Chapter 4

Regional Trends and Forecasts

Introduction

This chapter provides an in-depth look at emissions and air quality in California's five major metropolitan areas (data for individual counties are provided in Appendix B). The emissions data include the latest point source estimates provided by districts as well as inventory improvements from recent SIPs. The air quality statistics include values reflecting the national ambient air quality standards. Below, we will briefly discuss some of the statistics used to characterize ozone and PM air quality in this chapter.

In addition to maximum concentrations and number of days above the standards, the ozone statistics include the annual 4th high 8-hour concentration and the design value. The annual 4th high 8-hour concentration is the annual number that goes into the calculation of the national 8-hour design value. We also provide the the maximum 1-hour concentration and the national 1-hour design value. The design values are related to the national 8-hour ozone standard and the national 1-hour ozone standard (revoked). These statistics are reported for the end year of the three-year period. For example, the 2011 design value reflects data for the years 2009 through 2011.

The design values are concentrations that are compared to the standard for the purpose of determining attainment status. However, values for these statistics that are included in this almanac may not satisfy data completeness requirements or the boundaries of a nonattainment area, which may differ from county or air basin boundaries. Data conforming to the established design value requirements are available for the national 8-hour ozone standard on ARB's website at *www.arb.ca.gov/airqualitytoday* under "recent year's ozone air quality." Historical data are available on the web at *www.arb.ca.gov/adam*.

Finally, it is important to note that air quality statistics based on a single year of data (for example, the yearly count of days above the standard) can fluctuate from year-to-year because of variations in weather. As a result, this almanac compares three-year averages when characterizing the percentage increase or decrease in days above the standard. In this case, the number of exceedance days for 1992 (which represents an average of 1990, 1991, and 1992) is then compared to the 2011 value (which represents an average of 2009, 2010, and 2011), giving a much more stable indicator of long-term progress.

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South Coast Air Basin

Introduction - Area Description

The South Coast Air Basin is California's largest metropolitan region. The area includes the southern two-thirds of Los Angeles County, all of Orange County, and the western urbanized portions of Riverside and San Bernardino counties. It covers a total of 6,480 square miles, is home to more than 42 percent of California's population, and generates about 24 percent of the State's total NO_x emissions and about 16 percent of the State's total $PM_{2.5}$ emissions.

The South Coast Air Basin generally forms a lowland plain, bounded by the Pacific Ocean on the west and by mountains on the other three sides. In terms of air pollution potential, the warm sunny weather associated with a persistent high pressure system is conducive to the formation of ozone, commonly referred to as "smog." The problem is further aggravated by the surrounding mountains, frequent low inversion heights, and stagnant air conditions. All of these factors act together to trap pollutants in the air basin.

Pollutant concentrations in parts of the South Coast Air Basin are among the highest in the nation. As a result, controlling the contributing emission sources poses a great challenge to State and local air pollution control agencies.

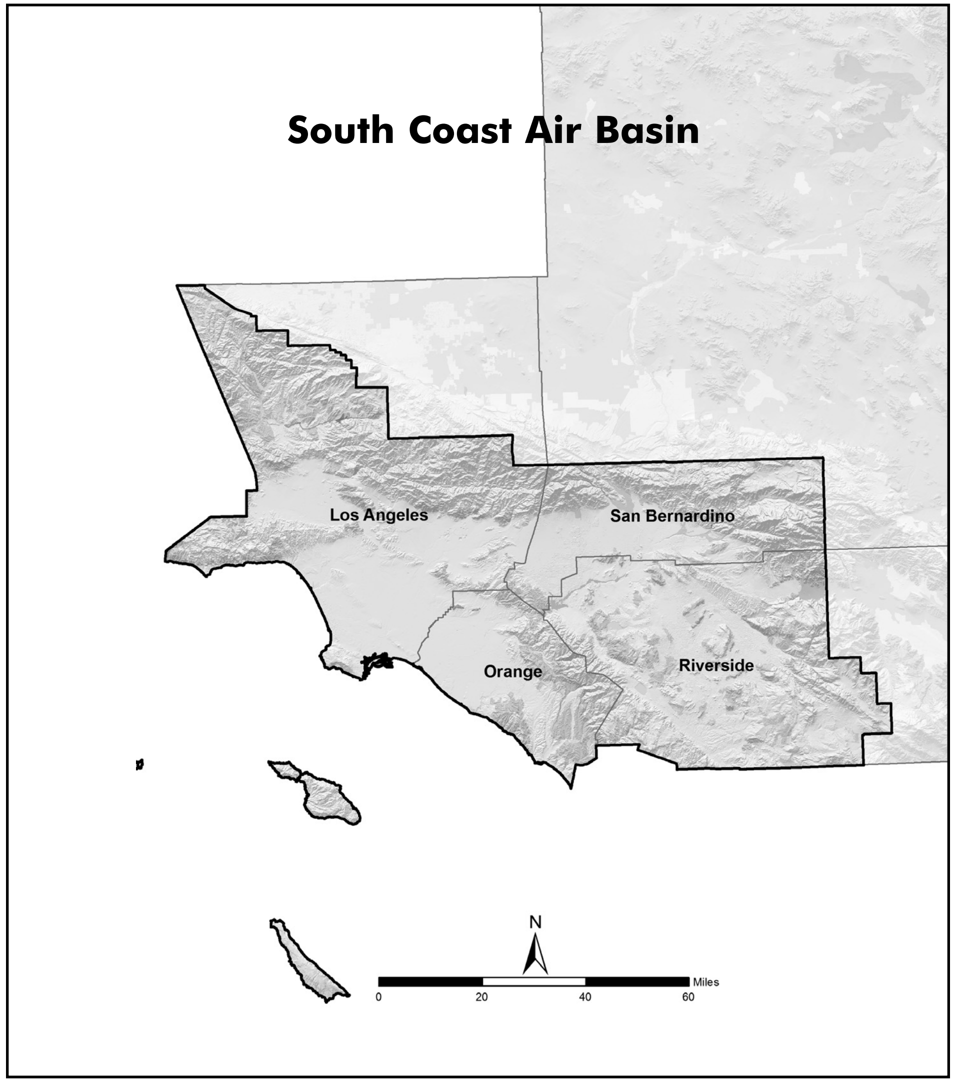

Figure 4-1

South Coast Air Basin
Emission Trends and Forecasts

Overall, since 2000 the emission levels for the ozone precursors NO_x and VOC have been decreasing in the South Coast Air Basin and are projected to continue decreasing through 2035. The decreases are predominantly due to motor vehicle controls and reductions in evaporative emissions. In the South Coast Air Basin, on-road motor vehicles are the largest contributors to NO_x, and VOC emissions. Other mobile sources are also significant contributors to NO_x emissions. The emission levels for SO_x have decreased since 2000. This is mainly due to the switch from fuel oil to natural gas for electric generation and to reduced sulfur content in fuels.

South Coast Air Basin Emissions (tons/day, annual average)								
Pollutant	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
VOC	956	678	544	429	400	393	393	391
NO_X	1106	888	603	451	357	289	266	257
SO_X	53	50	19	18	17	17	18	20
DPM	22	21	12	7	5	4	4	4
$PM_{2.5}$	88	84	71	67	67	68	70	71
PM_{10}	179	175	160	155	161	165	170	172
NH_3	123	107	92	96	93	91	93	92

Table 4-1

South Coast Air Basin
Population and VMT

Both population and the daily VMT grew from 2000 to 2010 and are projected to continue to grow at high rates in the South Coast Air Basin from 2010 to 2035. While high growth rates are often associated with corresponding increases in emissions and pollutant concentrations, aggressive emission control programs in the South Coast Air Basin have resulted in emission decreases and a continuing improvement in air quality.

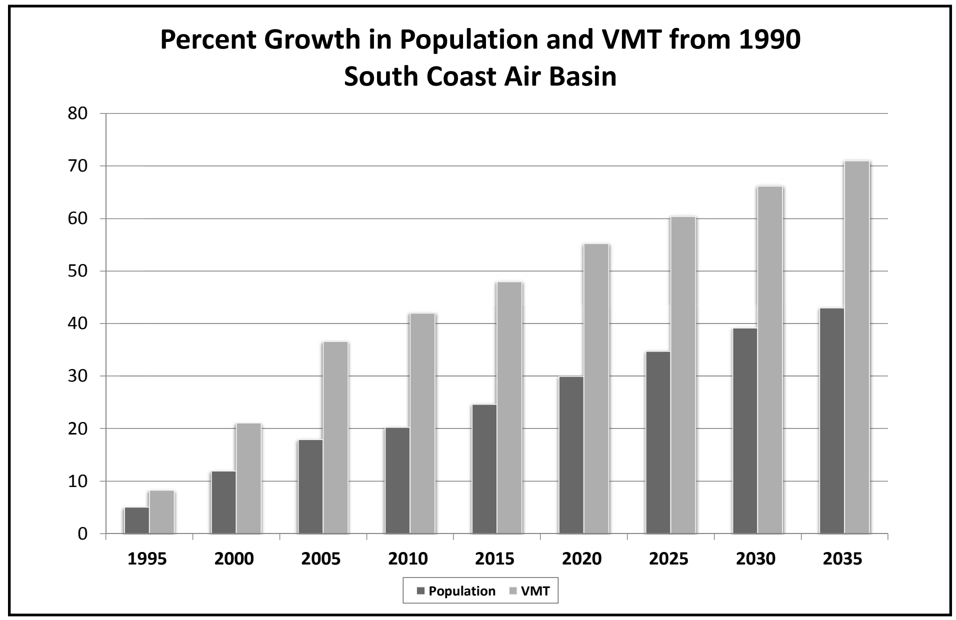

Figure 4-2

Parameter	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Population	13083594	13745292	14640692	15425626	15735186	16308365	17003779	17624153	18206278	18707348
Avg. Daily VMT/1000	257490	278813	311684	351680	365620	381013	399639	413000	427819	440283

Table 4-2

South Coast Air Basin

Ozone Precursor Emission - Trends and Forecasts

Emissions of the ozone precursors NO_x and VOC in the South Coast Air Basin are generally following the statewide downward trend. Motor vehicle miles traveled in the basin are increasing, but NO_x and VOC emissions from on-road vehicles are dropping as more stringent vehicle emission standards have been adopted. These decreases in NO_x and VOC emissions are projected to continue between 2010 and 2035, as even more stringent motor vehicle standards are implemented and as newer, lower-emitting vehicles become a larger percentage of the fleet. NO_x emissions from electric utilities in the air basin have declined substantially since 2000, despite a nationwide increase in emissions from electric utilities in the same time period. These large reductions are primarily due to increased use of natural gas as the principal fuel for power plants, and control rules that limit NO_x emissions.

NO_X Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***1106***	***888***	***603***	***451***	***357***	***289***	***266***	***257***
Stationary Sources	135	67	62	54	54	55	56	57
Area-wide Sources	32	28	21	19	18	16	15	14
On-Road Mobile	707	580	381	249	172	118	102	96
Gasoline Vehicles	399	246	173	111	73	52	40	31
Diesel Vehicles	308	334	208	138	99	65	61	65
Other Mobile	232	214	139	128	113	99	93	91
Gasoline Fuel	27	25	18	15	14	14	14	14
Diesel Fuel	175	164	101	94	79	66	59	56
Other Fuel	29	25	20	19	19	20	21	22

Table 4-3

VOC Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***956***	***678***	***544***	***429***	***400***	***393***	***393***	***391***
Stationary Sources	222	123	121	107	115	122	128	133
Area-wide Sources	188	162	130	119	122	126	130	133
On-Road Mobile	382	245	178	107	76	63	55	44
Gasoline Vehicles	367	229	168	101	71	58	49	38
Diesel Vehicles	15	16	10	5	5	5	5	6
Other Mobile	165	148	114	96	86	82	81	82
Gasoline Fuel	143	128	100	83	74	70	68	68
Diesel Fuel	19	17	11	9	8	7	7	8
Other Fuel	3	3	3	4	4	5	5	6

Table 4-4

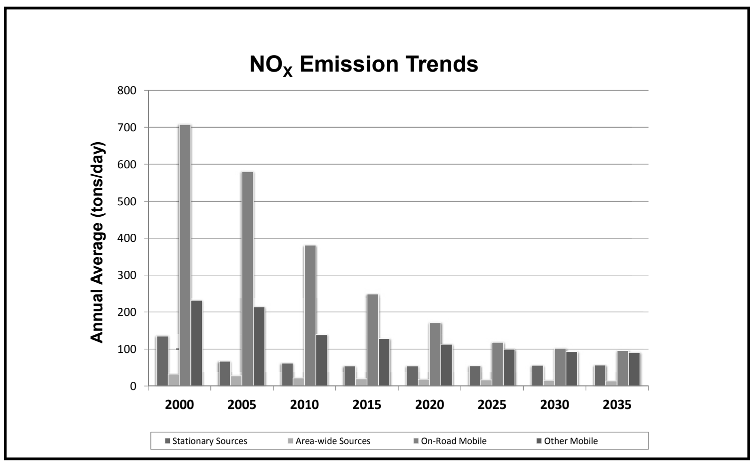

Figure 4-3

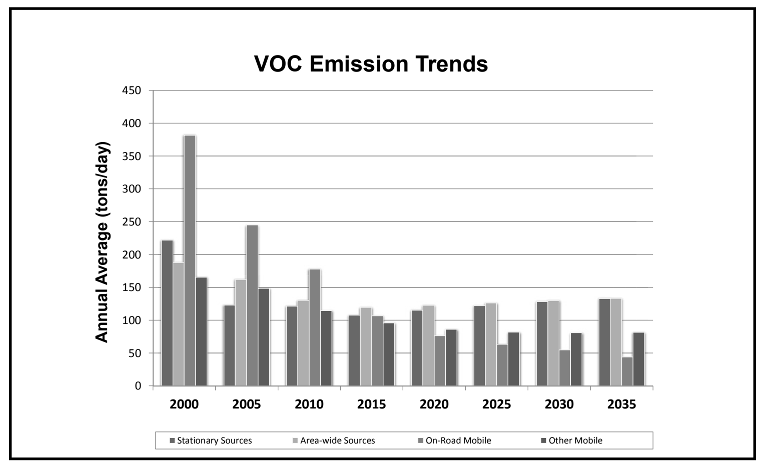

Figure 4-4

South Coast Air Basin

Directly Emitted $PM_{2.5}$ Emission - Trends and Forecasts

Direct emissions of $PM_{2.5}$ have decreased in the South Coast Air Basin since 2000. Stationary source and area-wide source emissions have remained relatively flat. The bulk of the decline of $PM_{2.5}$ emissions are from diesel mobile sources.

Particulate matter can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_x, SO_x, VOC, and ammonia. The $PM_{2.5}$ emission inventory includes only directly emitted particulate emissions.

$PM_{2.5}$ Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***88***	***84***	***71***	***67***	***67***	***68***	***70***	***71***
Stationary Sources	17	16	14	14	15	16	17	17
Area-wide Sources	36	34	33	33	35	35	36	36
On-Road Mobile	22	21	17	12	11	11	12	12
Gasoline Vehicles	10	9	9	8	8	8	9	9
Diesel Vehicles	11	11	8	4	3	3	3	4
Other Mobile	12	13	8	7	6	5	5	5
Gasoline Fuel	3	3	3	3	3	3	3	3
Diesel Fuel	9	9	4	4	3	2	2	2
Other Fuel	0	0	0	1	1	1	1	1

Table 4-5

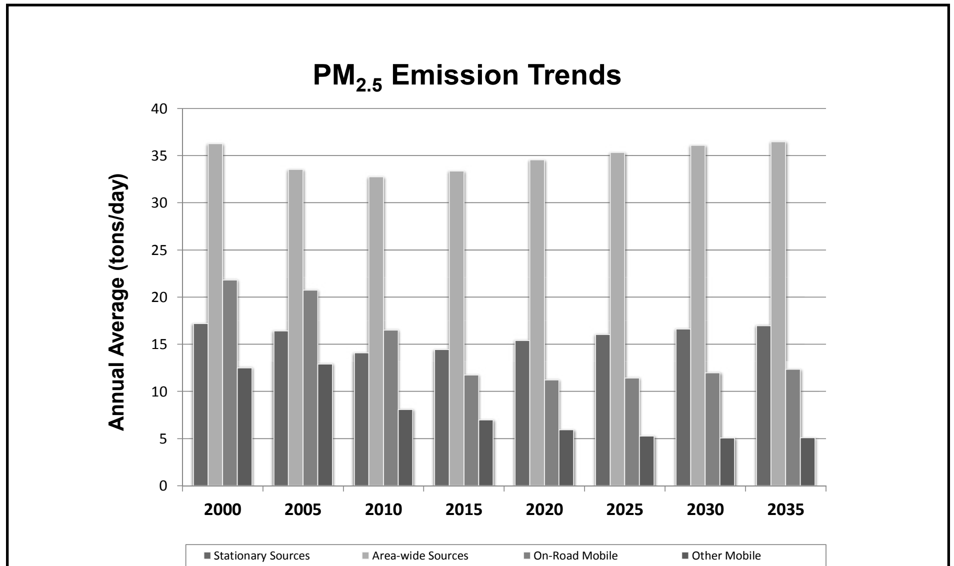

Figure 4-5

South Coast Air Basin

Diesel PM Emission - Trends and Forecasts

Diesel PM emissions decreased from 2000 to 2010 primarily as a result of reduced exhaust emissions from diesel mobile sources. These decreases can be attributed to the efforts of ARB's Diesel Risk Reduction Plan. Since its adoption in 2000, this program has achieved reductions in DPM emissions from on-road and off-road vehicles as well as stationary and portable diesel-fueled engines. This has been accomplished through new regulatory standards for all new diesel-fueled engines and vehicles along with retrofit requirements (e.g. catalyzed diesel particulate filters) for existing engines and vehicles. Additional reductions are being achieved through improvements to the quality of diesel fuel by the reduction of sulfur content.

Through programs such as the Diesel Risk Reduction Program, emissions from diesel mobile sources are projected to continue to decrease through 2035.

Diesel PM Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***22***	***21***	***12***	***7***	***5***	***4***	***4***	***4***
Stationary Sources	1	0	0	0	0	0	0	0
Area-wide Sources	0	0	0	0	0	0	0	0
On-Road Mobile	11	11	7	3	2	2	2	2
Gasoline Vehicles	0	0	0	0	0	0	0	0
Diesel Vehicles	11	11	7	3	2	2	2	2
Other Mobile	10	10	5	4	3	2	2	2
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	10	10	5	4	3	2	2	2
Other Fuel	0	0	0	0	0	0	0	0

Table 4-6

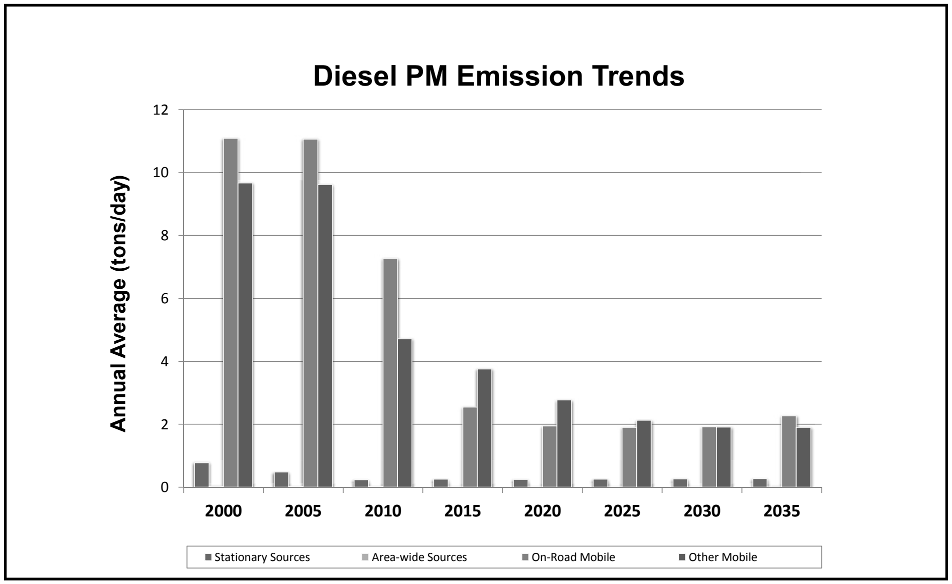

Figure 4-6

South Coast Air Basin

Ammonia Emission - Trends and Forecasts

Ammonia emissions have decreased in the South Coast Air Basin since 2000. Area-wide source emissions from livestock waste and pesticide usage are expected to remain relatively flat from 2020 through 2035. Ammonia emissions from stationary sources, mainly waste disposal and fuel combustion, are forecasted to increase slightly from 2015 to 2035, while on-road mobile source emissions remain flat during the same period.

NH_3 Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***123***	***107***	***92***	***96***	***93***	***91***	***93***	***92***
Stationary Sources	26	28	29	40	42	43	44	44
Area-wide Sources	71	55	44	41	37	35	35	35
On-Road Mobile	26	24	19	16	14	14	14	14
Gasoline Vehicles	25	23	18	15	14	13	13	13
Diesel Vehicles	0	0	0	0	1	1	1	1
Other Mobile	0	0	0	0	0	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	0	0	0	0	0	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-7

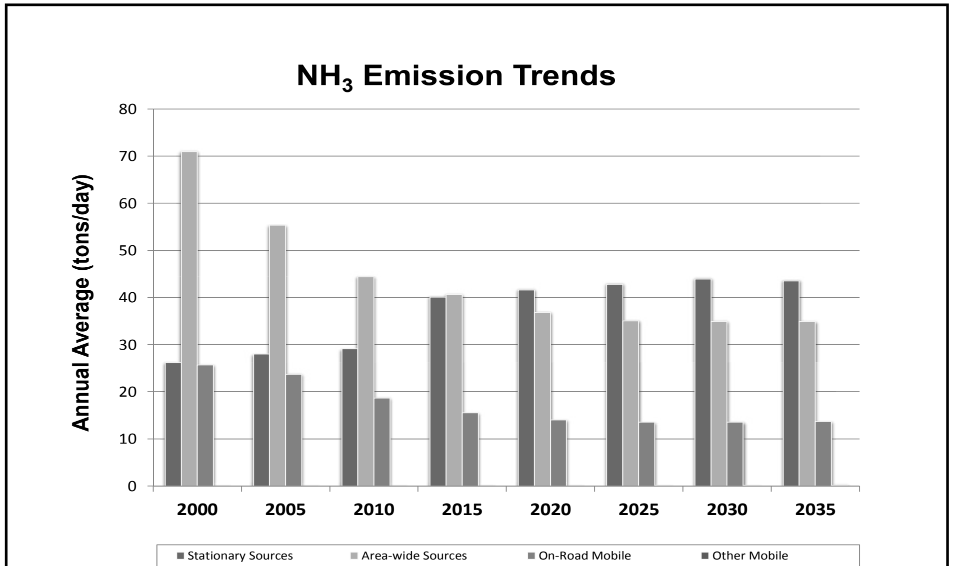

Figure 4-7

South Coast Air Basin

Ozone Air Quality Trend

Ozone air quality in the South Coast Air Basin has improved substantially over the last 50 years. During the 1960s, maximum 1-hour concentrations were above 0.60 ppm. Today, ozone levels rarely reach 0.15 ppm, and typical maximum daily values only occasionally reach the former federal standard of 0.124 ppm. The 2012 8-hour design value was 41 percent lower than the 1992 value. The number of days above the standards has also declined dramatically, and the trend for 1-hour ozone is similar to that for 8-hour. Today, nearly 60 percent of the population lives in areas that meet the 8-hour ozone standard.

Although ozone has improved substantially over time, the rate of progress has been more modest in recent years. This may be attributable to changes in the mix and reactivity of precursor emissions in the South Coast. Continuing implementation of emissions control measures will ensure continued progress throughout the Air Basin.

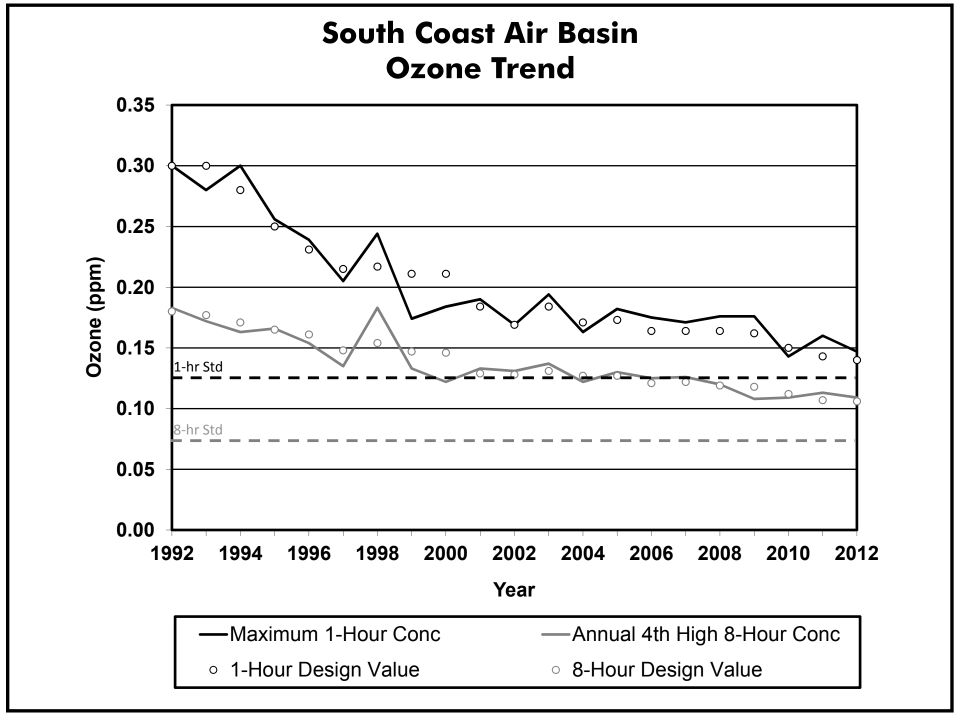

Figure 4-8

The South Coast is designated nonattainment for the 1-hour ozone standard and the 8-hour ozone standard. ARB and the South Coast Air Quality Management District have developed SIPs to demonstrate how the region will meet these standards. U.S. EPA has approved a SIP showing the Basin will meet the 0.08 ppm 8-hour ozone standard by 2023. ARB has also submitted a SIP to U.S. EPA demonstrating the area will meet the 1-hour ozone standard in 2022. These plans call for continuing NO_x and VOC reductions needed to meet the ozone standards. These reductions result from regulations and incentive programs that lead to cleaner vehicles for on-road and off-road applications, less polluting consumer products, and industrial and commercial sources. By 2016, the District will submit a new plan demonstrating how the region will meet the 8-hour ozone standard of 0.075 ppm by 2032.

OZONE (ppm)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Annual 4th High 8-Hour	0.183	0.172	0.163	0.166	0.154	0.135	0.183	0.133	0.122	0.133	0.131	0.137	0.122	0.130	0.125	0.126	0.120	0.108	0.109	0.113	0.109
8-Hour Design Value	0.180	0.177	0.171	0.165	0.161	0.148	0.154	0.147	0.146	0.129	0.128	0.131	0.127	0.127	0.121	0.122	0.119	0.118	0.112	0.107	0.106
Maximum 1-Hour Concentration	0.300	0.280	0.300	0.256	0.239	0.205	0.244	0.174	0.184	0.190	0.169	0.194	0.163	0.182	0.175	0.171	0.176	0.176	0.143	0.160	0.147
1-Hour Design Value[1]	0.300	0.300	0.280	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	0.143	0.140
Days Above Nat. 8-Hour Standard	191	183	164	150	141	155	120	120	126	128	132	133	115	116	114	108	119	113	102	106	111

[1] The national 1-Hour standard has been revoked. Current and historical 1-Hour data are provided for reference.

Table 4-8

South Coast Air Basin

Ozone Contour Maps: 3-Year Average of National 8-Hour Exceedance Days

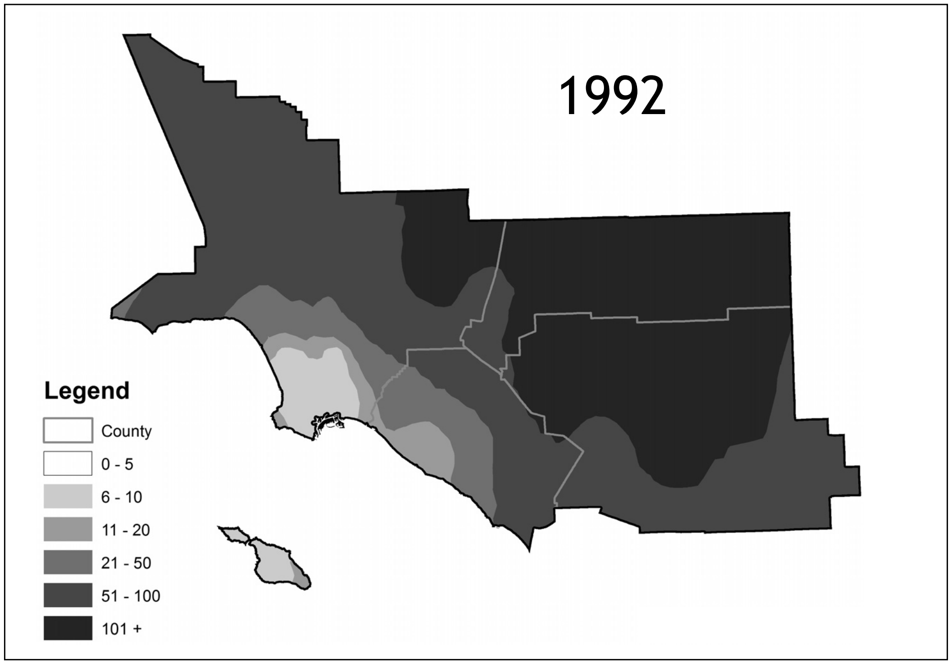

Figure 4-9

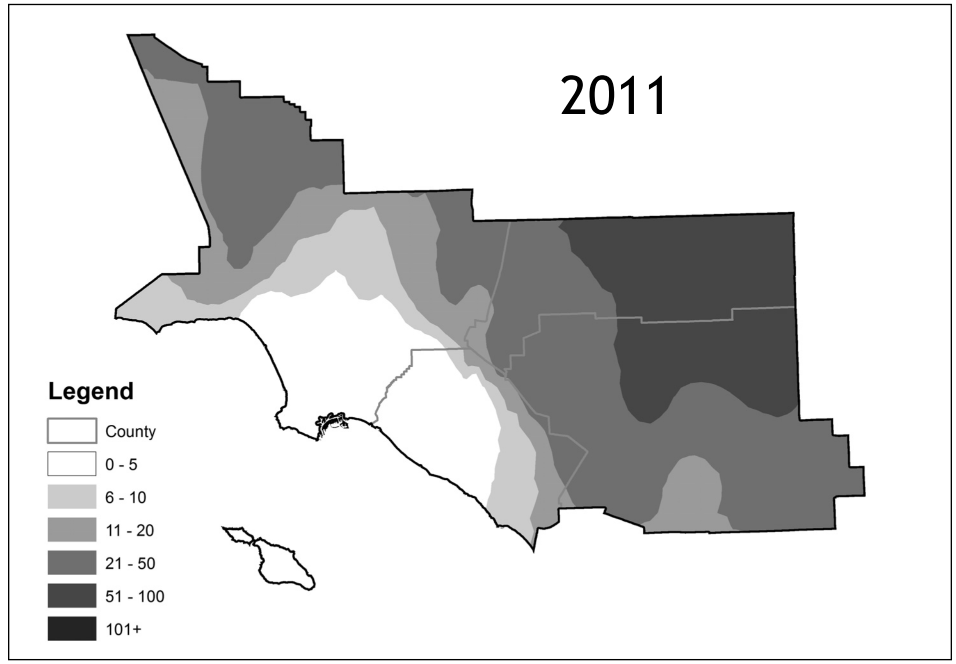

Figure 4-10

Another way to look at ozone air quality is to evaluate how widespread the problem is within a region. The maps on this page illustrate how the number of days exceeding the national 8-hour standard have changed across the South Coast Air Basin over the last two decades. Three-year averages are used to help mitigate the impact of changes in meteorology.

Overall, the two maps show a substantial reduction in the number of exceedance days over the last 20 years. During the 1992 time period, nearly all of the South Coast had more than 50 exceedance days, with more than 100 days in nearly one-third of the air basin. This is equivalent to more than three months during a year with ozone concentrations above the level of the standard. The coastal areas were cleaner than the inland areas. However, the entire population of South Coast lived in regions exceeding the 8-hour ozone standard

The 2011 map now shows a large area with less than ten exceedance days. Much of this area currently meets the national standard, including about two-thirds of Orange County and one-third of Los Angeles County, where the majority of the Air Basin population lives and works. Today, this represents nearly 60 percent of the population. The areas with fewer than 50 exceedance days have also grown significantly, while the area with more than 50 days has been reduced. The area with the highest number of exceedance days is now limited to portions of Riverside and San Bernardino counties.

South Coast Air Basin

$PM_{2.5}$ Air Quality Trend

Similar to ozone, $PM_{2.5}$ levels in the South Coast have decreased significantly since monitoring began in 1999. Figure 4-11 shows the 24-hour and annual average $PM_{2.5}$ design values in the South Coast Air Basin from 1999 through 2011. Overall, the annual average design value has decreased 46 percent since $PM_{2.5}$ monitoring began. The 24-hour $PM_{2.5}$ design value has also declined 49 percent within the same period.

The South Coast Air Basin is currently designated as nonattainment for both the annual and 24-hour $PM_{2.5}$ standards. In 2012, the South Coast adopted the *2012 Air Quality Management Plan*. The plan incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, on-road and off-road mobile sources and area sources. The 2012 plan demonstrates attainment of the federal 24-hour $PM_{2.5}$ standard by 2014. In addition, U.S. EPA has approved a plan showing how the basin will meet the 15 $\mu g/m^3$ annual $PM_{2.5}$ standard by 2014. Measures adopted as part of the $PM_{2.5}$ SIP, as well as programs to reduce ozone and diesel PM will continue to reduce public exposure to $PM_{2.5}$ in this region. By 2016, the District will submit a new $PM_{2.5}$ plan demonstrating how the region will meet the revised 12 $\mu g/m^3$ annual $PM_{2.5}$ standard.

The South Coast Air Basin meets the federal 24-hour PM_{10} standard.

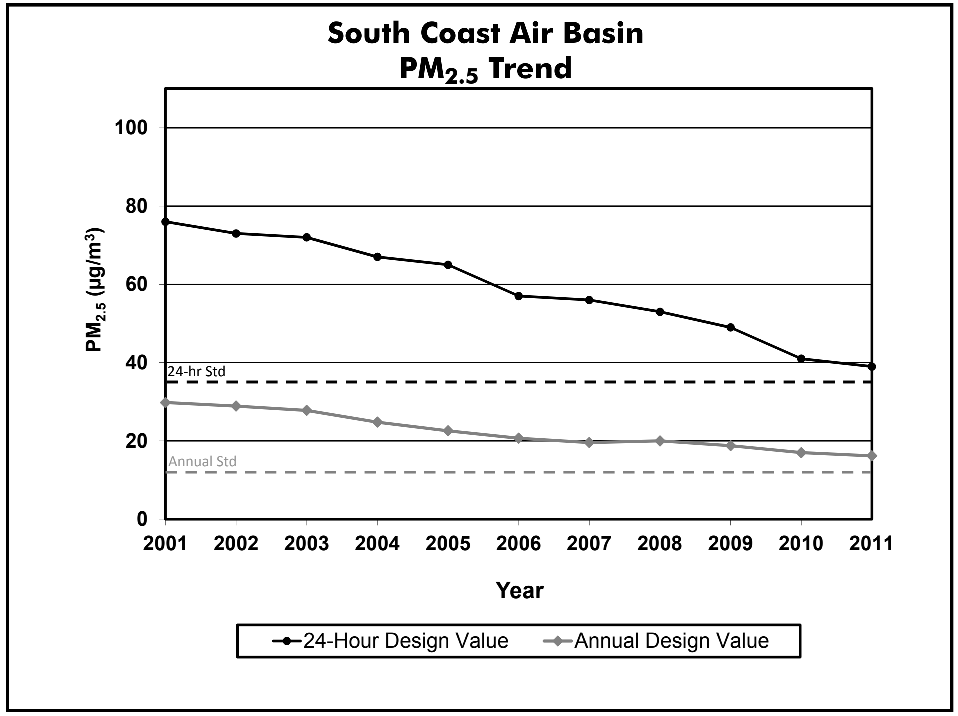

Figure 4-11

$PM_{2.5}$ ($\mu g/m^3$)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
98th Percentile of 24-Hr Conc.	85.6	83.0	74.3	66.3	76.6	72.4	58.3	54.4	70.7	47.1	42.9	35.6	40.2
24-Hour Design Value			76.0	73.0	72.0	67.0	65.0	57.0	56.0	53.0	49.0	41.0	39.0
Maximum Annual Average	30.2	28.3	31.0	27.5	24.8	22.1	20.9	20.8	20.9	18.3	17.2	15.5	15.9
Annual Design Value			29.8	28.9	27.8	24.8	22.6	20.7	19.6	20.0	18.8	17.0	16.2

Table 4-9

South Coast Air Basin

Nitrogen Dioxide Air Quality Trend

Over the last 20 years, NO_2 values have decreased significantly in the South Coast Air Basin. The national 1-hour design value for 2011 was over 67 percent lower than what it was during 1992.

The national annual average standard has not been exceeded since 1991. A new national 1-hour standard was adopted by U.S. EPA in January 2010 and is intended to focus on near-road NO_2 exposure. As a result, a new near-road monitoring network is in the process of being deployed. The South Coast federal 1-hour design value is 72 ppb, well below the national 1-hour standard of 100 ppb (98th percentile).

NO_2 is formed from NO_x emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_x emissions.

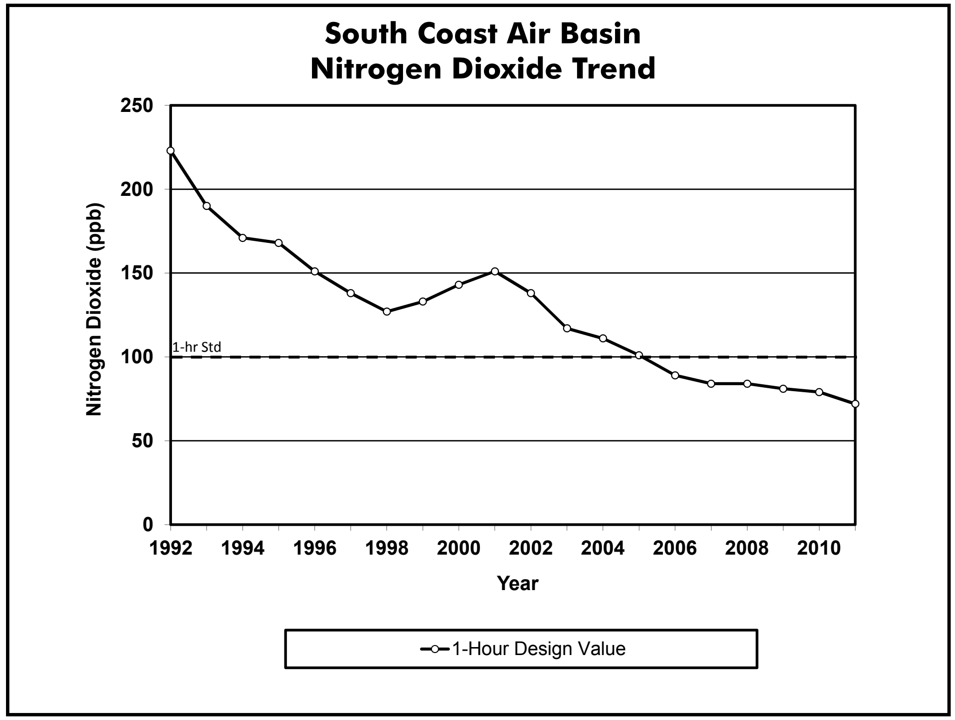

Figure 4-12

NITROGEN DIOXIDE (ppb)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Maximum 1-Hour Concentration	300	260	247	239	250	200	255	307	214	251	262	163	157	136	137	108	125	115	118	110
1-Hour Design Value	223	190	171	168	151	138	127	133	143	151	138	117	111	101	89	84	84	81	79	72
Maximum Annual Average	51	50	50	46	42	43	43	51	44	41	40	35	34	31	31	31	30	28	26	25

Table 4-10

San Francisco Bay Area Air Basin

Introduction - Area Description

The San Francisco Bay Area is California's second largest metropolitan area. The nine county area comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern half of Sonoma County, and the southwestern portion of Solano County. The area is oriented north-south and covers about 400 square miles of the area's total 5,340 square miles.

About 19 percent of California's population resides in the San Francisco Bay Area, and pollution sources in the region account for about 15 percent of the State's total NO_x emissions and about eleven percent of the State's total $PM_{2.5}$ emissions. The climate in the San Francisco Bay Area varies. Along the coast, temperatures are mild year-round. However, as one moves inland, temperatures show larger diurnal and seasonal variations. Overall air quality in the San Francisco Bay Area Air Basin is better than inland areas such as the South Coast, San Joaquin Valley, and Sacramento regions. This is due to a more favorable climate, with cooler temperatures and better ventilation.

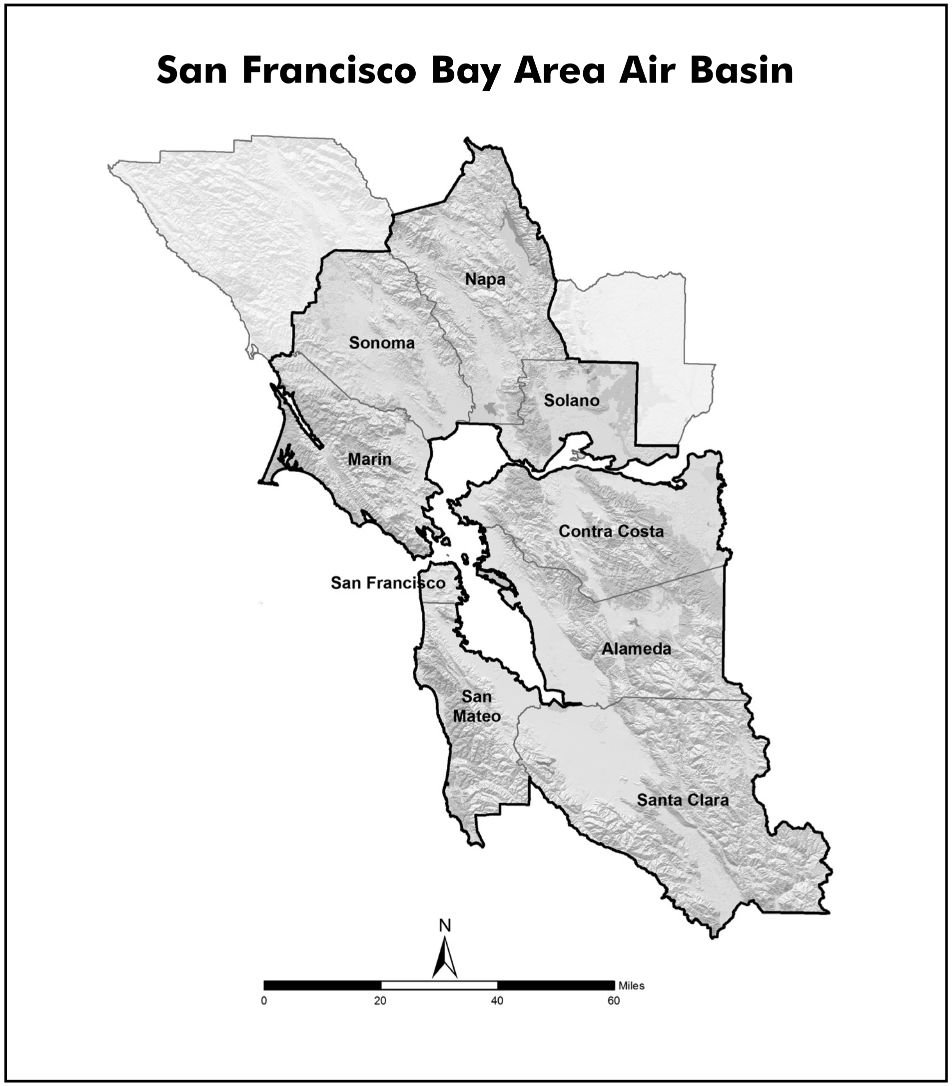

Figure 4-13

San Francisco Bay Area Air Basin
Emission Trends and Forecasts

The emission levels for the ozone precursors NO_x and VOC have been trending downward in the San Francisco Bay Area Air Basin since 2000. On-road motor vehicles are the largest contributors to VOC, and NO_x emissions in the air basin. The implementation of stricter mobile source (both on-road and other) emission standards will continue to decrease vehicle emissions in this air basin. Controls on stationary source solvent evaporation and fugitive emissions will also continue to reduce VOC emissions. The emission levels for SO_x are also projected to decrease from 2000 to 2015. This is mainly due to the switch from fuel oil to natural gas for electric generation and to reduced fuel sulfur content.

San Francisco Air Basin Emissions (tons/day, annual average)								
Pollutant	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
VOC	502	352	293	236	222	217	217	216
NO_X	591	445	345	272	219	191	181	176
SO_X	71	60	30	24	25	26	28	30
DPM	10	9	6	3	2	2	2	2
$PM_{2.5}$	76	60	55	44	44	44	48	48
PM_{10}	157	133	129	119	121	122	127	129
NH_3	33	32	30	31	30	30	31	31

Table 4-11

San Francisco Bay Area Air Basin
Population and VMT

Compared with the statewide totals, population and the number of vehicle miles traveled each day grew steeply until 2000, but have slowed in recent years and are projected to continue at this slower rate through 2035. During that 45-year period, the population is projected to increase about 37 percent, from about 5.9 million in 1990 to about 8.0 million in 2035. During the same period, the daily VMT is projected to increase 56 percent, from about 135 million miles per day in 1990 to over 210 million miles per day in 2035.

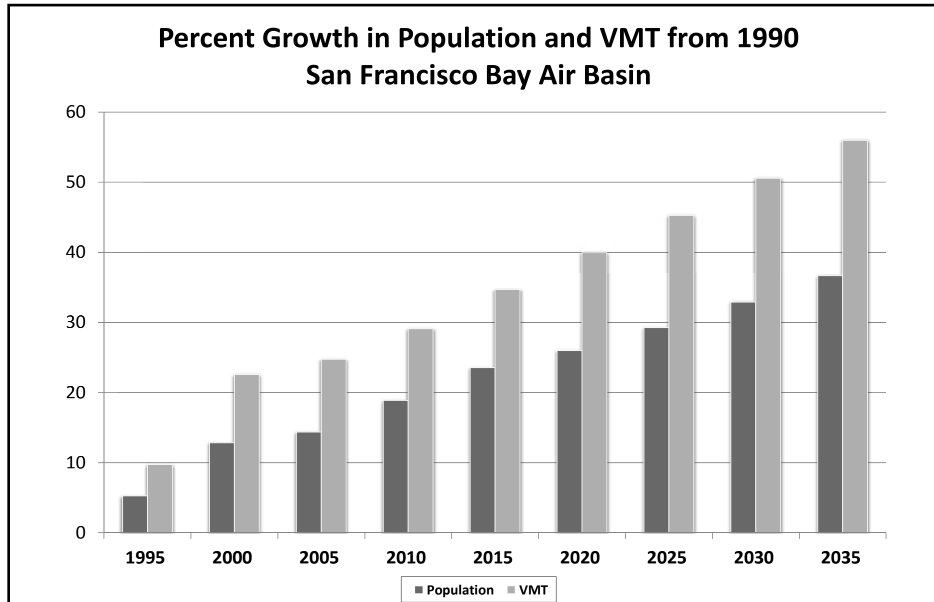

Figure 4-14

Parameter	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Population	5874273	6182721	6627186	6718351	6982853	7257728	7402393	7590871	7806614	8025820
Avg. Daily VMT/1000	134997	148108	165491	168375	174235	181799	188906	196062	203246	210554

Table 4-12

San Francisco Bay Area Air Basin

Ozone Precursor Emission - Trends and Forecasts

Emissions of ozone precursors have decreased in the San Francisco Bay Area Air Basin since 2000 and are projected to continue declining through 2035. The Bay Area has a significant motor vehicle population, and the implementation of stricter motor vehicle controls has resulted in significant emissions reductions for NO_x and VOC.

Stationary source emissions of VOC have declined over the last 15 years due to new controls for oil refinery fugitive emissions and new rules for control of VOC from various industrial coatings and solvent operations.

NO_X Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***591***	***445***	***345***	***272***	***219***	***191***	***181***	***176***
Stationary Sources	87	49	43	40	40	40	41	42
Area-wide Sources	20	16	15	16	17	18	19	20
On-Road Mobile	354	267	187	127	84	59	51	46
Gasoline Vehicles	218	128	86	54	36	26	20	15
Diesel Vehicles	136	139	101	72	48	33	31	30
Other Mobile	130	112	99	89	79	73	70	68
Gasoline Fuel	13	12	8	7	7	6	7	7
Diesel Fuel	92	77	66	55	43	38	35	33
Other Fuel	25	24	25	27	29	29	29	29

Table 4-13

VOC Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***502***	***352***	***293***	***236***	***222***	***217***	***217***	***216***
Stationary Sources	100	66	62	61	65	67	69	72
Area-wide Sources	97	84	79	72	73	73	75	75
On-Road Mobile	229	136	99	58	43	37	34	30
Gasoline Vehicles	221	129	94	54	40	35	31	27
Diesel Vehicles	7	7	5	3	3	3	3	3
Other Mobile	77	66	53	46	42	40	39	39
Gasoline Fuel	60	51	40	33	29	27	27	27
Diesel Fuel	10	8	6	5	4	4	4	4
Other Fuel	8	6	7	8	8	8	8	8

Table 4-14

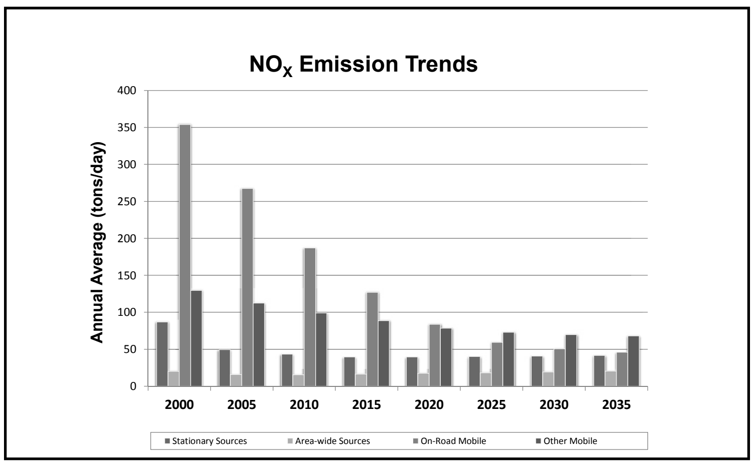

Figure 4-15

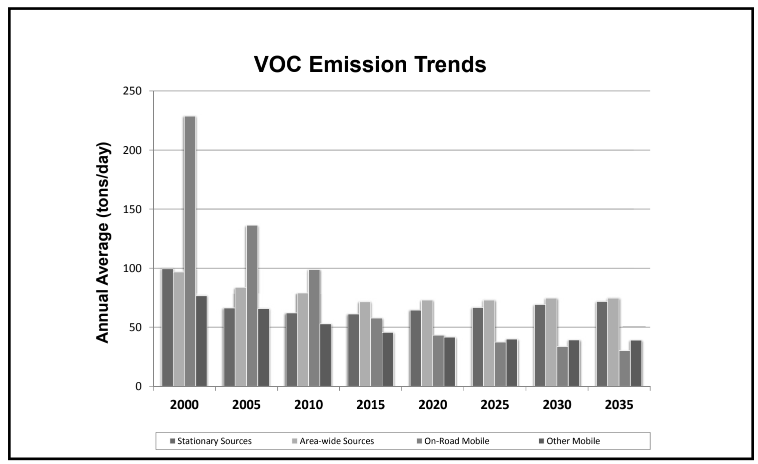

Figure 4-16

San Francisco Bay Area Air Basin

Directly Emitted $PM_{2.5}$ Emission - Trends and Forecasts

Direct emissions of $PM_{2.5}$ have declined in the San Francisco Bay Area Air Basin between 2000 and 2010 and are projected to increase slightly through 2035. Emissions from stationary sources declined, while area-wide sources are projected to slightly increase after 2015. This increase in area-wide sources is primarily due to growth in fugitive dust sources. Emissions of directly emitted $PM_{2.5}$ from diesel motor vehicles have been decreasing since 2000 due to adoption of more stringent emission standards; even while population and VMT have increased steadily.

Particulate matter can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_x, SO_x, VOC, and ammonia. The $PM_{2.5}$ emission inventory includes only directly emitted particulate emissions.

$PM_{2.5}$ Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***76***	***60***	***55***	***44***	***44***	***44***	***48***	***48***
Stationary Sources	15	11	11	3	3	3	3	4
Area-wide Sources	44	34	31	32	32	33	36	36
On-Road Mobile	10	9	7	6	5	5	6	6
Gasoline Vehicles	5	4	4	4	4	4	4	4
Diesel Vehicles	5	5	3	2	1	1	2	2
Other Mobile	7	6	5	4	3	3	3	3
Gasoline Fuel	1	1	1	1	1	1	1	1
Diesel Fuel	5	4	3	2	1	1	1	1
Other Fuel	1	0	0	0	1	1	1	1

Table 4-15

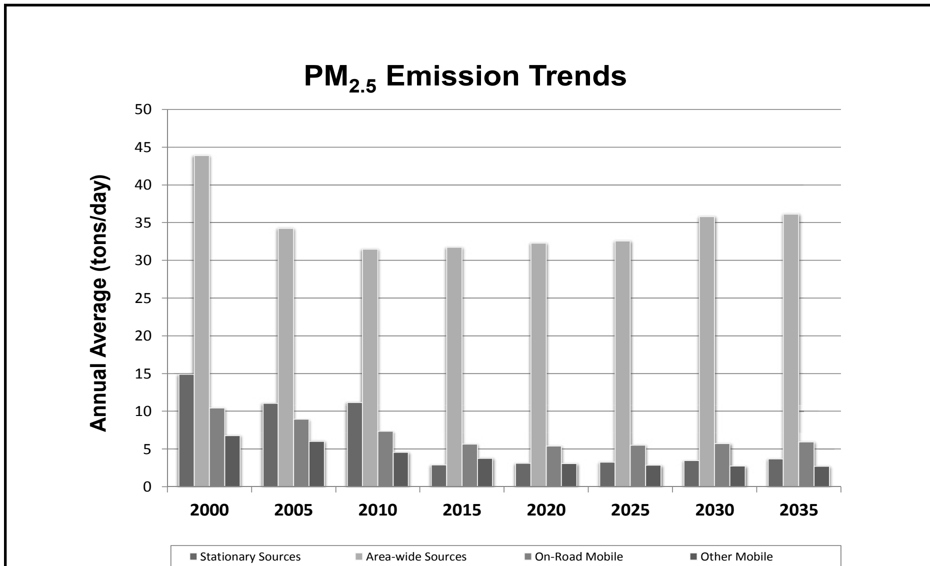

Figure 4-17

San Francisco Bay Area Air Basin

Diesel PM Emission - Trends and Forecasts

Diesel PM emissions decreased from 2000 to 2010 primarily as a result of reduced exhaust emissions from diesel mobile sources. Emissions from diesel mobile sources are projected to continue to decrease through 2035.

Diesel PM Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***10***	***9***	***6***	***3***	***2***	***2***	***2***	***2***
Stationary Sources	0	0	0	0	0	0	0	0
Area-wide Sources	0	0	0	0	0	0	0	0
On-Road Mobile	5	4	3	1	1	1	1	1
Gasoline Vehicles	0	0	0	0	0	0	0	0
Diesel Vehicles	5	4	3	1	1	1	1	1
Other Mobile	5	4	3	2	1	1	1	1
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	5	4	3	2	1	1	1	1
Other Fuel	0	0	0	0	0	0	0	0

Table 4-16

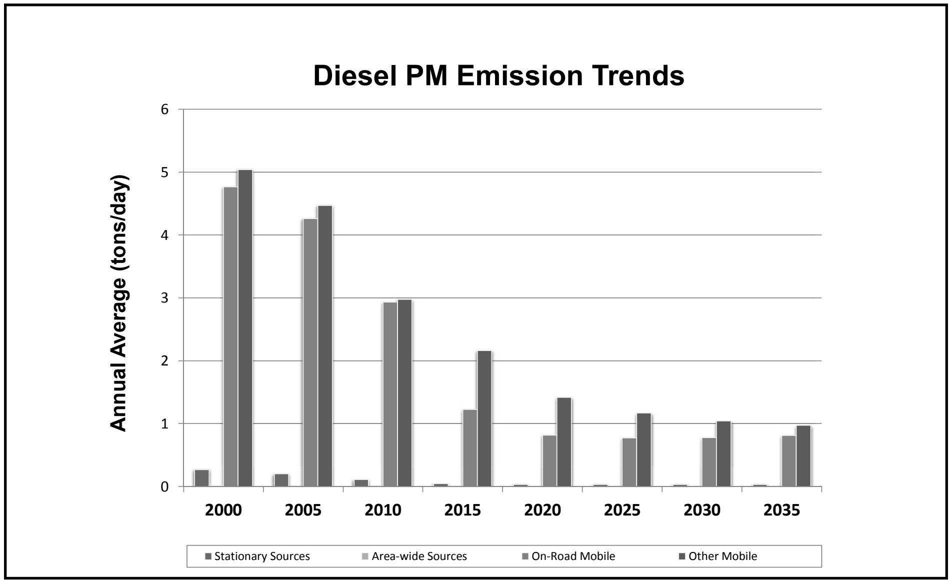

Figure 4-18

San Francisco Bay Area Air Basin

Ammonia Emission - Trends and Forecasts

Ammonia emissions are forecasted to remain flat in the San Francisco Bay Area Air Basin from 2000 through 2035. Most of the ammonia emissions are from area-wide sources, particularly from livestock waste and pesticide usage. Other sources of ammonia emissions are stationary sources, mainly waste disposal and fuel combustion, and on-road mobile sources.

NH_3 Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***33***	***32***	***30***	***31***	***30***	***30***	***31***	***31***
Stationary Sources	1	1	1	3	4	4	4	4
Area-wide Sources	19	20	20	20	21	21	21	21
On-Road Mobile	12	11	9	7	6	6	6	6
Gasoline Vehicles	12	11	8	7	6	6	6	6
Diesel Vehicles	0	0	0	0	0	0	0	0
Other Mobile	0	0	0	0	0	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	0	0	0	0	0	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-17

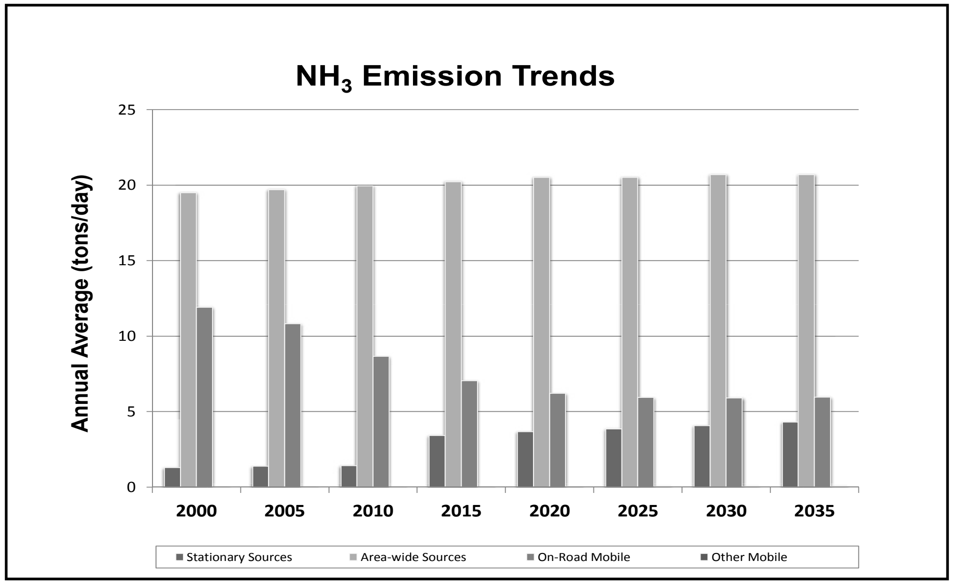

Figure 4-19

San Francisco Bay Area Air Basin

Ozone Air Quality Trend

Ozone concentrations in the San Francisco Bay Area are much lower than in the South Coast and San Joaquin Valley Air Basins. The 1- and 8-hour design values have declined by an average of nearly 17 percent during the last 20 years. The number of days when national standards are exceeded shows a similar trend. The 2012 8-hour design value indicates that the area now meets the 2008 federal standard. Continuing implementation of statewide emissions control measures will ensure continued progress throughout the Air Basin.

In September 2010, the Bay Area Air Quality Management District adopted the *Bay Area 2010 Clean Air Plan*. The 2010 plan defines a comprehensive multi-pollutant control strategy including 55 control measures to reduce emissions of ozone, PM, air toxics, and greenhouse gases from a wide variety of emission sources.

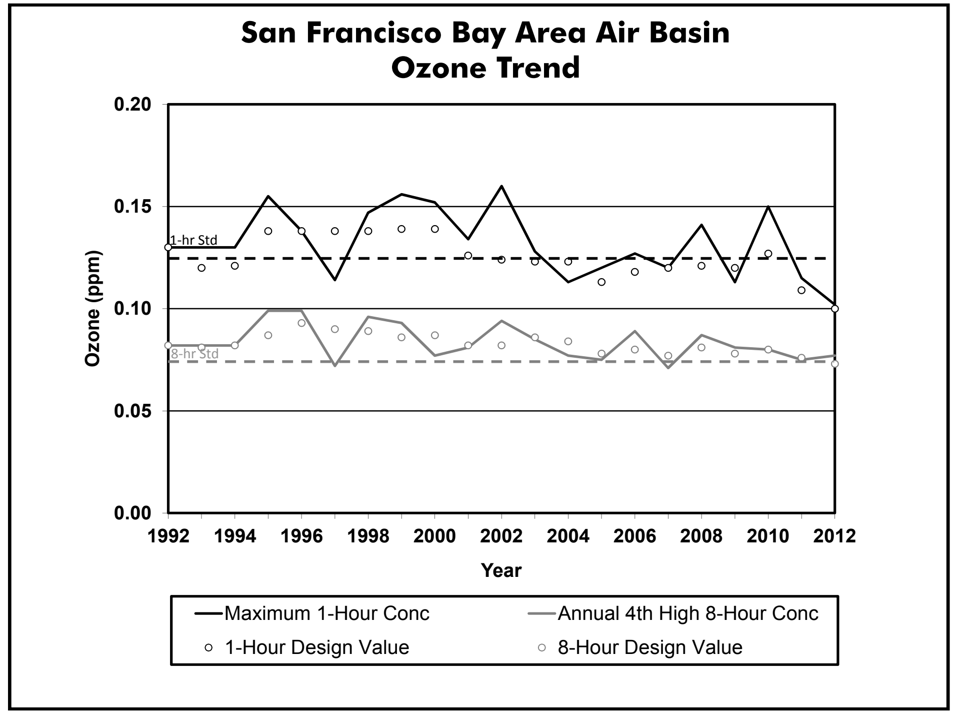

Figure 4-20

OZONE (ppm)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Annual 4th High 8-Hour	0.082	0.082	0.082	0.099	0.099	0.072	0.096	0.093	0.077	0.081	0.094	0.085	0.077	0.075	0.089	0.071	0.087	0.081	0.080	0.075	0.077
8-Hour Design Value	0.082	0.081	0.082	0.087	0.093	0.090	0.089	0.086	0.087	0.082	0.082	0.086	0.084	0.078	0.080	0.077	0.081	0.078	0.080	0.076	0.073
Maximum 1-Hour Concentration	0.130	0.130	0.130	0.155	0.138	0.114	0.147	0.156	0.152	0.134	0.160	0.128	0.113	0.120	0.127	0.120	0.141	0.113	0.150	0.115	0.102
1-Hour Design Value[1]	0.130	0.120	0.121	0.138	0.138	0.138	0.138	0.139	0.139	0.126	0.124	0.123	0.123	0.113	0.118	0.120	0.121	0.120	0.127	0.109	0.100
Days Above Nat. 8-Hour Standard	18	18	13	22	25	5	24	18	9	13	15	12	7	5	17	2	12	8	9	4	4

[1] The national 1-Hour standard has been revoked. Current and historical 1-Hour data are provided for reference.

Table 4-18

San Francisco Bay Area Air Basin

$PM_{2.5}$ Air Quality Trend

The San Francisco Bay Area has seen significant progress in both the 24-hour and annual average $PM_{2.5}$ design values over the last 13 years. The San Francisco Bay Area is in attainment of the national annual average $PM_{2.5}$ standard and concentrations have decreased 36 percent since 2001. The 24-hour design value has seen the biggest decline over the past 13 years, decreasing 62 percent.

Although the Bay Area is designated as non-attainment for the 24-hour national $PM_{2.5}$ standard, recent monitoring data now shows that the Bay Area meets the 24-hour $PM_{2.5}$ standard. U.S. EPA approved a "clean data determination" for the 24-hour $PM_{2.5}$ standard for the Bay Area on January 9, 2013.

The San Francisco Bay Area Air Basin also attains the national 24-hour standard for PM_{10}.

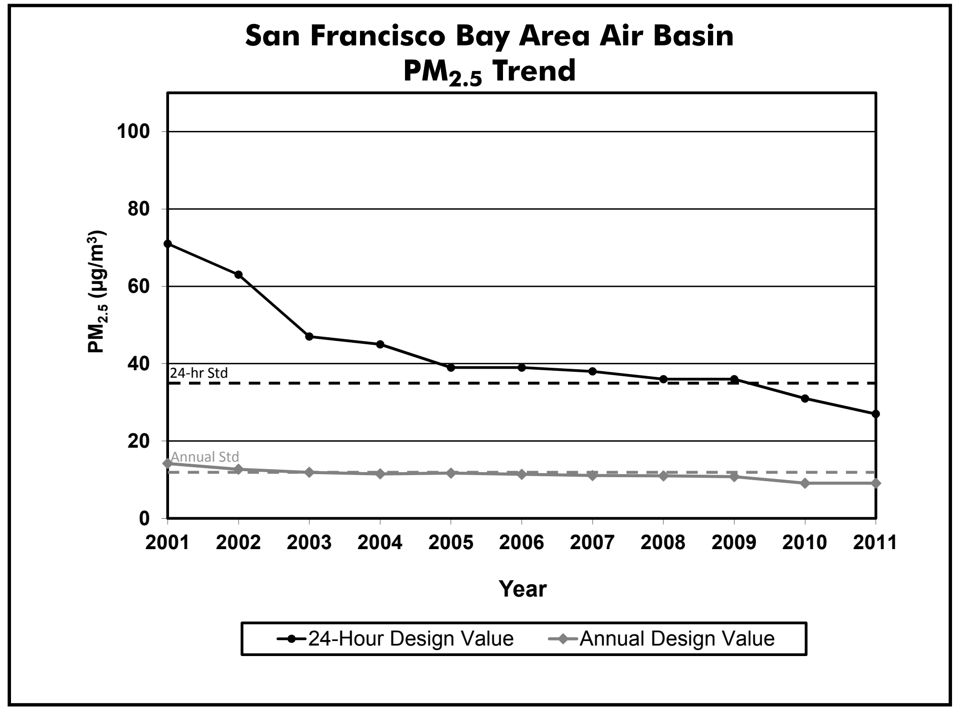

Figure 4-21

$PM_{2.5}$ ($\mu g/m^3$)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
98th Percentile of 24-Hr Conc.	69.3	63.4	80.0	57.6	37.4	39.8	40.9	36.6	39.2	36.3	33.5	26.8	30.5
24-Hour Design Value			71.0	63.0	47.0	45.0	39.0	39.0	38.0	36.0	36.0	31.0	27.0
Maximum Annual Average	16.2	13.6	12.8	14.0	11.7	11.6	11.8	10.8	10.7	11.5	10.1	10.5	10.1
Annual Design Value			14.2	12.7	11.9	11.5	11.7	11.4	11.1	11.0	10.8	9.1	9.1

Table 4-19

San Francisco Bay Area Air Basin

Nitrogen Dioxide Air Quality Trend

The San Francisco Bay Area has attained the national NO_2 standards for more than 20 years and ambient concentrations continue to be well below the level of the standard. The 1-hour design value has declined 36 percent since 1992 and design values are below the level of the 1-hour federal standard of 100 ppb.

A new national 1-hour standard was adopted by U.S. EPA in January 2010 and is intended to focus on near-road NO_2 exposure. As a result, a new near-road monitoring network is in the process of being deployed.

NO_2 is formed from NO_x emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_x emissions.

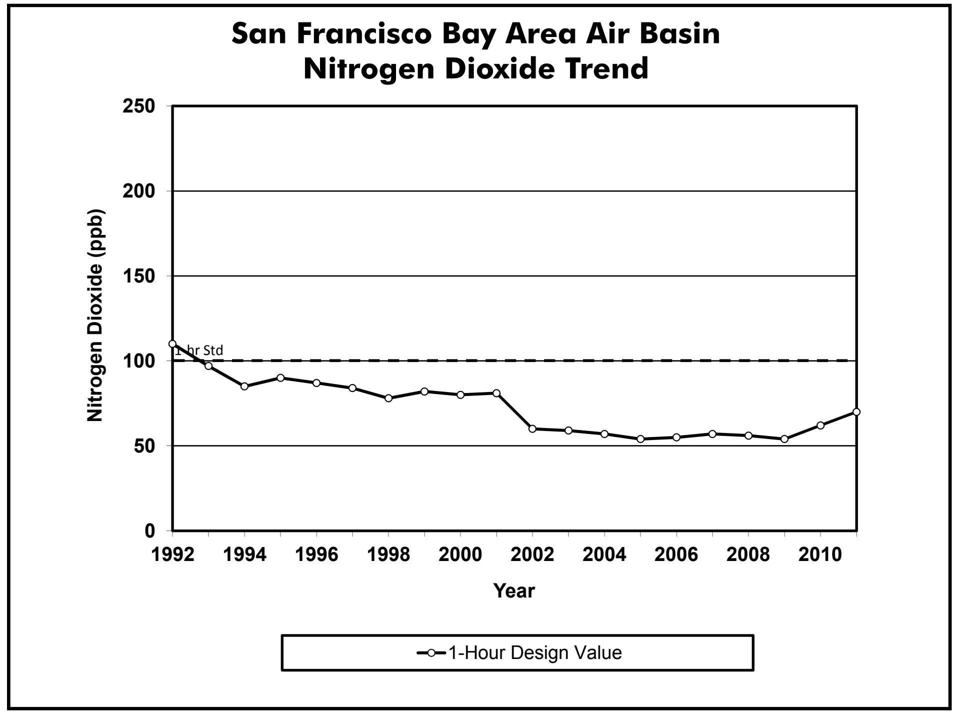

Figure 4-22

NITROGEN DIOXIDE (ppb)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Maximum 1-Hour Concentration	110	120	107	116	108	118	98	128	114	108	80	81	73	74	107	69	80	69	93	93
1-Hour Design Value	110	97	85	90	87	84	78	82	80	81	60	59	57	54	55	57	56	54	62	70
Maximum Annual Average	25	27	28	27	25	25	25	26	25	24	19	18	17	19	18	17	17	16	16	16

Table 4-20

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San Joaquin Valley Air Basin

Introduction - Area Description

The San Joaquin Valley Air Basin (Valley) occupies the southern two-thirds of California's Central Valley. The eight-county area comprises Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties and the western portion of Kern County. The Valley covers nearly 23,490 square miles. With very few exceptions, the San Joaquin Valley is flat, with most of the area lying below 1,000 feet in elevation and most of the population living below 500 feet. The Valley floor slopes downward from east to west, and the San Joaquin River winds its way along the western side from south to north.

Similar to other inland areas, the San Joaquin Valley has cool wet winters and hot dry summers. Generally, the temperature increases and rainfall decreases from north to south.

In contrast to other California areas, air quality in the San Joaquin Valley is not dominated by emissions from one large urban area. Instead, there are a number of moderately sized urban areas spread along the main axis of the Valley. Overall, about 10 percent of California's population lives in the San Joaquin Valley, and pollution sources in the region account for about 15 percent of the State's total NO_x emissions and about 18 percent of the State's total $PM_{2.5}$ emissions.

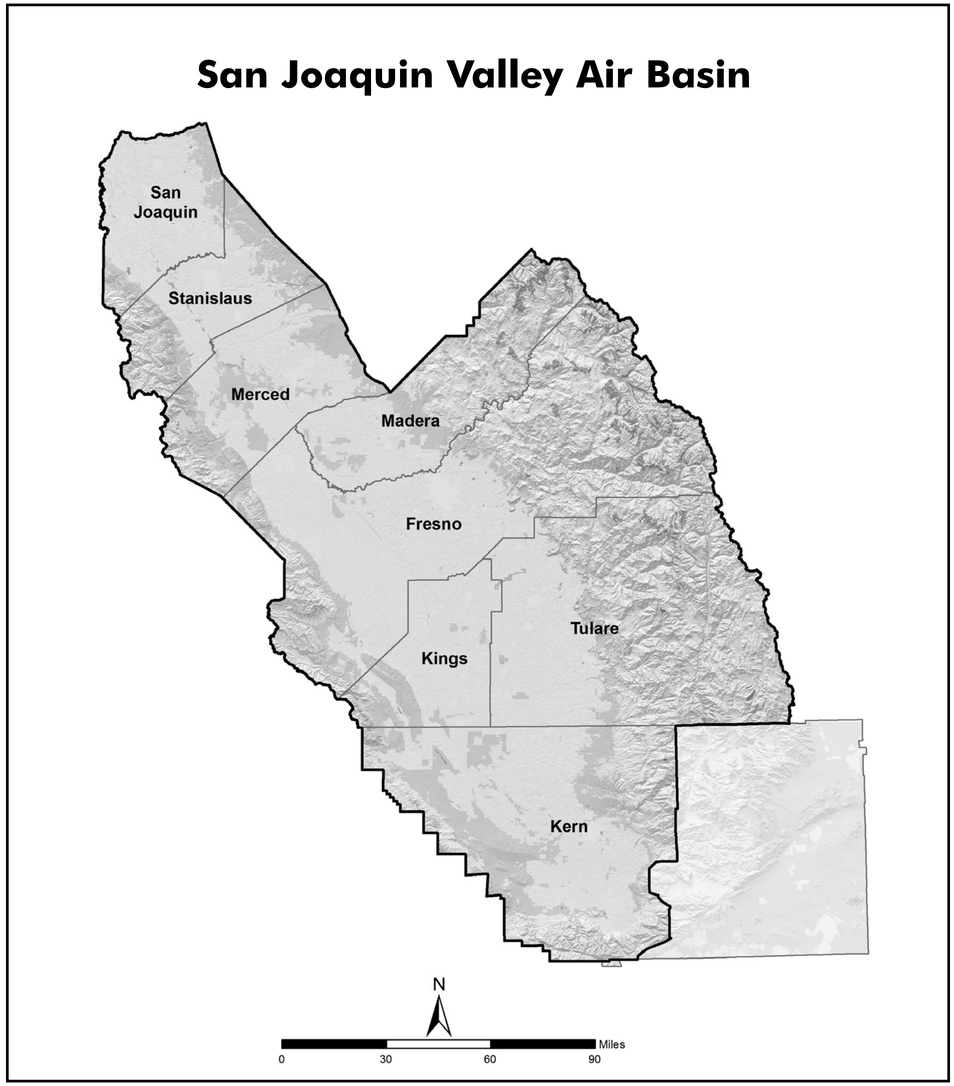

Figure 4-23

San Joaquin Valley Air Basin

Emission Trends and Forecasts

The emission levels in the San Joaquin Valley Air Basin have been decreasing since 2000. The decreases are predominantly due to motor vehicle controls and reductions in evaporative and fugitive emissions. On-road motor vehicles, other mobile sources, and stationary sources are all significant contributors to NO_x emissions. A significant portion of the stationary source VOC emissions is fugitive emissions from the extensive oil and gas production operations in the lower San Joaquin Valley. PM_{10} emissions are mostly fugitive dust from paved and unpaved roads, agricultural operations, and waste burning. The emission levels for SO_x have also decreased since 2000. This is mainly due to the switch from fuel oil to natural gas for electric generation and to reduced fuel sulfur content.

San Joaquin Valley Air Basin Emissions (tons/day, annual average)								
Pollutant	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
VOC	486	441	408	344	345	352	356	358
NO_X	567	529	363	272	212	173	159	153
SO_X	27	15	12	10	10	10	11	11
DPM	16	16	11	6	5	4	3	3
$PM_{2.5}$	100	93	77	73	72	72	72	72
PM_{10}	359	305	284	278	278	276	275	274
NH_3	379	408	434	390	417	444	446	448

Table 4-21

San Joaquin Valley Air Basin

Population and VMT

The population and number of vehicle miles traveled each day in the San Joaquin Valley Air Basin has grown and is projected to continue growing at a much faster rate than most other areas of the State. The population is projected to increase about 125 percent, from about 2.6 million in 2000 to nearly six million in 2035. During the same period, the daily VMT is projected to increase by 209 percent, from over 52 million miles per day in 2000 to over 161 million miles per day in 2035.

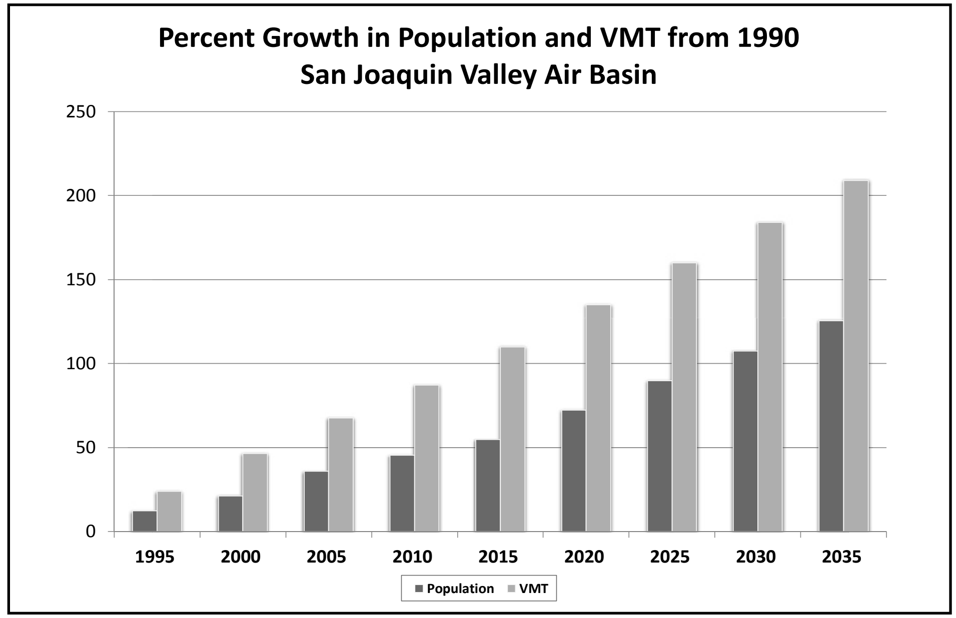

Figure 4-24

Parameter	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Population	2645311	2972667	3205449	3593550	3848324	4092379	4555564	5018845	5486353	5965229
Avg. Daily VMT/1000	52199	64705	76445	87485	97700	109563	122653	135663	148253	161310

Table 4-22

San Joaquin Valley Air Basin

Ozone Precursor Emission - Trends and Forecasts

Emissions of the ozone precursors NO_x and VOC are projected to decrease in the San Joaquin Valley Air Basin through 2020. While NO_x continues to decline after 2020, VOC increases slightly. Both stationary source and motor vehicle NO_x emissions have been reduced by the adoption of more stringent emission standards.

Stricter standards have reduced VOC emissions from motor vehicles since 2000, even though VMT have been increasing. Stationary and area-wide sources of VOC include petroleum production operations and the use of solvents. Stricter emission standards and new controls have reduced the VOC emissions from these sources.

NO_X Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***567***	***529***	***363***	***272***	***212***	***173***	***159***	***153***
Stationary Sources	75	59	41	30	28	28	27	28
Area-wide Sources	15	16	13	13	13	13	14	14
On-Road Mobile	324	310	205	138	91	67	65	65
Gasoline Vehicles	101	65	51	32	22	17	14	12
Diesel Vehicles	223	245	155	106	69	50	51	54
Other Mobile	153	144	103	91	79	64	53	46
Gasoline Fuel	5	5	4	4	3	3	3	3
Diesel Fuel	144	135	95	84	70	55	45	37
Other Fuel	4	4	3	3	5	5	5	5

Table 4-23

VOC Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***486***	***441***	***408***	***344***	***345***	***352***	***356***	***358***
Stationary Sources	112	100	98	96	99	103	107	110
Area-wide Sources	219	218	212	180	188	196	198	200
On-Road Mobile	99	70	56	33	26	24	23	21
Gasoline Vehicles	87	57	48	28	21	18	17	15
Diesel Vehicles	12	13	9	6	5	6	6	7
Other Mobile	56	53	42	35	32	30	28	27
Gasoline Fuel	34	32	26	21	19	17	17	16
Diesel Fuel	19	17	12	10	8	7	6	5
Other Fuel	4	4	4	4	6	6	6	6

Table 4-24

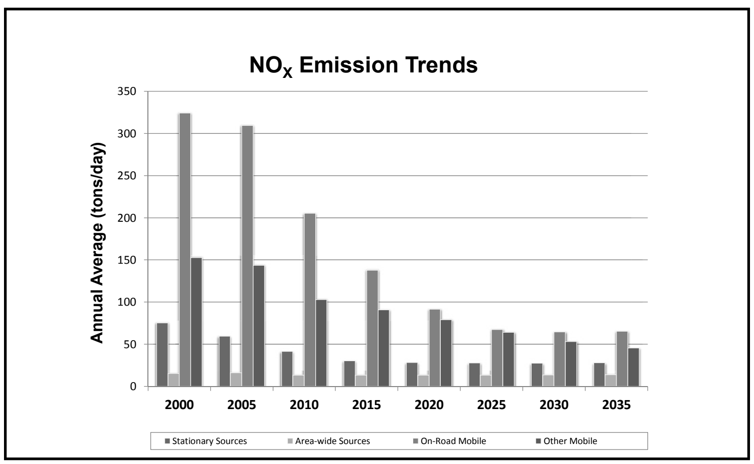

Figure 4-25

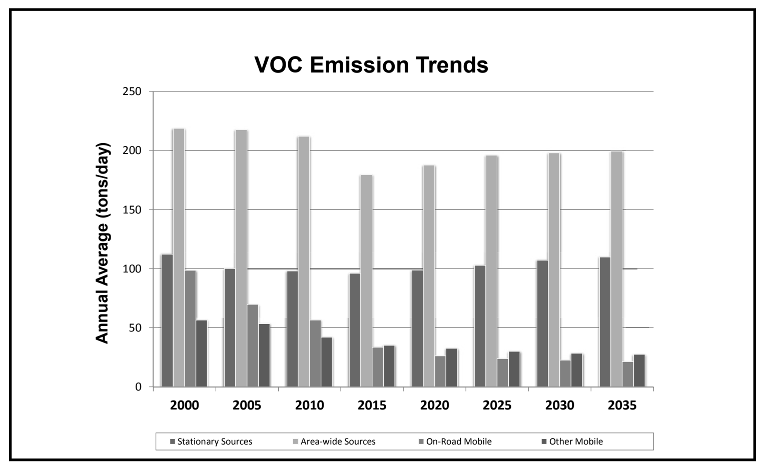

Figure 4-26

San Joaquin Valley Air Basin

Directly Emitted $PM_{2.5}$ Emission - Trends and Forecasts

Direct emissions of $PM_{2.5}$ decreased from 2000 to 2015 and are projected to remain flat after 2015. $PM_{2.5}$ emissions in the San Joaquin Valley are dominated by emissions from area-wide sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, dust from farming operations, waste burning, and residential fuel combustion (including wood).

Particulate matter can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_x, SO_x, ROG, and ammonia. The $PM_{2.5}$ emission inventory includes only directly emitted particulate emissions.

$PM_{2.5}$ Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***100***	***93***	***77***	***73***	***72***	***72***	***72***	***72***
Stationary Sources	11	10	9	9	9	9	10	10
Area-wide Sources	70	64	54	54	54	54	54	54
On-Road Mobile	10	10	7	4	4	5	5	5
Gasoline Vehicles	2	2	2	2	2	2	3	3
Diesel Vehicles	7	8	5	2	2	2	2	3
Other Mobile	9	8	6	6	5	4	4	3
Gasoline Fuel	1	1	1	1	1	1	1	1
Diesel Fuel	7	7	5	4	3	2	2	1
Other Fuel	1	1	1	1	2	2	2	2

Table 4-25

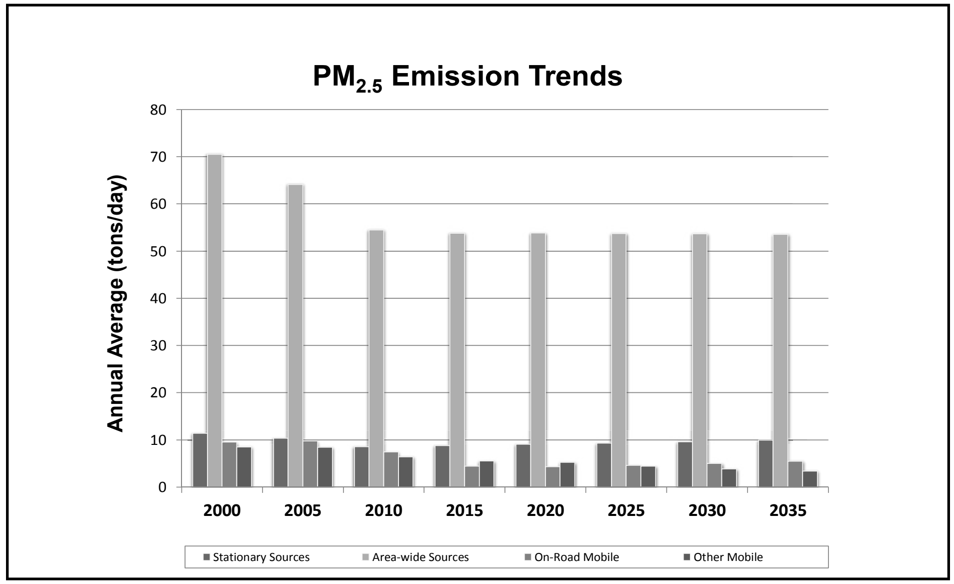

Figure 4-27

San Joaquin Valley Air Basin

Diesel PM Emission - Trends and Forecasts

Diesel PM emissions decreased from 2000 to 2010 primarily as a result of reduced exhaust emissions from diesel mobile sources. Emissions from diesel mobile sources are projected to continue to decrease through 2035.

Diesel PM Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***16***	***16***	***11***	***6***	***5***	***4***	***3***	***3***
Stationary Sources	1	1	1	0	0	0	0	0
Area-wide Sources	0	0	0	0	0	0	0	0
On-Road Mobile	7	8	5	2	1	1	1	2
Gasoline Vehicles	0	0	0	0	0	0	0	0
Diesel Vehicles	7	8	5	2	1	1	1	2
Other Mobile	7	7	5	4	3	2	2	1
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	7	7	5	4	3	2	2	1
Other Fuel	0	0	0	0	0	0	0	0

Table 4-26

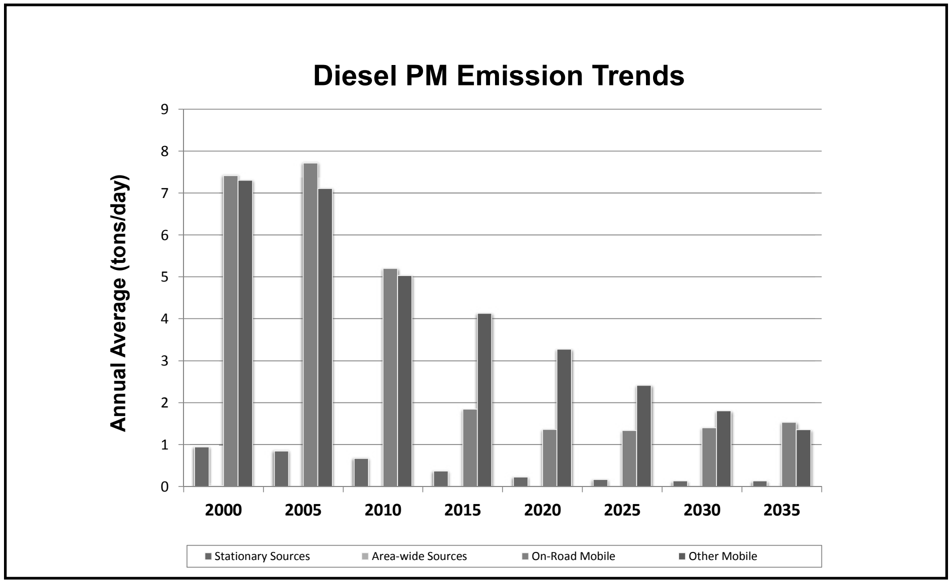

Figure 4-28

San Joaquin Valley Air Basin

Ammonia Emission - Trends and Forecasts

Ammonia emissions are forecasted to remain relatively constant. About 92 percent of the emissions are from area-wide source emissions from livestock waste and pesticide usage.

NH_3 Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***379***	***408***	***434***	***390***	***417***	***444***	***446***	***448***
Stationary Sources	17	20	23	26	28	31	34	36
Area-wide Sources	356	382	405	360	385	409	408	407
On-Road Mobile	6	6	5	4	4	4	5	5
Gasoline Vehicles	5	5	5	4	4	4	4	4
Diesel Vehicles	0	0	0	0	0	0	0	1
Other Mobile	0	0	0	0	0	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	0	0	0	0	0	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-27

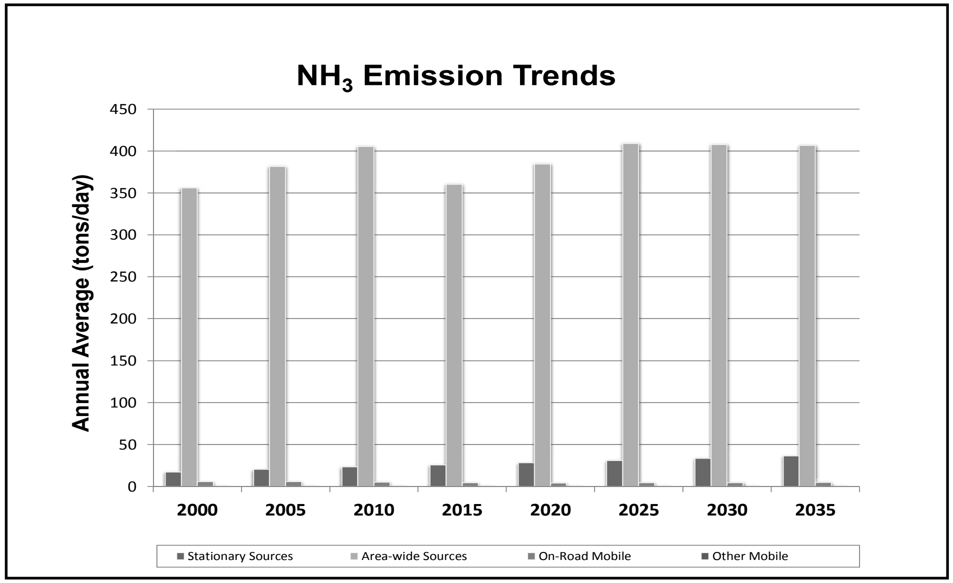

Figure 4-29

San Joaquin Valley Air Basin

Ozone Air Quality Trend

Ozone levels in the San Joaquin Valley are among the most severe in the State. During the 1980s the Valley averaged nearly 60 federal 1-hour exceedance days per year. However, now the Valley only occasionally exceeds the 1-hour standard. Additionally, 8-hour design values have declined an average of nearly 17 percent, while the three-year average of the national 8-hour exceedance days declined nearly 30 percent. Most of this progress has occurred since 2003. Today, nearly 16 percent of the population live in areas that meet the 8-hour ozone standard, compared with 20 years ago when the standard was exceeded throughout the Valley.

Similar to the South Coast the San Joaquin Valley is designated non-attainment for the 1-hour and 8-hour ozone standards. ARB and the San Joaquin Valley Air Pollution Control District have developed SIPs to demonstrate how the region will meet these standards. U.S. EPA has approved a SIP showing the Valley will meet the 0.08 ppm 8-hour ozone standard by 2023. The District has also recently adopted a SIP demonstrating the area will meet the 1-hour ozone standard by 2017. These plans call for continuing NOx and VOC reductions needed to meet the ozone standards.These reductions result from regulations and incentive programs that lead to cleaner vehicles for on-road and off-road applications, less polluting consumer products, and industrial and commercial sources. By 2016, the District will submit a new plan demonstrating how the region will meet the 8-hour ozone standard of 0.075 ppm by 2032.

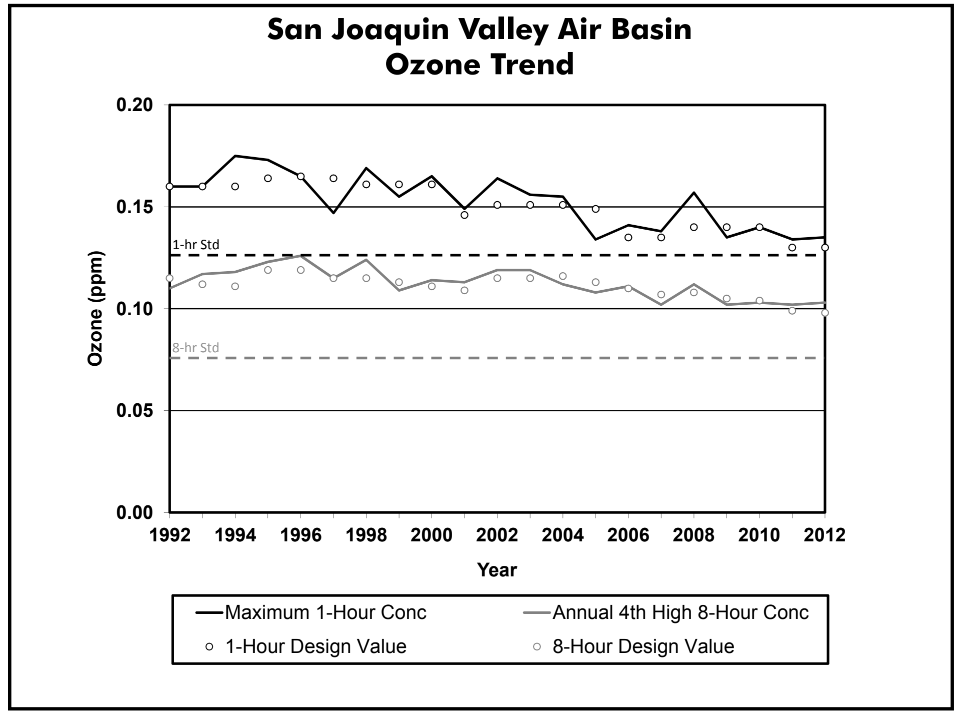

Figure 4-30

OZONE (ppm)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Annual 4th High 8-Hour	0.110	0.117	0.118	0.123	0.126	0.115	0.124	0.109	0.114	0.113	0.119	0.119	0.112	0.108	0.111	0.102	0.112	0.102	0.103	0.102	0.103
8-Hour Design Value	0.115	0.112	0.111	0.119	0.119	0.115	0.115	0.113	0.111	0.109	0.115	0.115	0.116	0.113	0.110	0.107	0.108	0.105	0.104	0.099	0.098
Maximum 1-Hour Concentration	0.160	0.160	0.175	0.173	0.165	0.147	0.169	0.155	0.165	0.149	0.164	0.156	0.155	0.134	0.141	0.138	0.157	0.135	0.140	0.134	0.135
1-Hour Design Value[1]	0.160	0.160	0.160	0.164	0.165	0.164	0.161	0.161	0.161	0.146	0.151	0.151	0.151	0.149	0.135	0.135	0.140	0.140	0.140	0.130	0.130
Days Above Nat. 8-Hour Standard	155	144	137	142	143	138	112	153	144	162	158	160	143	102	120	110	127	98	93	109	105

[1] The national 1-Hour standard has been revoked. Current and historical 1-Hour data are provided for reference.

Table 4-28

San Joaquin Valley Air Basin

Ozone Contour Maps: 3-Year Average of National 8-Hour Exceedance Days

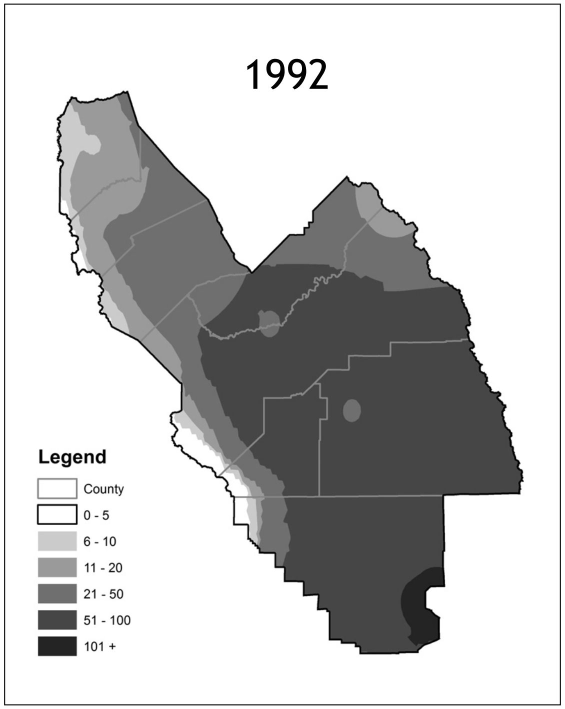

Figure 4-31

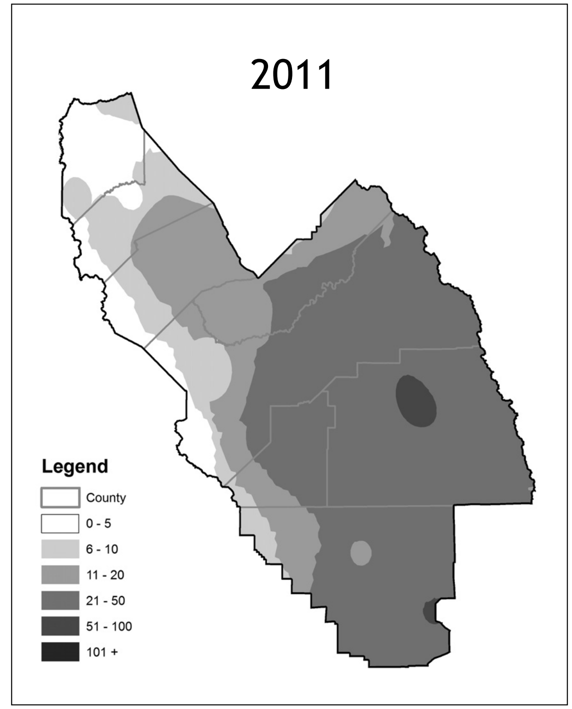

Figure 4-32

Another way to look at ozone air quality is to evaluate how widespread the problem is within the Air Basin, using data for all sites. The maps on this page illustrate the reduction in days exceeding the national 8-hour standard over the last two decades throughout the basin. The use of three-year averages helps to mitigate year-to-year changes in meteorology.

Similar to the South Coast, the two maps show a substantial reduction in the number of exceedance days over the last 20 years. During the 1992 time period, far more than half of the San Joaquin Valley had between 51 and 100 exceedance days. The worst site had 169 days, which is equivalent to nearly six months during a year with ozone concentrations above the level of the standard. Areas in the northern San Joaquin Valley were cleaner than areas in the central and southern Valley.

The 2011 map shows larger portions of the populated areas of San Joaquin Valley which now experience 0 to 5 exceedance days. Much of the rest of the Valley experiences an average of 11 to 50 exceedance days per year. Areas with more than 51 exceedance days are generally limited to small areas in the eastern portion of the central and southern San Joaquin Valley. While the extent of these areas is much smaller than during 1992, the areas of poorer ozone air quality overall tend to be the most heavily populated. Even though these areas still pose a challenge, the 10 worst sites show an average reduction in exceedance days of more than 43 percent over the last two decades.

San Joaquin Valley Air Basin

$PM_{2.5}$ Air Quality Trend

While the San Joaquin Valley has unique geographical and meteorological challenges, the annual design value for $PM_{2.5}$ shows an overall downward trend, decreasing 26 percent from 2001 to 2011. The 24-hour $PM_{2.5}$ design value also declined 40 percent during this period, with the most pronounced progress between 2001 and 2004.

The San Joaquin Valley Air Basin is currently designated as nonattainment for the annual and 24-hour $PM_{2.5}$ standards. The San Joaquin Valley adopted their 2012 $PM_{2.5}$ SIP in December 2012 that shows attainment of the 24-hour $PM_{2.5}$ standard by 2019. The plan incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, on-road and off-road mobile sources and area sources. In addition, U.S. EPA has approved a plan showing how the Valley will meet the 15 $\mu g/m^3$ annual $PM_{2.5}$ standard in 2014. Measures adopted as part of the $PM_{2.5}$ SIP which includes programs to reduce ozone and diesel PM will continue to reduce public exposure to $PM_{2.5}$ in this region. In 2016, the District will submit a new $PM_{2.5}$ plan demonstrating how the region will meet the revised 12 $\mu g/m^3$annual $PM_{2.5}$ standard.

The San Joaquin Valley attains the national 24-hour standard for PM_{10}.

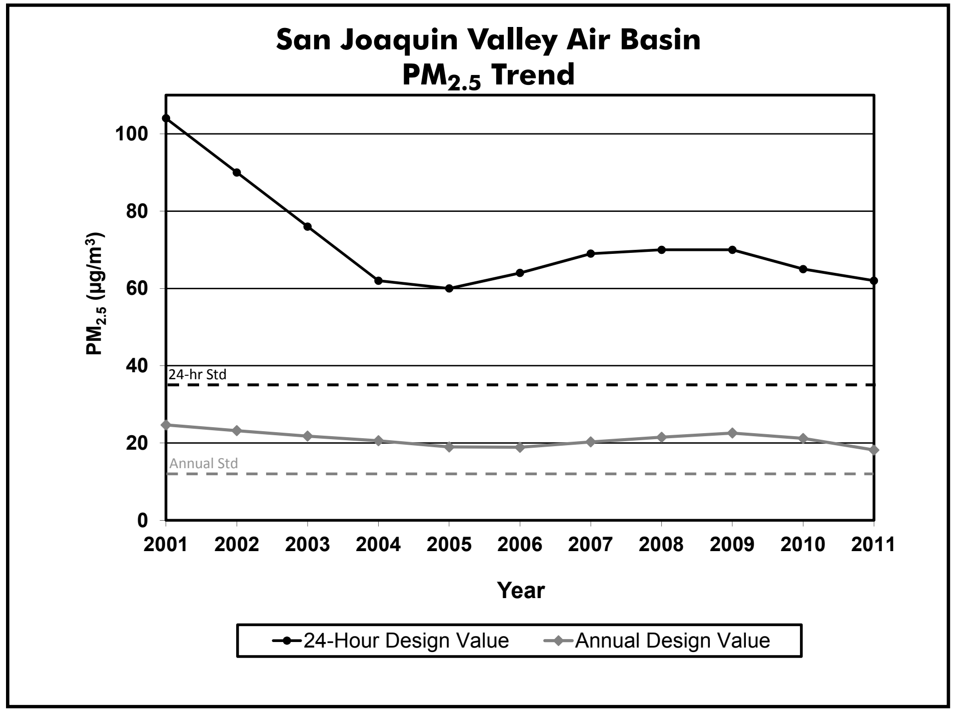

Figure 4-33

$PM_{2.5}$ ($\mu g/m^3$)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
98th Percentile of 24-Hr Conc.	120.0	103.0	96.0	80.4	56.0	61.5	74.9	64.7	73.0	72.3	66.7	56.2	69.5
24-Hour Design Value			104.0	90.0	76.0	62.0	60.0	64.0	69.0	70.0	70.0	65.0	62.0
Maximum Annual Average	27.6	23.9	22.5	24.1	19.6	18.9	19.8	19.3	22.0	23.5	22.5	17.9	20.4
Annual Design Value			24.7	23.2	21.8	20.6	19.0	18.9	20.3	21.5	22.6	21.2	18.2

Table 4-29

San Joaquin Valley Air Basin

Nitrogen Dioxide Air Quality Trend

The San Joaquin Valley has attained the national NO_2 standards for more than 20 years and ambient concentrations continue to be well below the level of the standard. The 1-hour design value has decreased by 41 percent since 1992 and this downward trend is expected to continue.

A new national 1-hour standard was adopted by U.S. EPA in January 2010 and is intended to focus on near-road NO_2 exposure. As a result, a new near-road monitoring network is in the process of being deployed.

NO_2 is formed from NO_x emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_x emissions.

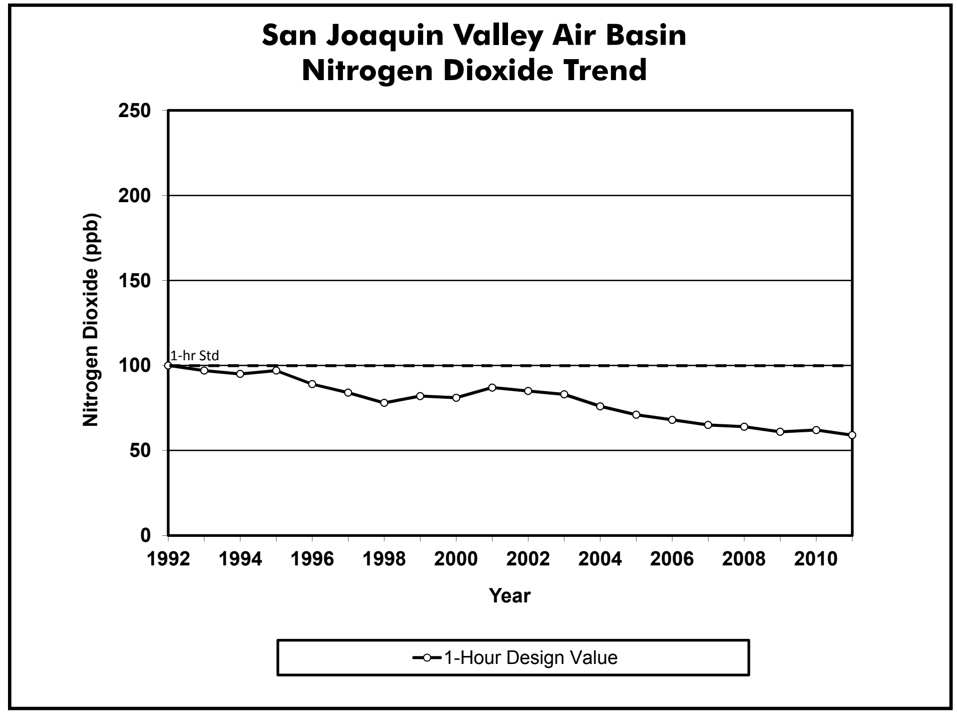

Figure 4-34

NITROGEN DIOXIDE (ppb)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Maximum 1-Hour Concentration	190	160	144	119	110	103	112	108	99	115	107	92	83	87	100	101	98	76	82	69
1-Hour Design Value	100	97	95	97	89	84	78	82	81	87	85	83	76	71	68	65	64	61	62	59
Maximum Annual Average	27	27	24	29	29	24	24	27	24	22	24	23	19	21	21	20	19	18	14	15

Table 4-30

San Diego Air Basin

Introduction - Area Description

The San Diego Air Basin lies in the southwest corner of California and comprises all of San Diego County. However, the population and emissions are concentrated mainly in the western portion of the County. The Air Basin covers 4,200 square miles, includes about eight percent of the State's population, and produces about five percent of the State's NO_x emissions and five percent of the State's $PM_{2.5}$ emissions. Because of its southerly location and proximity to the ocean, much of the San Diego Air Basin has a relatively mild climate. Higher temperatures and seasonal variations are experienced further inland.

Air quality in the San Diego Air Basin is impacted not only by local emissions, but also by pollutants transported from other areas — in particular, ozone and ozone precursor emissions transported from the South Coast Air Basin and Mexico.

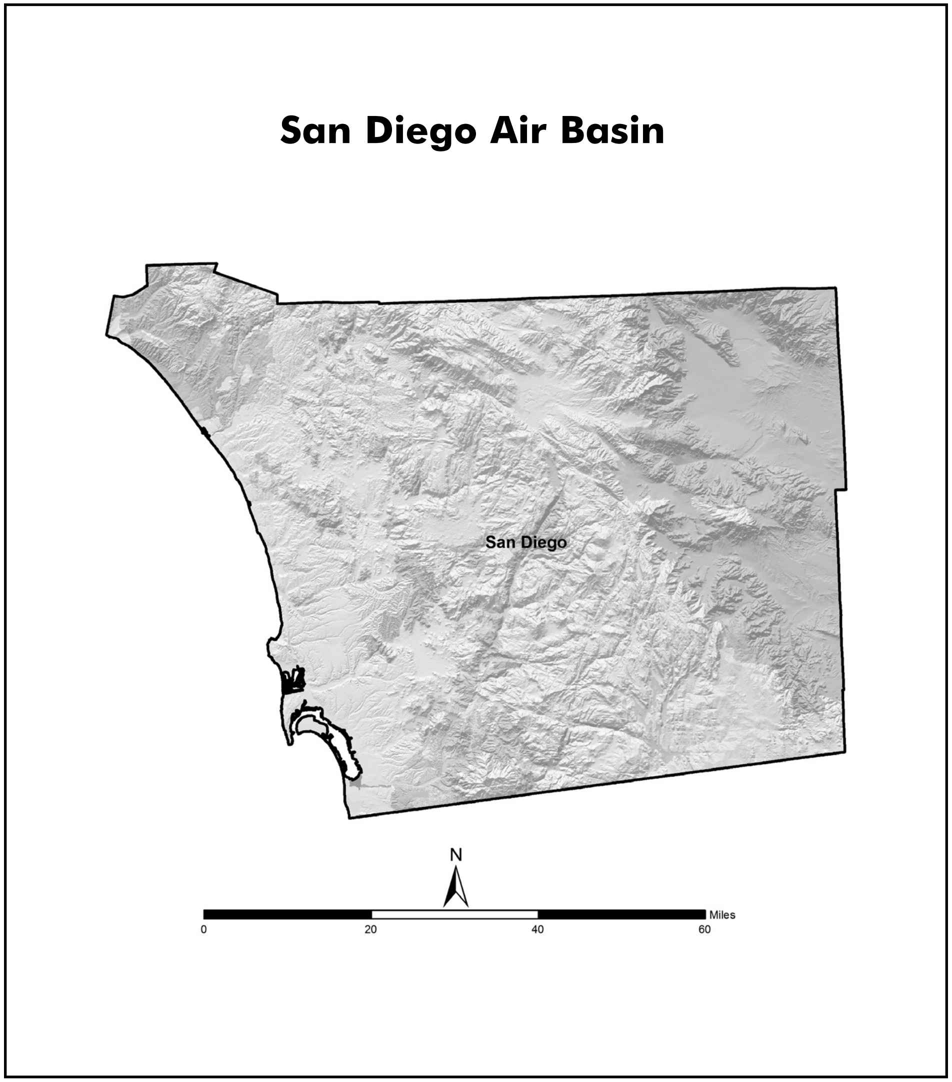

Figure 4-35

San Diego Air Basin
Emission Trends and Forecasts

Emissions of NO_x and VOC in the San Diego Air Basin have been following the declining statewide trends since 2000. These trends are largely due to motor vehicle controls and reductions in evaporative emissions. Mobile sources (both on-road and other) are by far the largest contributors to NO_x and VOC emissions in the San Diego Air Basin. The majority of the PM_{10} and $PM_{2.5}$ emissions are from area-wide sources.

San Diego Air Basin Emissions (tons/day, annual average)								
Pollutant	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
VOC	198	160	139	119	114	111	111	111
NO_X	202	155	120	90	68	56	51	49
SO_X	3	3	2	1	1	1	1	2
DPM	4	3	2	1	1	1	1	1
$PM_{2.5}$	26	25	23	19	19	20	20	21
PM_{10}	76	80	78	73	74	75	76	77
NH_3	16	15	15	14	14	14	14	14

Table 4-31

San Diego Air Basin
Population and VMT

Population in the San Diego Air Basin during the 1990-2035 period is projected to increase by nearly 44 percent, from almost 2.5 million in 1990 to over 3.6 million in 2035. During this same time period, the number of vehicle miles traveled each day is projected to increase by 92 percent, from over 57 million miles per day in 1990 to over 109 million miles per day in 2035.

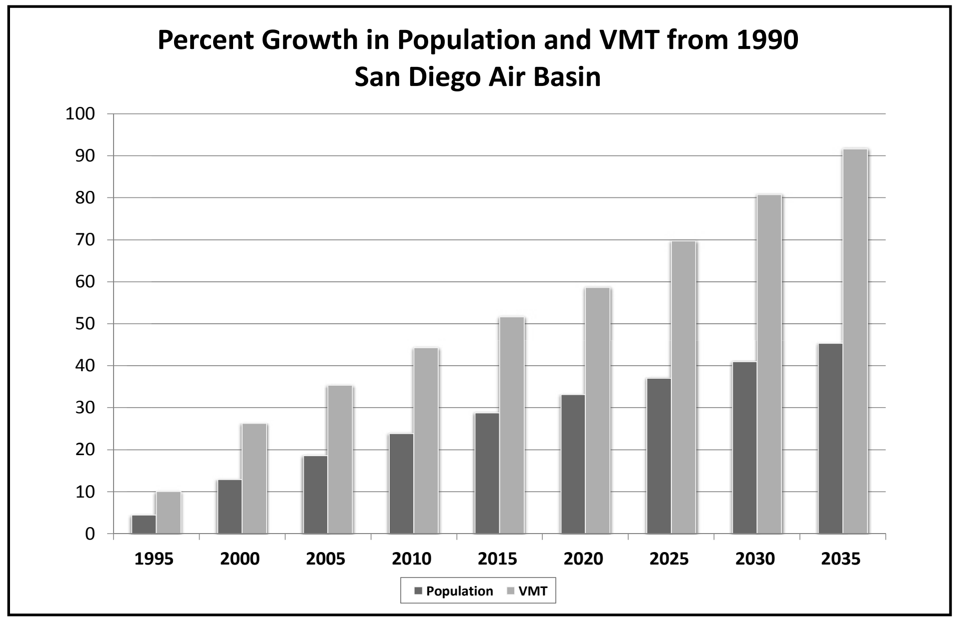

Figure 4-36

Parameter	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Population	2504897	2615201	2828374	2970135	3102745	3225139	3333995	3432537	3530896	3640255
Avg. Daily VMT/1000	57264	63022	72291	77498	82630	86836	90863	97179	103491	109748

Table 4-32

San Diego Air Basin

Ozone Precursor Emission - Trends and Forecasts

Emissions of the ozone precursors NO_x and VOC have been decreasing overall since 2000. These decreases are mostly due to decreased emissions from motor vehicles, brought about by stricter motor vehicle emission standards. Stationary and area-wide source emissions of VOC have remained mostly unchanged over the last 35 years, with stricter emission standards offsetting industrial and population growth.

NO_x Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***202***	***155***	***120***	***90***	***68***	***56***	***51***	***49***
Stationary Sources	13	7	7	4	4	4	5	5
Area-wide Sources	3	3	3	3	3	3	3	3
On-Road Mobile	144	109	79	55	37	27	23	20
Gasoline Vehicles	90	52	38	25	17	13	10	8
Diesel Vehicles	53	57	42	30	20	14	13	12
Other Mobile	42	37	32	28	24	22	21	21
Gasoline Fuel	5	5	4	4	4	4	4	4
Diesel Fuel	30	25	21	17	13	11	11	10
Other Fuel	7	7	6	7	7	7	7	7

Table 4-33

VOC Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***198***	***160***	***139***	***119***	***114***	***111***	***111***	***111***
Stationary Sources	31	32	33	31	34	35	36	37
Area-wide Sources	42	38	36	35	36	37	38	39
On-Road Mobile	82	50	38	24	18	16	14	12
Gasoline Vehicles	79	48	36	23	17	15	13	11
Diesel Vehicles	3	3	2	1	1	1	1	1
Other Mobile	44	39	33	28	25	23	23	23
Gasoline Fuel	36	33	27	22	20	18	18	18
Diesel Fuel	4	3	2	2	1	1	1	1
Other Fuel	4	4	4	4	4	4	4	4

Table 4-34

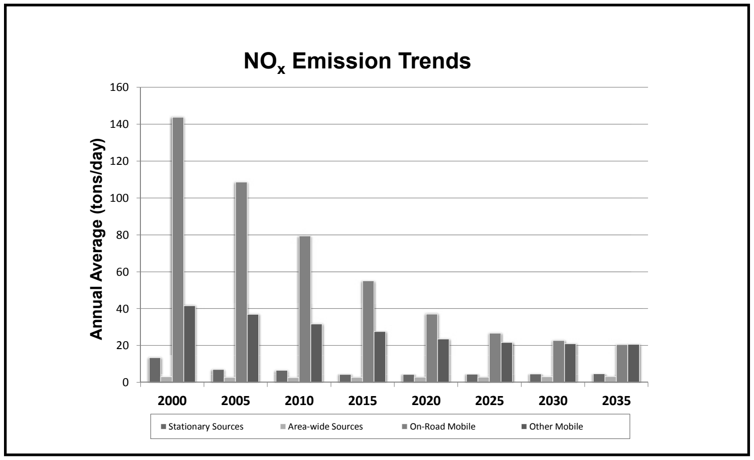

Figure 4-37

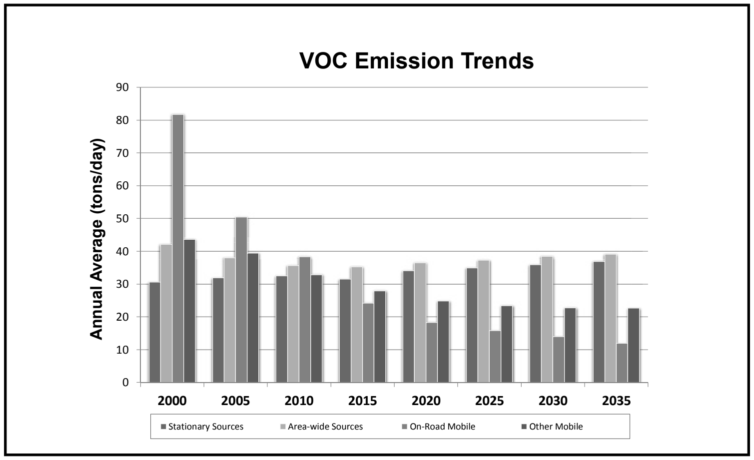

Figure 4-38

San Diego Air Basin

Directly Emitted $PM_{2.5}$ Emission - Trends and Forecasts

Direct emissions of $PM_{2.5}$ decreased steadily in the San Diego Air Basin between 2000 and 2010 and are projected to increase slightly after 2020.

Particulate matter can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_x, SO_x, VOC, and ammonia. The $PM_{2.5}$ emission inventory includes only directly emitted particulate emissions.

$PM_{2.5}$ Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***26***	***25***	***23***	***19***	***19***	***20***	***20***	***21***
Stationary Sources	6	6	5	3	3	3	3	3
Area-wide Sources	11	11	11	11	11	11	12	12
On-Road Mobile	4	4	3	3	2	3	3	3
Gasoline Vehicles	2	2	2	2	2	2	2	2
Diesel Vehicles	2	2	1	1	1	1	1	1
Other Mobile	4	4	4	3	3	3	3	3
Gasoline Fuel	1	1	1	1	1	1	1	1
Diesel Fuel	2	1	1	1	0	0	0	0
Other Fuel	2	2	2	2	2	2	2	2

Table 4-35

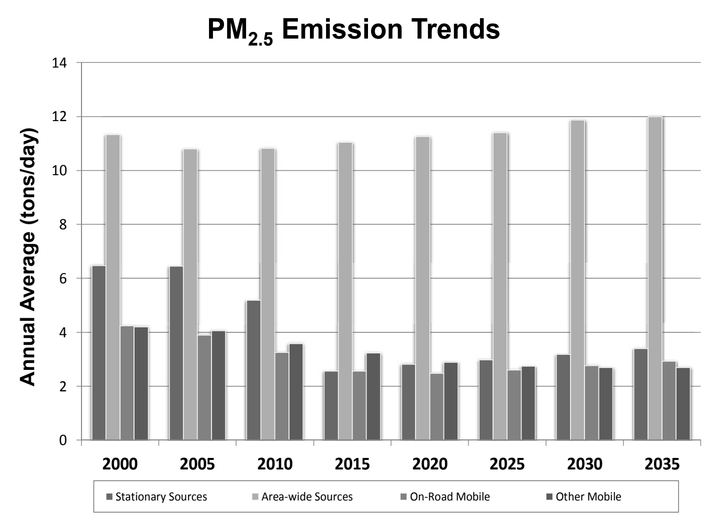

Figure 4-39

San Diego Air Basin

Diesel PM Emission - Trends and Forecasts

Diesel PM emissions decreased from 2000 to 2010 primarily as a result of reduced exhaust emissions from diesel mobile sources. Emissions from diesel mobile sources are projected to continue to decrease through 2035.

Diesel PM Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***4***	***3***	***2***	***1***	***1***	***1***	***1***	***1***
Stationary Sources	0	0	0	0	0	0	0	0
Area-wide Sources	0	0	0	0	0	0	0	0
On-Road Mobile	2	2	1	0	0	0	0	0
Gasoline Vehicles	0	0	0	0	0	0	0	0
Diesel Vehicles	2	2	1	0	0	0	0	0
Other Mobile	2	1	1	1	0	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	2	1	1	1	0	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-36

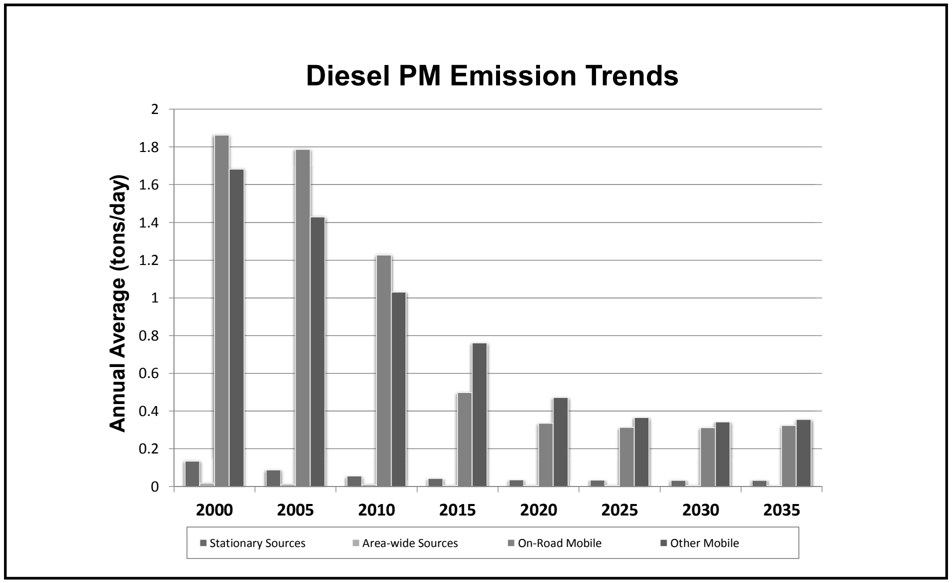

Figure 4-40

San Diego Air Basin

Ammonia Emission - Trends and Forecasts

Ammonia emissions remain fairly flat from 2000 through 2035 in the San Diego Air Basin. The majority of the emissions are from area-wide sources such as livestock waste and pesticide usage. Most of the remaining ammonia emissions are from on-road mobile sources.

NH_3 Emission Trends (tons/day, annual average)								
Emission Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***16***	***15***	***15***	***14***	***14***	***14***	***14***	***14***
Stationary Sources	1	1	1	1	1	1	1	1
Area-wide Sources	9	9	9	9	9	9	9	10
On-Road Mobile	6	5	4	4	3	3	3	3
Gasoline Vehicles	6	5	4	4	3	3	3	3
Diesel Vehicles	0	0	0	0	0	0	0	0
Other Mobile	0	0	0	0	0	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	0	0	0	0	0	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-37

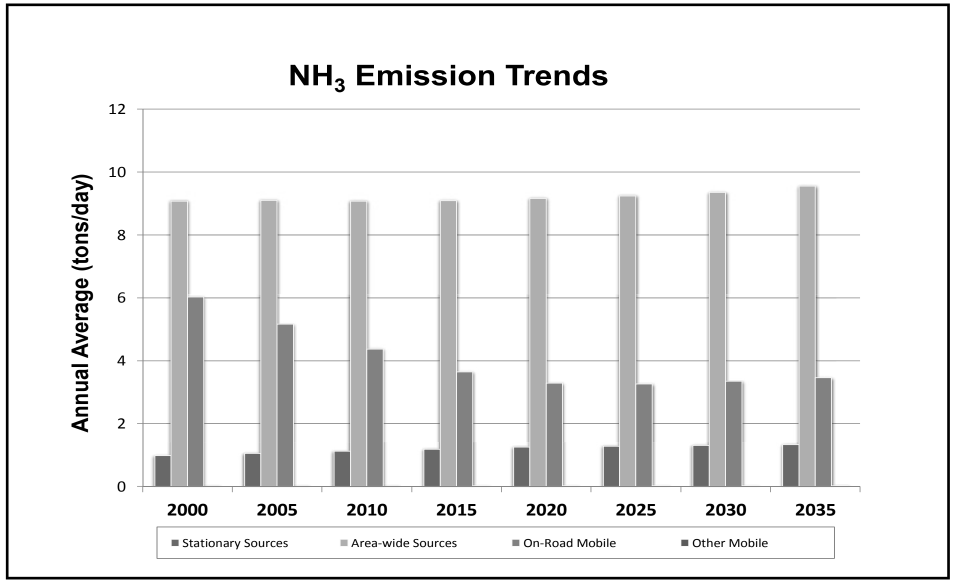

Figure 4-41

San Diego Air Basin

Ozone Air Quality Trend

Both the design value and the number of days above the national ozone standard have decreased substantially over the last 20 years. The 8-hour ozone design value shows an overall decline of 31 percent from 1992 to 2012. There were 105 national 8-hour standard exceedance days during 1992, compared with 10 during 2012, representing a decrease of 88 percent in the three-year average of the national 8-hour exceedance days. Today, 97 percent of the population live in areas meeting the standard.

San Diego County is nonattainment for the 0.075 ppm 8-hour ozone standard. The region met the level of the previous 0.08 ppm 8-hour ozone standard in 2011 resulting in the U.S. EPA issuing a Clean Data Finding and redesignating San Diego to attainment for the 0.08 ppm 8-hour ozone standard on July 5, 2013. Current ARB and local programs will provide the continuing reductions in NO_x and VOCs required to bring San Diego County into attainment of the 0.075 ppm standard.

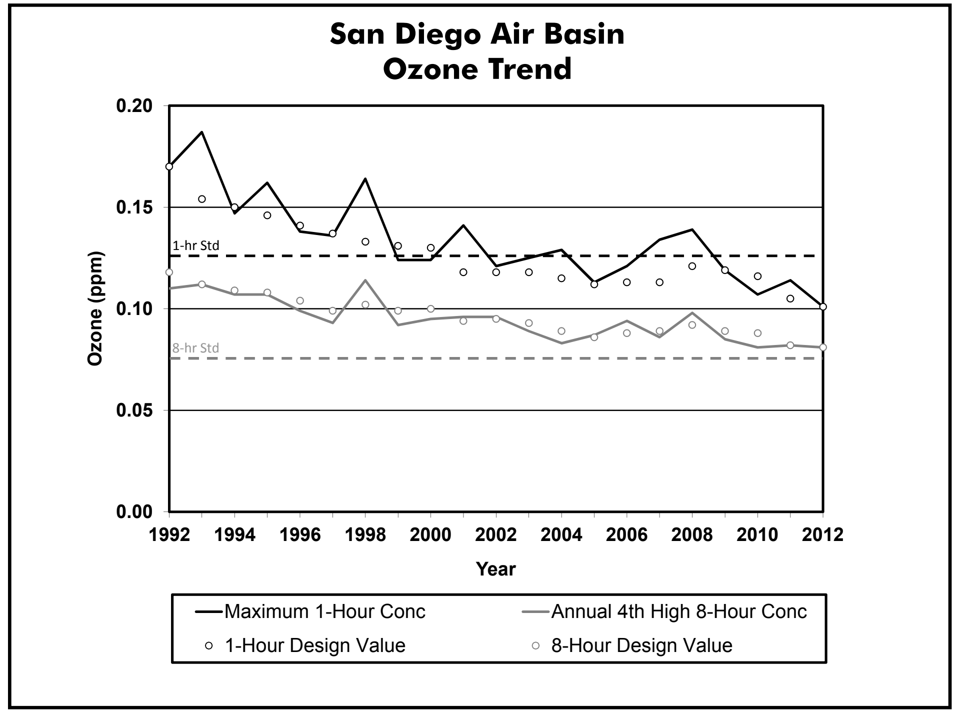

Figure 4-42

OZONE (ppm)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Annual 4th High 8-Hour	0.110	0.112	0.107	0.107	0.099	0.093	0.114	0.092	0.095	0.096	0.096	0.089	0.083	0.087	0.094	0.086	0.098	0.085	0.081	0.082	0.081
8-Hour Design Value	0.118	0.112	0.109	0.108	0.104	0.099	0.102	0.099	0.100	0.094	0.095	0.093	0.089	0.086	0.088	0.089	0.092	0.089	0.088	0.082	0.081
Maximum 1-Hour Concentration	0.170	0.187	0.147	0.162	0.138	0.136	0.164	0.124	0.124	0.141	0.121	0.125	0.129	0.113	0.121	0.134	0.139	0.119	0.107	0.114	0.101
1-Hour Design Value[1]	0.170	0.154	0.150	0.146	0.141	0.137	0.133	0.131	0.130	0.118	0.118	0.118	0.115	0.112	0.113	0.113	0.121	0.119	0.116	0.105	0.101
Days Above Nat. 8-Hour Standard	105	91	90	94	64	43	58	44	46	43	31	38	23	24	38	27	35	24	14	10	10

[1] The national 1-Hour standard has been revoked. Current and historical 1-Hour data are provided for reference.

Table 4-38

San Diego Air Basin

$PM_{2.5}$ Air Quality Trend

The San Diego Air Basin currently meets both the national annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and the 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$. San Diego Air Basin has seen a 42 percent decrease in the 24-hour $PM_{2.5}$ design value since 2001. San Diego's annual design value has also decreased 26 percent since 2001.

The San Diego Air Basin also attains the national 24-hour standard for PM_{10}.

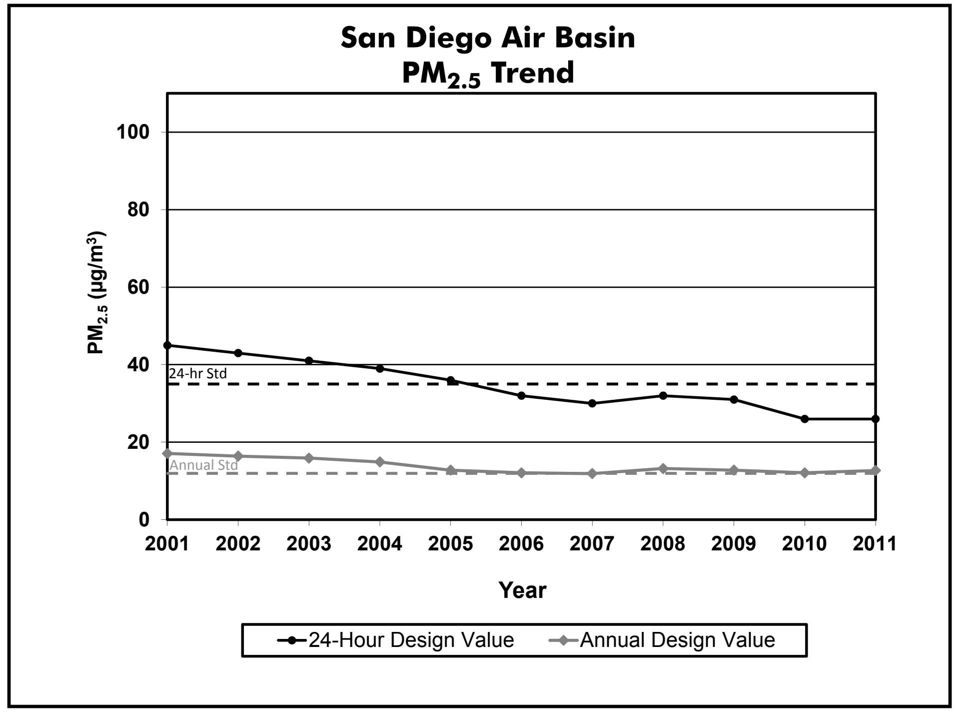

Figure 4-43

$PM_{2.5}$ ($\mu g/m^3$)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
98th Percentile of 24-Hr Conc.	45.1	48.7	40.8	39.3	46.9	37.4	30.2	30.8	37.7	30.2	25.2	25.2	27.4
24-Hour Design Value			45.0	43.0	41.0	39.0	36.0	32.0	30.0	32.0	31.0	26.0	26.0
Maximum Annual Average	18.0	15.8	17.7	16.0	15.5	14.1	11.8	13.1	13.3	13.7	13.5	12.3	12.4
Annual Design Value			17.1	16.4	15.9	14.9	12.8	12.1	11.9	13.2	12.8	12.1	12.7

Table 4-39

San Diego Air Basin

Nitrogen Dioxide Air Quality Trend

The San Diego Air Basin attains the national NO_2 standard. Since 1990, ambient concentrations have been well below the levels of the national 1-hour and annual average standards. Data show that the 1-hour design value decreased nearly 38 percent from 1992 to 2011.

A new national 1-hour standard was adopted by U.S. EPA in January 2010 and is intended to focus on near-road NO_2 exposure. As a result, a new near-road monitoring network is in the process of being deployed.

Because NO_x emissions contribute to ozone, as well as to NO_2, many of the ozone control measures help reduce ambient NO_2 concentrations. Furthermore, NO_x emission controls are a critical part of the ozone control strategy. As a result, these controls should ensure continued attainment of the national NO_2 standard.

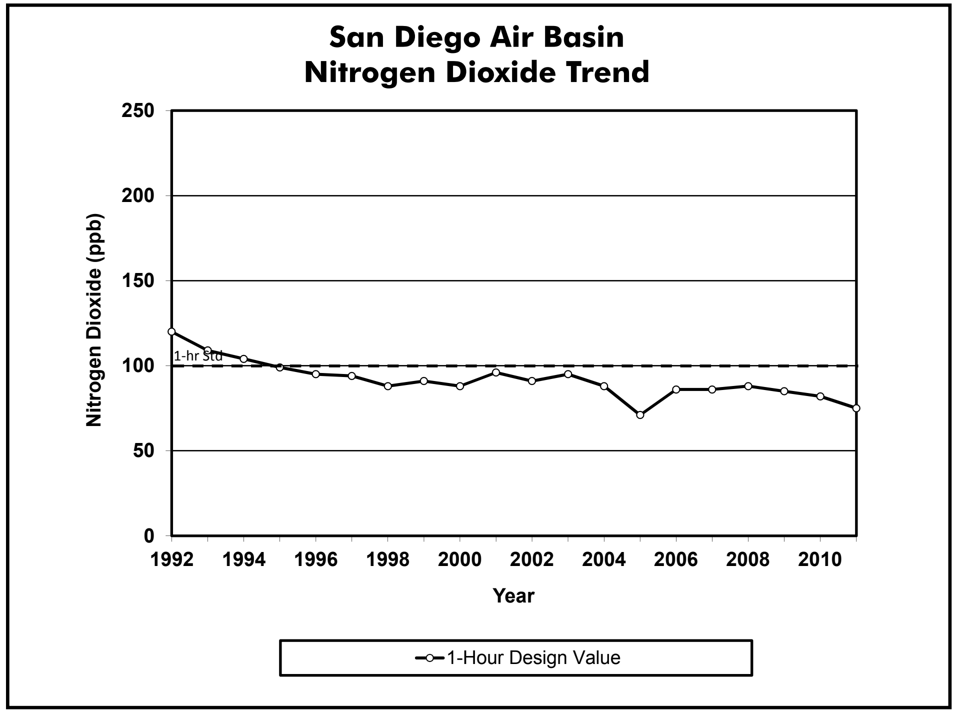

Figure 4-44

NITROGEN DIOXIDE (ppb)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Maximum 1-Hour Concentration	190	130	157	140	124	142	132	172	117	148	126	148	125	109	97	101	123	91	91	100
1-Hour Design Value	120	109	104	99	95	94	88	91	88	96	91	95	88	71	86	86	88	85	82	75
Maximum Annual Average	27	23	24	26	22	24	23	26	24	22	22	21	23	24	24	22	24	21	21	20

Table 4-40

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Sacramento Metropolitan Area

Introduction - Area Description

Located in the northern portion of the Central Valley, the Sacramento Metropolitan Area is home to California's capital. This area includes the southern part of the Sacramento Valley Air Basin as well as the western portion of El Dorado County and the western and central portions of Placer County. The Sacramento Metropolitan Area occupies 5,602 square miles and has a population of more than two million people, or just over six percent of the State's population. This area produces about five percent of the State's NO_x emissions and six percent of the State's $PM_{2.5}$ emissions.

Because of its inland location, the climate of the Sacramento Metropolitan Area is more extreme than that of the San Francisco Bay Area or South Coast air basins. The winters are generally cool and wet, while the summers are hot and dry.

Emissions from the urbanized portion (Sacramento, Yolo, Solano, and Placer Counties) dominate the emission inventory for the Sacramento Metropolitan Area, and on-road motor vehicles are the primary source of emissions.

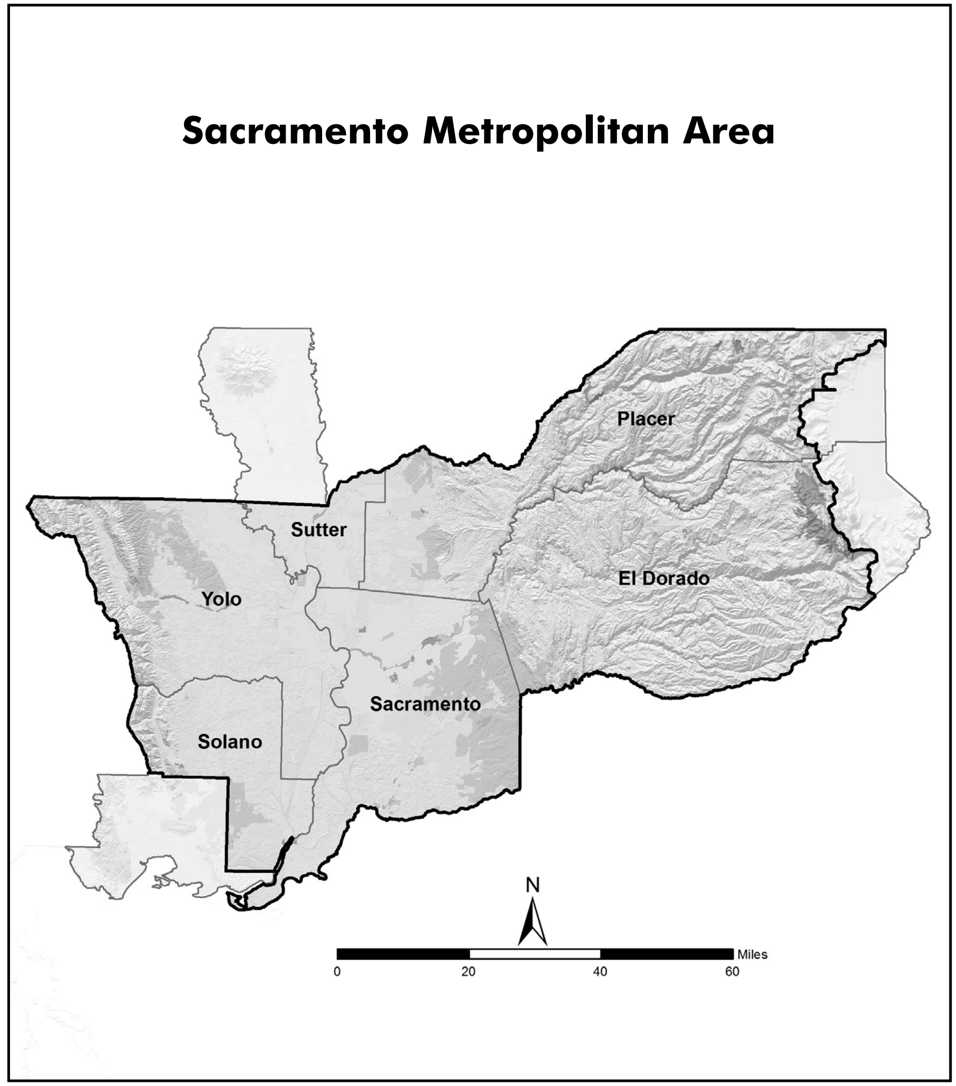

Figure 4-45

Sacramento Metropolitan Area
Emission Trends and Forecasts

The emission levels in the Sacramento Metropolitan Area are trending downward from 2000 to 2035 for NO_x and VOC. The decreases in NO_x and VOC are largely due to motor vehicle controls and reductions in evaporative emissions. Mobile sources are by far the largest contributors to NO_x and VOC emissions in the Sacramento Metropolitan Area. $PM_{2.5}$ emissions decrease slightly from 2000 to 2035 while PM_{10} emissions remain constant The emission levels for SO_x are also fairly flat from 2000 to 2035.

Sacramento Metropolitan Area Emissions (tons/day, annual average)								
Pollutant	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
VOC	158	126	110	99	94	93	95	94
NO_X	187	165	118	96	74	62	57	54
SO_X	3	3	2	2	2	2	2	2
DPM	4	4	2	1	1	1	1	1
$PM_{2.5}$	32	28	24	25	25	25	26	27
PM_{10}	86	83	80	83	84	84	86	87
NH_3	28	28	28	28	28	28	28	28

Table 4-41

Sacramento Metropolitan Area
Population and VMT

Between 1990 and 2035, population in the Sacramento Metropolitan Area is projected to grow at a higher rate than the statewide average-a 90 percent increase, compared with a 54 percent increase statewide. Population is projected to grow from 1.6 million in 1990 to almost 3.1 million in 2035. During this same period, the increase in the number of vehicle miles traveled each day is projected to be higher than the overall statewide value: a 157 percent increase in the Sacramento Metropolitan Area. VMT are projected to increase from about 29 million miles in 1990 to over 75 million miles in 2035.

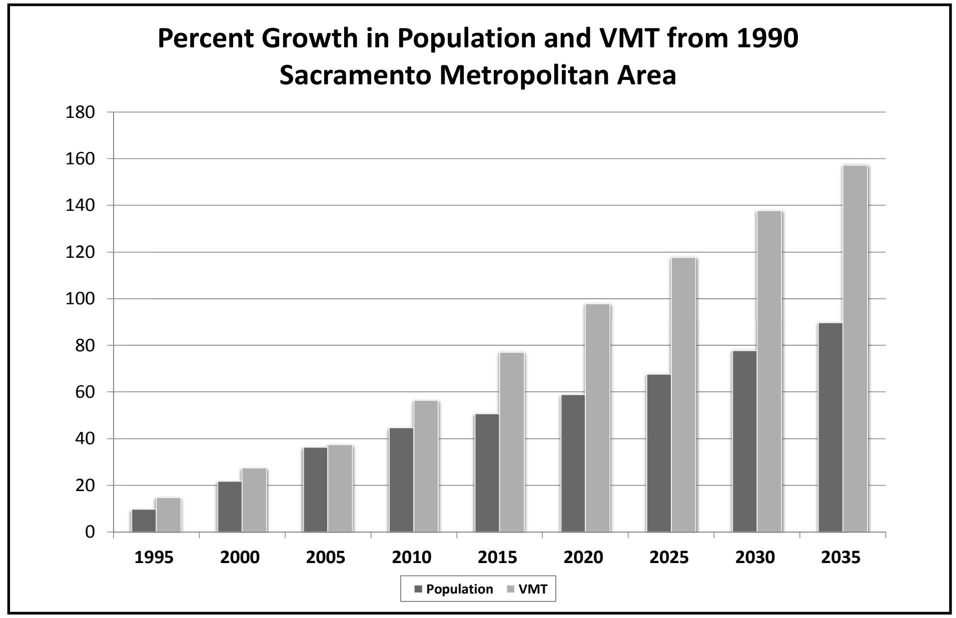

Figure 4-46

Parameter	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Population	1614624	1771449	1964285	2201002	2336097	2432108	2565083	2706127	2870371	3062405
Avg. Daily VMT/1000	29177	33472	37187	40080	45628	51621	57720	63493	69350	75057

* Note: VMT is estimated at the county, air basin, and air district level. Since the Sacramento Metropolitan Ozone Non-attainment area includes sub-county areas, the above VMT and population estimates include a small portion of Sutter county which falls outside the Sacramento Metropolitan Ozone Non-attainment area

Table 4-42

Sacramento Metropolitan Area

Ozone Precursor Emission - Trends and Forecasts

Emissions of NO_x decreased from 2000 to 2010 and are projected to continue decreasing from 2010 to 2035. On-road motor vehicles and other mobile sources are by far the largest contributors to NO_x emissions. More stringent mobile source emission standards and cleaner burning fuels have largely contributed to the decline in NO_x emissions. VOC emissions have continued decreasing due to more stringent motor vehicle standards and new rules for control of VOC from various industrial coating and solvent operations.

NO_X Emission Trends (tons/day, annual average)								
Emission Sources	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***187***	***165***	***118***	***96***	***74***	***62***	***57***	***54***
Stationary Sources	16	13	12	13	12	13	13	13
Area-wide Sources	6	5	5	6	6	6	6	6
On-Road Mobile	118	103	72	50	34	24	21	19
Gasoline Vehicles	68	42	31	20	14	10	8	7
Diesel Vehicles	51	61	41	30	19	14	13	12
Other Mobile	47	43	30	27	23	19	17	15
Gasoline Fuel	3	3	3	3	3	3	3	3
Diesel Fuel	42	37	24	21	17	14	11	10
Other Fuel	3	2	2	3	3	3	3	3

Table 4-43

VOC Emission Trends (tons/day, annual average)								
Emission Sources	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***158***	***126***	***110***	***99***	***94***	***93***	***95***	***94***
Stationary Sources	20	19	21	24	25	26	27	28
Area-wide Sources	45	38	35	38	39	40	42	43
On-Road Mobile	62	40	31	18	14	12	11	9
Gasoline Vehicles	59	36	29	17	13	11	9	8
Diesel Vehicles	3	3	2	1	1	1	1	1
Other Mobile	31	29	23	19	16	15	14	14
Gasoline Fuel	26	24	20	16	14	13	12	12
Diesel Fuel	5	4	3	2	2	1	1	1
Other Fuel	1	1	1	1	1	1	1	1

Table 4-44

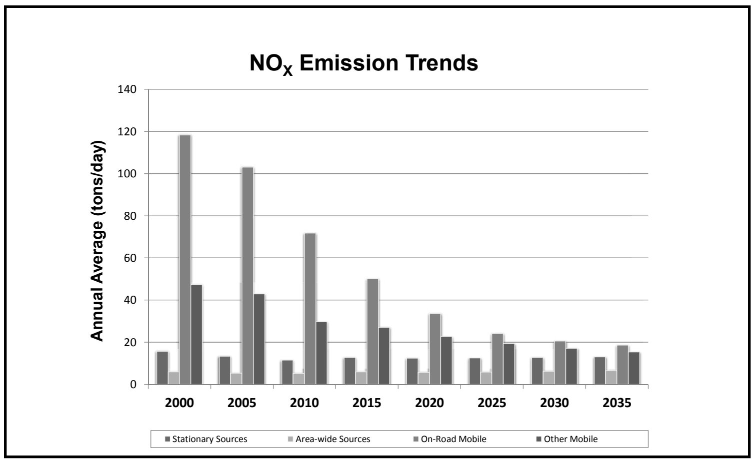

Figure 4-47

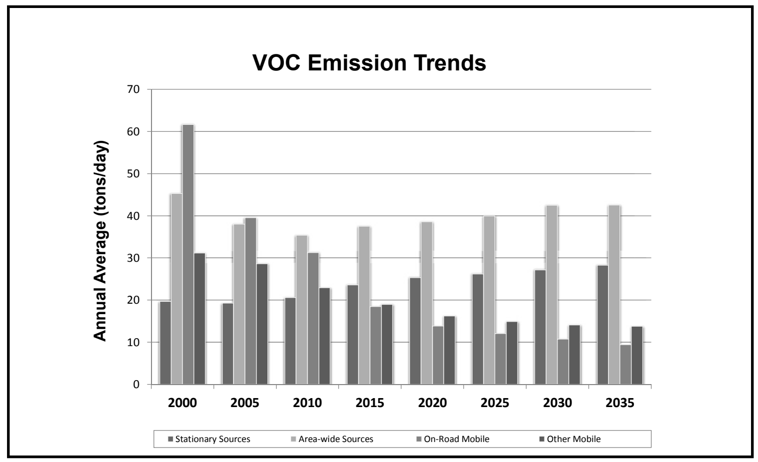

Figure 4-48

Sacramento Metropolitan Area

Directly Emitted $PM_{2.5}$ Emission - Trends and Forecasts

Direct emissions of $PM_{2.5}$ have steadily declined in the Sacramento Metropolitan Area between 2000 and 2010 and then are projected to increase very slightly through 2035. Emissions are dominated by contributions from area-wide sources, primarily fugitive dust from paved and unpaved roads, fugitive dust from construction and demolition, particulates from residential fuel combustion (including wood), and waste burning. Emissions of directly emitted $PM_{2.5}$ from mobile sources and stationary sources in the Sacramento Metropolitan Area have remained relatively steady.

Particulate matter can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_x, SO_x, ROG, and ammonia. The $PM_{2.5}$ emission inventory includes only directly emitted particulate emissions.

$PM_{2.5}$ Emission Trends (tons/day, annual average)								
Emission Sources	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***32***	***28***	***24***	***25***	***25***	***25***	***26***	***27***
Stationary Sources	5	4	3	4	4	4	5	5
Area-wide Sources	22	18	17	17	17	17	19	19
On-Road Mobile	3	3	3	2	2	2	2	2
Gasoline Vehicles	2	1	1	1	1	2	2	2
Diesel Vehicles	2	2	1	1	1	1	1	1
Other Mobile	3	3	2	2	1	1	1	1
Gasoline Fuel	1	1	1	1	1	0	0	0
Diesel Fuel	2	2	1	1	1	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-45

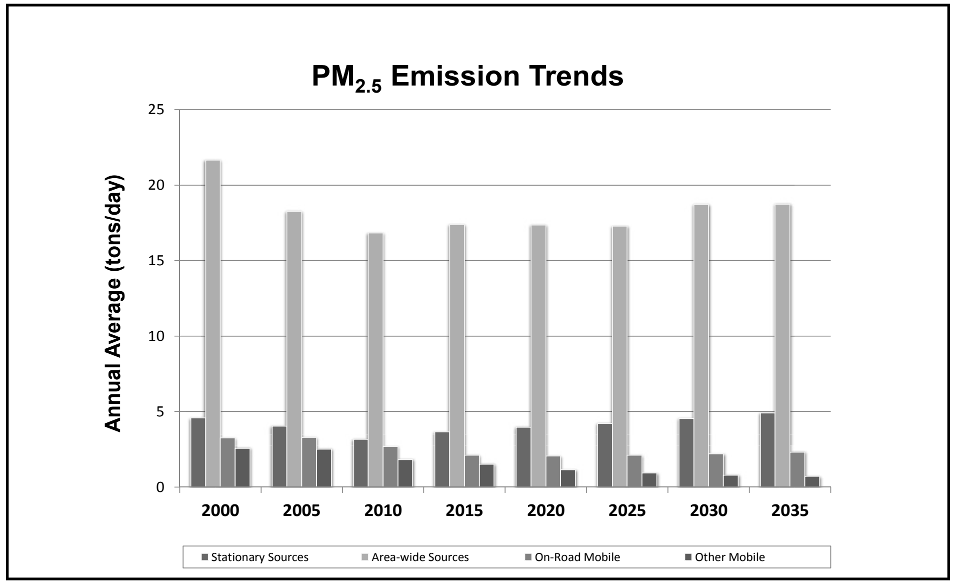

Figure 4-49

Sacramento Metropolitan Area

Diesel PM Emission - Trends and Forecasts

Diesel PM emissions decreased from 2000 to 2010 primarily as a result of reduced exhaust emissions from diesel mobile sources. Emissions from diesel mobile sources are projected to continue to decrease through 2035.

Diesel PM Emission Trends (tons/day, annual average)								
Emission Sources	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	***4***	***4***	***2***	***1***	***1***	***1***	***1***	***1***
Stationary Sources	0	0	0	0	0	0	0	0
Area-wide Sources	0	0	0	0	0	0	0	0
On-Road Mobile	2	2	1	1	0	0	0	0
Gasoline Vehicles	0	0	0	0	0	0	0	0
Diesel Vehicles	2	2	1	1	0	0	0	0
Other Mobile	2	2	1	1	1	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	2	2	1	1	1	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-46

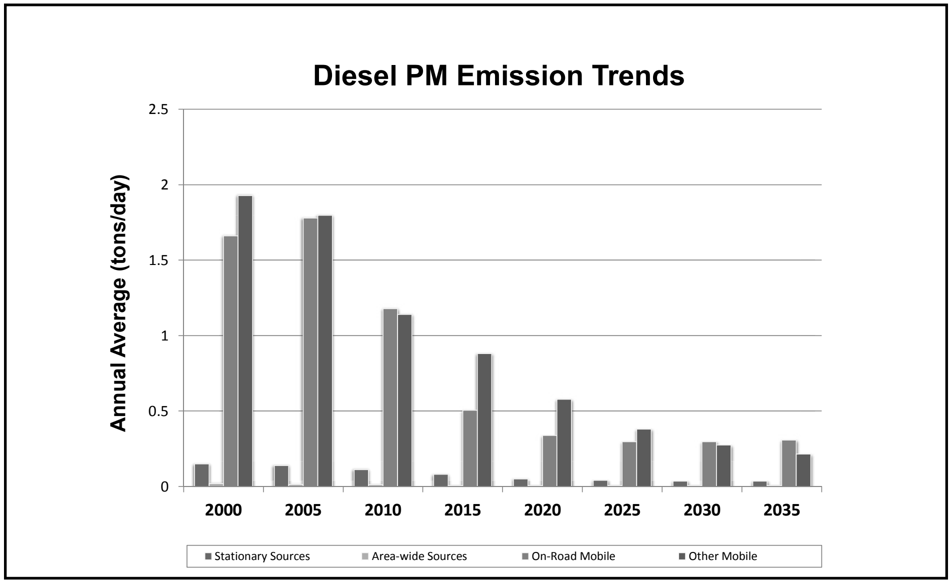

Figure 4-50

Sacramento Metropolitan Area

Ammonia Emission - Trends and Forecasts

Ammonia emissions are projected to remain fairly constant in the Sacramento Metropolitan Area. These emissions are dominated by area-wide sources such as livestock waste and pesticide usage. Other contributors of ammonia emissions are stationary sources and on-road mobile source.

NH_3 Emission Trends (tons/day, annual average)								
Emission Sources	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All Sources	**28**	**28**	**28**	**28**	**28**	**28**	**28**	**28**
Stationary Sources	1	2	3	3	3	3	3	3
Area-wide Sources	23	22	22	22	22	22	22	22
On-Road Mobile	4	4	3	3	2	2	2	2
Gasoline Vehicles	4	4	3	3	2	2	2	2
Diesel Vehicles	0	0	0	0	0	0	0	0
Other Mobile	0	0	0	0	0	0	0	0
Gasoline Fuel	0	0	0	0	0	0	0	0
Diesel Fuel	0	0	0	0	0	0	0	0
Other Fuel	0	0	0	0	0	0	0	0

Table 4-47

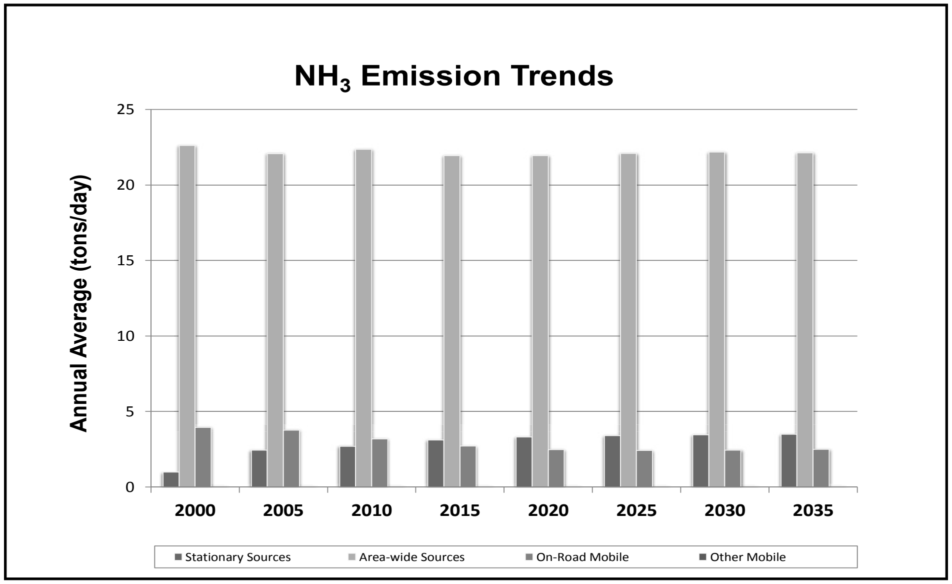

Figure 4-51

Sacramento Metropolitan Area

Ozone Air Quality Trend

Since 1992, the 8-hour design value decreased approximately 10 percent. Although the trend is more variable for the number of days above the national standards. The three-year average of the national 8-hour exceedance days has declined nearly 45 percent since 1992. Additionally, the population living in areas below the standard has increased from five percent in 1992 to 36 percent in 2011.

In March 2009, ARB approved the *2009 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan*. This plan sets out a strategy for attaining the 1997 federal 8-hour ozone standard in the Sacramento Nonattainment Area by 2018. By 2016, the District will submit a new plan demonstrating how the region will meet the 8-hour ozone standard of 0.075 ppm by 2032. U.S. EPA finalized a "clean data determination" for the 1-hour ozone standard for the Sacramento Metropolitan Area on October 3, 2012.

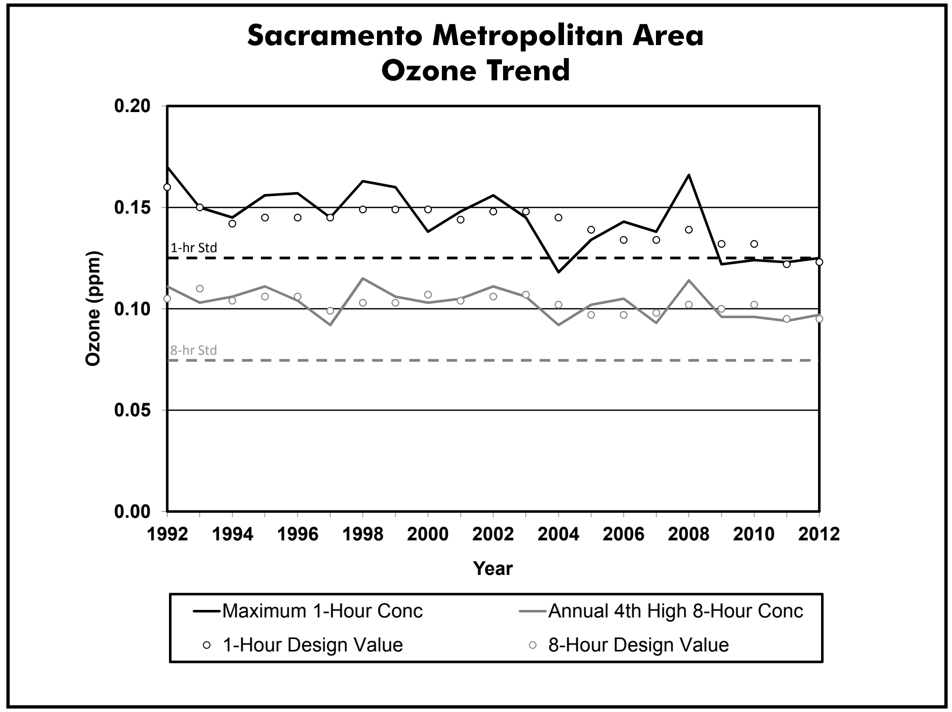

Figure 4-52

OZONE (ppm)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Annual 4th High 8-Hour	0.111	0.103	0.106	0.111	0.104	0.092	0.115	0.106	0.103	0.105	0.111	0.106	0.092	0.102	0.105	0.093	0.114	0.096	0.096	0.094	0.097
8-Hour Design Value	0.105	0.110	0.104	0.106	0.106	0.099	0.103	0.103	0.107	0.104	0.106	0.107	0.102	0.097	0.097	0.098	0.102	0.100	0.102	0.095	0.095
Maximum 1-Hour Concentration	0.170	0.150	0.145	0.156	0.157	0.145	0.163	0.160	0.138	0.148	0.156	0.145	0.118	0.134	0.143	0.138	0.166	0.122	0.124	0.123	0.125
1-Hour Design Value[1]	0.160	0.150	0.142	0.145	0.145	0.145	0.149	0.149	0.149	0.144	0.148	0.148	0.145	0.139	0.134	0.134	0.139	0.132	0.132	0.122	0.123
Days Above Nat. 8-Hour Standard	90	48	73	64	76	45	60	80	61	73	86	79	61	53	74	38	56	42	23	45	49

[1] The national 1-Hour standard has been revoked. Current and historical 1-Hour data are provided for reference.

Table 4-48

Sacramento Metropolitan Area

$PM_{2.5}$ Air Quality Trend

The Sacramento Metropolitan Area has seen significant progress in both the 24-hour and annual average $PM_{2.5}$ design values over the last 13 years. The Sacramento Metropolitan Area is in attainment of the national annual average $PM_{2.5}$ standard and concentrations have decreased 20 percent since 2001. The 24-hour design value has seen the biggest decline over the past 14 years, decreasing 51 percent.

Although the Sacramento Metropolitan Area is designated as non-attainment for the 24-hour national $PM_{2.5}$ standard, recent monitoring data now shows that the Sacramento Metropolitan Area meets the 24-hour national $PM_{2.5}$ standard. U.S. EPA finalized a "clean data determination" for the 24-hour $PM_{2.5}$ standard for the Sacramento Metropolitan Area on July 15, 2013.

The Sacramento Metropolitan Area also currently attains the national 24-hour standard for PM_{10}.

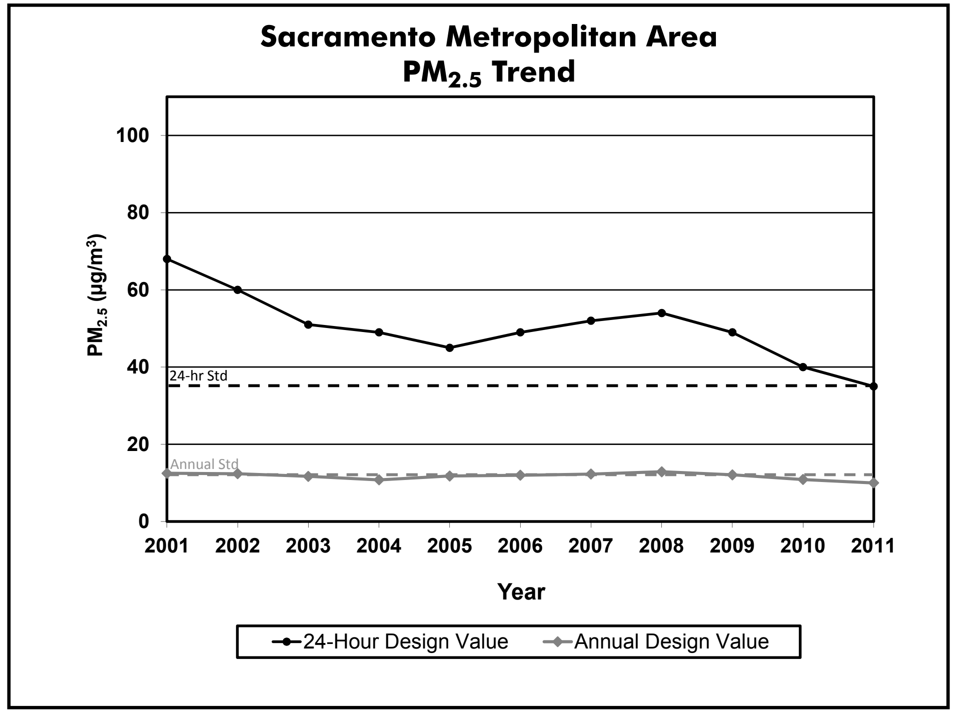

Figure 4-53

$PM_{2.5}$ (µg/m³)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
98th Percentile of 24-Hr Conc.	96	84	81	53	63	43.0	42.0	49.0	55.0	53.0	54.9	38.7	27.3	45.1
24-Hour Design Value			72	68	60	51.0	49.0	45.0	49.0	52.0	54.0	49.0	40.0	35.0
Maximum Annual Average		19.9	12.3	11.9	14.3	12.3	11.5	11.5	13.1	12.3	13.2	10.7	8.8	10.5
Annual Design Value				12.5	12.4	11.7	10.8	11.8	12.0	12.3	12.9	12.1	10.9	10.0

Table 4-49

Sacramento Metropolitan Area

Nitrogen Dioxide Air Quality Trend

The Sacramento Metropolitan Area has attained the national NO_2 standard for more than 20 years. The 2011 1-hour design value has declined by 43 percent from 1992 levels. The Sacramento Metropolitan Area shows more variability in maximum 1-hour concentrations than other areas of the State. This variability may be due to changes in emission sources and may also reflect year-to-year changes in meteorology. However, ambient concentrations are well below the level of both standards.

A new national 1-hour standard was adopted by U.S. EPA in January 2010 and is intended to focus on near-road NO_2 exposure. As a result, a new near-road monitoring network is in the process of being deployed.

NO_2 is formed from NO_x emissions, which also contribute to ozone. As a result, the majority of the future emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target mobile sources, which account for more than three-quarters of California's NO_x emissions.

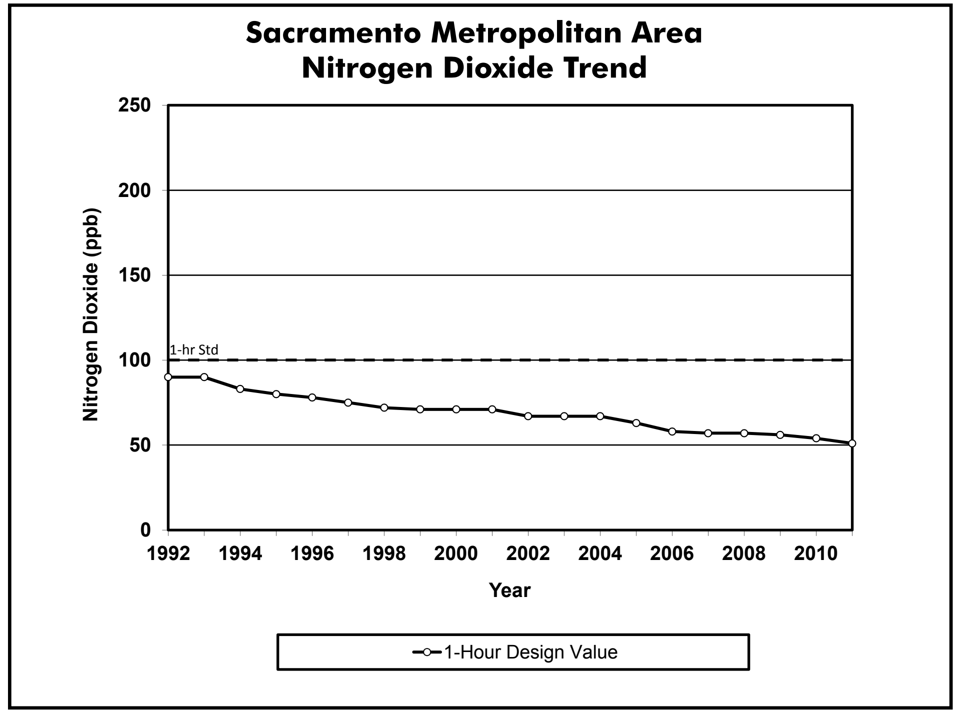

Figure 4-54

NITROGEN DIOXIDE (ppb)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Maximum 1-Hour Concentration	190	120	111	99	145	92	101	110	86	172	90	102	146	79	97	127	115	68	95	66
1-Hour Design Value	90	90	83	80	78	75	72	71	71	71	67	67	67	63	58	57	57	56	54	51
Maximum Annual Average	21	22	22	22	22	19	21	21	19	19	20	18	17	16	16	15	15	13	12	13

Table 4-50