SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
5 YEAR NETWORK ASSESSMENT

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I. INTRODUCTION

A periodic Network Assessment of the Ambient Air Monitoring Network is required by Federal Regulations as a key tool to help ensure that criteria pollutants are measured in important locations and that monitoring resources are used in the most effective and efficient manner to meet the needs of multiple stakeholders. Network assessments help identify new data needs and associated technologies, find opportunities for consolidation of individual sites into multi-pollutant sites, and identify geographic areas where network coverage should be increased or decreased based on changes in the population and/or emissions. The Environmental Protection Agency (EPA) requires that local agencies perform an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in Title 40, Part 58, Section 10 of the Code of Federal Regulations (40 CFR § 58) Appendix D, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the Ambient Air Monitoring Network. This report describes the assessment of the Ambient Air Monitoring Network operated by the South Coast Air Quality Management District (AQMD) and fulfills the requirements for a periodic network review as listed in 40 CFR § 58.10. Regulation requires that the report be submitted to the EPA by July 1 2010.

SOUTH COAST AQMD HISTORY

Early efforts to control air pollution in California began in Los Angeles with legislation proposing counties establish Air Pollution Control Boards. The proposed legislation was approved and signed into law on June 10, 1945 and the Los Angeles County Air Pollution Control District was established in October 1947. Orange County, San Bernardino, and Riverside formed Air Pollution Control Districts by 1957. Realizing that air pollution was a regional problem, the four counties merged to form the South Coast AQMD in 1977. Geographically, South Coast AQMD encompasses 10,750 square miles and is located within the South Coast Air Basin (SCAB), which is the second most populated area in the United States. Southern California consistently records the highest levels of ozone (O3) and particulates in the nation. As the local air pollution control agency, South Coast AQMD is responsible for controlling air quality emissions from various sources to meet National Ambient Air Quality Standards (NAAQS) as well as ambient air quality standards established by the California Air Resources Board (CARB). Every three years an Air Quality Management Plan is developed and adopted by the South Coast AQMD Board, which describes what actions will be taken to bring the SCAB into compliance with State and Federal clean air standards. To assess compliance with State and Federal standards, a surveillance network of 40 permanent air monitoring sites are maintained to measure criteria pollutants. The air quality data collected by the surveillance network is used for comparison to air quality standards, developing control strategies and regulations to meet those standards, and to provide public information on current and forecasted air quality.

South Coast AQMD operates 40 permanent air monitoring sites in the SCAB and a portion of the Salton Sea Air Basin in Coachella Valley. This area includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. South Coast AQMD also operates numerous temporary monitoring sites for shorter-term objectives such as air toxic studies, community-based monitoring, and compliance with air quality regulations.

MONITORING NETWORK HISTORY

The earliest air monitoring station was operated by the Los Angeles County Air Pollution Control District at 5201 Santa Fe St. before being relocated to the agency's headquarters at 434 South San Pedro in 1955. The oldest monitoring location still in existence is located in Azusa and opened in 1957. The newest permanent site was added in 2008 in Compton to replace the Lynwood air monitoring location. Table 1 provides a list of monitoring locations, EPA Air Quality System (AQS) site codes, and the pollutants measured at each site. Table 2 provides monitoring objectives and the spatial scale of representativeness for monitors at each site. Table 3 describes the monitoring purpose for monitors at each site. Table 4 describes the monitoring objective, purpose, and spatial scale for continuous particulate analyzers at each site. Monitoring objectives are defined as:

Background Level monitoring is used to determine general background levels of air pollutants as they enter the SCAB.

High Concentration monitoring is conducted at sites to determine the highest concentration of an air pollutant in an area within the monitoring network. A monitoring network may have multiple high concentration sites (i.e., due to varying meteorology year to year).

Pollutant Transport is the movement of a pollutant between air basins or areas within an air basin. Transport monitoring is used to assess and mitigate upwind areas when a transported pollutant affects neighboring downwind areas. Also, transport monitoring is used to determine the extent of regional pollutant transport among populated areas and to rural areas.

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

Representative Concentration monitoring is conducted to represent the air quality concentrations for a pollutant expected to be similar throughout a geographical area. These sites do not necessarily indicate the highest concentrations in the area for a particular pollutant.

Source Impact monitoring is used to determine the impact of significant sources or source categories of air quality emissions on ambient air quality. The air pollutant sources may be stationary or mobile.

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

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

Real Time Reporting/Modeling is used to provide data to the EPA's AIRNOW system, which reports conditions for air pollutants on a real time basis to the general public. Data is also used to provide accurate and timely air quality forecast guidance to residents of the South Coast basin.

Multiple purposes for measuring a pollutant at a particular site are possible. There is some overlap between monitoring objectives as defined by the EPA and given in Table 2, and the monitoring purposes provided in Table 3.

A brief description of the network for each criteria pollutant monitored and monitoring program is provided below:

Ozone

The South Coast AQMD operates 30 sites where ozone (O3) measurements are made as part of the Air Monitoring Network. Figure 2 in Section III shows the spatial distribution of these sites.

Carbon Monoxide

Ambient carbon monoxide (CO) monitors measure concentrations at 26 locations. Figure 5 in Section III shows the spatial distribution of these sites.

Nitrogen Dioxide

The nitrogen dioxide (NO2) network consists of 26 sites. These sites are mostly located in areas of highest NO2 concentration. The spatial distribution of NO2 monitors is shown in Figure 7, Section III.

Sulfur Dioxide

Sulfur dioxide (SO2) monitors are located at 7 sites. Figure 9 in Section III shows the spatial distribution of the sites.

Particulate Lead

Total suspended particulate (TSP) lead (Pb) measurements are collected at 19 sites as part of the network. Five sites are source-oriented and the remaining 10 sites are population-oriented. The spatial distribution of these sites is shown in Figure 11, Section III.

PM10

Size-selective inlet high volume samplers are operated at 22 sites to meet the requirements for PM10 Federal Reference Method (FRM) sampling. Of the 22 sites, 13 also include continuous PM10 analyzers. Figure 13 in Section III shows the spatial distribution of the sampling sites.

PM2.5

A network of 17 FRM samplers was first implemented in January 1999. Since then, the network has expanded to include 20 sites depicted in Figure 16, Section III and listed in Table 5. Continuous PM2.5 Met One Beta Attenuation Monitors (BAMs) were first deployed in 2001. Sixteen continuous PM2.5 monitors are now operating in the Basin.

PM2.5 speciation sampling is also a part of the South Coast AQMD PM2.5 monitoring program. The network includes two Speciation Trends Network (STN) samplers and four permanent South Coast AQMD speciation monitoring locations.

The following is a brief description of specific programs that are operated within the Ambient Air Monitoring Network:

Photochemical Assessment Monitoring Stations (PAMS)

The PAMS network was initiated in June 1994 and consists of 7 air monitoring locations. PAMS are used to collect data for a target list of Volatile Organic Compounds (VOCs), Nitrogen Oxides (NOx), Reactive Oxides of Nitrogen (NOy), O3, and meteorological measurements. The PAMS network was established to provide information about the effectiveness of control strategies, emissions tracking, trends, and exposure. To address regulatory changes, site-specific observations from the recent National PAMS Network Assessment, and to address potential synergies between programs, South Coast AQMD made changes in June 2009 to the PAMS monitoring network based on specific recommendations:

- Burbank was reclassified from Type 2/1 to Type 2. This change addressed the National PAMS Network Assessment observation that Burbank should be reclassified to a Type 2 precursor site. The recommendation is consistent with the heavily urbanized/industrialized area, which is impacted by high levels of O3 precursor emissions.
- Santa Clarita was reclassified as Type 3 from Type 2. Although the National PAMS Network Assessment observed that Santa Clarita was consistent with a Type 2 site, recent data was more consistent with a Type 3 maximum O3 concentration site rather than a Type 2 O3 precursor site.
- Banning was relocated to Los Angeles (Main). The National PAMS Network Assessment observed that Banning had the lowest O3 concentrations of all the Type 2 sites and should be reclassified to a Type 3 or 4 site. Instead, to create synergies between programs, South Coast AQMD relocated the Banning PAMS site to the Los Angeles (Main) site as Type 2. This satisfies the EPA recommendation for use of the same monitoring platform and equipment to meet the objectives of multiple programs. Los Angeles (Main) is also a National Air Toxics Trends Station (NATTS), a future National Core-Multi-pollutant Monitoring Station (NCore), and an STN site.
- Azusa was reclassified from Type 3 to Type 2. This proposed change addresses the National PAMS Network Assessment observation that Azusa has high VOC and NOx concentrations, with lower O3 concentrations. The site now more closely resembles a Type 2 O3 precursor site.
- Upland was relocated to the Rubidoux site. The National PAMS Network Assessment observed that Upland was no longer consistent with a Type 4 site and recommended reclassification to Type 3. South Coast AQMD relocated the Upland PAMS site to Rubidoux as a Type 3 location where synergies can be created among the NATTS, NCore, and the STN programs.

- LAX Hastings and Pico Rivera remained unchanged.

Currently, manual VOC canisters are in operation at the Azusa, LAX Hastings, Rubidoux, Los Angeles (Main), and Santa Clarita air monitoring stations. During the intensive season from July 1 until September 30, VOC canisters are run every three hours for a period of twenty-four hours every 3rd day and a twenty-four hour sample is run every 6th day. During the non-intensive season from October 1 through June 30, twenty-four hour VOC canister samples are run every 6th day.

At Los Angeles (Main) and Santa Clarita air monitoring stations, during the intensive season from July 1 until September 30, carbonyl samples are run every three hours for a period of twenty-four hours every 3rd day and a twenty-four hour sample is run every 6th day. During the non-intensive season from October 1 through June 30, twenty-four hour carbonyl samples are run every 6th day.

Automated gas chromatography flame ionization detector (GC\FID) VOC systems are in operation at the Pico Rivera and Burbank air monitoring stations. During the intensive sampling season from July 1 until September 30, the GC\FID is run to collect 3-hour samples and twenty-four hour VOC canisters are run every 6th day. Like the other PAMS sites, carbonyl samples are run every three hours with one additional twenty-four hour sample run every 6th day. During the non-intensive season from October 1 through June 30, the GC/FID is idle and twenty-four hour VOC canister samples are run every 6th day and twenty-four hour carbonyl samples are run every 6th day. Rubidoux is a collocated site for VOC canister sampling and Pico Rivera is a collocated site for VOC canister and carbonyl sampling.

The first South Coast AQMD upper air meteorological monitoring station was established at Los Angeles International Airport (LAX) in 1994. Subsequent upper air stations include Ontario International Airport (ONT) installed in 1996, Moreno Valley (MOV) installed in 2001 at the Moreno Valley Municipal Water Treatment Plant in Riverside County, Irvine installed at the University of California Research and Extension Center in 2006, and Pacoima at Whiteman Airport during May 2007. The upper air stations use a combination of remote sensing and surface meteorological instrumentation, including the Vaisala (formerly Radian/URS) LAP-3000 radar wind profiler with a Radio Acoustic Sounding System (RASS), the Atmospheric Systems Corporation (formerly AeroVironment Inc.) mini Sodar acoustic wind profiler, and tower-mounted meteorological measurements of wind, pressure, temperature, relative humidity, solar radiation and ultraviolet radiation.

The PAMS network monitoring objectives and requirements are summarized in Table 6.

NATTS

The NATTS program was developed to fulfill the need for long-term hazardous air pollutant (HAP) monitoring data of consistent quality nationwide. South Coast AQMD has conducted several air toxics measurement campaigns in the past, which demonstrated the variety and spatial distribution of air toxics sources across SCAB. A single air toxics

measurement site cannot reflect the levels and trends of air toxics throughout the basin. For this reason, two NATTS sites are used to characterize the SCAB's toxics levels. The first site is a central urban core site in Los Angeles that reflects concentrations and trends due primarily to urban mobile source emissions. A second, more rural, inland site at Rubidoux captures the transport of pollutants from a variety of upwind mobile and industrial sources in the most populated areas of the air basin. NATTS monitoring began in February 2007 and continues at the Los Angeles (Main) and Rubidoux air monitoring sites. During April 2010, a system audit was conducted by the EPA, which assessed the South Coast AQMD NATTS program. The audit found no major issues with the operation of the network but recommended implementation of blanking and low level concentration challenge samples. Blanking will be implemented in 2010 and low level challenge samples will be implemented in 2011.

NCore

In October 2006, the EPA issued amendments to ambient air monitoring regulations for criteria pollutants. One of the most significant changes in regulations was the requirement to establish NCore stations. These stations provide pollutant data at much lower detection limits than the existing air monitoring network. NCore monitoring regulations require that South Coast AQMD make NCore stations operational by January 1, 2011. To meet this goal, South Coast AQMD has installed trace level analyzers for CO, NOy, SO2, and Continuous FEM BAM PM2.5 in Rubidoux and Los Angeles (Main), both of which are existing STN and NATTS sites.

NETWORK ASSESSMENTS

Regulatory Requirements

The earliest air monitoring sites in the United States were established over 50 years ago with sites added to the national network as needed to fulfill Federal monitoring requirements and other objectives. Since the time of inception, air quality, population, and behaviors have changed, and there is a general need for re-evaluation of the overall network design and objectives. Recognizing this need, the U.S. EPA finalized an amendment to the ambient air monitoring regulations on October 17, 2006 to address the issue. In the amendment, the U.S. EPA required State and local air monitoring agencies to conduct a network assessment once every five years, with the first assessment due by July 1, 2010.

> The state or where applicable local agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in 40 CFR § 58 Appendix D, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the Ambient Air Monitoring Network. The Network Assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals, and for any sites

> that are being proposed for discontinuance. The assessment must also consider the effect on data users other than the agency itself, such as nearby States and Tribes or health effects studies. For PM2.5, the assessment must also identify needed changes to population-oriented sites. The state or where applicable local agency must submit a copy of this assessment along with a revised annual network plan to the Regional Administrator. (40 CFR § 58.10d 236)

In general, air monitoring networks must be designed to meet three basic objectives according to 40 CFR § 58. First, they must provide air pollution data to the general public in a timely manner. Second, they must support compliance with ambient air quality standards shown in Table 7, and third, they must support research studies on health effects assessments. In order to achieve these goals, networks must meet the 40 CFR § 58 Appendix D, Network Design, and Appendix E, Probe Siting Criteria.

Network Design Criteria

Ambient air monitoring network design is specified by U.S. EPA and include monitoring objectives and general criteria, as outlined in 40 CFR § 58 Appendix D. Each objective is related to a specific type of air monitoring site, and air monitoring networks must be designed for each criteria pollutant and must meet specific objectives. Monitoring objectives and corresponding scales of representativeness are shown in Table 8.

Minimum Number of Sites

As a general requirement, the U.S. EPA specifies the minimum numbers of sites required in a network based on the latest census population data and design value concentrations for specific criteria pollutants. The minimum number of O3 sites required is based upon the Metropolitan Statistical Area (MSA) population and the most recent 3-year design value as shown in Table 9. As of July 2009, there were no minimum requirements for the number of CO, NO2, and SO2 monitoring sites in an air monitoring network, other than NCore requirements. New regulations for NO2 and SO2 require minimum numbers of monitoring locations taking effect in 2013, but they will not be addressed in this assessment. Local agencies are required to conduct ambient air Pb monitoring taking into account:

- Pb sources which are expected or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS.
- The potential for population exposure and logistics.

At a minimum, there must be one source oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from sources of Pb, which emit 1.0 or more tons per year based on the latest National Emission Inventory (NEI) or other justifiable methods or data. Local Agencies are also required to conduct Pb monitoring in each Core Based Statistical Area (CBSA) with a population equal to or greater than 500,000 people. At a minimum, there must be one non-source oriented SLAMS site located to measure neighborhood scale Pb concentrations in urban areas impacted by re-entrained dust from roadways, closed industrial sources of Pb, hazardous waste sites,

construction and demolition projects and other fugitive sources of Pb. The number of PM10 sites required is based upon MSA population data and shown in Table 10. The number of PM2.5 sites required is based upon MSA population data and shown in Table 11. The final number of sites in a network is subject to U.S. EPA Regional Administrator approval via the Annual Network Plan.

Probe Siting Criteria

Once a site has been selected based on monitoring objective and spatial scale, the site must also meet specific siting criteria for each spatial scale and each pollutant as specified in 40 CFR § 58 Appendix E. These criteria include the placement of the pollutant measuring device inlet probe, spacing from minor sources of pollution, spacing from obstructions to the monitoring probe, spacing from trees, spacing from roadways, probe material and residence time.

Horizontal and Vertical Placement

Inlet probes must be placed both horizontally and vertically so that at least 90 percent of the area over which pollutants are being measured and averaged is 1 meter (m) from walls or any supporting structure. For measurement of particulates, a minimum of 2 m is required. Inlet probes must also be placed between 2 m and 15 m above the ground level for all criteria pollutants at the neighborhood scale. Particulate probe inlets at middle and micro scale are to be between 2 m and 7 m above ground level. Near roadway, and CO micro scale measurements are to be 3 +/- ½ m above ground level. A summary of horizontal and vertical placement is shown in Table 12.

Spacing from Minor Sources

Spacing requirements are dependent upon the monitoring objective. If the objective is to measure the *impact* of a stationary source's primary pollutant emissions, then the probe may be located close to the source and be classified as a micro-scale site. A micro-scale site typically represents an area up to 100 m in size. If the objective is to measure pollutants over a larger area such as a neighborhood or city, then the monitoring location should be located away from minor sources of pollutants so as not to impact air quality data collected at the site. Particulate matter sites should not be located in unpaved areas where windblown dust can influence data collected. Special attention should be placed on horizontal and vertical probe placement from furnace or incineration flues to prevent scavenging of O3 by NO and O3 reactive hydrocarbons.

Spacing from Obstructions

Buildings and other obstacles may scavenge SO2, O3, or NO2 and restrict airflow for any pollutant measured. To prevent this influence, the probe must have unrestricted airflow and be located away from obstacles. The distance from an obstacle to the probe should be twice the height that the obstacle protrudes above the inlet. For particulate sampling, a minimum of 2 m separation is required between monitors, walls, parapets, and structures.

Spacing from Trees

Trees can scavenge SO2, O3, and NO2 by adsorption and provide a surface for particle deposition. Trees also act as obstructions and special attention should be made to adhere

to correct spacing. To reduce interference, the probe inlet should be at least 10 m from the drip line of the tree. For micro-scale sites, no trees should exist between the probe inlet and the source being measured.

Spacing from Roadways

O3 and NO2 in particular are susceptible to interference from roadway emissions. When siting monitors for neighborhood scale and urban scales, it is important to minimize roadway interference. Recommended spacing from roadways for O3, NO2, CO, and PM samplers are summarized in Tables 13, 14, and Figure 1. Recent requirements for micro-scale NO2 monitoring near roadways are not addressed in this assessment.

EPA Guidance and Memos

To facilitate the Network Assessment, the EPA issued guidance for local air quality agencies. During March 1998, the EPA Office of Air Quality Planning and Standards (OAQPS) issued State and Local Air Monitoring Stations (SLAMS), National Air Monitoring Stations (NAMS), and PAMS Network Review Guidance. Guidance advocated examination of compliance with Network Design Criteria, monitoring objectives, and minimum number of sites required. Guidance also recommended examination of 40 CFR § 58 Appendix E Probe Siting Criteria. In February 2007, the EPA issued Ambient Air Monitoring Network Assessment Guidance, which included analytical techniques for assessments of Ambient Air Monitoring Networks. In the guidance, the EPA summarized the context of network assessments, provided an overview of requirements in 40 CFR § 58, and an overview of the assessment process. The EPA provided steps in the assessment process and technical approaches including identification of monitoring needs, correlation analysis, and population change in order to assess high and low value monitors. The final step in the guidance was to suggest changes to the network, obtain input from State, Federal, and local stakeholders, and revise recommendations based on input.

EPA Tools

To supplement guidance, the EPA presented an overview of the network assessment process at the 2009 National Ambient Air Monitoring Conference. Training focused on the process of conducting network assessments, providing guidance on analytical techniques used for assessments, and emphasized the goal of identifying and removing low value monitors such that resources can be re-allocated to areas that are under-represented. To further aid in the process, the following tools were made available that are used in this analysis:

Population Animation

The population animation tool is a Google Earth display that shows the change in population over 19 years relative to the 1990 population at the census tract level. Accompanying the population changes are the monitoring network changes from 1990 to 2008. The sites will be displayed as either black circles or gray triangles representing active and inactive sites, respectively. Clicking on a site gives details of the sites start and end year. The animation serves as clear example of how populations have changed within the country over the past 19 years and how the monitoring networks have evolved to serve those shifting populations. In

many cases around urban areas across the country, the population has shifted away from the urbanized core to the suburbs and the monitoring networks have not evolved to take into account this change.

Correlation Matrix Analysis

The Correlation Matrix Analysis shows the correlation, relative difference, and distance between pairs of sites within a monitoring network. The purpose of the analysis/tool is to provide a means of determining possible redundant sites that could be removed if pollution trends in that area are captured adequately by a nearby site.

TABLE 1 Ambient Air Monitoring Locations

Location	AQS No.	Pollutants Monitored	Start Date
Anaheim	060590007	CO,NO2,O3,PM10,PM2.5	08/01
ATSF (Exide)	060371406	Pb	1/99
Azusa	060370002	CO,NO2,O3,PM10,PM2.5,SO4	01/57
Banning Airport	060650012	NO2,O3,PM10, PM2.5	04/97
Big Bear	060718001	PM2.5	02/99
Burbank	060371002	CO,NO2,SO2,O3,PM10,PM2.5	10/61
Closet World (Quemetco)	060371404	Pb	10/08
Compton	060371302	CO,NO2,O3,Pb,PM2.5	01/04
Costa Mesa	060591003	CO,NO2,SO2,O3	11/89
Crestline	060710005	O3,PM10	10/73
Fontana	060712002	CO,NO2,SO2,O3,PM10,PM2.5,SO4	08/81
Glendora	060370016	CO,NO2,O3,PM2.5,PM10	08/80
Indio	060652002	O3,PM10,PM2.5	01/83
La Habra	060595001	CO,NO2,O3	08/60
Lake Elsinore	060659001	CO,NO2,O3,PM2.5,PM10	06/87
LAX Hastings	060375005	CO,NO2,O3,PM10,Pb,SO4	04/04
Long Beach (North)	060374002	CO,NO2,SO2,O3,PM10,PM2.5,Pb,SO4	10/62
Los Angeles (Main St.)	060371103	CO,NO2,SO2,O3,PM10,Pb,PM2.5,SO4	09/79
Mira Loma (Jurupa)[2]	060650004	CO,NO2,O3,PM10	10/93
Mira Loma (Van Buren)	060658005	CO,NO2,O3,PM10,PM2.5	11/05
Mission Viejo	060592022	CO,O3,PM10,PM2.5	06/99
Norco	060650003	PM10	12/80
Ontario Fire Station	060710025	PM10,PM2.5	01/99
Palm Springs	060655001	CO,NO2,O3,PM10,PM2.5	04/71
Pasadena	060372005	CO,NO2,O3,PM2.5,SO4	04/82
Perris	060656001	O3,PM10	05/73
Pico Rivera #2	060371602	CO,NO2,O3,Pb,PM2.5,SO4,PM10	09/05
Pomona	060371701	CO,NO2,O3	06/65
Redlands	060714003	O3,PM10	09/86
Rehrig (Exide)	060371405	Pb	11/07
Reseda	060371201	CO,NO2,O3,PM2.5	03/65
Riverside (Magnolia)	060651003	CO,Pb,PM2.5,SO4	10/72
Rubidoux	060658001	CO,NO2,SO2,O3,PM10,Pb,PM2.5,SO4	09/72
San Bernardino	060719004	CO,NO2,O3,PM10,Pb,PM2.5	05/86
Santa Clarita	060376012	CO,NO2,O3,PM10,PM2.5	05/01
South Long Beach	060374004	PM10,Pb,PM2.5,SO4	06/03
Temecula[1]	TBD	O3, PM2.5	
Uddelholm (Trojan Battery)	060371403	Pb	11/92
Upland	060711004	CO,NO2,O3,Pb,PM2.5,PM10,SO4	03/73
Van Nuys Airport	060371402	Pb	1/10
West Los Angeles	060370113	CO,NO2,O3,SO4	05/84

[1] Site to begin operation in 2010

[2] Site to be closed in 2010 or 2011

TABLE 2 FRM/FEM Criteria Pollutant Monitoring Objective and Spatial Scales

MONITORING OBJECTIVE
HC – High Concentrations
RC – Representative Concentrations
IM – Impact
BL – Background

SPATIAL SCALE
MI – Microscale
MS – Middle Scale
NS – Neighborhood Scale
US – Urban Scale

Location	CO	NO2	SO2	O3	PM10	PM2.5	Pb
Anaheim	NS/RC	US/RC		NS/RC	NS/RC	NS/RC	
ATSF (Exide)							MI/IM
Azusa	NS/RC	US/RC		US/HC	NS/RC	NS/RC	
Banning Airport		NS/RC		NS/RC	NS/RC		
Big Bear						NS/RC	
Burbank	NS/HC	NS/RC	NS/RC	US/HC	NS/RC	NS/RC	
Closet World (Quemetco)							MI/IM
Compton	MS/HC	MS/RC		NS/RC		NS/RC	NS/RC
Costa Mesa	NS/RC	NS/RC	NS/RC	NS/RC			
Crestline				NS/HC	NS/RC		
Fontana	NS/RC	US/RC	NS/RC	US/RC	NS/HC	NS/RC	
Glendora	NS/RC	NS/RC		NS/HC			
Indio				NS/RC	NS/HC	NS/RC	
La Habra	NS/RC	US/RC		NS/RC			
Lake Elsinore	NS/RC	NS/RC		NS/RC			
LAX Hastings	MS/RC	MS/RC	NS/RC	MS/RC	NS/RC		NS/RC
Long Beach (North)	MI/HC	MS/RC	NS/HC	MS/RC	MI/RC	NS/HC	MI/RC
Los Angeles (Main St.)	NS/RC	NS/HC	NS/RC	NS/RC	NS/RC	NS/HC	NS/RC
Mira Loma (Jurupa)[2]	NS/RC	NS/RC		NS/RC	NS/HC		
Mira Loma (Van Buren)	NS/RC	NS/RC		NS/RC	NS/HC	NS/RC	
Mission Viejo	NS/RC			NS/RC	NS/RC	NS/RC	
Norco					NS/RC		
Ontario Fire Station					NS/HC	NS/RC	
Palm Springs	NS/RC	NS/RC		NS/RC	NS/RC	NS/RC	
Pasadena	MS/RC	MS/HC		NS/RC		NS/RC	
Perris				NS/RC	NS/RC		
Pico Rivera #2	NS/RC	NS/HC		NS/HC		NS/RC	NS/RC
Pomona	MI/RC	MS/RC		MS/HC			
Redlands				NS/RC	NS/RC		
Rehrig (Exide)							MI/IM
Reseda	NS/RC	US/RC		US/HC		NS/RC	
Riverside	MI/HC	US/RC				NS/RC	MI/HC
Rubidoux	MS/RC	US/RC	NS/RC	US/HC	NS/HC	NS/HC	NS/RC
San Bernardino	MS/RC	US/RC		NS/HC	NS/HC	NS/RC	NS/RC
Santa Clarita	NS/RC	NS/RC		US/HC	NS/RC	NS/RC	
South Long Beach					NS/HC	NS/RC	NS/HC
Temecula[1]							
Uddelholm (Trojan Battery)							MI/IM
Upland	NS/RC	NS/RC		NS/RC			NS/RC
Van Nuys Airport							MI/IM
West Los Angeles	NS/RC	MS/HC		MS/RC			

[1] Site to begin operation in 2010
[2] Site to be closed in 2010 or 2011

TABLE 3 FRM/FEM Criteria Pollutant Monitoring Purposes

MONITORING PURPOSE

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

Location	CO	NO2	SO2	O3	PM10	PM2.5	Pb
Anaheim	TR	TR/RC		TR	TR	TR/EX	
ATSF (Exide)							SO
Azusa	TR	TR/RC		TR	TR	TR/EX	
Banning Airport		TP/RC		TP	TP		
Big Bear						EX/SO/TP	
Closet World (Quemetco)							SO
Burbank	TR	TR/RC	TR	TR	TR	TR/EX	
Compton	TR/HC	TR/RC		TR/RC		EX/RC	EX
Costa Mesa	RC	TR/RC	TR	RC			
Crestline				HC	TP/RC		
Fontana	RC	TP/RC	TR	RC	HC	EX/TP	
Glendora	RC	TR/RC		HC			
Indio				TP	HC	TP/EX	
La Habra	RC	TR/RC		RC			
Lake Elsinore	TP/RC	TP/RC		TP/RC			
LAX Hastings	BK	BK	BK	BK	BK		BK
Long Beach (North)	HC	TR/RC	TR/HC	TR	TR/RC	EX/HC	EX
Los Angeles (Main St.)	SO/RC	SO/HC	TR	TR/RC	TR/RC	EX/HC	EX
Mira Loma (Jurupa)[2]	TP/RC	TP/RC		TR/RC	HC/CP		
Mira Loma (Van Buren)	CP	CP		CP	HC/CP	CP	
Mission Viejo	RC			TR/RC	TR/RC	EX/RC	
Norco					TR/RC		
Ontario Fire Station					HC	EX/RC	
Palm Springs	TP/RC	TP/RC		TP	TP/RC	EX/TP	
Pasadena	TR/RC	TR/HC		TR/RC		EX/RC	
Perris				TP	TR		
Pico Rivera #2	RC	HC		HC		EX/RC	EX
Pomona	RC	RC		HC			
Redlands				TP/RC	TP/RC		
Rehrig (Exide)							SO
Reseda	RC	TR/RC		HC		EX/RC	
Riverside	HC	TR/RC				EX/RC	EX
Rubidoux	TR/RC	TR/RC	TR	TR/HC	TR/HC	EX/TR/HC	EX
San Bernardino	TR/RC	TP/RC		TR/HC	TR/HC	EX/TR	EX
Santa Clarita	RC	TP/RC		TP/HC	RC	EX/RC	
South Long Beach					HC	EX/SO	EX
Uddelholm (Trojan Battery)							SO
Temecula[1]							
Upland	RC	TR/RC		TR/RC			EX
Van Nuys Airport							SO
West Los Angeles	RC	TR/HC		RC			

[1] Site to begin in 2010

[2] Site to be closed in 2010 or 2011

TABLE 4 Continuous PM10/PM2.5 Monitoring Purpose, Objective, and Spatial Scales

MONITORING OBJECTIVE
HC – High Concentrations
RC – Representative Concentrations

SPATIAL SCALE
MI – Microscale
NS – Neighborhood Scale

TYPE
TEOM
BAM (NON-FEM)
BAM (FEM)

MONITORING PURPOSE

SO – Source Impact
TP – Pollutant Transport
TR – Trend Analysis
RM – Real-Time Reporting/Modeling
SPM – Special Purpose Monitoring

Location	Continuous PM10				Continuous PM2.5			
	Type	Purpose	Objective	Scale	Type	Purpose	Objective	Scale
Anaheim [1]	BAM	RM	RC	NS	BAM/FEM	SPM	RC	NS
Banning Airport					BAM/NON-FEM	RM	RC	NS
Burbank [1]	TEOM	RM	RC	NS	BAM/FEM	SPM	RC	NS
Crestline					BAM/NON-FEM	RM	RC	NS
Glendora	BAM	RM	RC	NS	BAM/NON-FEM	RM	RC	NS
Indio	TEOM	RM	HC	NS				
Lake Elsinore	TEOM	RM	RC	NS	BAM/NON-FEM	RM	RC	NS
Long Beach (North) [1]	BAM	RM	RC	NS	BAM/FEM	SPM	RC	NS
Los Angeles (Main St.) [1]	BAM	RM	RC	NS	BAM/FEM	SPM	HC	NS
Mira Loma (Jurupa)	TEOM	RM	HC	NS				
Mira Loma (Van Buren) [1]	BAM	RM	HC	NS	BAM/FEM	SPM	HC	NS
Palm Springs	TEOM	RM	HC	NS				
Reseda					BAM/NON-FEM	RM	RC	NS
Riverside	BAM	RM	HC	NS	BAM/NON-FEM	RM	HC	NS
Rubidoux [1]	TEOM	RM	HC	NS	BAM/FEM & NON-FEM	SPM/RM	HC	NS
San Bernardino	TEOM	RM	RC	NS				
Santa Clarita					BAM/NON-FEM	RM	RC	NS
South Long Beach [1]					BAM/FEM	SPM	RC	NS
Temecula [2]					BAM/NON-FEM	RM	RC	NS
Upland	BAM	RM	RC	NS	BAM/NON-FEM	RM	RC	NS

[1] PM2.5 FEM BAM Samplers replaced NON-FEM Samplers during FY 2008-2009 and designated as special purpose monitors

[2] Site planned during Fiscal Year 2010-2011

TABLE 5 PM2.5 FRM Monitoring Stations Assigned Site Numbers

Location	Site Code	CARB No.	AQS No.	Start Date	Schedule
Anaheim	ANAH	30178	060590007	01/03/99	Daily
Azusa	AZUS	70060	060370002	01/04/99	1-in-3
Big Bear	BGBR	36001	060718001	02/08/99	1-in-6
Burbank[1]	BURK	70069	060371002	01/21/99	Daily
Compton	COMP	70112	060371302	11/08	1-in-3
Fontana	FONT	36197	060712002	01/03/99	1-in-3
Indio "A"	INDI	33157	060652002	01/30/99	1-in-3
Indio "B"	INDI	33157	060652002	05/12/00	1-in-6
Long Beach (North)	LGBH	70072	060374002	01/03/99	Daily
Los Angeles "A" (Main St.)	CELA	70087	060371103	01/03/99	Daily
Los Angeles "B" (Main St.)	CELA	70087	060371103	01/06/99	1-in-6
Mira Loma (Van Buren)	MRLM	33165	060658005	11/09/05	Daily
Mission Viejo	MSVJ	30002	060592022	06/15/99	1-in-3
Ontario Fire Station	ONFS	36025	060710025	01/03/99	1-in-3
Palm Springs	PLSP	33137	060655001	12/26/99	1-in-3
Pasadena	PASA	70088	060372005	03/04/99	1-in-3
Pico Rivera #2	PICO	70185	060371602	09/12/05	1-in-3
Reseda	RESE	70074	060371201	01/24/99	1-in-3
Riverside	RIVM	33146	060651003	01/06/99	1-in-3
Rubidoux "A"	RIVR	33144	060658001	01/03/99	Daily
Rubidoux "B"	RIVR	33144	060658001	01/03/99	1-in-6
San Bernardino	SNBO	36203	060719004	01/03/99	1-in-3
South Long Beach	SLGB	70110	060374004	06/20/03	Daily

[1] Changed to daily on 04/16/09 for comparison to FEM BAM

TABLE 6 PAMS Network

			July 1 to September 30		October 1 to June 30		
Site Type	**Date Established as PAMS**	**Site / AQS ID#**	**VOC**	**Carbonyl**	**VOC**	**Carbonyl**	**Additional Requirements**
1	04/01/2004	LAX Hastings (replaced Hawthorne)	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	No Sampling	1 x 24 hr sample every 6th day	No Sampling	
2	06/01/1995	Azusa	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	No Sampling	1 x 24 hr sample every 6th day	No Sampling	No/NOx required
2	07/01/1997	Burbank	Continuous GC and 1 x 24 hr sample every 6th day	8 x 3 hr samples every day and 1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	
2	06/01/2009	Los Angeles (Main)	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	Trace level CO required at one type 2 site.
2	08/01/2005	Pico Rivera #2	Continuous GC and 1 x 24 hr sample every 6th day	8 x 3 hr samples every day and 1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	
3	06/09/2009	Rubidoux	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	No Sampling	1 x 24 hr sample every 6th day	No Sampling	NOy required
3	05/01/2001	Santa Clarita	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	8 x 3 hr samples every 3rd day and 1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	1 x 24 hr sample every 6th day	

SITE TYPES:
1 – Upwind and background characterization site (type 1 or 3)
2 – Maximum O3 precursor emissions impact site or above 8 hr zone
3 – Maximum O3 concentration site
4 – Extreme downwind monitoring site

MONITORING REQUIREMENTS:
One type 1 or type 3 site required per area

One type 2 site required per area

No type 4 required

REDUCED REQUIREMENTS:
Speciated VOC only required at type 2 and one other

Carbonyl only required in areas classified as serious

NO/NOx required only at type 2
NOy required at one site per PAMS area (type 1 or 3)

TABLE 7 Ambient Air Quality Standards

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.08 ppm (157 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2) *	Annual Arithmetic Mean	0.030 ppm (56 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	0.053 ppm	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (338 µg/m^3)		0.100 ppm	None	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		0.075 ppm	None	—
Lead[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

* The Nitrogen Dioxide ambient air quality standard was amended on February 22, 2007, to lower the 1-hr standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law, expected later this year.

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (02/22/07)**

TABLE 8 Relationship Between Monitoring Objective/Site Type and Scale of Representativeness

Monitoring Objective/Site Type and Scale of Representativeness	
Highest concentration	Micro, middle, neighborhood (sometimes urban for secondary formed pollutants such as ozone)
Population oriented	Neighborhood, urban
Source Impact	Micro, middle, neighborhood
Background and regional transport	Urban, regional
Welfare based	Urban, regional

TABLE 9 Minimum Ozone Monitoring Requirements

MSA population	Most recent 3 year design value > 85% of O3 NAAQS	Most recent 3 year design value < 85% of O3 NAAQS[1]
> 10 million	4	2
4 - 10 million	3	1
350,000 - < 4 million	2	1
50,000 - 350,000	1	0
[1] - mimimum monitoring requirements apply in absence of a design value		

TABLE 10 Minimum PM10 Monitoring Requirements

MSA population	Most recent 3 year design value > 85% of $PM_{2.5}$ NAAQS	Most recent 3 year design value < 85% of $PM_{2.5}$ NAAQS
> 1,000,000	3	2
500,000-1,000,000	2	1
50,000-500,000	1	0

TABLE 11 Minimum PM2.5 Monitoring Requirements

Population	High Concentration[1]	Medium Concentration[2]	Low Concentration[3]
>1,000,000	6-10	4-8	2-4
500,000-1,000,000	4-8	2-4	1-2
250,000-500,000	3-4	1-2	0-1
100,000-250,000	1-2	0-1	0

[1] - High concentrations are those that exceed $PM_{2.5}$ NAAQS by 20% or more

[2] - Medium concentrations are those where ambient concentrations > 80% NAAQS

[3] - Low concentrations ar those where ambient concentrations are < 80% NAAQS

TABLE 12 Horizontal and Vertical Inlet Probe Placement

Measurement	Spacing from obstructions	Inlet probe height
All neighborhood scale criteria pollutants	>1 m	2 - 15 m
Middle and micro scale particulate pollutants[1]	>2 m	2 - 7 m
Near roadway microscale CO	> 1 m	3 +/- 1/2 m

[1] 2 m apart for flow rates > 200 lpm and 1 m apart for flow rates < 200 lpm

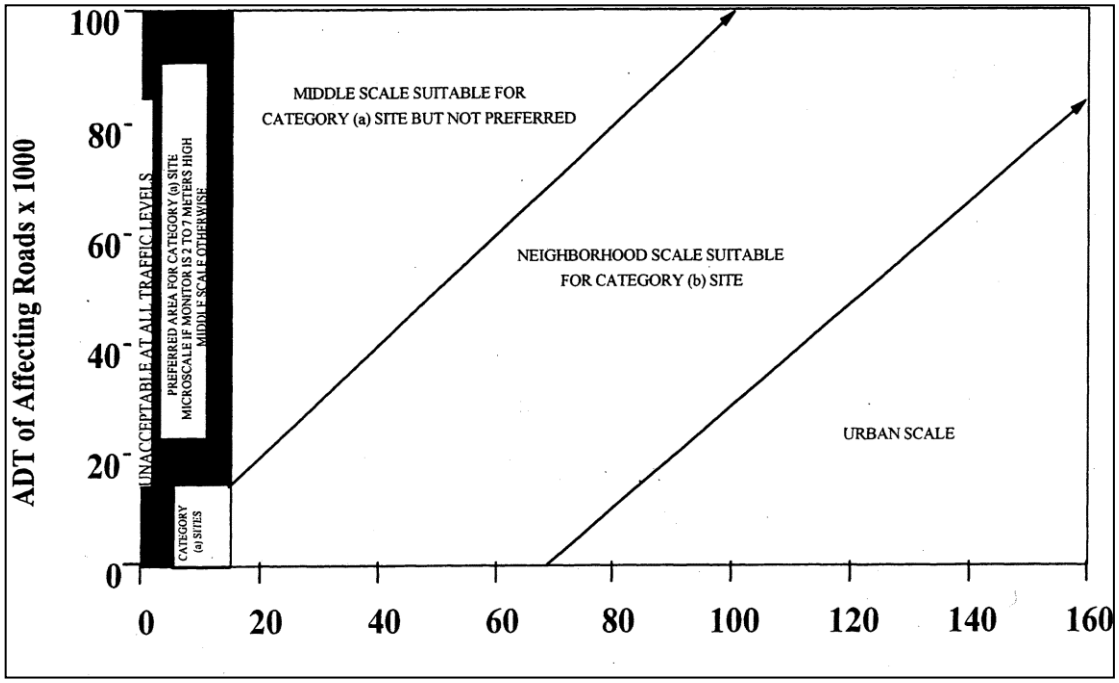
TABLE 13 Minimum Seperation Between Nearest Traffic Lane and Probe Inlet

Roadway Average DailyTraffic	O3 & NO2 at neighborhood and urban scale
≤ 1,000	10
10,000	20
15,000	30
20,000	40
40,000	60
70,000	100
> 110,000	250

TABLE 14 Minimum Separation Between Nearest Traffic Lane and Probe Inlet

Roadway Average DailyTraffic	CO at neighborhood scale
≤ 10,000	10
15,000	25
20,000	45
30,000	80
40,000	115
50,000	135
> 60,000	150

FIGURE 1 Distance of PM Samplers to Nearest Traffic Lane in Meters
Source: CFR 40 § 58 Appendix E



II. SITE ASSESSMENTS

OVERVIEW

This section describes the process that was undertaken for assessing individual sites in the South Coast AQMD monitoring network. It describes criteria used to assess sites, which include site history, security of future occupancy, infrastructure, monitoring objectives, probe siting criteria, data uses, and cost. The assessment criteria also include potential synergies that are considered in assessing the importance of a monitoring site.

SITE ASSESSMENT CRITERIA DESCRIPTIONS

Site History/Longevity

Many sites in the South Coast AQMD network have been in operation for more than 20 years. Establishing historical data trends over a period of time assists in determining the effectiveness of control measures.

Security of Future Occupancy

Many of the sites in the South Coast AQMD network are established at properties that are leased on a monthly or annual basis. Many sites are located at municipal properties where continuance of the current agreement will not change in the foreseeable future. There are however, locations where property owner needs such as refusal to establish long term lease, expansion of facilities, remodeling, or increases in rent make security of future occupancy uncertain.

Infrastructure

Consideration of the infrastructure at air monitoring locations is a crucial part of the site assessment. The condition of the building, electrical capabilities, data communication capabilities, and space for expansion are evaluated.

Probe Criteria

The earliest monitoring stations were established in the late 1950's and since that time urban development and changes in land use, population, and air quality trends have affected monitoring objectives and the probe siting criteria so that air pollution data may no longer adequately represent the intended area. Requirements for probe siting criteria includes an examination of the horizontal and vertical probe placement, spacing of the probe from obstructions, spacing of the probe in relation to minor sources, and spacing of the probe from roadways based on the individual criteria pollutant spatial scale of representativeness and Average Daily Traffic (ADT).

Non-NAAQS Data Uses

Besides NAAQS compliance status evaluation and progress demonstrations, data from South Coast AQMD air monitoring stations is used for real-time public notification of air pollution events, air quality forecasting, and the analysis and modeling for strategic plan development, including the preparation of the Air Quality Management Plan (AQMP). Due to the large population in Southern California and the complexity of the geography and meteorology, a relatively large number of air monitoring stations are needed to

adequately describe air quality and meteorology in South Coast AQMD's jurisdiction. As a whole, the South Coast AQMD air monitoring network successfully meets the needs for planning, public notification, and forecasting purposes.

Public Notification

Data from the criteria pollutants that are measured continuously are available to the public in near real time, through the South Coast AQMD, U.S. EPA AirNow, and California Air Resourced Board websites, as well as through the South Coast AQMD Interactive Voice Response (IVR) automated phone system. Warnings of current air pollution events that occur are transmitted to the public via the South Coast AQMD website, fax, email, recorded phone messages, and press releases. The U.S. EPA EnviroFlash alert system is used to alert subscribers of measured unhealthy air quality by email, RSS feeds or Twitter alerts. At this time, air quality notifications are primarily driven by PM2.5 and summertime O3 measurements, although PM10 episodes can also occur occasionally during exceptional events (e.g., natural windblown dust events, wildfires, and fireworks displays). A robust real-time network is needed to support the accurate mapping of data and transmittal of episodic health information for the large population and geographic diversity of the SCAB and the Coachella Valley.

Air Quality Forecasting

South Coast AQMD provides daily air quality forecasts to the public, predicting day-in-advance concentrations and Air Quality Index (AQI) values of O3, PM2.5, PM10, CO, and NO2 for 38 source-receptor areas throughout South Coast AQMD's jurisdiction. The forecasts are disseminated to the public through the South Coast AQMD and U.S. EPA AirNow websites, the South Coast AQMD IVR phone system, and through the news media, as well as by subscription via fax, email, RSS feeds, and Twitter (using EnviroFlash). South Coast AQMD also provides high wind/windblown dust forecasts for the Coachella Valley for South Coast AQMD Rule 403.1, agricultural and wildland prescribed fire burn forecasts and, starting in November 2010, residential wood burning forecasts. South Coast AQMD air quality forecast tools utilize forecaster experience, empirical/statistical models, and prognostic grid models. Current and historical air quality and meteorological data are critical to the forecasting process. The South Coast AQMD measurements are used to develop the empirical models and to provide current inputs during daily forecast preparation. The monitoring data is also used to evaluate and refine the prognostic grid models.

Air Quality Planning

South Coast AQMD measurements are important for the air quality planning process, including strategic plan development to demonstrate future year attainment of the NAAQS. Current levels and historic air quality trends are documented as a component of the AQMP and reasonable further progress analysis. Meteorological and air quality models are used to simulate representative past episodes or longer periods, as compared to measured air quality data throughout the region. Emissions are then be adjusted in the model

for future years based on projected population, business growth, infrastructure and the effect of control measures to evaluate the efficacy of potential emissions control strategies. A relatively dense monitoring network of pollutants and their precursors is needed throughout the modeling domain to adequately evaluate the ability of the models to simulate air quality.

Health Studies
Support for air pollution research studies is prime objective in assessing the value of an air monitoring location. Air pollution data collected is used to supplement data collected by researchers working on health effects assessments. Sites used as platforms for scientific studies involved with health or welfare impacts, measurement methods development, or used as collaborative efforts with researchers are considered here due to their important role in supporting the air quality management program.

Environmental Justice (EJ)
Following the South Coast AQMD Board's EJ initiatives in October 1997, the South Coast AQMD has been a leader in identifying and addressing community EJ concerns, particularly as raised by low income, ethnic minority communities who may be disproportionately impacted by localized emissions and mobile source pollutants. In support of the program, toxics monitoring and periodic health effects studies take place at air monitoring locations throughout the network. Support of these studies is taken into consideration while determining the value of an air monitoring location.

Cost
Assessment of the cost to relocate a site is an important factor is determining the value of a monitoring location. Cost assessment takes into account the availability of sampling locations in the area, as well as the cost of rent and the number of monitors at the sampling site.

Synergies
Consideration of potential synergies between monitoring programs and external objectives are taken into account while establishing the value of the monitoring location. Establishing synergies between monitoring programs such as NCore, PAMS, NATTS, Health Studies, and South Coast AQMD's EJ programs enhance the value of the monitoring location. Synergies external to the air monitoring network that are taken into consideration while determining the value of the site include use of facilities by South Coast AQMD field inspection personnel for office space and data communications.

INDIVIDUAL SITE ASSESSMENTS

The current AQMD air monitoring network meets or exceeds U.S. EPA monitoring requirements and satisfies multiple monitoring purposes. Over the last twenty years, population, sources of pollution, ambient levels of pollution, and the surveillance air monitoring network have been modified such that the original monitoring objectives of each site may no longer apply. The

effects of these factors, as well as data and monitoring needs, are assessed by site. Measurements taken at each air monitoring site, AQS number, and date of inception are shown in Table 1. The probe siting criteria assessment is shown in Table 15.

Anaheim

The Anaheim site was established at its current location at 1630 Pampas Lane in August 2001 after moving from 1010 Harbor Blvd. due to sale of the Orange County Agricultural Department facility where the site had resided since 1981. We currently hold a 5 year lease with the Anaheim School District for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform began as a temporary location, and therefore was not supported adequately. The monitoring platform needs to be removed, and supported properly with a cement base. Concurrently, the compound in which the site is housed needs to be expanded and electrical wiring upgraded to accommodate the necessary changes to meet probe siting criteria. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from trees requirement and probe distance from traffic lane. Spacing from trees for all pollutants should be at least 10 m and distance from traffic land should be a minimum of 10 m and 15 m respectively for gaseous and particulate pollutants. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include speciated PM2.5 sampling, Radnet program, EJ, and regional toxics air monitoring studies. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service.

ATSF (Exide)

The ATSF site was established at its current location in January 1999 to monitor Pb source emissions from the Exide facility in the City of Commerce. We currently have an agreement with the owners of the property to allow air monitoring and do not anticipate any changes in the near future. The infrastructure is adequate and probe siting criteria meets requirements for source impact siting. The cost to move the location is low, however, the current site is the best available location.

Azusa

The Azusa site was established at its current location in January 1957. We currently hold a 5 year lease for our monitoring location and do not anticipate any changes in the near future. The infrastructure meets the needs of the air monitoring network. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include PAMS, CARB, and administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site is high due to the number of instruments at the site, cost of rent in the area, and length of service.

Banning Airport
The Banning Airport site was established at its current location during April 1997, after moving from the Banning-Alessandro air monitoring location. We hold a 4 year lease with the airport for our monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility meets the needs of the air monitoring network. The site meets 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service.

Big Bear
The Big Bear site was established at its current location in February 1999 to assess PM2.5 winter wood smoke. We currently have a 2 year agreement with airport management and do not anticipate any changes in the near future. The infrastructure is adequate and meets 40 CFR § 58 Appendix E Probe Siting Criteria. The cost to move the location is low, and there have been no exceedances of the PM2.5 standard, however the cost to maintain the site is high due to the distant location.

Burbank
The Burbank site was established at its current location at 228 West Palm Avenue during October 1961. We currently hold a 3 year lease with the owners of the monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility is adequate. The site however does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from traffic lane for O3 and NO2 are 6.2 meters short of requirement. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include PAMS, BioWatch, Regional Toxics studies, and CARB Toxics monitoring. Administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site to meet probe siting criteria will be higher than the current location due to the high cost of rent in the area and number of monitors.

Closet World (Quemetco)
The Closet World site was established at its current location in October 2008 to monitor Pb source emissions from the Quemetco facility in the City of Industry. We currently have an agreement with the owners of the property to allow us to sample and do not anticipate any changes in the near future. The infrastructure is adequate and probe siting criteria meets requirements for source impact siting. The cost to relocate is low due to a single instrument at the site.

Compton
The Compton site was established at its current location at 700 North Bullis Road in January 2004 after moving from the Lynwood site due to inadequate site infrastructure. We currently hold a 10 year lease with the City of Compton for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the

site meets the needs of the air monitoring network. The site meets requirements of 40 CFR § 58 Appendix E Probe Siting Criteria, spacing from roadways, trees, and obstructions. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site is high due to the number of instruments at the site and cost of rent in the area.

Costa Mesa

The Costa Mesa site was established at its current location in November 1989. We currently hold a 5 year lease with the owners for our current monitoring location and do not anticipate any changes in the near future. The site lacks adequate space to expand to include particulate sampling. The site meets requirements of 40 CFR § 58 Appendix E Probe Siting Criteria, spacing from roadways, trees, and obstructions. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Administrative synergies include use of office space for Air Quality Inspectors. The cost of relocating the site is significant; however, finding a site that can accommodate particulate sampling will add value to the network.

Crestline

The Crestline site was established at its current location at Lake Gregory in October 1973. We currently hold a month to month contract for our current monitoring location with the San Bernardino County Regional Parks Department, but do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform is outdated and lacks sufficient space. Money has been set aside for a new monitoring platform but basic infrastructure must be installed first. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from trees requirement. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent, and length of service.

Fontana

The Fontana site was established at its current location at 14360 Arrow Highway during August 1981. We currently hold a month to month lease with San Bernardino County Fire for the monitoring location and do not anticipate any changes in the near future. The infrastructure meets the needs of the air monitoring network; however, there is no room for further expansion. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria, however, the adjacent property is a large dirt lot which contains vegetation which will cause siting problems in the coming years. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include speciated PM2.5 sampling, Radnet program, EJ, and Regional Toxics Air Monitoring Studies. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service.

Glendora
The Glendora site was established at its current location at 840 E. Laurel during August 1980. We currently hold a month to month lease with the city of Glendora for our monitoring location and are concerned about the future stability of remaining at the location. The current monitoring platform is housed in a structure which requires attention. The site was established by California Air Resources Board in a now outdated housing. The monitoring platform needs to be removed, and supported properly with a cement base. Concurrently, the compound in which the site is housed needs to be expanded and electrical wiring upgraded to accommodate the necessary changes to meet probe siting criteria. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria; however, the area is surrounded by a vacant dirt lot which can have an impact on particulate readings. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include the BioWatch program, regional toxics studies, and regional health studies. The cost to relocate is high due to the number of instruments at the site, cost of rent in the area, and length of service. Cost can be mitigated by consolidating the site with nearby air monitoring locations.

Indio
The Indio site was established at its current location at 46-990 Jackson Street during January 1983. We currently hold a month to month lease with the city of Indio and do not anticipate any changes in the near future. The current monitoring platform is a modular wood structure, which requires extensive maintenance. Money has been set aside for a new monitoring platform. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria; however, the area is surrounded by a dirt lot occasionally used as parking which can have an impact on particulate readings. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service.

La Habra
The La Habra site was established at its current location at 621 West Lambert Road during August 1960. We currently hold a month to month lease with the city of La Habra and do not anticipate any changes in the near future. The site lacks adequate space to expand to include particulate sampling and the monitoring structure requires attention. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from trees requirement and probe distance from traffic lane. Spacing from trees for all pollutants should be at least 10 m and distance from traffic land should be a minimum of 10 and 15 m respectively for gaseous and particulate pollutants. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include speciated PM2.5 sampling, Radnet program, and regional toxics air monitoring studies. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service. Although the cost is significant, finding a site which can accommodate

particulate sampling will add value to the network and costs can be mitigated by consolidation with an existing air monitoring location.

Lake Elsinore

The Lake Elsinore site was established at its current location at 506 West Flint St. during June 1987. We currently hold a 4 year lease with the City of Lake Elsinore for the monitoring location and do not anticipate any changes in the near future. The infrastructure meets the needs of the air monitoring network. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria; however, the adjacent property contains vegetation which will cause siting problems in the coming years. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include regional health studies. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service.

LAX Hastings

The LAX Hastings site was established at its current location at 7201 W. Westchester Parkway during April 2004. The site was established to replace the Hawthorne air monitoring location located on the grounds of Anza Elementary School in Hawthorne, which was established to replace the Lennox air monitoring location. We currently hold a month to month lease with Los Angeles International Airport for the monitoring location and do not anticipate any changes in the near future. The infrastructure meets the needs of the air monitoring network; however, there is no room for further expansion within the current compound. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include PAMS and regional toxics air monitoring studies. The cost to relocate the site to meet probe siting criteria will be significant due to the number of samplers and the current low cost lease.

Long Beach (North)

The North Long Beach site was established at its current location at 3648 N Long Beach Blvd during October 1961. We currently hold a 4 year lease with the owners of the monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility is adequate. The site however, does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from traffic lane for O3, CO, NO2, PM10, and Pb. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include Speciated PM2.5, Regional Health Studies, EJ, Regional Toxics studies, and CARB Toxics monitoring. Administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site to meet probe siting criteria is high due to the number of instruments at the site, cost of rent in the area, and length of service.

Los Angeles (Main Street)
The Los Angeles Main Street site was established at its current location at 1630 North Main Street in September 1979. We currently hold a month to month lease with the Los Angeles Department of Water and Power (LADWP) for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform lacks adequate space and power. Arrangements have been made with LADWP to update the space and power to meet the needs of the network during FY2010-11. The site is currently in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include speciated PM2.5 sampling, PAMS, STN, NATTS, NCORE, EJ, regional health studies, regional toxics studies, and CARB Toxics monitoring. The cost to relocate the site is high due to the number of instruments at the site, cost of rent in the area, and length of service.

Mira Loma (Jurupa)
The Mira Loma Jurupa site was established at its current location at 10551 Bellegrave during December 1993 by CARB as part of the Children's Health Study. We currently have a no cost agreement with the Jurupa Unified School District for our monitoring location and are unsure about the future stability of remaining at the location. The current monitoring platform is housed in a structure which requires attention. The current monitoring platform began as a temporary location with no room for expansion and poor electrical infrastructure. The site does not meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from obstructions, which is detailed in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include regional health studies. The cost to relocate the site will be low due to a site established nearby to replace this site due to the poor infrastructure.

Mira Loma (Van Buren)
The Mira Loma Van Buren was established at its current location at 5130 Poinsettia Drive during November 2005. This location served as a replacement for the Mira Loma Jurupa site due to the location's poor instrument siting and infrastructure. We currently have a no cost agreement with the Jurupa Unified School District for our monitoring location and do not anticipate any changes in the near future. The site is in compliance with the requirements of 40 CFR § 58 Appendix E Probe Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include regional health studies and regional toxics studies.

Mission Viejo
The Mission Viejo site was established at its current location at 26081 Via Pera during June 1999. We currently hold a 5 year lease with the El Toro Water District for the monitoring location and do not anticipate any changes in the near future. The infrastructure meets the needs of the air monitoring network; however, there is no room for further expansion within the current compound. The site is in compliance with 40

CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. The cost to relocate the site to meet probe siting criteria will be significant due to the number of samplers and the current low cost lease.

Norco

The Norco site was established at its current location on the grounds of the Naval Surface Warfare Center in December 1980 to examine O3 and particulates. We currently have a 5 year contract through 2014 and do not anticipate any changes in the near future. The infrastructure of the facility meets the needs of particulate sampling, but there are no facilities for continuous analyzers. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. The cost to maintain the site is high, with a technician traveling to the site to maintain a single instrument. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site is low to a single instrument at the site. This cost can be further mitigated by consolidation with a nearby site.

Ontario Fire Station

The Ontario Fire Station site was established at its current location at 1408 E. Francis during January 1999. We currently hold a 4 year lease with the City of Ontario for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility meets the needs of particulate sampling, but there are no facilities for continuous analyzers. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from obstructions surrounding the instrumentation. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site is high due to the number of samplers but this can be mitigated by consolidation with a nearby site.

Palm Springs

The Palm Springs site was established at its current location at 590 Racquet Club Road during April 1971. We currently hold a 4 year lease with the City of Palm Springs for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility currently meets the needs of the monitoring network, but there is no room for future expansion. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from obstructions and probe distance from traffic lane. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site to meet probe siting criteria will be high due to number of analyzers and length of service.

Pasadena
The Pasadena site was established at its current location at 752 Wilson Ave during April 1982. We currently hold a month to month lease with the California Institute of Technology for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform is housed in a structure, which is outdated. Money has been set aside for a new monitoring platform but basic infrastructure is lacking and the compound in which the site is housed needs to be expanded. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from trees requirement. Spacing from trees for all pollutants should be at least 10 m. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site to meet probe siting criteria will be higher due to the number of samplers, length of service, and cost of space in the area.

Perris
The Perris site was established at its current location at 237 North D Street during May 1973. We currently hold a 2 year lease for our current monitoring location with Riverside County and do not anticipate any changes in the near future. The current monitoring platform is housed in a structure which requires attention. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from obstructions. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site to meet probe siting criteria will be higher than the current location, which is at no cost due to its location on a public facility.

Pico Rivera #2
The Pico Rivera #2 site was established at its current location at 4144 San Gabriel River Parkway in September 2005 after moving from 3713-B San Gabriel River Parkway due to influences from surrounding facilities. We currently hold a 2 year lease with the Whittier Utility Authority and do not anticipate any changes in the near future. The infrastructure of the facility meets the needs of the air monitoring network. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include PAMS and Regional Toxics studies. The cost to relocate the site is high due to the number of samplers, length of service and cost of space in the area.

Pomona
The Pomona Fire Station site was established at its current location at 924 Garey Ave in June 1965 to investigate CO emissions from motor vehicles. We currently hold a 3 year lease and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring building is outdated and does not allow for particulate sampling. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from roadway for O3 and NO2. Distances

are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs; however, calibration and repair technicians use space as a workshop. The cost to relocate the site is high due to the number of samplers and length of service, but this can be mitigated by consolidation with a nearby sites.

Redlands

The Redlands site was established at its current location at 500 Deerborn Ave during September 1986. We currently hold a month to month lease with the City of Redlands and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform is housed in a structure which is outdated. Money has been set aside for a new monitoring platform, but basic infrastructure is lacking and the compound in which the site is housed needs to be expanded. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from trees requirement. Spacing from trees for all pollutants should be at least 10 m. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space. The cost to relocate the site to meet probe siting criteria will be higher than the current location which is on a public facility.

Rehrig (Exide)

The Rehrig site was established at 4010 E. 26th Street in the City of Vernon during October 2007 to monitor Pb source emissions from the Exide facility in the City of Vernon. We currently have an agreement with the owners of the property to allow us to sample and do not anticipate any changes in the near future. The infrastructure is adequate and probe siting criteria meets requirements for source impact siting.

Reseda

The Reseda site was established at its current location at 18330 Gault Street during March 1965. We currently hold a 5 year lease with the owners of the monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility is adequate. The site however does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from traffic lane for O3 and NO2. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs; however, administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site to meet probe siting criteria will be higher than the current location due to the high cost of rent in the area, number of monitors, and length of service.

Riverside (Magnolia)

The Riverside site was established at its current location at 7002 Magnolia Avenue during October 1972 by the CARB to investigate CO emissions from motor vehicles. We currently have a 3 year lease with the owners of the facility for our monitoring location and do not expect any changes in the near future. The monitoring platform meets the

needs of the current monitoring program; however, there is no room for further expansion. The site does not meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from roadway which is detailed in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include health studies research; administrative synergies include use of office space for Air Quality Inspectors. The cost to relocate the site to meet probe siting criteria will be higher than the current location due to the high cost of rent in the area, number of monitors, and length of service.

Rubidoux

The Rubidoux site was established at its current location at 5888 Mission Boulevard during September 1972. We currently hold a 3 year lease with Southern California Edison for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility has been recently updated and meets the need of monitoring network. The site is currently in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include speciated PM2.5 sampling, PAMS, STN, NATTS, NCORE, CARB Toxics monitoring, and regional toxics air monitoring studies. The cost to relocate the site to meet probe siting criteria will be higher than the current location due to the number of monitors, length of service, and cost of rent in the area.

San Bernardino

The San Bernardino site was established at its current location at 24302 East 4th Street during May 1986. We currently hold a 3 year lease with the City of San Bernardino Unified School District and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform is housed in a structure which is outdated. Money has been set aside for a new monitoring platform, but basic infrastructure is lacking and the compound in which the site is housed needs to be expanded. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria with criteria shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include EJ and regional toxics studies. The cost to relocate the site to meet probe siting criteria will be higher than the current location due to the number of instruments, length of service, and cost of rent in the area.

Santa Clarita

The Santa Clarita site was established at its current location at 22224 Placerita Canyon Road during May 2001 after moving from 24875 San Fernando Road at the request of Los Angeles County Fire Station #73. We currently have an agreement with Los Angeles County for space and do not anticipate any changes in the near future. The infrastructure of the facility meets the needs of the air monitoring network. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include PAMS and

Regional Toxics studies. The cost to relocate the site is high due to the number of samplers, length of service, and cost of space in the area.

South Long Beach

The South Long Beach site was established at its current location at 1305 E Pacific Coast Highway during June 2003 to monitor particulate influence from port activities. We currently have an agreement to monitor with the Long Beach City College for our current monitoring location and do not anticipate any changes in the near future. The infrastructure of the facility meets the needs of particulate sampling, but there are no facilities for continuous analyzers and no room for expansion. The site does not currently meet 40 CFR § 58 Appendix E Probe Siting Criteria, specifically spacing from obstructions surrounding the instrumentation. Distances are shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site is low due to the number of samplers and this can be further mitigated by consolidation with a nearby site.

Temecula

The Temecula site was established at its current location at Lake Skinner MWD Facilities during July 2010. We currently hold an open ended lease with MWD for our current monitoring location and do not anticipate any changes in the near future. The infrastructure meets the needs of the monitoring network and is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs and the site is restricted to operations personnel only.

Uddelholm

The Uddelholm site was established at 9313 Santa Fe Springs Road in the City of Santa Fe Springs during October 1992 to monitor Pb source emissions from the Trojan Battery facility. We currently have an agreement with the owners of the property to allow us to sample and do not anticipate any changes in the near future. The infrastructure is adequate and probe siting criteria meets requirements for source impact siting.

Upland

The Upland site was established at its current location at 1350 San Bernardino Road during March 1973. We currently hold a month to month lease with the Upland Cascade Mobile Home Park for our monitoring location and do not anticipate any changes in the near future. The monitoring platform is adequate for the current location and the site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. Synergies between air monitoring programs include the regional health studies. The cost to relocate the site will be high due to potential higher rent, number of samplers, and length of service. This can be mitigated by consolidating the site with nearby air monitoring locations.

Van Nuys Airport

The Van Nuys Airport site was established at 16345 Raymer during January 2010 to monitor Pb source emissions from the Van Nuys Airport. We currently have an agreement with the owners of the property to allow us to sample and do not anticipate any changes in the near future. The infrastructure is adequate and probe siting criteria meets requirements for source impact siting.

West Los Angeles

The West Los Angeles site was established at its current location at Wilshire and Sawtelle Boulevards on the grounds of the Veterans Administration Hospital during May 1984. We currently have an agreement with the VA Administration to monitor and do not anticipate any changes in the near future. The infrastructure of the facility requires attention. The current monitoring platform is housed in a structure which is outdated. The site is in compliance with 40 CFR § 58 Appendix E Probe Siting Criteria with criteria shown in Table 15. Non-NAAQS data uses include modeling and forecasting of daily pollution levels for public information. There are no synergies between air monitoring programs or use of office space. The cost to relocate the site to meet probe siting criteria will be higher than the current location due to the number of instruments, length of service, and cost of rent in the area.

TABLE 15 Probe Siting

Metric		Horizontal and vertical placement	Spacing from minor sources	Spacing from obstructions	Spacing from trees		Probe distance from traffic lane (m)		ADT Volume	Probe material and sample residence time
Station	Pollutant				Actual	Required	Actual	Required		
Anaheim	O3	1	None	None	**6**	>10	**7.5**	>10	<500	7.4
	CO	1	None	None	**6**	>10	**7.5**	>10	<500	6.4
	NO2	1	None	None	**6**	>10	**7.5**	>10	<500	7.5
	PM10	2	None	None	11	>10	**10.5**	>15	<500	NA
	PM2.5	1	None	None	**8**	>10	**10**	>15	<500	NA
Azusa	O3	1	26 [1]	None	23	>10	14.5	>10	<500	7.9
	CO	1	26 [1]	None	23	>10	14.5	>10	<500	6.7
	NO2	1	26 [1]	None	23	>10	14.5	>10	<500	8.5
	PM10	2	26 [1]	None	23	>10	18.5	>15	<500	NA
	PM2.5	1	26 [1]	None	23	>10	15.8	>15	<500	NA
Banning	O3	1	60 [2]	47	None		80	>20	<2000	8.2
	NO2	1	60 [2]	47	None		80	>20	<2000	9.1
	PM10	2	60 [2]	47	None		80	>15	<2000	NA
Big Bear	PM2.5	1	None	32	36	>10	114	>15	2876	NA
Burbank	O3	1	None	None	18	>10	**13.8**	>20	<2000	6.5
	CO	1	None	None	18	>10	13.8	>10	<2000	6.3
	NO2	1	None	None	18	>10	**13.8**	>20	<2000	7.8
	SO2	1	None	None	18	>10	13.8	NA	<2000	7.9
	PM10	2	None	None	19	>10	**13.8**	>15	<2000	NA
	PM2.5	1	None	None	20	>10	**13.8**	>15	<2000	NA
Compton	O3	1	None	None	16	>10	16.36	>10	<1000	7.6
	CO	1	None	None	16	>10	16.36	>10	<1000	8.7
	NO2	1	None	None	16	>10	16.36	>10	<1000	8.2
	PM2.5	1	None	None	13	>10	21	>15	<1000	NA
	Pb	2	None	None	17	>10	23	>15	<1000	NA
Costa Mesa	O3	1	None	None	18	>10	34	>20	<2000	6.7
	CO	1	None	None	18	>10	34	>10	<2000	7.4
	NO2	1	None	None	18	>10	34	>20	<2000	8.8
	SO2	1	None	None	18	>10	34	NA	<2000	9.5
Crestline	O3	1	None	None	**9**	>10	55	>20	<8000	10
	PM10	2	None	None	**8**	>10	55	>15	<8000	NA
	PM2.5	2	None	None	**7**	>10	55	>15	<8000	NA

[1] Welding shop

[2] Propeller airplane exhaust

TABLE 15 (cont) Probe Siting

Metric		Horizontal and vertical placement	Spacing from minor sources	Spacing from obstructions	Spacing from trees		Probe distance from traffic lane (m)		ADT Traffic Volume	Probe material and sample residence time
Station	Pollutant				Actual	Required	Actual	Required		
Fontana	O3	1	9 [3,4]	None	19	>10	92	>30	12500	5.5
	CO	1	9 [3,4]	None	19	>10	92	>25	12500	5.1
	NO2	1	9 [3,4]	None	19	>10	92	>30	12500	6.0
	SO2	1	9 [3,4]	None	19	>10	92	NA	12500	6.5
	PM10	2	9 [3,4]	None	14	>10	86	>15	12500	NA
	PM2.5	1	9 [3,4]	None	16	>10	86	>15	12500	NA
Glendora	O3	1	None	None	16	>10	121	>20	1834	7.6
	CO	1	None	None	16	>10	121	>10	1834	7.0
	NO2	1	None	None	16	>10	121	>20	1834	7.8
	PM10	2	6 [3]	None	16	>10	121	>15	1834	NA
	PM2.5	1	6 [3]	None	16	>10	121	>15	1834	NA
Indio	O3	1	6 [3]	60	None		88	>40	16528	12.5
	PM10	2	6 [3]	60	None		88	>17	16528	NA
	PM2.5	1	6 [3]	60	None		88	>17	16528	NA
La Habra	O3	1	28 [5]	None	3	>10	40	>100	66200	7.5
	CO	1	28 [5]	None	3	>10	40	>150	66200	6.1
	NO2	1	28 [5]	None	3	>10	40	>100	66200	7.4
Lake Elsinore	O3	1	None	None	17	>10	50	>20	<2000	5.1
	CO	1	None	None	17	>10	50	>10	<2000	5.1
	NO2	1	None	None	17	>10	50	>20	<2000	5.7
	PM10	2	None	None	10	>10	50	>15	<2000	NA
	PM2.5	1	None	None	10	>10	50	>15	<2000	NA
LAX Hastings	O3	1	600 [6]	None	20	>10	85	>20	<2000	6.1
	CO	1	600 [6]	None	20	>10	85	>10	<2000	6.5
	NO2	1	600 [6]	None	20	>10	85	>20	<2000	6.8
	PM10	2	600 [6]	None	16	>10	92	>15	<2000	NA
	Pb	2	600 [6]	None	16	>10	92	>15	<2000	NA

[3] Unpaved parking
[4] Diesel nearby
[5] Refueling station nearby
[6] Airport runway nearby

TABLE 15 (cont) Probe Siting

Metric		Horizontal and vertical placement	Spacing from minor sources	Spacing from obstructions	Spacing from trees		Probe distance from traffic lane (m)		ADT Traffic Volume	Probe material and sample residence time
Station	Pollutant				Actual	Required	Actual	Required		
Long Beach (North)	O3	1	None	5	**6**	>10	**8**	>40	19900	6.9
	CO (µs)	1	None	5	**6**	>10	8	2-10	19900	6.1
	NO2	1	None	5	**6**	>10	**8**	>40	19900	8.4
	SO2	1	None	5	**6**	>10	8	NA	19900	8.9
	PM10	2	None	5	**4**	>10	**8**	>20	19900	NA
	PM2.5	1	None	11	None		55	>20	19900	NA
	Pb (µs)	2	None	5	**4**	>10	10	2-10	19900	NA
Los Angeles (Main St.)	O3	1	45	30	None		71	>40	15276	7.1
	CO	1	45	30	None		71	>45	15276	7.2
	NO2	1	45	30	None		71	>40	15276	7.6
	SO2	1	45	30	None		71	NA	15276	9.5
	PM10	2	27	52	None		51	>15	15276	NA
	PM2.5	1	27	52	None		51	>15	15276	NA
	Pb	2	27	52	None		51	>15	15276	NA
Mira Loma (Jurupa)	O3	1	None	2	None		165	>60	25717	4.5
	CO	1	None	2	None		165	>80	25717	4.8
	NO2	1	None	2	None		165	>60	25717	6.1
	PM10	2	None	2	None		165	>25	25717	NA
Mira Loma (Van Buren)	O3	1	None	None	36	>10	14	>10	<1000	6.7
	CO	1	None	None	36	>10	14	>10	<1000	5.9
	NO2	1	None	None	36	>10	14	>10	<1000	7.0
	PM10	2	None	None	40	>10	15	>15	<1000	NA
	PM2.5	2	None	None	40	>10	15	>15	<1000	NA
Mission Viejo	O3	1	None	None	None		138	>20	<2000	11.4
	CO	1	None	None	None		138	>10	<2000	11.1
	PM10	2	None	None	None		175	>15	<2000	NA
	PM2.5	1	None	None	None		175	>15	<2000	NA
Norco	PM10	2	None	None	29	>10	25	>15	<500	NA
Ontario (Fire-Station)	PM10	2	96 [7]	7	18	>10	43	>15	<2000	NA
	PM2.5	1	96 [7]	7	20	>10	43	>15	<2000	NA

[7] Fire training facility

TABLE 15 (cont) Probe Siting

Metric		Horizontal and vertical placement	Spacing from minor sources	Spacing from obstructions	Spacing from trees		Probe distance from traffic lane (m)		ADT Traffic Volume	Probe material and sample residence time
Station	Pollutant				Actual	Required	Actual	Required		
Palm Springs	O3	1	None	None	22	>10	**17**	>20	<5000	9.3
	CO	1	None	None	22	>10	17	>10	<5000	8.3
	NO2	1	None	None	22	>10	**17**	>20	<5000	9.5
	PM10	2	None	3	19	>10	20	>15	<5000	NA
	PM2.5	1	None	3	19	>10	**13**	>15	<5000	NA
Pasadena	O3	1	None	None	**6**	>10	66	>20	<5000	6.7
	CO	1	None	None	**6**	>10	66	>10	<5000	6.1
	NO2	1	None	None	**6**	>10	66	>20	<5000	6.7
	PM2.5	1	None	None	**6**	>10	70	>15	<5000	NA
Perris	O3	1	None	7	30	>10	74	>60	39500	7.4
	PM 10	2	None	7	30	>10	74	>40	39500	NA
Pico Rivera	O3	1	9 [3]	None	30	>10	41	>40	<20000	6.8
	CO	1	9 [3]	None	30	>10	**41**	>45	<20000	6.7
	NO2	1	4 [3]	None	30	>10	41	>40	<20000	6.5
	PM2.5	1	4 [3]	None	27	>10	35	>20	<20000	NA
	Pb/SO4	2	4 [3]	None	27	>10	35	>20	<20000	NA
Pomona	O3	1	None	None	None		**7**	>60	25000	7.4
	CO (µs)	1	None	None	None		7	2-10	25000	7.0
	NO2	1	None	None	None		**7**	>60	25000	8.2
Redlands	O3	1	2 [3]	None	**8**	>10	26	>20	4709	17.5
	PM10	2	2 [3]	None	10	>10	26	>15	4709	NA
Reseda	O3	1	10 [10]	None	14	>10	**16**	>20	<2000	6.7
	CO	1	10 [10]	None	14	>10	16	>10	<2000	6.0
	NO2	1	10 [10]	None	14	>10	**16**	>20	<2000	7.8
	PM2.5	1	10 [10]	None	14	>10	19	>15	<2000	NA
Riverside	CO (µs)	1	None	None	15	>10	**27**	2-10	40,000	11.4
	NO2	1	None	None	15	>10	**27**	>60	40,000	12.9
	PM2.5	1	None	None	15	>10	**28**	>40	40,000	NA
	Pb/SO4(µs)	2	None	None	15	>10	**28**	2-10	40,000	NA

[3] Unpaved parking

[8] Print shop

TABLE 15 (cont) Probe Siting

Metric		Horizontal and vertical placement	Spacing from minor sources	Spacing from obstructions	Spacing from trees (m)		Probe distance from traffic lane (m)		ADT Traffic Volume	Probe material and sample residence time
Station	Pollutant				Actual	Required	Actual	Required		
Rubidoux	O3	1	None	38	10	>10	119	>40	<20,000	4.7
	CO	1	None	38	10	>10	119	>45	<20,000	5.6
	NO2	1	None	38	10	>10	119	>40	<20,000	7.6
	SO2	1	None	38	10	>10	119	NA	<20,000	7.5
	PM10	2	None	18	10	>10	119	>20	<20,000	NA
	PM2.5	1	None	20	10	>10	119	>20	<20,000	NA
	Pb/SO4	2	None	18	10	>10	119	>20	<20,000	NA
San Bernardino	O3	1	None	None	14	>10	23	>20	<2500	7.9
	CO	1	None	None	14	>10	23	>10	<2500	7.4
	NO2	1	None	None	14	>10	23	>20	<2500	8.7
	PM10	2	None	None	19	>10	16	>15	<2500	NA
	PM2.5	1	None	None	19	>10	16	>15	<2500	NA
	Pb	2	None	None	19	>10	16	>15	<2500	NA
Santa Clarita	O3	1	None	None	30	>10	91	>20	<5000	6.6
	CO	1	None	None	30	>10	91	>10	<5000	6.0
	NO2	1	None	None	30	>10	91	>20	<5000	6.5
	PM10	2	None	None	30	>10	91	>15	<5000	NA
	PM2.5	1	None	None	30	>10	91	>15	<5000	NA
Long Beach (South)	PM10	2	None	20	None		86	>15	<10000	NA
	PM2.5	1	None	20	None		86	>15	<10000	NA
	Pb/SO4	2	None	20	None		86	>15	<10000	NA
Temecula	O3	1	450 [10]	30 [9]	60	>10	1056	>20	6500	TBD
	PM10	2	450 [10]	30 [9]	60	>10	1056	>15	6500	TBD
Upland	O3	1	None	None	19	>10	80	>20	<10000	9.5
	CO	1	None	None	19	>10	80	>10	<10000	8.4
	NO2	1	None	None	19	>10	80	>20	<10000	8.7
	PM10	2	None	None	12	>10	80	>15	<10000	NA
	PM2.5	1	None	None	12	>10	80	>15	<10000	NA
	Pb/SO4	2	None	None	12	>10	80	>15	<10000	NA
West Los Angeles	O3	1	None	None	45	>10	23	>20	<10000	7.5
	CO	1	None	None	45	>10	23	>10	<10000	6.9
	NO2	1	None	None	45	>10	23	>20	<10000	7.9

[9] Microwave tower

[10] Water treatment facility

TABLE 16 Individual Site Assessment Summary

	Site Longevity (Years)	Security of Future Occupancy	Infrastructure				Probe and Monitoring Path Criteria		Data Use Other Than NAAQS	Cost to Move	Synergies Gained
			Building	Electricity	Communications	Space	Obstructions	Distance from Traffic Lane			
Anaheim	9	Secure	Inadequate	Inadequate	Adequate	Inadequate	Obstructed	Inadequate	Yes	High	No
ATSF	10	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	No	Low	No
Azusa	53	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	Low	Yes
Banning Airport	13	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
Big Bear	11	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	No	Low	No
Burbank	49	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Inadequate	Yes	High	Yes
Closet World	2	Secure	NA	Adequate	NA	Adequate	Unobstructed	Adequate	No	Low	No
Compton	6	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
Costa Mesa	21	Secure	No	No	Adequate	No	Unobstructed	Adequate	Yes	High	Yes
Crestline	37	Secure	No	No	Adequate	Adequate	Unobstructed	Adequate	Yes	High	No
Fontana	29	Secure	Adequate	Adequate	Adequate	No	Obstructed	Adequate	Yes	High	Yes
Glendora	30	No	No	Adequate	Adequate	No	Unobstructed	Adequate	Yes	Low	Yes
Indio	27	Secure	No	Adequate	Adequate	No	Obstructed	Adequate	Yes	High	No
La Habra	50	Secure	No	No	No	No	Obstructed	Inadequate	No	High	No
Lake Elsinore	23	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
LAX Hastings	6	Secure	Adequate	Adequate	Adequate	No	Unobstructed	Adequate	Yes	High	Yes
Long Beach (North)	48	Secure	Adequate	Adequate	Adequate	Adequate	Obstructed	Inadequate	Yes	High	Yes
Los Angeles (Main Street)	31	Secure	No	No	No	No	Unobstructed	Adequate	Yes	High	Yes
Mira Loma (Jurupa)	17	No	No	No	No	No	Obstructed	Adequate	Yes	Low	Yes
Mira Loma (Van Buren)	5	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
Mission Viejo	11	Secure	Adequate	Adequate	Adequate	No	Unobstructed	Adequate	No	High	No

TABLE 16 (cont) Individual Site Assessment Summary

	Site Longevity	Security of Future Occupancy	Infrastructure				Probe and Monitoring Path Criteria		Data Use Other Than NAAQS	Cost to Move	Synergies Gained
			Building	Electricity	Communications	Space	obstructed	Distance from Traffic Lane			
Norco	30	Secure	NA	Adequate	NA	Inadequate	Unobstructed	Adequate	No	Low	No
Ontario Fire Station	11	Secure	NA	Adequate	NA	Inadequate	Unobstructed	Adequate	No	High	No
Palm Springs	39	Secure	Adequate	Adequate	Adequate	Inadequate	Obstructed	Inadequate	No	High	No
Pasadena	28	Secure	Inadequate	Adequate	Adequate	Inadequate	Obstructed	Adequate	No	High	No
Perris	37	Secure	Inadequate	Adequate	Adequate	Inadequate	Obstructed	Adequate	No	High	No
Pico Rivera #2	5	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
Pomona	45	Secure	Inadequate	Adequate	Adequate	Inadequate	Unobstructed	Inadequate	No	High	No
Redlands	24	Secure	Inadequate	Adequate	Adequate	Adequate	obstructed	Adequate	No	High	No
Rehrig (Exide)	3	Secure	NA	Adequate	NA	Adequate	Unobstructed	Adequate	No	Low	No
Reseda	45	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Inadequate	No	High	No
Riverside (Magnolia)	38	Secure	Adequate	Adequate	Adequate	Inadequate	Obstructed	Inadequate	Yes	High	Yes
Rubidoux	38	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
San Bernardino	24	Secure	Inadequate	Adequate	Adequate	Inadequate	Unobstructed	Adequate	Yes	High	Yes
Santa Clarita	9	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
South Long Beach	7	Secure	NA	Adequate	NA	Inadequate	Obstructed	Adequate	Yes	High	No
Temecula	< 1 yr	Secure	Adequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	No	High	No
Uddelholm (Trojan Battery)	18	Secure	NA	Adequate	Adequate	Adequate	Unobstructed	Adequate	No	Low	No
Upland	37	Secure	Inadequate	Adequate	Adequate	Adequate	Unobstructed	Adequate	Yes	High	Yes
Van Nuys Airport	< 1 yr	Secure	NA	Adequate	Adequate	Adequate	Unobstructed	Adequate	No	Low	No
West Los Angeles	26	Secure	Inadequate	Adequate	NA	Adequate	Unobstructed	Adequate	Yes	High	No

TABLE 17 Summary Table

Site	Issue	Description
Anaheim	Spacing from trees - proximity to tree s/b > 10 m from dripline	Anaheim is 6 m from palm tree.
	Probe distance from traffic lane	O3 CO and NO2 are 7.5 m s/b ≥ 10 m; PM10 and PM2.5 are 10 m s/b ≥ 15 m for neighborhood scale
Azusa	Spacing from minor sources	Azusa is 26 m down wind from welding shop.
Banning	Spacing from minor sources	Banning is 60 m from leaded gasoline aircraft runway.
Burbank	Probe distance from traffic lane	O3 and NO2 are 13.8 m s/b ≥ 20 m; PM10 and PM2.5 are 13.8 m s/b ≥ 15 m
Crestline	Spacing from trees - proximity to tree s/b > 10 m from dripline	Crestline is 8 m from pine tree.
Fontana	Spacing from minor sources	Fontana is 9 m from regularly idling diesel exhaust and unpaved parking. Particulate monitoring should not be located in unpaved areas.
Glendora	Spacing from minor sources	Glendora is 3 m from unpaved parking. Particulate monitoring should not be located in unpaved areas.
Indio	Spacing from minor sources	Indio is 3 m from unpaved parking. Particulate monitoring should not be located in unpaved areas.
La Habra	Spacing from minor sources	La Habra is 28 m from refueling facility.
	Spacing from trees - proximity to tree s/b > 10 m from dripline	La Habra is 3 m from cypress.
	Probe distance from traffic lane	O3 and NO2 are 40 m s/b ≥ 100 m; CO is 40 m s/b ≥ 150 m for neighborhood scale
Long Beach	Probe distance from traffic lane	O3 and NO2 are 8 m s/b ≥ 40 m; PM10 is 8 m s/b ≥ 20 m for neighborhood scale. Pb and CO are microscale
Long Beach (North)	Spacing from obstructions	North Long Beach is 5 m from building that exceeds height requirement for particulates.
	Spacing from trees - proximity to tree s/b > 10 m from dripline	North Long Beach is 4 m from tree.
Los Angeles (Main)	Probe siting - inlet probe height	Los Angeles (Main) inlet probe height > 2-15 m for neighborhood scale requirement
Mira Loma	Spacing from obstructions	Mira Loma (Jurupa) is 2 m from building which exceeds height requirement for particulates.
Palm Springs	Spacing from obstructions	Palm Springs is 3 m from building that exceeds height requirement for particulates.
	Probe distance from traffic lane	O3 and NO2 are 17 m s/b ≥ 20 m
Pasadena	Spacing from trees - proximity to tree s/b > 10 m from dripline	Pasadena is 6 m from tree.
Pico Rivera	Spacing from minor sources	Pico Rivera is 4 m from unpaved parking. Particulate monitoring should not be located in unpaved areas.
	Probe distance from traffic lane	CO is 41 m s/b ≥ 45 m
Pomona	Probe distance from traffic lane	O3 and NO2 are 7 m s/b ≥ 60 m; CO is microscale
Redlands	Spacing from minor sources	Redlands is 2 m from unpaved parking. Particulate monitoring should not be located in unpaved areas.
	Spacing from trees - proximity to tree s/b > 10 m from dripline	Redlands is 8 m from tree.
Reseda	Spacing from minor sources	Reseda is 10 m from print shop.
	Probe distance from traffic lane	O3 and NO2 are 16 m s/b ≥ 20 m
Riverside	Probe siting - inlet probe height	Riverside roadside microscale CO > 3 +/- 1/2 m requirement
	Probe distance from traffic lane	NO2 is 27 m s/b ≥ 60 m; particulate are 28 m s/b ≥ 42 m except Pb (microscale)

III. NETWORK ASSESSMENT

OVERVIEW

The current AQMD pollutant monitoring networks meet or exceed U.S. EPA monitoring requirements and satisfy multiple monitoring purposes. This section describes the process for assessing individual pollutant networks and monitoring programs in the South Coast AQMD monitoring network. The criteria for assessing the networks include the examination of overall network monitoring objectives, the spatial scales of representativeness, the minimum number of monitors required by regulation, and correlation analysis to determine redundancy or gaps within each network.

NETWORK ASSESSMENT CRITERIA DESCRIPTIONS

The criteria used for network assessment are described below. They include an assessment of monitoring objectives and spatial scales relative to 40 CFR § 58 Appendix D criteria. Another criteria was a correlation analysis using the provided U.S. EPA tools to identify redundant sites or geographical areas which may need additional sites within a monitoring network. Finally, networks were evaluated against the regulatory requirements for the minimum number of monitors using the latest census data available.

Monitoring Objectives

Over the last twenty years, population, sources of pollution, ambient levels of pollution, and the South Coast AQMD air monitoring network have been modified. A periodic reassessment of monitoring objectives will help ensure that the current network design meets the original and any new monitoring objectives.

Ambient air monitoring network design is specified, at a minimum, by the U.S. EPA and includes monitoring objectives and general criteria as outlined in 40 CFR § 58 Appendix D. Each pollutant measured at each air monitoring site is related to a specific monitoring objective. Depending on pollutant, air monitoring networks are designed to meet all or a subset of the following objectives:

- *Highest concentrations* expected to occur in the geographical area covered by the network.
- *Representative concentrations in areas of high population density* in the geographical area covered by the network.
- *Impact* of significant sources or source categories of pollution such as refineries or specific area sources such as residential fuel combustion.
- *Background* concentration levels, usually located upwind of the air monitoring network.
- *Regional transport* of pollution to areas outside of the monitoring network usually located downwind of the air monitoring network.
- The last type of site required measures air pollution impacts on visibility, vegetation damage, or other *welfare based* impacts.

Spatial Scale of Representativeness

Each monitoring objective or site type is also related to a specific spatial scale of representativeness as shown in Table 8. The goal in deciding on a location for a monitor is to correctly match the spatial scale of representativeness with the monitoring objective for the site being established. Spatial scale of representativeness is the physical dimension of the air parcel being represented by the air monitoring location. Spatial scales are defined as:

- Microscale – represents concentrations in an area ranging from several meters to 100 m.
- Middle scale – represents concentrations in an area from 100 m to .5 kilometers.
- Neighborhood scale – represents concentrations in an area that has uniform land use and is .5 kilometers to 4.0 kilometers.
- Urban scale – represents concentrations in an area the size of a city, from 4 to 50 kilometers in size. Influence from sources of pollution may prevent homogenous representation of a pollutant on an urban scale.
- Regional scale – represents concentrations in a homogenous geographical area without large sources of pollution, usually tens to hundreds of kilometers in size.

Correlation Analysis

The U.S. EPA provided tools to assist in the network assessment process. The Correlation Matrix Analysis shows the correlation, relative difference, and distance between pairs of sites within a Core Based Statistical Area (CBSA) or a region. During the static analysis, each CBSA displays a graphical matrix for O3, PM2.5 reference, and equivalent methods and continuous particulate sites. The shape of ellipses represents the Pearson squared correlation between sites with circles representing zero correlation and a straight diagonal line representing a perfect correlation. The correlation between two sites quantitatively describes the degree of relatedness between the measurements made at two sites. The correlation, however, may indicate whether a pair of sites is related, but it does not indicate if one site consistently measures pollutant concentrations at levels substantially higher or lower than the other. For this purpose, the color of the ellipses represents the average relative difference between sites where the daily relative difference is defined as:

$$\frac{abs(s1 - s2)}{avg(s1, s2)}$$

Where $s1$ and $s2$ represent the concentrations at sites one and two in the pairing, *abs* is the absolute difference between the two sites and *avg* is the average of the two site concentrations. The average relative difference between the two sites is an indicator of the overall measurement similarity between the two sites. Site pairs with a lower average relative difference are more similar to each other than pairs with a larger difference. The distance between the sites influences both the correlation and the relative difference between sites. Usually sites with a larger distance between them will generally be more poorly correlated and have large differences in the corresponding pollutant

concentrations. The distance between site pairs in the correlation matrix graphic is displayed in kilometers in the middle of each ellipse.

The purpose of this analysis tool is to provide a means of identifying potential redundant sites that could be removed. Potentially redundant sites exhibit fairly high correlations of 0.8 consistently across all of their pairings and have low average relative difference, despite the distance between it and other sites. Usually, it is expected that correlation between sites will decrease as distance increases. However, for a regional air pollutant such as O3, sites in the same air shed can have very similar concentrations and be highly correlated. More unique sites will tend to exhibit the opposite characteristics. They will not be very well correlated with other sites and their relative difference would be higher than other site-to-site pairs.

Note that results from such a correlation analysis are just one criteria in assessing the value of sites within a network. Other site-specific or network design factors, such as health studies, EJ, inter-program synergies, long-term trends, and logistical constraints may add value to a site even if the measured concentrations are similar to other nearby sites.

Minimum number of monitors

As a general requirement, the U.S. EPA specifies the minimum numbers of sites required in a criteria pollutant network based on the latest census population data. For instance, the minimum number of O3 sites required is based upon the MSA population and the most recent 3-year design value as shown in Table 9. These are minimum requirements and the total number of sites necessary to adequately satisfy all monitoring objectives may be higher. As of 2009, there were no minimum requirements for the number of CO, NO2, and SO2 monitoring sites in an air monitoring network. More recent minimum requirements for NO2 and SO2 are not considered in this assessment. Discontinuing operations within existing monitoring networks, even if not required by regulation, is usually subject to U.S. EPA Regional Administrator approval. One minimum requirement for the number of Pb sites is based upon estimated source emissions. A site must be located at maximum downwind concentration for each source that exceeds 1.0-tons/year Pb emissions within the boundaries of the air monitoring network. Another minimum monitoring requirement for Pb is based on population. The number of PM10 sites required is based upon MSA population data and design values as shown in Table 10. The number of PM2.5 sites required is based upon MSA population data and measured concentrations as shown in Table 11. The final number of sites required may be more than the regulatory minimums dependent upon U.S. EPA Regional Approval of Annual Network Plans.

The South Coast AQMD jurisdictional boundary encompasses two MSA's as defined by the U.S. Office of Management and Budget and the U.S. Census Bureau. The Los Angeles-Long Beach-Santa Ana MSA (Code 31100) had a population of 12,365,627 based on the year 2000 U.S. Census. The Riverside-San Bernardino-Ontario MSA (Code 40140) had a population of 3,254,821 in 2000. The minimum number of monitors for each pollutant is based on MSA population and measured concentrations as described in 40 CFR § 58 Appendix D. The South Coast AQMD network exceeds the minimum monitoring requirements for all criteria pollutants.

POLLUTANT NETWORK ASSESSMENTS

Ozone (O3)

O3 is formed when the precursor gases VOC and NOx react in the atmosphere with sunlight. Emissions from VOC and NOx sources are frequently trapped in the South Coast Basin by the surrounding mountains and a persistent inversion layer. This leads to high ozone values, especially during the summer and early fall months.

Regulatory Requirement

Local agencies must operate O3 monitoring sites at various locations depending upon population and O3 design values relative to the NAAQS. Ambient air quality standards for O3 have been set by both the State and Federal governments and continue to be made more stringent. The current ambient air quality standards for O3 are included in Table 7. To assess compliance with Federal and State standards, South Coast AQMD operates 30 sites with O3 measurements as part of the Air Monitoring Network. Figure 2 shows the spatial distribution of these sites.

Monitoring Objective

The majority of the O3 monitoring network sites have been designated as population exposure monitoring locations as depicted in Table 18. Sites downwind of the formation of O3 such as Santa Clarita, Crestline, Banning, Perris, Rubidoux, and San Bernardino areas tend to have much higher concentrations. The sites which recorded the highest 2008 O3 concentrations include: Central San Bernardino Mountains (Crestline), Central San Bernardino Valley 1 (Fontana), Santa Clarita, Central San Bernardino Valley 2 (San Bernardino), East San Gabriel Valley 2 (Glendora), North West San Bernardino Valley (Upland), East San Bernardino Valley (Redlands), and Banning. The preceding seven sites are representative of high concentration sites for O3. Background site designations are typically coastal areas. The following sites recorded the lowest O3 concentrations in 2008: South West Coastal LA County (LAX Hastings), Coastal LA County (North Long Beach), North Orange County (La Habra), Central Orange County (Anaheim), and South San Gabriel Valley (Pico Rivera 2). LAX Hastings and North Long Beach recorded the lowest concentrations and are more representative of background concentrations. As mentioned earlier, population trends show increasing development and population in the inland area. In general, the western sites in the O3 monitoring network provide lower value information than those inland sites to the north or east. The O3 monitoring network/population trend is depicted in Figure 3.

TABLE 18 O3 Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
Anaheim	Population oriented	Neighborhood	Yes
Azusa	High concentration	Urban	Yes
Banning	Population oriented	Neighborhood	Yes
Burbank	High concentration	Urban	Yes
Compton	Population oriented	Neighborhood	Yes
Costa Mesa	Population oriented	Neighborhood	Yes
Crestline	High concentration	Neighborhood	Yes
Fontana	Population oriented	Urban	Yes
Glendora	High concentration	Neighborhood	Yes
Indio	Population oriented	Neighborhood	Yes
La Habra	Population oriented	Neighborhood	Yes
Lake Elsinore	Population oriented	Neighborhood	Yes
LAX Hastings	Population oriented	Middle	No
Long Beach (North)	Population oriented	Middle	No
Los Angeles (Main St.)	Population oriented	Neighborhood	Yes
Mira Loma (Jurupa)	Population oriented	Neighborhood	Yes
Mira Loma (Van Buren)	Population oriented	Neighborhood	Yes
Mission Viejo	Population oriented	Neighborhood	Yes
Palm Springs	Population oriented	Neighborhood	Yes
Pasadena	Population oriented	Neighborhood	Yes
Perris	Population oriented	Neighborhood	Yes
Pico Rivera	High concentration	Neighborhood	Yes
Pomona	High concentration	Middle	Yes
Redlands	Population oriented	Neighborhood	Yes
Reseda	High concentration	Urban	Yes
Rubidoux	High concentration	Urban	Yes
San Bernardino	High concentration	Neighborhood	Yes
Santa Clarita	High concentration	Urban	Yes
Temecula	TBD	TBD	TBD
Upland	Population oriented	Neighborhood	Yes
West Los Angeles	Population oriented	Middle	No

Spatial Scale of Representativeness

Monitoring objectives are matched with specific spatial scales of representativeness as shown in Table 18. When compared to the U.S. EPA criteria, some potential changes in monitoring objectives may be possible within the South Coast AQMD O3 network. The LAX Hastings and North Long Beach site record low concentrations of O3 and may be more consistent with background concentrations at the urban scale of representativeness. Other factors such as nearby roadways may also contribute to low O3 levels at North Long Beach.

Individual site assessments of the Spatial Scale of Representativeness for O3 are shown in Table 18.

Correlation Analysis

The correlation matrix analysis shows the correlation, relative difference, and distance between sites. The shape of the ellipses represents the Pearson Squared Correlation between sites with a circle representing zero correlation and a straight line representing perfect correlation; correlation between the sites represents the degree of relatedness. The correlation however, does not indicate if one site measures concentrations substantially higher or lower than another, for this the color of the ellipses represents the average relative difference. This analysis aids in determining sites that are redundant. Confounding factors affecting analysis include AQS site data with < 75% completion is not used.

O3 correlation for 2008 between sites in Los Angeles, Orange, Riverside, and San Bernardino counties are shown in Figure 4. Site pairs that result in correlations greater than 0.8 and relative differences less than 0.3 for O3 are:

60370002 (Azusa) with	060370016 (Glendora) 060371701 (Pomona) 060372005 (Pasadena) 060710004 (Upland) 060712002 (Fontana).
060370016 (Glendora) with	060371701 (Pomona) 060372005 (Pasadena) 060711004 (Upland) 060712004 (Fontana)
060371002 (Burbank) with	060371103 (Central LA) 060372005 (Pasadena).
060371103 (Central L.A.) with	060371602 (Pico Rivera 2) 060372005 (Pasadena).
060371701 (Pomona) with	060372005 (Pasadena) 060658001 (Rubidoux) 060711004 (Upland) 060712002 (Fontana) 060719004 (San Bernardino)
060590007 (Anaheim) with	060595001 (La Habra)
060650012 (Banning Airport) with	060651016 Torres Martinez (Indian Reservation not operated by South Coast AQMD)

060658001 (Rubidoux) with	060712002 (Fontana) 060714003 (Redlands) 060719004 (San Bernardino)
060711004 (Upland) with	060712002 (Fontana)
060712002 (Fontana) with	060714003 (Redlands) 060719004 (San Bernardino)
060714003 (Redlands) with	060719004 (San Bernardino).

This analysis shows that for O3, many sites generate comparable data. This result is expected for ozone given the regional nature of the pollutant and the density of the current network. Even if sites measure somewhat comparable ozone levels, the need for public reporting of health alert and AQI levels necessitates a relatively dense ozone network to capture spatial variability. Clusters of sites with generally highest correlations, small average differences, and close proximities include Fontana/Redlands/San_Bernardino/Rubidoux, Azusa/Glendora/Pomona/Upland/Fontana, and Anaheim/La Habra.

O3 Minimum Monitoring Requirement

U.S. EPA criteria specify the minimum number of sites required in an air monitoring network based on MSA population and design value. Design values currently exceed the standard and population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 19. The information shows that the South Coast AQMD air monitoring network significantly exceeds the required minimum numbers of samplers for O3.

Table 19 Minimum O3 Requirement

MSA	Min. # Monitors Required	# Monitors Active
31100	4	17
40140	2	13

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. The highest levels of CO in ambient air typically occur during the colder months of the year when inversion conditions are more frequent. South Coast AQMD operates 26 sites with CO measurements as part of the South Coast AQMD air monitoring network. Figure 5 shows the spatial distribution of these sites.

Regulatory Requirement

Starting in the early 1970's, the EPA set national standards that have considerably reduced emissions of CO and other pollutants from motor vehicles. Since 1970, CO emissions from on-road vehicles have been reduced by over 40 percent. The greatest reductions have been in emissions from cars (nearly 60 percent). Currently, there is no minimum requirement for the number of CO monitoring sites. Continued operation of existing SLAMS, FRM, or FEMS is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS CO monitoring is ongoing, at least one site must be a maximum concentration site for the monitoring network.

Monitoring Objective

The CO monitoring network and population trends are depicted in Figure 6. The majority of the CO monitoring network sites are designated as population exposure sites. Review of the 2008 data indicates that Lynwood and Central Orange County (Anaheim) sites recorded the highest 8-hour average for CO in 2008 as 4.3 ppm and 3.6 ppm respectively. The Lynwood air monitoring location was replaced in 2008 by the Compton location due to unstable infrastructure and after concurrent sampling showed that CO levels were comparable at the two sites. The lowest recorded values include the Palm Springs, Lake Elsinore, Santa Clarita, and Saddleback Valley (Mission Viejo) sites. The Compton site is consistent with high concentration levels of CO. The lowest levels are found at Palm Springs, Lake Elsinore, Santa Clarita, and Mission Viejo. All sites other than Compton and Anaheim are consistent with population exposure. The majority of sites remain on the west side where population growth has remained relatively stagnant. CO measurements in general are of lower value given the attainment status of the basin and the low design values. However, the prospect of new CO NAAQS adds value in terms of tracking long-term trends and spatial variability.

TABLE 20 CO Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
Anaheim	High concentration	Neighborhood	Yes
Azusa	Population oriented	Neighborhood	Yes
Burbank	Population oriented	Neighborhood	Yes
Compton	High concentration	Middle	Yes
Costa Mesa	Population oriented	Neighborhood	Yes
Fontana	Population oriented	Neighborhood	Yes
Glendora	Population oriented	Neighborhood	Yes
La Habra	Population oriented	Neighborhood	Yes
Lake Elsinore	Population oriented	Neighborhood	Yes
LAX Hastings	Population oriented	Middle	No
Long Beach (North)	Population oriented	Micro	Yes
Los Angeles (Main St.)	Population oriented	Neighborhood	Yes
Mira Loma (Jurupa)	Population oriented	Neighborhood	Yes
Mira Loma (Van Buren)	Population oriented	Neighborhood	Yes
Mission Viejo	Population oriented	Neighborhood	Yes
Palm Springs	Population oriented	Neighborhood	Yes
Pasadena	Population oriented	Middle	No
Pico Rivera	Population oriented	Neighborhood	Yes
Pomona	Population oriented	Micro	No
Reseda	Population oriented	Neighborhood	Yes
Riverside	Population oriented	Micro	Yes
Rubidoux	Population oriented	Middle	No
San Bernardino	Population oriented	Middle	No
Santa Clarita	Population oriented	Neighborhood	Yes
Upland	Population oriented	Neighborhood	Yes
West Los Angeles	Population oriented	Neighborhood	Yes

Spatial Scale of Representativeness

Most sites are consistent with the appropriate CO spatial scale of representativeness for the monitoring objective. Comparison of EPA criteria with Table 20 shows the LAX Hastings, Pasadena, Pomona, Rubidoux, and San Bernardino sites could be re-designated at different spatial scales that may be more consistent with monitoring objectives.

Correlation Analysis

Correlation analysis was not available for CO using EPA provided tools. This is due to the lack of a minimum number of required monitoring sites.

Minimum Number of Sites Required

For the CO monitoring network, there must only be one site designated as maximum concentration (Compton). All others may be considered for closure by

demonstrating either attainment has been reached and expected to be maintained, a monitor is consistently low relative to other monitors, a monitor has not measured a violation with NAAQS, a monitor has siting issues, a monitor is upwind of the urban area, or a site has logistical problems beyond agency control.

EPA criteria specify minimum numbers of sites required in an air monitoring network based on MSA population. Population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 21. The information shows that the South Coast AQMD air monitoring network significantly exceeds the required minimum numbers of samplers for CO.

Table 21 Minimum CO Requirement

MSA	Minimum Number of Monitors Required	Number of Monitors Active
31100	0	17
40140	0	9

Nitrogen Dioxide

Nitrogen dioxide (NO2) is one of a group of highly reactive gases known as "oxides of nitrogen," or "nitrogen oxides" (NOx). Some NO2 is emitted directly but most NO2 forms in the atmosphere from the NO emissions from cars, trucks, buses, power plants, and any high-temperature combustion process. In addition to contributing to the formation of ground-level O3 and fine particle pollution, NO2 is linked with a number of adverse effects on the respiratory system. The South Coast AQMD operates 26 sites as part of the NO2 monitoring network. The spatial distribution of NO2 monitors is shown in Figure 7. Review of 1992 through 2009 data indicates that the annual NAAQS for NO2 was not exceeded.

Regulatory Requirement

As of 2009, there was no minimum requirement for the number of NO2 monitoring sites. Continued operation of existing SLAMS sites is required until discontinuation is approved by the U.S. EPA Regional Administrator. Where SLAMS NO2 monitoring is ongoing, at least one site must be a maximum concentration site for the monitoring network.

On February 9, 2010, EPA made revisions to the NO2 NAAQS requiring monitoring where maximum NO2 concentrations are expected to occur, including within 50 m of major roadways, as well as monitors sited to measure the area-wide NO2 concentrations that occur more broadly across communities. To accomplish this, a two-tiered monitoring network is proposed for the NO2 NAAQS. One tier (the near-road network) will reflect the much higher NO2 concentrations that occur near-road and the second-tier (area-wide) characterizes the NO2 concentrations that occur in a larger area such as neighborhood or urban

areas. However, these new NAAQS and monitoring regulations for NO2 are not considered in this assessment.

Monitoring Objective

There is no minimum requirement for the monitoring for NO2, but the U.S. EPA Regional Administrator must approve any reduction of the current operating monitoring network. The current NO2 monitoring network and population trends are shown in Figure 8. The majority of the NO2 monitoring network is designated as population exposure sites. A review of data indicates that the highest 1-hour concentrations in 2008 were recorded at the North Long Beach, Lynwood, and Central LA monitoring locations and the lowest concentrations were recorded at the Palm Springs and Lake Elsinore sites. During 2008, the Lynwood site was moved to the Compton location. The North Long Beach, Compton, and Central LA sites are more representative of high concentration sites than population exposure. The remainder of the sites are representative of population exposure. Monitors are distributed primarily in the western portion of the basin where higher NO2 levels are expected. Given the attainment status of the basin and the low ambient levels, these monitors are generally of lower value. However, the new 2010 NAAQS and monitoring requirements add value in terms of long-term trends and spatial variability.

TABLE 22 NO2 Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
Anaheim	Population oriented	Urban	Yes
Azusa	Population oriented	Urban	Yes
Banning	Population oriented	Neighborhood	Yes
Burbank	Population oriented	Neighborhood	Yes
Compton	High concentration	Middle	Yes
Costa Mesa	Population oriented	Neighborhood	Yes
Fontana	Population oriented	Urban	Yes
Glendora	Population oriented	Neighborhood	Yes
La Habra	Population oriented	Urban	Yes
Lake Elsinore	Population oriented	Neighborhood	Yes
LAX Hastings	Population oriented	Middle	No
Long Beach (North)	High concentration	Middle	Yes
Los Angeles (Main St.)	High concentration	Neighborhood	Yes
Mira Loma (Jurupa)	Population oriented	Neighborhood	Yes
Mira Loma (Van Buren)	Population oriented	Neighborhood	Yes
Palm Springs	Population oriented	Neighborhood	Yes
Pasadena	Population oriented	Neighborhood	Yes
Pico Rivera	Population oriented	Neighborhood	Yes
Pomona	Population oriented	Middle	No
Reseda	Population oriented	Urban	Yes
Riverside	Population oriented	Urban	Yes
Rubidoux	Population oriented	Urban	Yes
San Bernardino	Population oriented	Urban	Yes
Santa Clarita	Population oriented	Neighborhood	Yes
Upland	Population oriented	Neighborhood	Yes
West Los Angeles	Population oriented	Neighborhood	Yes

Spatial Scale of Representativeness

Most sites were consistent with NO2 spatial scale of representativeness. Comparison of Table 22 with EPA criteria showed that the LAX Hastings, and Pomona sites could be designated at spatial scales that are more consistent with monitoring objectives. North Long Beach is more representative of a high concentration site at the neighborhood scale. The remainder of the sites are representative of population-oriented sites at the neighborhood scale.

Correlation Analysis

Correlation analysis was not available for NO2 using EPA provided tools. This is due to the lack of a minimum number of required monitoring sites.

Minimum Number of Sites Required

For the NO2 monitoring network, there must only be one site designated as maximum concentration. All others may be considered for closure by demonstrating either attainment has been reached and expected to be maintained, a monitor is consistently low relative to other monitors, a monitor has not measured a violation with NAAQS, a monitor has siting issues, a monitor is upwind of the urban area, or a site has logistical problems beyond agency control.

EPA criteria specify minimum numbers of sites required in an air monitoring network based on MSA population. Population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 23. The information shows that the South Coast AQMD air monitoring network significantly exceeds the required minimum numbers of samplers for NO2. Also included in the table is the new requirement for near roadway monitoring which is to begin operation by January 1, 2013.

Table 23 Minimum NO2 Requirement

MSA	Minimum Number of Monitors Required	Number of Monitors Active	New Minimum Requirement	
			Near Roadway	Area Wide
31100	0	17	2	1
40140	0	9	2	1

Sulfur Dioxide

Sulfur dioxide (SO2) is one of a group of highly reactive gasses known as oxides of sulfur (SOx). The largest sources of SO2 emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO2 emissions include industrial processes such as extracting metal from ore and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. South Coast AQMD operates SO2 monitors at 7 sites. Figure 9 shows the spatial distribution of the sites. The monitors are clustered mostly in the areas where SO2 sources may be located. The federal standard has not been exceeded in the basin for nearly 30 years.

Regulatory Requirement

The EPA first set standards for SO2 in 1971. The EPA set a twenty-four hour primary standard at 140 ppb and an annual average standard at 30 ppb (to protect health). The EPA also set a 3-hour average secondary standard at 500 ppb. Currently, there is no minimum requirement for the number of SO2 monitoring sites. Continued operation of existing SLAMS sites are required until discontinuation is approved by The U.S. EPA Regional Administrator. Where SLAMS SO2 monitoring is ongoing, at least one site must be designated a maximum concentration site.

On June 2, 2010, the EPA strengthened the primary NAAQS for SO2. The EPA is also revising the ambient air monitoring requirements for SO2. States will need

to make adjustments to the existing monitoring network in order to ensure that monitors meeting the new network design regulations are sited and operational by January 1, 2013. However, these new NAAQS and monitoring regulations for NO2 are not considered in this assessment.

The final monitoring regulations require monitors to be placed in Core Based Statistical Areas (CBSAs) based on a population weighted emissions index for the area. The final rule requires:

- 3 monitors in CBSAs with index values of 1,000,000 or more;
- 2 monitors in CBSAs with index values less than 1,000,000 but greater than 100,000; and
- 1 monitor in CBSAs with index values greater than 5,000.

Monitoring Objective

As of 2009, there was no minimum requirement for the monitoring of SO2, but the U.S. EPA Regional Administrator must approve any reduction of the current monitoring network. The current SO2 monitoring network and population trends are shown in Figure 10. All SO2 monitors are designated as population oriented with the exception of North Long Beach, which is designated as high concentration as shown in Table 24. A review of the annual data shows that the maximum 1-hour concentration in 2008 was .09 ppm at North Long Beach and the next highest concentration was .02 ppm at LAX Hastings; the remaining sites were generally below the threshold for the monitoring instrumentation. The majority of the SO2 sites are in the western portion of the Basin. This is appropriate, even though the population growth has occurred inland, because the majority of SO2 sources are oil refineries located near the coast. North Long Beach should remain a high concentration site and the inland locations are appropriately designated as population oriented.

TABLE 24 SO2 Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
Burbank	Population oriented	Neighborhood	Yes
Costa Mesa	Population oriented	Neighborhood	Yes
Fontana	Population oriented	Neighborhood	Yes
LAX Hastings	Population oriented	Neighborhood	Yes
Long Beach (North)	High concentration	Neighborhood	Yes
Los Angeles (Main St.)	Population oriented	Neighborhood	Yes
Rubidoux	Population oriented	Neighborhood	Yes

Spatial Scale of Representativeness

All SO2 spatial scales of representativeness were consistent with the monitoring objectives as shown in Table 24.

Correlation Analysis

Correlation analysis was not available for SO2 using EPA provided tools. This is due to the lack of a minimum number of required sites.

Minimum number of sites required

For the SO2 monitoring network, there must only be one site designated as maximum concentration. All others may be considered for closure by demonstrating either attainment has been reached and expected to be maintained, a monitor is consistently low relative to other monitors, a monitor has not measured a violation with NAAQS, a monitor has siting issues, a monitor is upwind of the urban area, or a site has logistical problems beyond agency control. EPA criteria specify the minimum number of sites required in an air monitoring network based on MSA population. Population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 25. The information shows that the South Coast AQMD air monitoring network significantly exceeds the required minimum numbers of samplers for CO. Also included in the table is the new requirement for monitoring which is to begin operation by January 1, 2013.

Table 25 Minimum SO2 Requirement

MSA	Minimum Number of Monitors Required	Number of Monitors Active	New Minimum Requirement
			Monitors Required
31100	0	5	2
40140	0	2	2

Pb

Pb is a metal found naturally in the environment as well as in manufactured products. The major sources of Pb emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. As a result of the EPA's regulatory efforts to remove Pb from gasoline, emissions of Pb from the transportation sector dramatically declined between 1980 and 1999, and levels of Pb in the air decreased by 94 percent between 1980 and 1999. Today, the highest levels of Pb in air are usually found near Pb smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. Total Suspended Particulate (TSP) measurements are collected at 15 sites as part of the South Coast AQMD monitoring network; five of the sites are source-oriented microscale Pb sites, and 10 sites measure population-oriented ambient Pb. The spatial distribution of these sites is shown in Figure 11.

Regulatory Requirement

On November 12, 2008, the EPA issued final revisions to the NAAQS standards for Pb. New network design requirements were implemented for monitoring sources of Pb (source-oriented monitoring) and urban Pb monitoring (non-source oriented). To meet this requirement, a new source-oriented site was established on January 1st, 2010 at the Van Nuys Airport and monitoring will continue at

existing sites near the Exide (Vernon), Quemetco (City of Industry), and the Trojan Battery (Santa Fe Springs) facilities.

Non source-oriented monitors are located in urban areas to gather information on general population Pb exposure. Starting January 1, 2011, one non source-oriented monitor is required in each CBSA with a population > 500,000 as determined by the most recent census data. South Coast AQMD's current Pb monitoring network exceeds the minimum required monitoring specified as part of the final revision to the NAAQS for Pb.

Monitoring Objective

The current Pb monitoring network and population trends are shown in Figure 12. All of the non-source-oriented Pb monitoring network sites are population-oriented. The Pb monitoring network was put in place when leaded gasoline was still being used in automobiles. With the mainstream use of unleaded gasoline, concentrations of Pb have decreased with no clear high concentration site. Therefore, all of the non-source-oriented Pb monitoring have been re-designated as population-oriented monitoring locations. The source-oriented sites are appropriately considered source impact sites.

TABLE 26 Pb Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
ATSF (Exide-Vernon)	Source impact	Micro	Yes
Closet World (Quemetco-City of Industy)	Source impact	Micro	Yes
Compton	Population oriented	Neighborhood	Yes
LAX Hastings	Population oriented	Neighborhood	Yes
Long Beach (North)	Population oriented	Neighborhood	Yes
Long Beach (South)	Population oriented	Neighborhood	Yes
Los Angeles (Main St.)	Population oriented	Neighborhood	Yes
Pico Rivera	Population oriented	Neighborhood	Yes
Rehrig (Exide-Vernon)	Source impact	Micro	Yes
Riverside	Population oriented	Neighborhood	Yes
Rubidoux	Population oriented	Neighborhood	Yes
San Bernardino	Population oriented	Neighborhood	Yes
Uddelholm (Trojan Battery-Santa Fe Springs)	Source impact	Mico	Yes
Upland	Population oriented	Neighborhood	Yes
Van Nuys Airport	Source impact	Micro	Yes

Spatial Scale of Representativeness

The proper scale for the five source-oriented sites is microscale. The scale for the non-source-oriented sites are neighborhood scale or greater as shown in Table 26.

Correlation Analysis

Correlation analysis was not available for Pb using EPA provided tools. This was because most agencies across the country do not have an existing Pb monitoring network.

Minimum Number of Sites Required

EPA criteria specify the minimum number of sites required in an air monitoring network based on MSA population. Population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 27. Only two facilities exceed the 1.0 ton/year emissions threshold for source-oriented monitoring based on the latest data: Exide (Vernon) and Van Nuys Airport. The information shows that the South Coast AQMD air monitoring network significantly exceeds the required minimum numbers of samplers for Pb. Also included in the table is the new requirement for urban monitoring which is to begin operation by January 1, 2011.

Table 27 Minimum Pb Requirement

MSA	Minimum Number of Monitors Required		Number of Monitors Active		New Minimum Requirement
	Source Impact	Urban Monitoring	Source Impact	Urban Monitoring	Urban Monitoring
31100	2	0	5	6	1
40140	0	0	0	4	1

PM10

Particulate matter also known as particle pollution or PM, is a complex mixture of microscopic particles and liquid droplets. Particle pollution is made up of a number of components, including ions (such as nitrates and sulfates), organic chemicals, elemental carbon, metals, and soil or dust particles.

The size of particles is directly linked to their potential for causing health problems. The U.S. EPA regulates particles that are 10 micrometers (μm) in diameter or less (PM10) because these particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart, lungs and cause serious health effects. "Inhalable coarse particles," are defined as larger than 2.5 μm but smaller than 10 μm in diameter.

Regulatory Requirement

The nation's air quality standards for particulate matter were first established in 1971 and were not significantly revised until 1987, when the EPA changed the indicator of the standards to regulate inhalable particles smaller than or equal to 10 μm in diameter. PM10 measurements contain both fine (PM2.5) and coarse particles. In 2006, the U.S. EPA revoked the annual PM10 standard because the available evidence did not suggest a link between long-term exposure to PM10 and health problems. The 24-hour PM10 NAAQS was retained as well as

minimum monitoring requirements for PM10 based on MSA population and PM10 design value as specified in 40 CFR § 58 Appendix D.

To meet this requirement, size-selective inlet high-volume samplers are operated at 22 sites to meet the requirements for PM10 FRM sampling. In addition PM10 continuous FEM analyzers are operated at 14 sampling sites providing hourly particulate concentration measurements. Figure 13 shows the spatial distribution of the sampling sites. Real-time monitors, for the most part, are clustered in the high concentration areas, with two located in the desert area where wind-blown crustal material can cause exceedances of the twenty-four hour standard during high wind events. Real time PM10 monitors also support ongoing health studies in the region. All PM10 FRM monitors currently operate on a one-in-six day schedule with the exception of Indio and Rubidoux, the maximum concentration sites in each air basin, which operate on an enhanced frequency one-in-three day schedule as required by 40 CFR § 58.12(e). The continuous PM10 FEM monitors also provide a daily record of PM10 values at many of the higher concentration sites.

Monitoring Objective

The majority of the PM10 sites are designated as population exposure sites as shown in Table 28. The 2007-2008 data shows that Mira Loma (Van Buren) reported the highest concentrations in the South Coast Basin at 142 and 135 $\mu g/m^3$ in 2007, and 2008 respectively (excluding exceptional events). This site began operation in 2006, and previous to that, Rubidoux was designated as the maximum concentration site requiring enhanced monitoring frequency as per 40 CFR § 58.12(e) based on 2000-2005 monitoring data. This assessment concludes that based on recent years monitoring data, Mira Loma will be designated the maximum concentration site and the required enhanced monitoring frequency will be provided by a continuous PM10 FEM BAM recently installed at the site. The remainder of the PM10 sites are consistent with population exposure at the neighborhood scale. Figure 14 shows the distribution of the PM10 monitors along with the population change from 1990 through 2009. Sites are concentrated inland, where particulate concentrations tend to be higher.

TABLE 28 PM10 Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
Perris	Population oriented	Neighborhood	Yes
Anaheim	Population oriented	Neighborhood	Yes
Azusa	Population oriented	Neighborhood	Yes
Banning	Population oriented	Neighborhood	Yes
Burbank	Population oriented	Neighborhood	Yes
Crestline	Population oriented	Neighborhood	Yes
Fontana	Population oriented	Neighborhood	Yes
Glendora	Population oriented	Neighborhood	Yes
Indio	Population oriented	Neighborhood	Yes
Lake Elsinore	Population oriented	Neighborhood	Yes
LAX Hastings	Population oriented	Neighborhood	Yes
Long Beach (North)	Population oriented	Neighborhood	Yes
Los Angeles (Main St.)	Population oriented	Neighborhood	Yes
Mira Loma (Jurupa)	Population oriented	Neighborhood	Yes
Mira Loma (Van Buren)	High Concentration	Neighborhood	Yes
Mission Viejo	Population oriented	Neighborhood	Yes
Norco	Population oriented	Neighborhood	Yes
Ontario (Fire-Station)	Population oriented	Neighborhood	Yes
Palm Springs	Population oriented	Neighborhood	Yes
Redlands	Population oriented	Neighborhood	Yes
Rubidoux	Population oriented	Neighborhood	Yes
San Bernardino	Population oriented	Neighborhood	Yes
Santa Clarita	Population oriented	Neighborhood	Yes
Long Beach (South)	Population oriented	Neighborhood	Yes
Temecula	TBD	TBD	TBD
Upland	Population oriented	Neighborhood	Yes

Spatial Scale of Representativeness

The vast majority of sites showed consistency between the spatial scale of representativeness and monitoring objective. The North Long Beach site was designated at the middle scale but with a population-oriented monitoring objective. Population-oriented sites are more consistent with the neighborhood scale of representativeness.

Correlation Analysis

PM10 correlation analysis for data collected during 2008 between sites in Los Angeles, Orange, Riverside, and San Bernardino counties are shown in Figure 15. Site pairs with correlations greater than 0.8 and relative differences less than 0 .3 for PM10 are:

060370002 (Azusa) with 060710025 (Ontario)

060370016 (Glendora) with	060711004 (Upland)
060658001 (Rubidoux) with	060658001 (Norco)
0600658005 (Mira Loma VB) with	060658001 (Rubidoux)
060712002 (Fontana) with	060710025 (Ontario)
060719004 (San Bernardino) with	060712002 (Fontana)

This analysis shows that for PM10, few sites correlate in low concentration areas. The greatest correlation was found between Rubidoux and Mira Loma (Van Buren), the two sites with the highest 24-hour PM10 concentrations in the Basin.

Minimum Number of Sites Required

EPA criteria specify the minimum number of sites required in an air monitoring network based on MSA population and design value. Population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 29. The information shows that the South Coast AQMD air monitoring network significantly exceeds the minimum required number of samplers for PM10.

Table 29 Minimum PM10 Requirement

MSA	Min. # Monitors Required	# Monitors Active
31100	2	9
40140	3	16

PM2.5

Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including ions (such as nitrates and sulfates), organic chemicals, elemental carbon, metals, and soil or dust particles. Fine particles, such as those found in smoke and haze, are 2.5 μm in diameter and smaller. These particles can be directly emitted from sources such as mobile sources, meat cooking and forest fires, or they can form when gases emitted from power plants, industries, and automobiles react in the air.

Regulatory Requirement

The nation's air quality standards for particulate matter were first established in 1971 and were not significantly revised until 1987, when the EPA changed the indicator of the standards to regulate inhalable particles smaller than or equal to 10 um in diameter. Ten years later, after a lengthy review, the EPA revised the PM standards, setting separate standards for fine particles (PM2.5) based on their link to serious health problems including increased symptoms, hospital admissions, emergency room visits, and premature death for people with heart

and lung disease. The regulation also required local agencies to operate a minimum number of PM2.5 monitoring sites as specified in 40 CFR § 58 Appendix D.

To comply with regulatory requirements, a network of 17 Federal Reference Method (FRM) samplers was first deployed in early 1999. In December 1999, a second Coachella Valley PM2.5 sampling site was established in Palm Springs. On June 20, 2003, PM2.5 sampling began at the South Long Beach location. The final addition to the PM2.5 FRM network occurred in October 2005 at the newly established Mira Loma (Van Buren) site. The current number of PM2.5 FRM sampling sites remains at 20 and is depicted in Figure 16.

Prior to 2009, a network of continuous PM2.5 monitors was in operation, although they did not have FEM status. In January 2009, a network of seven PM2.5 FEM monitors were deployed and designated as Special Purpose Monitors (SPM) in order to provide time for comparison to collocated FRM samplers. The two-year maximum SPM status expires at the end of 2010 and comparability analysis will be completed before that time. A network of ten non-FEM PM2.5 continuous monitors continues operation.

Monitoring Objective

The PM2.5 monitoring network is shown in Figure 17 along with population trend from 1999 through 2009. Most PM2.5 sites are designated as population exposure at the neighborhood scale. Review of 2008 data shows that Central Los Angeles, Anaheim, Pasadena, South Long Beach, Rubidoux, Burbank, and North Long Beach recorded the highest concentrations of PM2.5. The lowest value recorded was at the Palm Springs monitoring location, which is more consistent with a regional transport site rather than a population-oriented site.

TABLE 30 PM2.5 Network Design

Station	Monitoring objective	Spatial Scale	Site consistent with monitoring objective
Anaheim	Population oriented	Neighborhood	Yes
Azusa	Population oriented	Neighborhood	Yes
Big Bear	Population oriented	Neighborhood	Yes
Burbank	Population oriented	Neighborhood	Yes
Compton	Population oriented	Neighborhood	Yes
Crestline	Population oriented	Neighborhood	Yes
Fontana	Population oriented	Neighborhood	Yes
Glendora	Population oriented	Neighborhood	Yes
Indio	Population oriented	Neighborhood	Yes
Lake Elsinore	Population oriented	Neighborhood	Yes
Long Beach (North)	High concentration	Neighborhood	Yes
Los Angeles (Main St.)	High concentration	Neighborhood	Yes
Mira Loma (Van Buren)	Population oriented	Neighborhood	Yes
Mission Viejo	Population oriented	Neighborhood	Yes
Ontario (Fire-Station)	Population oriented	Neighborhood	Yes
Palm Springs	Population oriented	Neighborhood	Yes
Pasadena	Population oriented	Neighborhood	Yes
Pico Rivera	Population oriented	Neighborhood	Yes
Reseda	Population oriented	Neighborhood	Yes
Riverside	Population oriented	Neighborhood	Yes
Rubidoux	High concentration	Neighborhood	Yes
San Bernardino	Population oriented	Neighborhood	Yes
Santa Clarita	Population oriented	Neighborhood	Yes
Long Beach (South)	Population oriented	Neighborhood	Yes
Upland	Population oriented	Neighborhood	Yes

Spatial Scale of Representativeness

All PM2.5 spatial scales of representativeness were consistent with the monitoring objectives as shown in Table 30.

Correlation Analysis

PM2.5 correlation for 2008 between sites in Los Angeles, Orange, Riverside, and San Bernardino counties are shown in Figure 18. Data for 2008 was used because it was the most recent complete data set for the South Coast AQMD PM2.5 monitoring network. Site pairs with correlations greater than 0.8 and relative differences less than 0.3 for PM2.5 are:

060370002 (Azusa) with	060372005 (Pasadena)
	060658001 (Rubidoux)
060374002 (North Long Beach) with	060374004(South Long Beach)
060651003 (Riverside Magnolia) with	060658001 (Rubidoux)

060710025 (Ontario) with	060712002 (Fontana)
060712002 (Fontana) with	060719004 (San Bernardino)

This analysis shows that for PM2.5, a number of clusters have a high level of correlation and a low average relative difference.

Minimum Number of Sites Required

EPA criteria specify minimum numbers of sites required in an air monitoring network based on MSA population and measured concentrations. Population data was taken from the 2000 census to determine the required number of samplers for the SCAB and are shown in Table 31. The information shows that the South Coast AQMD air monitoring network exceeds the required minimum numbers of samplers for PM2.5.

Table 31 Minimum PM2.5 Requirement

MSA	Minimum Number of Monitors Required	Number of Monitors Active
31100	6-10	12
40140	6-10	11

Figure 2 South Coast AQMD O3 Monitoring Locations

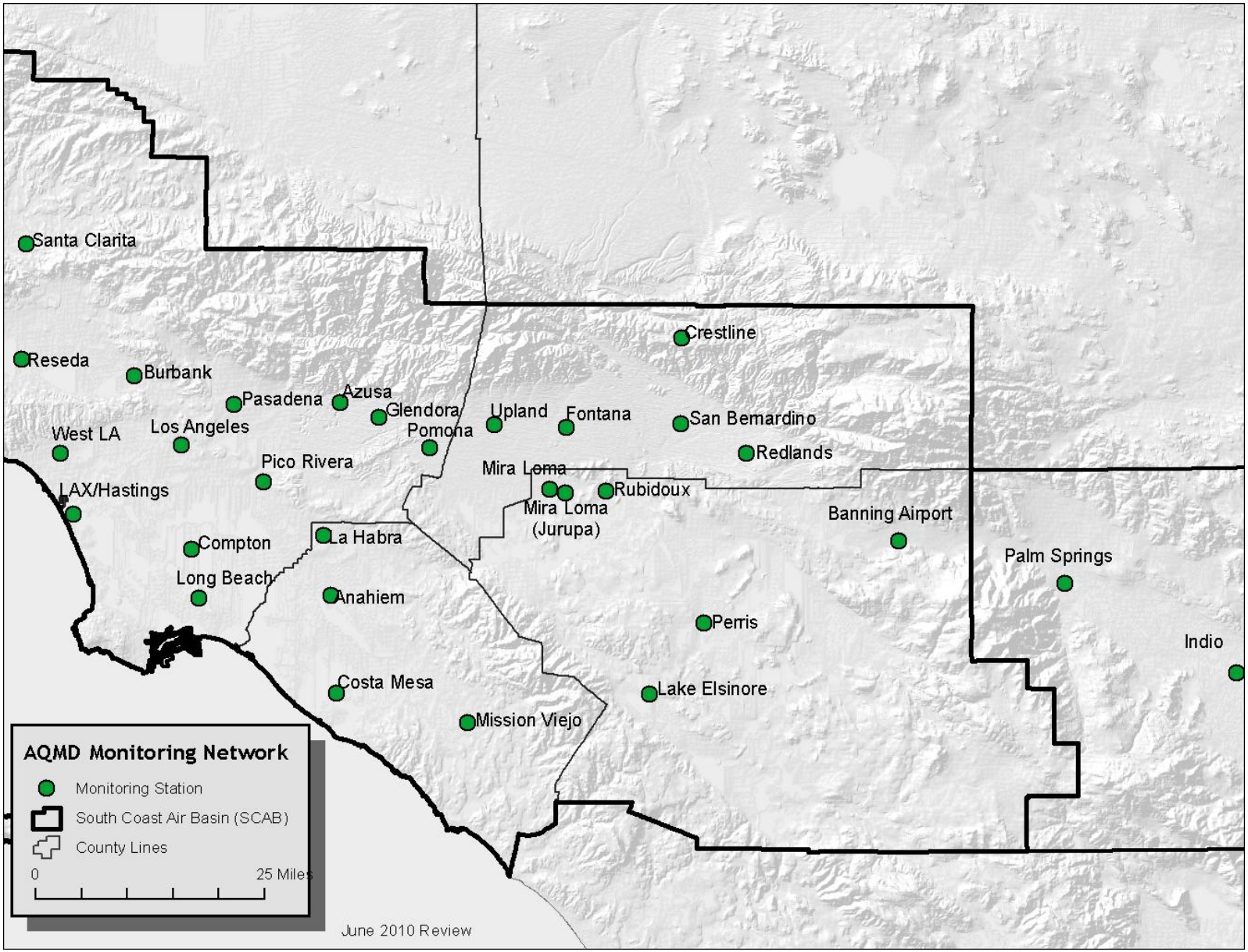


Figure 3 O3 Monitoring Locations and Change in Population 1990 Through 2009

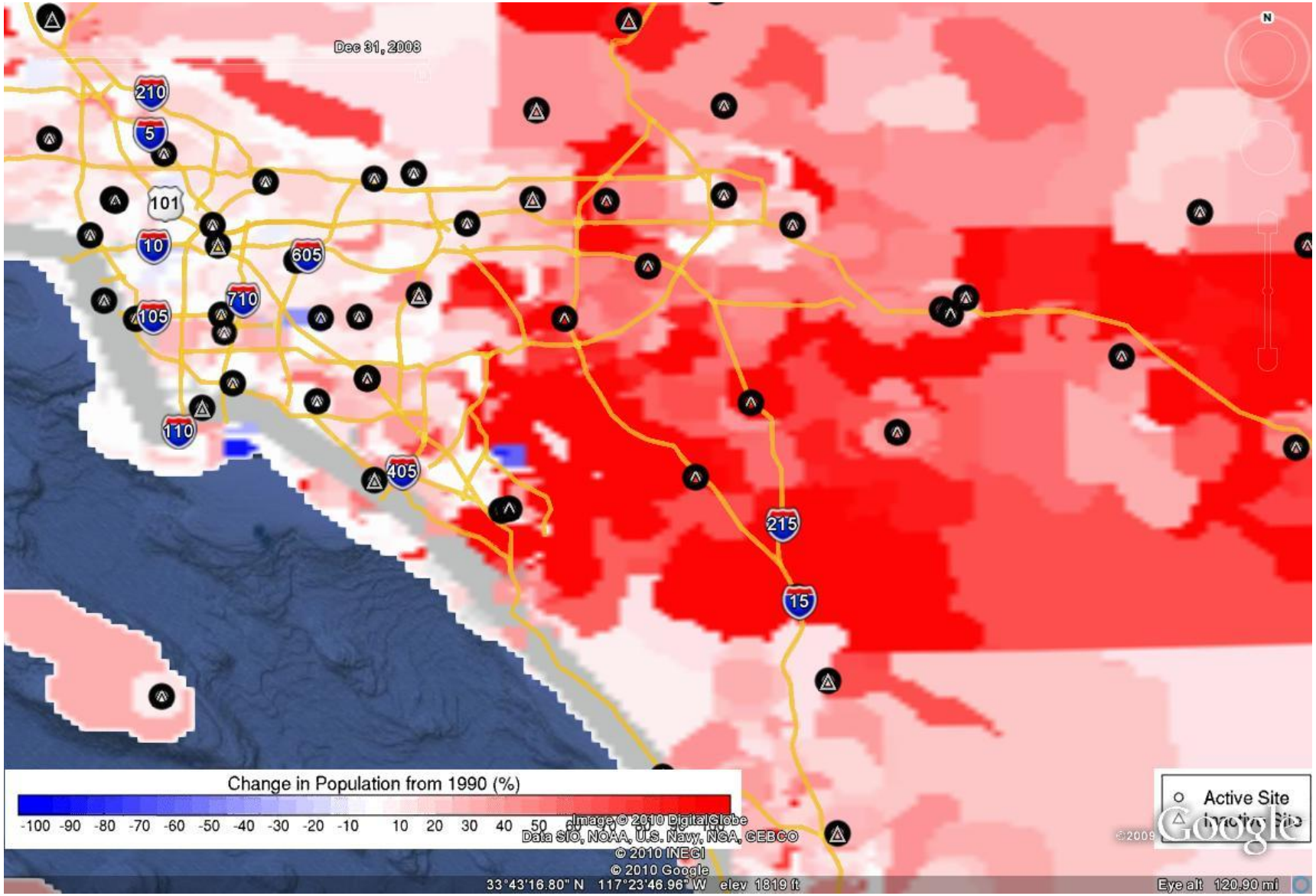


Figure 4 2008 Los Angeles, Orange, Riverside, and San Bernardino County O3 Site Correlation

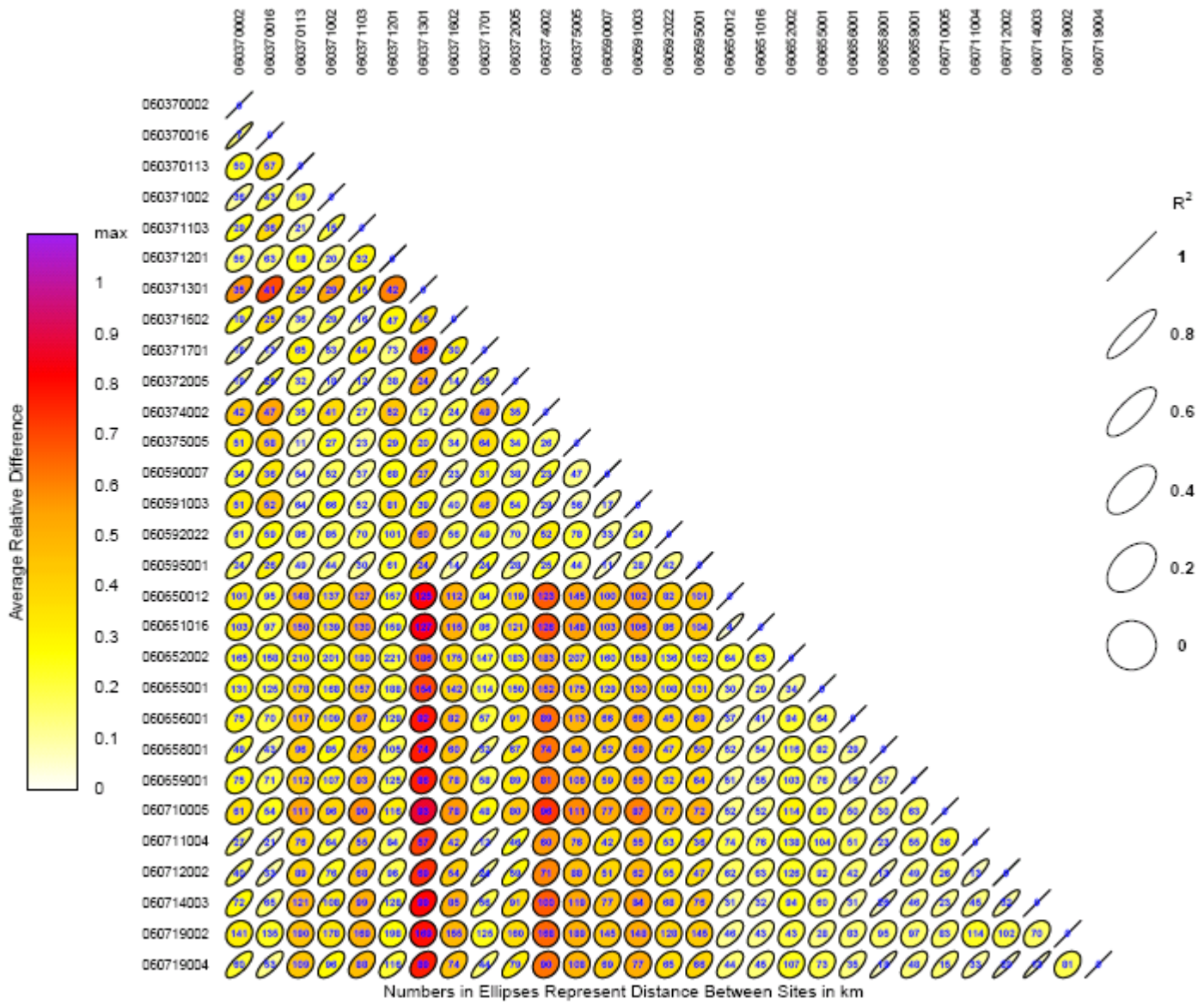


Figure 5 South Coast AQMD Monitoring Locations for CO

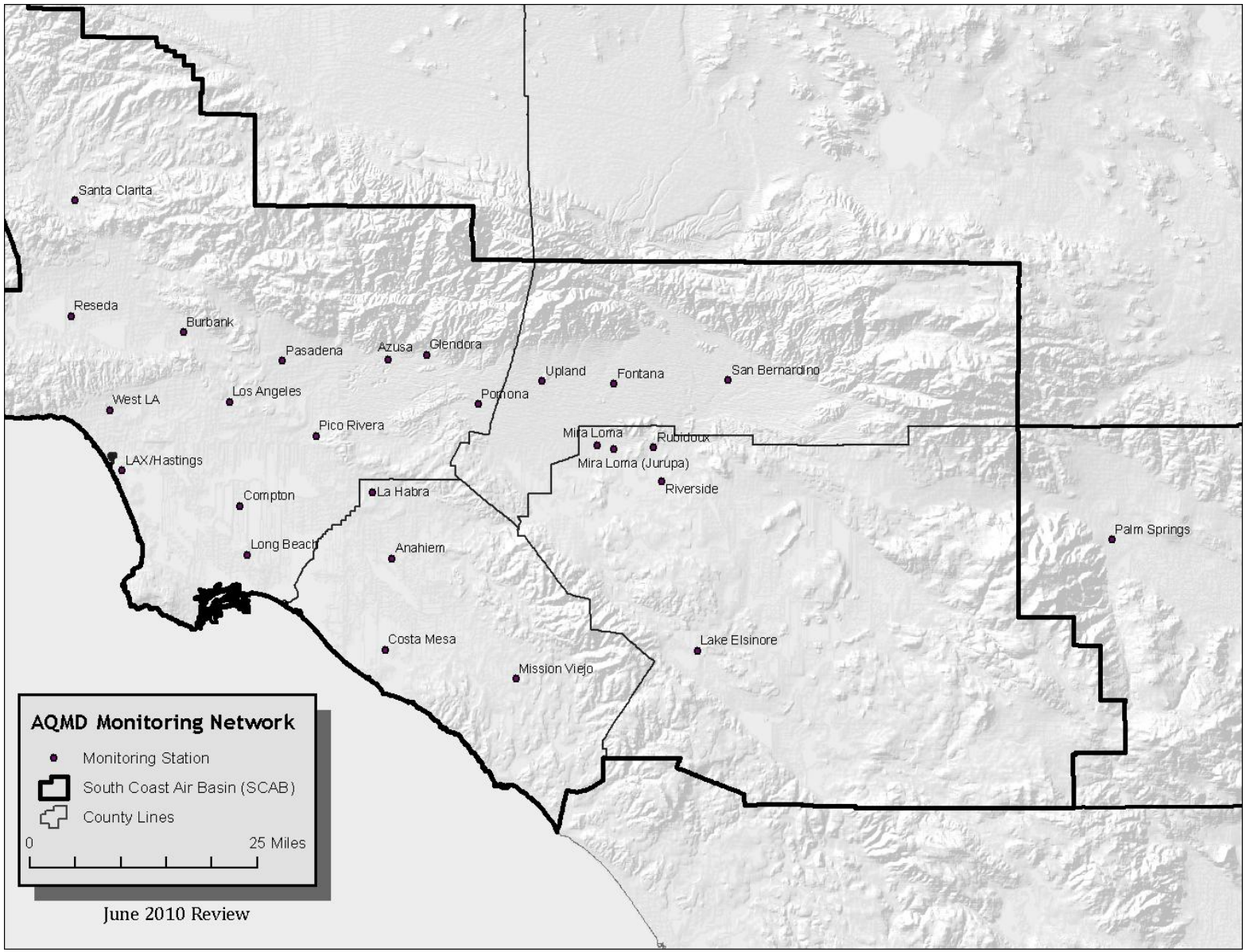


Figure 6 CO Monitoring Locations and Change in Population 1990 Through 2009

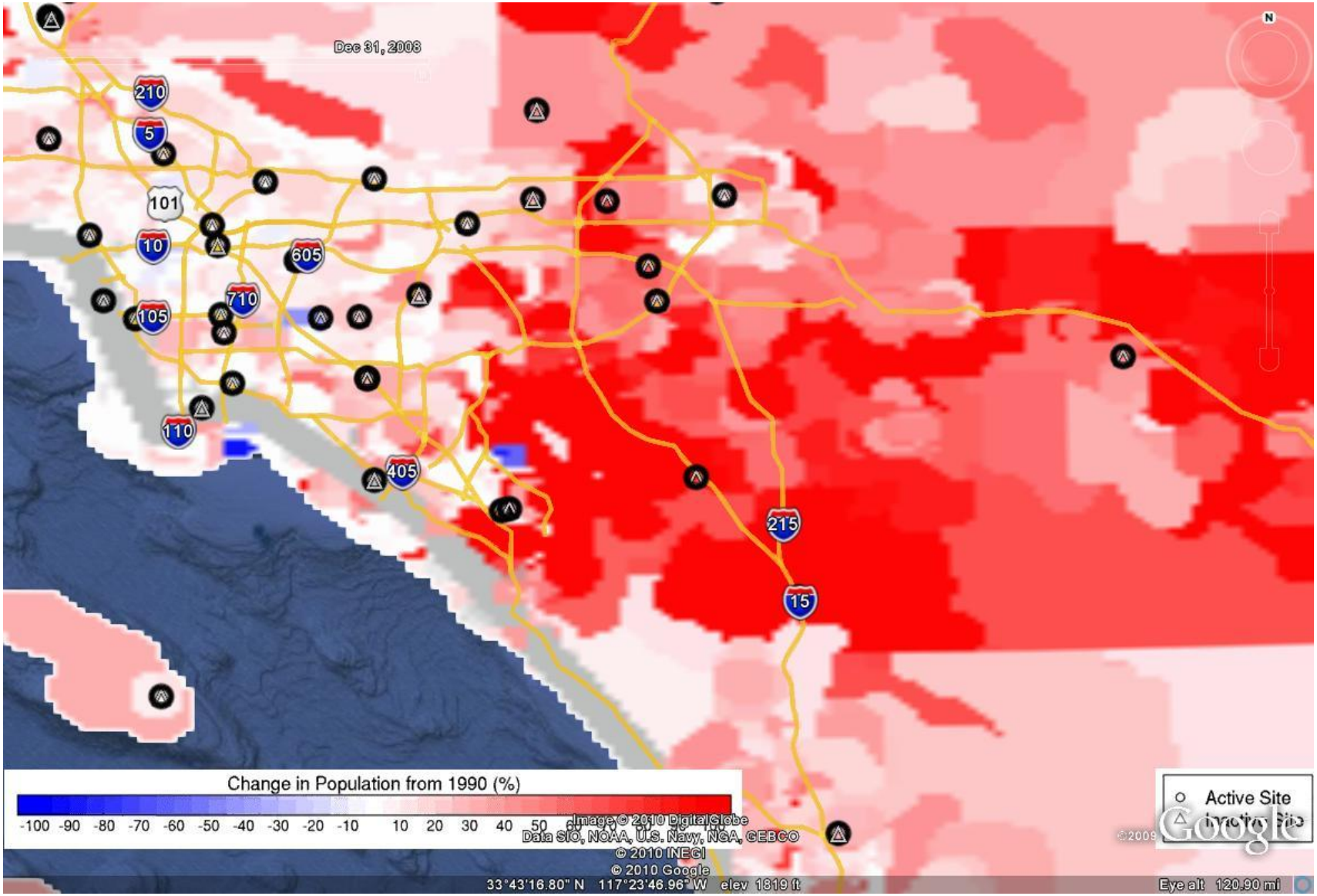


Figure 7 South Coast AQMD Monitoring Locations for NO2

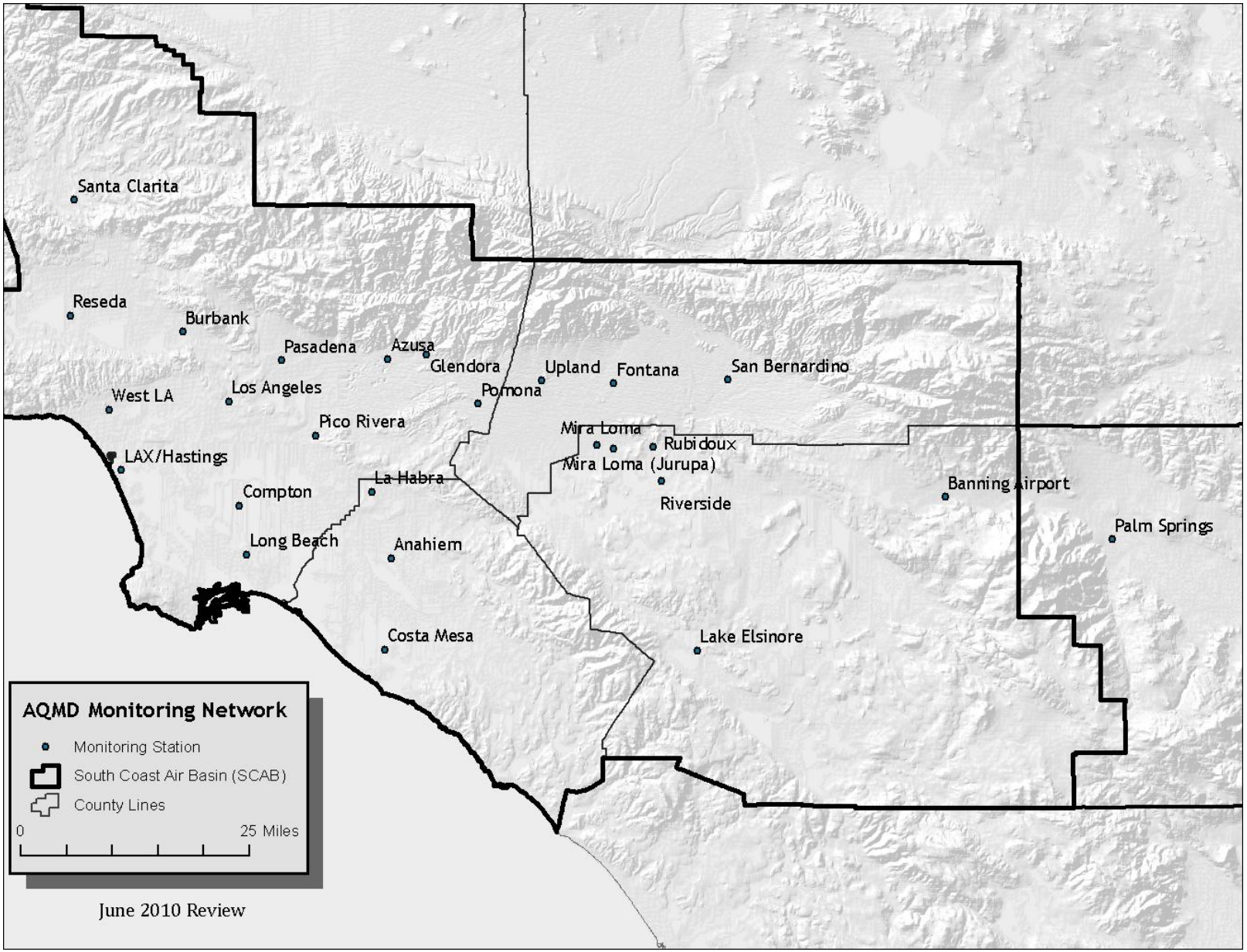


Figure 8 NO2 Monitoring Locations and Change in Population 1990 Through 2009

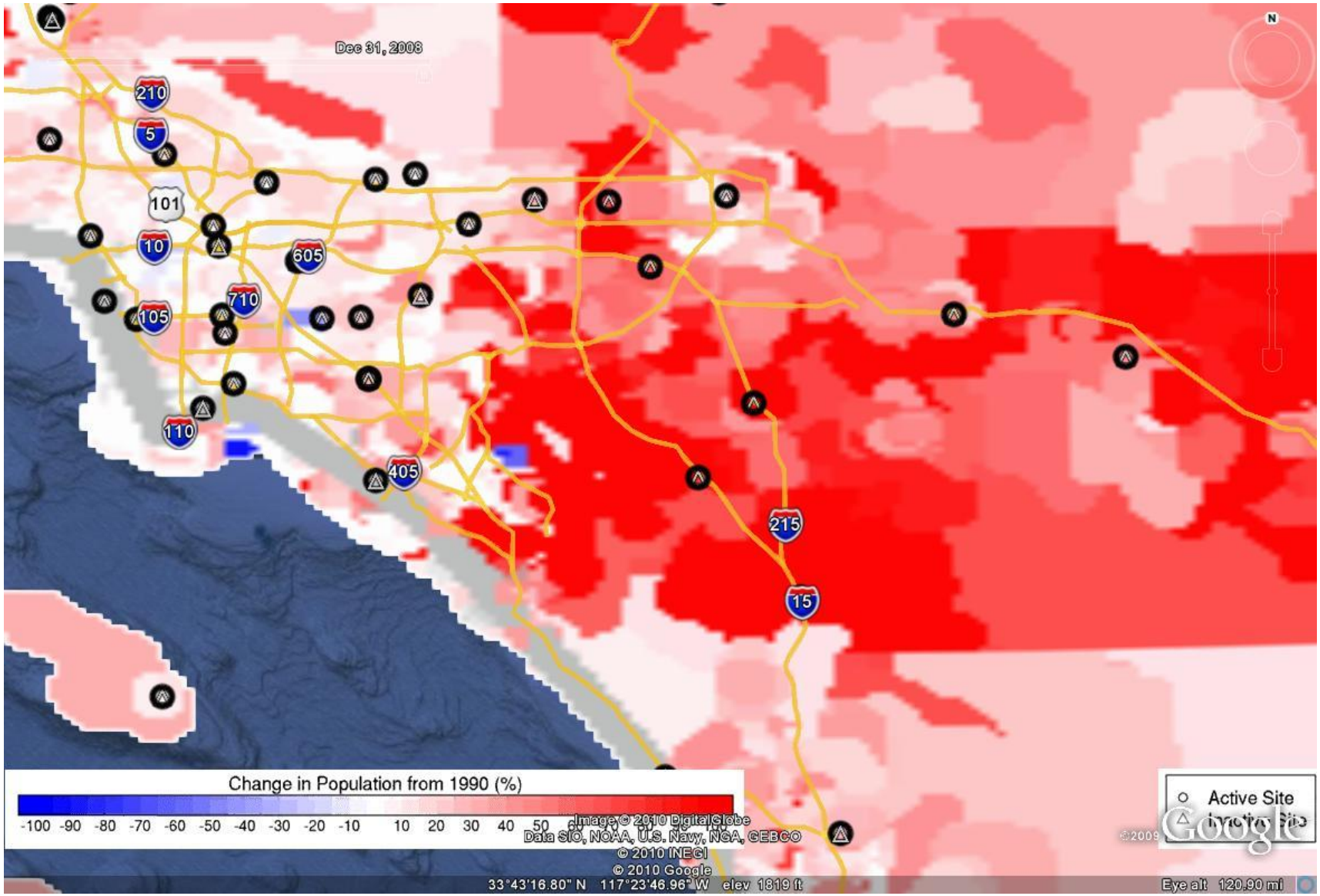


Figure 9 South Coast AQMD Monitoring Locations for SO2

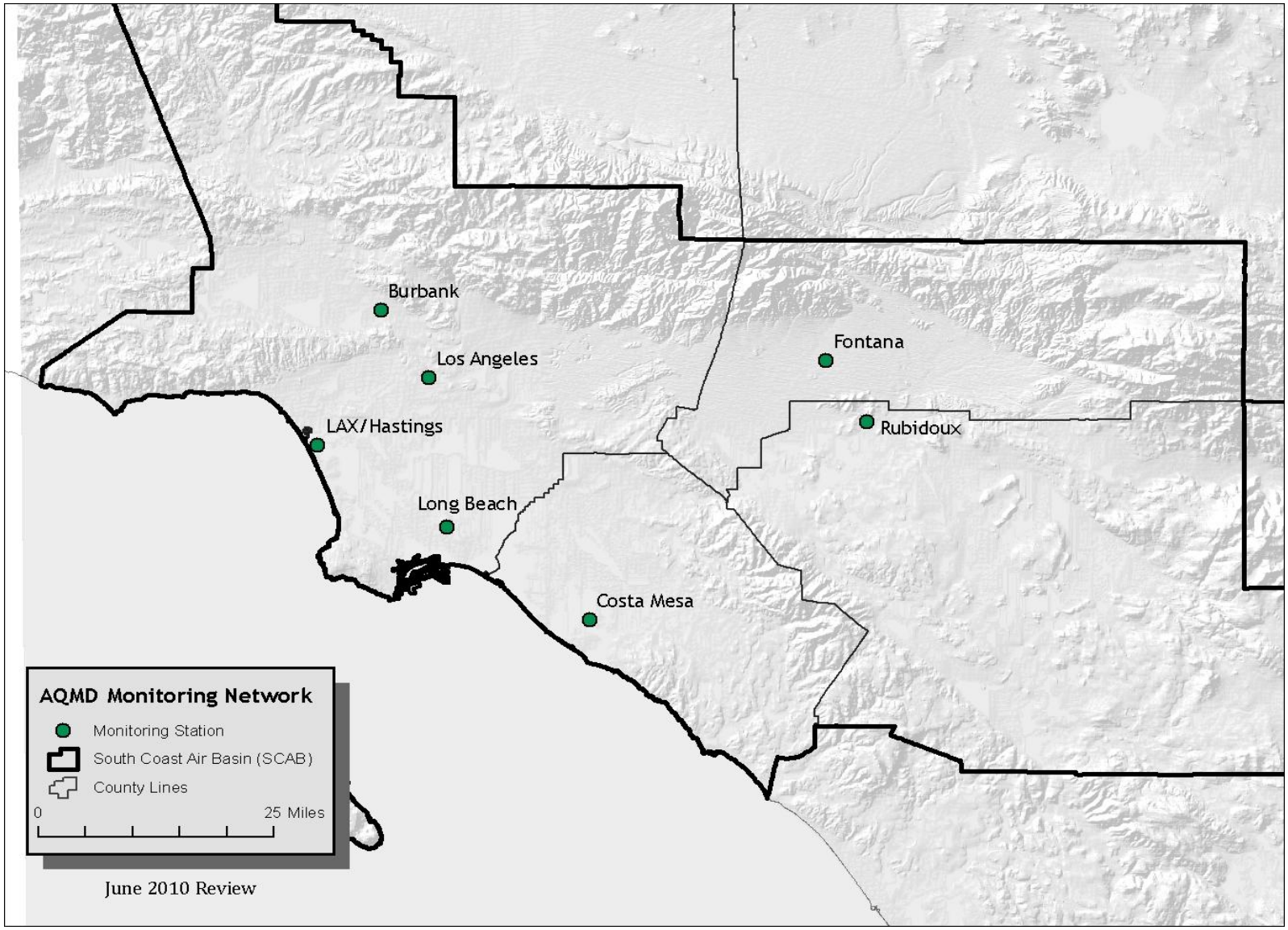


Figure 10 SO2 Monitoring Locations and Change in Population 1990 Through 2009

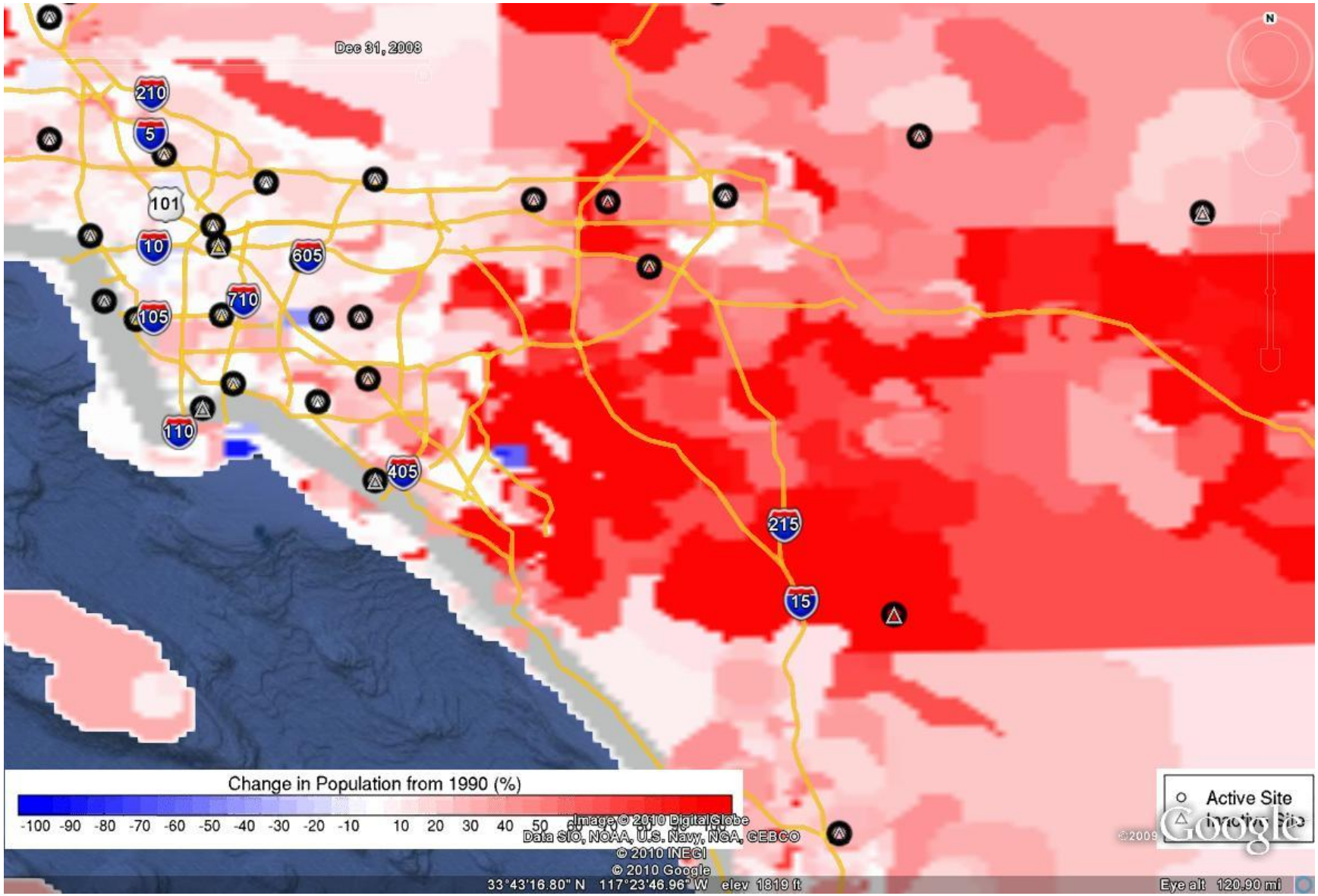


Figure 11 South Coast AQMD Source and Ambient Pb Monitoring Locations

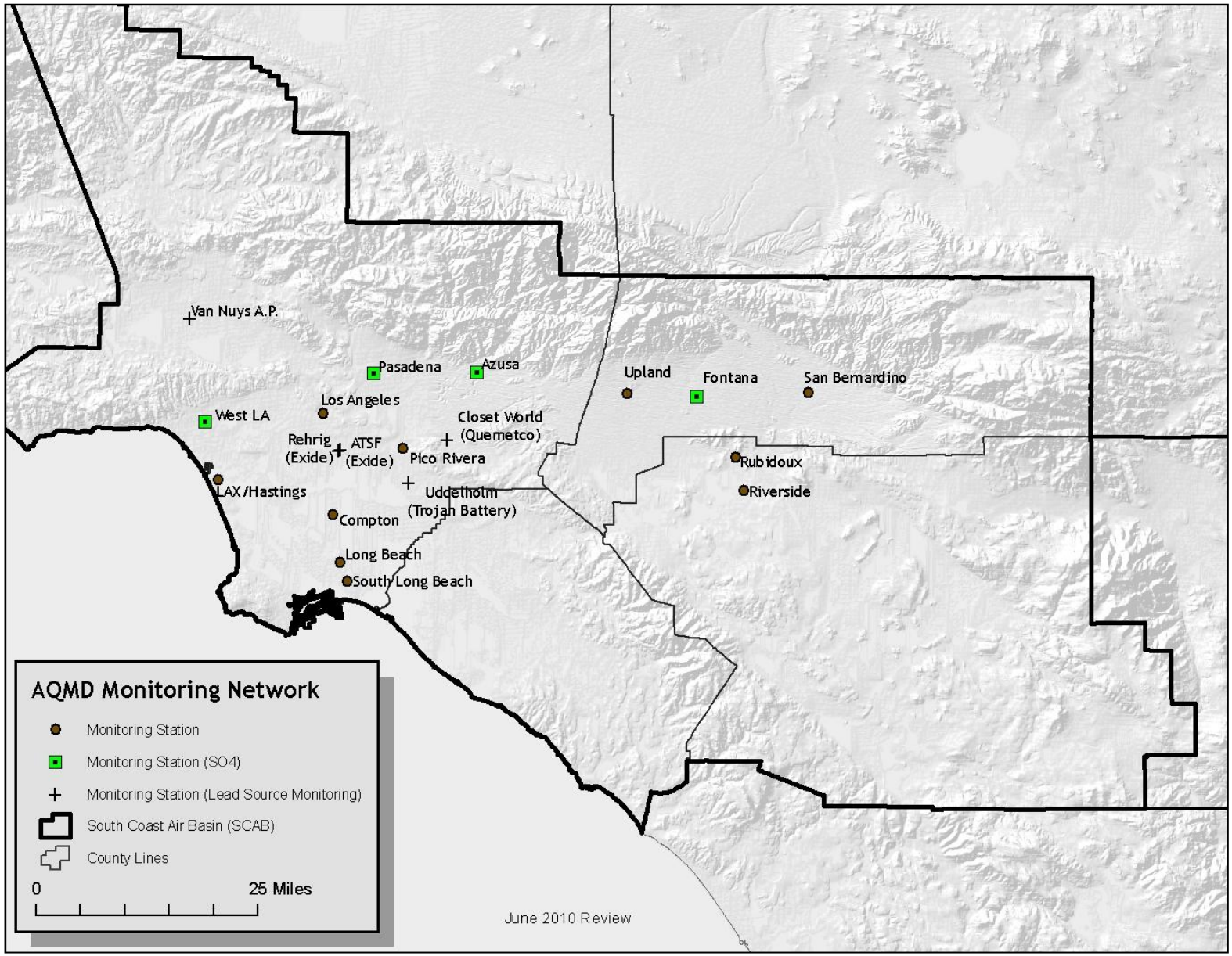


Figure 12 Pb Monitoring Locations and Change in Population 1990 Through 2009

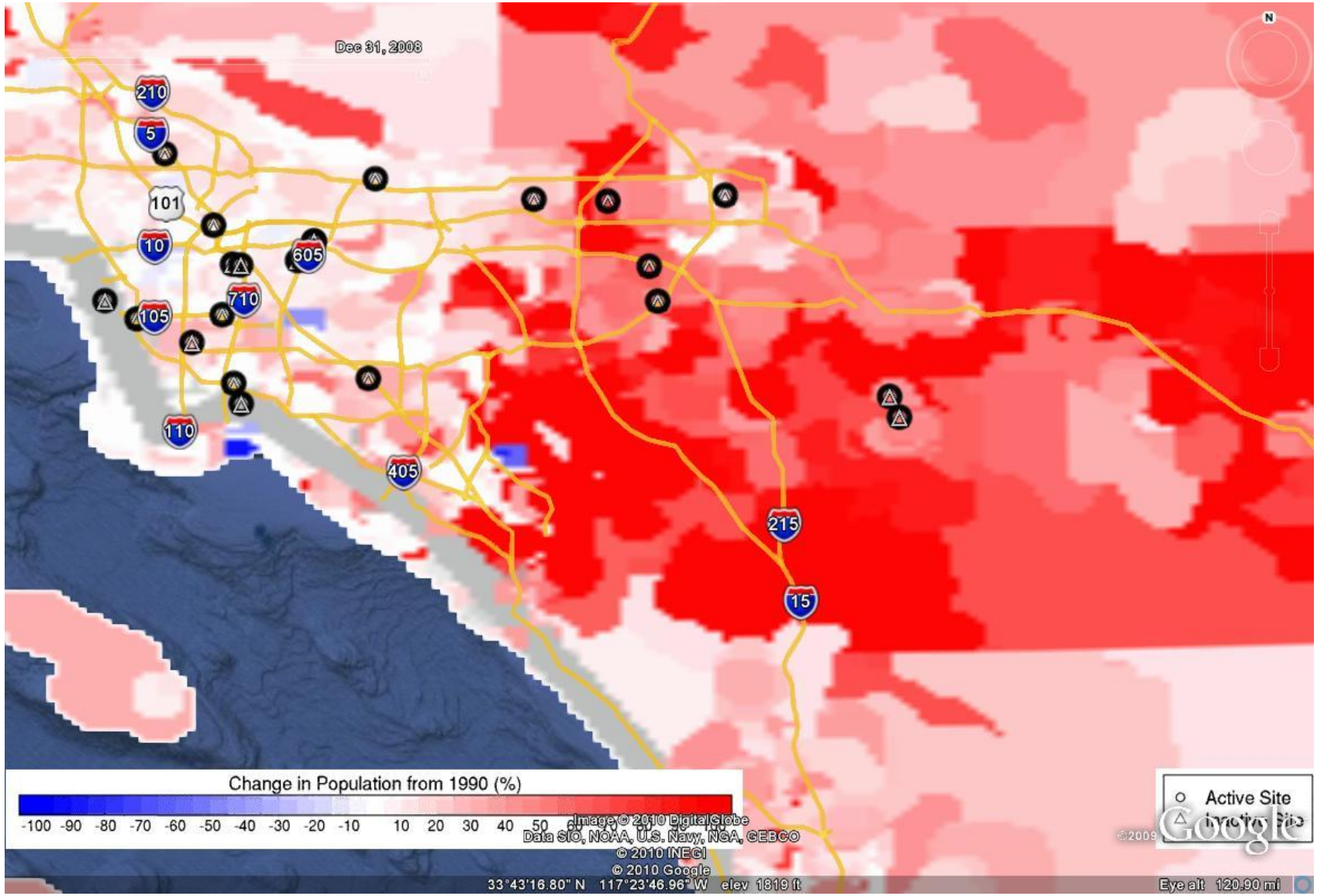


Figure 13 South Coast AQMD PM10 Monitoring

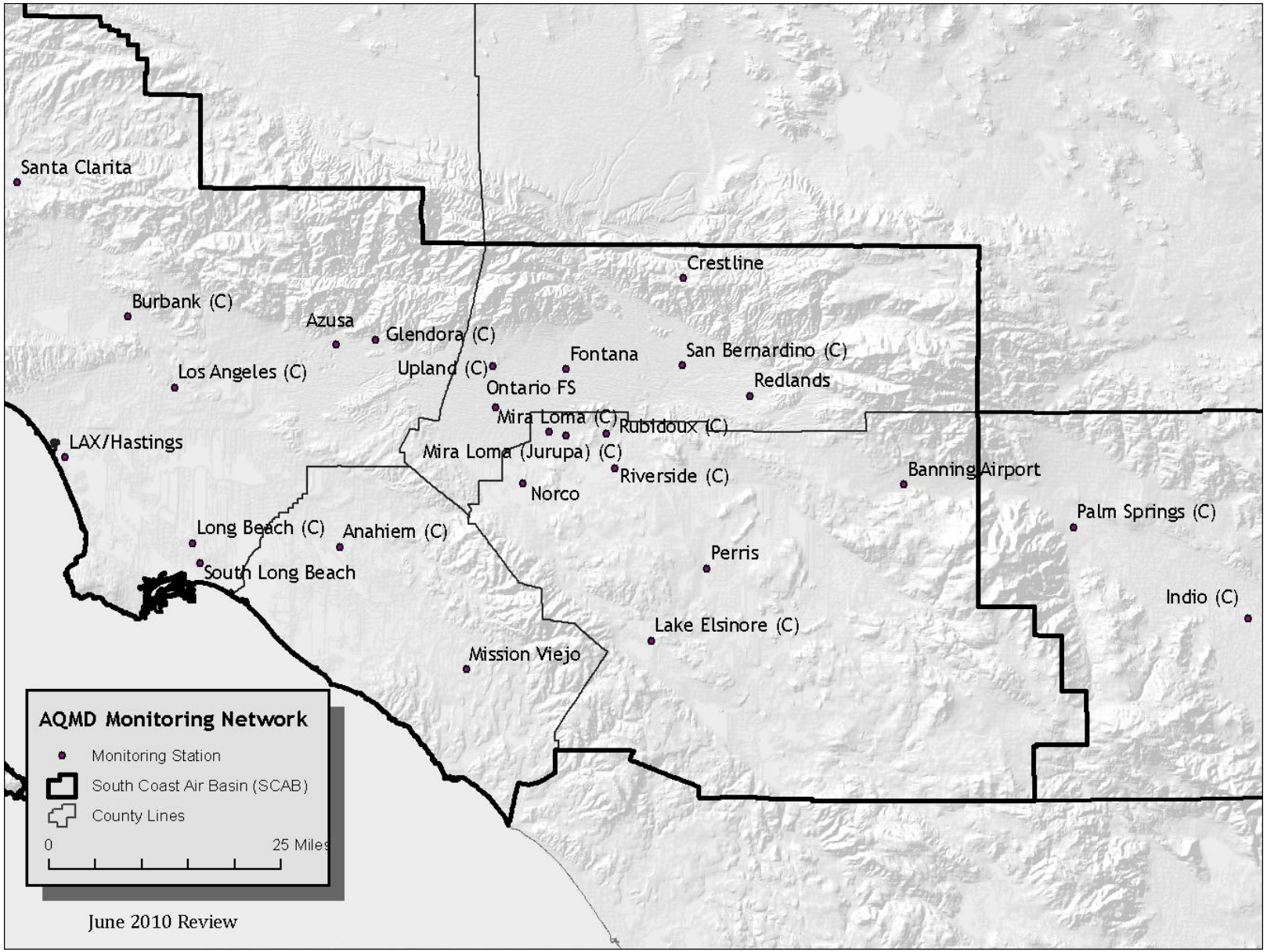


Figure 14 PM10 Monitoring Locations and Change in Population 1990 Through 2009

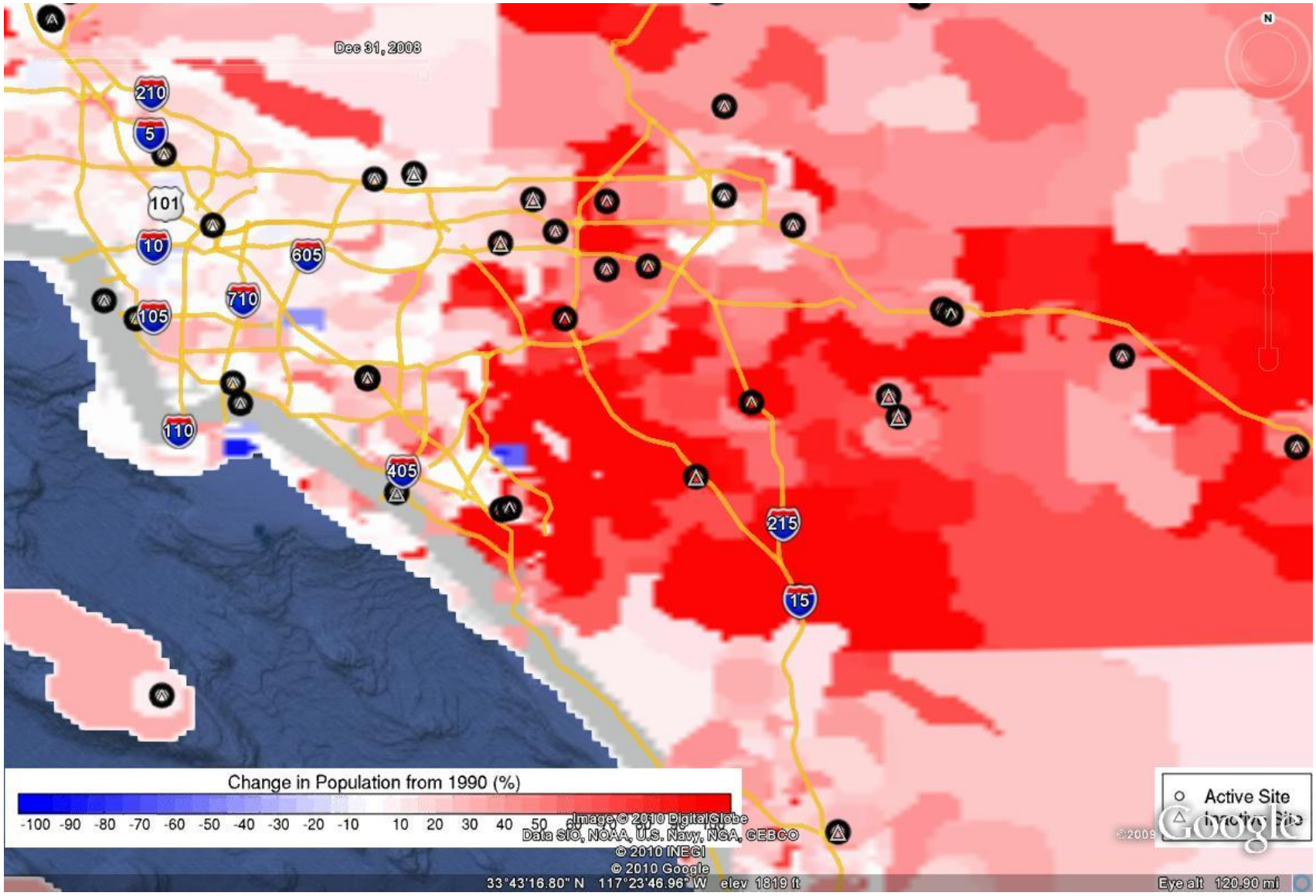
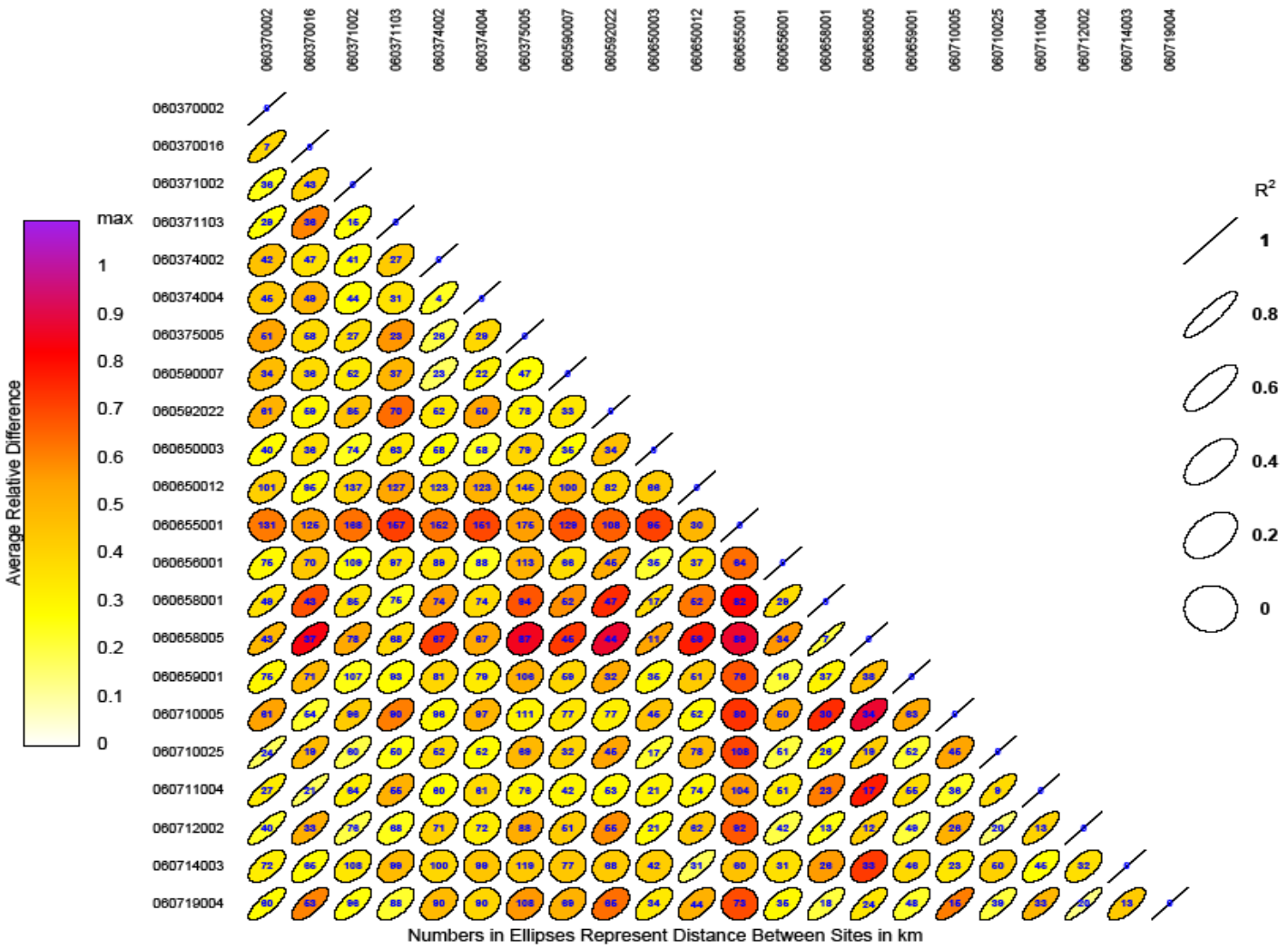


Figure 15 2008 Los Angeles, Orange, Riverside, and San Bernardino County PM10



B = BAM FEM
B1 = BAM

Figure 16 South Coast AQMD PM2.5 Monitoring Locations

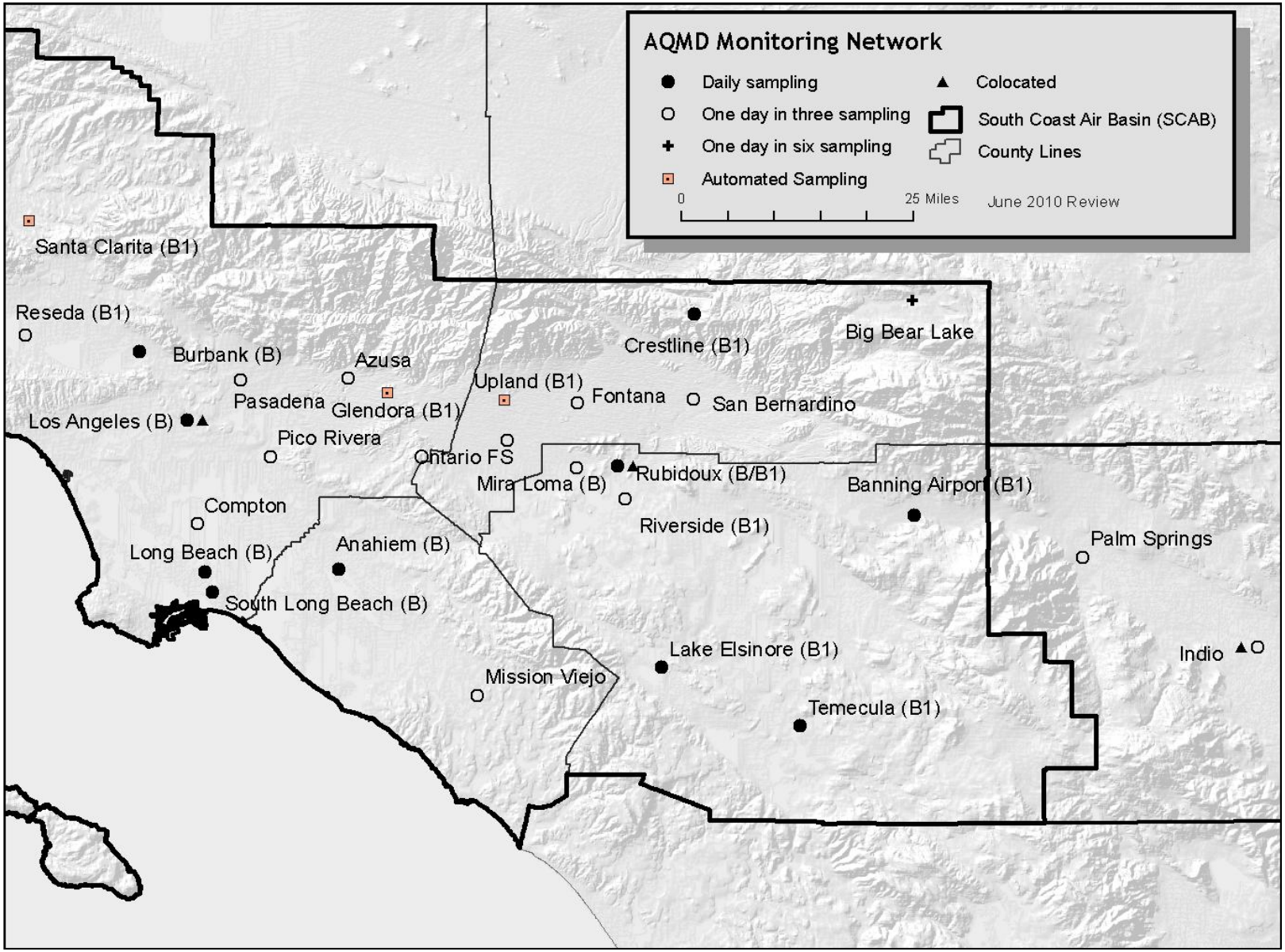


Figure 17 PM2.5 Monitoring Locations and Population Change 1999 Through 2009

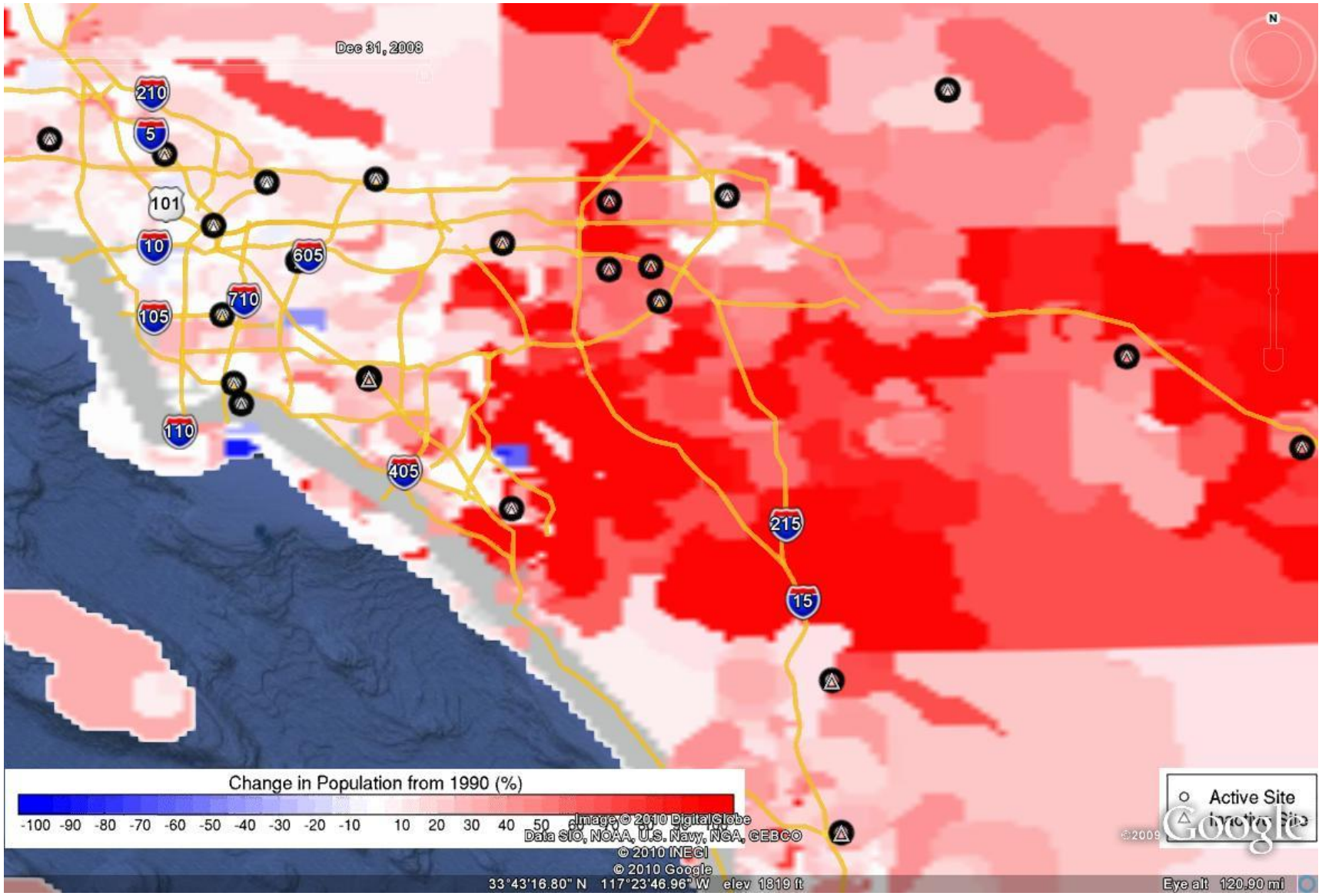


Figure 18 2008 Los Angeles, Orange, Riverside, and San Bernardino County PM2.5

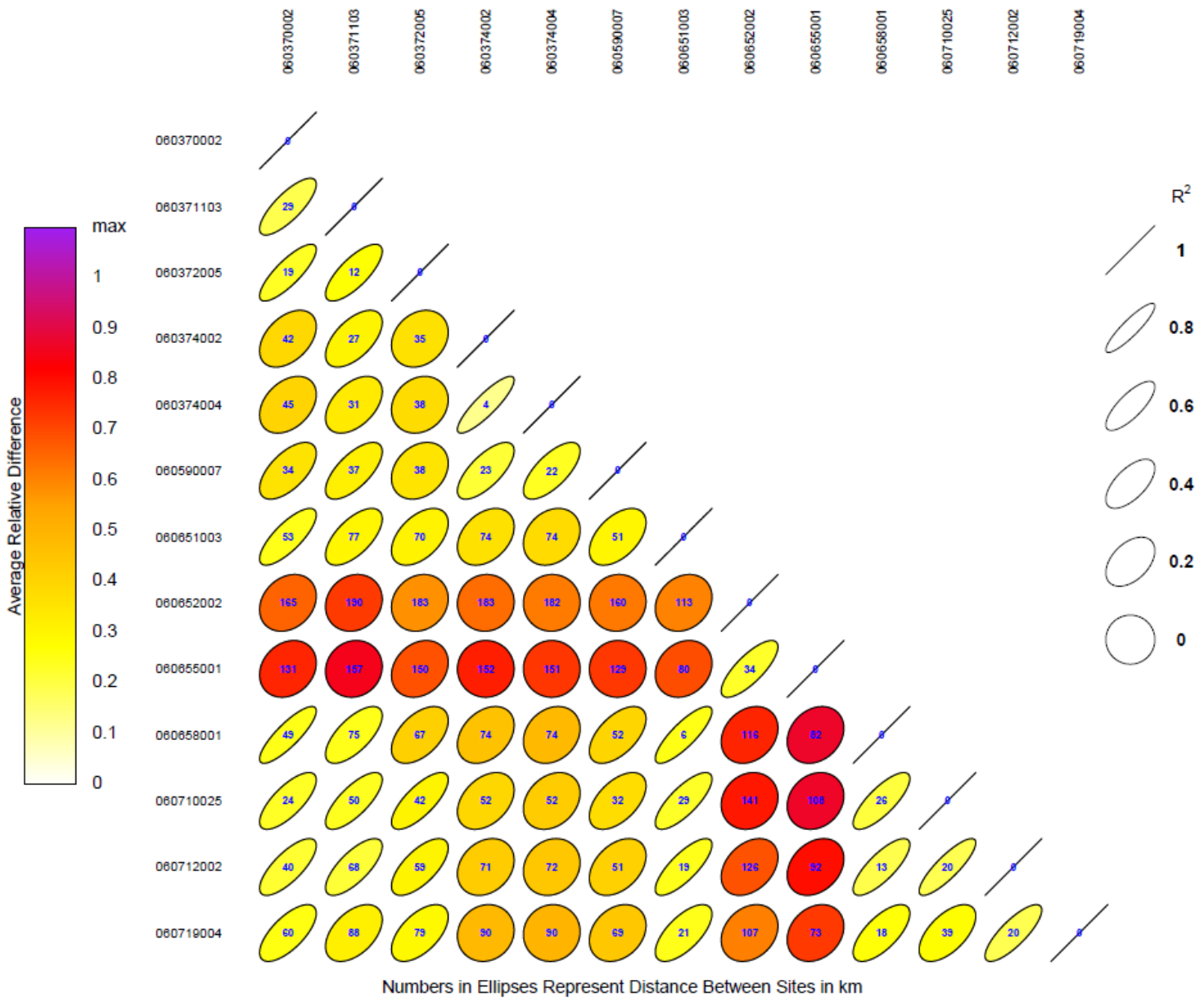


TABLE 32 Summary Table

Analysis	Issue	Conclusion
Network Design		
O3	Monitoring Objective	Crestline, Fontana, Santa Clarita, San Bernardino, Glendora, Upland, Redlands & Banning are consistent with High Concentration sites.
O3	Monitoring Objective	LAX Hastings and North Long Beach values are consistent with background levels
O3	Monitoring Objective	The remainder of the sites are consistent with Population exposure at neighborhood or urban level scale of representativeness; sites in the western portion should be examined for their data value
CO	Monitoring Objective	Lynwood and Anaheim values are consistent with high concentration sites. Lynwood was closed during 2008 and moved to Compton.
CO	Monitoring Objective	Palm Springs, Lake Elsinore, Santa Clarita, and Mission Viejo sites are more consistent with background concentrations
CO	Monitoring Objective	The remainder of the sites are consistent with population exposure at the neighborhood scale of representativeness; sites in the western portion should be further examined for their data value
NO2	Monitoring Objective	North Long Beach, Lynwood and Central LA are consistent with high concentration monitoring sites. Lynwood closed in 2008 and was relocated to Compton
NO2	Monitoring Objective	Palm Springs and Lake Elsinore are consistent with background concentrations
NO2	Monitoring Objective	The remainder of the sites are consistent with population exposure; sites in the western portion should be examined for their data value
SO2	Monitoring Objective	North Long Beach remains consistent with a high concentration site; the remainder of sites should be further examine for data value
PM10	Monitoring Objective	Mira Loma (Van Buren), Indio, Rubidoux, Azusa, Santa Clarita, and Ontario (Fire Station). Are consistent with high concentration monitoring sites
PM10	Monitoring Objective	Crestline, Mission Viejo, and LAX Hastings are consistent with background concentrations
PM10	Monitoring Objective	The remainder of the sites are consistent with population exposure at the neighborhood scale of representativeness.
PM2.5	Monitoring Objective	Central Los Angeles, Anaheim, Pasadena, South Long Beach, Rubidoux, Burbank and North Long Beach are consistent with their current designation as high concentration sites
PM2.5	Monitoring Objective	Palm Springs is consistent with background concentrations

TABLE 32 Summary Table (cont)

Analysis	Issue	Conclusion
Pb	Monitoring Objective	North Long Beach population oriented monitoring objective is not consistent with micro scale representation, is more consistent with a high concentration monitoring objective at microscale
Pb	Monitoring Objective	All sites should be examined further for their data value
Correlation Matrix	O3	Azusa & Glendora/Pomona/Pasadena/Upland/Fontana O3 correlation $\geq$ .8 & relative difference $\leq$ .3
Correlation Matrix	O3	Glendora & Pomona/Pasadena/Upland/Fontana O3 correlation $\geq$ .8 & relative difference $\leq$ .3
Correlation Matrix	O3	Burbank & Central LA/Pasadena O3 correlation $\geq$ .8 & relative difference $\leq$ .3
Correlation Matrix	O3	Central LA & Pico Rivera/Pasadena O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Pomona & Upland/Fontana O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Anaheim & La Habra O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Banning Airport & Tribal site O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Rubidoux & Fontana/Redlands/San Bernardino O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Upland & Fontana O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Fontana & Redlands/San Bernardino O3 correlation > .8 & relative difference < .3
Correlation Matrix	O3	Redlands & San Bernardino O3 correlation > .8 & relative difference < .3
Correlation Matrix	PM2.5	Burbank and Pasadena > .8 & relative difference < .3
Correlation Matrix	PM2.5	Central LA & Pasadena > .8 & relative difference < .3
Correlation Matrix	PM2.5	Riverside Magnolia & Fontana/San Bernardino/Rubidoux > .8 & relative difference < .3
Correlation Matrix	PM2.5	Fontana & San Bernardino > .8 & relative difference < .3
Correlation Matrix	PM2.5	San Bernardino & Rubidoux > .8 & relative difference < .3
Correlation Matrix	PM2.5	Rubidoux & Mira Loma Van Buren > .8 & relative difference < .3
Correlation Matrix	PM10	Azusa & Glendora/Ontario > .8 & relative difference < .3
Correlation Matrix	PM10	Glendora & Upland > .8 & relative difference < .3
Correlation Matrix	PM10	Norco & Rubidoux > .8 & relative difference < .3
Correlation Matrix	PM10	Rubidoux & Mira Loma Van Buren > .8 & relative difference < .3
Correlation Matrix	PM10	Ontario & Fontana > .8 & relative difference < .3
Correlation Matrix	PM10	Fontana & San Bernardino > .8 & relative difference < .3
Minimum number of sites required	Gaseous Criteria Pollutants	South Coast AM network exceeds minimum number of sites required for O3, CO, NO2, & SO2
Minimum number of sites required	Particulate Criteria Pollutants	South Coast AM network exceeds minimum number of sites required for PM2.5, PM10, & Pb

IV. POTENTIAL SOUTH COAST AQMD NETWORK CHANGES AND RECOMMENDATIONS

OVERVIEW

This section describes potential changes to the South Coast AQMD air monitoring network that would help to address the findings of the site-by-site assessments (Section II) and the pollutant network assessments (Section III). The overall goal of these potential modifications to the network design is to improve the ability to achieve multiple monitoring objectives while ensuring the efficient use of resources.

Note that the current AQMD air monitoring network meets or exceeds U.S. EPA monitoring requirements and satisfies multiple monitoring purposes. The dense network of monitoring locations covering a wide area provides the necessary data for NAAQS attainment decisions. It also provides a robust data set for air quality model validation, trend analysis, health studies, and real-time public communication of air quality status. The AQMD places a high value on all these monitoring purposes, all of which must be carefully considered before network changes are made.

Many of the findings described in the previous sections are site-specific issues that are addressed by South Coast AQMD on an ongoing basis. These include site infrastructure improvements and alterations such as vegetation trimming, soil stabilization or paving, replacement of shelters, moving probes and inlets to meet appropriate setback criteria, and increasing or improving power supplies. Through the Annual Network Plan and regular audit and maintenance schedules, issues such as these are continually being identified and addressed. However, when such issues cannot be addressed due to logistical constraints, then the value and monitoring objectives of a particular site could be reconsidered. Furthermore, the monitoring objectives and spatial scales of all sites are assessed as part of the Annual Network Plan, ensuring U.S. EPA minimum monitoring requirements are satisfied. Therefore, relatively minor changes to site infrastructure and monitoring objective/spatial scale designations are not explicitly addressed in this section, although these factors are important in determining the value of a site within a larger pollutant monitoring network.

What follows are some potential network modifications that address larger issues such as redundancies, gaps, efficiencies, and synergies within and between the South Coast AQMD pollutant monitoring networks. A summary of recommended network modifications to the South Coast AQMD monitoring network is provided at the end of this section. Note that there are many purposes for air quality monitoring, some beyond those described in this assessment. Closing, moving or creating monitoring sites requires significant resources and often a long period of concurrent monitoring to show comparability. Thus, these suggestions must be weighed against many other factors before being implemented.

SO2, NO2, AND CO MONITORING NETWORKS

The South Coast AQMD monitoring network far exceeds the minimum monitoring requirements for SO2, NO2, and CO, and South Coast AQMD areas are currently in attainment of the NAAQS

for these pollutants. As of 2009, there were no minimum monitoring requirements for these criteria pollutants. In 2010, minimum monitoring requirements were added for NO2 and SO2, and these new regulations will require changes to the NO2 network by 2013. New NAAQS and monitoring regulations for CO are also anticipated with possible network modifications required.

In all cases, South Coast AQMD measurements of SO2, NO2, and CO are made at monitoring sites that are also part of the more essential O3 and PM monitoring networks for which the basin is not in attainment with the NAAQS. Thus, the cost of continuing to monitor for these pollutants is relatively low given that the site infrastructure and staff resources dedicated to the sites will continue as part of the PM and O3 networks. However, there are costs associated with the maintenance, calibration, replacement, and auditing of the SO2, NO2, and CO instruments as well as the resources required to validate and submit the data to U.S. EPA.

Given the recent and upcoming revisions to monitoring regulations for these pollutants, a reduction in the number of SO2, NO2, and CO monitors in the network is not recommended until network design decisions to meet the new requirements have been made. For instance, new NO2 sites will be needed near roadways and possibly in EJ areas. The shifting of resources to accommodate these new requirements will affect the current network configuration.

Once the new regulations for CO are final and network design decisions for NO2 and SO2 have been made, a reconsideration of the extent of the SO2, NO2, and CO networks is recommended. It is likely that the future South Coast AQMD monitoring networks for these pollutants will continue to exceed minimum requirements in order to meet other objectives such as model validation, maintenance plan requirements, and trend analysis. A careful consideration of these factors along with the costs of continued operation may lead to more efficient and effective monitoring networks for SO2, NO2, and CO.

OZONE MONITORING NETWORK

South Coast AQMD exceeds the minimum monitoring requirements for the O3 monitoring network. Due to the large population in Southern California and the complexity of the geography and meteorology, a relatively large number of air monitoring stations are needed to adequately describe air quality in South Coast AQMD's jurisdiction and provide important health information to the public. Both South Coast AQMD air basins (South Coast and Coachella Valley) are designated non-attainment for O3, and a wide, robust O3 network is critical for accurate assessment and modeling efforts.

However, as a regional pollutant, O3 concentrations generally do not vary significantly on short spatial scales, the exception being near busy roadways where NO titration occurs. Based on the correlation analysis in Section III, some sites in close proximity to one another provide very similar O3 readings. Three clusters of high similarity identified in Section III were:

- Fontana/Redlands/San Bernardino/Rubidoux
- Azusa/Glendora/Pomona/Upland/Fontana

- Anaheim/La Habra

In terms of siting criteria, findings related to these sites included:

- La Habra - is within 3 m of cypress trees surrounding inlet probe and does not meet distance from traffic lane requirement.

- Pomona - is less than the required distance from roadway.

Other assessment findings regarding these sites include:

- Glendora has been in operation for 30 years and was originally a CARB monitoring location. There have been difficulties securing a long-term rental contract and the City of Glendora requirements have made it difficult to upgrade the monitoring shelter. The site lacks adequate space and infrastructure to expand at the current location.
- La Habra has been in operation for 50 years; however, it lacks adequate space and infrastructure to expand to include particulate monitoring. The site has not typically been used for research or air toxics studies and there are few synergies at the site between air monitoring programs.
- Pomona has been in operation for 45 years; however, it lacks adequate space and infrastructure to expand. The data has not typically been used for research or air toxics studies and the site was originally intended as a micro-scale CO location. There are few synergies between air monitoring programs at this location.

The Fontana/Redlands/San Bernardino/Rubidoux cluster is well spaced in an area of generally the highest O3 levels in the basin. It is important to continue to monitor in this area and have a good spatial distribution of O3 levels given the frequent exceedances and need for public health advisories. Therefore, no changes are recommended to these O3 sites.

The Azusa/Glendora/Pomona/Upland cluster (excluding the more distant site Fontana) is geographically compact showing high degree of comparability in O3 measurements. In 2007 and 2008, Upland recorded the most exceedances of federal and state air quality standards of O3, although this area is no longer the highest O3 region in the basin. The Glendora site is only seven km from the Azusa site, and although it can record higher O3 levels than Azusa, readings are typically lower than Upland. The Pomona site is also relatively close to both Upland and Azusa. Upland and Azusa have been active sights for 37 and 53 years respectively providing the needed long-term trends. Given the proximity to other correlated stations and the siting and infrastructure issues mentioned above, both Glendora and Pomona could be considered potentially redundant in terms of O3 measurements.

The Anaheim/La Habra cluster show similar but relatively low levels of O3 according to recent data and the correlation analysis. Given these low levels, the unresolvable siting issues, and the few other measurements made at La Habra (CO and NO2 only), this site would be another potential candidate for reduction in size of the O3 network.

If O3 measurements cease at both La Habra and Pomona, a geographical gap might be created in northwestern Orange County. South Coast AQMD headquarters in Diamond Bar is at the center of that gap, and a new site at headquarters would fill the potential need for additional O3 measurements in the area while providing considerable efficiencies with a convenient location.

Two other changes to the O3 network are already underway. First, the Mira Loma Van Buren monitoring location was established as a replacement site for the Mira Loma Jurupa monitoring location. Ozone data for Jurupa was not included in the correlation analysis as it is not in the AQS database. The closure of the Jurupa station is planned within the coming year. Second, a new site in Temecula is already in place with O3 measurements planned. It is in an area that has grown significantly in recent years and may not be adequately represented by the current O3 monitoring network.

PM2.5 MONITORING NETWORK

The South Coast AQMD monitoring network exceeds the minimum monitoring requirements for PM2.5. Due to the large population in Southern California, the complexity of the geography, and the non-attainment status of the basin, a relatively large number of air monitoring stations are needed to adequately describe air quality and provide important health information to the public.

As a generally regional pollutant, PM2.5 concentrations generally do not vary significantly on short spatial scales unless very near strong sources of particulate matter. Based on the correlation analysis in Section III, some sites in close proximity to one another provide very similar PM2.5 readings. Two clusters of high similarity identified in Section III were:

- San Bernardino/Rubidoux/Fontana
- North Long Beach/South Long Beach

In terms of siting criteria, findings related to these sites included:

- Fontana is within 9 m of unpaved parking and within 9 m of regularly idling diesel exhaust.
- South Long Beach does not currently meet all 40 CFR § 58 Appendix E Probe Siting Criteria, specifically the spacing from obstructions surrounding the instrumentation.

Other assessment findings regarding these and other sites include:

- Big Bear Lake has been in operation for 11 years and was originally established to determine the extent of winter wood smoke particulate matter. Since that time, there have not been exceedances of the standard. It is the only measurement made at the site and thus there are no synergies between monitoring programs. Consideration must be given to the remoteness of the location and the cost to maintain the site.

- Fontana has been in operation for 29 years. However, the site lacks adequate space and infrastructure to expand at the current location.

- South Long Beach was established June 2003 to monitor particulate influence from port activities. The infrastructure of the facility meets the needs of particulate sampling, but there are no facilities for continuous analyzers and no room for expansion. There are no synergies between air monitoring programs or use of office space by inspectors. The cost to relocate the site is low due to the low number of samplers and there is potential to move this site to a location nearer to port activities.

The San Bernardino/Rubidoux/Fontana cluster is relatively well spaced in an area of generally the highest PM2.5 levels in the basin. It is important to continue to monitor in this area and have a good spatial distribution of PM2.5 levels given the frequent exceedances and need for public health advisories. Despite some potential siting issues at Fontana, no changes are recommended to these PM2.5 sites.

The North Long Beach/South Long Beach cluster is geographically compact with only four miles separating the sites. Data at the two sites is similar in terms of correlation, exceedances, averages, and maximum levels. The South Long Beach location was intended to measure the impact of the nearby port activities. However, no site closer to the Port area could be secured at the time. In 2007, a site for a temporary air monitoring study was secured much closer to Port activities, and this site is still available to be made permanent with sufficient infrastructure for expansion. Given the limitations of the current South Long Beach site with no room for gaseous measurements, and the original intended purpose of the site, the temporary site on Anaheim Street in Long Beach may be a better option. Therefore, a potential modification of the PM2.5 network is to move the South Long Beach measurements to this new site closer to the Port activities. Concurrent monitoring may need to be conducted to show that the new site records similar or higher PM2.5 levels than the current site.

The Big Bear Lake monitoring location only measures PM2.5, and has not been in violation of the 24-hour or annual PM2.5 NAAQS in 2007 or 2008. Sampling only occurs on a reduced, U.S. EPA approved, sampling frequency of one-in-six day due to the remote location. The original intent of the site was to determine if wintertime residential wood burning could lead to NAAQS violations. Given that violations have not been observed and that the remote location of the site requires significant staff resources to maintain even at the reduced sampling schedule, the value of the site should be reconsidered.

Another suggested change in the configuration of the PM2.5 network is to continue the transition to continuous PM2.5 FEM monitors. Currently, these monitors are being run collocated with FRM filter-based measurements to establish comparability and determine any biases. Once complete, the FEM continuous monitors can replace many existing FRM monitors in the network. This will reduce the considerable resources required to maintain the aging FRM samplers and to process and weigh the collected filter samples. It will also provide for daily data at sites that may only be one-in-three day sites currently, and it will provide useful hourly data for public reporting and air quality assessments.

PM10 MONITORING NETWORK

The South Coast AQMD monitoring network exceeds the minimum monitoring requirements for PM10. Due to the large population in Southern California, the complexity of the geography, and the current non-attainment status of the basin, a relatively large number of air monitoring stations are needed to adequately describe air quality and provide important health information to the public.

PM10 includes PM2.5, but concentrations can vary significantly on short spatial scales. However, based on the correlation analysis in Section III, some sites in close proximity to one another provide similar PM10 readings. These sites tend to be in the highest concentration areas (Rubidoux and Mira Loma Van Buren), but the correlated site clusters are not as clear as for O3 and PM2.5.

In terms of siting criteria, findings related to PM10 sites include:

- South Long Beach does not currently meet all 40 CFR § 58 Appendix E Probe Siting Criteria, specifically the spacing from obstructions surrounding the instrumentation.

Other assessment findings regarding these and other sites include:

- Norco has been in operation for 30 years. The infrastructure is inadequate as there are no indoor facilities which allow for monitoring of criteria pollutants. Data is not used for purposes other than NAAQS and there are no other measurements being made at the site.

- Ontario Fire Station –has been in operation for 11 years. The infrastructure is inadequate as there are no indoor facilities which allow for monitoring of criteria pollutants. Data are not used for purposes other than NAAQS and there are no synergies between programs.

Given the high levels of PM10 recorded at both Rubidoux and Mira Loma, no changes are recommended for PM10 measurements at these sites, despite their high level of correlation. However, given that Mira Loma has consistently recorded higher levels of PM10 over the last five years than Rubidoux, the Mira Loma site should be designated as the expected maximum concentration PM10 site as per 40 CFR § 58.12(e).

The only measurement at the Norco site is PM10 and thus does not provide any synergies with other programs. It consistently records lower PM10 concentrations than nearby Rubidoux and Mira Loma. Therefore, it can be considered for potential elimination from the PM10 monitoring network. A similar analysis can be made for the Ontario station, with few synergies with other programs and very similar PM10 statistics levels to Norco and other nearby sites. If both sites were eliminated, this may create a geographical gap in western Riverside and San Bernardino Counties. To provide spatial coverage in that area, the sites could be consolidated into a new location with better infrastructure between the current Norco and Ontario sites.

The potential move of the South Long Beach site closer to port activities suggested for the PM2.5 network also holds for the PM10 network.

Another suggested change in the configuration of the PM10 network is to transition towards continuous PM10 FEM monitors. New continuous PM10 monitors have recently been deployed for a regional health study and can eventually serve to replace many existing FRM monitors in the network. This will reduce the considerable resources required to maintain the aging FRM samplers and to process and weigh the collected filter samples. It will also provide for daily data at sites that may only be one-in-six day sites currently, and it will provide useful hourly data for public reporting and air quality assessments.

SUMMARY OF RECOMMENDED NETWORK MODIFICATIONS

The current AQMD air monitoring network meets or exceeds U.S. EPA monitoring requirements while satisfying a wide array of monitoring purposes, some beyond those described in this assessment. Meeting minimum monitoring requirements is just one factor in determining the value of sites and measurements. Given the challenges of meeting air quality standards in Southern California and the need for information to help in developing control strategies to achieve attainment, the South Coast AQMD monitoring network will continue to far exceed the minimum requirements. Furthermore, closing, relocating or creating monitoring sites requires significant resources and often a long period of concurrent monitoring to show comparability. Thus, the suggestions summarized below must be weighed against many other factors before being implemented. Most changes to the monitoring network are subject to approval by the U.S. EPA Regional Administrator.

- Once new monitoring regulations, attainment status, and network decisions are known for SO2, NO2, and CO, consider a general reduction in the number of sites monitoring for those pollutants in the network while still meeting all monitoring objectives and purposes.

- Reconsider the values of the Glendora, La Habra and Pomona sites, and potentially consolidate measurements at nearby sites or at a new site in Diamond Bar.

- Reconsider the value of the Big Bear Lake PM2.5 site.

- Consider moving all South Long Beach measurements to a new permanent site on Anaheim Street in Long Beach that is closer to port activities and will better achieve the original purpose of the site.

- Reconsider the value of the Norco and Ontario particulate sites, and potentially consolidate measurements at nearby sites or at a new site between the two.

- Continue to transition to continuous PM measurements that can eventually replace filter-based measurements.