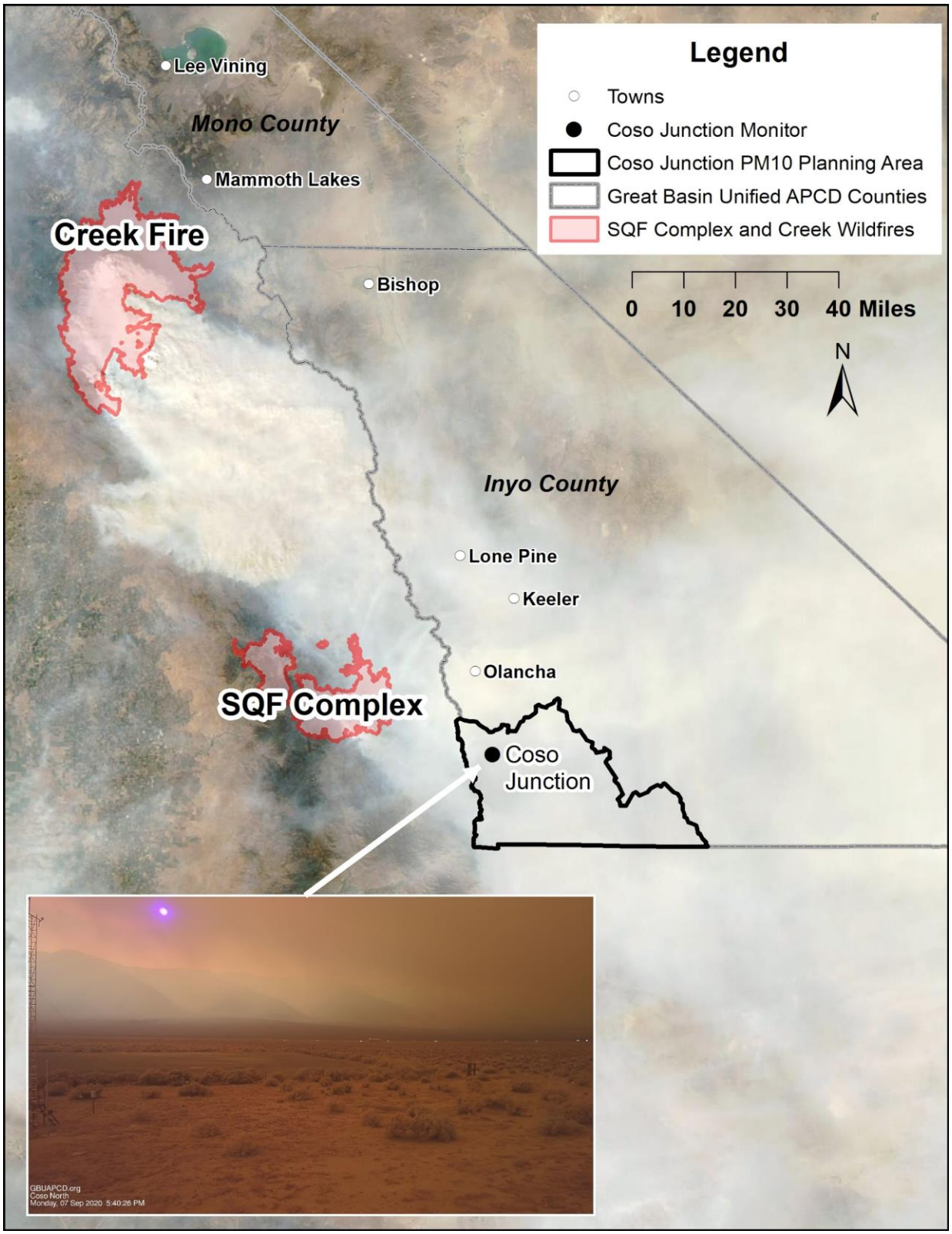
Exceptional Event Demonstration for Wildfire Smoke Impacts to the Coso Junction PM10 Monitor on September 7, 2020



July 2021

Great Basin Unified Air Pollution Control District

On the Cover: Aqua MODIS (True Color) Satellite image from September 7, 2020 courtesy of NASA WorldView. Satellite image shows the extent of the smoke plumes generated by the Creek Fire and SQF Complex Wildfires.

Inset photo on the cover shows smoke engulfing Coso Junction on September 7, 2020 at 5:40 PM PDT. Image from the Great Basin Unified APCD camera monitoring system.

Exceptional Event Demonstration for Wildfire Smoke Impacts to the Coso Junction PM10 Monitor on September 7, 2020

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Executive Summary

The Great Basin Unified Air Pollution Control District (GBUAPCD) has determined that wildfire smoke impacts resulted in an exceedance of the federal 24-hour PM10 National Ambient Air Quality Standard (NAAQS) at GBUAPCD's Coso Junction PM10 monitoring station on September 7, 2020, primarily caused by two wildfires burning in California, the Creek Fire and the SQF Complex.

The Coso Junction Planning Area (see map in Figure 1.1) had achieved attainment status with regard to the PM10 standard based on the 2007-2009 dataset and had met the federal regulatory deadline. Coso Junction must continue to show compliance with the PM10 standard under its federally-approved PM10 maintenance plan. GBUAPCD staff evaluated data from the September 7, 2020 PM10 exceedance and has determined the event to be of regulatory significance. The required Second 10-year maintenance plan is being circulated in tandem with this Exceptional Event (EE) demonstration based on a 2018-2020 design value. The driving force behind this EE demonstration is attaining a NAAQS-acceptable design value for the maintenance plan. The inclusion of this PM10 exceedance in the dataset would adversely affect Coso Junction's compliance with the standard, resulting in a 2018-2020 three-year design value over 1.05. This document presents information demonstrating the monitored PM10 data on the exceedance day were affected by wildfire smoke intrusions into the Coso Junction PM10 Planning Area. GBUAPCD requests EPA's concurrence with GBUAPCD staff's determination that these wildfire events were exceptional in nature and meet US EPA's criteria as described in the Exceptional Event Rule (EER) and, therefore, should not be considered in the calculation of the three-year design value for the Coso Junction Planning Area.

In GBUAPCD's analysis, all the elements of the EER were utilized to analyze the causal relationship, apply the conceptual model, and determine the effect on air quality caused by this wildfire event. In addition, GBUAPCD staff continued to show that the exceedance of the standard was not reasonably controllable or preventable and that the exceedance was a natural event unlikely to recur.

The analysis that follows shows the September 7, 2020 PM10 exceedance was unambiguously impacted by wildfire smoke. The PM10 impacts on the following day, September 8, 2020, were caused by a combination of continued wildfire smoke followed by regional wind-blown dust. Only the September 7, 2020 exceedance is presented here for consideration for exclusion from the NAAQS.

The fires responsible for the wildfire smoke were the SQF Complex in the Sequoia National Forest and the Creek Fire in the Sierra National Forest. The Creek Fire grew massively on September 7, 2020 burning 43,996 acres and sending pyrocumulous clouds high into the atmosphere as well as southeast to Coso Junction. The SQF Complex was smaller, though much closer to Coso Junction. Smoke from these fires caused a 24-hour PM10 impact of 189 µg/m³ on September 7, 2020 at Coso Junction. Historical daily average PM10 concentration at Coso Junction on this date is 21.8 µg/m³ (see Table 3.7). The SQF Complex was lightning-caused and a natural event. The cause of the Creek Fire is still under investigation as of this writing. Tinder dry fuel, warmer than typical conditions, and lack of precipitation, caused 2020 to be one of the worst wildfire years in recorded California history. Indeed, the Creek Fire presently ranks as California's all-time 4th largest wildfire at 377,693 acres, and the SQF Complex ranks as California's all-time 18th largest wildfire at 170,384 acres (see Appendix C).

The GBUAPCD is requesting concurrence on exclusion of the NAAQS exceedance and monitored PM10 values from Table 1 in that they meet the criteria in the EER as summarized in Table 1.1.

Table 1: Daily average AQS NAAQS PM10 concentrations for the Exceptional Event requested for exclusion.

Date	Coso Junction (06-027-1001-4)
9/7/2020	189 µg/m³

1. INTRODUCTION

Statement of Purpose / Action Requested

The GBUAPCD identified that wildfires caused a PM10 exceedance in the Coso Junction PM10 Planning Area on September 7, 2020. This exceedance is sourced to smoke from wildfires on the west slope of the Sierra Nevada of California, from which winds transported smoke over the Sierra crest to the southeast resulting in increased PM10 concentrations at the Coso Junction monitoring station (AQS site ID 06-027-1001-4). Under the Clean Air Act (CAA), the Exceptional Events Rule (EER) allows the exclusion of air quality monitoring data influenced by Exceptional Events from use in determinations of exceedances of the National Ambient Air Quality Standards (NAAQS). This document provides a description of the events, an overview of the EER, and the regulatory significance of this demonstration. In addition, the information presented in this document satisfies all of the EER criteria, as summarized in Table 1.1.

Table 1.1: Summary of GBUAPCD demonstration based on Exceptional Event Rule (EER) Requirements

EER Requirement	Section	Summary
Narrative conceptual model	3	The narrative conceptual model describes the affected area, meteorological conditions of the region and the source causing the violations. It includes a discussion of how emissions from the wildfires led to the violations at the Coso Junction monitor.
Clear Causal Relationship	3	The wildfire events affected air quality in such a way that there exists a clear causal relationship between the wildfires and the monitored violation. Evidence includes satellite images of wildfire smoke drifting toward Coso Junction; back and forward-trajectories linking wildfires with the Coso Junction monitor; wind roses and other meteorological data showing the direction and impact to the monitor, and; a comparison of PM10 data requested for exclusion against historical PM10 concentrations at Coso Junction.
Natural event or caused by human activity that is unlikely to recur	4	The natural event or human activity that is unlikely to recur requirement is met by demonstrating that the events meet the EER definition of wildfire. GBUAPCD provides evidence that the wildfires were natural events, none of the wildfires were confirmed to be caused by human activity, and they occurred on wildland.
Not Reasonably Controllable or Preventable	5	The not-reasonably-controllable-or-preventable requirement is met by demonstrating that the wildfires were natural, lightning-caused events and occurred on wildland. The exception is the Creek Fire, whose ignition source is still under investigation.
Procedural requirements	6	GBUAPCD met EER procedural requirements for flagging, initial notification, demonstration, and public comment.

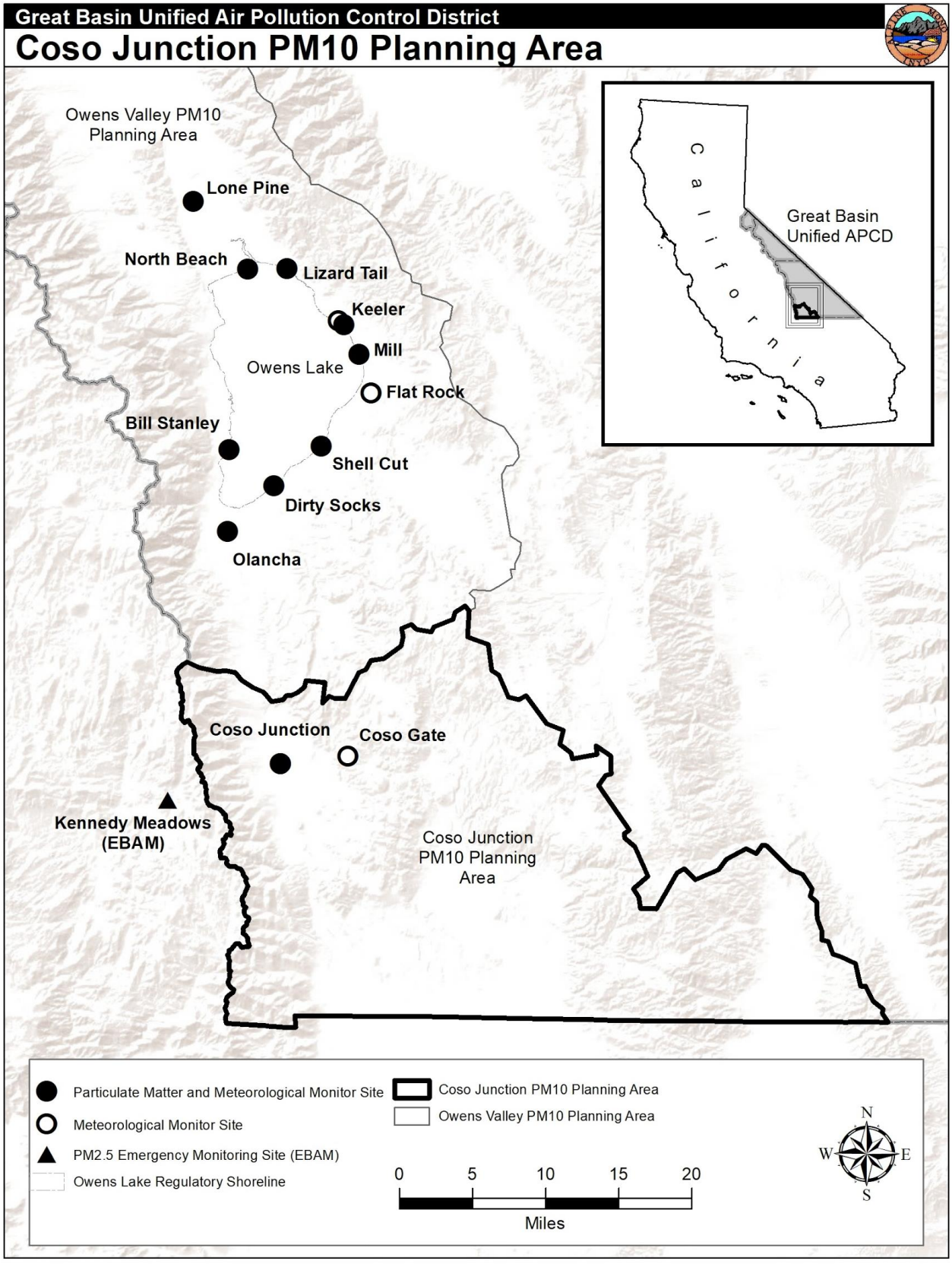


Figure 1.1: Map of the Coso Junction PM10 Planning Area, in the context of the jurisdiction of the GBUAPCD (grayed areas shown in the inset map), and the State of California.

Attainment Status

The Coso Junction PM10 Planning Area status was redesignated as attainment for the PM10 NAAQS by the US EPA on July 29, 2010. The primary source of the PM10 impacts in the area has historically been windblown dust emissions from Owens Lake, located within the adjacent Owens Valley PM10 Planning Area to the north. With jurisdiction over both the Coso Junction and Owens Valley PM10 Planning Areas, the GBUAPCD adopted numerous measures to control emissions from Owens Lake that also affect Coso Junction[1]. These permanent and enforceable emission reductions resulted in the redesignation of the Coso Junction PM10 Planning Area. Concurrent with redesignation, the US EPA approved the first 10-year Coso Junction PM10 Maintenance Plan, which expired in 2020.

The Coso Junction PM10 Planning Area Second 10-Year Maintenance Plan is presented in tandem with this Exceptional Event documentation, and together, fulfill the Clean Air Act requirements to demonstrate continued maintenance of the NAAQS for the 10-year period following the expiration of the first maintenance plan. EPA's concurrence with September 7, 2020 wildfire exclusion from the NAAQS is required to continue the attainment designation status for the Coso Junction PM10 Planning Area. Appendix E shows the 2018-2020 Coso Junction PM10 design values both including and excluding the requested Exceptional Event.

Exceptional Events Definition and Demonstration Criteria

EPA promulgated the EER in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560), pursuant to the 2005 amendment of CAA section 319(b), which allows for the exclusion of air quality monitoring data influenced by exceptional events from use in determinations of exceedances or violations of NAAQS, provided that the following criteria are met:

1. The occurrence of an exceptional event must be demonstrated by reliable, accurate data that is promptly produced and provided by Federal, State, or local government agencies;
2. A clear causal relationship must exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location;
3. There is a public process for determining whether an event is exceptional; and,
4. There are criteria and procedures to petition the Administrator to exclude air quality monitoring data that is directly due to exceptional events from use in determinations by the Administrator with respect to exceedances or violations of the national ambient air quality standards.

[1]Examples of Owens Lake dust control enforcement mechanisms include District Rule 433 https://www.federalregister.gov/documents/2016/09/13/2016-21872/approval-of-california-air-plan-revisions-great-basin-unified-air-pollution-control-district;
the 2016 Owen Valley Planning Area PM10 State Implementation Plan https://gbuapcd.org/District/AirQualityPlans/OwensValley/;
and the 2014 Stipulated Judgment https://gbuapcd.org/Docs/District/AirQualityPlans/SIP_Archive/2014_Stipulated_Judgment_20141230.pdf

The 2016 EER revisions added sections 40 CFR 50.1(j)-(r), 50.14, and 51.930. The EER as defined in 40 CFR 50.14 states that "…a State that has flagged data as being flagged due to an exceptional event and is requesting exclusion of the affected measurement data shall, after notice and opportunity for public, submit a demonstration to justify data exclusion to the Administrator according to the schedule established under paragraph (c)(2)(i)(B)." Per 40 CFR 50.14(c)(3)(iv)(A)-(E), the demonstration to justify data exclusion must include:

1. 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);
2. 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;
3. Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section. The Administrator shall not require a State to prove a specific percentile point in the distribution of data;
4. A demonstration that the event was both not reasonably controllable and not reasonably preventable; and
5. A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

With respect to wildfires, 40 CFR 50.14(b)(4) states that "The Administrator shall exclude data from use in determinations of exceedances and violations where a State demonstrates to the Administrator's satisfaction that emissions from wildfires caused a specific air pollution concentration in excess of one or more national ambient air quality standard at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Provided the Administrator determines that there is no compelling evidence to the contrary in the record, the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements identified in paragraph (c)(3)(iv)(D) of this section regarding the not reasonably controllable or preventable criterion." In addition, the air agency must meet several procedural requirements, including:

1. Submission of an Initial Notification of Potential Exceptional Event and flagging of the affected data in EPA's Air Quality System (AQS) as described in 40 CFR 50.14(c)(2)(i); and
2. Completion and documentation of the public comment process described in 40 CFR 50.14(c)(3)(v).

The GBUAPCD has determined that PM10 concentrations exceeding the NAAQS on September 7, 2020 qualify as an Exceptional Event under Title 40, Part 50 of the Code of Federal Regulations (CFR), the revised EER. The purpose of this document is to provide technical documentation to support a concurrence and petition the Regional Administrator for Region 9 of the U.S. Environmental Protection Agency (EPA) to exclude air quality monitoring data for PM10 from the normal planning and regulatory requirements under the CAA in accordance with the EER. This Exceptional Event demonstration was published for public review and comment on May 28, 2021 (see Section 6). Comments were submitted to info@gbuapcd.org and were accepted through the GBUAPCD Governing Board meeting on July 1, 2021.

2. BACKGROUND

Regional Description

The Coso Junction PM10 Planning Area is located in eastern California in the southern portion of Inyo County (Figure 1.1). Flanked by the Sierra Nevada mountains to the west and the Coso Range to the east, the area is sparsely populated and is an arid high desert that receives less than 5 inches of rain per year. A majority of the Coso Junction PM10 Planning Area is covered by the China Lake Naval Air Weapons Station and is generally restricted from public access. The Coso Junction PM10 Planning Area covers 792 square miles and is located within the jurisdiction of the Great Basin Unified Air Pollution Control District (GBUAPCD). The Coso Junction PM10 Planning Area currently has one active PM10 monitoring site, Coso Junction (06-027-1001-4), located near the State of California Coso Junction rest area in Rose Valley. In addition to the Coso Junction PM10 monitoring site, there is one other AQS-reported site in the planning area, Coso Gate (06-027-0020) which only reports meteorological conditions and H2S emissions. Coso Junction is a SLAMS monitor, while Coso Gate monitors emissions related to a permitted geothermal operation. There are no cities or towns in the Planning Area, however, there are four small communities, each containing a handful of outpost residences.

The elevation of the Coso Junction monitoring site is 3,380 feet MSL. The Sierra crest rises steeply above the western edge of Rose Valley, at an average elevation of 8,500 feet MSL, roughly 5,000 feet above the valley floor.

Climate

The temperature at Coso Junction is cool in winter and hot in summer with the majority of precipitation falling in winter months, with occasional summer monsoons bringing sporadic precipitation in July and August (see Table 2.1).

Table 2.1: Coso Junction Monthly Normal Temperature (1997-2018) and Precipitation (2000-2018).

Month	Temperature Mean (°C)	Temperature Minimum (°C)	Temperature Maximum (°C)	Precipitation Mean (inches)
January	7.1	-9.9	23.4	1.05
February	8.4	-8.2	24.1	0.75
March	12.2	-6.4	28.7	0.27
April	15.4	-2.4	32.0	0.05
May	20.4	-1.0	37.8	0.07
June	25.8	6.2	41.1	0.03
July	28.7	12.4	41.8	0.38
August	27.6	11.6	39.6	0.22
September	23.8	5.2	38.1	0.04
October	17.0	0.0	33.7	0.27
November	10.3	-8.4	28.2	0.19
December	6.1	-12.5	22.6	0.73

Wind Patterns

Typical winds in the Coso Junction area in the Fall are diurnal, composed of light to non-existent winds in the evening and overnight hours, elevating to a light breeze in the afternoon. Elevated wind speeds occur when thunderstorms move through the area or a regional front passes through. Wind is normally from the south or north, aligned with the valley, occasionally from the west as down-slope (foehn) winds, and rarely from the east. High wind events are typically caused by regional-scale weather fronts with wide-ranging impacts. As fronts impact the area, strong winds generally come from the west or north with hourly averages occasionally reaching 20 m/s. These events rarely last longer than 12 hours.

Overview of Monitoring Network

The following parameters are recorded at hourly intervals at the Coso Junction monitoring site and uploaded to AQS. For reference, the AQS parameter codes are also listed:

- 42402 - Hydrogen Sulfide (H2S)
- 61101 - Horizontal Wind Speed (average)
- 61103 - Vector Wind Speed (average)
- 61104 - Wind Direction (average)
- 61106 - Standard Deviation of Wind Direction (average)
- 62101 - Temperature (average)
- 62201 - Relative Humidity (average)
- 65102 - Precipitation (total)
- 81102 - PM10 Standard Conditions (average)
- 85101 - PM10 Local Conditions (average)

Characteristics of Non-event PM10 Concentrations

Air quality at Coso Junction is generally very good, with clean air and unobstructed views of the Sierra crest. PM10 concentrations in September are typically low, with hourly averages generally between 20

µg/m³ and 40 µg/m³, as shown in Figure 2.1. The figure shows the average hourly wind speed and PM10 in the top graph and wind direction in the bottom graph. The time period spans one-week in July 2020 prior to widespread California wildfires which began mid-August. This period is considered non-event, as it reflects typical conditions without notable local or regional PM10 influences.

Lacking urban infrastructure and/or industrial development, since the increased control of dust sources on Owens Lake, the typical sources of PM10 impacting the Coso Junction PM10 Planning Area are wildfire smoke and both local and regional wind-blown dust.

Historically, air pollution in the Coso Junction PM10 Planning Area has been dominated by windblown dust transported from Owens Lake, located north of the Rose Valley, outside the Coso Junction PM10 Planning Area. Owens Lake lies within the Owens Valley PM10 Planning Area, a Serious PM10 nonattainment area. The District has air quality regulatory enforcement authority over both Coso Junction and Owens Valley PM10 Planning Areas. Air pollution from District-permitted facilities within the Coso Junction PM10 Planning Area boundaries has generally not had a significant impact on PM10 concentrations. Stationary sources within the Coso Junction PM10 Planning Area include the Coso geothermal power generation facilities, military operations at the China Lake Naval Air Weapons Station, and volcanic cinder and pumice mining operations.

Particulate matter pollution has infrequently been documented from sources other than Owens Lake. High PM10 concentrations were monitored and documented in 1990 due to windblown dust from abandoned agricultural land and in 2007 windblown dust originated from an unpaved truck parking area. The agricultural land, located north of the monitoring site, was stabilized by natural vegetation cover after the land was fallowed in 1991. Since that time no agricultural activities have taken place in the Coso Junction PM10 Planning Area. Dust from the unpaved truck parking area, located adjacent to the PM10 monitor site, was mitigated by gravel cover in 2008 and then asphalt pavement in 2009. Flash flooding in July 2013 caused silt and soil to be deposited on the valley floor that dried and became a source of PM10 emissions. Vegetation has begun to reestablish on the emissive silt deposit areas and should provide reasonable control in the next several years.

Diurnal temperature fluctuations result in afternoon breezes typically up to 8 m/s, however, hourly average wind speeds above 10 m/s are not uncommon. These gusts have the potential to stir up dust from the desert landscape and create brief dusty conditions.

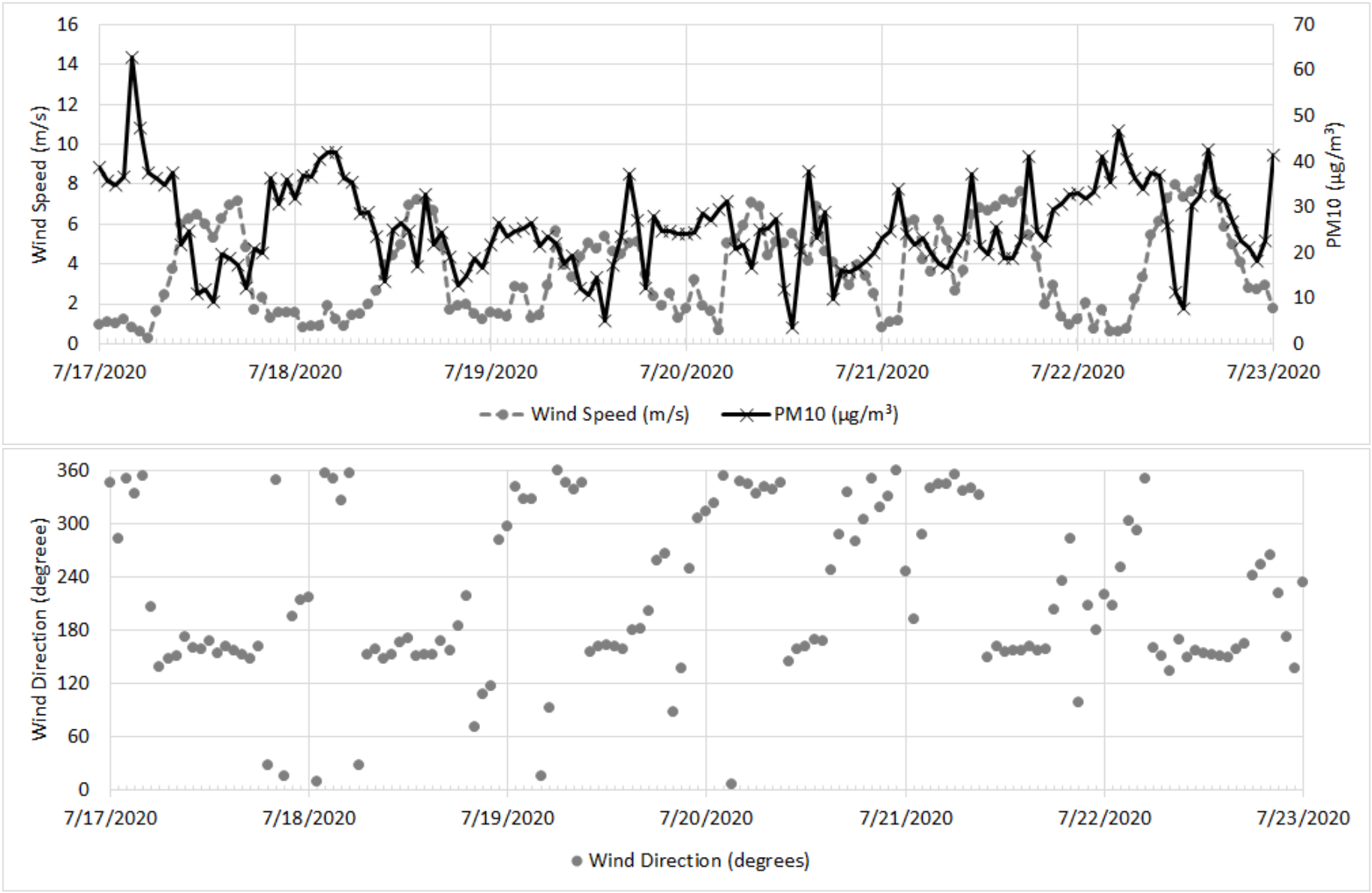


Figure 2.1: Typical non-event conditions, average hourly wind speed and PM10 (top) and wind direction (bottom).

Characteristics of Wildfire Event PM10 Concentrations

In 2020, there were two days exceeding the PM10 NAAQS at the Coso Junction monitor, September 7 and September 8, both impacted by wildfire smoke which traveled from the fires burning on the west side of the Sierra Nevada Mountains to the east side where the Coso Junction monitor is located.

The graph in Figure 2.2 shows the average hourly PM10 concentrations and wind speed conditions on the three days surrounding the September 7, 2020 Exceptional Event. A tabular listing of all Coso Junction monitored hourly parameter values for the September 7, 2020 Exceptional Event day, as well as the day prior to and following the event, is shown in the table in Appendix D, all derived from AQS[2]. The Figure 2.2 graph shows wind speeds prior to September 7, 2020 are similar to the non-event conditions in Figure 2.1, with maximum daily wind speeds ranging from 6 m/s to 8 m/s. PM10 concentrations are also similar to non-event conditions, with only a few spikes above 100 µg/m³. Similar to September 7, 2020, the few PM10 hourly concentration spikes prior to September 7, 2020 are the result of wildfire smoke, notably spikes over 200 µg/m³ the day prior to the Exceptional Event. This uptick in PM10 is consistent with the growing and increasingly emissive nearby SQF Complex fire, which was ignited by lightning on August 19, 2020 (see Figure 3.8).

The Figure 2.2 graphs show that on the afternoon of September 7, 2020 at 17:00 PST, PM10 concentrations at Coso Junction rose abruptly. This increase was the result of wildfire smoke drifting southeast over the Sierra crest from the Creek Fire and SQF Complex, with hourly values reaching 627.9 µg/m³ by 20:00. On the day following the September 7, 2020 event, a significant and widespread regional windblown smoke/dust event impacted the Owens Valley and Coso Junction, resulting in PM10 exceedances at many GBUAPCD monitoring sites. This regional event impacted Coso Junction from the north on September 8, 2020 05:00 PST, with elevated winds and PM10 spikes. The National Weather Service bureau to the north in Reno, Nevada, reported that sources as far away as Nevada were blown southward into California during this rare region-wide wind event (see Appendices A and B). Compared with the smoke impacts on September 7, 2020, the hourly PM10 concentration spikes at Coso Junction on September 8, 2020 were much higher, up to 1857.4 µg/m³.

[2] AQS is the Environmental Protection Agency Air Quality System, https://www.epa.gov/aqs. Data were obtained through an AQS AMP501 Extract Raw Data report.

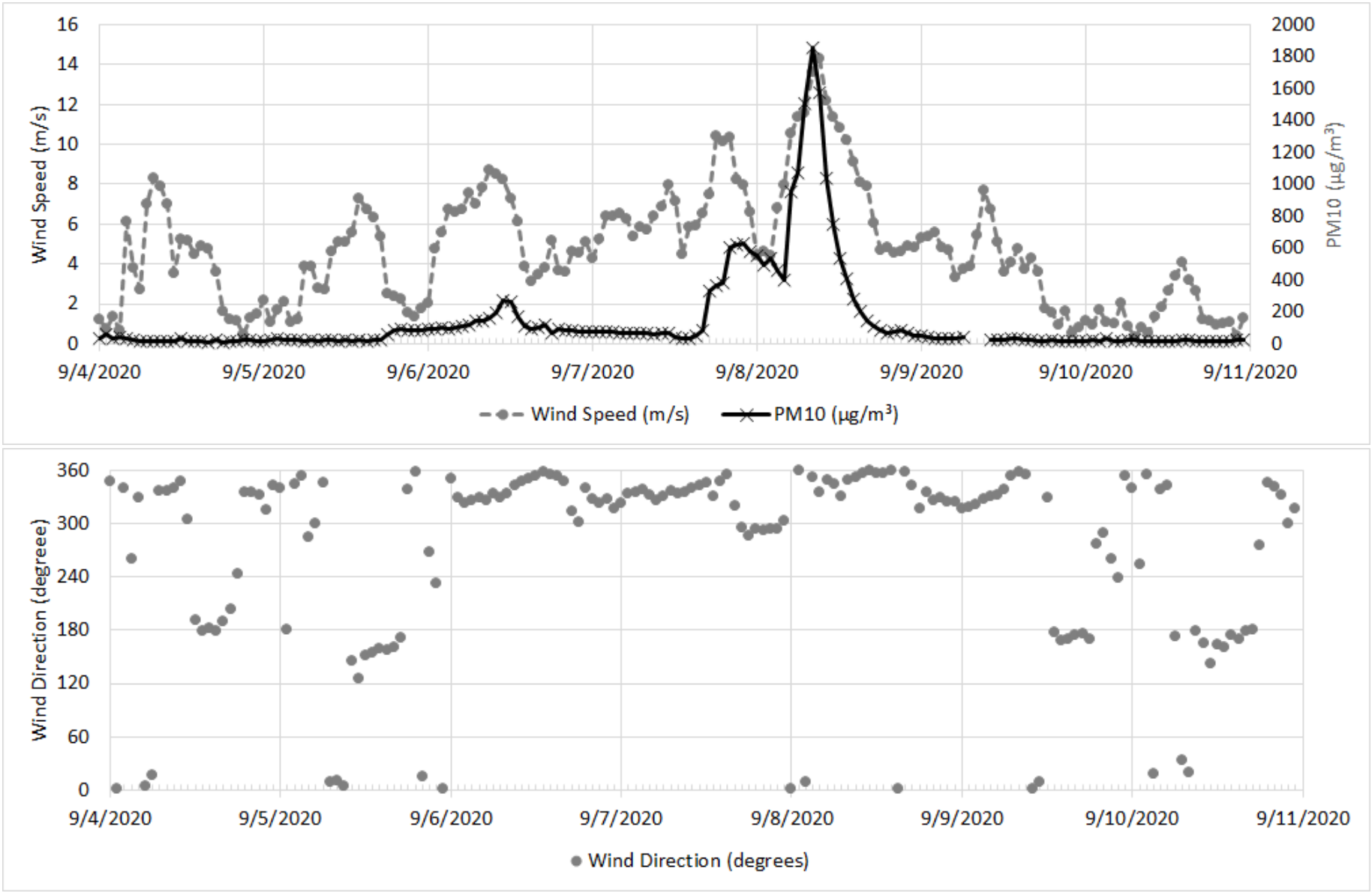


Figure 2.2: 2020 event conditions, average hourly wind speed and PM10 (top) and wind direction (bottom)

Characteristics of 24-hour PM10 NAAQS values

Further expanding on the comparison of non-event PM10 and PM10 observed during the September 7, 2020 Exceptional Event, the graph in Figure 2.3 shows the Coso Junction 24-hour AQS-computed PM10 NAAQS values for Quarter 3 between 2015 and 2020. Excluding the 2020 Exceptional Event, daily average PM10 is typically well below 100 µg/m³. The year 2020, represented by the thick black line, stands out as slightly elevated in late-August and September, which is consistent with the widespread California wildfires which began August 17, 2020 and continued through October 2020.

The graph shows the 24-hour PM10 NAAQS violation threshold of 150µg/m³ as a dashed black line. The graph shows four occasions when the PM10 NAAQS was exceeded with callout text denoting the date, concentration, and source of each event. Note that only the September 7, 2020 exceedance is currently being evaluated and recommended for exclusion from the NAAQS. Although analysis is preliminary on the other exceedances on the graph, initial findings indicate they were either caused by windblown dust largely from outside the planning area, smoke from wildfires, or a local permitted paving operation.

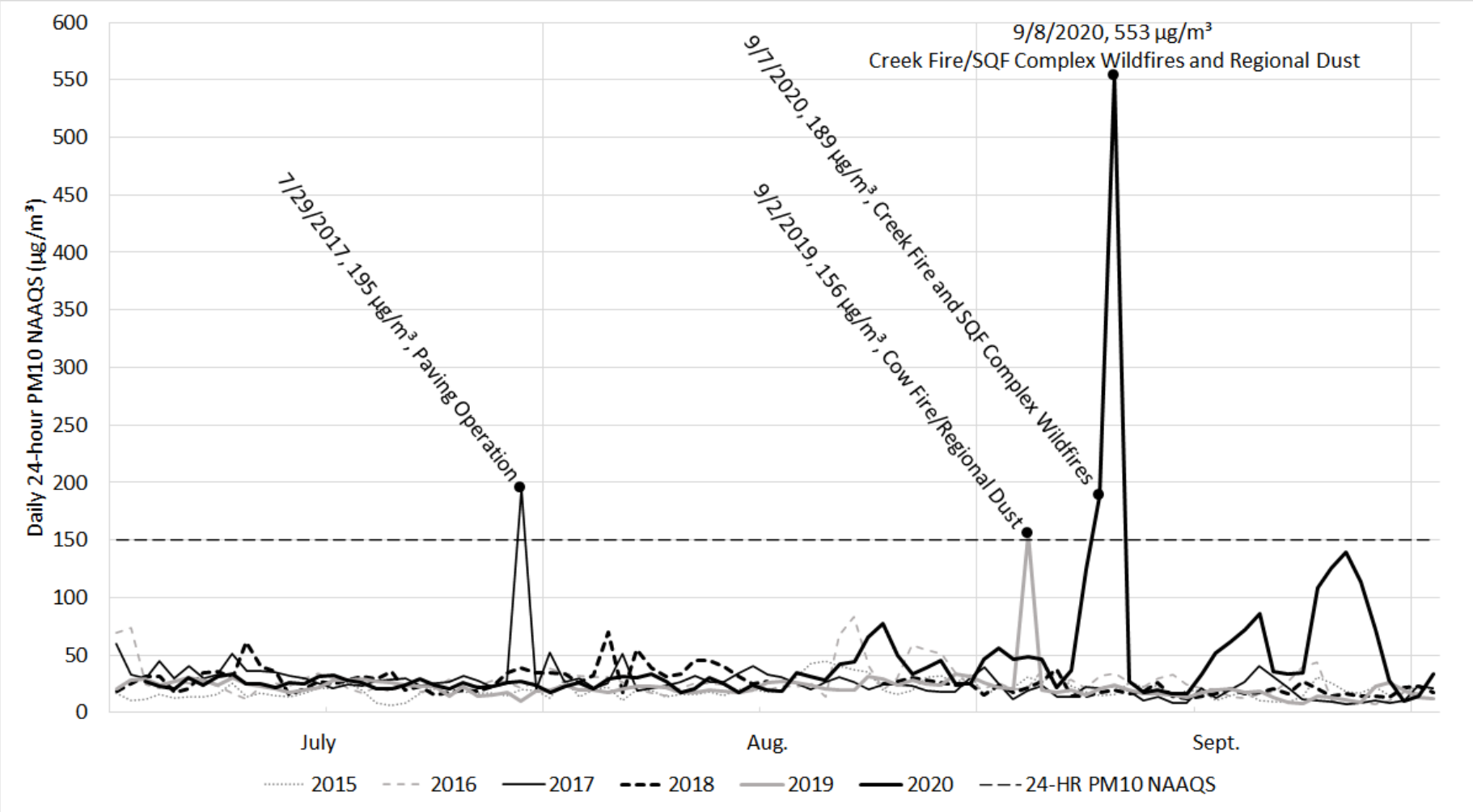


Figure 2.3: Comparison of Coso Junction 24-hour average PM10 NAAQS values for Q3, 2015-2020.

3. EXCEPTIONAL EVENT DEMONSTRATION

The GBUAPCD monitored a PM10 exceedance at Coso Junction on September 7, 2020 violating the 2012, 150 µg/m³ 24-hour PM10 NAAQS, with a daily average concentration of 189 µg/m³. This elevated concentration was the result of smoke from California wildfires that was transported southeast over the Sierra Crest to the Coso Junction PM10 Planning Area. The following day, September 8, 2020 was also a PM10 exceedance day but it is not requested for exclusion at this time because 1) the source was confounded by a mixture of continuing wildfire smoke and regional wind-driven dust, and 2) only one concurred exceptional event is required to attain a satisfactory design value. The following sections contain detailed information on the wildfires causing the September 7, 2020 exceedance, the specific circumstances leading to the exceedance, comparisons between conditions on non-event days and the event day, regional PM impacts beyond Coso Junction, and a clear causal relationship between the wildfires and the monitored exceedance.

Conceptual Model / Summary of Events

The SQF Complex and Creek Fire wildfires were responsible for the smoke impacts causing the September 7, 2020 PM10 NAAQS violation at Coso Junction. The Aqua MODIS satellite image on September 7, 2020 shown in Figure 3.1 clearly shows the smoke plume dispersion from the Creek Fire and SQF Complex wildfires drifting southeast over the Sierra crest and into the Coso Junction Planning Area.

Starting mid-day on September 7, 2020, smoke from these fires billowed up and flowed east-south-eastward (SQF Complex) and southeastward (Creek Fire) merging together in the Coso Junction PM10 Planning Area, arriving at the Coso Junction monitor at approximately 17:00 PST. The SQF Complex and Creek Fires were both large fires, with many personnel involved with their control and monitoring, all of which is well documented in this demonstration. This conceptual model is supported by the fire managers' assessments, the air quality managers' assessments, photos, satellite images, and observed and modeled smoke plumes, each presented below.

Table 3.1 lists the wildfire statistics of the SQF Complex and Creek Fires, including the size, ignition date, distance from the Coso Junction monitor, ranked size, ignition source, and latitude/longitude. Links to each incident command website are in the Table 3.1 footnotes and screenshots are shown in Appendix H. Other wildfires also burned in California in the days leading up to the Exceptional Event. The fire statistics for those wildfires are listed in Table 3.2, also including the size, ignition date, distance and direction from Coso Junction, ranked size, ignition source, and general location.

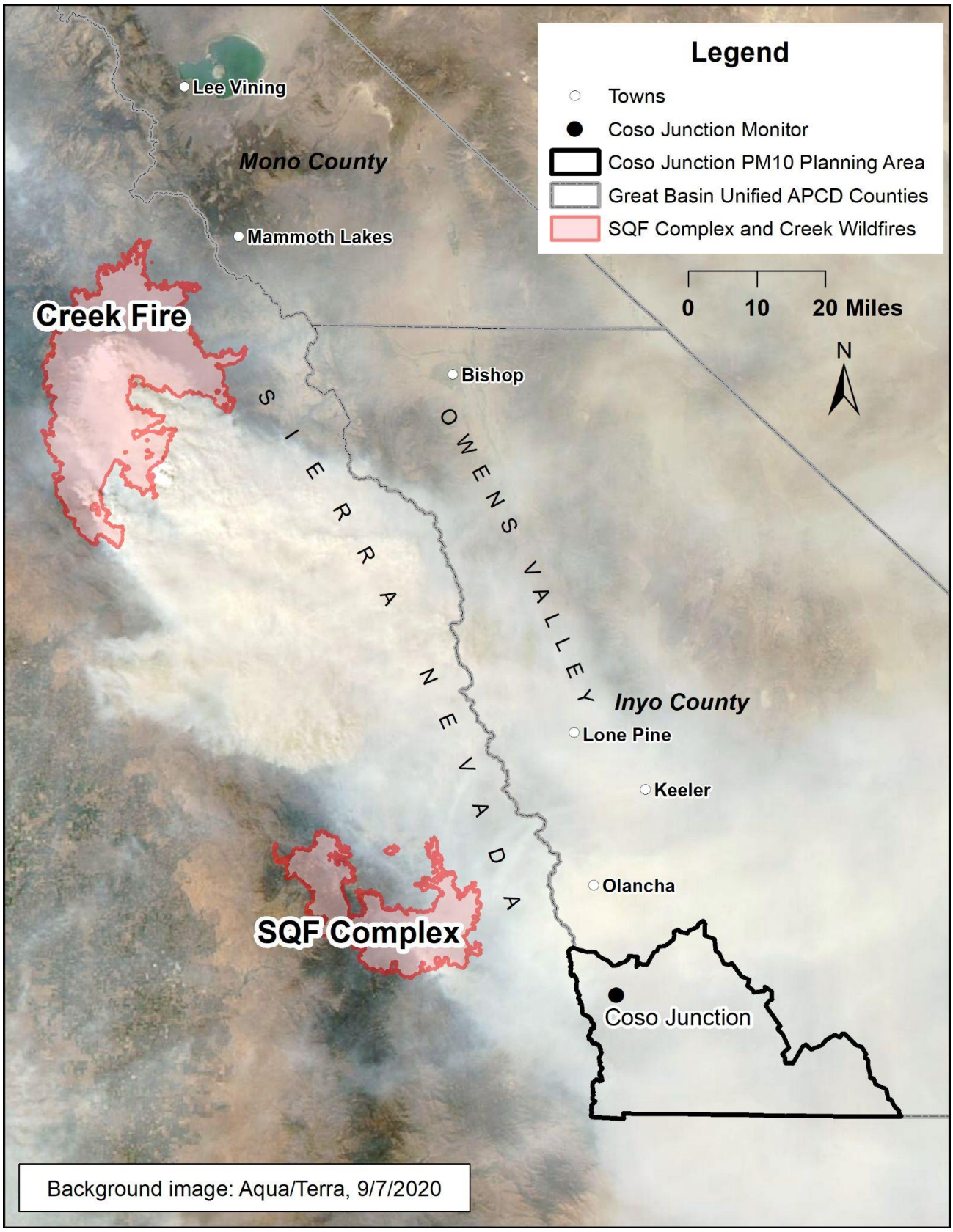


Figure 3.1: Satellite image showing the SQF Complex and Creek Fire smoke plumes entering the Coso Junction PM10 Planning area on September 7, 2020.

Table 3.1: Statistics of wildfires affecting the September 7, 2020 PM10 exceedance at Coso Junction.

Wildfire Name	Final Size (acres)	Ignition Date	Distance from Coso Junction (miles)	Direction Cone from Coso Junction (degrees)	Ranked Size in California by acreage	Ignition Source	Latitude	Longitude
SQF Complex[3]	377,693	8/19/2020	21	275-310 (WNW)	18th	Lightning	36.255	-118.497
Creek Fire[4]	170,384	9/4/2020	98	311-330 (NW)	4th	Under investigation	37.201	-119.272

[3] SQF Complex: https://inciweb.nwcg.gov/incident/7048/
[4] Creek Fire: https://inciweb.nwcg.gov/incident/7147

Table 3.2: Statistics of additional significant California wildfires >100,000 acres or within 200 miles of Coso Junction active during the September 8, 2020 Exceptional Event.

Wildfire Name	Final Size (acres)	Ignition Date	Distance from Coso Junction (miles)	Direction Cone from Coso Junction (degrees)	Ranked Size in California by acreage	Ignition Source	General Location
August Complex[5]	1,032,648	8/16/2020	457	311-315 (NW)	1st	Lightning	Mendocino, Shasta-Trinity and Six Rivers National Forests
SCU Lightning Complex[6]	396,624	8/16/2020	404	291-292 (WNW)	3rd	Lightning	Santa Clara County, Alameda County, Contra Costa County, San Joaquin County, Merced and Stanislaus County
LNU Lightning Complex[7]	363,220	8/17/2020	248	296-302 (WNW)	5th	Lightning	Napa - Wine Country
North Complex[8]	318,935	8/17/2020	389	326-328 (NNW)	6th	Lightning	Plumas National Forest
Dolan Fire[9]	124,924	8/18/2020	235	269-272 (W)	N/A	Suspected Arson	Los Padres National Forest
Slink Fire[10]	26,759	8/29/2020	200	331-332 (NNW)	N/A	Lightning	Humboldt-Toiyabe National Forest

[5] August Complex: https://inciweb.nwcg.gov/incident/6983/
[6] SCU Lightning Complex CalFire: https://www.fire.ca.gov/incidents/2020/8/18/scu-lightning-complex/
[7] LNU Lightning Complex: https://inciweb.nwcg.gov/incident/7027/
[8] North Complex: https://inciweb.nwcg.gov/incident/6997/
[9] Dolan Fire: https://inciweb.nwcg.gov/incident/7018/
[10] Slink Fire: https://inciweb.nwcg.gov/incident/7105/

The satellite image in Figure 3.2 shows the numerous wildfires burning in California on September 6, 2020, the day preceding the PM10 Exceptional Event at the Coso Junction monitor, as well as their associated smoke plumes. The fire producing the most visible smoke plume in the image is the Creek Fire, featuring a massive pyrocumulous cloud. The SQF Complex smoke plume is also shown, west of the Owens Valley and southeast of the Creek Fire, although its smoke plume is less obvious when compared to the Creek Fire plume. Although the Figure shows other wildfires were actively burning in California, as listed in Table 3.2, the Creek Fire and SQF Complex are deemed to be the primary factors in the Coso Junction PM10 exceedance on September 7, 2020 based on 1) their proximity to Coso Junction, 2) HYSPLIT trajectories, 3) Air Resource Advisor reports, and 4) visible smoke plume dispersion in satellite imagery (Figure 3.1). Based on the evidence, the smoke from the numerous wildfires burning in California on and the days leading to the Coso Junction exceptional event on September 8, 2020 undoubtedly played a role in the exceedance, though by far, the primary influencers causing the exceedance were the Creek Fire and SQF Complex.

Figure 3.2: Satellite image of wildfires and their smoke plumes in California on September 6, 2020. (Source: http://californiasmokeinfo.blogspot.com/2020/09/sunday-september-6-2020-snapshot-of.html)

The Creek Fire

The Creek Fire ignited on September 4, 2020. The Creek Fire Incident Update for September 6, 2020 (see Figure 3.3) shows this wildland fire located in the Sierra National Forest had grown 45,500 acres in the two days since ignition and had already required the deployment of 800 firefighting personnel. On the next day, the Coso Junction PM10 Exceptional Event day of September 7, 2020, the Creek Fire Incident Update in Figure 3.4 shows the fire had grown to 78,790 acres, a massive daily growth of 33,290 acres.

Creek Fire

Incident Update Sheet

Date	Time	Information Officer	Information #
09-6-20	8:20 A.M.	Alex Olow	559-269-2259

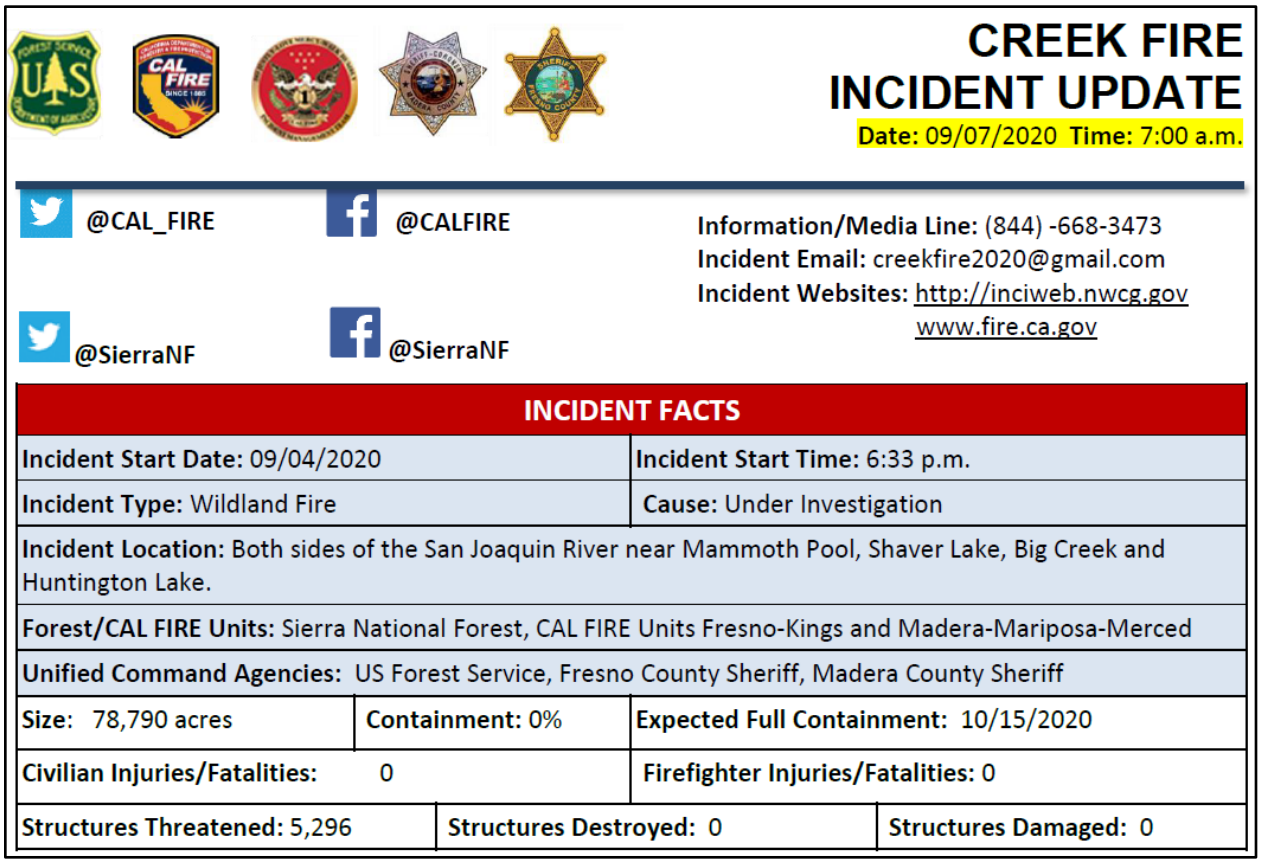
Incident Details			
Start Date	09-4-20	**Cause**	Under Investigation
Start Time	6:00 P.M.	**Acres**	45,500
Incident Type	Vegetation Fire	**% Containment**	0
Jurisdiction	Sierra N.F.	**Date of Containment**	-
Location: Both sides of San Joaquin River near Mammoth Pool and the communities of Shaver Lake, Big Creek and Huntington Lake.		**Latitude**	37.19574°
		Longitude	-119.2638°

Resources				
Engines	**Hand Crews**	**Dozers**	**Helicopters**	**Air Tankers**
25	5	3	2	3
Total Personnel: 800				
Assisting Agencies: CAL FIRE, Fresno County Fire, Fresno Sheriff, Caltrans, Southern California Edison, PG&E, Madera County Sheriff, CHP.				

Structures		
Threatened	**Damaged**	**Destroyed**
3000	0	0

Current Situation:	The Creek Fire a fast-moving fire burning on both Districts of the Forest. The fire which started near the communities of Big Creek and Huntington Lake, moved very quickly prompting several evacuations. Early Saturday afternoon the fire crossed the San Joaquin River and made a run into the Mammoth Pool area. Prompting some members of the public to shelter in place near Wagner's Store and Campground. With assistance the California Army National Guard, 207 people were safely evacuated and assessed for medical needs. The fire burned actively overnight. Crews will be challenged today by steep rugged terrain, heavy fuel loading and high temperatures. Additional resources have been ordered including a Type 1 Incident Management Team. Evacuations and closures remain in effect.
Evacuations:	Mandatory Evacuations in place for the communities of Big Creek, Huntington Lake, Shaver Lake and Cascadel Woods.
Road Closures:	Hwy 168 is closed 2.7 miles east of Prather below the four lanes. Visitors are advised that there is no access to the Shaver Lake area.

Figure 3.3: Creek Fire Incident Update, issued September 6, 2020.



CREEK FIRE INCIDENT UPDATE

Date: 09/07/2020 **Time:** 7:00 a.m.

@CAL_FIRE @CALFIRE

@SierraNF @SierraNF

Information/Media Line: (844) -668-3473
Incident Email: creekfire2020@gmail.com
Incident Websites: http://inciweb.nwcg.gov
www.fire.ca.gov

INCIDENT FACTS		
Incident Start Date: 09/04/2020		**Incident Start Time:** 6:33 p.m.
Incident Type: Wildland Fire		**Cause:** Under Investigation
Incident Location: Both sides of the San Joaquin River near Mammoth Pool, Shaver Lake, Big Creek and Huntington Lake.		
Forest/CAL FIRE Units: Sierra National Forest, CAL FIRE Units Fresno-Kings and Madera-Mariposa-Merced		
Unified Command Agencies: US Forest Service, Fresno County Sheriff, Madera County Sheriff		
Size: 78,790 acres	**Containment:** 0%	**Expected Full Containment:** 10/15/2020
Civilian Injuries/Fatalities: 0		**Firefighter Injuries/Fatalities:** 0
Structures Threatened: 5,296	**Structures Destroyed:** 0	**Structures Damaged:** 0

Figure 3.4: Creek Fire Incident Update, issued September 7, 2020.

The Creek Fire progression map produced on September 10, 2020 in Figure 3.5 shows the rapid advancement of the fire perimeter from the date of origin. It indicates the fire grew 36,169 acres on September 6, 2020 and an additional 43,996 acres on September 7, 2020. The acreage discrepancies with the Incident Updates likely reflect more refined mapping of the perimeter on this later date.

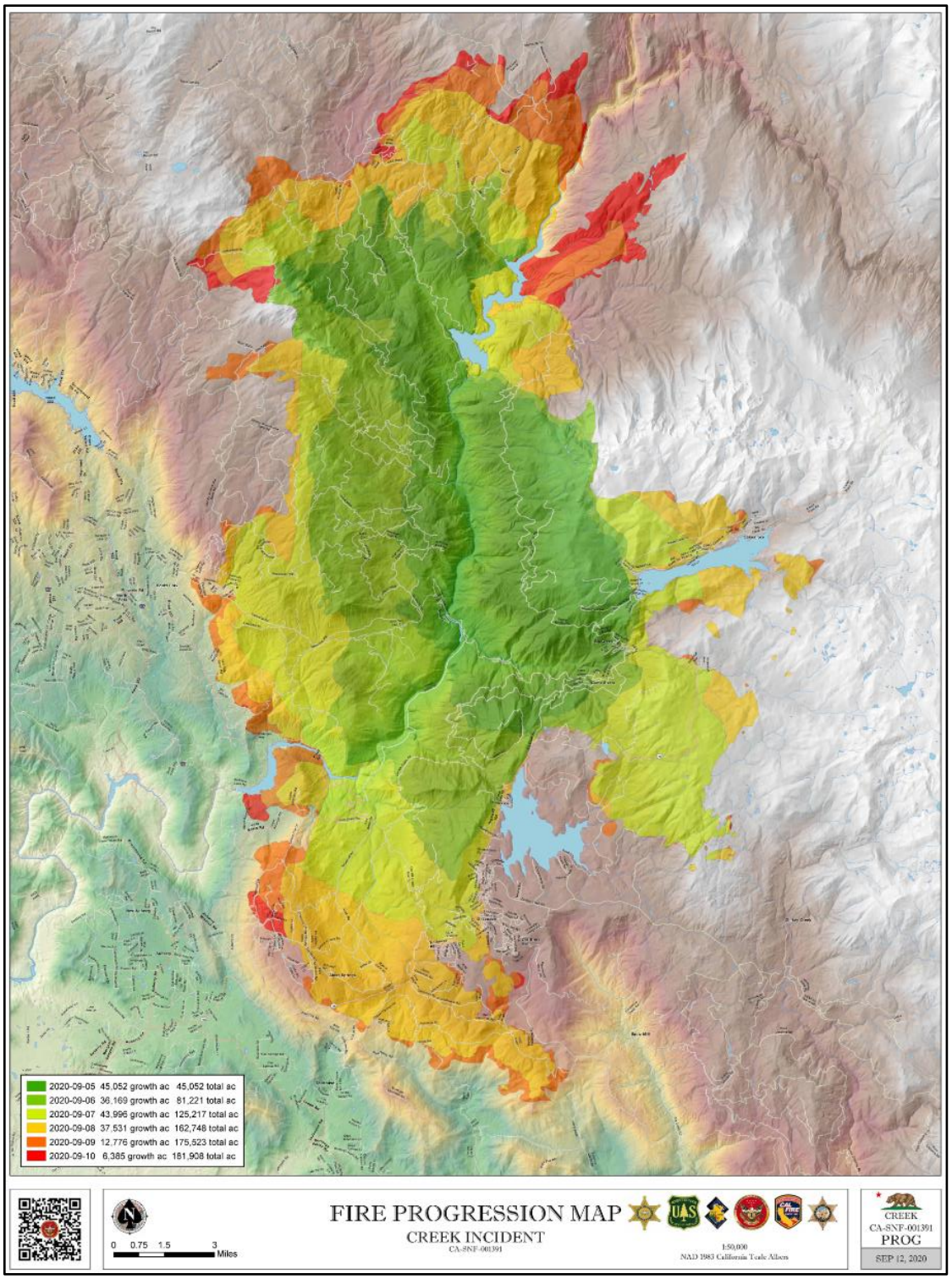


Figure 3.5: Map showing Creek Fire progression, through September 10, 2020.

To illustrate the magnitude of the Creek Fire conflagration between September 4 and September 7, a dedicated Air Resource Advisor (ARA) arrived September 8, 2020 tasked with reporting conditions and predicting PM concentrations at nearby communities. Prior to the assignment of a dedicated ARA on September 8, the Humboldt-Toiyabe National Forest ARA covered the smaller Slink Fire and other fires burning in northern Mono County and produced a Smoke Outlook on September 6, 2020, as shown in Figure 3.6, referencing the Creek Fire. The ARA reported that:

- The Creek Fire in Sierra National Forest grew 36,000 acres and inundated the area with smoke - much of that smoke stayed aloft and dispersed, but impacts were still seen throughout the area, especially south of the Slink Fire.
- Monday is expected to have northwesterly flow.

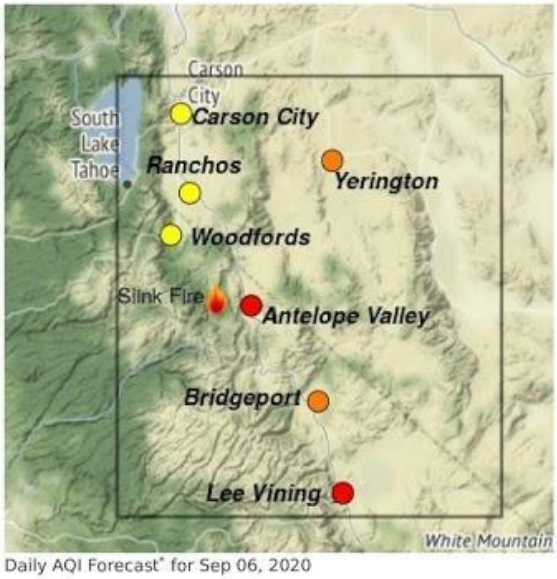
The observations and predictions by the Humboldt-Toiyabe ARA on September 6, 2020 are consistent with the observations and measurements obtained by the GBUAPCD, in particular, the northwest air flow on Monday, September 7, 2020, which brought smoke from the Creek Fire southeast to the Coso Junction area.

Smoke Outlook for 9/06 - 9/07
Humboldt-Toiyabe NF - Slink Fire
Issued at: 2020-09-06 07:27 PDT

Special Statement
Yesterday, the Creek Fire in Sierra National Forest grew 36,000 acres and inundated the area with smoke - much of that smoke stayed aloft and dispersed, but impacts were still seen throughout the area, especially south of the Slink Fire.

Fire:
The Slink Fire is now at 20,800 acres with containment up to 21%. The smoke from the Creek Fire halted aerial operations yesterday evening and are waiting for it to lift later this afternoon, which will also increase fire activity. Monday is expected to have northwesterly flow which could increase growth so crews are working to contain the south and northwest perimeter where the fire is most active.

Smoke:
Smoke impacts from the both the Slink Fire and Creek Fire could be seen overhead at Woodfords and Ranchos yesterday, but most of the smoke stayed aloft - Carson City also stayed in Moderate without severely impacted by smoke. Yerington is seeing smoke impacts into Unhealthy this morning - it should lift this afternoon and NW winds later today may keep smoke out of Mason Valley tonight. Smoke did severely impact areas south of the Slink Fire - Bridgeport and Lee Vining were hit hard, with Lee Vining going into Hazardous air quality. Bridgeport is currently Unhealthy and trending down and expected to be USG for the day - please take precautions to protect yourself and reduce your exposure to smoke.



Daily AQI Forecast* for Sep 06, 2020

Station	Yesterday hourly (6a noon 6p)	Sat 9/05	Forecast* Comment for Today -- Sun, Sep 06	Sun 9/06	Mon 9/07
Carson City			Moderate expected for most of the day		
Yerington			Unhealthy air quality this morning, smoke expected to lift this afternoon and should see improved air quality later in the day		
Ranchos			Currently Good, Periods of Moderate this morning		
Woodfords			Currently Good, Periods of Moderate and even USG possible this morning, should clear again in the afternoon		
Antelope Valley			Heavier smoke impacts last night and this morning, smoke expected to lift in the afternoon and evening		
Bridgeport			Overnight smoke last night still lingering this morning, expecting it to lift midday, smoke impacts likely again tonight, but not as severe as last night		
Lee Vining			Heavily impacted by the Creek Fire last night and into this morning, smoke may begin to lift later this morning, NW winds may lessen the impacts tonight		

Issued 2020-09-06 07:27 PDT by Ali Kamal, Air Resource Advisor (SlinkFireARA@gmail.com)

Air Quality Index (AQI)	Actions to Protect Yourself
Good	None
Moderate	Unusually sensitive individuals should consider limiting prolonged or heavy exertion.
USG	People within Sensitive Groups* should **reduce** prolonged or heavy outdoor exertion.
Unhealthy	People within Sensitive Groups* should **avoid all** physical outdoor activity.
Very Unhealthy	Everyone should avoid prolonged or heavy exertion.
Hazardous	Everyone should avoid any outdoor activity.

***Disclaimer:** This forecast is based on fine particulates only; ozone is not included. Forecasts may be wrong; use at own risk. Use caution as conditions can change quickly. See your health professional as needed. Smoke sensitive groups should take appropriate precautions.

Additional Links
California Smoke Information -- http://californiasmokeinfo.blogspot.com/
AQI Basics -- https://www.airnow.gov/index.cfm?action=aqibasics.aqi
Additional Fire Information -- https://inciweb.nwcg.gov/incident/article/7105/54736/
Wildfire Smoke and Air Quality Information -- https://www.airnow.gov/fires/
Tahoe Fire Cameras -- http://www.alertwildfire.org/tahoe/firecams.html
--

Issued by USFS Wildland Fire Air Quality Response Program -- www.wildlandfiresmoke.net
Humboldt-Toiyabe NF Current Outlook -- tools.airfire.org/outlooks/Humboldt-ToiyabeNF
*Smoke and Health Info -- www.airnow.gov/index.cfm?action=smoke.index

Figure 3.6: Air Resource Advisor Smoke Outlook for the Humboldt-Toiyabe National Forest, issued September 6, 2020.

Figure 3.7 shows the September 8, 2020 ARA Smoke Outlook for the San Joaquin-Yosemite Area (Creek Fire) indicating that as of September 7, the Creek fire had burned 135,000 acres with 50,000 acres burned on the September 7, 2020 exceedance day alone. The Smoke Outlook further states:

- NW transport winds are blowing smoke to the southeast and there is a lot of residual smoke from yesterday trapped in the canyons and lower terrain.
- Forecast for poor visibility, potentially less than ¼ mile.

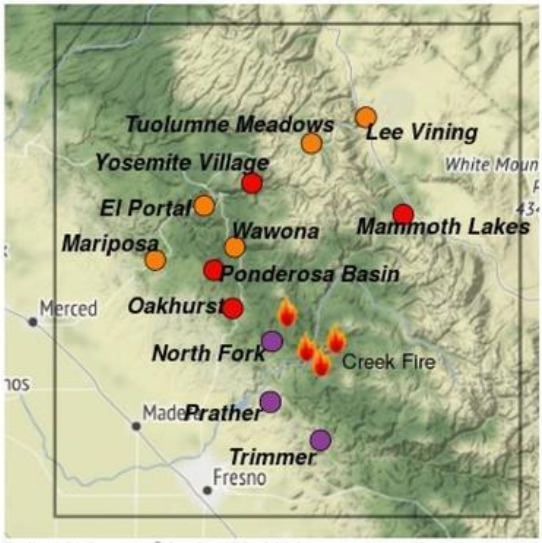
The Creek Fire smoke transport to the southeast observed and predicted by the ARA is consistent with conditions observed and monitored by the GBUAPCD, including the degraded visibility as forecasted by the ARA. With this southeast transport, smoke flowed over the Sierra crest into the Owens Valley, funneling south to Coso Junction.

Smoke Outlook for 9/08 - 9/09
San Joaquin-Yosemite Area (Creek Fire)
Issued at: 2020-09-08 11:28 PDT

Fire
As of last night, the Creek Fire has burned over 135,000 acres, much of it in heavy mixed conifer fuels, with over 50,000 acres of that burning in the last 24 hrs. Potential for extreme fire behavior and large-scale growth continues.

Smoke
NW transport winds are blowing smoke to the SE from the Creek Fire this morning, and there is a lot of residual smoke from yesterday trapped in the canyons and lower terrain. Some of this may mix out in the afternoon, however continued large-scale emissions are likely to worsen air quality tonight and tomorrow, throughout the forecast area.

Notes
Forecasts reflect particulate matter only – not ozone. Poor visibility, potentially less than 1/4 mile, may occur on roads to the south and/or west of the fire and may also hinder aircraft flight operations.



Daily AQI Forecast* for Sep 08, 2020

Station	Yesterday hourly	Mon 9/07	Forecast* Comment for Today -- Tue, Sep 08	Tue 9/08	Wed 9/09
Lee Vining	6a noon 6p		Possible moderate range this afternoon		
Tuolumne Meadows			Possible moderate range this afternoon		
Mammoth Lakes			Possible moderate range this afternoon		
Yosemite Village			Possible moderate range this afternoon		
El Portal			Possible moderate range this afternoon		
Wawona			Possible moderate range this afternoon		
Mariposa			Possible moderate range this afternoon		
Ponderosa Basin			Some afternoon improvement; worsening again likely late afternoon/evening		
Oakhurst	No hourly data		Some afternoon improvement; worsening again likely late afternoon/evening		
North Fork			Continued Very Unhealthy to Hazardous range; Possible improvement in afternoon		
Trimmer			Continued Very Unhealthy to Hazardous range; Possible improvement in afternoon		
Prather	No hourly data		Continued Very Unhealthy to Hazardous range; Possible improvement in afternoon		

Issued 2020-09-08 11:28 PDT by Leland Tarnay, Air Resource Advisor (leland_tarnay@firenet.gov)

Air Quality Index (AQI)	Actions to Protect Yourself
Good	None
Moderate	Unusually sensitive individuals should consider limiting prolonged or heavy exertion.
USG	People within Sensitive Groups* should **reduce** prolonged or heavy outdoor exertion.
Unhealthy	People within Sensitive Groups* should **avoid all** physical outdoor activity.
Very Unhealthy	Everyone should avoid prolonged or heavy exertion.
Hazardous	Everyone should avoid any outdoor activity.

***Disclaimer:** This forecast is based on fine particulates only; ozone is not included. Forecasts may be wrong; use at own risk. Use caution as conditions can change quickly. See your health professional as needed. Smoke sensitive groups should take appropriate precautions.

Additional Links
Fire and Smoke Map -- https://fire.airnow.gov/
Great Basin Unified APCD -- https://www.gbuapcd.org/
Tuolumne County APCD -- https://www.tuolumnecounty.ca.gov/364/Air-Pollution-Control-District
San Joaquin Valley APCD -- http://www.valleyair.org
Mariposa County APCD -- https://www.mariposacounty.org/433/Air-Pollution-Control-District
CA Smoke Blog -- http://californiasmokeinfo.blogspot.com/

Issued by USFS Wildland Fire Air Quality Response Program -- www.wildlandfiresmoke.net
San Joaquin-Yosemite Current Outlook -- tools.airfire.org/outlooks/SanJoaquin-Yosemite
*Smoke and Health Info -- www.airnow.gov/index.cfm?action=smoke.index

Figure 3.7: Smoke Outlook for the San Joaquin-Yosemite Area, issued September 8, 2020.

The SQF Complex

The SQF Complex wildfire was ignited by a lightning strike on August 19, 2020 and the size of the fire had grown to 55,961 acres by September 7, 2020 (see map in Figure 3.11). The SQF Complex was a wildland fire in the Sequoia and Inyo National Forests. The SQF Complex consisted of two fires managed together: the larger Castle Fire, and the smaller Shotgun Fire. The SQF Complex Fire Update dated September 8, 2020 in Figure 3.8 indicates that:

- In the afternoon, as winds become more westerly, the Creek Fire smoke could shift north of the Sequoia (SQF) Complex.

Indeed, this prediction is consistent with the observations and ambient measurements made by the GBUAPCD. Measurements and satellite images confirmed Creek Fire smoke was transported southeast to north of the SQF Complex.

Sequoia Complex (#SQFComplex) Fire Update

Sequoia and Inyo National Forests
September 8, 2020
Northern Rockies Incident Management Team 1
Mike Goicoechea, Incident Commander

Fire Information: 559-697-5148, 8 AM-8 PM
Email: sqfcomplex2020@gmail.com
Website: inciweb.nwcg.gov/incident/7048/
Facebook: www.facebook.com/SequoiaNF www.facebook.com/inyonf
Facebook: www.facebook.com/TulareCountyFireDepartment
Twitter: @sequoiaforest and @Inyo_NF

Virtual Community Meeting 6 PM tonight
Broadcast via **Facebook Live** at: www.facebook.com/SequoiaNF

Operational video briefings are posted to the Sequoia NF Facebook site daily.

Incident Statistics
Location: 25 miles N of Kernville, CA
Date of origin: 8/19/20 Cause: Lightning
Size: 62,887 acres Containment: 7%
Cost: $13.5 million Injuries: 11
Civilians evacuated: 1,433
Structures threatened: 838

Resources
Hand Crews: 13 Engines: 49
Water-tenders: 19 Dozers: 8
Helicopters: 8 Personnel: 792

On 9/7/2020, The USDA Forest Service issued **emergency forest closures** and emergency fire restrictions for the Pacific Southwest Region. These orders affect eight National Forests, including the Sequoia and Inyo National Forests.

Sequoia (#SQF) Complex: The complex includes the 62,389 acre Castle fire and the 498 acre Shotgun fire.

Castle Fire: On Monday afternoon, northwest winds pushed active fire on the eastern flank of the fire towards Little Horse Meadows. Structure protection groups remained ready through the night at Beach Meadows. Along the southern edge, fire was held along the Kern River towards Lion Meadows. Due to the fire being pushed on the southeast corner, direct firefighting tactics on the ground and retardant from air resources were used in this area. On the western flank of the fire, operations personnel began the work of scouting the fire's edge that reached into Freeman Grove. A new fire start in Pierpoint diverted five fire engines. The fire was 100% contained at 1/10th of an acre.

Today: Scouting on the western flank will continue to access how far the fire has progressed into the Freeman Grove area and form a tactical plan for successful firefighting activity. Direct fireline in this area is not possible due to steep, rugged terrain and the risk of firefighters' safety. Personnel are working to assess how to tie indirect fire containment lines together from the north and south on the western edge of the fire. The western edge of the fire remains the highest priority for the incident management team due to the values at risk in nearby communities.

The southeast side of the fire will be tested with winds continuing from the northwest bringing the potential of spotting. Backcountry structure protection groups on the east side in the Inyo National Forest will continue their work with fuels mitigation to protect area values at risk, including structures. On the northeast flank, resources will work to limit impacts to local resources within the Golden Trout Wilderness area.

Shotgun Fire: Continues to hold at 498 acres, slowly burning in a rocky drainage and being monitored by aircraft.

Weather: Weather conditions today will be slightly more favorable for firefighters with temperatures 7-9 degrees cooler and relative humidity levels up 2-3%. Morning winds in the drainages will become south to southwest in the early afternoon with speeds gusting to 14 miles per hour. Winds will continue to be heavily impacted by local terrain and shading from the Creek Fire smoke.

Smoke: Northwest winds on Tuesday will allow smoke from the Creek Fire to shade the Sequoia Complex. In the afternoon, as winds become more westerly, the Creek Fire smoke could shift north of the Sequoia Complex area.

Figure 3.8: Sequoia and Inyo National Forest Sequoia (SQF) Complex Fire Update from September 8, 2020.

The Air Resource Advisor (ARA) Smoke Outlook Report for the Southern Sierra-Sequoia SQF Complex on September 7, 2020 is shown in Figure 3.9. Notably, it states:

- Yesterday was an active fire day for the SQF Complex. Significant growth was experienced.
- The outlook area will be under a blanket of smoke due to the SQF and Creek Fire.
- Today's air quality will be much impaired for the Outlook area.
- Very Unhealthy or worse levels are expected for Owens Valley.
- During this period [9/7-9/8] smoke from Creek Fire will affect the area. It will combine with SQF Complex smoke and contribute to very poor air quality.

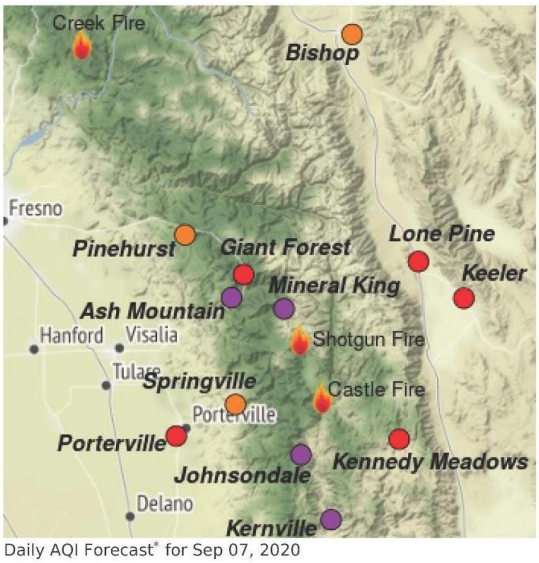
All these bulleted predictions and observations by the SQF Complex ARA in Figure 3.9 are consistent with the observations and ambient air quality measurements made by the GBUAPCD, as demonstrated in the sections below. While there is no specific ARA forecast for Coso Junction due to lack of a population center, all other nearby communities were predicted to have Unhealthy air quality from the SQF Fire on September 7, 2020 (Lone Pine, Keeler, Kennedy Meadows).

Smoke Outlook for 9/07 - 9/08
Southern Sierra - Sequoia : SQF Complex
Issued at: 2020-09-07 07:57 PDT

Fire
Yesterday was an active fire day for SQF Complex-Castle Fire. Significant fire growth was experienced. Daily acres burned have been averaging 3 to 5 thousand acres. However, today's fire growth is expected to be less. Hot and dry conditions continue but will be less under more stable conditions. The outlook area will be under a blanket of smoke due to SQF and Creek Fire. This blanket is expected to moderate the fire's activity both day and night. This will support progress on fire suppression efforts. For fire information, visit inciweb.nwcg.gov/incident/7048.

Smoke
Today's air quality will be much impaired for the Outlook area. Very Unhealthy or worse levels are expected for Owens Valley, Kern River drainage, and Sequoia National Park. Transport Winds will shift NW Monday thru Wednesday. During this period smoke from Creek Fire will affect the area. It will combine with SQF Complex smoke and contribute to very poor air quality. The San Joaquin Valley and the Sierra foothills will also be impacted.

Special Note
Poor Visibility, less than 1/4 mile, requires heightened attention when driving & hinders aircraft flight operations.



Daily AQI Forecast* for Sep 07, 2020

Station	Yesterday hourly (6a noon 6p)	Sun 9/06	Forecast* Comment for Today -- Mon, Sep 07	Mon 9/07	Tue 9/08
Pinehurst			Unhealthy for Sensitive Groups today		
Giant Forest			Unhealthy today		
Ash Mountain			Very Unhealthy today		
Mineral King			Very Unhealthy today		
Springville			Unhealthy for Sensitive Groups today		
Porterville			Unhealthy today		
Johnsondale			Very Unhealthy today		
Kernville			Very Unhealthy today		
Kennedy Meadows			Unhealthy today		
Keeler			Unhealthy today		
Lone Pine			Unhealthy today		
Bishop			Unhealthy for Sensitive Groups today		

Issued 2020-09-07 07:57 PDT by Gary M. Curcio, ARA, gary.curcio@gmail.com

Air Quality Index (AQI)	Actions to Protect Yourself
Good	None
Moderate	Unusually sensitive individuals should consider limiting prolonged or heavy exertion.
USG	People within Sensitive Groups* should **reduce** prolonged or heavy outdoor exertion.
Unhealthy	People within Sensitive Groups* should **avoid all** physical outdoor activity.
Very Unhealthy	Everyone should avoid prolonged or heavy exertion.
Hazardous	Everyone should avoid any outdoor activity.

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Additional Links
California Smoke Blog -- http://californiasmokeinfo.blogspot.com/
San Jaoquin APCD -- http://www.valleyair.org
Fire and Smoke Map -- https://fire.airnow.gov/#
Eastern Kern APCD -- http://www.kernair.org
Great Basin Unified APCD -- https://www.gbuapcd.org/
--

Issued by USFS Wildland Fire Air Quality Response Program -- www.wildlandfiresmoke.net
Southern Sierra - Sequoia Current Outlook -- tools.airfire.org/outlooks/SouthernSierra-Sequoia
*Smoke and Health Info -- www.airnow.gov/index.cfm?action=smoke.index

Figure 3.9: Air Resource Advisor Smoke Outlook for the Southern Sierra, September 7, 2020.

The SQF (Sequoia) Complex progression map in Figure 3.10 shows that the fire grew 5,523 acres on September 6, 2020 and grew an additional 6,641 acres on September 7, 2020. The yellow line running north to south on the right side of the map is the Sierra crest, indicating how close the fire was to the Owens Valley and the Coso Junction PM10 Planning Areas, both bordering the crest to the east.

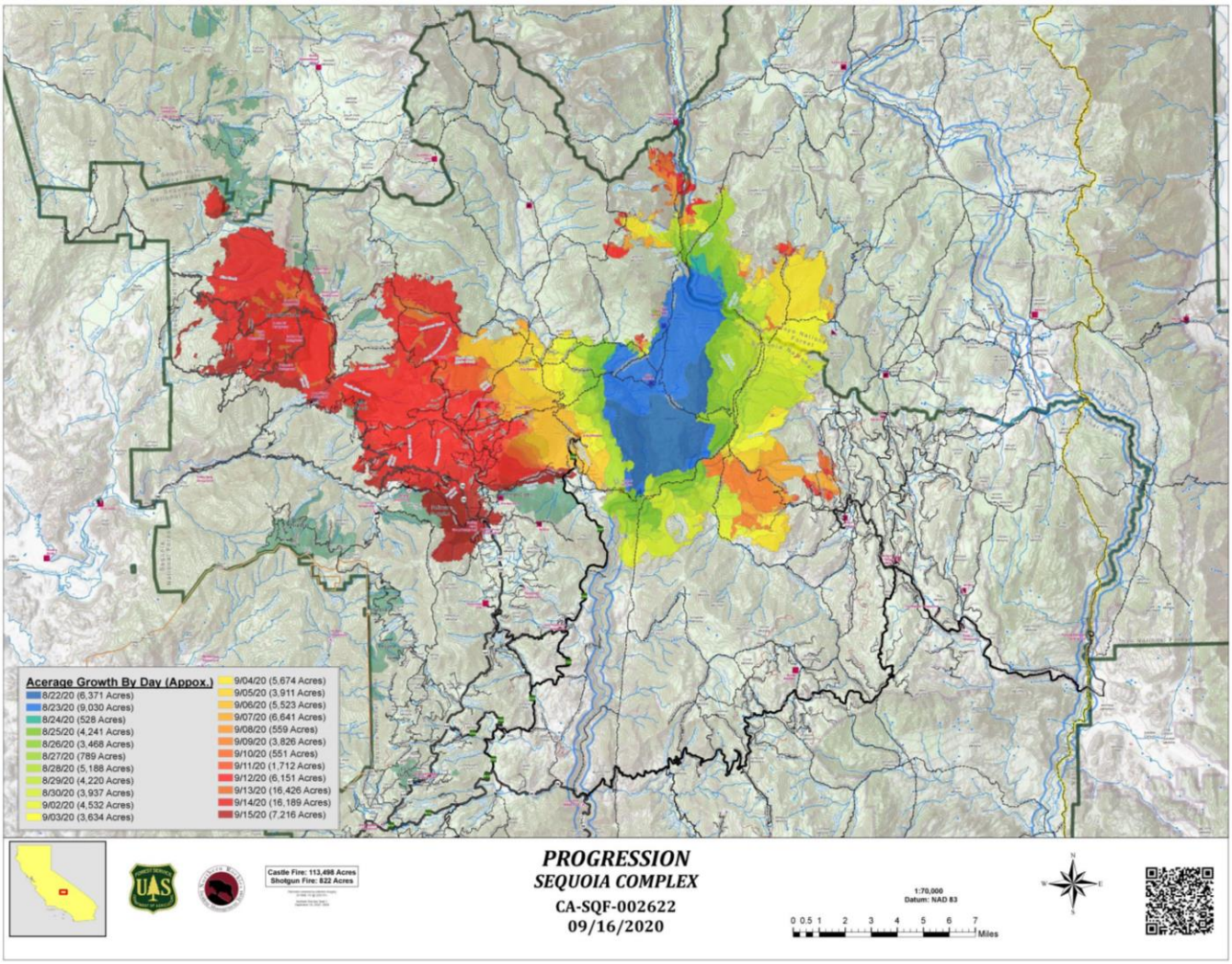


Figure 3.10: Map showing SQF Complex progression, through September 15, 2020.

The map in Figure 3.11 shows the SQF Complex extent on September 7, 2020 with the Castle Fire component mapped at 55,523 acres, and the Shotgun Fire component mapped at 438 acres.

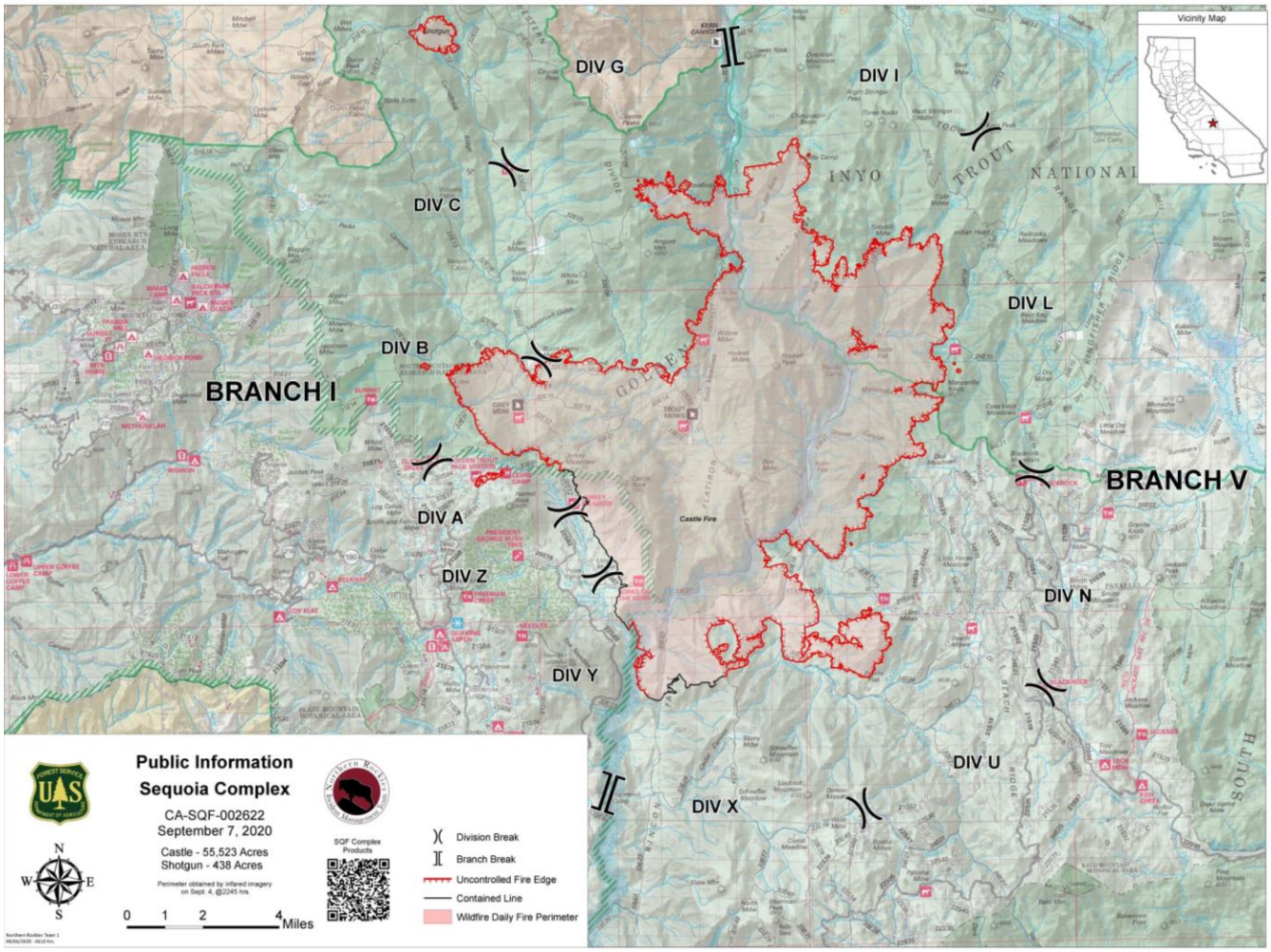


Figure 3.11: Map showing SQF Complex extent on September 7, 2020.

The map in Figure 3.12 shows the SQF Complex the following day, on September 8, 2020, when the acreage of the Castle Fire component had grown to 62,389 acres, an increase of 6,866 acres. Both map in Figures 3.11 and 3.12 show the relative location of the SQF Complex in the upper-right corner.

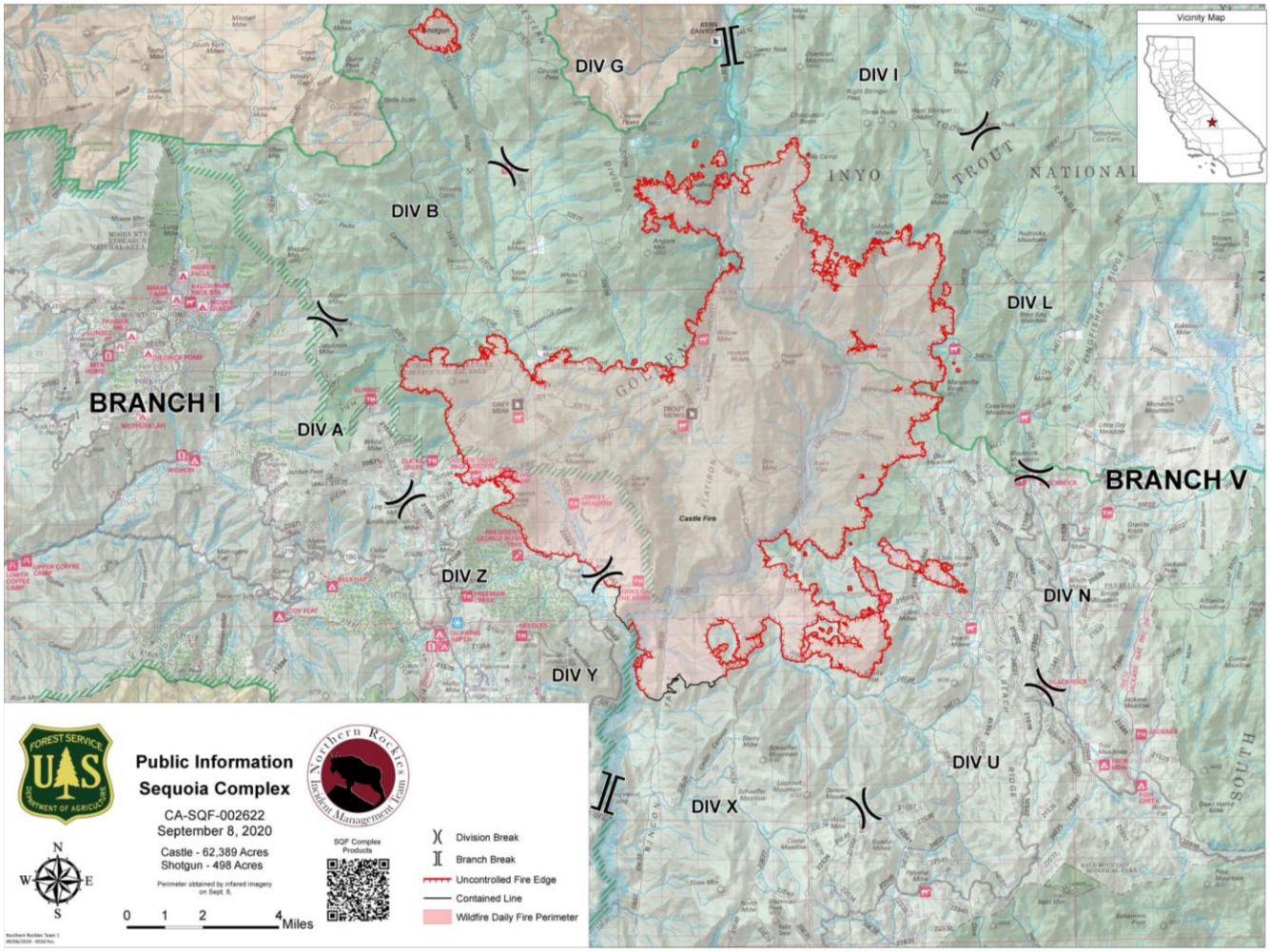


Figure 3.12: Map showing SQF Complex extent on September 8, 2020

Visible Satellite Smoke Plumes, Detected Hotspots, and HMS Smoke Layers

The map in Figure 3.13 presents Worldview satellite imagery showing wildfire hotspots as orange dots, including the SQF Complex and Creek Fires on September 7, 2020. From this image, the obvious smoke plumes heading over the Sierra crest and directly toward the Coso Junction area are from the Creek Fire and the SQF Complex.

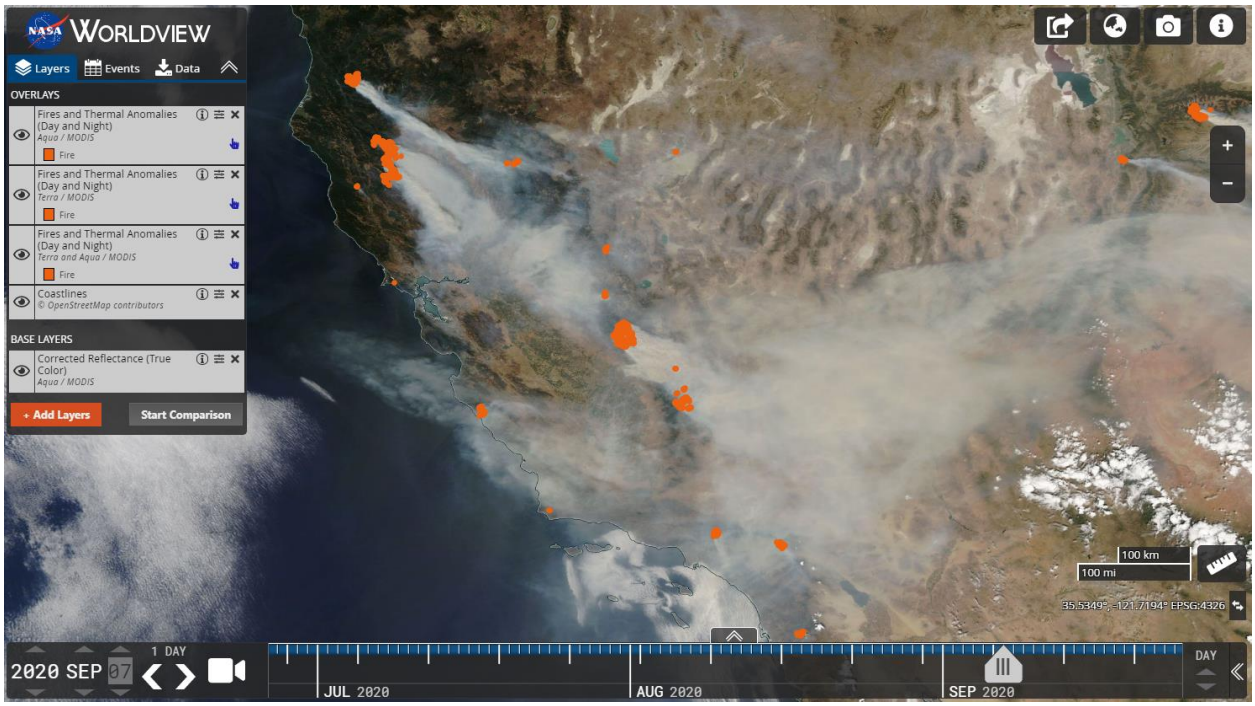


Figure 3.13: Worldview satellite imagery showing the SQF Complex and Creek Fires, September 7, 2020 (source: https://worldview.earthdata.nasa.gov).

The map in Figure 3.14 is from AirNowTech Navigator[11], showing the smoke plumes impacting Coso Junction, detected hotspots, and monitored PM10 concentrations on September 7, 2020 21:00 PST. Note the black circle highlighting Coso Junction.

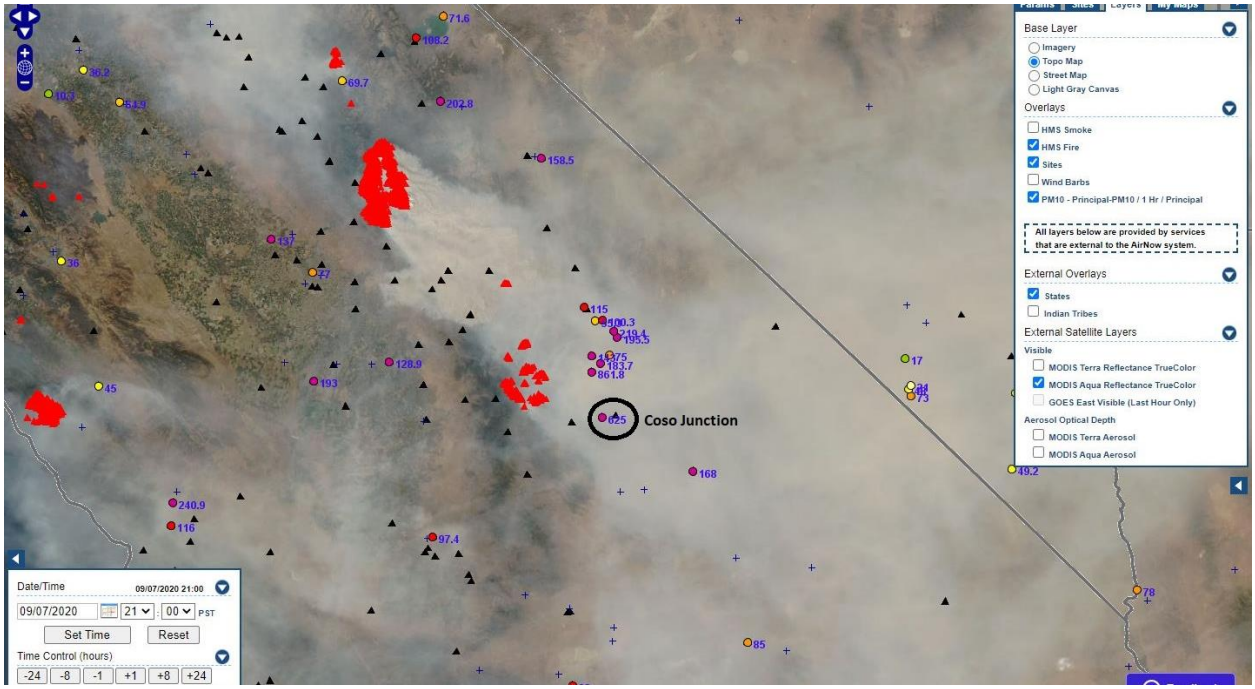


Figure 3.14: Satellite Image, detected hotspots, and monitored PM10 concentrations on September 7, 2020 21:00 PST. (Source https://www.airnowtech.org/navigator/index.cfm#)

[11] AirNowTech navigator is accessible at https://www.airnowtech.org/navigator/index.cfm.

Figure 3.15 shows a Hazard Mapping System (HMS) Smoke Plume map of modeled smoke plume density and detected hotspots in California and the Coso Junction area on September 7, 2020. Note the majority of California on this day was under a heavy HMS smoke plume, as well as the entirety of the Coso Junction PM10 Planning Area.

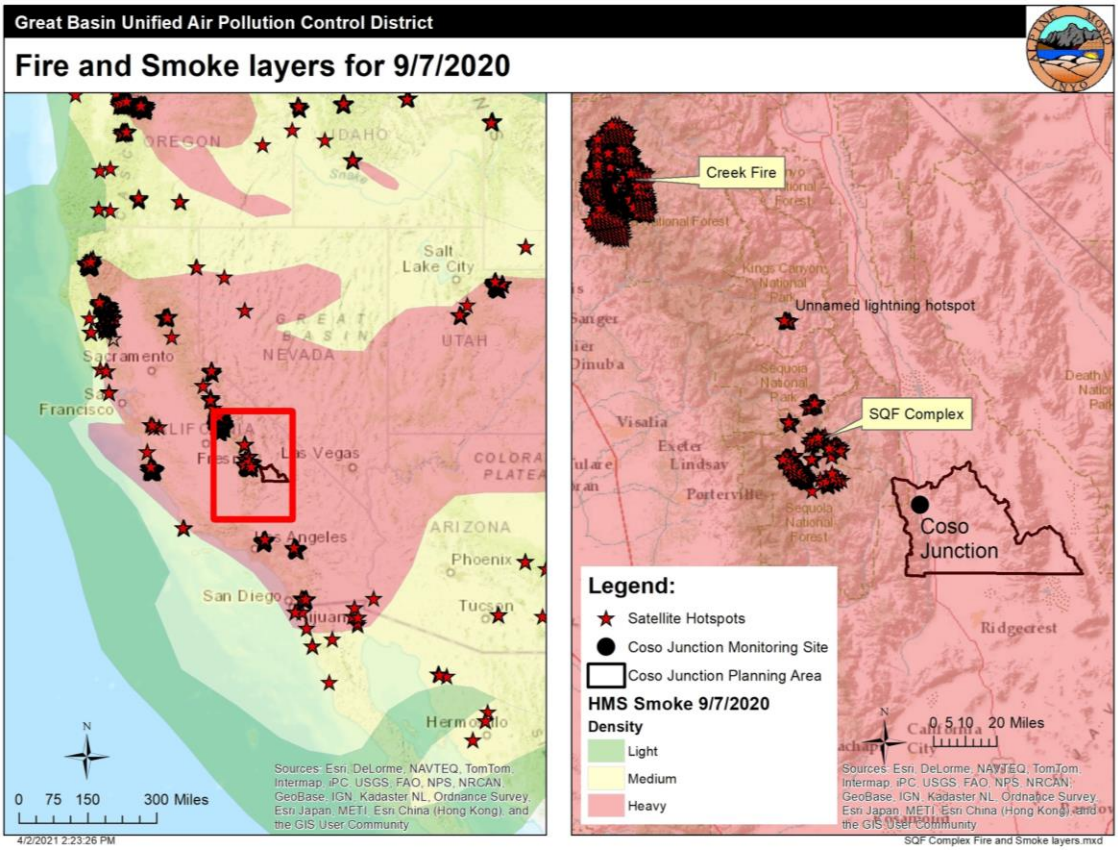


Figure 3.15: Hazard Mapping System (HMS) Smoke Plume Map, September 7, 2020 (Source: https://www.ospo.noaa.gov/Products/land/hms.html).

Event-related PM10 Concentrations

Wildfire smoke from the SQF Complex and Creek Fires was transported southeast into the Coso Junction PM10 Planning Area by winds from the northwest. The graph in Figure 3.16 shows hourly PM10 concentrations during the week prior to, and following, the Coso Junction Exceptional Event on September 7, 2020. The graph shows the elevated hourly PM10 concentrations on the Exceptional Event day, as well as elevated PM10 on the following day. There were also relatively minor PM10 spikes at Coso Junction in the days leading to the Exceptional Event, also caused by smoke incursions into the planning area, but none following September 8, 2020.

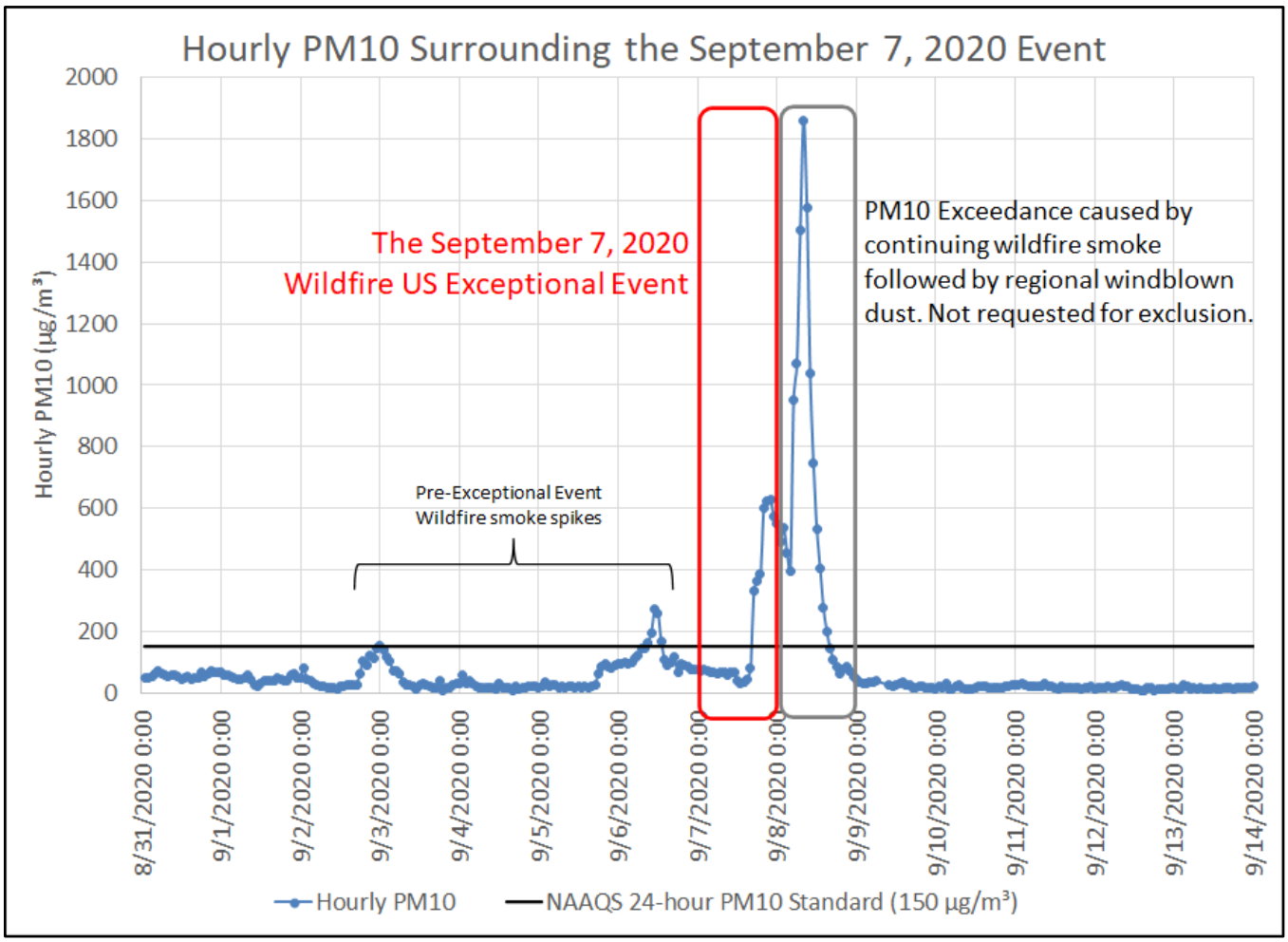


Figure 3.16: Graph showing hourly PM10 at Coso Junction the week prior and following the September 7, 2020 Exceptional Event.

Table 3.3 shows Coso Junction PM10 daily NAAQS averages the week prior to and following the September 7, 2020 Exceptional Event. The Exceptional Event is highlighted yellow with a value of 189 µg/m³. The September 8, 2020 also exceeded the NAAQS for PM10 from continued smoke concentrations followed by regional blowing dust. Due to the complicated nature of the impacts on this day, and the fact that exclusion of only one day (September 7) is needed to attain the NAAQS, a request for exclusion of September 8 data is not requested at this time. A brief analysis of the events of September 8 are, however, included in this document.

Table 3.3: Coso Junction PM10 NAAQS averages the week prior to and following the September 7, 2020 Exceptional Event.

Date	PM10 NAAQS Average (µg/m³)	Even/Non-event
8/31/2020	56	Non-event
9/1/2020	46	Non-event
9/2/2020	48	Non-event
9/3/2020	46	Non-event
9/4/2020	22	Non-event
9/5/2020	37	Non-event
9/6/2020	124	Non-event
9/7/2020	189	Wildfire US Smoke Exceptional Event
9/8/2020	553	NAAQS Exceedance not requested for exclusion: regional windblown smoke/dust
9/9/2020	27	Non-event
9/10/2020	18	Non-event
9/11/2020	20	Non-event
9/12/2020	16	Non-event
9/13/2020	16	Non-event
9/14/2020	33	Non-event

Regional PM Impacts

In addition to Coso Junction, PM impacts from wildfire smoke were observed at neighboring monitors, notably at Owens Lake to the north, and Kennedy Meadows to the southwest. See map in Figure 1.1 for monitoring site locations. The timing and monitored hourly PM concentrations shown in Figures 3.17 through 3.19 are consistent with the narrative of this EE documentation. The PM10 monitors are on the left side of the figures, while the PM2.5 monitors are on the right. Note the only PM2.5 monitors in the region were at Keeler, Lone Pine, and Kennedy Meadows, the latter two monitors being EBAMs and not regulatory grade monitors, though useful in estimating concentrations. The color scheme is a color ramp from green (low PM) to red (high PM).

Figure 3.17 shows moderate PM concentrations on September 6, 2020 with PM10 and PM2.5 values into the low 100's $\mu g/m^3$.

Figure 3.18 shows quite clean air on September 7, 2020 until 17:00 when PM10 values increased rapidly at Coso Junction starting at 17:00 PST. Similarly, the magnitude and timing of PM impact was observed at Olancha, the closest PM10 monitor to Coso Junction on the east side of the Sierra crest, as well as all other Owens Lake monitors though to a lesser degree. The nearest monitor to Coso Junction is the Kennedy Meadows PM2.5 EBAM. While also elevated for PM, the timing and magnitude at Kennedy Meadows differ from Coso Junction. This is likely because Kennedy Meadows is on the west side of the Sierra crest, a formidable barrier to local transport, while Coso Junction is on the east side. Elevated concentrations at Coso Junction, as well as many Owens Lake sites continued through 23:00 PST.

Hourly PM	Site/Parameter												
Hour	PM10 Coso Junction	PM10 Olancha	PM10 Dirty Socks	PM10 Lizard Tail	PM10 Lone Pine	PM10 Mill	PM10 North Beach	PM10 Shell Cut	PM10 Stanley	PM10 Keeler	PM2.5 Keeler	PM2.5 Lone Pine EBAM	PM2.5 Kennedy Meadows EBAM
9/6/2020	96	106	99	67	44	109	43	95	104	106	101	48	53
9/6/2020 1:00	96	91	104	70	66	113	62	92	87	108	105	53	48
9/6/2020 2:00	100	95	96	106	80	86	82	85	80	111	105	36	47
9/6/2020 3:00	96	89	84	125	86	87	93	87	91	104	95	76	52
9/6/2020 4:00	99	87	99	117	104	99	104	111	80	85	76	63	53
9/6/2020 5:00	111	97	97	108	123	118	143	142	87	99	89	103	71
9/6/2020 6:00	122	110	149	112	145	134	165	144	100	117	110	98	64
9/6/2020 7:00	148	134	140	141	164	153	243	144	120	141	130	119	62
9/6/2020 8:00	147	136	140	165	192	169	232	173	128	164	153	148	70
9/6/2020 9:00	163	176	214	237	259	185	244	201	169	172	162	192	55
9/6/2020 10:00	196	195	229	234	289	259	281	236	176	257	241	237	60
9/6/2020 11:00	271	185	255	242	261	271	285	261	186	239	240	281	77
9/6/2020 12:00	261	199	264	233	216	286	223	282	217	223	224	238	53
9/6/2020 13:00	170	226	233	190	152	204	168	210	214	183	192	198	15
9/6/2020 14:00	111	161	137	120	128	88	113	127	214	88	95	177	19
9/6/2020 15:00	93	131	125	108	113	86	107	124	117	81	78	111	18
9/6/2020 16:00	99	126	122	118	117	97	136	117	119	96	88	123	27
9/6/2020 17:00	119	126	131	103	64	107	87	116	112	109	100	84	42
9/6/2020 18:00	69	60	121	82	89	92	77	106	91	95	83	61	45
9/6/2020 19:00	97	77	96	90	85	85	79	101	55	81	75	44	199
9/6/2020 20:00	89	76	97	83	70	96	70	109	105	110	69	63	146
9/6/2020 21:00	84	65	89	65	50	79	56	81	75	75	53	62	106
9/6/2020 22:00	79	77	84	68	50	85	46	94	74	85	43	19	79
9/6/2020 23:00	76	74	96	74	50	71	43	73	68	71	44	33	36

Figure 3.17: Regional hourly PM concentrations (µg/m³) on September 6, 2020, the day prior to the proposed Exceptional Event.

Hourly PM	Site/Parameter												
Hour	PM10 Coso Junction	PM10 Olancha	PM10 Dirty Socks	PM10 Lizard Tail	PM10 Lone Pine	PM10 Mill	PM10 North Beach	PM10 Shell Cut	PM10 Stanley	PM10 Keeler	PM2.5 Keeler	PM2.5 Lone Pine EBAM	PM2.5 Kennedy Meadows EBAM
9/7/2020	76	71	61	55	49	70	46	57	72	67	56	38	39
9/7/2020 1:00	73	61	55	55	49	56	44	67	55	59	45	39	36
9/7/2020 2:00	77	54	52	51	42	63	37	61	56	72	58	35	46
9/7/2020 3:00	73	52	57	44	37	59	34	53	54	72	64	35	46
9/7/2020 4:00	69	47	54	53	42	59	32	54	48	64	59	30	38
9/7/2020 5:00	70	43	58	57	47	51	32	51	52	64	53	18	46
9/7/2020 6:00	65	38	45	47	43	52	31	43	45	47	27	24	46
9/7/2020 7:00	66	35	52	45	45	43	38	49	42	49	29	31	64
9/7/2020 8:00	68	38	61	44	38	45	33	43	42	46	32	31	111
9/7/2020 9:00	58	50	52	50	38	42	35	47	44	44	32	46	141
9/7/2020 10:00	66	24	41	45	34	43	44	45	39	41	28	12	173
9/7/2020 11:00	66	54	39	43	32	41	36	43	43	38	30	34	223
9/7/2020 12:00	42	37	35	40	20	36	29	38	40	35	36	30	313
9/7/2020 13:00	30	29	36	37	48	40	31	40	42	36	33	35	342
9/7/2020 14:00	35	42	33	35	49	36	40	31	62	40	29	32	316
9/7/2020 15:00	47	170	55	39	74	37	40	37	50	40	31	3	157
9/7/2020 16:00	81	253	213	43	71	48	31	57	68	41	30	23	157
9/7/2020 17:00	331	346	50	43	79	65	141	202	60	43	39	34	92
9/7/2020 18:00	363	501	56	62	93	152	48	76	63	103	71	40	66
9/7/2020 19:00	386	747	153	77	76	146	71	72	62	143	126	53	95
9/7/2020 20:00	603	896	89	76	75	227	58	90	105	197	162	38	91
9/7/2020 21:00	625	862	184	100	115	196	55	75	143	219	206	55	116
9/7/2020 22:00	628	720	102	109	231	196	131	132	114	212	204	96	190
9/7/2020 23:00	574	684	159	170	225	232	233	150	121	213	203	185	180

Figure 3.18: Regional hourly PM concentrations (µg/m³) on September 7, 2020, the day of the proposed exceptional event.

Figure 3.19 shows continued widespread PM impacts into the early hours of September 8, 2020 followed by much higher concentrations beginning at 04:00. The much-elevated and widespread PM impacts continue through 11:00 PST when they slowly degrade at all sites. The excessive PM impacts between 04:00 and 10:00 are the result of regional windblown dust from the north, discussed in the following sections.

Hourly PM	Site/Parameter												
Hour	PM10 Coso Junction	PM10 Olancha	PM10 Dirty Socks	PM10 Lizard Tail	PM10 Lone Pine	PM10 Mill	PM10 North Beach	PM10 Shell Cut	PM10 Stanley	PM10 Keeler	PM2.5 Keeler	PM2.5 Lone Pine EBAM	PM2.5 Kennedy Meadows EBAM
9/8/2020	551	571	295	226	114	322	143	242	115	255	251	153	159
9/8/2020 1:00	491	296	138	187	105	191	106	207	173	254	258	97	184
9/8/2020 2:00	537	325	255	252	165	198	154	150	179	242	216	101	223
9/8/2020 3:00	457	240	373	419	422	275	282	602	227	310	134	84	333
9/8/2020 4:00	397	165	1042	1048	1026	966	783	832	237	1022	205	90	327
9/8/2020 5:00	953	509	1495	1247	1194	1269	1012	1121	448	1259	337	214	304
9/8/2020 6:00	1072		1213	1431	1290	1391	1015	1163	662	1575	408	285	296
9/8/2020 7:00	1504		1321	1643	1394	1529	1239	1423	1061	1812	463	286	315
9/8/2020 8:00	1857		1496	1585	1217	1591	1159	1713	1207	1988	460	322	325
9/8/2020 9:00	1575		1236	1262	961	1358	914	1199	1128	1473	372	279	341
9/8/2020 10:00	1037	885	1236	867	682	834	580	868	737	696	211	238	347
9/8/2020 11:00	747	634	632	614	464	516	394	588	561	464	130	180	424
9/8/2020 12:00	532	473	456	414	360	370	303	410	435	341	101	120	420
9/8/2020 13:00	405	372	363	286	247	286	200	330	316	262	73	97	261
9/8/2020 14:00	278	254	242	200	171	203	132	271	219	169	49	72	240
9/8/2020 15:00	202	193	175	149	133	146	101	158	173	131	45	54	191
9/8/2020 16:00	146	150	135	125	114	106	90	119	137	96	29	35	136
9/8/2020 17:00	109	124	96	102	84	76	69	141	113	62	20	10	102
9/8/2020 18:00	85	77	67	85	87	59	59	64	95	54	15	21	99
9/8/2020 19:00	65	84	95	107	105	80	75	114	85	49	11	30	72
9/8/2020 20:00	75	86	104	96	84	104	68	108	99	49	14	32	55
9/8/2020 21:00	87	88	77	68	66	79	48	82	72	77	31	23	35
9/8/2020 22:00	72	74	59	45	50	54	34	62	60	49	13	26	47
9/8/2020 23:00	54	54	50	44	36	45	28	50	52	42	12	11	37

Figure 3.19: Regional hourly PM concentrations (µg/m³) on September 8, 2020, the day after the proposed Exceptional Event.

PM10/PM2.5 Proportioning

Since wildfire smoke is generally characterized by smaller-sized particles and dust is characterized by larger-sized particles, a review of the PM2.5 to PM10 proportions is instructive to determine whether wildfire smoke or dust is responsible for elevated PM. Although there is no PM2.5 monitor at Coso Junction, there are permanent collocated Federal Equivalent Method PM10 and PM2.5 monitors to the north at Keeler (see map in Figure 1.1).

The Tables in 3.4 to 3.6 show the hourly ratios of PM2.5 to PM10 at Keeler. The colors are ramped from low PM2.5-to-PM10 fraction (green) to high fraction (red).

Table 3.4 shows the fraction of PM2.5 to PM10 was very high during the September 7, 2020 wildfire smoke event, with ratios generally in the 0.70 to 0.90 range, occasionally PM2.5 even topping PM10 concentrations.

Figure 3.5 shows on the following day, September 8, 2020, the high ratio continued from the previous day until 02:00 when the ratio fell dramatically, at the time the regional windblown dust event arrived from the north.

Figure 3.6 shows a typical windblown dust event without smoke influence on October 27, 2019 when the ratio is low, 0.10 to 0.20, similar to ratios found during the dust intrusion on September 8, 2020 between 04:00 and 09:00.

During the highest smoke concentrations on September 7, 2020 PM2.5 was over 90% of PM10 concentrations, whereas during the highest concentrations of the windblown dust event, the percentage was less than 20%. This is further evidence that the source of the PM impact on September 7, 2020 was wildfire smoke.

Table 3.4: Fraction of PM2.5 to PM10 at Keeler during the 9/7/2020 wildfire smoke event.

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PM2.5	56	45	58	64	59	53	27	29	32	32	28	30	36	33	29	31	30	39	71	126	162	206	204	203
PM10	67	59	72	72	64	64	47	49	46	44	41	38	35	36	40	40	41	43	103	143	197	219	212	213
Fraction	0.84	0.75	0.81	0.88	0.92	0.83	0.58	0.60	0.70	0.74	0.69	0.78	1.02	0.90	0.73	0.76	0.74	0.91	0.69	0.88	0.82	0.94	0.96	0.95

Table 3.5: Fraction of PM2.5 to PM10 at Keeler during 9/8/2020 when wildfire smoke was overcome by windblown dust at 04:00.

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PM2.5	251	258	216	134	205	337	408	463	460	372	211	130	101	73	49	45	29	20	15	11	14	31	13	12
PM10	255	254	242	310	1022	1259	1575	1812	1988	1473	696	464	341	262	169	131	96	62	54	49	49	77	49	42
Fraction	0.98	1.01	0.89	0.43	0.20	0.27	0.26	0.26	0.23	0.25	0.30	0.28	0.30	0.28	0.29	0.34	0.30	0.31	0.28	0.23	0.28	0.41	0.26	0.30

Table 3.6: Fraction of PM2.5 to PM10 at Keeler during windblown dust on 10/27/2019.

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PM2.5	10	6	0	81	80	66	59	43	44	39	58	42	62	66	92	65	49	5	15	10	6	1	3	4
PM10	17	10	14	609	720	593	605	363	320	277	298	227	331	357	620	421	245	27	37	35	20	7	10	12
Fraction	0.56	0.66	0.01	0.13	0.11	0.11	0.10	0.12	0.14	0.14	0.19	0.19	0.19	0.18	0.15	0.15	0.20	0.18	0.40	0.30	0.32	0.18	0.33	0.32

September 8, 2020 Regional Dust Event

The day following the proposed September 8, 2020 Exceptional Event also exceeded the NAAQS at Coso Junction with a daily average PM10 concentration of 553 µg/m³. The particulate source on this day was a mix of continuing wildfire smoke from the previous day, followed by a massive windblown regional dust event from the north. The National Weather Service (NWS) Reno office warned of prolonged hazardous AQI due to dust, and breezy northeast winds and thick dust across much of the region (see Appendix A). Appendix B shows a NWS map of dust across Nevada.

As shown in Table 3.19, above, hourly PM concentrations at Coso Junction between 00:00 and 03:00 were consistently elevated at all sites between Coso Junction and other nearby monitors. The GBUAPCD considers these hours to be the continued smoke impacts from the Creek Fire and SQF Complex based on the largely PM2.5 component of the PM2.5-to-PM10 ratio at the Keeler monitor (see Table 3.5). Then, starting at 04:00, monitors at Owens Lake, such as Keeler and Lone Pine showed a rapid increase in hourly PM10 values to greater than 1000 µg/m³. The PM2.5/PM10 proportions quickly changed between 03:00 and 04:00 from predominantly PM2.5-sized particles to predominately PM10-sized particles, indicating the onset of massive amounts of windblown dust.

Regionally, the advance of the north to south dust front can be traced on the map in Figure 3.20 which shows the time at which hourly PM10 impacts reached at least 1000 µg/m³. The short black arrows represent the wind direction vector at the time 1000 µg/m³ PM10 was reached.

The map in Figure 3.20 indicates the dust front reached the northernmost GBUAPCD PM10 monitor at Mono Shore on September 8, 2020 at 01:00, followed by Bishop-NCORE at 02:00, Lone Pine and Dirty Socks at 04:00, then finally Coso Junction at 06:00. The red line in Figure 3.20 shows the general direction of regional dust transport from NNW to SSE. Other monitors outside the jurisdiction of the GBUAPCD to the north of this map, such as Yerington, Nevada (32-019-2012) located 60 miles north of Mono Shore, showed a similar pattern with PM10 reaching nearly 1000 µg/m³ starting two hours prior to dust impacts at Mono Shore, on September 7, 2020 23:00.

At this time the GBUAPCD is not requesting NAAQS exclusion for the Coso Junction PM10 exceedance on September 8, 2020. A 2020 design value of 1.0 is achieved by excluding the September 7, 2020 wildfire smoke event alone.

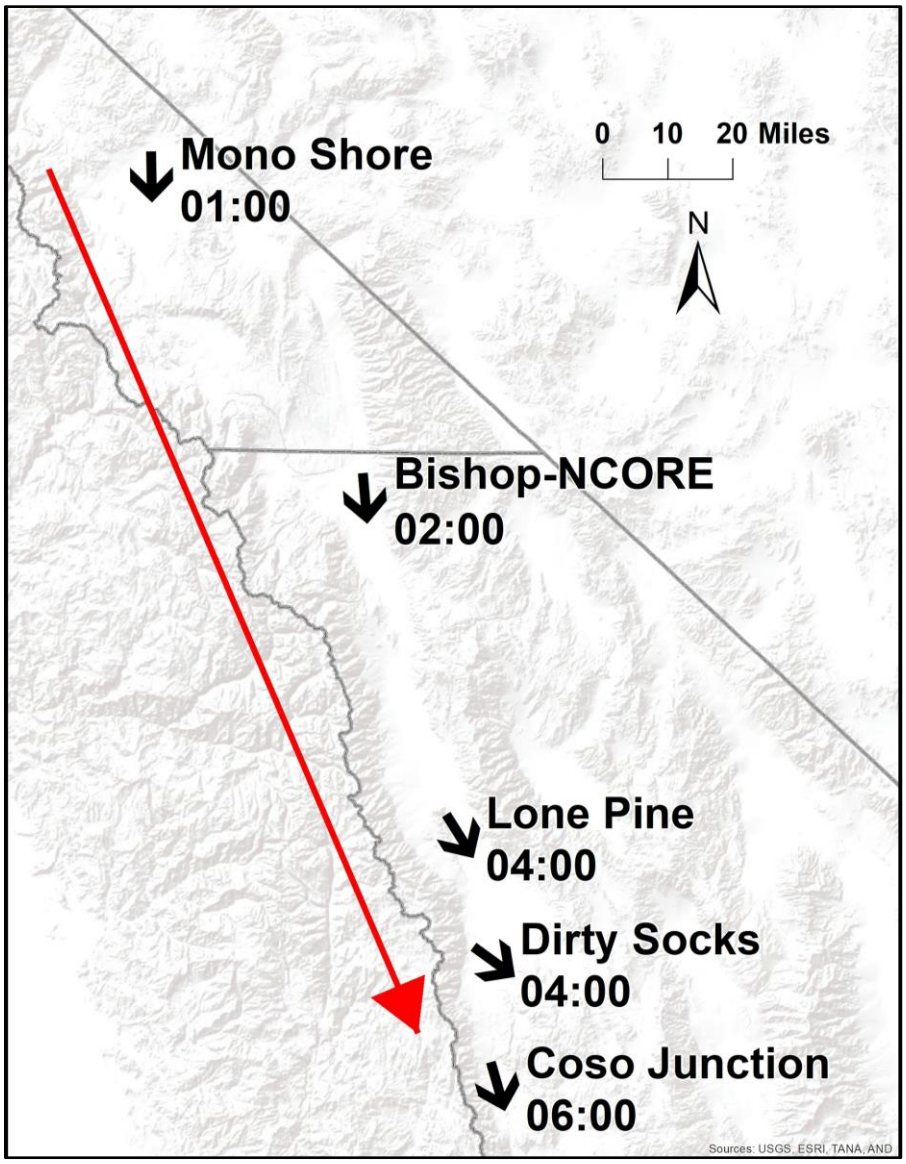


Figure 3.20: September 8, 2020 arrival times of hourly PM10 concentrations of at least 1000 µg/m³. The shorter black arrows show wind direction vectors at the time of 1000 µg/m³ impact.

Meteorological Conditions

Meteorological conditions preceding the September 7, 2020 event was characterized by widespread lack of precipitation and slightly warmer than average temperatures, as shown in the August 2020 maps in Figures 3.21 and 3.22.

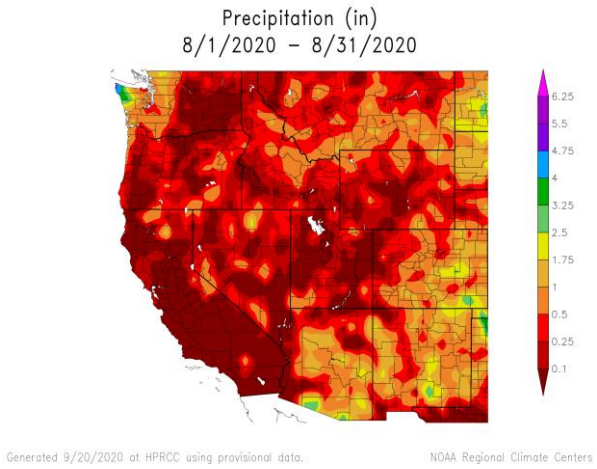


Figure 3.21: Precipitation, in inches, Western Regional Climate Center, western US, August 2020. (Source https://hprcc.unl.edu/products/maps/acis/wrcc/Aug20PDataWRCC.png)

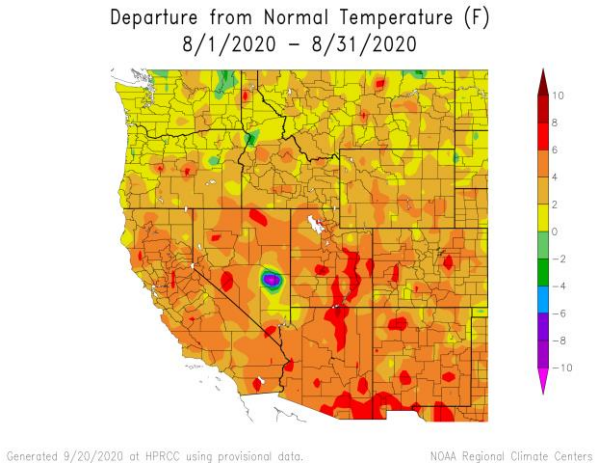


Figure 3.22: Departure from normal temperature (degrees Fahrenheit), Western Regional Climate Center, western US, August 2020. (Source: https://hprcc.unl.edu/products/maps/acis/wrcc/Aug20TDeptWRCC.png)

The Drought Monitor map in Figure 3.23 shows conditions in the southern Sierra and Coso Junction area were abnormally dry in August 2020, which may help explain the volatility and rapid growth of the Creek Fire and SQF Complex.

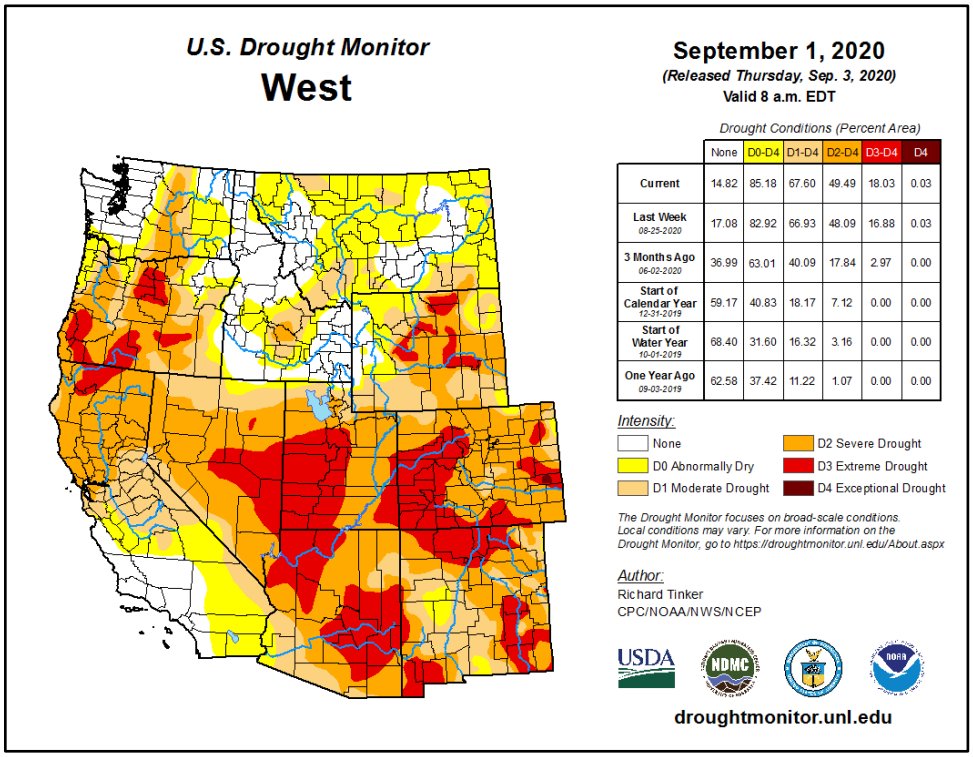


Figure 3.23: Drought conditions for the western U.S. on September 1, 2020. (Source: https://droughtmonitor.unl.edu/Maps/MapArchive.aspx)

The exceptionally dry and warm conditions in August 2020, as depicted in Figures 3.21 through 3.23, led to tinder-dry fuels across California. Then a massive lightning storm released thousands of strikes across the state[12]. Many of these lightning strikes became wildfires[13], including the SQF Complex, which was ignited by the August 16, 2020 lightning storm and continued to burn and grow through the Exceptional Event day, September 7, 2020. Figure 3.24 shows a map of lightning impacts in a 24-hour period between August 15, 2020 06:00 and August 16, 2020 06:00. Note the lightning strikes represented as dots in the Sequoia region of the southern Sierra, some of which became the SQF Complex.

[12] See CBS News report here: https://www.cbsnews.com/news/lightning-siege-hits-california-with-nearly-12000-strikes-in-a-week-2020-08-22/

[13] Further information on the August 2020 Lightning Storm and Resulting Wildfires: https://en.wikipedia.org/wiki/August_2020_California_lightning_wildfires

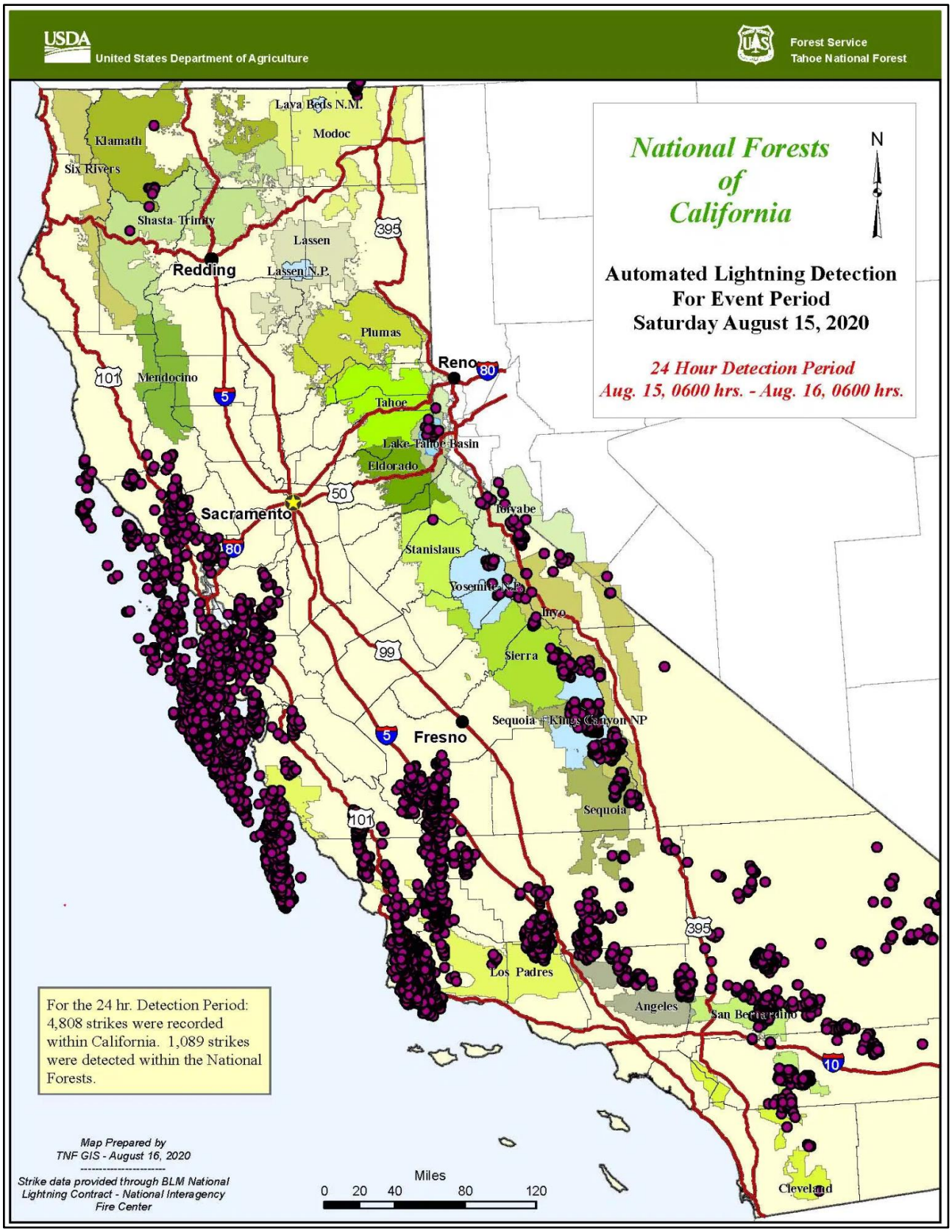


Figure 3.24: Map of August 15, 2020 lightning strikes in California. (Source: https://yubanet.com/regional/lightning-map-shows-4808-strikes-in-california/)

Surface weather maps in Figure 3.25 show no precipitation or weather fronts on the September 7, 2020 Exceptional Event day with slightly low pressure and no strong wind gradients.

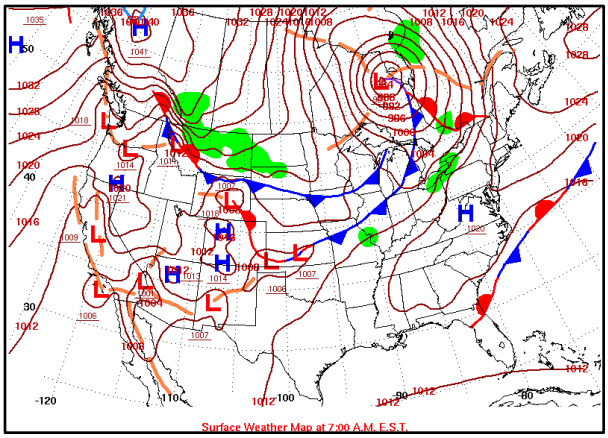


Figure 3.25: Surface weather map September 7, 2020 04:00 PST. (Source: https://www.wpc.ncep.noaa.gov/dailywxmap/index_20200907.html)

Visibility Analysis

The GBUAPCD operates two cameras at the Coso Junction monitoring site, a north-facing camera and a south-facing camera. Each camera records images every 30-seconds during daylight hours. The GBUAPCD uses these cameras with the specific purpose of identifying sources of particulate emissions. Each image recorded in a day is compiled into a daily movie file, and displayed in sunup-to-sundown video animation. Links to the camera daily movies on event days are as follow:

September 7, 2020 - Coso Junction North Camera video animation: https://gbuapcd.org/Docs/VideoReview/ExceedanceVideos/Coso%20North%2009_07_2020.mp4
September 7, 2020 - Coso Junction South Camera video animation: https://gbuapcd.org/Docs/VideoReview/ExceedanceVideos/Coso%20South%2009_07_2020.mp4

These videos show the rapid influx of SQF Complex and Creek Fire smoke. The timing of the perceived smoke plume impacting Coso Junction is consistent with the timing of the rapid rise in monitored PM10 concentrations in the afternoon of September 7, 2020.

- Camera animation sequence of events are summarized below, with corresponding still frame images from the North and South cameras in Table 3.7:
    - 6:05 AM, daybreak illuminates lingering smoke, car lights on US Highway 395 appear partly obscured.
    - 6:28 AM, astronomical sunrise, though no shadows visible through the smoke.
    - 6:28 AM through 12:30 PM, continued smoke, particularly dense against the Sierra.
    - 12:30 PM through 4:40 PM, waves of smoke plumes flowing south visible against the Sierra.
    - 4:40 PM through 5:30 PM, smoke cleared from Sierra canyons, though a denser plume building over the valley and flowing south, gradually dropping to the valley floor.
    - 5:30 PM through 5:50 PM, dense smoke plume approaching, impact imminent.
    - 5:50 PM, dense smoke plume impact.
    - 5:50 PM through astronomical sunset at 7:09 PM. Waves of dense smoke impacting Coso Junction, flowing southward. Car lights turned on well before sunset indicating reduced visibility.
    - At no time during the day from either camera is windblown dust visible, either nearby or toward the Sierra.

Table 3.7: North and South Coso Junction camera still images on September 7, 2020.

Time	North Camera	South Camera
6:05 AM		
6:28 AM		
12:30 PM		
4:40 PM		

5:30 PM		
5:50 PM		
7:09 PM		

The Coso Junction PM10 Planning Area generally has cloud-free skies and little to no visible air pollution. When an event takes place and visibility is impaired, it is often clearly discernible in the Coso Junction site cameras. Figure 3.26 compares camera views taken on a non-event day in 2018 (upper photo) and the Exceptional Event day (lower photo), each on the same day of each year, resolved to the same hour and minute. On the non-event day the Sierra crest is easily visible. In the September 7, 2020 event day the visibility is obviously impaired when compared to the non-event day.

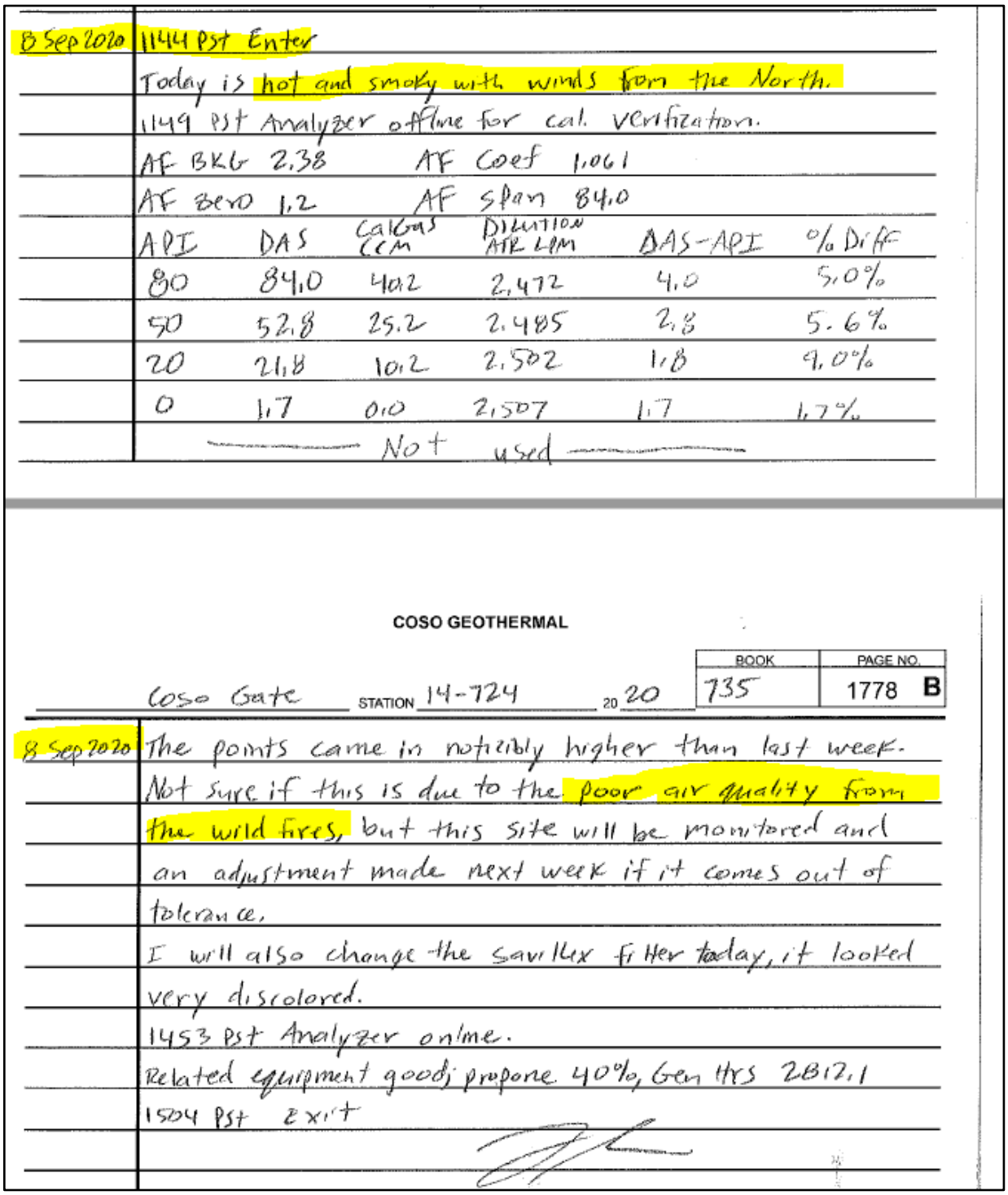
September 7, 2018, 3:04 PM PST (non-event day)

September 7, 2020 3:04 PM PST (Exceptional Event day)

Figure 3.26: Comparison of September 7, 2018 non-event, above, compared with the September 7, 2020 event, below, at the Coso Junction North Camera at the same time of day, 3:04 PM PST.

Direct observation / Station Log

Monday, September 7, 2020 was Labor Day, a federal and GBUAPCD holiday, and no staff were attending their sites. The following day, however, the Coso Gate site operator registered the site log found in Figure 3.27 indicating hot temperatures and smoke with winds from the north. The site operator also mentions poor air quality from the wildfires.



8 Sep 2020 1144 PST Enter
Today is hot and smoky with winds from the North.
1149 PST Analyzer offline for cal. verification.
AF BKG 2.38 AF Coef 1.061
AF Zero 1.2 AF Span 84.0

API	DAS	CalGas CCM	Dilution Air LPM	DAS-API	% Diff
80	84.0	40.2	2.472	4.0	5.0%
50	52.8	25.2	2.485	2.8	5.6%
20	21.8	10.2	2.502	1.8	9.0%
0	1.7	0.0	2.507	1.7	1.7%

Not used

COSO GEOTHERMAL

BOOK	PAGE NO.
735	1778 B

Coso Gate STATION 14-724 20 20

8 Sep 2020 The points came in noticibly higher than last week. Not sure if this is due to the poor air quality from the wild fires, but this site will be monitored and an adjustment made next week if it comes out of tolerance.
I will also change the Savillex filter today, it looked very discolored.
1453 PST Analyzer online.
Related equipment good; propane 40%, Gen Hrs 2812.1
1504 PST exit

Figure 3.27: Coso Gate site log from September 8, 2020.

Event weather summary

Hour-by-hour meteorological and particulate data for the September 7, 2020 event day are found in Appendix D and graphed in Figure 2.2. These data, in conjunction with the PM10-rose found in Figure 3.28, reveal the following:

From September 7, 2020 at midnight through 16:00 PST, PM10 was minimal to moderate, always less than 100 µg/m³). Winds were similarly moderate and from the north. At 17:00 PST, both wind and PM10 increased dramatically. Wind increased to 10.4 m/s and PM10 increased to 330.6 µg/m³. At 22:00 PST wind speed dropped though PM10 remained elevated through midnight. PM10 peaked at 627.9 µg/m³ at 22:00 PST. Winds during this period were consistently from the north-northwest.

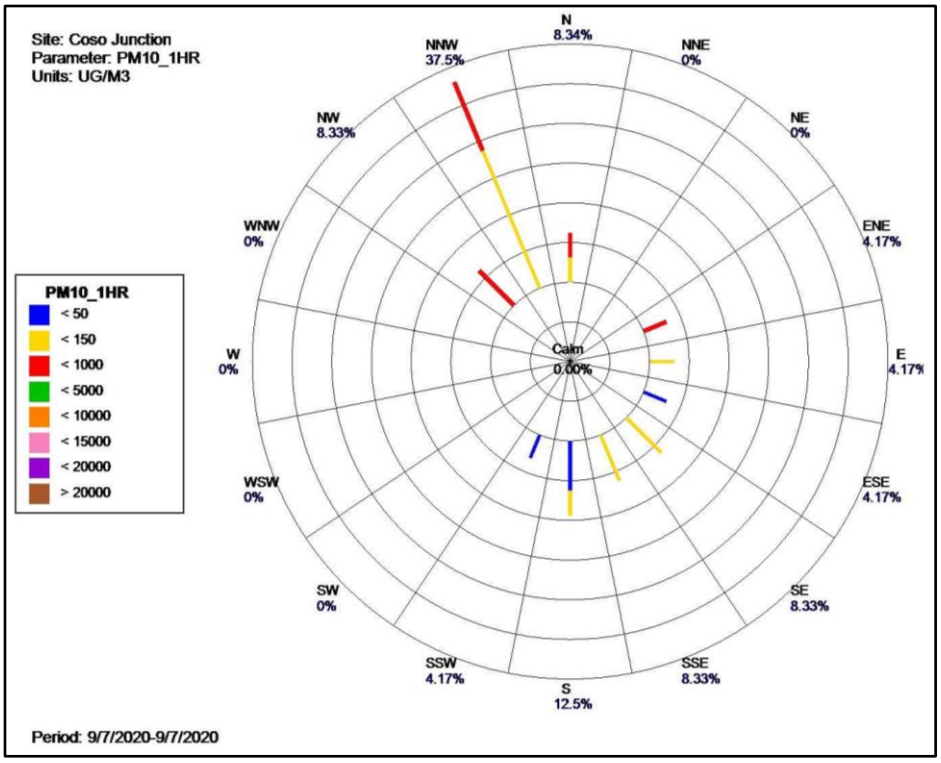


Figure 3.28: PM10 rose on September 7, 2020 at Coso Junction.

Clear Causal Relationship

In this section evidence is provided that demonstrates the PM10 event for which the GBUAPCD is requesting EPA Exceptional Event concurrence was caused by smoke produced from wildland fires.

Based on the documentation provided in Section 3 of this submittal, the Creek Fire and SQF Complex events qualify as a wildfires because lightning and an undetermined ignition source caused the unplanned wildfire events. The EPA generally considers the emissions of PM10 from wildfires on wildland to meet the regulatory definition of a natural event, defined as one 'in which human activity plays little or no direct causal role.' These wildfire events occurred on wildland (see Figure 3.4, Figure 3.8, and Appendix H) and accordingly, GBUAPCD has shown that these events are natural events and may be considered for treatment as exceptional events.

Deviation from Normal Conditions

In order to establish that the PM10 concentrations on the requested Exceptional Event (EE) day were out-of-the-ordinary and exceptional, the meteorological and particulate matter data collected during non-event days must be compared with those the same data collected on event days, as well as those that happened under similar conditions, but with no exceedances.

The graph in Figure 2.3, above, shows that the September 7, 2020 PM10 exceedance was the third-highest PM10 exceedance in Q3 between 2015 and 2020, only behind the following day September 8, 2020 when continuing wildfire smoke was overwhelmed by a regional windblown dust event, and a paving operation incident on July 29, 2017. Table 3.8, below, examines the same data, showing all Q3 PM10 NAAQS exceedances at Coso Junction between 2015 and 2020, ordered by descending PM10 exceedance value. The table also lists the dates of each exceedance, the rank and percentile among all monitored days in Q3 between 2015 and 2020, and a comment on the impact source of each exceedance. Note the September 7, 2020 EE is formatted bold, ranks third and is 99.650 percentile.

Table 3.8: Quarter 3 PM10 exceedances at Coso Junction between 2015 and 2020.

Date	NAAQS 24-hour PM10 (µg/m³)	Rank	Percentile	PM10 Impact Source
9/8/2020	553	1	99.999%	Continuing wildfire smoke, followed by a regional wind-blown dust event.
7/29/2017	195	2	99.816%	Paving operation incident
9/7/2020	**189**	**3**	**99.650%**	**Creek Fire and SQF Complex wildfire smoke**
9/2/2019	156	4	99.450%	Regional windblown dust with possible Cow Fire wildfire smoke

Table 3.9 compares conditions during non-event days on September 7th in years 2014 through 2019, alongside the September 7, 2020 Exceptional Event day. The table shows Coso Junction daily average PM10, average temperature, maximum temperature, and wind speed. The Exceptional Event date and daily PM10 NAAQS average are bolded in the right column. Notable interpretations of the table are as follows:

- Daily Average PM10 - The table shows the daily average PM10 concentration on September 7 has varied between 15 µg/m³ and 24 µg/m³, averaging 21.8 µg/m³, while the Exceptional Event on September 7, 2020 was 189 µg/m³.
- Hourly PM10 - The maximum hourly PM10 concentration on the September 7th's between 2014 and 2019 was 56.2 µg/m³, while the maximum hourly PM10 on the 2020 EE day was 627.9 µg/m³.
- Temperature - The table shows both the average daily temperature and the maximum daily temperature on the 2020 EE day were higher, 31.7 and 35.3 degrees Celsius, respectively, than the average of the previous six September 7th's with 26.5 and 33.3 degrees Celsius, respectively.
- Wind Speed - The daily average wind speed on the 2020 EE day was higher than the average of the previous six September 7th's at 6.9 m/s, compared to 3.5 m/s, though the maximum hourly wind speed was only slightly higher than the normal maximum wind speed at 10.4 m/s, compared to the normal of 8.4 m/s.

In summary, PM10 on the September 7, 2020 Exceptional Event day shows a strong deviation from historic September 7th's, while meteorological parameters are similar to normal conditions.

Table 3.9: PM10 and meteorological conditions, observed and typical, on the September 7, 2020 Exceptional Event (EE) day and previous September 7th's between 2014 and 2019. The Exceptional Event date is bold-outlined. Data are from AQS report AMP501 and the EPA Data Mart.[14]

	Non-EE	Non-EE	Non-EE	Non-EE	Non-EE	Non-EE	EE
Parameter	9/7/2014	9/7/2015	9/7/2016	9/7/2017	9/7/2018	9/7/2019	**9/7/2020**
PM10							
Max Hourly Obs. (µg/m³)	54.0	38.4	49.9	31.7	30.2	56.2	627.9
24-hour Avg Obs. (µg/m³)	24	15.0	32.0	21.0	18.0	21.0	**189.0**
24-hour Avg Norm. (µg/m³)	21.8	21.8	21.8	21.8	21.8	21.8	--
Average Temperature							
Observed (°C)	26.9	25.0	25.2	25.9	28.0	27.8	31.7
Normal (°C)	26.5	26.5	26.5	26.5	26.5	26.5	--
Maximum Temperature							
Observed (°C)	33.7	31.57	32.46	33.0	35.09	34.0	35.3
Normal (°C)	33.3	33.3	33.3	33.3	33.3	33.3	--
Wind Speed							
24-hour Max Obs. (m/s)	10.3	6.4	6.5	8.4	7.3	11.9	10.4
24-hour Max Norm. (m/s)	8.4	8.4	8.4	8.4	8.4	8.4	--
24-hour Avg Obs. (m/s)	3.8	3.2	2.8	3.4	3.1	4.9	6.9
24-hour Avg Norm. (m/s)	3.5	3.5	3.5	3.5	3.5	3.5	--

Analysis Showing Wildfire Influence on Affected Days

HYSPLIT Model

The HYSPLIT model[15] is a useful tool to display the forward trajectory wind directions for forest fire smoke plumes and the back trajectory wind direction for receptors (monitoring sites). The HYSPLIT model can also show wind trajectories at different elevations. For this demonstration 500 meter, 1000 meter, and 1500 meter elevations above the surface were selected. The HYSPLIT model was run on EPA AIRNowTech Navigator[16] to show the hourly trajectories and receptor PM10 concentrations

[14] Data source: EPA Interactive Map of Air Quality https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

[15]The HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) model, developed by the National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory and the Australian Bureau of Meteorology Research Centre in 1988.

[16] AirNowTech Navigator is accessed here: https://www.airnowtech.org/index.cfm

recorded at the time of maximum smoke impact. The HYSPLIT[17] model was also run on the NOAA website. Output graphics from those simulations can be found in Appendix I.

Figure 3.29 shows forward HYSPLIT models for the Creek Fire and the SQF Complex. Both model runs begin September 7, 2020 11:00 PST. The Creek Fire model is a 12-hour run, while the SQF Complex is a 6-hour run. The model clearly shows Creek Fire and SQF Complex plume trajectories traversing toward the Owens Valley and Coso Junction.

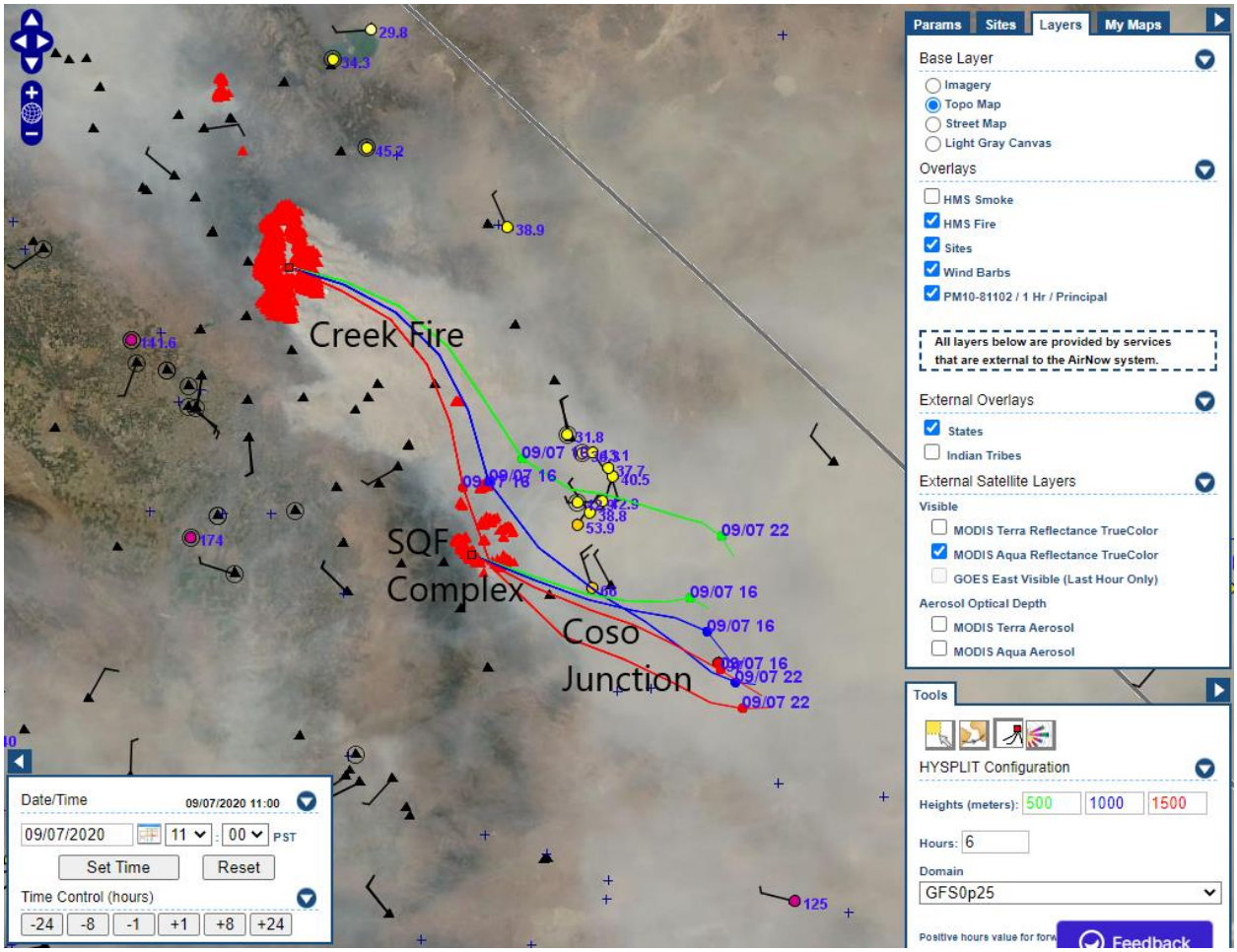


Figure 3.29: Forward HYSPLIT model for Creek and SQF Complex Fires on September 7, 2020.

[17] The NOAA HYSPLIT Model can be accessed here: https://www.ready.noaa.gov/hypub-bin/trajtype.pl?runtype=archive

Figure 3.30 shows a 6-hour backward HYSPLIT model for Coso Junction beginning September 7, 2020 18:00 PST. The backward plume trajectory from Coso Junction clearly places the source of the PM10 impact at the SQF Complex and Creek Fires.

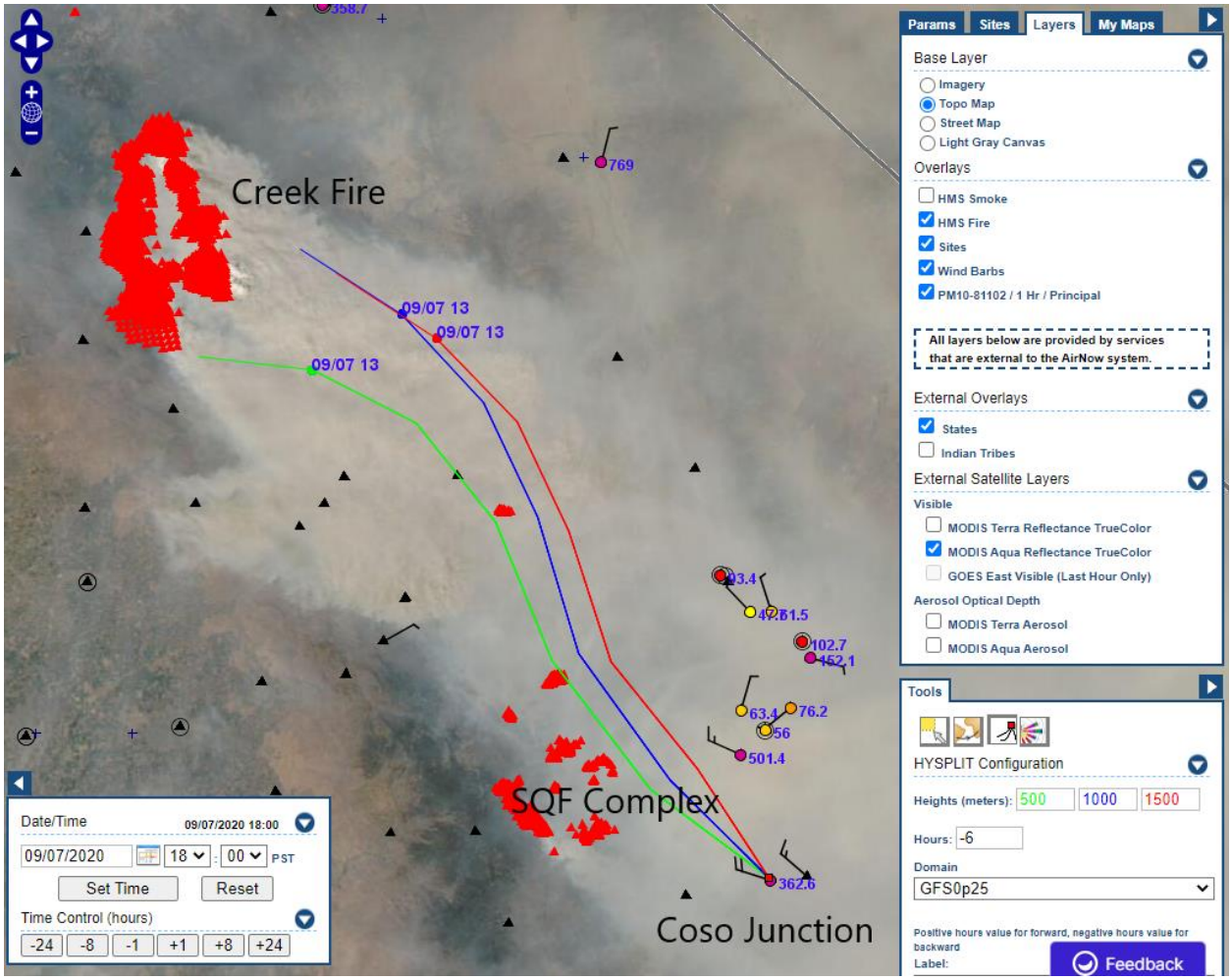


Figure 3.30: Backward HYSPLIT model for Creek and SQF Complex Fires on September 7, 2020.

NOAA/NWS Area Forecast Discussions

Figures 3.31 and 3.32 show the National Weather Service (NWS) Sacramento Statewide Near Surface Smoke Forecast for Monday, September 7, 2020 4:00 PM PDT and 08:00 PM PDT, respectively. These maps show a large, dense plume of smoke emitted by the Creek Fire, moving southeast to blanket the Coso Junction PM10 Planning Area. The 04:00 PM PDT map shows smoke moving toward Coso Junction, then four hours later, the 08:00 PM PDT map shows the entire Planning Area engulfed in smoke.

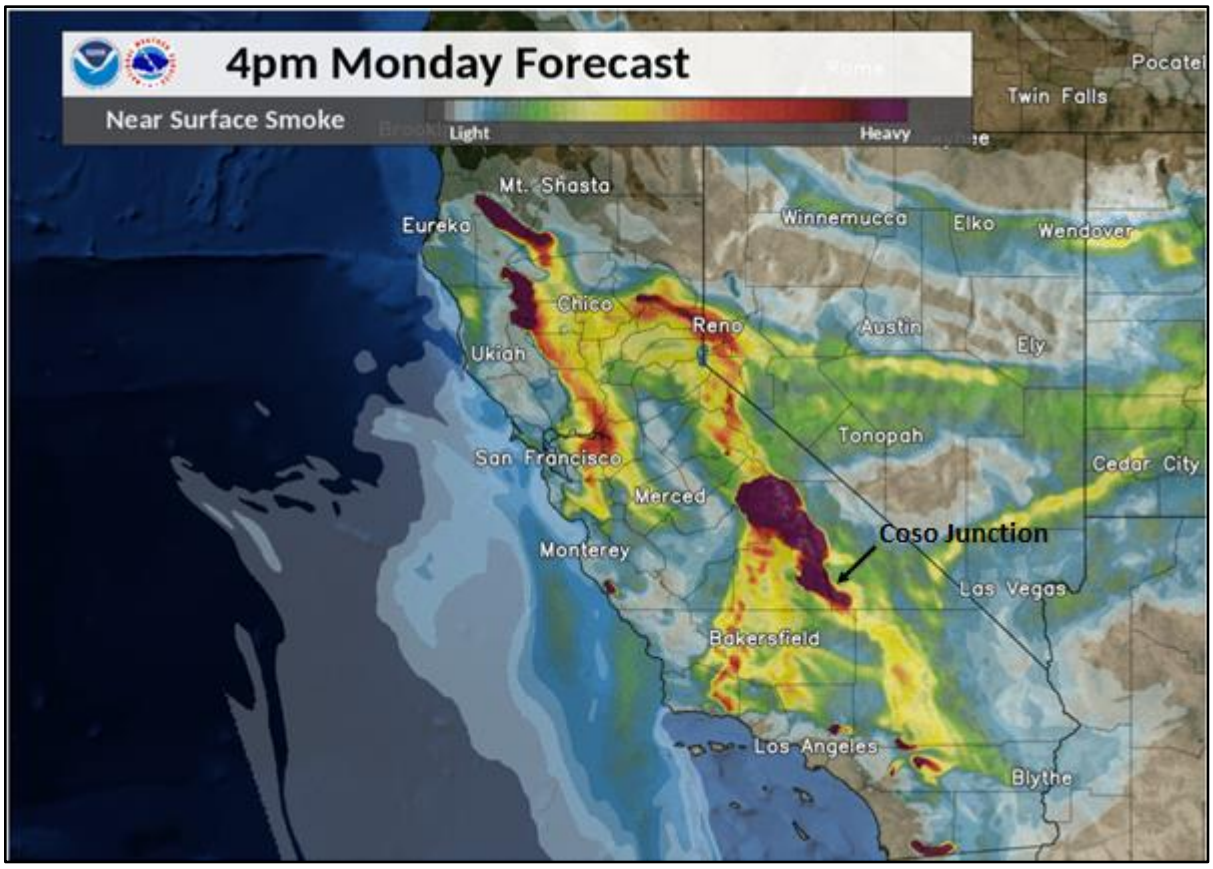


Figure 3.31: Map showing National Weather Service Sacramento Statewide Smoke Forecast at 4:00 PM PDT Monday, September 7, 2020. (Source: http://californiasmokeinfo.blogspot.com/search?updated-max=2020-09-08T17:19:00-07:00&max-results=10&reverse-paginate=true)

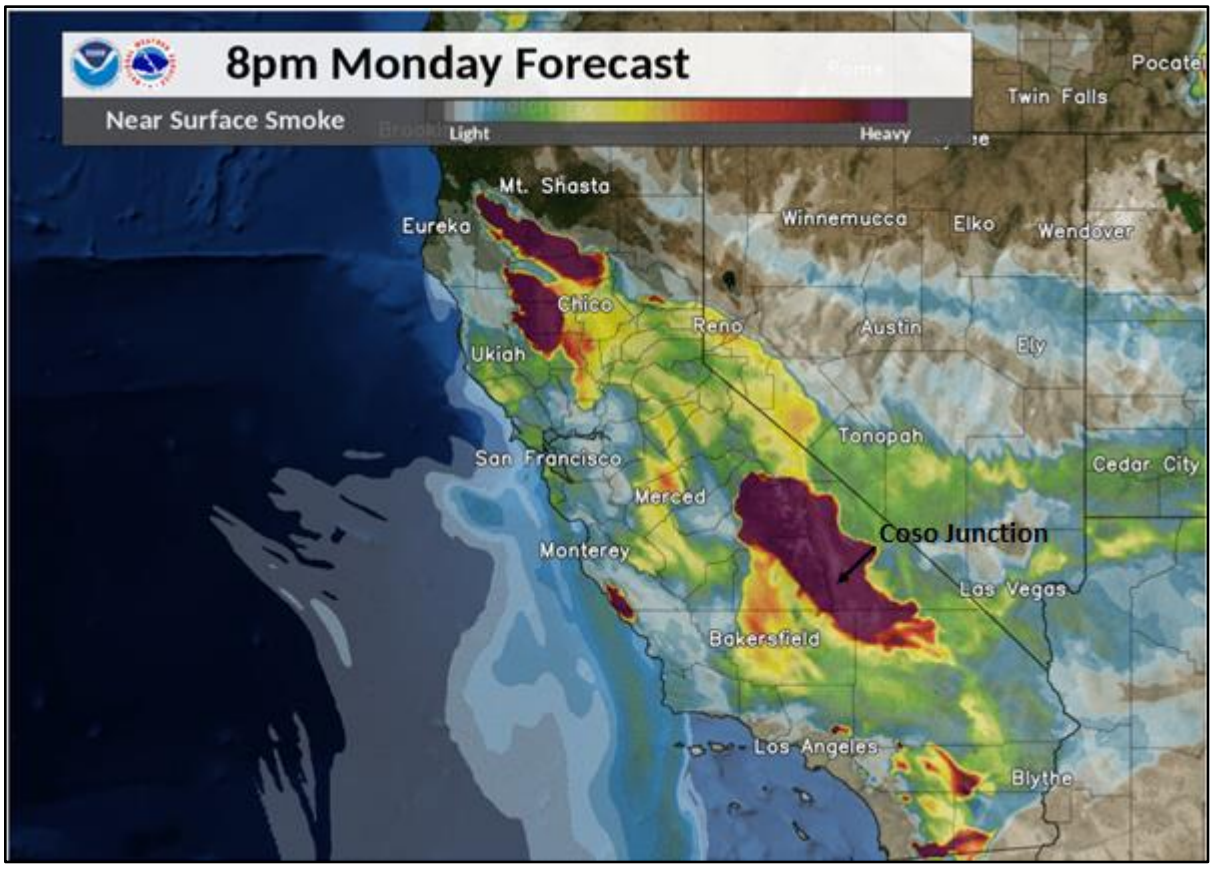


Figure 3.32: Map showing National Weather Service Sacramento Statewide Smoke Forecast at 10:00 PM PDT Monday, September 7, 2020. (Source http://californiasmokeinfo.blogspot.com/search?updated-max=2020-09-08T17:19:00-07:00&max-results=10&reverse-paginate=true)

Figures 3.33 and 3.34 are National Oceanic and Atmospheric Administration satellite imagery analyses of observed dust and smoke over the United States.

The report in Figure 3.33 for September 6, 2020 observes:

- Extremely thick smoke was observed over California

The report in Figure 3.34 for September 7, 2020 indicates that:

- Heavy remnant smoke from yesterday's fires throughout California were moving east across Nevada… The same California fires are still emitting moderate to extremely heavy smoke plumes that continue to move towards the east.

These smoke plume products from the NWS in conjunction with the satellite imagery interpretations from NOAA, provide further evidence that the smoke observed at Coso Junction is directly linked to wildfires and smoke was directly transported from the wildfires to the location of the monitor.

Sunday, September 6, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0305Z Sunday, September 7, 2020

SMOKE:
Western U.S. into Central U.S…
An area of extremely thick smoke was observed over most of California and Oregon before turning east over Idaho, Wyoming and into the central plains including Kansas, Colorado and northern Texas. A combination of new smoke due to a number of very large fire complexes and stagnant remnant smoke from previous days was to blame. Moderate to light density smoke also related to the widespread fire activity also extended off of the Pacific coast of California, over much of the western U.S. and across the northern and central plains prior to engulfing the Great Lakes region and Mississippi Valley. Additional scattered fire activity throughout Colorado, Washington, Oregon and Idaho added to the increased volume of smoke encompassing much of the United States.

DUST:
Pacific Northwest...
Waves of light blowing dust were observed moving through far southwestern Canada into Washington state and northern Oregon.

JL

THIS TEXT PRODUCT IS PRIMARILY INTENDED TO DESCRIBE SIGNIFICANT AREAS OF SMOKE ASSOCIATED WITH ACTIVE FIRES AND SMOKE WHICH HAS BECOME DETACHED FROM THE FIRES AND DRIFTED SOME DISTANCE AWAY FROM THE SOURCE FIRE. TYPICALLY OVER THE COURSE OF ONE OR MORE DAYS. AREAS OF BLOWING DUST ARE ALSO DESCRIBED. USERS ARE ENCOURAGED TO VIEW A GRAPHIC DEPICTION OF THESE AND OTHER PLUMES WHICH ARE LESS EXTENSIVE AND STILL ATTACHED TO THE SOURCE FIRE IN VARIOUS GRAPHIC FORMATS ON OUR WEB SITE:

JPEG: http://www.ospo.noaa.gov/data/land/fire/currenthms.jpg
GIS: ftp://satpsanone.nesdis.noaa.gov/FIRE/HMS/GIS/
KML: http://www.ospo.noaa.gov/data/land/fire/fire.kml (fire)
http://www.ospo.noaa.gov/data/land/fire/smoke.kml (smoke)

ANY QUESTIONS OR COMMENTS REGARDING THIS PRODUCT SHOULD BE SENT TO:
SSDFireTeam@noaa.gov

Figure 3.33: NOAA descriptive narrative for smoke/dust observed in satellite imagery, September 6, 2020. (Source https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020I070304.html)

Monday, September 7, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1800Z Sunday, September 7, 2020

SMOKE:
Western U.S. into Central U.S…
Heavy remnant smoke from yesterday's fires throughout California were moving east across Nevada, Utah, Colorado, and then moving SE into northern Texas and Oklahoma. The same California fires are still emitting moderate to extremely heavy smoke plumes that continue to move towards the east.

An area of extremely thick smoke was observed over Oregon before turning east over Idaho, Wyoming and into the central plains including Kansas, Colorado and northern Texas. A combination of new smoke due to a number of very large fire complexes and stagnant remnant smoke from previous days was to blame. Moderate to light density smoke also related to the widespread fire activity also extended off of the Pacific coast of California, over much of the western U.S. and across the northern and central plains prior to engulfing the Great Lakes region and Mississippi Valley. Additional scattered fire activity throughout Colorado, Washington, Oregon and Idaho added to the increased volume of smoke encompassing much of the United States.

Rodriguez

THIS TEXT PRODUCT IS PRIMARILY INTENDED TO DESCRIBE SIGNIFICANT AREAS OF SMOKE ASSOCIATED WITH ACTIVE FIRES AND SMOKE WHICH HAS BECOME DETACHED FROM THE FIRES AND DRIFTED SOME DISTANCE AWAY FROM THE SOURCE FIRE. TYPICALLY OVER THE COURSE OF ONE OR MORE DAYS. AREAS OF BLOWING DUST ARE ALSO DESCRIBED. USERS ARE ENCOURAGED TO VIEW A GRAPHIC DEPICTION OF THESE AND OTHER PLUMES WHICH ARE LESS EXTENSIVE AND STILL ATTACHED TO THE SOURCE FIRE IN VARIOUS GRAPHIC FORMATS ON OUR WEB SITE:

JPEG: http://www.ospo.noaa.gov/data/land/fire/currenthms.jpg
GIS: ftp://satpsanone.nesdis.noaa.gov/FIRE/HMS/GIS/
KML: http://www.ospo.noaa.gov/data/land/fire/fire.kml (fire)
http://www.ospo.noaa.gov/data/land/fire/smoke.kml (smoke)

ANY QUESTIONS OR COMMENTS REGARDING THIS PRODUCT SHOULD BE SENT TO:
SSDFireTeam@noaa.gov

Figure 3.34: NOAA descriptive narrative for smoke/dust observed in satellite imagery, September 7, 2020. (Source: https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020l072001.html)

GBUAPCD Smoke Health Advisory Alerts

Table 3.10 lists the automated health advisories published to the GBUAPCD website at https://www.gbuapcd.org/AirMonitoringData/HealthAdvisories/ during the September 7, 2020 Exceptional Event. Per GBUAPCD Rule 701[18], a Stage 1 smoke advisory is issued when smoke-impacted monitors record an hourly average PM10 value between 100 µg/m³ and 200 µg/m³, while a Stage 2 is greater than 200 µg/m³. During normal business hours, a curated manual alert is prepared and issued by GBUAPCD staff, however, this event occurred on the Labor Day holiday and no staff were available to issue a manual advisory, so only automated advisories were broadcasted. The GBUAPCD automated alert system is unable to differentiate between dust and smoke without guidance. By default, alerts are sent as dust alerts. However, when a wildfire occurs in the region and is deemed by GBUAPCD staff to have the potential to impact a monitor with smoke, a wildfire tag is manually applied to the GBUAPCD database so that when a PM health advisory threshold is met and a wildfire tag exists, the advisory is issued as a smoke advisory. This was the case on September 7, 2020. Following the ignition of the SQF Complex in August 2020, GBUAPCD recognized the size and proximity of the SQF Complex to the Coso Junction monitor and that the fire had the potential to transport smoke to the monitor. Accordingly, GBUAPCD staff applied a wildfire tag to the database for the Coso Junction monitor preemptively enabling health advisories to be distributed as smoke advisories.

Table 3.10: Coso Junction Automated Smoke Advisories published to www.gbuapcd.org/smoke on September 7, 2020.

Location	Post Date	Post Time (PDT)	Type	PM10 Stage	PM10 Value
Coso Junction	9/7/2020	19:15:01	Smoke	2	330.6
Coso Junction	9/7/2020	20:15:01	Smoke	2	362.6
Coso Junction	9/7/2020	21:15:01	Smoke	2	386.4
Coso Junction	9/7/2020	22:15:01	Smoke	2	602.7
Coso Junction	9/7/2020	23:15:01	Smoke	2	625.0

In addition to the automated alerts posted to the GBUAPCD website (www.gbuapcd.org) on September 7, 2020, a curated GBUAPCD Smoke Health Advisory was issued on September 8, 2020 as shown in Figure 3.35. The alert lists the Creek Fire, Castle Fire (SQF Complex), and Slink Fire as causing wildfire smoke buildup in Inyo, Mono, and Alpine Counties.

[18] Rule 701, the GBUAPCD Air Pollution Episode Plan, can be viewed here: https://gbuapcd.org/Docs/PermittingAndRules/RulesAndRegulations/Rule701.pdf

GBUAPCD Smoke Advisory <HealthAdvisories@gbuapcd.org> Tue, Sep 8, 2020, 8:26 AM ☆ Reply ⋮
to me ▾

Smoke Advisory

Great Basin Unified Air Pollution Control District

Smoke Source: Creek, Castle and Slink Fires

Air Quality Health Advisory: Stage 2 in Alpine, Mono and Inyo Counties

Based on PM10 and PM2.5 air pollution levels at all community monitors overnight and into the morning on September 8, 2020 a Stage 2 Air Pollution Health Advisory is in effect through the rest of today, September 8, 2020 for Alpine, Mono and Inyo Counties. Periods of significant smoke, ash and/or dust may fluctuate depending on wind patterns and locations. Visit www.gbuapcd.org for near real time conditions.

A Stage 2 Health Advisory recommends everyone refrain from strenuous outdoor activities in the impacted area.

For more information on ways to protect yourself from wildfire smoke, click here.

Additional Emergency and low cost sensors may be found here. PurpleAir sensors do not accuratly caputre PM10 impacts and may under report health conditions in some instances.

Smoke conditions may change quickly. If you have any questions please visit: www.gbuapcd.org or call the Great Basin Air Pollution Control District office in Bishop at 760-872-8211 during regular business hours.

Health advisories on the web: https://gbuapcd.org/AirMonitoringData/HealthAdvisories/

More Information: Slink Fire InciWeb Page

More Information: Castle (SQF Complex) Fire InciWeb Page

More Information: Creek Fire InciWeb Page

Information on all smoke events being monitored in the District: https://gbuapcd.org/smoke/

Recommendations for Outdoor Physical Activity during Smoky Conditions

This guide is intended to help you make decisions on outdoor activities when it's smoky outside.
Group information is listed below.

Length of Outdoor Physical Activity	Good for Groups (1 – 3) Visibility > 10 miles	Moderate for Group 1 Individuals Visibility 5 - 10 miles	Unhealthy for Group 1 & 2 Individuals Visibility 3 – 5 miles	Unhealthy for Group 1 - 3 Individuals Visibility 1.5 – 3 miles	Very Unhealthy for Group 1 - 3 Individuals Visibility 1 – 1.5 miles	Hazardous for Group 1 – 3 Individuals Visibility < 1 mile
30 Minutes	No Restrictions	Group 1 Individuals should monitor or reduce physical activity.	Groups 1 & 2 should limit time spent outdoors or reduce physical activity.	Groups 1 & 2 should avoid the outdoors and Group 3 should reduce physical activity.	All Groups should avoid the outdoors and physical activity.	All Groups should avoid the outdoors and physical activity.
1 Hour	No Restrictions	Group 1 Individuals should monitor or reduce physical activity.	Groups 1 & 2 should considerably limit time spent outdoors and reduce physical activity.	All Groups should avoid the outdoors and physical activity.		
2 Hours or More	No Restrictions	Group 1 Individuals should limit prolonged physical activity.	Groups 1 & 2 should avoid the outdoors and Group 3 should reduce physical activity.			

WHICH GROUP ARE YOU IN?		
Group 1 Individuals	**Group 2 Individuals**	**Group 3 Individuals**
This group includes those with respiratory or heart disease, angina, pulmonary disease, asthma, emphysema or any other disease that may be impacted by any level of smoke.	This group includes those with asthma, or recent respiratory infections, those who experience seasonal allergies, work outside, or in general are more sensitive to the acute effects of smoke.	This group includes those who are more resistant to the short term effects of smoke. Healthy people may also experience adverse effects of smoke depending on duration and exposure.

Graphic created by: Kern County APCD

Great Basin Unified Air Pollution Control District

Figure 3.35: GBUAPCD Smoke Alert, broadcasted via text and email on September 8, 2020.

Media coverage

The SQF Complex and Creek Fire received much regional and national media attention and reporting, as shown in Figure 3.36 and Figure 3.37. In particular, the Creek Fire received national attention from the helicopter evacuation of 200 people trapped by the fire[19] and a massive pyrocumulonimbus cloud (Figure 3.37). In addition, there were many social media posts regarding these events. Coso Junction, being sparsely populated, has no newspaper coverage and thereby, no local news reporting. The Inyo Register newspaper, a small newspaper covering Inyo County, inconsistently reports high-level news items, with occasional wildfire smoke stories, such as smoke impacts in the Owens Valley from the Creek Fire[20] and Forest Closure related to the SQF Complex[21].

There were numerous live streams of fire updates. Examples are the Sequoia National Forest live-streams of their Morning Briefing for the SQF Complex on Facebook:

- September 7, 2020; see https://www.facebook.com/SequoiaNF/videos/243456790260867/
- September 8, 2020; this video discusses the winds and break-out expansion of the fire on September 7, 2020; see https://www.facebook.com/SequoiaNF/videos/352869602562455/

Figure 3.36: The southwest edge of the SQF Complex on 9/7/2020, courtesy Inciweb. (Source: https://inciweb.nwcg.gov/incident/photograph/7048/82/105259)

[19] Read more about the Creek Fire helicopter evacuation at USA Today: https://www.usatoday.com/story/news/nation/2020/09/10/creek-fire-stockton-national-guard-rescue-california-wildfire-saves-200/3457357001/

[20] Inyo Register, Creek Fire: https://www.inyoregister.com/content/creek-fire-dumps-smoke-valley

[21] Inyo Register, Forest Closure, Fire Listing: https://inyoregister.com/content/national-forest-closure-order-extended-through-weekend

Figure 3.37: Creek Fire pyrocumulonimbus on 9/5/2020 from a Southwest flight between San Jose, CA and Las Vegas, NV, courtesy the Washington Post/Twitter.
(Source:https://www.washingtonpost.com/weather/2020/09/06/california-wildfires-heat-wave/)

4. NATURAL EVENT

Based on the documentation provided in Section 3 (Exceptional Event Demonstration), the Creek Fire and SQF Complex events qualify as wildfires because lightning and an undetermined source caused these unplanned wildfire events.

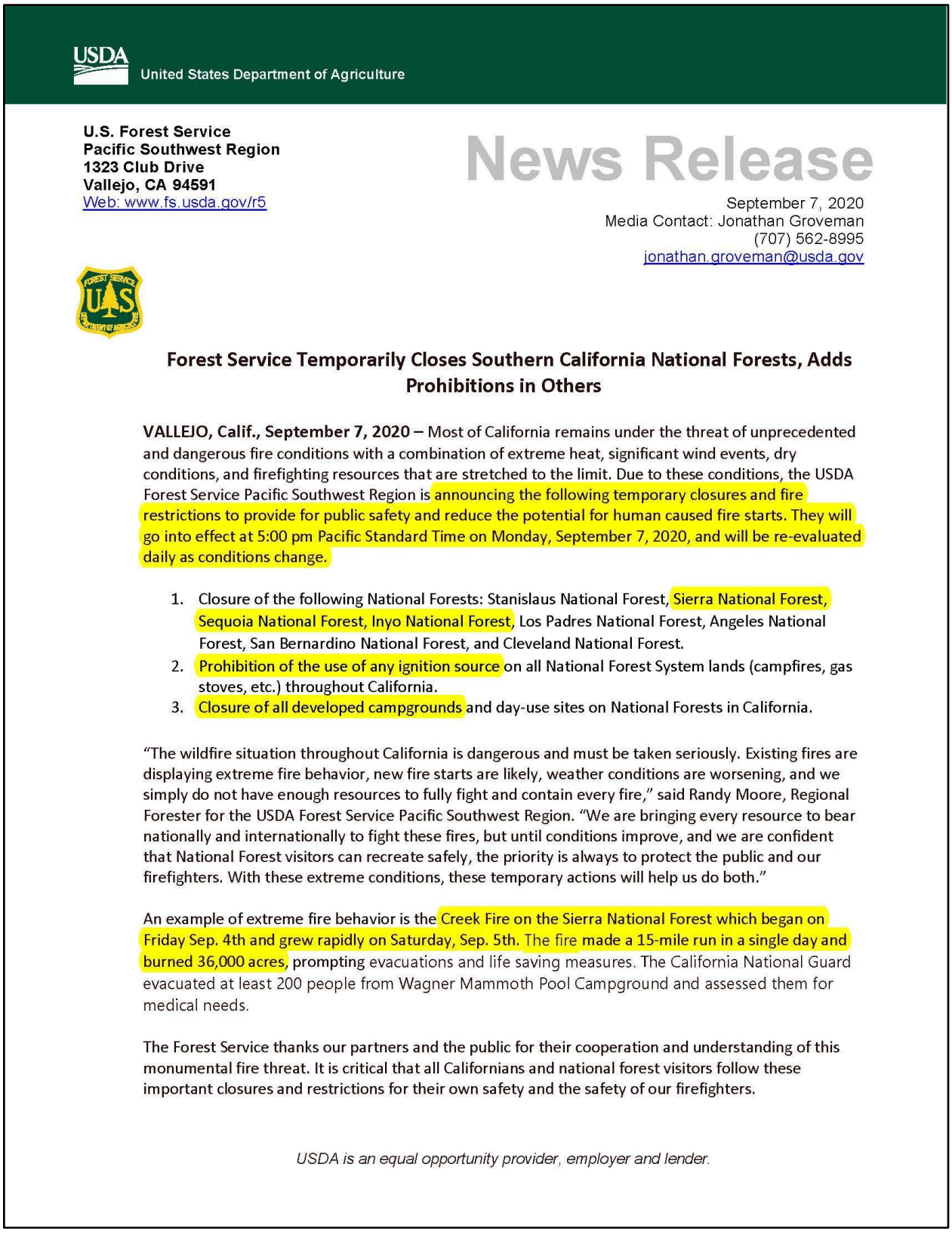
The EPA generally considers the emissions of PM10 from wildfires on wildland to meet the regulatory definition of a natural event at 40 CFR 50.1(k), defined as one ‘in which human activity plays little or no direct causal role.’ Both the Creek Fire and the SQF Complex events meet the definitions of wildfires on wildland as provided in 40 CFR 50.1(n) and (o). These wildfires occurred on wildland as documented in Figures 3.4 and 3.8 and accordingly, the GBUAPCD has shown that these events are natural events and their impact may be considered for treatment as an Exceptional Event.

5. NOT REASONABLY CONTROLLABLE OR PREVENTABLE

Based on the documentation provided in Section 3 of this submittal, lightning and an undetermined source caused the SQF Complex and Creek Fire wildfire events on wildland. The GBUAPCD is not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually made would have been reasonable. In addition, appropriate precautions were taken to prevent human-induced wildfires by the closures by the United States Forest Service, as shown in Figure 5.1. The intent of the closure is in part, to “reduce the potential for human-caused fire starts.”

With respect to wildfires, 40 CFR 50.14(b)(4) states that “…[p]rovided the Administrator determines that there is no compelling evidence to the contrary in the record, the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements identified in paragraph (c)(3)(iv)(D) of this section regarding the not reasonably controllable or preventable criterion.” As shown in previous sections, the SQF Complex and Creek Fire meet the definitions of wildfires on wildland and were therefore not reasonably controllable or preventable.

The GBUAPCD concludes that the SQF Complex and Creek Fire wildfire events should be considered natural events that were not reasonably controllable or preventable.



USDA United States Department of Agriculture

U.S. Forest Service
Pacific Southwest Region
1323 Club Drive
Vallejo, CA 94591
Web: www.fs.usda.gov/r5

News Release

September 7, 2020
Media Contact: Jonathan Groveman
(707) 562-8995
jonathan.groveman@usda.gov

Forest Service Temporarily Closes Southern California National Forests, Adds Prohibitions in Others

VALLEJO, Calif., September 7, 2020 – Most of California remains under the threat of unprecedented and dangerous fire conditions with a combination of extreme heat, significant wind events, dry conditions, and firefighting resources that are stretched to the limit. Due to these conditions, the USDA Forest Service Pacific Southwest Region is announcing the following temporary closures and fire restrictions to provide for public safety and reduce the potential for human caused fire starts. They will go into effect at 5:00 pm Pacific Standard Time on Monday, September 7, 2020, and will be re-evaluated daily as conditions change.

1. Closure of the following National Forests: Stanislaus National Forest, Sierra National Forest, Sequoia National Forest, Inyo National Forest, Los Padres National Forest, Angeles National Forest, San Bernardino National Forest, and Cleveland National Forest.
2. Prohibition of the use of any ignition source on all National Forest System lands (campfires, gas stoves, etc.) throughout California.
3. Closure of all developed campgrounds and day-use sites on National Forests in California.

"The wildfire situation throughout California is dangerous and must be taken seriously. Existing fires are displaying extreme fire behavior, new fire starts are likely, weather conditions are worsening, and we simply do not have enough resources to fully fight and contain every fire," said Randy Moore, Regional Forester for the USDA Forest Service Pacific Southwest Region. "We are bringing every resource to bear nationally and internationally to fight these fires, but until conditions improve, and we are confident that National Forest visitors can recreate safely, the priority is always to protect the public and our firefighters. With these extreme conditions, these temporary actions will help us do both."

An example of extreme fire behavior is the Creek Fire on the Sierra National Forest which began on Friday Sep. 4th and grew rapidly on Saturday, Sep. 5th. The fire made a 15-mile run in a single day and burned 36,000 acres, prompting evacuations and life saving measures. The California National Guard evacuated at least 200 people from Wagner Mammoth Pool Campground and assessed them for medical needs.

The Forest Service thanks our partners and the public for their cooperation and understanding of this monumental fire threat. It is critical that all Californians and national forest visitors follow these important closures and restrictions for their own safety and the safety of our firefighters.

USDA is an equal opportunity provider, employer and lender.

Figure 5.1: United States Forest Service closure order, dated September 7, 2020.

6. EER PROCEDURAL REQUIREMENTS

According to the provisions in 40 CFR 50.14(c)(1)(i), air agencies 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." Table 3.10 lists the GBUAPCD Automated Smoke Advisories that were broadcasted during this Exceptional Event. The Advisories were posted on the GBUAPCD Smoke website in real-time at https://www.gbuapcd.org/AirMonitoringData/Smoke.

In addition to the automated advisories, the GBUAPCD issued curated Smoke Health Advisories to email and SMS lists which include media outlets, public health agencies and the general public, as well as posting to the GBUAPCD Smoke website. GBUAPCD Health Advisories are standard District practice, as mandated by Rule 701[22], with the intent to help keep the public informed, safe, and aware of current or potential upcoming impacts. Health Advisories related to the SQF Complex began on Friday, August 28th, 2020 (see Appendix G), again on Friday, September 4, 2020 (see Appendix F), and the day following the Exceptional Event on Tuesday, September 8, 2020 (Figure 3.34). The Friday, August 28th, 2020 advisory warned of smoky conditions from the SQF Complex. The Friday, September 4th, 2020 advisory reported on anticipated smoke impacts from the Slink Fire, a relatively small wildfire only 16,200 acres at the time. The Slink Fire was located 200 miles north of Coso Junction and not anticipated to have impacts beyond adjacent communities in Mono and Alpine Counties. The Creek Fire did not ignite until after business hours later that day, September 4, 2020 18:00, and therefore, was not addressed in the September 4, 2020 Advisory.

GBUAPCD staffing schedules do not include coverage on weekends or holidays. Therefore, no staff were available to issue advisories during the Labor Day weekend of Saturday, September 5th and Sunday, September 6th, or on Monday, September 7th, the Labor Day holiday. The Smoke Advisory that followed the Friday, September 4th Advisory was on Tuesday, September 8th. This Advisory is shown in Figure 3.34 and lists the Creek Fire, Castle Fire (SQF Complex), and Slink Fire as causing wildfire smoke impacts in Inyo, Mono, and Alpine Counties.

In addition, according to 40 CFR 50.14(c)(3)(v), air agencies must "document [in their exceptional events demonstration] that the [air agency] followed the public comment process and that the comment period was open for a minimum of 30 days…." Further, air agencies must submit any received public comments to the EPA and address in their submission those comments disputing or contradicting the factual evidence in the demonstration.

The GBUAPCD posted notice of this Exceptional Event demonstration on May 28, 2021 on the GBUAPCD website at: https://gbuapcd.org. Notice of the public comment period was also emailed to the California Air Resources Control Board. Comments were accepted through the GBUAPCD Governing Board meeting on July 1, 2021. Appendix J contains the web posting, email notice, and public comments that were received, and GBUAPCD's responses to these comments. No comments were received during the public comment period.

[22] Rule 701, the GBUAPCD Air Pollution Episode Plan, can be viewed here: https://gbuapcd.org/Docs/PermittingAndRules/RulesAndRegulations/Rule701.pdf

7. CONCLUSION AND RECOMMENDATIONS

The SQF Complex and Creek Fire were wildfires in California's Sierra Nevada mountains. The SQF Complex was ignited naturally by lightning strikes. The ignition source of the Creek Fire is, as yet, undetermined. The SQF Complex burned 170,384 acres, primarily in Sequoia National Park and Sequoia National Forest, growing to California's 18th largest wildfire to-date. The SQF Complex was located approximately 20 miles west of the Coso Junction PM10 Planning Area. The Creek Fire burned in the Sierra National Forest, reaching 379,895 acres to become California's 4th largest wildfire to-date. Each wildfire produced substantial amounts of smoke, some of which lofted southeast over the Sierra crest into the Coso Junction PM10 Planning Area, impacting the Coso Junction PM10 monitoring site.

The SQF Complex and Creek Fire resulted in a PM10 exceedance on September 7, 2020. This Exceptional Event Demonstration supports the criteria for Exceptional Events detailed in the 2016 Exceptional Events Rule. Specifically, the documentation used the following evidence to demonstrate the Exceptional Event:

- ambient air monitoring data
- analysis of the monitoring data compared to historical concentrations and conditions
- analysis of wildfire growth and smoke emissions
- analysis of PM2.5-to-PM10 ratios
- satellite imagery (visible and detected smoke plumes)
- narratives from the National Oceanic and Atmospheric Administration and National Weather Service
- HYSPLIT trajectory analyses
- social media posts

This EE Demonstration clearly presents justification for the exclusion of Coso Junction PM10 data for September 7, 2020 due to an Exceptional Event as described in 40 CFR 50.14(c)(3)(iv). This Exceptional Event Demonstration has provided evidence that:

1. Emissions from the SQF Complex and Creek Fire wildfires events caused a PM10 exceedance at the Coso Junction monitor;
2. The events affected air quality in such a way that there exists a clear causal relationship between the wildfire events and the exceedance on September 7, 2020;
3. Event-influenced concentrations were unusual and above normal historical concentrations;
4. The events were wildfires and natural events predominantly occurring on wildland; and
5. The events were not reasonably controllable or preventable.

The GBUAPCD recommends that EPA Region 9 concur with the Exceptional Events Demonstration for Wildfire Smoke Impacts to the Coso Junction PM10 monitor on September 7, 2020 and exclude said data from the Coso Junction PM10 monitor from inclusion in the calculation of the three-year design value for the Coso Junction Planning Area.

APPENDICES

Appendix A
National Weather Service, Reno, conditions reported on September 8, 2020, documenting the unusual cold front with strong winds from the northeast and widespread blowing dust.

NWS Reno -- Dust, Chilly Temps, Super Dry Air Inbox ×

Chris Smallcomb - NWS Reno <chris.smallcomb@noaa.gov> Sep 8, 2020, 8:45 AM Reply
to Chris, bcc: rev.em.partners

Dust, Chilly Temps, Super Dry Air

National Weather Service - Reno, NV
Issued: 830 AM PDT Tuesday, September 8, 2020
Point of Contact: NWS Reno Operations (24/7/365) (775) 673-8100

Anyone have "prolonged hazardous AQI due to dust" on their 2020 bingo card!? Well that strong cold front ripped through last night producing breezy northeast winds and thick dust across much of the region.

KEY POINTS

- **Massive Temperature Changes:** Robust early autumn cold front brings much colder weather today and tonight. Frosts likely for rural lower elevation and mountain valleys tonight. Warms back to above normal by late week but nothing close to what we just endured. Dry air will allow noticeable cooling at night.
- **Dusty, Bone Dry Airmass:** Breezy NE winds continue today with very low humidity values = areas of critical fire weather. Unusual for a NE wind but the atmosphere is just so dry behind the front. Low humidity and poor recoveries expected through Thursday. Areas of dust/PM10 persist today, should get better late today or tonight.
- **Any Hope of Rain?** The phrase, "Abandon Hope All Ye Who Enter Here" applies. None of our reliable two-week simulations show any meaningful signal for wetting rains through 9/21. A handful show t-storms possibly returning 9/19-21 but they are outliers so the probability is fairly low.

CHANGES FROM PREVIOUS BRIEFING

- We expected dust but this is nuts. Probably lingering today with improvement late today or tonight - but there are no "dust simulations" we have to predict that with any accuracy.

Appendix B: NWS Reno Twitter report of widespread dust in the early hours of September 8, 2020, blowing dust from lakebeds and playas from southwest Oregon and Nevada, southward into the Reno NWS reporting area, which includes Mono County, just to the north of Inyo County. (Animation viewable at: https://twitter.com/nwsreno/status/1303359470911721474?lang=en)

Appendix C: Top 20 Largest California Wildfires (accessed 2/5/2021 from CalFire. The Creek Fire is #4 and the SQF Complex is #18. (Source: https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf)

Top 20 Largest California Wildfires

	FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1	**AUGUST COMPLEX** *(Under Investigation)**	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	**1,032,649**	935	1
2	**MENDOCINO COMPLEX** *(Under Investigation)*	July 2018	Colusa, Lake, Mendocino & Glenn	**459,123**	280	1
3	**SCU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Stanislaus, Santa Clara, Alameda, Contra Costa, & San Joaquin	**396,624**	222	0
4	**CREEK FIRE** *(Under Investigation)**	September 2020	Fresno & Madera	**377,693**	853	0
5	**LNU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Sonoma, Lake, Napa, Yolo & Solano	**363,220**	1,491	6
6	**NORTH COMPLEX** *(Under Investigation)**	August 2020	Butte, Plumas & Yuba	**318,930**	2,352	15
7	**THOMAS** *(Powerlines)*	December 2017	Ventura & Santa Barbara	**281,893**	1,063	2
8	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
9	**RUSH** *(Lightning)*	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
10	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
11	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
12	**CARR** *(Human Related)*	July 2018	Shasta County & Trinity	**229,651**	1,614	8
13	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
14	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
15	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
16	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
17	**LAGUNA** *(Powerlines)*	September 1970	San Diego	**175,425**	382	5
18	**SQF COMPLEX** *(Lightning)*	August 2020	Tulare	**170,384**	228	0
19	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
20	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0

There is no doubt that there were fires with significant acreage burned in years prior to 1932, but those records are less reliable, and this list is meant to give an overview of the large fires in more recent times.
This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.
*Numbers not final.

CAL FIRE
11/3/2020

Appendix D: Coso Junction hourly monitored values prior to and following event day. Event days and PM10 concentrations requested for exclusion are highlighted yellow.

Hour	H2S (ppb)	Horizontal Wind Speed (m/s)	Vector Wind Speed (m/s)	Wind Direction (degrees)	Standard Deviation of Wind Speed	Temperature (C)	Relative Humidity (%)	Precipitation (inches)	PM10 (µg/m³)	Event/ Non-event
9/6/2020 0:00	1	2.1	1.5	350.1	42.8	26.3	19.8	0	95.9	Non-event
9/6/2020 1:00	1	4.8	4.2	329.6	26.8	27	18.3	0	95.9	Non-event
9/6/2020 2:00	1.3	5.6	5.6	322.5	6.3	27.7	18.8	0	99.6	Non-event
9/6/2020 3:00	1.3	6.7	6.6	326.4	9	27.9	18	0	95.9	Non-event
9/6/2020 4:00	1.3	6.6	6.6	329.1	6.2	27.7	18.3	0	99.2	Non-event
9/6/2020 5:00	1.2	6.7	6.7	326.9	8.2	27.5	19.2	0	111.4	Non-event
9/6/2020 6:00	1.4	7.6	7.5	334.2	6.3	27.3	18.6	0	122.2	Non-event
9/6/2020 7:00	1.4	7	6.9	329.8	7.7	29.2	15.8	0	147.7	Non-event
9/6/2020 8:00	1.3	7.8	7.7	334.1	10.4	31.5	13.6	0	146.7	Non-event
9/6/2020 9:00	1.3	8.7	8.6	342.6	8.5	33.2	12	0	163.2	Non-event
9/6/2020 10:00	1.3	8.5	8.4	347.9	12	34.8	11.1	0	196.1	Non-event
9/6/2020 11:00	1.5	8.2	7.8	350.9	18.2	36.3	10.4	0	271.2	Non-event
9/6/2020 12:00	1.5	7.3	6.9	353.9	17.2	37.7	9.1	0	260.7	Non-event
9/6/2020 13:00	1.2	6.1	5.9	358.7	15	38.7	7.4	0	170.1	Non-event
9/6/2020 14:00	1	3.9	3.7	354.6	17.9	39.1	7.4	0	110.6	Non-event
9/6/2020 15:00	1	3.1	3	353.6	17.8	39.3	7.3	0	92.5	Non-event
9/6/2020 16:00	1	3.5	3.4	347.9	15.3	39	7.5	0	99.3	Non-event
9/6/2020 17:00	1.1	3.8	3.6	313.6	18.4	37.4	8.5	0	118.6	Non-event
9/6/2020 18:00	1	5.2	4.8	301.1	20.7	36.9	8.6	0	68.7	Non-event

9/6/2020 19:00	1	3.7	3.6	339.3	13.1	34.1	11.9	0	97	Non-event
9/6/2020 20:00	1	3.6	3.4	327.5	18.5	32.7	10.7	0	88.5	Non-event
9/6/2020 21:00	1	4.6	4.5	323.6	10.8	33	11.4	0	84	Non-event
9/6/2020 22:00	1.1	4.6	4.5	328.4	9.3	31.4	11.4	0	79	Non-event
9/6/2020 23:00	1	5.1	5.1	317.1	5.6	31.6	12.3	0	76.3	Non-event
9/7/2020 0:00	1	4.3	4.2	322.7	9.1	30.1	13	0	75.6	EE Wildfire Smoke
9/7/2020 1:00	1.1	5.2	5.2	334.1	8	29	15.3	0	73.3	EE Wildfire Smoke
9/7/2020 2:00	1.1	6.4	6.3	335.8	8.9	28.8	15.5	0	76.6	EE Wildfire Smoke
9/7/2020 3:00	1.2	6.4	6.3	337.9	9.6	27.9	16.6	0	72.9	EE Wildfire Smoke
9/7/2020 4:00	1.2	6.5	6.5	332.5	7.5	27.3	16.9	0	69.4	EE Wildfire Smoke
9/7/2020 5:00	1.2	6.3	6.2	326.3	7.2	27.1	17.2	0	69.5	EE Wildfire Smoke
9/7/2020 6:00	1.1	5.4	5.3	331.2	8.9	27.1	17	0	65.2	EE Wildfire Smoke
9/7/2020 7:00	1.1	5.9	5.8	337.2	7.8	28.1	15.9	0	66.1	EE Wildfire Smoke
9/7/2020 8:00	1.1	5.7	5.7	334.5	8.3	29.7	14.4	0	67.7	EE Wildfire Smoke
9/7/2020 9:00	1	6.4	6.3	335.3	9.2	31.3	12.9	0	57.7	EE Wildfire Smoke
9/7/2020 10:00	0.9	6.9	6.8	339.3	10.7	32.2	12.8	0	65.7	EE Wildfire Smoke
9/7/2020 11:00	1.1	8	7.8	343.5	11.4	32.4	10.4	0	66	EE Wildfire Smoke
9/7/2020 12:00	0.9	7.1	7	346	12.7	33.8	9.9	0	42.3	EE Wildfire Smoke
9/7/2020 13:00	0.9	4.5	4.3	330.4	14.3	34.8	7.8	0	30.4	EE Wildfire Smoke
9/7/2020 14:00	0.8	5.8	5.6	347.6	14.5	35.2	8.3	0	34.9	EE Wildfire Smoke
9/7/2020 15:00	0.8	5.9	5.7	355	14.9	34.3	9.1	0	46.7	EE Wildfire Smoke
9/7/2020 16:00	1	6.5	6	319.6	23.6	35.3	6.5	0	81.4	EE Wildfire Smoke
9/7/2020 17:00	1.6	7.5	7.2	296.3	15.3	34.9	9.6	0	330.6	EE Wildfire Smoke
9/7/2020 18:00	1.8	10.4	10.2	286.6	10.5	34.4	12.6	0	362.6	EE Wildfire Smoke

9/7/2020 19:00	1.7	10.2	10	293.8	12	34	12.7	0	386.4	EE Wildfire Smoke
9/7/2020 20:00	2.2	10.3	10.1	292.1	11.4	34	12.9	0	602.7	EE Wildfire Smoke
9/7/2020 21:00	2.6	8.2	8.1	293.4	10.2	33.7	12.6	0	625	EE Wildfire Smoke
9/7/2020 22:00	2.8	8	7.9	294.7	10	33.6	13.2	0	627.9	EE Wildfire Smoke
9/7/2020 23:00	2.8	6.6	6.4	303.3	16.1	33.1	14.7	0	574.1	EE Wildfire Smoke
9/8/2020 0:00	2.5	4.4	4.1	1.3	20	30.8	14.4	0	550.8	Smoke/dust event
9/8/2020 1:00	2.4	4.6	4.4	359.2	18.4	30.7	15	0	490.8	Smoke/dust event
9/8/2020 2:00	2.4	4.4	4.3	9	11.8	29.4	15.7	0	536.6	Smoke/dust event
9/8/2020 3:00	2.2	6.8	6.5	351.8	16.7	27.3	20.6	0	457.3	Smoke/dust event
9/8/2020 4:00	1.4	8	7.8	334.8	10.9	26.7	18.2	0	396.6	Smoke/dust event
9/8/2020 5:00	1	10.6	9.7	349.8	22.4	26.8	20	0	952.5	Smoke/dust event
9/8/2020 6:00	0.8	11.4	10.7	344.7	19.5	25.8	20.6	0	1072.1	Smoke/dust event
9/8/2020 7:00	0.9	11.6	11.3	330.3	11.3	25.2	20.4	0	1503.6	Smoke/dust event
9/8/2020 8:00	0.9	13.6	12.8	348.7	19.4	24.9	18.2	0	1857.4	Smoke/dust event
9/8/2020 9:00	1	14.3	13.3	352.2	21.7	25.5	16.1	0	1574.7	Smoke/dust event
9/8/2020 10:00	1.1	12.2	11.2	356.7	23.2	26.3	13.8	0	1036.9	Smoke/dust event
9/8/2020 11:00	1	11.4	10.8	359.6	17.2	27.3	10.9	0	746.5	Smoke/dust event
9/8/2020 12:00	0.9	10.8	10.3	357.2	18.2	28.2	8.6	0	532.1	Smoke/dust event
9/8/2020 13:00	0.9	10.2	9.4	356.8	22.8	28.9	7.5	0	404.9	Smoke/dust event
9/8/2020 14:00	1.1	9.1	8.7	359.7	17.9	29.3	5.9	0	277.9	Smoke/dust event
9/8/2020 15:00	1.2	8.1	7.8	0.8	15.1	29.3	5.5	0	201.7	Smoke/dust event
9/8/2020 16:00	1.2	7.9	7.6	358.1	16.4	29.1	5.1	0	145.6	Smoke/dust event
9/8/2020 17:00	1.2	6.1	5.6	342.3	22	28.1	5.6	0	109.4	Smoke/dust event
9/8/2020 18:00	1.2	4.7	4.6	317	8.9	26.5	5.7	0	85.4	Smoke/dust event

9/8/2020 19:00	1.2	4.8	4.5	335.5	20.4	25	6	0	65.1	Smoke/dust event
9/8/2020 20:00	1.2	4.6	4.5	325.7	9.5	24.2	7.4	0	75.4	Smoke/dust event
9/8/2020 21:00	1.4	4.6	4.6	329.7	9.5	22.6	8.9	0	86.8	Smoke/dust event
9/8/2020 22:00	1.3	4.9	4.8	324.2	7.8	21.8	9.9	0	71.8	Smoke/dust event
9/8/2020 23:00	1.2	4.8	4.7	324.1	8.4	20.8	11	0	53.6	Smoke/dust event
9/9/2020 0:00	1.2	5.3	5.3	316.9	9.4	20	12.2	0	46.9	Non-event
9/9/2020 1:00	1.4	5.3	5.3	318.2	10.2	19.8	13.6	0	37.9	Non-event
9/9/2020 2:00	1.5	5.6	5.5	321.6	9.2	19.2	14.5	0	32.8	Non-event
9/9/2020 3:00	1.6	4.8	4.7	327.8	12.3	18.3	15.4	0	31.8	Non-event
9/9/2020 4:00	1.6	4.7	4.6	331.2	9.3	17.9	16.5	0	34.7	Non-event
9/9/2020 5:00	1.5	3.3	3.2	332.5	12.9	15.7	17.9	0	35.7	Non-event
9/9/2020 6:00	1.6	3.7	3.7	338.5	10.5	16.8	16.7	0	39.6	Non-event
9/9/2020 7:00	1.6	3.9	3.7	353.3	15.5	19	14.2	0		Non-event
9/9/2020 8:00	1.3	5.4	5.2	358.9	16.6	21	11.8	0		Non-event
9/9/2020 9:00	1.1	7.7	7.4	355.1	16.6	22.8	10	0		Non-event
9/9/2020 10:00	1	6.7	6.3	1.3	19.3	24.2	9	0	25.2	Non-event
9/9/2020 11:00		5.1	4.8	9.5	19.2	25.6	7.7	0	23.9	Non-event
9/9/2020 12:00		3.6	3.1	329.5	28.6	26.9	7.3	0	25.7	Non-event
9/9/2020 13:00		4.1	1.9	177.1	58.8	27.7	7.3	0	30.4	Non-event
9/9/2020 14:00	1	4.8	4.6	168.1	17.1	27.7	7.2	0	35.5	Non-event
9/9/2020 15:00	1	3.8	3.6	170.1	17	27.8	6.8	0	26.7	Non-event
9/9/2020 16:00	0.9	4.3	4.2	175.1	12.2	27.4	6.7	0	26.2	Non-event
9/9/2020 17:00	0.9	3.6	3.6	175.9	7.3	26	7.1	0	18.8	Non-event
9/9/2020 18:00	1	1.8	1.1	169.3	49.9	23.7	7.8	0	18.5	Non-event

9/9/2020 19:00	1	1.5	1.5	277.3	13.8	20.7	11.4	0	22.1	Non-event
9/9/2020 20:00	0.9	0.9	0.7	289.6	38.4	17.8	11.1	0	20.2	Non-event
9/9/2020 21:00	1	1.6	1.6	259.6	13.4	17.9	10.3	0	18	Non-event
9/9/2020 22:00	1.1	0.5	0.4	238.5	45.6	16	11.8	0	15.8	Non-event
9/9/2020 23:00	1.1	0.8	0.7	353.1	23.7	13	14.9	0	16.9	Non-event

Appendix E: AQS AMP480 report showing the 2018-2020 design value both including and excluding the requested Exceptional Event (EE).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: May. 5, 2021

Pollutant: PM10 Total 0-10um STP(81102)
Standard Units: Micrograms/cubic meter (25 C)(001)
NAAQS Standard: PM10 24-hour 2006
Statistic: Annual Estimated Days > Standard **Level:** 150

Design Value Year: 2020

REPORT INCLUDES MEASUREMENTS WITH EXCEPTIONAL EVENT FLAGS.

State Name: California

			2020				2019				2018				3 - Year	
Site ID	POC	STREET ADDRESS	Exceedances Estimated	Exceedances Count	#Comp Quarter	Cert& Eval	Exceedances Estimated	Exceedances Count	#Comp Quarter	Cert& Eval	Exceedances Estimated	Exceedances Count	#Comp Quarter	Cert& Eval	Estimated Exceedances	Validity Ind.
06-027-1001	4	COSO JUNCTION REST AREA, HWY 395	2	2	4	Y	1	1	4	Y	1.1	1	4	Y	1.4	Y

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

Page 2 of 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: May. 5, 2021

Pollutant: PM10 Total 0-10um STP(81102)
Standard Units: Micrograms/cubic meter (25 C)(001)
NAAQS Standard: PM10 24-hour 2006
Statistic: Annual Estimated Days > Standard **Level:** 150

Design Value Year: 2020
REPORT EXCLUDES ALL MEASUREMENTS WITH EXCEPTIONAL EVENT FLAGS.
State Name: California

			2020				2019				2018				3 - Year	
Site ID	POC	STREET ADDRESS	Exceedances Estimated	Exceedances Count	#Comp Quarter	Cert& Eval	Exceedances Estimated	Exceedances Count	#Comp Quarter	Cert& Eval	Exceedances Estimated	Exceedances Count	#Comp Quarter	Cert& Eval	Estimated Exceedances	Validity Ind.
06-027-1001	4	COSO JUNCTION REST AREA, HWY 395	1	1	4	Y	1	1	4	Y	1.1	1	4	Y	1	Y

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

Page 2 of 3

Appendix F: Smoke Advisory issued Friday, September 4th, prior to the ignition of the Creek Fire.

GBUAPCD Smoke Advisory <HealthAdvisories@gbuapcd.org> Sep 4, 2020, 8:27 AM Reply

to me

Smoke Advisory

Great Basin Unified Air Pollution Control District

Smoke Source: Slink Fire

Air Quality Health Advisory: Stage 1 in Alpine and northern Mono Counties

Based on air pollution levels at the Antelope Valley PM2.5 monitor between 7:00 am and 8:00 am on September 4, 2020 a Stage 1 Air Pollution Health Advisory is in effect for Mono and Alpine Counties through the rest of the day. Periods of smoke and clearing may fluctuate depending on wind patterns and locations. There will be no District-issued Health Advisories through the Labor Day weekend. Current PM conditions can be found 24/7 here.

A Stage 1 Health Advisory recommends children, the elderly, people with heart or lung problems, or people with current illnesses such as the flu or Covid-19, to stay indoors and avoid strenuous outdoor activities in the impacted areas.

For more information on ways to protect yourself from wildfire smoke, click here.

GBUAPCD Slink Fire page, which includes links to the ARA Air Quality Summary Report.

Webcam of the Slink Fire

Smoke conditions may change quickly. If you have any questions please visit: www.gbuapcd.org or call the Great Basin Air Pollution Control District office in Bishop at 760-872-8211 during regular business hours.

Health advisories on the web: https://gbuapcd.org/AirMonitoringData/HealthAdvisories/

More Information: Slink Fire InciWeb Page

Information on all smoke events being monitored in the District: https://gbuapcd.org/smoke/

Recommendations for Outdoor Physical Activity during Smoky Conditions

This guide is intended to help you make decisions on outdoor activities when it's smoky outside.
Group information is listed below.

Length of Outdoor Physical Activity	Good for Groups (1 – 3) Visibility > 10 miles	Moderate for Group 1 Individuals Visibility 5 - 10 miles	Unhealthy for Group 1 & 2 Individuals Visibility 3 – 5 miles	Unhealthy for Group 1 - 3 Individuals Visibility 1.5 – 3 miles	Very Unhealthy for Group 1 - 3 Individuals Visibility 1 – 1.5 miles	Hazardous for Group 1 – 3 Individuals Visibility < 1 mile
30 Minutes	No Restrictions	Group 1 Individuals should monitor or reduce physical activity.	Groups 1 & 2 should limit time spent outdoors or reduce physical activity.	Groups 1 & 2 should avoid the outdoors and Group 3 should reduce physical activity.	All Groups should avoid the outdoors and physical activity.	All Groups should avoid the outdoors and physical activity.
1 Hour	No Restrictions	Group 1 Individuals should monitor or reduce physical activity.	Groups 1 & 2 should considerably limit time spent outdoors and reduce physical activity.	All Groups should avoid the outdoors and physical activity.		
2 Hours or More	No Restrictions	Group 1 Individuals should limit prolonged physical activity.	Groups 1 & 2 should avoid the outdoors and Group 3 should reduce physical activity.			

WHICH GROUP ARE YOU IN?		
Group 1 Individuals	**Group 2 Individuals**	**Group 3 Individuals**
This group includes those with respiratory or heart disease, angina, pulmonary disease, asthma, emphysema or any other disease that may be impacted by any level of smoke.	This group includes those with asthma, or recent respiratory infections, those who experience seasonal allergies, work outside, or in general are more sensitive to the acute effects of smoke.	This group includes those who are more resistant to the short term effects of smoke. Healthy people may also experience adverse effects of smoke depending on duration and exposure.

Great Basin Unified Air Pollution Control District

Appendix G: Smoke Advisory issued Friday, August 28th, 2020 noting smoky conditions from the SQF Complex (aka Sequoia Complex), part of which was the Castle Fire.

GBUAPCD Smoke Advisory Health Advisories ×

GBUAPCD Smoke Advisory <HealthAdvisories@gbuapcd.org> Aug 28, 2020, 4:28 PM Reply

to me

Smoke Advisory

Great Basin Unified Air Pollution Control District

Smoke Source: Castle Fire (Sequoia Complex)

Air Advisory: Inyo County

Smoky conditions are expected in Inyo County through the weekend due to the Castle Fire (SQF Complex) burning in the Golden Trout Wilderness. The current weather patterns have been bringing smoke into the area in the evening through the early morning with clearing for portions of the day. Periods of smoke and clearing may fluctuate through out the weekend depending on wind patterns and locations. Visit www.gbuapcd.org for near real time conditions.

Children, the elderly, people with heart or lung problems, or people with current illnesses such as the flu or Covid-19, should stay indoors and avoid strenuous outdoor activities in the impacted areas when smoke is elevated.

An air resource advisor (ARA) has been added to the Sequoia Complex fire team. For the most recent report click here.

For more information on ways to protect yourself from wildfire smoke, click here.

Inyo County Monitors

Bishop

Coso Junction

Keeler

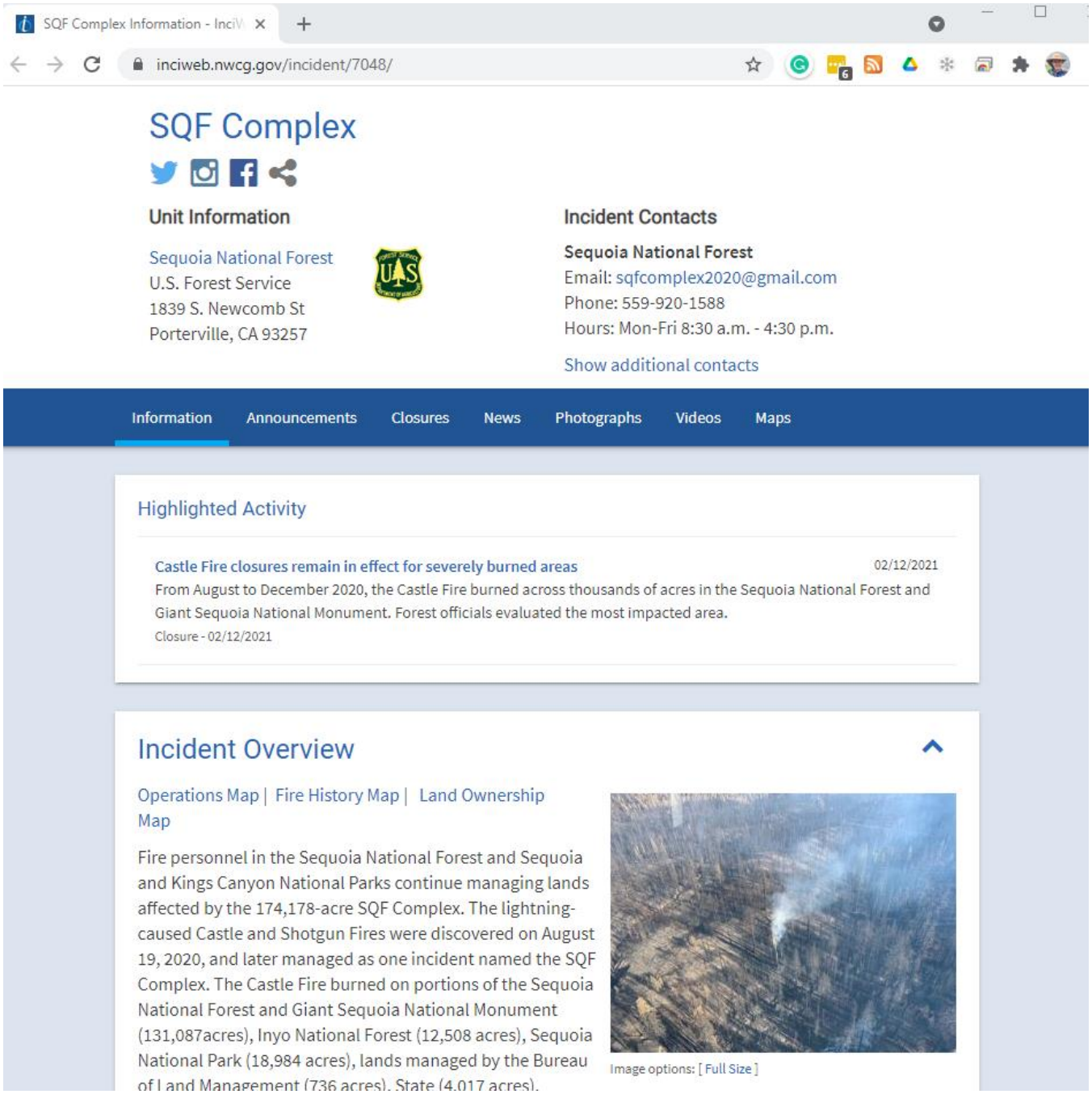
Lone Pine

Lone Pine Emergency PM2.5 monitor

Olancha

Low Cost Sensor Data

Appendix H - SQF and Creek Fire Incident Website Screenshots



Creek Fire Information - InciWeb

inciweb.nwcg.gov/incident/7147

Creek Fire

Unit Information

Sierra National Forest
U.S. Forest Service
1600 Tollhouse Road
Clovis, CA 93611

Incident Contact

Creek Fire Information and Media
Email: 2020.Creek@firenet.gov
Phone: 559-297-0706
Hours: M-F 8am-4pm

Information | Announcements | Closures | News | Photographs | Videos | Maps

Highlighted Activity

Sierra National Forest Declares the Creek Fire 100% contained 12/24/2020

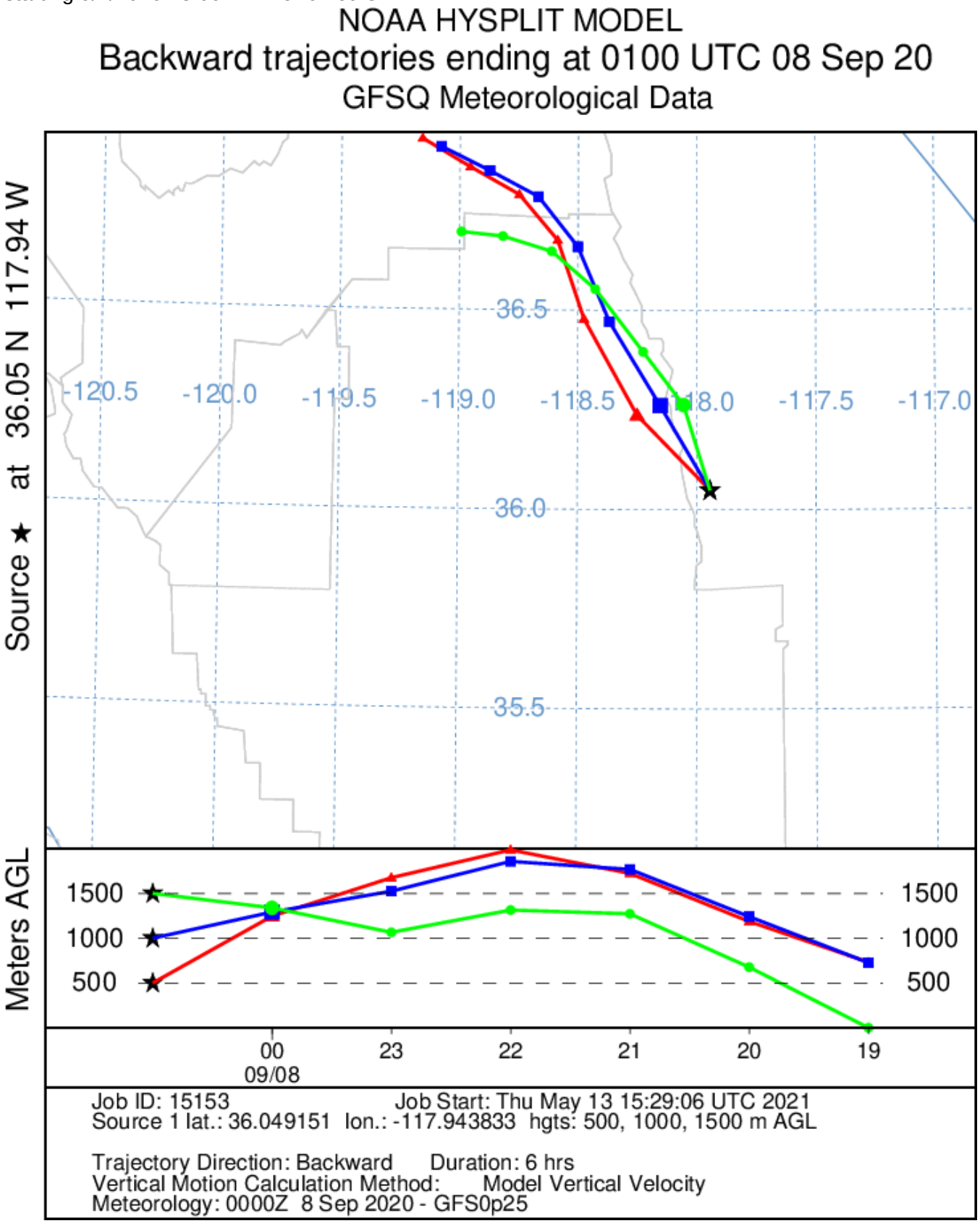
CLOVIS, Calif., December 24, 2020 – For Immediate Release. With the recent change in weather conditions, Fire Officials with the Sierra National Forest are declaring the Creek Fire 100 percent...

News - 12/24/2020

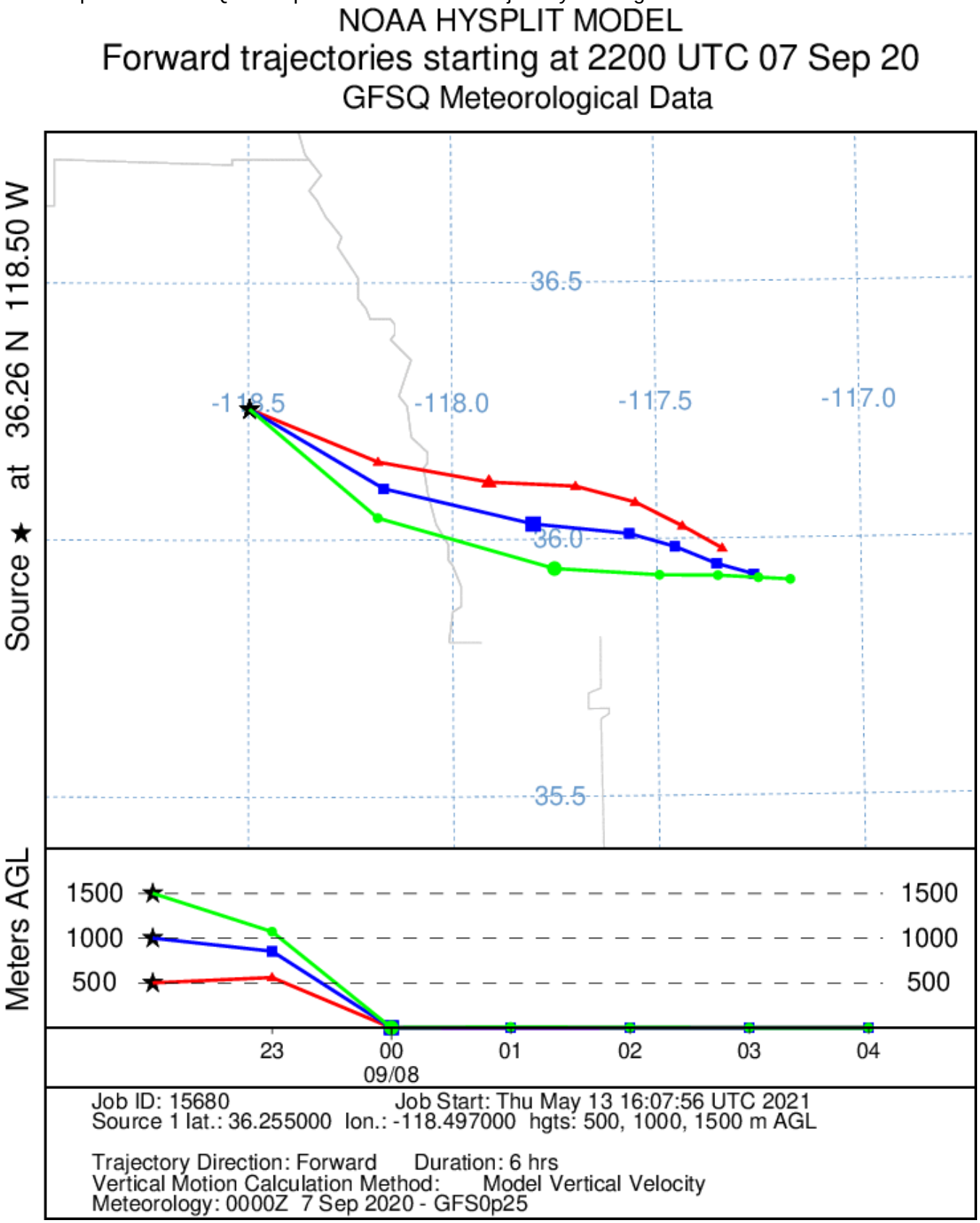
Incident Overview

CLOVIS, Calif., December 24, 2020 – For Immediate Release. With the recent change in weather conditions, Fire Officials with the Sierra National Forest are declaring the Creek Fire 100 percent contained. The Creek Fire started the evening of September 04, 2020 in the Big Creek drainage burning an unprecedented 379,895 acres before being contained on December 24, 2020.

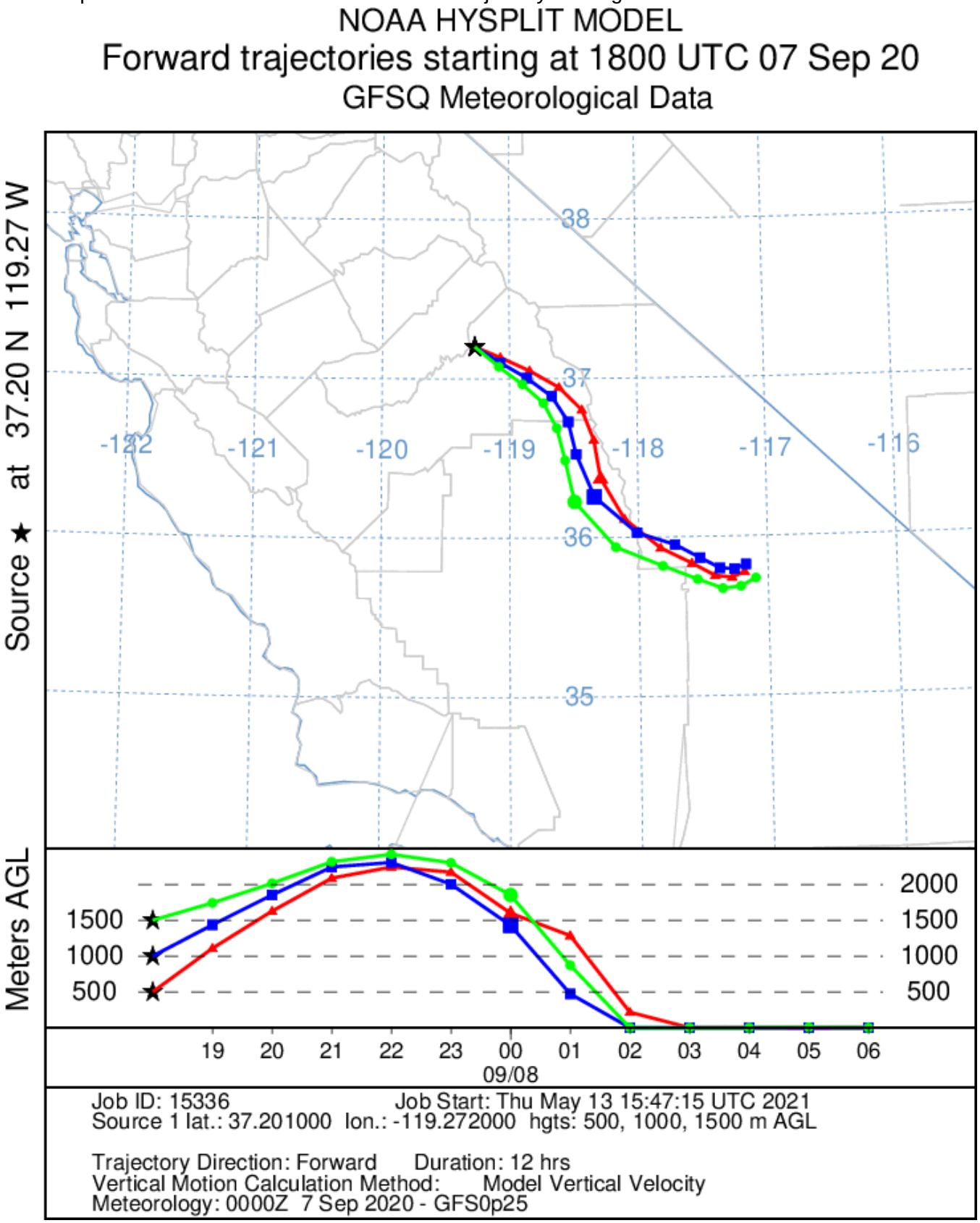
Appendix I - NOAA HYSPLIT trajectories. This map shows the backward trajectory from Coso Junction starting 9/7/2020 18:00 PDT for 6 hours.



This map shows the SQF Complex 6-hour forward trajectory starting 9/7/2020 15:00 PDT.



This map shows the Creek Fire 12-hour forward trajectory starting 9/7/2020 11:00 PDT.



Appendix J - Public Comment web posting, CARB email notice, and public comments and responses.

No comments were received on this document during the public comment period, May 28, 2021 through July 1, 2021.

Below is the email from GBUAPCD to CARB and EPA announcing the public comment period:

Chris Howard <choward@gbuapcd.org>

Public Comment period for Coso Junction EE demonstration
1 message

Chris Howard <choward@gbuapcd.org> Fri, May 28, 2021 at 1:00 PM
To: Theresa Najita <theresa.najita@arb.ca.gov>, Anna Mebust <mebust.anna@epa.gov>
Cc: Phill Kiddoo <pkiddoo@gbuapcd.org>, Chris Lanane <clanane@gbuapcd.org>, Ann Logan <ann@gbuapcd.org>

Theresa and Anna,

Please find attached a Notification for Public Comment for the *Exceptional Event Demonstration for Wildfire Smoke Impacts to the Coso Junction PM10 Monitor on September 7, 2020*. The EE Demonstration document is also attached. The public comment period is open for 34 days beginning Friday, May 28, 2021 and ending Thursday, July 1, 2021, following the GBUAPCD Governing Board Meeting.

The EE demonstration is now listed on our website under What's New and downloadable from the Coso Junction PM10 SIP page.

We at the District appreciate all the comments you've already provided to improve the content and clarity of this demonstration. Please let us know if you'd like a version in Word to provide additional comments through track changes.

Sincerely,
Chris

Chris Howard
Senior Research and Systems Analyst
Great Basin Unified Air Pollution Control District
157 Short St, Bishop, CA 93514 | 760.258.8513 | http://gbuapcd.org/

2 attachments

2021_Coso_JctnEELglNtc.pdf
143K

GBUAPCD Exceptional Event Demonstration September 7 2020.pdf
12451K

Below is the GBUAPCD webpage on May 28, 2021 announcing the EE demonstration public comment period:

Below is the public notice related to the public comment period:

Phillip L. Kiddoo
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
157 Short Street, Bishop, California 93514-3537
760-872-8211 Fax: 760-872-6109

NOTICE OF PUBLIC COMMENT PERIOD
GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
COSO JUNCTION PLANNING AREA EXCEPTIONAL EVENT DEMONSTRATION

The Great Basin Unified Air Pollution Control District (GBUAPCD) has made available for public comment its *Exceptional Event Demonstration for Wildfire Smoke Impacts to Coso Junction PM10 Monitor, September 7, 2020* (Coso EE 2021) in accordance with Title 40 of the Code of Federal Regulations Part 50.14. Copies of the Draft Coso EE 2021 and supporting documents may be obtained from the GBUAPCD by email from Chris Howard at choward@gbuapcd.org, or Chris Lanane at clanane@gbuapcd.org, or by visiting the District's website, www.gbuapcd.org, under "What's New." Written comments should be sent via email to pkiddoo@gbuapcd.org. Written comments received by 12:00 noon on Thursday, June 3, 2021, will be included in an informational item and staff report provided to the Governing Board of the GBUAPCD at its regular Board meeting on Thursday, July 1, 2021, at 10:00 a.m. at the Alpine County Supervisors room in the Alpine County Administrative Center, 99 Water Street (State Hwy 89), Markleeville, California 96120. Oral comments will also be taken at this meeting. All comments must be received by 10:00 a.m. on Thursday, July 1, 2021, to be included in the staff report presented to the U.S. EPA for their consideration and action. Comments on the document should be sent to Mr. Phillip Kiddoo, Air Pollution Control Officer, GBUAPCD, by e-mail to pkiddoo@gbuapcd.org. For further information, contact Mr. Chris Howard, Senior Systems Analyst, or Mr. Chris Lanane, Air Monitoring Specialist, at (760) 872-8211.

2021-05-21

Publication Dates

Inyo Register	May 29, 2021
The Sheet	May 29, 2021
Tahoe Daily Tribune	May 28, 2021

Mail List: Public Notice

End of document:
Exceptional Event Demonstration for Wildfire Smoke Impacts to the Coso Junction PM10 Monitor on September 7, 2020