Exceptional Events Demonstration for 2015 Ozone Exceedance in Washoe County from the 2015 California Wildfires August 21, 2015

Submitted to U.S. EPA Region IX November 10, 2016

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ACRONYMS

AQI	Air Quality Index
AQMD	Washoe County Health District - Air Quality Management Division
AQS	Air Quality System
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EC	Elemental Carbon
EE	Exceptional Event
EER	Exceptional Events Rule
EPA	U.S. Environmental Protection Agency
ºF	Degrees Fahrenheit
FR	Final Rule
HA 87	Hydrographic Area 87
HYSPLIT	Hybrid Single-Particle Lagrangian Integrated Trajectory
Km	Kilometers
$\mu g/m^3$	Micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-Pollutant Monitoring Station
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NWS	National Weather Service
OC	Organic Carbon
O_3	Ozone
PST	Pacific Standard Time
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter less than or equal to 2.5 microns in aerodynamic diameter
PM_{10}	Particulate Matter less than or equal to 10 microns in aerodynamic diameter
ppm	Parts Per Million
SLAMS	State and Local Air Monitoring Station
SO_2	Sulfur Dioxide
TSP	Total Suspended Particles
UTC	Coordinated Universal Time
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Carbon

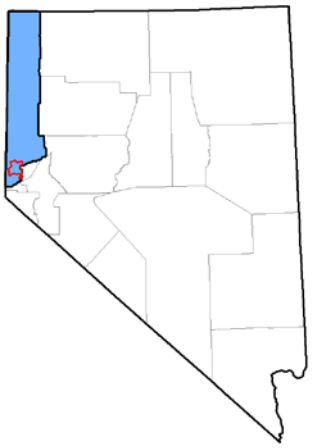
1.0 NARRATIVE CONCEPTUAL MODEL

1.1 Regional Description

Washoe County is located in the northwest portion of Nevada. It is bounded by California, Oregon, and the Nevada counties of Humboldt, Pershing, Storey, Churchill, Lyon, and Carson City (Figure 1.1). The Truckee Meadows is approximately 200 square miles in size and situated in the southern portion of Washoe County. It is geographically identified as Hydrographic Area 87 (HA 87) as defined by the State of Nevada, Division of Water Resources. Most of Washoe County's population lives in and around the Truckee Meadows.

The Truckee Meadows sits at an elevation of 4,400 feet above sea level and surrounded by mountain ranges. To the west, the Sierras rise to elevations of 9,000 to 11,000 feet. Hills to the east reach 6,000 to 7,000 feet. The Truckee River, flowing from the Sierras eastward, drains into Pyramid Lake to the northeast of the Truckee Meadows.

Figure 1.1
Washoe County, Nevada



Average annual wind speed measured at the Reno-Tahoe International Airport is 6.4 mph. January is the calmest month (4.5 mph) with April being the windiest (8.3 mph). Wintertime (November-January) averages 4.9 mph and summertime (June-August) averages 7.2 mph.

Most of Reno's precipitation falls from November through March in the form of rain and snow. Reno receives an average of 7.40 inches of precipitation per calendar year (1981-2010 climate normals). Table 1.1 lists temperature and precipitation normals as measured at the Reno-Tahoe International Airport.

Table 1.1: Monthly Normal Temperature and Rainfall (1981-2010)

	Temperature (^{o}F)			Precipitation (inches)
Month	Maximum	Minimum	Normal	Normal
January	45.7	25.4	35.6	1.03
February	51.0	28.9	39.9	1.02
March	57.9	33.5	45.7	0.76
April	63.9	37.8	50.9	0.47
May	73.5	45.5	59.5	0.49
June	83.3	52.0	67.7	0.51
July	92.2	57.7	74.9	0.18
August	90.6	55.8	73.2	0.23
September	82.0	48.5	65.2	0.35
October	69.2	38.8	54.0	0.51
November	55.0	30.5	42.7	0.82
December	45.6	25.0	35.3	1.03

The 2014 population of Washoe County was 436,797. Approximately 66 percent of Washoe County's residents live in the Truckee Meadows, which includes the cities of Reno and Sparks. Anthropogenic activities such as transportation, manufacturing, freight distribution, and residential wood use are also concentrated in the Truckee Meadows.

Washoe County experiences two distinct air pollution seasons – wintertime particulate matter (PM) and summertime ozone (O_3). Wildfire smoke throughout the year, especially during the summer months, can dramatically increase summertime PM and ozone.

Wintertime temperature inversions combined with light winds can contribute to elevated levels of Particulate Matter less than or equal to 2.5 microns ($PM_{2.5}$), Particulate Matter less than or equal to 10 microns (PM_{10}), Nitrogen Dioxide (NO_2), and Carbon Monoxide (CO). Inversions are common in mountain valleys such as the Truckee Meadows. Air pollution episodes persist until stronger winds scour the cold air out of the valley and break the temperature inversion.

Northern Nevada receives an abundant amount of sunshine and solar radiation during the summer months. Mobile sources (i.e., cars and trucks) emit ozone precursors and their activity increases during the summer. Ozone concentrations are typically highest between May through September, especially during the months of June, July, and August.

Strong winds can occur at any time of year. 2-minute gusts over 40 mph are not uncommon. These winds lower the gaseous pollutant (O_3, CO, NO_2, and SO_2) concentrations, but typically increase PM levels, especially PM_{10}. Hourly PM_{10} levels can reach more than 500 $\mu g/m^3$ for several hours.

All areas of Washoe County currently attain the National Ambient Air Quality Standards (NAAQS) for all pollutants and averaging times. However, portions of Washoe County have been designated non-attainment for the following NAAQS: 1) 1971 Total Suspended Particles (TSP) (24-hour and Annual); 2) CO (8-hour); 3) 1979 ozone (1-hour); and 4) 1987 PM_{10} (24-hour and Annual). Control strategies since the 1970's targeting mobile sources, woodstoves, and dust control have reduced emissions and improved air quality.

1.2 Overview of Ambient Air Monitoring Network

In 2015 the Washoe County Health District Air Quality Management Division (AQMD) operated 7 ambient air monitoring sites in Washoe County (Figure 1.2). The blue boundary delineates HA 87 as defined by the State of Nevada, Division of Water Resources. Table 1.2 lists the parameters monitored in 2015, sorted by site.

Figure 1.2: Washoe County Health District - AQMD Ambient Air Monitoring Sites

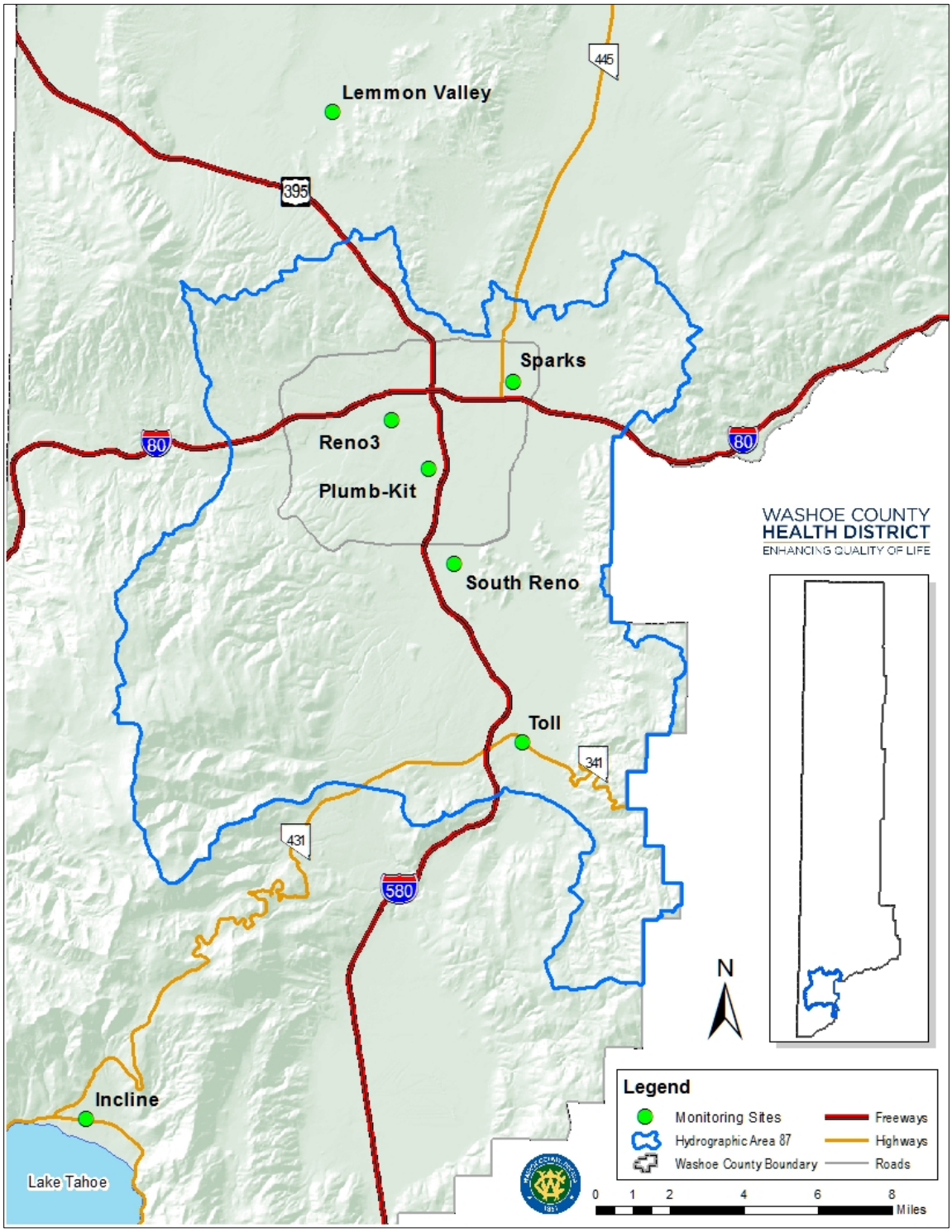


Table 1.2: List of Monitoring Sites and Pollutants Monitored in 2015

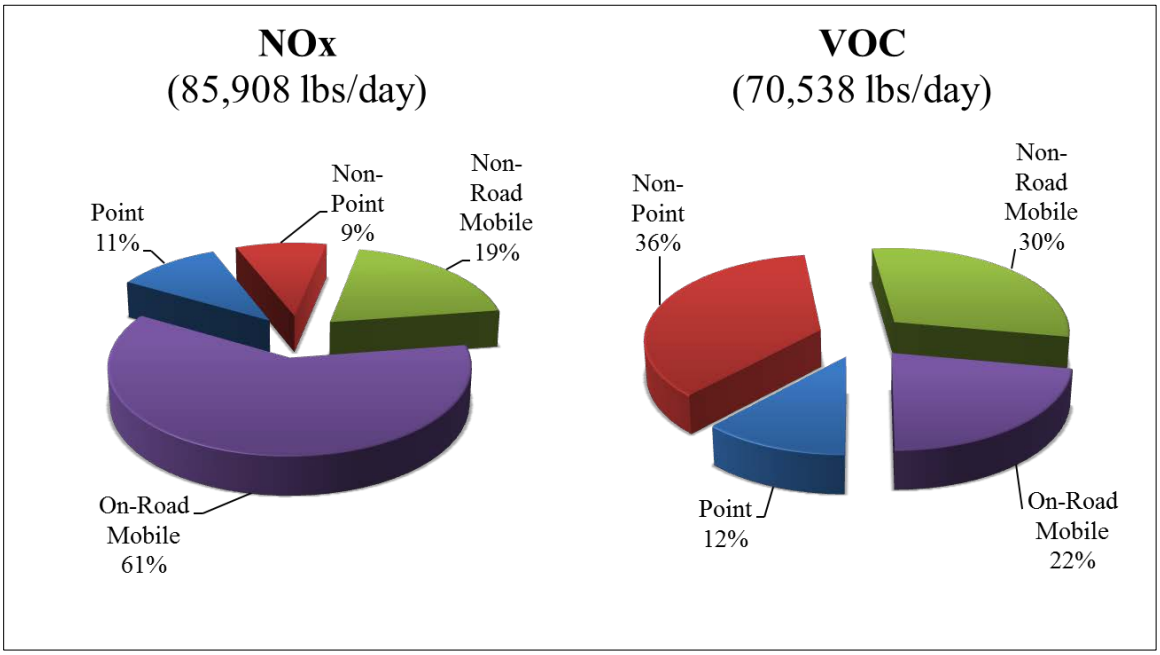
Network Type Site SLAMS	O_3	CO	Trace CO	Trace NO	NO_2	NO_x	Trace NOy	Trace SO_2	PM_{10} (manual)	PM_{10} (continuous)	$PM_{2.5}$ (manual)	$PM_{2.5}$ (continuous)	PM_{coarse} (manual)	PM_{coarse} (continuous)	$PM_{2.5}$ Speciation	Meteorology
Incline	✓															
Lemmon Valley	✓	✓														
Plumb-Kit										✓						✓
South Reno	✓									✓						✓
Sparks	✓	✓								✓		✓		✓		✓
Toll	✓	✓								✓						✓
NCore																
Reno3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Speciation Trends																
Reno3															✓	

The AQMD's ambient air monitoring network meets the minimum monitoring requirements for all criteria pollutants pursuant to Title 40 Part 58 of the Code of Federal Regulations (CFR), Appendix D. Washoe County's monitoring network is reviewed annually pursuant to 40 CFR 58.10 to ensure the network meets the monitoring objectives defined in 40 CFR 58, Appendix D (See Appendix A for the Region IX of the U.S. Environmental Protection Agency (EPA) Annual Network Plan Approval Letter). Data was collected and quality assured in accordance with 40 CFR 58 and submitted to the Air Quality System (AQS). Additionally, 2015 data was certified on April 22, 2016, and the Data Certification Letter was submitted to EPA Region IX on April 22, 2016 (See Appendix B).

1.3 Characteristics of Non-Event Ozone Formation

Ozone is formed from a chemical reaction between nitrogen oxides and volatile organic compounds in the presence of sunlight. Mobile Sources (On-Road and Non-Road) are the largest categories of ozone precursors. Figure 1.3 illustrates the ozone planning inventory which represents Nitrogen Oxide (NOx) and Volatile Organic Carbon (VOC) emissions for a typical summer day.

Figure 1.3: NOx and VOC Emissions for a Typical Day in Summertime



Based on historic, non-event ozone monitoring data for the previous six years, below are the characteristics of ozone levels throughout the year in the Truckee Meadows.

1. January through March: This is generally the period with the lowest ozone concentrations during the year because of the cooler temperatures, shorter days, and unsettled weather patterns.
2. April through May: This is a transitional period between spring and summer. 8-hour ozone concentrations above 65 ppb are unusual. Infrequently, meteorological conditions (specifically from late April to early June) are favorable for ozone formation in Northern/Central California followed by stronger than normal west-southwesterly winds conducive to interstate transport of existing pollution downwind towards the Reno/Sparks area.
3. June through August: The highest ozone levels are typically observed during these summer months. Mobile Source activity, including Vehicle Miles Traveled (VMT), peaks during the summer. Afternoon winds, also known as the Washoe Zephyr, typically keep ozone concentrations from reaching NAAQS levels. These are the months where wildfire smoke and secondary ozone impacts are most likely to occur. Historic (2010-2015) 8-hour statistics at the Reno3 (AQS ID 32-031-0016) station are listed below (Table 1.3).

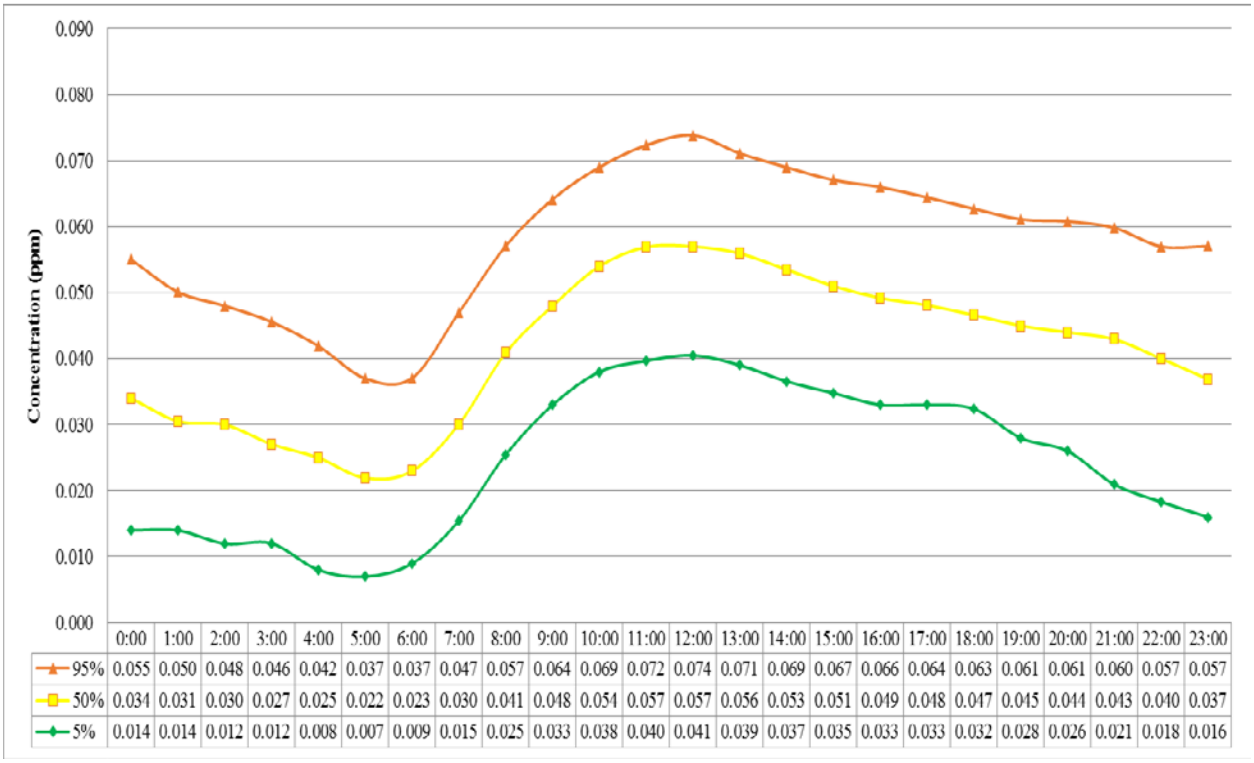
Table 1.3: Historic 8-hour Ozone Concentrations at Reno3

Percentile	Concentration (ppm)
100	0.075
99	0.073
95	0.068
50	0.055

4. September through October: Ozone concentrations typically begin to decrease as mobile source activity, temperatures, and solar radiation also decrease. Wildfire smoke and secondary ozone impacts can still be observed during this period.
5. November through December: Ozone concentrations are typically low during these months because of cooler temperatures and shorter days.

Figure 1.4 illustrates the typical summertime (June-August) diurnal ozone pattern at the Reno3 monitoring site. These patterns are based on historic ozone data from 2010 to 2015.

Figure 1.4: Typical Summertime 1-hour Ozone Diurnal Pattern at Reno3



	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
95%	0.055	0.050	0.048	0.046	0.042	0.037	0.037	0.047	0.057	0.064	0.069	0.072	0.074	0.071	0.069	0.067	0.066	0.064	0.063	0.061	0.061	0.060	0.057	0.057
50%	0.034	0.031	0.030	0.027	0.025	0.022	0.023	0.030	0.041	0.048	0.054	0.057	0.057	0.056	0.053	0.051	0.049	0.048	0.047	0.045	0.044	0.043	0.040	0.037
5%	0.014	0.014	0.012	0.012	0.008	0.007	0.009	0.015	0.025	0.033	0.038	0.040	0.041	0.039	0.037	0.035	0.033	0.033	0.032	0.028	0.026	0.021	0.018	0.016

2.0 EXCEPTIONAL EVENT SUMMARY

2.1 Exceptional Events Definition and Demonstration Criteria

On [October 3, 2016], the EPA finalized revisions to the "Treatment of Data Influenced by Exceptional Events", regulations that govern the exclusion of event-influenced air quality data from certain regulatory decisions under the Clean Air Act (CAA) Section 319(b). This rule is known as the Exceptional Events Rule (EER). The EER contains definitions, procedural requirements, requirements for air agency demonstrations, and criteria for EPA approval for the exclusion of air quality data from regulatory decisions. The EER states that the EPA has the authority to exclude air quality monitoring data from regulatory determinations related to exceedances or violations of the NAAQS and avoid designating an area as nonattainment, redesignating an area as nonattainment, or reclassifying an existing nonattainment area to a higher classification if a State adequately demonstrates that an exceptional event has caused an exceedance or violation of a NAAQS. The CAA includes four requirements that, collectively, define an exceptional event:

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

EPA regulations in 40 CFR 50.14(c)(3)(iv) states that exceptional events demonstrations must address and include the following elements:

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

2.2 Statement of Purpose

On August 21, 2015, the AQMD monitored an exceedance of the 2015 8-hour O_3 NAAQS at the Reno3 air quality monitoring site due to smoke plume impacts from several wildfires in California. The AQMD has determined that the 2015 California Wildfires influenced O_3 concentrations exceeding the 2015 NAAQS on August 21, 2015 and qualify as an exceptional event under Title 40, Part 50 of the Code of Federal Regulations (40 CFR 50), EER. The purpose of this document is to petition the Regional Administrator for EPA Region IX to exclude air quality monitoring data for O_3 from the normal planning and regulatory requirements under the CAA in accordance with the EER. This demonstration package will have a regulatory impact on the 2015 8-hour O_3 designation for Washoe County.

The following demonstration package will define the exceptional event and justify data exclusion according to the CAA 319(b) and the revised EER (40 CFR 50.14(c)(3)(iv). The analysis will address these definitions and provide documentation to establish that the 2015 California Wildfires quality as an exceptional event. Specifically, that the event affected air quality by demonstrating that: 1) the event was not reasonably controllable or preventable, 2) the event was a natural event, 3) there was a clear causal relationship between the 8-hour O_3 concentrations in Washoe County and the event. An Exceptional Events Initial Notification was sent to EPA Region IX on Tuesday, May 10, 2016 (see Appendix C). This exceptional event demonstration underwent public comment from October 1 to October 31, 2016 (See Appendix D).

2.3 Summary of Event

The 2015 fire season in California was above the 10 year average with 8,745 fires and 893,362 acres burned reported by all agencies. The 10 year average is 7,971 fires with 673,446 acres burned. Of the 8,745 fires, 273 were greater than 10 acres. On August 18, 2015, smoke from numerous lightning caused wildfires throughout California began to impact the Reno/Sparks area. Smoke plume impacts continued to affect the Reno/Sparks area throughout August. Between August 18 and August 21, 2015, the AQMD monitored 9 exceedances of the 2015 8-hour O_3 NAAQS and 2 exceedances of the 24-hour $PM_{2.5}$ NAAQS across its air quality monitoring network due to the smoke plume impacts. The $PM_{2.5}$ concentrations due to the smoke plume impacts were highest on August 21, 2015. The AQMD is requesting exclusion of the 8-hour O_3 concentration from Reno3 on August 21, 2015 due to the increase in $PM_{2.5}$ causing an exceedance of the O_3 NAAQS.

Figure 2.1 shows the location, start date, containment, and acres burned on August 21, 2015. Figures 2.2 and 2.3 show the satellite image of the wildfire smoke plume traveling from the Complex Fires into the Reno/Sparks area on August 20-21, 2015. The Reno/Sparks area was mostly impacted from the Complex Fires (Fork, Mad River, South, Route, and River Complex) as well as from the Gasquet Complex and Nickowitz fires north of the Complex Fires. Figures 2.4 through 2.6 show the perimeter of the Complex Fires. Perimeter maps were not available for the Gasquet Complex and Nickowitz Fires.

Figure 2.1: Location of Wildfires on August 21, 2015

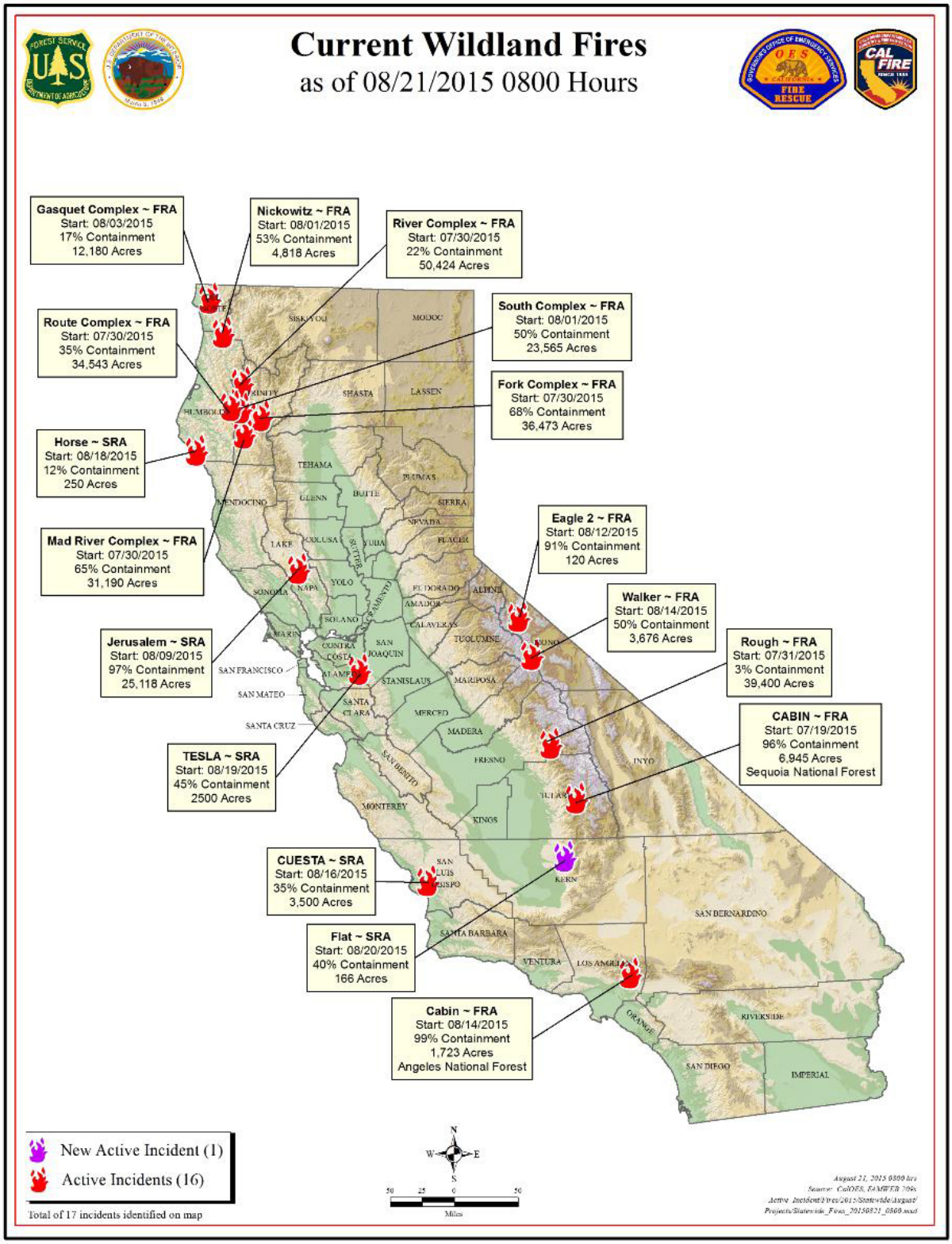


Figure 2.2: Satellite Image of the Northwestern California Fires on August 20, 2015

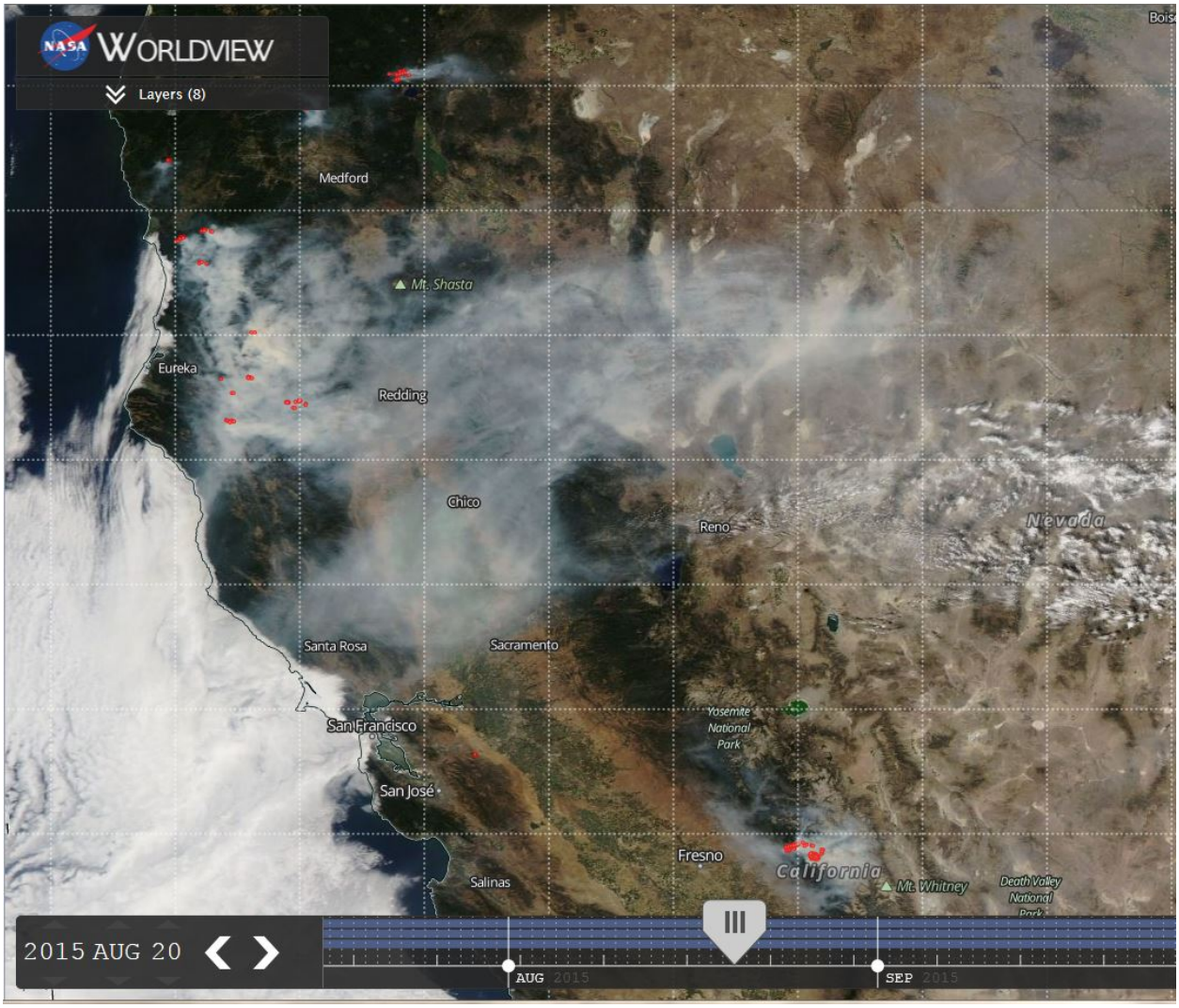


Figure 2.3: Satellite Image of the Northwestern California Fires on August 21, 2015

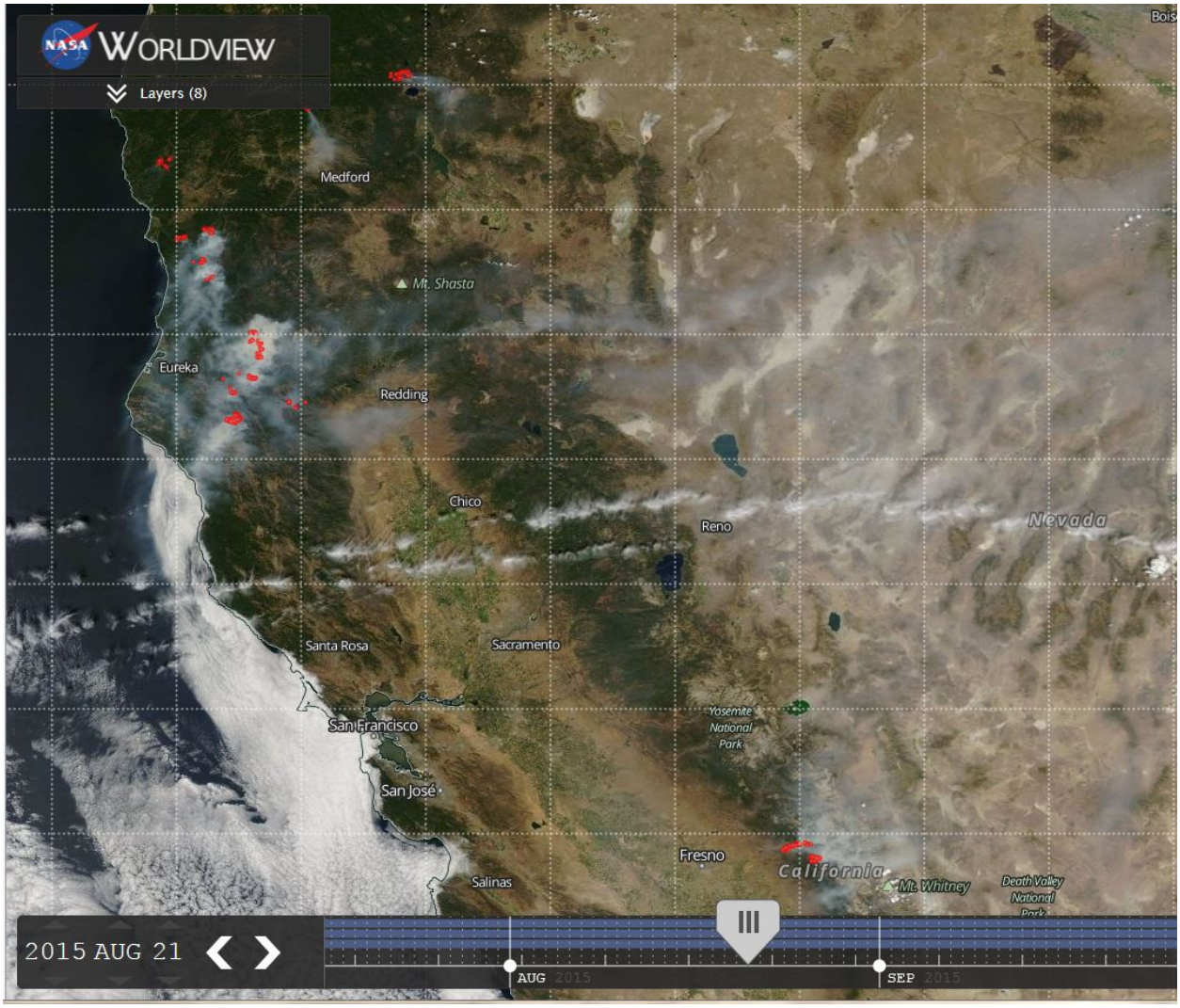


Figure 2.4: Perimeter of Fork Complex Fire on August 20, 2015

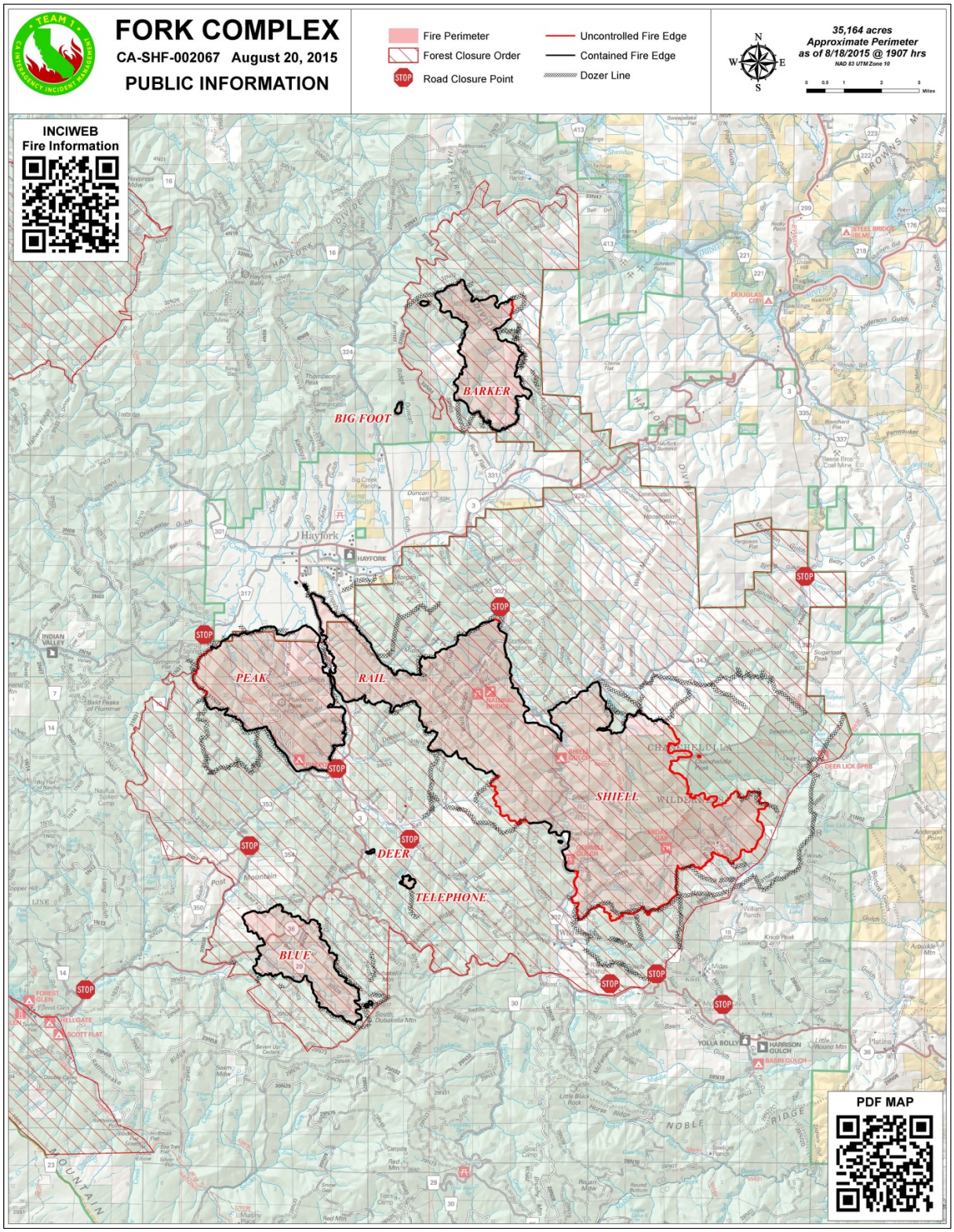


Figure 2.5: Perimeter of Mad River, Route, and South Complex Fires on August 20, 2015

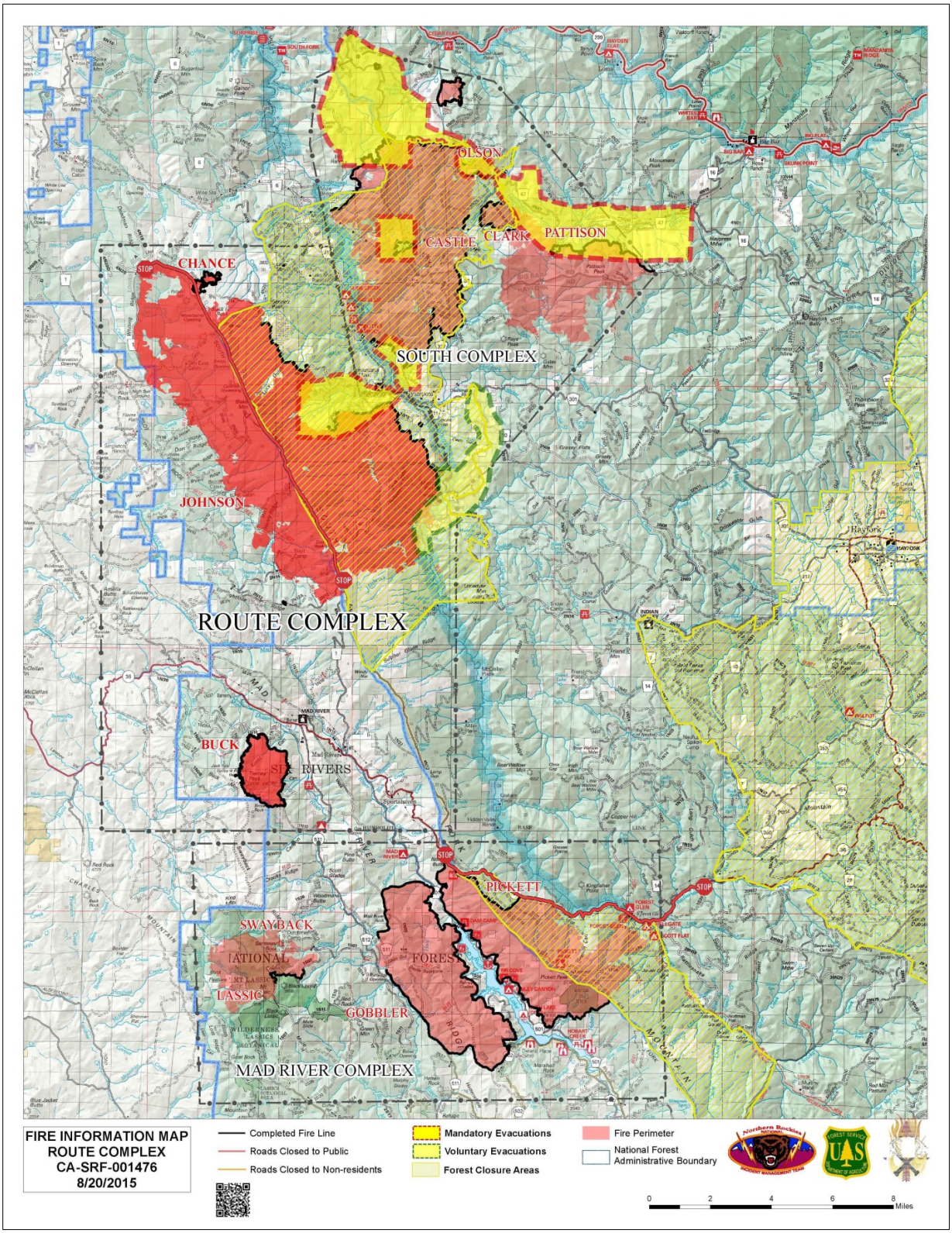
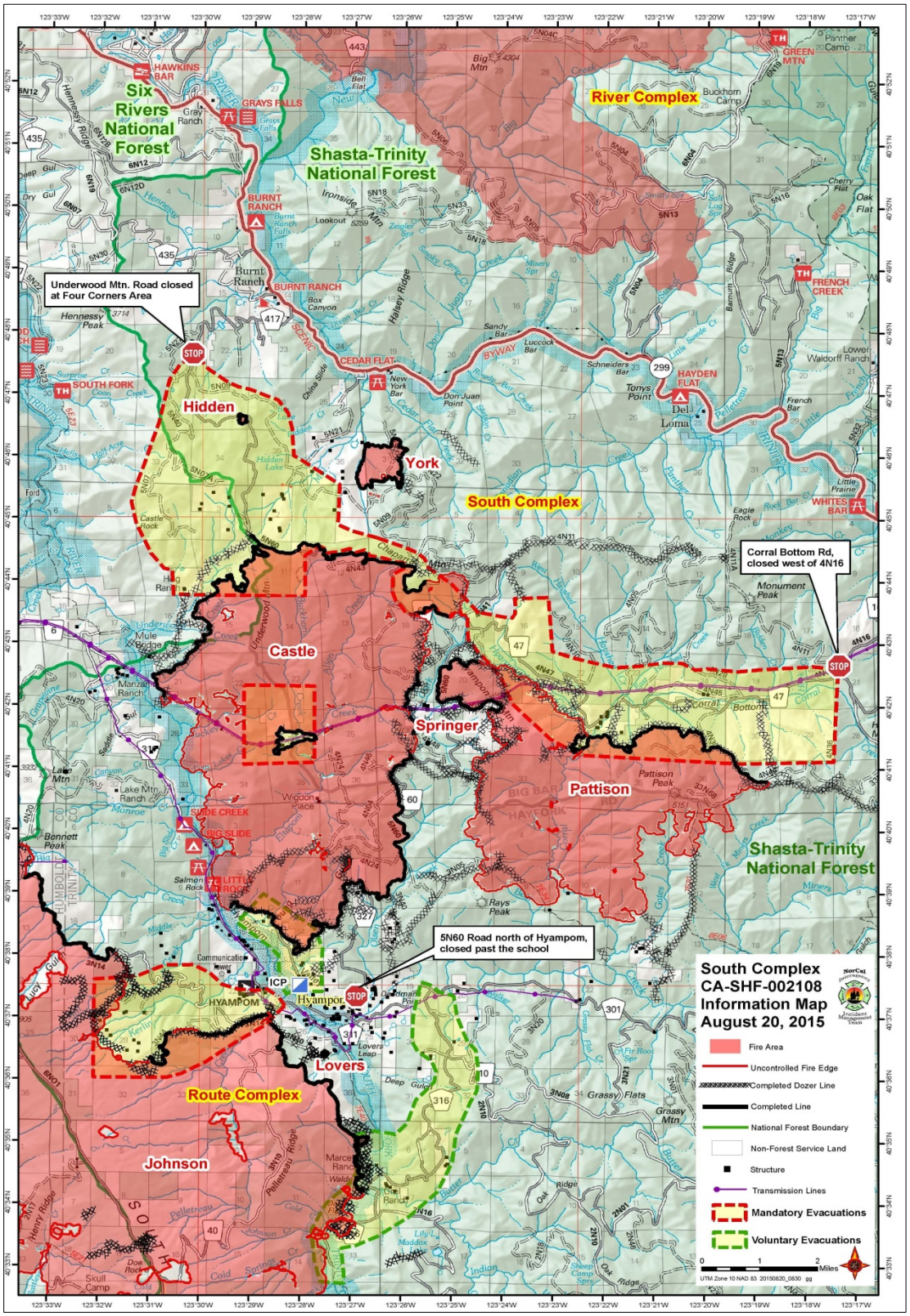


Figure 2.6: Perimeter of Route, South, and River Complex Fires on August 20, 2015



2.4 Event Related Concentrations

On August 21, 2015 the AQMD monitored 4 exceedances of the 8-hour O_3 NAAQS, with the highest concentration reaching 0.073 parts per million (ppm). Wildfire smoke and ozone precursors from the California Complex Fires were transported east across into Nevada on prevailing winds, ozone concentrations elevated across northern California and Nevada, resulting in the O_3 exceedance at the Reno3 monitoring site. Elevated $PM_{2.5}$ and NOx concentrations support the presence of wildfire smoke. Section 2.5 further describes the meteorological conditions experienced during the event.

Table 2.1 lists O_3 concentrations across the ambient air monitoring network seven days before and after the August 21, 2015 event. It highlights the elevated concentrations and exceedance at the Reno3 site during the event.

Figure 2.7 shows the $PM_{2.5}$, O_3, and NOx concentrations at the Reno3 site seven days before and after the August 21, 2015 event. These pollutants were elevated, especially on August 21. This supports the demonstration that the increase in wildfire smoke also increased NOx concentrations, which increased O_3 levels.

Figure 2.8 shows O_3 and $PM_{2.5}$ concentrations at all other monitoring sites. The elevated concentrations throughout the monitoring network demonstrate that the wildfire smoke impacts were regional and consistent with dispersion from fires over 200 kilometers (km) away.

Table 2.1: 8-hour Ozone Concentrations (ppm) for August 14-28, 2015

Monitoring Site	08/14	08/15	08/16	08/17	08/18	08/19	08/20	08/21	08/22	08/23	08/24	08/25	08/26	08/27	08/28
Reno3	0.052	0.055	0.061	0.066	0.075	0.073	0.070	0.073	0.062	0.059	0.048	0.049	0.042	0.043	0.046
Sparks	0.049	0.054	0.060	0.066	0.070	0.071	0.069	0.072	0.058	0.060	0.048	0.049	0.041	0.043	0.046
Toll	0.048	0.051	0.054	0.064	0.068	0.069	0.070	0.073	0.058	0.056	0.045	0.048	0.042	0.041	0.048
South Reno	0.050	0.053	0.057	0.066	0.073	0.071	0.070	0.072	0.058	0.059	0.048	0.048	0.041	0.042	0.048
Lemmon Valley	0.053	0.053	0.060	0.063	0.069	0.067	0.068	0.067	0.062	0.058	0.047	0.051	0.043	0.045	0.049
Incline	0.047	0.046	0.051	0.059	0.063	0.061	0.061	0.064	0.062	0.054	0.043	0.044	0.037	0.039	0.045

In this exceptional event demonstration, AQMD is requesting to exclude all hourly O_3 data from the Reno3 monitoring site for August 21, 2015 from 0000 Pacific Standard Time (PST) to 2300 PST from comparison to the NAAQS. Exclusion of the data caused by this exceptional event will have a regulatory impact on the attainment designation of the 2015 8-hour O_3 NAAQS.

Figure 2.7: Reno3 Ozone, NOx, and $PM_{2.5}$ Hourly Concentrations for August 14-28, 2015

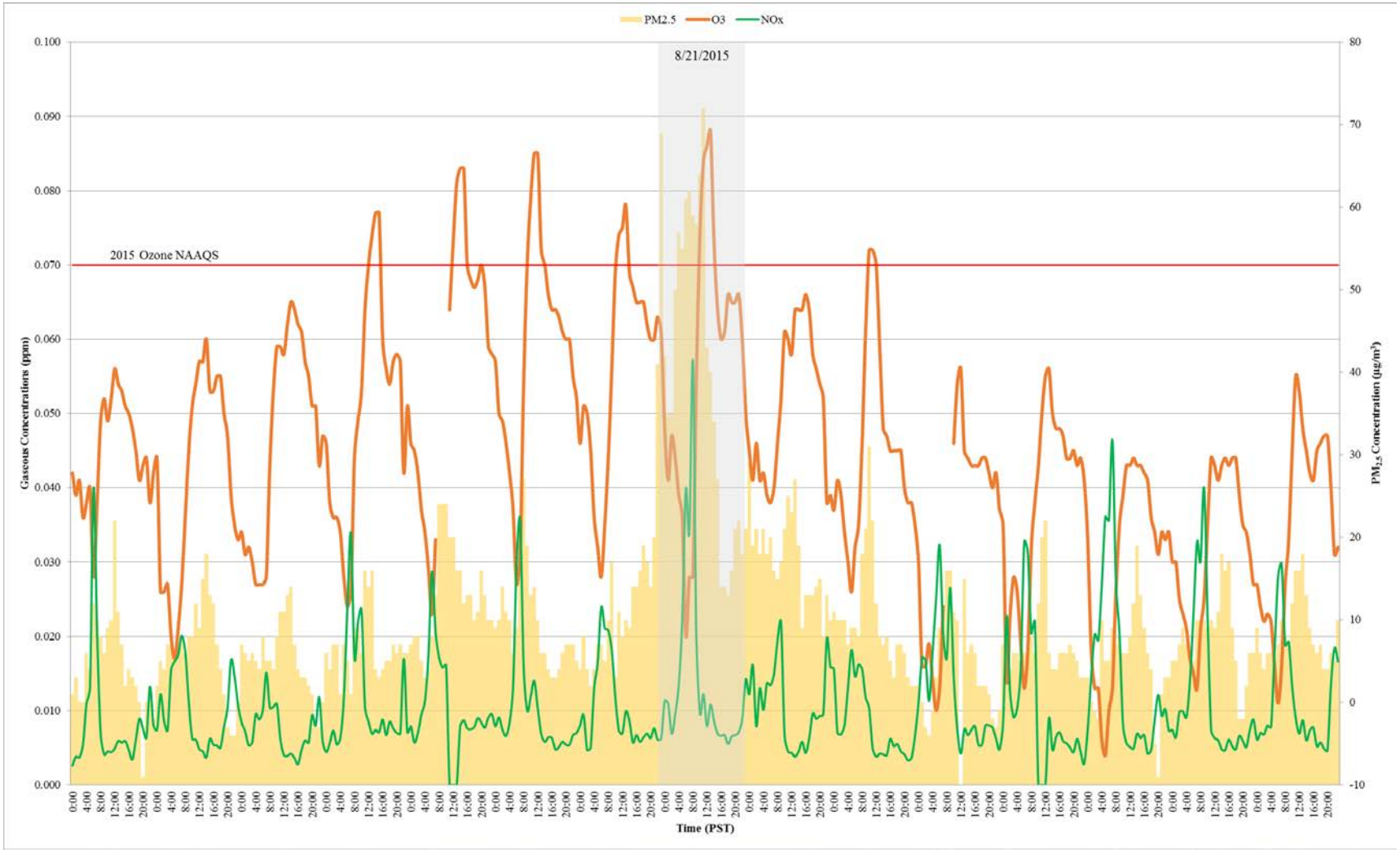
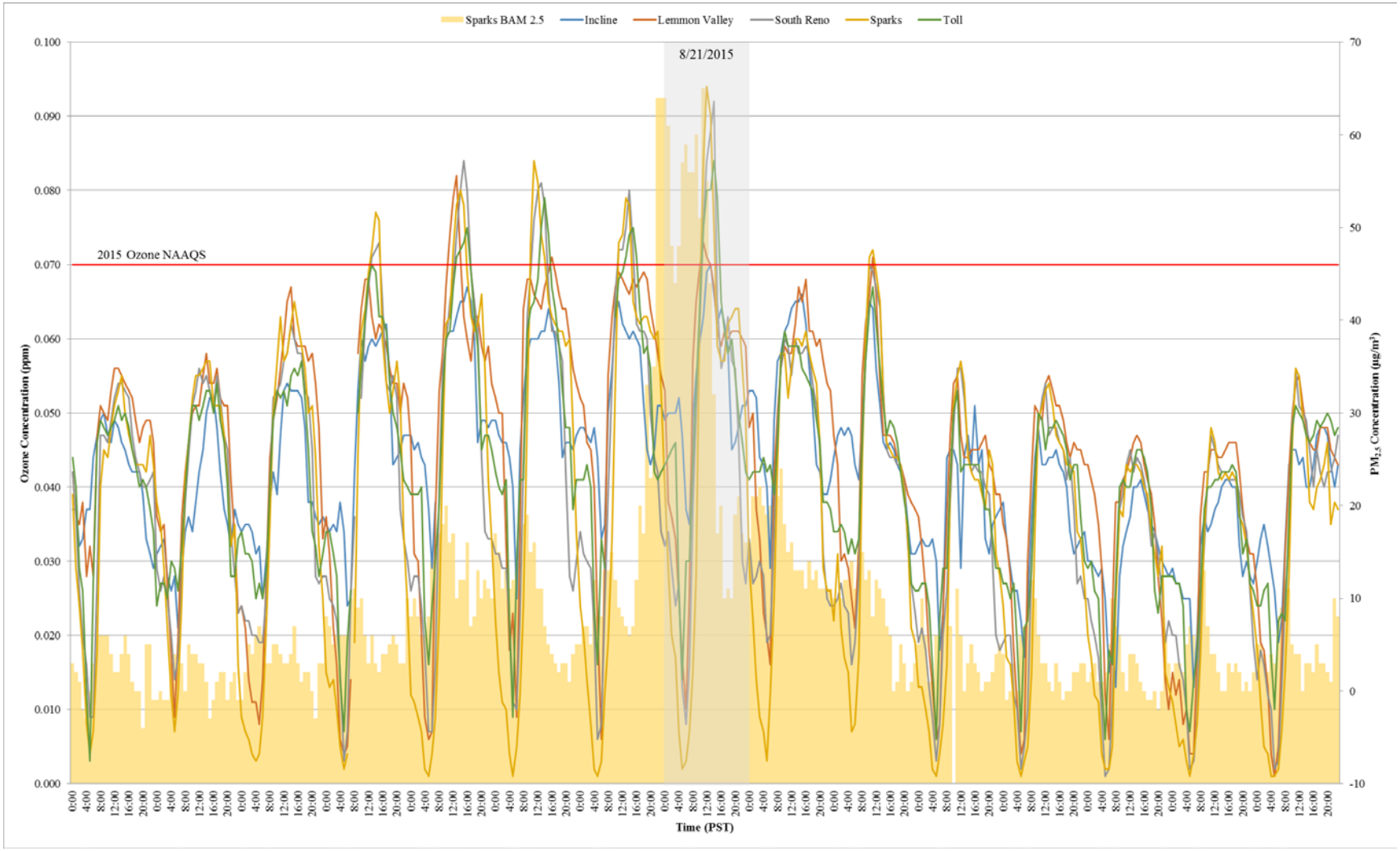


Figure 2.8: Sparks, Incline, Lemmon Valley, South Reno, and Toll Ozone and $PM_{2.5}$ Hourly Concentrations for August 14-28, 2015



2.5 Meteorological Conditions

In Nevada, the primary summer months of July, August, and September are typically dominated by a large synoptic scale high pressure system over the western states. At times, this high-pressure system is seasonally located over the four-corners area (Arizona, New Mexico, Colorado, and Utah) producing southerly or southeasterly winds, which bring subtropical moisture into the southwestern deserts and often into northern Nevada. Such flows produce thunderstorms and rain, and sometimes hail and gusty winds, and are commonly referred to as the "monsoon season."

During the period of August 17-21, 2015, when smoke from northern California fires moved eastward into northern and northwestern Nevada, the typical high-pressure system moved westward and was located generally near southern California. Such a position reverses the prevailing winds aloft from southerly/southeasterly to westerly or northwesterly.

Figures 2.9 through 2.13 show the weather maps for 4:00 am PST each day from August 17 through August 21, 2015. There are several things to note. First of all, the position of the upper level high pressure system near southern California producing weak westerly or northwesterly upper level winds but showing progressively stronger influence in time over this period. Secondly, surface maps are similar across the period with surface thermal lows near Las Vegas and extending across the central valley of California into northern California. Such situations generally produce light and often variable surface wind conditions. Thirdly, the precipitation maps show no precipitation over any portion of Nevada or California during this entire period.

In the desert portions of Northern Nevada, visibilities are typically very good. Reductions in summertime visibility to levels below 10 miles only occur in the summer under three conditions: 1) heavy rain from thunderstorms; 2) blowing dust from thunderstorm downdrafts that can cause winds to exceed 50 mph at times; and 3) smoke from wildfires.

Figure 2.9: Daily Weather Map August 17, 2015

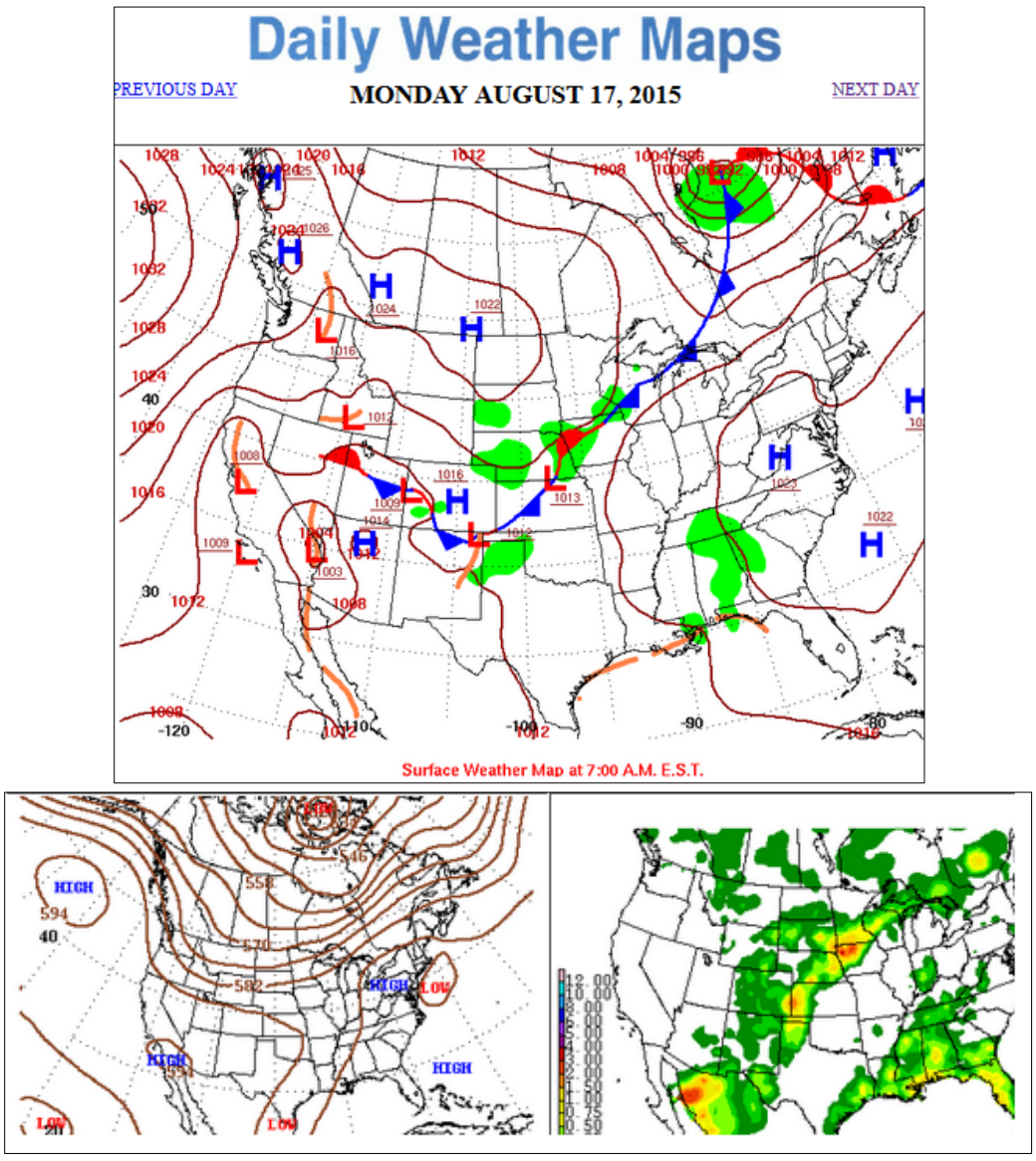


Figure 2.10: Daily Weather Map August 18, 2015

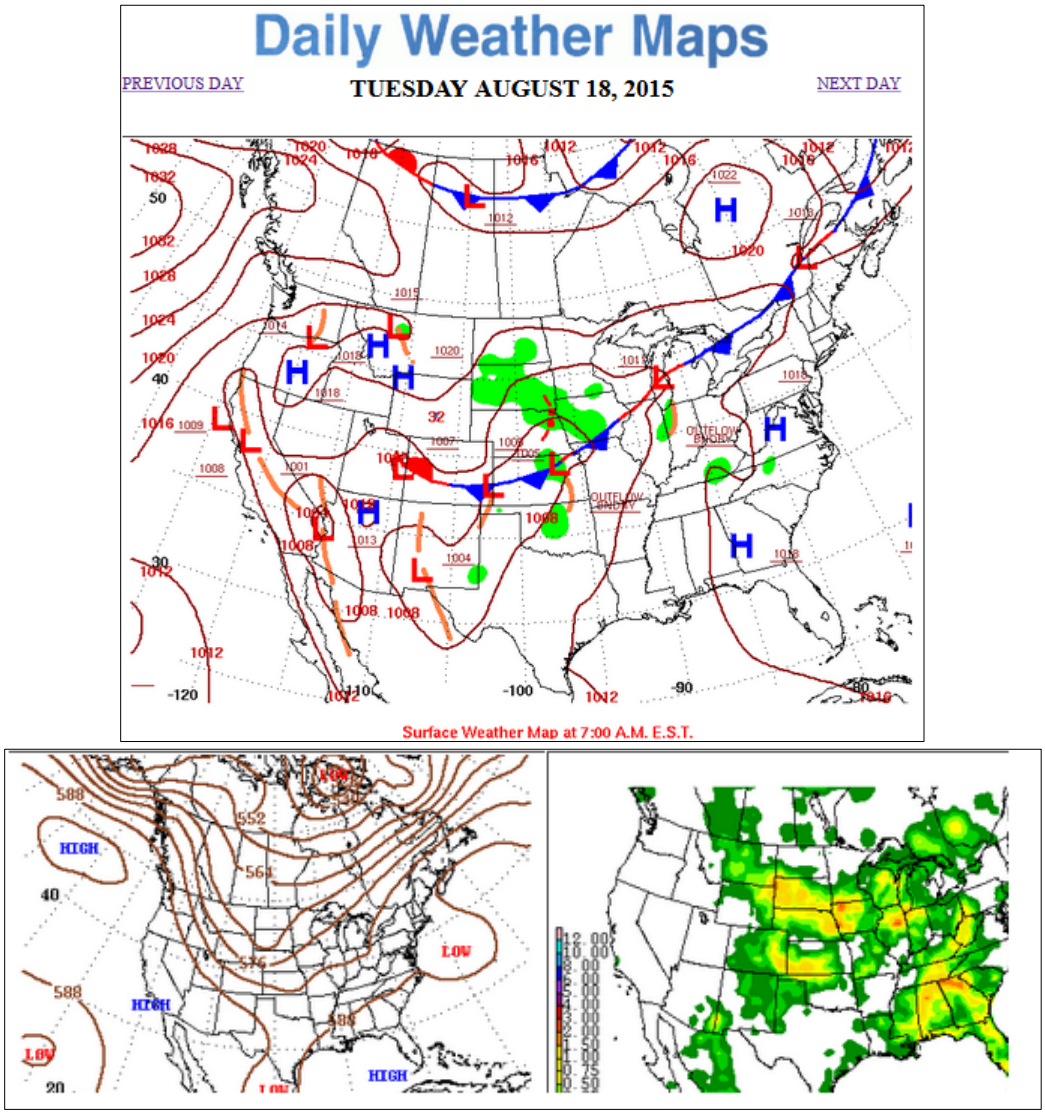


Figure 2.11: Daily Weather Map August 19, 2015

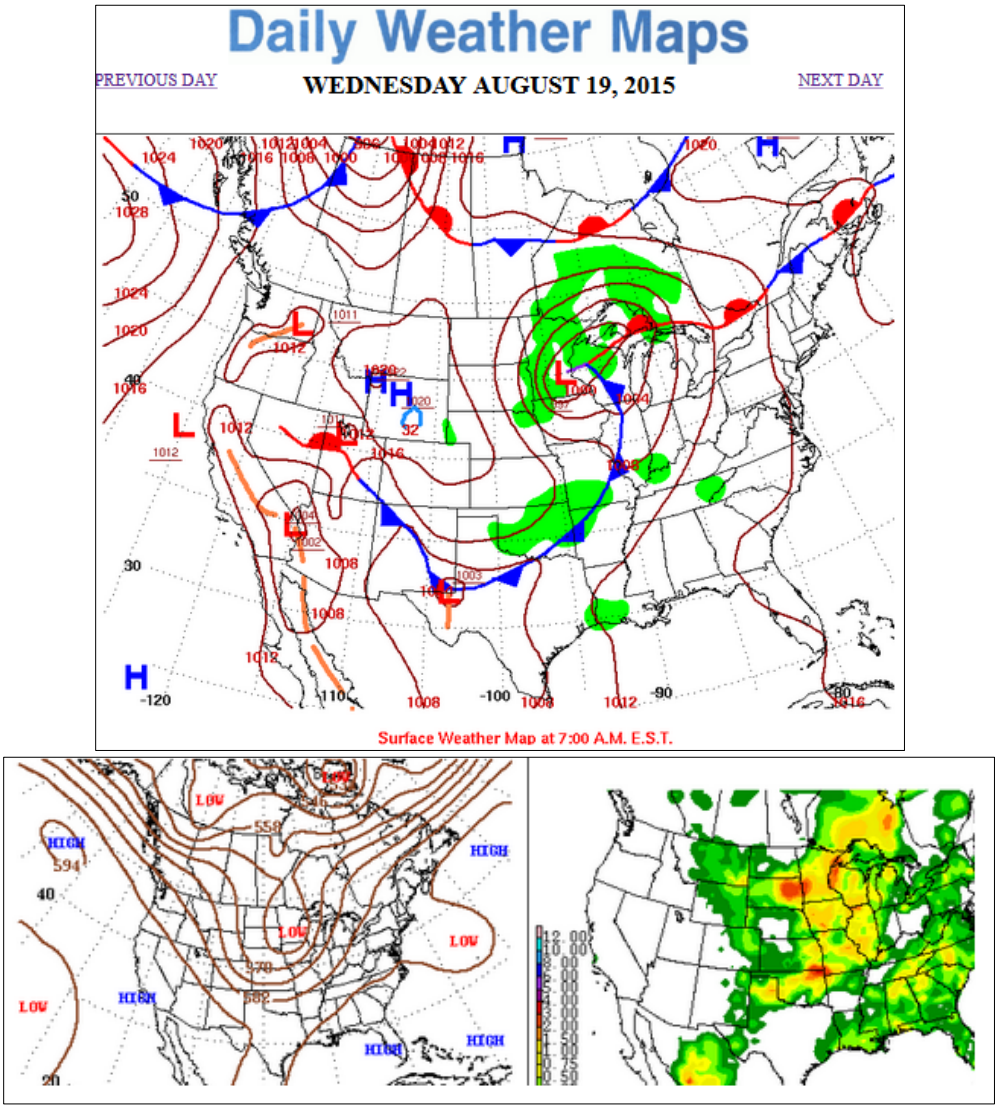


Figure 2.12: Daily Weather Map August 20, 2015

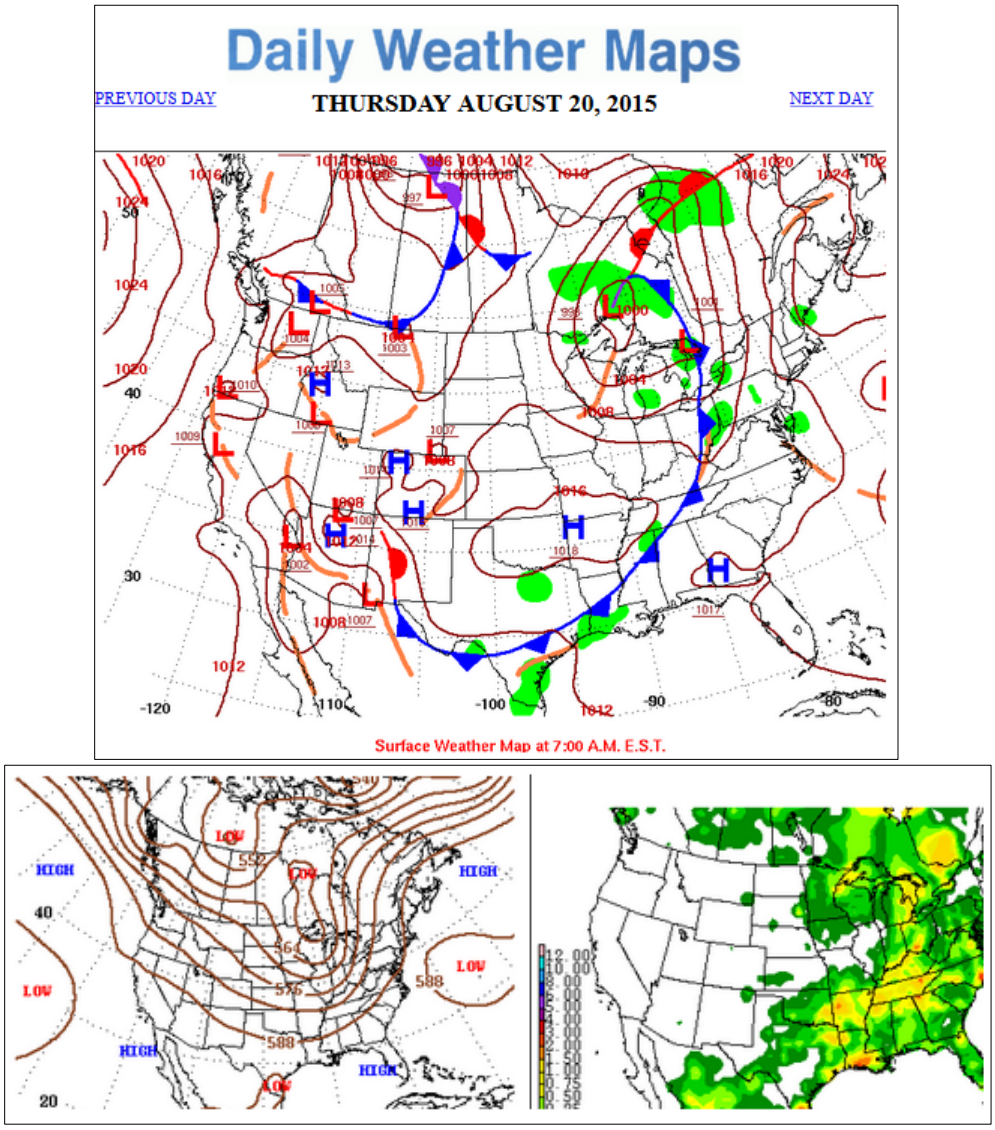
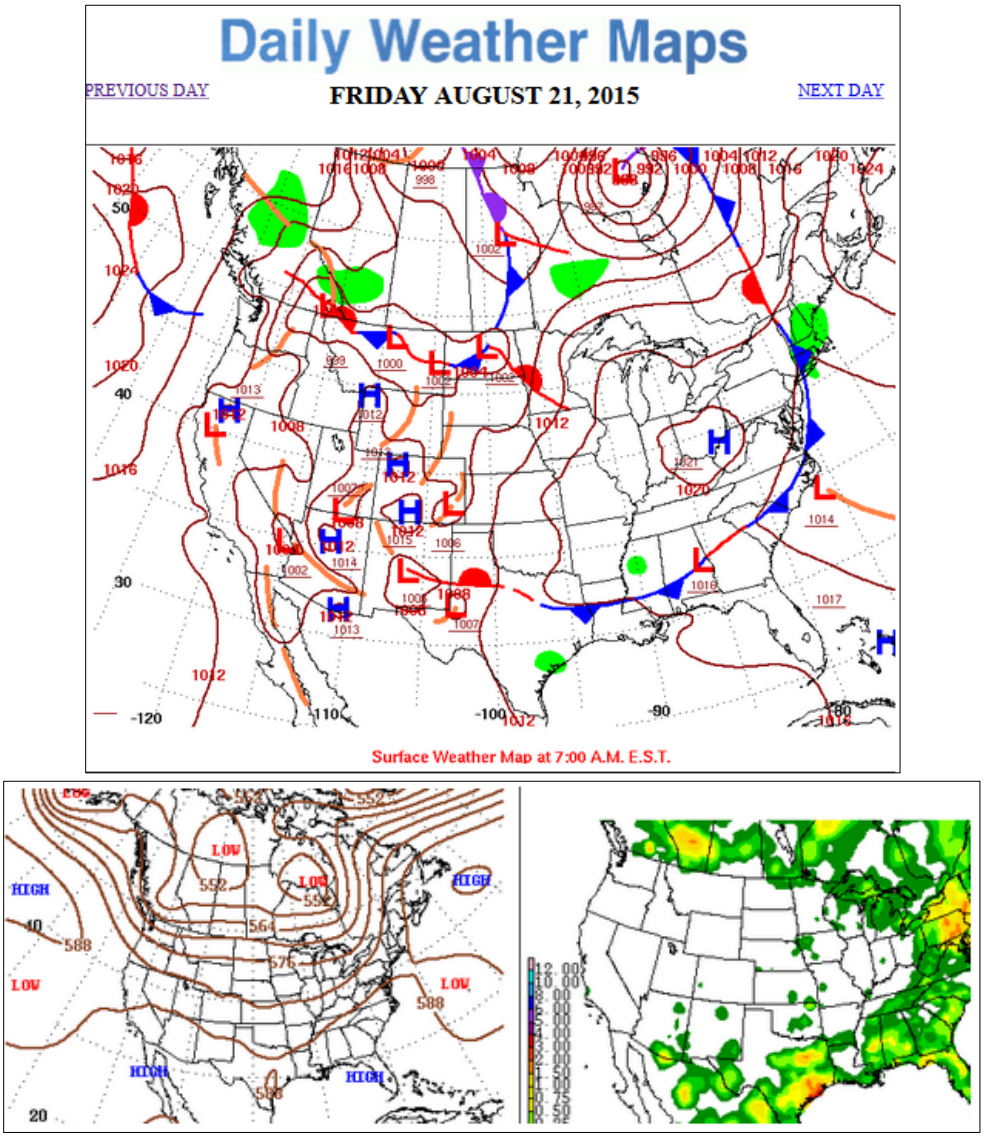


Figure 2.13: Daily Weather Map August 21, 2015



2.6 Meteorological Assessment of Smoke Influence in Northwestern Nevada

The fires in northern California have been well documented. It is not the intent here to provide further documentation of those fires but rather to illustrate the significant influence of the smoke plumes in northwestern Nevada toward the latter part of the period.

Since there were no thunderstorms during this period, any reductions in visibility over wide areas would be convincing evidence of smoke plume impacts. Visibilities are typically recorded using standard procedures at airports. In this analysis, four airport locations were used: Sacramento (an upwind location), Reno, Lovelock, and Fallon Naval Air Station.

Hourly visibility readings were plotted and are shown in Figure 2.14. Although maximum visibilities can well exceed 10 miles, especially in the deserts, standard visibility reporting procedures put the maximum reportable value at 10 miles. Anything below 10 miles connotes a visibility-reducing event.

Figure 2.14 reveals some very interesting features. Sacramento, nearest to the Jerusalem Fire, was impacted on the August 17 and 18, 2015 with reduced visibilities, but thereafter did not have any hour below 10 miles, except for 3:00 am on the August 21, when the visibility dropped to 9 miles.

If the smoke traveled from west to east across the Sierras, it would follow that visibilities would be affected at locations sequentially from west to east. That is not the case in this situation. Visibility reductions on the August 18 occurred initially at Fallon -- the south easternmost airport of the three Nevada airports plotted. For this to occur, one of two scenarios are possible: 1) the smoke plume was aloft over Reno and Lovelock and mixed to the ground by the time it reached Fallon. Or 2), and more likely, the plume moved eastward from extreme northern California into extreme northern Nevada, and then moved in a southeasterly direction affecting Fallon before Lovelock or Reno.

On the August 19, greater smoke impacts as depicted by even lower visibilities down to 7 miles at times, occurred at both Fallon and Lovelock, indicating the plume was moving more directly southeasterly such that both locations were in the path of the plume.

On the August 20, visibility reductions at Lovelock went down to 6 miles during the day and further down to 4 miles by the end of the day. At Fallon, visibility was below 6 miles for much of the afternoon hours but had a brief increase late evening, suggesting variability in the plume density. Also, late in the evening, Reno showed the first indications of visibility below 10 miles.

August 21 indicates a broad, widespread smoke event over most of northwestern Nevada. Reno visibility was below 10 miles for most of the day, improving in the evening. Minimum visibility was down to 4 miles for several hours beginning in the morning and continuing into the afternoon. At Lovelock, visibility was below 10 miles all day, except for one hour late in the evening. Lowest visibilities were at 2 miles for two hours in the afternoon, indicating very dense smoke impacts for much of the day, and then steadily improving in the evening. The lowest visibilities were monitored at Fallon, where visibilities were at 2 miles for five consecutive

hours, and 4 miles or less for most of the day, then improving considerably in the evening, suggesting the end of the smoke episode.

From a meteorological perspective, using visibility as a reasonable surrogate for smoke density, Fallon was the most impacted by the northern California smoke plume, with visibility impacts noted on the last four of the five days analyzed. Lovelock was next most impacted, showing reduced visibilities on the last three days analyzed. Reno was impacted most notably on August 21, with smoke impacts, from a visibility perspective beginning late on the August 20. Figure 2.15 shows Lovelock and Fallon in relationship to Reno.

Figure 2.14: Visibility at Key Sites August 17, 2015 to August 21, 2015

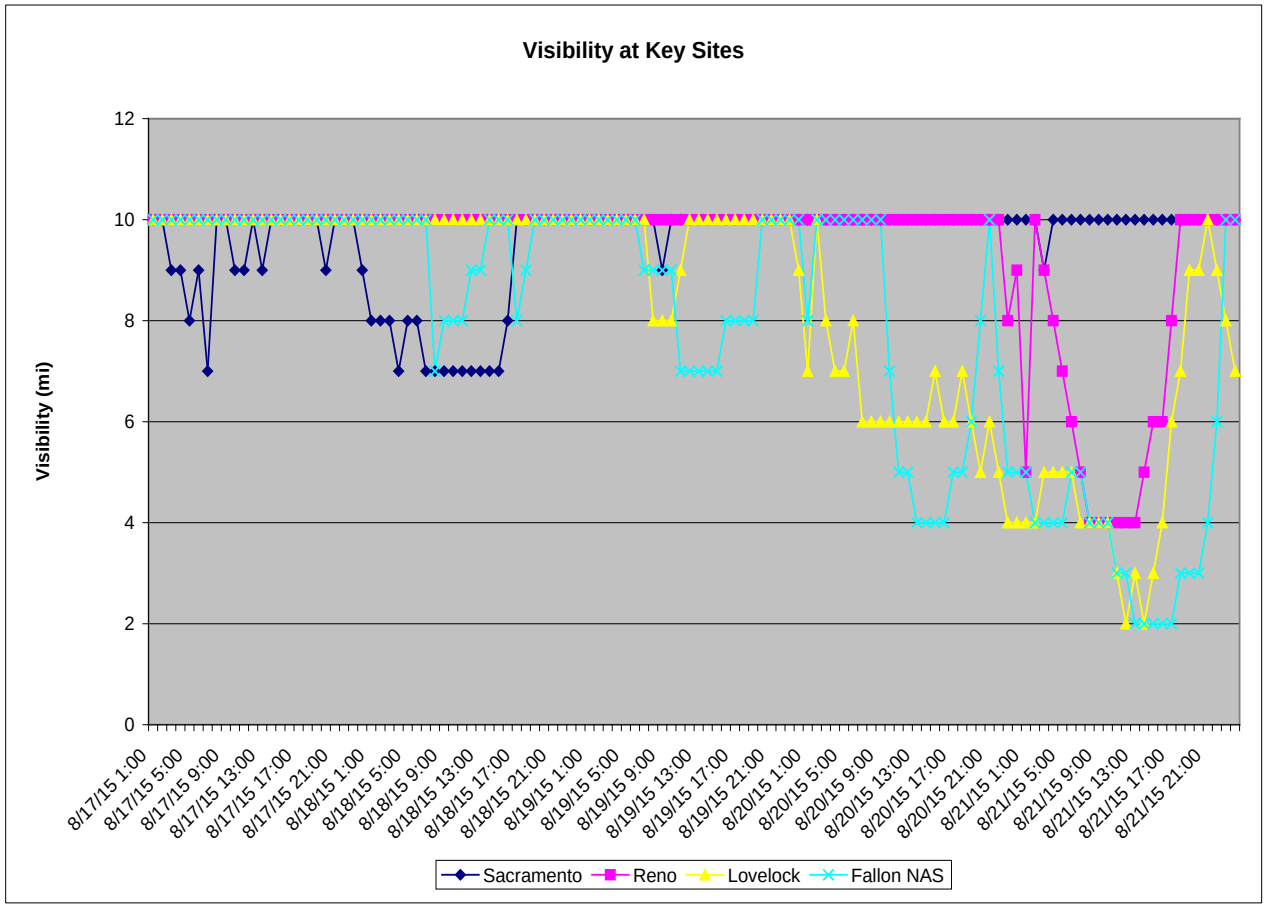
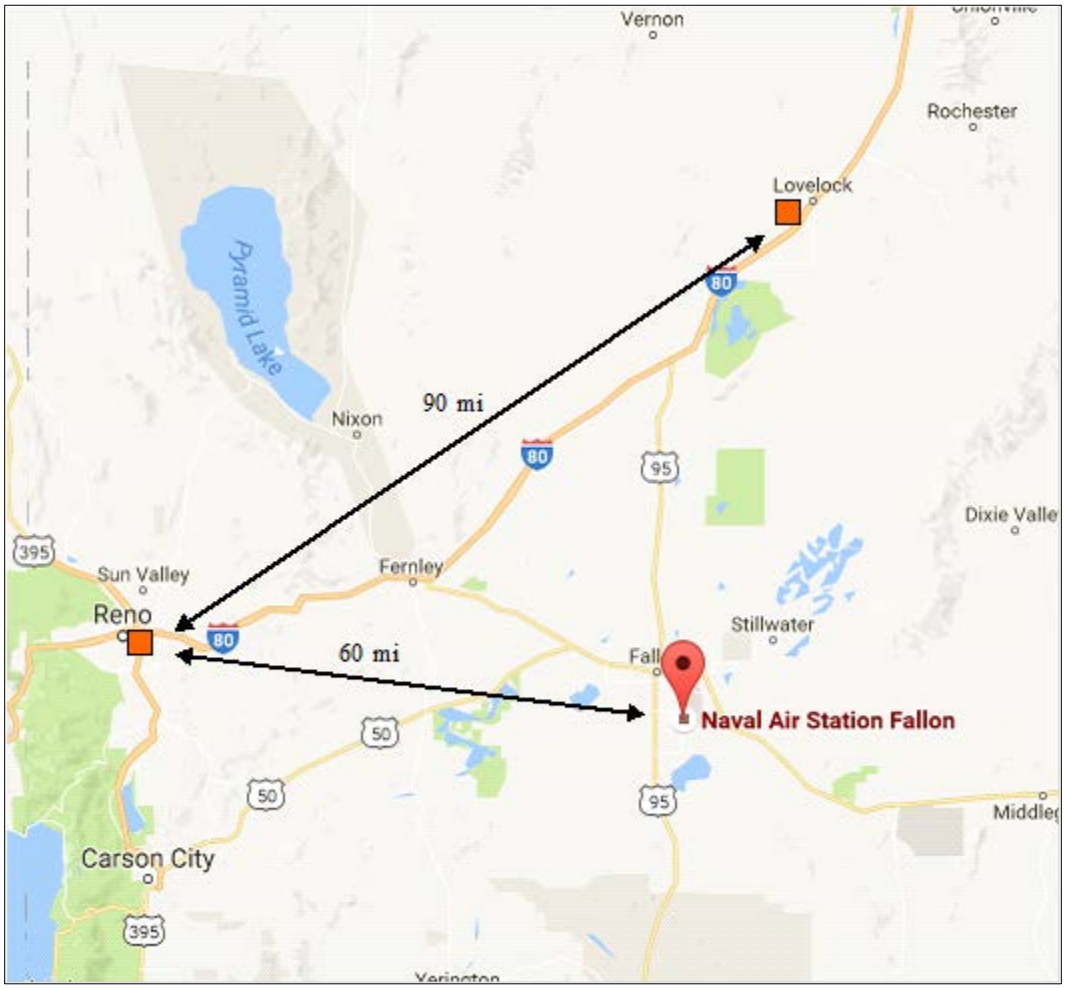


Figure 2.15: Location of Lovelock and Fallon in Relationship to Reno



Below is an Area Forecast Discussion from the National Weather Service issued August 21, 2015.

```
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE RENO NV
322 AM PDT FRI AUG 21 2015

.SYNOPSIS...

DRY CONDITIONS WITH ABOVE NORMAL TEMPERATURES WILL CONTINUE THROUGH
THIS WEEKEND. AFTERNOON ZEPHYR BREEZES ARE EXPECTED FOR THE NEXT
FEW DAYS, EXCEPT FOR LIGHTER WINDS ON SATURDAY. HAZE AND SMOKE
FROM LARGE WILDFIRES IN CALIFORNIA AND THE PACIFIC NORTHWEST WILL
DRIFT ACROSS THE REGION FOR THE NEXT FEW DAYS. A COOLING TREND
WITH BREEZY CONDITIONS IS LIKELY LATER NEXT WEEK.

.SHORT TERM...

DRY WEATHER PATTERN WILL CONTINUE THROUGH THIS WEEKEND WITH FEW
CHANGES MADE TO THE ONGOING FORECAST. SHORTWAVE MOVING FROM
SOUTHWEST CANADA TO MONTANA WILL BRING ZEPHYR-TYPE BREEZES ACROSS
MOST AREAS THIS AFTERNOON. GUSTS MAY BRIEFLY EXCEED 30 MPH IN A
FEW LOCATIONS OF WESTERN NV NORTH OF HIGHWAY 50 AND FAR NORTHEAST
CA. AS RIDGE BUILDS IN SATURDAY, LIGHTER WINDS ARE EXPECTED,
FOLLOWED BY A RETURN OF ZEPHYR BREEZES WITH GUSTS 25-30 MPH SUNDAY
AS THE RIDGE CENTER MOVES EAST TOWARD THE FOUR CORNERS REGION.
TEMPERATURES SHOULD EDGE SLIGHTLY DOWNWARD TODAY, BUT REMAIN ABOVE
NORMAL THROUGH THE WEEKEND WITH HIGHS GENERALLY IN THE MID 90S FOR
MOST LOWER ELEVATIONS.

SMOKE AND HAZE HAS PERSISTED THROUGH THE OVERNIGHT HOURS GENERALLY
FROM TRUCKEE-CARSON CITY-FALLON NORTHWARD TO THE OREGON BORDER.
OBSERVATIONS IN THESE AREAS HAVE REPORTED VISIBILITY DOWN TO 4-5
MILES AND/OR CEILINGS BETWEEN 4000-6000 FEET AGL, DESPITE NO
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CLOUD COVER SHOWING UP ON IR SATELLITE. THIS SMOKE SHOULD THIN OUT
LATER IN THE MORNING, BUT WIND PATTERNS SIMILAR TO YESTERDAY ARE
EXPECTED LATER TODAY. AS A RESULT, WE WOULD EXPECT ANOTHER ROUND
OF SMOKE AND HAZE TO MOVE IN ACROSS NORTHEAST CA-NORTHWEST NV THIS
AFTERNOON, THEN DRIFT SOUTH TO NEAR HIGHWAY 50 THIS EVENING. SOME
SMOKE FROM DIFFERENT FIRES IN EASTERN OREGON-WESTERN IDAHO MAY
SPREAD INTO PARTS OF NORTHWEST NV LATER TONIGHT, AS A PERIOD OF
NORTH WINDS DEVELOPS BEHIND THE TROUGH PASSAGE.
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2.7 Media Coverage

The AQMD provided prompt notifications throughout the exceptional event to the public and local media. Air Quality Index (AQI) Forecasts and Air Alerts were distributed daily via EnviroFlash. Air quality information was also available from the AQMD website (OurCleanAir.com), social media (Facebook, Twitter, YouTube), and Air Quality Hotline [(775) 785-4110]. The AQMD provided appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by the exceptional event by providing health advisories on a daily basis based on the AQI range.

AQMD created Facebook and Twitter pages in June and July 2013, respectively and started YouTube in December 2013. As a part of improving our outreach and educational component of our mission statement, we created these pages to serve as a direct outlet to the public and other entities for the daily air quality index update, winter time burn codes, and emergency situations. Examples of media coverage during the exceptional event are shown in Figures 2.16 through 2.18. For additional media coverage of the exceptional event, see Appendix E.

Figure 2.16: AirNow Screen Shot for August 21, 2015

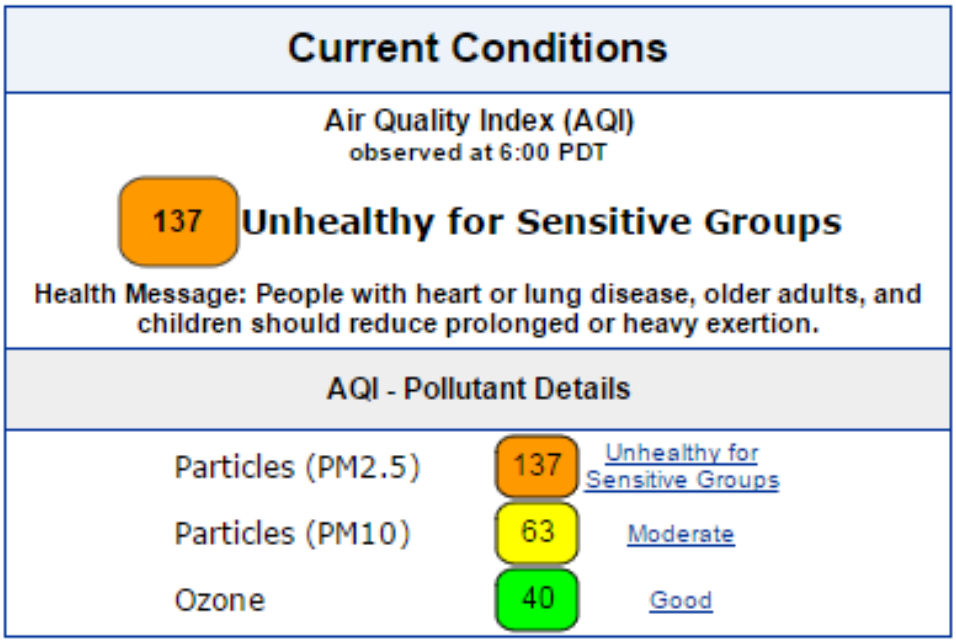


Figure 2.17: Webcam Photo of Smoke Impacts in Reno on August 21, 2015

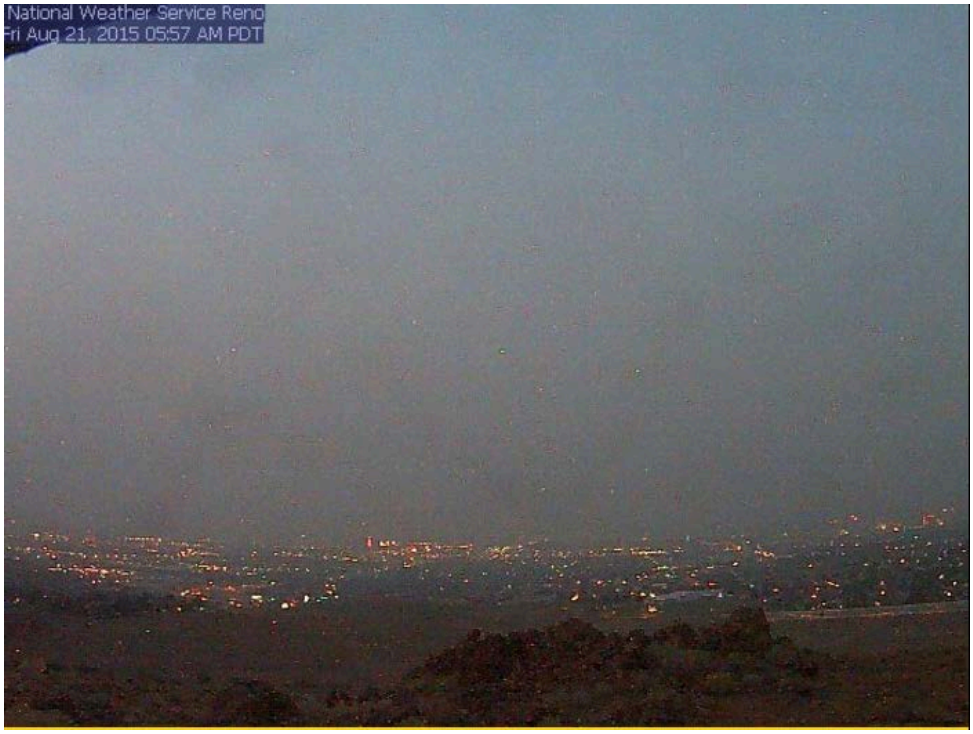
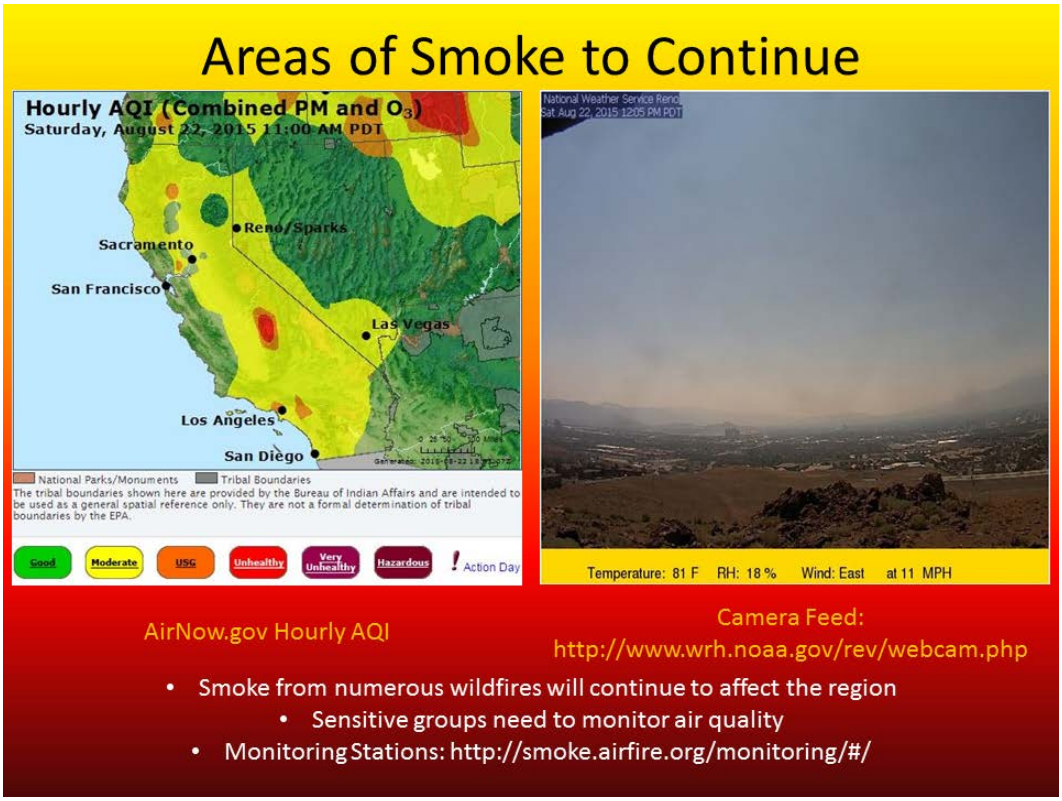


Figure 2.18: National Weather Service Weather Story from August 22, 2015



3.0 CLEAR CAUSAL RELATIONSHIP

3.1 Introduction

This section of the demonstration addresses the technical element that there is a clear causal relationship between the wildfire event and the monitored exceedance, providing evidence that the event affected air quality. In this section, per the EPA's 2016 EER revision and the Wildfire Ozone Guidance, demonstrations are provided for: 1) a comparison of the O_3 data requested for exclusion against historical O_3 concentrations at the monitor, and 2) the fire's emissions were transported to the monitor and the wildfires emissions affected the monitor.

3.2 Comparison of Event-Related Concentrations with Historical Concentrations

As part of demonstrating a clear causal relationship between the wildfire event and the O_3 exceedance, historical, non-event O_3 season concentrations were compared to the August 21, 2015 event. Graphs of the 5-year historical O_3 seasonal concentrations are shown in Figures 3.1 and 3.2, with the Reno3 O_3 exceedance represented as a red square in each figure. The 99^{th} percentile value for the O_3 season (June through August), which is the O_3 exceedance during the August 21, 2015 event, is 0.073 ppm.

Figure 3.3 shows the hourly seasonal percentiles for O_3 from 2010-2014 as compared to the concentrations of O_3 formation on August 21, 2015. For five hours, starting at 1000 PST until 1400 PST, the O_3 concentrations were over the 95^{th} percentile, with four hours of concentrations at 5-17 ppb higher than non-event related concentrations. This data clearly demonstrates that smoke from the 2015 wildfire events caused an increase in O_3 concentrations at the Reno3 site on August 21, 2015.

Figure 3.1: Reno3 8-Hour Daily Ozone Season Maximums June-August, 2010-2015

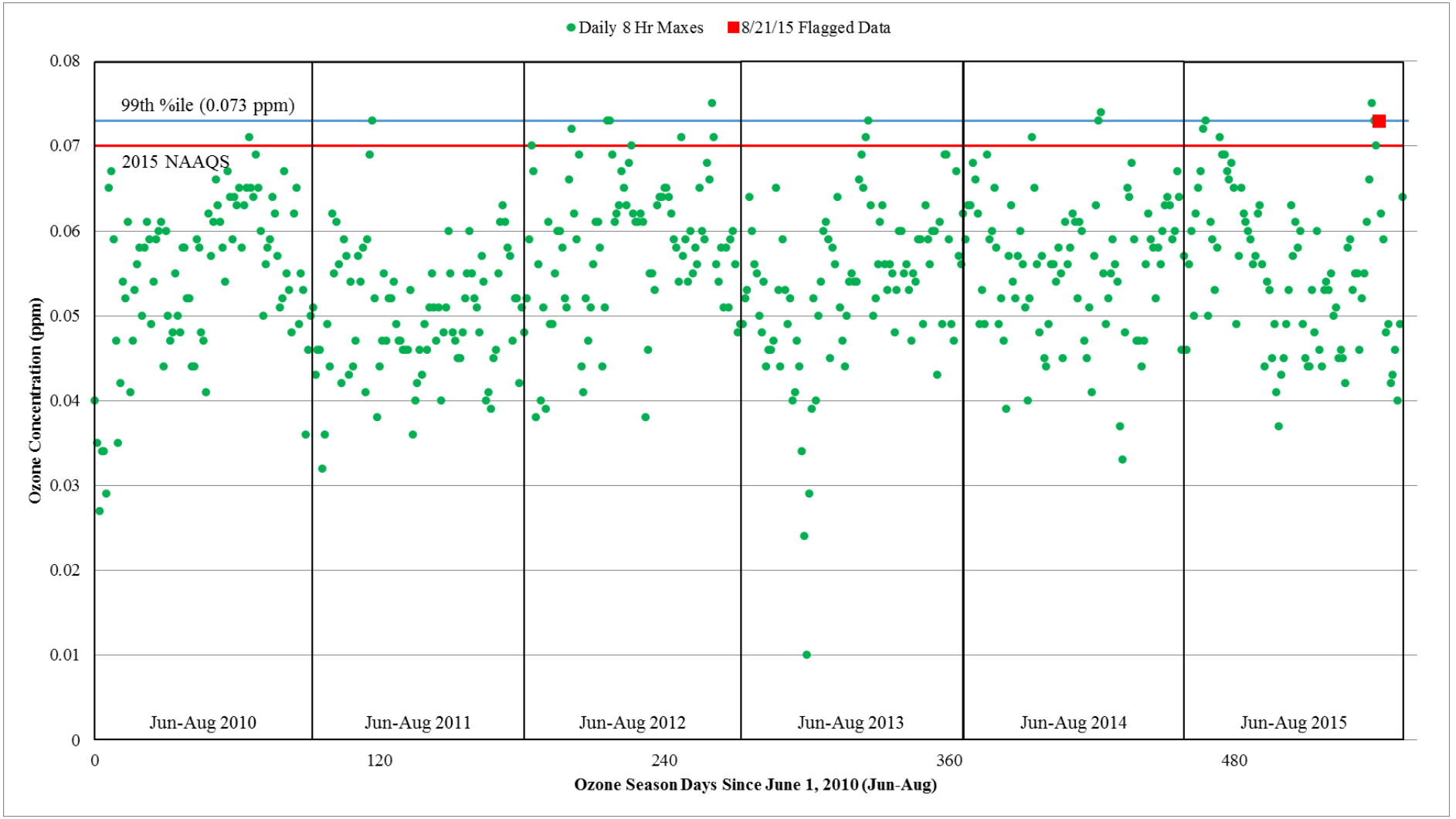


Figure 3.2: Reno3 8-Hour Ozone Daily Maximums June-August, 2010-2015

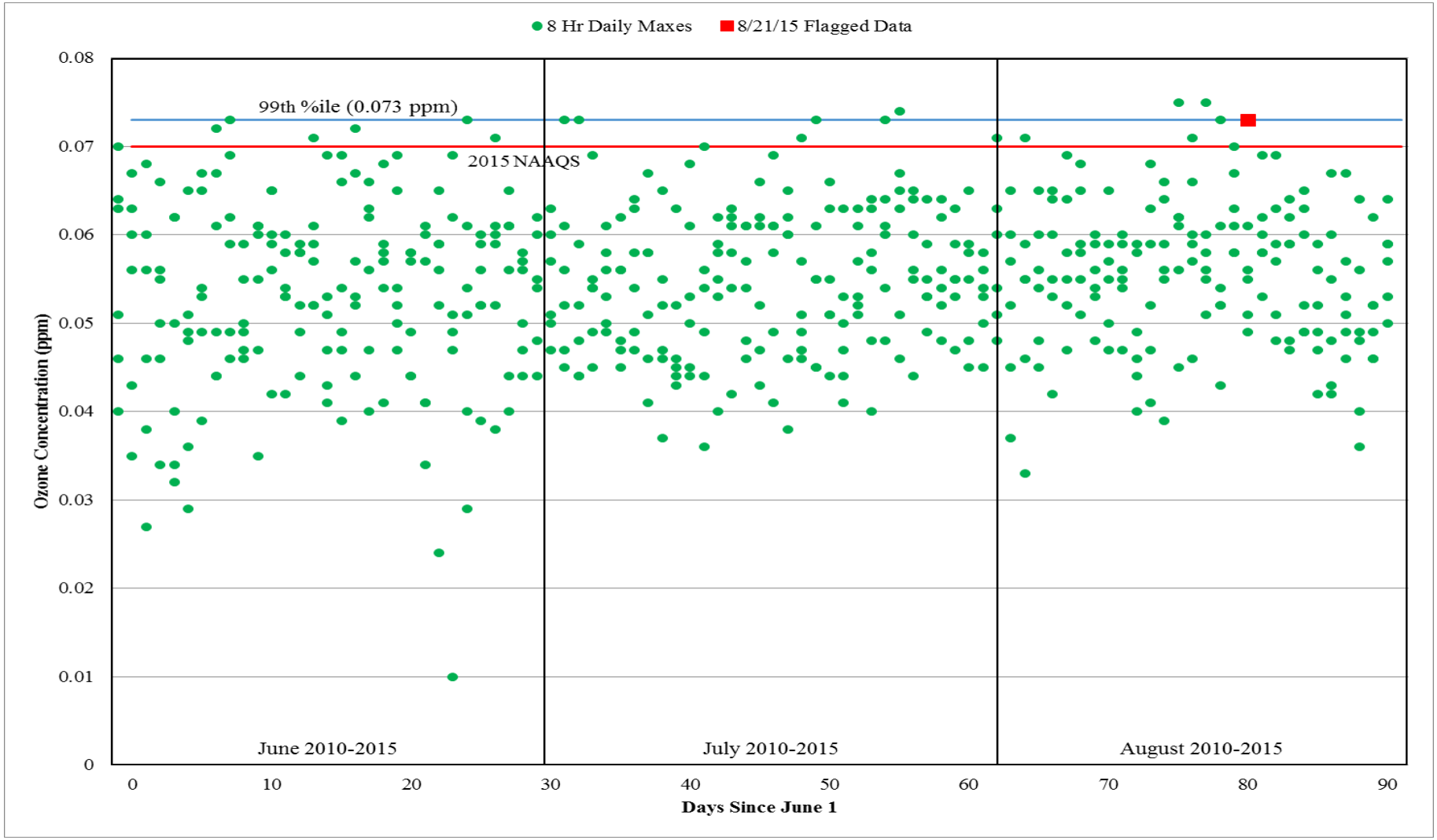
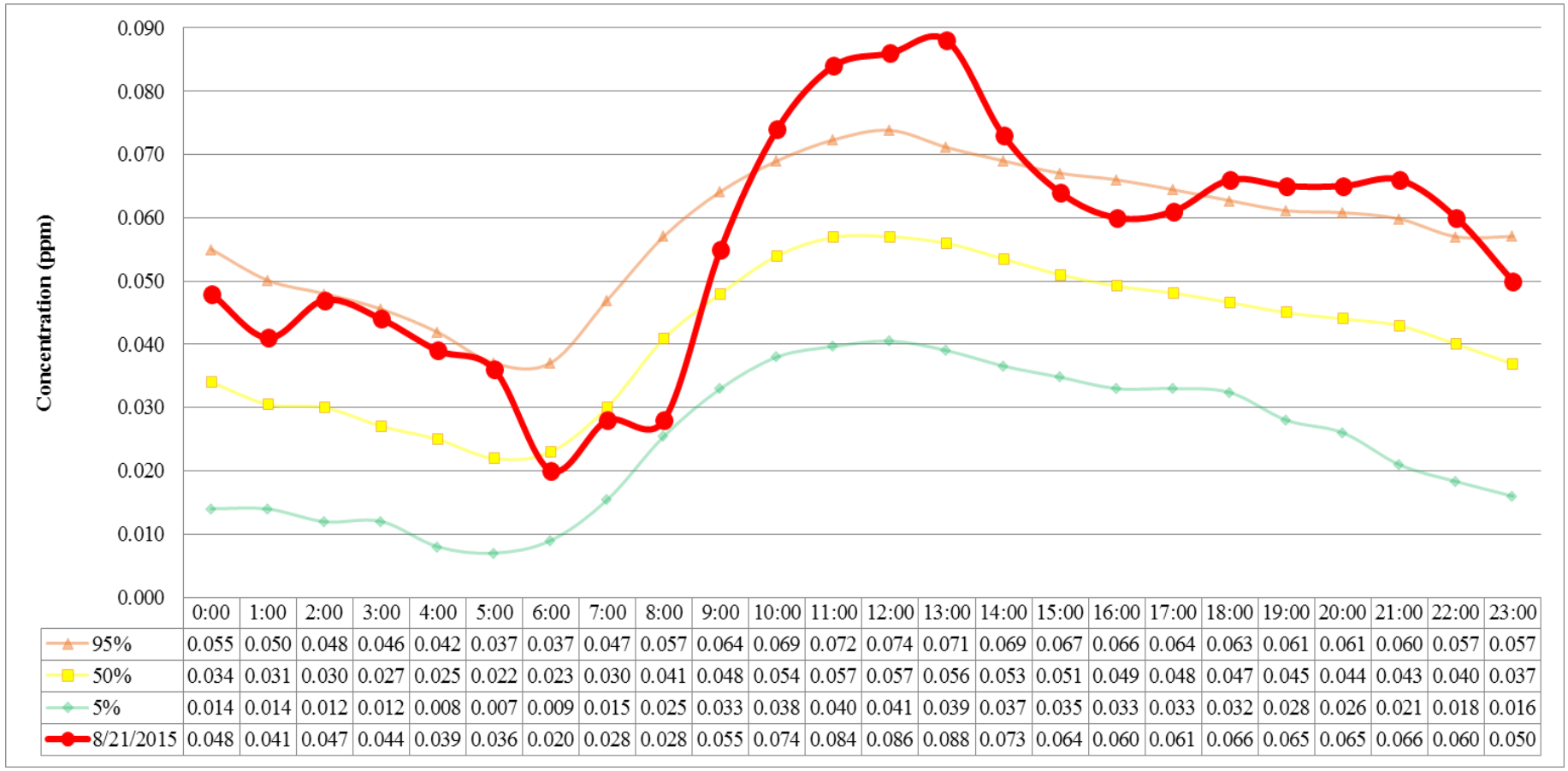


Figure 3.3: Percentiles for Hourly Seasonal Ozone for 2010-2014 with August 21, 2015



	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
95%	0.055	0.050	0.048	0.046	0.042	0.037	0.037	0.047	0.057	0.064	0.069	0.072	0.074	0.071	0.069	0.067	0.066	0.064	0.063	0.061	0.061	0.060	0.057	0.057
50%	0.034	0.031	0.030	0.027	0.025	0.022	0.023	0.030	0.041	0.048	0.054	0.057	0.057	0.056	0.053	0.051	0.049	0.048	0.047	0.045	0.044	0.043	0.040	0.037
5%	0.014	0.014	0.012	0.012	0.008	0.007	0.009	0.015	0.025	0.033	0.038	0.040	0.041	0.039	0.037	0.035	0.033	0.033	0.032	0.028	0.026	0.021	0.018	0.016
8/21/2015	0.048	0.041	0.047	0.044	0.039	0.036	0.020	0.028	0.028	0.055	0.074	0.084	0.086	0.088	0.073	0.064	0.060	0.061	0.066	0.065	0.065	0.066	0.060	0.050

3.3 Tier 2 Approach

The EPA's Wildfire Ozone Guidance defines a tiering strategy for demonstrations based on the events potential for O_3 formation and the level of evidence required to demonstrate a clear causal relationship between the event and the exceedance. The exceptional event that occurred on August 21, 2015, clearly meets the definition of a Tier 1 demonstration based on the guidance, however, this demonstration will satisfy a Tier 2 approach based on discussions and guidance by EPA Region IX. Specifically, this section provides compelling evidence that: 1) wildfire smoke emissions were transported to the monitor, 2) the wildfire smoke affected the monitor, and 3) emission quantification of the level of wildfire impact at the Reno3 site in the Washoe County monitoring network indicated that the monitored O_3 concentrations exceeded those during non-event related concentrations. Additionally, this section explains in detail the supporting documentation of the two key factors for a Tier 2 demonstration: 1) "Fire emissions and distance of fire(s) to affected monitoring site locations(s)", and 2) "Comparisons of the event related O_3 concentrations with non-event related concentration".

Key Factor #1

To satisfy the key factor #1 for a Tier 2 demonstration, the estimated daily emissions of total tons per day of NOx and VOC divided by distance of the wildfires to the affected monitor (Q/D) is required. The Wildfire Ozone Guidance recommends that the Q/D value in tons per day per kilometer (tpd/km) should be greater than or equal to 100 tpd/km to satisfy a Tier 2 demonstration.

The AQMD used the BlueSky Playground tool 2.0 beta to estimate the emissions of NOx and VOCs emitted from seven fires in Northwest California on August 20, 2015. Emissions were estimated for August 20, 2015 instead of August 21, assuming the smoke plume from August 20 moved into the Reno area on August 21. See Figures 2.2 and 2.3 for satellite images showing the smoke plume moving into the Reno area on August 21.

The distance was identified by the closest perimeter of the Complex Fires on August 20, 2015 (178 km) and the total acres burned during August 20, were totaled (13,512 acres), using the aggregate approach described in the Wildfire Ozone Guidance. Using "Wildfire" as the emission type in the BlueSky Playground, "Very Dry" as the Fuel Moisture Conditions, FCCS Fuelbed #7 based on fuels information from Inciweb, average distance and totaled acreage burned on August 20, according to the BlueSky tool, the fires produced a total of 24,566 tons of NOx plus VOCs. This equates to an emissions/distance ratio (Q/D) of 86 tpd/km. Table 3.1 details the data used for the calculation of Q/D for August 20, 2015.

Since the dense smoke plume that impacted the Reno/Sparks area on August 20 did not dissipate completely, an additional Q/D test was evaluated summing the emissions from August 20 and 21. Using the same emission scenario described above for August 21, the BlueSky Playground tool determined emissions from August 21 produced 11,053 tons of NOx plus VOCs, equaling a Q/D of 39 tpd/km. Assuming the remaining smoke from the August 20 did not completely dissipate, the Q/D values were summed from August 20 and 21, equaling 125 tons/km for the two days. Table 3.2 shows the details of the calculation of Q/D for August 21, 2015.

The Q/D test, in this case, does not meet the criteria for Q/D > 100 for a single day. Because smoke never completely left the Reno/Sparks valley from August 19 and 20, it is safe to assume that NOx and VOCs emissions also accumulated in the valley, leading to a higher Q/D. The Wildfire Ozone Guidance suggests using Q/D as a screening tool for Tier 2; however, research[1] has demonstrated that ozone production may increase with distance from the wildfire. Therefore, Q/D may not be the most accurate representation of O_3 levels produced based on the distance from the wildfire.

Table 3.1: Q/D Calculations for Seven Northwest Wildfires on August 20, 2015

Fire Name	Lat/Long	Distance (km)	Acres	Emissions (tons)	Q/D (tpd/km)
Fork Complex	40.45/-123.128	187	1,120		
Mad River Complex	40.34/-123.383	197	3,622		
South Complex	40.62/-123.448	207	290		
Route Complex	40.64/-123.586	215	1,391		
River Complex	40.91/-123.437	214	2,622		
Gasquet Complex	41.85/-123.969	271	3,563		
Nickowitz	41.47/-123.75	246	904		
Totals			13,512	24,566	86

Table 3.2: Q/D Calculations for Seven Northwest Wildfires on August 21, 2015

Fire Name	Start Lat/Long	Distance (km)	Acres	Emissions (tons)	Q/D (tpd/km)
Fork Complex	40.45/-123.128	187	188		
Mad River Complex	40.34/-123.383	197	1,106		
South Complex	40.62/-123.448	207	758		
Route Complex	40.64/-123.586	215	193		
River Complex	40.91/-123.437	214	2,325		
Gasquet Complex	41.85/-123.969	271	1,357		
Nickowitz	41.47/-123.75	246	152		
Totals			6,079	11,053	39

[1] Jaffe and Widger, 2012. Ozone production from wildfires: A critical review. Atmospheric Environment 51,1-10

Key Factor #2

A comparison of the event related O_3 concentration with non-event related high O_3 concentrations is required to satisfy the key factor #2 in a Tier 2 demonstration. Addressing key factor #2 involves demonstrating that the exceedance due to the event is either 1) in the 99th percentile (0.073 ppm) of the 5-year distribution of O_3 monitoring data, or 2) is one of the four highest O_3 concentrations within 1 year. As addressed in Section 2.2, the O_3 exceedance on August 21, 2015 due to the wildfire events was the 99th percentile concentration of the 5-year distribution of O_3 monitoring data (See Figures 3.1 and 3.2). Additionally, the O_3 exceedance of 0.073 ppm is one of the four highest O_3 concentrations of 2015. This event meets both criteria for key factor #2 and therefore supports the demonstration that the exceedance at the Reno3 monitor on August 21, 2015 was due to the exceptional event.

3.4 Additional Tier 2 Evidence

In addition to providing the evidence of the key factors, the Wildfire Ozone Guidance requires additional evidence that the fire emissions were present at the altitude of the monitor. The Guidance requires at least one of the following pieces of evidence 1) photographic evidence of ground level smoke at the monitor, 2) concentrations of supporting measurements, or 3) evidence of changes in spatial/temporal patterns of O_3 and/or NOx. The following subsections provide multiple pieces of evidence that emission from the wildfires affected the Reno3 monitor.

Trajectory Analysis

This comprehensive weight of evidence includes documentation of the extensive nature of the fires by using the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model trajectories (both forward and backward) and NOAA's Hazard Management System smoke plume maps.

The HYSPLIT model computes simple air parcel trajectories. Its calculation method is a hybrid between the Lagrangian approach, which uses a moving frame of reference as the air parcels move from their initial location, and the Eulerian approach, which uses a fixed three-dimensional grid as a frame of reference. HYSPLIT backward trajectories show the path an air parcel took backward in hourly steps for a specified length of time. Applications include tracking the release of radioactive material, volcanic ash, and wildfire smoke.

Figure 3.4 shows the backward HYSPLIT trajectory and smoke plume for August 21, 2015 for 0800 PST. Ozone is already beginning to form at 0800 PST, and continues to increase throughout the day (see Appendix F for hour by hour backward trajectories for all of August 20 and 21). The map includes 24-hour backward trajectories at two different heights (1000 and 1500 meters) arriving at the Reno3 monitoring site with smoke density plume. The map also shows the monitoring stations east of the Complex Fires (Weaverville, Anderson, Chester, Quincy, Chico, and Grass Valley). Figure 3.5 shows the backward HYSPLIT model on August 21, 2015. The backward trajectories demonstrate that the dense smoke plume visible in Figure 2.2 on August 20, 2015 traveled across California, exacerbating $PM_{2.5}$ concentrations leading to an increase in O_3 concentrations in Washoe County on August 21, 2015.

Figure 3.4: 24-Hour Backward HYSPLIT Trajectories and Smoke Plume on August 21, 2015

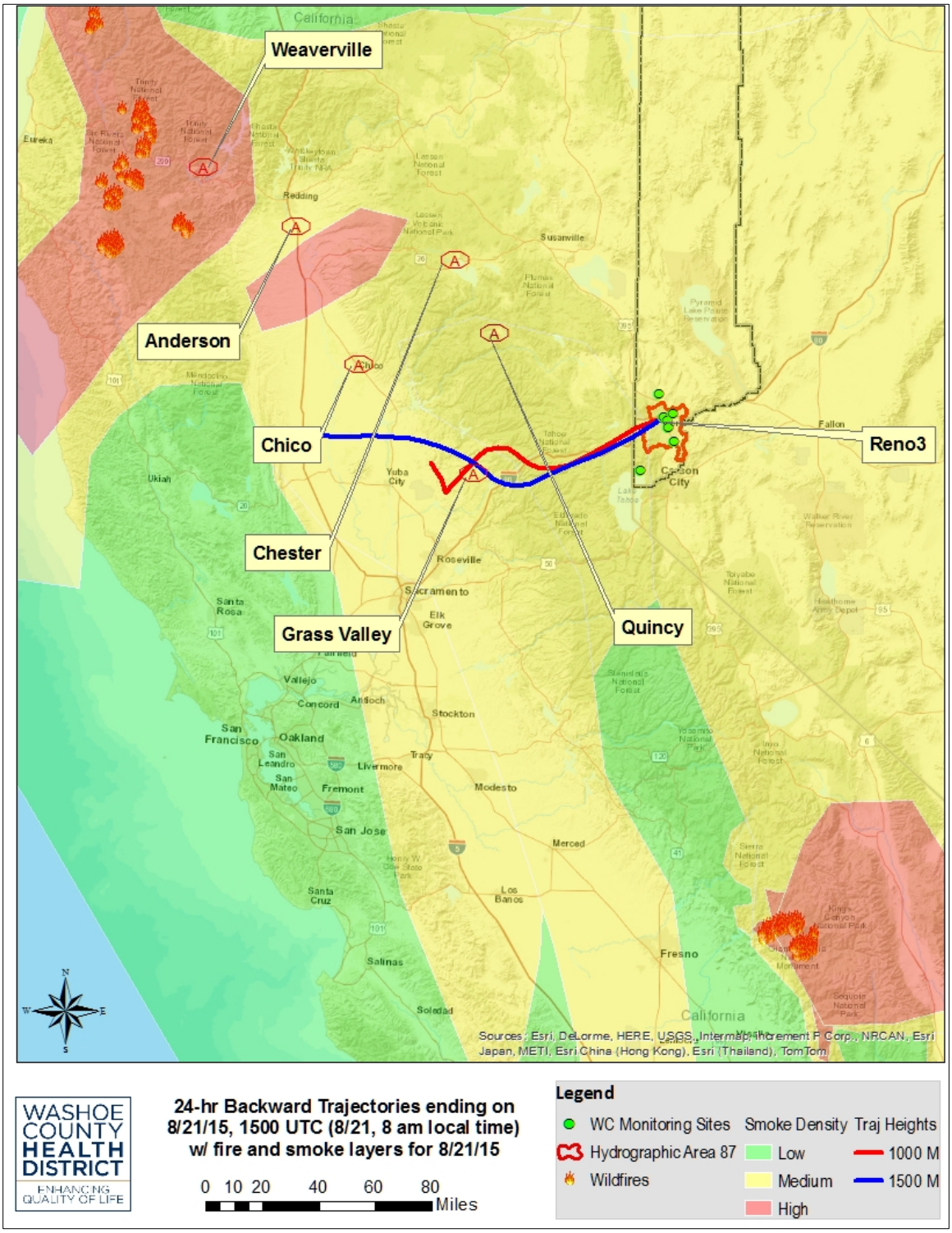
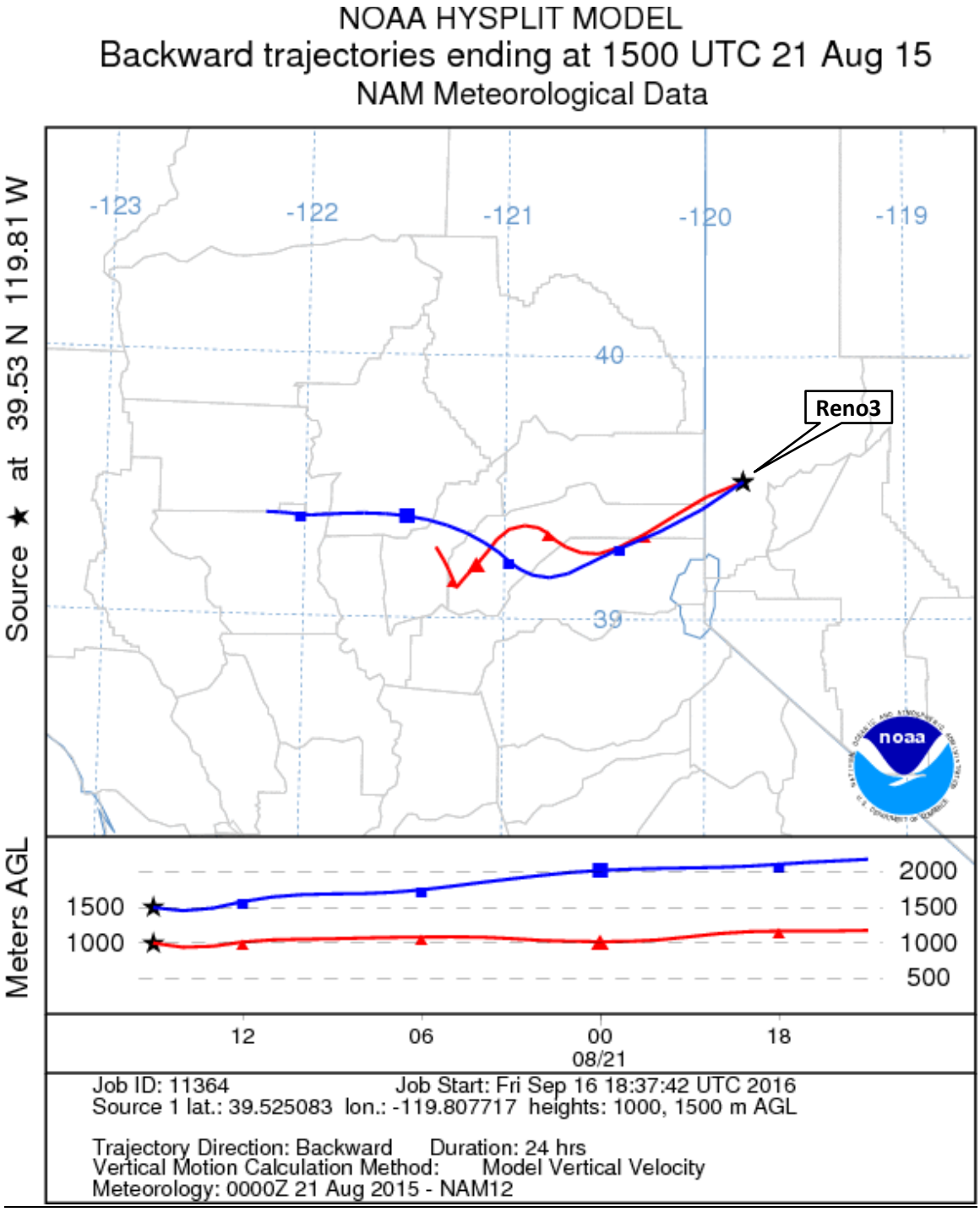


Figure 3.5: Backward Trajectory HYSPLIT Model on August 21, 2015



Additionally, forward trajectories were ran for August 20, 2015 at 0800 PST from six ambient monitoring stations east and southeast of the Complex Fires. These HYSPLIT trajectories, as seen in Figure 3.6, demonstrate that the height of the traveling smoke plume was too high to affect the monitoring stations southeast of the Complex Fires, and that the plume settled into HA87, impacting $PM_{2.5}$ and O_3 concentrations. Figures 3.7 through 3.12 show the HYSPLIT trajectories from each monitoring station identified in Figure 3.6 on August 20, 2015 at 0800 PST. These forward trajectories show that the dense smoke plume from August 20, 2015 traveled at a height greater than 1000 meters over the course of 24-hours and settled into HA87 on August 21, 2015. This is also supported by the satellite image in Figure 2.3 which shows the southern edge of the smoke moving up and over the Sierra Nevada Mountains toward HA87.

$PM_{2.5}$ concentrations from the six ambient air monitoring stations identified in Figure 3.4 are listed in Table 3.2. This table identifies that the $PM_{2.5}$ concentrations in the dense smoke plume traveled at a height over the southeast monitors, as identified by the lower concentrations at the monitoring sites at lower elevations east of the Complex Fires. Chester, which sits at an elevation of 1,381 meters, saw greater impacts from the smoke plume, with $PM_{2.5}$ concentrations twice those of the lower elevation sites.

The trajectories and $PM_{2.5}$ concentrations identifies that the dense smoke plume from the Complex Fires traveled at high elevations on August 20, 2015 and settled into HA87 beginning early on August 21, 2015, elevating $PM_{2.5}$ and O_3 concentrations monitored at the Reno3 during the mid-day period.

Figure 3.6: 24-Hour Forward HYSPLIT Trajectory and Smoke Plume on August 20, 2015

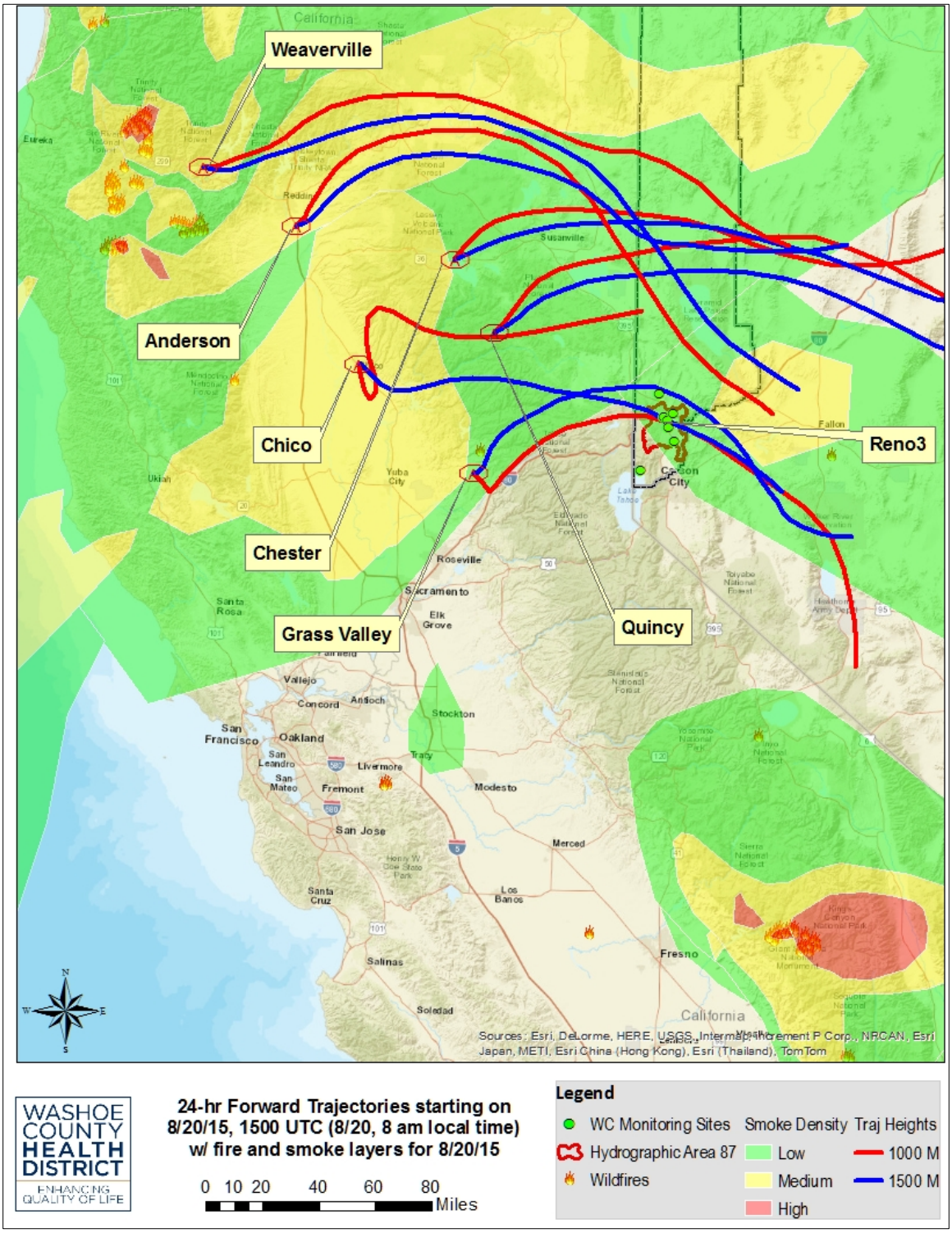


Figure 3.7: Weaverville Forward Trajectory HYSPLIT Model on August 20, 2015

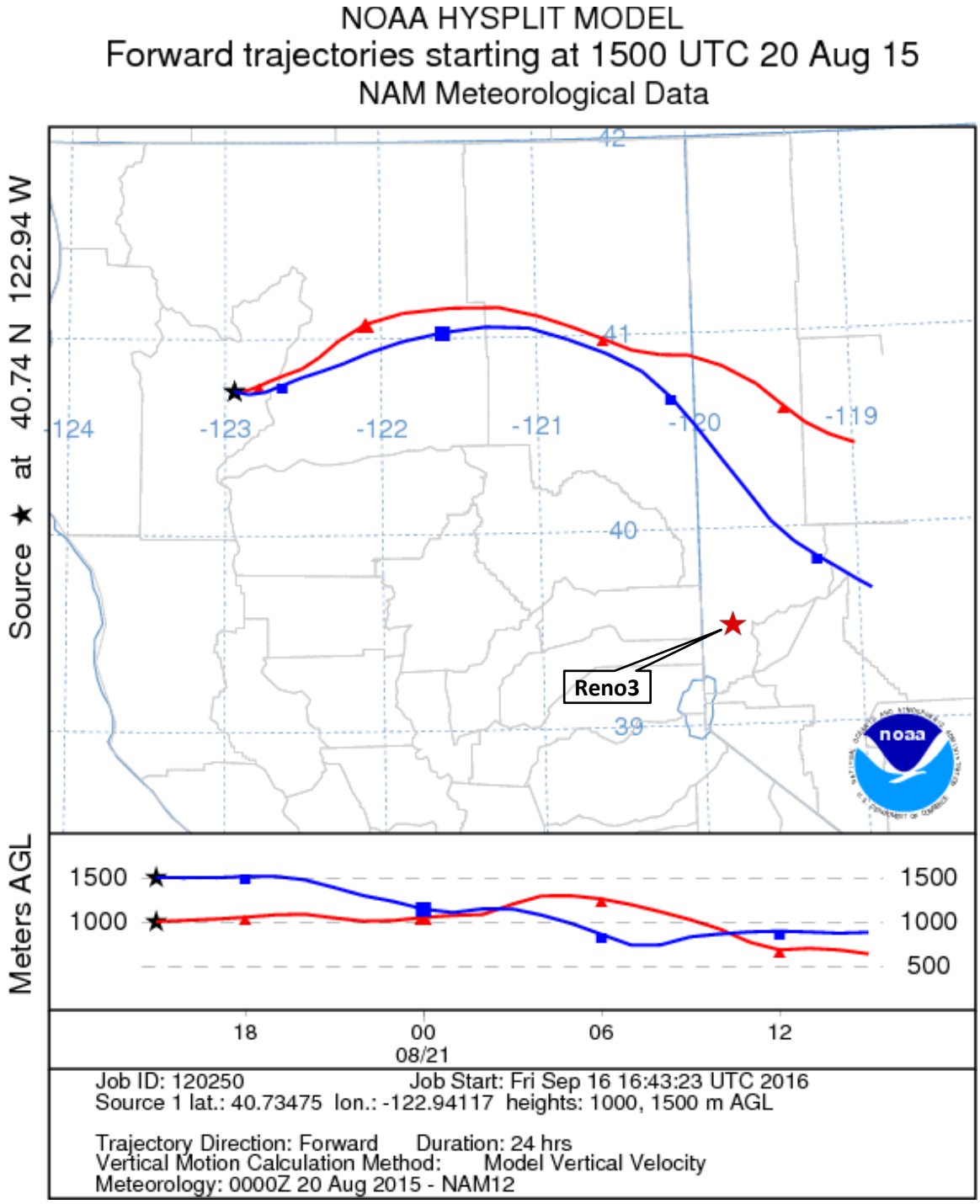


Figure 3.8: Anderson forward Trajectory HYSPLIT Model on August 20, 2015

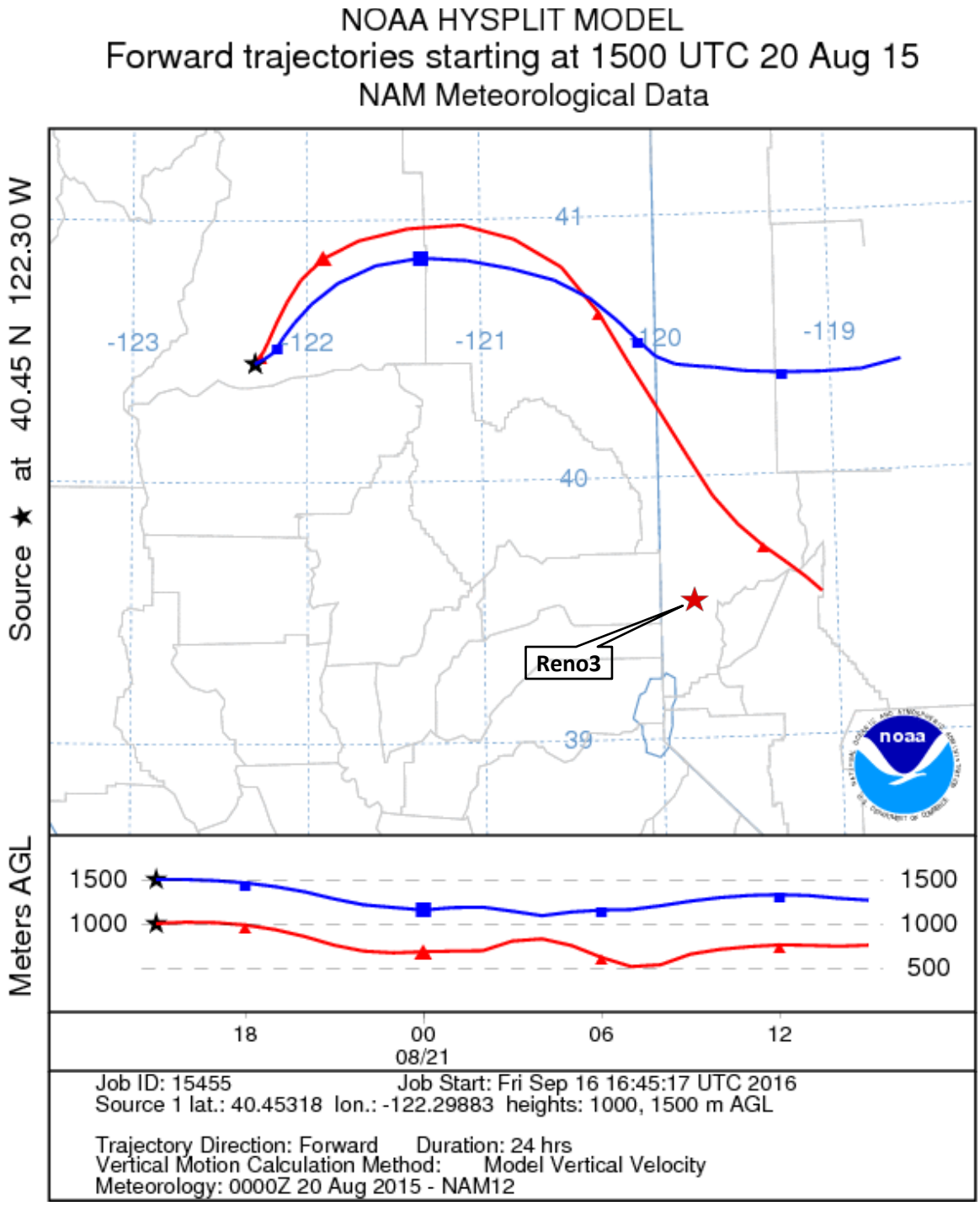


Figure 3.9: Chester Forward Trajectory HYSPLIT Model on August 20, 2015

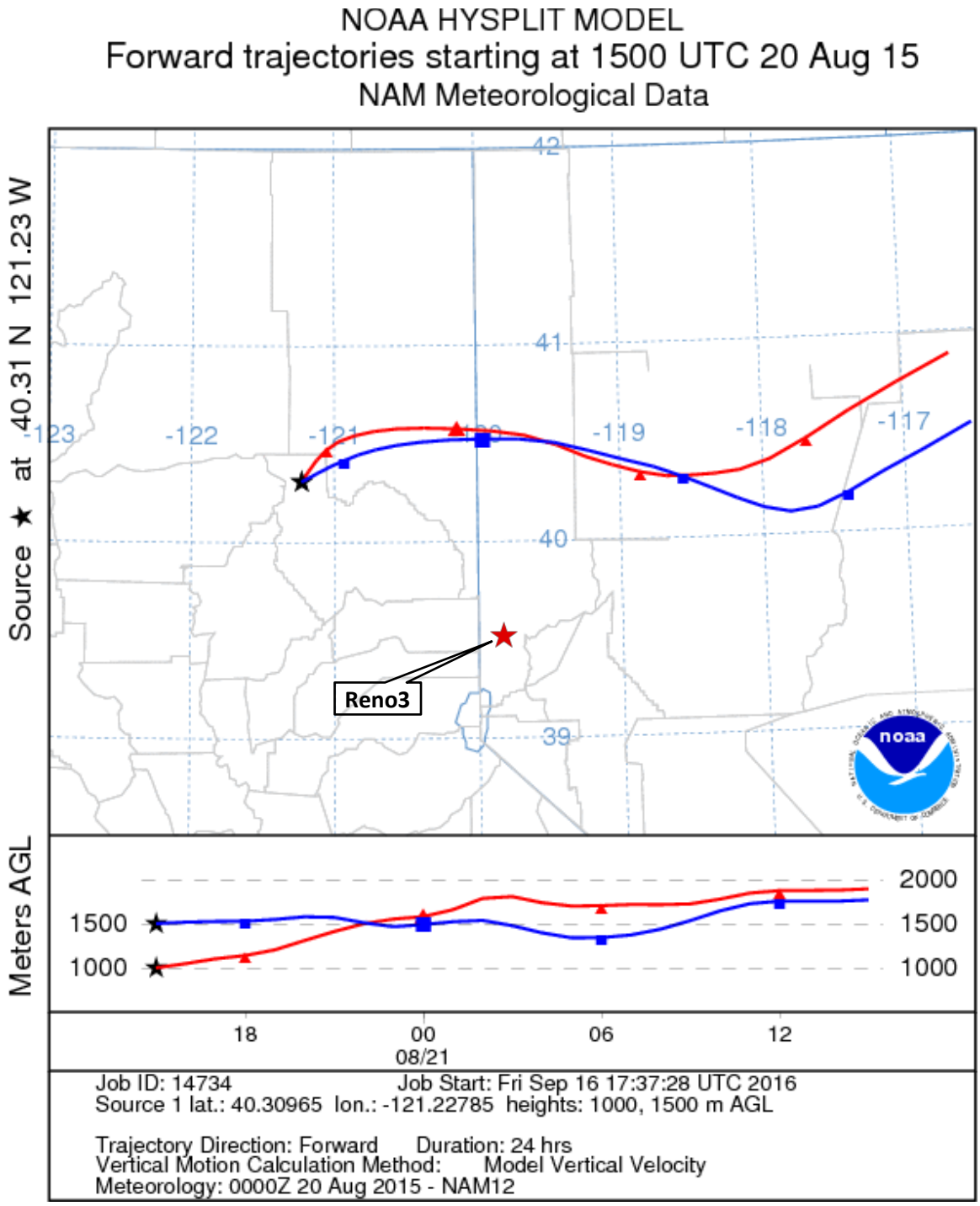


Figure 3.10: Quincy Forward Trajectory HYSPLIT Model on August 20, 2015

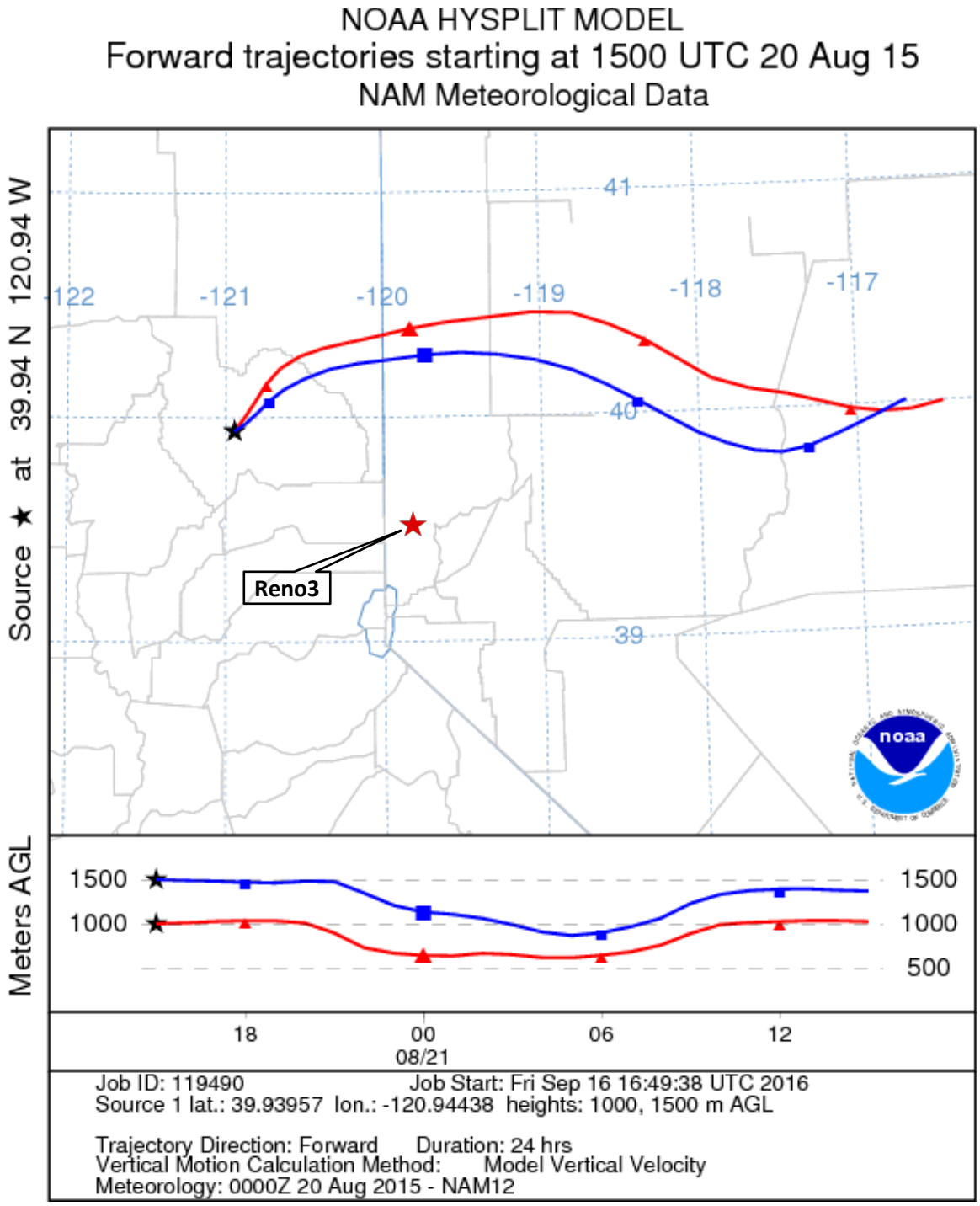


Figure 3.11: Chico Forward Trajectory HYSPLIT Model on August 20, 2015

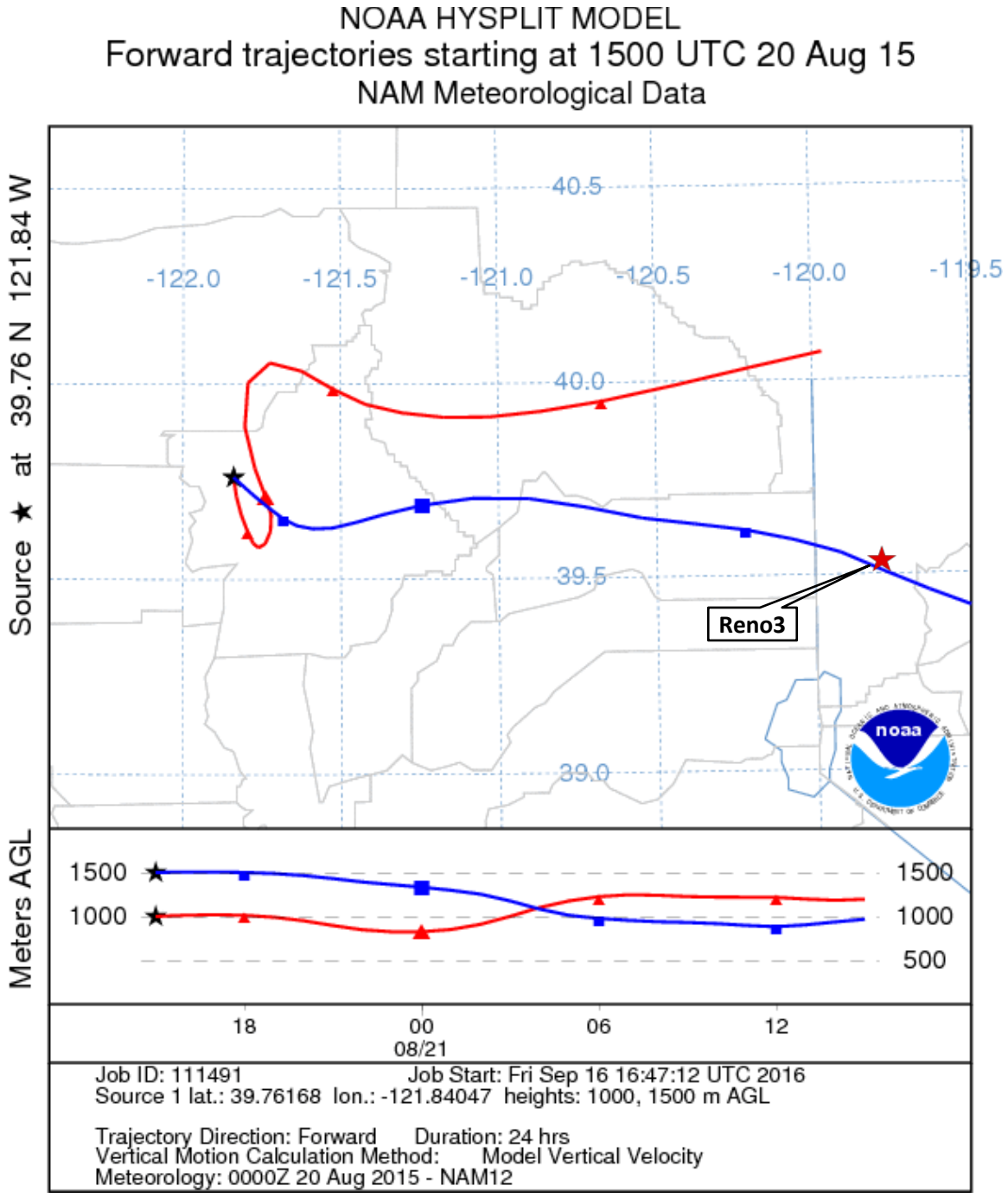


Figure 3.12: Grass Valley Forward Trajectory HYSPLIT Model on August 20, 2015

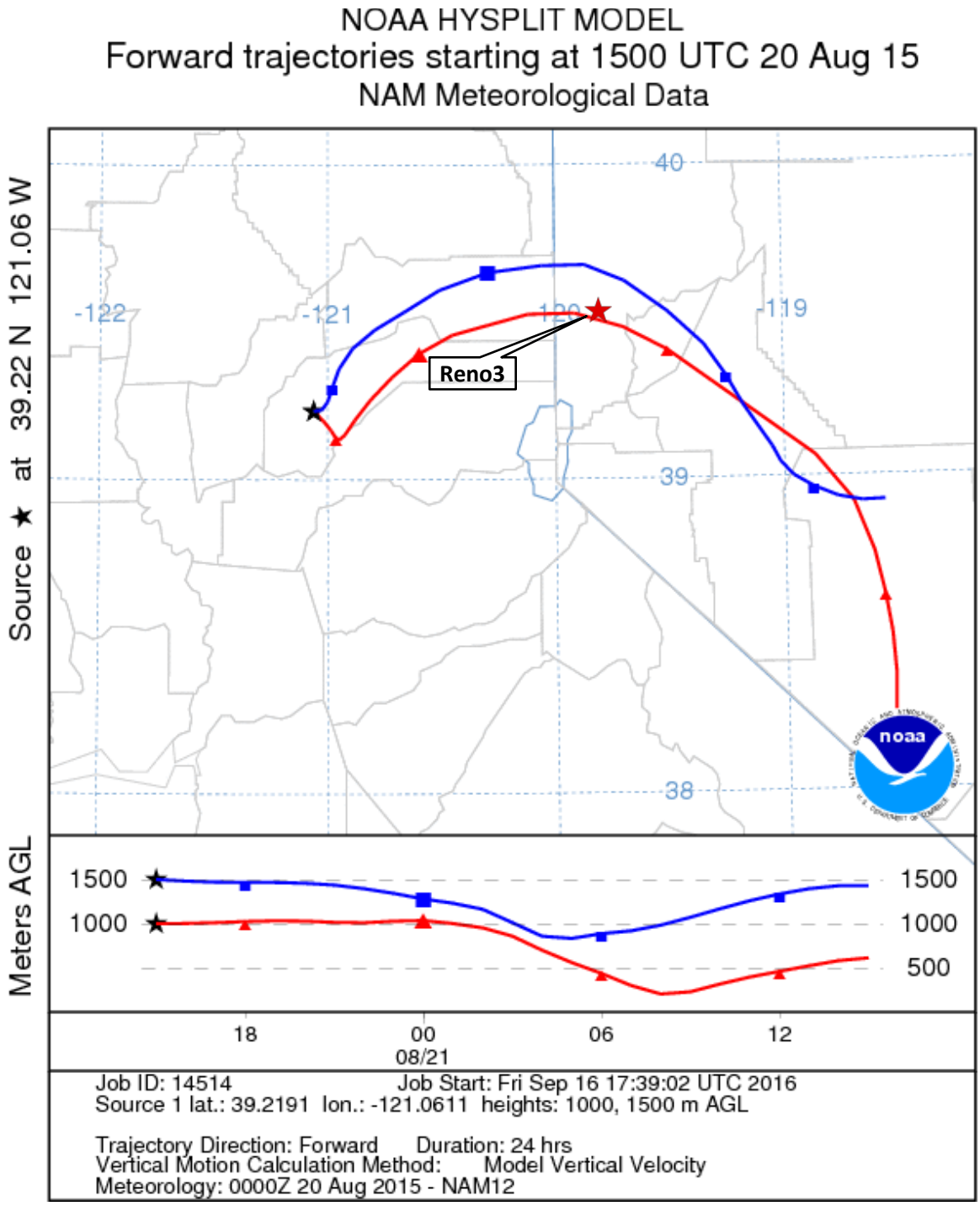


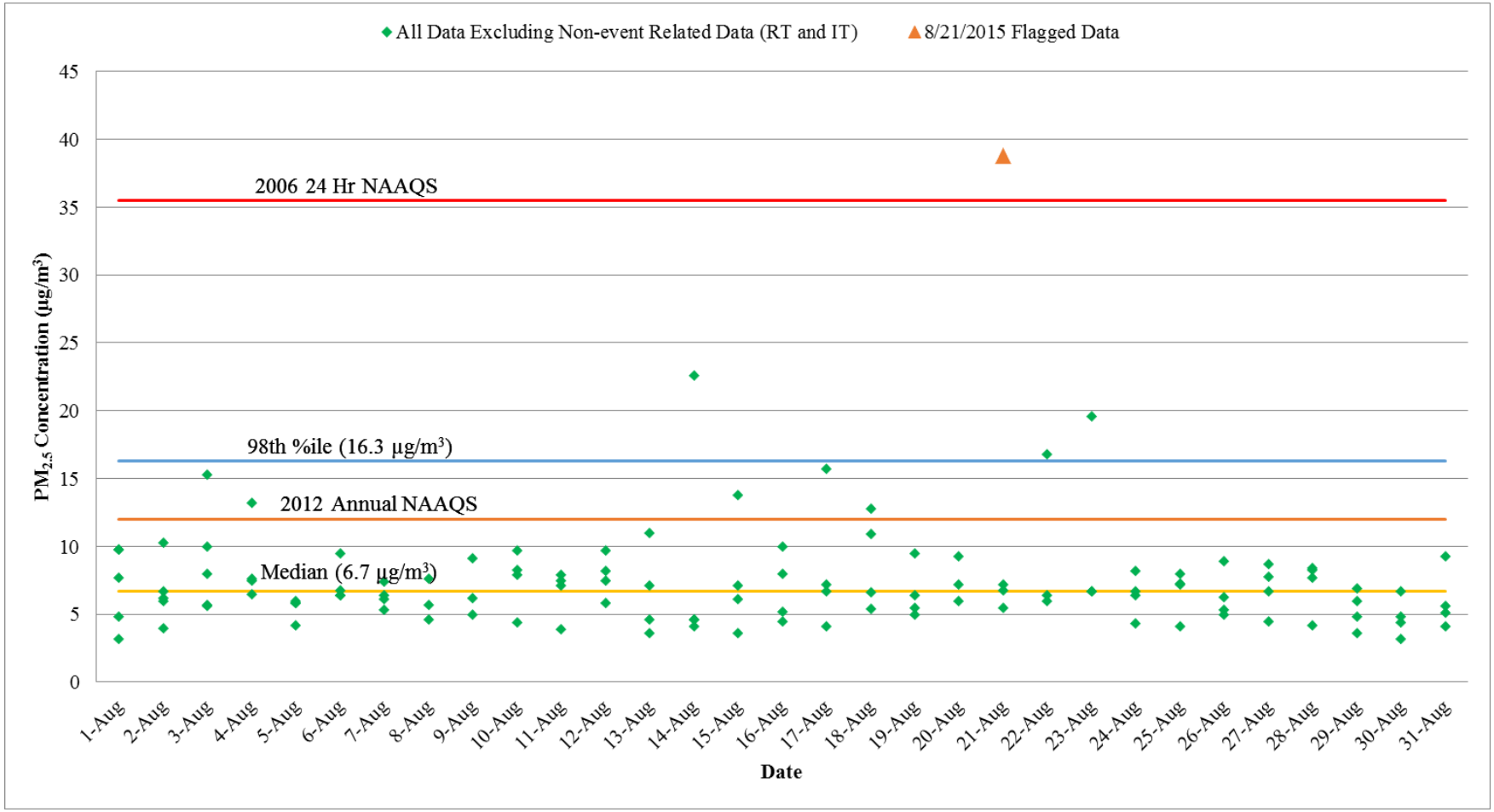
Table 3.3: California Ambient Air Monitoring Sites and Reno 24-Hour $PM_{2.5}$ averages

Monitoring City (AQS ID)	Elevation (m)	08/20 ($\mu g/m^3$)	08/21 ($\mu g/m^3$)
Weaverville (06-105-0002)	631	303.3	233.0
Anderson (06-089-0007)	136	20.7	20.7
Chester (06-063-1007)	1,381	49.5	40.0
Quincy (06-063-1006)	1,042	28.2	20.8
Chico (06-007-0008)	68	11.5	19.9
Grass Valley (06-057-0005)	865	9.9	12.9
Truckee (06-057-1001)	1,777	12.8	27.0
Reno (32-031-0016)	1,369	13.8	38.8

Concentrations of Supporting Measurements

Figure 3.13 shows the elevated level of the 24-hour $PM_{2.5}$ average on August 21, 2015 (indicated by the red triangle) as compared to 5-year historical concentrations. $PM_{2.5}$ data in Figure 3.13 does not include data from the 2013 (Rim and American Fires) Exceptional Events Demonstrations submitted to the EPA. The 24-hour average $PM_{2.5}$ concentration on August 21, 2015 is the 100^{th} percentile during June through August 2011-2015 (excluding 2013 Exceptional Events $PM_{2.5}$ concentrations) with a concentration of 38.8 $\mu g/m^3$.

Figure 3.13: Reno3 24-Hour $PM_{2.5}$ Averages for August 2011-2015



$PM_{2.5}$ Speciation Data

The Reno3 site is part of the EPA's national Speciation Trends Network with an operating $PM_{2.5}$ speciation sampler since 2001. The sampler is operating on the same schedule as the $PM_{2.5}$ FRM, thereby allowing direct comparison between the two samplers for $PM_{2.5}$ exceedance days. Elemental carbon (EC) and organic carbon (OC) are two of the many pollutants measured at the Reno3 Speciation site.

Organic carbon can be emitted directly from combustion activities or produced from secondary processes such as gas-to-particle formation. Elemental carbon, also known as light absorbing carbon or black carbon, is emitted directly from combustion sources. Increased summer background concentrations of OC in the western United States were regional by nature, likely due to the influence of biomass burning emissions. Conversely, summer background concentrations of EC due to impacts from biomass burning were higher in the urban areas.[1]

In Washoe County, speciation data from the Reno3 site supports the findings based on the research paper cited in reference 2 above. During the 2015 Wildfires, the highest OC concentration was in the 95th percentile for the previous 5 years of June through August data (2010-2014). The run day for the collected sample was on August 22, 2015. The 5-year June through August (2010-2014) median background concentration is 1.61 µg/m^3. Likewise, EC concentrations were also elevated into the 90th percentile during the 2015 California wildfires, as compared to the 5-year June through August (2014-2014) median background concentration of 0.36 µg/m^3. These statistics did not exclude data from the 2013 Rim and American Fires. Details of OC and EC background, and 2015 June through August concentrations are depicted in Figure 3.14. Table 3.2 lists the historical concentrations of OC and EC from 2010 to 2014, inclusive of concentrations affected by wildfires from California in August 2013.

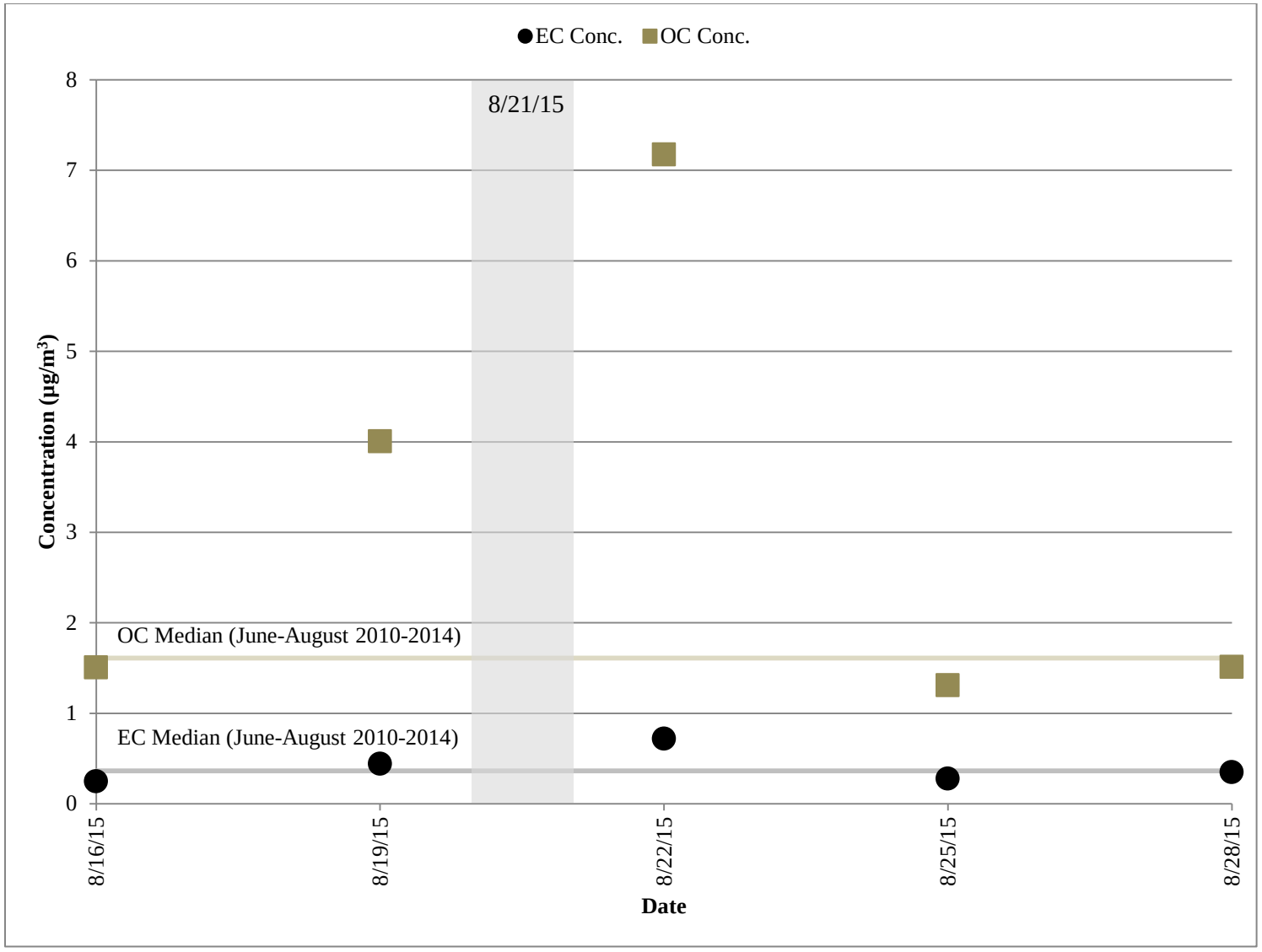
Table 3.4: 2010-2014 (Jun, Jul, and Aug) Elemental & Organic Carbon Concentrations

	Concentrations (µg/m^3)			
	Highest	Lowest	Median	Average
Elemental Carbon	2.92*	0.09	0.36	0.44*
Organic Carbon	41.78*	0.13	1.61	2.45*

*Concentrations include days in August 2013 that were impacted by the Rim and American wildfires.

[1] J. L. Had, B.A. Schichtel, W. C. Malm, and N. H. Frank, Research Article, "Spatial and Temporal Trends in $PM_{2.5}$ Organic and Elemental Carbon across the United States", Hindawi Publishing Corporation, Advances in Meteorology, Volume 2013, Article ID 367674, 13 pages.

Figure 3.14: Elemental & Organic Carbon Concentrations during the 2015 Wildfires



4.0 CONCLUSIONS AND RECOMMENDATIONS

This demonstration package makes a compelling case that the unusually high O_3 concentrations that led to the O_3 exceedance on August 21, 2015 were due to the direct impacts of the 2015 California Wildfires. The demonstration also documents and provides analysis to support that the 2015 California Wildfires meets the criteria for an exceptional event and will allow for EPA to exclude the O_3 data for August 21, 2015. The fires were not reasonably controllable or preventable due to the event being caused by lightning. Additionally, there is a clear and causal relationship between the smoke plumes from the fire and the measured exceedance in Washoe County. This relationship is demonstrated in Section 3.0. This demonstration package will have a regulatory impact on the 2015 8-hour O_3 designation for Washoe County. Based on the information contained in this demonstration, EPA should be able to clearly identify the 2015 California Wildfires as an exceptional event in accordance with the EER and exclude the requested O_3 data for August 21, 2015.

APPENDIX A

EPA 2015 ANNUAL NETWORK PLAN APPROVAL LETTER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

OCT 2 1 2015

Mr. Daniel K. Inouye
Chief, Monitoring and Planning Branch
Air Quality Management Division
Washoe County Health District
P.O. Box 11130
Reno, Nevada 89520-0027

Dear Mr. Inouye:

Thank you for your submission of the Washoe County Health District's 2015 Ambient Air Monitoring Network Plan in July 2015. We have reviewed the submitted document based on the requirements set forth under 40 CFR 58. Based on the information provided in the plan, the U.S. Environmental Protection Agency (EPA) approves all portions of the network plan except those specifically identified below.

Please note that we cannot approve portions of the annual network plan for which the information in the plan is insufficient to judge whether the requirement has been met, or for which the information, as described, does not meet the requirements as specified in 40 CFR 58.10 and the associated appendices. EPA Region 9 also cannot approve portions of the plan for which the EPA Administrator has not delegated approval authority to the regional offices. Accordingly, the first enclosure (*A. Annual Monitoring Network Plan Items where EPA is Not Taking Action*) provides a listing of specific items of your agency's annual monitoring network plan where EPA is not taking action. The second enclosure (*B. Additional Items Requiring Attention*) is a listing of additional items in the plan that EPA wishes to bring to your agency's attention.

The third enclosure (*C. Annual Monitoring Network Plan Checklist*) is the checklist EPA used to review your plan for overall items that are required to be included in the annual network plan along with our assessment of whether the plan submitted by your agency addresses those requirements.

The first two enclosures highlight a subset of the more extensive list of items reviewed in the third enclosure. All comments conveyed via this letter (and enclosures) should be addressed (through corrections within the plan, additional information being included, or discussion) in next year's annual monitoring network plan.

We also want to thank you for your timely submission of the 2015 Ambient Air Monitoring Network Assessment for the Washoe County Health District, as required under 40 CFR Part

58.10. We recognize that preparing the network assessment was a significant project and we appreciate your effort.

The recently revised ozone NAAQS, finalized on October 1, 2015, includes language that revokes all existing seasonal ozone waivers upon the effective date of the final rule. EPA Region 9 will consider all previously approved ozone season waivers effective until December 31, 2015. In advance of the 2016 ozone monitoring season (January – December), EPA Region 9 recommends that agencies seeking new ozone waivers for the 2015 8-hour Ozone NAAQS of 0.070 ppm submit waiver requests no later than December 1, 2015.

If you have any questions regarding this letter or the enclosed comments, please feel free to contact me at (415) 947-4534 or Michael Flagg at (415) 972-3372.

Sincerely,

Meredith Kurpius, Manager
Air Quality Analysis Office

Enclosures:

A. Annual Monitoring Network Plan Items where EPA is Not Taking Action
B. Additional Items Requiring Attention
C. Annual Monitoring Network Plan Checklist

cc (via email): Craig Petersen, Washoe County AQMD

A. Annual Monitoring Network Plan Items where EPA is Not Taking Action

We are not acting on the portions of annual network plans where either EPA Region 9 lacks the authority to approve specific items of the plan, or EPA has determined that a requirement is either not met or information in the plan is insufficient to judge whether the requirement has been met.

- Per 40 CFR 58.11(c), NCore, PAMS, and STN network design and changes are subject to approval of the EPA Administrator. Therefore, we are not acting on these items.

- EPA identified items in your agency's annual monitoring network plan where a requirement was not being met or information in the plan was insufficient to judge whether the requirement was being met based on 40 CFR 58.10 and the associated appendices. Therefore, we are not acting on the following items:

Item	Checklist Row	Issue
For low volume PM instruments (flow rate < 200 liters/minute), all other PM instruments are > 1 m from the lovol. If no, list distance (meters) and instruments.	17	Insufficient information to judge
Distance from supporting structure	78	Not meeting requirement

Additional information for each of these items may be found for the row listed in column 2, in the third enclosure (*C. Annual Monitoring Network Plan Checklist).*

B. Additional Items Requiring Attention

- [Item 21] The minimum monitoring requirements for $PM_{2.5}$ are specified in 40 CFR 58 Appendix D 4.7.1(a) in terms of number of sites: "State, and where applicable local, agencies must operate the minimum number of required $PM_{2.5}$ SLAMS **sites** listed in Table D-5 of this appendix" not number of monitors. Please modify next year's ANP to present this requirement in terms of number of sites.
- [Item 22] There is a requirement for one continuous monitor per 40 CFR 58 Appendix D 4.7.2. There were three sites in 2014 with continuous $PM_{2.5}$ FEM monitors operating. Although there is information in this year's ANP demonstrating the requirement is met, it doesn't specifically discuss the requirement in 40 CFR 58 Appendix D 4.7.2. Please consider adding this to next year's plan, for example, in a footnote or paragraph following Table 4.

C. ANNUAL MONITORING NETWORK PLAN CHECKLIST
(Updated October 1, 2015)

Year: 2015
Agency: Washoe County Health District Air Quality Management Division (AQMD)

40 CFR 58.10(a)(1) requires that each Annual Network Plan (ANP) include information regarding the following types of monitors: SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations.

40 CFR 58.10(a)(1) further directs that, "The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable." On this basis, review of the ANPs is based on the requirements listed in 58.10 along with those in Appendices A, C, D, and E.

EPA Region 9 will not take action to approve or disapprove any item for which Part 58 grants approval authority to the Administrator rather than the Regional Administrators, but we will do a check to see if the required information is included and correct. The items requiring approval by the Administrator are: PAMS, NCore, and Speciation (STN/CSN).

Please note that this checklist summarizes many of the requirements of 40 CFR Part 58, but does not substitute for those requirements, nor do its contents provide a binding determination of compliance with those requirements. The checklist is subject to revision in the future and we welcome comments on its contents and structure.

Key:

White	meets the requirement
Yellow	requirement is not met, or information is insufficient to make a determination. Action requested in next year's plan or outside the ANP process (items listed in Enclosure A).
Green	item requires attention in order to improve next year's plan (items listed in Enclosure B).

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
GENERAL PLAN REQUIREMENTS					
1.	Submit plan by July 1st	58.10 (a)(1)	Yes	Yes	
2.	30-day public comment / inspection period[5]	58.10 (a)(1), 58.10 (a)(2)	Yes, transmittal email	Yes	No comments received
3.	Modifications to SLAMS network – case when we are not approving system modifications	58.10 (a)(2) 58.10 (b)(5) 58.10(e) 58.14	Yes, pages 9-11	Yes	None
4.	Modifications to SLAMS network – case when we are approving system modifications per 58.14	58.10 (a)(2) 58.10 (b)(5) 58.10(e) 58.14	NA	NA	None
5.	Does plan include documentation (e.g., attached approval letter) for system modifications that have been approved since last ANP approval?		Yes, Appendix A&B	Yes	Plan includes EPA approval letters for the Galletti site closure, the Spanish Springs SPM site initiation and expected conversion to a SLAMS, and the South Reno discontinuation of CO monitoring.
6.	Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal	58.10 (b)(5)	Yes, pages 9-11	Yes	Site initiation of Spanish Springs SPM site (See Row 5)
7.	A plan for establishing a near-road $PM_{2.5}$ monitor (in CBSAs $\geq$ 2.5 million) by 1/1/2015 **(plan was due July 1, 2014)**	58.10(a)(8)(i)	NA	NA	
8.	A plan for establishing a near-road CO monitor (in CBSAs $\geq$ 2.5 million) by 1/1/2015 **(plan was due July 1, 2014)**	58.10(a)(7) 58.13(e)(1)	NA	NA	
9.	NO_2 plan for establishment of 2nd near-road monitor by 1/1/2015 **(plan was due July 1, 2014)**	58.10 (a)(5)(iv)	NA	NA	

[1] Response options: NA (Not Applicable), Yes, No, Incomplete, Incorrect. The responses "Incomplete" and "Incorrect" assume that some information has been provided.
[2] To the best of our knowledge.
[3] Assuming the information is correct
[4] Response options: NA (Not Applicable) – [reason], Yes, No, Insufficient to Judge.
[5] The affected state or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
10.	Precision/Accuracy reports submitted to AQS	58.16(a); App A, 1.3 and 5.1.1	Yes, page 11	Yes	
11.	Annual data certification submitted	58.15 App. A 1.3	Yes, page 11	Yes	
12.	Statement that SPMs operating an FRM/FEM/ARM that meet Appendix E also meet either Appendix A or an approved alternative. Documentation for any Appendix A approved alternative should be included.[6]	58.11 (a) (2)	NA	NA	No SPMs currently operating
13.	SPMs operating FRM/FEM/ARM monitors for over 24 months are listed as comparable to the NAAQS or the agency provided documentation that requirements from Appendices A, C, or E were not met.[7]	58.20(c)	NA	NA	No SPMs currently operating
14.	For agencies that share monitoring responsibilities in an MSA/CSA: this agency meets full monitoring requirements or an agreement between the affected agencies and the EPA Regional Administrator is in place	App D 2(e)	NA	NA	
GENERAL PARTICULATE MONITORING REQUIREMENTS (PM_{10}, $PM_{2.5}$, Pb-TSP, Pb-PM_{10})					
15.	Designation of a primary monitor if there is more than one monitor for a pollutant at a site.	Need to determine collocation	Yes, page 30-31	Yes	
16.	Distance between QA collocated monitors (Note: waiver request or the date of previous waiver approval must be included if the distance deviates from requirement.)	App. A 3.2.5.6 and 3.2.6.3	Yes, page 31	Yes	

[6] Alternatives to the requirements of appendix A may be approved for an SPM site as part of the approval of the annual monitoring plan, or separately.
[7] This requirement only applies to monitors that are eligible for comparison to the NAAQS per 40 CFR §§58.11(e) and 58.30.

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
17.	For low volume PM instruments (flow rate < 200 liters/minute), all other PM instruments are > 1 m from the lovol. If no, list distance (meters) and instruments.	App E	Incomplete	Insufficient Info	Please include distance information in next year's ANP
18.	For high volume PM instruments (flow rate > 200 liters/minute), all other PM instruments are > 2m from the hivol. If no, list distance (meters) and instruments.	App E	NA	NA	None
$PM_{2.5}$ –SPECIFIC MONITORING REQUIREMENTS					
19.	Document how states and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor.	58.10 (c)	Yes, pages 10-11	Yes	
20.	Identification of any $PM_{2.5}$ FEMs and/or ARMs not eligible to be compared to the NAAQS due to poor comparability to FRM(s) (Note 1: must include required data assessment.) (Note 2: Required SLAMS must monitor $PM_{2.5}$ with NAAQS-comparable monitor at the required sample frequency.)	58.10 (b)(13) 58.11 (e)	NA	NA	
21.	Minimum # of monitoring **sites** for $PM_{2.5}$ [Note 1: should be supported by MSA ID, MSA population, DV, # monitoring sites, and # required monitoring sites] [Note 2: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App D, 4.7.1(a) and Table D-5	Yes, Pages 4-5	Yes	Note the minimum monitoring requirements for $PM_{2.5}$ are specified in 40 CFR 58 Appendix D 4.7.1(a) in terms of number of sites: "State, and where applicable local, agencies must operate the minimum number of required $PM_{2.5}$ SLAMS **sites** listed in Table D-5 of this appendix" not number of monitors. Please modify next year's ANP to present this requirement in terms of number of sites.

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
22.	Requirements for continuous $PM_{2.5}$ monitoring (number of monitors and collocation)	App D 4.7.2	Yes, Pages 4-5 See Note	Yes	There is a requirement for one continuous monitor per 40 CFR 58 Appendix D 4.7.2. There were three sites in 2014 with continuous $PM_{2.5}$ FEM monitors operating. Although there is information in this year's ANP demonstrating the requirement is met, it doesn't specifically discuss the requirement in 40 CFR 58 Appendix D 4.7.2. Please consider adding this to next year's plan, for example, in a footnote or paragraph following Table 4.
23.	FRM/FEM/ARM $PM_{2.5}$ QA collocation	App A 3.2.5	Yes, Page 8	Yes	
24.	$PM_{2.5}$ Chemical Speciation requirements for official STN sites	App D 4.7.4	Yes, Page 30	Yes	
25.	Identification of sites suitable and sites not suitable for comparison to the annual $PM_{2.5}$ NAAQS as described in Part 58.30	58.10 (b)(7)	Yes, Detailed site information	Yes	
26.	Required $PM_{2.5}$ sites represent area-wide air quality	App D 4.7.1(b)	Yes, Detailed site information	Yes	
27.	For $PM_{2.5}$, within each MSA, at least one site at neighborhood or larger scale in an area of expected maximum concentration	App D 4.7.1(b)(1)	Yes, Detailed site information	Yes	Galetti is listed as the maximum PM2.5 site
28.	Minimum monitoring requirement for near-road $PM_{2.5}$ monitor (in CBSA $\geq$ 2.5 million) by 1/1/2015	58.13(f)(1) App D 4.7.1(b)(2)	NA	NA	
29.	If additional SLAMS $PM_{2.5}$ is required, there is a site in an area of poor air quality	App D 4.7.1(b)(3)	NA	NA	
30.	States must have at least one $PM_{2.5}$ regional background and one $PM_{2.5}$ regional transport site.	App D 4.7.3	NA	NA	This requirement is met by other agencies in the state.
31.	Sampling schedule for $PM_{2.5}$ - applies to year-round and seasonal sampling schedules (note: date of waiver approval must be included if the sampling season deviates from requirement)	58.10 (b)(4) 58.12(d) App D 4.7 EPA flowchart	Yes, Detailed site information	Yes	
32.	Frequency of flow rate verification for manual $PM_{2.5}$ monitors audit	App A 3.3.2	Yes, Detailed site information	Yes	
33.	Frequency of flow rate verification for automated $PM_{2.5}$ monitors audit	App A 3.2.3	Yes, Detailed site information	Yes	

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
34.	Dates of two semi-annual flow rate audits conducted in **CY2014**for $PM_{2.5}$ monitors	App A, 3.2.4 and 3.3.3	Yes, Detailed site information	Yes	
PM_{10} –SPECIFIC MONITORING REQUIREMENTS					
35.	Minimum # of monitoring sites for PM_{10}	App D, 4.6 (a) and Table D-4	Yes, Page 5	Yes	
36.	Manual PM_{10} method collocation (note: continuous PM_{10} does not have this requirement)	App A 3.3.1	NA	NA	
37.	Sampling schedule for PM_{10}	58.10 (b)(4) 58.12(e) App D 4.6	Yes, Detailed site information	Yes	
38.	Frequency of flow rate verification for manual PM_{10} monitors audit	App A 3.3.2	NA	NA	The only manual PM_{10} monitor in the network is the QA-collocated PM_c pair.
39.	Frequency of flow rate verification for automated PM_{10} monitors audit	App A 3.2.3	Yes, Detailed site information	Yes	
40.	Dates of two semi-annual flow rate audits conducted in **CY2014** for PM_{10} monitors	App A, 3.2.4 and 3.3.3	Yes, Detailed site information	Yes	
Pb –SPECIFIC MONITORING REQUIREMENTS					
41.	Minimum # of monitors for non-NCore Pb [Note: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App D 4.5 58.13(a)	Yes, Page 7	Yes	None
42.	Pb collocation: for non-NCore sites	App A 3.3.4.3	NA	NA	
43.	Any source-oriented Pb site for which a waiver has been granted by EPA Regional Administrator	58.10 (b)(10)	NA	NA	
44.	Any Pb monitor for which a waiver has been requested or granted by EPA Regional Administrator for use of Pb-PM_{10} in lieu of Pb-TSP	58.10 (b)(11)	NA	NA	
45.	Designation of any Pb monitors as either source-oriented or non-source-oriented	58.10 (b)(9)	NA	NA	
46.	Sampling schedule for Pb	58.10 (b)(4) 58.12(b) App D 4.5	NA	NA	

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
47.	Frequency of flow rate verification for Pb monitors audit	App A 3.3.4.1	NA	NA	
48.	Dates of two semi-annual flow rate audits conducted in **CY2015** for Pb monitors	App A 3.3.4.1	NA	NA	
GENERAL GASEOUS MONITORING REQUIREMENTS					
49.	Frequency of one-point QC check (gaseous)	App. A 3.2.1	Yes, Detailed site information	Yes	
50.	Date of Annual Performance Evaluation (gaseous) conducted in **CY2014**	App. A 3.2.2	Yes, Detailed site information	Yes	
O_3 –SPECIFIC MONITORING REQUIREMENTS					
51.	Minimum # of monitoring sites for O_3 [Note: should be supported by MSA ID, MSA population, DV, # monitoring sites, and # required monitoring sites][8]	App D, 4.1(a) and Table D-2	Yes, page 4	Yes	
52.	Identification of maximum concentration O_3 site(s)	App D 4.1 (b)	Yes, Detailed site information	Yes	Sparks is listed as the maximum concentration site for O_3.
53.	Sampling season for O_3 (Note: Waivers must be renewed annually. EPA expects agencies to submit re-evaluations of the relevant data each year with the ANP. EPA will then respond as part of the ANP response.)	58.10 (b)(4) App D, 4.1(i)	Yes, Detailed site information	Yes	
NO_2 –SPECIFIC MONITORING REQUIREMENTS					
54.	Minimum monitoring requirement for single near-road NO_2 monitor (in CBSA $\geq$ 1 million) by 1/1/2014	58.13(c)(3) App D 4.3.2	Yes, Detailed site information	Yes	None required
55.	Minimum monitoring requirement for second near-road NO_2 monitor (in CBSA $\geq$ 2.5 million) by 1/1/2015	58.13(c)(4) App D 4.3.2	Yes, Detailed site information	Yes	None required

[8] Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements. In addition, ozone monitors that do not meet traffic count/distance requirements to be neighborhood or urban scale (40 CFR 58 Appendix E, Table E-1) cannot be counted towards minimum monitoring requirements.

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
56.	Minimum monitoring requirements for area-wide NO_2 monitor in location of expected highest NO_2 concentrations representing neighborhood or larger scale (operation required by January 1, 2013)	App D 4.3.3	NA	NA	
57.	Minimum monitoring requirements for susceptible and vulnerable populations monitoring (aka RA40) NO_2 (operation required by January 1, 2013)	App D 4.3.4	NA	NA	
58.	Identification of required NO_2 monitors as either near-road, area-wide, or vulnerable and susceptible population (aka RA40)	58.10 (b)(12)	NA	NA	
CO –SPECIFIC MONITORING REQUIREMENTS					
59.	Minimum monitoring requirement for near-road CO monitor (in CBSA ≥ 2.5 million) by 1/1/2015	58.13(e)(1) App D 4.2.1	Yes, Detailed site information	Yes	None required
SO_2 –SPECIFIC MONITORING REQUIREMENTS					
60.	Minimum monitoring requirements for SO_2 [Note: Only monitors considered to be required SLAMs are eligible to be counted towards meeting minimum monitoring requirements.]	App D 4.4	Yes, Detailed site information	Yes	None required
NCORE –SPECIFIC MONITORING REQUIREMENTS					
61.	NCore site and all required parameters operational: year-round O_3, trace SO_2, trace CO, NO_y, NO, $PM_{2.5}$ mass, $PM_{2.5}$ continuous, $PM_{2.5}$ speciation, $PM_{10-2.5}$ mass, resultant wind speed at 10m, resultant wind direction at 10m, ambient temperature, relative humidity, and Pb at CBSAs ≥ 500,000.	58.10 (a)(3); Pb collocation App. A 3.3.4.3; $PM_{10-2.5}$ minimum monitoring App. D 4.8; $PM_{10-2.5}$ sampling schedule 58.10 (b)(4)	Yes, Detailed site information	Yes	Washoe does not monitor for Pb at their NCore site. No Pb is required at the NCore site since CBSA population is < 500,000.

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
		58.12(f) App D 4.8; $PM_{10-2.5}$ collocation App. A 3.3.6			
SITE OR MONITOR - SPECIFIC REQUIREMENTS (OFTEN INCLUDED IN DETAILED SITE INFORMATION TABLES)					
62.	AQS site identification number for each site	58.10 (b)(1)	Yes, Detailed site information	Yes	
63.	Location of each site: street address and geographic coordinates	58.10 (b)(2)	Yes, Detailed site information	Yes	
64.	MSA, CBSA, CSA or other area represented by the monitor	58.10 (b)(8)	Yes, Detailed site information	Yes	
65.	Parameter occurrence code for each monitor	Needed to determine if other requirements (e.g., min # and collocation) are met	Yes, Detailed site information	Yes	
66.	Statement of purpose for each monitor	58.10 (a)(1)	Yes, Detailed site information	Yes	
67.	Basic monitoring objective for each monitor	App D 1.1 58.10 (b)(6)	Yes, Detailed site information	Yes	
68.	Site type for each monitor	App D 1.1.1	Yes, Detailed site information	Yes	
69.	Monitor type for each monitor, and Network Affiliation(s) as appropriate	Needed to determine if other requirements (e.g., min # and collocation) are met	Yes, Detailed site information	Yes	

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
70.	Scale of representativeness for each monitor as defined in Appendix D	58.10(b)(6); App D	Yes, Detailed site information	Yes	
71.	Parameter code for each monitor	Needed to determine if other requirements (e.g., min # and collocation) are met	Yes, Detailed site information	Yes	
72.	Method code and description (e.g., manufacturer & model) for each monitor	58.10 (b)(3); App C 2.4.1.2	Yes, Detailed site information	Yes	
73.	Sampling start date for each monitor	Needed to determine if other requirements (e.g., min # and collocation) are met	Yes, Detailed site information	Yes	
74.	Distance of monitor from nearest road	App E 6	Yes, Detailed site information	Yes	
75.	Traffic count of nearest road	App E	Yes, Detailed site information	Yes	
76.	Groundcover	App E 3(a)	Yes, Detailed site information	Yes	
77.	Probe height	App E 2	Yes, Detailed site information	Yes	
78.	Distance from supporting structure	App E 2	Yes, Detailed site information	No	PM instruments at all sites should be greater than 2 meters from any supporting structure.
79.	Distance from obstructions on roof (horizontal distance to the obstruction and vertical height of the obstruction above the probe should be provided)	App E 4(b)	Yes, Detailed site information	Yes	
80.	Distance from obstructions not on roof (horizontal distance to the obstruction and vertical height of the obstruction above the probe should be provided)	App E 4(a)	Yes, Detailed site information	Yes	

	ANP requirement	Citation within 40 CFR 58	Was the information submitted?[1] If yes, page #s. Flag if incorrect[2]?	Does the information provided[3] meet the requirement?[4]	Notes
81.	Distance from the drip line of closest tree(s)	App E 5	Yes, Detailed site information	Yes	For monitors <10m from drip line of closest trees, the ANP explains "Trees are not of sufficient height and leaf canopy density to interfere with the normal unrestricted airflow or pollutant scavenging around the monitoring path. At least 90 percent of the monitoring path is at least 10 meters from the drip line of the trees."
82.	Distance to furnace or incinerator flue	App E 3(b)	Yes, Detailed site information	Yes	
83.	Unrestricted airflow (expressed as degrees around probe/inlet or percentage of monitoring path)	App E, 4(a) and 4(b)	Yes, Detailed site information	Yes	
84.	Probe material ($NO/NO_2/NO_y$, SO_2, O_3; For PAMS: VOCs, Carbonyls)	App E 9	Yes, Detailed site information	Yes	
85.	Residence time ($NO/NO_2/NO_y$, SO_2, O_3; For PAMS: VOCs, Carbonyls)	App E 9	Yes, Detailed site information	Yes	

Public Comments on Annual Network Plan
Were comments submitted to the S/L/T agency during the public comment period?

No

If no, skip the remaining questions.
If yes:

- Were any of the comments substantive?
  - If yes, which ones?
  - Explain basis for determination if any comments were considered not substantive:
- Did the agency respond to the substantive comments?
  - If yes, was the response adequate?
- Do the substantive comments require separate EPA response (i.e., agency response wasn't adequate)?
- Are the sections of the annual network plan that received substantive comments approvable after consideration of comments?
  - If yes, provide rationale:

APPENDIX B

2015 DATA CERTIFICATION LETTER

WASHOE COUNTY
HEALTH DISTRICT
ENHANCING QUALITY OF LIFE

April 22, 2016

Deborah Jordan
Air Division Director
U.S. EPA Region 9
75 Hawthorne Street, AIR-1
San Francisco, CA 94105

Re: CY2015 Ambient Air Monitoring Data Certification

Dear Ms. Jordan:

Attached please find a copy of the Washoe County Health District, Air Quality Management Division's (AQMD) AQS AMP600 Data Certification Report and AMP450NC Quick Look summary report for ambient air monitoring data for all State and Local Air Monitoring Stations (SLAMS) and Special Purpose Monitors (SPMs) which meet criteria in 40 CFR 58 Appendix A operated from January 1 to December 31, 2015. Included is data from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors for CO, $NO/NO_x/NO_2$, ozone, PM_{10}, $PM_{10-2.5}$, $PM_{2.5}$, and SO_2 (hourly and 5-minute average data).

Please note that the SO_2 data at the Reno 3 monitoring station (EPA ID 32-031-0016) was only 71% (hourly) and 68% (5-minute) complete for October - December (4th Quarter) 2015. An AQS AMP430 Data Completeness Report summarizing this issue is also attached. The SO_2 analyzer initially failed in August 2015 with a bad UV lamp driver board. AQMD staff replaced UV lamp driver board, but problems with an unstable zero caused two weekly precision check failures in November 2015, invalidating two full weeks of data. After numerous zero adjustments and a full PMT factory calibration, one more week of data was lost in December 2015. AQMD staff replaced the failing SO_2 analyzer in January 2016.

This letter certifies that the ambient concentration data and the quality assurance data are completely submitted to AQS (with the exception of the note above), and the ambient data are accurate to the best of my knowledge taking into consideration the quality assurance findings.

Please contact me or Craig Petersen at (775) 784-7200 with any questions or concerns.

Sincerely,

Daniel Inouye

Daniel Inouye
Branch Chief, Monitoring and Planning

Attachments

cc: Meredith Kurpius, Air Quality Analysis Office, U.S. EPA, Region 9
Fletcher Clover, Air Quality Analysis Office, U.S. EPA, Region 9
Charlene Albee, Director, AQMD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: BAA

CERTIFICATION EVALUATION AND CONCURRENCE

Report Request ID: 1436094

Report Code: AMP600

Apr. 19, 2016

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	32	031									

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA			

AGENCY SELECTIONS

Washoe County District Health Department

SELECTED OPTIONS

Option Type	Option Value
MERGE PDF FILES	YES
AGENCY ROLE	CERTIFYING

DATE CRITERIA

Start Date	End Date
2015	2015

Data Evaluation and Concurrence Report Summary

Apr. 19, 2016

Certification Year: 2015
Certifying Agency (CA): Washoe County District Health Department (1138)

Pollutants in Report:

Parameter Name	Code	Monitors Evaluated	Monitors Recommended for Concurrence by AQS	Monitors NOT Recommended for Concurrence by AQS
Carbon monoxide	42101	4	4	0
Nitrogen dioxide (NO2)	42602	1	1	0
Ozone	44201	6	6	0
PM10 Total 0-10um STP	81102	6	6	0
PM2.5 - Local Conditions	88101	3	3	0
Sulfur dioxide	42401	1	1	0

PQAOs in Report:

PQAO Name	PQAO Code	TSA Date
Washoe County District Health Department	1138	09/16/10

Summary of 'N' flags for all pollutants:

PQAO	Parameter Code	AQS Site-ID	POC	AQS Recommended Flag	Cert. Agency Recommended Flag	Reason for AQS Recommendation

Signature of Monitoring Organization Representative: Daniel Inouye

Data Evaluation and Concurrence Report for Gaseous Pollutants

Certifying Year 2015
Certifying Agency Code Washoe County District Health Department (1138)
Parameter Carbon monoxide (42101) (ppm)
PQAO Name Washoe County District Health Department (1138)
QAPP Approval Date 02/12/2013

NPAP Audit Summary:

Number of Passed Audits	NPAP Bias	Criteria Met
1	.738462	Y

AQS Site ID	POC	Monitor Type	Routine Data						One Point Quality Check			Annual PE		NPAP		QAPP Appr.	Concur. Flag		
			Mean	Min	Max	Exceed. Count	Outlier Count	Perc. Comp.	Precision	Bias	Complete	Bias	Complete	Bias	PQAO Level Criteria		Aqs Rec Flag	CA Rec Flag	Epa Concur
32-031-0016	1	SLAMS	0.280	0.033	2.532	0	0	91	6.37	+/-4.96	100	7.25	100		Y	Y	Y		
32-031-0025	1	SLAMS	0.152	0.000	1.100	0	0	98	1.23	+1.21	100	2.63	100		Y	Y	Y		
32-031-1005	1	SLAMS	0.428	- 0.500	2.700	0	0	99	0.72	+2.46	100	2.10	100	0.74	Y	Y	Y		
32-031-2009	1	SLAMS	0.214	0.000	1.500	0	0	99	1.31	+/-0.99	100	3.17	100		Y	Y	Y		

Data Evaluation and Concurrence Report for Gaseous Pollutants

Certifying Year 2015
Certifying Agency Code Washoe County District Health Department (1138)
Parameter Nitrogen dioxide (NO2) (42602) (ppb)
PQAO Name Washoe County District Health Department (1138)
QAPP Approval Date 02/12/2013

NPAP Audit Summary:

Number of Passed Audits	NPAP Bias	Criteria Met
1	2.63566	Y

AQS Site ID	POC	Monitor Type	Routine Data						One Point Quality Check			Annual PE		NPAP		QAPP Appr.	Concur. Flag		
			Mean	Min	Max	Exceed. Count	Outlier Count	Perc. Comp.	Precision	Bias	Complete	Bias	Complete	Bias	PQAO Level Criteria		Aqs Rec Flag	CA Rec Flag	Epa Concur
32-031-0016	1	SLAMS	14.1	0.0	67.2		0	98	2.70	+3.07	100	10.81	100	2.64	Y	Y	Y		

Data Evaluation and Concurrence Report for Gaseous Pollutants

Certifying Year 2015
Certifying Agency Code Washoe County District Health Department (1138)
Parameter Ozone (44201) (ppm)
PQAO Name Washoe County District Health Department (1138)
QAPP Approval Date 02/12/2013

NPAP Audit Summary:

Number of Passed Audits	NPAP Bias	Criteria Met
2	2.70608	Y

			Routine Data						One Point Quality Check			Annual PE		NPAP			Concur. Flag		
AQS Site ID	POC	Monitor Type	Mean	Min	Max	Exceed. Count	Outlier Count	Perc. Comp.	Precision	Bias	Complete	Bias	Complete	Bias	PQAO Level Criteria	QAPP Appr.	Aqs Rec Flag	CA Rec Flag	Epa Concur
32-031-0016	1	SLAMS	0.049	0.005	0.088	0	0	96	1.62	-3.53	100	5.60	100	2.32	Y	Y	Y		
32-031-0020	1	SLAMS	0.049	0.009	0.092	0	0	99	0.97	+/-0.82	100	- 0.08	100		Y	Y	Y		
32-031-0025	1	SLAMS	0.048	0.011	0.084	0	0	99	1.21	+/-0.98	100	1.04	100		Y	Y	Y		
32-031-1005	1	SLAMS	0.049	0.009	0.094	0	0	99	1.42	+/-1.17	100	0.79	100	3.10	Y	Y	Y		
32-031-2002	1	SLAMS	0.047	0.023	0.070	0	0	100	1.69	+1.85	100	0.81	100		Y	Y	Y		
32-031-2009	1	SLAMS	0.051	0.018	0.084	0	0	99	2.72	+/-2.45	100	- 0.23	100		Y	Y	Y		

Data Evaluation and Concurrence Report for Gaseous Pollutants

Certifying Year 2015
Certifying Agency Code Washoe County District Health Department (1138)
Parameter Sulfur dioxide (42401) (ppb)
PQAO Name Washoe County District Health Department (1138)
QAPP Approval Date 02/12/2013

NPAP Audit Summary:

Number of Passed Audits	NPAP Bias	Criteria Met
		Y

			Routine Data						One Point Quality Check			Annual PE		NPAP			Concur. Flag		
AQS Site ID	POC	Monitor Type	Mean	Min	Max	Exceed. Count	Outlier Count	Perc. Comp.	Precision	Bias	Complete	Bias	Complete	Bias	PQAO Level Criteria	QAPP Appr.	Aqs Rec Flag	CA Rec Flag	Epa Concur
32-031-0016	1	SLAMS	0.4	- 0.2	7.2		0	89	7.82	+/-5.81	100	- 2.03	100		Y	Y	Y		

Data Evaluation and Concurrence Report for Particulate Matter

Certifying Year: 2015
Certifying Agency: Washoe County District Health Department (1138)

Parameter: PM10 Total 0-10um STP (81102) CONTINUOUS
PQAO Name: Washoe County District Health Department (1138)
Quality Assurance Project Plan Approval Date: 02/12/2013

Monitors Summaries

			Routine Data (ug/m3)						Flow Rate Verification		Flow Rate Audit			Collocation / Concurrence Flag		
AQS Site ID	POC	Monitor Type	Mean	Min	Max	Exceed. Count	Outlier Count	% Complete	Bias	% Complete	Bias	% Complete	QAPP Appr.	AQS Rec Flag	CA Rec Flag	EPA Concur
32-031-0016	2	SLAMS	18.90	-4.0	237.0		0	99	+/-1.19	100	+1.02	100	Y	Y		
32-031-0020	2	SLAMS	17.46	-4.0	720.0		0	99	+/-1.28	100	+0.25	100	Y	Y		
32-031-0025	2	SLAMS	15.02	-5.0	640.0		0	99	+/-0.94	100	+0.46	100	Y	Y		
32-031-0030	2	SLAMS	22.41	-2.0	317.0		0	99	+0.88	100	+1.24	100	Y	Y		
32-031-1005	4	SLAMS	22.43	-2.0	388.0		0	99	-1.09	100	-0.43	100	Y	Y		

Parameter: PM10 Total 0-10um STP (81102) INTERMITTENT
PQAO Name: Washoe County District Health Department (1138)
Quality Assurance Project Plan Approval Date: 02/12/2013

Collocation Summary

# Sites	# Sites Req	# Sites Collocated	% Collocated	CV Est	CV UB	Criteria Met?
0	0	0	100			Y

Monitors Summaries

			Routine Data (ug/m3)						Flow Rate Audit		Collocation				Concurrence Flag		
AQS Site ID	POC	Monitor Type	Mean	Min	Max	Exceed. Count	Outlier Count	% Complete	Bias	% Complete	CV	% Complete	PQAO Crit. Met	QAPP Appr.	AQS Rec Flag	CA Rec Flag	EPA Concur
32-031-0016	1	SLAMS	19.55	3.0	68.0	0	0	100	-1.11	100			Y	Y	Y		

Data Evaluation and Concurrence Report for Particulate Matter

Certifying Year: 2015
Certifying Agency: Washoe County District Health Department (1138)

Parameter: PM2.5 - Local Conditions (88101)
PQAO Name: Washoe County District Health Department (1138)
Quality Assurance Project Plan Approval Date: 02/12/2013

Collocation Summary

Method	# Sites	# Sites Req	# Sites Collocated	% Collocated	CV Est	CV UB	Criteria Met?
170	2	1	1	100	17.18	18.83	Y

PEP Summary

# Methods	# Audited Methods	# PEP Required	# PEP Submitted	% Complete	Bias	Criteria Met?
1	1	5	5	100	+8.00	Y

Monitors Summaries

				Routine Data (ug/m3)						Flow Rate Audit		Collocation			PEP PQAO		Concurrence Flag		
AQS Site ID	POC	Method	Monitor Type	Mean	Min	Max	Exceed. Count	Outlier Count	% Complete	Bias	% Complete	CV	% Complete	PQAO Crit. Met	Crit. Met	QAPP Appr.	AQS Rec Flag	CA Rec Flag	EPA Concur
32-031-0016	1	142	SLAMS	6.24	.3	21.7		0	100	-1.50	100			Y	Y	Y	Y		
32-031-0016	3	170	SLAMS	7.71	-10.0	96.0		0	99	+0.40	100	18.83	100	Y	Y	Y	Y		
32-031-1005	1	170	SLAMS	7.86	-4.0	89.0		0	99	-0.90	100			Y	Y	Y	Y		

Data Concurrence and Evaluation Report for Lead

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: BAA

QUICKLOOK ALL PARAMETERS

Report Request ID: 1420473

Report Code: AMP450NC

Mar. 3, 2016

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	32	031									

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
ALL			

SELECTED OPTIONS

Option Type	Option Value
MERGE PDF FILES	YES
EVENTS PROCESSING	EXCLUDE REGIONALLY CONCURRED EVENTS
AGENCY ROLE	PQAO

SORT ORDER

Order	Column
1	STATE_CODE
2	COUNTY_CODE
3	SITE_ID
4	PARAMETER_CODE
5	POC
6	DATES
7	EDT_ID

SCR GROUP SELECTIONS

Washoe Co,NV

DATE CRITERIA

Start Date	End Date
2015	2015

APPLICABLE STANDARDS

Standard Description
CO 8-hour 1971
Lead 3-Month 2009
Lead 3-Month PM10 Surrogate 2009
Lead Quarterly 1978
NO2 Annual 1971
Ozone 8-Hour 2008
PM10 24-hour 2006
PM25 24-hour 2013
SO2 1-hour 2010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Mar. 3, 2016

EXCEPTIONAL DATA TYPES

EDT	DESCRIPTION
0	NO EVENTS
1	EVENTS EXCLUDED
2	EVENTS INCLUDED
5	EVENTS WITH CONCURRENCE EXCLUDED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Mar. 3, 2016

Parameter		Unit	POC	PQAO	Year	Meth	# Obs	1st Max Value	2nd Max Value	3rd Max Value	4th Max Value	Arith. Mean	Duration	Cert& Eval	EDT
Site ID: 32-031-0016	City: Reno		County: Washoe						Address: 301 A STATE STREET, RENO, NV 89502						
42101	Carbon monoxide	Parts per million	1	1138	2015	593	7891	1.5	1.5	1.5	1.5	.28	8-HR RUN AVG END HOUR		0
42401	Sulfur dioxide	Parts per billion	1	1138	2015	600	7784	7.2	6.7	5.2	5.2	1.15*	1 HOUR		0
42401	Sulfur dioxide	Parts per billion	2	1138	2015	600	89492	23.0	15.4	8.7	8.7	.43*	5 MINUTE		0
42600	Reactive oxides of nitrogen (NOy)	Parts per billion	1	1138	2015	699	8450	309.3	258.2	256.7	243.4	22.19	1 HOUR		0
42601	Nitric oxide (NO)	Parts per billion	1	1138	2015	099	8546	270.1	268.3	249.3	228.3	8.97	1 HOUR		0
42601	Nitric oxide (NO)	Parts per billion	2	1138	2015	699	8452	252.0	214.2	201.3	196.3	8.17	1 HOUR		0
42602	Nitrogen dioxide (NO2)	Parts per billion	1	1138	2015	099	8546	67.2	64.2	56.2	54.1	14.11	1 HOUR		0
42603	Oxides of nitrogen (NOx)	Parts per billion	1	1138	2015	099	8546	336.9	324.1	300.5	267.8	23.06	1 HOUR		0
42612	NOy - NO	Parts per billion	1	1138	2015	699	8448	57.2	55.8	55.6	55.4	13.86	1 HOUR		0
44201	Ozone	Parts per million	1	1138	2015	087	8340	.075	.073	.073	.073	.0432	8-HR RUN AVG BEGIN HOUR		0
61101	Wind Speed - Scalar	Knots	1	1138	2015	061	8736	22.7	10.7	10.3	10.1	3.00	1 HOUR		0
61102	Wind Direction - Scalar	Degrees Compass	1	1138	2015	061	8753	322	321	317	317	206.2	1 HOUR		0
61103	Wind Speed - Resultant	Knots	1	1138	2015	061	8736	12.4	9.7	9.3	9.3	2.35	1 HOUR		0
61104	Wind Direction - Resultant	Degrees Compass	1	1138	2015	061	8753	360	360	360	360	201.5	1 HOUR		0
62101	Outdoor Temperature	Degrees Fahrenheit	1	1138	2015	040	8754	98	97	97	97	55.9	1 HOUR		0
62201	Relative Humidity	Percent relative humidity	1	1138	2015	061	8755	99	99	98	98	45.7	1 HOUR		0
68105	Ambient Temperature	Degrees Centigrade	1	1138	2015	142	121	29.0	27.8	27.5	27.2	13.26	24 HOUR		0
68108	Sample Baro Pressure	Millimeters (mercury)	1	1138	2015	142	121	653	652	652	650	644.4	24 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	1	1138	2015	125	119	68	61	56	49	19.5	24 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	365	67	58	58	57	18.4	24-HR BLK AVG		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	8715	237	207	182	151	18.9	1 HOUR		0
85101	PM10 - LC	Micrograms/cubic meter (LC)	1	1138	2015	125	119	63	56	51	45	17.3	24 HOUR		0
85101	PM10 - LC	Micrograms/cubic meter (LC)	2	1138	2015	122	8675	216	188	166	132	16.9	1 HOUR		0
86101	PM10-2.5 - Local Conditions	Micrograms/cubic meter (LC)	1	1138	2015	173	119	41.8	37.0	35.9	27.8	11.41	24 HOUR		0

Note: The * indicates that the mean does not satisfy summary criteria.

Parameter		Unit	POC	PQAO	Year	Meth	# Obs	1st Max Value	2nd Max Value	3rd Max Value	4th Max Value	Arith. Mean	Duration	Cert& Eval	EDT
Site ID: 32-031-0016	City: Reno	County: Washoe						Address: 301 A STATE STREET, RENO, NV 89502							
86101	PM10-2.5 - Local Conditions	Micrograms/cubic meter (LC)	2	1138	2015	185	8669	201.0	185.0	159.0	121.0	9.01	1 HOUR		0
88101	PM2.5 - Local Conditions	Micrograms/cubic meter (LC)	1	1138	2015	142	121	21.7	21.3	19.3	17.2	6.24	24 HOUR		0
88101	PM2.5 - Local Conditions	Micrograms/cubic meter (LC)	3	1138	2015	170	8709	96.0	94.0	92.0	72.0	7.71	1 HOUR		0
88101	PM2.5 - Local Conditions	Micrograms/cubic meter (LC)	3	1138	2015	170	365	38.8	37.7	30.3	22.9	7.65	24-HR BLK AVG		0
Site ID: 32-031-0020	City: Reno	County: Washoe						Address: 4110 DE LUCCI LANE, RENO NV 89502							
44201	Ozone	Parts per million	1	1138	2015	087	8703	.073	.072	.071	.070	.0432	8-HR RUN AVG BEGIN HOUR		0
61101	Wind Speed - Scalar	Knots	1	1138	2015	061	8734	29.5	28.4	27.2	26.8	3.33	1 HOUR		0
61102	Wind Direction - Scalar	Degrees Compass	1	1138	2015	061	8734	312	311	310	310	179.3	1 HOUR		0
62101	Outdoor Temperature	Degrees Fahrenheit	1	1138	2015	040	8759	96	96	96	96	54.2	1 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	365	100	68	58	58	17.0	24-HR BLK AVG		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	8720	720	555	453	421	17.5	1 HOUR		0
Site ID: 32-031-0025	City: Reno	County: Washoe						Address: 684A STATE ROUTE 341, RENO NV 89521							
42101	Carbon monoxide	Parts per million	1	1138	2015	093	8639	.5	.5	.5	.5	.30	8-HR RUN AVG END HOUR		0
44201	Ozone	Parts per million	1	1138	2015	087	8738	.073	.070	.070	.069	.0438	8-HR RUN AVG BEGIN HOUR		0
61101	Wind Speed - Scalar	Knots	1	1138	2015	061	8759	37.7	34.2	34.0	32.4	4.66	1 HOUR		0
61102	Wind Direction - Scalar	Degrees Compass	1	1138	2015	061	8759	321	320	320	319	170.3	1 HOUR		0
62101	Outdoor Temperature	Degrees Fahrenheit	1	1138	2015	040	8759	97	97	97	97	54.7	1 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	365	155	68	64	55	14.8	24-HR BLK AVG		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	8715	640	596	567	413	15.2	1 HOUR		0

Note: The * indicates that the mean does not satisfy summary criteria.

Parameter		Unit	POC	PQAO	Year	Meth	# Obs	1st Max Value	2nd Max Value	3rd Max Value	4th Max Value	Arith. Mean	Duration	Cert& Eval	EDT
Site ID: 32-031-0030	City: Reno	County: Washoe						Address: 891 E. PLUMB LN., RENO, NV 89502							
61101	Wind Speed - Scalar	Knots	1	1138	2015	061	8756	24.1	21.9	21.0	20.6	3.63	1 HOUR		0
61102	Wind Direction - Scalar	Degrees Compass	1	1138	2015	061	8756	325	322	321	321	206.9	1 HOUR		0
62101	Outdoor Temperature	Degrees Fahrenheit	1	1138	2015	040	8756	99	97	97	97	55.6	1 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	363	70	68	64	61	21.9	24-HR BLK AVG		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	2	1138	2015	122	8690	317	222	218	210	22.4	1 HOUR		0
Site ID: 32-031-1005	City: Sparks	County: Washoe						Address: 750 4TH ST, SPARKS, NV 89431							
42101	Carbon monoxide	Parts per million	1	1138	2015	093	8693	2.1	2.1	2.1	2.0	.47	8-HR RUN AVG END HOUR		0
44201	Ozone	Parts per million	1	1138	2015	087	8714	.072	.071	.071	.070	.0423	8-HR RUN AVG BEGIN HOUR		0
61101	Wind Speed - Scalar	Knots	1	1138	2015	061	8745	23.5	23.1	21.6	18.4	2.93	1 HOUR		0
61102	Wind Direction - Scalar	Degrees Compass	1	1138	2015	061	8744	315	314	314	313	183.0	1 HOUR		0
62101	Outdoor Temperature	Degrees Fahrenheit	1	1138	2015	040	8746	98	97	97	97	54.7	1 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	4	1138	2015	122	8695	388	260	246	238	22.4	1 HOUR		0
81102	PM10 Total 0-10um STP	Micrograms/cubic meter (25 C)	4	1138	2015	122	364	66	56	54	54	21.9	24-HR BLK AVG		0
85101	PM10 - LC	Micrograms/cubic meter (LC)	3	1138	2015	122	8686	336	221	216	208	19.9	1 HOUR		0
86101	PM10-2.5 - Local Conditions	Micrograms/cubic meter (LC)	1	1138	2015	185	8681	327.0	215.0	209.0	201.0	11.96	1 HOUR		0
88101	PM2.5 - Local Conditions	Micrograms/cubic meter (LC)	1	1138	2015	170	8704	89.0	84.0	79.0	69.0	7.86	1 HOUR		0
88101	PM2.5 - Local Conditions	Micrograms/cubic meter (LC)	1	1138	2015	170	364	39.2	32.3	28.6	28.5	7.79	24-HR BLK AVG		0
Site ID: 32-031-2002	City: Incline Village-Crystal Bay	County: Washoe						Address: 855 ALDER DRIVE, INCLINE VILLAGE, NV 89451							
44201	Ozone	Parts per million	1	1138	2015	087	8730	.064	.063	.062	.062	.0433	8-HR RUN AVG BEGIN HOUR		0

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM

QUICKLOOK ALL PARAMETERS

Mar. 3, 2016

Parameter		Unit	POC	PQAO	Year	Meth	# Obs	1st Max Value	2nd Max Value	3rd Max Value	4th Max Value	Arith. Mean	Duration	Cert& Eval	EDT
Site ID: 32-031-2009	City: Lemmon Valley-Golden Valley	County: Washoe									Address: 325 PATRICIAN DR, LEMMON VALLEY, NV 89506				
42101	Carbon monoxide	Parts per million	1	1138	2015	093	8736	1.3	1.3	1.2	1.2	.34	8-HR RUN AVG END HOUR	0	
44201	Ozone	Parts per million	1	1138	2015	087	8736	.075	.075	.073	.072	.0468	8-HR RUN AVG BEGIN HOUR	0	

Note: The * indicates that the mean does not satisfy summary criteria.

QUICKLOOK ALL PARAMETERS

Mar. 3, 2016

METHODS USED IN THIS REPORT

PARAMETER	METHOD CODE	COLLECTION METHOD	ANALYSIS METHOD
42101	093	INSTRUMENTAL	GAS FILTER CORRELATION CO ANALYZER
42101	593	INSTRUMENTAL	Gas Filter Correlation Teledyne API 300 EU
42401	600	Instrumental	Ultraviolet Fluorescence API 100 EU
42600	699	Instrumental	Chemiluminescence Teledyne API 200 EU/501
42601	099	INSTRUMENTAL	GAS PHASE CHEMILUMINESCENCE
42601	699	Instrumental	Chemiluminescence Teledyne API 200 EU/501
42602	099	INSTRUMENTAL	GAS PHASE CHEMILUMINESCENCE
42603	099	INSTRUMENTAL	GAS PHASE CHEMILUMINESCENCE
42612	699	Instrumental	Chemiluminescence Teledyne API 200 EU/501
44201	087	INSTRUMENTAL	ULTRA VIOLET ABSORPTION
61101	061	Instrumental	Met One Sonic Anemometer Model 50.5
61102	061	Instrumental	Met One Sonic Anemometer Model 50.5
61103	061	Instrumental	Met One Sonic Anemometer Model 50.5
61104	061	Instrumental	Met One Sonic Anemometer Model 50.5
62101	040	INSTRUMENTAL	ELECTRONIC OR MACHINE AVG.
62201	061	Instrumental	Met One 083D
68105	142	BGI Models PQ200-VSCC or PQ200A-VSCC	Electronic
68108	142	BGI Models PQ200-VSCC or PQ200A-VSCC	Barometric Sensor
81102	122	INSTRUMENT MET ONE 4 MODELS	BETA ATTENUATION
81102	125	BGI Inc. Model PQ200 PM10	Gravimetric
85101	122	INSTRUMENT MET ONE 4 MODELS	BETA ATTENUATION
85101	125	BGI Inc. Model PQ200 PM10	Gravimetric
86101	173	BGI Inc Model PQ200 PM10-2.5 Sampler Pair	Paired Gravimetric Difference
86101	185	Met One BAM-1020 System	Paired Beta Difference
88101	142	BGI Models PQ200-VSCC or PQ200A-VSCC	Gravimetric
88101	170	Met One BAM-1020 Mass Monitor w/VSCC	Beta Attenuation

Note: The * indicates that the mean does not satisfy summary criteria.

QUICKLOOK ALL PARAMETERS

Mar. 3, 2016

PQAOS USED IN THIS REPORT

PQAO	AGENCY DESCRIPTION
1138	Washoe County District Health Department

Note: The * indicates that the mean does not satisfy summary criteria.

CERTIFICATION EVALUATION AND CONCURRENCE FLAG MEANINGS

FLAG	MEANING
M	The monitoring organization has revised data from this monitor since the most recent certification letter received from the state.
N	The certifying agency has submitted the certification letter and required summary reports, but the certifying agency and/or EPA has determined that issues regarding the quality of the ambient concentration data cannot be resolved due to data completeness, the lack of performed quality assurance checks or the results of uncertainty statistics shown in the AMP255 report or the certification and quality assurance report.
S	The certifying agency has submitted the certification letter and required summary reports. A value of "S" conveys no Regional assessment regarding data quality per se. This flag will remain until the Region provides an "N" or "Y" concurrence flag.
U	Uncertified. The certifying agency did not submit a required certification letter and summary reports for this monitor even though the due date has passed, or the state's certification letter specifically did not apply the certification to this monitor.
X	Certification is not required by 40 CFR 58.15 and no conditions apply to be the basis for assigning another flag value
Y	The certifying agency has submitted a certification letter, and EPA has no unresolved reservations about data quality (after reviewing the letter, the attached summary reports, the amount of quality assurance data submitted to AQS, the quality statistics, and the highest reported concentrations).

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: BAA

DATA COMPLETENESS REPORT

Report Request ID: 1436101 Report Code: AMP430 Apr. 19, 2016

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	32	031	0016	42401	1						
	32	031	0016	42401	2						

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA			

SELECTED OPTIONS

Option Type	Option Value
OZONE EVALUATION	SEASONAL-HOURLY
MERGE PDF FILES	YES
AGENCY ROLE	REPORTING

SORT ORDER

Order	Column
1	EPA_REGION
2	STATE_CODE
3	MONITOR_TYPE
4	COUNTY_CODE
5	SITE_ID
6	PARAMETER_CODE
7	POC

DATE CRITERIA

Start Date	End Date
2015 01	2015 12

APPLICABLE STANDARDS

Standard Description
CO 1-hour 1971
Lead 3-Month 2009
Lead 3-Month PM10 Surrogate 2009
NO2 Annual 1971
Ozone 1-hour Daily 2005
PM10 24-hour 2006
PM25 Annual 2013
SO2 1-hour 2010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
DATA COMPLETENESS REPORT

Apr. 19, 2016

MONITORS NOT REPORTING

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
DATA COMPLETENESS REPORT

Apr. 19, 2016

MONITORS REPORTING

DATE RANGE: JAN. 01, 2015 THRU DEC. 31, 2015
REGION: (09) SAN FRANCISCO
STATE: Nevada

REP ORG: Washoe County District Health Department
MONITOR TYPE: SLAMS

SITE ID / CITY / ADDRESS	PARAMETER	POC	DURATION / METHOD	OBSERVATIONS NUMBER / PERCENT JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
32-031-0016	42401 Sulfur dioxide	1	1	732	643	735	707	734	703	729	704	524	723	343	507	7784
Reno			600	98%	96%	99%	98%	99%	98%	98%	95%	73%	97%	48%	68%	89%
301 A STATE STREET, RENO, NV 89502																
32-031-0016	42401 Sulfur dioxide	2	H	8414	7405	8446	8160	8450	8099	8391	8043	6059	8313	3894	5818	89492
Reno			600	94%	92%	95%	94%	95%	94%	94%	90%	70%	93%	45%	65%	85%
301 A STATE STREET, RENO, NV 89502																

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
DATA COMPLETENESS REPORT

Apr. 19, 2016

REPORT SUMMARY

DATE RANGE: JAN. 01, 2015 THRU DEC. 31, 2015
REGION: (09) SAN FRANCISCO
STATE: Nevada
REP ORG: Washoe County District Health Department
MONITOR TYPE: SLAMS

PARAMETER	ACTIVE MONITORS	# NOT REPORTING	# MONITORS > 75%	MONITORS AVG COMPLETENESS
42401 Sulfur dioxide	2	0	2	87.0%
MT SUMMARY: SLAMS	2	0	2	87.0%
RO SUMMARY: Washoe County District Health Department	2	0	2	87.0%
STATE SUMMARY: Nevada	2	0	2	87.0%
REGION SUMMARY: (09) SAN FRANCISCO	2	0	2	87.0%
REPORT SUMMARY:	2	0	2	87.0%

APPENDIX C

EXCEPTIONAL EVENT INITIAL NOTIFICATION

Initial Notification of Potential Exceptional Event Information Summary

Submitting Agency: Washoe County Health District, Air Quality Management Division
Agency Contact: Daniel Inouye, Branch Chief
Date Submitted: June 3, 2016
Applicable NAAQS: 2006 24-Hour $PM_{2.5}$ and 2015 8-Hour Ozone
Affected Regulatory Decision[1]: Attainment of the 2015 8-Hour Ozone NAAQS
Area Name/Designation Status: Washoe County Attainment Area
Design Value Period: 2013-2015

Narrative: On August 18, 2015 smoke from numerous wildfires in the Northwest portion of California impacted the Reno/Sparks area. The smoke impacts contributed to several exceedances of the National Ambient Air Quality Standards (NAAQS) for Particulate Matter less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$) and Ozone (O_3) at several sites in the Washoe County Health District, Air Quality Management Division's (AQMD) monitoring network. The AQMD requests that the Regional Administrator for Region IX of the U.S. Environmental Protection Agency (EPA) accepts this Initial Notification so an Exceptional Events Demonstration document can be prepared to petition for the exclusion of the air quality monitoring data effected from these fires from the normal planning and regulatory requirements under the Clean Air Act (CAA) in accordance with the Exceptional Events Rule (EER).

Table A (1):

Information specific to each flagged site day that may be submitted to EPA in support of the affected regulatory decision listed above.

Date(s) of Event	NAAQS Standard	Type of Event (high wind, volcano, wildfires/prescribed burns, other)	AQS Flag	Site AQS ID	POC	Site Name	Monitor Concentration
08/21/2015	$PM_{2.5}$	Northwest Wildfires	RT	32-031-0016 32-031-1005	3 1	Reno3 Sparks	38.8 µg/m^3 39.2 µg/m^3

*Data was flagged in AQS on 04/14/2016 and 05/03/2016 as Wildfire Event from 08/18/2015 (00:00) to 08/21/2015 (23:59)

Table A (2):

Information specific to each flagged site day that may be submitted to EPA in support of the affected regulatory decision listed above.

Date(s) of Event	NAAQS Standard	Type of Event (high wind, volcano, wildfires/prescribed burns, other[2])	AQS Flag	Site AQS ID	POC	Site Name	Monitor Concentration
08/18/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.075 ppm
				32-031-1005	1	Sparks	0.070 ppm
				32-031-0025	1	Toll	0.068 ppm
				32-031-0020	1	South Reno	0.073 ppm
				32-031-2009	1	Lemmon Valley	0.069 ppm
				32-031-2002	1	Incline	0.063 ppm
08/19/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.073 ppm
				32-031-1005	1	Sparks	0.071 ppm
				32-031-0025	1	Toll	0.069 ppm
				32-031-0020	1	South Reno	0.071 ppm
				32-031-2009	1	Lemmon Valley	0.067 ppm
				32-031-2002	1	Incline	0.061 ppm
08/20/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.070 ppm
				32-031-1005	1	Sparks	0.069 ppm
				32-031-0025	1	Toll	0.070 ppm
				32-031-0020	1	South Reno	0.070 ppm
				32-031-2009	1	Lemmon Valley	0.068 ppm
				32-031-2002	1	Incline	0.061 ppm
08/21/2015	Ozone	Northwest Wildfires	RT	32-031-0016	1	Reno3	0.073 ppm
				32-031-1005	1	Sparks	0.072 ppm
				32-031-0025	1	Toll	0.073 ppm
				32-031-0020	1	South Reno	0.072 ppm
				32-031-2009	1	Lemmon Valley	0.067 ppm
				32-031-2002	1	Incline	0.064 ppm

Table B (1):
Violating Sites Information for **24-Hour $PM_{2.5}$** (listing of all violating sites[3] in the planning area, regardless of operating agency, and regardless of whether or not they are affected by EEs)

Site (AQS ID)	Design Value (without EPA concurrence on all events listed in Table A (1) above)	Design Value (with EPA concurrence on all events listed in Table A (1) above)
Reno3 (32-031-0016)	29	29
Sparks (32-031-1005)	32	32

Table B (2):
Violating Sites Information for **8-Hour Ozone** (listing of all violating sites[3] in the planning area, regardless of operating agency, and regardless of whether or not they are affected by EEs)

Site (AQS ID)	Design Value (without EPA concurrence on all events listed in Table A (2) above)	Design Value (with EPA concurrence on all events listed in Table A (2) above)
Reno3 (32-031-0016)	71	70
Sparks (32-031-1005)	68	68
Toll (32-031-0025)	68	68
South Reno (32-031-0020)	68	68
Lemmon Valley (32-031-2009)	68	68
Incline (32-031-2002)	62	62

Table C (1):
Summary of Maximum Design Value (DV) Site Information for **24-Hour $PM_{2.5}$** (Effect of EPA Concurrence on Maximum Design Value Site Determination)

Maximum DV site (AQS ID) **without EPA concurrence** on any of the events listed in Table A (1) above	Design Value 32	Design Value Site Sparks (32-031-1005)	Comment
Maximum DV site (AQS ID) **with EPA concurrence** on all events listed in Table A (1) above	Design Value 32	Design Value Site Sparks (32-031-1005)	Comment

Table C (2):
Summary of Maximum Design Value (DV) Site Information for **8-Hour Ozone** (Effect of EPA Concurrence on Maximum Design Value Site Determination)

Maximum DV site (AQS ID) **without EPA concurrence** on any of the events listed in Table A (2) above	Design Value 71	Design Value Site Reno3 (32-031-0016)	Comment
Maximum DV site (AQS ID) **with EPA concurrence** on all events listed in Table A (2) above	Design Value 70	Design Value Site Reno3 (32-031-0016)	Comment

Table D:
Site(s) with Invalid $PM_{2.5}$ or Ozone Design Values

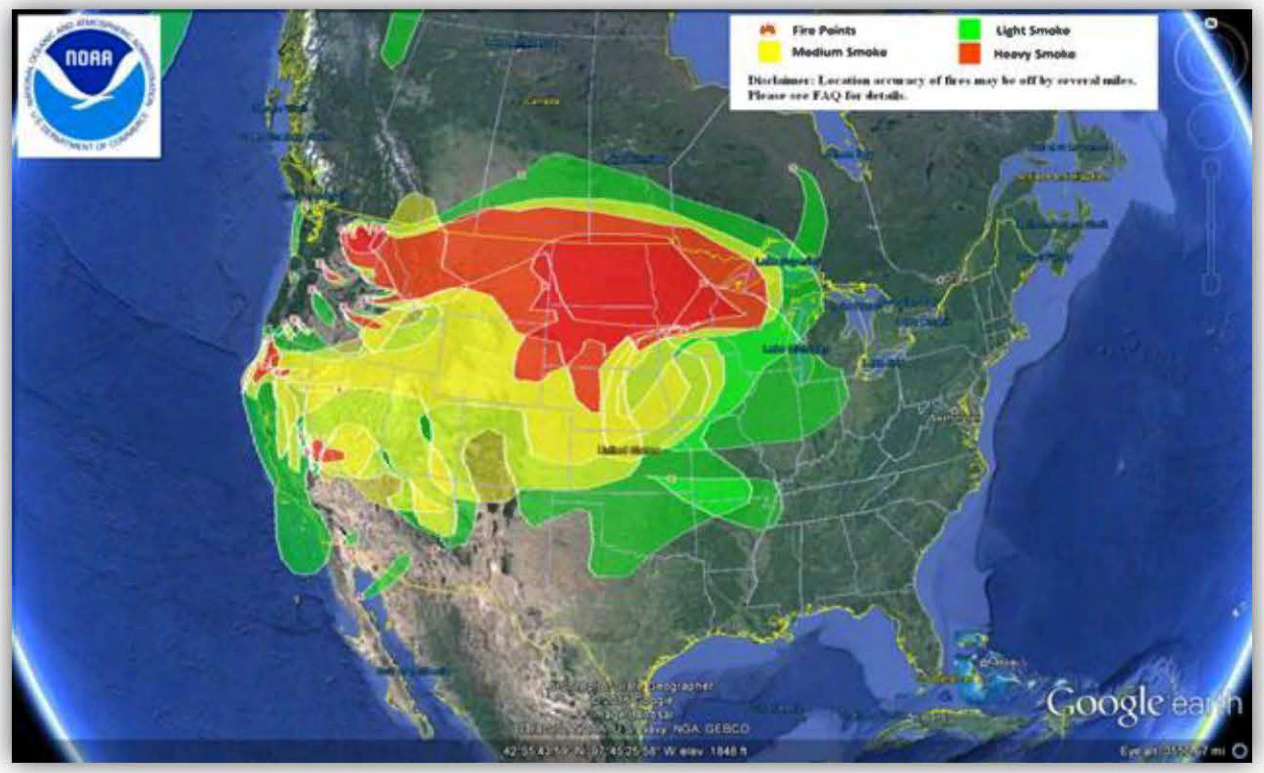
Site Name (AQS ID)	Parameter(s)	Reason for Invalid Design Value(s)	Comments
none	n/a	n/a	n/a

[1] designation, classification, attainment determination, attainment date extension, or finding of SIP inadequacy leading to SIP call
[2] Provide additional information for types of event described as "other"
[3] Note if violating monitor is a near-road monitor

Supporting Images:

Aqua Satellite Image of the Northwest Fires from 8/21/2016

HMS Smoke layers for 8/21/2016



APPENDIX D

PUBLIC INSPECTION PLAN

A public notice was published in the Reno Gazette-Journal on October 1, 14 and 27, 2016 notifying the public that the Draft 2015 California Wildfire Exceptional Events Demonstration was available for public comment from October 1 through October 31, 2016. A hard copy was available at the AQMD office and on the website (OurCleanAir.com). The AQMD did not receive any public comments during the public comment period.

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STATE OF NEVADA
COUNTY OF WASHOE

Being first duly sworn, deposes and says: That as the legal clerk of the Reno Gazette-Journal, a daily newspaper of general circulation published in Reno, Washoe County, State of Nevada, that the notice referenced below has published in each regular and entire issue of said newspaper between the date: 10/01/2016 - 10/27/2016, for exact publication dates please see last line of Proof of Publication below.

Subscribed and sworn to before me

Signed: Kim Bird

AMERICA ACEVEDO
NOTARY PUBLIC - STATE OF NEVADA
My Commission Expires: 06-26-2018
Certificate No: 14-14488-2

Notice of Proposed Action by the Washoe County Health District Air Quality Management Division PUBLIC NOTICE EPA allows data that have been directly influenced

Publish Dates:

10/01/16, 10/14/16, 10/27/16

Notice of Proposed Action by the Washoe County Health District
Air Quality Management Division
PUBLIC NOTICE

EPA allows data that have been directly influenced by exceptional and/or natural events (i.e., wildfires) to be excluded in the determination of exceedances and National Ambient Air Quality Standards violations for State Implementation Plan purposes. Pursuant to 40 CFR 50.14(c)(3)(i), the Washoe County Health District, Air Quality Management Division (AQMD) is soliciting comments on its final demonstrations of the 2015 California Wildfires that caused elevated concentrations of O3 and PM2.5 throughout Washoe County, Nevada and AQMD's decision to flag this episode based on these analyses. A copy of the exceptional events package is available for review beginning October 1, 2016 at the AQMD website (OurCleanAir.com) and office at 1001 E. 9th Street, Suite B171, Reno, NV 89512. Interested parties can submit written comments throughout the comment period which will end on October 31, 2016. Any comments received will be considered and forwarded to EPA with the final exceptional events package. Comments should be addressed, faxed, or emailed to: Daniel Inouye, Monitoring and Planning Branch Chief, Washoe County Health District, Air Quality Management Division, P.O. Box 11130, Reno,NV 89520;FAX:(775)784-7225,EMAIL:dinouye@washoecounty.us.

No 1608934 October 1, 14, 27, 2016

APPENDIX E

MEDIA COVERAGE

KOLO 8 News Now
August 21, 2015

Washoe County air quality is unhealthy this morning because of smoke from nearby fires: http://bit.ly/1HZPNFW

KRNV News 4
August 21, 2015

#BESMOKESMART **NEW INFO**: Washoe schools must cancel or move activities indoors Friday afternoon because "unhealthy" air quality conditions. Officials say there's no word on whether or not any schools have made cancellations. GET the latest in air quality news here at MyNews4.com.

Washoe schools must cancel or move activities indoors due to poor air quality

According to Washoe County School District spokesperson Victoria Campbell, area schools' outdoor activities may be canceled or moved indoors Friday...

WWW.MYNEWS4.COM | BY SINCLAIR BROADCAST GROUP

Meteorologist Tim Studebaker
August 21, 2015 ·

SMOKE & HAZE: Air Quality in Reno-Sparks is in the Unhealthy for Sensitive Groups range this morning with wildfire smoke across the region.

MYNEWS4.COM

KTVN Channel 2 News
August 21, 2015 ·

#AirQualityAlert The Air Quality Management Division sent out an alert Friday morning saying air quality has reached unhealthy levels for sensitive groups in Washoe County.

Smoke and haze from fires burning in California and across the Pacific Northwest continue to drift into the region.

People sensitive to air quality should limit outdoor activity until air quality improves. ... See More

Air Quality Has Reached Unhealthy Levels in Washoe County

Just before 8:00 a.m. Friday the Washoe County Air Quality Management Division sent out an alert saying air quality had reached 'unhealthy' levels.

KTVN.COM | BY CHLOE BEARDSLEY

KTVN Mike Alger
August 21, 2015 ·

A slow improvement to the smoke...
http://mikealger.net/.../dense-smoke-to-slowly-thin-and-the-.../

Dense Smoke To Slowly Thin...And The Final Word on Urban Heat Island.

The dense smoke coming into Nevada from the northern California Fires will continue to plague...

MIKEALGER.NET

KTVN Channel 2 News
August 21, 2015 ·

This is what it looks like outside right now. Not much to see beyond the Grand Sierra Resort. Hazy skies will likely continue over the next few days. It's best to stay indoors if you are sensitive to the unhealthy air. The Washoe County School District says schools can decide to either cancel all outdoor practices, or move activities indoors. School recesses will be assessed on a site-by-site case.

Meteorologist Tim Studebaker added 2 new photos.

August 21, 2015 ·

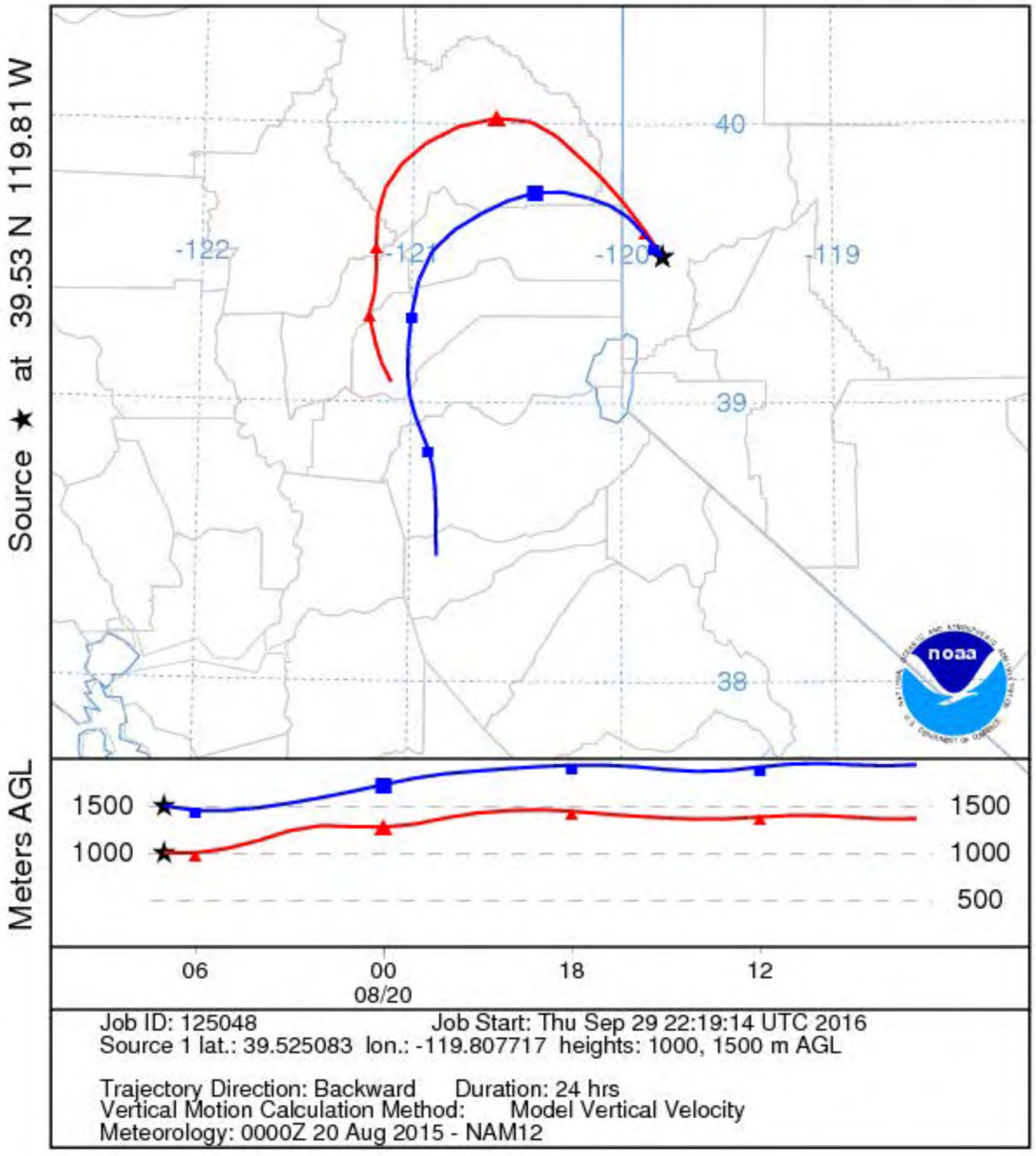
Like Page

Is it me or has the smoke cleared quite a bit (at least in Reno)? Here are before and after pictures from noon today and 6pm. What are you seeing where you live?

APPENDIX F

HYSPLIT BACKWARD TRAJECTORIES

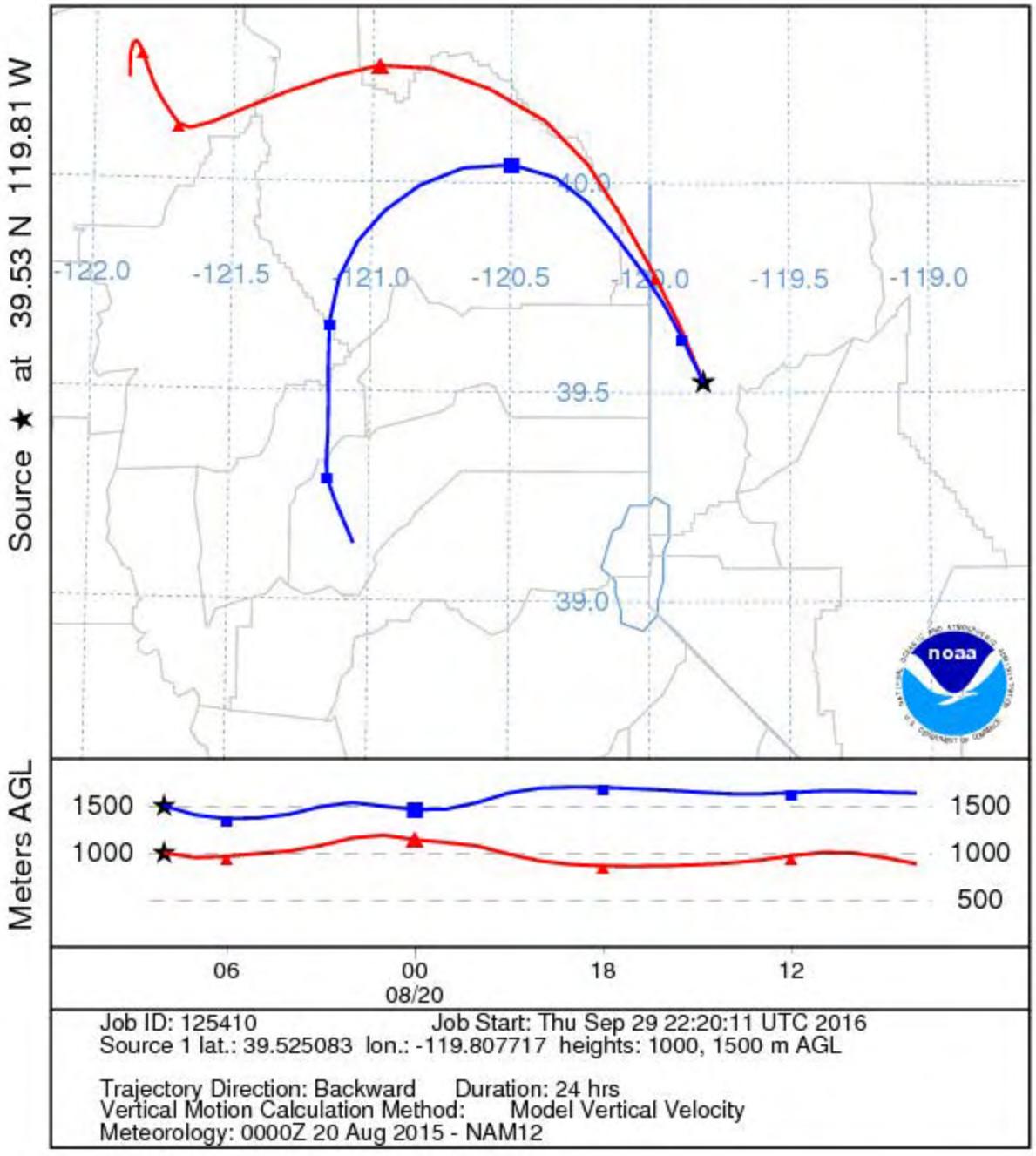
NOAA HYSPLIT MODEL
Backward trajectories ending at 0700 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 125048 Job Start: Thu Sep 29 22:19:14 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

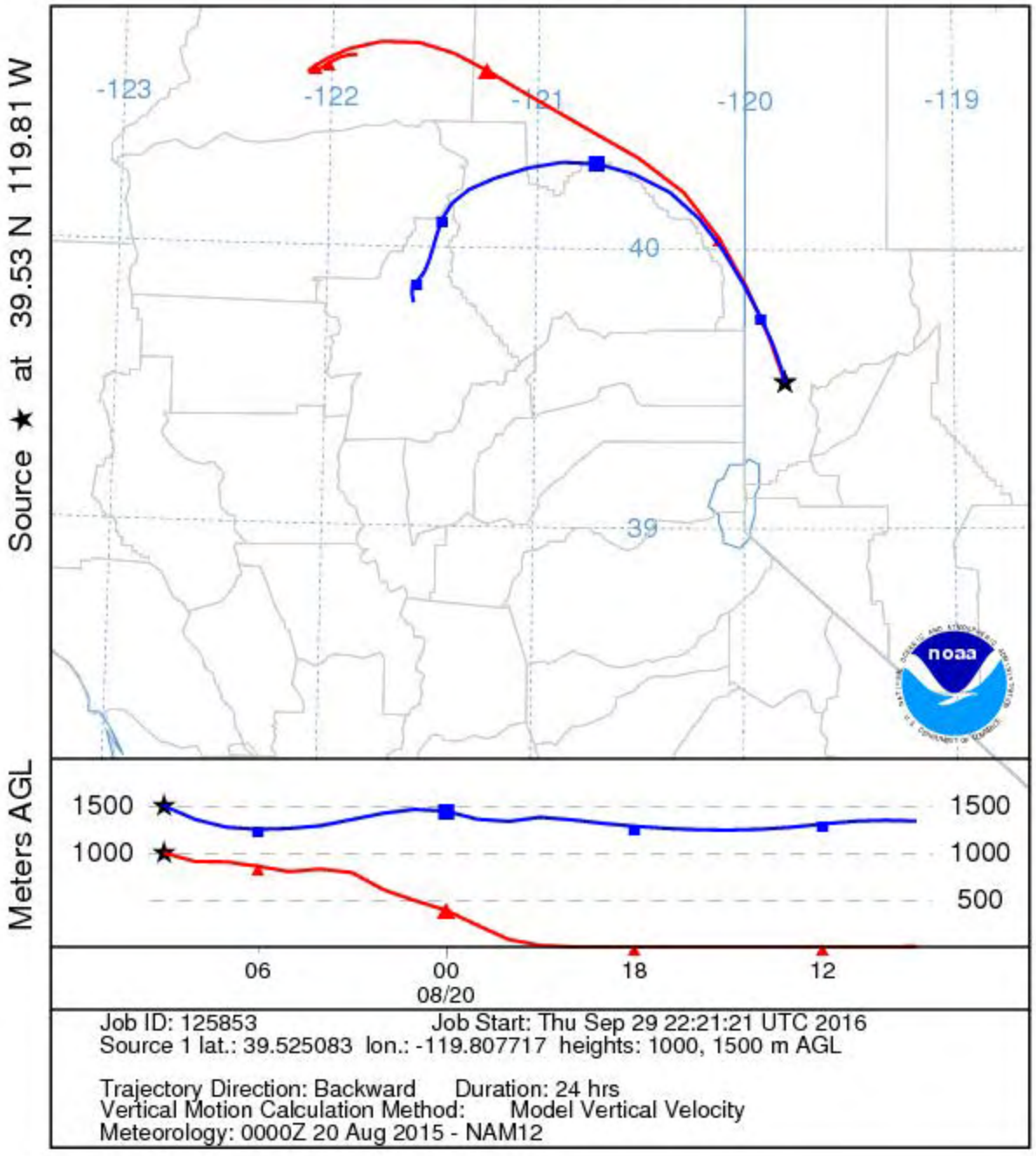
NOAA HYSPLIT MODEL
Backward trajectories ending at 0800 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 125410 Job Start: Thu Sep 29 22:20:11 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

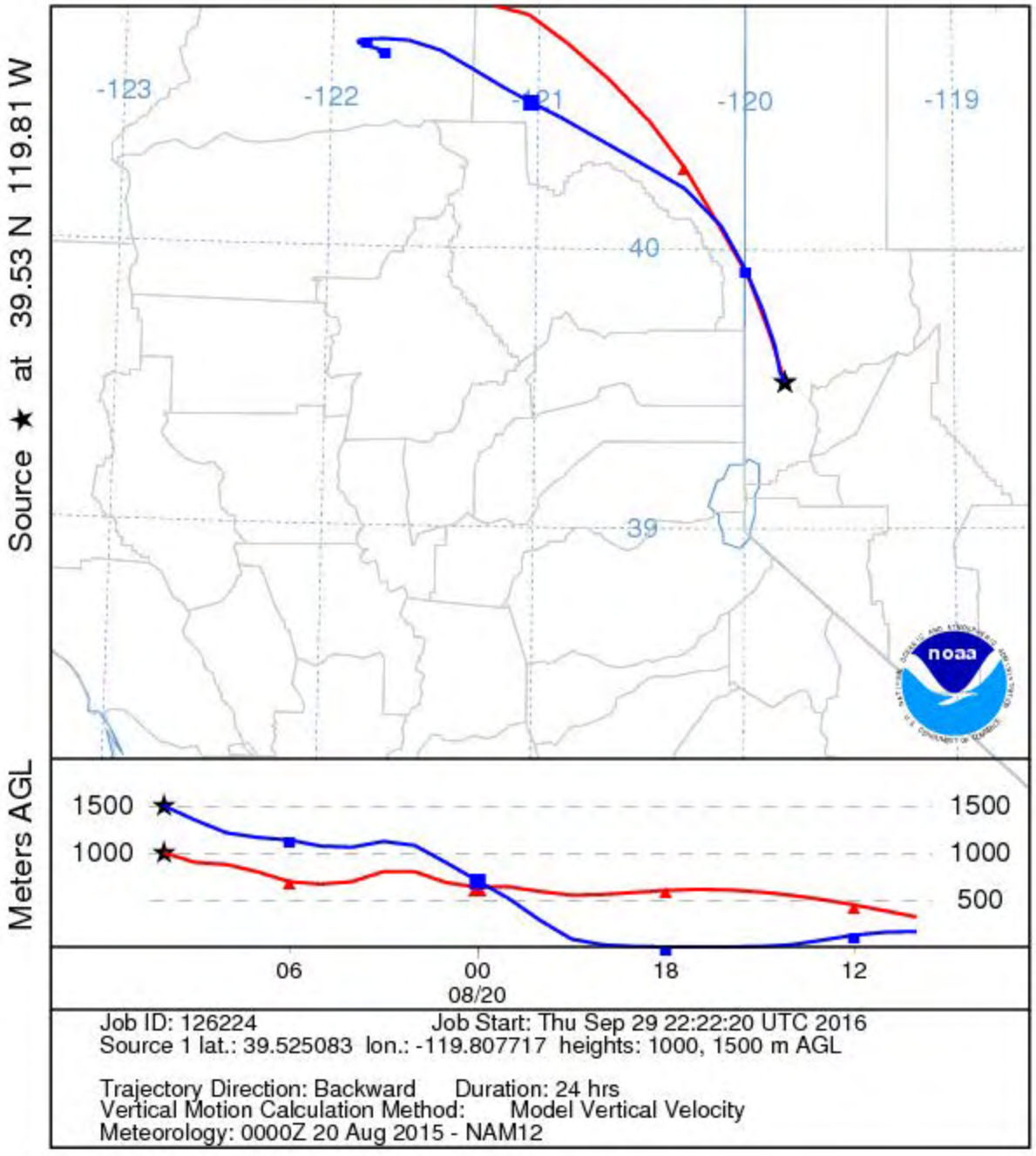
NOAA HYSPLIT MODEL
Backward trajectories ending at 0900 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 125853 Job Start: Thu Sep 29 22:21:21 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

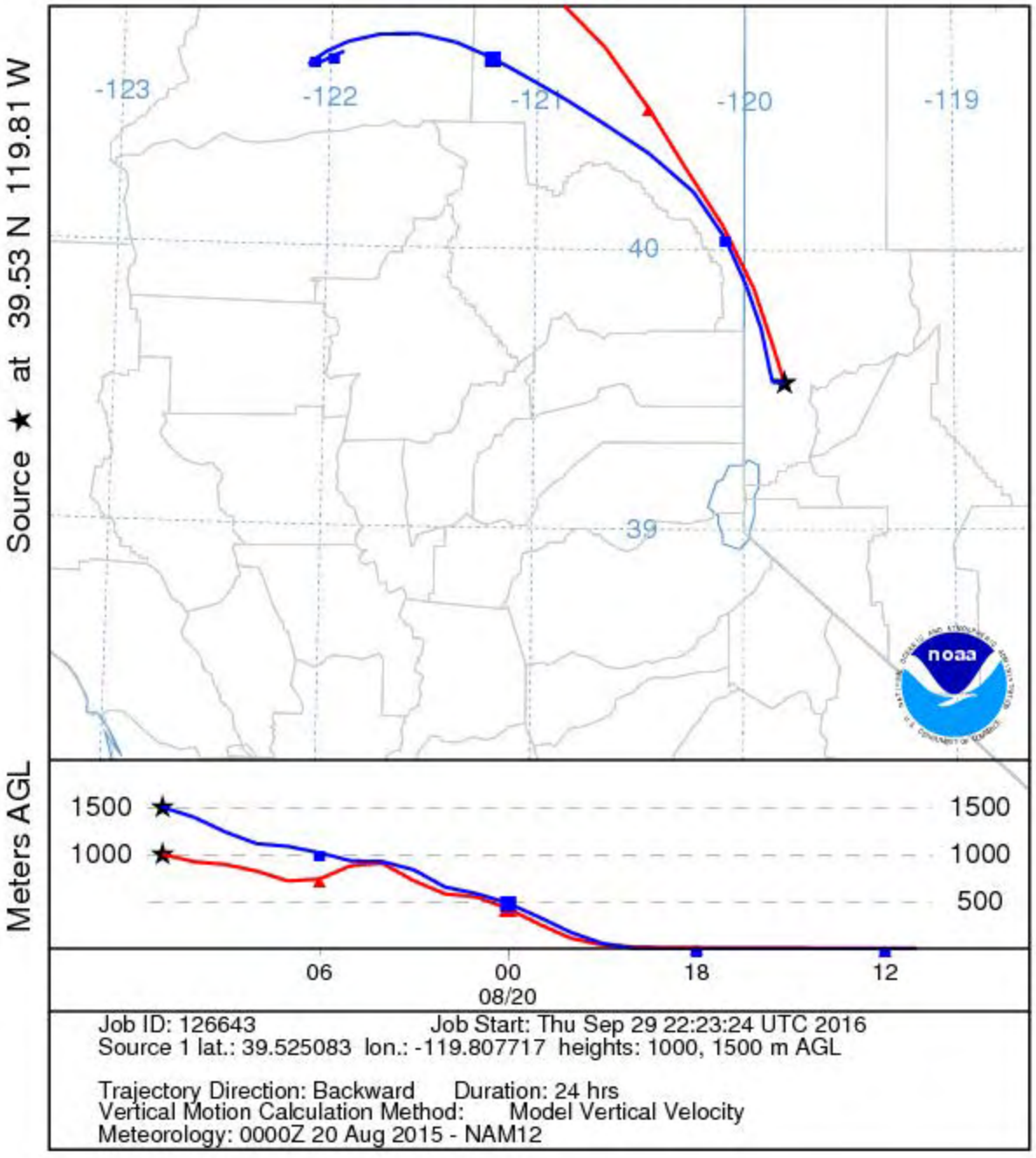
NOAA HYSPLIT MODEL
Backward trajectories ending at 1000 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 126224 Job Start: Thu Sep 29 22:22:20 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

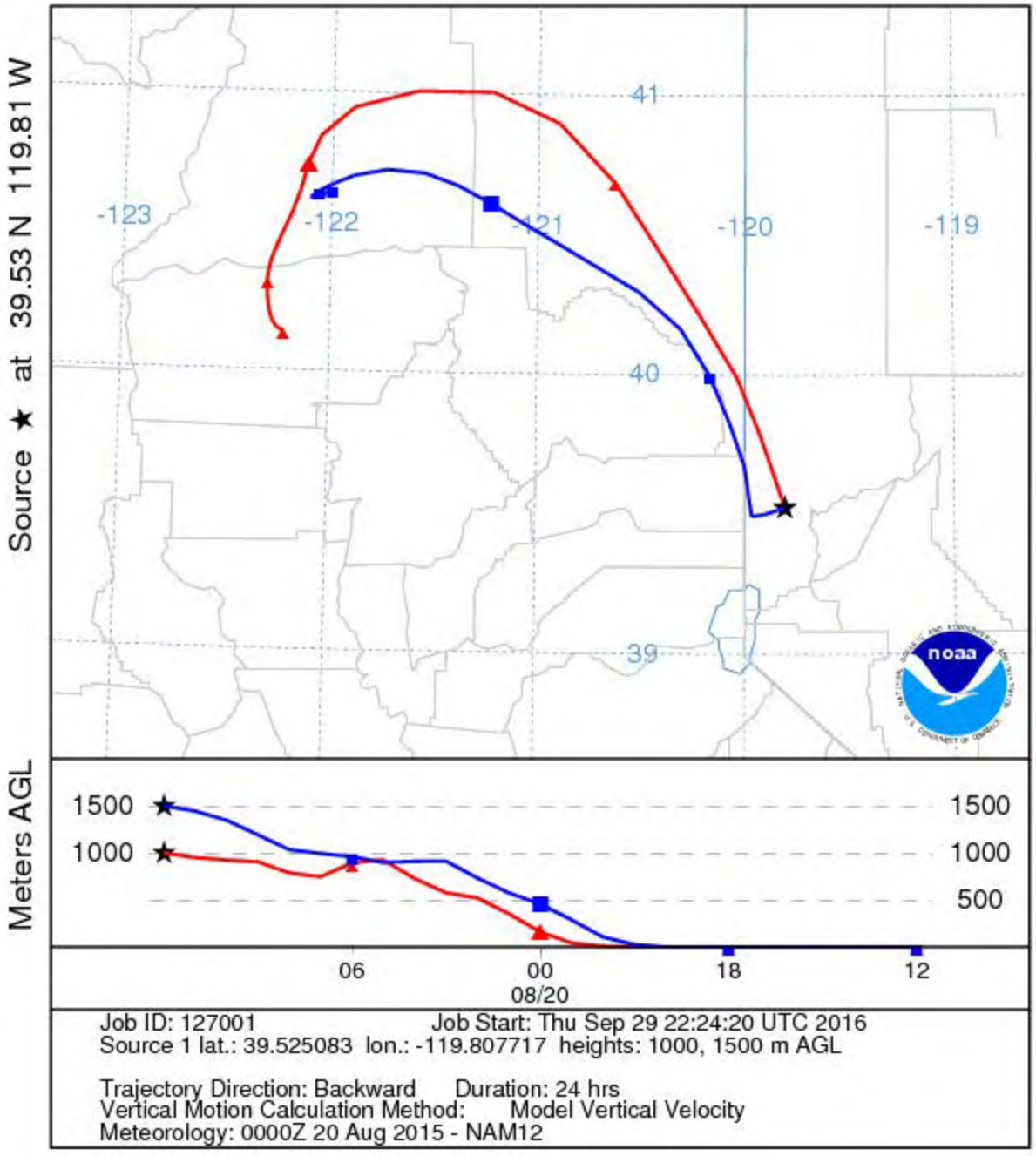
NOAA HYSPLIT MODEL
Backward trajectories ending at 1100 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 126643 Job Start: Thu Sep 29 22:23:24 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

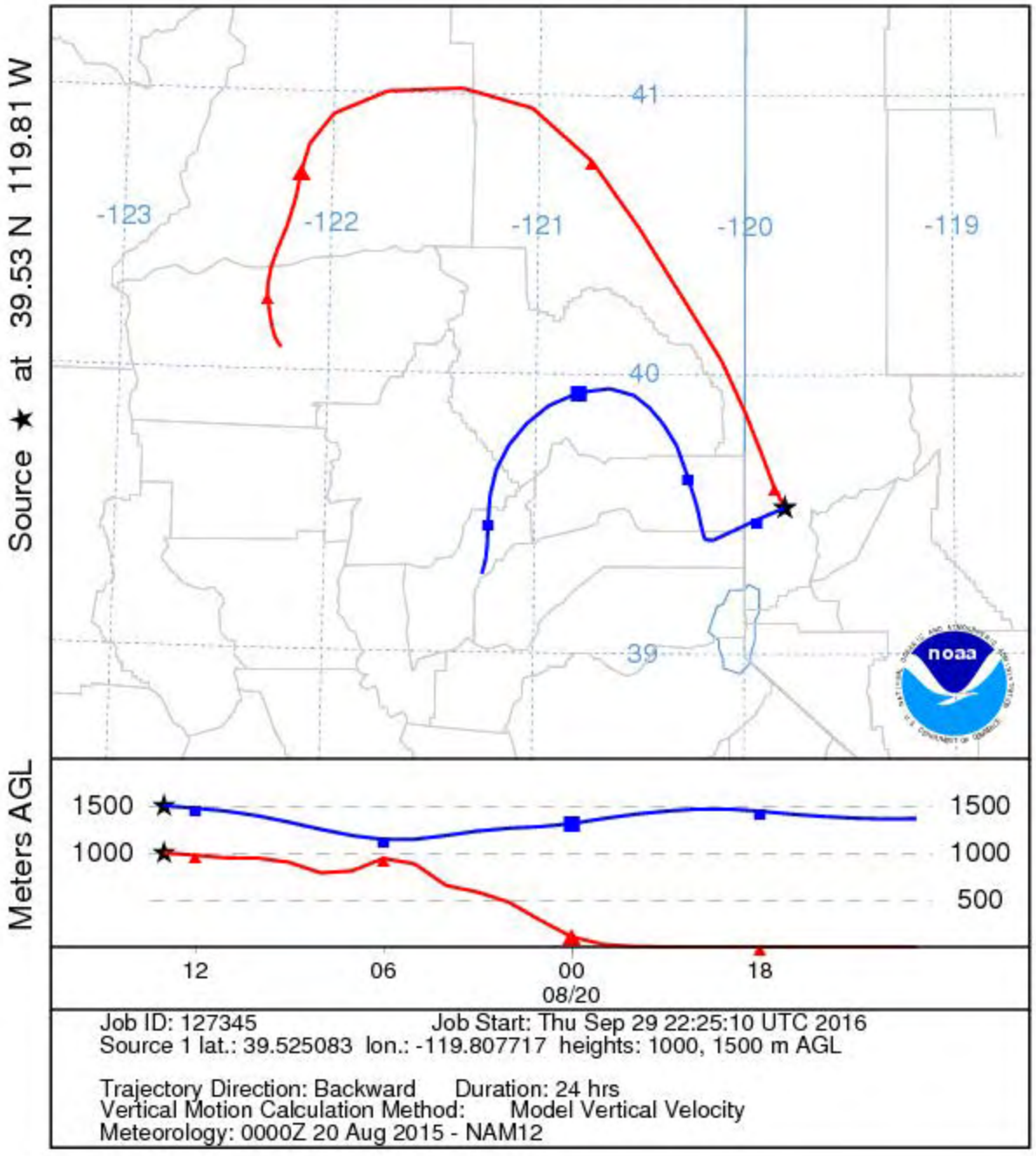
NOAA HYSPLIT MODEL
Backward trajectories ending at 1200 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 127001 Job Start: Thu Sep 29 22:24:20 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

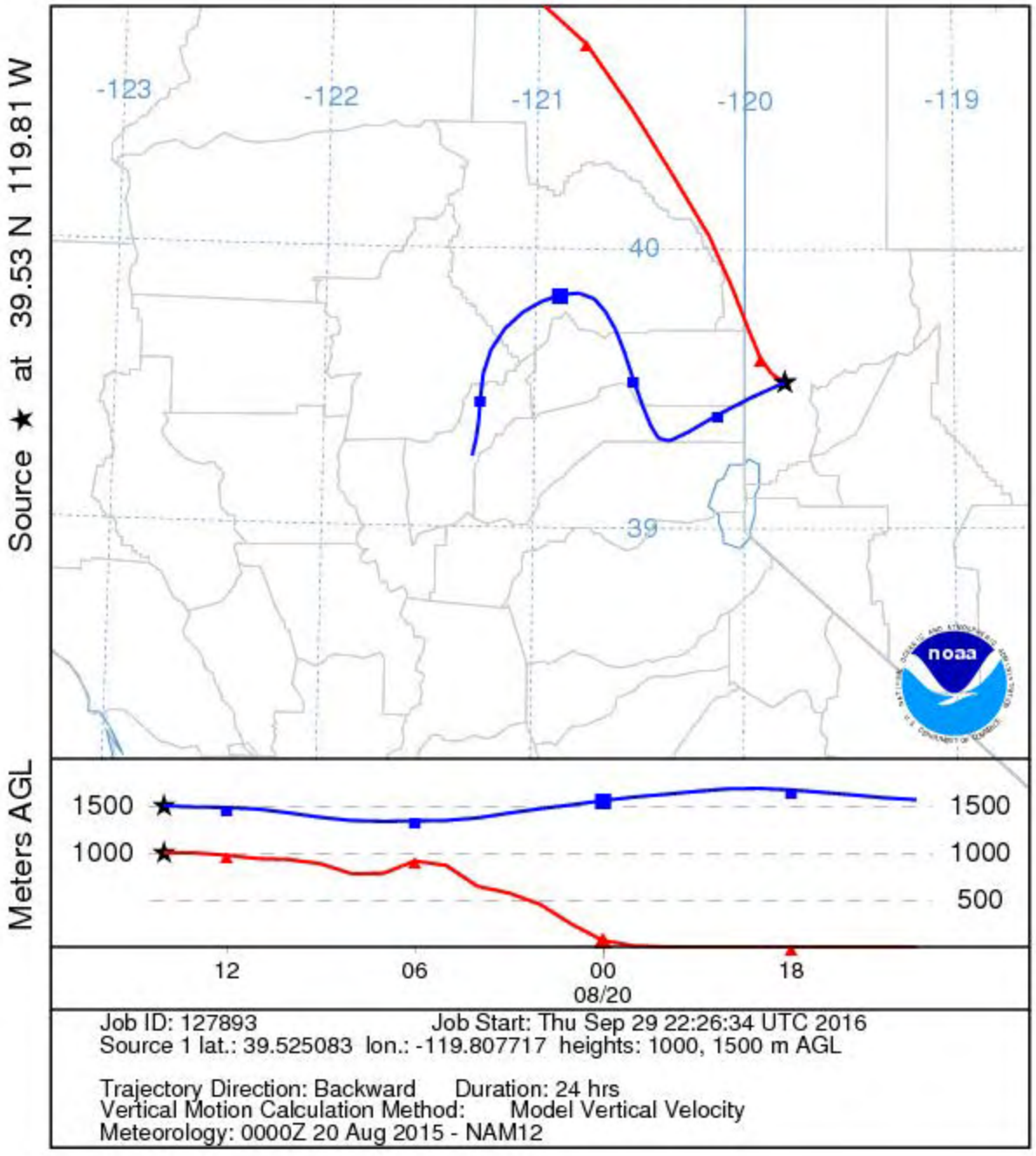
NOAA HYSPLIT MODEL
Backward trajectories ending at 1300 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 127345 Job Start: Thu Sep 29 22:25:10 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

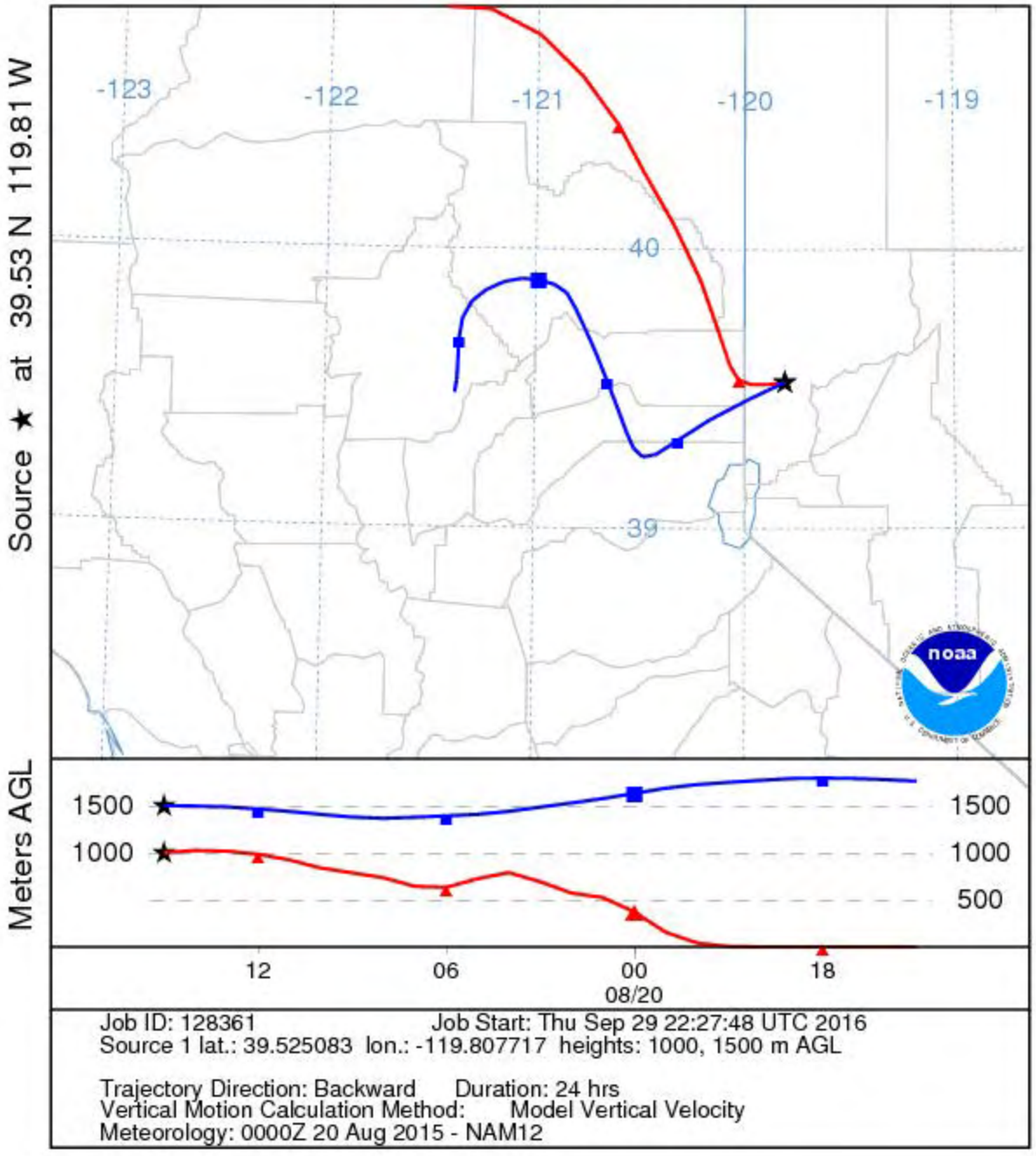
NOAA HYSPLIT MODEL
Backward trajectories ending at 1400 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 127893 Job Start: Thu Sep 29 22:26:34 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

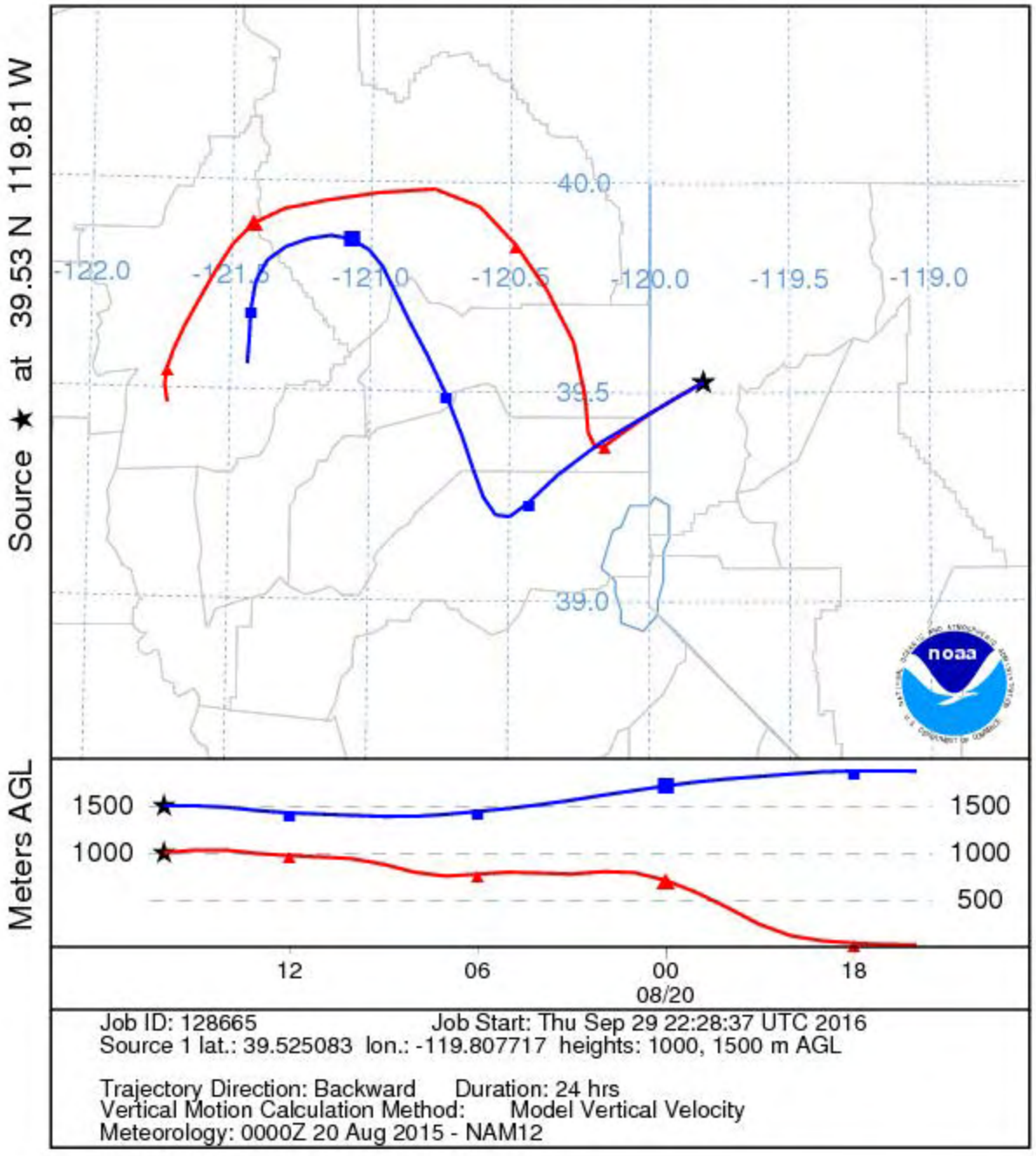
NOAA HYSPLIT MODEL
Backward trajectories ending at 1500 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 128361 Job Start: Thu Sep 29 22:27:48 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

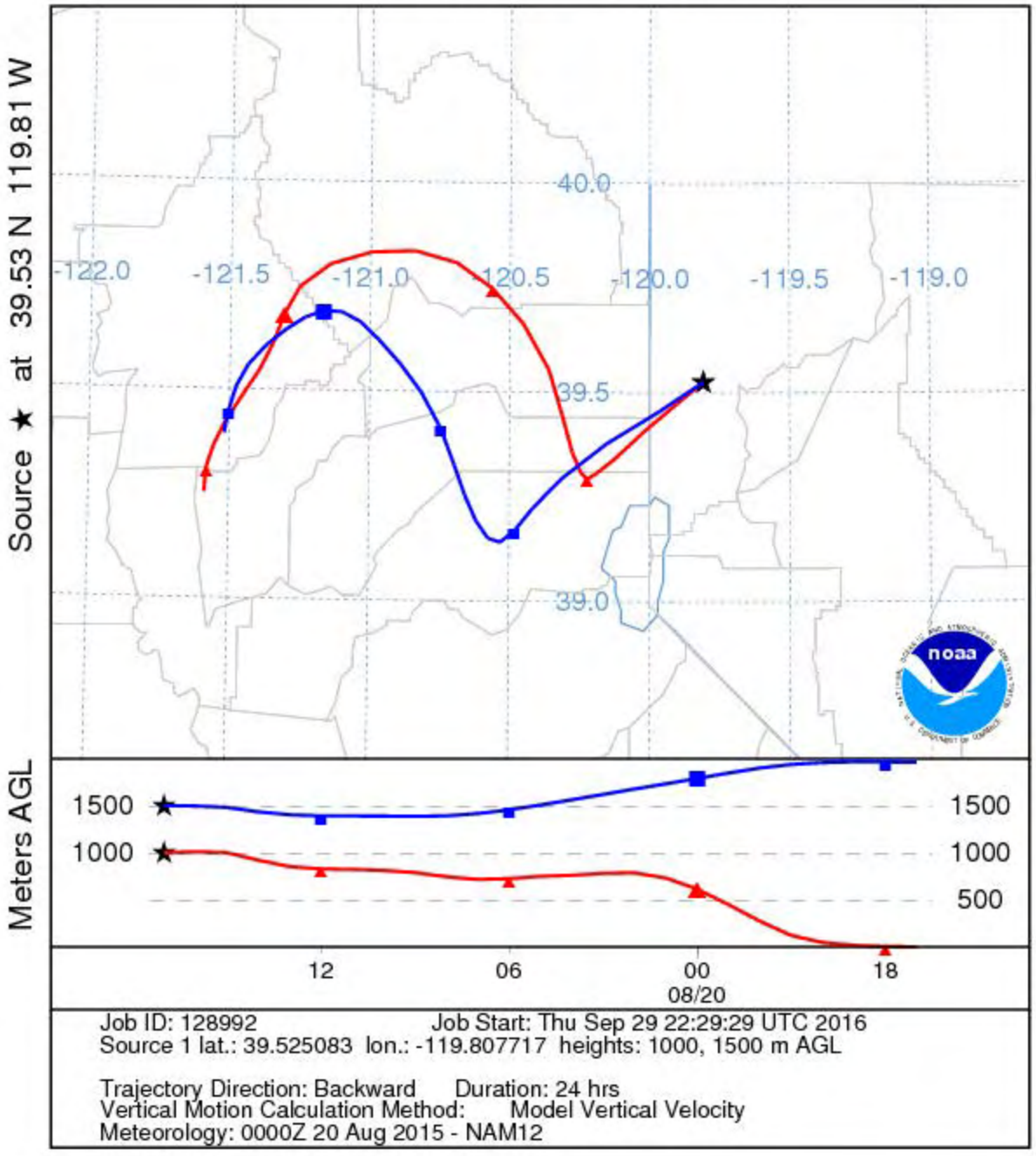
NOAA HYSPLIT MODEL
Backward trajectories ending at 1600 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 128665 Job Start: Thu Sep 29 22:28:37 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

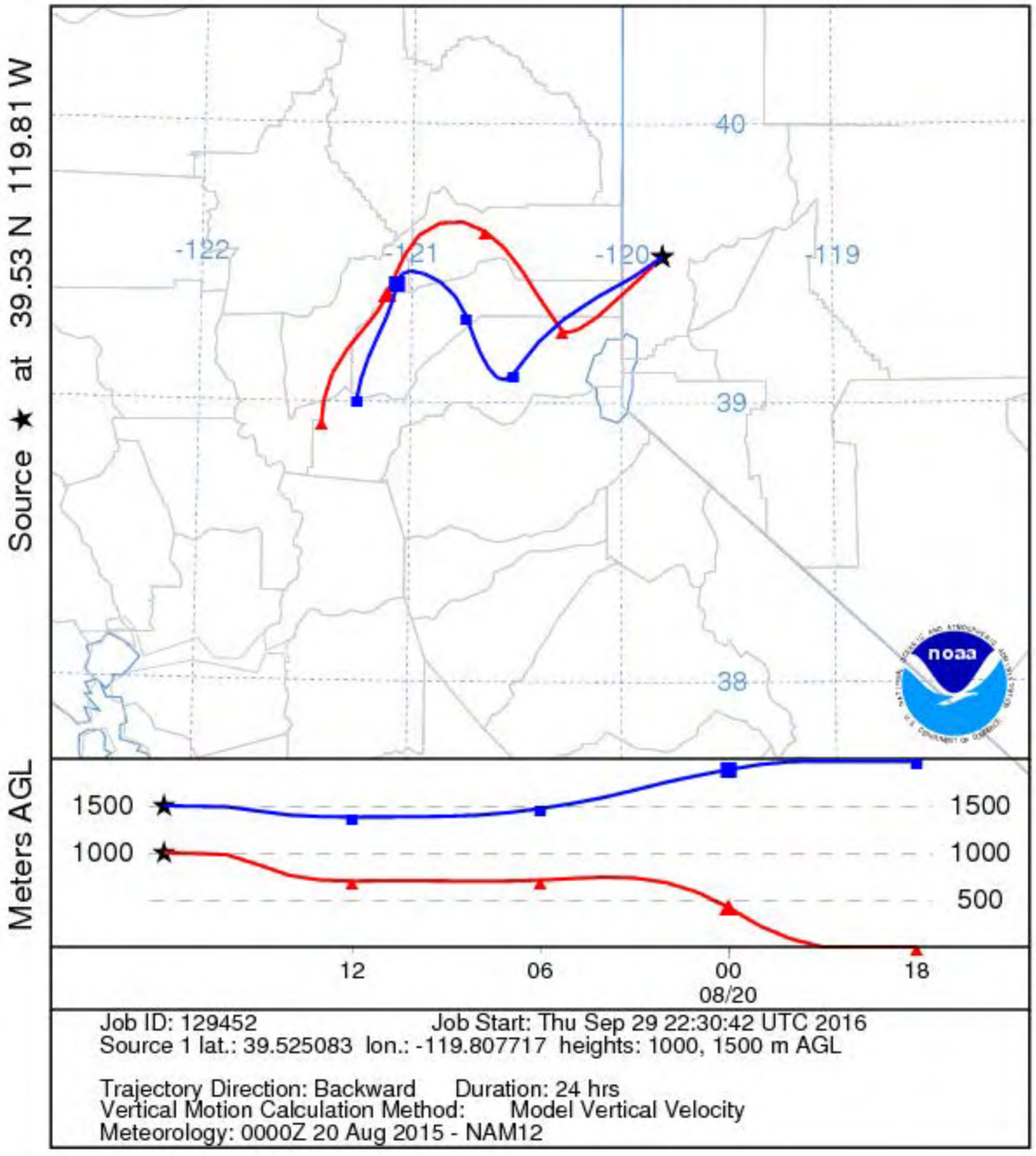
NOAA HYSPLIT MODEL
Backward trajectories ending at 1700 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 128992 Job Start: Thu Sep 29 22:29:29 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

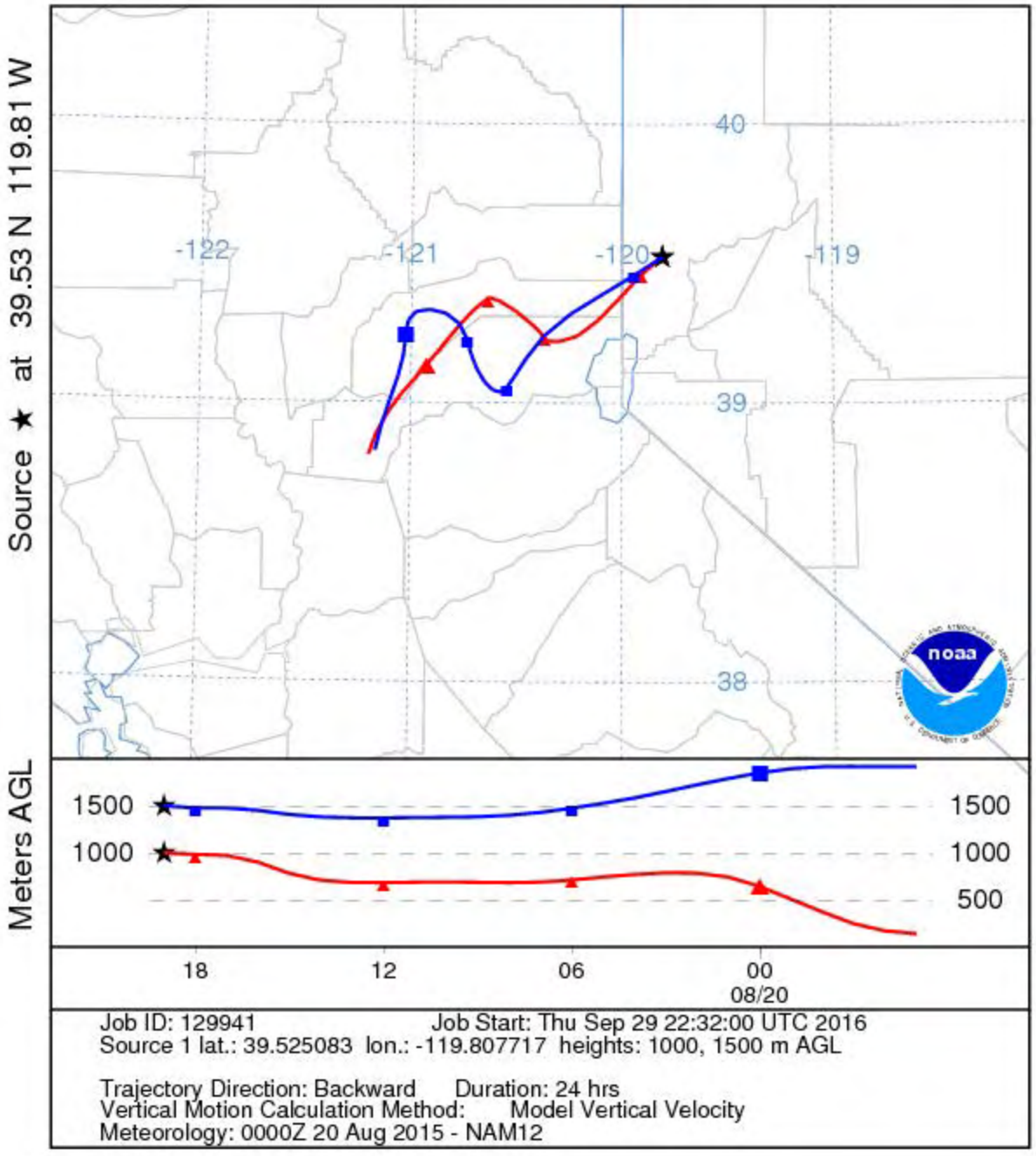
NOAA HYSPLIT MODEL
Backward trajectories ending at 1800 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 129452 Job Start: Thu Sep 29 22:30:42 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

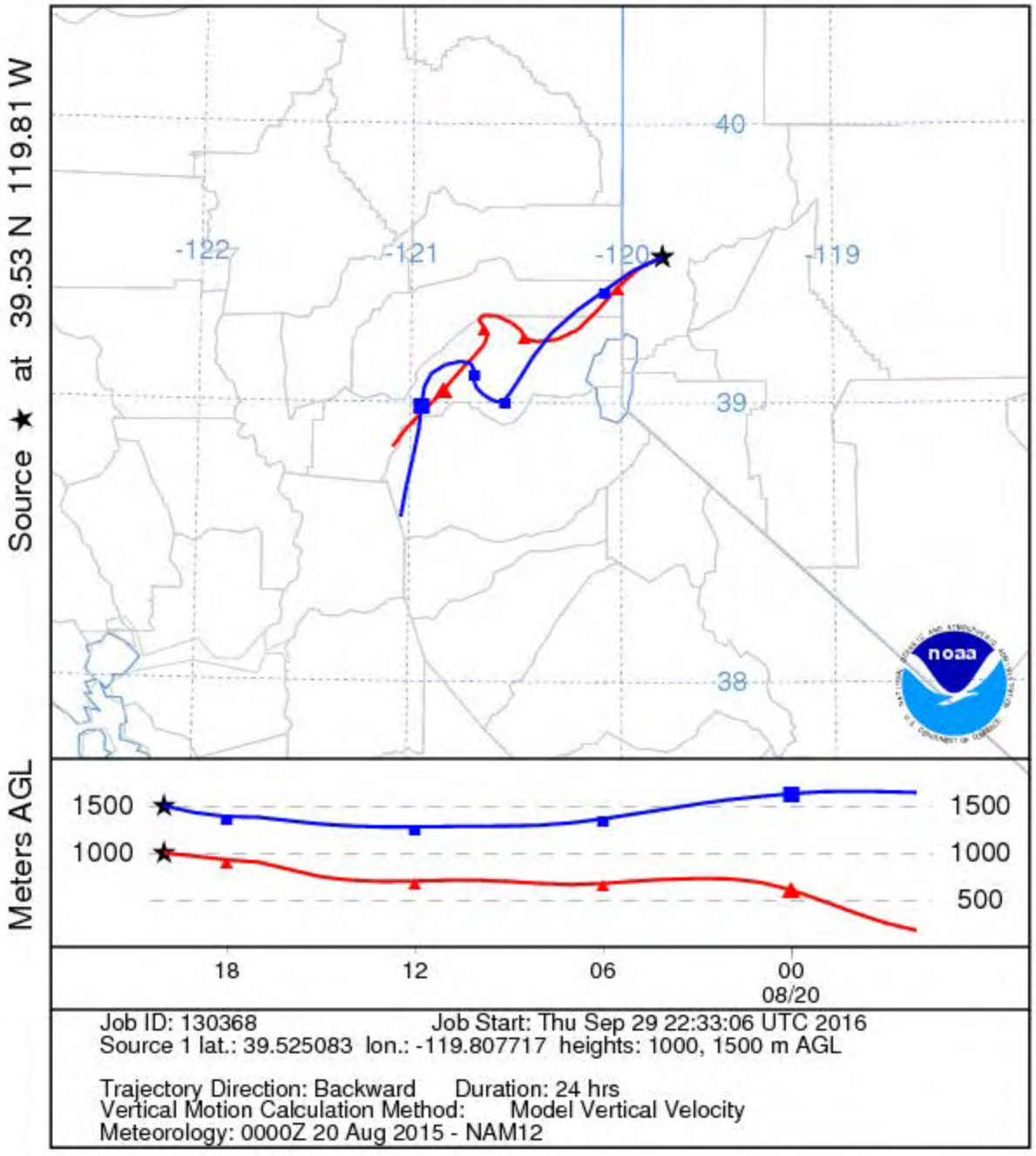
NOAA HYSPLIT MODEL
Backward trajectories ending at 1900 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 129941 Job Start: Thu Sep 29 22:32:00 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

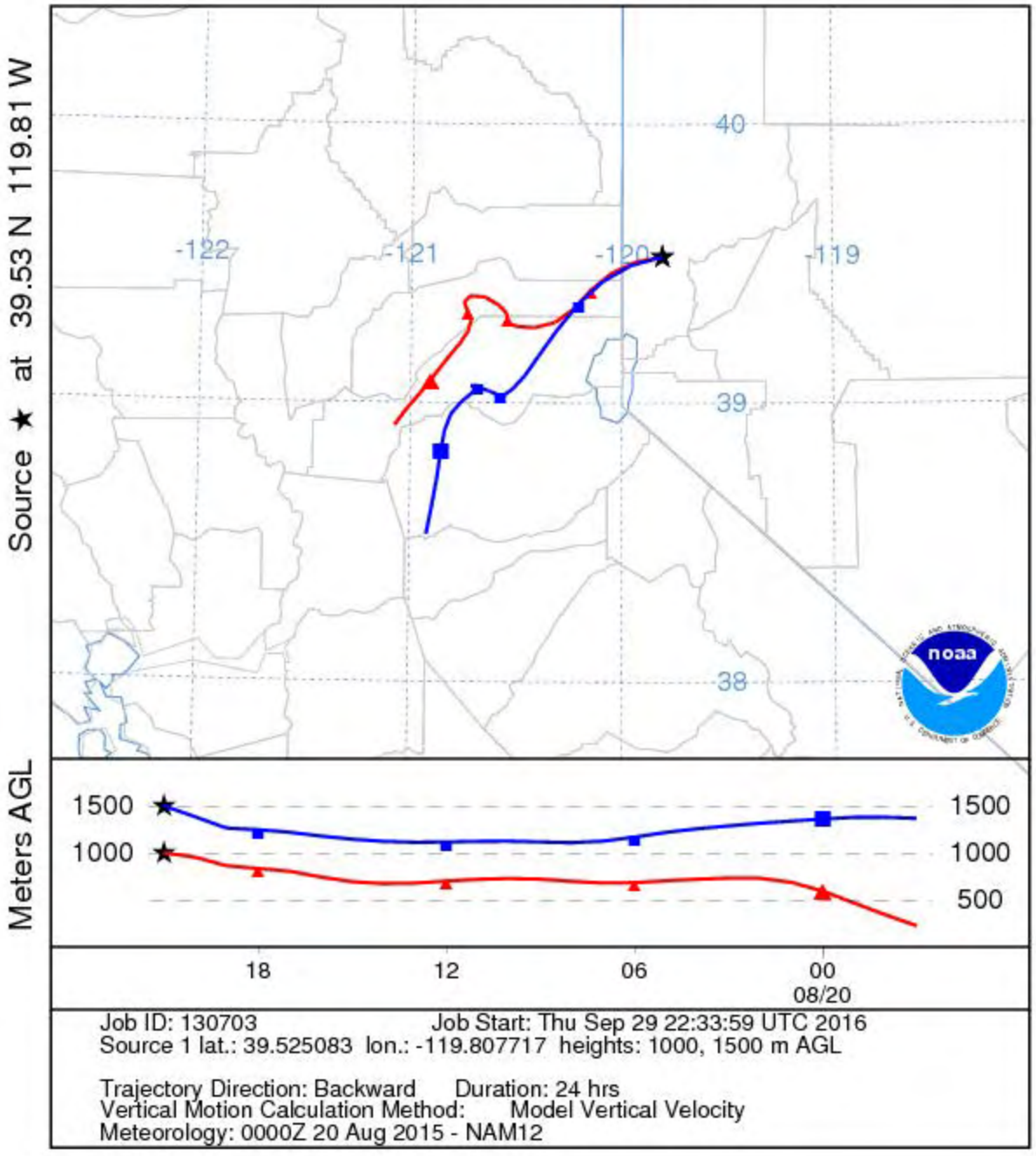
NOAA HYSPLIT MODEL
Backward trajectories ending at 2000 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 130368 Job Start: Thu Sep 29 22:33:06 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

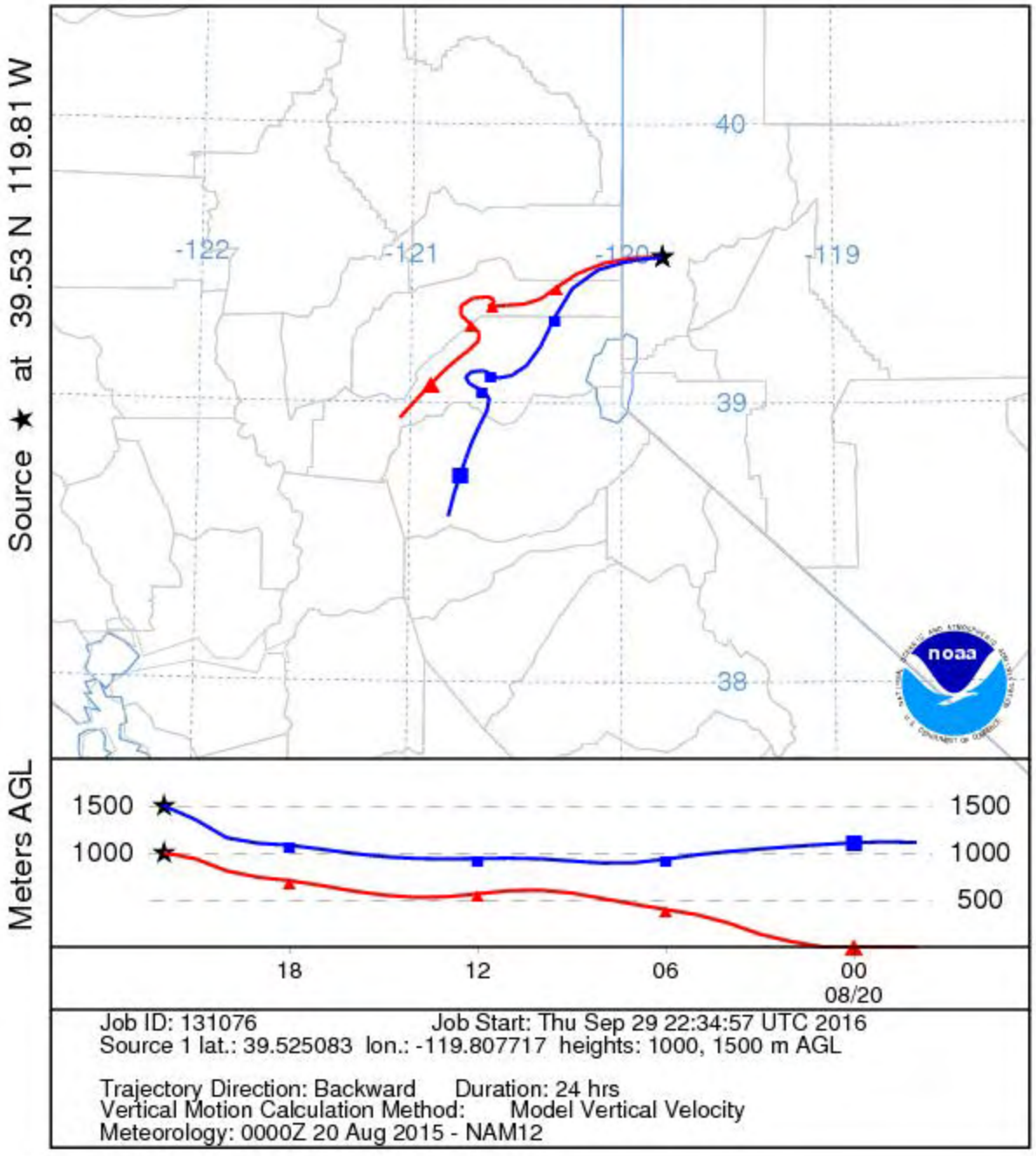
NOAA HYSPLIT MODEL
Backward trajectories ending at 2100 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 130703 Job Start: Thu Sep 29 22:33:59 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

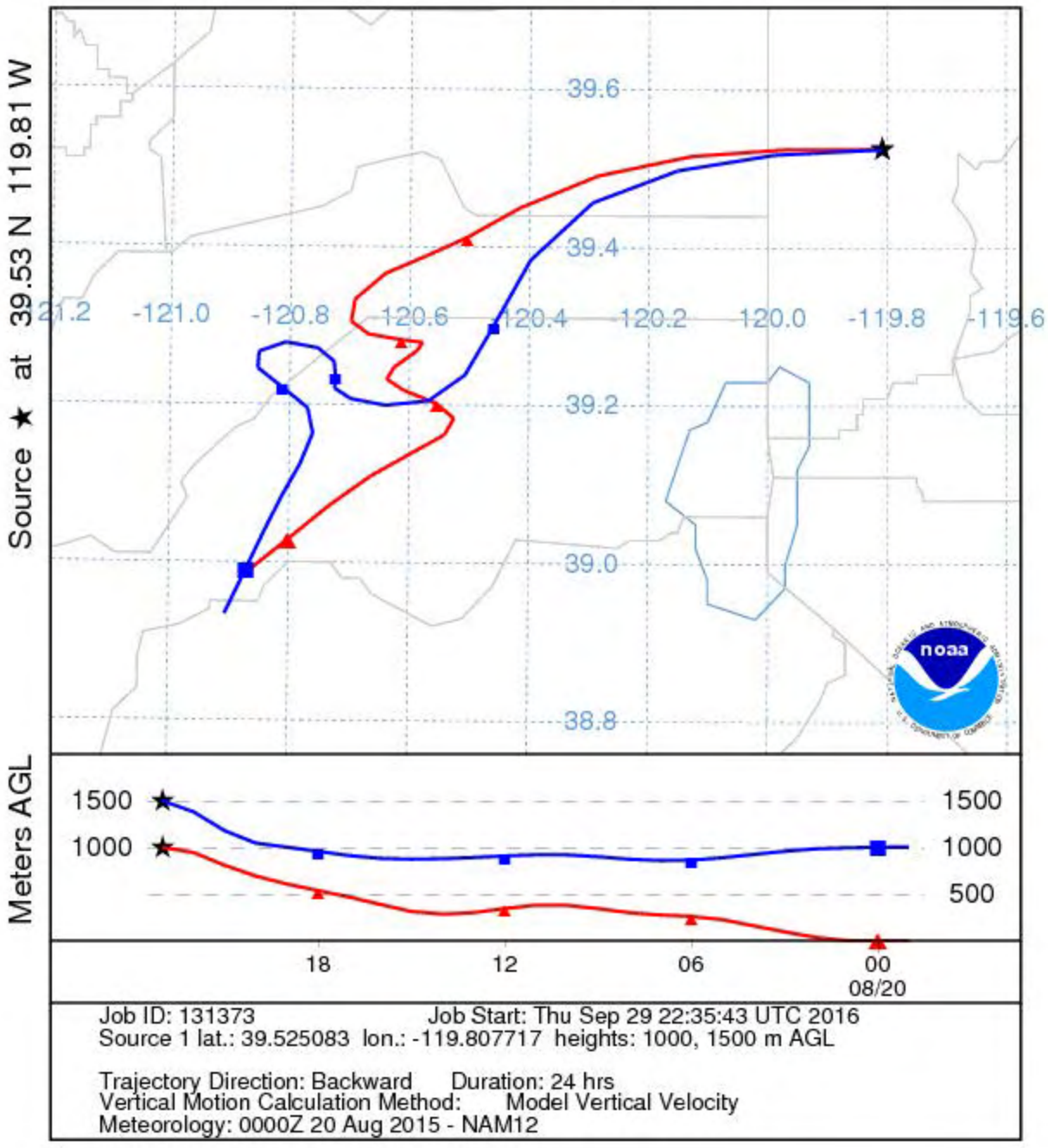
NOAA HYSPLIT MODEL
Backward trajectories ending at 2200 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 131076 Job Start: Thu Sep 29 22:34:57 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

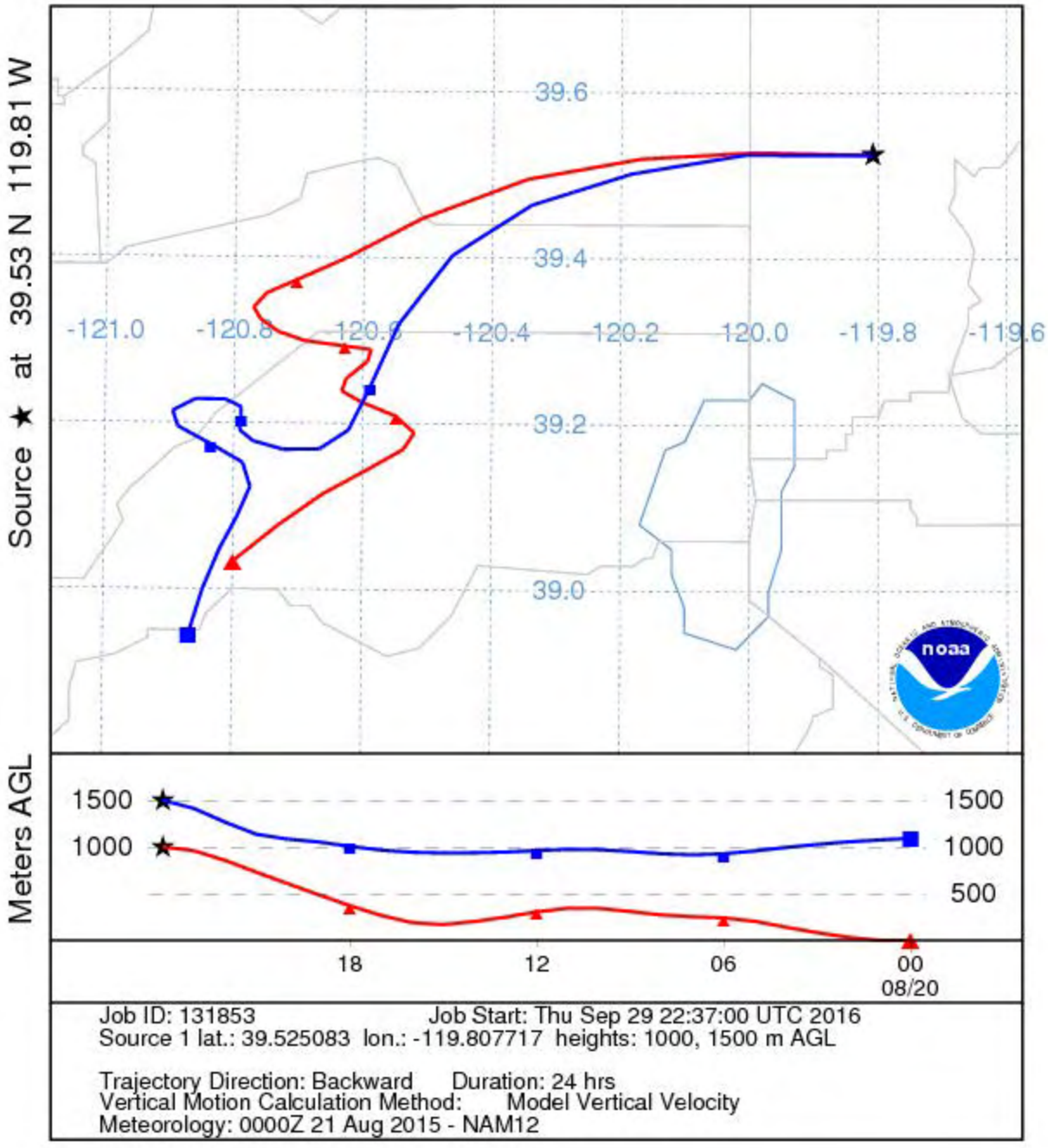
NOAA HYSPLIT MODEL
Backward trajectories ending at 2300 UTC 20 Aug 15
NAM Meteorological Data



Job ID: 131373 Job Start: Thu Sep 29 22:35:43 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 20 Aug 2015 - NAM12

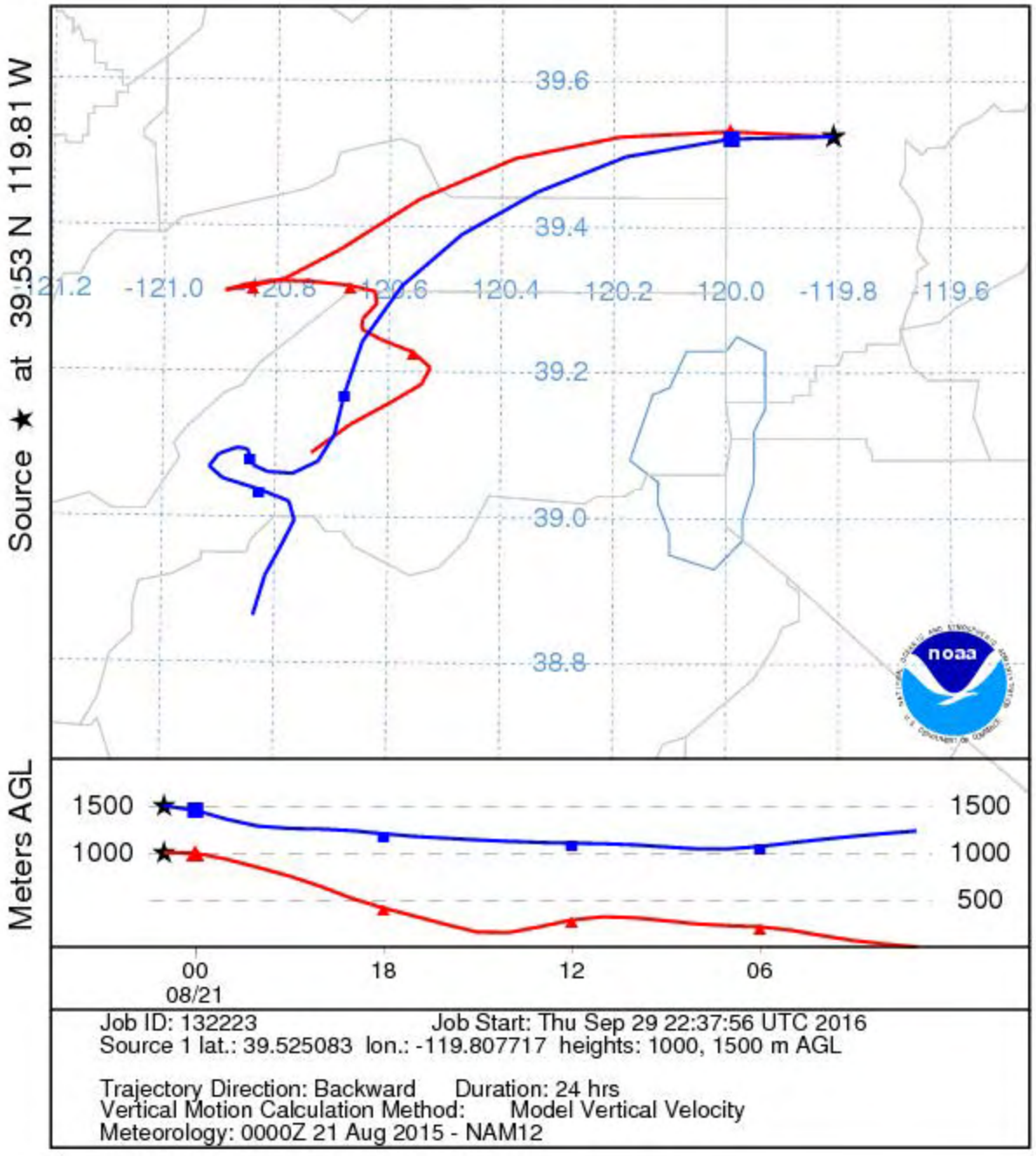
NOAA HYSPLIT MODEL
Backward trajectories ending at 0000 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 131853 Job Start: Thu Sep 29 22:37:00 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

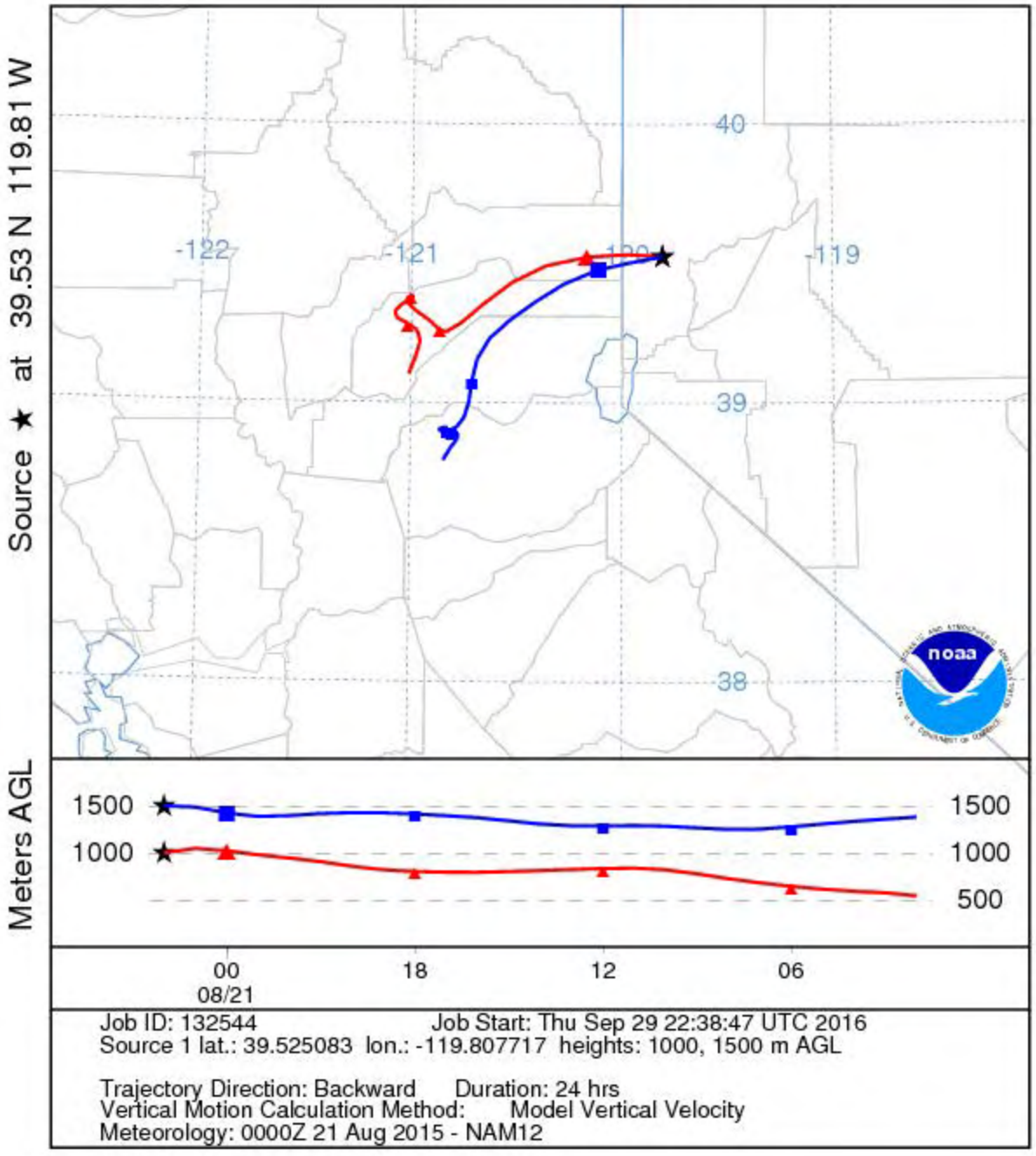
NOAA HYSPLIT MODEL
Backward trajectories ending at 0100 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 132223 Job Start: Thu Sep 29 22:37:56 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

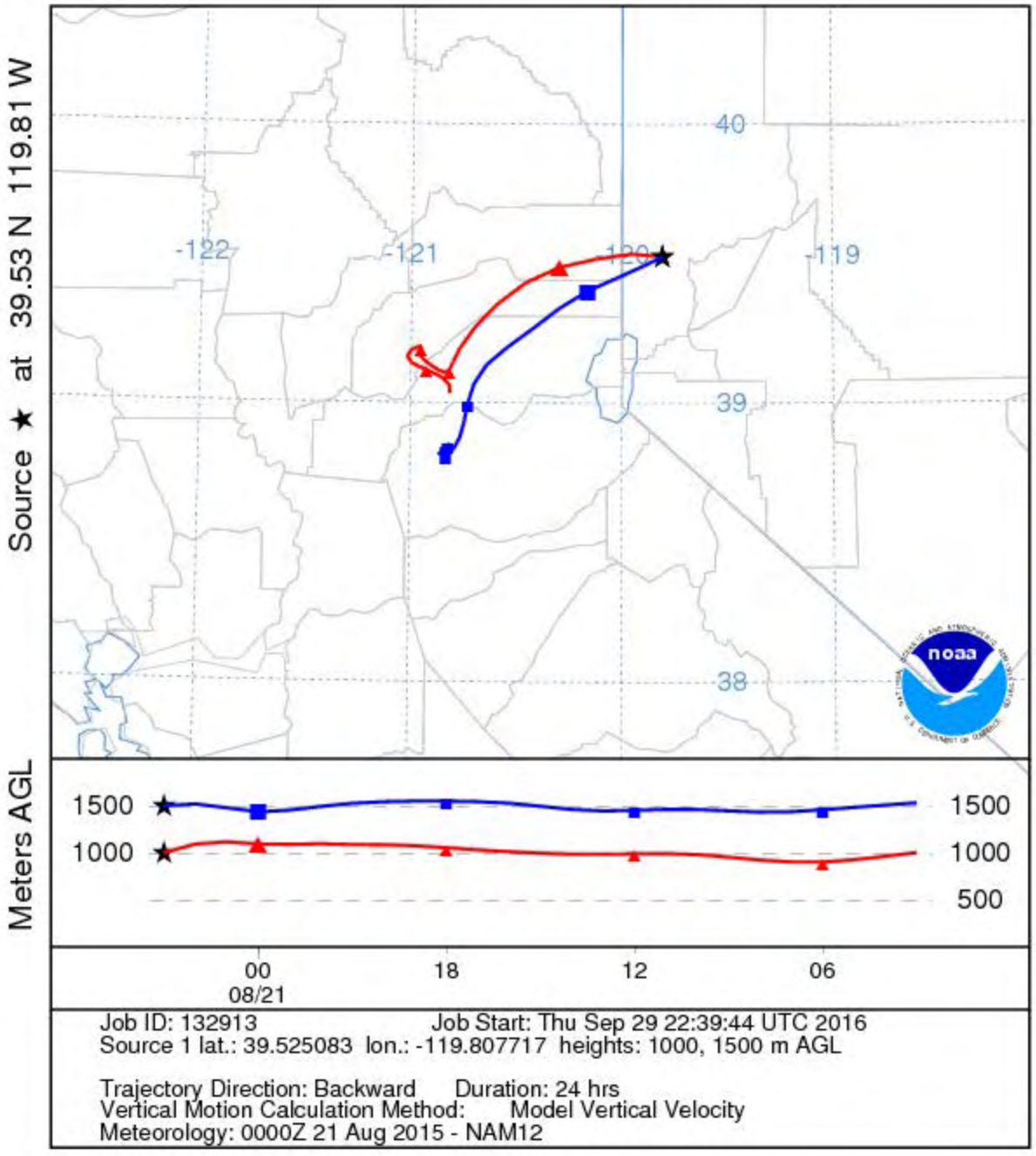
NOAA HYSPLIT MODEL
Backward trajectories ending at 0200 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 132544 Job Start: Thu Sep 29 22:38:47 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

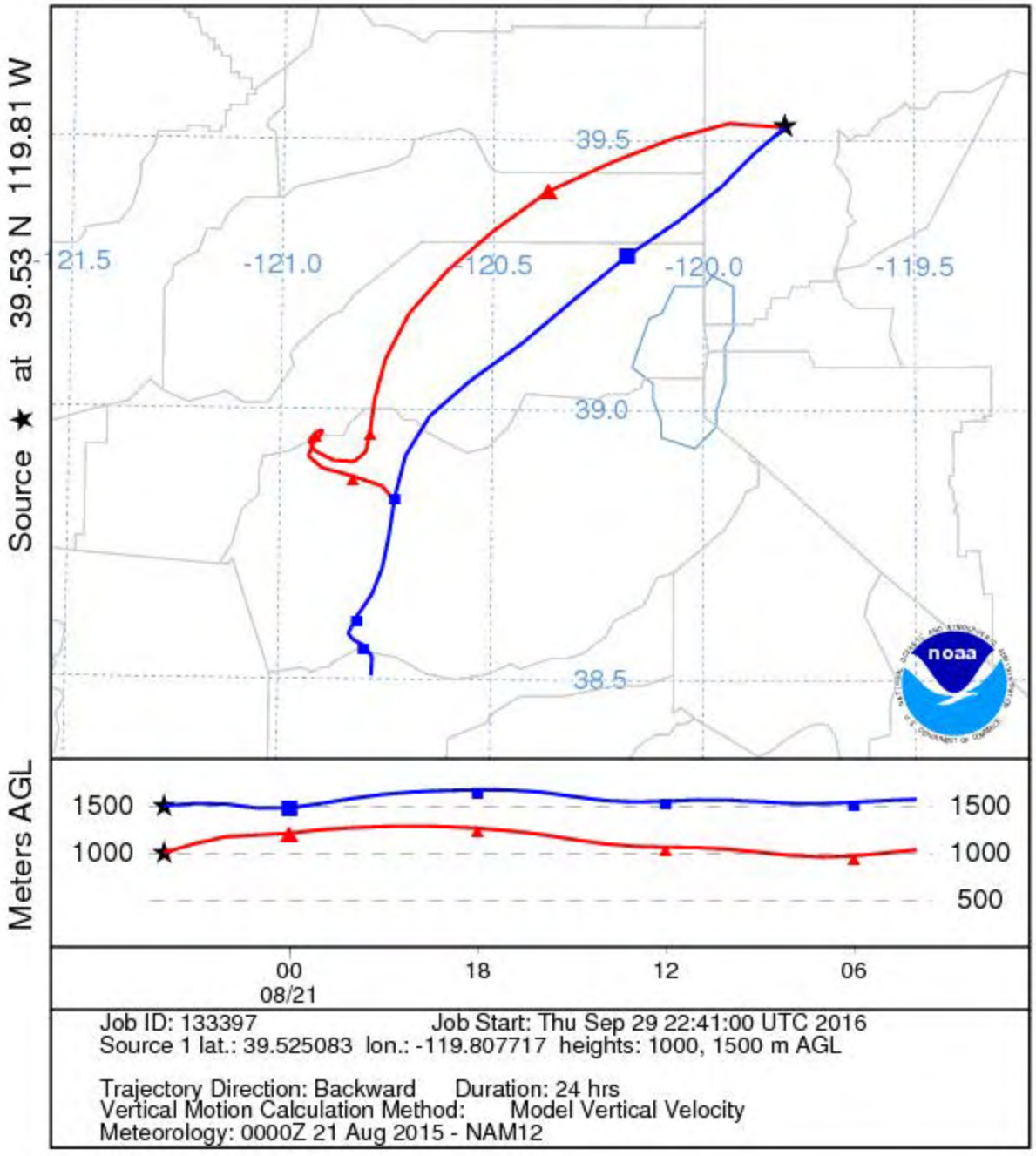
NOAA HYSPLIT MODEL
Backward trajectories ending at 0300 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 132913 Job Start: Thu Sep 29 22:39:44 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

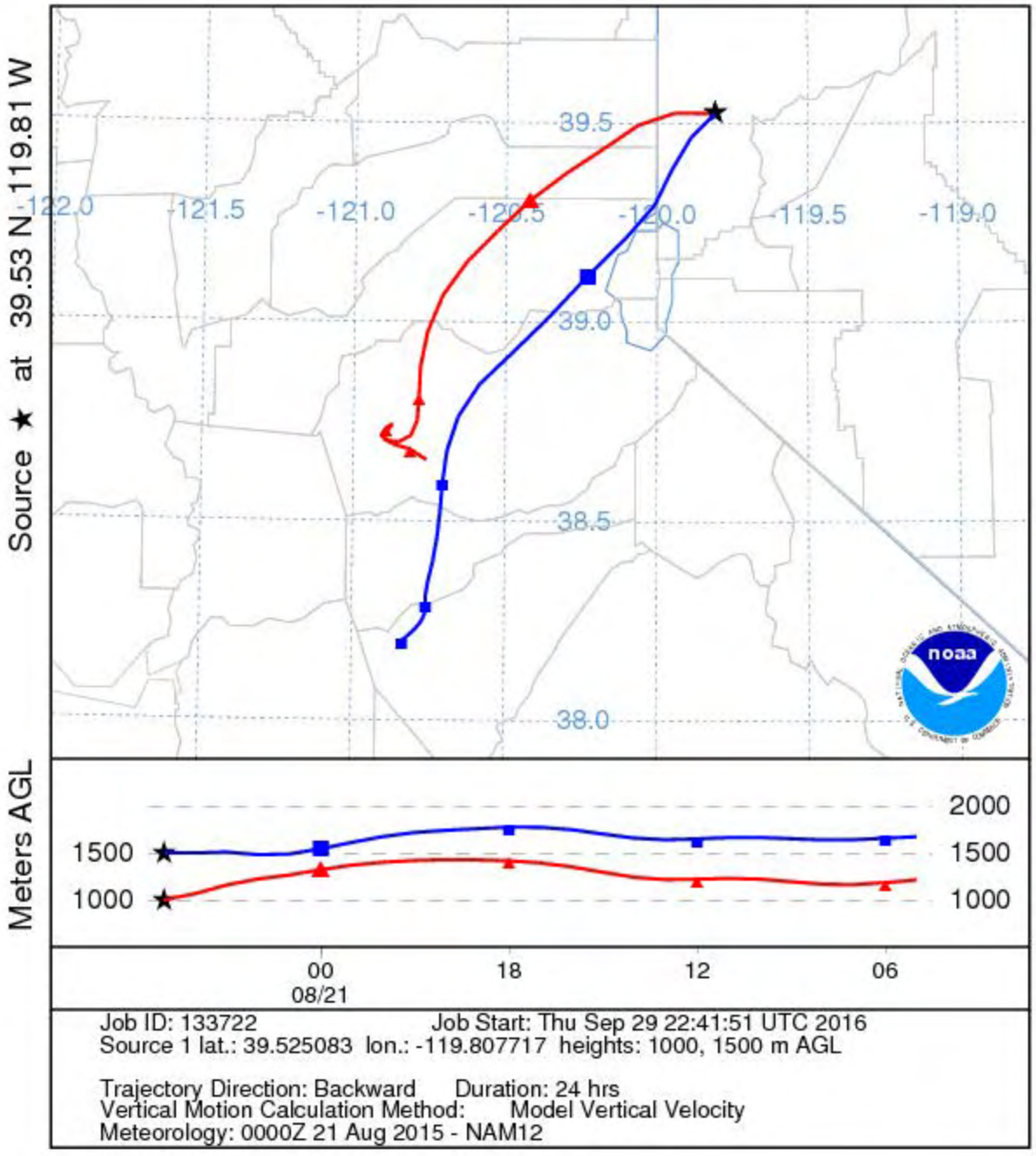
NOAA HYSPLIT MODEL
Backward trajectories ending at 0400 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 133397 Job Start: Thu Sep 29 22:41:00 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

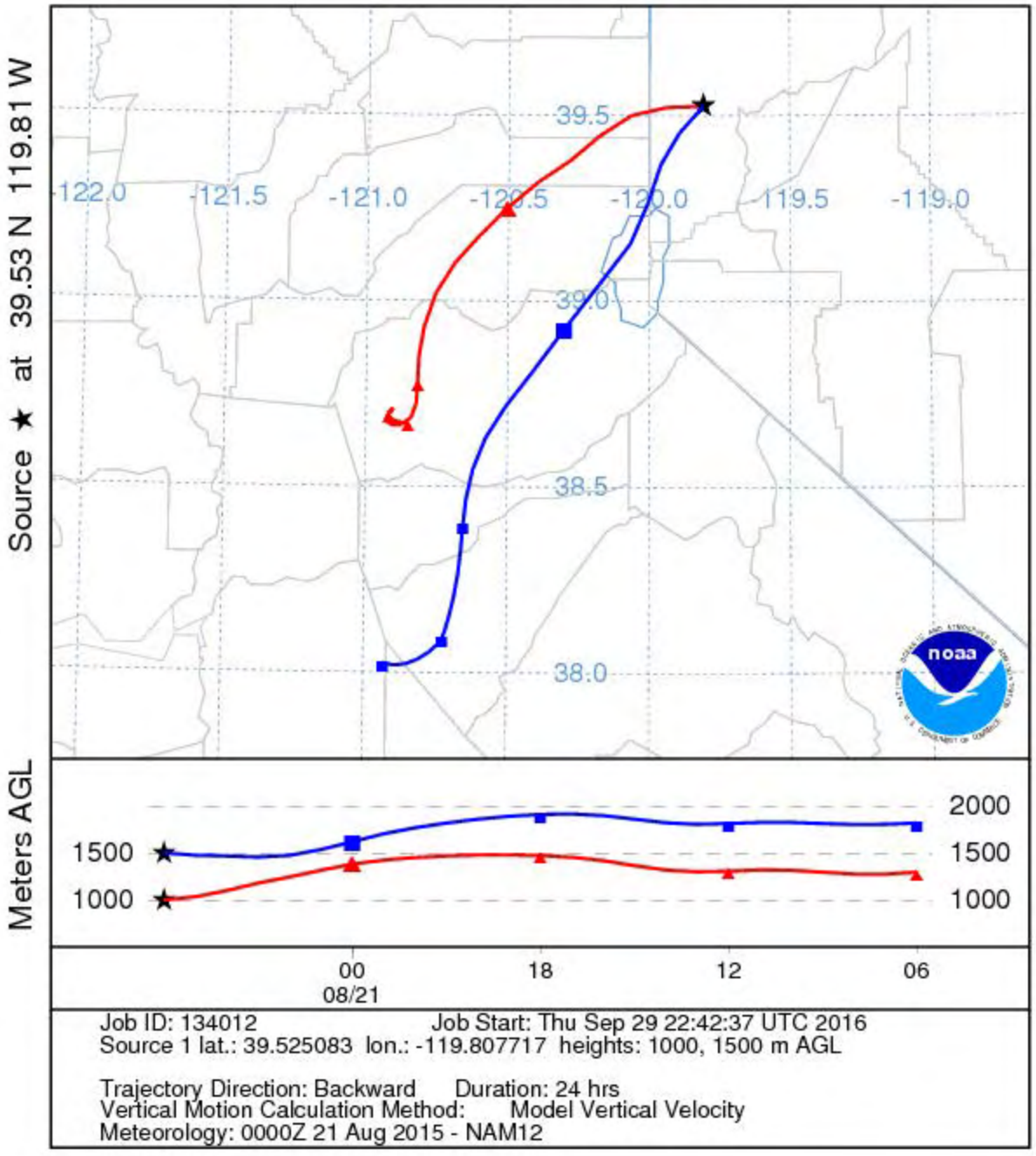
NOAA HYSPLIT MODEL
Backward trajectories ending at 0500 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 133722 Job Start: Thu Sep 29 22:41:51 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

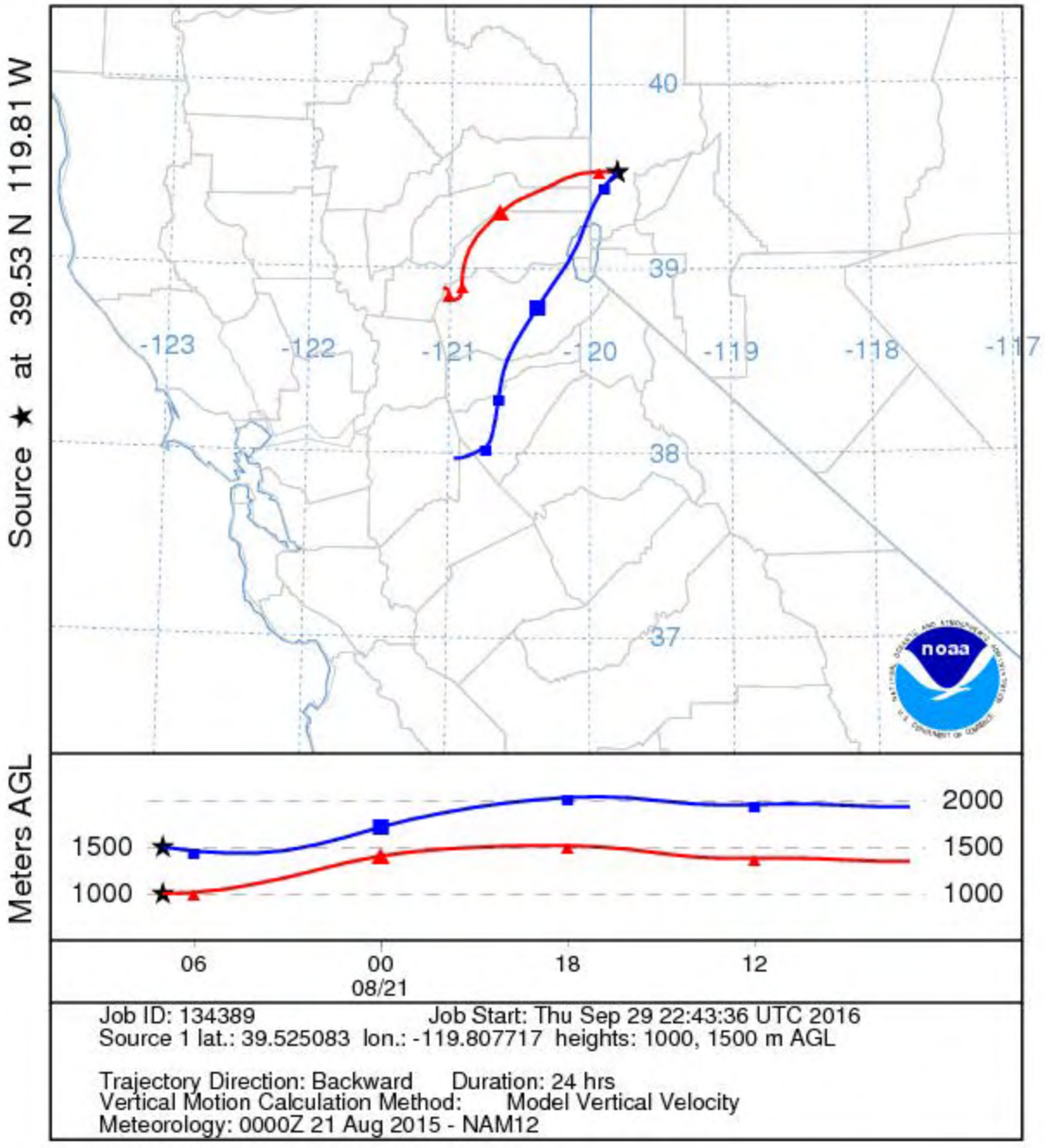
NOAA HYSPLIT MODEL
Backward trajectories ending at 0600 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 134012 Job Start: Thu Sep 29 22:42:37 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

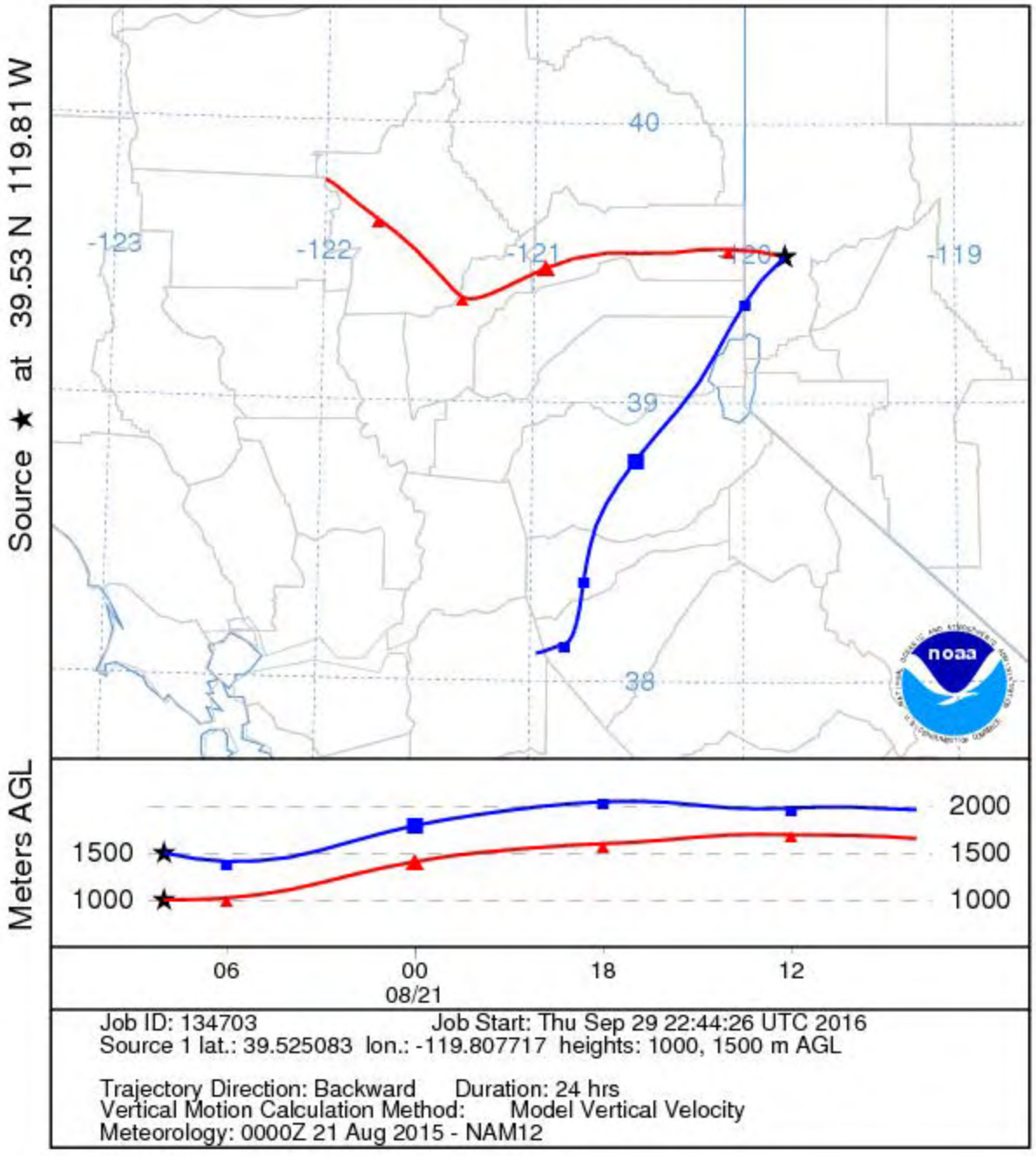
NOAA HYSPLIT MODEL
Backward trajectories ending at 0700 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 134389 Job Start: Thu Sep 29 22:43:36 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

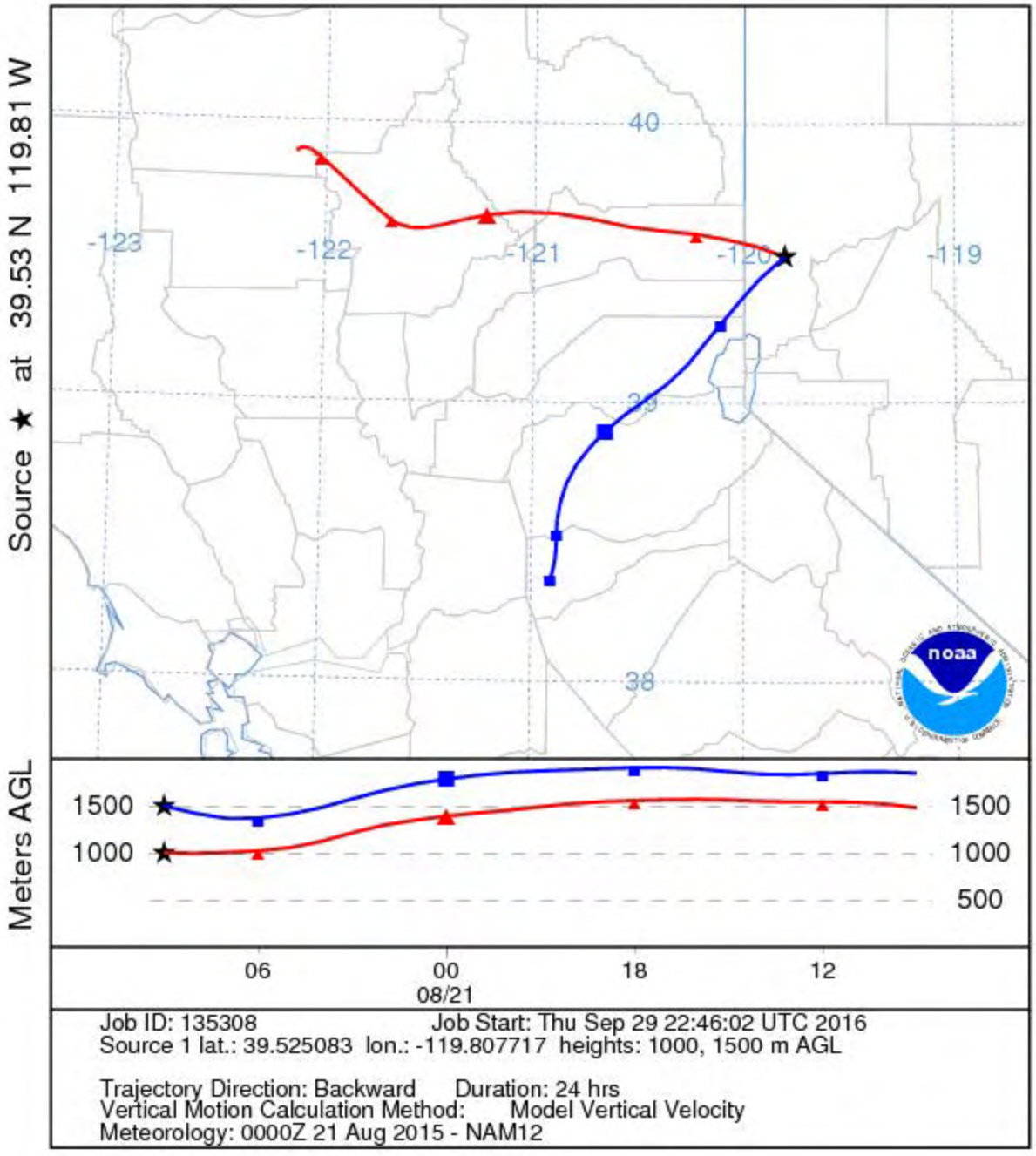
NOAA HYSPLIT MODEL
Backward trajectories ending at 0800 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 134703 Job Start: Thu Sep 29 22:44:26 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

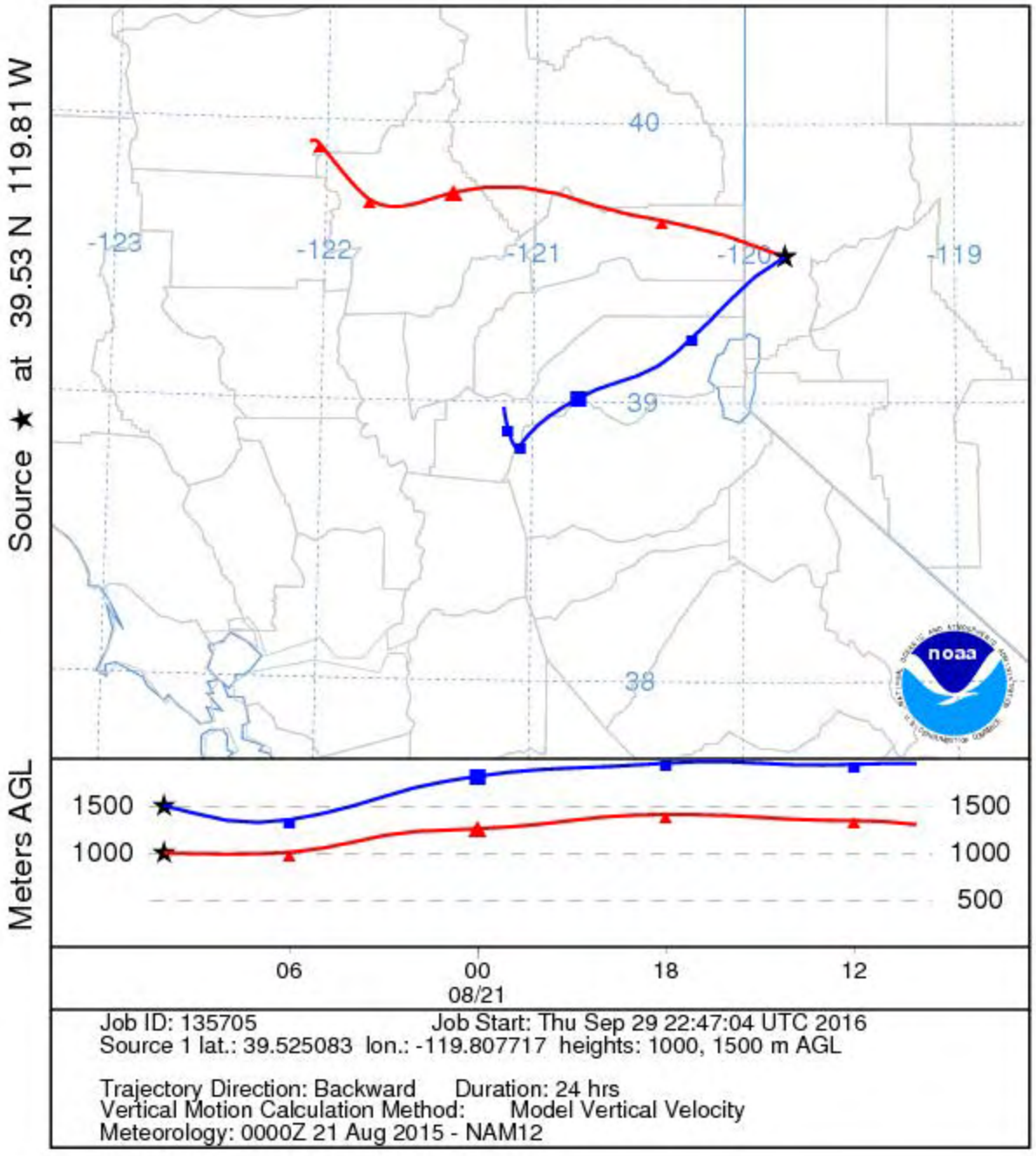
NOAA HYSPLIT MODEL
Backward trajectories ending at 0900 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 135308 Job Start: Thu Sep 29 22:46:02 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

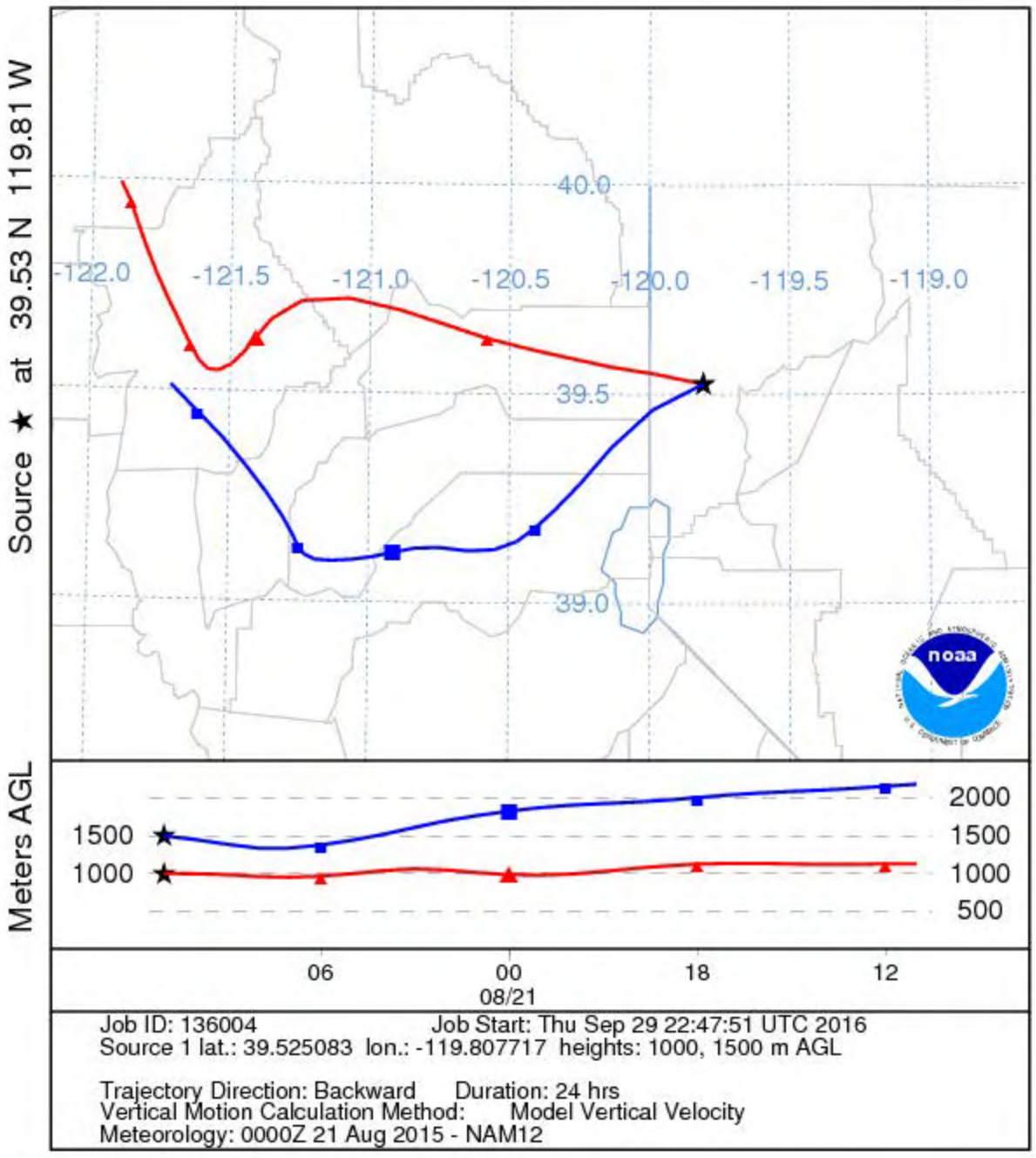
NOAA HYSPLIT MODEL
Backward trajectories ending at 1000 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 135705 Job Start: Thu Sep 29 22:47:04 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

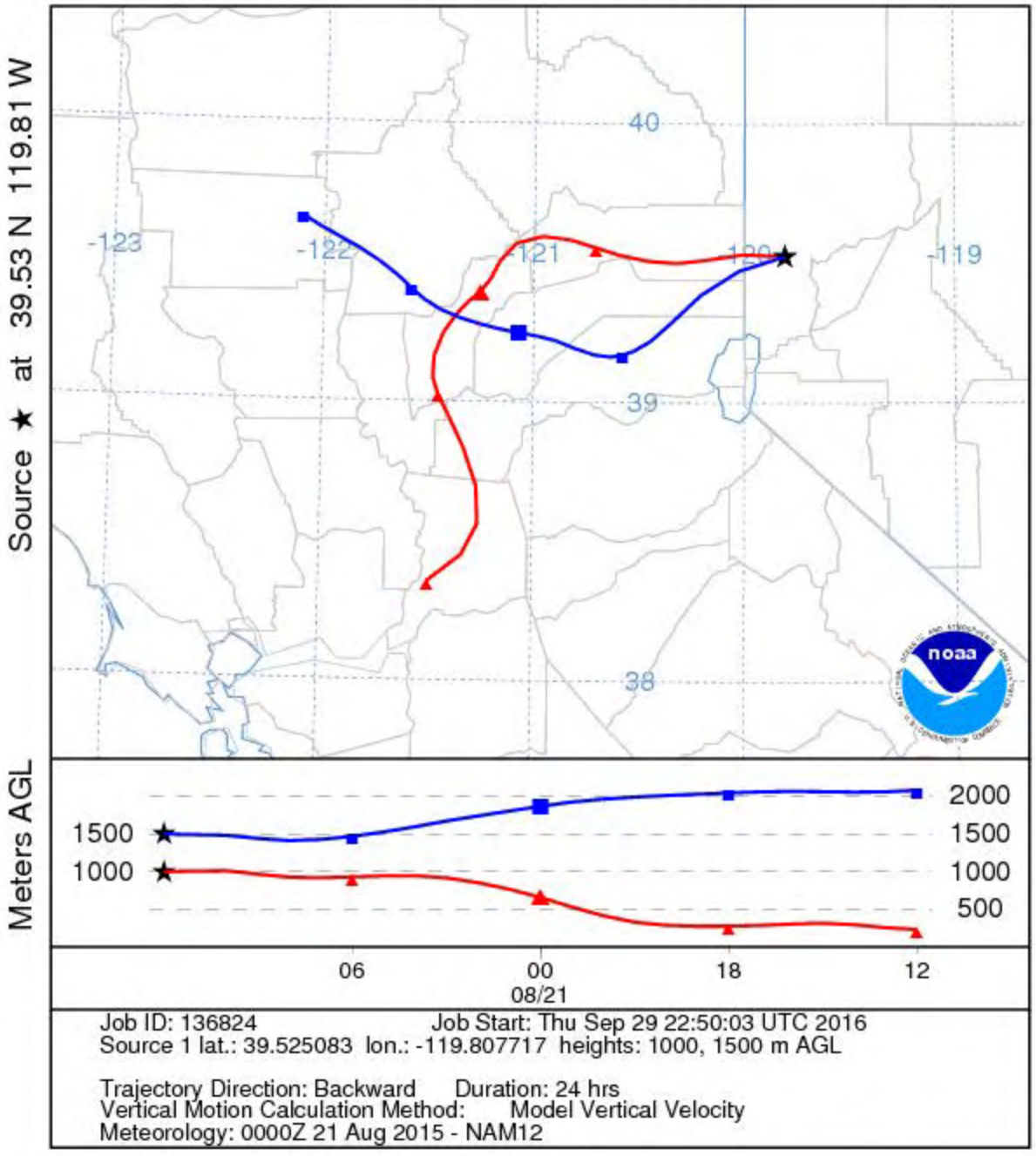
NOAA HYSPLIT MODEL
Backward trajectories ending at 1100 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 136004 Job Start: Thu Sep 29 22:47:51 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

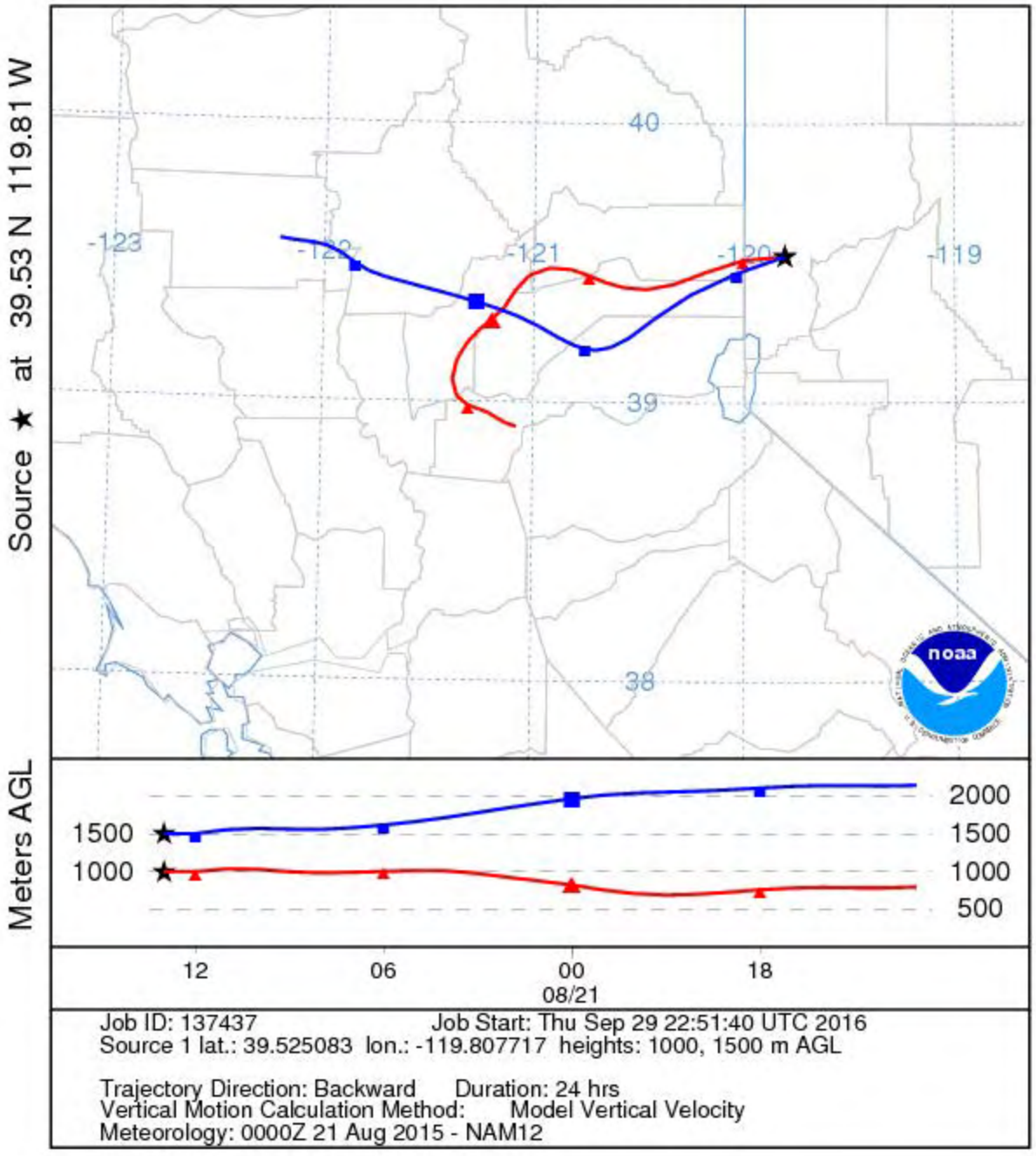
NOAA HYSPLIT MODEL
Backward trajectories ending at 1200 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 136824 Job Start: Thu Sep 29 22:50:03 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

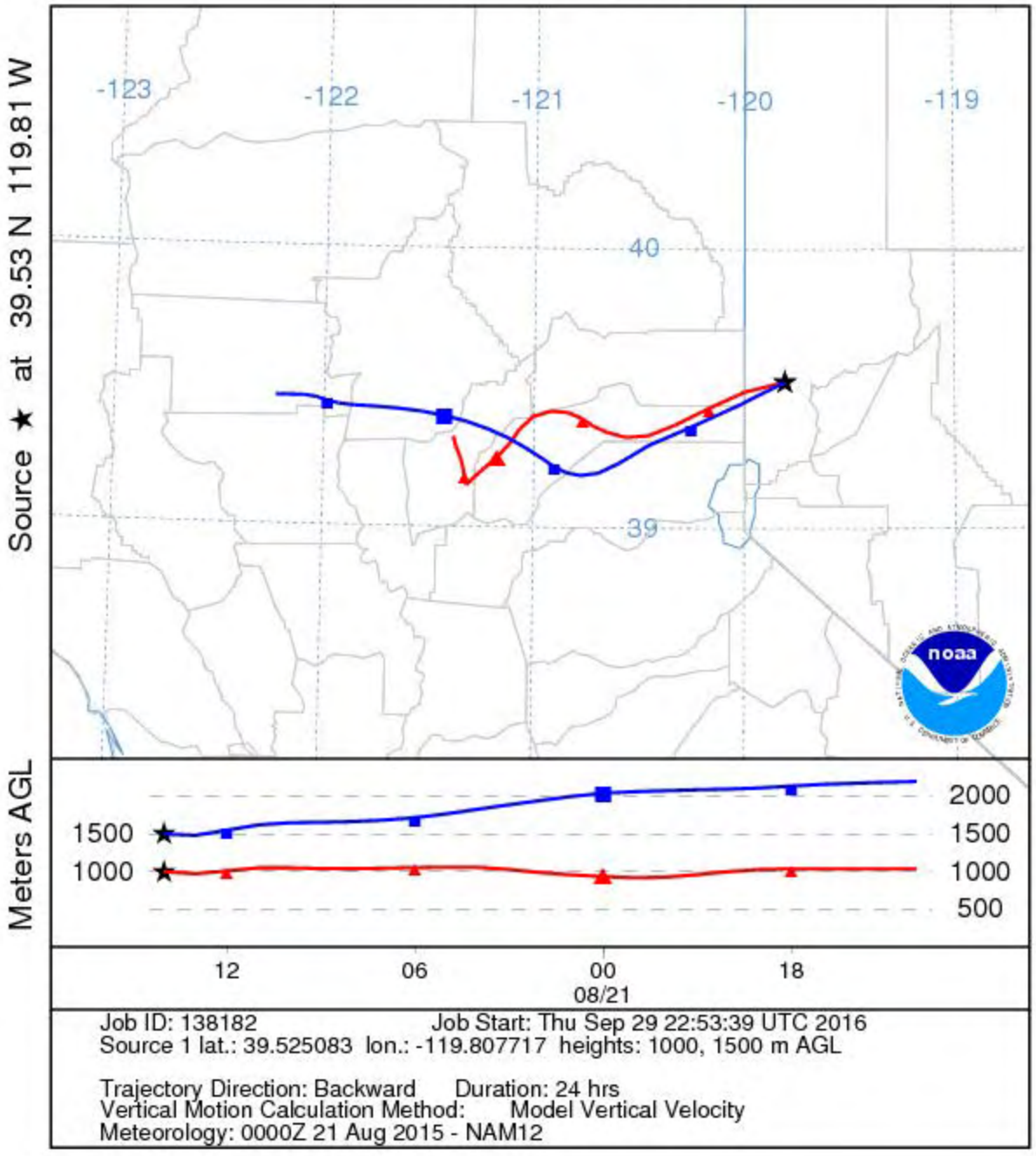
NOAA HYSPLIT MODEL
Backward trajectories ending at 1300 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 137437 Job Start: Thu Sep 29 22:51:40 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

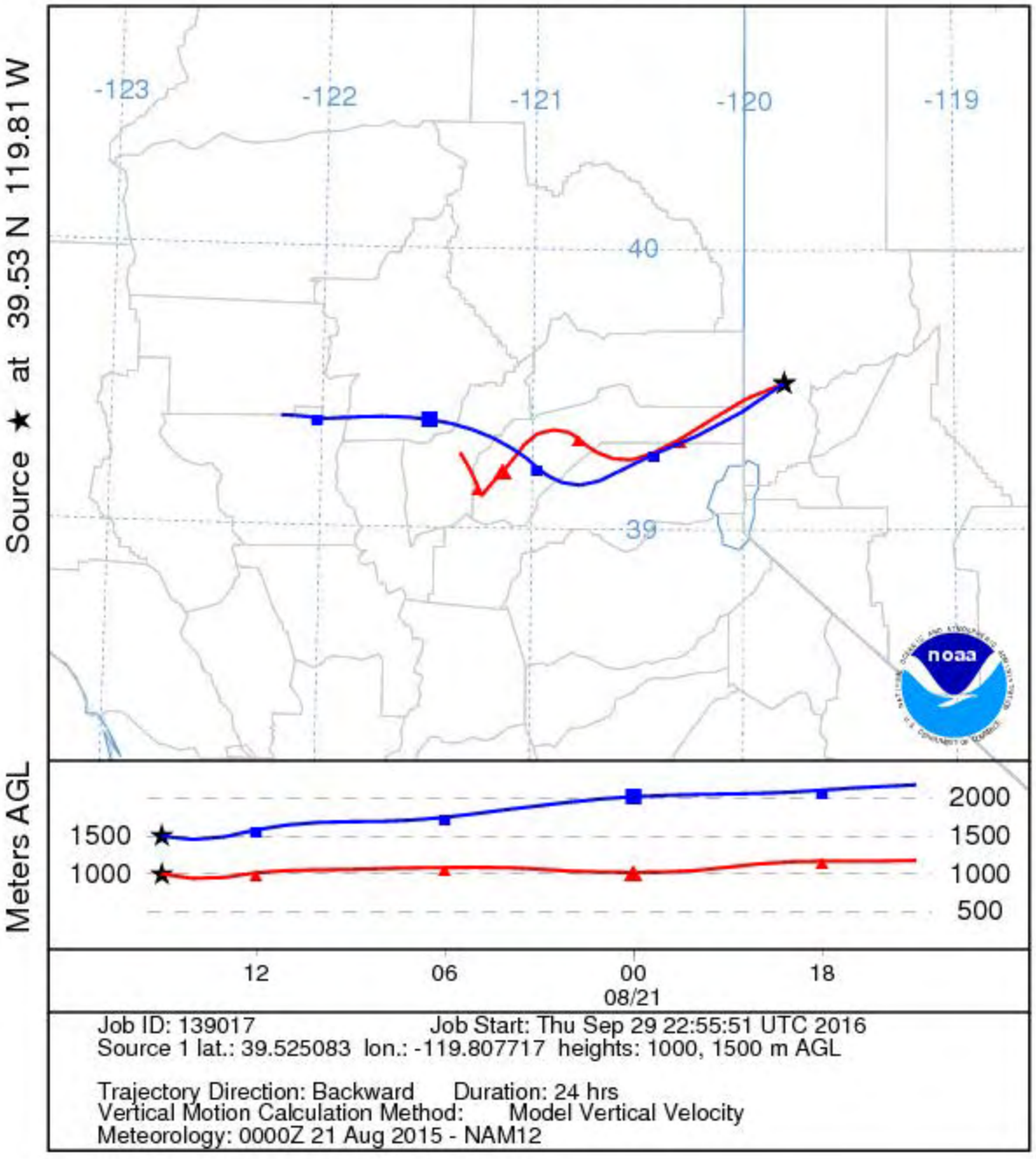
NOAA HYSPLIT MODEL
Backward trajectories ending at 1400 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 138182 Job Start: Thu Sep 29 22:53:39 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

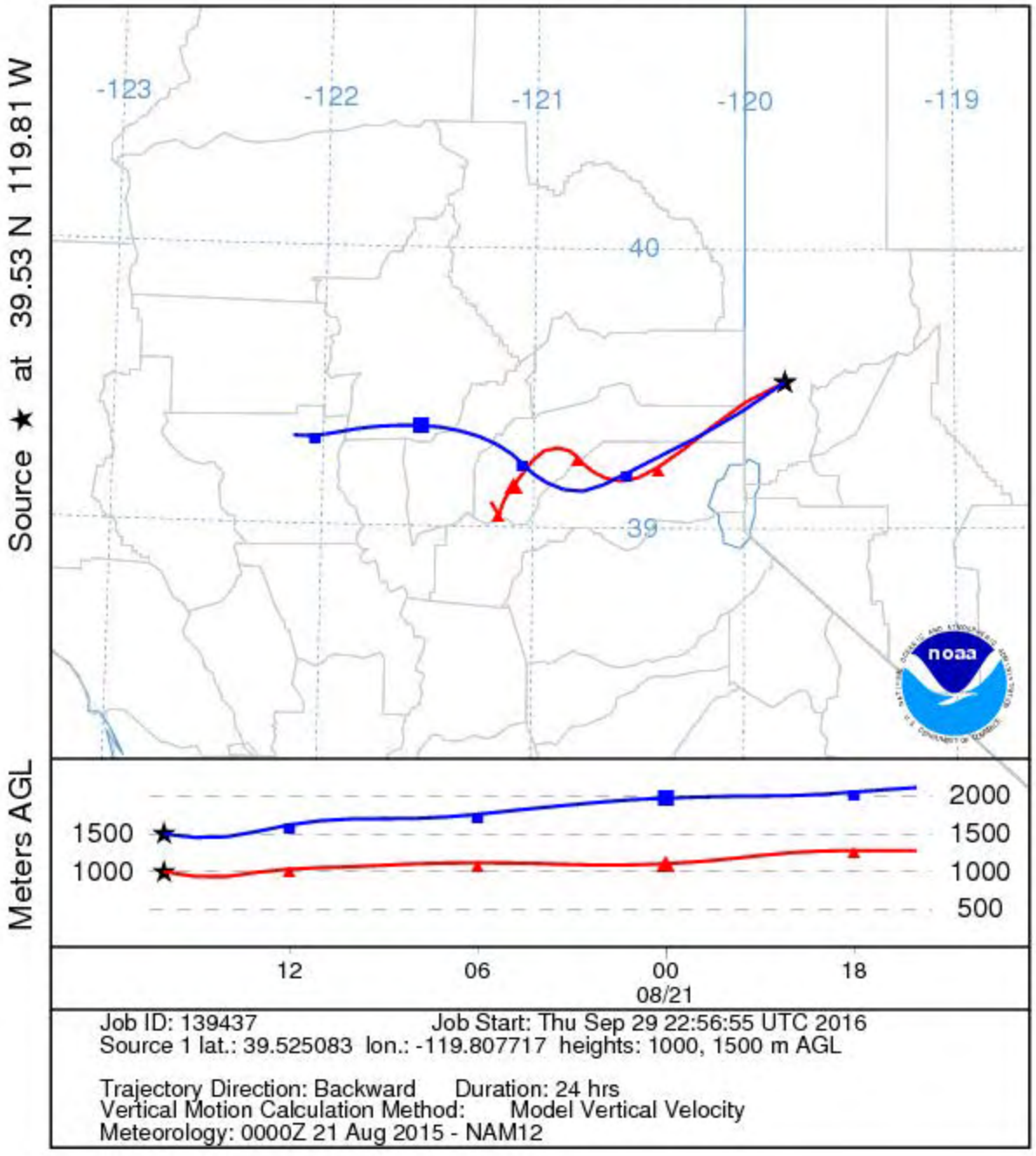
NOAA HYSPLIT MODEL
Backward trajectories ending at 1500 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 139017 Job Start: Thu Sep 29 22:55:51 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

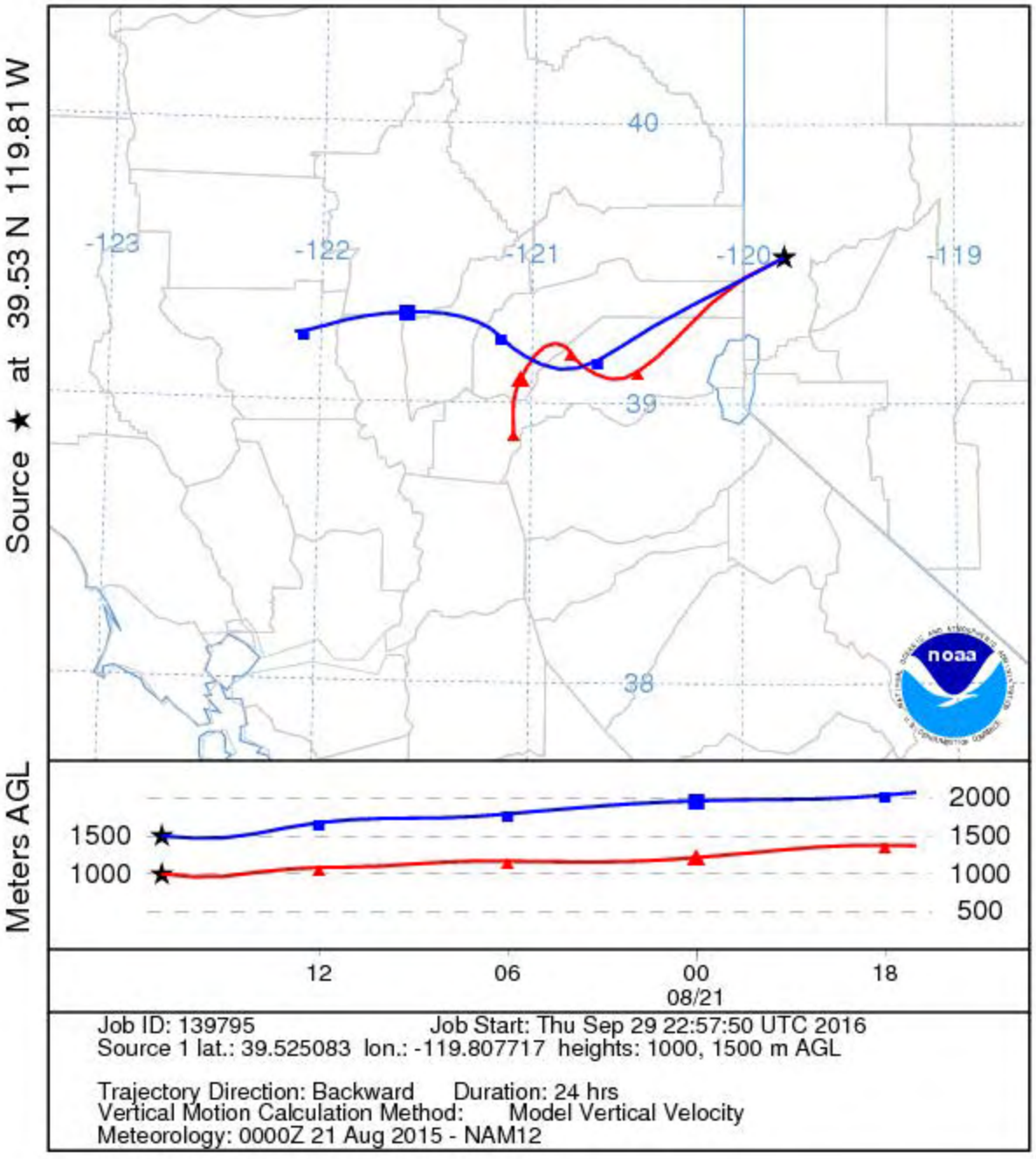
NOAA HYSPLIT MODEL
Backward trajectories ending at 1600 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 139437 Job Start: Thu Sep 29 22:56:55 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

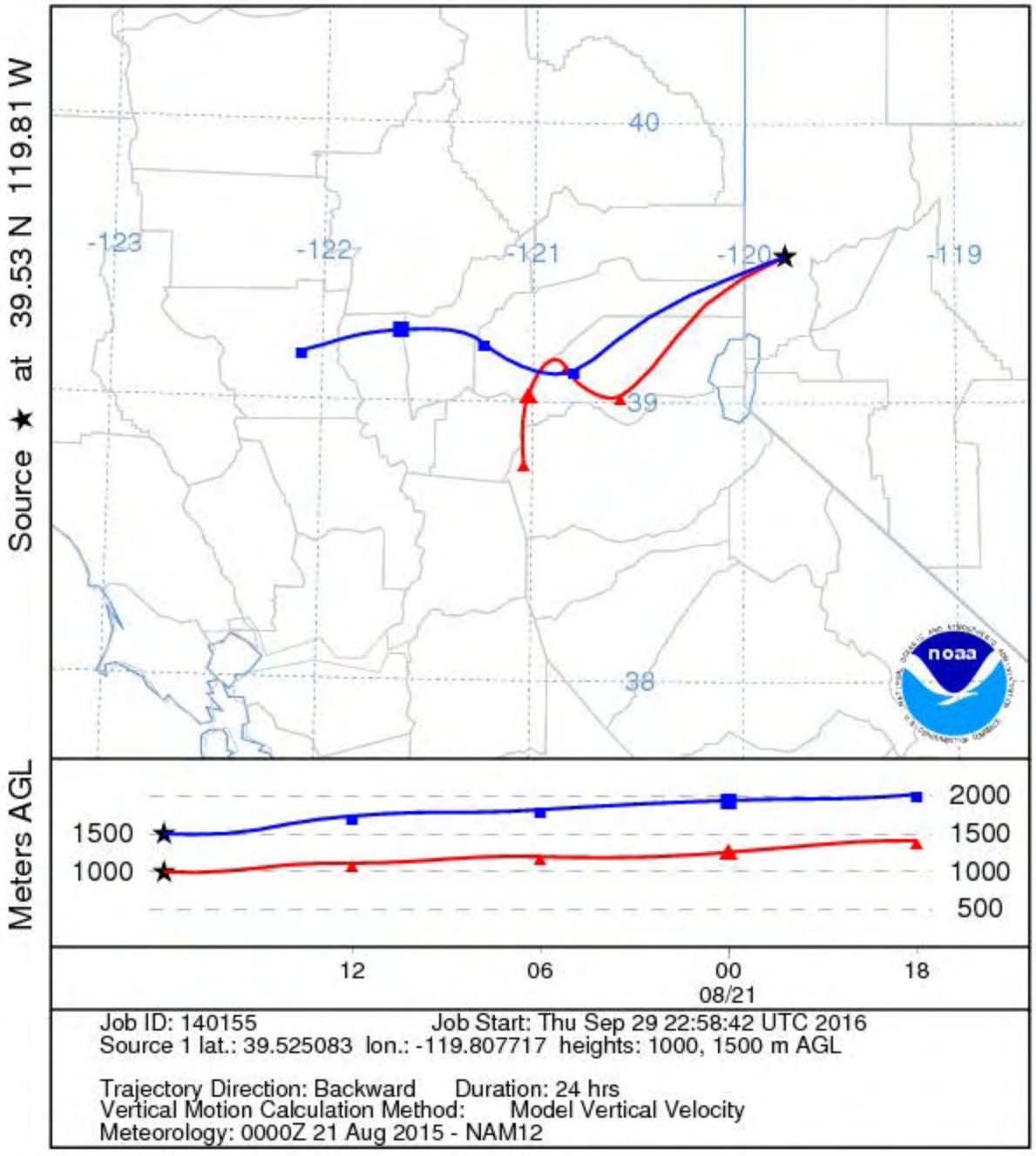
NOAA HYSPLIT MODEL
Backward trajectories ending at 1700 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 139795 Job Start: Thu Sep 29 22:57:50 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

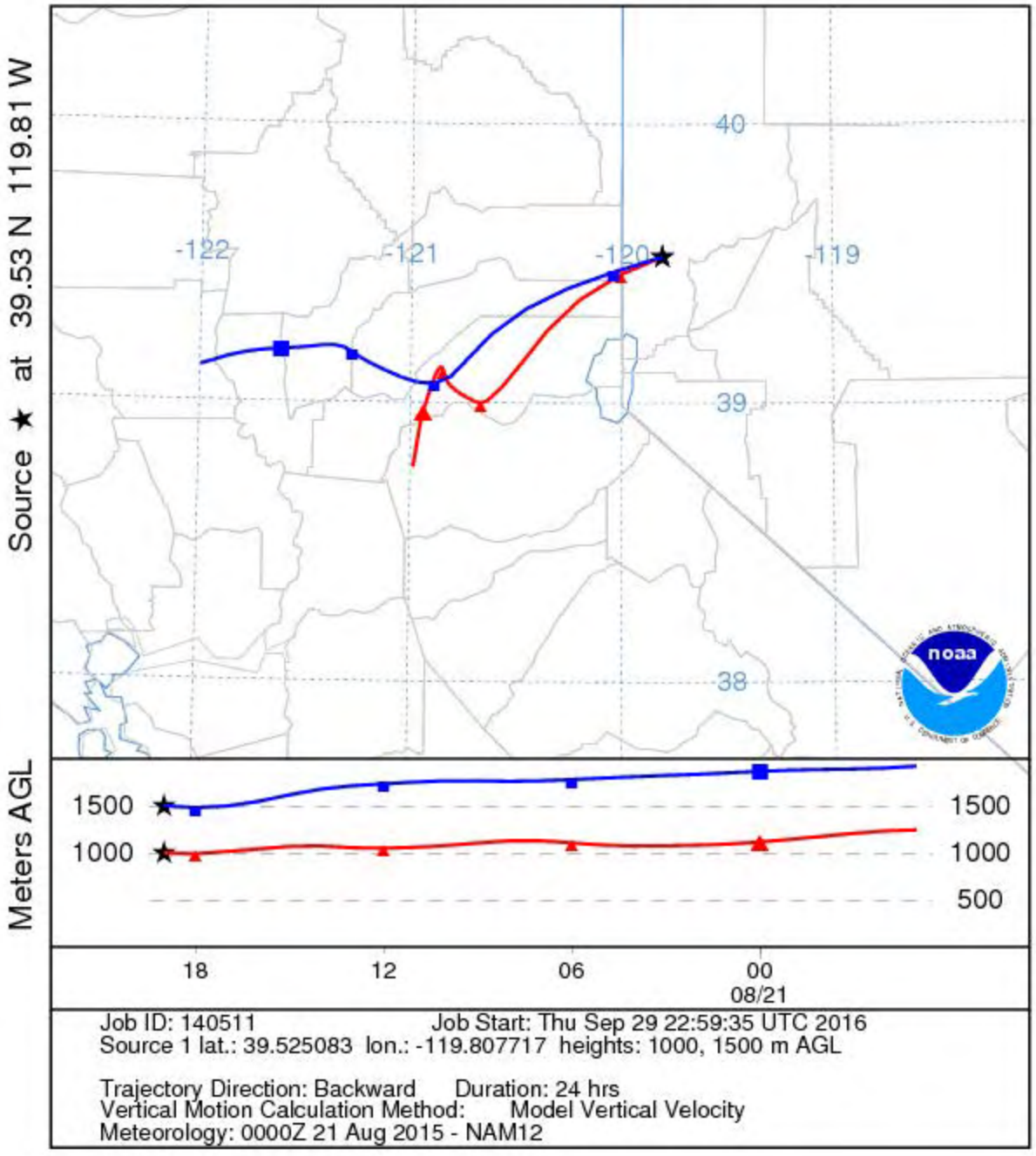
NOAA HYSPLIT MODEL
Backward trajectories ending at 1800 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 140155 Job Start: Thu Sep 29 22:58:42 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

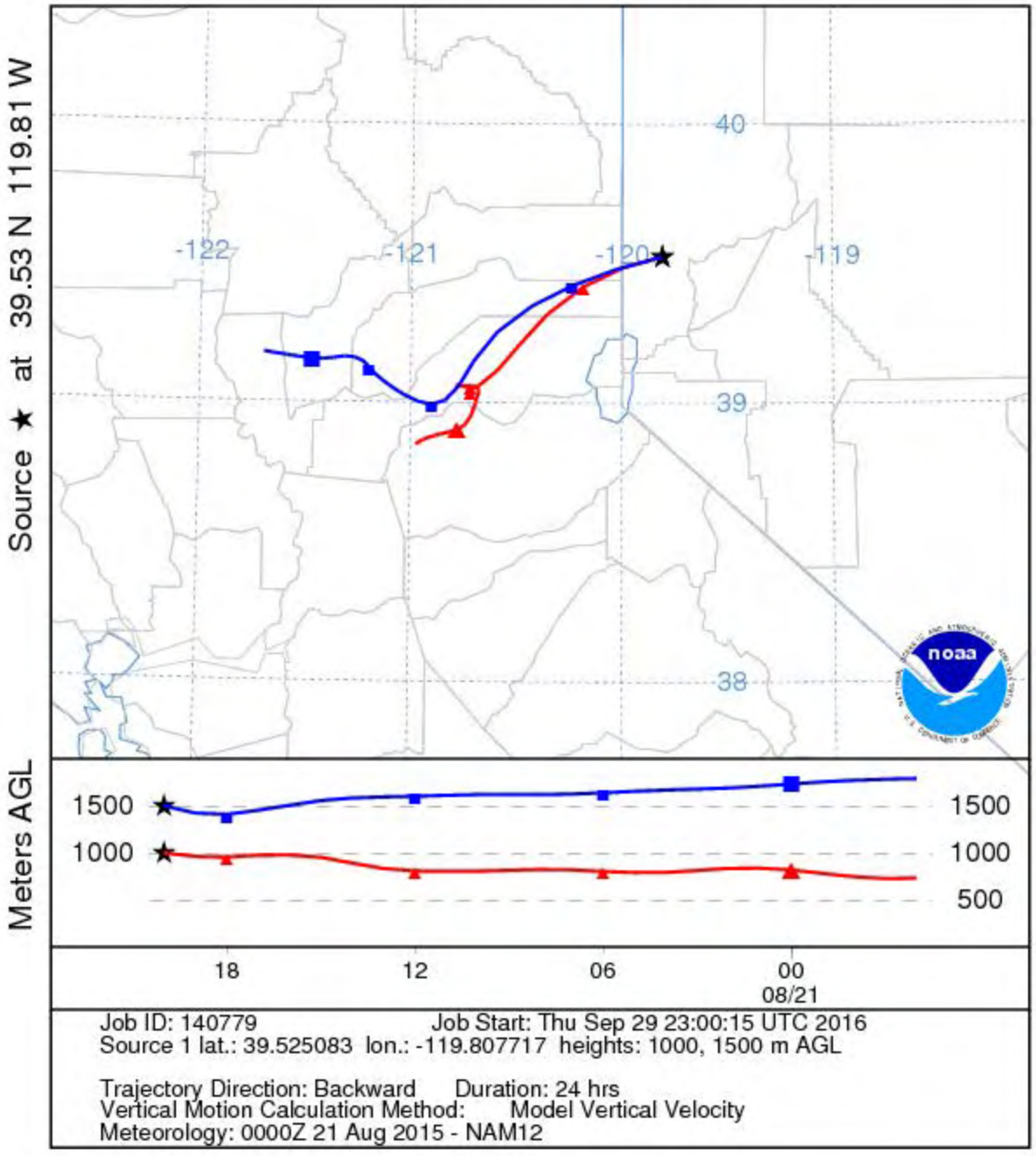
NOAA HYSPLIT MODEL
Backward trajectories ending at 1900 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 140511 Job Start: Thu Sep 29 22:59:35 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

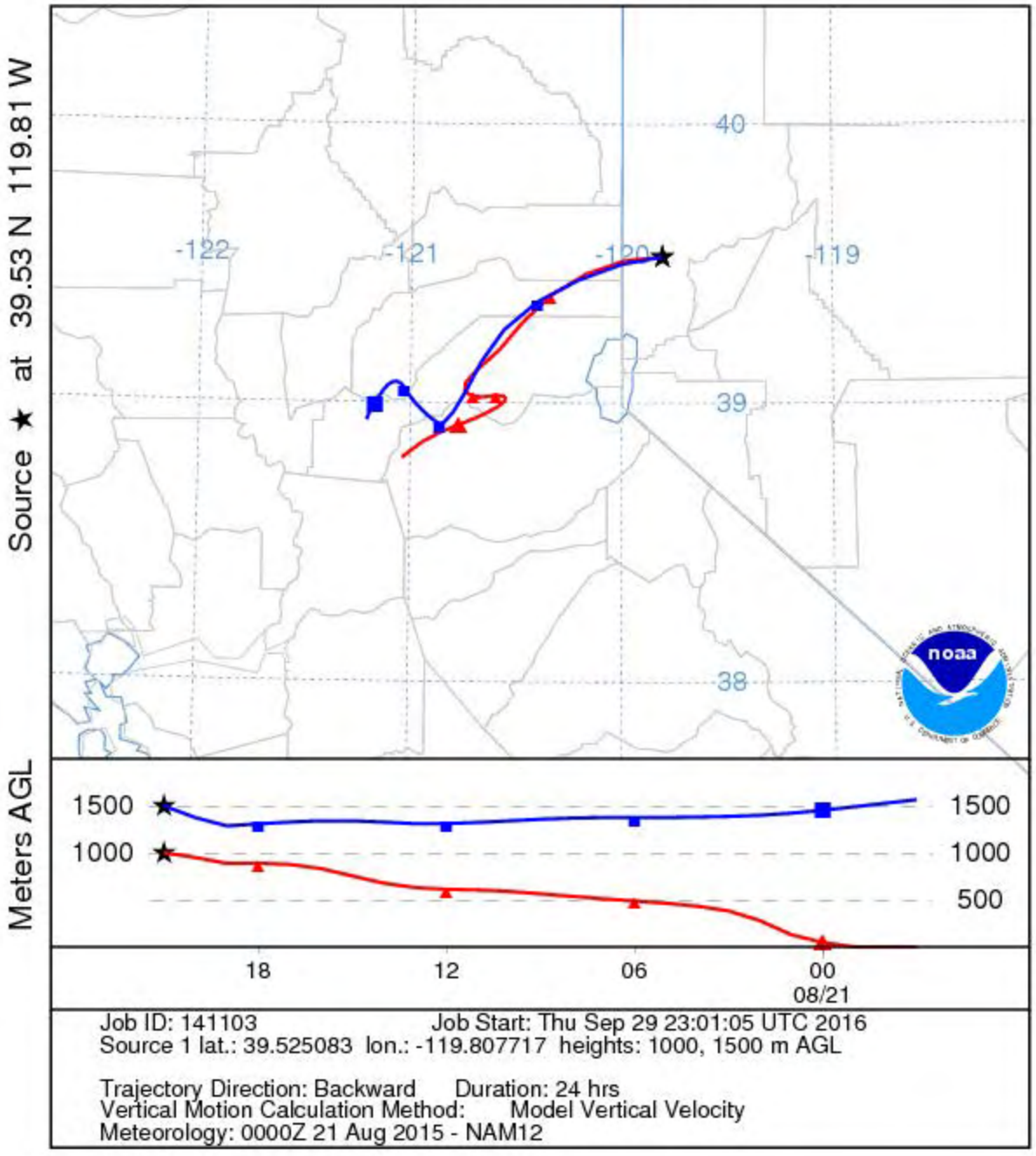
NOAA HYSPLIT MODEL
Backward trajectories ending at 2000 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 140779 Job Start: Thu Sep 29 23:00:15 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

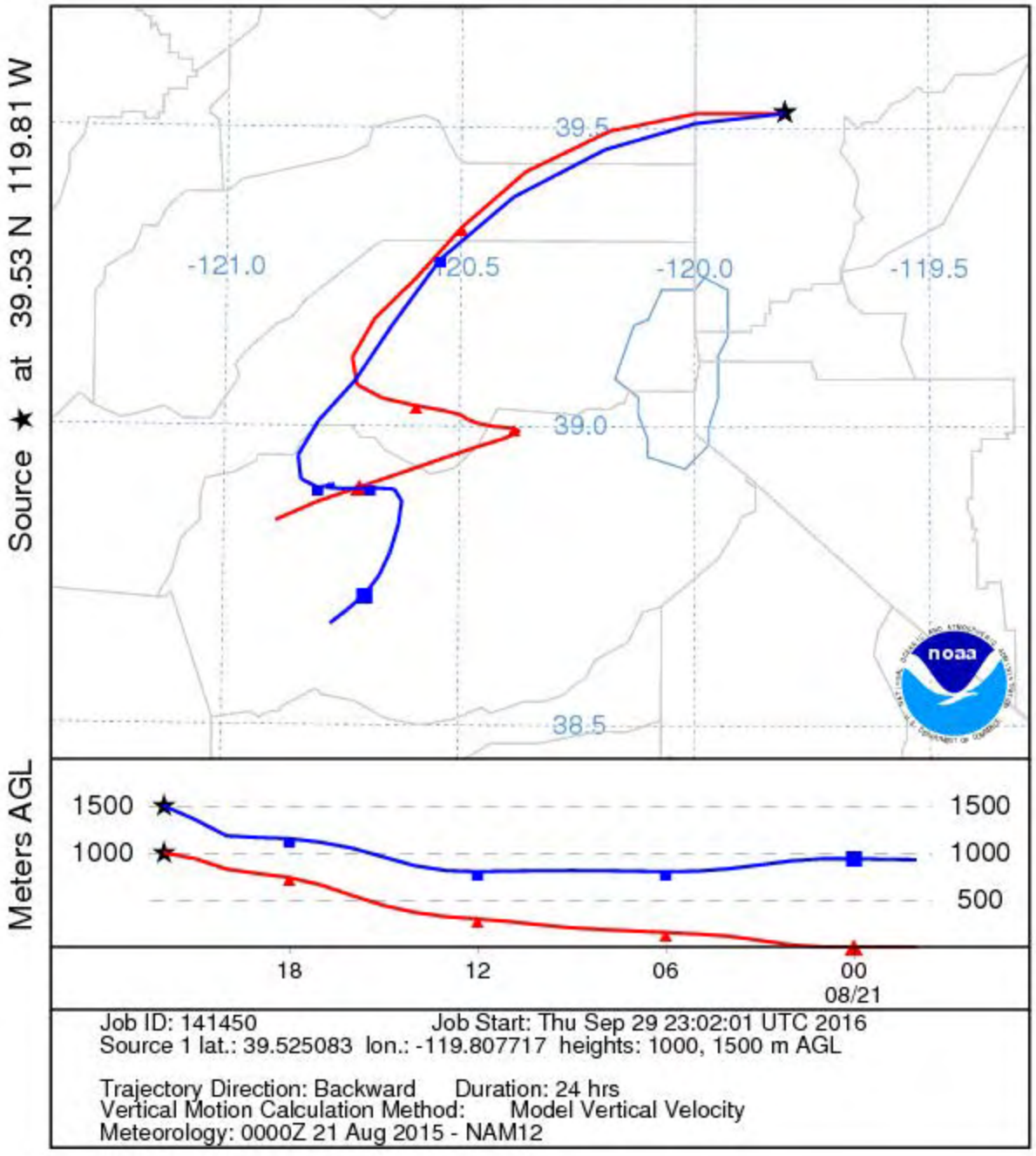
NOAA HYSPLIT MODEL
Backward trajectories ending at 2100 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 141103 Job Start: Thu Sep 29 23:01:05 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

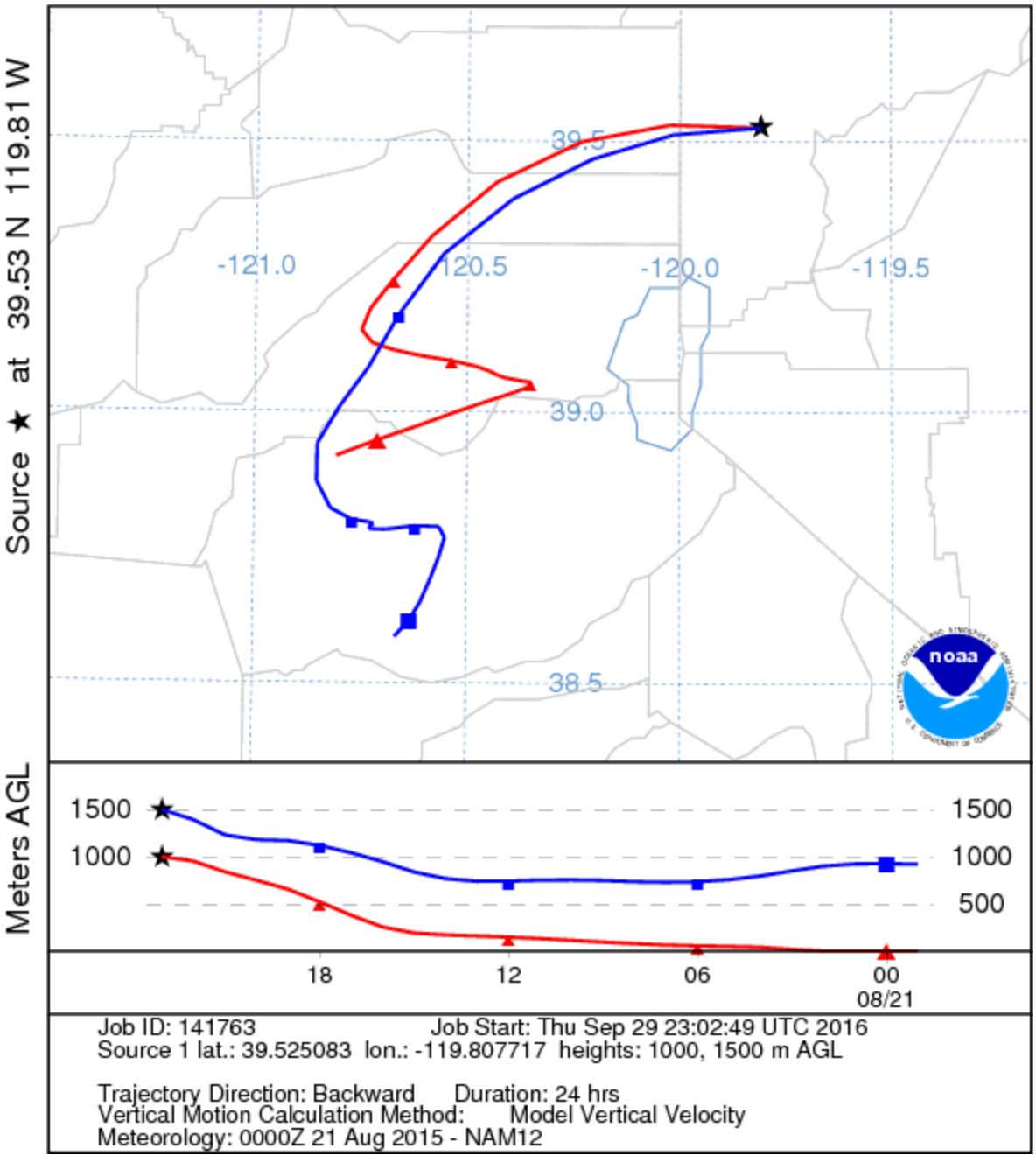
NOAA HYSPLIT MODEL
Backward trajectories ending at 2200 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 141450 Job Start: Thu Sep 29 23:02:01 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

NOAA HYSPLIT MODEL
Backward trajectories ending at 2300 UTC 21 Aug 15
NAM Meteorological Data



Job ID: 141763 Job Start: Thu Sep 29 23:02:49 UTC 2016
Source 1 lat.: 39.525083 lon.: -119.807717 heights: 1000, 1500 m AGL

Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 21 Aug 2015 - NAM12

Addendum to the

Exceptional Events Demonstration for 2015 Ozone Exceedance in Washoe County from the 2015 California Wildfires August 21, 2015

Submitted to U.S. EPA Region 9 March 17, 2017

Prepared by:

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OurCleanAir.com

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ACRONYMS

AQI	Air Quality Index
AQMD	Washoe County Health District, Air Quality Management Division
AQS	Air Quality System
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EC	Elemental Carbon
EE	Exceptional Event
EER	Exceptional Events Rule
EPA	U.S. Environmental Protection Agency
ºF	Degrees Fahrenheit
HA 87	Hydrographic Area 87
HYSPLIT	Hybrid Single-Particle Lagrangian Integrated Trajectory
km	Kilometers
$\mu g/m^3$	Micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-Pollutant Monitoring Station
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NWS	National Weather Service
OC	Organic Carbon
O_3	Ozone
PST	Pacific Standard Time
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter less than or equal to 2.5 microns in aerodynamic diameter
PM_{10}	Particulate Matter less than or equal to 10 microns in aerodynamic diameter
ppm	Parts Per Million
SLAMS	State and Local Air Monitoring Station
SO_2	Sulfur Dioxide
TSP	Total Suspended Particles
UTC	Coordinated Universal Time
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1.0 NARRATIVE CONCEPTUAL MODEL

1.1 Regional Description

Refer to the *Exceptional Events Demonstration for 2015 Ozone Exceedance in Washoe County from the 2015 California Wildfires August 21, 2015* (2015 EE Demonstration).

1.2 Overview of Ambient Air Monitoring Network

Refer to the 2015 EE Demonstration

1.3 Characteristics of Non-Event Ozone Formation

Refer to the 2015 EE Demonstration

2.0 EXCEPTIONAL EVENT SUMMARY

2.1 Exceptional Events Definition and Demonstration Criteria

Refer to the 2015 EE Demonstration

2.2 Statement of Purpose

In August 2015, smoke from numerous lightning caused wildfires in California, Oregon, and Washington was transported into the Reno/Sparks, Nevada area. This resulted in elevated ozone (O_3) and fine particulate matter ($PM_{2.5}$) concentrations on August 18-21, 2015. On June 3, 2016, the Washoe County Health District, Air Quality Management Division (AQMD) submitted an Initial Notification of Potential Exceptional Event Information Summary to the U.S. Environmental Protection Agency (EPA) Region 9 requesting exclusion of those data for comparison to National Ambient Air Quality Standards (NAAQS). EPA determined that the August 2015 event could have a regulatory impact, however, directed AQMD to proceed with an exceptional events demonstration for a single monitor (Reno3, AQS ID 32-031-0016), for a single parameter (O_3), for a single day (August 21).

On November 10, 2016, AQMD submitted an *Exceptional Events Demonstration for 2015 Ozone Exceedance in Washoe County from the 2015 California Wildfires August 21, 2015 (*2015 EE Demonstration*)* to EPA Region 9. Subsequently, EPA Region 9 requested an addendum to the 2015 EE Demonstration to include two additional days (August 18 and 19, 2015) for O_3 from the Reno3 monitor.

This addendum includes additional data and information demonstrating that the O_3 exceedances on August 18 and 19, 2015 were the result of smoke impacts from numerous wildfires throughout the Pacific Northwest. It also further supports the August 21, 2015 event documented in the 2015 EE Demonstration.

This addendum underwent 30-day public comment concurrent with EPA Region 9's review beginning March 17, 2017 pursuant to 40 CFR 50.14(c)(3)(v). By May 1, 2017, AQMD will forward any written comments received and provide documentation that the public comment process was followed.

2.3 Summary of Event

The 2015 fire season in California was above the 10-year average with 8,745 fires and 893,362 acres burned as reported by all agencies. The 10-year average is 7,971 fires with 673,446 acres burned. Of the 8,745 fires, 273 were greater than 10 acres. Additionally, the fire season in the Pacific Northwest was record-breaking.

On August 16, 2015, smoke from numerous wildfires throughout California, Oregon, and Washington began to impact the Reno/Sparks area. Smoke plume impacts continued to affect the Reno/Sparks area throughout August. Between August 18 and August 21, 2015, the AQMD monitored 9 exceedances of the 2015 8-hour O_3 NAAQS and 2 exceedances of the 24-hour

$PM_{2.5}$ NAAQS across its air quality monitoring network. The AQMD is requesting additional exclusion through this addendum of the 8-hour O_3 concentrations from Reno3 on August 18 and 19, 2015 due to the increase in $PM_{2.5}$ from wildfire smoke causing exceedances of the O_3 NAAQS.

The Reno/Sparks area was impacted from the California Complex Fires (Fork, Mad River, South, Route, River, and Gasquet) and Nickowitz Fire north of the Complex Fires (refer to the 2015 EE Demonstration for perimeter maps of the California Complex Fires), as well as several complex fires located throughout Oregon and Washington (Figures 2.1 and 2.2). The exceptional event days are summarized below.

Figure 2.1: Location of Large Fire Locations in Oregon 2015
(Northwest Annual Fire Report 2015)

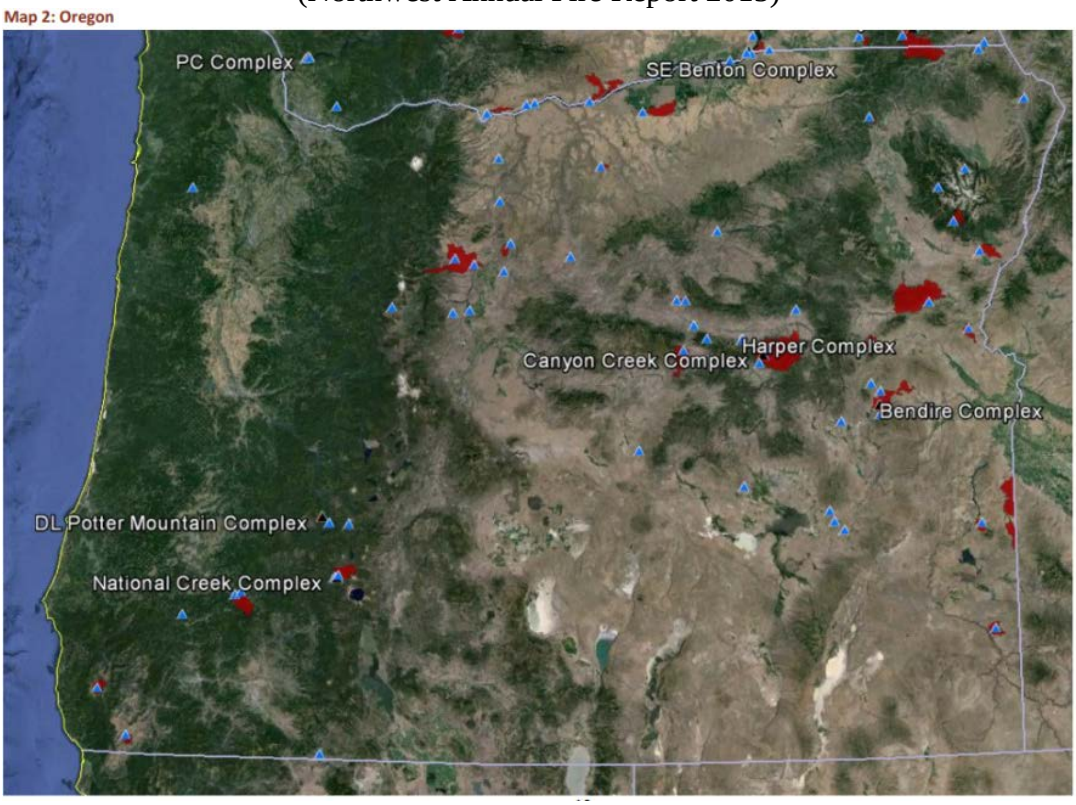
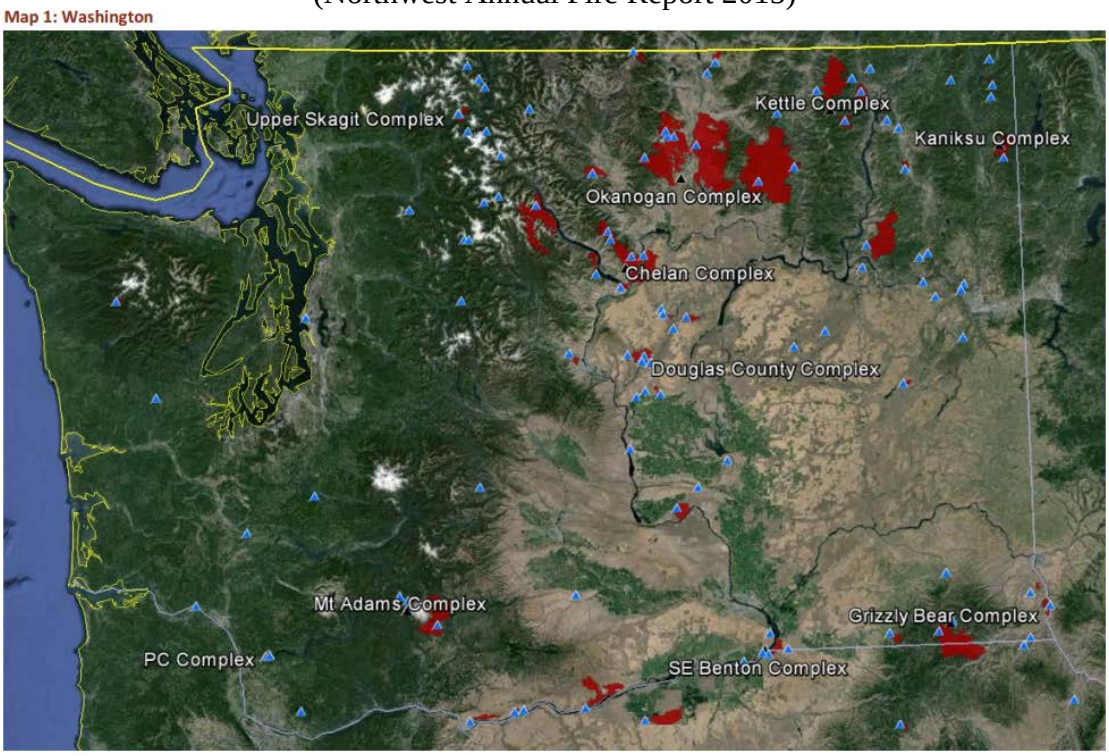


Figure 2.2: Location of Large Fire Locations in Washington 2015
(Northwest Annual Fire Report 2015)



Daily Event Summaries

The following sections and figures below show evidence that there was an exceptional event on August 17, 18, and 19, 2015, and the impacts from the event affected the Reno/Sparks area. Included below by event day is: 1) Current Wildland Fires map for California, 2) Worldview satellite image of visible smoke from the Pacific Northwest wildfires, 3) AirNow Tech images of the HMS smoke plume, detected fires, and O_3 concentrations, 4) HMS smoke plume maps, 5) Satellite Smoke Text Products[1], and 6) media posts. Media posts were not readily available for August 16 and 17, 2015 as the heaviest wildfire smoke was still upwind of the Reno/Sparks area.

AQMD collaborated with the National Weather Service (NWS) and local media to provide timely notifications to the public throughout the exceptional event. Air Quality Index (AQI) forecasts and air alerts were distributed daily, or more frequently, via EnviroFlash and social media (Facebook, Twitter). AQMD leverages NWS and local media's tens of thousands of social media followers to share accurate and consistent information to the community. In addition, air quality information was available from the AQMD website (OurCleanAir.com) and Air Quality Hotline [(775) 785-4110].

[1] These text products are produced by the National Oceanic and Atmospheric Administration and provide a narrative of the satellite imagery. Text products are updated twice per day. Current and historic text products are available at www.ssd.noaa.gov/PS/FIRE/smoke.html.

August 16, 2015 Event Summary

Figure 2.3: Location of California Wildland Fires August 16, 2015

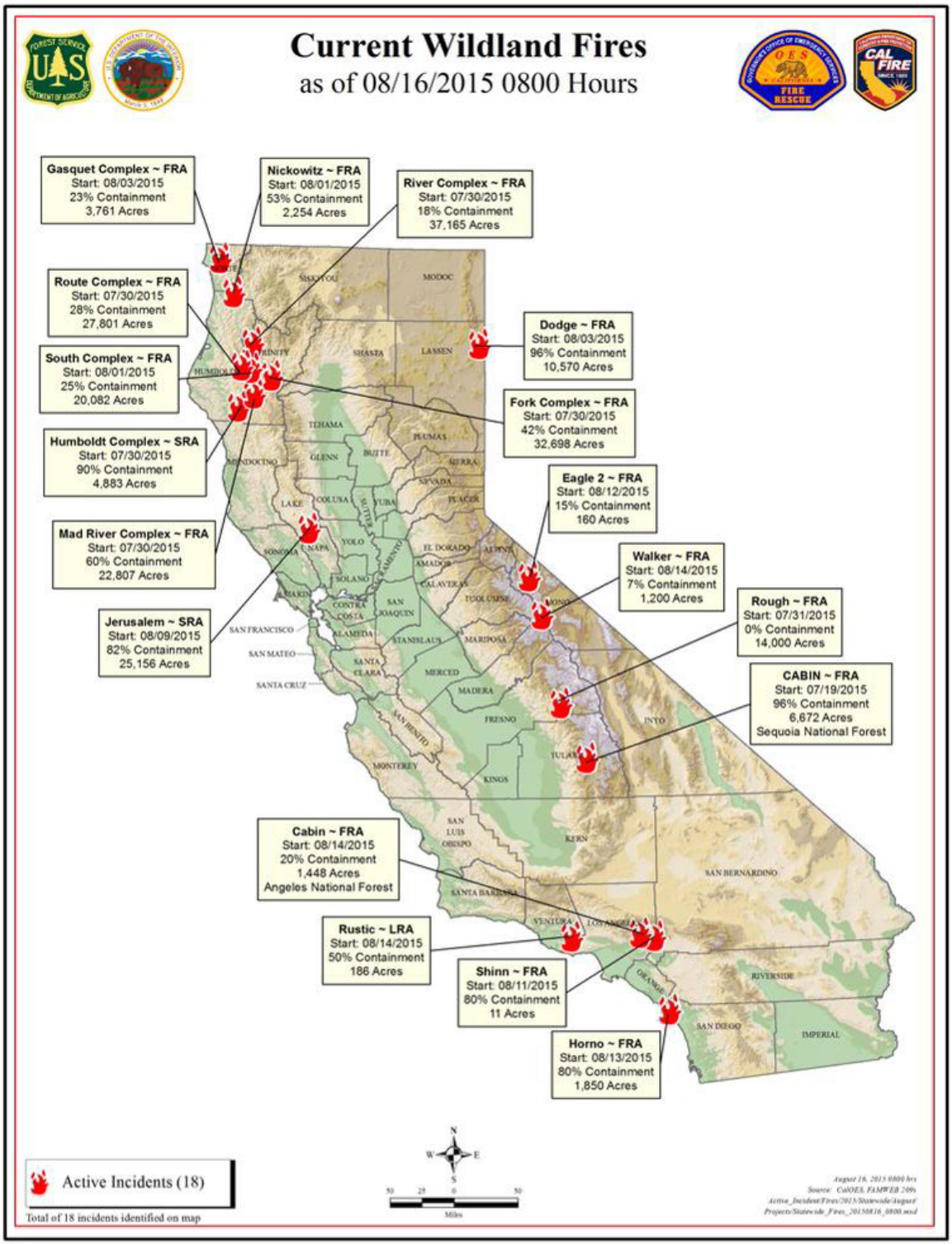


Figure 2.4: Satellite Image of the California and Pacific Northwest Wildfires August 16, 2015

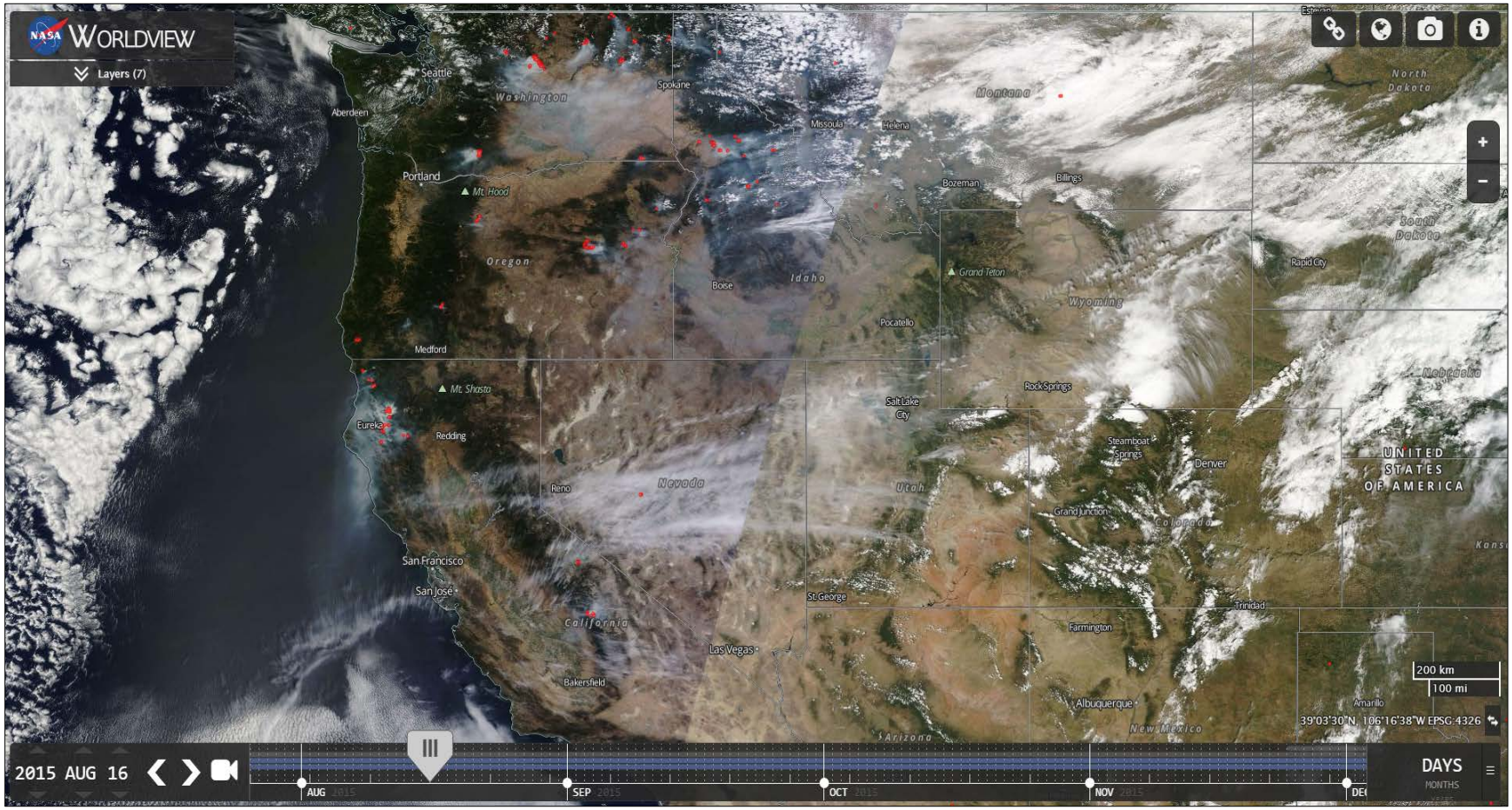


Figure 2.5: AirNow Tech Image of Active Fires, Smoke Plumes, and O_3 Concentrations throughout the Pacific Northwest
August 16, 2015

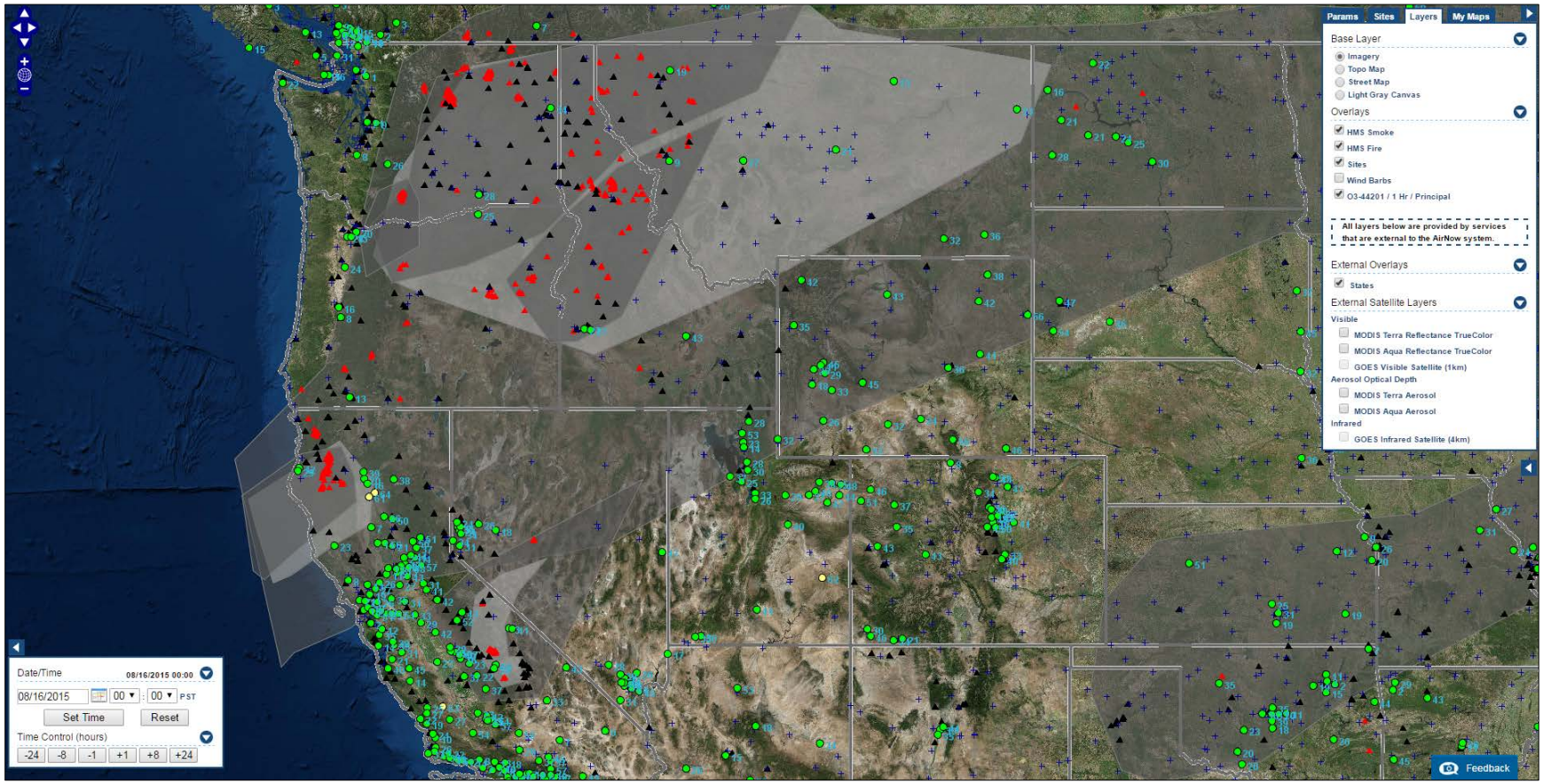


Figure 2.6: HMS Smoke Plume Map August 16, 2015

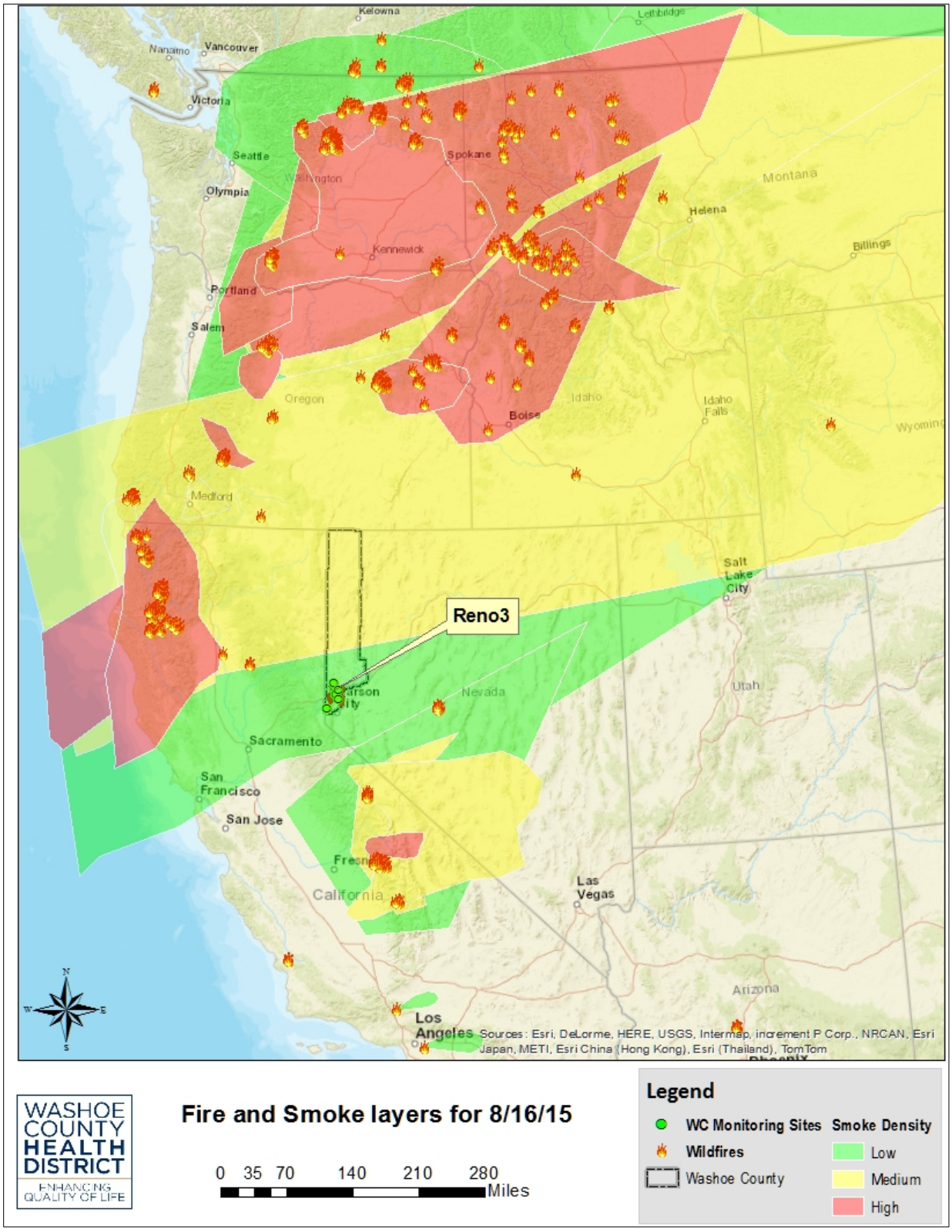


Figure 2.7: Satellite Smoke Text Product August 16, 2015

Saturday, August 15, 2015

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0245Z August 16, 2015

SMOKE:
Northwestern/North Central US/South Central Canada:
The large number of wildfires scattered across portions of the
Northwestern US continued to emit tremendous quantities of smoke. The
largest and most dense area of smoke of moderate to thick density was
visible spreading to the east across portions of Washington, Oregon, and
Idaho, across Montana and North Dakota. The thicker smoke also covered
much of the southern half of Alberta, Saskatchewan, and Manitoba in
southwestern Canada.

Northern and Central California:
Thick smoke from the cluster of fires in northern California moved
primarily to the south and over west central California and offshore
over the Pacific along the coast.

East Central California/Western Nevada:
Fires in the Sierras produced thick smoke plumes which moved to the
northeast into western Nevada.

Much of the US and Southern to Southeastern Canada:
An extremely large surrounding mass of mainly thin density smoke
was visible in between the thicker areas of smoke over the Western
and Northwestern US and also over a large portion of the Central and
South Central US as well as over the northern Great Lakes region. The
thinner density smoke also covered much of southeastern Canada and was
just beginning to enter the Northeastern US over northern NY state and
northern New England.

JS

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/Products/land/hms.html
GIS: http://www.firedetect.noaa.gov/viewer.htm
KML: http://www.ssd.noaa.gov/PS/FIRE/kml.html
ANY QUESTIONS OR COMMENTS REGARDING THIS PRODUCT SHOULD BE SENT TO
SSDFireTeam@noaa.gov

August 17, 2015 Event Summary

Figure 2.8: Location of California Wildland Fires August 17, 2015

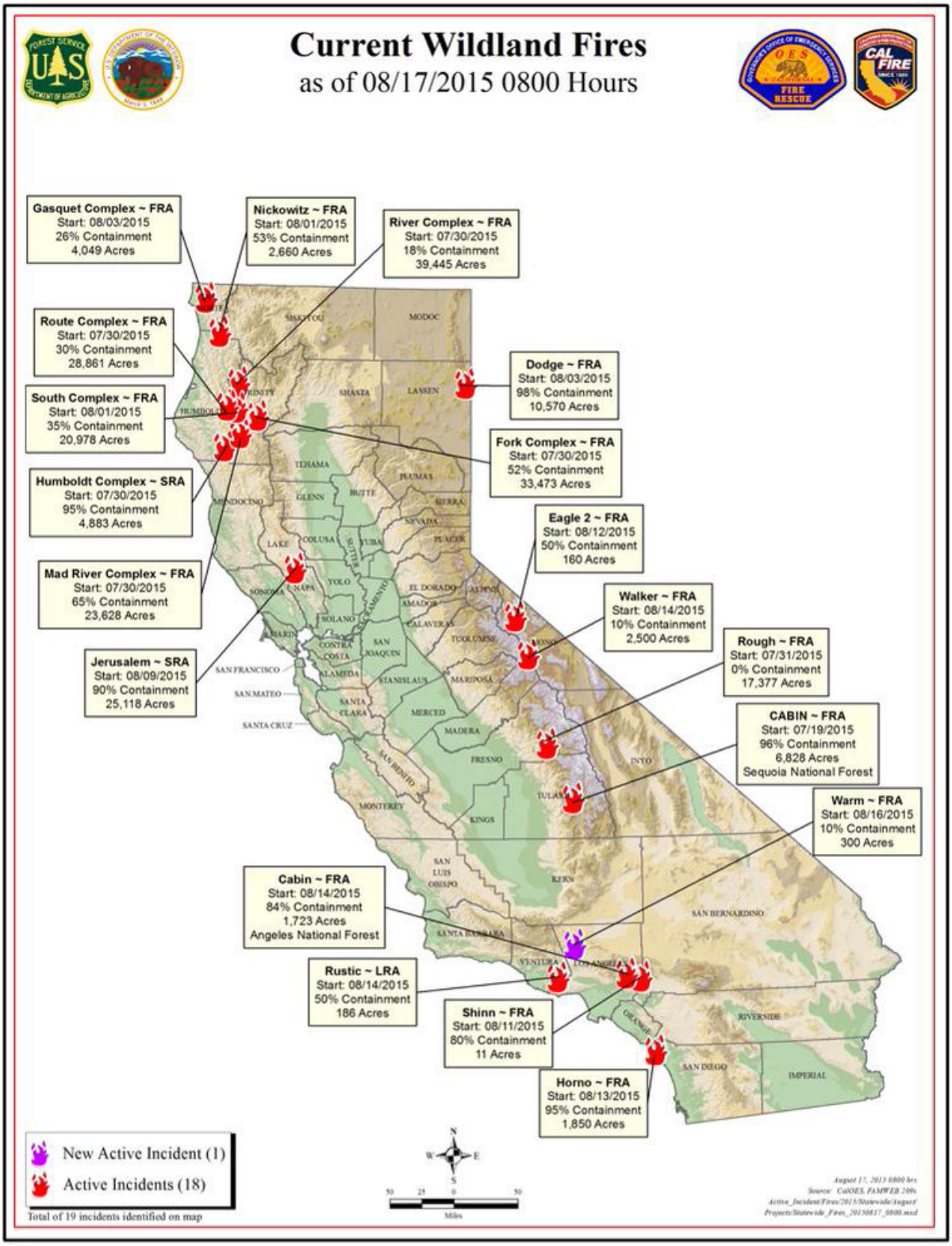


Figure 2.9: Satellite Image of the California and Pacific Northwest Wildfires August 17, 2015

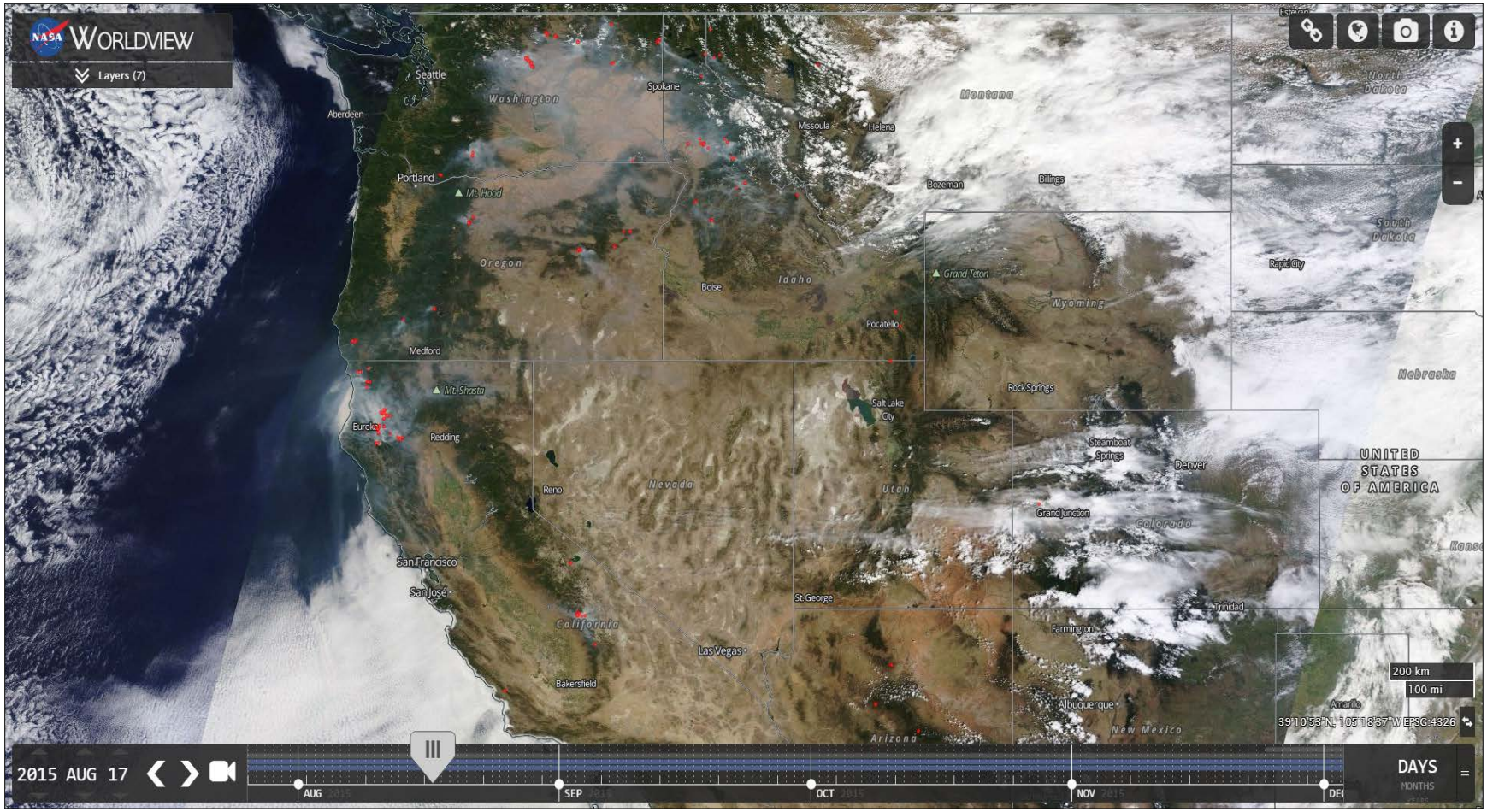


Figure 2.10: AirNow Tech Image of Active Fires, Smoke Plumes, and O_3 Concentrations throughout the Pacific Northwest
August 17, 2015

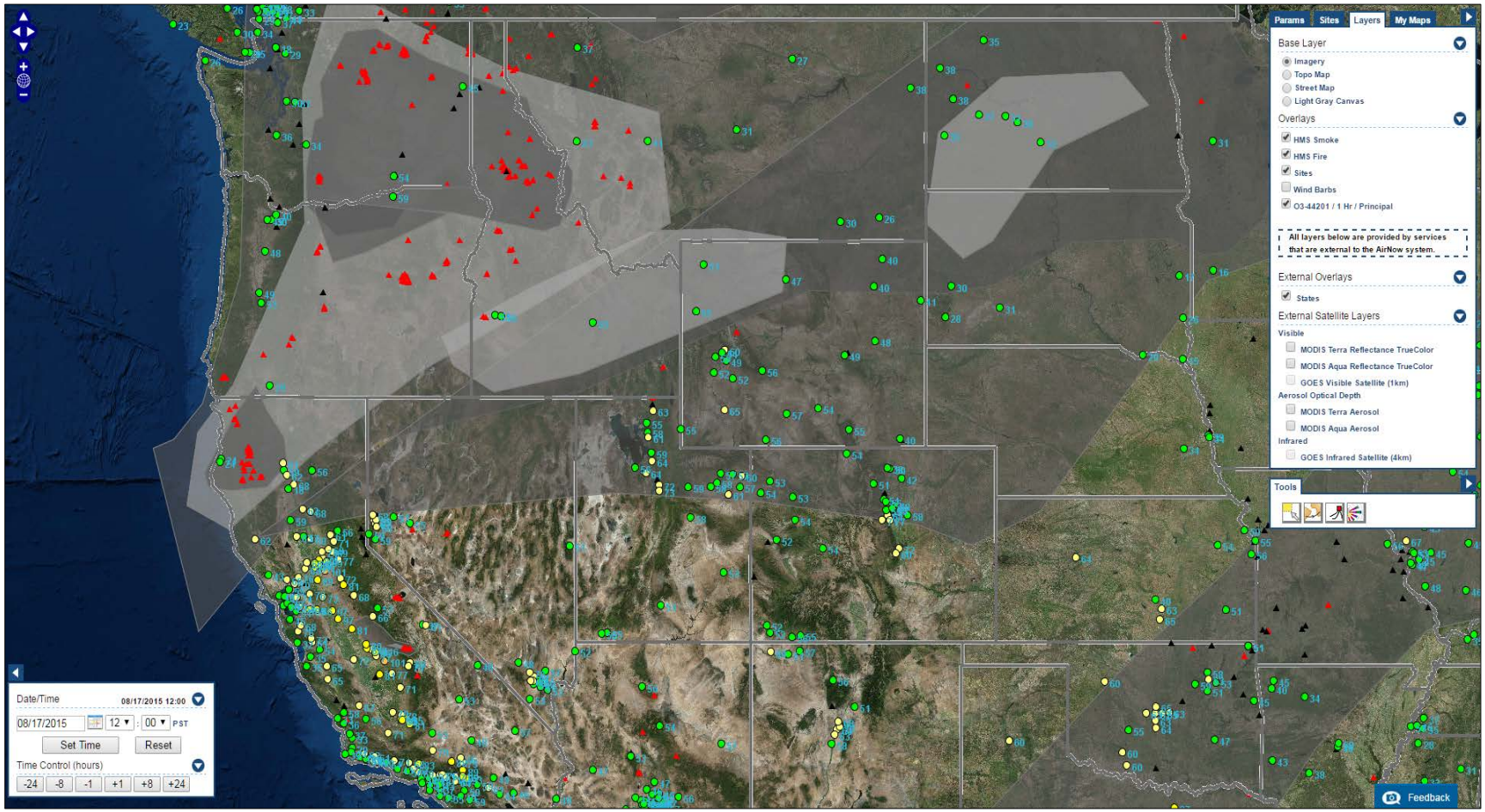


Figure 2.11: HMS Smoke Plume Map August 17, 2015

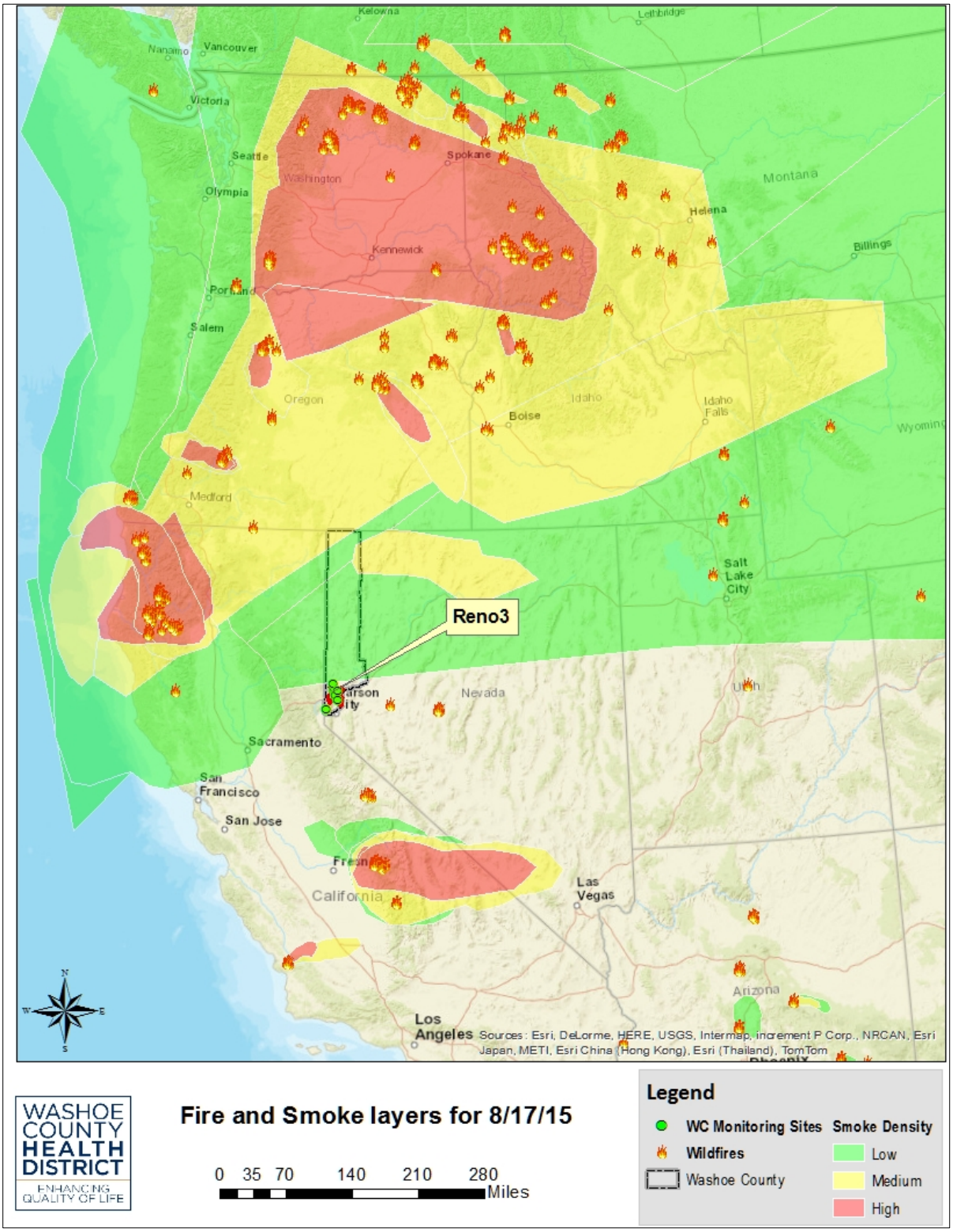


Figure 2.12: Satellite Smoke Text Product August 17, 2015

Sunday, August 16, 2015

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0300Z August 17, 2015

SMOKE:
Western and Central US/Canada:
A large area of light to heavy density smoke is visible being emitted from wildfires burning in the Pacific NW that stretches across the country. The heaviest smoke is visible around the large wildfire complexes located in California, Oregon, Washington, Idaho, and Montana. Medium-density smoke is visible throughout California, Nevada, Oregon, Washington, Idaho, Montana, Wyoming, North and South Dakota, and Minnesota into Ontario. Light density smoke is visible in a majority of central US moving east and south, affecting Michigan, Ohio, Indiana, Wisconsin, Illinois, Iowa, Missouri, Arkansas, Kansas, Oklahoma, and Texas. Another light density plume is seen in eastern Saskatchewan moving through northern Manitoba, southwestern Nunavut, through central Hudson Bay and into Northern Quebec.

Northern and Central California:
Areas of low to heavy density smoke from the cluster of fires in northern California is moving west to the Pacific along the coast. The fires in central California are also producing low to moderate density smoke heading northeast in to Nevada and joining the bigger smoke produced from the fires in northwestern US.

Eastern US:
Two areas of light to medium density remnant smoke are visible moving NE through the central US/Great Lakes region into the Mid-Atlantic/Northeast and offshore Atlantic Ocean. This smoke originates from the wildfires burning in the Pacific NW and Canada.

Oegerle

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/Products/land/hms.html
GIS: http://www.firedetect.noaa.gov/viewer.htm
KML: http://www.ssd.noaa.gov/PS/FIRE/kml.html
ANY QUESTIONS OR COMMENTS REGARDING THIS PRODUCT SHOULD BE SENT TO SSDFireTeam@noaa.gov

August 18, 2015 Event Summary

Figure 2.13: Location of California Wildland Fires August 18, 2015

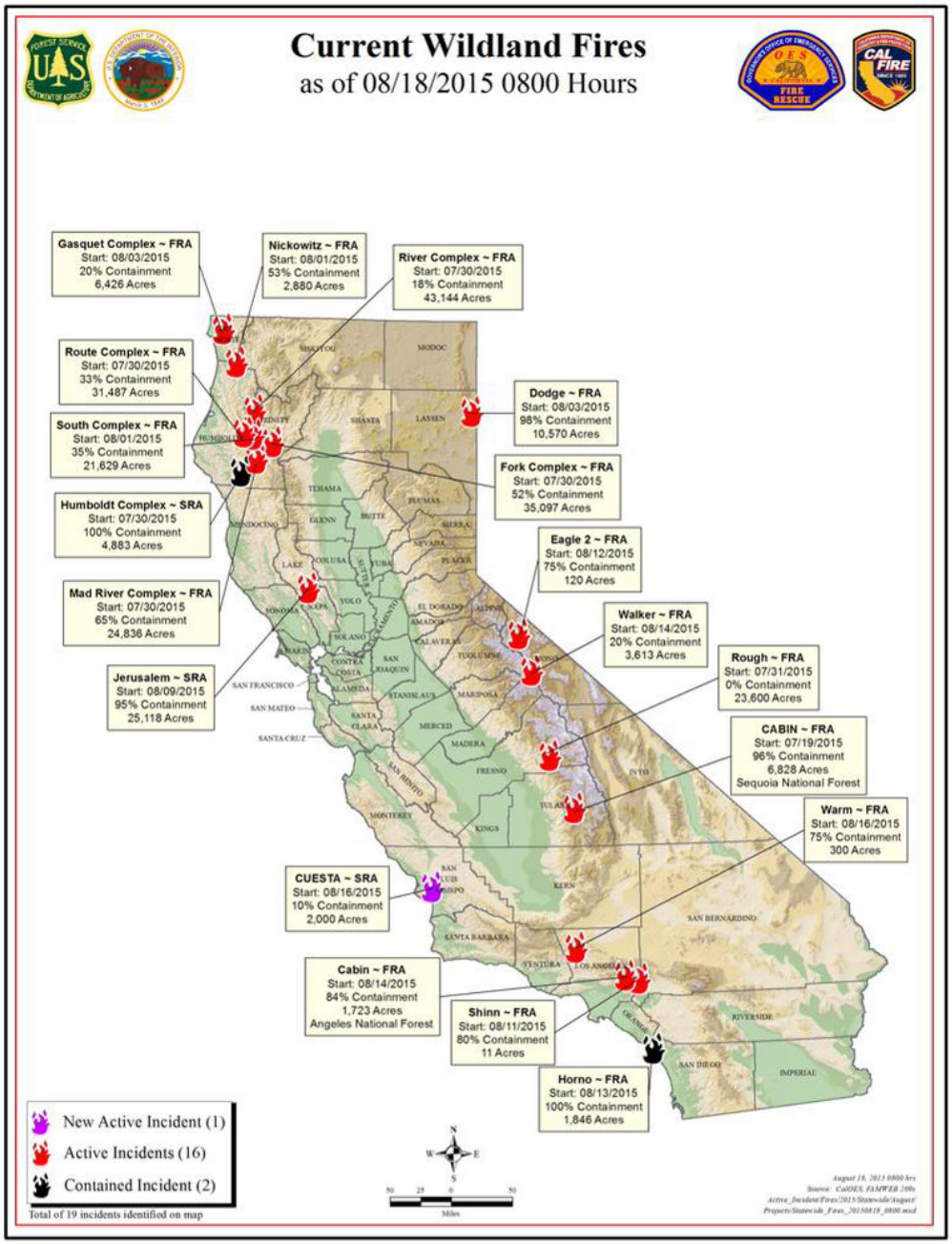


Figure 2.14: Satellite Image of the California and Pacific Northwest Wildfires August 18, 2015

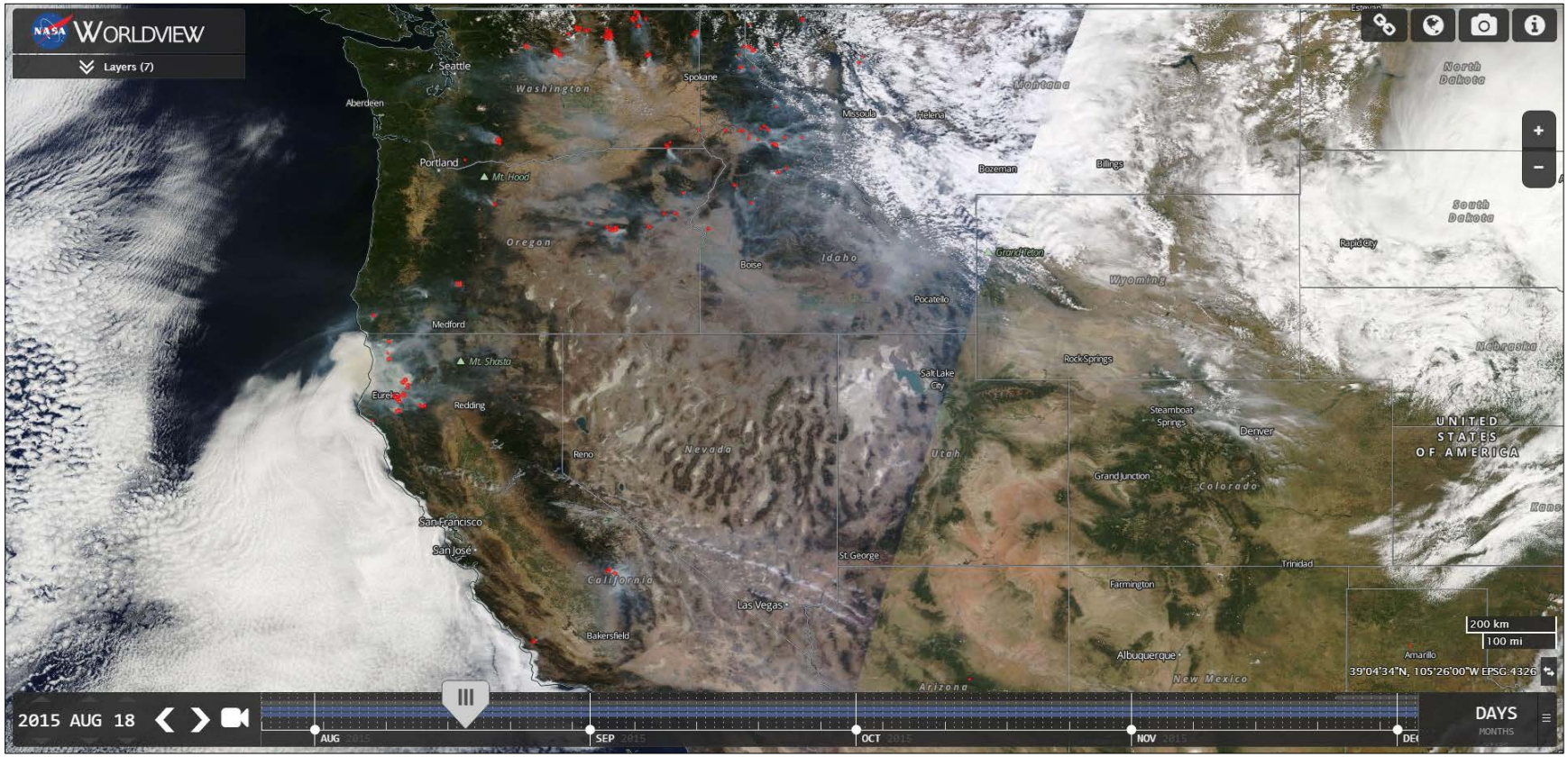


Figure 2.15: AirNow Tech Image of Active Fires, Smoke Plumes, and O_3 Concentrations throughout the Pacific Northwest
August 18, 2015

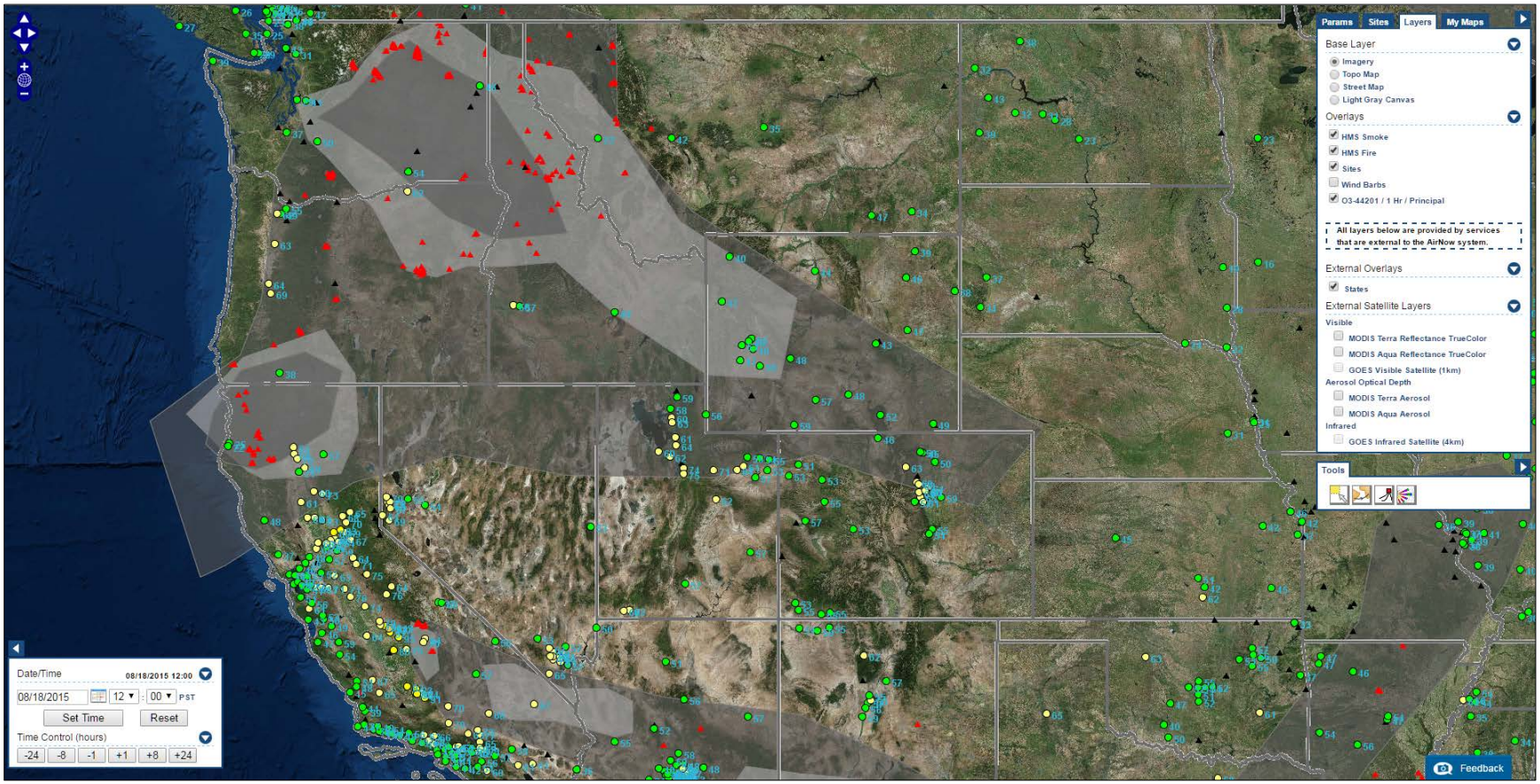


Figure 2.16: HMS Smoke Plume Map August 18, 2015

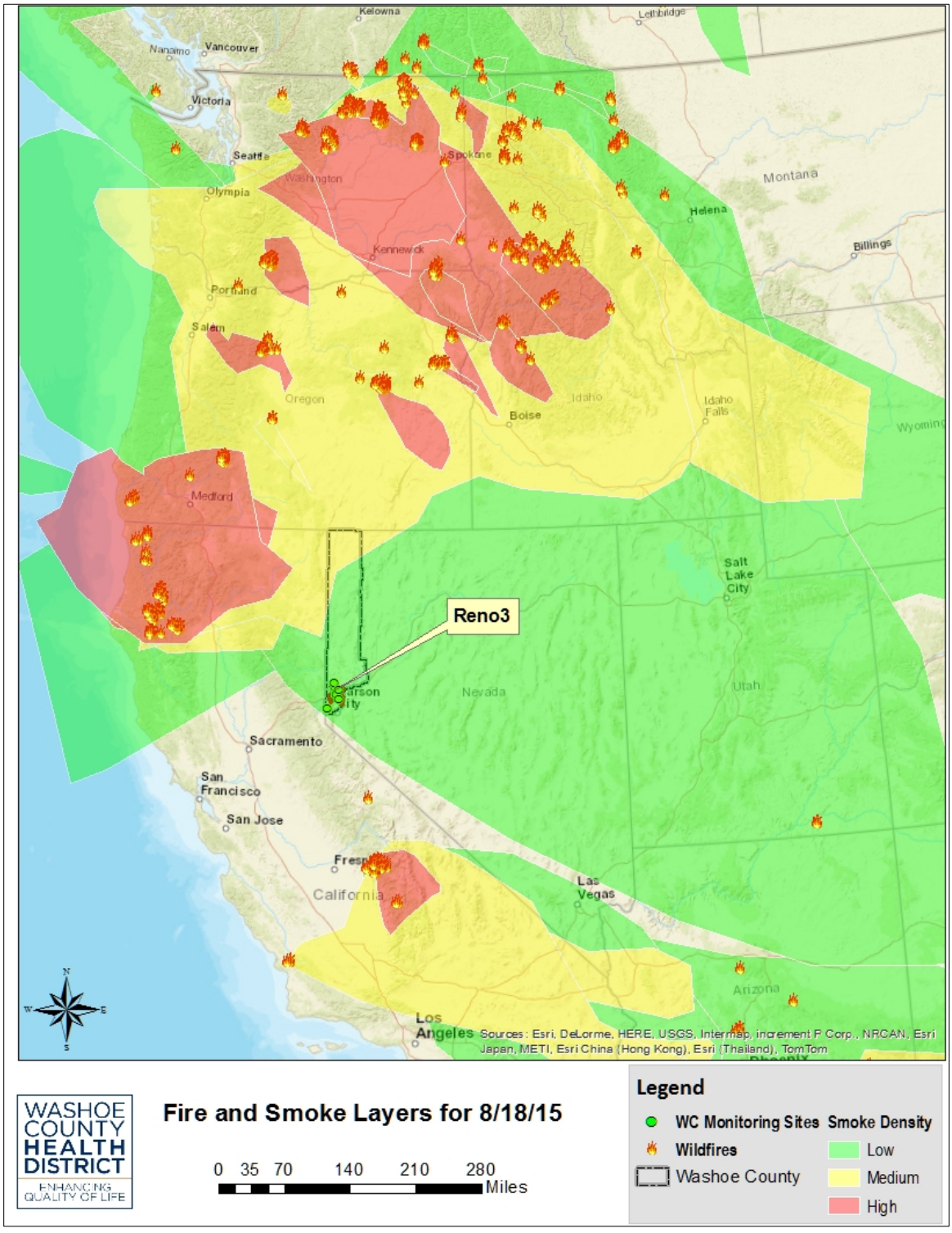


Figure 2.17: Satellite Smoke Text Product August 18, 2015

Monday, August 17, 2015

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0230Z August 18, 2015

SMOKE:
Western US/Plains/Southern Canada/Mississippi Valley/Upper Great
Lakes/Ohio Valley:
Numerous wildfires burning across the Pacific Northwest and California
are producing tremendous amounts of smoke over a large section of
western/central US. Moderately dense to dense smoke is seen across
sections of northern California, covering most of Oregon, northern
Nevada, central/eastern Washington, Idaho, western Montana, northwest
Wyoming and western North Dakota and South Dakota. The heaviest smoke
is located over northwest California, northern Oregon, central/eastern
Washington and into parts of northern Idaho. Lighter smoke spreads as
far east as Minnesota, as far north as southern Alberta/Saskatchewan
and as far south as northeast Kansas. Another area of residual smoke
from the wildfires out west is seen over parts of the Southern Plains,
spreading northeast across Texas, eastern/central Oklahoma, northeast
Arkansas, southeast Kansas, most of Missouri, Illinois, western Indiana
and up to northern Michigan.

Mid Atlantic and Northeast US/ far Eastern Canada/Atlantic
A large area of residual light smoke is seen as far south as Delaware
and extending north across the northeast into New Hampshire, Mass,
Conn, RI, Maine and north into eastern Quebec and far north as
Labrador/Newfoundland.

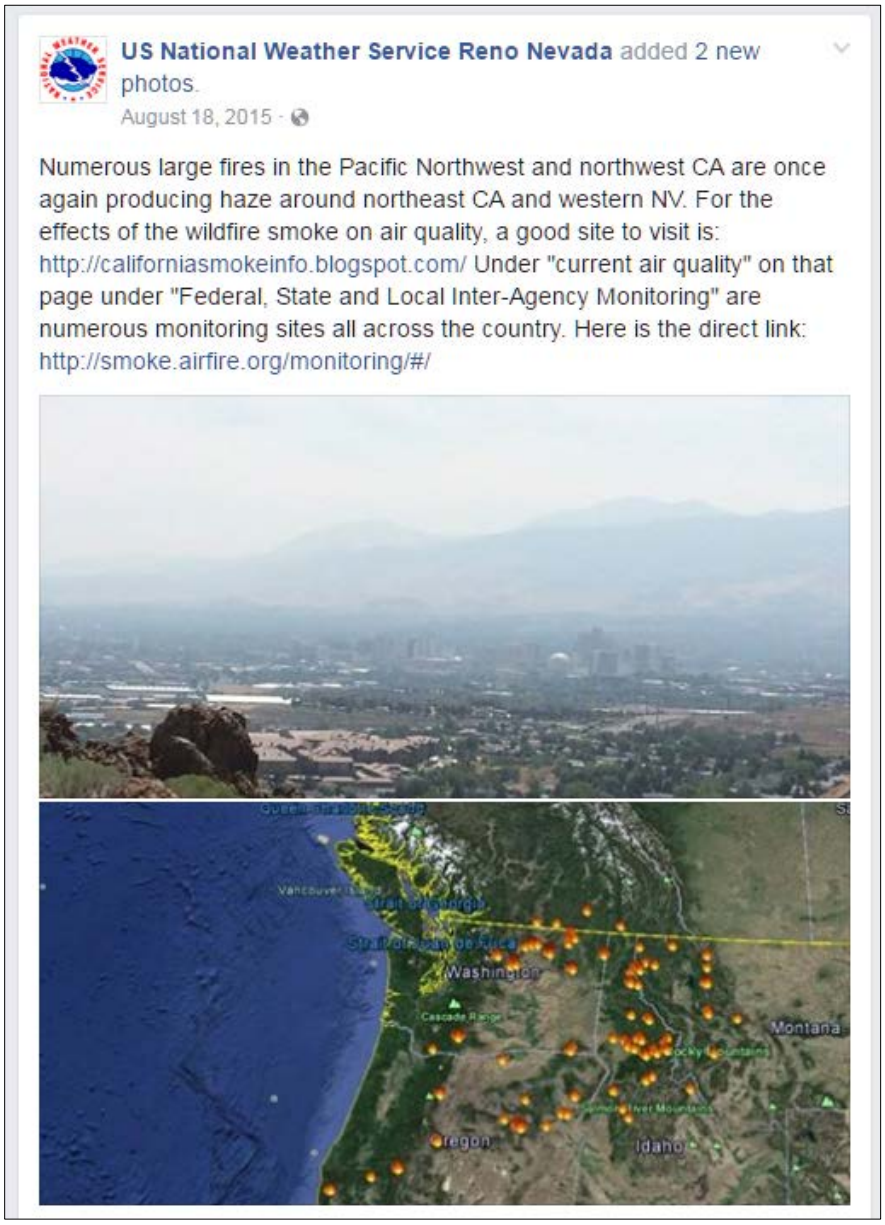
Southeast California:
A large wildfire burning in east central Fresno county is producing
a large area of moderately dense to very dense smoke across several
counties. Smoke is seen in Tulare and Inyo counties in California and
spreading east into the counties of Nye, Clark and Lincoln in southern
Nevada.

J Kibler

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/Products/land/hms.html
GIS: http://www.firedetect.noaa.gov/viewer.htm
KML: http://www.ssd.noaa.gov/PS/FIRE/kml.html
ANY QUESTIONS OR COMMENTS REGARDING THIS PRODUCT SHOULD BE SENT TO
SSDFireTeam@noaa.gov

Figure 2.18: Media Coverage August 18, 2015



August 19, 2015 Event Summary

Figure 2.19: Location of California Wildland Fires August 19, 2015

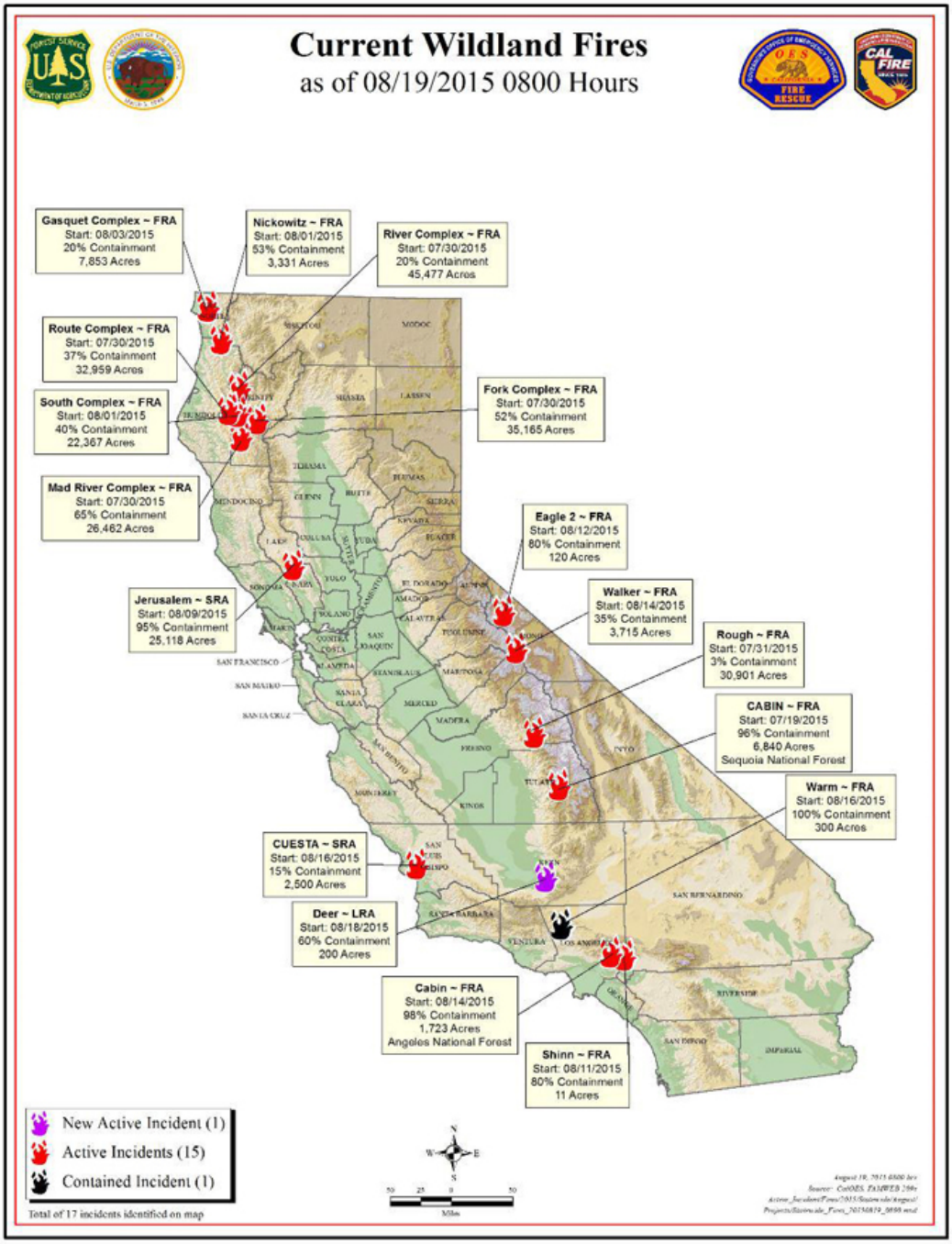


Figure 2.20: Satellite Image of the California and Pacific Northwest Wildfires August 19, 2015

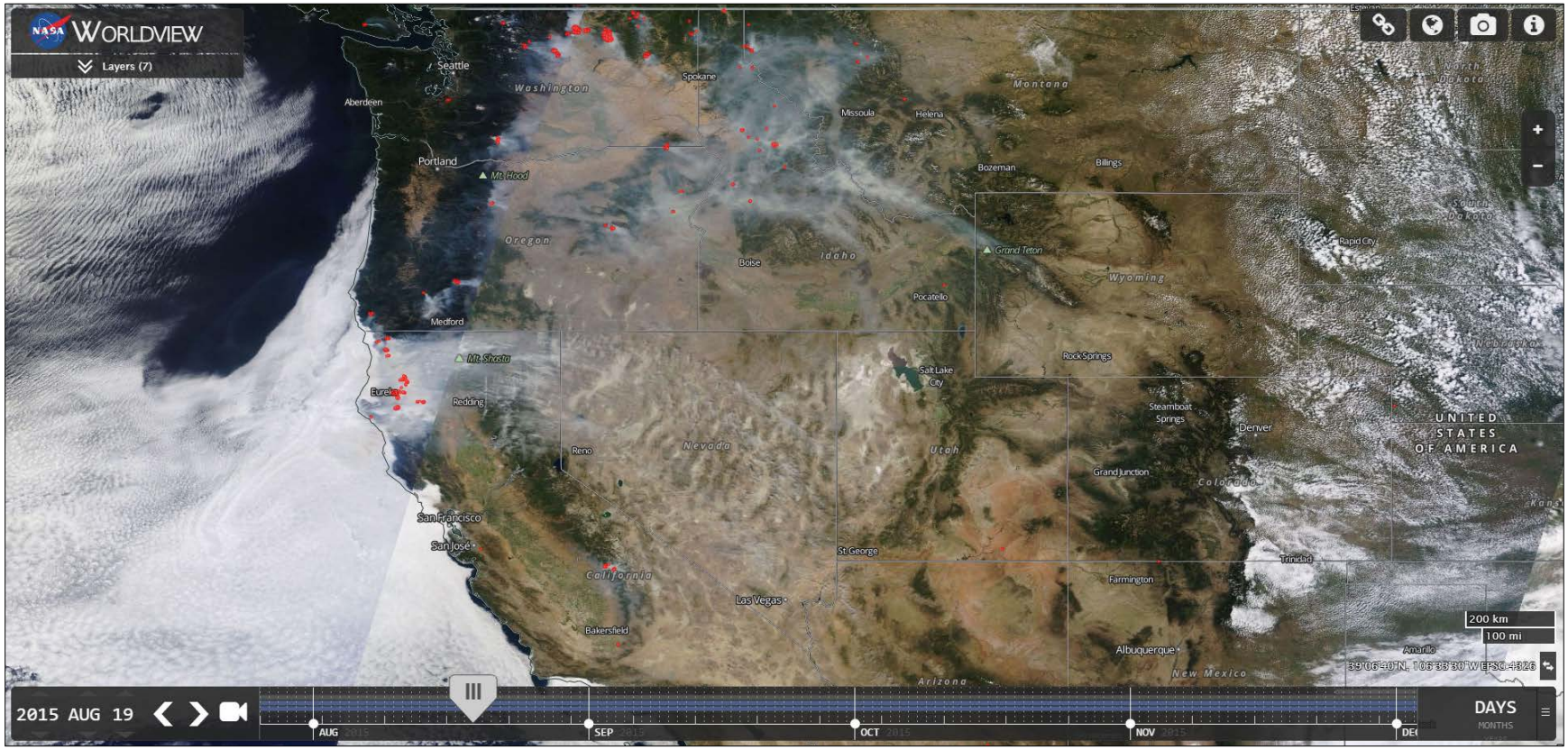


Figure 2.21: AirNow Tech Image of Active Fires, Smoke Plumes, and O_3 Concentrations throughout the Pacific Northwest
August 19, 2015

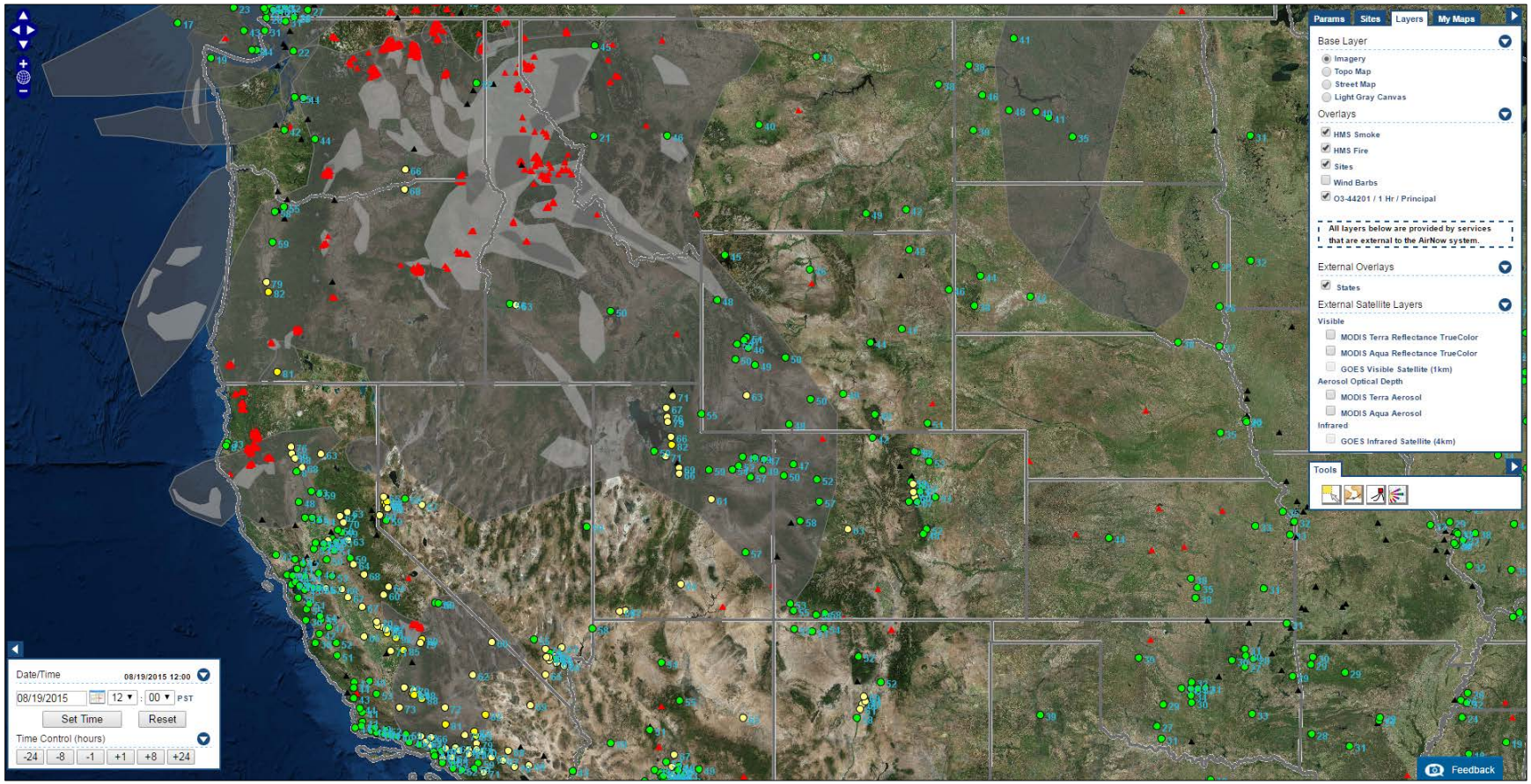


Figure 2.22: HMS Smoke Plume Map August 19, 2015

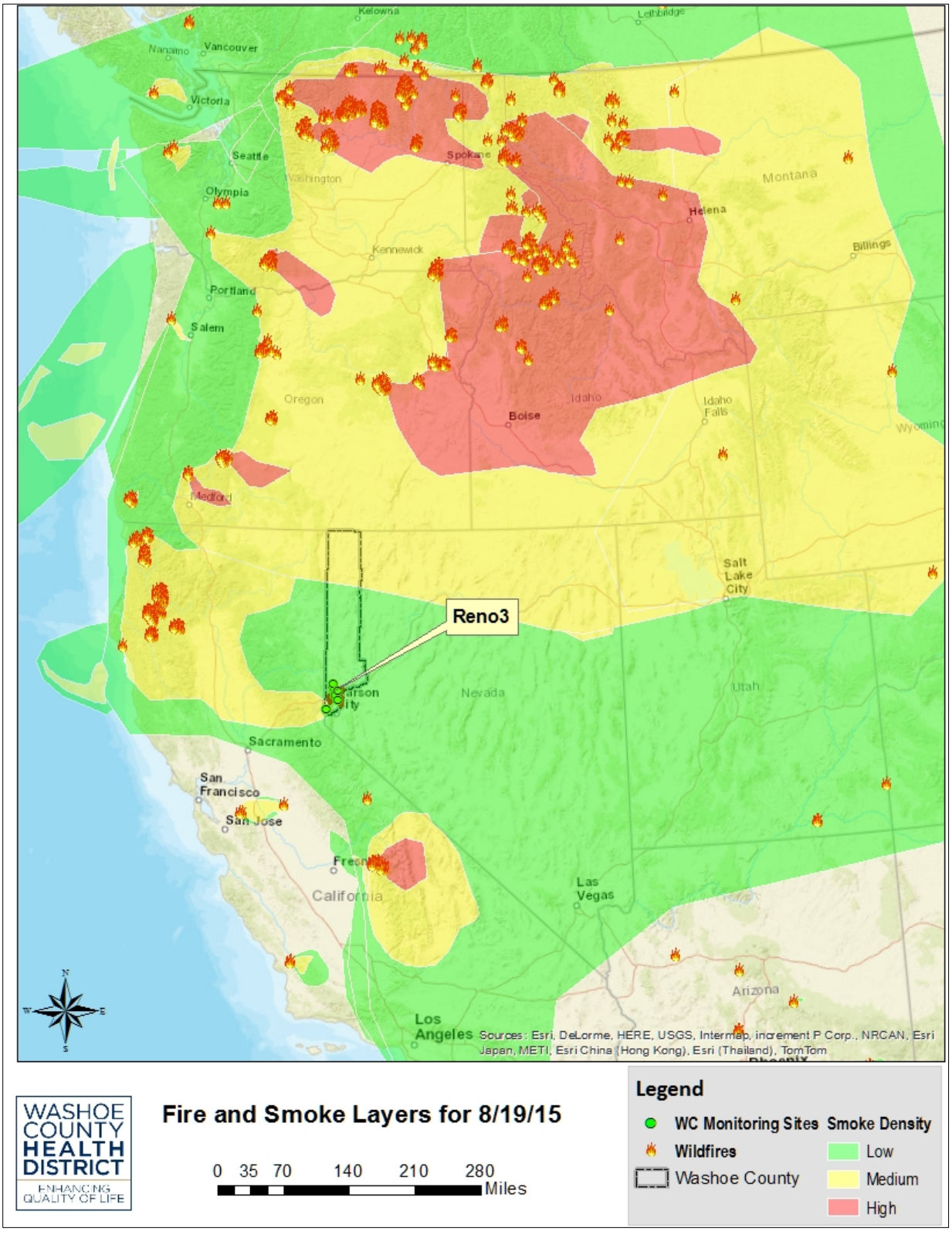


Figure 2.23: Satellite Smoke Text Product August 19, 2015

Wednesday, August 19, 2015

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1815Z August 19, 2015

SMOKE:
Western US/SW Canada:
Large areas of smoke ranging from light to heavy density are visible over a majority of the western US as well as southwest Canada. The heaviest smoke is visible over parts of Oregon, Washington, Idaho, and Montana. Moderate density smoke is visible in this region as well, extending south Nevada as well as over areas of California where other wildfires are burning. The lighter smoke spreads as far east as Colorado and as far north as southern British Columbia. This smoke is mostly from large wildfires burning in the western US. In addition, over parts of Alberta and British Columbia, mostly thin smoke that appears to have originated from Asia is seen moving southeastward.

North Central US/South Central Canada/Hudson Bay:
An area of smoke wraps around the backside of an upper low over the Midwest. The smoke extends from the Dakotas north and then northeast across southern Manitoba and along the Manitoba/Ontario border. Another area of thin smoke is present of Hudson Bay as well. This smoke is likely from fires in the western US.

Northeast US/Eastern Canada:
Areas of residual light smoke are seen as far south southern New England extending north and northeast towards Maine and south of Nova Scotia. Other thin smoke is seen over the Gulf of St. Lawrence and across parts of Newfoundland. This smoke originates from the wildfires in the Pacific Northwest. Additional aerosol seen mixed between clouds over the Great Lakes may be smoke-related but could not be confirmed given the general hazy appearance.

DUST
Texas/New Mexico:
An aerosol seen over southern New Mexico and west/central Texas is believed to be elevated dust particles.

Gulf of California:
Optically thick dust particles can be seen in the morning GOES imagery moving west and southwest from northwest Mexico across portions of the Gulf of California.

Sheffler

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/Products/land/hms.html
GIS: http://www.firedetect.noaa.gov/viewer.htm
KML: http://www.ssd.noaa.gov/PS/FIRE/kml.html
ANY QUESTIONS OR COMMENTS REGARDING THIS PRODUCT SHOULD BE SENT TO SSDFireTeam@noaa.gov

Figure 2.24: Media Coverage August 19, 2015

2.4 Event Related Concentrations

On August 18 and 19, 2015 the AQMD monitored 5 exceedances of the 8-hour O_3 NAAQS, with the highest concentration reaching 0.075 parts per million (ppm) at the Reno3 monitoring site. Wildfire smoke and O_3 precursors from wildfires throughout the Pacific Northwest were transported into Nevada on prevailing winds resulting in the O_3 exceedances at the Reno3 monitoring site. Elevated $PM_{2.5}$ and NOx concentrations support the presence of wildfire smoke.

Table 2.1 below lists O_3 concentrations across the ambient air monitoring network on August 18 and 19, 2015 monitored during the exceptional event. Refer to Table 2.1 in the 2015 EE Demonstration for the 8-hour O_3 concentrations for seven days before and after the wildfire events. It highlights the elevated concentrations and exceedance at the Reno3 site during the event.

Table 2.1: 8-hour O_3 Concentrations (ppm)

Monitoring Site	08/18	08/19
Reno3	0.075	0.073
Sparks	0.070	0.071
Toll	0.068	0.069
South Reno	0.073	0.071
Lemmon Valley	0.069	0.067
Incline	0.063	0.061

In this exceptional event addendum, AQMD is requesting to exclude all hourly O_3 data from the Reno3 monitoring site for August 18 and 19, 2015 from 0000 Pacific Standard Time (PST) to 2300 PST from comparison to the NAAQS. Exclusion of the data caused by this exceptional event will have a regulatory impact on the attainment designation of the 2015 8-hour O_3 NAAQS.

Figure 2.13 shows the $PM_{2.5}$, O_3, and NOx concentrations at the Reno3 site seven days before and after the August 2015 events. These pollutants were elevated, especially on all three exceptional event days in August 2015 (August 18, 19, and 21, 2015). This supports the demonstration that the increase in wildfire smoke also increased NOx concentrations, which increased O_3 levels.

Figure 2.14 shows O_3 and $PM_{2.5}$ concentrations at all other monitoring sites throughout the network. The elevated concentrations throughout the monitoring network demonstrate that the wildfire smoke impacts were regional and consistent with dispersion from fires 300 to 1,000 kilometers (km) away.

Figure 2.25: Reno3 O_3, NOx, and $PM_{2.5}$ Hourly Concentrations for August 14-28, 2015

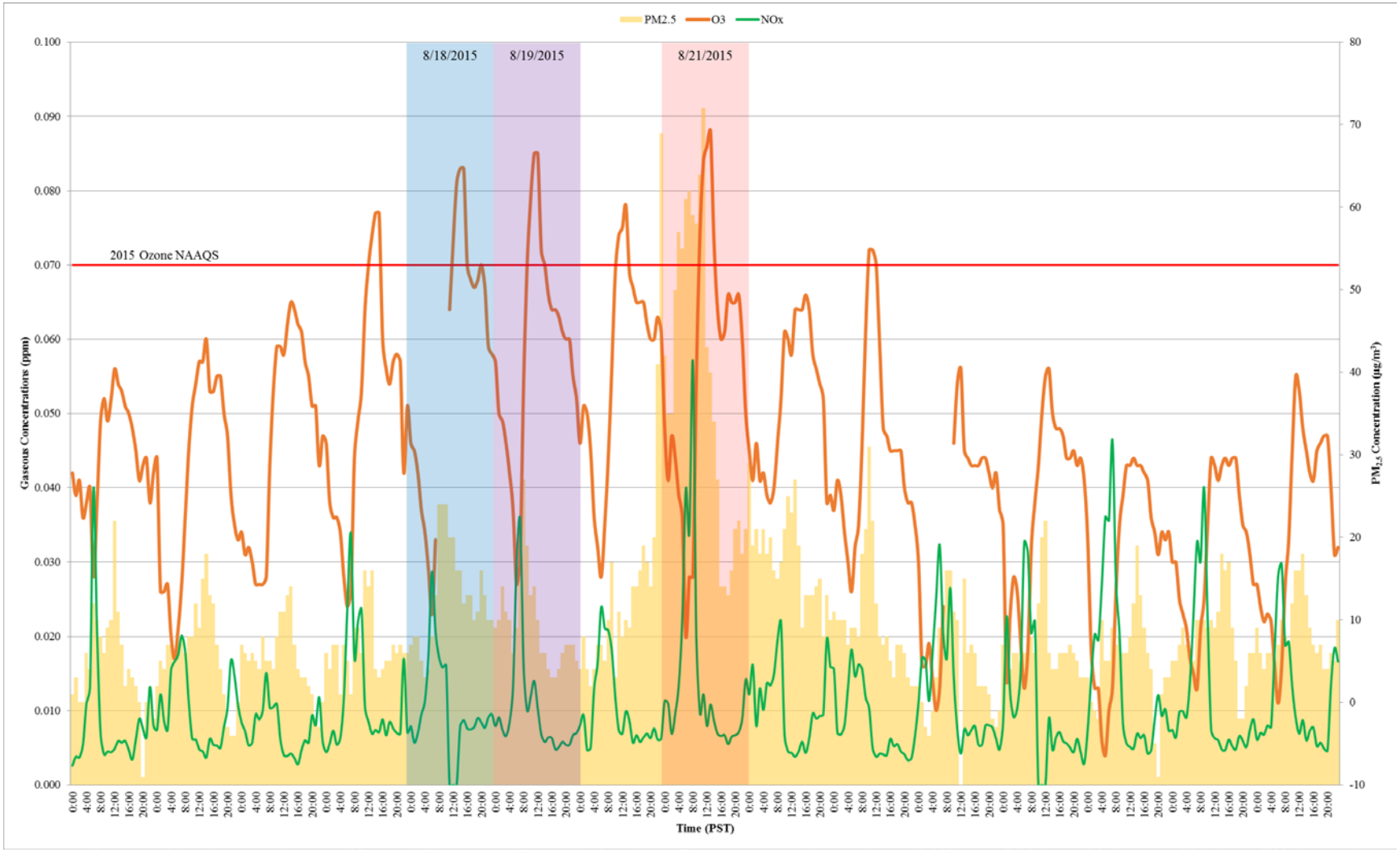
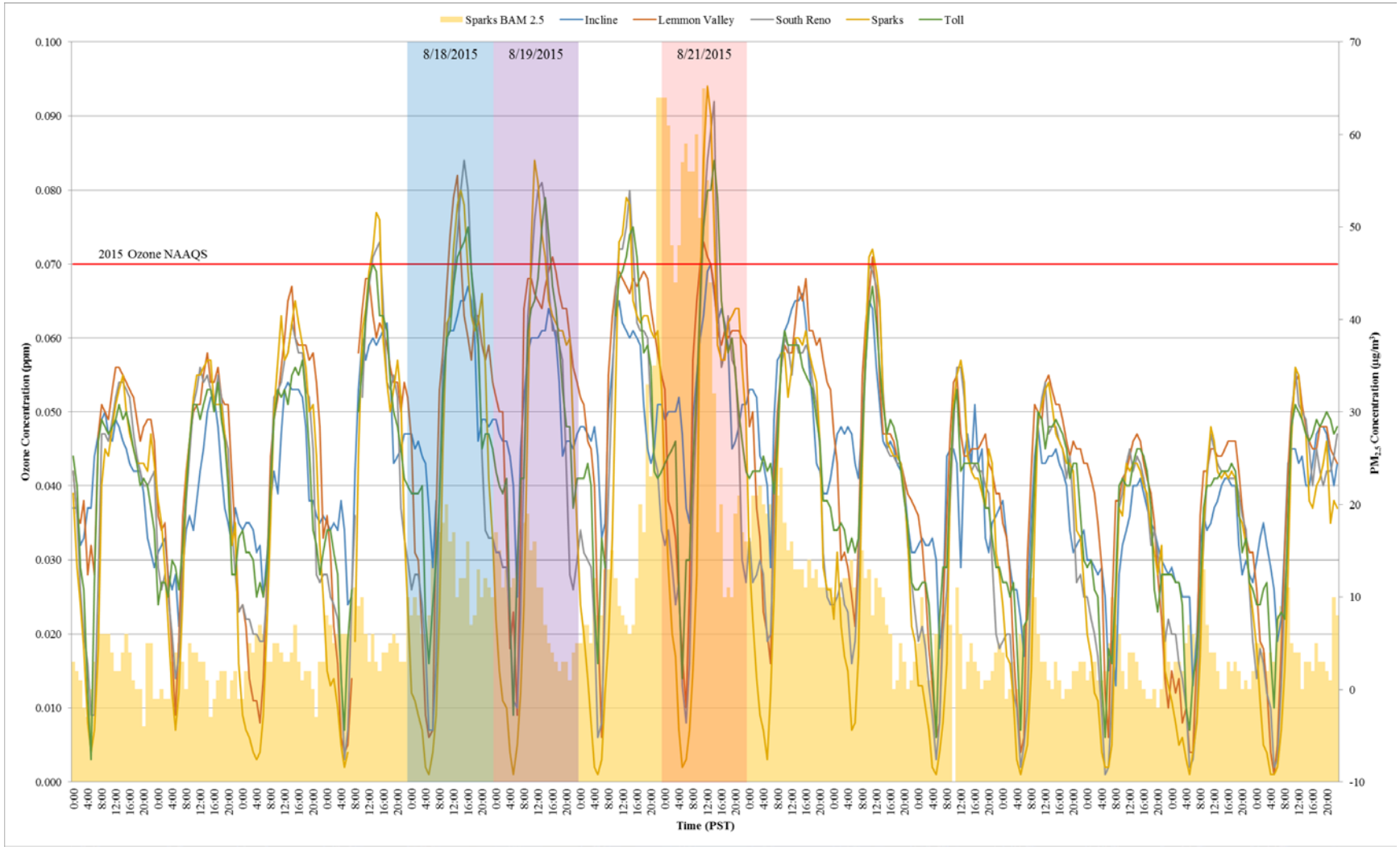


Figure 2.26 Sparks, Incline, Lemmon Valley, South Reno, and Toll O_3 and $PM_{2.5}$ Hourly Concentrations for August 14-28, 2015



2.5 Meteorological Conditions

Refer to the 2015 EE Demonstration for detailed daily weather and visibility.

Event Weather Summary

Temperature and wind speed data were analyzed days before, during, and after the exceptional events. August 16 and 25 were selected as shoulder days around the events because these were regular sample days for the $PM_{2.5}$ Speciation monitor. The table below summarizes the period from August 16 to 25. Weather observations are from the Reno-Tahoe International Airport, approximately three miles southeast of the Reno3 monitoring station.

Table 2.2: Temperature and Wind Speed on Exceptional Events and Non-Event Days

Parameter	08/16	08/18	08/19	08/21	08/25
O_3					
8-hour maximum (ppb)	0.061	0.075	0.073	0.073	0.049
Maximum Temperature					
Observed (^oF)	98	98	98	95	96
Normal (^oF)	91	90	90	90	89
Wind Speed					
24-hour Observed (mph)	5.8	4.9	5.7	6.5	6.9
24-hour Normal (mph)	6.6	6.6	6.6	6.6	6.6
2-min Observed (mph)	26	18	22	22	23

Temperatures on August 16 were as high, or higher, than the event but 8-hour O_3 concentrations were at least 0.012 ppm lower. The temperature on August 25 was comparable to the event, but concentrations were up to 0.026 ppm lower. The typical Washoe Zephyr Winds were present each afternoon.

The weather data further support the 2015 EE Demonstration that wildfire smoke affected the Reno3 monitor and increased O_3 concentrations. Unusual weather (other than transport of wildfire smoke) was not a factor contributing to the exceptional event.

2.6 Meteorological Assessment of Smoke Influence in Northwestern Nevada

Refer to the 2015 EE Demonstration.

2.7 Media Coverage

Refer to Section 2.3 of this addendum.

3.0 CLEAR CAUSAL RELATIONSHIP

3.1 Introduction

Refer to the 2015 EE Demonstration.

3.2 Comparison of Event-Related Concentrations with Historical Concentrations

As part of demonstrating a clear causal relationship between the wildfire event and the O_3 exceedance, historical, non-event O_3 season concentrations were compared to the August 18 and 19, 2015 events. Graphs of the 5-year historical O_3 seasonal concentrations are shown in Figures 3.1 and 3.2, with the Reno3 O_3 exceedances represented as squares in each figure. The 99^{th} percentile value for the O_3 season (June through August), which is the O_3 exceedance on August 19 and 21, 2015 event, is 0.073 ppm.

Figures 3.3 and 3.4 show the hourly seasonal percentiles for O_3 from 2010-2015 as compared to the concentrations of O_3 formation on August 18 and 19, 2015. This data clearly demonstrates that smoke from the 2015 wildfire events caused an increase in O_3 concentrations at the Reno3 site on August 18 and 19, 2015.

Figure 3.1: Reno3 8-Hour Daily O_3 Season Maximums June-August, 2010-2015

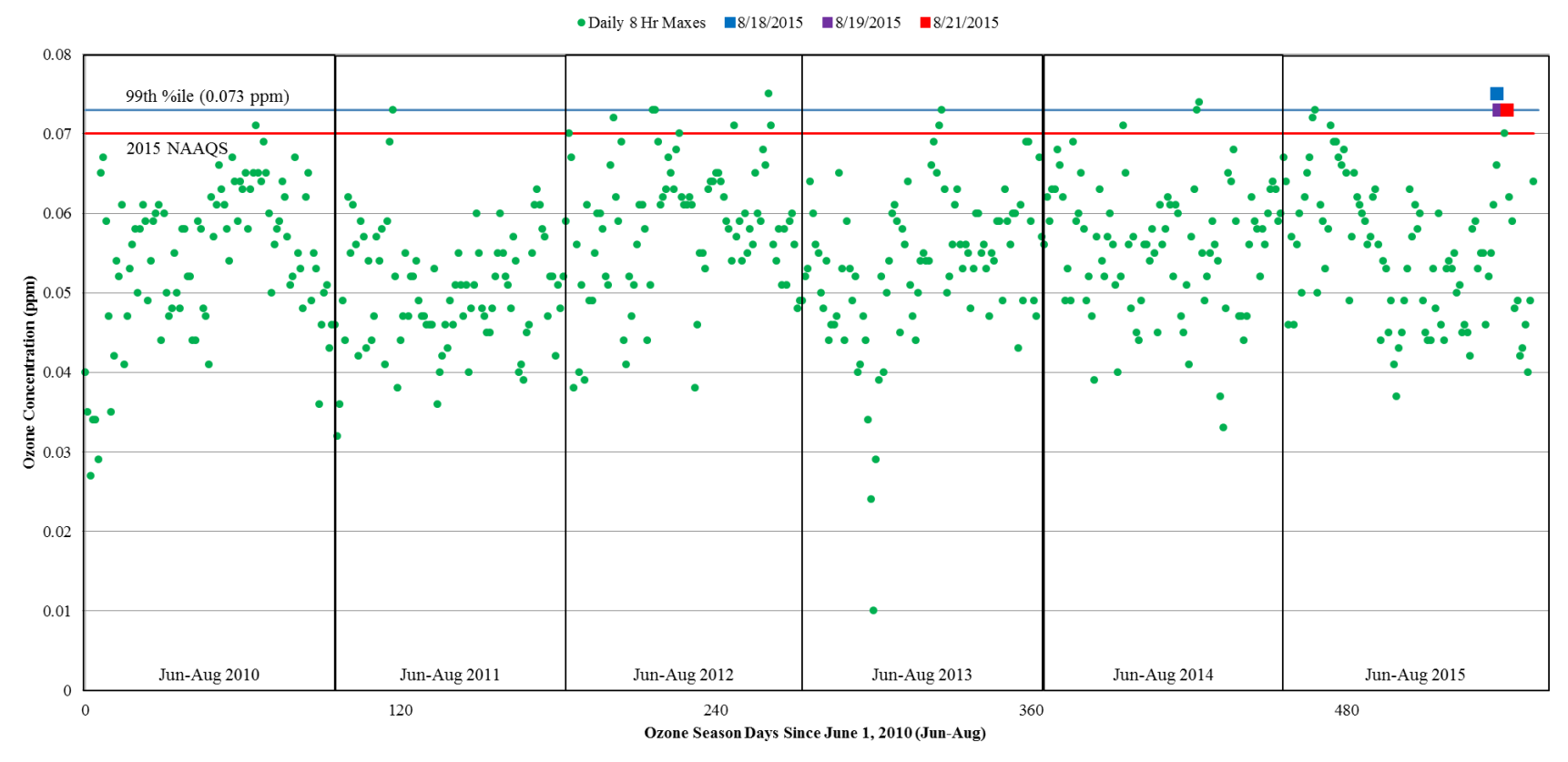


Figure 3.2: Reno3 8-Hour O_3 Daily Maximums June-August, 2010-2015

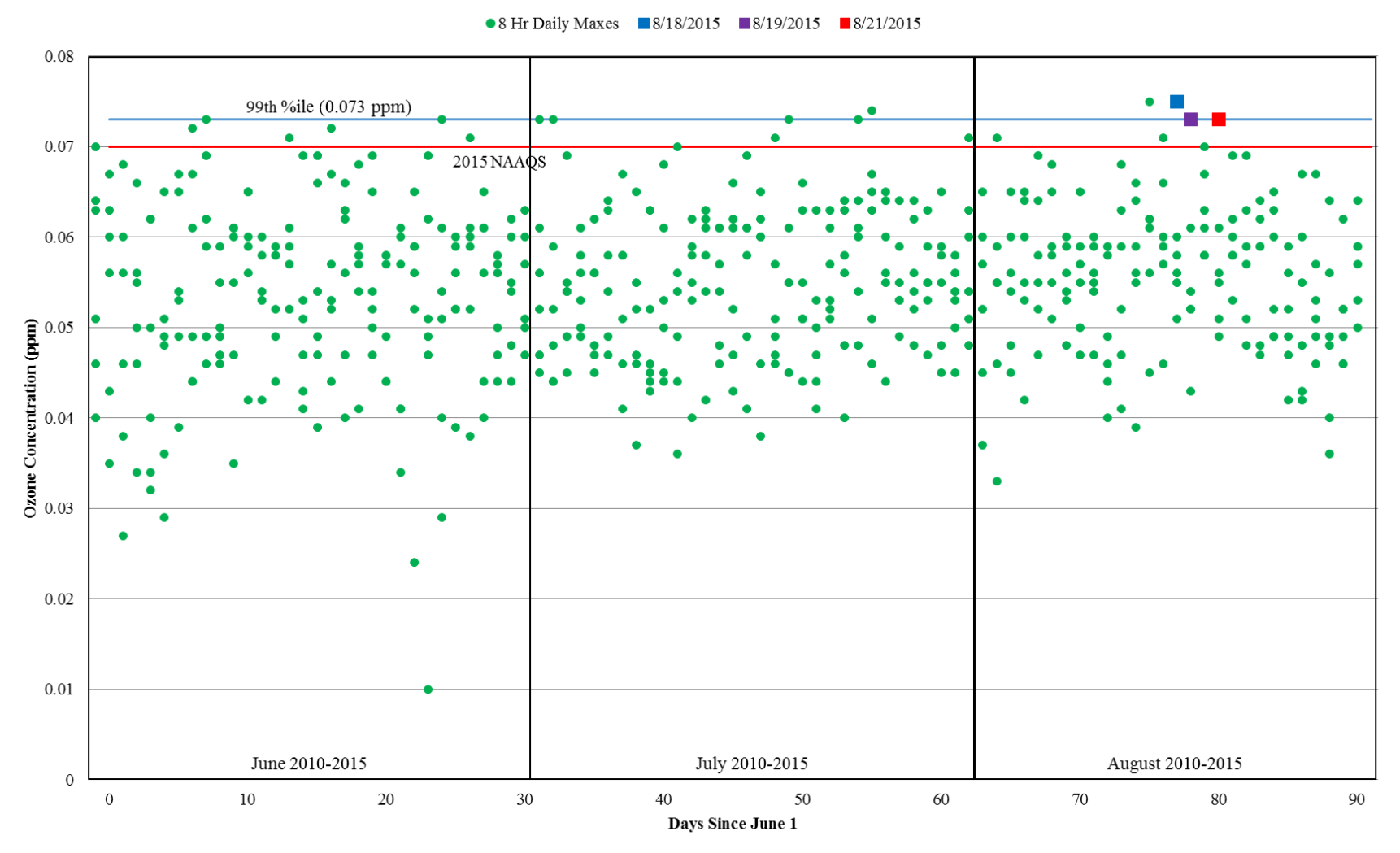
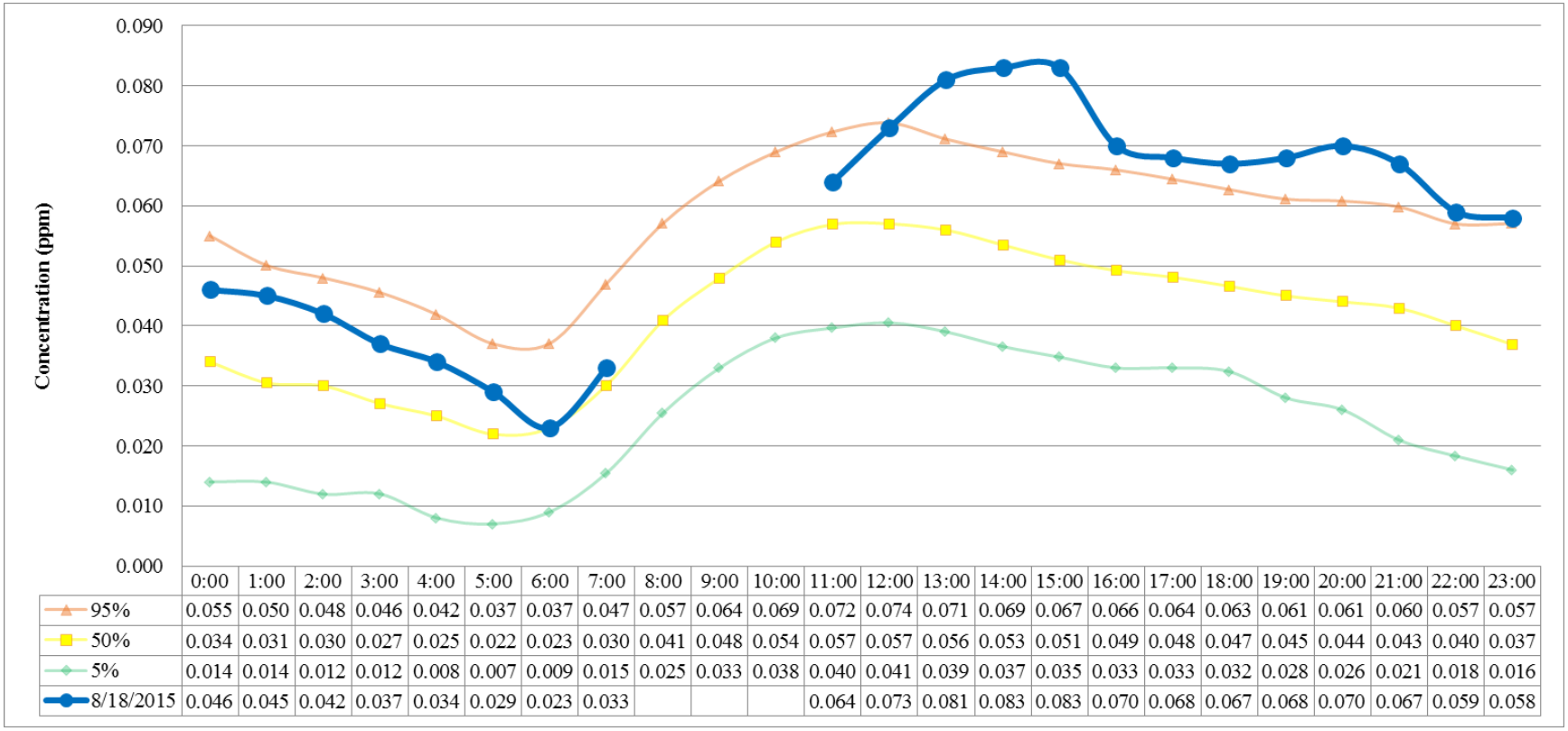
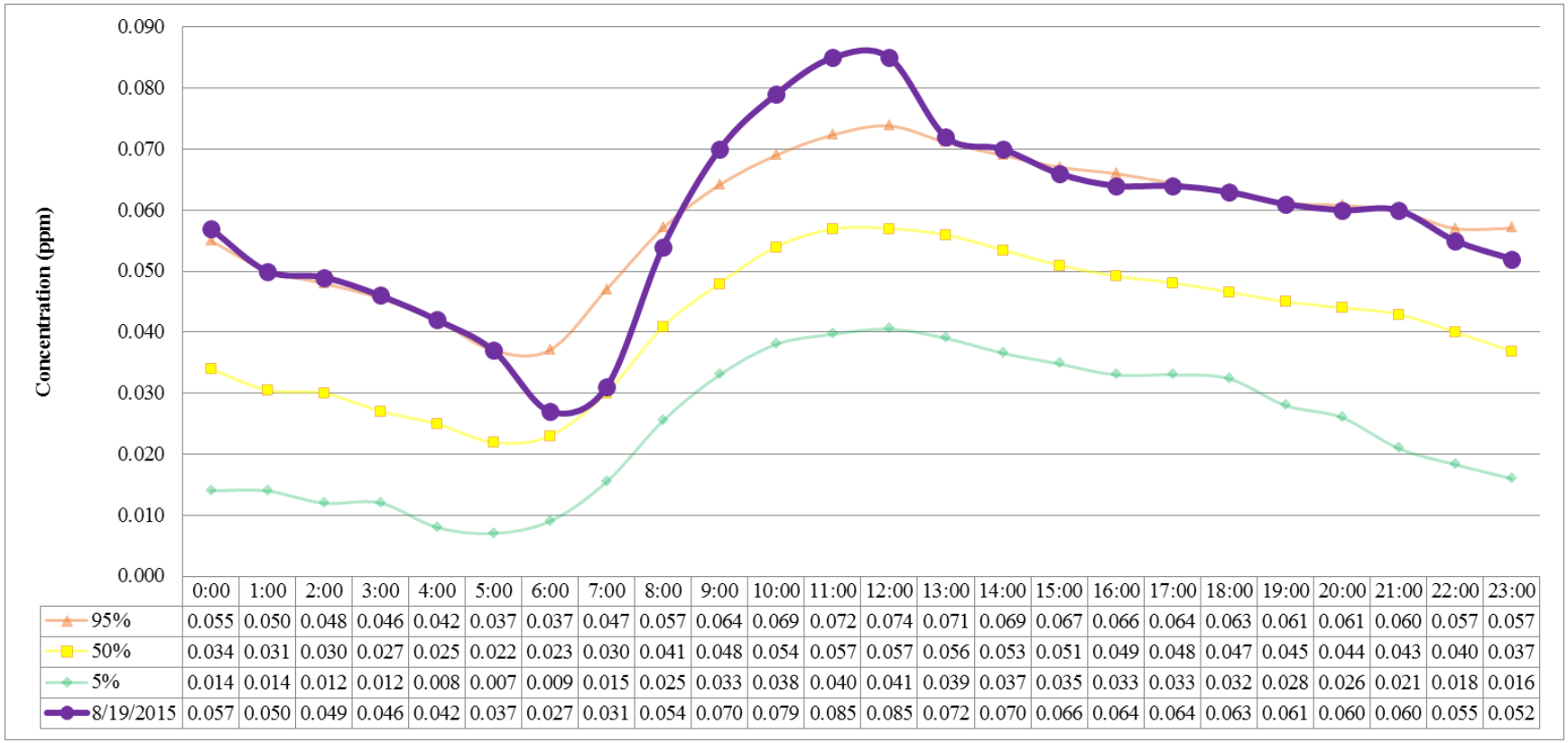


Figure 3.3: Percentiles for Hourly Seasonal O_3 for 2010-2014 with August 18, 2015



	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
95%	0.055	0.050	0.048	0.046	0.042	0.037	0.037	0.047	0.057	0.064	0.069	0.072	0.074	0.071	0.069	0.067	0.066	0.064	0.063	0.061	0.061	0.060	0.057	0.057
50%	0.034	0.031	0.030	0.027	0.025	0.022	0.023	0.030	0.041	0.048	0.054	0.057	0.057	0.056	0.053	0.051	0.049	0.048	0.047	0.045	0.044	0.043	0.040	0.037
5%	0.014	0.014	0.012	0.012	0.008	0.007	0.009	0.015	0.025	0.033	0.038	0.040	0.041	0.039	0.037	0.035	0.033	0.033	0.032	0.028	0.026	0.021	0.018	0.016
8/18/2015	0.046	0.045	0.042	0.037	0.034	0.029	0.023	0.033				0.064	0.073	0.081	0.083	0.083	0.070	0.068	0.067	0.068	0.070	0.067	0.059	0.058

Figure 3.4: Percentiles for Hourly Seasonal O_3 for 2010-2014 with August 19, 2015



	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
95%	0.055	0.050	0.048	0.046	0.042	0.037	0.037	0.047	0.057	0.064	0.069	0.072	0.074	0.071	0.069	0.067	0.066	0.064	0.063	0.061	0.061	0.060	0.057	0.057
50%	0.034	0.031	0.030	0.027	0.025	0.022	0.023	0.030	0.041	0.048	0.054	0.057	0.057	0.056	0.053	0.051	0.049	0.048	0.047	0.045	0.044	0.043	0.040	0.037
5%	0.014	0.014	0.012	0.012	0.008	0.007	0.009	0.015	0.025	0.033	0.038	0.040	0.041	0.039	0.037	0.035	0.033	0.033	0.032	0.028	0.026	0.021	0.018	0.016
8/19/2015	0.057	0.050	0.049	0.046	0.042	0.037	0.027	0.031	0.054	0.070	0.079	0.085	0.085	0.072	0.070	0.066	0.064	0.064	0.063	0.061	0.060	0.060	0.055	0.052

3.3 Tier 2 Approach

Refer to the 2015 EE Demonstration.

Key Factor #1

The differences between this addendum and the 2015 EE Demonstration are listed below.

1. The addendum includes three additional evaluation days (August 17, 18, and 19).
2. Impacts from the Oregon and Washington wildfires are evaluated in the addendum.
3. Tables 3.1 and 3.2 in the 2015 EE Demonstration incorrectly listed distances in miles instead of km. Q/D calculations correctly used km and the Q/D ratios in those tables are correct. Revised tables for August 20 and 21 with the correct distance units are included in this section.

BlueSky Playground inputs used in the 2015 EE Demonstration were also used to calculate emissions for August 17, 18, and 19. These inputs were: 1) Emission Type = "Wildfire", 2) Fuel Moisture Condition = "Very Dry", and 3) FCCS Fuelbed # = default by location.

It is important to note that the fire origination location was used to determine FCCS Fuelbed # and distance (D). This is the practical approach to using BlueSky Playground, however it can introduce differences in both Q and D. First, as wildfires grow, the emissions are generated from polygons instead of a single point. These polygons are located away from the fire origination locations used in BlueSky Playground and can increase or decrease the actual distance from the fire to the monitor. Secondly, a change in fire location inputs for BlueSky Playground can result in a different FCCS Fuelbed # leading to different emission factors and emissions.

Following are Q/D calculations for August 17-21, 2015.

Table 3.1: Q/D Calculations for Monday, August 17, 2015

Fire Location/ Name	Lat/Long	Distance (km)	Acres Burned	Emissions (tons)	Q/D (tpd/km)
NW California/					
Fork Complex	40.45/-123.128	301	775	465	2
Mad River Complex	40.34/-123.383	317	821	1,493	5
South Complex	40.62/-123.448	332	896	569	2
Route Complex	40.64/-123.586	345	1,060	1,927	6
River Complex	40.91/-123.437	345	2,280	2,039	6
Nickowitz	41.47/-123.750	396	671	600	2
Gasquet Complex	41.85/-123.969	436	288	258	1
Total			6,791	7,351	
Oregon*/					
Canyon Creek	44.28/-118.96	561	NA		
Washington*/					
Kettle	48.76/-118.461	1,066	NA		
Grizzly Bear	46.11/-117.679	814	NA		
Okanogan	48.519/-119.662	1,038	NA		

*Detailed information on acres burned for the Oregon and Washington fires on August 17, 2015 were not readily available, therefore the Q/D was not calculated.

Table 3.2: Q/D Calculations for Tuesday, August 18, 2015

Fire Location/ Name	Lat/Long	Distance (km)	Acres Burned	Emissions (tons)	Q/D (tpd/km)
NW California/					
Fork Complex	40.45/-123.128	301	1,624	1,031	3
Mad River Complex	40.34/-123.383	317	1,208	2,196	7
South Complex	40.62/-123.448	332	651	413	1
Route Complex	40.64/-123.586	345	2,626	4,774	14
River Complex	40.91/-123.437	345	3,699	3,308	10
Nickowitz	41.47/-123.750	396	671	600	2
Gasquet Complex	41.85/-123.969	436	2,377	2,126	5
Total			12,856	14,448	
Oregon/					
Canyon Creek	44.28/-118.96	561	6,619	4,795	9
Washington/					
Kettle*	48.76/-118.461	1,066	NA		
Grizzly Bear**	46.11/-117.679	814	4,000*	7,255	9
Okanogan	48.519/-119.662	1,038	933	13	<1

*Detailed information on acres burned for the Kettle Fire on August 18, 2015 was not readily available; therefore Q/D was not calculated.
**Detailed information on acres burned between August 17 and 19, 2015 were not readily available, therefore the total acres burned for the two days (8,000) were divided to determine Q.

Table 3.3: Q/D Calculations for Wednesday, August 19, 2015

Fire Location/ Name	Lat/Long	Distance (km)	Acres Burned	Emissions (tons)	Q/D (tpd/km)
NW California/					
Fork Complex	40.45/-123.128	301	68	43	<1
Mad River Complex	40.34/-123.383	317	1,626	2,956	9
South Complex	40.62/-123.448	332	738	469	1
Route Complex	40.64/-123.586	345	1,472	2,676	8
River Complex	40.91/-123.437	345	2,333	2,086	6
Nickowitz	41.47/-123.750	396	403	360	1
Gasquet Complex	41.85/-123.969	436	6,640	5,938	14
Total			13,280	14,528	
Oregon/					
Canyon Creek	44.28/-118.96	561	4,463	3,233	6
Washington/					
Kettle	48.76/-118.461	1,066	166	120	<1
Grizzly Bear	46.11/-117.679	814	4,000	7,255	9
Okanogan	48.519/-119.662	1,038	1,856	27	<1

Table 3.4: Q/D Calculations for Thursday, August 20, 2015

Fire Location/ Name	Lat/Long	Distance (km)	Acres Burned	Emissions (tons)	Q/D (tpd/km)
NW California/					
Fork Complex	40.45/-123.128	301	1,120	650	2
Mad River Complex	40.34/-123.383	317	3,622	6,015	19
South Complex	40.62/-123.448	332	400	168	1
Route Complex	40.64/-123.586	345	1,391	2,310	7
River Complex	40.91/-123.437	345	2,532	2,264	7
Nickowitz	41.47/-123.750	396	535	478	1
Gasquet Complex	41.85/-123.969	436	2,463	2,202	5
Total			12,063	14,087	
Oregon/					
Canyon Creek	44.28/-118.96	561	5,675	4,111	7
Washington/					
Kettle	48.76/-118.461	1,066	5,983	4,335	4
Grizzly Bear	46.11/-117.679	814	2,000	3,628	4
Okanogan	48.519/-119.662	1,038	6,463	94	<1

Table 3.5: Q/D Calculations for Friday, August 21, 2015

Fire Location/ Name	Lat/Long	Distance (km)	Acres Burned	Emissions (tons)	Q/D (tpd/km)
NW California/					
Fork Complex	40.45/-123.128	301	188	119	<1
Mad River Complex	40.34/-123.383	317	1,106	2,011	6
South Complex	40.62/-123.448	332	810	514	2
Route Complex	40.64/-123.586	345	193	351	1
River Complex	40.91/-123.437	345	2,415	2,106	6
Nickowitz	41.47/-123.750	396	952	851	2
Gasquet Complex	41.85/-123.969	436	1,864	1,667	4
Total			7,528	7,673	
Oregon/					
Canyon Creek	44.28/-118.96	561	7,755	5,618	10
Washington/					
Kettle	48.76/-118.461	1,066	1,842	1,335	1
Grizzly Bear	46.11/-117.679	814	36,000	65,296	80
Okanogan	48.519/-119.662	1,038	0	0	0

As stated in the 2015 EE Demonstration, Q/D is an equation to estimate fire emissions. It does not account for the cumulative impact of numerous fires producing smoke for multiple days with poor dispersion. This wildfire O_3 episode also supports research that O_3 production can increase with distance (and plume age) from wildfires.

Key Factor #2

A comparison of the event related O_3 concentration with non-event related high O_3 concentrations is required to satisfy the key factor #2 in a Tier 2 demonstration. Refer to Section 2.4 and 3.2 for event related O_3 concentration with non-event related highs and historical O_3 concentrations.

3.4 Additional Tier 2 Evidence

Refer to the 2015 EE Demonstration.

Trajectory Analysis

Refer to the 2015 EE Demonstration for HYSPLIT description. The following subsections of this addendum provide evidence that the emissions from the Pacific Northwest wildfires affected the Reno3 monitor on August 18 and 19, 2015.

The following figures show the 72-hour backward HYSPLIT trajectories and smoke plumes ending on August 18 and 19, 2015. The maps include 72-hour backward trajectories at three different heights (500, 1000 and 1500 meters) ending at the Reno3 monitoring site with the smoke plume for each day. The backward trajectories demonstrate that the dense smoke plume from August 15 and 16, 2015 traveled across the Pacific Northwest, exacerbating $PM_{2.5}$ concentrations leading to an increase in O_3 concentrations in Washoe County on August 18 and 19, 2015. The trajectory profiles identify that the dense smoke plume from the several wildfires throughout the Pacific Northwest traveled along the lower regions of the valley on August 15 and 16, 2015 and settled into the Reno/Sparks area on August 18 and 19, 2015, elevating O_3 concentrations monitored at the Reno3 during the exceptional event. Accompanying the trajectories are area forecast discussions from the National Weather Service (Reno Forecast Office).

Additional Tier 2 Evidence for August 18, 2015

Figure 3.5: 72-Hour Backward HYSPLIT Trajectory and Smoke Plume August 18, 2015

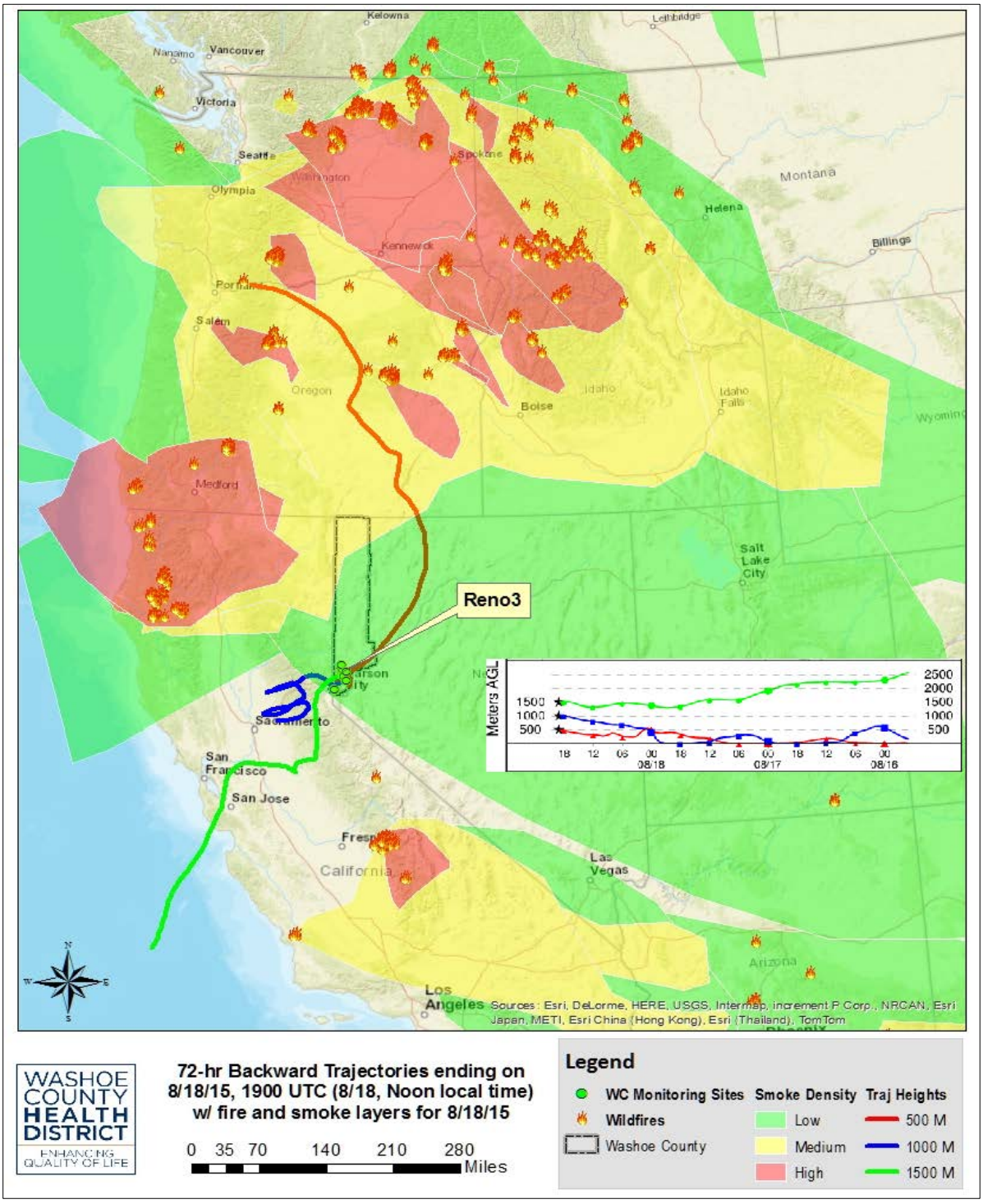
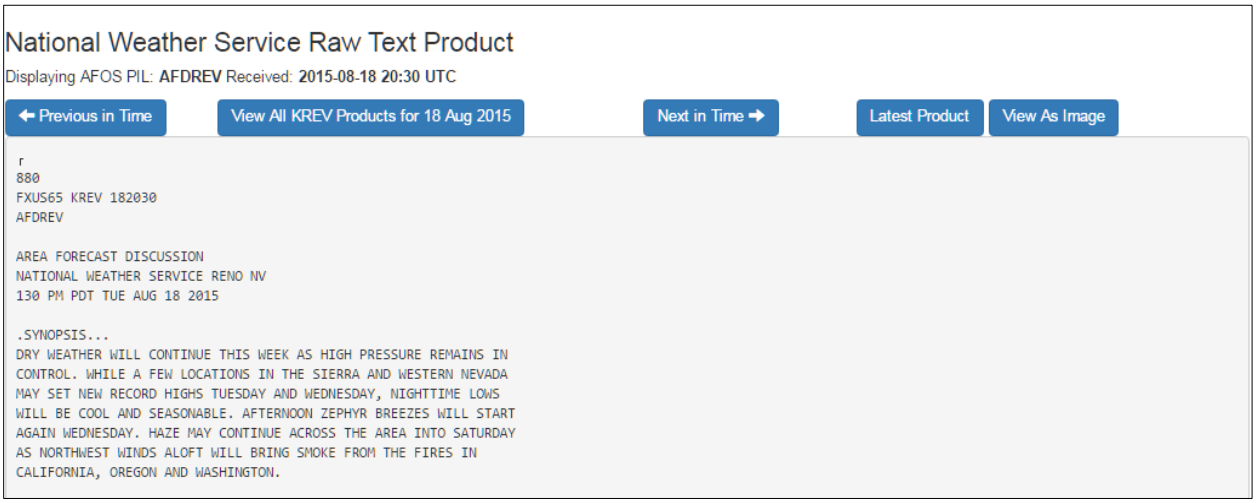


Figure 3.6: National Weather Service (Reno) Area Forecast Discussion for August 18, 2015



National Weather Service Raw Text Product

Displaying AFOS PIL: **AFDREV** Received: **2015-08-18 20:30 UTC**

← Previous in Time | View All KREV Products for 18 Aug 2015 | Next in Time → | Latest Product | View As Image

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880
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AFDREV

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE RENO NV
130 PM PDT TUE AUG 18 2015

.SYNOPSIS...
DRY WEATHER WILL CONTINUE THIS WEEK AS HIGH PRESSURE REMAINS IN
CONTROL. WHILE A FEW LOCATIONS IN THE SIERRA AND WESTERN NEVADA
MAY SET NEW RECORD HIGHS TUESDAY AND WEDNESDAY, NIGHTTIME LOWS
WILL BE COOL AND SEASONABLE. AFTERNOON ZEPHYR BREEZES WILL START
AGAIN WEDNESDAY. HAZE MAY CONTINUE ACROSS THE AREA INTO SATURDAY
AS NORTHWEST WINDS ALOFT WILL BRING SMOKE FROM THE FIRES IN
CALIFORNIA, OREGON AND WASHINGTON.
```

Additional Tier 2 Evidence for August 19, 2015

Figure 3.7: 72-Hour Backward HYSPLIT Trajectory and Smoke Plume August 19, 2015

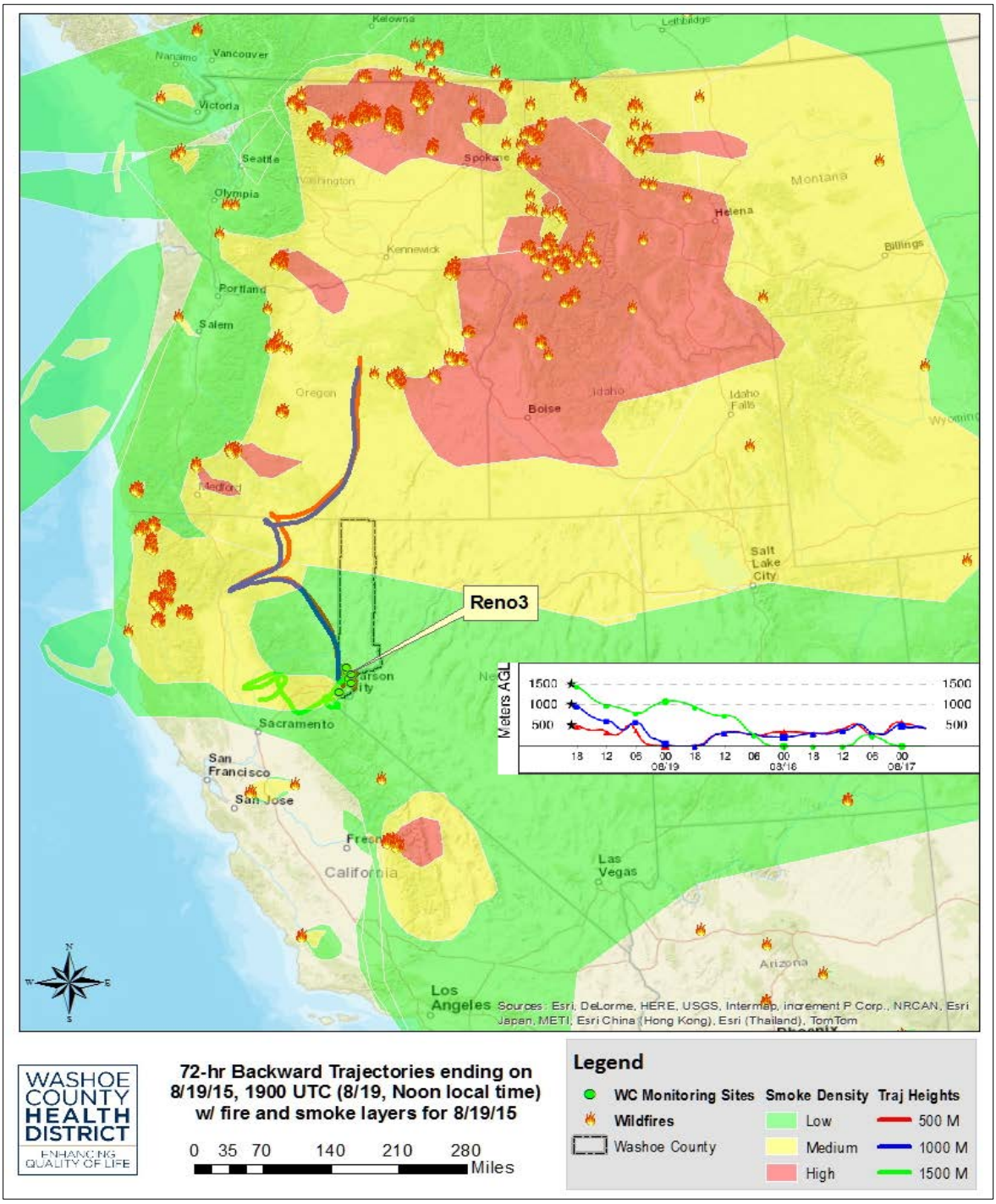
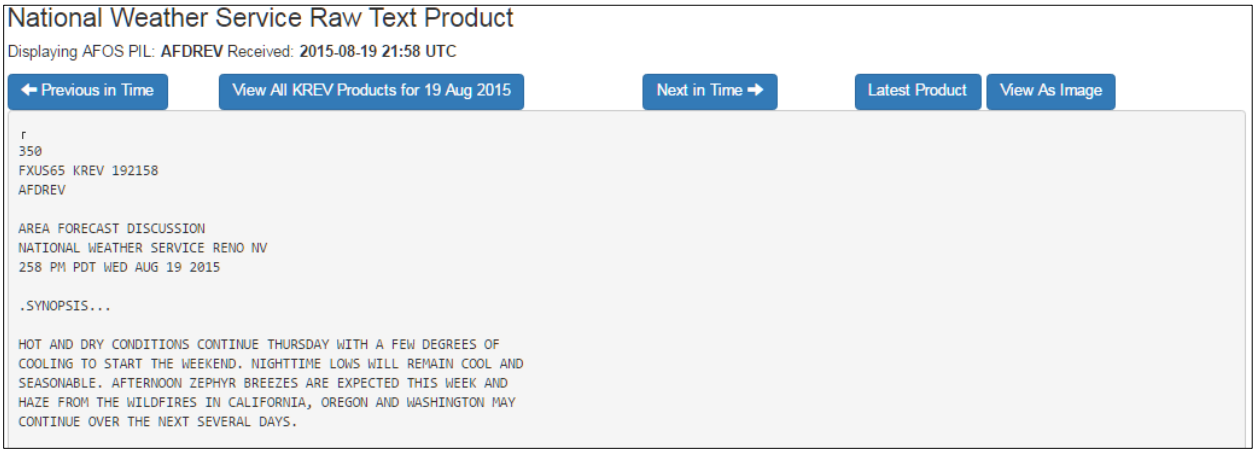


Figure 3.8: National Weather Service (Reno) Area Forecast Discussion for August 19, 2015



National Weather Service Raw Text Product

Displaying AFOS PIL: **AFDREV** Received: **2015-08-19 21:58 UTC**

← Previous in Time | View All KREV Products for 19 Aug 2015 | Next in Time → | Latest Product | View As Image

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r
350
FXUS65 KREV 192158
AFDREV

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE RENO NV
258 PM PDT WED AUG 19 2015

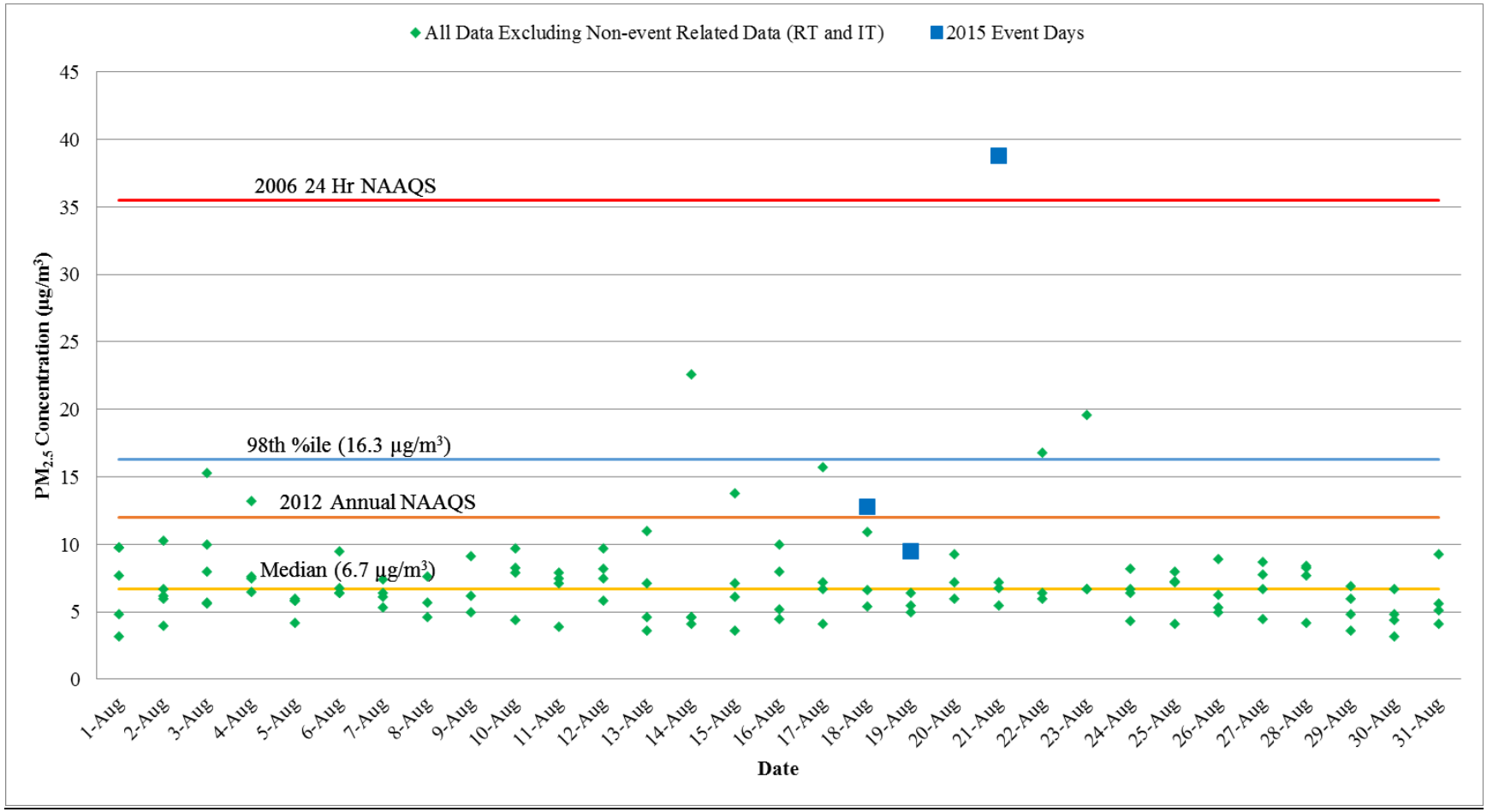
.SYNOPSIS...

HOT AND DRY CONDITIONS CONTINUE THURSDAY WITH A FEW DEGREES OF
COOLING TO START THE WEEKEND. NIGHTTIME LOWS WILL REMAIN COOL AND
SEASONABLE. AFTERNOON ZEPHYR BREEZES ARE EXPECTED THIS WEEK AND
HAZE FROM THE WILDFIRES IN CALIFORNIA, OREGON AND WASHINGTON MAY
CONTINUE OVER THE NEXT SEVERAL DAYS.
```

Concentrations of Supporting Measurements

Figure 3.9 shows the elevated level of the 24-hour $PM_{2.5}$ average on August 18, 19, and 21, 2015 (indicated by the blue squares) as compared to 5-year historical concentrations. $PM_{2.5}$ data in Figure 3.9 does not include data from the 2013 (Rim and American Fires) Exceptional Event Demonstration submitted to the EPA in November 2016.

Figure 3.9: Reno3 24-Hour $PM_{2.5}$ Averages for August 2011-2015



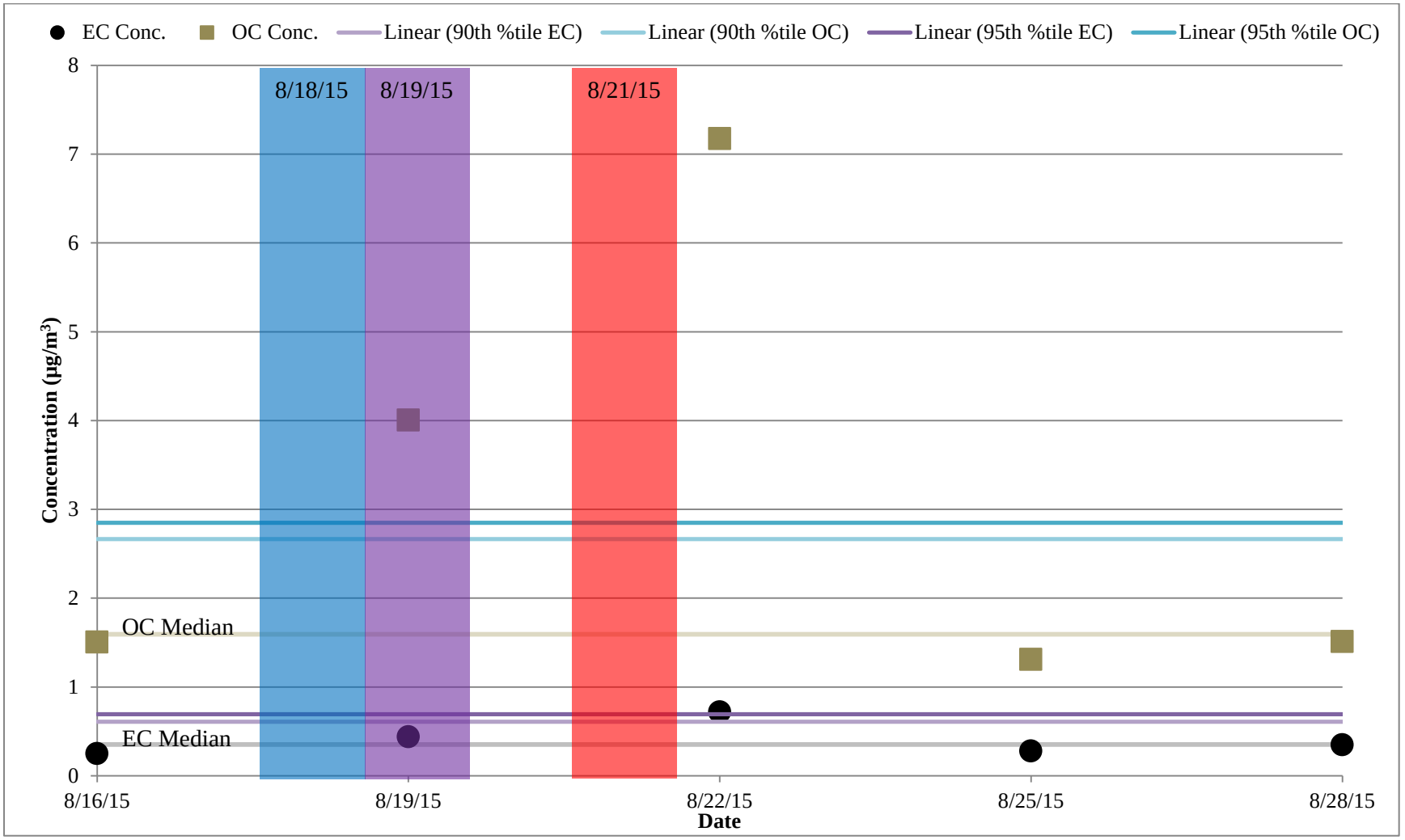
$PM_{2.5}$ Speciation Data

Refer to the 2015 EE Demonstration for detailed information on the Speciation Trends Network as well as historical concentrations of OC and EC from 2010 to 2014. The $PM_{2.5}$ Speciation monitor follows EPA's sampling calendar that scheduled two samples during the event (August 19 and 22, 2015).

The historical (Jun-Aug, 2010-2014) median OC concentration is 1.61 µg/m^3. During the 2015 wildfires, the OC concentration recorded on August 19 (4.00 µg/m^3) and August 22 (7.17 µg/m^3) were both above the 95th percentile compared to historical concentrations.

Likewise, EC concentrations were also elevated above the 90th percentile on August 19 (0.44 µg/m^3) and August 22 (0.69 µg/m^3). These are in comparison to the historical median concentration of 0.36 µg/m^3. Figure 3.10 depicts August 16-28, 2015 concentrations in comparison to historical OC and EC concentrations. Historical concentrations do not include data from the 2013 Rim and American Fires

Figure 3.10: Elemental and Organic Carbon Concentrations during the 2015 Wildfires



$PM_{2.5}$ and Carbon Monoxide Correlation

It has been documented that ambient $PM_{2.5}$ and CO concentrations are correlated in the presence of wildfire smoke and as presented at the EPA/WESTAR Exceptional Events Workshop in November 2016 in Denver, CO. $PM_{2.5}$ and CO at the Reno3 monitoring site were plotted for August 18, 19, and 21, 2015 and compared to a non-event day (Equation below).

Non-Event Slope (August 24, 2015)

$$y = 4.5986x + 2.5884 \qquad R^2 = 0.0014$$

Figure 3.11: Hourly Reno3 $PM_{2.5}$ and CO for August 18, 2015

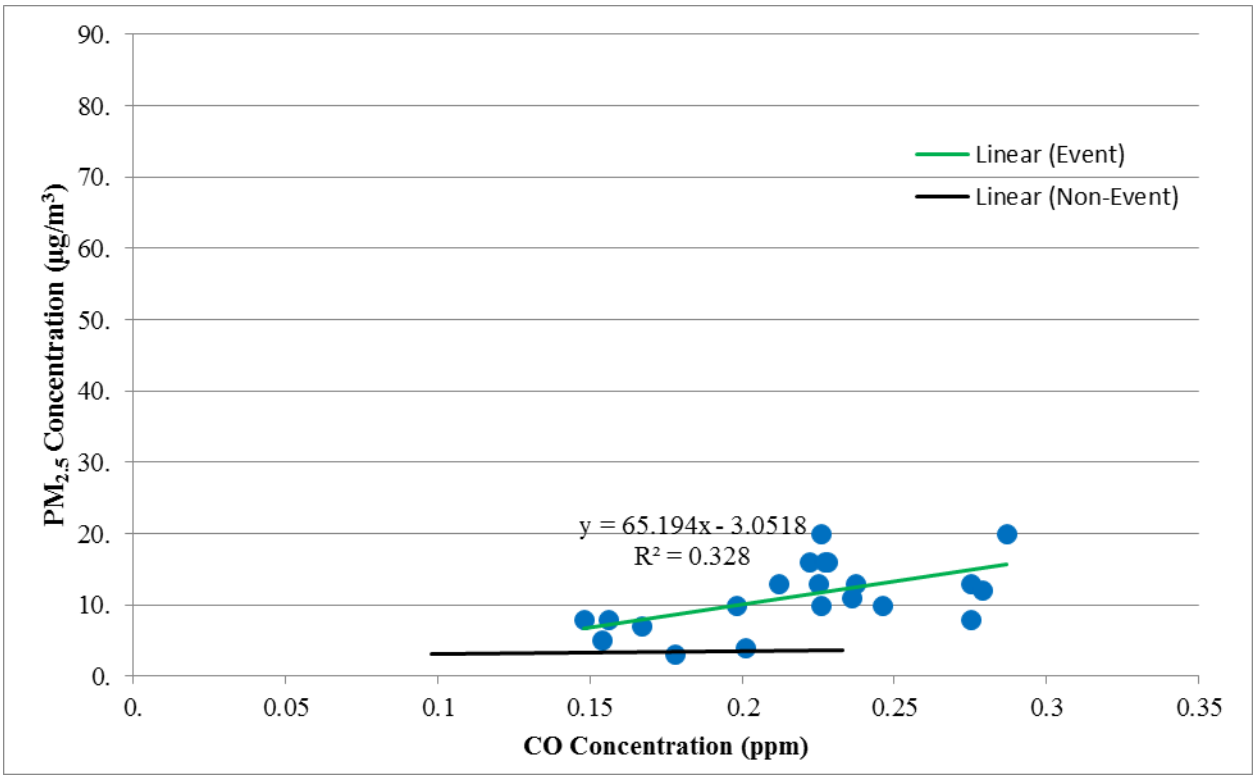


Figure 3.12: Hourly Reno3 $PM_{2.5}$ and CO for August 19, 2015

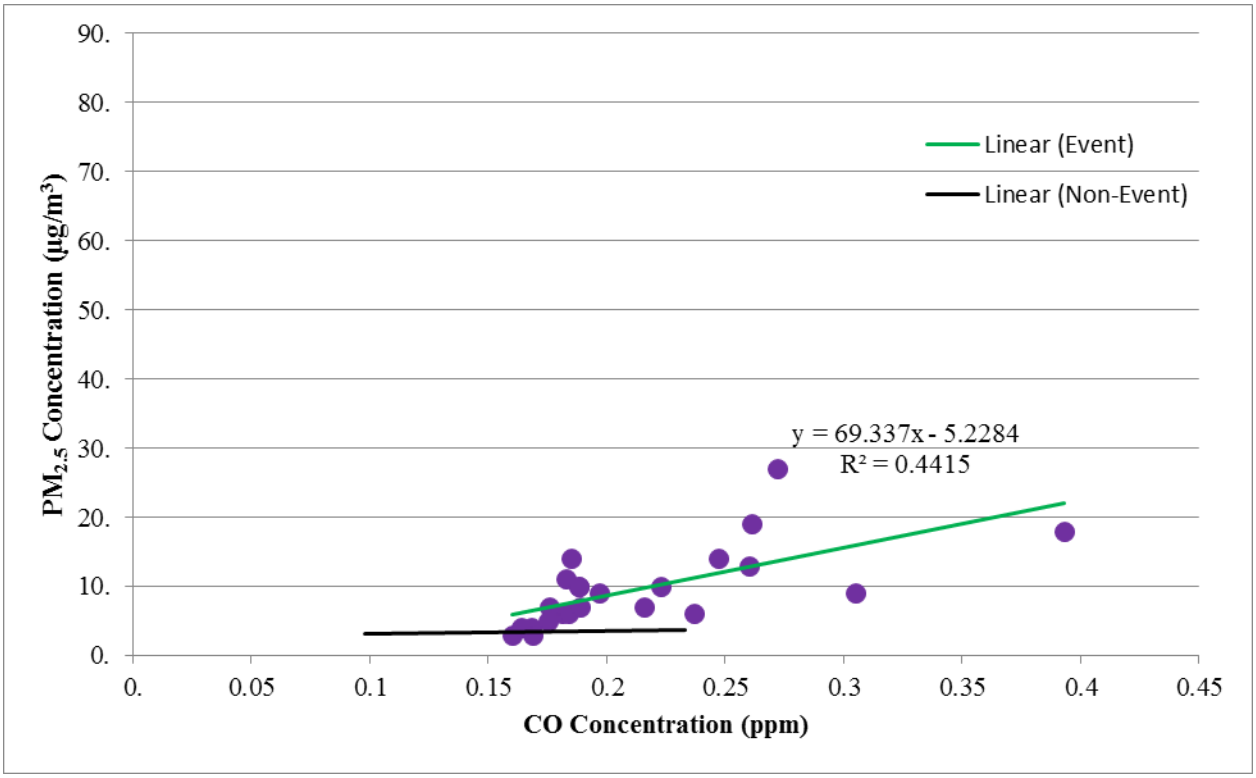
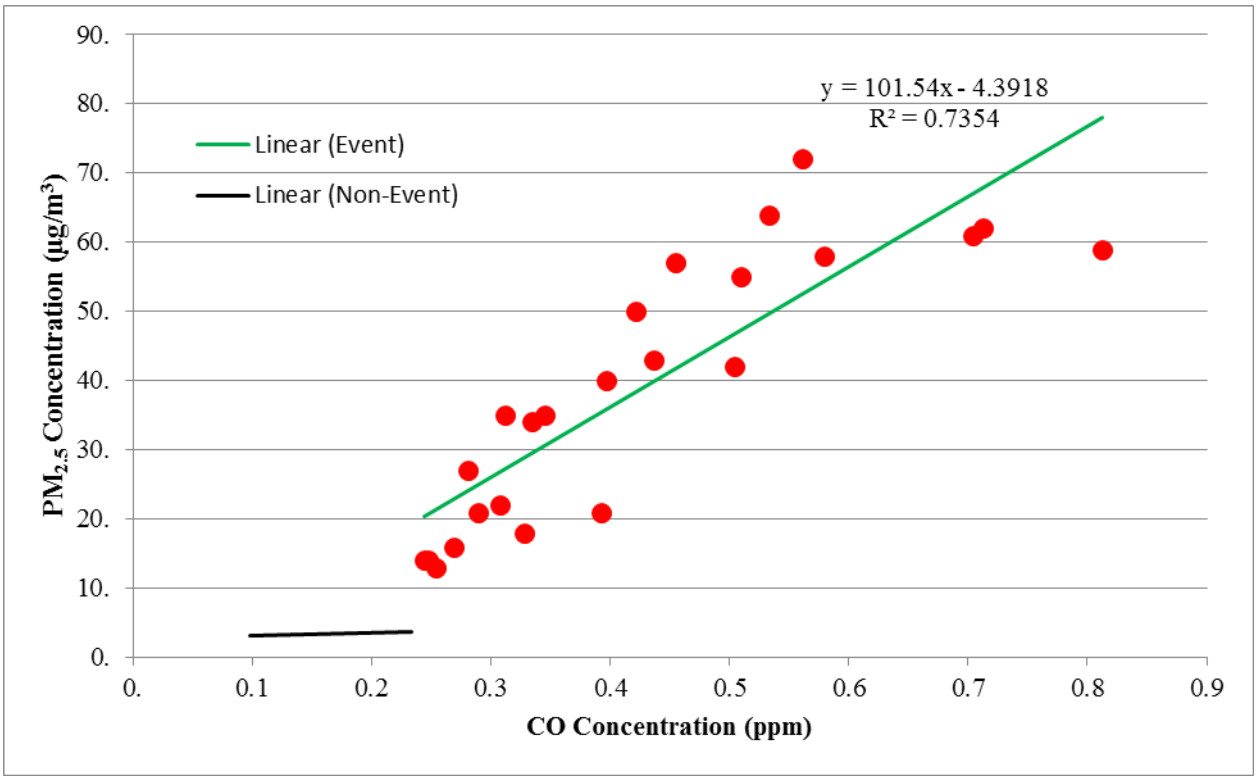


Figure 3.13: Hourly Reno3 $PM_{2.5}$ and CO for August 21, 2015



3.5 Clear Causal Relationship Conclusion

In August 2015, numerous wildfires in Northwest California, Oregon, and Washington burned tens of thousands of acres. Wildfire smoke, including O_3 precursors, from these fires was transported into the Reno/Sparks area beginning August 17. The Reno/Sparks area, specifically the Reno3 monitor (AQS ID 32-031-0016), measured elevated concentrations of O_3, $PM_{2.5}$, NOx, CO, OC, and EC. The most critical parameters demonstrating wildfire smoke and O_3 (O_3, OC, and EC) were in the 90^{th} to 100^{th} percentiles compared to historical concentrations (June-August, 2010-2014). Below is a summary of these critical parameters from the Reno3 station during the days recommended to be excluded (August 18, 19, and 21, 2015) from comparison to the O_3 NAAQS.

	Percentiles Compared to Historical Concentrations (Jun-Aug, 2010-2014)		
Parameter	8/18	8/19	8/21
O_3	99^{th}	99^{th}	99^{th}
OC	95^{th}	95^{th}	95^{th}
EC	90^{th}	90^{th}	90^{th}

Hourly O_3 concentrations during this period were also unusually high compared to historical concentrations further supporting the presence of wildfire smoke. Additional evidence of the exceptional event is documented with $PM_{2.5}$ to CO correlations, HYPSLIT backward trajectories, visible satellite imagery, detected smoke layers, AirNow Tech images, Satellite Smoke Text products, NWS Area Forecast Discussions, and social media posts.

The comparisons and statistical analyses provided in Section 3.0 of this addendum support AQMD's demonstration that the wildfire event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedances on August 18 and 19, 2015. Section 3.0 thus satisfies the clear causal relationship criterion as required by the EER and 40 CFR 50.14(c)(3)(iv). This addendum further supports the August 21, 2015 exceptional event demonstrated in the 2015 EE Demonstration.

4.0 NATURAL EVENT

Based on the documentation provided in Section 2.0 of this addendum, the event qualifies as a wildfire because lightning caused dozens of unplanned wildfire events throughout the Pacific Northwest. The EPA generally considers the emissions of O_3 precursors 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." These wildfire events occurred on wildland, as documented in Section 2.0, due to lightning, and accordingly, AQMD has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event. Additionally, as demonstrated in Section 2.0 by location maps of the wildfires, the wildfire events were on wildlands occurring on Federal or State owned lands.

5.0 NOT REASONABLY CONTROLLABLE OR PREVENTABLE

Based on the documentation provided in Section 2.0 of this addendum, lightning caused the wildfire events on wildland. The AQMD is not aware of any evidence clearly demonstrating that prevention or control efforts beyond those actually made would have been reasonable. Therefore, emissions from this wildfire were not reasonably controllable or preventable.

6.0 CONCLUSION AND RECOMMENDATIONS

In August 2015, smoke from numerous wildfires in California, Oregon, and Washington transported into the Reno/Sparks, Nevada area. This resulted in elevated O_3 and $PM_{2.5}$ concentrations on August 18-21, 2015. The 2015 EE Demonstration and this addendum support the criteria for an exceptional event detailed in the 2016 Exceptional Events Rule and 2016 Wildfire Ozone Guidance. Specifically, the documentation used the following evidence to demonstrate the exceptional event.

- ambient air monitoring data
- statistical analyses of the monitoring data compared to historical concentrations
- analyses of wildfire smoke emissions
- satellite imagery (visible and detected smoke)
- narratives from the National Oceanic and Atmospheric Administration and National Weather Service (Reno)
- HYSPLIT trajectory analyses
- social and traditional media posts

This addendum, in conjunction with the 2015 EE Demonstration clearly demonstrate the justification of the exclusion of data from August 18, 19, and 21 due to an exceptional event under 40 CFR 50.14(c)(3)(iv). The addendum and demonstration has provided evidence that:

1. Emissions from a wildfire event caused O_3 exceedances at the Reno3 monitor;
2. The event affected air quality in such a way that there exists a clear causal relationship between the event and the exceedances on August 18, 19, and 21, 2015;
3. Event-influenced concentrations were above normal historical concentrations;
4. The event was a lightning caused wildfire on wildland, and therefore a natural event;
5. The event was lightning caused, and therefore not reasonably controllable or preventable.

The AQMD recommends that EPA Region 9 concur with the 2015 EE Demonstration and addendum and exclude data from the Reno3 O_3 monitor for August 18, 19, and 21, 2015 from comparison to the NAAQS.