

Great Basin Unified
Air Pollution Control District

2017
Annual Air Quality Monitoring Network Plan

Revised Draft

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Prepared by
Christopher Lanane
Air Monitoring Specialist

Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514
(760) 872-8211
(760) 872-6109 Fax
www.gbuapcd.org

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1.0 Introduction

An annual review of all national air quality monitoring networks is required by Federal regulations as a means to identify needs for addition, relocation, or termination of monitoring stations or instrumentation. The Annual Air Quality Monitoring Network Plan (AMNP) prepared by the California Air Resources Board (CARB), the primary quality assurance organization (PQAO) of which the Great Basin Unified Air Pollution Control District (District) is a part, includes the area encompassed by the District. As part of the ARB PQAO, the District operates under the ARB's EPA-approved Quality Assurance Program (QAP). With this monitoring plan, the District has sought to develop a more comprehensive and District-specific plan for submittal to the U.S. Environmental Protection Agency (EPA). This plan describes the network of ambient air quality monitors to be operated by the District during the 2017 calendar year. It includes a review of actions taken in the monitoring network during the 2016-2017 fiscal year and plans for actions in the years ahead. This draft plan addresses the requirements for an annual network plan as listed in the Code of Federal Regulations, Title 40, Part 58, Section 10 (40 CFR 58.10). These regulations require that the AMNP be submitted to the EPA by July 1 of each year after a 30-day public inspection period. The inspection period for this plan began on April 8, 2017, and closed on May 11, 2017, after which the plan, along with the comments received during the public inspection period, will be submitted to EPA for approval. Please note that all highlighted text indicates additions and/or revisions of the information contained in the 2016 AMNP.

The District staff, along with the CARB and EPA Region IX conducted a comprehensive review of the air monitoring stations throughout the District in 2007. State and Local Air Monitoring Station (SLAMS) designations, monitoring objectives, and spatial scales of representativeness were assigned to the criteria pollutants monitored by site. Each year, District staff conducts an annual review of the air monitoring network to evaluate whether the current monitoring strategies are meeting the needs of the District, to determine compliance with all current Federal and State regulations, and to aid in the development of future monitoring strategies. When monitoring station additions or relocations are warranted, site reports are written and/or updated locally and in the EPA's Air Quality System (AQS) database to document compliance with established monitoring criteria.

2.0 Public Comments

Pursuant to Federal regulations, this draft plan was made available for public inspection and comment for at least 30 days prior to submission to the EPA. Notice of availability of the document was published in local newspapers and the document was posted to the District's website (www.gbupcd.org) on April 8, 2017, under the link, "What's New." The public inspection period provides an opportunity for the public, the EPA, and any other interested parties to provide comments on the plan. Comments received during the inspection period will be included with the plan in the submission. Following the review period ending May 11, 2017, the plan will be submitted to EPA for approval of any SLAMS network changes.

3.0 Network Design

The District operates sixteen (16) active PM₁₀ monitoring stations, that include meteorological monitoring, and six (6) additional meteorology only, monitoring stations in four planning areas

and in the general environs of the District's three counties: Alpine, Inyo, and Mono. The planning areas in the District are: Coso Junction (formerly Searles Valley), Owens Valley, Mono Basin, and Mammoth Lakes. Figures 1 - 3 present maps of the entire District indicating the planning areas, the monitoring stations currently in operation, and those stations planned for installation this year. Note that three monitoring stations, North Beach, Mill Site, and Dirty Socks, were shut down due to the cancelation of leases in November 2012, by the Los Angeles Department of Water & Power, the land owner and the air polluter responsible for the dust emissions from Owens Lake. In the first quarter of 2014, a permit was granted by the California State Lands Commission for the new North Beach monitoring location. That station has been fully operational since August 2014. In November 2014 the lease dispute with the LADWP was resolved and the Dirty Socks and Mill Site monitoring stations were re-installed in their former locations. PM10 monitoring at these locations re-commenced in December 2014.

Table 1 provides a list of the monitoring stations, the pollutants measured at each station, the EPA Air Quality System (AQS, the EPA's national air quality data base) site codes, and the start date for each station. Table 2 presents the monitoring objective and spatial scale for each monitor at each site. A list of the monitoring objectives and a description of them is provided in this document. Portions of these monitoring objectives and their descriptions are adapted from the CARB annual network plan for 2016.

After consultation with the District Board and District monitoring specialists, the APCO determines monitoring locations in the District, as delegated by CARB. Monitoring locations are then added to or removed from the network monitoring plan that is assembled and presented annually to the public for inspection. This plan is then submitted to EPA for review and consideration for approval. The EPA Region IX administrator has the final authority on the configuration of the monitoring network.

Multiple purposes for monitoring a pollutant at a particular site are possible. There is some overlap between monitoring objectives as defined by EPA, presented in Table 2, and the monitoring purposes presented in Table 3. A brief description of the network for each criteria pollutant monitored is provided here. Further site-specific information is presented in the site reports presented in Appendix A.

The primary and basic objective of all of the District's ambient air quality monitors, including all SLAMS and SPMs, is to determine compliance with the national ambient air quality standards (NAAQS) for each pollutant and to aid the District in the development of emissions control strategies that protect the public health. Data from these monitors has and will continue to be used in the development of attainment plans for the two remaining nonattainment areas in the District, the Owens Valley Planning Area and the Mono Basin Planning Area, and in verifying compliance with the PM10 standard in the attainment areas, the Coso Junction Maintenance Area and the Mammoth Lakes Planning Area, within the District.

A secondary objective of the monitoring program is to provide air pollution data to the public in near-real-time through presentation of the data on the District's website. Additionally, these data are used to notify the public of unhealthy levels of particulate through the District's Dust Alert system. These notifications are received by any interested parties through e-mail or text message.

Figure 1. Great Basin Unified Air Pollution Control District Map

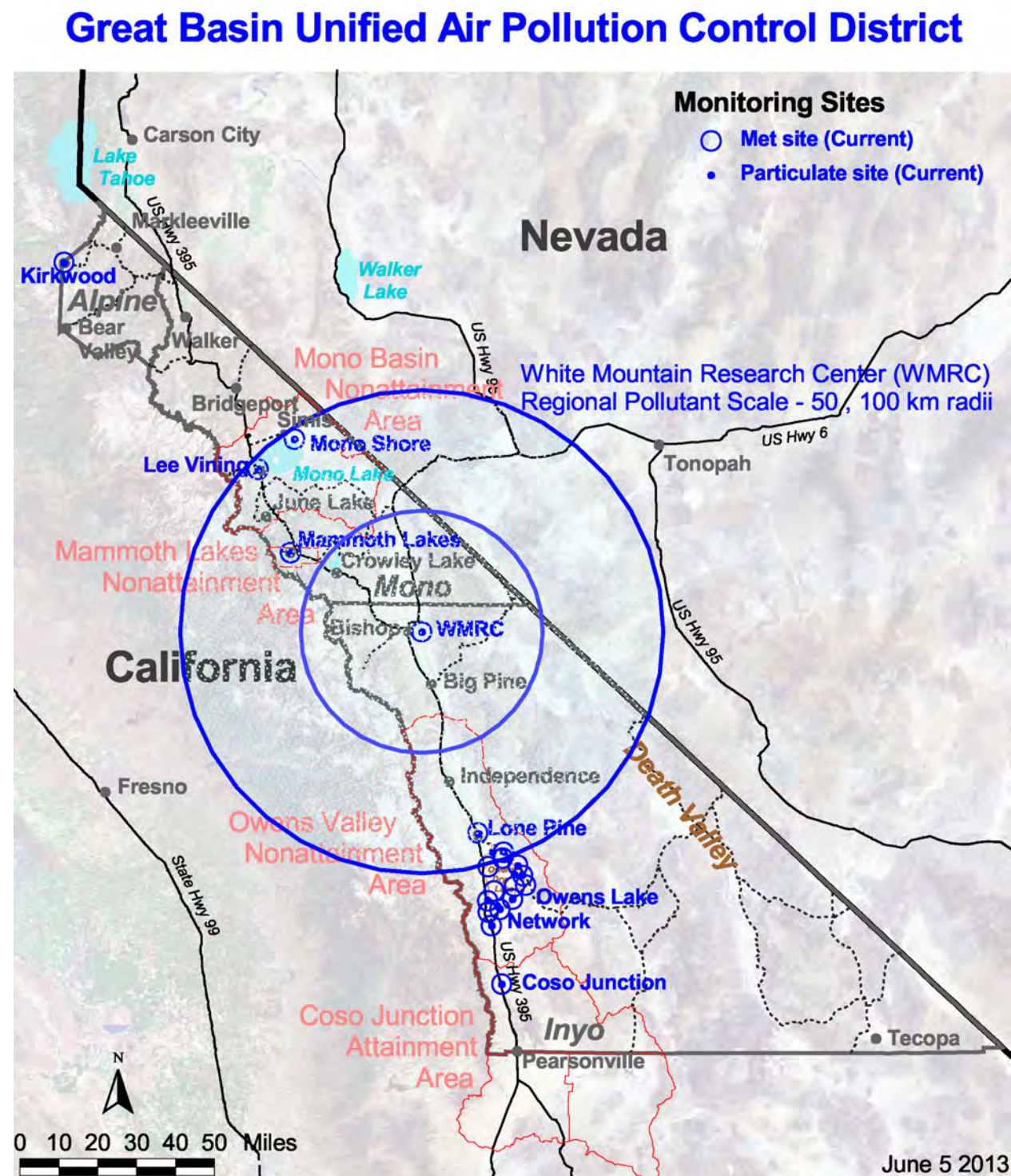


Figure 2. Great Basin Unified Air Pollution Control District Map, Owens Lake detail

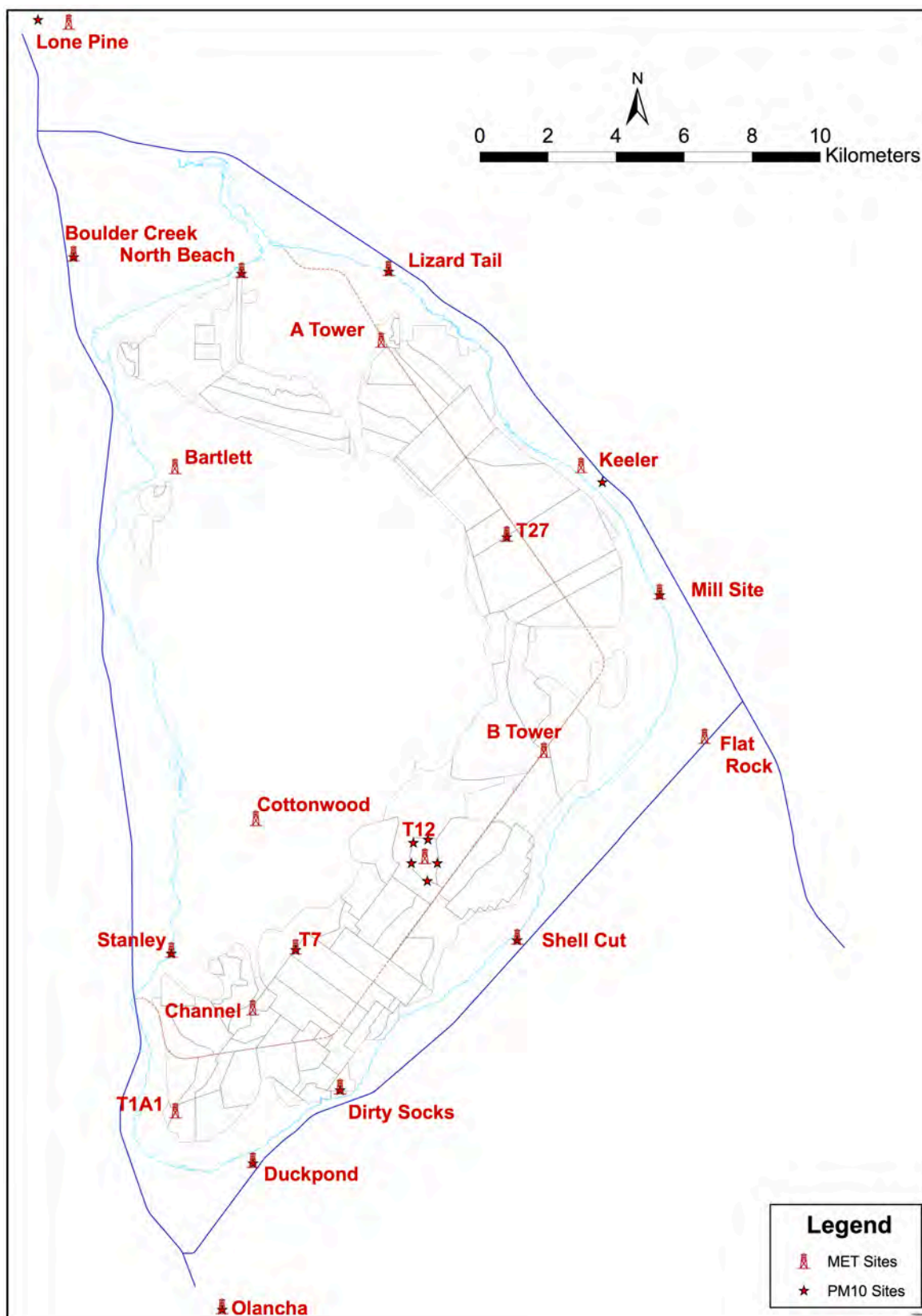


Figure 3. Great Basin Unified Air Pollution Control District Map, Mono Lake detail



Table 1. List of Monitoring Sites and Variables Monitored

Site Name	Network	AQS Number	Pollutants Monitored	Monitoring Frequency	Start Date
Dirty Socks *	Owens Lake	06-027-0022	PM10	Hourly	Jun-99
Shell Cut	Owens Lake	06-027-0025	PM10	Hourly	Jan-01
Flat Rock **	Owens Lake	06-027-0024	PM10	Hourly	Jan-01
Bill Stanley	Owens Lake	06-027-0026	PM10	Hourly	Mar-02
Olancho	Owens Lake	06-027-0021	PM10	Hourly	Aug-95
Lone Pine	Owens Lake	06-027-0004	PM10	Hourly	Jan-80
North Beach *	Owens Lake	06-027-0029	PM10	Hourly	Nov-08
Lizard Tail	Owens Lake	06-027-0028	PM10	Hourly	Feb-08
Keeler	Owens Lake	06-027-1003	PM10, PM2.5	Hourly	Jul-94
Mill Site *	Owens Lake	06-027-0030	PM10	Hourly	May-11
T-7	Owens Lake	SPM	PM10	Hourly	Jul-12
T-27	Owens Lake	SPM	PM10	Hourly	Aug-12
Coso Junction	Owens Lake	06-027-1001	PM10	Hourly	Mar-79
Mammoth Lakes	Mammoth Lakes	06-051-0001	PM10	Hourly	Apr-84
Lee Vining	Mono Basin	06-051-0005	PM10	1-in-3-day	Jan-81
Simis Residence †	Mono Basin	06-051-0007	PM10	1-in-3-day	May-82
Mono Shore	Mono Basin	06-051-0011	PM10	Hourly	Jan-00
White Mountain ††	District	06-027-0002	PM10	Hourly	Apr-06
NCORE	District	06-027-0002	CO, SO2, O3, NOy, PM10, PM2.5, PM10-2.5	Hourly	Jan-15

* Monitor restarted December 2014 after two-year hiatus due to lease cancellation by property owner.

** PM10 monitoring suspended at Flat Rock May 2011 when monitor was moved to Mill Site. Flat Rock now used for meteorological monitoring and video capture and PM monitor testing.

† PM10 monitoring suspended August 2008; meteorological monitoring suspended June 2011.

†† District's Portable 1 Monitoring Station berth, adjacent to District's NCORE station.

Table 2. Criteria Pollutant Monitoring Objectives and Spatial Scales

MONITORING OBJECTIVE/ SITE TYPE	SPATIAL SCALE
HC - Highest Concentration	MI - Microscale
PO - Population Exposure	MS - Middle Scale
SO – Source Oriented	NS - Neighborhood Scale
BK – General/Background	US - Urban Scale
RT - Regional Transport	RS – Regional Scale
WI – Welfare Related Impacts	NaS – National Scale
SPM - Special Purpose Monitor	GS – Global Scale
XD – Extreme Downwind	
UB – Upwind Background	
QA – Quality Assurance	
OT – Other	

Site Name	Network	PM10	PM2.5
Dirty Socks *	Owens Lake	HC-SO/NS	
Shell Cut	Owens Lake	SO/NS	
Flat Rock **	Owens Lake	SO/NS	
Bill Stanley	Owens Lake	SO/NS	
Olancho	Owens Lake	SO-PO/NS	
Lone Pine	Owens Lake	PO/NS	
North Beach *	Owens Lake	HC-SO/NS	
Lizard Tail	Owens Lake	HC-SO/NS	
Keeler	Owens Lake	PO/NS	PO/NS
Mill Site *	Owens Lake	PO/NS	
T-7 †	Owens Lake	HC-SO/NS	
T-27 †	Owens Lake	HC-SO/NS	
Coso Junction	Owens Lake	PO-RT/NS	
Mammoth Lakes	Mammoth Lakes	PO/NS	
Lee Vining	Mono Basin	PO/NS	
Simis Residence ††	Mono Basin	SO/NS	
Mono Shore	Mono Basin	HC-SO/NS	
White Mountain	District	BK/RS	BK/RS
NCORE	District	BK/RS	

* Monitor restarted December 2014: two-year hiatus due to lease cancellation.

** PM10 monitoring ended at Flat Rock May 2011. Station now used for meteorological monitoring, video capture and PM monitor testing.

† T-7 and T27 are special purpose monitors that began operation in July and August 2012, respectively.

†† PM10 monitoring suspended August 2008; meteorological monitoring June 2011.

Table 3. Criteria Pollutant Monitoring Purposes

MONITORING PURPOSE

BK - Background Level	RC - Representative Concentration
HC - High Concentration	SO - Source Impact
TP - Pollutant Transport	TR - Trend Analysis
EX - Population Exposure	CP - Site Comparison
SPM - Special Purpose Monitor	

Site Name	Network	PM10	PM2.5
Dirty Socks *	Owens Lake	RC/SO	
Shell Cut	Owens Lake	RC/SO	
Flat Rock **	Owens Lake	RC/SO	
Bill Stanley	Owens Lake	RC/SO	
Olancha	Owens Lake	RC/EX	
Lone Pine	Owens Lake	RC/EX	
North Beach	Owens Lake	RC/SO	
Lizard Tail	Owens Lake	RC/SO	
Keeler	Owens Lake	RC/EX	RC/EX
Mill Site *	Owens Lake	RC/SO	
T-7 †	Owens Lake	HC/SPM	
T-27 †	Owens Lake	HC/SPM	
Coso Junction	Owens Lake	RC/TP	
Mammoth Lakes	Mammoth Lakes	RC/EX	RC/EX
Lee Vining	Mono Basin	RC/EX	
Simis Residence ††	Mono Basin	RC/SO	
Mono Shore	Mono Basin	HC/SO	
White Mountain	District	RC/BK	
NCORE	District	RC/BK	

* Monitor restarted December 2014 after two-year hiatus due to lease cancellation by property owner.

** PM10 monitoring ended at Flat Rock May 2011. Station now used for meteorological monitoring, video capture and PM monitor testing.

† T-7 and T27 are special purpose monitors that began operation in July and August 2012, respectively.

†† PM10 monitoring suspended August 2008; meteorological monitoring June 2011.

Definitions

Air Pollution Control Officer (APCO) – the chief executive official for the District.

Background Level monitoring is used to determine general background levels of air pollutants.

Core-based Statistical Area (CBSA) is defined by the U.S. Office of Management and Budget as a statistical geographic entity consisting of the county or counties associated with at least one urbanized area/urban cluster of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration. The two categories of CBSAs are metropolitan statistical areas and micropolitan statistical areas.

Design Concentration is defined as the fourth highest concentration monitored during a specified period, e.g., one year.

Design Values are calculations based on the previous three years of monitoring data that provide estimates of the number of exceedances expected each year at a given site or in a given air basin. Design values greater than 1 per year for PM₁₀ indicate that an area is not in attainment, as the standard allows only one exceedance per year for an area to remain in attainment.

High Concentration monitoring is conducted at sites to find the highest concentration of an air pollutant in an area within a given monitoring network. A monitoring network may have multiple high concentration sites as a result of varying meteorology, source area variability, etc.

Metropolitan Statistical Area (MSA) is defined by the EPA and by the U.S. Office of Management and Budget as areas having at least one urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.

Micropolitan Statistical Area (MiSA) is defined by the U.S. Census Bureau and the U. S. Office of Management and Budget as an area having one urbanized area or urban cluster of between 10,000 and 50,000 population.

Monitoring Objectives are the measures for determining the level of pollutant impacts from particular sources at particular sites, i.e., to determine the highest concentrations (HC) affecting specific places from sources; the impact from a particular source or set of sources (SI) in a given area; the impact caused by concentrations affecting specific populations (PO), communities, etc.; background level (BK) concentrations measured upwind of sources or not impacted by sources; areas impacted by transport of pollution (PT) generated from distant sources; measuring impacts to visibility, plants, or other welfare affects (VI).

Monitoring Planning Area (MPA) is defined by the EPA as a contiguous geographic area with established, well-defined boundaries, such as a metropolitan statistical area,

county, or State, having a common area that is used for planning monitoring locations for PM_{2.5}. MPAs may cross political boundaries, e.g., State, County, etc. MPAs are generally oriented toward areas with populations greater than 200,000.

Nonattainment Area is any area that does not attain the standard for at least one of the pollutants for which there are National Ambient Air Quality Standards (NAAQS).

Pollutant Transport is the movement of pollutant(s) between air basins or areas within an air basin. Pollutant transport monitoring is used to assess and address sources from upwind areas when those transported pollutant(s) affect neighboring downwind areas. Transport monitoring can also be used to determine the extent of regional pollutant transport.

Population Exposure monitoring is conducted to represent the air pollutant concentrations to which a populated area is exposed.

Primary Quality Assurance Organization (PQAO), the organizational umbrella that ensures that those monitoring organizations under its purview ensure compliance with State and Federal air monitoring requirements. A PQAO is defined by five factors common to all monitoring organizations under its purview: common quality assurance organization; common team of field operators with similar training and procedures; common calibration facilities and standards; common field management, laboratory, or headquarter; common QAPP and/or SOPs.

Representative Concentration monitoring is conducted to determine pollutant concentrations over a homogeneous geographical area. These sites do not necessarily indicate the highest concentrations in an area for a particular pollutant.

Site Comparison monitoring is used to assess the effect of moving a monitoring location a short distance (approximately 2 miles or less) on measured pollutant levels. Some monitoring stations become unusable due to development, change of lease terms, eviction, etc. In these cases, attempts are made to conduct concurrent monitoring at both the old and new monitoring locations for a period of time in order to compare pollutant concentrations at both.

Source Impact monitoring is used to determine the impact of particular and significant sources of pollutant emissions on the air quality. Air pollutant sources may be stationary or mobile.

Spatial Scales define the concentrations within a given area that has relatively uniform land use and reasonably homogeneous geography. These scales are defined as follows:

Microscale - defines an area with dimensions ranging from several meters up to about 100 meters (several yards up to 100 yards).

Middle Scale - defines an area of up to several city blocks in size, with dimensions ranging from about 100 meters to 0.5 kilometers (100 yards to 1/3 mile)

Neighborhood Scale - defines an area with dimensions in the 0.5 to 4.0 kilometer range (1/3 mile to 2.5 miles). Most of the District's sites have been determined to be neighborhood scale sites.

Urban Scale - defines an area with dimensions on the order of 4 to 50 kilometers (2.5 miles to 30 miles).

Regional Scale - usually defines rural areas and extends from tens to hundreds of kilometers (or miles).

National and Global Scale - these measurement scales represent pollutant concentrations characterizing the nation and the globe as a whole.

Special Purpose Monitors are used for surveys to determine whether a permanent monitor need be installed. They are also used to determine whether an existing monitoring network provides sufficient coverage to an area for determining pollutant impacts to that area.

Tapered Element Oscillating Microbalance (TEOM) – a monitor that measures particulate mass by drawing air through a filter positioned atop a sintered glass tube vibrating at a measured frequency. The frequency of the oscillation of the tube is attenuated as the filter loads with particulate. This attenuation in frequency is inversely proportional to the mass of the particulate collected.

Trend Analysis monitoring is useful for comparing and analyzing air pollution concentrations over time. Trend analysis can show the progress or lack thereof in improving the air quality for a given area over a period of many years.

Monitored Pollutants and Meteorological Variables

PM₁₀

Medium-volume size-selective inlet filter-based PM₁₀ monitors (Rupprecht & Patashnick/Thermo Partisol Plus 2025) are or will be operated at four (4) sites. Monitoring at the sites is conducted on either the Federal one-in-three-day schedule or on a daily schedule for the primary monitors. At the Keeler station, a collocated Partisol is operated on the Federal 1-in-12 sampling schedule. Filter-based monitors typically measure integrated 24-hour-average PM concentrations.

Continuous PM₁₀ and PM_{2.5} monitors (Rupprecht & Patashnick TEOM 1400a AB monitors) are operated in conjunction with filter-based monitors at three of the four filter-based monitor sites. Continuous PM₁₀ monitors alone are operated at an additional 12 fixed sites with two additional continuous PM₁₀ monitors in portable stations. The advantage of continuous PM₁₀ monitors is that they are capable of measuring hourly pollutant concentrations. These continuous PM₁₀ monitors are concentrated in areas of high PM₁₀ impact: e.g. around the shoreline of Owens Lake, in the Town of Mammoth Lakes, at the site of maximum impact on the north shore of Mono Lake. Hourly resolution of PM₁₀ concentrations enables the District to more accurately determine the source of the emissions, especially in short-term wind-event driven emissive areas like Owens and Mono Lakes. The operation of all District PM₁₀ monitors, including SLAMS and SPMs, are conducted in accordance with the provisions of 40 CFR 58 Appendix A.

Since the District's monitoring program relies so heavily on continuous PM₁₀ monitors, the Keeler monitoring station hosts the collocated continuous PM₁₀ monitors as well as collocated filter-based PM₁₀ monitors. Collocation of continuous monitors serves to ensure that the hourly-resolved PM₁₀ data collected by the monitors is scientifically defensible, although such collocation is not required by the US EPA. Typical hourly average PM₁₀ concentration comparisons at the Keeler station range between 92 and 95% between the collocated continuous PM₁₀ monitors, calculated on an annual basis.

PM_{2.5}

The District operates one collocated PM_{2.5} monitoring station at the Keeler monitoring site. The collocated monitor is a medium volume filter-based Federal Equivalent Method (FEM) sampler (Rupprecht & Patashnick Partisol Plus 2025 with a very sharp-cut cyclone (VSCC) for PM_{2.5}, EQPM-0202-145). On July 1, 2013, the primary monitor changed from an R&P 2025 to a Rupprecht & Patashnick 1400a (AB) TEOM with an 8500C Filter Dynamics Measurement System (FDMS) unit configured for collection of PM_{2.5} particulate matter, at the request of the District's PQAO, the CARB. This TEOM/FDMS operates continuously, collecting hourly PM_{2.5} concentrations and the collocated monitor operates on the Federal 1-in-12-day schedule. It should be noted that, as the entire District's population is less than the minimum requirements (50,000) for a metropolitan statistical area under 40 CFR 58 Appendix D, Section 4.7, no additional PM_{2.5} monitoring locations are required. The Keeler site monitors the highest concentrations of PM₁₀ for a populated community in the District and state and local staff determined that the District's PM_{2.5} station should be located this site, which provides data for population-oriented representative PM_{2.5} particulate concentrations.

During 2013, the District's Mammoth Lakes monitoring station was severely impacted by smoke from forest fires to the north of the community. It was determined that, due to these impacts from wildfires and the desire to distinguish between road cinder impacts (PM₁₀), and domestic wood smoke impacts (PM_{2.5}) that the District should consider installing a continuous monitor capable of monitoring both PM₁₀ and PM_{2.5}. Staff had planned to install a Thermo 1405DF TEOM, certified as an EPA Equivalent method monitor for PM₁₀, PM_{2.5}, and PM₁₀-PM_{2.5} after comparison testing with other District PM monitors was completed in June 2015. The results of the comparison were not definitive, so District staff elected to continue the comparison study through 2016-2017, in two locations: the WMRC/NCore station, and the Keeler monitoring station.

At this point, the District's method for review of its PM_{2.5} monitoring network, currently consisting of two monitoring stations (one collocated station - Keeler), and for obtaining public comment on the network, is to be conducted along with the public inspection period for the annual air quality monitoring network plan.

Meteorology

The District operates meteorological sensors at nearly all permanent fixed monitoring stations. Meteorological variables measured include wind speed and wind direction. In addition, at some locations ambient temperature, relative humidity, barometric pressure, precipitation, and solar radiation are also monitored.

Network Description

Owens Lake

The Owens Lake monitoring network consists of a combination of twelve (12) ambient air monitoring stations: seven (7) stations ring the lake along the historic shoreline, one of which is a population-based station, located at Keeler; two other population-oriented sites are located in the communities of Lone Pine north of the lake and Olancho, south of the lake. An additional monitor is located 20 miles south of the lake at Coso Junction. This station is used for modeling of Owens Lake plume trajectories and is used to monitor local source impacts in the Coso Junction Maintenance Area. Each station utilizes an R&P TEOM continuous monitor for PM₁₀ measurements. Ten (10) of the ambient air monitoring stations in the Owens Lake network are designated as SLAMS sites.

The purpose of the monitoring stations that ring the lake (North Beach, Lizard Tail, Keeler, Mill Site, Shell Cut, Dirty Socks, Stanley), all of which are designated as SLAMS sites, is to measure the shoreline impacts of PM emissions from the Owens Lake bed. Additionally, the Keeler and Mill Site stations serve as population-oriented monitors, with the Keeler station being located in the community of Keeler, and the Mill Site station being located near the LADWP Keeler Facility, which is the reporting station for the LADWP employees that work on the Owens Lake project. The Lone Pine and Olancho stations to the north and south of the lake, respectively, serve to monitor the impacts of PM emissions on the populations in the communities of Lone Pine and Olancho. The Coso Junction station, located 20 miles south of Owens Lake serves two purposes: monitoring the transport of both local and wind-driven PM emissions from Owens Lake, and monitoring the impacts of those same emissions on the visitors, employees, and residents in the Coso Junction area.

Dust Identification Program

In addition to the ten SLAMS stations around the Owens Lake, the District operates two air quality stations on the lakebed: one at the locations designated T7 on the south end of the lake, and another, designated T27 toward the east central area of the lake; and four on-lake meteorological stations. T7 and T27 are special purpose monitors (SPMs) for PM₁₀ used to refine the model to aid in determining specific dust source areas requiring mitigation and are part of the District's Dust Identification Program. In addition, the program consists of a series of approximately 150 sand motion sensors (Sensits) and accompanying sand collection devices (Cox Sand Catchers (CSCs)) operated by the District as well as 140 Sensit/CSC sites operated by the City of Los Angeles. The network also utilizes dust observations made by District personnel during wind events and fourteen (14) camera stations with a total of 22 cameras collecting images of the lakebed every thirty seconds during daylight hours. This system coupled with the model and the SLAMS stations described above enables the District to pinpoint emissive areas of the lakebed that may cause or contribute to exceedances of the Federal PM₁₀ standard. A map detailing the locations of the monitoring sites used for the Dust ID program is presented in Figure 4.

Mammoth Lakes

The Mammoth Lakes monitoring network consists of one monitoring station located in the Town of Mammoth Lakes. This station utilizes an R&P TEOM 1400a(AB)/8500C FDMS for hourly-resolved PM₁₀ concentrations and an R&P 2025 Partisol Sequential Sampler operating on the

one-in-three-day schedule for the collection of 24-hour integrated PM₁₀ concentration data. The FDMS TEOM is not an EPA equivalent method monitor, but is necessary for the town to accurately measure and forecast woodsmoke-driven PM₁₀ events using hourly-resolved data. The District plans to upgrade the continuous monitor during 2017 to a newer generation EPA equivalent method continuous monitor that will measure hourly-resolved PM₁₀, PM_{2.5} and PM_{10-2.5} concentrations. This station is used by the District to determine compliance with the Federal PM₁₀ standard for this previously nonattainment community. The hourly resolved data allows Town personnel to forecast and determine "no-burn" days for wood-burning heater operators in order to maintain compliance with the Federal PM₁₀ standard. The purpose of the station is to monitor PM impacts on the resident and visitor populations of the Town. The Mammoth Lakes Planning Area was redesignated as attainment in October 2015.

NCORE

The District has also been asked by EPA to install and operate a rural NCore station. The purpose of the station is to monitor background concentrations of pollutants in an area that is not impacted directly by emissions generated in and around metropolitan areas. This station has been installed at the District's White Mountain Research Center monitoring site. The station was nominally operational January 1, 2013, and submission of valid data to AQS began January 1, 2015. Further details on the station are contained in Appendix B, which contains a standalone monitoring plan for the District's NCore station.

Mono Lake

The Mono Lake monitoring network consists of three monitoring stations: Lee Vining, Simis Ranch, and Mono Shore. The purpose of the Lee Vining station is to monitor the impacts of PM concentrations on the population in the community of Lee Vining. The purpose of the Simis and Mono Lake stations is to monitor the PM impacts on or near the shoreline of Mono Lake. Through August of 2008, PM₁₀ concentrations were collected using BGI PQ200 monitors located at Simis Ranch and Mono Shore. PM₁₀ concentrations at Lee Vining are collected using an R&P 2025 Partisol Sequential Sampler. The BGI monitors at Simis Ranch were removed and PM₁₀ monitoring suspended in 2008 due to the fact that no exceedances of the Federal PM₁₀ standard had been measured there since 1996, and a point-of-maximum-impact site, Mono Shore, being outfitted with a PM₁₀ monitor in 1999. The BGI monitors at Mono Shore were replaced in 2008 with an off-the-grid solar-powered R&P TEOM PM₁₀ continuous monitor. The TEOM provides hourly-resolved PM₁₀ concentrations and has provided the District with the opportunity to develop a Dust ID program at Mono Lake. This Dust ID network consists of twenty-seven (27) sites with CSCs. Ten (10) of those sites have collocated Sensits associated with them. This network is used to measure the mass of saltating particles to estimate sand flux rates across a 2km² area. The Mono Lake Dust ID network is presented in Figure 5.

Figure 4. Owens Lake Map: Dust Identification Program Detail

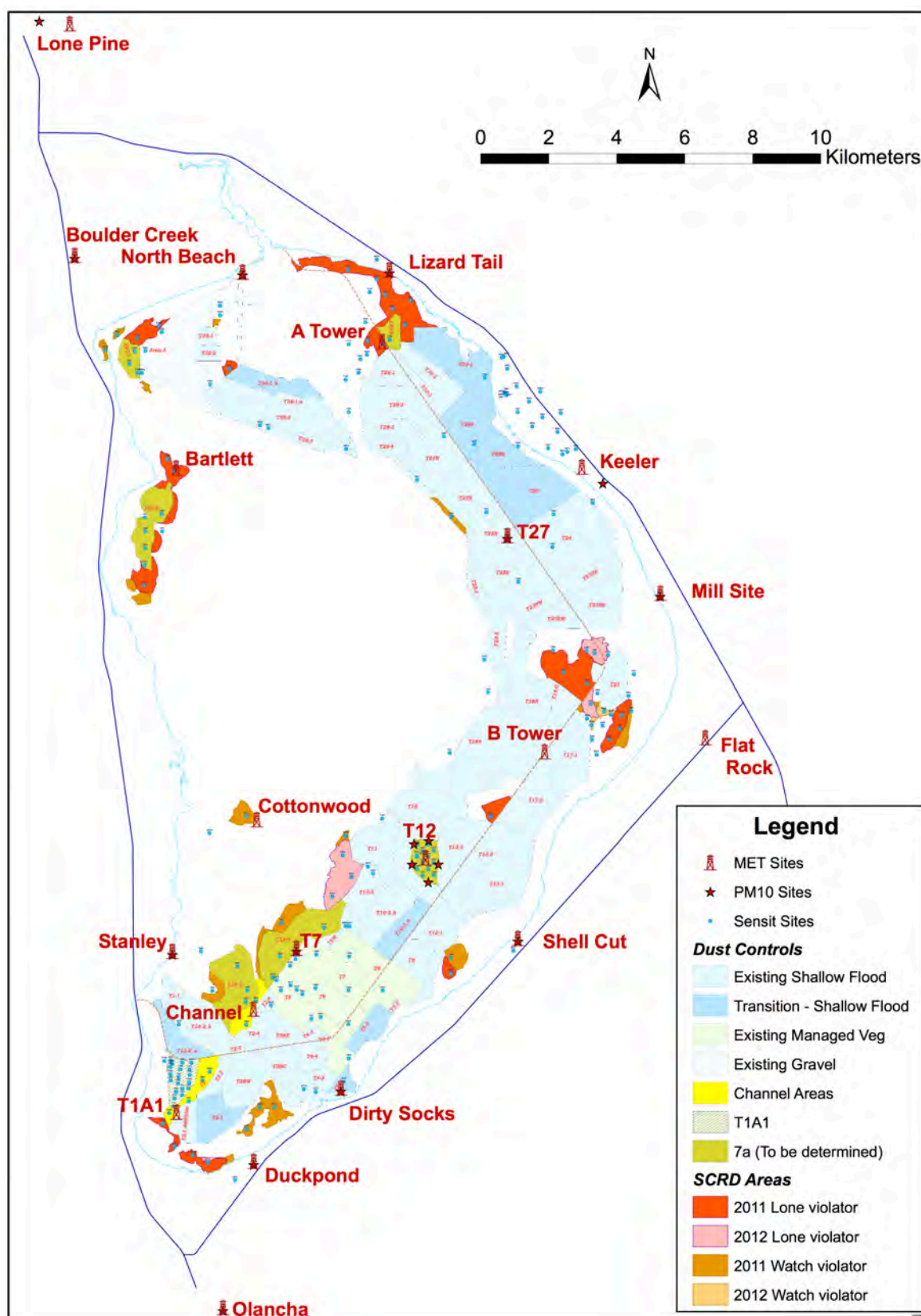
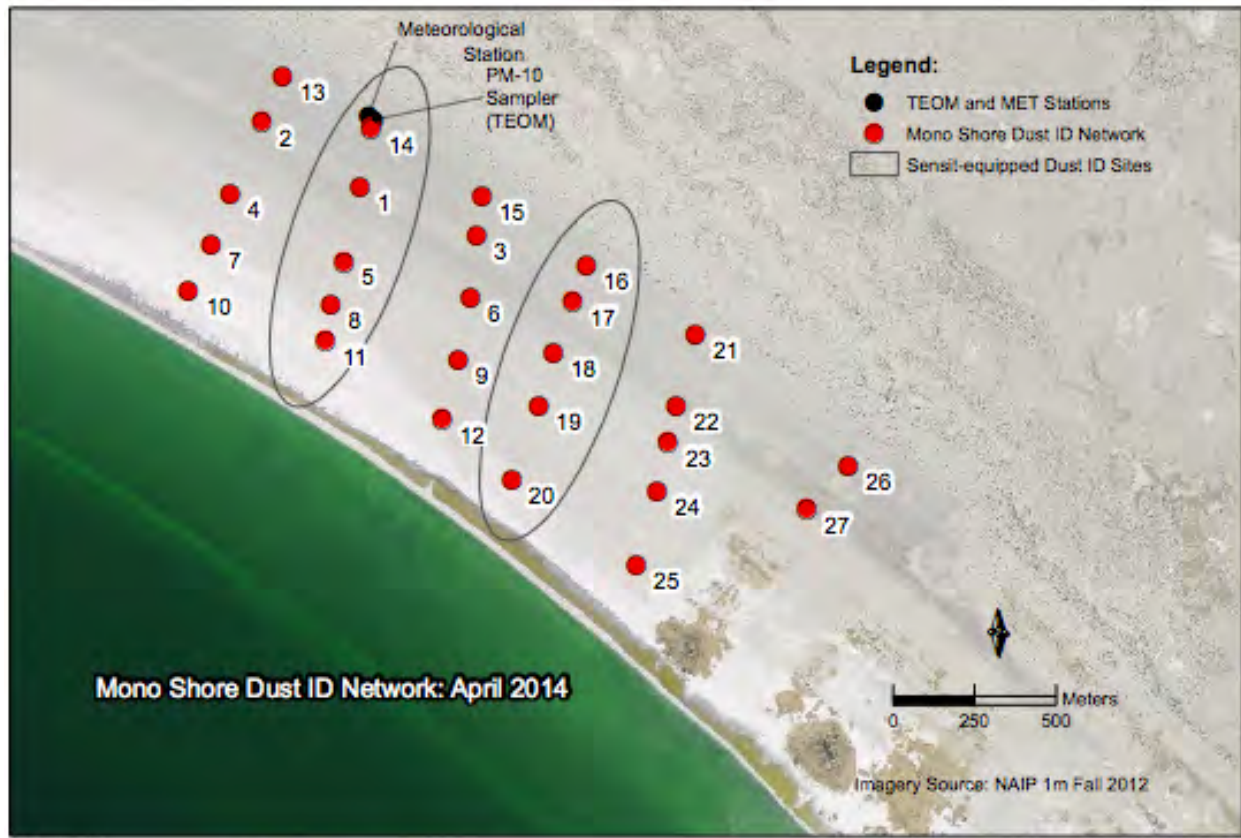


Figure 5. Mono Lake Map: Dust Identification Program Detail

4.0 Special Programs

The District periodically conducts special monitoring programs for rule compliance and pollutant level assessment. The data gathered are for informational purposes initially and may lead to designation of special purpose monitors, as defined under Title 40 CFR 58.20, or to permanent monitoring locations in the District's network, or to nothing beyond the initial purpose of information gathering. During the 2017 monitoring year, the District will continue conducting the special programs listed below.

Portable PM₁₀ Monitoring

Staff determined there was a need for small portable TEOM monitors that could be transported to monitoring locations and set up for short-term episode PM₁₀ monitoring. Staff has constructed two portable TEOM stations each of which utilizes a propane-fired generator for power. The stations can operate unattended for more than five days on two small tanks of propane. The stations have been successfully operated during several episodes on and around Owens Lake from February 2010 to 2015. These stations have been in operation at the Boulder Creek RV Park (on line power) and Duck Pond stations around Owens Lake from 2013 through early 2015. Subsequent to

that monitoring period, Portable 3 was moved to the northernmost residence in the community of Keeler in order to monitor impacts from the Keeler Dunes as the emissive areas of the Dunes are mitigated. Portable Station 2 was moved to the White Mountain Research Center site and collocated with a continuous PM_{2.5} monitor and with two continuous PM₁₀, PM_{2.5}, and PM_{10-2.5} monitors for a comparison study.

Special BACM Study – Owens Lake

A special purpose monitoring network of five (5) TEOM stations was installed by the LADWP's consultant for the purpose of measuring any potential emissions from the T12-1 Area during a test of a proposed Best Available Control Measure (BACM). The test was conducted from 2012 through mid-2015. The monitors were subsequently removed from the T12-1 area and distributed to other areas of the lakebed to monitor compliance of the newly applied BACM to other areas of the lakebed.

Wildfire Monitoring

Staff, prompted by the District Governing Board, procured two Met One eBAM continuous PM_{2.5} monitors configured as stand-alone portable off-grid monitors for measuring PM impacts from wildfires. The monitors were procured in August 2015 and were deployed to three wildfire incidents each in 2015 and 2016 to monitor PM_{2.5} impacts. Data from these monitors are collected via the AIRSIS satellite connection and are posted to the web. It is anticipated these monitors will aid the District by providing up-to-date local information on wildfire impacts to the residents and visitors in the District.

5.0 Recent or Proposed Modifications to Network

Owens Lake

Two on-lake PM₁₀ monitoring stations, designated T7 and T27, were installed in the Owens Lake Network in July and August 2012, respectively. Each of these stations consists of one TEOM 1400ab continuous PM₁₀ monitor in a temperature-controlled shelter and meteorological sensors for wind speed and direction at 4-meters above ground level. These monitors are operated in compliance with all Title 40 CFR Part 58, Appendices A, C, and E requirements, as are all District monitors. Data from these special purpose monitors (SPMs) are used to refine the modeling of PM₁₀ emissions from the remaining source areas on the lakebed and further refine the District's Dust Identification Program.

During May 2011, the PM₁₀ monitoring was suspended at the Flat Rock station and the monitor moved to the Mill Site. The Flat Rock station was being impacted by dust emitting areas between the station and the 3,600-foot regulatory shoreline. An analysis was conducted and District staff determined that source areas from the lakebed impacted Flat Rock infrequently and that the Shell Cut station would also typically monitor those lakebed source areas. The District had a critical need to fill a gap in the network on the east shore of the lake south of Keeler in order to measure lakebed emission impacts caused by winds from the west, thus the PM₁₀ monitor at Flat Rock was moved to the Mill Site location. (A formal site closure report/request will be submitted to EPA during 2015). Within the week after the commencement of PM₁₀

monitoring at the Mill Site location, the monitor measured an exceedance of the Federal PM₁₀ standard from lakebed sources driven by winds from the west.

In November 2012, the leases for the Dirty Socks, Mill, and North Beach monitoring stations were canceled by the owner, the Los Angeles Department of Water & Power. In the first quarter of 2014, a permit was granted by the CSLC for the new North Beach monitoring location. The station has been fully operational since August 2014. In November 2014 the lease dispute with the LADWP was resolved and the Dirty Socks and Mill Site monitoring stations were re-installed in their former locations. PM₁₀ monitoring at these locations re-commenced in December 2014.

Coso Junction

The Coso Junction monitoring station measures PM₁₀ from local sources impacting the Coso Junction Management Area, and serves as a transport monitoring site for windblown PM₁₀ from Owens Lake to the north. When the Area was designated, “in attainment,” in 2010, it was noted that the station could be affected by local sources around the monitoring station. In order to address this concern, monthly reports were produced for the first year of operation after the designation took place. During that period, the local sources were covered with gravel and/or cinders and the areas where vegetation had died off were watered and replanted with native plant species. Additionally, a camera was installed at the site to help with monitoring emissions from local sources. Collection of valid data resumed August 1, 2010, at the Coso Junction PM₁₀ monitoring station.

In July 2013 severe flash flooding occurred in the vicinity of the Coso Junction, which is near the center of the Rose Valley. The entire valley floor, including US. Highway 395 and the Gill Station Road, by which the Coso Junction station is accessed, were inundated with silts and soils from the Inyo Mountain range to the east. These silts and soils have been removed from the highway and from Gill Station Road, however, they remain on the valley floor. District staff has noted at least two occasions in 2013, as noted in the 2014 AMNP, and two occasions in 2014 (2/16/2014 and 4/25/2014) when west winds coming down the leeward side of the Sierra Nevada have kicked up these soils resulting in violations of the federal PM₁₀ standard at the monitoring station. Requests for consideration of these violations as exceptional events were submitted to EPA IX for consideration in April 2015. A map of the deposition areas (Figure 6) is presented below. EPA determined, in June 2016, that the events were of no regulatory significance at this time and deferred review of the exceptional events request.

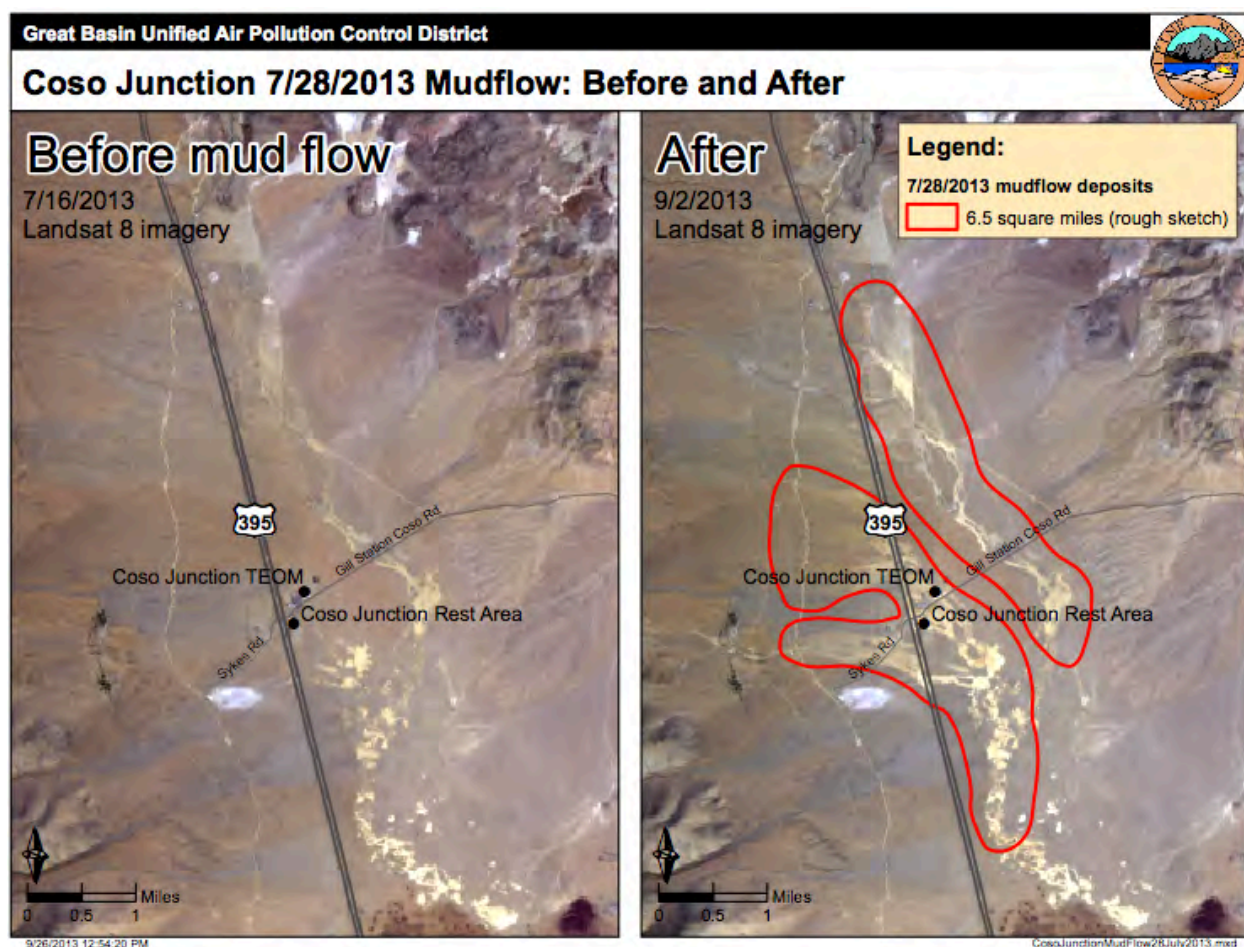


Figure 6. Coso Junction Silt Deposition Area

Mammoth Lakes

The venerable Rupperecht & Patashnick 1400a (AB) TEOM with the 8500c FDMS unit is scheduled to be replaced in 2017 ostensibly with a Teledyne-API T640X certified as an EPA-equivalent method continuous monitor for PM_{10} , $PM_{2.5}$, and $PM_{10-2.5}$. The replacement will take place after the new monitor has undergone comparison testing against the 1400a(AB)/8500c monitoring $PM_{2.5}$ and a 1400a(AB) unit monitoring PM_{10} at the District's WMRC monitoring station, if the results of the comparison are favorable. The testing has been extended through June 2017, during the dust season. The District will continue to operate the R&P 2025 Partisol Plus PM_{10} monitor in conjunction with the TAPI T640X on the 1-in-3-day schedule, **should the T640X be installed.**

Mono Lake

The District has operated monitoring stations in the Mono Basin area for approximately 18 years. Over the last year, District staff assessed the Mono Lake monitoring network and determined that some changes needed to be made. First, staff determined it was necessary to collect hourly-resolved PM_{10} data at the Mono Lake North Shore site, especially during the episodic dust storms at the Lake. Second, it was determined that staff needed to operate the network and utilize resources more efficiently.

In order to address the first determination, a continuous TEOM PM₁₀ monitor was installed in May 2008 at the Mono Lake North Shore site to facilitate the collection of hourly-resolved PM₁₀ data. An additional goal was set for the Mono Shore site to operate the continuous PM₁₀ monitor through the entire year, rather than seasonally as had been done with the filter-based monitors.

In addressing the second determination, staff noted that no PM₁₀ violations had been measured at the Simis Ranch site since August 31, 1996. The District had collected 12 years of data subsequent to that measured violation. As a result, the decision was made to suspend the collection of PM₁₀ data at the Simis Ranch site as of August 2008. Meteorological monitoring at the Simis Ranch site was suspended in July 2011.

The North Shore site is an off-the-grid station consisting of a large solar power array and battery system. In order to minimize power consumption, the TEOM PM₁₀ monitor is housed in a custom-designed Zomeworks Cool Cell. The Cool Cell regulates the temperature of the Cell housing the TEOM passively using a water radiator and reservoir system to regulate the Cell temperature. The continuous monitor and the seasonally (non-winter) operating filter-based medium volume PM₁₀ monitors (BGI PQ200) were operated side-by-side from May through August 2008 in order to provide comparison data between the two different monitoring methods. After that comparison period, the filter-based monitors were shut down and removed from service, leaving the continuous PM₁₀ monitor as the primary monitor for that station.

Future changes to the Mono Lake network include the installation of a continuous PM₁₀, PM_{2.5}, and PM_{10-2.5} monitor in the community of Lee Vining. The District has operated a filter-based PM₁₀ monitor in Lee Vining, located on the southwest side of Mono Lake, for over 15 years. Plans are to install a continuous Teledyne-API T640X PM monitor in Lee Vining station in 2017.

National Core Multipollutant Monitoring Station (NCORE)

The District was chosen by EPA Region IX staff to install and operate one of the EPA NCORE monitoring stations. The NCORE network consists of 75-plus monitoring stations around the nation that will be used by EPA for determining national monitoring and regulatory strategies. Seven monitoring stations are to be placed in California and the District was chosen to operate one of them: a rural NCORE site. These sites will be funded by EPA for capital equipment and operation and maintenance.

The first phase of funding began with the 2008 calendar year. Funds were received for the procurement of the prescribed monitoring equipment which includes: a low-level carbon monoxide monitor (CO), a low-level sulfur dioxide monitor (SO₂), a low-level reactive nitrogen compounds monitor (NO_y), a low-level ozone monitor (O₃), and a calibration system for the monitors. The EPA also provided the District with funds for the procurement of a monitoring station enclosure in which to house the NCORE monitoring equipment. The District's NCORE site is located at the White Mountain Research Center, east of Bishop, near the current berth of the District's Portable Monitoring Station. Final approval of the site by EPA headquarters was given in mid-2009. Installation of the station and procurement and installation of the remaining equipment took place throughout 2012. Data of record have been collected since January 1, 2015. In May 2014, a Teledyne-API 602 Beta Plus monitor was installed at the NCORE station. This monitor is EPA-certified as an equivalent method for monitoring PM₁₀, PM_{2.5}, and PM_{10-2.5}.

2.5. A comparison test between the 602, a Thermo 1405DF TEOM and a 1400a(AB)/8500C FDMS/TEOM monitoring PM_{2.5} and a 1400a(AB) TEOM monitoring PM₁₀ was conducted through 2016 to determine which monitor(s) will be used at the NCORE station. Subsequently, the TAPI 602 was removed and a Teledyne-API T640X installed and the comparison continued.

6.0 Minimum Monitoring Requirements, PM Design Concentrations

The District's jurisdictional boundaries encompass no Metropolitan Statistical Areas (MSA) as defined by the U.S. Office of Management and Budget and the U. S. Census Bureau (population greater than 50,000). The District does, however, contain Monitoring Planning Areas defined as "areas determined to be (potentially) in violation of the PM_{2.5} NAAQS." The District is also required to operate at least one monitor in each of the **two (2) remaining** PM₁₀ nonattainment areas and in **the two (2) attainment areas**. The Coso Junction Area was designated attainment in October 2010, **the Mammoth Lakes Planning Area in October 2015**. The District's network meets or exceeds the minimum monitoring requirements for criteria pollutants as detailed below. Please note that the Coso Junction Management Area (formerly the Searles Valley Nonattainment Area) encompasses the northern portion of the Searles Valley, immediately north of Pioneer Point, as well as the Rose Valley in the southwestern portion of Inyo County. In all cases where the District has installed one filter-based monitor and one continuous monitor at a station, the continuous monitor has been designated as the primary monitor and the filter-based monitor as collocated. **Table 4 contains the PM₁₀ design concentration for each of the District's monitoring stations for the 2016 calendar year.**

PM₁₀

<u>Nonattainment Area Monitors</u>	<u>Min. No. Monitors Required</u>	<u>No. of Monitors Active</u>	<u>PM₁₀ Design Concentration</u>
Coso Junction	1	1	127
Owens Lake	1	10	880
Mammoth Lakes	1	2	99
Mono Basin	1	2	2,619

PM_{2.5}

<u>MPA</u>	<u>Min. No. Monitors Required</u>	<u>No. of Monitors Active</u>	<u>PM_{2.5} Design Concentration</u>
Keeler	1	2+1 collo.	34

**Table 4. PM10 Design Concentrations
based on 2016 Monitoring Data**

Monitor Site	PM10 Design Concentration	PM10 Design Values, 2014-2016
Mammoth	70	0
Mono Shore	2289	22.6
Coso Junction	124	1.4
Dirty Socks*	128	1
Keeler Primary	199	6.9
Keeler Colocated	183	7.1
Lizard Tail	151	2.3
Lone Pine*	70	0.3
Mill*	74	32.7
North Beach	128	2.3
Olancho	162	3.4
Portable 2	55	N/A - SPM
Portable 3	175	N/A - SPM
Shell Cut	236	5.4
Stanley	76	1
T-27	69	N/A - SPM
T-7	75	N/A - SPM

* Values based on data that did not meet EPA completeness criteria for the three year period.

7.0 Data Certification and Reporting

CARB, as the District's PQAQO, has delegated the responsibilities for data collection, validation and reporting to the District, as the monitoring organization. District staff ensures that all data and statistical reports are submitted to the Air Quality System, the EPA's national air monitoring database, and that the data are certified annually, as required by regulation. Precision and accuracy reports are generated quarterly by the District and submitted to AQS. The 2016 dataset will be certified by May 1, 2017.

APPENDIX A

Site Information Summaries Site Reports

Table A.1

Great Basin Unified Air Pollution Control District
Site Specific Information

Site Name	Network	AQS Number	Pollutants Monitored	Start Date
Dirty Socks *	Owens Lake	06-027-0022	PM10, Met.	Jun-99
Shell Cut	Owens Lake	06-027-0025	PM10, Met.	Jan-01
Flat Rock **	Owens Lake	06-027-0024	PM10, Met.	Jan-01
Bill Stanley	Owens Lake	06-027-0026	PM10, Met.	Mar-02
Olancho	Owens Lake	06-027-0021	PM10, Met.	Aug-95
Lone Pine	Owens Lake	06-027-0004	PM10, Met.	Jan-80
North Beach	Owens Lake	06-027-0029	PM10, Met.	Nov-08
Lizard Tail	Owens Lake	06-027-0028	PM10, Met.	Feb-08
Keeler	Owens Lake	06-027-1003	PM10, PM2.5, Met.	Jul-94
Mill Site *	Owens Lake	06-027-0030	PM10, Met.	May-11
T-7 †	Owens Lake	SPM	PM10	Jul-12
T-27 †	Owens Lake	SPM	PM10	Aug-12
Coso Junction	Owens Lake	06-027-1001	PM10, Met.	Mar-79
Mammoth Lakes	Mammoth Lakes	06-051-0001	PM10, Met.	Apr-84
Lee Vining	Mono Basin	06-051-0005	PM10, Met.	Jan-81
Simis Residence ††	Mono Basin	06-027-0007	Met.	Nov-81
Mono Shore	Mono Basin	06-027-0011	PM10, Met.	Jan-00
White Mountain	District	06-027-0002	PM10, Met.	Apr-06
NCORE	District	06-027-0002	O3, CO, SO2, Noy, PM10, PM2.5, Met.	Apr-12

* Monitor restarted December 2014 after two-year hiatus due to lease cancellation by property owner.

** PM10 monitoring suspended at Flat Rock May 2011. Flat Rock now used for meteorological monitoring and video capture only.

† T-7 and T27 are special purpose monitors that began operation in July and August 2012, respectively.

†† PM10 monitoring suspended August 2008; meteorological monitoring suspended June 2011.

Air Quality Monitoring Network Plan – May 2017

Table A.2

Great Basin Unified Air Pollution Control District
Site Specific Information
Pollutant Monitors

Site Name	Monitoring	Pollutants Monitored										Thermo Scientific TEOM 1405DF, PM10, PM2.5, PM10-PM2.5	
	Frequency	R&P Partisol 2025 Sequential PM10		R&P TEOM Continuous PM10		R&P FDMS-TEOM Continuous PM10		R&P Partisol 2025 Sequential PM2.5		R&P TEOM Continuous PM2.5			
		P code	81102	P code	81102	P code	81102	P Code	88101	P Code	88101	P Code	81102
		M code	127	M code	079	M Code		M Code	145	M Code	181	M Code	208
		POC	Serial No.	POC	Serial No.	POC	Serial No.	POC	Serial No.	POC	Serial No.	P Code	88101
Dirty Socks Shell Cut Flat Rock ** Bill Stanley Olancha Lone Pine North Beach Lizard Tail Keeler Keeler Collo. Mon. Mill Site T-7 † T-27 † Coso Junction Mammoth Lakes Lee Vining Simis Residence †† Mono Shore White Mountain NCORE	Daily			2	24918							M Code	182
				2	24923							P Code	86101
				2	**							M Code	207
				1	23572							POC	Serial No.
				2	21292								
						4	24928						
				1	24982								
				1	24983								
				4	24786			1	21135	1	24922		
		6	21442	UA	21002			2	21127				
		7	21183	1	24925								
				SPM	24981								
				SPM	23573								
				4	22618								
NCORE Additional Pollutants	Hourly 1-in-3												

- ** PM10 monitoring suspended at Flat Rock May 2011. Flat Rock now used for meteorological monitoring and video capture only.
- † T-7 and T27 are special purpose monitors that began operation in July and August 2012, respectively.
- †† PM10 monitoring suspended August 2008; meteorological monitoring suspended June 2011.
- ††† PM10 collocated continuous monitor, POC = UA, or unassigned.

Table A.3
**GBUAPCD QUALITY ASSURANCE AUDITS
2016**

GBUAPCD TEOM Audits 2016				
Site	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Bill Stanley	03/17/2016	06/16/2016	08/02/2016	12/09/2016
Coso Junction	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Dirty Socks	03/17/2016	06/16/2016	08/02/2016	12/09/2016
Keeler #1 pm 2.5	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Keeler #2 pm10 pri	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Keeler #3 pm10 co	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Lizard Tail	02/11/2016	06/08/2016	09/08/2016	11/02/2016
Lone Pine FDMS	03/17/2016	06/08/2016	09/08/2016	11/02/2016
Mammoth FDMS	03/02/2016	04/07/2016	07/19/2016	12/20/2016
Mill Site	03/17/2016	06/15/2016	08/02/2016	12/09/2016
Mono Shore	03/02/2016	04/07/2016	07/19/2016	12/20/2016
North Beach	02/11/2016	06/08/2016	09/08/2016	11/02/2016
Olancho	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Portable 2	02/02/2016	04/20/2016	08/01/2016	11/15/2016
Portable 3	02/11/2016	06/15/2016	08/02/2016	12/09/2016
Shell Cut	03/17/2016	06/16/2016	08/02/2016	12/09/2016
T-27	02/11/2016	06/08/2016	09/08/2016	11/02/2016
T-7	02/11/2016	06/08/2016	09/08/2016	11/02/2016
WMRC	02/02/2016	04/20/2016	08/01/2016	11/15/2016

GBUAPCD Partisol Audits 2016				
Site	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Keeler pm2.5	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Keeler pm10 pri	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Keeler pm10 co	03/10/2016	06/22/2016	10/13/2016	11/22/2016
Lee Vining	03/02/2016	04/07/2016	07/19/2016	12/20/2016
Mammoth	03/02/2016	04/07/2016	07/19/2016	12/20/2016

GBUAPCD Meteorological Audits 2016			ARB Audits of GBUAPCD Sites	
Site	First Semi-Annual	Second Semi-Annual	Site	Date
A-Tower	5/23/16		Coso Junction	10/27/16
Bill Stanley	6/16/16		Dirty Socks	9/13/16
B-Tower	5/23/16		Flat Rock	9/15/16
Cottonwood		7/21/16	Keeler 1 PM2.5 FDMS	9/15/16
Dirty Socks	6/16/16		Keeler 2 PM10 TEOM	9/15/16
Flat Rock	6/16/16		Keeler 3 PM10 TEOM	9/15/16
Keeler		7/21/16	Lizard Tail	9/14/16
Kirkwood	6/7/16		Lone Pine FDMS	9/14/16
Lizard Tail	2/11/16	11/2/16	Mammoth FDMS	10/20/16
Lone Pine	6/15/16		Mill	9/13/16
Mammoth	3/31/16		Mono Shore	10/19/16
Mill	3/17/16		North Beach	9/14/16
Mono Lake Shore	6/1/16		Olancho	9/15/16
NCore/WMRC	6/13/16	12/8/16	Portable-2	10/18/16
North Beach	2/11/16	11/2/16	Shell Cut	9/13/16
Olancho	7/21/16		Stanley	9/13/16
Portable-3	6/15/16		WMRC	10/18/16
Shell Cut	6/16/16			
T-27	2/11/16	11/2/16	Keeler pm2.5 partisol	9/15/16
T-7	2/11/16	11/2/16	Keeler pm10 pri partisol	9/15/16
			Keeler pm10 co partisol	9/15/16
			Lee Vining Partisol	10/19/16
			Mammoth partisol	10/20/16

Bold text denotes audits delayed into following quarter.

APPENDIX B

NCORE Station Monitoring Plan



Great Basin Unified
Air Pollution Control District

**2017 Air Quality Monitoring
Network Plan
For
National Core (NCORE) Monitoring Station**

located at
White Mountain Research Center
Bishop, California

May 2017

**Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514**

National Core (NCore) Multi-pollutant Monitoring Stations:

In October 2006 the United States Environmental Protection Agency (EPA) issued final amendments to the ambient air monitoring regulations for criteria pollutants. These amendments are codified in 40 CFR parts 53 and 58. The purpose of the amendments was to enhance ambient air quality monitoring to better serve current and future air quality needs. One of the most significant changes in the regulations was the requirement to establish National Core (NCore) multi-pollutant monitoring stations. These stations will provide data on several pollutants at lower detection limits and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. The final network plan was to be submitted to EPA by July 1, 2010 and the stations were to be operational by January 1, 2011. Delays in funding and procurement of equipment resulted in delays of the start of monitor testing at the District's NCore station until January 1, 2013, and the beginning of the upload of valid data to AQS January 1, 2015.

The NCore Network addresses the following monitoring objectives:

- timely reporting of data to the public through AIRNow, air quality forecasting, and other public reporting mechanisms
- support development of emission strategies through air quality model evaluation and other observational methods
- accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors
- support long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards (NAAQS)
- compliance through establishing nonattainment/attainment areas by comparison with the NAAQS
- support multiple disciplines of scientific research, including; public health, atmospheric and ecological

In 2007, 2010, and 2011, EPA provided funding to the Great Basin Unified Air Pollution Control District (the District) to establish an NCore station in the Eastern Sierra region of California. After evaluating the existing network, historical data, meteorology, and topography the District recommends the following changes to its air monitoring network to become effective July 1, 2009, and implemented by January 1, 2010:

- 1) Establish an NCore multi-pollutant monitoring station in the Eastern Sierra region at the White Mountain Research Center (formerly Station) (WMRC), 3000 East Line Street, Bishop, California. The location meets the objective for a rural NCore site and meets regional scale criteria for PM_{2.5}, PM₁₀, ozone (O₃), total reactive nitrogen compounds (NO_y), and carbon monoxide (CO).
- 2) For the near-term, collocate the NCore station with the District's existing Portable monitoring station, which collects data for PM₁₀ (continuous), wind speed, wind direction, ambient temperature, and relative humidity.

Monitoring Objective

Determine compliance with NAAQS; observe pollution trends for national data analysis, provide pollution levels for daily index reporting; and provide data for scientific studies.

Table 1 Monitors

Monitor Type	Designation	Analysis Method	Frequency of Sampling
Carbon Monoxide (CO)	NCore	Automated Reference Method utilizing trace level non-dispersive infrared analysis.	Continuously
Sulfur Dioxide (SO ₂)	NCore	Automated Equivalent Method utilizing trace level UV fluorescence analysis	Continuously
PM ₁₀ TEOM	SLAMS	Automated Equivalent Method utilizing Tapered Element Oscillating Microbalance/gravimetric analysis	Continuously
Total Reactive Nitrogen (NO _x)	NCore	Automated trace level chemiluminescence analysis.	Continuously
Meteorological	SLAMS	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, temperature	Continuously
Ozone (O ₃)	NCore	Automated trace level Equivalent Method utilizing an Ultraviolet Photometer	Continuously

Quality Assurance Status

All Quality Assurance procedures shall be implemented in accordance with 40 CFR 58, Appendix A. Quality Assurance Project Plans from the CARB and the District cover PM₁₀, PM_{2.5}, and meteorological measurements. For the trace level instruments, the quality assurance project plan and standard operating procedures (SOPs) utilized currently by the CARB will be used for each new instrument in the project. The most recent annual performance evaluation of the District's NCORE station took place October 18, 2016, and was conducted by CARB QA staff and included audits of the meteorological sensors and the following trace-level pollutant gas analyzers: ozone (O₃), carbon monoxide (CO), and sulfur dioxide (SO₂).

Area of Representativeness

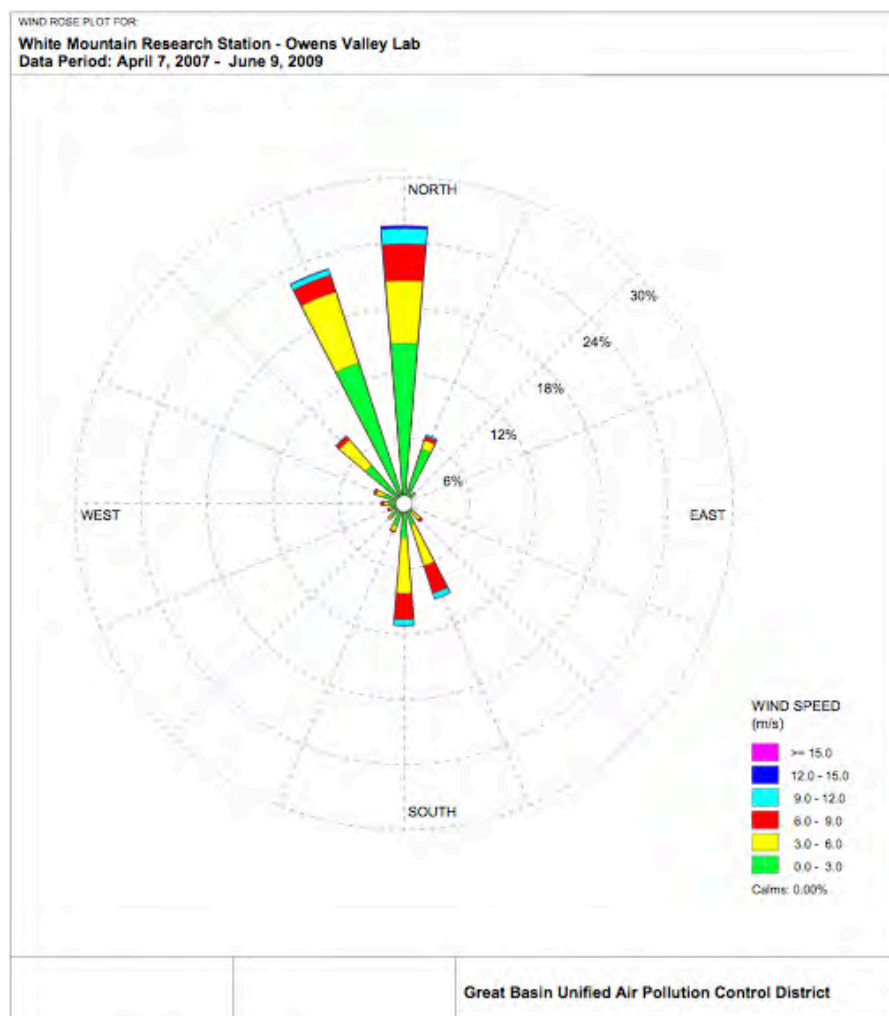
40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. The monitoring objective for the NCore site is to produce data that represents a large area and therefore the spatial scale of the site is important. The spatial scale defines the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. It is determined by the characteristics of the area surrounding the air monitoring site and the site's distance from nearby air pollution sources such as roadways, factories, etc. In the case of rural NCore stations, which are to be located to determine general background concentrations levels, the spatial scales to be used are regional or larger. Table 2 shows the area of representativeness for each pollutant for the WMRC site.

Table 2: Spatial Scales for Each Pollutant

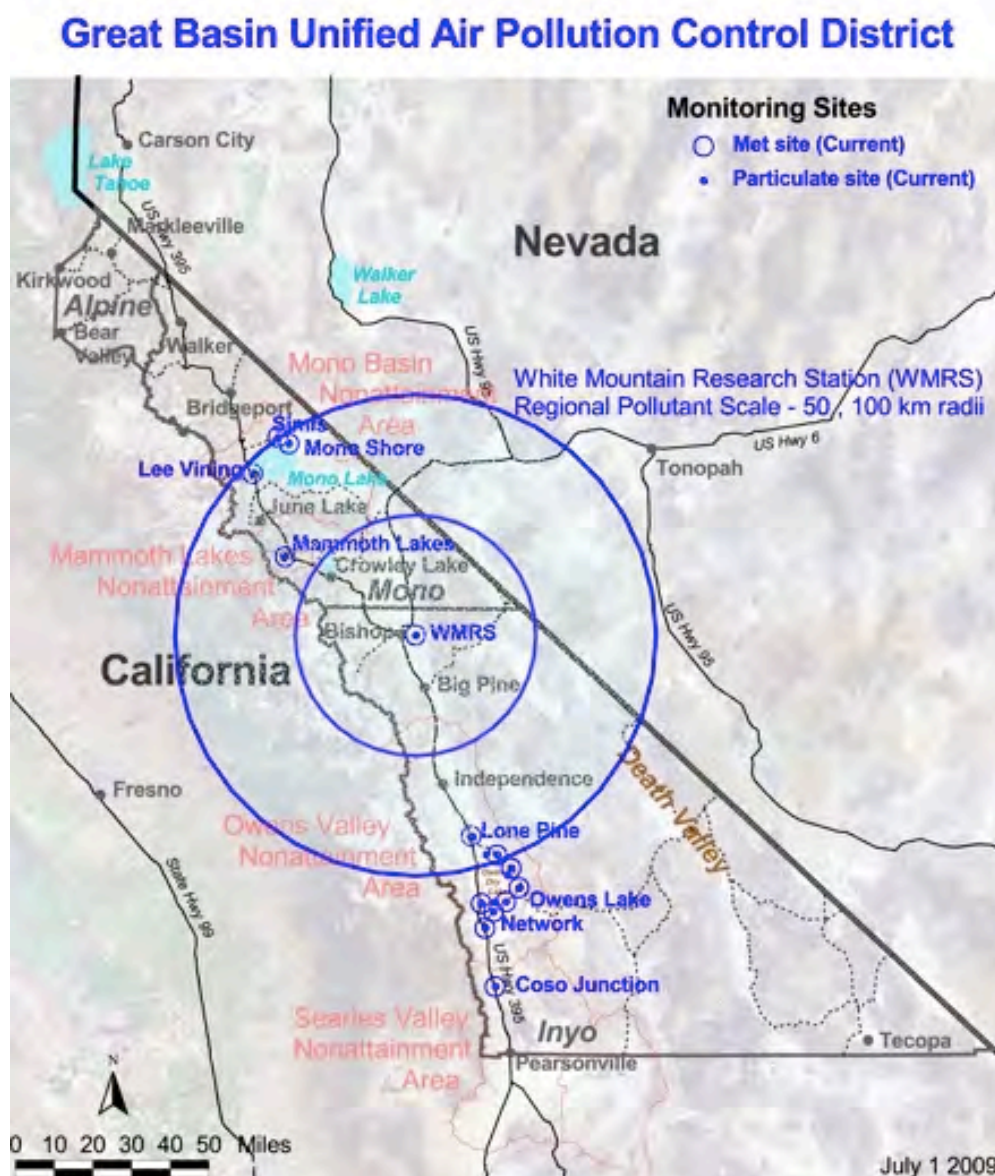
Pollutant	Spatial Scale	Comments
NO _y	Regional Scale	Same scale as used for O ₃
CO	> Middle Scale	No Regional scale for CO
SO ₂	> Neighborhood Scale	No Regional scale for SO ₂
PM ₁₀	> Neighborhood Scale	No Regional scale for PM ₁₀
O ₃	Regional Scale	Same scale as used for NO _y

For regional scale the area covered is tens of kilometers to hundreds of kilometers.

There are no MSAs within the District's current monitoring network due to the sparse population in this high desert setting, approximately 2 people per square mile. On a 10 km scale the land use varies from riparian areas along the Owens River 0.6 kilometers west of the site to light industry, small commercial, and residential in the City of Bishop (population 4,000) 5 kilometers west of the site. The topography of the area varies from high desert to mountain peaks.

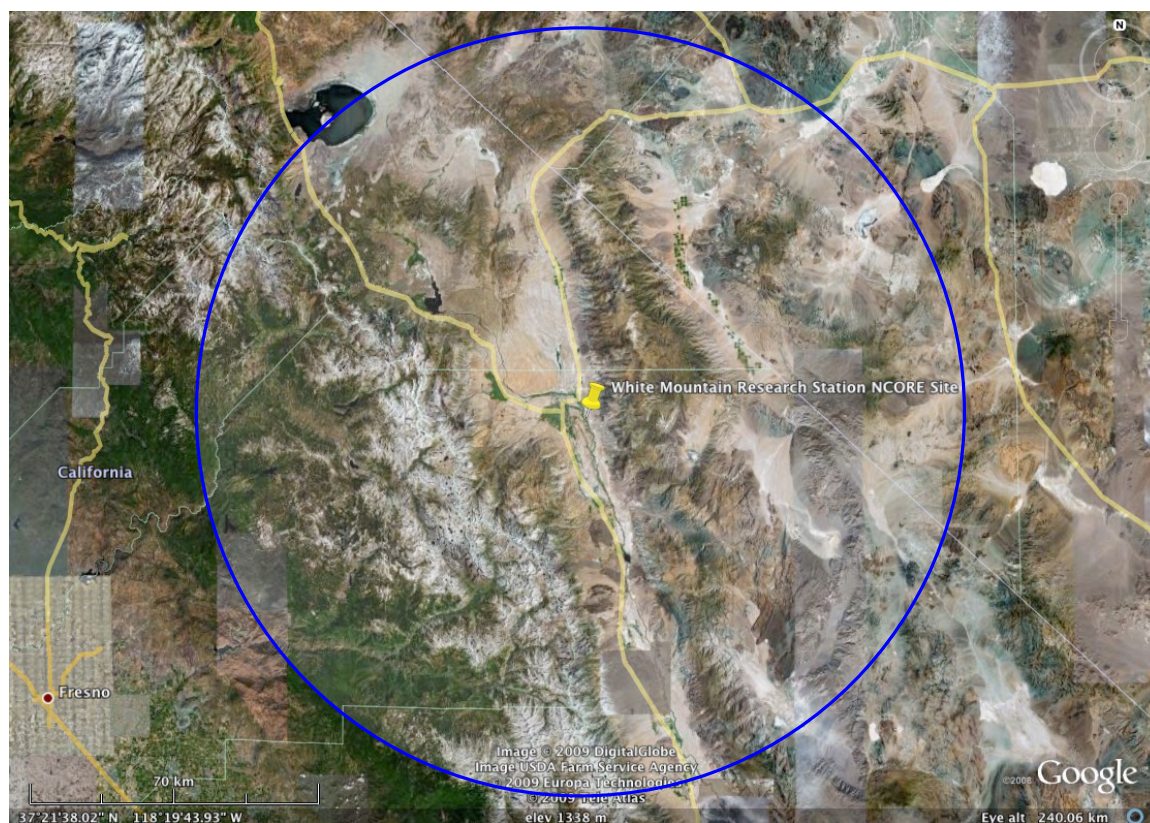


The White Mountain Research Center's Owens Valley Laboratory, where the NCore monitoring station is located, is in the Owens Valley, a high-desert valley, the floor of which is at an average elevation of 4,000 feet above mean sea level. The valley is open north to south and is bordered on the east by the White Mountains that rise from the valley floor to an elevation of 10,000 feet, with peaks up to 14,000 feet. The valley is bordered on the west by the Sierra Nevada range, which rises in elevation up to 14,000 feet. As can be seen from the District map and the area-wide view below, the NCore site is located East of the City of Bishop and east of the developed area around the City. The wind rose above indicates the prevailing wind directions of north and south, up and down the Owens Valley. The placement of the NCore site east of Bishop provides an excellent location for measuring background pollutant concentrations as there are no major pollution sources, other than particulate matter, for 100km.



White Mountain Research Center (formerly Station)
Regional Pollutant Scale 50 and 100 km radii

The Owens Valley, Mono Basin, and Mammoth Lakes Nonattainment areas have been designated as such due to PM_{10} concentrations that exceed the Federal standard of $150\mu g/m^3$. The sources of these concentrations are wind-blown dust from the exposed lakebeds of the Owens and Mono lakes and wintertime wood smoke and road cinders, in the case of Mammoth Lakes. The PM_{10} influence around Mono Lake is largely restricted to the immediate basin by the topography. The influence around Owens Lake is mostly caused by north winds driving the dust south. Occasional south wind storms will drive the dust northward, but the impacts generally reach only to the community of Independence, 20 miles north of Owens Lake and 40 miles south of the station at the White Mountain Research Center. During north wind events, occasional dust may impact the station from the Chalfant and Hammil Valleys from agricultural fields not properly mitigated.



White Mountain Research Station
Topographic Regional Map (90 km radius shown)

Site Description and Spacing:

Site Name: White Mountain Research Center

AQS ID: 06-027-0002

Location: (WMRC - 3000 East Line Street) NCore Station – 200 Poleta Road

County: Inyo

GPS Coordinates: 37°21'38" North Latitude, 118°19'50" West Longitude

Date Established: April 7, 2006

Inspection Date: August 20, 2009

Inspection By: Catherine Brown, EPA IX

Site Approval Status: Approved





The station is located on the grounds of the University of California White Mountain Research Center. The location is in the northeast portion of Inyo County and is approximately 0.6 km east of the Owens River and 5 km east of Bishop, California.

NCore and PM_{2.5} SLAMS Siting Criteria

Appendix E to 40 CFR Part 58-*Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring* contains specific location criteria applicable to NCore and SLAMS siting. The following measurements and data were obtained for evaluation of compliance with the criteria.

1. Horizontal Placement of Sampling Probes:

The gaseous instruments are located in an 8'w x 8' h x 20'l air monitoring shelter located in an open area. The nearest building is the WMRC maintenance building approximately 150 meters east of the station. The sample probe inlets are installed approximately 4 meters above the ground. The Districts Portable monitoring station is placed next to the NCore air monitoring shelter and includes a 10-meter telescoping meteorological tower.

Manual particulate samplers to be used for the NCore program will be placed on the metal monitoring platform adjacent to the NCore shelter. The height of the inlets of the filter-based particulate samplers above ground will be approximately 5 meters. The inlet for the continuous PM₁₀ monitor in the Portable station is approximately 1.5 meters above the roof and approximately 4.25 meters above the ground. Inlets for the continuous particulate monitor in the NCore station were placed on the roof of the air monitoring shelter with the sample inlets 1 meter above the roof (4 meters above ground) with at least 1 meter of separation from any and all structures on the roof. The control unit is located inside the temperature-controlled shelter.

2. Spacing from Obstructions:

There are no obstructions to air flow around the site. The WMRC maintenance building is located 150 meters east of the proposed NCore station location and is 4 meters in height. This potential obstruction is 37 times the height of the obstruction away from the station and is not in a quadrant where it would affect the prevailing wind direction.

3. Spacing from Roadways:

Tables E-1, E-2, and Figure E-1 of 40 CFR Part 58 Appendix E list the minimum distances from roadways a monitoring probe needs to be based on the annual average daily traffic (AADT) counts. Table 3 summarizes the findings and includes the minimum separation distance from roadways for each pollutant. AADT counts were obtained from traffic count data from the California Department of Transportation's (CalTrans) website, at: <http://www.dot.ca.gov/trafficops/census/volumes2015/>

Table 3
Spacing from Roadways Analysis

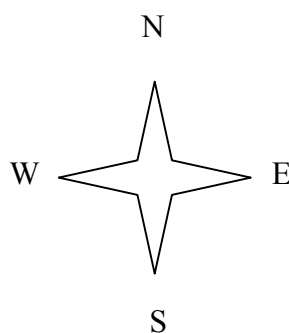
Roadway	ADT	Distance from site (meters)	Minimum Distance Required (meters)			
			Ozone Table E-1	NO/NO _y Table E-1	CO Table E-2	PM Figure E-1
US Highway 395	15,200 (2011)	5,700	40	30	45	80
East Line Street, Poleta Road	<1000 (estimated)	85	40	30	45	80

4. Spacing from Minor Sources:

The closest source to the site is the community of Bishop, California, 5 kilometers east of the site. The greater Bishop area has a population of approximately 12,600 (2010 US Census Bureau). Pollutant sources are limited to small businesses, residential home heating, vehicular traffic (15,800 AADT) along US Highway 395. There are two permitted sources near the site: 7/11 Materials 4.5 km to the west and Standard Industrial Minerals 5 km to the north. These sources are listed below (Table 4) along with their emission rates. The first source is a concrete batch plant and the second is a non-metallic minerals (primarily kaolin clay) processing plant. These plants' operating schedules are limited to 3 to 5 days per week and to a certain number of weeks per year, usually in the summer months.

Table 4
Minor Source Emissions

Source	Emissions Type	Hours of Operation Per day	Emissions Rates	
			Pounds Per Hr. For Op	Pounds per hour 24hrs/day, 365 days/yr.
7/11 Materials	particulate	14	5.7	0.26
Standard Industrial Minerals	particulate	8	4.22	0.19



Direction	Description	Distance from Site
North	Power line along Line Street/Laws-Poleta Road	124 meters
North East	White Mountains	14 kilometers
East	WMRC Maintenance Building (maintenance and repair shop)	150 meters
South East	Owens Valley, open land	
South	Owens Valley, open land	
South west	Owens Valley, open land	
West	Bench above Owens River	600 meters
North West	Owens Valley, open land	

Site Details:

The Google Earth™ image on page 7 indicates where the air monitoring shelter is located on the White Mountain Research Station compound. The shelter is 8' w x 8'h x 20' l. The roof of the shelter is flat to support the sample inlets for the continuous particulate samplers and has additional room for other samplers if the need arises. Immediately adjacent to the shelter is the sampling platform that provides a 10' x 20' area elevated to the level of the shelter roof where future monitors can be installed. The 10-meter meteorological tower and the District's Portable monitoring station are placed north of the NCore shelter and sampling platform (See photos in the NCore Site Report). The meteorological tower on the NCore station is a tilt-down type with a gin pole and winch system that allows the tower to tilt down and provides for easy servicing and calibration of the meteorological instruments. The shelter is wired for 200-amp service and has internet and cellular telephone connections. The shelter has a heating and air conditioning system that maintains indoor temperatures between 20-30 ° C, as required for the operation of the pollutant gas analyzers.