Chapter 2

Current Emissions and Air Quality

Introduction

This chapter provides statewide information on current emissions and air quality, relative to the national ambient air quality standards. The first section of this chapter includes a summary table of the statewide emission inventory and the air quality information can be found in the second section.

It should be noted that emission inventories are developed for many purposes, including SIPs, and for other planning and regulatory needs. For this edition of the Almanac, the current emissions data represent a calendar year 2012 snapshot with updated mobile source estimates from the EMFAC2011 and various off-road models. Also included are the latest point source estimates provided by districts as well as inventory improvements from recent SIPs.

Emissions Data

The summary table shows emission data by three major source categories: stationary, area-wide, and mobile sources. Emission data for natural sources are provided in Appendix D. The remaining sections of this Chapter provide information on emissions and air quality on a statewide basis. Emissions are presented for NO_x, VOC, PM_{10}, $PM_{2.5}$, DPM, SO_x, and NH_3.

Emissions are reported as annual averages in tons per day (tpd). For most sources and pollutants that are not seasonal, this describes emissions very well. However, for some pollutants such as PM_{10} and $PM_{2.5}$, annual averages do not give an accurate indication of the seasonal nature of emissions. Many sources of PM_{10} and $PM_{2.5}$ are seasonal, including wildfires, agricultural processes, and residential wood combustion. Additionally, many sources of PM_{10} and $PM_{2.5}$ can also be very localized, and basinwide annual averages do not give any information about these sources.

Air Quality Data

The air quality section provides an overview of statewide progress made towards attainment of federal ozone and $PM_{2.5}$ standards. The discussion includes maps showing 2011 8-hour ozone design values and 2011 maximum 98th percentile 24-hour $PM_{2.5}$ design values by air basin. Additionally, exceedance day, design value, and percent above the standard information has been provided for each pollutant's nonattainment areas. This information along with the percent above the standard comparison in Chapter 4 help to give a more complete picture of progress in each of these key areas.

Additional information is provided for three other pollutants, these include Carbon Monoxide (CO), Nitrogen Dioxide (NO_2) and Sulfur Dioxide (SO_2). An indication of "No Data" indicates that not enough information was provided to meet data requirements in order to calculate a value. In some areas "No Data" may mean no data was collected or that the data may have been limited to a certain time of the year and thus may not meet the minimum data collection threshold.

NO_x Sources - Statewide

NO_x is a group of gaseous compounds of nitrogen and oxygen, many of which contribute to the formation of ozone, PM_{10}, and $PM_{2.5}$. Most NO_x emissions are produced by the combustion of fuels. Industrial sources report NO_x emissions to local air districts and the ARB. Other sources of NO_x emissions are estimated by the local air districts and the ARB. Mobile sources (including on-road and other mobile) make up about 83 percent of the total statewide NO_x emissions. Area-wide sources, which include residential fuel combustion and managed burning and disposal, contribute only a small portion of the total NO_x emissions.

NOx Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**284**	**13%**
Area-wide Sources	**75**	**4%**
On-Road Mobile	**1024**	**49%**
Gasoline Vehicles	**395**	**19%**
Diesel Vehicles	**629**	**30%**
Other Mobile	**723**	**34%**
Gasoline Fuel	**45**	**2%**
Diesel Fuel	**613**	**29%**
Other Fuel	**65**	**3%**
Total Statewide	**2106**	**100%**

Table 2-1

VOC Sources - Statewide

VOCs are photochemically reactive and contribute to the formation of ozone, as well as PM_{10} and $PM_{2.5}$. These emissions result primarily from incomplete fuel combustion and the evaporation of chemical solvents and fuels. Mobile sources (including on-road and other mobile) are the largest contributors to statewide VOC emissions. Stationary sources of VOC emissions include processes that use solvents (such as dry cleaning, degreasing, and coating operations) and petroleum-related processes (such as petroleum refining and marketing and oil and gas extraction). Area-wide VOC sources include consumer products, pesticides, aerosol and architectural coatings, asphalt paving and roofing, farming operations, and other evaporative emissions.

VOC Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**384**	**22%**
Area-wide Sources	**609**	**35%**
On-Road Mobile	**403**	**23%**
Gasoline Vehicles	**371**	**21%**
Diesel Vehicles	**33**	**2%**
Other Mobile	**342**	**20%**
Gasoline Fuel	**259**	**15%**
Diesel Fuel	**53**	**3%**
Other Fuel	**29**	**2%**
Total Statewide	**1739**	**100%**

Table 2-2

Directly Emitted Particulate Matter (PM_{10} and $PM_{2.5}$)

PM is a mixture of substances that includes elements such as carbon and metals; compounds such as nitrates, sulfates, and organic compounds; and complex mixtures such as diesel exhaust and soil. $PM_{2.5}$ includes fine particles with a diameter of 2.5 microns or smaller and is a subset of PM_{10}. These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles, known as primary particles are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks or fires. Others form in complicated reactions in the atmosphere of chemicals such as sulfur dioxides and nitrogen oxides that are emitted from power plants, industries and automobiles. These particles, known as secondary particles, make up most of the fine particle pollution in the country.

Area-wide sources account for about 65 and 83 percent of the statewide emissions of directly emitted $PM_{2.5}$ and PM_{10}, respectively. The major area-wide sources of $PM_{2.5}$ and PM_{10} are fugitive dust, especially dust from unpaved and paved roads, agricultural operations, and construction and demolition. Sources of PM_{10} include crushing or grinding operations, and dust stirred up by vehicles traveling on roads. Sources of $PM_{2.5}$ include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. Exhaust emissions from mobile sources contribute only a very small portion of directly emitted $PM_{2.5}$ and PM_{10} emissions, but are a major source of the VOC and NO_x that form secondary particles.

$PM_{2.5}$ Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**62**	**15%**
Area-wide Sources	**271**	**65%**
On-Road Mobile	**43**	**10%**
Gasoline Vehicles	**21**	**5%**
Diesel Vehicles	**22**	**5%**
Other Mobile	**42**	**10%**
Gasoline Fuel	**9**	**2%**
Diesel Fuel	**25**	**6%**
Other Fuel	**8**	**2%**
Total Statewide	**418**	**100%**

Table 2-3

PM_{10} Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**123**	**8%**
Area-wide Sources	**1213**	**83%**
On-Road Mobile	**78**	**5%**
Gasoline Vehicles	**48**	**3%**
Diesel Vehicles	**30**	**2%**
Other Mobile	**46**	**3%**
Gasoline Fuel	**10**	**1%**
Diesel Fuel	**27**	**2%**
Other Fuel	**9**	**1%**
Total Statewide	**1460**	**100%**

Table 2-4

SO_x Sources - Statewide

Oxides of Sulfur (SO_x) are a group of compounds of sulfur and oxygen. Stationary sources account for 49 percent of the emissions of SO_x. Emissions from stationary sources are related to diesel fuel combustion. Other mobile sources, primarily ocean-going vessels, generate about 40 percent of the statewide SO_x emissions.

SO_X Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**52**	**49%**
Area-wide Sources	**6**	**6%**
On-Road Mobile	**5**	**5%**
Gasoline Vehicles	**4**	**4%**
Diesel Vehicles	**1**	**1%**
Other Mobile	**42**	**40%**
Gasoline Fuel	**0**	**0%**
Diesel Fuel	**38**	**36%**
Other Fuel	**4**	**3%**
Total Statewide	**105**	**100%**

Table 2-5

Ammonia Sources - Statewide

Ammonia is a gaseous compound of nitrogen and hydrogen that can easily be condensed into a liquid during cold conditions. Ammonia is considered a precursor of $PM_{2.5}$ because it can react with NO_x in the atmosphere to form ammonium nitrate.

Area-wide sources account for 81 percent of the statewide emissions of ammonia. The major area-wide source of ammonia is livestock waste. Ammonia emissions from on-road vehicles are produced by three-way catalyst equipped gasoline vehicles. Ammonia emissions from stationary sources are primarily related to NO_x emission controls, the manufacture of a variety of products, and waste disposal.

Ammonia emission sources have strong geographic differences. In the San Joaquin Valley, ammonia emissions are dominated by livestock and other agricultural sources. However, in the South Coast Air Basin ammonia emissions from stationary sources and motor vehicles are also significant contributors.

NH_3 Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**86**	**12%**
Area-wide Sources	**574**	**81%**
On-Road Mobile	**45**	**6%**
Gasoline Vehicles	**43**	**6%**
Diesel Vehicles	**1**	**0%**
Other Mobile	**0**	**0%**
Gasoline Fuel	**0**	**0%**
Diesel Fuel	**0**	**0%**
Other Fuel	**0**	**0%**
Total Statewide	**706**	**100%**

Table 2-6

Diesel PM Sources - Statewide

Diesel engines at ports, including ships, cargo handling equipment, locomotives, and trucks, emit a complex mixture of air pollutants, composed of gaseous and solid material. The solid particles in diesel exhaust, which at times may be visible, are known as particulate matter, which includes carbon particles or "soot." In 1998, ARB identified DPM as a toxic air contaminant based on its potential to cause cancer and other health problems.

Health risks from DPM are highest in areas of concentrated emissions, such as near ports, rail yards, freeways, or warehouse distribution centers. Exposure to DPM is a health hazard, particularly to children whose lungs are still developing, and the elderly who may have other serious health problems. DPM is also a large component of PM pollution in many cities. Table 2-7 shows the source categories for DPM.

Diesel PM Emissions (annual average)		
Emissions Source	**tons/day**	**Percent**
Stationary Sources	**2**	**3%**
Area-wide Sources	**0**	**0%**
On-Road Mobile	**20**	**42%**
Gasoline Vehicles	**0**	**0%**
Diesel Vehicles	**20**	**42%**
Other Mobile	**27**	**55%**
Gasoline Fuel	**0**	**0%**
Diesel Fuel	**27**	**55%**
Other Fuel	**0**	**0%**
Total Statewide	**49**	**100%**

Table 2-7

2012 Statewide Emission Inventory

Summary

Division	Emissions (tons/day, annual average)						
Major Category	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Stationary Sources	**384**	**284**	**52**	**62**	**123**	**2**	**86**
Fuel Combustion	26	211	28	22	26	2	14
Waste Disposal	38	4	1	1	2	0	62
Cleaning and Surface Coatings	139	0	0	3	3	0	0
Petroleum Production and Marketing	131	4	5	2	2	0	0
Industrial Processes	49	64	17	35	91	0	10
Area-Wide Sources	**609**	**75**	**6**	**271**	**1213**	**0**	**574**
Solvent Evaporation	354	0	0	0	0	0	155
Miscellaneous Processes	255	75	6	271	1213	0	419
Mobile Sources	**746**	**1747**	**47**	**85**	**124**	**47**	**45**
Light Duty Passenger Vehicles	139	117	2	11	25	0	17
Light and Medium Duty Trucks	157	201	2	9	20	0	23
Heavy Duty Trucks	64	631	1	21	28	19	4
Other On-Road	44	74	0	2	4	1	0
Aircraft and Trains	37	157	4	11	12	3	0
Ships, Ocean Going Vessels & C Harbor Craft	14	268	38	10	10	10	0
Pleasure Crafts	98	19	0	5	6	0	0
Recreational Vehicles	34	2	0	0	0	0	0
Off-Road Equipment	123	181	0	11	12	8	0
Other Off-Road	36	96	0	5	6	6	0
Total Statewide - All Sources**	**1739**	**2106**	**105**	**418**	**1460**	**49**	**706**

* Includes directly emitted particulate matter only.

** Natural sources are provided in Appendix D. These summaries do not include emission estimates of wind blown dust - from exposed lake beds from Owens and Mono Lakes. These emissions are estimated to be about 23 tons/day of PM_{10}.

Table 2-8

2012 Statewide Emission Inventory by Sub-Category

Division / Major Category / Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Stationary Sources (division total)	**384**	**284**	**52**	**62**	**123**	**2**	**86**
Fuel Combustion (major category total)	*26*	*211*	*28*	*22*	*26*	*2*	*14*
- Electric Utilities	2	21	5	5	6	0	9
- Cogeneration	2	16	1	2	2	0	1
- Oil And Gas Production (Combustion)	2	10	1	2	2	0	0
- Petroleum Refining (Combustion)	3	18	9	2	2	0	1
- Manufacturing And Industrial	7	63	8	5	6	0	1
- Food And Agricultural Processing	3	21	1	1	1	1	0
- Service And Commercial	5	46	3	4	4	0	1
- Other (Fuel Combustion)	1	16	0	1	2	0	0
Waste Disposal (major category total)	*38*	*4*	*1*	*1*	*2*	*0*	*62*
- Sewage Treatment	1	0	0	0	0	0	0
- Landfills	12	1	0	0	1	0	9
- Incinerators	1	3	1	0	0	0	0
- Soil Remediation	0	0	0	0	0	0	0
- Other (Waste Disposal)	24	0	0	0	0	0	52
Cleaning And Surface Coatings (major category total)	*139*	*0*	*0*	*3*	*3*	*0*	*0*
- Laundering	2	0	0	0	0	0	0
- Degreasing	34	0	0	0	0	0	0
- Coatings And Related Process Solvents (sub-category total)	58	0	0	2	2	0	0
- Auto Marine, & Aircraft	21	0	0	0	0	0	0
- Paper & Fabric	1	0	0	0	0	0	0
- Metal, Wood, & Plastic	21	0	0	1	1	0	0
- Other	15	0	0	0	0	0	0

* Includes directly emitted particulate matter only.

Table 2-9

2012 Statewide Emission Inventory by Sub-Category

Division / Major Category / Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Stationary Sources (division total) (continued)							
Cleaning And Surface Coatings (major category) (continued)							
- Printing	18	0	0	0	0	0	0
- Adhesives And Sealants	20	0	0	0	0	0	0
- Other (Cleaning And Surface Coatings)	8	0	0	1	1	0	0
Petroleum Production And Marketing (major category total)	*131*	*4*	*5*	*2*	*2*	*0*	*0*
- Oil And Gas Production	36	2	0	0	0	0	0
- Petroleum Refining	12	2	4	2	2	0	0
- Petroleum Marketing (sub-category total)	83	0	0	0	0	0	0
- Fuel Distribution Losses	15	0	0	0	0	0	0
- Fuel Storage Losses	2	0	0	0	0	0	0
- Vehicle Refueling	38	0	0	0	0	0	0
- Other	28	0	0	0	0	0	0
- Other (Petroleum Production And Marketing)	0	0	0	0	0	0	0
Industrial Processes (major category total)	*49*	*64*	*17*	*35*	*91*	*0*	*10*
- Chemical	15	2	2	1	1	0	0
- Food And Agriculture	18	0	0	3	10	0	0
- Mineral Processes	4	53	12	22	64	0	1
- Metal Processes	0	1	0	0	1	0	0
- Wood And Paper	2	1	0	7	10	0	0
- Glass And Related Products	0	6	2	0	1	0	0
- Electronics	0	0	0	0	0	0	0
- Other (Industrial Processes)	9	1	0	1	6	0	9

* Includes directly emitted particulate matter only.

Table 2-9 (continued)

2012 Statewide Emission Inventory by Sub-Category

Division Major Category Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Area-Wide Sources (division total)	**609**	**75**	**6**	**271**	**1213**	**0**	**574**
Solvent Evaporation (major category total)	*354*	*0*	*0*	*0*	*0*	*0*	*155*
- Consumer Products	205	0	0	0	0	0	0
- Architectural Coatings And Related Process Solvent (sub-category total)	78	0	0	0	0	0	0
- Architectural Coating	66	0	0	0	0	0	0
- Thinning & Cleanup Solvents	12	0	0	0	0	0	0
- Pesticides/Fertilizers (sub-category total)	42	0	0	0	0	0	155
- Farm Use	39	0	0	0	0	0	155
- Commercial Use	2	0	0	0	0	0	0
- Asphalt Paving / Roofing	29	0	0	0	0	0	0
- Other (Solvent Evaporation)	-	-	-	-	-	-	-
Miscellaneous Processes (major category total)	*255*	*75*	*6*	*271*	*1213*	*0*	*419*
- Residential Fuel Combustion (sub-category total)	57	60	3	55	57	0	3
- Wood Combustion	54	6	1	50	52	0	3
- Cooking And Space Heating	3	45	1	4	4	0	0
- Other	0	10	0	1	1	0	0
- Farming Operations (sub-category total)	146	0	0	21	145	0	349
- Tilling,Harvesting, & Growing	0	0	0	19	124	0	0
- Livestock	146	0	0	3	21	0	349

* Includes directly emitted particulate matter only..

Table 2-9 (continued)

2012 Statewide Emission Inventory by Sub-Category

Division Major Category Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Area-Wide Sources (division total) (continued)							
Miscellaneous Processes (major category) (continued)							
- Construction And Demolition (sub-category total)	0	0	0	16	164	0	0
- Building	0	0	0	8	84	0	0
- Road Construction Dust	0	0	0	8	80	0	0
- Paved Road Dust	0	0	0	25	163	0	0
- Unpaved Road Dust	0	0	0	27	271	0	0
- Fugitive Windblown Dust (sub-category total)	0	0	0	46	320	0	0
- Farm Lands	0	0	0	13	77	0	0
- Pasture Lands	0	0	0	2	13	0	0
- Unpaved Roads	0	0	0	30	230	0	0
- Fires	1	0	0	1	1	0	0
- Managed Burning And Disposal (sub-category total)	43	15	4	50	57	0	5
- Agricultural Burning**	11	7	1	13	14	0	2
- Non-Agricultural Burning**	32	7	3	37	43	0	4
- Other	0	0	0	0	0	0	0
- Cooking	7	0	0	28	33	0	0
- Other (Miscellaneous Processes)	2	0	0	0	0	0	61

* Includes directly emitted particulate matter only.

** Agricultural burning includes the prescribed burning of prunings and field crops. Non-agricultural burning includes prescribed burning activities associated with range improvement, forest management, wildland fire use, and weed abatement.

Table 2-9 (continued)

2012 Statewide Emission Inventory by Sub-Category

Division / Major Category / Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Mobile Sources (division total)	**746**	**1747**	**47**	**85**	**124**	**47**	**45**
On-Road Motor Vehicles (major category total)	*403*	*1024*	*5*	*43*	*78*	*20*	*45*
- Light Duty Passenger (sub-category total)	139	117	2	11	25	0	17
- Non-Evaporative	65	116	2	11	25	0	17
- Evaporative	74	0	0	0	0	0	0
- Diesel	0	2	0	0	0	0	0
- Light Duty Trucks(<3750 lbs.) (sub-category total)	42	33	0	2	3	0	3
- Non-Evaporative	19	32	0	2	3	0	3
- Evaporative	23	0	0	0	0	0	0
- Diesel	0	0	0	0	0	0	0
- Light Duty Trucks (>3750 lbs) (sub-category total)	59	79	1	4	9	0	9
- Non-Evaporative	27	79	1	4	9	0	9
- Evaporative	32	0	0	0	0	0	0
- Diesel	0	0	0	0	0	0	0
- Medium Duty Trucks (sub-category total)	56	90	1	3	8	0	11
- Non-Evaporative	31	90	1	3	8	0	11
- Evaporative	25	0	0	0	0	0	0
- Diesel	0	0	0	0	0	0	0
- Light Heavy Duty Gas Trucks (<10000 lbs) (sub-category total)	25	44	0	1	2	0	3
- Non-Evaporative	16	44	0	1	2	0	3
- Evaporative	9	0	0	0	0	0	0
- Light Heavy Duty Gas Trucks (>10000 lbs) (sub-category total)	2	4	0	0	0	0	0
- Non-Evaporative	1	4	0	0	0	0	0
- Evaporative	1	0	0	0	0	0	0
- Medium Heavy Duty Gas Trucks (sub-category total)	6	9	0	0	0	0	0
- Non-Evaporative	4	9	0	0	0	0	0
- Evaporative	2	0	0	0	0	0	0

* Includes directly emitted particulate matter only.

Table 2-9 (continued)

2012 Statewide Emission Inventory by Sub-Category

Division / Major Category / Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Mobile Sources (division total) (continued)							
On-Road Motor Vehicles (major category) (continued)							
- Heavy Heavy Duty Gas Trucks (sub-category total)	1	4	0	0	0	0	0
- Non-Evaporative	1	4	0	0	0	0	0
- Evaporative	0	0	0	0	0	0	0
- Light Heavy Duty Diesel Trucks (<10000 lbs)	4	88	0	1	2	1	0
- Light Heavy Duty Diesel Trucks (>10000 lbs)	1	22	0	0	1	0	0
- Medium Heavy Duty Diesel Trucks	5	88	0	4	5	3	0
- Heavy Heavy Duty Diesel Trucks	21	373	1	15	18	15	1
- Motorcycles (sub-category total)	36	9	0	0	0	0	0
- Non-Evaporative	26	9	0	0	0	0	0
- Evaporative	11	0	0	0	0	0	0
- Heavy Duty Diesel Urban Buses	1	34	0	1	2	1	0
- Heavy Duty Gas Urban Buses (sub-category total)	1	2	0	0	0	0	0
- Non-Evaporative	1	2	0	0	0	0	0
- Evaporative	0	0	0	0	0	0	0
- School Buses (sub-category total)	1	8	0	0	1	0	0
- Non-Evaporative	1	1	0	0	0	0	0
- Evaporative	0	0	0	0	0	0	0
- Diesel	0	7	0	0	1	0	0
- Other Gas Buses (sub-category total)	1	3	0	0	0	0	0
- Non-Evaporative	1	3	0	0	0	0	0
- Evaporative	0	0	0	0	0	0	0
- Motor Coach Diesel Buses	0	7	0	0	0	0	0
- All Other Diesel Buses	0	5	0	0	0	0	0
- Motor Homes (sub-category total)	2	7	0	0	0	0	0
- Non-Evaporative	1	4	0	0	0	0	0
- Evaporative	1	0	0	0	0	0	0
- Diesel	0	3	0	0	0	0	0

* Includes directly emitted particulate matter only.

Table 2-9 (continued)

2012 Statewide Emission Inventory by Sub-Category

Division / Major Category / Sub-Category	Emissions (tons/day, annual average)						
	VOC	NO_x	SO_x	$PM_{2.5}$*	PM_{10}*	DPM	NH_3
Mobile Sources (division total) (continued)							
Other Mobile Sources (major category total)	*342*	*723*	*42*	*42*	*46*	*27*	*0*
- Aircraft	29	55	4	8	9	0	0
- Trains	8	102	0	3	3	3	0
- Ships and Commercial Boats	0	0	0	0	0	0	0
- Ocean Going Vessels (sub-category total)	9	209	37	7	7	7	0
- Residual Oil	0	0	0	0	0	0	0
- Diesel	9	209	37	7	7	7	0
- Commercial Harbor Craft	5	59	0	2	3	3	0
- Pleasure Craft (sub-category total)	98	19	0	5	6	0	0
- Non-Evaporative	75	16	0	4	6	0	0
- Evaporative	22	0	0	0	0	0	0
- Diesel	1	3	0	0	0	0	0
- Off-Road Recreational Vehicles (sub-category total)	34	2	0	0	0	0	0
- All-Terrain Vehicles	12	2	0	0	0	0	0
- Motorcycles	17	1	0	0	0	0	0
- Snowmobiles	3	0	0	0	0	0	0
- Golf Carts, Specialty Carts & Minibikes	2	0	0	0	0	0	0
- Off-Road Equipment (sub-category total)	123	181	0	11	12	8	0
- Lawn And Garden Equipment	81	12	0	2	2	0	0
- Non-Evaporative	45	7	0	1	1	0	0
- Evaporative	35	0	0	0	0	0	0
- Diesel	1	5	0	0	0	0	0
- Commercial & Industrial Equipment	42	169	0	10	11	8	0
- Non-Evaporative	18	18	0	3	3	0	0
- Evaporative	9	0	0	0	0	0	0
- Diesel	16	140	0	7	8	8	0
- Natural Gas	0	10	0	0	0	0	0
- Farm Equipment (sub-category total)	18	96	0	5	6	6	0
- Non-Evaporative	2	2	0	0	0	0	0
- Evaporative	2	0	0	0	0	0	0
- Diesel	14	95	0	5	6	6	0
- Fuel Storage and Handling	18	0	0	0	0	0	0
Total Statewide - All Sources**	**1739**	**2106**	**105**	**418**	**1460**	**49**	**706**

* Includes directly emitted particulate matter only.

** Natural sources are provided in Appendix D. These summaries do not include emission estimates of wind blown dust - from exposed lake beds from Owens and Mono Lakes. These emissions are estimated to be about 23 tons/day of PM_{10}.

Table 2-9 (continued)

Statewide Ozone - 2011 Air Quality

Ozone concentrations in California have improved greatly over the last several decades as a result of the implementation of comprehensive control programs for mobile and stationary sources. Compared with 1990, ozone concentrations are about 10 to 50 percent lower throughout California, with some of the largest decreases occurring in areas with the worst ozone air quality. Additionally, the number of days people are exposed to unhealthy ozone levels has dropped by an average of over 65 percent among the air basins. A number of areas in the State have been below the federal ozone standards for many years, and seven areas that were originally designated as nonattainment for the 1997 federal 8-hour ozone standard of 0.08 ppm now meet this standard. In addition, many of these areas also meet, or are very close to meeting the more health-protective 2008 8-hour ozone standard of 0.075 ppm. Progress continues in all areas of the State, with the greatest remaining challenge in the South Coast and San Joaquin Valley.

The 2011 data from California's ozone network are summarized in Table 2-10 and 2-11. Table 2-10 summarizes design values and the number of days exceeding the 0.075 ppm 8-hour ozone standard in each of California's 15 air basins. Air basins represent relatively large areas of the State with similar meteorology and are often geographically linked. Although nine air basins have at least one site with concentrations above the standard, there can be a great deal of variability in ozone levels within an air basin. Therefore, Table 2-11 provides a summary for the individual regions within these air basins that have been designated as nonattainment. Nonattainment areas are portions of an air basin(s) with unique air pollution characteristics and in some cases can share boundaries with air basins. Of the nonattainment areas 7 of the 16 had concentrations in 2011 which were within five percent of the standard and many areas are expected to meet the standard by 2015.

The highest ozone levels and number of exceedance days are found in the South Coast and the San Joaquin Valley. SIPs for these two regions, as well as several other urban areas will be submitted to U.S. EPA in 2016 that will demonstrate how the regions will meet the 8-hour ozone standard. More discussion on the SIPs of the five air basins discussed in this almanac can be found in Chapter 4.

Ozone - 2011 Air Quality Tables

8-Hour Design Values and Exceedance Days by Air Basin

AIR BASIN	2011 8-Hour Design Value	Number of days in 2011 above the National 8-Hour Standard
Great Basin Valleys	0.071	3
Lake County	0.057	0
Lake Tahoe	N/A	N/A
Mojave Desert	0.097	95
Mountain Counties	0.084	32
North Central Coast	0.070	0
North Coast	0.047	0
Northeast Plateau	0.058	0
Sacramento Valley	0.095	46
Salton Sea	0.093	59
San Diego	0.082	10
San Francisco Bay Area	0.076	4
San Joaquin Valley	0.099	109
South Central Coast	0.083	11
South Coast	0.107	106

Table 2-10

National 8-Hour Nonattainment Areas: Design Values and 8-Hour Exceedance Days by Area

Area	Design Values	Exceedance Days	Percent above Standard
Butte County	0.077	6	3%
Calaveras County	0.077	3	3%
Coachella Valley	0.093	54	24%
Eastern Kern	0.080	20	7%
Imperial County	0.080	15	7%
Mariposa County	0.077	10	3%
Nevada County (Western part)	0.079	7	5%
Sacramento Metropolitan Area	0.095	45	27%
San Diego County	0.082	10	9%
San Francisco Bay Area	0.076	4	1%
San Joaquin Valley	0.099	109	32%
San Luis Obispo County (Eastern San Luis Obispo)	0.078	6	4%
South Coast Air Basin	0.107	106	43%
Tuscan Buttes	0.076	1	1%
Ventura County	0.083	8	11%
West Mojave Desert	0.097	95	29%

Table 2-11

Statewide $PM_{2.5}$ - 2011 Air Quality

Due to California's comprehensive emission control program, $PM_{2.5}$ concentrations in California have improved greatly since monitoring began in 1999. Compared with 1999, 24-hour $PM_{2.5}$ concentrations are about 40 to 50 percent lower throughout California, with some of the largest decreases occurring in areas with the worst $PM_{2.5}$ air quality.

A number of areas in the State have been below the federal $PM_{2.5}$ standard for many years, and four areas that were originally designated as nonattainment for the 2006 federal 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ now meet this standard. Progress continues in all areas of the State, with the greatest remaining challenge in the South Coast and San Joaquin Valley.

The 2011 data from California's $PM_{2.5}$ network are summarized in Tables 2-12 and 2-13. Table 2-12 summarizes annual and 24-hour $PM_{2.5}$ design values in each of California's 15 air basins. Air basins represent relatively large areas of the State with similar meteorology and are often geographically linked. Although three air basins have at least one site with concentrations above the standard, there can be a great deal of variability in $PM_{2.5}$ levels within an air basin. Therefore, Table 2-13 provides a summary for the individual regions within these air basins that have been designated as nonattainment for the 24-hour standard. Nonattainment areas are portions of an air basin(s) with unique air pollution characteristics and in some cases can share boundaries with air basins. Five of the seven nonattainment areas had 2011 concentrations meeting the standard. Only the South Coast and San Joaquin Valley had 2011 concentrations above the standard.

As mentioned above, the highest $PM_{2.5}$ levels are found in the South Coast and San Joaquin Valley, with the highest 24-hour design value and the largest number of exceedance days occurring in the San Joaquin Valley. SIPs that demonstrate how the regions will attain the 24-hour $PM_{2.5}$ standard were submitted to U.S. EPA in 2012 and 2013. More discussion on the SIPs for these two areas can be found in Chapter 4.

$PM_{2.5}$ - 2011 Air Quality Tables

24-Hour and Annual Average Design Values by Air Basin

AIR BASIN	2011 24-Hour Design Value in micrograms/cubic meter*	2011 Annual Average Design Value in micrograms/cubic meter*
Great Basin Valleys	36.0	7.4
Lake County	7.0	3.2
Mojave Desert	*	*
Mountain Counties	33.0	9.4
North Central Coast	15.0	6.3
North Coast	23.0	6.4
Northeast Plateau	*	*
Sacramento Valley	35.0	10.1
Salton Sea	35.0**	14.0**
San Diego	24.0	11.2
San Francisco Bay Area	31.0	9.9
San Joaquin Valley	62.0	18.2
South Central Coast	22.0	9.3
South Coast	39.0	16.2

* These statistics and determination of their validity are calculated according to the methods specified in 40 CFR Part 50, Appendix N. Validity is based on the number of measurements available per quarter and therefore, depends on data completeness. Both the 98th percentile concentration and the average of quarters concentration relate to the national $PM_{2.5}$ standards, while only the average of quarters concentration relates to the State $PM_{2.5}$ standard.
** Calexico-Ethel design value is based on incomplete data
24-hour data - The table may include data from extreme, exceptional, or unusual concentration events: however, there is a mechanism in place to review for these types of events during the area designation process.
Annual average data - Extreme, exceptional, or unusual concentration events do not generally significantly influence the annual average. However, their exclusion can be considered on a case-by-case basis.
Table 2-12

National $PM_{2.5}$ Nonattainment Areas: 24-Hour Design Values by Area

Area	Design Values	Percent above Standard
Imperial	35*	Meets Standard*
Butte County	35	Meets Standard
Sacramento Metro Area	35	Meets Standard
San Francisco Bay Area Air Basin	31	Meets Standard
San Joaquin Valley Air Basin	62	77%
South Coast Air Basin	39	11%
Yuba City/Marysville	27	Meets Standard

* Calexico-Ethel design value is based on incomplete data
Areas with clean data findings: Butte County, Sacramento, San Francisco Bay Area, and Yuba City/Marysville
Table 2-13

Statewide Carbon Monoxide, Nitrogen Dioxide, Sulfur Dioxide 2011 Air Quality

Carbon Monoxide

The national CO standard is now attained statewide in California. The requirements for cleaner vehicles and fuels have been primarily responsible for the reductions in CO, despite significant increases in population and the number of vehicle miles traveled each day. 8-hour CO design values range from 0.90 to 7.52 ppm, all well below the federal 8-hour CO standard of 9 ppm.

Nitrogen Dioxide

California has attained the annual average NO_2 standard since 1998, with current annual average NO_2 concentrations ranging from 1 to 18 ppb, well below the federal annual average standard of 53 ppb. In the early 1980s, 1-hour NO_2 concentrations in California were as high as 300 ppb, three times the level of the new 1-hour standard. Today, 1-hour NO_2 design values range from 23 to 75 ppb, with all values meeting the level of the federal 1-hour NO_2 standard of 100 ppb. The current monitoring network provides a robust indicator of regional exposure to NO_2. U.S. EPA has also established new monitoring requirements to measure NO_2 concentrations near major roadways in urban areas. Air districts in California are in the process of developing this new network, which will be phased in between 2014 and 2017.

Sulfur Dioxide

In 2010, U.S. EPA strengthened the primary NAAQS for SO_2 to 75 ppb. The two existing primary standards were revoked because they would not provide additional public health protection given a 1-hour standard set at 75 ppb. 1-hour SO_2 design values range from 2 to 17 ppb, and currently, no areas exceed the new lower standard.

However, U.S. EPA has stated that the current monitoring network does not adequately characterize short-term SO_2 concentrations in the vicinity of SO_2 emission sources. Therefore, U.S. EPA is expected to require additional evaluation of these sources before making SO_2 designations.

Carbon Monoxide, Nitrogen Dioxide, Sulfur Dioxide - 2011 Air Quality Tables

Peak Indicator and Design Values by Air Basin

AIR BASIN	2011 Carbon Monoxide 8-Hour Design Value (ppm)	2011 Nitrogen Dioxide 1-Hour Design Value (ppb)	2011 Sulfur Dioxide 1-Hour Design Value (ppb)
Great Basin Valleys	No Data	No Data	No Data
Lake County	No Data	No Data	No Data
Lake Tahoe	No Data	No Data	No Data
Mojave Desert	4.25	61	9
Mountain Counties	No Data	No Data	No Data
North Central Coast	0.90	33	No Data
North Coast	1.61	23	4
Northeast Plateau	No Data	No Data	No Data
Sacramento Valley	2.42	51	2
Salton Sea	7.52	64	8
San Diego	2.31	75	No Data
San Francisco Bay Area	2.61	70	17
San Joaquin Valley	2.23	59	8
South Central Coast	1.81	42	6
South Coast	3.83	72	7

Table 2-14