July 8, 2007 Portola Exceptional Event

On July 5, 2007, lightning from a series of dry thunderstorms ignited fires in the Plumas National Forest near Wheeler Peak. By the time the fire was contained on July 11th, the Antelope Complex Fire had burned more than 25,000 acres. On July 8, 2007, the Portola PM2.5 FRM monitor recorded a PM2.5 mass concentration of 41 ug/m3, which exceeded the PM2.5 24-hour National Ambient Air Quality Standard (NAAQS) of 35 ug/m3.

The fire was located at ~5,000 feet in elevation. Due to the complex terrain of this region, smoke may impact some valleys and not others. However, the trajectories show that only the Portola monitor was affected by the fire.

The Portola monitor was the closest monitor to the Antelope-Wheeler Complex fire. Portola is ~23 miles southeast from the center of the fire. The town of Portola is located at ~4,800 feet and is hilly. The elevation at the monitoring site is 4,895 feet and the site is located in a valley.

The Quincy monitor is ~24 miles southwest from the center of the Antelope-Wheeler Complex fire. The town of Quincy is located at ~3,400 feet and is hilly. The elevation at the monitoring site is 3,422 feet and the site is located in a valley.

The Grass Valley monitor was the furthest of the three monitors from the fire. Grass Valley is ~67 miles southwest from the center of the Antelope-Wheeler Complex fire. The town is located at ~2,400 feet and the elevation at the monitoring site is 2,484 feet. The surrounding region and the monitoring site are hilly.

The location for the Antelope-Wheeler Complex Fire used in the previous report was misidentified. A revised Hysplit analysis was made using the coordinates obtained from the United States Forestry Service (USFS) website. Fire perimeter information from this website was incorporated into revised Google earth images, overlaying the Hysplit forward trajectories from the fire. Those trajectories confirm the high impact at the Portola monitor and show no major impacts at the Quincy and Grass Valley monitors, as was noted in the Natural Events documentation.

Figure 1 is a forward trajectory from the center of the Antelope-Wheeler Complex Fire from the hours of midnight to midnight on July 6, 2007. This trajectory accounts for every hour on July 6, 2007.

Figure 1- July 6, 2007 (every hour)

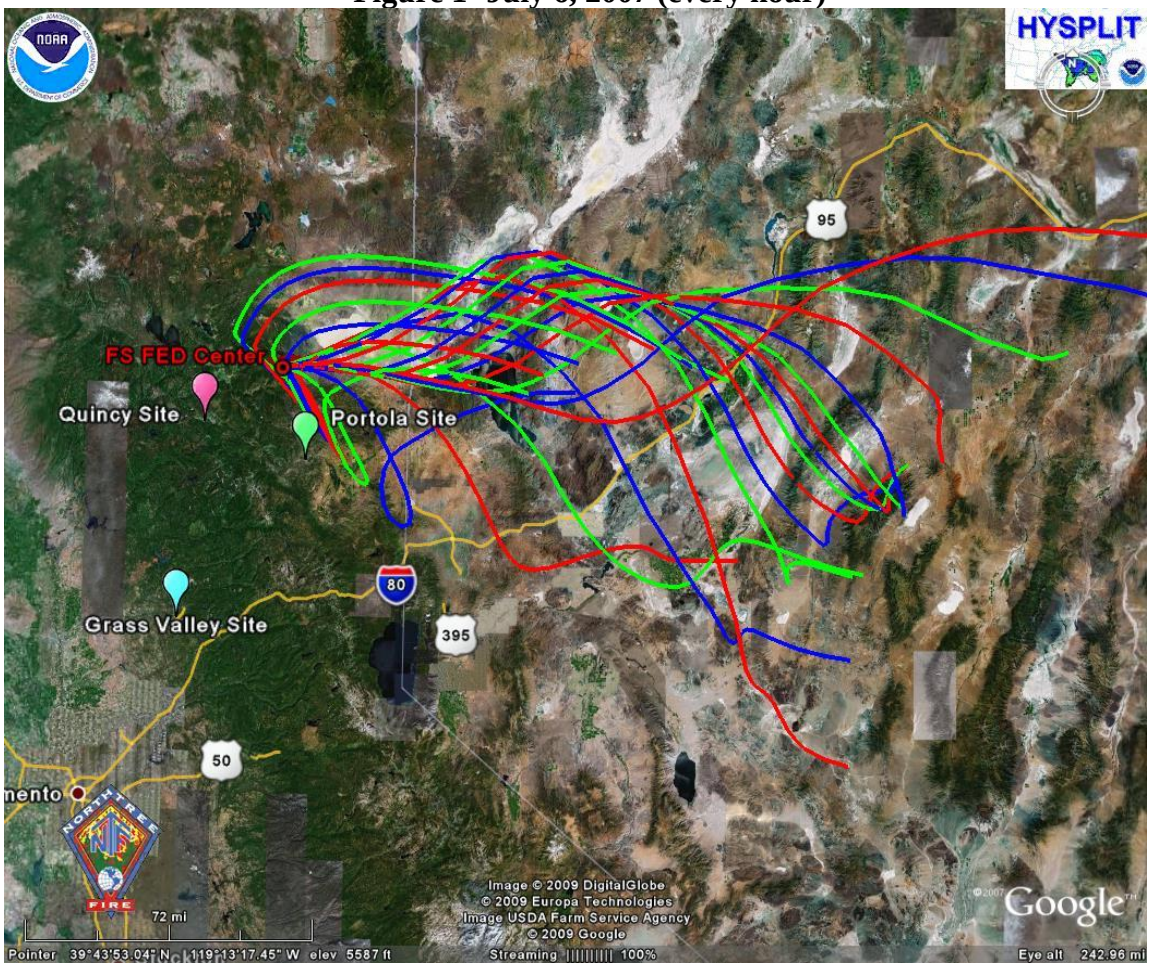


Figure 2 is a forward trajectory from the center of the Wheeler Complex Fire from the hours of midnight to midnight on July 7, 2007. This trajectory accounts for every hour on July 7, 2007.

Figure 2- July 7, 2007 (every hour)

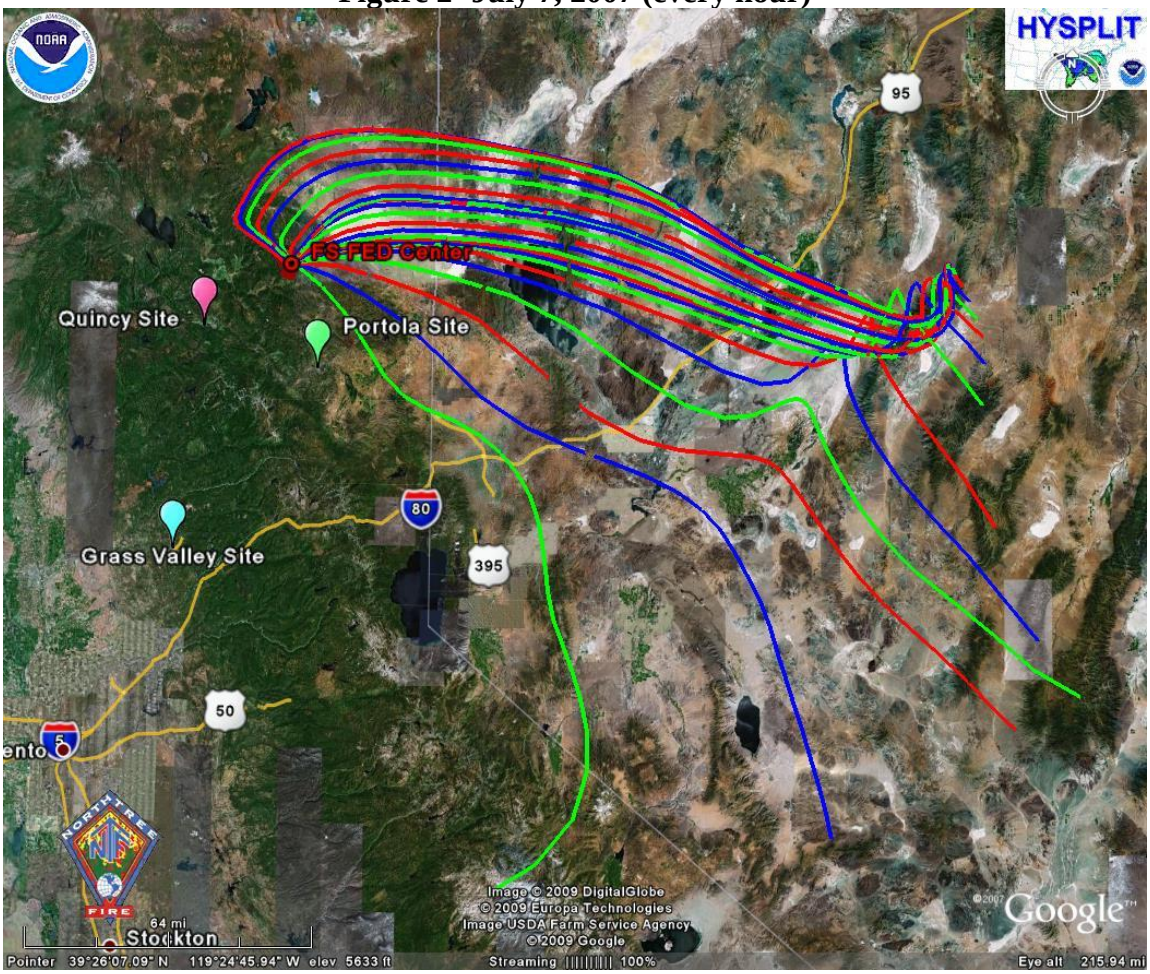


Figure 3 is a forward trajectory from the estimated point of the Wheeler Complex Fire on July 8, 2007 from the hours of midnight to midnight. This point shows the progression of the fire on July 8, 2007 from the beginning of the fire. This trajectory accounts for every hour on July 8, 2007.

Figure 3- July 8, 2007 (every hour) not centered

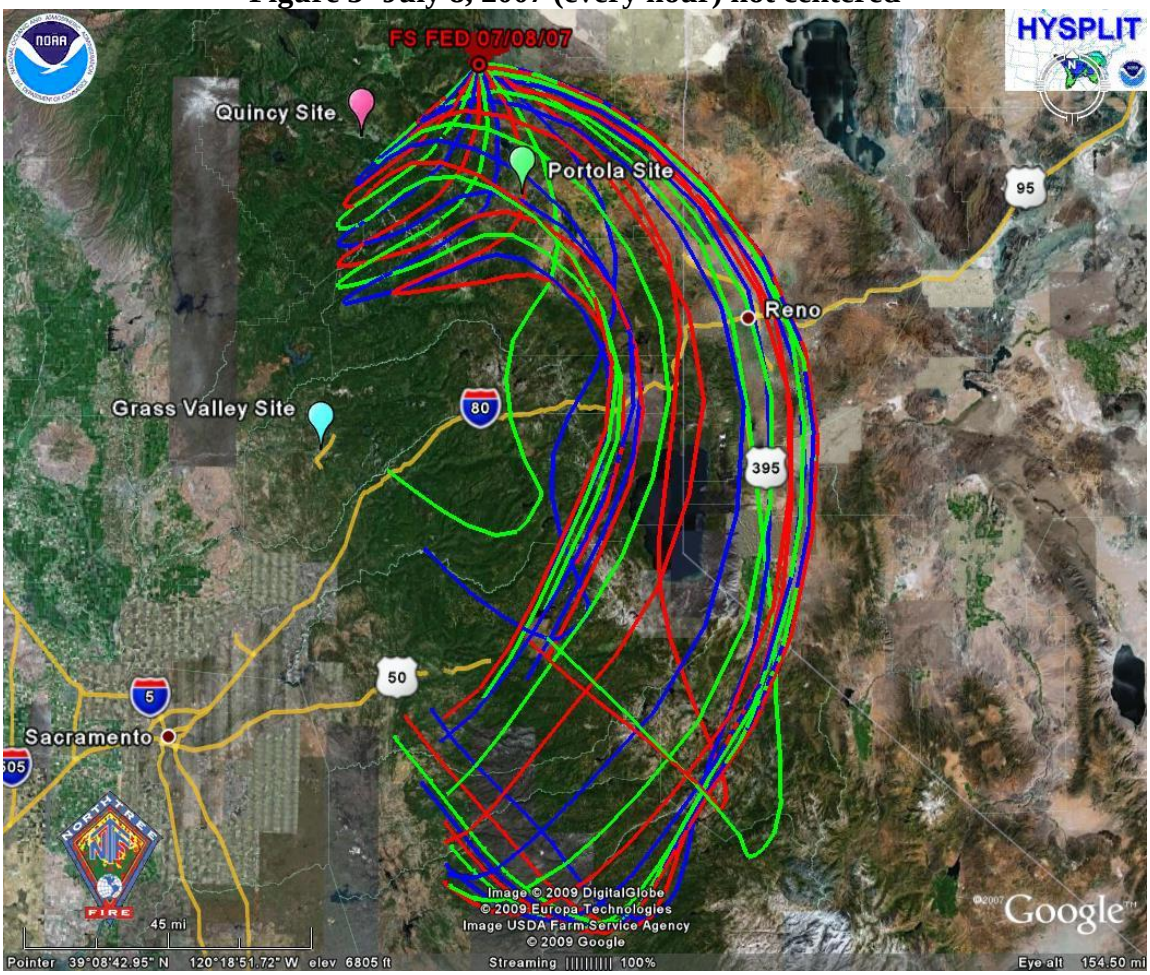


Figure 4 is a forward trajectory from the center of the Wheeler Complex Fire from the hours of midnight to midnight on July 9, 2007. This trajectory accounts for every hour on July 9, 2007.

Figure 4- July 9, 2007 (every hour)

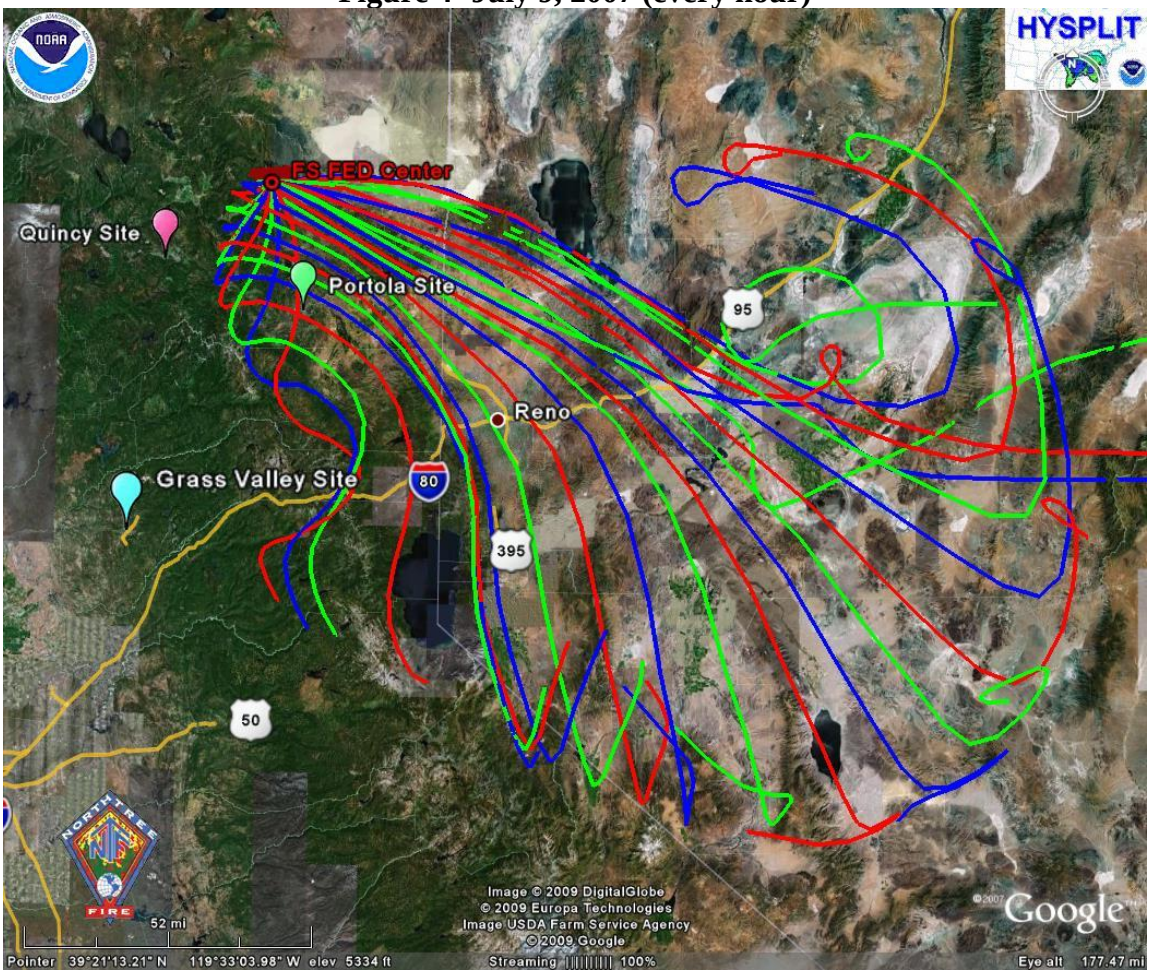


Figure 5 is a forward trajectory from the center of the Wheeler Complex Fire from the hours of midnight to midnight on July 10, 2007. This trajectory accounts for every hour on July 10, 2007

Figure 5- July 10, 2007 (every hour)

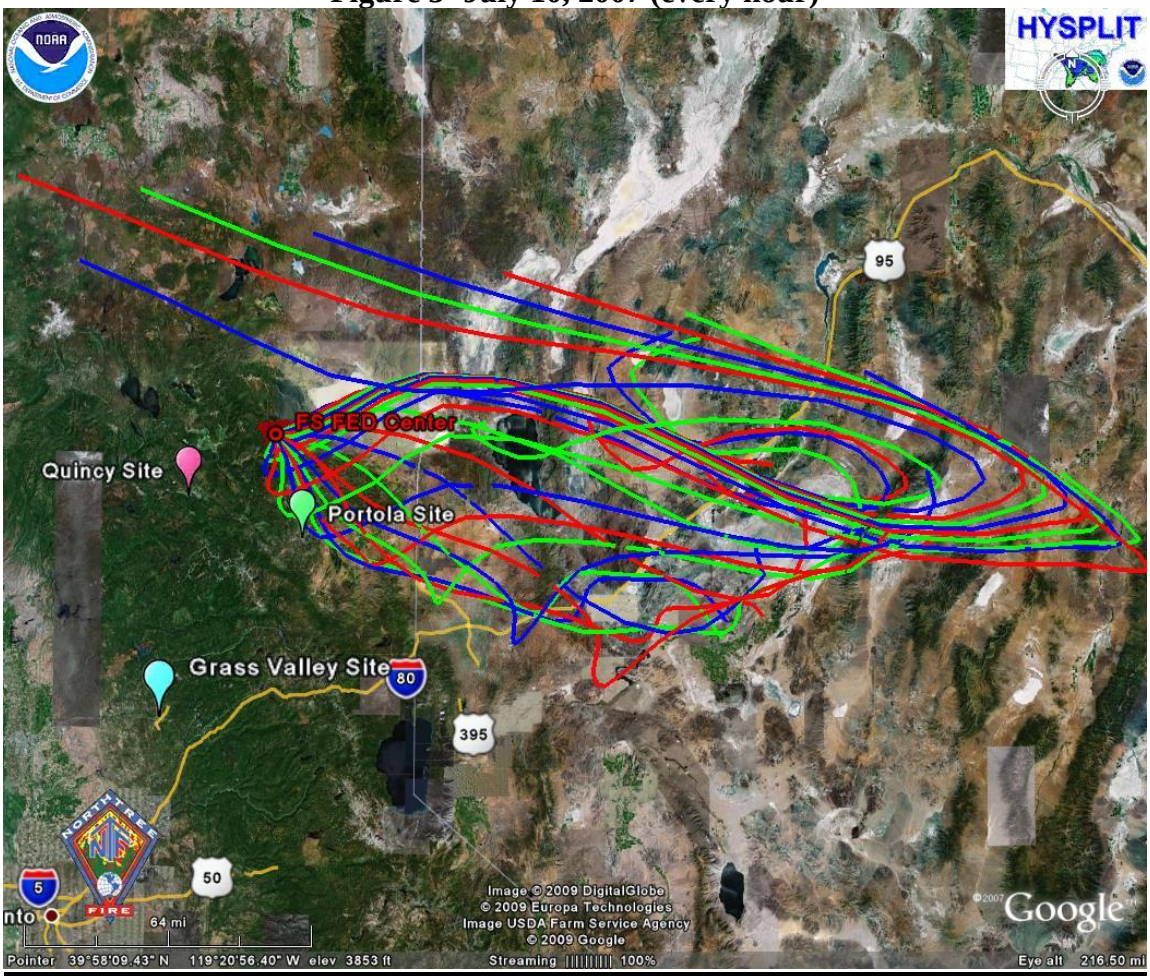
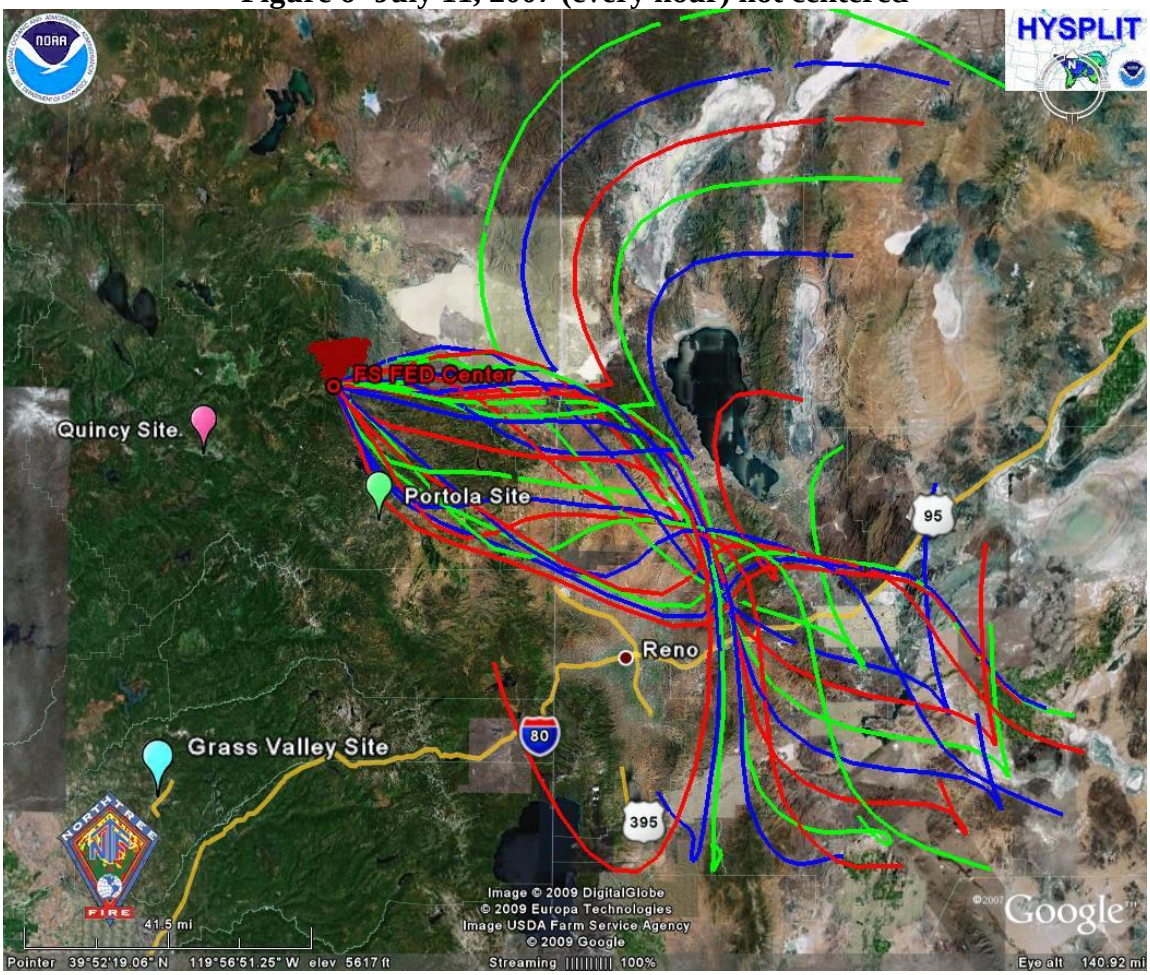


Figure 6 is a forward trajectory from the estimated point of the Wheeler Complex Fire on July 11, 2007 from the hours of midnight to midnight. This point shows the progression of the fire on July 11, 2007 from the beginning of the fire. This trajectory accounts for every hour on July 11, 2007

Figure 6- July 11, 2007 (every hour) not centered



Hourly PM2.5 BAM data was available for the duration of the Antelope-Wheeler Complex Fire (Figure 7 and Table 1). Hourly PM2.5 BAM data was missing during several key hours at Portola on July 8, 2007 which explains why the maximum concentration at the Portola monitor was not higher than Quincy.

Figure 7- PM2.5 BAM average and maximum concentrations (July 5-11, 2007)

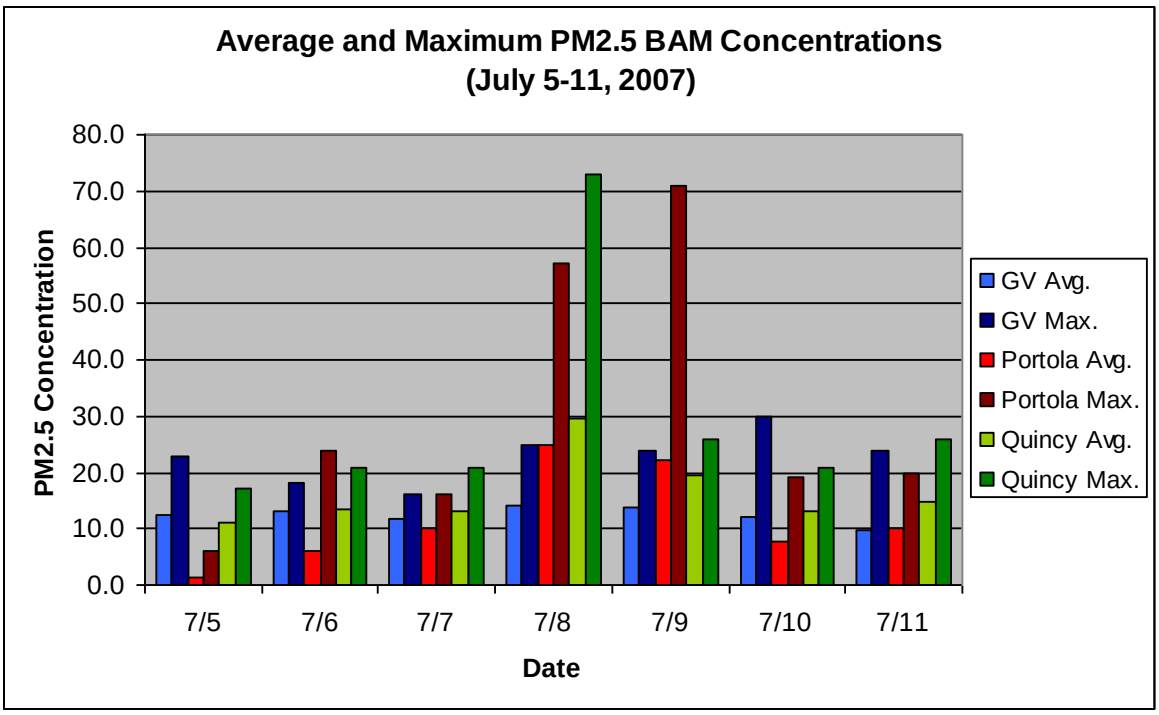


Table 1. PM2.5 BAM average and maximum concentrations (July 5-11, 2007)

Date	GV Avg.	GV Max.	Portola Avg.	Portola Max.	Quincy Avg.	Quincy Max.
5-Jul	12.4	23.0	1.5	6.0	11.0	17.0
6-Jul	13.2	18.0	6.2	24.0	13.3	21.0
7-Jul	11.7	16.0	10.0	16.0	13.0	21.0
8-Jul	14.0	25.0	24.8	57.0	29.5	73.0
9-Jul	13.8	24.0	22.2	71.0	19.6	26.0
10-Jul	12.2	30.0	7.8	19.0	13.2	21.0
11-Jul	9.6	24.0	10.2	20.0	14.7	26.0

Figures 8-10 display the hourly PM2.5 BAM data for the Portola, Quincy, and Grass Valley monitoring sites for July 5-11, 2007. Tables 2-4 show the corresponding data in a table format.

Figure 8- Portola PM2.5 BAM data (July 5-11, 2007)

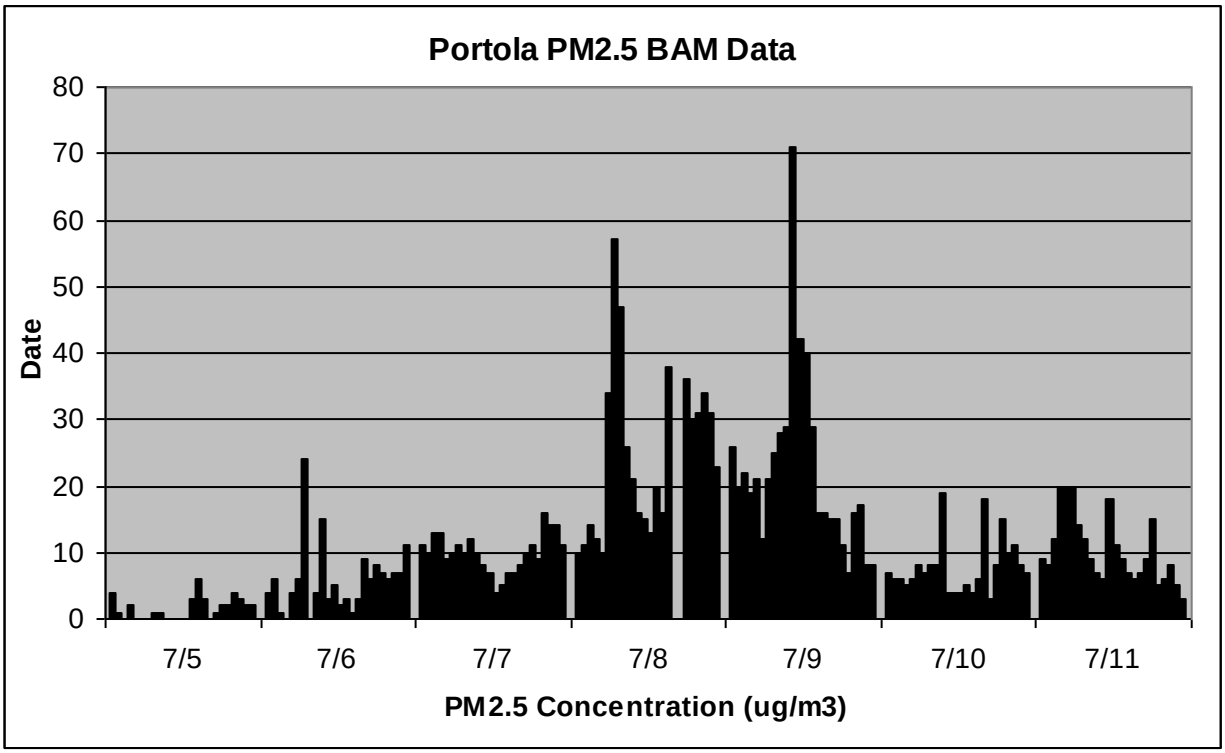


Table 2. Hourly PM2.5 BAM data at the Portola monitoring site (July 5-11, 2007)

Date	00-01	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-00	Days Avg	Day's Max
5-Jul	4	1	0	2	0	0	0	1	1	0	0	0	0	3	6	3	0	1	2	2	4	3	2	2	1.5	6
6-Jul	4	6	1	0	4	6	24		4	15	3	5	2	3	1	3	9	6	8	7	6	7	7	11	6.2	24
7-Jul	11	10	13	13	9	10	11	10	12	10	8	7	4	5	7	7	8	10	11	9	16	14	14	11	10	16
8-Jul	10	11	14	12	10	34	57	47	26	21	16	15	13	20	16	38			36	30	31	34	31	23	24.8	57
9-Jul	26	20	22	19	21	12	21	25	28	29	71	42	40	29	16	16	15	15	11	7	16	17	8	8	22.2	71
10-Jul	7	6	6	5	6	8	7	8	8	19	4	4	4	5	4	6	18	3	8	15	10	11	8	7	7.8	19
11-Jul	9	8	12	20	20	20	14	12	9	7	6	18	11	9	7	6	7	9	15	5	6	8	5	3	10.2	20

Figure 9- Quincy PM2.5 BAM data (July 5-11, 2007)

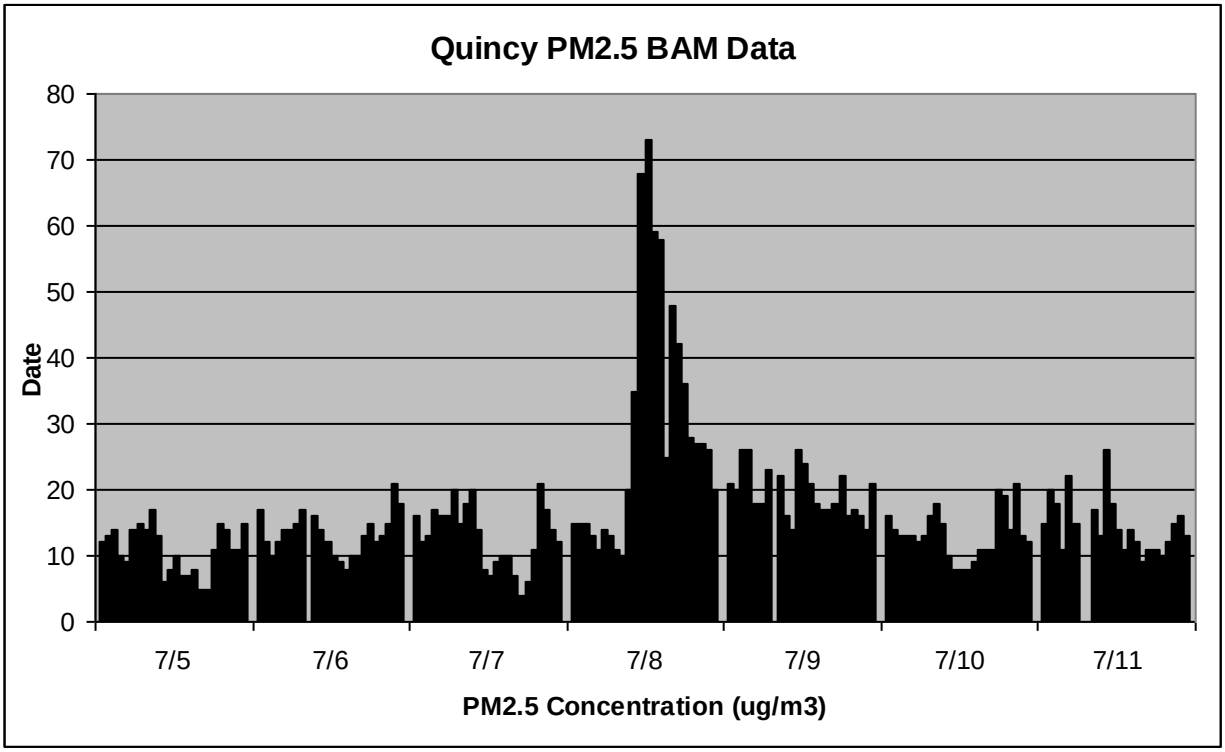


Table 3. Hourly PM2.5 BAM data at the Quincy monitoring site (July 5-11, 2007)

Date	00-01	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-00	Days Avg	Day's Max
5-Jul	12	13	14	10	9	14	15	14	17	13	6	8	10	7	7	8	5	5	11	15	14	11	11	15	11	17
6-Jul	17	12	10	12	14	14	15	17		16	14	12	10	9	8	10	10	13	15	12	13	15	21	18	13.3	21
7-Jul	16	12	13	17	16	16	20	15	18	20	14	8	7	9	10	10	7	4	6	11	21	17	14	12	13.0	21
8-Jul	15	15	15	13	11	14	13	11	10	20	35	68	73	59	58	25	48	42	36	28	27	27	26	20	29.5	73
9-Jul	21	20	26	26	18	18	23		22	16	14	26	24	21	18	17	17	18	22	16	17	16	14	21	19.6	26
10-Jul	16	14	13	13	13	12	13	16	18	15	10	8	8	8	9	11	11	11	20	19	14	21	13	12	13.2	21
11-Jul	15	20	18	11	22	15			17	13	26	18	14	11	14	12	9	11	11	10	12	15	16	13	14.7	26

Figure 10- Grass Valley PM2.5 BAM data (July 5-11, 2007)

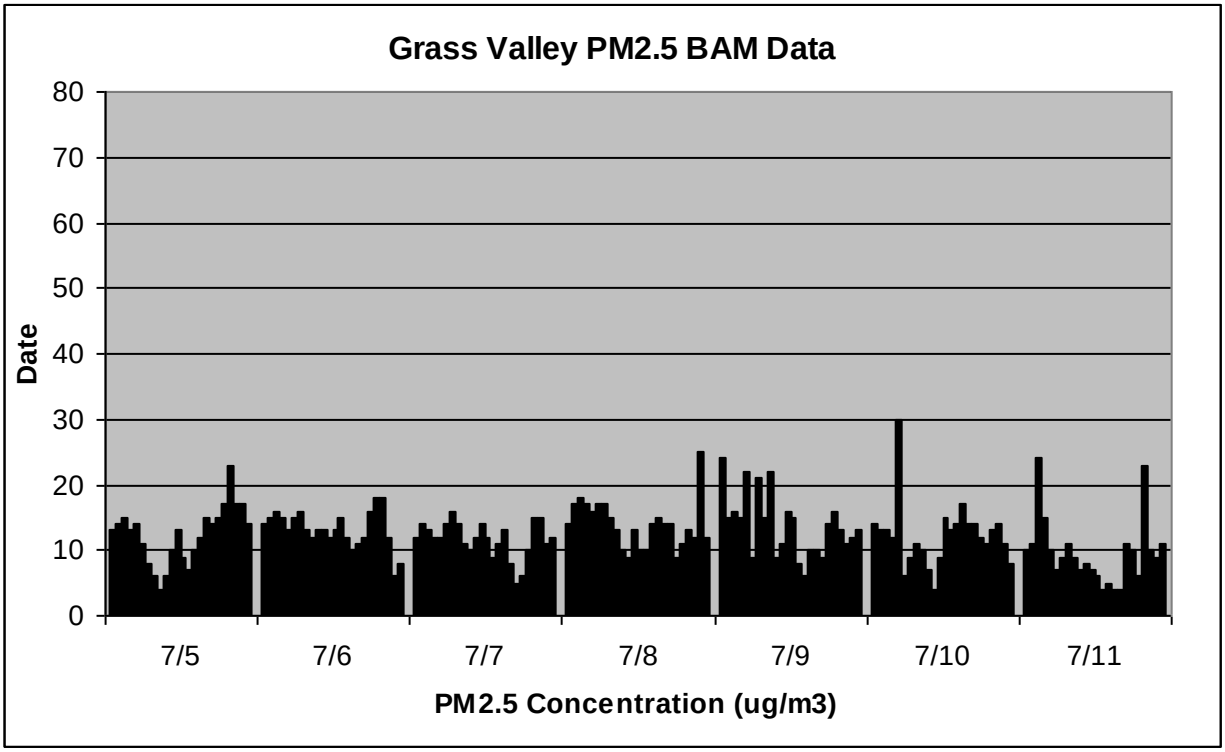


Table 3. Hourly PM2.5 BAM data at the Grass Valley monitoring site (July 5-11, 2007)

Date	00-01	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-00	Days Avg	Day's Max
5-Jul	13	14	15	13	14	11	8	6	4	6	10	13	9	7	10	12	15	14	15	17	23	17	17	14	12.4	23
6-Jul	14	15	16	15	13	15	16	13	12	13	13	12	13	15	12	10	11	12	16	18	18	12	6	8	13.2	18
7-Jul	12	14	13	12	12	14	16	14	11	10	12	14	12	9	11	13	8	5	6	10	15	15	11	12	11.7	16
8-Jul	14	17	18	17	16	17	17	15	13	10	9	13	10	10	14	15	14	14	9	11	13	12	25	12	14	25
9-Jul	24	15	16	15	22	9	21	15	22	9	11	16	15	8	6	10	10	9	14	16	13	11	12	13	13.8	24
10-Jul	14	13	13	12	30	6	9	11	10	7	4	9	15	13	14	17	14	14	12	11	13	14	11	8	12.2	30
11-Jul	10	11	24	15	10	7	9	11	9	7	8	7	6	4	5	4	4	11	10	6	23	10	9	11	9.6	24

Figure 11 displays the PM2.5 chemical composition at the Portola monitoring site from June 26, 2007 to July 29, 2007. Carbon speciation data was unavailable so an alternative method was used to estimate the carbon concentration. The carbon concentration at the Portola monitoring site was estimated by subtracting all estimated components (ammonium nitrate + ammonium sulfate + geological + elements) from the PM2.5 mass measured using the speciation sampler. Because speciation data was only available for the start and end dates of the fire we are not able to see a large increase in the carbon concentration. Speciation data was not available for the Portola site on July 8th. However, on July 11, 2007, the day the fire was contained, the PM2.5 concentration was elevated in comparison to the surrounding weeks, due primarily to a higher than average carbon component.

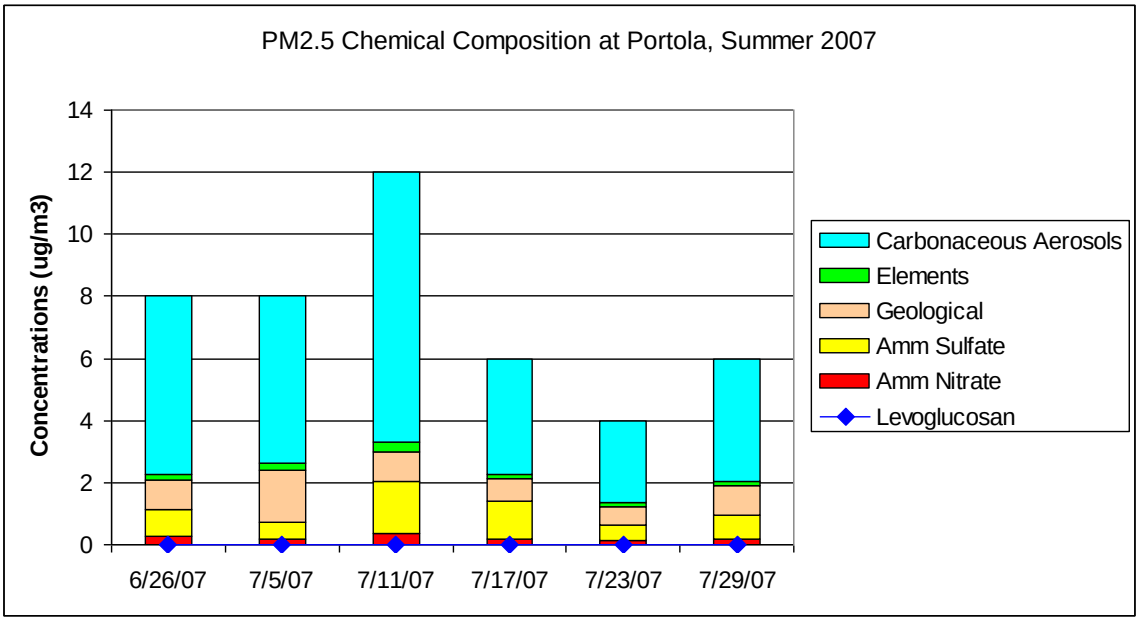



Figure 11- Portola PM2.5 Chemical Composition, Summer 2007