1999 Annual Air Quality Report

County of San Luis Obispo
Air Pollution Control District

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The air quality database for San Luis Obispo County is a public record and is available from the APCD office in various forms, including comprehensive records of all hourly or other sample values acquired anywhere in the county. Data summaries are published in the APCD quarterly newsletter Clear Vision, and in this Annual Air Quality Report. Ozone summary data appear weekly in the Saturday edition of the San Luis Obispo County Telegram Tribune, a local newspaper. Each month data from all countywide monitoring is added to separate archives maintained by the federal Environmental Protection Agency (EPA) and by the ARB. Summary data from San Luis Obispo County can be found in EPA and ARB publications and on the District's website at:

www.sloapcd.dst.ca.us.

1999 Air Quality Summary

Most areas of San Luis Obispo County enjoyed good air quality in 1999. The only exception was elevated ozone concentrations recorded at the District's research station on the summit of Black Mountain at an elevation of 3400 feet. The Black Mountain station was established to monitor pollutant transport in the upper atmosphere and does not represent conditions at ground level or in populated areas. In 1999 the state ozone standard was exceeded on only one day in Paso Robles and one day in Morro Bay. The proposed federal eight-hour standard for ozone was not exceeded anywhere in the county except at Black Mountain. Countywide exceedances of the state PM_{10} standard of 50 ug/m^3 occurred on 7 out of 60 different sample days in 1999, down from 15 different violation days in 1998. This is the lowest occurrence of PM10 exceedances recorded in our county in the last 10 years. All of the PM_{10} exceedances occurred near the coast on the Nipomo Mesa. There were no exceedances of the national air quality standard for PM_{10} in the county in 1999.

In San Luis Obispo County, ozone and PM_{10} are the pollutants of main concern, since exceedances of state health-based standards for those are experienced here in most years. For this reason our county is designated as a non-attainment area for both the state ozone and PM_{10} standards .

Air Quality Monitoring

San Luis Obispo County air quality was measured in 1999 by a network of nine monitoring stations, depicted in the map on page 2. The APCD operated stations at Nipomo Regional Park, Grover Beach, Morro Bay, Atascadero and a research station on the summit of Black Mountain. The State Air Resources Board (ARB) operated stations at San Luis Obispo and Paso Robles. Two stations on the Nipomo Mesa were operated by a private contractor for a petroleum refining and production company.

Air quality monitoring is rigorously controlled by federal and state quality assurance and control procedures to ensure data validity. Gaseous pollutant levels are measured continuously and averaged each hour, 24 hours a day. Particulate pollutants are generally sampled by filter techniques for averaging periods of three to 24 hours. PM_{10} (inhalable particulate matter 10 microns or less in size) is sampled for 24 hours every sixth day on the same schedule nationwide. In addition, PM_{10} is sampled continuously at the Atascadero monitoring station using a TEOM (*tapered element oscillating microbalance*) sampler.

Figure 1: Air Monitoring Stations in San Luis Obispo County in 1999

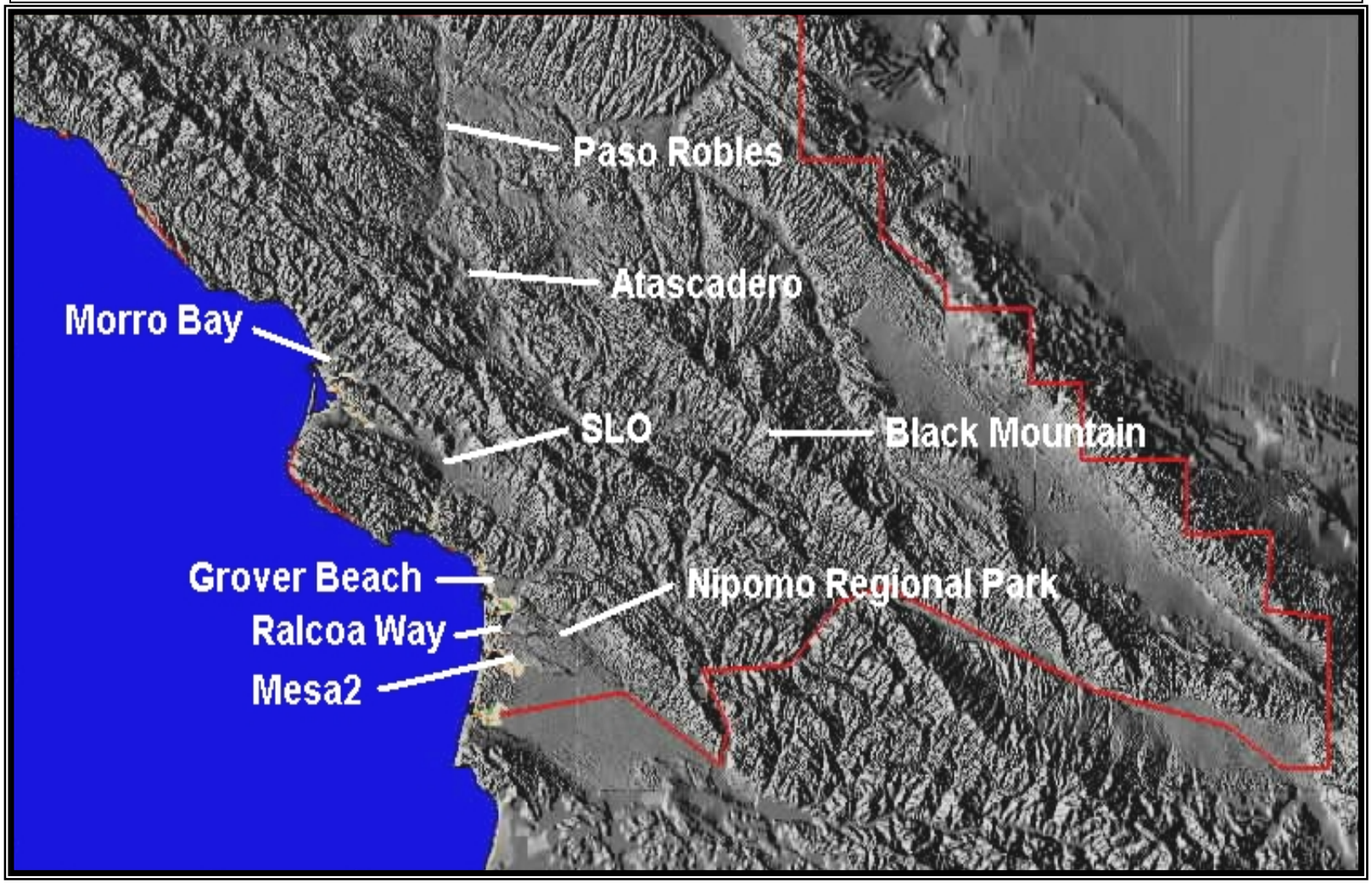


Table 1: Ambient Air Quality Parameters Monitored in San Luis Obispo County (1999)

	O_3	NO	NO_2	NOx	SO_2	CO	TRS	PM_{10}	$PM_{2.5}$	TEOM	WS	WD	ATM
APCD Stations													
Atascadero	X	X	X	X				X	X	X	X	X	X
Morro Bay	X							X			X	X	
Nipomo Regional Park	X	X	X	X	X			X			X	X	
Grover Beach	X	X	X	X	X						X	X	
Black Mountain	X										X	X	
ARB Stations													
San Luis Obispo	X	X	X	X		X		X	X		X	X	X
Paso Robles	X							X			X	X	X
Contractor Operated Stations													
Nipomo,													
Guadalupe Rd.	X				X			X			X	X	X
Nipomo,													
Ralcoa Way					X		X	X			X	X	

O_3	Ozone	PM_{10}	Particulates < 10 microns (samples every sixth day)
NO	Nitric Oxide	$PM_{2.5}$	Particulates < 2.5 microns (samples every sixth day)
NO_2	Nitrogen Dioxide	TEOM	Particulates <10 microns(monitored continuously)
NOx	Oxides of Nitrogen	WS	Wind Speed
SO_2	Sulfur Dioxide	WD	Wind Direction
CO	Carbon Dioxide	ATM	Ambient Temperature
TRS	Total Reduced Sulfur		

Table 2: Ambient Air Quality Standards

Pollutant		Averaging Time	California Standard	National Standard
Ozone		1 Hour	0.09 ppm	0.12 ppm
		8 Hour		0.08 ppm (proposed)
Carbon Monoxide		8 Hour	9.0 ppm	9 ppm
		1 Hour	20 ppm	35 ppm
Nitrogen Dioxide		Annual Average		0.053 ppm
		1 Hour	0.25 ppm	
Sulfur Dioxide		Annual Average		80 $\mu g/m^3$ (primary)
		24 Hour	0.04 ppm	0.14 ppm (primary)
		3 Hour		0.5 ppm (secondary)
		1 Hour	0.25 ppm	
Suspended Particulate Matter	**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 $\mu g/m^3$
	$PM_{2.5}$	Annual Arithmetic Mean		15 $\mu g/m^3$ (proposed)
		24 Hour		65 $\mu g/m^3$ (proposed)
Hydrogen Sulfide		1 Hour	0.03 ppm	
Visibility		1 Observation	In sufficient amount to reduce the prevailing visibility to less than ten miles when the relative humidity is less than 70%.	

In recent years we have experienced both our worst and our cleanest ozone seasons. The factors that lead to ozone formation are very complex and include: climate, topography, emissions of precursor pollutants, and pollutant transport. Air quality monitoring has shown that ozone levels can be very different from year to year. The reasons for this are not yet fully understood and are the subject of ongoing research.

***A standard exceedance** occurs when a measured value meets exceedance criteria prescribed by state or federal agencies and does not necessarily constitute a violation.*

***A standard violation** may occur following a single or cumulative series of standard exceedances. Criteria constituting a violation are unique for each pollutant and may result in changes to an areas attainment status.*

New Federal Standards

On July 18 1997 the federal Environmental Protection Agency (EPA) promulgated new health-based standards for ozone and particulate matter. The new federal ozone standard is based on the fourth highest 8-hour average concentration measured in a year. Attainment is determined by averaging the fourth highest concentrations from each year over a three-year period. The resultant value is not to equal or exceed 0.08 parts per million (ppm) ozone (.085 ppm or greater). This new standard is considered to be more protective of public health than the old 1-hour federal standard of 0.12 ppm ozone.

EPA also promulgated a new particulate standard for fine fraction particles less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$). Particles of this size are the most damaging to our health since they lodge deeply in the lungs and may contain substances of varying toxicity. The new 24-hour federal $PM_{2.5}$ standard is 65 micrograms per cubic meter of air (ug/m^3). The annual average standard is 15 ug/m^3. The state standard for particulate remains set for PM_{10} with no state standard yet promulgated for $PM_{2.5}$.

A 1999 federal court ruling blocked implementation of both the new federal ozone and $PM_{2.5}$ standards. Although EPA has asked the U. S. Supreme Court to reconsider that decision, the outcome of these legal battles has yet to be determined. In the interim the old federal standards for ozone and PM_{10} remain in effect.

Monitoring for $PM_{2.5}$ began statewide in January 1999. In San Luis Obispo County sampling is performed after the manner of the existing PM_{10} network in which samples are run for 24 hours every sixth day resulting in 61 samples per year. A $PM_{2.5}$ monitor is operated here by ARB at San Luis Obispo and two collocated samplers are operated by the APCD at Atascadero.

Determination of attainment of the new federal ozone standard was to have been based on data from 1997 through 1999. The table below shows how we have done at Paso Robles, the site that frequently records the highest ozone concentrations in our county. Preliminary results indicate we would be in attainment of the new federal ozone standard if it were implemented.

Table 3: Preliminary Determination of Compliance with the New Federal Ozone Standard at Paso Robles

Fourth Highest 8-Hour Averages

1997	1998	1999	3-Year Average
0.070 ppm	0.099 ppm	0.075 ppm	**0.081 ppm**

Ambient Air Quality Data Summaries

Ozone

While ground level ozone is harmful to plants and animals and is considered a pollutant, upper level (stratospheric) ozone occurs naturally and protects the earth from harmful ultra-violet energy from the sun.

Although ozone occurs naturally at low concentrations near the earth's surface, much higher and unhealthful levels are created when airborne mixtures of hydrocarbons and oxides of nitrogen are driven by sunlight to react, forming ozone pollution. The emissions of these ozone precursor pollutants come from many human activities, but primarily from industry and the wide use of motor vehicles. As a pollutant, ozone is a strong oxidant gas, which attacks plant and animal tissues. It causes impaired breathing and reduced lung capacity, especially among children, athletes, and persons with respiratory disorders. It also causes significant crop and forest damage. Ozone is a pollutant of particular concern in California where geography, climate and high population densities contribute to frequent violations of health-based air quality standards.

Particulate Matter

Fine particulate matter, in addition to being a health hazard, can greatly reduce visibility.

Recent research suggests that fine particulate may be much more detrimental to human health than previously thought.

The two classes of particulate matter are PM_{10} (coarse particulate matter less than 10 microns in aerodynamic diameter), and $PM_{2.5}$ (fine particulate matter 2.5 microns or less in aerodynamic diameter). Both consist of many different types of particles that vary in their chemical activity and toxicity. $PM_{2.5}$ tends to be a greater health risk since it cannot be removed from the lungs once it is deeply inhaled. Sources of particulate pollution include: mineral extraction and production; combustion products from industry and motor vehicles; demolition and construction; agricultural operations; fire; paved and unpaved roads; condensation of gaseous pollutants into liquid or solid particles; and natural sources such as wind-blown dust.

NO_2, SO_2

NO_2 and SO_2 create aerosols, which may fall as acid rain causing damage to crops, forests, and lakes.

Nitrogen dioxide (NO_2) is the brownish-colored component of smog. NO_2 irritates the eyes, nose and throat, and can damage lung tissues. Sulfur dioxide (SO_2) is a colorless gas with health effects similar to NO_2. SO_2 and NO_2 are generated by fossil fuel combustion in mobile sources (such as vehicles, ships and aircraft), and at stationary sources (such as industry, homes and businesses). SO_2 may also be emitted by petroleum production and refining operations. The state and national standards for NO_2 have never been exceeded in this county. The state standard for SO_2 has been exceeded 34 times on the Nipomo Mesa since 1984. As a result, San Luis Obispo County was formerly listed as non-attainment for the state SO_2 standard by the ARB. Equipment and processes at the facilities responsible for the emissions have changed in recent years, and the state SO_2 standard is now rarely exceeded there. Exceedances of the federal SO_2 standard have never been measured here.

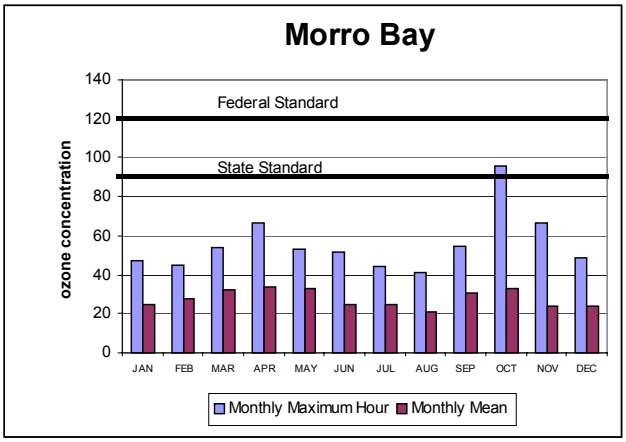
CO

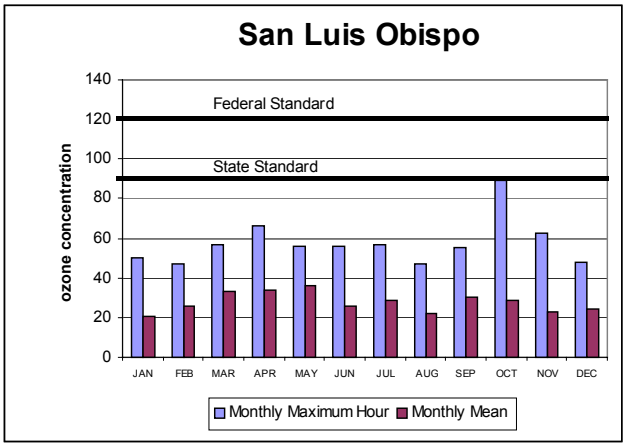
CO is a colorless, odorless gas that can lower the bloods ability to carry oxygen.

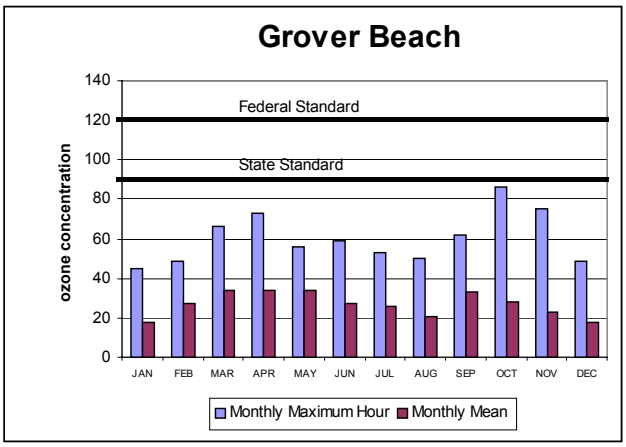
Carbon monoxide (CO) can cause headaches and fatigue and results from fuel combustion of all types. Motor vehicles are by far the chief contributor of CO in outdoor air. State CO standards have not been exceeded in San Luis Obispo since 1975. CO is measured at only one location in the county and the measured concentrations have been low in recent years.

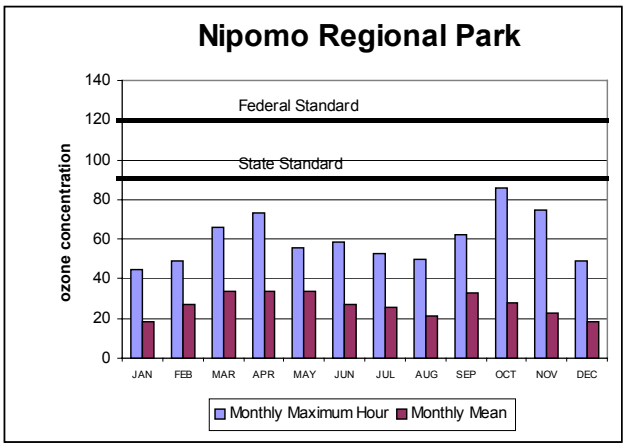
1999 Ozone

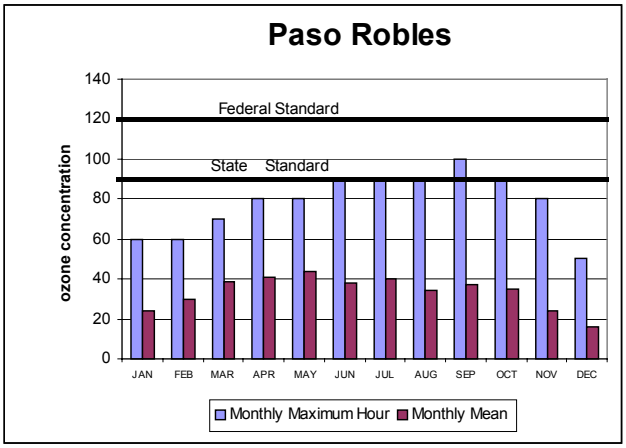
The following graphs depict 1999 monthly ozone concentrations at six locations. There are two data bars presented for each month. The monthly maximum hour bar shows the highest hourly average concentration during the month. The monthly mean bar, the shorter of the two, is a monthly average concentration and depicts an overall average ozone intensity for the month.

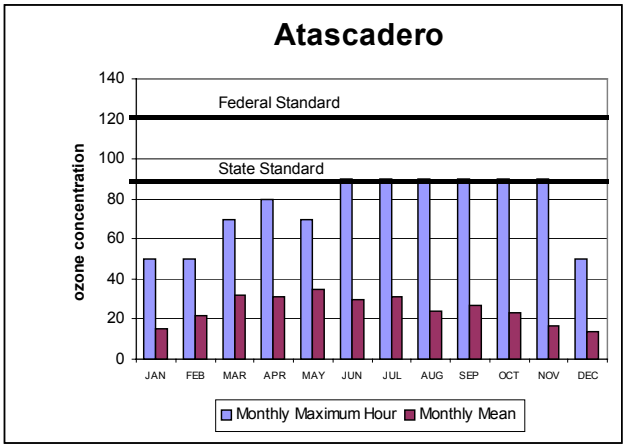






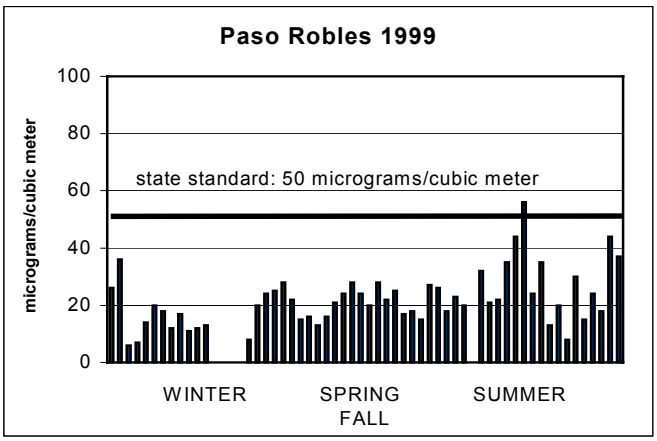


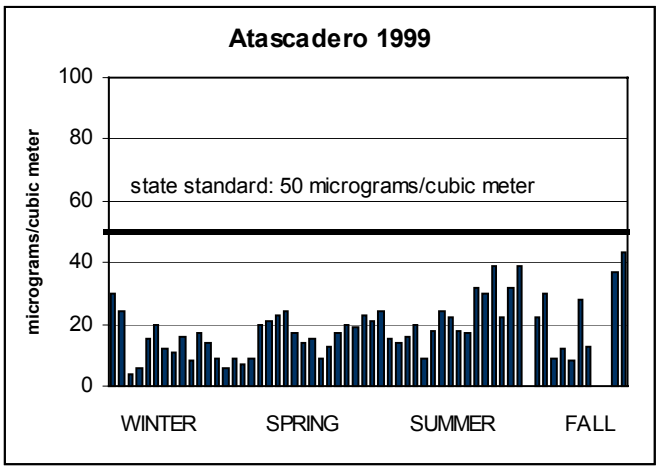


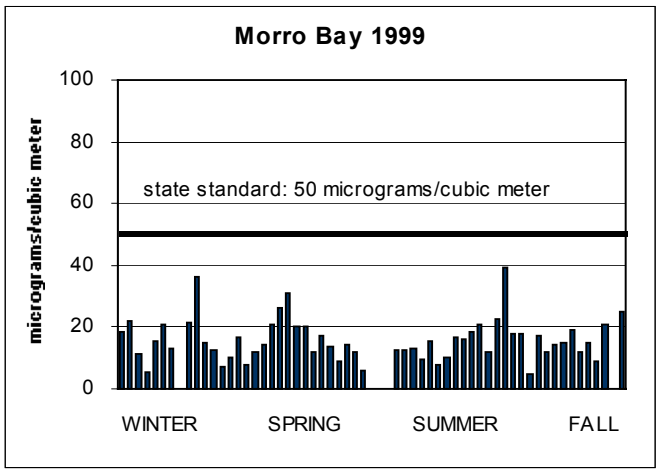


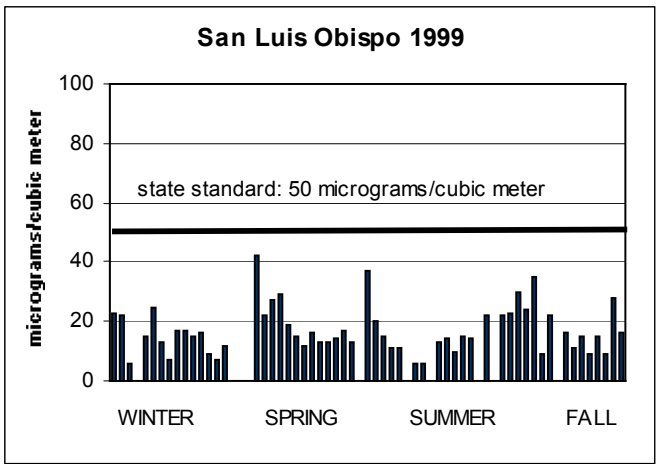
Particulate Matter, 10 microns or less (PM_{10})

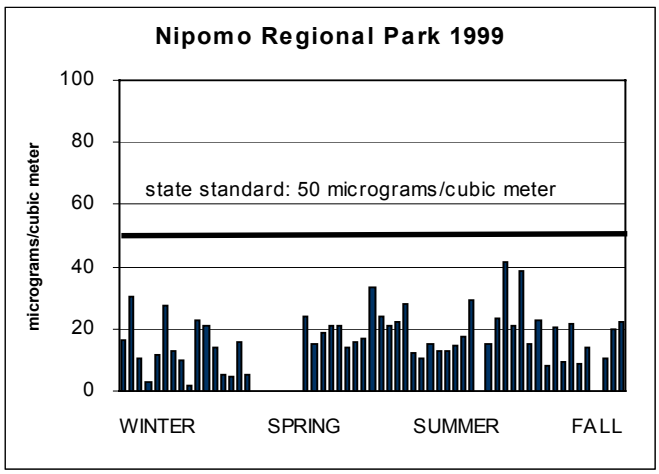
The graphs on this and the next page present PM_{10} data from seven locations and a graph of PM_{10} trend over the past seven years. In 1999 exceedances of the state standard of 50 micrograms per cubic meter were recorded at three air monitoring stations in the county. No exceedance of the national standard of 150 micrograms per cubic meter was measured.

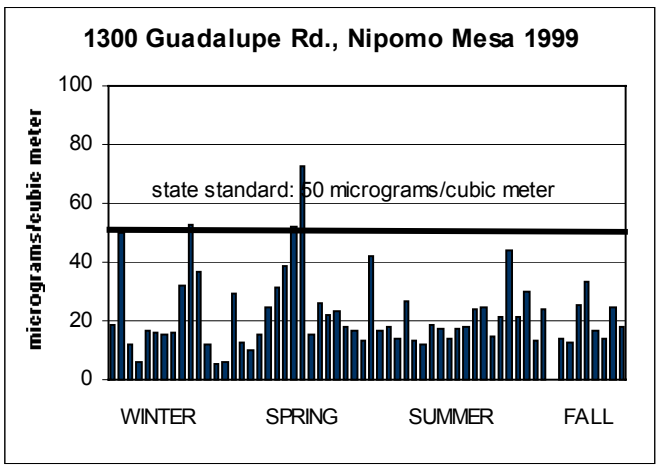






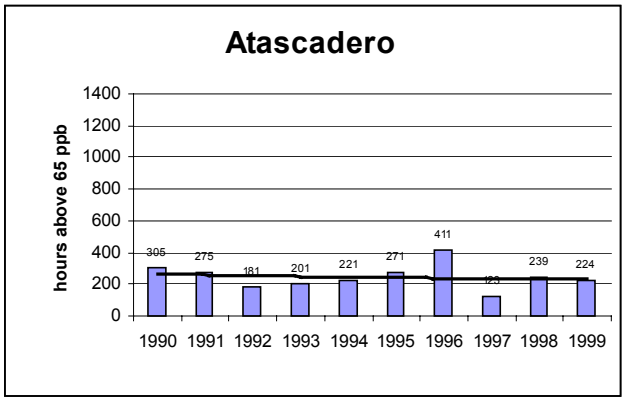


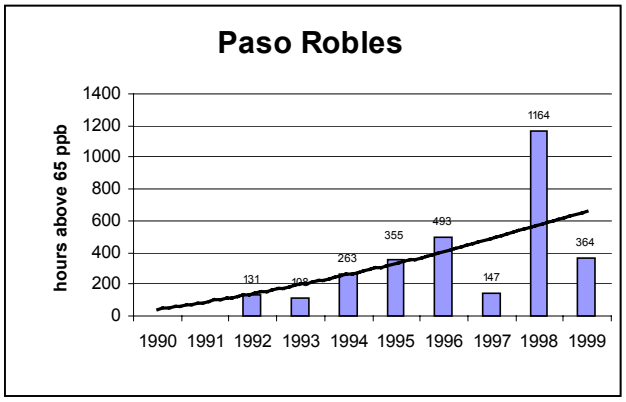


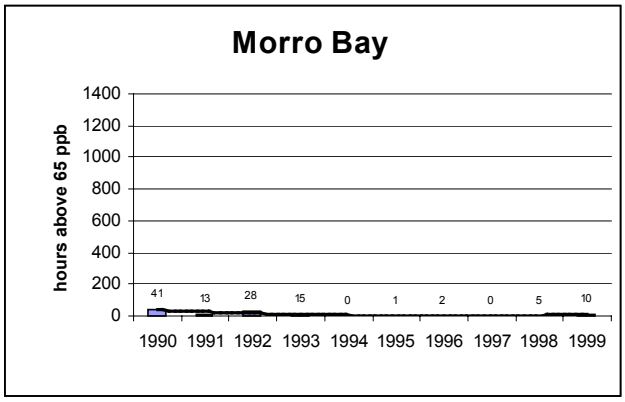


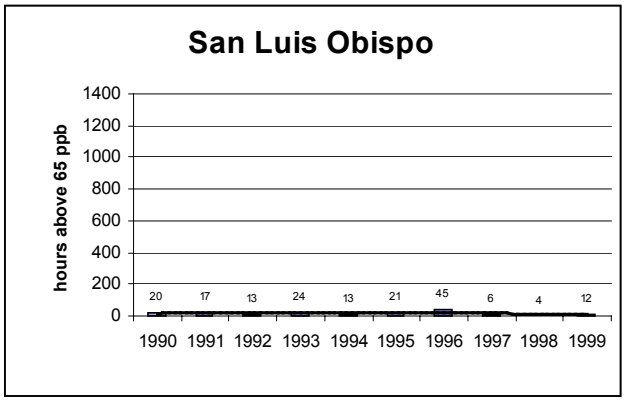
Countywide Ozone Trends - 1990-1999

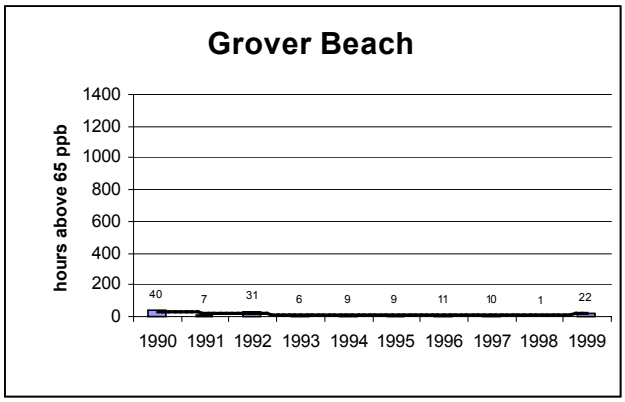
The following graphs depict ozone trends at six locations within the county for the past ten years (eight years at Paso Robles and Nipomo). Each data bar represents the total number of hours in a given year in which the ozone concentrations exceeded 65 parts per billion. This concentration level is a useful indicator for trend purposes even though there are no health standards for single-hour exposures to 65 parts per billion of ozone. The location of the Paso Robles monitoring station was changed in 1991. Consequently, data from Paso Robles is incomplete for 1990 and 1991. No data was collected for Nipomo in 1997 and 1998 during which time the station was relocated. Monitoring resumed at Nipomo in November 1998.

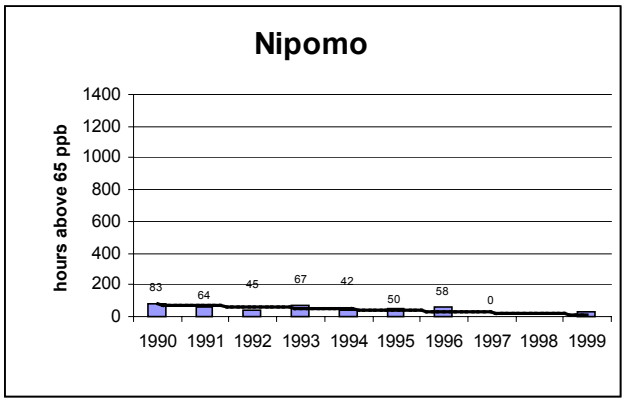












Errata

Subsequent to the original publication of this report, some minor errors were discovered in the ozone trends charts on page 9. Corrected charts appear below; see the 2008-2009 Annual Air Quality Report for detailed discussion of the errors in the original figures.