Air Quality Monitoring Program at the Port of Los Angeles

Year Six Data Summary
May 2010 - April 2011

Prepared For:

Port of Los Angeles
Environmental Management Division
425 South Palos Verdes Street
San Pedro, California 90733-0151

July 2011

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ACRONYMS

BAM	Beta Attenuation Monitors
CAAP	Clean Air Action Plan
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CO	Carbon Monoxide
DPM	Diesel Particulate Matter
DRI	Desert Research Institute
EC	Elemental Carbon
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
MATES	Multiple Air Toxics Exposure Study
m/s	Meters per Second
$\mu g/m^3$	Micrograms per Meter Cubed
NAAQS	National Ambient Air Quality Standards
NO	Nitrogen Oxide
NO_X	Nitrogen Oxides
NO_2	Nitrogen Dioxide
OC	Organic Carbon
O_3	Ozone
PAH	Polycylic Aromatic Hydrocarbons
PCAC	Port Community Advisory Committee
PM	Particulate Matter
PM_{10}	Particulate Matter of Aerodynamic Diameter Less than 10 Microns
$PM_{2.5}$	Particulate Matter of Aerodynamic Diameter Less than 2.5 Microns
POLA	Port of Los Angeles
Port	Port of Los Angeles
ppb	Parts per Billion
ppm	Parts per Million
ROI	Region of Influence
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SFS	Sequential Filter Sampler
SO_x	Sulfur Oxides
SO_2	Sulfur Dioxide
SPPS	Saints Peter and Paul Elementary School
TITP	Terminal Island Treatment Plant Station
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound

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1.0 EXECUTIVE SUMMARY

The Port of Los Angeles (Port or POLA) began an air monitoring program in February 2005. The program includes a network of four monitoring stations in the vicinity of the Port including: a Coastal Boundary station located in the southern end of the Port, near the ocean; a Source-Dominated station located near the center of Port operations; and the San Pedro and Wilmington Community stations located within those communities. Figure ES-1 shows the four stations relative to the Port.

The main objective of the air monitoring program is to estimate ambient levels of diesel particulate matter (DPM) in proximity to the Port that are due to Port operational activities. A secondary program objective is to estimate ambient gaseous pollutants and particulate matter (PM) levels due to Port emissions within adjacent communities. In addition, expansion of the program in 2008 now allows for the "real-time" continuous measurement of additional contaminants.

This report provides a summary of the data collected by the Port of Los Angeles (Port or POLA) Air Quality Monitoring Program during the most recent reporting year, Year 6: May 2010 through April 2011. There are four gaseous criteria air pollutants measured on a continuous basis under this program: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and ozone (O_3). In addition, PM is measured at the 10 micron and 2.5 microns size thresholds (PM_{10} and $PM_{2.5}$, respectively) using two methods: (a) traditional filter-based samplers, and (b) on a continuous basis using beta attenuation monitors (BAM). In addition to the air quality data, meteorological parameters are continuously measured at all four stations. The meteorological data are useful for interpreting the air quality data, and for special studies such as air modeling.

Preliminary real-time data from the air monitoring stations are available for public review at the San Pedro Bay Ports Clean Air Action Plan website: http://www.cleanairactionplan.org. Historical filter-based particulate monitoring data are also available for public review at the Port's website: http://portoflosangeles.org/environment/air_quality.asp.

The data collected at the Port's monitoring stations during this reporting year were compared to the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) established for each pollutant on the applicable averaging periods. While such comparisons are presented, this report does not make any representations as to compliance with NAAQS or CAAQS and the information presented herein should not be construed to the contrary. NAAQS compliance determinations are made by the U.S. Environmental Protection Agency (USEPA) with input from state and regional air agencies. CAAQS compliance determinations are made by the California Air Resources Board (CARB). For the South Coast Air Basin (SCAB), which includes the Los Angeles metropolitan region, the South Coast Air Quality Management District (SCAQMD) is responsible for operating the air quality monitoring stations which are used for those demonstrations. While the Port's monitoring stations are operated in accordance with the same federal and state regulations and guidelines, the Port's stations are outside the official monitoring network and are not used in those determinations.

Ambient air pollution levels near the San Pedro Bay are influenced by a number of factors including local pollutant emissions, regional air pollution levels, and meteorology. Several important criteria air pollutants (e.g., ozone and $PM_{2.5}$) are created (at least in part) by chemical reactions which occur after the release of emissions into the atmosphere. As such, concentrations from these pollutants are expected to be more regional. Other pollutants, like SO_2, are more localized in nature.

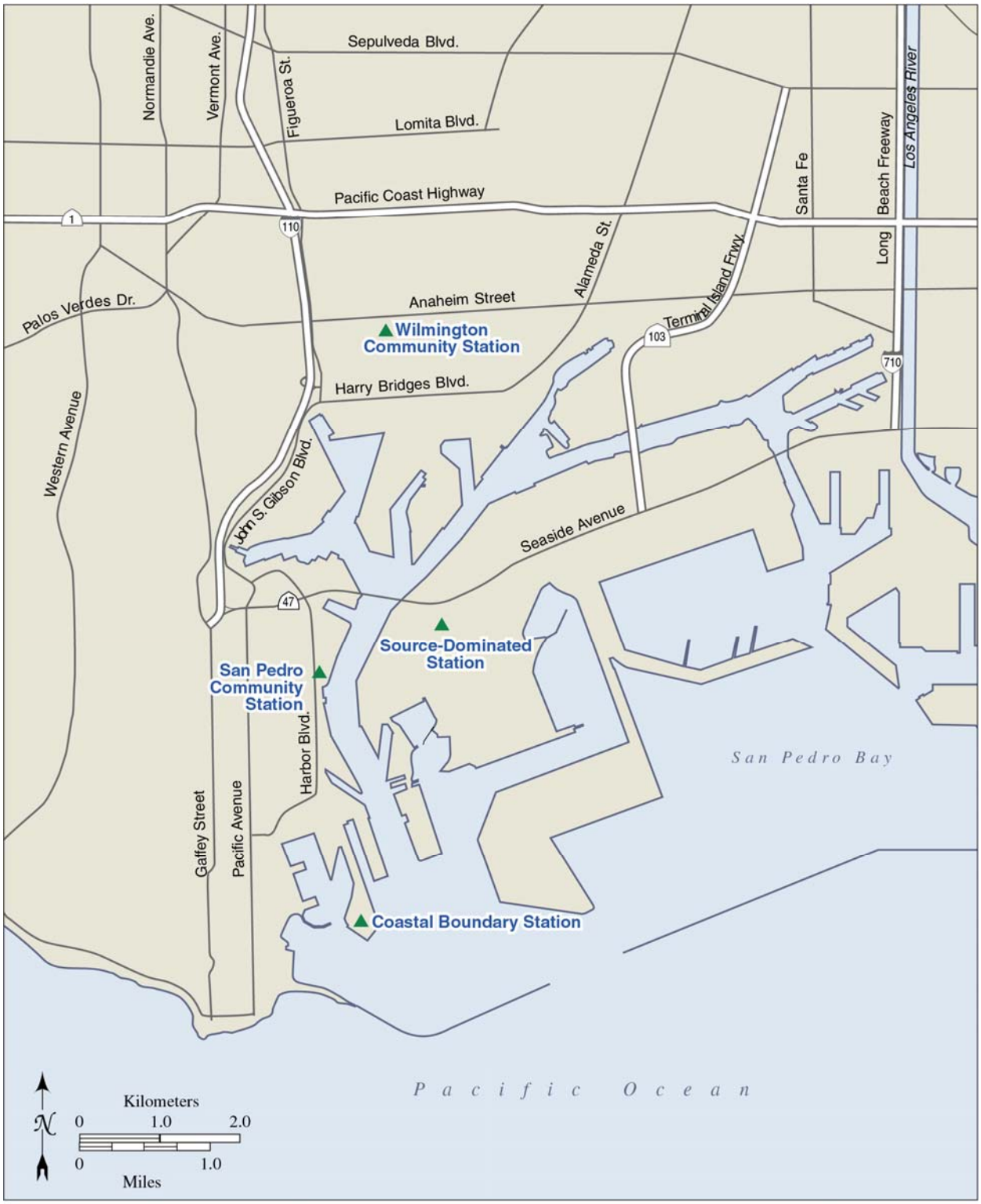


Figure ES-1. Locations of the Port's Air Monitoring Stations

Emissions from goods movement are an important contributor to air pollution levels in the SCAB region. DPM emissions, an important air toxic, are a contributor to $PM_{2.5}$ concentrations. Based on the latest available Port emissions inventory, Port-related mobile source emissions are estimated to contribute about 4% of the regional nitrogen oxide (NO_X) emissions and 5% of the regional DPM emissions in 2009; however, they have been trending lower in comparison to prior years.[1] This decline was due to a number of factors including the successful implementation of control measures under the San Pedro Bay Ports Clean Air Action Plan (CAAP), which have significantly reduced emissions rates from goods movement sources such as heavy duty trucks, ocean going vessels, and cargo handling equipment. The decrease in Port-related emissions was also affected in part by a sharp decline in goods movement activity at the San Pedro Bay ports during that period. Container throughput at the Port experienced a significant drop due to the economic recession of 2008-2009, with a 16% year-over-year improvement in 2010. Container throughput at the Port was approximately 8% lower in 2010 as compared to 2006, which had the record for container throughput.

In addition, meteorology can have a significant influence on regional air pollution levels from one year to the next. So while CAAP measures have improved air emissions levels around the Port, the amount of any decrease (or increase) in Port ambient air pollutant concentrations attributed to goods movement-focused control measures under the CAAP cannot be quantified solely through air quality monitoring.

The data collected during this monitoring period have been averaged and compared to the various National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) established for each pollutant. Table ES-1 presents the results of a comparison between the data collected by the monitoring network and the NAAQS and CAAQS during the most recent 12-month period. No NAAQS were exceeded for any pollutants measured within the monitoring network. However, several CAAQS were exceeded by data collected from at least one station; the annual CAAQS for PM_{10}, the 1-hour and 8-hour CAAQS for O_3, and the annual CAAQS for NO_2. The SCAB is designated as nonattainment for O_3, $PM_{2.5}$, and PM_{10}.

In addition to measuring $PM_{2.5}$ and PM_{10}, the particulate filters exposed in the Port's monitoring network are routinely analyzed for elemental and organic carbon (EC/OC). EC in particular is of interest, because it has been used as a surrogate of DPM. Although the EC data are analyzed and presented in this report, there are no NAAQS or CAAQS associated with this parameter.

[1] Port of Los Angeles Inventory of Air Emissions - 2009. Starcrest Consulting Group LLC. (http://www.portoflosangeles.org). June, 2010.

Table ES-1. Exceedances of NAAQS and CAAQS during Reporting Year 6 at the Port's Air Monitoring Stations

Parameter	Monitoring Stations			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
$PM_{2.5}$ 24-hour and annual NAAQS	No	No	No	No
$PM_{2.5}$ Annual CAAQS	No	No	No	No
PM_{10} 24-hour NAAQS	No	No	No	No
PM_{10} 24-hour CAAQS	No	No	n/a*	n/a*
PM_{10} annual CAAQS	Yes	Yes	n/a*	n/a*
CO 1-hour and 8-hour NAAQS	No	No	No	No
CO 1-hour and 8-hour CAAQS	No	No	No	No
NO_2 1-hour and annual NAAQS	No	No	No	No
NO_2 1-hour CAAQS	No	No	Yes	No
O_3 8-hour NAAQS	No	No	No	No
O_3 1-hour and 8-hour CAAQS	Yes	Yes	No	Yes
SO_2 1-hour and 3-hour NAAQS	No	No	No	No
SO_2 1-hour and 24-hour CAAQS	No	No	No	No

n/a*: PM_{10} data were not collected at this station

The POLA air monitoring network now has a six-year data record for particulate matter that can be used to determine trends in the data over this period. The annual average concentrations of particulate-related pollutants ($PM_{2.5}$, PM_{10}, and EC) were consistently found to be highest during the second year of monitoring (May 2006 to April 2007), with the exception of the annual average PM_{10} concentrations, which were flat over the first three years of record. The lowest annual average concentrations of these pollutants were measured during the most recent reporting year (May 2010 to April 2011).

Averaged across the four monitoring stations in the Port's monitoring network from 2005-2006 to 2010-2011, the annual average $PM_{2.5}$ concentrations decreased by 37 percent; the annual average PM_{10} concentrations decreased by 28 percent; and the annual average EC concentrations decreased by 52 percent. Figures ES-2 through ES-4 present the annual average $PM_{2.5}$, PM_{10}, and EC concentrations measured at the Port's air monitoring network since the start of the monitoring program in 2005. The figures show the decrease in all three measures of particulates over this time period. The decreases in annual average PM_{10} concentration have accelerated during the last three years, while $PM_{2.5}$ and EC concentrations have decreased steadily since the second year of monitoring (May 2006 – April 2007).

Figure ES-2

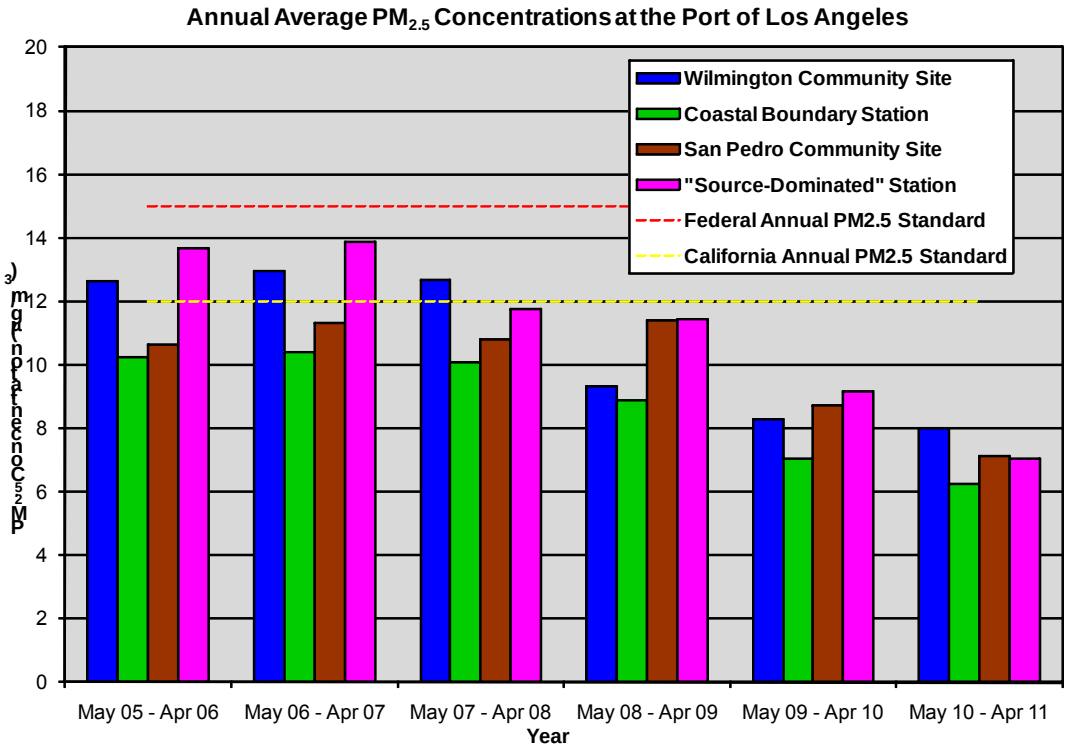


Figure ES-3

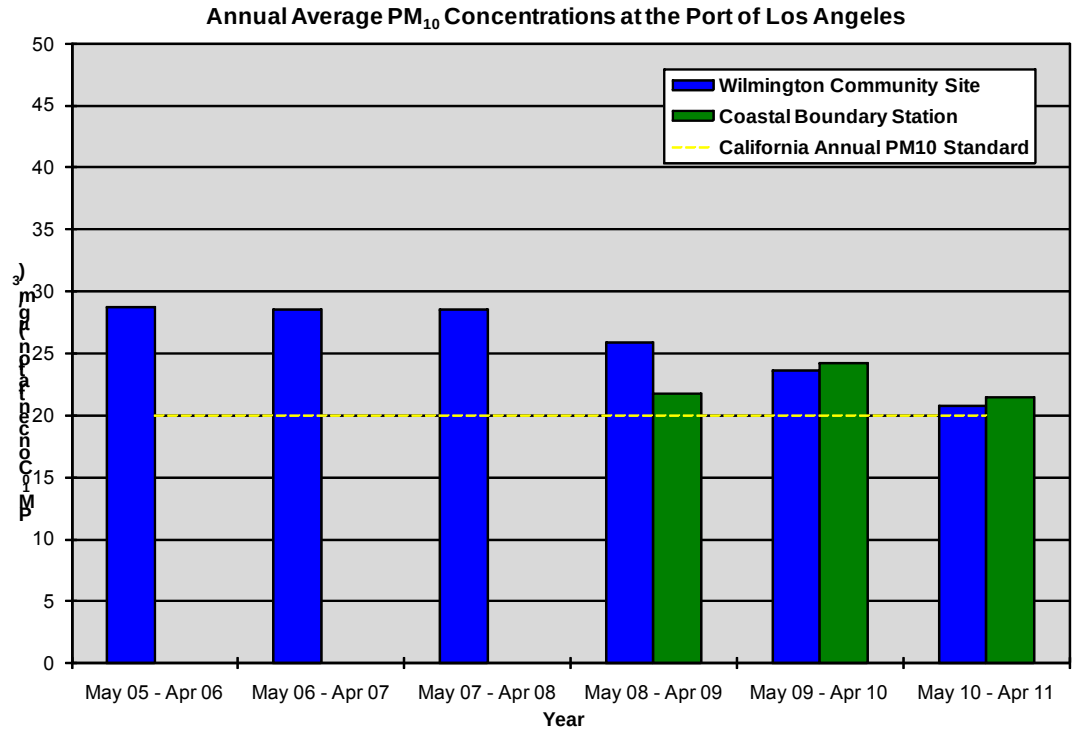


Figure ES-4

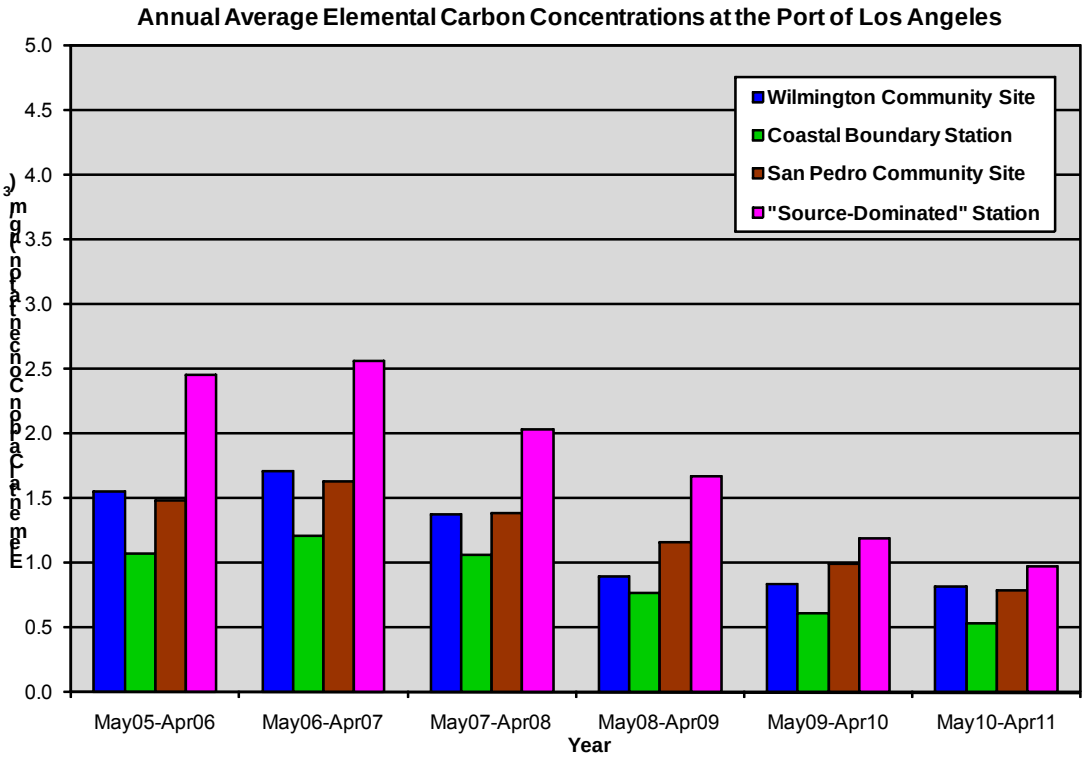


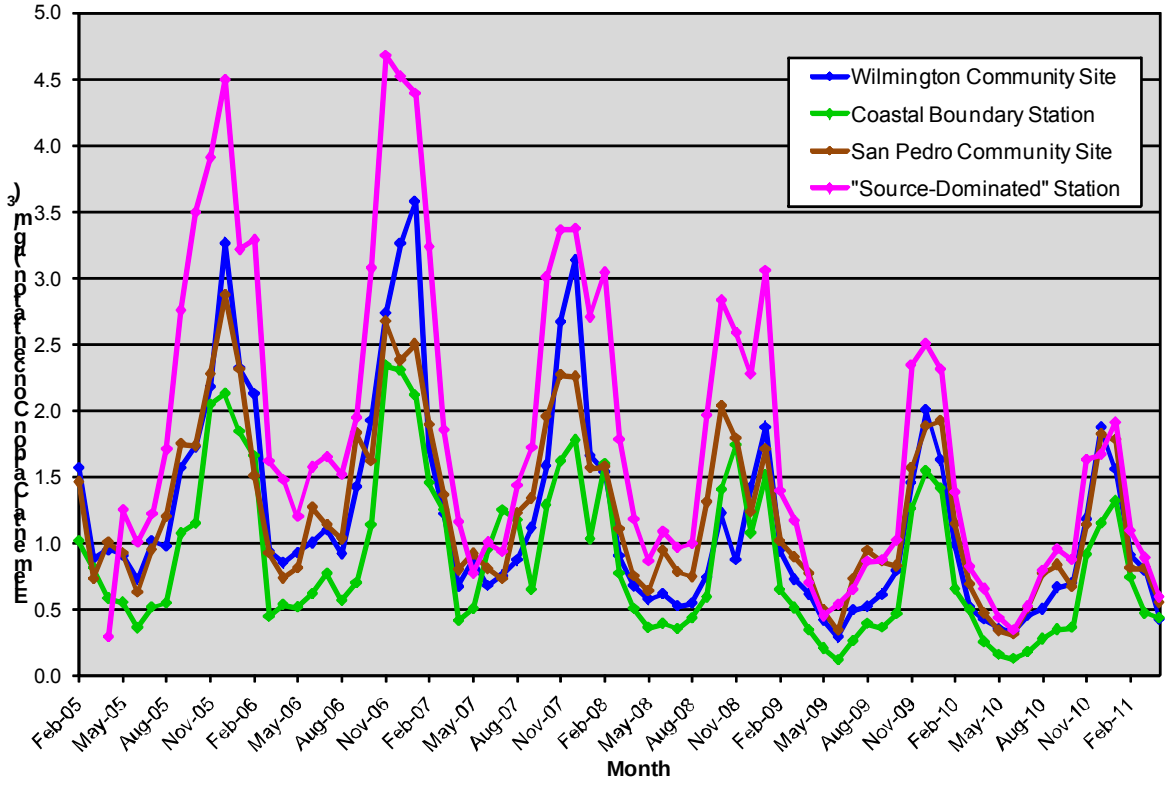
Figure ES-5 is a graph of monthly EC concentrations at all four stations over the six-year monitoring period, which provides additional information on the variability and trends of DPM levels around the Port. The graph shows a remarkably consistent pattern of peaks and valleys in EC concentrations each year, with the maximum monthly EC levels occurring in the fall and winter, probably due to atmospheric inversions which are more common at that time of year and tend to limit the mixing of EC emissions into the atmosphere. This is particularly evident at the Source Dominated station near the center of Port operations, where monthly averages during the first years of the monitoring program (2005-2007) were several times higher in the fall/winter period than in the spring/summer period. This yearly pattern of EC concentrations evident in ES-5 has a much larger amplitude and more consistent pattern than the corresponding figures for $PM_{2.5}$ and PM_{10} concentrations (Figures A-3 and A-7, respectively, in Appendix A-1).

Figures ES-4 and ES-5 show two additional features:

1. A decreasing annual average EC concentration at each station.
2. A strong trend of lower annual maximum and lower annual minimum EC concentrations over the period of record.

Figure ES-5

Monthly Average Elemental Carbon Concentrations at the Port of Los Angeles



2.0 INTRODUCTION

The Port of Los Angeles (Port or POLA) began its air quality monitoring program in February 2005. Under the initial program, representative ambient particulate matter (PM) and meteorological data were collected within the Port's operational region of influence (ROI). The collected PM data included two sizes of particulate matter: (1) "inhalable" PM that is less than 10 microns in diameter (PM_{10}) and (2) fine PM that is less than 2.5 microns in diameter ($PM_{2.5}$). In early 2008, the Port completed an expansion of the monitoring program to include continuous monitoring of four gaseous criteria air pollutants [ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and carbon monoxide (CO)], and expanded the particulates monitoring to include ultrafine particles and polycyclic aromatic hydrocarbons (PAH).

The driver of this program was the increased concern over health effects from diesel particulate matter (DPM). Further, the expanded monitoring program provides additional data to help provide an indication of the Port's area compliance with air quality standards, access to real-time data and presentation of that data for public review on a website, and the opportunity to conduct additional detailed analyses and an enhanced evaluation of source-receptor relationships in future studies.

The monitoring program consists of a network of four stations located in the vicinity of the Port of Los Angeles: one each in San Pedro and Wilmington, the two communities adjacent to the Port; one near the southern coastal boundary of the Port; and one on Terminal Island, near the operational center of the Port. The station locations are shown in Figure 1.

The design of the network was developed during 2003 and 2004. A monitoring work plan was developed and extensive discussions were held with the Port Community Advisory Committee (PCAC), and with the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB). The monitoring work plan was revised in 2008 to reflect the upgrades made to the air monitoring program.[2]

2.1 Siting of the Monitoring Stations

The locations of the monitoring stations were selected to be representative of ambient air quality conditions within the Port and the adjacent communities of San Pedro and Wilmington. Each monitoring site was selected based on three factors: (1) sites that met EPA criteria for locating monitoring stations (particularly unobstructed exposure to the local air flow), (2) site availability, and (3) site security.

The candidate locations for the San Pedro and Wilmington Community stations were subjected to a validation monitoring study to ensure the representativeness of the locations, and that the best available site were chosen in each community. Additional details of this selection process are provided in earlier annual reports[3].

In late 2007/early 2008, the air monitoring program was expanded to include real-time monitoring of gaseous criteria pollutants and particulates. During the planning stage of this expansion, it was discovered that the San Pedro Community and Source-Dominated station had to be moved short distances, because the existing rooftop locations used at those sites could not support the shelters required to house the real-time monitoring instruments. Validation studies were conducted for each of these moves, which were detailed in previous annual reports.

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[2] *The Port of Los Angeles Air Quality Monitoring Program Maintenance Plan*, Port of Los Angeles, 2008.

[3] *Air Quality Monitoring Program at the Port of Los Angeles Summary of Data Collected During the Fifth Year, May 2009 – April 2010*. Available at: http://caap.airsis.com/Documents/POLA-5th-Annual-Monitoring-Report.pdf.

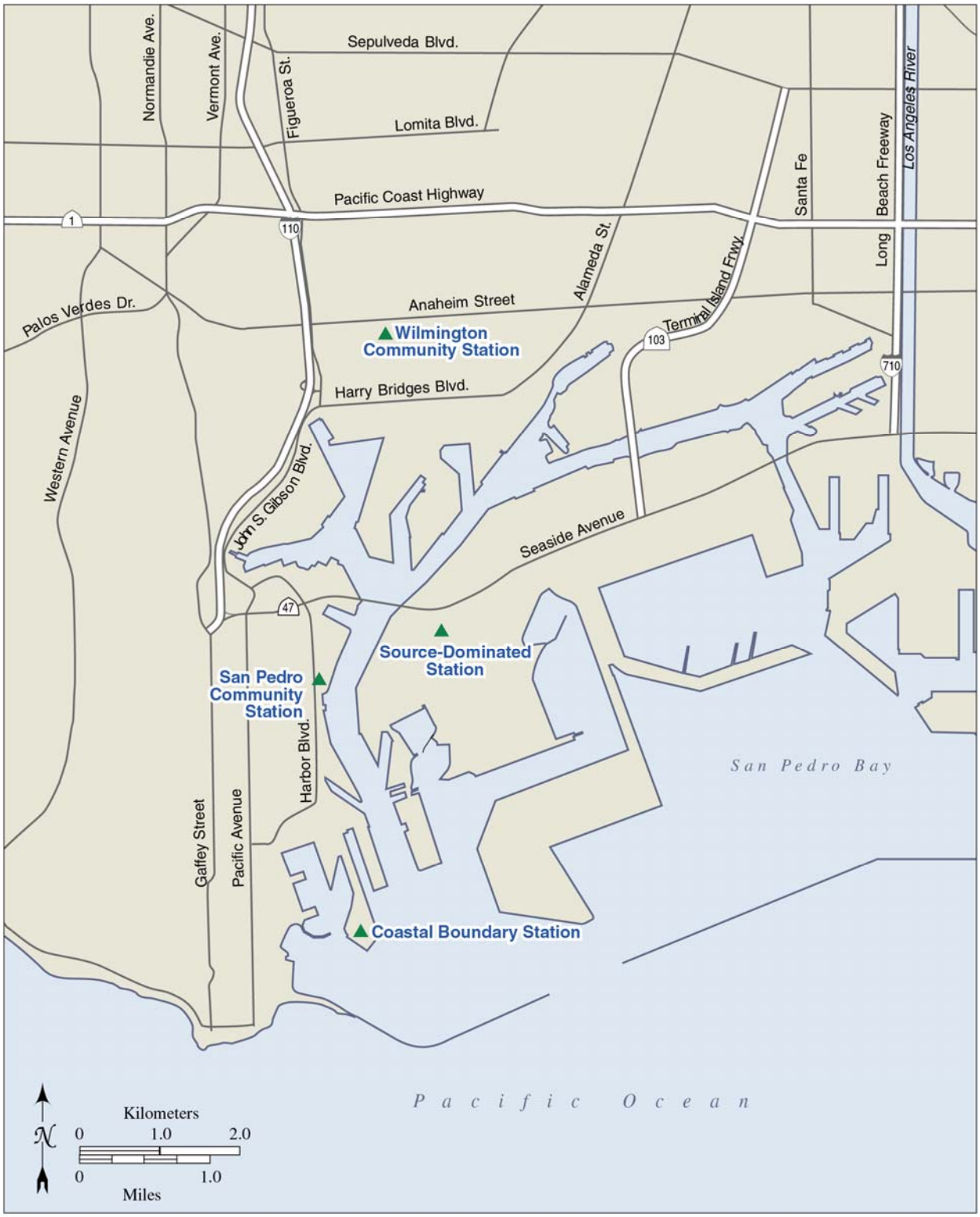

Figure 1. Locations of the Port's Air Monitoring Stations

3.0 DESCRIPTION OF THE AIR MONITORING PROGRAM

The following discussion presents a summary of the Port's air monitoring network. The main objective of the air monitoring program is to estimate ambient levels of DPM in proximity to the Port that are due to Port operational activities. A secondary objective is to estimate ambient gaseous pollutants and PM levels due to Port emissions within adjacent communities. Furthermore, expansion of the program in 2008 allows for continuous monitoring at additional pollutants of concern.

3.1 Locations of the Monitoring Network

The locations of the four stations currently in operation in the Port's air monitoring network are shown in Figure 1 and include the following stations:

- *Wilmington Community Monitoring Station* (33^{o} 46' 43.79" N, 118^{o} 16'10.56" W) – This station is located at the Saints Peter and Paul Elementary School (SPPS) in the City of Wilmington. This station is designed to collect air quality data that are representative of the residential areas of Wilmington. It is centrally located and is approximately 0.5 miles north of Port operations.
- *San Pedro Community Monitoring Station* (33^{o} 44' 30" N, 118^{o} 16'44.75" W) – This station is located adjacent to the Promenade walkway along Harbor Drive, across the street from the intersection of Harbor Boulevard and West 3rd Street. This station is designed to collect air quality data that are representative of the residential areas of San Pedro. It is centrally located and is approximately 0.1 mile west of the main ship channel.
- *Coastal Boundary Station* (33^{o} 42' 50.58" N, 118^{o} 16' 27.07" W*)* – This station is located at Berth 47 (Berth 47 station) in the Port Outer Harbor. This location has the least direct exposure to emissions from Port operations.
- *Terminal Island Treatment Plant Station* (33^{o} 44' 41.03" N, 118^{o} 15' 40.13" W*)* – This station is located on Pier 300, at the Terminal Island Treatment Plant (TITP) on Ferry Street. This station is expected to have the highest exposure to emissions from Port operations, as it is in direct proximity to terminal operations which use a large number of diesel engine sources (trucks, trains, ships, and cargo handling equipment). It is also referred to as the "Source-Dominated" station, because of the predominance of on-road and off-road diesel emission sources in the area.

3.2 The Monitoring Network

All four stations have the same instrumentation, which collect a comprehensive set of integrated 24-hour average $PM_{2.5}$ and PM_{10} samples, and real-time data measuring gaseous criteria pollutants, $PM_{2.5}$ and PM_{10}, ultrafine particles, and meteorological data, as shown in Table 3-1. The Wilmington Community Monitoring station includes additional supplemental instruments, as shown in the table and discussed below.

Table 3-1. Air Quality and Meteorological Instrumentation Currently in Operation at the Port Monitoring Stations

Parameter	Monitoring Stations			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
$PM_{2.5}$ Integrated Filter Sampler ($PM_{2.5}$ mass and EC/OC)	√	√	√	√
$PM_{2.5}$ Continuous Monitor ($PM_{2.5}$ mass)	√	√	√	√
PM_{10} Continuous Monitor (PM_{10} mass)	√	√	√	√
$PM_{2.5}$ FRM Filter Monitor ($PM_{2.5}$ mass)	√			
PM_{10} FRM Filter Monitor (PM_{10} mass)	√	√		
Ultrafine Particle Counters	√	√	√	√
CO Monitor	√	√	√	√
NO_2 Analyzer	√	√	√	√
O_3 Analyzer	√	√	√	√
SO_2 Analyzer	√	√	√	√
Meteorological Instruments (wind speed & direction, temp.)	√	√	√	√
Supplemental Meteorological Instruments (rel. humidity, solar radiation, barometric pressure)	√			

The stations in the Port's network are equipped with the following components:

1. *Detailed 24-hour sampling for $PM_{2.5}$* – Each station is equipped with a multi-port $PM_{2.5}$ "sequential filter sampler" (SFS) monitor that simultaneously collects samples on a 24-hour basis on two different filter media (Teflon and quartz). This allows for the analysis of samples for mass (Teflon filters) and detailed chemical speciation (quartz and Teflon filters combined), including carbon fractions (elemental carbon/organic carbon), metals, and soluble ions. Samples are collected at each site every third day, following EPA's nationwide schedule. This allows direct comparison of the data collected within the network and at other agency stations in the vicinity.
2. *Continuous Monitoring of $PM_{2.5}$* and *PM_{10}* – In addition to the detailed 24-hr $PM_{2.5}$ sampling described above, each of the Port's monitoring stations are equipped to monitor $PM_{2.5}$ and PM_{10} on a continuous and real-time hourly basis using Met One Instruments Beta Attenuation Monitors (BAM).

3. *PM_{10} Filter-based Monitoring* – The Wilmington Community and Coastal Boundary stations have Federal Reference Method (FRM) PM_{10} monitors with EPA design certification to measure $PM_{2.5}$ concentrations for compliance with the NAAQS and CAAQS.
4. *$PM_{2.5}$ Filter-based Monitoring* – The Wilmington Community station has an FRM $PM_{2.5}$ monitor to verify operation of the SFS monitors and to measure $PM_{2.5}$ concentrations for compliance with the NAAQS and CAAQS.
5. *Continuous Gaseous Pollutant Monitoring* – Each station is equipped with analyzers to determine real-time air pollutant concentrations for the gaseous pollutants (i.e. NO-NO_2-NO_x, O_3, CO, and SO_2). These analyzers are FRM- or federal equivalent method (FEM)-designated monitors and include the following:
    a. Pulsed Fluorescence SO_2 Analyzer
    b. Chemiluminescent NO-NO_2-NO_x Analyzer
    c. Gas Filter Correlation CO Analyzer
    d. U.V. Photometric Ozone (O_3) Analyzer
6. *Additional monitoring parameters* – Additional instruments have been added to the network from time to time, to take advantage of advances in new instrumentation or to address new monitoring questions.
    a. In April 2011, water-based ultrafine particle counters (TSI Model 3783) were installed at each station in the network. Results from the ultrafine particulate counters will be included in the 7th Annual Report.
    b. Real-time PAH data were collected through 2010 under an EPA special study, which has been discontinued. The results of the study are available on the CAAP website (http://caap.airsis.com/Documents/POLA_PAH_Final_Report_092309.pdf).

4.0 Data Analysis

4.1 Regulatory Background

Air quality is determined by the size and topography of the air basin, the local and regional meteorological influences, and the type and concentration of pollutants in the atmosphere, which are generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Comparison of these pollutant concentrations with the federal and state ambient air quality standards is often made to evaluate air quality conditions in an area. The USEPA has established the NAAQS which are maximum pollutant limits that shall not be exceeded more than once per year (other than short-term standards for O_3, NO_2, SO_2, and PM, and those based on annual averages). Annual pollutant averages are never to exceed the annual NAAQS. Primary standards set limits to protect public health, including the health of "sensitive" populations such as children and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The Clean Air Act and its subsequent amendments delegate the enforcement of these standards to the states, who may adopt the NAAQS as state standards or establish more stringent acceptable pollutant concentration levels if they deem necessary. CARB has established a set of state standards (CAAQS) that are often more stringent than the NAAQS. Table 4-1 presents the California and national ambient air quality standards.

Table 4-1. California and National Ambient Air Quality Standards

Pollutant	Averaging Times	California Standards	National Standards	
			Primary	Secondary
Ozone (O_3)	8-hour	0.070 ppm	0.075 ppm	Same as Primary
	1-hour	0.090 ppm	---	
Carbon Monoxide (CO)	8-hour	9.0 ppm	9.0 ppm	---
	1-hour	20.0 ppm	35.0 ppm	---
Nitrogen Dioxide (NO_2)	Annual	0.030 ppm	0.053 ppm	Same as primary
	1-hour	0.180 ppm	0.100 ppm*	
Sulfur Dioxide (SO_2)	Annual	---	0.030 ppm	---
	24-hour	0.040 ppm	0.140 ppm	---
	3-hour	---	---	0.500 ppm
	1-hour	0.250 ppm	0.075 ppm**	---
Lead	30-day	1.5 $\mu g/m^3$	---	---
	Rolling 3-Month	---	0.15 $\mu g/m^3$	Same as primary
Respirable Particulate Matter (PM_{10})	Annual	20 $\mu g/m^3$	---	Same as primary
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	
Fine Particulate Matter ($PM_{2.5}$)	Annual	12 $\mu g/m^3$	15 $\mu g/m^3$	Same as primary
	24-hour	---	35 $\mu g/m^3$	

Notes: National Primary Standards: Levels of air quality necessary, with an adequate margin of safety to protect public health.

National Secondary Standards: Levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

*This standard was promulgated on January 22, 2010.

** The new one-hour SO_2 standard was promulgated on June 3, 2010.

4.2 Air Quality Data Summary – Year 6

The following analysis summarizes of the data collected from May 2010 through April 2011 and draws comparisons to the NAAQS and CAAQS. These summaries include the following parameters: [1] PM_{10}, [2] $PM_{2.5}$, [3] elemental carbon, [4] CO, [5] NO_2, [6] SO_2, and [7] O_3. The wind speed and direction measurements collected during this period are also summarized. In addition to these written summaries, the data are presented in several ways:

1. Presentation of the air quality data in a graphical format (Figures A-1 through A-15 in Appendix A-1[4]). The graphs typically display monthly averages of the measured air quality data. Although there are no air quality standards that are based on a monthly average, that time period was used to average the data for the graphs because it is a good timeframe for viewing data trends, both on an annual basis and over the entire monitoring period.
2. Presentation of wind roses, which visually depict the distribution of winds at each of the four monitoring sites; showing their speed, direction and frequency (Figures A-16 through A-19 in Appendix A-1).
3. Presentation of the air quality data in tables (Tables A-1 through A-17 in Appendix A-2).

This data summary is a compilation and presentation of data collected during the sixth year of monitoring (May 2010 - April 2011). Much of these data are also available on the Port's website (filter-based data) at http://www.portoflosangeles.org, and the Clean Air Action Plan (CAAP) website (real-time data) at http://www.cleanairaction plan.org. The data summary is presented below.

4.2.1 PM Data Summary

PM measurements are collected for $PM_{2.5}$, PM_{10}, and EC. Filter-based monitoring began in early 2005, while the real-time monitoring (using beta attenuation monitors or BAMs) was initiated in 2008.

4.2.1.1 $PM_{2.5}$ Data

The results of the $PM_{2.5}$ monitoring program are shown in Figures A-1 through A-4 in Appendix A-1 and Tables A-1 through A-4 in Appendix A-2. These figures and tables are discussed in this section and in Section 5.1 (Data Trends).

The data in Table A-1 is shown graphically in Figure A-1, which presents a bar graph of annual average $PM_{2.5}$ concentrations from the filter-based integrated monitors over the monitoring period (Figure A-1 is also shown as Figure ES-2 in the Executive Summary). The figure shows a relatively constant decrease in $PM_{2.5}$ concentrations since the 2006-2007 year.

The data presented in Table A-1 is also shown graphically in Figure A-2 as average monthly concentrations of $PM_{2.5}$ from the filter-based integrated monitors during the current 2010-2011 reporting year. The figure shows that during the year, the $PM_{2.5}$ concentrations were generally lower during the summer months and higher in the winter season, similar to the previous years. This phenomenon is probably due to better dispersion of the emissions during the summer.

Figure A-3 presents a graph of monthly average $PM_{2.5}$ concentrations from the filter-based data collected at the four stations over the entire 6-year monitoring period. At each station, there is a general tendency for higher $PM_{2.5}$ concentrations to occur in the late fall and winter. A general reduction in $PM_{2.5}$ concentrations over the period of record is also evident in the figure, which is discussed in more detail in the data trends section (Section 5.1).

[4] The tabular and graphic data presentations are quite extensive, so that most figures and tables have been included in Appendix A of this report.

Since early 2008, $PM_{2.5}$ concentrations have also been measured at the four Port stations using real-time particulate monitors (BAMs). Figure A-4 presents a graph of the real-time BAM $PM_{2.5}$ concentrations, measured during the current monitoring year and averaged on a monthly basis to illustrate the overall trend and to remove the day-to-day variations in the data. The patterns of $PM_{2.5}$ measurements in the filter-based and real-time monitors are similar, although the real-time BAM data from the Port monitoring stations are consistently higher than the filter-based data. Other studies have confirmed that continuous monitoring instruments such as the BAM exhibit a positive measurement bias when compared to the filter-based data[5].

NAAQS Compliance

The 24-hour $PM_{2.5}$ NAAQS is met when the 98th percentile of the daily average $PM_{2.5}$ concentrations, averaged over three years, are equal to or less than 35 $\mu g/m^3$. The annual average NAAQS for $PM_{2.5}$ is 15 $\mu g/m^3$.

- The three-year averages (May 2008 - April 2011) of the 98th percentile of the 24-hour average $PM_{2.5}$ concentrations at the four Port stations are less than the NAAQS (35 $\mu g/m^3$), as shown in Table 4-2. Thus, data from the monitors show that the stations are currently meeting the 24-hour average $PM_{2.5}$ NAAQS.

- For the current year, the annual average $PM_{2.5}$ concentrations measured by the filter-based monitors are also shown in Table 4-2. There were no exceedances of the NAAQS.

Table 4-2. NAAQS Compliance – Three Year Average of 98th Percentile of 24-hour and Annual Average $PM_{2.5}$ Concentrations

Averaging Time	Period	$PM_{2.5}$ Concentration ($\mu g/m^3$)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
24-hour *	May 2008 - April 2011	21.9	22.8	21.6	25.4	35.0
Annual	May 2010 - April 2011	8.0	6.2	7.1	7.1	15.0

***** Three Year Average of 98th Percentile of 24-hour

CAAQS Compliance

The annual $PM_{2.5}$ CAAQS is met when the annual average $PM_{2.5}$ concentration is equal to or less than 12 $\mu g/m^3$. There is no separate 24-hour $PM_{2.5}$ CAAQS. For the current monitoring year, the annual average $PM_{2.5}$ concentrations measured by the filter-based monitors are shown in Table 4-3. There were no exceedances of the CAAQS.

[5] Weirman, S. and P. Doraiswamy, Current Issues in Air Quality Monitoring, AWMA EM Magazine, 2009.

Table 4-3. CAAQS Compliance – Annual Average $PM_{2.5}$ Concentrations

Averaging Time	Period	$PM_{2.5}$ Concentration ($\mu g/m^3$)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	CAAQS
Annual	May 2010 - April 2011	8.0	6.2	7.1	7.1	12.0

4.2.1.2 PM_{10} Data

The results of the PM_{10} monitoring program are shown in Figures A-5 through A-8 in Appendix A-1 and Tables A-5 through A-7 in Appendix A-2. These figures and tables are discussed in this section and Section 5.1(Data Trends).

The data in Table A-5 is shown graphically in Figure A-5, which presents a bar graph showing the annual average PM_{10} concentrations from the filter-based integrated monitors over the monitoring period (Figure A-2 is also shown as Figure ES-3 in the Executive Summary). The figure shows a relatively constant annual average PM_{10} concentration for Years 1-3 of the monitoring program (2005-2006 through 2007-2008) at the Wilmington Community station (the only long-term monitoring record for PM_{10}). However, this has been followed by a relatively steady decrease in PM_{10} levels in Years 4-6 (2008-2009 through 2010-2011). The 3-year monitoring record at the Coastal Boundary station has not been representative of the site during the last two years, because of major construction of a marina just to the north of the station.

The data presented in Table A-5 is also shown graphically in Figure A-6, as average monthly concentrations of PM_{10} from the filter-based monitors during the current 2010-2011 reporting year. The figure shows that there is less variability in PM_{10} concentrations than $PM_{2.5}$ concentrations during the year, although there were moderate increases in PM_{10} levels at the beginning and end of the sampling period.

Figure A-7 presents a graph of monthly average PM_{10} concentrations from the filter-based data collected at the four stations over the entire 6-year monitoring period. The seasonal effects on PM_{10} concentrations are somewhat less obvious than they were on $PM_{2.5}$ concentrations. There is also less general reduction over time of PM_{10} concentrations, which is reasonable since fugitive emissions from open areas and roads are one of the major sources of PM_{10} concentrations. This is discussed in more detail in the data trends section (Section 5.1).

Figure A-8 presents the monthly average PM_{10} concentrations from the filter-based data collected over the entire 6-year monitoring period. PM_{10} data from filter-based monitors has been collected only at the Wilmington Community station, with a second PM_{10} monitor added at the Coastal Boundary station in August 2008. The most evident feature of Figure A-7 is that spikes in PM_{10} concentrations occasionally occur during the fall or winter season (October - January). This was particularly evident in October 2007, when large wildfires were present throughout southern California. The fall and early winter is also the driest time of the year when Santa Ana winds are most common. In contrast, the lowest monthly PM_{10} concentrations were measured in February through March of 2005 and 2006, when there were significant precipitation events.

Since early 2008, $PM_{2.5}$ concentrations have also been measured at the four Port stations using real-time particulate monitors (BAMs). The data in Table A-7 is shown graphically in Figure A-8, which presents the real-time BAM $PM_{2.5}$ concentrations measured during the current monitoring year and averaged on a monthly basis. The patterns of $PM_{2.5}$ measurements in the filter-based and real-time monitors are similar, but the real time PM_{10} concentrations demonstrate more variability, and are

somewhat higher. Figure A-8 shows that over the last four months of the current year, PM_{10} concentrations measured by the BAM at the Coastal Boundary station have increased from the lowest average concentrations measured within the network to the highest average concentrations. This is likely due to large-scale construction activity starting in 2010 at the marina just north of Berth 47, which produced significant amounts of fugitive dust.

NAAQS Compliance

The 24-hour PM_{10} NAAQS is attained when the number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. The annual average NAAQS for PM_{10} was revoked in 2006.

- The 24-hour maximum PM_{10} concentrations are shown in Table 4-4. There were no exceedances of the federal 24-hour PM_{10} NAAQS measured at any of the Port stations during the current year. The 24-hour monitoring results are presented in Table A-5.

Table 4-4. NAAQS Compliance – Highest 24-hour Average PM_{10} Concentrations

Averaging Time	Period	PM_{10} Concentration ($\mu g/m^3$)		
		Wilmington Community Station	Coastal Boundary Station	CAAQS
Annual	May 2010 - April 2011	46.6	48.9	150.0

CAAQS Compliance

The 24-hour PM_{10} CAAQS is 50 $\mu g/m^3$, and the annual average CAAQS is 20 $\mu g/m^3$, which are not to be exceeded.

- No exceedances of the 24-hour PM_{10} CAAQS of 50 $\mu g/m^3$ were measured at the Port stations during the current monitoring year, as shown in Table 4-5. The 24-hour PM_{10} monitoring results for the current monitoring year are presented in Table A-5.

- Table 4-5 shows that the annual average PM_{10} concentrations measured with the filter-based monitors were above the annual CAAQS of 20 $\mu g/m^3$ at both monitoring sites during the current year. This is consistent with data collected throughout the South Coast Air Basin, which is designated as nonattainment for both PM_{10} and $PM_{2.5}$. The annual average monitoring results for the current monitoring year along with the previous 5 years of monitoring are presented in Table A-5.

Table 4-5. CAAQS Compliance – Highest 24-hour and Annual Average PM_{10} Concentrations

Averaging Time	Period	PM_{10} Concentration ($\mu g/m^3$)		
		Wilmington Community Station	Coastal Boundary Station	NAAQS
24-hour	May 2010 - April 2011	46.6	48.9	50.0
Annual	May 2010 - April 2011	20.8	21.5	20.0

4.2.1.3 EC Data

There are no federal or state standards for EC, but there is interest in the data because it has been used as a surrogate for DPM in the SCAQMD MATES-II and MATES-III studies. EC concentrations are measured by analyzing the filters collected on the filter-based monitors located at each station.

The data in Table A-8 is shown graphically in Figure A-9, which presents a bar graph of annual average EC concentrations from the filter-based integrated monitors over the monitoring period (Figure A-9 is also shown as Figure ES-4 in the Executive Summary). The figure shows that EC concentrations have decreased at a greater rate than $PM_{2.5}$ or PM_{10} concentrations over the six-year monitoring period. The greatest decrease in EC concentrations has occurred at the Source Dominated station near the center of Port operations, which has recorded a 60 percent decrease in EC levels.

The data presented in Table A-8 is also shown graphically in Figure A-10 as average monthly EC concentrations from the filter-based integrated monitors during the current 2010-2011 reporting year. The figure shows that EC concentrations were generally lower during the spring and early summer months and higher in the winter season. This phenomenon is probably due to better dispersion of the emissions during the summer.

Figure A-11 presents a graph of EC concentrations over the 6-year period of record. The graph shows a remarkably consistent pattern of peaks and valleys in EC concentrations each year, with the maximum values occurring in the fall and winter, probably due to atmospheric inversions which tend to limit the mixing of EC emissions into the atmosphere. This yearly pattern of EC concentrations has a much larger amplitude than the corresponding figures for $PM_{2.5}$ and PM_{10} concentrations (Figures A-3 and A-7, respectively). The figure also shows a strong trend of lower annual maximum and lower annual minimum EC concentrations over the period of record, which is discussed in more detail in the data trends section (Section 5.1).

Table 4-6. Annual Average EC Concentrations in the POLA Air Monitoring Network

Averaging Time	Period	EC Concentration (µg/m^3)			
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
Annual	May 2010 - April 2011	0.8	0.5	0.8	1.0

4.2.2 Gaseous Criteria Pollutant Data Summary

The Port monitoring network has collected real-time measurements for CO, NO_2, O_3, and SO_2 since 2008. These results are discussed below, arranged by individual pollutant.

4.2.2.1 CO Data Summary

Figure A-12 shows the average monthly CO concentrations over the period of record. Graphs of average monthly pollutant concentrations have been selected as a convenient scale for illustration of the main features in the data set. The highlights of this graph are:

- Average CO concentrations are low for this pollutant throughout the period.

- There is a slight increase in CO concentrations during the winter months, presumably due to the light wind conditions and surface-based temperature inversions commonly present during this time of year, which tend to trap pollutants in the lower atmosphere.

NAAQS Compliance

The NAAQS for CO are 9 ppm during an 8-hour period and 35 ppm during a 1-hour period, and are not to be exceeded more than once per year. During the current monitoring year, no exceedances of the NAAQS for CO were recorded at the Port's monitoring stations.

- The maximum 1-hour average CO concentration measured within the network during the current monitoring year was 4.6 ppm, at the Wilmington Community station as shown in Table 4-7. This is well below the 1-hour NAAQS of 35 ppm.

- The maximum 8-hour average CO concentration was 2.7 ppm, measured at the Wilmington Community station, as shown in Table 4-7. Thus, there were no exceedances of the 8-hour NAAQS of 9 ppm.

Table 4-7. NAAQS Compliance – Maximum 1-hour and 8-hour CO Concentrations

Averaging Time	Period	CO Concentration (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
Max 1-hr CO Concentration	May 2010 - April 2011	4.6	1.7	2.4	2.1	35.0
Max 8-hr CO Concentration	May 2010 - April 2011	2.7	1.1	2.1	1.3	9.0

CAAQS Compliance

The CAAQSs for CO are 9 ppm during an 8-hour period and 20 ppm over a 1-hour period, and are not to be exceeded. During the current monitoring year, no exceedances of the CAAQSs for CO were recorded at the Port's monitoring stations, as shown in Table 4-8 below.

Table 4-8. CAAQS Compliance – Maximum 1-hour and 8-hour CO Concentrations

Averaging Time	Period	CO Concentration (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
Max 1-hr CO Concentration	May 2010 - April 2011	4.6	1.7	2.4	2.1	20.0
Max 8-hr CO Concentration	May 2010 - April 2011	2.7	1.1	2.1	1.3	9.0

4.2.2.2 NO_2 Data Summary

Figure A-13 shows the average monthly concentrations of NO_2 over the current monitoring year. The graph shows that there is an annual cyclical pattern in the NO_2 concentrations. Average monthly NO_2 concentrations fall to a minimum level during the summer months and gradually increase into the winter. There are two possible explanations for this pattern:

1. The lower concentrations in the summer may be due to the complex series of atmospheric chemical reactions that exist between NO_2 and ground-level O_3.
2. The surface-based temperature inversions commonly present during the winter months may trap the NO_2 closer to the ground, thereby increasing the ground level concentration of this pollutant.

NAAQS Compliance

The NAAQS for NO_2 is an annual arithmetic mean of 0.053 ppm. In addition, effective January 22, 2010, EPA established a new 1-hour NAAQS for NO_2 which is attained when the 3-year average of the 98th percentile of the daily maximum 1-hour average does not exceed 0.100 ppm.

During the 12-month reporting period, neither the new 1-hour average NO_2 NAAQS nor the annual average was exceeded at any of the Port's monitoring stations, as shown in Table 4-9.

- The latest 3-year (May 2008 through April of 2011) average of the 98th percentile 1-hour NO_2 concentration ranged from 0.064 ppm at the Coastal Boundary station to 0.089 ppm at the San Pedro Community station.

- The annual average NO_2 concentration measured during the current monitoring year was a maximum of 0.020 ppm, which is well below the NO_2 annual average NAAQS of 0.053 ppm.

Table 4-9. NAAQS Compliance – Three Year Average of the 98th Percentile 1-hour Average and Annual Average NO_2 Concentrations

Averaging Time	Period	NO_2 Concentrations (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
1-hour *	May 2008 - April 2011	0.079	0.064	0.089	0.088	0.100
Annual	May 2010 - April 2011	0.020	0.010	0.020	0.020	0.053

***** Three Year Average of 98th Percentile of 1-hour Average

CAAQS Compliance

The annual average CAAQS for NO_2 is 0.030 ppm, and the 1-hour CAAQS for NO_2 is 0.180 ppm. Both are not to be exceeded.

- During the current monitoring year, the 1-hour NO_2 CAAQS of 0.180 ppm was exceeded at the San Pedro Community station (a 1-hour NO_2 concentration of 0.200 ppm was measured), as shown in Table 4-10. This maximum value is more than twice the maximum measured at any of the other stations. This exceedance occurred in December 2010 when inversions are more common, and was possibly due to activities related to repaving the adjacent parking lot that occurred during that time period.

- The maximum annual average NO_2 concentrations during the current reporting year was 0.023 ppm, measured at the Wilmington Community station, as shown in Table 4-10. The annual average NO_2 concentrations for all Port stations were below the NO_2 annual average CAAQS of 0.030 ppm.

Table 4-10. CAAQS Compliance – NO_2 Concentrations

Averaging Time	Period	NO_2 Concentrations (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
1-hour	May 2010 - April 2011	0.098	0.093	0.200	0.099	0.180
Annual	May 2010 - April 2011	0.023	0.011	0.018	0.020	0.030

4.2.2.3 O_3 Data Summary

Figure A-14 shows the average monthly concentration of O_3 for the current monitoring year.

- The graph shows that O_3 concentrations peak during the summer months at each station, because the photochemical reactions required to produce O_3 are stronger during the summer (O_3 is a secondary pollutant formed from VOCs and NO_x in the presence of sunlight).

- The monthly average O_3 concentrations measured at the Coastal Boundary station are generally slightly higher than other stations; despite the fact that this station is more removed from Port operations and other localized emission sources. All of the stations are exposed to similar regional levels of O_3, but it is likely that the NO_x emissions from local sources deplete the local ozone levels at the other stations through atmospheric chemical reactions.

NAAQS Compliance

The 8-hour average O_3 NAAQS is met when the fourth-highest 8-hour concentration in a year, averaged over three years, is equal to or less than 0.075 ppm. During the reporting period there were no exceedances of the O_3 NAAQS, as shown in Table 4-11. The average fourth-highest 8-hour O_3 concentrations ranged from 0.057 ppm at the Source Dominated station to 0.065 ppm at the Coastal Boundary station. These concentrations are below the 8-hour NAAQS.

Table 4-11. NAAQS Compliance - Fourth highest 8-hour Average O_3 Concentrations

Averaging Time	Period	O_3 Concentrations (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
8-hour *	May 2008 - April 2011	0.060	0.065	0.060	0.057	0.075

***** Fourth highest 8-hour Average

CAAQS Compliance

The CAAQSs for O_3 are 0.070 ppm during an 8-hour period and 0.090 ppm over a 1-hour period, and are not to be exceeded. During the current monitoring year, exceedances of both the maximum 1-hour average CAAQS and maximum 8-hour average CAAQS for O_3 were observed.

- Maximum 1-hour average O_3 concentrations exceeded the 1-hour O_3 CAAQS of 0.090 ppm at three of the four stations in the network during the current monitoring year, as shown in Table 4-12. Only San Pedro Community Station showed readings below the 1-hour O_3 CAAQS. These data are consistent with the designation of the South Coast Air Basin as an ozone nonattainment area.

- During the current monitoring year, the maximum 8-hour average O_3 concentrations exceeded the 8-hour O_3 CAAQS at the Wilmington Community and the Coastal Boundary stations.

Table 4-12. CAAQS Compliance – Maximum 1-hour and 8-hour Average O_3 Concentrations

Averaging Time	Period	O_3 Concentrations (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
1-hour	May 2010 - April 2011	0.110	0.130	0.080	0.140	0.090
8-hour	May 2010 - April 2011	0.087	0.076	0.064	0.062	0.070

4.2.2.4 SO_2 Data Summary

Figure A-15 shows the average monthly concentration of SO_2 for the current monitoring year (monthly averages are used in the figure for clarity in showing long-term trends in the data, not because it is related to a standard). Figure A-15 shows that SO_2 concentrations remained relatively constant and low during the current monitoring period.

NAAQS Compliance

Effective August 23, 2010, EPA established a new 1-hour NAAQS for SO_2 which is attained when the 3-year average of the 99th percentile of the daily maximum 1-hour average does not exceed 0.075 ppm. The secondary NAAQS for SO_2 is a 3-hour average that is attained if the second highest daily 3-hour maximum does not exceed 0.500 ppm. (Primary standards are designed to protect public health, while secondary standards are designed to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation and buildings). During the reporting period, no exceedances of the primary and secondary NAAQSs for SO_2 were recorded at the Port's monitoring stations.

- The latest 3-year (May 2008 through April 2011) average of the 99th percentile SO_2 concentrations ranged from 0.027 ppm at the Coastal Boundary station to 0.047 ppm at the Source Dominated station, as shown in Table 4-13. These are below the new 1-hour NAAQS for SO_2 of 0.075 ppm.

- The second highest 3-hour average SO_2 concentrations measure during the current monitoring year ranged from 0.023 ppm at the Coastal Boundary station to 0.041 ppm at the Source Dominated station, as shown in Table 4-13. These concentrations are well below the 3-hour average SO_2 secondary NAAQS.

Table 4-13. NAAQS Compliance – 3 Year Average of the 99th Percentile 8-hour Average and 2nd Highest 3-hour Average SO_2 Concentrations

Averaging Time	Period	NO_2 Concentrations (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
1-hour *	May 2008 - April 2011	0.030	0.027	0.030	0.047	0.075
3-hour **	May 2010 - April 2011	0.027	0.023	0.031	0.041	0.500

***** Three Year Average of 99th Percentile of 8-hour
** Second highest 3-hour Average

CAAQS Compliance

The CAAQS for SO_2 are 0.250 ppm over a 1-hour period and 0.040 ppm over a 24-hour averaging period, and are not to be exceeded.

- During the current monitoring year, the maximum 1-hour SO_2 concentrations ranged from 0.029 ppm at the Wilmington Community station to 0.048 ppm at the Source Dominated station, as shown in Table 4-14. These concentrations were below the SO_2 1-hour CAAQS of 0.250 ppm.

- The maximum 24-hour average SO_2 concentrations measured during the current monitoring year ranged from 0.009 ppm at the Coastal Boundary station to 0.024 ppm at the Source Dominated station, as shown in Table 4-14. These concentrations are below the SO_2 maximum 24-hour average CAAQS of 0.040 ppm.

Table 4-14. CAAQS Compliance – Highest 1-hour and 24-hour Average SO_2 Concentrations.

Averaging Time	Period	O_3 Concentrations (ppm)				
		Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	NAAQS
1-hour	May 2010 - April 2011	0.029	0.080	0.031	0.048	0.250
24-hour	May 2010 - April 2011	0.009	0.012	0.008	0.024	0.040

4.3 Meteorological Data

The meteorological data collected at each of the four stations are useful in interpreting the PM data collected at the site. In addition, the meteorological data sets can be used in air dispersion modeling and other data analyses.

Wind roses, which graphically show the frequency of occurrence of wind speed and direction at a site, have been constructed using from the data collected by this monitoring program. The historical data was used to develop the wind roses that are shown projected on the Port base map in Figure 2[6]. Wind roses were also created using the meteorological data collected at each station for the current monitoring year and are shown in Appendix A-1, as Figures A-16 through A-19. The wind roses look very similar to annual wind roses produced data collected during previous years. Wind roses are useful in air quality analyses, because they readily indicate the directions in which emissions are most frequently transported. By convention, winds are shown in the direction from which they came; for example, a west wind blows from the west.

These figures indicate that the general air flow patterns during the current monitoring period are very similar to the historical air flow patterns observed in the air monitoring network. The predominant wind patterns at each station are considerably different, indicating that the Port area experiences complex air flow patterns.

[6] The wind speed scale typically included with a wind rose is not shown on Figure 2 for the sake of clarity. The full wind roses, with wind speed scales included, are provided in Figures A-16 through A-19 in Appendix A-1.

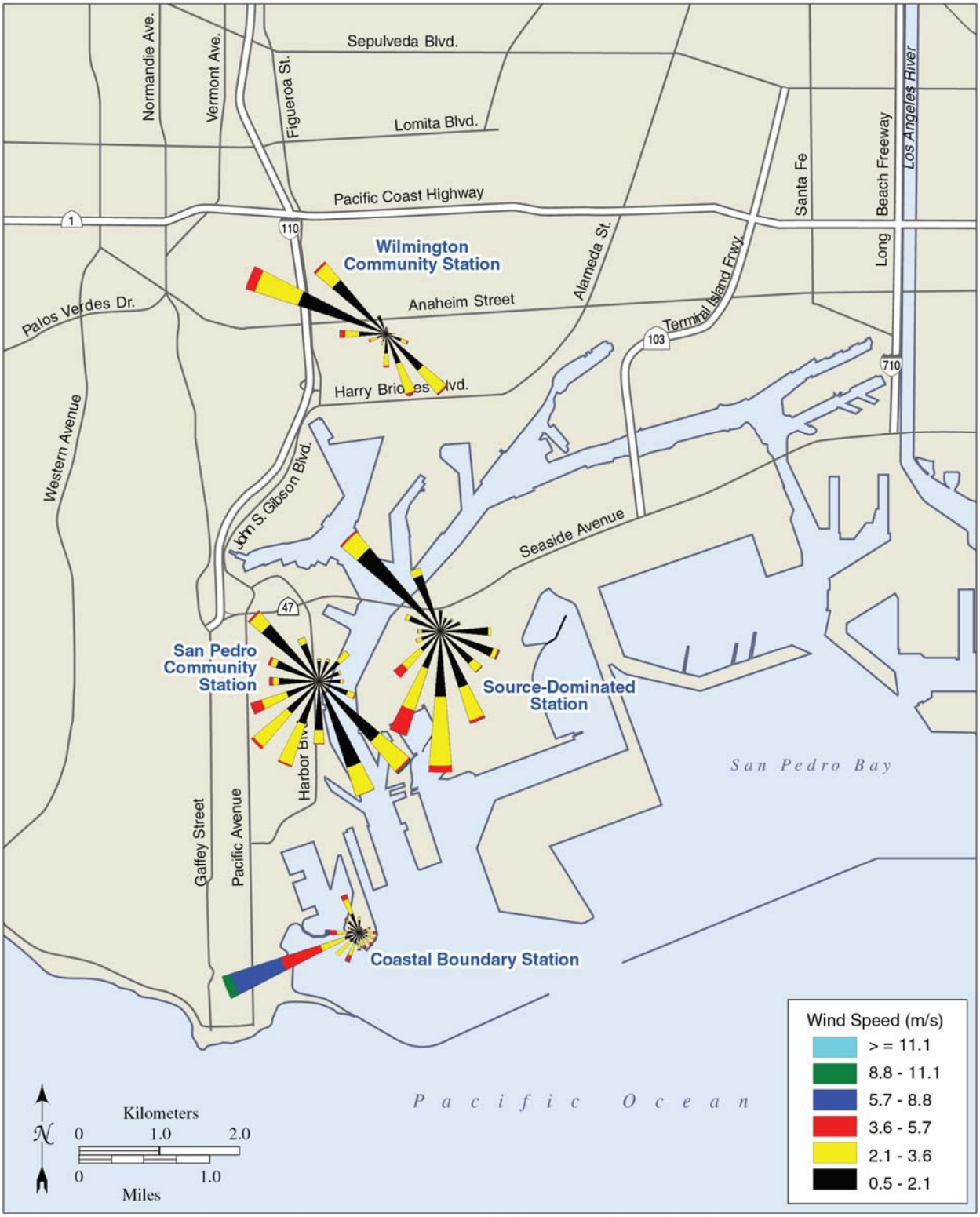

Figure 2. Wind Roses for the Port Air Monitoring Network Stations for the Period of May 2010 to April 2011

4.4 Data Quality Assurance

Several quality assurance measures have been incorporated into this program. These measures include:

1. Collocated monitors at the Wilmington Community Station. The Desert Research Institute (DRI) SFS used at each site for speciation sample collection are not FRM monitors. $PM_{2.5}$ and PM_{10} FRM monitors are collocated with the SFS at the Wilmington Community Station to validate the operation of the SFS monitors in the Port monitoring network.
2. Field blanks were periodically taken at each station to ensure that there was no systematic contamination of the filters.
3. Monitoring checklists were routinely completed by the field technicians during every station visit, conducted on a third-day schedule.
4. Semi-annual external audits of the system were performed by an independent contractor.

5.0 TRENDS ANALYSIS

With six years of data for the filter-based monitors and three years of data for the real-time instruments, a preliminary analysis of the trends in the data was conducted. This analysis uses annual averages to assess the general long-term trends in the data, even if there are no annual standards for that pollutant.

Ambient air pollution levels near the San Pedro Bay are influenced by a number of factors including local pollutant emissions, regional air pollution levels, and meteorology. Several important criteria air pollutants (i.e., ozone, $PM_{2.5}$) are created (in whole or in part) by chemical reactions which occur after the release of emissions into the atmosphere. As such, concentrations from these pollutants are expected to be more regional. Others pollutants, like SO_2, are more localized and directly influenced by nearby emissions sources.

A review of the Port's air emission inventories shows that Port-related air pollutant emissions have declined in recent years.[7] This decline was due to a number of factors including the successful implementation of control measures under the CAAP. Those measures have significantly reduced emissions rates from goods movement sources such as heavy duty trucks, ocean going vessels, and cargo handling equipment. Between 2005, the CAAP baseline year, and 2009, emissions associated with Port of Los Angeles operations showed a 52% reduction in DPM, a 56% reduction in sulfur oxides (SOx) and a 33% reduction in NOx. Additionally, the decrease in Port-related emissions was affected by a decline in goods movement activity at the San Pedro Bay ports in late-2008 through 2009. Meteorology can also have a significant influence on regional air pollution levels from one year to the next. So while CAAP measures have improved air emission levels, it is not presently known how much of any decrease (or increase) in ambient air pollutant concentrations measured at the Port air monitoring stations can be directly attributed to the Port's goods movement-focused control measures under the CAAP.

5.1 Trends in $PM_{2.5}$, PM_{10} and EC Data

Six years of $PM_{2.5}$ and PM_{10} data are now available from the stations, which provide a preliminary analysis of trends in the PM data from the network. Table 5-1 presents the annual average $PM_{2.5}$ and PM_{10} data collected by the filter-based monitors at the four stations in the Port's air monitoring network over the six-year period of record.

5.1.1 Trends in $PM_{2.5}$ Concentrations

Table 5-1 shows that the annual average measured $PM_{2.5}$ concentrations over the six years of monitoring record at the four monitoring stations had decreases ranging from 27 percent at the Coastal Boundary station to 48 percent at the Terminal Island Treatment Plant station, for an average decrease of 37 percent across the entire monitoring network. During the last two years, the annual average $PM_{2.5}$ concentration has been below the CAAQS (12 $\mu g/m^3$) at all of the stations.

The annual average $PM_{2.5}$ concentrations at each station over the current monitoring year were also shown earlier in Figure ES-2. The figure shows the trend in decreasing annual average $PM_{2.5}$ concentrations quite clearly, and it can be seen from Table 5-1 and Figure ES-2 that most of the decrease in $PM_{2.5}$ concentrations has occurred over the last three years. Figure A-3 in Appendix A-1 shows the monthly average $PM_{2.5}$ concentrations over the period of record. The graph shows that the trend of decreasing $PM_{2.5}$ concentrations occurs in each season, with the decreasing yearly peak $PM_{2.5}$ concentrations (generally occurring in the fall) particularly evident. In addition, the maximum monthly annual average $PM_{2.5}$ concentrations measured during the program, which occurred at the

[7] Port of Los Angeles Inventory of Air Emissions - 2009. Starcrest Consulting Group LLC. (http://www.portoflosangeles.org). June, 2010.

Wilmington Community station in October 2007, were a result of the large southern California wildfires occurring at that time.

Table 5-1. Annual Average $PM_{2.5}$ Concentrations over the Period of Record

Averaging Period	Annual Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	**Coastal Boundary Station**	**San Pedro Community Station**	**Source Dominated Station**
May 2005 - April 2006	12.6	10.2	10.6	13.7
May 2006 - April 2007	12.9	10.4	11.3	13.9
May 2007 - April 2008	12.7	10.1	10.8	11.8
May 2008 - April 2009	9.3	8.9	11.4	11.4
May 2009 - April 2010	8.3	7.3	8.6	9.3
May 2010 - April 2011	8.0	6.2	7.1	7.1
Percentage change (2005/2006) to (2010/2011)	**-27%**	**-39%**	**-33%**	**-48%**

Table 5-2 shows that the 98th percentile of the 24-hour average $PM_{2.5}$ concentration over the six-year period of monitoring record had decreases ranging from 30 percent at the Coastal Boundary station to 46 percent at the Source Dominated station, which are similar to the decreases measured in the annual average $PM_{2.5}$ concentrations. The 98th percentile values are presented to be consistent with the form of the 24-hour NAAQS standard. Because both of these measures showed similar decreases, this indicates that $PM_{2.5}$ concentrations throughout the entire data set have been reduced.

Table 5-2. 98th Percentile of the 24-hour Average $PM_{2.5}$ Concentrations over the Period of Record

Averaging Period	24-hour Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
May 2005 - April 2006	32.7	25.3	23.8	31.4
May 2006 - April 2007	36.2	25.5	21.0	27.6
May 2007 - April 2008	41.1	30.7	32.5	34.8
May 2008 - April 2009	23.8	29.6	29.2	34.9
May 2009 - April 2010	18.9	21.6	19.5	22.1
May 2010 - April 2011	22.9	14.3	16.2	17.0
Percentage change (2005/2006) to (2010/2011)	**-30%**	**-44%**	**-32%**	**-46%**

5.1.2 Trends in PM_{10} Concentrations

Table 5-3 shows that annual PM_{10} concentrations at the Wilmington Community station have decreased by 28 percent over the six-year period of monitoring record, which is almost identical to the decrease in annual average $PM_{2.5}$ concentrations at this station. No other station measured PM_{10} concentrations for the entire period of monitoring record.

The annual average PM_{10} concentrations at each station over the period of record were also shown earlier in Figure ES-3. Table 5-1 and Figure ES-3 show that most of the decrease in PM_{10} concentrations has occurred over the last three years. Figure A-3 in Appendix A-1 shows the monthly average $PM_{2.5}$ concentrations over the period of monitoring record, and there is less of a seasonal trend in PM_{10} concentrations compared to PM_{10} concentrations. This may be due to the sources of PM_{10} emissions, which are primarily fugitive emissions from open areas and roads. Table 5-3 and Figure ES-3 demonstrate that most of the decrease in PM_{10} concentrations has occurred over the last three years.

Table 5-4 shows that maximum 24-hour PM_{10} concentrations at the Wilmington Community station over the six-year period of record had a decrease of 28 percent, which is very similar to the decrease in annual average PM_{10} concentrations at the station. Because both of these measures showed similar decreases, this indicates that $PM_{2.5}$ concentrations throughout the entire data set have been reduced.

Table 5-3. Annual Average PM_{10} Concentrations over the Period of Record

Averaging Period	Annual Average PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
May 2005 - April 2006	28.7	--
May 2006 - April 2007	28.6	--
May 2007 - April 2008	28.5	--
May 2008 - April 2009	25.9	--
May 2009 - April 2010	23.5	24.0
May 2010 - April 2011	20.8	21.5
Percentage change (2005/2006) to (2010/2011)	**-28%**	--

Table 5-4. Maximum 24-hour Average PM_{10} Concentrations over the Period of Record

Averaging Period	Maximum 24-hour PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
May 2005 - April 2006	63.3	--
May 2006 - April 2007	60.5	--
May 2007 - April 2008	169.7	--
May 2008 - April 2009	74.7	--
May 2009 - April 2010	71.0	53.6
May 2010 - April 2011	46.6	48.9
Percentage change (2005/2006) to (2010/2011)	**-26%**	--

Trends in EC Concentrations

Table 5-5 shows that the annual average measured EC concentrations over the six years of monitoring record at the four monitoring stations had decreases ranging from 47 percent at the Wilmington and San Pedro Community stations to 60 percent at the Source Dominated station. These decreases are greater than the measured decreases in $PM_{2.5}$ or PM_{10} concentrations at these stations.

The annual average EC concentrations at each station over the period of record were also shown earlier in Figure ES-4, which clearly shows the trend in decreasing annual average EC concentrations. The data in Table 5-5 and Figure ES-4 show that the decrease in EC concentrations has been relatively steady since the second year of monitoring (May 2006 - April 2007).

Figure A-11 in Appendix A-1 shows the monthly average EC concentrations over the period of record for each station, and the dramatic seasonal variations are clearly evident (with peaks in the fall/early winter and valleys in the winter/spring period). Also evident in Figure A-11 is the strong trend of decreasing maximum and decreasing minimum EC concentrations within each year. These data demonstrate that changes in Port operations and/or reductions in emissions from CAAP measures are likely having a large effect on EC concentrations.

Table 5-5. Annual Average EC Concentrations over the Period of Record

Averaging Period	Annual Average EC Concentrations (µg/m^3)			
	Wilmington Community Station	**Coastal Boundary Station**	**San Pedro Community Station**	**Source Dominated Station**
May 2005 - April 2006	1.5	1.1	1.5	2.5
May 2006 - April 2007	1.7	1.2	1.6	2.6
May 2007 - April 2008	1.4	1.1	1.4	2.0
May 2008 - April 2009	0.9	0.8	1.2	1.7
May 2009 - April 2010	0.8	0.6	1.0	1.2
May 2010 - April 2011	0.8	0.5	0.8	1.0
Percentage change (2005/2006) to (2010/2011)	**-47%**	**-55%**	**-47%**	**-60%**

5.2 Trends in Gaseous Criteria Pollutants

The real-time instruments that measure the gaseous criteria pollutants were installed and became operational in early 2008, so only three complete years of data are available to evaluate the data trends for gaseous criteria pollutant.

5.2.1 Trends in CO Concentrations

Table 5-6 presents the maximum 1-hour CO concentrations measured at the four stations within the Port's air monitoring network over the three-year period that the real-time instrumentation has been in operation (i.e., since 2008). These data are also shown in Tables A-9 and A-10.

The maximum 1-hour CO concentrations show no discernable trend, with three stations showing decreasing maximum CO concentrations and one station showing increasing CO concentrations. This is probably reflective of the lack of large sources of CO emissions and the low ambient CO levels that are present around the monitoring stations. All 1-hour maximum values are well below the 1-hour CO NAAQS of 35 ppm.

Table 5-6. Maximum 1-hour CO Concentrations over the Period of Record

Averaging Period	Maximum 1-hour CO Concentrations (µg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
May 2008 - April 2009	5.3	2.0	5.2	5.1
May 2009 - April 2010	4.5	2.2	2.7	4.9
May 2010 - April 2011	4.6	1.7	7.5	2.1
Percentage change (2005/2006) to (2010/2011)	**-13%**	**-15%**	**44%**	**-59%**

* 1-hour Average NAAQS for CO is 35.0 ppm.

Table 5-7 presents the maximum 8-hour CO concentrations measured at the four stations within the Port's air monitoring network over the three-year period of monitoring record. The maximum 8-hour CO concentrations also show no discernable trend, with three stations showing modest decreases in maximum 8-hour CO concentrations and one station showing increasing maximum 8-hour CO concentrations. All of the 1-hour maximum values are below the 1-hour CO NAAQS of 9 ppm. Because these concentrations are the highest daily values recorded during a year, they are likely to be more variable from station to station.

Table 5-7. Maximum 8-hour CO Concentrations over the Period of Record

Averaging Period	Maximum 8-hour CO Concentrations (µg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
May 2008 - April 2009	2.7	1.3	1.5	1.6
May 2009 - April 2010	2.8	2.1	1.4	1.6
May 2010 - April 2011	2.7	1.1	2.1	1.3
Percentage change (2005/2006) to (2010/2011)	**0%**	**-15%**	**40%**	**-19%**

* 8-hour Average NAAQS for CO is 9.0 ppm.

5.2.2 Trends in NO_2 Concentrations

Table 5-8 presents the 98th percentile of the daily maximum 1-hour NO_2 concentrations at the four stations in the Port's air monitoring network, over the three-year period of record. These data are also shown in Tables A-11 and A-12.

Table 5-8. 98th Percentile of the Daily Maximum 1-hour NO_2 Concentrations over the Period of Record

Averaging Period	Daily Maximum 1-hour NO_2 concentrations (µg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
May 2008 - April 2009	0.086	0.066	0.080	0.088
May 2009 - April 2010	0.071	0.066	0.082	0.087
May 2010 - April 2011	0.079	0.061	0.106	0.090
Percentage change (2005/2006) to (2010/2011)	**-8%**	**-8%**	**32%**	**2%**

* 98th Percentile of the Daily Maximum 1-hour NAAQS for NO_2 is 0.100 ppm.

The table shows that the 98th percentile of the daily maximum 1-hour NO_2 concentration had small changes over the 3-year period of monitoring record, with the exception of the NO_2 concentrations at the San Pedro Community station, which showed an increase over the past year of monitoring. The

increases in maximum 1-hour NO_2 concentrations at the San Pedro Community station occurred in December 2010, when the nearby cruise ship terminals are active and when atmospheric inversions are more common, which tend to keep emissions near ground level. In addition, the parking lot immediately adjacent to the air monitoring station was repaved during that time period.

5.2.3 Trends in O_3 Concentrations

Table 5-9 presents the fourth-highest average 8-hour O_3 concentrations at the four stations in the Port's air monitoring network over the three-year period of monitoring record. These data are also shown in Tables A-14 and A-15. There were very small changes measured in the O_3 concentrations during this period, ranging from -3 to +4 percent. Because O_3 is a secondary pollutant that takes several hours to form from volatile organic compounds and nitrogen oxides in the presence of sunlight, ozone concentrations are more reflective of regional air quality pollutant levels in the SoCAB rather than localized pollutant levels.

Table 5-9. Fourth Highest Average 8-hour O_3 Concentrations over the Period of Record

Averaging Period	Fourth Highest Average 8-hour O_3 Concentrations (ppm)			
	Wilmington Community Station	**Coastal Boundary Station**	**San Pedro Community Station**	**Source Dominated Station**
May 2008 - April 2009	0.061	0.063	0.062	0.055
May 2009 - April 2010	0.058	0.067	0.061	0.058
May 2010 - April 2011	0.060	0.065	0.060	0.057
Percentage change (2005/2006) to (2010/2011)	**-2%**	**3%**	**-3%**	**4%**

* Fourth highest 8-hour average NAAQS for O_3 is 0.075 ppm.

5.2.4 Trends in SO_2 Concentrations

Table 5-10 presents the 99th percentile of the 1-hour daily maximum SO_2 concentrations at the four stations in the Port's air monitoring network over the three-year period of monitoring record. These data are also shown in Tables A-16 and A-17. The table shows that the 99th percentile of the daily maximum SO_2 concentrations at the four stations decreased by a range of 21 percent at the San Pedro Community station to 52 percent at the Coastal Boundary station over the three-year period. These decreases may be attributed to changes in the Port's operations and/or the effect of the CAAP and other regulatory measures on SO_2 emissions.

Table 5-10. 99th Percentile of 1-hour Daily Maximum SO_2 Concentrations over the Period of Record

Averaging Period	99th Percentile of 1-hour Daily Maximum SO_2 Concentrations (ppm)			
	Wilmington Community Station	**Coastal Boundary Station**	**San Pedro Community Station**	**Source Dominated Station**
May 2008 - April 2009	0.039	0.040	0.034	0.051
May 2009 - April 2010	0.022	0.023	0.030	0.059
May 2010 - April 2011	0.030	0.019	0.027	0.032
Percentage change (2005/2006) to (2010/2011)	**-23%**	**-52%**	**-21%**	**-37%**

* 99th Percentile of 1-hour Daily Maximum NAAQS for SO_2 is 0.075 ppm.

6.0 CONCLUSIONS

This report presents a summary of the monitoring data collected by the Port's air quality monitoring program during the 12 month period of May 2010 to April 2011. In addition, trends in the PM data were presented for the six-year period (May 2005 through April 2011) of monitoring record that now exists, and for the gaseous criteria pollutant data that have been collected over the past three years of monitoring (May 2008 through April 2011).

During the current reporting monitoring period there were no exceedances of any NAAQS. However, several exceedances of the more restrictive CAAQS were recorded by the Port's monitoring program:

- The 1-hour and 8-hour average O_3 CAAQS were exceeded by several stations.
- The annual PM_{10} CAAQS was exceeded based on the filter-based monitors at the Coastal Boundary and Wilmington Community stations.
- The annual average NO_2 CAAQS was exceeded at the San Pedro Community station.

The O_3 and PM_{10} results were consistent with concentrations measured at other ambient monitoring stations in the SCAB. The exceedance of the NO_2 CAAQS at the San Pedro station may have been due to adjacent repaving activities occurring during that time period. The SCAB is designated as nonattainment for ozone, $PM_{2.5}$, and PM_{10}.

The trend analysis over the six-year period of record demonstrated that the most significant change was in PM data: the decrease in annual average concentrations across the network were 37 percent for $PM_{2.5}$ concentrations, 28 percent for PM_{10} concentrations, and 52 percent for EC concentrations.

Appendix A

Port of Los Angeles Monitoring Program
Annual Report

May 2010 - April 2011

Figures and Tables

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Appendix A1

Port of Los Angeles Monitoring Program
Annual Report
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Summary Figures of Monitoring Results

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Appendix A-1
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Figure Page

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Figure A-1

Annual Average $PM_{2.5}$ Concentrations at the Port of Los Angeles

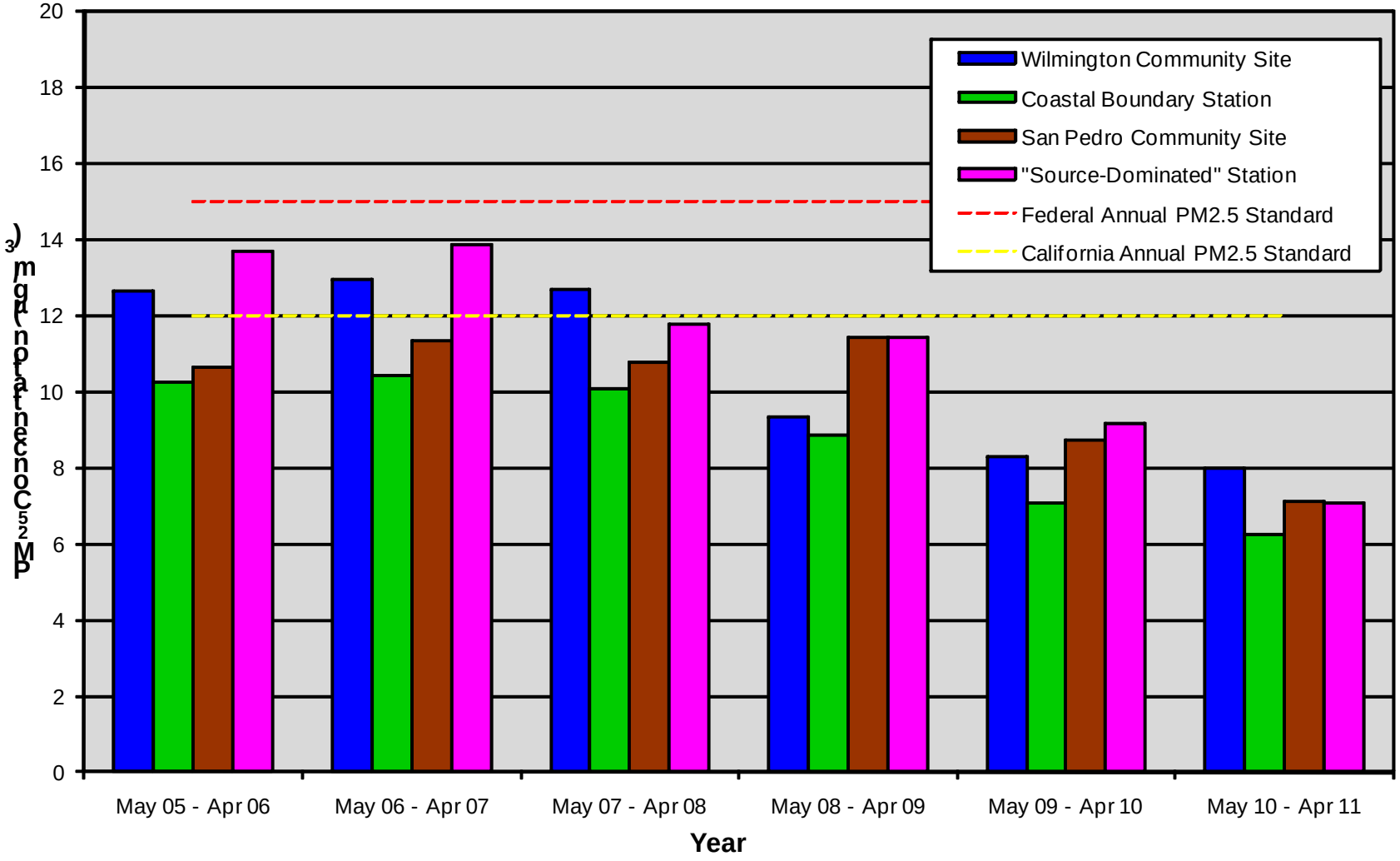


Figure A-2

Monthly Average $PM_{2.5}$ Concentrations at the Port of Los Angeles
May 2010 - April 2011

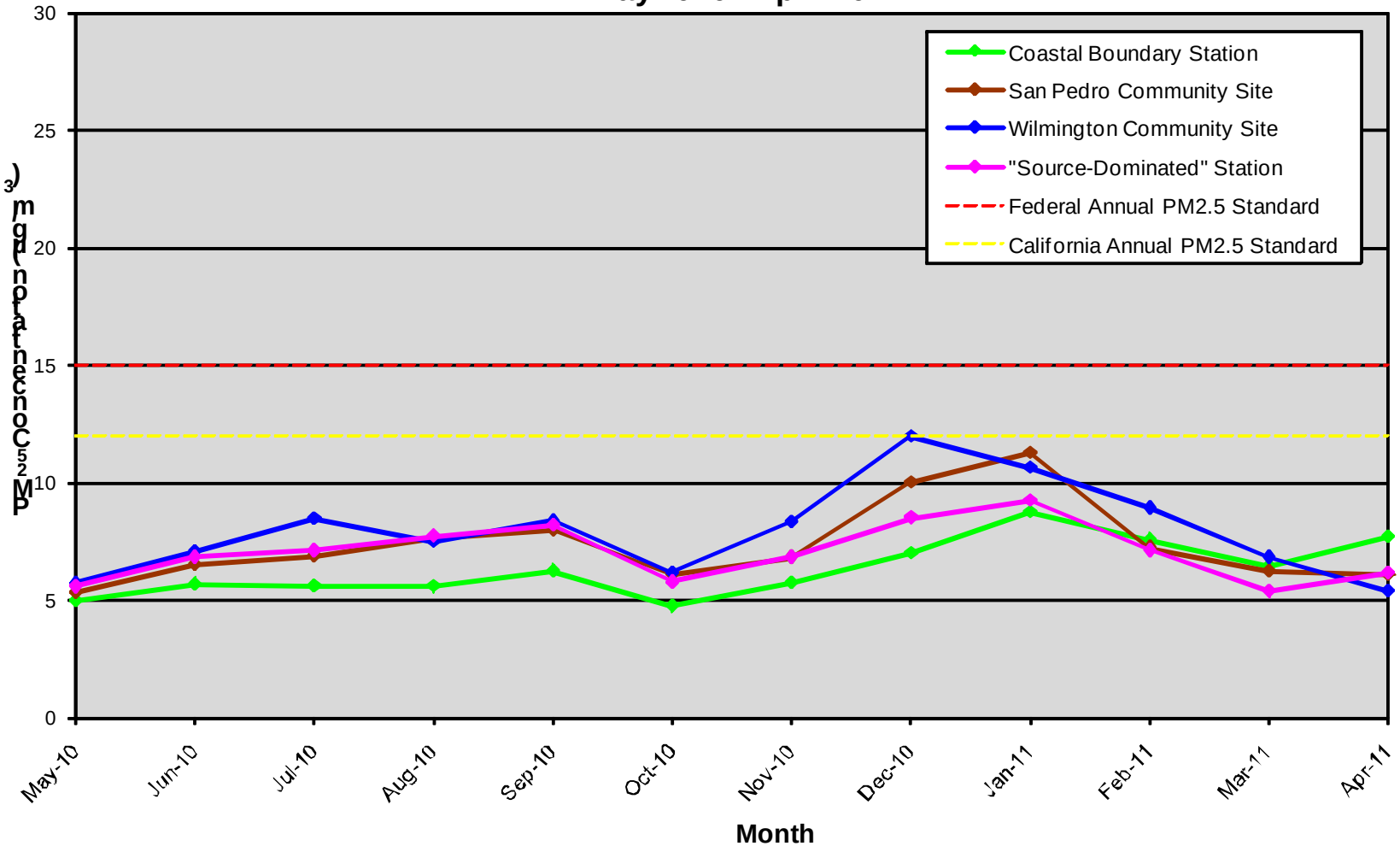


Figure A-3

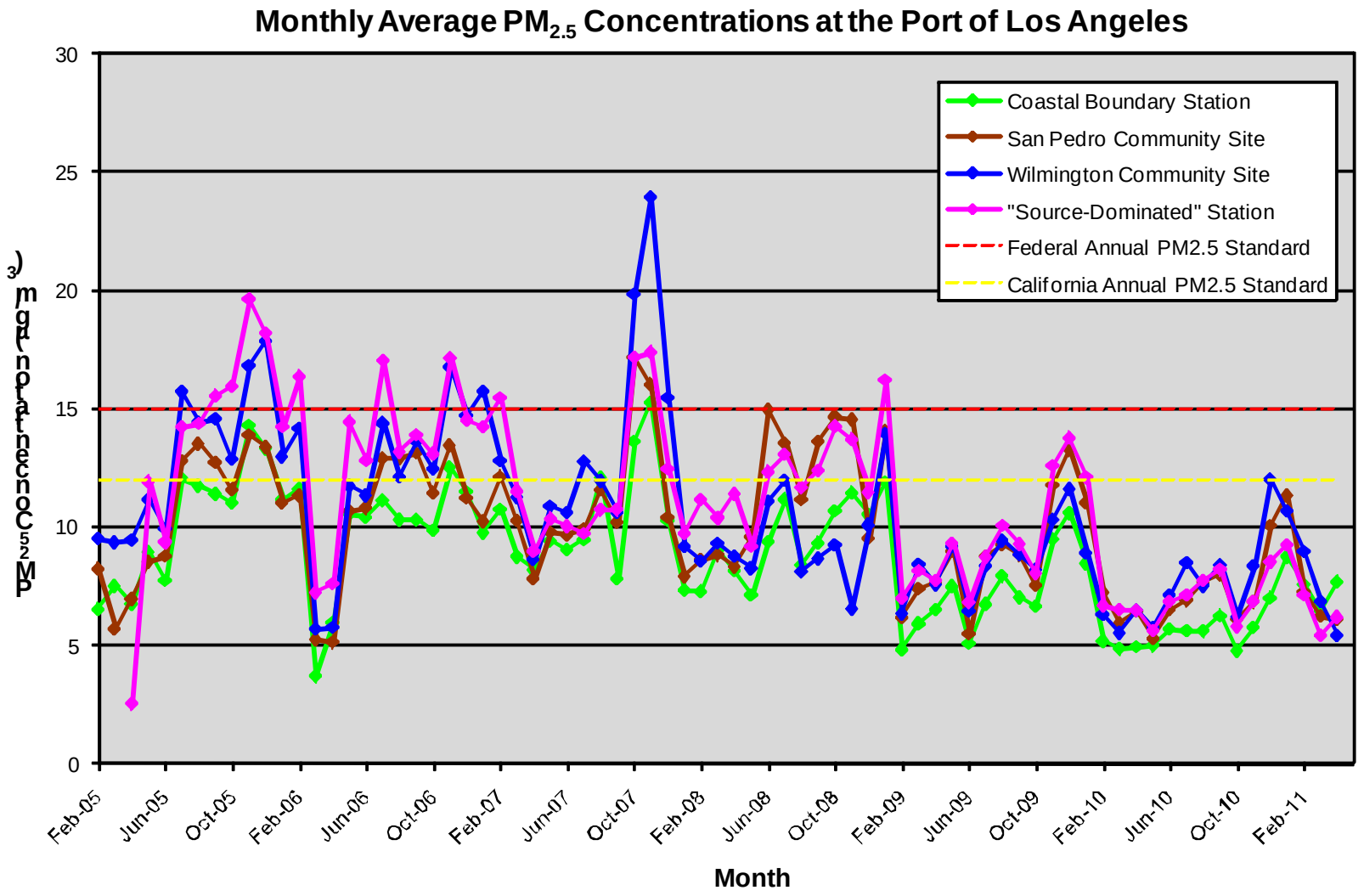

Monthly Average PM2.5 Concentrations at the Port of Los Angeles
Coastal Boundary Station
San Pedro Community Site
Wilmington Community Site
"Source-Dominated" Station
Federal Annual PM2.5 Standard
California Annual PM2.5 Standard
30
25
20
15
10
5
0
Feb-05
Jun-05
Oct-05
Feb-06
Jun-06
Oct-06
Feb-07
Jun-07
Oct-07
Feb-08
Jun-08
Oct-08
Feb-09
Jun-09
Oct-09
Feb-10
Jun-10
Oct-10
Feb-11
Month

Figure A-4

Monthly Average BAM $PM_{2.5}$ Concentrations at the Port of Los Angeles
May 2010 - April 2011

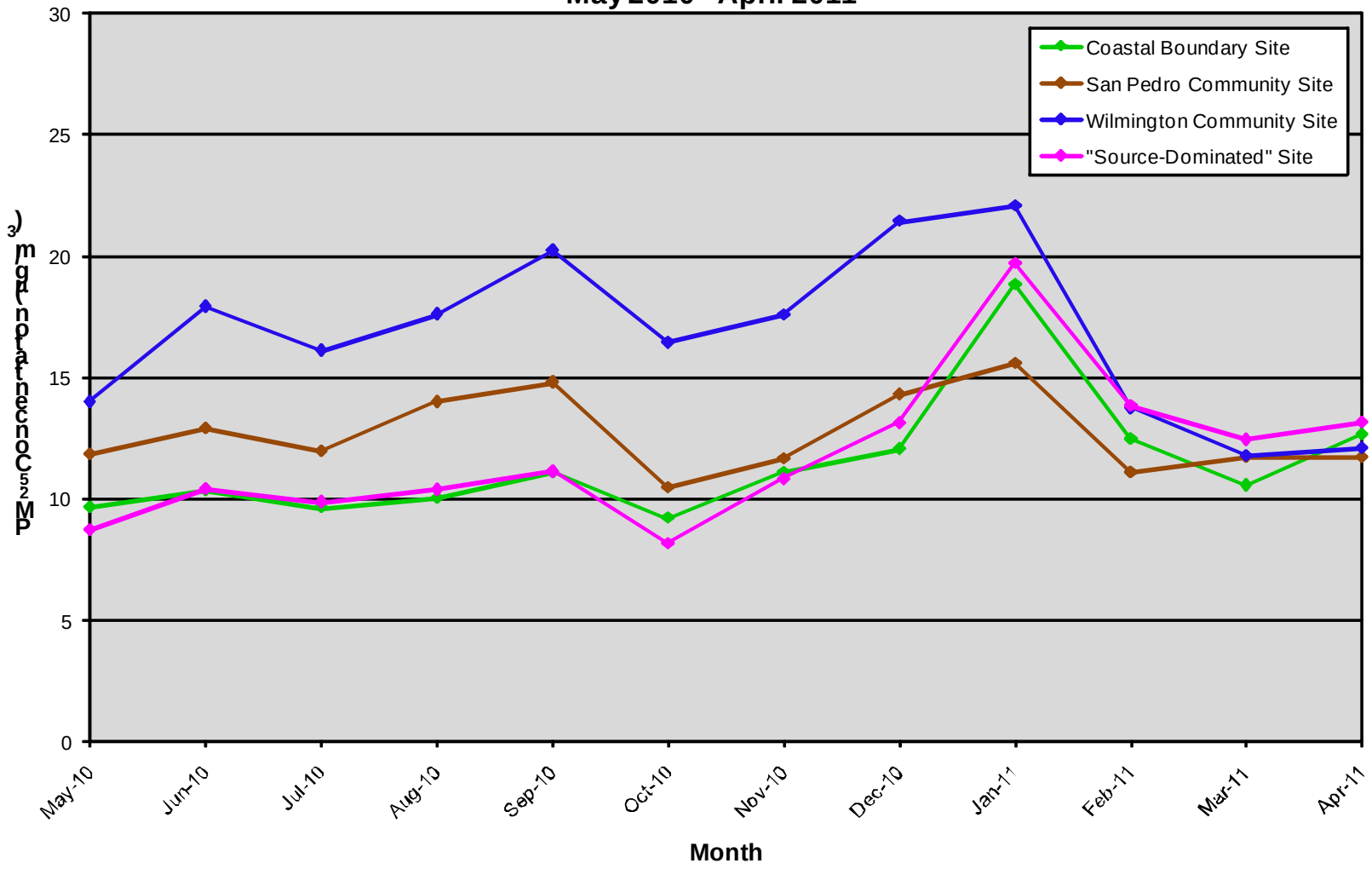


Figure A-5

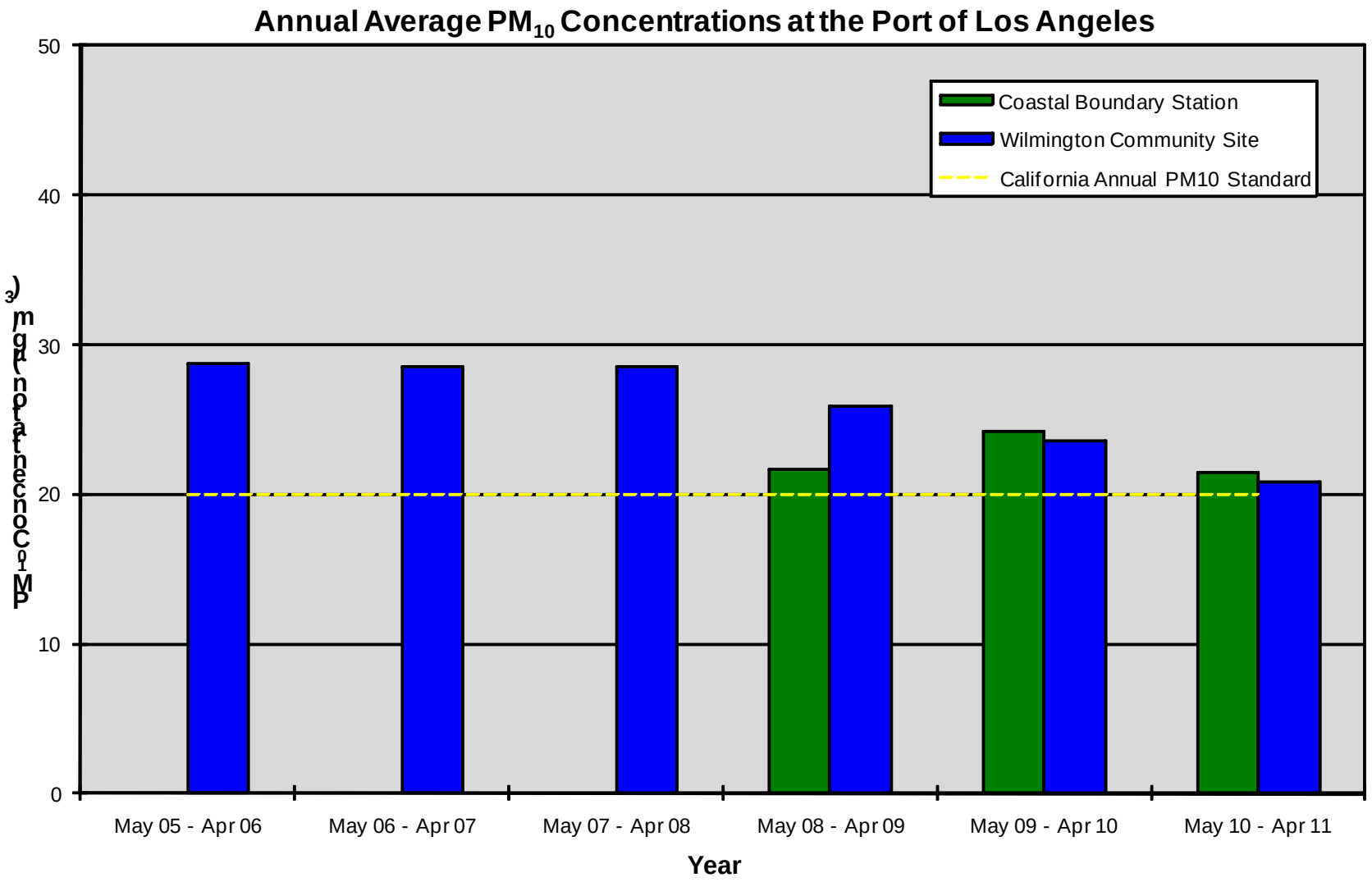

Annual Average PM10 Concentrations at the Port of Los Angeles
50
40
30
20
10
0
Coastal Boundary Station
Wilmington Community Site
California Annual PM10 Standard
May 05 - Apr 06
May 06 - Apr 07
May 07 - Apr 08
May 08 - Apr 09
May 09 - Apr 10
May 10 - Apr 11
Year

Figure A-6

Monthly Average PM_{10} Concentrations at the Port of Los Angeles
May 2010 - April 2011

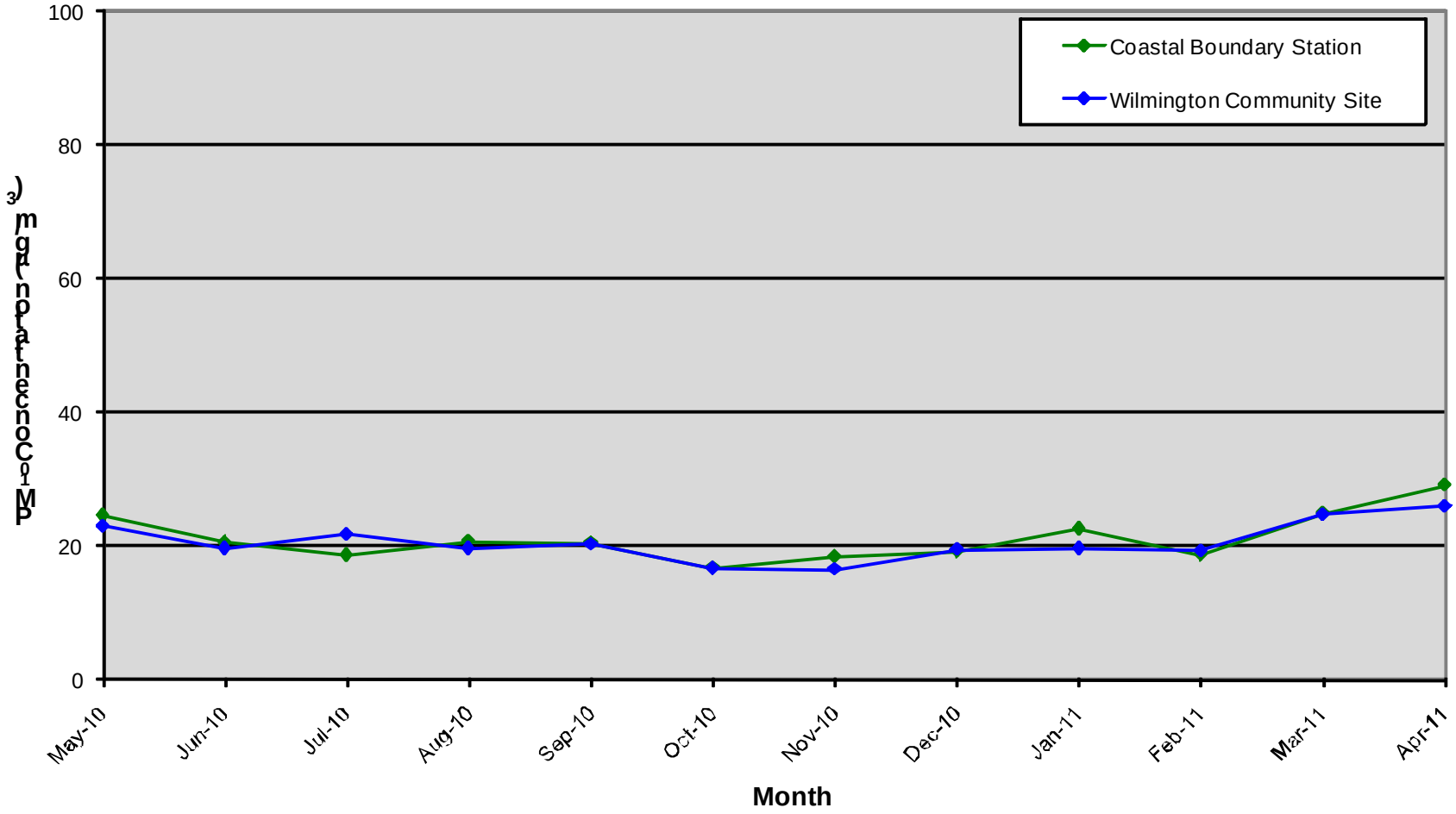


Figure A-7

Monthly Average PM_{10} Concentrations at the Port of Los Angeles

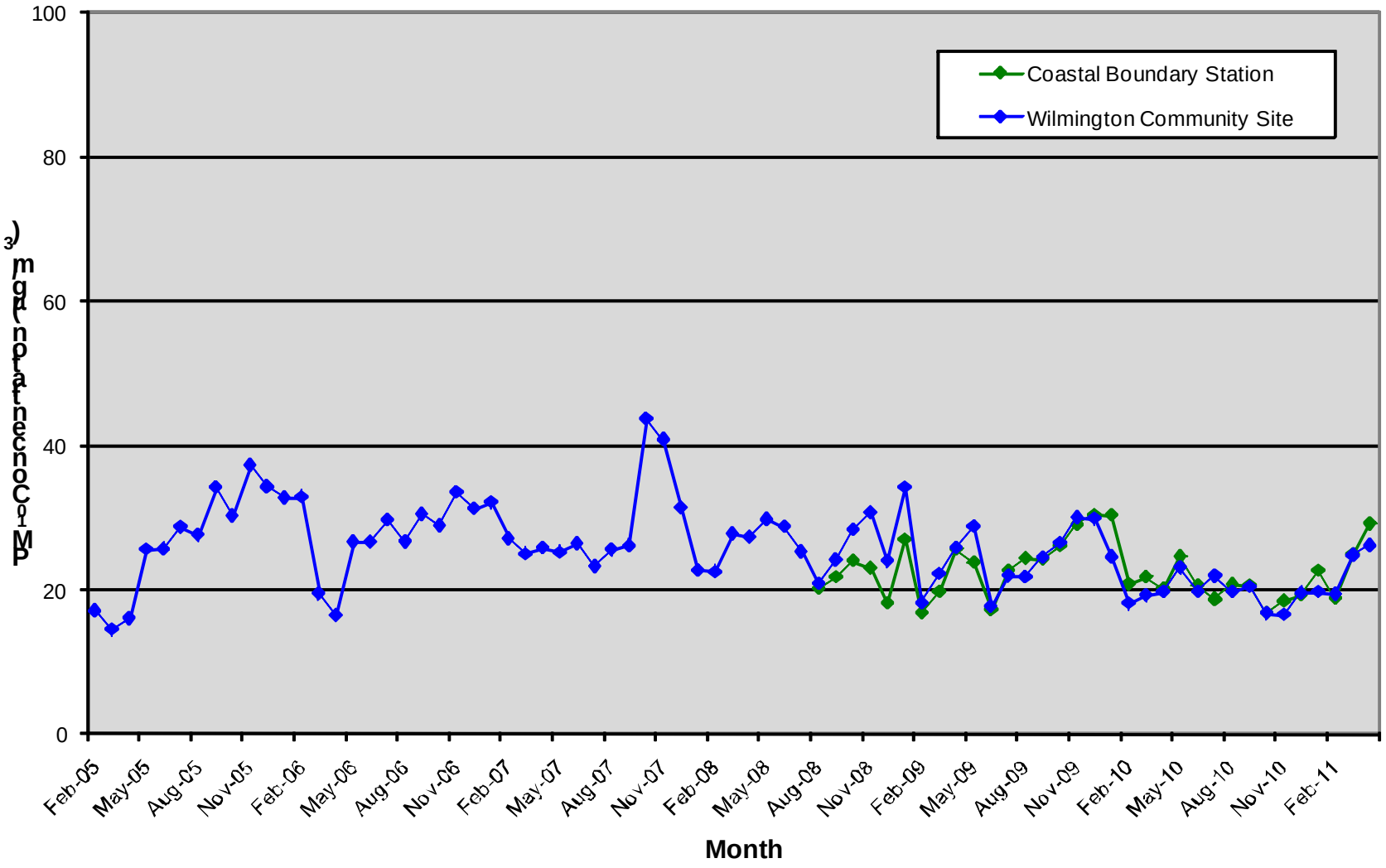


Figure A-8

Monthly Average BAM PM_{10} Concentrations at the Port of Los Angeles
May 2010 - April 2011

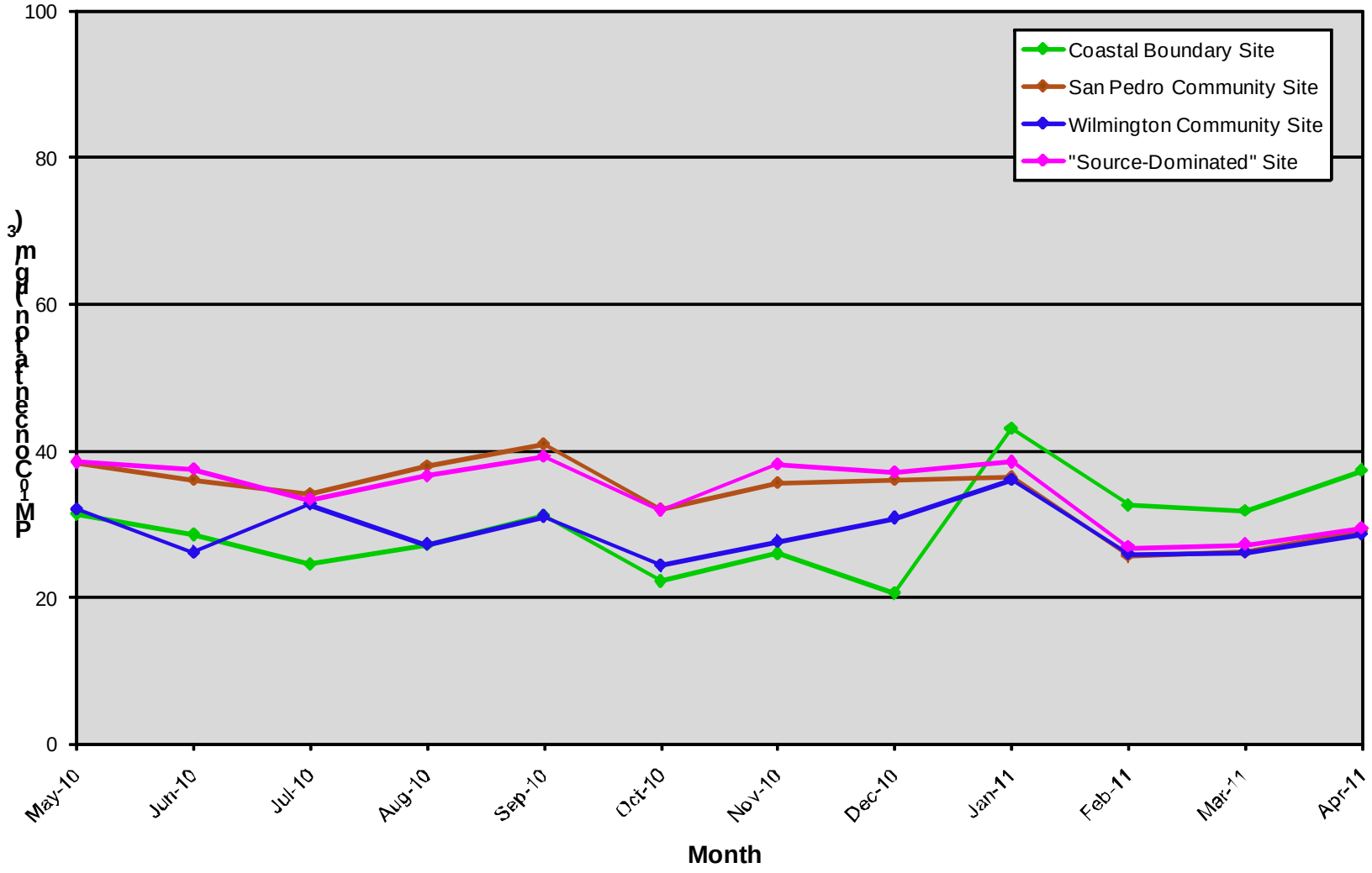


Figure A-9

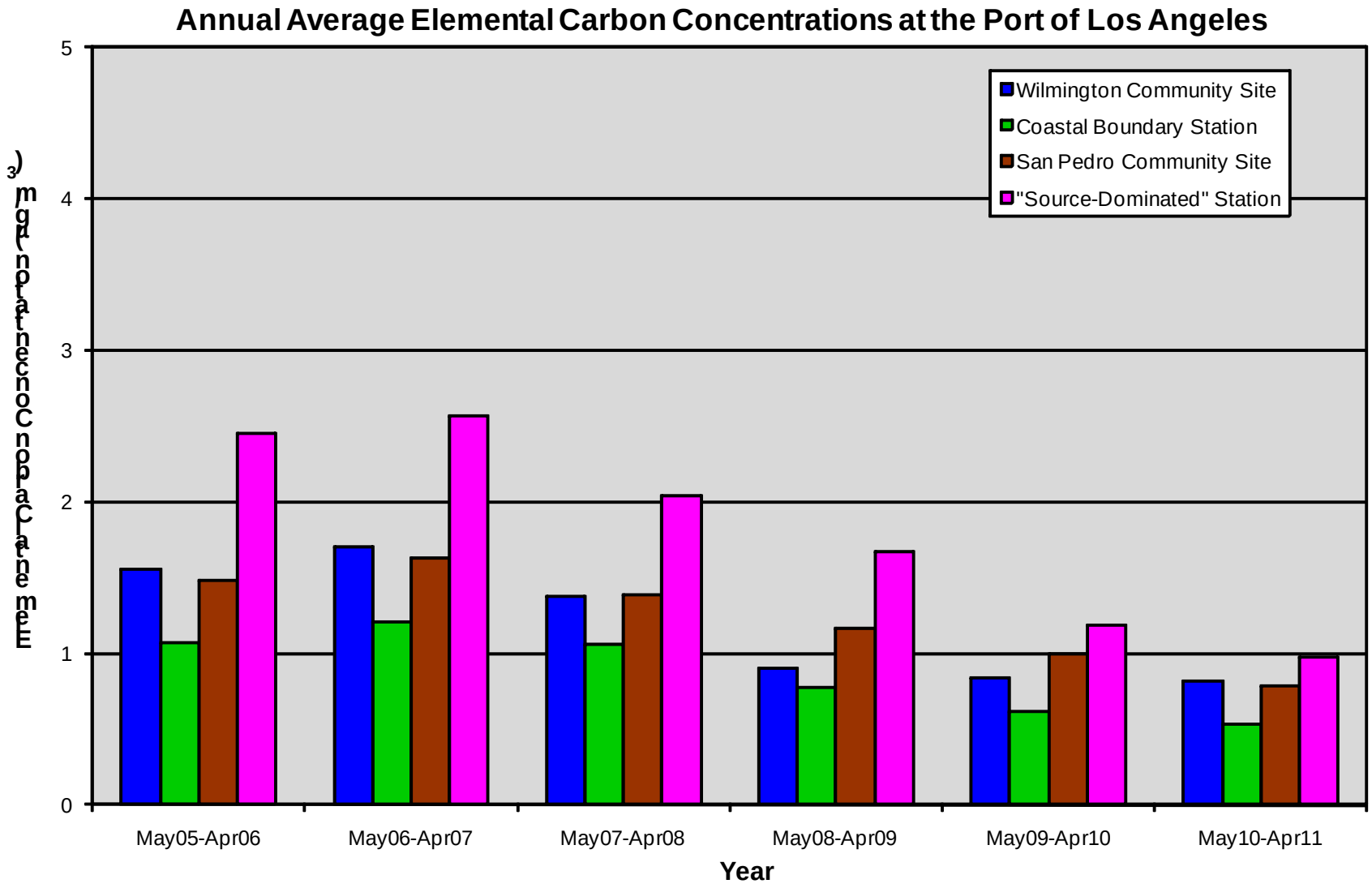

Annual Average Elemental Carbon Concentrations at the Port of Los Angeles
Wilmington Community Site
Coastal Boundary Station
San Pedro Community Site
"Source-Dominated" Station
5
4
3
2
1
0
May05-Apr06
May06-Apr07
May07-Apr08
May08-Apr09
May09-Apr10
May10-Apr11
Year

Figure A-10

Monthly Average Elemental Carbon Concentrations at the Port of Los Angeles
May 2010 - April 2011

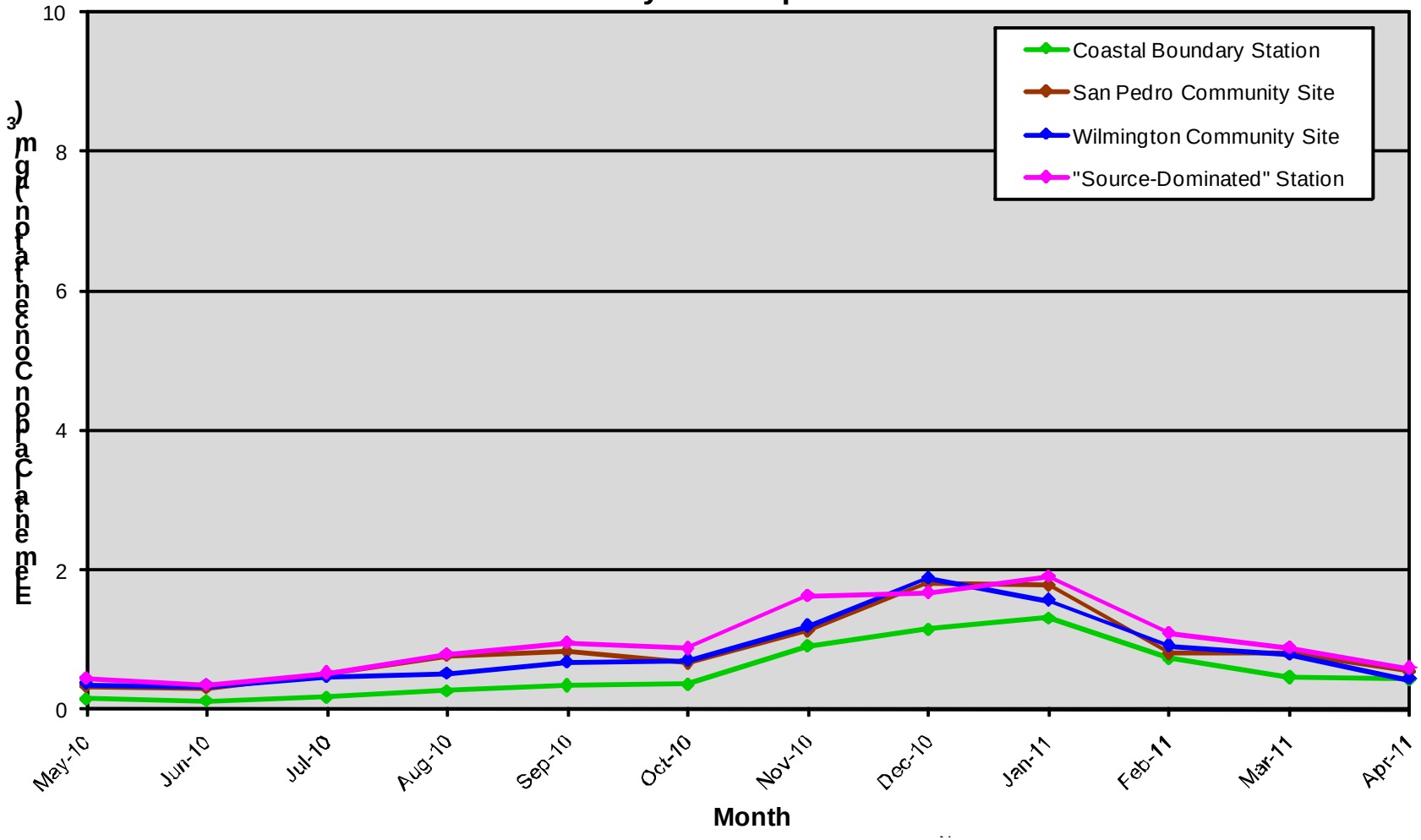


Figure A-11

Monthly Average Elemental Carbon Concentrations at the Port of Los Angeles

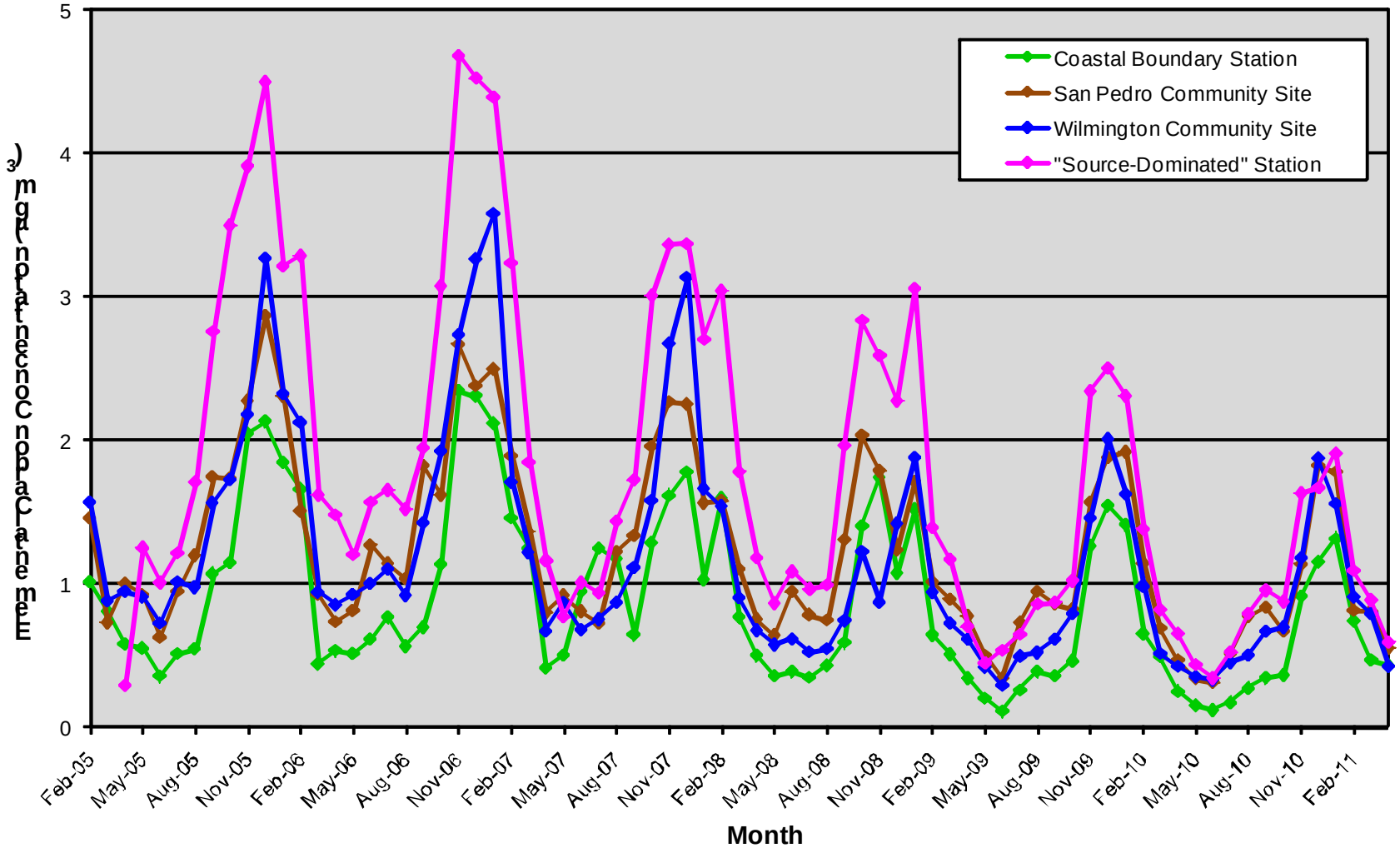


Figure A-12

Monthly Average CO Concentrations at the Port of Los Angeles
May 2010 - April 2011

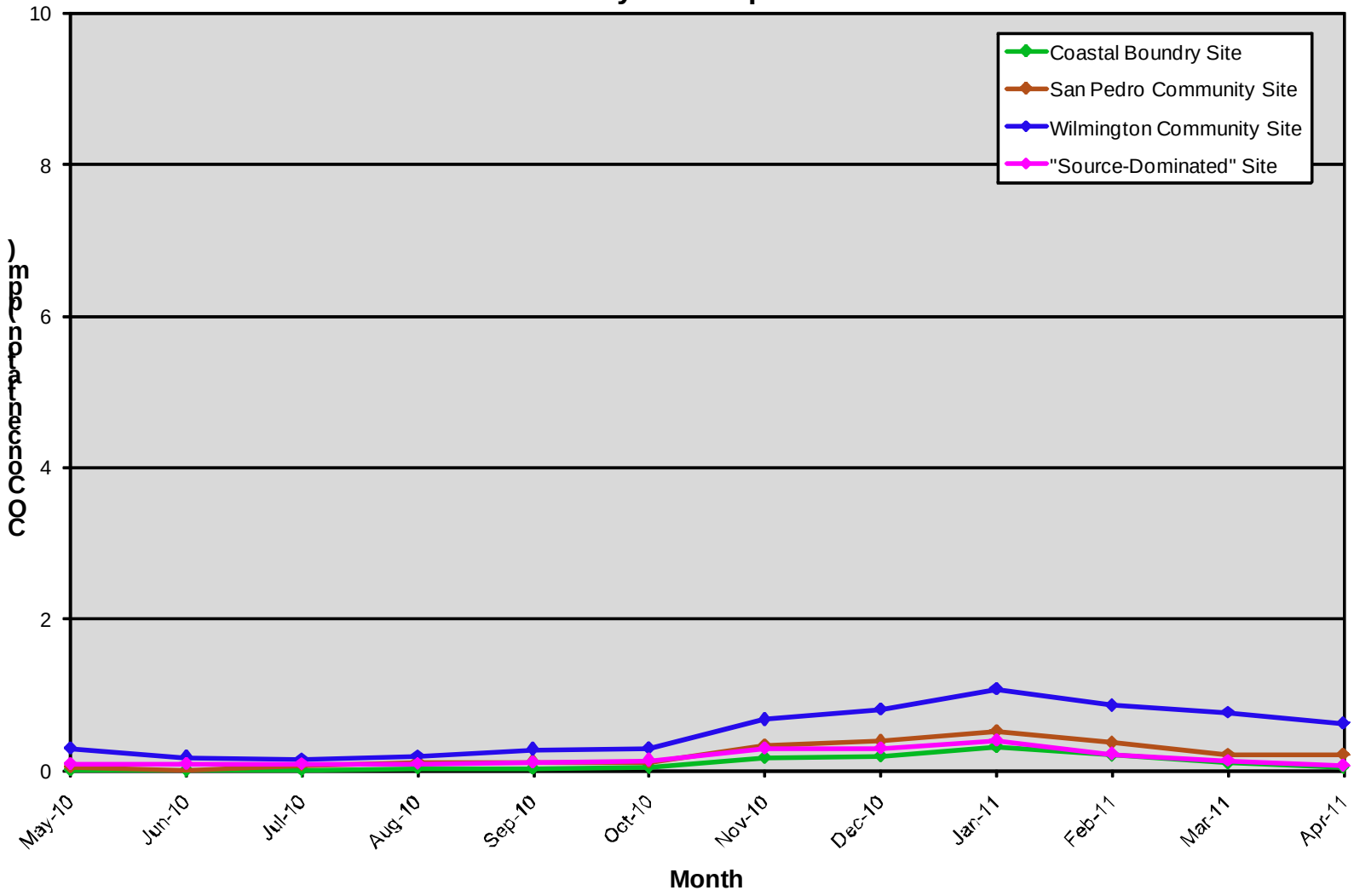


Figure A-13

Monthly Average NO_2 Concentrations at the Port of Los Angeles
May 2010 - April 2011

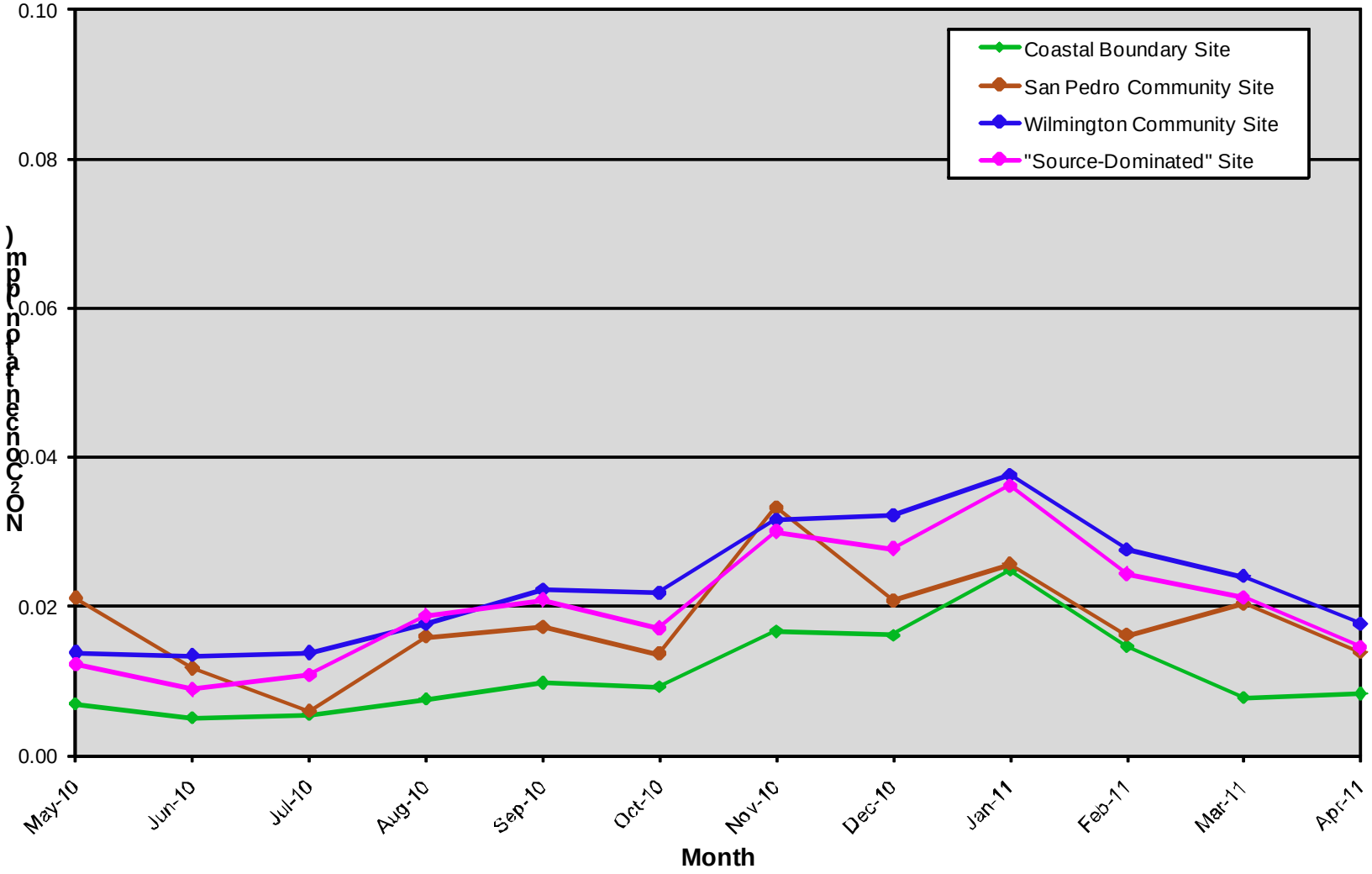


Figure A-14

Monthly Average O_3 Concentrations at the Port of Los Angeles
May 2010 - April 2011

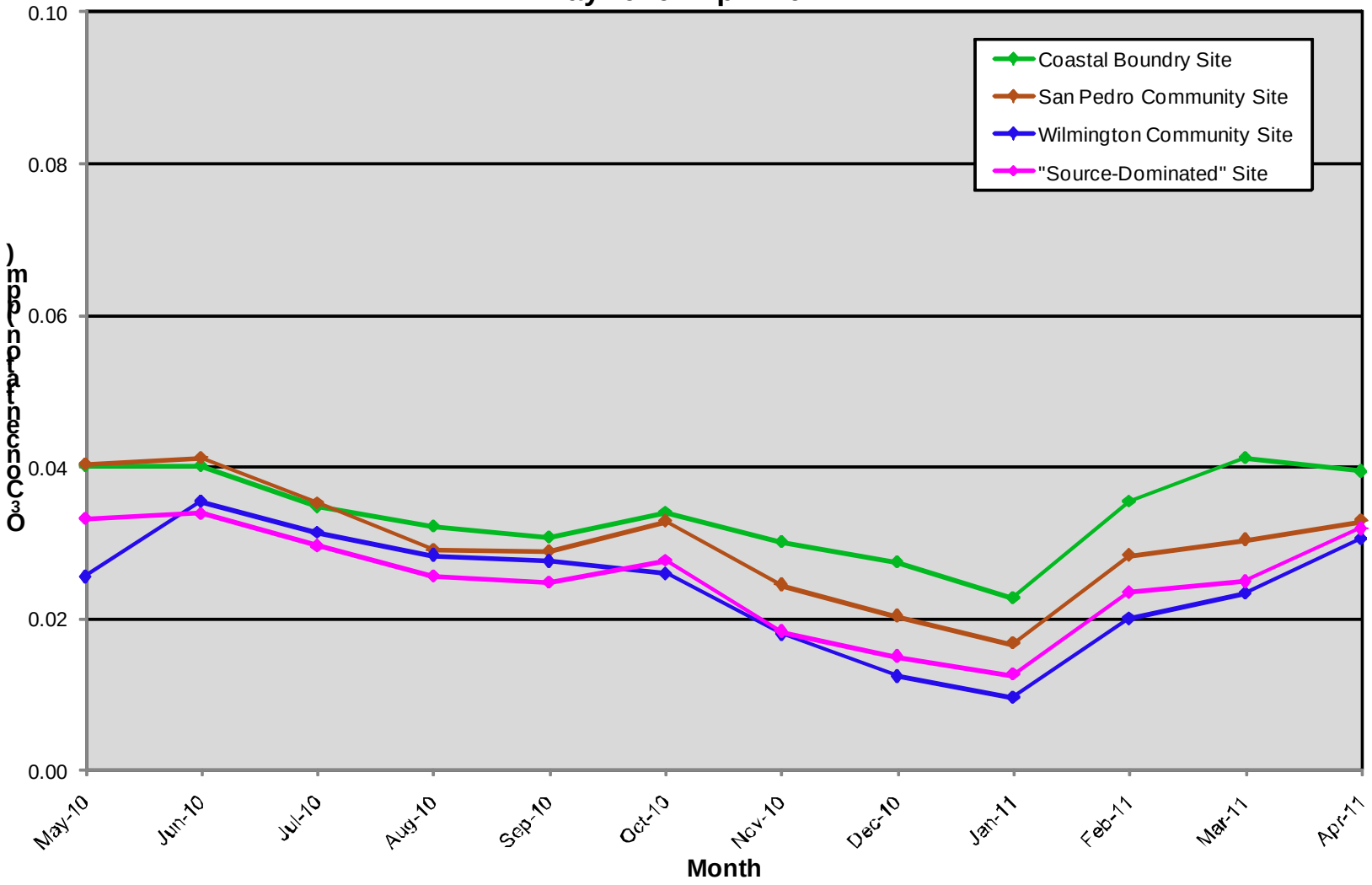


Figure A-15

Monthly Average SO_2 Concentrations at the Port of Los Angeles
May 2010 - April 2011

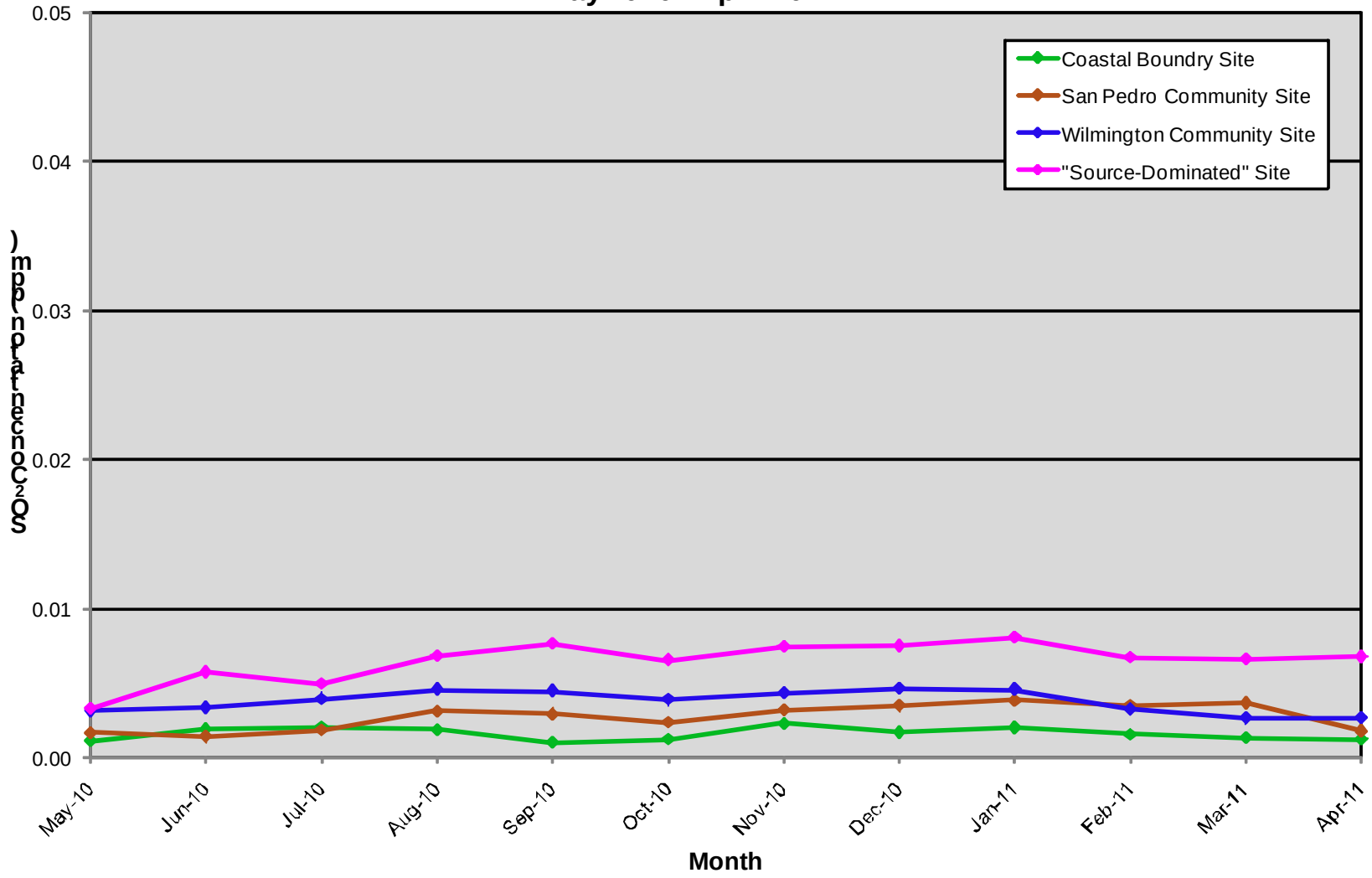


Figure A-16

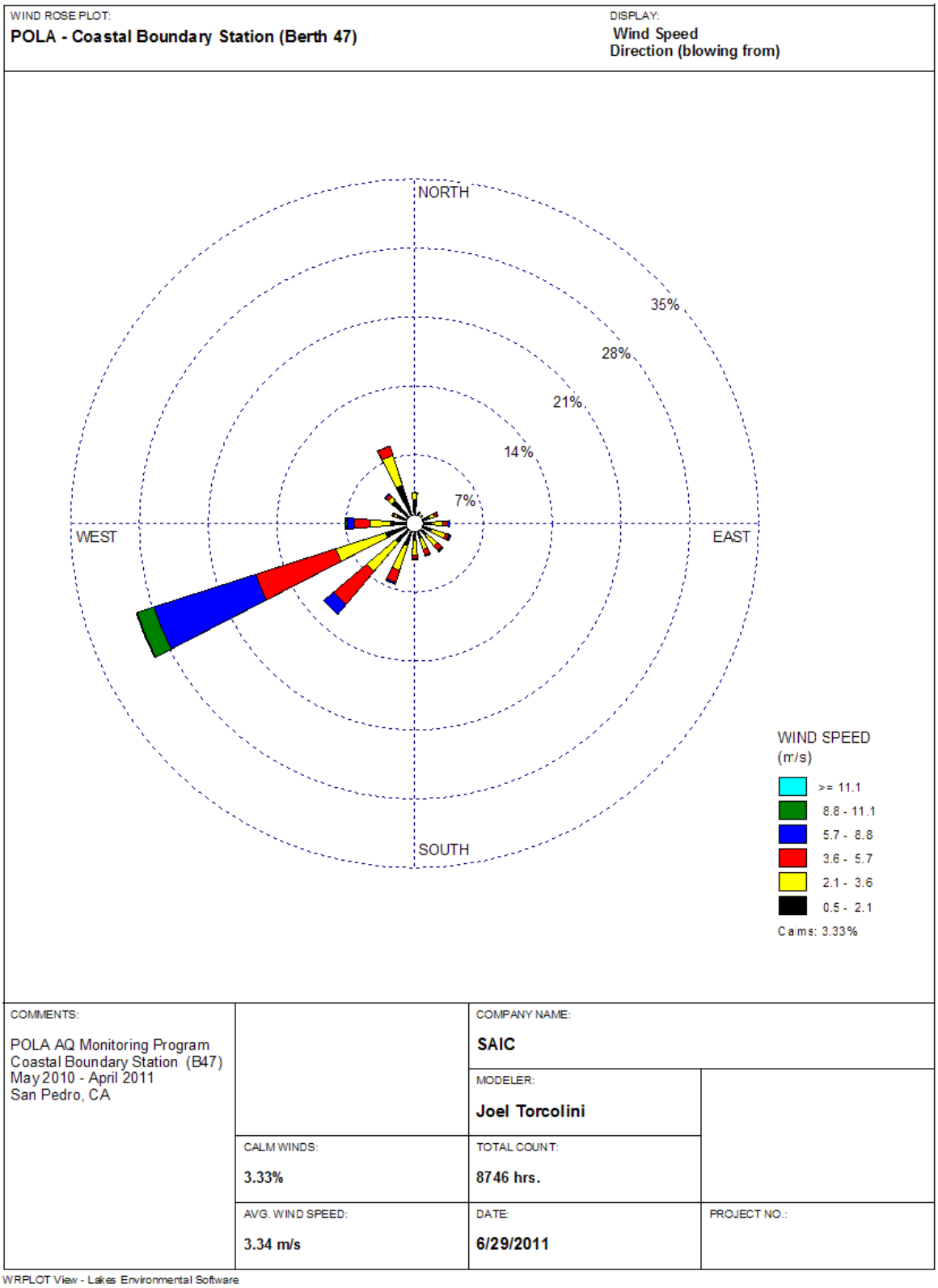

WIND ROSE PLOT:
POLA - Coastal Boundary Station (Berth 47)
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
35%
28%
21%
14%
7%
WIND SPEED
(m/s)
>= 11.1
8.8 - 11.1
5.7 - 8.8
3.6 - 5.7
2.1 - 3.6
0.5 - 2.1
Calms: 3.33%
COMMENTS:
POLA AQ Monitoring Program
Coastal Boundary Station (B47)
May 2010 - April 2011
San Pedro, CA
COMPANY NAME:
SAIC
MODELER:
Joel Torcolini
CALM WINDS:
3.33%
TOTAL COUNT:
8746 hrs.
AVG. WIND SPEED:
3.34 m/s
DATE:
6/29/2011
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-17

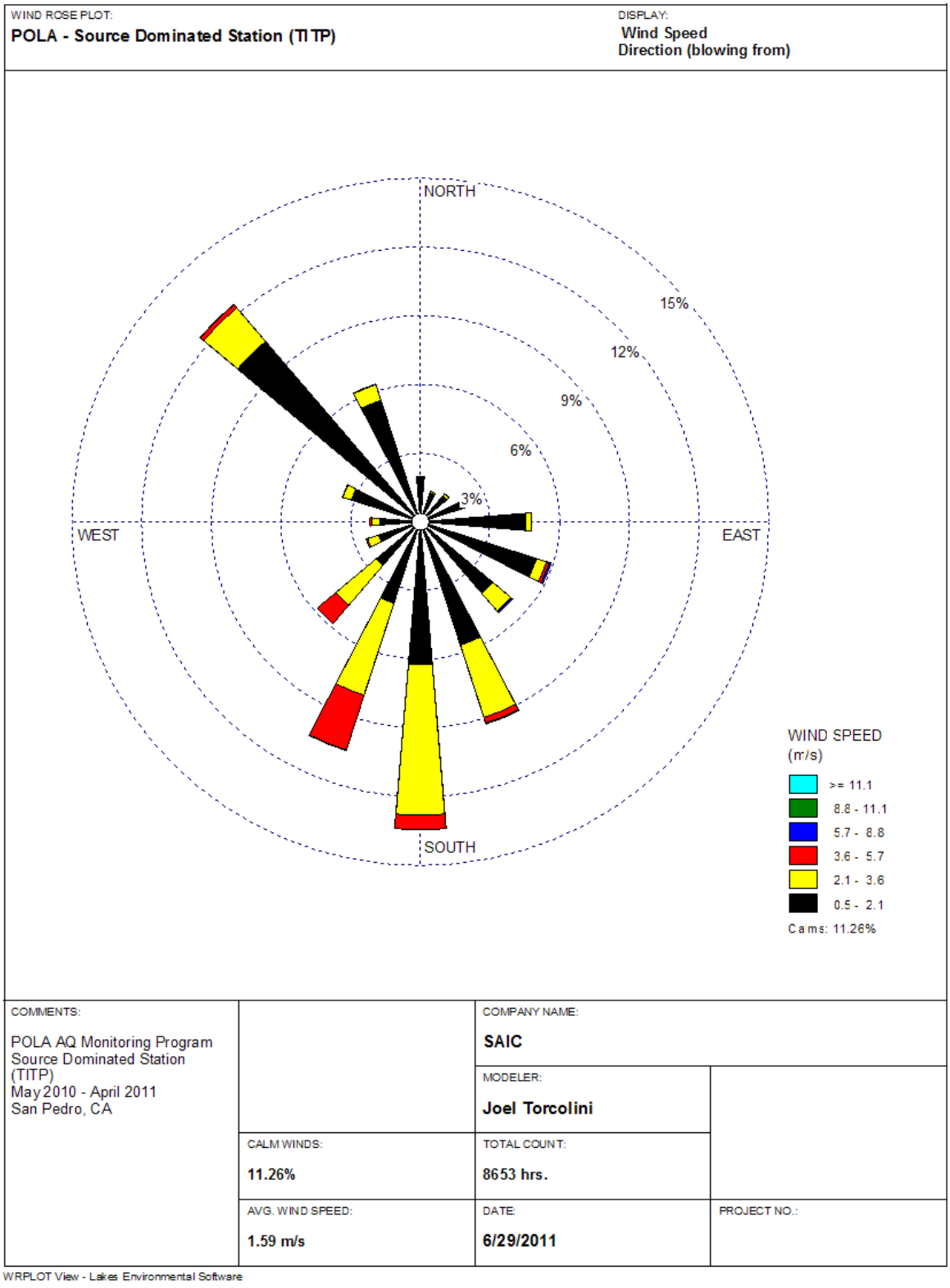

WIND ROSE PLOT:
POLA - Source Dominated Station (TITP)
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
3%
6%
9%
12%
15%
WIND SPEED
(m/s)
>= 11.1
8.8 - 11.1
5.7 - 8.8
3.6 - 5.7
2.1 - 3.6
0.5 - 2.1
Calms: 11.26%
COMMENTS:
POLA AQ Monitoring Program
Source Dominated Station
(TITP)
May 2010 - April 2011
San Pedro, CA
COMPANY NAME:
SAIC
MODELER:
Joel Torcolini
CALM WINDS:
11.26%
TOTAL COUNT:
8653 hrs.
AVG. WIND SPEED:
1.59 m/s
DATE:
6/29/2011
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-18

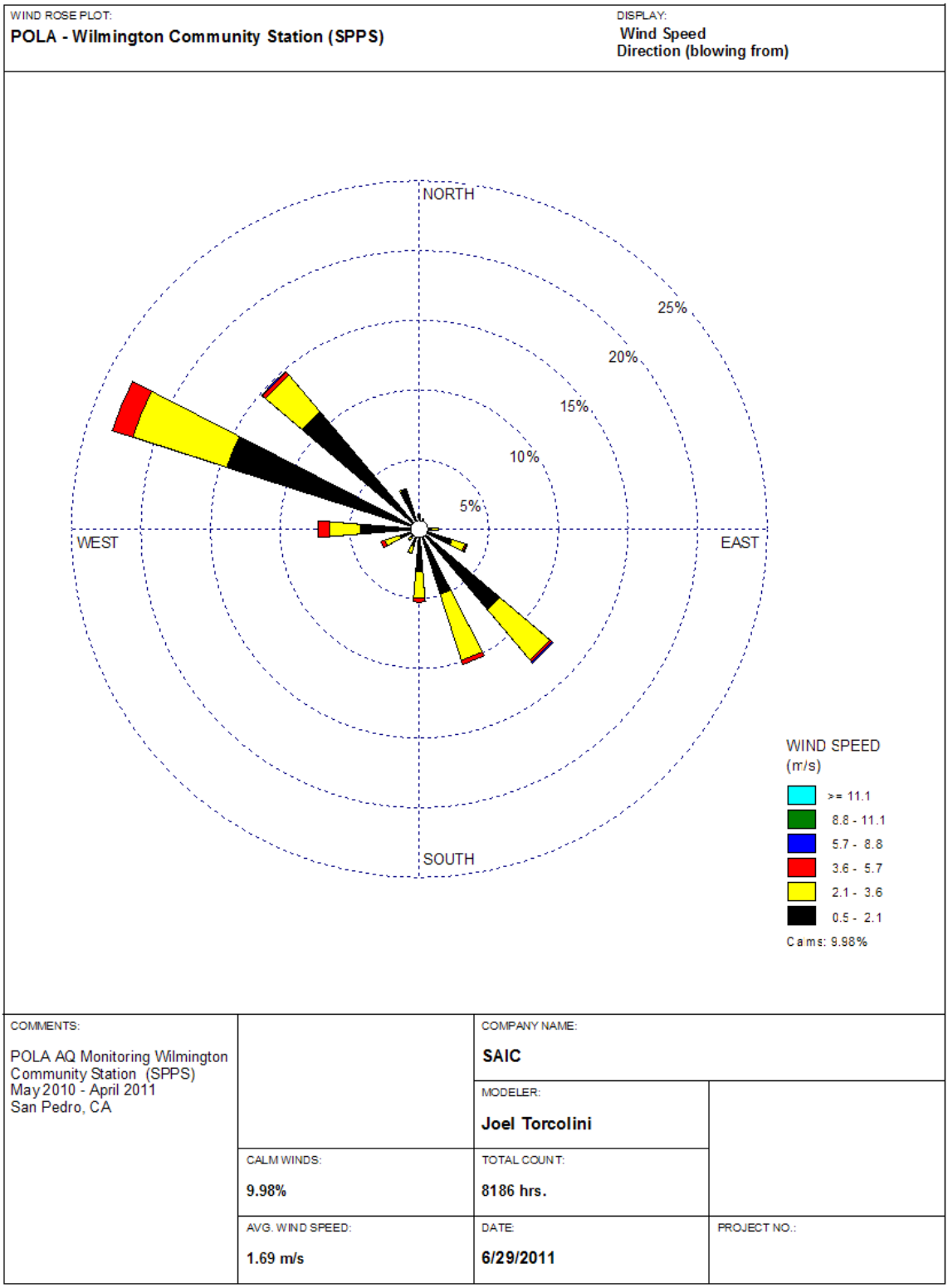
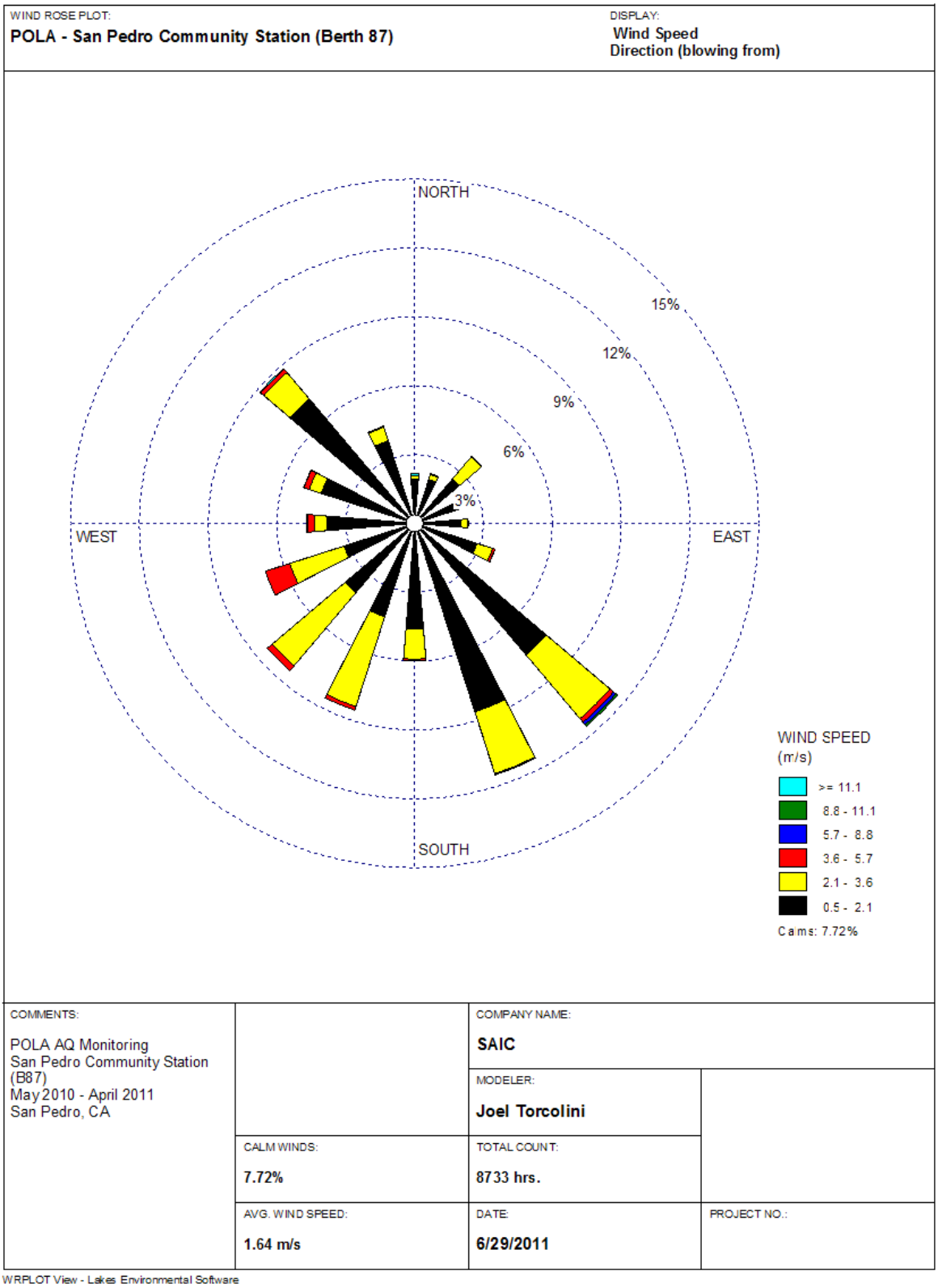

WIND ROSE PLOT:
POLA - Wilmington Community Station (SPPS)
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
5%
10%
15%
20%
25%
WIND SPEED
(m/s)
>= 11.1
8.8 - 11.1
5.7 - 8.8
3.6 - 5.7
2.1 - 3.6
0.5 - 2.1
Calms: 9.98%
COMMENTS:
POLA AQ Monitoring Wilmington
Community Station (SPPS)
May 2010 - April 2011
San Pedro, CA
COMPANY NAME:
SAIC
MODELER:
Joel Torcolini
CALM WINDS:
9.98%
TOTAL COUNT:
8186 hrs.
AVG. WIND SPEED:
1.69 m/s
DATE:
6/29/2011
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-19


WIND ROSE PLOT:
POLA - San Pedro Community Station (Berth 87)
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
3%
6%
9%
12%
15%
WIND SPEED
(m/s)
>= 11.1
8.8 - 11.1
5.7 - 8.8
3.6 - 5.7
2.1 - 3.6
0.5 - 2.1
Calms: 7.72%
COMMENTS:
POLA AQ Monitoring
San Pedro Community Station
(B87)
May 2010 - April 2011
San Pedro, CA
COMPANY NAME:
SAIC
MODELER:
Joel Torcolini
CALM WINDS:
7.72%
TOTAL COUNT:
8733 hrs.
AVG. WIND SPEED:
1.64 m/s
DATE:
6/29/2011
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Appendix A2

Port of Los Angeles Monitoring Program
Annual Report
May 2010 - April 2011

Summary Tables of Monitoring Results

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Appendix A-2
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Figure Page

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Table A-1. Monitoring Year 6 Filter-Based $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
05/02/10	5.0	4.4	4.8	5.2
05/05/10	8.1	6.3	7.1	7.5
05/08/10	6.9	5.8	6.6	6.7
05/11/10	3.0	3.0	3.0	3.6
05/14/10	9.3	6.4	8.0	7.8
05/17/10	5.2	4.4	5.1	
05/20/10	6.7	4.6	6.1	6.6
05/23/10	4.0	3.7	3.6	4.2
05/26/10	3.2	2.8	3.5	3.5
05/29/10	5.8	8.5	5.1	5.5
06/01/10		5.9	6.1	6.4
06/04/10	9.3	6.5	7.4	7.6
06/07/10			6.6	6.6
06/10/10	5.2	3.8	4.2	4.6
06/13/10		6.7	7.9	8.0
06/16/10	7.3	5.7	6.6	8.0
06/19/10	6.1	4.9	5.8	5.6
06/22/10	6.8	6.0	7.4	8.0
06/25/10	8.1	5.9	7.5	7.3
06/28/10	7.0	5.5	5.5	6.2
07/01/10	14.6	6.6	10.2	11.4
07/04/10	11.5	9.6	7.3	6.7
07/07/10		4.0	2.4	5.5
07/10/10	11.0	9.0	10.7	10.4
07/13/10	8.0	4.1	6.5	6.3
07/16/10	9.9	6.8	9.9	9.8
07/19/10	5.9	5.0	6.5	6.7
07/22/10	6.4	3.2	3.9	4.1
07/25/10	6.2	4.6	6.3	5.8
07/28/10	4.2	2.7	5.4	4.6
07/31/10	6.9	6.3	6.8	7.0
08/03/10	7.6	5.3	8.2	7.9
08/06/10	8.3		7.1	7.6
08/09/10	7.4	5.5	6.8	7.1
08/12/10	6.4	3.9	6.4	6.6
08/15/10	6.6	3.5	5.6	5.7
08/18/10	7.4	7.1	10.0	10.5
08/21/10	6.2	4.2	7.0	6.5

Table A-1. Monitoring Year 6 Filter-Based $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
08/24/10	8.9	8.7	11.9	11.4
08/27/10	9.0	7.2	8.3	8.7
08/30/10		5.1	5.3	5.3
09/02/10	7.6	5.7	9.3	10.3
09/05/10	8.8	6.8	7.6	7.5
09/08/10	4.8	4.2	4.5	5.4
09/11/10	6.2	6.3	8.0	7.8
09/14/10	8.5	5.3	7.3	7.4
09/17/10	8.6	6.2	8.7	7.5
09/20/10	6.9	4.7	6.5	6.6
09/23/10	8.0	6.2	7.8	8.3
09/26/10	16.1	10.5	12.8	12.9
09/29/10		6.7	7.3	8.4
10/02/10	7.7	5.8	7.2	
10/05/10	4.2	2.9	4.0	3.4
10/08/10	6.7	5.6	6.8	6.7
10/11/10	8.6	6.1	9.3	7.4
10/14/10	9.4	6.8	8.5	8.7
10/17/10	3.1	2.5	2.8	2.8
10/20/10	2.8	2.1	3.0	3.1
10/23/10	3.3	2.6	3.7	3.5
10/26/10	6.3	5.7	5.7	6.7
10/29/10	9.9	7.6	9.8	9.8
11/01/10	7.1	6.8	8.4	9.6
11/04/10	10.2	11.5	10.7	11.2
11/07/10	3.8	2.8	4.0	3.8
11/10/10	6.0	4.9		7.4
11/13/10	11.7	7.5		9.0
11/16/10	9.0	4.9	7.5	7.0
11/19/10	6.0	4.7	5.7	3.4
11/22/10	4.6	3.7	3.7	5.1
11/25/10	22.5	8.6	12.0	9.5
11/28/10	2.5	2.1	2.2	2.4
12/01/10	8.1	6.3	7.1	8.8
12/04/10	22.9	13.5	21.3	20.7
12/07/10	12.5	7.6	13.4	14.3
12/10/10	10.6	4.4	8.0	6.3
12/13/10	9.8	7.4	6.9	9.7

Table A-1. Monitoring Year 6 Filter-Based $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
12/16/10	3.4	2.5	3.4	2.9
12/19/10	3.1			0.6
12/22/10	2.5	5.1		2.2
12/25/10	20.1	8.5		10.6
12/28/10	10.6	8.1		9.2
12/31/10	28.2			
01/03/11	7.4	4.9		6.5
01/06/11	11.6	8.1		10.1
01/09/11	18.6	6.7		8.5
01/12/11	6.2		11.5	7.4
01/15/11	12.4	11.0		11.6
01/18/11	17.3	14.3	17.1	15.7
01/21/11	9.6	11.9	8.9	10.3
01/24/11	10.2		15.5	9.0
01/27/11	10.4	10.1	12.2	10.2
01/30/11	3.0	3.0	2.6	3.0
02/02/11	10.9	9.1	9.5	8.2
02/05/11	19.6	16.2	16.6	17.0
02/08/11	9.7	8.1	8.2	8.2
02/11/11	10.3	10.9	8.1	9.4
02/14/11	6.2	5.6	5.9	5.5
02/17/11	9.0	4.6	3.7	4.0
02/20/11	6.2	4.3	6.3	4.2
02/23/11	6.4		4.3	5.7
02/26/11	2.2	1.7	2.5	1.8
03/01/11	7.4	7.2	7.4	8.1
03/04/11	9.1		11.8	9.3
03/07/11	4.4	3.4		3.7
03/10/11	8.6	14.3		6.2
03/13/11	8.3	5.9	9.7	4.1
03/16/11	5.0	3.5	4.3	4.5
03/19/11	3.3	2.4	2.7	2.7
03/22/11	8.3	11.6	3.1	3.7
03/25/11	2.8	2.3	2.3	2.4
03/28/11	5.6	5.0	4.5	4.5
03/31/11	12.3	8.7	10.3	10.3
04/03/11	4.2	5.9	4.0	3.8
04/06/11	7.3		6.4	6.8

Table A-1. Monitoring Year 6 Filter-Based $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
04/09/11	6.6	4.2	4.6	4.2
04/12/11	7.9	6.5	6.9	7.5
04/15/11	8.1	12.5	14.1	14.2
04/18/11	3.8	4.5	5.4	5.3
04/21/11	2.0		2.3	3.1
04/24/11	1.0		1.9	1.7
04/27/11	9.5		8.2	8.0
04/30/11	3.6	12.6	7.2	7.3
12-Month Averages				
May 05 - Apr 06	12.6	10.2	10.6	13.7
May 06 - Apr 07	12.9	10.4	11.3	13.9
May 07 - Apr 08	12.7	10.1	10.8	11.8
May 08 - Apr 09	9.3	8.9	11.4	11.4
May 09 - Apr 10	8.3	7.3	8.6	9.3
May 10 - Apr 11	8.0	6.2	7.1	7.1

Note: Annual $PM_{2.5}$ National Ambient Air Quality Standard is 15 $\mu g/m^3$

Annual $PM_{2.5}$ California Ambient Air Quality Standard is 12 $\mu g/m^3$

24-hour $PM_{2.5}$ National Ambient Air Quality Standard is 35 $\mu g/m^3$

Table A-2. Highest 24-Hour Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)

Wilmington Community Station		Coastal Boundary Station		San Pedro Community Station		Source Dominated Station	
Date	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**
12/31/10	28.2	02/05/11	16.2	12/04/10	21.3	12/04/10	20.7
12/04/10	**22.9(1)**	**03/10/11**	**14.3(1)**	**01/18/11**	**17.1(1)**	**02/05/11**	**17.0(1)**
11/25/10	22.5	01/18/11	14.3	02/05/11	16.6	01/18/11	15.7
12/25/10	20.1	12/04/10	13.5	01/24/11	15.5	12/07/10	14.3
02/05/11	19.6	04/30/11	12.6	04/15/11	14.1	04/15/11	14.2
01/09/11	18.6	04/15/11	12.5	12/07/10	13.4	09/26/10	12.9
01/18/11	17.3	01/21/11	11.9	09/26/10	12.8	01/15/11	11.6
09/26/10	16.1	03/22/11	11.6	01/27/11	12.2	07/01/10	11.4
07/01/10	14.6	11/04/10	11.5	11/25/10	12.0	08/24/10	11.4
12/07/10	12.5	01/15/11	11.0	08/24/10	11.9	11/04/10	11.2
01/15/11	12.4	02/11/11	10.9	03/04/11	11.8	12/25/10	10.6
03/31/11	12.3	09/26/10	10.5	01/12/11	11.5	08/18/10	10.5
11/13/10	11.7	01/27/11	10.1	11/04/10	10.7	07/10/10	10.4
01/06/11	11.6	07/04/10	9.6	07/10/10	10.7	09/02/10	10.3
07/04/10	11.5	02/02/11	9.1	03/31/11	10.3	03/31/11	10.3
07/10/10	11.0	07/10/10	9.0	07/01/10	10.2	01/21/11	10.3
02/02/11	10.9	03/31/11	8.7	08/18/10	10.0	01/27/11	10.2
12/28/10	10.6	08/24/10	8.7	07/16/10	9.9	01/06/11	10.1

(1) This value represents the 98th percentile of the 24-hour concentrations for the current year. This value is used to calculate a 3-year average to determine compliance with 24-hour $PM_{2.5}$ NAAQS (35.0 $\mu g/m^3$).

Table A-3. 98th Percentile of the Highest 24-Hour Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)

Year	$PM_{2.5}$ Concentrations ($\mu g/m^3$)				
	Wilmington Community Station	**Coastal Boundary Station**	**San Pedro Community Station**	**Source Dominated Station**	**1-hour NAAQS**
2005-2006	32.7	25.3	23.8	31.4	--
2006-2007	36.2	25.5	21.0	27.6	--
2007-2008	41.1	30.7	32.5	34.8	--
2008-2009	23.8	29.6	29.2	34.9	--
2009-2010	18.9	21.6	19.5	22.1	--
2010-2011	22.9	17.1	16.2	19.2	--
Average	**21.9**	**22.8**	**21.6**	**25.4**	**35.0**

Note: The three year average is calculated to determine compliance with NAAQS.

Table A-4. Monitoring Year 6 BAM $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
05/02/10	11.9	10.0	12.3	7.8
05/05/10	23.1	15.2	18.5	
05/08/10	17.2	13.9	15.7	11.5
05/11/10	6.0	6.8	6.0	3.9
05/14/10	22.1	12.4	15.2	11.8
05/17/10	11.5	7.9	7.8	6.4
05/20/10	18.7		12.9	10.3
05/23/10	7.9	8.4	8.5	6.1
05/26/10	5.8	3.6	4.4	3.5
05/29/10	11.6	6.5	9.3	8.9
06/01/10	16.2	8.5	12.8	11.1
06/04/10	20.8	12.3	13.0	11.7
06/07/10	15.7	6.6	9.2	9.0
06/10/10	13.2	9.0	8.2	6.6
06/13/10	23.5	14.8	17.0	13.2
06/16/10	22.1	13.6	15.2	11.7
06/19/10	18.3	11.1	12.7	9.3
06/22/10	17.5	12.2	15.0	13.4
06/25/10	17.4	10.1	12.6	11.3
06/28/10	12.6	8.1	10.8	6.2
07/01/10	26.6	13.6	18.9	18.0
07/04/10	19.5	15.3	13.4	8.4
07/07/10	15.4	6.3	11.4	8.6
07/10/10	24.8	16.7	18.4	14.6
07/13/10	13.2	4.0	12.5	9.0
07/16/10	21.5	15.4	18.2	17.4
07/19/10	18.1	9.2	2.4	10.4
07/22/10	10.1	4.7	6.2	5.1
07/25/10	14.1	7.3	10.1	9.0
07/28/10	7.6		8.8	6.7
07/31/10	15.2	10.3	11.8	8.0
08/03/10	16.7	8.0	14.4	12.0
08/06/10	16.8	8.8	12.4	9.7
08/09/10	14.8	8.1	11.9	9.0
08/12/10	15.7	7.2	12.8	8.2
08/15/10	17.4	7.7	12.2	8.9
08/18/10	17.1	10.9	16.9	12.6
08/21/10	16.0	7.4	11.9	8.1

Table A-4. Monitoring Year 6 BAM $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
08/24/10	21.6	19.6	22.2	17.8
08/27/10	22.2	14.3	16.9	12.9
08/30/10	14.6	9.5	11.2	6.4
09/02/10	26.6	17.5	22.7	18.3
09/05/10	25.0	14.5	16.5	13.5
09/08/10	14.8	8.9	9.7	5.9
09/11/10	17.4	10.7	15.4	11.7
09/14/10	18.0	9.6	14.0	11.4
09/17/10	22.7	10.1	13.8	9.3
09/20/10	17.0	10.6	11.0	7.2
09/23/10	19.7		13.3	10.8
09/26/10	25.0		20.1	16.4
09/29/10	19.9	15.4	13.7	10.8
10/02/10	20.9	9.6	12.2	9.2
10/05/10	13.0	6.7	6.3	2.8
10/08/10	19.3	10.3	13.5	9.2
10/11/10	24.3	11.9	14.3	11.2
10/14/10	26.1	12.8	16.3	14.7
10/17/10	9.8	4.2	4.4	3.4
10/20/10	11.5	4.6	4.4	3.8
10/23/10	11.5	3.9	5.9	4.5
10/26/10	15.9	12.1	11.4	9.6
10/29/10	20.0	16.0	16.3	12.1
11/01/10	17.6	14.7	15.2	12.4
11/04/10	17.8	18.3	14.0	12.7
11/07/10	12.1	5.2	7.7	4.3
11/10/10	16.4	8.7	10.9	9.2
11/13/10	18.5	11.3	10.8	9.0
11/16/10	22.4	13.6	15.1	11.8
11/19/10	15.2	9.5	10.1	9.6
11/22/10	14.1	6.7	6.3	8.0
11/25/10	32.5	16.6	19.3	15.3
11/28/10	7.6	3.3	2.6	3.0
12/01/10	15.2	5.0	8.3	10.5
12/04/10	39.2	28.7	32.4	32.8
12/07/10	27.0	17.0	22.1	22.8
12/10/10	25.1	10.3	16.7	14.5
12/13/10	17.5	14.1	18.5	15.2

Table A-4. Monitoring Year 6 BAM $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
12/16/10	12.4	7.0	7.6	6.2
12/19/10	7.0	0.7	1.5	1.6
12/22/10	9.8	3.4	5.7	1.9
12/25/10	33.2	15.5	20.3	18.8
12/28/10	22.9	13.9	13.7	13.8
12/31/10	40.9	12.4	17.1	9.5
01/03/11	16.3	12.5	12.6	11.6
01/06/11	20.4	16.7	13.9	18.6
01/09/11	19.5	19.4	17.3	19.2
01/12/11	12.3	11.2	7.9	13.5
01/15/11	21.1	16.8	14.2	20.0
01/18/11	33.1	31.7	28.8	30.8
01/21/11	17.1	17.0	11.0	18.2
01/24/11	17.7	16.2	11.7	17.2
01/27/11	18.0	14.2	10.0	17.3
01/30/11	12.4	10.9	7.9	10.4
02/02/11	11.4	11.0	7.2	13.3
02/05/11	36.6	32.9	27.3	33.8
02/08/11	20.5	21.5	17.1	19.3
02/11/11	11.3	15.0	10.5	16.1
02/14/11	10.6	8.6	10.2	11.9
02/17/11	7.2	6.9	6.6	9.1
02/20/11	11.0	8.2	9.0	9.4
02/23/11	12.3	11.1	10.3	12.6
02/26/11	3.6	2.9	3.4	4.0
03/01/11	14.1	12.0	13.1	16.4
03/04/11	21.6	24.5	25.9	23.9
03/07/11	6.5	8.5	7.9	7.6
03/10/11	13.7	10.8	12.4	12.8
03/13/11	17.1	13.8	16.2	17.0
03/16/11	9.2	9.1	10.9	10.6
03/19/11	5.6	5.2	5.8	7.3
03/22/11	9.1	5.2	6.8	7.8
03/25/11	6.1	5.2	6.0	6.6
03/28/11	11.2	9.5	8.6	10.5
03/31/11	20.2	17.2	18.7	19.6
04/03/11	7.1	8.1	7.6	8.4
04/06/11	12.7	14.7	13.8	15.0

Table A-4. Monitoring Year 6 BAM $PM_{2.5}$ Concentrations

Sample Date	$PM_{2.5}$ Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
04/09/11	6.7	7.1	8.5	7.4
04/12/11	14.3	15.0	15.3	17.0
04/15/11	21.3	22.1	22.5	22.9
04/18/11	12.1	10.8	11.6	12.5
04/21/11	7.4	7.8	6.3	8.7
04/24/11	4.9	4.5	3.8	4.9
04/27/11	18.6	17.9	15.1	16.6
04/30/11	12.4	13.8	10.9	12.6

Table A-5. Monitoring Year 6 Filter-Based PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
05/02/10	21.5	26.0
05/05/10	30.1	30.8
05/08/10	28.8	33.4
05/11/10	16.0	22.3
05/14/10	41.3	24.7
05/17/10	11.4	10.7
05/20/10	28.2	30.6
05/23/10	22.0	26.4
05/26/10	8.6	8.0
05/29/10	22.2	31.9
06/01/10	19.8	
06/04/10	18.2	
06/07/10	12.3	10.3
06/10/10	17.3	18.4
06/13/10	25.8	28.3
06/16/10	27.2	27.3
06/19/10	24.1	28.0
06/22/10	22.2	22.4
06/25/10	18.1	17.3
06/28/10	12.0	11.8
07/01/10	44.7	23.0
07/04/10	24.9	23.8
07/07/10	33.8	13.1
07/10/10	22.8	20.2
07/13/10	24.5	23.4
07/16/10	27.6	33.6
07/19/10	12.1	15.5
07/22/10	9.0	6.8
07/25/10	14.4	15.2
07/28/10	12.7	13.6
07/31/10	13.9	16.0
08/03/10	20.4	15.7
08/06/10	16.7	13.5
08/09/10	14.5	11.3
08/12/10	15.4	12.4
08/15/10	16.6	15.5

Table A-5. Monitoring Year 6 Filter-Based PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
08/18/10	20.1	31.2
08/21/10	18.4	19.0
08/24/10	32.0	37.8
08/27/10	22.3	20.0
08/30/10	20.4	30.1
09/02/10	15.3	14.1
09/05/10	21.6	21.6
09/08/10	14.7	15.2
09/11/10	12.8	15.7
09/14/10	19.9	18.3
09/17/10	19.3	14.6
09/20/10	19.2	17.1
09/23/10	26.6	25.8
09/26/10	29.3	36.8
09/29/10	24.9	25.6
10/02/10	18.9	18.9
10/05/10	16.2	14.9
10/08/10	20.6	22.1
10/11/10	20.3	18.4
10/14/10	18.7	14.5
10/17/10	6.3	6.6
10/20/10	8.4	7.6
10/23/10	7.1	6.8
10/26/10	25.1	28.3
10/29/10	25.4	28.8
11/01/10	17.0	20.1
11/04/10	25.1	47.1
11/07/10	9.2	9.5
11/10/10	16.8	17.1
11/13/10	22.7	25.3
11/16/10	15.3	11.0
11/19/10	12.9	11.2
11/22/10	14.1	14.6
11/25/10	24.7	19.8
11/28/10	7.2	7.6
12/01/10	17.3	22.8
12/04/10	36.2	33.6
12/07/10	21.7	22.5

Table A-5. Monitoring Year 6 Filter-Based PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
12/10/10	21.2	14.0
12/13/10	19.2	20.8
12/16/10	13.3	14.5
12/19/10	3.2	5.7
12/22/10	5.4	
12/25/10	24.9	
12/28/10	19.9	
12/31/10	32.1	
01/03/11	12.7	
01/06/11	26.2	
01/09/11	19.9	
01/12/11	14.2	22.5
01/15/11	25.1	
01/18/11	35.5	41.7
01/21/11	22.2	42.7
01/24/11	25.7	
01/27/11	25.0	29.0
01/30/11	12.3	12.2
02/02/11	29.0	26.7
02/05/11	33.6	31.9
02/08/11	30.9	27.0
02/11/11	21.3	27.9
02/14/11	12.3	12.3
02/17/11	14.6	14.1
02/20/11	9.5	7.0
02/23/11	16.2	14.8
02/26/11	6.2	6.0
03/01/11	22.8	29.0
03/04/11	29.1	35.0
03/07/11	21.8	
03/10/11	26.9	27.3
03/13/11	30.2	29.2
03/16/11	21.1	22.0
03/19/11	13.3	15.4
03/22/11	16.9	17.1
03/25/11		16.0
03/28/11	22.8	22.2
03/31/11	42.4	35.4

Table A-5. Monitoring Year 6 Filter-Based PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
04/03/11	13.8	28.0
04/06/11	38.7	44.6
04/09/11	13.3	12.8
04/12/11	31.8	29.0
04/15/11	46.6	48.9
04/18/11	20.8	18.5
04/21/11	11.3	10.7
04/24/11	5.3	9.1
04/27/11	40.7	48.5
04/30/11	38.6	40.6
12-Month Averages		
May 05 - Apr 06	28.7	--
May 06 - Apr 07	28.6	--
May 07 - Apr 08	28.5	--
May 08 - Apr 09	25.9	--
May 09 - Apr 10	23.5	24.0
May 10 - Apr 11	20.8	21.5

Note: California Annual Ambient Air Quality Standard for PM_{10} is 20.0 $\mu g/m^3$
There is currently no National Annual Ambient Air Quality Standard for PM_{10}

Table A-6. Maximum 24-Hour PM_{10} Concentrations ($\mu g/m^3$)

Year	PM_{10} Concentrations ($\mu g/m^3$)			
	Wilmington Community Station	Coastal Boundary Station	1-hour NAAQS	1-hour CAAQS
2005-2006	63.3	--	150.0	50.0
2006-2007	60.5	--	150.0	50.0
2008-2009	169.2	--	150.0	50.0
2008-2009	74.7	--	150.0	50.0
2009-2010	71.0	53.6	150.0	50.0
2010-2011	46.6	48.9	150.0	50.0

Table A-7. Monitoring Year 6 BAM PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
05/02/10	25.9	34.9
05/05/10	38.3	47.3
05/08/10	37.2	49.6
05/11/10	19.7	23.3
05/14/10	72.4	34.8
05/17/10	15.3	15.3
05/20/10	40.1	
05/23/10	27.5	32.0
05/26/10	10.4	10.0
05/29/10	27.3	37.6
06/01/10	24.9	24.5
06/04/10	27.6	22.7
06/07/10	17.2	12.0
06/10/10	21.2	27.3
06/13/10	33.4	40.4
06/16/10	32.4	40.4
06/19/10	30.4	39.0
06/22/10	28.9	32.5
06/25/10	25.0	23.1
06/28/10	15.2	14.2
07/01/10	71.2	30.3
07/04/10	31.6	30.8
07/07/10	56.6	15.9
07/10/10	35.2	28.4
07/13/10	41.3	33.8
07/16/10	40.8	47.7
07/19/10	23.5	18.0
07/22/10	13.8	8.0
07/25/10	20.3	20.2
07/28/10	17.2	16.9
07/31/10	20.4	18.5
08/03/10	29.1	22.1
08/06/10	24.6	18.8
08/09/10	21.3	13.5
08/12/10	23.0	16.3
08/15/10	25.0	23.6
08/18/10	28.9	39.6

Table A-7. Monitoring Year 6 BAM PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
08/21/10	26.1	27.3
08/24/10	43.1	51.3
08/27/10	30.3	27.9
08/30/10	27.3	38.4
09/02/10	29.8	24.9
09/05/10	30.7	31.4
09/08/10	20.7	22.9
09/11/10	20.5	21.6
09/14/10	36.4	29.2
09/17/10	31.7	18.9
09/20/10	25.7	25.4
09/23/10	40.9	35.9
09/26/10	43.3	53.1
09/29/10	34.6	35.4
10/02/10	27.5	27.4
10/05/10	22.1	16.0
10/08/10	31.9	25.3
10/11/10	28.5	23.5
10/14/10	32.2	17.7
10/17/10	12.7	6.9
10/20/10	18.3	11.8
10/23/10	13.3	7.8
10/26/10	36.6	41.7
10/29/10	37.0	38.8
11/01/10	29.6	32.5
11/04/10	36.7	62.1
11/07/10	16.1	10.6
11/10/10	25.3	23.4
11/13/10	34.6	30.0
11/16/10	26.6	14.2
11/19/10	23.0	13.3
11/22/10	22.3	14.2
11/25/10	39.7	23.9
11/28/10	13.2	4.8
12/01/10	26.4	26.7
12/04/10	49.7	41.5
12/07/10	39.7	29.6
12/10/10	37.8	18.0
12/13/10	30.0	27.9

Table A-7. Monitoring Year 6 BAM PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
12/16/10	22.7	14.1
12/19/10	5.3	4.8
12/22/10		15.3
12/25/10		17.6
12/28/10		25.1
12/31/10		13.8
01/03/11		9.9
01/06/11	36.7	32.7
01/09/11	25.4	36.8
01/12/11	20.8	40.4
01/15/11	38.2	41.3
01/15/11	38.2	41.3
01/18/11	51.7	66.3
01/21/11	33.0	69.4
01/24/11	36.1	56.5
01/27/11	38.9	52.9
01/30/11	16.0	24.0
02/02/11	41.7	54.6
02/05/11	52.0	57.4
02/08/11	40.0	47.1
02/11/11	30.9	50.7
02/14/11	20.3	23.1
02/17/11	16.9	22.6
02/20/11	13.2	16.3
02/23/11	24.2	29.6
02/26/11	5.6	10.3
03/01/11	26.3	37.1
03/04/11	35.6	44.9
03/07/11	22.5	26.7
03/10/11	32.5	34.3
03/13/11	35.0	42.0
03/16/11	25.2	30.9
03/19/11	12.2	19.5
03/22/11	18.2	19.5
03/25/11	13.8	19.4
03/28/11	24.7	31.4
03/31/11	50.8	46.0
04/03/11	Y6.0	27.2
04/06/11	31.0	41.0

Table A-7. Monitoring Year 6 BAM PM_{10} Concentrations

Sample Date	PM_{10} Concentrations ($\mu g/m^3$)	
	Wilmington Community Station	Coastal Boundary Station
04/09/11	13.3	17.0
04/12/11	34.4	41.8
04/15/11	51.3	61.5
04/18/11	23.6	29.2
04/21/11	13.2	20.4
04/24/11	6.9	16.4
04/27/11	44.1	62.2
04/30/11	42.8	55.2

Table A-8. Monitoring Year 6 Filter-Based Elemental Carbon Concentrations

Sample Date	EC Concentrations (μg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
05/02/10	0.2	0.1	0.2	0.2
05/05/10	0.3	0.1	0.4	0.3
05/08/10	0.5	0.2	0.6	0.5
05/11/10	0.2	0.0	0.0	0.5
05/14/10	0.5	0.2	0.5	0.3
05/17/10	0.3	0.1	0.4	
05/20/10	0.6	0.2	0.4	0.7
05/23/10	0.2	0.1	0.2	0.4
05/26/10	0.2	0.1	0.2	0.3
05/29/10	0.4	0.3	0.5	0.6
06/01/10		0.1	0.4	0.2
06/04/10	0.6	0.3	0.5	0.4
06/07/10	0.4		0.3	0.3
06/10/10	0.3	0.2	0.2	0.3
06/13/10		0.2	0.1	0.3
06/16/10	0.3		0.4	0.7
06/19/10	0.3	0.1	0.3	0.1
06/22/10	0.3	0.0	0.3	0.6
06/25/10	0.3	0.1	0.3	0.3
06/28/10	0.3	0.0	0.2	0.2
07/01/10	0.7	0.1	0.3	0.4
07/04/10	0.2	0.0	0.2	0.3
07/07/10		0.1	0.4	0.5
07/10/10	0.6	0.4	0.6	0.5
07/13/10	0.8	0.2	0.9	0.9
07/16/10	0.9	0.2	1.0	0.9
07/19/10	0.2	0.2	0.6	0.4
07/22/10	0.2	0.1	0.3	0.4
07/25/10	0.4	0.1	0.3	0.2
07/28/10	0.2	0.1	0.5	0.7
07/31/10	0.3	0.5	0.4	0.4
08/03/10	0.7	0.1	0.9	1.0
08/06/10	0.4		0.5	0.5
08/09/10	0.3	0.2	0.4	0.5
08/12/10	0.5		0.5	0.5
08/15/10	0.8	0.2	0.5	0.7

Table A-8. Monitoring Year 6 Filter-Based Elemental Carbon Concentrations

Sample Date	EC Concentrations (μg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
08/18/10	0.7	0.7	1.4	1.6
08/21/10	0.3	0.1	0.6	0.7
08/24/10	0.3	0.3	1.8	1.3
08/27/10	0.5	0.2	0.5	0.5
08/30/10		0.3	0.5	0.6
09/02/10	0.3	0.2	0.6	0.9
09/05/10	0.5	0.2	0.6	0.4
09/08/10	0.3	0.1	0.5	0.5
09/11/10	0.1	0.3	0.6	0.7
09/14/10	0.5	0.1	1.0	1.2
09/17/10	0.3	0.2	0.5	0.3
09/20/10	0.5	0.4	0.6	0.7
09/23/10	1.0	0.7	0.9	1.7
09/26/10	1.6	1.0	1.5	1.8
09/29/10		0.5	1.5	1.3
10/02/10	0.8	0.4	0.6	1.1
10/05/10	0.4	0.0	0.6	0.3
10/08/10	1.0	0.6	1.1	1.4
10/11/10	0.6	0.1	0.6	0.4
10/14/10	0.9	0.2	0.4	0.5
10/17/10	0.1	0.0	0.1	0.1
10/20/10	0.3	0.1	0.3	0.5
10/23/10	0.3	0.3	0.4	0.9
10/26/10	1.0	0.7	0.9	1.4
10/29/10	1.5	1.3	1.6	2.1
11/01/10	1.1	1.2	1.7	2.6
11/04/10	1.9	2.2	2.4	3.4
11/07/10	0.5	0.2	0.5	0.8
11/10/10	1.1	1.0	1.2	2.7
11/13/10	1.9	1.3	1.5	2.1
11/16/10	0.9	0.4	0.6	0.7
11/19/10	0.4	0.1	0.3	0.4
11/22/10	0.8		0.5	1.3
11/25/10	2.9	1.7	2.4	1.8
11/28/10	0.3	0.1	0.1	0.5
12/01/10	1.6	1.2	1.5	2.7
12/04/10	2.1	1.5	2.1	2.1
12/07/10	3.1	1.6	3.3	4.5

Table A-8. Monitoring Year 6 Filter-Based Elemental Carbon Concentrations

Sample Date	EC Concentrations (μg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
12/10/10	1.4	0.9	1.4	1.0
12/13/10	1.5	1.2	2.1	2.0
12/16/10	0.5	0.1	0.4	0.5
12/19/10	0.3			0.1
12/22/10	0.7	0.1		0.6
12/25/10	2.7	0.8		1.2
12/28/10	2.2	2.0		2.1
12/31/10	4.5	2.0		1.6
01/03/11	1.3	0.9		1.3
01/06/11	2.2	1.3		2.3
01/09/11	0.8	0.3		0.9
01/12/11	1.2		2.0	1.7
01/15/11	2.3	2.2		2.9
01/18/11	2.7	2.5	2.0	3.4
01/21/11	1.7	1.7	1.5	2.0
01/24/11			2.7	2.1
01/27/11	1.7	1.7	2.5	2.2
01/30/11	0.2	0.0	0.1	0.2
02/02/11	0.9	0.5	0.9	
02/05/11	2.0	1.5	1.3	1.9
02/08/11	0.6	0.4	0.5	1.1
02/11/11	1.5	1.8	1.4	1.7
02/14/11	0.7	0.4	0.6	0.8
02/17/11	0.6	0.6	0.6	0.7
02/20/11	0.9	0.6	0.7	0.8
02/23/11	0.9		1.0	1.3
02/26/11	0.2	0.0	0.1	0.2
03/01/11		1.2	1.4	1.7
03/04/11	1.0		0.9	1.0
03/07/11	0.1	0.1		0.3
03/10/11	1.5	0.7		1.0
03/13/11	0.6	0.4	0.8	0.9
03/16/11	0.6	0.3	0.5	0.6
03/19/11	0.2	0.0	0.1	0.3
03/22/11	0.8	0.5	0.8	0.8
03/25/11	0.0	0.0	0.2	0.2
03/28/11	0.9	0.4	0.5	0.9
03/31/11	2.2	1.2	2.0	2.0

Table A-8. Monitoring Year 6 Filter-Based Elemental Carbon Concentrations

Sample Date	EC Concentrations (μg/m^3)			
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station
04/03/11	0.3	0.2	0.2	0.4
04/06/11	0.5		0.3	0.3
04/09/11	0.5	0.5	0.4	0.9
04/12/11	0.5	0.2	0.5	0.5
04/15/11	0.1	0.9	1.4	1.4
04/18/11	0.0	0.2	0.3	0.4
04/21/11	0.0		0.1	0.2
04/24/11			0.2	0.2
04/27/11	0.9		1.3	0.9
04/30/11	1.0	0.6	0.8	0.7
12-Month Averages				
May 05 - Apr 06	1.5	1.1	1.5	2.5
May 06 - Apr 07	1.7	1.2	1.6	2.6
May 07 - Apr 08	1.4	1.1	1.4	2.0
May 08 - Apr 09	0.9	0.8	1.2	1.7
May 09 - Apr 10	0.8	0.6	1.0	1.2
May 10 - Apr 11	0.8	0.5	0.8	1.0

Table A-9. Maximum 1-Hour CO Concentrations

Year	CO Concentrations (ppm)					
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour NAAQS	1-hour CAAQS
2008-2009	5.3	2.0	5.2	5.1	35.0	20.0
2009-2010	4.5	2.2	2.7	4.9	35.0	20.0
2010-2011	4.6	1.7	7.5	2.1	35.0	20.0

Note: CO was not measured during Years 1-3

Table A-10. Maximum 8-Hour CO Concentrations

Year	CO Concentrations (ppm)					
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	8-hour NAAQS	8-hour CAAQS
2008-2009	2.7	1.3	1.5	1.6	9.0	9.0
2009-2010	2.8	2.1	1.4	1.6	9.0	9.0
2010-2011	2.7	1.1	2.1	1.3	9.0	9.0

Note: CO was not measured during Years 1-3

Table A-11. Monitoring Year 6 Daily Maximum 1-Hour Average NO_2 Concentrations (ppm)

Wilmington Community Station		Coastal Boundary Station		San Pedro Community Station		Source Dominated Station	
Date	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**
09/27/10	0.098	01/25/11	0.093	12/02/10	0.200	12/01/10	0.099
01/17/11	0.095	12/02/10	0.073	12/01/10	0.146	09/27/10	0.094
01/25/11	0.086	11/04/10	0.070	11/29/10	0.144	12/08/10	0.092
12/03/10	0.085	01/28/11	0.068	11/27/10	0.138	07/20/10	0.091
12/08/10	0.085	01/18/11	0.065	11/30/10	0.130	11/02/10	0.091
11/04/10	0.081	08/11/10	0.063	11/26/10	0.116	01/25/11	0.091
11/02/10	**0.079(1)**	**12/08/10**	**0.061(1)**	**11/25/10**	**0.106(1)**	**11/03/10**	**0.090(1)**
01/18/11	0.079	08/18/10	0.059	11/24/10	0.104	01/18/11	0.086
11/05/10	0.078	11/03/10	0.058	05/26/10	0.097	01/26/11	0.086
11/03/10	0.077	12/03/10	0.058	06/02/10	0.092	12/02/10	0.078
09/25/10	0.075	10/28/10	0.057	05/29/10	0.090	11/29/10	0.074
12/05/10	0.074	10/29/10	0.057	05/27/10	0.087	12/03/10	0.074
04/16/11	0.074	01/26/11	0.057	09/27/10	0.086	01/13/11	0.074
09/24/10	0.072	12/05/10	0.056	01/25/11	0.083	01/28/11	0.074
02/07/11	0.072	09/26/10	0.053	05/13/10	0.080	11/04/10	0.073
02/05/11	0.070	02/05/11	0.053	05/25/10	0.075	11/10/10	0.073
03/31/11	0.070	12/28/10	0.052	01/18/11	0.075	12/07/10	0.072
09/26/10	0.069	04/16/11	0.051	06/14/10	0.074	12/13/10	0.071

(1) This value represents the 98th percentile of the daily maximum 1-hour concentration for the current year. This value is used to calculate the 3-year average to determine compliance with the 1-hour NO_2 NAAQS (0.100 ppm).

Table A-12. 98th Percentile of the Daily Maximum 1-Hour Average NO_2 Concentrations

Year	NO_2 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour NAAQS
2008-2009	0.086	0.066	0.080	0.088	--
2009-2010	0.071	0.066	0.082	0.087	--
2010-2011	0.079	0.061	0.106	0.090	--
Average	**0.079**	**0.064**	**0.089**	**0.088**	**0.100**

Note: The three year average is calculated to determine compliance with the 1-hr NO_2 NAAQS.

Table A-13. Maximum 1-Hour NO_2 Concentrations

Year	NO_2 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour CAAQS
2008-2009	0.099	0.077	0.105	0.103	0.180
2009-2010	0.083	0.146	0.105	0.101	0.180
2010-2011	0.098	0.093	0.200	0.099	0.180

Note: NO_2 was not measured during Years 1-3

Table A-14. Monitoring Year 6 Daily Maximum 8-Hour Average O_3 Concentrations (ppm)

Wilmington Community Station		Coastal Boundary Station		San Pedro Community Station		Source Dominated Station	
Date	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**
09/26/10	0.087	09/27/10	0.076	05/07/10	0.064	09/26/10	0.062
09/27/10	0.067	04/30/11	0.067	09/26/10	0.062	09/02/10	0.060
09/24/10	0.064	03/21/11	0.065	05/08/10	0.061	04/15/11	0.057
10/10/10	**0.061(1)**	**03/19/11**	**0.065(1)**	**05/29/10**	**0.060(1)**	**04/30/11**	**0.057(1)**
09/25/10	0.061	04/15/11	0.064	09/24/10	0.059	05/07/10	0.056
04/14/11	0.057	03/20/11	0.064	05/16/10	0.059	04/14/11	0.055
04/30/11	0.057	09/25/10	0.063	05/15/10	0.057	04/10/11	0.055
08/18/10	0.056	09/26/10	0.062	06/05/10	0.057	09/25/10	0.054
04/15/11	0.056	10/10/10	0.062	03/19/11	0.057	04/27/11	0.053
05/29/10	0.054	04/12/11	0.061	09/02/10	0.057	04/09/11	0.053
05/07/10	0.054	03/25/11	0.061	09/25/10	0.056	09/24/10	0.052
09/02/10	0.054	04/14/11	0.061	04/30/11	0.056	04/08/11	0.052
10/09/10	0.053	10/29/10	0.061	05/06/10	0.056	04/29/11	0.052
04/10/11	0.053	01/18/11	0.061	04/14/11	0.056	10/15/10	0.052
08/23/10	0.052	05/07/10	0.060	04/15/11	0.055	05/16/10	0.051
04/27/11	0.052	03/31/11	0.060	06/01/10	0.055	04/12/11	0.051
05/04/10	0.051	03/17/11	0.060	03/21/11	0.055	03/20/11	0.051
06/05/10	0.051	03/22/11	0.059	10/15/10	0.055	11/16/10	0.051

(1) This value represents the fourth highest daily maximum 8-hour concentration during the current year. This value is used to calculate the 3-year average to determine compliance with the 8-hour O_3 NAAQS (0.075 ppm).

Table A-15. Fourth Highest 8-Hour O_3 Concentrations (ppm)

Year	O_3 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour NAAQS
2008-2009	0.061	0.063	0.062	0.055	--
2009-2010	0.058	0.067	0.061	0.058	--
2010-2011	0.061	0.065	0.060	0.057	--
Average	**0.060**	**0.065**	**0.061**	**0.057**	**0.075**

Note: The three year average is calculated to determine compliance with the 8-hr O_3 NAAQS.

Table A-16. Maximum 1-Hour O_3 Concentrations (ppm)

Year	O_3 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour CAAQS
2008-2009	0.083	0.097	0.081	0.091	0.090
2009-2010	0.085	0.097	0.081	0.101	0.090
2010-2011	0.109	0.130	0.083	0.143	0.090

Note: O_3 was not measured during Years 1-3

Table A-17. Maximum 8-Hour O_3 Concentrations (ppm)

Year	O_3 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	8-hour CAAQS
2008-2009	0.083	0.097	0.081	0.091	0.070
2009-2010	0.063	0.071	0.064	0.062	0.070
2010-2011	0.087	0.076	0.064	0.062	0.070

Note: O_3 was not measured during Years 1-3

Table A-18. Monitoring Year 6 Daily Maximum 1-Hour SO_2 Concentrations (ppm)

Wilmington Community Station		Coastal Boundary Station		San Pedro Community Station		Source Dominated Station	
Date	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**	**Date**	**Conc.**
04/16/11	0.046	06/14/10	0.235	12/03/10	0.042	08/22/10	0.059
12/08/10	0.035	08/11/10	0.032	08/17/10	0.039	01/04/11	0.048
12/10/10	0.033	11/18/10	0.024	11/14/10	0.029	08/23/10	0.046
01/17/11	**0.030(1)**	**11/14/10**	**0.019(1)**	**01/28/11**	**0.027(1)**	**06/02/10**	**0.032(1)**
08/23/10	0.026	12/11/10	0.018	01/16/11	0.019	06/03/10	0.032
12/09/10	0.023	11/13/10	0.016	07/13/10	0.018	04/19/11	0.029
02/05/11	0.021	11/17/10	0.014	07/15/10	0.017	01/16/11	0.028
07/13/10	0.020	12/09/10	0.014	07/16/10	0.017	10/10/10	0.027
07/18/10	0.019	02/24/11	0.013	09/30/10	0.017	04/16/11	0.025
12/03/10	0.019	12/31/10	0.010	11/04/10	0.017	04/28/11	0.025
05/29/10	0.018	12/08/10	0.009	12/08/10	0.017	12/09/10	0.024
08/19/10	0.018	12/28/10	0.009	12/09/10	0.016	04/06/11	0.024
09/25/10	0.018	01/28/11	0.009	08/24/10	0.016	04/12/11	0.024
01/16/11	0.017	02/05/11	0.009	11/03/10	0.015	04/17/11	0.024
02/16/11	0.016	02/10/11	0.009	03/15/11	0.015	04/30/11	0.024
03/02/11	0.016	02/17/11	0.009	11/17/10	0.015	11/06/10	0.023
04/28/11	0.016	03/01/11	0.009	12/10/10	0.014	12/03/10	0.023
09/24/10	0.015	08/23/10	0.008	01/17/11	0.014	02/11/11	0.023

(1) This value represents the 99th percentile of the daily maximum 1-hour concentrations for the current year. This value is used to calculate the 3-year average to determine compliance with the 8-hour SO_2 NAAQS (0.075 ppm).

Table A-19. 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations (ppm)

Year	SO_2 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour NAAQS
2008-2009	0.039	0.040	0.034	0.051	--
2009-2010	0.022	0.023	0.030	0.059	--
2010-2011	0.030	0.019	0.027	0.032	--
Average	**0.030**	**0.027**	**0.030**	**0.047**	**0.075**

Note: The three year average is calculated to determine compliance with the 1-hr SO_2 NAAQS.

Table A-20. Maximum 1-Hour SO_2 Concentrations (ppm)

Year	SO_2 Concentrations (ppm)				
	Wilmington Community Station	Coastal Boundary Station	San Pedro Community Station	Source Dominated Station	1-hour CAAQS
2008-2009	0.050	0.124	0.053	0.067	0.250
2009-2010	0.029	0.040	0.056	0.104	0.250
2010-2011	0.046	0.235	0.042	0.059	0.250

Note: SO_2 was not measured during Years 1-3