

# Current Air Quality and Trends

In the South Coast air Quality Management District

Published August 2001

## 2000 AIR QUALITY

### Maximum Concentrations

In a continuing trend of significant long-term improvement in air quality, in the year 2000 the South Coast Air Basin (Basin) made it through a summer without experiencing a stage 1 episode for the second year in a row. Also, the year 2000 was the second year in the history of ambient air monitoring that the Basin was not the location recording the highest ozone concentration in the nation. Nonetheless, maximum pollutant concentrations in the region still exceed the federal standards for ozone, carbon monoxide and particulate matter (PM10 and PM2.5) by a wide margin. Figure 1 shows maximum pollutant concentrations in 2000 for the Basin compared to other metropolitan areas in the U.S. Maximum concentrations in these large U.S. urban areas exceeded the federal ozone and PM10 standards in some instances, but did not exceed the carbon monoxide standard.

Maximum 1-hour average and 8-hour average ozone concentrations in 2000 (0.184 ppm and 0.159 ppm) were 147% and 187% of the federal 1-hour and 8-hour standards, respectively. The highest 8-hour average carbon monoxide concentration of the year (10.0 ppm) was 105% of the federal standard. Maximum 24-hour average and annual average PM10 concentrations ( $139 \mu\text{g}/\text{m}^3$  and  $60.1 \mu\text{g}/\text{m}^3$ ) were 92% and 119% of the federal 24-hour and annual standards, respectively. Maximum 24-hour average and annual average PM2.5 concentrations ( $119.6 \mu\text{g}/\text{m}^3$  and  $28.2 \mu\text{g}/\text{m}^3$ ) were, respectively, 183% and 182% of the federal 24-hour and annual standards.

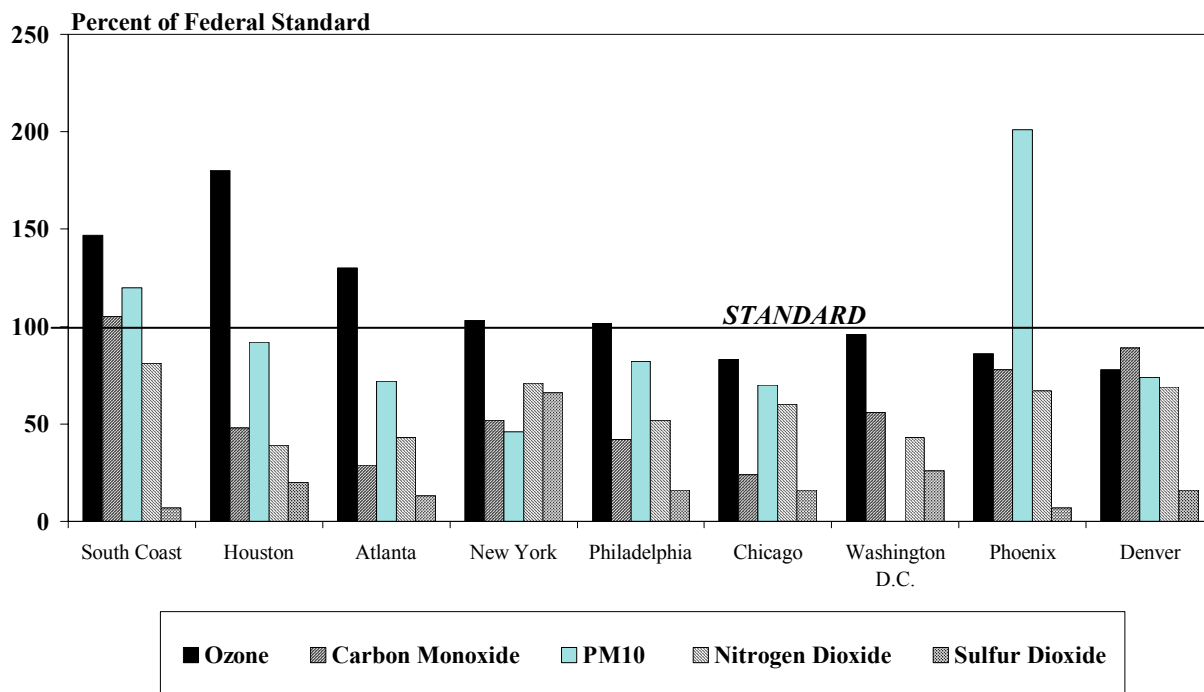


Figure 1  
2000 Air Quality  
Maximum Pollutant Concentrations as Percentages of the Federal Standard



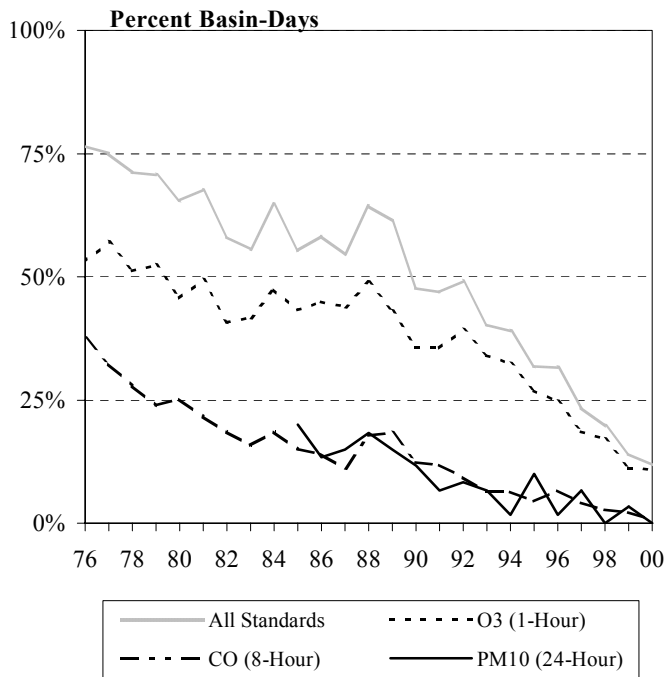
South Coast Air Quality Management District  
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In 2000, the federal nitrogen dioxide standard was not exceeded, with a maximum concentration (0.0435 ppm) which was 81% of the federal standard. The maximum 1-hour average nitrogen dioxide concentration (0.21 ppm) was 81% of the state standard. State standard for sulfate was exceeded on one day at one location. The maximum 24-hour concentration (26.7  $\mu\text{g}/\text{m}^3$ ) was 107% of the state standard. (There is no federal sulfate standard.) Sulfur dioxide and lead concentrations continued to remain well below the federal and state standards in 2000.

### Air Quality Trends

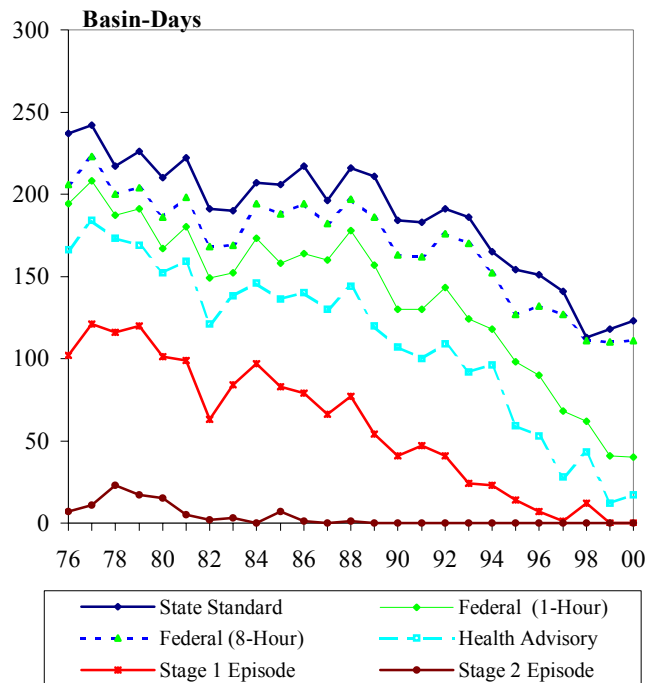
The number of exceedances recorded in 2000 shows that air quality trends through 2000 are consistent with a continuation of the downtrends reported in previous years. Figure 2 shows the trend in percent number of days exceeding the federal standards in the Basin. In 2000, there were 43 days on which one or more federal standards were exceeded somewhere in the Basin, most of which (40 days) were for ozone alone. Between 1976-1978 and 1998-2000, the three-year average number of days exceeding any of the federal standards for 1-hour ozone, 8-hour carbon monoxide or 24-hour PM10 in the Basin was reduced by 80%. "(All Standards" does not include PM10 until 1985.) The three-year average number of days exceeding the carbon monoxide federal standard was reduced by 94% for the same period. The number of sampling days exceeding the federal 24-hour PM10 standard decreased 93% between 1985-1987 and 1998-2000. (Three-year averages were used to minimize the effect of year-to-year variations due to changes in meteorological conditions.)

Figure 3 shows the number of days exceeding state and federal ozone standards and health advisory and episode levels in the Basin for the years 1976-2000. Between the periods 1976-1978 and 1998-2000, stage 1 episodes decreased 96%, health advisories decreased 86%. Exceedances of 1-hour and 8-hour federal standards decreased 76% and 47%, and state standard exceedances decreased 49%.



**Figure 2**  
 1976-2000

Percent Days Exceeding the Federal Standards



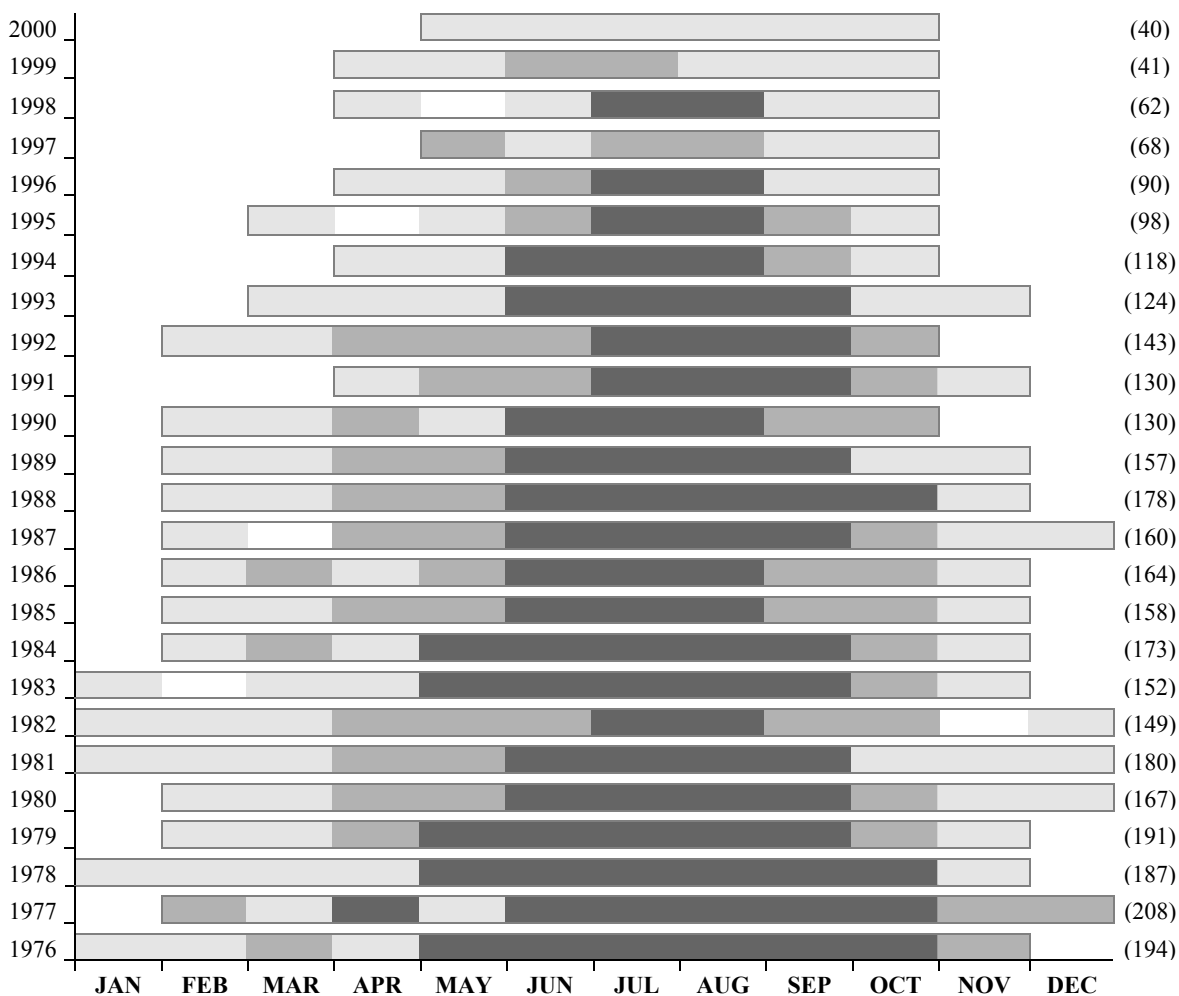
**Figure 3**

Ozone, 1976-2000

Basin-Days Exceeding Standards and Episode Levels

The chart below (Figure 4) shows the number of days per month exceeding the federal ozone standard for the period 1976-2000. Up until the early 1990's it was common to have days exceeding the federal ozone standard as early as February and as late as November and December. Since the mid 1990's there have been no federal standard exceedances recorded in the months of January-March and November-December. Also, the frequency of exceedances in fall (September and October) has been reduced significantly in recent years.

The monthly distribution of the federal ozone standard exceedances shows the trend toward shorter duration of the period of the year that high ozone concentrations occur (smog season). Although weather conditions contributed to the lower ozone concentrations, weather-adjusted trend studies have indicated that the significant downtrend in ozone concentration and shorter smog season in the Basin are mainly attributed to emission reduction and reduced reactivity of emitted organic compounds in the region.



\* Number of Days: 0 1-10 11-20 21-31 (Total Basin-Days)

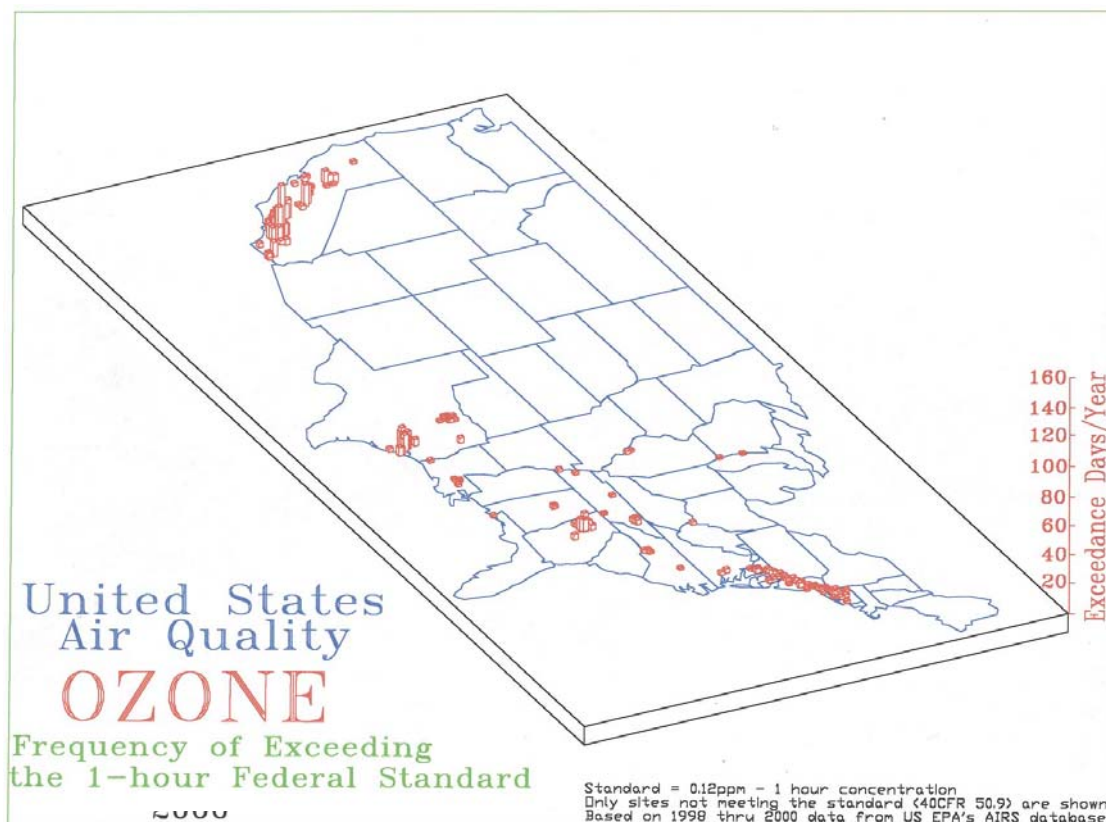
Figure 4  
 Monthly Number of Days\*  
 Exceeding Federal Ozone Standard in the Basin

## **Comparison of Air Quality in Different Areas**

Despite the significant downturn, the South Coast Air Basin still has some of the worst air quality in the nation in terms of the annual number of days exceeding the federal standards. The highest U.S. location in terms of number of days over the federal ozone standard was located in the Basin (Central San Bernardino Mountains, 17 days). Other areas with the greatest number of exceedances outside California were located in Houston Metropolitan Area, Texas (16 days) and Atlanta, Georgia (5 days). Figure 5 shows the average number of days exceeding the federal ozone standard in the U.S. for the period 1998-2000.

Figure 6 shows the number of days exceeding the 1-hour federal ozone standard in different areas of the Basin in 2000. The standard was exceeded most frequently in the Basin's Central San Bernardino Mountains and adjacent areas. The coastal areas of Los Angeles and Orange Counties did not exceed the federal ozone standard. The more stringent state standard was exceeded at all locations monitored (not shown).

Figure 7 shows the distribution of the three-year average of the annual fourth-highest 8-hour average ozone concentrations in the Basin for the years 1998-2000 (for comparison to the 8-hour federal ozone standard). The three-year average concentrations exceeded the 8-hour federal standard level in most areas of the Basin. The 8-hour average concentration was also lowest at the coastal areas, increasing to a peak in the Northwest San Bernardino Valley areas.



**Figure 5**  
**Ozone 1998-2000**  
**Annual Average Number of Days Exceeding**  
**1-Hour Federal Standard**

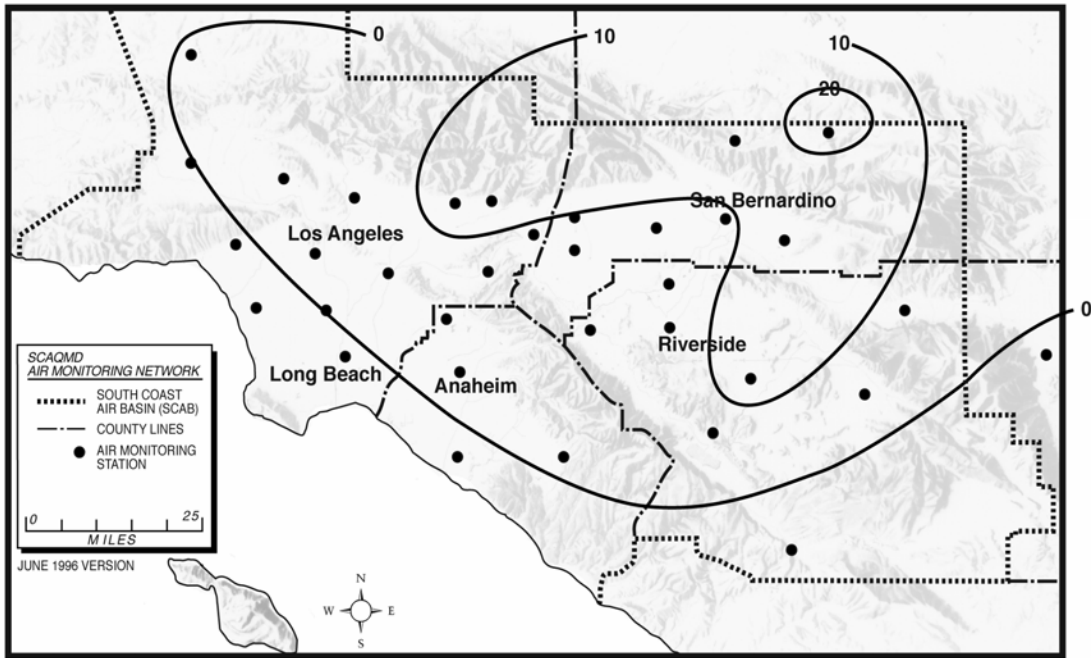


Figure 6  
Ozone 2000  
Number of Days Exceeding 1-Hour Federal Standard

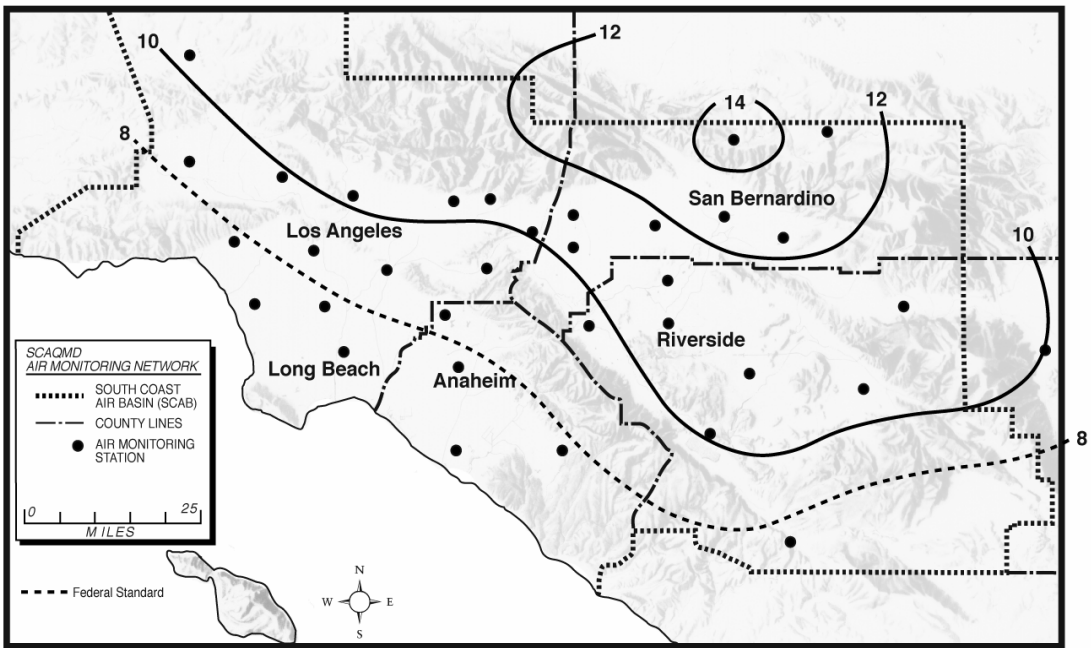
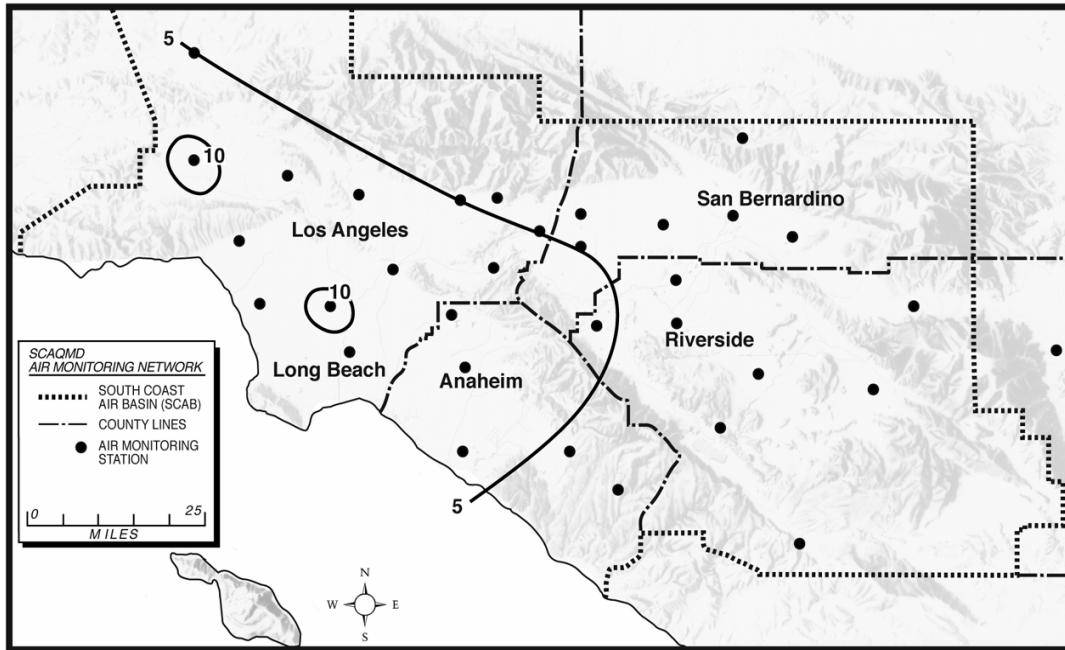


Figure 7  
Ozone, 1997-2000  
3-Year Average of the Fourth-Highest 8-Hour Average Concentration, pphm

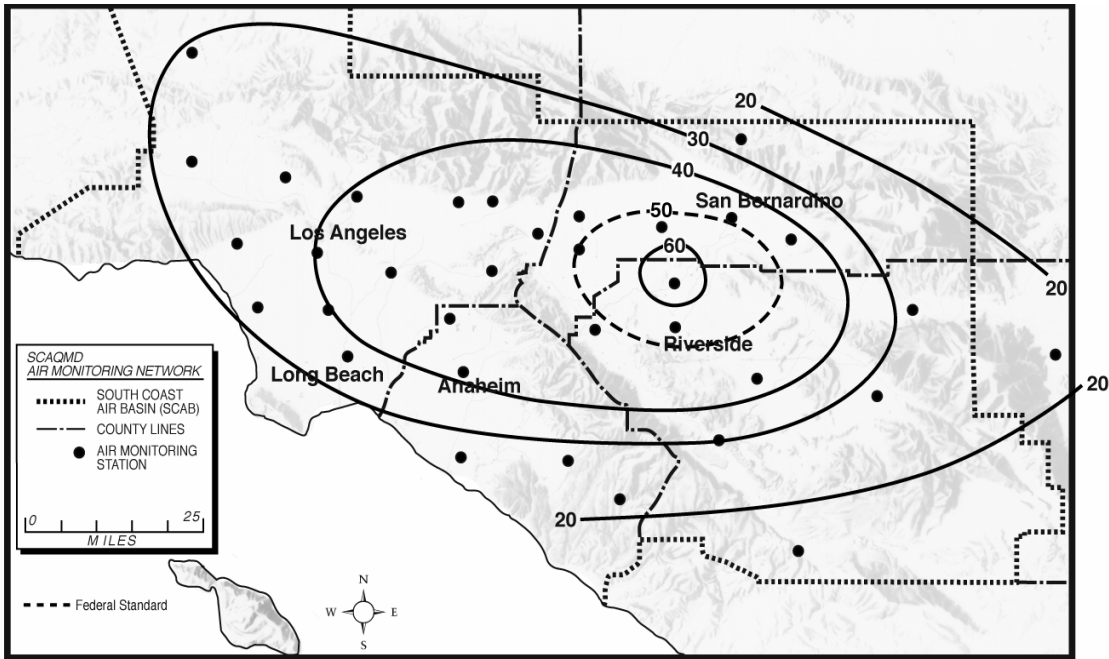
The Basin was among the few locations in the nation still exceeding the federal carbon monoxide standard. The South Central Los Angeles County area in the Basin (and Calexico in Imperial County, California) recorded the most frequent exceedances of the federal carbon monoxide standard (2 days). Figure 8 shows the distribution of maximum 8-hour average carbon monoxide concentration in the Basin in 2000. The standard was exceeded only in Los Angeles County areas, in the areas of South Central Los Angeles County and West San Fernando Valley.



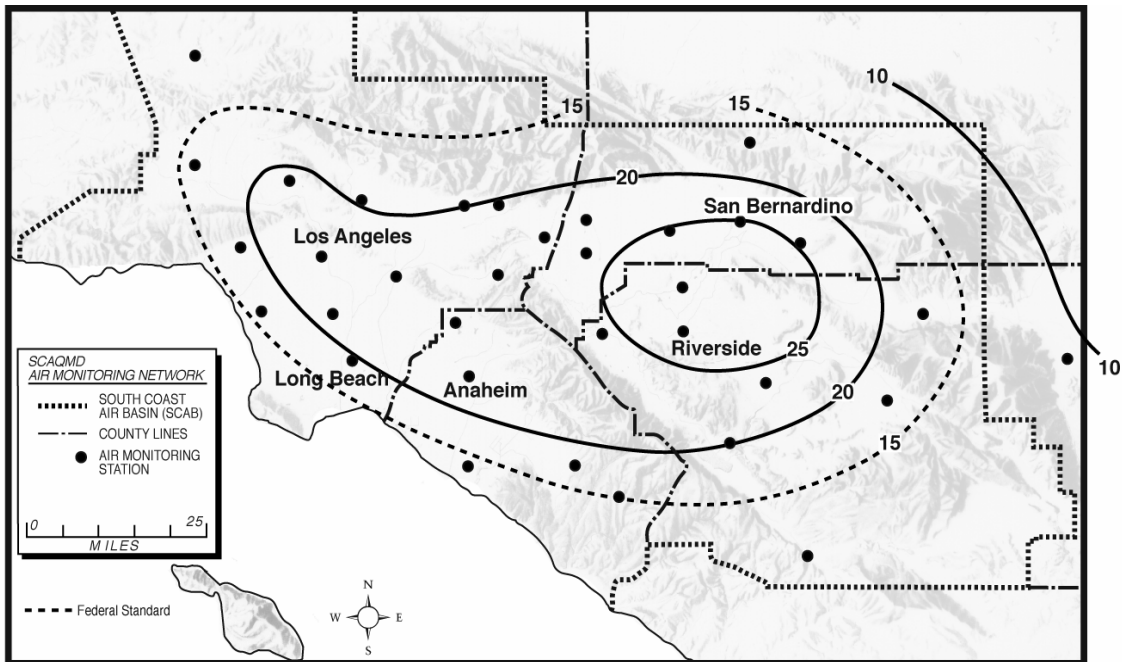
**Figure 8**  
**Carbon Monoxide 2000**  
**Maximum 8-Hour Average Concentration, ppm**

Figure 9 shows the annual average PM10 concentrations at locations in the Basin in 2000. The federal annual PM10 standard was exceeded at only a few locations monitored in the District in Riverside and San Bernardino Counties.

Figure 10 shows the annual average PM2.5 concentrations in different areas of the Basin. PM2.5 concentrations were also higher in the inland valley areas of San Bernardino County and Metropolitan Riverside County areas. However, PM2.5 concentrations were also high in the metropolitan areas of Los Angeles and Orange Counties. The high PM2.5 concentrations in these areas are due to the secondary formation of smaller-sized particulate resulting from mobile and stationary source activities.



**Figure 9**  
**PM10 2000**  
Annual Average Concentration,  $\mu\text{g}/\text{m}^3$   
(Federal Standard =  $50 \mu\text{g}/\text{m}^3$ )



**Figure 10**  
**PM2.5 2000**  
Annual Average Concentration,  $\mu\text{g}/\text{m}^3$   
(Federal Standard =  $15 \mu\text{g}/\text{m}^3$ )

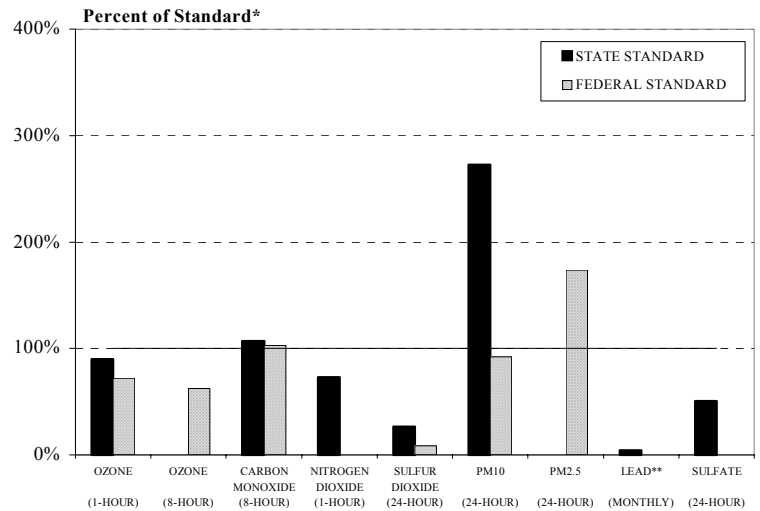
**DECEMBER 2000  
AIR QUALITY**

Air quality statistics in the South Coast Air Basin and the downwind desert area of Coachella Valley in the Salton Sea Air Basin for December 2000 are summarized in Tables 1 and 2. Table 1 shows the maximum concentrations for all criteria pollutants recorded in December 2000 compared to the state and federal ambient air quality standards. It also shows the date of the maximum concentration, maximum Air Quality Index (AQI) value recorded in December for each pollutant, and the location where the maximum concentration was recorded. (Please refer to page 10 for more information on AQI.)

The number of days exceeding the state and federal standards and the maximum concentrations of the pollutants in each source/receptor area during December 2000 are shown in Table 2. The state and federal ambient air quality standards are given in Table 3.

Figure 11 compares the maximum pollutant concentrations recorded in December 2000 as percentages of the state and federal standards. Figure 12 shows the maximum Air Quality Index values recorded in December 2000 for different pollutants compared to the maximum annual AQI values for the year 2000.

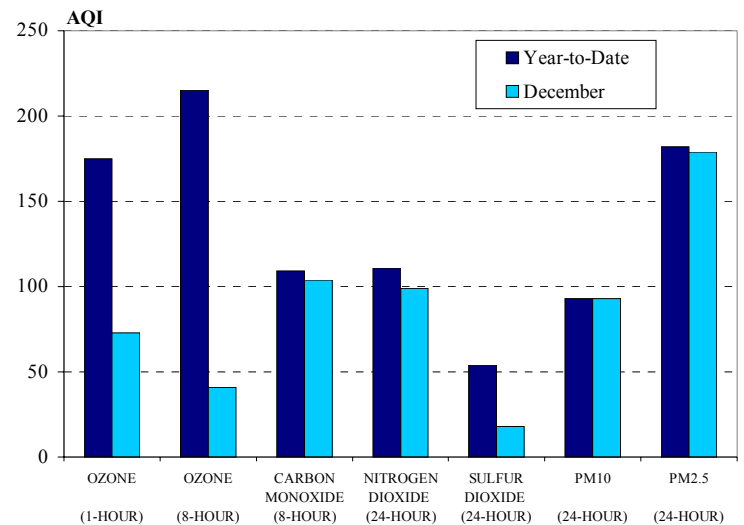
Figure 13 shows the location of the District's air monitoring stations in each source/receptor area. The source/receptor area names and numbers, and air monitoring station numbers are shown in Table 2 (page 11).



\*There are no short-term federal standards for lead and nitrogen dioxide (standards are quarterly and annual, respectively). There is presently no federal sulfate standard.

\*\*Higher lead concentrations were recorded at special monitoring sites located immediately downwind of stationary sources of lead.

**Figure 11  
Maximum Concentrations Recorded in December 2000**



**as Percentages of State and Federal Standards**

**Figure 12  
Maximum AQI Values**

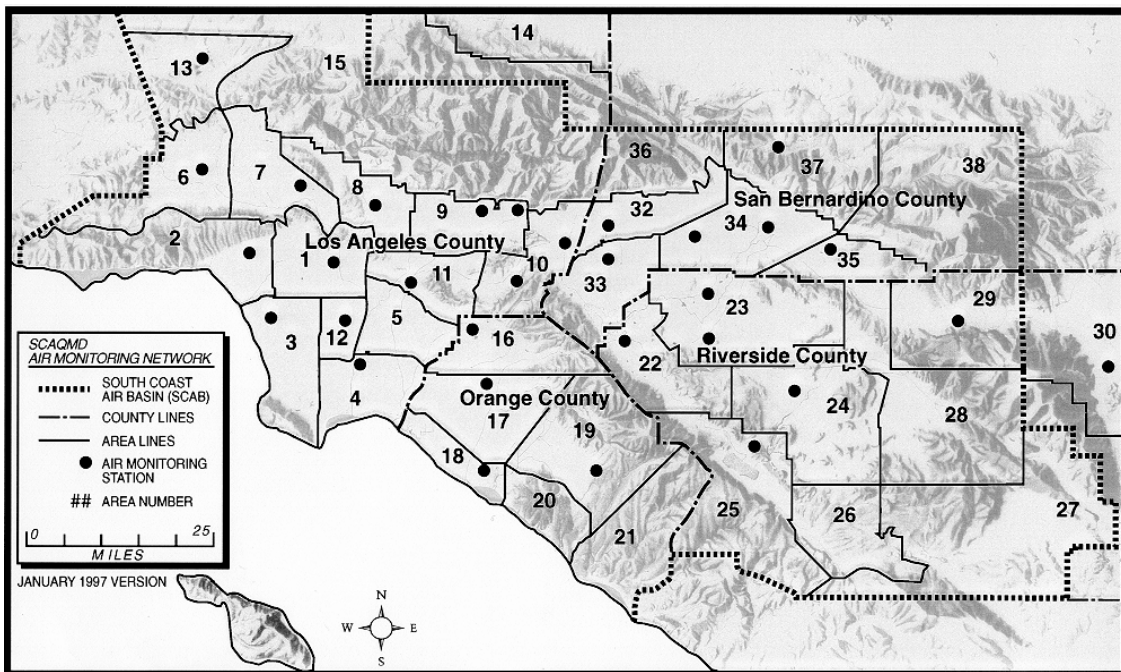


**Table 1. Maximum Concentrations Reported in December 2000 Compared to the Ambient Air Quality Standards**

Pollutant Averaging Time	Maximum Concentrations					Location
	ppm/ ug/m3	Date	% State Standard	% Federal Standard	AQI	
<b>Ozone</b>						
1-Hour	0.09	December 23	90%	72%	73	Lake Elsinore
8-Hour	0.053	December 23	--	62%	41	Lake Elsinore
<b>Carbon Monoxide</b>						
8-Hour	9.75	December 2	107%	103%	104	West San Fernando Valley
<b>Nitrogen Dioxide</b>						
1-Hour	0.19	December 8	73%	--		Banning Airport
24-Hour	0.107	December 21	--	--	99	Central Los Angeles
<b>Sulfur Dioxide</b>						
1-Hour	0.05	December 5	19%	--		South Coastal Los Angeles County
24-Hour	0.014	December 6	29%	8%	18	South Coastal Los Angeles County
<b>Particulate (PM10)</b>						
24-Hour	139	December 5	273%	92%	93	Metropolitan Riverside County
<b>Particulate (PM2.5)</b>						
24-Hour	113.9	December 2	--	174%	179	Central Orange County
<b>Sulfates</b>						
24-Hour	12.6	December 2	50%	--		South Coastal Los Angeles County
<b>Lead*</b>						
30-Day	0.06	a)	4%	--		Central Los Angeles
30-Day*	0.33	a)	22%	--		Southeast Los Angeles County

\*Maximum monthly average concentration recorded at special monitoring sites in the immediate vicinity of major lead sources.

a) Monthly Average.



**Figure 13**  
**South Coast Air Basin and Adjoining Areas of Salton Sea and Mojave Desert**  
**Air Basins and Monitoring Stations**

**AIR QUALITY INDEX (AQI)**

The Air Quality Index (AQI) has been established by the U.S. Environmental Protection Agency to provide information on pollutant concentrations for ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The AQI is normalized across pollutants so that an AQI value of 100 represents the level of health protection associated with the health-based federal air quality standard for each pollutant. This Index replaces the old Pollutant Standards Index (PSI) established by EPA in 1976. The revised index includes a new sub-index for 8-hour ozone concentrations and 24-hour concentrations of fine particulate matter. It also adds an additional category just above the level of the standard and includes changes to reflect this new air quality category of "unhealthy for sensitive groups."

EPA has revised the air quality index to enhance the public's understanding of air pollution across the nation. The AQI has been adopted internationally and is used around the world to provide the public with information on air pollutants. It is used by state and local agencies to report daily air quality to the

public and serves as a basis for programs that encourage the public to take necessary actions on days when air pollutant levels are projected to be of concern to local communities.

The South Coast Air Quality Management District has been using the AQI since November 2000, to forecast and report smog levels in the South Coast Air Basin and Coachella Valley area and to advise residents on how to adjust their daily activities to reduce exposure to air pollution. The AQI integrates information on pollutant concentrations from the entire monitoring network in the Basin into a single number that represents the poorest daily air quality in the area. The concentration for each of the pollutants is converted into an index value. The pollutant with the highest index value is reported as the AQI for that day.

Shown below are the AQI categories and their health effects' descriptive names, index ranges and corresponding 1-hour and 8-hour ozone concentration ranges. An AQI value greater than 100 indicates that at least one pollutant exceeded the level of the standard, designated as "unhealthy for sensitive groups" (as defined in the AQI's pollutant-specific cautionary statements).

**AQI Categories and Ranges**

Category	AQI	O3 (ppm) 8-hour	O3 (ppm) 1-hour
Good	0 - 50	0.000 - 0.064	--
Moderate	51 - 100	0.065 - 0.084	--
Unhealthy for Sensitive Groups	101 - 150	0.085 - 0.104	0.125 - 0.164
Unhealthy	151 - 200	0.105 - 0.124	0.165 - 0.204
Very Unhealthy	201 - 300	0.125 - 0.374	0.205 - 0.404

