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Air Pollution Control Officer

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NOTICE OF PUBLIC HEARING

ADOPTION AND APPROVAL OF (1) PROPOSED ORDER UNDER THE PROVISIONS OF CAL. HEALTH & SAFETY CODE SECTION 42316, (2) PROPOSED DISTRICT RULE 433 FOR THE CONTROL OF PARTICULATE EMISSIONS AT OWENS LAKE, AND (3) PROPOSED FINAL 2016 REVISION TO THE OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN

PLEASE TAKE NOTICE that on Wednesday, April 13, 2016, the Governing Board of the Great Basin Unified Air Pollution Control District (GBUAPCD) will conduct a public hearing and consider for adoption and approval of (1) a proposed order authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain additional dust control measures on the Owens Lake bed, (2) a proposed District Rule 433 (Control of Particulate Emissions at Owens Lake), and (3) a proposed final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively “Board Actions”). The public hearing and the Governing Board’s consideration for adoption and approval of the Board Actions will occur at the District Governing Board’s regular meeting on **Wednesday, April 13, 2016 at 10:15 a.m. at the City of Los Angeles Department of Water and Power Administrative Building, Training Room 134A, 111 Sulfate Road, Keeler, California 93530**. Other actions related to the Board Actions may also be taken at the meeting. Members of the public will have an opportunity to submit written comments or make oral statements at the public hearing on each of the proposed Board Actions.

The GBUAPCD prepared the 2016 SIP for the control of fine dust emissions (PM_{10}) in response to a finding by the United States Environmental Protection Agency (USEPA) that the Owens Valley Planning Area did not attain the 24-hour National Ambient Air Quality Standard (NAAQS) for PM_{10} as required by the federal Clean Air Act. The dried Owens Lake bed soils and crusts are a source of wind-blown dust during significant wind events and contribute to elevated concentrations of PM_{10}.

The GBUAPCD has adopted a series of SIPs to address and control PM_{10}. In 2008, the GBUAPCD approved the 2008 Revised State Implementation Plan for the Owens Valley Planning Area (2008 SIP), which was implemented through GBUAPCD Board Order #080128-01. In 2011, a dispute arose between the GBUAPCD and the City regarding these requirements. On December 30, 2014, the Sacramento Superior Court entered a Stipulated Judgment for the GBUAPCD in the case captioned *City of Los Angeles v. California Air Resources Board, et al*., Case No. 34-2013-80001451-CU-WM-GDS to resolve this dispute. Under the major provisions of this agreement, the City agreed to implement additional dust control measures on the lake bed (for a total of 48.6 square miles) by December 31, 2017. The GBUAPCD may also order the City to implement dust control measures on up to 4.8 additional square miles of the lake bed if needed to meet the NAAQS or related state standards. The GBUAPCD agreed to revise the 2008 SIP by December 31, 2014 (later amended by agreement to April 15, 2016) to incorporate the relevant provisions of the Stipulated Judgment into a proposed 2016 SIP Order.

GBUAPCD also proposes to adopt District Rule 433 pursuant to California Health & Safety Code Section 41511. The Rule includes the control elements of the 2016 SIP Order and will comprise the attainment strategy for the 2016 SIP to be submitted to the California Air Resources Board and the U.S. Environmental Protection Agency for their approval. The 2016 SIP contains the project location, history, air quality setting, emission inventory, control measures, air quality modeling, control strategy, and enabling legislation. The goal of the proposed Board Actions is to continue to reduce dust emissions from the dry lake bed to attain the 24-hour NAAQS for PM_{10} in 2017. A Notice of Determination will be prepared under the California Environmental Quality Act in connection with the proposed Board Actions based upon the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power.

Copies of the proposed order, District Rule 433, the 2016 SIP and the EIR may be obtained from and will be available for public review at the GBUAPCD web-site www.gbuapcd.org, at the GBUAPCD office at 157 Short Street, Bishop, California, and at Inyo County Libraries in Independence, Big Pine, Bishop, Lone Pine, Death Valley and Tecopa, California. Written comments on these rule revisions should be sent to Phillip L Kiddoo, Air Pollution Control Officer, GBUAPCD, 157 Short Street, Bishop, CA 93514. Written comments received by 5:00 pm on March 18, 2016 will be included in the staff report sent to the Governing Board members. Oral and written comments will also be taken at the meeting. For further information, contact the District's Board Clerk, Tori DeHaven at (760) 872-8211.

GBUAPCD staff encourages those who have comments on the 2016 SIP to attend the meeting on April 13, 2016 and submit written comments or make oral statements to the Governing Board prior to the Board Actions.

DRAFT FINAL

Prepared for
Great Basin Unified Air Pollution Control District
Bishop, California

Prepared by
Ramboll Environ US Corporation
Los Angeles, California

Date
February, 2016

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

2016 OWENS VALLEY PLANNING AREA PM_{10} STATE IMPLEMENTATION PLAN

RAMBOLL ENVIRON

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(Appendices are available on the enclosed disc)

GLOSSARY, ACRONYMS, AND MEASUREMENT UNITS

A&WMA	Air and Waste Management Association
A/P	Annual/Present
AERMOD	AMS/EPA Regulatory Model
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
BLM	Bureau Of Land Management
CA	California
CAA	Clean Air Act
CALMET	California meteorological preprocessor program
CALPUFF	non-steady-state meteorological and air quality modeling system
CARB	California Air Resources Board
CE	control efficiencies
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CSC(s)	Cox Sand Catcher(s)
CSLC	California State Lands Commission
DCA(s)	Dust Control Area(s)
DCM(s)	Dust Control Measure(s)
DWM	Dynamic Water Management
EA	Environmental Assessment
ECR(s)	Eligible Cultural Resource(s)
EIR(s)	Environmental Impact Report(s)
ENVIRON	Environ International Corporation
EPA	Environmental Protection Agency
FR	Federal Register
FS	Forest Service
g/m^3	grams per cubic meter
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
IPET	Induced Particulate Erosion Test
LADWP	Los Angeles Department of Water and Power
MAG	Maricopa Association of Governments
MDCE	Minimum Dust Control Efficiency
MHz	Megahertz (million Hertz)
MOA	Memorandum Of Agreement
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NOP	Notice of Preparation
NOx	Nitrogen Oxide
OEHHA	Office of Environmental Health Hazard Assessment
OVPA	Owens Valley Planning Area
PM	Particulate Matter
PM_{10}	Particulate Matter Of Size Less Than Or Equal To 10 Micrometers
$PM_{2.5}$	Particulate Matter Of Size Less Than Or Equal To 2.5 Micrometers
PRBO	Point Reyes Bird Observatory
PSD	Prevention of Significant Deterioration
RFP	Reasonable Further Progress
SCAQMD	South Coast Air Quality Management District
SCRD(s)	Supplemental Control Requirements Determination(s)
SIP(s)	State Implementation Plan(s)
SO_2	sulfur dioxide
SOA	Stipulated Order of Abatement
TEOM(s)	Tapered Element Oscillating Microbalance(s)
TPY	tons per year
TSP	Total Suspended Particulates
TWB^2	Tillage with BACM (Shallow Flood) Backup
US	United States
USA	United States Of America
USEPA	United States Environmental Protection Agency
$\mu g/m^3$	micrograms per cubic meter

SUMMARY

S.1 Purpose of the SIP

The purpose of the 2016 State Implementation Plan (2016 SIP) is to provide a plan to (1) attain the National Ambient Air Quality Standard (NAAQS) for particulate matter less than 10 microns in diameter (PM_{10}) as required by the Clean Air Act (CAA) and its 1990 Amendments and (2) implement the provisions of the 2014 Stipulated Judgment between the Great Basin Unified Air Pollution Control District (GBUAPCD or "District") and the City of Los Angeles ("City") ("2014 Stipulated Judgment") which provides for the continued operation of existing dust control measures and for the implementation of additional control measures in order to attain and maintain compliance with state and federal air quality standards (*City of Los Angeles, et al. v California Air Resources Board*, Sacramento County Superior Court, Case No. 34-2013-80001451-CU-WM-GDS).

The 2016 SIP revises the requirements contained in the 2008 Owens Valley PM_{10} SIP (2008 SIP) which was prepared in response to a finding by the United States Environmental Protection Agency (USEPA) that the southern Owens Valley (known as the Owens Valley Planning Area or OVPA) did not attain the NAAQS for PM_{10} by December 31, 2006, as mandated by the CAA (USEPA, 2007a). As required by CAA Sections 188(e) and 189(d), the 2008 SIP provided for attainment as soon as practicable and committed to achieving at least a five percent annual reduction in PM_{10} emissions starting from a 2006 emission inventory base year. The 2016 SIP revision continues the commitment to attain the NAAQS by providing a control strategy to implement control measures on additional areas at Owens Lake and to approve the use of new dust control measures to augment the existing Best Available Control Measures (BACM) that were available in the 2008 SIP.

S.2 Federal Clean Air Act and the Owens Valley SIP History

In 1987, the USEPA revised the NAAQS, replacing total suspended particulates (TSP) with PM_{10}, a new indicator for particulate matter. The intent of this health-based standard for particulate matter is to prevent airborne concentrations of suspended particles that are injurious to human health. PM_{10} can penetrate deep into the respiratory tract, and lead to a variety of respiratory problems and illnesses.

Also in 1987, the USEPA designated the OVPA as one of the areas in the nation that violated the new PM_{10} NAAQS. Subsequent air quality monitoring by the District has shown that the bed of Owens Lake—most of which is owned by the State of California and managed by the California State Lands Commission (CSLC)—is the major source of PM_{10} emissions contributing to air quality violations in the OVPA. The Owens Lake bed is considered an anthropogenic (human-caused) source of PM_{10} because the City of Los Angeles' Aqueduct diverts water sources that historically supplied the lake. In January 1993, the southern Owens Valley was reclassified as "serious nonattainment" for PM_{10}. The District prepared and adopted a SIP in 1998 (1998 SIP), which was approved by USEPA in 1999. Subsequent SIP revisions were prepared in 2003 to address PM_{10} control requirements to reduce windblown dust from Owens Lake and in 2008 to incorporate dust control provisions of the 2006 Settlement Agreement between the City of Los Angeles and the District. This 2016 SIP will provide an update on control measure implementation, commitments for additional dust controls at Owens Lake, and new control measures to augment the BACM in the 2008 SIP.

S.3 Health Impacts of PM_{10} from Owens Lake

Particulate pollution is generally associated with dust, smoke, and haze and can be measured as PM_{10}. These particles are extremely small, one-seventh the diameter of a human hair or 400 times smaller than the period at the end of this sentence. Because of their small size, the particles can easily penetrate into the lungs. Breathing PM_{10} can cause a variety of health problems. It can increase the number and severity of asthma and bronchitis attacks. It can cause breathing difficulties in people with heart or lung disease, and it can increase the risk for, or complicate, existing respiratory infections. Children, the elderly, and people with existing heart and lung problems are especially sensitive to elevated levels of PM_{10}. Even healthy people can be adversely affected by dust at extremely high concentrations. The USEPA has set an episode level of 600 micrograms per cubic meter ($\mu g/m^3$) (averaged over 24 hours) as the level that can pose a significant risk of harm to the health of the general public (40 CFR 51.151).

The NAAQS for PM_{10} is frequently violated in the OVPA because of windblown dust from Owens Lake and the Keeler Dunes, with some of the highest concentrations measured in the country (USEPA, 2007a). Wind speeds greater than about 17 miles per hour (mph) have the potential to cause significant wind erosion from the barren lake bed. Prior to implementing dust control measures on the lake bed, 24-hour average PM_{10} concentrations measured at the Dirty Socks monitor site at times exceeded 12,000 $\mu g/m^3$—more than 80 times higher than the 24-hour NAAQS of 150 $\mu g/m^3$.

Studies of dust transport from Owens Lake have shown that historically Owens Lake dust plumes have caused exceedances of the PM_{10} NAAQS as far as Ridgecrest, 60 miles south of the lake, exposing many more people to violations of the PM_{10} standard than just the residents near Owens Lake. About 40,000 permanent residents from Ridgecrest to Bishop are affected by the dust from Owens Lake. In addition, many visitors spend time in this dust-impacted area, to enjoy the many recreational opportunities the Eastern Sierra and high desert have to offer.

From 2012 through 2014, daily PM_{10} sampling recorded 24 PM_{10} exceedances at the Keeler monitor site. This averages about 8 exceedances of the PM_{10} NAAQS per year. The Lizard Tail monitor recorded 16 PM_{10} exceedance days from 2012 through 2014 and recorded the highest concentration (3,916 $\mu g/m^3$) of the nine sites monitored. Table S-1 shows the number of exceedances from 2012 through 2014 at each site. All monitor sites except Lone Pine were in violation of the 24-hour average PM_{10} NAAQS, which allows no more than one exceedance per year over a three year period.

Table S-1: OVPA NAAQS PM_{10} Violations (2012-2014)			
Monitoring Site	**2012**	**2013**	**2014**
Dirty Socks TEOM [1]	5	No Data	Incomplete
Keeler #3 PM_{10} TEOM	5	10	9
Lizard Tail TEOM	12	2	2
Lone Pine FDMS	1	0	0
Mill [1]	4	No Data	Incomplete
North Beach TEOM [1]	9	No Data	Incomplete
Olancha 3 TEOM	3	7	3
Shell Cut TEOM	10	4	1
Stanley TEOM	3	0	1

Notes:
[1] The Dirty Socks, Mill, and North Beach monitoring sites were not operated in 2013 and portions of 2014 due to lease disputes with the landowner.

S.4 Sources of PM_{10} Emissions

PM_{10} emissions in the OVPA are dominated by fugitive dust emissions resulting from wind erosion on the exposed Owens Lake playa. Other wind erosion sources in the OVPA include off-lake sources of lake bed dust (i.e. the Keeler and Olancha dune areas), small mining facilities, and open areas near the municipalities of Lone Pine and Independence that have been disturbed by human activity, including Inyo County's Lone Pine landfill. There is a lack of large industrial sources in the Owens Valley and the only other sources of criteria pollutant emissions are wood stoves, fireplaces, unpaved and paved road dust, and vehicle tailpipe emissions. Prescribed burning for wildland management on federal and private lands also generates PM_{10} in and around the nonattainment area; however, prescribed burning is not normally conducted on windy days when wind erosion is at its highest.

USEPA has established *de minimis* criteria for source categories contributing to PM_{10}. Specifically, USEPA has established a source category contribution level of 5 $\mu g/m^3$ based on the 24-hour PM_{10} NAAQS. If a source category contributes more than this level to measured ambient PM_{10} concentrations in a serious nonattainment area, then BACM or BACT are required to be implemented for that source. Once the *de minimis* level is determined, then any source category which exceeds that limit is subject to BACM/BACT.

The ambient PM_{10} data used in this analysis is from a near-exceedance day scenario in which the 24-hour PM_{10} concentration was measured near the NAAQS 24-hour PM_{10} exceedance threshold (150 $\mu g/m^3$) and the predominant source of PM_{10} was characterized as "non-lake." This is a conservative approach to calculating the *de minimis* level as it produces a small *de minimis* emissions threshold and makes it feasible for non-lake sources to be considered significant. Using an exceedance day with higher ambient concentrations and large lake bed emissions would raise the *de minimis* threshold and make it so that most non-lake sources would not be considered significant.

With the exception of fugitive windblown dust emissions and activity-related unpaved road dust emissions, the emissions data used in this analysis are derived from the California Air Resources Board (CARB) 2012 and 2015 emission inventories for Inyo County, and are ratioed to the OVPA by various factors (e.g. population, roadway miles, and land area). Where applicable, the fugitive windblown dust emission estimates take into account the wind conditions that occurred on the modeled near-exceedance day. For purposes of the significant source analysis, emissions from fugitive windblown dust emissions from unpaved roads and open desert areas are limited to a two-kilometer buffer surrounding Owens Lake. This approach is used as a way to account for the distance between emission sources and impacted monitors. While fugitive windblown dust emissions from unpaved roads and open desert areas are substantial in the OVPA, they are also diffuse. The two-kilometer buffer has been applied to capture the emissions that could have a quantifiable impact at the monitors; the lake bed and the two-kilometer buffer (including Keeler and Olancha dunes) is the "Owens Lake Subarea" relevant for the determination of significant sources.

The significant source emissions threshold is calculated by multiplying the exceedance day emissions inventory for the Owens Lake Subarea (Table S-2) by the ratio of the significant source category contribution (5 $\mu g/m^3$) to the near exceedance day concentration (150.1 $\mu g/m^3$). This yields a threshold level of 18.1 tons per day; there are three PM_{10} sources above the *de minimis* level and therefore identified as significant source categories in the OVPA, including: fugitive windblown dust from exposed lake beds and fugitive windblown dust from dunes (Keeler and Olancha).

Table S-2: Exceedance Day PM_{10} Emission Inventory for the Owens Lake Subarea and the OVPA (tons/day)

Category[1]	2012	2015
Manufacturing and Industrial	0.03	0.03
Service and Commercial	0.01	0.01
Mineral Processes	0.71	0.71
Metal Processes	0.02	0.03
Other (Industrial Processes)	0.01	0.01
Residential Fuel Combustion	0.02	0.02
Construction and Demolition	0.01	0.01
Paved Road Dust	0.03	0.03
Fugitive Windblown Dust from Agricultural Lands (Non-Pasture)	0.01	0.01
Fugitive Windblown Dust and Activity-related Dust from Unpaved Roads and Associated Areas[2]	12.09	12.09
Fugitive Windblown Dust from Exposed Lake Beds	45.30	45.30
Fugitive Windblown Dust from Dunes	--	--
Keeler Dunes	169.20	169.20
Olancha Dunes	312.00	312.00

Table S-2: Exceedance Day PM_{10} Emission Inventory for the Owens Lake Subarea and the OVPA (tons/day)

Fugitive Windblown Dust from Open Desert[2,3]	2.94	2.94
Managed Burning and Disposal	0.09	0.09
On-Road Mobile	0.02	0.01
Wildfires	0.17	0.17
TOTAL Owens Lake Subarea	**542.65**	**542.66**
Fugitive Windblown Dust from Unpaved Roads and Associated Areas (outside Owens Lake Subarea)	132.13	132.13
Fugitive Windblown Dust from Open Desert (outside Owens Lake Subarea)	53.76	53.76
TOTAL OVPA (for informational purposes only)	**728.54**	**728.55**

Notes:
[1] Sources with emissions less than 0.005 tons/day have been omitted.
[2] Fugitive windblown dust source limited to two-kilometer buffer around Owens Lake.
[3] Excluding areas associated with Olancha and Keeler dunes.

Data Sources:
All Source Categories (except those noted below): CARB emission inventory for Inyo County ratioed to the OVPA; **Unpaved Road Dust**: GBUAPCD; **Lake Beds and Dunes**: Air Quality Modeling; **Open Desert**: Constructive estimate based on similar land uses and conditions in Imperial County Air Pollution Control District.

S.5 Adopted Control Strategy and Measures

S.5.1 Owens Lake Bed Mitigations

Since 1980 GBUAPCD and other researchers have been involved with the study of the lake environment and the mechanisms that cause Owens Lake's severe dust storms. Since 1989 GBUAPCD has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unusual Owens Lake playa environment. Three dust control measures have been approved for use on the lake and have been designated as BACM by the District in concurrence with the USEPA.[1] These measures include Shallow Flooding, Managed Vegetation, and Gravel Blanket. Subsequent GBUAPCD Board Orders (see Sections S.5.1.4 and S.5.1.5) expanded and/or modified these BACM.

S.5.1.1 Shallow Flooding BACM

The naturally wet surfaces on the lake bed, such as seeps, springs, and the remnant brine pool, are resistant to windblown dust emissions. The Shallow Flooding BACM PM_{10} control measure attempts to mimic these physical processes, thus providing dust control over large areas with reasonably minimal and cost-effective infrastructure. Under this control measure water must be applied in amounts and by means sufficient to achieve the following performance standards established by the District.

For all Shallow Flooding areas except those within the 2006 Dust Control Area (DCA):

[1] Great Basin Unified Air Pollution Control District. 2003. Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan – 2003 Revision. GBUAPCD. Bishop, California. November 13.

- At least 75 percent of each square mile designated as BACM Shallow Flooding areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. For these Shallow Flooding dust control areas, 75 percent of each entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
- Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
- Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
- Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.

For all Shallow Flooding areas within the 2006 DCA:

- The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flooding Control Efficiency Curve (included as Figure S-1) to achieve the control efficiencies (CE) targets specified by the District for the period commencing on October 16 of each year.
- For only those Shallow Flooding areas with specified CE targets of 99 percent or more:
    - Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
    - Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
    - Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
- For only those Shallow Flooding areas with specified CE targets of less than 99 percent:
    - Shallow Flooding areal wetness cover shall be based upon the Shallow Flooding Control Efficiency Curve (Figure S-1) and shall be maintained through June 30 of every year.

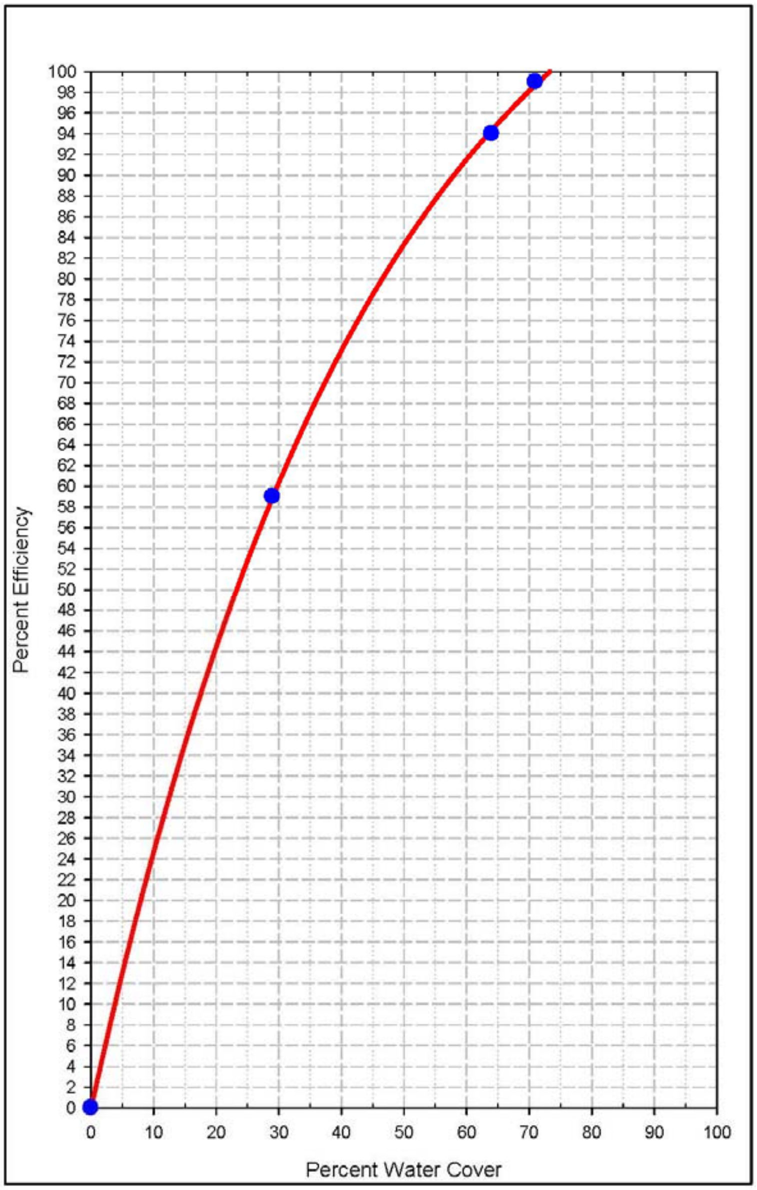

Figure S-1: Shallow Flooding Control Efficiency Curve

S.5.1.2 Managed Vegetation BACM

Vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. The Managed Vegetation BACM PM_{10} control measure attempts to create a vegetated environment from the barren playa that ultimately reduces windblown dust emissions. The primary performance requirement for Managed Vegetation BACM is based on the amount of surface cover provided by the vegetation present across the area. The vegetation cover is measured both as the overall average as well as the variation in spatial distribution across each contiguous Managed Vegetation control area. Areas controlled with Managed Vegetation BACM shall maintain a minimum overall average vegetation cover of 37 percent for each contiguous Managed Vegetation area. However, it is recognized that over-control in some portions of a control area can offset under-control in other areas, as long as under-controlled areas are not large enough to become emissive. Table S-3 provides a range of allowable vegetation covers across multi-sized grids to ensure coverage distributions are sufficient to prevent PM_{10} emissions. The cover at any point within a Managed Vegetation control area can vary from the average as set forth in Table S-3.

Table S-3: Managed Vegetation BACM Vegetative Cover Criteria

Grid Scale	Average	>5% cover	>10% cover	>20% cover
(acres)	(minimum % cover)	(minimum % of DCM area)		
0.1	37	92	83	65
1	37	94	87	68
10	37	95	89	74
100	37	95	90	77

Managed Vegetation BACM areas will be subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grid scales (to 1, 10, and 100 acres). Vegetative cover distributions measured across a Managed Vegetation site using the multiple grid scales will be characterized to determine if they meet the threshold levels given in Table S-3.

Vegetative cover compliance is to be determined based on a satellite image of the area taken in the fall between September 21 and December 21 of each year. The image shall be ground-truthed, calibrated, and validated by reference to measurements made by point frame or by equivalent methods approved at the sole discretion of the District. The vegetation planted for dust control shall consist only of locally-adapted native species approved by both the District and the CSLC. As of January 1, 2016, a plant list of 48 native species has been approved (GBUAPCD, 2015b).

S.5.1.3 Gravel Blanket BACM

The Gravel Blanket BACM PM_{10} control measure prevents PM_{10} emissions by: (1) preventing the formation of efflorescent evaporite salt crusts, because the large pore spaces between the gravel particles disrupt the capillary movement of saline water to the surface where it can evaporate and deposit salts; and (2) creating a surface that has a high threshold wind velocity so that direct movement of the large gravel particles is prevented and the finer particles of the underlying lake bed soils are protected. Areas controlled with Gravel Blanket BACM must meet one of the following two performance standards:

- The entire control area must be covered with a layer of gravel at least four inches thick, where all gravel material placed must be screened to a size greater than one-half inch in diameter. Where it is necessary to support the gravel blanket, it can be placed over a permanent permeable geotextile fabric; or
- The entire control area must be covered with a layer of gravel at least two inches thick underlain with a permanent permeable geotextile fabric. All gravel material placed must be screened to a size greater than one-half inch in diameter.

S.5.1.4 2008 Board Order

Concurrent with the publication of the 2008 SIP, GBUAPCD adopted Board Order No. 080128-01 ("2008 Board Order"), which required the City of Los Angeles to continue to operate and maintain the 29.8 square miles of BACM already established in the 2003 Dust Control Area (DCA). The 2008 Board Order also required the City of Los Angeles to implement an additional 12.7 square miles of Shallow Flooding or Moat & Row[2] in an area delineated as the 2006 DCA. The City was also mandated to control PM_{10} emissions from a 0.5 square-mile area in the southern portion of the Owens Lake bed, known as the "Channel Area". Per the 2008 Board Order, the City was allowed to implement up to 3.5 square miles of Moat & Row in the DCA. After three years, if the measure proved effective the City could apply to the District for a SIP revision to designate Moat & Row as BACM. The 2008 SIP was approved by CARB in June 2008 and submitted to the USEPA (CARB, 2008).

S.5.1.5 Post-2008 Board Order

After the adoption of the 2008 SIP, the City requested and was granted a variance in 2009 to extend the completion deadline for Moat & Row on 3.5 square miles of the lake bed. The variance included a condition that required the City to implement Gravel BACM on two square miles of the lake bed by 2012 (known as "Phase 8"). In 2011, a dispute arose between the District and the City of Los Angeles regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2008 SIP. Subsequent disputes were fully and finally resolved by the 2014 Stipulated Judgment entered in favor of the District.

A revision to the 2008 SIP was prepared in 2013 to incorporate an extension to the NAAQS attainment deadline, as well as to include modifications to some of the previously implemented control measures. Concurrent with this revision, GBUAPCD adopted Board Order No. 130916-01 ("2013 Board Order"), which required the City of Los Angeles to implement new dust control measures in place of Moat & Row in an approximately 3.1 square-mile area now called the "Phase 7a" area. The Phase 7a area includes six DCAs designated as T37-1, T37-2, T1A-3, T1A-4, T-32-1, and T12-1. Per the 2013 Board Order, the City of Los Angeles was required to implement fully-compliant BACM PM_{10} controls (other than Managed Vegetation BACM) in the Phase 7a areas by December 31, 2015. Areas controlled by Managed Vegetation BACM were required to achieve fully-compliant BACM vegetation cover by December 31, 2017. The 2013 Board Order excluded from the Phase 7a areas all California Register of Historical Resources-eligible areas plus necessary buffer areas. Approximately 277 acres of the Phase 7a areas were identified as Eligible Cultural Resources (ECR) areas and were given the title of "Phase 7b Areas." The District will monitor the Phase 7b ECR areas following implementation of dust controls in adjacent areas. It is anticipated that emissions from the ECR areas will be reduced once dust control measures are implemented in adjacent areas. In the same manner as the off-lake dust source areas were created as a result of sand migration from the lake bed, the ECR areas will have less sand migration from the adjacent areas after dust controls are in place and it is expected that emissions will be reduced as dust is winnowed from the loose sand deposits. This

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2 "Moat & Row" is a PM_{10} control measure characterized by an array of earthen berms (rows) about 5 feet high above the lake bed surface, flanked on either side by slope-sided ditches (moats) about 4 feet deep. The rows are topped with sand fences up to 5 feet high that increase the effective height of the rows. Moats are intended to capture moving soil particles, and rows are intended to physically shelter the downwind lake bed from the wind.

emissions decay has been monitored by the District in off-lake areas that are adjacent to lake bed dust control areas. For attainment demonstration purposes, the Phase 7b ECR areas will be assumed to have no emissions after dust controls are implemented in 2015. However, if any ECR area is determined to have caused or contributed to an exceedance of the standard after dust controls are implemented in adjacent areas, it will be ordered for dust control under the contingency measure provisions in the SIP. The 2013 Board Order also recognized adjustments to existing BACM, including "Reduced Thickness Gravel"[3] as an approved type of the Gravel Blanket BACM and "Brine Shallow Flooding"[4] as a subcategory of the Shallow Flooding BACM. In light of California's ongoing drought, the 2013 Board Order also emphasized the need for reductions in water usage, stating that "[the] District and [the City of Los Angeles] shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered on Owens Lake." Lastly, the 2013 Board Order modified provisions for PM_{10} control in the Keeler Dunes stating that the District would work with stakeholders to develop and implement a project to control dust emissions from the dunes by December 31, 2015.

S.5.2 Keeler Dunes Mitigations

The Keeler Dunes were identified in the 2006 Settlement Agreement and the 2008 SIP as one of the significant sources of PM_{10} emissions in the OVPA requiring dust control implementation in order for the OVPA to attain the NAAQS. As a result, the District began investigating the Keeler Dunes in 2008 with the goal of developing a dust control strategy. As part of the Keeler Dunes Investigation, several public workshops and meetings were held to discuss the results of the work and present possible dust control measure ideas and receive input from interested stakeholders, including: Native American Tribes in the Owens Valley, Keeler and Lone Pine residents, Caltrans, the U.S. Bureau of Land Management (BLM) and the City of Los Angeles. Since the Keeler Dunes are located on both Federal land, under the jurisdiction of the BLM, and land owned by the City of Los Angeles, preparation of the environmental review documents for the project followed requirements for both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

In October through November 2011, the District prepared a Notice of Preparation (NOP) for the project and held public workshops to receive input on a proposed dust control project in the Keeler Dunes. Originally, the Draft EIR/EA was going to be completed and made available for public comment in early 2012. However, due to several project delays, the Draft EIR/EA was not completed until March 2014 and the Final EIR/EA was not certified until July 2014 (GBUAPCD, 2014).

The main action that enabled the dust control project to finally move forward was the August 2013 Stipulated Order of Abatement. As part of the abatement order, the City of Los Angeles made a $10 million public benefit contribution to the District to control PM_{10} emitted from the Keeler Dunes. In return, the District agreed to forever release the City of Los Angeles from any and all liability for dust emissions, regardless of origin, from the Keeler Dunes and other dune areas in the vicinity of Owens Lake.

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[3] A measure consistent with the Gravel Blanket BACM except that the gravel thickness is reduced from a minimum of four inches to two inches, provided that all reduced thickness gravel areas are underlain with geotextile fabric.

[4] A measure consistent with the Shallow Flooding BACM except that the water used for dust control may contain elevated levels of dissolved salts.

The Keeler Dunes project is fundamentally a vegetation project in which the goal is to recreate a stable self-sustaining vegetated dune system while at the same time minimizing the impact to the natural resources present within the dunes. The design for the project was based on a small-scale pilot project completed by the District from 2013-2015 and from previous dust control research by the Desert Research Institute in Reno, Nevada in New Mexico and along the coast of California as well as dust control measures used in China and Africa for stabilization of large mobile sand dunes. The ultimate aim of the project is to establish a self-sustaining stable non-emissive vegetated dune field, similar to those found in other locations around Owens Lake that can be managed with minimal or no extended resources.

The design of the Keeler Dunes dust control project uses straw bales as temporary roughness elements to stabilize the dune surface in order to allow the establishment of five species of locally adapted native shrubs. The District conducted a 1.2 acre test of the project design in the northern portion of the Keeler Dunes starting in 2013. Data from this test project confirmed that target dust control levels can be achieved with the straw bale array and that the native shrubs can successfully be established within the dune system.

The full scale dust control project is designed to reduce PM_{10} emissions by about 95% within the community of Keeler and involves the placement of approximately 82,000 certified weed-free straw bales and planting of approximately 246,000 native shrubs (three shrubs per bale). The bales are placed in a random array patterned after a natural vegetation distribution. The native shrubs are irrigated with water from the Keeler Community Service District well through a temporary above ground irrigation system. After a three year plant establishment period it is anticipated that the shrubs will have matured such that they no longer require supplemental irrigation.

Construction of the Keeler Dunes Project began in October 2014. Placement of the straw bales was completed in December 2015 along with the planting of 48,000 native shrubs. Additional plantings will take place in 2016 to complete the project, but in the meantime, the straw bales are expected to reduce dust emissions from the Keeler Dunes by 95%.

S.6 Proposed Control Measures

The following proposed control measures come from the 2014 Stipulated Judgment and additional discussions between the District and the City of Los Angeles. They are summarized below and form the basis of the District's proposed Rule 433.

S.6.1 Future On-Lake Supplemental Dust Control Areas

As a result of the 2014 Stipulated Judgment, the City of Los Angeles will be required to implement BACM PM_{10} control measures on 3.62 square miles of the Owens Lake bed by December 31, 2017 (Phase 9/10 areas; see Figure S-2), with the exception for areas identified as ECR areas. The District will monitor the Phase 9/10 ECR areas following the implementation of dust controls in adjacent areas. It is anticipated that emissions from the ECR areas will be reduced once dust control measures are implemented in adjacent areas. In the same manner as the off-lake dust source areas were created as a result of sand migration from the lake bed, the ECR areas will have less sand migration from the adjacent areas after dust controls are in place and it is expected that emissions will be reduced as dust is winnowed from the loose sand deposits. This emissions decay has been monitored by the District in off-lake areas that are adjacent to lake bed dust control areas. For attainment demonstration purposes, the Phase 9/10 ECR areas will be assumed to have no emissions after dust controls are implemented in 2017. However, if any ECR area is determined to have caused or contributed to an exceedance of the standard after dust controls are implemented in adjacent areas, it will be ordered for dust control under the contingency measure provisions in the SIP.

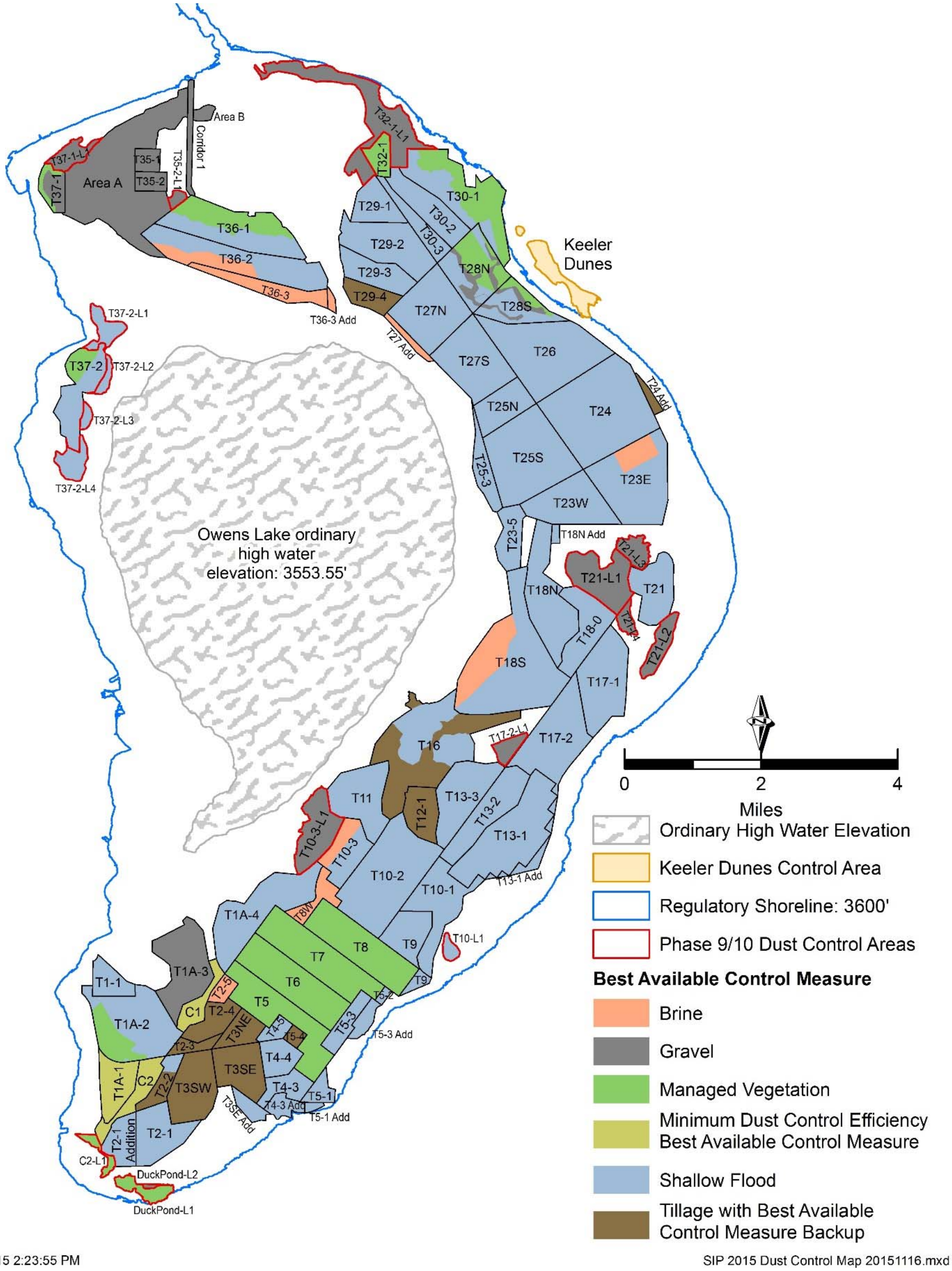

Figure S-2: PM_{10} Dust Control Measures Map

S.6.2 Shallow Flooding BACM

In areas containing infrastructure capable of achieving and maintaining compliant Shallow Flooding BACM, the City of Los Angeles may implement Tillage with BACM (Shallow Flood) Backup (TWB[2]) or Brine BACM as alternatives to BACM Shallow Flooding to achieve specified CE levels. Additionally, in specific control areas that have historically displayed a late start and/or early end to source activity, the City of Los Angeles may implement Dynamic Water Management to modify the Shallow Flooding dust season.

Tillage with BACM (Shallow Flood) Backup or TWB[2] involves the roughening of a soil surface using mechanical methods in accordance with performance requirements established by the District. If the erosion threshold established by the District is exceeded, the City of Los Angeles must utilize BACM Shallow Flooding as a back-up control method in order to prevent NAAQS violations. Water must be applied in amounts and by means sufficient to meet the CE level of 99% or CE targets for Minimum Dust Control Efficiency (MDCE) areas.

Dynamic Water Management or DWM is an operational modification to BACM Shallow Flooding that allows delayed start dates and/or earlier end dates required for shallow flooding in specific areas that have historically had low PM_{10} emissions within the modified time periods. The truncated dust control periods allow for water savings while achieving the required CE level. If a DWM area becomes susceptible to wind erosion outside of the modified dust control period, the area is required to be flooded to meet the required CE for that area.

Brine BACM involves the application of brine and the creation of wet and/or non-emissive salt deposits sufficient to meet a CE level of 99% or CE targets for Minimum Dust Control Efficiency (MDCE) areas. Unlike Brine Shallow Flooding (approved in 2013), Brine BACM areas are not required to meet prescribed Shallow Flooding wetness cover requirements, but instead are allowed to meet the required cover requirement with a mix of water and stable salt crusts in accordance with performance requirements established by the District. However, if a brine BACM area becomes susceptible to wind erosion (i.e. the District-defined erosion threshold is exceeded), the area is required to be flooded to meet the required CE for that area.

S.6.3 Minimum Dust Control Efficiency BACM

Beginning in 2008, the District allowed for Minimum Dust Control Efficiency or MDCE BACM in certain areas to reduce water use and address environmental concerns in sensitive wetlands areas. MDCE BACM is a dust control measure for which the control efficiency target is adjusted to match the required control level based on air quality modeling for the 2006 dust control areas. The control efficiency targets may be less than 99%, but the level of control in all areas is intended to prevent exceedances of the NAAQS. MDCE BACM is currently implemented in certain Shallow Flooding areas, in the T1A-1 Sand Fence Area, and in the 0.5 square mile Channel Area.

S.6.4 Off-lake Sources

With the exception of Keeler Dunes, controls on off-lake sources are not proposed as controls or contingency measures in this 2016 SIP. There are two rationales for this decision. The first is that monitoring and modeling analyses indicate that emissions from off-lake sources more than two kilometers away do not have an impact on achieving attainment. This belief is consistent with "source weighting" analyses performed by the Maricopa Association of Governments (MAG) in support of the May 2012 *MAG 2012 Five Percent Plan for PM-10 for* *the Maricopa County Nonattainment Area* ("MAG 5% Plan").[5] In the MAG 5% Plan, MAG asserted that there is a need to account for distance between emission sources and impacted monitors and found that a 1/distance weighting factor proved to be the best value to use to adjust PM_{10} emissions developed through back trajectory domains. In addition, in supporting analyses performed using the dispersion model AERMOD, MAG found that at the threshold of high wind conditions (i.e. winds greater than 12 miles per hour), PM_{10} concentrations drop by a factor of 10 between 0 and 500 meters, between 500 and 2,800 meters, and between 2,800 and 30,000 meters.[6] As the majority of the PM_{10} monitors in the OVPA are on or very near the Owens Lake bed, the two-kilometer buffer is used to capture the emissions that could have quantifiable impacts at the monitors.

The second rationale is that at sources less than two kilometers away emissions will continue to reduce as on-lake controls prevent additional deposition on those lands. This emissions decay has been monitored by the District in off-lake areas that are adjacent to lake bed dust control areas.

S.7 Modeled Attainment Demonstration

An air quality modeling analysis was performed to show that the proposed control strategy would reduce the PM_{10} emissions to a level that will bring the OVPA into compliance with the PM_{10} NAAQS. After the proposed control strategy is implemented, ambient PM_{10} levels are expected to be below the 24-hour PM_{10} NAAQS of 150 $\mu g/m^3$ at all monitor locations that are at or above the regulatory shoreline. The highest impact area is expected to occur in the area near and above the northeast regulatory shoreline.

S.8 Conclusion

The proposed control strategy requires the City to continue to operate and maintain the 45.0 square miles of existing control measures on the Owens Lake bed. It also requires control of the Keeler Dunes and the placement of BACM on an additional 3.62 square miles of lake bed identified as the Phase 9/10 areas. Air quality modeling has shown that this strategy can reduce PM_{10} impacts at sites above the regulatory lake shore to below the federal 24-hr PM_{10} standard by 2017.

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5 MAG. 2012. MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area. May. Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-for-PM10-for-the-Maricopa-County-Nonattainment-Area.pdf. Accessed on January 11, 2016.

6 MAG. 2012. MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area. Appendices: Volume II. May. Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-Appendices_Volume-2.pdf. Accessed on January 11, 2016

1. INTRODUCTION

The purpose of the 2016 State Implementation Plan (2016 SIP) is to provide a plan to (1) attain the National Ambient Air Quality Standard (NAAQS) for particulate matter less than 10 microns in diameter (PM_{10}) as required by the Clean Air Act (CAA) and its 1990 Amendments and (2) implement the provisions of the 2014 Stipulated Judgment between the Great Basin Unified Air Pollution Control District (GBUAPCD or "District") and the City of Los Angeles ("City") which provides for the continued operation of existing dust control measures and for the implementation of additional control measures in order to attain and maintain compliance with state and federal air quality standards (*City of Los Angeles, et al. v California Air Resources Board*, Sacramento County Superior Court, Case No. 34-2013-80001451-CU-WM-GDS).

The 2016 SIP revises the requirements contained in the 2008 Owens Valley PM_{10} SIP (2008 SIP) which was prepared in response to a finding by the United States Environmental Protection Agency (USEPA) that the southern Owens Valley (known as the Owens Valley Planning Area or OVPA) did not attain the NAAQS for PM_{10} by December 31, 2006, as mandated by the CAA (USEPA, 2007a). As required by CAA Sections 188(e) and 189(d), the 2008 SIP provided for attainment as soon as practicable and committed to achieving at least a five percent annual reduction in PM_{10} emissions starting from a 2006 emission inventory base year. The 2016 SIP revision continues the commitment to attain the NAAQS by providing a control strategy to implement control measures on additional areas at Owens Lake and in the Keeler Dunes and to approve the use of new dust control measures to augment the existing Best Available Control Measures (BACM) that were available in the 2008 SIP.

1.1 Federal Clean Air Act and the Owens Valley SIP History

In 1987, the USEPA revised the NAAQS, replacing total suspended particulates (TSP) with PM_{10}, a new indicator for particulate matter. The intent of this health-based standard for particulate matter is to prevent airborne concentrations of suspended particles that are injurious to human health. PM_{10} can penetrate deep into the respiratory tract, and lead to a variety of respiratory problems and illnesses.

Also in 1987, the USEPA designated the OVPA as one of the areas in the nation that violated the new PM_{10} NAAQS. Subsequent air quality monitoring by the District has shown that the bed of Owens Lake—most of which is owned by the State of California and managed by the California State Lands Commission (CSLC)—is the major source of PM_{10} emissions contributing to air quality violations in the OVPA. The Owens Lake bed is considered an anthropogenic (human-caused) source of PM_{10} because the City of Los Angeles' Aqueduct diverts water sources that historically supplied the lake. In January 1993, the OVPA was reclassified as "serious nonattainment" for PM_{10}. The District prepared and adopted a SIP in 1998 (1998 SIP), which was approved by the USEPA in 1999. Subsequent SIP revisions were prepared in 2003 to address PM_{10} control requirements to reduce windblown dust from Owens Lake and in 2008 to incorporate dust control provisions of the 2006 Settlement Agreement between the City of Los Angeles and the District (Appendix I-1). This 2016 SIP will provide an update on control measure implementation, commitments for additional dust controls at Owens Lake and in the Keeler Dunes, and new control measures to augment the BACM in the 2008 SIP (see Section 6.3 for additional details).

1.2 Elements of the 2016 SIP

The 2016 SIP includes a PM_{10} emissions inventory for the OVPA, a determination of significant sources of PM_{10} emissions, a discussion of control measures, an analysis of the control strategy needed to attain the PM_{10} standard, and an air quality modeling analysis that demonstrates it is possible to attain the PM_{10} standard with the proposed additional dust controls. The following is a brief description of the contents of the 2016 SIP:

- Chapter 2 describes the OVPA and provides a history of Owens Lake and the air pollution problem.
- Chapter 3 includes a summary of PM_{10} air pollution measurements taken in the Owens Lake area, a description of sensitive airsheds in the area, and an assessment of how air quality in the Planning Area compares to the federal standards.
- Chapter 4 contains the PM_{10} emissions inventory summary from wind erosion and other sources in the OVPA, as well as a determination of the significant sources of PM_{10}.
- Chapter 5 describes the PM_{10} control measures that the District, in cooperation with the City, has developed for the significant sources of PM_{10}, an analysis of how those control measures compare with other control measures implemented in other serious nonattainment PM_{10} areas, and summarizes the status of those control measures as BACM.
- Chapter 6 sets forth the control strategy and describes how the control measures will be placed on the significant sources to accomplish the overall level of control that is needed upon completion.
- Chapter 7 contains the modeled attainment demonstration and describes the technical approach to the dispersion modeling.
- Chapter 8 contains a discussion on the proposed extended attainment date and 5% plan requirements.
- Chapter 9 presents other requirements of the CAA including reasonable further progress quantitative milestones and proposed contingency measures.
- Chapter 10 contains the proposed rule (Rule 433) that will be issued to implement the 2016 SIP control strategy.
- Conclusions and a checklist of the required elements of a SIP document are provided in Chapter 11.
- References are summarized in a composite list in Chapter 12.
- The declaration of the Board Clerk and associated resolution is contained in Chapter 13.
- Definitions, terms, acronyms and measurement units are defined in a glossary at the beginning of this SIP (located after the Table of Contents).
- Appendices to the 2016 SIP are organized by chapter (e.g. Chapter 2 = Appendix II). Appendices contain details about ambient PM_{10} monitoring results, emission inventories, assessment of BACM for significant PM_{10} sources, control strategy and attainment demonstration plan, and additional 2016 SIP support documents (see List of Appendices in the Table of Contents).

2. OWENS VALLEY PLANNING AREA

2.1 Project Location and Land Ownership

2.1.1 Location

The OVPA is located in Inyo County in eastern-central California. It is situated at the south end of the deep, long, narrow Owens Valley with the Sierra Nevada to the west (maximum elevation 14,505 feet), the White-Inyo Mountains to the east (max. elev. 14,246 ft.), and the Coso Range to the south (max. elev. 8,160 ft.) (see Figures 2-1 and 2-2). The predominantly dry, alkaline Owens Lake bed is approximately eight miles south of the community of Lone Pine on U.S. Highway 395 and 60 miles north of the city of Ridgecrest. The communities of Olancha and Keeler are located on the southwestern and eastern shores of the lake bed, respectively. The bed of Owens Lake is defined as the area below 3,600 feet above mean sea level (all elevations will be given in feet above mean sea level). The lake bed extends about seventeen miles north and south and ten miles east and west and covers an area of approximately 110 square miles (approx. 70,000 acres). The majority of the lake bed (over 89%) is state land under the jurisdiction of the CSLC. The remaining portions of the lake bed are owned by the City, the U.S. Bureau of Land Management (BLM), and other public and private entities.

Beginning in 2000, the City of Los Angeles Department of Water & Power (LADWP) constructed various dust control measures over an area encompassing a total of 43 square miles (approx. 27,500 acres) on the lake bed. Figure 2-3 shows the locations of the BACM control measures that were implemented by the end of 2015, as well as the control measures that will be completed by the end of 2017. These will bring the total area of land under control to 48.6 square miles (approx. 31,100 acres).

2.1.2 Land Ownership

As mentioned above, approximately 65,000 acres, or 89 percent, of the Owens Lake bed is owned by the State of California and managed by the CSLC. Most of this state-owned land on the lake bed is leased for a variety of purposes. Rio Tinto Minerals leases over 16,000 acres of lake bed for the purposes of extracting trona ore (an evaporite sodium carbonate mineral). In addition, there are a few agricultural (grazing) leases along the regulatory shoreline. Most of the remaining state-owned lake bed areas are leased from the state by the City for the purpose of developing and implementing PM_{10} control measures. Most of the remaining 11 percent of the lake bed, or approximately 8,000 acres, is owned by the City and is managed by the LADWP. The City's lands are primarily in the Owens River delta and on the lake bed west of Keeler. A few small areas below and considerable areas above the regulatory shoreline are federal lands managed by the BLM. A few small isolated private land parcels are also located on the lake bed. All control measures and supporting infrastructure are owned by the City, on property owned by the City, or on leases or easements from other underlying owners.

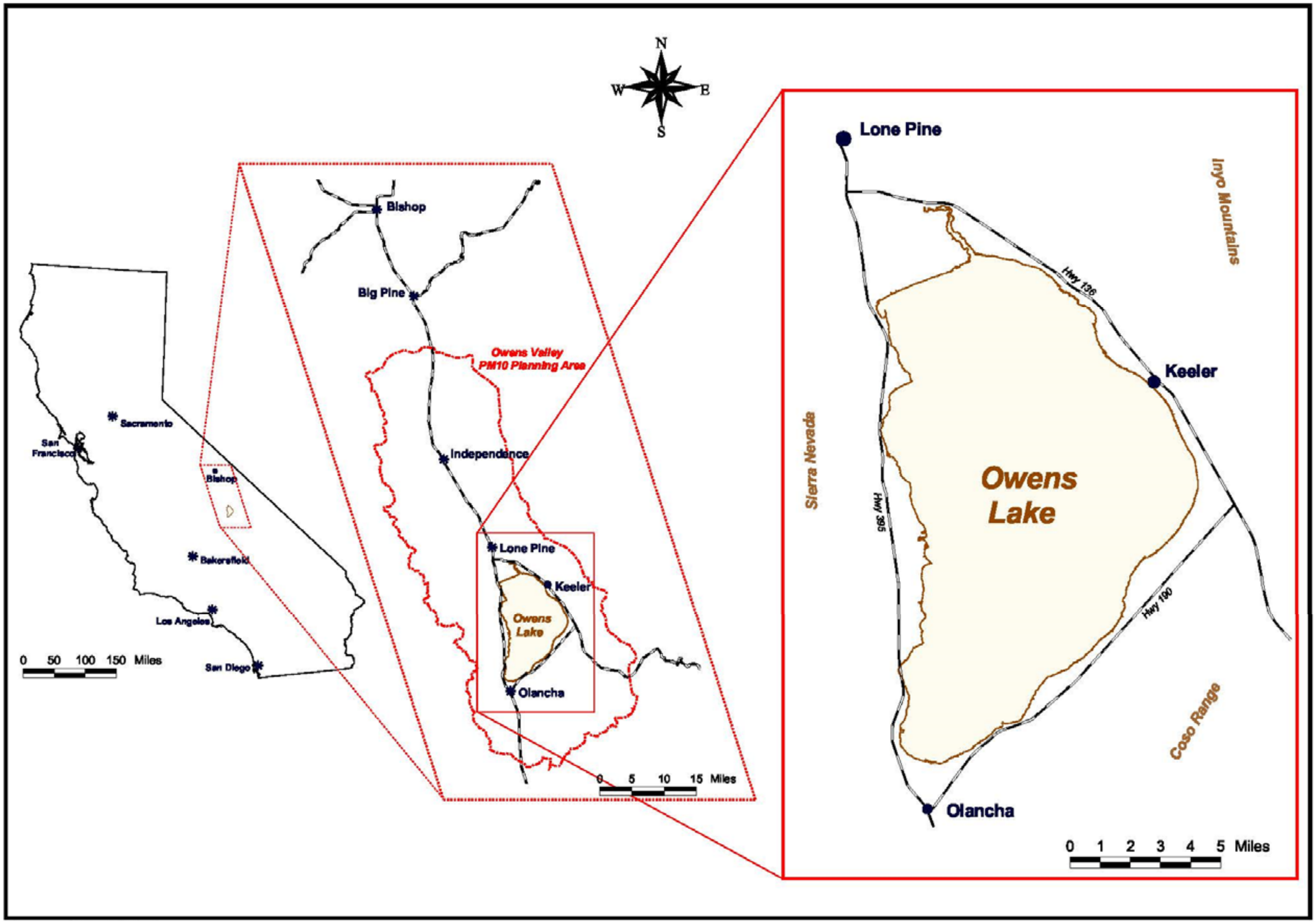

Figure 2-1: Vicinity Map

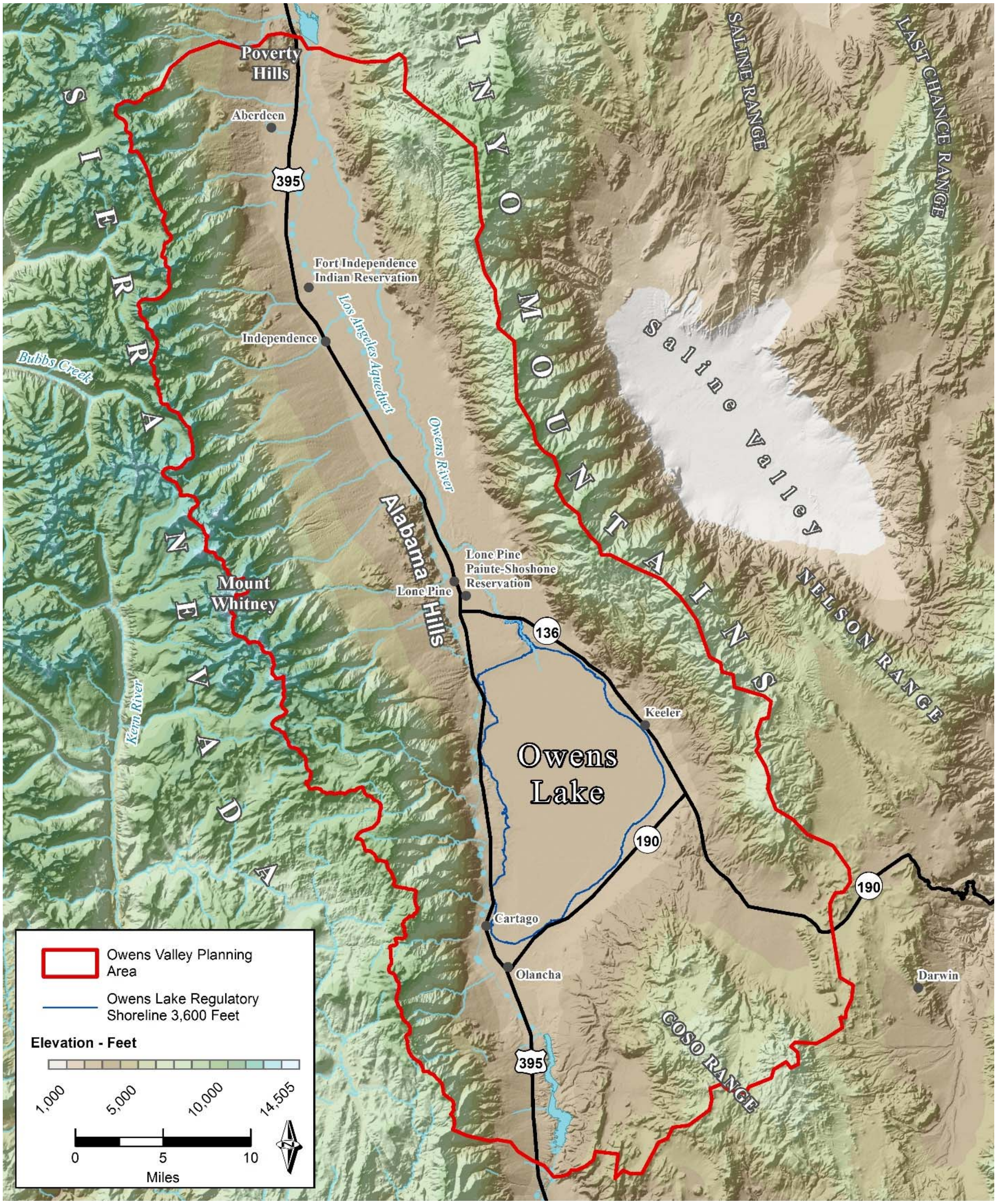

Figure 2-2: Relief Map

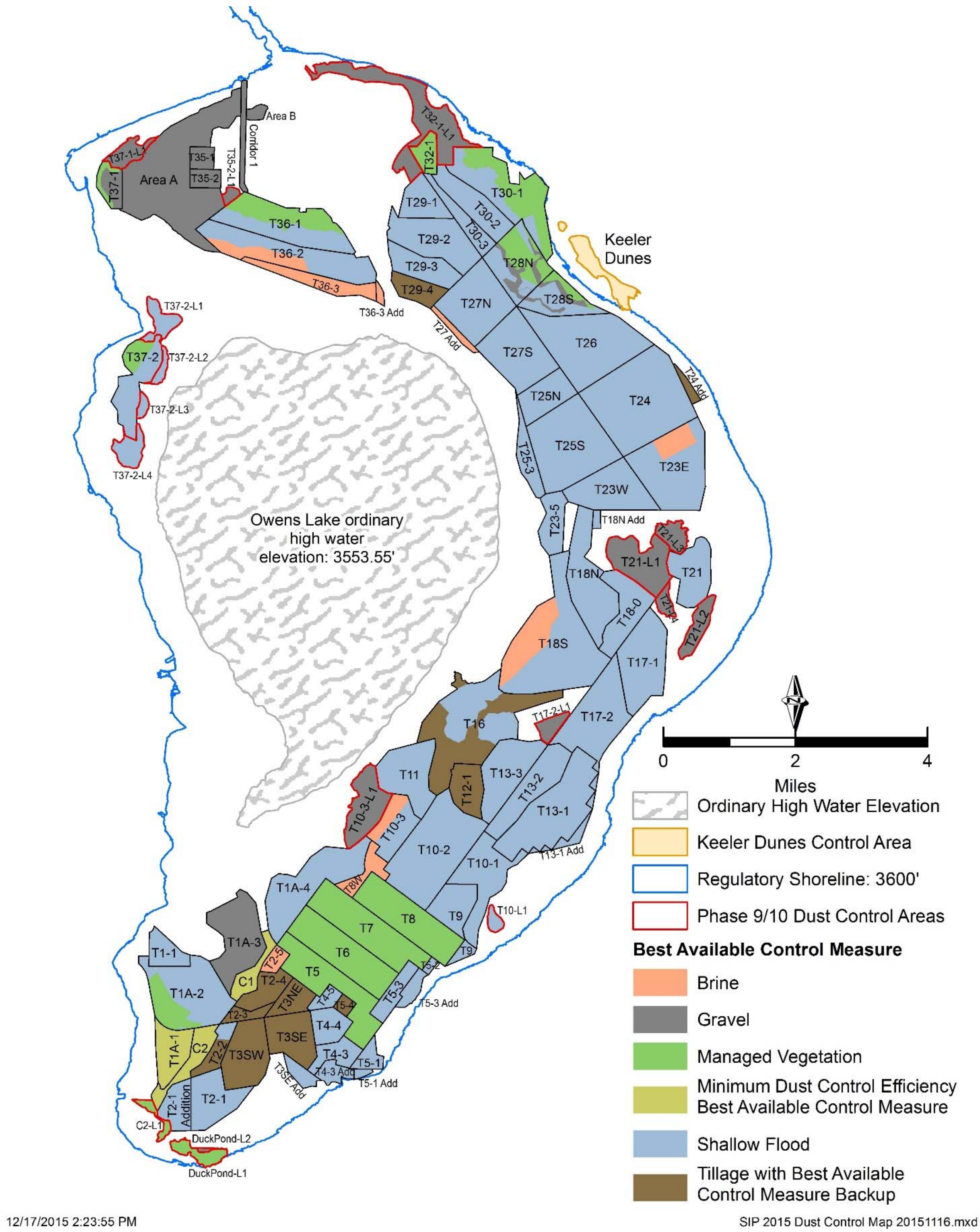

Figure 2-3: PM_{10} Dust Control Measures Map

2.2 Project History

2.2.1 Environmental Setting and Effects of Diversions on Owens Lake

2.2.1.1 Geologic History

Owens Lake has had a dynamic history over the past millennia in response to climatic and hydrologic changes. In its current condition, Owens Lake is a terminal playa in the southern portion of the Owens Valley that receives only a small amount of surface water through the remnant flows of the Owens River and a few springs. However, before historic times (prior to the mid-1800s), Owens Lake had a varied history such that the lake ranged from a large relatively deep fresh water lake covering hundreds of square miles to a small saline lake thought to be only a few tens of square miles.

Owens Lake is part of an ancient chain of lakes formed over 140,000 years ago. During most of their history, the system was supplied with water from the Owens River drainage (although at their largest extent the lakes also received water from Lake Russell [in the Mono Basin] in the north) and extended through China Lake, Searles Lake, and Panamint Lake to Lake Manley, the southeastern-most lake of the chain, in what is now known as Death Valley.

Geomorphic and sedimentological data indicate that the water levels in pluvial Owens Lake fluctuated significantly throughout its history with periods of overflow separated by periods of lake levels remaining within the basin. The oldest recognized shoreline features are present at elevations between 3,871 and 3,937 feet and were formed about 160,000 years before present. Prominent preserved shoreline features at elevations between 3,806 feet and 3,757 feet mark high stands of ancient Owens Lake estimated to have formed about 25,000 and 15,500 years before present, respectively. During the Pleistocene-Holocene transition (15,000 to 10,000 years before present) the geologic record indicates that the lake level of Owens Lake had extreme fluctuation but that it was turned into a closed-basin lake with no surface outflow through Rose Valley (Bacon et al., 2006).

During periods when the basin was hydrologically closed, the lack of surface outflow from Owens Lake combined with an arid climate created a saline condition with the only water loss coming from evaporation and transpiration. Historic Owens Lake, in 1872 prior to significant water diversions, was a perennial closed-basin alkali lake covering over approximately 100 square miles with a maximum water depth of about 50 feet. With the completion of the Los Angeles Aqueduct in 1913 and the associated beginning of major water export from the Owens Valley, the water level of Owens Lake dropped to its present level of 3,554 feet by 1926 exposing the lake bed surface and deposited salts.

Present in several locations around the historic bed of Owens Lake are small dune systems. The oldest dune systems are present at an elevation of 3,619 feet and formed about 900-730 years before present. These paleo-dunes are visible as stable vegetated mounds and ridges that are aligned subparallel to the margin of the modern Owens Lake playa. In several areas around the Owens playa younger active modern dunes are present. These dunes and sand sheets formed since the modern desiccation of Owens Lake by material transported from the exposed lake bed onto the surrounding alluvial fans (Bacon et al., 2006; Lancaster and Bacon, 2012).

2.2.1.2 Historic Lake Levels

Although historic lake levels were as high as 3,597 feet in 1878 (Lee, 1915), surface water diversions in the Owens Valley over the last 130 years have reduced the lake to less than one-third of its original size and about five percent of its original volume (Mihevc et al., 1997). From the 1880s to the early 1900s, withdrawals from the Owens River for agricultural purposes substantially reduced surface water inflow to the lake. Extensive in-valley irrigation projects compounded by drought caused the lake level to drop as low as 3,565 feet in 1906. However, as the drought ended and lands purchased by the City of Los Angeles were taken out of agricultural production, by 1912 the level had risen to 3,579 feet (Lee, 1915). In 1913, the City completed a fresh water aqueduct system and began exporting waters of the Owens River south to the City of Los Angeles. Demand for exported water increased as Los Angeles grew, and diversions for irrigation continued in the Owens Valley (mainly on City-owned property). These factors resulted in Owens Lake becoming virtually dry by 1926—its level having dropped to its current ordinary high water elevation of about 3,554 feet (Saint-Amand, et al., 1986 and LADWP, 1966).

A former or stranded shoreline was left behind at an approximate elevation of 3,600 feet. The former shoreline bounds the lake bed playa in aerial photographs and on most maps. The area enclosed by the stranded shoreline is approximately 110 square miles (approx. 70,000 acres). Today, the remnant Owens Lake consists of a hypersaline permanent brine pool about 26 square miles (16,500 acres) in size in the lowest portion of the basin, surrounded by dry playa soils and crusts. The ordinary high water mark of this remnant brine pool has been defined by the U.S. Army Corps of Engineers to be that portion of the lake basin below 3,553.55 feet. Evaporite deposits and brines cover much of the playa area; the concentration of dissolved solids (salts) can be as high as 77 percent by weight (GBUAPCD, 2001).

2.2.1.3 Plants and Wildlife

The Owens Valley has been described as having a very rich variety of plants with over 2,000 species represented in the region, though they are limited in distribution at Owens Lake to the relic shoreline and nearby alluvial fans (DeDecker, 1984). Riparian, alkaline meadow and alkali seep plant communities, which circumscribe Owens Lake, provide important habitat for resident and migratory wildlife species. Historically, Owens Lake was one of the most spectacular places for birds in California. After the lake dried, and prior to dust mitigation, wildlife resources were limited, mostly confined to springs and seeps fringing the margin of the lake. Dust mitigation measures, especially shallow flooding, ponding, and wetlands currently attract tens of thousands of migratory birds and provide habitat for nesting birds. In 1997, the National Audubon Society designated Owens Lake a California Important Bird Area. An estimated 63,000 American Avocets stop at the lake during fall (Page and Ruhlen 2002). A wintering group of 300 to 400 Snow Geese winters at the lake and Snowy Plover breed there in very high numbers (400 to 600 adults; G. Page, Point Reyes Bird Observatory [PRBO]).

2.2.1.4 Cultural History

The Owens Valley has attracted the interest of archeologists since at least the 1930s. The Riddells (Riddell, 1951, Riddell and Riddell, 1956) conducted the major work in the region in the 1940s and 1950s, recording several sites on the perimeter of Owens Lake including important sites at Cottonwood Creek and Rose Spring. Two California State Historic Landmarks and two California Points of Historic Interest are located in the vicinity of Owens Lake. Ethnographic data indicate that the eastern shore of Owens Lake was used by Native American groups. Historic resources related to mining and transportation have been identified above the stranded shoreline.

The shorelands of Owens Lake have a diverse and rich prehistoric and historic cultural history. Native American tribes have lived in the Owens Lake area for thousands of years utilizing the abundant water, animal, and plant resources of the area and incorporating them into their cultural heritage. Following settlement of the valley by people of European descent in the late 1800s, the eastern shore of Owens Lake became the industrial center of Inyo County. Mining at Cerro Gordo, in the Inyo Mountains east of Owens Lake, began in 1865 and at its peak it was one of the largest silver mines in California. In the 1870s steamboats provided transportation for materials across Owens Lake. The narrow gauge Carson and Colorado Railroad was completed to Keeler in 1883 providing rail access north up the Owens Valley into Nevada. Salt mining and production of soda ash began on the eastern side of Owens Lake with the Inyo Development Company in 1885 and later with the Natural Soda Products plant in 1912. With the desiccation of Owens Lake, salt mining moved to the western shore of Owens Lake in 1917. Currently, salt mining is conducted within the brine pool area by Rio Tinto Minerals.

2.2.2 Legal History

Prior to the implementation of control measures, there were two legal decisions that affected future dust controls at Owens Lake. One was the Natural Soda Products case that limited the City's ability to put water on the lake bed, and the other was Senate Bill 270 (SB 270) which required the City to implement dust control measures at Owens Lake in order to mitigate air pollution caused by their water gathering operations. Senate Bill 270 was subsequently codified as California Health and Safety Code Section 42316 ("Section 42316"). From 1997 through 2014, when the 2014 Settlement Agreement was reached, there were numerous legal actions related to dust control requirements at Owens Lake. This included cases taken to hearing boards, the California Air Resources Board (CARB), and state and federal courts. The outcome of these cases provided the framework for the dust control strategy in the 2016 SIP. The cases that helped shape this strategy are discussed in the following sections.

2.2.2.1 Natural Soda Products Co. vs. City of Los Angeles

In 1937, the Natural Soda Products Company, a lessee of mineral rights from the State of California, sued the City of Los Angeles for damages to its chemical plant and business caused by the City's flooding of Owens Lake, which occurred in 1937, 1938, and 1939. The court decided the case in 1943 and a judgment for damages was awarded. Additional action by the State, as well as the subsequent appeal by the City resulted in an injunction through which the City was prohibited from increasing the natural flow of the Owens River, by diverting waters of the Mono Basin into it, if such a diversion would necessitate the release of water into or onto Owens Lake. In addition, the City was found to be under no obligation to spread surplus water onto land owned in the Owens Valley in excess of amounts that could reasonably be used on such land or stored underground for future beneficial use.

Although the Owens Lake dust control measures are not expected to interfere with mining interests, the Shallow Flooding and Managed Vegetation control measures (see Section 6.2) involve releasing water onto Owens Lake, which is an action that could have conflicted with the injunction. In September of 2000, the Riverside County Superior Court modified that injunction to allow for the implementation of dust control measures on Owens Lake (People v. City of Los Angeles, et al., (2000) Riverside County Superior Court, Case No. 34042).

2.2.2.2 California Health and Safety Code Section 42316

In 1982, the City applied for a permit from the District to construct and operate a geothermal electric generating plant in the Coso Known Geothermal Resource Area. The permit was denied on the basis that the City was in violation of air pollution rules and regulations elsewhere in the region. Specifically, District Rule 200 considered the water-gathering operations of the City to be a "facility" responsible for the particulate emissions from Owens Lake and concluded that an air quality permit was required for the City's Aqueduct operations.

After failure of efforts to petition the action, a negotiated settlement emerged in SB 270 (now codified as Section 42316) sponsored by Senator Dills in 1983. Under Section 42316, the District may require the City to undertake reasonable measures to mitigate air quality impacts of its activities in the production, diversion, storage, or conveyance of water and may require the City to pay reasonable fees associated with the development of the mitigation measures and related air quality analyses. The mitigation measures shall not affect the right of the City to produce, divert, store, or convey water. The City may appeal a District order to the CARB. Either the City or the District may challenge the CARB decision in the California Superior Court. Under this provision, the District has ordered the City to implement BACM dust controls at Owens Lake and left the choice of whether or not to implement a measure using water to the City. The selected control measures must also be approved by the CSLC and other stakeholders that consider other environmental concerns in addition to air pollution.

2.2.2.3 The 1998 Memorandum of Agreement

In the last two decades, the City has filed several appeals and legal challenges of District orders under Section 42316. The first appeal and challenge resulted in the 1998 Memorandum of Agreement ("1998 MOA") between the City and the District.[7] Under the 1998 MOA, the City committed to its responsibility to reduce particulate emissions from the Owens Lake bed so that the OVPA would attain and maintain the CAA ambient air quality standards for PM_{10} by the statutory deadline. Among other provisions, the parties agreed to a schedule for implementation of BACM on the dried Owens Lake bed and for revisions of the District's proposed 1997 SIP Order and associated control measure order, District Order 070297-04, to reflect the relevant terms of the agreement. As discussed below, the District subsequently incorporated those terms in its 2003 SIP.

2.2.2.4 The 2006 Settlement Agreement

In 2005 and 2006, the City appealed and challenged the District's orders under Section 42316. This dispute was resolved in the 2006 Settlement Agreement between the City and the District.[8] Under the 2006 Settlement Agreement, the parties agreed to a schedule for implementation of supplemental BACM control measures on the dried Owens Lake bed and for revisions of the District's proposed 2003 SIP Order and associated control measure order. As discussed below, the District subsequently incorporated those terms in its 2008 SIP through District Board Order 080128-01 to reflect the relevant terms of the agreement.

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7 Available at: http://www.gbuapcd.org/owenslake/index.htm.

8 Available at: http://www.gbuapcd.org/Air%20Quality%20Plans/2008SIPfinal/2008%20SIP%20-%20FINAL%20-%20Ch%208_Attachment%20A%20-%20Settlement%20Agreement%20LADWP_No%20Changes.pdf.

2.2.2.5 Variance and Abatement Orders for Delayed Completion of Phase 7 Dust Controls

On September 25, 2009, the City requested and was granted a variance that extended the October 1, 2009 deadline for the completion of Moat & Row[9] dust control measures on 3.5 square miles of the Owens Lake bed to October 1, 2010. The variance was requested to complete an environmental study and delays related to obtaining a lease from the State Lands Commission. The PM_{10} emissions that would have been emitted because of the one-year delay in implementing the Moat & Row dust control measures were offset by two variance conditions. The variance conditions included: (1) implementing BACM using gravel on two square miles of the lake bed outside the dust control boundaries required in the 2008 SIP, and (2) implementing temporary tilling on 3.5 square miles of the Shallow Flooding BACM areas that were under construction and were to be flooding by April 1, 2010. A portion of the Moat & Row project was completed on 0.4 square miles of the lake bed in the T1A-1 area. This was a sand fence project that was constructed in an area with natural runoff during wet periods and sparse vegetation. It is referred to as the sand fence area in Minimum Dust Control Efficiency (MDCE) BACM areas in the 2016 SIP. The two square mile gravel project was fully implemented by November 2012. This two square mile Gravel BACM area is referred to as the Phase 8 dust control project in the 2016 SIP (District Hearing Board Order GB09-06).

Due to the denial of a lease from the CSLC to implement the Moat & Row dust control measure on the remaining 3.1 square miles, the City missed the October 1, 2010 deadline for implementation. On March 17, 2011, serving as the Abatement Hearing Board, the District Governing Board issued a Stipulated Order for Abatement to install BACM on the 3.1 square mile area (known as the Phase 7a dust control area) by December 31, 2013, except for areas that will have Managed Vegetation BACM which will be fully implemented by December 31, 2015. The emissions from the Phase 7a area were offset by a $6.5 million public benefit contribution to be used for Clean Air Projects within the District. These projects included paving roads and parking lots in the Owens Lake area, replacing over 450 non-USEPA certified woodstoves with cleaner burning appliances, and other assorted projects which provided air quality health benefits to people throughout the District (Stipulated Order of Abatement 110317-01).

Due to the discovery of cultural artifacts in the Phase 7a dust control areas, the City was again delayed in its efforts to implement dust control measures. On August 19, 2013, District Governing Board issued a Modified Stipulated Order for Abatement that extended the deadline to implement BACM on the Phase 7a areas to December 31, 2015, except for areas that will have managed vegetation BACM which will be fully implemented by December 31, 2017. As part of this abatement order the City made a $10 million public benefit contribution to the District to control PM_{10} emitted from the Keeler Dunes (Stipulated Order of Abatement 130819-01). The District worked with consultants to design and construct a straw bale/vegetation project that would control PM_{10} emissions from the Keeler Dunes. Installation of the straw bales was completed in December 2015 and is expected to provide the necessary level of control to protect the community of Keeler from PM_{10} violations.

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[9] "Moat & Row" is a PM_{10} control measure characterized by an array of earthen berms (rows) about 5 feet high above the lake bed surface, flanked on either side by slope-sided ditches (moats) about 4 feet deep. The rows are topped with sand fences up to 5 feet high that increase the effective height of the rows. Moats are intended to capture moving soil particles, and rows are intended to physically shelter the downwind lake bed from the wind.

Vegetation is expected to replace the bales as they deteriorate. Vegetation planting for the Keeler Dune project was started in January 2015 and is expected to be completed by the end of 2016.

2.2.2.6 Federal Suit

In 2012, the City filed a federal court lawsuit that challenged the jurisdiction of the District, state, and federal agencies to order the City to mitigate dust at Owens Lake under the requirements of the federal CAA (*City of Los Angeles v. Great Basin Unified Air Pollution Control District, et al.*, E.D. Cal Case 1:12CV1683 AWI SAB). In its 2013 decision, the court held that the City is responsible as an 'operator' under the CAA because of its water diversion activities and is therefore responsible for air pollution control on the dried Owens Lake bed. The court dismissed the City's claims for regulatory relief, and found that the District and other agencies had jurisdiction to order the City to implement dust control measures under the CAA.[10]

2.2.2.7 2014 Stipulated Judgment

In 2011 and 2012, the City appealed and challenged the District's orders under Section 42316. Those orders directed the City to implement additional dust control measures at Owens Lake under the procedures in District Board Order No. 080128-01. The City appealed this order to the CARB as allowed under Section 42316.[11] In 2013, CARB heard and denied the City's appeal of the District's 2011 order.[12] The City challenged CARB's decision at the Sacramento County Superior Court. In December 2014, the court issued a decision on the City's appeal of the 2011 order, which upheld CARB's decision to deny the City's appeal and affirmed the District's order to implement additional control measures at Owens Lake.[13] The City and the District concurrently negotiated a more comprehensive agreement which was entered by the court as the 2014 Stipulated Judgment for the District. The judgment requires the City to implement the dust control measures ordered in 2011 and 2012 and provides for additional dust control measures up to 53.4 square miles in total for all ordered dust control areas. It further allows for the use of Tillage with BACM back-up (TWB^2) as a new control measure that would reduce water use at Owens Lake. These and other provisions of the Stipulated Judgment (see Section 6.3) are incorporated as commitments and requirements in this 2016 SIP. The 2014 Stipulated Judgment is included as Appendix II-1.

2.2.3 Regulatory History

2.2.3.1 PM_{10} Nonattainment Designation

On July 1, 1987, the USEPA revised the NAAQS, replacing TSP as the indicator for particulate matter with a new indicator called PM_{10}. The standards for PM_{10} were set at 150 micrograms per cubic meter (μg/m^3) for a 24-hour average and 50 μg/m^3 for an annual average. At the same time, USEPA set forth regulations for implementing the revised NAAQS, and announced

[10] The court's decision is available at: http://www.gbuapcd.org/owenslake/FederalCase/130502.01_Opinion_Order_Motion_To_Dismiss_LADWP_US_DistrictCourt.pdf.

[11] The filings for these proceedings are available at: http://www.gbuapcd.org/owenslake/supplementalcontrolrequirements.htm.

[12] The CARB decision is available at: http://gbuapcd.org/owenslake/2011SCR/CARB-Appeal/CARBDecisionandFindings20121119.pdf

[13] The court's decision is available at: http://gbuapcd.org/owenslake/2011SCR/SacramentoSuperiorCourt-FinalDecision.pdf.

the policy for development of SIPs and supporting control strategies. On August 7, 1987, USEPA identified the OVPA as one of the areas in the nation that violated the PM_{10} NAAQS. Subsequent air quality monitoring by the District showed that the dried bed of Owens Lake is the predominant source of PM_{10} emissions contributing to air quality violations in the OVPA. Extremely high PM_{10} concentrations (over 12,000 μg/m^3 or more than 80 times the standard) have been verified downwind of Owens Lake. Inter-basin transport of PM_{10} into the OVPA is inconsequential.

Consequently, the USEPA required the State of California to prepare a SIP for the OVPA that demonstrates how PM_{10} emissions will be decreased to comply with the NAAQS. The District is the agency delegated by the state to fulfill this requirement. An initial SIP was prepared by the District in 1988 (GBUAPCD, 1988).

2.2.3.2 1990 Clean Air Act Amendments

In November 1990, the federal CAA Amendments were enacted, setting new statutory requirements for attaining the PM_{10} NAAQS. All areas in the United States that were previously classified as federal nonattainment areas for PM_{10}, including the OVPA, were designated as "moderate" PM_{10} nonattainment areas. In November 1991, the District prepared an addendum to the 1988 SIP that updated the air quality information and the work performed since 1988 (GBUAPCD, 1991).

Section 188(b) of the CAA specified that any area that could not attain the NAAQS by December 1994 would subsequently be reclassified as a "serious" PM_{10} nonattainment area. In January 1993, USEPA completed its initial reclassification process, and included the OVPA among five nationwide areas reclassified as "serious," effective February 8, 1993. Section 189(b) of the CAA further specified that a SIP revision was due within eighteen months of the reclassification (by August 8, 1994). The revision was to assure that implementation of BACM, including "best available control technology" (BACT), would be effective within four years of the reclassification date. A BACM SIP was prepared in June 1994 and approved by the CARB (GBUAPCD, 1994).

The CAA required that by February 8, 1997, a PM_{10} Attainment SIP must be submitted to the USEPA that (a) included preferred and contingency PM_{10} control strategies, (b) provided air quality modeling that demonstrated attainment of the federal air quality standards from the implementation of these controls, and (c) provided quantitative milestones for "reasonable further progress" reporting to the USEPA. The CAA further required that the PM_{10} NAAQS be attained by December 31, 2001. On November 16, 1998, the District adopted a SIP, which was approved by USEPA on August 17, 1999 (GBUAPCD, 1998).

On November 13, 2003, the District adopted the 2003 Revised State Implementation Plan for the OVPA (2003 SIP), which was later approved by the CARB. The 2003 SIP primarily addressed the PM_{10} control requirements to reduce windblown PM_{10} emissions from 29.8 square miles of the exposed playa at Owens Lake. By December 31, 2006, the City had implemented dust control measures on all 29.8 square miles of the lake bed as required in the 2003 SIP. However, after the 2003 SIP was adopted, the USEPA policy direction changed to require three continuous years of air quality data without violations prior to December 31, 2006 to demonstrate attainment, rather than only requiring that the control measures be completely implemented. Numerous NAAQS violations occurred during the three-year attainment demonstration period. As a result, on March 23, 2007, the USEPA published the finding that the OVPA failed to attain the 24-hour NAAQS for PM_{10} by December 31, 2006, as required under CAA §189(d) (USEPA, 2007a).

As a result of this finding, the OVPA SIP was revised to include a control strategy that would provide for attainment in the OVPA as soon as practicable, by achieving at least a five percent reduction in PM_{10} emissions per year. The 2008 SIP had to demonstrate that the NAAQS could be attained by March 23, 2012, unless the USEPA granted an extension which could extend the deadline to 2017 (CAA §179(d)(3)). In accordance with CAA §189(d), the revised SIP had to be submitted to the USEPA by December 31, 2007.

The 2008 SIP revised the 2003 SIP and included an updated analysis of the particulate matter air pollution problem in the OVPA and a revised control strategy to bring the area into attainment with the federal air quality standard for particulate matter as soon as practicable. It also incorporated provisions of the 2006 Settlement Agreement between the District and the City to expand dust control measures to additional areas at Owens Lake in order to attain the NAAQS as soon as practicable (GBUAPCD, 2006). The 2008 SIP was approved by CARB in June 2008 and submitted to the USEPA (CARB, 2008). After the adoption of the 2008 SIP, the City requested and was granted a variance in 2009 to extend the completion deadline for dust control measure known as Moat & Row on 3.5 square miles of the lake bed. The variance included a condition that required the City to implement Gravel BACM on two square miles of the lake bed by 2012. In 2011, the completion deadline was extended under a Stipulated Order of Abatement (SOA) for 3.1 square miles of the Moat & Row areas, and the City agreed to provide $6.5 million as a public benefit contribution to offset emissions by controlling other sources of air pollution. Another extension to the deadline was granted in 2013 through a modification to the SOA, which required the City to implement BACM instead of Moat & Row areas on the 3.1 square miles area, and to provide $10 million as a public benefit contribution to be used to control dust from the Keeler Dunes (see Section 2.2.2.5). The provisions of the 2013 modified SOA were incorporated into the OVPA SIP revision in September 2013 (GBUAPCD, 2013a), and the Coso Junction SIP revision in December 2013 (GBUAPCD, 2013b). The OVPA and Coso Junction SIP revisions were approved by CARB and submitted to the USEPA in May and October 2014, respectively (CARB, 2014a; CARB, 2014b). The USEPA approved the 2010 PM_{10} Maintenance Plan and Redesignation for the Coso Junction Planning Area (USEPA, 2010; 75 FR 54031-54033).

As discussed in Section 2.2.2.7, the City appealed dust control orders issued in 2011 and 2012. These appeals were resolved in 2014 through a negotiated agreement that was incorporated into a court-ordered stipulated judgment. The 2014 Stipulated Judgment requires the City to implement BACM in the 2011 and 2012 dust control areas by the end of 2017, except for those areas that are identified as significant cultural resource areas. It also allows the District to order additional dust control areas up to 53.4 square miles in total for all ordered dust control areas, and to allow for the use of TWB^2 as a new control measure that will reduce water use at Owens Lake. These and other provisions of the Stipulated Judgment are incorporated as commitments and requirements in this 2016 SIP (see Section 6.3).

2.2.3.3 Exceptional Events Rule

On March 22, 2007, the USEPA adopted a rule to allow the exclusion of monitored or modeled air quality exceedances and violations that were caused by exceptional or natural events.

Exceptional events can be human-caused events that are not expected to recur, and natural events, which are considered to be caused by natural sources such as wildland fires, volcanic activities, or extreme-wind events. This rule replaced the USEPA's natural events policy that was approved in 1996. The rule defines the term "exceptional event" to mean an event that:

- Affects air quality;
- Is not reasonably controllable or preventable;
- Is an event caused by human activity that is unlikely to recur at a particular location or a natural event; and
- Is determined by USEPA through the process established in these regulations to be an exceptional event.

USEPA defined a "natural event" as an event in which human activity plays little or no direct causal role. As this pertains to windblown dust from dry lake beds, the USEPA's rulemaking cites the U.S. House of Representatives report on approving CAA §188(f), in which they discussed a circumstance in which recurring emissions from a source should be considered to be caused by human activity. Both the House and Senate committee reports for the 1990 CAA specifically cited the case of windblown dust from Owens and Mono Lakes, and agreed with USEPA's statement that high concentrations of dust from the lake bed were due to human activity, i.e., the long-term diversion of water from a lake (USEPA, 2007b, U.S. Senate, 1989, House of Representatives, 1990).

Although violations caused by windblown dust from the Owens Lake bed do not qualify as natural events, the exceptional events rule can be applied to dust events that pass two separate and independent tests:

- that BACM for windblown dust was in place and properly maintained to the extent possible at the time of the event, and
- that unusually high winds were the cause of the exceedance.

At Owens Lake, BACM would be Shallow Flooding, Managed Vegetation, Gravel Blanket, Minimum Dust Control Efficiency BACM, variations on Shallow Flooding (TWB[2], Dynamic Water Management, and Brine BACM) or any other control measure approved by the Air Pollution Control Officer (APCO) and the USEPA as BACM for Owens Lake. Because these BACM measures are intended to control dust during high wind events, it would be necessary to demonstrate that winds were "unusually high" based on historical records for the Owens Lake area. If it is determined that an exceptional event occurred, then a plan would be developed to determine what measures should be taken to safeguard public health should such an event recur.

On May 10, 2013, the USEPA issued interim guidance documents ("Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events") regarding the Exceptional Events Rule, which clarified provisions of the rule and included examples of approved demonstrations. More recently, on November 10, 2015, the USEPA issued proposed revisions to the Exceptional Events Rule with the intent to provide clarity and increase the administrative efficiency of the Exceptional Events Rule criteria and process. The District has reviewed these proposed revisions, and has concluded that they do not change the fact that windblown dust from the lake bed does not qualify as a natural or exceptional event because the windblown dust is emitted as a result of human-caused diversion of water by the City of Los Angeles.

3. AIR QUALITY SETTING

3.1 Weather and Climate

The OVPA is located in the southern end of the Owens Valley in Inyo County, California. Owens Lake is bounded by the Inyo Mountains to the east, and the Sierra Nevada to the west, which rise over 10,000 feet above the lake bed surface. Because it is in the rain shadow of the Sierra Nevada, annual rainfall is very low in the project area. Owens Lake averages approximately four inches of rainfall per year with the majority of that falling from November through April. Temperatures range from around 18°F to 70°F during winter and 45°F to 112°F during summer. Hourly average wind speeds in the area can exceed 55 mph with gusts exceeding 85 mph. These winds are generally associated with the passage of low-pressure systems during winter and spring months. The leading edges of these low-pressure systems are usually cold fronts that initially produce winds from the south as the colder air mass approaches, under-running and displacing the warmer air in its path. As the leading edge of the front passes, the wind direction shifts, often resulting in converging winds from the south along the east side of the valley and from the north along the west side. Cold winds from the north typically follow the passage of the low-pressure system as high pressure begins to build back over the area.

3.2 Air Quality and Area Designations

Air quality is regulated through federal, state, and local requirements and standards in the project area. Under the CAA, the USEPA has set ambient air quality standards to protect public health and welfare. NAAQS have been set for the following criteria pollutants: PM_{10}, particulate matter less than 2.5 microns ($PM_{2.5}$), ozone, carbon monoxide, oxides of nitrogen (NO_x), sulfur dioxide (SO_2), and lead. In addition, California has set air quality standards for these pollutants, which are usually more stringent, and has also added standards for vinyl chloride, hydrogen sulfide, sulfates and visibility-reducing particles. Table 3-1 shows the current California and national ambient air quality standards.

The OVPA has been designated by the State and the USEPA as nonattainment for the state and federal 24-hour average PM_{10} standards. The boundaries of the federal PM_{10} nonattainment area are shown in Figure 3-1. The area is designated as "attainment" or "unclassified" for all other federal ambient air quality standards. Monitoring and research conducted for more than 30 years, as well as the SIPs previously prepared for OVPA, has determined that windblown dust from the dry bed of Owens Lake is the dominant cause of NAAQS violations for PM_{10} in the nonattainment area.

The USEPA designated the Owens Valley as a "serious" nonattainment area due to the frequent violations of the NAAQS for PM_{10} and the inability of the area to attain the standard by December 31, 1995. For additional details and background regarding the history of the OVPA's PM_{10} SIPs that have been adopted by the District up through 2008, please refer to Section 2.2.3.2.

Table 3-1: Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	**Averaging Time**	**California Standards [1]**		**National Standards [2]**		
		Concentration [3]	**Method [4]**	**Primary [3,5]**	**Secondary [3,6]**	**Method [7]**
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.070 ppm (137 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	12.0 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemiluminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)		0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[12,13]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[14]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

Table 3-1 (continued): Ambient Air Quality Standards

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (10/1/15)**

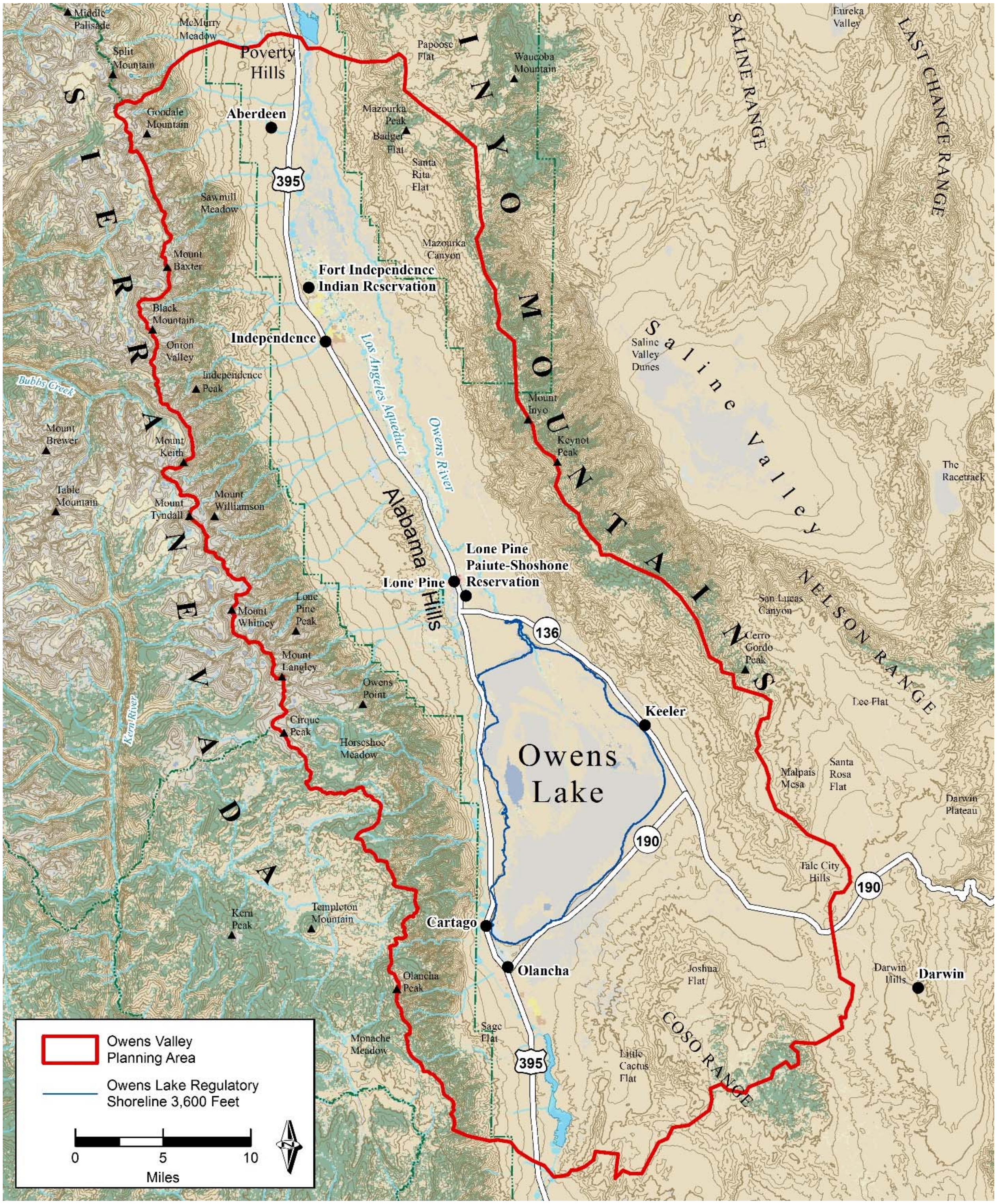

Figure 3-1: Boundaries of the Federal PM_{10} Nonattainment Area

3.3 PM_{10} Health and Visibility Impacts

3.3.1 Health Impacts of PM_{10}

Particulate pollution is generally associated with dust, smoke, and haze and can be measured as PM_{10}, which indicates particulate matter less than 10 microns in average aerodynamic diameter. These particles are extremely small, one-seventh the diameter of a human hair or 400 times smaller than the period at the end of this sentence. Because of their small size, the particles can easily penetrate into the lungs. Breathing PM_{10} can cause a variety of health problems. It can increase the number and severity of asthma and bronchitis attacks. It can cause breathing difficulties in people with heart or lung disease, and it can increase the risk for, or complicate, existing respiratory infections. Children, the elderly and people with existing heart and lung problems are especially sensitive to elevated levels of PM_{10}. Even healthy people can be adversely affected by dust at extremely high concentrations. The USEPA has set an episode level of 600 $\mu g/m^3$ (averaged over 24 hours) as the level that can pose a significant risk of harm to the health of the general public (40 CFR 51.151).

3.3.2 Owens Lake Health Advisory Program

The NAAQS for PM_{10} is frequently violated in the OVPA because of windblown dust from Owens Lake and the Keeler Dunes, with some of the highest concentrations measured in the country (USEPA, 2007a). Wind speeds greater than about 17 mph have the potential to cause significant wind erosion from the barren lake bed. Prior to implementing dust control measures on the lake bed, 24-hour average PM_{10} concentrations measured at the Dirty Socks monitor site at times exceeded 12,000 $\mu g/m^3$—more than 80 times higher than the 24-hour NAAQS of 150 $\mu g/m^3$.

In 1995, the District instituted a program to advise the public when unhealthful levels of particulate pollution occur in the Owens Valley area. Under this program, the District issued Air Pollution Health Advisories when PM_{10} concentrations exceeded selected trigger levels. In March 2014, the District issued Rule 701 – Air Pollution Episode Plan, which expanded the existing health advisory program to include criteria levels for $PM_{2.5}$ and added trigger levels for wildfire smoke episodes as an additional measure to protect public health. Air pollution episode notifications are disseminated to schools and doctor's offices in the area, to local news media, and to the general public through phone text messaging, e-mail, and the District's health advisory website (http://gbuapcd.org/healthadvisory).

- Stage 1 Air Pollution Health Advisories are issued when hourly PM_{10} levels exceed 400 $\mu g/m^3$ for dust or 100 $\mu g/m^3$ for wildfire smoke, or hourly $PM_{2.5}$ levels exceed 150 $\mu g/m^3$. The Stage 1 Health Advisory recommends: 1) everyone minimize outdoor activity; 2) children, the elderly, and people with heart or lung problems refrain from strenuous outdoor activities in impacted areas; and 3) outdoor physical education classes, sports practices, and athletic competitions be rescheduled or cancelled, if practicable.
- Stage 2 Air Pollution Health Advisories are issued when hourly PM_{10} levels exceed 800 $\mu g/m^3$ for dust or 200 $\mu g/m^3$ for wildfire smoke, or hourly $PM_{2.5}$ levels exceed 300 $\mu g/m^3$. The Stage 2 Health Advisory recommends: 1) everyone eliminate outdoor activities in impacted areas; 2) everyone remain indoors with doors and windows closed until the episode is terminated; and 3) everyone avoid activities that produce aerosols, dust, fumes, and other irritants.

From fall of 1995 through spring of 2007, over 150 advisories were issued as part of the Air Pollution Health Advisory program. From spring 2008 to spring 2014, 82 advisories were issued. In spring 2014, the District began issuing automated advisories whenever health advisory thresholds were reached at community monitors. Between inception of the automated system and October 2015, 140 advisories were issued. This program is not intended to replace the need to control the dust problem at Owens Lake area, but is intended to help reduce adverse health effects until dust control measures are in place. The health advisory program will remain in effect until dust control measures are fully implemented in the Owens Lake area and PM_{10} levels no longer violate the NAAQS.

3.3.3 Cancer Risk Due to Owens Lake Dust Storms

In addition to the high levels of fine particulate matter, Owens Lake dust also contains cadmium, arsenic, and other toxic metals that are at levels above those in soils in the Owens Valley due to natural concentration in the terminal lake. These metals pose a significant risk for additional cancer cases in the areas of greatest dust impact. Table 3-2, shown below, and also presented in the 2008 SIP, demonstrates that the cancer risk at Keeler, associated with cadmium and arsenic in the Owens Lake dust, was estimated at 23 additional cases in a million. This was based on an annual concentration average of 45 μg/m^3 from the dust storms, breathed over a 70-year period. The value of 45 μg/m^3 was taken from the seven-year average of PM_{10} concentrations measured using a Tapered Element Oscillating Microbalance (TEOM) monitor at Keeler (1993-2000). This average represented the annual average prior to the implementation of controls.

Table 3-2: Inhalation Cancer Risk at Keeler due to Owens Lake Dust Storms

Toxic Metal	Cancer Potency (μg/m^3)$^{-1}$	Toxic Metal Concentration (parts per million)	Inhalation Cancer Risk
Cadmium	4.2 x 10^{-3}	29	5 per million
Arsenic	3.3 x 10^{-3}	118	18 per million
		Lifetime Cancer Risk:	**23 per million**

Notes:

- Cancer potency from the Air Toxics Hot Spots Program (OEHHA, 2002).
- Dust samples are taken from Keeler PM_{10} filters, with concentrations measured by x-ray fluorescence (Chester LabNet, 1996).
- 70-year cancer risk at PM_{10} = 45 μg/m^3 (Keeler annual average from 1993-2000).

Under the District’s adopted air toxics policy, a toxic risk greater than one in a million additional cancer cases is considered to be significant. This policy requires implementation of controls on sources that pose a risk greater than one in a million in order to reduce the risk, and it prohibits the issuance of a permit to sources that exceed a risk of 10 in a million (GBUAPCD, 1987). Model calculations project an average Keeler PM_{10} concentration of 21 μg/m^3 after all dust control measures are operational. This would result in reducing the pre-dust control cancer risk of 23 in a million to around 10 in a million, which would be more in line with the District’s goal for protecting public health.

3.3.4 Visibility and Sensitive Airsheds

Under normal conditions, visibility in the Owens Valley generally ranges from 37 to 93 miles, with the best visibility occurring during winter. Visibility is most limited from May through September and during days when Owens Lake dust storms occur. Owens Lake dust storms can reduce visibility to near zero at Owens Lake and obscure visibility 150 miles away from the lake bed. The main cause of visibility degradation in the Owens Valley is fine particles in the atmosphere. In addition to dust from Owens Lake, visibility degradation results from transport of air pollutants from the San Joaquin Valley and South Coast air basins, and from wildfires.

Most of the visibility degradation can be attributed to inter-basin transport of air pollutants. On days when Owens Lake dust storms do not occur, emissions of fine particulate matter from gasoline and diesel fueled vehicles and equipment within the Owens Valley are local man-made contributors to visibility degradation. However, these local sources have an insignificant impact on the area’s visibility. Nitrogen dioxide, a light-absorbing gas formed during local fuel combustion, contributes less than five percent to the overall visibility degradation. Other local man-made sources of visibility degrading emissions represent less than five percent of the overall reduction in visibility (Trijonis, et al., 1988).

There are 22 sensitive airsheds in the region, including wilderness areas, national parks, national forests, a national historic site, and the R-2508 military airspace. Figure 3-2 shows the locations of these sensitive airsheds. Four of these airsheds are designated as Class I PSD (Prevention of Significant Deterioration) areas, which are afforded more stringent protection from visibility degradation and for impacts from air pollutants: John Muir and Domeland Wilderness Areas, Kings Canyon and Sequoia National Parks. These sensitive areas and their classifications are shown in Table 3-3.

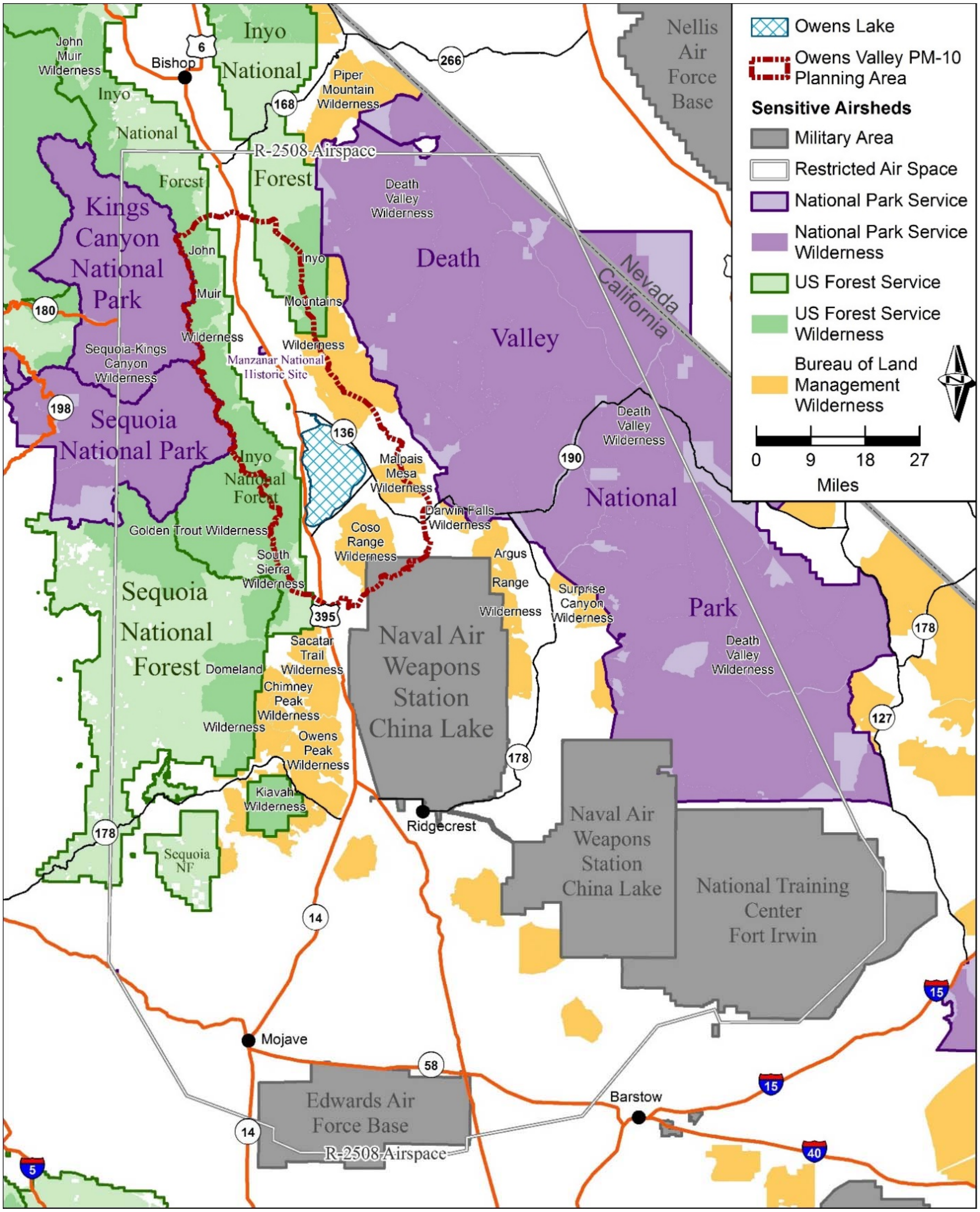

Figure 3-2: Locations of Sensitive Airsheds near the Owens Valley Planning Area

Table 3-3: Sensitive Airsheds and their PSD Classifications

Sensitive Airshed	PSD Airshed Classification
Wilderness Areas on National Forest Service (FS) and Bureau of Land Management (BLM) Lands:	
Argus Range (BLM)	Class II
Chimney Peak (BLM)	Class II
Coso Range (BLM)	Class II
Darwin Falls (BLM)	Class II
Domeland (BLM & FS)	Class I
Golden Trout (FS)	Class II
Inyo Mountains (FS)	Class II
John Muir (FS)	Class I
Kiavah (BLM & FS)	Class II
Malpais Mesa (BLM)	Class II
Owens Peak (BLM)	Class II
Piper Mountain (BLM)	Class II
Sacatar Trail (BLM)	Class II
South Sierra (FS)	Class II
Surprise Canyon (BLM)	Class II
National Parks:	
Death Valley (includes Death Valley Wilderness)	Class II
Kings Canyon (includes Sequoia-Kings Canyon Wilderness)	Class I
Sequoia (includes Sequoia-Kings Canyon Wilderness)	Class I
National Historic Sites:	
Manzanar	Class II
Non-Wilderness Areas of National Forests:	
Inyo	Class II
Sequoia	Class II
Military Area:	
China Lake Naval Air Weapons Station	Class II

The R-2508 military air space, which includes the China Lake Naval Air Weapons Station, is a sensitive site for visibility impacts from Owens Lake dust events. Good visibility is needed for some military operations, such as an air-to-air test (an air-launched target whose target is also in the air), which relies on high-speed cameras to record time and position information. Owens Lake events can reduce the visibility to less than one to two miles at China Lake. The Department of the Navy has stated that cancellation of a test costs the Range and/or its customer approximately $10,000 to $50,000. Prior to the implementation of dust controls, Owens Lake dust events sometimes led to the cancellation of several tests per day, lasting for one to two days, or occasionally longer (Stevenson, 1996).

3.4 Monitoring Sites and Data Collection

3.4.1 PM_{10} Monitoring Network

Ambient PM_{10} measurements to determine compliance with the federal PM_{10} NAAQS have been taken at Keeler, Olancha, Dirty Socks, Lizard Tail, Shell Cut, Stanley, Mill, North Beach, and Lone Pine (Figure 3-3). Meteorological data are also collected at these permanent monitoring sites to provide wind speed, wind direction, and temperature information. In addition to the permanent monitoring sites, the District operates two on-lake Special Purpose PM_{10} Monitors and two portable PM_{10} monitors which are deployed to various shoreline locations for episode-specific monitoring. Another site that monitors for PM_{10} from Owens Lake is the Coso Junction site. This site is about 10 miles south of the OVPA. Several additional on-lake and near-lake meteorological sites are also used to improve the accuracy of the Owens Lake Dust Identification Model ("Dust ID Model"). Precipitation data are collected at Keeler, Shell Cut, Stanley, Mill, A-Tower, and B-Tower. Relative humidity is collected at Olancha, Mill, A-Tower, and B-Tower. Barometric pressure is recorded at Olancha. An upper air profiler was operated from March to May 2000 and January to September 2001 at Dirty Socks and from October 2001 to June 2003 at Mill to measure upper level wind speeds and temperature profiles.

The Lone Pine Paiute-Shoshone Tribe installed a PM_{10} monitor on the Lone Pine reservation in 2002 and a $PM_{2.5}$ monitor in 2006. Both monitors are TEOM monitors that provide hourly concentration data. They are operated in accordance with federal monitoring guidelines (40 CFR, Part 58). The monitor site is located southeast of the District's Lone Pine monitor site. Data from the Lone Pine Tribe's PM_{10} TEOM have closely paralleled the values recorded by the District's Lone Pine TEOM, although specific dust plumes may cause high values at one of these TEOMs and yet miss the other.

Currently, all the District PM_{10} monitor sites in the planning area are equipped with TEOM continuous PM_{10} samplers (EPA Manual Reference Method: EQPM-1090-079) that provide hourly and daily PM_{10} concentrations. TEOMs are USEPA equivalent method particulate monitors. Keeler operates a second, collocated PM_{10} TEOM as well as a $PM_{2.5}$ TEOM. In addition to the TEOM samplers, Keeler operates two Partisol PM_{10} samplers (RFPS-1298-126 and RFPS-1298-127) and one Partisol $PM_{2.5}$ sampler, which are filter-based USEPA-approved reference method samplers that were operated to provide 24-hour average PM concentrations. The Partisol samplers confirm the 24-hour averages of the TEOM samplers (Parker, 2003).

The District performed a detailed study of different types of PM_{10} monitors and found significant differences in the concentrations measured by collocated monitors of different types. The District's analysis showed that TEOM and Partisol samplers, which have identical inlet designs, provide the most consistent measurements at Owens Lake, and that they are the most suitable monitors for measuring PM_{10} caused by wind-blown dust (Ono, et al., 2000).

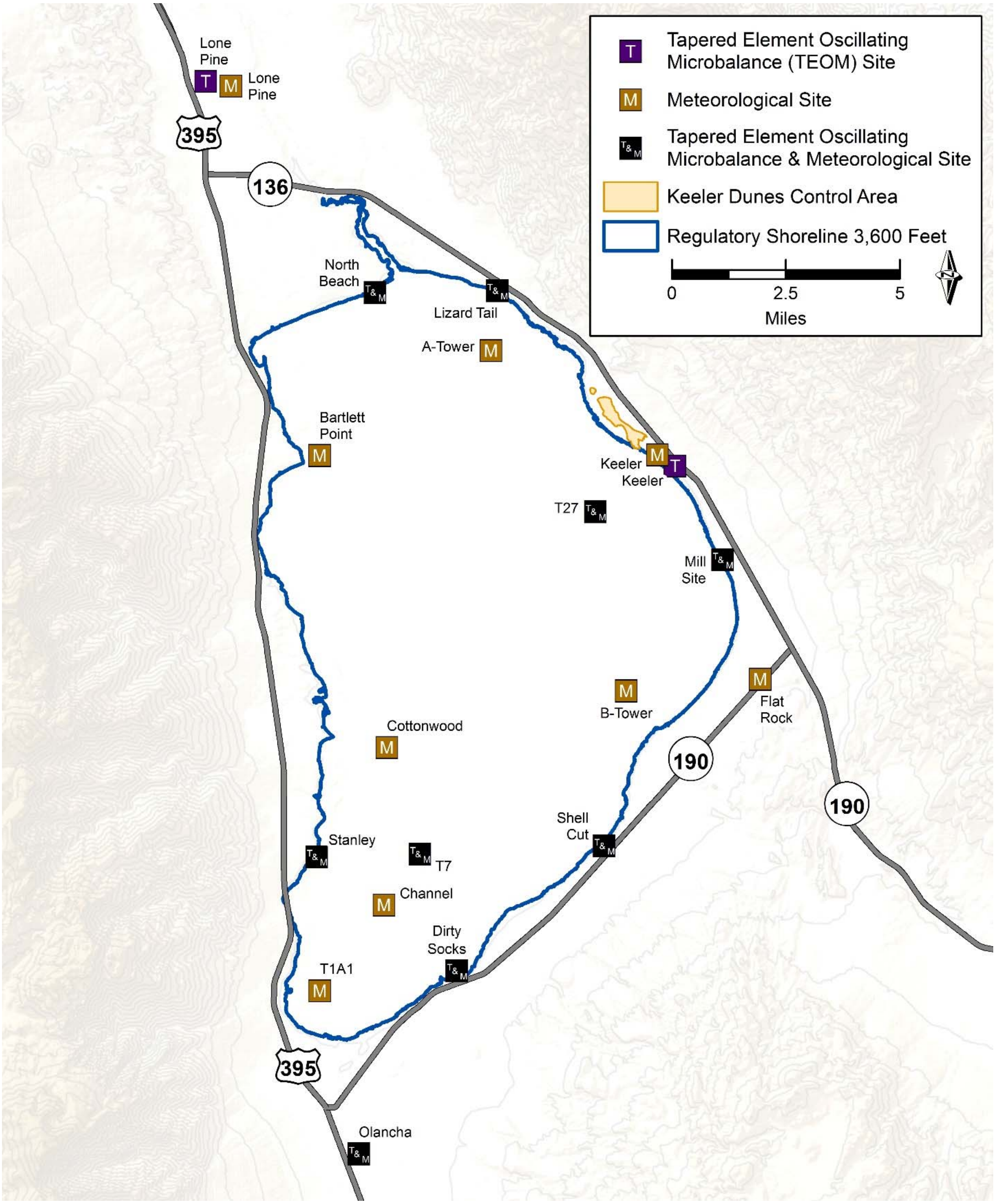

Figure 3-3: Locations of PM_{10} Monitor Sites

3.4.2 Dust Transport Study

Historically, the permanent PM_{10} monitoring stations were operated on a one-in-six day schedule to sample PM_{10}, and did not sample on the other five off-schedule days. This was changed for a period from March 1993 to June 1995 to collect data to assess the PM_{10} impacts downwind from Owens Lake toward the City of Ridgecrest. A special-purpose monitoring network was set up adding the southern communities of Pearsonville, Inyokern and Ridgecrest. During the special-purpose monitoring period, samplers at both Owens Lake and the southern sites were operated on days when Owens Lake dust events were forecast to have impacts toward the south. The results of this study showed that Owens Lake dust plumes caused exceedances of the PM_{10} NAAQS as far as Ridgecrest, 60 miles south of the lake. The 1998 SIP (GBUAPCD, 1998) includes the monitoring data from this episode-monitoring program.

About 40,000 permanent residents from Ridgecrest to Bishop are affected by the dust from Owens Lake. In addition, many visitors spend time in this dust-impacted area, to enjoy the many recreational opportunities the Eastern Sierra and high desert have to offer. Lone Pine annually hosts the Lone Pine film festival, which draws thousands of visitors from outside the area. The National Park Service has expressed concern in the past regarding the health hazard posed to the 86,000 people that annually visit the Manzanar National Historic Site, 15 miles north of Owens Lake. The Park Service was concerned because a high percentage of the visitors to Manzanar are older visitors who are more prone to airborne respiratory threats, and that they will spend 3 to 4 hours outdoors in a potentially harmful environment (Hopkins, 1997).

3.4.3 $PM_{2.5}$ Monitoring at Keeler

Monitoring of fine particulate matter ($PM_{2.5}$) at Keeler occurs on a 1-in-3-day schedule, as it has since 1999. A continuous $PM_{2.5}$ monitor has been in operation since 2009 and a collocated 1-in-12-day $PM_{2.5}$ monitor operated from 1999 through 2013. Nearly two decades of collocated PM_{10} and $PM_{2.5}$ monitors show a strong relationship between $PM_{2.5}$ levels and PM_{10} levels at the Keeler site. A high $PM_{2.5}$ value of 193 μg/m^3, recorded on December 28, 2006, indicates that a serious fine particulate pollution problem may exist at this site. However, the current 24-hour $PM_{2.5}$ NAAQS is 35 μg/m^3 for the 98th percentile value at a monitor in a calendar year, averaged over three years. For daily monitoring, the 98th percentile is the seventh highest concentration day each calendar year. From 2012 through 2014 the 98th percentile concentrations were 34.4, 39.0, and 28.6 μg/m^3. For purposes of compliance with the PM2.5 NAAQS, the 3-year average 98th percentile was 34.0 μg/m^3 in 2014. As of mid-November 2015 only three days have exceeded the 35 μg/m^3 NAAQS threshold in the current year. It is likely that 2013 to 2015 will also be in attainment of the $PM_{2.5}$ NAAQS standard.

3.5 PM_{10} Data Summary

3.5.1 24-hour Average PM_{10}

From 2012 through 2014, daily PM_{10} sampling recorded 24 PM_{10} exceedances at Keeler. This averages about 8 exceedances of the PM_{10} NAAQS per year. The Lizard Tail monitor recorded 16 PM_{10} exceedance days from 2012 through 2014 and recorded the highest concentration (3,916 μg/m^3) of the nine sites monitored. Table 3-4 shows the number of exceedances from 2012 through 2014 at each site. All monitor sites except Lone Pine were in violation of the 24-hour average PM_{10} NAAQS, which allows no more than one exceedance per year averaged over a three year period. See Appendix III-1 for a table of the continuous monitor exceedance concentrations recorded at each monitor during 2012 through 2014, as well as tables summarizing the number of exceedances each year by type of source (on-lake, off-lake, Keeler Dunes, or a combination) and the number of exceedances due to each source type at each monitor.

Table 3-4: OVPA NAAQS PM_{10} Violations (2012-2014)

Monitoring Site	2012	2013	2014
Dirty Socks TEOM [1]	5	No Data	Incomplete
Keeler #3 PM_{10} TEOM	5	10	9
Lizard Tail TEOM	12	2	2
Lone Pine FDMS	1	0	0
Mill [1]	4	No Data	Incomplete
North Beach TEOM [1]	9	No Data	Incomplete
Olancha 3 TEOM	3	7	3
Shell Cut TEOM	10	4	1
Stanley TEOM	3	0	1

Notes:
[1] The Dirty Socks, Mill, and North Beach monitoring sites were not operated in 2013 and portions of 2014 due to lease disputes with the landowner.

3.5.2 Annual Average PM_{10}

The USEPA eliminated an annual PM_{10} NAAQS in 2006 (prior to its elimination, the annual PM_{10} NAAQS was 50 μg/m^3), though it is instructive to track annual PM_{10} averages in order to observe trends. For example, since the installation of a TEOM PM_{10} monitor at Dirty Socks in 1999, there has been a marked decrease in the annual average PM_{10} correlated with dust control implementation. Years 2000 through 2003 had no dust controls in the immediate vicinity and all had annual averages above 130 μg/m^3, reaching 245 μg/m^3 in 2001. Between 2004 and 2006, dust controls were phased in and annual averages were 44 μg/m^3 and 63 μg/m^3, respectively. Once nearby dust sources were controlled, 2007 through 2012 experience annual averages in the 20 μg/m^3 range, except 2010 which reached 42 μg/m^3.

3.5.3 PM_{10} Trends

Since dust control measures were put in place on the lake bed, PM_{10} levels at Owens Lake have decreased at the monitoring sites, as indicated by the decrease in the number of NAAQS exceedances that have been recorded in recent years. See Appendix III-1 for a table of the continuous monitor exceedance concentrations recorded at each monitor during 2012 through 2014, as well as tables summarizing the number of exceedances each year by type of source (on-lake, off-lake, Keeler Dunes, or a combination) and the number of exceedances due to each source type at each monitor. In addition, Appendix III-2 includes a memorandum prepared by the District dated March 11, 2015, which contains several figures showing the number of NAAQS exceedances at each monitor in graphical format (GBUAPCD, 2015a).

4. PM_{10} EMISSIONS INVENTORY AND DETERMINATION OF SIGNIFICANT SOURCES

4.1 Introduction and Significant Source Emissions Threshold

USEPA has established *de minimis* criteria for source categories contributing to PM_{10}. Specifically, USEPA has established a source category contribution level of 5 μg/m^3 based on the 24-hour PM_{10} NAAQS.[14,15] If a source category contributes more than this level to measured ambient PM_{10} concentrations in a serious nonattainment area, then BACM or BACT are required to be implemented for that source. Once the *de minimis* level is determined, then any source category which exceeds that limit is subject to BACM/BACT. At present, there are no PM_{10} sources in the OVPA that meet the federal definition of a PM_{10} major source. Therefore, no BACT analysis is required. Additionally, the BACM/BACT requirement does not apply to mobile sources of emissions. Please refer to the *2016 Owens Valley Planning Area State Implementation Plan BACM Assessment* (2016 BACM Assessment) in Appendix V-1 for additional details regarding the evaluation of significant sources in the OVPA.

The ambient PM_{10} data used in this analysis is from a near-exceedance day scenario[16] in which the 24-hour PM_{10} concentration was measured near the NAAQS 24-hour PM_{10} exceedance threshold (150 μg/m^3) and the predominant source of PM_{10} was characterized as "non-lake." This is a conservative approach to calculating the *de minimis* level as it produces a small *de minimis* emissions threshold and makes it feasible for non-lake sources to be considered significant. Using an exceedance day with higher ambient concentrations and corresponding large lake emissions would raise the *de minimis* threshold and make it so that most non-lake sources would not be considered significant.

With the exception of fugitive windblown dust emissions and activity-related unpaved road dust emissions, the emissions data used in this analysis are derived from the California Air Resources Board (CARB) 2012 and 2015 emission inventories for Inyo County, and are ratioed to the OVPA by various factors (e.g. population, roadway miles, and land area). Where applicable, the fugitive windblown dust emission estimates take into account the wind conditions that occurred on the modeled near-exceedance day. For purposes of the significant source analysis, emissions from fugitive windblown dust emissions from unpaved roads and open desert areas are limited to a two-kilometer buffer surrounding Owens Lake. This approach is used as a way to account for the distance between emission sources and impacted monitors. While fugitive windblown dust emissions from unpaved roads and open desert areas are substantial in the OVPA, they are also diffuse. The two-kilometer buffer has been applied to capture the emissions that could have a quantifiable impact at the monitors; the lake bed and the two-kilometer buffer (including Keeler and Olancha dunes) is the "Owens Lake Subarea" relevant for the determination of significant sources. A more detailed

[14] State Implementation Plans for Serious PM_{10} Non-Attainment Areas, and Attainment Date Waivers for PM_{10} Non-Attainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, Federal Register, Vol. 59, No. 157, August 16, 1994.

[15] The USEPA eliminated the annual PM_{10} NAAQS of 50 μg/m^3 in 2006.

[16] On the example near-exceedance day, May 11, 2014, the PM_{10} 24-hour average was measured to be 150.1 μg/m^3 at the Keeler monitoring site. It should be noted that on this same day, an exceedance caused almost entirely by "on-lake" sources was measured at the Olancha monitoring site, where the PM_{10} 24-hour average was measured to be 309.9 μg/m^3.

description and justification of the Owens Lake Subarea exceedance day emission inventory can be found in Sections 2.4 and 2.5 of the 2016 BACM Assessment.

PM_{10} emissions in the OVPA are dominated by fugitive dust emissions resulting from wind erosion on the exposed Owens Lake playa. The dominance of dust emissions from the playa has been documented by the District and other researchers who have studied dust source areas in the OVPA since the 1970s (Holder, 2016). Other wind erosion sources in the OVPA include off-lake sources of lake bed dust (i.e. the Keeler and Olancha dune areas), small mining facilities, and areas near the communities of Lone Pine and Independence that have been disturbed by human activity, including Inyo County's Lone Pine landfill. There is a lack of large industrial sources in the Owens Valley and the only other sources of criteria pollutant emissions are wood stoves, fireplaces, unpaved and paved road dust, and vehicle tailpipe emissions. Prescribed burning for wildland management on federal and private lands also generates PM_{10} in and around the nonattainment area; however, prescribed burning is not normally conducted on windy days when wind erosion is at its highest. Table 4-1 shows the PM_{10} emissions inventory for the OVPA on an exceedance day.

Table 4-1: Exceedance Day PM_{10} Emission Inventory for the Owens Lake Subarea and the OVPA (tons/day)

Category[1]	2012	2015
Manufacturing and Industrial	0.03	0.03
Service and Commercial	0.01	0.01
Mineral Processes	0.71	0.71
Metal Processes	0.02	0.03
Other (Industrial Processes)	0.01	0.01
Residential Fuel Combustion	0.02	0.02
Construction and Demolition	0.01	0.01
Paved Road Dust	0.03	0.03
Fugitive Windblown Dust from Agricultural Lands (Non-Pasture)	0.01	0.01
Fugitive Windblown Dust and Activity-related Dust from Unpaved Roads and Associated Areas[2]	12.09	12.09
Fugitive Windblown Dust from Exposed Lake Beds	45.30	45.30
Fugitive Windblown Dust from Dunes	--	--
Keeler Dunes	169.20	169.20
Olancha Dunes	312.00	312.00
Fugitive Windblown Dust from Open Desert[2,3]	2.94	2.94
Managed Burning and Disposal	0.09	0.09
On-Road Mobile	0.02	0.01
Wildfires	0.17	0.17
TOTAL Owens Lake Subarea	**542.65**	**542.66**

Table 4-1: Exceedance Day PM_{10} Emission Inventory for the Owens Lake Subarea and the OVPA (tons/day)

Category[1]	2012	2015
Fugitive Windblown Dust from Unpaved Roads and Associated Areas (outside Owens Lake Subarea)	132.13	132.13
Fugitive Windblown Dust from Open Desert (outside Owens Lake Subarea)	53.76	53.76
TOTAL OVPA (for informational purposes only)	**728.54**	**728.55**

Notes:
[1] Sources with emissions less than 0.005 tons/day have been omitted.
[2] Fugitive windblown dust source limited to two-kilometer buffer around Owens Lake.
[3] Excluding areas associated with Olancha and Keeler dunes.

Data Sources:
All Source Categories (except those noted below): CARB emission inventory for Inyo County ratioed to the OVPA; **Unpaved Road Dust**: GBUAPCD; **Lake Beds and Dunes**: Air Quality Modeling; **Open Desert**: Constructive estimate based on similar land uses and conditions in Imperial County Air Pollution Control District.

Appendix IV-1 includes additional details regarding the emissions inventory and supporting documentation and calculation methodologies.

4.2 Significant Sources

The significant source emissions threshold is calculated by multiplying the exceedance day emissions inventory for the Owens Lake Subarea (Table 4-1) by the ratio of the significant source category contribution (5 $\mu g/m^3$) to the near exceedance day concentration (150.1 $\mu g/m^3$). This yields a threshold level of 18.1 tons per day; there are three PM_{10} sources above the *de minimis* level and therefore identified as significant source categories in the OVPA (Table 4-2).

Table 4-2: Significant Source Categories of PM_{10} in the OVPA (tons/day)

Category	2012	2015
Fugitive Windblown Dust from Exposed Lake Beds	63.54	63.54
Fugitive Windblown Dust from Dunes	--	--
Keeler Dunes	154.24	154.24
Olancha Dunes	66.60	66.60

The following sections describe the significant sources in further detail.

4.2.1 Windblown Dust from Owens Lake, Keeler Dunes, and Olancha Dunes

The inventory estimates for fugitive dust emissions from Owens Lake, Keeler Dunes, and Olancha Dunes are derived from the mass emission modeling estimates for these areas on the near-exceedance day, May 11, 2014. These estimates are based on the modeling approach as described in Chapter 7 of this 2016 SIP.

4.3 PM_{10} Emissions Forecast

Table 4-3 provides a summary of the annual emissions forecast for all the emission source categories in the planning area for the period from 2000 to 2020. PM_{10} emission estimates for the Owens Lake bed, Keeler Dunes, and Olancha Dunes from 2000 to 2014 are based on modeled dust year estimates of emissions derived from observed monitoring results. The "dust year" concept is used to follow the dust season in the OVPA, which begins in July and lasts through the following June (i.e. data for the 2014 dust year covers July 2013 through June 2014). It has traditionally been used to describe emissions from modeled windblown dust sources. Hereafter, emissions summarized by dust year will be labeled as such. PM_{10} emissions from the control areas (i.e. Lake Bed and Keeler Dunes) in future years are projected based on the 2014 dust year emission inventory and assumed emission reductions using the target minimum dust control efficiency for each control area. Future estimates of PM_{10} emissions from the Olancha Dunes assume that as controls are applied to the lake bed, the dunes will have less sand migration from adjacent areas and emissions will reduce as PM_{10} is winnowed away.[17] This decay is assumed to occur until the emissions from the dunes reach those of a natural dune system[18], and is quantified according to Equation 1.

$$E_{s,t} = B_s + (E_{s,i} - B_s)\, e^{\frac{-\Delta T}{T}} \qquad \text{Equation 1}$$

$E_{s,t}$ = Adjusted off-lake PM_{10} emissions from source area s for year t
B_s = Natural PM_{10} emissions from source area s
$E_{s,i}$ = Initial off-lake PM_{10} emissions from source area s for year t
ΔT = Number of years since control measures were implemented in the adjacent lake bed area; e.g. 1, 2, 3, etc.)
T = Constant value for rate of change, T = 3 years.

Emissions from the two-kilometer buffer surrounding Owens Lake have been separated out in the forecast for illustrative purposes. The 2010 through 2014 PM_{10} emission estimates for this area are based on modeled estimates of emissions derived from observed monitoring results. The 2000 through 2009 PM_{10} emission estimates assume that emission rates from the two-kilometer buffer will follow a similar trend as those from the Olancha Dunes, since both are impacted by the lake bed sources; therefore, emissions for this period are estimated using an equation derived from the years when there are modeled emission estimates for both the Olancha Dunes and the two-kilometer buffer (i.e. dust years 2010 through 2014)[19]. Future estimates of PM_{10} emissions from the two-kilometer buffer follow the

[17] This emissions decay has been monitored in off-lake areas that are adjacent to lake bed dust control areas (Ono and Howard, 2015).

[18] For this analysis, a "natural dune system" is assumed to have an emission factor of 0.0481 tons PM_{10} per acre per year. This emission factor was developed in relation to the May 2004 ENVIRON International Corporation report entitled "Development of a Windblown Fugitive Dust Model and Inventory for Imperial County" (ENVIRON International Corporation, 2004; Mansell, 2005).

[19] The resulting equation is: [2-km Buffer Emissions, TPY] = 0.8345*[Olancha Dunes Emissions, TPY]-1030.5

same approach as is used for the Olancha Dunes (see Equation 1), except that the decay is assumed to occur until the emissions from the buffer reach those of a natural scrub desert.[20]

For the remaining sources, with the exception of fugitive windblown dust from open desert, the emissions data used in this analysis are derived from the CARB 2005, 2010, 2012, 2015, and 2020 emission inventories for Inyo County, and are ratioed to the OVPA by the same factors used for the exceedance day inventory (see Appendix IV-1, Table 2)[21]. Emission estimates for fugitive windblown dust from open desert are assumed to stay constant over time and were calculated using emission factors of a similar desert-like environment (e.g. Imperial County). Note, this estimate excludes fugitive windblown dust emissions related to the two-kilometer buffer. This approach is shown in detail in Appendix IV-1, Tables 5a and 5b.

[20] For this analysis, a "natural scrub desert" is assumed to have an emission factor of 0.0272 tons PM_{10} per acre per year (ENVIRON International Corporation, 2004; Mansell, 2005).

[21] Data computed from the CARB inventories has been used as follows: forecast years 2000 to 2009 (CARB 2005 inventory); forecast years 2010 to 2011 (CARB 2010 inventory); forecast years 2012 to 2014 (CARB 2012 inventory); forecast years 2015 to 2019 (CARB 2015 inventory); forecast year 2020 (CARB 2020 inventory).

Table 4-3: Summary of the Annual Emissions Forecast for all PM_{10} Emission Source Categories in the OVPA for the Period from 2000 through 2020 (tons/year)								
YEAR[1]	**LAKE BED EMISSIONS**	**OFF-LAKE EMISSIONS**						**TOTAL**
		Keeler Dunes	***Olancha Dunes***	***2-km Buffer (excluding dunes)***	***Windblown Dust Unpaved Roads***	***Windblown Dust Open Desert[2]***	***Misc. Sources[3]***	
2000	31,054	1,025	4,123	2,410	416	19,622	854	59,388
2001	75,163	2,893	5,523	3,579	416	19,622	854	107,936
2002	47,916	4,110	4,824	2,996	416	19,622	854	80,623
2003	60,539	3,688	5,350	3,434	416	19,622	854	93,788
2004	32,569	2,202	3,598	1,972	416	19,622	854	61,118
2005	23,565	5,872	6,546	4,433	416	19,622	854	61,192
2006	73,174	8,386	5,732	3,753	416	19,622	854	111,824
2007	5,154	5,382	5,448	3,516	416	19,622	854	40,278
2008	6,652	5,627	6,238	4,176	416	19,622	854	43,469
2009	20,423	2,354	3,612	1,984	416	19,622	854	49,150
2010	43,325	1,856	6,129	4,302	416	19,622	854	76,279
2011	29,680	2,520	5,228	3,478	416	19,622	744	61,573
2012	29,264	5,256	6,680	4,461	416	19,622	744	66,329
2013	5,060	4,137	5,045	2,780	416	19,622	744	37,690
2014	1,936	2,778	4,008	2,435	416	19,622	744	31,825

Table 4-3: Summary of the Annual Emissions Forecast for all PM_{10} Emission Source Categories in the OVPA for the Period from 2000 through 2020 (tons/year)

YEAR[1]	LAKE BED EMISSIONS	OFF-LAKE EMISSIONS						TOTAL
		Keeler Dunes	*Olancha Dunes*	*2-km Buffer (excluding dunes)*	*Windblown Dust Unpaved Roads*	*Windblown Dust Open Desert*[2]	*Misc. Sources*[3]	
2015	1,936	2,778	2,886	1,952	416	19,622	747	30,223
2016	1,222	172	2,082	1,606	416	19,622	747	25,752
2017	1,222	172	1,506	1,358	416	19,622	747	24,928
2018	355	41	1,093	1,180	416	19,622	747	23,340
2019	355	41	798	1,053	416	19,622	747	22,917
2020	355	41	586	962	416	19,622	750	22,617

Notes:

[1] For the modeled windblown dust sources (i.e. Lake Bed, Keeler and Olancha dunes, two-kilometer buffer), each year represents a "dust year" that runs from July through the following June (i.e. 2014 data is from July 2013 through June 2014).

[2] Emissions assumed constant over time.

[3] Miscellaneous sources include: manufacturing and industrial, service and commercial, mineral processes, metal processes, residential fuel combustion, construction and demolition, paved and unpaved road dust (activity related), windblown dust from agricultural lands, managed burning and disposal, on-road mobile, and wildfires.

5. BACM ASSESSMENT

5.1 Introduction

The CAA requires areas designated as serious nonattainment for PM_{10} to implement BACM and BACT on all significant sources of PM_{10} or PM_{10} precursors.[22] BACM/BACT is defined as the maximum degree of emission reduction considering technical and economic feasibility and environmental impacts of the control. BACM/BACT must be implemented independent of attainment requirements. While BACM/BACT apply to PM_{10} precursors, ambient PM_{10} in the OVPA is overwhelmingly primary PM_{10}, with little or no contribution from secondary aerosols; therefore BACM/BACT is not required for those precursors. The following sections summarize the assessment of BACM for the significant sources in the OVPA. Please refer to the 2016 BACM Assessment in Appendix V-1 for additional details.

5.2 Owens Valley PM_{10} Control Programs and Regulations

5.2.1 Fugitive Windblown Dust from Exposed Lake bed

Since 1980 GBUAPCD and other researchers have been involved with the study of the lake environment and the mechanisms that cause Owens Lake's severe dust storms. Since 1989 GBUAPCD has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unusual Owens Lake playa environment. Three dust control measures have been approved for use on the lake and have been designated as BACM by the District in concurrence with the USEPA (see Appendix A of the 2016 BACM Assessment in Appendix V-1). These measures include Shallow Flooding, Managed Vegetation, and Gravel Blanket; subsequent GBUAPCD Board Orders expanded and/or modified these BACM (see Sections 3.2.1 and 3.2.2 of the 2016 BACM Assessment). Currently, District Rule 401 specifically requires the City of Los Angeles to implement BACM (or other approved control measures) on any windblown dust source areas on Owens Lake that cause or contribute to monitored exceedances of State PM_{10} standards at residences within communities zoned for residential use. Figure 2-3 shows the location and type of dust control measures implemented to date, as well as the locations for future installations. Since the Owens Lake playa is the only controlled source of its kind in the United States, the controls currently implemented on the lake bed are the most stringent for this source type.

5.2.2 Fugitive Windblown Dust from Sand Dunes

The areas surrounding Owens Lake contain multiple dune systems created by sand moving off of the exposed lake bed during various times in the past as the lake level fluctuated. Most of these dune deposits contain a suite of native shrubs and grasses that stabilize them such that they are not significant dust sources. However, there are two dune systems, the Keeler Dunes and Olancha Dunes, which contain mobile sands that generate PM_{10} during wind events. The Keeler Dunes, located approximately one mile northwest of the community of Keeler, cause multiple exceedances of the NAAQS per year in the community of Keeler. As a response, the District is in the process of implementing a dust control project (scheduled for completion in 2016), which will involve the placement of approximately 82,000 straw bales and planting of approximately 246,000 native shrubs (see Section 6.2.2 for additional information). The project design consists of creating a stable self-sustaining low-impact vegetated dune system, similar in nature to the non-emissive dune areas around the lake in order to attain the Federal and State PM_{10} NAAQS in the communities of Keeler and

[22] BACM applies to certain area sources and BACT applies to stationary, mostly point, sources.

Swansea. To date, no dune-related dust control projects of this size have been implemented in other serious nonattainment areas.

The Olancha Dunes are located south of Owens Lake about 1.5 miles east of the community of Olancha. The Olancha Dunes have not been monitored and investigated to the same extent as the Keeler Dunes. However, since the implementation of dust control measures on the southern portions of Owens Lake starting in 2002, the number of PM_{10} exceedances coming from the direction of the Olancha Dunes has shown a downward trend. It is expected that the downward trend in PM_{10} levels will continue over time as the dunes continue to erode and the dust is winnowed out from the sand deposit areas.

5.3 Comparative Analysis

5.3.1 Summary

As discussed above and summarized in Table 5-1 below, GBUAPCD is currently implementing BACM for the Owens Lake playa and Keeler Dunes, the leading contributors to PM_{10} exceedances in the OVPA. These source types are unique to the OVPA, and GBUAPCD and partnering entities have gone to significant lengths to study and control the PM_{10} emissions associated with these areas.

Table 5-1: Comparative Analysis for Sources Above the *De Minimis* Level

Source Category	Dry Lake bed	Off-Lake Dunes
Great Basin	District Rule 401 requires BACM on windblown dust source areas on Owens Lake. BACM is location-specific, with control efficiencies from 20 to 100%. Shallow flooding, managed vegetation, and gravel cover have been deemed to meet the requirements of BACM by the USEPA (March 2000). Board Orders have adaptively managed BACM implementation over time, actively evaluating emitting portions of the lake bed and related BACM.	Board Order 130916-01 requires the implementation of a PM_{10} control project on the Keeler Dunes. This project is currently in progress and involves creating a stable self-sustaining low-impact vegetated dune system, designed to reduce PM_{10} emissions by ~95% in Keeler and Swansea.
Imperial County	N/A	N/A
San Joaquin Valley	N/A	N/A
South Coast	N/A	N/A
Maricopa County	N/A	N/A
Clark County	N/A	N/A

Table 5-1: Comparative Analysis for Sources Above the *De Minimis* Level		
Source Category	**Dry Lake bed**	**Off-Lake Dunes**
Discussion / Justification	This source is the only one of its kind actively managed with tested and adopted BACM measures. Thus, controls implemented represent the most stringent in any serious PM_{10} nonattainment area.	To date, no dune-related dust control projects of this type have been implemented particularly on this scale. Thus, controls implemented represent the most stringent in any serious PM_{10} nonattainment area.
Notes: [1] "N/A" implies that the source does not exist or is not actively managed in the nonattainment area.		

5.4 Assessment

5.4.1 Summary

Chapter 4 of the 2016 BACM Assessment assesses the emission reductions, cost, and cost-effectiveness of the dust control measures implemented in the OVPA. This analysis is summarized below in Table 5-2.

Table 5-2: Control Effectiveness, Cost Information, and Cost Effectiveness				
Source Category (and Windblown Dust Controls)	**Average Annual Emissions (tons)**	**Control Effectiveness**	**Costs**	**Cost-effectiveness ($/ton)**
Dry Lake bed (varied controls)	2006: 73,174 2010: 43,325 2014: 1,936	Up to 99% depending on control and location	$145.8M (annualized)[3] for 2016 SIP	$2,390
Off-Lake Dunes (straw bales and re-vegetation)	Keeler[1]: 3,309 Olancha[1,2]: 5,418	95% with straw bales with future shrub establishment	$700K (annualized)[3] for straw bales and re-vegetation with watering	$222
Notes: [1] Average of 2010-2014 annual emissions. [2] No active controls are anticipated for the Olancha Dunes. PM_{10} is anticipated to winnow out over time (Ono and Howard, 2015). [3] Costs are annualized assuming interest = 5%, n = 25 years, A/P = 0.07.				

5.5 Stormwater Management

The bed of Owens Lake is subject to infrequent, but significant flooding, alluvial deposition and fluctuating brine pool levels caused by stormwater runoff flows. In order to protect the PM_{10} control measures installed on the lake bed, as well as the downstream lease holders, the City shall design, install, operate and maintain flood and siltation control facilities. Flood and siltation control facilities shall be designed to provide levels of protection appropriate for the PM_{10} control measures being protected. For example, lake bed areas controlled with Managed Vegetation or Gravel Blanket may require a higher level of flood and siltation protection than areas controlled with Shallow Flooding. Appropriate flood and siltation control facilities shall be integrated into the design and operation of all PM_{10} control measures. All flood and siltation control facilities shall be continually operated and maintained to provide their designed level of protection. All flood and siltation control facilities and PM_{10} control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness.

All flood and siltation control facilities shall be designed so as not to cause the existing trona mineral deposit lease area (CSLC leases PRC 5464.1, PRC 3511 and PRC 2969.1) to be subjected to any greater threat of water inundation and alluvial material contamination than would have occurred under natural conditions prior to the installation of PM_{10} control measures.

5.6 Regulatory Effectiveness

Rule effectiveness is a measure of the compliance by the regulated sources with the control measures required under the plan. Since virtually all the PM_{10} emissions in the Planning Area originate from the dry playa of Owens Lake, and since a single operator, the City of Los Angeles, is required to undertake the control measures required under this plan to control those emissions, the District projects a rule effectiveness of 100 percent for the plan's control measures.

The District will enforce the plan's requirements through continual oversight and inspection of the City's efforts to construct, operate and maintain the control measures, and through periodic inspection and monitoring. The plan contains milestones in 2017 for construction and operation of BACM in the Phase 9/10 dust control areas, annual determinations to identify any additional lake bed sources that cause or contribute to exceedances of the PM_{10} standard, and continuous monitoring, inspections, and testing to ensure compliance with the performance standards required under this plan.

6. CONTROL STRATEGY AND ATTAINMENT DEMONSTRATON

6.1 Introduction and Existing Rules and Regulations to Control PM_{10}

The focus of the discussion in the 2016 SIP control strategy is on controls for Owens Lake, which are regulated under Section 42316. This is discussed in more detail in Section 6.2.1, Section 6.3 and in Chapter 10. Other sources that contribute PM_{10}, such as industrial sources, forest management burning, and other fugitive dust sources are covered under existing District Rules. These rules are listed in Table 6-1 for sources other than Owens Lake. Methods to control fugitive dust and to comply with these rules are included in permits to operate for industrial sources.

Table 6-1: Existing Rules and Regulations to Control Sources of PM_{10}

District Rule	Description
209-A	Requires new sources with PM_{10} emissions greater than 250 pounds per day of total suspended particulates, or facility modifications of greater than 15 tons per year of PM_{10} to apply Best Available Control Technology to control PM emissions.
400	Limits visible emissions from any source, except those exempted under Rule 405, to less than Ringelmann 1 or 20% opacity.
401	Requires that reasonable precautions be taken to prevent visible particulate emissions from crossing the property boundary. Requires the City of Los Angeles to implement dust control measures at Owens Lake in order to prevent monitored violations of the state PM10 standard in communities.
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 that a burn plan be approved by the APCO.
410	Limits forest management burning to designated burn days and requires that a burn plan be approved by the APCO.
411	Limits wildland management burning to designated burn days and requires that a burn plan be approved by the APCO.
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.

6.1.1 Fugitive Dust Regulations

It should be noted that contractors involved in the implementation of the 2016 SIP control strategy are subject to these District rules and regulations regarding fugitive dust control. District Rules 400 and 401 limit visible emissions and require that reasonable precautions be taken to control fugitive dust from activities such as road building, grading, gravel mining and hauling. Mitigation measures to control fugitive dust associated with the implementation of dust control measures (DCMs) on the lake bed are discussed in the Environmental Impact Report for the 2003 and 2008 SIPs (GBUAPCD, 2004 and GBUAPCD, 2008). Any gravel mining and hauling activities will be required to apply for an Authority to Construct and obtain a Permit to Operate from the District. The permit will include Conditions of Approval. As discussed in Section 6.4 below, District Rule 401.D requires the City to implement dust control measures on lake bed areas that cause or contribute to monitored violations of the state PM_{10} standard in any community surrounding Owens Lake.

6.1.2 Transportation Conformity

Transportation conformity requirements, contained in District Regulation XII, 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. The emissions inventory shows very low PM_{10} emissions from mobile sources and transportation-related activities in the Planning Area.

However, fugitive dust from construction-related activities in areas along Highway 395 has caused significant dust events in the Planning Area. For transportation conformity purposes, PM_{10} emissions from construction-related activities will be quantified as required by District Rule 1231(e) for any new highway construction projects in the OVPA, and will be subject to District Rules 400 and 401 for controlling fugitive dust.

6.1.3 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. Prescribed burning activities will take place on federal lands for forest management and private lands for rangeland improvement and wildland management purposes. The burn season for prescribed burning is expected to last about 60 days per year and average burn day emissions have been estimated at 42.2 tons per day. The inclusion of these emission estimates for prescribed burning is for SIP conformity purposes to ensure that prescribed burning activities in the nonattainment area have been considered in the Owens Valley PM_{10} SIP attainment demonstration.

Prescribed burning activities are not expected to take place on windy days when Owens Lake dust storms occur. Predicted high wind days are avoided when performing prescription burns for fire safety reasons. In addition, prescribed burning is regulated through District Rules 410 and 411 for wildland and forest management burning. These rules require that a burn plan be submitted to the Air Pollution Control Officer prior to conducting the burn, and that burning will not cause or contribute to violations of the air quality standards. For General Conformity purposes, all prescribed burns in the OVPA will be limited to 42.2 tons of PM_{10} per day. If prescribed burning is done in a manner that complies with District rules, burning activities are not expected to interfere with attainment of the PM_{10} NAAQS in the Owens Valley.

6.2 Adopted Control Strategy and Measures

6.2.1 Owens Lake Bed Mitigations

Since 1980 GBUAPCD and other researchers have been involved with the study of the lake environment and the mechanisms that cause Owens Lake's severe dust storms. Since 1989 GBUAPCD has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unusual Owens Lake playa environment. Three dust control measures have been approved for use on the lake and have been designated as BACM by the District in concurrence with the USEPA.[23] These measures include Shallow Flooding, Managed Vegetation, and Gravel Blanket. Subsequent GBUAPCD Board Orders (see Sections 6.2.1.4 and 6.2.1.5) expanded and/or modified these BACM.

6.2.1.1 Shallow Flooding BACM

The naturally wet surfaces on the lake bed, such as seeps, springs, and the remnant brine pool, are resistant to windblown dust emissions. The Shallow Flooding BACM attempts to mimic these physical processes, thus providing dust control over large areas with reasonably minimal and cost-effective infrastructure. Under this control measure water must be applied in amounts and by means sufficient to achieve the following performance standards established by the District.

For all Shallow Flooding areas except those within the 2006 Dust Control Area (DCA):

- At least 75 percent of each square mile designated as BACM Shallow Flooding areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. For these Shallow Flooding dust control areas, 75 percent of each entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
- Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
- Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
- Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.

For all Shallow Flooding areas within the 2006 DCA:

- The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flooding Control Efficiency Curve (included as Figure 6-1) to achieve the control efficiencies (CE) targets specified by the District for the period commencing on October 16 of each year.
- For only those Shallow Flooding areas with specified CE targets of 99 percent or more:
  - Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.

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[23] Great Basin Unified Air Pollution Control District. 2003. Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan – 2003 Revision. GBUAPCD. Bishop, California. November 13.

- Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.

- For only those Shallow Flooding areas with specified CE targets of less than 99 percent:
  - Shallow Flooding areal wetness cover shall be based upon the Shallow Flooding Control Efficiency Curve (Figure 6-1) and shall be maintained through June 30 of every year.

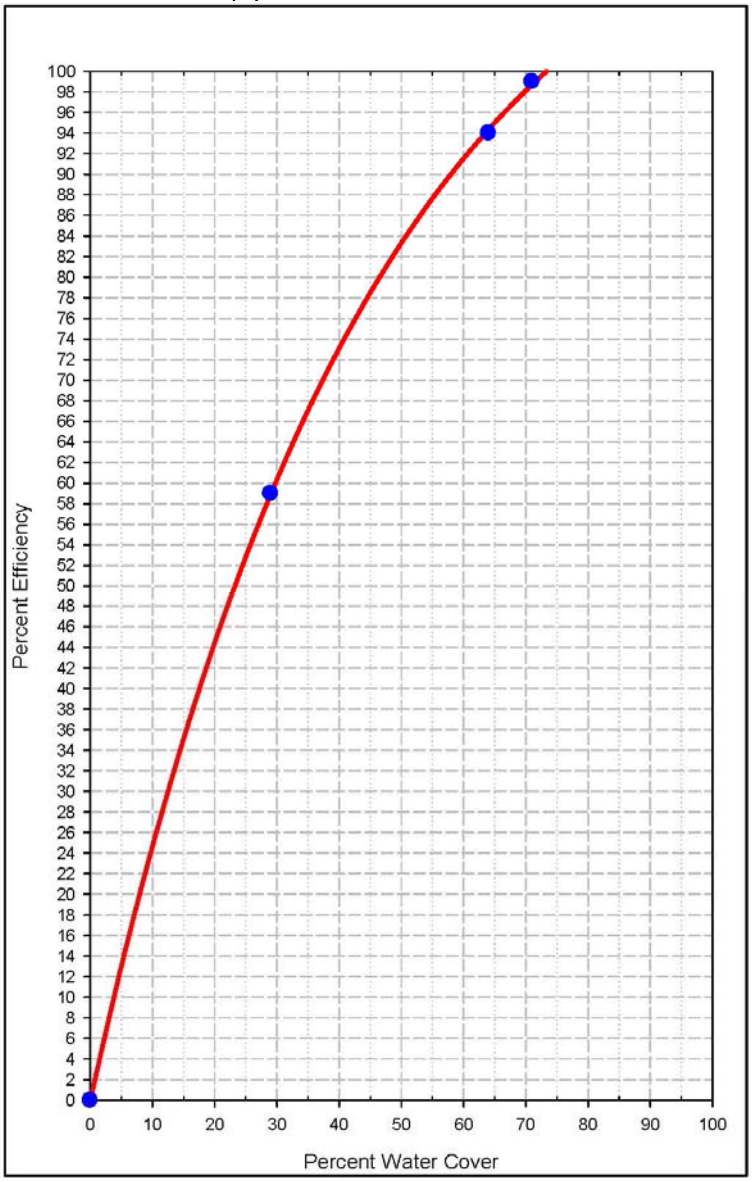

Figure 6-1: Shallow Flooding Control Efficiency Curve

6.2.1.2 Managed Vegetation BACM

The primary purpose of Managed Vegetation BACM is to provide surface stabilization of areas on the lake bed to reduce PM_{10} emissions. Vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. Vegetative cover that is sufficiently dense and uniform (particularly avoiding large, contiguous barren expanses) provides an effective barrier that keeps surface wind speeds from reaching the threshold friction velocity required to generate emissions and traps sand and sand-sized soil particles.

Vegetation on the Owens Lake bed has naturally become established where sufficient water quantity and quality is available on or near the surface of the lake bed to leach the saline lake bed soils and sustain plant growth. Natural saltgrass-dominated (Distichlis spicata) meadows and wetland areas around the playa margins and the scattered spring mounds found on the playa are examples of such areas (Figure 6-2). Observation and monitoring of these naturally vegetated areas has shown that, with sufficient vegetated cover, very little dust emissions are generated from them. In addition to directly protecting the lake bed surface, saltating particles moving from an adjacent source area into vegetated areas are trapped thereby preventing further emissions.

Figure 6-2: Natural Saltgrass Meadow (foreground) and Wetland (midground) at Swede's Pasture along the Eastern Shore of Owens Lake

The Managed Vegetation BACM is modeled on these naturally protective vegetated areas found along the margins of the lake bed. Successful dust control using Managed Vegetation relies on soil types and conditions suitable for plant growth. Generally, the barren lake bed soils are not suitable for vegetation establishment without prior reclamation to reduce the high salinity levels present. These conditions may be created by leaching and installing subsurface drainage in order to remove leached salts from the rooting zone. An example of existing Managed Vegetation PM_{10} controls constructed by the City can be seen in Figure 6-3.

Figure 6-3: Vegetation Planted by the City in the T30-1 Dust Control Area

The control efficiency for the Managed Vegetation control measure is 99 percent, as it is with most of the other control areas on the lake bed. The primary performance requirement for Managed Vegetation BACM is based on the amount of surface cover provided by the vegetation present across the area. The vegetation cover is measured both as the overall average as well as the variation in spatial distribution across each contiguous Managed Vegetation control area. Areas controlled with Managed Vegetation BACM shall maintain a minimum overall average vegetation cover of 37 percent for each contiguous Managed Vegetation area. However, it is recognized that over-control in some portions of a control area can offset under-control in other areas, as long as under-controlled areas are not large enough to become emissive. Table 6-2 provides a range of allowable vegetation covers across multi-sized grids to ensure coverage distributions are sufficient to prevent PM_{10} emissions. The cover at any point within a Managed Vegetation control area can vary from the average as set forth in Table 6-2.

Table 6-2: Managed Vegetation BACM Vegetative Cover Criteria

Grid Scale	Average	>5% cover	>10% cover	>20% cover
(acres)	(minimum % cover)	(minimum % of DCM area)		
0.1	37	92	83	65
1	37	94	87	68
10	37	95	89	74

Table 6-2: Managed Vegetation BACM Vegetative Cover Criteria				
Grid Scale	**Average**	**>5% cover**	**>10% cover**	**>20% cover**
(acres)	(minimum % cover)	(minimum % of DCM area)		
0.1	37	92	83	65
1	37	94	87	68
100	37	95	90	77

Managed Vegetation BACM areas will be subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grid scales (to 1, 10, and 100 acres). Vegetative cover distributions measured across a Managed Vegetation site using the multiple grid scales will be characterized to determine if they meet the threshold levels given in Table 6-2.

Vegetative cover compliance is to be determined based on a satellite image of the area taken in the fall between September 21 and December 21 of each year. The image shall be ground-truthed, calibrated, and validated by reference to measurements made by point frame or by equivalent methods approved at the sole discretion of the District. The "point frame" or "point-intercept" method to measure vegetation cover can be found in BLM Technical Reference LM/RS/ST-96/002+1730, Method G (BLM, 1999). The vegetation planted for dust control shall consist only of locally-adapted native species approved by both the District and the CSLC. As of January 1, 2016, a plant list of 48 native species has been approved (GBUAPCD, 2015b). A technical report containing additional information regarding the Managed Vegetation BACM is included as Appendix VI-1.

6.2.1.3 Gravel Blanket BACM

The Gravel Blanket BACM PM_{10} control measure prevents PM_{10} emissions by: (1) preventing the formation of efflorescent evaporite salt crusts, because the large pore spaces between the gravel particles disrupt the capillary movement of saline water to the surface where it can evaporate and deposit salts; and (2) creating a surface that has a high threshold wind velocity so that direct movement of the large gravel particles is prevented and the finer particles of the underlying lake bed soils are protected. Areas controlled with Gravel Blanket BACM must meet one of the following two performance standards:

- The entire control area must be covered with a layer of gravel at least four inches thick, where all gravel material placed must be screened to a size greater than one-half inch in diameter. Where it is necessary to support the gravel blanket, it can be placed over a permanent permeable geotextile fabric; or
- The entire control area must be covered with a layer of gravel at least two inches thick underlain with a permanent permeable geotextile fabric. All gravel material placed must be screened to a size greater than one-half inch in diameter.

6.2.1.4 2008 Board Order

Concurrent with the publication of the 2008 SIP, GBUAPCD adopted Board Order No. 080128-01 ("2008 Board Order"), which required the City of Los Angeles to continue to operate and maintain the 29.8 square miles of BACM already established in the 2003 Dust Control Area (DCA). The 2008 Board Order also required the City of Los Angeles to implement an additional 12.7 square miles of Shallow Flooding or Moat & Row in an area delineated as the 2006 DCA. The City was also mandated to control PM_{10} emissions from a 0.5 square-mile area in the southern portion of the Owens Lake bed, known as the "Channel Area". Per the 2008 Board Order, the City was allowed to implement up to 3.5 square miles of Moat & Row in the DCA. After three years, if the measure proved effective the City could apply to the District for a SIP revision to designate Moat & Row as BACM. The 2008 SIP was approved by CARB in June 2008 and submitted to the USEPA (CARB, 2008).

6.2.1.5 Post-2008 Board Order

After the adoption of the 2008 SIP, the City requested and was granted a variance in 2009 to extend the completion deadline for Moat & Row on 3.5 square miles of the lake bed. The variance included a condition that required the City to implement Gravel BACM on two square miles of the lake bed by 2012 (known as "Phase 8"). In 2011, a dispute arose between the District and the City of Los Angeles regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2008 SIP. Subsequent disputes were fully and finally resolved by the 2014 Stipulated Judgment entered in favor of the District (see Section 2.2.2.7).

A revision to the 2008 SIP was prepared in 2013 to incorporate an extension to the NAAQS attainment deadline, as well as to include modifications to some of the previously implemented control measures. Concurrent with this revision, GBUAPCD adopted Board Order No. 130916-01 ("2013 Board Order"), which required the City of Los Angeles to implement new dust control measures in place of Moat & Row in an approximately 3.1 square-mile area now called the "Phase 7a" area. The Phase 7a area includes six DCAs designated as T37-1, T37-2, T1A-3, T1A-4, T-32-1, and T12-1 (see Figure 2-3). Per the 2013 Board Order, the City of Los Angeles was required to implement fully-compliant BACM PM_{10} controls (other than Managed Vegetation BACM) in the Phase 7a areas by December 31, 2015. Areas controlled by Managed Vegetation BACM were required to achieve fully-compliant BACM vegetation cover by December 31, 2017. The 2013 Board Order excluded from the Phase 7a areas all California Register of Historical Resources-eligible areas plus necessary buffer areas. Approximately 277 acres of the Phase 7a areas were identified as Eligible Cultural Resources (ECR) areas and were given the title of "Phase 7b Areas." The District will monitor the Phase 7b ECR areas following implementation of dust controls in adjacent areas. It is anticipated that emissions from the ECR areas will be reduced once dust control measures are implemented in adjacent areas. In the same manner as the off-lake dust source areas were created as a result of sand migration from the lake bed, the ECR areas will have less sand migration from the adjacent areas after dust controls are in place and it is expected that emissions will be reduced as dust is winnowed from the loose sand deposits. This emissions decay has been monitored in off-lake areas that are adjacent to lake bed dust control areas (Ono and Howard, 2015). For attainment demonstration purposes, the ECR areas will be assumed to have no emissions after dust controls are implemented in 2015. However, if any ECR area is determined to have caused or contributed to an exceedance of the standard after dust controls are implemented in adjacent areas, it will be ordered for dust control under the contingency measure provisions in the SIP. The 2013

Board Order also recognized adjustments to existing BACM, including "Reduced Thickness Gravel"[24] as an approved type of the Gravel Blanket BACM and "Brine Shallow Flooding"[25] as a subcategory of the Shallow Flooding BACM. In light of California's ongoing drought, the 2013 Board Order also emphasized the need for reductions in water usage, stating that "[the] District and [the City of Los Angeles] shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered on Owens Lake." Lastly, the 2013 Board Order modified provisions for PM_{10} control in the Keeler Dunes stating that the District would work with stakeholders to develop and implement a project to control dust emissions from the dunes by December 31, 2015 (see Section 6.2.2).

6.2.2 Keeler Dunes Mitigations

The Keeler Dunes were identified in the 2006 Settlement Agreement and the 2008 SIP as one of the significant sources of PM_{10} emissions in the OVPA requiring dust control implementation in order for the OVPA to attain the NAAQS. As a result, the District began investigating the Keeler Dunes in 2008 with the goal of developing a dust control strategy. As part of the Keeler Dunes Investigation, several public workshops and meetings were held to discuss the results of the work and present possible dust control measure ideas and receive input from interested stakeholders, including: Native American Tribes in the Owens Valley, Keeler and Lone Pine residents, Caltrans, BLM and the City of Los Angeles. Since the Keeler Dunes are located on both Federal land, under the jurisdiction of the BLM, and land owned by the City of Los Angeles, preparation of the environmental review documents for the project followed requirements for both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

In October through November 2011, the District prepared a Notice of Preparation (NOP) for the project and held public workshops to receive input on a proposed dust control project in the Keeler Dunes. Originally, the Draft EIR/EA was going to be completed and made available for public comment in early 2012. However, due to several project delays, the Draft EIR/EA was not completed until March 2014 and the Final EIR/EA was not certified until July 2014 (GBUAPCD 2014).

The main action that enabled the dust control project to finally move forward was the August 2013 Stipulated Order of Abatement (see Section 2.2.2.5). As part of the abatement order the City of Los Angeles made a $10 million public benefit contribution to the District to control PM_{10} emitted from the Keeler Dunes. In return, the District agreed to forever release the City of Los Angeles from any and all liability for dust emissions, regardless of origin, from the Keeler Dunes and other dune areas in the vicinity of Owens Lake.

The Keeler Dunes project is fundamentally a vegetation project in which the goal is to recreate a stable self-sustaining vegetated dune system while at the same time minimizing the impact to the natural resources present within the dunes. The design for the project was based on a small-scale pilot project completed by the District from 2013-2015 and from previous dust control research by the Desert Research Institute in Reno, Nevada in New Mexico and along the coast of California as well as dust control measures used in China and

[24] A measure consistent with the Gravel Blanket BACM except that the gravel thickness is reduced from a minimum of four inches to two inches, provided that all reduced thickness gravel areas are underlain with geotextile fabric.

[25] A measure consistent with the Shallow Flooding BACM except that the water used for dust control may contain elevated levels of dissolved salts.

Africa for stabilization of large mobile sand dunes (Gillies and Lancaster, 2013; Gillies et al., 2015). The ultimate aim of the project is to establish a self-sustaining stable non-emissive vegetated dune field, similar to those found in other locations around Owens Lake that can be managed with minimal or no extended resources.

The design of the Keeler Dunes dust control project uses straw bales as temporary roughness elements to stabilize the dune surface in order to allow the establishment of five species of locally adapted native shrubs. The District conducted a 1.2 acre test of the project design in the northern portion of the Keeler Dunes starting in 2013. Data from this test project confirmed that target dust control levels can be achieved with the straw bale array and that the native shrubs can successfully be established within the dune system.

The dust control project, shown in Figure 6-4, is designed to reduce PM_{10} emissions by about 95% within the community of Keeler and involves the placement of approximately 82,000 certified weed-free straw bales and planting of approximately 246,000 native shrubs (three shrubs per bale). The bales are placed in a random array patterned after a natural vegetation distribution (see Figure 6-5). The native shrubs are irrigated with water from the Keeler Community Service District well through a temporary above ground irrigation system. After a three year plant establishment period it is anticipated that the shrubs will have matured such that they no longer require supplemental irrigation.

Figure 6-4: Aerial View of the Keeler Dunes Dust Control Project (June 2, 2015)

The project is designed to minimize environmental impacts to natural resources within the dunes both during project construction and implementation and during long-term project operation and maintenance. In the design of the project, control of the dunes will be slowly transferred from the straw bales to the native shrubs over a period of three to five years as the bales degrade and the plants grow and mature (see Figure 6-6).

Construction of the Keeler Dunes Project began in October 2014. Placement of the straw bales was completed in December 2015 along with the planting of 48,000 native shrubs. Additional plantings will take place in 2016 to complete the project, but in the meantime, the straw bales are expected to reduce dust emissions from the Keeler Dunes by 95%, controlling about 2,740 tons of PM_{10} per year.

Figure 6-5: Straw Bale Array in the Keeler Dunes Dust Control Project (January 2015)

Figure 6-6: Shrubs Planted along the Base of a Straw Bale in the Project Test Site Started in 2013 (20 months after planting)

6.3 Proposed Control Measures

The following proposed control measures come from the 2014 Stipulated Judgment and additional discussions between the District and the City of Los Angeles. They are summarized below and form the basis of the District's proposed Rule 433 (see Chapter 10).

6.3.1 Future On-Lake Supplemental Dust Control Areas

As a result of the 2014 Stipulated Judgment, the City of Los Angeles will be required to implement BACM PM_{10} control measures on 3.62 square miles of the Owens Lake bed by December 31, 2017 (Phase 9/10 areas; see Figure 2-3), with the exception for areas identified as ECR areas. The District will monitor the Phase 9/10 ECR areas following the implementation of dust controls in adjacent areas. It is anticipated that emissions from the ECR areas will be reduced once dust control measures are implemented in adjacent areas. In the same manner as the off-lake dust source areas were created as a result of sand migration from the lake bed, the ECR areas will have less sand migration from the adjacent areas after dust controls are in place and it is expected that emissions will be reduced as dust is winnowed from the loose sand deposits. This emissions decay has been monitored in off-lake areas that are adjacent to lake bed dust control areas (Ono and Howard, 2015). For attainment demonstration purposes, the ECR areas will be assumed to have no emissions after dust controls are implemented in 2017. However, if any ECR area is determined to have caused or contributed to an exceedance of the standard after dust controls are implemented in adjacent areas, it will be ordered for dust control under the contingency measure provisions in the SIP. Completion of the Phase 9/10 control measures is expected to result in reducing lake bed PM_{10} emissions by about 1,580 tons per year.

6.3.2 Shallow Flooding BACM

In areas containing infrastructure capable of achieving and maintaining compliant Shallow Flooding BACM, the City of Los Angeles may implement TWB^2 or Brine BACM as alternatives to BACM Shallow Flooding to achieve specified CE levels. Additionally, in specific control areas that have historically displayed a late start and/or early end to source activity, the City of Los Angeles may implement Dynamic Water Management to modify the Shallow Flooding dust season.

Tillage with BACM (Shallow Flood) Backup or TWB^2 means stabilizing the surface through roughening and developing soil clods using mechanical methods in accordance with performance requirements established by the District. If the erosion threshold established by the District is exceeded or the performance requirements are no longer met, the City must utilize BACM Shallow Flooding as a back-up control method in order to prevent NAAQS violations. Water must be applied in amounts and by means sufficient to meet the CE level of 99% or CE targets for MDCE areas.

Dynamic Water Management or DWM is an operational modification to BACM Shallow Flooding that allows delayed start dates and/or earlier end dates required for shallow flooding in specific areas that have historically had low PM_{10} emissions within the modified time periods. The truncated dust control periods allow for water savings while achieving the required CE level. If a DWM area becomes susceptible to wind erosion outside of the modified dust control period, the area is required to be flooded to meet the required CE for that area (see GBUAPCD, 2016a for details of the performance requirements for DWM).

Brine BACM involves the application of brine and the creation of wet and/or non-emissive salt deposits sufficient to meet a CE level of 99% or CE targets for MDCE areas. Unlike Brine

Shallow Flooding (approved in 2013), Brine BACM areas are not required to meet prescribed Shallow Flooding wetness cover requirements. However, if a brine BACM area becomes susceptible to wind erosion (i.e. the District-defined erosion threshold is exceeded) or the performance requirements are no longer met, the area is required to be flooded to meet the required CE for that area (see GBUAPCD, 2016b for details of the performance requirements for Brine BACM).

The District-defined erosion threshold is determined from sand flux measurements or the Induced Particulate Erosion Test (IPET) test method. As mentioned above, BACM Shallow Flooding must be implemented in TWB[2], DWM, or Brine BACM areas if any of the following thresholds are exceeded or if a TWB[2], DWM, or Brine BACM area fails to meet the required performance criteria:

- Sand flux measured at 15 centimeters above the surface exceeds 5.0 grams per square centimeter per day on DWM or Brine BACM areas or 1.0 grams per square centimeter per day on TWB[2] areas, or
- IPET method shows visible dust emissions when operated at the reference test height.
- Additional performance criteria are also required for Brine BACM areas.
    - The total combined extent of water or saturated surface and stable salt crusts (as defined by GBUAPCD, 2016b) must meet the amount as defined by the Shallow Flooding Control Efficiency Curve, and
    - The extent of stable capillary brine crust must not exceed more than one-third of the required surface cover as defined by the Shallow Flooding Control Efficiency Curve.

If the APCO determines that one of the above thresholds and performance requirements have not been met in a TWB[2] or Brine BACM area, the APCO will issue a written order to the City that the area must meet the Shallow Flooding BACM requirements within 37 days.

If the APCO determines that one of these thresholds is exceeded in a conventionally flooded (ponded or lateral/bubbler irrigated) DWM area, the APCO will issue a written order to the City that the area must meet the required wetness target within 15 days if the emissive area is less than or equal to 25 percent of the DWM area, and 21 days if the emissive area is greater than 25 percent of the DWM area. Shallow Flooding areas irrigated with sprinklers shall be re-flooded within 15 calendar days of a re-flood order being issued regardless of the amount of DWM area that is ordered. If any DWM area becomes emissive and is therefore issued a re-flood order by the APCO more than once in a continuous six-year period, these areas will revert to the standard Shallow Flooding period and will no longer be eligible for DWM. Should a re-flooding order be issued by the APCO for a DWM area less than once in a rolling six year period, that re-flooding order shall only apply to the modified start or end period upon which the area was identified for re-flooding and not the entire dust year (see GBUAPCD, 2016a for details of the required performance requirements for DWM).

6.3.3 Minimum Dust Control Efficiency BACM

Beginning in 2008, the District allowed for Minimum Dust Control Efficiency or MDCE BACM in certain areas to reduce water use and address environmental concerns in sensitive wetlands areas. MDCE BACM is a dust control measure for which the control efficiency target is adjusted to match the required control level based on air quality modeling for the 2006 dust control areas. The control efficiency targets may be less than 99%, but the level of control in all areas is intended to prevent exceedances of the NAAQS. MDCE BACM is currently implemented in certain Shallow Flooding areas, in the T1A-1 Sand Fence Area, and in the 0.5 square mile Channel Area.

6.3.4 Off-lake Sources

With the exception of Keeler Dunes, controls on off-lake sources are not proposed as controls or contingency measures in this 2016 SIP. There are three rationales for this decision. The first is that monitoring and modeling analyses indicate that emissions from off-lake sources more than two kilometers away do not have an impact on achieving attainment. This belief is consistent with "source weighting" analyses performed by the Maricopa Association of Governments (MAG) in support of the May 2012 *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* ("MAG 5% Plan").[26] In the MAG 5% Plan, MAG asserted that there is a need to account for distance between emission sources and impacted monitors and found that a 1/distance weighting factor proved to be the best value to use to adjust PM_{10} emissions developed through back trajectory domains. In addition, in supporting analyses performed using the dispersion model AERMOD, MAG found that at the threshold of high wind conditions (i.e. winds greater than 12 miles per hour), PM_{10} concentrations drop by a factor of 10 between 0 and 500 meters, between 500 and 2,800 meters, and between 2,800 and 30,000 meters.[27] As the majority of the PM_{10} monitors in the OVPA are on or very near the Owens Lake bed, the two-kilometer buffer is used to capture the emissions that could have quantifiable impacts at the monitors.

The second rationale is that at sources less than two kilometers away emissions will continue to reduce as on-lake controls prevent additional deposition on those lands. This emissions decay has been monitored in off-lake areas that are adjacent to lake bed dust control areas (Ono and Howard, 2015). This decay is assumed to occur according to the rate presented in Equation 1 (see Section 4.3). Emissions of PM_{10} from off-lake areas are expected to be reduced by about 770 tons per year near the shoreline and by about 2,090 tons per year in the Olancha Dunes as the result of controls that are implemented on the lake bed.

The third rationale is based on previous research and air quality studies conducted within the OVPA, land use and classification, and video captured by District dust cameras (Holder, 2016).

6.4 Controls to Meet the State PM_{10} Standard

Following the implementation of the proposed control strategy, PM_{10} levels are expected to show compliance with the federal standard of 150 μg/m^3 at the regulatory shoreline of Owens Lake and the state standard of 50 μg/m^3 in the local communities that surround the lake. If needed, additional control measures can be ordered to help meet the state PM_{10} standard. The Board adopted District Rule 401.D in December 2006, which requires the City to implement dust control measures in lake bed areas that cause or contribute to monitored violations of the state PM_{10} standard in any community surrounding Owens Lake. In accordance with the 2006 Settlement Agreement, any District orders to implement dust

[26] MAG. 2012. MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area. May. Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-for-PM10-for-the-Maricopa-County-Nonattainment-Area.pdf. Accessed on January 11, 2016.

[27] MAG. 2012. MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area. Appendices: Volume II. May. Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-Appendices_Volume-2.pdf. Accessed on January 11, 2016

control measures to meet the state standard are to be based on Dust ID data. For the purpose of applying District Rule 401.D, the Dust ID model results will only be used to determine if any lake bed dust source area(s) caused or contributed to a state PM_{10} standard violation after that violation is monitored at a community-based monitor site (GBUAPCD, 2006).

6.5 Implementation Monitoring and Enforcement

Adoption of the control strategy set forth in this 2016 SIP will require the District to maintain programs to monitor and enforce the proper and timely execution of mandatory implementation and air quality attainment provisions of this 2016 SIP. With regard to air quality, the District will continue to monitor PM_{10} levels in the OVPA in order to determine:

- Whether reasonable further progress is being made, as predicted by the estimated annual emission trend (Figure 8-1),
- Whether the control strategy achieves progress toward attainment of the 24-hour PM_{10} NAAQS by 2017,
- Whether lake bed source areas are causing or contributing to PM_{10} NAAQS exceedances at the shoreline, and
- Whether the PM_{10} NAAQS has been attained in the OVPA.

With regard to control measure deployment, the District will monitor and enforce the City of Los Angeles' implementation of the control strategy, to ensure that the control measures are properly and timely installed, and that their installation and operation conform to the design and performance requirements of this 2016 SIP. Failure to meet any of the mandatory project implementation milestones set forth in Section 9.1 or failure to meet any of the requirements set forth in District's proposed Rule 433 (Section 10.1) are subject to enforcement as authorized by Section 42316. This includes the requirements associated with the implementation, operation and maintenance of dust controls, as well as the environmental impact mitigation measures associated with the project. Although the District prepared Environmental Impact Reports (EIRs) associated with the 1998, 2003, and 2008 SIPs, the LADWP is responsible for all future EIRs for dust control projects on the lake bed. As such, the LADWP recently prepared a full project-level EIR that analyzes anticipated impacts of the Phase 9/10 Project (see Appendix VI-2). If any additional environmental analysis, leases, easements and permit approvals are required to implement any future control measures on the lake bed, they are the sole responsibility of the City. For enforcement purposes, each Phase or Increment is a separate milestone.

The District will continue to ensure the City operates all dust control measures such that they comply with the performance requirements set forth in this and past SIPs. This includes measuring the wetness cover in Shallow Flooding areas and the vegetation cover in Managed Vegetation areas. Compliance measurement on the large scale of Owens Lake dust controls typically employs the use of satellite imagery coupled with ground-truthing. Improvements to the methods used for control measure compliance and enforcement will continue. Paragraph 19 of the 2008 Board Order and Section 29 of the 2006 Settlement Agreement commit the District and the City to work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships and compliance specifications for all PM_{10} control measures.

With regard to the impact of the control measures on the environment, the District adopted Mitigation Monitoring and Reporting Programs at the time it certified the Final Environmental

Impact Reports for the 1997 SIP (GBUAPCD, 1997), the 2003 SIP (GBUAPCD, 2003), the 2008 SIP (GBUAPCD, 2008), and the Keeler Dunes Project (GBUAPCD, 2014). The City adopted a Mitigation Monitoring and Reporting Program at the time it certified the Final EIR for the Phase 9/10 Project (LADWP, 2015a). As required by the Mitigation and Monitoring Programs, the District will enforce the mitigation measures, as well as elements of the project description, that are intended to avoid or lessen adverse environmental impacts of implementing the control strategy. Some of those mitigation measures and project elements require long-term monitoring of certain environmental effects of implementing the control strategy, and taking appropriate responsive action when the monitoring discloses an adverse environmental effect.

6.6 Cost and Employment

The cost of implementing PM_{10} control measures on the Owens Lake bed depends on the total acreage and types of DCMs used by the City of Los Angeles to meet the NAAQS. Based on actual costs for DCMs in place and the City's estimates for work to be constructed, LADWP staff estimated that the total cost of planning, design, permitting and construction for the DCMs that were in place by mid-2015 were approximately $891 million. This estimate includes the costs of LADWP facilities and staff, but excludes payments made directly to the District. Costs associated with the completion of the Phase 7a Project and the Phase 9/10 Project are estimated to be around $313 million (LADWP, 2015b).

At the time of this 2016 SIP, operation and maintenance costs are estimated by the City to be approximately $25.5 million per year. The annual cost of water for the project is estimated to be about $36 million. As a result, total annual costs are estimated to be $61.5 million (LADWP, 2015b).

The cost for control of PM_{10} emissions in terms of dollars per ton is instructive in that it allows the cost of PM_{10} control at Owens Lake to be compared with the costs elsewhere. At the time of this 2016 SIP, costs were calculated for the entire project. By annualizing the estimated capital costs over 25 years ($1.204 billion total cost, interest = 5%, n = 25 years, A/P = 0.07—annualized construction cost = $84.3 million) and using the above annual operation and maintenance cost estimate ($61.5 million), the 25-year total annualized cost for Owens Lake dust controls is estimated at $145.8 million per year. The projected emission reductions from the 48.6 square mile control area are estimated at approximately 61,000 tons per year by mid-2018 when compared to 2006 emissions. This gives a cost of $2,390 per ton of PM_{10} controlled for the entire project on the lake bed. The total cost for dust control for the Keeler Dunes straw bale/vegetation project is $10 million, which translates to annual control costs of $222 per ton.

Past analyses by the San Joaquin Valley Unified Air Pollution Control District estimate the cost of controlling windblown dust at between $7,700 and $65,000 per ton (SJVUAPCD, 2003). In the South Coast Air Quality Management District (which includes the City of Los Angeles) a fugitive dust control measure is considered cost feasible for PM_{10} Best Available Control Measures if cost-effectiveness is less than $5,300 per ton (SCAQMD, 1994). Therefore, the cost of controlling PM_{10} emissions from the bed of Owens Lake is about 3 to 27 times less, on a per ton basis, than the costs for control elsewhere in California.

Following the 2003 SIP, the City created about 65 new long-term jobs at Owens Lake for the operation and maintenance of the 29.8 square miles of controls. The additional 13.2 square miles of controls required by the 2008 SIP raised the total City jobs at Owens Lake to about

70 (LADWP, 2007). Actions mandated by this 2016 SIP are expected to maintain similar levels of employment.

6.7 Reducing Implementation Costs

During the course of implementing the control strategy, experience and ongoing studies will continue to provide knowledge that will help reduce the cost of implementing the control measures. The City will continue to gain additional experience, while constructing and operating the control measures on the playa that will help to reduce costs associated with the control measures. The newly proposed TWB[2], Brine BACM, and Dynamic Water Management controls and the concepts set forth to reduce water use on Shallow Flooding areas (shoulder season adjustments and minimum dust control efficiencies) are examples of cost- and water-saving measures proposed by the City. The proposed allowance for adjustments to BACM, discussed in Sections 6.3.2 and 6.3.3, provide both the time and the control measure flexibility to ensure that dust control measure efficiencies will improve over time.

6.8 Authority and Resources

Under Section 42316, the District is authorized to require the City of Los Angeles to undertake reasonable control measures to mitigate the air quality impacts of its activities in the production, diversion, storage or conveyance of water. The control measures may only be required on the basis of substantial evidence that the water production, diversion, storage or conveyance of water by the City causes or contributes to violations of state or federal ambient air quality standards. In addition, the control measures shall not affect the right of the City to produce, divert, store or convey water.

The District has found that the control measures required under this plan are reasonable and that, on the basis of substantial evidence, the City's water production, diversion, storage or conveyance causes or contributes to violations of state or federal ambient air quality standards in the Owens Valley Planning Area. Also, the District has concluded that the required control measures do not affect the right of the City to produce, divert, store or convey water. On this basis, the District has authority, directly under state law, to issue orders directing the City of Los Angeles to implement the control strategy described in this plan. Those orders are enforceable by the District under state law. California Health & Safety Code §42402 provides that the District may impose civil penalties of up to $10,000 per day against a person who violates any order issued pursuant to Section 42316. In addition, under Section 41513, the District is empowered to bring a judicial action in the name of the People of the State of California to enjoin any violation of its orders. These District authorities under state law apply to the enforcement of the specific requirements set forth in this 2016 SIP, as well as to any subsequent actions that may be necessary as contingency measures to ensure the City takes all reasonable actions to bring the Owens Valley PM_{10} Planning Area into attainment with the NAAQS.

The District has the financial resources to enforce compliance with the plan. Section 42316 authorizes the District annually to assess and collect reasonable fees from the City of Los Angeles. The amount of the fees is set by the District, based on an estimate of the actual costs to the District of its activities associated with the development of air pollution control measures and related air quality analysis, pertaining to the air quality impacts of the City's production, diversion, storage or conveyance of water. Enforcement of the requirements of this plan is a cost that the District may properly include in the estimate it develops as a basis to impose its annual fees under Section 42316. Such enforcement costs include salaries and expenses of appropriate personnel and attorneys' fees incurred in enforcing provisions of the plan and defending the District in challenges to the plan and its adoption. As with the control measures, the District's orders to pay fees are enforceable under state law. The District may impose civil penalties of up to $10,000 per day and seek injunctive relief if any of its fee assessments are not timely and fully paid. Moreover, although state law permits the City to appeal an order imposing fees to the California Air Resources Board, the Court of Appeal of the State of California has ruled that the appeal does not stay the City's obligation to pay the fees on time (City of Los Angeles, et al. v. Superior Court of Kern County (1998) Cal. Court of Appeal, 5th App. Dist., Case F029795).

7. MODELED ATTAINMENT DEMONSTRATION

7.1 Introduction and Rationale

A Hybrid Model was applied to assess attainment and to evaluate control strategies for the 2016 OVPA PM_{10} SIP. The Hybrid Model consists of two components: simulations of lake bed and Keeler Dune source areas with the CALPUFF modeling system using data from the Dust ID Program; and an observed portion derived from the PM_{10} monitoring data on days exceeding the PM_{10} NAAQS. The baseline period for the assessment was July 2009 to June 2014, the last five years of Dust ID Program measurements analyzed by the District.

The rationale for the hybrid modeling approach was based on many years of Dust ID Program measurements, recent meetings with USEPA and CARB staff, and many previous studies conducted in the Owens Valley over the last 40 years by multiple investigators. As discussed in Chapter 4, emission inventory estimates for days with high PM_{10} concentrations in the OVPA are dominated by windblown dust sources. The primary sources of windblown dust include source areas on the lake bed, the Keeler Dunes, the Olancha Dunes, secondary source areas close to the regulatory 3,600-foot shoreline, intermittent sources near the lake bed caused by flash flood deposits, and occasionally large scale regional events associated with the passing of a severe frontal system. Measurements and observations have shown there are no significant sources of windblown dust within the OVPA outside the immediate area of the lake bed (Holder, 2016).

As lake bed sources have been controlled since 2001, the number of exceedance events and magnitude of PM_{10} concentrations observed at monitors surrounding the lake have been greatly reduced (GBUAPCD, 2015a). The lake bed source influence has declined and now the Keeler Dunes, Olancha Dunes and secondary sources of windblown dust near the shoreline comprise a larger fraction of the PM_{10} on days exceeding the NAAQS.

Ono and Howard (2015) conducted a study of the link between lake bed sources and off-lake sources. Visual observations and other data from the Dust ID Program suggests most of the off-lake dust source areas in the OVPA are located near the lake bed primarily along the southern, eastern, and northern shorelines. An investigation of the history and morphology of the Keeler Dunes found the natural dune area expanded following the drying of Owens Lake. Observations of the Keeler Dunes found that following the implementation of shallow flood dust control measures in 2001 in the area west of the dunes, the dunes not only stopped expanding, but began to erode along the upwind edge after the sand source was cut off (GBUAPCD, 2012).

Similar to the Keeler Dunes, other off-lake dust source areas are thought to be closely tied to erosion activity in adjacent lake bed areas (i.e. shore lands adjacent to the northern and southeastern portions of the historic lake bed). With the limited supply of sand and dust in these off-lake areas, PM_{10} present in the deposited soil is expected to be winnowed out over time, resulting in lower PM_{10} emissions. Such a decrease in PM_{10} emissions and impacts were observed at Owens Lake near the Dirty Socks PM_{10} monitor site. A comparison of off-lake and lake bed PM_{10} impacts measured at the Dirty Socks monitor site found dust from off-lake areas was closely linked to dust activity in adjacent lake bed areas (Ono and Howard, 2015). The results showed the downward trends in on-lake PM_{10} exceedance numbers and concentration levels closely matched the trends in off-lake areas based on a three year averaging time.

Prior to deciding on the hybrid modeling approach, the District attempted to apply the CALPUFF dispersion model to off-lake areas outside the Dust ID sand motion monitoring network in a fashion similar to the techniques used for the Keeler Dunes and lake bed sources. Unlike the lake bed source areas, there is an absence of sand motion data for most off-lake areas so for those areas, PM_{10} emissions were based on sand motion estimates using the Gillette Model for sand flux (Ono, 2006). However, this approach did not satisfactorily simulate emissions from the off-lake areas and therefore the off-lake dispersion model performed poorly in predicting PM_{10} impacts.

In the absence of reliable simulations for the off-lake source areas except the Keeler Dunes, a Hybrid Model was developed to combine model predictions with monitoring data on exceedance days at the PM_{10} sampling sites. The attainment demonstration only examines compliance at these locations. However, the PM_{10} sampling sites were selected to be downwind of the largest PM_{10} source areas or in communities of interest, and therefore monitor concentrations are representative of PM_{10} impacts in the areas of the expected highest impact and in the communities. During the modeling period, there were nine monitor sites surrounding the lake bed, two sites that were located on the lake bed and a number of off-lake locations where portable PM_{10} monitors were sited when dust events were forecasted. Compliance at the monitoring locations and the hybrid modeling approach using dispersion and receptor-based modeling is consistent with the USEPA's SIP Development Guideline (USEPA, 1987).

The remainder of this chapter provides: an overview of the Dust ID Program, describes the methods used to estimate the contributions from sources outside the Dust ID sand motion monitoring network, summarizes dispersion modeling techniques with CALPUFF, and presents attainment demonstration methods and results. Further details concerning all aspects for the attainment demonstration are provided in Appendix VII-1.

7.2 Overview of the Dust ID Program

The District started a field monitoring program at Owens Lake in January 2000 to identify PM_{10} emission source areas, and to estimate their PM_{10} emissions and impacts on air quality at the shoreline. The Dust ID Program was designed based on previous observations and field studies suggesting PM_{10} emissions are related to the flux of saltating sand-sized particles. These data have been used to support development of both the 2003 and 2008 SIPs. The District has also used the data combined with dispersion modeling to identify candidate source areas for further supplemental control since the 2008 SIP. The data used in the 2016 SIP were collected during July 2009 through June 2014 using the methods described in the Owens Lake Dust ID Field Manual (GBUAPCD, 2007), 2008 SIP, and 2011 to 2014 Supplemental Control Requirements Determinations (SCRDs).

Figure 7-1 and Figure 7-2 are maps of Owens Lake showing the locations of the meteorological, sand motion, and PM_{10} monitoring stations during July 2009 and July 2013, respectively. Features of the Dust ID Program are as follows:

- Co-located Sensits and Cox Sand Catchers (CSCs) were used to estimate five-minute sand flux rates at each lake bed monitor site shown in Figure 7-1 and Figure 7-2. Sensits measure the kinetic energy and the particle counts of sand-sized particles as they saltate (bounce) across the surface. CSCs are passive instruments used to collect sand-sized particles blown across the surface during a dust event. For a given period, the total mass of saltating sand was based on the CSC catch. The Sensits were then used to time-resolve the horizontal sand flux (Ono, et al., 2003a, Gillette, et al., 2004). The sand motion monitoring network is constantly evolving with the addition of sites located to examine new source areas as they become active and with the removal of sites as source areas are controlled. During July 2009 through June 2014 the number of sand motion sites in the Dust ID network ranged from 200 to 230 locations.

- At different times during July 2009 through June 2014, hourly PM_{10} concentration data were collected at 33 sites around Owens Lake using TEOM PM_{10} monitors. TEOMs are a USEPA-designated equivalent method for measurement of PM_{10} concentration. The TEOMs are used to assess compliance at 13 off-lake monitoring sites. Additional special purpose monitoring on the lake bed at 20 different sites has been used to aid in the identification of source areas, examine the effectiveness of control measures, assess model performance, and refine PM_{10} emission fluxes.
- Five-minute and hourly surface meteorological data were collected at up to 16 District stations within the domains shown in Figure 7-1 and Figure 7-2. These data were augmented by two additional District sites south of the domain and several sites operated by the City during periods of the five year study.
- To help verify the location of dust source areas, for the last 10 years 16 time-lapse video cameras were installed to continuously record dust events during daylight hours. Initially three human observers mapped dust source areas and plumes during the storms on regular workdays. In later years, techniques were developed to map source areas on the lake from the video camera archive. In addition, the erosion boundaries of source areas were mapped with the aid of a field crew using a Global Positioning System (GPS) after dust storms following procedures in the Dust ID protocol (GBUAPCD, 2007).
- Two additional video camera views in the northern portion of the OVPA outside of the modeling domain were installed in October 2013 at the Owens Valley site to record regional transport into the domain from the north. The cameras at this site are also used to identify local source areas in the northern OVPA not included in the current sand motion monitoring network on and adjacent to the lake bed. Most of the southern portion of the OVPA in and around Owens Lake is visible from the cameras located within the modeling domain (Holder, 2016).

A large Geographic Information System (GIS) database was constructed using observations collected during the Dust ID Program. The Owens Lake Dust ID Field Manual provides further detail (GBUAPCD, 2007). Using the GIS database, the District prepared maps displaying sand movement, winds, visually observed plume and source area boundaries, and PM_{10} concentrations for dust events at Owens Lake during the 2016 SIP study period. Many aspects of the database are accessible to the public through the District’s website.[28]

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[28] Available at: http://www.gbuapcd.org/owenslake.htm

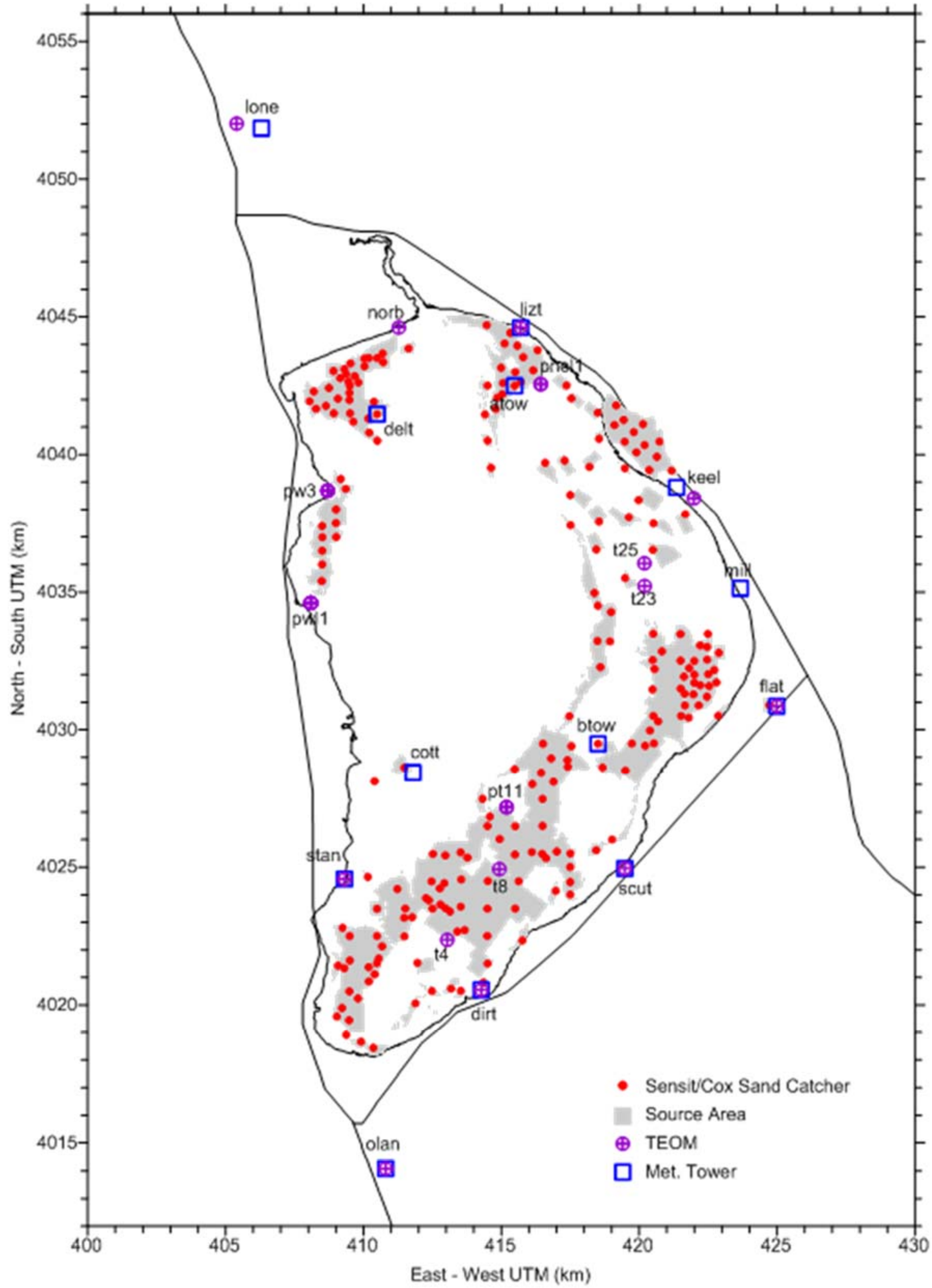

Figure 7-1: Dust ID Network for July 2009

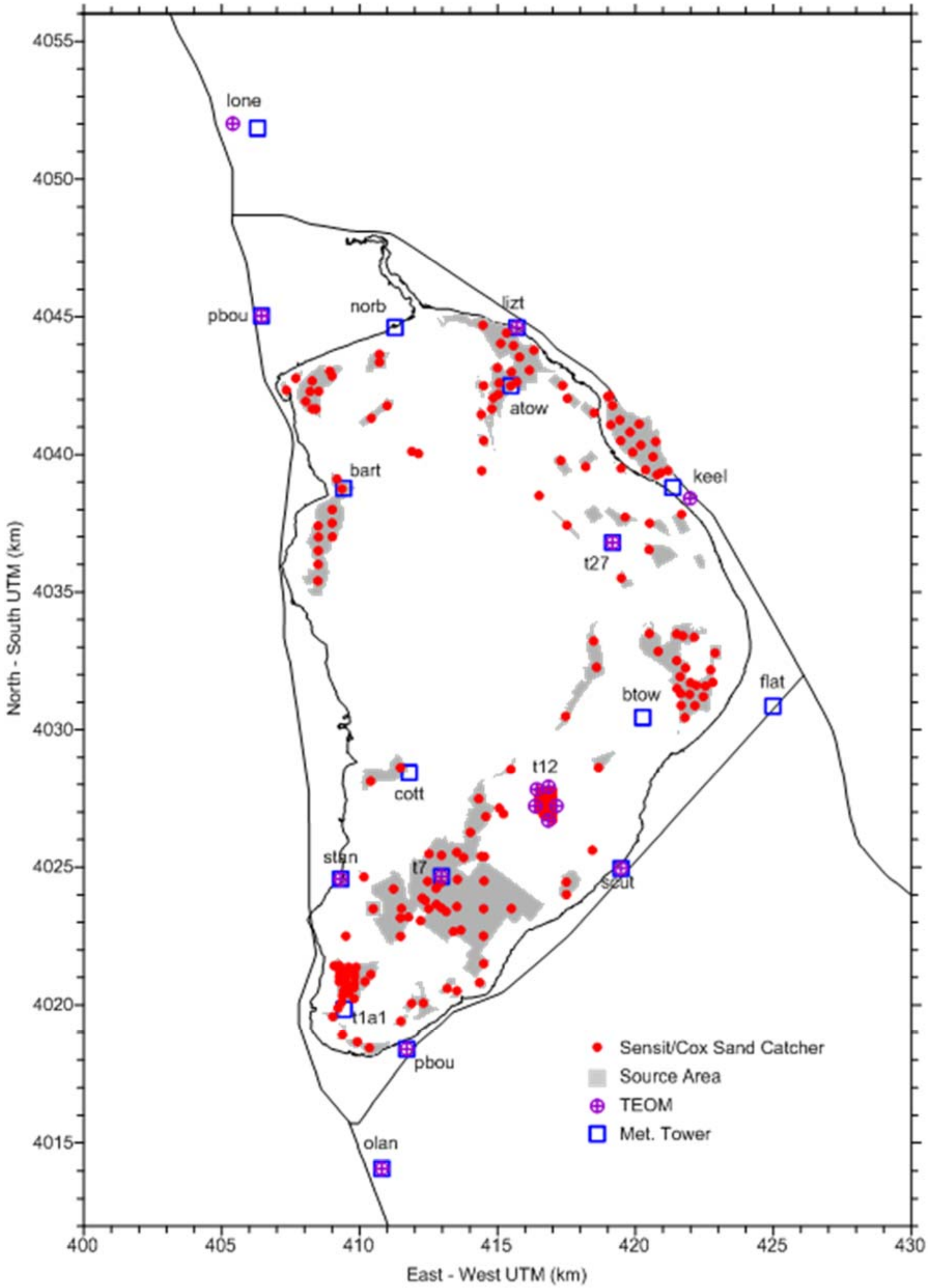

Figure 7-2: Dust ID Network for July 2013

7.3 Exceedance Days, Out-of-Network Contribution, and Background

Dust ID Program data were examined to identify "exceedance days" for the PM_{10} monitoring sites surrounding the lake bed from July 2009 to June 2014. Special purpose sampling at the portable TEOM locations and sites on the lake bed were not included in the analysis. For the purposes of the OVPA attainment demonstrations, USEPA required in the approval of the 1998 Owens Valley SIP that the standard be met at the regulatory shoreline located at the 3,600 foot elevation (USEPA, 1999; 64 FR 34178). Special purpose monitor sites are denoted by a "p" for portable and "t" for temporary as the first character in the site names shown in Figure 7-1 and Figure 7-2. For the remaining 10 sites, every day exceeding 150 μg/m^3 was selected for further analysis. A summary of the 188 exceedance days is shown in Table 7-1. Note the Flat Rock monitor was relocated to the Mill Site in 2012.

Table 7-1: Summary of Exceedance Day PM_{10} Concentrations for July 2009 to June 2014

Site Name	ID [1]	Years	No. of Days > 150 μg/m^3	Maximum PM_{10} (μg/m^3)	Design PM_{10} (μg/m^3) [2]
Dirty Socks	dirt	3	26	1,437	998
Flat Rock	flat	2	9	871	233
Keeler	keel	5	33	2,994	518
Lizard Tail	lizt	5	42	4,571	1,654
Lone Pine	lone	4	1	169	#N/A
Mill Site	mill	1	7	754	712
North Beach	norb	3	17	1,536	385
Olancha	olan	5	22	779	310
Shell Cut	scut	5	23	2,149	395
Stanley	stan	5	8	286	180

Notes:
1 TEOM locations are shown in Figure 7-1 or Figure 7-2.
2 Design day based on n+1 highest in n years. For example the 6th highest in 5 years or the 2nd highest in 1 year.

Wind direction screening was applied to apportion daily exceedance PM_{10} concentrations into in-network versus out-of-network contributions. Hours with wind directions towards the TEOMs from the lake bed and Keeler Dune Sensit network were considered in-network hours. The daily average PM_{10} concentrations from all other wind directions were assumed to be the out-of-network contribution to be added to dispersion model predictions for the same day and TEOM site. The wind direction screening limits for each PM_{10} sampling site are shown in Table 7-2.

Table 7-3 summarizes the out-of-network contributions to daily average PM_{10} contributions on exceedances days during July 2009 to June 2014. Some of the highest contributions occur during some of the larger regional events. However, the median or typical contributions are much smaller and range from 4 μg/m^3 to 223 μg/m^3, at Dirty Socks and Shell Cut, respectively. The overall median or most likely daily PM_{10} contribution for out-of-network sources is 19 µg/m^3, close to the background concentration of 20 µg/m^3 used in the 2003 SIP, 2008 SIP, and all the SCRD analyses. The background concentration used in previous studies was derived from the lowest PM_{10} concentrations at any site in the Dust ID Program on days where any site in the network exceeded 150 µg/m^3 (Ono, 2002). The previous analysis also applied wind direction screening to remove hours within the daily averages from lake bed source areas.

Table 7-2: Wind Direction Screening Angles Used to Assess Winds from the Dust ID Sensit Network to PM_{10} Sampling Sites

TEOM [1]	Meteorological Tower [1]	Min. Wind Direction [2]	Max. Wind Direction [2]	Spans North?
Lone Pine	Lone Pine	126	176	No
Keeler	Keeler	151	330	No
Flat Rock	Flat Rock	224	345	No
Shell Cut	Shell Cut	227	33	Yes
Dirty Socks	Dirty Socks	234	50	Yes
Olancha	Olancha	333	39	Yes
Stanley	Stanley	349	230	Yes
North Beach	North Beach	55	250	No
Lizard Tail	Lizard Tail	128	288	No
Mill Site	Mill Site	157	333	No

Notes:
[1] TEOM and Meteorological Tower locations are shown in Figure 7-1 or Figure 7-2.
[2] Degrees from North.

The Hybrid Model uses actual measured background to account for the sources not included in the dispersion modeling analysis as opposed to a constant of 20 µg/m^3 used in previous regulatory analyses. The out-of-network contributions are typically around 19 µg/m^3, but as shown in Table 7-3 can be much higher. Half the out-of-network daily contributions are lower than used in the 2003 SIP, 2008 SIP, and SCRDs and some are as low as no contribution.

For the purposes of conservative estimates in the attainment demonstration, the out-of-network contribution was not allowed to be lower than 20 µg/m^3. This limit is about double the average hourly PM_{10} concentration within the Dust ID network for all hours with wind speeds less than 6 meters per second (m/s) between 1993 and 2015 (Howard, 2016). A typical background for non-windblown sources affecting sampling sites in the OVPA appears to be around 10 µg/m^3 and on windy days the contribution of the out-of-network sources increases to about 20 µg/m^3. Conceptually, the increase is assumed to be caused by wind suspension from "natural" desert surfaces on windy days. Contributions above 20 µg/m^3 are assumed to be the result of either local wind suspension from secondary sources close to the shoreline or from very large scale regional events that affect the entire OVPA.

Table 7-3: Out-of-Network Source Contribution Summary on Exceedance Days for July 2009 to June 2014

Site Name	ID [1]	Median PM_{10} ($\mu g/m^3$)	Maximum PM_{10} ($\mu g/m^3$)	N > 150 $\mu g/m^3$
Dirty Socks	dirt	4	244	4
Flat Rock	flat	41	652	2
Keeler	keel	16	2,979 [2]	4
Lizard Tail	lizt	18	3,444 [2]	14
Lone Pine	lone	165	165	1
Mill Site	mill	9	350	2
North Beach	norb	21	570	5
Olancha	olan	8	293	1
Shell Cut	scut	223	2,125 [3]	16
Stanley	stan	133	277	4
All Sites		19		

Notes:
[1] TEOM locations are shown in Figure 7-1 or Figure 7-2.
[2] Occurred during December 1, 2011 Dust Event
[3] Occurred on May 25, 2012

7.4 Dispersion Modeling Approach

The Hybrid Model combines an observed PM_{10} component representing sources not within the Dust ID sand motion monitoring network with dispersion model predictions from source areas on the lake bed and within the Keeler Dunes where the District observes sand motion every five-minutes at over 200 locations. This section summarizes the dispersion modeling component of the Hybrid Model used to assess attainment.

The CALPUFF modeling system was selected for assessing lake bed and Keeler Dune source contributions to observed PM_{10} concentrations on exceedance days for the 2016 SIP. The subsequent reduction in contributions from these sources as controls are implemented, combined with the out-of-network components, were used to assess attainment in future years.

CALPUFF is the USEPA recommended modeling approach for long-range transport studies (40 CFR Part 51, Appendix W). USEPA also recommends application of the modeling system on a case-by-case basis to near-field dispersion problems when the three-dimensional qualities of the wind field and/or non-steady state dispersion phenomena are of interest. Observations during the Dust ID Program indicate dust events on Owens Lake are sometimes influenced by complex wind patterns, with plumes from the northern source areas traveling in different directions than plumes from the southern source areas. In some of the more extreme events, westerly downslope and gap winds over portions of the Sierras result in a large eddy forming over the modeling domain.

CARB and the USEPA approved the application of CALPUFF during their review of the modeling protocol for the 2003 SIP and their approval of the 2010 PM_{10} Maintenance Plan and Redesignation Request for the Coso Junction Planning Area (USEPA, 2004; USEPA, 2010; 75 FR 54031-54033). CARB Staff assessments of the SCRDs also conclude the CALPUFF model as part of the Owens Lake Dust Identification Protocol is consistent with USEPA's technical guidance (CARB, 2012).

The CALPUFF modeling techniques for the lake bed and Keeler Dunes follow the same general methods as applied in the 2003 SIP, 2008 SIP, and SCRD modeling analyses. The major differences are as follows:

- Five-minute sand motion and meteorological data were used as the basis for the simulations. Simulations performed with these data are more chaotic than simulations with hourly data and tend to more closely resemble the characteristics depicted in imagery from the dust storms observed in the OVPA. The District has also conducted several different model performance analyses as part of the SCRDs and the results suggest the more stochastic simulations slightly improve model performance.
- A later version of the CALPUFF modeling system was employed that could utilize the five-minute emissions and wind data.
- Features of the source characterization have changed slightly. Source areas were better resolved, especially near the regulatory 3,600-foot shoreline. Source areas were divided to account for internal changes of land ownership or the presence of ECR areas to allow a more refined tracking of source contributions.
- The methods used to estimate PM_{10} emissions from sand motion data were modified slightly with revised default seasonal constants modified based on five-minute simulations of the baseline period and seven general source regions on the lake bed.

Further details concerning the CALPUFF simulations are provided in the remainder of this section and in Appendix VII-1.

7.4.1 Preparation of the Meteorological Data

Preparation of the meteorological data for the dispersion modeling followed the same basic procedures used in the 2003 and 2008 SIPs except later versions of the CALPUFF modeling system were employed to utilize available five-minute surface observations. Three-dimensional wind fields at five-minute intervals for CALPUFF were constructed from surface and upper air observations using the CALMET meteorological preprocessor program. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

The model domain shown in Figure 7-3 is a 34 kilometer-by-48 kilometer (21 mile-by-30 mile) area centered on Owens Lake. The extent of the model domain was selected to include the “data rich” study area, important emission source areas, terrain features that act to channel winds, and receptor areas of interest. The meteorological grid used a one-kilometer horizontal mesh size with ten vertical levels ranging geometrically from the surface to four kilometers aloft.

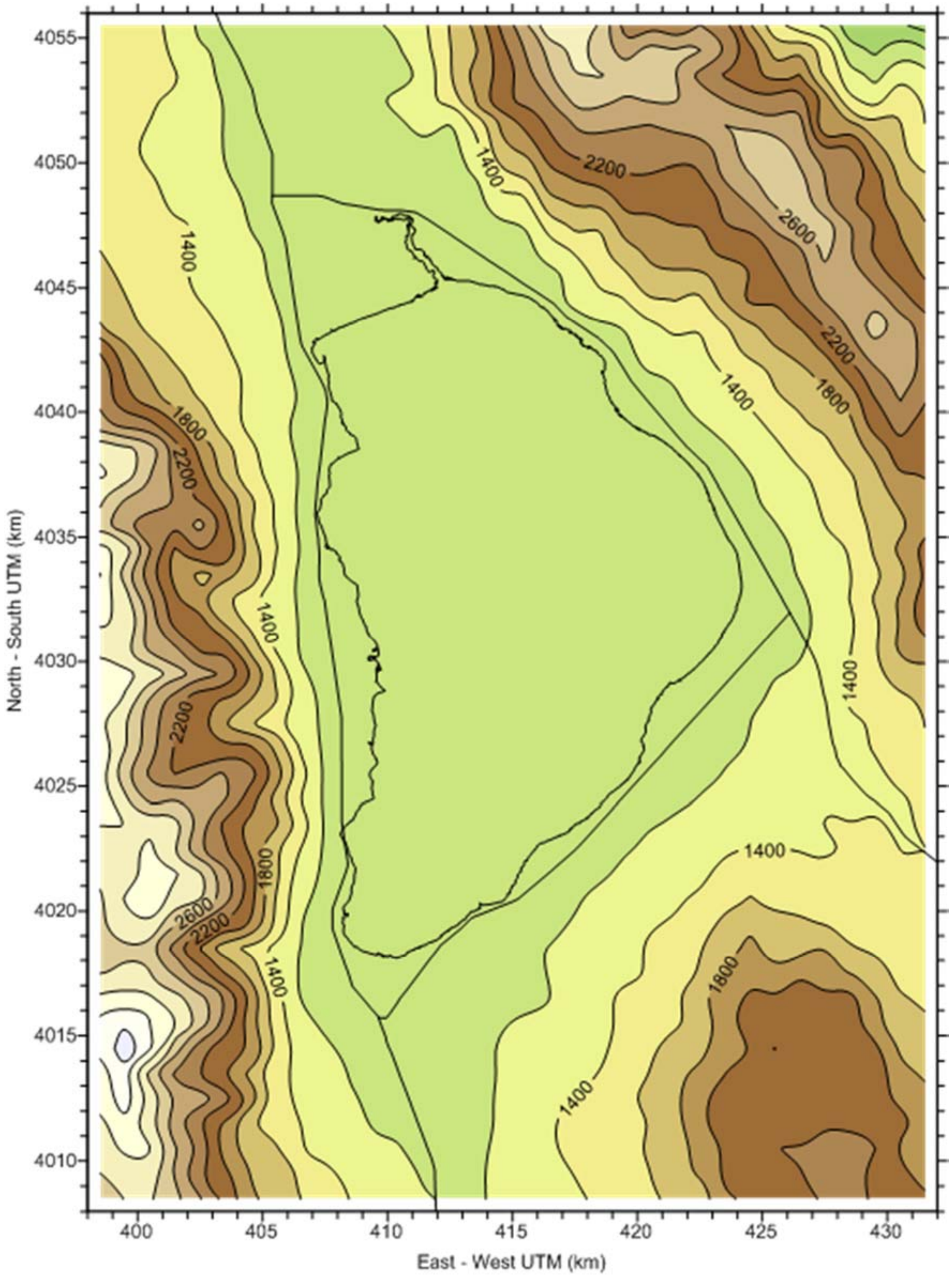

Figure 7-3: CALPUFF Model Domain and 1-km Mesh Size Terrain Contours

The majority of the necessary surface meteorological data came from the District's network of ten-meter towers shown in Figure 7-1 and Figure 7-2 and two District stations south of the domain. In addition to the District's network, surface data from the City's field programs at Owens Lake were used when available. Five-minute observations from both District and City surface sites were used whenever available. Cloud cover and ceiling height observations were also obtained from the Bishop Airport and China Lake. Cloud cover is a variable used to estimate the surface energy fluxes and, along with ceiling height and wind speed, is used to calculate the Pasquill stability class (a classification of atmospheric stability).

The upper air data for CALMET included regional twice-daily upper air soundings from Las Vegas, Reno, Desert Rock Airport (Mercury, Nevada), and China Lake Naval Air Station. China Lake and Desert Rock observations were used prior to July 2010; Reno observations were used from July 2010 to December 2010; and Las Vegas soundings have been used since January 2011. The twice daily soundings provide upper level temperature profiles and lapse rates used by CALMET to estimate the depth of the boundary layer.

CALMET options were selected to estimate upper level winds within the domain by extrapolating local surface wind measurements aloft. The power law exponents used to construct the profiles are based on Wind Profiler measurements conducted at Owens Lake from January 2001 to June 2004. During this period, a 915 megahertz (MHz) Radar Wind Profiler and Radio Acoustic Sounding System were used to collect upper level wind and temperature measurements at two different locations within the modeling domain. Wind profile characteristics based on measurements from windy periods during the field study have been used in CALPUFF modeling studies to estimate upper level winds since the Wind Profiler was decommissioned in June 2004.

7.4.2 PM_{10} Emissions and Source Characterization

This section provides an overview of the methods used to calculate five-minute windblown PM_{10} emissions for dispersion model simulations at Owens Lake. These methods are more fully discussed in Appendix VII-1: Air Quality Modeling Report. PM_{10} emission fluxes from lake bed source areas and Keeler Dunes at Owens Lake were calculated using five-minute sand flux activity data and the following simple relationship:

$$Q_a = K_f \times q_{15} \qquad \text{Equation 2}$$

Q_a = vertical PM_{10} emission flux (g/(cm^{2}hour))
K_f = an empirical constant (referred to as the K-factor)
q_{15} = the horizontal sand flux measured at 15 cm above the surface (g/(cm^{2}hour))

Field data at Owens Lake suggest the horizontal sand flux at a single measurement height is proportional to the total horizontal sand flux and is a good indicator of wind erosion processes generating PM_{10} emissions. The total horizontal sand flux is a strong function of both the surface shear stress and the properties of the soil at the time of the event. Rather than trying to predict the horizontal sand flux using wind speed and properties of the soil, sand movement on the lake was parameterized using the network of paired Sensit and CSC measurements from the Dust ID Program.

Experimental and theoretical evidence suggest K_f is a property associated with the binding energies of the soil and is relatively independent of the surface stress induced by wind speed. On Owens Lake this empirical constant appears to vary by season, due to the presence or absence of protective salt crusts, and by source regions grouped together by surface soil textures. In the Dust ID Program K_f was inferred using the modeling practices described by Ono, et al. (2003a). Simulations were performed using a first guess for K_f and the measured sand flux data. Following a screening analysis, predictions were then compared to observed PM_{10} concentrations and a revised estimate for K_f was obtained. The screening criteria were selected to ensure a strong relationship existed between the source area and the downwind PM_{10} monitoring site. The source-to-receptor relationship was established using wind direction data, sand flux data for the source area, the maps generated from visual observations, and source contribution matrices based on the modeling. The data were also filtered to exclude large regional dust events and other periods where sources outside the Dust ID network may have contributed a large fraction of the observed PM_{10}.

The screened estimates for K_f were then grouped together by period and general source region on the lake bed. Seven general source regions were selected based on common surface soil properties. These source regions are identified as: the Keeler Dunes, Keeler Area, Northwest Area, Northeast Area, Central Area, Managed Vegetation Area, and the South Area (see maps in Appendix VII-1). The periods were subjectively based on inspection of the variability exhibited in time series plots and considerations of the precipitation-temperature history thought to affect surface crusting, surface erodibility, and the formation of efflorescent salts on the surface. For each period and general source region with nine or more hourly K_f estimates remaining after the screening process, a revised K_f was derived based on the 75th percentile of the ensemble. During periods and for general source regions areas where nine data pairs were not available, seasonal K_f defaults for the general source regions were used. The resulting seasonal 75th percentile K-factors for 2009 to 2014 and defaults for each of the seven general source regions are listed in Appendix VII-1.

The CALPUFF simulations at Owens Lake are sensitive to source area configuration. Emissions were varied every five-minutes according to Equation 2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. The following general rules were used to characterize and map source areas on the lake bed:

- Actual source boundaries were used when available to delineate emission sources in the simulations. Actual source boundaries were derived using a weight-of-evidence approach considering visual observations, GPS mapping, mapping from the video camera images, and surface erosive characteristics. Erosive characteristics considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool.
- Source boundaries were also defined based on the dust control measure (DCM) locations. For example, sand flux measurements outside the DCM were assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM were assumed to apply to the area inside the DCM.
- Source areas were represented by a series of 100 meter-by-100 meter cells generally conforming to the actual shape of the source area sharing the same five-minute sand flux rates as the sand flux site representing the source area. Smaller 50 meter-by-50 meter rectangles were used in some instances near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. The small cells sizes were also used in the Keeler Dunes and in source areas where future controls within the area might vary by ownership or if the source area contained an ECR area.

Thirteen different source area configurations were used to describe lake bed and Keeler Dunes sources during July 2009 to June 2014. As an example, Figure 7-4 shows the source configuration used for the July 1, 2013 to February 28, 2014 CALPUFF simulations. The number of individual irregular source areas tracked in the simulations for each period varied from 330 to 650 sources characterized by 7,200 to 10,100 square cells for the 13 periods of the simulation. The total simulated area ranged from 41 to 73 square kilometers.

7.4.3 CALPUFF Options and Application

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM_{10} concentrations. In this study, the following options were selected for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves
- Near-field puffs modeled as Gaussian puffs, not elongated slugs
- Consideration of dry deposition and depletion of mass from the plume

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, the CALPUFF simulations assumed a lognormal distribution with a geometric mean diameter of 3.5 microns (μm) and a geometric standard deviation of 2.2 (Niemeyer, et al., 1999). These variables are based on the average of 13 dust plume size distributions reported by Niemeyer between June 1995 and March 1996 at different locations within the OVPA. This same particle size distribution has been used in the 2003 SIP, 2008 SIP, and each of the SCRDs.

7.5 Attainment Demonstration

The Hybrid Model described in the preceding sections and in Appendix VII-1 was applied to assess future year compliance with the 24-hour PM_{10} NAAQS. For each exceedance day and assumed set of controls, dispersion model contributions from lake bed and the Keeler Dunes were scaled and combined with out-of-network contributions. The contributions were derived from a five-year baseline period of July 2009 to June 2014. The methods used for the dispersion modeling were discussed in Section 7.4 and derivation of the out-of-network contributions was presented in Section 7.3. The remainder of this section describes the control efficiencies assigned for future years and the results of the Hybrid Model assessment of compliance with the NAAQS.

7.5.1 Control Efficiencies

The attainment demonstration applies the Hybrid Model to assess control efficiencies for future years. The effects of these controls on lake bed and Keeler Dune source areas were assessed by applying controls to the emissions estimated for each of 13 different source configurations from July 2009 to June 2014. Control efficiencies for future years were assigned based on the type of control measure and the year of implementation as shown in Table 7-4. The locations of the control measures are shown in Figure 2-3 and descriptions of each measure are provided in Section 6.2.

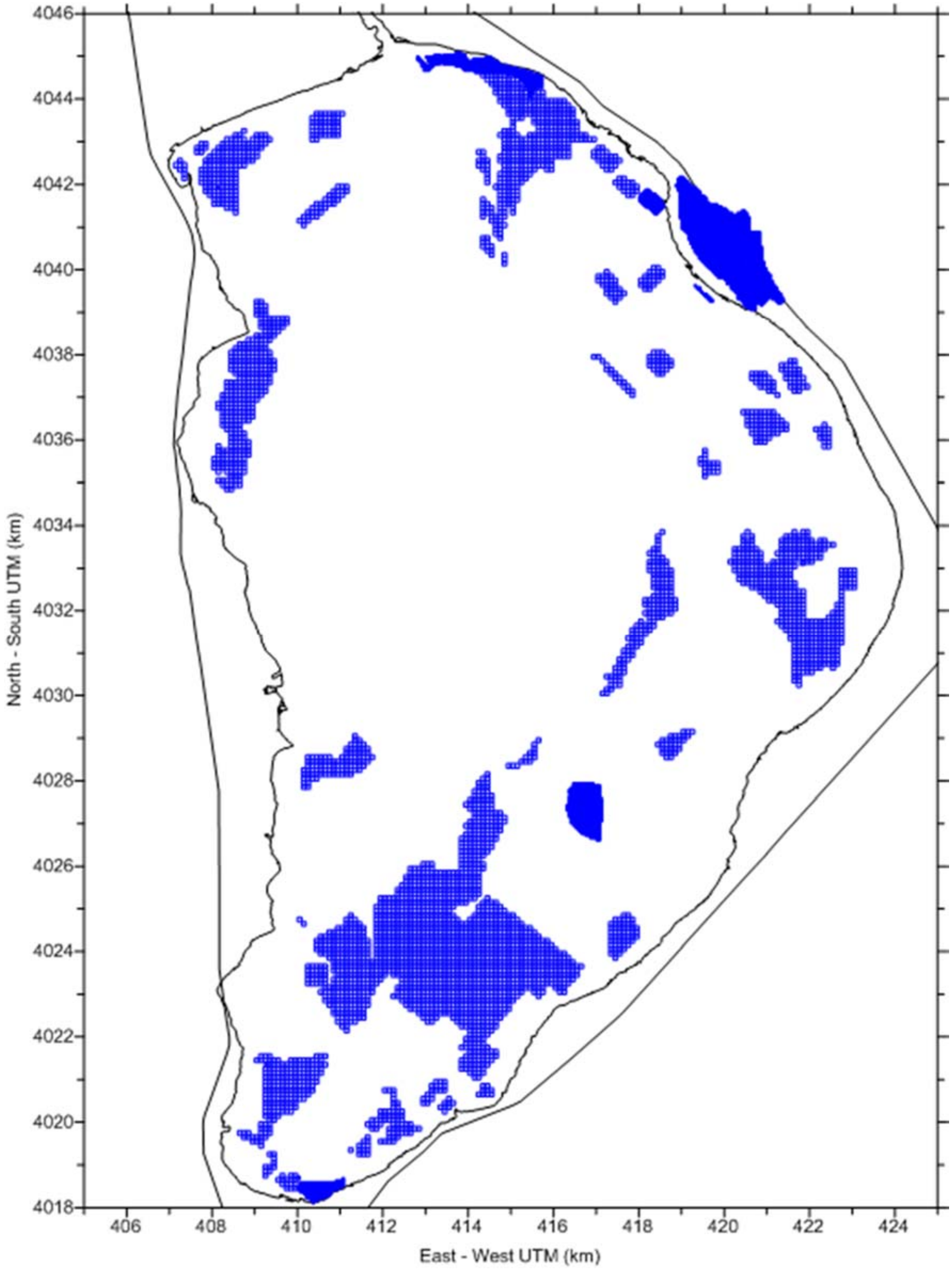

Figure 7-4: Area Source Configuration for July 2013

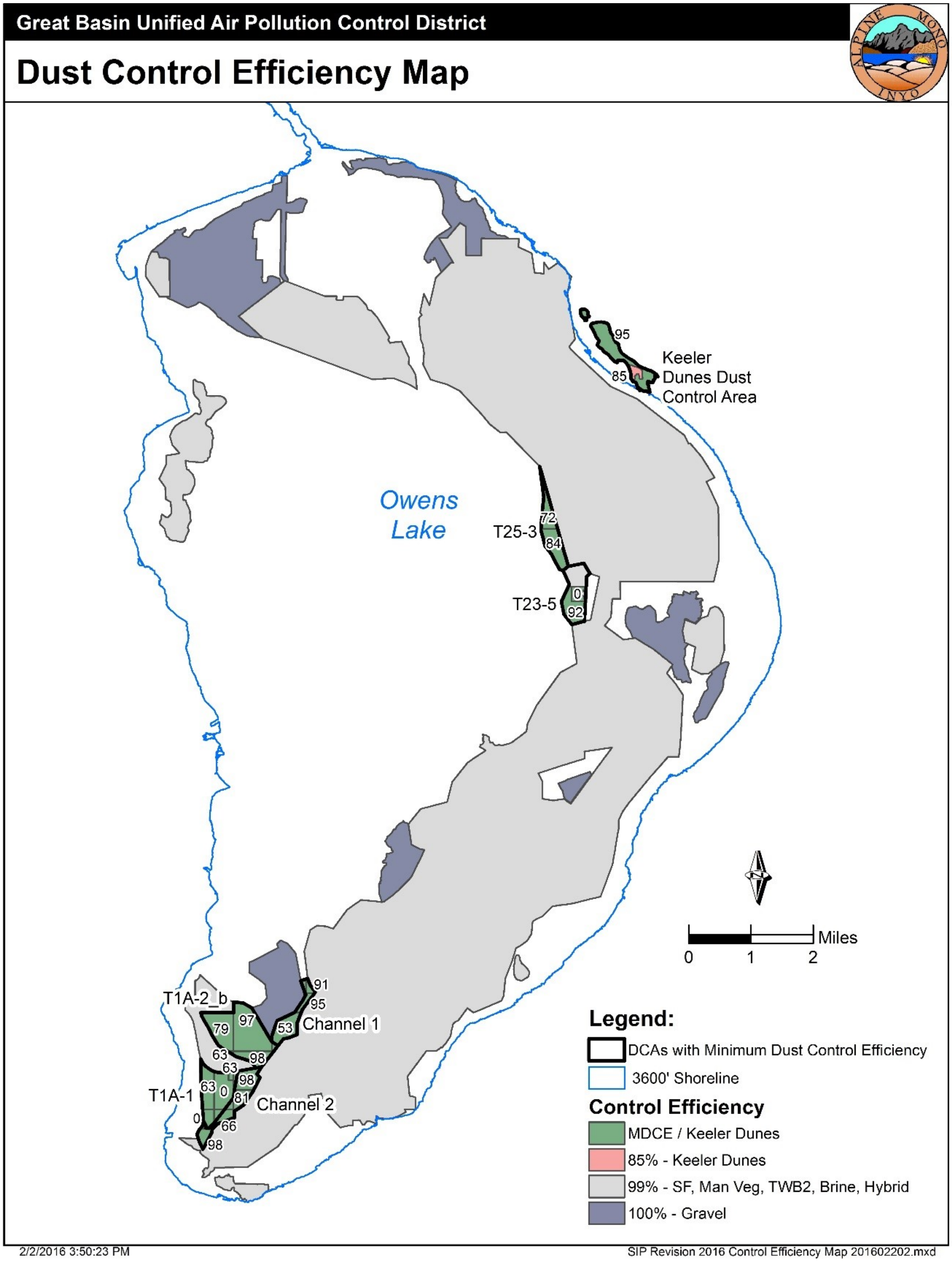

Figure 7-5: Dust Control Efficiency Map

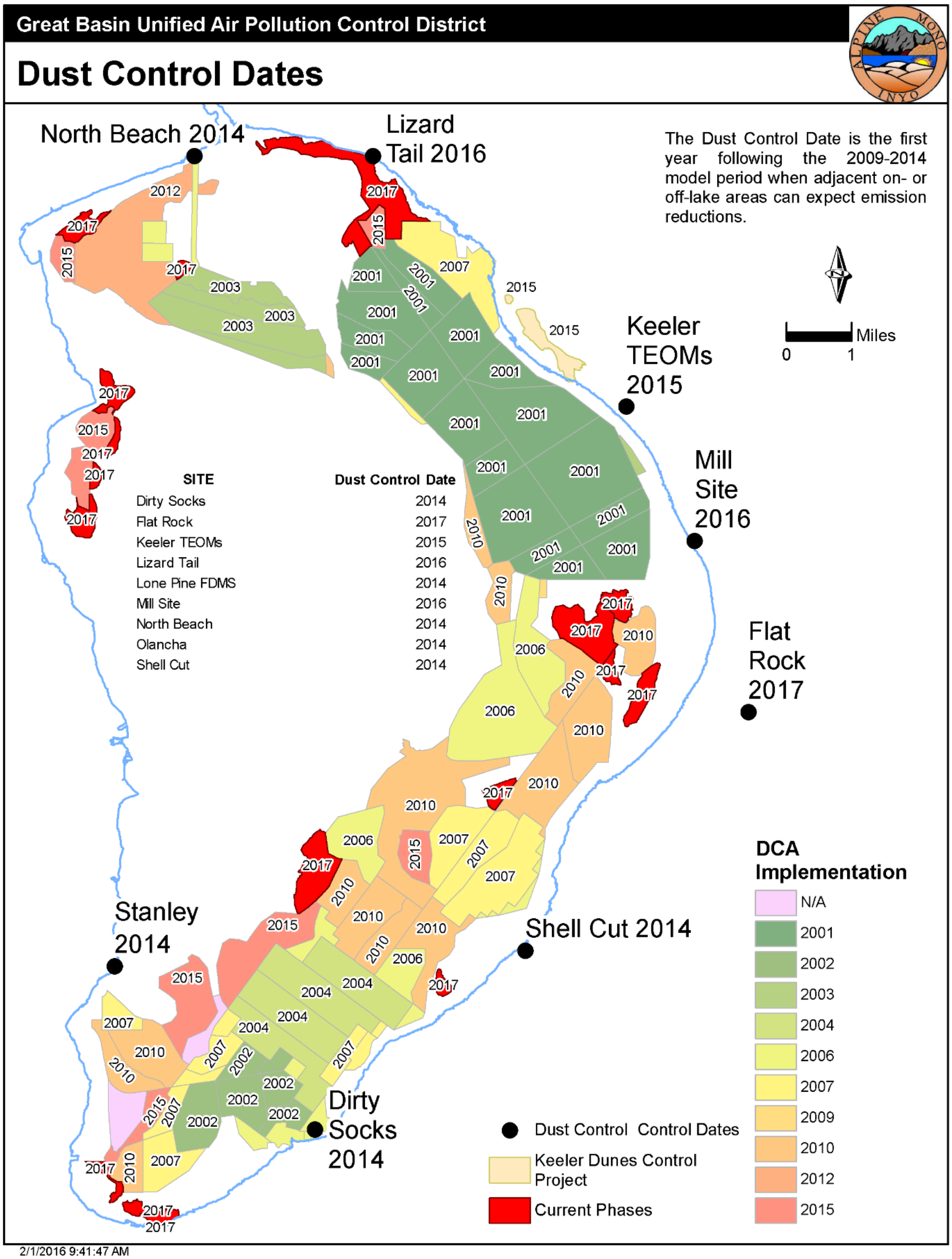

Figure 7-6: Dust Control Dates

ECR Areas and Contingency Areas were assumed to be fully controlled in the attainment demonstrations. Contingency Areas refer to areas on the lake bed initially identified as candidates for control based on the dispersion modeling supporting the SCRDs. Although dispersion modeling suggested potential high PM_{10} concentrations downwind from such areas, other observations within the Dust ID Program and uncertainty regarding the important variables used to characterize emissions led the District to remove these areas from the final SCRD areas. ECR Areas and Contingency Areas would be covered under the Districts contingency measures outlined in Section 9.3 of the 2016 SIP. Note that the areas excluded from the model due to emissions uncertainty is approximately 0.5 square miles, much less than the 4.8 square miles that can be ordered in the future under the District contingency measure program.

Figure 7-5 shows the control measures and control efficiencies expected to be in place by Dust Year 2017/2018. For each of 13 different source configurations from July 2009 to June 2014, dispersion model contributions by source area were reduced accordingly. The revised contributions were summed and combined with the out-of-network contribution to obtain a prediction for each exceedance day and future year.

Table 7-4: Control Efficiencies for Future Years

Control Area	7/2015-6/2016	7/2017-6/2018	7/2019-6/2020
Phases 1-8	Yes (varies by BACM)	Yes (varies by BACM)	Yes (varies by BACM)
Phases 9 & 10	0%	Yes (varies by BACM)	Yes (varies by BACM)
Lake bed ECRs	0%	100%	100%
Keeler Dunes ECR	0%	100%	100%
Keeler Dunes DCA	95%	95%	95%
Contingency Areas	0%	100%	100%

The Hybrid Model also considered the secondary effects of lake bed and Keeler Dunes controls on the out-of-network contributions to PM_{10} for each exceedance day. For purposes of the attainment demonstration (see Section 7.1), such contributions are assumed to be primarily the result of emissions from areas surrounding the shoreline close to the monitoring sites where sand has migrated and PM_{10} deposited over a period of years. The attainment demonstration assumes as controls are implemented on the lake bed and Keeler Dunes, emissions from these secondary source areas would also be reduced over time. The reduction in contribution from such areas was specified via:

$$C_T = (C_{out} - C_b)\left(e^{\frac{-\Delta T}{T_S}}\right) + C_b \qquad \text{Equation 3}$$

C_T = PM_{10} contribution from out-of-network sources in future year T (μg/m^3)

C_{out} = PM_{10} contribution from out-of-network sources during the baseline period from July 2009 to June 2014 (μg/m^3)

C_b = background PM_{10} concentration of 20 μg/m^3 (see Section 7.3)

ΔT = number of years from the implementation of controls on the lake bed and/or Keeler Dune from nearby sources during the baseline period

T_s = time scale for decay assumed to be about 3 years

The out-of-network contributions were calculated for exceedance days according to the methods outlined in Section 7.3. As further controls are implemented after the baseline period of July 2009 to June 2014, the out-of-network contributions were reduced according to an assumed Dust Control date and time scale. The Dust Control dates assumed for the attainment demonstration are shown in Figure 7-6. For the purposes of the attainment demonstration, the time scale was assumed to be three years based on the analysis of PM_{10} concentrations observed at Dirty Socks (Ono and Howard, 2015).

7.5.2 Attainment Demonstration Results

Table 7-5 and Figure 7-7 display design concentrations predicted by the Hybrid Model for each future year and PM_{10} monitoring site above the 24-hour NAAQS during the baseline period. Design concentrations depend on the number of years during the five-year baseline period that each site operated and for 24-hour PM_{10} compliance is assessed based on the 6th highest in five years, the 5th highest in four years, and so on. The number of years for each site used to calculate design concentrations is shown in Table 7-1.

The Hybrid Model predicts the OVPA would be in attainment by dust year 2017/2018 following the implementation of the last set of controls on the lake bed source areas starting in 2016. The highest future year predictions are at Lizard Tail, because this site had the highest initial design concentration and due to the proximity of this site to nearby lake bed sources controlled at later implementation years than for some of the other sites.

Table 7-5: PM_{10} Design Concentration Predictions

Site ID [1]	Observed	Hybrid Model Design Concentration Predictions (µg/m³) by Year						
	7/2009-6/2014	7/2009-6/2014	7/2014-6/2015	7/2015-6/2016	7/2016-6/2017	7/2017-6/2018	7/2018-6/2019	7/2019-6/2020
dirt	998	1,235	1,235	213	213	93	87	83
flat	233	228	228	133	133	94	74	59
keel	518	560	560	123	115	50	43	37
lizt	1,654	1,993	1,993	1,684	1,684	142	109	85
mill	712	642	642	526	508	125	95	74
norb	385	448	445	114	87	67	54	44
olan	310	294	294	84	68	41	41	39
scut	395	586	506	212	157	105	83	70
stan	180	115	96	59	49	39	35	31

Notes:
[1] TEOM locations are shown in Figure 7-1 or Figure 7-2.

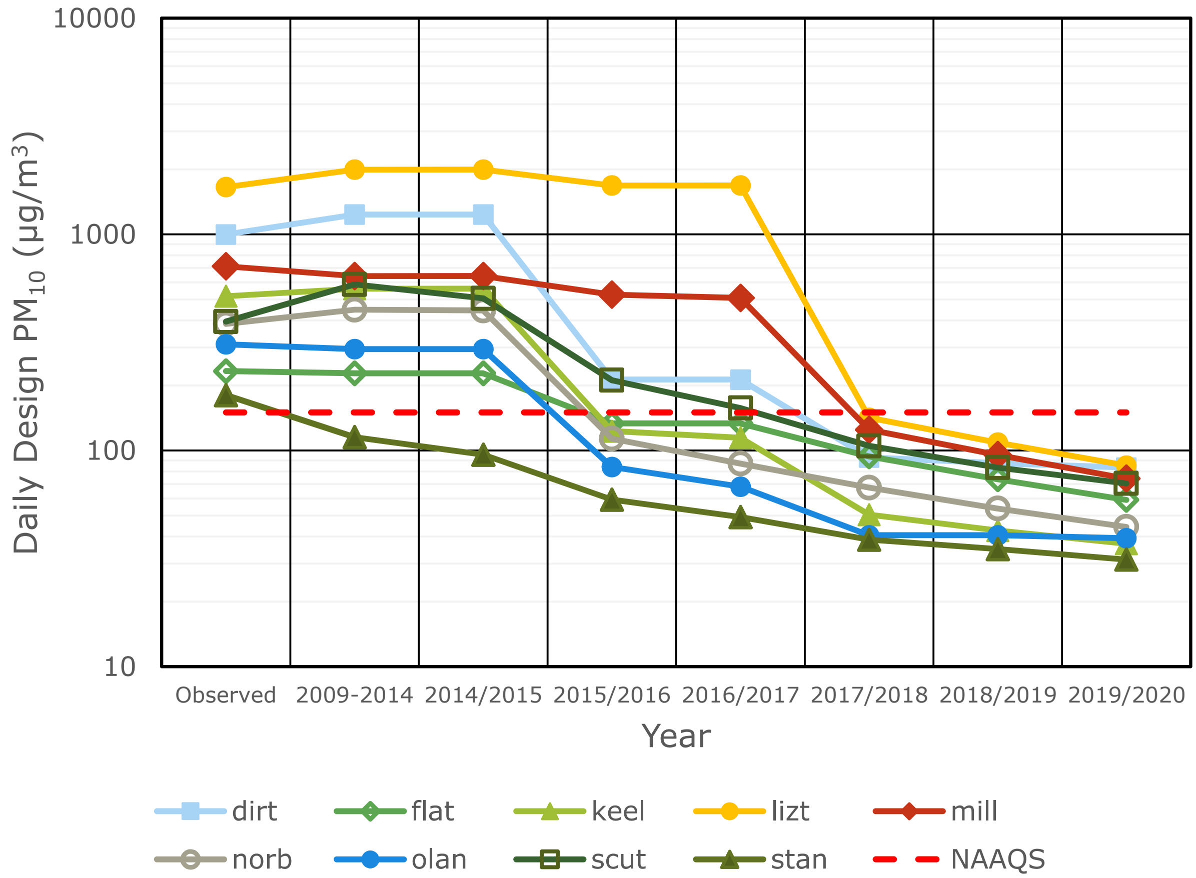

Figure 7-7: Owens Valley Model Forecast, Future Year PM_{10} Design Concentrations

8. EXTENDED ATTAINMENT DATE JUSTIFICATION AND FIVE PERCENT PLAN REQUIREMENTS

The applicable attainment date for the OVPA was initially set as December 31, 2006. On March 23, 2007, the USEPA published a finding that the OVPA did not attain the federal PM_{10} standard by this date (72 FR 13560). Per CAA §179(d)(3), the attainment deadline applicable to an area that misses the serious area attainment date is as soon as practicable, but no later than five years from the publication date of the nonattainment finding notice (i.e. March 23, 2007). However, the USEPA may extend the attainment deadline to the extent it deems appropriate for a period no greater than 10 years from the publication date (72 FR 13560). Therefore, the revised attainment date for the OVPA could be March 23, 2012, or if the USEPA grants a five-year extension under CAA §188(e), the attainment date could be in 2017.

If a serious nonattainment area does not meet the attainment deadline (which may be an extended attainment date), CAA §189(d) dictates that emissions must be reduced by five percent per year until attainment is reached. By submitting the 2008 SIP which committed to a control strategy that could achieve a five percent reduction in PM_{10} emissions per year, the District met the requirements of Section 189(d) for areas that fail to attain. As discussed in Chapters 6 and 7, the 2016 SIP revises the PM_{10} control strategy and attainment demonstration to incorporate new information about additional PM_{10} sources, their ambient impacts, and new BACM approaches. Recognizing that the dominating sources of PM_{10} in the OVPA are fugitive windblown dust sources, which are tied to meteorology and are highly irregular year-to-year, the 2016 SIP adopts a three-year rolling average (beginning in the 2005 dust year and ending in the 2007 dust year) from which to measure the five percent reductions.

A plot of the PM_{10} emissions forecast presented in Table 4-3 demonstrates that the control strategy presented in the 2016 SIP for on-lake sources would allow for at least a five percent reduction in PM_{10} emissions per year at the time that attainment is anticipated in 2017 (i.e. between dust years 2017 and 2018) (see Figure 8-1). As can be seen in the figure, three-year rolling average emissions were reduced substantially below the five-percent trend line in dust years 2008 to 2010, and although emissions in dust years 2011 to 2014 were above the trend line the overall trend in emissions from the Owens Lake Subarea and overall have and will continue to decline faster than the five-percent trend line after dust year 2014.

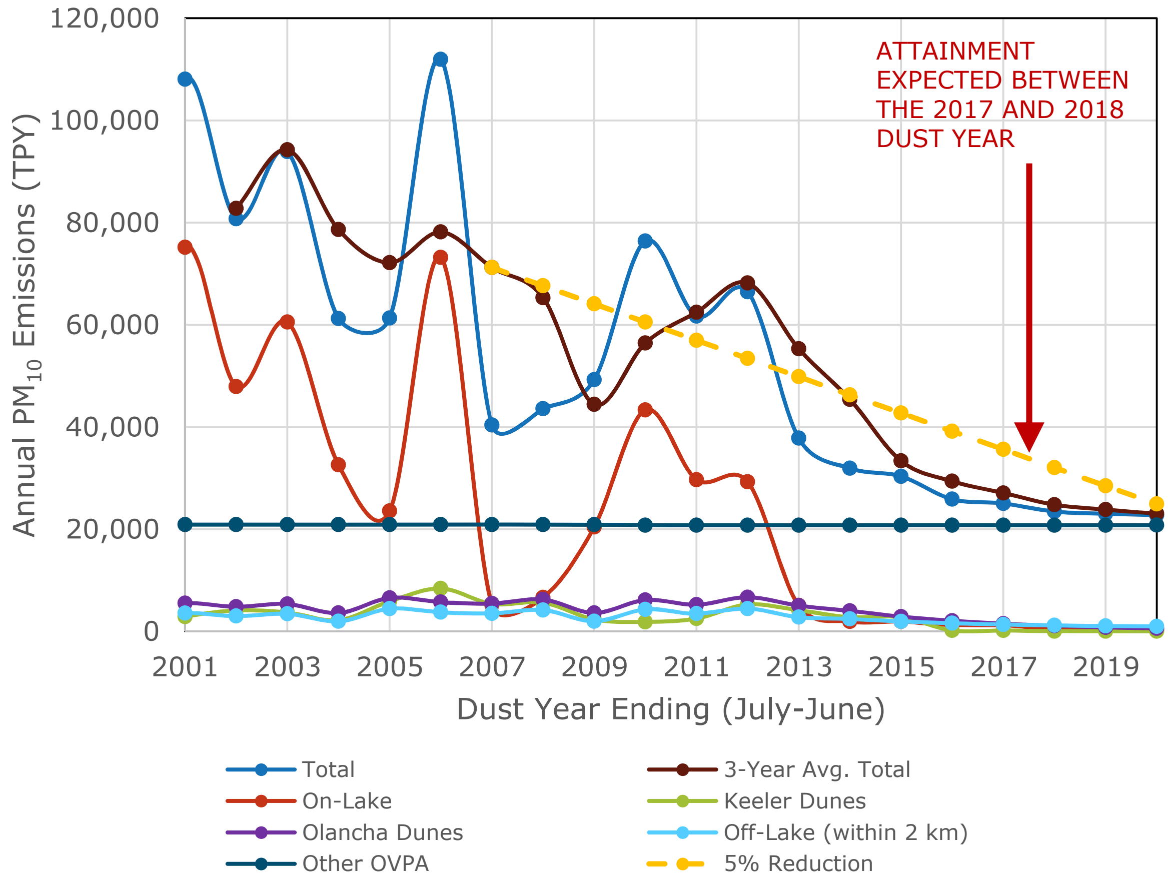

Figure 8-1: 2016 SIP Emissions Trend Analysis: July 2000 to June 2020, All OVPA Sources

9. OTHER CLEAN AIR ACT REQUIREMENTS

9.1 Implementation Milestones and Emission Reductions

Table 4-3 summarizes the PM_{10} emission forecast associated with the proposed 2016 SIP control strategy. As shown in Figure 8-1, the proposed control strategy would allow for at least a five percent reduction in the three-year average of PM_{10} emissions per year at the time that attainment is anticipated. Attainment of the federal PM_{10} standard is expected in 2017. To meet this attainment deadline, the final control measures must be implemented by December 31, 2017.To help prevent new dust source areas from causing additional violations of the federal standard, the District will continue to monitor and observe dust through the Owens Lake Dust ID program. After attainment is reached, the District will require three years of air monitoring data showing no violations of the federal standard in the planning area before redesignation can be requested.

9.2 Reasonable Further Progress

Under CAA Section 189(c), the demonstration of attainment SIP is required to include quantitative milestones that are to be achieved every three years until the area is redesignated attainment. These milestones must demonstrate reasonable further progress toward attainment of the NAAQS by the attainment date. The main milestone associated with this 2016 SIP involves completion of Phase 9/10 dust controls by December 31, 2017. The Planning area is then expected to attain the NAAQS after three years or by 2020. As required by Section 189(c)(2) of the CAA, the District shall submit to the USEPA, no later than 90 days after the date of each milestone, a demonstration that each milestone has been met.

9.3 Contingency Measures

The federal Clean Air Act Amendments of 1990 require a description of contingency measures (CAA Section 172(c)(9) and 182(c)(9)). The contingency measures are control measures that will be implemented in case the 2016 SIP control strategy fails to bring the planning area into attainment or the Reasonable Further Progress Milestones cannot be met. The District commits to make a Supplemental Control Requirements (SCR) determination at least once a year, as to whether there have been any monitored or modeled exceedances of the PM_{10} NAAQS from areas on the Owens Lake bed that have not been included in the 2016 SIP control strategy or if implemented controls do not control emissions sufficiently to attain the NAAQS. The procedure for the SCR determination is described in detail in Paragraphs 10 and 11 and Attachment B of the 2008 Board Order.

If monitoring and/or modeling demonstrates BACM PM_{10} control measures are needed in an ECR area to attain or maintain the PM_{10} NAAQS after BACM PM_{10} control measures are implemented in adjacent areas, the District will order the City of Los Angeles to select and implement BACM PM_{10} control measures on those areas. The District reserves the right to order the City of Los Angeles to implement, operate, and maintain a total of up to 53.4 square miles of BACM PM_{10} control measures on the Owens Lake bed below the Regulatory Shoreline (elev. 3,600 feet) and above the ordinary high water level of Owens Lake (elev. 3,552.55 feet). As expeditiously as practicable and not more than three years after such order for additional BACM PM_{10} control measures, the City of Los Angeles shall install, operate, and maintain BACM PM_{10} control measures that achieve a control efficiency of 99%. If BACM Managed Vegetation is chosen, up to two additional years for vegetation growth is allowed to achieve the 37% vegetation cover requirement.

10. CONTROL STRATEGY IMPLEMENTATION

Under Section 42316 (see Section 6.8), the District will adopt a rule requiring the City of Los Angeles to implement the 2016 SIP PM_{10} control measures on the schedule included below. The schedule will require that implementation of the additional PM_{10} control measures take place over about a two-year period with completion by December 31, 2017. The proposed rule to implement the control strategy ("proposed Rule 433") is incorporated into this 2016 SIP and will be adopted concurrently with the approval of this 2016 SIP.

Proposed Rule 433 requires the City of Los Angeles to implement, operate, and maintain Shallow Flooding, TWB^2, Dynamic Water Management, Brine BACM, Managed Vegetation and/or Gravel Blanket within the areas shown in and described by Figure 10-1. The Attainment Demonstration in Chapter 7 shows that, based on data collected during the five-year period between July 2009 and June 2014, implementing the PM_{10} controls required in this 2016 SIP will provide for the Owens Lake bed to attain the NAAQS at monitoring locations above the historic shoreline (3,600 foot elevation) by 2017.

The Keeler Dunes mitigation measures were defined and adopted in the 2013 Board Order and continued implementation is contained in the 2016 SIP Board Resolution (see Chapter 13).

10.1 Proposed Rule 433

The following proposed rule is incorporated into this 2016 SIP and constitutes an integral part thereof (see Exhibit 10-1). The complete proposed rule with exhibits and attachments is included as Appendix X-1.

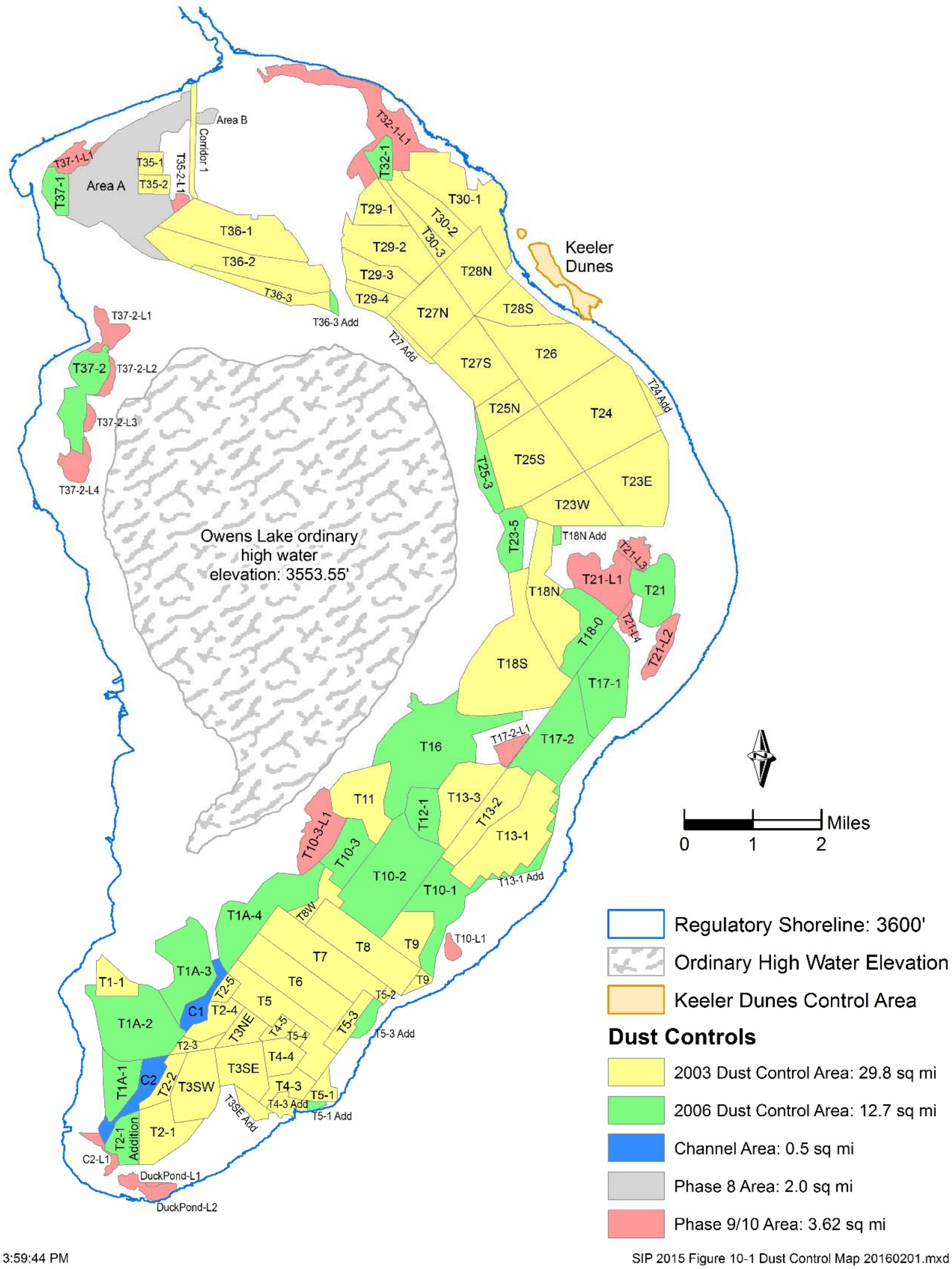

Figure 10-1: PM10 Dust Control Areas Map

Exhibit 10-1: Proposed Rule 433 Language

The purpose of this regulation is to effectuate a regulatory mechanism under the federal Clean Air Act to attain the National Ambient Air Quality Standards ("NAAQS") and to implement the Stipulated Judgment between the Great Basin Unified Air Pollution Control District ("District") and the City of Los Angeles ("City") dated December 30, 2014 and entered by the Superior Court of the State of California, County of Sacramento. This regulation does not alter or supersede any provision in the Stipulated Judgment, nor does it relieve any party from full compliance with the requirements of the Stipulated Judgment. This regulation sets the basic requirements for the Best Available Control Measures ("BACM") and defines the areal extent of these controls at Owens Lake required in order to meet the NAAQS. This regulation does not preclude the City or the District from implementing more stringent or additional mitigation pursuant to the Stipulated Judgment.

A. DEFINITIONS

1. "BACM PM_{10} Control Areas" are areas on the dried bed of Owens Lake at or below the Regulatory Shoreline elevation of 3,600 feet and at or above Owens Lake's ordinary high water elevation of 3,553.55 feet on which BACM PM_{10} Control Measures shall be implemented, and

   BACM PM_{10} Control Areas are:

   a. Areas, as shown on the map in Exhibit 1 – Dust Control Area Map, including:

      i. 29.8 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures ("2003 Dust Control Area");

      ii. 13.2 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures, except for Eligible Cultural Resource Areas where PM_{10} BACM selection and implementation dates will be deferred as set forth in Paragraph C.3. ("2006 Dust Control Area" and "Channel Area");

      iii. 2.0 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures ("Phase 8 Area");

      iv. 3.62 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures to be installed by December 31, 2017, except for Eligible Cultural Resource Areas, where PM_{10} BACM selection and implementation dates will be deferred as set forth in Paragraph C.3. ("Phase 9/10 Area"); and

   b. Additional areas as designated pursuant to Section C., "CONTINGENCY MEASURES" of this rule.

2. "BACM PM_{10} Control Measures" are best available control measures designed to reduce PM_{10} emissions to Control Efficiency ("CE") levels specified below. The following BACM PM_{10} Control Measures are approved to be used.

   a. "BACM Shallow Flooding" means the application of water to the surface of the lake bed in accordance with the performance standards for shallow flooding in Attachment A, Section I - Performance Requirements for BACM Shallow Flooding. Water shall be applied in amounts and by means sufficient to meet a CE level of 99% or CE targets for Minimum Dust Control Efficiency Areas.

   b. "Tillage with BACM (Shallow Flood) Backup or TWB²" means the roughening of a soil surface using mechanical methods in accordance with the specifications in Attachment A, Section IV – Performance Requirements for Tillage with BACM Back-up, and to utilize

BACM shallow flooding as a back-up control method in order to prevent NAAQS violations. BACM Shallow Flooding must be implemented in TWB[2] areas if the erosion threshold as defined in Paragraph A.2.h is exceeded. Water shall be applied in amounts and by means sufficient to meet the CE level of 99% or CE targets for Minimum Dust Control Efficiency areas.

c. “Brine BACM” means the application of brine and the creation of wet and/or non-emissive salt deposits sufficient to meet the CE level of 99% as described in Attachment A, Section V – Performance Requirements for Brine BACM. BACM Shallow Flooding must be implemented in Brine BACM areas if the erosion threshold as defined in Paragraph A.2.h is exceeded.

d. “BACM Managed Vegetation” means planting surfaces of the BACM PM_{10} Control Areas with protective vegetation to meet the CE level of 99% by maintaining overall average vegetation cover of at least 37% for each contiguous Managed Vegetation area and an areal distribution based on vegetation cover thresholds and grid size.

e. “BACM Gravel Blanket” means the application of a layer of gravel sufficient to meet the CE level of 100% by covering the control area with

- a layer of gravel at least four inches thick with gravel screened to a size greater than ½ inch in diameter, or
- a layer of gravel at least two inches thick with gravel screened to ½ inch in diameter underlain with a permanent permeable geotextile fabric.

f. “Dynamic Water Management or DWM” is a BACM Shallow Flooding operational modification that allows delayed start dates and/or earlier end dates required for shallow flooding in specific areas that have historically had low PM_{10} emissions within the modified time periods. The truncated dust control periods allows for water savings while achieving the required CE level. Areas eligible for the DWM program and their modified start and/or end dates for shallow flooding are identified in Attachment A, Section VI – Performance Requirements for Dynamic Water Management. If any DWM area becomes susceptible to wind erosion outside of the modified dust control period the area will be required to be flooded to meet the required CE for that area. BACM Shallow Flooding must be implemented in DWM areas if the erosion threshold as defined in Paragraph A.2.h is exceeded.

g. “Minimum Dust Control Efficiency or MDCE” BACM is a dust control measure for which the control efficiency target is adjusted to match the required control level based on air quality modeling for the 2006 dust control areas as shown on the map in Exhibit 2 – Dust Control Efficiency Requirements. The control efficiency targets may be less than 99%, but the level of control in all areas is intended to prevent exceedances of the NAAQS. MDCE BACM includes:

i. Shallow flood areas where the wetness cover is adjusted following the curve in Exhibit 3 - Shallow Flood Control Efficiency and Wetness Cover Curve,

ii. Channel Area - a state-regulated wetland area as shown in Exhibits 1 and 2 where vegetation cover is enhanced by irrigation and seeding with native plants in a manner sufficient to prevent windblown dust from causing exceedances of the NAAQS, and

iii. Sand Fence Area – an area as shown in Exhibits 1 and 2 located in area T1A-1 where sand fences, vegetation and natural water runoff combine to provide sufficient protection to prevent windblown dust from causing exceedances of the NAAQS.

h. "Erosion Threshold" is applicable to TWB^2, DWM, and Brine BACM to trigger BACM Shallow Flooding which must be implemented to comply with the shallow flood CE target for that area. The erosion threshold is determined from sand flux measurements or the Induced Particulate Erosion Test (IPET) test method as described in Attachment A, Paragraphs IV.C.2 and IV.C.4. BACM Shallow Flooding must be implemented in TWB^2, DWM or Brine BACM areas if any of the following thresholds are exceeded as determined using the methods described in Attachment A:

   i. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day on DWM or Brine BACM areas or 1.0 gram per square centimeter per day on TWB^2 areas, or

   ii. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height.

i. "Approved BACM" includes the control measures specified above and other measures approved by the APCO and the US Environmental Protection Agency as equivalent to these methods.

3. "Eligible Cultural Resource Area or ECR Area" is an area or areas where dust control measures will be implemented on a deferred schedule due to the presence of significant cultural resources that make the areas eligible for listing under the California Register of Historic Resources.

B. REQUIREMENTS

1. For the 2003 Dust Control Area the City shall continuously operate and maintain any mix of approved BACM PM_{10} Control Measures as defined above in Section A to meet the 99% efficient CE level. Selection of the type and location of BACM PM_{10} Control Measures within the area is solely the responsibility of the City.

2. For the 2006 Dust Control Area the City shall continuously operate and maintain approved BACM PM_{10} Control Measures defined above in Section A to meet the CE target specified in Exhibit 2, except for ECR Areas where BACM PM_{10} Control Measure selection and implementation dates will be deferred as set forth in Paragraph C.3., and any areas of BACM Managed Vegetation, for which the City shall comply with the minimum 37% average vegetation cover target and areal distribution requirements by December 31, 2017.

3. For the Phase 8 Area consisting of 2.0 square miles the City shall continue to operate and maintain BACM Gravel Blanket.

4. For the Phase 9/10 Project Area consisting of 3.62 square miles the City shall select and install BACM PM_{10} Control Measures by December 31, 2017, except for ECR Areas, where PM_{10} BACM selection and implementation dates will be deferred as set forth in Paragraph C.3.

5. In areas containing infrastructure capable of achieving and maintaining compliant BACM Shallow Flooding the City may implement TWB^2, Brine Shallow Flooding or Dynamic Water Management as alternatives to BACM Shallow Flooding or MDCE BACM shallow flooding.

C. CONTINGENCY MEASURES

1. At least once each calendar year, the District shall determine whether additional areas of the lake bed require BACM PM_{10} Control Measures in order to attain or maintain the PM_{10} NAAQS.
2. If the District has not demonstrated attainment with the PM_{10} NAAQS on or before December 31, 2017, or has not met reasonable further progress milestones, the District shall order the City to apply one or more BACM PM_{10} Control Measures as set forth in Paragraphs A.2 and C.4 on those areas of the Owens Lake bed that cause or contribute to exceedances of the PM_{10} NAAQS.
3. If monitoring and/or modeling demonstrates BACM PM_{10} Control Measures are needed in an ECR Area(s) to attain or maintain the PM_{10} NAAQS after BACM PM_{10} Control Measures are implemented in adjacent areas, the District shall order the City to select and implement BACM PM_{10} Control Measures set forth in Paragraph A.2.
4. The District may order the City to implement, operate and maintain a total of up to 53.4 square miles of waterless or water-neutral BACM PM_{10} Control Measures on the Owens Lake bed below the Regulatory Shoreline (elev. 3,600 feet) and above the ordinary high water level of Owens Lake (elev. 3,553.55 feet).
5. As expeditiously as practicable and not more than three years after any such order for additional BACM PM_{10} Control Measures, the City shall install, operate and maintain BACM PM_{10} Control Measures that achieve a control efficiency of 99%. If BACM Managed Vegetation is chosen up to two additional years for vegetation growth is allowed to achieve the 37% vegetation cover requirement.

11. CONCLUSIONS AND SIP CHECKLIST

A checklist of SIP requirements pertinent to the present plan (as outlined in USEPA general SIP guidelines for "serious" PM_{10} nonattainment areas[29]) is presented in Table 11-1. As documented in Table 11-1, all remaining SIP requirements applicable to the 2016 OVPA PM_{10} SIP have been successfully addressed.

Table 11-1 SIP Checklist

Required Elements	Document Location	Comments
Emissions Inventory	Chapter 4; Appendix IV-1	CARB's Almanac of Emissions and Air Quality (2013 Edition), Base Year 2012, was revised as described in Chapter 4 and in Appendix IV-1.
A plan that enables attainment of the PM_{10} federal air quality standards	Chapter 6 (Control Strategy and Attainment Demonstration); Chapter 7 (Modeled Attainment Demonstration)	Included.
Annual reductions in PM_{10} or PM_{10} precursor emissions that are of no less than 5% until attainment	Chapter 4, Section 4.3; Appendix IV-1 Chapter 8	Included.
BACM and BACT for significant sources and major stationary sources of PM_{10}, to be implemented no later than 4 years after reclassification of the area as serious	Chapter 5; Appendix V-1 (BACM Assessment)	Reclassification of the OVPA to serious nonattainment for PM_{10} occurred on January 1993. District adopted BACM SIP in 1998 and revised in 2003 and 2008. Further control of fugitive PM_{10} emissions from the significant source categories identified in Section 4.2 began in January 2006 and meets BACM stringency, as established in Section 5.3. There are no PM_{10} sources in the OVPA that meet the federal definition of a PM_{10} major source; therefore, no BACT analysis is included.
Transportation conformity and motor vehicle emission budgets in accord with the attainment plan	Chapter 6, Section 6.1.2	Included.
RFP and quantitative milestones	Chapter 9, Section 9.1 and 9.2	Included.
Contingency measures	Chapter 9, Section 9.3	Included.

[29] FR Vol. 59, No. 157, August 16, 1994, p. 42002

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13. DECLARATION OF THE CLERK OF THE BOARD AND RESOLUTIONS CERTIFYING THE EIR AND APPROVING THE SIP

13.1 Declaration of the Clerk of the Governing Board

EXHIBIT A: Notice of Public Hearing

EXHIBIT B: Proofs of Publication

EXHIBIT C: Mailing and Distribution List

13.2 District Board Order No. 160413-04 and Resolution No. 2016-02

13.3 District Board Order No. 160413-05 and Resolution No. 2016-03

EXHIBIT A: Findings of Fact

Notice of Determination: Great Basin Unified Air Pollution Control District Board Order No. 160413-01

Notice of Determination: Great Basin Unified Air Pollution Control District Rule 433

Notice of Determination: 2016 Revision to Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

DECLARATION OF THE CLERK OF THE GOVERNING BOARD OF THE GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

I, Tori DeHaven, declare as follows:

1. I am the Board Clerk of the Governing Board of the Great Basin Unified Air Pollution Control District (District). The District is a unified air pollution control district consisting of Inyo, Mono and Alpine counties in the State of California.

2. At least thirty (30) days before the April 13, 2016 public hearing of the Great Basin Unified Air Pollution Control District Governing Board to adopt the proposed final 2016 revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, I served, or caused to be served, in sealed envelopes or via e-mail, true copies of the following documents:

   a. Notice of Public Hearing (attached hereto as **Exhibit A**); and/or

   b. (i) A proposed order authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain additional dust control measures on the Owens Lake bed, (ii) a proposed District Rule 433 (Control of Particulate Emissions at Owens Lake), and (iii) a proposed final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively proposed "Board Actions").

   on the following persons or entities and addressed as indicated:

   - Administrator of the United States Environmental Protection Agency via the appropriate regional office by sending to:

     <u>Federal Express Priority Overnight Delivery</u>
     Ms. Deborah Jordan
     Director
     U.S. EPA Region 9
     75 Hawthorne Street
     San Francisco, CA 94105

   - Each local air pollution control agency significantly impacted by sending to:

     <u>Federal Express Overnight Delivery</u>
     Mr. Glen Stephens
     Air Pollution Control Officer
     Kern County Air Pollution Control District
     2700 "M" Street, Suite 302
     Bakersfield, CA 93301-2370

     Mr. Glen Stephens
     Air Pollution Control Officer
     Eastern Kern Air Pollution Control District
     2700 "M" Street, Suite 302
     Bakersfield, CA 93301-2370

Mr. Eldon Heaston
Executive Director
Antelope Valley Air Quality Management District
43301 Division Street, Suite 206
Lancaster, CA 93535-4649

Mr. Eldon Heaston
Executive Director
Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2383

Mr. Seyed Sadredin
Air Pollution Control Officer
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg
Fresno, CA 93726

- California Air Resources Board by sending to:

Federal Express Overnight Delivery
Mr. Richard Corey
Executive Officer
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

- City of Los Angeles and the Department of Water and Power of the City of Los Angeles by sending to:

Federal Express Overnight Delivery
Ms. Marci Edwards
General Manager
Los Angeles Department of Water and Power
111 N. Hope Street, Room 1550
Los Angeles, CA 90012

Federal Express Overnight Delivery
Mr. Martin Adams
Senior Assistant General Manager – Water System
Los Angeles Department of Water and Power
111 N. Hope Street, Room 1449
Los Angeles, CA 90012

Federal Express Overnight Delivery
Mr. Richard F. Harasick
Director of Water Resources
Los Angeles Department of Water and Power
111 N. Hope Street, Room 1460
Los Angeles, CA 90012

Federal Express Overnight Delivery
Ms. Julie Conboy-Riley
Deputy City Attorney
Los Angeles Department of Water and Power
111 N. Hope Street, Room 340
Los Angeles, CA 90012

Federal Express Overnight Delivery
Mr. Nelson Mejia
Manager of Owens Lake Compliance & Engineering Support
Los Angeles Department of Water and Power
111 N. Hope Street, Room 1315
Los Angeles, CA 90012

Federal Express Overnight Delivery
Milad Taghavi
Manager of Owens Lake Regulatory Affairs & Long Term Planning
Los Angeles Department of Water and Power
111 N. Hope Street, Room 1468
Los Angeles, CA 90012

Federal Express Overnight Delivery
Mr. James Yannotta
Aqueduct Manager
Los Angeles Department of Water and Power
300 Mandich Street
Bishop, CA 93514

c. At least thirty (30) days before the April 13, 2016 public hearing of the Great Basin Unified Air Pollution Control District Governing Board to consider for adoption and approval the proposed Board Actions, I caused to be published a notice of the public hearing of the Governing Board of the Great Basin Unified Air Pollution Control District in the form attached hereto as **Exhibit A**, in the: 1) Inyo Register, a newspaper of general circulation in the County of Inyo, California, the county wherein the entire Owens Valley PM_{10} Planning Area is situated; 2) in The Sheet, a newspaper of general circulation in Mono County, California; 3) in the Tahoe Daily Tribune, a newspaper of general circulation in El Dorado County, California (a county adjacent to Alpine County, California, which has no newspaper of general circulation); and 4) in the Ridgecrest Daily Independent, a newspaper of general circulation in Kern County, California. Copies of the proofs of such publication are attached hereto as **Exhibit B**.

d. At least thirty (30) days before the April 13, 2016 public hearing of the Great Basin Unified Air Pollution Control District Governing Board to consider for adoption and approval the proposed Board Actions, and continuously through the date of the public hearing, a copy of the Board Actions and the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power was made available for public review at the GBUAPCD website www.gbuapcd.org, and at the District's main office at 157 Short Street, Bishop, California, which office is located in

Inyo County, California, the region in which the entire Owens Valley PM_{10} Planning area and the affected source are located.

e. At least thirty (30) days before the April 13, 2016 public hearing of the Great Basin Unified Air Pollution Control District Governing Board to consider for adoption and approval the proposed Board Actions, I sent, or caused to be sent via e-mail or in sealed envelopes via the United States Postal Service, postage prepaid, a copy of the notice of public hearing of the Governing Board of the Great Basin Unified Air Pollution Control District in the form attached hereto as **Exhibit A** to each and every addressee shown in the list attached hereto as **Exhibit C.**

f. As authorized by District Governing Board Resolution No. 2016-03, I hereby certify on behalf of the District that the document contained within is the authoritative compilation of the *Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan* and Incorporated Board Order adopted July 2, 1997; as revised by the 1998 Revision and Incorporated Board Order adopted November 16, 1998; as revised by the 2003 Revision and Incorporated Board Order adopted November 13, 2003; as revised by the 2008 Revision and Incorporated Board Order adopted January 28, 2008; as revised by the 2013 Revision and Incorporated Board Order adopted on September 16, 2013; as revised by the 2016 Revision and Incorporated District Rule 433.

This compilation may be correctly referred to as the “Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order, 2016 Revision.”

I declare that the foregoing is true and correct under penalty of perjury. Done at Bishop, Inyo County, California, this ____ day of ____________, 2016.

____

Tori DeHaven
Clerk of the Board

Phillip L. Kiddoo
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

NOTICE OF PUBLIC HEARING

ADOPTION AND APPROVAL OF (1) PROPOSED ORDER UNDER THE PROVISIONS OF CAL. HEALTH & SAFETY CODE SECTION 42316, (2) PROPOSED DISTRICT RULE 433 FOR THE CONTROL OF PARTICULATE EMISSIONS AT OWENS LAKE, AND (3) PROPOSED FINAL 2016 REVISION TO THE OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN

PLEASE TAKE NOTICE that on Wednesday, April 13, 2016, the Governing Board of the Great Basin Unified Air Pollution Control District (GBUAPCD) will conduct a public hearing and consider for adoption and approval of (1) a proposed order authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain additional dust control measures on the Owens Lake bed, (2) a proposed District Rule 433 (Control of Particulate Emissions at Owens Lake), and (3) a proposed final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively “Board Actions”). The public hearing and the Governing Board’s consideration for adoption and approval of the Board Actions will occur at the District Governing Board’s regular meeting on **Wednesday, April 13, 2016 at 10:15 a.m. at the City of Los Angeles Department of Water and Power Administrative Building, Training Room 134A, 111 Sulfate Road, Keeler, California 93530**. Other actions related to the Board Actions may also be taken at the meeting. Members of the public will have an opportunity to submit written comments or make oral statements at the public hearing on each of the proposed Board Actions.

The GBUAPCD prepared the 2016 SIP for the control of fine dust emissions (PM_{10}) in response to a finding by the United States Environmental Protection Agency (USEPA) that the Owens Valley Planning Area did not attain the 24-hour National Ambient Air Quality Standard (NAAQS) for PM_{10} as required by the federal Clean Air Act. The dried Owens Lake bed soils and crusts are a source of wind-blown dust during significant wind events and contribute to elevated concentrations of PM_{10}.

The GBUAPCD has adopted a series of SIPs to address and control PM_{10}. In 2008, the GBUAPCD approved the 2008 Revised State Implementation Plan for the Owens Valley Planning Area (2008 SIP), which was implemented through GBUAPCD Board Order #080128-01. In 2011, a dispute arose between the GBUAPCD and the City regarding these requirements. On December 30, 2014, the Sacramento Superior Court entered a Stipulated Judgment for the GBUAPCD in the case captioned *City of Los Angeles v. California Air Resources Board, et al*., Case No. 34-2013-80001451-CU-WM-GDS to resolve this dispute. Under the major provisions of this agreement, the City agreed to implement additional dust control measures on the lake bed (for a total of 48.6 square miles) by December 31, 2017. The GBUAPCD may also order the City to implement dust control measures on up to 4.8 additional square miles of the lake bed if needed to meet the NAAQS or related state standards. The GBUAPCD agreed to revise the 2008 SIP by December 31, 2014 (later amended by agreement to April 15, 2016) to incorporate the relevant provisions of the Stipulated Judgment into a proposed 2016 SIP Order.

GBUAPCD also proposes to adopt District Rule 433 pursuant to California Health & Safety Code Section 41511. The Rule includes the control elements of the 2016 SIP Order and will comprise the attainment strategy for the 2016 SIP to be submitted to the California Air Resources Board and the U.S. Environmental Protection Agency for their approval. The 2016 SIP contains the project location, history, air quality setting, emission inventory, control measures, air quality modeling, control strategy, and enabling legislation. The goal of the proposed Board Actions is to continue to reduce dust emissions from the dry lake bed to attain the 24-hour NAAQS for PM_{10} in 2017. A Notice of Determination will be prepared under the California Environmental Quality Act in connection with the proposed Board Actions based upon the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power.

Copies of the proposed order, District Rule 433, the 2016 SIP and the EIR may be obtained from and will be available for public review at the GBUAPCD web-site www.gbuapcd.org, at the GBUAPCD office at 157 Short Street, Bishop, California, and at Inyo County Libraries in Independence, Big Pine, Bishop, Lone Pine, Death Valley and Tecopa, California. Written comments on these rule revisions should be sent to Phillip L Kiddoo, Air Pollution Control Officer, GBUAPCD, 157 Short Street, Bishop, CA 93514. Written comments received by 5:00 pm on March 18, 2016 will be included in the staff report sent to the Governing Board members. Oral and written comments will also be taken at the meeting. For further information, contact the District's Board Clerk, Tori DeHaven at (760) 872-8211.

GBUAPCD staff encourages those who have comments on the 2016 SIP to attend the meeting on April 13, 2016 and submit written comments or make oral statements to the Governing Board prior to the Board Actions.

Chapter 13.1

EXHIBIT B TO CLERK'S DECLARATION

>Proofs of Publication from:

Inyo Register
The Sheet
Tahoe Daily Tribune
Ridgecrest Daily Independent

Chapter 13.1

EXHIBIT C TO CLERK'S DECLARATION

>Mailing and Distribution List

Chapter 13.2

Board Order #160413-04

Clerk's certification of Resolution 2016-02 Certifying the EIR

RESOLUTION NO. 2016-02

RESOLUTION OF THE GOVERNING BOARD OF THE GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT MAKING AND ADOPTING RESPONSIBLE AGENCY FINDINGS PURSUANT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT FOR (1) PROPOSED ORDER #160413-01 UNDER THE PROVISIONS OF CAL. HEALTH & SAFETY CODE SECTION 42316, (2) PROPOSED DISTRICT RULE 433 FOR THE CONTROL OF PARTICULATE EMISSIONS AT OWENS LAKE, AND (3) PROPOSED FINAL 2016 REVISION TO THE OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN

For reasons detailed below, the Governing Board (Governing Board) of the Great Basin Unified Air Pollution Control District (GBUAPCD), with the GBUAPCD acting as a Responsible Agency under the California Environmental Quality Act (CEQA) (Public Resources Code §21000 *et seq.*);makes and adopts the following findings for adoption and approval of (1) a proposed order authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain dust control measures on the Owens Lake bed, (2) a proposed District Rule 433 (Control of Particulate Emissions at Owens Lake), and (3) a proposed final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively "Board Actions"), that it has reviewed and considered the information contained in the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power before deciding to adopt and approve the Board Actions.

WHEREAS, pursuant to the federal Clean Air Act Amendments of 1990, the State of California is required to submit to the Administrator of the United States Environmental Protection Agency a State Implementation Plan for the Owens Valley Planning Area that demonstrates timely attainment of the National Ambient Air Quality Standards (NAAQS) for PM_{10}, defined as particulate matter having an aerodynamic diameter of a nominal 10 microns or less; and

WHEREAS, the GBUAPCD is the body vested by law with the authority and responsibility to develop and adopt the Attainment Demonstration State Implementation Plan for the Owens Valley PM_{10} Planning Area, and to submit the Attainment Demonstration State Implementation Plan to the California Air Resources Board for its approval and submittal to the U.S. Environmental Protection Agency Administrator on behalf of the State of California; and

WHEREAS, on July 2, 1997, the Governing Board adopted the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order (collectively, 1997 SIP) to comply with the requirements of the state and federal air quality law; and

WHEREAS, on July 2, 1997, in conjunction with its adoption of the 1997 SIP, the Governing Board adopted a resolution certifying that the Final Environmental Impact Report for the 1997 SIP (1997 EIR) had been completed in compliance with CEQA, that the Governing Board had reviewed and considered the information and analysis contained in the 1997 EIR, and that the 1997 EIR reflected the independent judgment of the District; and

WHEREAS, on November 16, 1998, the 1997 SIP was revised with the adoption of the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order (collectively, 1998 SIP) by the Governing Board to comply with the requirements of the state and federal air quality law; and

WHEREAS, on November 16, 1998, in conjunction with its adoption of the 1998 SIP, the Governing Board adopted a resolution certifying that Addendum Number 1 to the 1997 EIR had been completed in compliance with CEQA, that the Governing Board had reviewed and considered the information and analysis contained in Addendum Number 1 to the 1997 EIR, and that Addendum Number 1 to the 1997 EIR reflected the independent judgment of the District; and

WHEREAS, on November 13, 2003, the 1998 SIP was revised with the adoption of the 2003 revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order (collectively, 2003 SIP) by the Governing Board to comply with the requirements of the state and federal air quality law; and

WHEREAS, on November 13, 2003, in conjunction with its adoption of the 2003 SIP, the Governing Board adopted a resolution certifying that Final Environmental Impact Report for the 2003 SIP (2003 EIR) had been completed in compliance with CEQA, that the Governing Board had reviewed and considered the information and analysis contained in the 2003 EIR, and that the 2003 EIR reflected the independent judgment of the District; and

WHEREAS, the 2003 SIP requires the District to continue studying the sources of particulate matter air pollution from the Owens Lake bed area and to take appropriate of actions to reduce particulate emissions so that the Owens Valley PM_{10} Planning Area will attain and maintain the NAAQS for particulate matter by the statutory deadlines; and

WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM_{10}) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990; and

WHEREAS, in response to USEPA's finding, to comply with the requirements of the state and federal air quality laws and to comply with the provisions of a December 4, 2006 Settlement Agreement between the District and the City of Los Angeles, the District adopted a 2008 revision to the 2003 SIP; and

WHEREAS, the Governing Board certified and adopted a 2008 Subsequent Environmental Impact Report for the proposed adoption of the 2008 SIP under applicable CEQA statutory law and regulations; and approved the 2008 Revised State Implementation Plan for the Owens Valley Planning Area (2008 SIP), which was implemented through GBUAPCD Board Order #080128-01; and

WHEREAS, in 2011, a dispute arose between the GBUAPCD and the City regarding the requirements of the 2008 SIP, which were resolved when the Sacramento Superior Court entered a Stipulated Judgment for the GBUAPCD on December 30, 2014 in the case captioned *City of Los Angeles v. California Air Resources Board, et al*., Case No. 34-2013-80001451-CU-WM-GDS (Stipulated Judgment); and

WHEREAS, under the Stipulated Judgment, the City agreed to implement additional dust control measures on the lake bed (for a total of 48.6 square miles) by December 31, 2017, and the GBUAPCD may also order the City to implement dust control measures on up to 4.8 additional square miles of the lake bed if needed to meet the NAAQS or related state standards; and the GBUAPCD agreed to revise the 2008 SIP by December 31, 2014 (later amended by agreement to April 15, 2016) to incorporate the relevant provisions of the Stipulated Judgment into a 2016 SIP Order; and

WHEREAS, the GBUAPCD also proposes to adopt District Rule 433 to contain the dust control requirements of the 2016 SIP Order, which will comprise the attainment strategy for the 2016 SIP to be submitted to the California Air Resources Board and the U.S. Environmental Protection Agency for their approval; and

WHEREAS, the adoption and approval of the Board Actions is a "project" as defined by CEQA; and

WHEREAS, under the Stipulated Judgment, the City served as Lead Agency to prepare and certify the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (City EIR) for the dust control project required by the Board Actions; and filed a Notice of Determination for the project on June 8, 2015; and

WHEREAS, the GBUAPCD is a Responsible Agency under Title 14 of the California Code of Regulations Section 15091 and is to consider the information and analysis in the City EIR in its determinations of whether to adopt and approve the Board Actions; and

WHEREAS, on April 13, 2015, after providing public notice of its actions, the Governing Board of the GBUAPCD conducted a public hearing to adopt and approve the Board Actions; and

WHEREAS, the Governing Board of the GBUAPCD has reviewed the City EIR in its entirety, considered its contents, determined that the City EIR meets all the requirements under CEQA and relied upon the City EIR analysis and information in adopting and approving the Board Actions;

NOW, THEREFORE, BE IT RESOLVED by the Governing Board of the Great Basin Unified Air Pollution Control District as follows:

1. The City EIR was presented to the Governing Board of the Great Basin Unified Air Pollution Control District.

2. The Governing Board has reviewed and considered the information and analysis contained in the City EIR before adopting and approving the Board Actions.

3. The Governing Board applying its independent judgment and analysis concurs with the findings and analysis contained in the City EIR.

4. The City EIR found that except for lake bed areas containing cultural resources, all impacts were beneficial, less than significant or less than significant as mitigated, and the Governing Board of the GBUAPCD concurs with those findings. For areas containing cultural resources, the City EIR concluded that impacts of the project could not be mitigated to less than significant levels, and therefore selected the alternative of avoidance of those areas as the environmentally superior alternative.

5. The Governing Board has considered the environmental effects of the project identified in the City EIR of the activities adopted, authorized and required by the Board Actions, and has based its decision on the environmental impacts of those portions of the project that are subject to the authority of the GBUAPCD.

6. The Governing Board finds pursuant to Public Resources Code Sections 21000 *et seq*., including California Code of Regulations, Title 14, Sections 15091 and 15096, that with respect to the significant or potentially significant effects of the Board Actions, that changes or alterations have been required in, or incorporated into the project which mitigate or avoid the significant environmental effects thereof as identified in the EIR.

7. The Governing Board has determined that there is no new information, changes in the project or changes in circumstances or conditions since the preparation and certification of the City EIR that would require further revision or addendum to the EIR or that would require further environmental review in order to approve the Board Actions.

APPROVED AND ADOPTED by the Governing Board of the Great Basin Unified Air Pollution Control District this **13th day of April, 2016,** by the following vote:

AYES:

NOTES:

ABSTAIN:

____
(Name) Chair of Governing Board

ATTEST:

____
Tori DeHaven
Clerk of the Governing Board

Chapter 13.3

Board Order #160413-05

Clerk's certification of Resolution 2016-03 Certifying the Order, Rule & SIP

RESOLUTION NO. 2016-03

RESOLUTION OF THE GOVERNING BOARD OF THE GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT ADOPTING AND ISSUING (1) BOARD ORDER #160413-01 UNDER THE PROVISIONS OF CAL. HEALTH & SAFETY CODE SECTION 42316, (2) DISTRICT RULE 433 FOR THE CONTROL OF PARTICULATE EMISSIONS AT OWENS LAKE, AND (3) FINAL 2016 REVISION TO THE OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, AND MAKING FINDINGS OF FACT

WHEREAS, pursuant to the federal Clean Air Act Amendments of 1990 (CAAA), the State of California is required to submit to the Administrator of the United States Environmental Protection Agency (U.S. EPA) a State Implementation Plan for the Owens Valley PM_{10} Planning Area, located in southern Inyo County, California, that demonstrates timely attainment of the National Ambient Air Quality Standards (NAAQS) for PM_{10}, defined as particulate matter having an aerodynamic diameter of a nominal 10 microns or less; and

WHEREAS, the Great Basin Unified Air Pollution Control District (District or GBUAPCD) is the body vested by law with the authority and responsibility to develop and adopt the Demonstration of Attainment State Implementation Plan for the Owens Valley PM_{10} Planning Area, and to submit the Demonstration of Attainment State Implementation Plan to the California Air Resources Board for its approval and submittal to the U.S. EPA Administrator on behalf of the State of California; and

WHEREAS, on March 23, 2007, the U.S. EPA published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for PM_{10} by December 31, 2006 as mandated by the CAAA; and

WHEREAS, as a result of the U.S. EPA finding, the State Implementation Plan for the Owens Valley Planning Area that was approved by the District in 2003 must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as soon as practicable and that said revised SIP must be submitted to the U.S. EPA by December 31, 2007; and

WHEREAS, starting in 1997, the GBUAPCD has adopted a series of SIPs to address and control PM_{10}; including in 2008 when the GBUAPCD approved the 2008 Revised State Implementation Plan for the Owens Valley Planning Area (2008 SIP), which was implemented through GBUAPCD Board Order #080128-01; and

WHEREAS, in 2011, a dispute arose between the GBUAPCD and the City regarding the requirements of the 2008 SIP, which were resolved when the Sacramento Superior Court entered a Stipulated Judgment for the GBUAPCD on December 30, 2014 in the case captioned *City of Los Angeles v. California Air Resources Board, et al.*, Case No. 34-2013-80001451-CU-WM-GDS (Stipulated Judgment); and

WHEREAS, under the Stipulated Judgment, the City agreed to implement additional dust control measures on the lake bed (for a total of 48.6 square miles) by December 31, 2017, and the GBUAPCD may also order the City to implement dust control measures on up to 4.8 additional square miles of the lake bed if needed to meet the NAAQS or related state standards; and the GBUAPCD agreed to revise the 2008 SIP by December 31, 2014 (later amended by agreement to April 15, 2016) to incorporate the relevant provisions of the Stipulated Judgment into a 2016 SIP Order; and

WHEREAS, the GBUAPCD proposes to adopt District Rule 433 (Control of Particulate Emissions at Owens Lake) to contain the dust control requirements of the 2016 SIP Order, which will comprise the attainment strategy for the 2016 SIP to be submitted to the California Air Resources Board and the U.S. Environmental Protection Agency for their approval; and

WHEREAS, notice to the public and to the California Air Resources Board was duly and timely given of this public hearing on the adoption of District Rule 433 in accordance with California Health & Safety Code §40725; and

WHEREAS, the District prepared and made available for review a written analysis of District Rule 433 under Health & Safety Code §40727.2, and

WHEREAS, adoption of the revisions and rules is necessary, as demonstrated by the record of this proceeding, to comply with the legal requirement imposed on the District by federal law and state law, including but not limited to the federal Clean Air Act and Health and Safety Code Section 42316; and

WHEREAS, District Rule 433 is consistent with and not in conflict with or contradictory to, any existing statutes, court decisions, or State or federal regulations, and

WHEREAS, District Rule 433 is written so that persons directly affected by it can easily understand its meaning, and

WHEREAS, District Rule 433 includes requirements that are duplicative of requirements contained in this Board Order ordering air pollution controls at Owens Lake, but it is necessary and proper in order to execute the powers and duties granted to, and imposed upon the District for the adoption of the 2016 SIP in order to comply with the CAAA, and

WHEREAS, District Rule 433 and this resolution adequately and comprehensively set forth the proper references to the legal authority that authorizes and requires the District to adopt this Rule, and

WHEREAS, no changes have been made in the text of Rule 433 originally made available to the public that are so substantial as to significantly affect its meaning, and

WHEREAS, the District has prepared a proposed 2016 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan which incorporated proposed District Rule 433 (collectively, 2016 SIP) and circulated the proposed 2016 SIP Order, 2016 SIP and Rule 433 and the for public and governmental agency comment; and

WHEREAS, the control strategy for the 2016 SIP includes the Keeler Dunes Project which was funded by the City and implemented by GBUAPCD pursuant to a settlement agreement between those parties in 2013, and consists of straw bale and native vegetation dust control measures on 194 acres to provide the necessary control efficiency to meet the NAAQS and CAAQS for PM10 in the communities of Swansea and Keeler with scheduled completion in 2016; and which settlement agreement provides a release of the City's liability to the GBUAPCD under the GBUAPCD's state law authority for the subject areas as more specifically described in the agreement;

WHEREAS, under the Stipulated Judgment, the City served as Lead Agency to prepare and certify the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) for the dust control project required by the Board Actions; and filed a Notice of Determination for the project on June 8, 2015; and the GBUAPCD served as the Responsible Agency to assist with, and to rely upon the EIR in considering the adoption of the 2016 SIP Order, District Rule 433 and the 2016 SIP.

WHEREAS, in Resolution 2016-02, which is incorporated by reference herein, the Governing Board of the Great Basin Unified Air Pollution Control District (Governing Board) acted as a Responsible Agency in reviewing and considering the EIR; and

WHEREAS, the EIR found that except for lake bed areas containing cultural resources, all impacts were beneficial, less than significant or less than significant as mitigated, and the Governing Board of the GBUAPCD concurs with those findings. For areas containing cultural resources, the EIR concluded that impacts of the project could not be mitigated to less than significant levels, and therefore selected the alternative of avoidance of those areas as the environmentally superior alternative; and

WHEREAS, the Governing Board has further determined and made findings in the attached Exhibit A to explain and support its consideration, adoption and issuance of the 2016 SIP Order, District Rule 433 and 2016 SIP; and

WHEREAS, the Governing Board has conducted a public hearing on the adoption and issuance of the 2016 SIP Order, District Rule 433 and the 2016 SIP, and has provided for and invited the submission of statements, arguments, or contentions, both written and oral, in accordance with Health & Safety Code §40726; and

WHEREAS, the 2016 SIP Order, District Rule 433 and the 2016 SIP will be effective upon adoption;

NOW, THEREFORE, BE IT RESOLVED by the Governing Board of the Great Basin Unified Air Pollution Control District as follows:

1. Through this Resolution, the Governing Board hereby finds and determines to be true, on the basis of substantial evidence, each statement of fact, and hereby adopts on the basis of the record of this proceeding each conclusion of law, set forth in the recitals to this Resolution.

2. Through this Resolution, the Governing Board hereby approves and directs the Air Pollution Control Officer to issue to the City of Los Angeles, Great Basin Unified Air Pollution Control District Order No. 160413-01, in the form attached hereto, which adoption and issuance are effective immediately.

3. Through this Resolution, the Governing Board hereby approves, adopts and promulgates District Rule 433 (Control of Particulate Emissions at Owens Lake) which is included and incorporated in Chapter 12 of the 2016 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, in the form attached hereto, which approval and adoption are effective immediately.

4. Through this Resolution, the Governing Board hereby approves and adopts the 2016 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, in the form attached hereto, which approval and adoption are effective immediately.

5. Through this Resolution, the Governing Board hereby authorizes and commits the District to complete the Keeler Dunes Project as set forth in the 2016 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan.

6. Through this Resolution, the Governing Board hereby reaffirms each of its findings and resolutions made in Resolution 2016-02, which is incorporated herein by reference.

7. Through this Resolution, the Governing Board makes all the findings set forth in the Findings of Fact which are incorporated herein by reference and included as Exhibit A to this Resolution.

8. Through this Resolution, including the exhibits incorporated herein and attached hereto, the Governing Board has satisfied its obligations pursuant to the Health and Safety Code, including but not limited to Section 43216, and the Public Resources Code Sections 21000 *et seq*., including California Code of Regulations, Title 14, Sections 15091 and 15096, in that the Governing Board has found with respect to the significant or potentially significant effects of the 2016 SIP Order, District Rule 433 and the 2016 SIP, that changes or alterations have been required in, or incorporated into the project which mitigate or avoid many of the significant environmental effects thereof as identified in the EIR.

9. Through this Resolution, the Governing Board hereby authorizes and directs the Air Pollution Control Officer to execute on behalf of the District the Notices of Determination for the 2016 SIP Order, District Rule 433 and the 2016 SIP, and to file or record the notices reflecting those actions as provided by applicable law.

10. Through this Resolution, the Governing Board hereby authorizes and directs the Air Pollution Control Officer to execute and deliver on behalf of the District all documents and to undertake all acts as are necessary to comply with applicable law including, but not limited to, California Health & Safety Code §40724 and §40724.5, and to enforce District Rule 433 hereunder.

11. The Clerk of the Governing Board is hereby authorized to compile and publish the complete 2016 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order, adopted on April 13, 2016 and shall certify on behalf of the District that said compilation is the authoritative version of the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order.

12. The District shall prepare and maintain a record of this rule adoption in accordance with Health & Safety Code §40728.

APPROVED, ADOPTED and ORDERED by the Governing Board of the Great Basin Unified Air Pollution Control District this 13th **day of April 2016,** by the following vote:

AYES:

NOES:

ABSTAIN:

____
(Name), Chair of the Governing Board

ATTEST:

____
Tori DeHaven
Clerk of the Governing Board

Incorporated attachments:

Exhibit A - Findings of Fact

Governing Board of the Great Basin Unified Air Pollution Control District
April 13, 2016

RESOLUTION NO. 2016-03

EXHIBIT A - FINDINGS OF FACT

District Board Order #160413-01, District Rule 433 and 2016 Revision to the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan

Findings of Fact Under the Provisions of California Health & Safety Code §42316(a); Public Resources Code Sections 21000 *et seq*., and California Code of Regulations, Title 14, Sections 15091 and 15096; and Other Findings of Fact

Related Documentation:

2016 revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP)

Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR)

Staff report on the subject of Board Order #160413-01, District Rule 433 and the 2016 SIP prepared for the Great Basin Unified Air Pollution Control District Governing Board

Project Files May Be Reviewed at:
Great Basin Unified Air Pollution Control District
157 Short Street, Bishop, California 93514
(760) 872-8211

RESOLUTION NO. 2016-03

Exhibit A - Findings of Fact Relating to:

District Board Order #160413-01, District Rule 433 and 2016 Revision to the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan

Contents

A. Findings of fact under the provisions of California Health & Safety Code §42316(a)

Section 42316(a) of the California Health and Safety Code provides the authority for the Great Basin Air Pollution Control District to "require the City of Los Angeles to undertake reasonable measures, including studies, to mitigate the air quality impacts of its activities in the production, diversion, storage, or conveyance of water and may require the City to pay, on an annual basis, reasonable fees, based on an estimate of the actual costs to the district of its activities associated with the development of the mitigation measures and related air quality analysis with respect to those activities of the City. The mitigation measures shall not affect the right of the City to produce, divert, store, or convey water and, except for studies and monitoring activities, the mitigation measures may only be required or amended on the basis of substantial evidence establishing that water production, diversion, storage, or conveyance by the City causes or contributes to violations of state or federal ambient air quality standards."

On the basis of substantial evidence in the record, and for the reasons set forth in the staff report prepared for the Governing Board's April 13, 2016 hearing for adoption and approval of (1) proposed District Board Order #160413-01 authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain dust control measures on the Owens Lake bed (2016 SIP Order), (2) a proposed District Rule 433 (Control of Particulate Emissions at Owens Lake), and (3) a proposed final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively Board Actions), which is hereby incorporated herein by reference, the Governing Board of the Great Basin Unified Air Pollution Control District (Governing Board) makes the following findings:

1. The Governing Board finds that there are violations of the state and federal ambient air quality standards for PM_{10} in the Owens Valley PM_{10} Planning Area.

2. The Governing Board finds that the dried bed of the Owens Lake causes and is the primary contributor to the violations of the state and federal ambient air quality standards for PM_{10} in the Owens Valley PM_{10} Planning Area.

3. The Governing Board finds that the City's water diversions in the Owens Valley have uncovered essentially all of the dust source areas on the dried bed of Owens Lake, thus causing and contributing to violations of the state and federal ambient air quality standards for PM_{10} in the Owens Valley PM_{10} Planning Area.

4. The Governing Board finds that the dust control measures (DCMs) known as Shallow Flooding, Managed Vegetation, and Gravel Blanket, as required and permitted by the Board Actions, have been approved by the U.S. Environmental Protection Agency as Best Available Control Measures (BACM) for the control of PM_{10} emissions from the dried bed of Owens Lake.

5. The Governing Board finds that the DCMs known as Shallow Flooding, Managed Vegetation, and Gravel Blanket, as required and permitted by the Board Actions, are reasonable and proven control measures for controlling PM_{10} emissions from the dried bed of Owens Lake.

6. The Governing Board finds that the DCMs known as Shallow Flooding, Managed Vegetation, and Gravel Blanket, as required and permitted by the Board Actions, will be effective in mitigating the air quality impacts caused by the City of Los Angeles' water diversions.

7. The Governing Board finds that the alternative DCM known as Tillage with BACM Backup is proposed as a reasonable and effective control strategy in the Board Actions.

8. The Governing Board finds that the DCMs and all their associated requirements contained in the Board Actions do not affect the right of the City to produce, divert, store or convey water.

9. The Governing Board finds the DCMs required and provided for by the Board Actions can be completed by the milestones and deadlines set forth in the Board Actions.

10. The Governing Board finds that the time period for implementation contained in the Board Actions is a reasonable period to complete the implementation of the DCMs.

11. The Governing Board finds that the contingency measures contained in the Board Actions are reasonable and adequate to ensure the Owens Valley PM_{10} Planning Area attains the federal PM_{10} ambient air quality standard as expeditiously as practicable.

12. The Governing Board finds that there are reasonable and valid mechanisms in place that allow the District to enforce compliance with the requirements contained in the Board Actions.

13. The Governing Board finds that California Health & Safety Code Section 42316(a) provides the District with the authority and resources necessary to insure compliance with the requirements set forth in the Board Actions.

14. The Governing Board finds that the 2016 SIP Order consists of the 2008 SIP Order and the relevant provisions of the Stipulated Judgment entered on December 30, 2014 in the case captioned *City of Los Angeles v. California Air Resources Board, et al*., Case No. 34-2013-80001451-CU-WM-GDS (Stipulated Judgment), and that the Board Actions are consistent with the Stipulated Judgment.

15. The Governing Board makes each and every of the above findings on the basis of substantial evidence in the record. The District is the custodian of the materials that constitute the record of proceedings upon which the decision to approved the Proposed Project is based. These materials are located at the District's offices at 157 Short Street, Bishop, California 93514.

B. <u>Findings of fact regarding the approval and adoption of the Board Actions</u>

16. Based upon the fact that the Owens Valley PM_{10} Planning Area (Owens Valley) has been designated a serious non-attainment area by the USEPA, and that the Owens Valley is required by the Clean Air Act Amendments of 1990 to attain the PM_{10} 24-hour standard as expeditiously and practicable, the GBUAPCD Governing Board finds that the approval and adoption of the Board Actions is necessary.

17. Based upon the fact that California Health and Safety Code Section 42316(a) allows the District to require the City of Los Angeles to undertake reasonable measures to mitigate the air quality impacts of the City's water-gathering activities, the Governing Board finds that the District has the authority to adopt the Board Actions, including the adoption and issuance of District Board Order #160413-01.

18. Based upon public comment on the Plan, the Governing Board finds that the Board Actions and each element of those actions are written clearly so that they can be easily understood by the persons affected.

19. Based upon an examination of the legal and regulatory history of the Owens Valley PM_{10} Planning Area, and the above findings on the compatibility of the Plan and Order with Health and Safety Code Section 42316, the Governing Board finds that the Board Actions are consistent with existing statutes, court decisions, and state and federal regulations.

20. Based upon the fact that state law delegates to the District the responsibility for control of stationary sources of air pollution, the Governing Board finds that the Board Actions do not duplicate existing state or federal regulations.

21. The Governing Board references the Clean Air Act Amendments of 1990 and State of California Health and Safety Code Section 42316 as the laws that the District implements through the Board Actions.

22. The Governing Board finds that reasonable notice of the Governing Board's intention to hold a public hearing to approve and adopt the Board Actions was given in compliance with the provisions of Title 40 of the Code of Federal Regulations, Section 51.102.

23. The Governing Board finds that notice of the public hearing to approve and adopt the Board Actions was published in the following newspapers more than 30 days in advance of the hearing: the *Inyo Register* (Inyo County), the *Review Herald* (Mono County) and the *Tahoe Daily Tribune* (for Alpine County).

24. The Governing Board finds that the Board Actions were available for public inspection at the District's office in Bishop, California at least 30 days in advance of the public hearing to approve and adopt those actions.

25. The Governing Board finds that the Executive Officer of the California Air Resources Board was given notice of the public hearing and a copy of the Board Actions at least 30 days in advance of the hearing.

26. The Governing Board finds that the Administrator of the U.S. Environmental Protection Agency (through the Regional Administrator) was given notice of the public hearing and a copy of the Board Actions at least 30 days in advance of the hearing.

27. The Governing Board finds that the adjacent Kern County Air Pollution Control District was given notice of the public hearing and a copy of the Board Actions at least 30 days in advance of the hearing.

28. The Governing Board finds that the City of Los Angeles was given notice of the public hearing and a copy of the Board Actions at least 30 days in advance of the hearing.

29. The Governing Board finds that for the reasons and based on the facts set forth in Resolution 2016-02, that it has considered the environmental effects of the Board Actions as a Responsible Agency under the California Environmental Quality Act (CEQA).

30. The Governing Board makes each and every of the findings in this Exhibit on the basis of substantial evidence in the record. The District is the custodian of the materials that constitute the record of proceedings upon which the decision to approve the Board Actions is based. These materials are located at the District's offices at 157 Short Street, Bishop, California 93514.

C. <u>Finding of fact regarding the Final Subsequent Environmental Impact Report prepared for the 2008 SIP (State Clearinghouse No. 2007021127)</u>

The action authorized and required by the Board Actions is a "project" as defined by the California Environmental Quality Act (CEQA) (Public Resources Code §21000 *et. seq.)*. The City is the lead agency for the project. The District is the responsible agency.

On July 2, 1997, the Governing Board of the Great Basin Unified Air Pollution Control District (Governing Board) adopted and certified the Final Environmental Impact Report (1997 EIR) for the 1997 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order (1997 SIP) concurrently with the adoption of that 1997 SIP. The 1997 SIP was revised when the Governing Board adopted the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order on November 16, 1998 (1998 SIP). The Governing Board, concurrently with the 1998 SIP adoption, certified an addendum to the 1997 EIR entitled Addendum No. 1 to the Final Environmental Impact Report for the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order (1998 EIR). The 1998 SIP was revised when the Governing Board adopted the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order on November 13, 2003 (2003 SIP). The Governing Board, concurrently with the 2003 SIP adoption, certified the 2003 EIR entitled Final Environmental Impact Report for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan and Incorporated Board Order (2003 EIR).

For consideration of the revisions contained in the 2008 SIP, the District prepared a 2008 Final Subsequent Environmental Impact Report for the 2008 SIP. Pursuant to the requirements of CEQA, the 2008 FSEIR described the 2008 SIP (also referred to herein as the 'Proposed Project') and affected environment; it identifies, analyzes and evaluates the potential significant environmental impacts that may result from the Proposed Project; it identifies measures to mitigate adverse environmental impacts; and it identifies and compares the merits of project alternatives.

in 2011, a dispute arose between the GBUAPCD and the City regarding the requirements of the 2008 SIP, which were resolved when the Sacramento Superior Court entered a Stipulated Judgment for the GBUAPCD on December 30, 2014 in the case captioned *City of Los Angeles v. California Air Resources Board*, *et al*., Case No. 34-2013-80001451-CU-WM-GDS (Stipulated Judgment).

Under the Stipulated Judgment, the City served as Lead Agency to prepare and certify the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) for the dust control project required by the Board Actions; and filed a Notice of Determination for the project on June 8, 2015

The City's EIR covers the actions required by the Board Actions, requiring the Los Angeles Department of Water and Power (LADWP) to install Best Available Control Measures (BACM) to mitigate dust on areas known as Phase 9/10. The Phase 9/10 Project (Project) consists of seventeen separate and discrete Dust Control Areas (DCAs): Duck Pond-L1, C2-L1, T10-1-L1, T17-2-L1, T21-L1, T21-L2, T37-2-L4, T37-2-L3, T37-2-L2, T37-2-L1,T35-2-L1, T37-1-L1, T32-1-L1, Duck Pond-L2, T10-3-L1, T21-L3, T21-L4, as well as 1.82 sq miles of Transition Areas that currently contain DCMs, but will be transitioned to less water-intensive methods (Transition Area). Other areas that may be the subject of contingency measures. Project as proposed in the Draft Environmental Impact Report (EIR) will expand the existing system of DCMs on Owens Lake by construction and operation of an additional 3.61 sq miles of dust control in seventeen DCAs, as identified above, and 1.82 sq miles of Transition Area dust controls in one existing DCA. Installation of BACM on Project DCAs and Transition Area entails ground disturbing activities such as grading, dirt moving, boring, trenching and road, berm, pipeline and other construction.

The City prepared a Draft EIR which analyzed the potential environmental impacts associated with the construction and operation of the proposed Project and sets forth the applicable facts supporting the Board's findings. Significant impacts were identified for cultural resources for the originally proposed Project that could not be mitigated to less than significant levels. All other impacts including air quality, biological resources, and transportation, were found to be less than significant as mitigated. Based on the analysis presented in the Draft EIR and public comments received, the Avoidance Alternative has been identified as the environmentally superior alternative. The Avoidance Alternative avoids significant impacts to cultural resources. Mitigation measures have been identified to reduce all other impacts to less than significant levels.

The City also developed a Mitigation Monitoring and Reporting Program to ensure implementation of the mitigation measures for the Environmentally Superior Alternative outlined in the Draft EIR for Project. The Mitigation Monitoring and Reporting Program has been prepared by LADWP as the lead agency for Project under CEQA, in conformance with Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097. Adoption of a Mitigation Monitoring and Reporting Program is required for projects in which the lead agency has required changes or adopted mitigation to avoid significant environmental effects. LADWP shall have primary responsibility for administrating the Mitigation Monitoring and Reporting Program activities to staff, consultants, or contractors. LADWP has the responsibility of ensuring that monitoring is documented through periodic reports and that deficiencies are promptly corrected. LADWP's designated environmental monitor will track and document compliance with mitigation measures, note any problems that may result, and take appropriate action to remedy problems. Specific responsibilities of LADWP include coordination of all mitigation monitoring activities, management of the preparation, approval, and filing of monitoring or permit compliance reports, maintenance of records concerning the status of all approved mitigation measures, and coordination with other agencies.

The City concluded that its EIR identifies impacts that are potentially significant unless mitigation is incorporated, and proposes mitigation measures and a program for implementation, over which LADWP will maintain oversight and act as monitoring agent. The City found that with the implementation of the above noted mitigation measures for the environmentally superior alternative, potential impacts to cultural resources, air quality, biological resources, and transportation will be less than significant.

The CEQA Guidelines require the District Governing Board, with the District as a responsible agency, to consider the information in the City EIR along with other information that may be presented to the District when deciding whether to approve the Proposed Project. The EIR sets forth the information to be considered in the Governing Board's evaluation of benefits and potential impacts to the environment resulting from the implementation of the Board Actions. The Governing Board has reviewed and considered the information in EIR and applied its independent judgment and analysis to consider that information in taking the Board Actions. The Governing Board concurs with the City's analysis, findings and conclusions, and specifically that:

- Changes or alterations have been required in, or incorporated into, the project that avoid or substantially lessen the significant environmental effects as identified in the EIR.
- The mitigation measures identified in the Final Subsequent EIR are feasible and will be required as conditions of approval.
- All significant effects on the environment due to the project have been eliminated or substantially lessened where feasible.
- Changes or alterations have been required in, or incorporated into the project which mitigate or avoid many of the significant environmental effects thereof as identified in the EIR.
- There is no new information, changes in the project or changes in circumstances or conditions since the preparation and certification of the EIR that would require further revision or addendum to the EIR, or that would require further environmental review before taking the Board Actions

Further findings by the Governing Board are contained in Resolution 2016-02 and which are incorporated and made part of these findings by reference.

Notice of Determination

To: ☒ Office of Planning and Research

For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street, Room 121
Sacramento, CA 95814

☒ County Clerk
County of Inyo
P.O. Drawer F
Independence, CA 93526

From:
(Public Agency)
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514

Contact: Phillip L. Kiddoo, Air Pollution Control Officer
Phone: (760) 872-8211

Subject: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Great Basin Unified Air Pollution Control District Board Order #160413-01 authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain additional dust control measures on the Owens Lake bed
Project Title

	Mr. Phillip L. Kiddoo	(760) 872-8211
State Clearinghouse Number (If submitted to Clearinghouse)	**Lead Agency Contact Person**	**Area Code / Telephone/Extension**

Owens Lake (bounded by S.H. 136, S.H. 190, and U.S. 395), Inyo County, CA
Project Location (include county)

2016 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

Land Use / Zoning / General Plan Designations:
The dry Owens Lake is primarily owned and operated in trust for the people of the State of California by the California State Lands Commission. Although it is not subject to local regulatory authority by Inyo County (County), the County's General Plan recognizes the location of state-owned and federally owned lands at Owens Lake. The Land Use element of the Inyo County General Plan designates the project area as Natural Resources and State and Federal Lands. This land use designation "is applied to land or water areas that are essentially unimproved and planned to remain open in character, [and] provides for the preservation of natural resources, the managed production of resources, and recreational uses." The Inyo County Zoning Ordinance designates the project area as predominantly OS-40: Open Space Zone, 40-acre minimum lot size.

Project Description:
On April 13, 2016, the Governing Board of the Great Basin Unified Air Pollution Control District (GBUAPCD) adopted and issued (1) District Board Order #160413-01 authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain additional dust control measures on the Owens Lake bed, (2) District Rule 433 (Control of Particulate Emissions at Owens Lake), and (3) the final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively "Board Actions"). The Board Actions include orders and requirements for the City to construct and operate additional dust

control measures (DCMs) on the dry Owens Lake bed at the southern end of Owens Valley in Inyo County, eastern-central California. The project is located approximately 5 miles south of the community of Lone Pine and approximately 61 miles south of the City of Bishop. The primary goal of the project is to continue to reduce dust emissions from the dry Owens Lake bed by implementing all Owens Lake bed fine particulate matter (PM_{10}) control measures to achieve the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The project is analyzed in detail in the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power.

The project site is not identified on a list of hazardous materials sites compiled pursuant to California Government Code Section 65962.5 (Cortese List). No hazardous material sites are located within 1 mile of the project site.

This is to advise that the **Great Basin Unified Air Pollution Control District** has approved the above
☐ Lead Agency ☒ Responsible Agency

described project on **April 13, 2016** and has made the following determinations regarding the above described project:

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
5. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the Final EIR, with comments and responses and record of project approval, is available to the general public at: Great Basin Unified Air Pollution Control District, 157 Short Street, Bishop, CA 93514.

	April 13, 2016	Air Pollution Control Officer
Signature (Public Agency)	*Date*	*Title*

Date received for filing at OPR: ______________________________

Revised 2005

Notice of Determination

To: ☒ Office of Planning and Research

For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street, Room 121
Sacramento, CA 95814

☒ County Clerk
County of Inyo
P.O. Drawer F
Independence, CA 93526

From:
(Public Agency)
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514

Contact: Phillip L. Kiddoo, Air Pollution Control Officer
Phone: (760) 872-8211

Subject: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Great Basin Unified Air Pollution Control District Rule 433 (Control of Particulate Emissions at Owens Lake)
Project Title

	Mr. Phillip L. Kiddoo	(760) 872-8211
State Clearinghouse Number (If submitted to Clearinghouse)	**Lead Agency Contact Person**	**Area Code / Telephone/Extension**

Owens Lake (bounded by S.H. 136, S.H. 190, and U.S. 395), Inyo County, CA
Project Location (include county)

2016 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

Land Use / Zoning / General Plan Designations:
The dry Owens Lake is primarily owned and operated in trust for the people of the State of California by the California State Lands Commission. Although it is not subject to local regulatory authority by Inyo County (County), the County's General Plan recognizes the location of state-owned and federally owned lands at Owens Lake. The Land Use element of the Inyo County General Plan designates the project area as Natural Resources and State and Federal Lands. This land use designation "is applied to land or water areas that are essentially unimproved and planned to remain open in character, [and] provides for the preservation of natural resources, the managed production of resources, and recreational uses." The Inyo County Zoning Ordinance designates the project area as predominantly OS-40: Open Space Zone, 40-acre minimum lot size.

Project Description:
On April 13, 2016, the Governing Board of the Great Basin Unified Air Pollution Control District (GBUAPCD) adopted and issued (1) District Board Order #160413-01 authorized by California Health & Safety Code Section 42316 for the City of Los Angeles (City) to install, operate and maintain additional dust control measures on the Owens Lake bed, (2) District Rule 433 (Control of Particulate Emissions at Owens Lake), and (3) the final 2016 revision to the previously-adopted Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2016 SIP) (collectively "Board Actions"). The Board Actions include orders and requirements for the City to construct and operate additional dust control measures (DCMs) on the dry Owens Lake bed at the southern end of Owens Valley in Inyo

County, eastern-central California. The project is located approximately 5 miles south of the community of Lone Pine and approximately 61 miles south of the City of Bishop. The primary goal of the project is to continue to reduce dust emissions from the dry Owens Lake bed by implementing all Owens Lake bed fine particulate matter (PM_{10}) control measures to achieve the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The project is analyzed in detail in the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power.

The project site is not identified on a list of hazardous materials sites compiled pursuant to California Government Code Section 65962.5 (Cortese List). No hazardous material sites are located within 1 mile of the project site.

This is to advise that the **Great Basin Unified Air Pollution Control District** has approved the above
☐ Lead Agency ☒ Responsible Agency

described project on **April 13, 2016** and has made the following determinations regarding the above described project:

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
5. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the Final EIR, with comments and responses and record of project approval, is available to the general public at: Great Basin Unified Air Pollution Control District, 157 Short Street, Bishop, CA 93514.

	April 13, 2016	Air Pollution Control Officer
Signature (Public Agency)	*Date*	*Title*

Date received for filing at OPR: ______________________________

Revised 2005

Notice of Determination

To: ☒ Office of Planning and Research

For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street, Room 121
Sacramento, CA 95814

☒ County Clerk
County of Inyo
P.O. Drawer F
Independence, CA 93526

From:
(Public Agency)
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514

Contact: Phillip L. Kiddoo, Air Pollution Control Officer
Phone: (760) 872-8211

Subject: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

2016 Revision to Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

Project Title

	Mr. Phillip L. Kiddoo	(760) 872-8211
State Clearinghouse Number (If submitted to Clearinghouse)	**Lead Agency Contact Person**	**Area Code / Telephone/Extension**

Owens Lake (bounded by S.H. 136, S.H. 190, and U.S. 395), Inyo County, CA

Project Location (include county)

2016 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

Land Use / Zoning / General Plan Designations:
The dry Owens Lake is primarily owned and operated in trust for the people of the State of California by the California State Lands Commission. Although it is not subject to local regulatory authority by Inyo County (County), the County's General Plan recognizes the location of state-owned and federally owned lands at Owens Lake. The Land Use element of the Inyo County General Plan designates the project area as Natural Resources and State and Federal Lands. This land use designation "is applied to land or water areas that are essentially unimproved and planned to remain open in character, [and] provides for the preservation of natural resources, the managed production of resources, and recreational uses." The Inyo County Zoning Ordinance designates the project area as predominantly OS-40: Open Space Zone, 40-acre minimum lot size.

Project Description:
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County, eastern-central California. The project is located approximately 5 miles south of the community of Lone Pine and approximately 61 miles south of the City of Bishop. The primary goal of the project is to continue to reduce dust emissions from the dry Owens Lake bed by implementing all Owens Lake bed fine particulate matter (PM_{10}) control measures to achieve the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The project is analyzed in detail in the Environmental Impact Report for the Owens Lake Dust Mitigation Program – Phase 9/10 Project (May 2015) (EIR) prepared by the City of Los Angeles Department of Water and Power.

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______________________	April 13, 2016	Air Pollution Control Officer
Signature (Public Agency)	*Date*	*Title*

Date received for filing at OPR: ______________________

Revised 2005

APPENDIX I-1
2006 SETTLEMENT AGREEMENT

(AVAILABLE ON ENCLOSED DISC)

APPENDIX II-1
2014 STIPULATED JUDGMENT

(AVAILABLE ON ENCLOSED DISC)

APPENDIX III-1
PM_{10} NAAQS EXCEEDANCES (2012-2014)

(AVAILABLE ON ENCLOSED DISC)

APPENDIX III-2
TRENDS IN PM_{10} LEVELS AT OWENS LAKE (MARCH 11, 2015)

(AVAILABLE ON ENCLOSED DISC)

APPENDIX IV-1
2016 SIP INVENTORY

(AVAILABLE ON ENCLOSED DISC)

APPENDIX V-1
OVPA 2016 SIP BACM ASSESSMENT

(AVAILABLE ON ENCLOSED DISC)

APPENDIX VI-1
2016 DESCRIPTION OF MANAGED VEGETATION FOR PM_{10} CONTROL ON OWENS LAKE

(AVAILABLE ON ENCLOSED DISC)

APPENDIX VI-2
OWENS LAKE DUST MITIGATION PROGRAM PHASE 9/10 PROJECT FINAL ENVIRONMENTAL IMPACT REPORT (MAY 2015)

(AVAILABLE ON ENCLOSED DISC)

APPENDIX VII-1
AIR QUALITY MODELING REPORT

(AVAILABLE ON ENCLOSED DISC)

APPENDIX X-1
GBUAPCD PROPOSED RULE 433

(AVAILABLE ON ENCLOSED DISC)