2010 PM10 Maintenance Plan and Redesignation Request for the Coso Junction Planning Area

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EXECUTIVE SUMMARY

This document is a revision to the 2004 PM10 State Implementation Plan (SIP) for the Coso Junction PM10 Planning Area. It includes 1) a request to redesignate the area from nonattainment for the National Ambient Air Quality Standard for PM10 (federal standard) to attainment based on monitoring data and a modeling analysis, and 2) a maintenance plan that contains requirements to ensure the federal PM10 standard will not be violated in the future. As required to redesignate the area to attainment, the enclosed monitoring data and modeling analysis show the Coso Junction Planning Area (CJPA) had less than or equal to 1.0 average annual exceedances of the federal PM10 standard (150 $\mu g/m^3$ for a 24-hour average) during the 3-year period from January 2007 through December 2009.

The 2004 State Implementation Plan for the Coso Junction Planning Area examined the PM10 problem during the period from 1985 to 2003. During that period, 15 violations of the federal 24-hour PM10 standard were monitored at the Coso Junction rest area on Highway US 395. Thirteen of those violations were found to have been caused by windblown dust from the dry lake bed of Owens Lake that is 14 miles outside (to the north) of the Coso Junction Planning Area. In November 2004, the District adopted a SIP for the CJPA to explain how the area would be brought into attainment. Since PM10 violations at Coso Junction were primarily caused by windblown dust from Owens Lake, the Coso Junction attainment demonstration relied on implementing dust controls outside of the planning area. Under the 2003 Owens Valley PM10 SIP, windblown dust from 29.8 square miles of the dry lake bed at Owens Lake were required to be controlled by December 2006. A dispersion modeling analysis showed these dust mitigation efforts would be adequate to bring the Coso Junction Planning Area into attainment.

A review of daily ambient monitoring data from Coso Junction showed three monitored exceedances of the federal 24-hour PM10 standard (150 micrograms per cubic meter, $\mu g/m^3$) during the 3-year period from January 2007 through December 2009. The federal 24-hour PM10 standard allows no more than an average of 1.0 expected exceedances per year over a 3-year period. Since daily PM10 monitor data showed the monitor site had an average of 1.0 exceedances per year, PM10 levels near the monitor site can be considered to be in attainment with the federal standard.

A closer examination of the three exceedances found that two exceedances in 2007 (6/5/2007, 217 $\mu g/m^3$; 12/6/2007, 283 $\mu g/m^3$) were caused by windblown dust from an unpaved truck parking area west of the PM10 monitor site. The owner of the unpaved parking area was notified and the area was graveled in 2008 and surfaced with asphalt in 2009 to control fugitive dust. The third monitored exceedance (12/22/2009, 168 $\mu g/m^3$) was caused by windblown dust from Owens Lake. During that event, dust source areas at Owens Lake that were not previously identified in the 2003 Owens Valley SIP contributed to the exceedance at Coso Junction. A revision to the Owens Valley SIP in 2008 included the majority of these dust source areas as part of an additional 9.8 square miles of the lake bed that was controlled using shallow flooding in

April 2010. Another 3.5 square miles of the lake bed are expected to be controlled by October 2010. Therefore, dust control measures were implemented to mitigate the causes of dust for all three PM10 exceedances at Coso Junction that took place during the 3-year attainment demonstration period.

Although daily PM10 monitor data collected at the Coso Junction rest area showed the area could be considered to be in attainment with the federal standard, higher PM10 levels are likely to have occurred at locations closer to Owens Lake, since this is the primary source of windblown dust that caused Coso Junction to be designated nonattainment. The monitor site at the Coso Junction rest area is about 18 miles south of Owens Lake, while the northern boundary of the CJPA is closer at 14 miles from Owens Lake. To determine if windblown dust from Owens Lake caused PM10 violations at the northern boundary or at other locations in the CJPA, a dispersion model was run to analyze windblown dust impacts for the 3-year period from July 2006 through June 2009.

To evaluate attainment through a modeling analysis, the fourth highest value over a 3-year period must be below 150 $\mu g/m^3$ at all locations. The District used the CALPUFF dispersion model, which is a guideline model recommended by the United States Environmental Protection Agency (US EPA) for long-range transport and situations where complex winds influence dispersion. As expected, the CALPUFF model showed the highest PM10 concentrations were at the northern boundary of the CJPA. The highest site had two days with modeled impacts above 150 $\mu g/m^3$ and a third high concentration of 150 $\mu g/m^3$. Since 150 $\mu g/m^3$ is not an exceedance of the PM10 standard there were only two modeled exceedances at the highest receptor site in the CJPA. The fourth highest modeled value at the same site for the 3-year period was 137 $\mu g/m^3$. Therefore, the CALPUFF model analysis demonstrated it is reasonable to believe that attainment of the standard was achieved at all locations in the planning area.

As a result of our evaluation of monitoring data and a CALPUFF modeling analysis, the District recommends through the adoption of this SIP revision that the California Air Resources Board request the US EPA redesignate the Coso Junction Planning Area from nonattainment to attainment for the federal PM10 standard.

To ensure compliance with the federal PM10 standard is maintained in future years, the District evaluated future activities that could affect PM10 levels in the planning area and the adequacy of existing rules, policies and emission control requirements to control emissions from those sources and activities. District staff found that existing rules for fugitive dust and new source review were adequate to control potential new sources within the Coso Junction Planning Area. For PM10 sources outside the planning area, the major concern is for windblown dust from Owens Lake. District staff believes the control strategy and contingency requirements in the 2008 Owens Valley PM10 SIP are adequate to protect air quality in the Coso Junction area. Therefore, no additional contingency measures will be needed to ensure future compliance with the federal PM10 standard in the Coso Junction Planning Area.

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GLOSSARY

CALPUFF	A USEPA recommended air quality model for long-range transport and situations where complex winds influence dispersion.
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CH&SC	California Health and Safety Code
CJPA	Coso Junction Planning Area
CoGa	Coso Gate model receptor site
CoJu	Coso Junction model receptor site
District	Great Basin Unified Air Pollution Control District
Dust ID Program	Owens Lake Dust Identification Program
Federal Standard	National Ambient Air Quality Standard (PM10 = 150 $\mu g/m^3$ for a 24-hour average)
GBUAPCD	Great Basin Unified Air Pollution Control District
PM10	particulate matter less than 10 microns
PSD	Prevention of Significant Deterioration
SIP	State Implementation Plan
US EPA	United States Environmental Protection Agency
km	kilometers
m/s	meters per second
mph	miles per hour
$\mu g/m^3$	micrograms per cubic meter

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PM10 Maintenance Plan and Redesignation Request for the Coso Junction PM10 Planning Area

1 Planning Area

The Coso Junction PM10 Planning Area (CJPA) is located in Eastern California in the southern portion of Inyo County (Figure 1). It is an arid desert area that receives less than 5 inches of rain per year. The area is rural in nature and sparsely populated. The principle PM10 monitor site is located at the Coso Junction rest area in the Rose Valley. This valley is flanked by the Sierra Nevada and Coso mountain ranges. The China Lake Naval Air Weapons Station, which covers most of the CJPA, is generally restricted from public access.

Air pollution in the Coso Junction Planning Area is dominated by windblown dust transported from Owens Lake, which is located outside the planning area. Air pollution from District permitted facilities within the CJPA boundaries has generally not had a significant impact on PM10 concentrations in the planning area. These sources include the Coso geothermal power operations, military operations at the China Lake Naval Air Weapons Station, and volcanic cinder and pumice mining operations. Although generally not a problem in the planning area, high PM10 readings were documented in 1990 due to windblown dust from abandoned agricultural land, in 2002 from a wildfire, and in 1990 from windblown dust from an unpaved truck parking area. None of these types of events are expected to recur at Coso Junction. The agricultural land just north of the monitor site was stabilized by natural vegetation cover in 1991 after the land was fallowed. Since that time no agricultural activities have taken place in the CJPA. Dust from the unpaved truck parking area, located adjacent to the PM10 monitor site was mitigated by covering it with gravel in 2008 and then asphalt pavement in 2009.

2 Clean Air Act Regulatory History

The Coso Junction Planning Area was initially designated as a PM10 nonattainment area in 1987 along with the Indian Wells Valley and Trona. Together they comprised the Searles Valley PM10 nonattainment area as shown in Figure 2. The Great Basin Unified Air Pollution Control District adopted a State Implementation Plan (SIP) for the Coso Junction portion of the Searles Valley PM10 nonattainment area in November 1991 (GBUAPCD, 1991). This was followed by air quality plans for the Indian Wells Valley and Trona, which were regulated by the Kern County Air Pollution Control District and the Mojave Desert Air Quality Management District (formerly San Bernardino County Air Pollution Control District).

In August 2002, the United States Environmental Protection Agency (US EPA) redesignated the Searles Valley into three separate PM10 nonattainment areas. Under this regulatory action, Coso Junction and the Indian Wells Valley were classified as moderate PM10 nonattainment areas, and a finding of attainment was made for Trona. (Federal Register, 2002a, 2002b) In 2003, Indian Wells Valley was reclassified to attainment with US EPA's approval of the Moderate Area SIP and Maintenance SIP. (Federal Register, 2003a and 2003b) In November 2004, the Great Basin Unified Air Pollution Control District adopted a SIP revision for the Coso Junction PM10 Planning Area that forecast compliance with the federal PM10 standard in 2010.

Figure 1. The Coso Junction Planning Area is located in the southern portion of Inyo County, CA. Much of the planning area is covered by the China Lake Naval Air Weapons Station, which has restricted access for the general public. Most of the PM10 standard exceedances monitored at Coso Junction were caused by windblown dust from the exposed lake bed at Owens Lake.

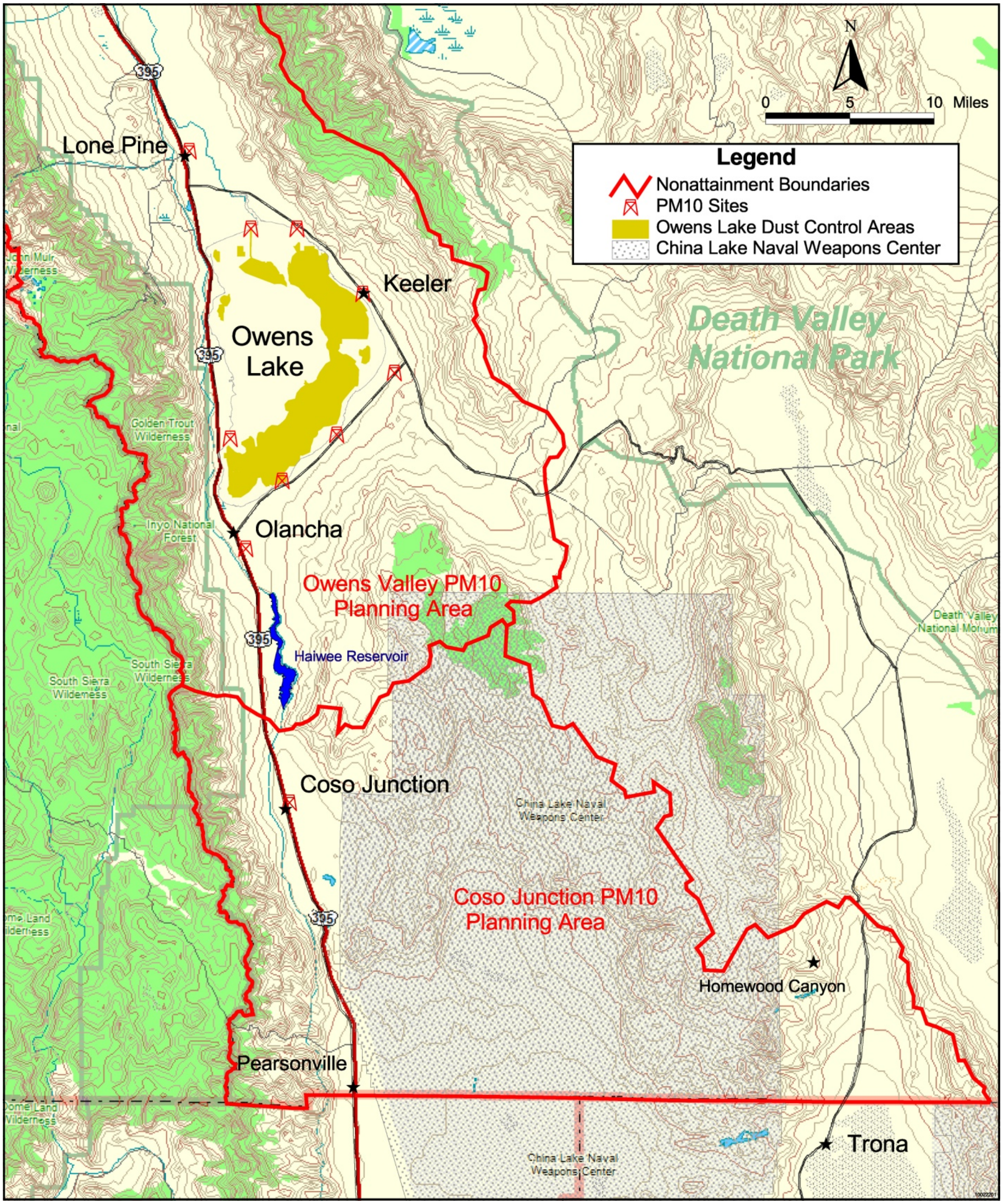
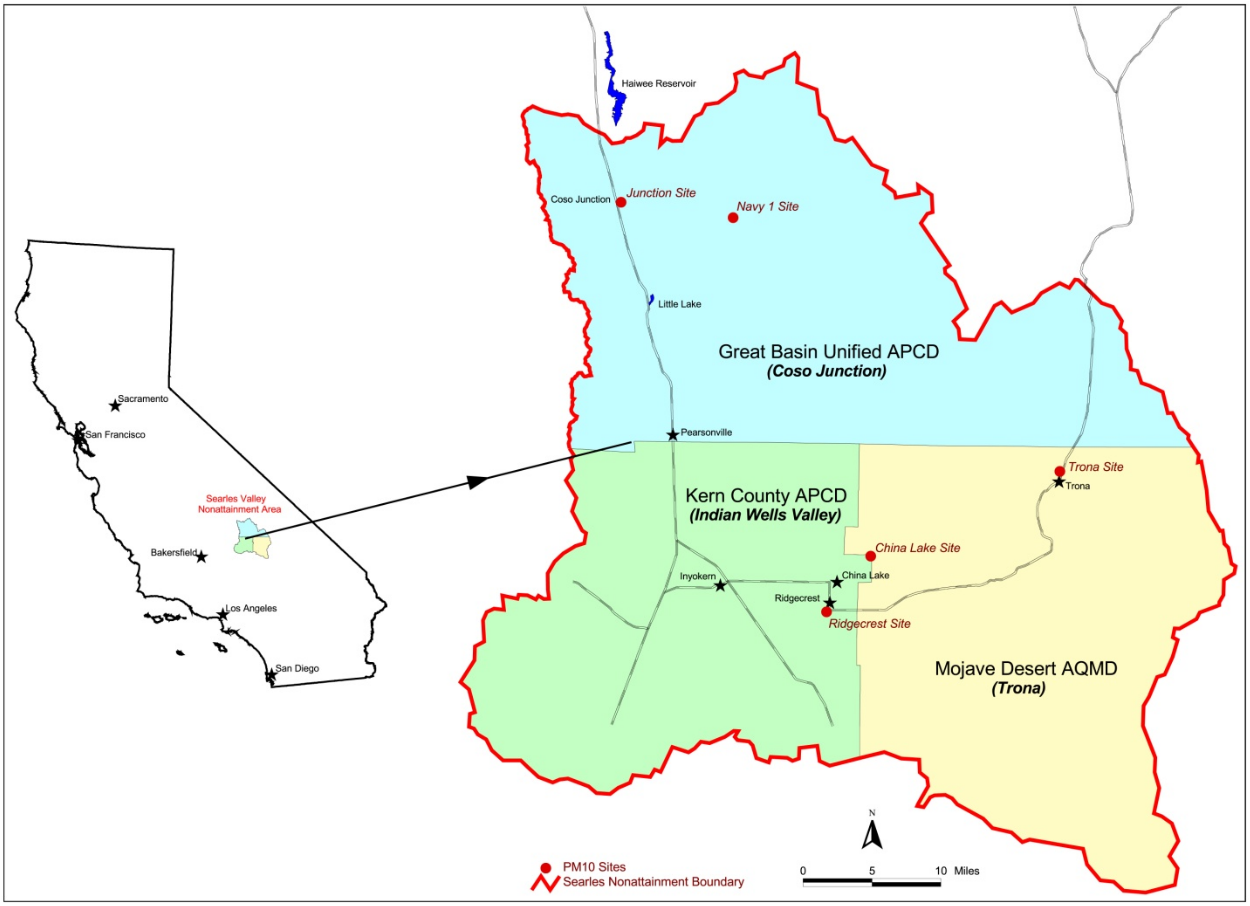


Figure 2. The Searles Valley PM10 Nonattainment Area was reclassified into three separate planning areas in 2002. Indian Wells Valley and Trona were classified attainment for the federal PM10 standard in 2002 and 2003.



The Coso Junction attainment demonstration was based on controlling dust from Owens Lake, which was scheduled to implement dust control measures on 29.8 square miles of the lake bed by December 31, 2006. The 2004 Coso Junction SIP included a CALPUFF dispersion model analysis that indicated that after dust controls were implemented at Owens Lake at the end of 2006, the Coso Junction Area would be in attainment. However, an additional 3 years of data collection and monitoring were needed to demonstrate the CJPA had attained the PM10 standard.

This document is intended to provide the air quality monitoring data and modeling analysis to demonstrate the area has attained the PM10 standard. In addition, it includes regulatory requirements to ensure the CJPA will maintain compliance with the federal PM10 standard in the future.

3 Air Quality

Twenty-two exceedances of the federal 24-hour PM10 standard were monitored at Coso Junction in the 24 years from 1985 to 2009. Eighteen out of 22 of these exceedances were caused by dust from Owens Lake. High northerly winds and high PM10 concentrations near Owens Lake are good indicators for windblown dust to be transported from the exposed lake bed at Owens Lake to the CJPA.

To document the Owens Lake dust impact at Coso Junction and other downwind sites, a special-purpose monitoring network was operated from 1993 to 1996. The monitoring network shown in Figure 3 measured Owens Lake dust impacts at five downwind sites and found exceedances of the standard as far as 50 miles from Owens Lake. PM10 monitors at Coso Junction, Navy I, and Pearsonville are within the CJPA boundaries. Sites north of Coso Junction are in the Owens Valley PM10 planning area and the monitor sites in Ridgecrest and Inyokern are in the Indian Wells PM10 planning area.

Table 1 shows a summary of the PM10 exceedances monitored in the CJPA and the levels measured at other sites in the network. Table 2 shows PM10 concentrations, wind speed and directions in the Owens Lake area for these exceedance days. As previously mentioned, 18 of the 22 exceedances in the CJPA were caused by dust from Owens Lake. The exceptions to this are four events measured at Coso Junction on 4/23/90, 7/25/02, 6/5/07, and 12/6/07.

- The event on 4/23/90 was caused by windblown dust from abandoned agricultural land located upwind from the monitor site. In 1991, this agricultural field naturally re-vegetated after heavy March rains. Since that time, the field has remained covered with volunteer vegetation and has not been observed as a dust source area. (GBUAPCD, 1991)
- The event on 7/25/02 was caused by smoke from the McNally wildfire in the Sierra about 20 miles west of the planning area. About 150,000 acres of mixed conifer, heavy brush and grass burned from July 21 to August 29, 2002. (Wilderness Society, 2003)
- Two events on 6/5/07 and 12/6/07 were caused by windblown dust from an unpaved truck parking area west of the PM10 monitor site. The truck stop owner was notified and the parking area was surfaced with gravel in 2008 and recycled asphalt in 2009.

Table 3 shows the number of monitored exceedances per year, and the expected number of exceedances per year based on the monitoring frequency. Prior to 2006, samples were normally collected on a once every sixth-day, or once every third-day schedule. In 2006, daily PM10 monitoring was initiated at Coso Junction. Table 3 also includes the 3-year annual average PM10 concentrations for Coso Junction, which in 2009 was 19 $\mu g/m^3$. However, it should be noted that the US EPA revoked the annual PM10 standard in 2006, which at the time was set at 50 $\mu g/m^3$. A complete list of PM10 monitor data for Coso Junction and other nearby sites is included in Appendix A, and hourly data for the 22 exceedances is summarized in Appendix B.

Figure 3. PM10 monitor locations in and near the Coso Junction Planning Area.

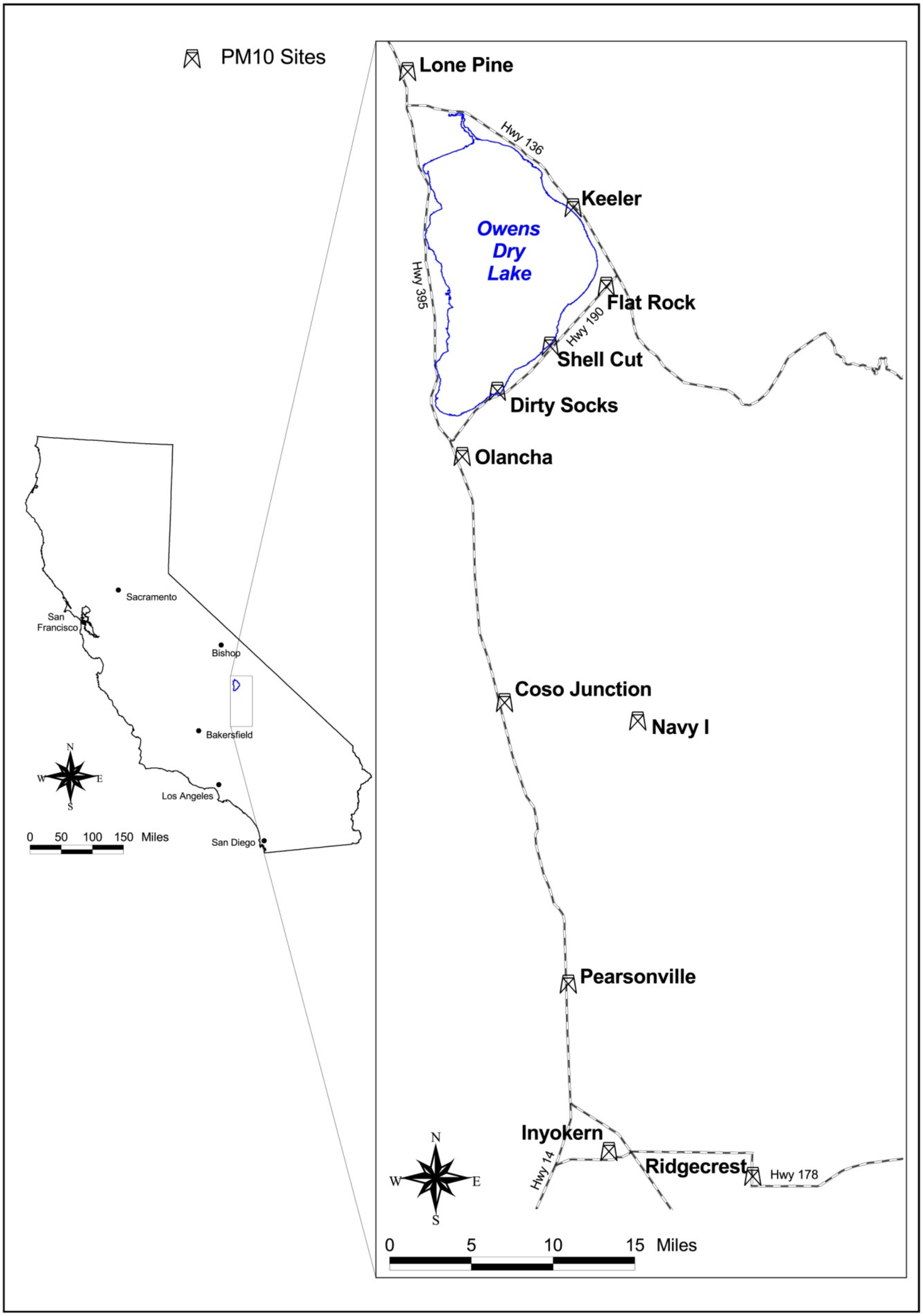


Table 1. Summary of PM10 exceedances monitored over 150 µg/m^3 in the Coso Junction Planning Area and concentrations at other sites on the same day. See Table 2 for causes of exceedances in the CJPA for the dates shown below and Appendix B for hourly meteorological data for these events.

	24-Hour Average PM-10 Concentrations (µg/m^3)										
	Coso Junction Planning Area			Indian Wells Valley		Owens Valley Planning Area					
Exceedance Date	Coso Junction	Navy	Pearson-ville	Ridge-crest	Inyo-kern	Keeler	Olancha	Lone Pine	Dirty Socks	Flat Rock	Shell Cut
4/25/1985	**307**							92			
4/2/1986	**1175**							95			
6/7/1986	**157**							44			
1/15/1987	**196**					100		25			
2/3/1989	**227**	101				**1861**		126			
4/23/1990	**866**	94					**200**				
10/26/1993	**254**		131	16	59	112	**346**				
12/23/1993	**188**		50	18	9	**412**	**185**	58			
1/5/1994	**388**		**239**	75		**199**	**365**	76			
4/8/1995	**692**		**392**	**235**		**158**	128	107			
4/9/1995		**567**				**331**	**2252**	52			
4/21/1995	**337**	**268**				51	119	16			
4/27/1996	**50**	18	**176**	92	81	65	**657**	28			
5/23/1996	**309**		132	31	79	**259**	42	34			
3/6/1998	**91**	**246**				**305**	33	42			
3/18/1998	**409**	49				46	**228**				
7/25/2002	**175**			36		87	71	64	75	100	90
2/2/2003	**484**			**162**		**484**	**1062**	116	**10933**	**395**	**9162**
12/28/2006	**296**					**2101**	**428**	126	104	**735**	94
6/5/2007	**217**			35		**159**	55	71	68	**508**	**182**
12/6/2007	**283**					13	38	15	29	10	16
12/22/2009	**168**					**236**	76	42	17	**217**	34

Table 2. Over the last 25 years, violations of the federal PM10 standard in the Coso Junction Planning Area were primarily caused by dust from the Owens Lake area. See Table 1 for PM10 concentrations on the dates shown below and Appendix B for hourly meteorological data for these events.

Exceedance Date	Maximum Hourly Wind		Primary Cause of Exceedance
	Max Speed MPH @ 10 m	Direction of Max Wind Degrees	
4/25/1985	30.0	335	N wind all day, Owens Lake Dust, Coso Met
4/2/1986	37.5	350	N wind all day, Owens Lake Dust
6/7/1986	27.5	315	Variable winds during day, Owens Lake Dust
1/15/1987	40.0	35	N wind all day, Owens Lake Dust
2/3/1989	38.0	285	Variable winds during day, Owens Lake Dust
4/23/1990	26.0	272	Abandoned Ag Land Dust
10/26/1993	29.3	18	N wind all day, Owens Lake Dust
12/23/1993	25.7	35	N wind all day, Owens Lake Dust
1/5/1994	31.0	22	Variable winds during day, Owens Lake Dust
4/8/1995	23.2	316	Coso Junction Met, Owens Lake Dust
4/9/1995	35.9	358	Coso Junction Met, Owens Lake Dust
4/21/1995	29.2	7	N wind all day, Owens Lake Dust
4/27/1996	26.0	38	N wind all day, Owens Lake Dust
5/23/1996	30.7	5	N wind all day, Owens Lake Dust
3/6/1998	34.9	354	Variable winds during day, Owens Lake Dust
3/18/1998	12.0	48	Variable winds during day, Owens Lake Dust
7/25/2002	17.6	163	McNally Fire smoke
2/2/2003	36.2	3	N wind all day, Owens Lake Dust
12/28/2006	46.8	337	N wind all day, Owens Lake Dust
6/5/2007	36.2	264	W wind, Coso Junction Parking Area Dust
12/6/2007	42.6	252	W wind, Coso Junction Parking Area Dust
12/22/2009	39.1	1	N wind, Regional and Owens Lake Dust

Table 3. The expected number of exceedances per year has decreased since dust control measures were implemented on 29.8 square miles of the Owens Lake bed in December 2006.

Year	PM10 Concentration (µg/m³)			Number of Exceeds	Expected Number of Exceedances Per Year	Number Sample Days
	Annual Average	3-Year Average	Peak 24-Hour			
1985	**Invalid**		307	1		49
1986	51.51		1175	2	12	58
1987	33.62		196	1	6	59
1988	22.12	35.75	92	0	0	59
1989	27.50	27.74	227	1	6	61
1990	29.37	26.33	866	1	6	60
1991	18.80	25.22	93	0	0	60
1992	**Invalid**		38	0		36
1993	28.78		254	2	12	59
1994	16.69		388	1	6	61
1995	32.28	25.92	692	2	12	58
1996	**Invalid**		309	1		51
1997	**Invalid**		92	0		54
1998	23.31		409	1	6	59
1999	14.84		46	0	0	114
2000	15.02	17.72	74	0	0	110
2001	11.88	13.91	100	0	0	122
2002	18.04	14.98	175	1	3	115
2003	20.54	16.82	484	1	3	121
2004	14.89	17.82	66	0	0	121
2005	18.24	17.89	97	0	0	119
2006	20.72	17.95	296	1	1	273
2007	19.91	19.62	283	2	2	363
2008	18.63	19.75	137	0	0	366
2009	18.59	19.04	168	1	1	362

More information on the Coso Junction PM10 monitor site is included in the District's annual Ambient Air Monitoring Network Plan, which was approved by the US EPA. (GBUAPCD, 2009a) As a commitment in the maintenance plan for the CJPA the District is authorized to continue daily PM10 monitoring at the Coso Junction rest area to ensure new and existing sources of PM10 are identified and controlled, if necessary. (CH&SC §40001)

4 Attainment Emissions Inventory

The attainment emissions inventory for the CJPA is based on estimated daily PM10 emissions for 2008. Emission estimates for 2008 are typical of emissions in the CJPA over the 3-year period (2007-09) when PM10 compliance was determined from monitoring and modeling evaluations. PM10 emissions generated in the CJPA are primarily from permitted facilities on the China Lake Naval Air Weapons Station property, which is generally restricted from public access. Table 4 shows the daily PM10 emissions inventory for permitted facilities in the CJPA and for area and mobile sources. Total PM10 emissions are estimated at 1,478 pounds per day. In comparison, total daily PM10 emissions generated in the CJPA are less than 0.1% of the emissions caused by windblown dust from Owens Lake, which is the primary cause of PM10 violations at Coso Junction. PM10 emissions from Owens Lake were estimated at 1.55 million pounds for the CJPA design day (January 5, 2007).

4.1 Stationary Source Emissions

The point source emission estimates shown in Table 4 were developed from information contained in current District and federal Title V permit files. Unpaved road and haul road emissions for permitted sources are included in the daily emissions for each facility. Emissions were based on 10-hour workdays for the pumice and rock plants.

4.2 Area Source Emissions

Unpaved road dust emissions in the area source category are estimated for non-permitted facility related traffic. An estimate of PM10 emissions from reentrained road dust from unpaved roads is based on the method found in US EPA's *Compilation of Air Pollution Emission Factors, AP-42* (USEPA, 2006).

$$E = \frac{k\,(s/12)^a\,(S/30)^d}{(M/0.5)^c} - C \qquad \text{Eq. 1}$$

Where:
- E = PM10 emissions in pound per vehicle mile traveled
- s = silt content of road surface material (5%)
- S = mean vehicle speed (30 miles per hour)
- M = surface material moisture content (assume 0.3%)
- C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 for PM10).

For PM10 from public unpaved roads: k = 1.8, a = 1, d = 0.5 and c = 0.2.

Table 4. Daily PM10 emissions inventory for the Coso Junction Planning Area for 2008 through 2025. For the purpose of the maintenance plan, no significant growth is expected in the emissions inventory through the year 2025.

Daily PM10 Emissions for 2008 through 2025	
Stationary Sources	**Pounds/day**
California Lightweight Pumice	167
China Lake Naval Air Weapons Station	84
Coso Operating Company	953
Halliburton Services	20
Twin Mountain Rock	58
Area Sources	
Unpaved Roads	83
Paved Roads	101
Mobile Sources	
On-Road Motor Vehicles	12
Total PM10 (pounds per day)	1,478

Equation 1 yields an emission rate of 0.83 pounds of PM10 per vehicle mile traveled. Assuming an average of 2 vehicle trips per day on 50 miles of unpaved roads in the public portion of the CJPA, yields 100 vehicle-miles per day and 83 pounds of PM10 per day. (CARB, 2010a)

PM10 from paved road dust is based on CARB's emission estimates for Inyo County in 2008 (0.99 tons of PM10 per day) and pro-rated for the proportion of traffic in the CJPA (5.1%), which yields 101 pounds per day. (CARB, 2010b)

Based on population growth in Inyo County, area source emissions are not expected to change significantly in future years.

4.3 Mobile Source Emissions

PM10 from on-road motor vehicle emissions (excludes re-entrained road dust) is based on CARB's emission estimates for Inyo County in 2008 (0.12 tons of PM10 per day) and pro-rated for the proportion of traffic in the CJPA (5.1%), which yields 12 pounds per day. (CARB, 2010) The mobile source emissions are not expected to change in future years.

4.4 Emissions Growth Forecast

Due to the sparse population, lack of population growth, and the expectation that industrial operations in the planning area will not change significantly, the emissions inventory forecast will remain stable for all future years. The 2000 US census shows 102 people living in the Coso Junction Planning area in the communities of Pearsonville and Homewood Canyon. This is about 0.5% of the total population of Inyo County. According to the US Census Bureau, Inyo County's population declined from 18,281 in 1990 to 17,945 in 2000. Population continued to decline to 17,136 in 2008. Over those 18 years, Inyo County's population decreased by 4.5%. (US Census Bureau, 2010)

For the purpose of the emissions forecast for the maintenance plan, the daily PM10 emissions inventory will be the same as shown in Table 4 for the next 17 years through the year 2025.

4.5 Wind Erosion from Sources Other than Owens Lake

Undisturbed open areas in the CJPA are generally invulnerable to significant wind erosion. Ambient monitors show low PM10 concentrations (23 $\mu g/m^3$) on windy days when winds are not from the direction of Owens Lake or other known windblown dust source areas (see section 5.2). Two known windblown dust source areas in the CJPA, however were found to be significant.

In 1990 and 2007, three exceedances of the federal PM10 standard were monitored at Coso Junction, which were caused by windblown dust from a fallow agricultural field and an unpaved truck parking area (see Table 2). As noted in the air quality discussion, these areas are no longer a dust problem since the agricultural field is protected by volunteer vegetation cover and the truck parking area is now paved. Since these areas are no longer a significant source of dust, they are not included in the daily PM10 emissions in Table 4 for the years 2008 through 2025. However, PM10 emissions from these source areas can be estimated for each of the event days in 1990 and 2007.

A wind tunnel-based emissions algorithm was developed for the 1998 Owens Valley PM10 SIP, which can be used to estimate PM10 emissions from the agricultural field , public unpaved roadways and the unpaved truck parking area. The Owens Lake emissions equation for the fall period (equation 2) provides a good estimate for wind erosion in the CJPA since the surfaces can be considered to be disturbed, but they lack the efflorescent salts that characterize the lake bed surface at Owens Lake in the spring. ($E = 0$ in equation 2 for $u \leq 7.6$ m/s) (GBUAPCD, 1998)

$$E = 1.34 \times 10^{-5}\, e^{(0.25 \times u)} \qquad \text{Eq. 2}$$

Where: E = PM10 emissions in grams per square meter per second
u = Hourly average wind speed at 10 m in meters per second (for $u > 7.6$ m/s)

Appendix B includes meteorological data for these three wind events. The agricultural field covered 314.5 acres on 4/23/1990, and the PM10 emissions on that day are estimated at 12,566 pounds. Wind erosion from the unpaved truck parking area (4.7 acres) is estimated at 551 pounds on 6/5/2007 and 763 pounds on 12/6/2007. Wind erosion from unpaved roadways in the CJPA (46.8 acres) is estimated at 5,489 pounds on 6/5/2007 and 7,611 pounds on 12/6/2007.

5 Control Strategy

As discussed in the Air Quality section of this document, PM10 exceedances in the CJPA are primarily due to the transport of windblown dust from the Owens Lake area. Therefore, achieving emission reductions at Owens Lake is the primary control strategy for reaching attainment in the CJPA. The US EPA classified the southern Owens Valley as a serious PM10 nonattainment area in 1993 and required a SIP be developed to achieve compliance with the federal standard. A SIP was adopted in 1998 and approved by the US EPA for the Owens Valley with an interim control strategy that required dust controls on 16.5 square miles of the lakebed. Under the Owens Valley SIP, the City of Los Angeles is responsible for mitigating the dust generated from Owens Lake in order to bring the area into attainment with the federal standard. (GBUAPCD, 1998) The Owens Valley SIP was revised in 2003 to expand dust controls to 29.8 square miles of the lake bed by December 31, 2006. (GBUAPCD, 2003) The City of Los Angeles successfully implemented these control measures by the required deadline. Another revision to the Owens Valley SIP in 2008 expanded control requirements to a total of 43.1 square miles of the Owens Lake bed. The Board Order to implement control measures in the 2008 SIP is included as Appendix C of this document. The City of Los Angeles is expected to have dust control measures implemented on 39.6 square miles of the lakebed by April 1, 2010, and then to expand the control area to 43.1 square miles by October 1, 2010. (GBUAPCD, 2008; GBUAPCD, 2009b)

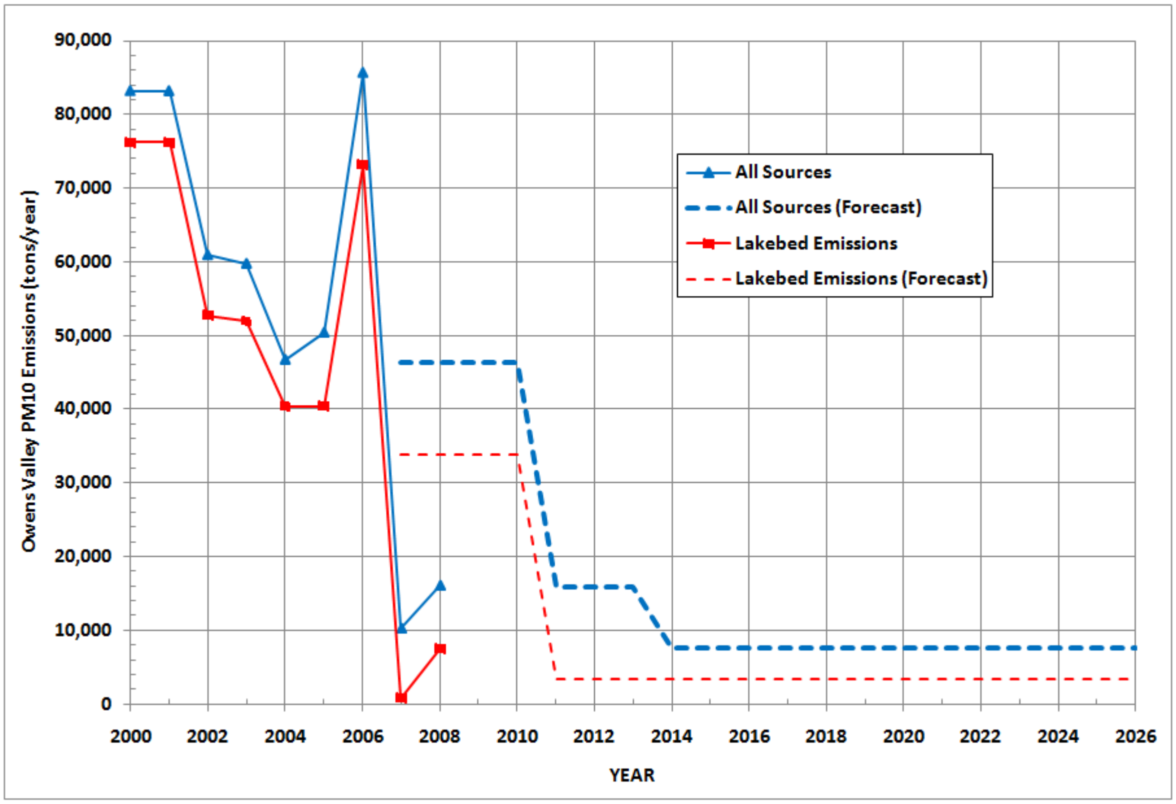
Figure 4 shows the annual PM10 emissions trend for the Owens Valley planning area. The blue line represents total PM10 emissions from all sources in the planning area, and the red line represents the windblown dust emissions from the Owens Lake bed. The dashed lines represent emission forecasts for Owens Lake based on the implementation of additional control measures on the lake bed and in the Keeler Dunes. Actual PM10 emissions from the Owens Lake bed have been reduced by 90% since 2000 when the City of Los Angeles initiated efforts to control windblown dust at Owens Lake. Windblown dust emissions were estimated using hourly PM10 emission measurements collected through the Owens Lake Dust Identification Program. Hourly data on windblown dust was collected from 2000 through 2008 using the methodology described in the Owens Valley PM10 SIP. (GBUAPCD, 2008) The decrease in windblown dust emissions from Owens Lake after 2006 is reflected in the reduction in Owens Lake-caused PM10 exceedances monitored at Coso Junction in 2007, 2008 and 2009 (Table 3). The additional 2008 Owens Valley SIP control measures, which will be implemented in 2010 should result in even lower PM10 levels at Coso Junction than those observed during this 3-year period.

Other sources of PM10 that caused exceedances of the federal standard at Coso Junction included; a wildfire and windblown dust from agricultural operation and from an unpaved truck parking area. These events were discussed in the Air Quality section of this document. Current District rules are adequate to prevent agricultural operations, prescribed burning, and windblown dust from disturbed surface areas from causing exceedances of the standard in the future. Table 5 shows the current District rules that limit PM10 emissions in the planning area.

5.1 Contingency Measures

The Owens Valley SIP also includes contingency measures (referred to as Supplemental Control Requirements in the Owens Valley SIP) that require the City of Los Angeles to implement dust control measures on any new windblown dust areas on the lakebed and to improve dust control measures in areas where it is necessary to prevent exceedances of the PM10 standard at any location on the shoreline of Owens Lake (see Appendix C, *Board Order #080128-01 Requiring the City of Los Angeles to Undertake Measures to Control PM10 Emissions from the Dried Bed of Owens Lake*). The District will rely on all the PM10 control measures and the Supplemental Control Requirements in the Owens Valley SIP, and existing District rules to ensure compliance

Figure 4. Since 2000, actual PM10 emissions from the exposed lakebed at Owens Lake have decreased by 90% as a result of dust control measures implemented by the City of Los Angeles. PM10 emissions will decrease in 2011 after additional dust controls are implemented on 13.3 square miles of the lake bed. This will bring the total to 43.1 square miles of dust control areas.



is maintained in the CJPA. The Board Order in Appendix C includes all the Owens Lake control measures and the Supplemental Control Requirements, which the District will rely on to prevent Owens Lake dust from causing future violations in the CJPA. (GBUAPCD, 2008)

The District is authorized to continue daily ambient PM10 monitoring at Coso Junction (CH&SC § 40001). If an exceedance of the federal PM10 standard is monitored the District will investigate the cause of the exceedance within 60 days following the end of the calendar quarter during which the event occurred. Exceedances found to be caused by dust from Owens Lake will be investigated to determine if the required control measures were properly implemented in accordance with Board Order #080128-01. Exceedances found to be caused by dust from local sources that are subject to current District regulations will be addressed and corrected. Exceedances found to be caused by Exceptional Events, such as wildfires or earthquakes will be flagged in accordance with US EPA policy (Federal Register, 2007).

To prevent new facilities from causing an air pollution problem, any new facilities in the CJPA that may emit air pollution will be subject to the District's new source review rules (209-A, 216 and 216-A). Facilities that qualify as a major source under the US EPA federal permitting guidelines will also be subject to federal PSD (Prevention of Significant Deterioration) permitting requirements (40 CFR 51.166 and 52.21).

Table 5. Existing District rules and regulations to control sources of PM10.

District Rule	Description
209-A	Requires new sources with PM10 emissions greater than 250 pounds per day of total suspended particulates, or facility modifications of greater than 15 tons per year of PM10 to apply Best Available Control Technology to control PM emissions.
216	Requires the Air Pollution Control Officer to evaluate air pollution impacts before issuing an Authority to Construct or Permit to Operate for a new facility.
216-A	Requires permits for any new secondary source of air pollution including buildings, commercial parking and housing developments.
400	Limits visible emissions from any source, except those exempted under Rule 405, to less than Ringelmann 1 or 20% opacity.
401	Requires reasonable precautions be taken to prevent visible particulate emissions from crossing the property boundary.
402	Prohibits sources of air pollution from causing a nuisance to the public or endangering public health and safety.
408	Limits agricultural burning operations to designated burn days and requires a burn permit.
409	Limits range improvement burning to designated burn days and requires a burn plan be approved by the Air Pollution Control Officer.
410	Limits forest management burning to designated burn days and requires a burn plan be approved by the Air Pollution Control Officer.
411	Limits wildland management burning to designated burn days and requires a burn plan be approved by the Air Pollution Control Officer.
502	Requires conservation management plans to reduce fugitive dust emissions from agricultural operations greater than 10 acres in Inyo, Mono and Alpine Counties
Reg. XII	Requires that federal actions and federally funded transportation-related projects conform to SIP rules and that they do not interfere with efforts to attain federal air quality standards.
Reg. XIII	Requires that federal actions and federally funded projects conform to SIP rules and that they do not interfere with efforts to attain federal air quality standards. Federal actions that have the potential to emit more than 100 tons per year of PM10 in the CJPA will be required to complete a conformity determination.

Figure 5. Windblown dust from this truck parking area located west of the PM10 monitor site at the Coso Junction rest area caused two exceedances of the PM10 standard in 2007. The parking area was graveled in 2008 to control dust. In 2009, most of it was paved and used as a staging area for a highway construction project. The PM10 monitor site is the structure with the railing on top in the center of the photo. Coso Junction wind measurements are taken at a 10 m height on the tower to the left (north) of the PM10 monitor. (View looking to the northeast, February 24, 2010)

5.2 Miscellaneous Sources and Model Background

To determine the PM10 contribution from miscellaneous sources other than Owens Lake on days with Owens Lake dust events, the District reviewed the hourly PM10 data from the Coso Junction monitor site. By looking at hours with high winds (>7 m/s, 16 mph) and screening out wind directions from Owens Lake and the unpaved parking area located to the west of the monitor, the average PM10 concentration at Coso Junction was determined to be 23 $\mu g/m^3$ on windy days. This is close to the average background concentration of 20 $\mu g/m^3$ that was determined for sites in the Owens Valley Planning Area. If the unpaved parking area had been included in the wind direction screening, the average PM10 concentration for high wind hours would have been 40 $\mu g/m^3$. However, since this source has already been adequately controlled by gravel and asphalt pavement it will not be treated in the model attainment demonstration. Figure 5 shows a photo taken on February 24, 2010 of the paved truck parking area located west of the Coso Junction PM10 monitor site. To account for sources other than windblown dust from Owens Lake in the attainment demonstration a background concentration of 20 $\mu g/m^3$ was added to all 24-hour model predictions.

6 Air Quality Modeling and Attainment Demonstration

Since 18 of the 22 PM10 violations monitored at Coso Junction were found to have been caused by windblown dust from the Owens Lake bed, the Owens Valley PM10 model was used to model the attainment demonstration for the Coso Junction PM10 redesignation request and maintenance plan. It should be noted the four non-Owens Lake-caused exceedances, were caused by: windblown dust from a fallow agricultural field, which is now stabilized with volunteer vegetation; an unpaved truck parking area, which has since been paved and graveled; and a wildfire in 2002. The air quality modeling study was not intended to simulate these types of non-recurrent events.

Dispersion modeling was performed to estimate PM10 concentrations during high wind events along the southern boundary of the Owens Valley PM10 Planning Area, which is the northern boundary of the CJPA. Dust source areas at Owens Lake were simulated using the methods described in the Owens Valley PM10 Planning Area 2003 and 2008 State Implementation Plan revisions (GBUAPCD, 2003; GBUAPCD, 2008). Based on the sand flux and meteorological data collected during July 2006 to June 2009, the simulations suggest PM10 concentrations from dust source areas on Owens Lake will not cause violations of the federal PM10 standard in the neighboring Coso Junction PM10 planning area.

6.1 Modeling Techniques

Dispersion model simulations were performed with the regulatory version 5.8 of the CALPUFF modeling system following the techniques of 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 (at 10 m height), 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. Full details on the modeling protocol for this study can be found in District Board Order #080128-01, Attachment C, Section 6.0 (included as Appendix C of this document). Some of the features of the Coso Junction CALPUFF model simulation were:

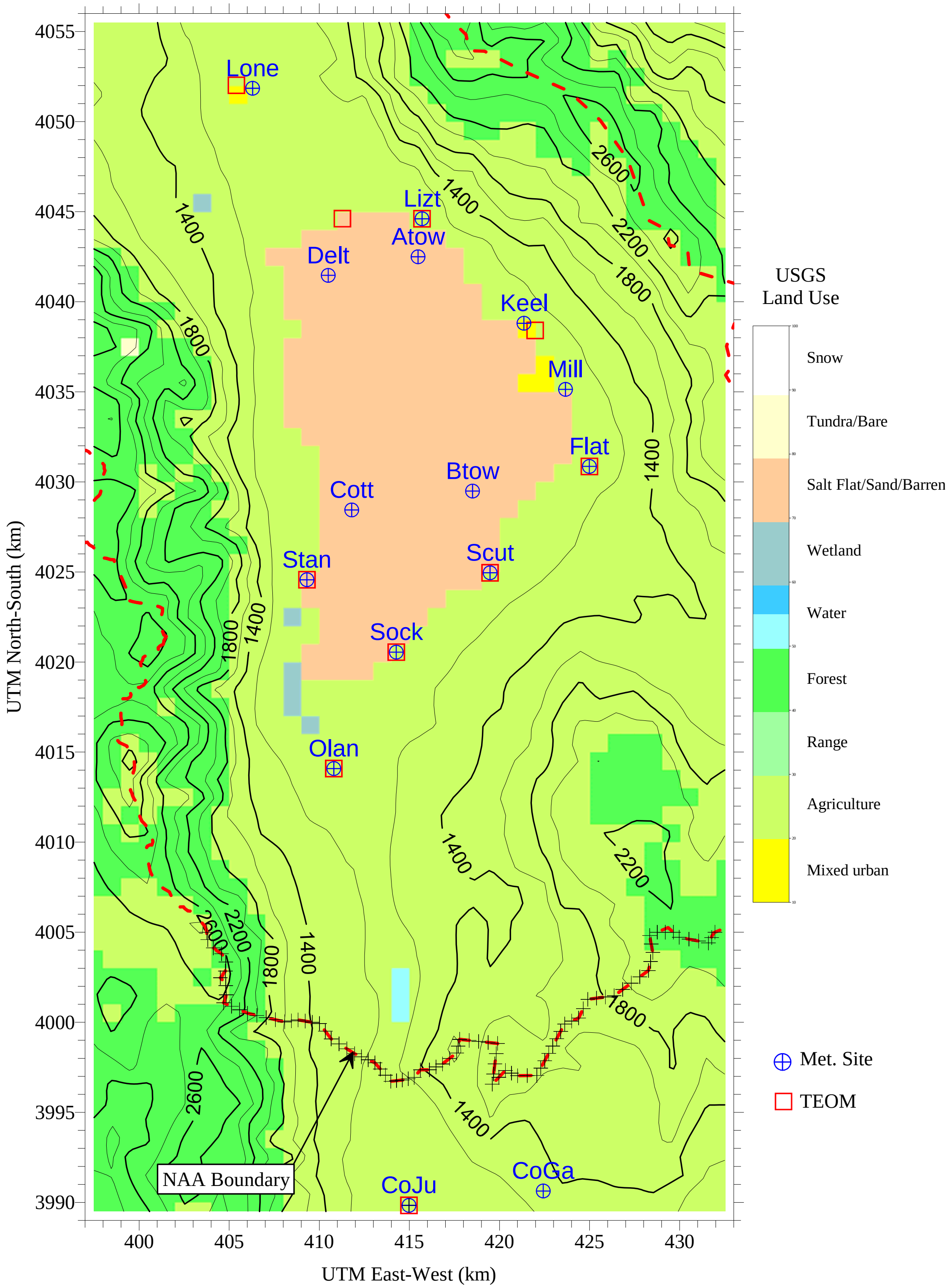
- Model simulation period was from July 2006 to June 2009 using the last three years of data available from the Owens Lake Dust ID Program.

- The Owens Valley study domain was extended to the south to include the common boundary of the southern Owens Valley and northern Coso Junction PM10 planning areas. The revised modeling domain is depicted in Figure 6. The revised study domain is 36 km-by-67 km versus the Owens Valley domain of 34 km-by-48 km.

- The same vertical and horizontal mesh sizes are used in both modeling analyses.

- Data collected at two additional surface meteorological stations in the southern portions of the current domain were used to construct the wind fields for the simulations. Data from the Coso Junction (CoJu) and Coso Gate (CoGa) sites shown in Figure 6 were prepared using the same methods as described in the Owens Valley PM10 SIP.

Figure 6. The dispersion modeling domain for the Owens Valley and Coso Junction Planning Areas was 36 km by 67 km.



- To assess attainment, PM10 concentration predictions were obtained at 90 receptors placed along the southern Owens Valley PM10 Planning Area boundary. The receptor interval shown in Figure 6 is 300-600 m. A receptor was also placed at the Coso Junction site where current and historical PM10 observations are/have been collected.

- Area source PM10 emission fluxes were calculated using hourly Sensit sand motion data and seasonal proportionality constants (K-factors) for July 2006 to June 2009. The procedures used to derive the seasonal 75th percentile K-factors are described in the 2003 and 2008 Owens Valley PM10 SIPs.

- Twelve different area source configurations were available from the Owens Lake Dust ID Program based on source delineations for the three-year period.

- No additional controls were assumed for the Owens Lake sources. Sources were characterized as observed during the simulation period without the effects of controls planned for many of these areas.

- As in the 2003 and 2008 Owens Valley SIP attainment demonstrations, the current simulations only include windblown emissions from sources on the lakebed and the Keeler Dunes. As discussed in the previous section, 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 protocol for the Owens Valley SIP (GBUAPCD, 2003; GBUAPCD, 2008).

- Attainment for the 24-hour PM10 NAAQS was assessed using the fourth highest daily prediction at the same receptor during the three-year simulation.

Appendix D of this document provides a summary of the model results. It also includes an evaluation of model performance comparing predictions and observations for 10 monitor sites in the Owens Valley and Coso Junction planning areas. The model performance results suggest model predictions as a whole are relatively unbiased, but scattered, and that the predicted frequency distributions are generally within a factor-of-two of the observed distribution.

6.2 Model Results

Table 6 summarizes the results for the CALPUFF simulations of Owens Lake dust events during July 2006 through June 2009, conservatively assuming no future controls would reduce emissions. Figure 7 shows predicted 24-hour design concentrations at the common planning area boundary. The design concentration is the 4th highest 24-hour prediction in the three-year simulation. If the design concentration is under the federal standard of 150 $\mu g/m^3$, then that location is in attainment with the standard. The modeling results show the highest design concentration including background at the boundary of the CJPA is 137 $\mu g/m^3$.

Table 6. Summary of maximum PM10 model predictions in the Coso Junction Planning Area for the period from July 2006 through June 2009. The design concentration is the 4th highest 24-hour prediction in the three-year simulation at the same location, in this case it is 137 µg/m^3.

Summary of Maximum PM10 Predictions July 2006 to June 2009		
Statistic	**Period**	**PM10 (µg/m^3)**
Max 24-hour	3q06-2q09	225.5
2nd 24-hour	3q06-2q09	164.2
3rd 24-hour	3q06-2q09	150.5
4th 24-hour	3q06-2q09	136.6
Average	3q06-2q07	20.6
Average	3q07-2q08	21.1
Average	3q08-2q09	21.7
Average	2007	20.4
Average	2008	21.2

As would be expected, the highest 24-hour PM10 concentration occurred at the boundary of the Owens Valley and Coso Junction planning areas near the valley floor and along the west side of the valley. The model showed PM10 concentrations decreasing at distances further from Owens Lake. The added distance to the southern boundary of the Owens Valley Planning Area and associated greater dilution of dust source plumes, produces much lower predictions than for receptors placed along the Owens Lake shoreline. Figure 8 shows that 24-hour average PM10 concentrations for the model design day for Coso Junction (January 5, 2007) decreased at locations further from Owens Lake.

The dust sources on the Owens Lake bed were simulated as ground level area sources located inside the historical shoreline. The CALPUFF modeling system assumes passive, non-buoyant ground based sources remain ground based as they travel downwind and concentrations within individual dust plumes always decrease with downwind distance. Stagnation and re-circulation of dust source plumes that might result in pockets of higher concentrations at fixed downwind receptor locations generally do not occur concurrently with the regional high wind events that are necessary to produce emissions on the lakebed. When only emissions from lakebed sources are considered, attainment of the PM10 standard at the northern boundary of the CJPA is sufficient to demonstrate attainment within the entire planning area.

Figure 7. The predicted 4th highest 24-hour PM10 concentration over 3 years for receptors on the northern boundary of the CJPA are shown on the map below. Every 4th receptor concentration is plotted on the map. The 3-year modeling period is from July 2006 through June 2009.

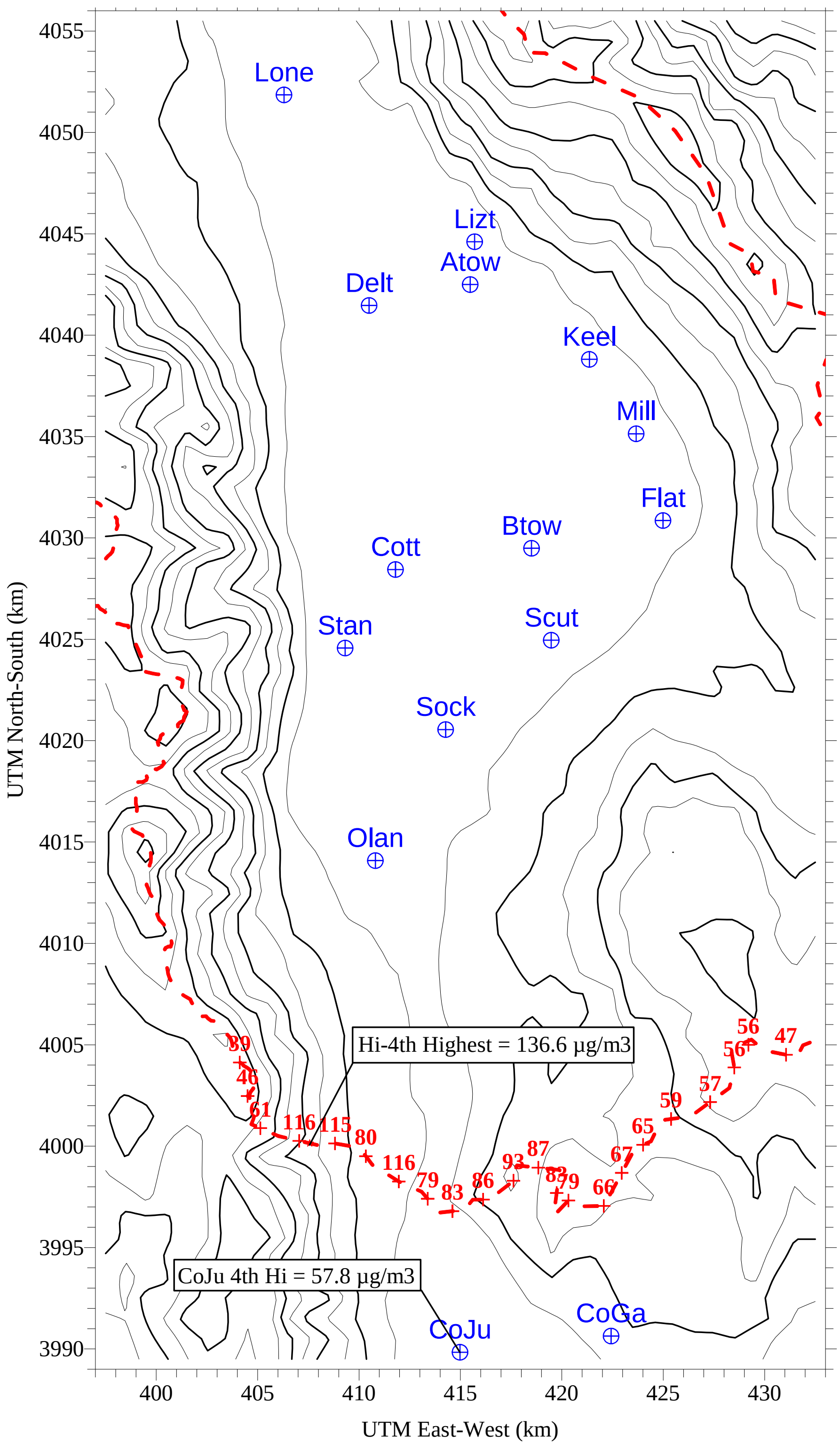
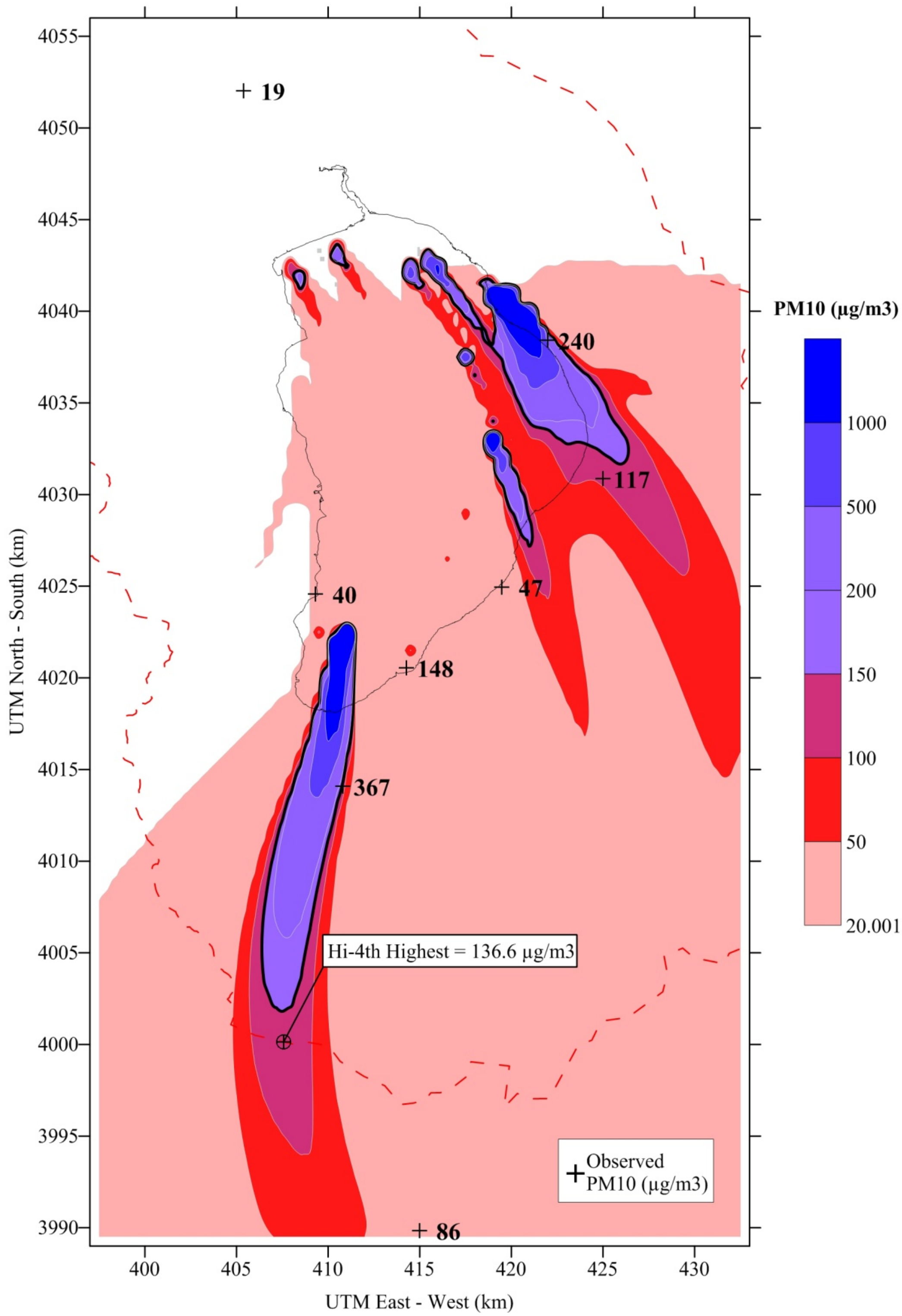


Figure 8. This isopleth map shows model concentrations for the 4th highest day in the CJPA over the 3-year modeling period (January 5, 2007). Modeled 24-hour average PM10 concentrations are below the federal standard of 150 µg/m^3 at all locations in the CJPA.



It should be noted the current analysis used estimates of windblown emissions during July 2006 through June 2009—future emissions will be substantially lower. The model simulations for the attainment demonstration did not account for controls currently planned on many of these source areas that will be implemented in the future. If planned controls, such as the 13.3 square miles that will be completed in October 2010 were considered in the modeling analysis, predicted concentrations would be much lower than suggested by the current simulations.

7 Transportation Conformity

Transportation conformity requirements contained in District Regulation XII require that federal actions and federally funded transportation projects conform to SIP rules and that they do not interfere with efforts to attain federal air quality stands. Transportation sources were not found to contribute to the nonattainment problem at Coso Junction and PM10 from paved roads. Estimated at 113 pounds per day, paved road emissions comprise less than 10% of the daily PM10 emissions in the CJPA (see Table 4), and less than 1/100th of a percent of the Owens Lake dust emissions on the design day (1.55 million pounds on January 5, 2007). Due to their benign role in the PM10 problem in the CJPA, transportation-related projects such as road construction will be exempt from Transportation Conformity determination requirements under District Regulation XII.

8 General Conformity

General conformity requirements contained in District Regulation XIII require that federal actions and federally funded projects conform to SIP rules and that they do not interfere with efforts to attain federal air quality standards. A conformity determination is currently required for any federally funded (non-transportation) project or action that takes place in a moderate PM10 nonattainment area, including the CJPA that has the potential to exceed a *de minimis* PM10 emissions threshold of 100 tons per year. In order to maintain the stringency of control requirements in the CJPA under a maintenance plan, the District will retain the 100 tons of PM10 per year *de minimis* emissions threshold for triggering a conformity determination as currently required under District Regulation XIII.

9 Request to Redesignate Coso Junction to Attainment

Through this document the District demonstrated that, over the 3-year period from January 2007 through December 2009, the Coso Junction area attained the federal 24-hour standard for PM10. Daily PM10 monitoring data collected at Coso Junction over the last 3 years has not shown more than 1.0 exceedances of the PM10 standard per year as required to demonstrate attainment of the federal standard. In addition, a dispersion modeling analysis was performed for a 3-year period to demonstrate no more than 1.0 exceedances of the PM10 standard could be expected at any location in the Coso Junction Planning Area. The District believes the Coso Junction PM10 Planning Area has attained the federal PM10 standard and requests the California Air Resources Board recommend to the US Environmental Protection Agency that the area be redesignated from nonattainment to attainment with the federal PM10 standard.

10 Request to Approve Coso Junction PM10 Maintenance Plan

To ensure that compliance with the federal PM10 standard is maintained in future years, the District evaluated future activities that could affect PM10 levels in the planning area and the adequacy of existing rules, policies and emission control requirements to control emissions from those sources and activities. District staff found that existing rules for fugitive dust, new source review and General Conformity were adequate to control potential new sources within the Coso Junction Planning Area.

Emissions from PM10 sources in the CJPA decreased over the last 18 years due to a drop in local population and the closing of one of the permitted facilities. Emission sources in the CJPA are not expected to increase in the future, but it is more likely that they will either remain steady or decline. However, if new facilities are constructed in the CJPA, District regulations for new source review (Rule 209-A, 216, and 216-A) and federal PSD regulations (40 CFR 51.166 and 52.21) will prevent PM10 emissions from new facilities from causing or contributing to exceedances of the PM10 standard.

The major concern for maintaining PM10 compliance in the CJPA is for windblown dust from Owens Lake. Since 13.5 square miles of additional control measures are expected to be implemented at Owens Lake by October 1, 2010, PM10 air quality is expected to continue to improve in the CJPA as emissions from Owens Lake decline. District staff believes the control strategy and contingency requirements in the 2008 Owens Valley PM10 SIP are adequate to protect air quality in the Coso Junction area. Therefore, no additional contingency measures will be needed to ensure future compliance with the federal PM10 standard in the CJPA.

Furthermore, as a commitment in the Coso Junction PM10 Maintenance Plan, the District will continue daily monitoring of PM10 at the Coso Junction rest area to help ensure new sources of PM10 are identified and controlled if necessary. If an exceedance of the federal PM10 standard is monitored the District will investigate the cause of the exceedance within 60 days from the end of the calendar quarter in which the event occurred. Exceedances found to be caused by dust from Owens Lake will be investigated to determine if the required control measures were properly implemented in accordance with Board Order #080128-01. Exceedances found to be caused by dust from local sources that are subject to current District regulations will be addressed and corrected. Exceedances found to be caused by Exceptional Events, such as wildfires or earthquakes will be flagged in accordance with US EPA policy (Federal Register, 2007).

The District requests that this document be approved by the California Air Resources Board as the PM10 Maintenance Plan for the Coso Junction Planning Area and submitted to the US Environmental Protection Agency for their consideration and approval.

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