

APPENDIX D

METEOROLOGICAL ANALYSIS

July 10, 2008

The added emissions from an unprecedented number of wildfires burning in the Coast Range and Sierra Nevada mountains caused several exceedances of the 1-hour federal ozone standard at Folsom during late June and early July of 2008 (refer to discussion of Episodes 1 and 2). After an exceedance at Folsom on July 7, the wildfires continued to burn, and wildfire-related ozone and precursor emissions continued to build-up in the southern Sacramento Valley. Ozone concentrations at Folsom remained high during this time period, but did not exceed the 1-hour standard. However, with the continued build-up of emissions and a substantial amount of ozone carryover, another exceedance of the 1-hour standard occurred on July 10. The following analysis describes the conditions leading up to this exceedance, focusing on emissions in the mixed layer. In this document, the mixed layer is considered that portion of the lower atmosphere where temperature decreases with height from the ground to the base of the lowest inversion layer. Emissions in the mixed layer impact ground level ozone concentrations.

Analysis

The hundreds of wildfires started by the lightning strikes during the June 20-21, 2008, storm continued to burn into July. By July 10, many of the fires surrounding the Sacramento Valley had burned more than 1,000 acres, while a substantial number had burned more than 10,000 acres. Overall, more than 1,000,000 acres were reported burned within 300 miles of Folsom, with close to 140,000 acres burned within 100 miles of Folsom (see Figure 1 and Table 1).

The Days before the Exceedance: Following the July 7 exceedance, 1-hour ozone concentrations at Folsom fell to just below the federal standard on July 8, despite strengthening weather conditions normally conducive to high ozone. Although ozone levels fell, the mid-day NASA satellite image shows substantial amounts of smoke drifting over the Sacramento Valley (see Figure 2). Based on airport observations, haze or smoke was reported at one or more of the three airports in the southern Sacramento Valley (Mather Field (nearest Folsom), Sacramento Executive, and Sacramento International) during all 24 hours of July 8 (see Table 2). This shows that wildfire emissions were present in the area at ground level. Still, ozone concentrations did not exceed the standard. Unlike the previous exceedance days, the low level inversion on July 8 broke at 1400 PST. This provided for greater dilution and dispersion of the wildfire-related emissions, which likely prevented an exceedance from occurring.

Similar weather conditions persisted into July 9. A surface high pressure ridge continued to build into northern California (see Figure 3), and there was continued transport of wildfire emissions from the surrounding mountains into the Sacramento Valley. During the early morning hours, these emissions combined with those from the previous day and were trapped in the southern Sacramento

Valley by a low overnight mixed layer and a very large eddy wind circulation pattern in the southern portion of the Sacramento Valley (see Tables 3 and 4, as well as Figure 4). As the day progressed, surface wind flow from the northwest to north transported additional wildfire emissions into the southern Sacramento Valley, compounding the overall burden (see Figures 5 and 6). By mid-day on July 9, the NASA visible satellite image (see Figure 7) shows smoke throughout the central and southern portions of the Sacramento Valley. The smoke is particularly thick over the eastern portion of the Sacramento Valley.

Airport observations confirm that smoke reached the ground. During the very early morning hours (0300-0400 PST), visibilities were 8 to 10 miles, with reports of smoke and haze in the southern Sacramento Valley (see Figure 8). By 0900-1000 PST, visibilities were more limited (5 to 6 miles in the southern Sacramento Valley), and there were more widespread reports of smoke and haze (see Figure 9). By late afternoon, visibilities were severely impacted in the eastern portion of the Sacramento Valley (see Figure 10). The visibility near Folsom was less than 1 mile, and all sites in the southern portion of the Sacramento Valley reported smoke. The severe impact on visibilities confirms that much of the smoke visible in the satellite image was present at the surface, and this smoke severely impacted the southern Sacramento Valley. Overall, at least one of the three airports in the southern Sacramento Valley reported smoke or haze during 23 of the 24 hours on July 9 (refer to Table 2).

In general, there were several factors on the preceding days that contributed to the ozone exceedance on July 10, 2008. First, there was surface wind flow from the northwest through north on June 9. These winds carried additional wildfire-related emissions from a broader swath of area into the southern Sacramento Valley. Second, wind speeds were relatively low. This allowed for the transport of emissions, but also served to keep the air mass relatively intact as it was transported into the southern Sacramento Valley. Finally, although wildfire emissions were not sufficient to cause an exceedance of the federal standard on July 8 or 9, there were substantial amounts of wildfire-related ozone and ozone precursors lingering in the air mass. These were carried over into July 10, providing a substantial concentration to which that day's ozone was added. Although these factors were important contributors to the transport and concentration of smoke in the southern Sacramento Valley, they would not be expected to cause an exceedance of the federal standard under the typical emissions burden.

The Day of the Exceedance: Several factors contributed to the July 10, 2008, ozone exceedance at Folsom. First, there was a very high level of ozone carried over from the previous day. A shallow mixed layer and localized eddy circulation pattern during the overnight and early morning hours kept wildfire-generated ozone and emissions carried over from the two previous days trapped near the ground in the southern Sacramento Valley. The minimum ozone concentration measured at Folsom on July 10 was 0.031 parts per million at 0500 PST (see Figure 11). This is nearly twice the average level for Folsom, and it is about

one-quarter the level of the federal 1-hour standard. This considerable carryover level provided a high baseline, to which ozone was added during the day of July 10.

Second, the wind direction was optimal for transporting emissions from fire areas in several directions to the southern Sacramento Valley. During the early morning hours of July 10, surface air movement in the southern Sacramento Valley was controlled by the typical downslope drainage winds (refer to Tables 2 and 3) and sea breeze flow from the Bay Area through the Carquinez Strait (see Figure 12). The drainage flow transporting emissions from wildfires in the Sierra Nevada Mountains was aided by the 0400 PST surface pressure gradient. The pressure gradient is the difference in atmospheric pressure between two areas and provides a force which moves air from a higher to a lower pressure area. At 0400 PST, there was a 6.2 millibar pressure difference between Reno (KRNO; area of higher pressure) and Sacramento (KSAC; area of lower pressure). Similarly, drainage flow transporting emissions from wildfires in the Coast Range Mountains was aided by the 0400 PST 2.5 millibar pressure gradient between San Francisco (KSFO; area of higher pressure) and Sacramento (KSAC; area of lower pressure). In addition to the drainage flow, surface air flow from the northwest through north transported wildfire emissions from a number of large fires in the northern Coast Range Mountains into the southern portion of the Sacramento Valley. Wildfire emissions from all these various directions converged and were caught up in a localized surface eddy circulation pattern which trapped the emissions in the southwestern portion of the Sacramento Valley. The shallow mixed layer (approximately 150 meters between midnight and 0700 PST) kept the trapped wildfire emissions from dispersing upward (see Figure 13).

The late morning NASA satellite image shows emissions from the various fire areas drifting over the Sacramento Valley (see Figure 14). Emissions continued to concentrate in the southern portion of the Sacramento Valley due to the convergence of surface winds (see Figure 15). Surface winds from the northwest through north transported emissions from large fires in the northern Coast Range Mountains into the southern portion of the Sacramento Valley. In addition, the southwest sea breeze flow brought fire emissions from the Bay Area into the southern Sacramento Valley (fire emissions in the Bay Area were those that had transported from wildfires in the Coast Range; see Figures 14 and 16 through 18). Over time, the fire emissions trapped in the southern portion of the Sacramento Valley were pushed eastward toward Folsom, by the strengthening sea breeze (see Figure 19). This eastward push of emissions was aided by the drop in the surface pressure gradient between Reno and Sacramento. Following the 1200 PST exceedance, the NASA satellite image shows the Folsom area totally obscured by heavy smoke (see Figure 20).

Airport visibility observations confirm the continued transport and build-up of smoke throughout the day in the northern Bay Area and southern Sacramento Valley on July 10. During the early morning hours (0300-0400 PST), the reported visibility near Folsom was 6 miles, with observed smoke (see Figure 16). Several hours later (0900-1000 PST), the visibility near Folsom was

down to 3 miles, and there were widespread observations of smoke and haze at the surrounding sites (see Figure 17). Between 1100 and 1200 PST, the reported visibility near Folsom remained at 3 miles. Visibilities at the other sites in the southern Sacramento Valley decreased substantially, and all three sites reported smoke (see Figure 18). Overall, at least one of the three sites in the southern Sacramento Valley reported smoke or haze during all of the hours on July 10 between midnight and 1200 PST, the hour of the exceedance (refer to Table 2). Following the exceedance (1300-1400 PST), the visibility near Folsom was very low, at 1.5 miles with observed smoke (see Figure 21).¹

Third, the height of the mixed layer was low, and remained relatively low throughout the day (refer to Figure 13). From midnight to 0700 PST, the height of the mixed layer remained relatively constant, at approximately 150 meters. Between 0800 PST and 1200 PST, the height doubled, increasing to about 330 meters. This was the maximum height of the mixed layer for the day. While the rise in the height of the mixed layer allowed some additional wildfire emissions to be mixed to the surface, it still provided a relatively shallow lid to trap those emissions close to the surface, where they impacted ground level ozone concentrations.

Fourth, ambient temperatures in the Sacramento area on July 10 were high enough to promote ozone formation from wildfire emissions. The maximum temperature at Folsom reached 108 degrees Fahrenheit. Although this temperature is high, it is not unheard of for the Folsom area. Furthermore, a comparison of maximum temperatures in the Sacramento region on July 10 with those on the surrogate day showed that the July 10 temperatures were not so high as to cause an exceedance, if the emissions burden were typical (refer to Sonoma Technology, Inc., Appendix Y).

In conclusion, the transport and build-up of wildfire-related emissions and their impact on the July 10, 2008, peak 1-hour ozone concentration at the Folsom monitoring site is supported by several factors, as summarized, below:

- 1) Wildfire emissions transported into the southern Sacramento Valley during the prior two days resulted in a very high level of wildfire-related ozone carryover. The amount of carryover was about twice the average level at Folsom and about one-quarter of the level of the federal 1-hour standard.
- 2) Early morning downslope drainage winds on July 10 transported additional wildfire emissions from the Coast Range and Sierra Nevada mountains into the central and southern Sacramento Valley. In addition, early morning surface winds from the northwest through north transported wildfire emissions from large fires in the northern Coast Range Mountains into the southern Sacramento Valley, adding to the overall burden.

¹ Note: airport observations for the 1200 to 1300 PST time period are not included here, because they appear to be in error. While the observations for all other sites in the southern and central Sacramento Valley are consistent with the previous hour's observations (the 1100-1200 PST observation), the report for Mather Field Airport, the site nearest Folsom, lists a visibility of 10 miles, with no observed smoke or haze.

- 3) The morning eddy wind circulation pattern trapped the transported wildfire emissions, allowing them to build-up in the southern Sacramento Valley. The morning surface pressure gradient between Reno and Sacramento helped keep the wildfire emissions trapped in the Valley.
- 4) During the late morning hours, the eddy circulation pattern weakened, and the fire emissions trapped in the southern portion of the Sacramento Valley were pushed eastward toward Folsom, as the sea breeze strengthened and spread over the southern and central portions of the Sacramento Valley. Observations of decreasing visibilities, haze, and smoke from the early morning hours through the time of the exceedance corroborate the transport of wildfire-related emissions into the Folsom area and confirm the presence of smoke at ground level.
- 5) The low height of the mixed layer during the overnight and early morning hours of July 10 provided a lid that trapped and concentrated wildfire-related emissions close to the ground. The height of the mixed layer increased during the several hours preceding the exceedance, allowing additional wildfire emissions carried throughout a larger volume of air to be mixed downward, where they could impact ground level ozone measurements. Although the inversion conditions were conducive to higher ozone concentrations, they were not sufficient or typical of conditions needed to cause an exceedance, based on the surrogate day assessment.
- 6) Ambient temperatures on July 10 were high, resulting in conditions conducive to ozone formation. However, the surrogate day assessment indicates temperatures were not high enough to generate an exceedance from emissions normally present in the area. The addition of wildfire-related emissions provided the precursors needed to generate ozone concentrations in excess of the federal 1-hour standard.

The conditions summarized above led to a build-up of ozone and wildfire-related emissions that resulted in a federal 1-hour ozone exceedance at the Folsom site. Historically, these types of meteorological conditions have not resulted in a federal 1-hour ozone exceedance, based on the similar day assessment (refer to Sonoma Technology, Inc., Appendix Y). Therefore, the addition of wildfire-related emissions is what caused the 1-hour ozone exceedance measured on July 10, 2008.

**FIGURES AND TABLES FOR METEOROLOGICAL DISCUSSION
EPISODE 4: JULY 10, 2008**

**Figure 1
Map of Fires for June 20 through July 10, 2008**

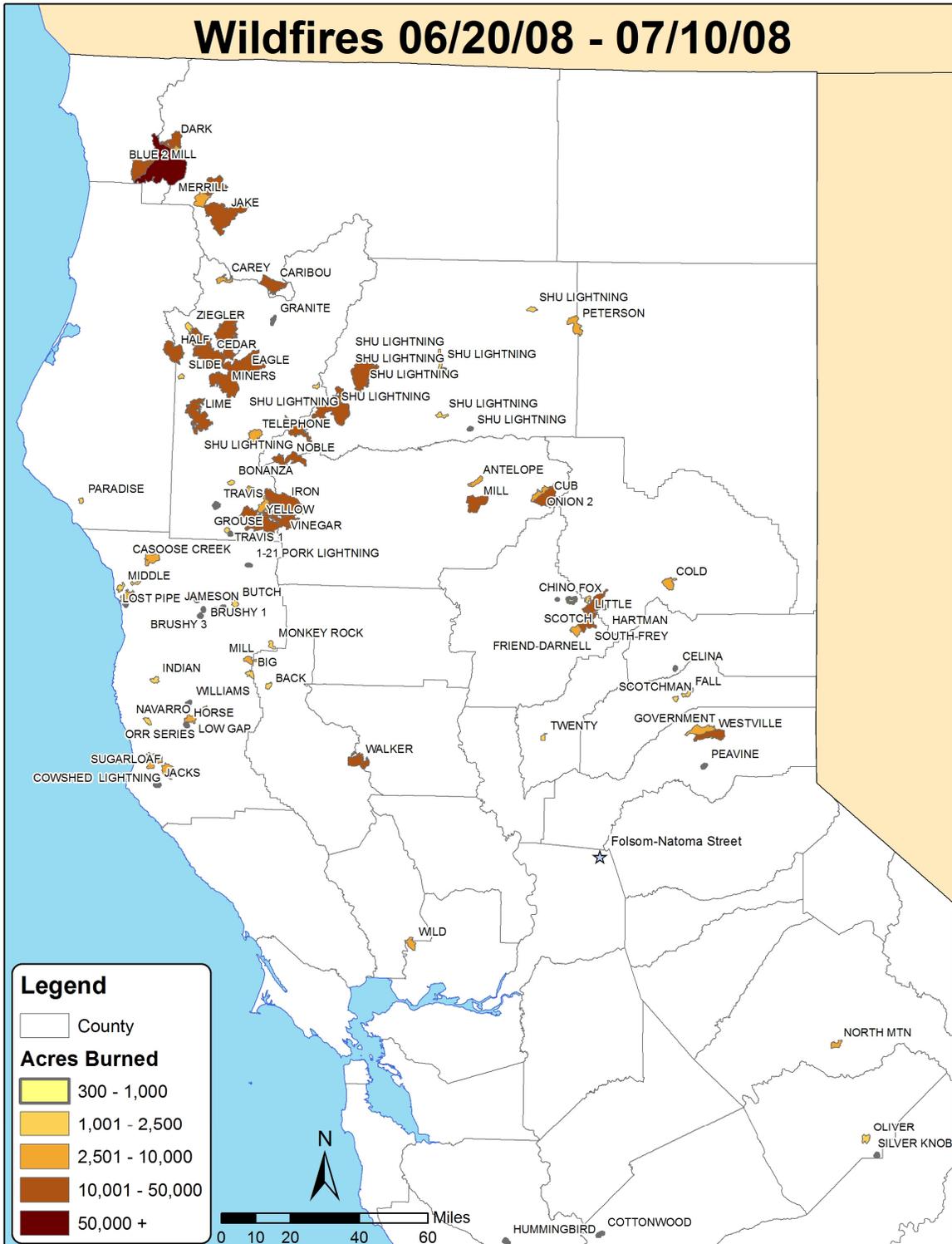


Table 1
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
RIVER 2	20080620	20080706	6	004608		Mendocino	108	39.032	-123.124
RUNNING SPRINGS	20080620	20080621	12	004608		Mendocino	124	39.222	-123.357
TRABING	20080620	20080622	594	005581		Santa Cruz	126	36.939	-121.818
SHU LIGHTNING	20080620		388	004727		Shasta	130	40.474	-121.910
JACKS	20080620	20080712	729	004608		Mendocino	130	38.939	-123.561
SAN JUAN GRADE	20080620	20080620	22	002358		Monterey	131	36.811	-121.581
TWO ROCK	20080620	20080621	4	004602		Mendocino	131	39.368	-123.449
SHU LIGHTNING	20080620		249	004727		Shasta	134	40.539	-121.892
SHU LIGHTNING	20080620		2054	004727		Shasta	136	40.528	-122.070
SHAMROCK	20080620	20080625	52	004608		Mendocino	138	39.680	-123.407
TABLE MTN	20080620	20080626	146	004608		Mendocino	142	39.230	-123.707
ARCHER	20080620	20080709	8	004608		Mendocino	142	39.849	-123.360
ALBION RIVER	20080620	20080621	2	004607		Mendocino	143	39.239	-123.724
RED HILL	20080620	20080715	42	004608		Mendocino	143	39.940	-123.302
SHU LIGHTNING	20080620		263	004727		Shasta	145	40.472	-122.573
BURNS FLAT	20080620	20080630	29	004608		Mendocino	147	39.769	-123.529
SHU LIGHTNING	20080620		564	004727		Shasta	148	40.717	-122.065
SHU LIGHTNING	20080620		1193	004727		Shasta	150	40.735	-122.083
SHU LIGHTNING	20080620		35312	004727		Shasta	151	40.546	-122.662
SHU LIGHTNING	20080620		12977	004727		Shasta	152	40.453	-122.845
4 MILE	20080620	20080719	6	004608		Mendocino	153	39.651	-123.729
SHU LIGHTNING	20080620		1148	004727		Shasta	154	40.788	-122.091
LINCOLN	20080620	20080622	20	004597		Mendocino	154	39.703	-123.713
SHU LIGHTNING	20080620		30	004727		Shasta	155	40.844	-121.973
SHU LIGHTNING	20080620		1045	004727		Trinity	156	40.487	-122.922

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
SHU LIGHTNING	20080620		28330	004727		Shasta	157	40.698	-122.511
TELEPHONE	20080620	20080813	6911		00000115	Trinity	158	40.421	-123.096
SHU LIGHTNING	20080620		1310	004727		Trinity	160	40.637	-122.764
SHU LIGHTNING	20080620		1911	004727		Shasta	160	40.982	-121.581
LIME	20080620	20080813	24885		00000137	Trinity	173	40.496	-123.411
BEAR WALLOW	20080620	20080713	39		00000140	Trinity	174	40.514	-123.407
INDIAN VALLEY	20080620	20080703	182		00000144	Trinity	175	40.519	-123.416
DEEP #1	20080620	20080705	30		00000145	Trinity	176	40.561	-123.387
MADDOX LAKE #3	20080620	20080813	23		00000143	Trinity	176	40.547	-123.425
HITCHCOCK	20080620	20080813	53		00000111	Trinity	177	40.534	-123.459
GRASSY CREEK	20080620	20080624	18		00000148	Trinity	178	40.615	-123.369
BOTTOM	20080620	20080621	20		00000057	Trinity	179	40.682	-123.293
LARABEE 3	20080620	20080621	29	003405		Humboldt	186	40.387	-123.879
HIGH	20080620	20080622	29	003395		Humboldt	188	40.364	-123.945
IRONSIDE	20080620	20080731	12834		00000164	Trinity	190	40.821	-123.424
HALF	20080620	20080825	15130		00000035	Humboldt	192	40.762	-123.559
REDCREST 2	20080620	20080621	30	003396		Humboldt	192	40.413	-123.990
MILL	20080620	20081003	65882		00000023	Siskiyou	237	41.542	-123.651
THREE	20080620	20080723	4923	00000010	00000010	Siskiyou	238	41.600	-123.573
BOTTLE	20080621	20080622	19	00000038	00000038	El Dorado	26	38.954	-120.823
FORESTHILL	20080621	20080625	55	013273		Placer	31	39.020	-120.780
SOLDIER	20080621	20080624	30	00000037	00000037	El Dorado	34	38.778	-120.552
TWENTY	20080621	20080625	1355	013264		Yuba	38	39.181	-121.481
CAPPS	20080621	20080622	19	00000027	00000027	El Dorado	39	38.652	-120.442
PEAVINE	20080621	20080706	581	00000040	00000040	Placer	40	39.067	-120.610

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
GOVERNMENT	20080621	20080801	9220	00000037	00000037	Placer	47	39.219	-120.629
WESTVILLE	20080621	20080801	11090	00000041	00000041	Placer	48	39.198	-120.570
SCOTCHMAN	20080621	20080703	1165	00000025	00000025	Nevada	51	39.350	-120.766
FALL	20080621	20080715	2417	00000033	00000033	Nevada	54	39.375	-120.699
FORBESTOWN	20080621	20080624	26	00000058	00000058	Yuba	58	39.527	-121.225
CELINA	20080621	20080702	309	00000032	00000032	Sierra	59	39.479	-120.770
25 FIRE	20080621	20080626	168	00000031	00000031	Sierra	59	39.529	-121.002
WILD	20080621	20080627	4102	004790		Solano	60	38.303	-122.171
BROWN	20080621	20080831	29		00000061	Butte	66	39.637	-121.145
SOUTH-FREY	20080621	20080831	12402	00000052	00000052	Butte	69	39.673	-121.250
HARTMAN	20080621	20080831	331		00000068	Plumas	72	39.731	-121.155
WARNERVILLE	20080621	20080621	59	005699		Stanislaus	73	37.716	-120.625
SCOTCH	20080621	20080831	13008		00000063	Plumas	74	39.749	-121.206
FOUR MILE	20080621		789	000539		Butte	74	39.741	-121.342
HUNGARY	20080621	20080831	20		00000050	Butte	76	39.763	-121.437
RODY	20080621	20080831	19		00000054	Butte	77	39.798	-121.323
COLD	20080621	20080831	5599		00000070	Plumas	82	39.835	-120.807
BIG	20080621	20080704	74		00000027	Plumas	84	39.891	-121.302
SLATE	20080621	20080804	10		00000031	Plumas	86	39.918	-121.001
NORTH MTN	20080621	20080719	2964		00000013	Tuolumne	88	37.899	-119.897
CREST	20080621	20080704	39		00000038	Plumas	89	39.977	-121.258
OLD TOLL	20080621	20080623	78	007976		Mariposa	99	37.510	-120.116
KEDDIE	20080621	20080625	78		00000073	Plumas	104	40.167	-120.896
CUB	20080621	20080721	14729	00000013	00000013	Tehama	105	40.189	-121.480
ONION 2	20080621	20080722	4905	00000015	00000015	Tehama	107	40.208	-121.522

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
BACK	20080621	20080629	1566	00000019	00000019	Lake	108	39.370	-122.976
HWY 140	20080621	20080623	1566	007972		Mariposa	108	37.336	-120.146
MILL	20080621	20080629	13512	004261	00000079	Tehama	109	40.162	-121.868
OLIVER	20080621	20080714	2806		00000014	Mariposa	113	37.499	-119.740
INDIAN PEAK	20080621	20080623	49	007986		Mariposa	113	37.405	-119.863
MONKEY ROCK	20080621	20080714	1886	00000016	00000016	Mendocino	113	39.542	-122.967
BIG	20080621	20080705	2193	00000012	00000012	Mendocino	114	39.417	-123.077
ANTELOPE	20080621	20080629	3417	004308		Tehama	115	40.251	-121.871
HUMMINGBIRD	20080621	20080624	786	003094		Santa Clara	115	37.060	-121.635
MILL	20080621	20080726	3042	00000041	00000041	Mendocino	117	39.476	-123.085
SILVER KNOB	20080621	20080626	570		00000011	Mariposa	118	37.429	-119.683
STAR	20080621	20080714	235		00000018	Madera	118	37.523	-119.561
WESTFALL	20080621	20080714	102		00000019	Mariposa	119	37.444	-119.658
WHITE HURST	20080621	20080623	256	003091		Santa Clara	120	36.996	-121.693
ROAD 600	20080621	20080622	2	007985		Madera	121	37.313	-119.794
RIDEOUT	20080621	20080708	26	004732		Mendocino	122	39.285	-123.299
FOLSOM	20080621	20080708	91	004656		Mendocino	124	39.511	-123.213
5-12 WHIPPLE LIGHTNING	20080621	20080630	12	004658		Mendocino	125	39.087	-123.434
OSO	20080621	20080712	228	004673		Mendocino	126	39.131	-123.444
WILLIAMS	20080621	20080627	445	004682		Mendocino	127	39.288	-123.406
SUGARLOAF	20080621	20080709	6928	004696		Mendocino	128	38.998	-123.506
BRUSHY 8	20080621	20080710	97	004688		Mendocino	128	39.630	-123.225
CHIQUITO	20080621	20080717	145		00000017	Madera	129	37.414	-119.429
BRUSHY 7	20080621	20080625	141	004689		Mendocino	129	39.660	-123.215
BRUSHY 6	20080621	20080710	31	004706		Mendocino	130	39.652	-123.245

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
BRUSHY 5	20080621	20080625	92	005151		Mendocino	130	39.640	-123.264
SLIDES	20080621	20080627	1641	00000022	00000022	Tehama	131	40.064	-122.858
BRUSHY 3	20080621	20080712	327	004669		Mendocino	133	39.686	-123.286
COWSHED LIGHTNING	20080621	20080715	4466	004655		Mendocino	134	39.031	-123.611
JOHNSON	20080621	20080625	52	00000039	00000039	Trinity	135	40.022	-123.000
SHAMROCK EAST	20080621	20080712	481	004691		Mendocino	135	39.655	-123.361
BRUSHY 1	20080621	20080626	391	004639		Mendocino	136	39.683	-123.345
NORTHFORK CAMP	20080621	20080706	9	004704		Mendocino	136	39.313	-123.570
GILEAD	20080621	20080626	30	00000038	00000038	Trinity	137	40.022	-123.044
NAVARRO	20080621	20080626	1853	004657		Mendocino	137	39.204	-123.625
IRON	20080621	20080823	30660	00000118	00000118	Tehama	138	40.140	-122.923
YELLOW	20080621	20081120	31933	00000047	00000047	Trinity	139	40.062	-123.056
SHAMROCK WEST	20080621	20080712	46	004699		Mendocino	139	39.669	-123.430
BULL	20080621	20080627	40	00000040	00000040	Trinity	140	40.006	-123.150
GROUSE	20080621	20080705	6324	00000033	00000033	Trinity	141	40.127	-123.030
5-10 CAVANAUGH LIGHTNING	20080621	20080709	24	004652		Mendocino	141	39.154	-123.726
CAMP	20080621	20080630	231	00000035	00000035	Trinity	143	40.077	-123.144
LOST CREEK	20080621	20080630	31		00000062	Trinity	144	40.099	-123.156
WATERSPOUT #1	20080621	20080710	61		00000066	Trinity	145	40.114	-123.147
SPRING	20080621	20080710	10		00000075	Trinity	145	40.116	-123.152
CREEK	20080621	20080710	30		00000084	Trinity	145	40.116	-123.156
NOBLE	20080621	20080708	12985		00000119	Shasta	146	40.325	-122.902
TROUGH #1	20080621	20080813	3689		00000120	Trinity	147	40.185	-123.119
NIELSON	20080621	20080714	86		00000031	Trinity	148	40.015	-123.340
SWIM	20080621	20080630	185		00000058	Trinity	149	40.166	-123.181

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
TRAVIS	20080621	20080626	958		00000054	Trinity	151	40.122	-123.294
BONANZA	20080621	20080705	1371		00000059	Trinity	153	40.220	-123.217
VAN HORN	20080621	20080623	68		00000029	Trinity	153	40.204	-123.236
BIERCE	20080621	20080622	18		00000134	Trinity	153	40.250	-123.203
LONG	20080621	20080626	11		00000037	Trinity	154	40.124	-123.354
FUELS	20080621	20080621	9		00000034	Trinity	154	40.178	-123.298
PETERSON	20080621	20080701	8022	00000046	00000046	Shasta	155	40.917	-121.338
SOUTH FORK	20080621	20080626	83		00000123	Trinity	156	40.370	-123.107
RED MOUNTAIN LIGHTNING	20080621	20080801	7513	004695		Mendocino	156	39.892	-123.640
HARDY CREEK LIGHTNING	20080621	20080711	5354	004973		Mendocino	157	39.726	-123.760
PAINTERS	20080621	20080622	15			Lassen	159	40.824	-120.078
CHINA	20080621	20080623	35		00000159	Trinity	162	40.514	-123.070
LASSIC	20080621	20080621	23		00000028	Trinity	169	40.345	-123.498
BASIN COMPLEX	20080621	20080727	163607	00000016	00000016	Monterey	170	36.256	-121.642
FISHER	20080621	20080705	35		00000153	Trinity	170	40.449	-123.395
LOGWOOD	20080621	20080727	20	00000017	00000017	Monterey	172	36.231	-121.697
MINERS	20080621	20081031	24876	00000106	00000106	Trinity	175	40.637	-123.268
EAGLE	20080621	20081004	32024	00000066	00000066	Trinity	176	40.714	-123.163
BOULDER	20080621	20080622	33		00000113	Trinity	176	40.518	-123.464
STUARTS	20080621	20080630	224		00000095	Trinity	181	40.911	-122.971
GRANITE	20080621	20080914	552		00000180	Trinity	182	40.909	-123.015
PARADISE	20080621	20080801	1072	003423		Humboldt	183	40.120	-124.035
CEDAR	20080621	20080731	25392		00000079	Trinity	184	40.749	-123.361
SLIDE	20080621	20080708	1182	00000184	00000184	Trinity	185	40.659	-123.512
BUCKHORN	20080621	20080731	29814		00000188	Trinity	186	40.836	-123.263

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
BENNETT	20080621	20080622	31		00000114	Humboldt	186	40.655	-123.557
CARSON	20080621	20080704	65	003450		Humboldt	189	40.429	-123.893
SARGEANTS	20080621	20080621	20	002373		Monterey	191	35.936	-120.757
CARIBOU	20080621	20081216	13127	00000026	00000026	Siskiyou	191	41.059	-123.025
DENNY	20080621	20080625	43		00000176	Trinity	194	40.923	-123.378
ZIEGLER	20080621	20080731	2349		00000069	Trinity	195	40.868	-123.480
CAREY	20080621	20080731	3714		00000175	Trinity	200	41.073	-123.294
GOULD	20080621	20080702	229	00000015	00000015	Siskiyou	200	41.199	-123.042
PACKSADDLE	20080621	20080624	35		00000039	Humboldt	212	41.168	-123.520
CRAPO	20080621	20080731	15	00000016	00000016	Siskiyou	214	41.349	-123.220
JAKE	20080621	20081003	38417		00000041	Siskiyou	216	41.347	-123.310
MERRILL	20080621	20081003	8339		00000068	Siskiyou	223	41.408	-123.437
HAYPRESS	20080621	20081003	13665		00000049	Siskiyou	225	41.469	-123.362
BLUE 2	20080621	20081003	17552	00000026	00000026	Del Norte	241	41.537	-123.785
DARK	20080621	20080723	10390	00000011	00000011	Siskiyou	242	41.651	-123.602
RAVINE	20080622	20080623	23	013351		Placer	14	38.891	-121.173
LITTLE	20080622	20080831	1399		00000043	Plumas	75	39.765	-121.248
FOX	20080622	20080831	1870		00000045	Butte	75	39.761	-121.339
WALKER	20080622	20080705	11173	004843		Colusa	75	39.065	-122.480
CHINO	20080622	20080831	159		00000049	Butte	76	39.763	-121.417
ROCK2	20080622	20080831	24		00000044	Butte	76	39.780	-121.290
QUARRY	20080622	20080622	211	005708		San Mateo	97	37.681	-122.415
BEACH FIRE	20080622	20080622	7	081477	08-1477	Marin	101	38.231	-122.946
CLIFF RIDGE	20080622	20080712	4658	004752		Mendocino	132	39.051	-123.569
THOMES	20080622	20080630	980	00000029	00000029	Tehama	132	40.035	-122.918

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
HARVEY	20080622	20080701	949	00000031	00000031	Tehama	133	40.092	-122.854
VINEGAR	20080622	20080625	14544	00000030	00000030	Tehama	134	40.076	-122.923
BROWN	20080622	20080625	3787	002390		San Benito	139	36.687	-120.920
CORRAL FIRE	20080623	20080721	12434	002759		Lassen	151	40.863	-120.861
MURPHY	20080623	20080630	51		00000049	Shasta	156	40.819	-122.120
MIDDLE	20080623	20080715	2067	004807		Mendocino	160	39.762	-123.800
BOSWELL	20080625	20080915	60	00000044	00000044	Tehama	132	40.053	-122.895
1-6 SKUNK 2 LIGHTNING	20080625	20080704	2	005131		Mendocino	138	39.751	-123.341
CUTTHROAT	20080625	20080625	84		00000052	Trinity	178	40.758	-123.157
1-11 RAY SPRINGS LIGHTNING	20080626	20080705	0	005224		Mendocino	136	39.888	-123.182
INDIAN	20080626	20080712	2096	004884		Mendocino	139	39.378	-123.593
LEONARD LAKE	20080627	20080704	0	005161		Mendocino	124	39.260	-123.347
LITTLE JUAN CREEK (MRC)	20080627	20080715	327	004941		Mendocino	156	39.693	-123.768
HORSE	20080628	20080704	576	005164		Mendocino	126	39.195	-123.414
NOMANS	20080628	20080820	119	00000050	00000050	Siskiyou	244	41.722	-123.519
PIUTE	20080628	20080730	37346		00000018	Kern	270	35.496	-118.339
FULLER	20080629	20080722	68		00000024	Madera	136	37.404	-119.270
OLD	20080630	20080630	40	013940		Placer	18	38.923	-121.015
WIGGELL	20080701	20080701	300	000348	44	Tulare	222	36.021	-118.907
BTU LIGHTNING COMPLEX	20080702	20080724	53699	007660		Butte	83	39.859	-121.447
RIVER 1	20080704	20080706	1	005184		Mendocino	108	39.016	-123.120
JACK SMITH	20080704	20080712	1538	005155		Mendocino	123	39.263	-123.320
LOW GAP	20080704	20080715	1347	005160		Mendocino	124	39.156	-123.386
ORR SERIES	20080704	20080712	3416	005165		Mendocino	125	39.220	-123.394
BUTCH	20080704	20080704	2367	005132		Mendocino	129	39.710	-123.173

Table 1 (continued)
List of Fires for June 20 through July 10, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
JAMESON	20080704	20080712	880	005152		Mendocino	131	39.690	-123.237
BRUSHY 4	20080704	20080712	181	005150		Mendocino	132	39.664	-123.276
1-21 PORK LIGHTNING	20080704	20080712	403	005129		Mendocino	132	39.876	-123.104
MURPHY RIDGE	20080704	20080704	272	005130		Mendocino	134	39.858	-123.161
BRUSHY 2	20080704	20080708	10	005149		Mendocino	134	39.686	-123.311
MIDDLE OUTLET LIGHTNING	20080704	20080715	135	005180		Mendocino	135	39.579	-123.405
BLUE NOSE	20080704	20080704	51	005144		Mendocino	137	39.898	-123.186
SKUNK 1	20080704	20080708	8	005131		Mendocino	138	39.766	-123.337
BURGER CREEK	20080704	20080712	452	005170		Mendocino	139	39.722	-123.383
BLUE SLIDE 1	20080704	20080714	186	005127		Mendocino	140	39.895	-123.268
CASOOSE CREEK	20080704	20080704	371	005139		Trinity	142	40.005	-123.211
TRAVIS 3	20080704	20080704	25	005147		Trinity	145	40.046	-123.219
PANTHER BASIN	20080704	20080710	68	005143		Trinity	145	39.986	-123.284
H. RANCH	20080704	20080704	100	005142		Trinity	149	39.986	-123.398
BELL SPRINGS	20080704	20080709	90	005169		Mendocino	156	39.951	-123.571
LOST PIPE	20080704	20080710	1187	005136		Mendocino	156	39.783	-123.720
TRAVIS 1	20080705	20080705	1171	005227		Trinity	144	40.019	-123.231
EVANS	20080706	20080706	104	006273		Calaveras	39	38.184	-120.831
WILMS	20080706	20080706	57	006292		Stanislaus	69	37.787	-120.623
FRIEND-DARNELL	20080708	20080721	4112		00000539	Butte	66	39.633	-121.311
CLAVEY	20080708	20080711	11		00000028	Tuolumne	76	38.059	-120.013
HILL	20080710	20080714	12		00002355	Mariposa	105	37.757	-119.628
COTTONWOOD	20080710	20080711	797	009015		Merced	110	37.095	-121.141
SODA	20080710	20080710	46		0821569	Kern	293	34.854	-118.881

Figure 2
Visible Satellite Image

July 8, 2008, 1231 PST



NASA Visible Aqua MODIS Bands 1, 4, and 3 True Color Satellite Image
(250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008190/ca-north-000/crefl2_A2008190203111-2008190204027_250m_ca-north-000_143.jpg

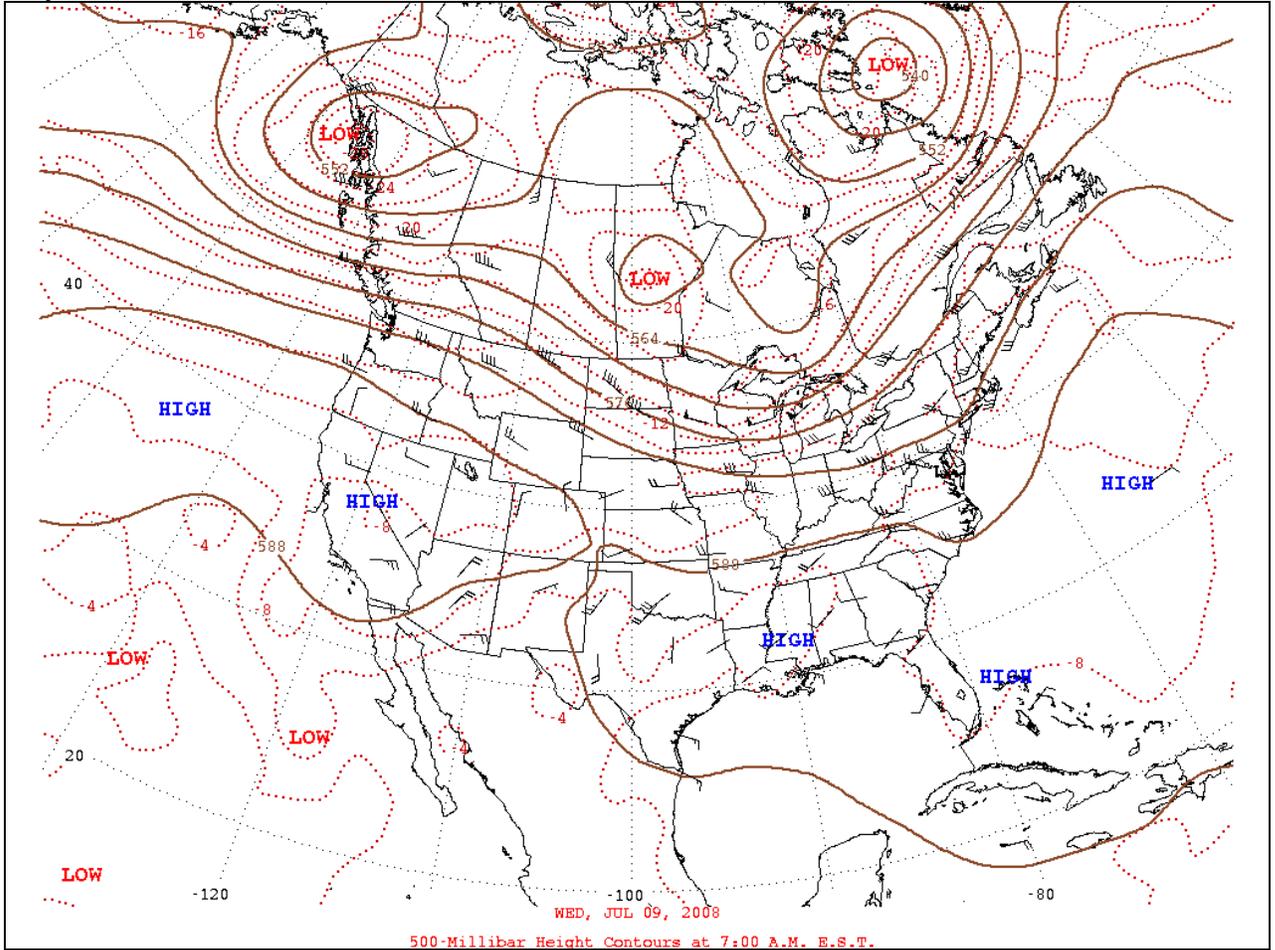
Table 2
Summary of Smoke and Haze Observations at
Southern Sacramento Valley Airports* during June 8 through 10, 2008

Date	Number of Hours with Haze and/or Smoke Observations	Percent of Hours in Day with Haze and/or Smoke
July 8, 2008	24	100
July 9, 2008	23	96
July 10, 2008 (00-1200 PST)	13	100

** Hour counted as having haze or smoke if at least one of the three southern Sacramento Valley airports (Mather Field, Sacramento Executive, or Sacramento International) reported such.*

Figure 3
NOAA Daily 500 mb Weather Map

July 9, 2008, 0400 PST



http://www.hpc.ncep.noaa.gov/dailywxmap/index_20080709.html

Table 3
Paradise-Airport and Cool Hourly Winds July 9-10, 2008

Date	Start Time (PST)	Paradise-Airport		Cool-Highway 193	
		Wind Speed (miles/hour)	Wind Direction (degrees)	Wind Speed (miles/hour)	Wind Direction (degrees)
07092008	0:00	9.2	54	3.5	27
	1:00	9.2	58	2.3	45
	2:00	8.1	60	3.5	53
	3:00	1.2	326	4.6	49
	4:00	1.2	0	3.5	46
	5:00	1.2	246	3.5	35
	6:00	5.8	358	4.6	30
	7:00	8.1	28	5.8	27
	8:00	5.8	26	4.6	30
	9:00	0	225	3.5	333
	10:00	0	198	4.6	299
	11:00	1.2	232	4.6	278
	12:00	3.5	255	4.6	265
	13:00	2.3	241	5.8	268
	14:00	1.2	198	4.6	273
	15:00	1.2	281	5.8	291
	16:00	2.3	215	6.9	301
	17:00	2.3	214	3.5	279
	18:00	3.5	172	2.3	285
	19:00	3.5	58	1.2	47
	20:00	6.9	43	3.5	34
	21:00	6.9	38	3.5	40
	22:00	9.2	37	3.5	48
23:00	9.2	40	2.3	51	
07102008	0:00	9.2	41	3.5	57
	1:00	9.2	42	4.6	49
	2:00	9.2	42	3.5	48
	3:00	11.5	37	3.5	52
	4:00	9.2	36	3.5	43
	5:00	8.1	43	3.5	47
	6:00	9.2	44	2.3	54
	7:00	8.1	48	3.5	28
	8:00	1.2	68	1.2	135
	9:00	1.2	174	2.3	171
	10:00	2.3	207	3.5	201
	11:00	3.5	216	6.9	213

Table 3 (continued)
Paradise-Airport and Cool Hourly Winds July 9-10, 2008

Date	Start Time (PST)	Paradise-Airport		Cool-Highway 193	
		Wind Speed (miles/hour)	Wind Direction (degrees)	Wind Speed (miles/hour)	Wind Direction (degrees)
07102008	12:00	3.5	218	4.6	225
	13:00	3.5	216	4.6	222
	14:00	3.5	220	5.8	213
	15:00	1.2	181	5.8	212
	16:00	2.3	127	4.6	207
	17:00	2.3	110	3.5	208
	18:00	2.3	89	2.3	210
	19:00	2.3	148	1.2	78
	20:00	3.5	73	2.3	57
	21:00	4.6	40	2.3	64
	22:00	5.8	26	2.3	47
	23:00	6.9	42	2.3	44

Table 4
Thomes Creek (33 miles SW of Red Bluff)
Hourly Winds July 9-10, 2008

Date	Hour (PST)	Wind Speed (mph)	Wind Direction
07092008	0:51	10	W
	1:51	9	W
	2:51	14	WSW
	3:51	13	WSW
	4:51	14	WSW
	5:51	15	WSW
	6:51	11	WSW
	7:51	9	W
	8:51	9	W
	9:51	4	SW
	10:51	5	NNW
	11:51	3	NNE
	12:51	4	ENE
	13:51	4	NNE
	14:51	5	NNE
	15:51	6	ENE
	16:51	3	NNE
	17:51	4	ENE
	18:51	1	WNW
	19:51	11	WSW
	20:51	11	W
	21:51	11	WSW
	22:51	11	WSW
	23:51	11	W
07102008	0:51	12	WSW
	1:51	12	WSW
	2:51	9	WSW
	3:51	10	WSW
	4:51	10	WSW
	5:51	11	WSW
	6:51	9	WSW
	7:51	8	W
	8:51	9	WSW
	9:51	4	W
	10:51	5	NE
	11:51	6	NNE

Table 4 (continued)
Thomes Creek (33 miles SW of Red Bluff)
Hourly Winds July 9-10, 2008

Date	Hour (PST)	Wind Speed (mph)	Wind Direction
07102008	12:51	5	NE
	13:51	4	E
	14:51	4	N
	15:51	3	NNE
	16:51	1	E
	17:51	2	E
	18:51	7	WSW
	19:51	9	SW
	20:51	11	WSW
	21:51	10	W
	22:51	7	WSW
	23:51	9	WSW

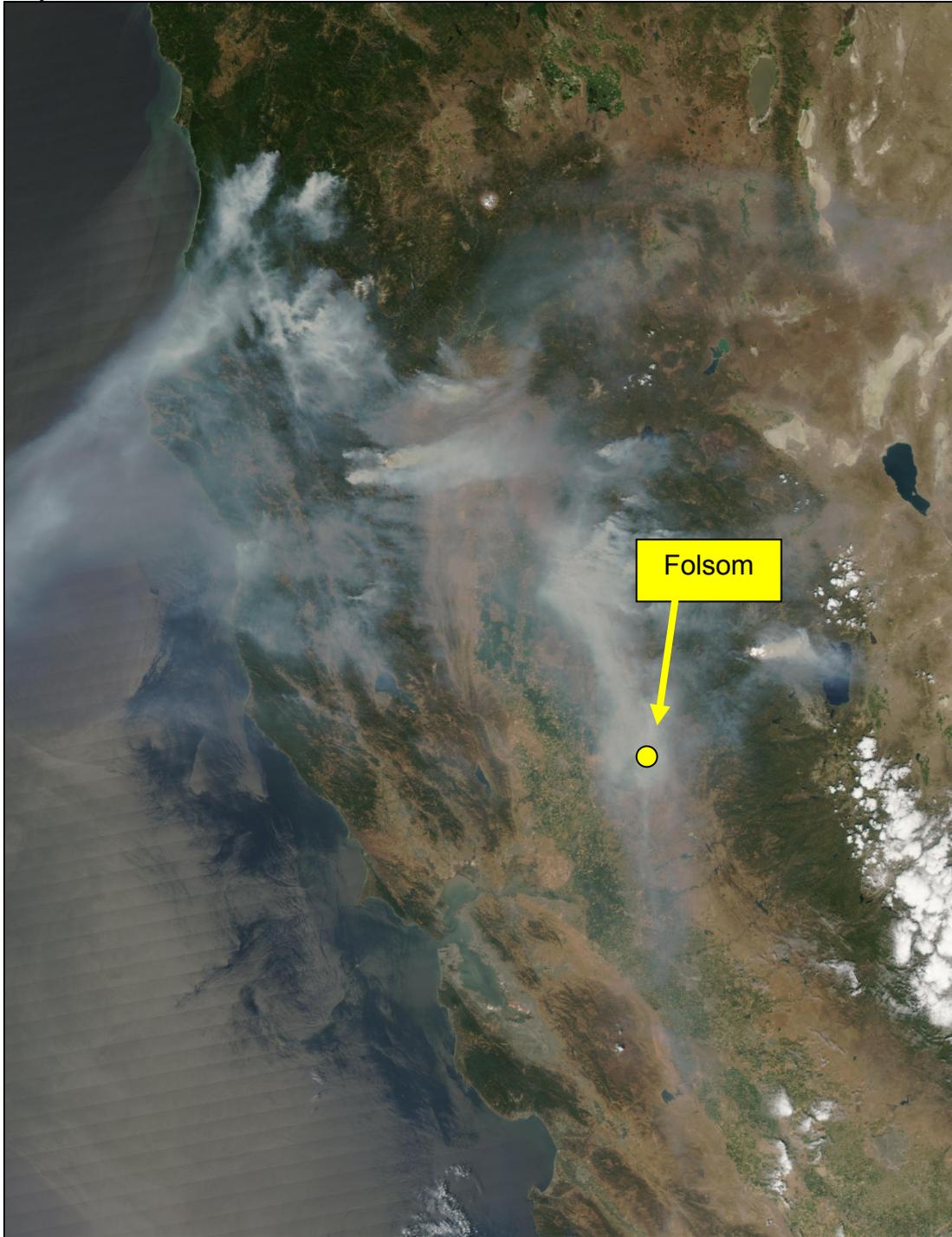
ID: TCKC1
NAME: THOMES CREEK
LATITUDE: 39.8542
LONGITUDE: -122.61
ELEVATION: 1029 ft
MNET: RAWS

Figure 6
 Surface Winds (Knots) July 9, 2008, 1500-1600 PST



Figure 7
Visible Satellite Image

July 9, 2008, 1314 PST



NASA Visible Aqua MODIS Bands 1, 4, and 3 True Color Satellite Image
(250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008191/ca-north-000/crefl2_A2008191211421-2008191212244_250m_ca-north-000_143.jpg

Figure 10
Visibility (Miles) and Present Weather July 9, 2008 1500-1600 PST

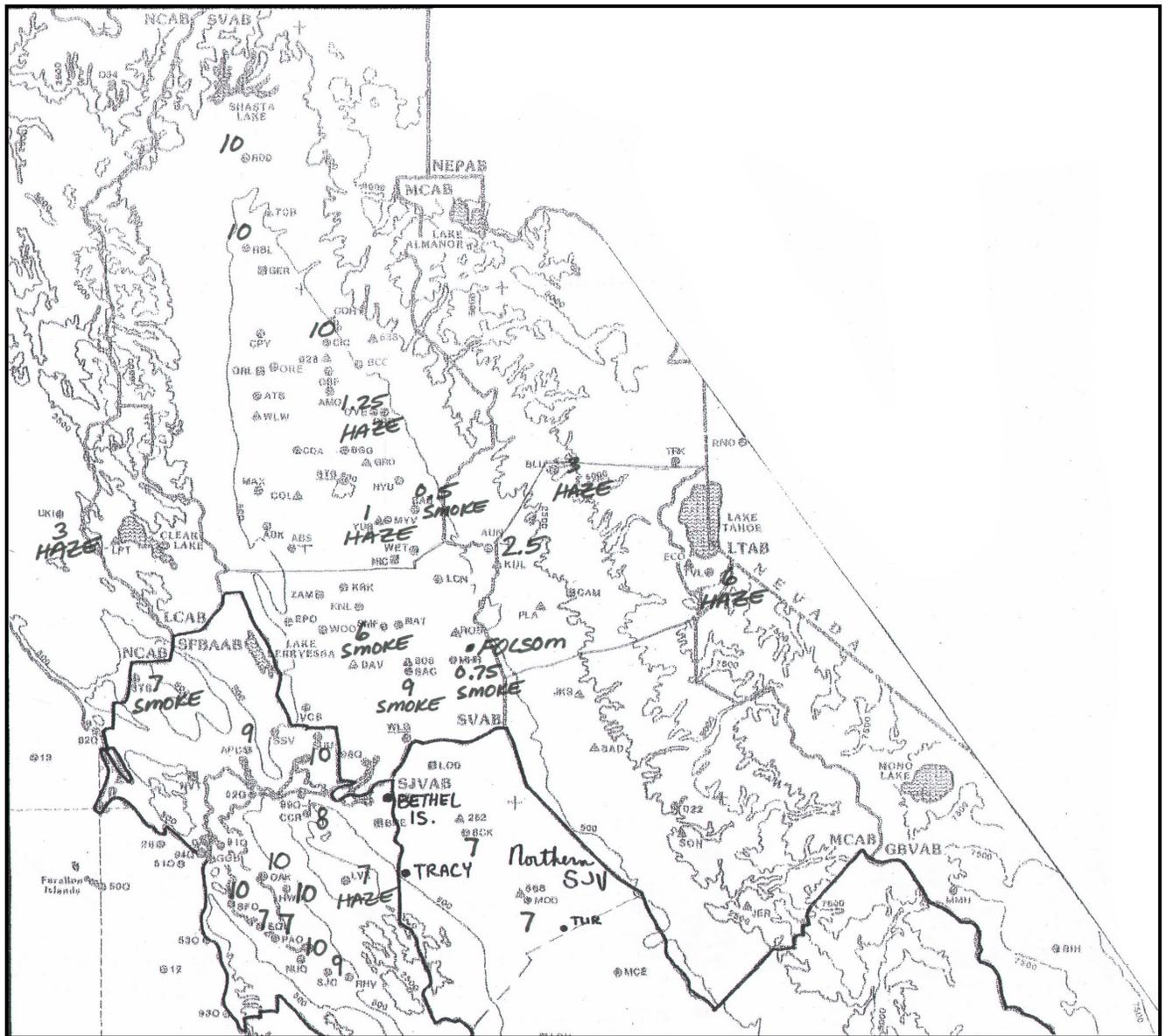


Figure 11

Number of Days that a Daily Minimum 1-hour Ozone Concentration Equals a Specified Value at Folsom (May-October 2004-2008)

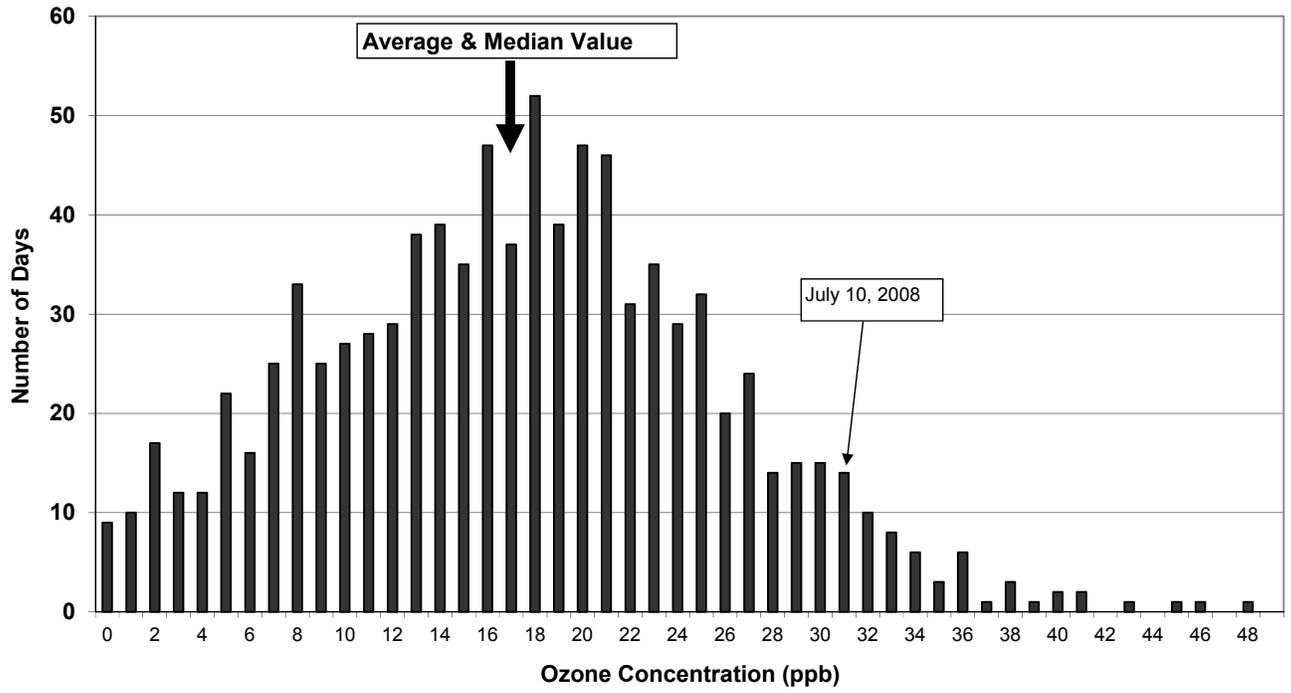


Figure 12
 Surface Winds (Knots) July 10, 2008, 0300-0400 PST

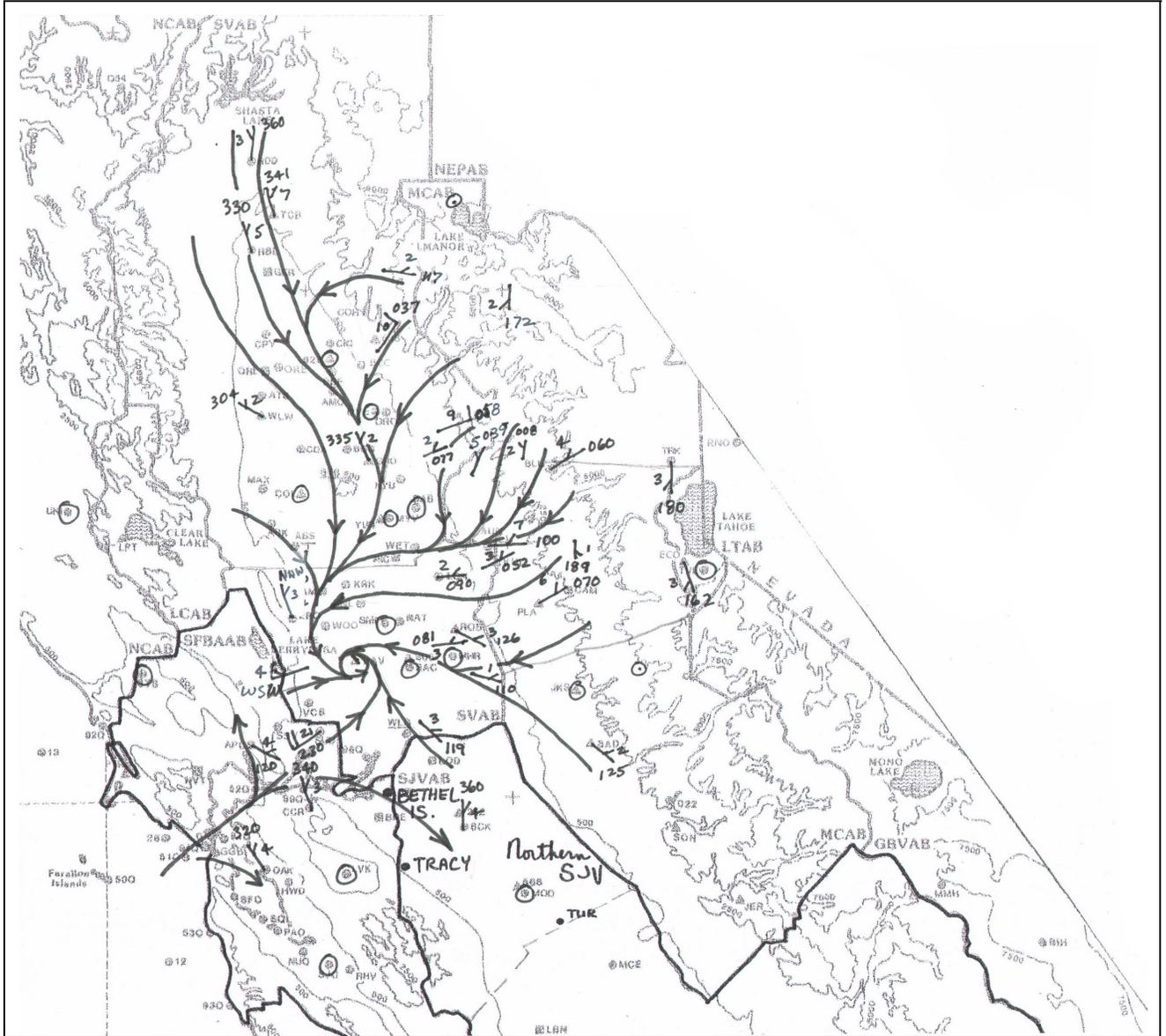


Figure 13
Change in Height of Mixing Layer at Elk Grove on July 10, 2008

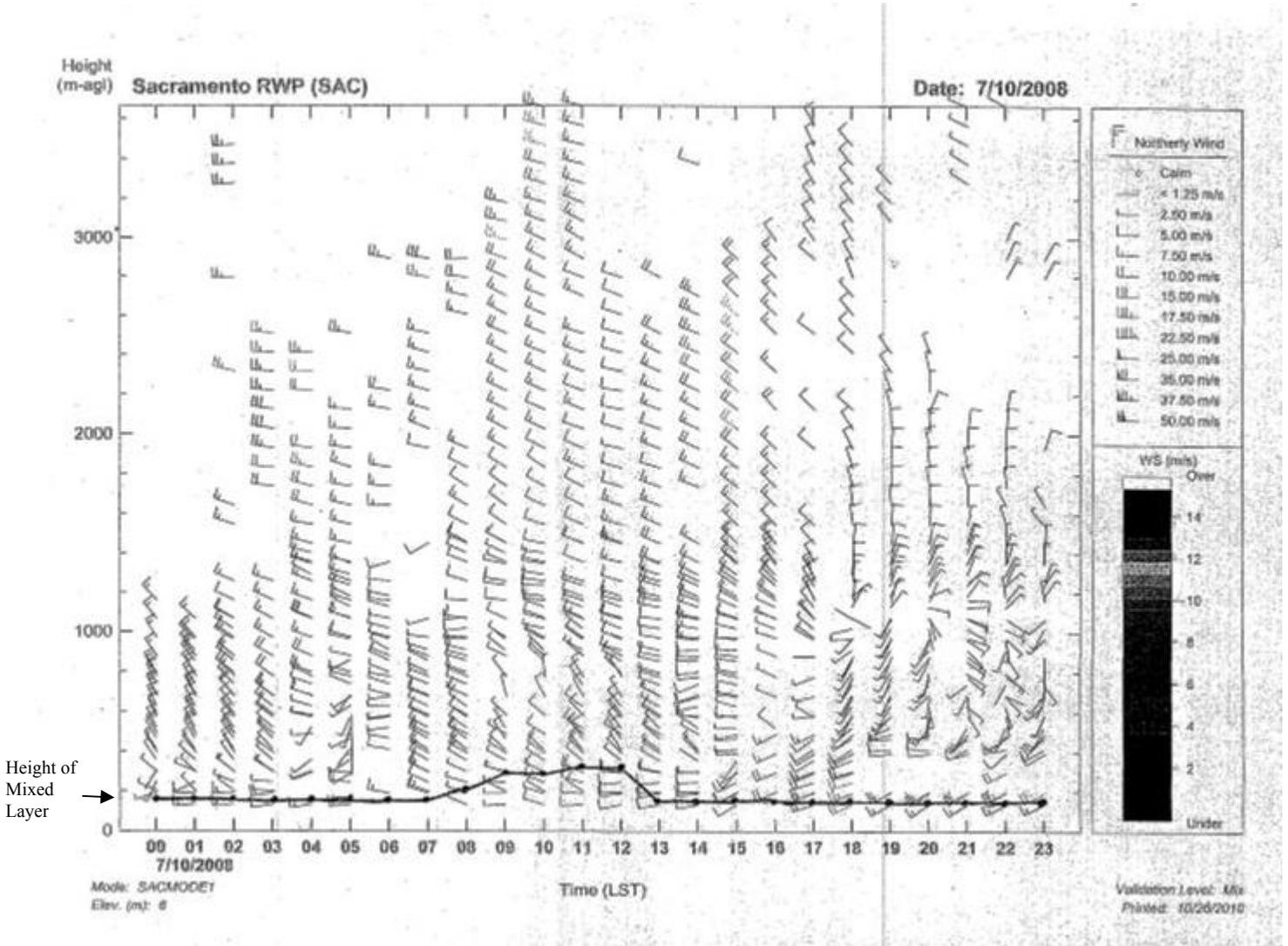
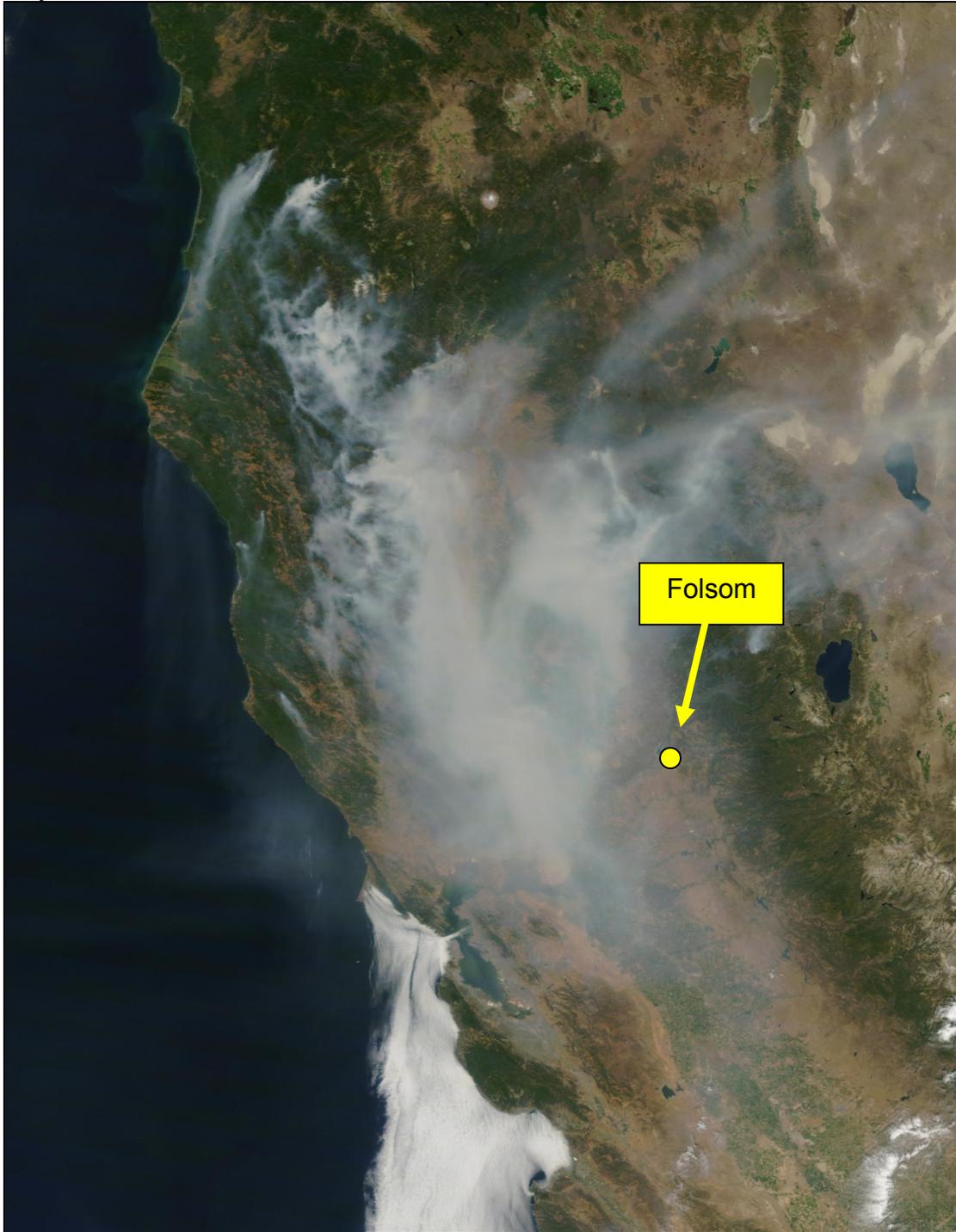


Figure 14
Visible Satellite Image

July 10, 2008, 1038 PST



NASA Visible Terra MODIS Bands 1, 4, and 3 True Color Satellite Image
(250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008192/ca-north-000/crefl1_A2008192183811-2008192185022_250m_ca-north-000_143.jpg

Figure 16
Visibility (Miles) and Present Weather July 10, 2008 0300-0400 PST

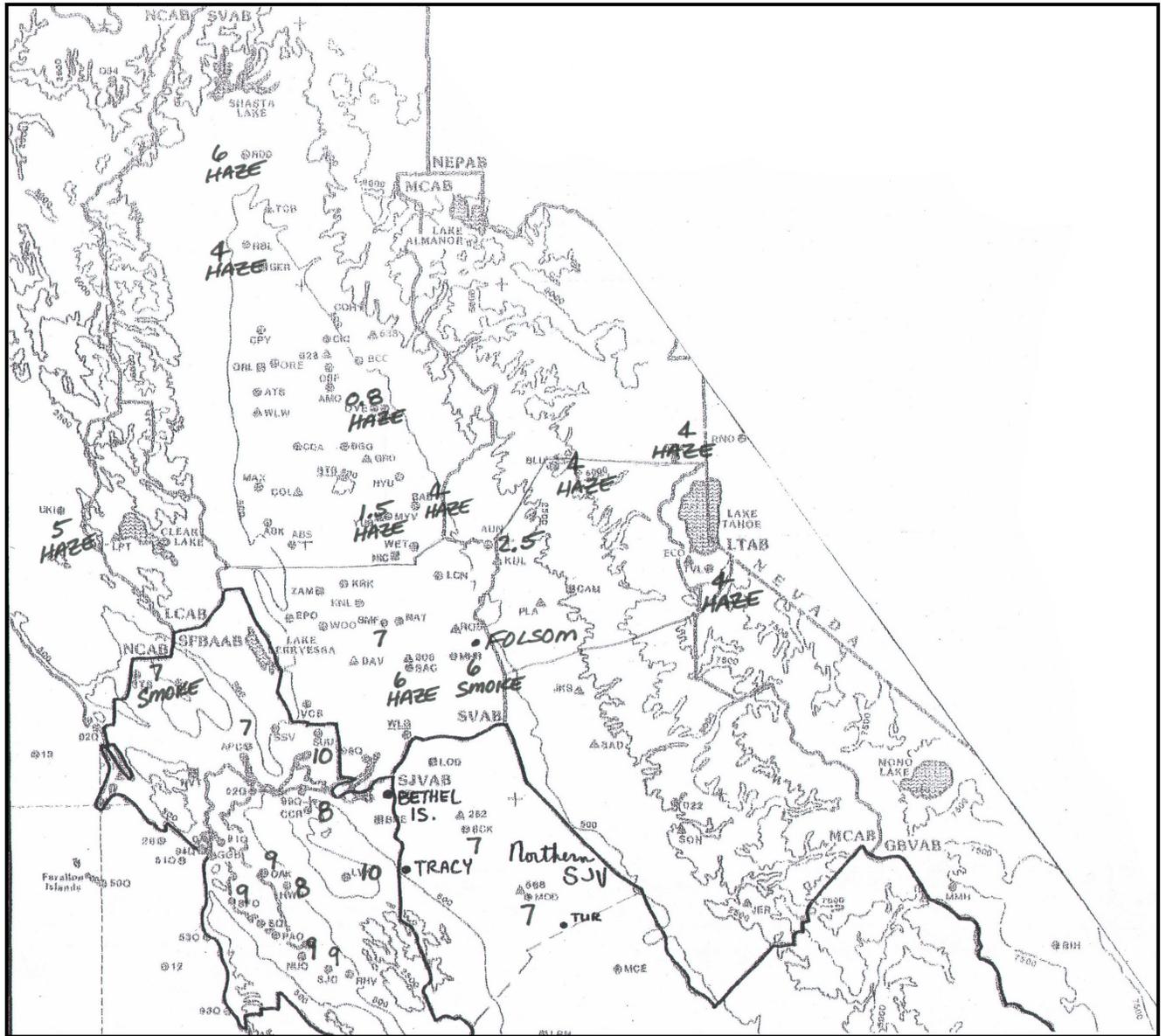
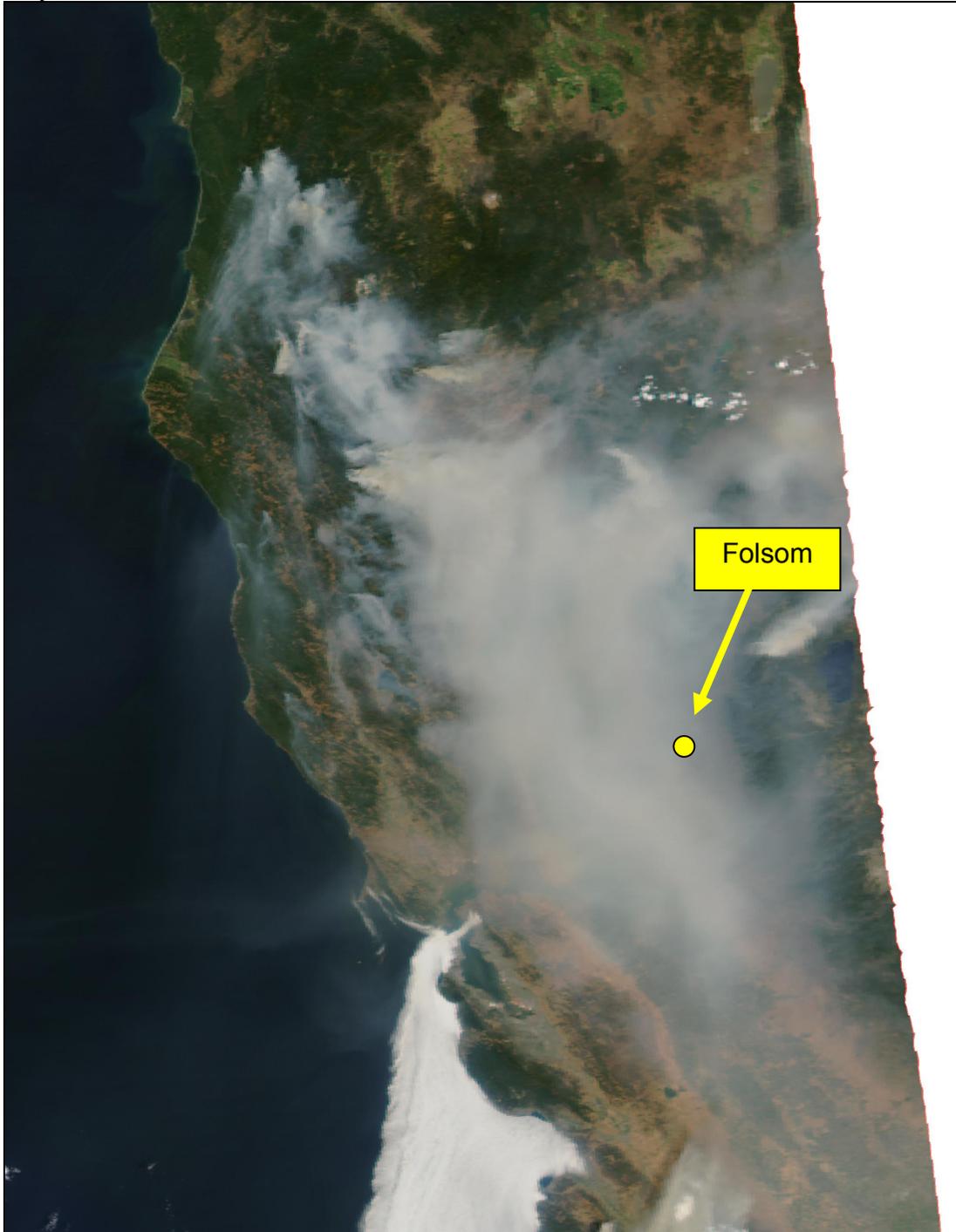


Figure 19
Surface Winds (Knots) July 10, 2008, 12-1300 PST



Figure 20
Visible Satellite Images

July 10, 2008, 1359 PST



NASA Visible Aqua MODIS Bands 1, 4, and 3 True Color Satellite Image
(250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008192/ca-north-000/crefl2_A2008192215913-2008192220520_250m_ca-north-000_143.jpg

Figure 21
Visibility (Miles) and Present Weather July 10, 2008 1300-1400 PST

