SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix II

Current Air Quality

2016 AIR QUALITY MANAGEMENT PLAN

March 2017

FINAL 2016 AQMP
APPENDIX II

CURRENT AIR QUALITY

MARCH 2017

CONTRIBUTORS

South Coast Air Quality Management District

Wayne Nastri
Executive Officer

Jill Whynot
Chief Operating Officer

Philip M. Fine, Ph.D.
Deputy Executive Officer
Planning, Rule Development, & Area Sources

Authors

SCAQMD – Planning, Rule Development, & Area Sources

Kevin Durkee, Senior Meteorologist

Shoreh Cohanim, Air Quality Specialist

Payam Pakbin, Ph.D., Air Quality Specialist

Contributors

Mark Bassett, Ph.D., Air Quality Specialist

Stephen Dutz, Principal Air Quality Chemist

Laura Saucedo, Sr. Air Quality Chemist

Rene Bermudez, Principal AQ Instrument Specialist

Brian Vlasich, Sr. Air Quality Instrument Specialist

Hanna Zhuang, Air Quality Instrument Specialist

Production

Jong Hoon Lee, Ph.D., Air Quality Specialist

Arlene Martinez, Sr. Administrative Secretary

Table of Contents

SUMMARY

CHAPTER 1: INTRODUCTION

CHAPTER 2: AIR QUALITY IN THE SOUTH COAST AIR BASIN

CHAPTER 3: AIR QUALITY IN THE THE SALTON SEA AIR BASIN, RIVERSIDE COUNTY (COACHELLA VALLEY)

SUMMARY

This appendix contains a detailed summary of air quality in 2015 and prior year trends for the South Coast Air Basin (Basin) and the Riverside County portion of Salton Sea Air Basin (SSAB), under the jurisdiction of the South Coast Air Quality Management District (SCAQMD or District). The Basin includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties. The Riverside County portion of the SSAB under the District's jurisdiction is the Coachella Valley Planning Area (Coachella Valley).

Chapter 1 of this appendix presents descriptions of the air quality setting for the SCAQMD jurisdiction, including the relevant boundaries, weather factors and emissions for both the Basin and the Coachella Valley. It also briefly describes the properties and health and welfare effects of the criteria pollutants, i.e., those pollutants that have an associated health-based National Ambient Air Quality Standard (NAAQS or federal standard). It also details the level and form of both the NAAQS and the California Ambient Air Quality Standards (CAAQS or State standards).

Chapters 2 and 3 present summaries of current air quality and trends for each of the criteria pollutants in the Basin and the Coachella Valley, respectively. These chapters include the 2015 peak concentrations and 2013–2015 3-year design values for comparison to federal and State standards, along with geographical, seasonal, and diurnal variations. Air quality statistics and trends presented in this appendix provide information on the recent history and current status and progress toward attainment of the NAAQS and CAAQS, providing a baseline for planning toward future attainment.

In the Basin, Ozone (O_3) and fine particulate matter (PM2.5, particles less than 2.5 microns in diameter) are the pollutants of primary concern. For these, the U.S. EPA has designated the Basin as a nonattainment area for the NAAQS. The Basin had the highest number of days exceeding the federal ozone NAAQS of any urban area nationwide in 2015. State standards for ozone, PM2.5, and PM10 are also not met in the Basin. The Basin is in attainment of the PM10 (particles less than 10 microns in diameter) NAAQS. Nitrogen dioxide (NO_2), carbon monoxide (CO), and sulfur dioxide (SO_2) levels are in attainment with both the federal and the State standards. The Basin is in attainment of the lead (Pb) NAAQS, with the final near-source monitoring location below the standard throughout the 2012 through 2015 time period. The District will request that U.S. EPA redesignate the Los Angeles County portion of the Basin as attainment for lead. The Basin is also in attainment of the State standards for lead, sulfates (SO_4^{2-}), and hydrogen sulfide (H_2S).

The Coachella Valley is a NAAQS nonattainment area for 8-hour ozone and 24-hour PM10 and also does not attain the California State standards for ozone and PM10. However, the Coachella Valley is now in attainment of the 1979 1-hour ozone NAAQS. All exceedances of the 24-hour PM10 NAAQS in the Coachella Valley are associated with high-wind natural events. PM2.5 concentrations remain below the federal and State standards in the Coachella Valley, along with the remainder of the criteria pollutants, except that the State hydrogen sulfide (H_2S) standard is exceeded due to naturally occurring emissions from the Salton Sea.

Detailed air quality statistics for each of the District's monitoring locations in the Basin and the SSAB are contained in the attachment to this appendix, for the years 1995 through 2015. Please refer to Appendix II from the 2003 AQMP[1] for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP[2] for 1990–2005 data.

[1] 2003 AQMP, Appendix II: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2003-air-quality-management-plan/2003-aqmp-appendix-ii.pdf?sfvrsn=2

[2] 2007 AQMP, Appendix II: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2007-air-quality-management-plan/2007-aqmp-appendix-ii.pdf?sfvrsn=2

CHAPTER 1

INTRODUCTION

Air Quality Setting

SCAQMD Jurisdiction and Air Quality Monitoring Network

Weather Factors

Emissions

Ambient Air Quality Standards

Design Values

Summary of Criteria Pollutants and Air Quality Standards

Air Quality Setting

SCAQMD Jurisdiction and Air Quality Monitoring Network

California's first local air pollution control agency, the Los Angeles County Air Pollution Control District (LAAPCD), was formed in 1947, and APCDs were formed in Orange, Riverside, and San Bernardino Counties soon afterward. These four agencies combined in 1976 to form the Southern California APCD, which was replaced by the South Coast Air Quality Management District (SCAQMD or District) by State legislation, effective February 1, 1977, with jurisdiction over the South Coast Air Basin (Basin). The Mojave Desert Air Quality Management District (MDAQMD) was also formed, which covers the Mojave Desert Air Basin (MDAB), except for a portion within SCAQMD jurisdiction in eastern Riverside County. Later, the Antelope Valley Air Pollution Control District (AVAPCD) was formed, which covers the Antelope Valley desert portion of Los Angeles County that is not within SCAQMD jurisdiction.

The Basin includes all of Orange County and the non-desert areas of Los Angeles, Riverside, and San Bernardino Counties. The District is also responsible for air quality in the Riverside County portion of the Salton Sea Air Basin (SSAB), which is primarily the Coachella Valley Planning Area (Coachella Valley). The region encompassed by the District is shown in Figure 1-1.

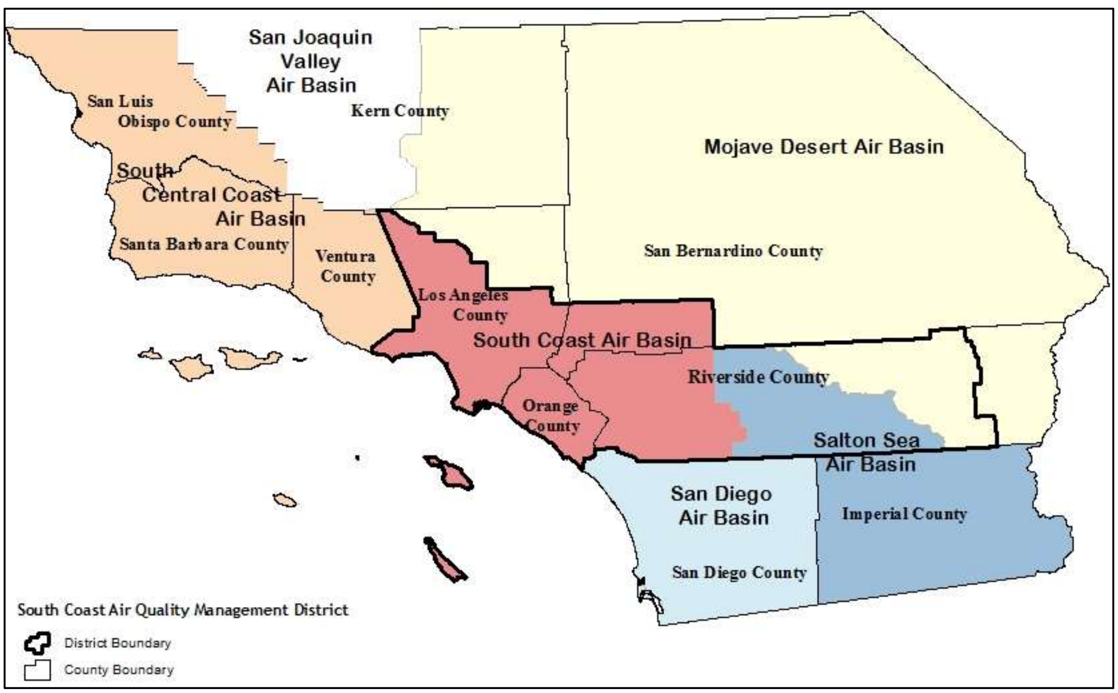

FIGURE 1-1

South Coast Air Quality Management District and Surrounding Jurisdictions

(The grey portion of Riverside County is the Coachella Valley Planning Area portion of the Salton Sea Air Basin)

The Basin has an area of 6,800 square miles with a population of approximately 16 million people in 2015. The Los Angeles urban area (the nation's second largest), the Anaheim-Fullerton urban area, and the Riverside-San Bernardino urban area lie within the Basin's boundaries. About two-thirds of the Basin's population lives within Los Angeles County.

The 2015 population in the Coachella Valley was approximately 465,000. SCAQMD also has jurisdiction over a small portion of the MDAB in Eastern Riverside County (see Figure 1-1). The area is sparsely populated desert and contains a portion of Joshua Tree National Park. The SSAB and the MDAB have a combined area of approximately 32,200 square miles. These two Basins include most of the desert portions of Los Angeles, Riverside, and San Bernardino Counties, as well as Imperial County and part of Kern County.

Table 1-1 summarizes the historic, current and future projections of the population of the Basin and the Coachella Valley.

TABLE 1-1

Historic and Projected Populations for South Coast Air Basin and Coachella Valley

AREA	Historic Population				Projected Population		
	1980	1990	2000	2010	2020	2031	2040
South Coast Air Basin	10,500,000	13,083,594	14,640,692	15,735,186	16,764,932	17,940,418	18,822,083
Coachella Valley	139,000	244,070	325,937	425,404	497,257	596,386	673,425

Source: Historic populations from Southern California Association of Governments, January 2016 CARB 2013 Almanac of Emissions and Air Quality, 2013 Edition, Appendix C [http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm]; Population projections from Southern California Association of Governments (SCAG) [January 2016 update]

U.S. EPA has set National Air Quality Standards (NAAQS) for six principal pollutants, which are called "criteria" pollutants," including O_3, PM (including both PM10 and PM2.5), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). In 2015, SCAQMD measured concentrations of air pollutants at 34 routine ambient air monitoring stations in its jurisdiction, with primary focus on these criteria pollutants. In addition to the ambient monitoring, lead concentrations continued to be monitored at five source-oriented monitoring sites, immediately downwind of stationary lead sources. By the beginning of 2015, the SCAQMD also added four new near-road monitoring stations. The near-road measurements focus on carbon monoxide (CO), nitrogen dioxide (NO_2), and PM2.5 near some of the most heavily trafficked roadways in southern California. Additions to the SCAQMD ambient air monitoring network since the previous 2012 AQMP, which included air quality data summaries through the 2011, include a new monitoring station in the southeastern Coachella Valley in the community of Mecca to measure PM10 and hydrogen sulfide (H_2S) and a station close to the Salton Sea to measure H_2S.

Monitoring Network Status

U.S. EPA has set National Air Quality Standards (NAAQS) and monitoring requirements for six principal pollutants, which are called "criteria" pollutants," including O_3, PM (including both PM10 and PM2.5), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). In 2015, SCAQMD measured concentrations of air pollutants at 34 routine ambient air monitoring stations in its jurisdiction, with primary focus on these criteria pollutants. In addition to the ambient monitoring, lead concentrations are monitored at five source-oriented monitoring sites, immediately downwind of stationary lead sources.

There have been several changes to the SCAQMD ambient air monitoring network since the previous AQMP, which was finalized in 2012 and summarized air quality through 2011. Long-term monitoring stations at North Long Beach and Burbank had to be closed in 2013 and 2014, respectively, due to lease decisions beyond the District's control; replacements for these two stations are being sought at this time. Filter-based PM2.5 measurements have continued at North Long Beach until a suitable replacement station can be obtained. The Ontario Fire Station monitoring station was closed in 2014, due to lack of sufficient space at the Ontario site measurements beyond the limited PM10 and PM2.5 sampling. The Riverside-Magnolia station was also closed, with those measurements (PM2.5, lead, CO and NO_2) consolidated at the nearby Riverside-Rubidoux station in 2015. Replacements for the Ontario Fire Station and Riverside-Magnolia air monitoring stations are not required by U.S. EPA and the measurements from these locations are well-represented by other SCAQMD stations.

A new special-purpose monitoring station was added, starting in January 2013, in the southeastern Coachella Valley in the community of Mecca to measure PM10 and hydrogen sulfide (H_2S). A second H_2S monitor was added on Torres-Martinez tribal property to measure naturally occurring odors from the Salton Sea close to the shoreline.

To implement recent U.S. EPA requirements to monitor NO_2, CO, and PM2.5 near major roadways in large urban areas, four new near-road monitoring stations were installed. The NO_2 measurements began on January 1, 2014 at a near-road site at Vernon Street in Anaheim, Orange County, adjacent to Interstate Highway 5. This was followed by a new near-road site near Etiwanda Avenue in San Bernardino County next to Interstate Highway 10 in July 2014. CO measurements began at both the I-5 and I-10 near-road sites in December 2014. These two sites represent high traffic volume routes. Near-road NO_2 and PM2.5 measurements began in 2015 next to California Highway 60, west of Vineyard Avenue near the San Bernardino/Riverside County border, and next to Interstate Highway 710, at Long Beach Blvd. in Los Angeles County. These two sites represent high traffic volumes with a high fraction of diesel truck traffic.

The near-road monitoring is source-specific, that is, the pollutant measurements are directly impacted by the close proximity of the traffic-related emissions from the roadways. As a result, higher measured air pollutant concentrations are generally expected at the near-road sites than those found further away from the freeways. The near-road measurements provide representative pollutant exposure information for people who live, work, or go to school adjacent to freeways or who spend significant time traveling on the busiest southern California roadways. Once sufficient near-road data is collected for a full 3-year design value[3] calculation, it can be included in analyses for attainment of the NAAQS.

Figure 1-2 shows the locations of the regular ambient air monitoring stations along with the District boundaries. Table A-1 and Figure A-1 in the attachment to this appendix also show the District's current ambient air monitoring network.[4]

[3] A design value is a statistic that describes the air quality status of a given area relative to the level and form of the NAAQS. For most criteria pollutants, the design value is a 3-year average and takes into account the form of the short-term standard (e.g., 98th percentile, fourth high value, etc.). Design values can also be calculated for standards that are exceedance-based (e.g., 1-hour ozone and 24-hour PM10) so that they can be expressed as a concentration instead of an exceedance count, in order to allow a direct comparison to the level of the standard. Note that the modeling design values used for the AQMP attainment demonstration are based on a 5-year period, weighted toward the center year, as specified in U.S. EPA modeling guidelines.

[4] For more detailed current information and maps of the SCAQMD air monitoring network by pollutant measured and monitoring station details, please refer to SCAQMD's Annual Air Monitoring Network Plan, available on the web at http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan.

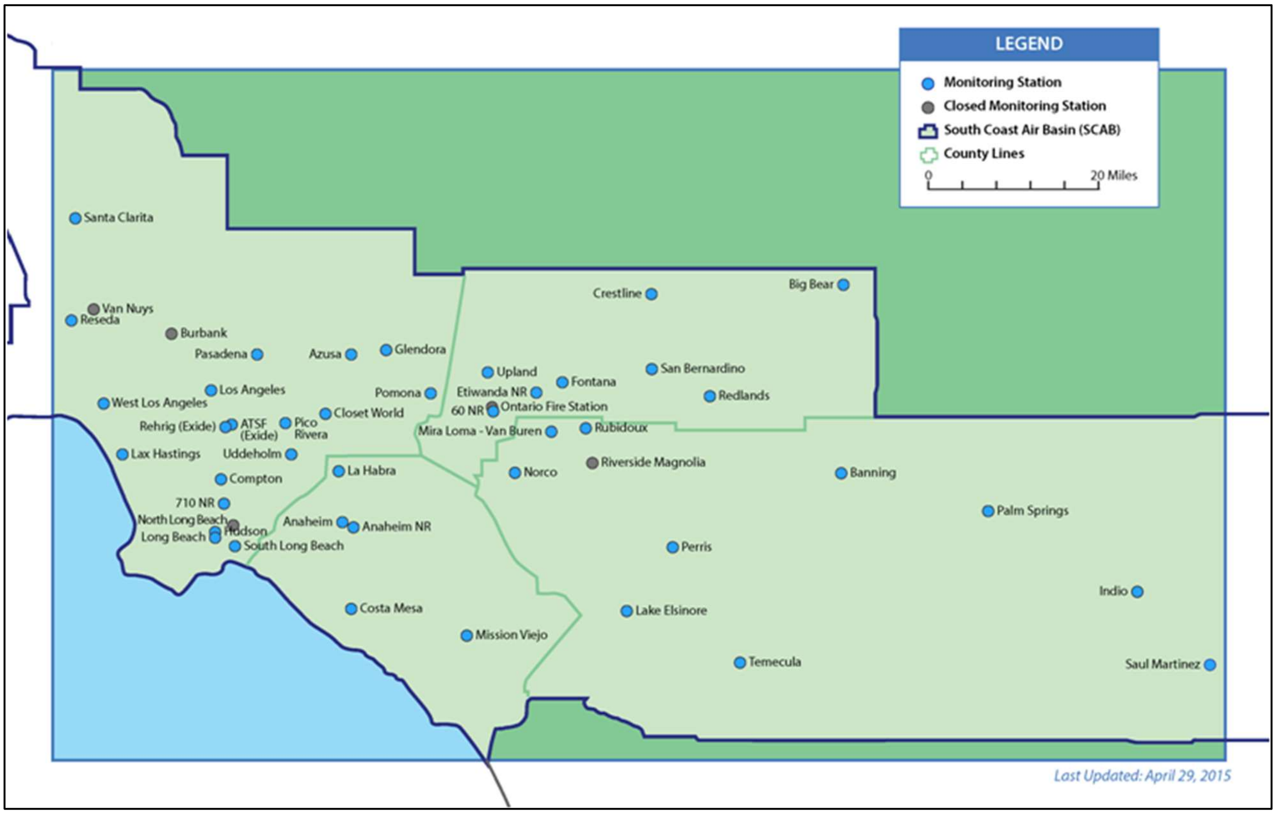

FIGURE 1-2

South Coast Air Quality Management District Ambient Air Monitoring Stations in 2015

[Note stations closed (grey dots): N. Long Beach in 2013 (FRM PM2.5 still operating), Burbank and Ontario Fire Station in 2014, Riverside-Magnolia in 2015, and Van Nuys Airport lead (Pb) monitor; Salton Sea Air Basin include: Palm Springs, Indio, and Mecca-Saul Martinez stations, in Riverside County's Coachella Valley; all other stations are in the South Coast Air Basin; I-710 (labeled 710 NR), CA-60 (60 NR), I-5 (Anaheim NR), and I-10 (Etiwanda NR) are near-road stations]

Weather Factors

The climate of the District varies considerably between the coastal zone, inland valleys, mountain areas, and deserts. Most of the Basin is relatively arid, with very little rainfall and abundant sunshine during the summer months. It has light winds and poor vertical mixing compared to most other large urban areas in the U.S. The combination of poor air dispersion and abundant sunshine provides conditions especially favorable to the formation of photochemical smog and the trapping of particulates and other pollutants. The Basin is bounded to the north and east by mountains with maximum elevations exceeding 10,000 feet. The unfavorable combination of meteorology, topography, and emissions from the nation's second largest urban area results in the Basin having some of the worst air quality in the U.S.

The prevailing daytime sea breeze tends to transport pollutants and precursor emissions from coastal areas into the Basin's inland valleys, and from there, still further inland into neighboring areas of the SSAB (especially the Coachella Valley) and the MDAB. Concentrations of primary pollutants (those emitted directly into the air) are typically highest close to the sources which emit them. However, secondary pollutants (those formed in the air by chemical reactions, such as ozone and the majority of PM2.5) reach maximum concentrations some distance downwind of the sources that emit the precursors, due to the fact that the polluted air mass is moved inland by the prevailing winds many miles to areas where maximum concentrations are reached.

Emissions

The year 2012 emissions are the base year emissions used for the 2016 AQMP. In that year, the Basin's annual average daily emissions were approximately 2,123 tons of CO, 470 tons of volatile organic compounds (VOC), 540 tons of oxides of nitrogen (NOx), 18 tons of sulfur oxides (SOx), 152 tons of PM10, 66 tons of PM2.5, and 81 tons of ammonia (NH_3). The 2012 annual average daily emissions in the Coachella Valley are much lower than in the Basin: approximately 60 tons of CO, 14 tons of VOC, 27 tons of NOx, 0.2 tons of SOx, 15 tons of PM10, 3 tons of PM2.5, and 2.4 tons of NH_3. The difference in local emissions between these two areas under SCAQMD jurisdiction, along with the prevailing wind flows into the Coachella Valley from the Basin, illustrate the importance of pollutant transport to the Coachella Valley's air quality. Figure 1-3 shows the 2012 annual average daily emissions for the Basin and the Coachella Valley.

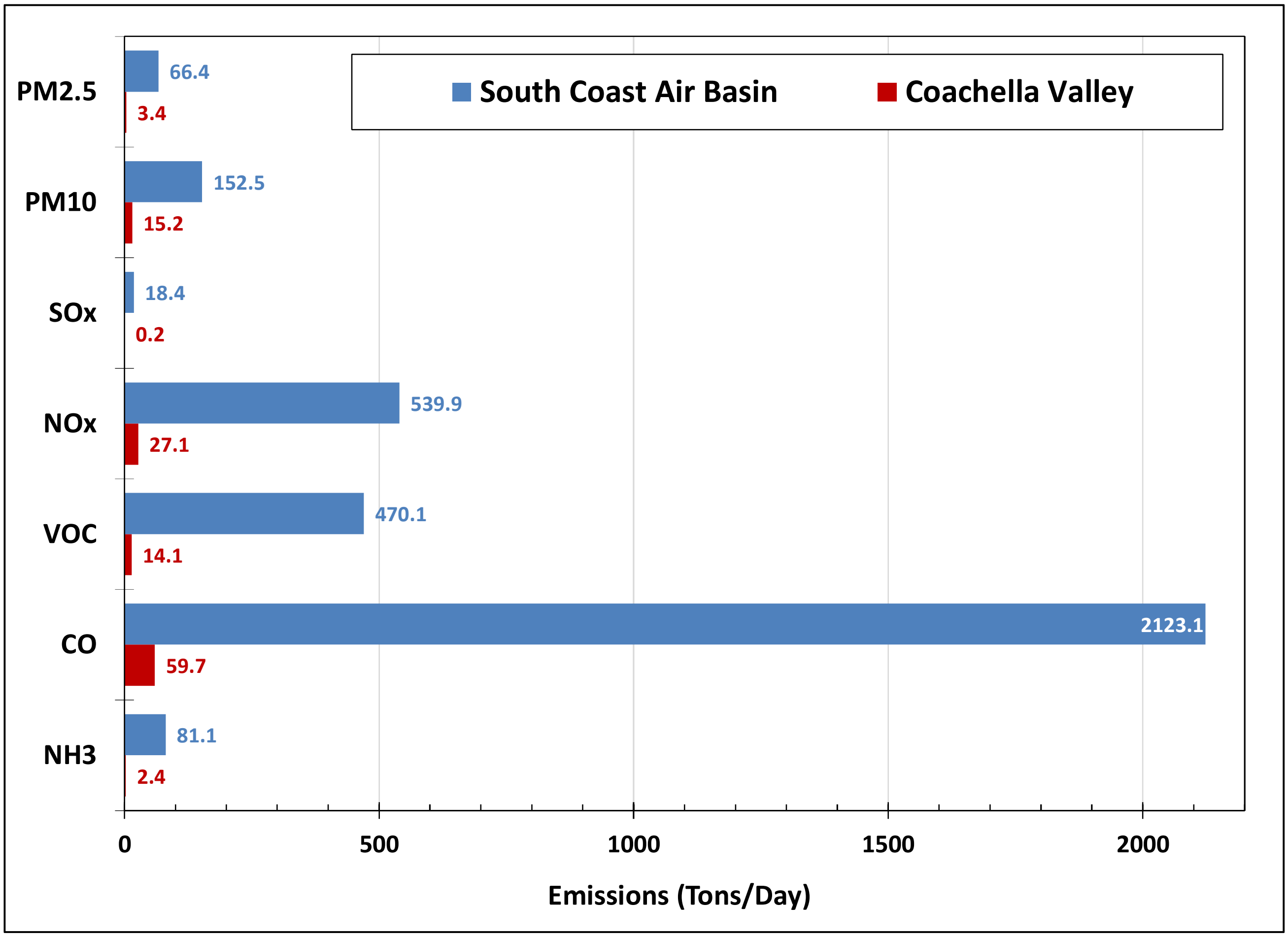

FIGURE 1-3

South Coast Air Basin and Coachella Valley 2012 Base Year Annual Average Daily Emissions (Tons per Day)

Much of the directly emitted PM10 and PM2.5 is attributed to fugitive dust sources such as re-suspended road dust, construction activities, farming operations and wind-blown dust, but other directly-emitted substances such as diesel particulate are also significant. Additional PM10 and PM2.5 particles form in the atmosphere through secondary chemical reactions from gaseous precursor emissions. VOCs and NO_x are precursors of ozone, and they also react to form nitrates and solid organic compounds, which are a significant fraction of the ambient particulate matter. SO_2 reacts to form sulfates which are also significant contributors to the Basin's PM10 and PM2.5 levels. Most emissions vary relatively little by season, but there are large seasonal differences in the atmospheric concentrations of pollutants due to seasonal variations in the weather. Details of the 2012 base year and future-year projected emissions inventories are contained in Appendix III.

Ambient Air Quality Standards

Both the federal government and the State of California have adopted ambient air quality standards, which define the concentration below which long-term or short-term exposure to a pollutant is not expected to cause adverse effects to public health and welfare. The criteria pollutants, those that have federal health-based National Ambient Air Quality Standards (NAAQS or federal standards), are: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), coarse and fine particulate matter (PM10 and PM2.5, respectively), and lead. The State of California also has California Ambient Air Quality Standards (CAAQS or State standards) for these criteria pollutants, plus standards for, and sulfates (SO_4^{2-}), hydrogen sulfide (H_2S), and vinyl chloride, as well as a welfare-based standard for visibility-reducing particles.

For several of the NAAQS, there are both primary and secondary standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. This document focuses mainly on the primary federal and State standards. The federal and State primary standards are summarized in Table 1-2, along with a brief summary of health and welfare effects. Further discussion of the health effects of air pollutants is presented in Chapter 2 and more detailed health information is presented in Appendix I: Health Effects.

TABLE 1-2

Ambient Air Quality Standards and Key Health and Welfare Effects

AIR POLLUTANT	FEDERAL STANDARD (NAAQS) Concentration, Averaging Time, Year of NAAQS Review	STATE STANDARD (CAAQS) Concentration, Averaging Time	KEY HEALTH & WELFARE EFFECTS[#]
Ozone (O_3)	**0.070 ppm, 8-Hour (2015)** 0.075 ppm, 8-Hour (2008) 0.08 ppm, 8-Hour (1997) 0.12 ppm, 1-Hour (1979)	**0.070 ppm, 8-Hour** **0.09 ppm, 1-Hour**	(a) Pulmonary function decrements and localized lung injury in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Increased respiratory related hospital admissions and emergency room visits; (e) Vegetation damage; (f) Property damage
Fine Particulate Matter (PM2.5)	**35 µg/m³, 24-Hour (2006)** **12.0 µg/m³, Annual (2012)** 15.0 µg/m³, Annual 1997)	**12 µg/m³, Annual**	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Decline in pulmonary function or growth in children; (c) Increased risk of premature death; (d) Increased risk of lung cancer; (e) increased asthma-related hospital admissions; (f) increased school absences and lost work days; (g) possible link to reproductive effects; (h) visibility reduction
Respirable Particulate Matter (PM10)	**150 µg/m³, 24-Hour (1997)**	**50 µg/m³, 24-Hour** **20 µg/m³, Annual**	
Carbon Monoxide (CO)	**35 ppm, 1-Hour (1971)** **9 ppm, 8-Hour (1971)**	**20 ppm, 1-Hour** **9.0 ppm, 8-Hour**	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Possible impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide (NO_2)	**100 ppb, 1-Hour (2010)** **0.053 ppm, Annual (1971)**	**0.18 ppm, 1-Hour** **0.030 ppm, Annual**	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in children with asthma; (b) Increased airway responsiveness in asthmatics; (c) Contribution to atmospheric discoloration
Sulfur Dioxide (SO_2)	**75 ppb, 1-Hour (2010)**	**0.25 ppm, 1-Hour** **0.04 ppm, 24-Hour**	Respiratory symptoms (bronchoconstriction, possible wheezing or shortness of breath) during exercise or physical activity in persons with asthma
Lead (Pb)	**0.15 µg/m³, rolling 3-month average (2008)**	**1.5 µg/m³, 30-day average**	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction; (c) cardiovascular effects, including coronary heart disease and hypertension
Sulfates-PM10 (SO_4^{2-})	**N/A**	**25 µg/m³, 24-Hour**	(a) Decrease in lung function; (b) Aggravation of asthmatic symptoms; (c) Vegetation damage; (d) Degradation of visibility; (e) Property damage
Hydrogen Sulfide (H_2S)	**N/A**	**0.03 ppm, 1-hour**	Exposure to lower ambient concentrations above the standard may result in objectionable odor and may be accompanied by symptoms such as headaches, nausea, dizziness, nasal irritation, cough, and shortness of breath

ppm – parts per million by volume; ppb – parts per billion by volume (0.01 ppm = 10 ppb)
Standards in bold are the current, most stringent standards; there may be continuing obligations for former standards
State standards are "not-to-exceed" values based on State designation value calculations
Federal standards follow the 3-year design value form of the NAAQS

[#] List of health and welfare effects is not comprehensive; detailed health effect information can be found in Appendix I: Health Effects or the U.S. EPA NAAQS documentation at http://www.epa.gov/ttn/naaqs/

Design Values

Air quality statistics are often presented in terms of the maximum concentrations measured at monitoring stations or in air basins, as well as for the number of days exceeding State or federal standards. These are instructive in regard to trends and the effectiveness of control programs. However, it should be noted that an exceedance of the concentration level of a federal standard does not necessarily lead to nonattainment designation. For NAAQS attainment/nonattainment decisions a *Design Value* for each station is calculated typically based on the most recent 3 years of data along with the form of the standard. For example, the design value for the 24-hour PM2.5 NAAQS is based on the annual 98th percentile measurement of all the 24-hour samples at each station, averaged over 3 years. The overall design value for an air basin is the highest design value of all the stations in that basin. U.S. EPA also allows certain data to be flagged and not considered for NAAQS attainment status, when that data is influenced by exceptional events, such as high wind events, wildfires, volcanoes, or some cultural events (e.g. Independence Day fireworks) that meet strict criteria. Table 1-3 shows the design value requirements utilizing the form of the federal standards for the federal criteria pollutants.

TABLE 1-3

National Ambient Air Quality Standards (NAAQS) and Design Value Requirements

Pollutant	Averaging Time**	NAAQS Level	Design Value Form of NAAQS*
Ozone (O_3)	1-Hour (1979) [revoked 2005]	0.12 ppm	Not to be exceeded more than once per year averaged over 3 years
	8-Hour (2015)	**0.070 ppm**	**Annual fourth highest 8-hour average concentration, averaged over 3 years**
	8-Hour(2008) [revised 2015]	0.075 ppm	
	8-Hour(1997) [revoked 2015]	0.08 ppm	
Fine Particulate Matter (PM2.5)	**24-Hour (2006)**	**35 µg/m^3**	**3-year average of the annual 98th percentile of daily 24-hour concentration**
	Annual (2012)	**12.0 µg/m^3**	**Annual average concentration, averaged over 3 years** *(annual averages based on average of 4 quarters)*
	Annual (1997) [revised 2012]	15.0 µg/m^3	
Respirable Particulate Matter (PM10)	**24-Hour (1987)**	**150 µg/m^3**	**Not to be exceeded more than once per year averaged over 3 years**
	Annual (1987) [revoked 2006]	50 µg/m^3	Annual average concentration, averaged over 3 years
Carbon Monoxide (CO)	**1-Hour (1971)**	**35 ppm**	**Not to be exceeded more than once a year**
	8-Hour (1971)	**9 ppm**	
Nitrogen Dioxide (NO_2)	**1-Hour (2010)**	**100 ppb**	**3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations**
	Annual (1971)	**0.053 ppm**	**Annual average concentration, averaged over 3 years**
Sulfur Dioxide (SO_2)	**1-Hour (2010)**	**75 ppb**	**3-yer average of the 99th percentile of the daily maximum 1-hour average concentrations**
	24-Hour (1971)#	0.14 ppm	Not to be exceeded more than once per year
	Annual (1971)#	0.03 ppm	Annual arithmetic average
Lead (Pb)	**3-Month Rolling Average (2008)##**	**0.15 µg/m^3**	**Highest rolling 3-month average of the 3 years**

Bold text denotes the current and most stringent NAAQS

* The NAAQS is attained when the design value (form of concentration listed) is equal to or less than the level of the NAAQS, assessed by station; for pollutants with the design values based on "exceedances" (1-hour O_3, 24-hour PM10, CO, and 24-hour SO_2), the NAAQS is attained when the concentration associated with the design value is less than or equal to the standard level:

- For 1-hour O_3 and 24-hour PM10, the NAAQS is attained when the 4th highest daily concentrations of the 3-year period is less than or equal to the standard level
- For CO and 24-hour SO_2, the standard is attained when the 2nd highest daily concentration of the most recent year is equal to or less than the standard level

** Year of U.S. EPA NAAQS update review shown in parenthesis and revoked or revised status in brackets; for revoked or revised NAAQS, areas may have continuing obligations until that standard is attained: for 1-hour O_3, the South Coast Air Basin has continuing obligations under the former 1979 standard; for 8-hour O_3, the NAAQS was lowered from 0.08 ppm to 0.075 ppm to 0.070 ppm, but the previous 8-hour O_3 NAAQS and most related implementation rules remain in place until that standard is attained

\# Annual and 24-hour SO_2 NAAQS are expected to be revoked 12/2021, one year from final attainment designations for the (2010) 1-hour SO_2 NAAQS expected 12/2020

\#\# 3-month rolling averages of the first year (of the three year period) include November and December monthly averages of the prior year; the 3-month average is based on the average of "monthly" averages

Summary of Criteria Pollutants and Air Quality Standards

Ambient air quality standards are periodically reviewed by U.S. EPA and State agencies to incorporate the findings from the most current research available on the effects of pollutants. Alert and advisory levels for advising the public about unhealthful air quality are also recommended. The section below summarizes the pollutant properties and health information, along with the air quality standards, including the recently revised or newly established standards.

Ozone Properties

The Basin's unique air pollution problem was first recognized in the 1940's. The Los Angeles urban area smog was worse than other areas. Early research showed that ozone was being formed in the Basin's atmosphere from VOCs and NOx being emitted into the air in the presence of sunshine and trapped laterally by the mountainous terrain and vertically by strong low-altitude temperature inversions that act as a lid to vertical mixing of air. Regular monitoring of total oxidants was begun by the Los Angeles Air Pollution Control District (LAAPCD) in the 1950's, and annual maximum 1-hour ozone concentrations in excess of 0.60 ppm (600 ppb) were recorded at that time.

Ozone, a colorless gas with a sharp odor at very high concentrations, is a highly reactive form of oxygen. High ozone concentrations exist naturally high above the earth in the stratosphere. Some mixing of stratospheric ozone downward to the earth's surface does occur; however, the extent of ozone transport from aloft is limited. At the earth's surface in sites remote from urban areas, ozone concentrations are normally very low (0.03-0.05 ppm).

In urban areas, ozone is formed by a complicated series of chemical and photochemical reactions between VOCs, NOx, and the oxygen in the air. A decrease in ozone precursors may or may not result in a linear decrease in ozone. Ozone concentrations are dependent not only on overall precursor levels, but also on the ratio of the concentrations of VOCs to NOx , the reactivity of the specific VOCs present, the spatial and temporal distribution of emissions, the level of solar radiation, and other weather factors.

While ozone is beneficial in the stratosphere, where it blocks skin-cancer-causing ultraviolet radiation, it is a highly reactive oxidant. It is this reactivity which accounts for its damaging effects on materials, plants, and human health at the earth's surface.

The propensity of ozone to react with organic materials causes it to be damaging to living cells, and ambient ozone concentrations in the Basin are frequently sufficient to cause adverse health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection. People with respiratory diseases, children, the elderly, and people who exercise heavily are more susceptible to the effects of ozone.

Plants are sensitive to ozone at concentrations well below the health-based standards and ozone is responsible for significant crop damage and damage to forests and other ecosystems.

The adverse effects of ozone air pollution exposure on health have been studied for many years, as is documented by a significant body of peer-reviewed scientific research, including studies conducted in southern California. The 2013 U.S. EPA document, *Integrated Science Assessment of Ozone and Related*

Photochemical Oxidants,[5] describes these health effects and discusses the State of the scientific knowledge and research. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

Ozone Air Quality Standards

Studies have shown that even relatively low concentrations of ozone, if lasting for several hours, can significantly reduce lung function in normal healthy people. Effective September 16, 1997, the U.S. Environmental Protection Agency (U.S. EPA) adopted an 8-hour average federal ozone standard with a level of 0.08 ppm, intending to replace the 1-hour standard that was adopted in 1979 (0.12 ppm). This 1997 8-hour ozone standard was more stringent than the 1979 1-hour standard and provided greater protection to public health. The 8-hour standard is intended to help protect people who spend a significant amount of time working or playing outdoors, a group that is particularly vulnerable to the effects of ozone. (Due to the monitoring and reporting requirements of the older ozone standards, a level of 0.085 ppm or 85 ppb is required to exceed the 1997 8-hour standard and 0.125 ppm or 125 ppb is required to exceed the 1979 1-hour standard.)

The U.S. EPA eventually revoked the 1979 federal 1-hour ozone standard, effective June 15, 2005. However, the South Coast Air Basin and the former Southeast Desert Modified Air Quality Management Area (which included the Coachella Valley) had not attained the 1-hour federal ozone standard by the attainment date. On August 25, 2014, U.S. EPA proposed a clean data finding based on 2011–2013 data and a determination of attainment for the 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on April 15, 2015, effective May 15, 2015, including preliminary 2014 data. The Basin has not yet attained the 1-hour ozone NAAQS and has some continuing obligations under the former standard.

The 1997 8-hour standard was subsequently lowered from 0.08 to 0.075 ppm, effective May 27, 2008. On October 1, 2015, U.S. EPA finalized the new 2015 ozone NAAQS at 0.07 ppm, effective December 28, 2015. Nonattainment areas of the 1997 or the 2008 8-hour ozone standards, including the South Coast Air Basin and the Coachella Valley, still have continuing obligations to demonstrate attainment of that standard by the applicable attainment date. Statistics presented in this Appendix refer to the current 2015 8-hour ozone NAAQS, the revised 2008, and the revoked 1997 8-hour ozone NAAQS, as well as the revoked 1979 1-hour ozone NAAQS, for purposes of historical comparison and assessment of progress towards attainment of those standards.

The State of California Air Resources Board (CARB), established an 8-hour average State ozone standard (0.070 ppm), effective May 17, 2006. The earlier State 1-hour ozone standard (0.09 ppm) also continues to remain in effect.

While the 1-hour ozone episode levels and the related health warnings still exist, they are essentially replaced by the more protective health warnings associated with the current 8-hour ozone NAAQS, which includes the Air Quality Index (AQI)[6] scale for real-time reporting of air pollution levels and forecasts. The older 1-hour

[5] U.S. EPA. (2013). Integrated Science Assessment of Ozone and Related Photochemical Oxidants (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/076F. [http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492]

[6] U.S. EPA Air Quality Index (AQI). [https://www.airnow.gov/index.cfm?action=aqibasics.aqi]

ozone episode warning levels include the State Health Advisory (0.15 ppm), Stage 1 (0.20 ppm), Stage 2 (0.35 ppm) and Stage 3 (0.50 ppm). The State 1-hour ozone Health Advisory was last exceeded in the Basin in 2013. The Basin's last 1-hour ozone Stage 1 episode occurred in 2003. The last 1-hour ozone Stage 2 episode occurred in 1988 and the last Stage 3 episode occurred in 1974.

Particulate Matter Properties

Particulate matter (PM) air pollution is a complex mixture of small particles and liquid droplets, made up of a number of components, including acids and salts (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Particles originate from a variety of anthropogenic mobile and stationary sources and from natural sources. These particles can be emitted directly or formed in the atmosphere by transformations of gaseous emissions, such as sulfur oxides (SOx), nitrogen oxides (NOx), ammonia (NH_3) and volatile organic compounds (VOC). Examples of secondary particle formation include: 1) conversion of SO_x and NOx to acid droplets or vapor that further react with ammonia to form ammonium sulfate and ammonium nitrate; and 2) reactions involving gaseous VOC, yielding organic compounds that condense on existing particles to form secondary organic aerosol (SOA) particles.

A significant body of peer-reviewed scientific research, including studies conducted in Southern California, points to adverse impacts of particulate matter air pollution on both increased illness (morbidity) and increased death rates (mortality). The 2009 U.S. EPA *Integrated Science Assessment for Particulate Matter*[7] describes these health effects and discusses the State of the scientific knowledge. A summary of health effects information and additional references can also be found in the 2016 AQMP, Appendix I: Health Effects.

The size of particles is directly linked to their potential for causing health problems. Particles that are 10 micrometers (µm) in diameter or smaller (PM10) are of more concern than larger particles because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. PM air pollution is typically grouped into two overlapping categories:

- *Inhalable particles* (PM10), such as those found near roadways and dusty industries, are smaller than 10 µm in diameter. PM10 includes all PM2.5 particles;
- *Fine particles* (PM2.5), such as those found in smoke and haze, are 2.5 µm in diameter and smaller. These particles can be directly emitted from combustion sources, such as from diesel exhaust (soot) or forest fire smoke, or they can form when gases emitted from power plants, industries and motor vehicles react in the air. PM2.5 is a subset of PM10 particles.

PM10 Properties

Respirable particles (particulate matter less than about 10 micrometers in diameter) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis, and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to PM10.

PM10 particles are both directly emitted and formed chemically in the atmosphere from diverse emission sources. Major sources of PM10 include re-suspended road dust or soil entrained into the atmosphere by

---

[7] U.S. EPA. (2009). Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546]

wind or activities such as construction and agriculture. These are mainly the coarser particles, in the PM10-2.5 coarse fraction range (often referred to as PM-Coarse, i.e., particles in the size range between 2.5 µm and 10 µm). Other components of PM10 form in the atmosphere (secondary PM10) from gaseous precursor emissions. These are mostly the smaller particles, mainly in the PM2.5 size range.

PM2.5 Properties

PM2.5, also known as fine particles, are the finer sized particles less than 2.5 µm in diameter; small enough to penetrate the defenses of the human respiratory system and lodge in the deepest recesses of the lung, causing potential adverse health impacts. The health effects include increased risks of heart attacks and strokes, aggravated asthma, acute bronchitis and chronic respiratory problems such as shortness of breath and painful breathing (in children, the elderly and sensitive people), and premature deaths (mainly in the elderly due to weaker immune systems). Sources of PM2.5 include diesel-powered vehicles such as buses and trucks, fuel combustion from automobiles, power plants, industrial processes, and wood burning.

In the Basin, much of the PM10 fraction is actually PM2.5 and smaller in size than 2.5 µm, a situation which has major implications for both health and atmospheric visibility. Reducing PM2.5 concentrations will therefore not only reduce the threat to the health of the Basin's population, but will also improve visibility in this region.

Total Suspended Particulate (TSP) Properties

Total suspended particulate (TSP) is the name applied to the complex mixture of particles suspended in the atmosphere, with no strict differentiation for particle size. TSP is collected on a glass fiber filter by means of a high volume sampler. Samples are collected for a 24-hour period every sixth day, and then returned to the laboratory to be weighed for mass and chemically analyzed to determine the concentrations of sulfate, nitrate, and lead. The federal and State standards for lead are based on the analysis of TSP samples. Other than the specific health effects of lead, the fine fraction of TSP has greater effects on health and visibility than the coarse fraction. Of greatest concern to public health are the particles small enough to be inhaled into the lungs (PM10) and especially the smaller fine particles that are inhaled more deeply into the lungs (PM2.5). As a result the federal standard for TSP mass has been replaced with the PM10 and PM2.5 standards.

Particulate Matter (PM) Air Quality Standards

PM10 Air Quality Standards

In 1987, U.S. EPA adopted PM10 standards, replacing the earlier TSP standard. The District began PM10 monitoring in late 1984. U.S. EPA promulgated both a short-term 24-hour average standard (150 µg/m^3)[8] and an annual standard (50 µg/m^3). Over the years, the forms and levels of the federal PM10 standards were reviewed by U.S. EPA. Changes to the federal standards for PM10 became effective on December 17, 2006. U.S. EPA first proposed to revise the 24-hour PM10 standard by establishing a new indicator for coarse particles (particles generally between 2.5 and 10 microns in diameter, PM10-2.5), to include PM10-2.5 that is mainly generated by resuspended dust from high-density traffic on paved roads, industrial sources, and construction sources; but specifically excluding PM10-2.5 that is generated by rural windblown dust and soils and by agricultural and mining sources. U.S. EPA proposed to set the PM10-2.5 standard at a level of 70 µg/m^3.

[8] µg/m^3 = micrograms per cubic meter

However, the coarse particle standard was not included as part of the final regulation which retained the 24-hour PM10 standard (150 µg/m^3).

U.S. EPA also revoked the annual PM10 standard due to a cited lack of evidence of adverse health effects linked to long-term exposure to coarse particles, beyond that already protected against by the PM2.5 annual standard. As part of the revision to the ambient air monitoring regulations in 2006, PM10-2.5 monitoring was required at National Core (NCore) multi-pollutant monitoring stations by January 1, 2011. Currently, the District measures PM10-2.5 at two NCore PM monitoring sites in the Basin (Central Los Angeles and Riverside-Rubidoux). In the most recent review of the PM standards completed in June of 2012, U.S. EPA did not propose changes to the PM10 standard and a PM10-2.5 standard has not been promulgated.

PM2.5 Air Quality Standards

In 1997, U.S. EPA adopted new federal air quality standards for the subset of fine particulate matter, PM2.5, to complement existing PM10 standards that target the full range of inhalable particulate matter. The District began monitoring PM2.5 concentrations in 1999. In 2006, U.S. EPA significantly lowered the level of the 24-hour PM2.5 standard, from 65 µg/m^3 to 35 µg/m^3, while retaining the level of the annual PM2.5 standard at 15.0 µg/m^3.

In the 2006 PM NAAQS review, U.S. EPA determined that individuals with pre-existing heart and lung diseases, older adults, and children are at greater risk from the effects associated with fine PM exposures. Based on the results of the previous studies and an extensive new body of scientific evidence that links the negative health impacts of PM2.5 exposure on these and possibly additional sensitive subpopulations, U.S. EPA strengthened the annual PM2.5 standard from 15.0 to 12.0 µg/m^3, effective March 18, 2013.[9] The current 24-hour standard of 35 µg/m^3 remained unchanged. In addition, U.S. EPA required near-roadway PM2.5 monitoring at two locations in the Basin, which have been implemented by the January 1, 2015 deadline. Adjustments were also made to the Air Quality Index (AQI), which is used to report current and forecasted pollutant levels, to be consistent with the current 24-hour and new proposed annual PM2.5 standards. Table 1-4 summarizes the history of the PM NAAQS to date.

[9] Since the revised annual PM2.5 NAAQS rule was proposed by U.S. EPA on June 14, 2012, it is often referred to as the 2012 annual PM2.5 federal standard.

TABLE 1-4

Summary of National Ambient Air Quality Standards (NAAQS) for Particulate Matter, 1971–Present

Year of NAAQS Rulemaking	PM Indicator	Averaging Time	Level (µg/m^3)
1971	TSP - Total Suspended Particles (≤ 25–45 µm)	24-hour	260
		Annual	75
1987	PM10	24-hour*	150
		Annual	50
1997	PM2.5	24-hour**	65
		Annual	15.0
	PM10	24-hour*	150
		Annual	50
2006	PM2.5	24-hour**	35
		Annual	15.0
	PM10	24-hour*	150
		Annual	(revoked)
2012	PM2.5	24-hour**	**35**
		Annual	**12.0**
	PM10	24-hour*	**150**

* The form of the PM10 24-hour NAAQS is *not to be exceeded more than once per year averaged over 3 years by station*

** The form of the PM2.5 24-hour NAAQS is based on the 98th percentile value by station

The 2013–2015 PM2.5 annual design values did not exceed the former (1997) annual PM2.5 standard (15 µg/m^3) at any Basin or Coachella Valley locations. Five out of 19 regular monitoring sites exceeded the current (2012) annual standard of 12 µg/m^3 for the period 2013–2015. Figure 1-4 shows the 2013-2015 annual PM2.5 design values by monitoring station for the Basin and the Coachella Valley, as compared to the current 2012 and former 1997 annual PM2.5 NAAQS.

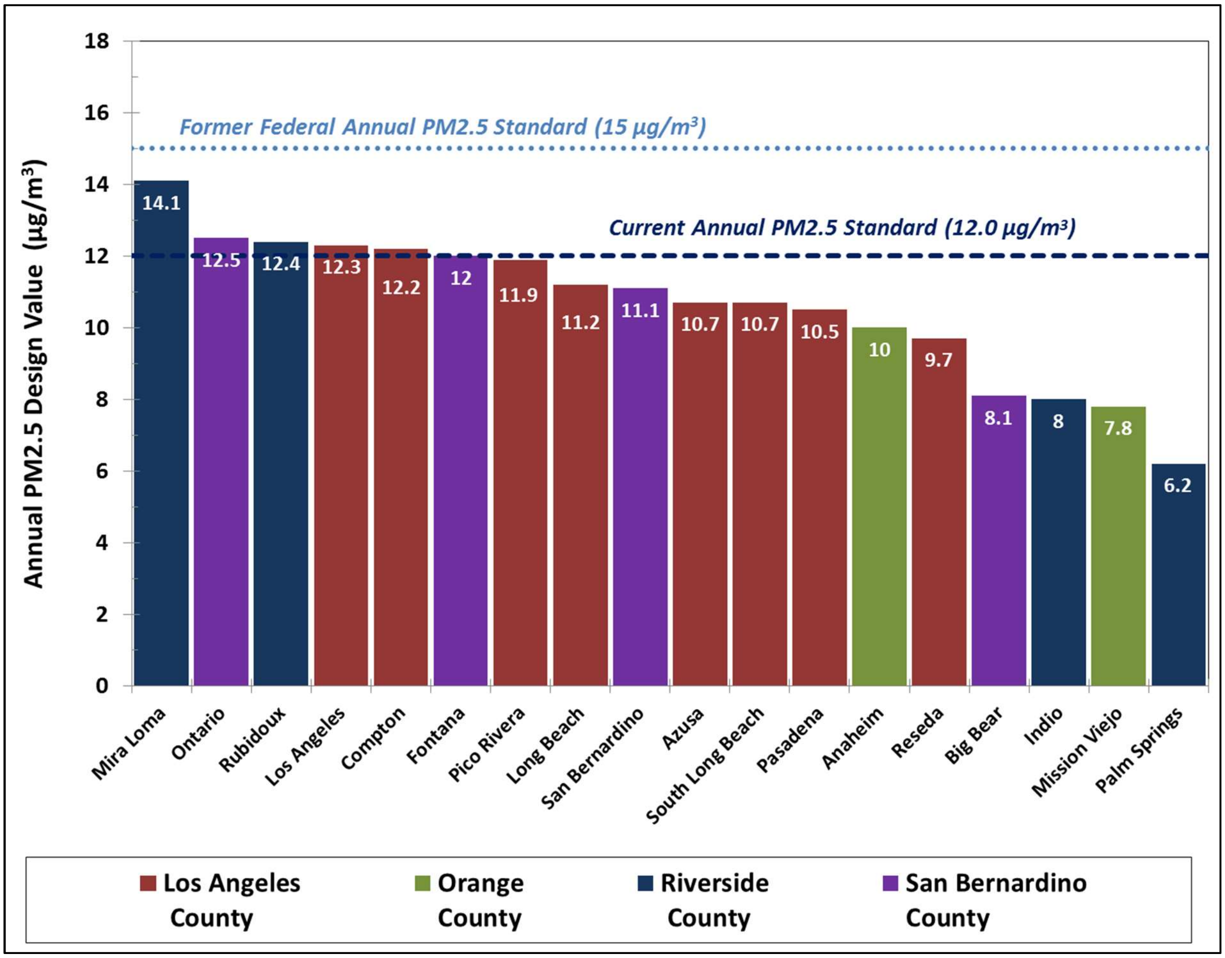

FIGURE 1-4

Annual PM2.5 3-Year (2013–2015) Design Values by Station, Compared to Current 2012 and Former 1997 Annual PM2.5 Federal Standards

CO Properties

Carbon monoxide (CO) is a colorless, odorless, relatively inert gas. It is a trace constituent in the unpolluted troposphere, and is produced by both natural processes and human activities. In remote areas far from human habitation, carbon monoxide occurs in air at an average background concentration of 0.04 ppm, primarily as a result of natural processes such as forest fires and the oxidation of methane. Global atmospheric mixing of CO from urban and industrial sources creates higher background concentrations (up to 0.20 ppm) near urban areas. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels, mainly gasoline. In 2000, 98 percent of the CO emitted into the Basin's atmosphere was from mobile sources. Consequently, CO concentrations are generally highest in the vicinity of major concentrations of vehicular traffic. CO concentrations have continued to decrease due to reformulated fuels and more efficient combustion in newer vehicles.

As a primary pollutant, carbon monoxide is directly emitted into the air. Ambient concentrations of CO in the Basin exhibit large spatial and temporal variations, due to variations in the rate and locations at which CO is emitted, and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late at night during the coolest, most atmospherically stable portion of the day.

The adverse effects of ambient carbon monoxide air pollution exposure on health have been recently reviewed in the 2010 U.S. EPA *Integrated Science Assessment for Carbon Monoxide.*[10] This document presents a detailed review of the available scientific studies and conclusions on the causal determination of the health effects of CO. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

When carbon monoxide is inhaled in sufficient concentration, it can displace oxygen and bind with the hemoglobin in the blood, reducing the capacity of the blood to carry oxygen. Individuals most at risk from the effects of CO include heart patients, fetuses (unborn babies), smokers, and people who exercise heavily. Normal healthy individuals are affected at higher concentrations, which may cause impairment of manual dexterity, vision, learning ability, and performance of work. The results of studies concerning the combined effects of CO and other pollutants in animals have shown a synergistic adverse effect after exposure to CO and ozone.

CO Air Quality Standards

The State and federal CO standards have been reviewed recently, with no changes recommended. The CO standards are based on both short-term (1-hour; 35 ppm federal and 20 ppm State) and longer-term (8-hour; 9 ppm federal and 9.0 ppm State) exposures.

NO_2 Properties

Nitrogen dioxide (NO_2) is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from nitrogen (N_2) and oxygen (O_2) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts with the oxygen in air to give NO_2. NO_2 is largely responsible for the brownish tinge of polluted urban air. The two gases, NO and NO_2, are referred to collectively as oxides of nitrogen (NOx). In the presence of sunlight, NO_2 reacts to produce nitric oxide and an oxygen atom. The oxygen atom can react further to produce ozone, via a complex series of chemical reactions involving hydrocarbons (VOCs). NO_2 may also react to produce nitric acid (HNO_3) which reacts further to produce nitrates, which are a component of PM.

The adverse effects of ambient nitrogen dioxide air pollution exposure on health were reviewed in the 2008 U.S. EPA *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria,*[11] and more recently in the

---

[10] U.S. EPA. (2010). Integrated Science Assessment for Carbon Monoxide (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/019F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=218686]

[11] U.S. EPA. (2008). Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/071. [http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=194645]

2016 U.S. EPA *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria.*[12] These documents present detailed reviews of the available scientific studies and conclusions on the causal determination of the health effects of NO_2, including evidence supporting the short-term NO_2 standard (1-hour, 100 ppb), which was adopted in 2010. A summary of health effects information and additional references can also be found in Appendix I: Health Effects. NO_2 is a respiratory irritant and reduces resistance to respiratory infection. Children and people with respiratory disease are most susceptible to its effects.

NO_2 Air Quality Standards

Effective April 12, 2010, U.S. EPA established a primary NO_2 1-hour NAAQS, at 100 ppb (3-year average of the annual 98th percentile of 1-hour daily maximum concentrations for each station). The short-term standard supplements the existing (1971) annual NAAQS (0.053 ppm). In addition to the ambient NO_2 monitoring network, U.S. EPA also established requirements for near-road NO_2 monitoring in large metropolitan areas, within 50 meters of the most heavily trafficked roadways. Effective March 20, 2008, the California Air Resources Board (CARB) revised the State NO_2 1-hour standard from 0.25 ppm to 0.18 ppm and established a new annual State standard of 0.030 ppm.

SO_2 Properties

Sulfur dioxide (SO_2) is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid (H_2SO_4), which contributes to acid deposition, and sulfates, which is a component of PM10 and PM2.5. Most of the SO_2 emitted into the atmosphere is produced by the burning of sulfur-containing fuels.

The adverse effects of SO_2 air pollution exposure on health were reviewed in the 2008 U.S. EPA *Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria*.[13] This document presents a detailed review of the available scientific studies and conclusions on the causal determination of the health effects of SO_2. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

At sufficiently high concentrations, sulfur dioxide affects breathing and the defenses of the lungs, and it can aggravate respiratory and cardiovascular diseases. Asthmatics and people with chronic lung disease or cardiovascular disease are most sensitive to its effects. Sulfur dioxide also causes plant damage, damage to materials, and acidification of lakes and streams.

---

[12] U.S. EPA. (2016). Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/068. [https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879]

[13] U.S. EPA. (2008). Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/047F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=198843#Download]

SO_2 Air Quality Standards

Based on the review of the SO_2 standards, U.S. EPA has established the 1-hour SO_2 standard to protect the public health against short-term exposure. The 1-hour average NAAQS was set at 75 ppb and the annual (0.03 ppm) and 24-hour (0.14 ppm) federal standards were revoked, effective August 2, 2010.[14]

Sulfate Properties

Sulfates are chemical compounds which contain the sulfate ion (SO_4^{2-}) and are part of the mixture of solid materials which make up PM2.5, PM10 and TSP. Most of the sulfates in the atmosphere are produced by oxidation of sulfur dioxide. Oxidation of sulfur dioxide yields sulfur trioxide (SO_3) which reacts with water to produce sulfuric acid (H_2SO_4), which contributes to acid deposition. The reaction of sulfuric acid with basic substances such as ammonia yields sulfates, a component of PM.

In 2002, CARB reviewed and retained the State standard for sulfates, retaining the concentration level (25 $\mu g/m^3$) but changing the basis of the standard from a Total Suspended Particulate (TSP) measurement to a PM10 measurement. In their 2002 staff report,[15] CARB reviewed the health studies related to exposure to ambient sulfates, along with particulate matter, and found an association with mortality and the same range of morbidity effects as PM10 and PM2.5, although the associations were not as consistent as with PM10 and PM2.5. U.S. EPA has not promulgated a separate NAAQS for sulfates. The 2009 U.S. EPA *Integrated Science Assessment for Particulate Matter*[16] also contains a review of sulfate studies.

Lead (Pb) Properties

Lead in the atmosphere is present as a mixture of a number of lead compounds. Leaded gasoline and lead smelters had historically been the main Basin sources of lead emitted into the air. Due to the phasing out of leaded gasoline, there has been a dramatic reduction in atmospheric lead in the Basin over the past three decades. The primary source of lead is related to businesses that work with lead, such as lead battery recycling facilities. Another source is general aviation, since most small planes continue to use leaded fuels.

The adverse effects of ambient lead exposures on health have been reviewed in the 2013 U.S. EPA document, *Integrated Science Assessment for Lead: Final Report*.[17] This document presents a detailed assessment of the available scientific studies and presents conclusions on the causal determination of the health effects of lead,

---

[14] The 1971 annual and 24-hour SO_2 NAAQS were revoked, effective August 23, 2010, however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour NAAQS. The final area designations are expected by January 31, 2020 due to new source-specific monitoring requirements.

[15] CARB. (2002). Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. California Air Resources Board, Sacramento, CA. [http://www.arb.ca.gov/regact/aaqspm/isor.pdf]

[16] U.S. EPA. (2009). Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546]

[17] U.S. EPA. (2013). Integrated Science Assessment for Lead (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/075F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=255721#Download]

including the rationale to retain the current federal lead standard. A summary of health effects information and additional references can also be found in the 2016 AQMP, Appendix I: Health Effects.

Lead Air Quality Standards

The national standard for lead was revised on October 15, 2008 from a quarterly average of 1.5 µg/m^3 to a rolling 3-month average of 0.15 µg/m^3, with a maximum (not-to-be-exceeded) form, evaluated over a 3-year period (36 months). The current indicator of lead in total suspended particles (Pb-TSP) was retained. The revision became effective on January 12, 2009.

U.S. EPA also enhanced the lead monitoring requirements in its 2008 NAAQS revisions, requiring air monitoring near lead sources, those with the potential for 3-month average lead concentrations to exceed the revised standard of 0.15 µg/m^3. Lead monitoring is required in large urban areas with monitors located to measure lead concentrations in areas impacted by resuspended dust from roadways, nearby industrial sources identified as significant lead sources, hazardous waste sites, construction and demolition projects, or other fugitive dust sources of lead. Following a petition in 2009, U.S. EPA revised the monitoring requirements, lowering the emission threshold at which monitoring is required for both source-oriented and large urban area-based non-source oriented monitoring. The monitoring revision became effective in January 2011.

In 2015, the District's lead monitoring network included eight regular monitoring sites and an additional five source-specific sites. None of these locations exceeded the lead NAAQS in recent years and SCAQMD will request that U.S. EPA redesignate the Basin's remaining nonattainment area in Los Angeles County to attainment for the lead NAAQS.

CHAPTER 2

AIR QUALITY
IN THE SOUTH COAST AIR BASIN

Overview of Air Quality in the Basin

Current Air Quality Summary

The maximum pollutant concentrations measured at SCAQMD monitoring stations in 2015 exceeded the levels of the federal and State standards for ozone, PM2.5, and nitrogen dioxide (NO_2). One or more stations in the Basin exceeded one or more of the most current federal standards in 2015 on a total of 146 days in 2015 (40 percent of the year), including 113 days over the 2015 ozone 8-hour NAAQS, 30 days over the 2006 24-hour PM2.5 NAAQS (including near-road sites, 25 days with just the ambient stations), 2 days over the 24-hour PM10 NAAQS (high-wind exceptional events), and 1 day over the 2010 1-hour NO_2 NAAQS. The Basin's maximum measured concentrations for ozone and PM2.5 in 2015 were among the highest in the country. In 2015, the Basin exceeded the revised 2008 and revoked 1997 8-hour ozone NAAQS on 81 and 47 days, respectively.

Both 24-hour and annual PM2.5 concentrations have improved significantly over the past 15 years and only two locations in the Basin (both in Metropolitan Riverside County) currently remain in violation of the 24-hour design value form of the PM2.5 NAAQS. However, both the 24-hour PM2.5 design values and number of days over the standard in the Basin have increased slightly each year since 2013, due in large part to the extreme drought conditions in Southern California and the associated lack of periodic rainout and increased dispersion normally associated with weather events in the winter months. While several stations in the Basin remain in violation of the current 2012 annual PM2.5 NAAQS (12.0 $\mu g/m^3$), no Basin stations have violated the former (1997) annual PM2.5 NAAQS (15.0 $\mu g/m^3$) in 2015 or since the 2011–2013 design value periods.

In 2015, NO_2 concentrations exceeded the level of the 1-hour NAAQS on one day at a single location. However, attainment of the NAAQS is measured with the three-year design value that takes into account the form of the federal standards and a multi-year average, as detailed previously in Table 1-3. The design value form of the NAAQS, based on the annual 98th percentile maximum daily 1-hour concentration at a station averaged over three years, did not violate the standard or affect the NO_2 NAAQS attainment designation. While the Basin also exceeded the PM10 24-hour NAAQS on two days at two different locations, this also does not jeopardize the Basin's clean design value, which allows for one exceedance per year averaged over three years, or the PM10 NAAQS attainment designation. Both PM10 exceedances were caused by high-wind events that would also qualify for exclusion under the U.S EPA Exceptional Event Rule.

The Basin exceeded the level of the State 1-hour and 8-hour ozone, annual and 24-hour PM10, and annual PM2.5 standards in 2015. The other criteria pollutants, sulfur dioxide (SO_2), carbon monoxide (CO), and sulfates (SO_4^{2-}), did not exceed federal or State standards. Figure 2-1 shows the Basin maximum pollutant concentrations for 2015, as a percentage of the federal and State standards.

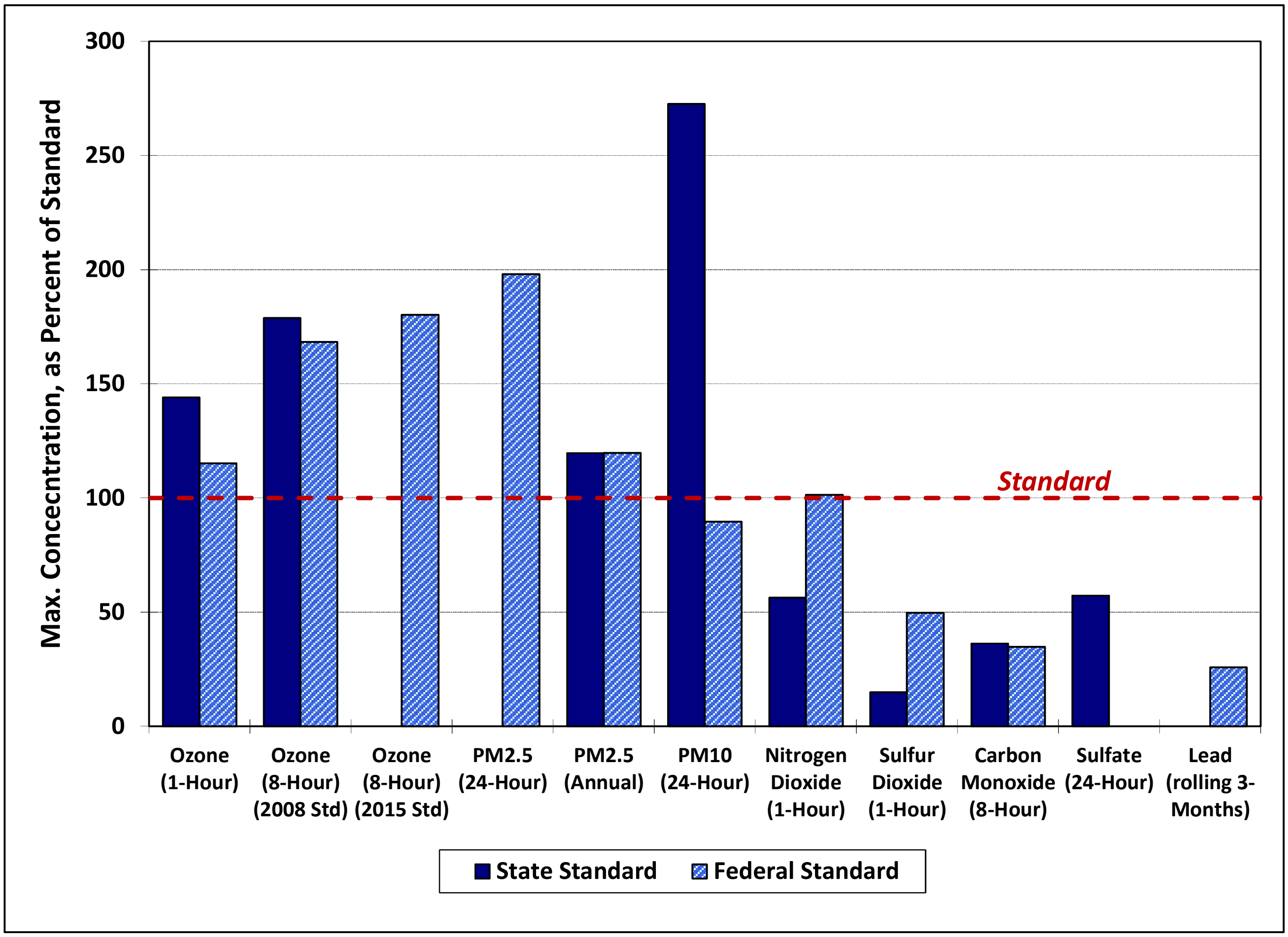

FIGURE 2-1

2015 South Coast Air Basin Maximum Pollutant Concentrations

(as Percent of State and Federal Standards)

Attainment/Nonattainment Designations

As discussed above, in 2015, the Basin exceeded the pollutant concentration levels defined by the National Ambient Air Quality Standards (NAAQS) for ozone, PM2.5, and NO_2. Attainment of the NAAQS is based on the design value level and form of the standard, which is typically averaged over a 3-year period. Figure 2-2 shows the current federal ozone and PM design value status for the Basin for the 2013–2015 3-year period, as compared to the current and former NAAQS. The current U.S. EPA NAAQS attainment designations for the Basin are presented in Table 2-1. The current attainment designation status of the State standards in the Basin is presented in Table 2-2.

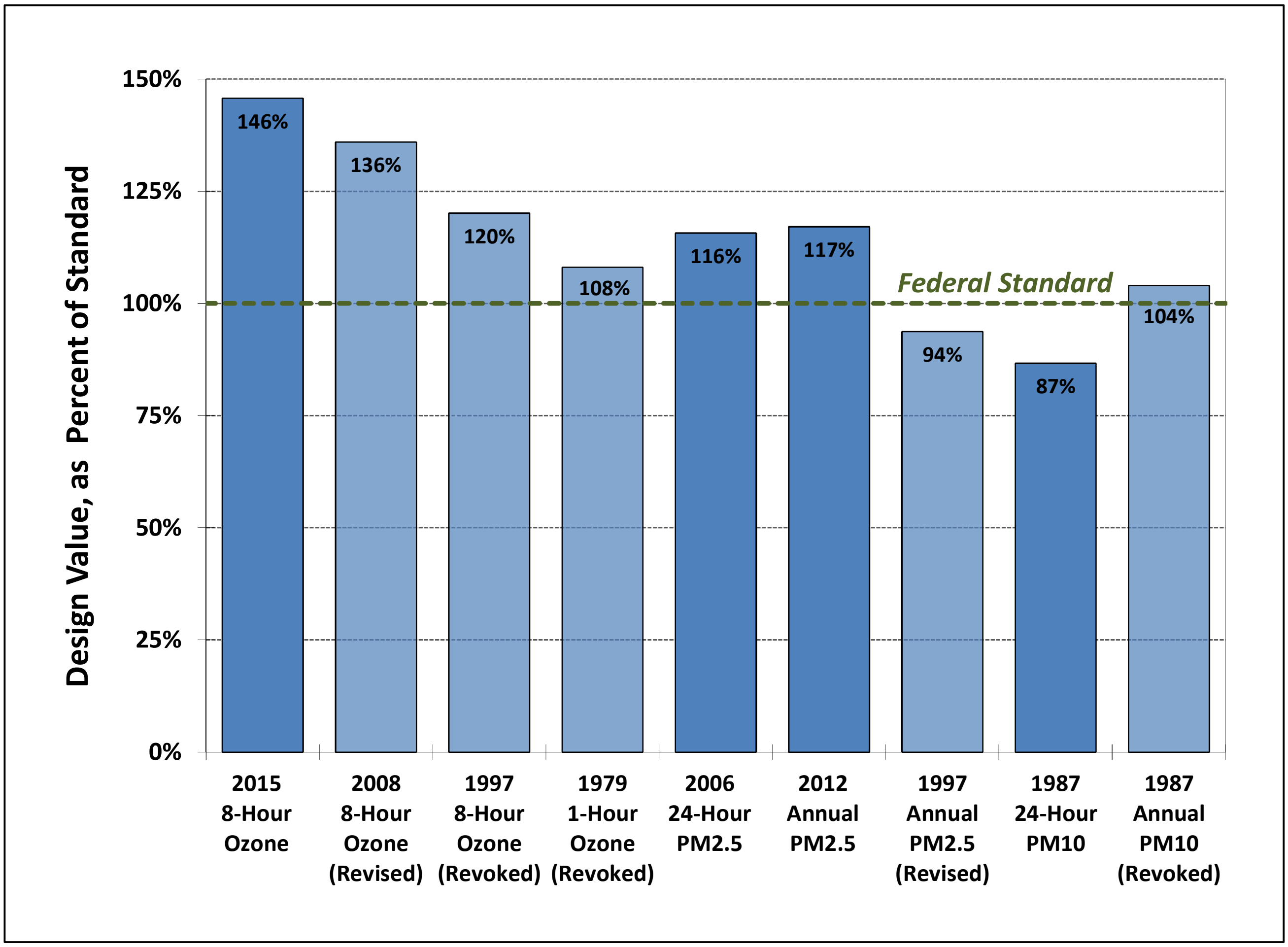

FIGURE 2-2

South Coast Air Basin and Coachella Valley 2013–2015 3-Year Design Values

(Percentage of current and former NAAQS; PM10 is combined FRM and FEM data; darker shade indicates current, most-stringent NAAQS)

TABLE 2-1

National Ambient Air Quality Standards (NAAQS) Attainment Status – *South Coast Air Basin*

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Nonattainment ("extreme")	2/26/2023 (revised deadline)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment ("extreme")	Pending (beyond 2032)
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment ("extreme")	7/20/2032
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment ("extreme")	6/15/2024
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Nonattainment ("serious")	12/31/2019
	(2012) **Annual** (12.0 µg/m^3)	Nonattainment ("moderate")	12/31/2021
	(1997) **Annual** (15.0 µg/m^3)	Attainment (final determination pending)	4/5/2015 (attained 2013)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Attainment (Maintenance)	7/26/2013 (attained)
Lead (Pb)[g]	(2008) **3-Months Rolling** (0.15 µg/m^3)	Nonattainment (Partial) (Attainment determination to be requested)	12/31/2015
CO	(1971) **1-Hour** (35 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
	(1971) **8-Hour** (9 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
NO_2[h]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (attained)
SO_2[i]	(2010) **1-Hour** (75 ppb)	Designations Pending (expect Unc./Attainment)	N/A (attained)
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	3/19/1979 (attained)

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05 ; however, the Basin has not attained this standard and therefore has some continuing obligations with respect to the revoked standard; original attainment date was 11/15/2010; the revised attainment date is 2/6/23

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the revoked 1997 and revised 2008 ozone NAAQS until they are attained

e) The attainment deadline for the 2006 24-hour PM2.5 NAAQS was 12/31/15 for the former "moderate" classification; U.S.EPA approved reclassification to "serious," effective 2/12/16 with an attainment deadline of 12/31/2019; the 2012 (proposal year) annual PM2.5 NAAQS was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3; new annual designations were final 1/15/15, effective 4/15/15; U.S. EPA has proposed a clean data determination for the Basin for the 1997 annual (15.0 µg/m^3) and 24-hour PM2.5 (65 µg/m^3) standards – final action pending

f) The annual PM10 NAAQS was revoked, effective 12/18/06; the 24-hour PM10 NAAQS deadline was 12/31/2006; the Basin's Attainment Re-designation Request and PM10 Maintenance Plan was approved by U.S. EPA on 6/26/13, effective 7/26/13

g) Partial Nonattainment designation – Los Angeles County portion of the Basin only for near-source monitors; expect to remain in attainment based on current monitoring data; attainment re-designation request pending

h) New 1-hour NO_2 NAAQS became effective 8/2/10, with attainment designations 1/20/12; annual NO_2 NAAQS retained

i) The 1971 annual and 24-hour SO2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO2 1-hour NAAQS; final area designations expected by 12/31/20 due to new source-specific monitoring requirements; Basin expected to be in attainment due to ongoing clean data

TABLE 2-2

California Ambient Air Quality Standards (CAAQS) Attainment Status

South Coast Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a] South Coast Air Basin
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Nonattainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment
	Annual (20 µg/m^3)	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment
CO	**1-Hour** (20 ppm)	Attainment
	8-Hour (9.0 ppm)	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment
	Annual (0.030 ppm)	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment
	24-Hour (0.04 ppm)	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified

a) CA State designations shown were updated by CARB in 2016, based on the 2013–2015 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events; Source: http://www.arb.ca.gov/desig/statedesig.htm#current

b) CA State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a State designation

Air Quality Trends

There have been significant improvements in the Basin's air quality over the years since measurements began. Figure 2-3 shows the trends of *basin-days*[18] exceeding the federal standards for ozone, PM10, and PM2.5 for 1990 through 2015, as a percentage of annual days with monitoring data. PM2.5 shows the most dramatic improvement of these pollutants.

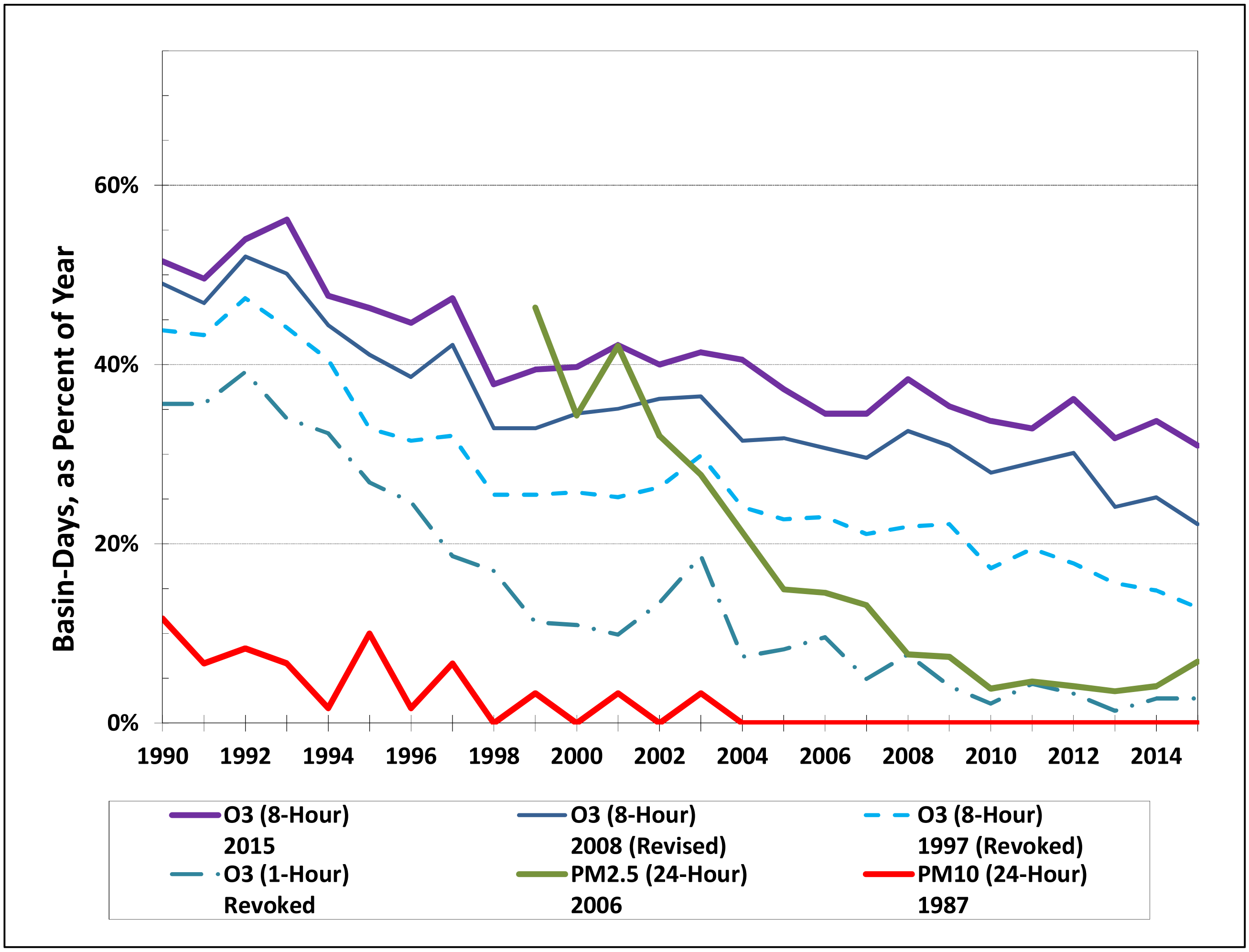

FIGURE 2-3

Trend of Basin-Days Exceeding Federal Standards, 1990–2015

(as percentages of the year; flagged PM10 exceptional events excluded)

[18] A "basin-day" is recorded if one or more locations in the air basin exceeded the level of the standard on that day. Multiple locations exceeding on the same day count as a single basin-day.

Figure 2-4 shows the trend from 1976 through 2015 of the annual number of Basin days exceeding various metrics for ozone, including: the 1-hour Stage 1[19] level (0.20 ppm); the 1-hour State Health Advisory level (0.15 ppm); the revoked 1979 1-hour NAAQS (0.125 ppm); the revoked 1997 8-hour NAAQS (0.08 ppm); the revised 2008 8-hour NAAQS (0.075 ppm); and the new 2015 8-hour NAAQS (0.070 ppm). All the ozone trends show the significant improvement achieved through the period. However, they also show the need for continued efforts in order to meet all the 8-hour ozone standards and the 1979 1-hour standard.

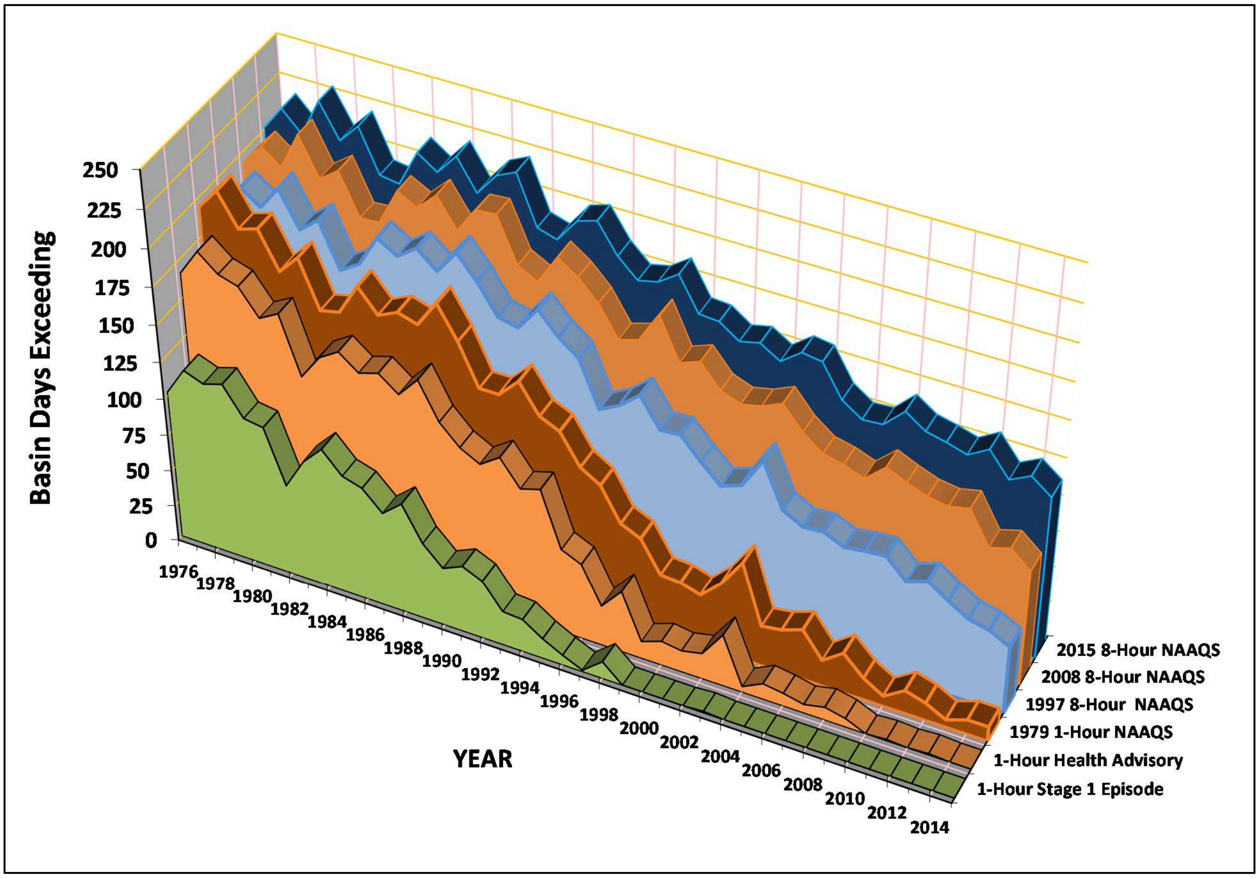

FIGURE 2-4

Trend of Number of Basin Days Exceeding Current and Former Ozone NAAQS and
1-Hour Ozone Episode Levels (Health Advisory and Stage-1), 1976 through 2015

Figure 2-5 shows the trend of design value concentrations for ozone and PM2.5 in the Basin for the past two decades, as percentages of the corresponding federal standards. The pollutant-specific sections of this chapter contain additional trends by pollutant.

---

[19] While the 1-hour ozone episode levels and the related 1-hour ozone health warnings still exist, they are essentially replaced by the more protective health warnings associated with the current 8-hour ozone NAAQS. The 1-hour ozone episode warning levels include the State Health Advisory (0.15 ppm), Stage 1 (0.20 ppm), Stage 2 (0.35 ppm) and Stage 3 (0.50 ppm). The State 1-hour ozone Health Advisory was last exceeded in the Basin in 2013. The Basin's last 1-hour ozone Stage 1 episode occurred in 2003. The last 1-hour ozone Stage 2 episode occurred in 1988 and the last Stage 3 episode occurred in 1974.

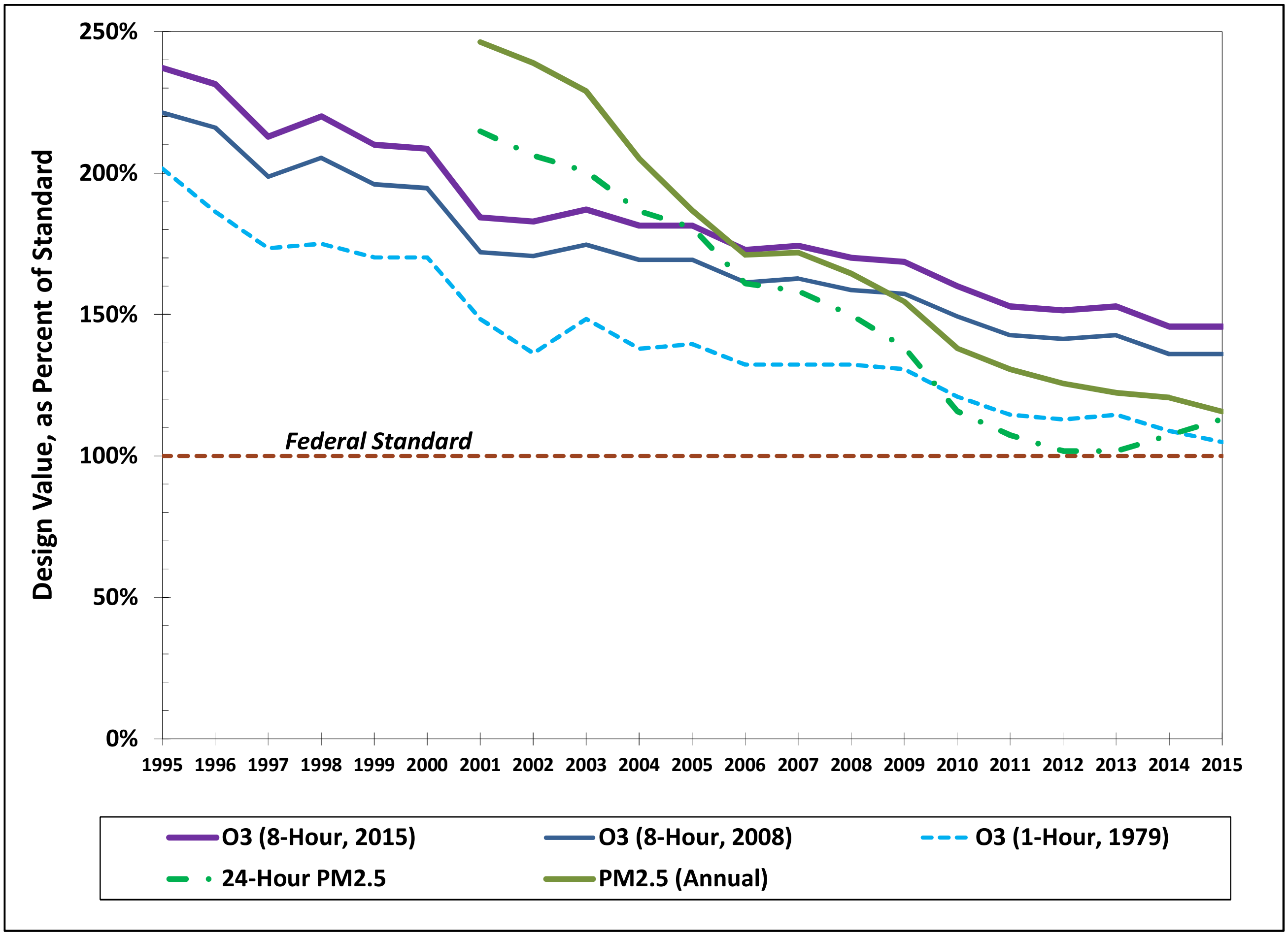

FIGURE 2-5

Trends of South Coast Air Basin Maximum 3-Year Design Values for Ozone (2015 8-hour, 2008 8-hour, and 1979 1-hour NAAQS) and PM2.5 (24-hour and Annual), 1995–2015

(as percentages of current and former federal standards)

Spatial and Temporal Variability

Air quality in the Basin varies widely by season and by area. The highest pollutant concentrations were all recorded in, or downwind of, the densely populated areas of the Basin. The Basin's air quality concentrations and the occurrence of exceedances vary with season due to seasonal differences in the weather, solar radiation intensity for photochemical reactions, and to a lesser extent, seasonal variations in emissions. Higher ozone concentrations are generally recorded during the May to October "smog season" and exceedances of the federal and State ozone standards are most frequent in July and August. However, the stricter 2015 ozone NAAQS is exceeded between late March and early November.

Particulate matter (PM10 and PM2.5) levels do not have as clear of a pattern as ozone, and elevated concentrations are sometimes recorded throughout the year. However, the highest PM10 and PM2.5 concentrations are typically measured during the late fall and winter months. Figure 2-6 shows the number of Basin-wide days per month when any of the federal standards were exceeded in the Basin in 2015.

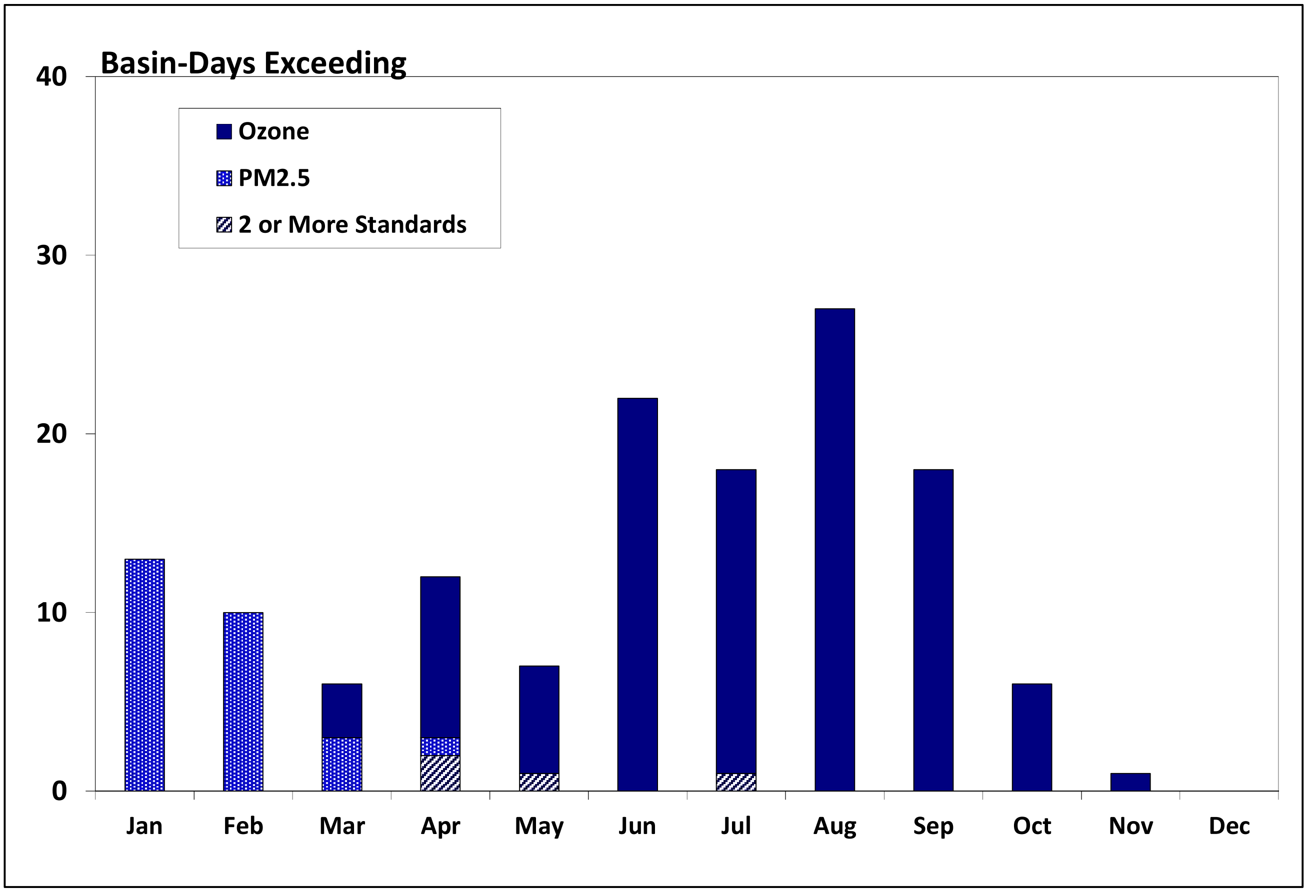

FIGURE 2-6

Number of Basin-Days per Month Exceeding the Federal Standards in 2015

The number of days exceeding the level of the new 2015 8-hour ozone NAAQS (0.070 ppm[20]) in 2015 varied widely by monitoring location, from 0 (zero) day to 86 days. Likewise, exceedances of the 2008 8-hour ozone NAAQS (0.075 ppm) also varied, from zero to 61 days. In both cases, ozone exceedances were fewest along the coast, and increased through the inland valleys to a maximum in the Basin's Central San Bernardino Mountains. Ozone concentrations tend to be higher on weekends than on weekdays, although this difference is slightly less distinct in recent years. The time of day with the highest average ozone concentrations is in the early to middle afternoon, although the inland areas of the Basin will often peak later in the afternoon or in the early evening.

While day-of-week and time-of-day PM2.5 concentrations varied considerably by location for 2013–2015 period, the day-of-week PM2.5 concentrations were slightly higher on Saturdays. The hourly PM2.5 diurnal peaks generally occurred in the morning, starting with the period of heaviest morning traffic. Additional spatial and temporal analyses are presented in the pollutant-specific sections later in this chapter.

[20] ppm = parts per million, by volume; ppb = parts per billion, by volume; 1 ppm = 1000 ppb

Air Quality Compared to Other U.S. Metropolitan Areas

In spite of significant improvement, the Basin still has some of the worst air quality in the nation. In 2015, seven of the country's top ten locations most frequently exceeding the 2015 8-hour ozone NAAQS were located within the Basin, including stations in San Bernardino, Riverside and Los Angeles Counties.[21] The location with the highest number of days over the 2015 8-hour ozone NAAQS was in the Basin's Central San Bernardino Mountains (86 days in the community of Crestline). The Basin exceeded the 2008 8-hour ozone NAAQS on 81 days, more days than any other areas in the country. The Basin exceeded the 2015 ozone NAAQS on 113 days. Similarly, seven out of the top ten locations with the highest maximum 8-hour average ozone concentrations in the nation were also located in the Basin. Of the top ten locations, only one area (Houston, Texas) was located outside of California. The highest maximum 8-hour average ozone concentration recorded was 0.127 ppm (in the Central San Bernardino Mountains area), almost 180 percent of the 2015 ozone NAAQS.

Figures 2-7 and 2-8 show the maximum pollutant concentrations in 2015 for the Basin compared to other major metropolitan areas in the U.S. and California air basins, respectively. Maximum concentrations in all of these areas exceeded both the 2015 and 2008 8-hour ozone NAAQS. The current annual PM2.5 standard was exceeded in the South Coast Air Basin, Houston, and Chicago metropolitan areas, as well as in California's San Joaquin Valley. The 24-hour PM2.5 standard, was exceeded in the Basin, Phoenix, and Chicago, as well as in all of the California air basins shown except San Diego.

The 24-hour PM10 standard was not exceeded in any of the U.S. areas and California air basins shown, once data flagged for exceptional events was excluded from the analysis. Of the areas shown for 2015, the level of the 1-hour NO_2 federal standard was exceeded in the Basin, Houston, and New York areas, as well as in the San Joaquin Valley. SO_2 concentrations were below the 1-hour federal standard in the Basin and in all of the urban areas shown in Figures 2-7 and 2-8. However, the SO_2 standard was exceeded in other U.S. urban and rural areas, with the highest 2015 concentrations recorded in the State of Arizona (Gila County). The CO standards were not exceeded in the U.S. in 2015 and are not shown in the figures. Nationwide, the federal lead standard (not shown) was exceeded at six locations in 2015, at source-oriented monitoring stations, in Pennsylvania and Arizona.

[21] The top 10 stations in the nation for number of exceedances in 2015 of the 2015 8-hour ozone NAAQS (0.070 ppm) include Basin stations in the areas of Central San Bernardino Mountains (in the Crestline-Lake Gregory community), Central San Bernardino Valley (San Bernardino and Fontana), East San Bernardino Valley (Redlands), Northwest San Bernardino Valley (Upland), San Gorgonio Pass (Banning), and Metropolitan Riverside County (Riverside-Rubidoux), as well as stations in the San Joaquin Valley Air Basin (Bakersfield and Fresno) and the Antelope Valley Air Basin (Lancaster).

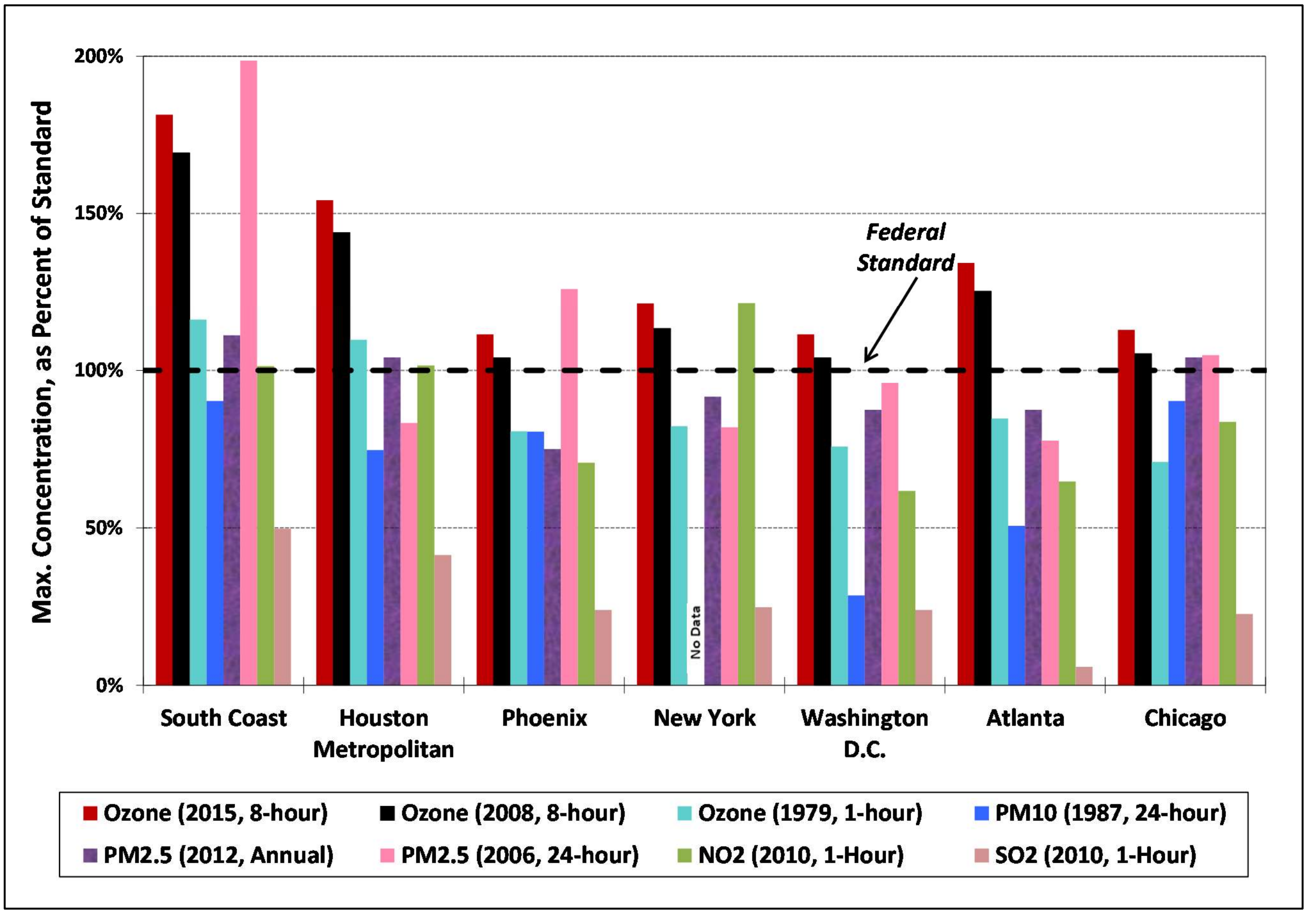

FIGURE 2-7

2015 South Coast Air Basin Air Quality Compared to Other U.S. Urban Areas

(maximum pollutant concentrations as percentages of the NAAQS, flagged exceptional events are excluded)

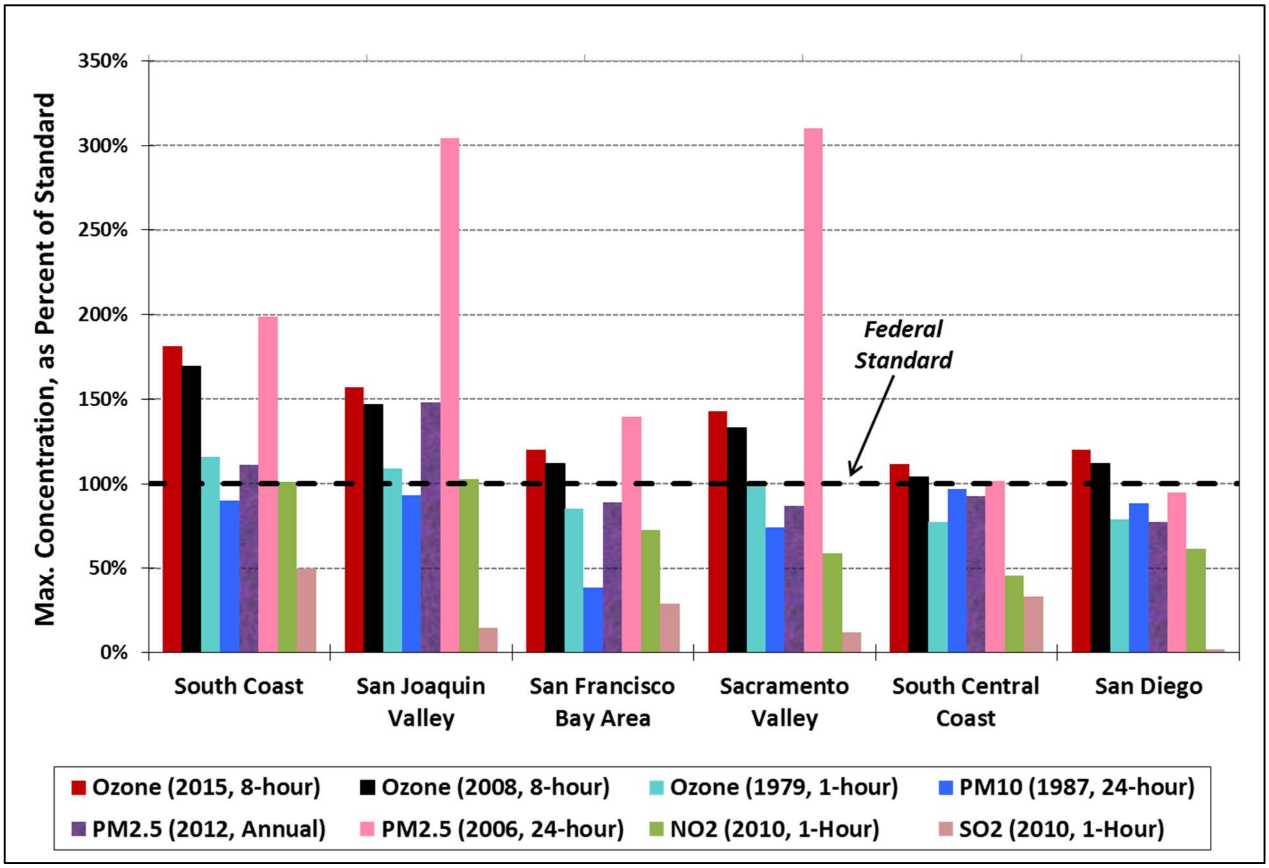

FIGURE 2-8

2015 South Coast Air Basin Air Quality Compared to Other California Air Basins

(maximum pollutant concentrations as percentages of the NAAQS, flagged exceptional events are excluded)

As noted previously, maximum pollutant concentrations do not necessarily indicate NAAQS violations and subsequent attainment/nonattainment designation changes, which is determined by the design value form of the NAAQS. Figures 2-9 and 2-10 show the 2013–2015 3-year design values for the Basin compared to other urban areas in the U.S. and California, respectively. While the 2015 maximum ozone concentrations for all the urban areas shown above in Figures 2-7 and 2-8 are over the 2015 and 2008 ozone NAAQS, 2013-2015 ozone design values in some of these urban areas shown in Figures 2-9 and 2-10 are not in violation of these 8-hour ozone NAAQS. For the revoked 1979 1-hour ozone NAAQS, only the Basin had 1-hour design values over the federal standard for the 2013–2015 period. The design values for annual averaged PM2.5 are over the 2012 annual PM2.5 NAAQS for the Basin, along with Houston, the San Joaquin Valley, and California's South Central Coast. The 24-hour PM2.5 design values are over the 24-hour PM2.5 NAAQS in the Basin and the San Joaquin Valley; no other urban areas shown exceeded that standard. PM10 design values are over the standard in Phoenix and the San Joaquin Valley, although some of these may have been influenced by pending exceptional events. The design values for NO_2, SO_2, and CO (not shown) did not violate the NAAQS for any of the urban areas shown for the 2013–2015 period.

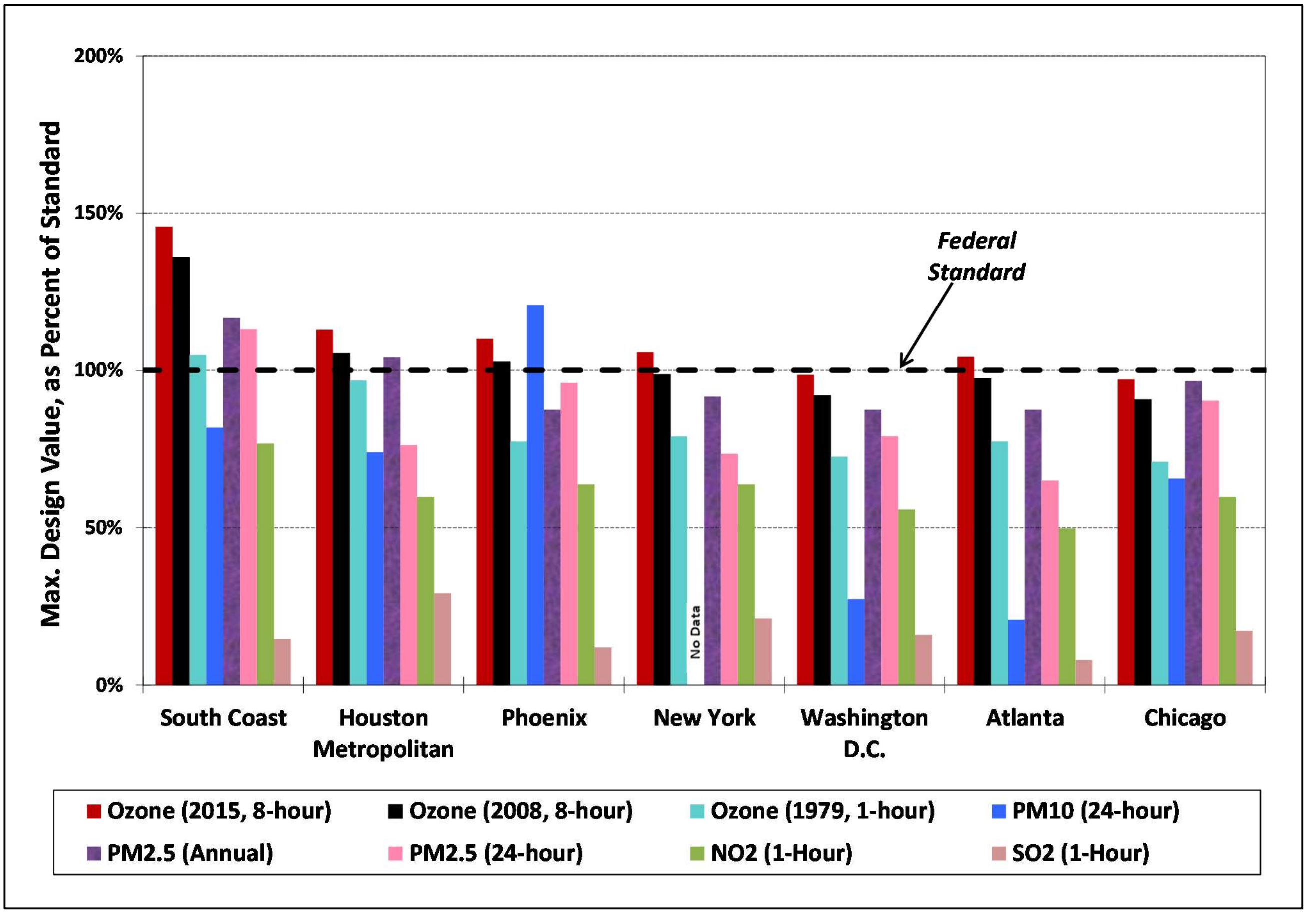

FIGURE 2-9

2015 South Coast Air Basin Air Quality Compared to Other U.S. Urban Areas

(maximum 3-year design value concentrations as percentages of the corresponding NAAQS; flagged exceptional events are excluded)

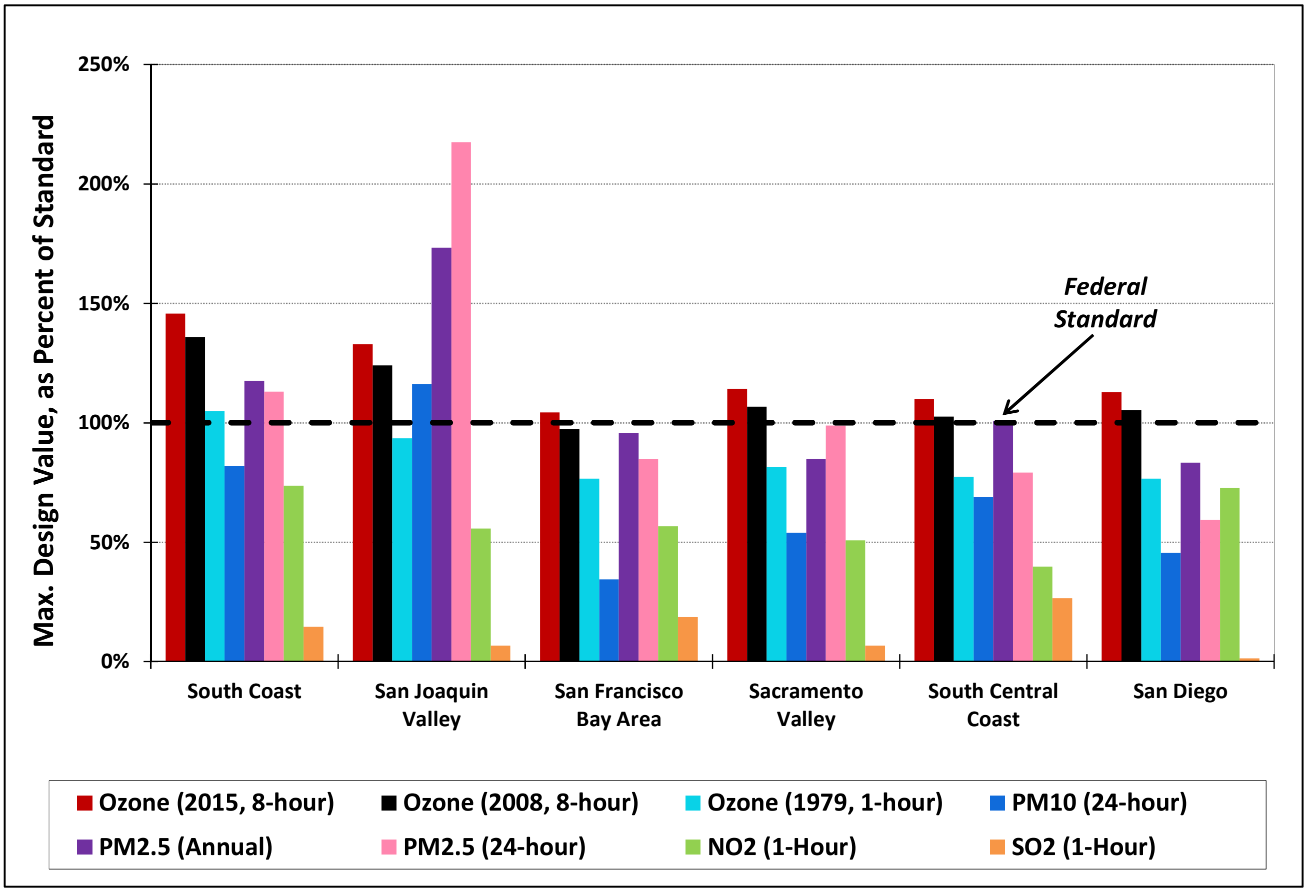

FIGURE 2-10

2015 South Coast Air Basin Air Quality Compared to Other California Air Basins

(maximum 3-year design value concentrations as percentages of the corresponding NAAQS; flagged exceptional events are excluded)

Pollutant-Specific Air Quality Summary

Ozone (O_3)

Current Ozone Air Quality

In 2015, SCAQMD monitored ozone concentrations at 29 locations in the Basin, including two locations in the Coachella Valley portion of the SSAB. The East San Fernando Valley (Burbank) station was closed in 2015, due to loss of the lease space. Installation of a new Burbank monitoring location is in progress. Figure 2-11 maps the locations of the SCAQMD ozone network.

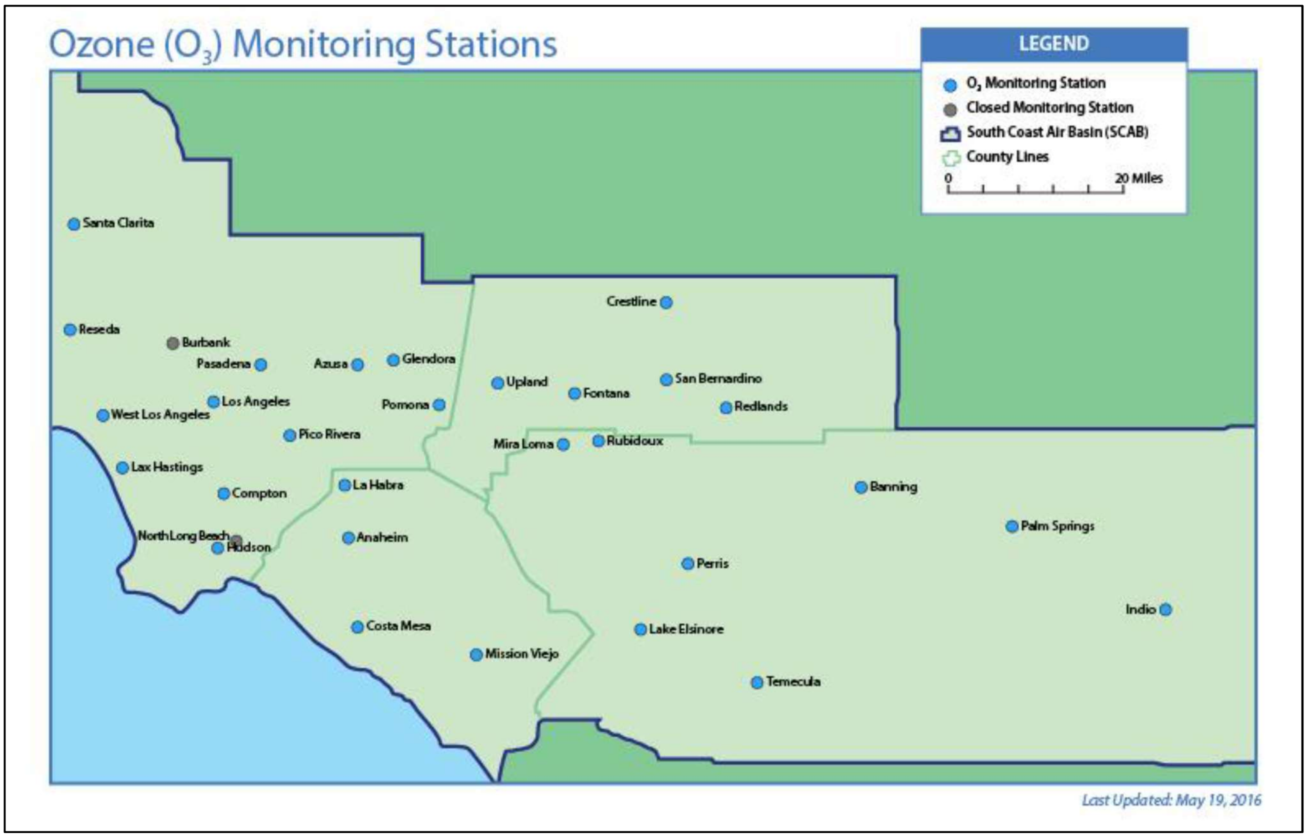

FIGURE 2-11

South Coast Air Quality Management District Ozone Air Monitoring Locations

(Note that ozone stations that were closed at N. Long Beach in 2013 and Burbank in 2014 are shown with grey dots, pending locating new stations; Palm Springs and Indio stations, in Riverside County's Coachella Valley are in the Salton Sea Air Basin; all other stations are in the South Coast Air Basin)

The 2015 Basin maximum ozone concentrations continued to exceed federal standards by wide margins, although the ozone trends have shown continuing improvements through the years. All four counties in the Basin, as well as the Coachella Valley portion of the SSAB, exceeded the level of the new 2015 (0.070 ppm) and the former 2008 (0.075 ppm) and 1997 (0.08 ppm) 8-hour ozone NAAQS in 2015. While not all stations had days exceeding the previous 8-hour federal standards, all SCAQMD monitoring stations except the one in Long Beach exceeded the 2015 federal standard.

Basin-wide, a total of 113 days exceeded the 2015 ozone federal standard (81 days over the 2008 standard and 47 days over the 1997 standard). The State 8-hour ozone standard was exceeded on 115 days. The highest number of days in 2015 over the 2015, 2008 and 1997 8-hour federal ozone standards (86, 61, and 30 days, respectively) occurred in the Central San Bernardino Mountains. The 2015 maximum 8-hour average ozone concentration of 0.127 ppm was also measured at this location.

When comparing to the design value form of the federal standard, all four of the Basin's counties were above the 2015 8-hour ozone NAAQS for the 2013–2015 design values. Three of the Basin's four counties (except Orange County) were above both the 2008 and 1997 8-hour ozone NAAQS for 2013–2015 design values. The Basin's highest 2013–2015 8-hour ozone design value (0.102 ppm, measured in the Central San Bernardino Mountains) was 146 percent of the 2015 8-hour ozone NAAQS (136 percent of the 2008 NAAQS and 121 percent of the 1997 NAAQS). Table 2-3 summarizes the number of days exceeding current and former federal and State 1-hour and 8-hour ozone standard levels by county in the Basin and the Coachella Valley in 2015. Table 2-4 shows the 2015 maximum 8-hour ozone concentrations and 3-year design values by air basin and county, for comparison to the current and former 8-hour ozone NAAQS, along with the State designation value, for comparison to the State ozone standards.

TABLE 2-3

2015 Number of Days Exceeding Current and Former Ozone Standards at the Peak Station by County and Basin

Basin/County	2015 # Days > New (2015) 8-Hour O_3 NAAQS (0.070 ppm)	Area of Maximum Exceedances of the 2015 Ozone NAAQS	2015 # Days > Former (2008) 8-Hour O_3 NAAQS (0.075 ppm)	2015 # Days > Former (1997) 8-Hour O_3 NAAQS (0.08 ppm)	2015 # Days > Former (1979) 1-Hour O_3 NAAQS (0.12 ppm)	2015 # Days > Current 8-Hour O_3 State Standard (0.07 ppm)	2015 # Days > Current 1-Hour O_3 State Standard (0.09 ppm)
South Coast Air Basin							
Los Angeles	74	Santa Clarita Valley	54	25	4	80	52
Orange	12	Saddleback Valley	4	0	0	14	5
Riverside	76	Metropolitan Riverside County	51	29	2	81	43
San Bernardino	**102**	**Central San Bernardino Mountains**	**75**	**42**	**8**	**102**	**65**
Salton Sea Air Basin							
Riverside	58	Coachella Valley (Palm Springs)	30	5	0	54	3

Bold text denotes the peak value

Note: The 2015 8-hour ozone NAAQS became effective on December 28, 2015; the 2008 ozone standard was still in effect during the 2014 and 2015 ozone seasons

TABLE 2-4

2015 Maximum 8-Hour Average Ozone Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 8-Hour O_3 Average (ppm)	2013–2015 8-Hour O_3 Design Value (ppm)	Percent of New (2015) O_3 NAAQS (0.070 ppm)	Percent of Former (2008) O_3 NAAQS (0.075 ppm)	Percent of Former (1997) O_3 NAAQS (0.08 ppm)	Area of Design Value Maximum	2013–2015 8-Hour O_3 State Designation Value# (ppm)	Percent of State O_3 Standard (0.070 ppm)
South Coast Air Basin								
Los Angeles	0.108	0.094	134	125	112	Santa Clarita Valley	0.109	156
Orange	0.088	0.075	107	100*	89	Saddleback Valley	0.082	117
Riverside	0.105	0.093	133	124	111	Metropolitan Riverside County	0.106	151
San Bernardino	**0.127**	**0.102**	**146**	**136**	**121**	**Central San Bernardino Mountains**	**0.114**	**163**
Salton Sea Air Basin								
Riverside	0.092	0.088	126	117	105	Coachella Valley (Palm Springs)	0.093	133

Bold text denotes the peak value

* Note that 100 percent of the NAAQS is not violating the federal standard

\# The *State 8-Hour Designation Value* is the highest State 8-hour ozone average, rounded to three decimal places, during the last 3 years (State designation value source: https://www.arb.ca.gov/adam/select8/sc8start.php)

All monitored locations measured maximum 1-hour average ozone concentrations well below the Stage 1 episode level (0.20 ppm, 1-hour) and below the ozone health advisory level (0.15 ppm, 1-hour) in 2015. Except for one day in 2003 (at a special-purpose monitor in the San Bernardino Mountains), the Stage 1 ozone episode level has not been exceeded in the Basin since 1998. There have been no exceedances of the Stage 2 episode level (1-hour average ozone ≥ 0.35 ppm) since 1988 and the Stage 3 episode level (1-hour average ozone ≥ to 0.50 ppm) has not been exceeded since 1974.

The Basin exceeded the level of the former (1979) 1-hour federal ozone standard (0.12 ppm) on 10 days in 2015, with exceedances in Los Angeles, Riverside and San Bernardino Counties; Orange County did not exceed the 1979 standard. The State 1-hour standard (0.09 ppm) was exceeded on 71 days in the Basin. The most exceedances of the former 1-hour standard in 2015 (6 days) occurred in the Central San Bernardino Mountains (Crestline-Lake Gregory air monitoring station). The 2015 peak 1-hour ozone concentration in the Basin was 0.144 ppm, also measured in the Central San Bernardino Mountains area. This value was slightly higher than the 2014 peak of 0.141 ppm, which was the Basin's lowest annual peak 1-hour concentration since ozone measurements started in the mid-1950s.

The calculated peak 2013-2015 1-hour ozone design value[22] for the 2013-2015 period (0.130 ppm in the Central San Bernardino Mountains) was 104 percent of the former 1-hour NAAQS. Table 2-5 shows the 2015 maximum 1-hour ozone concentrations and calculated design value by air basin and county for comparison to the revoked NAAQS, along with the 1-hour State designation value for comparison State 1-hour ozone standard.

TABLE 2-5

2015 Maximum 1-Hour Average Ozone Concentrations and 2012–2014 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour O_3 Average (ppm)	2013–2015 1-Hour O_3 Design Value (ppm)	Percent of Former (1979) O_3 NAAQS (0.12 ppm)	Area of Design Value Max	2013–2015 1-Hour O_3 State Designation Value# (ppm)	Percent of State O_3 Standard (0.09 ppm)
South Coast Air Basin						
Los Angeles	0.136	0.127	102	East San Gabriel Valley	**0.13**	**144**
Orange	0.103	0.102	82	North Orange County & Saddleback Valley	0.10	111
Riverside	0.132	0.121	97	Metropolitan Riverside County	**0.13**	**144**
San Bernardino	**0.144**	**0.130**	**104**	**Central San Bernardino Mountains**	**0.13**	**144**
Salton Sea Air Basin						
Riverside	0.102	0.104	83	Coachella Valley(Palm Springs)	0.11	122

Bold text denotes the peak value

* Note that 100 percent of the NAAQS is not violating the federal standard

\# The *State 1-Hour Designation Value* is the highest hourly ozone measurement during the last 3 years, rounded to two decimal places. In practice, the designation value is the highest measured concentration in the 3 year period that remains, after excluding measurements identified as affected by highly irregular or infrequent events (State designation value source: https://www.arb.ca.gov/adam/select8/sc8start.php)

[22] The former 1979 1-hour ozone NAAQS allows for one exceedance per year on average when averaged over 3 years. The calculated design value is the 4th high value over a 3-year period, allowing the design value to be expressed in terms of a concentration. When shown in parts-per-million to 3 decimal places the design value is compared to 0.125 ppm, which would exceed the NAAQS.

Tables A-2 through A-10 in the attachment show the number of days exceeding the federal 8-hour and 1-hour ozone standards, as well as the annual fourth high 8-hour average, maximum 1-hour, and design value concentrations, at all routine SCAQMD air quality monitoring stations, for the period 1995–2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Ozone Spatial Variation

The number of days exceeding the ozone standards in the Basin varies widely by area. Figures 2-12 through 2-14 map the number of days in 2015 exceeding the 2015 8-hour ozone NAAQS and the former 2008 and 1997 8-hour ozone NAAQS in different areas of the Basin. The number of exceedances of the federal 8-hour ozone standards was lowest in the coastal areas, due in large part to the prevailing sea breeze which transports emissions inland before high ozone concentrations are reached. The concentrations increased towards the Riverside County and San Bernardino County valleys and adjacent mountain areas, as well as in the area around Santa Clarita in Los Angeles County. The Central San Bernardino Mountains recorded the greatest number of exceedances of the current and former 8-hour federal ozone NAAQS (86 days for the 2015 ozone NAAQS, 61 days for the 2008 NAAQS, and 30 days for the 1997 NAAQS), as well as the 8-hour State ozone standard (86 days), in 2015.

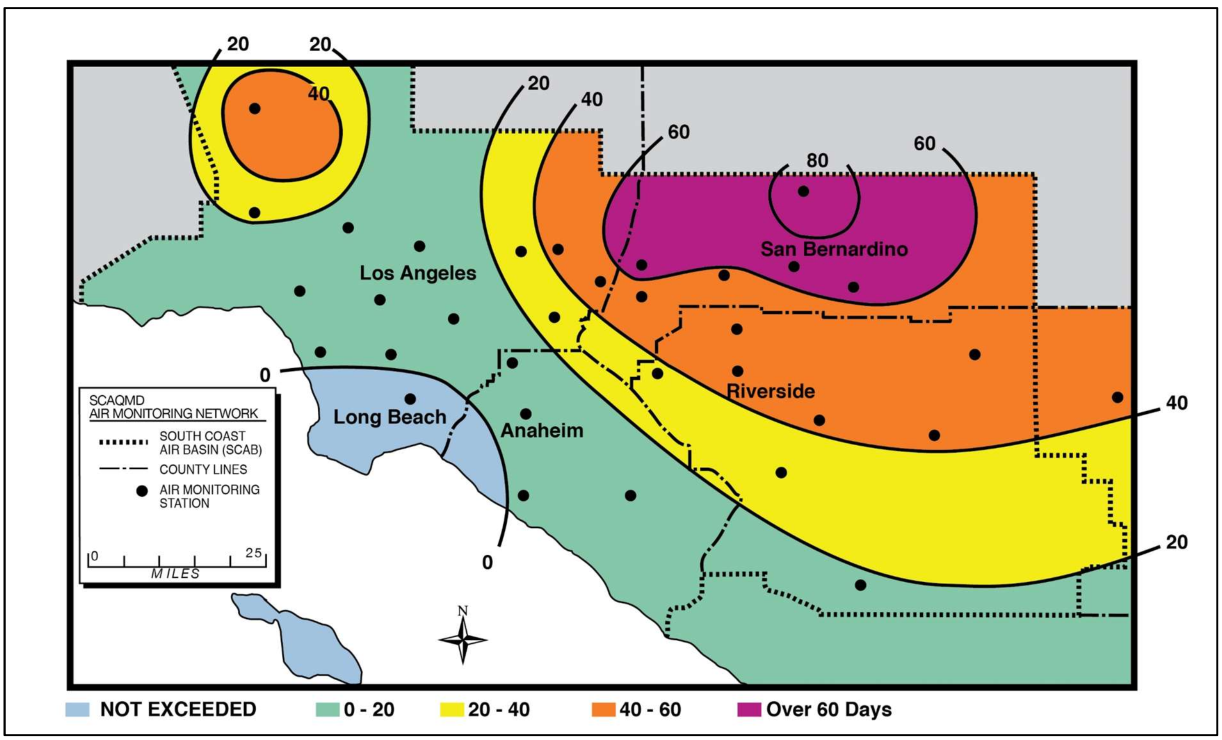

FIGURE 2-12

Number of Days in 2015 Exceeding the 2015 8-Hour Ozone Federal Standard

(8-hour average ozone > 0.070 ppm)

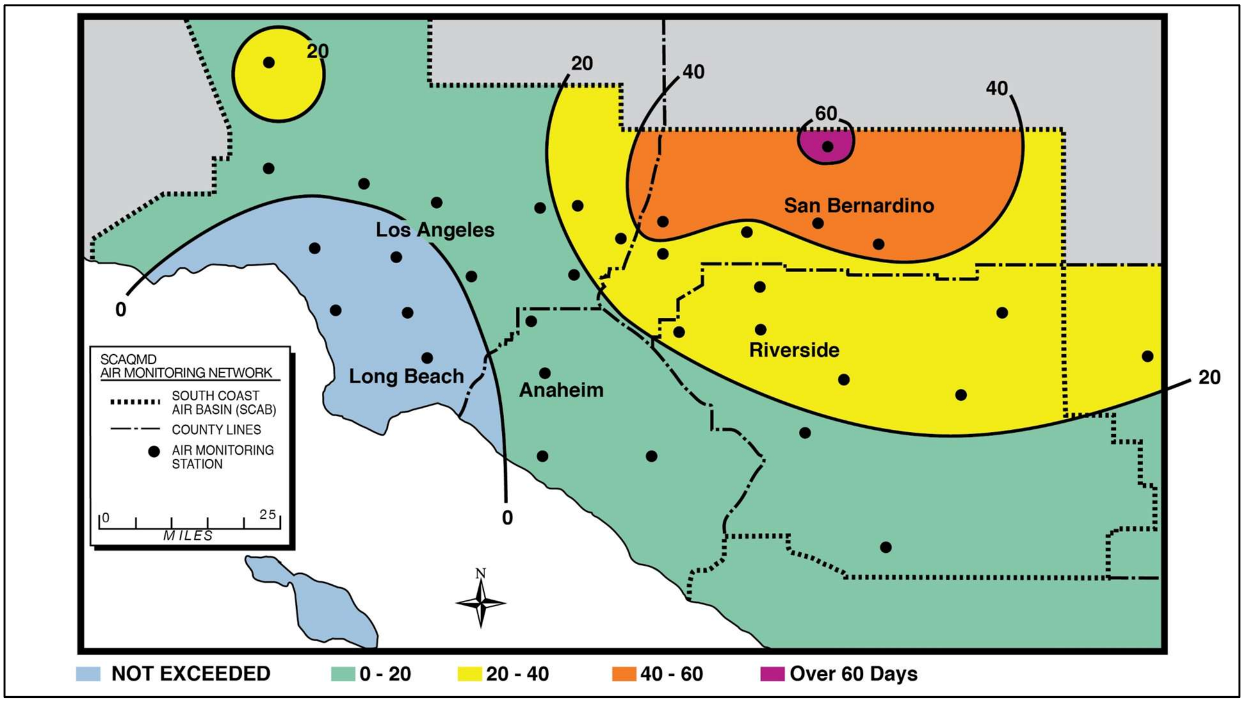

FIGURE 2-13

Number of Days in 2015 Exceeding the Revised 2008 8-Hour Ozone Federal Standard

(8-hour average ozone > 0.075 ppm)

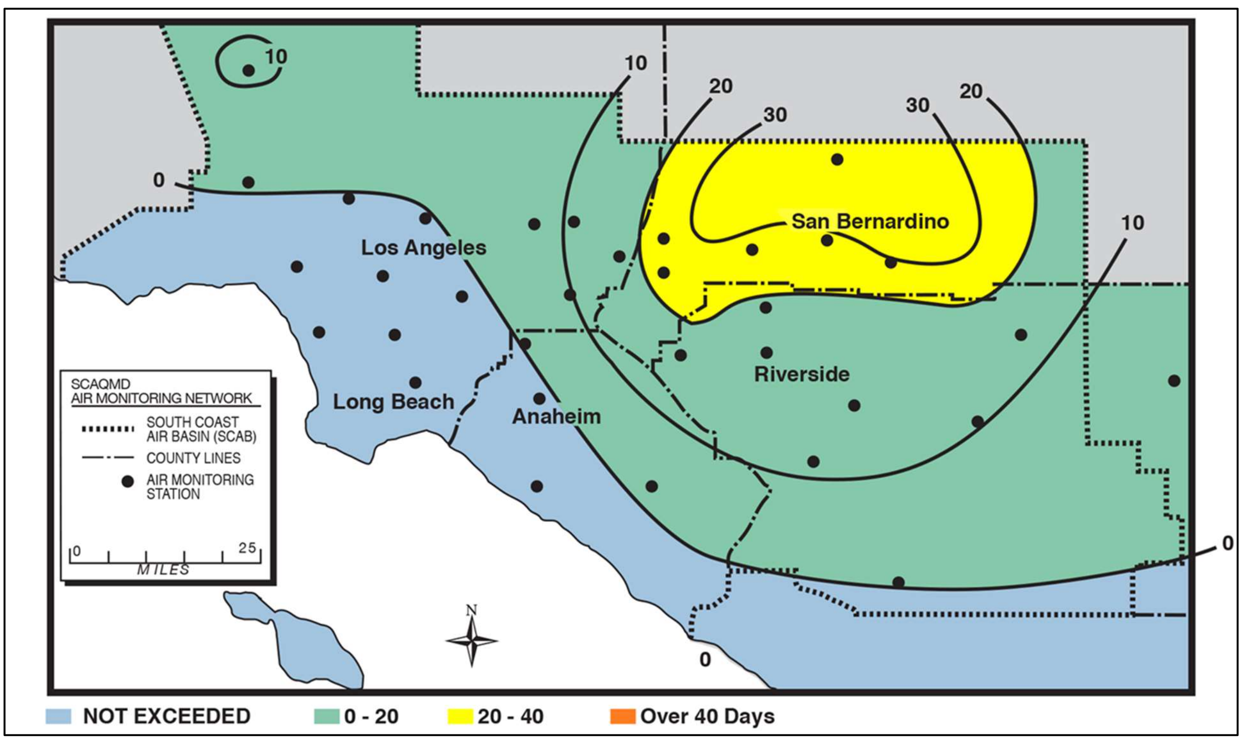

FIGURE 2-14

Number of Days in 2015 Exceeding the Revoked 1997 8-Hour Ozone Federal Standard

(8-hour average ozone > 0.08 ppm)

Figure 2-15 maps the number of days in 2015 exceeding the 1979 1-hour ozone NAAQS in different areas of the Basin. The former 1-hour federal standard was not exceeded in a large portion of the Basin. It was exceeded the most (6 days) in the inland Central San Bernardino Valley (San Bernardino monitoring station). Exceedances of the 1-hour ozone standard extended to all areas monitored in San Bernardino County and in Metropolitan Riverside County, as well as in Santa Clarita and the eastern San Gabriel Valley in Los Angeles County. The Coachella Valley did not exceed the former 1-hour ozone standard in 2015.

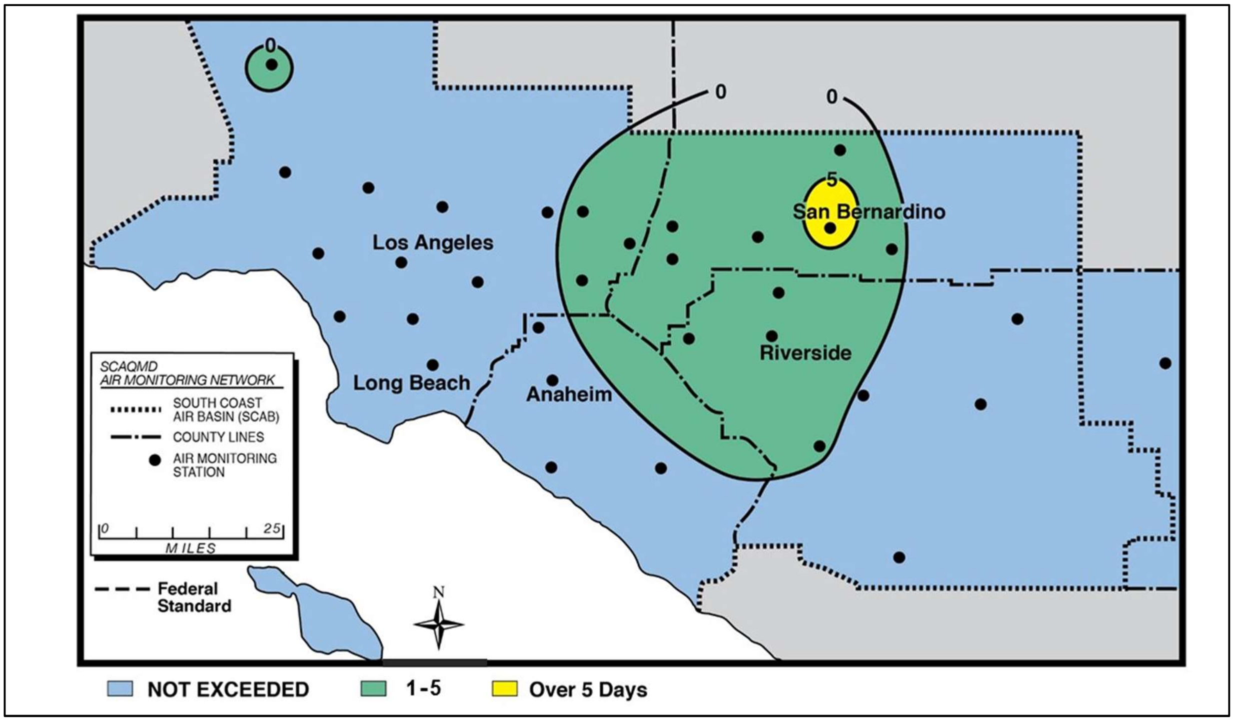

FIGURE 2-15

Number of Days in 2015 Exceeding the Revoked 1979 1-Hour Federal Ozone Standard

(1-hour average ozone > 0.12 ppm; green shaded area indicates areas with exceedances)

Ozone Trends

The rate of ozone air quality improvement has been dramatic since the concerted effort to manage air quality in the Basin began decades ago. Significant improvements were seen throughout the 1990s. While the rate of improvement in ozone has slowed somewhat since the year 2000, the overall trend, as well as the expectation for the future, is continuing gradual improvement. Figure 2-16 shows the Basin-wide trend (1990–2015) of number of days exceeding the 2015, 2008 and 1997 8-hour ozone standards and the former (1979) 1-hour ozone standard. Figure 2-17 shows the trend (1990–2015) of the 8-hour and 1-hour ozone 3-year design values for the Basin.

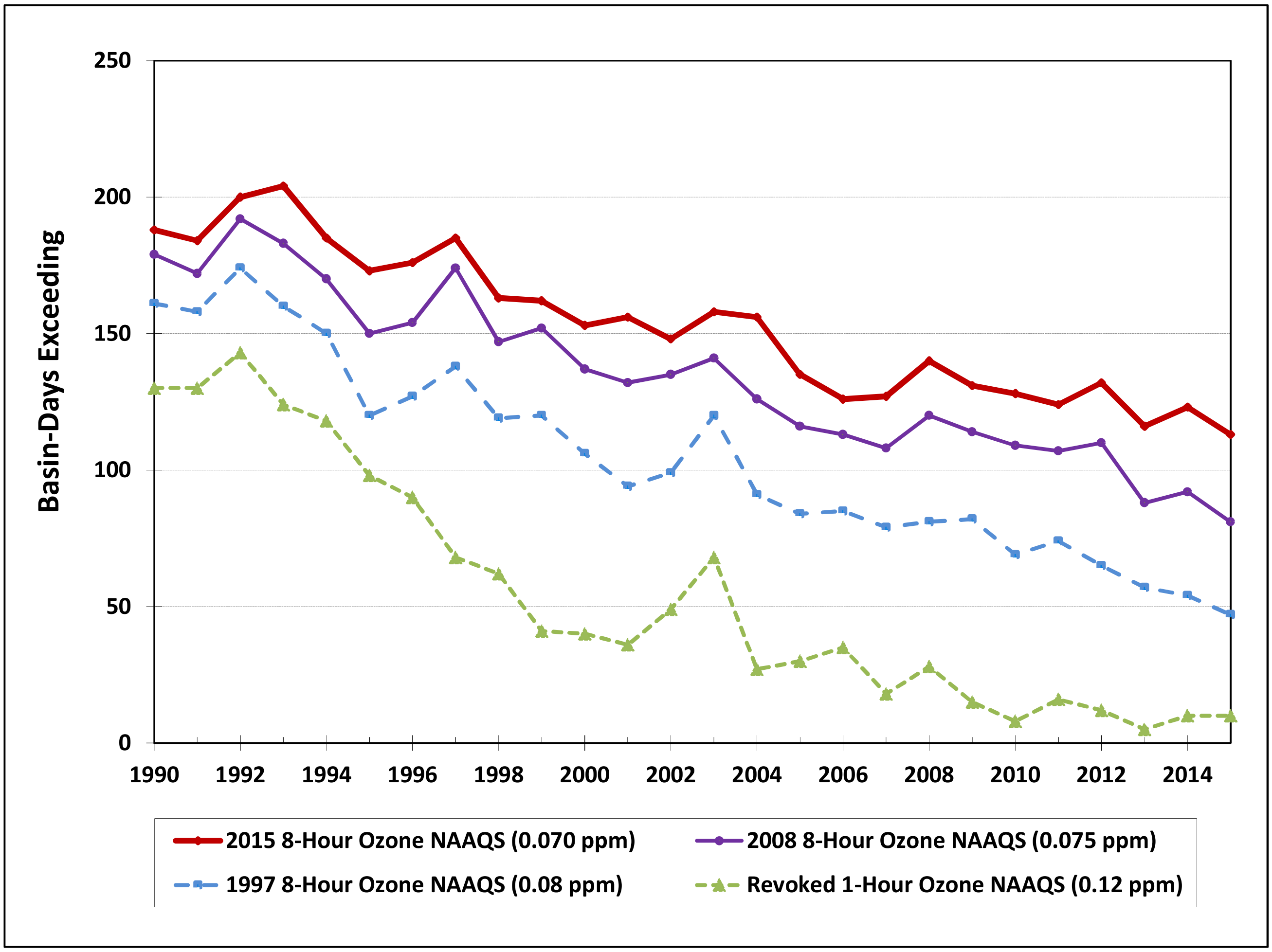

FIGURE 2-16

Trend of Annual Basin Days Exceeding 8-Hour and 1-hour Ozone NAAQS

(South Coast Air Basin; by year, 1990–2015)

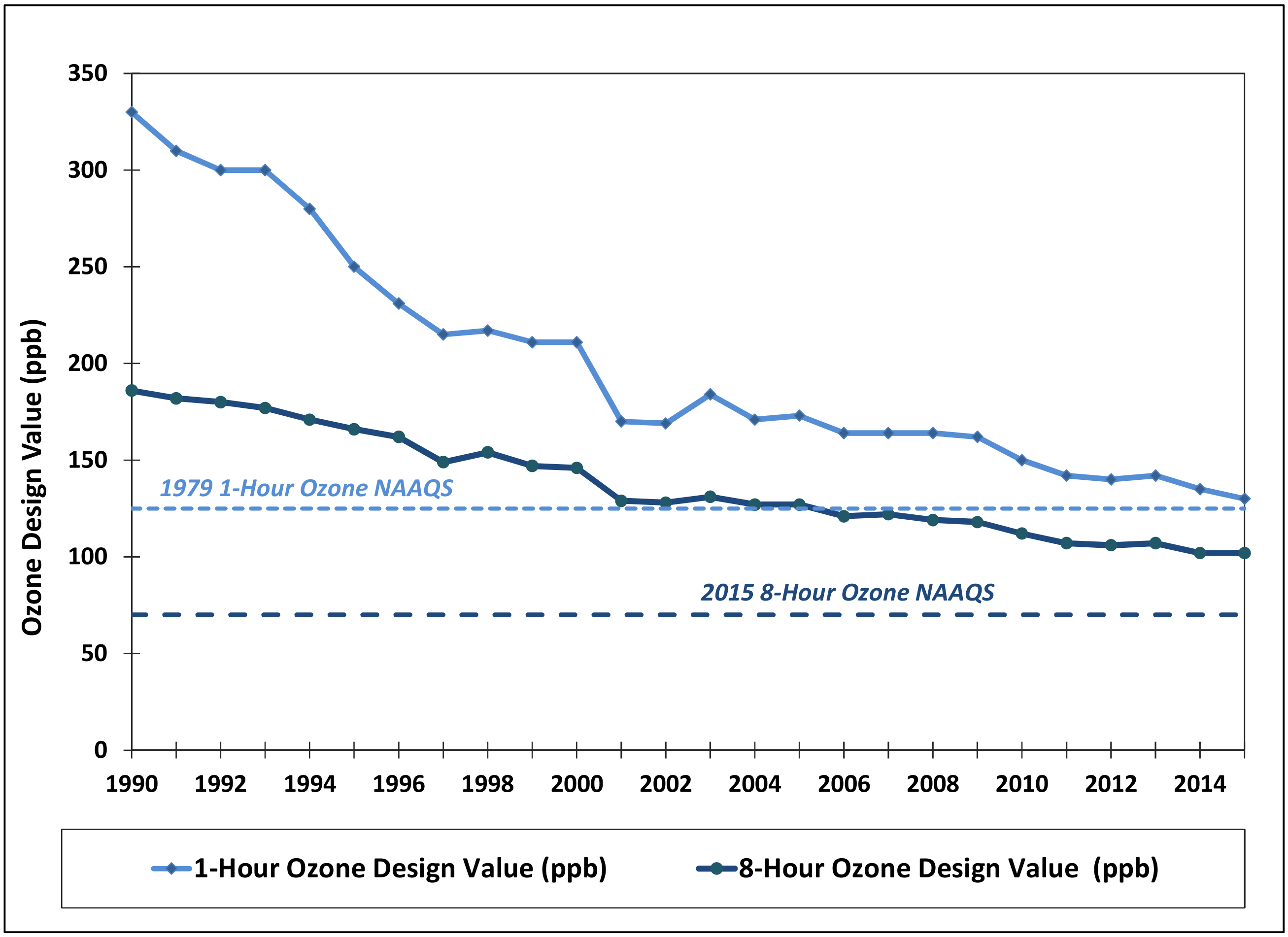

FIGURE 2-17

South Coast Air Basin Ozone Design Value Trends, 1990–2015

Ozone Temporal Variation

Because photochemical reactions require sunlight to proceed, ozone formation is favored by strong solar radiation. Solar radiation is more intense and of longer duration in summer than in winter and summertime temperature inversions are often strong and persistent, trapping pollutants in a shallow mixed layer. This causes ozone concentrations to be higher in summer than in winter. Peak ozone concentrations generally occur near the middle of the day during the period of May through September.

Figure 2-18 shows the number of days per month that one or more monitoring stations exceeded the 2008 federal 8-hour ozone standard level (0.075 ppm) for the period 1995-2015. May through October is typically considered to be the ozone "smog season" in Southern California and most exceedances occur in July and August, with most days in those months exceeding the standard. Up until the late 1980's it would have been common to have days exceeding the 2008 federal ozone standard for most of the year, had that standard been in place at that time. By the late 1990's there were very few exceedances in the months of November through February. There have been relatively few exceedances of the 2008 ozone NAAQS in March or October in more recent years. The frequency of exceedances in the spring (April–June) has continued to decline in recent years. A similar analysis based on the new 2015 ozone NAAQS would again show exceedances in more months for 2015, with exceedances starting in late March and ending in early November of that year.

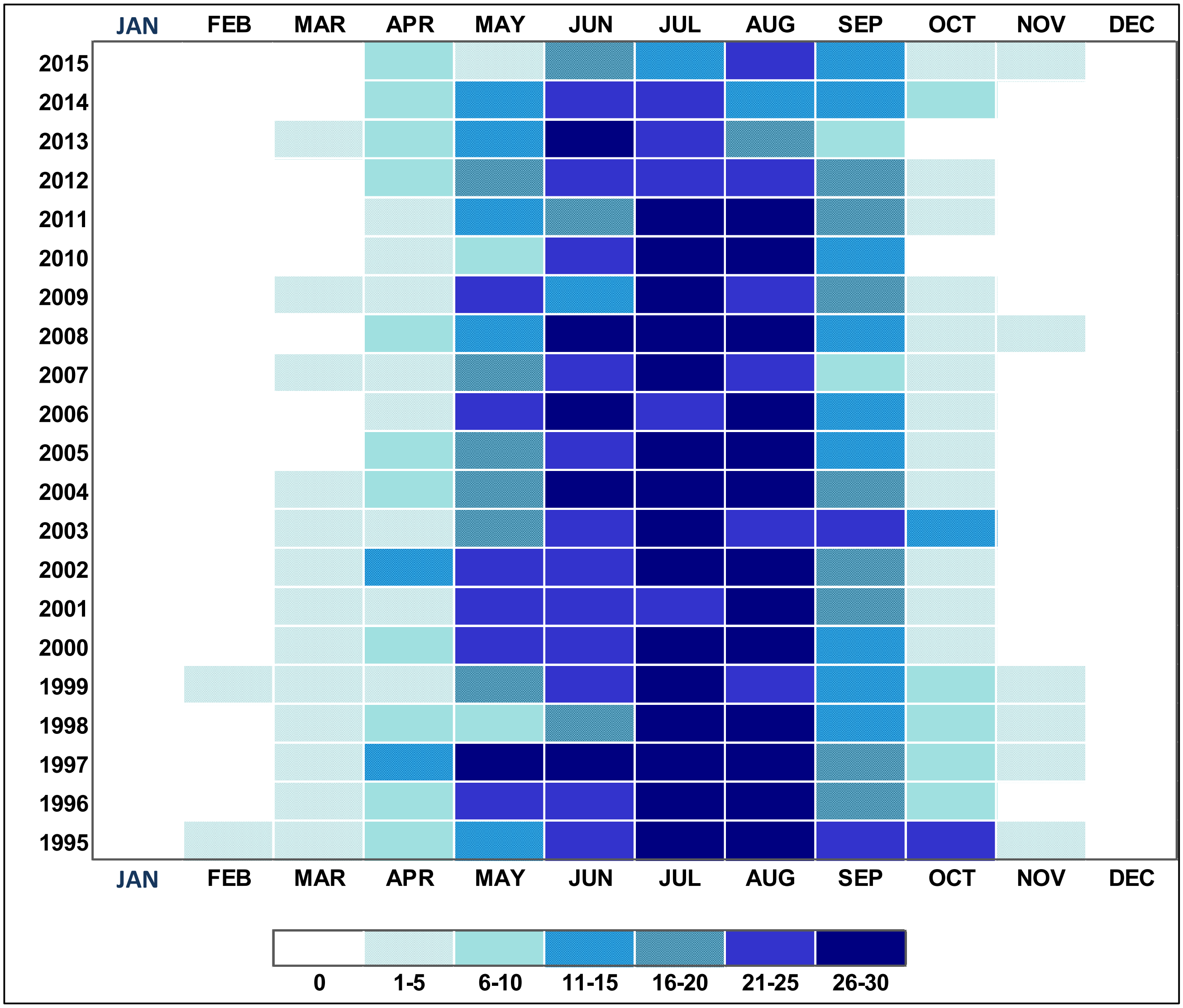

FIGURE 2-18

Monthly Distribution of Basin Days Exceeding the 2008 8-hour Ozone NAAQS

(South Coast Air Basin, for Years 1995–2015)

Since the mid-1970s, it has been documented that ozone concentrations in the Basin are more often higher on weekends than on weekdays, in spite of the fact that ozone precursors are lower on weekends than on weekdays. Similar effects have been observed in some other metropolitan areas in the nation such as San Francisco, Washington D.C., Philadelphia, and New York. This "weekend effect" was quite pronounced in previous years in the Basin. CARB has sponsored several research projects to study the causes of elevated ozone levels on weekends in the Basin. Changes in daily traffic patterns that impact the relative quantity and temporal loading of precursor VOC and NOx emissions have been suggested as strongly contributing to these observations. Carryover of matured precursors from weekdays to weekends is also suggested as a contributing factor. It is generally expected that this difference will decrease as ozone precursor emissions continue to decline.

Figure 2-19 shows the number of station-days[23] that the Basin exceeded the 2015 8-hour ozone federal standard for each day of the week for the 2013–2015 period. In that time period, the weekend days had more exceedances than the weekdays, with Sundays having slightly more than Saturdays. Averaged ozone concentrations by day-of-week (not shown) also indicate a similar pattern that seen in the number of exceedances, with weekends higher than weekdays.

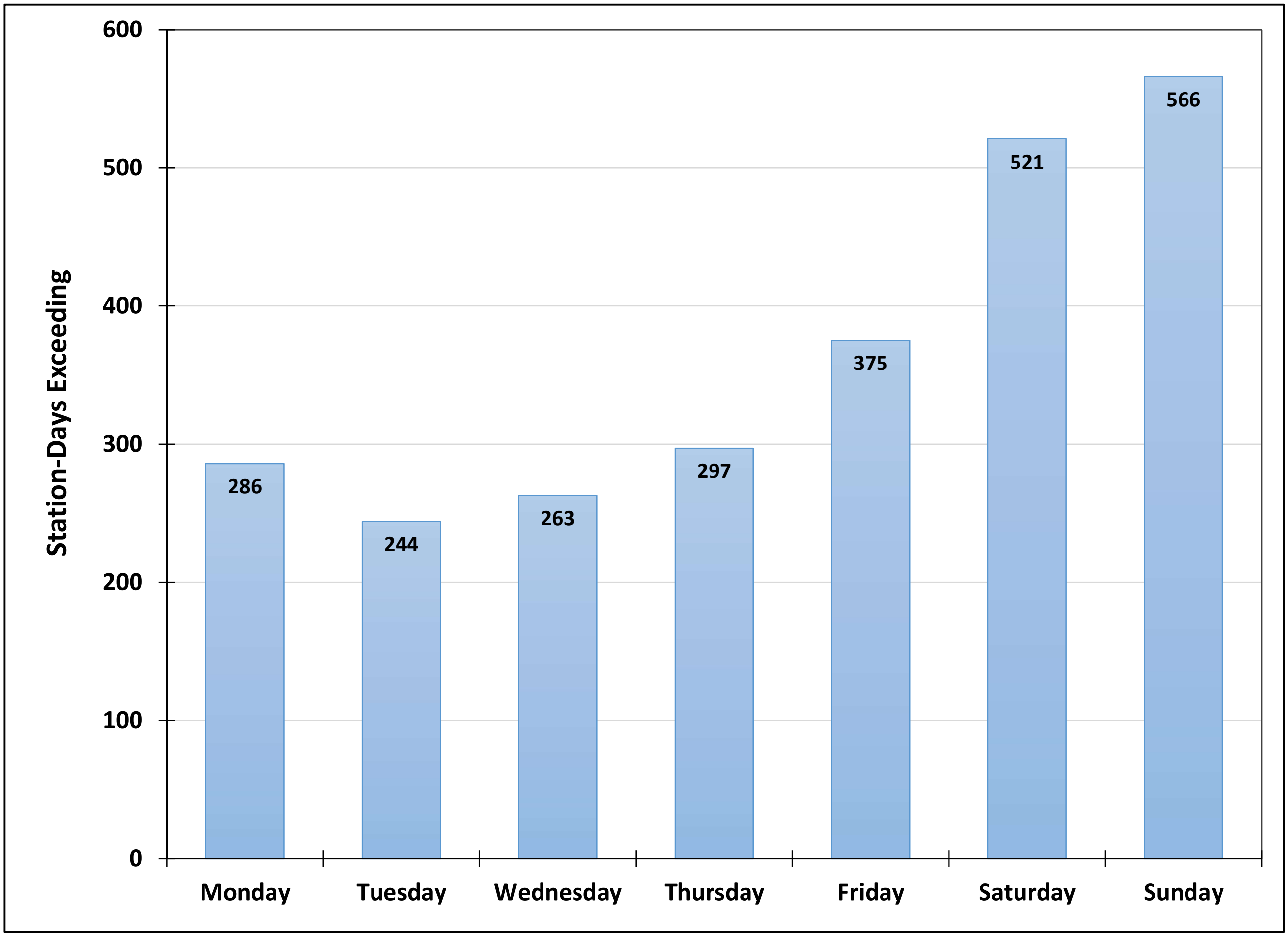

FIGURE 2-19

8-Hour Ozone Day-of-Week Variation, 2013–2015

(total station-days exceeding the 2015 8-hour ozone NAAQS over the 3-year period by day of week)

Because time and sunlight are required for precursor organic gases and nitrogen oxides to react to form ozone, the peak ozone concentrations usually occur between the early afternoon and early evening hours. By this time, the prevailing sea breeze has moved the polluted air mass miles inland from many of the major sources of precursor emissions. Ozone concentrations in the Basin are typically low during early morning hours, increasing rapidly after sunrise and peaking in the afternoon. Peak concentrations generally occur earlier in the day for coastal areas and later for locations further downwind. In the mountain and desert areas, ozone

[23] The term *station-days* represents the total number of days the standard was exceeded at individual monitoring stations summed for all stations in the Basin.

can remain elevated well into the night due to the lack of NOx emissions in those areas to help scavenge the ozone when the photochemistry ceases after dark.

Figure 2-20 illustrates the average of the smog season (May–October) 1-hour ozone concentrations for each hour of the day (shown in Pacific Standard Time), by station, for the years 2013–2015. The average peak occurs near 1 p.m. at the coastal stations (LAX) and most stations in the Basin reach their peak by 2 p.m. The far inland stations at Central San Bernardino Valley (San Bernardino) and Central San Bernardino Mountains (Crestline, where the highest concentrations have been measured in recent years) peak near 3 or 4 p.m., but the ozone at Crestline decreases at a slower rate in the evening, leading to higher 8-hour ozone values. On the worst smog days, this station can remain relatively high through the night.

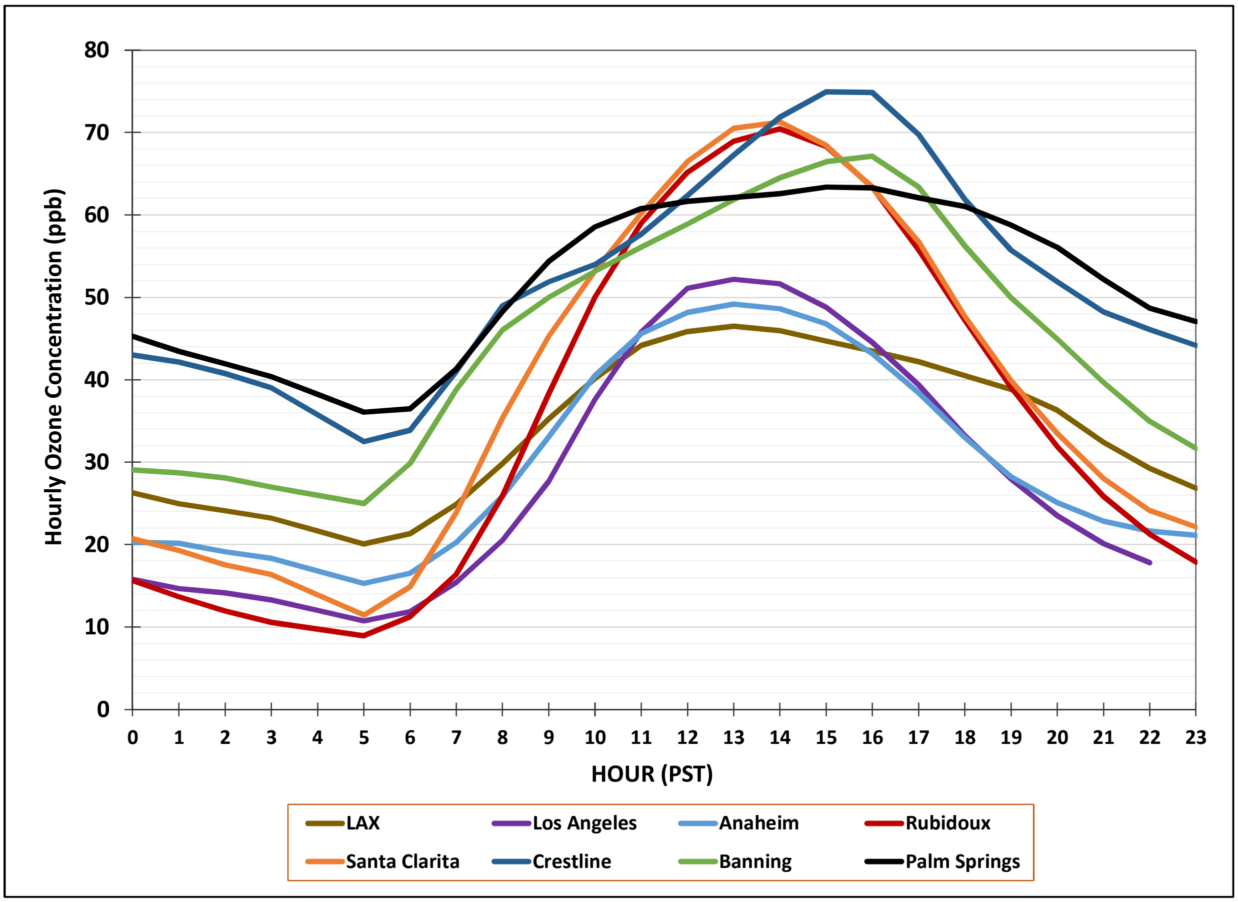

FIGURE 2-20

Diurnal Variation of Basin May–October 2013–2015 Averaged Hourly Ozone Concentrations

Particulate Matter (PM)

PM10 and PM2.5 concentrations are monitored throughout the District by samples collected on quartz or Teflon filters in samplers with size selective inlets. These are known as the Federal Reference Methods (FRMs). Some stations also have continuous PM10 and/or PM2.5 measurements, using either Beta Attenuation Monitor (BAM) or Tapered Element Oscillating Microbalance (TEOM) instrumentation. This data is available in real-time and is used for air quality forecasting and public reporting of current conditions. Where the continuous BAM or TEOM PM10 monitors have been certified by U.S. EPA to be Federal Equivalent Methods (FEM), the continuous PM10 data is averaged for the 24-hour period (midnight to midnight) and used for comparison to the standards on days when a valid FRM filter measurement was not collected.

For PM2.5, there can be significant differences between the FEM and FRM results that have been recognized by national assessments of the technologies. SCAQMD measures FRM PM2.5 on a daily basis at the critical stations in the Basin and does not use the continuous PM2.5 data to compare to the NAAQS for attainment purposes. This issue was further addressed in U.S. EPA's 2012 PM2.5 NAAQS revision, which allowed air districts to annually petition U.S. EPA for a waiver precluding the continuous measurements for use in NAAQS attainment consideration, when the continuous PM2.5 measurements do not meet performance requirements for equivalency to FRM measurements at specific locations. The continuous FEM PM2.5 monitors in the Basin do not meet the U.S. EPA equivalency requirements and are not used for NAAQS attainment comparison.[24]

PM2.5 Air Quality

SCAQMD began regular monitoring of PM2.5 in 1999 following the U.S. EPA's adoption of the first national PM2.5 standards in 1997. Figure 2-21 shows the PM2.5 monitoring sites within the SCAQMD jurisdiction, including the Coachella Valley, in 2015. PM2.5 concentrations were measured at 26 locations throughout the SCAQMD jurisdiction in 2015, including two stations in the SSAB in the Coachella Valley and two near-road sites. Two stations (Burbank and Ontario Fire Station) were closed during 2014. Nineteen stations had filter-based FRM monitoring and eight of these FRMs (including the two near-road sites) sampled daily to improve temporal coverage with the FRM measurements beyond the required 1-in-3 day sampling schedule. One station, in the Big Bear Lake area of the Eastern San Bernardino Mountains, has a 24-hour sample collected every six days. Fourteen stations, including one near-road site, employed continuous PM2.5 BAM monitors. As discussed above, the continuous PM2.5 monitors in the Basin are used for forecasting, real-time air quality alerts, and for evaluating diurnal patterns, but only FRM data is used for comparison to the NAAQS.

[24] The continuous PM2.5 monitors deployed by SCAQMD are FEM-designated Beta Attenuation Monitor (BAM) instruments, but in use they do not meet the correlation and bias requirements set by U.S. EPA for equivalency to FRM filter measurements. The U.S. EPA waiver from NAAQS comparison for the continuous samplers is re-evaluated annually as part of the SCAQMD Annual Air Quality Monitoring Network Plan. [http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan]

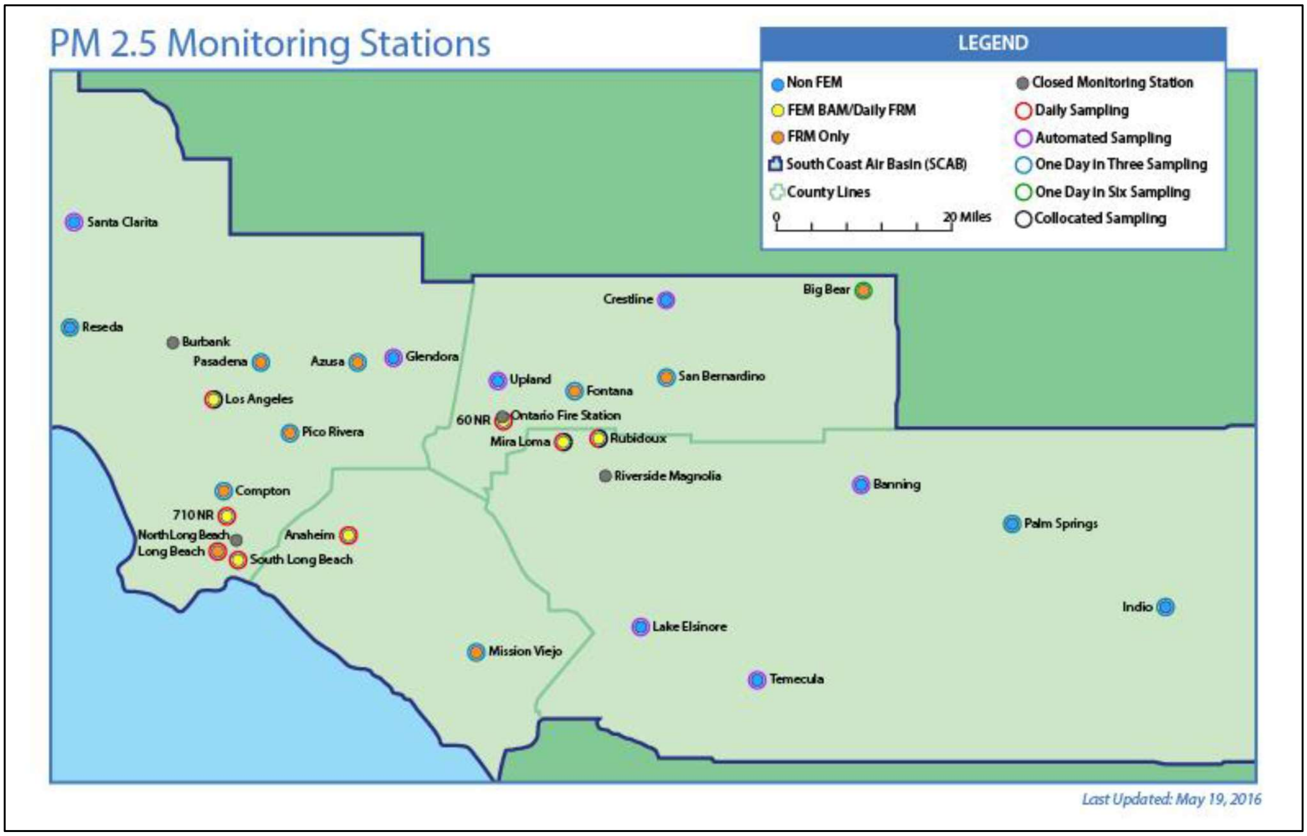

FIGURE 2-21

South Coast Air Quality Management District PM2.5 Air Monitoring Locations

(Note that while the station at N. Long Beach was closed in 2013, FRM PM2.5 monitoring was allowed to continue; some continuous monitors are not certified as FEM monitors, shown as Non-FEM; Reseda and Banning stations also have FRM measurements; Palm Springs and Indio stations are FRM samplers only and are in the Salton Sea Air Basin – Coachella Valley; the Route 710 and Route 60 Near Road PM2.5 monitoring started on January 1, 2015)

The 2015 FRM 24-hour PM2.5 concentrations are summarized in Table 2-6. The near-road data was not included in this analysis due to insufficient data to allow for calculation of design values (see the Near-Road PM2.5 section below for further information on these measurements). PM2.5 concentrations were higher in the inland valley areas of metropolitan Riverside County and San Bernardino County. The Basin 2015 PM2.5 maximum 24-hour average concentration of 70.3 µg/m^3 was measured in the East San Gabriel Valley area at the Azusa air monitoring station on July 5, associated with fireworks on Independence Day. The next highest 24-hour PM2.5 concentration in 2015 was 56.6 µg/m^3, measured in the Metropolitan Riverside County area at the Mira Loma air monitoring station. There is no State 24-hour PM2.5 standard.

Although maximum 24-hour concentrations exceed the standard, the 98th percentile form of the 2013–2015 design value only violated the standard at two Basin locations in Metropolitan Riverside County, at the Mira Loma and Rubidoux air monitoring stations, with design values of 41 µg/m^3 and 36 µg/m^3, respectively (117 percent and 103 percent of the 24-hour PM2.5 NAAQS). Mira Loma had been the only station with a design value violating the 24-hour PM2.5 NAAQS since the 2008–2010 design value period.

The higher PM2.5 concentrations in the Basin, particularly in the inland valley areas, are mainly due to the secondary formation of smaller particulates resulting from mobile, stationary and area source emissions of precursor gases (i.e., NOx, SOx, NH_3, and VOC) that are converted to PM in the atmosphere. Most of the 24-

hour PM2.5 exceedances in the Basin typically occur in the late fall and winter months (shown below in Figure 2-25). The lack of storm events and rainfall in the last four years has contributed to an increase in the PM2.5 concentrations and the number of days over the standard, as the precursor and particulates are not dispersed or washed out periodically.

TABLE 2-6

2015 Maximum 24-hour Average PM2.5 Concentrations and 2013–2015 Design Values by Basin and County#

Basin/County	2015 Maximum 24-Hour PM2.5 Average (μg/m³)	2013–2015 24-Hour PM2.5 Design Value (μg/m³)	Percent of 2006 PM2.5 NAAQS (35 μg/m³)	Area of Design Value Max
South Coast Air Basin				
Los Angeles	**70.3****[**]	34	97	Central Los Angeles and South San Gabriel Valley
Orange	45.8	28	80	Central Orange County
Riverside	56.6	**41**	**117**	**Metropolitan Riverside County**
San Bernardino	50.5	35	100[*]	Central San Bernardino Valley
Salton Sea Air Basin				
Riverside	24.6	17	49	Coachella Valley

Bold text denotes the peak value

\# Based on FRM filter data

* 100 percent of the NAAQS is not in violation of that standard

** Peak value associated with Independence Day fireworks – flagged as an exceptional event

The 2015 annual average PM2.5 concentrations are summarized in Table 2-7, based on the FRM measurements. The maximum annual average of 14.5 μg/m³ was measured at the CA-60 Near-Road site, located west of Vineyard Avenue near the San Bernardino/Riverside County border (near the cities of Ontario, Mira Loma, and Upland). The second highest maximum annual average PM2.5 concentration (13.3 μg/m³) was measured in the Metropolitan Riverside County area at the Mira Loma station. The Basin maximum 2013–2015 annual average design value was 14.1 μg/m³ at the Mira Loma station (118 percent of the current 2012 annual average PM2.5 NAAQS, 12.0 μg/m³). This design value is below the former 1997 annual average PM2.5 NAAQS of 15.0 μg/m³, for which the Basin remains in attainment. This is the lowest PM2.5 Basin design value since these measurements began in 1999. Since the near-road PM2.5 sites only became operational in 2015, the data period is insufficient for design value calculations. The CA-60 freeway near-road station could potentially become the design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected. The annual PM2.5 State standard is still violated in all counties of the Basin.

Tables A-11 through A-16 in the attachment show the annual PM2.5 arithmetic mean and annual design value concentrations, the percent of sampling days exceeding the 24-hour PM2.5 NAAQS, and the annual maximum, 98th percentile, and design value 24-hour PM2.5 concentrations at all routine ambient SCAQMD air quality monitoring stations, for the period 1999–2015.

TABLE 2-7

2015 Maximum Annual Average PM2.5 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Max. Annual Average (μg/m³)#	2013–2015 PM2.5 Annual Design Value (μg/m³)#	Percent of Current (2012) NAAQS (12.0 μg/m³)#	Percent of Former (1997) NAAQS (15.0 μg/m³)#	Area of Design Value Max	2013–2015 3-Year High State Annual PM2.5 Designation Value (μg/m³)##	Percent of State Annual PM2.5 Standard (12 μg/m³)
South Coast Air Basin							
Los Angeles	12.4	12.3	103	82	Central Los Angeles	**19**	**158**
Orange	9.4	10.0	83	67	Central Orange County	16	133
Riverside	**13.3**	**14.1**	**118**	94	**Metropolitan Riverside County**	**19**	**158**
San Bernardino	11.0	12.5	104	83	Southwest San Bernardino Valley	17	142
Salton Sea Air Basin							
Riverside	7.5	8.0	67	53	Coachella Valley	8	67

Bold text denotes the peak value

\# Based on FRM filter data, excluding near-road stations due to insufficient period of record for design value calculation; the federal design value is based on the average of the 3 annual averages in the period

\## Based on combined FRM filter and continuous FEM data (federal FEM waiver is not applied to State designation); data may include exceptional events; the State annual designation value is the highest year in the 3-year period (State designation value source: https://www.arb.ca.gov/adam/select8/sc8display.php)

PM2.5 Spatial Variation

In 2015 the 98th percentile concentration was exceeded at eight stations. These stations include Central Los Angeles (Downtown Los Angeles) and South San Gabriel Valley (Pico Rivera) in Los Angeles County; the Metropolitan Riverside County area (Mira Loma and Rubidoux) in Riverside County; and the Central San Bernardino Valley (Fontana) and East San Bernardino Mountains (Big Bear Lake) in San Bernardino County; as well as at both near-road sites. Generally, PM2.5 concentrations are higher in the inland valley areas of Metropolitan Riverside County and San Bernardino County. These higher PM2.5 concentrations are mainly due to the secondary formation of smaller particles resulting from mobile, stationary and area source emissions of precursor gases (NOx, SOx, NH_3, VOC) that are converted to particulate matter in the atmosphere. Secondary formation occurs due to chemical reaction in the atmosphere generally some distance downwind from the original emission sources and PM2.5 varies geographically and seasonally due to topography and weather conditions that affect atmospheric chemistry and dispersion. The locations of PM2.5 precursor emission sources play a large role in where the PM2.5 peaks occur.

Figure 2-22 maps the distribution of annual average PM2.5 concentrations in different areas of the Basin. This shows peak annual average concentrations in the Metropolitan Riverside area where transport and secondary chemical processes are most important, as well as a secondary peak in the Central Los Angeles area due to the abundant motor vehicle sources.

Most of the exceedances of the PM2.5 24-hour NAAQS occurred during the first quarter of 2015, when the highest 24-hour PM2.5 concentrations are expected. However, this is also the time frame when the Basin typically sees the most rainfall and most frequent storm events. The first quarter of 2015 had the lowest number of rain days in the past decades, as is discussed further below in this appendix (see Impacts of Drought on PM2.5 Air Quality). This reduced frequency of unstable weather conditions and storms, significantly reduces the pollution dispersion resulting in longer episodes of stagnant air when particulate pollution can build to unhealthful levels.

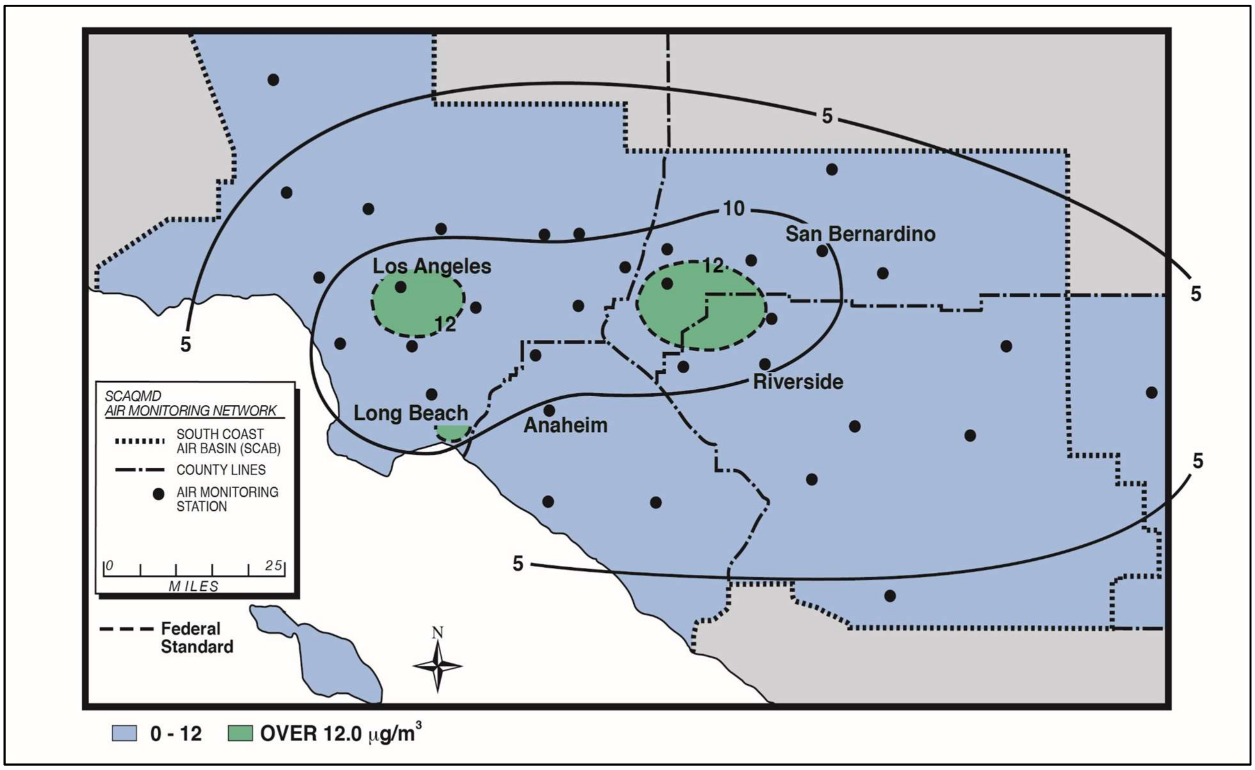

FIGURE 2-22

Spatial Distribution of the 2015 Annual Average PM2.5 Concentrations

(The 2012 annual PM2.5 NAAQS is 12 µg/m^3, annual arithmetic mean)

PM2.5 Trends

Figure 2-23 shows the trend of the Basin 3-year 24-hour and annual design values, compared to the current 2006 24-hour and 2012 annual PM2.5 standards, for the period of 2001 through 2015. This illustrates the significant progress toward attainment of the standards in the last 15 years. It also shows the reversal in trend of 24-hour PM2.5 for the 2014 and 2015 design values due to the impact of the drought. Programs and regulations aimed at reducing direct emissions of particles as well as those that reduce gaseous emissions that can form particles in the atmosphere have played an important role in reducing PM2.5 concentrations. These include the national, State, and regional programs designed to reduce ozone-forming emissions of VOCs and NOx, which also contribute to secondary PM2.5 formation.

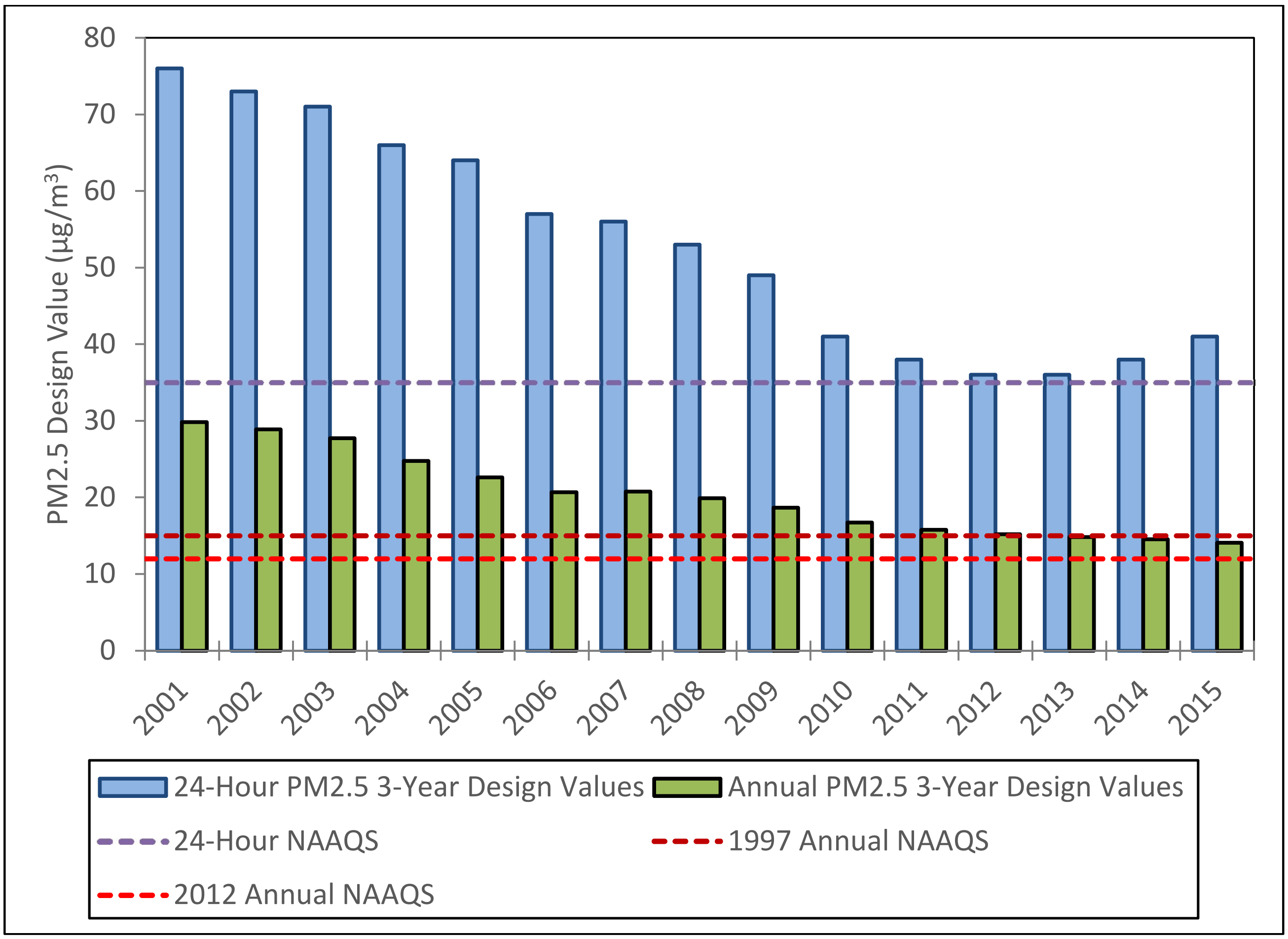

FIGURE 2-23

South Coast Air Basin Peak PM2.5 Design Value Trends, 2001–2015

PM2.5 Temporal Variation

Seasonal and day-of-week variations in PM2.5 concentrations are complex and location dependent, and may vary from year to year depending on meteorological conditions, the presence of large wildfires, residential wood burning, and other factors. Meteorological conditions such as wind direction and speed, mixing height and temperature play an important role in the formation and removal mechanisms of PM and its components. PM2.5 concentrations typically have a distinct seasonal pattern in the Basin, with higher concentrations in the first (January–March) and fourth (October–December) calendar quarters. This is, in part, because secondary PM precursors, such as particulate nitrates and carbonaceous particles, are more readily formed in cooler weather. Wood stove and fireplace use in the cool months also increases direct emissions of carbon. Persistent trapping occurs in the cool months due to near-surface temperature inversions formed by the radiation of heat from the surface on the cool nights. Figure 2-24 shows the Basin-wide monthly averaged PM2.5 concentrations, by month for the years 2013–2015. The highest monthly PM2.5 averages were recorded in January and February, followed by December.

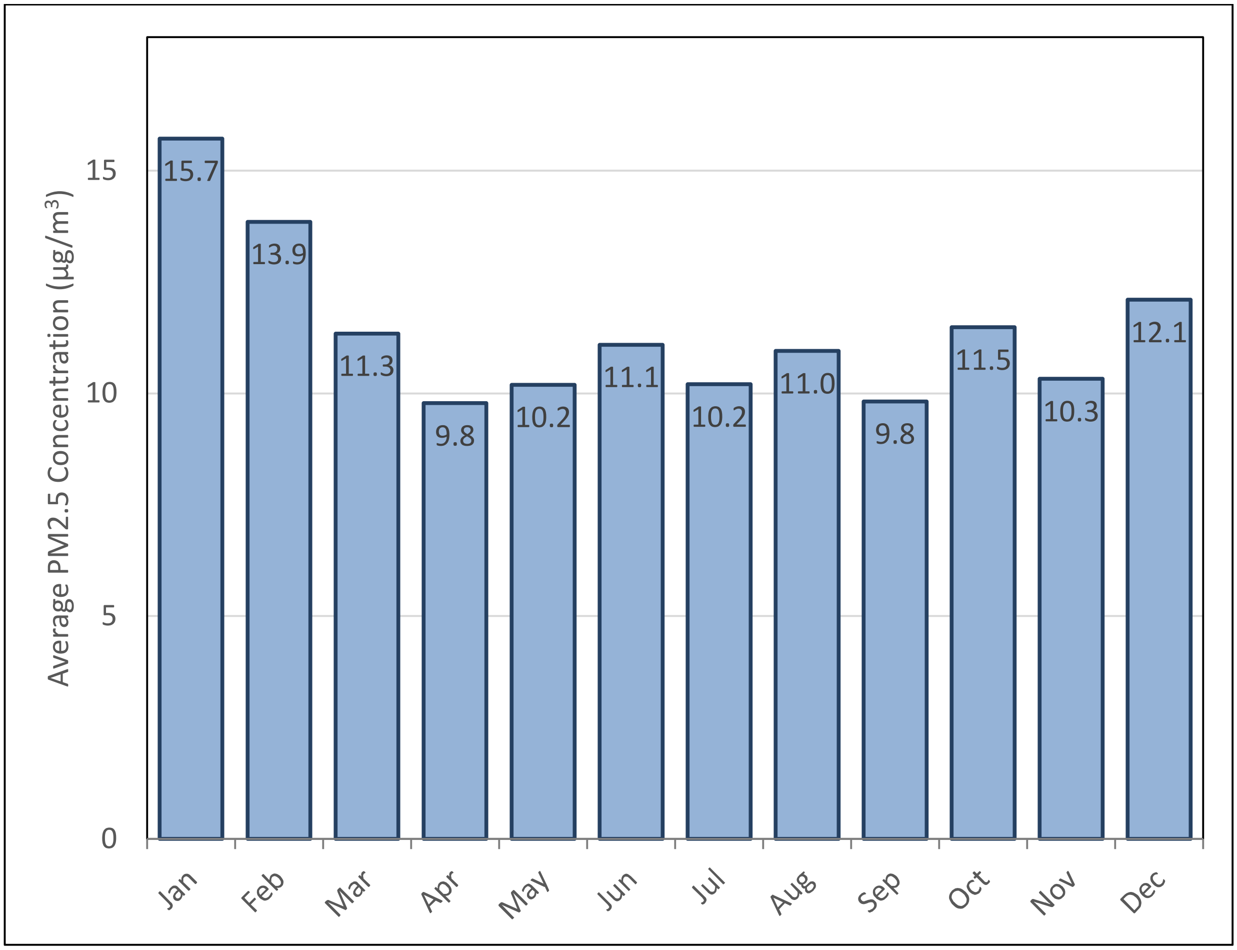

FIGURE 2-24

PM2.5 Variation of Basin-wide FRM Monthly Average Concentration, 2013–2015

As shown in Figure 2-25, the highest number of station-days when the PM2.5 concentration exceeds the 24-hour NAAQS in the most recent three years occurred during the fall and winter seasons. SCAQMD introduced the "*Check Before You Burn*" program to help improve wintertime air quality by issuing 24-hour no-burn alerts for residential fireplaces, outdoor fire pits, and wood stoves when air quality is forecasted to reach unhealthful levels. Alerts are issued only during winter wood-burning months (November 1 through the end of February) for specific areas or the entire South Coast Air Basin, depending on the forecasted concentrations. The wintertime program became mandatory on November 1, 2011 under the provisions of Rule 445 – Wood-Burning Devices, which was amended in May 2013 to lower the forecast threshold for wood burning curtailment.

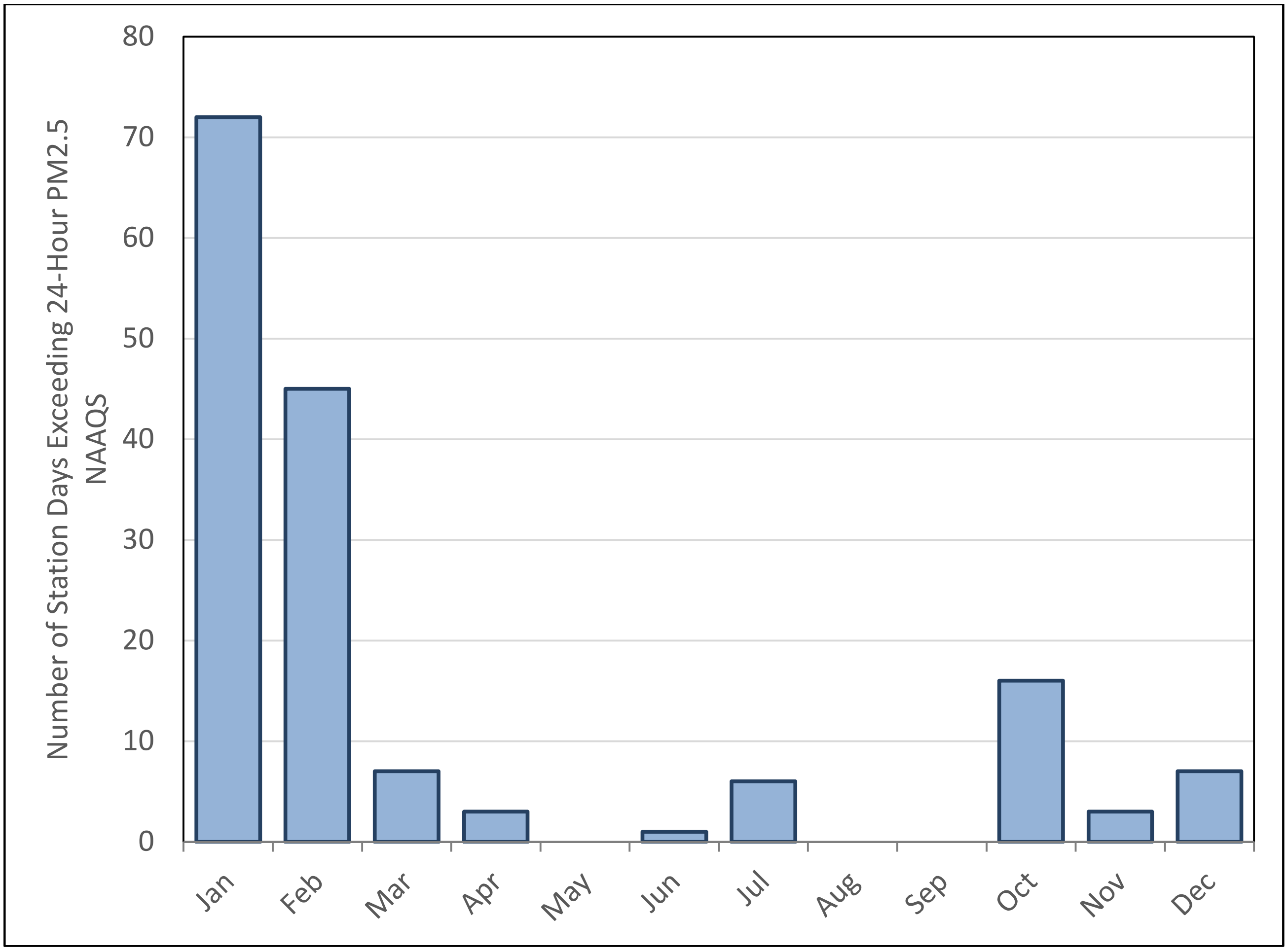

FIGURE 2-25

2013–2015 PM2.5 Monthly Variation of Station-Days Exceeding the 2006 24-Hour PM2.5 NAAQS (35.0 µg/m^3)

Figure 2-26 shows an analysis of day-of-week variation in Basin-wide PM2.5 daily concentrations averaged for the years 2013-2015. This shows that Saturdays have slightly higher average PM2.5 concentrations, likely due to buildup of pollution over multiple weekdays, the change in traffic patterns, and increase in residential wood burning. Mondays had the lowest concentrations, likely due to Monday's decreased carryover from the traffic on weekends and reduced wood burning on the weekdays. However, the average difference from the lowest day of the week to the highest is only 0.4 µg/m^3. PM2.5 concentrations generally remain consistent between Tuesdays and Fridays.

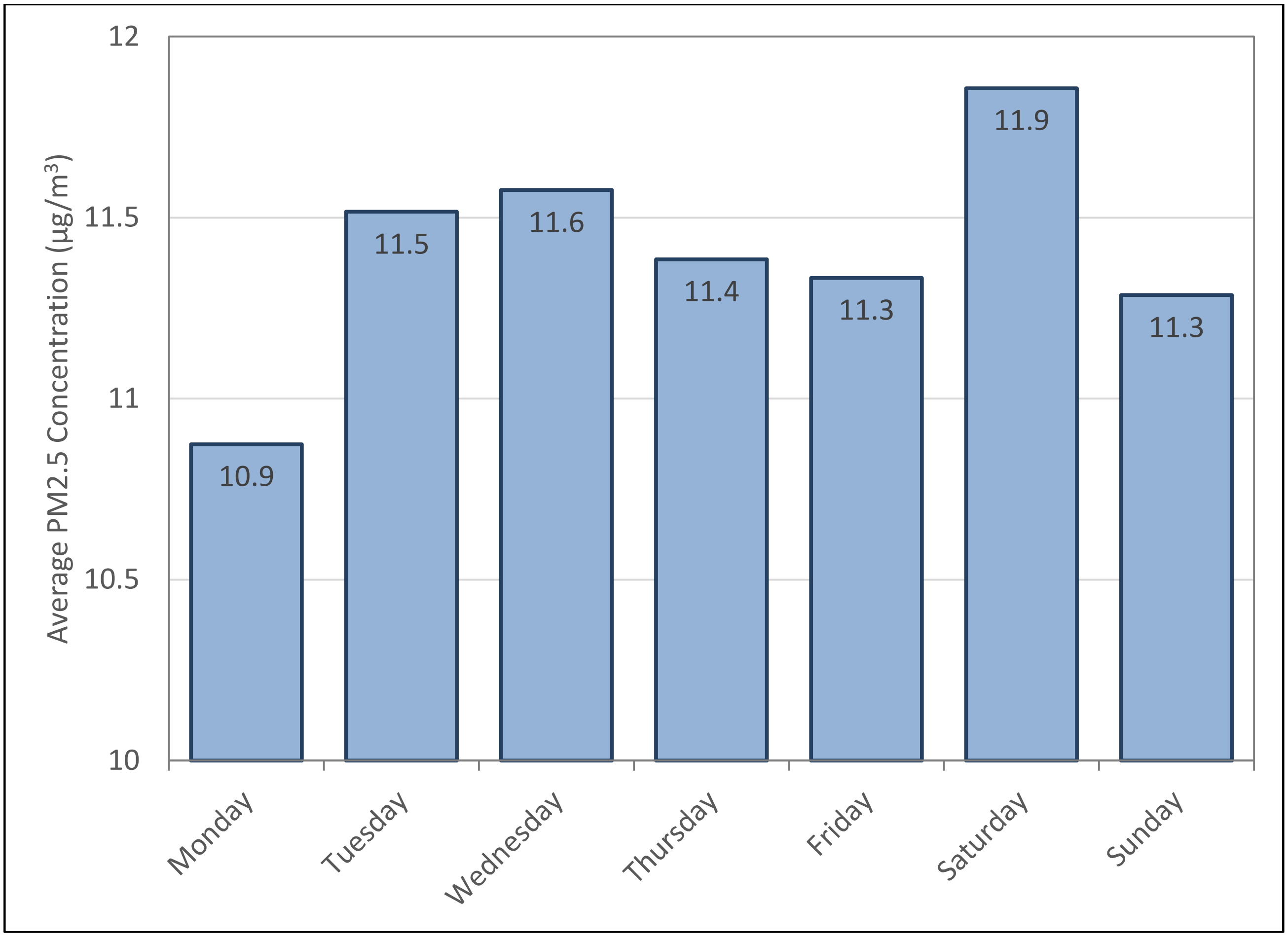

FIGURE 2-26

PM2.5 Basin-wide Day-of-Week Variation of 24-Hour Average FRM PM2.5 Concentrations, 2013–2015

Figure 2-27 shows average PM2.5 concentration by hour of the day for the 2013–2015 period, based on the continuous PM2.5 measurements using hourly FEM BAM sampler data. The diurnal plots are for the Basin maximum PM2.5 monitor at Metropolitan Riverside County (Mira Loma), as well as for Central Los Angeles (Downtown L.A.), Central Orange County (Anaheim), and for the average of several other sites throughout the Basin. In general, PM2.5 concentrations in urban environments have been shown to closely follow temporal variation in traffic density, with highest levels observed on weekdays during rush hours. As seen in Figure 2-27, PM2.5 concentrations peaked in the morning between 0600 and 0900 PST because of rush hour traffic and decreased throughout the day due to decreased traffic volume, increased wind speeds and subsequent dispersion of PM2.5 and precursor emissions. PM2.5 can also be formed by chemical reactions in the atmosphere, particularly in the photochemically active, warm seasons. This is often seen as a mid-day peak associated with secondary particle formation, seen in the plots between 0600 PST and 1400 PST. The PM2.5 concentrations reach a secondary peak in the evening hours, following evening traffic, and can remain elevated overnight when the lower nighttime temperature inversion (particularly in colder seasons) traps the pollutants in a shallower layer near the surface.

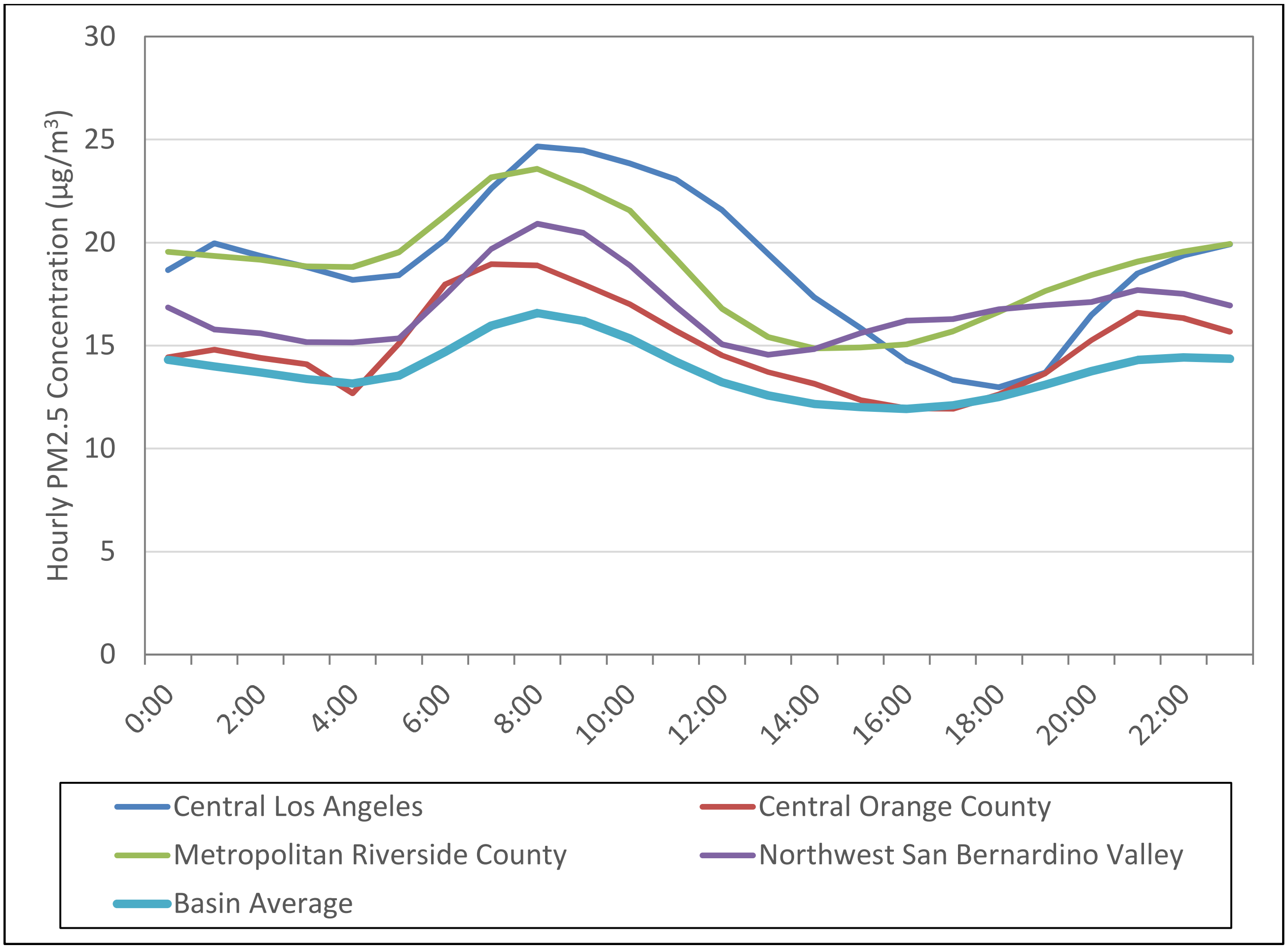

FIGURE 2-27

Diurnal Variation of Hourly FEM PM2.5, Averaged by Time of Day, 2013–2015

The effect of meteorology on PM2.5 concentration is more evident when comparing average diurnal patterns for different seasons (Figure 2-28). Several factors contribute to the seasonal variability of PM2.5. The winter season, characterized by lower temperatures and lower mixing heights, along with wood burning and heating-related emissions, result in elevated PM2.5 levels in the evenings. Summer months on the other hand, are typically characterized by distinctly higher mid-day levels, due to the increased photochemical activity, favoring particle formation. As a result, PM2.5 concentration remains elevated after the morning rush hour traffic and through much of the remainder of the day.

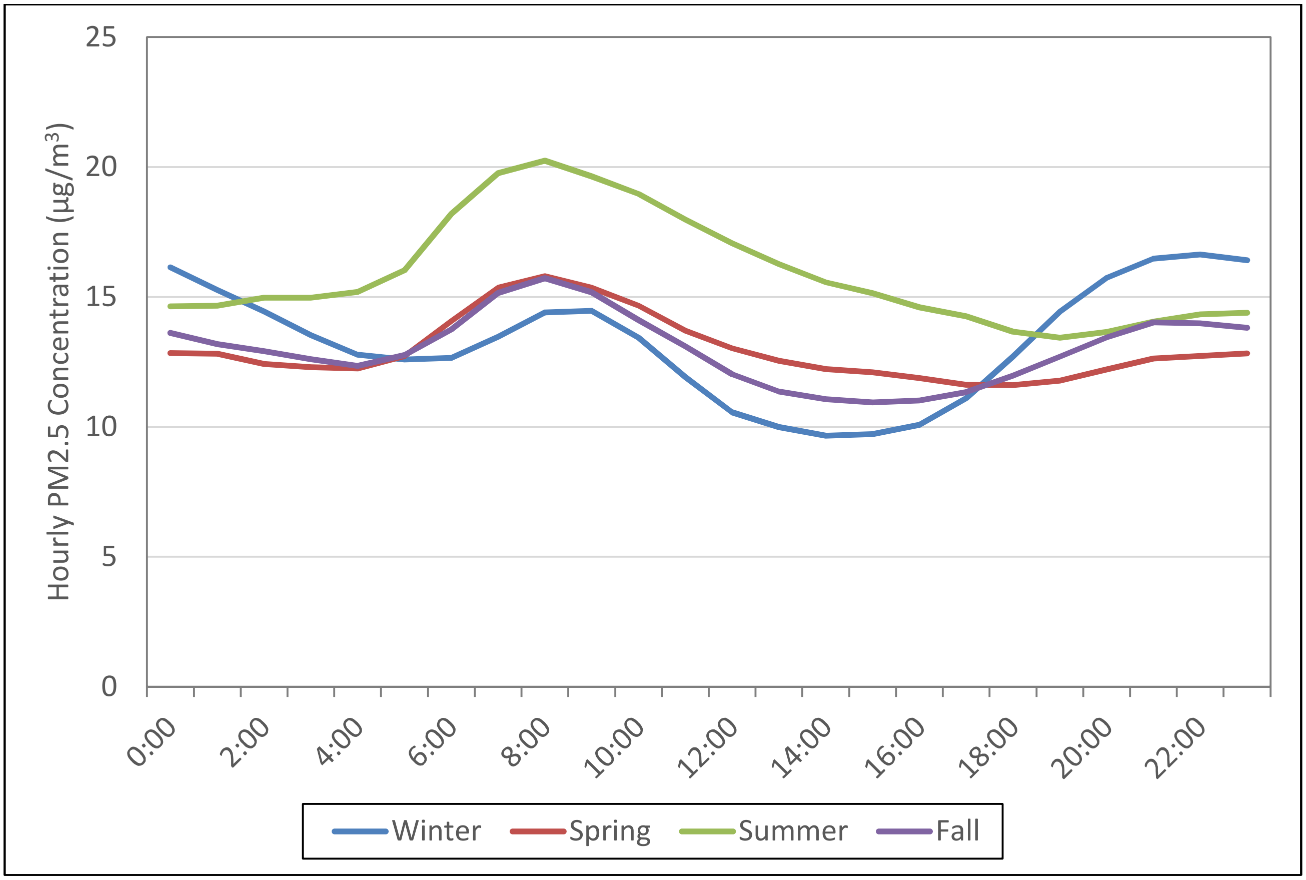

FIGURE 2-28

Seasonal Diurnal Variation of Hourly FEM PM2.5, Averaged by Time of Day for the Basin, 2013–2015

PM2.5 Speciation

Further insight into the sources of fine particulate matter requires an examination of particle composition, therefore PM2.5 speciation sampling, to determine the chemical components of PM2.5 is also a part of the District's PM2.5 measurement program. Currently, PM2.5 speciation samplers are deployed at four representative locations in each of the Basin's counties (Anaheim, Fontana, Los Angeles and Rubidoux). The 24-hour filter samples from the Speciation Air Sampling System (SASS) samplers in the SCAQMD ambient network are run every six days, with analysis conducted at the SCAQMD Laboratory. Figure 2-29 shows the trends of the annual concentration of six PM2.5 component species: Elemental Carbon (EC), Organic Carbon (Organics), Sulfate (SO_4), Nitrate (NO_3), Ammonium (NH_4), and Crustal Elements (soils). Most of the components show a downward trend in recent years. The largest decline is observed for NH_4, NO_3, SO_4 and EC. These reductions are attributed to the success of regulatory efforts, such as stringent regulations and a myriad of programs that target PM2.5, and NOx and diesel emissions. Concentrations of the crustal material have been more or less constant throughout the years, with a slight increase in the past three years, most likely attributable to the recent drought. The lack of rain leads to drier ground surfaces and less crusting of soil and washing of road surfaces. This can lead to enhanced resuspension of fugitive dust by moving vehicles and winds. Fugitive dust can boost concentrations of both PM10 and PM2.5, although the coarse portion of PM10 is usually more affected. Unlike other components of PM2.5, organics concentrations have been increasing since 2012, after a period of progressive decline.

FIGURE 2-29

South Coast Air Basin PM2.5 SASS Speciation Network Annual Trends, 2004–2014

[annual averaged PM2.5 mass of Ammonium (NH_4), Nitrate (NO_3), Sulfate (SO_4), Crustal Component Concentrations, Organics and Elemental Carbon (EC) for Anaheim, Fontana, Los Angeles and Rubidoux]

More information can be assessed from the relative contribution of each component species to total PM2.5 mass concentration, as is presented in Figure 2-30. The relative contributions of NH_4, NO_3, SO_4 and EC are decreasing with a higher rate, particularly since 2010, while the relative contribution of organics and crustal material have been increasing. Crustal material emissions are usually from sources like windblown soil and dust, brake lining abrasion, tire wear, and bioaerosols, all of which can be difficult to regulate. As a result, with little year to year variation and considering the declining PM2.5 concentrations, the relative contribution of these emissions to PM2.5 mass is on the rise. The organics are the other PM2.5 component with an increasing concentration and relative contribution, especially during the drought years.

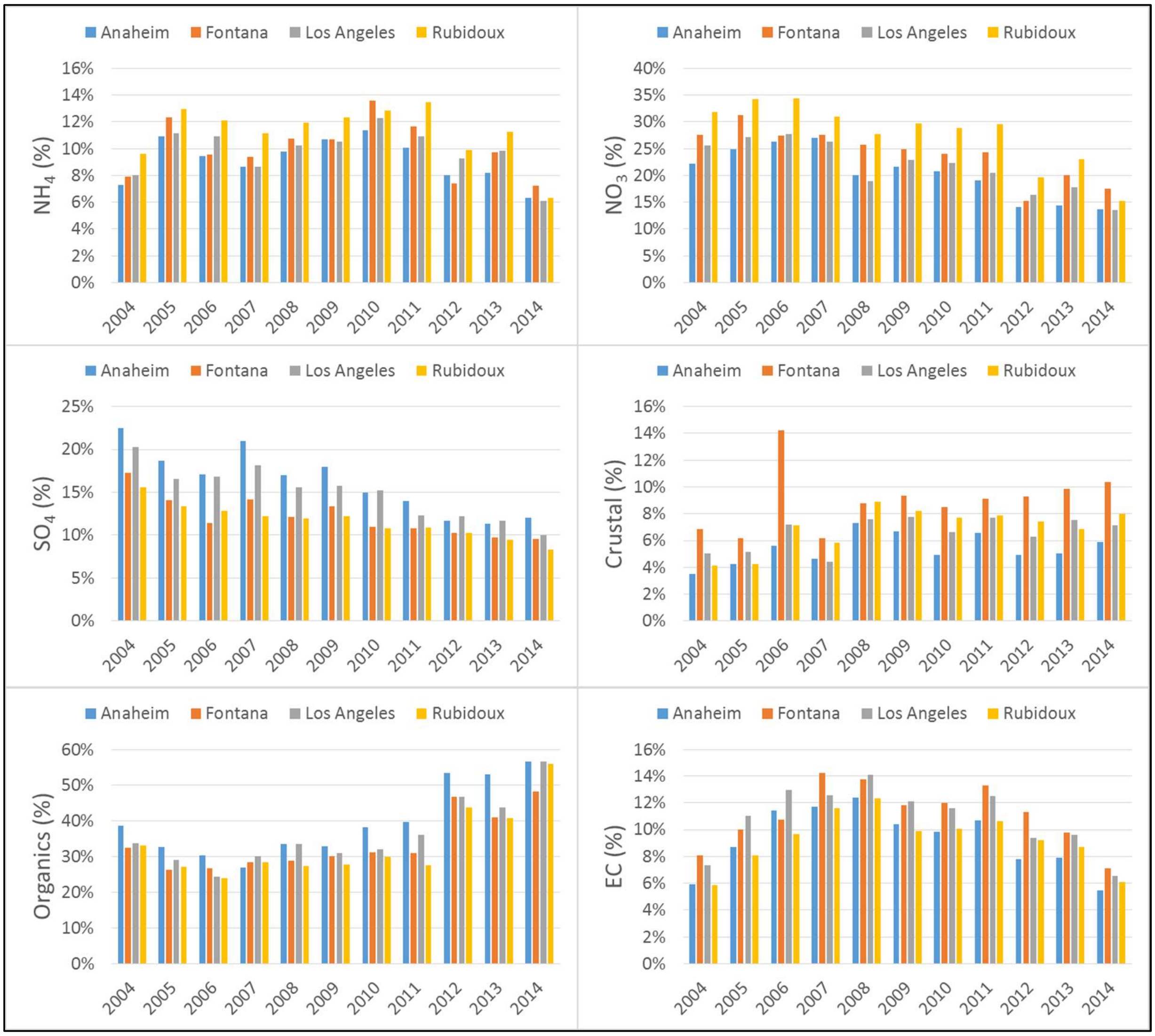

FIGURE 2-30

South Coast Air Basin PM2.5 Speciation Network Annual Trends
of Relative Contribution to Mass, 2004–2014

[annual averaged PM2.5 Ammonium (NH_4), Nitrate (NO_3), Sulfate (SO_4), Crustal Component Concentrations, Organics and Elemental Carbon (EC) for Anaheim, Fontana, Los Angeles and Rubidoux as percent of total mass]

The PM2.5 components have a strong seasonality, as is shown in Figure 2-31. The organics and SO_4 have a reverse seasonality compared to rest of components. The highest organics and SO_4 concentrations are measured in spring and summer, and they have the highest relative contribution in summer, likely due to higher fraction of particulate organic carbon due to a secondary origin in gas/particle conversion of volatile organic compounds. This fraction could be estimated from the minimum ratio between particulate organic and elemental carbon. Organic carbon is the largest contributor to the PM2.5 mass at all four of the speciation sites and in all seasons. The average contribution of elemental carbon to the PM2.5 mass concentration is 10% on average over all the sites.

The OC to EC ratio is often used to distinguish the relative importance of primary and secondary organics. It is generally assumed that EC, the main component of soot, is only emitted by primary combustion sources, and these primary emissions have some characteristic ratio of OC to EC. If observed ratios of OC/EC are higher than those assumed to occur in primary emissions (a ratio between 2 and 5 is generally assumed for OC/EC in primary emissions), then the excess OC is assumed to be due to secondary organic aerosol formation.

Figure 2-32 shows the historical trend of OC/EC ratios at each of the speciation sites. In the period of 2004 through 2011, the OC/EC ratios at all four sites were within the values assumed for primary emissions (with exception of 2004 which is slightly above those values, particularly at Anaheim and Rubidoux). However the OC/EC ratio increased significantly between 2011 and 2014, with highest ratios at all four sites observed in 2014, suggesting that secondary OC is becoming an even more important component of PM2.5. It should be noted that the primary OC/EC ratio is highly dependent on the sampling and analysis methods and thus may not be consistent from study to study. In addition, the primary OC/EC ratio can vary throughout the 24-hour sample collection period and may also be highly variable from day to day.

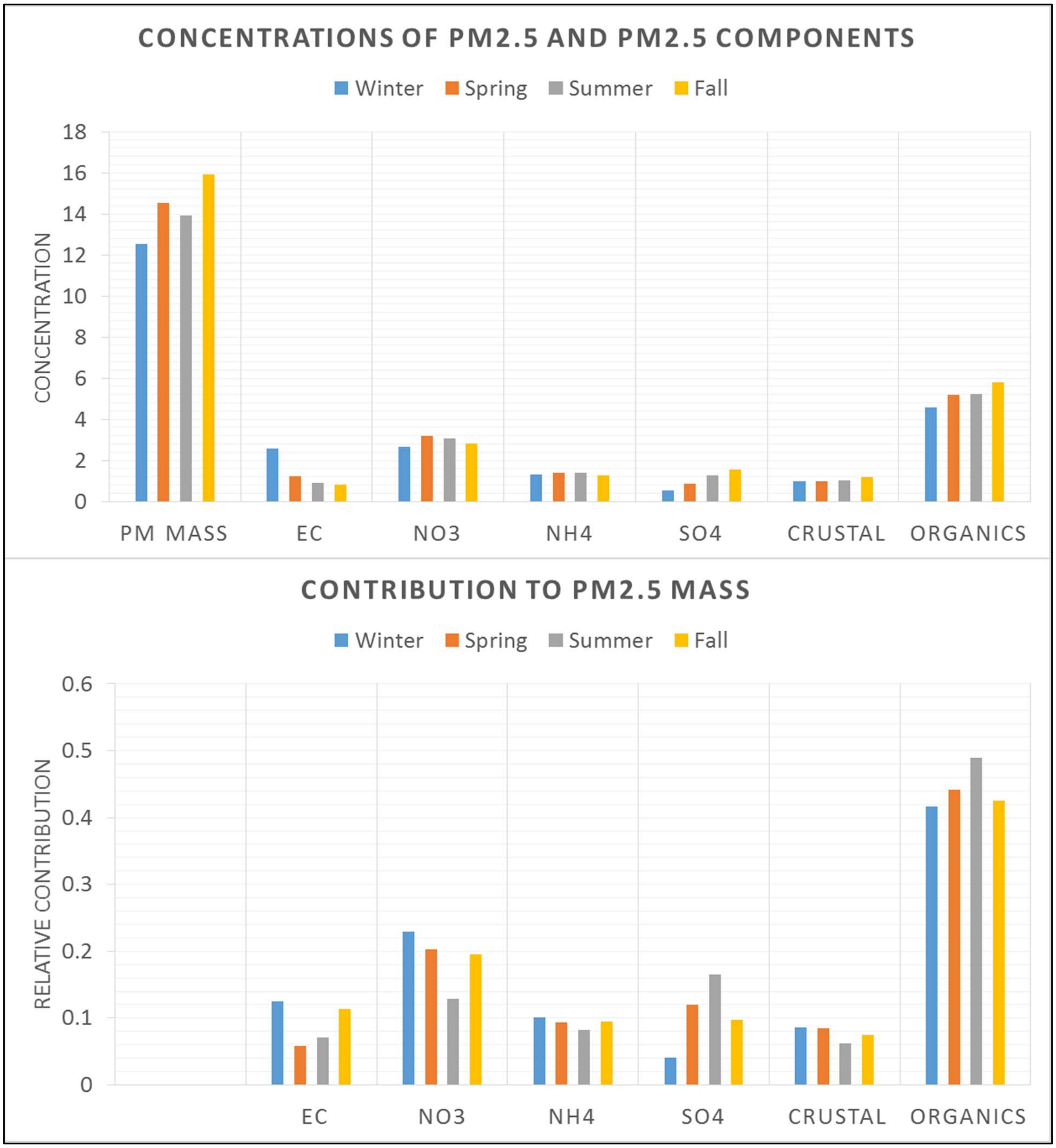

FIGURE 2-31

Seasonal Variations in relative contribution of PM2.5 Components to Total Mass and Concentrations of PM2.5 Components, 2011–2014

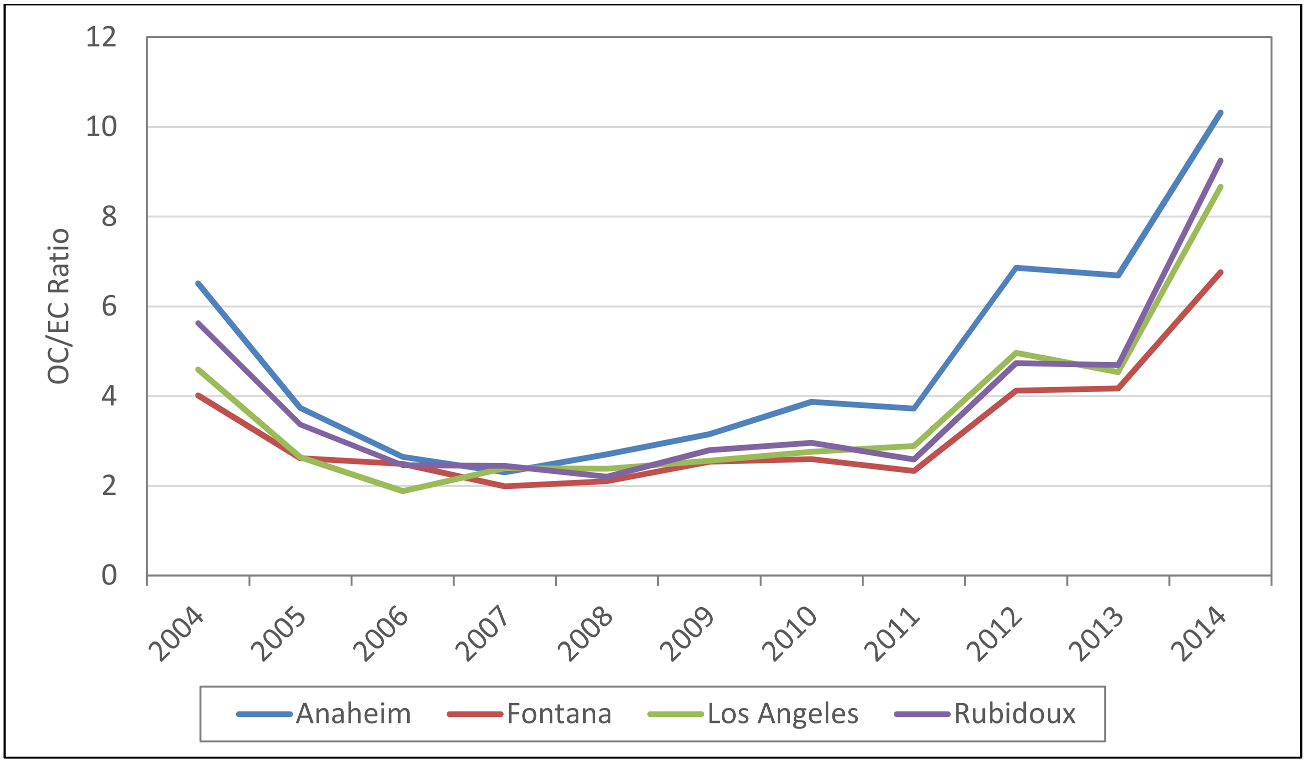

FIGURE 2-32

Trends of South Coast Air Basin PM2.5 Organic Carbon (OC) to Elemental Carbon (EC) Ratio, 2011–2014

Figure 2-33 shows the composition from the speciation sampler at the Riverside-Rubidoux station, comparing the 2013 annual average to the 2013 peak 24-hour average sampled at this location. This is the closest PM2.5 speciation station to the Basin maximum PM2.5 station (Mira Loma) and it was the Basin maximum location before monitoring began at Mira Loma. On the high day, the nitrates become a larger fraction of the mass compared to the annual average, indicating the importance of secondary atmospheric processes to the PM2.5 composition in Riverside County.

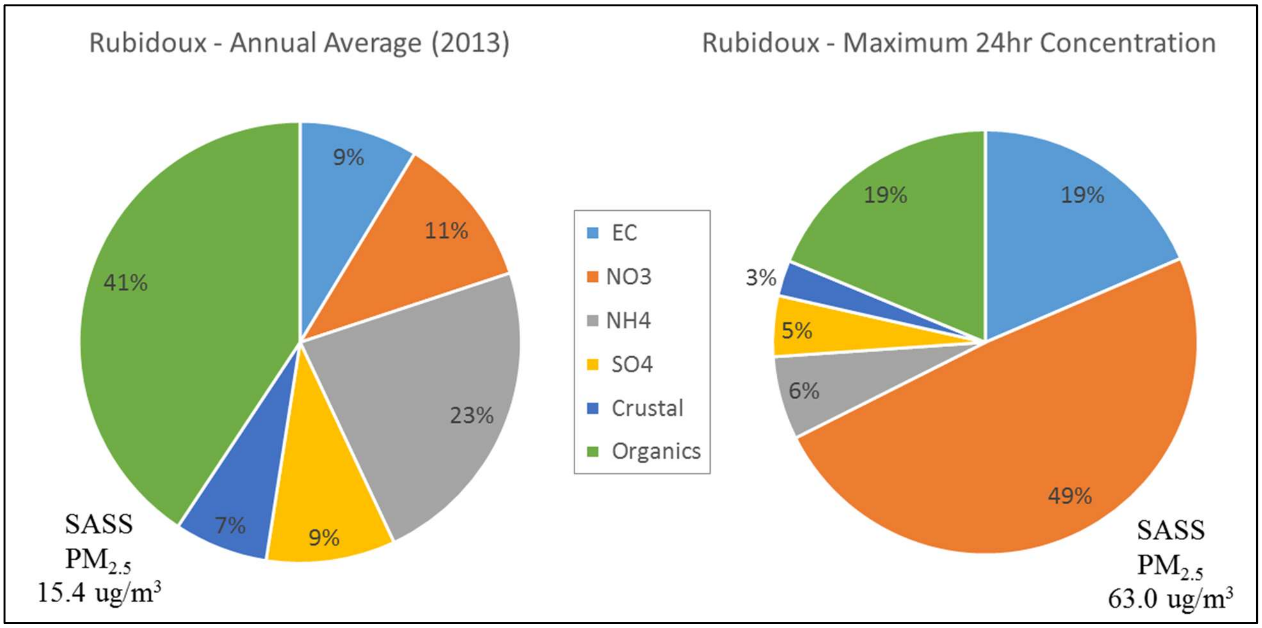

FIGURE 2-33

2013 PM2.5 Composition for Annual Average and Highest Day
(Riverside-Rubidoux SASS Speciation Sampler)

Near-Road PM2.5

On December 14, 2012, U.S. EPA strengthened the NAAQS for PM2.5 and, as part of the revisions, a requirement was added to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways as a result of direct emissions from cars and heavy-duty diesel trucks and buses. SCAQMD has installed the two required PM2.5 monitors by January 1, 2015, at locations selected based upon the existing near-roadway NO_2 sites that were ranked higher for heavy-duty diesel traffic. The locations are: (1) I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and (2) CA-Route 60, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland. These near-road sites measure PM2.5 daily with FRM filter-based measurements.

Table 2-8 summarizes the 2015 annual and 24-hour PM2.5 data from the near-road sites and nearby ambient monitoring stations. The 2015 PM2.5 annual averages from the Route 710 and Route 60 Near-Road sites were 12. 9 and 14.5 µg/m^3, respectively. The nearby ambient stations in South Coastal Los Angeles County (North Long Beach Station) and in Metropolitan Riverside County (Mira Loma station) measured 10.8 and 13.3 µg/m^3, respectively, for the 2015 annual average. Thus, the annual PM2.5 measurements from these sites for 2015 indicate that the near-road sites do indeed measure higher than the nearby ambient stations, on average. If this pattern holds for the long term, the CA-60 near-road station could potentially become the 3-year design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected.

While it reasonably could be expected that the highest near-road site would also become the basin-maximum design value site for the 24-hour PM2.5 NAAQS, this may not be the case for the Basin. The 2015 98th percentile 24-hour PM2.5 concentration is higher at the I-710 Near-Road than at the nearby N. Long Beach station. However, the 98th percentile 24-hour concentration remains higher at Mira Loma (43.2 µg/m^3) than at the CA-60 Near-Road site (39.9 µg/m^3). The number of days over the 24-hour PM2.5 NAAQS was also significantly higher at the Mira Loma station, with 17 days over the 24-hour NAAQS compared to 10 days at the CA-60 Near-Road site. PM2.5 24-hour concentrations at the Mira Loma station are likely higher than the near-road site on the highest days, due to the influence of enhanced secondary particle formation at Mira Loma.

TABLE 2-8

2015 Annual Arithmetic Mean, Maximum and 98th Percentile 24-Hour PM2.5 Concentrations, and Number of Samples Exceeding the 24-Hour PM2.5 NAAQS at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road PM2.5					Nearby Ambient PM2.5				
	Annual Average PM2.5 (µg/m³)	Peak 24-Hour PM2.5 (µg/m³)	98th Pctl. 24-Hour PM2.5 (µg/m³)	No. Samples Exceeding 24-Hour PM2.5 NAAQS		Annual Average PM2.5 (µg/m³)	Peak 24-Hour PM2.5 (µg/m³)	98th Pctl. 24-Hour PM2.5 (µg/m³)	No. Samples Exceeding 24-Hour PM2.5 NAAQS
Near-Road Station	**2015**	**2015**	**2015**	**2015**	**Ambient Station**	**2015**	**2015**	**2015**	**2015**
Route 710 N. R. (at Long Beach Bl., Los Angeles County)	12.9	48.8	35.7	7	**North Long Beach**	10.8	54.6	32.1	3
Route 60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	**14.5**	52.7	39.9	10	**Mira Loma**	13.3	**56.6**	**43.2**	**17**

Bold text denotes the peak value

Filter-based FRM measurements shown

The annual PM2.5 NAAQS is 12.0 µg/m³; the 24-hour PM2.5 NAAQS is 35 µg/m³

Impacts of Drought on PM2.5 Air Quality

The drought conditions that have persisted in Southern California and the southwestern United States over the past few years have negatively affected air quality in many areas. The low amount and frequency of rainfall leads to less washing of road surfaces and drier ground surfaces, which reduces the natural crusting of soils that is improved by moisture. This can lead to enhanced resuspension of fugitive dust by moving vehicles and winds. Fugitive dust can raise concentrations of both PM10 and PM2.5. More importantly, the ongoing drought conditions have caused a reduction of the natural air pollution cleansing effect of precipitation due to washout – particulate matter and its precursors captured and removed by raindrops. The reduced frequency of storms also translates to fewer days of enhanced pollutant dispersion. Without the storm systems and related winds, there is less mixing of air pollutants with cleaner air in the atmosphere and less transport that moves pollutants out of the region. The lack of windy, unstable weather conditions during storms results in longer episodes of stagnant air when particulate pollution builds to unhealthful levels. The dry conditions have also contributed to increased frequency and intensity of wildfire events throughout the State, with resulting impacts to both particulate and ozone air quality. The net impact of the drought on air quality in the Basin over the past several years has been to disrupt the steady progress seen in prior years toward attainment of the 24-hour PM2.5 NAAQS, for which the design value is based on the 3-year average of the 98th percentile measurement.

Table 2-9 shows the rainfall statistics for the National Weather Service Downtown Los Angeles meteorological station, 2006–2015. Figure 2-34 shows the 2002–2015 trend of both 98th percentile 24-hour PM2.5 values and the 3-year design value, along with the trends of PM2.5-equivalent emissions[25] and the number of rainfall days during the first and fourth quarters of the year. The first and fourth quarters are the most important to consider, since the vast majority of the days that exceed the federal 24-hour standard in the Basin occur during this period. This is also the time period that the Basin typically experiences the most rainfall and more frequent storm events.

TABLE 2-9

Trends of Annual and Quarters 1 & 4 Rainfall Totals and Number of Rain Days for Downtown Los Angeles, 2006–2015

30-Year Average	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual Rainfall (inches)										
14.93	11.61	5.66	14.43	9.39	23.09	12.26	8.15	3.60	9.77	7.66
Quarter 1 (Jan., Feb., Mar.) Rainfall (inches)										
9.35	7.30	1.16	9.62	4.24	9.69	8.04	3.21	1.92	4.76	2.79
Quarter 4 (Oct., Nov., Dec.) Rainfall (inches)										
4.03	1.31	3.24	4.66	4.97	11.70	3.76	3.21	0.88	4.61	1.03
Quarter 1 & Quarter 4 (Jan., Feb., Mar., Oct., Nov., Dec.) Rainfall (inches)										
13.38	8.61	4.40	14.28	9.21	21.39	11.80	6.42	2.80	9.37	3.82
Annual Rain Days (≥ 0.01 inches)										
35.7	36	24	35	25	53	32	38	27	24	26
Quarter 1 (Jan., Feb., Mar.) Rain Days										
18.0	19	10	19	12	18	17	11	13	8	9
Quarter 4 (Oct., Nov., Dec.) Rain Days										
11.0	8	9	12	9	26	10	20	8	10	8
Quarter 1 & Quarter 4 Rain Days										
29.0	27	19	31	21	44	27	31	21	18	17

Rainfall data from National Weather Service, Downtown Los Angeles Meteorological Station (USC Campus);
Rainfall totals in inches; rain days defined as measured rainfall ≥ 0.01 inches;
30-year normal precipitation averages based on 1981–2010 data

[25] PM2.5 equivalent emissions are directly emitted PM2.5 emissions plus PM2.5 precursor emissions weighted by potential to create PM2.5 (see 2012 AQMP, Appendix V: Modeling and Attainment Demonstrations: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/appendix-v-final-2012.pdf).

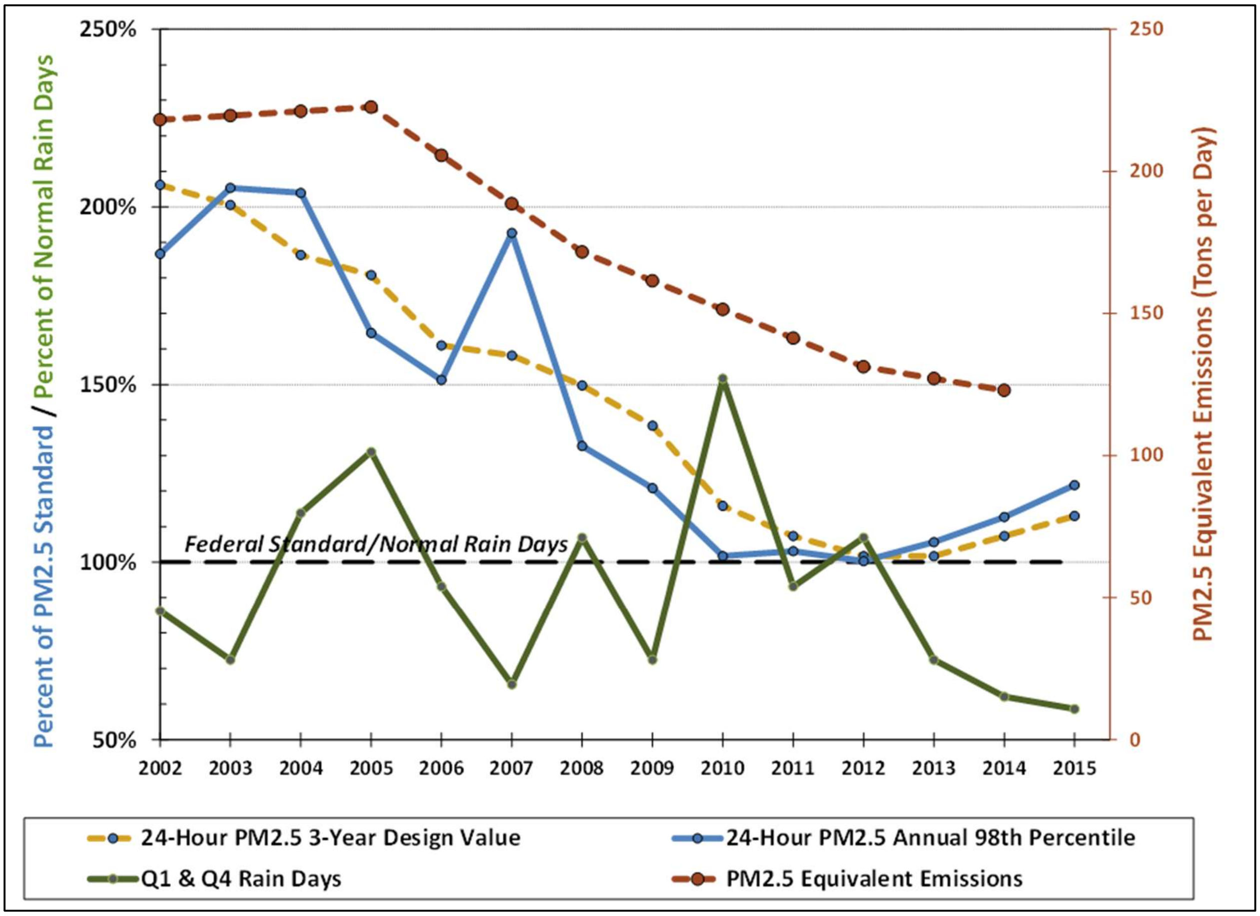

FIGURE 2-34

Trend of South Coast Air Basin Maximum 24-Hour PM2.5 3-Year Design Values and Corresponding Annual 98th Percentile Concentration as Percent of the 24-Hour PM2.5 NAAQS (35 µg/m^3), with Annual Trends of PM2.5 Equivalent Emissions and Percent of Normal Number of Rain Days for Quarters 1 (Jan.–Mar.) and 4 (Oct.–Dec.)

(Basin maximum PM2.5 from Riverside-Rubidoux air monitoring station through 2006, then Mira Loma after that station was installed)

Annual precipitation totals have been below the normal, or average, value of 14.93 inches (30-year average, 1981–2010) at Downtown Los Angeles from 2011 through most of 2015. Similar relative rainfall deficits were seen at stations throughout Southern California in this time period. After a very wet year in 2010, Downtown Los Angeles measured 82 percent of normal annual rainfall in 2011, with the number of rain days in the first and fourth quarters at 93 percent of the average of 29 days that typically occur during those months. Annual rainfall in 2012 was only 55 percent of normal, but the number of rain days in the first and fourth quarters was a little above normal. Although these initial signs of the emerging drought existed in 2011 and 2012, the cumulative effect of multiple dry years had not yet taken a significant toll on air quality and the amount of storm systems and rain events was not significantly below average. The 98th percentile 24-hour PM2.5 concentrations continued the steady decline in 2012, as had been seen in most years since the PM2.5 measurements started in 1999. This consistent trend of improving fine particulate air quality is associated with the continued implementation of PM2.5-related emission reductions in the Basin. In 2012, the Basin maximum annual 98th percentile 24-hour PM2.5 was at an all-time low of 35.1 µg/m^3 at Mira Loma, the Basin's highest station, which was under the federal PM2.5 standard (35.5 µg/m^3 is needed to exceed the standard due to rounding conventions).

The 2013 annual rainfall total measured at Downtown Los Angeles was just 3.6 inches, 24 percent of normal. Rainfall events of 0.01 inches or more were 27 percent fewer in 2013 than the average of 29 days that typically occur during the first and fourth quarters of the year, when the Basin historically experiences its highest 24-hour PM2.5 concentrations. As the drought intensified, the impact on PM2.5 air quality became evident in 2013. The 2013 Mira Loma annual 98th percentile concentration increased to 37.5 µg/m^3. The Basin's PM2.5-related emissions continued to decrease, while the long-term trend of steady progress seen in prior years started to reverse due to the drought-related meteorological conditions.

By 2014 the rainfall deficit from the ongoing drought in Southern California had become severe, with annual rainfall totals at 65 percent of normal at Downtown Los Angeles. With only 62 percent of the normal number of rain days and the smaller rain amounts due to the weaker and less frequent storm systems in 2014 and that year's maximum 98th percentile PM2.5 concentration increased to 40.0 µg/m^3.

Southern California annual rainfall totals for 2015 were again quite low, with only 7.66 inches measured at Downtown Los Angeles, 51 percent of normal for the year. The first quarter of 2015 had very little rain, 2.79 inches, which is 30 percent of normal rainfall for that quarter. Only 50 percent of the normal number of rain days were recorded in the first quarter of 2015. A strong El Niño pattern developed by the end of 2015, but the rainfall increased only slightly in the fourth quarter. However, the storm track frequently reached Southern California. Even though there was little precipitation, the improved ventilation from the systems led to significantly improved PM2.5 concentrations in the fourth quarter of 2015. Unfortunately, the effect on the annual 98th percentile PM2.5 concentration was already significant due to the first quarter of 2015. That value for the year 2015 increased to 43.2 µg/m^3 at Mira Loma, the highest 98th percentile concentration measured in the Basin since 2008.

With daily measurements in the Basin for PM2.5, the 98th percentile concentration is typically the 8th highest measurement at the Mira Loma air monitoring station. In recent years, the 8th or 9th highest concentration at Mira Loma may still have been over the level of the federal standard, but with the ongoing effect of the long-term drought and lack of storm systems, the 17th highest concentration, in only the first quarter of 2015, was still over the level of the NAAQS at Mira Loma. This was the highest number of days over the standard at a single station since 2007. Basin-wide, 25 days exceeded the 24-hour standard in 2015, the most in a single year since 2009. Notably, there were no additional exceedances of the 24-hour PM2.5 standard occurring at Mira Loma through the remaining three quarters of 2015, including the fourth quarter which typically includes several days over the standard.

The preliminary PM2.5 data for the first quarter of 2016 indicates that only three days exceeded the 24-hour NAAQS at Mira Loma in that quarter, as compared to 17 days for the first quarter of 2015. Only four days Basin-wide had exceedances the NAAQS in the first quarter of 2016 at one or more stations, compared to 25 days in 2015. Likewise, the preliminary 2016 first quarter average at Mira Loma was 15.1 µg/m^3, compared to 18.4 µg/m^3 for the first quarter of 2015. As was seen in the fourth quarter of 2015, the Basin did not receive the anticipated high rainfall in the first quarter of 2016 with the El Niño conditions, but the amount of unsettled weather conditions was significantly greater than in 2014 and 2015, leading to fewer days with elevated PM2.5 levels.

While the 2012 AQMP PM2.5 attainment demonstration and the 2015 associated supplemental SIP submission indicated that attainment of the 24-hour standard was predicted to occur by the end of 2015, it could not anticipate the effect of the ongoing drought on the measured PM2.5. The 2006 to 2010 base period used for the 2012 attainment demonstration had near-normal rainfall. While the trend of PM2.5-equivalent emission reductions continued through 2015, the severe drought conditions contributed to the PM2.5 increases observed after 2012. As a result of the disrupted progress toward attainment of the federal 24-hour PM2.5 standard, SCAQMD submitted a request and the U.S. EPA approved, in January 2016, a "bump up" to the nonattainment classification from "moderate" to "serious," with a new attainment deadline as soon as practicable, but not beyond December 31, 2019. Further discussion of drought effects on future air quality is contained in Appendix V: Modeling and Attainment Demonstrations.

PM10 Air Quality

In 2015, SCAQMD measured PM10 concentrations at 23 stations, including three in the Coachella Valley. Nineteen stations employed high-volume, filter-based FRM PM10 samplers with size-selective inlets. The 24-hour (midnight to midnight) samples are run on the federally required minimum 6-day sampling schedule, except that the Riverside-Rubidoux, Mira Loma (frequency increased in 2015), and Indio (Coachella Valley) stations sampled on a 3-day schedule for additional temporal resolution at these historic peak PM10 locations. Nine stations employed continuous PM10 monitors (4 BAM and 5 TEOM instruments). Five of these were collocated with FRM samplers, while the remaining four were not sited along with FRM monitors. The continuous monitors, for the most part, are clustered in the historic higher concentration areas. Unlike PM2.5 FEM measurements, there is no waiver for PM10 FEM instruments and those measurements are the official reading for attainment determination on the days with no FRM filter sample. At locations where both FRM samplers and FEM PM10 continuous analyzers are deployed together, the data is generally combined for attainment purposes, with the FRM data the primary data source when available. Figure 2-35 shows the routine ambient PM10 monitoring sites in the SCAQMD jurisdiction.

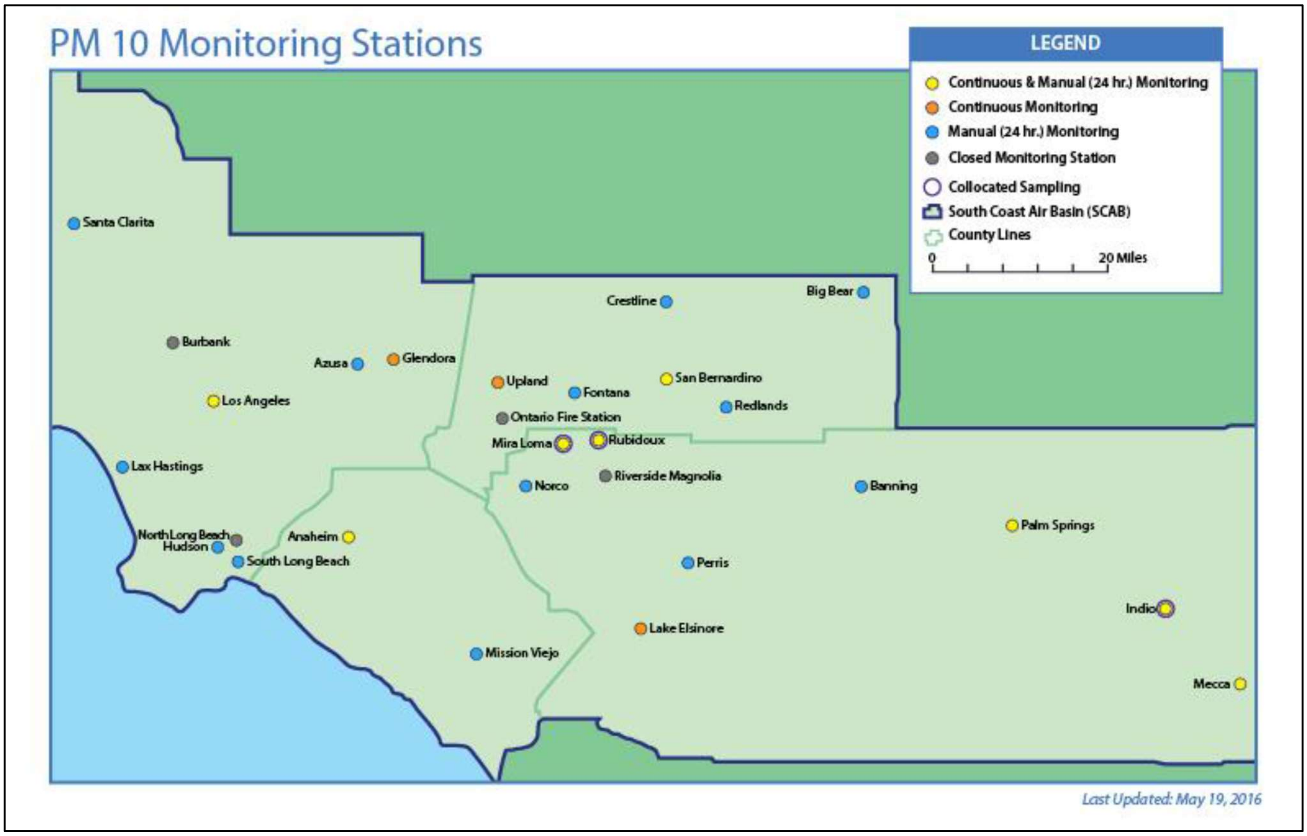

FIGURE 2-35

South Coast Air Quality Management District PM10 Monitoring Locations

(Note that PM10 stations were closed at N. Long Beach in 2013 and at Burbank and Ontario in 2014 are mapped with grey dots; the Big Bear station did not measure ambient PM10 in 2015; Palm Springs, Indio and Mecca-Saul Martinez stations are in the Salton Sea Air Basin – Coachella Valley; the manual FRM PM10 monitors also comprise the SCAQMD sulfates network)

The 2015 maximum 24-hour PM10 and 2013–2015 design values and state designation values are summarized by county and basin in Table 2-10. In that year, the federal 24-hour standard level (150 µg/m^3) was exceeded on two days in the Basin, at the Perris Valley station on September 9 (188 µg/m^3) and at the Central San Bernardino Valley station at in the City of San Bernardino on December 26 (187 µg/m^3). These high 24-hour averages were both associated with high-wind conditions and were flagged as exceptional events pending further documentation and U.S. EPA concurrence.[26] At this time, these two events also do not jeopardize the attainment design value, which allows for one exceedance per year at a station, averaged over three years. The PM10 standard was exceeded on eight days in the Coachella Valley at one or more of the three stations operating in 2015. These were all associated with high-winds and were flagged as exceptional events, pending further documentation and U.S. EPA concurrence.

[26] In this case, an exceptional event determination may not be pursued since the form of the PM10 standard allows for one exceedance per year at a station and the exceeding data may not affect attainment status or other regulatory decision. Exceptional event concurrence my not be pursued to if this data does not affect the attainment status or other regulatory decision.

The Basin has remained in attainment of the 24-hour PM10 NAAQS since 2006, with a 2013–2015 24-hour design value of 126 μg/m^3 in Metropolitan Riverside County at the Mira Loma station. The Coachella Valley 2013–2015 design value for PM10 is 150 μg/m^3 (100 percent of the NAAQS).[27] The much more stringent State 24-hour PM10 standard (50 μg/m^3) was exceeded at several stations in the Basin and in the Coachella Valley.

TABLE 2-10

2015 Maximum 24-hour Average PM10 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 24-Hour PM10 Average (μg/m^3)*	2013–2015 24-Hour PM10 Design Value (μg/m^3)*	2013–2015 Percent of PM10 NAAQS (150 μg/m^3)#	Area of Design Value Max	2013–2015 High State 24-Hour PM10 Designation Value (μg/m^3)##	2013–2015 Percent of State 24-Hour PM10 Standard (50 μg/m^3)
South Coast Air Basin						
Los Angeles	101	93	60	East San Gabriel Valley	75.6	151
Orange	66	85	55	Central Orange County	12.1	24
Riverside	**139****	**126**	**81**	**Metropolitan Riverside County**	**123.8**	**248**
San Bernardino	96**	103	66	Central San Bernardino Valley	19.2	38
Salton Sea Air Basin						
Riverside	**152****	**150**	**100**	**Coachella Valley (Indio)**	**128.2**	**256**

* Based on the FRM data when available, otherwise daily averaged FEM data is included

** Higher concentrations in 2015 were measured in the Basin and Coachella Valley that were related to high-wind events and have been flagged for exclusion from NAAQS comparison in accordance with the U.S. EPA Exceptional Events Rule; U.S. EPA concurrence is required for exclusion of exceptional events after submittal of supporting documentation

\# 155 μg/m^3 is needed to exceed the level of the PM10 NAAQS

\#\# The State 24-hour Expected Peak Day Concentration (EPDC) is a calculated 3-year value after accounting for statistical outliers; the State 24-hour Designation Value is the highest concentration at or below the EPDC over the 3-year period; State data may include exceptional events; State PM10 24-hour average designation value includes FRM and BAM FEM data, but not TEOM FEM instruments since the TEOM is not a California Approved Sampler (CAS) for standard compliance (most notably, SCAQMD uses TEOM instruments to supplement FEM measurements in the Coachella Valley)

The 2015 maximum annual average PM10 is summarized by basin and county in Table 2-11, along with the design values and state designation values. In 2015, the revoked annual average PM10 NAAQS (50 μg/m^3) was not exceeded in the Basin, with a maximum annual average PM10 concentration of 48.8 μg/m^3 in the Metropolitan Riverside County area at the Mira Loma station. The 3-year annual average for 2013–2015 however, exceeded the former NAAQS, with 51.8 μg/m^3 at Mira Loma. No other stations in the Basin or the Coachella Valley exceeded the former federal annual PM10 standard or the 2013–2015 annual average in

[27] After exclusion of flagged exceptional events, the Coachella Valley calculated design value is 152 μg/m^3, which rounds to 150 μg/m^3 per rounding requirements for comparison to the 24-hour PM10 NAAQS of 150 μg/m^3. This is equal to, but not exceeding the NAAQS.

2015. The much more stringent State annual PM10 standard (20 µg/m^3) was exceeded at most stations in each county in the Basin and in the Coachella Valley. The State standard was exceeded most frequently in the Basin's inland valleys, centered on Metropolitan Riverside County.

TABLE 2-11

2015 Maximum Annual Average PM10 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum Annual PM10 Average (µg/m^3)*	2013–2015 Annual PM10 Averages** (µg/m^3)	2013–2015 Percent of Former Annual PM10 NAAQS** (50 µg/m^3)	Area of Design Value Max	2013–2015 3-Yr. High State Annual Average PM10 Designation Value (µg/m^3)#	2013–2015 Percent of State PM10 Standard (20 µg/m^3)
South Coast Air Basin						
Los Angeles	37.1	38.0	76	East San Gabriel Valley	43	215
Orange	24.8	26.1	52	Central Orange County	27	135
Riverside	**48.8**	**51.8**	**104**	**Metropolitan Riverside County**	**45**	**225**
San Bernardino	37.8	39.4	79	Central San Bernardino Valley	39	195
Salton Sea Air Basin						
Riverside	36.5	37.2	74	Coachella Valley (Indio)	**45**	**225**

* Based on the FRM data when available, otherwise FEM data is used

** The federal annual PM10 standard was revoked in 2006

\# State data may include exceptional events; State PM10 annual average designation value includes FRM and BAM FEM data, but not TEOM FEM instruments since the TEOM is not a California Approved Sampler (CAS) for standard compliance (most notably, SCAQMD uses TEOM instruments to supplement FEM measurements in the Coachella Valley); State annual designation value is the highest year in the 3-year period

For each routine SCAQMD FRM ambient monitor, the annual arithmetic mean, percent of sampling days exceeding State and federal standards, and annual maximum 24-hour average PM10 concentrations are shown in Tables A-17 to A-19 in the attachment for the years 1995–2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

PM10 Spatial Variation

Figure 2-36 shows the contour map of the annual average (arithmetic mean) PM10 concentrations distribution in the Basin in 2015. The highest annual average PM10 concentration was recorded in the Metropolitan Riverside County area at the Mira Loma station with an annual averaged concentration of 48.8 µg/m^3, which did not exceed the revoked annual average PM10 NAAQS (50 µg/m^3). The areas with the highest annual average PM10 concentrations were generally recorded in and around the Metropolitan Riverside County area and in the San Bernardino Valley areas, as shown in Figure 2-36. Much of eastern Los Angeles County also saw elevated annual PM10, but still below the former NAAQS. The much more stringent State annual PM10 standard (20 µg/m^3) was exceeded in most stations in each county in the Basin and in the Coachella Valley.

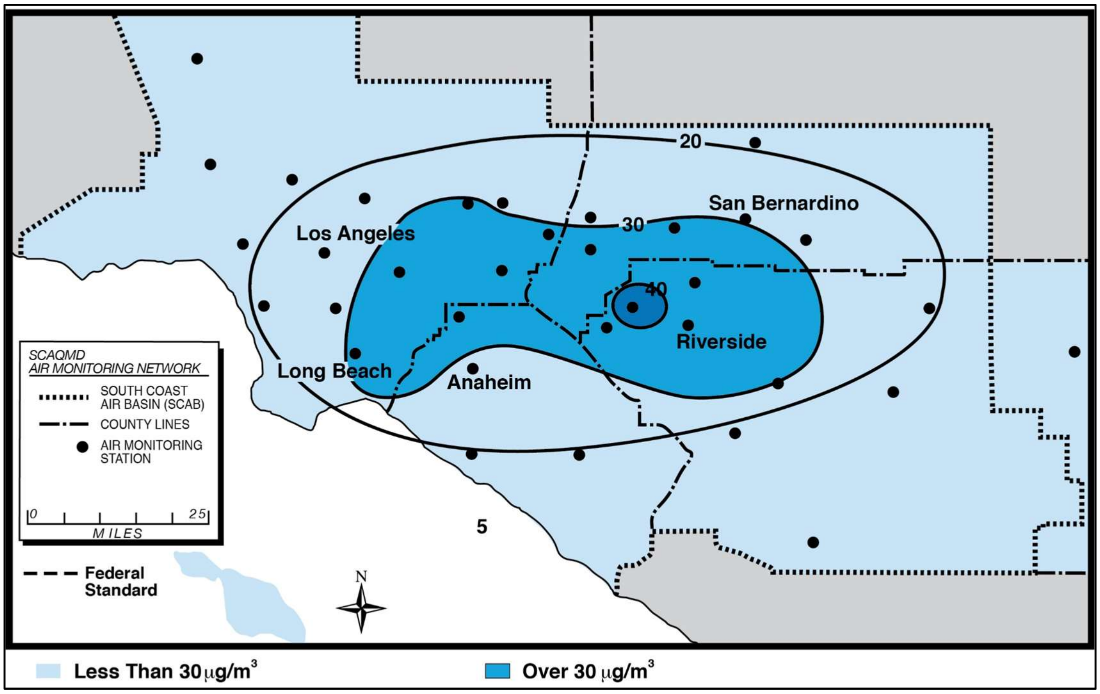

FIGURE 2-36

Annual Arithmetic Mean PM10 Particulate Matter (μg/m^3) in 2015

PM10 Trends

Figure 2-37 shows the trend for the period between 1995 and 2015 of the 3-year design value form of the 24-hour federal PM10 standard for the Basin (i.e., the fourth highest 24-hour average PM10 concentration in three years). The Basin's annual maximum 24-hour average concentration has remained below the federal PM10 standard (150 μg/m^3) since 2003, and U.S EPA finalized a clean data finding and attainment redesignation in 2013. Also shown is the trend for the design value form of the revoked annual federal PM10 standard (50 μg/m^3), that is, the 3-year average of the annual arithmetic mean concentrations. The Basin's annual average concentration had been reduced below the level of the revoked federal annual PM10 standard in 2011 and 2012, but was slightly over that standard at one location (Mira Loma) in the 2013, 2014, and 2015.

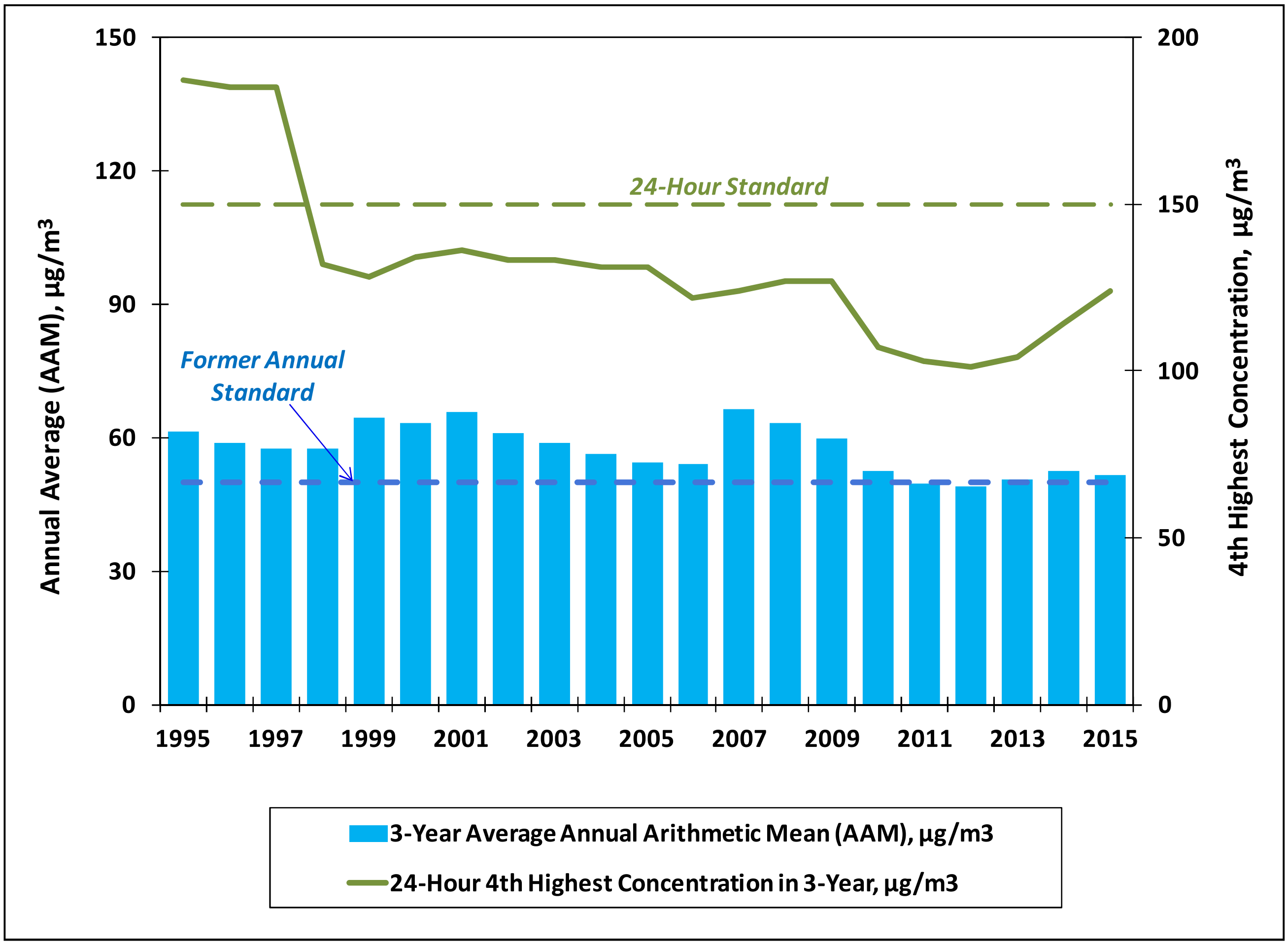

FIGURE 2-37

PM10 Particulate Matter Design Value Trend

(1995 through 2015 data, 3-Year Average of Annual Arithmetic Mean and 4th Highest 24-Hour PM10 Concentration in 3 Years, µg/m³)

PM10 Temporal Variation

Exceedances of the 24-hour PM10 federal standard in the Basin have become increasingly rare in recent years. In fact, the only exceedances in the Basin for the past decade have been associated with exceptional events, such as high-wind natural events or cultural events (Independence Day fireworks). As a consequence, variations in exceedances of the State 24-hour PM10 standard are considered here for the seasonal and day-of-week patterns in the Basin, using the FRM and FEM PM10 measurements combined.

Figure 2-38 shows the number of days in each month exceeding the State standard at one or more Basin locations in 2013–2015. Overall, the greatest number of exceedances of the State standard occurred in the summer months. This is consistent with previous analyses of seasonal variations in PM10 showing that the monthly average PM10 concentrations and the monthly average number of days exceeding the State standard tend to peak in summer and fall in the inland valley areas of the Basin where PM10 concentrations are highest. Higher summertime PM10 concentrations can be attributed to elevated wind speeds and lower relative humidity that both enhance wind induced re-suspended particles. Due to the higher number of exceedances in the inland valleys, the pattern for the Basin is more similar to those for individual sites in the inland valley areas. However, in the South Coastal Los Angeles County area (Long Beach), monthly average PM10 concentrations and the average number of days exceeding the State standard show different monthly trends with highest concentrations recorded in the late fall and winter months.

Figure 2-39 shows the monthly average concentration for stations in two areas, Metropolitan Riverside County (Riverside-Rubidoux) and Southwest Coastal Los Angeles County (LAX) with different seasonal characteristics. As was found in the previous analyses, PM10 concentrations tend to be higher in the summer and fall months in the inland valley areas, but higher in the late fall and winter months in the coastal areas. Most of the coastal high values occur at that time due to windblown dust from the strong, offshore Santa Ana winds that occur in the fall and winter. Moreover, higher port activity due to peak cargo traffic which typically occurs in the fall of each year coupled with the lower mixing height in the fall may also contribute to the higher PM10 concentrations during this time of year.

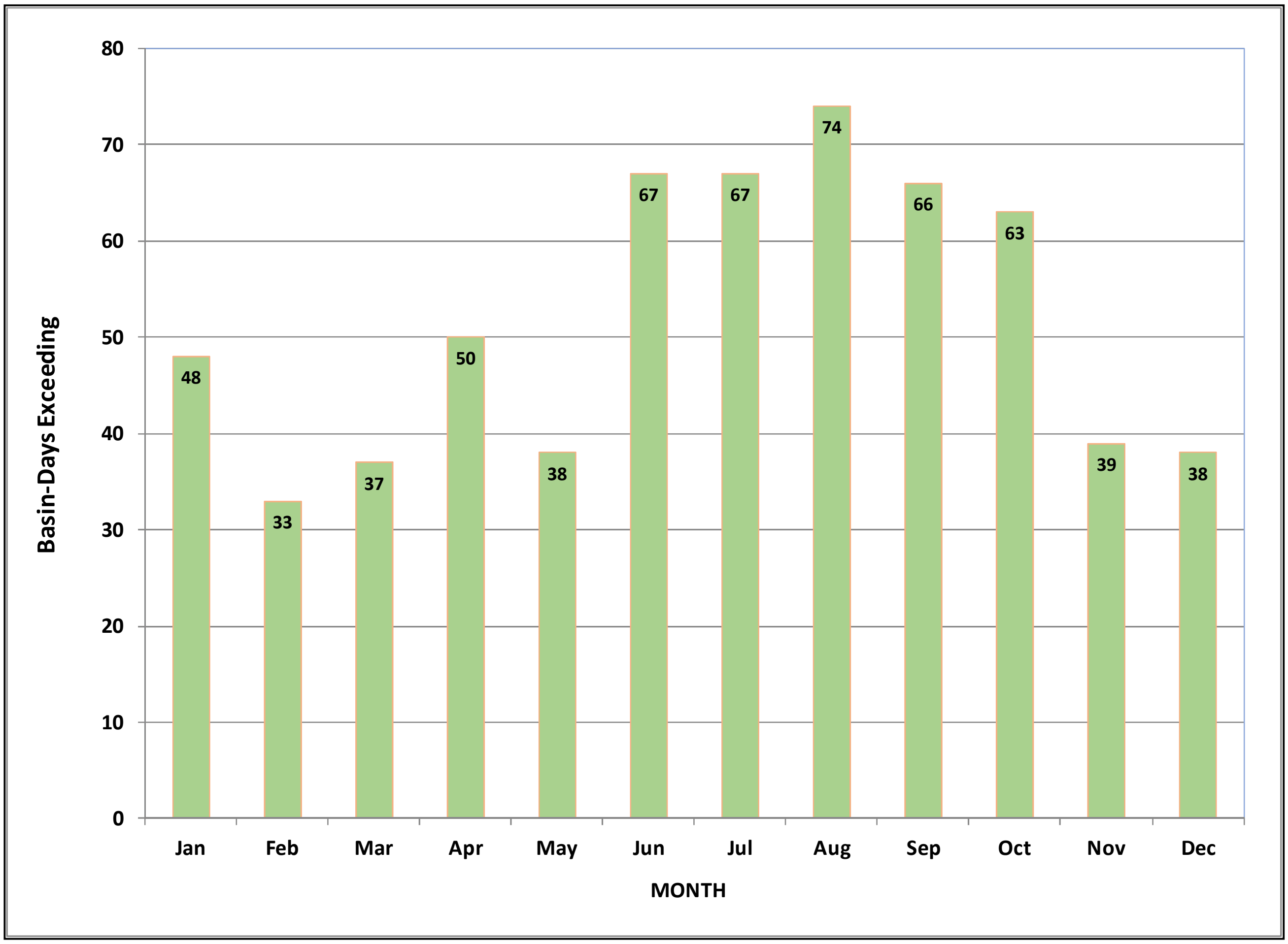

FIGURE 2-38

Basin-Days Exceeding the State PM10 Standard (50 µg/m^3) by Month, 2013–2015

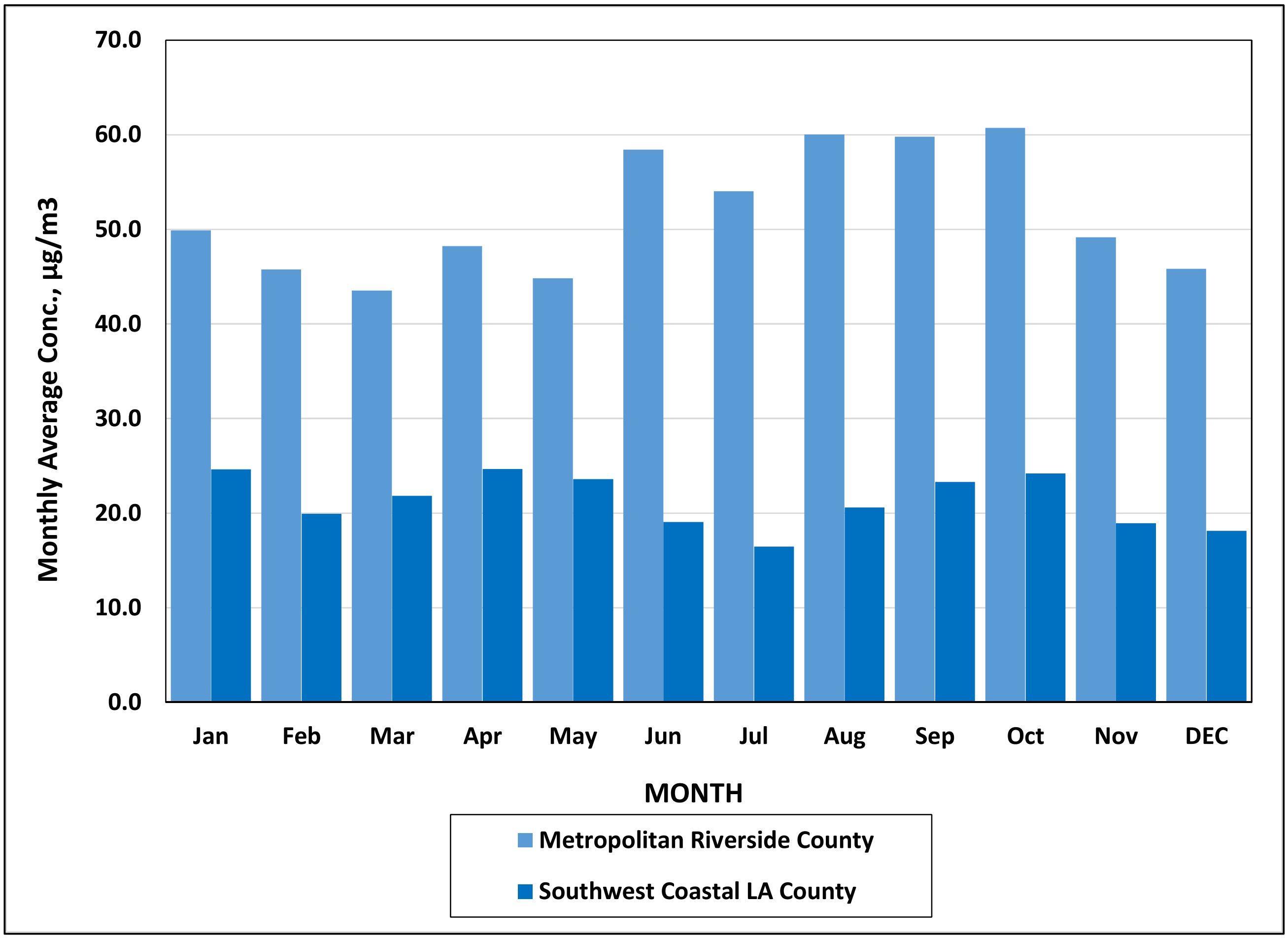

FIGURE 2-39

PM10 Monthly Average Concentration (µg/m^3), 2013–2015

Figure 2-40 shows averaged hourly PM10 concentrations for each hour of the day throughout 2015, including the entire Basin and averaged for select monitoring stations in each of the counties in the Basin. On average and for the Basin, PM10 concentrations show a peak between 0600 and 0900 PST during the morning rush-hour traffic, and as the day progresses and temperature increases, causing the temperature inversion base to rise and vertical mixing to increase, resulting in a decrease in PM10 concentrations between 1000 and 1600 PST. The morning peak is followed by the secondary PM10 peak associated with the evening rush hour traffic.

The diurnal variations in the PM10 concentrations can vary from one location to another, as well as seasonally. Since PM10 concentration are generally higher in the inland valleys, the diurnal trend for the Basin is more similar to those for individual sites in the inland valley areas. The Central Los Angeles site shows a different diurnal pattern, with concentrations remaining high between the morning and evening rush hour traffic. This site is located in downtown Los Angeles and in proximity to a network of major roadways and freeways, with persistent traffic throughout the day.

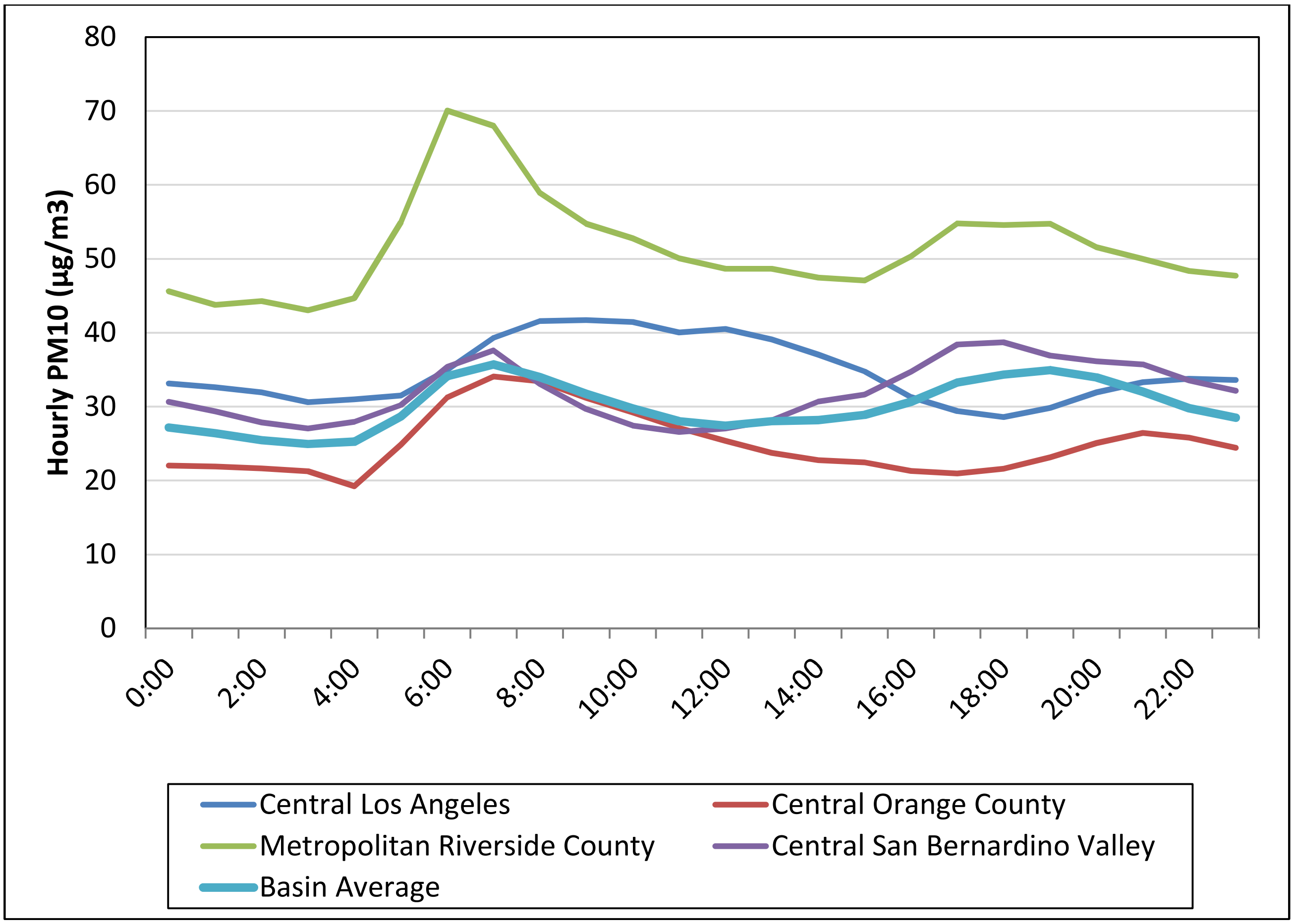

FIGURE 2-40

PM10 Diurnal Variation, 2015

(annual averaged FEM Hourly PM10 concentrations, by hour of the day; time in Pacific Standard Time)

Carbon Monoxide (CO)

CO Air Quality

In 2015, ambient CO concentrations were monitored at 25 locations throughout the SCAQMD jurisdiction, including one station in the Coachella Valley and two near-road monitors. The Burbank station in the East San Fernando Valley was closed during 2014, with relocation pending. The Riverside-Magnolia station in Metropolitan Riverside area was closed at the beginning of 2015. Relocation of that site is not planned, since nearby sites provide adequate coverage in that area. Figure 2-41 shows the routine ambient CO monitoring sites in the SCAQMD jurisdiction.

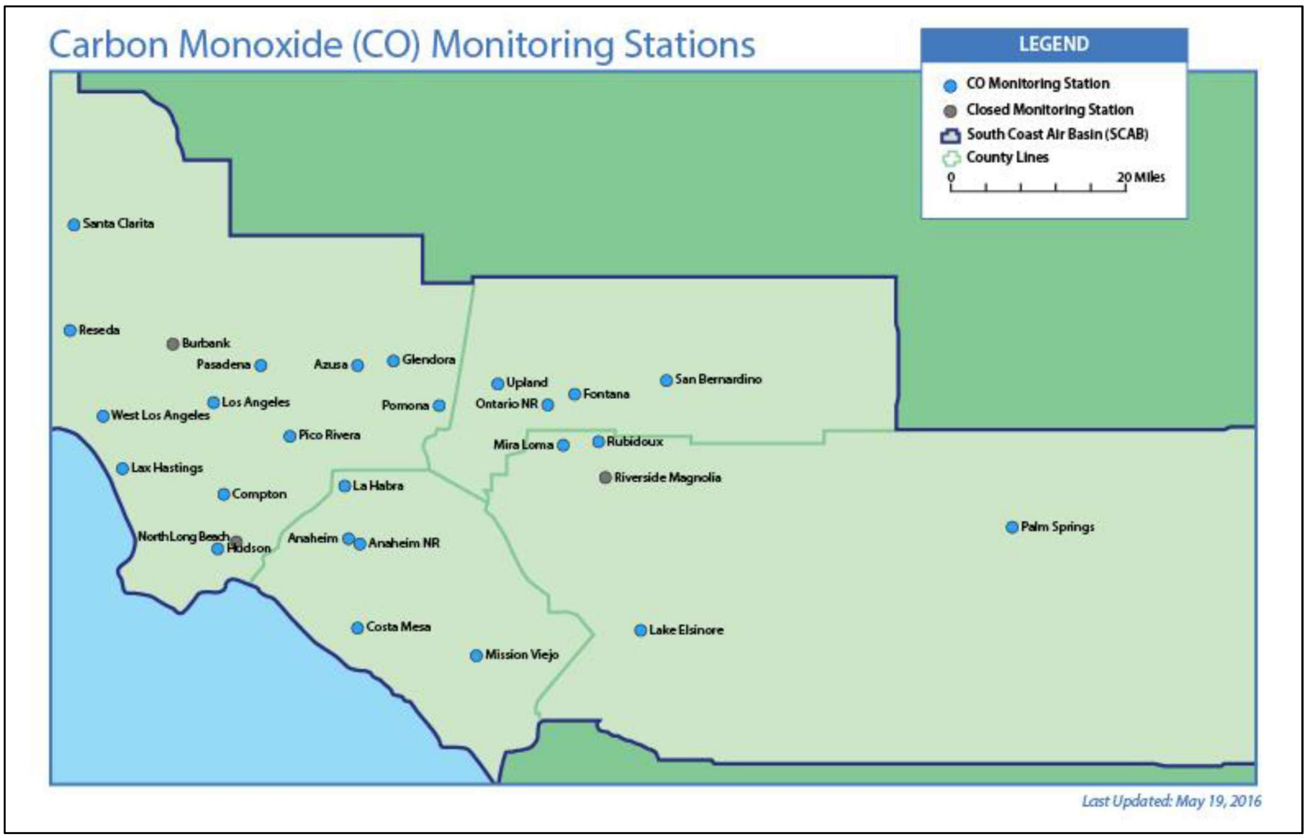

FIGURE 2-41

South Coast Air Quality Management District Carbon Monoxide Air Monitoring Locations

[Note that CO stations that were closed at N. Long Beach in 2013, Burbank in 2014, and Riverside-Magnolia in 2015 mapped with grey dots; near-road stations on the I-10 (labelled Ontario NR) and the I-5 (Anaheim NR) are shown]

Tables 2-12 and 2-13 summarize the 2015 1-hour and 8-hour average CO maximum concentrations and 2015 design values by air basin and county. In 2015, no areas exceeded the CO air quality standards, including the near-road stations. The highest ambient station concentrations of CO continued to be recorded in the areas of Los Angeles County, where vehicular traffic is dense and weak nighttime drainage flows transport CO from surrounding areas under relatively stagnant conditions. The Basin's 1-hour and 8-hour CO maximum concentrations (4.4 ppm and 3.3 ppm, respectively) and design values (4.3 ppm and 3.0 ppm, respectively) were both recorded in the South Central Los Angeles County area. The new near-road monitors in Orange and San Bernardino counties did not increase the Basin's maximum CO values or design values in 2015 over that from Los Angeles County, although the near-road concentrations were often higher than the nearest ambient stations.

All areas of the Basin have continued to remain below the federal standard level since 2003. U.S. EPA redesignated the Basin to attainment of the federal CO standards, effective June 11, 2007. There have also been no exceedances of the Stage 1 episode (federal alert) level (8-hour average CO greater ≥ 15 ppm) since 1997. The CO concentrations are also well below the State standards.

The annual maximum 8-hour CO concentrations at all routine SCAQMD ambient air monitoring stations are shown in Table A-20 in the attachment to this appendix, for the period 1995–2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

TABLE 2-12

2015 Maximum 1-Hour CO Concentrations and 2015 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour CO Average (ppm)	2015 1-Hour CO Design Value* (ppm)	Percent of 1-Hour CO NAAQS (35 ppm)	Area of Design Value Max	Percent of 1-Hour CO State Standard (20 ppm)
South Coast Air Basin					
Los Angeles	**4.4**	**4.3**	**11**	**South Central L.A. County**	**22**
Orange	3.1 *(3.1 at I-5 N.R.)*	2.9 *(2.9 at I-5 N.R.)*	8 *(8)*	North Orange County	15 *(15)*
Riverside	2.5	2.2	6	Metropolitan Riverside County	11
San Bernardino	2.8 *(2.7 at I-10 N.R.)*	2.2 *(2.7 at I-10 N.R.)***	6 *(8)*	Central San Bernardino Valley	11 *(14)*
Salton Sea Air Basin					
Riverside	2.0	1.9	5	Coachella Valley	10

Bold text denotes Basin maximum; I-5 and I-10 near-road monitors are shown in parenthesis

* The 1-hour CO design value is the 2nd highest 1-hour average concentration at a station in a single year

** The 2015 1-hour CO design value maximum in San Bernardino County was at the I-10 near-road station

TABLE 2-13

2015 Maximum 8-Hour CO Concentrations and 2015 Design Values by Basin and County

Basin/County	2015 Maximum 8-Hour CO Average (ppm)	2015 8-Hour CO Design Value* (ppm)	Percent of 8-Hour CO NAAQS (9 ppm)	Area of Design Value Max	Percent of 8-Hour CO State Standard (9.0 ppm)
South Coast Air Basin					
Los Angeles	**3.3**	**3.0**	**33**	**South Central L.A. County**	**33**
Orange	2.2 *(2.3 at I-5 N.R.)*	2.0 *(2.3 at I-5 N.R.)*	22 *(26)*	Central Orange County	22 *(26)*
Riverside	1.7	1.5	17	Metropolitan Riverside County	17
San Bernardino	1.8 *(2.6 at I-10 N.R.)*	1.8 *(2.5 at I-10 N.R.)*	20 *(28)*	Central San Bernardino Valley	20 *(28)*
Salton Sea Air Basin					
Riverside	0.7	0.5	6	Coachella Valley	6

Bold text denotes Basin maximum; I-5 and I-10 near-road monitors are shown in parenthesis

* The 8-hour CO design value is the 2nd highest 8-hour average concentration at a station in a single year

Near-Road CO

On August 12, 2011 U.S. EPA issued a decision to retain the existing NAAQS for CO, determining that those standards provided the required level of public health protection. However, U.S. EPA added a monitoring requirement for near-road CO monitors in urban areas with population of 1 million or more, utilizing stations that would be implemented to meet the 2010 NO2 near-road monitoring requirements. The two new CO monitors are at the I-5 Near-Road site, located in Orange County near Anaheim, and the I-10 Near-Road site, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The near-road CO measurements began at these two locations in late December 2014. From that time to the end of 2015, the data shows that while the near-road measurements were often higher than the nearest ambient monitors, as would be expected in the near-road environment, they did not exceed the levels of the 1-hour or 8-hour CO NAAQS. Tables 2-14 and 2-15 compare the available near-road measurements for annual peak 1-hour and 8-hour CO, respectively, to the comparable measurements from the nearby ambient stations at Anaheim and Fontana. The form of the CO standard is that the peak concentration is not to be exceeded more than once per year. The tables include the design value, which is the second highest CO concentration in a single year.

The 2015 near-road peak 1-hour CO concentration measured was 3.1 ppm, measured at the I-5 Near-Road site, while the peak 8-hour CO concentration was 2.6 ppm at the I-10 Near-Road site, both well below the respective NAAQS levels (35 ppm and 9 ppm, respectively). The 2015 near-road CO design values were higher than that of the nearest ambient stations for both federal standards. Based on this limited period of data, it appears that the near-road CO design values will be very unlikely to affect the Basin's attainment status for the State and federal CO standards.

TABLE 2-14

2014 and 2015 Maximum and Second Highest 1-Hour CO Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road CO						**Nearby Ambient CO**				
		Peak 1-Hour CO (ppm)		**2nd Max. 1-Hour CO (ppm)**			**Peak 1-Hour CO (ppm)**		**2nd Max. 1-Hour CO (ppm)**	
Near-Road Station	**Start Date**	**2014**	**2015**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	12/18/2014	N/A	3.1	N/A	**2.9**	**Anaheim**	3.1	3.1	2.6	2.6
I-10 N. R. (at Etiwanda Av., San Bernardino County)	12/23/2014	N/A	2.7	N/A	**2.7**	**Fontana**	2.6	**2.8**	2.2	2.2

Bold text denotes maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

The 1-hour CO NAAQS is 35 ppm, not to be exceeded more than once at a station in a single year

TABLE 2-15

2014 and 2015 Maximum and Second Highest 8-Hour CO Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road CO						**Nearby Ambient CO**				
		Peak 8-Hour CO (ppm)		**2nd Max. 8-Hour CO (ppm)**			**Peak 8-Hour CO (ppm)**		**2nd Max. 8-Hour CO (ppm)**	
Near-Road Station	**Start Date**	**2014**	**2015**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	12/18/2014	N/A	**2.3**	N/A	**2.3**	**Anaheim**	2.1	2.2	2.1	2.0
I-10 N. R. (at Etiwanda Av., San Bernardino County)	12/23/2014	N/A	**2.6**	N/A	**2.5**	**Fontana**	1.2	1.2	1.1	1.1

Bold text maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

The 8-hour CO NAAQS is 9 ppm, not to be exceeded more than once at a station in a single year

Nitrogen Dioxide (NO_2)

NO_2 Air Quality

In 2015, ambient NO_2 concentrations were monitored at 27 locations throughout the SCAQMD jurisdiction, including one station in the Coachella Valley and four near-road monitoring stations. The Burbank station in the East San Fernando Valley was closed during 2014, with relocation pending. The Riverside-Magnolia station in Metropolitan Riverside area was closed at the beginning of 2015. Relocation of that site is not planned, since nearby sites provide adequate coverage in that area. Figure 2-42 shows the routine ambient NO_2 monitoring sites in the SCAQMD jurisdiction.

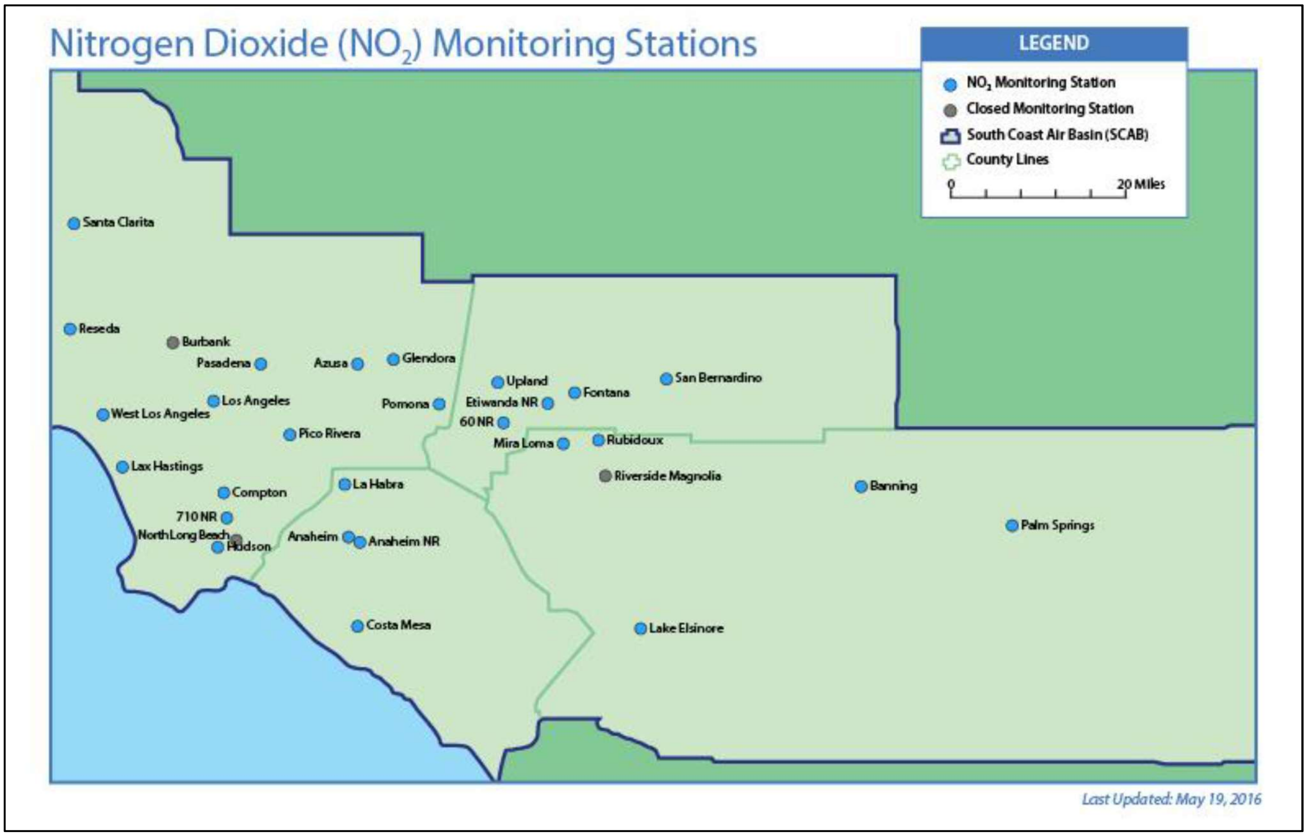

FIGURE 2-42

South Coast Air Quality Management District Nitrogen Dioxide Air Monitoring Locations

[Note that NO_2 stations that were closed at N. Long Beach in 2013, Burbank in 2014, and Riverside-Magnolia in 2015 are mapped with grey dots; near-road stations on the I-710 (710NR), CA-60 (60NR), I-5 (Anaheim NR), and I-10 (Etiwanda NR) are shown]

The current 1-hour average NO_2 NAAQS (100 ppb) was exceeded on one day in 2015 in the South Coastal Los Angeles County area at the Long Beach-Hudson air monitoring station (a location close to periodic diesel truck and bus activity). However, the 98th percentile form of the 1-hour NAAQS was not exceeded and the 2013–2015 design value is not in violation of the NAAQS. The higher relative concentrations in the Los Angeles area are indicative of the concentrated emission sources, especially motor vehicles. Although the Basin is in attainment of the State and federal standards, NO_2 is still of concern, since oxides of nitrogen (NOx) are precursors to both ozone and particulate matter. Further control of NO_x will be required to attain the ozone and particulate standards.

The Basin has not exceeded the federal annual standard for NO_2 (0.053 ppm or 53 ppb) since 1991, when the Los Angeles County portion of the Basin recorded the last violation of that standard in the U.S. No State NO_2 standards were exceeded in 2015. Tables 2-16 and 2-17 summarize the 2015 ambient station maximum 1-hour and annual average concentrations of NO_2 by air basin and county, in comparison to federal and State standards. These tables do not include the new near-road stations, since the period of record is not yet sufficient to calculate the 3-year NO_2 design values. The near-road NO2 data is summarized further below.

TABLE 2-16

2015 Maximum 1-Hour NO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour NO_2 Average (ppb)	2013–2015 1-Hour NO_2 Design Value (ppb)	Design Value Percent of 1-Hour NO_2 NAAQS (100 ppb)	Area of Design Value Max	2013–2015 1-Hour NO_2 State Designation Value (ppm)	Percent of 1-Hour NO_2 State Standard (0.18 ppm)
South Coast Air Basin						
Los Angeles	**101.8***	**74**	**74**	**South Coastal LA Co.**	**0.14**	**78**
Orange	59.1	58	58	Central Orange County	0.09	50
Riverside	68.1	54	54	Metropolitan Riverside County	0.07	39
San Bernardino	89.1	64	64	Central San Bernardino Valley	0.09	50
Salton Sea Air Basin						
Riverside	41.5	39	39	Coachella Valley	0.05	28

Bold text denotes the peak value

Table does not include near-road stations since data period is insufficient for 3-year design value calculation (see near-road NO_2 discussion below)

The 1-hour NO_2 design value is the annual 98th percentile daily maximum 1-hour concentration, averaged over 3 years at a station

* Although the maximum 1-hour concentration exceeded the standard on 1 day, the 98th percentile form of the design value did not violate the NAAQS

TABLE 2-17

2015 Maximum Annual Average NO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum Annual NO_2 Average (ppm)	2013–2015 Annual NO_2 Design Value (ppm)	Percent of Annual NO_2 NAAQS (0.053 ppm)	Area of Design Value Max	2013–2015 Annual State NO_2 Designation Value# (ppm)	Percent of Annual State NO_2 Standard (0.030 ppm)
South Coast Air Basin						
Los Angeles	**0.0222**	**0.022**	**42**	**Central Los Angeles County**	**0.023**	**77**
Orange	0.0150	0.016	30	Central Orange County	0.018	60
Riverside	0.0144	0.016	30	Metropolitan Riverside County	0.017	57
San Bernardino	0.0187	0.020	38	Central San Bernardino Valley	0.021	70
Salton Sea Air Basin						
Riverside	0.0062	0.007	13	Coachella Valley	0.008	27

Bold text denotes the peak value

The annual NO_2 design value is the annual average of the quarterly averages, averaged over 3 years at a station

This table does not include near-road stations since data period is insufficient for 3-year design value calculation (see near-road NO_2 discussion below)

The annual average and annual maximum 1-hour average NO_2 concentrations, for each monitoring station in the SCAQMD jurisdiction for the years 1995–2015, are shown in Tables A-21 and A-22, respectively, in the attachment to this appendix. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Near-Road NO_2

With the revised NO_2 NAAQS in 2010, near-road NO_2 measurements were required to be phased in for larger cities. The four near-road monitoring stations are: (1) I-5 Near-Road, located in Orange County near Anaheim; (2) I-710 Near-Road, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; (3) CA-60 Near-Road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland; and (4) I-10 Near-Road, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The longest operating near-road station in the Basin, adjacent to I-5 in Orange County, has not exceeded the level of the 1-hour NO_2 NAAQS (100 ppb) since the measurements began on January 1, 2014. The peak 1-hour NO_2 concentration at that site in 2014 was 78.8 ppb and the peak concentration for 2015 was 70.2 ppb. This can be compared to the annual peak values measured at the nearest ambient monitoring station in Central Orange County (Anaheim station), where the 2014 and 2015 peaks were 75.8 and 59.1, respectively. In terms of the design value form of the NAAQS, the 98th percentile daily maximum 1-hour concentrations at the Anaheim near-road site were 66.0 ppb and 61.4 ppb, respectively, for 2014 and 2015, compared to 59.8 ppb and 54.6 ppb from the Anaheim ambient monitoring station. The annual average NO_2 NAAQS (0.053 ppm, or 53 ppb) was also not exceeded. Thus, while the Anaheim near-road NO_2 measurements are higher than the ambient Orange County measurements, as would be expected close to traffic emissions sources, it does not appear that NO_2 design values will violate the NAAQS or CAAQS at this location.

Likewise, the shorter period of data available from the remaining three near-road stations indicates that these locations will also likely measure higher NO_2 than the nearest ambient stations, but they have not exceeded the level of the 1-hour or annual NO_2 NAAQS or CAAQS through the end of 2015. Tables 2-18 and 2-19 compare the available near-road NO_2 measurements for peak 1-hour and annual average NO_2, respectively, to the nearest ambient measurements. The 98th percentile concentration is included for comparison to the design value form of the 1-hour NO_2 NAAQS of 100 ppb. Based on this limited period of data, it appears that the near-road NO_2 measurements will be unlikely to affect the Basin's attainment status for the State and federal NO_2 standards.

TABLE 2-18

2014 and 2015 Maximum and 98th Percentile 1-Hour NO_2 Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road NO_2						Nearby Ambient NO_2				
		Annual Peak 1-Hour NO_2 (ppb)		98th Percentile 1-Hour NO_2 (ppb)			Annual Peak 1-Hour NO_2 (ppb)		98th Percentile 1-Hour NO_2 (ppb)	
Near-Road Station	**Start Date**	**2014**	**2015***	**2014**	**2015***	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	1/1/2014	**78.8**	**70.2**	**66.0**	**61.4**	**Anaheim**	75.8	59.1	59.8	54.6
I-10 N. R. (at Long Beach Bl., Los Angeles County)	2/18/2015	N/A	**94.7**	N/A	**74.8**	**Compton**	68.2	73.6	59.2	58.7
CA-60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	7/9/2015	N/A	**79.2**	N/A	**77.2**	**Upland**	74.1	71.6	56.7	55.7
I-10 N. R. (at Etiwanda Av., San Bernardino County)	10/8/2014	**93.0**	87.2	**69.5**	**73.0**	**Fontana**	70.4	**89.1**	63.6	66.1

Bold text denotes maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

* 2015 NO_2 data is incomplete for I-710 and CA-60 Near-Road Sites

The 1-hour NO_2 NAAQS is 100 ppb

TABLE 2-19

2014 and 2015 Annual NO_2 Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road NO_2				**Nearby Ambient NO_2**		
		Annual Average NO_2 (ppb)			**Annual Average NO_2 (ppb)**	
Near-Road Station	**Start Date**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	1/1/2014	**27.2**	**25.4**	**Anaheim**	15.2	14.6
I-710 N. R. (at Long Beach Bl., Los Angeles County)	2/18/2015	N/A	**23.9**	**Compton**	15.6	16.9
CA-60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	7/9/2015	N/A	N/A	**Upland**	16.6	15.9
I-10 N. R. (at Etiwanda Av., San Bernardino County)	10/8/2014	N/A	**29.8**	**Fontana**	20.2	18.7

Bold text denotes maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

* 2015 is incomplete for I-710 and CA-60 Near-Road Sites

The annual average NO_2 NAAQS is 0.053 ppm, or 53 ppb

Sulfur Dioxide (SO_2)

SO_2 Air Quality

In 2015, ambient sulfur dioxide was measured at six Basin locations. The Burbank station was closed in 2014, pending relocation to a new location. Figure 2-43 shows the routine ambient SO_2 monitoring sites in the SCAQMD jurisdiction.

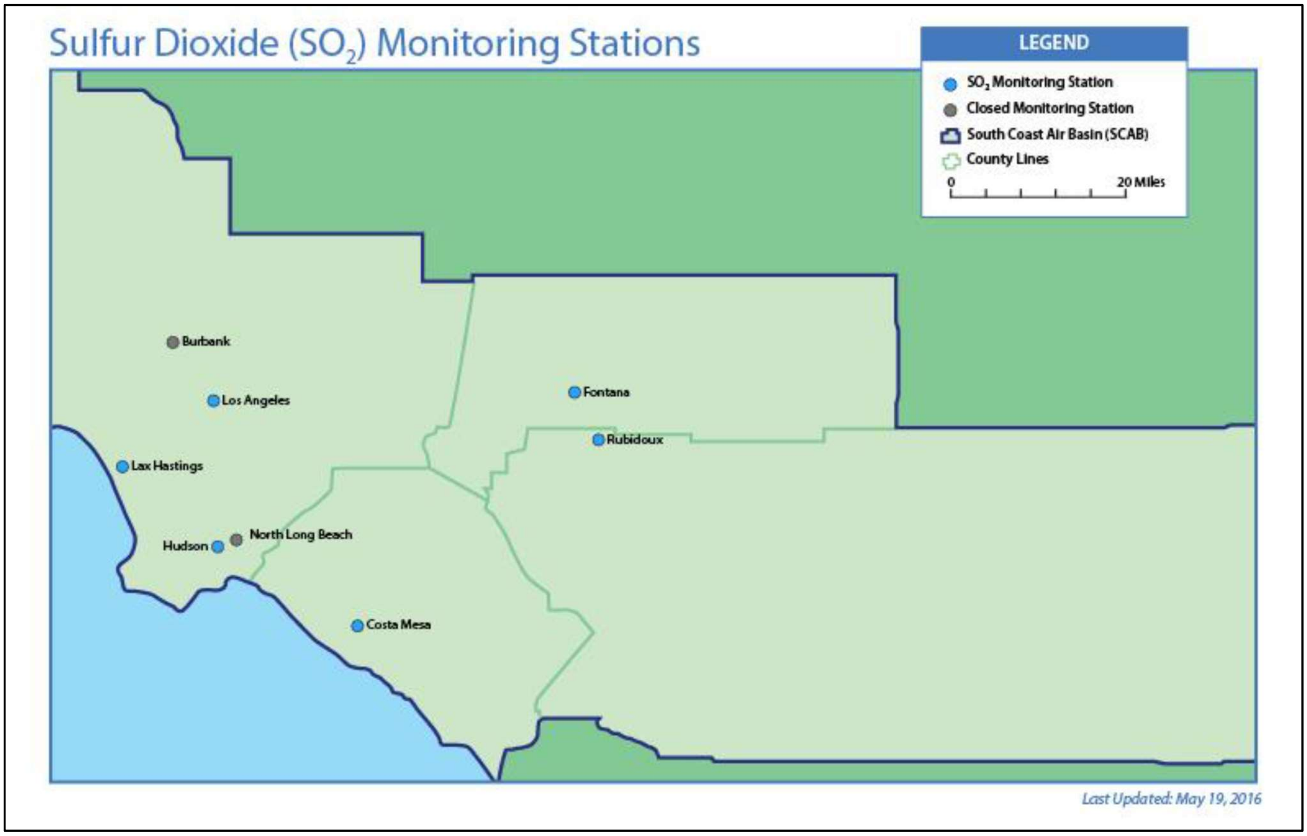

FIGURE 2-43

South Coast Air Quality Management District Sulfur Dioxide Air Monitoring Locations

(Note that SO_2 stations that were closed at N. Long Beach in 2013 and Burbank in 2014 are mapped with grey dots)

Based on the review of the SO_2 standards, U.S. EPA established the 1-hour SO_2 standard to protect the public health against short-term exposure. The level of the 1-hour average standard was set at 75 ppb, effective August 2, 2010, revoking the former annual (0.03 ppm) and 24-hour (0.14 ppm) federal standards. No violations have occurred of the current federal 1-hour standards, the former federal annual or 24-hour standards, or the State standards (0.25 ppm, 1-hour or 0.04 ppm, 24-hour) in 2015, or in recent years, in the Basin. The annual and 24-hour federal standards were last exceeded in the 1960's and the State standards were last exceeded in 1990. Though sulfur dioxide concentrations remain well below the standards, sulfur dioxide is a precursor to sulfate, which is a component of fine particulate matter. Tables 2-20 and 2-21 summarize the 2015 maximum and design value 1-hour and 24-hour average SO_2 concentrations, respectively, by county. The annual maximum 1-hour average SO_2 concentrations for each monitoring station in the SCAQMD jurisdiction are shown in Table A-23 in the attachment, for the years 1995–2015.

TABLE 2-20

2015 Maximum 1-Hour SO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour SO_2 Average (ppb)	2013–2015 1-Hour SO_2 Design Value (ppb)	Percent of 1-Hour SO_2 NAAQS (75 ppb)	Area of Design Value Max	Percent of 1-Hour SO_2 State Standard (0.25 ppm or 250 ppb)
South Coast Air Basin					
Los Angeles	**37.5**	**11**	**15**	**South Coastal LA County**	**4**
Orange	4.5	3	4	North Coastal Orange County	1
Riverside	1.9	3	4	Metropolitan Riverside County	1
San Bernardino	4.0	3	4	Central San Bernardino Valley	1
Salton Sea Air Basin					
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical analyses and lack of emissions sources indicate concentrations are well below standards

The 1-hour SO_2 design value is the annual 99th percentile 1-hour daily maximum concentration, averaged over 3 years at a station

TABLE 2-21

2015 Maximum 24-Hour Average SO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 24-Hour SO_2 Average (ppm)	2013–2015 24-Hour SO_2 Design Value (ppm)	Percent of 24-Hour SO_2 former NAAQS (0.14 ppm)	Area of Design Value Max	Percent of 24-Hour SO_2 State Standard (0.04 ppm)
South Coast Air Basin					
Los Angeles	**0.005**	**0.003**	**2**	**South Coastal LA County**	**8**
Orange	0.001	0.001	1	North Coastal Orange County	3
Riverside	0.001	0.001	1	Metropolitan Riverside County	3
San Bernardino	0.001	0.001	1	Central San Bernardino Valley	3
Salton Sea Air Basin					
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical analyses and lack of emissions sources indicate concentrations are well below standards

The 24-hour SO_2 design value is the 2nd highest 24-hour average concentration at a station in a single year

Sulfates (SO_4^{2-})

Sulfate Air Quality

Sulfates, as measured from FRM PM10 filters, was sampled at 18 stations in 2015 in the SCAQMD jurisdiction, including two locations in the Coachella Valley. Two stations were closed in 2014, Burbank and Ontario Fire Station, with only partial-year data available. The North Long Beach station was closed in 2013. New locations are pending for the Burbank and North Long Beach stations. Since the sulfate measurement is analyzed in the laboratory from the collected 24-hour PM10 filters, the sulfate network is identical to the FRM PM10 monitoring network. The measurements are done every sixth day, except that two stations in Metropolitan Riverside County (Rubidoux and Mira Loma) and one in the Coachella Valley (Indio) measure every third day. Figure 2-35, in the PM10 section above, maps the manual FRM PM10 stations that also comprise the SCAQMD sulfate network.

In 2015, the State 24-hour PM10-sulfate standard (25 µg/m^3) was not exceeded anywhere in the Basin or the Coachella Valley, nor has it been exceeded since 1990. The peak Basin sulfate concentration of 21.0 µg/m^3 (84 percent of the State standard) was measured in the East San Gabriel Valley. This was higher than the peaks in recent years, due to the impact of Independence Day fireworks on the July 5 measurement. Several other stations in the Basin also had annual peaks on this day and it is anticipated that these will not be included in the State designation value calculations for 2015. There is no corresponding federal standard for sulfates. Maximum 24-hour concentrations and anticipated maximum State designation values by air basin and county are summarized in Table 2-22. The annual maximum 24-hour average sulfate concentrations for each monitoring station in the SCAQMD jurisdiction are shown in Table A-24 in the attachment, for the years 1995–2015.

TABLE 2-22

2015 Maximum 24-Hour Average Sulfates (SO_4^{2-} from PM10) Concentrations by Basin and County

Basin/County	2015 Maximum 24-Hour SO_4^{2-} Average ($\mu g/m^3$)	2013–2015 24-Hour SO_4^{2-} State Designation Value ($\mu g/m^3$)	2015 Percent of State SO_4^{2-} Standard (25 $\mu g/m^3$)	Area of Max
South Coast Air Basin				
Los Angeles	**21.0***	**6.9***	**33**	**South Coastal Los Angeles County**
Orange	4.2	4.2	17	Central Orange County
Riverside	5.9*	4.2*	17	Metropolitan Riverside County
San Bernardino	14.7*	4.6*	18	Central San Bernardino Valley
Salton Sea Air Basin				
Riverside	4.6**	2.6**	10	Coachella Valley (Palm Springs)

Bold text denotes the peak value

* The 2015 Basin maximum sulfate concentration of 21.0 $\mu g/m^3$ in Los Angeles County, as well as the peaks in Riverside and San Bernardino Counties, occurred on July 5, 2015, due to fireworks on Independence Day; it is anticipated that these may be excluded from the State designation value calculations for a peak 2015 Basin designation value of 6.9 $\mu g/m^3$

** The 2015 Coachella Valley maximum sulfate concentration of 4.6 $\mu g/m^3$ at the Palm Springs station was associated with a high-wind exceptional event; it is anticipated that this may be excluded from the State designation value calculations for a peak 2015 Basin designation value of 2.6 $\mu g/m^3$

Lead (Pb)

Current Lead Air Quality

In 2015, SCAQMD's lead monitoring network included eight ambient monitoring locations and an additional five source-specific sites near major lead emissions sources. The North Long Beach station was closed in 2013 and the Riverside-Magnolia station was closed at the beginning of 2015. The source-specific station at Van Nuys Airport was closed in 2013, with no violation of the lead standards measured. A new source-specific lead monitor was installed in Fontana near a recycling facility, starting in January 2015. Figure 2-44 shows the ambient and source-specific lead monitoring sites in the SCAQMD jurisdiction.

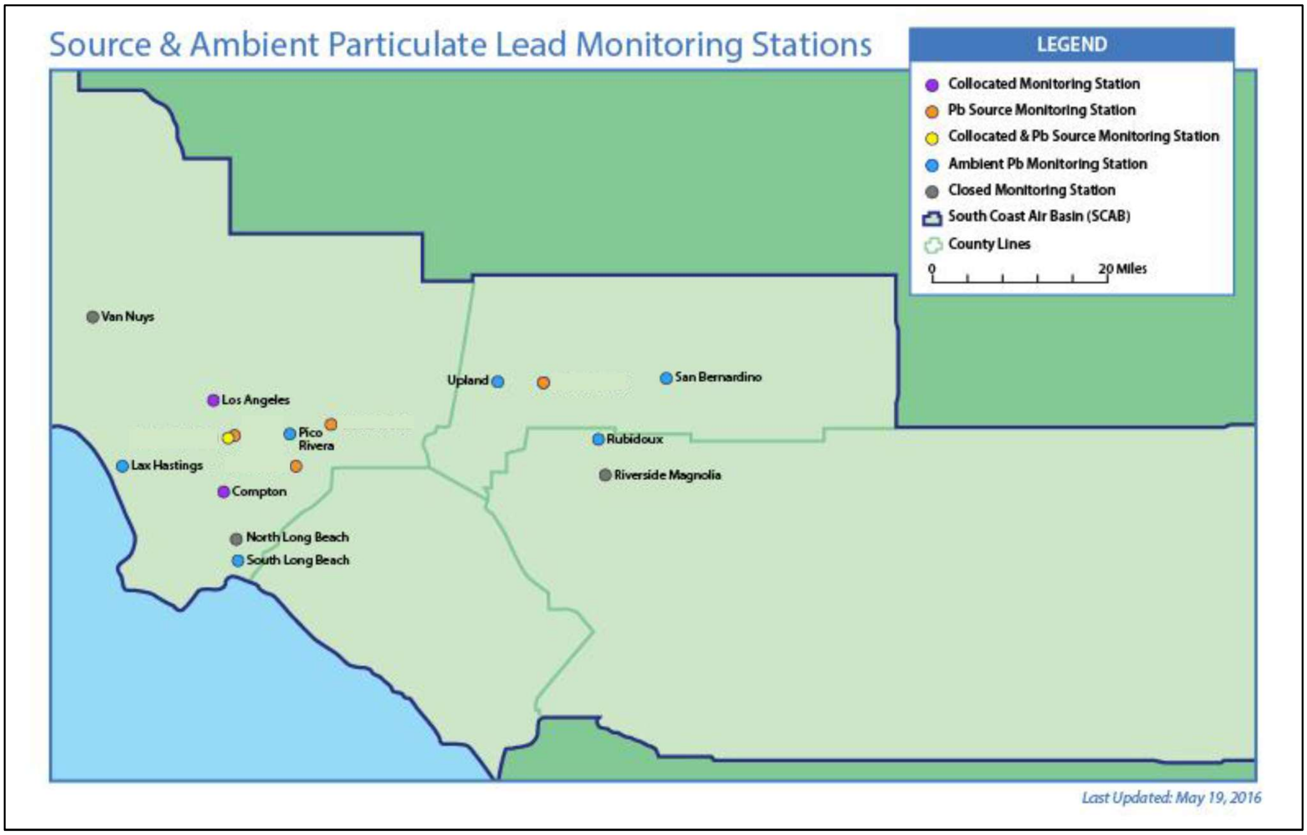

FIGURE 2-44

South Coast Air Quality Management District Ambient and Source-Specific Lead (Pb) Air Monitoring Locations

(Note that lead stations that were closed at N. Long Beach and Van Nuys in 2013 and at Riverside-Magnolia in January 2015 are mapped with grey dots)

Based on the review of the NAAQS for lead, U.S. EPA established the current standard of 0.15 µg/m^3 for a rolling 3-month average, effective October 15, 2008 (measured from total suspended particulates, TSP). There have been no violations of the lead standards at the District's regular ambient air monitoring stations since 1982, primarily as a result of removal of lead from gasoline. However, monitoring at two stations, immediately adjacent to stationary sources of lead, recorded exceedances of the standard in Los Angeles County for the 2007–2009 data period, which was used for designation under the revised standard that included the new requirements for near-source monitoring. As a result, a non-attainment designation was determined for the Los Angeles County portion of the Basin when the current standard was implemented. While near-source lead measurements in Los Angeles County had previously violated the current NAAQS, there have been no exceedances of the federal standard in the Basin as of either the 2012–2014 or the 2013–2015 3-year design value period.

Table 2-23 summarizes the Basin's maximum 3-month rolling average lead concentrations recorded in 2015 and in the 2013–2015 design value period, by county. The current lead concentrations in Los Angeles county are now well below the lead NAAQS (0.15 µg/m^3), including the monitoring at the source oriented locations (down to 27 percent of the NAAQS for the 2015 maximum 3-month rolling average). The lead data from both the ambient and source-specific locations throughout the Basin has remained well below the NAAQS since 2012, due mainly to the implementation of stricter SCAQMD rules for the lead sources. The new source-specific measurements in San Bernardino County in 2015 are generally higher than the ambient measurements, but are well below the level of NAAQS. The less-stringent State 30-day standards for lead were not exceeded in any other area of the Basin in 2015, as is also shown in Table 2-23, or any recent year.

As a result of the 2012–2014 and 2013–2015 design value remaining well below the NAAQS, SCAQMD will be petitioning U.S. EPA for a redesignation to attainment for the federal lead standard for the Los Angeles County nonattainment area. Stringent SCAQMD rules governing lead-producing sources will protect from again exceeding the federal standard. Furthermore, the business that had been the largest single source of lead emissions in Los Angeles County has closed in recent months and is in the process of demolition and clean-up.

The maximum calendar annual maximum monthly average and 3-month rolling average lead concentrations at each monitoring site in the SCAQMD jurisdiction for the years 1995–2015 are provided in Tables A-25 and A-26, respectively, in the attachment.

TABLE 2-23

2015 Maximum 3-Month Rolling Average Lead Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Max 3-Month Rolling Average Design Value (μg/m³)	2013–2015 Max 3-Month Rolling Average Design Value (μg/m³)	Percent of Current NAAQS (0.15 μg/m³)	Area of Design Value Max	2015 Max 30-Day Average (μg/m³)	Percent of State Standard (1.5 μg/m³)
South Coast Air Basin						
Los Angeles*	**0.04**	**0.08**	**53**	**Southeast Los Angeles County**	**0.05**	**3**
Orange	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Riverside	0.01	0.01	7	Metropolitan Riverside County	0.01	1
San Bernardino*	0.03	0.03	20	Central San Bernardino Valley	0.04	3
Salton Sea Air Basin						
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.	N.D.

Bold text denotes the peak value

N.D. = No Data; historical analyses and emissions profiles indicate concentrations would be well below standards

The lead NAAQS design value is the highest rolling 3-month average over a 3-year period at a station

* The higher lead concentrations in Los Angeles and San Bernardino Counties were measured at sites immediately downwind lead sources; the maximum 3-month average design value was measured at a near-source station in Los Angeles County (Santa Fe Springs) for February through April of 2013; the single year of data from the San Bernardino County near-source lead monitor is insufficient for a complete 3-year design value calculation, but is included here

CHAPTER 3

AIR QUALITY IN THE SALTON SEA AIR BASIN, RIVERSIDE COUNTY (COACHELLA VALLEY)

Overview of Coachella Valley Air Quality

Current Air Quality Summary
Attainment/Nonattainment Designations

Pollutant-Specific Air Quality Discussion

Ozone (O_3)
Fine Particulate Matter (PM2.5)
Particulate Matter (PM10)
Carbon Monoxide (CO)
Nitrogen Dioxide (NO_2)
Sulfur Dioxide (SO_2)
Sulfate (SO_4^{2-})
Lead (Pb)
Hydrogen Sulfide (H_2S)

Overview of Coachella Valley Air Quality

In 2015, the SCAQMD monitored air quality at four routine locations in the Riverside County portion of the Salton Sea Desert Air Basin (SSAB), all within the Coachella Valley. Figure 3-1 shows a map of the area and topography. A long-term monitoring station (Palm Springs) is located immediately downwind of the densely populated South Coast Air Basin (Basin). A second long-term station (Indio) is located further downwind in the Coachella Valley. A relatively new monitoring station has also been operational in the community of Mecca at the Saul Martinez Elementary School to measure PM10, with a continuous TEOM instrument, and Hydrogen Sulfide (H_2S), a gas emitted naturally from the Salton Sea that causes strong odors at times. The Mecca station is in the southeastern Coachella Valley, a few miles from the northern shore of the Salton Sea. Additional continuous H_2S monitoring is now being conducted at the northern shore of the Salton Sea in a sparsely populated area. Since the end of May 2014, SCAQMD has also been measuring PM2.5 with a continuous, special-purpose monitor in Desert Hot Springs, predominantly downwind of the 800 megawatt CPV Sentinel natural gas-powered electric generation facility.

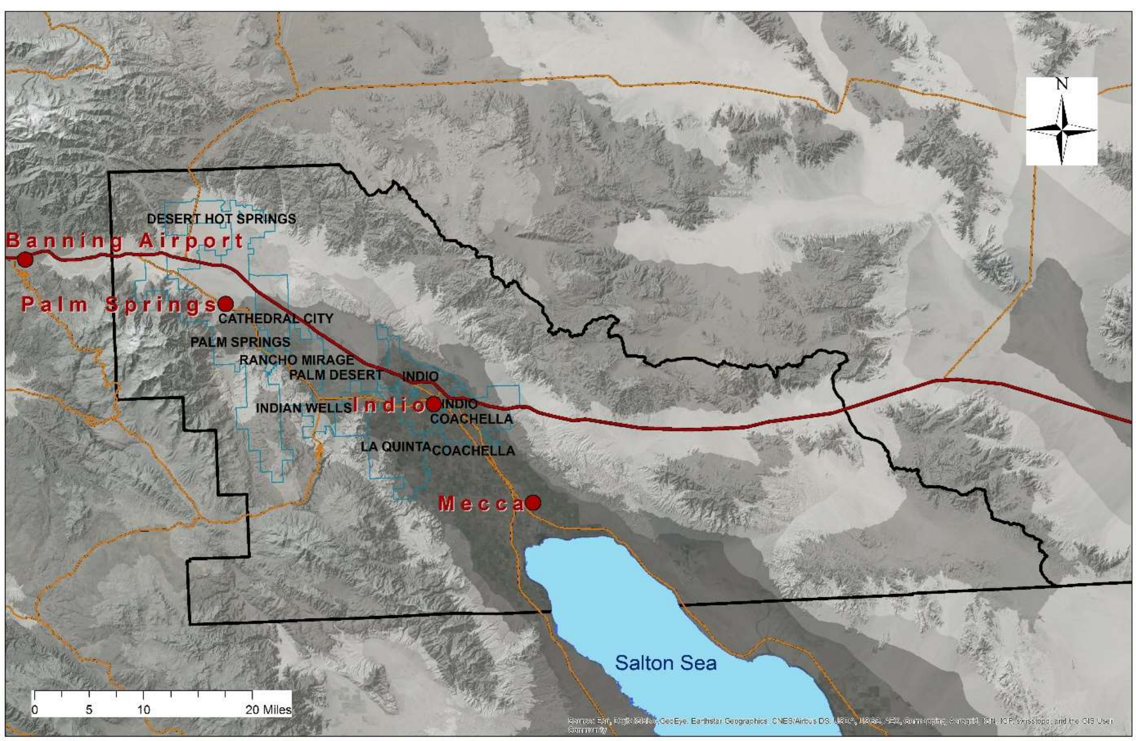

FIGURE 3-1

Location and Topography of the Coachella Valley Planning Area

[the San Gorgonio Pass (AKA Banning Pass) is the west-east pass between the mountains near the Banning Airport air monitoring station that leads from the South Coast Air Basin into the Coachella Valley; SCAQMD air monitoring stations at Palm Springs, Indio, and Mecca are shown within the Coachella Valley boundaries]

Current Air Quality Summary

Federal and State standards for PM2.5, carbon monoxide (CO), and nitrogen dioxide (NO_2) were not exceeded in the Coachella Valley in 2015, nor was the State standard for Sulfate (SO_4^{2-}, from PM10). However, the Coachella Valley exceeded State and federal standards for both ozone and PM10, although the NAAQS PM10 exceedances were due to high-wind exceptional events.

In 2015, the new 2015 8-hour ozone federal standard (0.070 ppm) was exceeded in the Coachella Valley on 47 days (13 percent of the year), while the revised 2008 (0.075 ppm) and revoked 1997 (0.08 ppm) 8-hour standards were exceeded on 26 and 5 days, respectively. The maximum 8-hour ozone concentration was 0.092 ppm (131, 123 and 109 percent of the 2015, 2008 and 1997 ozone standards, respectively). The former 1979 1-hour federal ozone standard level (0.12 ppm) was not exceeded in the Coachella Valley in 2015, with a maximum 1-hour concentration of 0.10 ppm. Ozone concentrations in the Coachella Valley, and the number of days exceeding the federal ozone standards, are greatest in the late spring and summer months, with no exceedances during the winter. The Palm Springs station consistently has more days above the federal and State ozone standards each year than the Indio station.

The 24-hour PM10 NAAQS was exceeded on eight days in 2014 and eight more in 2015. These were flagged by the District for consideration under the U.S. EPA Exceptional Events Rule,[28] due to high-wind natural windblown dust events. The stations at Palm Springs, Indio and Mecca were included in this summary. Pending preparation of supporting documentation and U.S. EPA concurrence with the flags, the Coachella Valley did not violate the 24-hour PM10 NAAQS in 2014 or 2015.

The maximum concentrations measured at the SCAQMD Coachella Valley air monitoring stations in 2015 are shown in Figure 3-2, as percentages of the State and federal standards. Figure 3-3 shows the Coachella Valley 3-year (2013–2015) design values, as percentages of the current and revoked federal standards.

[28]The U.S. EPA Exceptional Events Rule, *Treatment of Data Influence by Exceptional Events*, became effective May 21, 2007. The previous U.S. EPA *Natural Events Policy* for Particulate Matter was issued on May 30, 1996. On September 16, 2016, U.S. EPA promulgated revisions to the Exceptional Event Rule. Under the Exceptional Events Rule, U.S. EPA allows certain data to be flagged in the U.S. EPA Air Quality System (AQS) database and not considered for NAAQS attainment status when that data is influenced by exceptional events, such as high winds, wildfires, volcanoes, or some cultural events (Independence Day fireworks) that meet strict requirements.

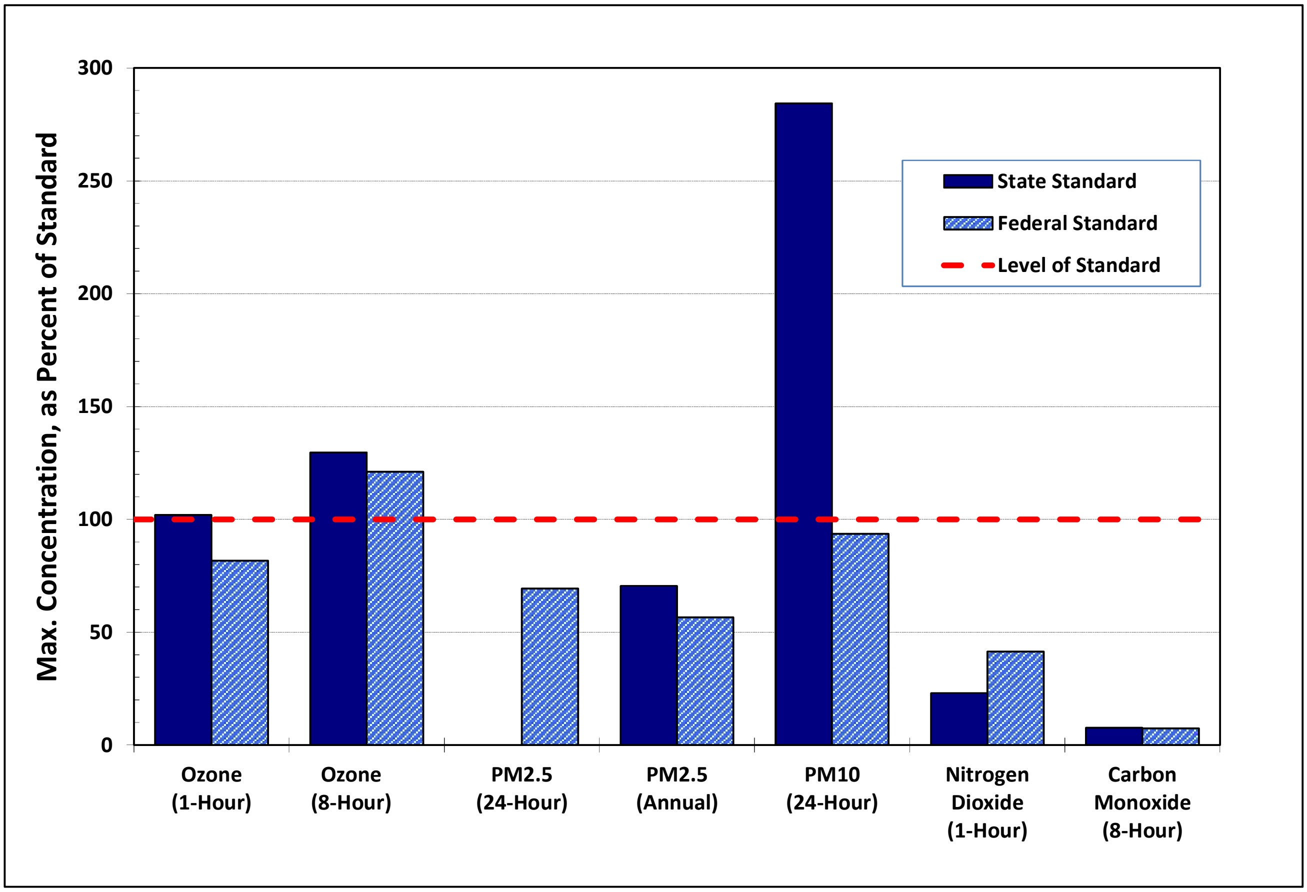

FIGURE 3-2

Coachella Valley 2015 Maximum Pollutant Concentrations
as Percent of State and Federal Standards

(the 2008 8-hour federal ozone standard is shown – note that the bar for the State 8-hour ozone standard is the nearly the same as for the new 2015 8-hour federal ozone standard, which is not shown; for PM10, flagged exceptional events are excluded, pending required event documentation and U.S. EPA concurrence; there is no State 24-hour PM2.5 standard)

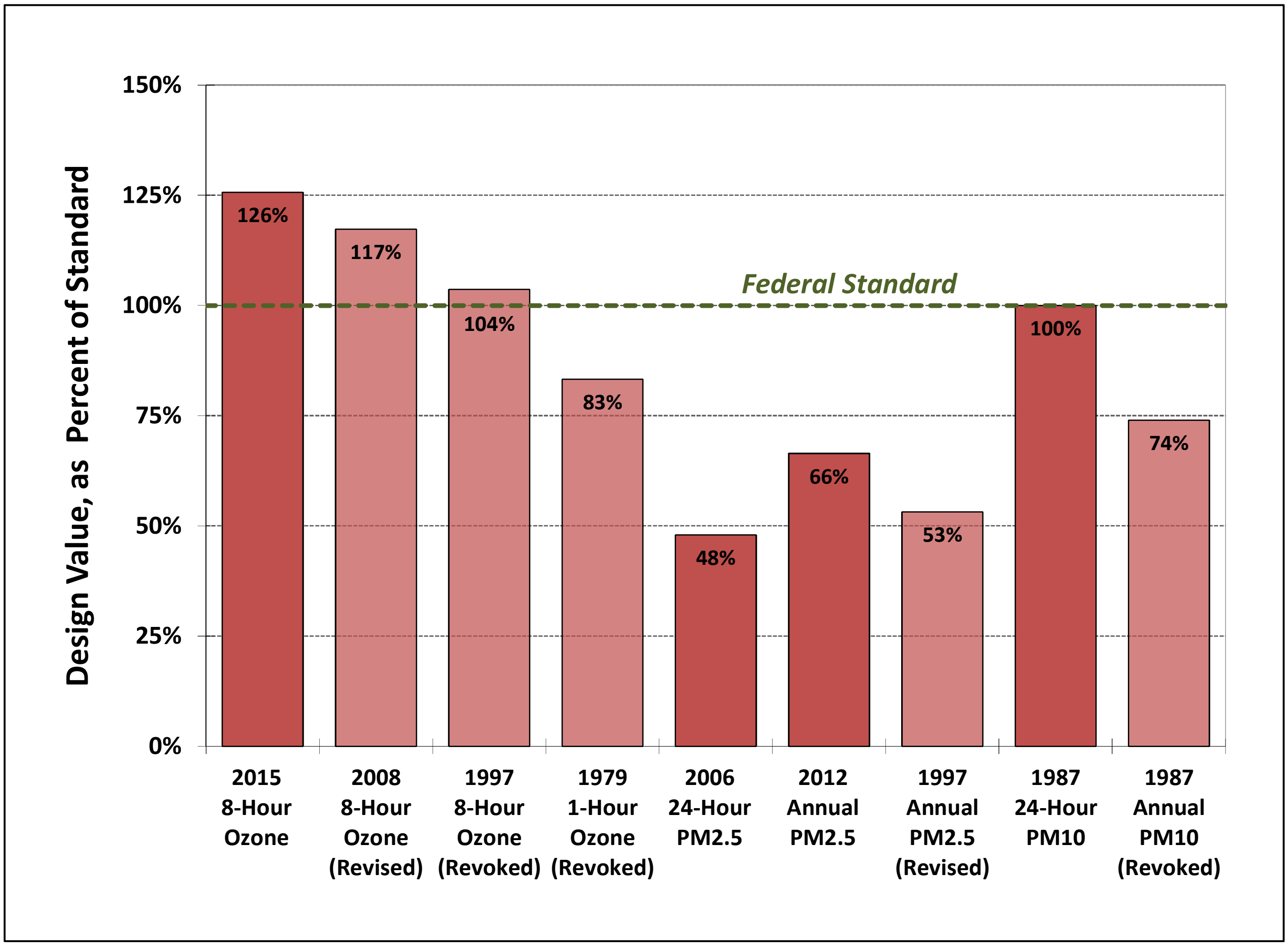

FIGURE 3-3

Coachella Valley 3-Year (2012–2014) Design Values as Percent of Federal Standard

(PM10 flagged exceptional events are excluded but supporting documentation and U.S. EPA concurrence is still needed; note that 100 percent of the Federal Standard is not exceeding that standard; darker shading indicates current, most-stringent NAAQS)

Attainment/Nonattainment Designations

The current NAAQS and CAAQS, with attainment designations for the Coachella Valley, are presented in Tables 3-1 and 3-2, respectively. Statistics for Coachella Valley ambient air monitoring data are included in the tables by pollutant for the years 1995–2014, which can be found along with the Basin monitoring data in the attachment to this appendix.

TABLE 3-1

National Ambient Air Quality Standards (NAAQS) Attainment Status

Coachella Valley Portion of the Salton Sea Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Attainment	11/15/2007 (attained 12/31/2013)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment (Severe)	Pending
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment (Severe-15)	7/20/2027
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment (Severe-15)	6/15/2019
PM2.5[e]	(2006) **24-Hour** (35 μg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(2012) **Annual** (12.0 μg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(1997) **Annual** (15.0 μg/m^3)	Unclassifiable/Attainment	N/A (attained)
PM10[f]	(1987) **24-hour** (150 μg/m^3)	Nonattainment (Serious)	12/31/2006
Lead (Pb)	(2008) **3-Months Rolling** (0.15 μg/m^3)	Unclassifiable/Attainment	Unclassifiable/ Attainment
CO	(1971) **1-Hour** (35 ppm)	Unclassifiable/Attainment	N/A (attained)
	(1971) **8-Hour** (9 ppm)	Unclassifiable/Attainment	N/A (attained)
NO_2[g]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Unclassifiable/Attainment	N/A (attained)
SO_2[h]	(2010) **1-Hour** (75 ppb)	Designations Pending	N/A
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	Unclassifiable/ Attainment

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05; the Southeast Desert Modified Air Quality Management Area, including the Coachella Valley, had not timely attained this standard by the 11/15/07 "severe-17" deadline, based on 2005-2007 data; on 8/25/14, U.S. EPA proposed a clean data finding based on 2011-2013 data and a determination of attainment for the former 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on 4/15/15, effective 5/15/15, and included preliminary 2014 data

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the 1997 and 2008 ozone NAAQS until they are attained

e) The annual PM2.5 standard was revised on 1/15/13, effective 3/18/13, from 15 to 12 μg/m3

f) The annual PM10 standard was revoked, effective 12/18/06; the 24-hour PM10 NAAQS attainment deadline was 12/31/2006; the Coachella Valley Attainment Redesignation Request and PM10 Maintenance Plan was postponed by U.S. EPA pending additional monitoring and analysis in the southeastern Coachella Valley

g) New 1-hour NO_2 NAAQS became effective 8/2/10; attainment designations 1/20/12; annual NO_2 NAAQS retained

h) The 1971 Annual and 24-hour SO_2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard; final area designations expected by 12/31/2020 with SSAB expected to be designated Unclassifiable/Attainment

TABLE 3-2

California Ambient Air Quality Standards (CAAQS) Attainment Status

Coachella Valley portion of Salton Sea Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a]
		Coachella Valley
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Attainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment
	Annual (20 µg/m^3)	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment
CO	**1-Hour** (20 ppm)	Attainment
	8-Hour (9.0 ppm)	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment
	Annual (0.030 ppm)	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment
	24-Hour (0.04 ppm)	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified[c]

a) CA State designations shown were updated by CARB on January 5, 2016, based on the 2012-2014 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events [Source: http://www.arb.ca.gov/desig/statedesig.htm#current]

b) CA State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a designation, but nonattainment is anticipated for the H_2S CAAQS in at least part of the Coachella Valley

Pollutant-Specific Air Quality Summary

Ozone (O_3)

Atmospheric ozone in the Riverside county portion of SSAB is both directly transported from the Basin and formed photochemically from precursors emitted upwind. The precursors are emitted in greatest quantity in the coastal and central Los Angeles County areas of the Basin. The Basin's prevailing sea breeze causes polluted air to be transported inland. As the air is being transported inland, ozone is formed, with peak concentrations occurring in the inland valleys of the Basin, extending from eastern San Fernando Valley through the San Gabriel Valley into the Riverside-San Bernardino area and the adjacent mountains. As the air is transported still further inland into the Coachella Valley, through the San Gorgonio Pass, ozone concentrations typically decrease due to dilution, although ozone standards can still be exceeded.

Ozone is measured continuously at two locations in the Coachella Valley at the Palm Springs and Indio air monitoring stations. In 2015, the new 2015 8-hour ozone federal standard (0.070 ppm) was exceeded in the Coachella Valley on 47 days (13 percent of the year), while the previous 2008 (0.075 ppm) and 1997 (0.08 ppm) 8-hour standards were exceeded on 26 and 5 days, respectively. The maximum 8-hour ozone concentration was 0.092 ppm (131, 123 and 109 percent of the level of the 2015, 2008 and 1997 ozone standards, respectively). The former 1979 1-hour federal ozone standard level (0.12 ppm) was not exceeded in the Coachella Valley in 2014, with a maximum 1-hour concentration of 0.102 ppm. Ozone concentrations in the Coachella Valley, and the number of days exceeding the federal ozone standards, are greatest in the late spring and summer months, with no exceedances during the winter.

The 8-hour ozone design value for the Coachella Valley for the 3-year period of 2013–2015 was 0.088 ppm (126, 117, and 104 percent of the 2015, 2008, and 1997 ozone NAAQS, respectively). The 1-hour ozone design value was 0.104 ppm, which is 83 percent of the former 1979 1-hour ozone NAAQS. While the Coachella Valley remains in attainment of the former 1-hour federal standard, the 8-hour NAAQS are still violated. The Palm Springs station had higher ozone design values and significantly more days above the standards than the Indio station.

The 1-hour and 8-hour State ozone standards were exceeded on 3 days and 51 days, respectively, in the Coachella Valley in 2015. The 1-hour ozone health advisory level (≥ 0.15 ppm) has not been exceeded in the Coachella Valley area since 1998. No 1-hour Stage 1 episode levels (≥ 0.20 ppm) have been recorded in the Coachella Valley area since 1988.

Figure 3-4 shows the trend of the annual peak ozone concentrations (1-hour and 8-hour averages) measured in the Coachella Valley between 1990 and 2015. Figure 3-5 shows the trend of the annual number of days exceeding federal and State ozone standards at Coachella Valley monitoring sites for the years 1990–2015. Figure 3-6 shows the 3-year ozone design value trends from 1990 through 2015 (labeled as the end year of each 3-year design value period). As is illustrated, the Coachella Valley has experienced a trend of steady ozone improvements over the years. However, additional gains are needed to achieve the new and previous 8-hour ozone standards.

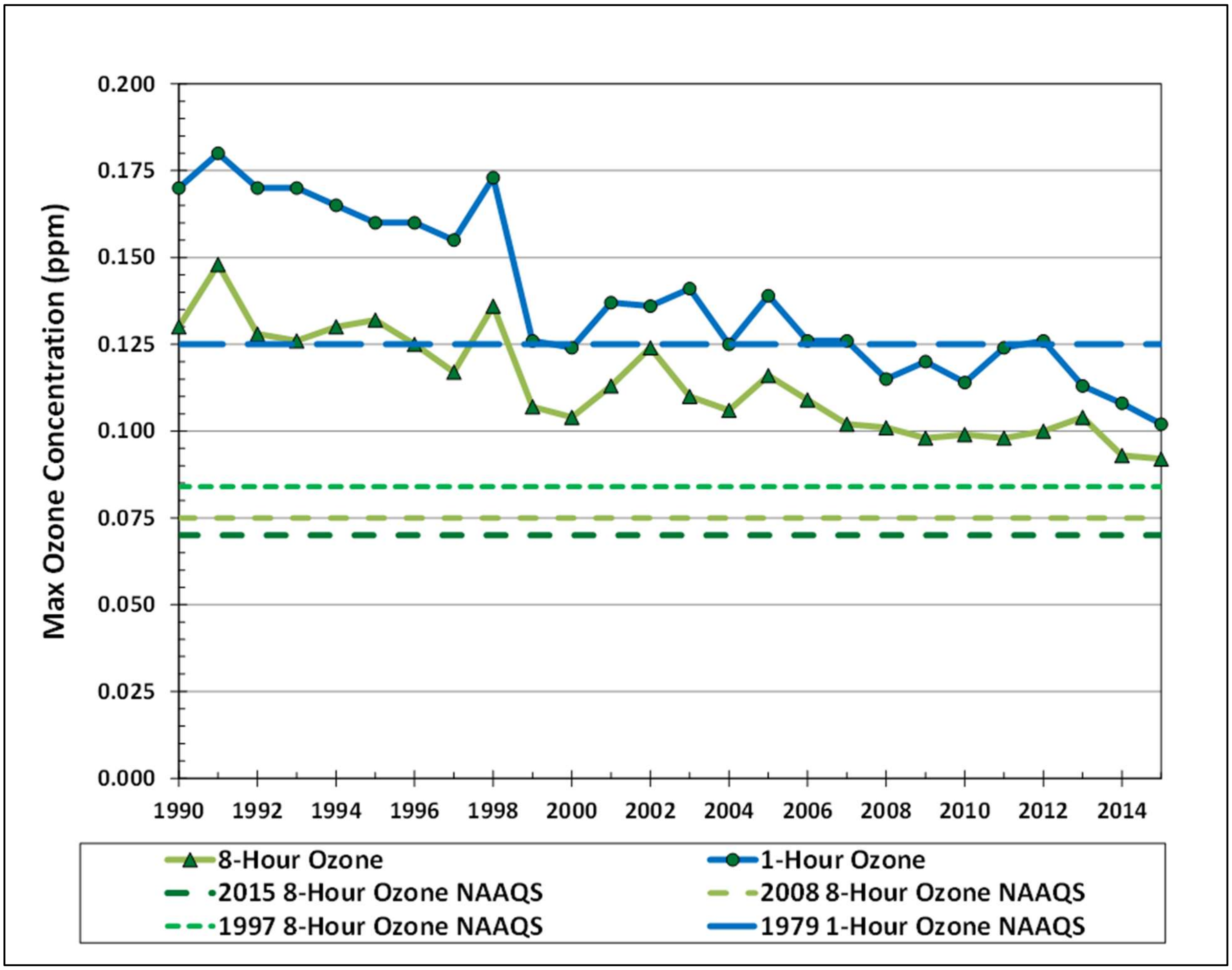

FIGURE 3-4

Trends of Coachella Valley Maximum 1-hour and 8-hour Ozone Concentrations, 1990–2015

(dashed lines depict the new 2015 8-hour and the previous 2008 and 2997 8-hour and 1979 1-hour federal ozone standards)

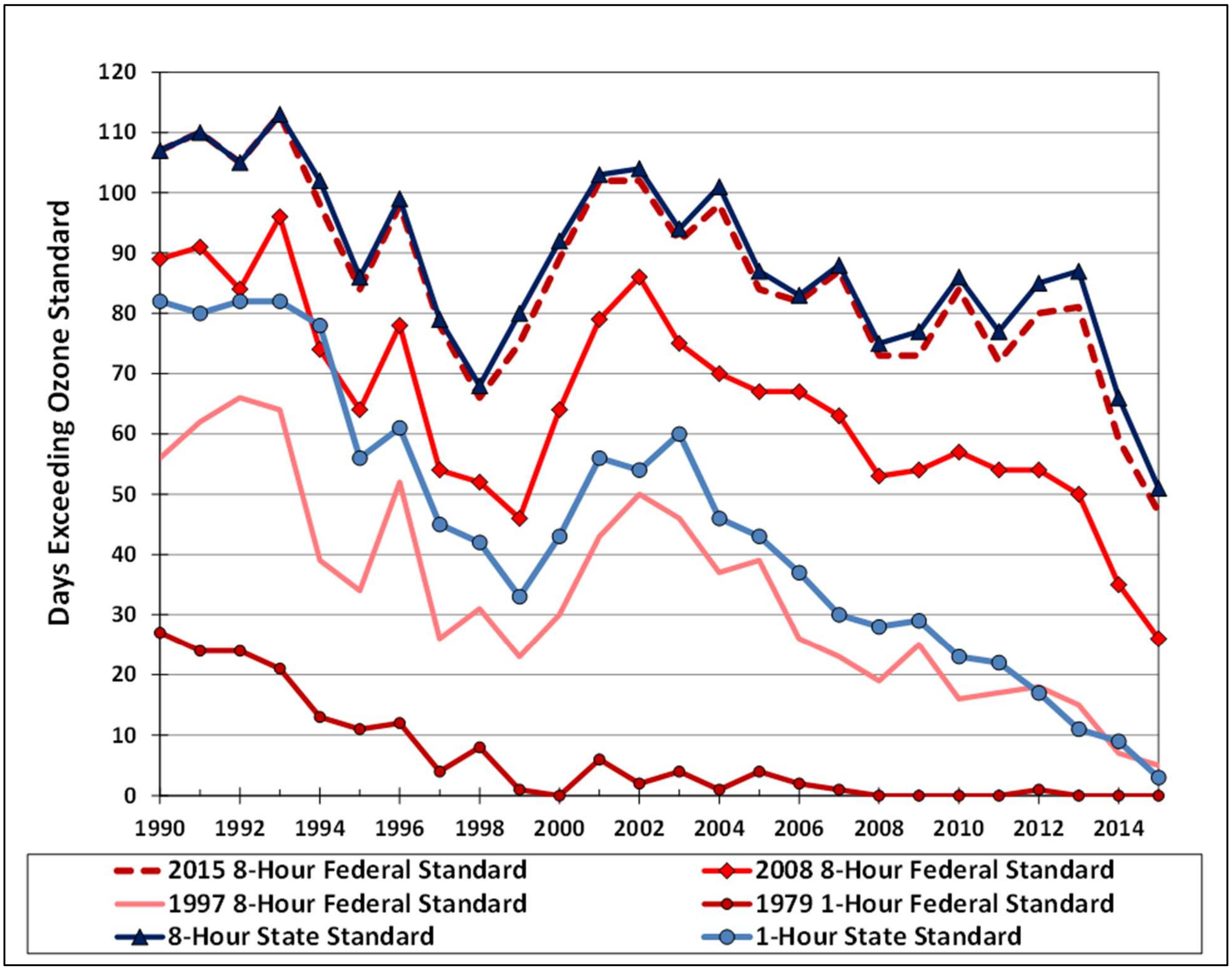

FIGURE 3-5

Number of Days Exceeding Federal and State Ozone Standards
in the Coachella Valley, 1990–2015

(the new 2015 8-hour federal standard is now the current ozone NAAQS, but commitments remain toward timely attainment of the former federal standards; the Coachella Valley has attained the former 1979 federal 1-hour ozone standard)

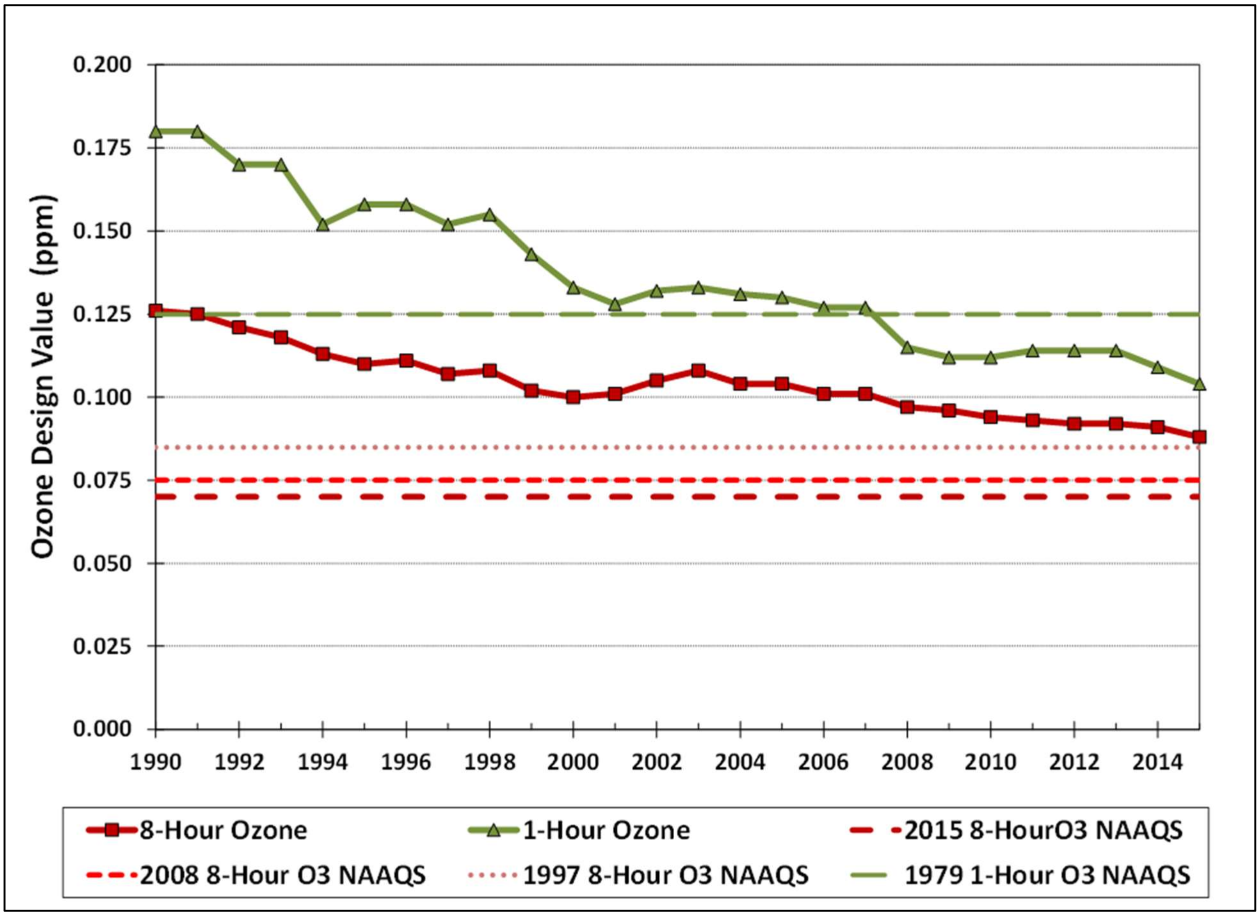

FIGURE 3-6

Coachella Valley Federal 8-Hour and 1-Hour Ozone 3-Year Design Value Trends, 1990–2015

[dashed lines indicate the current 2015, revised 2008, and revoked 1997 8-hour NAAQS and the revoked 1979 1-hour ozone NAAQS (attained); year plotted is the end year of the 3-year design value period]

Tables A-2 through A-10 in the attachment to this appendix show the number of days exceeding the federal 8-hour and 1-hour ozone standards, as well as the fourth highest 8-hour average and maximum 1-hour concentrations, at all routine SCAQMD air quality monitoring stations including the two Coachella Valley sites, for the period 1995–2014. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Ozone and Ozone Precursor Transport

Pollutant transport from the South Coast Air Basin to the Salton Sea Air Basin occurs through the San Gorgonio Pass (sometimes referred to as the Banning Pass) to the Coachella Valley.[29] The transport pathway to the

[29] Keith, R.W. (1980). A Climatological Air Quality Profile: California's South Coast Air Basin. Staff Report, South Coast Air Quality Management District.

Coachella Valley has been well documented and studied in the past. An experiment in the early 1970s concluded that the South Coast Air Basin was the source of the observed high ozone levels in the Coachella Valley.[30] Transport from Anaheim to Palm Springs was directly identified with an inert sulfur hexafluoride tracer release.[31] A comprehensive study of transport from the South Coast Air Basin to the Salton Sea Air Basin also confirmed the ozone transport pathway to the Coachella Valley.[32]

Ozone pollutant transport to the Coachella Valley can be demonstrated by examining averaged ozone concentrations by time of day for various stations along the transport corridor from Los Angeles County into Riverside County and into the Coachella Valley. Figure 3-7 shows the diurnal distribution of averaged 1-hour ozone concentrations for the May–October smog season, by hour, for the 2012–2014 period. The Coachella Valley transport route is represented, starting at Central Los Angeles as the main emissions source region and passing through Riverside-Rubidoux and Banning and finally through the San Gorgonio Pass to Palm Springs in the Coachella Valley. Near the source regions, ozone peaks occur just after mid-day (1:00 to 2:00 p.m. Pacific Standard Time, PST), on average, during the peak of incoming solar radiation and therefore the peak of ozone production. Ozone peaks near the emissions source region are not as high as those further downwind, due to the photochemical reaction time needed for ozone to form from precursor gases. Downwind of the source region, ozone peaks occur later in the day and at generally higher concentrations as ozone and ozone precursors are transported downwind and photochemical reactions continue. At Palm Springs, ozone concentration peaks occur between 4:00 and 6:00 p.m. PST. If this peak were locally generated, it would be occurring closer to near mid-day, as is seen in the major source areas of the South Coast Air Basin, and not in the late afternoon or early evening, as is seen at Palm Springs.

---

[30] Kauper, E.K. (1971). Coachella Valley Air Quality Study. Final Report, Pollution Res. & Control Corp., Riverside County Contract & U.S. Public Health Service Grant No. 69-A-0610 RI.

[31] Drivas, P.J., and F.H. Shair. (1974). A Tracer Study of Pollutant Transport in the Los Angeles Area. *Atmos. Environ*. 8, 1155-1163.

[32] Smith, T.B., et al. (1983). The Impact of Transport from the South Coast Air Basin on Ozone Levels in the Southeast Desert Air Basin. CARB Research Library Report No. ARB-R-83-183. CARB Contract to MRI/Caltech. [http://www.arb.ca.gov/research/single-project.php?row_id=64953]

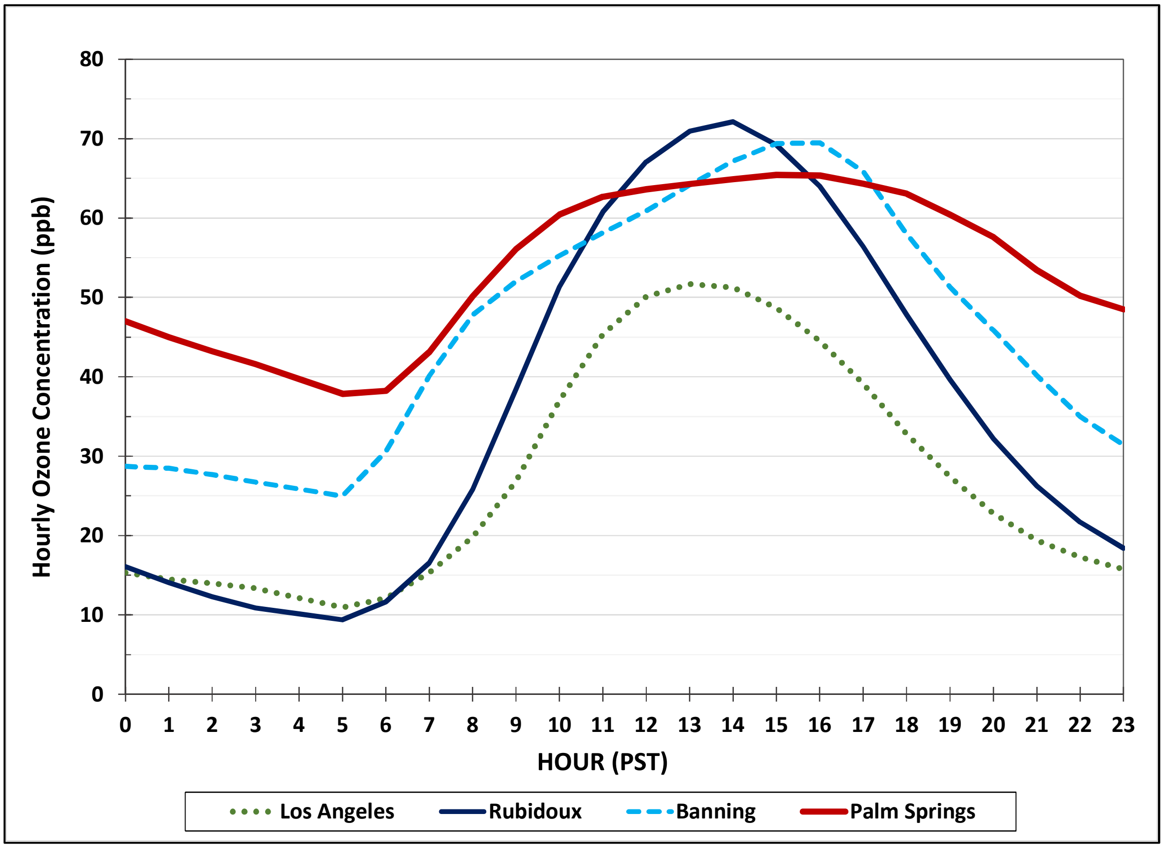

FIGURE 3-7

Diurnal Profile of 3-Year (2012–2014) Hourly Ozone Concentrations
Along the Transport Route into the Coachella Valley
[hours in Pacific Standard Time (PST); averaged for the May-October ozone season by hour]

Palm Springs also exhibits higher morning ozone concentrations, when compared to the concentrations in the morning in the South Coast Air Basin closer to the main emissions source areas (i.e., Los Angeles and Rubidoux). The stations in the South Coast have more local NOx emissions (mostly from mobile sources) that help scavenge[33] the ozone after dark when ozone photochemistry ceases. The Coachella Valley has limited local NOx emissions to help scavenge the ozone at night. This elevated overnight ozone contributes to an early morning start to the daily ozone increase in Coachella Valley, starting after sunrise (5-6 a.m. PST), with the ample sunlight and strong overnight temperature inversions in the desert. Ozone concentrations observed on high ozone days in the Coachella Valley can reach an initial peak before noon and then drop slightly with increased mixing in the early afternoon, before climbing to the daily peak, typically between 4 and 6 p.m., as the typical onshore flow reaches the Coachella Valley through the San Gorgonio Pass, transporting new ozone from the South Coast Air Basin.

[33] Freshly emitted NOx includes NO, which destroys ozone through a fast reaction colloquially termed 'scavenging.'

Fine Particulate Matter (PM2.5)

SCAQMD began PM2.5 fine particulate monitoring in both the Coachella Valley and the Basin in 1999. Two long-term, routine stations (Palm Springs and Indio) measure PM2.5 with 24-hour filter-based FRM measurements every third day, as required by U.S. EPA monitoring regulations. PM2.5 has remained relatively low, especially when compared to the South Coast Air Basin, due to fewer combustion-related emissions sources and less secondary aerosol formation in the atmosphere. There is also typically increased vertical mixing and horizontal dispersion in the desert areas. When looking at the 3-year design value for the 2013-2015 period, the Coachella Valley PM2.5 24-hour design value (17 $\mu g/m^3$) is 48 percent of the 24-hour NAAQS (35 $\mu g/m^3$) and the annual average design value (8.0 $\mu g/m^3$) is 66 percent of the current (2012) annual NAAQS (12.0 $\mu g/m^3$).

Figure 3-8 shows the trend of 3-year design values for annual average and 24-hour PM2.5 from 2001 through 2015. The stations in the Coachella Valley have not violated the 3-year design value form of the current standards since monitoring began. The annual average for the first year of measurements (1999) was just slightly above the level of the standard as can be seen in the trend of the annual average PM2.5 concentrations, as shown in Figure 3-9, along with annual trend of PM10. As was seen elsewhere in California, the increasing trend in the 24-hour design values in the Coachella Valley after 2012 is likely due, at least in part, to the ongoing drought conditions (see the PM2.5 section in Chapter 2 for additional drought discussion).

There are occasionally some individual days that exceeded the level of the 24-hour PM2.5 standard in the Coachella Valley, due to the PM2.5 fine particulate portion of windblown dust during very high PM10 events caused by high winds. Even though the PM2.5 standard can be exceeded during these exceptional events, the PM2.5 mass is a very small fraction of the total PM10 mass. These events are extreme and can be flagged as exceptional events, but they do not occur frequently enough to violate the 98th percentile form of the 24-hour PM2.5 standard.

The 2015 Coachella Valley maximum 24-hour average and the highest annual average concentrations (24.6 $\mu g/m^3$ and 7.5 $\mu g/m^3$, respectively, both at Indio) were 69 percent and 62 percent of the current federal 24-hour and annual standards. The annual PM2.5 State standard (12.0 $\mu g/m^3$), which is the same level as the federal annual standard, but with different rounding requirements, is also not exceeded in the Coachella Valley.

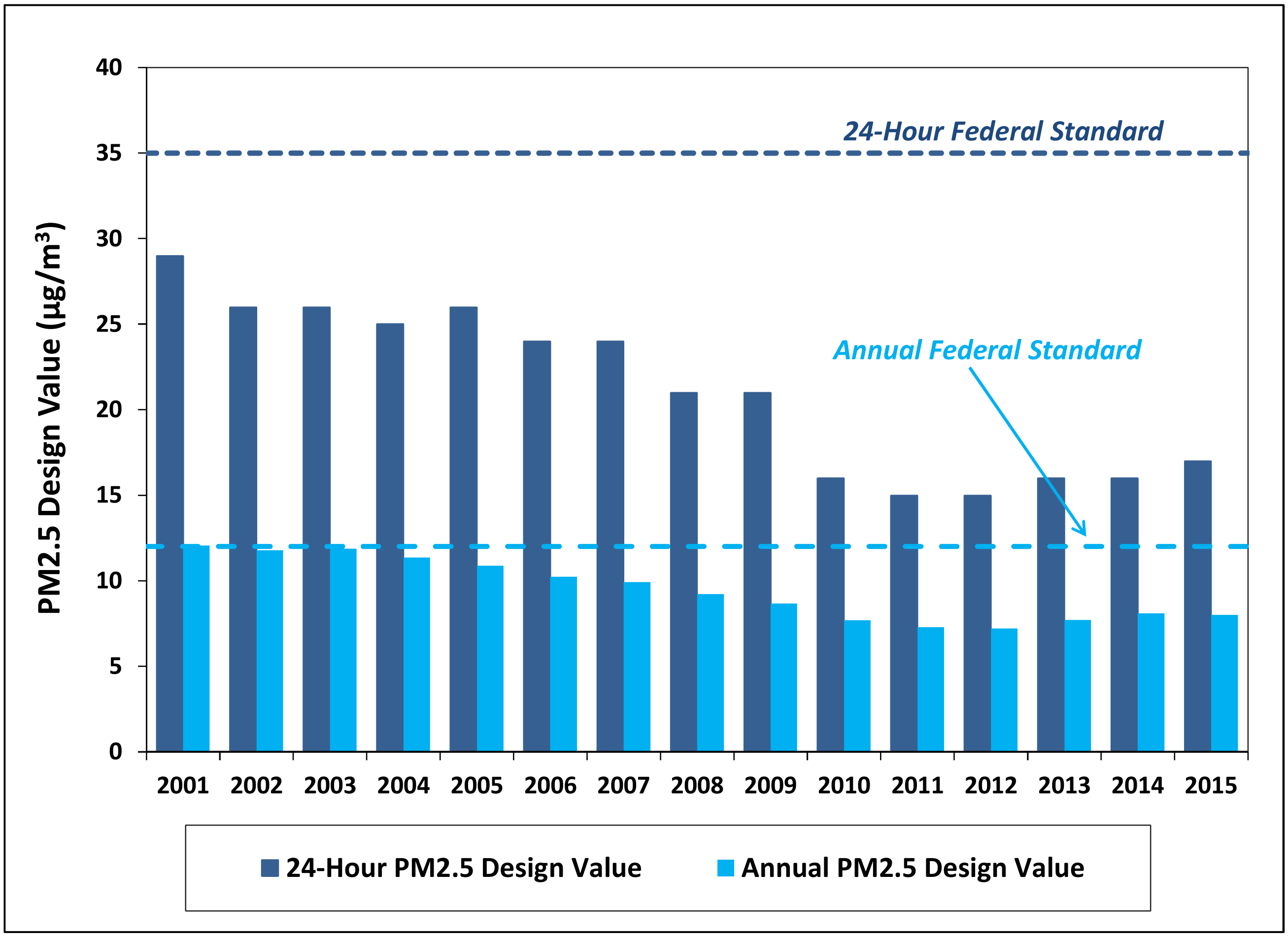

FIGURE 3-8

Coachella Valley Trend of 24-Hour and Annual Average PM2.5 Design Values, 2001–2015

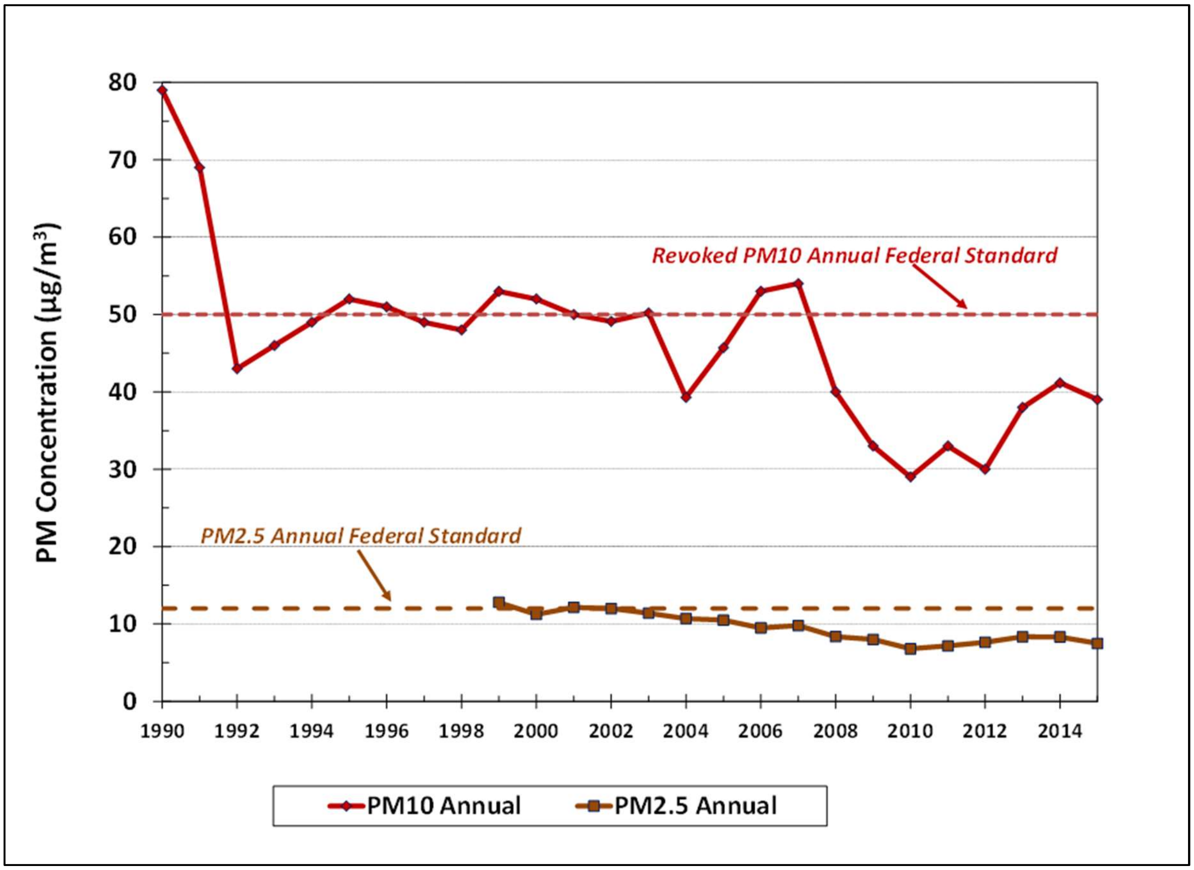

FIGURE 3-9

Coachella Valley Trend of Annual Average PM10 and PM2.5, 1990–2015

Desert Hot Springs PM2.5 Monitoring

In addition to the routine PM2.5 measurements, SCAQMD has been measuring PM2.5 since May 28, 2014 with a continuous FEM instrument in Desert Hot Springs. This station is in the predominantly downwind direction of the 800 megawatt CPV Sentinel natural gas-powered electric generation facility.[34] Through the end of 2015, only a single day, June 19, 2015, exceeded the level of the 24-hour federal standard with a concentration of 52.3 $\mu g/m^3$. That high day was associated with a strong windblown dust event that also had very high PM10 concentrations, due to outflows from thunderstorm activity over the desert southwest. Therefore this day would qualify for flagging as a high-wind exceptional event and this PM2.5 concentration was not correlated to power plant emissions. In addition, such occasional single high values over the level of the standard have not caused a violation of the 98th percentile, 3-year design value form of the PM2.5 NAAQS.

The Desert Hot Springs PM2.5 annual average for 2015, the first full year of measurements, was 6.66 µg/m3, well below the 12.0 µg/m3 annual federal standard in this northern Coachella Valley location. While the

[34] Current and historic preliminary data from the Desert Hot Springs temporary special purpose monitor near CPV Sentinel can be found on the SCAQMD website at: [http://www.aqmd.gov/home/library/air-quality-data-studies/special-monitoring/cpv-sentinel-monitoring]

concentrations from the continuous PM2.5 instruments, such as that used at the Desert Hot Springs station, are typically biased higher than the filter-based FRM PM2.5 measurements, the annual average concentration of 6.7 µg/m3 is slightly above the 2015 FRM PM2.5 annual average measured at Palm Springs (5.8 µg/m3) and slightly below that measured at Indio (7.5 µg/m3).

Particulate Matter (PM10)

PM10 is measured daily at both Indio and Palm Springs by supplementing the (primary) 1-in-3-day Federal Reference Method (FRM) filter sampling at Indio and the 1-in-6-day FRM sampling at Palm Springs with (secondary) continuous hourly Federal Equivalent Method (FEM) measurements at both stations. In addition, a third station has been operational in the community of Mecca in the southeastern Coachella Valley since 2013, measuring PM10 with a real-time FEM sampler. This monitoring was started at the request of U.S. EPA Region IX to help evaluate windblown dust in that portion of the Coachella Valley, which is potentially impacted by high-wind natural events, agricultural activities, and fugitive dust from the exposed shoreline of the receding Salton Sea.

Although exceedances of the ozone standard in the Coachella Valley area are primarily due to the transport of ozone and its precursors from the densely populated areas of the upwind Basin to the west, PM10 in the Coachella Valley is largely due to locally generated sources of fugitive dust (e.g., construction activities, re-entrained dust from paved and unpaved road travel, and natural wind-blown sources). The Coachella Valley is subject to frequent high winds that generate wind-blown sand and dust, leading to high episodic PM10 concentrations, especially from disturbed soil and natural desert blowsand[35] areas. PM10 is the only pollutant which often reaches higher concentrations in the SSAB than in the Basin. All days in recent years that exceeded the 24-hour PM10 NAAQS at the Indio, Palm Springs, or Mecca stations would not have exceeded that standard except for the contribution of windblown dust and sand due to strong winds in the upwind source area (high-wind natural events).

On some of the Coachella Valley's high PM10 days, long-range transport of wind-generated dust and sand occurs with relatively light winds in the Coachella Valley, when entrained dust from desert thunderstorm outflows is transported to the Coachella Valley from the desert areas of southeastern California, Arizona, Nevada or northern Mexico. These events are typically seen in the summer months with southeasterly flows and thunderstorm activity related to the North American Monsoon.[36] In the more extreme cases seen in the southwestern U.S. deserts, a deep wall of dust entrained by the thunderstorm downdraft and outflow can advance long distances from the origin, creating dust storms that are often referred to as *haboobs*.

---

[35] The blowsand process is a natural sand migration caused by the action of winds on the vast areas of sand in the Coachella Valley. The sand is supplied by weather erosion of the surrounding mountains and foothills. Although the sand migration is somewhat disrupted by urban growth in the Valley, the overall region of blowsand activity encompasses approximately 130 square miles, extending from near Cabazon in the San Gorgonio Pass to the Salton Sea.

[36] Adams, D.K., and A.C. Comrie. (1979). The North American Monsoon. *Bull. Amer. Meteor. Soc.,* 78, 2197-2213. [http://journals.ametsoc.org/doi/pdf/10.1175/1520-0477%281997%29078%3C2197%3ATNAM%3E2.0.CO%3B2]

______. (2004). The North American Monsoon. Reports to the Nation on our Changing Planet. NOAA/National Weather Service. [http://www.cpc.noaa.gov/products/outreach/Report-to-the-Nation-Monsoon_aug04.pdf]

On other high PM10 days, local windblown dust and sand is generated from strong winds in the Coachella Valley. Air forced through the San Gorgonio Pass (also referred to as Banning Pass) can create strong northwesterly winds along the centerline of the Coachella Valley. This wind forcing is often related to a marine air mass with a deep marine layer and strong westerly onshore (sea-breeze) flows in the South Coast Air Basin pushing through the San Gorgonio Pass. On other days, storm systems with frontal passages create strong winds through the San Gorgonio Pass and along the Valley. Hourly averaged winds measured near Cathedral City, in the Whitewater River Wash near the centerline of the Coachella Valley, typically exceeded 25 mph for at least one hour on approximately one third of the days in each year.

In 2015, high-wind natural events occurred on eight days that caused high 24-hour PM10 concentrations over the federal standard at the monitors at Indio, Palm Springs, or Mecca. Eight days in 2015 were flagged as exceptional events due to high winds. The days for which PM10 data was flagged for high-wind exceptional events in 2014 and 2015 are summarized in Table 3-3. Seven high-wind events in 2014 and four more in 2015 were associated with strong onshore winds from the Basin through the San Gorgonio Pass and down the Coachella Valley. Two days in 2014 and four days in 2015 had high PM10 due to strong outflows from thunderstorms over Arizona and northern Mexico that entrained dust and sand that was transported into the Coachella Valley. Some of the highest PM10 concentrations measured in the Coachella Valley in 2014 and 2015 occurred because of these monsoonal thunderstorm events.

As was done for similar high-wind events in prior years, the 2014 and 2015 events in the Coachella Valley have been flagged in the U.S. EPA Air Quality System (AQS) database as high-wind exceptional events, in accordance with the U.S. EPA Exceptional Events Rule, with further documentation and U.S. EPA concurrence pending. After excluding days flagged due to high-wind natural events, the federal 24-hour and former annual PM10 standards were not exceeded at the Coachella Valley stations in 2014, nor in 2015. Therefore, the maximum 2015 24-hour PM10 concentration (152 $\mu g/m^3$) and annual average (39 $\mu g/m^3$) were 100 and 78 percent of the current 24-hour federal PM10 standard and the revoked annual federal standard (50 $\mu g/m^3$), respectively.[37]

[37] Technically, a 24-hour PM10 concentration ≥ 155 $\mu g/m^3$ is required to exceed the federal standard, due to rounding requirements. While Coachella Valley concentrations near, but below 155 $\mu g/m^3$, are also influenced by high winds, exceptional event flagging may only apply to data that exceeds a NAAQS. Likewise, the revoked federal annual PM10 standard required an annual PM10 concentration ≥ 50.1 $\mu g/m^3$ to exceed that standard.

TABLE 3-3

High-Wind Exceptional Event Days in the Coachella Valley in 2014 and 2015

Date	Palm Springs PM10 (µg/m³)	Indio PM10 (µg/m³)	Mecca PM10 (µg/m³)#	Event Description
03/26/2014	113*	**168**	123*	high winds
04/12/2014	57*	**243**	**183***	high winds
04/13/2014	32*	**168**	132*	high winds
04/25/2014	49*	52	**183***	high winds
05/10/2014	73*	**215**	**226***	high winds
06/13/2014	29*	101	**183***	high winds
06/27/2014	38*	**165**	130*	high winds
07/27/2014**	106*	152	152*	high winds – monsoonal thunderstorms
08/18/2014	**313***	**298**	**237***	high winds – monsoonal thunderstorms
05/07/2015	15*	ND	**209***	high winds
07/08/2015	23*	**174**	**180***	high winds – monsoonal thunderstorms
07/17/2015	**161**	**337**	**306***	high winds – monsoonal thunderstorms
08/19/2015	48*	**181**	147*	high winds – monsoonal thunderstorms
09/09/2015	**187**	**176**	128*	high winds – monsoonal thunderstorms
11/02/2015	ND	**182**	87*	high winds
12/14/2015	11*	55	**203***	high winds
12/26/2015	13*	100	**300***	high winds

ND = No Data

Bold text indicates concentrations in excess of the PM10 NAAQS

\# In 2014 Mecca PM10 monitor was considered special purpose for evaluation purposes and the data was not submitted to the U.S. EPA AQS database; the 2014 Mecca data considered preliminary and subject to change in validation; 2015 Mecca FEM PM10 data was submitted to the AQS database, including exceptional event flags

* Indicates measurement with continuous FEM (TEOM) instrument; FRM filter is primary measurement when available

** Peak measured concentrations on 7/27/14 did not technically exceed the federal PM10 standard, which requires a 24-hour average of 155 µg/m³, or above to exceed

When considering the form of the federal PM10 standards, after excluding the flagged high-wind exceptional events, the 3-year (2013–2015) design values for the Coachella Valley are 150 µg/m^3 for the 24-hour average and 38 µg/m^3 for the annual average (former standard). These are 100 and 70 percent of the 24-hour and former annual PM10 federal standards, respectively, and 304 and 190 percent of the California State 24-hour (50 µg/m^3) and annual average (20 µg/m^3) PM10 standards. Figure 3-9 (in the previous section) shows the trend of the annual average PM10 concentrations in the Coachella Valley for the station showing the highest PM10 measurements from 1990 through 2015, along with the annual PM2.5 trend.

For each routine District ambient air monitoring station, the annual arithmetic mean, percent of sampling days exceeding State and federal standards, and maximum 24-hour average PM concentrations are shown in Tables A-11 to A-19 in the attachment to this appendix for the years 1995-2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Carbon Monoxide (CO)

Carbon monoxide was measured at one Coachella Valley air monitoring station (Palm Springs) in 2015. Neither the federal nor State standards were exceeded. The maximum 8-hour average CO concentration recorded in 2015 (0.7 ppm) was less than 8 percent of both the federal (9 ppm) and State (9.0 ppm) 8-hour standards. The maximum 1-hour CO concentration (2.0 ppm) was 6 percent of the federal (35 ppm) and 10 percent of the State (20 ppm) 1-hour CO standards. Historical carbon monoxide air quality data show that the Coachella Valley area has not exceeded the federal CO standards in nearly three decades.

For the 3-year period 2013–2015, the 1-hour and 8-hour design values were 1.9 ppm and 0.5, 5 and 6 percent, respectively, of the federal standards (10 percent of the State 1-hour standard and 6 percent of the State 8-hour standard).

The annual maximum 8-hour CO concentrations at all District air monitoring stations, including the Coachella Valley, are shown in Table A-20 in the attachment, for the period 1995-2015.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide was measured at one station (Palm Springs) in the Coachella Valley in 2015. The maximum 1-hour average NO_2 concentration (41.5 ppb) was 42 percent of the 2010 federal 1-hour standard (100 ppb) and 23 percent of the State 1-hour standard (180 ppb). The maximum annual average NO_2 concentration (0.0062 ppm) was approximately 12 percent of the federal annual standard (0.0534 ppm) and 21 percent of the State annual standard (0.030 ppm).

For the 3-year of 2013–2015, the NO_2 design values for the Coachella Valley were 39 ppb for the 1-hour average and 0.0069 ppm for the annual average, 39 percent and 13 percent of those NAAQS, respectively.

The annual averages and annual maximum 1-hour average NO_2 concentrations for each monitoring station in the District (including the Coachella Valley) for the years 1995–2015 are shown in Tables A-21 and A-22, in the attachment to this appendix.

Sulfur Dioxide (SO_2)

Sulfur dioxide was not measured in the Coachella Valley in 2015. Historic analyses have shown SO_2 concentrations to be well below the State and federal standards and there are no significant emissions sources of SO_2 in the Coachella Valley.

Sulfates (SO_4^{2-})

Sulfate, from FRM PM10 filters, was measured at two stations (Palm Springs and Indio) in the Coachella Valley in 2015. The 2015 maximum 24-hour average sulfate concentration was 4.6 $\mu g/m^3$ and the 3-year maximum State designation value was 2.6 $\mu g/m^3$ (10 percent of the 25 $\mu g/m^3$ State sulfate standard). While still low, the 4.6 $\mu g/m^3$ peak value may not be the State designation value, since it was associated with a high-wind exceptional event that caused exceedances of the PM10 NAAQS at Indio at both the Palm Springs and Indio air monitoring stations. There is no federal sulfate standard.

The maximum 24-hour average concentrations at each SCAQMD air monitoring station, including the Coachella Valley, for the years 1995–2015 are shown in Table A-24 in the attachment.

Lead (Pb)

Lead concentrations were not measured in the Coachella Valley in 2015. Historic analyses have shown concentrations to be less than the State and federal standards and no major sources of lead emissions are located in the Coachella Valley.

Hydrogen Sulfide (H_2S)

SCAQMD started measuring H_2S near the Salton Sea at two locations in November 2013, in order to better understand odor events related to the Salton Sea and to better communicate these events to the community. One of the H_2S monitoring stations is located on Torres-Martinez tribal land that is close to the shore, in a sparsely populated area. The second monitor is located at the SCAQMD Mecca air monitoring station site (Saul Martinez Elementary School), a more populated community approximately four miles north of the Salton Sea.

A significant H_2S odor event occurred in September 2012, bringing sulfur or rotten-egg odors and widespread attention to this issue of H_2S odors from the Salton Sea. This event affected people in communities throughout the Coachella Valley, across many areas of the South Coast Air Basin, and into portions of the Mojave Desert Air Basin to the north. Over 235 complaints were registered with SCAQMD during this event, from as far west as the San Fernando Valley in Los Angeles County.

The H_2S produced in the Salton Sea is a product of anaerobic organic decay that is particularly active in the summer months, especially at the bottom of the shallow Sea with the abundant desert sunlight and heat. The 2012 event occurred during a period of moist southeasterly "monsoonal" flows in desert areas of southeastern California, along with desert thunderstorms. Strong outflow winds from thunderstorms to the south crossed the Salton Sea, causing mixing in the water layers that released and transported significant amounts of H_2S gas and the associated odors.

While strong events like that of September 2012 are uncommon, less extreme releases of H_2S can frequently cause odors in areas close to the Salton Sea. These events are more prevalent during the hot summer months, especially when the southeasterly "monsoonal" flow events occur, but they sometimes occur at other times of the year. Elevated H_2S concentrations are typically measured near the Salton Sea during wind shifts that bring flows from the south or east directions. These shifts occur most often in the early morning or the late afternoon/early evening hours in this area. The Salton Sea's receding shorelines and shallower waters may affect the number or severity of these odor events in the future.

While there is no federal standard for H_2S, the State of California has set a standard of 30 parts per billion (ppb), averaged over one hour as a level not to be reached or exceeded. The State standard was adopted in 1969, based on the thresholds for annoyance and unpleasant odors, with the purpose of decreasing odor annoyances.[38] Humans can detect H_2S odors at extremely low concentrations, down to a few ppb. Above the State standard, most individuals can smell the offensive odor and many may experience temporary symptoms such as headaches and nausea due to unpleasant odors. The CAAQS for H_2S was reviewed in 1984 and retained.

In 2014 and 2015, 24 and 27 days, respectively, had exceedances of the 1-hour State H_2S standard at the sparsely populated Torres-Martinez monitoring site at the Salton Sea. Of these, five days in 2014 and 12 days in 2015 had H_2S exceedances that lasted longer than one hour. The highest number of hourly exceedances in a day was 20, on September 9, 2015, while the next highest number of hours exceeding was six. The exceedances at this station occurred between the beginning of April and the end of October, with most occurring in August and September. The highest 1-hour concentration measured at the Torres-Martinez station in 2014 and 2015 was 183 ppb, on September 9, 2015.

Further north from the Salton Sea in Mecca, the State H_2S standard was exceeded on three days in 2014 and on 6 days in 2015, with a peak concentration of 129 ppb on September 3, 2015. The most hours in a day to exceed the standard at Mecca was six, on September 9, 2014. Most of the daily exceedances only lasted one or two hours. All the 2014 and 2015 Mecca exceedances occurred in the months of August and September. Figure 3-10 shows the 2014 and 2015 monthly number of days by station exceeding the State H_2S standard in the Coachella Valley.

[38] Collins, J., and D. Lewis. (2000). Hydrogen Sulfide: Evaluation of Current California Air Quality Standards with Respect to Children. California Office of Environmental Health Hazard Assessment document prepared for CARB. [http://www.arb.ca.gov/ch/ceh/001207/h2s_oehha.PDF]

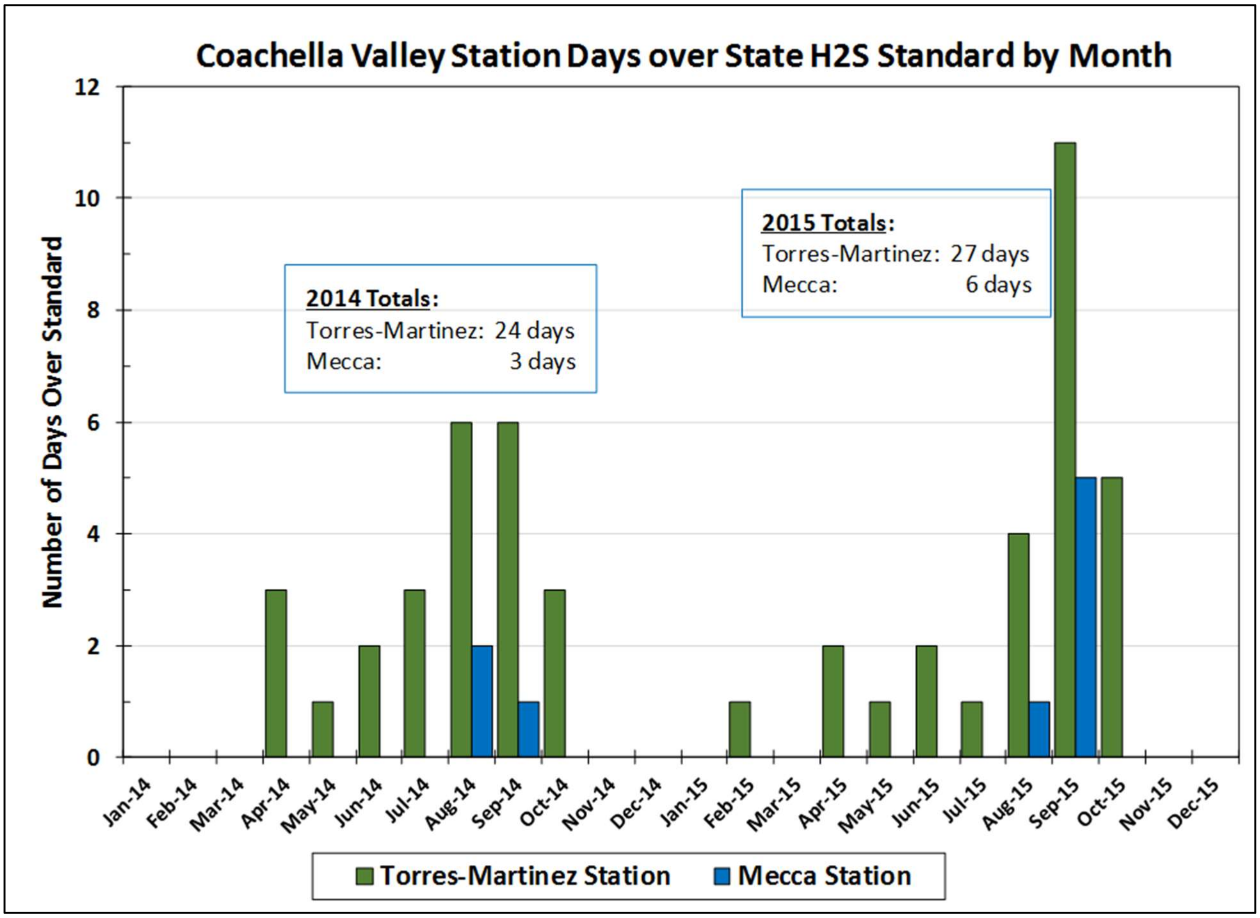

FIGURE 3-10

Number of Days in Each Month with 1-Hour Hydrogen Sulfide (H_2S) over the State Standard in 2014 and 2015 for Coachella Valley Monitoring Stations

(the Salton Sea near-shore site is labeled Torres-Martinez and the nearby community site is Mecca)

ATTACHMENT TO APPENDIX II

TABLE A-1
Air Monitoring Stations and Source/Receptor Areas*

AREA #	SOURCE/RECEPTOR AREA*	LOCATION	STN #
LOS ANGELES COUNTY			
1	Central LA	Los Angeles	087
2	Northwest Coastal LA County	West Los Angeles	091
3	Southwest Coastal LA County 1	Hawthorne (moved)	094
3	Southwest Coastal LA County 2	LAX-Hastings	820
4	South Coastal LA County 1	North Long Beach (closed in 2013)#	072
4	South Coastal LA County 2	South Long Beach	077
4	South Coastal LA County 3	Long Beach, Port	033
6	West San Fernando Valley	Reseda	074
7	East San Fernando Valley	Burbank (closed in 2014)	069
8	West San Gabriel Valley	Pasadena	088
9	East San Gabriel Valley 1	Azusa	060
9	East San Gabriel Valley 2	Glendora	591
10	Pomona/Walnut Valley	Pomona	075
11	South San Gabriel Valley	Pico Rivera	085
12	South Central LA County 1	Lynwood (moved)	084
12	South Central LA County 2	Compton	112
13	Santa Clarita Valley	Santa Clarita	090
ORANGE COUNTY			
16	North Orange County	La Habra	3177
17	Central Orange County	Anaheim	3176
18	North Coastal Orange County	Costa Mesa	3195
19	Saddleback Valley 1	El Toro (moved)	3186
19	Saddleback Valley 2	Mission Viejo	3812
RIVERSIDE COUNTY			
22	Norco/Corona	Norco	4155
23	Metropolitan Riverside County 1	Riverside – Rubidoux	4144
23	Metropolitan Riverside County 2	Riverside – Magnolia (closed in 2015)	4146
23	Metropolitan Riverside County 3	Mira Loma	4165
24	Perris Valley	Perris	4149
25	Elsinore Area	Lake Elsinore	4158
26	Temecula Valley	Temecula – Lake Skinner	4031
29	Banning Airport	Banning Airport	4164
30	Coachella Valley 1**	Palm Springs	4137
30	Coachella Valley 2**	Indio	4157
30	Coachella Valley 2**	Mecca (started PM10 in 2013)	4157
SAN BERNARDINO COUNTY			
32	Northwest San Bernardino Valley	Upland	5175
33	Southwest San Bernardino Valley	Ontario (closed in 2014)	5817
34	Central San Bernardino Valley 1	Fontana	5197
34	Central San Bernardino Valley 2	San Bernardino	5203
35	East San Bernardino Valley	Redlands	5204
37	Central San Bernardino Mountains	Crestline – Lake Gregory	5181
38	East San Bernardino Mountains	Big Bear Lake	5818

* Source/receptor areas and area numbers are mapped in Figure A-1
The four near-road monitoring sites started in 2014-2015 are not listed, please refer to Chapter 1 of this appendix for more information
** Salton Sea Air Basin
# Site continues to monitor filter based (FRM) PM2.5

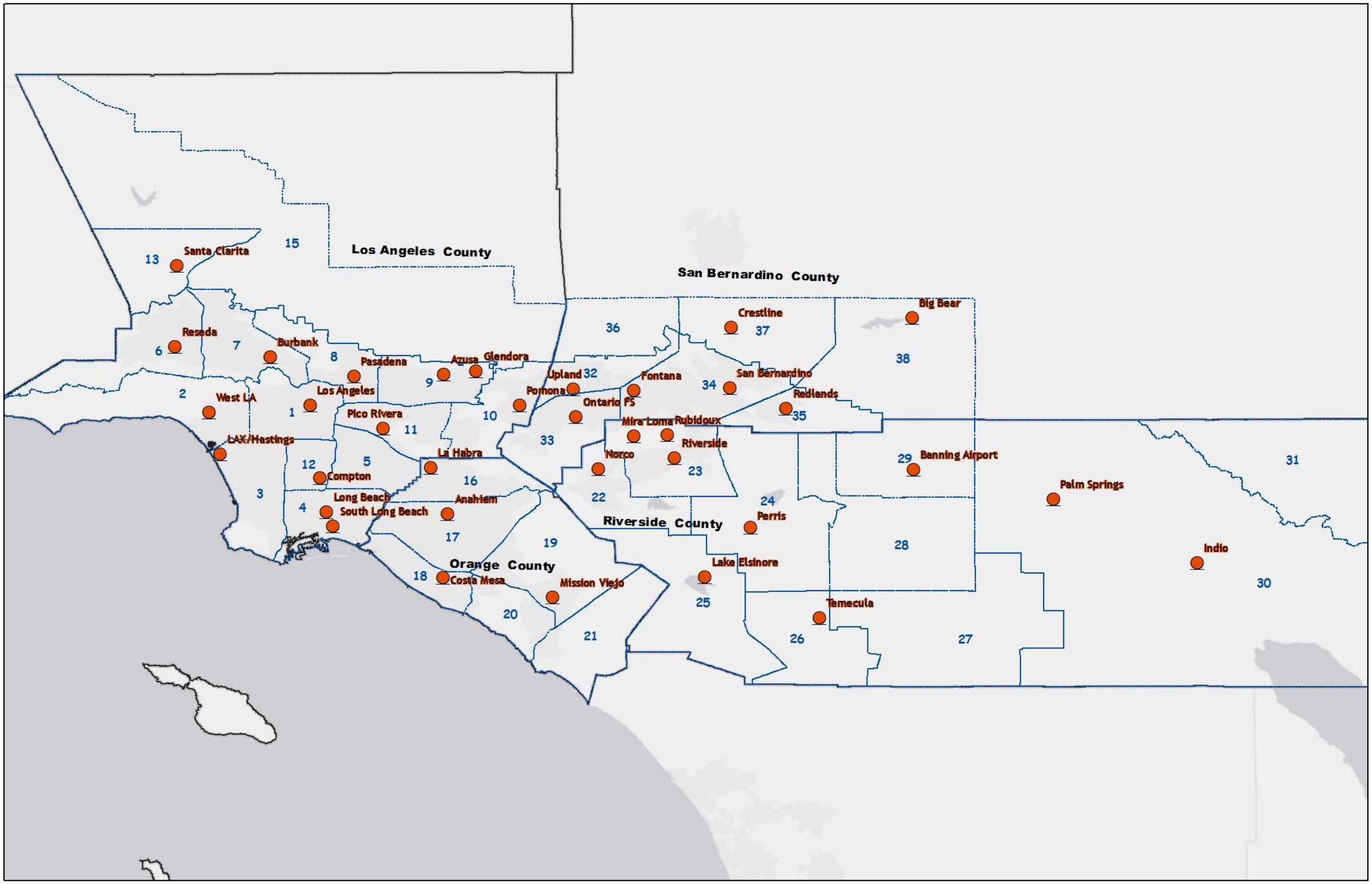

FIGURE A-1
South Coast Air Basin and Adjoining Areas of Salton Sea Air Basin
(with Source/Receptor Areas)

TABLE A-2

Ozone – Number of Days Exceeding the 2015 Federal Standard

(0.070 ppm, 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	104	65	41	40	26*	32	33	26	48	35	20	24	27	37	29	8	18	18	15	18	27
069	East San Fernando Valley	58	37	20	29	27	29	20	21	43	48	22	32	18	31	27	8	10	15	17	2	--
072	South Coastal Los Angeles County 1	4	5	1*	3	2	2	0	0	0	2	0	0	1	1	0	1	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	1	0
074	West San Fernando Valley	48	68	18	32	12	12	34	60	91	82	43	55	43	37	28	35	35	38	20	27	32
075	Pomona/Walnut Valley	84	41	20	34	18	19	13	32	46	36	30	40	26	46	36	10	23	28	22	53	53
084	South Central Los Angeles County 1															--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	1	4	1
085	South San Gabriel Valley	59	31	22	29	9	11	7	5	17	12	--	8*	8	12	5	1	1	6	1	7	11
087	Central Los Angeles	32	23	9	14	11	10	8	6	14	13	3	7	4	6	5	1	0	2	0	6	6
088	West San Gabriel Valley	83	54	26	33	18	36	32	28	52	46	19	34	17	26	19	5	13	20	2	13	18
090	Santa Clarita Valley	81	79	63	50	42	50	50	102	100	91	79	78	62	79	75	40	51	81	57	64	52
091	Northwest Coastal Los Angeles County	14	19	12	2	3	4	2	5	19	13	10	2	2	8	5	3	0	1	1	5	2
094	Southwest Coastal Los Angeles County 1	9	11	13	0	1	1	14	1	3	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	17	2	0	1	1	0	0	0	1	1	6	3
591	East San Gabriel Valley 2	117	88	67	61	29	48	65	47	67	49	36	41	41	60	62	41	40	57	40	58	48
ORANGE COUNTY:																						
3176	Central Orange County	15	10	1	10	1	8	0*	3	15	49	7	4	6	10	2	1	1	0	0	6	1
3177	North Orange County	27	23	9	14	8	11	5	4	12	11	2	11	9	14	8	4	3	3	2	6	7
3186	Saddleback Valley 1				--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	11	3	1	10	1	3	1	0	17	11	2	0	1	5	3	2	1	1	2	6	2
3812	Saddleback Valley 2	--	--	--	--	--	4	16	13	26	32	10	22	10	25	12	2	4	4	5	10	8
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	70	93	75*	63	64	87	98	99	88	86	75	78	81	68	71	76	66	76	76	55	47
4144	Metropolitan Riverside County	117	116	98*	84	64	69	64	89	98	87	79	73	66	85	54	74	90	70	36	66	55
4149	Perris Valley	118	119	78	52	28	89	102	90	81	58	2	97	87	92	88	76	75	64	58	59	49
4157	Coachella Valley 2**	61	55	11	39	49	22	62	63	59	67	56	41	48	43	39	45	40	43	35	24	11
4158	Lake Elsinore	104	24	1	75	90	87	101	90	78	76	68	69	52	88	63	40	43	29	24	13	31
4031	Temecula Valley			--	--	--	--	--	--	--	--	--	--	--	--	--	--					
4164	Banning Airport	40	51	176	93	88	80	94	100	107	89	86	90	58	94	89	75	57	71	65	58	46
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--			60	28	56	58	70	31	52	51
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	108	59	68	57	38	50	59	41	62	46	43	64	54	64	69	52	45	66	44	57	66
5181	Central San Bernardino Mountains	129	132	109	121	127	109	127	128	115	125	119	103	113	114	104	97	102	99	98	93	86
5197	Central San Bernardino Valley 1	96	84	64	64	38	45	54	42	69	68	61	65	55	79	63	49	53	85	66	52	57
5203	Central San Bernardino Valley 2	116	121	110	70	65	68	75	59	83	77	70	70	70	83	76	58	65	74	51	75	78
5204	East San Bernardino Valley	126	130	128	86	77	97	87*	90	109	101	53	78	79	100	90	82	96	98	90	79	76
	District Maximum	129	132	176	121	127	109	127	128	115	125	119	103	113	114	104	97	102	99	98	93	86

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-3

Ozone – Number of Days Exceeding the 2008 Federal Standard

(0.075 ppm, 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	88	53	26	33	19*	27	25	17	35	21	14	17	20	28	17	4	12	10	6	11	17
069	East San Fernando Valley	49	25	15	24	15	23	7	14	38	36	10	23	13	17	14	5	6	8	6	1	--
072	South Coastal Los Angeles County 1	2	2	0*	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
074	West San Fernando Valley	39	49	11	23	7	10	21	44	73	62	26	33	28	26	19	22	26	23	11	11	15
075	Pomona/Walnut Valley	73	36	16	28	14	10	5	24	38	22	17	27	18	35	23	7	16	15	15	33	36
084	South Central Los Angeles County 1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	1	2	0
085	South San Gabriel Valley	46	24	15	22	4	9	5	3	14	6	--	4*	5	5	3	1	0	0	0	5	2
087	Central Los Angeles	21	17	8	11	5	8	4	6	8	5	2	3	3	3	2	1	0	1	0	2	0
088	West San Gabriel Valley	70	45	21	26	10	25	23	19	40	25	12	23	11	16	12	3	5	9	0	7	7
090	Santa Clarita Valley	66	68	42	39	25	36	41	90	89	74	68	62	44	62	64	28	31	57	40	45	37
091	Northwest Coastal Los Angeles County	10	10	6	2	1	1	1	1	12	5	4	0	2	2	3	1	0	0	0	4	0
094	Southwest Coastal Los Angeles County 1	5	9	8	0	1	0	6	0	1	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	12	1	0	0	0	0	0	0	0	1	3	1
591	East San Gabriel Valley 2	105	69	45	49	19	30	49	33	58	33	26	29	26	45	42	24	30	45	24	38	34
ORANGE COUNTY:																						
3176	Central Orange County	8	7	1	7	1	3	0*	1	11	29	2	3	1	4	1	1	0	0	0	4	1
3177	North Orange County	18	13	8	6	4	7	2	2	7	3	0	7	8	5	3	1	0	2	1	2	2
3186	Saddleback Valley 1	8	11	5	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	3	2	1	2	0	2	0	0	7	5	0	0	0	3	0	1	1	1	1	4	1
3812	Saddleback Valley 2	--	--	--	--	--	4	8	6	15	16	6	13	5	15	10	2	2	1	2	5	3
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	52	73	54*	47	38	61	77	82	70	55	61	61	58	51	53	55	49	51	46	35	26
4144	Metropolitan Riverside County	104	99	79*	69	46	50	50	64	86	70	55	57	46	64	35	50	68	47	26	41	39
4149	Perris Valley	101	93	67	41	17	71	85	72	72	44	16	83	73	77	67	53	54	46	34	38	31
4157	Coachella Valley 2**	44	46	3	22	30	18	40	45	40	50	34	28	29	27	24	22	19	24	18	10	4
4158	Lake Elsinore	82	18	1	63	64	65	77	67	57	43	41	54	35	69	37	23	28	17	12	6	19
4031	Temecula Valley	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14	4	3	4	6
4164	Banning Airport	--	--	127	63	63	64	72	86	84	64	64	74	43	74	70	62	41	53	41	38	25
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	44	23	47	22	40	36	47	21	29	36
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	97	52	52	47	24	32	52	32	46	28	30	51	35	50	49	42	36	45	27	42	53
5181	Central San Bernardino Mountains	113	120	89	111	104	94	103	112	107	92	98	96	93	97	92	75	84	86	72	68	61
5197	Central San Bernardino Valley 1	88	75	47	56	30	26	43	34	69	48	45	46	43	58	48	38	39	62	42	37	39
5203	Central San Bernardino Valley 2	109	105	89	60	54	50	62	42	62	55	56	56	51	63	62	47	39	54	36	51	57
5204	East San Bernardino Valley	118	111	105	72	68	76	73*	74	101	74	44	62	58	75	73	61	80	79	63	55	54
	District Maximum	118	120	127	111	104	94	103	112	107	92	98	96	93	97	92	75	84	86	72	68	61

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-4
Ozone – Number of Days Exceeding the 1997 Federal Standard
(0.084 ppm, 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	68	36	17	22	7*	15	18	11	21	10	6	10	14	14	7	0	3	2	1	3	7
069	East San Fernando Valley	29	11	6	13	3	11	4	5	21	7	2	12	7	8	5	0	0	2	0	0	--
072	South Coastal Los Angeles County 1	0	0	0*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
074	West San Fernando Valley	20	28	2	12	0	0	7	27	49	30	12	17	9	14	8	5	7	10	3	2	4
075	Pomona/Walnut Valley	55	22	10	20	8	5	3	14	24	13	11	16	10	19	9	0	6	4	4	9	14
084	South Central Los Angeles County 1															--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	0	0	0
085	South San Gabriel Valley	24	11	7	12	2	4	2	0	2	0	--	3*	2	1	1	1	0	0	0	1	0
087	Central Los Angeles	9	7	3	9	2	4	1	0	2	1	1	0	2	1	1	0	0	0	0	1	0
088	West San Gabriel Valley	53	27	13	17	3	13	9	10	28	10	5	7	6	6	6	0	0	1	0	4	0
090	Santa Clarita Valley	48	42	25	34	11	12	25	52	69	52	47	40	17	35	33	7	18	29	18	16	15
091	Northwest Coastal Los Angeles County	1	4	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	2	0
094	Southwest Coastal Los Angeles County 1	3	4	2	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	4	0	0	0	0	0	0	0	0	0	0	0
591	East San Gabriel Valley 2	84	52	24	37	7	21	28	21	40	16	13	15	14	26	19	7	16	14	7	14	11
ORANGE COUNTY:																						
3176	Central Orange County	1	0	1	4	0	1*	0	0	1	8	0	1	1	1	0	1	0	0	0	0	0
3177	North Orange County	8	6	3	4	1	2	2	0	2	0	0	4	2	0	0	1	0	0	0	2	0
3186	Saddleback Valley 1					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
3812	Saddleback Valley 2	--	--	--	--	--	2	2	1	8	4	1	6	2	6	3	0	0	0	0	2	2
RIVERSIDE COUNTY:																						1
4137	Coachella Valley 1**	27	52	26*	30	20	28	39	46	43	32	35	23	21	17	22	14	14	16	11	7	5
4144	Metropolitan Riverside County	78	72	52*	57	22	26	33	35	62	35	32	30	17	38	11	21	35	17	7	12	17
4149	Perris Valley	73	63	36	28	6	39	56	39	46	20	0	53	38	41	29	23	21	11	8	7	12
4157	Coachella Valley 2**	17	23	1	12	7	7	15	15	19	18	18	7	6	8	5	3	6	5	5	2	1
4158	Lake Elsinore	51	10	1	44	33	26	46	41	36	21	15	24	19	32	16	6	12	5	1	1	12
4031	Temecula Valley			--	--	--	--	--	--	--	--	--	--	--	--	--	--					
4164	Banning Airport	18	18	102	39	31	34	47	48	62	41	39	43	16	45	41	21	22	24	11	11	11
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--			23	6	10	22	19	7	6	20
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	78	37	28	39	16	18	30	19	34	18	15	25	18	30	25	10	17	25	12	15	27
5181	Central San Bernardino Mountains	91	96	66	86	82	64	74	82	71	66	69	59	62	67	60	41	48	43	39	41	30
5197	Central San Bernardino Valley 1	72	60	30	42	15	16	31	21	43	29	23	29	19	35	27	7	22	35	21	14	20
5203	Central San Bernardino Valley 2	85	87	63	47	30	23	38	29	45	39	31	29	25	43	27	14	24	27	11	21	29
5204	East San Bernardino Valley	96	88	77	58	36	47	52*	44	72	56	24	36	25	50	43	24	41	43	27	27	30
	District Maximum	96	96	102	86	82	64	74	82	72	66	69	59	62	67	60	41	48	43	39	41	30

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-5
Ozone – Number of Days Exceeding the Former (1979) 1-Hour Federal Standard
(0.12 ppm, 1-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	63	26	11	19	2*	11	9	5	11	2	4	7	3	7	4	0	0	1	0	0	0
069	East San Fernando Valley	20	6	2	7	0	3	2	1	4	2	2	6	0	1	1	0	0	0	0	0	--
072	South Coastal Los Angeles County 1	0	0	0*	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
074	West San Fernando Valley	8	11	0	7	0	0	2	9	14	2	2	6	1	0	1	0	3	1	0	0	0
075	Pomona/Walnut Valley	47	16	7	18	2	3	1	5	13	4	3	9	2	5	1	0	0	0	1	0	2
084	South Central Los Angeles County 1	0	1	0	0	0	0	0	0	0	0	0	0	0	0*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0
085	South San Gabriel Valley	20	32	6	10	0	2	1	0	1	0	--	1*	2	0	1	0	0	0	0	0	0
087	Central Los Angeles	5	24	0	5	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
088	West San Gabriel Valley	44	54	5	14	0	7	1	3	7	1	2	5	3	0	3	0	0	0	0	0	0
090	Santa Clarita Valley	26	68	13	16	0	1	9	32	35	13	11	20	2	8	5	1	3	6	2	2	1
091	Northwest Coastal Los Angeles County	1	13	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
094	Southwest Coastal Los Angeles County 1	0	1	0	0	1	0	0	0	0	0*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0*	0	0	0	0	0	0	0	0	0	0	0
591	East San Gabriel Valley 2	73	49	18	28	3	11	13	12	22	5	8	10	3	12	7	0	4	3	1	5	2
ORANGE COUNTY:																						
3176	Central Orange County	2	1	0	2	0*	1	0*	0	2	0	0	0	1	0	0	0	0	0	0	0	0
3177	North Orange County	4	5	1	5	0	1	0	0	1	0	0	3	1	0	0	0	0	0	0	0	0
3186	Saddleback Valley 1	1	2	2	2	0	1*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3812	Saddleback Valley 2	--	--	--	--	--	2*	1	2	4	0	1	0	0	0	0	0	0	0	0	0	0
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	9	12	4*	8	1	0	6	2	4	1	4	2	1	0	0	0	0	1	0	0	0
4144	Metropolitan Riverside County	52	36	13*	32	3	3	7	12	18	8	3	8	2	8	0	1	4	1	0	1	1
4149	Perris Valley	36	31	6	8	0	15	19	4	7	2	1	12	4	4	1	0	2	0	0	0	0
4157	Coachella Valley 2**	3	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4158	Lake Elsinore	23	17	4	22	5	1	12	6	7	2	3	3	3	6	1	0	1	0	0	0	1
4031	Temecula Valley	0	0*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
4164	Banning Airport	--	--	--	25	5	4	16	13	27	7	10	8	1	10	1	0	3	0	0	0	0
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	4	0	4	0	0	1	0	0	1	1
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	67	35	12	30	4	10	14	5	15	3	8	14	7	9	3	1	5	4	3	1	2
5181	Central San Bernardino Mountains	65	62	29	57	30	17	26	22	34	9	18	9	13	16	7	6	8	2	0	1	3
5197	Central San Bernardino Valley 1	57	38	10	32	4	7	13	8	26	7	9	12	9	8	3	2	5	5	2	1	3
5203	Central San Bernardino Valley 2	61	63	32	39	14	7	18	6	19	6	9	10	8	11	2	1	2	0	2	0	6
5204	East San Bernardino Valley	69	65	35	43	12	11	21*	23	38	12	6	11	7	12	1	1	7	3	3	2	2
	District Maximum	73	68	35	57	30	17	26	32	38	13	18	20	13	16	7	6	8	6	3	5	6

* Less than 12 full months of data   ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-6
Ozone – Annual Maximum 8-Hour Average (ppb)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	146	136	123	147	98	142	130	102	124	104	122	120	113	111	107	81	72	95	85	92	96
069	East San Fernando Valley	115	116	103	124	99	118	104	95	106	109	108	128	96	109	96	84	84	88	83	79	--
072	South Coastal Los Angeles County 1	78	83	73	75	81	81	70	64	68	74	69	58	73	74	67	84	61	67	70	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	63	66	69	72	94
074	West San Fernando Valley	112	124	94	118	84	84	116	121	127	115	113	109	105	103	100	91	103	98	92	92	66
075	Pomona/Walnut Valley	150	126	115	131	103	122	107	111	121	100	112	127	109	110	99	82	96	92	99	99	98
084	South Central Los Angeles County 1	83	86	56	64	67	57	55	64	62	52	63	69	81	--	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78	60	65	70	80	81	72
085	South San Gabriel Valley	119	104	101	120	98	114	100	79	97	81	65	94	100	93	101	86	74	75	72	92	81
087	Central Los Angeles	107	95	92	111	108	103	99	79	88	91	98	79	102	90	100	80	65	77	69	94	74
088	West San Gabriel Valley	134	126	113	140	96	134	119	101	108	102	114	117	101	100	114	81	84	86	75	96	84
090	Santa Clarita Valley	150	129	129	147	98	110	128	144	152	133	141	120	110	131	122	105	122	112	104	110	108
091	Northwest Coastal Los Angeles County	85	95	84	79	82	79	80	77	104	89	90	74	87	96	94	78	68	73	75	94	72
094	Southwest Coastal Los Angeles County 1	101	93	89	69	84	75	79	72	77	60	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	76	66	75	75	70	70	67	75	81	80	77
591	East San Gabriel Valley 2	158	150	130	171	103	146	134	114	134	107	130	127	117	118	118	99	111	110	100	101	102
ORANGE COUNTY:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3176	Central Orange County	86	84	87	104	76	97	70	78	87	97	77	88	99	86	77	88	92	67	70	81	80
3177	North Orange County	109	103	100	115	91	99	89	79	87	79	75	114	107	84	82	96	74	78	78	88	82
3186	Saddleback Valley 1	97	101	96	110	81	110	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	81	80	77	85	75	86	73	70	88	87	72	62	72	79	72	76	77	76	83	79	79
3812	Saddleback Valley 2	--	--	--	--	--	87	97	93	105	90	85	105	90	104	95	82	83	78	82	88	88
RIVERSIDE COUNTY:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4137	Coachella Valley 1**	132	125	117	136	104	104	113	124	110	106	116	109	102	101	98	99	98	100	104	93	92
4144	Metropolitan Riverside County	146	162	129	169	110	112	119	124	140	114	129	117	111	116	100	98	115	102	103	104	105
4149	Perris Valley	161	133	112	129	97	126	135	117	121	104	78	122	116	114	108	107	112	93	90	94	102
4157	Coachella Valley 2**	111	100	94	115	107	96	98	110	105	99	95	90	95	92	90	87	90	89	87	91	85
4158	Lake Elsinore	142	123	85	143	123	104	120	114	137	113	119	109	109	118	105	91	106	89	89	86	98
4031	Temecula Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	85	82	78	100	87
4164	Banning Airport	127	117	148	134	123	112	128	130	146	116	132	116	114	120	104	107	111	98	103	97	97
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	119	104	107	90	94	104	102	96	102	104
SAN BERNARDINO COUNTY:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5175	Northwest San Bernardino Valley	166	152	132	171	116	149	138	116	134	104	121	131	115	122	121	97	122	111	111	101	106
5181	Central San Bernardino Mountains	203	164	138	206	142	148	139	139	142	145	145	142	137	126	117	123	136	112	105	106	127
5197	Central San Bernardino Valley 1	156	162	133	172	105	138	135	123	148	123	128	123	122	124	128	100	124	110	122	105	111
5203	Central San Bernardino Valley 2	165	173	137	180	132	126	144	112	137	129	129	126	121	122	126	104	121	109	112	99	117
5204	East San Bernardino Valley	174	164	143	186	130	130	143	122	153	135	123	135	124	120	122	111	133	109	119	104	115
	District Maximum	203	173	148	206	142	149	144	144	153	145	145	142	137	131	128	123	136	112	122	110	127

+ Site relocated   * Less than 12 full months of data   ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-7
Ozone – Annual Maximum 4th Highest 8-Hour Average (ppb)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	138	127	113	126	95	108	102	97	104	92	87	90	96	101	91	76	82	79	80	81	88
069	East San Fernando Valley	106	98	95	101	84	97	87	91	96	89	81	97	88	92	86	77	81	81	79	69	--
072	South Coastal Los Angeles County 1	71	73	67	65	68	66	60	59	63	70	59	56	56	64	64	57	60	60	60	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	57	54	57	61	87
074	West San Fernando Valley	101	110	83	100	81	80	89	111	119	101	98	103	92	95	93	87	91	95	84	83	56
075	Pomona/Walnut Valley	136	113	95	120	89	88	82	99	109	95	96	108	102	100	95	81	86	85	85	90	94
084	South Central Los Angeles County 1	51	57	53	51	41	50	54	49	57	65	63	64	56	55+	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	64	50	61	64	63	73	65
085	South San Gabriel Valley	105	93	97	102	80	86	81	74	82	78	51	78	79	77	72	59	63	71	70	79	75
087	Central Los Angeles	91	93	81	96	79	85	76	77	82	77	70	75	72	73	73	64	60	68	60	72	72
088	West San Gabriel Valley	130	117	100	117	86	104	90	95	101	93	85	96	89	91	95	75	77	80	70	86	82
090	Santa Clarita Valley	130	123	116	127	95	97	112+	131	137	107	118	112	101	108	103	88	101	102	94	97	91
091	Northwest Coastal Los Angeles County	81	88	78	70	69	71	64	73	83	76	76	67	67	73	75	70	62	65	59	77	69
094	Southwest Coastal Los Angeles County 1	78	86	83	63	66	65	79	64	70	56*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	86*	68	62	66	65	61	59	62	59	60	75	69
591	East San Gabriel Valley 2	148	140	121	142	96	112	110	110	123	95	97	106	104	112	108	91	95	95	88	96	95
ORANGE COUNTY:																						
3176	Central Orange County	82	81	68	87	61	74	66	69	80	88	75	70	73	76	68	64	67	65	63	76	65
3177	North Orange County	96	90	82	93	78	83	73	71	80	75	65	89	82	78	75	71	69	70	66	75	73
3186	Saddleback Valley 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	75	70	70	76	70	67	69	66	79	75	66	60	65	75	66	60	67	60	65	76	68
3812	Saddleback Valley 2	--	--	--	--	--	87	72	81	95	84	78	90	80	92	84	69	74	71	74	78	75
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	106	116	101	108	98	96	111	109	105	99	108	98	97	96	96	93	92	94	90	89	86
4144	Metropolitan Riverside County	142	130	118	136	104	106	109	109	120	111	105	111	99	111	89	94	107	96	94	91	96
4149	Perris Valley	132	122	105	115	91	111	124	107	116	95	82	113	103	106	101	100	94	90	88	89	94
4157	Coachella Valley 2**	96	98	82	97	89	87	93	97	100	94	92	85	87	88	85	84	85	85	85	84	79
4158	Lake Elsinore	126	108	111	128	106	98	111	104	112	102	97	101	97	108	96	88	92	87	81	79	93
4031	Temecula Valley	81	67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	73	77	75	77	79
4164	Banning Airport	101	107	93	81	114+	102	116	113	127	112	119	104	95	108	100	99	100	95	91	94	91
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	105	103	100	109	86	92	96	95	92	87	93
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	145	138	112	137	103	117	120	105	114	102	101	112	112	108	102	91	98	102	95	93	101
5181	Central San Bernardino Mountains	167	155	125	183	133	122	133	131	130	122	130	111	126	120	108	109	106	103	99	102	107
5197	Central San Bernardino Valley 1	143	137	115	132	98	100	123	114	132	111	113	114	112	110	100	94	105	106	100	93	100
5203	Central San Bernardino Valley 2	152	145	127	145	115	111	128	105	123	112	113	118	117	112	101	96	101	100	97	95	105
5204	East San Bernardino Valley	162	138	126	148	115	112	131	117	137	119	113	124	112	112	100	97	113	105	104	99	102
	District Maximum	167	155	127	183	133	122	133	131	137	122	130	124	126	120	108	109	113	106	104	102	107

+ Site relocated * Less than 12 full months of data ** Salton Sea Air Basin
Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-8
Ozone – 3-Year 8-HourDesign Values (ppb)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	143	135	126	122	111	109	101	102	101	97	94	89	91	95	96	89	83	79	80	80	83
069	East San Fernando Valley	108	103	99	98	93	94	89	91	91	92	88	89	88	92	88	85	81	79	80	76	74
072	South Coastal Los Angeles County 1	74	73	70	68	66	66	64	61	60	64	64	61	57	58	61	61	60	58	59	60	60
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	58	56	56	57	58
074	West San Fernando Valley	114	106	98	97	88	87	83	93	106	110	106	100	97	96	93	91	90	91	90	87	84
075	Pomona/Walnut Valley	139	129	114	109	101	99	86	89	96	101	100	99	102	103	99	92	87	84	85	86	89
084	South Central Los Angeles County 1	60	56	54	57	48	47	48	51	53	57	61	64	61	58							
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	58	56	58	58	62	66	67
085	South San Gabriel Valley	114	108	98	97	93	89	82	80	79	78	70	69	69	78	76	69	64	63	67	73	74
087	Central Los Angeles	101	100	88	90	85	86	80	79	78	78	76	74	72	73	72	70	65	64	62	66	68
088	West San Gabriel Valley	132	126	115	111	101	102	93	96	95	96	93	91	90	92	91	87	82	77	75	78	77
090	Santa Clarita Valley	145	135	123	122	112	106	101	113	126	125	120	112	110	107	104	99	97	97	99	97	94
091	Northwest Coastal Los Angeles County	87	86	82	78	72	70	68	69	73	77	78	73	70	69	71	72	69	65	62	67	68
094	Southwest Coastal Los Angeles County 1	81	81	82	77	70	64	68	68	69	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	62	64	61	65	64	64	61	60	60	60	64	68
591	East San Gabriel Valley 2	157	146	136	134	119	116	106	110	114	109	105	99	102	107	108	103	98	93	92	93	93
ORANGE COUNTY:																						
3176	Central Orange County	91	88	77	78	72	74	67	69	71	79	81	77	72	73	72	69	65	64	64	68	68
3177	North Orange County	108	101	89	88	84	84	78	75	74	75	73	76	78	83	78	74	71	70	68	70	71
3186	Saddleback Valley 1	93	91	83	83	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	75	72	71	72	72	71	68	67	71	73	73	67	63	66	68	67	63	60	62	66	70
3812	Saddleback Valley 2	--	--	--	--	--	--	79	80	82	86	85	84	82	87	85	81	74	70	72	74	76
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	110	111	107	108	102	100	101	105	108	104	104	101	101	97	96	95	93	93	92	91	88
4144	Metropolitan Riverside County	150	140	130	128	119	115	106	108	112	113	112	109	105	107	99	98	96	98	98	93	93
4149	Perris Valley	142	132	119	114	103	105	108	114	115	106	97	96	99	107	103	102	98	94	90	89	90
4157	Coachella Valley 2**	95	95	92	92	89	91	89	92	96	97	95	90	88	86	86	85	84	84	85	84	82
4158	Lake Elsinore	130	124	115	115	115	110	105	104	109	106	103	100	98	102	100	97	92	89	86	82	84
4031	Temecula Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	79	77	76	76
4164	Banning Airport	111	111	100	93	96	99	110	110	118	117	119	111	106	102	101	102	99	98	95	93	92
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	104	102	104	98	95	91	94	94	91	89
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	151	144	131	129	117	119	113	114	113	107	105	105	108	110	107	100	97	97	98	96	96
5181	Central San Bernardino Mountains	166	162	149	154	147	146	129	128	131	127	127	121	122	119	118	112	107	106	102	101	102
5197	Central San Bernardino Valley 1	149	143	131	128	115	110	107	112	123	119	118	112	113	112	107	101	99	101	103	99	97
5203	Central San Bernardino Valley 2	155	153	141	139	129	123	118	114	118	113	116	114	116	115	110	102	99	98	99	97	99
5204	East San Bernardino Valley	166	155	142	137	129	125	119	120	128	124	123	118	116	116	108	103	103	105	107	102	101
	District Maximum	166	162	149	154	147	146	129	128	131	127	127	121	122	119	118	112	107	106	107	102	102

+ Site relocated * Less than 12 full months of data ** Salton Sea Air Basin
Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-9
Ozone – Annual Maximum 1-Hour Average (ppm)

	LOCATION	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
087	Central Los Angeles	.34	.21	.30	.31/	.29	.32	.40	.26	.29	.30	.22	.22	.21	.25
060	East San Gabriel Valley 1	.38	.32	.40	.45	.41	.35	.36	.39	.31	.36	.31	.30	.30	.33
069	East San Fernando Valley	.35	.31	.30	.39	.35	.27	.25	.31	.26	.30	.28	.23	.24	.20
091	Northwest Coastal Los Angeles County	.28	.18/	.24/	.26	.21	.23	.28	.23	.27/	.27	.20	.28	.24	.25
072	South Coastal Los Angeles County 1	.16	.15	.19	.21	.20	.23	.22	.30	.27	.23	.18	.17	.16	.16
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
074	West San Fernando Valley	.27	.34	.27	.33	.38	.25	.22	.26	.26	.25	.22	.22	.25	.23
075	Pomona/Walnut Valley	.36	.32	.41	.35	.37	.33	.31	.34	.31	.33	.27	.29	.29	.25
094	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	.19	.20	.22	.19
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	--	--	--	--
088	West San Gabriel Valley	.34	.32	.42	.44	.41	.33	.37/	.34	.30	.37	.26	.28	.29	.27
090	Santa Clarita Valley	.33	.33	.32	.32	.36	.29	.26/	.29	.27	.24	.24	.21	.30	.25
084	South Central Los Angeles County 1	.24	.24	.18	.29	.18	.21	.26	.23	.27	.21	.20	.24	.21	.14
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
085	South San Gabriel Valley	.35	.32	.43	.39	.39	.35	.39	.33	.27	.31	.24	.28	.30	.26
591	East San Gabriel Valley 2	--	--	--	--	.49	.39	.36	.38	.34	.39	.35	.33	.34	.34
3176	Central Orange County	.30	.19	.29	.33	.28	.26	.26	.30	.25	.25	.20	.22	.27	.24
3177	North Orange County	.30	.25	.35	.38	.31	.27	.32	.27	.32	.34	.25	.24	.29	.26
3195	North Coastal Orange County	.16	.18	.22	.21/	.16	.20	.18	.25	.25	.21	.17	.16	.13	--
3186	Saddleback Valley 1	.23	.20	.34	.32	.34	.33	.27	.29	.30	.28	.23	.20	.21	.23
3812	Saddleback Valley 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4137	Coachella Valley 1**	.22	.21	.20	.24	.21	.19	.19	.19	.20	.24	.18	.17	.20	.19
4157	Coachella Valley 2**	.16	.19	.17	.21	.11	.18	.17	.18	.19	.20	--	.16	--	.16
4155	Norco/Corona	.33	.36	.40	.33/	.34	.37	.35	.35	.30	.35	.27	.24	.25	.23
4141	Hemet/San Jacinto Valley	.19	.25	.27	--	--	--	--	--	.18*	.23	.18	.18	.18	.19
4144	Metropolitan Riverside County 1	.36	.35	.39	.34	.37	.30	.31	.36	.32	.35	.25	.29	.28	.27
4149	Perris Valley	.22	.28	.32	.25	.29	.24	.28	.26	.22	.29	.22	.20	.23	.21
4150	San Gorgonio Pass	.28	.27	.30	.27	.26	.23	.24	.26	.25	.29	.22	.21	.26	.23
4164	Banning Airport	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4163	Temecula Valley	.21	.17	.23	--	--	--	--	--	--	--	--	--	--	--
4158	Lake Elsinore	.20	.23	.30	--	--	--	--	--	--	--	--	--	--	.24
5203	Central San Bernardino Valley 2	.32	.37	.36	.34	.36	.36/	.30	.32	.30	.27/	.30	.25	.28	.30
5204	East San Bernardino Valley	.35	.33	.39	.34/	.32	.24	.29	.30	.29	.33/	.29	.24	.29	.27
5175	Northwest San Bernardino Valley	--	--	--	--	--	--	--	.36	.32	.33	.29	.28	.35	.32
5197	Central San Bernardino Valley 1	.38	.39	.42	.42	.42	.35/	.31	.32	.32	.34	.31	.29	.29	.32
5181	Central San Bernardino Mountains 1	.23	.32	.33	.40	.31	.35	.32	.28	.34	.30	.26	.29	.29	.27
	District Maximum	.38	.39	.43	.45	.49	.39	.40	.39	.34	.39	.35	.33	.35	.34

* Less than 12 full months of data / Station location change

** Salton Sea Air Basin

Refer to 2003 AQMP for 1955 to 1975 data

TABLE A-9 (CONTINUED)
Ozone – Annual Maximum 1-Hour Average (ppm)

LOCATION	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
087 Central Los Angeles	.20	.19	.20	.16	.19	.17	.14	.12	.15	.13	.136	.116	.122
060 East San Gabriel Valley 1	.23	.28	.27	.24	.25	.21	.20	.16	.20	.14	.174	.189	.136
069 East San Fernando Valley	.20	.22	.22	.18	.17	.17	.14	.13	.18	.12	.152	.129	.128
091 Northwest Coastal Los Angeles County	.16	.18	.17	.18	.16	.14	.14	.11	.13	.12	.104	.099	.118
072 South Coastal Los Angeles County 1	.12	.11	.15	.14	.16	.11	.11	.10	.12	.13	.118	.091	.084
033 South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--
074 West San Fernando Valley	.19	.22	.17	.19	.14	.15	.21	.12	.16	.10	.109	.140	.152
075 Pomona/Walnut Valley	.24	.24	.26	.21	.24	.22	.19	.16	.18	.14	.152	.144	.150
094 Southwest Coastal Los Angeles County	.10	.11	.15	.13	.11	.12	.13	.11	.09	.15	.095	.098	.088
820 Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	--	--	--
088 West San Gabriel Valley	.26	.23	.27	.22	.26	.21	.17	.14	.17	.12	.157	.160	.137
090 Santa Clarita Valley	.23	.24	.22	.22	.26	.21	.17	.16	.18	.12	.131/	.184	.169
084 South Central Los Angeles County 1	.15	.16	.17	.12	.12	.09	.10	.08	.09	.12	.089	.077	.072
112 South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--
085 South San Gabriel Valley	.19	.26	.26	.19	.22	.18	.14	.13	.18	.12	.139	.132	.111
591 East San Gabriel Valley 2	.29	.32	.30	.28	.30	.22	.21	.17	.22	.14	.172	.190	.152
3176 Central Orange County	.18	.25	.22	.17	.21	.13	.13	.10	.11	.10*	.132	.114	.103
3177 North Orange County	.21	.21	.21	.19	.25	.16	.15	.13	.18	.12	.137	.107	.121
3195 North Coastal Orange County	.15	.17	.15	.13	.12	.11	.10	.10	.12	.10	.102	.098	.087
3186 Saddleback Valley 1	.19	.24	.16	.16	.18	.15	.14	.13	.16	.10	.129	--	--
3812 Saddleback Valley 2	--	--	--	--	--	--	--	--	--	--	.119	.125	.136
4137 Coachella Valley 1**	.17	.18	.15*	.17	.17	.16	.16	.16	.17	.13	.124	.137	.136
4157 Coachella Valley 2 **	.16	.18	.14	.16	.12	.14	.12	.11	.13	.13	.112	.114	.114
4155 Norco/Corona	.17	.22	.23	.16	.17	.19	.16	--	--	--	--	--	--
4141 Hemet/San Jacinto Valley	.22	.19	.15	.18	.16	.15	.12	--	--	--	--	--	--
4144 Metropolitan Riverside County	.29	.24	.26	.26	.25	.21	.20	.19	.20	.14	.140	.143	.155
4149 Perris Valley	.19	.20	.21	.20	.18	.20	.18	.14	.15	.11	.164	.152	.147
4150 San Gorgonio Pass	.22	.20	.16	.16	.20	.18	.19	.13	.12/	--	--	--	--
4164 Banning Airport	--	--	--	--	--	--	--	--	.17	.14	.138	.149	.160
4031 Temecula Valley	--	.17*	.13	.13	.10*	.11	.10	--	--	--	--	--	--
4158 Lake Elsinore	.19	.20	.17	.19	.19	.19	.15	.16	.17	.14	.128	.151	.139
5203 Central San Bernardino Valley 2	.29	.25	.28	.21	.25	.20	.24	.20	.21	.16	.149	.184	.147
5204 East San Bernardino Valley	.30	.25	.27	.27	.23	.24	.22	.20	.22	.15	.152	.167*	.158
5175 Northwest San Bernardino Valley	.29	.27	.28	.24	.25	.24	.22	.19	.21	.15	.184	.171	.139
5197 Central San Bernardino Valley 1	.27	.29	.28	.24	.25	.22	.22	.17	.20	.14	.169	.165	.159
5181 Central San Bernardino Mountains 1	.33	.27	.28	.24	.27	.26	.20	.21	.24	.17	.176	.171	.161
District Maximum	.33	.32	.30	.28	.30	.26	.24	.21	.24	.17	.176	.190	.169

* Less than 12 full months of data / Station location change
** Salton Sea Air Basin
Refer to 2003 AQMP for 1955 to 1975 data

TABLE A-9 (CONCLUDED)
Ozone – Annual Maximum 1-Hour Average (ppm)

	LOCATION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
087	Central Los Angeles	0.152	0.110	0.121	0.108	0.115	0.109	0.139	0.098	0.087	0.093	0.081	0.113	0.104
060	East San Gabriel Valley 1	0.150	0.134	0.145	0.165	0.158	0.135	0.15	0.104	0.111	0.134	0.115	0.123	0.122
069	East San Fernando Valley	0.134	0.137	0.142	0.166	0.116	0.133	0.145	0.111	0.120	0.117	0.110	0.091	--
091	Northwest Coastal Los Angeles County	0.134	0.107	0.114	0.099	0.117	0.110	0.131	0.099	0.098	0.093	0.088	0.116	0.102
072	South Coastal Los Angeles County 1	0.099	0.090	0.091	0.081	0.099	0.093	0.089	0.101	0.073	0.084	0.092	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	0.074	0.080	0.090	0.087	0.087
074	West San Fernando Valley	0.179	0.131	0.138	0.158	0.129	0.123	0.135	0.122	0.130	0.129	0.124	0.116	0.119
075	Pomona/Walnut Valley	0.161	0.131	0.140	0.151	0.153	0.141	0.138	0.115	0.119	0.117	0.125	0.123	0.136
094	Southwest Coastal Los Angeles County	0.110	0.069*	--	--	--	--	--	--	--				--
820	Southwest Coastal Los Angeles County	--	0.120*	0.086	0.084	0.087	0.086	0.077	0.089	0.078	0.106	0.105	0.114	0.096
088	West San Gabriel Valley	0.152	0.130	0.145	0.151	0.149	0.122	0.176	0.101	0.107	0.111	0.099	0.124	0.111
090	Santa Clarita Valley	0.194	0.158	0.173	0.156	0.135	0.16	0.14	0.126	0.144	0.134	0.134	0.137	0.126
084	South Central Los Angeles County 1	0.081	0.083	0.111	0.088	0.102	0.078*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	0.104	0.081	0.082	0.086	0.09	0.094	0.091
085	South San Gabriel Valley	0.128	0.104	0.077	--	0.135	0.107	0.131	0.112	0.096	0.106	0.101	0.121	0.107
591	East San Gabriel Valley 2	0.162	0.134	0.160	0.175	0.147	0.156	0.15	0.124	0.134	0.147	0.135	0.133	0.127
3176	Central Orange County	0.136	0.120	0.095	0.113	0.127	0.105	0.093	0.104	0.088	0.079	0.084	0.111	0.100
3177	North Orange County	0.165	0.099	0.094	0.146	0.152	0.104	0.115	0.118	0.095	0.100	0.104	0.119	0.103
3195	North Coastal Orange County	0.107	0.104	0.085	0.074	0.082	0.094	0.087	0.097	0.093	0.090	0.095	0.096	0.099
3186	Saddleback Valley 1	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	0.153	0.116	0.125	0.123	0.108	0.118	0.121	0.117	0.094	0.096	0.104	0.115	0.099
4137	Coachella Valley 1**	0.141	0.125	0.139	0.126	0.126	0.11	0.12	0.114	0.124	0.126	0.113	0.108	0.102
4157	Coachella Valley 2 **	0.123	0.111	0.114	0.103	0.106	0.12	0.097	0.100	0.099	0.102	0.105	0.095	0.093
4155	Norco/Corona	--	--	--	--	--	--	--	--	--	--	--	--	
4141	Hemet/San Jacinto Valley	--	--	--	--	--	--	--	--	--	--	--	--	
4144	Metropolitan Riverside County	0.169	0.141	0.144	0.151	0.131	0.146	0.116	0.128	0.128	0.126	0.123	0.141	0.132
4165	Mira Loma	--	--	--	--	--	--	--	--	--	0.124	0.118	0.138	0.127
4149	Perris Valley	0.155	0.128	0.088	0.169	0.139	0.142	0.125	0.122	0.125	0.111	0.108	0.117	0.124
4150	San Gorgonio Pass	--	--	--	--	--	--	--	--	--	--	--	--	
4164	Banning Airport	0.166	0.156	0.144	0.139	0.129	0.149	0.133	0.124	0.127	0.117	0.115	0.114	0.124
4031	Temecula Valley	--	--	--	--	--	--	--	--	0.105	0.104	0.093	0.119	0.100
4158	Lake Elsinore	0.154	0.130	0.149	0.142	0.130	0.139	0.128	0.107	0.133	0.111	0.102	0.104	0.131
5203	Central San Bernardino Valley 2	0.160	0.157	0.163	0.154	0.153	0.157	0.15	0.129	0.135	0.124	0.139	0.121	0.134
5204	East San Bernardino Valley	0.174	0.160	0.146	0.165	0.149	0.154	0.145	0.128	0.151	0.136	0.133	0.128	0.137
5175	Northwest San Bernardino Valley	0.155	0.138	0.149	0.166	0.145	0.155	0.146	0.131	0.145	0.136	0.143	0.126	0.136
5197	Central San Bernardino Valley 1	0.176	0.149	0.150	0.159	0.144	0.162	0.142	0.143	0.144	0.142	0.151	0.127	0.133
5181	Central San Bernardino Mountains 1	0.163	0.163	0.182	0.164	0.171	0.176	0.149	0.142	0.16	0.14	0.12	0.130	0.144
	District Maximum	0.194	0.163	0.182	0.175	0.171	0.176	0.176	0.143	0.160	0.147	0.151	0.141	0.144

* Less than 12 full months of data / Station location change

** Salton Sea Air Basin

Refer to 2003 AQMP for 1955 to 1975 data

TABLE A-10
Ozone – 3-Year 1-Hour Design Values (ppm)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	0.240	0.196	0.195	0.181	0.168	0.174	0.160	0.160	0.150	0.141	0.142	0.141	0.145	0.141	0.135	0.134	0.127	0.111	0.112	0.115	0.118
069	East San Fernando Valley	0.167	0.159	0.144	0.166	0.166	0.166	0.129	0.129	0.128	0.128	0.134	0.142	0.142	0.138	0.121	0.121	0.118	0.111	0.110	0.102	0.095
072	South Coastal Los Angeles County 1	0.120	0.120	0.108	0.105	0.104	0.105	0.103	0.091	0.085	0.088	0.089	0.088	0.083	0.087	0.089	0.089	0.080	0.079	0.084	0.083	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.079	0.074	0.079	0.083	0.085	0.085
074	West San Fernando Valley	0.170	0.146	0.146	0.158	0.139	0.139	0.120	0.138	0.146	0.146	0.145	0.138	0.138	0.130	0.123	0.121	0.128	0.128	0.128	0.119	0.111
075	Pomona/Walnut Valley	0.213	0.213	0.187	0.175	0.161	0.161	0.140	0.144	0.150	0.150	0.145	0.139	0.140	0.141	0.138	0.135	0.119	0.115	0.117	0.119	0.123
084	South Central Los Angeles County 1	0.100	0.089	0.085	0.085	0.079	0.085	0.077	0.072	0.077	0.080	0.081	0.082	0.088	0.082							
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.097	0.087	0.082	0.081	0.086	0.087	0.088
085	South San Gabriel Valley	0.190	0.180	0.144	0.149	0.149	0.149	0.119	0.118	0.118	0.111	0.118	0.128	0.132	0.128	0.108	0.107	0.102	0.097	0.097	0.106	0.107
087	Central Los Angeles	0.167	0.167	0.137	0.141	0.138	0.138	0.119	0.119	0.116	0.115	0.115	0.108	0.111	0.108	0.111	0.104	0.098	0.089	0.085	0.094	0.097
088	West San Gabriel Valley	0.220	0.191	0.182	0.166	0.166	0.166	0.136	0.137	0.134	0.133	0.134	0.141	0.141	0.141	0.126	0.124	0.124	0.101	0.105	0.111	0.111
090	Santa Clarita Valley	0.206	0.205	0.165	0.163	0.158	0.158	0.184	0.169	0.184	0.171	0.173	0.164	0.164	0.148	0.138	0.138	0.135	0.132	0.133	0.133	0.126
091	Northwest Coastal Los Angeles County	0.150	0.138	0.122	0.118	0.111	0.109	0.102	0.099	0.116	0.116	0.114	0.107	0.109	0.101	0.114	0.111	0.108	0.095	0.093	0.093	0.094
094	Southwest Coastal Los Angeles County 1	0.120	0.109	0.113	0.113	0.108	0.090	0.094	0.091	0.094	0.087	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	0.120	0.109	0.113	0.113	0.108	0.090	0.094	0.091	0.094	0.087	0.103	0.099	0.080	0.080	0.079	0.079	0.077	0.078	0.076	0.090	0.093
591	East San Gabriel Valley 2	0.250	0.223	0.209	0.200	0.188	0.188	0.169	0.169	0.159	0.156	0.157	0.155	0.155	0.152	0.150	0.150	0.141	0.132	0.133	0.132	0.127
ORANGE COUNTY:																						
3176	Central Orange County	0.160	0.148	0.117	0.121	0.121	0.132	0.107	0.103	0.111	0.115	0.115	0.109	0.101	0.105	0.095	0.094	0.088	0.085	0.084	0.089	0.089
3177	North Orange County	0.170	0.156	0.138	0.144	0.127	0.127	0.114	0.114	0.120	0.120	0.109	0.118	0.128	0.128	0.104	0.104	0.099	0.097	0.096	0.102	0.102
3186	Saddleback Valley 1	0.147	0.139	0.130	0.131	0.130	0.129	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0.107	0.104	0.104	0.109	0.109	0.106	0.093	0.090	0.096	0.097	0.097	0.085	0.080	0.084	0.085	0.086	0.086	0.086	0.087	0.087	0.089
3812	Saddleback Valley 2	--	--	--	--	--	0.119	0.119	0.125	0.131	0.131	0.127	0.116	0.116	0.116	0.113	0.114	0.110	0.095	0.095	0.102	0.102
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	0.158	0.158	0.152	0.155	0.143	0.133	0.128	0.132	0.133	0.131	0.130	0.127	0.127	0.115	0.112	0.112	0.114	0.114	0.114	0.109	0.104
4144	Metropolitan Riverside County	0.220	0.200	0.187	0.187	0.166	0.166	0.140	0.143	0.157	0.157	0.157	0.141	0.134	0.140	0.135	0.135	0.126	0.126	0.126	0.121	0.121
4149	Perris Valley	0.200	0.180	0.173	0.156	0.137	0.147	0.149	0.149	0.149	0.136	0.136	0.152	0.152	0.142	0.135	0.126	0.122	0.121	0.115	0.108	0.116
4157	Coachella Valley 2**	0.130	0.124	0.124	0.118	0.121	0.121	0.112	0.112	0.114	0.113	0.113	0.108	0.106	0.106	0.106	0.104	0.099	0.099	0.098	0.095	0.095
4158	Lake Elsinore	0.185	0.185	0.180	0.166	0.162	0.160	0.136	0.137	0.140	0.139	0.140	0.130	0.130	0.135	0.132	0.132	0.122	0.111	0.111	0.103	0.114
4031	Temecula Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.094	0.094	0.094	0.090	0.093
4164	Banning Airport	--	--	0.180	0.180	0.170	0.155	0.143	0.146	0.151	0.152	0.150	0.139	0.138	0.139	0.138	0.138	0.126	0.124	0.126	0.114	0.113
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	--	--	0.131	0.128	0.128	0.118	0.121	0.119	0.119	0.117
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	0.234	0.231	0.208	0.189	0.181	0.181	0.169	0.169	0.155	0.146	0.148	0.148	0.148	0.150	0.146	0.146	0.134	0.134	0.136	0.135	0.128
5181	Central San Bernardino Mountains	0.230	0.227	0.215	0.217	0.211	0.211	0.170	0.166	0.163	0.162	0.163	0.163	0.164	0.164	0.162	0.149	0.142	0.140	0.134	0.124	0.130
5197	Central San Bernardino Valley 1	0.223	0.220	0.194	0.191	0.184	0.184	0.160	0.160	0.164	0.162	0.162	0.147	0.144	0.149	0.147	0.147	0.140	0.140	0.142	0.133	0.127
5203	Central San Bernardino Valley 2	0.219	0.221	0.197	0.196	0.188	0.182	0.158	0.151	0.158	0.151	0.157	0.154	0.153	0.153	0.150	0.147	0.129	0.124	0.125	0.122	0.129
5204	East San Bernardino Valley	0.220	0.216	0.202	0.190	0.190	0.190	0.152	0.154	0.167	0.163	0.163	0.159	0.157	0.157	0.146	0.145	0.134	0.134	0.134	0.132	0.128
	District Maximum	0.250	0.231	0.215	0.217	0.211	0.211	0.184	0.169	0.184	0.171	0.173	0.164	0.164	0.164	0.162	0.150	0.142	0.140	0.142	0.135	0.130

\+ Site relocated　　* Less than 12 full months of data　　** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-11
Fine Particulate Matter (PM2.5)# – Annual Arithmetic Mean (µg/m³)

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	23.9	20.2	21.7	21.0	19.3	18.3	17.0	15.5	15.9	14.1	13.2	10.9	12.1	11.0	10.5	9.88	9.88
069	East San Fernando Valley	22.9	21.4	24.8	24.0	22.1	19.1	17.9	16.6	16.8	14.1	14.4	12.6	13.2	12.2	12.2	--	--
072	South Coastal Los Angeles County 1	20.7	19.6	21.2	19.5	18.0	17.9	16.0	14.2	14.6	14.2	13.0	10.6	11.0	10.4	11.3	10.81	10.81
074	West San Fernando Valley	17.3	18.0	18.4	18.9	16.5	15.6	13.9	12.9	13.1	11.9	11.4	10.3	10.2	10.5	9.7	8.84	8.84
077	South Coastal Los Angeles County 2	--	--	--	--	20.5	16.5	14.7	14.5	13.7	13.7	12.5	10.4	10.7	10.6	11.0	10.26	10.26
084	South Central Los Angeles County1	24.3	23.0	24.5	23.3	20.3	18.5	17.5	16.7	15.9	15.5	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	14.7	12.6	13.0	11.69	11.95	11.78	11.78
085	South San Gabriel Valley	25.7	24.0	25.4	24.0	20.6	20.0	17.0	16.7	16.7	15.1	14.8	12.6	12.5	11.85	11.56	11.52	11.52
087	Central Los Angeles	23.0	21.9	22.9	22.1	21.4	19.7	18.1	15.6	16.8	15.7	14.3	11.9	13.0	12.55	11.95	12.38	12.38
088	West San Gabriel Valley	19.9	19.4	20.9	20.3	18.6	16.6	15.1	13.4	14.3	12.9	12.3	10.4	10.9	10.12	10.13	9.85	9.85
ORANGE COUNTY:																		
3176	Central Orange County	26.0	20.3	22.0	18.6	17.3	17.0	14.7	14.1	14.5	13.6	11.7	10.2	11.0	10.8	10.09	9.38	9.38
3812	Saddleback Valley	16.6	14.7	15.8	15.5	13.1	12.0	10.7	11.0	11.3	10.3	9.4	8.0	8.5	7.9	8.1	7.05	7.05
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**	--	9.7	10.7	10.0	9.0	8.9	8.4	7.7	8.7	7.2	6.6	6.0	6.0	6.5	6.5	5.76	5.76
4144	Metropolitan Riverside County 1	30.2	28.3	31.0	27.4	24.8	22.1	21.0	19.0	19.1	16.5	15.3	13.2	13.6	13.5	12.5	11.89	11.89
4146	Metropolitan Riverside County 2	26.7	25.3	28.2	27.1	22.6	20.8	18.0	17.0	18.1	13.4	13.5	11.1	11.8	11.4	11.3	--	--
4157	Coachella Valley 2**	12.8	11.2	12.2	12.0	11.4	10.7	10.5	9.5	9.8	8.4	8.0	6.9	7.2	7.6	8.4	7.54	7.54
4165	Mira Loma	--	--	--	--	--	--	--	20.6	21	18.2	16.8	15.2	15.3	15.1	14.1	13.34	13.34
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	25.7	24.5	24.9	24.3	22.1	19.9	18.9	17.6	19	15.4	14.2	12.1	12.6	12.8	12.3	11.05	11.05
5203	Central San Bernardino Valley 2	25.6	25.9	26.1	25.8	22.2	21.9	17.4	17.8	18.3	13.5	12.9	11.3	12.2	11.76	11.4	10.74	10.74
5817	Southwest San Bernardino Valley	25.4	24.1	26.5	25.4	23.8	20.9	18.8	18.5	17.9	15.6	14.8	12.9	13.2	12.4	12.0	--	--
5818	East San Bernardino Mountains	10.3	10.2	11.2	11.5	10.6	9.7	12.1	11.2	10.4	9.2	9.9	8.5	8.4	8.0	9.7	7.59	7.59
	District Maximum	30.2	28.3	31.0	27.4	24.8	22.1	21.0	20.6	21.0	18.2	16.8	15.2	15.3	15.1	14.1	14.5	13.34

* Less than 12 full months of data
** Salton Sea Air Basin
\# Federal Reference Method (FRM) filter data only

TABLE A-12
Fine Particulate Matter (PM2.5)# – Annual Design Values (μg/m^3)

STN#	LOCATION	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																
060	East San Gabriel Valley	21.9	21.0	20.7	19.5	18.2	16.9	16.1	15.1	14.3	12.7	11.8	11.1	11.0	11.1	10.7
069	East San Fernando Valley	23.0	23.4	23.6	21.7	19.7	17.9	17.1	15.9	15.1	13.6	13.3	12.6	12.5	12.1	12.1
072	South Coastal Los Angeles County 1	20.5	20.1	19.6	18.5	17.3	16.0	14.9	14.4	14.0	12.6	11.5	10.6	10.9	11.0	11.2
074	West San Fernando Valley	17.9	18.4	17.9	17.0	15.4	14.2	13.4	12.7	12.2	11.1	10.6	10.3	10.1	10.0	9.4
077	South Coastal Los Angeles County 2	--	--	--	18.5	17.3	15.2	14.3	14.0	13.3	12.2	11.2	10.6	10.8	10.8	10.7
084	South Central Los Angeles County1	23.9	23.6	22.7	20.7	18.7	17.5	16.6	15.7	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	17.1	16.7	16.0	15.4	14.2	13.4	12.4	12.2	12.1	12.1
085	South San Gabriel Valley	25.0	24.5	23.3	21.5	19.5	18.2	17.1	16.1	15.5	14.1	13.3	12.3	12.0	11.8	11.7
087	Central Los Angeles	22.6	22.3	22.2	21.1	19.7	17.7	16.7	16.1	15.6	14.0	13.1	12.5	12.5	12.3	12.2
088	West San Gabriel Valley	20.1	20.2	19.9	18.5	16.8	15.0	14.3	13.6	13.2	11.8	11.1	10.4	10.4	10.5	10.4
ORANGE COUNTY:																
3176	Central Orange County	22.7	20.3	19.3	17.6	16.4	15.3	14.4	14.1	13.3	11.9	11.0	10.6	10.6	10.5	10.0
3812	Saddleback Valley	15.7	15.4	14.8	13.5	11.9	11.2	10.9	10.9	10.4	9.3	8.7	8.1	8.2	8.0	7.7
RIVERSIDE COUNTY:																
4137	Coachella Valley 1**	10.2	10.1	9.9	9.3	8.8	8.3	8.2	7.8	7.5	6.6	6.2	6.2	6.4	6.5	6.2
4144	Metropolitan Riverside County 1	29.8	28.9	27.7	24.8	22.6	20.7	19.7	18.1	16.9	15.0	14.0	13.4	13.2	12.8	12.3
4146	Metropolitan Riverside County 2	26.7	26.9	26.0	23.5	20.5	18.6	17.6	16.1	14.9	12.6	12.1	11.4	11.5	11.2	11.1
4157	Coachella Valley 2**	12.1	11.8	11.9	11.4	10.9	10.2	9.9	9.2	8.7	7.7	7.3	7.2	7.7	8.1	8.1
4165	Mira Loma	--	--	--	--	--	--	20.8	19.9	18.7	16.7	15.8	15.2	14.8	14.6	13.97
SAN BERNARDINO COUNTY:																
5197	Central San Bernardino Valley 1	25.0	24.6	23.8	22.1	20.3	18.8	18.5	17.3	16.2	13.9	12.9	12.4	12.5	12.8	12.2
5203	Central San Bernardino Valley 2	25.8	25.9	24.7	23.3	20.5	19.0	17.7	16.4	14.8	12.5	12.1	11.7	11.8	11.6	11.3
5817	Southwest San Bernardino Valley	25.3	25.3	25.2	23.4	21.2	19.4	18.5	17.5	16.3	14.5	13.7	12.9	12.6	12.5	12.5
5818	East San Bernardino Mountains	10.6	11.0	11.1	10.6	10.8	11.0	11.2	10.3	9.8	9.2	8.9	8.3	8.7	8.2	8.1
	District Maximum	29.8	28.9	27.7	24.8	22.6	20.7	20.8	19.9	18.7	16.7	15.8	15.2	14.8	14.6	14.0

* Less than 12 full months of data
** Salton Sea Air Basin
\# Federal Reference Method (FRM) filter data only

TABLE A-13

Fine Particulate Matter (PM2.5)# – 24-Hour Design Values ($\mu g/m^3$)

STN#	LOCATION	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																
060	East San Gabriel Valley	62	59	57	54	54	49	47	41	42	38	35	29	26	27	29
069	East San Fernando Valley	67	69	62	55	53	48	47	42	39	34	33	31	31	29	30
072	South Coastal Los Angeles County 1	55	54	48	46	45	41	39	38	38	34	30	28	27	28	30
074	West San Fernando Valley	49	51	49	48	45	40	34	31	29	28	27	28	26	25	24
077	South Coastal Los Angeles County 2	--	--	--	48	44	38	36	35	34	31	28	26	25	26	28
084	South Central Los Angeles County1	61	60	57	53	51	51	48	43	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	47	46	42	40	35	34	31	29	29	31
085	South San Gabriel Valley	66	65	58	53	52	50	49	44	41	35	33	31	30	29	34
087	Central Los Angeles	61	62	58	57	56	49	48	44	42	34	31	30	31	32	34
088	West San Gabriel Valley	56	53	51	48	46	41	40	37	38	31	30	26	25	24	26
ORANGE COUNTY:																
3176	Central Orange County	63	58	53	49	47	44	43	42	39	32	28	26	25	27	29
3812	Saddleback Valley	42	43	43	41	36	32	31	29	29	23	23	21	21	19	18
RIVERSIDE COUNTY:																
4137	Coachella Valley 1**	28	26	25	22	23	21	20	18	17	15	13	13	13	14	15
4144	Metropolitan Riverside County 1	76	73	71	66	64	57	55	50	45	38	34	32	33	34	36
4146	Metropolitan Riverside County 2	65	65	62	58	50	47	49	48	43	33	30	27	28	27	28
4157	Coachella Valley 2**	29	26	26	25	26	24	24	21	21	16	15	15	16	16	17
4165	Mira Loma	--	--	--	--	--	--	56	53	49	41	38	36	36	38	40
SAN BERNARDINO COUNTY:																
5197	Central San Bernardino Valley 1	67	64	60	58	55	52	52	52	48	37	31	32	32	34	35
5203	Central San Bernardino Valley 2	70	68	64	66	58	55	53	52	48	35	32	30	31	30	32
5817	Southwest San Bernardino Valley	72	62	63	61	59	50	48	47	45	37	34	32	30	30	31
5818	East San Bernardino Mountains	29	30	30	28	30	33	37	36	32	30	29	29	31	27	30
	District Maximum	76	73	71	66	64	57	56	53	49	41	38	36	36	38	40

* Less than 12 full months of data

** Salton Sea Air Basin

Federal Reference Method (FRM) filter data only

TABLE A-14

Fine Particulate Matter (PM2.5)# – Percent of Sampling Days Exceeding the 24-Hour Federal Standard (35 µg/m^3)##

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	17	9	14	12	9	8	6*	3*	7	2	4	1	2	1	0	0	0
069	East San Fernando Valley	18	14*	16	19	14	10	8	6	9	2	2	1	2	1	1	1	--
072	South Coastal Los Angeles County 1	9	11*	14	9	7	7	4	2*	4	2	2	0	0	1	1	1	--
074	West San Fernando Valley	8*	8	7	10	7	4	4	1	1	2	1	1	1	2	1	0	0
077	South Coastal Los Angeles County 2	--	--	--	--	10	5	2	2	2	2	1	0	1	1	0	1	1
084	South Central Los Angeles County 1	18	14	16	18	9	7	7	4	4	3	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	3	1	0	1	1	1	1
085	South San Gabriel Valley	20	13	22	19	9	9	9*	6	5	4	2	0	1	1	0	0	0
087	Central Los Angeles	15	13	15	13	14	7	7	3	6	3	2	1	1	1	0	2	2
088	West San Gabriel Valley	9*	6	8	11	10	6	4	1	3	2	3	0	1	0	0	1	1
ORANGE COUNTY:																		
3176	Central Orange County	17	14*	16*	9	7	6	4	2	4	4	1	0	1	1	0	2	2
3812	Saddleback Valley	4*	4	5	3	3	3	0	1	2	0	1	0	0	0	0	0	0
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**	--	0	1	1	0	0	0*	0	0	0	0	0	0	0	0	0	0
4144	Metropolitan Riverside County 1	30	26*	33	25	21	15	11	11	11	4	4	1	1	2	2	1	1
4146	Metropolitan Riverside County 2	25	22	23	24	19	13	5	9	8	3	2	2	2	0	1	0	0
4157	Coachella Valley 2**	0*	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
4165	Mira Loma	--	--	--	--	--	--	--	12	12	9	6	2	3	2	3	3	3
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	17	19	15	19	14	14	6	6	9	5	2	2	2	3	1	1	1
5203	Central San Bernardino Valley 2	21	21*	23	24	15	15	3	8	11	3	2	2	2	0	1	1	1
5817	Southwest San Bernardino Valley	22	14	21	18	17	13	7	7	6	5	3	1	2	0	1	2	--
5818	East San Bernardino Mountains	--	0	0	0	0	0	4	2*	2	2	2	0	0	2	2	0	0
	District Maximum	30	22	33	25	21	15	11	12	12	9	6	2	3	3	3	3	3

* Less than 12 full months of data

** Salton Sea Air Basin

\# Federal Reference Method (FRM) filter data only

\## Effective December 17, 2006, U.S. EPA has strengthen the standard level from 65 µg/m^3 to 35 µg/m^3

TABLE A-15
Fine Particulate Matter (PM2.5)# – Annual Maximum 24-Hour Average (μg/m³)

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	81.3	92.5	79.7	72.4	121.2	75.6	132.7*	52.8*	63.8	53.1	72.1	44.4	49.5	39.6	29.6	32.4	70.3
069	East San Fernando Valley	79.5	84.4*	94.7	63.0	120.6	60.1	63.2	50.7	56.5	57.5	67.5	43.7	47.8	54.2	45.1	64.6	--
072	South Coastal Los Angeles County 1	66.9	81.5*	72.9	62.7	115.2	66.6	53.9	58.5*	82.9	57.2	63	35	39.7	49.8	47.2	51.5	54.6
074	West San Fernando Valley	79.0*	67.5	71.1	48.8	47.5	56.2	39.6	44.1	43.3	50.5	39.9	40.7	39.8	41.6	41.8	27.2	36.8
077	South Coastal Los Angeles County 2	--	--	--	--	--	59.7	50.8	53.6	68	60.9	55.8	33.7	42.0	46.7	42.9	52.2	48.3
084	South Central Los Angeles County 1	67.8	82.1	73.1	64.0	54.8	55.8	54.6	55	49	44.2	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	69.2	38.2	35.3	51.2	52.1	35.8	41.3
085	South San Gabriel Valley	85.6	89.5	77.3	61.0	90.3	60.7	58.2*	72.2	63.6	47.3	71.1	34.9	41.2	45.3	29.1	35.1	52.7
087	Central Los Angeles	69.3	87.8	73.4	66.3	83.7	75.0	73.7	56.2	64.2	78.3	61.7	39.2	49.3	58.7	43.1	59.9	56.4
088	West San Gabriel Valley	73.0*	66.3	78.1	57.8	89.0	59.4	62.9	45.9	68.9	66	52	35.2	43.8	30.5	25.7	38.8	48.5
ORANGE COUNTY:																		
3176	Central Orange County	68.7	113.9*	70.8*	68.6	115.5	58.9	54.7	56.2	79.4	67.9	64.6	31.7	39.2	50.1	37.8	56.2	45.8
3812	Saddleback Valley	56.6*	94.7	53.4	58.5	50.6	49.4	35.4	47	46.9	32.6	39.2	19.9	33.4	27.6	28	25.5	31.5
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**	--	28.5	44.7	42.3	21.2	27.1	26.2*	24.8	32.5	18.1	21.8	12.8	26.3	15.5	18.5	15.5	22.7
4144	Metropolitan Riverside County 1	111.2	119.6*	98.0	77.6	104.3	91.7	98.7	68.5	75.7	57.7	54.5	46.5	60.8	38.1	60.3	48.9	54.7
4146	Metropolitan Riverside County 2	90.0	79.3	74.9	75.5	73.3	93.8	95.0	55.3	68.6	43	42.2	43.7	51.6	30.2	53.7	30.9	--
4157	Coachella Valley 2**	29.6*	28.6	33.5	26.8	26.8	28.5	44.4	24.3	26.8	21.6	27.5	16.0	35.4	20	25.8	26.5	24.6
4165	Mira Loma	--	--	--	--	--	--	--	63.0	69.7	50.9	49.2	54.2	56.3	39.3	56.5	73.6	56.6
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	98.0	72.9	74.8	66.6	98.1	71.4	96.8	52.6	77.5	49	46.4	42.6	60.1	39.9	43.6	78.9	50.5
5203	Central San Bernardino Valley 2	121.5	89.8*	78.5	82.1	73.9	93.4	106.3	55	72.1	43.5	37.8	39.3	65.0	34.8	55.3	73.9	53.5
5817	Southwest San Bernardino Valley	85.8	73.4	71.2	64.8	88.9	86.1	87.8	53.7	72.8	54.2	46.9	46.1	52.9	35.2	49.3	38.4	--
5818	East San Bernardino Mountains	32.1	29.0	34.6	34.1	35.0	28.6	38.8	40.1*	45.4	36.8	40.8	35.4	30.6	36.4	35.5	24.2	39.4
	District Maximum	121.5	119.6	98.0	82.1	121.2	93.8	132.7	72.2	82.9	78.3	72.1	54.2	60.8	58.7	60.3	78.9	70.3

* Less than 12 full months of data
** Salton Sea Air Basin
# Federal Reference Method (FRM) filter data only

TABLE A-16
Fine Particulate Matter (PM2.5)# – Annual 24-Hour Average 98th Percentile Concentration (µg/m³)

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	64	62	61	51	56	54	53	39	49	35	43	35	31	26	26	30	30
069	East San Fernando Valley	50	83	69	55	60	49	51	43	48	35	34	33	34	28	30	29	--
072	South Coastal Los Angeles County 1	51	64	49	47	47	46	41	35	41	36	34	28	28	26	26	31	32
074	West San Fernando Valley	40	50	57	45	45	53	36	32	33	26	27	30	24	31	23	21	28
077	South Coastal Los Angeles County 2	--	--	--	--	53	42	38	35	34	35	30	27	27	25	25	27	31
084	South Central Los Angeles County1	53	63	66	53	52	53	48	45	46	37	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	38	32	32	30	24	31	37
085	South San Gabriel Valley	60	71	67	58	50	52	54	43	50	38	35	32	32	29	29	30	42
087	Central Los Angeles	52	73	58	55	61	50	53	39	51	40	34	27	32	32	29	35	38
088	West San Gabriel Valley	60	54	55	49	48	47	43	32	45	32	36	25	26	24	21	26	32
ORANGE COUNTY:																		
3176	Central Orange County	66	66	59	48	52	48	42	41	47	39	32	25	28	25	23	34	30
3812	Saddleback Valley	45	37	46	46	38	39	31	26	35	27	24	17	29	18	18	22	15
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**		23	33	23	20	23	25	16	21	17	15	13	13	14	14	15	17
4144	Metropolitan Riverside County 1	79	77	74	66	77	60	58	54	54	41	40	32	31	34	35	34	38
4146	Metropolitan Riverside County 2	62	67	66	64	56	54	41	48	57	39	34	27	28	27	29	26	--
4157	Coachella Valley 2**	30	26	30	22	25	27	25	19	27	19	17	12	16	16	16	17	20
4165	Mira Loma	--	--	--	--	--	--	--	53	60	47	41	36	37	35	38	40	43
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	66	65	70	57	54	63	48	44	65	47	33	31	28	36	33	35	38
5203	Central San Bernardino Valley 2	72	70	68	66	58	72	43	48	68	41	35	30	33	27	33	28	34
5817	Southwest San Bernardino Valley	86	65	65	57	67	60	50	42	53	45	36	31	35	29	27	35	--
5818	East San Bernardino Mountains	31	27	30	32	29	23	37	40	34	33	29	28	31	27	35	19	35
	District Maximum	86	83	74	66	77	72	58	54	68	47	43	36	37	36	38	40	43

* Less than 12 full months of data
** Salton Sea Air Basin
\# Federal Reference Method (FRM) filter data only

TABLE A-17

Particulate Matter (PM10)[#] – Annual Arithmetic Mean (μg/m³)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	49	45	46	41	56	46	45	46	44	35	35	32	36+	35	32	30	33	30	33	44	37
069	East San Fernando Valley	42	42	45	36	44	39	41	38	38*	38	34	36	40	36	39	30	29	26	29	31*	--
072	South Coast Los Angeles County 1	39	35	41	32	39	38	37	36	33	33	30	31	30+	29	31	22	24	23	23*	--	--
077	South Coast Los Angeles County 2	--	--	--	--	--	--	--	--	--	38	43	45	41+	36	33	27	29	26	27	27	26
087	Central Los Angeles	43	41	43	37	45	40	44	39	35	33	30	30	33	31*	33	27	29	30	30	31	27
090	Santa Clarita Valley	37	33	33	30	38	33	32	33	32	28	26	--	30+	26	23	21	21	20	22	23	18
094	Southwest Coastal Los Angeles County 1	36	33	36	33	36	36	37	37	30	31*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	25	23	27	29	26	25	21	22	20	21	22	21
ORANGE COUNTY:																						
3176	Central Orange County	44	35	39	36	49	40	36	34	33	34	28	33	31+	29+	31	22	25	22	25	27	25
3186	Saddleback Valley 1	38	30	35	31	37	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	29	28	26	31	27	24	19	23	23	23	24	18	19	17	19	20	19
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	27	29	26	26	29	24	27+	27	27	26	26	25+	31	23+*	23	19	19+	16	23	22	17
4144	Metropolitan Riverside County 1	69	61	65	56	72	60	63	59	57	56	52	54	55+	47	43	33	34	35	34	37	32
4149	Perris Valley	47	40	45	38	50	41	41	45	44	41	39	45	55+	38*	35	28	29	27	34	35	30
4150	San Gorgonio Pass	30	34	38	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	54	44	50	47	55	49	--	45	41	38	32	37	40+	34	36	27	28	27	28	31	30
4157	Coachella Valley 2**	52+	51+	49+	48+	53	52+	50+	51+	50+	39+	46	53+	54+	40+	33+	29	33+	30	38	41+	39
4164	Banning Airport	--	--	--	27	35	29	35	28	29	29	27	31	33	26	26	22	20	19	21	21	22
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	64	69	57	53	42	41	40	41	43	43
SAN BERNARDINO COUNTY:																						
5171	Southwest San Bernardino Valley 1	54	51	51	47	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5181	Central San Bernardino Mountains	20	24	24	25	27	24	--	37*	26*	26	26	26	26	24*	25	19	19	19	21	19	16
5197	Central San Bernardino Valley 1	61	55	54	50	60	53	51	50	47*	48	50	54	55+	40	40	34	32	34	41	40	38
5203	Central San Bernardino Valley 2	57	53	51	46	57	50	52	50	45	49	42	46	51+	43	42	32	32	29	31	34	30
5204	East San Bernardino Valley	48	46	43	41	47	46	47	41	37	39	33	36	40	29	30	26	26	23	27	26	25
5817	Southwest San Bernardino Valley 2	--	--	--	--	66	50	52	45	43	43	41	42	43+	39	36	32	31	31	33	33*	--
	District Maximum	69	61	65	56	72	60	63	59	57	56	52	64	69+	57	53	42	41	40	41	44	43

* Less than 12 full months of data

** Salton Sea Air Basin

\+ Excludes data flagged for exceptional events

\# Federal Reference Method (FRM) filter data only

Refer to 2003 AQMP for 1985–1994 data

TABLE A-18
Particulate Matter (PM10)# – Percent of Sampling Days Exceeding State (50 µg/m^3) and Federal (150 µg/m^3) 24-Hour Standards

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	40/2	41/0	40/0	28/0	58/0	42/0	38/0	40/0	35/0	15/0	22/0	12/0	20/0+	27/0	14/0	9/0	15/0	10/0	10/0	37/0	12/0
069	East San Fernando Valley	25/0	25/0	30/0	15/0	35/0	23/0	23/0	12/0	14/0*	12/0	8/0	19/0	19/0	13/0	18/0	2/0	4/0	2/0	2/0	3/0*	--
072	South Coast Los Angeles County 1	19/0	15/0	18/0	10/0	22/0	21/0	17/0	9/0	7/0	7/0	9/0	10/0	9/0+	2/0	5/0	0/0	0/0	0/0	0/0*	--	--
077	South Coast Los Angeles County 2	--	--	--	--	--	--	--	--	--	20/0	31/0	33/0	38/0+	16/0	9/0	3/0	0/0	2/0	2/0	3/0	2/0
087	Central Los Angeles	23/0	18/0	25/0	17/0	33/0	25/0	33/0	15/0	10/0	8/0	7/0	5/0	9/0	4/0	7/0	0/0	2/0	7/0	2/0	5/0	2/0
090	Santa Clarita Valley	14/0	9/0	9/0	6/0	21/0	7/0	7/0	12/0	16/0	3/0	2/0	2/0	9/0+	4/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0
094	Southwest Coastal Los Angeles County 1	21/0	8/0	7/0	12/0	10/0	16/0	14/0	20/0	5/0	13/0*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0/0*	0/0	0/0	5/0	0/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0
ORANGE COUNTY:																						
3176	Central Orange County	23/2	10/0	18/0	20/0	39/0	13/0	20/0	8/0	10/0	12/0	5/0	13/0	9/0+	5/0	2/0	0/0	3/0	0/0	2/0	3/0	2/0
3186	Saddleback Valley 1	18/0	7/0	7/0	10/0	10/0	3/0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	3/0	3/0	5/0	8/0	4/0	0/0	0/0	2/0	5/0	0/0	2/0	0/0	0/0	0/0	2/0	0/0	0/0
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	4/0	3/0	2/0	5/0	5/0	0/0	2/0+	5/0	7/0	3/0	3/0	4/0+	11/0	9/0+*	2/0	0/0	0/0+	0/0	5/0	4/0	0/0
4144	Metropolitan Riverside County 1	62/7	68/2	70/2	54/0	72/2	70/0	67/0	69/0	57/2	61/0	56/0	60/0	57/0+	41/0	29/0	6/0	13/0	16/0	8/0	15/0	9/0
4149	Perris Valley	38/0	33/0	32/0	26/0	50/0	22/0	27/0	39/0	33/0	25/0	32/0	35/0	56/0+	27/0*	16/0	2/0	5/0	2/0	18/0	13/0	3/0
4150	San Gorgonio Pass	12/0	19/0	25/0	9/0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	47/3	33/0	42/2	40/0	55/0	48/0	33/0	34/0	26/0	19/0	9/0	18/0	17/0+	15/0	12/0	0/0	3/0	2/0	4/0	5/0	3/0
4157	Coachella Valley 2**	44/2	50/0+	43/0+	40/0+	54/0	50/0+	45/0+	45/0+*	42/0+	20/0+*	34/0	50/0+	61/0+	22/0+	8/0+	5/0	2/0+	6/0	19/0+	20/0	18/0
4164	Banning Airport	--	--	--	4/0	12/0	8/0	13/2	11/0	15/0	12/0	3/0	15/0	15/0	2/0	2/0	2/0	2/0	0/0	2/0	0/0	2/0
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	70/0	75/0+	57/0	56/0	42/0	42/0	27/0	24/0	30/0	38/0
SAN BERNARDINO COUNTY:																						
5171	Southwest San Bernardino Valley 1	51/5	53/0	36/2	34/0	56/0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5181	Central San Bernardino Mountains	2/0	0/0	0/0	0/0	0/0	0/0	--	19/0	0/0*	2/0	0/0	2/0	4/0	0/0*	2/0	0/0	0/0	0/0	0/0	0/0	0/0
5197	Central San Bernardino Valley 1	57/3	57/0	48/0	47/0	61/0	52/0	57/0	53/0	54/0*	48/0	48/0	52/0	59/0+	23/0	22/0	17/0	7/0	15/0	31/0	22/0	13/0
5203	Central San Bernardino Valley 2	53/0	58/0	45/0	38/0	56/0	53/0	52/0	56/0	39/0	48/0	38/0	42/0	49/0+	32/0	21/0	5/0	5/0	2/0	5/0	7/0	3/0
5204	East San Bernardino Valley	41/2	42/0	38/0	32/0	40/0	44/0	45/0	32/0	26/0	33/0	21/0	20/0	32/0	7/0	3/0	2/0	3/0	0/0	3/0	3/0	2/0
5817	Southwest San Bernardino Valley 2	--	--	--	--	67/2	45/0	42/2	41/0	29/0	29/0	32/0	27/0	24/0+	24/0	15/0	5/0	5/0	7/0	5/0	13/0*	--

* Less than 12 full months of data

** Salton Sea Air Basin

\+ Excludes data flagged for exceptional events

\# Federal Reference Method (FRM) filter data only

Refer to 2003 AQMP for 1985–1994 data

TABLE A-19
Particulate Matter (PM10)# – Annual Maximum 24-Hour Average (µg/m³)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	157	100	116	87	103	94	106	91	119	83	76	81	83+	98	74	70	65	78	76	96	101
069	East San Fernando Valley	135	110	92	75	82	74	86	71	81*	74	92	71	109	66	80	51	61	55	52	60*	--
072	South Coastal Los Angeles County 1	146	113	87	69	79	105	91	74	63	72	66	78	75+	62	62	44	43	45	37*	--	--
077	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	83	131	117	123+	81	83	76	50	54	54	59	62
087	Central Los Angeles	141	138	102	80	88	80	97	65	81	72	70	59	78	66*	72	42	53	80	57	66	73
090	Santa Clarita Valley	87	91	67	60	75	64	62	61	72	54	55	53	131+	91	56	40	45	37	43	47	41
094	Southwest Coastal Los Angeles County 1	136	107	79	66	69	74	75	121	58	52*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	47*	44	45	128	50	52	37	41	31	38	46	42
ORANGE COUNTY:																						
3176	Central Orange County	172	101	91	81	122	126	93	69	96	74	65	104	75+	61+	63	43	53	48	77	85	59
3186	Saddleback Valley 1	122	79	86	70	111	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	56	98	60	80	64	47	41	57	74	42	56	34	48	37	51	41	49
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	68	130	63	72	104	44	53+	75	108	79	66	73+	83	75+*	140	37	42+	37	129	57	33
4144	Metropolitan Riverside County 1	219	162	163	116	153	139	136	130	164	137	123	109	118+	115	77	75	82	67	135	100	69
4149	Perris Valley	145	87	139	98	112	87	86	100	142	83	80	125	120+	85*	80	51	65	62	70	87	74
4150	San Gorgonio Pass	138	122	227	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	177	94	158	93	136	129	109+	78	116	76	79	74	93+	86	79	50	60	52	58	65	87
4157	Coachella Valley 2**	199	117+	144+	114+	119	114+	149+	139+	124+	83+	106	122+	146+	128+	132+	107	106+	124	129+	121	145
4164	Banning Airport	--	--	--	62	86	69	219	70	79	82	76	75	78	51	99	55	51	45	64	45	139
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	124	142	135	108	89	79	78	147	85	110
SAN BERNARDINO COUNTY:																						
5171	Southwest San Bernardino Valley 1	167	129	208	92	112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5181	Central San Bernardino Mountains	53	45	47	45	47	49	--	52*	47*	52	49	63	89	41*	57	39	43	43	37	47	41
5197	Central San Bernardino Valley 1	178	130	122	101	116	108	106	102	101*	106	108	142	111+	75	75	62	84	67	90	68	96
5203	Central San Bernardino Valley 2	148	136	108	114	134	108	106	94	98	118	72	92	136+	76	66	63	56	53	102	136	78
5204	East San Bernardino Valley	172	128	103	97	92	109	102	83	92	88	61	103	97	58	52	57	71	48	72	62	95
5817	Southwest San Bernardino Valley 2	--	--	--	--	--	124	166	91	149	93	74	78	115+	90	70	87	70	57	115	67*	--
	District Maximum	219	162	227	116	153	139	219	139	164	137	131	142+	146+	135	140	107	106	124	147+	136	145

* Less than 12 full months of data
** Salton Sea Air Basin
\+ Excludes data flagged for exceptional events

\# Federal Reference Method (FRM) filter data only
Refer to 2003 AQMP for 1985–1994 data

TABLE A-20
Carbon Monoxide – Annual Maximum 8-Hour Average (ppm)
(To Be Compared to Federal Standard (9 ppm) and State Standard (9.0 ppm), 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	6.3	4.0	4.3	3.9	3.9	4.9	2.9	2.4	2.6	2	1.7	1.7	1.8	1.6	1.7	1.3	1.4	1.2	1.7	1.9	1.3
069	East San Fernando Valley	12.0	9.3	7.4	7.5	9.0	6.1	4.9	4.6	4.7*	3.7	3.4	3.5	2.8	2.6	2.9	2.4	2.4	2.4	2.4	3.0	--
072	South Coastal Los Angeles County 1	6.6	6.9	6.7	6.6	5.4	5.8	4.7	4.6	4.7	3.4	3.5	3.4	2.6	2.6	2.2	2.1	2.6	2.2	2.0	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3	2.6	2.6	2.6	2.2
074	West San Fernando Valley	10.3	8.5	9.8	9.3	7.6	9.8	6.0	4.8	4.1	3.5	3.5	3.4	2.8	2.9	2.8	2.6	2.8	2.8	2.3	3.0	2.5
075	Pomona/Walnut Valley	6.1	5.0	5.0	7.3	6.7	4.9	3.4	3.3	4.4	3.1	2.5	2.1	2	2	1.8	1.8	1.6	1.5	1.6	1.6	1.6
084	South Central Los Angeles County 1	13.86	17.3	17.0	13.4	11.0	10.0	7.7	10.1	7.3	6.7	5.9	6.4	5.1	4.3*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.6	3.6	4.7	4.0	3.5	3.8	3.3
085	South San Gabriel Valley	7.86	8.1	6.2	6.1	5.6	5.3	4.0	4	4	3.6	2.4*	2.7*	2.9	2.1	2.1	1.9	2.4	2.2	2.0	2.5	1.7
087	Central Los Angeles	8.37	8.4	7.9	6.1	6.3	6.0	4.6	4	4.6	3.2	3.1	2.6	2.2	2.1	2.2	2.3	2.4	1.9	2.0	2.0	1.8
088	West San Gabriel Valley	9.12	7.1	6.0	6.3	6.6	7.4	5.0	4	3.8	3.4	2.8	2.8	2.3	2.1	2.1	2	2.2	1.6	1.7	1.8	1.6
090	Santa Clarita Valley	4.12	3.9	6.8	3.4	3.6	4.9	3.1	1.9	1.7	3.7	1.3	1.3	1.2	1.1	1.4	1.1	0.8	1.1	0.8	1.2	0.9
091	Northwest Coastal Los Angeles County	5.62	4.5	4.4	4.5	3.8	4.3	3.0	2.7	2.7	2.3	2.1	2	2	2	1.5	1.4	1.6	1.4	1.3	1.3	1.4
094	Southwest Coastal Los Angeles County 1	8.86	11.6	10.3	9.4	8.4	7.0	5.1	6.1	5	4.4*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	3.0*	2.1	2.3	2.4	2.5	1.9	2.2	1.8	2.5	2.5	1.9	1.4
591	East San Gabriel Valley 2	--	--	--	--	--	3.1	2.5--	2.3	2.1	2	1.9	2	2	3	2.1	1.3	1.1	1.1	0.8	0.7	1.0
ORANGE COUNTY:																						
3176	Central Orange County	8.00	7.5	5.8	5.3	5.3	6.8	4.7	5.4	3.9	4.1	3.3	3	2.9	3.6	2.7	2	2.1	2.3	2.6	2.1	2.2
3177	North Orange County	6.62	6.9	6.0	6.1	5.3	6.1	4.7	4.4	4.1	4	3.1	3	2.9	2.9	2.3	1.8	2.1	2.4	2.2	2.1	1.6
3186	Saddleback Valley 1	4.00	4.0	3.6	3.1	2.5	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	6.57	7.3	5.8	7.0	6.4	6.3	4.6	4.3	5.8	4.1	3.2	3	3.1	2	2.2	2.1	2.2	1.7	2.0	1.9	2.2
3812	Saddleback Valley 2	--	--	--	--	--	3.3	2.4	3.6	1.8	1.6	1.6	1.8	2.2	1.1	1	0.9	1	1.1	1.3	0.7	0.7
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	1.50	1.6	1.4	1.6	1.8	1.6	1.5	1.2	1.3*	1	0.8	1	0.8	0.6	0.7	0.5	0.6	0.5	1.5	0.9	0.7
4144	Metropolitan Riverside County 1	5.71	5.0	5.8	4.6	4.4	4.3	3.4	3	3.7	3	2.5	2.1	2.9	2	1.9	1.8	1.4	1.6	2.0	1.9	1.7
4146	Metropolitan Riverside County 2	6.50	5.4	5.0	4.6	4.1	4.3	4.5	3.9	3.4	2.1	2.4	2.3	2.1	2	1.8	1.7	1.5	1.5	1.6	1.4	--
4157	Coachella Valley 2**	--	--	--	--	--	2.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4158	Lake Elsinore	--	--	--	--	--	2.0	2.0	2	1.3*	0.9	1	1	1.4	1	0.7	0.6	0.7	0.7	0.6	1.4	0.6
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	2.7	2.1	1.9	2.4	1.9	1.9	1.9	1.9	2.4	1.6
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	--	--	--	--	--	2.6	1.8	1.6	2.9	2.1	1.8	1.8	1.7	1.6	1.5	1.8	1.3	1.1	1.7	1.2	1.3
5197	Central San Bernardino Valley 1	--	--	--	--	--	--	--	--	--	2.1*	2.1	2	1.8	1.9	1.5	1.4	1.1	1.1	1.3	1.2	1.2
5203	Central San Bernardino Valley 2	6.3	4.6	6.0	4.6	4.0	4.3	3.3	3.3	4.6	3.3	2.4	2.3	2.3	1.8	1.9	1.7	1.7	1.7	1.7	2.4	1.8
	District Maximum	13.9	17.3	17.0	13.5	11.7	10.0	7.7	10.1	7.3	6.7	5.9	6.4	5.1	4.3	4.6	3.6	4.7	4.0	3.5	3.8	3.3

* Less than 12 full months of data
** Salton Sea Air Basin
Refer to 2003 AQMP for 1976–1994 data

TABLE A-21
Nitrogen Dioxide – Annual Average (ppb)
(To Be Compared to Federal Standard (53.4 ppb) and State Standard (30 ppb), Annual Average of All Hours)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	46.4	41.5	33.8	36.4	39.0	36.6	33.1	33.6	29.6	20.4	25.1	25.8	25.3	23.0	19.4	18.5	19.0	19.5	17.7	17.8	15.4
069	East San Fernando Valley	45.4	46.1	42.4	41.6	45.6	41.5	41.9	40.2	35.6*	33.2	29.4	27.4	28.9	28.5	27.4	24.1	22.1*	21.9	20.2	21.8	--
072	South Coastal Los Angeles County 1	36.7	34.2	33.3	33.9	34.2	31.3	30.8	29.8	28.8*	28.0	24.1	21.5	20.7	20.8	21.2	19.8	17.7	20.8*	14.0*	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.2	25.3*	21.5	20.7	19.8
074	West San Fernando Valley	31.7	30.7	26.0	26.6	28.7	28.5	26.6	24.8	26.0*	21.4	20.2	17.4	18.6	18.0	17.1	16.7	14.9	14.9*	14.4*	11.7	13.5
075	Pomona/Walnut Valley	45.6	42.6	43.3	43.3	50.3	43.5	37.1	36.5	35.2	31.4	31.2	30.7	31.8	30.2	27.4	26.2	24.6	21.4	22.5	22.1	21.2
084	South Central Los Angeles County 1	46.3	41.2	42.8	39.3	42.8	38.6	36.9	35.7	31.2	30.1	--	30.6	29.1	30.1*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.4	17.9	18.6	17.2	17.6	15.6	16.9
085	South San Gabriel Valley	45.6	39.3	36.3	36.9	39.1	36.6	35.2	34.4	35.3	30.5	31.2	28.3*	24.9	26.3	25.9	22.9	23.7	20.4*	20.6	19.5	20.5
087	Central Los Angeles	45.0	43.6	43.0	39.8	39.1	40.4	37.8	32.7	33.8	32.8	30.8*	28.8	29.9	27.5	28.1	25.0	23.1	24.8*	21.8	22.2	22.2
088	West San Gabriel Valley	37.5	37.8	34.1	35.1	37.9	29.6	34.5	33.5	32.2	27.0	27.8	24.5	24.6	23.5	22.1	19.6	20.3*	17.2	19.1*	16.6	15.3
090	Santa Clarita Valley	30.5	--	--	--	28.4	24.6	23.9	20.0	22.1	20.4	24.1	18.4	19.6	16.5	15.1	14.3	13.3	13.6	14.4	12.7	11.8
091	Northwest Coastal Los Angeles County	27.8	28.9	28.5	27.1	29.1	27.3	25.1	24.9	23.1	19.8	19.0	17.3	20.0	18.4	17.0	15.6	13.9	13.7	14.5	13.3	11.7
094	Southwest Coastal Los Angeles County 1	30.5	28.5	28.0	29.5	29.5	27.5	25.0	24.4*	23.8	31.0*	17.8	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	13.6*	13.4	15.5	14.0	14.3	15.9	12.1	13.4	10.4*	11.8	11.9	10.9
591	East San Gabriel Valley 2	38.0	32.8	30.0	27.6	32.8	29.0	27.4	27.2	27.1	24.0	22.4	20.6	22.7	18.2	17.0	15.4	12.9	14.2*	13.0	13.1	11.2
ORANGE COUNTY:																						
3176	Central Orange County	37.1	31.9	33.2	33.6	32.7	30.0	29.3*	24.4	24.0	19.9	21.1	19.7	20.8	20.3	17.9	17.5	16.8	14.6	18	15.2	14.6
3177	North Orange County	39.1	35.4	32.9	34.4	35.1	30.4	27.5	25.6	28.4	25.2	24.9	22.4	21.9	20.6	20.6	20.1	17.7	18	14.8*	15.2	15.0
3195	North Coastal Orange County	23.9	20.6	19.9	20.0	20.9	20.5	18.2	18.7	19.9	15.1	13.1	14.5	13.2	13.2	13.0	11.3	10.0	10.4	11.6	10.8	11.6
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	22.3	21.0	15.8	17.0	19.5	17.8	17.5	17.2	17.3*	13.0	12.0	10.3	10.3	9.3	8.1	8.5	8.0	7.8	7.5	7.1	6.2
4144	Metropolitan Riverside County 1	30.6	29.4	26.2	22.5	22.5	23.6	24.7	23.7	21.7	17.2	22.2	19.9	20.6	19.2	17.1	16.8	16.6	15.5	17.3	15.1	14.4
4146	Metropolitan Riverside County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	25.8*	20.0	17.2	16.9	16.5*	15.8*	15.8	--
4158	Lake Elsinore	20.8	18.2	16.5	17.4	20.0	17.5	18.5	17.3	18.2*	15.1	14.2	15.1	17.4	12.9	12.9	10.1	9.6	10.2	8.4	8.2	8.7
4164	Banning Airport	--	--	--	21.5	24.3	23.7	21.1	19.9	19.3*	16.5	14.8	16.1	14.7	12.8	10.9	11.6	9.5	9.5	8.5	8.5	8.4
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	19.4	18.1	17.4	15.8	15.1	15.3	13.9	13.7	13.7	13.4
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	46.4	38.7	34.1	35.9	39.8	38.0	38.4	36.9	34.9	30.5	31.3	31.0	27.6	23.5	23.9	20.4	19.6	19.5	17.7*	16.6	15.9
5197	Central San Bernardino Valley 1	42.4	38.6	36.5	36.2	38.8	36.4	35.8	33.4*	30.7	27.3	31.0	27.0	23.9	20.7	23.5	23.1	21.1	22.1	20.6	20.2	18.7
5203	Central San Bernardino Valley 2	40.4	38.4	35.3	33.9	35.8	32.5	30.3	29.6	27.0	26.1	25.9	25.2	24.5	21.7	19.6	18.8	16.9	18.8	17.6	18.0	15.2
	District Maximum	46.4	46.1	43.3	43.3	50.3	43.5	41.9	40.2	35.6	33.2	31.3	31.0	31.8	30.2	28.1	26.2	24.6	25.3	22.5	22.2	22.2

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976–1994 data

TABLE A-22
Nitrogen Dioxide – Annual Maximum 1-Hour Average (ppm)
(To Be Compared to Federal Standard (0.100 ppm) and State Standard (0.18 ppm), 1-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	0.22	0.15	0.16	0.14	0.16	0.15	0.12	0.12	0.12	0.10	0.09	0.11	0.12	0.10	0.10	0.077	0.080	0.072	0.077	0.070	0.071
069	East San Fernando Valley	0.18	0.20	0.20	0.14	0.18	0.17	0.25	0.26	0.14*	0.12	0.09	0.10	0.09	0.11	0.09	0.082	0.068*	0.080	0.073	0.073	--
072	South Coastal Los Angeles County 1	0.21	0.17	0.20	0.16	0.15	0.14	0.13	0.13	0.14*	0.12	0.14	0.10	0.11	0.13	0.11	0.093	0.106	0.077*	0.067*	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.090	0.091*	0.081	0.136	0.102
074	West San Fernando Valley	0.14	0.16	0.20	0.14	0.12	0.11	0.09	0.09	0.13*	0.08	0.09	0.07	0.08	0.09	0.07	0.075	0.056	0.071*	0.058*	0.059	0.073
075	Pomona/Walnut Valley	0.18	0.18	0.15	0.15	0.16	0.14	0.13	0.11	0.12	0.11	0.08	0.10	0.10	0.11	0.10	0.097	0.087	0.082	0.079	0.089	0.072
084	South Central Los Angeles County 1	0.21	0.25	0.20	0.16	0.18	0.14	0.15	0.14	0.13	0.10	0.11	0.14	0.10	0.12*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.077	0.075	0.079	0.070	0.068	0.074
085	South San Gabriel Valley	0.23	0.17	0.15	0.14	0.16	0.14	0.14	0.12	0.14	0.12	0.09	0.10*	0.11	0.10	0.10	0.079	0.091	0.081*	0.079	0.087	0.070
087	Central Los Angeles	0.24	0.25	0.20	0.17	0.21	0.16	0.14	0.14	0.16	0.16	0.13*	0.11	0.10	0.12	0.12	0.089	0.110	0.077*	0.090	0.082	0.079
088	West San Gabriel Valley	0.22	0.19	0.17	0.16	0.16	0.17	0.15	0.15	0.14	0.12	0.10	0.12	0.09	0.11	0.08	0.071	0.087*	0.071	0.067*	0.075	0.075
090	Santa Clarita Valley	0.16	--	--	--	0.10	0.10	0.10	0.10	0.12	0.09	0.09	0.08	0.08	0.07	0.06	0.059	0.060	0.066	0.065	0.058	0.065
091	Northwest Coastal Los Angeles County	0.20	0.18	0.14	0.13	0.13	0.16	0.11	0.11	0.12	0.09	0.08	0.08	0.08	0.09	0.08	0.071	0.081	0.061	0.051	0.064	0.068
094	Southwest Coastal Los Angeles County 1	0.18	0.15	0.17	0.15	0.13	0.13	0.11*	0.10	0.12*	0.08	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.09*	0.09	0.10	0.08	0.09	0.08	0.076	0.098	0.062*	0.078	0.087	0.087
591	East San Gabriel Valley 2	0.20	0.14	0.13	0.13	0.14	0.13	0.12	0.10	0.12	0.12	0.09	0.10	0.11	0.10	0.09	0.079	0.078	0.060*	0.056	0.066	0.066
ORANGE COUNTY:																						
3176	Central Orange County	0.18	0.15	0.10	0.13	0.12	0.13	0.12*	0.10	0.13	0.12	0.09	0.11	0.10	0.09	0.07	0.073	0.074	0.067	0.082	0.076	0.059
3177	North Orange County	0.20	0.16	0.15	0.13	0.16	0.12	0.13	0.12	0.16	0.12	0.09	0.09	0.08	0.08	0.10	0.083	0.070	0.068	0.085*	0.084	0.058
3195	North Coastal Orange County	0.18	0.14	0.12	0.12	0.12	0.11	0.08	0.11	0.11	0.10	0.09	0.10	0.07	0.08	0.07	0.070	0.061	0.074	0.076	0.061	0.052
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	0.09	0.08	0.07	0.07	0.07	0.07	0.08	0.10	0.06*	0.07	0.10	0.09	0.06	0.05	0.05	0.046	0.045	0.045	0.052	0.046	0.042
4144	Metropolitan Riverside County 1	0.15	0.11	0.12	0.10	0.13	0.10	0.15	0.10	0.09	0.09	0.08	0.08	0.07	0.09	0.08	0.065	0.063	0.062	0.060	0.060	0.057
4146	Metropolitan Riverside County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	0.09*	0.08	0.061	0.057	0.060*	0.058*	0.056	--
4158	Lake Elsinore	0.21	0.10	0.11	0.09	0.11	0.08	0.09	0.07	0.08*	0.06	0.07	0.07	0.06	0.06	0.06	0.051	0.050	0.048	0.047	0.045	0.047
4164	Banning Airport	--	--	--	0.26	0.31	0.21	0.24	0.15	0.09*	0.08	0.07	0.11	0.08	0.08	0.06	0.066	0.061	0.072	0.052	0.052	0.050
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	0.08	0.07	0.10	0.08	0.062	0.059	0.061	0.054	0.058	0.068
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	0.20	0.15	0.15	0.14	0.13	0.15	0.13	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.11	0.079	0.069	0.067	0.062*	0.074	0.072
5197	Central San Bernardino Valley 1	0.17	0.17	0.14	0.15	0.15	0.12	0.13	0.12*	0.12	0.06	0.10	0.09	0.09	0.10	0.11	0.072	0.076	0.069	0.082	0.070	0.089
5203	Central San Bernardino Valley 2	0.16	0.15	0.14	0.11	0.14	0.10	0.11	0.11	0.10	0.12	0.08	0.09	0.08	0.09	0.08	0.069	0.062	0.067	0.072	0.073	0.071
	District Maximum	0.24	0.25	0.2	0.26	0.31	0.21	0.25	0.26	0.16	0.16	0.14	0.14	0.12	0.13	0.12	0.097	0.110	0.091	0.090	0.136	0.102

* Less than 12 full months of data ** Salton Sea Air Basin
Refer to 2003 AQMP for 1976–1994 data

TABLE A-23
Sulfur Dioxide – Annual Maximum 1-Hour Average (ppm)
(To Be Compared to Federal Standard (0.075 ppm) and State Standard (0.25 ppm), 1-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2021	2013	2014	
LOS ANGELES COUNTY:																						
60	East San Gabriel Valley 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
69	East San Fernando Valley	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01	0.01*	0.02	0.01	0.01	0.01	0.01	0.01	0.015	0.009	0.007	0.011	0.005	--
72	South Coastal Los Angeles County 1	0.14	0.04	0.04	0.08	0.05	0.05	0.05	0.03	0.03	0.04	0.04	0.03	0.11	0.09	0.02	0.040	0.015	0.022	0.022	--	--
33	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.043	0.023	0.015	0.015	0.038
74	West San Fernando Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
84	South Central Los Angeles County	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
85	South San Gabriel Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
87	Central Los Angeles	0.01	0.01	0.02	0.14	0.05	0.08	0.03	0.02	0.05*	0.08	0.07	0.03	0.01	0.01	0.01	0.010	0.020	0.005	0.006	0.005	0.013
88	West San Gabriel Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
90	Santa Clarita Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
91	Northwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
94	Southwest Coastal Los Angeles County 1	0.06	0.06	0.1	0.03	0.09	0.17	0.04	0.07	0.03	0.03*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.02*	0.04	0.02	0.02	0.02	0.02	0.026	0.012	0.005	0.010	0.015	0.015
ORANGE COUNTY:																						
3176	Central Orange County	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3177	North Orange County	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0.02	0.01	0.03	0.02	0.02	0.02	0.01	0.03	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.010	0.008	0.006	0.004	0.009	0.005
RIVERSIDE COUNTY:																						
4144	Metropolitan Riverside County	0.01	0.01	0.04	0.03	0.03	0.11	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.018	0.051	0.004	0.008	0.006	0.002
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000
5197	Central San Bernardino Valley 1	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.03*	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.007	0.012	0.023	0.004	0.004	0.004
5203	Central San Bernardino Valley 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	District Maximum	0.14	0.06	0.1	0.14	0.09	0.17	0.05	0.07	0.05	0.08	0.07	0.03	0.11	0.09	0.02	0.04	0.051	0.023	0.022	0.015	0.038

* Less than 12 full months of data
** Salton Sea Air Basin
Refer to 2003 AQMP for 1976–1994 data

TABLE A-24
Sulfates (PM10) – Annual Maximum 24-Hour Average (µg/m³)
(To Be Compared to State Standard of 25 µg/m³, 24-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
60	East San Gabriel Valley 1	12.7	11.9	12.9	10.5	16.9	14.3	12.7	12.3	13.1	10.8	10.8	17.0	34.2	17.3	7.3	7.3	6.6	5.2	4.8	14.3	21.0+
69	East San Fernando Valley	14.9	12.0	14.7	9.8	11.4	15.7	14.6	12.2	15.3	11.0	11.8	13.3	10.2	10.8	8.8	8.0	7.4	6.2	5.4	4.0*	--
72	South Coastal Los Angeles County 1	18.2	14.9	11.3	12.8	13.1	11.9	15.0	14.4	15.6	14.7	10.8	16.5	10.3	9.7	9.5	10.0	6.1	5.2	4.5	--	--
77	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	15.0	15.9	13.5	17.9	8.4	11.0	7.3	12.6	5.9	4.9	4.8	4.5	6.3
87	Central Los Angeles	16.2	14.7	16.2	10.3	16.7	14.6	16.2	13.5	14.5	10.5	11.7	13.1	9.4	12.7	9.5	7.5	8.0	5.7	5.8	11	6.1
90	Santa Clarita Valley	11.2	8.4	10.4	7.2	17.3	--	9.2	9.2	11.2	8.9	9.3	8.8	9.2	6.7	6.0	6.9	6.1	4.9	3.7	4.3	5.3
94	Southwest Coastal Los Angeles County1	18.1	16.1	15.3	11.6	17.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	12.6	11.0	12.4	10.7	13.4	8.4	8.5	5.9	5.4	5.6	5.1	6.5
ORANGE COUNTY:																						
3176	Central Orange County	14.5	17.3	14.7	12.9	9.6	--	9.9	11.8	11.3	12.2	9.0	12.8	12.1	8.7	7.6	6.6	6.5	4.4	4.7	9.4	4.2
3186	Saddleback Valley 1	12.3	15.1	14.2	9.1	8.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	8.6	12.3	10.1	10.9	10.5	9.2	9.2	9.4	8.8	6.8	6.1	7.4	4.8	4.2	4.4	4.0	3.3
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	6.8	5.7	5.9	5.5	5.4	6.2	6.0	5.3	6.5	5.2	5.5	4.9	5.8	5.2	4.8	5.1	4.4	5.9	3.5	2.6	4.6
4144	Metropolitan Riverside County 1	22.3	14.9	14.8	10.0	11.1	10.7	11.3	10.5	12.4	24.8	10.5	10.9	13.7	7.3	8.3	7.2	5.3	7.7	4.2	4.1	5.9
4149	Perris Valley	13.5	8.0	9.1	7.9	8.7	7.4	8.3	7.9	6.9	7.8	7.7	9.0	10.1	6.5	6.3	5.8	4.4	3.8	3.4	3.5	3.6
4150	San Gorgonio Pass	7.3	8.5	8.7	6.5	2.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	13.6	11.3	13.1	9.8	10.1	11.0	10.2	10.5	9.9	10.1	7.1	10.7	18.9	13.4	10.7	7.0	5.1	4.4	4.2	3.8	3.8
4157	Coachella Valley 2**	10.4	6.7	5.8	5.4	4.9	6.9	7.5	7.2	6.2	6.7	6.1	5.4	5.2	5.6	5.1	4.8	5.7	7.6	3.9	3.2	4.1
4164	Banning Airport				6.1	4.6	6.9	6.4	8.0	5.8	6.7	7.1	7.5	6.2	6.3	5.4	5.5	4.4	5	2.9	2.7	3.8
4165	Mira Loma Van Buren	--	--	--	--	--	--	--	--	--	--	--	10.1	19.6	8.6	5.9	5.3	5.4	4.7	4.2	4.2	4.9
SAN BERNARDINO COUNTY:																						
5181	Central San Bernardino Mountains	4.8	5.2	4.7	4.5	3.0	5.1	5.2	4.0	3.7	4.7	5.9	4.2	3.9	4.4	3.9	4.7	4.0	3.7	3.6	2.9	4.2
5197	Central San Bernardino Valley 1	14.2	11.0	11.2	9.8	11.6	11.6	11.3	11.6	12.4	10.2	9.0	11.7	22.2	8.9	6.1	6.2	6.0	4.6	4.1	5.0	14.7+
5203	Central San Bernardino Valley 2	11.9	11.6	9.2	13.1	10.8	10.6	10.3	10.8	11.4	10.4	9.3	10.0	9.7	8.3	5.6	6.6	5.5	4.4	4.6	4.6	9.0
5204	East San Bernardino Valley	11.3	9.9	8.8	9.6	9.8	10.2	9.0	9.7	9.0	10.5	8.6	11.7	11.3	7.4	5.4	6.6	4.9	4.2	3.6	3.4	7.3
5817	Southwest San Bernardino Valley	--	--	--	4.6	10.1	10.2	11.4	10.7	11.0	11.1	9.3	11.2	22.8	12.4	7.0	7.3	5.5	5.1	4.8	3.9*	--
	District Maximum	22.3	17.3	16.2	13.1	17.6	15.7	16.2	14.4	15.6	24.8	13.5	17.9	34.2	17.3	10.7	12.6	8.0	7.7	5.8	14.3	21.0+

* Less than 12 full months of data
** Salton Sea Air Basin
+Higher concentrations recorded due to the 4th of July firework activities.
Refer to 2003 AQMP, Appendix II for 1976–1994 data

TABLE A-25
Lead (TSP) – Annual Maximum Monthly Average (μg/m^3)
(To Be Compared to State Standard of 1.5 μg/m^3, Monthly Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
69	East San Fernando Valley	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
72	South Coastal Los Angeles County 1	0.05	0.09	0.05	0.07	0.06	0.05	0.05	0.03	0.10	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	--	--
77	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.010
84	South Central Los Angeles County 1	0.06	0.09	0.07	0.04	0.17	0.09	0.23	0.04	0.04	0.03	0.03	0.02	0.03	0.03	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.01	0.01	0.01	0.01	0.01	0.014
85	South San Gabriel Valley	0.07	0.09	0.08	0.07	0.21	0.09	0.07	0.06	0.05	0.03	0.03*	0.03	0.04	0.02	0.04	0.02	0.01	0.01	0.01	0.02	0.014
87	Central Los Angeles	0.07	0.08	0.07	0.06	0.13	0.06	0.06	0.05	0.15	0.03	0.03	0.02	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.013
94	Southwest Coastal Los Angeles County	0.04	0.04	0.06	0.06	0.05	0.08	0.04	0.02	0.17	0.01	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.008
LOS ANGELES COUNTY (Source-Specific):																						
	Van Nuys Airport, Van Nuys	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.06	0.13	0.09	--	--
	Trojan Battery, Santa Fe Springs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.15	0.08	0.12	0.12	0.11	0.05	0.05
	Quemetco, City of Industry	--	--	--	--	0.28	0.44	0.46	0.15	0.18	0.13	0.38	0.10	--	0.06*	0.11	0.12	0.07	0.04	0.07	0.04	0.02
	Exide (Rehrig), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	1.97*	2.88	0.80	0.48	0.54	0.13	0.12	0.10	0.03
	Exide (ATSF), Vernon	--	--	--	--	--	--	--	--	--	--	--	0.23	1.01	0.25	0.09	0.08	0.07	0.04	0.02	0.02	0.02
	Exide (Ayers St.), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04*	0.03	0.02	--	--	--	--	--
ORANGE COUNTY:																						
3176	Central Orange County	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RIVERSIDE COUNTY:																						
4144	Metropolitan Riverside County 1	0.04	0.08	0.07	0.08	0.06	0.06	0.04	0.03	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.008
4146	Metropolitan Riverside County 2	0.05	0.05	0.07	0.10	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
SAN BERNARDINO COUNTY:		0.05	0.04	0.04	0.05	0.07	0.07	0.05	0.02	0.08	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	--	--	--	--
5175	Northwest San Bernardino Valley	0.06	0.04	0.04	0.05	0.07	0.07	0.05	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010
5203	Central San Bernardino Valley	0.05	0.06	0.04	0.05	0.07	0.06	0.05	0.03	0.14	0.02	0.02	0.02	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.012
	District Maximum	0.07	0.09	0.08	0.1	0.28	0.44	0.46	0.15	0.18	0.13	0.38	0.23	1.97	2.88	0.8	0.48	0.12	0.13	0.12	0.10	0.014

* Less than 12 full months of data
Refer to 2003 AQMP for 1976–1994 data

TABLE A-26
Lead (TSP) – Annual Maximum 3-Month Rolling Average (μg/m³)
(To Be Used for Comparison to Federal Standard of 0.15 μg/m³, 3-Month Rolling Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
LOS ANGELES COUNTY:																						
69	East San Fernando Valley	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
72	South Coastal Los Angeles County 1	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.03	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--	--
77	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
84	South Central Los Angeles County 1	0.05	0.07	0.07	0.05	0.09	0.07	0.11	0.04	0.04	0.03	0.03	0.02	0.03	0.03	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.01	0.01	0.01	0.01	0.01	0.01
85	South San Gabriel Valley	0.06	0.06	0.07	0.06	0.10	0.08	0.05	0.05	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
87	Central Los Angeles	0.06	0.06	0.07	0.05	0.07	0.05	0.05	0.04	0.06	0.06	0.02	0.01	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
94	Southwest Coastal Los Angeles County	0.04	0.04	0.05	0.05	0.04	0.05	0.04	0.03	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01
LOS ANGELES COUNTY (Source-Specific):																						
	Van Nuys Airport, Van Nuys	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04	0.08	0.08	--	--
	Trojan Battery, Santa Fe Springs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.12	0.07	0.11	0.08	0.08	0.04	0.04
	Quemetco, City of Industry	--	--	--	--	0.22	0.37	0.33	0.12	0.15	0.11	0.22	0.09	--	--	0.10	0.10	0.06	0.03	0.04	0.03	0.01
	Exide (Rehrig), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	--	2.49	0.66	0.39	0.46	0.15	0.10	0.07	0.02
	Exide (ATSF), Vernon	--	--	--	--	--	--	--	--	--	--	--	0.21	0.55	0.22	0.08	0.05	0.06	0.03	0.02	0.02	0.02
	Exide (Ayers St.), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.02	0.02	--	--	--	--	--
ORANGE COUNTY:																						
3176	Central Orange County	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RIVERSIDE COUNTY:																						
4144	Metropolitan Riverside County 1	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.01
4146	Metropolitan Riverside County 2	0.03	0.03	0.05	0.06	0.04	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.02	0.04	0.03	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5203	Central San Bernardino Valley	0.04	0.05	0.03	0.04	0.05	0.05	0.05	0.03	0.08	0.07	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	District Maximum	0.06	0.07	0.07	0.06	0.22	0.37	0.33	0.12	0.15	0.11	0.22	0.21	0.55	2.49	0.66	0.39	0.46	0.15	0.10	0.07	0.01

* Less than 12 full months of data
Refer to 2003 AQMP for 1976–1994 data