Theodore D. Schade
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537
760-872-8211 Fax: 760-872-6109

April 29, 2011

Ms. Deborah Jordan
Air Division
USEPA Region 9, AIR-1
75 Hawthorne Street
San Francisco, California 94105

RE: PM10 Standard Exceedance at Coso Junction, CA

Dear Ms. Jordan:

On February 8, 2011, an exceedance of the federal PM10 standard was monitored at Coso Junction in the Coso Junction PM10 attainment area. (see Figure 1 for location) The 24-hour average PM10 concentration was 202 $\mu g/m^3$. In accordance with the Coso Junction SIP, the District has 60 days from the end of the calendar quarter to investigate the cause of the exceedance. Exceedances caused by dust from Owens Lake are to be investigated to determine if the required control measures were properly implemented in accordance with Board Order #080128-01. Our investigation found that the PM10 exceedance monitored at Coso Junction on February 8, 2011 was caused by dust from Owens Lake and by regionally generated windblown dust that impacted the Eastern Sierra. We also determined that the exceedance may not have occurred if dust sources at Owens Lake were controlled.

A modeling analysis found that dust from Owens Lake was high enough by itself to cause an exceedance of the PM10 standard in the Coso Junction PM10 attainment area. See enclosed modeling analysis. The model estimated 24-hour average PM10 impacts on the northern boundary of the Coso Junction Planning area up to 190 $\mu g/m^3$, which exceeds the federal standard of 150 $\mu g/m^3$.[1] An impact of 65 $\mu g/m^3$ was estimated for dust from Owens Lake at the Coso Junction PM10 monitor site. This indicates that the monitor concentration at Coso Junction may have been less the federal standard if not for the contribution of dust from Owens Lake. An animation of the modeled dust plumes for this event can be found on the District website at www.gbuapcd.org/data/coso/febexceed along with other information pertaining to the District's investigation of this event. A review of time-lapse video from the Coso Junction monitor site supports the model results. The video showed a dust plume coming from the north, which is usually indicative of Owens Lake dust, and no local sources of dust near the monitor.

[1] These modeled impacts from Owens Lake dust exclude the background concentration of 20 $\mu g/m^3$, which is included in the model estimates in the enclosed report.

The Owens Lake PM10 emissions came from windblown dust source areas that were required to have been controlled by May 1, 2010, and areas that have been identified for control under the Contingency Measures contained in District Board Order #080128-01. Figure 1 shows the location of dust source areas at Owens Lake on February 8, 2011. The USEPA approved this Board Order as a Contingency Measure in the 2010 PM10 Maintenance Plan for the Coso Junction Planning Area. In regards to the areas that were required to be controlled, an Order for Abatement (#110317-01) was adopted by the District's Governing Board on March 17, 2011. This order requires the City of Los Angeles to implement dust controls on the areas in violation by December 31, 2015.

The regional impact of this wind event was characterized by high hourly PM10 concentrations at monitor sites throughout the Eastern Sierra, including a site in Nevada. The map in Figure 2 provides the locations of the PM10 monitor sites used for this analysis. Hourly PM10 concentrations at sites north of Owens Lake were significantly lower than at sites downwind from Owens Lake as can be seen by comparing the hourly PM10 concentrations in the time-series plots in Figure 3. Corresponding hourly wind speed and direction data are shown in Tables 1 and 2. Final air monitoring data for the 1st quarter of 2011 will be submitted to AIRS by May 31, 2011.

In summary, the District found that the PM10 exceedance monitored at Coso Junction on February 8, 2011 can be attributed to a regional dust event and to dust from Owens Lake, but that the exceedance may not have occurred if dust sources at Owens Lake were controlled. The District will continue to monitor dust source areas at Owens Lake and to push for the timely implementation of dust controls as required under the District Board Order to help prevent additional PM10 exceedances. Please call me or Duane Ono at (760) 872-8211 if you have any questions regarding this matter.

Sincerely,

Theodore D. Schade
Air Pollution Control Officer

Enclosure

cc: Larry Biland, USEPA
William Van Wagoner, LADWP
Sylvia Oey, CARB

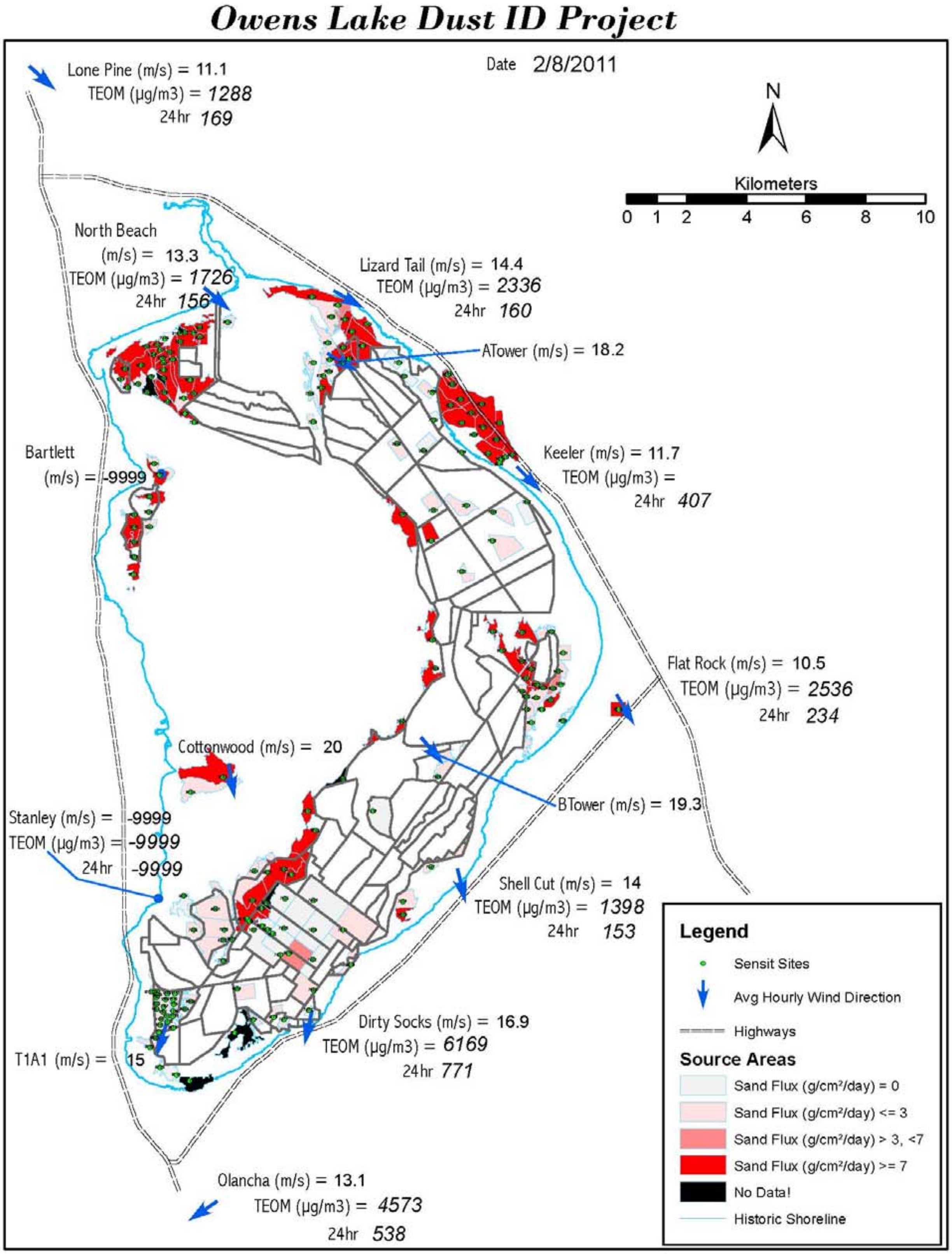

Figure 1. Sand flux, PM10 and winds at Owens Lake for the February 8, 2011 dust event.

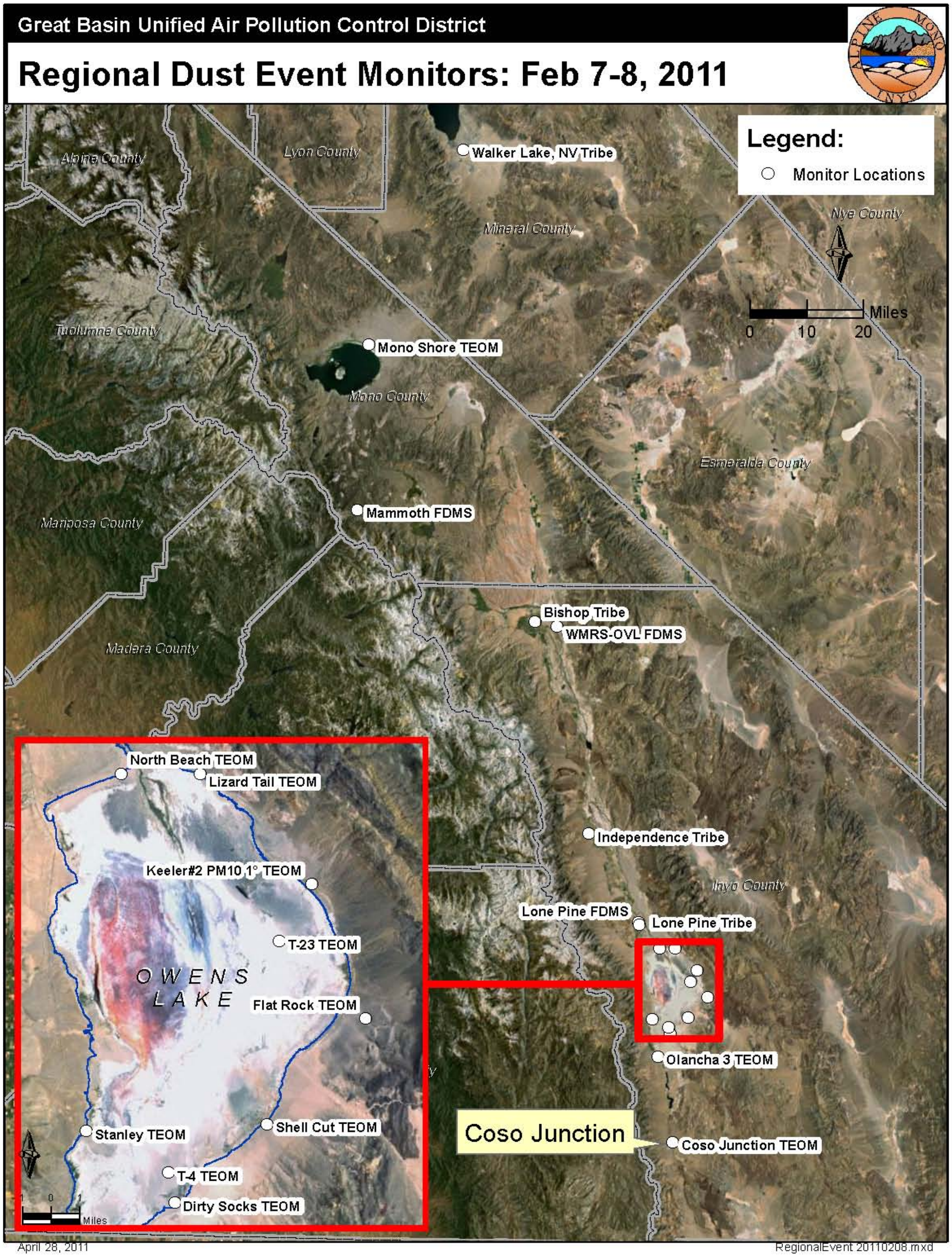

Figure 2. PM10 and meteorological monitor sites in the Great Basin Unified Air Pollution Control District and one site in Nevada were used for the dust event analysis.

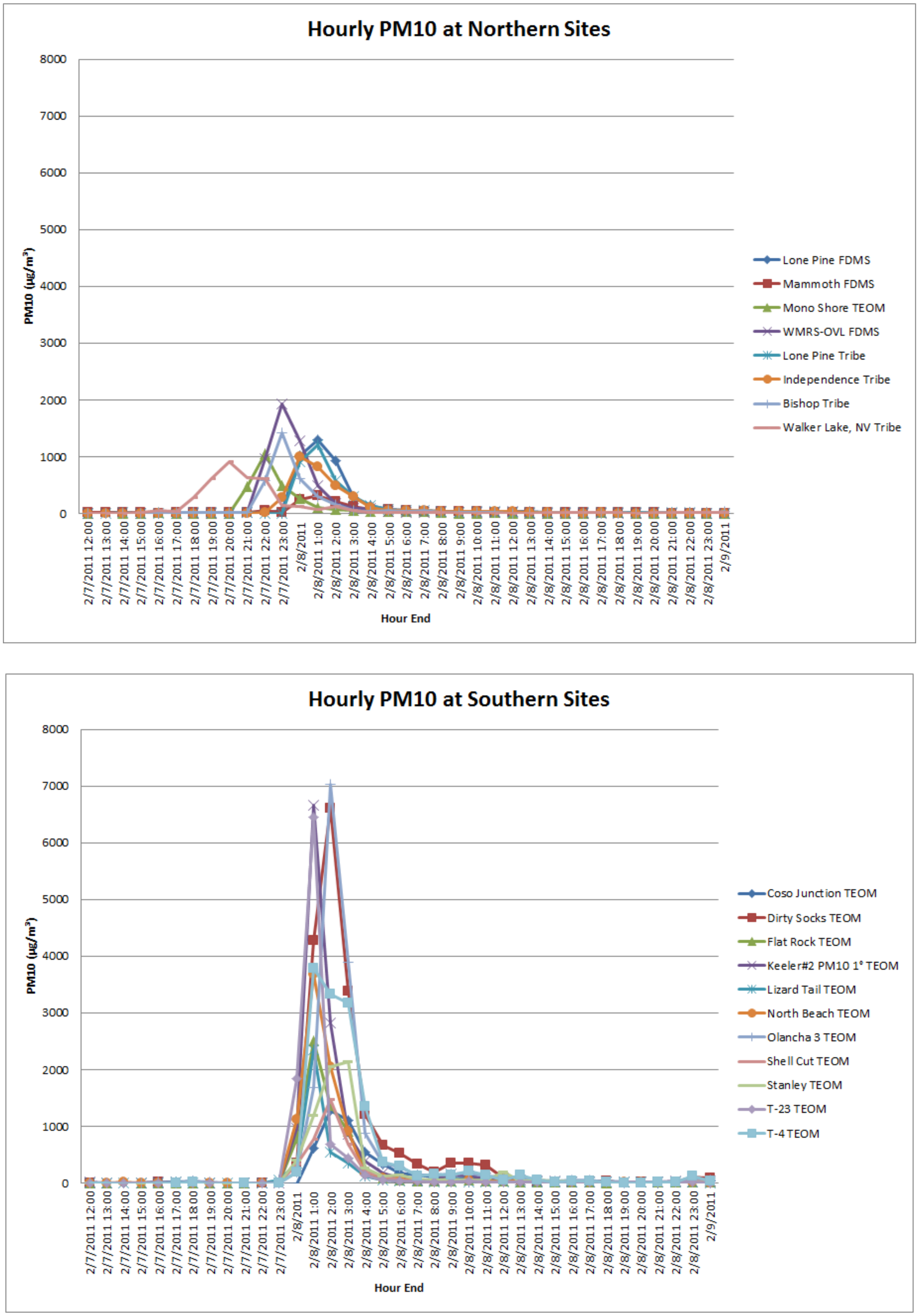

Figure 3. Although this was a regional dust event, PM10 concentrations increased significantly at southern sites as a result of windblown dust generated from Owens Lake.

Table 1. Hourly average wind speed data for February 8, 2011 event.

	Meteorological Sites, Wind Speed (m/s)																		
Hour End	Coso Junction TEOM	Dirty Socks TEOM	Flat Rock TEOM	Keeler MET	Lizard Tail TEOM	Lone Pine MET	Mammoth FDMS	Mono Shore TEOM	North Beach TEOM	Olancha 3 TEOM	Shell Cut TEOM	Stanley TEOM	T-23 TEOM	T-4 TEOM	WMRS-OVL FDMS	Bishop Tribe	Lone Pine Tribe	Walker Lake Tribe	Independence Tribe
2/7/2011 1:00	1.2	2.9	2.2	1.4	1.3	1.2	1.6	2.6	0.9	3.4	1.4	1.1	1.3	2.3	2.0	1.7	1.2	1.0	5.2
2/7/2011 2:00	1.3	1.7	1.3	0.9	1.1	1.2	1.6	2.6	1.2	3.0	0.9	1.7	1.5	1.4	2.7	1.7	1.3	1.4	4.6
2/7/2011 3:00	0.9	0.9	2.3	0.8	0.4	1.5	1.7	2.3	0.8	2.3	0.7	0.8	1.0	1.2	1.4	1.7	1.4	1.2	1.7
2/7/2011 4:00	0.6	1.1	1.7	1.1	1.6	0.8	1.6	2.8	2.4	1.8	1.1	0.9	0.9	1.2	0.7	1.3	1.2	1.2	1.7
2/7/2011 5:00	0.7	1.2	1.4	1.1	0.6	0.4	1.7	2.7	1.4	2.7	1.2	1.1	1.5	1.4	2.3	1.2	0.7	0.8	2.7
2/7/2011 6:00	0.6	1.1	0.9	1.4	0.9	2.8	1.8	2.4	1.8	1.7	1.0	1.5	1.4	2.3	1.9	1.3	2.5	1.4	3.0
2/7/2011 7:00	2.0	1.1	1.0	1.1	1.8	2.7	1.8	2.7	3.4	1.0	0.7	1.7	1.1	2.0	2.5	1.0	2.5	0.9	2.5
2/7/2011 8:00	3.0	1.2	2.7	1.2	0.4	2.4	1.7	2.1	2.9	0.7	1.8	0.9	1.0	1.3	2.0	0.8	2.1	1.8	1.7
2/7/2011 9:00	4.1	1.1	0.6	1.5	1.0	1.5	1.5	2.3	1.3	0.4	0.6	1.1	1.9	1.7	0.9	0.6	1.7	1.3	2.0
2/7/2011 10:00	2.3	1.3	1.6	1.6	1.0	1.8	2.2	2.5	1.1	2.2	1.5	1.1	2.8	1.1	1.2	0.7	1.9	1.4	2.2
2/7/2011 11:00	3.7	2.3	1.6	2.1	2.1	1.8	2.4	2.8	2.3	1.9	1.4	1.8	1.9	1.7	1.3	2.2	1.9	1.8	1.7
2/7/2011 12:00	1.9	2.7	2.6	2.6	2.9	1.9	2.3	2.0	2.7	2.3	3.0	2.1	3.3	2.4	1.8	2.3	2.0	3.4	2.2
2/7/2011 13:00	3.1	3.3	1.7	2.2	2.4	2.5	2.8	1.7		4.0	1.8	3.9	2.3	3.4	1.5	1.5	2.1	2.6	2.1
2/7/2011 14:00	3.4	1.8	1.7	3.1	3.8	2.5	2.6	2.0		1.1	1.7	3.1	3.1	1.9	1.8	2.0	2.9	1.3	1.8
2/7/2011 15:00	1.7	1.6	2.8	1.9	2.3	3.7	2.9	3.4	3.7	1.6	2.2	1.8	2.0	1.1	1.3	1.8	3.2	6.4	1.7
2/7/2011 16:00	3.8	2.9	2.4	1.1	0.9	3.0	3.0	9.2	1.5	2.7	2.0	2.2	1.7	2.4	1.7	2.5	2.6	7.0	1.7
2/7/2011 17:00	3.2	2.1	1.7	0.8	1.1	2.0	2.0	11.2	1.8	1.8	1.1	1.7	0.9	1.9	8.6	4.5	1.8	6.5	1.5
2/7/2011 18:00	1.8	1.2	1.3	0.8	1.3	1.6	1.8	8.4	1.7	2.1	1.6	2.0	1.2	2.1	6.6	2.9	1.4	4.5	2.2
2/7/2011 19:00	1.7	2.5	4.4	0.9	1.3	3.1	1.8	7.1	1.5	2.7	1.3	2.3	1.2	2.2	6.8	1.9	2.1	5.9	2.4
2/7/2011 20:00	1.9	3.1	4.9	1.9	2.4	3.2	2.1	3.4	2.3	4.0	2.8	2.4	2.3	2.3	7.5	1.7	2.7	5.9	4.0
2/7/2011 21:00	1.8	2.2	5.6	1.8	1.9	5.3	2.5	7.1	2.0	3.0	2.4	2.2	1.4	1.9	10.4	4.4	3.6	4.4	4.6
2/7/2011 22:00	3.0	1.8	2.1	2.0	1.9	2.7	2.9	11.7	2.4	2.4	2.6	2.9	2.9	2.2	14.4	7.5	2.7	3.9	5.1
2/7/2011 23:00	8.8	3.4	3.0	2.2	4.1	7.7	3.4	9.9	3.1	2.1	2.1	2.1	3.2	2.9	16.1	8.7	3.9	4.3	9.3
2/8/2011 0:00	7.6	4.2	3.7	7.5	6.8	14.8	4.4	5.3	9.3	4.1	8.2	6.6	11.1	4.5	13.2	8.6	9.5	4.0	13.2
2/8/2011 1:00	10.3	6.7	10.5	11.7	14.4	12.3	6.4	3.7	13.3	8.6	15.8	14.4	20.2	13.4	11.2	8.5	8.2	2.7	17.3
2/8/2011 2:00	10.8	16.9	11.9	10.9	11.8	11.1	6.6	3.8	12.8	13.1	14.0	7.5	17.4	13.4	10.1	8.4	9.0	1.7	17.4
2/8/2011 3:00	11.3	17.1	10.6	9.5	10.3	11.5	3.6	5.3	12.1	15.4	14.0	7.3	14.6	13.8	9.8	8.1	8.4	1.7	18.0
2/8/2011 4:00	7.3	16.3	9.7	8.8	7.7	10.5	1.5	4.8	10.2	15.9	13.8	13.8	13.0	14.4	11.6	7.0	7.4	1.5	15.9
2/8/2011 5:00	6.8	14.3	9.2	8.9	6.8	9.8	1.1	3.7	9.5	13.7	14.1	13.4	12.6	12.7	7.5	4.9	7.0	1.9	13.6
2/8/2011 6:00	7.1	14.3	8.3	8.3	6.4	8.4	1.5	2.0	9.2	14.1	12.9	15.7	11.2	12.8	7.1	4.6	6.3	1.1	11.5
2/8/2011 7:00	6.3	12.9	8.0	7.3	6.7	8.1	2.2	1.8	8.6	14.2	12.2	12.4	10.6	11.6	7.6	2.1	6.1	1.4	10.3
2/8/2011 8:00	7.7	11.7	8.5	7.2	7.2	8.0	1.5	1.3	8.8	13.3	11.0	13.5	10.4	11.6	7.9	3.3	6.3	1.3	10.2
2/8/2011 9:00	9.5	12.7	10.3	9.6	9.3	8.8	1.2	2.5	9.7	12.7	11.5	13.7	12.7	11.2	9.1	4.6	6.7	1.8	10.2
2/8/2011 10:00	10.2	12.3	9.6	9.6	10.0	9.5	1.3	2.6	10.1	10.7	11.4	13.6	12.6	11.0	10.0	5.8	7.2	2.9	9.7
2/8/2011 11:00	9.8	12.3	8.7	8.9	9.3	9.7	2.1	1.6	9.8	10.1	10.9	12.6	11.2	10.3	8.7	5.1	7.0	3.0	8.8
2/8/2011 12:00	8.9	11.4	8.6	8.3	8.7	8.6	1.9	3.1	8.8	10.0	9.6	11.8	10.5	10.3	6.8	5.1	6.7	2.9	9.7
2/8/2011 13:00	7.7	10.4	7.9	7.8	8.3	7.8	2.3	2.1	8.9	9.4	8.1	9.7	9.1	8.9	5.8	4.7	5.8	2.9	9.2
2/8/2011 14:00	7.0	8.5	7.0	7.6	8.2	7.1	2.6	3.4	7.8	7.7	7.2	8.5	8.4	7.3	6.3	4.4	5.6	3.0	8.4
2/8/2011 15:00	6.6	7.4	7.0	7.5	7.5	7.3	2.3	4.0	7.7	6.7	6.4	6.6	8.4	6.6	7.3	4.3	5.4	2.7	8.5
2/8/2011 16:00	6.5	6.6	6.8	6.8	7.0	7.1	1.9	3.2	7.0	6.2	6.5	7.7	7.9	6.3	6.9	3.8	5.3	3.2	7.7
2/8/2011 17:00	6.1	6.1	5.7	6.5	7.4	6.2	1.9	5.7	6.6	4.5	5.6	5.9	7.2	5.3	8.0	4.3	4.4	3.2	5.9
2/8/2011 18:00	4.1	5.7	5.2	6.8	4.0	6.3	1.3	5.7	4.8	2.1	5.8	5.8	6.4	4.2	6.7	4.2	4.4	2.8	4.8
2/8/2011 19:00	3.8	6.9	4.7	7.4	3.4	5.5	1.0	5.3	4.9	4.8	4.8	5.4	6.5	5.0	6.2	3.2	4.3	1.9	8.0
2/8/2011 20:00	4.5	7.2	4.6	7.7	4.6	7.2	0.7	4.6	6.7	6.0	7.0	6.7	7.2	6.6	8.0	2.5	5.5	1.9	8.0
2/8/2011 21:00	5.0	8.9	5.9	6.4	6.3	6.9	1.1	3.8	8.1	7.6	9.0	9.5	8.5	7.4	7.8	1.6	6.7	1.0	8.0
2/8/2011 22:00	6.7	10.6	8.8	6.8	8.9	6.5	0.5	2.3	8.7	8.7	10.4	10.8	11.6	8.6	7.0	2.4	6.4	1.1	7.2
2/8/2011 23:00	7.2	10.4	8.6	7.3	8.9	7.0	1.5	2.2	9.1	9.9	12.1	12.0	12.1	9.0	4.4	1.7	4.8	1.1	6.9
2/9/2011 0:00	6.5	8.8	4.0	6.6	8.4	6.0	0.9	1.5	8.5	9.4	10.9	11.1	11.1	7.2	3.1	0.8	4.9	0.8	5.9

Table 2. Hourly average wind direction data for February 2, 2011 event.

	Meteorological Sites, Wind Direction (degrees)																	
Hour End	Coso Junction TEOM	Dirty Socks TEOM	Flat Rock TEOM	Keeler MET	Lizard Tail TEOM	Lone Pine MET	Mammoth FDMS	Mono Shore TEOM	North Beach TEOM	Olancha 3 TEOM	Shell Cut TEOM	Stanley TEOM	T-23 TEOM	T-4 TEOM	WMRS-OVL FDMS	Bishop Tribe	Lone Pine Tribe	Independence Tribe
2/7/2011 1:00	182	173	134	88	111	311	266	40	1	161	208	213	166	179	9	328	338	307
2/7/2011 2:00	269	146	105	104	114	301	269	52	40	169	142	202	106	237	356	309	335	309
2/7/2011 3:00	357	139	130	24	160	194	263	29	311	170	158	188	105	135	93	282	249	342
2/7/2011 4:00	314	153	141	353	24	181	269	49	0	177	231	34	337	155	323	271	323	307
2/7/2011 5:00	297	217	152	117	76	254	285	34	354	171	180	217	153	204	19	330	141	318
2/7/2011 6:00	239	159	218	333	214	319	286	38	343	186	111	285	312	190	344	260	352	343
2/7/2011 7:00	346	48	110	109	358	320	285	41	329	323	97	24	101	27	35	299	353	338
2/7/2011 8:00	325	248	166	120	62	334	275	39	345	326	216	338	169	246	336	333	358	328
2/7/2011 9:00	346	157	148	137	192	313	246	217	29	127	211	173	146	158	353	286	3	352
2/7/2011 10:00	357	359	261	232	192	356	238	18	56	17	347	78	272	290	41	339	15	6
2/7/2011 11:00	345	40	217	177	162	136	225	172	148	33	354	95	152	84	311	296	154	83
2/7/2011 12:00	223	352	291	256	198	181	220	231	239	15	341	57	275	329	28	30	180	12
2/7/2011 13:00	349	59	284	282	296	35	220	266		31	34	53	346	40	324	56	37	47
2/7/2011 14:00	335	177	227	175	169	145	213	233		31	164	145	163	165	222	161	155	117
2/7/2011 15:00	174	323	279	235	190	162	235	218	189	181	309	112	236	246	245	305	186	150
2/7/2011 16:00	169	35	314	238	149	134	248	290	122	27	343	38	321	6	305	329	153	92
2/7/2011 17:00	194	25	261	239	200	173	231	280	209	343	16	70	218	49	340	341	184	2
2/7/2011 18:00	231	58	83	36	354	232	240	289	342	205	81	311	68	337	5	354	277	205
2/7/2011 19:00	36	178	146	71	132	168	231	292	195	211	185	221	178	179	349	290	201	198
2/7/2011 20:00	342	154	140	92	119	168	239	347	152	166	140	171	148	154	4	272	176	141
2/7/2011 21:00	228	150	149	24	152	162	264	7	91	199	148	316	272	189	12	348	181	320
2/7/2011 22:00	315	78	121	355	107	147	239	7	180	356	122	2	324	42	0	3	160	333
2/7/2011 23:00	284	198	137	120	213	357	233	4	180	278	217	237	196	203	347	357	9	351
2/8/2011 0:00	276	339	23	304	298	345	326	17	312	69	328	354	303	336	341	350	353	355
2/8/2011 1:00	337	30	330	316	300	330	340	20	311	30	347	355	312	342	337	349	330	356
2/8/2011 2:00	330	12	327	320	315	312	337	17	319	55	346	227	320	348	342	350	321	357
2/8/2011 3:00	328	14	329	320	319	313	325	10	326	36	348	288	325	359	350	344	329	351
2/8/2011 4:00	326	4	323	315	318	317	278	5	323	19	344	6	321	358	348	354	331	350
2/8/2011 5:00	327	6	322	314	322	312	265	4	324	16	343	13	322	358	357	352	328	354
2/8/2011 6:00	331	4	319	311	322	312	334	22	326	17	344	9	321	359	2	334	327	353
2/8/2011 7:00	331	10	321	314	325	308	334	38	329	20	346	8	326	0	2	348	323	351
2/8/2011 8:00	346	12	321	315	321	316	337	51	330	15	351	14	330	353	15	32	328	342
2/8/2011 9:00	358	6	322	319	324	332	7	30	336	16	348	17	326	354	18	29	342	347
2/8/2011 10:00	345	11	328	321	324	330	146	26	341	16	351	15	330	359	7	23	343	358
2/8/2011 11:00	343	11	328	321	326	334	27	224	340	14	349	22	328	0	358	15	353	0
2/8/2011 12:00	349	13	320	314	325	328	20	202	334	14	347	25	326	3	1	17	355	2
2/8/2011 13:00	349	9	316	318	325	327	46	222	336	15	345	24	330	2	359	16	347	1
2/8/2011 14:00	350	18	317	315	319	323	23	238	334	23	347	30	327	12	356	355	348	357
2/8/2011 15:00	345	18	320	315	322	330	12	234	338	20	342	27	326	13	356	6	343	357
2/8/2011 16:00	351	16	324	315	316	324	11	309	334	22	355	19	330	4	358	349	335	347
2/8/2011 17:00	351	12	331	338	316	321	2	10	328	16	353	11	333	3	353	7	335	338
2/8/2011 18:00	324	28	1	14	336	311	359	24	329	18	10	0	353	7	352	7	332	342
2/8/2011 19:00	316	23	7	16	335	319	46	39	335	28	5	9	2	17	359	351	336	340
2/8/2011 20:00	315	14	8	18	331	322	346	58	327	22	347	359	343	11	357	307	342	348
2/8/2011 21:00	315	13	324	12	320	330	314	54	326	23	343	8	320	1	356	332	348	360
2/8/2011 22:00	325	10	323	317	312	334	34	44	326	19	343	13	321	359	2	346	345	357
2/8/2011 23:00	325	16	321	317	315	339	327	21	329	27	342	20	321	14	344	323	354	3
2/9/2011 0:00	331	22	351	316	316	342	317	17	325	28	344	21	321	11	344	266	356	349

ENVIRON

April 22, 2011

MEMORANDUM

To: Duane Ono – Great Basin Unified APCD

From: Ken Richmond - ENVIRON

Subject: CALPUFF Simulations of the February 8, 2011 Dust Event
Assessment of Owens Lake Dust Source Contributions to PM_{10} Concentrations in the Coso Junction PM_{10} Attainment Area

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1 Introduction

ENVIRON conducted CALPUFF simulations to assess PM_{10} concentrations within the Coso Junction Attainment Area (CJAA) during a dust event on February 8, 2011. During this event the 24-hour PM_{10} concentration observed at the Coso Junction monitoring site was 205 µg/m^3. This observation exceeds the 150 µg/m^3 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS). The objective of the current analysis was to simulate Owens Lake windblown dust sources and estimate their contribution to the Coso Junction observation. The analysis supports a broader investigation into whether required dust control measures were properly implemented as directed by the CJAA State Implementation Plan (SIP). The remainder of this memorandum describes the dispersion modeling techniques and presents the results of the analysis.

2 Dispersion Modeling Methods

Dispersion model simulations were performed with the regulatory Version 5.8 of the CALPUFF modeling system following the techniques of the attainment demonstration in the 2010 CJAA SIP. These techniques are an extension of the same methods used by the Owens Lake Dust ID Program summarized in the 2003 and 2008 Owen Valley SIPs. The data collected by the Owens Lake Dust ID Program include surface meteorological data, upper air meteorological soundings, source area delineations, and horizontal sand flux observations. Sand flux measurements are used as the basis for PM_{10} emission rates from windblown sources on Owens dry lakebed. Some of the features of the Coso Junction CALPUFF model simulation were:

- The model simulation period was February 8, 2011 using preliminary data available from the Owens Lake Dust ID Program. These near real-time data are summarized daily on the Owens Lake Yesterday (OLY) website and are used for planning and diagnostic purposes.[1] The OLY summary for February 8, 2011 (prepared on February 9, 2011) is shown in Figure 1. Missing data shown in the figure due to telemetry problems were replaced by the data obtained from the monthly downloads of each site's data logger. Not

[1] The Owens Lake Yesterday data can be accessed at http://www.gbuapcd.org/owenslake/yesterday/

all the data have undergone the full quality assurance reviews/audits performed quarterly and semi-annually by the District. However these data are the best available to meet the statutory timeframe required for the current analysis.

- The modeling domain used in this analysis and in the 2010 CJAA SIP is depicted in Figure 2. The study domain is 36 km-by-67 km and is an extension of the 34 km-by-48 km Owens Valley domain used in the Owens Lake Dust ID Program. Figure 2 also shows the PM_{10} monitoring sites, meteorological monitoring sites and the common boundary of the southern Owens Valley and northern Coso Junction PM_{10} Planning Areas

- Data collected at two additional surface meteorological stations in the southern portions of the domain were used to construct the hourly wind fields for the February 8, 2011 simulation.

- PM_{10} concentration predictions were obtained at 90 receptors placed along the southern Owens Valley PM_{10} Planning Area boundary. The receptor interval shown in Figure 2 is 300-600 m. Receptors were also placed along a horizontal 500-m mesh size grid to examine the spatial extent of predicted plumes from Owens Lake dust sources. A receptor was also placed at the Coso Junction site.

- Dust source activity was characterized using hourly Sensit sand motion data from the network shown in Figure 3. Figure 1 summarizes the dust source activity on February 8, 2011, where 149 Sensits detected sand motion during the day.

- The source area delineations in the current simulation for each Sensit were the defaults assigned for the OLY simulations. Following procedures used by OLY and Owens Lake Dust ID Program, the 149 irregular shaped source areas were divided into 2,322 125 m-by-125 m square area sources for simulation by the CALPUFF modeling system.

- Area source PM_{10} emission fluxes were calculated from the hourly Sensit sand motion data using the default proportionality constants (K-factors) from the 2003 and 2008 Owen Valley SIPs. The February 8, 2011 simulation used the December to April seasonal default K-factors shown in Table 1.

- As in the 2003 and 2008 Owens Valley SIP attainment demonstrations, and the 2010 CJAA SIP, the current simulation only includes windblown emissions from sources on the lakebed and the Keeler Dunes. In order to account for background and miscellaneous sources, model predictions were added to a background concentration of 20 $\mu g/m^3$. This same background concentration is also included in the modeling for the Owens Valley SIPs and 2010 CJAA SIP.

The next section describes the results of the simulations using the methods above applied to the February 8, 2001 dust event.

Table 1: Owens Valley SIP Seasonal K-Factors

General Source Area [1]	K-Factor (x 10^{-5})	
	May to November	December to April
North	1.5	3.9
Keeler Dunes	6.0	7.4
Central	6.9	12.0
South	1.9	4.0
Other [2]	5.0	5.0

1. The General Source Areas are defined in the 2003 and 2008 Owens Valley PM10 SIPs
2. The "other" source refers to Sensit locations outside the General Source Areas. In the current simulation the only Sensit classified as "other" is Sensit 9810 near the Flat Rock monitoring site.

3 Dispersion Modeling Results and Discussions

The dispersion modeling methods described in the previous section were used to simulate the February 8, 2011 dust event. The event was characterized by persistent northerly winds that transported dust plumes from Owens Lake toward Coso Junction. The majority of the Owens Lake source activity occurred during the first few hours of the morning, but some activity was detected for every hour of the event. In addition to windblown dust from Owens Lake source areas, sources upwind of Owens Lake appear to have contributed to regional PM_{10} concentrations. As shown in Figure 1, observed PM_{10} concentrations at Lone Pine, North Beach and Lizard Tail also exceeded 150 µg/m^3. Observed concentrations were considerably higher downwind of the Owens Lake source areas with a 24-hour concentration of 771 µg/m^3 at the Dirty Socks monitoring site.

Figure 4 shows the CALPUFF predicted 24-hour PM_{10} concentrations throughout the model domain with the added background concentration of 20 µg/m^3. The model predicts the observed enhanced PM_{10} concentrations at Dirty Socks, Olancha, and Keeler sites, and to a lesser extent higher concentrations at the Shell Cut, Flat Rock, and Stanley sites. The highest predictions follow the valley floor with the plumes passing just west of the Coso Junction monitoring site. Secondary plumes are predicted to be diverted by the higher portions of the Coso range and pass well east of the Coso Junction site.

Figure 5 shows the maximum 24-hour predictions at the northern boundary of the Coso Junction PM_{10} Planning Area and at the Coso Junction monitoring site. The highest predicted concentration at the Coso Junction site and on the boundary between the two planning areas are 85 μg/m^3 and 210 μg/m^3, respectively. On February 8, 2011 the observed concentration at Coso Junction was 205 μg/m^3.

The model under predicts the observed concentration at the Coso Junction monitoring site. Figure 6 shows a plot of the hourly time series comparing predicted to observed concentrations at the Coso Junction site. The plot also shows the maximum hourly predictions at the boundary. The observations are bounded by the predictions at the actual site and those at the southern boundary. Examination of Figure 4 and Figure 6 shows observed concentrations at the Coso Junction could be explained by concentrations predicted for plumes travelling just west of the actual site. We hypothesize that small errors in plume trajectories influenced by the absence of meteorological data between Olancha and Coso Junction may have accounted to differences between predictions and observations.

The assumed background concentration of 20 μg/m^3 may also be too low for this event. Twenty-four hour concentrations upwind concentrations of the Owens Lake sources were about 160 μg/m^3 on February 8, 2011. If this background concentration also represents conditions at Coso Junction, the model prediction at Coso Junction would be 225 μg/m^3, somewhat closer to the observed concentration of 205 μg/m^3.

Figures

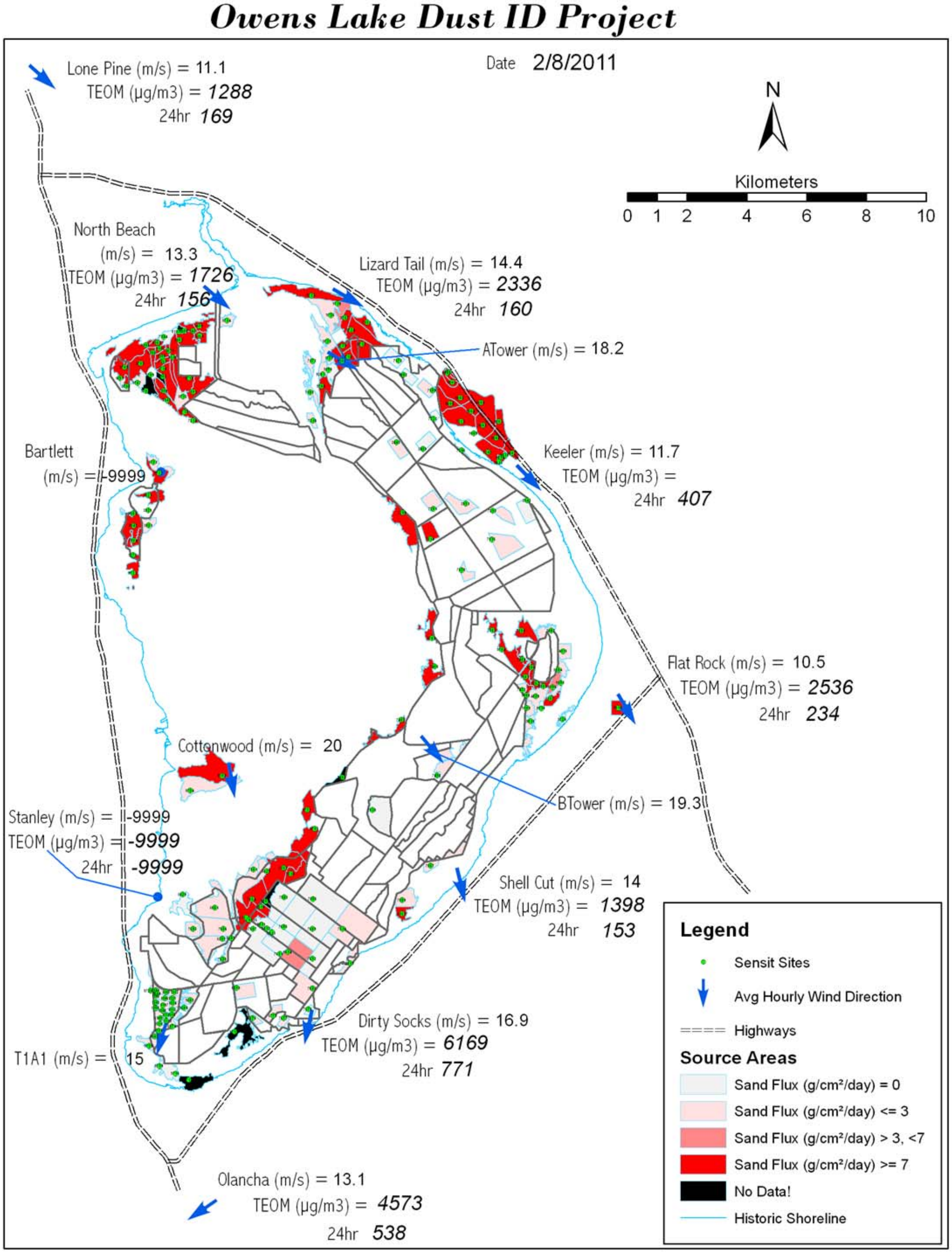

Figure 1: Owens Lake Yesterday Daily Summary of February 8, 2011.

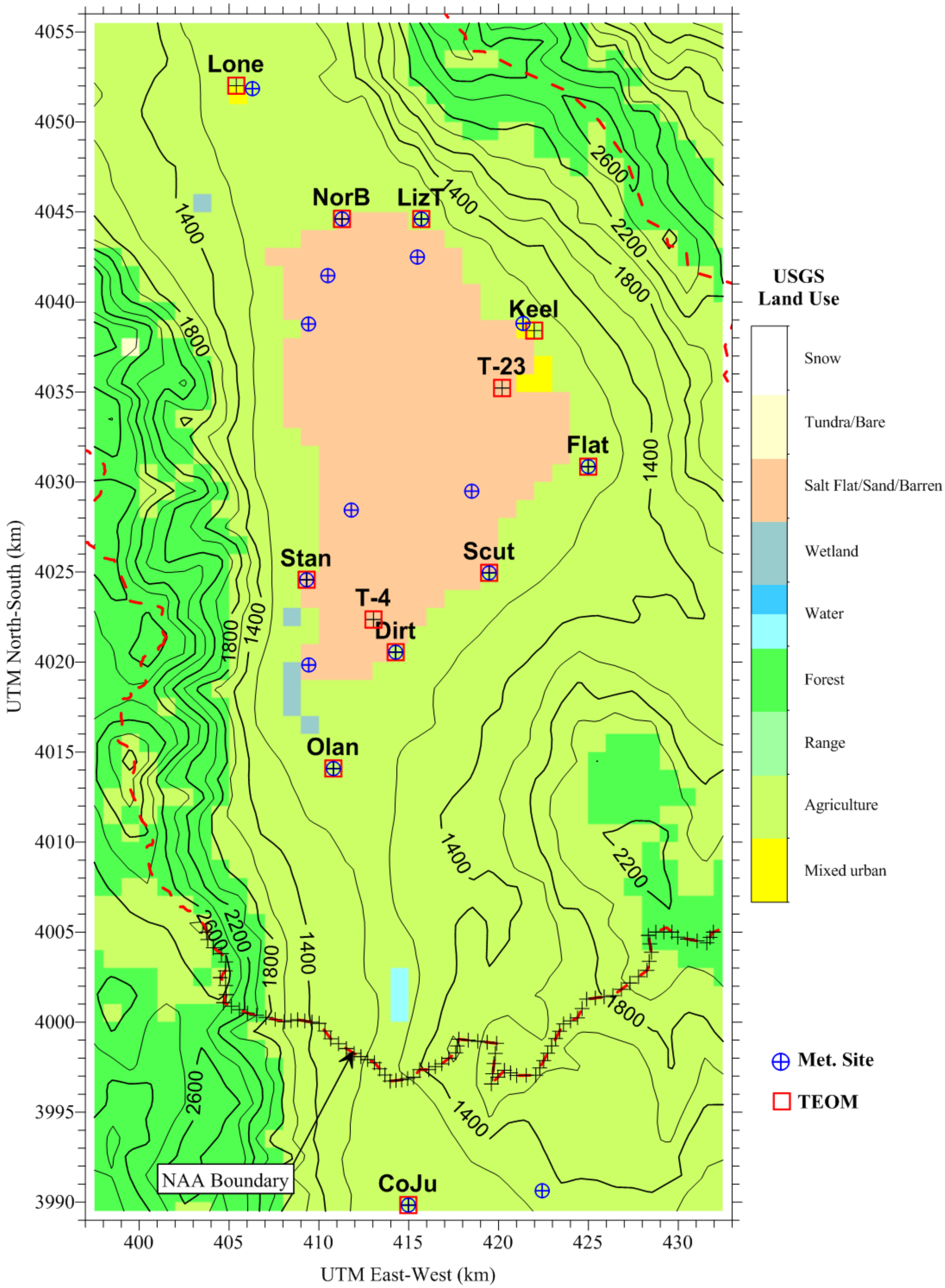

Figure 2: Dispersion Modeling Domain, Monitoring Stations, 1-km Mesh Size Land Use (USGS Categories) and Terrain Elevations (Contours in Meters)

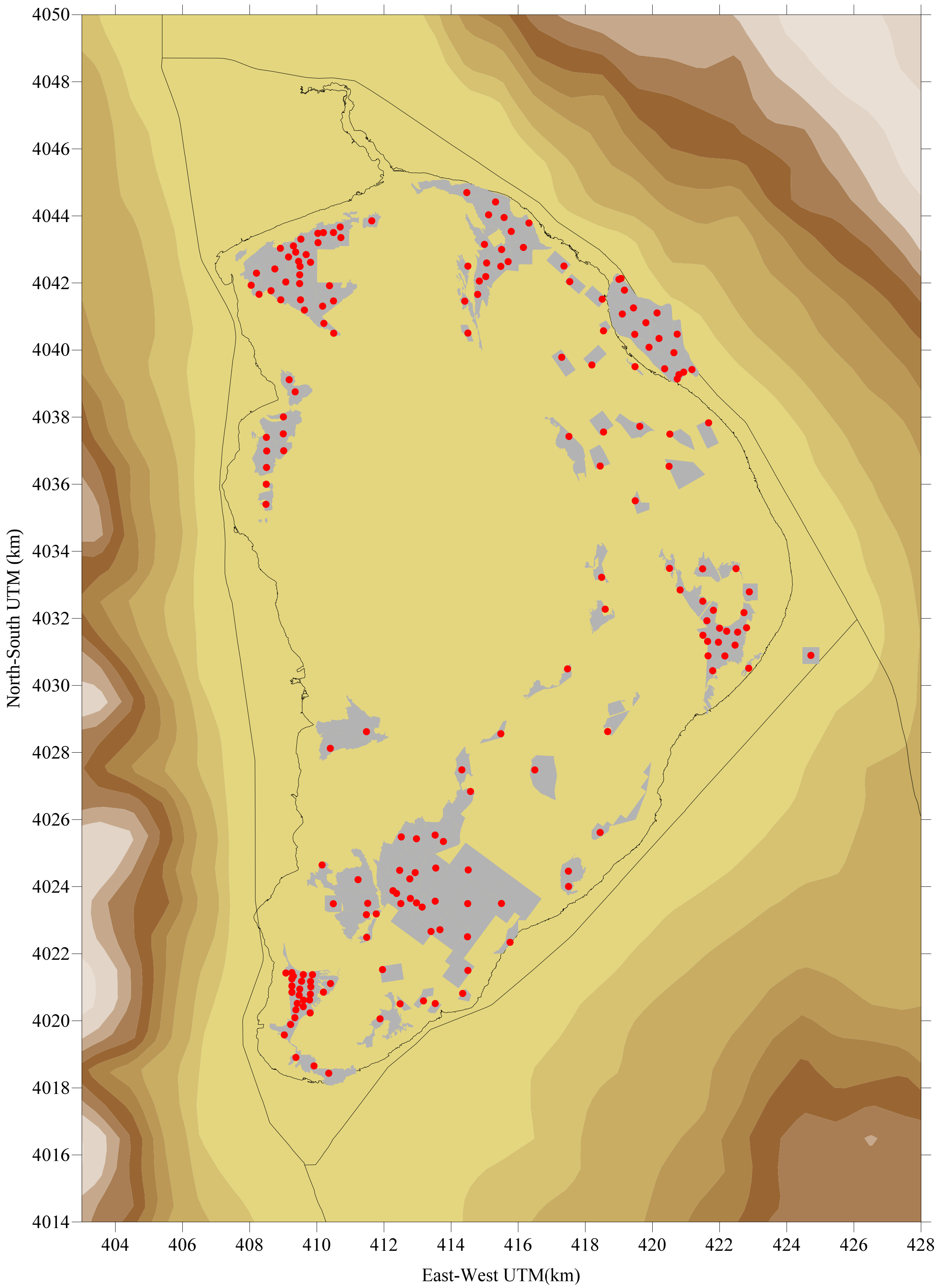

Figure 3: Source Areas and Sensit Locations

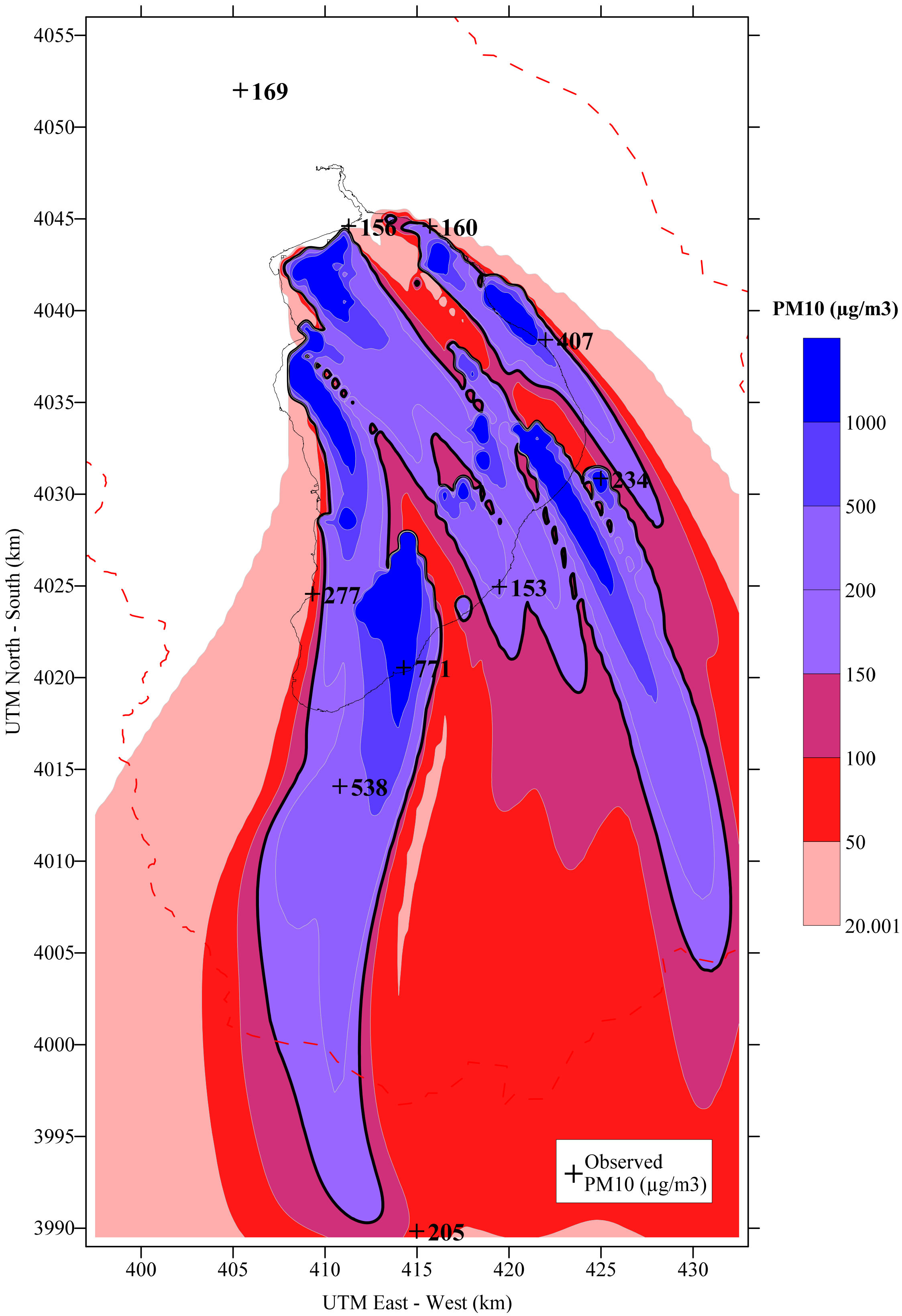

Figure 4: Predicted 24-Hour PM_{10} (µg/m^3) on February 8, 2011, RSIP Default K-Factors, Background of 20 µg/m^3

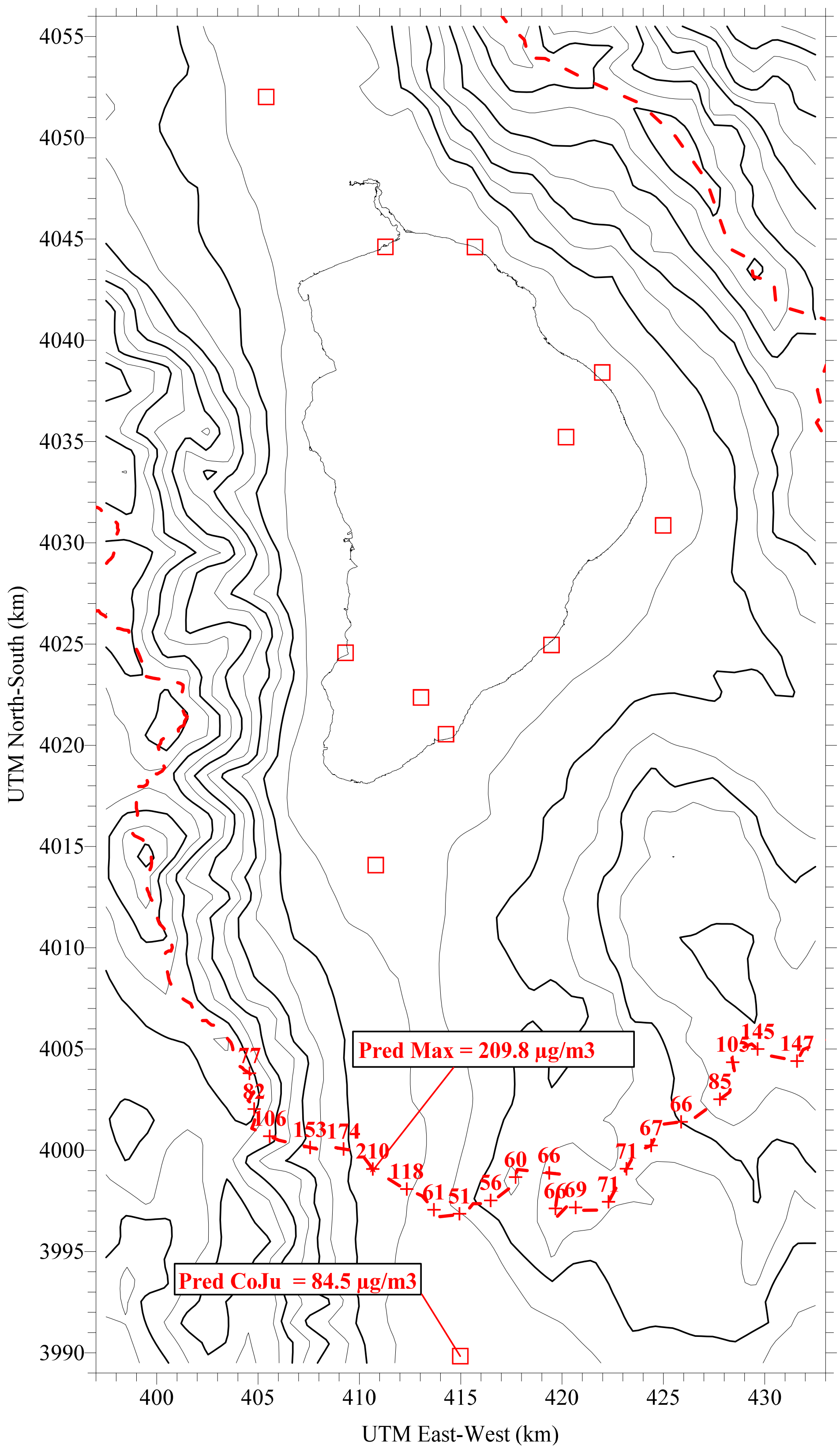

Figure 5: Predicted 24-hour PM_{10} (µg/m3), Receptors at Southern Limit of Owens Valley Planning Area, February 8, 2011, Every 4th Prediction Plotted

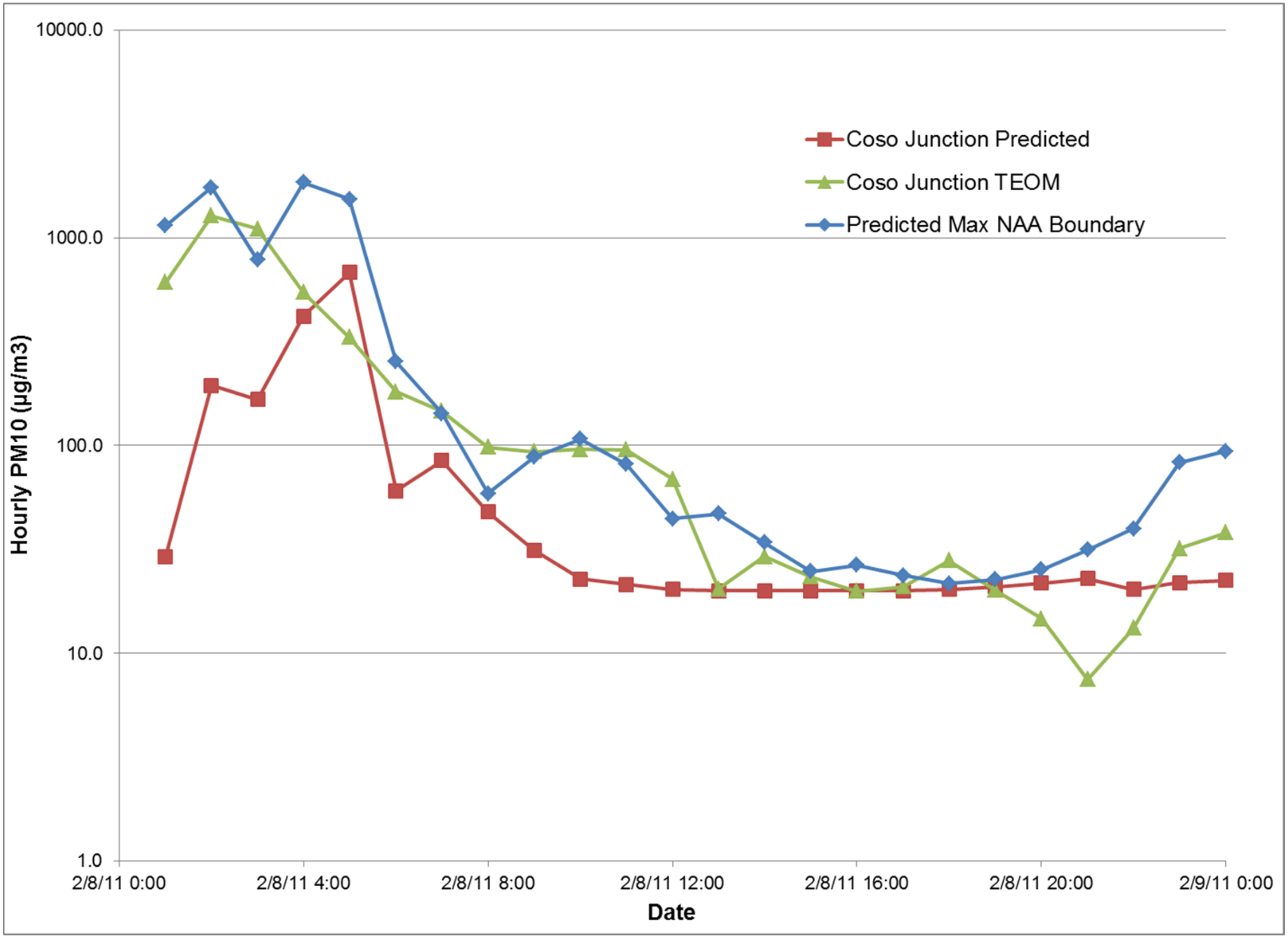

Figure 6: Predicted vs. Observed Hourly PM_{10} for February 8, 2011