

APPENDIX B

METEOROLOGICAL ANALYSIS

June 23, 2008

A storm system associated with a nearly stationary Gulf of Alaska low pressure area moved through northern and central California on June 20 and 21, 2008 (see Figures 1 through 4). This system generated numerous thunderstorms, some severe, with countless cloud-to-ground lightning strikes (see Figure 5). Because of record dry conditions (see Figure 6), these lightning strikes started nearly 200 wildfires in the Coast Range and Sierra Nevada mountains that surround the Sacramento Valley. As burning continued, ozone and ozone precursor emissions from the wildfires were transported to, and concentrated in, the southern Sacramento Valley. As emissions from these fires built-up in the southern Sacramento Valley, they caused an exceedance of the federal 1-hour ozone standard at the Folsom air monitoring site on June 23, 2008. Although wildfire emissions can be layered throughout the atmosphere, this analysis focuses on emissions in the mixed layer, because emissions in this layer impact ground level ozone concentrations. 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.

Analysis

Following the storm's passage, air over the Sacramento Valley began to stabilize, and winds decreased. Under these more stable conditions, ozone and ozone precursor emissions from the numerous lightning-generated wildfires ringing the Sacramento Valley drifted into the Valley, adversely impacting ozone concentrations (see Figure 7 and Table 1).

The Day before the Exceedance: As wildfires burned in the Coast Range Mountains, flow from the northwest transported emissions from these fires into the San Francisco Bay Area (Bay Area; refer to Figures 8 through 11). During the daylight hours on June 22, prevailing southwest surface winds in the Bay Area carried these fire-related emissions into the southern Sacramento Valley (see Figures 12 and 13). The mid-day NASA satellite image (refer to Figure 8) shows smoke from the Coast Range fires drifting eastward, towards and into the southern Sacramento Valley.

Airport visibility observations corroborate the movement and build-up of smoke throughout the day in the southern portion of the Valley. Figures 9 through 11 show the progression of the impact. During the early morning hours (0300-0400 PST), visibility was 9 to 10 miles throughout the Sacramento Valley and northern Bay Area (refer to Figure 9). Later in the morning (0900-1000 PST), reports indicate reductions in visibility, along with numerous observations of smoke

and haze throughout the southern Sacramento Valley and northern Bay Area (refer to Figure 10). By 1500 PST, there were substantial reductions in visibility and an increase in reports of smoke and haze, indicating a widespread impact of wildfire-related emissions (refer to Figure 11). As shown in Figure 11, the impact during the afternoon of June 22 was quite severe in the southern Sacramento Valley (3 to 5 mile visibilities with haze), which includes Folsom.

The Day of the Exceedance (June 23): Several factors contributed to the June 23 ozone exceedance at Folsom. First, the wind direction was optimal for transporting additional emissions from the various fire areas into the southern Sacramento Valley. During the overnight hours, air movement in the southern Sacramento Valley was controlled by the typical overnight mountain-to-valley surface drainage flow pattern. Drainage flow from the northeast carried emissions from wildfires burning in the Sierra Nevada Mountains (see Table 2), while drainage flow from the west-southwest carried emissions from fires burning in the Coast Range Mountains (see Table 3). Emissions from both directions were transported into the southern Sacramento Valley.

In addition to the drainage flow, there was a moderate sea breeze flow from the Bay Area through the Carquinez Strait (see Figure 14). The sea breeze flow was driven by an onshore pressure gradient. The pressure gradient is the difference in atmospheric pressure between two areas and provides a force which moves air from higher to lower pressure. At 0400 PST, the surface pressure difference was 3.3 millibars between San Francisco (KSFO; higher pressure area) and Sacramento (KSAC; lower pressure area; see Sonoma Technology, Inc., Appendix Y). The sea breeze weakened and formed an eddy circulation pattern upon entering the Sacramento Valley. As wildfires burned in the Coast Range Mountains, emissions from these fires were transported into the Bay Area by flow from the northwest (see Figures 15 through 19). The sea breeze carried these fire-related emissions from the Bay Area into the southern Sacramento Valley. These emissions, along with drainage flow emissions, were caught up in the localized eddy circulation pattern during the late night and early morning hours. This pattern kept emissions in the southern portion of the Valley (refer to Figure 14). Furthermore, because the overnight height of the mixed layer was low, the wildfire emissions were confined to a relatively shallow layer and were concentrated near the surface (see Figure 20).

By noon, emissions from the various areas had mixed and spread throughout the Sacramento Valley. Flow from the northwest continued to carry emissions from fires burning in the Coast Range Mountains into the Bay Area (refer to Figures 15 through 19). These wildfire-related emissions in the Bay Area then continued to drift into the southern portion of the Valley, as the afternoon

onshore pressure gradient strengthened (4.1 millibars between KSFO (higher pressure) and KSAC (lower pressure)), sustaining the moderate onshore sea breeze. In addition, a small eddy circulation pattern remained in the southwestern portion of the Valley (see Figure 21). As seen in the satellite images (refer to Figures 15 and 16), smoke covered the southern Sacramento Valley, especially along the east side of the Valley. However, the smoke impact diminished over the foothills and mountains located further east. This is corroborated by the fact that maximum 1-hour ozone concentrations were substantially lower at sites to the east of Folsom, and although their concentrations came close to the federal standard, they did not exceed the standard. Later in the afternoon, the eddy circulation pattern dissipated, and a portion of the emissions that had been trapped in the eddy were transported east by the sea breeze flow (see Figure 22).

Second, the inversion present on June 23 was somewhat stronger and lower than the day before, limiting the dispersion of wildfire emissions (see Figures 23 and 24). However, the surrogate day assessment indicates conditions were not sufficient to cause an exceedance under a normal emissions load (refer to Sonoma Technology, Inc., Appendix Y). As is typical in the Sacramento Valley during summer, the height of the mixed layer increased throughout the day on June 23. Over the course of the day, the height increased from approximately 150 meters at midnight to about 600 meters at noon. It then decreased to about 400 meters at 1500 PST (refer to Figure 20). The change in the height of the mixed layer allowed wildfire emissions within a larger volume of air to reach the ground. These emissions, in combination with those already close to the surface, compounded the severity of the wildfire impact. The greatest increase in the height of the mixed layer occurred from about 0900 PST to 1500 PST. Ozone concentrations also increased over these hours, reaching a maximum concentration at 1500 PST in Folsom.

Airport visibility observations confirm the transport and build-up of wildfire-related emissions (refer to Figures 17 through 19). During the early morning hours of June 23 (0300-0400 PST), sites in the northern portion of the Bay Area and the southern Sacramento Valley reported visibilities of 0.5 to 10 miles, with an observation of smoke at Sacramento Executive Airport (refer to Figure 17). By mid-morning (1000-1100 PST), visibility was substantially reduced throughout the northern portion of the Bay Area and southern Sacramento Valley (ranging from 3 to 5 miles), with widespread observations of smoke (refer to Figure 18). The reduced visibilities and reports of smoke persisted into the afternoon hours, including the time of the ozone exceedance at Folsom (refer to Figure 19). Airport observations reflect a measure of conditions on the ground. Therefore, the observations near Folsom confirm that pollutants and emissions from the surrounding wildfires reached the ground, where they had an impact on ground level ozone concentrations.

Third, ambient temperatures on June 23 were high enough to promote ozone formation from wildfire emissions. The maximum temperature reached 97 degrees

Fahrenheit at Folsom. While a maximum temperature of 97 degrees is not unusual for the Folsom area, the amounts of available precursors in the ground level air mass were unusual. The added emissions burden from the wildfires was sufficient to push local ozone concentrations to levels above the federal 1-hour standard. A comparison of maximum temperatures in the Sacramento region on June 23 with those on the surrogate day showed that the June 23 temperatures were not high enough to cause an exceedance, if the emissions burden were typical (refer to Sonoma Technology, Inc., Appendix Y).

In conclusion, the transport, build-up, and impact of wildfire emissions on ozone concentrations at the Folsom monitoring site on June 23, 2008, is supported by several factors, as summarized, below:

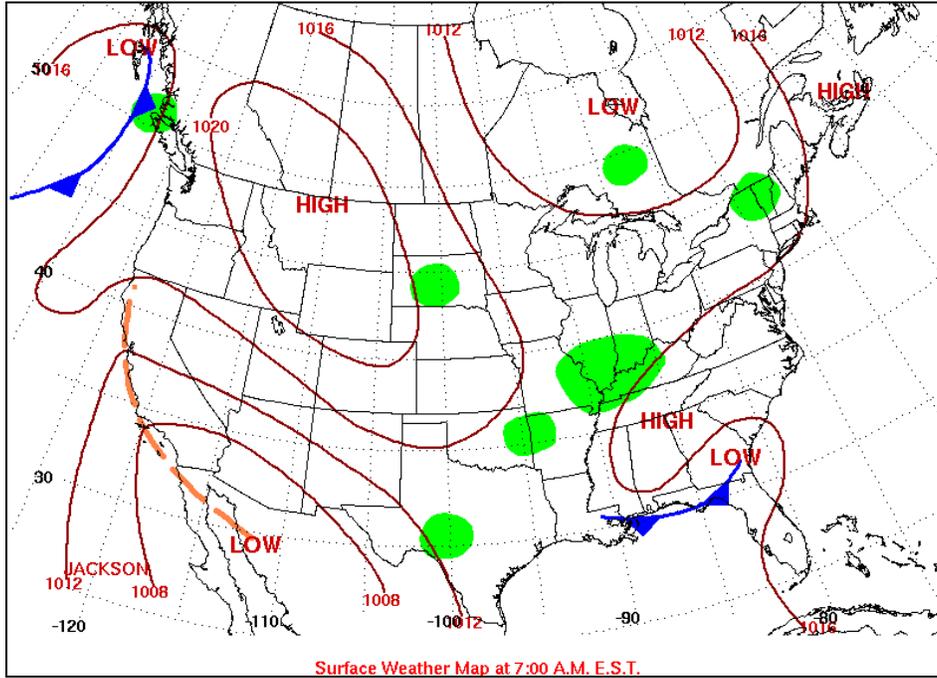
- 1) Based on satellite imagery, airfield visibility observations, and surface winds, there was a progression of smoke and wildfire emissions from the Coast Range Mountains to the southern Sacramento Valley, including the Folsom area, the day before the exceedance. During this time, surface winds were from the southwest, and emissions impacting the southern Sacramento Valley were attributable to wildfires in the Coast Range.
- 2) During the overnight hours, typical surface drainage winds and sea breeze flow transported emissions from wildfires in the Coast Range Mountains and the Sierra Nevada Mountains into the southern Sacramento Valley, adding to the emissions burden. These emissions were trapped near the ground by a low mixing height, and an eddy circulation pattern kept them in the southern Sacramento Valley.
- 3) As the eddy circulation dissipated on June 23, surface winds continued from the southwest, and there were observations of smoke throughout the Bay Area region and into the southern Sacramento Valley. This combination of conditions and observations indicate that wildfire emissions continued to build-up and concentrate in the southern Sacramento Valley.
- 4) A persistent inversion served to trap emissions closer to the ground on June 23 than on the previous day. In addition, an increase in the height of the mixed layer over the course of the day allowed emissions carried throughout a larger volume of air to be mixed downward, to the surface. 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.
- 5) Maximum ambient temperatures in the Sacramento area were conducive to ozone formation, but 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 wildfire-related emissions in the Folsom area. This higher level of precursor emissions contributed significantly to ozone formation and caused ozone concentrations to rise well above the levels normally measured at the Folsom site. The surrogate day assessment shows that the meteorological conditions present on June 23 would not be expected to result in a federal 1-hour ozone exceedance (refer to Sonoma Technology, Inc., Appendix Y). Therefore, the addition of the wildfire-related emissions was the primary cause of the federal 1-hour ozone exceedance.

FIGURES AND TABLES FOR METEOROLOGICAL DISCUSSION
EPISODE 1: JUNE 23, 2008

Figure 1
NOAA Surface Weather Maps

June 20, 2008, 0400 PST



June 21, 2008, 0400 PST

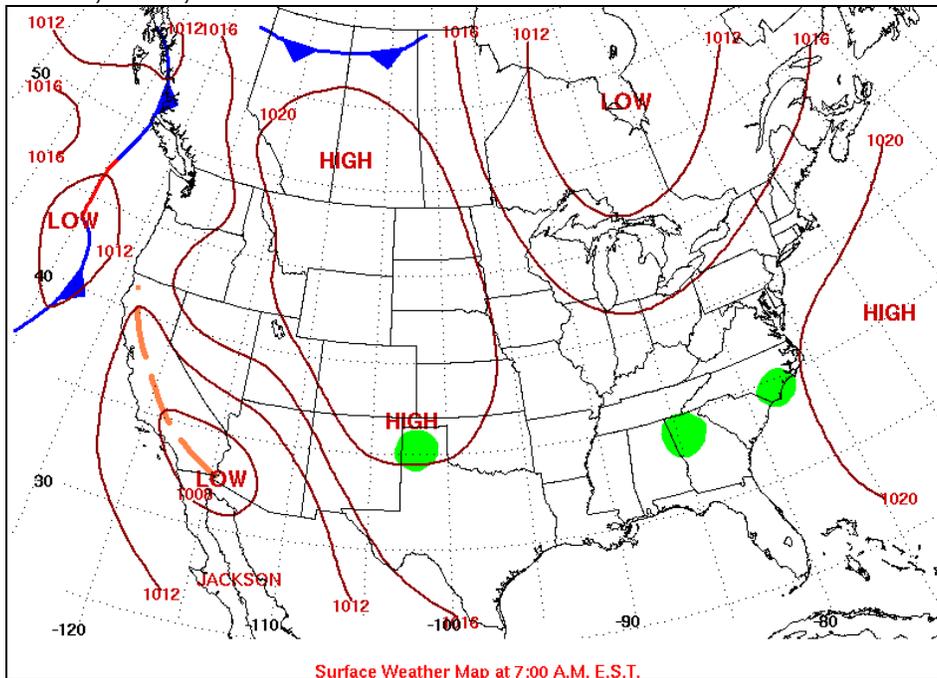
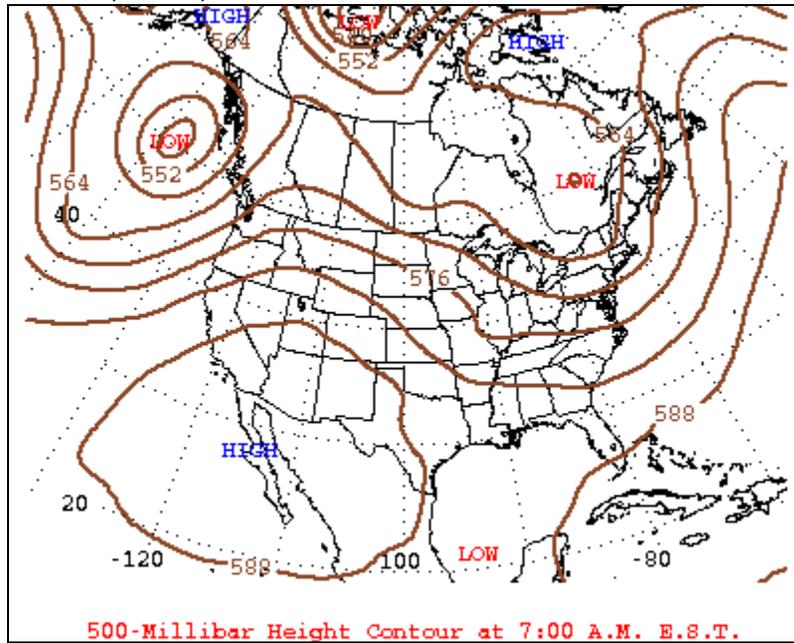


Figure 2
NOAA Daily 500 mb Weather Maps

June 20, 2008, 0400 PST



June 21, 2008, 0400 PST

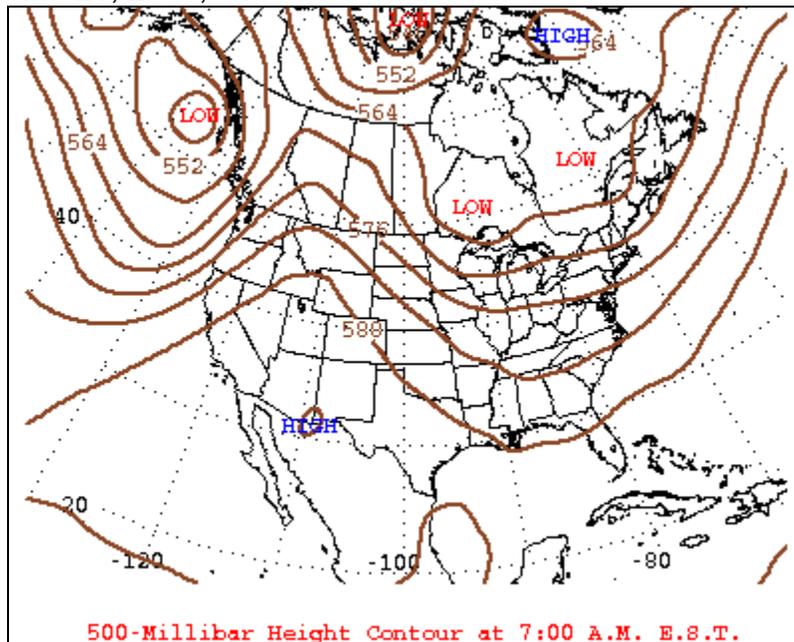
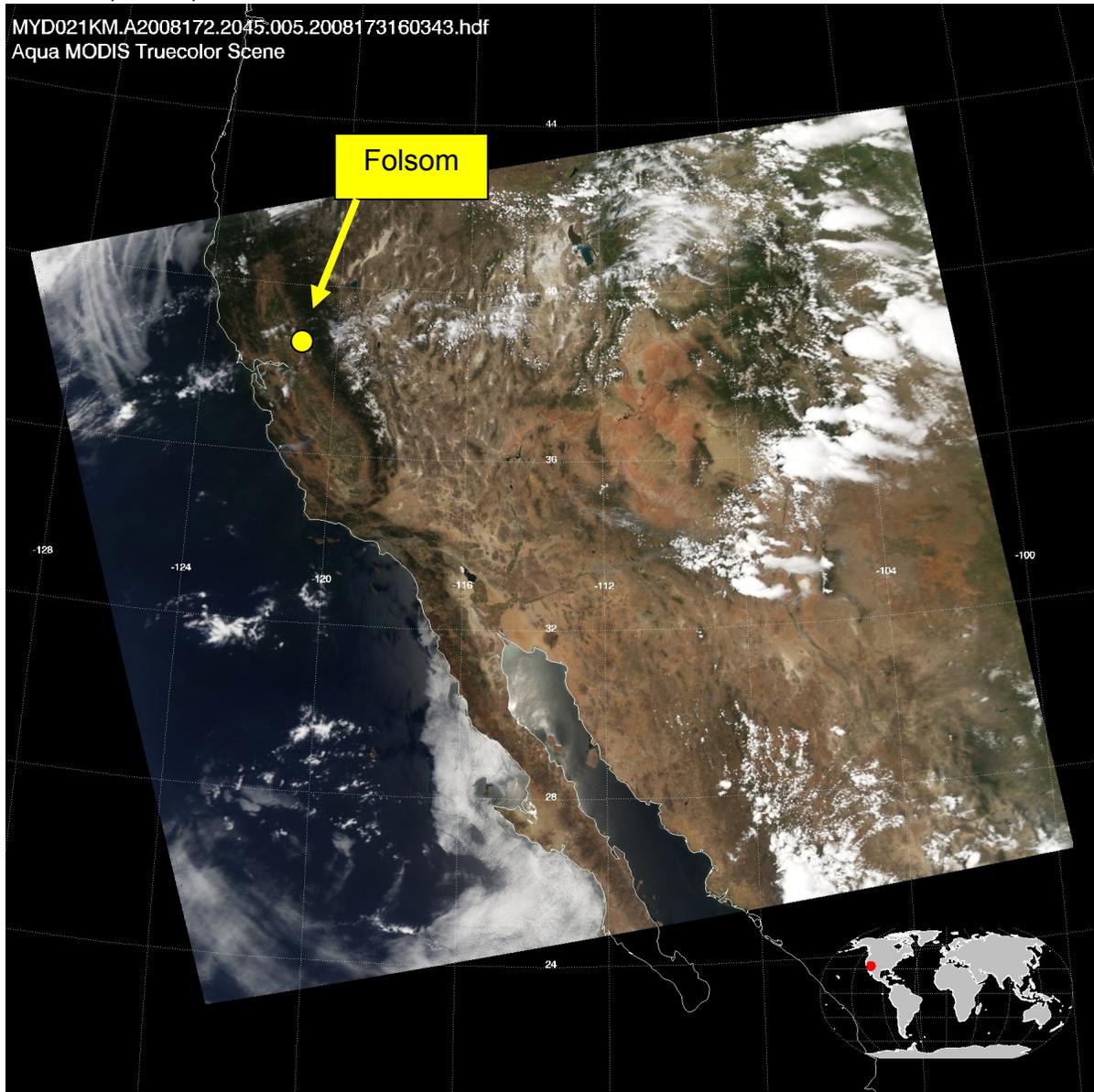


Figure 3 Visible Satellite Image

June 20, 2008, 1245 PST

MYD021KM.A2008172.2045.005.2008173160343.hdf
Aqua MODIS Truecolor Scene



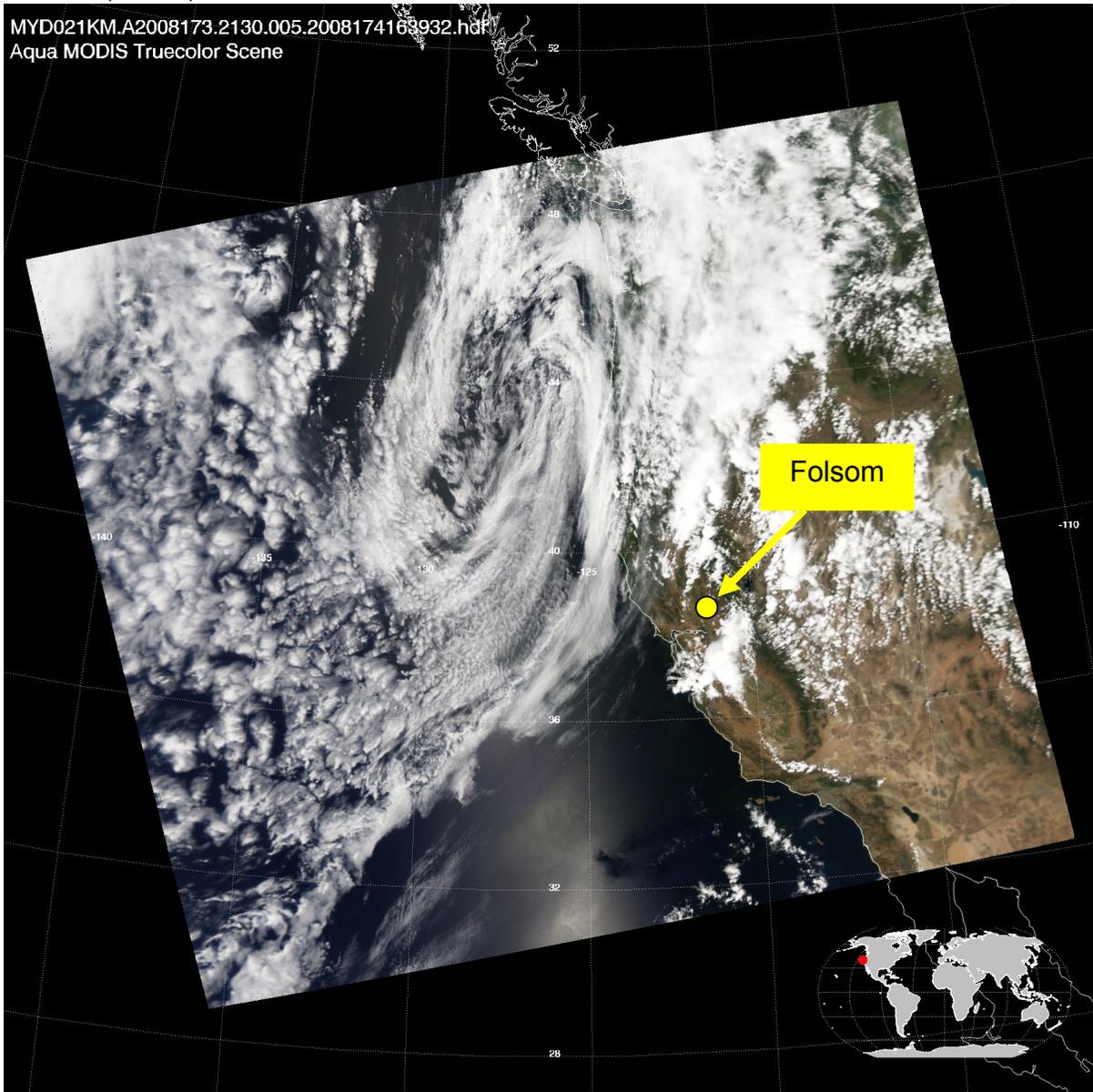
NASA Visible MODIS Satellite Images

http://modis-atmos.gsfc.nasa.gov/IMAGES/index_myd021km.html

Figure 4 Visible Satellite Image

June 21, 2008, 1330 PST

MYD021KM.A2008173.2130.005.2008174163932.hdf
Aqua MODIS Truecolor Scene



NASA Visible MODIS Satellite Images

(http://modis-atmos.gsfc.nasa.gov/IMAGES/index_myd021km.html)

**Figure 5
California Wildfires and Lightning Strikes**

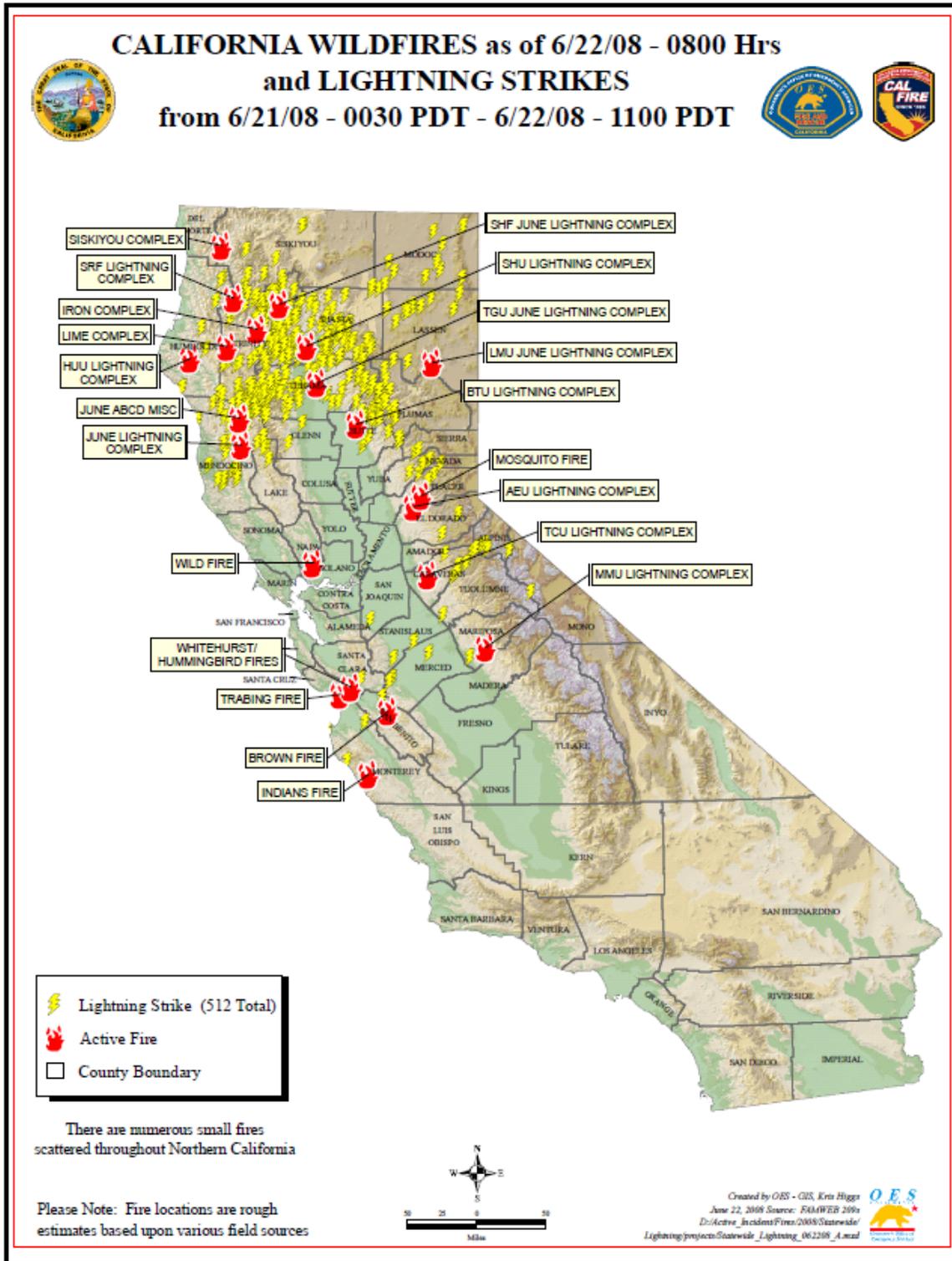


Figure 6 National Drought Summary – June 17, 2008

National Drought Summary -- June 17, 2008

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>.

The West

In the dry areas across the West, weekly precipitation totals in excess of 0.5 inch were restricted to western Wyoming and isolated sites in southern Idaho. Most locations received no measurable rainfall, which is not particularly unusual for these areas during summer. However, some areas of deterioration were noted, primarily across California, where all but the northwestern and southwestern extremities of the state are now experiencing at least moderate drought. Severe drought (D2) expanded northward slightly in the San Joaquin Basin.

Author: Rich Tinker, CPC/NOAA

**Table 1
List of Fires for June 20 through June 23, 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	-121.91
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	-122.07
SHAMROCK	20080620	20080625	52	004608		Mendocino	138	39.68	-123.407
TABLE MTN	20080620	20080626	146	004608		Mendocino	142	39.23	-123.707
ARCHER	20080620	20080709	8	004608		Mendocino	142	39.849	-123.36
ALBION RIVER	20080620	20080621	2	004607		Mendocino	143	39.239	-123.724
RED HILL	20080620	20080715	42	004608		Mendocino	143	39.94	-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
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

**Table 1 (continued)
List of Fires for June 20 through June 23, 2008**

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
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	-123.99
MILL	20080620	20081003	65882		00000023	Siskiyou	237	41.542	-123.651
THREE	20080620	20080723	4923		00000010	Siskiyou	238	41.6	-123.573
BOTTLE	20080621	20080622	19		00000038	El Dorado	26	38.954	-120.823
FORESTHILL	20080621	20080625	55	013273		Placer	31	39.02	-120.78
SOLDIER	20080621	20080624	30		00000037	El Dorado	34	38.778	-120.552
TWENTY	20080621	20080625	1355	013264		Yuba	38	39.181	-121.481
CAPPS	20080621	20080622	19		00000027	El Dorado	39	38.652	-120.442
PEAVINE	20080621	20080706	581		00000040	Placer	40	39.067	-120.61
GOVERNMENT	20080621	20080801	9220		00000037	Placer	47	39.219	-120.629
WESTVILLE	20080621	20080801	11090		00000041	Placer	48	39.198	-120.57
SCOTCHMAN	20080621	20080703	1165		00000025	Nevada	51	39.35	-120.766
FALL	20080621	20080715	2417		00000033	Nevada	54	39.375	-120.699
FORBESTOWN	20080621	20080624	26		00000058	Yuba	58	39.527	-121.225
CELINA	20080621	20080702	309		00000032	Sierra	59	39.479	-120.77

**Table 1 (continued)
List of Fires for June 20 through June 23, 2008**

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
25 FIRE	20080621	20080626	168		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	Butte	69	39.673	-121.25
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	37.51	-120.116
KEDDIE	20080621	20080625	78		00000073	Plumas	104	40.167	-120.896
CUB	20080621	20080721	14729		00000013	Tehama	105	40.189	-121.48
ONION 2	20080621	20080722	4905		00000015	Tehama	107	40.208	-121.522
BACK	20080621	20080629	1566		00000019	Lake	108	39.37	-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	-119.74
INDIAN PEAK	20080621	20080623	49	007986		Mariposa	113	37.405	-119.863
MONKEY ROCK	20080621	20080714	1886		00000016	Mendocino	113	39.542	-122.967
BIG	20080621	20080705	2193		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	37.06	-121.635

Table 1 (continued)
List of Fires for June 20 through June 23, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
MILL	20080621	20080726	3042		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	39.63	-123.225
CHIQUITO	20080621	20080717	145		00000017	Madera	129	37.414	-119.429
BRUSHY 7	20080621	20080625	141	004689		Mendocino	129	39.66	-123.215
BRUSHY 6	20080621	20080710	31	004706		Mendocino	130	39.652	-123.245
BRUSHY 5	20080621	20080625	92	005151		Mendocino	130	39.64	-123.264
SLIDES	20080621	20080627	1641		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	Trinity	135	40.022	-123
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	-123.57
GILEAD	20080621	20080626	30		00000038	Trinity	137	40.022	-123.044
NAVARRO	20080621	20080626	1853	004657		Mendocino	137	39.204	-123.625
IRON	20080621	20080823	30660		00000118	Tehama	138	40.14	-122.923
YELLOW	20080621	20081120	31933		00000047	Trinity	139	40.062	-123.056

Table 1 (continued)
List of Fires for June 20 through June 23, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
SHAMROCK WEST	20080621	20080712	46	004699		Mendocino	139	39.669	-123.43
BULL	20080621	20080627	40		00000040	Trinity	140	40.006	-123.15
GROUSE	20080621	20080705	6324		00000033	Trinity	141	40.127	-123.03
5-10 CAVANAUGH LIGHTNING	20080621	20080709	24	004652		Mendocino	141	39.154	-123.726
CAMP	20080621	20080630	231		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	-123.34
SWIM	20080621	20080630	185		00000058	Trinity	149	40.166	-123.181
TRAVIS	20080621	20080626	958		00000054	Trinity	151	40.122	-123.294
BONANZA	20080621	20080705	1371		00000059	Trinity	153	40.22	-123.217
VAN HORN	20080621	20080623	68		00000029	Trinity	153	40.204	-123.236
BIERCE	20080621	20080622	18		00000134	Trinity	153	40.25	-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	Shasta	155	40.917	-121.338
SOUTH FORK	20080621	20080626	83		00000123	Trinity	156	40.37	-123.107
RED MOUNTAIN LIGHTNING	20080621	20080801	7513	004695		Mendocino	156	39.892	-123.64
HARDY CREEK LIGHTNING	20080621	20080711	5354	004973		Mendocino	157	39.726	-123.76
PAINTERS	20080621	20080622	15			Lassen	159	40.824	-120.078
CHINA	20080621	20080623	35		00000159	Trinity	162	40.514	-123.07
LASSIC	20080621	20080621	23		00000028	Trinity	169	40.345	-123.498
BASIN COMPLEX	20080621	20080727	163607		00000016	Monterey	170	36.256	-121.642
FISHER	20080621	20080705	35		00000153	Trinity	170	40.449	-123.395

Table 1 (continued)
List of Fires for June 20 through June 23, 2008

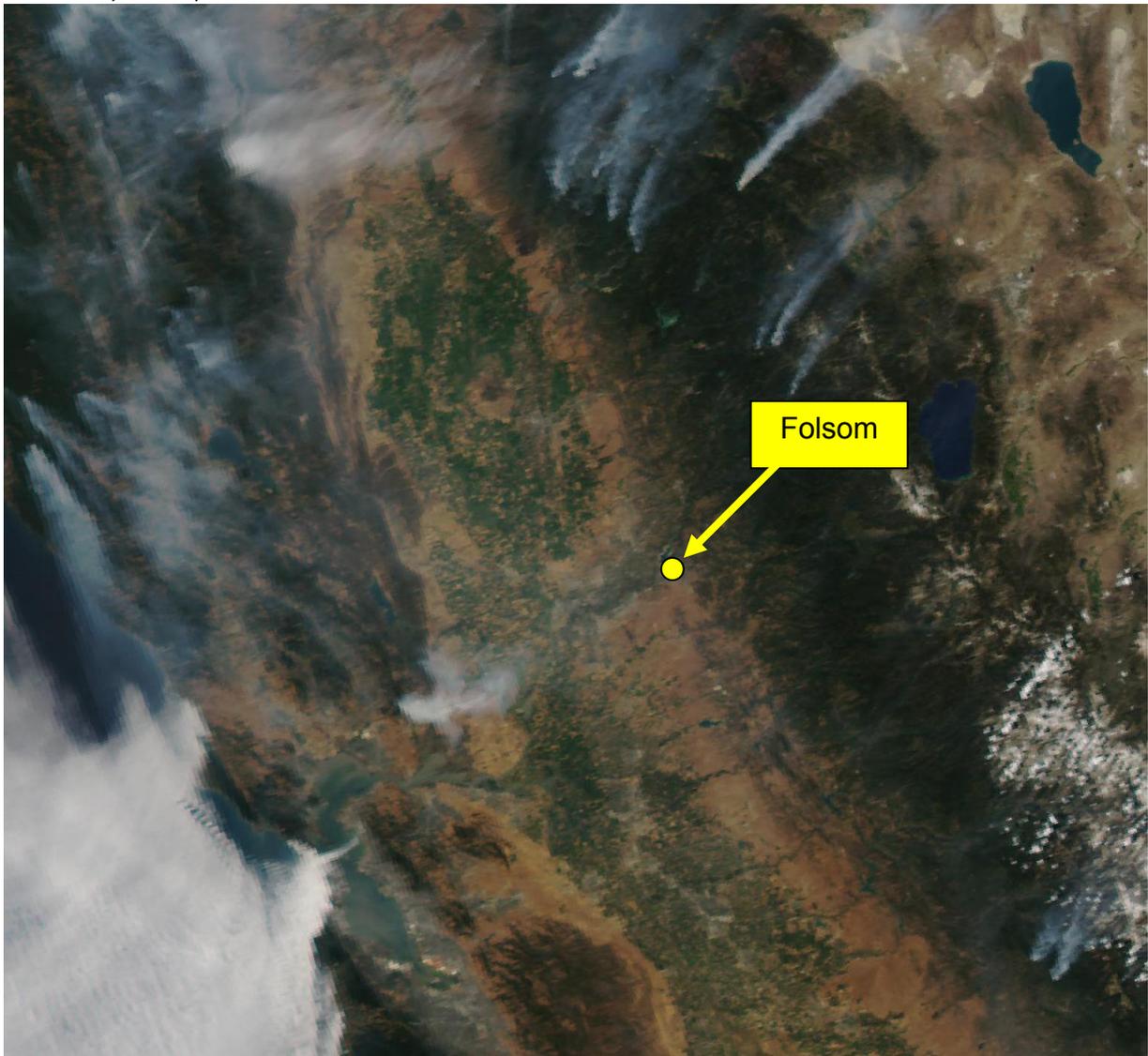
Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
LOGWOOD	20080621	20080727	20		00000017	Monterey	172	36.231	-121.697
MINERS	20080621	20081031	24876		00000106	Trinity	175	40.637	-123.268
EAGLE	20080621	20081004	32024		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	40.12	-124.035
CEDAR	20080621	20080731	25392		00000079	Trinity	184	40.749	-123.361
SLIDE	20080621	20080708	1182		00000184	Trinity	185	40.659	-123.512
BUCKHORN	20080621	20080731	29814		00000188	Trinity	186	40.836	-123.263
BENNETT	20080621	20080622	31		00000114	Humboldt	186	40.655	-123.557
CARSON	20080621	20080704	65	003450		Humboldt	189	40.429	-123.893
SERGEANTS	20080621	20080621	20	002373		Monterey	191	35.936	-120.757
CARIBOU	20080621	20081216	13127		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	-123.48
CAREY	20080621	20080731	3714		00000175	Trinity	200	41.073	-123.294
GOULD	20080621	20080702	229		00000015	Siskiyou	200	41.199	-123.042
PACKSADDLE	20080621	20080624	35		00000039	Humboldt	212	41.168	-123.52
CRAPO	20080621	20080731	15		00000016	Siskiyou	214	41.349	-123.22
JAKE	20080621	20081003	38417		00000041	Siskiyou	216	41.347	-123.31
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	Del Norte	241	41.537	-123.785
DARK	20080621	20080723	10390		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

Table 1 (continued)
List of Fires for June 20 through June 23, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
WALKER	20080622	20080705	11173	004843		Colusa	75	39.065	-122.48
CHINO	20080622	20080831	159		00000049	Butte	76	39.763	-121.417
ROCK2	20080622	20080831	24		00000044	Butte	76	39.78	-121.29
QUARRY	20080622	20080622	211	005708		San Mateo	97	37.681	-122.415
BEACH FIRE	20080622	20080622	7	081477		Marin	101	38.231	-122.946
CLIFF RIDGE	20080622	20080712	4658	004752		Mendocino	132	39.051	-123.569
THOMES	20080622	20080630	980		00000029	Tehama	132	40.035	-122.918
HARVEY	20080622	20080701	949		00000031	Tehama	133	40.092	-122.854
VINEGAR	20080622	20080625	14544		00000030	Tehama	134	40.076	-122.923
BROWN	20080622	20080625	3787	002390		San Benito	139	36.687	-120.92
CORRAL FIRE	20080623	20080721	12434	002759		Lassen	151	40.863	-120.861
MURPHY	20080623	20080630	51		00000049	Shasta	156	40.819	-122.12
MIDDLE	20080623	20080715	2067	004807		Mendocino	160	39.762	-123.8

Figure 8
Visible Satellite Image

June 22, 2008, 1231 PST



NASA Visible Aqua MODIS True Color Satellite Image (250 meter resolution)

<http://activefiremaps.fs.fed.us/imagery.php>

Figure 10
Visibility and Present Weather June 22, 2008 0900-1000 PST

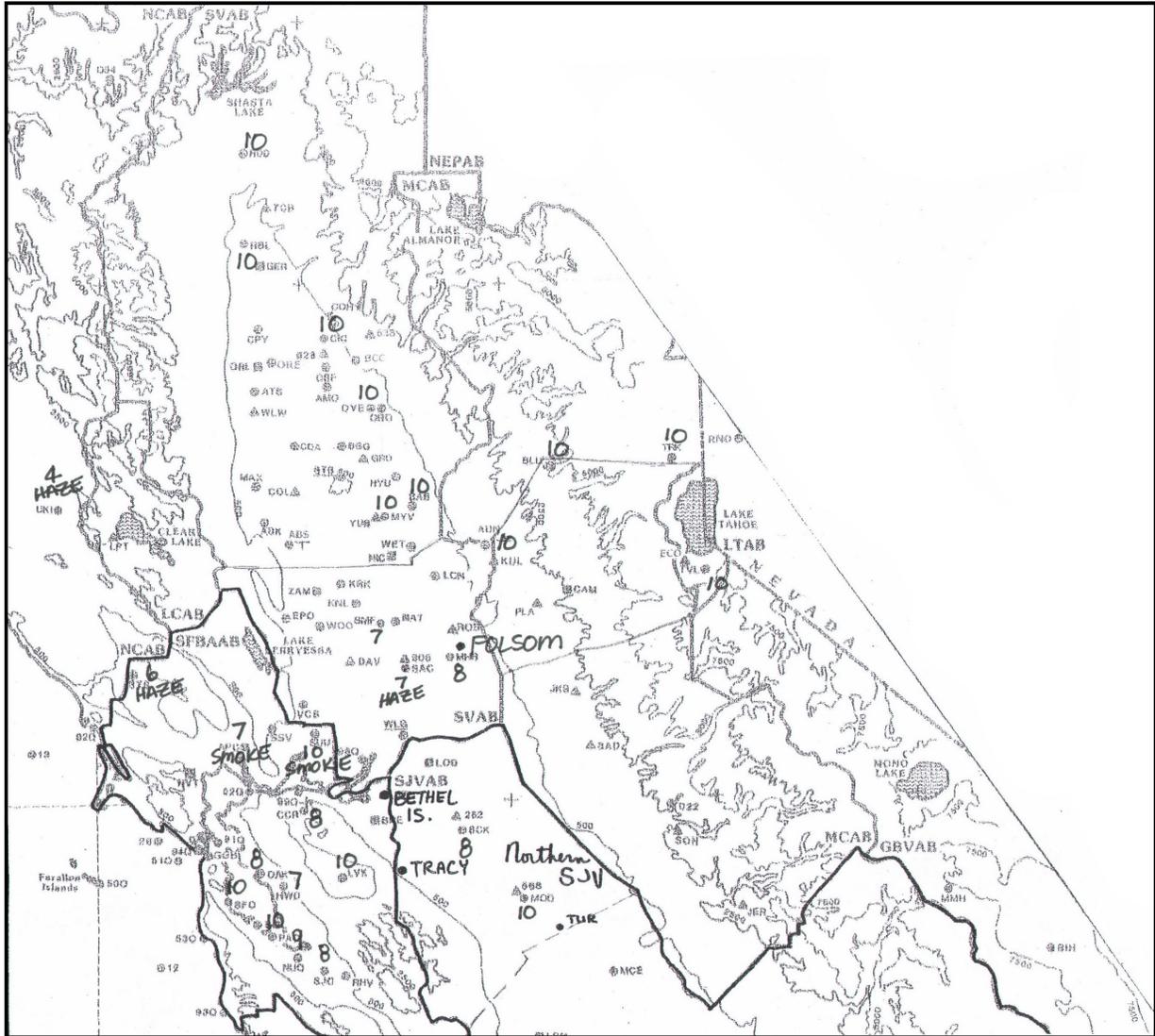


Figure 13
Surface Winds June 22, 2008, 1500-1600 PST

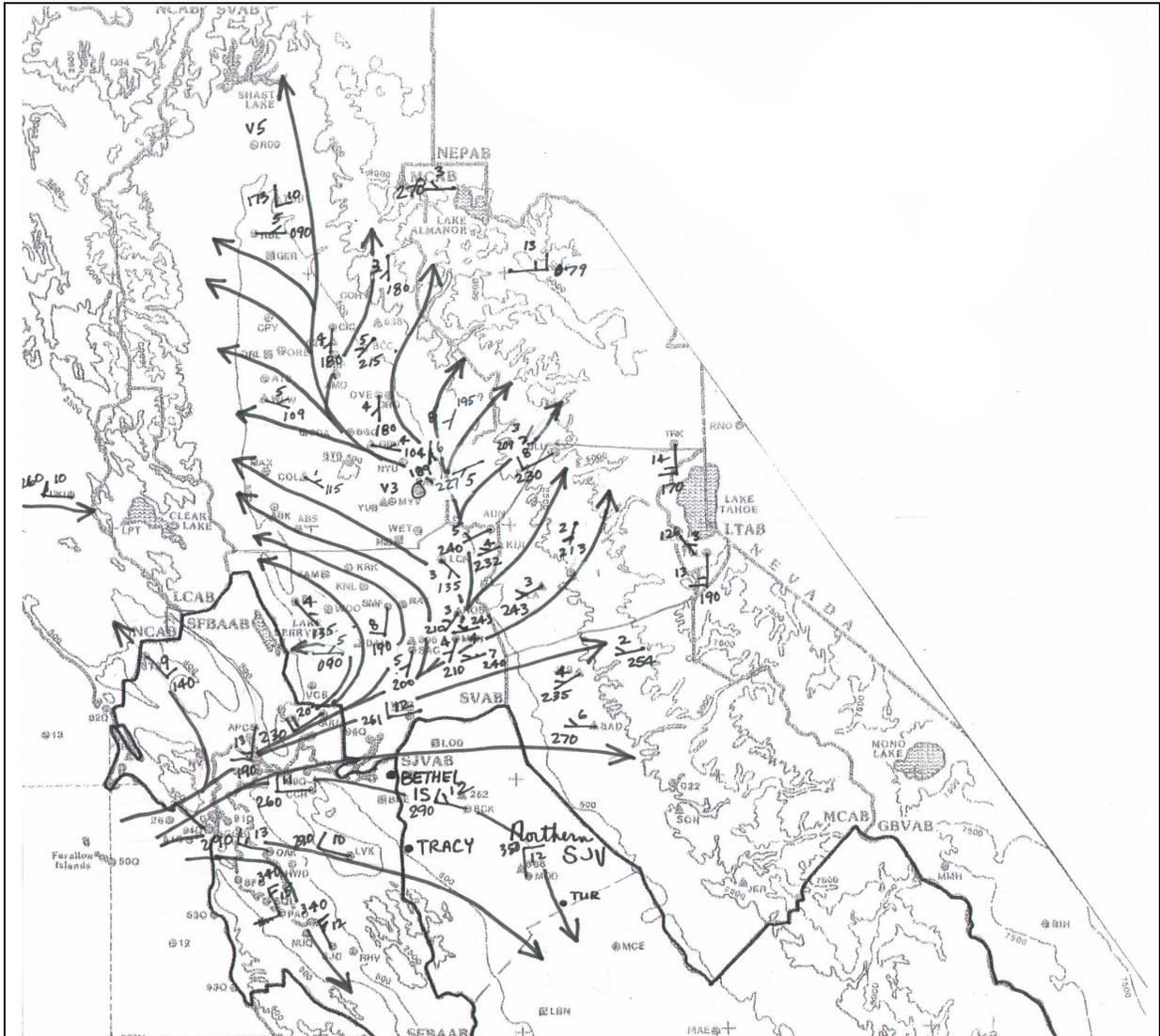


Table 2
Paradise-Airport and Cool Hourly Winds June 2008

Date	Start Time (PST)	Paradise-Airport		Cool-Highway 193	
		Wind Speed (miles/hour)	Wind Direction (degrees)	Wind Speed (miles/hour)	Wind Direction (degrees)
20080622	0:00	6.9	80	3.5	51
	1:00	5.8	76	2.3	29
	2:00	3.5	57	2.3	28
	3:00	1.2	67	2.3	43
	4:00	5.8	34	2.3	42
	5:00	3.5	10	3.5	49
	6:00	1.2	223	1.2	57
	7:00	1.2	266	2.3	151
	8:00	2.3	308	6.9	160
	9:00	3.5	191	4.6	204
	10:00	3.5	200	5.8	209
	11:00	4.6	207	5.8	232
	12:00	4.6	191	4.6	223
	13:00	4.6	214	4.6	225
	14:00	5.8	215	6.9	205
	15:00	5.8	215	4.6	232
	16:00	4.6	218	3.5	208
	17:00	4.6	219	3.5	204
	18:00	3.5	218	4.6	203
	19:00	2.3	210	0	167
	20:00	2.3	191	2.3	62
	21:00	5.8	42	2.3	39
	22:00	5.8	37	2.3	46
23:00	8.1	46	2.3	40	
20080623	0:00	10.4	44	3.5	53
	1:00	9.2	37	3.5	42
	2:00	8.1	37	3.5	56
	3:00	1.2	22	3.5	54
	4:00	2.3	45	3.5	54
	5:00	2.3	327	2.3	61
	6:00	1.2	76	2.3	42
	7:00	1.2	61	3.5	17
	8:00	1.2	210	3.5	305
	9:00	2.3	218	3.5	244
	10:00	2.3	212	4.6	269
	11:00	3.5	216	3.5	259
	12:00	3.5	214	4.6	235

Table 2 (continued)
Paradise-Airport and Cool Hourly Winds June 2008

Date	Start Time (PST)	Paradise-Airport		Cool-Highway 193	
		Wind Speed (miles/hour)	Wind Direction (degrees)	Wind Speed (miles/hour)	Wind Direction (degrees)
20080623 (continued)	13:00	3.5	213	5.8	212
	14:00	3.5	215	4.6	267
	15:00	3.5	204	4.6	287
	16:00	3.5	215	3.5	248
	17:00	3.5	213	3.5	272
	18:00	2.3	208	3.5	228
	19:00	2.3	158	0	281
	20:00	2.3	61	2.3	45
	21:00	4.6	37	2.3	39
	22:00	5.8	359	2.3	48
	23:00	6.9	19	3.5	43

Table 3
Thomes Creek (33 miles SW of Red Bluff)
Hourly Winds June 22-23, 2008

Date	Hour (PST)	Wind Speed (mph)	Wind Direction
20080622	0:51	11	W
	1:51	11	W
	2:51	9	WSW
	3:51	9	WSW
	4:51	7	WSW
	5:51	9	W
	6:51	2	N
	7:51	1	W
	8:51	5	ESE
	9:51	3	N
	10:51	6	E
	11:51	4	N
	12:51	3	N
	13:51	4	NE
	14:51	5	ENE
	15:51	4	N
	16:51	8	ESE
	17:51	5	SE
	18:51		
	19:51	1	W
	20:51	9	WSW
	21:51	10	WSW
	22:51	11	W
	23:51	11	WSW
20080623	0:51	12	WSW
	1:51	9	WSW
	2:51	10	WSW
	3:51	14	WSW
	4:51	9	WSW
	5:51	8	WSW
	6:51	8	WSW
	7:51	4	W
	8:51	3	NNE
	9:51	2	NNE
	10:51	2	ENE
	11:51	3	SW

Table 3 (continued)
Thomes Creek (33 miles SW of Red Bluff)
Hourly Winds June 22-23, 2008

Date	Hour (PST)	Wind Speed (mph)	Wind Direction
20080623 (continued)	12:51	7	SE
	13:51	3	NW
	14:51	4	NNW
	15:51	6	ESE
	16:51	8	SE
	17:51	7	ESE
	18:51	5	SE
	19:51	4	SSE
	20:51	3	SW
	21:51	6	W
	22:51	9	W
	23:51	10	W

LATITUDE: 39.8542
LONGITUDE: -22.61
ELEVATION: 1029ft
MNET: RAWS

Figure 14
Surface Winds June 23, 2008, 0300-0400 PST

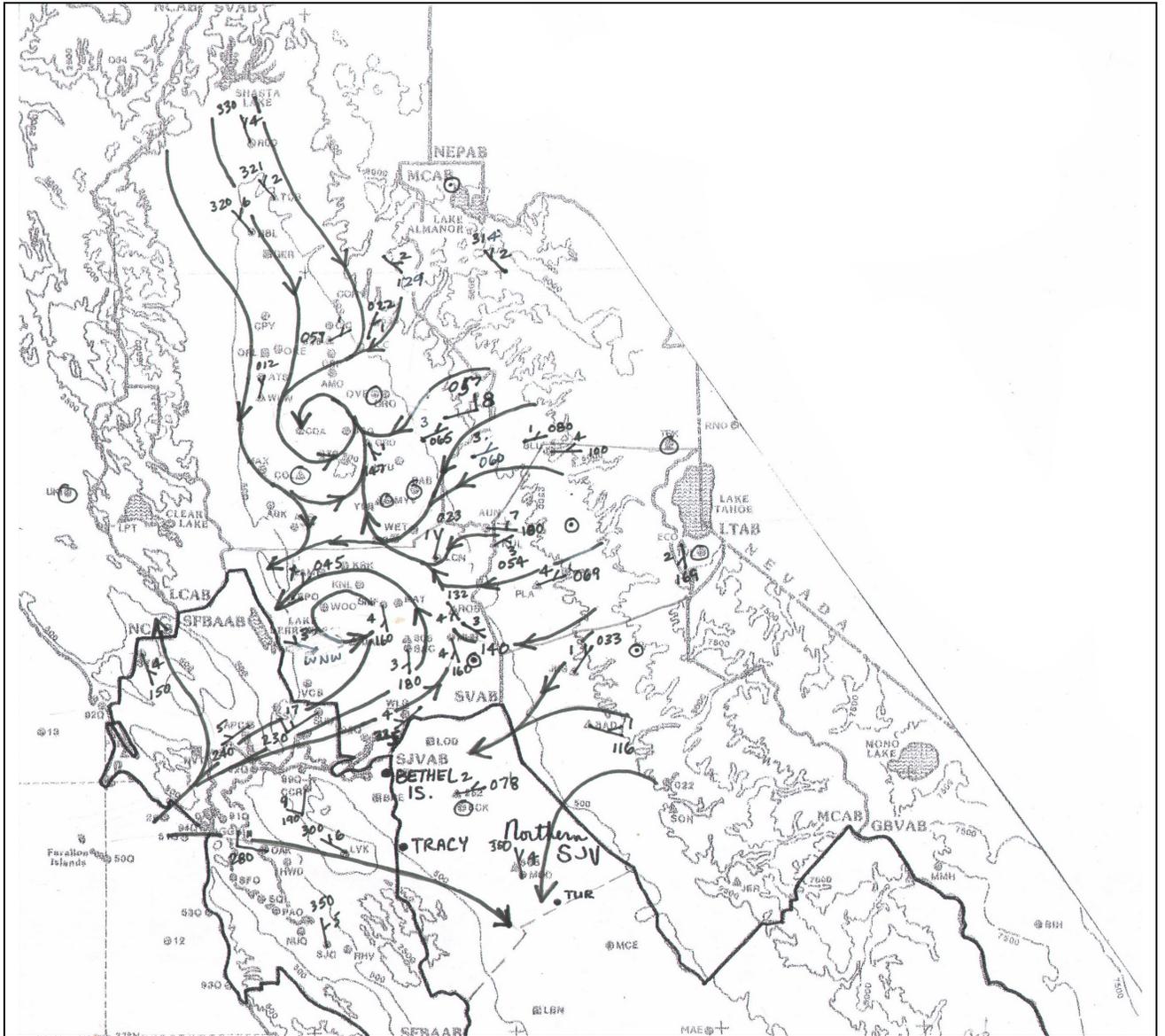
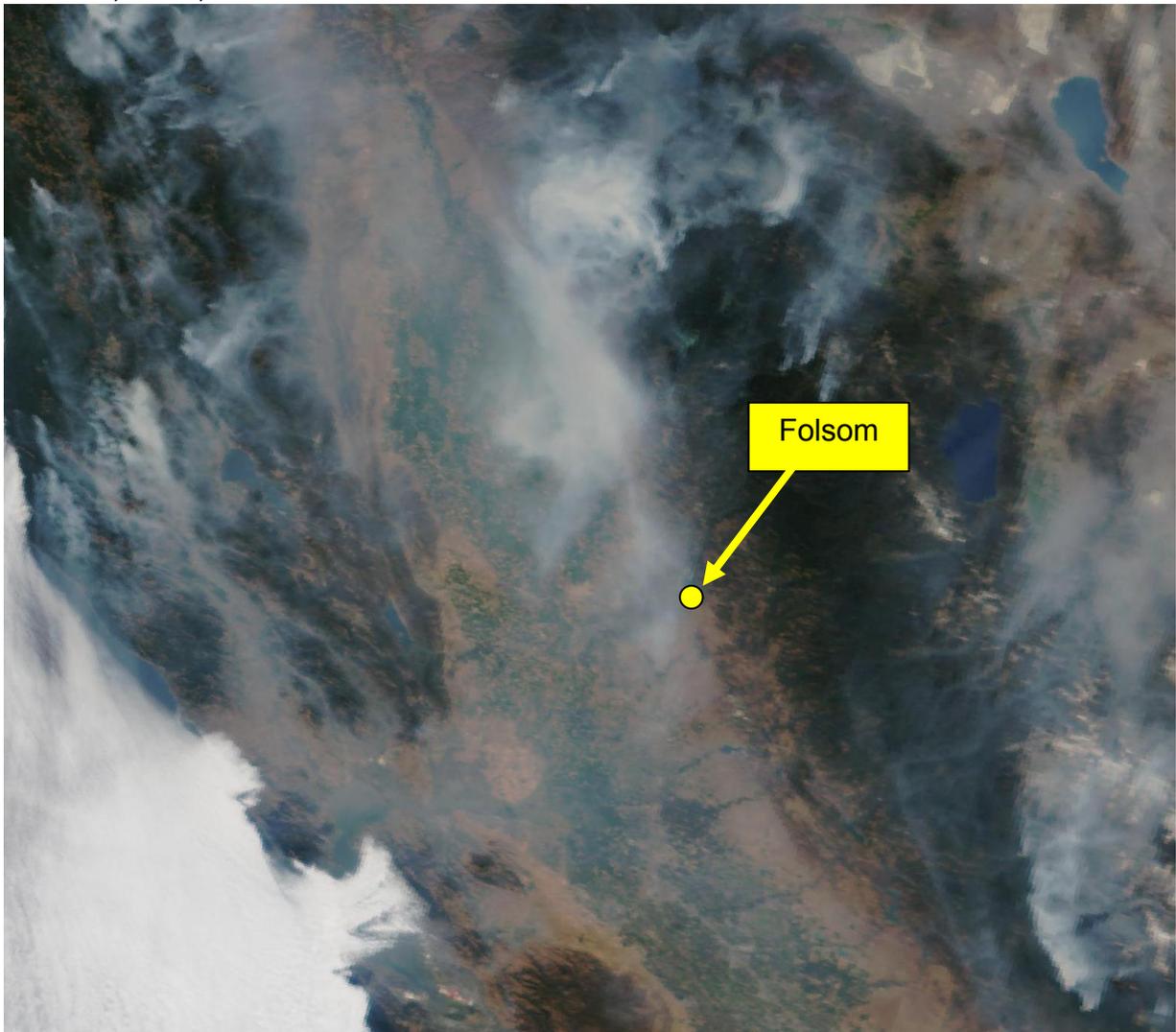


Figure 15
Visible Satellite Image

June 23, 2008, 1143 PST

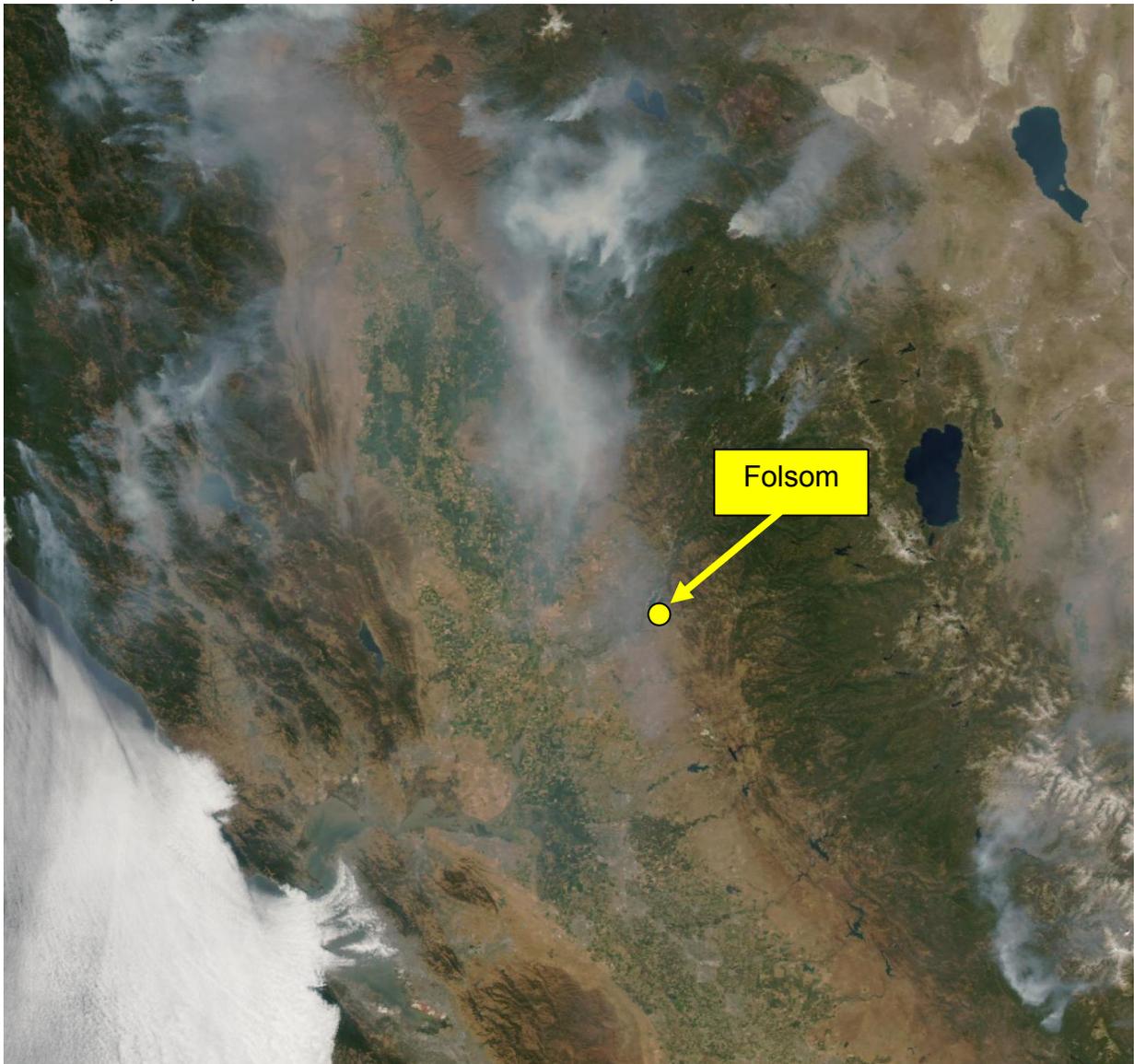


NASA Visible Aqua MODIS True Color Satellite Image (250 meter resolution)

<http://activefiremaps.fs.fed.us/imagery.php>

Figure 16
Visible Satellite Image

June 23, 2008, 1322 PST



NASA Visible Aqua MODIS True Color Satellite Image (250 meter resolution)
<http://activefiremaps.fs.fed.us/imagery.php>

Figure 17
Visibility and Present Weather June 23, 2008, 0300-0400 PST

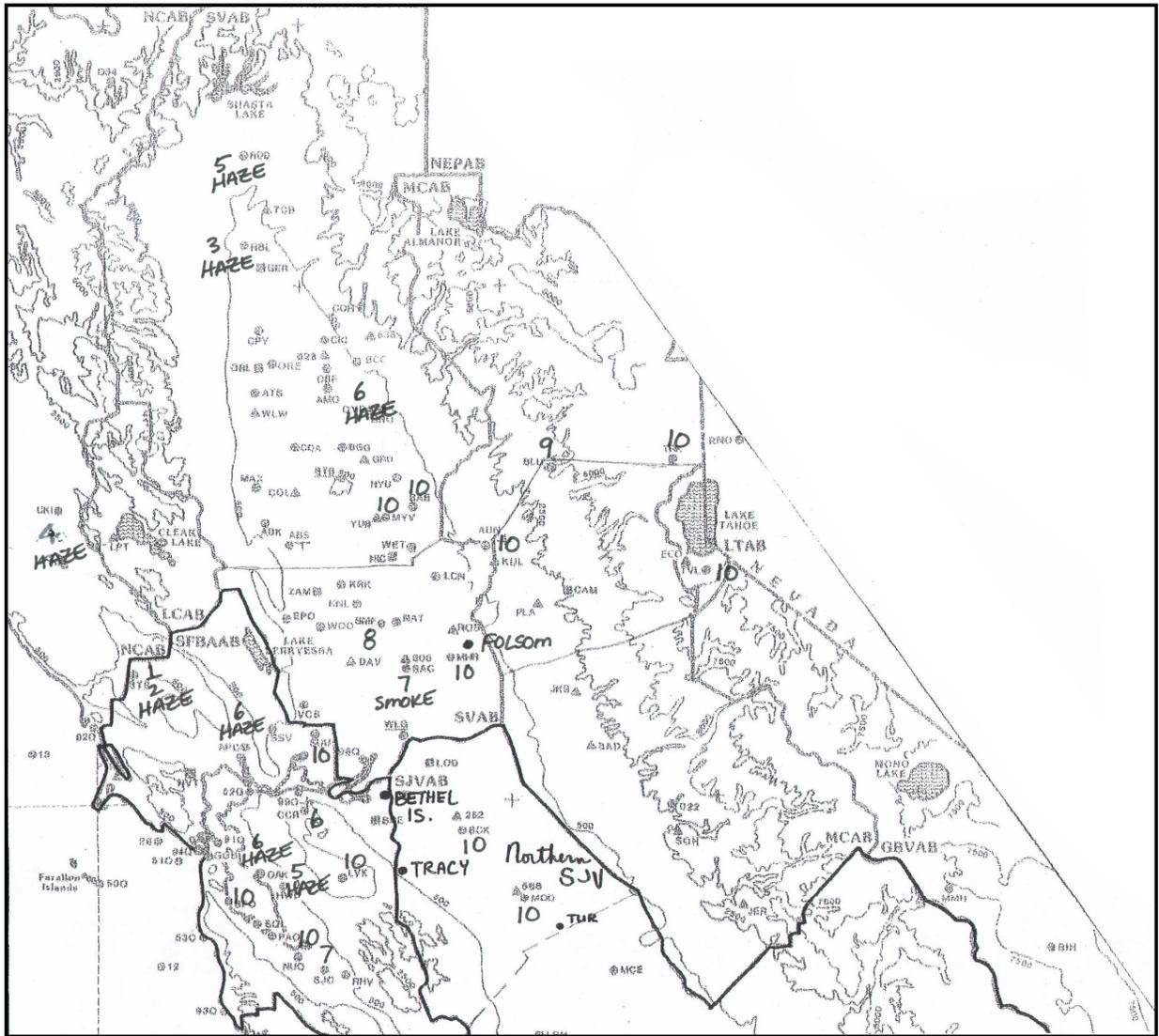


Figure 20
Change in Height of Mixed Layer at Elk Grove on June 23, 2008

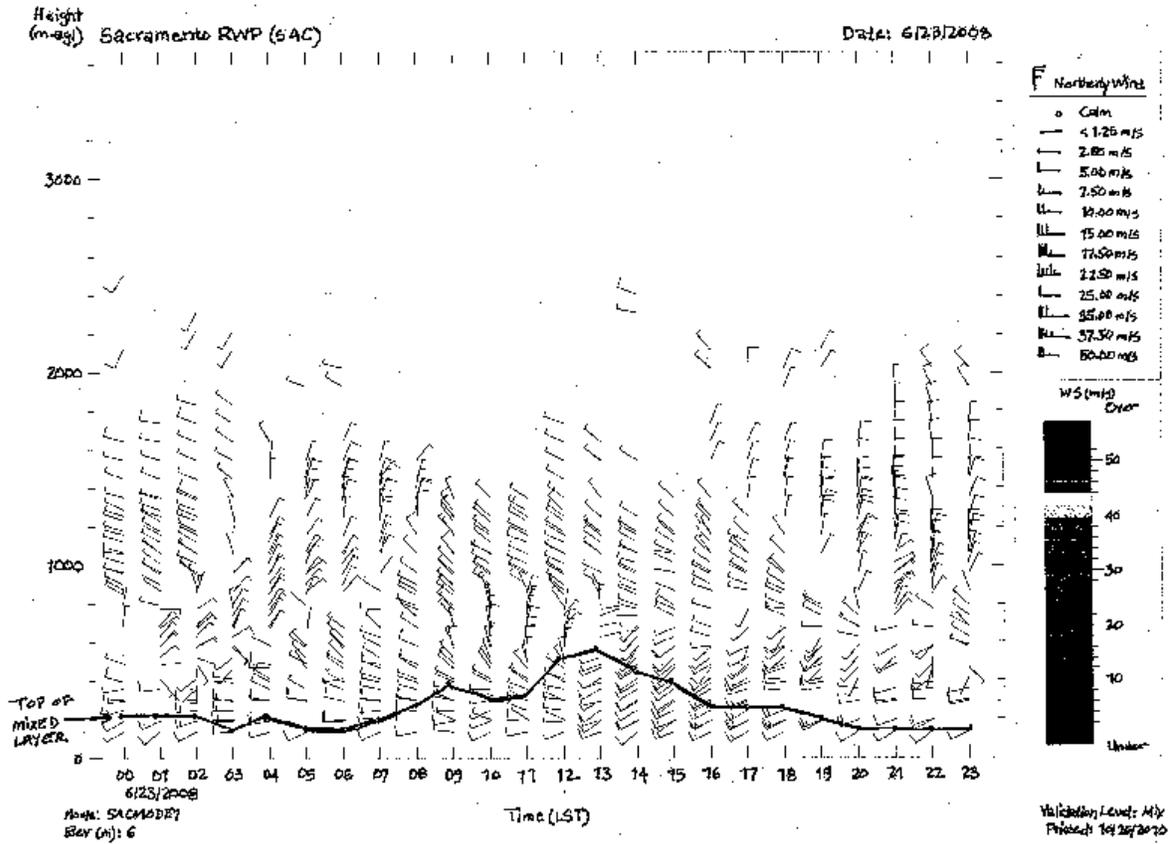


Figure 23

Inversion Base Height and Inversion Strength at Elk Grove

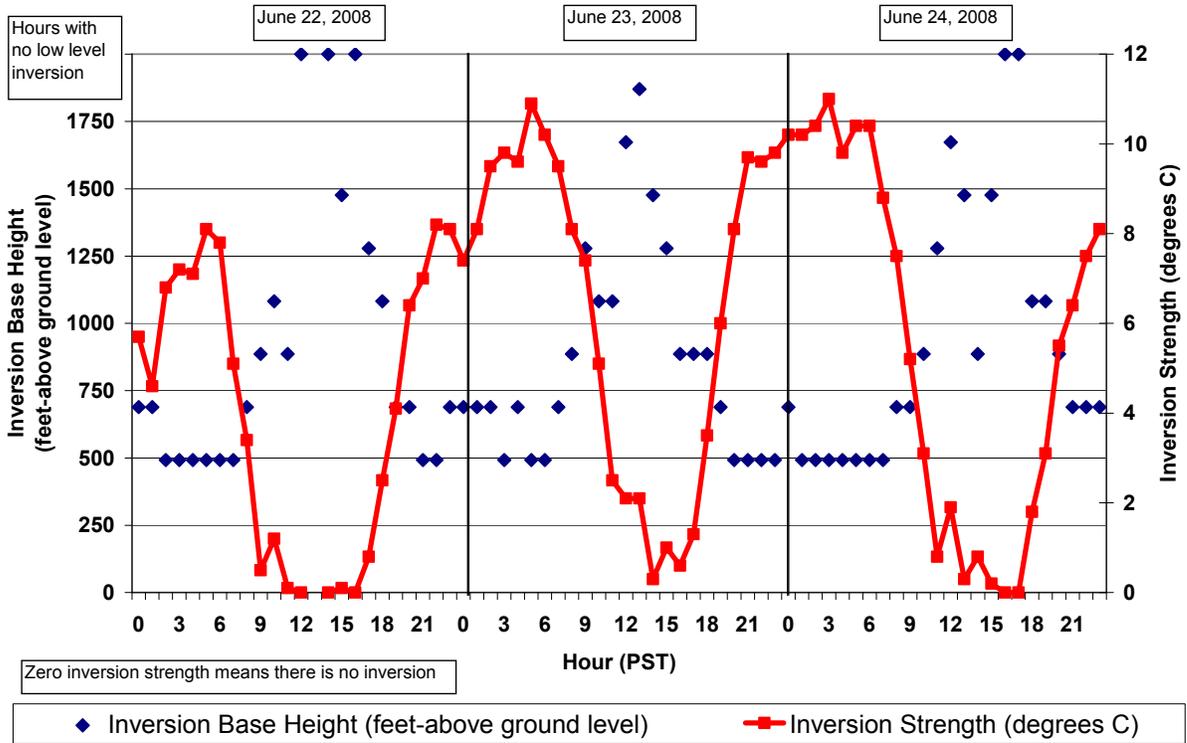


Figure 24

Elk Grove Inversion Strength June 22-24, 2008

