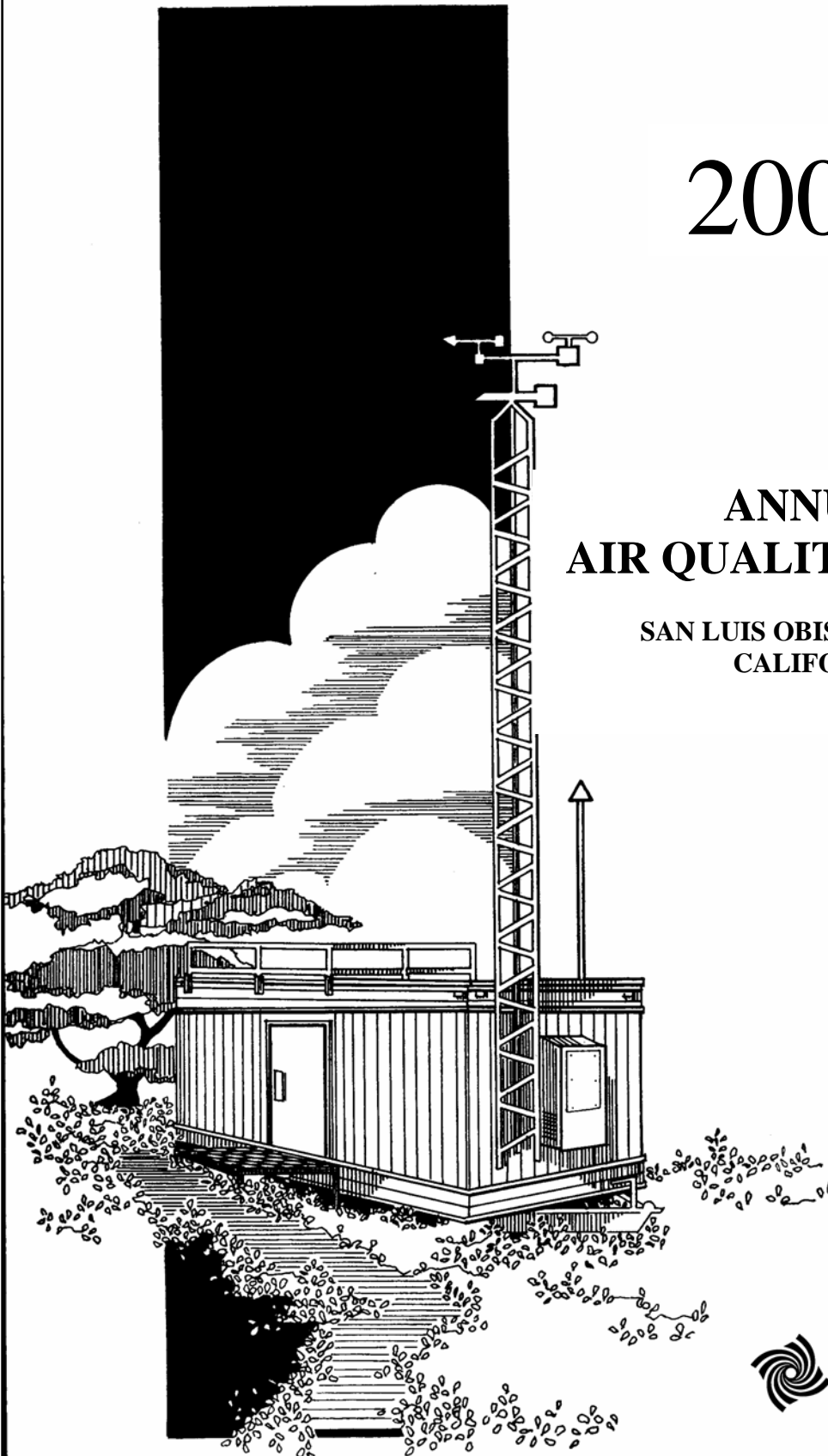


2007

**ANNUAL
AIR QUALITY REPORT**

**SAN LUIS OBISPO COUNTY
CALIFORNIA**



**AIR POLLUTION
CONTROL DISTRICT**
COUNTY OF SAN LUIS OBISPO

AIR POLLUTION CONTROL DISTRICT COUNTY OF SAN LUIS OBISPO

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2007 Annual Air Quality Report

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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 weekly on the APCD's website and in this Annual Air Quality Report. Ozone summary data appear weekly in the Saturday edition of the San Luis Obispo County Tribune, a local newspaper. Each month's data from ambient monitoring is added to separate archives maintained by the federal Environmental Protection Agency (EPA) and by the Air Resources Board (ARB). Summary data from San Luis Obispo County can be found in EPA and ARB publications and on the world wide web at the following websites:

- www.slocleanair.org
SLO APCD website
- www.arb.ca.gov
ARB website
- www.epa.gov
US EPA website

2007 Air Quality Summary

Although most populated areas of San Luis Obispo County enjoyed good air quality this year, ozone levels exceeding both federal and state standards were measured on numerous days in north county inland areas due to locally formed as well as transported pollution. Two days exceeding the federal 8-hour ozone standard of 0.08 parts per million (ppm) were recorded in 2007: one federal 8-hour exceedance day was recorded at the Carrizo Plains station and two exceedance days at the Red Hills station. Exceedance of the more stringent state 8-hour ozone standard of 0.070 ppm occurred on forty-five days: thirty-one days at the Carrizo Plains station; thirty-two days at the Red Hills station; one exceedance day in Atascadero and one exceedance day in Paso Robles. There was no measured exceedance of the state one hour ozone standard of 0.09 ppm in 2007.

Countywide, exceedances of the state 24 hour PM₁₀ standard of 50 ug/m³ occurred thirteen times out of 60 different sample days. Statistically, this is equivalent to 78 exceedance days for 2007 since sampling is only conducted once every six days. Two exceedance days were recorded at the Nipomo Regional Park station. Seven exceedance days were recorded at the Nipomo Mesa 2 stations. Thirteen exceedance days were recorded at the Hillview station. Combined smoke impacts from the Zaca and other Santa Barbara County fires, Los Angeles and San Diego fires were felt for five months in 2007 starting in July. County-wide Health Advisories were issued for smoke impacts from the fires by San Luis Obispo County's Health Officer and Air Pollution Control Officer starting in July 2007 and were not lifted until November 2007. On August 16, 2007 stations at Hillview, Mesa 2 and Nipomo Regional Park all recorded an exceedance of the state PM₁₀ standard due to the fires. There was no measured exceedance of state or federal PM_{2.5} standards or the federal air quality standard for PM₁₀ in 2007.

In San Luis Obispo County, ozone and PM₁₀ are the pollutants of main concern, since exceedances of state health-based standards for those are experienced here in most years. Our county is designated as a non-attainment area for the state PM₁₀ standard.

Air Quality Monitoring

San Luis Obispo County air quality was measured in 2007 by a network of ten ambient air monitoring stations. Station locations are depicted on the map on page 2. The APCD operated six permanent stations at Nipomo Regional Park, Grover Beach, Morro Bay, Atascadero, Red Hills and Carrizo Plains. The State Air Resources Board (ARB) operated stations at San Luis Obispo and Paso Robles. One station on the Nipomo Mesa was operated by the District for the ConocoPhillips refinery in 2007. A tenth station, a special purpose PM₁₀ monitoring station, is operated at Hillview, Nipomo Mesa.

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 24 hours. PM₁₀ (respirable particulate matter 10 microns or less in size) and PM_{2.5} (fine particulate matter 2.5 microns or less in size) are sampled for 24 hours every sixth day on the same schedule nationwide.

Table 1: Ambient Air Quality Parameters Monitored in San Luis Obispo County in 2007

O ₃	NO	NO ₂	NO _x	SO ₂	CO	PM ₁₀	PM _{2.5}	TEOM	WS	WD	ATM
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APCD Permanent Stations

Atascadero	X	X	X	X			X	X		X	X	X
Morro Bay	X	X	X	X			X			X	X	
Nipomo Reg. Park	X	X	X	X			X			X	X	X
Red Hills	X									X	X	X
Carrizo Plains	X									X	X	X

South County Special Study Sites

Hillview							X					
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ARB Stations

San Luis Obispo	X						X	X		X	X	X
Paso Robles	X						X			X	X	X

Operated by APCD

Mesa 2, Nipomo					X		X			X	X	X
Grover Beach										X	X	

Note: Grover Beach is operated as a meteorology station only.

Acronyms:

O ₃	Ozone	SO ₂	Sulfur Dioxide	PM ₁₀	Particulates < 10 microns (samples every sixth day)	WS	Wind Speed
NO	Nitric Oxide	CO	Carbon Monoxide			WD	Wind Direction
NO ₂	Nitrogen Dioxide	TEOM	Particulates <10 microns (monitored continuously)	PM _{2.5}	Particulates < 2.5 microns (samples every sixth day)	ATM	Ambient Temp
NO _x	Oxides of Nitrogen						

Table 2: Ambient Air Quality Standards in 2007

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 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 area's attainment status.

Pollutant	Averaging Time	California Standard	National Standard
Ozone (O₃)	1 Hour	0.09 ppm	-----
	8 Hour	0.070 ppm	0.08 ppm
Carbon Monoxide (CO)	8 Hour	9.0 ppm	9 ppm
	1 Hour	20 ppm	35 ppm
Nitrogen Dioxide (NO₂)*	Annual Arithmetic Mean	0.030 ppm	0.053 ppm
	1 hour	0.18 ppm	-----
Sulfur Dioxide (SO₂)	Annual Arithmetic Mean	-----	0.030 ppm (primary)
	24 Hour	0.04 ppm	0.14 ppm (primary)
	3 Hour	-----	0.5 ppm (secondary)
	1 Hour	0.25 ppm	-----
Respirable Particulate Matter (PM₁₀)	24 Hour	50 ug/m ³	150 ug/m ³
	Annual Arithmetic Mean	20 ug/m ³	-----
Fine Particulate Matter (PM_{2.5})	24 Hour	-----	35 ug/m ³
	Annual Arithmetic Mean	12 ug/m ³	15 ug/m ³
Hydrogen Sulfide (H₂S)	1 Hour	0.03 ppm	-----
Visibility	8 hour	Sufficient amount to reduce the prevailing visibility to less than ten miles when the relative humidity is less than 70 %.	

*Updated in 2007

Ambient Air Pollutants Of Local Concern

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.

Fine particulate matter, in addition to being a health hazard, can greatly reduce visibility. Research suggests that fine particulate is much more detrimental to human health than previously thought.

NO₂ and SO₂ create aerosols, which may fall as acid rain causing damage to crops, forests, and lakes.

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

Ozone

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 compromised respiratory systems. 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

Ambient air quality standards have been established for two classes of particulate matter: PM₁₀ (respirable 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: diesel exhaust, mineral extraction and production; combustion products from industry and motor vehicles; demolition and construction; agricultural operations; smoke from open burning; paved and unpaved roads; condensation of gaseous pollutants into liquid or solid particles; and natural sources such as wind-blown dust.

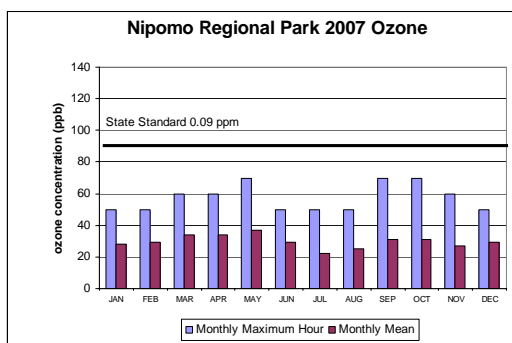
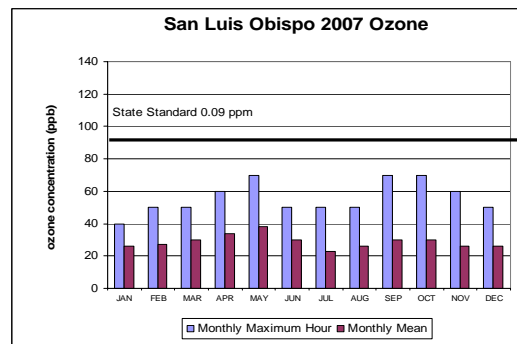
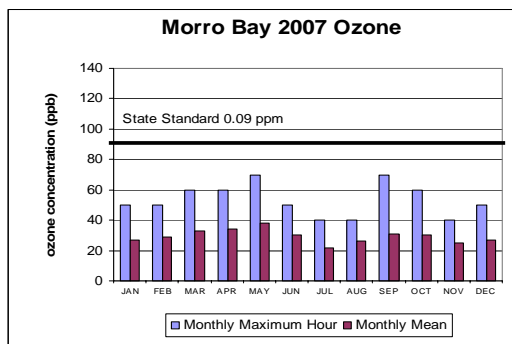
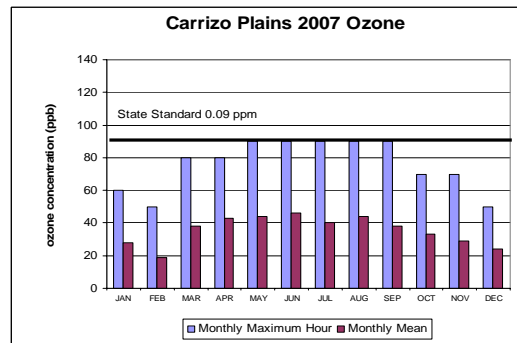
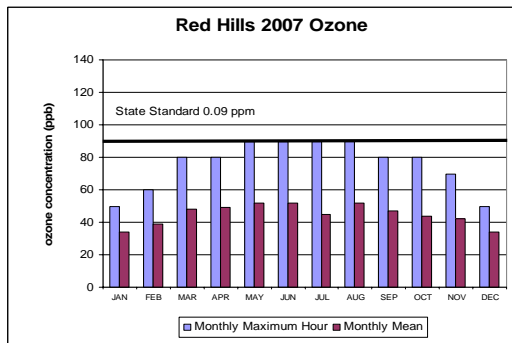
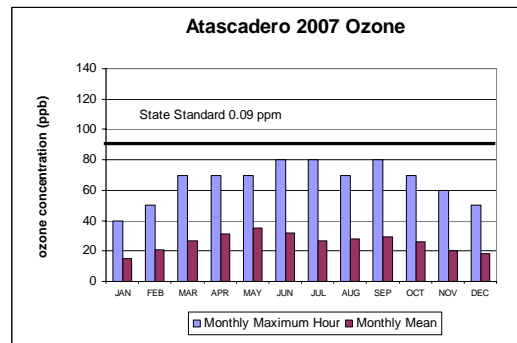
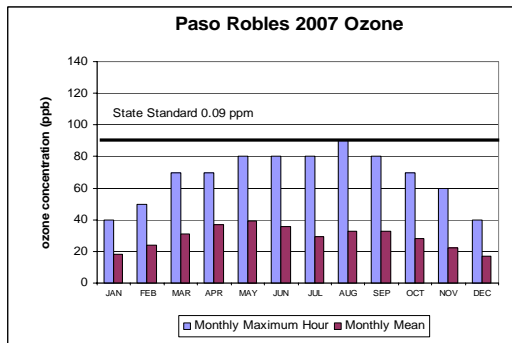
NO₂, SO₂, CO

Nitrogen dioxide (NO₂) is the brownish-colored component of smog. NO₂ irritates the eyes, nose and throat, and can damage lung tissues. Sulfur dioxide (SO₂) is a colorless gas with health effects similar to NO₂. Both pollutants are generated by fossil fuel combustion from mobile sources (such as vehicles, ships and aircraft), and at stationary sources (such as industry, homes and businesses). SO₂ may also be emitted by petroleum production and refining operations. The state and national standards for NO₂ have never been exceeded in this county. The state standard for SO₂ was exceeded periodically on the Nipomo Mesa up until 1993. Equipment and processes at the facilities responsible for the emissions were upgraded as a result, and the state SO₂ standard has not been exceeded since that time. Exceedances of the federal SO₂ standard have never been measured here.

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 County since 1975.

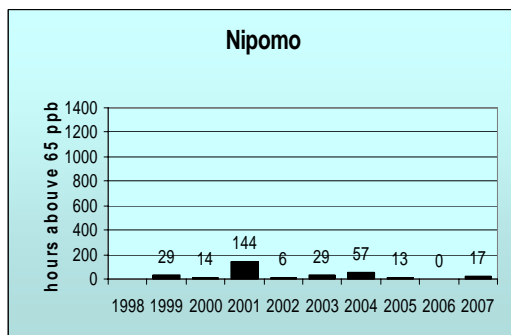
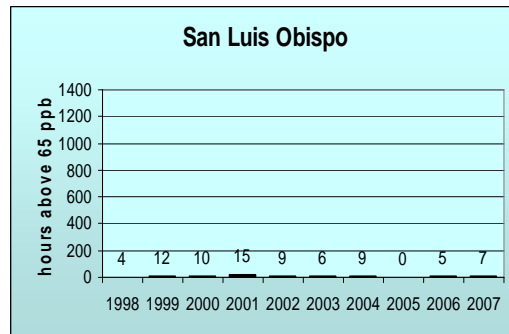
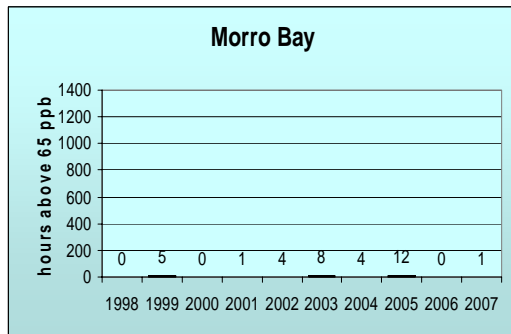
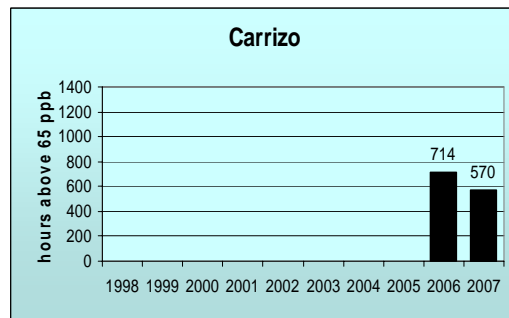
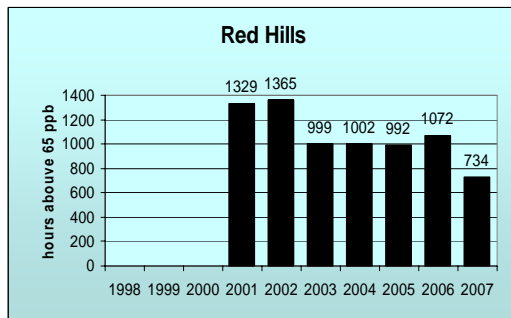
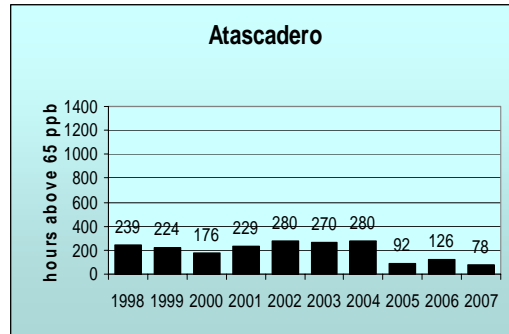
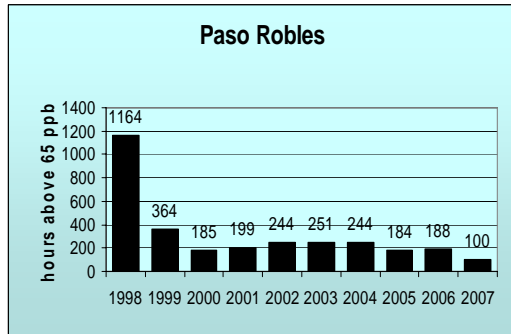
2007 Ozone

The following graphs depict 2007 monthly ozone concentrations at seven monitoring stations in the county. There are two data bars presented for each month. The monthly maximum hour bar shows the highest hourly average concentration during the month in parts per billion (ppb). The monthly mean bar is a monthly average concentration and depicts average ozone intensity (in ppb) for the month. Two days exceeding the federal 8-hour ozone standard of 0.08 parts per million (ppm) were recorded in 2007. One federal 8-hour exceedance day was recorded at the Carrizo Plains station and two exceedance days at the Red Hills station. One of these days was concurrent. Exceedance of the more stringent state 8-hour ozone standard of 0.070 ppm occurred on forty-five days. Thirty-one days at the Carrizo Plains station and thirty-two days at the Red Hills station was recorded for the state 8-hour standard. One exceedance day in Atascadero and one exceedance day in Paso Robles were also recorded for the state 8-hour standard. Some of these days were concurrent. There was no measured exceedance of the state one hour ozone standard of 0.09 ppm in 2007.



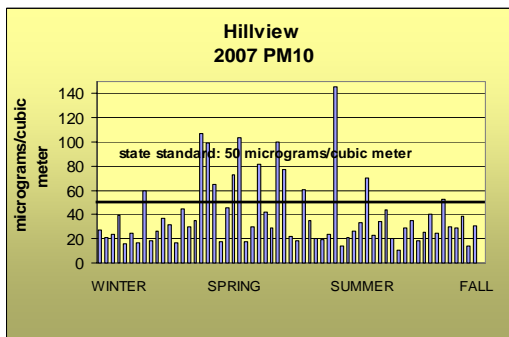
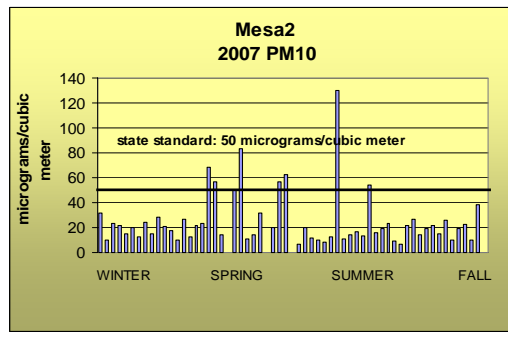
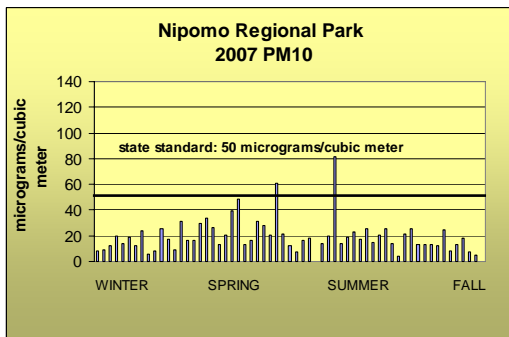
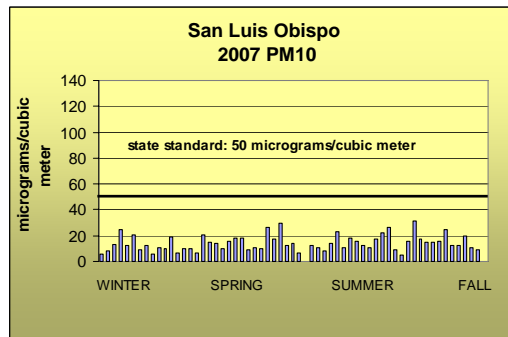
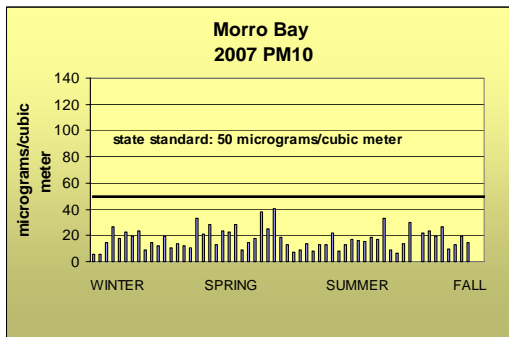
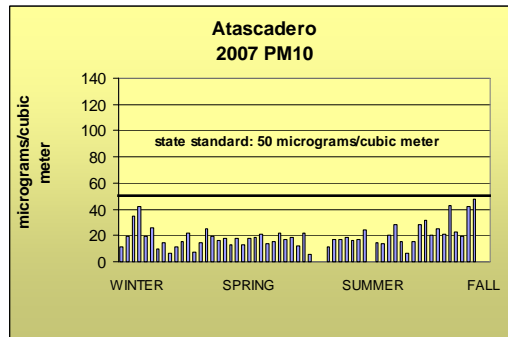
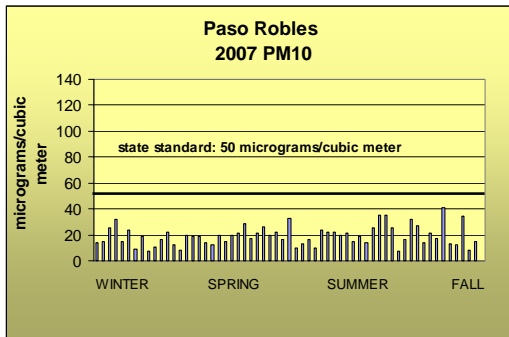
Countywide Ozone Trends - 1998-2007

The following graphs depict ozone trends at seven locations within the county for the past ten years; seven years at Red Hills, two years at Carrizo and nine years at 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. No data was collected for Nipomo in 1998 during which time the station was relocated. Monitoring resumed at Nipomo in November 1998.



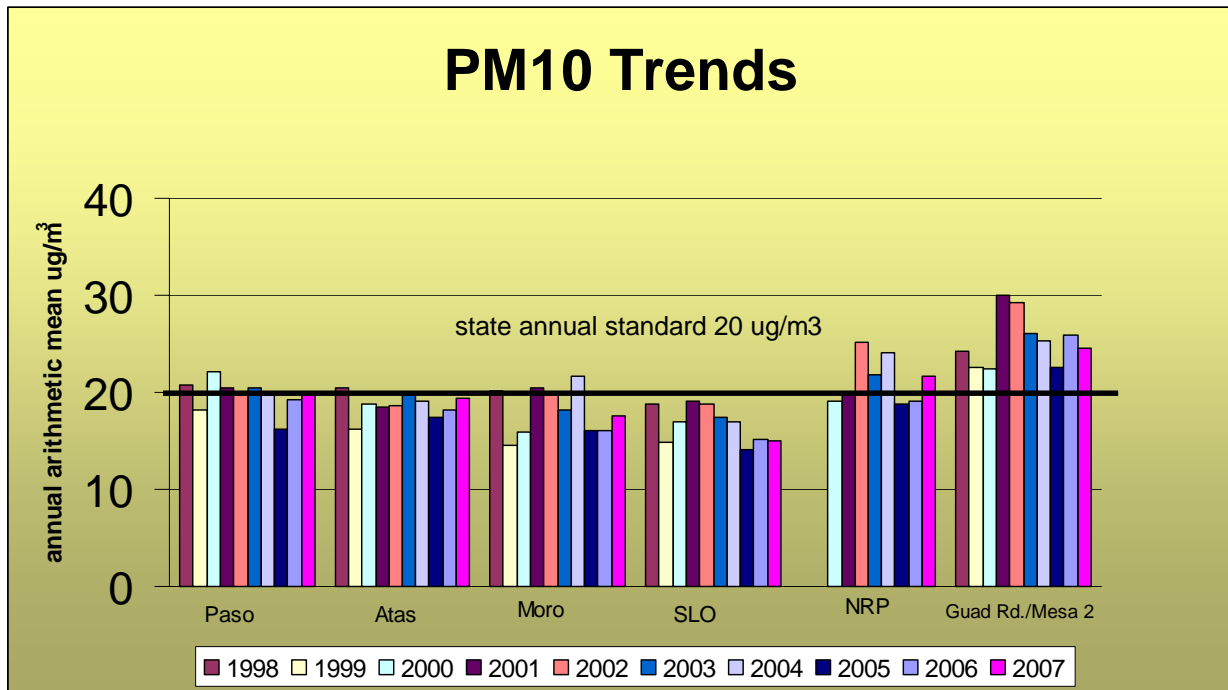
Particulate Matter, 10 microns or less (PM₁₀)

The graphs on this page present PM₁₀ particulate data from seven locations. Countywide, exceedances of the state 24 hour PM₁₀ standard of 50 ug/m³ occurred thirteen days out of 60 different sample days. Statistically, this is equivalent to 78 exceedance days for 2007 since sampling is only conducted once every six days. Two exceedance days were recorded at the Nipomo Regional Park station. Seven exceedance days were recorded at the Nipomo Mesa 2 station. Thirteen exceedance days were recorded at the Hillview station. Combined smoke impacts from the Zaca and other Santa Barbara County fires, Los Angeles and San Diego fires were felt for five months in 2007 starting in July. County-wide Health Advisories were issued for smoke impacts from the fires by San Luis Obispo County's Health Officer and Air Pollution Control Officer starting in July 2007 and were not lifted until November 2007. On August 16, 2007 stations at Hillview, Mesa 2 and Nipomo Regional Park all recorded an exceedance of the state PM₁₀ standard due to the fires. There was no measured exceedance of state or federal PM_{2.5} standards or the federal air quality standard for PM₁₀ in 2007.



Particulate Matter, 10 microns or less (PM₁₀) continued.

The graph below depicts the annual arithmetic average PM₁₀ concentration at six locations in San Luis Obispo County over the past ten years (eight years at NRP). While occasional exceedances of the state PM₁₀ standard occur at all sites, the monitors on the Nipomo Mesa at NRP and Guadalupe Road/Mesa 2 are consistently higher than elsewhere in the county. The reasons for this are being investigated through the South County Particulate Matter Phase II Study discussed on page 12 of this report.



Particulate Matter, 2.5 microns or less (PM_{2.5})

Monitoring for fine particulate matter (PM_{2.5}) began in 1999 and is performed at two locations in San Luis Obispo County: the San Luis Obispo and Atascadero monitoring stations. The federal standard for PM_{2.5} of 35 micrograms per cubic meter was not exceeded during 2007. California has not set a 24 hour PM_{2.5} standard.

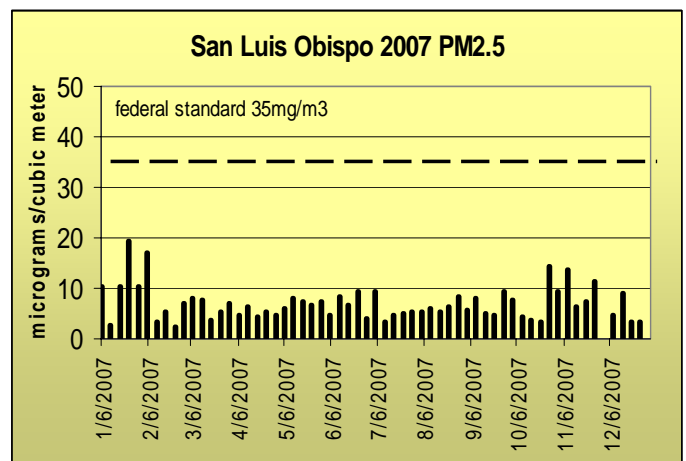
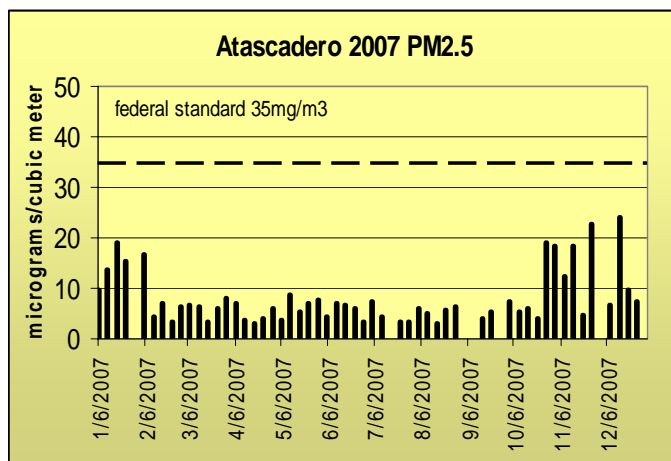


Table 3: First, Second and Third Highest Hourly Averages for 2007

The following table lists the highest hourly (and 8-hour for ozone) concentrations (expressed in parts per million) recorded in 2007 for ozone, sulfur dioxide, nitrogen dioxide and carbon monoxide at the stations where they are monitored. Sampling date and hour appears with each data value in the format of month/day: hour.

Station	O ₃ 1-hour			O ₃ 8-hour			SO ₂			NO ₂		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Paso Robles	.085 08/13:14	.084 08/15:14	.083 08/14:13	.074 06/13:10	.069 09/25:11	.068 09/26:11						
Atascadero	.079 06/13:13	.079 09/01:14	.077 09/26:13	.071 09/26:11	.068 09/25:10	.066 05/08:10				.046 01/23:18	.046 11/29:18	.045 01/24:18
Morro Bay	.071 09/26:17	.065 05/07:15	.063 10/22:15	.062 09/26:11	.059 05/07:10	.056 09/25:10				.046 03/12:07	.040 03/13:06	.039 01/09:17
San Luis Obispo	.071 10/22:14	.069 05/07:16	.067 09/26:17	.063 05/07:10	.062 09/26:10	.059 09/25:10						
Red Hills	.089 07/04:20	.089 07/05:00	.088 05/25:15	.088 07/04:18	.084 07/05:00	.084 08/14:11						
Carrizo Plains	.092 06/13:18	.092 09/07:16	.091 05/25:14	.086 05/25:09	.084 06/13:11	.080 07/04:11						
Nipomo Regional Park	.072 09/26:14	.070 05/07:15	.069 09/25:16	.068 09/26:11	.067 05/07:09	.061 09/25:10				.034 11/28:19	.031 01/23:19	.031 09/26:21
Nipomo, Mesa 2							.151 01/08:14	.141 02/07:14	.072 02/14:16			

Table 4: Summary of Particulate Matter Concentrations for 2007

The following table lists the highest concentrations and the annual means recorded in 2007 for PM₁₀ and PM_{2.5} particulate matter at the stations where they are monitored. Values are in micrograms/cubic meter. Values exceeding state or federal standards are in bold.

2007	PM ₁₀		PM _{2.5}	
	Highest Concentration	Annual Arithmetic Mean	Highest Concentration	Annual Arithmetic Mean
Paso Robles	44 ug/M³ 11/26	20.0 ug/M ³		
Atascadero	49 ug/M³ 12/20	19.6ug/M ³	23.9 ug/M³ 12/14	8.0 ug/M ³
Morro Bay	42ug/M³ 06/23	18.3ug/M ³		
San Luis Obispo	32 ug/M³ 10/27	15.0ug/M ³	19.2 ug/M³ 01/24	6.7 ug/M ³
Nipomo Regional Park	82 ug/M³ 08/16	22.3ug/M³		
Nipomo, Mesa2	133 ug/M³ 08/16	25.6ug/M³		
Hillview, Nipomo	146ug/M³ 08/16	40.8ug/M³		

2007 Ambient Air Monitoring Network Review

The San Luis Obispo County Air Pollution Control District (SLOAPCD) 2007 Ambient Air Monitoring Network Review Update is an annual examination and evaluation of the SLOAPCD's network of air pollution monitoring stations. The annual review of our State and Local Air Monitoring Stations (SLAMS) network is required by Title 40, Code of Federal Regulations, Part 58. The review process helps ensure continued consistency with the network's specific monitoring objectives defined in the regulations and confirms that the information in the state and federal monitoring records accurately and properly classify each station.

This report is a directory of existing and proposed monitoring in the SLOAPCD's network of SLAMS and research stations and serves as a progress report on the recommendations and issues raised in earlier network reviews. The report also addresses ongoing network design issues.

The review period of this report looks back to March 2005 (the publication of the 2005 Ambient Air Monitoring Network Review) and looks forward one year to January 2008. The report examines the monitoring network as it operated in 2005 and 2006, presents recommended changes to the monitoring configuration and discusses changes to the network infrastructure. Any changes to the monitoring network implemented as a result of a Review are reported in the annual air quality report. Below is a summary of the proposed and accomplished tasks from the 2007 Ambient Air Monitoring Network Review Update.

OZONE MONITORING NETWORK

Black Mountain: discontinue ozone monitoring at the Black Mountain station. Black Mountain was a SLOAPCD special study site. As reported in the 2006 Annual Air Quality Report, this station was closed in October 2006.

Red Hills: register this monitor and begin reporting data to the EPA/AQS database. This task was accomplished.

SULFUR DIOXIDE NETWORK

Nipomo Regional Park (NRP): discontinue sulfur dioxide monitoring at NRP. This task was completed as of December 2006.

PARTICULATE MONITORING NETWORK

Carrizo Plains: discontinue PM₁₀ sampling at the Carrizo Plains Station. No federal or state standards were exceeded during this interval and measured levels were generally comparable to results obtained at other particulate sampling sites in interior parts of the county. Due to its remote location this site is not suitable for ongoing labor-intensive PM₁₀ sampling. This task has been accomplished.

Atascadero: discontinue TEOM continuous PM₁₀ monitoring. The TEOM will be moved in 2008 to be a part of the South County PM Study II.

Woodlands: establish TEOM PM₁₀ and FRM PM_{2.5} sampling at the proposed Woodlands station. This task will be implemented after the South County PM Study II is completed.

Hillview: register this monitor and begin reporting data to the EPA/AQS database. This task has been accomplished.

SITE AND STRUCTURAL

Morro Bay: The building which houses the Morro Bay monitors was scheduled for removal and replacement with a small trailer. This task was accomplished.

Grover Beach: The trailer which houses the Grover Beach monitors is in need of replacement. The trailer will be removed and replaced with a small weatherproof structure to house the electronic equipment. This task has been delayed until after the South County PM Study II is completed.

ENERGY EFFICIENCY IMPROVEMENTS

The SLOAPCD embarked on a project to make all of our air monitoring stations as energy efficient as possible. We employed innovative and inexpensive ideas and technologies to redesign our stations for minimal energy consumption. More information about the SLOAPCD's energy efficiency project may be found at the following website: http://www.c-5.org/Efficiency_Project/

South County Particulate Matter Study

The report on the Nipomo Mesa Particulate Study, concluded in March 2006, was released to the public in 2007.

The results of the study document a serious problem on the Mesa, with exceedance of five of the six state and federal health standards for fine and coarse particulates recorded over the study period. Exceedances of the state 24 hour PM₁₀ standard were measured on over one quarter of the sample days.

The study data clearly demonstrates that the single largest contributor to the particulate problem is high northwesterly wind events entraining crustal particles upwind from the Mesa and transporting them to the Mesa area; particulate concentrations dropped off substantially at the farther inland location of the Mesa. Localized areas of higher concentration occur near dirt roads composed of fine sandy particles.

This study also attempted to evaluate the potential impacts from off-road vehicle activities at the Oceano Dunes State Vehicle Recreational Area (SVRA) on the elevated particulate levels seen on the Mesa. The SVRA is located upwind of the Mesa in the area shown by the study data to be the major source of particulates when high PM concentrations are measured on the Mesa. An analysis of average weekend and weekday particulate measurements taken on the Mesa over the past 12 years was conducted to determine if there were higher PM levels on the weekends relative to the typically higher weekend off-road vehicle activity at the SVRA. The analysis found higher weekend concentrations at one monitoring station, but the data were not conclusive. Secondary impacts from the off-road activities, such as denuding vegetation, may also play a role by destabilizing the dune structure, allowing winds to entrain fine particles and carry them downwind. Determining the potential secondary impacts of the off-road activities is beyond the scope of this report, but deserves further study.

Regardless of whether human activities or natural sources are responsible, the study documents the frequent occurrence of unhealthy particulate levels on the Mesa. Even though the composition of the particulates is mostly natural crustal particles, the health implications are not lessened. All fine airborne particulate matter, regardless of composition, can cause respiratory distress when inhaled, especially to the very young, the elderly and those with compromised respiratory systems. In addition, sand particles are high in crystalline silica, a known carcinogen with a high risk factor.

The study results also showed that sulfate concentrations on the Mesa are well below the California state sulfate standard, although higher sulfate concentrations were measured there than at other rural coastal areas of California. On days with light winds, the study data showed monitoring locations downwind from the ConocoPhillips Refinery complex had significantly higher sulfate concentrations than sites

located upwind from the refinery. The coke calcining facility, the major source of sulfur dioxide emissions at the refinery complex, shut down in March 2007 and will not resume operations.

The District Board of Directors has directed staff to conduct additional studies of particulate matter levels on the Nipomo Mesa to enable more definitive conclusions regarding the source(s) of the pollution and potential mitigation needed. Staff worked with UC Davis, Santa Barbara APCD and Great Basin AQMD to design and implement a follow-on study to further investigate the potential influence of off-road vehicle use at the SVRA, agriculture and the refinery on the elevated PM levels measured on the Mesa. Our collaborative partner in the study has been ConocoPhillips Santa Maria Facility and we have had assistance from the California Department of Parks and Recreation. The study implementation began in early 2008 and will run through a full year of PM monitoring in both impacted areas and similar non-impacted areas to provide adequate data on which to reach conclusions and base decisions. Comprehensive analysis of the data will begin after the field work is completed, with a formal report on the study findings expected to be completed in late 2009.

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