



Monterey Bay Unified Air Pollution Control District

**North Central Coast Air Basin
California**

Air Monitoring Network Assessment

June 30, 2010

Monterey Bay Unified Air Pollution Control District
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ACRONYMS

8HrO3	Ozone running eight hour average
AIRS	Air Information Retrieval System
AMBAG	The Association of Monterey Bay Area Governments
APCD	Air Pollution Control District
ARB AQS	The ARB Air Quality System audit division
ARM	approved regional method
ATM	Atmospheric temperature monitor
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CO	carbon monoxide
District	Short for Monterey Bay Unified Air Pollution Control District
DOF	California Department of Finance
EPA	United States Environmental Protection Agency
EPA AQS	The EPA Air Quality System audit division
FEM	federal equivalent method
FRM	federal reference method
IMPROVE	Interagency Monitoring of Protected Visual Environments
m	meters
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCCAB	North Central Coast Air Basin
NO2	nitrogen dioxide
O3	ozone
PM10	particulate matter (0 to 10 microns aerodynamic diameter)
PM2.5	particulate matter (0 to 2.5 microns aerodynamic diameter)
SIP	State Implementation Plan
SLAMS	State or Local Air Monitoring Stations
SO2	sulfur dioxide
SPM	special purpose monitoring
WDA	Wind direction average
WSA	Wind speed average

Background

Introduction

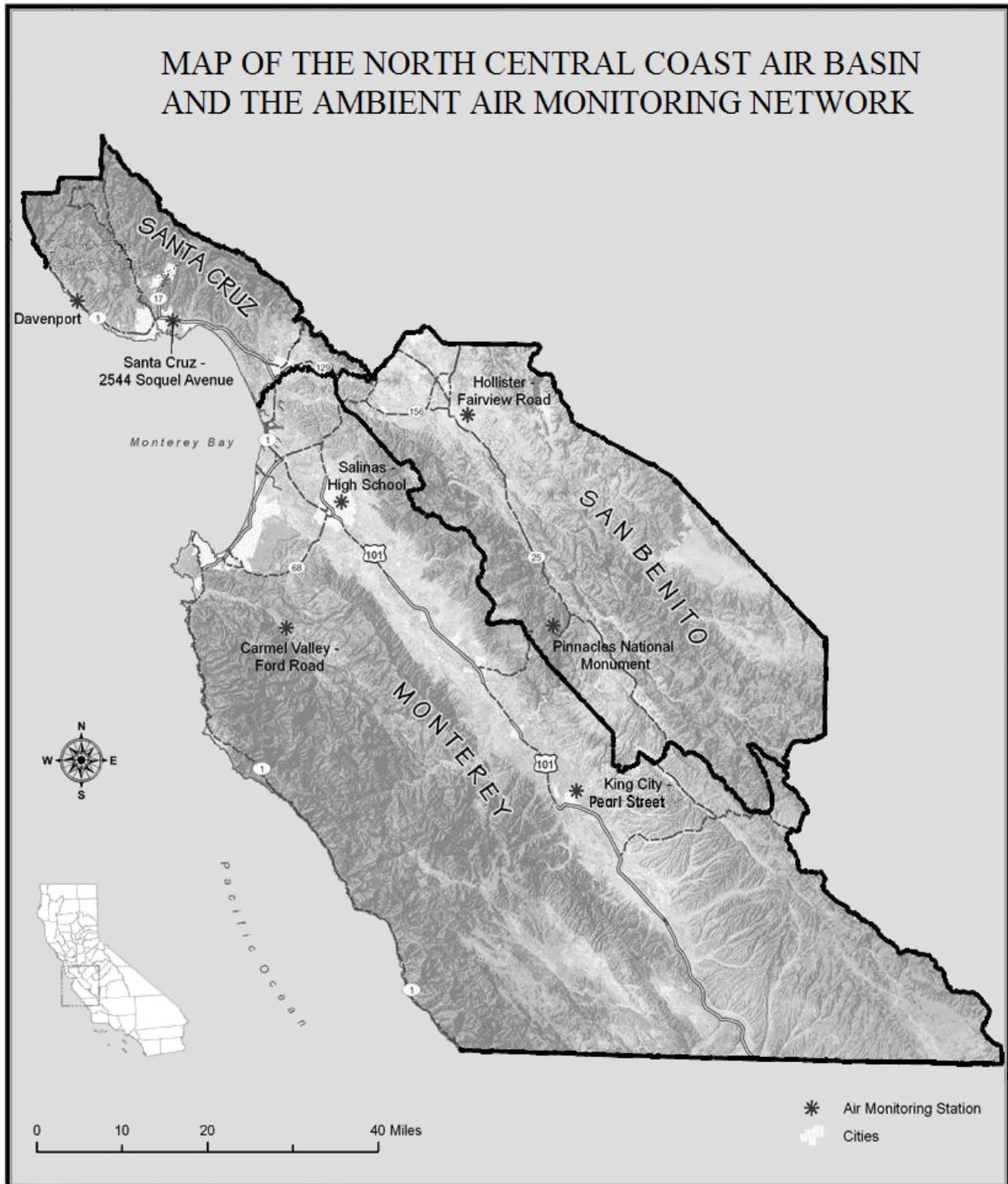
The EPA requires all air pollution control districts to submit an air monitoring network assessment for each of their individual ambient air monitoring systems every five years, starting July, 2010. The objective of the network assessment is to encourage optimal use of each district's resources in order to meet minimal monitoring requirements for pollutants of interest and to minimize monitoring redundancies within the district's area of responsibility. This report describes the North Central Coast Air Basin (NCCAB) and the ambient air monitoring network operated by the Monterey Bay Unified Air Pollution Control District (District). The analyses and potential corresponding courses of action are then discussed.

Geographical Description

Formed in 1974, the District is the public agency responsible for air quality management in Monterey, Santa Cruz, and San Benito Counties, which make up the NCCAB. The region forms an area of more than 5,100 square miles. With Monterey County covering over 3,320 square miles and Santa Cruz County covering only 445 square miles, the planning area consists of one of the largest and one of the smallest counties in the state. The NCCAB features varied vegetation, climate and geography. As shown in Figure 1, it includes portions of several mountain ranges: the Santa Lucia and Gabilan Ranges in Monterey and San Benito Counties, the southern portion of the Santa Cruz Mountains in Santa Cruz County, and the Diablo Range in the eastern half of San Benito County. The coastal terraces in the Santa Cruz area, the flat plains surrounding Watsonville, Salinas, and King City, and the southern Santa Clara Valley are sharply defined by the various mountain ranges.

The District currently collects and reports data from a network of seven air monitoring stations throughout the NCCAB, as shown in Figure 1. These monitoring sites include five State and Local Air Monitoring Stations (SLAMS) and two Special Purpose Monitoring (SPM) stations. The monitoring stations operated by the District at Salinas, Hollister, Santa Cruz, King City, and Carmel Valley are part of the SLAMS network. The King City station, which was originally located on the perimeter of the city, was relocated closer to the center of the city in 2007. These stations provide information on local and regional scale air quality. The stations operated at Davenport and Pinnacles are referred to as Special Purpose Monitoring sites because they provide information on the impact of specific sources, or to gauge air quality impacts on national resources, such as the National Parks. Six of the stations are directly operated and maintained by the District and one, the Pinnacles National Monument Site, is operated and maintained by the National Park Service.

Figure 1.



General Climate

The NCCAB has a climate that is best described as Mediterranean. Monterey and Santa Cruz are both coastal counties characterized by cool wet winters and warm, generally dry summers with average temperatures (degrees Fahrenheit) ranging from the high 30's to low 40's in the winter to mid to high 70's during the winter. Coastal fog and low overcast is common, especially during the evening to morning hours, during the summer months. San Benito County, which is inland from Monterey County, experiences higher daily temperatures and less coastal fog and overcast skies during the summer. The annual rainfall averages 19 inches in Monterey County, 30 inches in Santa Cruz County and 14 inches in San Benito County. The vast majority of the rainfall occurs between November and the following April.

Land Use

In Monterey and Santa Cruz counties urbanized development occupies about three percent of the land area. Approximately 65 percent of regional urban development in Monterey and Santa Cruz Counties extends around Monterey Bay on the coastal plain from the Cities of Santa Cruz to Carmel-by-the-Sea. Salinas is an exception, lying more than ten miles inland from Monterey Bay. Nearly three-quarters of the urban development is for residential purposes. Commercial land uses are concentrated in the major urban centers of the counties including Santa Cruz-Capitola, Monterey Peninsula, and Salinas. Tourism is also a major segment of the economic market in these areas.

Approximately 97 percent of San Benito County is unincorporated land and, of this area, 90 percent is used as farmland, rangelands, forest, and public lands. The bulk of the county's population resides in the central region near the incorporated cities of Hollister and San Juan Bautista. Hollister serves as the major commercial center for the county.

Industrial activity within the NCCAB includes oil production (San Ardo oil field), power generation (Moss Landing), commercial fishing (Moss Landing), cement manufacturing (Davenport), quarrying activities (all three counties), agricultural processing in the Salinas and Watsonville areas, sand mining (Hollister, Marina, Scotts Valley and the North Coast of Santa Cruz County), food processors (Salinas, Watsonville and Santa Cruz) and electronic manufacturing firms (Scotts Valley, Santa Cruz, Watsonville and Salinas).

The dominant land use within the NCCAB is agriculture with approximately 1,626,000 agricultural acres or 437,000 farmed acres (pasture land excluded). About 88 percent of farmed agricultural land is in the Salinas Valley with six percent in San Benito County and six percent in Santa Cruz County. Based on the 2005 Crops Reports, the gross agricultural crop value was \$3.27 billion in Monterey County, \$269 million in San Benito County and \$418 million in Santa Cruz County for a total of nearly \$4 billion.

Institutional land uses occupy significant portions of the land area within the NCCAB. Military land uses in Monterey County include Fort Hunter-Liggett, Camp Roberts, the Naval Postgraduate School, and the Presidio of Monterey. Other major institutional uses are the

University of California at Santa Cruz (UCSC) and the Soledad Correctional Facility. Fort Ord, comprising almost 28,000 acres, was closed in 1993. The California State University at Monterey Bay and the University of California at Santa Cruz, have both received over 2,000 acres of Fort Ord land for education and research uses.

The region has a significant amount of land in open space and recreation uses including several large State Parks, the Ventana Wilderness (164,503 acres), the Los Padres National Forest (304,035 acres), and the Pinnacles National Monument. Over 17,000 acres of Fort Ord have been dedicated to open space and recreational uses. The California Department of Parks and Recreation operates over 25 visitor facilities in the region.

Population Dynamics

The population data for the area are developed by federal, state and local agencies. The U. S. Census Bureau conducts a physical count of the population once every ten years, with the last decennial census in the year 2000. The California Department of Finance (DOF) releases annual population estimates to complement the decennial census. The most recent DOF figures are for the year 2007. The NCCAB's regional Metropolitan Planning Organization, the Association of Monterey Bay Area Governments (AMBAG), periodically develops population forecasts that uses the most recent economic and population growth data. Historically, the AMBAG forecasts for a given year have been a few percentage points higher than the corresponding DOF figure.

The most recent population forecasts, adopted by AMBAG on June 11, 2008, are presented in Table 1. The current AMBAG population figures in part represent "constrained forecasts" where limitations to growth due to such factors as the availability of water, wastewater treatment and local growth policies are taken into account.

DOF figures for 2007 indicate that the air basin is home to approximately 747,888 people with 57 percent residing in Monterey County, 35 percent in Santa Cruz County, and eight percent in San Benito County. AMBAG forecasts the area to grow to about 920,714 persons by 2035.

Table 1. Population Forecasts for the North Central Coast Air Basin
 (Association of Monterey Bay Area Governments, Adopted June 11, 2008)

AREA	YEAR				
	2005	2010	2020	2030	2035
Monterey County					
Carmel	4,091	4,075	3,873	4,007	4,033
Del Rey Oaks	1,647	1,627	2,237	3,197	3,171
Gonzalez	8,399	10,831	15,969	20,941	23,418
Greenfield	13,357	17,795	21,855	27,348	30,337
King City	11,430	13,540	17,269	22,482	24,726
Marina	19,051	24,551	29,274	32,010	32,942
Monterey	30,467	30,106	30,278	30,650	30,836
Pacific Grove	15,528	15,530	15,550	15,057	15,036
Salinas	149,705	153,779	163,234	170,913	173,359
Sand City	302	447	1,498	1,498	1,498
Seaside	35,173	34,666	35,158	35,017	35,549
Soledad	27,365	28,853	33,760	38,801	41,405
Unincorporated	106,117	109,509	113,778	113,628	114,052
Total	422,632	445,309	483,733	515,549	530,362
Santa Cruz County					
Capitola	9,918	10,124	10,693	11,090	11,269
Santa Cruz	56,421	58,919	63,265	65,884	67,807
Scotts Valley	11,565	11,923	12,311	12,688	12,921
Watsonville	49,571	51,903	56,544	61,245	62,463
Unincorporated	132,617	135,173	137,681	139,690	141,162
Total	260,092	268,041	280,493	290,597	295,621
San Benito County					
Hollister	37,002	40,415	49,064	59,259	62,756
San Juan Bautista	1,722	1,937	2,356	2,743	2,907
Unincorporated	18,600	20,079	24,720	27,429	29,068
Total	57,324	62,431	76,140	89,431	94,731
NCCAB Total	740,048	775,781	840,366	895,577	920,714

Pollution Sources

Ozone (Precursors)

Ozone, the primary constituent of smog, is formed in the atmosphere through complex chemical reactions involving volatile organic compounds (VOC) and nitrogen oxides (NO_x) in the presence of sunlight. Sources of VOC within the NCCAB include aircraft, on-/off-road motor vehicles, cleaning and surface coatings, solvent evaporation, landfills, petroleum production and marketing, and prescribed burning. Sources of NO_x include on-/off-road motor vehicles, stationary source fuel combustion, and industrial processes. Figures 2 and 3 illustrate some of the relative contributions of these general sources from within the NCCAB. In addition to emissions generated locally within the NCCAB, the California Air Resources Board (CARB) has determined that transport emissions from areas outside the air basin can account for violations of the State ozone ambient air quality standards (AAQS). This is particularly true at stations that currently do not meet the State standard, including Pinnacles, which is the air basin's design site for meeting the State AAQS, and to a lesser extent, Hollister.

Aside from emissions caused by human activity, emissions from natural sources also contribute to the formation of ozone. VOCs are the larger part of the natural inventory. Emissions from vegetation foliage (i.e. biogenic sources) are a primary contributor to ozone formation. For NO_x, natural emissions come from wildfires as well as microbial activity in the soil. Natural emissions are difficult to quantify and are highly dependant on ambient temperature, sunlight and moisture. Natural emissions vary greatly season to season and year to year. In general, natural emissions are highest during the ozone season. These emissions from natural sources are beyond regulatory control and are excluded from the anthropogenic inventory.

Particulates

PM10 and PM2.5 represents respirable particulate matter less than 10 and 2.5 microns in size, respectively. Because of their small size, they can be inhaled deep into the lungs and are therefore a health concern. They are classified as primary or secondary depending on their origin. Primary particles are unchanged after being directly emitted. Major sources of primary particles include fugitive dust from roads and agricultural operations. Secondary particulates are formed in the atmosphere largely by chemical reactions involving gases, e.g., sulfate from directly emitted sulfur oxides. Natural sources of particulates include sea spray, forest fires, volcanic debris, etc. Man-made sources include fuel combustion, industrial processes and transportation.

Figure 2. Volatile Organic Compounds (VOC)

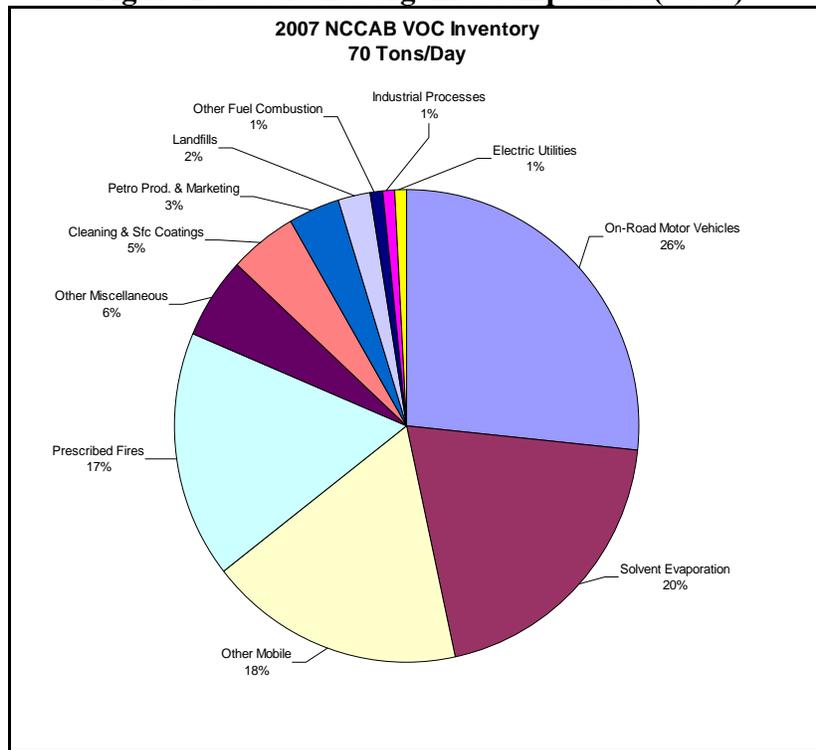
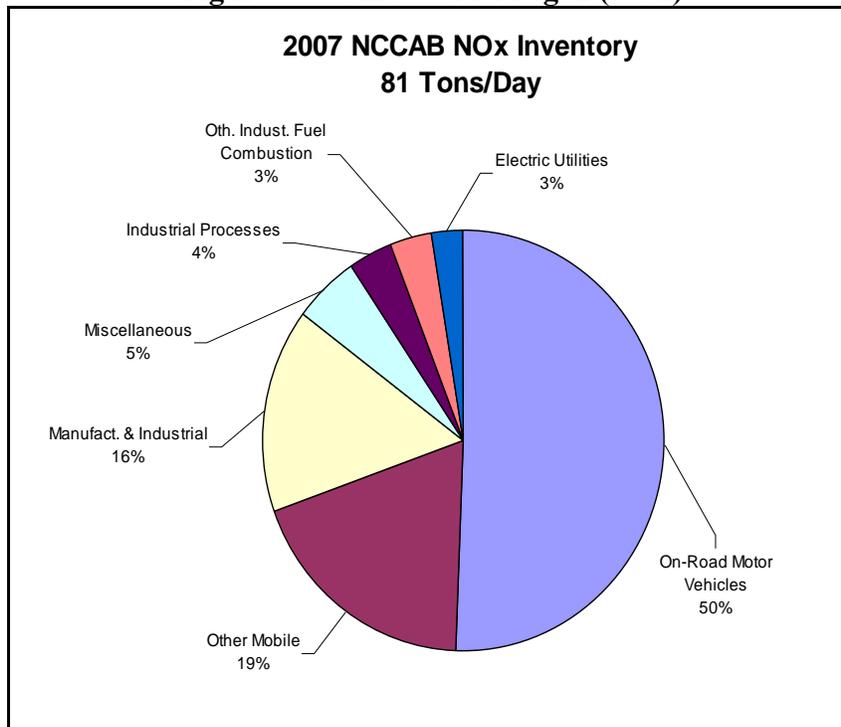


Figure 3. Oxides of Nitrogen (NOx)



Ambient Air Monitoring Network – 2006 to Present

There sites described below were part of the air monitoring network up until 2010. The SLAMS sites are used to track criteria pollutants to help ensure that the NCCAB falls within the state and national AAQS. The SPMs monitor pollutant levels emitted from a specific site (Davenport), or the effects of pollution in a specific area (Pinnacles). Tables 2-11 depict the histories for the parameters monitored at each site. The District’s annual network plan submitted simultaneously with this network assessment contains much detailed information about the current sites.

Salinas 3 (SLAMS)

The current location of this station was established in December 1999 to monitor air quality conditions in the Salinas Metropolitan Statistical Area (MSA), the District’s most populated area. This station features one of the District’s most extensive set of measurements. The data collected include CO, NO₂, O₃, PM₁₀, PM_{2.5}, BAM-PM_{2.5}, WSA, WDA and ATM. Particulate data, PM₁₀ and PM_{2.5} are acquired by filter based instruments operating on the one in six day schedule. PM_{2.5} data is also acquired hourly using newer FEM BAM-1020 monitors. Data from this populated area generally indicate good air quality and meet all state and federal standards for CO, NO₂, O₃, PM₁₀, and PM_{2.5}. Data from this site have been useful in assessing air pollution impacts on populations during unusual events, such as wildfires at Fort Ord.

Salinas Site Information

Site Name	Salinas 3
AQS ID	06-053-1003
GIS coordinates	N 36° 41’ 39.5” W 121° 37’ 23.6” Elevation: 21.3 meters
Location	High school. Urban and Center City.
Address	867 East Laurel Dr., Salinas, CA. 93905
County	Monterey
Representative Area	MSA: Salinas, CA.

Table 2. Salinas-3 AMS • 867 E. Laurel Drive, Salinas

AIRS Site Code	Parameter	Parameter Code	POC	Interval Code	Units Code	Method Code	Date Open	Date Closed
06-053-1003	03	44201	1	1	008	047	12/31/1999	N/A
	ATM	62101	1	1	015	040	12/31/1999	N/A
	WDA	61102	1	1	014	050	01/01/2000	N/A
	WSA	61101	1	1	012	050	01/01/2000	N/A
	NO _x	42603	1	1	008	074	01/01/2000	N/A
	NO	42601	1	1	008	074	01/01/2000	N/A
	NO ₂	42602	1	1	008	074	01/01/2000	N/A
	CO	42101	1	1	007	054	01/01/2000	N/A
	PM ₁₀ (STD)	81102	1	7	001	063	12/31/1999	N/A
	PM ₁₀ (ADT)	85101	1	7	105	063	12/31/1999	N/A
	PM ₁₀ (STD)	81102	2	7	001	063	09/01/2005	N/A
	PM ₁₀ (ADT)	85101	2	7	105	063	09/01/2005	N/A
	PM _{2.5} FRM	88101	1	7	001	117	01/01/2000	12/31/2009
	PM _{2.5} FRM	88101	2	7	001	117	10/31/2008	N/A
	PM _{2.5} FEM	88101	3	1	001	170	01/01/2010	N/A

Carmel Valley (SLAMS)

This station was established in 1982 due to the smoke concerns of the rural/residential Carmel Valley. The limited natural ventilation of the valley can also lead to trapping of ozone. Measurements made at this site include O3, WSA, WDA and ATM. Data from this location has been useful for issuing public health advisories during wildfire events.

Carmel Valley Site Information

Site Name Carmel Valley
 AQS ID 06-053-0002
 GIS coordinates N 36° 28' 54.5" W 121° 44' 0.1" Elevation: 137.2 meters
 Location Tularicitos Elementary School grounds. Suburban.
 Address 35 Ford Rd., Carmel Valley, CA. 93924
 County Monterey
 Representative Area MSA: Salinas, CA.

Table 3. Carmel Valley AMS • 35 Ford Road, Carmel Valley

AIRS Site Code	Parameter	Parameter Code	POC	Interval Code	Units Code	Method Code	Date Open	Date Closed
06-053-0002	O3	44201	1	1	008	047	01/01/1982	N/A
	ATM	62101	1	1	015	040	01/01/1997	N/A
	WDA	61102	1	1	014	050	07/01/2007	N/A
	WSA	61101	1	1	012	050	07/01/2007	N/A
	PM10 (STD)	81102	1	7	001	063	01/01/1992	09/30/2009
	PM10 (ADT)	85101	1	7	105	063	01/01/1997	09/30/2009

King City 2 (SLAMS)

This station was initially established in 1990 as a SPM station to monitor impacts from a nearby power plant. It was relocated to the city center in 2007, became a SLAMS station, and now serves as a population exposure/representative concentration site. Station funding was, and still is, provided by a consortium of organizations including the power plant, oil field interests and the District. Measurements made at the site include PM10, O3, WSA, WDA and ATM. PM10 data from this site has been used to help develop plans for controlling fugitive dust. Interestingly, the typically low levels of ozone recorded at this location were used to help demonstrate to ARB that the NCCAB was not the source of high ozone transported to San Luis Obispo County.

King City 2 Site Information (Current Site)

Site Name King City 2
 AQS ID 06-053-0008
 GIS coordinates N 36° 12' 32.8" W 121° 07' 33.5" Elevation: 99 meters
 Location San Lorenzo Middle School, residential, suburban.
 Address 415 Pearl St., King City, CA. 93930
 County Monterey
 Representative Area MSA: Salinas, CA.

Table 4. King City-2 AMS • 415 Pearl Street, King City (Current Site)

AIRS Site Code	Parameter	Parameter Code	POC	Interval Code	Units Code	Method Code	Date Open	Date Closed
06-053-0008	03	44201	1	1	008	019	05/25/2007	N/A
	ATM	62101	1	1	015	040	05/25/2007	N/A
	WDA	61102	1	1	014	050	05/25/2007	N/A
	WSA	61101	1	1	012	050	05/25/2007	N/A
	PM10 (STD)	81102	1	7	001	141	05/25/2007	N/A
	PM10 (ADT)	85101	1	7	105	141	05/25/2007	N/A

King City Site Information (Former Site)

Site Name King City
 AQS ID 06-053-0005
 GIS coordinates N 36° 13' 36.6" W 121° 06' 55.8" Elevation: 106.7meters
 Location Airport, suburban.
 Address 750 Metz Rd., King City, CA. 93930
 County Monterey
 Representative Area MSA: Salinas, CA.

Table 5. King City AMS • 750 Metz Road, King City (Former Site)

AIRS Site Code	Parameter	Parameter Code	POC	Interval Code	Units Code	Method Code	Date Open	Date Closed
06-053-0005	03	44201	1	1	008	019	07/01/1990	05/24/2007
	PM10 (STD)	81102	1	7	001	063	07/01/1990	05/24/2007
	PM10 (ADT)	85101	1	7	105	063	07/01/1990	05/24/2007
	PM10 (STD)	81102	1	7	001	141	02/05/2007	05/24/2007
	PM10 (ADT)	85101	1	7	105	141	02/05/2007	05/24/2007

Scotts Valley (SLAMS – Closed on 06/15/09)

Monitoring at that Scotts Valley location began in 1992 to assess population exposure to ozone. Data acquired included ozone, WS, WD and T. This was the area’s third highest site for ozone. This eight hour design values for this site have often exceeded state ozone standard although they did consistently meet the national ozone standard. Data has been used for ARB’s triennial transport assessments which documented significant ozone transport from the San Francisco Bay Area Air Basin, resulting in exceedance events. The station was closed on 06/15/2009.

Scotts Valley Site Information

Site Name Scotts Valley – 4
 AQS ID 06-087-0006
 GIS coordinates N 37° 03’ 6.60” W 122° 00’ 51.9” Elevation: 164.5 meters
 Location Office Building. City Center.
 Address 4859 Scotts Valley Dr., Scotts Valley, CA. 95066
 County Santa Cruz
 Representative Area MSA: Santa Cruz-Watsonville, CA.

Table 8. Scotts Valley-4 AMS • 4859 Scotts Valley Drive, Scotts Valley

AIRS Site Code	Parameter	Parameter Code	POC	Interval Code	Units Code	Method Code	Date Open	Date Closed
06-087-0006	03	44201	1	1	008	047	07/01/1994	06/15/2009
	ATM	62101	1	1	015	040	01/01/2004	06/15/2009
	WDA	61102	1	1	014	050	01/10/2004	06/15/2009
	WSA	61101	1	1	012	050	01/01/2004	06/15/2009

Pinnacles (SPM)

This station was established in 1987 by the National Park Service (NPS) to monitor air quality at Pinnacles National Monument, a federal Class I protected area and part of the national park monitoring network. Data acquired at this site include O₃, WS, WD and T. In addition, as part of the federal Interagency Monitoring of Protected Visual Environments (IMPROVE) program, a wide variety of particulate aerosols is monitored for the purpose of assessing visibility trends. However, the only parameters reported by the District at this site are O₃ and 8HrO₃. Although located in a remote unpopulated area, ozone readings at this site are the highest in the District and the ozone data are used to establish the NCCAB's designations in relation to the state and federal standards. CARB's triennial transport assessments have demonstrated that the cause of the high readings at this mountain site is attributal to transport, particularly from the upwind San Francisco Bay Area. Nitrate data from the IMPROVE monitors has also been used in District plans to indicate an improving trend, most likely due to regional reductions in motor vehicle NO_x emissions, as well as controls on stationary sources.

Pinnacles Site Information

Site Name Pinnacles
 AQS ID 06-069-0003
 GIS coordinates N 36° 29' 57" W 121° 10' 18" Elevation: 305 meters
 Location National Park
 Address Pinnacles National Monument, 5000 Hwy 146, Paicines, CA. 95043
 County San Benito
 Representative Area CBSA: San Jose – Sunnyvale – Santa Clara, CA.

Table 11. Pinnacles NM AMS • Pinnacles National Monument, Paicines

AIRS Site Code	Parameter	Parameter Code	POC	Interval Code	Units Code	Method Code	Date Open	Date Closed
06-069-0003	03	44201	1	1	007	019	11/07/1986	N/A

Network Analysis

Ambient Air Quality Standards

Ambient air quality standards (AAQS) are set to protect the public from the adverse effects of air pollution. State standards are established to protect public health, including the most sensitive members of the population. National standards include a primary standard to protect public health and a secondary standard to protect the public welfare including property, vegetation and visibility. Current State and National AAQS are shown in Table 12. All components of both the state and national standards for a parameter must be met in order for the standard to be attained.

Table 12. National & State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards		National Standards ^a			
		ppm	µg/m ³	Primary ^b		Secondary ^c	
				ppm	µg/m ³	ppm	µg/m ³
Ozone	1 hour	0.09	180				
	8 hours	0.070	137	0.075 ^h	147	0.075	147
Carbon Monoxide	8 hours	9.0	10,000	9	10,000	9.0	10,000
	1 hour	20	23,000	35	40,000	35.0	40,000
Nitrogen Dioxide	Annual	0.030	57	0.053	100	0.053	100
	1 hour	0.18	339				
Sulfur Dioxide	Annual			0.03	80		
	24 hours	0.04	105	0.14	365		
	3 hours					0.5	1,300
	1 hour	0.25	655				
Respirable Particulate Matter (PM ₁₀) ^d	Annual		20				
	24 hours		50		150		150
Fine Particulate Matter (PM _{2.5}) ^e	Annual		12		15		15
	24 hours		35		35		35
Lead	Calendar quarter				1.5		1.5
	30-day avg		1.5				
Sulfate	24 hours		25				
Hydrogen Sulfide	1 hour	0.03	42				
Vinyl Chloride	24 hours	0.010	26				
Visibility Reducing Particles	8 hours (10AM–6PM)	In sufficient amounts to reduce prevailing visibility to < 10 miles when relative humidity of < 70% with equivalent instrument method					

^a National standards, other than ozone and those based on annual averages, are not to be exceeded more than once a year.
^b Designed to protect human health with an adequate margin of safety
^c Designed to protect public welfare (i.e., prevent damage to vegetation, property, visibility)

(Adapted from CARB's 02/16/10 chart)

Number of Instruments per Site

The District's sites are ranked here according to the number of monitoring instruments currently in operation at each station as of January 1st, 2010 (Table 13). Sites which have the same number of instruments are ranked the same, regardless of the types of monitoring instruments or site descriptions (SLAMS or SPM). The rankings are based on the data shown on Tables 2-11.

Table 13 Ranking Based on Number of Parameters

Ranking	Site	AIRS Site Code	Number of Instruments	Instrument Types
1	Salinas-3	06-053-1003	10	O3, NO/NO2/NOx, CO, PM10, PM10 Colo, PM2.5 FRM, PM2.5 BAM-1020 FEM, WSA, WDA, & ATM.
2	Santa Cruz	06-087-0007	6	O3, PM10, PM2.5 BAM-1020 FEM, WSA, WDA, and ATM.
2	Hollister	06-087-0002	6	O3, PM10, PM2.5 BAM-1020 FEM, WSA, WDA, and ATM.
3	King City 2	06-053-0008	5	O3, PM10, WSA, WDA, and ATM.
3	Davenport	06-087-0003	5	NO/NO2/NOx, CO, WSA, WDA, and ATM.
4	Carmel Valley	06-053-0002	4	O3, WSA, WDA, and ATM.
4	Pinnacles	06-069-0003	4	O3, WSA, WDA, and ATM.

Trend Impacts for Each Site

The District's sites are ranked below strictly based on the number years that certain criteria pollutants were monitored at each station as of January 1st, 2010. Davenport is included in the O3 ranking because the O3 parameter will be reopened as stated in the annual network plan. The rankings are shown on Table 14 which is based on the data depicted on Tables 2-11.

Table 14 Ranking Based on Monitoring Time

O3 Ranking	Site	Date Open	Date Closed	# Years Open
1	Hollister	01/01/1980	N/A	30
2	Carmel Valley	01/01/1982	N/A	28
3	Pinnacles	11/07/1986	N/A	24
4	Davenport	12/01/1986	09/30/2009	24
5	Santa Cruz	09/24/1996	N/A	14
6	Salinas	12/31/1999	N/A	10
7	King City 2	05/25/2007	N/A	3
PM10 Ranking				
1	Hollister	01/01/1988	N/A	22
2	Santa Cruz	09/24/1996	N/A	14
3	Salinas	12/31/1999	N/A	10
4	King City 2	05/25/2007	N/A	3
PM2.5 FRM Ranking				
1	Santa Cruz	01/01/1999	12/31/2009	10
1	Hollister	01/01/1999	12/31/2009	10
2	Salinas	01/01/2000	12/31/2009	9
PM2.5 FEM Ranking				
1	Salinas	01/01/2010	N/A	0
1	Santa Cruz	01/01/2010	N/A	0
1	Hollister	01/01/2010	N/A	0

Measured Concentrations and Deviation from the AAQS (Ozone)

Tables 15 to 20 depict the both the calculated State 1Hr and 8Hr Ozone Design Values, and the National 1Hr and 8Hr Ozone Designation Values for the sites that are currently operating in 2010. Figures 4 and 5 give a visual representation of the State and National 8Hr trends from 2000 - 2009. This data was taken from CARB's data and statistics website at <http://www.arb.ca.gov/adam/>. Sites are ranked on Table 21 according to the magnitude of their State 8Hr Ozone Design Values from 2006-2008, and on Table 22 according to the magnitude their National 8Hr Ozone Designation Values from 2006-2008. Sites are also ranked on Tables 23 and 24 according to the magnitude of their deviation from the State and National 8Hr AAQS from 2006-2008, however, the EPA will be lowering the national AAQS for ozone this year which means that the rankings in Table 24, and possibly Table 23, will change. Because the State 1Hr Design Values are less precise and there is no National 1Hr AAQS, the 1Hr values have not been used for ranking in this assessment.

Table 15. Salinas 3 DV Trends

Salinas-3 Ozone Design/Designation Values				
Year	State (1Hr)	National (1Hr)	State (8Hr)	National (8Hr)
AAQS	0.09	*	0.070	0.075
2009	0.07	0.072	0.062	0.056
2008	0.07	0.067	0.060	0.055
2007	0.06	0.064	0.058	0.053
2006	0.07	0.073	0.062	0.056
2005	0.07	0.073	0.063	0.058
2004	0.07	0.075	0.063	0.059
2003	0.07	0.073	0.062	0.059
2002	0.07	0.073	0.060	0.057
2001	0.07	0.073	0.069	*
2000	0.08	0.068	0.066	*

Table 16. Carmel Valley DV Trends

Carmel Valley Ozone Design/Designation Values				
Year	State (1Hr)	National (1Hr)	State (8Hr)	National (8Hr)
AAQS	0.09	*	0.070	0.075
2009	0.07	0.073	0.064	0.058
2008	0.08	0.073	0.066	0.059
2007	0.07	0.073	0.065	0.058
2006	0.08	0.080	0.068	0.062
2005	0.08	0.080	0.070	0.065
2004	0.08	0.080	0.075	0.068
2003	0.08	0.080	0.071	0.066
2002	0.08	0.080	0.073	0.064
2001	0.08	0.080	0.068	0.063
2000	0.08	0.080	0.069	0.061

Table 17. King City 2 DV Trends

King City 2 Ozone Design/Designation Values				
Year	State (1Hr)	National (1Hr)	State (8Hr)	National (8Hr)
AAQS	0.09	*	0.070	0.075
2009	0.07	0.070	0.063	*
2008	0.07	0.072	0.068	*
2007	0.07	0.067	0.060	*
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*

Table 18. Santa Cruz DV Trends

Santa Cruz Ozone Design/Designation Values				
Year	State (1Hr)	National (1Hr)	State (8Hr)	National (8Hr)
AAQS	0.09	*	0.070	0.075
2009	0.07	0.073	0.061	0.055
2008	0.07	0.072	0.060	0.054
2007	0.07	0.065	0.058	0.052
2006	0.07	0.071	0.059	0.055
2005	0.08	0.079	0.063	0.057
2004	0.08	0.080	0.065	0.058
2006	0.07	0.071	0.059	0.055
2002	0.07	0.076	0.061	0.055
2001	0.08	0.079	0.064	0.058
2000	0.08	0.081	0.064	0.058

Table 19. Hollister DV Trends

Hollister Ozone Design/Designation Values				
Year	State (1Hr)	National (1Hr)	State (8Hr)	National (8Hr)
AAQS	0.09	*	0.070	0.075
2009	0.09	0.087	0.074	0.067
2008	0.09	0.090	0.076	0.069
2007	0.09	0.089	0.076	0.068
2006	0.09	0.089	0.076	0.068
2005	0.09	0.087	0.076	0.068
2004	0.09	0.097	0.079	0.072
2006	0.10	0.097	0.080	0.073
2002	0.10	0.097	0.080	0.073
2001	0.10	0.094	0.080	0.072
2000	0.10	0.102	0.086	0.074

Table 20. Pinnacles DV Trends

Pinnacles Ozone Design/Designation Values				
Year	State (1Hr)	National (1Hr)	State (8Hr)	National (8Hr)
AAQS	0.09	*	0.070	0.075
2009	0.10	0.098	0.087	0.077
2008	0.10	0.100	0.089	0.079
2007	0.10	0.097	0.085	0.074
2006	0.09	0.095	0.085	0.075
2005	0.10	0.095	0.084	0.076
2004	0.10	0.104	0.090	0.081
2003	0.10	0.106	0.090	0.081
2002	0.10	0.104	0.090	0.081
2001	0.10	0.100	0.089	0.079
2000	0.11	0.107	0.088	0.082

Figure 4. 10 Year Trend of State 8Hr Design Values

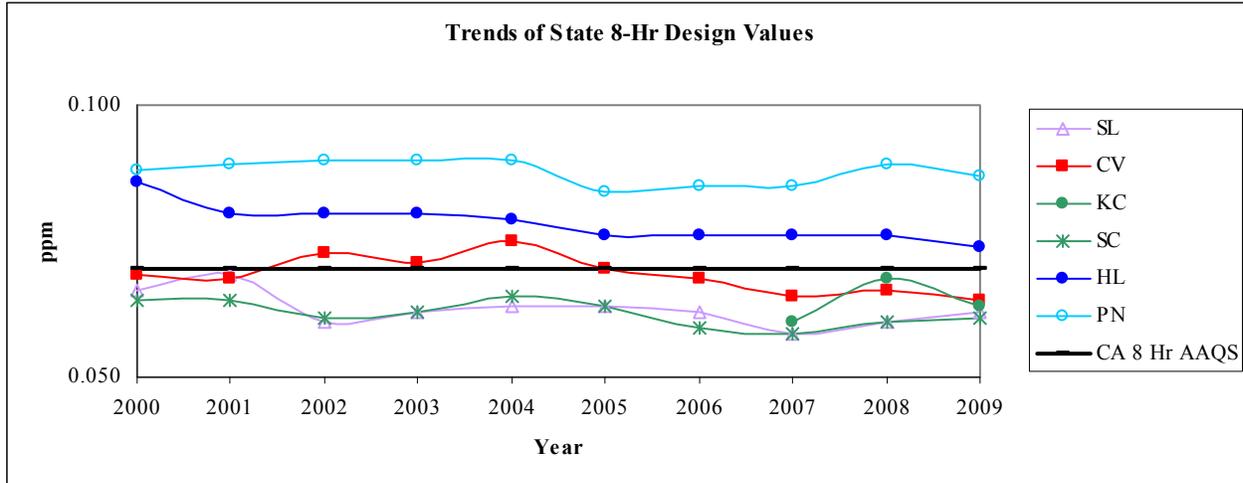


Figure 5. 10 Year Trend of National 8Hr Designation Values

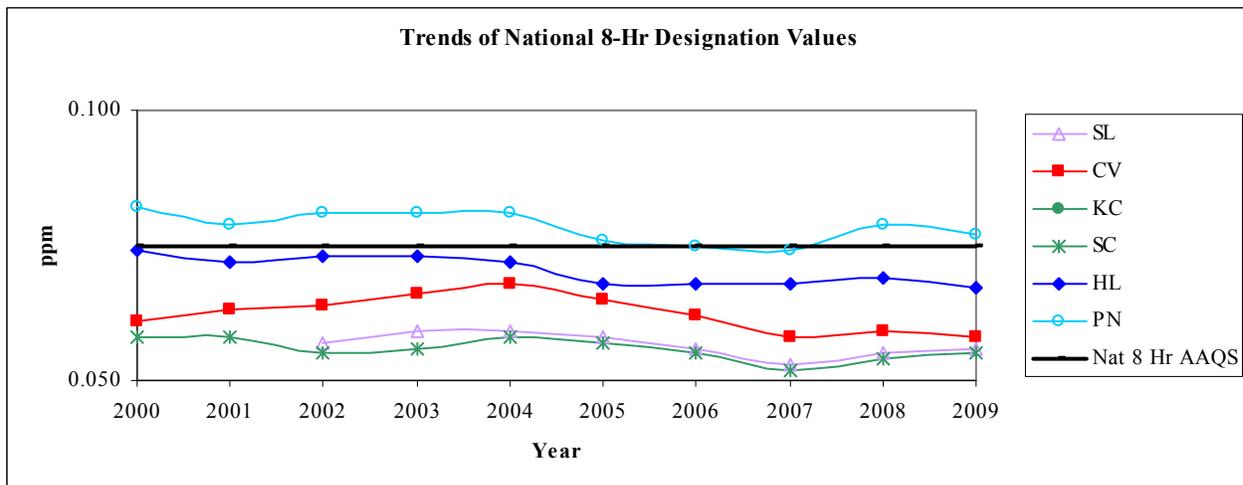


Table 21. Ranking Based on State 8Hr Design Values for Ozone

Ranking	Site	AIRS Site Code	CA 8Hr DV 2006 (ppm)	CA 8Hr DV 2007 (ppm)	CA 8Hr DV 2008 (ppm)
1	Pinnacles	06-069-0003	.085	.085	.089
2	Hollister	06-087-0002	.076	.076	.076
3	Carmel Valley	06-053-0002	.068	.065	.066
4	King City 2	06-053-0008	*	.060	.068
5	Salinas-3	06-053-1003	.062	.058	.060
6	Santa Cruz	06-087-0007	.059	.058	.060

Table 22. Ranking Based on National 8Hr Designation Values for Ozone

Ranking	Site	AIRS Site Code	National 8Hr DV 2006 (ppm)	National 8Hr DV 2007 (ppm)	National 8Hr DV 2008 (ppm)
1	Pinnacles	06-069-0003	.075	.074	.079
2	Hollister	06-087-0002	.068	.068	.069
3	Carmel Valley	06-053-0002	.062	.058	.059
4	Salinas-3	06-053-1003	.056	.053	.055
5	Santa Cruz	06-087-0007	.055	.054	.052
U	King City 2	06-053-0008	*	*	*

Table 23. Ranking Based on Deviation of State 8Hr Design Values from AAQS for Ozone

Ranking	Site	AIRS Site Code	CA 8Hr DV 2006 (ppm)	CA 8Hr DV 2007 (ppm)	CA 8Hr DV 2008 (ppm)
1	Carmel Valley	06-053-0002	0.002	0.005	0.004
2	Hollister	06-087-0002	0.006	0.006	0.006
3	King City 2	06-053-0008	*	0.010	0.002
4	Salinas-3	06-053-1003	0.008	0.012	0.010
5	Santa Cruz	06-087-0007	0.011	0.012	0.010
6	Pinnacles	06-069-0003	0.015	0.015	0.019

Table 24. Ranking Based on Deviation of National 8Hr Designation Values from AAQS for Ozone

Ranking	Site	AIRS Site Code	National 8Hr DV 2006 (ppm)	National 8Hr DV 2007 (ppm)	National 8Hr DV 2008 (ppm)
1	Pinnacles	06-069-0003	0.000	0.001	0.004
2	Hollister	06-087-0002	0.007	0.007	0.006
3	Carmel Valley	06-053-0002	0.013	0.017	0.016
4	Salinas-3	06-053-1003	0.019	0.022	0.020
5	Santa Cruz	06-087-0007	0.020	0.023	0.021
Unranked	King City 2	06-053-0008	*	*	*

Measured Concentrations and Deviation from the AAQS (PM2.5)

Table 25 depicts both the calculated State Annual Design Values, and the National 24Hr and Annual Ozone Designation Values, from 2006-2009, for the sites currently operating in 2010. These yearly values for all three stations are all about half of the AAQS. Because of the similar low design/designation values for the three sites, and because the each site represents a different MSA they are considered equally valuable and have been ranked equally. This data was taken from CARB's data and statistics website at <http://www.arb.ca.gov/adam/>.

Table 25. PM2.5 State Design/National Designation Trends for All Sites in the District

Year	Salinas (06-053-1003)		Santa Cruz (06-087-0007)			Hollister (06-087-0002)			
	Annual SD		24Hr SD	Annual SD		24Hr SD	Annual SD		24Hr SD
	Nat'l	CA	Nat'l	Nat'l	CA	Nat'l	Nat'l	CA	Nat'l
2006	6.9	7	14	*	7	*	*	*	*
2007	6.9	7	14	*	7	*	*	6	*
2008	7.1	7	14	6.7	7	14	*	7	*
2009	6.7	7	14	6.3	7	13	6.2	7	17
AAQS	15	12	35	15	12	35	15	12	35

Measured Concentrations and Deviation from the AAQS (PM10)

Tables 26 to 28 portray the calculated State PM10 24Hr Averages and PM10 Annual Arithmetic Means, and the National PM10 24Hr Averages, from 2006-2008, for the sites that are currently operating in 2010. King City consistently has the highest concentrations, followed by Salinas 3, Santa Cruz, and Hollister. The ranking of sites (Tables 29-31), based on deviation from the AAQS changes, depends on which standard is being used. This data was taken from CARB's data and statistics website at <http://www.arb.ca.gov/adam/>.

Table 26. Rankings based on State Annual Averages for PM10

Ranking	Site	AIRS Site Code	CA Annual Average 2006 ($\mu\text{g}/\text{m}^3$)	CA Annual Average 2007 ($\mu\text{g}/\text{m}^3$)	CA Annual Average 2008 ($\mu\text{g}/\text{m}^3$)	AAQS CA Annual Mean
1	King City 2	06-053-0008	*	*	27.4	20
2	Salinas-3	06-053-1003	19.9	18.2	20.6	20
3	Santa Cruz	06-087-0007	18.4	18.0	18.8	20
4	Hollister	06-087-0002	16.0	17.2	19.7	20

Table 27. Rankings based on State 24Hr Averages for PM10

Ranking	Site	AIRS Site Code	CA 24Hr Average 2006 ($\mu\text{g}/\text{m}^3$)	CA 24Hr Average 2007 ($\mu\text{g}/\text{m}^3$)	CA 24Hr Average 2008 ($\mu\text{g}/\text{m}^3$)	AAQS CA 24Hr Average
1	King City 2	06-053-0008	*	52.0	65.0	50
2	Salinas-3	06-053-1003	51.0	39.0	52.0	50
3	Santa Cruz	06-087-0007	37.0	34.0	45.0	50
4	Hollister	06-087-0002	46.0	40.0	40.0	50

Table 28. Rankings based National 24Hr Averages for PM10

Ranking	Site	AIRS Site Code	National 24Hr Average 2006 ($\mu\text{g}/\text{m}^3$)	National 24Hr Average 2007 ($\mu\text{g}/\text{m}^3$)	National 24Hr Average 2008 ($\mu\text{g}/\text{m}^3$)	AAQS National 24Hr Average
1	King City 2	06-053-0008	*	50.0	63.0	150
2	Salinas-3	06-053-1003	49.0	37.0	50.0	150
3	Santa Cruz	06-087-0007	37.0	32.0	44.0	150
4	Hollister	06-087-0002	45.0	40.0	39.0	150

Table 29. Rankings based Deviation of State Annual Averages from AAQS for PM10

Ranking	Site	AIRS Site Code	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)
1	Salinas-3	06-053-1003	0.1	1.8	0.6
2	Santa Cruz	06-087-0007	1.6	2.0	1.2
3	Hollister	06-087-0002	4.0	2.8	0.3
4	King City 2	06-053-0008	*	*	7.4

Table 30. Rankings based Deviation of State 24Hr Averages from AAQS for PM10

Ranking	Site	AIRS Site Code	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)
1	Salinas-3	06-053-1003	1	11	2
2	Hollister	06-087-0002	4	10	10
3	King City 2	06-053-0008	*	2	15
4	Santa Cruz	06-087-0007	13	16	5

Table 31. Rankings based Deviation of National 24Hr Averages from AAQS for PM10

Ranking	Site	AIRS Site Code	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)	Deviation from AAQS ($\mu\text{g}/\text{m}^3$)
1	King City 2	06-053-0008	*	100	87
2	Salinas-3	06-053-1003	101	113	100
3	Hollister	06-087-0002	105	110	111
4	Santa Cruz	06-087-0007	113	118	106

Area Designations and Attainment Status

CARB and the EPA are responsible for state and national designations, respectively. State designations are updated annually and national designations are updated when either the standards change, or when a district requests that they be re-designated due to changes in the area's air quality. Designations are made by air basin, and in some cases, at the county level.

Designations are made by pollutant according to the following categories:

- **Attainment** – Air quality in the area meets the standard.
- **Nonattainment Transitional** – Air quality is approaching the standard (State only).
- **Nonattainment** – Air quality in the area fails to the applicable standard.
- **Unclassified** – Data is insufficient to designate area, or designation has yet to be made.

Nonattainment designations are of most concern because they indicate that unhealthy levels of the pollutant exist in the area, which typically triggers a need to develop a plan to achieve the applicable standard. State and national designations are shown in Table 32.

Table 32. Attainment Status for the North Central Coast Air Basin

Pollutant	State	Federal
Ozone (O ₃)	Nonattainment	Attainment
Inhalable Particulates (PM ₁₀)	Nonattainment	Attainment
Fine Particulates (PM _{2.5})	Attainment	Attainment
Carbon Monoxide (CO)	Monterey Co. – Attainment San Benito Co. – Unclassified Santa Cruz Co. - Unclassified	Attainment
Nitrogen Dioxide (NO ₂)	Attainment	Attainment
Sulfur Dioxide (SO ₂)	Attainment	Attainment
Lead	Attainment	Attainment

(Table taken from the MBUAPCD 2008 Air Quality Management Plan)

Notes:

- 1) In 2006, the Federal 24-hour standard for PM_{2.5} was revised from 65µg/m³ to 35µg/m³.
- 2) Effective July 26, 2007, the ARB designated the NCCAB a nonattainment area for the State ozone standard.

Tools Supplied by the EPA for Network Assessments

Several tools were presented by the EPA to all of the districts at the National Air Monitoring conference in Nashville in 2009 to be used in the 5 year network assessment. They include the area served, removal bias, correlation matrix, and new site analysis tools. These tools were designed to work with Google Maps™ and were set up by the EPA to utilize the air monitoring data sets during the years from 2005 to 2008 for any district in the nation. The three year, 2006–2008, interval was used in this assessment because it was slightly more complete than the 2005–2007 interval. There are several limitations to these tools. Pollution sources, population dynamics, and geographical topography are not accounted for, so these tools are better utilized in conjunction with other station rankings and each other, and not by themselves.

Area Served Analysis (Ozone Sites)

This tool consists of Voronoi/Thiessen polygons that overlay a Google Earth™ map. Each polygon encloses a site and an area of points that are closer to that particular site than any other site. These polygons therefore represent the area served by a particular site when no other factors, such as population, geographical topography, or political boundaries are taken into consideration. Voronoi/Thiessen polygons tend to give weight to remote and urban boundary sites that help interpolate data in an area. Since several of the District's ozone sites are seen to represent areas that extend outside the boundaries of the district, and across mountain ranges (Figure 6), the results of this analysis were not taken literally, but were instead used in conjunction with other analyses and rankings in determining the usefulness of a site. District air monitoring sites were ranked according to area served as represented by the polygons as shown by Table 33. The ozone monitoring sites that are currently closed were unranked, except Davenport, which is expected to resume ozone monitoring this upcoming year.

Figure 6. Map of the NCCAB and a Representation of the Area Served by Each Ozone Site

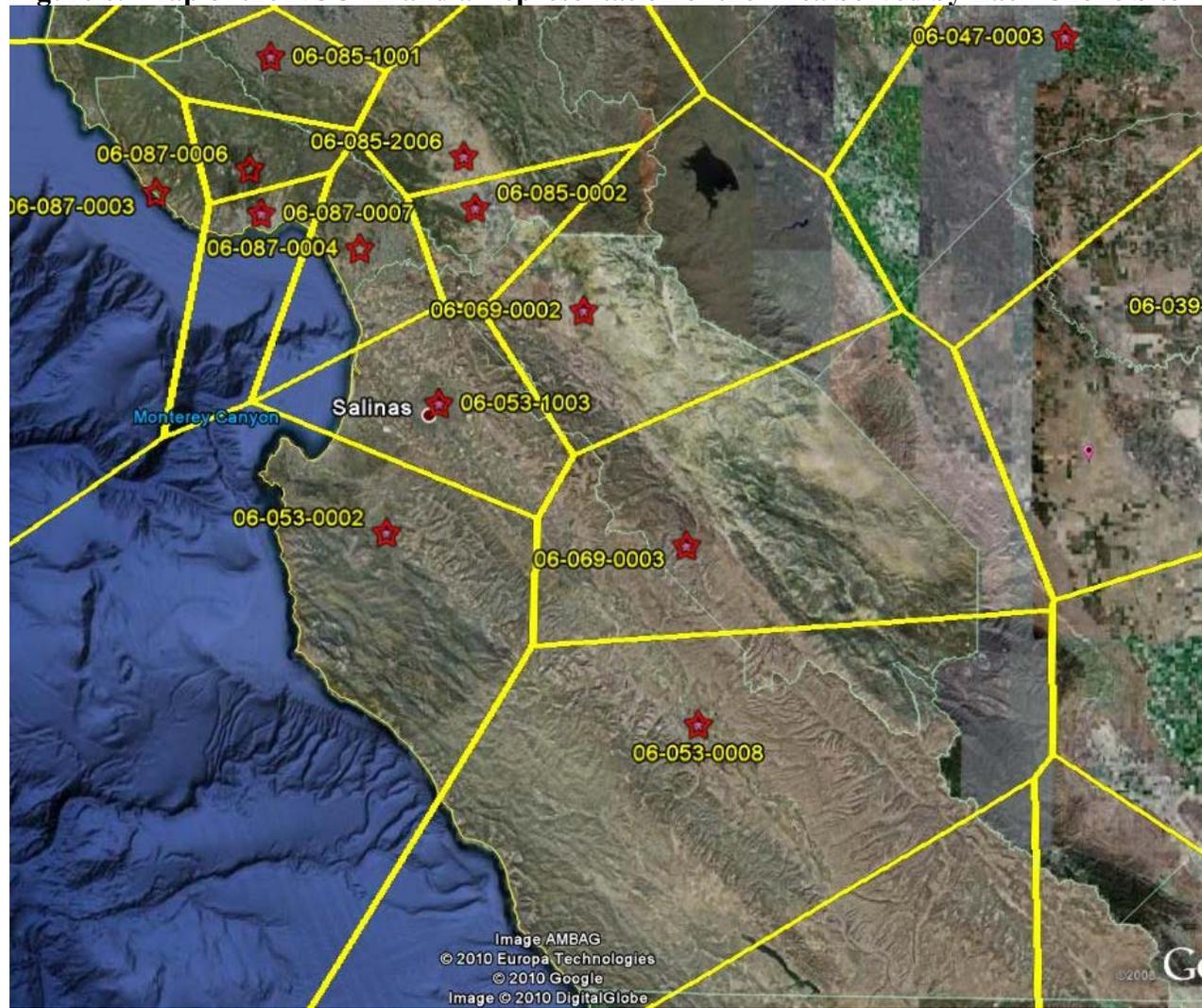


Table 33.

Ranking: 1	King City
AIRS Site Code	06-053-0008
Area	1883 sqmi
2000 Population	23040 (12 people/sqmi)
2008 Population	23412 (12 people/sqmi)

Ranking: 2	Pinnacles
AIRS Site Code	06-069-0003
Area	1804 sqmi
2000 Population	28118 (16 people/sqmi)
2008 Population	29371 (16 people/sqmi)

Ranking: 3	Carmel Valley
AIRS Site Code	06-053-0002
Area	838 sqmi
2000 Population	124352 (148 people/sqmi)
2008 Population	126357 (151 people/sqmi)

Ranking: 4	Hollister
AIRS Site Code	06-069-0002
Area	811 sqmi
2000 Population	51655 (64 people/sqmi)
2008 Population	53628 (66 people/sqmi)

Ranking: 5	Salinas
AIRS Site Code	06-053-1003
Area	394 sqmi
2000 Population	220126 (559 people/sqmi)
2008 Population	223677 (568 people/sqmi)

Ranking: 6	Davenport
AIRS Site Code	06-087-0003
Area	113 sqmi
2000 Population	4191 (37 people/sqmi)
2008 Population	4151 (37 people/sqmi)

Ranking: 7	Santa Cruz
AIRS Site Code	06-087-0007
Area	55 sqmi
2000 Population	110395 (1991 people/sqmi)
2008 Population	109332 (1972 people/sqmi)

Unranked: Site Closed	Watsonville
AIRS Site Code	06-087-0004
Area	164 sqmi
2000 Population	101880 (620 people/sqmi)
2008 Population	101353 (616 people/sqmi)

Unranked: Site Closed	Scotts Valley
AIRS Site Code	06-087-0006
Area	114 sqmi
2000 Population	50591 (445 people/sqmi)
2008 Population	50103 (441 people/sqmi)

Removal Bias and Correlation Matrix Analyses

The removal bias analysis, when applied to an ambient air monitoring network, gives an indication of the uniqueness of each site for a given pollutant. The analysis also gives a relative indication of a site's pollutant level with respect to the surrounding sites. If redundant sites are indicated, low priority sites may be removed in the analysis to remove to redundancy.

When the analysis was run on the District's ozone monitoring network, each of the sites was compared to 7-14 surrounding sites both inside and outside the district as shown on Table 34. The open circles representing each of the District's sites (Figure 7) indicate that they are all statistically significant from each other. No redundant sites, depicted by solid circles, are apparent. All of the sites except the Pinnacles site show a positive bias as indicated by a reddish circle (Figure 7) which means that they consistently monitor lower amounts of ozone than they surrounding sites they were compared to. The Pinnacles site is indicated by a bluish circle (Figure 7), since it measures higher ozone levels than its surrounding sites. The presence or absence of the Watsonville and Scotts Valley sites, which closed in 2009, did not alter the uniqueness of the remaining District sites.

The District's PM10 monitoring network was also analyzed using the removal bias tool. Each of the sites was compared to 12-20 surrounding sites both inside and outside the district as shown on Table 35. The open circles representing each of the District's PM10 sites (Figure 9) indicate that they are all statistically significant from each other. Santa Cruz and Hollister show positive biases as indicated by reddish circles, while the Salinas and King City 2 sites show negative biases as indicated by bluish circles (Figure 9). Closure of the Davenport, Watsonville, and Carmel Valley sites significantly altered the importance of the remaining District sites. King City 2 was indicated by a closed red circle prior to the closure of these monitors, which indicated that it was potentially redundant.

This correlation matrix serves a similar function to that provided by the Removal Bias tool in that it is intended to point out redundant sites in a network. A site that correlates well with all the other sites that it was paired with ($R^2 > 0.6$), and shows low relative differences with these sites despite distances may be considered redundant. Correlation between various sites typically decreases as distance increases. This analysis was performed for the ozone monitoring sites (Figure 8) and for the PM10 monitoring sites (Figure 10). The analysis was also performed on the Salinas and Santa Cruz PM2.5 monitoring sites indicating a very low correlation. There was not enough data for Hollister for it to be included in the PM2.5 analysis.

Figure 7. Removal Bias Results for Ozone Sites

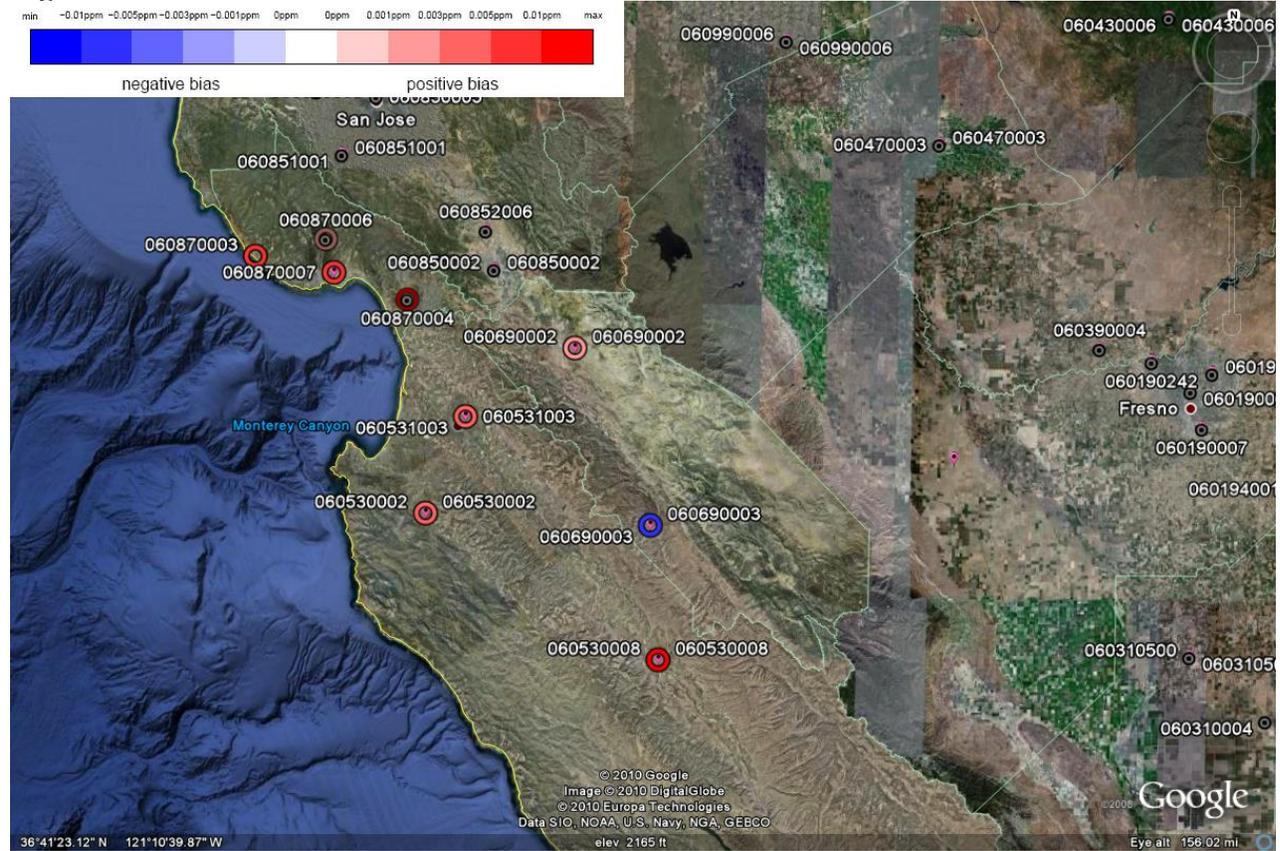


Figure 8. Correlation Matrix for District Sites (Ozone)

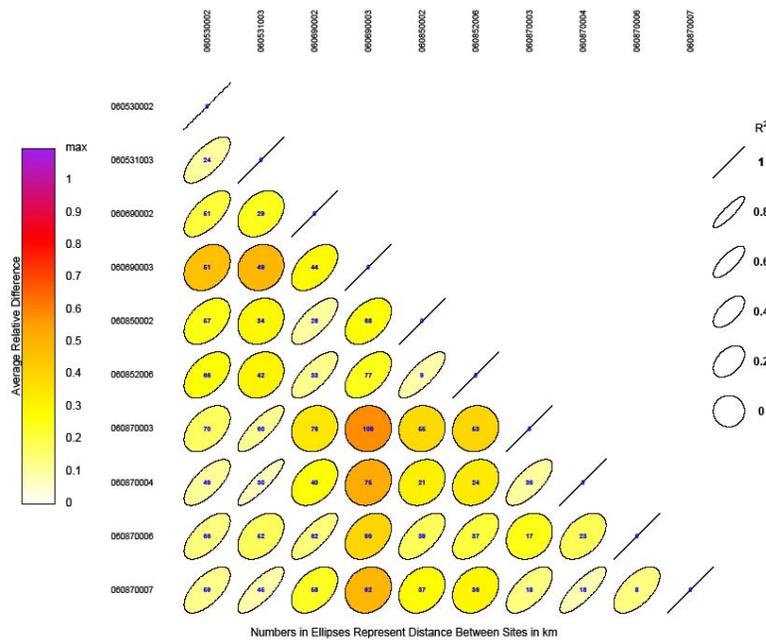


Table 34. Sites used in Removal Bias Analysis of District Ozone Sites

King City 2	
Airs Site Code	060530008
2006-2008 Design Value	N/A ppm
Average Bias	0.014 ppm
Sites Used in Bias Calculation	
060190242	060798001
060310500	060798005
060390004	060798006
060470003	060850002
060793001	060851001

Watsonville	
Airs Site Code	060870004
2006-2008 Design Value	0.055 ppm
Average Bias	0.011 ppm
Sites Used in Bias Calculation	
060793001	060851001
060798001	060852006
060811001	
060834003	
060850002	

Pinnacles	
Airs Site Code	060690003
2006-2008 Design Value	0.079 ppm
Average Bias	-0.005 ppm
Sites Used in Bias Calculation	
060190242	060798001
060310500	060798005
060390004	060798006
060470003	060850002
060793001	060851001

Santa Cruz 4	
Airs Site Code	060870007
2006-2008 Design Value	0.054 ppm
Average Bias	0.006 ppm
Sites Used in Bias Calculation	
060231004	060834003
060410001	060850002
060450008	060851001
060750005	060852006
060793001	060852007
060811001	

Salinas 3	
Airs Site Code	060531003
2006-2008 Design Value	0.055 ppm
Average Bias	0.011 ppm
Sites Used in Bias Calculation	
060190242	060798005
060310500	060811001
060390004	060834003
060470003	060850002
060793001	060851001
060798001	

Hollister	
Airs Site Code	060690002
2006-2008 Design Value	0.069 ppm
Average Bias	0.004 ppm
Sites Used in Bias Calculation	
060190242	060798005
060310500	060798006
060390004	060850002
060470003	060852006
060793001	060990006
060798001	

Davenport	
Airs Site Code	060870003
2006-2008 Design Value	0.052 ppm
Average Bias	0.005 ppm
Sites Used in Bias Calculation	
060231004	060834003
060410001	060851001
060450008	060852007
060750005	060870004
060793001	060870006
060811001	060971003

Scotts Valley-4	
Airs Site Code	060870006
2006-2008 Design Value	0.061 ppm
Average Bias	0.002 ppm
Sites Used in Bias Calculation	
060231004	060834003
060410001	060850002
060450008	060851001
060750005	060852006
060793001	060852007
060811001	

Carmel Valley	
Airs Site Code	060530002
2006-2008 Design Value	0.059 ppm
Average Bias	0.005 ppm
Sites Used in Bias Calculation	
060190242	060793001
060231004	060798001
060310500	060798005
060390004	060834003
060410001	060850002
060450008	060870004
060470003	060870006

Figure 9. Removal Bias Results for PM10 Sites

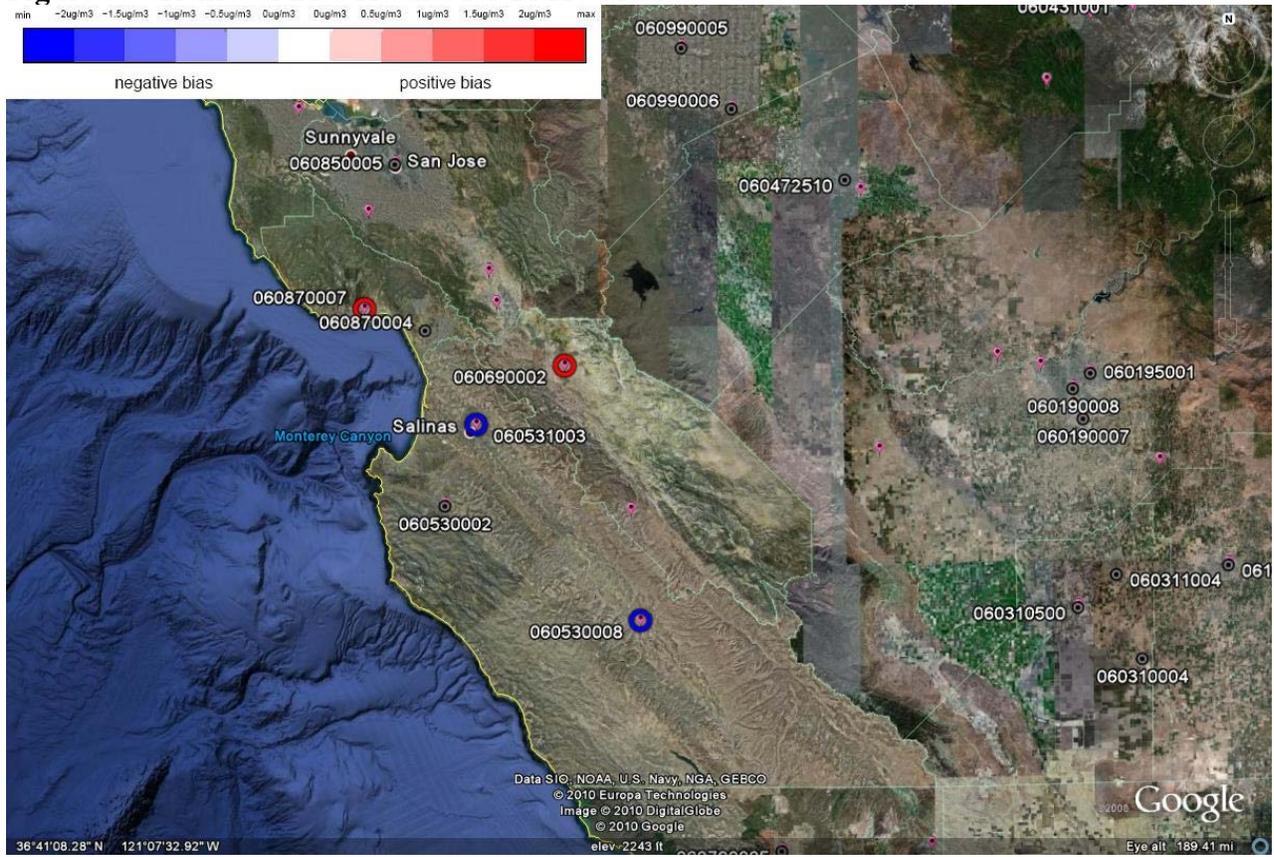


Figure 10. Correlation Matrix for District Sites (PM10)

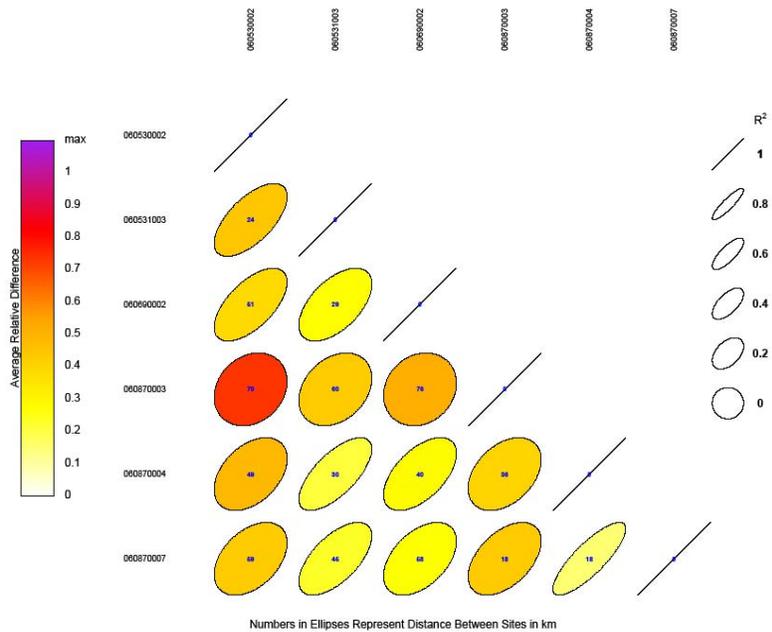


Table 35. Sites used in Removal Bias Analysis of District PM10 Sites

Salinas 3	
AQS ID	60531003
2006-2008 24-Hour Design Value	NA ug/m3
2006-2008 24-Hour Expected Exceedances	NA
Average Bias	-2.6 ug/m3
Sites Used in Bias Calculation:	
60110007	60773005
60190007	60773010
60190008	60790005
60310004	60793001
60310500	60850005
60431001	60870003
60452001	60870004
60472510	60990005
60510005	60990006
60530002	

Hollister 2	
AQS ID	60690002
2006-2008 24-Hour Design Value	45 ug/m3
2006-2008 24-Hour Expected Exceedances	0
Average Bias	3.8 ug/m3
Sites Used in Bias Calculation:	
60170011	60773005
60190007	60773010
60190008	60790005
60310004	60834003
60310500	60850005
60452001	60870003
60472510	60870004
60510005	60990005
60530002	60990006
60771002	

Santa Cruz	
AQS ID	60870007
2006-2008 24-Hour Design Value	44 ug/m3
2006-2008 24-Hour Expected Exceedances	0
Average Bias	4.5 ug/m3
Sites Used in Bias Calculation:	
60510005	60850005
60530002	60870003
60750005	60870004
60773005	60973002
60834003	60990006

King City 2	
AQS ID	60530008
2006-2008 24-Hour Design Value	NA ug/m3
2006-2008 24-Hour Expected Exceedances	NA
Average Bias	-2.9 ug/m3
Sites Used in Bias Calculation:	
60110007	60510005
60170011	60530002
60190007	60773005
60190008	60773010
60231004	60790005
60310004	60792006
60310500	60793001
60311004	60831008
60452001	60870003
60472510	60870004

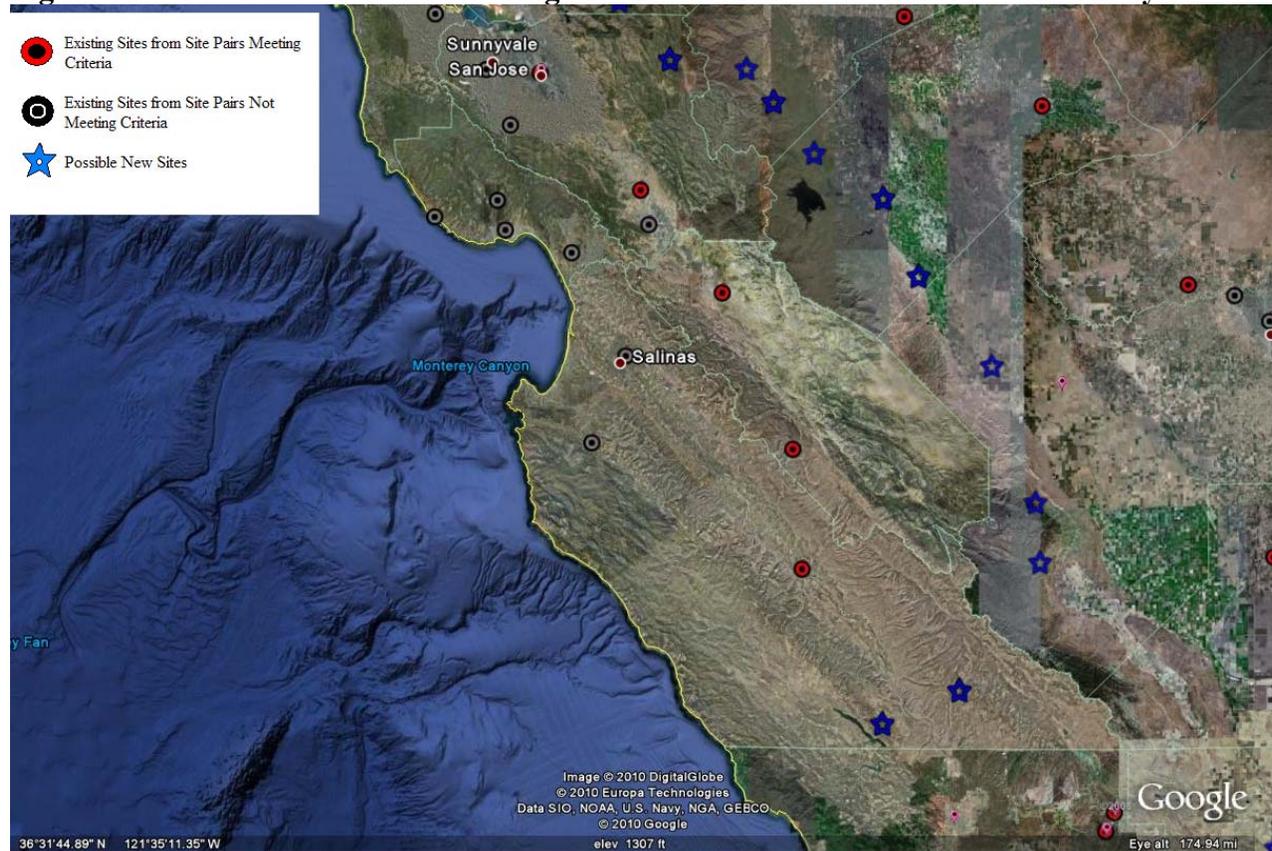
New Site Analysis for Potential Monitoring Sites (Ozone)

The new site analysis involved comparisons of site pairs that met with selected criteria (Table 36). Potential new site locations were placed midway between two sites depending on how their ozone monitoring data from 2006-2008 correlated with each other. Recommended defaults were used except that minimum distance between sites was reduced to 50km due to the District's highly variable terrain. The analysis was also run using the CA AAQS of .070ppm with no change in the results. Potential ozone monitoring sites appear in southern Monterey County (Figure 12).

Table 36. Criteria Selected for New Ozone Site Analysis

Criteria:	Settings
Site Pair Correlation:	<0.50
Minimum Distance Between Site Pairs:	50km
Difference Between Site Pairs:	0ppm
Probability of Exceeding 85% of 8-hour NAAQS of 0.075ppm:	80%

Figure 12. Potential Ozone Monitoring Site Locations Based on the New Site Analysis



New Site Analysis for Potential Monitoring Sites (PM10)

The District's PM10 sites were also analyzed. The criteria and results are shown in Table 37 and Figure 14, respectively. Recommended defaults were used except that minimum distance between sites was again reduced to 50km due to the District's highly variable terrain. The analysis was also run using the California AAQS of $50\mu\text{g}/\text{m}^3$ with no change in the results, other than that Hollister and Davenport no longer met the criteria. No new PM10 sites were recommended to be placed in the NCCAB. It should be noted that Davenport has historically displayed erroneously elevated readings due to aerosolized sea salt and is likely that it would not have exceeded the state AAQS with no sea salt present on the filter.

Table 37. Criteria Selected for New PM10 Site Analysis

Criteria:	Settings
Site Pair Correlation:	<0.50
Minimum Distance Between Site Pairs:	50km
Difference Between Site Pairs:	0ppm
Probability of Exceeding 85% of 24-hour NAAQS of $150\mu\text{g}/\text{m}^3$:	80%

Figure 14. Potential PM10 Monitoring Site Locations Based on the New Site Analysis

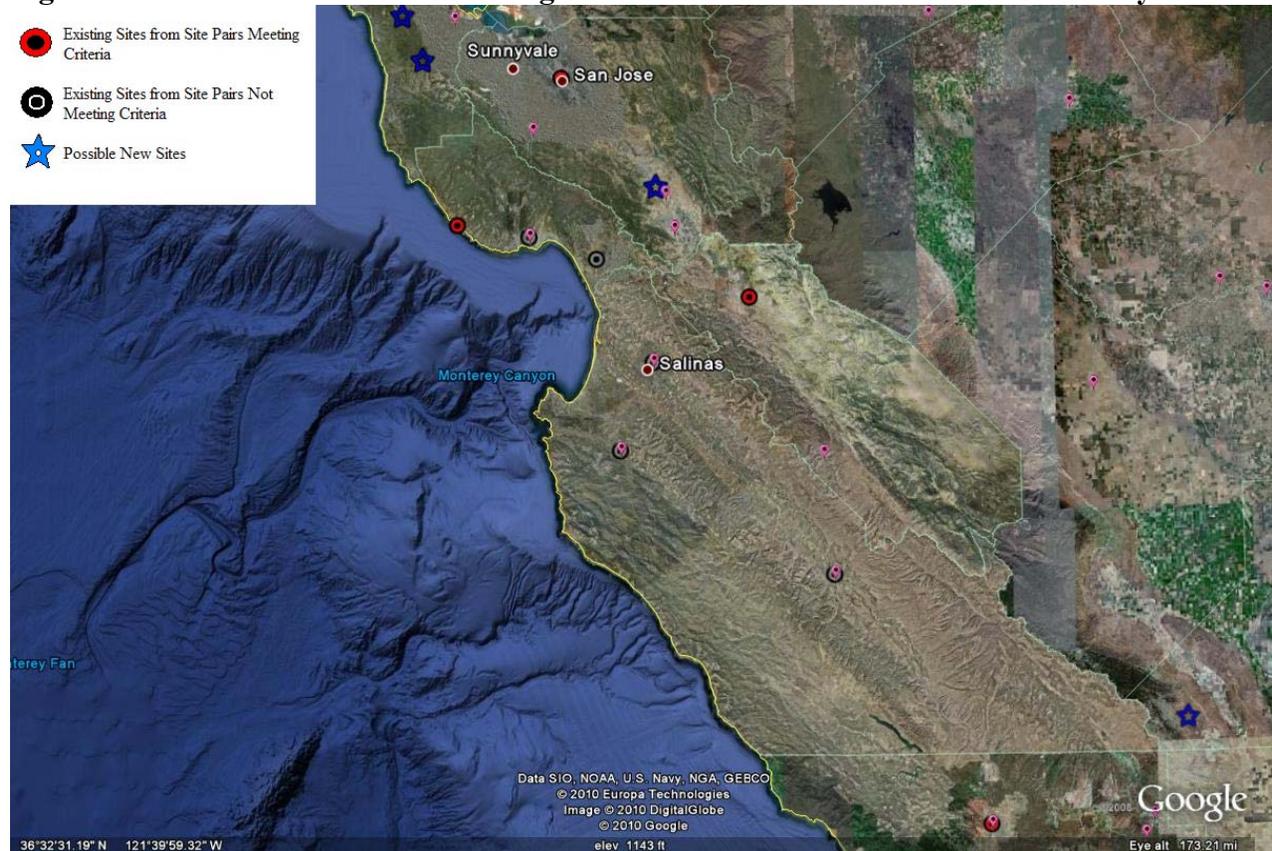
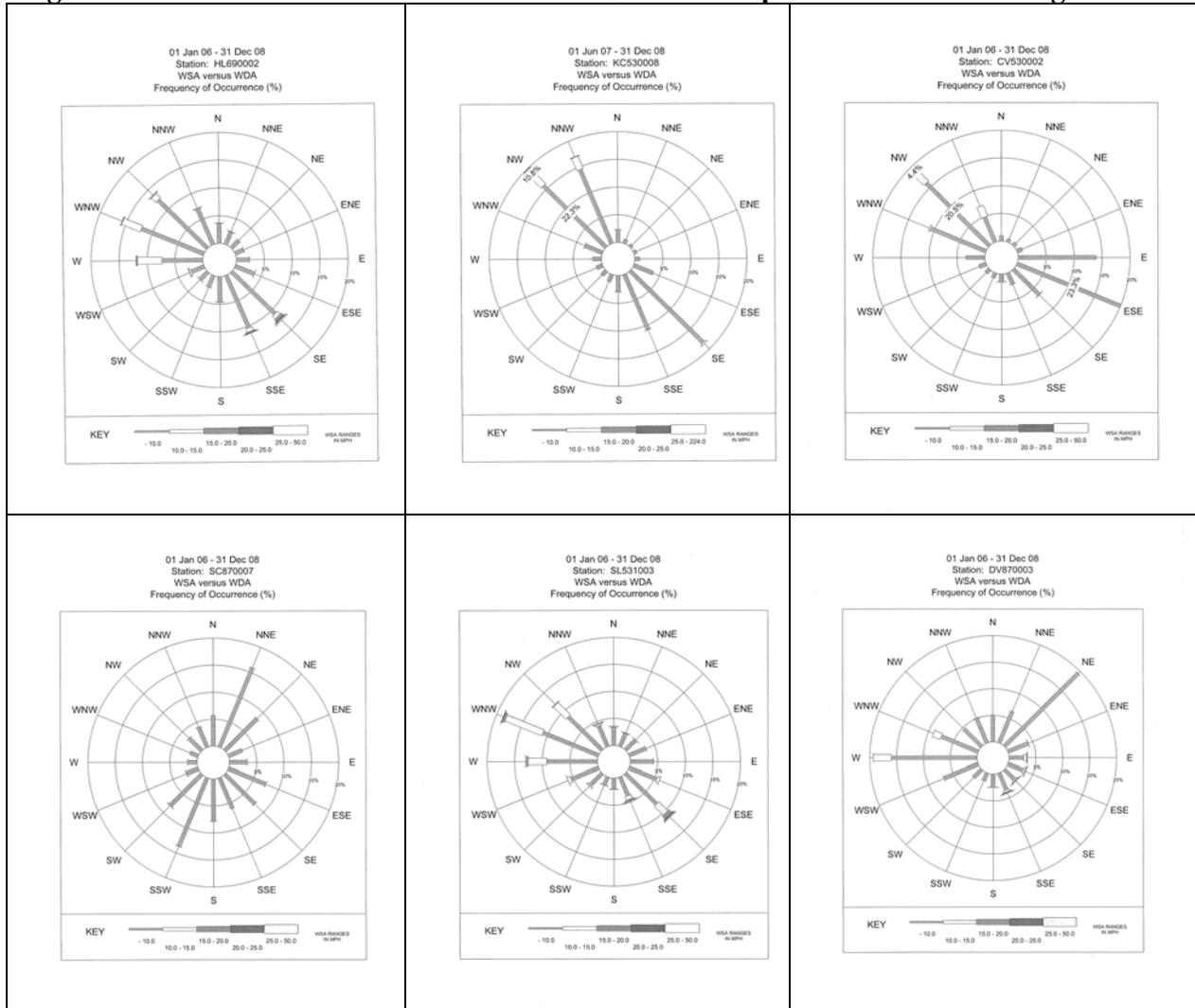


Figure 15. Wind Rose Charts for the Current District Operated Air Monitoring Sites



Discussion

The District currently collects ambient monitoring data from seven stations. Six of the stations are operated by the District, and the seventh station as mentioned previously, is operated by the National Park Service. The three largest stations, as described in terms of the number of parameters measured, are Salinas, Santa Cruz, and Hollister. They operate within the largest population centers for each MSA within the District's jurisdiction, and form the backbone of the ambient air monitoring network. The Hollister and Pinnacles stations help with monitoring ozone transport into the NCCAB and they document the District's highest ozone concentrations. The 2006-2008 wind patterns are shown on figure 15. The King City station serves to monitor a large portion of the southern part of Monterey County within the Salinas Valley, and helps with monitoring potential ozone transport through the District. The Davenport station was set up to monitor potential pollutants from the nearby CEMEX cement plant. With the closure of the plant, the Davenport station will be maintained with an ozone monitor. There is also the possibility that the cement plant will reopen under new ownership. The Davenport station will remain in operation as a special purpose monitoring site. The Carmel Valley station has been useful for smoke monitoring, particularly during two major wildfire events, the Basin Complex and the Indians Fire during the summer of 2008.

The movement and closures of some of the air monitoring stations played a part on how some analyses were done and on how much weight was given to their individual results. The monitoring times listed in Table 14 represent the stations only in their present locations. A few of the District's current stations were once located in nearby sites but had to be moved as the old sites became unsuitable for various reasons. Except for King City which moved three years ago, the stations have been at their present locations long enough to observe 10 years of ozone trends for comparison and to be able to run comparative analyses using 2006-2008 data. The Scotts Valley and Watsonville stations, while closed presently, did play a part in the analysis of the District's monitoring network since both stations were operating during the years used for the, removal bias, correlation matrix, and new sites analyses. Both stations were also included in the area served analysis, but were left unranked.

The results of the removal bias and correlation matrix analyses indicate that the current network consists of no redundant stations for both ozone and PM10. All of the stations appear to be monitoring separate and distinct air masses. For PM2.5, the Salinas and Santa Cruz stations are distinct from one another, but Hollister station could not be analyzed for that time period. The Hollister station however, is distinct from the other two stations in terms of ozone and PM10, and it is geographically separate by its presence in another valley, so it will be assumed at this time that PM2.5 at this site will also be distinct from the other two sites.

New Site analyses were performed for both ozone and PM10 monitors; however this tool was not yet available for PM2.5 monitors. These analyses indicated that the District is well covered at this time for both PM10 and ozone monitoring. Potential sites were indicated near the southern border of Monterey County, however the population in that area of Monterey is very low and scattered and maintaining a site there would be costly in terms of time and distance. There is currently no good practical reason to operate a station in that area. Future proposals for potential monitors will be discussed in upcoming annual network plans.

It is also to be noted that the District has switched from R&P FRM-2000 PM2.5 filter based instruments to FEM BAM-1020 continuous PM2.5 monitoring instruments at the start of 2010.