CHAPTER 3
EXISTING AIR QUALITY

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3.1 AIR QUALITY STANDARDS

California and the federal EPA have adopted air quality standards for pollutants of primary public health concern. Achieving and maintaining these standards is the chief focus of air quality management activities by agencies around the nation, and most air quality regulations address their emissions. By a variety of other control methods, the emissions and impacts of other air pollutants without ambient standards are also managed by those agencies.

At the state and national level, air quality standards are set or revised after careful review of all scientific studies which relate airborne pollutant levels to public health and welfare. Standards are typically set at levels intended to provide a reasonable margin of safety to protect the health of the most sensitive individuals in the population.

Pollutants for which national standards have been set on the basis of the 'criteria' studies noted above are known as 'criteria pollutants'. These include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, fine particulate matter and lead, a specific particulate pollutant. Different standards for these criteria pollutants and for several others listed below have been set by California and several other states. California standards tend to be more restrictive and health-protective than national standards. The CCAA requires all districts in California to adopt all control measures necessary to meet the state ambient air quality standards.

In determining compliance with the California standards, ARB distinguishes between an 'exceedance' and a 'violation' of a standard. An exceedance occurs whenever a measured pollutant concentration is higher than the applicable air quality standard for a given averaging time, such as an hour. That exceedance will be classified as a violation of the standard unless it is determined that the concentration was affected by a highly irregular event, or the monitored level occurs so infrequently that it is outside the bounds of normally expected air quality variation at that location. Exceedances affected by highly irregular or infrequent events are not considered to be violations of a state standard and are not used as a basis for making nonattainment designations.

In addition to standards for the criteria pollutants listed above, California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Table 3-1 shows all California and national ambient standards which are currently in effect. The narrative in Section 3.3 below describes the criteria pollutants in more detail. Chapter 8 presents a detailed discussion of visibility and other air quality issues.

3.2 AIR QUALITY MONITORING

In San Luis Obispo County, continuous air monitoring began in 1970. Since then, monitoring has been performed by the District, by the ARB and by private industry. Air monitoring is typically done either in locations which are representative of where people live and work, or near industrial sources to document their specific impacts on air quality. For most pollutants, continuous monitoring is performed 24 hours a day, and usually for periods of many years at any one location. The duration and continuity of this normal monitoring allow the identification of long-term trends, and of pollutant levels or patterns which differ from the norm.

To produce valid and accurate monitoring data, close attention by experienced technicians is required. Stringent quality assurance procedures for instrument operation and for data validation must be followed before monitoring data can be accepted into the county's air quality record. Because monitoring is expensive and labor intensive, the variety of pollutants monitored and number of stations operated in most regions of the state is, of necessity, limited. The air monitoring network in San Luis Obispo County has evolved over the years to meet growing and changing needs. While air quality in some parts of the county remains undocumented, the current network of stations and measured parameters provides a good database for determining the ambient pollutant levels experienced by most county residents, and for tracking compliance with state and federal health standards.

Most air monitoring in the county has occurred on the coastal plain and along the Highway 101 corridor, where residential, commercial and industrial activities are concentrated. The number of operating stations and the variety of analyzers in service at each station changes periodically as new needs are identified. As of December, 1999, nine public agency and private air monitoring stations were in operation in the county. The map in Figure 3-1 shows these locations along with other sites where monitoring has been performed in the past.

3.3 LOCAL POLLUTANT MEASUREMENTS

Pollutant concentrations at any one location tend to vary widely over time due to changing meteorological conditions and variations in source emission rates. As a result, air monitoring produces highly variable data sets which are difficult to characterize with a few simple numbers. Statistical descriptors of air quality data can range from simple averages and single highest measured values to more involved indicators. The simplest measure, cited in the narrative below, is to note the highest levels for a pollutant observed at different locations each year. Maximum values are used for evaluating compliance with air quality standards and for defining the time periods when highest pollutant concentrations are most likely to occur. These values characterize the most adverse air quality conditions observed during a year, and are important as a measure of public health protection.

The sections below describe the highest pollutant levels recorded in recent years at monitoring stations around the county. Table 3-2 presents maximum concentrations of criteria pollutants measured during the period 1989 through 1999.

Ozone

Ozone levels are measured at most monitoring sites in the county, and ozone remains a pollutant of highest concern countywide. The health effects of ozone are described in Chapter 1. Health concerns played a major role in recent revisions to the national ambient air quality standard for ozone. In 1997, the standard was changed from a 0.12 ppm hourly average to 0.08 ppm averaged over 8 hours, to address concerns over prolonged exposure to ozone. Later that same year, a legal challenge to the process by which EPA set the new standard resulted in a stay in its implementation. That legal challenge was resolved by the U. S. Supreme Court, but implementation has not yet begun. Until that legal challenge is resolved, the earlier national 0.12 ppm hourly average standard remains in effect. The existing state one hour ozone standard of 0.09 ppm is more stringent than the national hourly average ozone standard, and roughly equivalent to the 8-hour 0.08 ppm standard in terms of areas of the state and nation that may be classed as attainment or nonattainment.

The two highest ozone measurements on record in the county have both occurred at Paso Robles. A single hourly average of 0.16 ppm was observed at the Paso Robles monitoring station in 1975, and another single hour at that concentration was measured in 1984. On that same day in 1984, an hourly average of 0.13 ppm was measured at San Luis Obispo, the highest ozone level on record at that location. In Grover Beach and Morro Bay, highest hourly ozone values of 0.15 ppm were measured at both sites on the same day in 1989. Several successive hours of 0.13 ppm ozone were monitored at Grover Beach on one day in 1987. The highest ozone value measured at Atascadero, where monitoring began in late 1988, was an hourly average of 0.12 ppm observed once in 1989. More detailed descriptions of most of these specific ozone events can be found in Appendix F to the 1991 edition of the Clean Air Plan. Appendix F, entitled Characterization of Recent Ozone Excursions in San Luis Obispo County, is incorporated by reference in this current document. Copies of it are available from the APCD.

Ozone levels exceeding the national 0.12 ppm one-hour standard have occurred on average less than one day per year at any one monitoring site in the county. As a result, San Luis Obispo County is classified as 'attainment' for the one-hour national ozone standard. However, as shown in Table 3-3, exceedances of the state 0.09 ppm one-hour ozone standard are recorded periodically at monitoring sites throughout the county. As a result, the county is classified as 'nonattainment' for this standard.

Ozone levels approaching or exceeding the state standard are observed most frequently at our north county sites. In the period 1989 through 1999, 61 days during which the state one-hour standard was exceeded have been measured at one or more locations in the north county. In that same period, only seven days exceeding that standard have been measured in coastal and/or southern areas of the county.

Figure 3-3 shows the number of days each year when exceedances of the state ozone standard were recorded at monitoring locations around the county during the period 1989 through 1999. As shown in the chart, the majority of exceedance days are measured at our north county stations; however there is considerable variation in the frequency of occurrence from year to year. For example, the standard was exceeded at Paso Robles on 25 different days in 1998, the highest number of exceedance days in any one year since monitoring began in the county. This immediately followed 1997, which was the cleanest year on record for monitored ozone, with no exceedances of the state standard measured anywhere in the county. And in 1999, the year following the highest year on record, only two exceedance days were monitored countywide, one at Paso Robles and one at Morro Bay. Such dramatic year-to-year changes demonstrate the pronounced effect of meteorology variations on ozone formation and transport.

PM_{10} and $PM_{2.5}$

State and federal standards have been set for PM_{10}, which includes all particles 10 microns (Φ) or less in diameter. Particulate matter in this size range can be inhaled deeply into the respiratory tract and lungs, posing a significant health threat, as described in Chapter 1. In July, 1997, the federal EPA added new standards for $PM_{2.5}$, particulate matter with sizes of 2.5Φ or less in diameter. In this size range, all particles which enter the lungs remain lodged there, causing a greater threat to respiratory illness and contributing to premature death. Different monitoring methods and different samplers are required for sampling PM_{10} and $PM_{2.5}$.

Sampling for $PM_{2.5}$ began here in January, 1999 at San Luis Obispo and Atascadero. Since then, no single sample has exceeded the federal standard, nor have average levels at either location exceeded the federal annual average standard. As for PM_{10}, compliance with the 24-hour $PM_{2.5}$ standard is measured by taking a 24-hour sample every sixth day throughout the year. Compliance with the federal annual average $PM_{2.5}$ standard is determined by a simple arithmetic mean of all of the samples taken that year. Available data indicates that the county will be in attainment for the new standards.

PM_{10} monitoring has been performed at several locations around the county since 1987, and is currently monitored at seven sites. State and federal air quality standards for PM_{10} are set for both a 24-hour and an annual average period, as shown in Table 3-1. The county is currently in attainment of the federal PM_{10} standards, but does not meet the more stringent state standards. Compliance with the state annual average PM_{10} standard is determined by calculating the geometric mean (somewhat like an arithmetic mean) of all 24-hour samples taken throughout the year.

As shown in Table 3-4, the highest PM_{10} measurements in the county, and the most frequent exceedances of the state 24-hour standard of 50 Φg/m^3 (micrograms per cubic meter), have occurred at three special-purpose monitoring sites on the Nipomo Mesa (UCD1, UCD2 and Ralcoa Way). The highest 24-hour PM_{10} sample taken in the county to date was a value of 141 Φg/m^3 measured in 1993 at the Ralcoa Way station. Two similar 24-hour values of 136 and 135 Φg/m^3 were also measured at Ralcoa Way in 1990 and 1992. Since 1994, PM_{10} measurements have not exceeded 100 Φg/m^3 at any monitoring site in the county.

Figure 3-4 depicts the number of measured exceedances of the state 24-hour PM_{10} standard recorded at specific monitoring sites and countywide, from 1990 through 1999. As shown in both this figure and Table 3-4, concentrations exceeding the state 24-hour PM_{10} standard occur at least several times a year at each site where sampling is performed. The frequency of exceedances recorded at the Ralcoa Way station is significantly higher than at any other monitoring location. Because data from the special-purpose stations may not be representative of typical community exposure levels, the lower graphic in Figure 3-4 shows countywide PM_{10} levels both with and without that data.

The state annual PM_{10} standard of 30 Φg/m^3 has been exceeded at several locations around the county over the years, as noted in Table 3-4. However, all but one of the values listed represent only partial years of monitoring at a given location and are not considered representative of the annual concentration at those sites. For annual values which exceed the state standard, only the full year of Ralcoa Way data for 1995 meets all representativeness criteria. The annual value for that year was 30.5 Φg/m^{3,}, qualifying as a violation of the State annual average PM_{10} standard. Annual average PM_{10} concentrations at most other locations in the county are less than 25 Φg/m^3.

In certain areas of the county, higher PM_{10} levels show a seasonal pattern of occurrence. Figure 3-5 depicts, for each monitoring location, the average monthly incidence of PM_{10} samples which violate the state 24-hour standard. As shown in this chart, most violations at the north county stations of Atascadero and Paso Robles are measured during winter months. This may be linked to seasonal emissions from open burning and the use of wood stoves and fireplaces, combined with seasonal changes in meteorology which minimize dispersion of pollutants from these and other sources.

Figure 3-5 shows a different pattern for the Nipomo Mesa, where PM_{10} violations at Ralcoa Way and UCD1/2 occur more frequently in the spring. This may be due to typically higher spring winds acting on the significant fugitive dust sources in that region.

Sulfur Dioxide

Sulfur dioxide (SO_2) adversely affects the upper respiratory tract. When SO_2 (or particulate matter on which SO_2 is adsorbed) contacts moist respiratory surfaces, an acid is formed, causing the body to react in a way that interferes with normal breathing. In contrast to the regional nature of ozone and PM_{10}, higher SO_2 levels are usually very localized and source-specific. Thus, monitoring for SO_2 has occurred primarily in the southern coastal part of San Luis Obispo County, where an industrial source of SO_2 emissions, the Santa Maria Refinery, is located. This facility performs preliminary refining and sulfur removal from the high-sulfur crude oil produced in Central California.

Violations of the state 1-hour SO_2 standard have been measured several times in the past on the Nipomo Mesa. In the first two years after a new monitoring station began operation on the Mesa in late 1984, nine violations of the state 0.25 ppm hourly average SO_2 standard were recorded. This station and others subsequently installed nearby are adjacent to the refinery in key downwind locations. In mid-1986, new SO_2 emission controls were installed at the Unocal refinery, reducing ambient levels in the area substantially. Two hours of breakdown-related standard violations occurred in 1990, and one hour of breakdown-related violation was measured in 1993. With the exception of these incidents, no further exceedances of SO_2 standards have been observed since the refinery modifications were completed. No violations of any national SO_2 standard have ever been measured in the county. Because of this improvement in air quality, the ARB redesignated this area of San Luis Obispo County as attainment for the state SO_2 standard in November, 1990.

Even though emission controls and nearby SO_2 levels have improved significantly, monitoring stations on the Nipomo Mesa continue to register what are sometimes the highest SO_2 levels in the state for a given period. The highest hourly average recorded to date in the county occurred in September, 1990, when a refinery breakdown resulted in an hourly average concentration of 0.75 ppm SO_2 measured at a nearby monitoring station. This represents the third highest hourly average ever measured in the state. In June, 1993, another breakdown led to a single hour of 0.57 ppm SO_2 at the same station. Typically, however,SO_2 levels near these sources are much lower than these extreme values, with the highest levels in any year being less than half of the state standard. Analyzers at stations near the refinery often show long, continuous periods with SO_2 levels at or near zero ppm.

Nitrogen Dioxide

Monitoring for oxides of nitrogen occurs at several locations around the county, primarily to acquire information about NOx as a precursor of ozone. Ambient standards have been set at the state and national levels for one of the gaseous oxides of nitrogen, nitrogen dioxide (NO_2). Like sulfur dioxide, the health effects of NO_2 relate to its propensity to inflame moist respiratory surfaces.

Local ambient NO_2 levels tend to be highest in the winter, when morning temperature inversions create a low ceiling over pollutants emitted close to ground level. In the county's monitoring record, the highest hourly average of 0.11 ppm NO_2 was measured at San Luis Obispo and Morro Bay in 1981; this is less than half of the state one-hour standard of 0.25 ppm. Highest annual averages at all monitoring locations have historically measured less than half of the 0.05 ppm national annual average standard.

Carbon Monoxide

Carbon monoxide (CO) interferes with the ability of blood to carry oxygen to the body's tissues. Short-term exposure to CO at concentrations above the health standards can cause impairment of the central nervous system and other disorders. Exposure to concentrations substantially above established standards can be fatal. CO concentrations at these very high levels are not normally found in the outdoor environment.

CO monitoring in this county has only occurred in downtown San Luis Obispo. An hourly average concentration of 13 ppm was measured in 1983, and remains the highest value recorded since that date. Typically, highest hours observed in recent years average less than half of the state 20 ppm hourly standard. Similarly, maximum 8-hour average CO levels are generally less than half of the state and national eight-hour standard of 9 ppm. This represents a significant improvement from the early 1970's, when higher CO levels were measured and the state and national eight-hour standards were occasionally exceeded. The last violations of these standards in the county were recorded in 1975.

3.4 NONATTAINMENT POLLUTANT TRENDS

Evaluation of air quality data collected over several years at different monitoring locations is an important tool for determining progress toward attainment of standards. Air quality trend analyses can be used to judge the effectiveness of adopted control strategies, and are thus particularly useful for planning purposes. The following sections describe the data analyses performed for both ozone and PM_{10}.

Ozone

Trends have been evaluated using two indicators of ozone levels at each station- the highest hourly concentration measured annually, and the number of hours each year which equal or exceed 0.07 ppm ozone. The maximum yearly value represents one hour out of the roughly 3,000 daytime hours annually when elevated ozone concentrations might normally occur. The number of hours at or above 0.07 ppm is a more robust trend indicator because it is based on a greater number of data points, giving a more reliable picture of pollutant activity over the assessment period. Also, data analysis shows that ozone levels of 0.07 ppm and greater are indicative of meteorological and emission conditions under which exceedances of the state standard can occur. It should be emphasized that no ozone standards have been set at the level of 0.07 ppm, and adverse health effects are not implied by tracking this statistic. However, impacts on plant physiology, especially in leaf crops and grapes, are known to result from longer-term exposure to ozone levels above 0.06 ppm.

Figure 3-6 presents the annual count of hours at or above 0.07 ppm ozone for six key stations during the ten year period 1990 through 1999. The trend lines behind the bars represent best-fit linear regression analyses of the annual totals. As shown in the charts, hourly averages exceeding the 0.07 ppm threshold typically occur less than 100 times each year at stations on the coastal side of the Santa Lucia Range. The slope of the trend lines for these stations generally show a steady decline during this period. The occurrence of higher concentration ozone activity measured at San Luis Obispo, Morro Bay, and Grover Beach has been particularly low for the past five years or more. In contrast, ozone hours at or above 0.07 ppm occur much more frequently north of the Cuesta Grade, as evidenced by the bar charts for Paso Robles and Atascadero. The trend line for Paso Robles shows a pronounced increase in higher ozone level activity since 1992, primarily due to levels measured in 1998.

Figure 3-7 presents the highest hourly ozone concentrations recorded each year for the six key stations used in this analysis, for the sixteen year period 1984 through 1999. This statistic reflects the concentration of the single highest hour monitored at each site during a year, and is a less reliable trend indicator than one more broadly based on a larger number of constituent hours. It is, however, still of some value in assessing trends. As shown in the charts, there is quite a bit of variability in maximum ozone levels observed from one year to the next, and at different locations. This variability tends to obscure any trends in the data set. This statistic indicates some overall improvement in ozone levels at each monitoring site throughout the county.

Figure 3-3 shows that most recent exceedances of the state ozone standard in the last decade in the county have been measured at monitoring stations in Paso Robles or Atascadero. Differences in overall ozone activity at these stations can be attributed to a variety of factors. These include differences in local meteorological conditions such as inversions, which contribute to ozone formation; differences in topography, which can amplify the effects of adverse meteorology; and the proximity of stationary, mobile or urban sources of ozone precursor emissions. Ozone formation is highly dependent on sunlight intensity, air temperature, and the timing of precursors emitted into the existing pollutant mix. All of these factors affect the concentration and geographic extent of any ozone formed and measured on a given day. As a result, higher ozone levels tend to vary, sometimes dramatically, from one year to the next and from station to station.

Transport of pollutant-laden air from the San Joaquin Valley and Bay Area may also play a significant role, both in the high variation of measured ozone levels from one year to the next, and in the apparent declining air quality trend in the last decade. The 2001 ARB triennial review of pollutant transport in California specifically studied the transport of pollutants from distant urban sources to San Luis Obispo has been in that update. Their analysis found that, depending on meteorology, a range of ozone formation scenarios can occur in San Luis Obispo County. Exceedances of the state ozone standard in the North County can result entirely from locally emitted precursors, or from a combination of local emissions and pollutants transported into the county from adjacent areas. In certain situations, overwhelming transport of precursors and ozone from major urban areas outside of the county can be the cause of a standard exceedance. Distant urban sources for those transported pollutants may include the San Joaquin Valley and/or the San Francisco Bay area.

PM_{10}

Reliable analysis of PM_{10} trends is difficult to accomplish, for a variety reasons: (1) One 24-hour PM_{10} sample is typically collected every sixth day, leaving much uncertainty about what levels of PM_{10} might have occurred on the unsampled days; (2) PM_{10} levels at any one location may reflect region-wide influences as well as very local, diverse, and sometimes transient sources of airborne particles, such as regionwide burning, nearby dirt roads, or short-term grading projects; and (3) A full year of PM_{10} data contains roughly 60 sample values, compared to about 8,400 hourly values in a year of monitoring for a gaseous pollutant. With fewer data points, distinguishing unusual values from routine ones can be difficult.

For these reasons, no substantive analysis of PM_{10} trends is presented here. However, a review of Figure 3-4 indicates that some improvement in PM_{10} air quality appears to have occurred over the past decade.

3.5 LOCAL AND REGIONAL POLLUTANT TRANSPORT

Ozone is a "secondary" pollutant, formed in the atmosphere by a series of chemical reactions between oxides of nitrogen and reactive organic gases. These reactions are driven by sunlight (thus the term 'photochemical') and proceed at varying rates. Under the stable, somewhat stagnant meteorology that leads to the highest local ozone levels, a pollutant-laden air mass may drift away from its source area with ozone formation taking place as the air mass moves. This results in ozone levels downwind that are often higher than those found in the source area itself.

On the local level, ozone 'transport' from one area to another is common. As described above, this is why ozone levels in a rural location of the county can be higher than levels in a more congested urban area. On a different scale, ozone and ozone precursors can also be transported over long distances, with travel times up to several days, and can cause impacts in areas far from the point of origin. Ozone transport over distances of several hundred miles has often been documented in California.

In this county, higher ozone levels have occasionally been traced to emissions which originated in other air basins, such as the San Francisco Bay Area or the San Joaquin Valley. In fact, the ARB has acknowledged that pollutant transport may be an important factor in the declining ozone air quality experienced in our North County in recent years. However, documentation for such transport is often incomplete. Verification of the actual long-distance origin of ozone or ozone precursors for any given day requires an extensive, focused technical effort, and considerable supporting data. As a result, the real frequency of long-range pollutant transport affecting local ozone air quality has not been definitively established. However, the Central California Ozone Study (CCOS) in 2000 collected extensive field data from the northern half of the state to support photochemical modeling for the 2003 State attainment plans. This future modeling effort will provide a much better understanding of pollutant transport impacts in our region.

It is important to note that previous ARB studies have shown that emission sources and meteorology that exist in this county are sufficient to generate the levels of ozone we monitor. In addition, the several hundred miles that separate the county from major urban source areas make transport over this distance an infrequent event. Appendix F to the 1991 Clean Air Plan, Characterization of Recent Ozone Excursions in San Luis Obispo County, presents case histories of several suspected transport events.

3.6 NONATTAINMENT SEVERITY CLASSIFICATION

Section 40913 of the CCAA requires district plans to identify and provide commitments to implement control measures designed to achieve the state standards by the earliest practical date. The severity of the ozone problem in each nonattainment area is based on the ozone "design value" for each area. This value is determined by identifying the highest ozone level recorded at each monitoring location in the district within the last three years, excluding extreme values; values that result from exceptional events; or values attributable to overwhelming transport from an upwind district. Nonattainment severity classifications are as follows:

Ozone Design Value	Classification
0.09 - 0.12 ppm	Moderate
0.13 - 0.15 ppm	Serious
0.16 - 0.20 ppm	Severe
> 0.20 ppm	Extreme

There is a similar federal nonattainment severity classification based on the federal ozone standard. Since San Luis Obispo County does not exceed the federal ozone standard, or any other federal standard, the federal classification scheme has not been included here.

The control requirements applicable to nonattainment areas are based on the design value and severity classification. Districts must incorporate sufficient emission control strategies in their attainment plan to reduce the design value to the level of the state standard by a specified target date. The design value for our county has been determined by ARB to be 0.10 ppm. As a result, we are classified as a "moderate" ozone nonattainment area. The CCAA establishes December 31, 1997, as the attainment deadline for moderate nonattainment areas. Failure to meet the deadline could result in the District's severity classification and control requirements being 'bumped up' to that of a serious nonattainment area, if the ARB determines that such action would substantially increase our ability to attain the standard by the earliest practical date.

As shown in Figure 3-3, no violations of the State ozone standard were measured at any location in the county in 1997, and only two were measured in 1999; however, twelve violations were recorded in 1996 and 25 in 1998. Redesignation to attainment status requires three consecutive years with no recorded violations. Thus, we have not met the 1997 CCAA attainment deadline. ARB has evaluated the situation and determined that a bump-up to the “serious” category would not result in more expeditious attainment of the standard. This determination is based on the potential influence of upwind pollutant transport contributing to the continuing exceedances in the North County, and the substantial emission reductions achieved through control strategies already implemented or proposed for implementation (see Chapter 7).

Table 3-1

STATE AND NATIONAL AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	National Standards (primary)
Ozone (O_3)	1 Hour	0.09 ppm	0.12 ppm
	8 Hour		0.08 ppm
PM_{10}	Annual Geometric Mean	30 $\mu g/m^3$	
	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual Arithmetic Mean		50 $\mu g/m^3$
$PM_{2.5}$	24 Hour		65 $\mu g/m^3$
	Annual Arithmetic Mean		15 $\mu g/m^3$
Carbon Monoxide (CO)	8 Hour	9.0 ppm	9 ppm
	1 Hour	20 ppm	35 ppm
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean		0.053 ppm
	1 Hour	0.25 ppm	
Lead	30 days average	1.5 $\mu g/m^3$	
	Calendar Quarter		1.5 $\mu g/m^3$
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean		0.030 ppm
	24 Hour	0.04 ppm	0.14 ppm
	3 Hour		0.5 ppm (secondary)
	1 Hour	0.25 ppm	
Visibility Reducing Particles	8 Hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer-visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent.	
Sulfates	24 Hour	25 $\mu g/m^3$	
Hydrogen Sulfide	1 Hour	0.03 ppm	

Table 3-2
MAXIMUM POLLUTANT CONCENTRATIONS MEASURED IN SAN LUIS OBISPO COUNTY 1989-1999

Pollutant/Monitoring Station	Averaging Time++	Units of Measure	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Ozone (O3)													
San Luis Obispo	1-hour	ppm	0.12	0.08	0.09	0.08	0.09	0.07	0.08	0.08	0.07	0.07	0.09
Nipomo	1-hour	ppm	0.12	0.09	0.09	0.09	0.10	0.09	0.07	0.07	***	***	0.09
Grover Beach	1-hour	ppm	0.15	0.09	0.09	0.11	0.08	0.07	0.08	0.08	0.07	0.07	0.09
Morro Bay	1-hour	ppm	0.15	0.09	0.10	0.10	0.08	0.06	0.08	0.10	0.06	0.07	0.10
Paso Robles	1-hour	ppm	0.09	0.08	0.09	0.09	0.09	0.10	0.11	0.14	0.08	0.13	0.10
Atascadero	1-hour	ppm	0.12	0.10	0.11	0.10	0.10	0.10	0.10	0.10	0.09	0.10	0.09
Carbon Monoxide (CO)													
San Luis Obispo	1-hour	ppm	10	10	8	8	9	6	6	5	7	4	5
	8-hour	ppm	6.3	4.1	3.3	3.1	3.2	3.2	3.1	2.9	2.6	2.3	3.1
Nitrogen Dioxide (NO2)													
San Luis Obispo	1-hour	ppm	0.09	0.07	0.07	0.06	0.10	0.07	0.07	0.06	0.07	0.06	0.06
	annual	ppm	0.016	0.014	0.014	0.013	0.010	0.014	0.013	0.013	0.014	0.012	0.013
Nipomo	1-hour	ppm	0.05	0.05	0.08	0.04	0.10	0.05	0.06	0.04*	**	0.04	0.07
	annual	ppm	0.009	0.010	0.011	0.010	0.010	0.010	0.008	0.008*	**	0.008	0.007
Grover City	1-hour	ppm	0.07	0.06	0.05	0.05	0.10	0.05	0.04	0.05	0.04	0.05	0.05
	annual	ppm	0.007	0.008	0.007	0.007	0.010	0.010	0.007	0.007	0.008	0.007	0.008
SLO-Lewis Lane	1-hour	ppm	0.04	0.04	0.05	0.03	0.10	0.04	0.02*	**	**	**	**
	annual	ppm	0.007	0.008	0.008	0.006	0.010	0.000	0.003*	**	**	**	**
Atascadero	1-hour	ppm	--	0.07	0.07	0.06	0.10	0.07	0.06	0.06	0.07	0.06	0.07
	annual	ppm	--	0.020	0.017	0.015	0.010	0.010	0.012	0.012	0.012	0.011	0.013
Sulfur Dioxide (SO2)													
Nipomo	1-hour	ppm	0.04	0.03	0.03	0.04	0.03	0.03	0.024	0.031	**	**	**
	24-hour	ppm	0.006	0.005	0.01	0.01	0.01	0.01	0.004	0.005	**	**	**
	annual	ppm	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001*	**	**	**
Grover City	1-hour	ppm	0.03	0.08	0.03	0.03	0.04	0.03	0.04	0.05	0.04	0.02	0.04
	24-hour	ppm	0.008	0.01	0.005	0.004	0.01	0.02	0.004	0.005	0.006	0.004	0.005
	annual	ppm	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001
Morro Bay	1-hour	ppm	0.02	0.02	0.01	0.01	0.01	0.01	0.038	**	**	**	**
	24-hour	ppm	0.01	0.003	0.003	0.000	0.000	0.000	0.005	**	**	**	**
	annual	ppm	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**	**	**	**
SLO-Lewis Lane	1-hour	ppm	0.02	0.01	0.08	0.02	0.02	0.02	0.01*	**	**	**	**
	24-hour	ppm	0.006	0.010	0.010	0.004	0.010	0.000	0.000*	**	**	**	**
	annual	ppm	0.000	0.001	0.000	0.000	0.000	0.000	0.000*	**	**	**	**
Nipomo Mesa	1-hour	ppm	0.22	0.14	0.12	0.17	0.14	**	**	**	**	**	**
	24-hour	ppm	0.021	0.02	0.022	0.017	0.02	**	**	**	**	**	**
	annual	ppm	0.004	0.003	0.003	0.003	0.000	**	**	**	**	**	**
PM-10													
San Luis Obispo	24-hour	ug/m3	55	42	52	36*	57	37	51	39	55	32	44
	annual	ug/m3	23.9	19.4	22.9	18.8*	19.1	19.1	17.6	15.2	17.2	16.0	17.6
Atascadero	24-hour	ug/m3	63	79	62	44*	78*	44	52	44	70	47	43
	annual	ug/m3	26.3	23.4*	23.5*	22.3*	20.7*	21.1	20.8	16.1	18.7	16.3	19.4
Nipomo	24-hour	ug/m3	--	64	47	46	59*	52	62	48	**	**	72
	annual	ug/m3	--	24.6*	21.5	22.9	19.2*	20.8	17	18.1*	**	**	22.3
Morro Bay	24-hour	ug/m3	--	40	51	38	64	48*	40	42	57	33	39
	annual	ug/m3	--	24.1*	20.0*	17.8	18.6	18.3*	17.5	15.8	18.2	14.6	15.6
Paso Robles	24-hour	ug/m3	--	41	67	53*	54*	30*	56	46	75	55	58
	annual	ug/m3		21.5*	34.5*	22.8*	16.3*	19.5*	18.7	17.4	19	17.4	22.7

Notes:
-- Indicates data not available;
* Data are valid but incomplete and may not be representative;
** Monitoring Terminated;
*** No monitoring data for 1997 & 1998 due to relocation of station
++ Annual arithmetic mean for SO_2 and NO_2, annual geometric mean for TSP and PM_{10}.

Table 3-3

MAXIMUM 1-HOUR OZONE CONCENTRATION (PPM) IN SAN LUIS OBISPO COUNTY
Maximum Concentrations (Violations) *

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
NIPOMO	0.12(5)	0.09	0.09	0.09	0.10(1)	0.09	0.08	0.10(1)**	***	***	0.09
PASO	0.09	0.08	0.09	0.09	0.09	0.10(2)	0.11(6)	0.14(9)	0.08	0.13(25)	0.10(1)
SLO	0.12(6)	0.08	0.09	0.08	0.09	0.07	0.08	0.08	0.07	0.07	0.09
MORRO	0.15(6)	0.09	0.10(2)	0.10(1)	0.08	0.06	0.07	0.07	0.06	0.07	0.10(1)
GROVER	0.15(6)	0.09	0.09	0.11(6)	0.08	0.07	0.08	0.08	0.07	0.07	0.09
ATASCADERO	0.12(2)	0.11(8)	0.10(3)	0.10(2)	0.10(4)	0.10(4)	0.10(1)	0.11(7)	0.09	0.10(2)	0.09

Note: * Numbers in parenthesis refer to the number of hours measured which exceeded the state ozone standard.
** Data incomplete and not representative
*** No monitoring in 1997 & 1998 due to station relocation

OZONE STANDARDS

AVERAGING TIME	STATE	NATIONAL
1-hour average (ppm)	0.09	
8-hour average (ppm)		0.08

Notes:

- National standard is not to be exceeded and is a three-year average of the fourth-highest daily maximum eight-hour average of continuous ambient air monitoring data.
- State standards are not to be exceeded. Thus, every hour above 0.095 ppm ozone is a violation of the state standard.

Table 3-4:
PM_{10} LEVELS IN SAN LUIS OBISPO COUNTY

MAXIMUM 24-HOUR CONCENTRATION (ug/m3) Concentration (Violations)*										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
MORRO BAY	40**	51(1)**	38	64(2)	48**	40	48	57(1)	33	37
SLO	42	52(1)	36**	57(1)**	37	51(1)	39	55(2)	32	42
ATASCADERO	79(3)**	62(3)**	44	78(5)**	44	75(4)	44	70(1)	47	43
UCD2[#]	86(8)	119(7)**	+++	+++	+++	+++	+++	+++	+++	+++
UCD1[#]	--	75(3)**	114(7)	121(8)	97(6)	90(4)	84(4)	71(5)	65(4)	72(4)
NIPOMO	64(3)**	47	46	59(1)**	52(1)	62(1)	47**	+*+	+*+	41
RALCOA WAY	136(12)**	90(10)**	135(9)**	141(19)	107(10)	99(15)	98(12)	99(16)	73(13)	90(5)
PASO ROBLES	41**	67(4)**	53(2)**	54(1)**	30**	56(3)	46	75(1)	57(1)	56(1)

ANNUAL GEOMETRIC MEAN CONCENTRATION (ug/m^3) Concentration (Violation)***										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
MORRO BAY	24.1**	20.0**	17.8	18.6	18.3**	17.5	15.8	18.2	14.6	15.6
SLO	19.4	22.9	18.8**	19.1**	19.1	17.6	15.2	17.2	16.0	17.6
ATASCADERO	23.4**	23.5**	22.3**	20.7**	21.1	20.8	16.1	18.7	16.3	19.4
UCD2[#]	26.0	(**37.4**)**	+++	+++	+++	+++	+++	+++	+++	+++
UCD1[#]	--	23.1**	25.6	24	23.8	19.9	20.8	20.5	27.3	22.3
NIPOMO	24.6**	21.5	22.9	19.2**	20.8	17.1	18.1**	+*+	+*+	17.3
RALCOA WAY	--	--	(**37.2**)**	(**36.8**)**	(**35.9**)	30.5	29.1	**(33.2)**	(30.3)	27.2
PASO ROBLES	21.5**	(**34.5**)**	22.8**	16.3**	19.5**	18.7	17.4	19.0	17.4	22.7

AIR QUALITY STANDARDS FOR PM_{10} AND $PM_{2.5}$

POLLUTANT	AVERAGING TIME	STATE STANDARD	NATIONAL STANDARD
PM_{10}	24-Hour (ug/m^3)	50	150
	Annual (ug/m^3)	30 (geometric mean)	50 (arithmetic mean)
$PM_{2.5}$	24-Hour (ug/m^3)		65
	Annual (ug/m^3)		15 (arithmetic mean)

Notes:
- # The UCD1 and UCD2 monitoring stations are located on the Nipomo Mesa.
- * Numbers in parenthesis refer to number of sample days in violation of the state hourly PM_{10} standard.
- ** Data are incomplete and may not be representative.
- *** Bold values in parenthesis indicate a violation of the state annual PM_{10} standard.
- + The sampler size-selective inlet was changed at SLO during 1988 resulting in two data values (before and after).
- ++ The Paso Robles monitoring station was relocated from 10th street to Santa Fe Avenue in 1991.
- +++ Monitoring terminated.
- +*+ No monitoring in 1997 & 1998 due to station relocation

Figure 3-1

AIR MONITORING STATIONS IN SAN LUIS OBISPO COUNTY

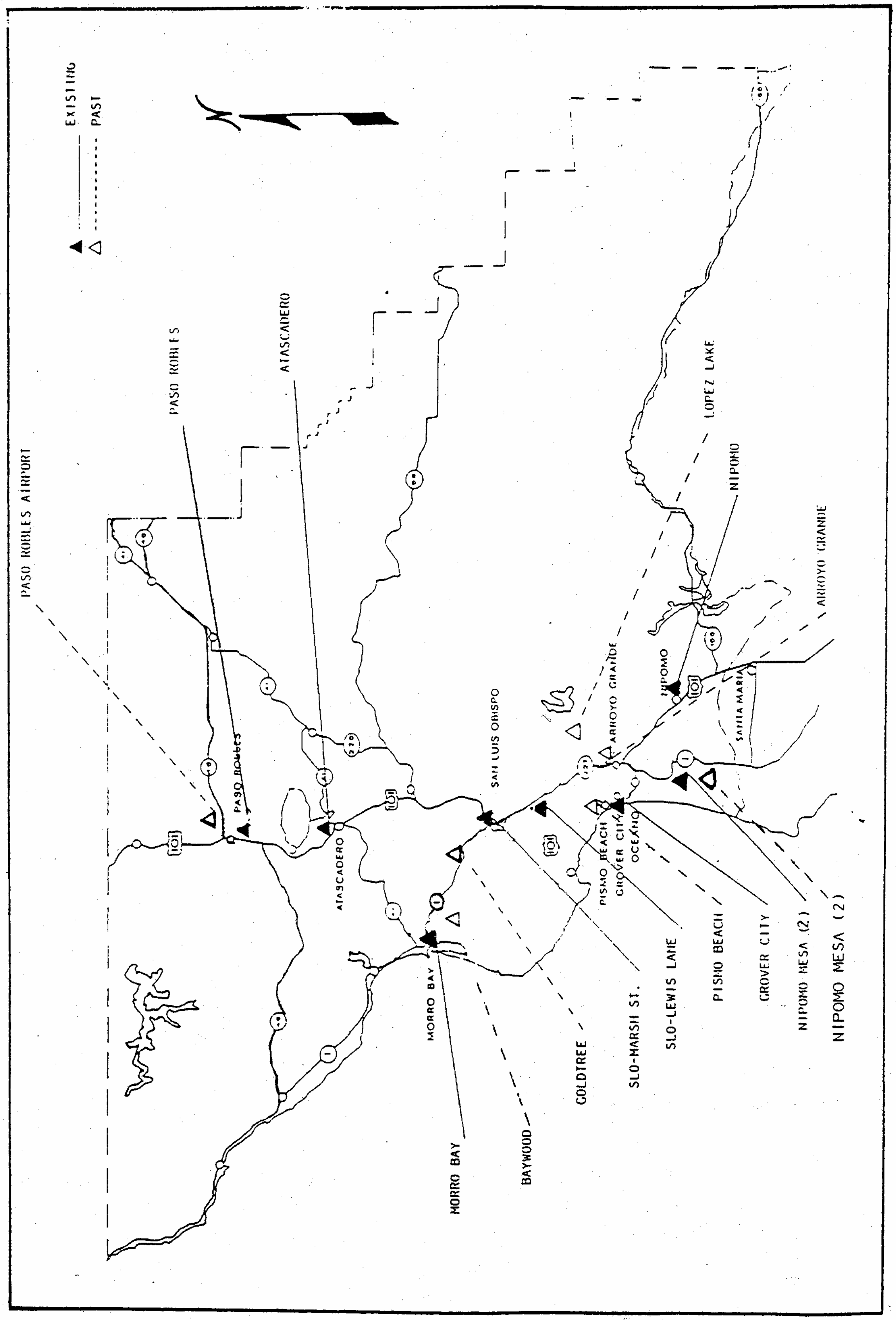
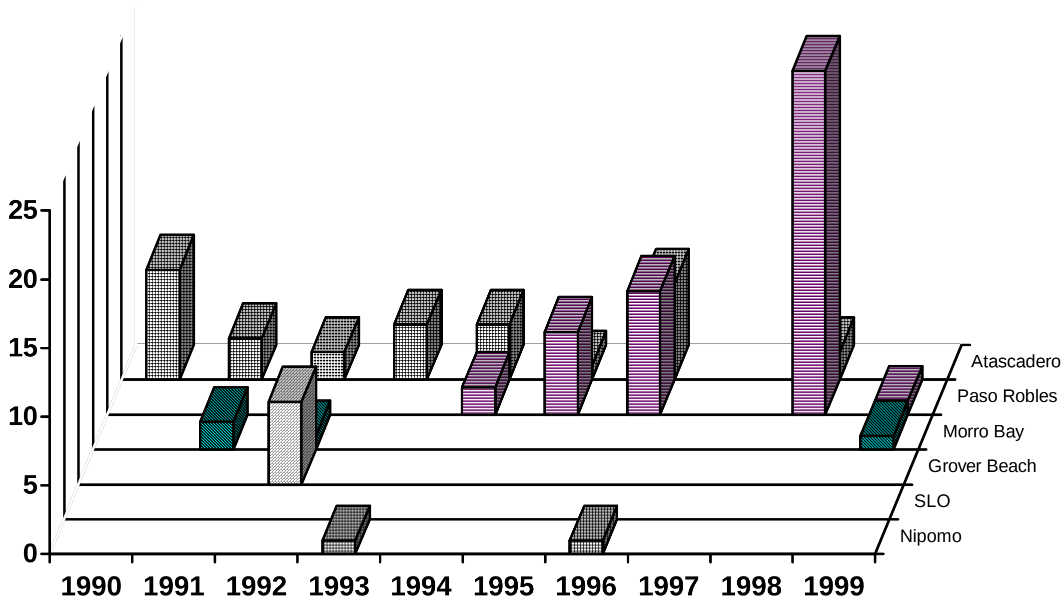


Figure 3-3

DAYS EXCEEDING THE STATE OZONE STANDARD: 1990-1999

STATION-BY-STATION OZONE EXECEEEDANCE DAYS



COUNTYWIDE OZONE EXCEEDANCE DAYS

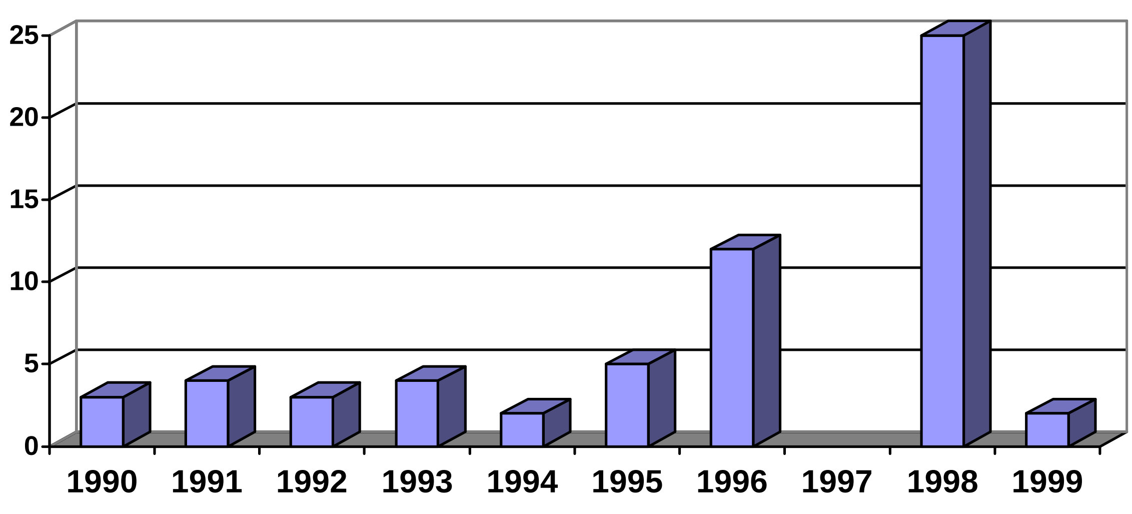
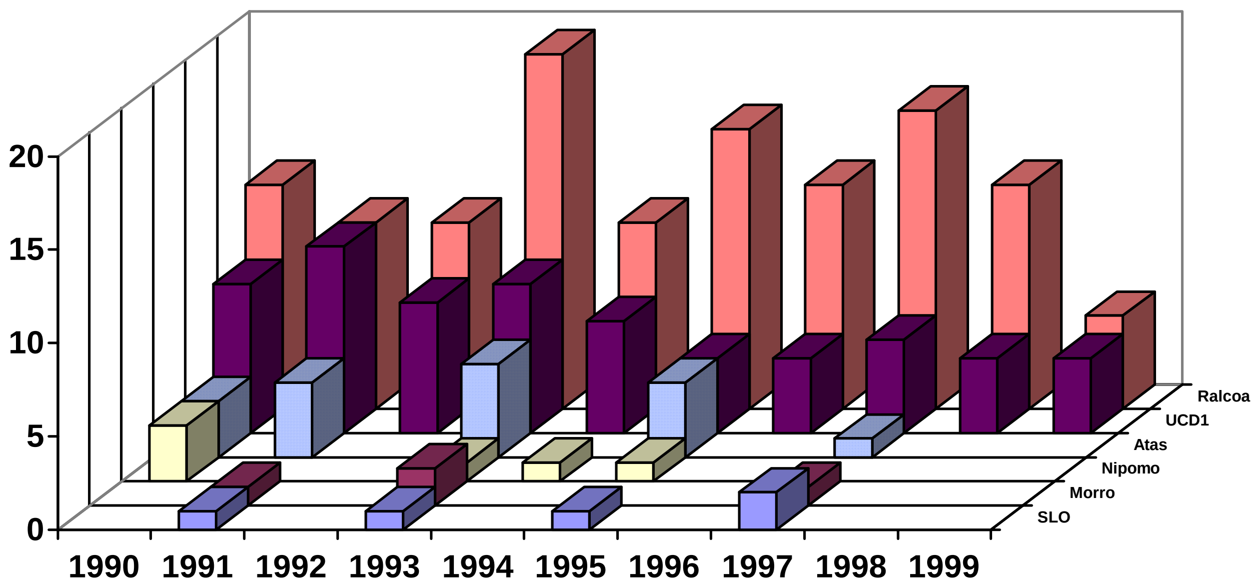


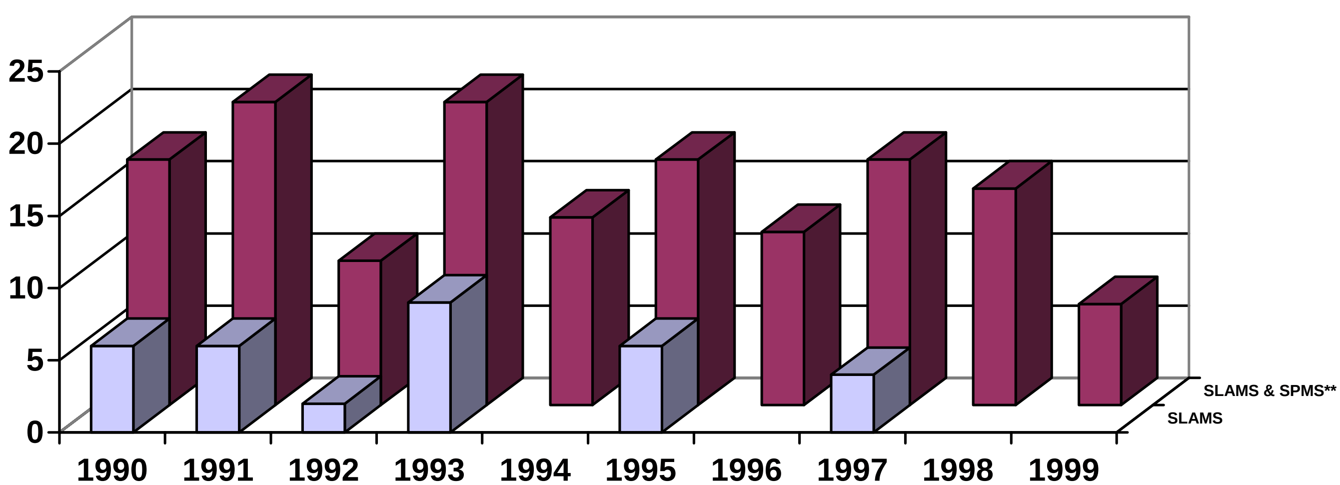
Figure 3-4

DAYS EXCEEDING THE PM_{10} STANDARD: 1990-1999

SELECTED STATIONS



COUNTYWIDE PM10 EXCEEDANCE DAYS



Note: *The location of the UCD1 particulate sampler was changed in 1991
**SLAMS – State and Local Air Monitoring Stations
SPMS – Special Purpose Monitoring Stations

Figure 3-5

PM_{10} VIOLATIONS BY MONTH
San Luis Obispo County
1987 - 1999

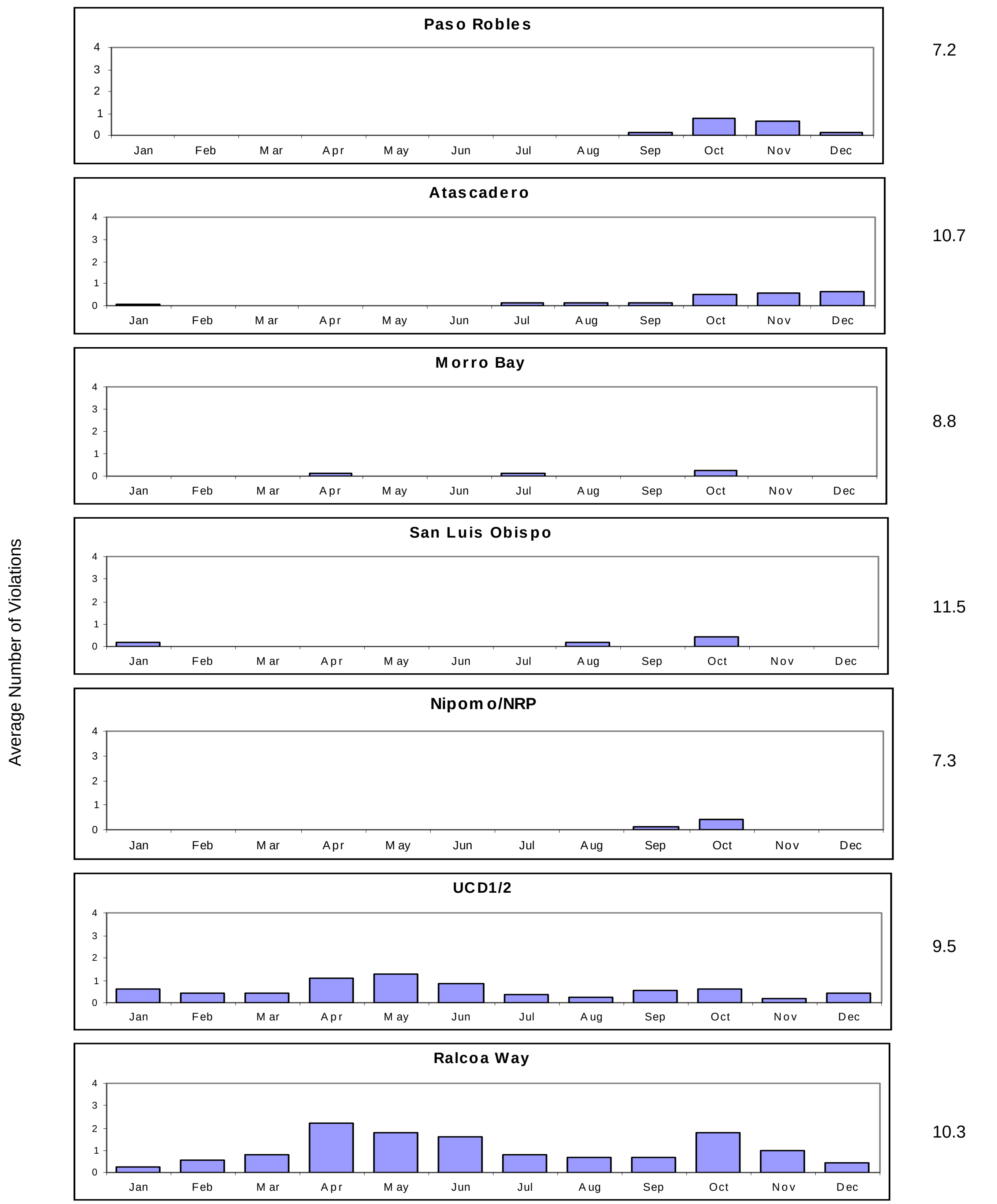
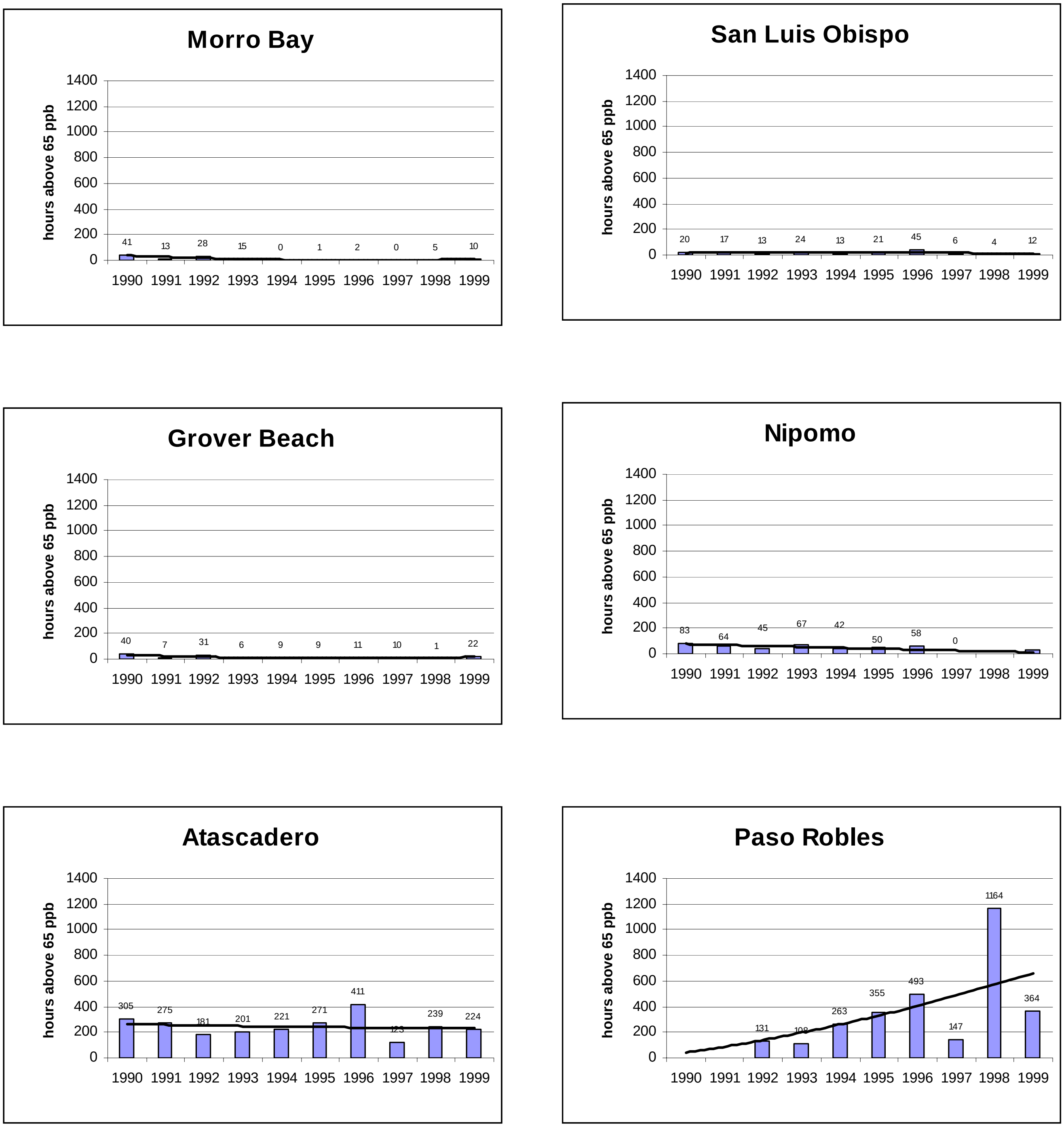


Figure 3-6

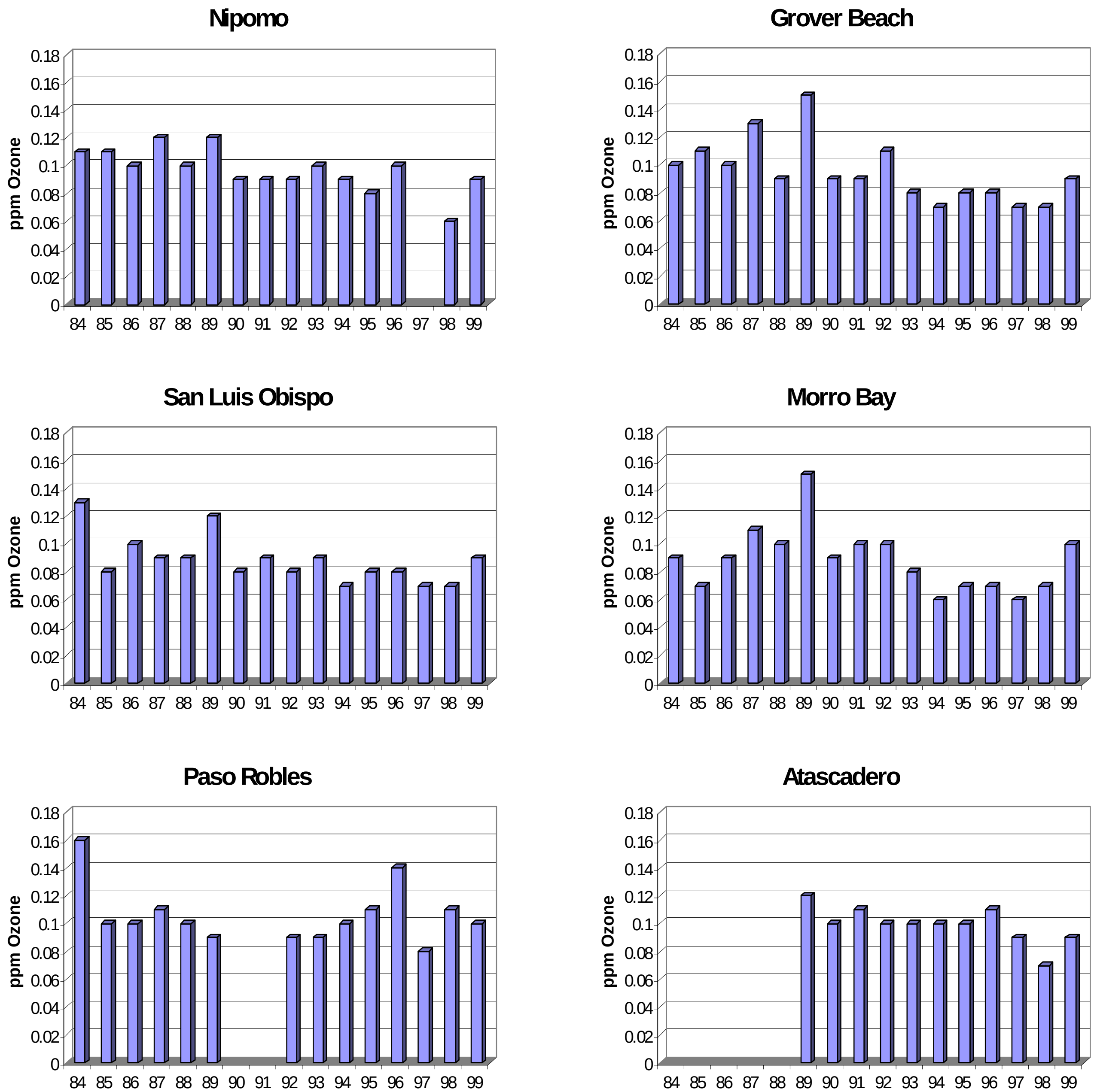
NUMBER OF HOURS ≥ 0.07 PPM OZONE : 1990-1999



Note: Monitoring at Nipomo was discontinued from September 1996 to June 1998

Figure 3-7

HIGHEST ANNUAL HOURLY OZONE VALUE 1984-1999



Note: Monitoring at Paso Robles discontinued from 1990 to 1991
Atascadero station installed in 1989
Monitoring at Nipomo discontinued from September 1996 to June 1998.