northbound from Gilman Springs to Beaumont Avenue has reopened, as has Gilman Springs between Alessandro and Highway 79.

An evacuation center is open at Beaumont High School, 39139 Cherry Valley Boulevard, in Beaumont. County Animal Services personnel will be at Beaumont High School to receive small animals. Large animals can go to the San Jacinto Animal Shelter at 581 South Grand. Anyone needing assistance with animal evacuations can call Riverside County Department of Animal Services at (951) 358-7387 More information is available at: (951) 940-6985.

Wildfire smoke map: Track fires and red flag warnings across the US and California

Progress made on Reche Fire, Gavilan Fire, Highland Fire

Progress has been made on three other blazes, and the causes of all four remain under investigation.

- The Reche Fire in Moreno Valley was at 437 acres and 90% contained, and all evacuations near it have been lifted.
- The Gavilan Fire in the unincorporated Perris area, was at 338 acres and 50% contained. Evacuation warning areas were lifted and roads open as of 8 p.m., according to Cal Fire.
- The Highland Fire in the Beaumont/Banning area burned 105 acres, was 98% contained and all evacuations have been lifted.

Extreme heat, some poor air quality expected all week

High heat is expected to continue through Friday across Riverside County, and moderate air quality, especially near fire zones, could impact people with asthma and other risks.

- **Extreme heat warnings:** Dangerously hot conditions with high temperatures of 112 to 118 through Tuesday, then 115 to 121 for Wednesday through Friday expected.
- **Impacted areas include:** The Coachella Valley, San Diego County deserts and San Gorgonio Pass near Banning.
- **How long?** The warnings are in effect until 8 p.m. Friday.
- **The dangers:** Extreme heat significantly increases the potential for heat related illnesses, particularly for thoseworking or participating in outdoor activities.
- **Smoky skies:** Winds will continue to push any remaining smoke from the Rabbit Fire toward the eastern part of the county, including the Coachella Valley, and may result in unhealthy air quality levels for sensitive groups.
- **Forecast:** High temperatures exceeding 112 could continue through at least the middle of next week.

Staff writer Ani Gasparyan contributed to this report.

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Figure 172: July 17, 2023 Desert Sun News article "Rabbit Fire near Beaumont grows to over 8,200 acres amid heat, air quality warnings." Accessed May 10, 2024.

37. Historical Appendix for Rabbit, Reche, and Highland Wildfires

Table 23 shows the exceedances of the NAAQS ozone 8-hour 1997 Standard that were marked as occurring during known past events with possible influence in Figure 38 and Figure 44 in the Historical section of the main document.

Table 23: Past exceedances of the NAAQS ozone 8-hour 1997 Standard *that occurred during known events with possible influence.*

Date	Station	AQSID	POC	Event	Ozone (ppm)
2020-08-14	Banning - South Hathaway Street	840060650012	1	Ranch 2 Fire	0.114
2020-08-20	Banning - South Hathaway Street	840060650012	1	Lake and Ranch 2 Fires and Long-Range Transport	0.102
2020-08-14	Palm Springs	840060655001	1	Ranch 2 Fire	0.094
2021-06-17	Palm Springs	840060655001	1	Telegraph/Mescal/Backbone/Pinnacle Fire	0.090
2021-06-18	Palm Springs	840060655001	1	Telegraph/Mescal/Backbone/Pinnacle Fire	0.092
2022-07-12	Palm Springs	840060655001	1	Long-Range Smoke Transport	0.088
2022-07-22	Palm Springs	840060655001	1	Long-Range Smoke Transport	0.089

38. Q/D Analysis for July 14, 2023 Appendix

The Q/D analysis is based on Section 3.5.1 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations, referred to below as 'EPA Guidance'. This section shows the one-day emissions estimates and Q/D calculations.

Table 24 shows the emissions data used for calculating Q/D. The VOC column is multiplied by 0.6 to estimate reactive VOC (rVOC) from total organic gases (TOG) for the Q/D calculations.

Table 24: Emissions data.

Date	Fire Name	1-Day Growth (Acres)	Latitude (degrees)	Longitude (degrees)	NOx (tons/ day)	VOC (tons/ day)	Q (tons /day)	Emissions Data Source
2023-07-14	Highland Fire	105	33.90267	-116.9422	3	20	15	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa26674a7fd
2023-07-14	Rabbit Fire	2,815	33.89209	-117.0218	93	525	408	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa275e292e2
2023-07-14	Reche Fire	437	33.97419	-117.2145	15	82	64	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa27f6136e0

38.1. Q/D Analysis for Banning - South Hathaway Street POC 1 Station for July 14, 2023

Table 25 shows the Q/D analysis for the Banning - South Hathaway Street POC 1 Station for July 14, 2023 using the method described in Steps 1-6 of Section 3.5.1 of the EPA Guidance.

Table 25: Q/D values for the exceedance of the NAAQS ozone 8-hour 1997 Standard *at Banning - South Hathaway Street POC 1 on July 14, 2023.*

Q/D Date	Date Metric	Fire Name	Q (tons/day)	Distance (km)	Q/D	Q/D > 100
2023-07-13	Prior Date	Highland Fire	0	8	0	No
2023-07-13	Prior Date	Rabbit Fire	0	15	0	No
2023-07-13	Prior Date	Reche Fire	0	33	0	No
2023-07-14	Date of First Hour	Highland Fire	15	8	2	No
2023-07-14	Date of First Hour	Rabbit Fire	408	15	26	No
2023-07-14	Date of First Hour	Reche Fire	64	33	2	No
2023-07-14	Date of Last Hour	Highland Fire	15	8	2	No
2023-07-14	Date of Last Hour	Rabbit Fire	408	15	26	No
2023-07-14	Date of Last Hour	Reche Fire	64	33	2	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Q (tons/day) is the fire emissions for the date shown in the 'Q/D Date' column. Distance (km) is the distance between the fire and the monitoring station.

38.2. Q/D Analysis for Palm Springs – Fire Station POC 1 Station for July 14, 2023

Table 26 shows the Q/D analysis for the Palm Springs – Fire Station POC 1 Station for July 14, 2023 using the method described in Steps 1-6 of Section 3.5.1 of the EPA Guidance.

Table 26: Q/D values for the exceedance of the NAAQS ozone 8-hour 1997 Standard *at Palm Springs – Fire Station POC 1 on July 14, 2023.*

Q/D Date	Date Metric	Fire Name	Q (tons/day)	Distance (km)	Q/D	Q/D > 100
2023-07-13	Prior Date	Highland Fire	0	38	0	No
2023-07-13	Prior Date	Rabbit Fire	0	45	0	No
2023-07-13	Prior Date	Reche Fire	0	64	0	No
2023-07-14	Date of First Hour	Highland Fire	15	38	0	No
2023-07-14	Date of First Hour	Rabbit Fire	408	45	9	No
2023-07-14	Date of First Hour	Reche Fire	64	64	1	No
2023-07-14	Date of Last Hour	Highland Fire	15	38	0	No
2023-07-14	Date of Last Hour	Rabbit Fire	408	45	9	No
2023-07-14	Date of Last Hour	Reche Fire	64	64	1	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Q (tons/day) is the fire emissions for the date shown in the 'Q/D Date' column. Distance (km) is the distance between the fire and the monitoring station.

39. Q/D Analysis for July 15, 2023 Appendix

The Q/D analysis is based on Section 3.5.1 of EPA's Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations, referred to below as 'EPA Guidance'. This section shows the one-day emissions estimates and Q/D calculations.

Table 27 shows the emissions data used for calculating Q/D. The VOC column is multiplied by 0.6 to estimate reactive VOC (rVOC) from total organic gases (TOG) for the Q/D calculations.

Table 27: Emissions data.

Date	Fire Name	1-Day Growth (Acres)	Latitude (degrees)	Longitude (degrees)	NOx (tons/ day)	VOC (tons/ day)	Q (tons /day)	Emissions Data Source
2023-07-14	Highland Fire	105	33.90267	-116.9422	3	20	15	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa26674a7fd
2023-07-14	Rabbit Fire	2,815	33.89209	-117.0218	93	525	408	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa275e292e2
2023-07-14	Reche Fire	437	33.97419	-117.2145	15	82	64	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa27f6136e0
2023-07-15	Rabbit Fire	4,785	33.89209	-117.0218	158	893	693	https://tools.airfire.org/playground/v3.5/emissionsresults.php?scenario_id=165fa287a6c7f8

39.1. Q/D Analysis for Banning – South Hathaway Street POC 1 Station for July 15, 2023

Table 28 shows the Q/D analysis for the Banning – South Hathaway Street POC 1 Station for July 15, 2023 using the method described in Steps 1-6 of Section 3.5.1 of the EPA Guidance.

Table 28: Q/D values for the exceedance of the NAAQS ozone 8-hour 1997 Standard *at Banning – South Hathaway Street POC 1 on July 15, 2023.*

Q/D Date	Date Metric	Fire Name	Q, tons/ day	Distance, km	Q/D	Q/D > 100
2023-07-14	Prior Date	Highland Fire	15	8	2	No
2023-07-14	Prior Date	Rabbit Fire	408	15	26	No
2023-07-14	Prior Date	Reche Fire	64	33	2	No
2023-07-15	Date of First Hour	Highland Fire	0	8	0	No
2023-07-15	Date of First Hour	Rabbit Fire	693	15	45	No
2023-07-15	Date of First Hour	Reche Fire	0	33	0	No
2023-07-15	Date of Last Hour	Highland Fire	0	8	0	No
2023-07-15	Date of Last Hour	Rabbit Fire	693	15	45	No
2023-07-15	Date of Last Hour	Reche Fire	0	33	0	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Q (tons/day) is the fire emissions for the date shown in the 'Q/D Date' column. Distance (km) is the distance between the fire and the monitoring station.

39.2. Q/D Analysis for Palm Springs - Fire Station POC 1 Station for July 15, 2023

Table 29 shows the Q/D analysis for the Palm Springs - Fire Station POC 1 Station for July 15, 2023 using the method described in Steps 1-6 of Section 3.5.1 of the EPA Guidance.

Table 29: Q/D values for the exceedance of the NAAQS ozone 8-hour 1997 Standard *at Palm Springs - Fire Station POC 1 on July 15, 2023.*

Q/D Date	Date Metric	Fire Name	Q, tons/ day	Distance, km	Q/D	Q/D > 100
2023-07-14	Prior Date	Highland Fire	15	38	0	No
2023-07-14	Prior Date	Rabbit Fire	408	45	9	No
2023-07-14	Prior Date	Reche Fire	64	64	1	No
2023-07-15	Date of First Hour	Highland Fire	0	38	0	No
2023-07-15	Date of First Hour	Rabbit Fire	693	45	16	No
2023-07-15	Date of First Hour	Reche Fire	0	64	0	No
2023-07-15	Date of Last Hour	Highland Fire	0	38	0	No
2023-07-15	Date of Last Hour	Rabbit Fire	693	45	16	No
2023-07-15	Date of Last Hour	Reche Fire	0	64	0	No

Note: 'Q/D Date' and 'Date Metric' give the date of the emissions and the purpose of calculating the emissions for the given Q/D Date. 'Date of First Hour' and 'Date of Last Hour' refer to the 8-hour window used to calculate the ozone concentration. 'Prior Date' refers to the day before the ozone exceedance. Q (tons/day) is the fire emissions for the date shown in the 'Q/D Date' column. Distance (km) is the distance between the fire and the monitoring station.

40. Public Notice Comment Appendix

No comments were received.