San Diego County
Air Pollution
Control District

MONITORING AND TECHNICAL SERVICES

5-Year Air Quality Monitoring Network Assessment 2025

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Monitoring and Technical Services

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Glossary of Terms

CAA	Clean Air Act
CARB	California Air Resources Board
CC	Community-Centered
CFR	Code of Federal Regulations
CHD	Congenital Heart Disease
CO	Carbon Monoxide
COPD	Chronic obstructive pulmonary disease
ED	Emergency Discharge
EPA	Environmental Protection Agency
FEM	Federal Equivalence Method
FRM	Federal Reference Method
GC	Gas Chromatograph
HHSA	Human health services agency
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Monitoring Network
NEI	National Emissions Inventory
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NO_y	Reactive Oxides of Nitrogen
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Stations
Pb	Lead
$PM_{1.0}$	Particulate Matter 1.0 Micrometers
$PM_{2.5}$	Particulate Matter 2.5 Micrometers
PM_{10}	Particulate Matter 10 Micrometers
POE	Point of Entry
SANDAG	San Diego Association of Governments
SDAB	San Diego Air Basin

SO_2	Sulfur Dioxide
TBD	To Be Determined
TPY	Ton per Year
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

1 INTRODUCTION

1.1 Purpose of the Network Assessment

Air monitoring networks are designed to achieve, with the available resources, the best possible scientific data that is used for the protection of public health and the environment. The types of monitors, the number of monitors, and their location needed to achieve this goal depends on factors, including the federal requirements, air quality standards, air pollution levels, demographics, technology (e.g. instrumentation, analyzers), and the budget. In accordance with EPA monitoring regulations, each State and local air pollution control agency must assess its monitoring network every five years to determine the following:

- If the network meets the monitoring objectives defined in Appendix D of the Code of Federal Regulations (CFR) Title 40, Part 58.19.
- Whether new sites are needed.
- Whether existing sites are no longer needed and can be terminated.
- Whether new technologies are appropriate for incorporation into the ambient air monitoring network.

The air monitoring objectives can shift over time, which is one of the major reasons behind the re-evaluation and reconfiguration of many monitoring networks. The alteration of a monitoring network can be initiated for several reasons. These reasons are:

- In response to a change in air quality. Air quality has changed since the adoption of the Clean Air Act (CAA) and the National Ambient Air Quality Standards (NAAQS). For example, the ambient concentrations of lead have dropped radically compared to past levels in the U.S.
- A change in population and behaviors. For example, the U.S. population has grown, aged and shifted toward more urban and suburban areas over the past few decades. In addition, the rates of vehicle ownership and annual miles driven have also risen.
- The establishment of new air quality objectives. New programs and rules are constantly being instituted, including rules that will reduce air pollution.
- The result of an improved understanding of air quality issues, as well as improved monitoring capabilities can be used to design a more effective monitoring network.

As a result of such changes, the San Diego Air Pollution Control District's (District) monitoring network may have unnecessary or redundant monitors, or ineffective and inefficient monitoring locations for some pollutants, while other areas or pollutants may have a lack of monitors. This assessment will assist the District in identifying any potential air monitoring gaps in the network. It will also help optimize the current network to better protect today's population and environment, while maintaining the ability to understand and continue to provide long-term historical air quality trends in the region by providing the best available air monitoring data to our stakeholders (e.g.

scientists, community based organizations, and the general public) to help assess long-term air quality trends in the region.

1.2 Scope of the Network Assessment

The network assessment will be used to evaluate the existing network of monitors to determine if it is providing representative and relevant monitoring data to characterize air quality in high population areas. It will also be used to evaluate whether the existing network serves areas with populations that are susceptible to health effects commonly attributed to poor air quality (e.g., children with asthma). The assessment must show the effects of any proposal to discontinue any sites or monitors on the data users other than the District itself. This includes nearby States and Tribes or organizations conducting studies on health effects.

The objectives for this network assessment are:

- to determine whether the existing network of monitors is meeting the intended monitoring objectives.
- To evaluate the network's adequacy for characterizing current air quality and impacts from future industrial and population growth.
- To identify and discuss potential areas where new monitors can be sited or removed to optimize the air monitoring network and/or to meet new monitoring objectives.

The following questions will be asked throughout this document to help meet the objectives of the network assessment:

- Are the existing sites collectively capable of characterizing all criteria pollutants? Are the existing sites capable of characterizing criteria pollutant trends (spatially and temporally)?
- If not, what are the monitoring gaps identified in this network assessment? If needed, where should new monitors be placed to address these air monitoring gaps?
- Does the existing network support future emissions assessment, reconciliation, and modeling studies? Are there parameters (at existing sites) or new sites that need to be added to support these objectives?
- Is the current monitoring network sufficient to adequately assess local air quality conditions with respect to all criteria pollutants? If not, where should monitors be relocated or added to improve the overall effectiveness of the monitoring network? How can the effectiveness of the monitoring network be maximized?

The EPA has set National Ambient Air Quality Standards (NAAQS) for common air pollutants, which are called criteria pollutants. These pollutants are known to cause health effects and harm the environment. This network assessment details the current monitoring network in the San Diego Air Basin (SDAB) for each of the criteria pollutants. The criteria pollutants are listed below:

- Ozone (O_3)
- Fine Particulate Matter 2.5 micrometers and less in diameter ($PM_{2.5}$)

- Particulate Matter 10 micrometers and less in diameter (PM_{10})
- Nitrogen Dioxide (NO_2)
- Carbon Monoxide (CO)
- Sulfur Dioxide (SO_2)
- Lead (Pb)

This network assessment will discuss each criteria pollutant individually. The District also measures additional compounds, including reactive oxides of Nitrogen (NOy), and PAMS parameters [carbonyls and Volatile Organic Compounds (VOCs)].

1.2.1 Scoring Overview

The scoring used in this Network Assessment is discussed below. A score is given for Health Data, Area Served and Population, a Correlation Matrix, and the Removal Bias. For Ozone and PM2.5 a score is given for EJ Index and Exceedance Probability.

1.2.2 Health Data

To rank stations based on health data, the previous seven years of health data from San Diego County Health and Human Services Agency was utilized for the following three maladies: asthma, congenital heart disease (CHD), and chronic obstructive pulmonary disease (COPD). These maladies were chosen due to the well documented correlation between rates of these conditions and air pollution.

Within the HHSA data there are three rates for each malady divided by region within San Diego County: Deaths per capita (of 100,000 people), hospitalizations per capita, and emergency department (ED) discharges per capita. Hospitalizations are defined as when a patient receives active but short-term treatment for severe injury or episode of illness, an urgent medical conditions, or during recovery from surgery. Meanwhile, ED discharges are defined as when a patient is discharged from an emergency hospital.

Scoring occurs by assigning a score to each outcome (death, hospitalization, ED discharge) for each malady within that region. The outcome rates within each region for a single malady are compared to each other and a score is assigned. The highest rate out of all regions for a malady present in the data set is given the highest points allotted (5) and the other regions are normalized to that value. Using this system, we find that a median rate would be given a 3, and a low rate would be given 1. The result gives us a score for every region in San Diego County for the deaths, hospitalizations, and ED discharges for each malady

1.2.3 Area Served and Population

Area served is one of the criteria reported by the EPA's NetAssess 2025. This tool estimates the boundaries between monitoring stations and calculates the area and population served by each

monitoring station for a specific pollutant. For simplicity, utilization of population within an area served will be used as it provides a better metric to grade stations on, as there may be stations with large areas but relatively low populations.

For each pollutant, the highest population station is given the full number of points (10). Each other station is normalized to most populated station area. A score of 5 will be a moderately populated station area, while a score of 1 will be sparsely populated. Note that each station has different pollutants being measured altering area/population served values for each pollutant. Due to this, the population can be different between pollutants since the area served can be higher or lower based from the amount of analyzers deployed throughout the network.

1.2.4 Correlation Matrix

The correlation matrix is one of the criteria reported by the EPA's NetAssess 2025. This tool calculates mean absolute differences and correlation between the different sites within the network. In short, absolute difference compares the concentrations of pollutants between the different sites, while correlation utilizes a statistical method to determine similarity. Since it will be easier to normalize the mean absolute difference rather than correlation, for simplicity, the scoring only considers mean absolute difference.

For each pollutant, the mean absolute difference across all stations is averaged. Correlation is different from the other NetAssess tools as this analysis provides a scale which is used to assign points. The highest value which denotes a unique station when compared to other stations, is given full points (10), but other stations are not normalized to this value. Instead, the scale provided by the tool is simply used. A moderately similar station in reference to other stations is given 5 points, while a very similar station in reference to other stations is given 1 point. Note that each pollutant has a different unit and incremental amount of measurement when determining mean absolute difference. This is due to the different expected concentrations and units for each pollutant.

1.2.5 Removal Bias

Removal bias is one of the criteria reported by the EPA's NetAssess 2025. This tool calculates how biased a pollutant concentration at a site will be, should that site concentration need to be estimated from neighbouring monitoring sites. For example, if a high concentration site is surrounded by low concentration sites and the high concentration site is removed, the estimated concentration will be not accurate and biased low since the other sites are used to estimate a value for the removed site.

For each pollutant, the mean removal bias was compared to other stations. The highest absolute mean removal bias station is given full points (10) while each other station is normalized to this station value. A score of 5 will indicate significant removal bias and a score of 1 will indicate little to no bias. Note that bias can occur in both a positive bias and a negative bias. In the rating, the absolute values of the mean removal bias are utilized so the scoring does not indicate the different types of bias, only the magnitude of that bias. To determine the type of bias, refer to the removal bias map or data that is found within each pollutant section.

1.2.6 Community-Centered Environmental Protection Index

The community-centered (CC) index is one of the criteria reported by the EPA's NetAssess 2025. This tool calculates and maps areas with a high environmental impact and high exposures to pollution. To address Community-Centered Environmental Protection Needs, the District has established a Community Air Monitoring Program.

This index only pertains to $PM_{2.5}$ and Ozone. For these pollutants, the highest CC index is given full points (10) indicating high concern, while each other station is normalized to this station value. A score of 5 will indicate moderate concern, while a score of 1 will indicate little or no concern.

1.2.7 Exceedance Probabilities (Ozone and $PM_{2.5}$)

The exceedance probabilities is one of the criteria reported by the EPA's NetAssess2025. This tool calculates the probability each station will exceed the Federal limit put forth by EPA for ozone and $PM_{2.5}$.

For these two pollutants, the scale given is 0% to 100%. Should a station be at 100% probability for exceeding the Federal limit, this station will receive the highest score of 10 points. Should a station have a 0% probability for exceeding the Federal limit, that station will receive 1 point.

2 EXECUTIVE SUMMARY

2.1 Introduction

The San Diego County Air Pollution Control District (District) is required by the U.S. Environmental Protection Agency (EPA) to complete a Network Assessment of its air monitoring network every five years. This latest assessment fulfills this requirement for 2025. This Network Assessment is also available to the public for review.

The Network Assessment documents the current status of the District's air monitoring network, and whether the network is properly designed to adequately measure the air pollution that the residents of San Diego County are exposed to on a daily basis. This Executive Summary gives the reader an introduction to the document and its findings. For detailed information, the reader is encouraged to explore the entire document.

2.2 Results of the Scoring of the San Diego County Air Monitoring Network Assessment

The District established a system to score the various parameters provided by the 2025 EPA Network Assessment tool, in addition to additional parameters, including population and health data. The resulting scores are used to inform the District of potential changes to the air monitoring network, if any are needed. These results are shown in **Table 2.1** below.

Table 2-1: Summary of the San Diego County Air Monitoring Network Assessment Scoring

	TOTAL SCORE	O_3 Scoring	NOx Scoring	CO Scoring	SO_2 Scoring	Pb Scoring	$PM_{2.5}$ Scoring	PM_{10} Scoring	Health Risk Scoring
Alpine (ALP)	**122**	39	18	N/A	N/A	N/A	16	10	39
Camp Pendleton (CMP)	**115**	24	21	N/A	N/A	N/A	35	13	22
Palomar Airport (CRQ)	**N/A**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chula Vista (CVA)	**112**	24	11	N/A	N/A	N/A	35	13	29
Donovan (DVN)	**112**	20	10	N/A	N/A	N/A	36	17	29
San Diego-Kearny Villa Rd. (KVR)	**106**	28	16	N/A	N/A	N/A	31	10	21
Lexington Elementary School (LES)	**139**	26	14	19	N/A	N/A	29	12	39
Rancho Carmel Dr. (RCD)	**118**	N/A	25	20	N/A	N/A	31	14	28
San Ysidro (SAY)	**115**	N/A	12	21	N/A	N/A	42	11	29
Sherman Elementary School (SES)	**121**	28	18	N/A	N/A	N/A	33	11	31
Total Points Possible	**235**	50	30	30	0	0	50	30	45

2.3 Site Discussion and Recommendations

This section will discuss instrumentation and sampler changes, site relocations, site renovations, site additions, and any gaps in monitoring that are identified. In addition, a summary for each of the District's current sites are provided. This section will address whether any monitors or stations are considered redundant in the District's Regional Air Monitoring Network. Also, if any air monitoring gaps are identified, we will discuss possible scenarios to help fill in these gaps. This includes adding a new monitoring location and monitors. This can include new technology that is available to improve the District's monitoring needs. In addition, we will discuss whether air pollution modeling is an option to extrapolate data to help fill in air monitoring gaps. Finally, we will also address whether a monitor or site is still valid for the air quality purpose that the monitor or site was originally designed to meet.

2.3.1 Site Instrument and Sampler Changes

Within 2022, the District began the transition from manual filter based particulate matter monitoring ($PM_{2.5}$ and PM_{10}) to continuous particulate matter monitors that detect $PM_{2.5}$ and PM_{10}. At this time the District utilizes one required manual filter based particulate matter sampler.

In quarter 4 of 2023, the District established the second near-road monitoring site in San Ysidro. This site has been fitted with a continuous particulate matter monitor detecting both $PM_{2.5}$ and PM_{10}, a nitrogen dioxide monitor, and a carbon monoxide monitor.

2.3.2 Site Relocations or Renovations

In quarter 2 of 2025, Chula Vista (CVA) monitoring site began renovations. A completion date is expected to be in the summer of 2025.. The District also plans to relocate the Camp Pendleton (CMP) site. This relocation date of the site has yet to be determined.

2.3.3 Potential Site Additions

The District is currently seeking a location for a monitoring site in Escondido. This site is planned to contain a continuous particulate matter monitor ($PM_{2.5}$ and PM_{10}), an ozone monitor, and a nitrogen dioxide monitor.

2.3.4 Identified Gaps of Coverage

There is currently a gap of ozone monitoring in the north inland region of the District. This gap will be filled once the proposed Escondido site is operational. The timeline for this expansion of monitoring is to be determined.

2.4 Summary of Site Discussion and Recommendations

2.4.1 Alpine

The area of Alpine has the highest ozone concentrations in San Diego County. This correlates to the highest ozone score within this assessment. When considering maladies reported by San Diego County Health and Human Services Agency, the eastern region which contains Alpine, has the highest health risk within the County. The Alpine site also serves as an EPA required design value for ozone. A design value is a statistic that describes the air quality status of a given location relative to the level of the National Ambient Air Quality Standards (NAAQS). The Alpine Site serves as an important monitoring station for those in East County, but also the monitoring District as a whole.

2.4.2 Camp Pendleton

Camp Pendleton is the only air monitoring site within the North Coastal region of San Diego County and the data from the monitors at this site provides valuable information regarding the transport of pollution from the Los Angeles region. This being established; Camp Pendleton is important to preventing a gap within the air monitoring network. In terms of assessment scoring, the Camp Pendleton site has relatively average scores within each pollutant.

2.4.3 Chula Vista

Chula Vista is one of three sites found within the Southern region of San Diego County. It is one of the District's longest running sites. In addition to the criteria pollutant monitoring, the site also hosts samplers used for the California Air Resources Board (CARB) Toxic Air Contaminants monitoring. It should also be noted that pollutant concentrations within Chula Vista are highly correlated to the nearby site of Sherman Elementary found North of this site. Within assessment scoring, we find that most pollutants are below average in score aside from $PM_{2.5}$. Within the southern region with help from the central region monitoring sites, the monitoring network is robust enough to likely allowing for no gaps to occur should Chula Vista monitoring should stop. Historically, the site was established to monitor emissions from a power station that was located two miles southwest from the monitoring station. The power station was discontinued in 2010 and demolished in 2013. The District is planning to update the station and deck at Chula Vista in Quarter 2 of 2025 and has no plans to discontinue monitoring at this location.

2.4.4 Donovan – Otay Mesa

Donovan is one of three sites found within the Southern region of San Diego County. Donovan serves an area designated near the District's International Border Community. Donovan also serves the special purpose of quantifying border pollutant concentrations. Pollutant scores besides particulate matter (both $PM_{2.5}$ and PM_{10}) trend lower. Particulate matter scores are higher than average.

2.4.5 Kearny Villa Road

Kearny Villa Rd. is the only site located in the North Central region of San Diego County. This being established; the Kearny Villa Rd. site is important to preventing a gap within the air monitoring network. The area around this site is one of the most populous within the County leading to a high area served score within the pollutant scoring calculations. As for the pollutant scoring themselves, this site has lower scores than other sites on average.

2.4.6 Lexington Elementary School

The Lexington Elementary School site is in the city of El Cajon within the Eastern region of San Diego County along with the Alpine site. When considering maladies reported by San Diego County Health and Human Services Agency, the eastern region which contains the Lexington Elementary School site, has the highest health risk within the county. Although pollutant scores trend along the average score for each pollutant, this site has the most diverse set of monitoring equipment, some of which is mandated by Federal and State programs. Programs include, the Photochemical Assessment Monitoring Stations (PAMS), National Core Monitoring Network (NCore), and California Air Resources Board Toxics Air Contaminants Program. This being established; the scoring of this site reflects the importance of the Lexington Elementary School site, since it is the highest scorer within the assessment.

2.4.7 Palomar Airport

The Palomar Airport site is unique from all other sites in the air monitoring network since this site only monitors lead concentrations emitted by air travel and is part of the EPA Airport Lead Study. A scoring assessment was not done on this site due to only having one measured pollutant.

2.4.8 Rancho Carmel Drive

The Rancho Carmel Drive site is a near-road site located in the North Inland region of San Diego County. It is the only monitoring site in this region making it important to the completion of the air monitoring network. This station is not equipped with ozone monitoring which this region lacks, so another proposed site (Escondido) would cover this pollutant gap. In general, the pollutants trend around average aside from NO_x, which is the highest score within the assessment for this pollutant by a significant amount.

2.4.9 San Ysidro

The San Ysidro site is the District's second near-road site and is located along the Mexico-US border in the southern region of San Diego County. The San Ysidro site serves an important purpose of quantifying pollution from highway traffic off Interstate 5 near the Port of Entry. This site has the highest score for $PM_{2.5}$ for almost all criteria except area served. This leads to highest $PM_{2.5}$ score by far within the network. Other pollutants trend around average within the site.

2.4.10 Sherman Elementary School

The Sherman Elementary School site is the only site found within the central region of San Diego County making it important for the completion of the air monitoring network. This station also serves as a Community Air Monitoring Program site. Pollutant scores trend around the average for each pollutant.

2.5 Summary of Coverage Gaps in Network

2.5.1 North Inland Coverage Gap

The District has identified a gap of monitoring in the north inland region of the District which is represented in **Figure 2-1**. More specifically, ozone is currently not being monitoring in this region which is problematic since exceedance probability of the EPA limit for ozone is high in this area. This gap will be filled once the proposed Escondido site is operational. The timeline for this expansion of monitoring is to be determined.

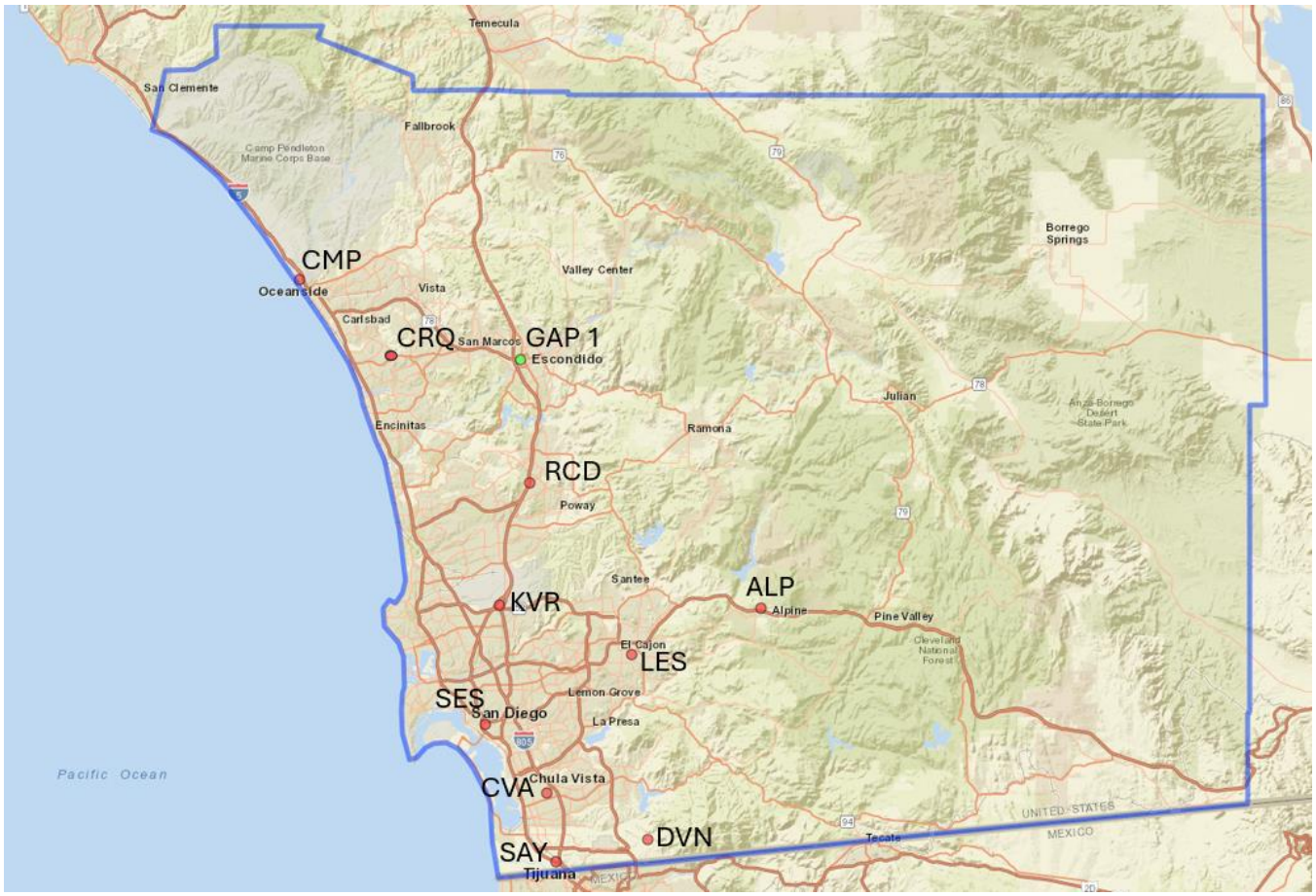


Figure 2-1: District Monitoring Gap Location

2.5.2 Additional Monitoring Considerations

In previous Network Assessments, the District identified additional gaps in coverage within the District. These additional spots proposed monitoring in areas including the Coastal North County, the East County, Mid-County, and the Southeast County. The District expanded coverage in the South region with the addition of the San Ysidro site. In addition, the District established a separate Community Air Monitoring group to address the specific needs of the community. This includes the Portside Community and the International Border Community. Additional information can be found on the District's website for the Community Air Monitoring Program. Depending on future funding, the District will seek options to implement portable monitoring enclosures in areas that may require additional criteria pollutant monitoring or for special monitoring projects.

3 Overview of the Regional Monitoring Network

3.1 San Diego Air Basin Description

San Diego County lies in the southwest corner of California, has an area of 4,526 square miles, and encompasses the San Diego Air Basin (SDAB) and includes part of the Salton Sea Air Basin. Most of the County's population and pollutant emissions are concentrated in the western portion of the County in the SDAB, which extends to the mountains in the near east. The topography in the SDAB, along with local meteorology, influences the pollutants in the basin. San Diego County also shares an international border with Mexico. The neighboring city of Tijuana forms a binational airshed with San Diego. The Air Pollution Control District has air monitoring stations set-up throughout the SDAB to monitor these pollutants.

3.2 San Diego Topography

The topography of San Diego County is highly diverse and comprises of coastal plains, lagoons, flatlands, mesas, broad valleys, canyons, foothills, mountains, and deserts. Generally, building structures are on the flatlands, mesas, and valleys, while the canyons and foothills tend to be sparsely developed. This segmentation is what has carved the region into a conglomeration of separate cities and communities that led to low density housing and an automobile-centric environment.

To the west of San Diego are the beaches and the Pacific Ocean, to the south is Tijuana, Mexico and the Baja California Peninsula, to the near east are the mountains, to the far east is the desert (the Salton Sea Air Basin), and to the north is the South Coast Air Basin (the greater Los Angeles-Riverside-San Bernardino area/Air Basin).

3.3 San Diego Climate

The climate is classified as Mediterranean, but it is diverse because of the topography. The climate is dominated by the Pacific High-pressure system that results in mild, dry summers and mild, wet winters. San Diego experiences over 150 days above 70°F and 8 inches to 12 inches of rainfall annually (mostly, November – March). El Niño and La Niña patterns have large effects on the annual rainfall received in San Diego.

An El Niño is a warming of the surface waters of the eastern Pacific Ocean. It is a climate pattern that occurs across the tropical Pacific Ocean that is associated with drastic weather occurrences, including enhanced rainfall in Southern California. La Niña is a term for cooler than normal sea surface temperatures across the Eastern Pacific Ocean. San Diego receives less than normal rainfall during La Niña years.

The Pacific High-pressure system drives the prevailing winds in the SDAB. The wind tends to blow onshore in the daytime and offshore at night. In the summer, an inversion layer is created over the coastal areas and increases the O_3 levels. In the winter, San Diego often experiences a shallow

inversion layer which tends to increase carbon monoxide and $PM_{2.5}$ concentration levels due to the increased use of residential wood burning.

In the fall months, the SDAB is often impacted by Santa Ana winds. These winds are the result of a high-pressure system over the Nevada-Utah region that overcomes the westerly wind pattern and forces hot, dry winds from the east to the Pacific Ocean. These powerful winds tend to blow the air basin's pollutants out to sea. However, a weak Santa Ana can transport air pollution from the South Coast Air Basin and greatly increase the San Diego ozone concentrations. A strong Santa Ana also primes the vegetation for firestorm conditions.

3.4 Population

According to the official 2020 U.S. census, the population for San Diego County is 3.3 million. Additional data on Population in cities and communities within San Diego County is provided in **Chapter 4**.

3.5 Criteria Pollutants

The EPA has set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, which are called criteria pollutants. These pollutants are known to cause health effects and harm the environment. **Table 3-1** lists the pollutants and the National Ambient Air Quality Standards (NAAQS) for each of the six criteria pollutants (NAAQS Table | US EPA). It is the role of the San Diego County APCD to measure for these criteria pollutants. In addition, the EPA requires that the San Diego County APCD operates additional monitoring programs (see **Table 3-2**).

Table 3-1: National Ambient Air Quality Standards (NAAQS) - CFR Part 50 NAAQS Table | US EPA

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
Particulate Pollution (PM)	**$PM_{2.5}$**	primary	1 year	9.0 µg/m^3	Annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	1 year	10 ppb	Annual mean averaged over 3 years

Table 3-2: Monitoring Programs in the San Diego Regional Air Monitoring Network

San Diego APCD Monitoring Programs
Criteria Pollutant Monitoring
National Core (NCore)
Near-road
Photochemical Assessment Monitoring Stations (PAMS)
Chemical Speciation Network (CSN)
Border 2025
Special Purpose Monitoring (SPM)

3.6 Regional Monitoring Network Design Requirements

The EPA regulations specify the minimum number of sites at which State and Local air agencies must deploy monitors to measure the criteria pollutants. The State and Local agencies generally find they need to deploy more monitors than are minimally required to fulfill State and Local purposes for monitoring. For example, often California air quality standards are more stringent than National standards, so many areas need more monitors than required by the EPA to show compliance with both State and National standards.

For pollutants monitoring, the minimum requirements for the number of monitors are stated in the Code of Federal Regulations (CFR), Title 40 Part58, Appendix D "Network Design Criteria for Ambient Air Quality Monitoring". Each pollutant or monitoring program has different requirements for determining the minimum number of monitors needed for a Metropolitan Statistical Area (MSA) and the requirements can change yearly. MSA population numbers used to determine monitoring requirements are taken from the latest U.S. Census.

The U.S. EPA regulations specify the minimum number of samplers and monitors (also referred to as analyzers) needed for monitoring each pollutant, including those required for collocation. For additional information, refer to the specific pollutants' chapter.

3.7 Overview of the Regional Monitoring Network

The District operates ten (10) monitoring sites that collects criteria air pollution data. The sites are listed in **Table 3-3** and shown in **Figure 3-1**. The District's monitoring network has been designed to provide criteria pollutant monitoring coverage to the majority of the inhabited regions of the County. The criteria pollutants include the following: ozone (O_3), Fine particulate matter 2.5 micrometers and less in diameter ($PM_{2.5}$), particulate matter 10 micrometers and less in diameter (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb).

The District also measures additional compounds, including reactive oxides of nitrogen (NO_y), and PAMS parameters [carbonyls, and Volatile Organic Compounds (VOCs)]. Monitoring for meteorological parameters is also conducted at most monitoring locations. Data for all the pollutants are used to help understand the nature of the ambient air quality in San Diego County,

as well as to inform the public regarding the quality of the air they breathe. Not all pollutants are monitored at all sites, but most sites monitor for multiple pollutants. A particular site's location and monitoring purpose determine the actual pollutants measured at that site.

The purpose of air monitoring is to identify the areas where pollutant levels exceed the ambient air quality standards and areas where those standards are not exceeded. Health-based ambient air quality standards are set at levels that preclude adverse impacts to human health (allowing for a margin of safety). The District develops strategies and regulations to achieve the emission reductions necessary to meet all health-based standards. Data from the ambient monitoring network is then used to indicate the success of the regulations and control strategies in terms of the rate of progress towards attaining the standards or to demonstrate that standards have been attained and maintained.

Table 3-3: List of Network Sites and Locations

Station Name	Station Abbreviation	Address	Latitude/ Longitude	AQS ID
Alpine-Padre Dam	ALP	2300 W. Victoria Dr.	32.842312° -116.768277°	06-073-1006
Camp Pendleton	CMP	21441 W. B St.	33.217020° -117.396179°	06-073-1008
Chula Vista	CVA	84 E. J St.	32.631243° -117.059086°	06-073-0001
Otay Mesa – Donovan	DVN	480 Alta Rd.	32.578162° -116.921388°	06-073-1014
Escondido*	ESC	TBD	-----	06-073-1002
Kearny Villa Rd.	KVR	6125A Kearny Villa Rd.	32.845713° -117.123979°	06-073-1016
Lexington Elementary School	LES	533 S. First St.	32.789569° -116.944308°	06-073-1022
McClellan-Palomar Airport	CRQ	2192 Palomar Airport Rd.	33.130898° -117.272392°	06-073-1023
Rancho Carmel Dr. (1st Near-road Site)	RCD	11403 Rancho Carmel Dr.	32.985428° -117.082213°	06-073-1017
San Ysidro (2nd Near-road Site)	SAY	198 W. San Ysidro Blvd.	32.552809° -117.047328°	06-073-1025
Sherman Elementary School	SES	450B 24th St.	32.710177° -117.142665°	06-073-1026

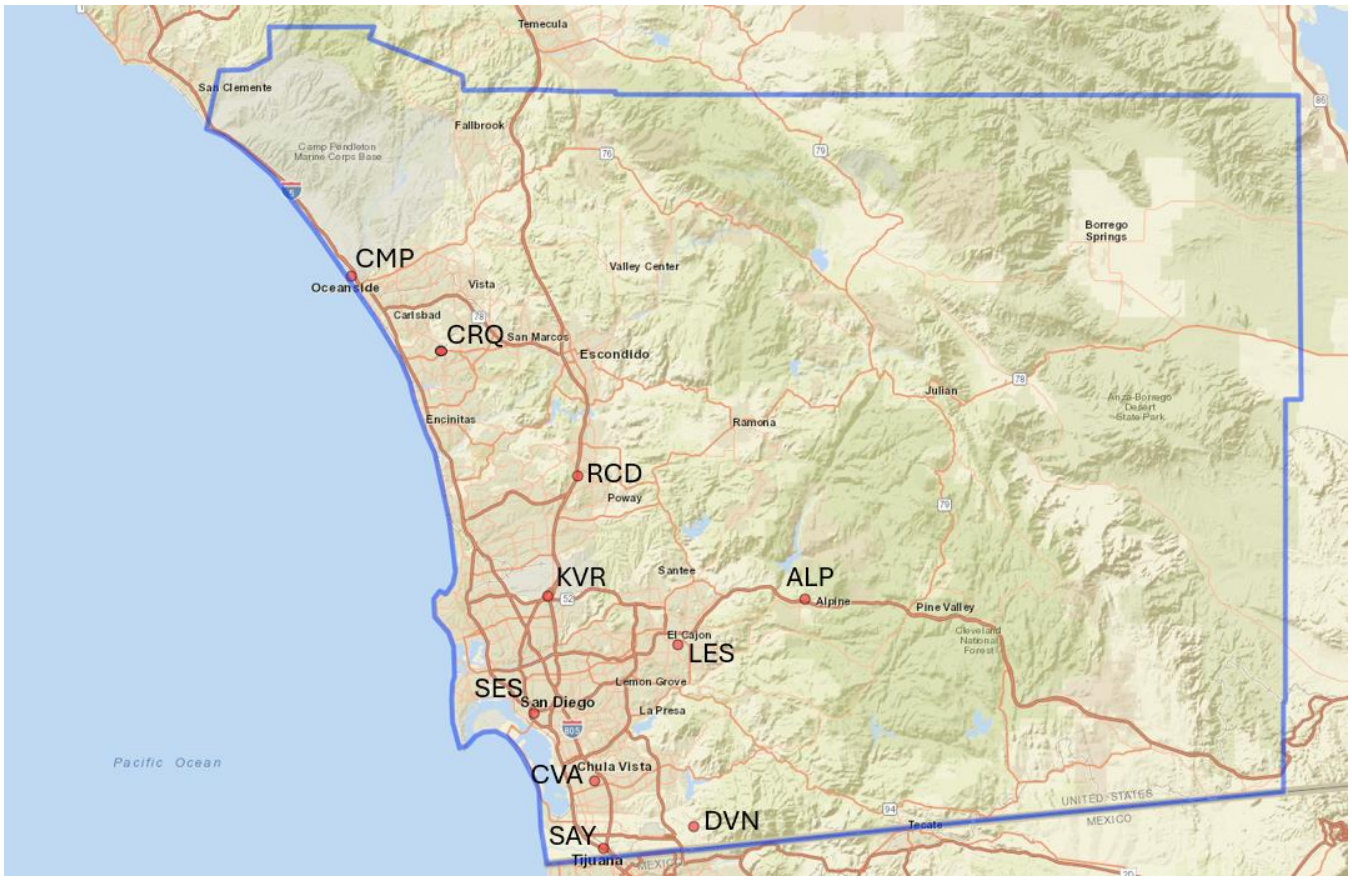


Figure 3-1: Monitoring Site Map

3.7.1 Monitoring Site Set-up and Logistics

The District must meet the requirements for the Network Design as stated in the CFR (Title 40, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", as stated in the section above. In addition, each site undergoes a site evaluation annually to confirm that the site meets the requirements. This includes shifts in population, distances to roadways, and obstructions or obstacles. In addition, the shelter, deck, and stairs are evaluated to determine if any upgrades are needed. The site location is evaluated to determine if another nearby location will better serve monitoring needs. The logistics involved in establishing a new site include the proximity to headquarters, access to the proposed site, safety, security, and availability of electrical power, and communications. The District must also ensure the site is suitable to place a monitoring station, including concrete pads, platforms, and gravel or paved roads for access. The District does not own any of the land where monitoring sites are installed. Therefore, the cost of leasing the site must also be factored into costs. The District must also budget for staffing the monitoring programs.

3.7.2 Changes in the Regional Monitoring Network since 2020 Network Assessment

Since the last Network Assessment in 2020, the District has started operating a second monitoring site in San Ysidro for the Near-road program (first Near-road monitoring site is the Rancho Carmel Drive site). This site monitors nitrogen dioxide, carbon monoxide, and particulate matter ($PM_{2.5}$ and PM_{10}).

3.7.3 Future Changes in the Regional Monitoring Network

The District will seek a new site for the regional monitoring program in Escondido. There is currently no expected start date for this project. The District will monitor nitrogen dioxide, ozone, and particulate matter ($PM_{2.5}$ and PM_{10}). The District is upgrading and remodeling the existing Chula Vista site to add a new trailer and wooden deck for samplers. The District will also seek a new site to relocate the Camp Pendleton monitoring site to nearby Oceanside.

4 POPULATION TRENDS

4.1 Population Trends of San Diego County

The District's regional monitoring network has evolved to its current state based on several factors, including population. The population for San Diego County is 3.3 million according to the 2020 U.S. Census. The monitoring stations are typically situated in communities of high population. **Table 4-1** lists the population from different communities in the county according to the 2020 U.S. census and the most recent population estimates according to the San Diego Association of Governments (SANDAG). The District uses population counts to assess where stations should be located to best serve the communities' air monitoring needs and provide representative air quality data. According to the population data, there is a slight decrease in the estimated population for 2023 in most communities compared to the 2020 census data.

Table 4-1: San Diego County Population Trends

Census Population Data						
City/Community	2010	2020	2021	2022	2023	Trend (%)
Carlsbad	105,328	114,737	114,964	114,275	113,495	-0.32
Chula Vista	243,916	275,499	275,774	274,823	274,333	-0.14
Coronado	18,912	20,196	19,046	18,360	18,437	-5.87
Del Mar	4,161	3,950	3,913	3,883	3,867	-1.18
El Cajon	99,478	106,187	105,198	104,042	102,991	-1.49
Encinitas	59,518	62,001	61,740	61,281	60,841	-0.86
Escondido	143,911	151,077	150,169	149,034	148,122	-0.98
Imperial Beach	26,324	26,131	25,907	25,675	25,458	-1.29
La Mesa	57,065	61,118	60,836	60,605	60,537	-0.56
Lemon Grove	25,320	27,631	27,388	27,353	27,569	-0.53
National City	58,582	56,163	55,794	55,769	55,236	-0.75
Oceanside	167,086	174,059	172,916	171,408	170,020	-1.13
Poway	47,811	48,836	48,526	48,267	48,051	-0.85
Escondido	143,911	151,077	150,169	149,034	148,122	-0.98
Imperial Beach	26,324	26,131	25,907	25,675	25,458	-1.29
La Mesa	57,065	61,118	60,836	60,605	60,537	-0.56
Lemon Grove	25,320	27,631	27,388	27,353	27,569	-0.53
National City	58,582	56,163	55,794	55,769	55,236	-0.75
Oceanside	167,086	174,059	172,916	171,408	170,020	-1.13
Poway	47,811	48,836	48,526	48,267	48,051	-0.85
San Diego	1,307,402	1,386,972	1,376,142	1,387,378	1,388,320	-0.16
San Marcos	83,781	94,861	93,263	93,895	94,188	-0.85
Santee	53,413	60,047	59,176	59,172	59,478	-0.96
Solana Beach	12,867	12940	12820	12721	12675	-1.17
Vista	93,834	98,411	98,942	98,881	98,344	0.23
SANDAG Population Data						
City/Community	2010	2020	2021	2022	2023	Trend (%)
Alpine	17,132	18,305	18,403	18,385	18,575	0.61
Barrio Logan	3,885	3,891	3,865	3,796	3,824	-1.21
Kearny Mesa	6,147	10,635	10,800	11,476	11,458	4.30
Otay	7,621	7,957	6,970	6,778	6,668	-10.86
Otay Mesa	14,941	18,045	17,784	18,274	19,285	1.67
San Ysidro	28,068	26,817	26,413	25,625	25,563	-2.66
Tierrasanta	30,252	30,310	30,058	29,522	29,459	-1.56

Unincorporated	486,604	518,018	513,021	510,986	511,223	-0.91
Regional (overall)	3,095,314	3,298,634	3,286,880	3,278,730	3,290,423	-0.30

4.2 Population and Communities

The District uses data provided from other County agencies and other databases including the U.S. Census and SANDAG for the Network Assessment. **Figure 4-1** below is from the County of San Diego and it shows the most densely populated regions in the County (2023 Region and SRA Demographic Profiles | Tableau Public). The more densely populated areas are also areas where the District has set up a regional air monitoring site. The District has a monitoring site in Camp Pendleton in the north coastal area and the Alpine site in the East region of the County. The District's additional sites are dispersed in areas with a higher population density.

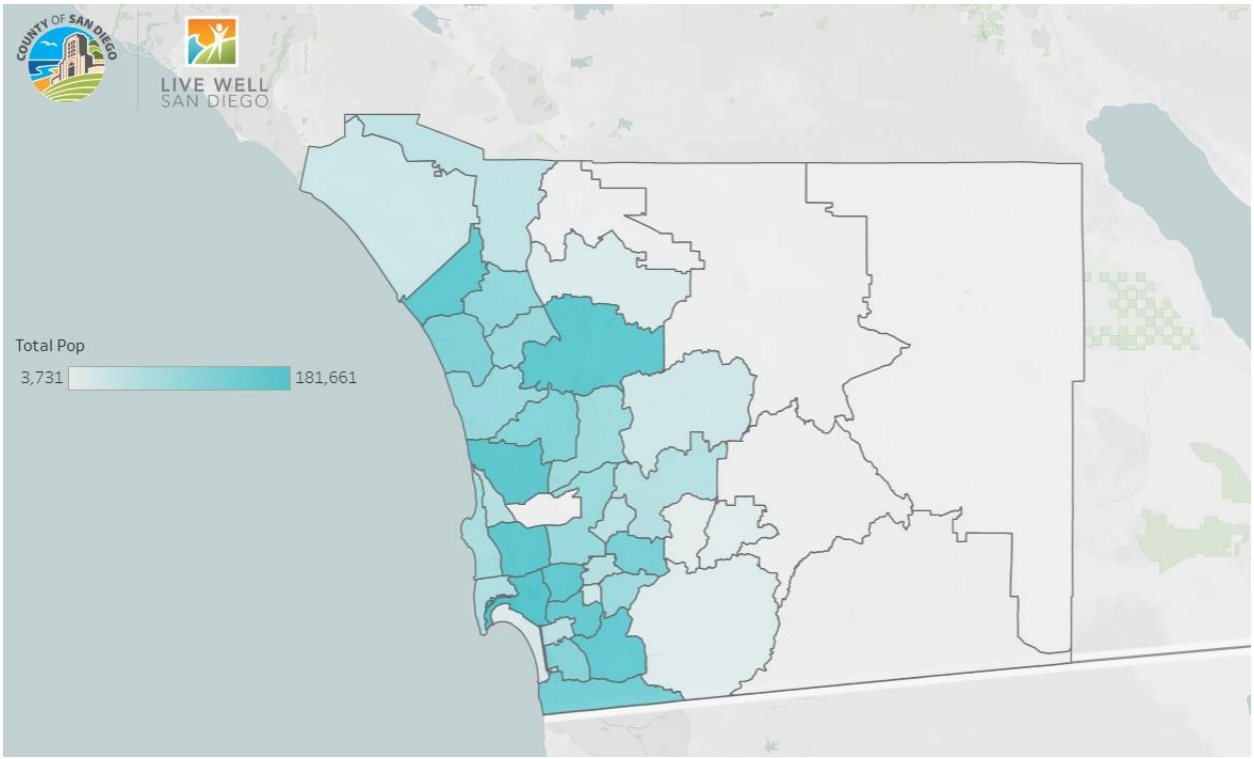


Figure 4-1: Regional and Subregional (SRA) Demographic Profile Map (2018 to 2022) from the County of San Diego

4.3 Network Design Studies – History

The siting of the District's existing regional monitoring sites is based on many factors, which have been discussed in previous chapters. These include federal and state requirements, population trends, distances to roadways, obstructions, and the logistics of deploying a shelter, in addition to other considerations. Many of the District's sites have had a presence in communities over the years. In addition, as new monitoring programs are required, the District works closely with the

Environmental Protection Agency to help identify representative sites for the specific program (e.g., Near-road monitoring program).

In addition, the District has conducted studies in the past throughout the SDAB to confirm that locations used for monitoring the criteria pollutants provide adequate coverage for the network. These studies have helped with designing the regional monitoring network and site selection to provide representative air pollution data.

The community of Alpine, located in the foothills east of San Diego, is a site that traditionally records the highest ozone readings in the network. This is attributed to the location downwind of the populated areas of the County and the topography. In 1989, the District conducted an ozone study in the town of Descanso at a Caltrans maintenance facility off State Route 80 to compare with measurements in Alpine. The ozone concentration recorded at the Descanso location were the same as those recorded at the Alpine site but with a one to two hour time lag in the ozone concentration readings depending upon the weather conditions. Because the concentration values at the Descanso site were similar to the concentration values at the Alpine site, the District discontinued the study.

The District also performed an ozone study in the community of Ramona. The city of Ramona is approximately 20 miles northwest of Alpine and 15 miles east-southeast of Escondido. It is also mid-elevation between the Escondido and Alpine locations. The values recorded in the Ramona study were the average values between Alpine and Escondido. Because the values at the Ramona location could be interpolated between the Alpine and Escondido monitors, the Ramona location was discontinued, and no further monitoring was conducted.

Additional studies were performed to determine if the District needed to increase monitoring within the network. Such studies were conducted in Chollas Heights (five miles northeast of the Downtown location and 10 miles southwest of the El Cajon location) and the northern area of downtown San Diego (2.5 miles north of the current Downtown station location). Both locations showed equivalent numbers to the Downtown San Diego (south) monitor; therefore, the studies were discontinued, and no further monitoring was performed.

Lastly, a study was performed to determine if the District needed to expand the network along the southwest quadrant of the air basin. An ozone monitor was placed in the community of Imperial Beach, approximately 15 miles southwest of the old Downtown San Diego monitor. The numbers collected there directly coincided with the values collected at the old Downtown San Diego monitor location; therefore, the study was discontinued, and no further monitoring was performed.

Some stations have relocated within a community or city due to tenancy issues, such as redevelopment or lease expiration. Often, the District is able to relocate a site to a nearby community with representative air pollution data. Similarly, the District is currently seeking a new monitoring site in Escondido. Monitoring at the District's site in Escondido was suspended due to redevelopment of the original site. The site in Escondido will provide air monitoring data for the North Inland region of the County.

4.4 Network Station Rating Based on Population

The population of each station is factored in the Network Assessment Tool used for each pollutant in the following chapters. For each pollutant the site has a corresponding population served count within a given area. Refer to pollutant chapters for the population rating.

5 HEALTH STATISTICS

5.1 Health Statistics for the County and Health Risk Summary

The County Department of Health and Human Services (HHSA) breaks down health statistics by region (**Figure 5-1,** Regional & Community Data). A myriad of health statistics will be detailed and discussed in this chapter. For the purposes of the Network Assessment, weight will be given to those health issues more closely associated with air pollution: asthma, heart disease, and chronic obstructive pulmonary disease (COPD). Other maladies like cancer, neurological, and low birth weight issues, are not included in this section. In **Table 5-1**, we find the average of reported rates over a span of 7 years (2016 to 2022).

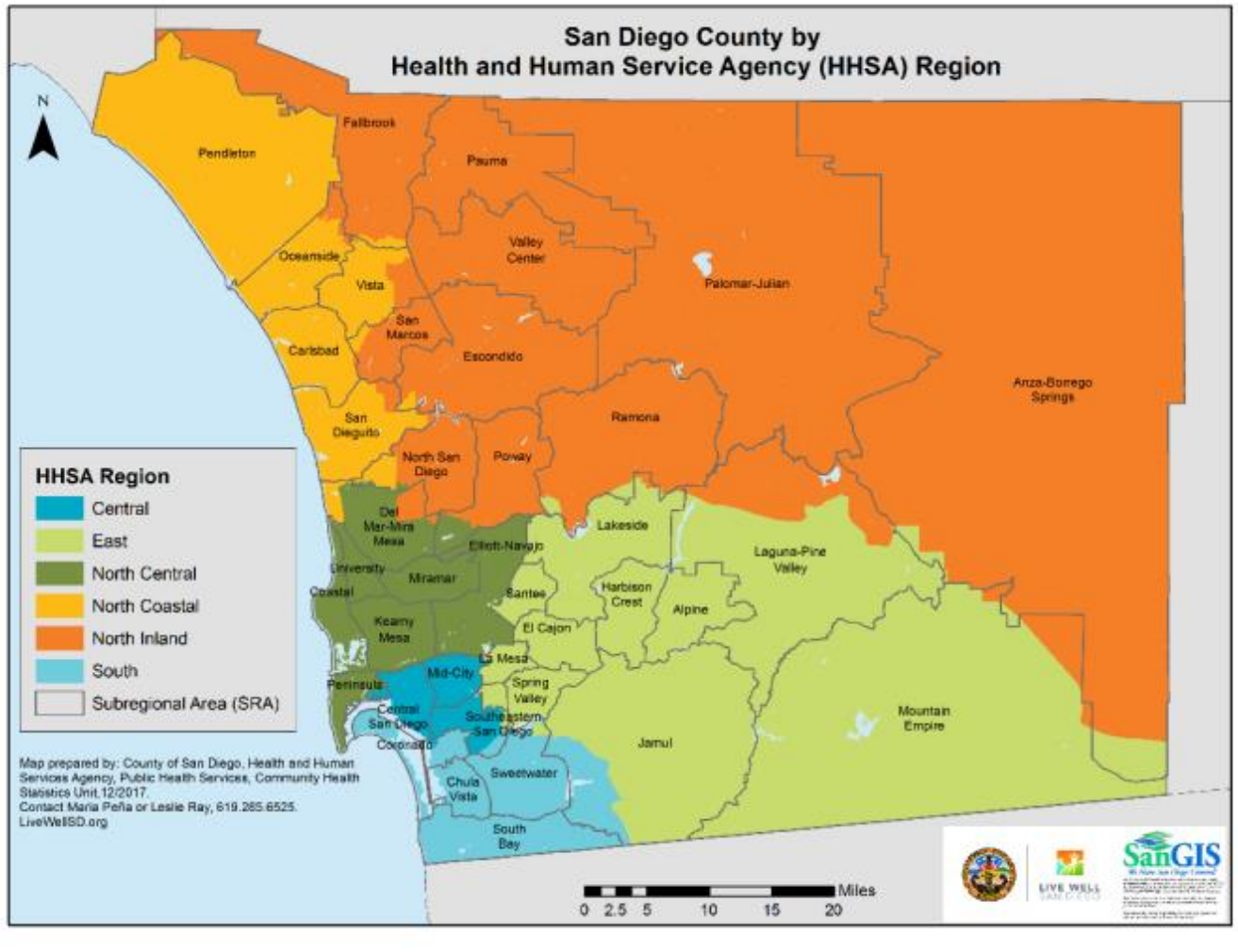


Figure 5-1: San Diego County HHSA Regions

Table 5-1: 7 Year average of Asthma, CHD, and COPD for Each San Diego County Region (2016 to 2022)

			Deaths			Emergency Department Discharge			Hospitalization		
Region	**Sub-Region**	**Monitoring Site**	**Avg. of Asthma Rate**	**Avg. of CHD Rate**	**Avg. of COPD Rate**	**Avg. of Asthma Rate**	**Avg. of CHD Rate**	**Avg. of COPD Rate**	**Avg. of Asthma Rate**	**Avg. of CHD Rate**	**Avg. of COPD Rate**
Central	Downtown Logan Heights Balboa Park University Heights	Sherman Elementary School (SES)	0.28	79.21	22.01	361.16	28.59	151.88	52.32	169.02	88.88
East	El Cajon La Mesa Santee Lemon Grove Spring Valley Alpine Jamul	Alpine (ALP) Lexington Elementary School (LES)	0.00	102.16	45.04	270.96	50.70	163.85	47.33	221.12	130.35
North Central	Kearny Mesa, Mira Mesa, La Jolla, Del Mar, Scripps Ranch	Kearny Villa Rd. (KVR)	0.11	64.45	22.05	142.99	25.64	61.11	25.75	134.80	43.20
North Coastal	Carlsbad Oceanside Encinitas Camp Pendleton	Camp Pendleton (CMP)	0.00	77.44	29.11	136.92	33.76	64.54	21.81	164.56	55.87
North Inland	San Marcos, Escondido, Poway, Fallbrook, Valley Center, Puama	Rancho Carmel Dr. (RCD)	0.63	77.52	31.20	147.19	50.56	69.96	24.99	169.37	53.93
South	Otay Mesa San Ysidro Chula Vista Bonita Imperial Beach Otay Ranch National City Coronado	Chula Vista (CVA) Otay Mesa Donovan (DVN) San Ysidro (SAY)	0.00	80.04	23.93	297.17	38.03	105.61	44.73	204.43	76.23

5.2 Asthma Health Issues by Region

Asthma is a chronic respiratory condition characterized by inflammation and narrowing of the airways, leading to recurring episodes of wheezing, shortness of breath, chest tightness, and coughing. These symptoms can vary in frequency and severity and may be triggered by factors such as allergens, exercise, cold air, respiratory infections, and environmental factors such as air

pollution. Extensive scientific literature has established a clear link between air pollution and both the development and exacerbation of asthma, highlighting the importance of addressing environmental determinants alongside clinical management. Although there is no cure for asthma, it can be effectively managed with medication, lifestyle adjustments, and regular medical care to maintain good respiratory health and reduce the risk of exacerbations.

The following figures (**Figure 5-2**, **Figure 5-3**, **Figure 5-4**) include graphical representations of data available from San Diego County Health and Human Services Agency (HHSA) that capture trends with respect to asthma. Absence of a column indicates that fewer than 5 deaths occurred.

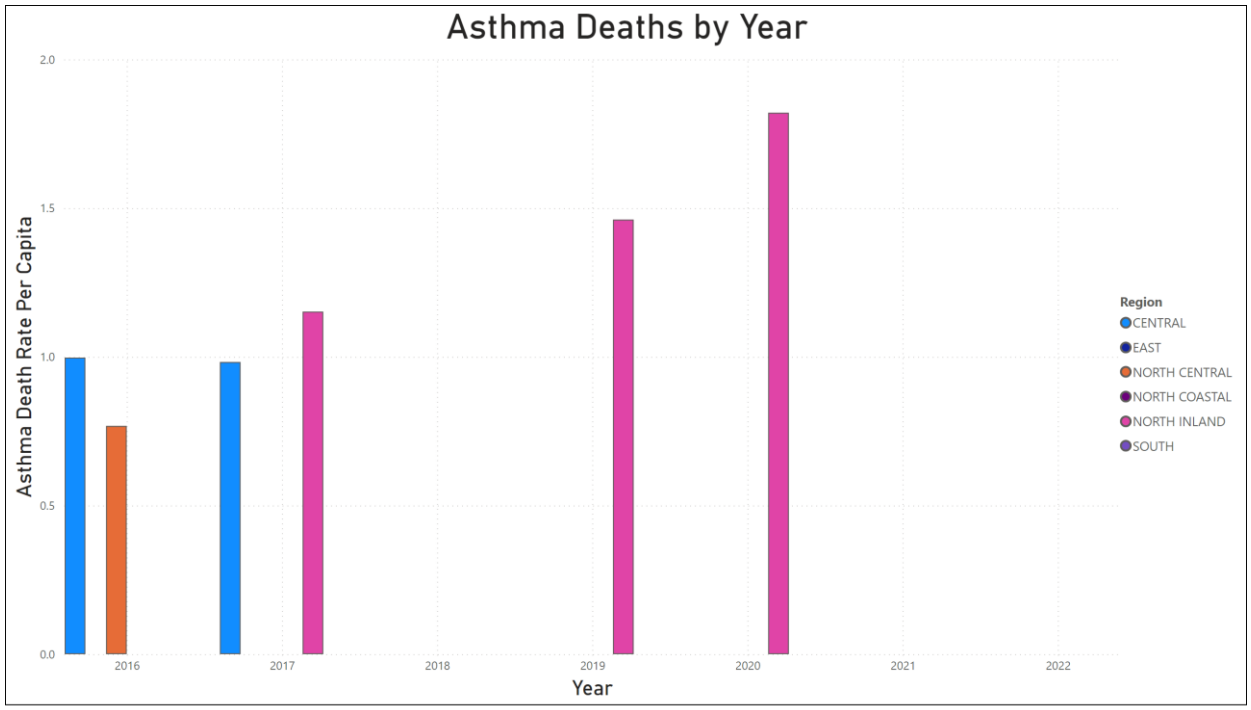


Figure 5-2 Asthma Deaths by Year

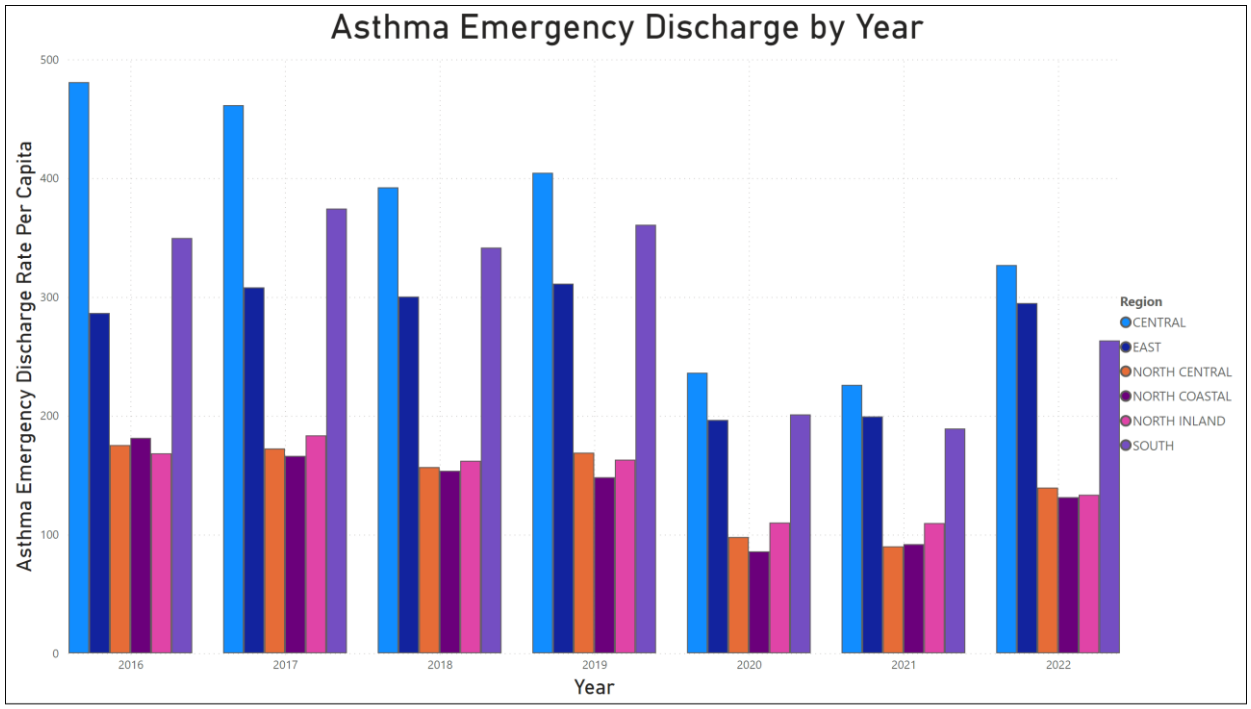


Figure 5-3: Asthma Emergency Discharge by Year

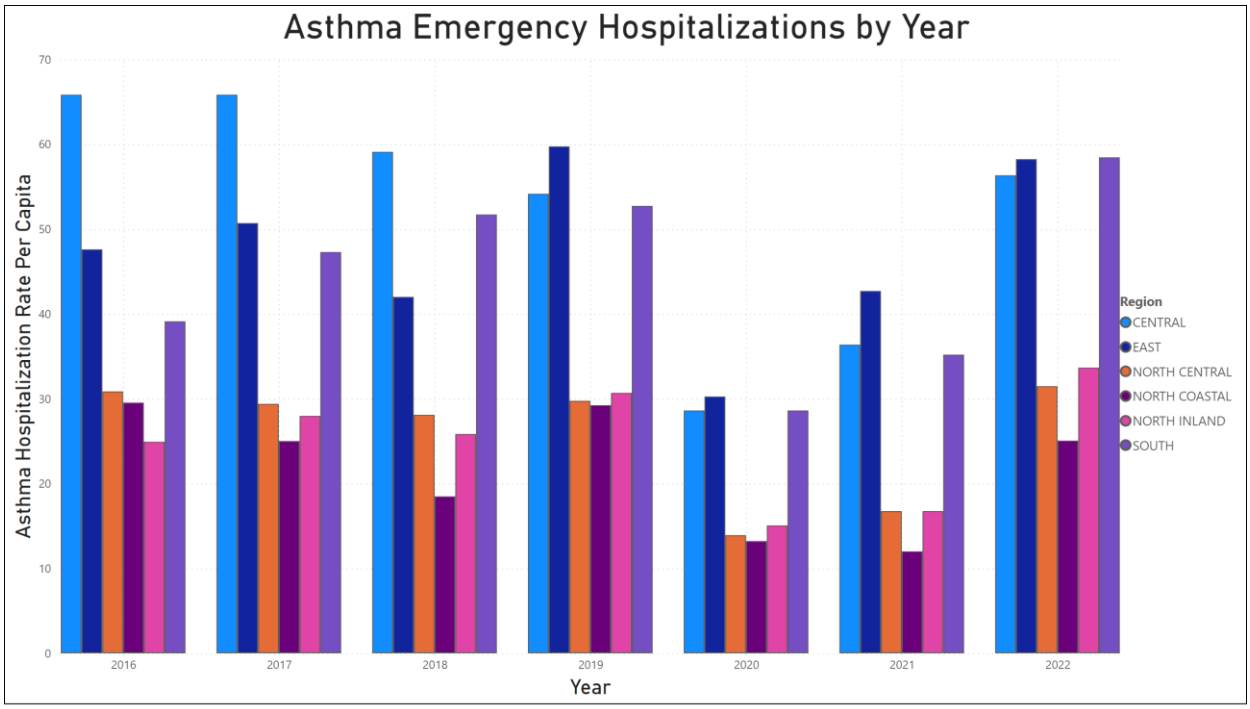


Figure 5-4: Asthma Emergency Hospitalizations by Year

5.3 Coronary Health issues by Region

Coronary Heart Disease (CHD) is a common and serious cardiovascular condition resulting from the buildup of atherosclerotic plaques in the coronary arteries, leading to reduced blood flow to the heart muscle. CHD can manifest as chest pain (angina), shortness of breath, or more severe events such as heart attacks and heart failure. In addition, a substantial body of research has identified air pollution as a significant environmental contributor to CHD incidence and mortality, with studies linking long-term exposure to pollutants such as fine particulate matter ($PM_{2.5}$) and nitrogen dioxide (NO_2) to increased risk of cardiovascular events.

The following figures (**Figure 5-5**, **Figure 5-6**, **Figure 5-7**) include graphical representations of data available from San Diego County Health and Human Services Agency (HHSA) that capture trends with respect to CHD.

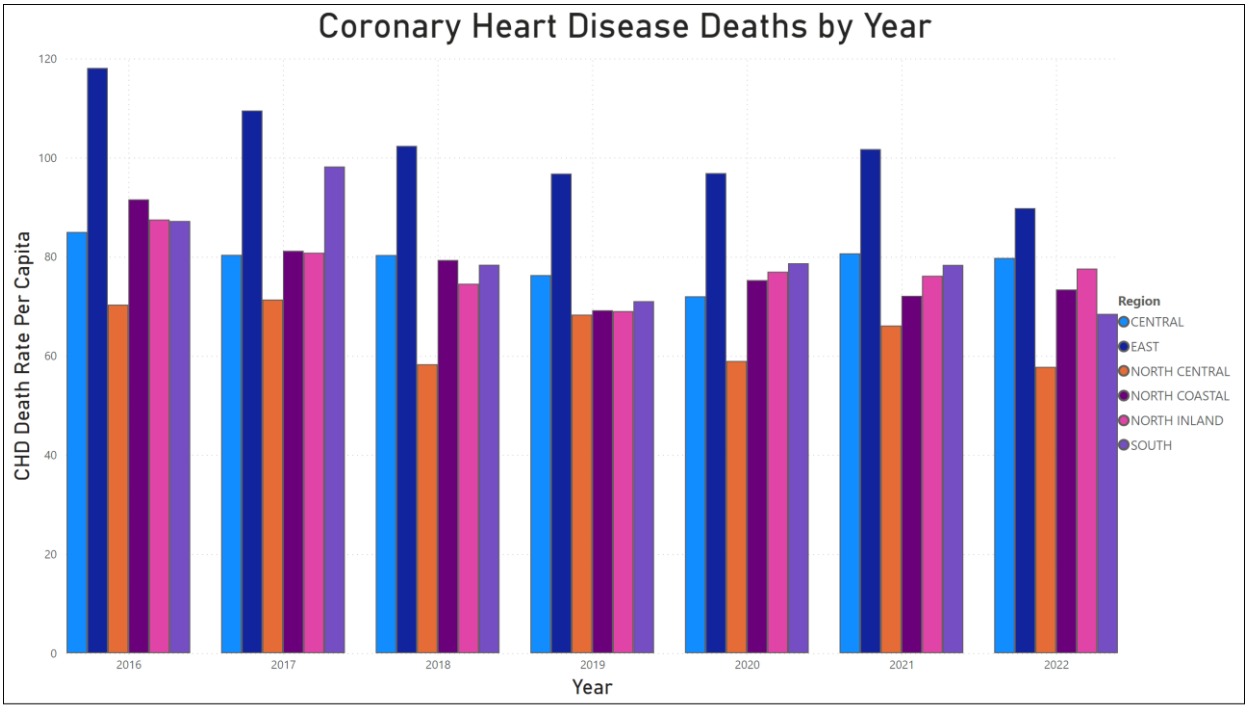


Figure 5-5: Coronary Heart Disease Deaths by Year

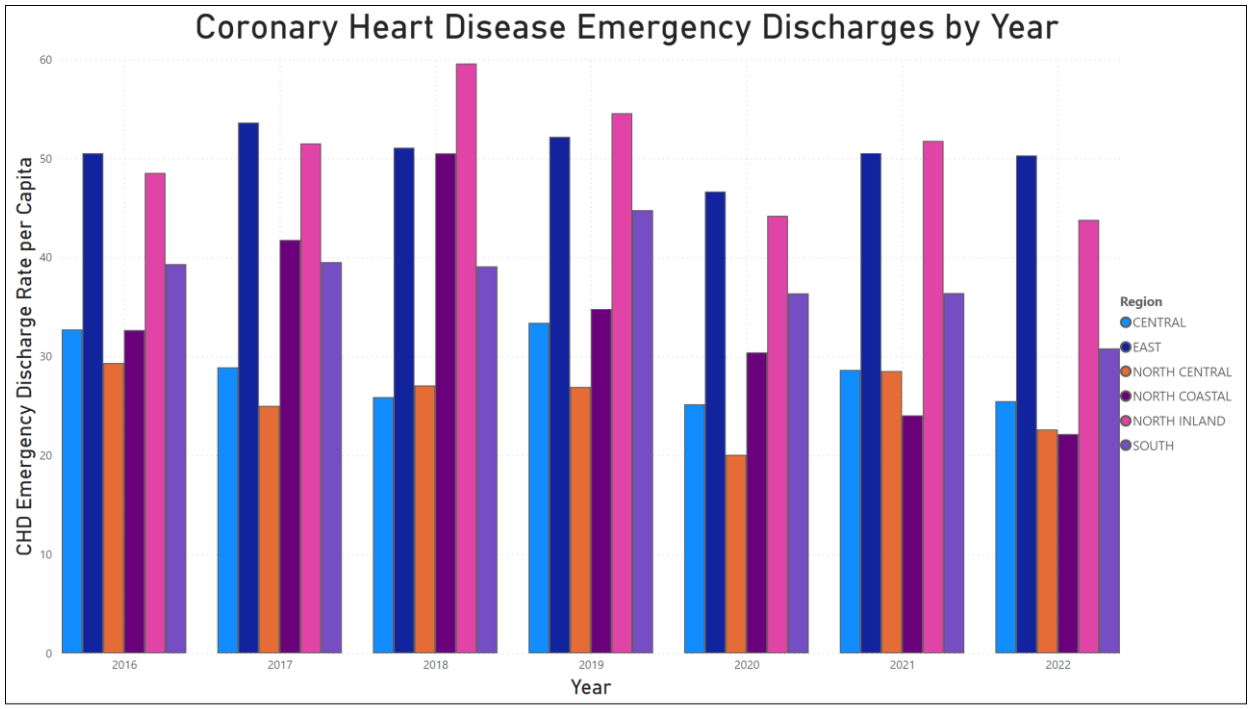


Figure 5-6: Coronary Heart Disease Emergency Discharges by Year

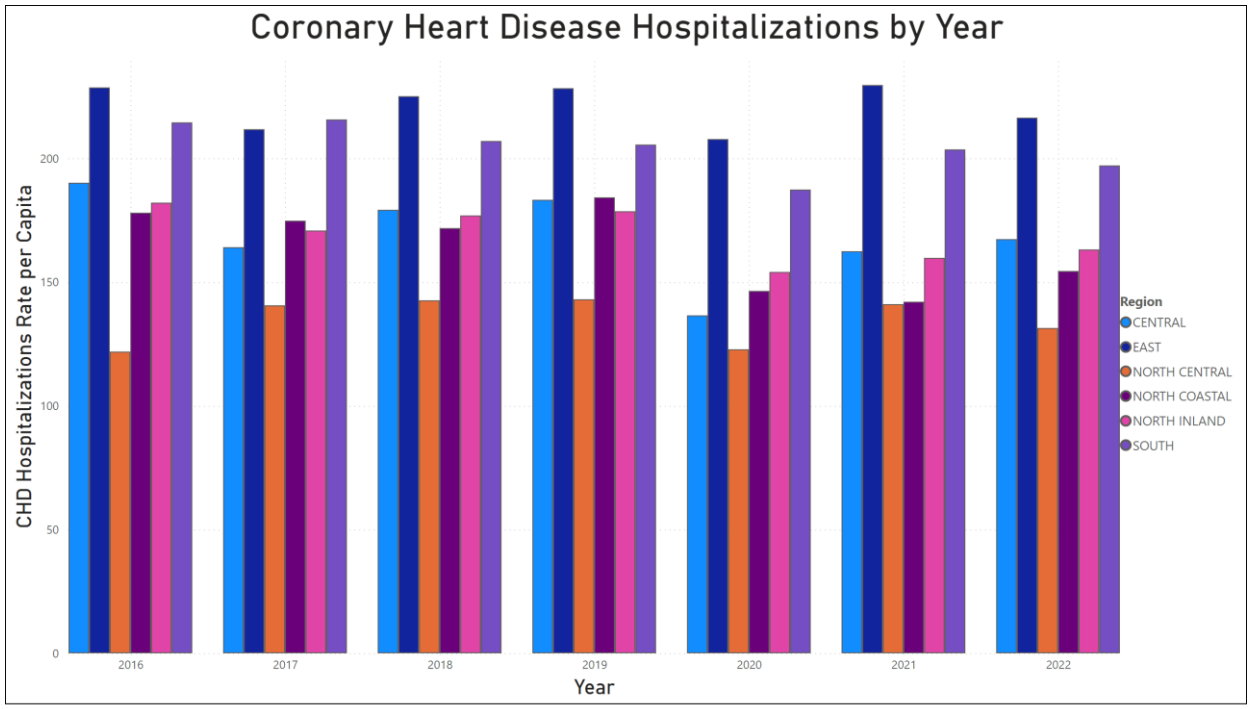


Figure 5-7: Coronary Heart Disease Hospitalizations by Year

5.4 Respiratory Health Issues by Region

Chronic Obstructive Pulmonary Disease (COPD) is a progressive respiratory condition characterized by persistent airflow limitation and symptoms such as chronic cough, sputum production, and shortness of breath. Notably, there is substantial and growing evidence linking air pollution—particularly exposure to fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and ozone (O_3)—to the development, progression, and exacerbation of COPD. Studies have shown that air pollution can accelerate lung function decline, increase the frequency of exacerbations, and contribute to hospital admissions and mortality.

The following figures (**Figure 5-8**, **Figure 5-9**, **Figure 5-10**) include graphical representations of data available from San Diego County Health and Human Services Agency (HHSA) that capture trends with respect to COPD.

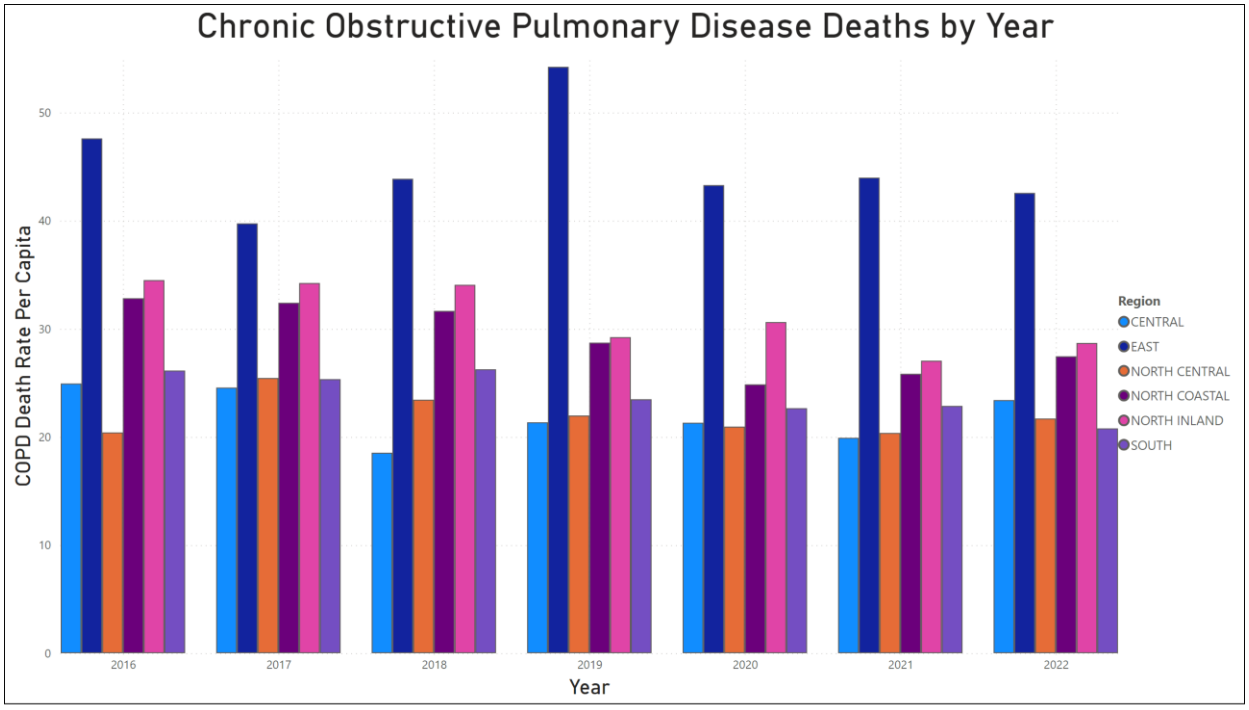


Figure 5-8: Chronic Obstructive Pulmonary Disease Deaths by Year

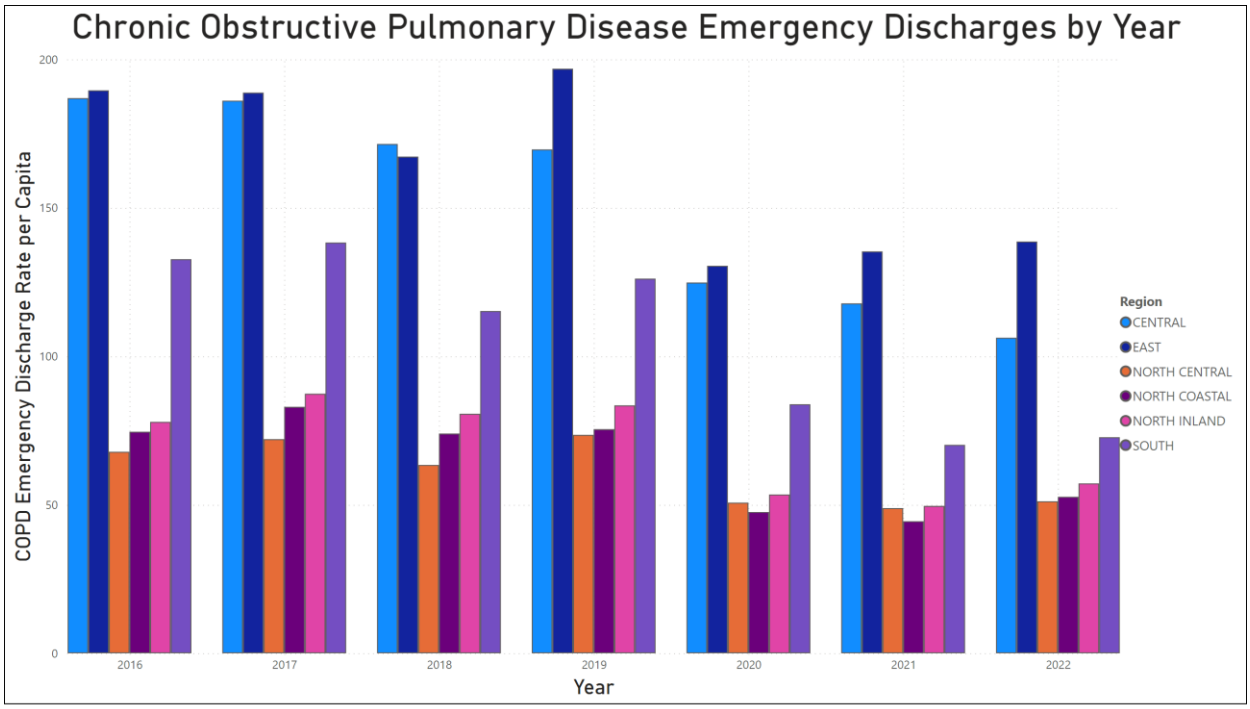


Figure 5-9: Chronic Obstructive Pulmonary Disease Emergency Discharges by Year

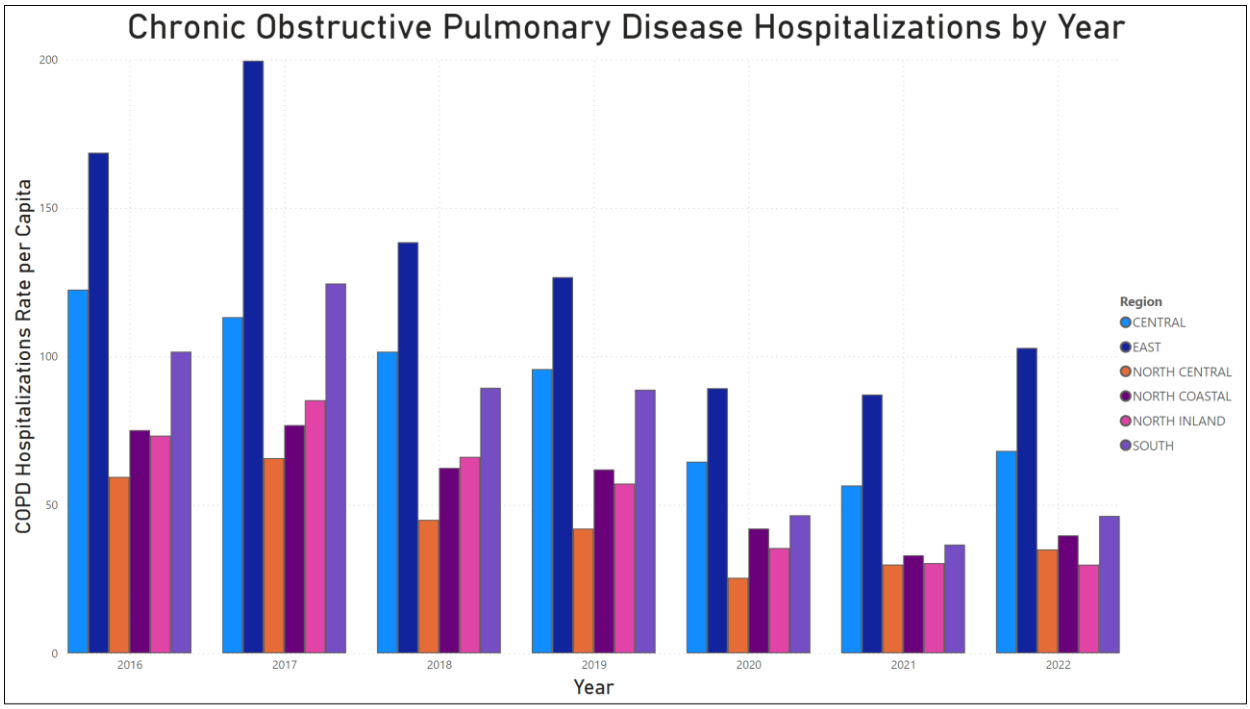


Figure 5-10: Chronic Obstructive Pulmonary Disease Hospitalizations by Year

5.5 Health Scoring for San Diego County Regions

The San Diego County regions are listed in **Table 5-2** with an associated health score. The scoring is based on the rates of the maladies explored in this section over the years 2016 – 2022. We find that the HHSA region of East County has the highest rates of maladies that may be influenced by air pollution. Meanwhile, Region North Central and North Coastal enjoy a relatively low rate of air pollution-based maladies.

Table 5-2: Final Health Scores for San Diego County Regions

Region	Monitoring Site	Health Score	Asthma Deaths Score	Asthma ED Score	Asthma Hosp. Score	CHD Death Score	CHD ED Score	CHD Hosp. Score	COPD Deaths Score	COPD ED Score	COPD Hosp. Score
Central	Sherman Elementary School (SES)	31	2	5	5	4	3	3	2	4	3
East	Alpine (ALP)	39	1	4	4	5	5	5	5	5	5
	Lexington Elementary School (LES)										
North Central	Kearny Villa Rd. (KVR)	21	1	2	3	3	3	3	2	2	2
North Coastal	Camp Pendleton (CMP)	22	1	2	2	4	3	3	3	2	2
North Inland	Rancho Carmel Dr. (RCD)	28	5	2	2	4	5	3	3	2	2
South	Chula Vista (CVA)	29	1	4	4	4	4	4	2	3	3
	Otay Mesa Donovan (DVN)										
	San Ysidro (SAY)										

5.6 Health Statistics Conclusion

Using data collected by San Diego County HHSA, we can assign a score to each ambient air monitoring station the District has based on the rates of asthma, CHD, and COPD within that region. We find that the East County region which contains the Alpine (ALP) station and the Lexington Elementary Station (LES) to be the most significant stations health wise. As a disclaimer, we must note that there may be health data that is not reflected in the HHSA dataset used above due to the possibility of people in the community not seeking medical care and/or seeking medical care in Mexico.

6 OZONE (O_3)

6.1 Ozone Introduction

The District has seven ozone monitors throughout the Regional Air Monitoring Network. **Figure 6-1** shows the existing ozone monitoring sites in the Regional Air Monitoring Network. From these seven monitors, the ozone annual 4th maximum concentation value and the Design Value is highest at the District's Alpine site which exceeds the National Ambient Air Quality Standards (NAAQS). District monitoring sites closer to the coast trend lower for the Annual 4th maximum and Design Values for ozone than the District's sites that are inland. The ozone trends by site are shown in the Appendix section of this Network Assessment. The District is seeking an alternative location to set up a monitoring site in Escondido, which would include an ozone monitor. The District meets or exceeds all minimum requirements for ozone monitoring and additional information can be found in the Annual Network Report.

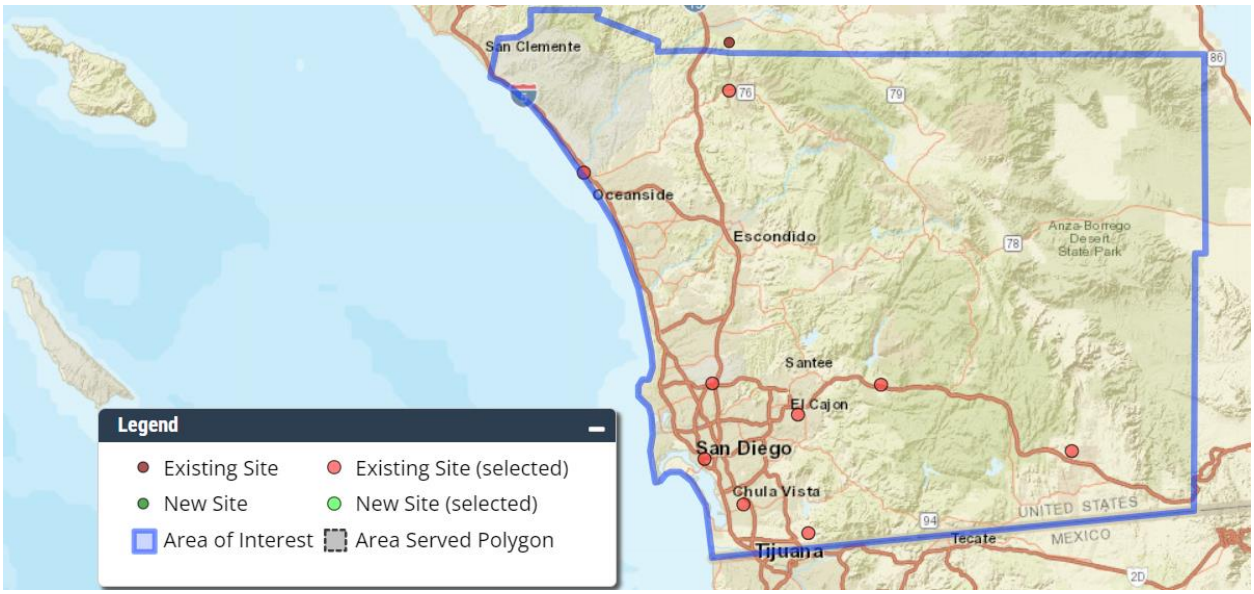


Figure 6-1: Ozone Monitoring Sites In San Diego County

6.2 Ozone Correlation Matrix

According to the EPA Network Assessment tool, the Correlation Matrix shows how concentrations at sites with ozone monitors within San Diego County compare to one another. The correlation matrix is used to identify sites that may be redundant in a network. **Figure 6-2** Shows the correlation matrix of ozone sites in San Diego. Sites with a high correlation, a low absolute difference, and close proximities are deemed redundant.

The red squares in the top-right corner show the mean absolute difference in concentrations between each pair of monitors. The numerical value indicates the distance (in kilometers) between

each pair of monitors. The intensity of the red boxes (from light red to dark red) represents the mean absolute difference in concentration where a dark red represents 0.01 ppm difference and light red represents 0 ppm difference. Each monitor comparison is represented by a square in the chart.

The blue squares in the bottom-left corner show the correlation between each pair of monitors, with numerical value in the box indicating the number of days used in the calculation. The intensity of the blue boxes (from light blue to dark blue) represents the correlation between sites where the lightest shade of blue is a correlation equal to 1 and the dark blue has a correlation equal to -1.

The numerical values in the white squares along the diagonal of the Correlation Matrix are the most recent design values for each site. The Alpine site typically has the highest ozone concentrations and is the Design Value site for the network.

The correlation matrix for ozone shows that many of the sites have similar data. Sites may measure comparable ozone levels, but there is a need for public reporting of health alerts and Air quality Index (AQI) levels require ozone reporting in highly populated communities. Additionally, many of the sites with ozone monitors serve a purpose within the air monitoring network. For example, the District's air monitoring site in Camp Pendleton provides valuable data for air pollution transport from the north of San Diego County. In past years, the District has discontinued monitoring in locations identified as redundant, such as Del Mar. From the ozone correlation matrix, the monitor at Chula Vista (CVA) has a high correlation (0.94) to the monitor at Sherman Elementary School (SES) and a low mean difference in concentration (0.003 ppm), while also being separated by a distance of 12 km. This indicates that the ozone monitor may be redundant. However, the District is seeking to update the monitoring shelter at CVA and has no plans to decommission this monitor. The District is seeking a new location for a monitoring site in Escondido to provide additional ozone monitoring in the north inland region of San Diego County. The sites labeled in red are tribal monitoring sites and are not part of the District's Regional Monitoring Network.

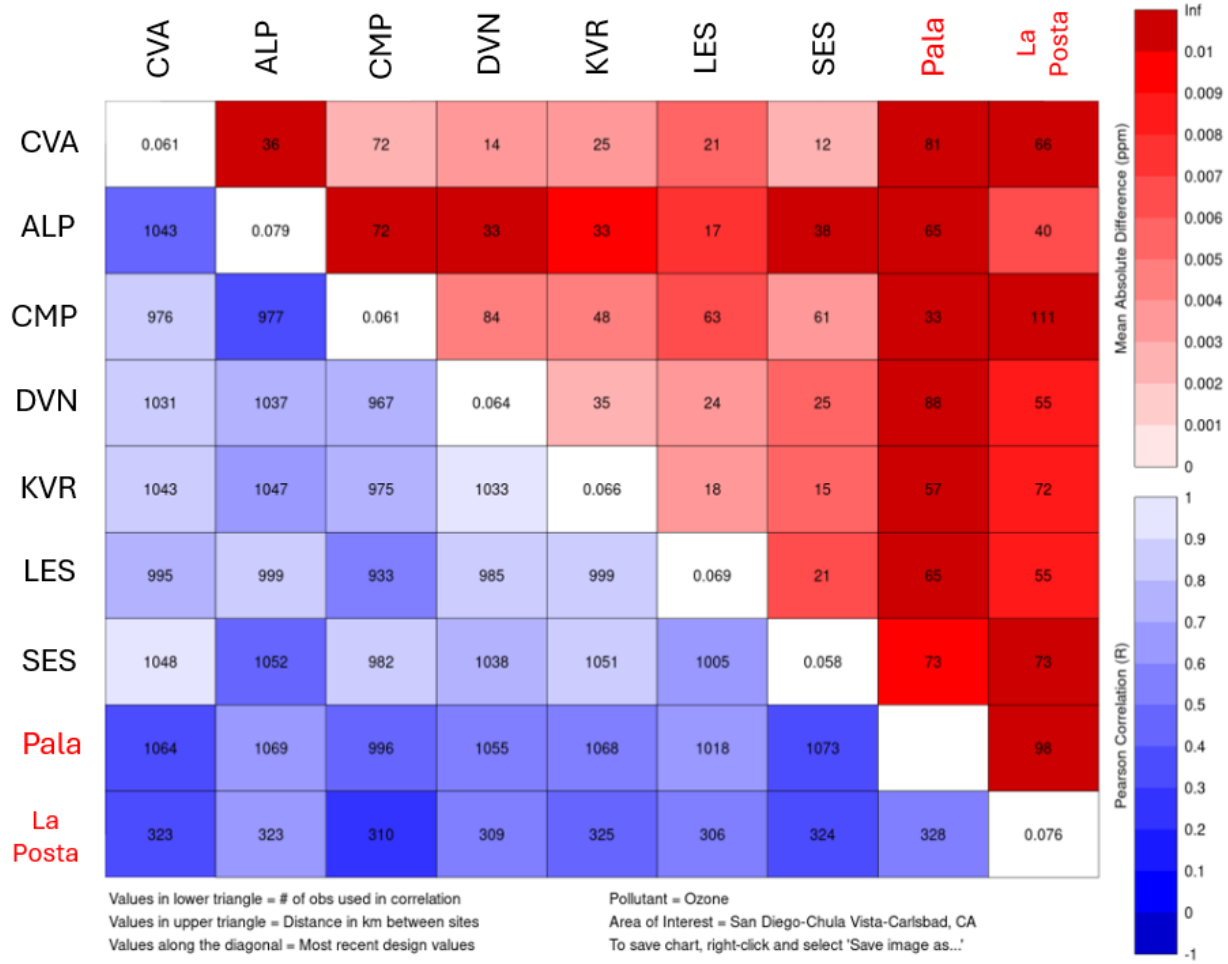


Figure 6-2: Correlation Matrix of Ozone Sites in San Diego

6.3 Ozone Removal Bias

The Ozone Removal Bias Map is shown in **Figure 6-3**. The removal bias value for each site is calculated using the nearest neighboring sites to estimate the concentration and compares it to the actual concentration from the selected site. If the removal bias value is small, that may indicate that the monitor may be redundant and could be removed. Red indicates that there is a positive bias. Blue indicates that there is a negative bias. As the bias increases in each direction, the deeper the color will appear. The lighter color indicates that there is a small bias, and these may be redundant sites. The removal bias is determined based on removal bias data from the EPA Network Assessment tool. This data is presented in **Table 6-1** below.

As an example, the Alpine site is shown to have a deep blue color on the removal bias map, which indicates a negative bias. This site measures the highest ozone concentrations in the network and is the Design Value site. Using the concentrations measured at nearby sites to estimate ozone

concentrations at Alpine would produce negatively biased data in the absence or removal of the Alpine site. This highlights the importance of the Alpine site as an ozone monitor in the network.

Sites that have a low bias (lighter color) include the District's sites in Camp Pendleton and Lexington Elementary School. However, these sites provide key data and the District does not plan to remove these sites. Camp Pendleton provides transport data and Lexington Elementary School is the site of the District's NCore and PAMS Program.

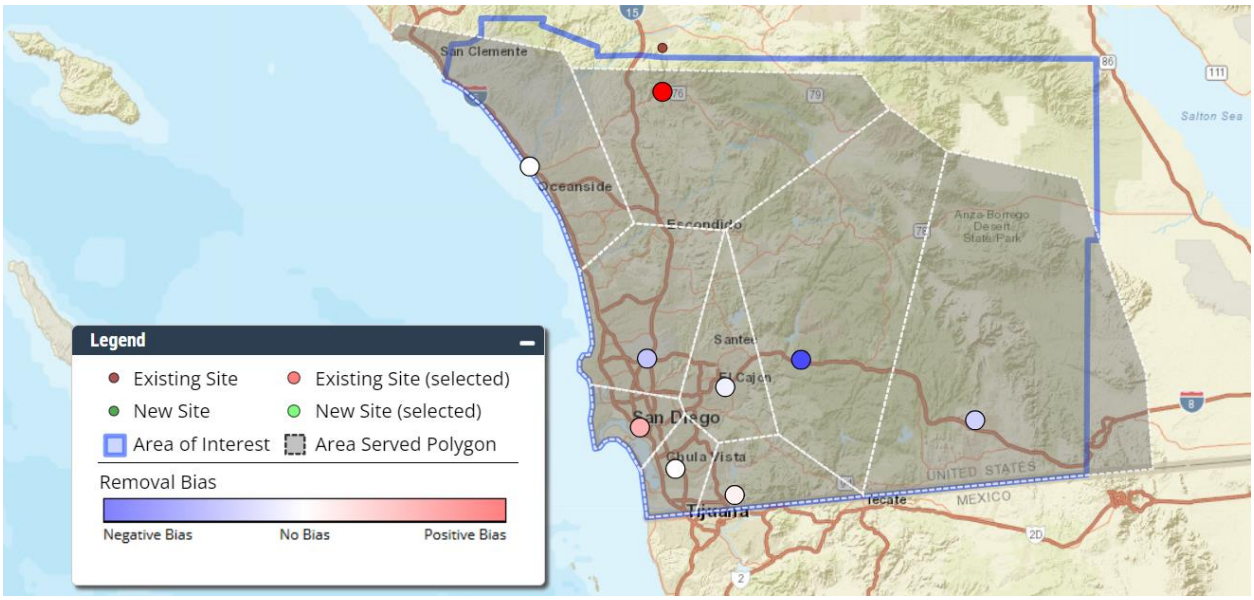


Figure 6-3: Removal Bias Map for Ozone Sites

Table 6-1: Removal Bias Data for Ozone Sites

Site	Neighbors Included	Daily Obs Count	Mean Removal Bias (ppm)	Removal Bias Standard Deviation (ppm)	Min Removal Bias (ppm)	Max Removal Bias (ppm)	Mean Relative Bias (%)	Min Relative Bias (%)	Max Relative Bias (%)
CVA	5	1065	1e-04	0.0027	-0.007	0.015	0.6	-22	39
ALP	6	1070	-0.0084	0.0054	-0.027	0.004	-15.2	-59	13
CMP	7	997	-1.00e-04	0.0075	-0.018	0.023	0.8	-43	65
DVN	7	1056	7e-04	0.0031	-0.013	0.016	2.2	-22	40
KVR	4	1069	-0.0028	0.0031	-0.015	0.006	-6.3	-39	22
LES	6	1019	-7.00e-04	0.0035	-0.016	0.011	-0.5	-22	49
SES	8	1074	0.0037	0.0032	-0.004	0.018	10.3	-10	61
Pala*	6	1091	0.0119	0.0086	-0.025	0.062	51	-79	1224
La Posta*	6	328	-0.0022	0.0059	-0.026	0.019	-3.6	-35	49

***Station is not managed by the District**

6.4 Ozone Areas Served

The regions and area served by the monitors represent significant population conglomerations. **Figure 6-4** is a pictorial representation of the area served by the ozone monitors in the air quality network. Numerical values of population within these areas can be found in **Table 6-2.** Each grey polygon represents the area that is closer to the monitor within it than any other monitor in the network. The elimination of any station will correspond to a decrease in coverage and a decrease in the District's ability to warn and inform the public of any health concerns.

The ozone monitor in Camp Pendleton provides area coverage in the North Coastal region of the County. The North Central region of the County has an ozone monitor at Kearny Villa Rd. The Central region of the County has an ozone monitor located at the Sherman Elementary School site. The South region of the County has ozone monitors located at the site in Chula Vista and at Donovan. In the East region of the County, ozone monitors are located in Lexington Elementary School site in El Cajon and the Alpine site.

It should be noted that the Area Served Map does not include the District's proposed site at Escondido. However, there is some area coverage in the North Inland region provided by a tribal air monitoring site (Pala). There is also a tribal monitoring site in La Posta that does provide additional area coverage for ozone in the East region of the County.

The demographics for each area served by monitoring sites are detailed in **Table 6-3** and **Table 6-4** below.

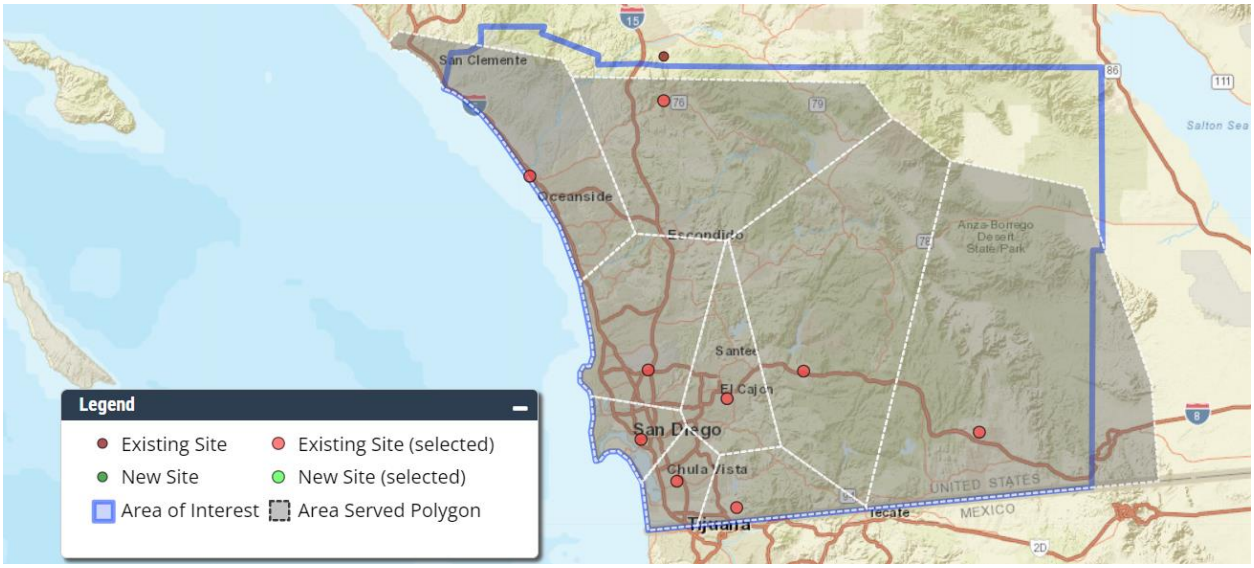


Figure 6-4: Area Served Map – Ozone

Table 6-2: Area Served for Ozone and Population

Site Name	Area (km²)	Total Population
Chula Vista	227	525,235
Alpine	1,244	67,780
Camp Pendleton	977	648,971
Pala Airpad*	2,335	278,410
Donovan	545	67,689
San Diego - Kearny Villa Rd.	870	813,261
El Cajon - Lexington Elementary School	508	440,610
San Diego - Sherman Elementary School	186	542,846
La Posta Band of Indians*	2,803	10,008

***Station is not managed by the District**

Table 6-3: Ozone Area Served Demographics

Site Name	Male	Female	Caucasian/ White	African/ Black	Native American	Asian	Pacific Islander	Other Race	Multiple Races	Hispanic/ Latino
Chula Vista	254,765	270,470	129,059	31,752	7,660	82,066	3,277	147,651	123,770	317,963
Alpine	33,775	34,005	48,721	754	1,833	1,226	182	6,279	8,785	15,207
Camp Pendleton	326,568	322,403	396,287	16,710	8,013	41,843	3,849	87,583	94,686	195,008
Pala Airpad*	137,472	140,938	134,377	5,850	7,481	18,733	833	65,878	45,258	123,632
Donovan	36,655	31,034	20,136	5,962	622	12,017	289	13,055	15,608	31,769
Kearny Villa Rd.	402,743	410,518	452,231	23,864	4,141	185,788	2,590	45,042	99,605	125,386
Lexington Elementary School	214,707	225,903	264,592	26,037	4,410	23,855	2,301	52,507	66,908	122,377
Sherman Elementary School	278,172	264,674	254,630	45,277	6,837	49,057	2,066	107,052	77,927	202,034
La Posta Band of Indians*	5,193	4,815	5,659	226	626	119	19	1,663	1,696	3,735

***Station is not managed by the District**

Table 6-4: Ozone Area Served Demographics (Cont.)

Site Name	Age 0 to 4	Age 5 to 9	Age 10 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 29	Age 30 to 34	Age 35 to 39
Chula Vista	29,064	33,283	36,783	37,375	38,088	39,017	37,075	35,502
Alpine	3,525	4,087	4,422	4,164	3,544	3,420	3,995	4,298
Camp Pendleton	34,113	37,246	40,721	43,348	55,868	44,017	40,949	41,577
Pala Airpad*	16,118	18,090	19,116	19,442	19,853	18,932	18,650	18,551
Donovan	3,441	4,533	5,235	5,070	4,469	4,556	4,995	5,469
Kearny Villa Rd.	40,617	44,939	47,092	52,676	70,258	60,026	57,900	56,773
Lexington Elementary School	25,769	27,931	29,129	26,723	27,433	29,923	31,766	31,287
Sherman Elementary School	25,605	24,940	25,870	30,979	49,327	59,860	56,541	46,352
La Posta Band of Indians*	546	605	634	593	451	528	555	564
Site Name	**Age 50 to 54**	**Age 55 to 59**	**Age 60 to 64**	**Age 65 to 69**	**Age 70 to 74**	**Age 75 to 79**	**Age 80 to 84**	**Age 85 and Over**
Chula Vista	32,764	33,251	31,310	25,588	19,537	12,849	9,338	9,674
Alpine	4,420	5,411	5,469	4,668	3,730	2,371	1,261	1,137
Camp Pendleton	40,679	43,137	40,655	34,823	28,345	18,224	11,915	14,345
Pala Airpad*	17,024	17,865	17,405	14,575	11,613	7,562	5,096	5,583
Donovan	4,956	4,130	3,167	2,374	1,886	978	639	513
Kearny Villa Rd.	50,812	50,907	47,641	40,259	34,155	23,015	15,469	16,978
Lexington Elementary School	26,964	29,600	28,898	23,573	18,891	11,915	7,848	8,697
Sherman Elementary School	30,909	30,357	27,179	23,274	18,188	11,539	7,077	7,365
La Posta Band of Indians*	584	732	879	828	656	347	222	185

***Station is not managed by the District**

6.5 Ozone Exceedance Probability

A map of the District's Ozone Exceedance Probability is shown in **Figure 6-5** below. The figure is from the EPA Network Assessment Tool and shows the exceedance probabilities for each census tract in the District for ozone. These values represent the probability of exceeding the National Ambient Air Quality Standards (NAAQS) (based on Downscaler fused air quality surfaces for 2019 to 2021). High exceedance probabilities are depicted in red and are shown to be in the Eastern region of the County. This is where the District's Alpine monitor is also located where exceedances are measured. The District's Design Value site is located in Alpine, which is consistent with the exceedance probability map.

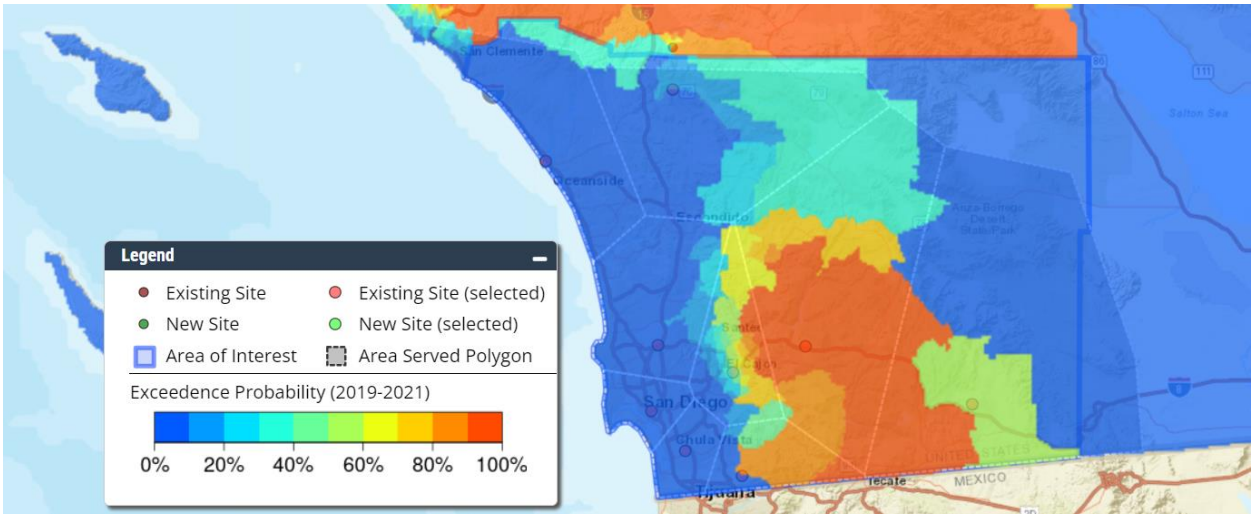


Figure 6-5: Ozone Exceedance Probability

6.6 Ozone Community-Centered Environmental Protection Index

A map of the District's Community-Centered (CC) Index is shown in **Figure 6-6** below. Areas in red depict a higher CC index. Currently, the District has additional monitoring in two communities as part of the Community Air Monitoring Program. One community is the Portside Community and the other is the International Border Community. Additional information on the District's Community Air Monitoring Program can be found on the District's website and in the Community Air Monitoring Plan. The community monitoring in the Portside Community provides additional monitoring in the Central region of the County which also has a higher CC Index based on the CC Index map provided by the EPA Network Assessment tool. **Table 7-5** presents the numerical values for Ozone CC Index and Ozone CC Percentile.

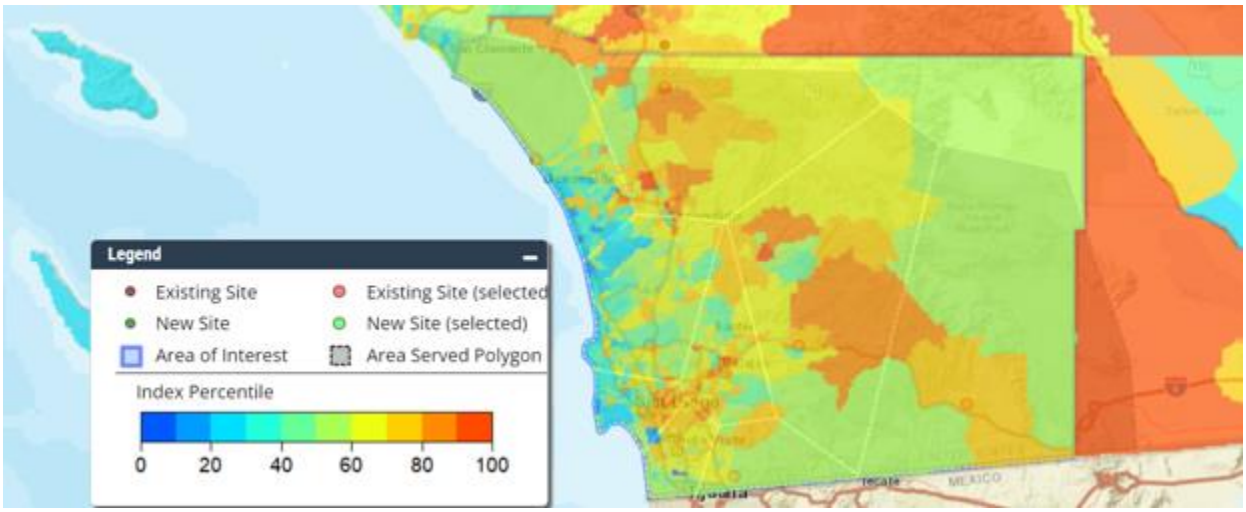


Figure 6-6: Ozone CC Index

Table 6-5: Ozone CC Index and CC Percentile

Site Name	Ozone CC Index	Ozone CC Percentile
Chula Vista	19.8	63
Alpine	23	65
Camp Pendleton	11.9	45
Pala Airpad*	28.4	73
Donovan	19.5	63
Kearny Villa Rd.	15	52
Lexington Elementary School	24.1	69
Sherman Elementary School	17.3	55
La Posta Band of Indians*	30.3	74

***Station is not managed by the District**

6.7 Ozone Rating Summary

Table 7-6 is a summary of the District's ozone monitor rating for the regional monitoring network. The scores are based on the analysis from the Network Assessment tool for ozone. The analysis includes scores for correlation between sites, site removal, area served, potential exceedances, and CC index.

Table 6-6: Ozone Rating Summary

Station	Overall Scoring	Correlation	Removal Bias	Area Served	Exceedance Threshold	CC Index	Comments
Alpine (ALP)	39	10	10	1	9	9	District's Design Value (DV) site.
Camp Pendleton (CMP)	24	7	1	9	1	6	District's north inland monitor. Site used for capturing pollution transport.
Chula Vista (CVA)	24	7	1	6	1	9	High correlation with nearby SES site.
Otay-Mesa Donovan (DVN)	20	7	1	1	2	9	District's monitor in the South region near the International Border Community.
Kearny Villa Rd. (KVR)	28	6	4	10	1	7	Site covers largest area served and population.
Lexington Elementary School (LES)	26	7	1	5	3	10	District PAMS and NCore site.
Sherman Elementary School (SES)	28	8	5	6	1	8	Central region of the County. Site located within District's Portside Community.

6.8 Conclusion – Ozone Monitoring

Over the last five years since the last Network Assessment was published in 2020, the District has maintained the same number of monitoring sites. There have been no changes to the location of ozone monitors and the District is seeking a new location for an ozone monitor in Escondido to fill a gap in the Regional Monitoring Network. The Alpine site is the Design Value site for the network and the highest ozone concentrations are measured in Alpine. The correlation matrix, area served study statistics, removal bias, exceedance probability, and CC Index helped assess the ozone monitoring throughout San Diego County.

7 NITROGEN DIOXIDE (NO_2)

7.1 NO_2 Introduction

The District has nine nitrogen dioxide (NO_2) monitors throughout the Regional Air Monitoring Network. **Figure 7-1** shows the existing NO_2 monitoring sites in the Regional Air Monitoring Network. The NO_2 trends by site are shown in the Appendix section of this Network Assessment. This includes the Annual 98th Pecentile and the Desgin Value. These values are compared to the National Ambient Air Quality Standards (NAAQS). The NO_2 concentrations throughout the sites in the Regional Monitoring Network have trended down over the years. The District is seeking an alternative location to set up a monitoring site in Escondido, which would include a NO_2 monitor. The District meets or exceeds all minimum requirements for NO_2 monitoring and additional information can be found in the Annual Network Report.

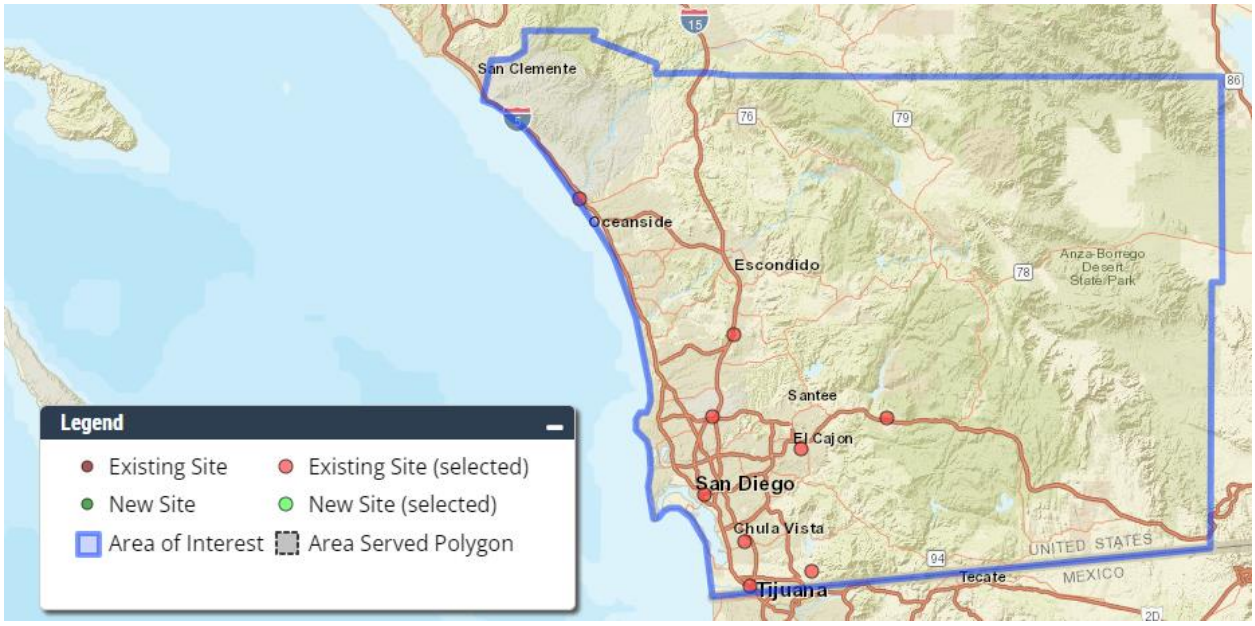


Figure 7-1: NO_2 Monitoring Sites in San Diego County

In addition to the nine NO_2 monitors throughout the Regional Monitoring Network, the District also operates a trace-level analyzer for NO_y (total reactive oxides of nitrogen) at the Lexington Elementary School site in El Cajon to compliment monitoring as part of the national core monitoring network (NCore) program. The NCore program is designed to enhance monitoring with multi-pollutant monitoring to help provide a better understanding of the atmosphere. Other pollutants monitored in the NCore program include trace-level SO_2, and trace-level CO, which are discussed in their respective chapters. Additional information on the NCore program is available in the District's Annual Network Report.

7.2 NO_2 Correlation Matrix

According to the EPA Network Assessment tool, the Correlation Matrix shows how concentrations at sites with NO_2 monitors within San Diego County compare to one another. The correlation matrix is used to identify sites that may be redundant in a network. **Figure 7-2** shows the correlation matrix of NO_2 sites in San Diego. Sites with a high correlation, a low absolute difference, and close proximities are deemed redundant.

The red squares in the top-right corner show the mean absolute difference in concentrations between each pair of monitors. The numerical value indicates the distance (in kilometers) between each pair of monitors. The intensity of the red boxes (from light red to dark red) represents the mean absolute difference in concentration where a dark red represents 20 ppb difference and light red represents 0 ppb difference. Each monitor comparison is represented by a square in the chart.

The blue squares in the bottom-left corner show the correlation between each pair of monitors, with numerical values in the box indicating the number of days used in the calculation. The intensity of the blue boxes (from light blue to dark blue) represents the correlation between sites where the lightest shade of blue is a correlation equal to 1 and the dark blue has a correlation equal to -1.

The numerical values in the white squares along the diagonal of the Correlation Matrix are the most recent design values for each site. San Ysidro (SAY) does not have a Design Value reported because three full years of data are needed to calculate a Design Value. Based on the NO_2 correlation matrix, the NO_2 monitor at Chula Vista (CVA) has a high correlation (0.91) with the monitor at Sherman Elementary School (SES) and a low mean difference in concentration (3.9 ppb), while also being separated by 12 km. This indicates that the NO_2 monitor may be redundant. However, the District is seeking to update the monitoring shelter at CVA and has no plans to decommission this monitor.

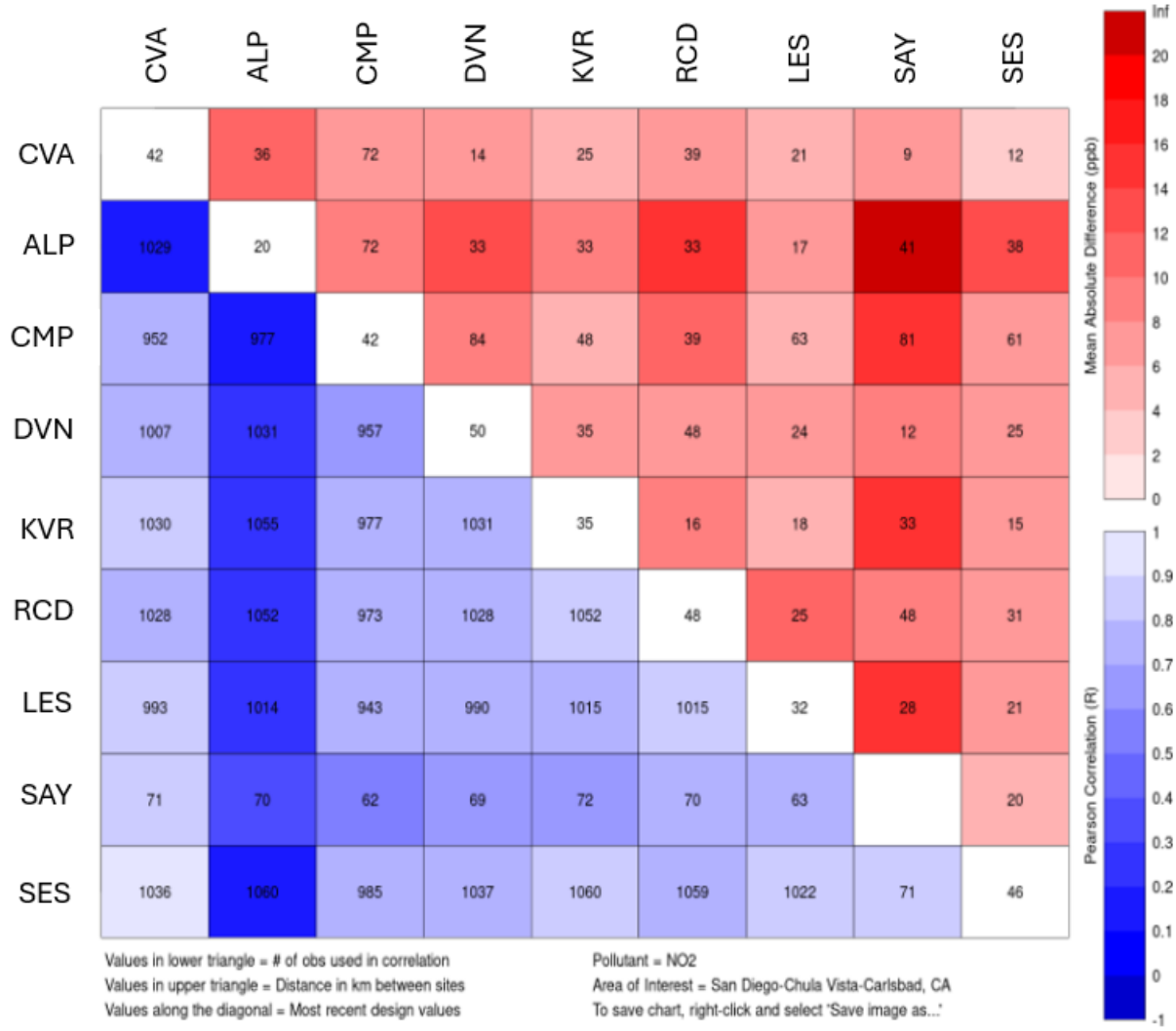


Figure 7-2: Correlation Matrix of NO_2 Sites in San Diego

7.3 NO_2 Removal Bias

The NO_2 Removal Bias Map is shown in **Figure 7-3**. The removal bias value for each site is calculated using the nearest neighboring sites to estimate the concentration and compares it to the actual concentration from the selected site. If the removal bias value is small, that may indicate that the monitor may be redundant and could be removed. Red indicates that there is a positive bias. Blue indicates that there is a negative bias. As the bias increases in each direction, the deeper the color will appear. The lighter color indicates that there is a small bias, and these may be redundant sites. The removal bias is determined based on removal bias data from the EPA Network Assessment tool. This data is presented in **Table 8-1** below.

Similar to the removal bias map for ozone monitors, the removal bias is highest at the Alpine site as shown on Removal Bias Map for NO_2. The NO_2 removal bias at the Alpine site is shown in a deep red color. This indicates that removal of this site would positively bias data. This is because NO_2 is

a key component to the formation of ozone and higher concentrations of ozone are measured at the District's Alpine site, which is the Design Value site for ozone.

The deep blue site marker on **Figure 7-3** represents the negative removal bias at the District's Rancho Carmel Drive (RCD) site. This site is part of the District's Near-road program, which is designed to measure near-road emissions.

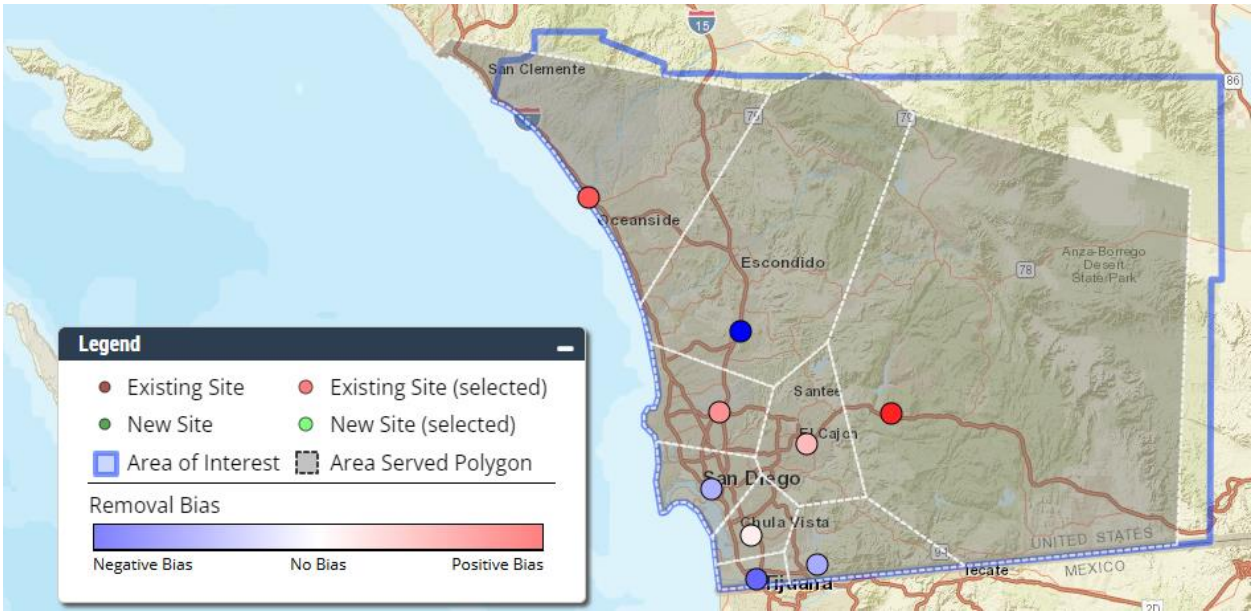


Figure 7-3: Removal Bias Map for NO_2 Sites

Table 7-1: Removal Bias Data for NO_2 Sites

Site	Neighbors Included	Daily Obs Count	Mean Removal Bias (ppb)	Removal Bias Standard Deviation (ppb)	Min Removal Bias (ppb)	Max Removal Bias (ppb)	Mean Relative Bias (%)	Min Relative Bias (%)	Max Relative Bias (%)
CVA	4	1,049	0.6	4.9	-21	21	12.8	-62	478
ALP	5	1,075	8.3	9	-17	35	135.1	-67	2685
CMP	6	995	6.3	5.9	-23	28	92.3	-48	1203
DVN	6	1,050	-3.2	8.4	-48	23	2	-83	469
KVR	4	1,075	4.1	5.1	-16	25	36.4	-61	303
RCD	7	1,072	-9.6	5.3	-34	8	-39.6	-82	80
LES	6	1,034	2.6	3.7	-13	14	32.3	-63	328
SAY	9	72	-5.7	5.6	-19	8	-15.5	-52	39
SES	7	1,080	-3	4.9	-31	11	-8.2	-76	205

7.4 NO_2 Area Served

Figure 7-4 is a pictorial representation of the area served by the NO_2 monitors in the Regional Air Quality Network. Each grey polygon represents the area that is closer to the monitor within it than any other monitor in the network. The elimination of any station will correspond to a decrease in coverage and a decrease in the District's ability to warn and inform the public of any health concerns.

Since the last Network Assessment in 2020, the District has added an additional NO_2 monitor in San Ysidro. This monitor is part of the Near-road Monitoring Program. The monitor is near the border crossing in San Ysidro, which is considered one of the busiest points of entry (POE) in the world. Vehicles crossing this POE emit air pollution as they move and as they idle. The monitor will provide valuable air quality data and help with determining the steps needed to improve air quality in the community.

The District is seeking an alternative location for a monitoring site in Escondido. The addition of a monitoring site in Escondido, which will include a NO_2 monitor, will provide additional coverage in the North Inland portion of the County.

The data on the demographics for each area served by NO_2 monitoring sites are detailed in **Table 8-2**, **Table 7-3**, and **Table 7-4** (below).

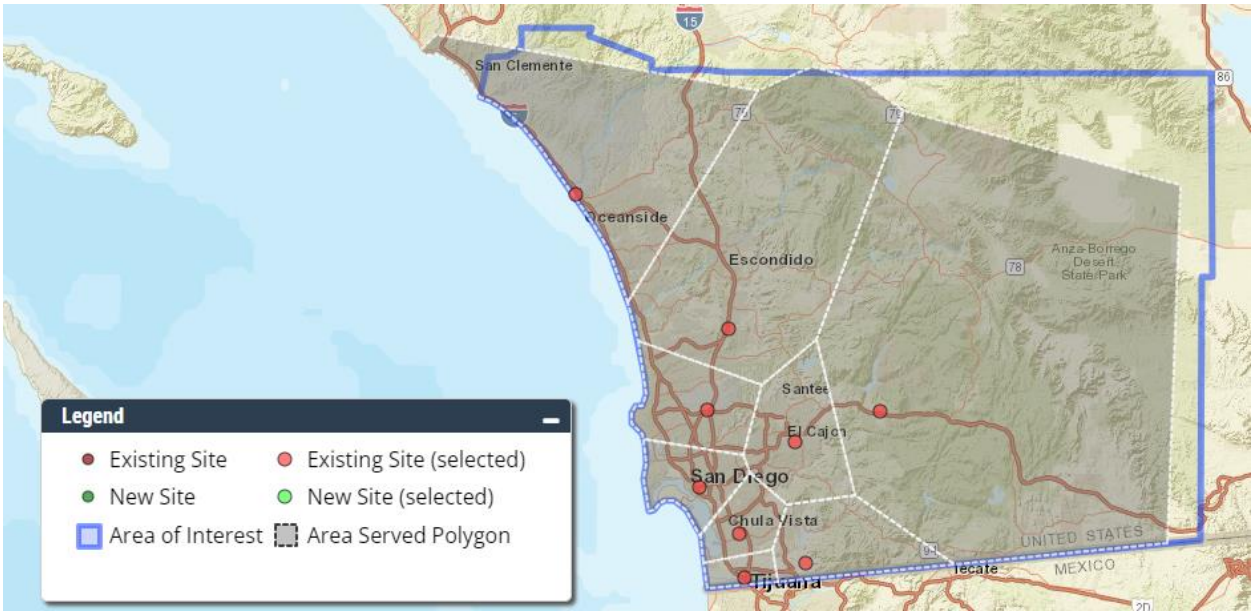


Figure 7-4: Area Served Map - NO_2

Table 7-2: Area Served for NO_2 and Population

Site Name	Area (km^2)	Total Population
Chula Vista	172	402,257
Alpine	5,305	68,983
Camp Pendleton	1,117	601,652
Donovan	545	67,689
Kearny Villa Rd.	329	454,048
Rancho Carmel Drive	1,606	689,961
Lexington Elementary School	374	435,315
Sherman Elementary School	186	542,846
San Ysidro	55	122,978

Table 7-3: NO_2 Area Served Demographics

Site Name	Male	Female	Caucasian/ White	African/ Black	Native American	Asian	Pacific Islander	Other Race	Multiple Races	Hispanic/ Latino
Chula Vista	195,183	207,074	100,389	27,432	5,638	70,910	2,803	104,012	91,073	228,016
Alpine	34,594	34,389	49,434	891	2,598	1,204	150	5,738	8,968	14,907
Camp Pendleton	304,394	297,258	358,948	16,328	8,261	35,329	3,815	88,742	90,229	194,977
Donovan	36,655	31,034	20,136	5,962	622	12,017	289	13,055	15,608	31,769
Kearny Villa Road	227,236	226,812	250,227	17,376	2,803	95,207	1,751	29,406	57,278	79,560
Rancho Carmel Drive	337,842	352,119	375,405	12,778	8,423	115,704	1,753	82,654	93,244	173,381
Lexington Elementary School	212,069	223,246	260,539	25,985	4,386	23,721	2,299	52,169	66,216	121,469
Sherman Elementary School	278,172	264,674	254,630	45,277	6,837	49,057	2,066	107,052	77,927	202,034
San Ysidro	59,582	63,396	28,670	4,320	2,022	11,156	474	43,639	32,697	89,947

Table 7-4: NO_2 Areas Served Demographics (Cont.)

Site Name	Age 0 to 4	Age 5 to 9	Age 10 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 29	Age 30 to 34	Age 35 to 39	Age 40 to 44
Chula Vista	22,235	25,404	27,830	27,983	28,552	29,199	28,263	27,413	25,255
Alpine	3,437	4,001	4,284	4,041	3,288	3,266	3,896	4,188	3,901
Camp Pendleton	31,933	33,861	36,315	39,332	53,883	42,657	39,063	38,286	34,820
Donovan	3,441	4,533	5,235	5,070	4,469	4,556	4,995	5,469	5,613
Kearny Villa Road	22,590	22,048	20,972	28,113	51,912	43,239	38,932	33,271	27,080
Rancho Carmel Drive	36,915	45,006	50,288	48,572	40,674	37,629	40,062	45,904	46,561
Lexington Elementary School	25,548	27,688	28,831	26,368	27,213	29,654	31,465	30,997	27,583
Sherman Elementary School	25,605	24,940	25,870	30,979	49,327	59,860	56,541	46,352	35,970
San Ysidro	6,829	7,879	8,953	9,392	9,536	9,818	8,812	8,089	7,416
Site Name	**Age 45 to 49**	**Age 50 to 54**	**Age 55 to 59**	**Age 60 to 64**	**Age 65 to 69**	**Age 70 to 74**	**Age 75 to 79**	**Age 80 to 84**	**Age 85 and Over**
Chula Vista	24,615	25,108	25,669	24,356	19,954	15,304	9,979	7,345	7,793
Alpine	4,008	4,407	5,547	5,918	5,232	4,272	2,602	1,444	1,251
Camp Pendleton	35,143	36,527	39,830	38,206	32,792	26,663	17,375	11,471	13,495
Donovan	5,665	4,956	4,130	3,167	2,374	1,886	978	639	513
Kearny Villa Road	24,926	24,844	24,946	23,729	19,966	17,261	11,979	8,541	9,699
Rancho Carmel Drive	47,877	47,338	47,286	43,914	36,839	29,903	19,286	12,304	13,603
Lexington Elementary School	26,105	26,640	29,135	28,344	23,110	18,559	11,720	7,749	8,606
Sherman Elementary School	31,514	30,909	30,357	27,179	23,274	18,188	11,539	7,077	7,365
San Ysidro	7,451	7,656	7,582	6,954	5,634	4,233	2,870	1,993	1,881

7.5 NO_2 Rating Summary

Table 7-5 is a summary of the District's NO_2 monitor rating for the regional monitoring network. The scores are based on the analysis from the Network Assessment too for NO_2. The analysis includes scores for the correlation between sites, site removal, and area served.

Table 7-5: NO_2 Rating Summary

Station	Overall Scoring	Correlation	Removal Bias	Area Served	Comments
Alpine (ALP)	18	7	9	2	District's monitor in the Eastern region of County.
Camp Pendleton (CMP)	21	5	7	9	District's North Coastal monitor. Monitor used to capture transport.
Chula Vista (CVA)	11	4	1	6	High correlation with nearby SES monitor.
Otay-Mesa Donovan (DVN)	10	5	4	1	Near International Border.
Kearny Villa Rd. (KVR)	16	4	5	7	Monitor located in North Central region of the County.
Lexington Elementary School (LES)	14	4	3	7	Monitor at District's PAMS and NCore site.
Rancho Carmel Dr (RCD)	25	5	10	10	Near-road site 1.
San Ysidro (SAY)	12	4	6	2	Near-road site 2. Located near Port of Entry.
Sherman Elementary School (SES)	18	7	3	8	Monitor located in Central region of County.

7.6 Conclusion – NO_2 Monitoring

Over the last five years since the last Network Assessment was published in 2020, the District has added one additional site with a NO_2 analyzer. This is the site in San Ysidro, which is part of the Near-road program. In addition to this site, the District is seeking an alternative location for the monitoring site in Escondido, which will include a NO_2 monitor and will provide additional air monitoring data in the North Inland region of the County to address gaps in the Regional Monitoring Network.

8 CARBON MONOXIDE (CO)

8.1 CO Introduction

The District has three carbon monoxide (CO) monitors throughout the Regional Air Monitoring Network. **Figure 8-1** shows the existing CO monitoring sites in the Regional Air Monitoring Network. The District monitors for CO at Lexington Elementary School in El Cajon, Rancho Carmel Drive, and San Ysidro. The CO monitor at Lexington Elementary School is part of the national core monitoring network (NCore) and is designed to enhance monitoring with multi-pollutant monitoring to help provide a better understanding of the atmosphere. A trace-level analyzer is used to monitor CO. The CO monitors at Rancho Carmel Drive and San Ysidro are part of the District's Near-road monitoring program. The CO trends by site are shown in the Appendix section of this Network Assessment. This includes the Annual 2nd Maximum, which are compared to the National Ambient Air Quality Standards (NAAQS). The CO concentrations measured in the District's Regional Monitoring Network are well below the NAAQS. The District meets or exceeds all minimum requirements for CO monitoring and additional information can be found in the Annual Network Report.

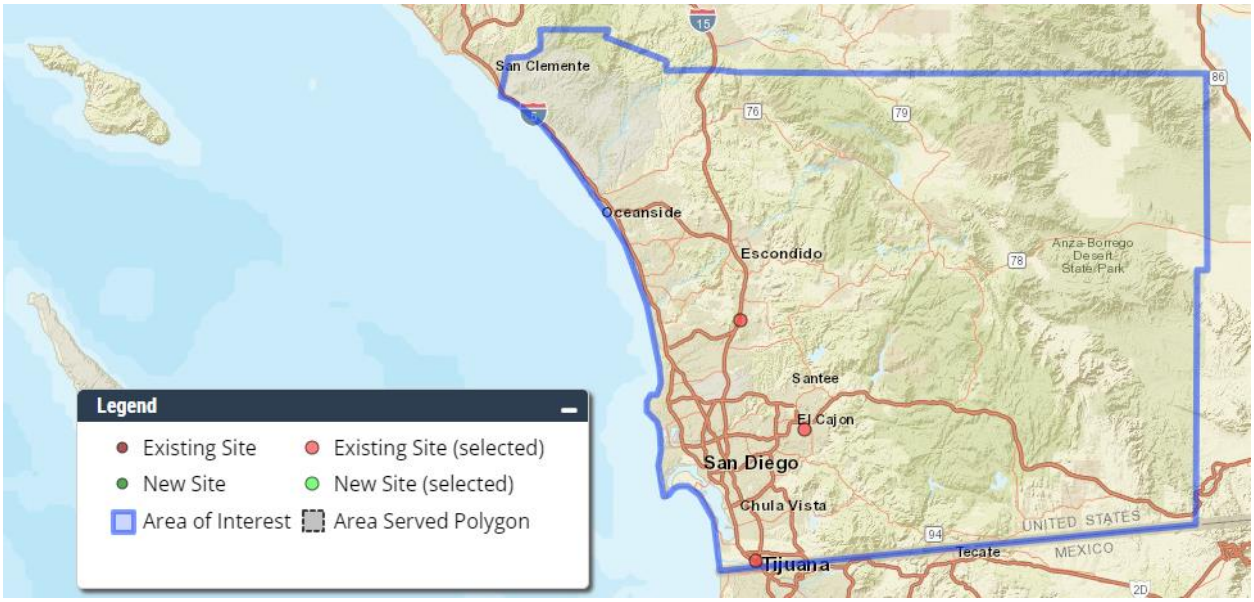


Figure 8-1: CO Monitoring Sites in San Diego County

8.2 CO Correlation Matrix

The CO Correlation Matrix from the EPA Network Assessment shows how concentrations at sites with CO monitors within San Diego County compare to one another. The correlation matrix is used to identify sites that may be redundant in a network. **Figure 8-2** Shows the correlation matrix of CO

sites in San Diego. Sites with a high correlation, a low absolute difference, and close proximities are deemed redundant.

The red squares in the top-right corner show the mean absolute difference in concentrations between each pair of monitors. The numerical value indicates the distance (in kilometers) between each pair of monitors. The intensity of the red boxes (from light red to dark red) represents the mean absolute difference in concentration where a dark red represents 1 ppm difference and light red represents 0 ppm difference. Each monitor comparison is represented by a square in the chart.

The blue squares in the bottom-left corner show the correlation between each pair of monitors, with numerical value in the box indicating the number of days used in the calculation. The intensity of the blue boxes (from light blue to dark blue) represents the correlation between sites where the lightest shade of blue is a correlation equal to 1 and the dark blue has a correlation equal to -1.

The numerical values in the white squares along the diagonal of the Correlation Matrix are the most recent design values for each site.

The CO monitors throughout the Regional Monitoring Network correlate with one another and there is no plan to discontinue monitoring at any of the three sites with CO monitors. The CO monitor at the Lexington Elementary School (LES) site is part of the NCore program, while the monitors at the Rancho Carmel Drive site and the San Ysidro site are part of the Near-road program. The Near-road program requires one CO monitor. The San Ysidro site was added as an additional CO monitor to compliment the Near-road program and provide CO monitoring at both locations.

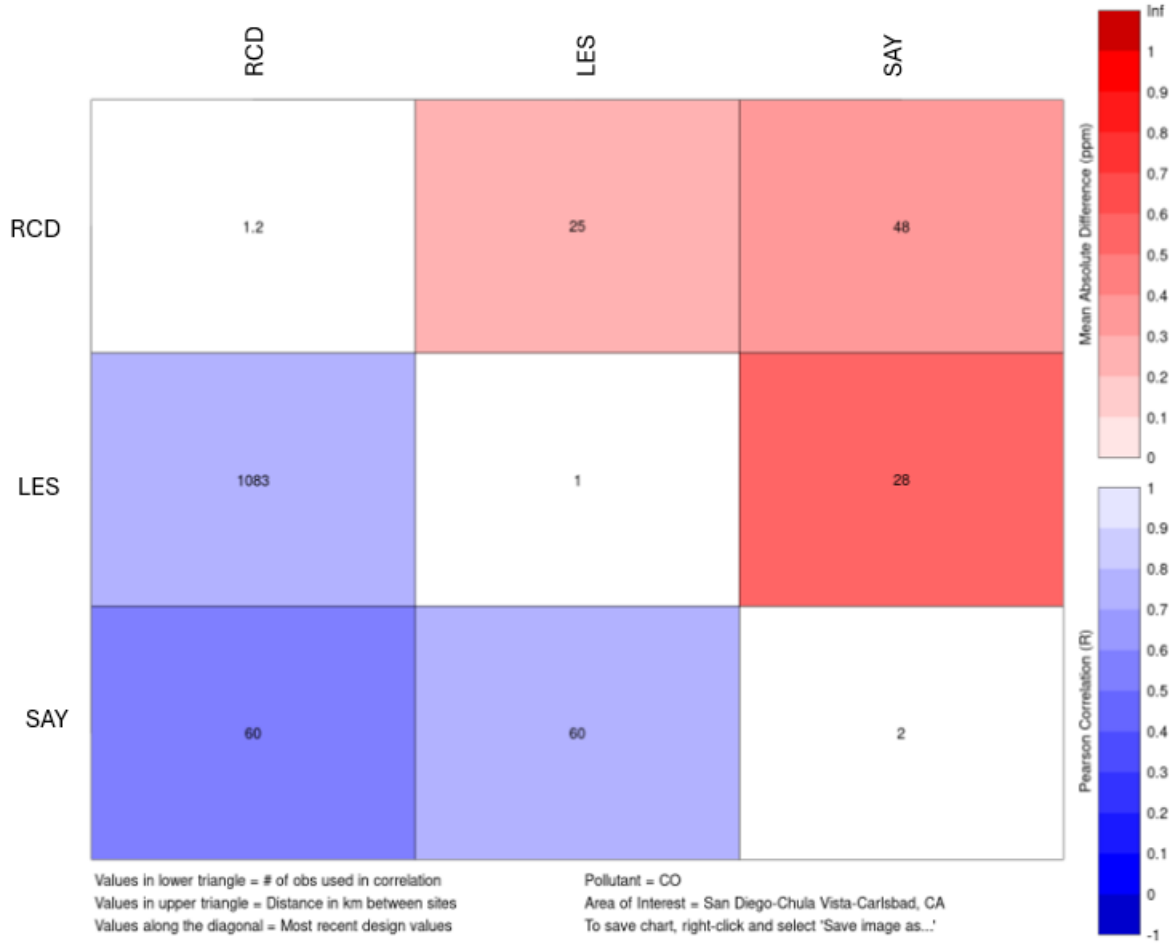


Figure 8-2: Correlation Matrix of CO Sites in San Diego

8.3 CO Removal Bias

The CO Removal Bias Map is shown in **Figure 8-3**. The removal bias value for each site is calculated using the nearest neighboring CO sites to estimate the concentration and compares it to the actual concentration from the selected site. If the removal bias value is small, that may indicate that the monitor may be redundant and could be removed. Red indicates that there is a positive bias. Blue indicates that there is a negative bias. As the bias increases in each direction, the deeper the color will appear. The lighter color indicates that there is a small bias, and these may be redundant sites. The removal bias is determined based on removal bias data from the EPA Network Assessment tool. This data is presented in **Table 8-1** below.

As shown in **Figure 8-3**, the two markers representing the Near-road sites (RCD and SAY) are colored in blue. This is due to the monitors being sited near a highway, where concentrations of CO tend to be higher, and the removal of these sites will result in a negative bias. Currently, no CO monitor is considered redundant and there are no plans to discontinue monitoring for CO at any of the three sites.

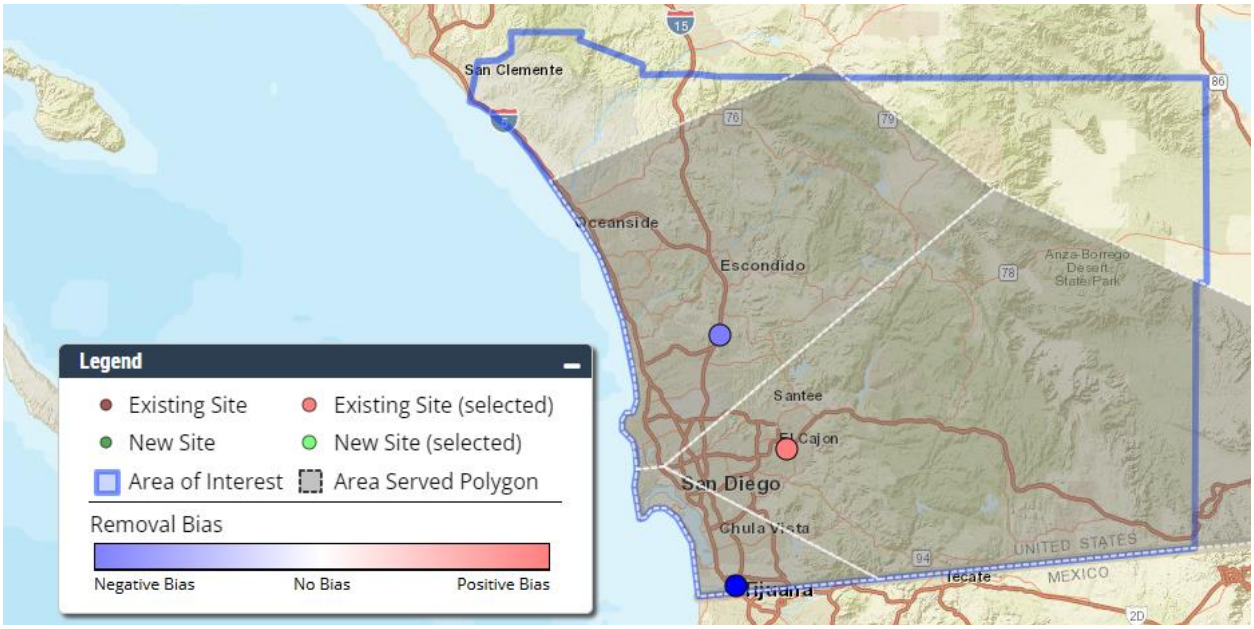


Figure 8-3: Removal Bias Map for CO Sites

Table 8-1: Removal Bias Data for CO Sites

Site	Neighbors Included	Daily Obs Count	Mean Removal Bias (ppm)	Removal Bias Standard Deviation (ppm)	Min Removal Bias (ppm)	Max Removal Bias (ppm)	Mean Relative Bias (%)	Min Relative Bias (%)	Max Relative Bias (%)
RCD	5	1,094	-0.26	0.13	-1.4	0.2	-40.8	-77	33
LES	4	1,084	0.26	0.13	-0.3	1.3	87.6	-42	482
SAY	9	60	-0.51	0.28	-1.3	0.2	-41.7	-63	38

8.4 CO Area Served

The regions and area served by the monitors represent significant population conglomerations. **Figure 8-4** is a pictorial representation of the area served by the CO monitors in the regional monitoring network. Each grey polygon represents the area that is closer to the monitor within it than any other monitor in the network.

The CO monitor located at the Rancho Carmel Drive (RCD) site provides air monitoring data as part of the Near-road monitoring program and is situated near Interstate 15. The CO monitor located at the San Ysidro (SAY) site provides air monitoring data as the second CO monitor deployed for the Near-road program and is situated near Interstate 5 and the Port of Entry. The CO monitor located at Lexington Elementary School (LES) is located in El Cajon as part of the NCore program. By adding

the CO monitor in San Ysidro, the District has increased coverage of CO monitoring throughout the County since the last Network Assessment in 2020.

Table 8-2 lists the area covered for each polygon and the population within that area. The demographics for each area served by CO monitoring sites are detailed in **Table 8-3**, and **Table 8-4** (below).

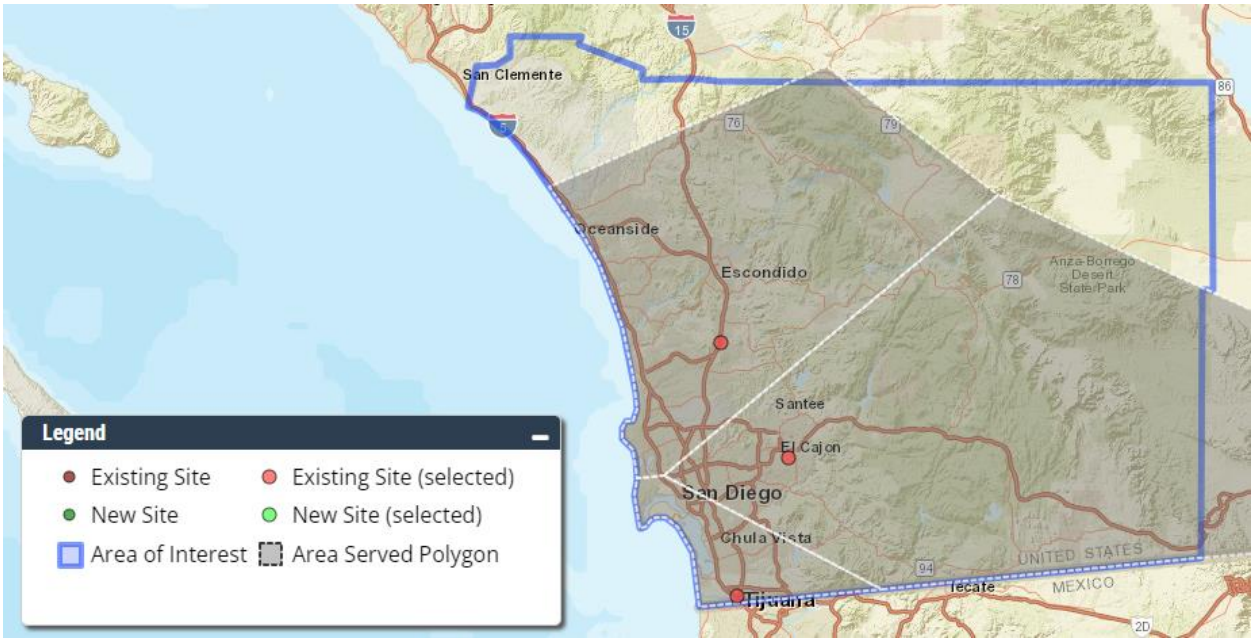


Figure 8-4: Area Served Map - CO

Table 8-2: Area Served for CO and Population

Site Name	Area (km^2)	Total Population
Rancho Carmel Drive	3,684	1,514,883
Lexington Elementary School	8,280	1,088,498
San Ysidro	369	759,373

Table 8-3: CO Area Served Demographics

Site Name	Male	Female	Caucasian/ White	African/ Black	Native American	Asian	Pacific Islander	Other Race	Multiple Races	Hispanic/ Latino
Rancho Carmel Drive	748,469	766,414	835,348	36,062	17,355	231,642	6,175	180,423	207,878	388,723
Lexington Elementary School	536,812	551,686	528,342	73,128	13,960	87,399	4,934	193,046	187,689	420,905
San Ysidro	380,766	378,607	252,931	45,037	10,398	91,244	3,722	195,262	160,779	411,290

Table 8-4: CO Area Served Demographics (Cont.)

Site Name	Age 0 to 4	Age 5 to 9	Age 10 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 29	Age 30 to 34	Age 35 to 39	Age 40 to 44
Rancho Carmel Drive	77,258	87,214	94,426	100,789	112,266	106,933	103,593	104,083	96,749
Lexington Elementary School	61,094	65,572	68,412	65,312	80,174	86,766	88,162	80,842	68,729
San Ysidro	39,583	44,254	48,330	52,911	60,760	63,953	61,000	55,726	49,474
Site Name	**Age 45 to 49**	**Age 50 to 54**	**Age 55 to 59**	**Age 60 to 64**	**Age 65 to 69**	**Age 70 to 74**	**Age 75 to 79**	**Age 80 to 84**	**Age 85 and Over**
Rancho Carmel Drive	95,991	96,492	98,895	93,113	78,876	65,015	42,820	28,166	32,204
Lexington Elementary School	64,365	65,166	68,495	65,307	54,398	42,630	26,722	17,726	18,626
San Ysidro	46,951	46,571	45,653	41,772	34,449	26,508	17,303	11,841	12,334

8.5 CO Rating Summary

Table 8-5 is a summary of the District's CO monitor rating for the regional monitoring network. The District has three CO monitors, which are located at the Rancho Carmel Drive station, the San Ysidro station, and the station at Lexington Elementary School in El Cajon. The scores are based on the analysis from the EPA Network Analysis Tool for CO. The analysis includes the scores for station correlation, removal bias, area served, and community type. The District exceeds the required amount of CO monitors deployed in the regional monitoring network and no additional monitors will be added in the near future.

Table 8-5: CO Monitor Summary Rating

Station	Overall Scoring	Correlation	Removal Bias	Area Served	Comments
Lexington Elementary School (LES)	19	5	6	8	Monitor part of District's NCore program. Trace level analysis.
Rancho Carmel Dr (RCD)	20	4	6	10	Near-road monitor #1.
San Ysidro (SAY)	21	5	10	6	Near-road monitor #2.

8.6 Conclusion – CO Monitoring

Since the last Network Assessment in 2020, the District added a CO monitor at the second Near-road monitoring site in San Ysidro. With the addition of this monitor, the District exceeds the number of required CO monitors in the Regional Monitoring Network. As the District moves forward, it will maintain the existing CO monitors and there are no plans to discontinue any CO monitors.

9 SULFUR DIOXIDE (SO_2)

9.1 SO_2 Introduction

The District has one SO_2 monitor in the Regional Air Monitoring Network located at Lexington Elementary School (LES) in El Cajon. For reference of monitor location, refer to **Figure 9-1**. This monitor is a trace-level analyzer that is part of the National Core (NCore) Program, and this monitor satisfies requirements of SO_2 monitors put forth by the EPA. The area served, correlation matrix, and removal bias are not available for SO_2 due to their only being one monitor within the District. The SO_2 trend for the Lexington Elementary School site is shown in the Appendix section of this Network Assessment. This includes the Annual 98th Percentile and the Desgin Value. These values are compared to the National Ambient Air Quality Standards (NAAQS). SO_2 concentrations at the Lexington Elementary School site are well below the NAAQS. Additional information on SO_2 can be found in the Annual Network Report.

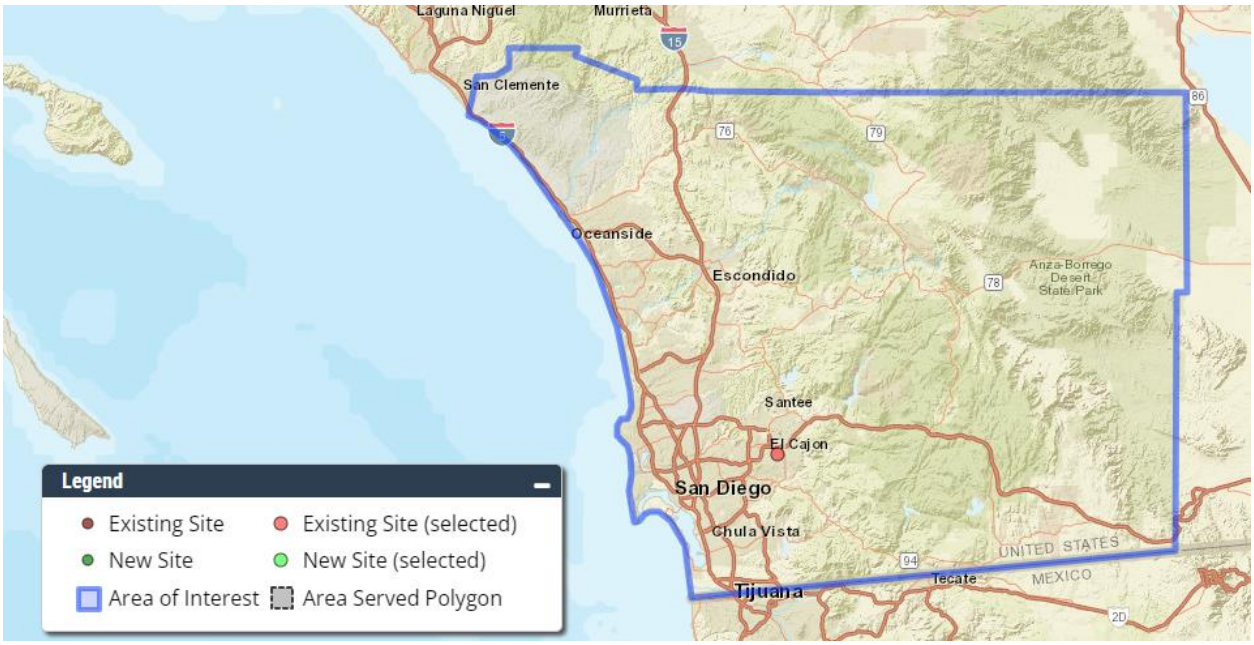


Figure 9-1: SO_2 Monitoring Sites in San Diego County

9.2 Rating Summary

Since there is only one SO_2 monitoring site in the Regional Monitoring Network, an Area Served map, Correlation Matrix, and a Removal Bias Map are not available from the EPA Network Assessment tool. There is no Rating summary available for this monitor and is reflected in the scoring summary in Table 2-1 as “N/A”.

9.3

9.3 Conclusion

The SO_2 monitor is federally required as part of the NCore Program. The annual average is routinely below 1 ppb, the maximum 24-hr concentration is routinely below 1 ppb, and the maximum 1-hr concentration is routinely below 5 ppb, and well below the standards for these metrics. The monitor consistently measures near zero concentrations and has since the inception of the NCore program. The SO_2 data from the NCore site is informative to EPA in showing areas that achieve these low SO_2 concentrations compared to other regions (outside of the San Diego Air Basin) with higher SO_2 measurements. There are no plans for the District to discontinue this monitor at this time.

10 Lead (Pb)

10.1 Lead Introduction

The District has one lead monitoring site in the Regional Air Monitoring Network. **Figure 10-1** shows the existing lead monitoring site in the Regional Air Monitoring Network. The District operates a primary and collocated lead monitor at McClellan-Palomar Airport (CRQ), which is located in the North Coastal Region of the County. The Design Value trend for lead at the Palomar Airport site is shown in the Appendix section of this Network Assessment and is compared to the National Ambient Air Quality Standards (NAAQS). Lead concentrations measured at the Palomar Airport site are well below the NAAQS. The District meets the minimum requirements for lead monitoring and additional information can be found in the Annual Network Report.

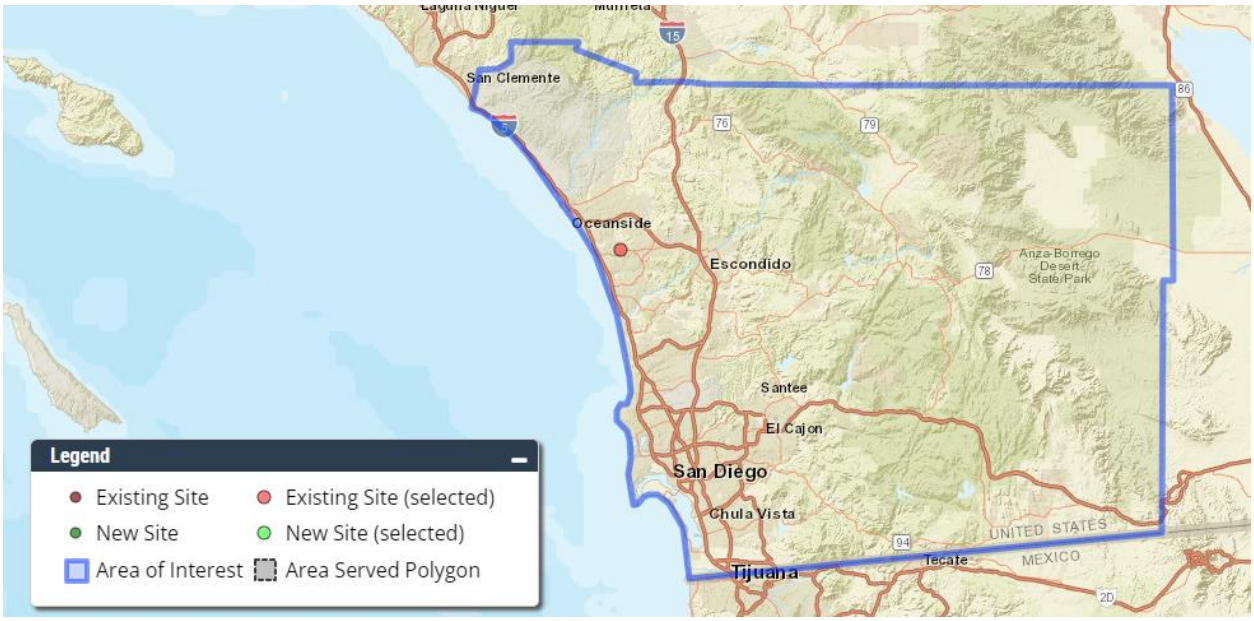


Figure 10-1: Lead Monitor Site

10.2 Lead Monitor Discussion

The District is required to sample for lead McClellan-Palomar Airport as part of the Airport Special Study for lead monitoring. For additional information on the District's monitoring requirements for lead, please refer to the District's Annual Network Report. The regulation for lead monitoring for the Airport Special Study was added in 2011 and several airports had to undergo temporary lead sampling, regardless if the National Emissions Inventory (NEI) were less than 1.0 TPY. If the analyzed emissions exceeded the NAAQS by 50%, the lead monitor was to become permanent, or until the emissions were proven to be less than 50% of the NAAQS (over a three-year period).

The Airports in the District's Network included Gillespie Field and McClellan-Palomar Airport. The Airport study at Gillespie Field officially concluded and it was determined by EPA that lead monitoring at this airport could be concluded.

The Airport study at McClellan-Palomar Airport did not pass the minimum tolerances established by the EPA. This required the District to sample for lead at Palomar Airport until such time as the measured concentrations were below the Federal standard for a minimum of three years. Measured concentrations for lead have met the waiver criteria (three continuous years of sampling at this location and less than 50% of the NAAQS) and the District will request the discontinuation of regulatory lead sampling at this site.

10.3 Lead Rating Summary

The District monitors for lead at the McClellan-Palomar Airport. This site operates a primary and collocated lead sampler. As a reference, the Area Served Map for lead is the County limits depicted in blue in Site Map Figure above. There is no site removal bias analysis or station correlation matrix included in this evaluation from the EPA Network Assessment Tool since the District only operates the one site at McClellan-Palomar. No lead rating summary table is provided in this chapter and the summary rating for all sites in **Table 2-1** is labelled as "N/A".

10.4 Lead Conclusion

The District operates Lead samplers at McClellan-Palomar Airport. The measured concentrations at the Palomar Airport location have been consistently well below the NAAQS and the District will petition the EPA to decommission lead sampling at this site.

11 PARTICULATE MATTER 2.5 µm ($PM_{2.5}$)

11.1 $PM_{2.5}$ Introduction

The District operates $PM_{2.5}$ monitors at nine monitors throughout the Regional Air Monitoring Network. The District is seeking an alternative location to set up a monitoring site in Escondido, which would include a $PM_{2.5}$ monitor. The $PM_{2.5}$ trends by site are shown in the Appendix section of this Network Assessment. This includes the Annual 98th Percentile and the Annual Mean compared to the National Ambient Air Quality Standards (NAAQS). The sites along the southern part of the County, which include the Donovan site and the San Ysidro site tend to measure the highest levels of $PM_{2.5}$ in the Regional Monitoring Network. The District meets or exceeds all minimum requirements for $PM_{2.5}$ monitoring and additional information can be found in the Annual Network Report.

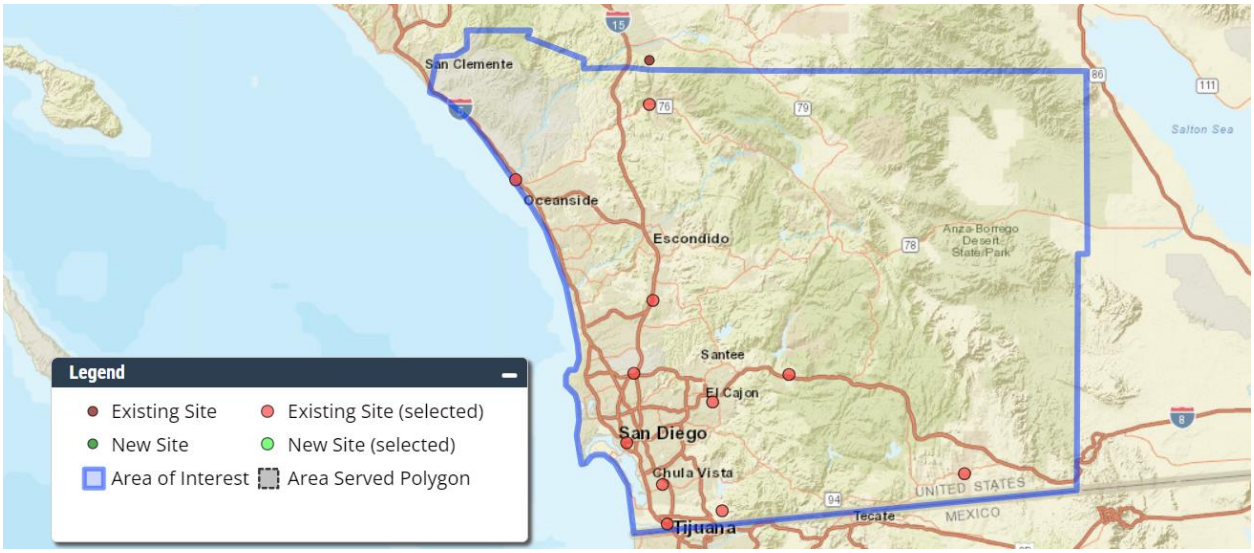


Figure 11-1: $PM_{2.5}$ Monitoring Sites in San Diego County

11.2 $PM_{2.5}$ Correlation Matrix

According to the EPA Network Assessment tool, the Correlation Matrix shows how concentrations at sites with $PM_{2.5}$ monitors within San Diego County compared to one another. The correlation matrix is used to identify sites that may be redundant in a network. **Figure 11-2** shows the correlation matrix of $PM_{2.5}$ sites in San Diego. Sites with a high correlation, a low absolute difference, and close proximities are deemed redundant.

The red squares in the top-right corner show the mean absolute difference in concentrations between each pair of monitors. The numerical value indicates the distance (in kilometers) between each pair of monitors. The intensity of the red boxes (from light red to dark red) represents the mean absolute difference in concentration where a dark red represents 10 µg/m^3 difference and

light red represents 0 µg/m^3 difference. Each monitor comparison is represented by a square in the chart.

The blue squares in the bottom-left corner show the correlation between each pair of monitors, with numerical value in the box indicating the number of days used in the calculation. The intensity of the blue boxes (from light blue to dark blue) represents the correlation between sites where the lightest shade of blue is a correlation equal to 1 and the dark blue has a correlation equal to -1.

The numerical values in the white squares along the diagonal of the Correlation Matrix are the most recent design values for the daily and annual for each site.

The District's $PM_{2.5}$ monitor at the Donovan (DVN) site typically measures the highest $PM_{2.5}$ concentrations in the Regional Monitoring Network. The San Ysidro (SAY) site was recently established as the second Near-road monitoring site, and it has also measured higher $PM_{2.5}$ concentrations. From the $PM_{2.5}$ correlation matrix, the monitor at Chula Vista (CVA) has a high correlation (0.91) to the monitor at Sherman Elementary School (SES) and a low mean difference in concentration (1.3 µg/m^3), while also being separated by a distance of 12 km. This indicates that the monitor may be redundant. However, the District is seeking to update the monitoring shelter at CVA and has no plans to decommission this monitor.

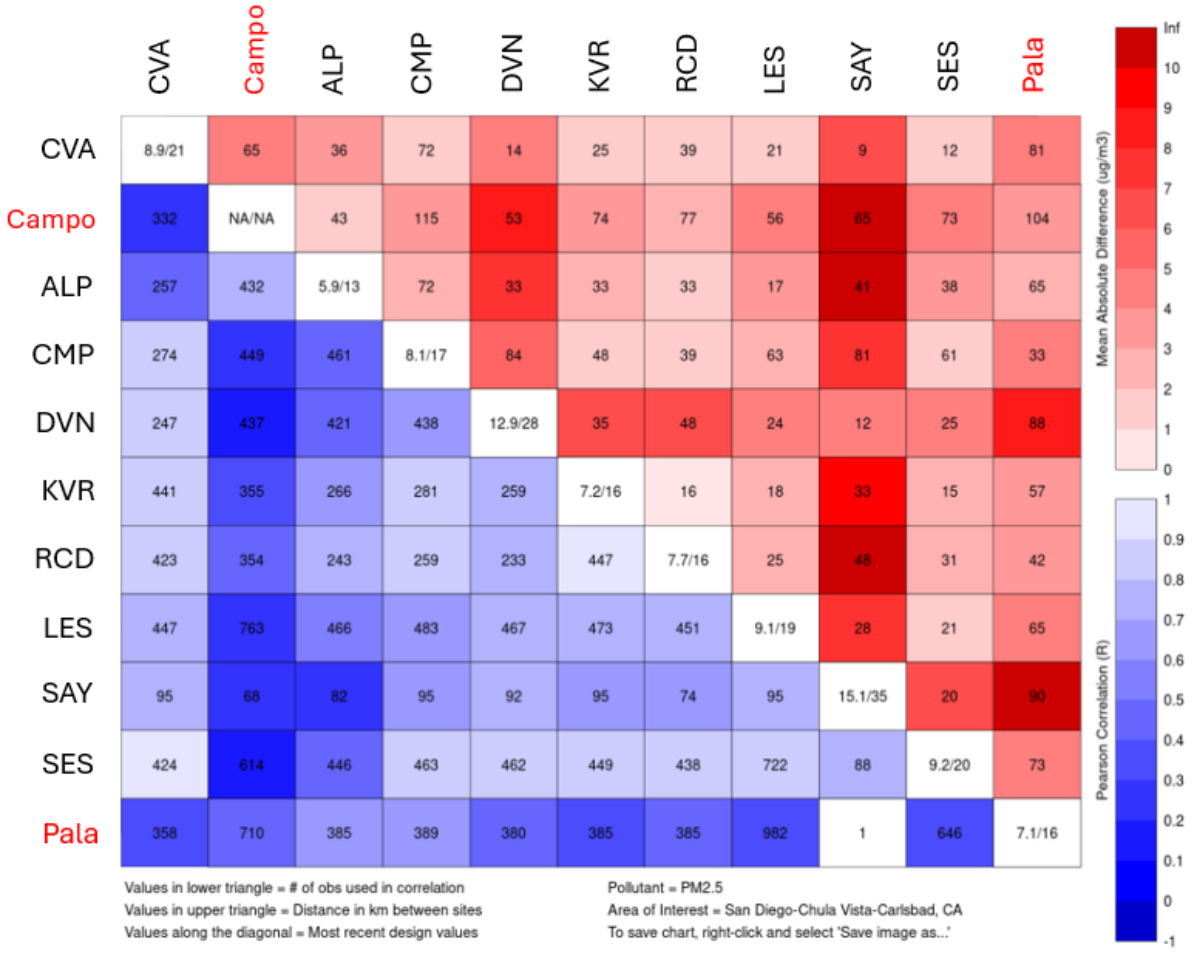


Figure 11-2: Correlation Matrix of $PM_{2.5}$ Sites in San Diego

11.3 $PM_{2.5}$ Removal Bias

The $PM_{2.5}$ Removal Bias Map is shown in **Figure 11-3**. The removal bias value for each site is calculated using the nearest neighboring sites to estimate the concentration and compares it to the actual concentration from the selected site. If the removal bias value is small, that may indicate that the monitor may be redundant and could be removed. Red indicates that there is a positive bias. Blue indicates that there is a negative bias. As the bias increases in each direction, the deeper the color will appear. The lighter color indicates that there is a small bias, and these may be redundant sites. The removal bias is determined based on removal bias data from the EPA Network Assessment tool. This data is presented in **Table 12-3**, below. Note that both the bias and the corresponding data include sites not under District control. These sites are highlighted with red text.

As shown in **Figure 11-3** and **Table 11-1** below, the Donovan and the San Ysidro monitors are two monitors that typically read higher $PM_{2.5}$ concentrations are show marked by a deep blue color on the Removal Bias Map. The removal of these sites would create a negative removal bias for $PM_{2.5}$

in the Regional Monitoring Network. Each $PM_{2.5}$ monitor provides valuable data in the Regional Monitoring Network. The monitor at Donovan is the site that typically measures the highest $PM_{2.5}$ in the Regional Monitoring Network. Similarly, the San Ysidro monitor has also measured high concentrations of $PM_{2.5}$ and serves as the District's second Near-road site. The monitor in Rancho Carmel Drive is a Near-road site located off the Interstate 15 freeway. The monitor in Camp Pendleton, located in the North Coastal region of the County, also provides $PM_{2.5}$ data for any transport from neighboring regions. The Kearny Villa Road site is located in the North Central region of the County. The monitor at Sherman Elementary School located in the Central region of the County is designated as the site of poor air quality. To the south of the Sherman Elementary Monitor is the monitor located at Chula Vista. The monitor at Lexington Elementary School and Alpine provides data for communities in the East part of the County. Adding an additional site in Escondido would provide valuable information on $PM_{2.5}$ in the North Inland part of the County.

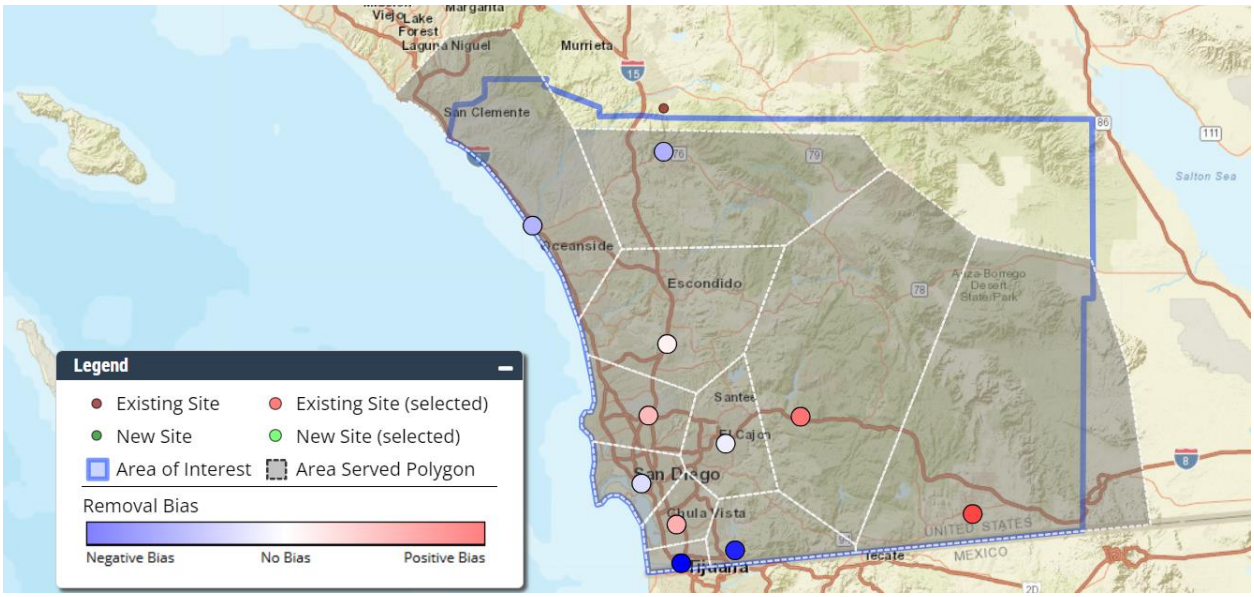


Figure 11-3: Removal Bias Map for $PM_{2.5}$ Sites

Table 11-1: Removal Bias Data for $PM_{2.5}$ Ozone Sites

Site	Neighbors Included	Daily Obs Count	Mean Removal Bias (µg/m³)	Removal Bias Standard Deviation (µg/m³)	Min Removal Bias (µg/m³)	Max Removal Bias (µg/m³)	Mean Relative Bias (%)	Min Relative Bias (%)	Max Relative Bias (%)
CVA	4	452	1.63	2.5	-3.4	14.2	20	-23	155
Campo*	7	777	3.75	3.83	-6.6	24.9	106.9	-52	1089
ALP	7	466	2.82	2.95	-3.4	14.4	71.4	-30	843
CMP	8	483	-1.52	2.14	-10.8	5.3	-15.9	-70	76
DVN	5	471	-4.47	4.25	-20.9	5.7	-27.2	-74	117
KVR	4	479	1.41	1.77	-3	12.8	27.7	-25	286
RCD	5	458	0.3	1.19	-4	11.9	6.6	-31	186
LES	6	756	-0.38	2.22	-17.4	6.9	-2.4	-74	78
SAY	10	95	-5.17	5.08	-22	3.6	-27.5	-72	24
SES	7	733	-0.72	1.68	-8.7	4.5	-6.1	-48	59
Pala*	5	976	-1.6	4.87	-22.3	22.2	0.4	-100	640

***Sites not controlled by the District**

11.4 $PM_{2.5}$ Area Served

Figure 12-4 is a pictorial representation of the area served by the $PM_{2.5}$ monitors in the Regional Monitoring Network. Each grey polygon represents the area that is closer to the monitor within it than any other monitor in the network. The elimination of any station will correspond to a decrease in coverage and a decrease in the District's ability to warn and inform the public of any health concerns.

The District's addition of Federal Equivalence Method (FEM) $PM_{2.5}$ monitors (Teledyne T640x) throughout the Regional Monitoring Network has provided additional coverage and more Area Seved. The District transitioned to the FEM monitors since the last Network Assessment. Currently, the site in Lexington Elementary School has a FEM monitor collocated with a required FRM monitor as part of the NCore program. The Kearny Villa Road monitoring site is the District's collocated site and operates two FEM $PM_{2.5}$ monitors.

The District is seeking to re-establish a monitoring site in Escondido. The Area Served Map shown does not include the proposed site at Escondido. The Pala air monitoring site does provide some area coverage in the North Inland region for $PM_{2.5}$. There is also a tribal monitoring site in Campo that provides additional area coverage extending to the eastern part of the County for $PM_{2.5}$.

The demographics for each area served by monitoring sites is detailed in **Tables 12-2**, **Tables 12-3**, and **Table 11-4** (below). Note that Campo and Pala stations are not under District control.

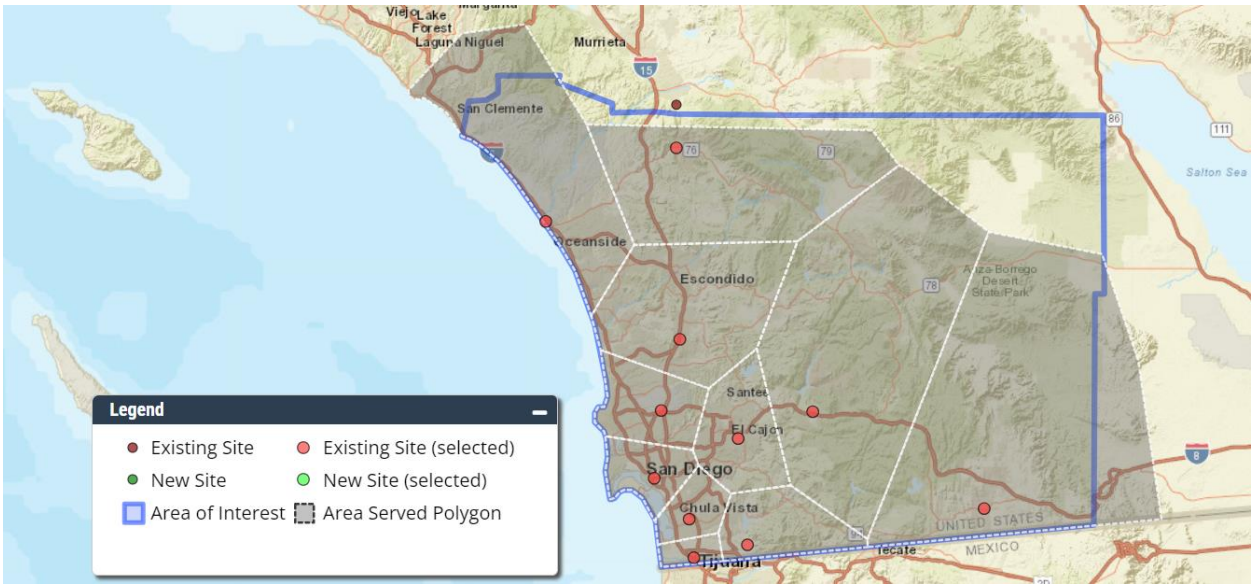


Figure 11-4: Area Served Map - $PM_{2.5}$

Table 11-2: Area Served for $PM_{2.5}$ and Population

Site Name	Area (km^2)	Total Population
Chula Vista	172	402,257
Alpine	1,223	55,945
Camp Pendleton	1,079	611,193
Campo Indian Reservation*	2,803	10,008
Pala Airpad*	2,142	108,693
Donovan	545	67,689
Kearny Villa Rd.	329	454,048
Rancho Carmel Drive	951	637,224
Lexington Elementary School	374	435,315
Sherman Elementary School	186	542,846
San Ysidro	55	122,978

***Sites not controlled by the District**

Table 11-3: Ozone Area Served Demographics

Site Name	Male	Female	Caucasian/ White	African/ Black	Native American	Asian	Pacific Islander	Other Race	Multiple Races	Hispanic/ Latino
Chula Vista	195,183	207,074	100,389	27,432	5,638	70,910	2,803	104,012	91,073	228,016
Alpine	27,914	28,031	41,764	625	1,593	1,033	127	3,793	7,010	10,591
Camp Pendleton	308,519	302,674	371,036	16,032	7,833	38,165	3,696	85,007	89,424	188,692
Campo Indian Reservation*	5,193	4,815	5,659	226	626	119	19	1,663	1,696	3,735
Pala Airpad*	53,885	54,808	62,496	1,682	4,518	5,449	346	17,598	16,604	36,498
Donovan	36,655	31,034	20,136	5,962	622	12,017	289	13,055	15,608	31,769
Kearny Villa Rd.	227,236	226,812	250,227	17,376	2,803	95,207	1,751	29,406	57,278	79,560
Rancho Carmel Drive	311,741	325,483	345,056	11,979	5,236	112,060	1,573	75,548	85,772	158,305
Lexington Elementary School	212,069	223,246	260,539	25,985	4,386	23,721	2,299	52,169	66,216	121,469
Sherman Elementary School	278,172	264,674	254,630	45,277	6,837	49,057	2,066	107,052	77,927	202,034
San Ysidro	59,582	63,396	28,670	4,320	2,022	11,156	474	43,639	32,697	89,947

***Sites not controlled by the District**

Table 11-4: Ozone Area Served Demographics (Cont.)

Site Name	Age 0 to 4	Age 5 to 9	Age 10 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 29	Age 30 to 34	Age 35 to 39
Chula Vista	22,235	25,404	27,830	27,983	28,552	29,199	28,263	27,413
Alpine	2,788	3,273	3,534	3,338	2,710	2,585	3,190	3,482
Camp Pendleton	32,227	34,559	37,605	40,648	53,753	41,837	38,732	38,869
Campo Indian Reservation*	546	605	634	593	451	528	555	564
Pala Airpad*	5,720	6,417	6,761	6,563	6,205	6,315	6,441	6,538
Donovan	3,441	4,533	5,235	5,070	4,469	4,556	4,995	5,469
Kearny Villa Rd.	22,590	22,048	20,972	28,113	51,912	43,239	38,932	33,271
Rancho Carmel Drive	34,244	41,939	46,889	45,321	37,981	34,851	37,060	42,615
Lexington Elementary School	25,548	27,688	28,831	26,368	27,213	29,654	31,465	30,997
Sherman Elementary School	25,605	24,940	25,870	30,979	49,327	59,860	56,541	46,352
San Ysidro	6,829	7,879	8,953	9,392	9,536	9,818	8,812	8,089

Site Name	Age 50 to 54	Age 55 to 59	Age 60 to 64	Age 65 to 69	Age 70 to 74	Age 75 to 79	Age 80 to 84	Age 85 and Over
Chula Vista	25,108	25,669	24,356	19,954	15,304	9,979	7,345	7,793
Alpine	3,670	4,608	4,737	4,092	3,292	2,069	1,104	987
Camp Pendleton	38,218	41,016	38,433	32,984	26,992	17,601	11,540	13,555
Campo Indian Reservation*	584	732	879	828	656	347	222	185
Pala Airpad*	6,760	7,774	8,254	7,415	6,289	4,041	2,596	2,567
Donovan	4,956	4,130	3,167	2,374	1,886	978	639	513
Kearny Villa Rd.	24,844	24,946	23,729	19,966	17,261	11,979	8,541	9,699
Rancho Carmel Drive	43,804	43,256	39,804	33,195	26,864	17,404	11,157	12,454
Lexington Elementary School	26,640	29,135	28,344	23,110	18,559	11,720	7,749	8,606
Sherman Elementary School	30,909	30,357	27,179	23,274	18,188	11,539	7,077	7,365
San Ysidro	7,656	7,582	6,954	5,634	4,233	2,870	1,993	1,881

***Sites not controlled by the District**

11.5 $PM_{2.5}$ Exceedance Probability

A map of the District's $PM_{2.5}$ Exceedance Probability is shown in **Figure 11-5** below. The figure is from the EPA 2025 Network Assessment Tool and shows the exceedance probabilities for each census tract in the District for $PM_{2.5}$. These values represent the probability of exceeding the National Ambient Air Quality Standards (NAAQS) (based on Downscaler fused air quality surfaces for 2019 to 2021). High exceedance probabilities are depicted in red and are shown to be in the western region of the County. This is where the District's Donovan monitor is also located where exceedances are most likely to be measured and is also the District's Design Value site.

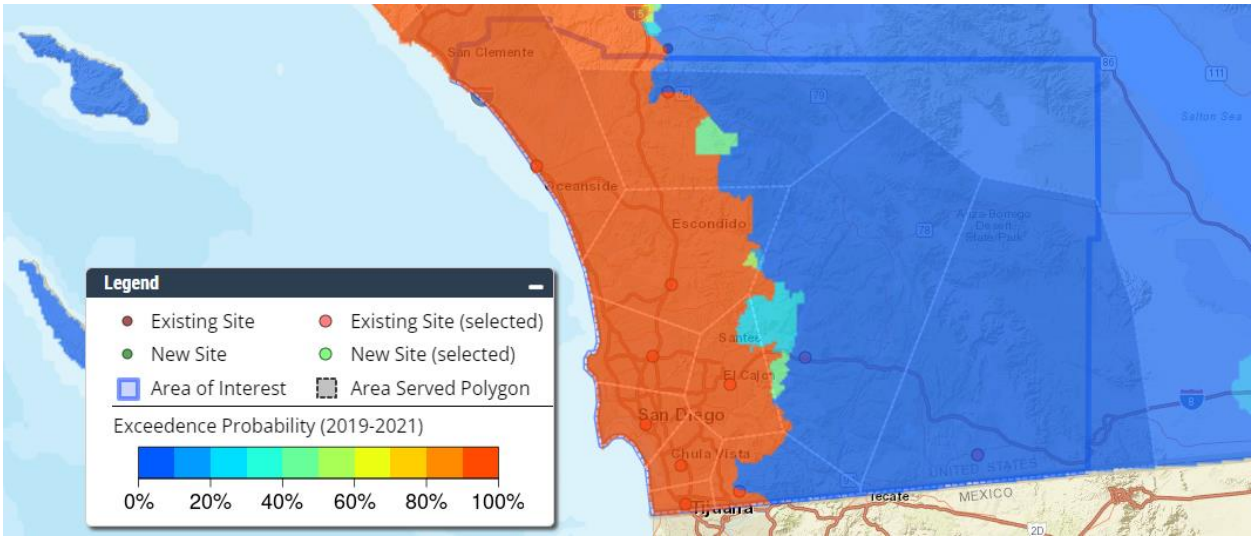


Figure 11-5: Exceedance Probability

11.6 $PM_{2.5}$ Community-Centred Environmental Protection Index

A map of the District's Community-Centered (CC) Index for $PM_{2.5}$ is shown in **Figure 11-6** below. Areas in red depict a higher CC index. This red area is also where the District has added monitoring with a focus on Community Monitoring. Currently, the District has additional monitoring two of these communities. One community is the Portside Community and the other is the International Border Community. The Portside Community is located in the Central region of the County and the International Border Community is located along the South region of the County and near the major Ports of Entry (POE). Additional information on the District's Community Air Monitoring Program can be found on the District's website and in the Community Air Monitoring Plan. **Table 12-5** presents the numerical values for Ozone CC Index and Ozone CC Percentile.

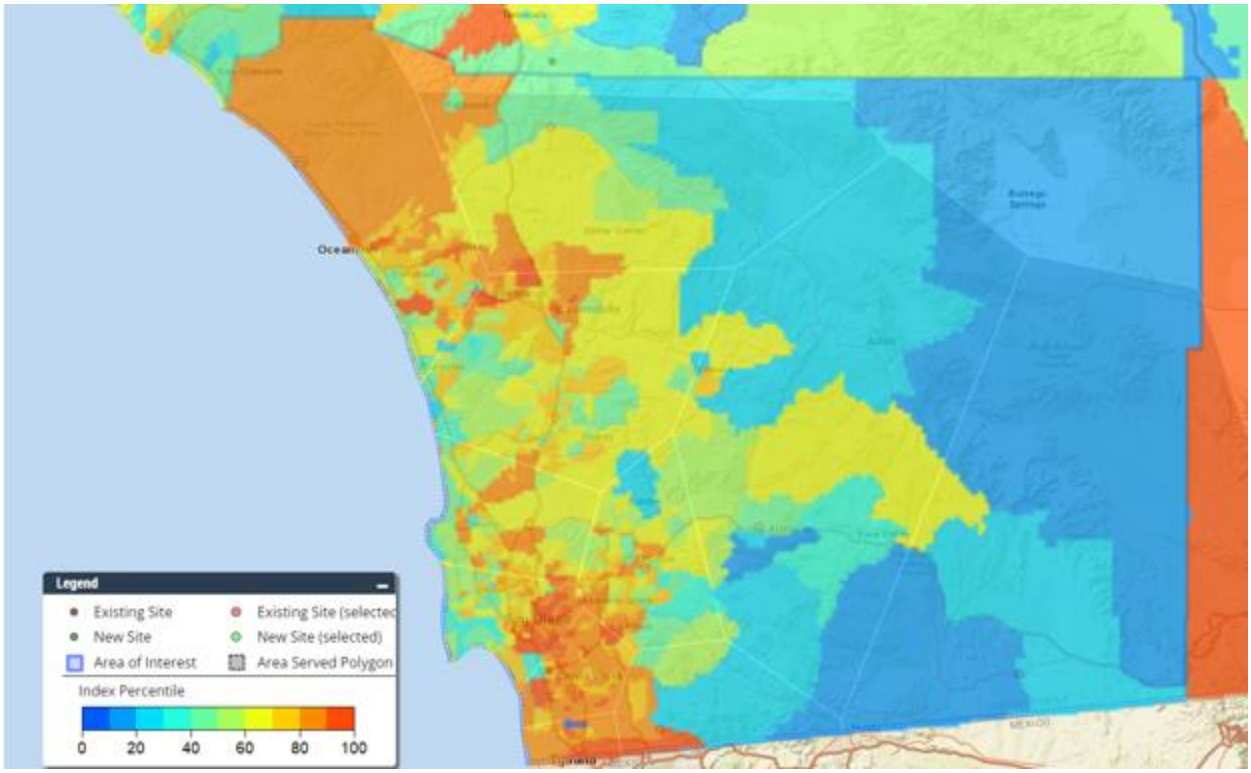


Figure 11-6: $PM_{2.5}$ CC Index

Table 11-5: PM2.5 CC Index and CC Percentile

Site Name	$PM_{2.5}$ CC Index	$PM_{2.5}$ CC Percentile
Chula Vista	39.1	84
Alpine	7.9	33
Camp Pendleton	23.5	66
Campo Indian Reservation*	5	23
Pala Airpad*	21.1	64
Donovan	28	74
Kearny Villa Rd.	22.8	65
Rancho Carmel Drive	23.1	66
Lexington Elementary School	24.4	69
Sherman Elementary School	29.8	72
San Ysidro	38.6	84

***Sites not controlled by the District**

11.7 $PM_{2.5}$ Rating Summary

Table 12-6 is a summary of the District's $PM_{2.5}$ monitor rating for the regional monitoring network. The scores are based on the analysis from the Network Assessment tool for $PM_{2.5}$. The analysis includes scores for correlation between sites, site removal, area served, potential exceedances, CC index.

Table 11-6: $PM_{2.5}$ Monitor Summary Rating

Station	Overall Scoring	Correlation	Removal Bias	Area Served	Exceedance Threshold	CC Index	Comments
Alpine (ALP)	16	5	6	1	2	2	Monitor located in East region of County.
Camp Pendleton (CMP)	35	4	4	10	10	7	Monitor located in North Coastal region of County.
Chula Vista (CVA)	35	4	4	7	10	10	High correlation with nearby SES monitor.
Otay-Mesa Donovan (DVN)	36	7	9	2	10	8	Monitor located in South region of County. High PM concentrations. Near International Border.
Kearny Villa Rd. (KVR)	31	4	3	8	10	6	Monitor located in North Central region of the County. District's collocated monitor site.
Lexington Elementary School (LES)	29	4	1	7	10	7	Part of NCore. Continuous PM monitor collocated with manual filter sampling.
Rancho Carmel Dr (RCD)	31	4	1	10	10	6	Near-road monitor #1.
San Ysidro (SAY)	42	10	10	2	10	10	Near-road monitor #2. High PM concentrations. Near Port of Entry.
Sherman Elementary (SES)	33	4	2	9	10	8	Monitor located in site of Poor Air Quality.

11.8 $PM_{2.5}$ Conclusion

Since the last Network Assessment was published in 2020, the District has added the number of Federal Equivalence Monitors (FEM) for $PM_{2.5}$ monitoring. The District added the second Near-road monitor at San Ysidro and the District is seeking a new location for a monitor in Escondido to address a gap in the network. The Donovan site is the Design Value site for the Network and the highest $PM_{2.5}$ concentrations have been recorded in Donovan. The correlation matrix, area served study statistics, removal bias, exceedance probability, and CC Index helped assess the $PM_{2.5}$ monitoring throughout San Diego County.

12 PARTICULATE MATTER 10 µm (PM_{10})

12.1 PM_{10} Introduction

The District operates PM_{10} monitors at nine monitors throughout the Regional Air Monitoring Network. The PM_{10} trends by site are shown in the Appendix section of this Network Assessment. This includes the Annual 2nd Maximum and the Desgin Value. These values are compared to the National Ambient Air Quality Standards (NAAQS). The District's Donvan site measures the highest PM_{10} concentration in the Regional Monitoring Network. It should be noted that only Lexington Elementary School, Donovan, and Chula Vista are included in the Appendix section since the District's recent deployment of a continuous PM analyzers, which includes PM_{10}, was deployed at most of the District's monitoring sites. The District is seeking an alternative location to set up a monitoring site in Escondido, which would include a PM_{10} monitor. The District meets or exceeds all minimum requirements for PM_{10} monitoring and additional information can be found in the Annual Network Report.

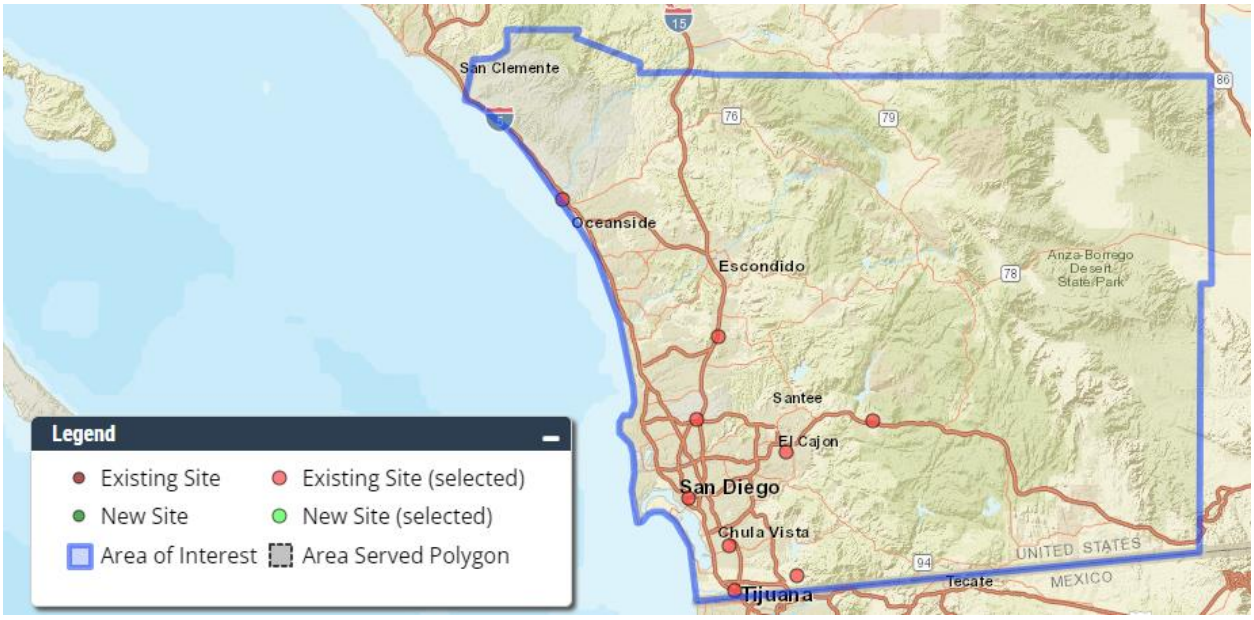


Figure 12-1: PM_{10} Monitoring Sites in San Diego County

12.2 PM_{10} Correlation Matrix

According to the EPA Network Assessment tool, the Correlation Matrix shows how concentrations at sites with PM_{10} monitors within San Diego County compare to one another. The correlation matrix is used to identify sites that may be redundant in a network. **Figure 12-2** shows the correlation matrix of PM_{10} sites in San Diego. The PM_{10} sites are the same as the $PM_{2.5}$ sites since the type of monitor used samples for both PM_{10} and $PM_{2.5}$ simultaneously. Sites with a high correlation, a low absolute difference, and close proximities are deemed redundant.

The red squares in the top-right corner show the mean absolute difference in concentrations between each pair of monitors. The numerical value indicates the distance (in kilometers) between each pair of monitors. The intensity of the red boxes (from light red to dark red) represents the mean absolute difference in concentration where a dark red represents 50 µg/m^3 difference and light red represents 0 µg/m^3 difference. Each monitor comparison is represented by a square in the chart.

The blue squares in the bottom-left corner show the correlation between each pair of monitors, with numerical value in the box indicating the number of days used in the calculation. The intensity of the blue boxes (from light blue to dark blue) represents the correlation between sites where the lightest shade of blue is a correlation equal to 1 and the dark blue has a correlation equal to -1.

The numerical values in the white squares along the diagonal of the Correlation Matrix are the most recent design values for the daily and annual for each site.

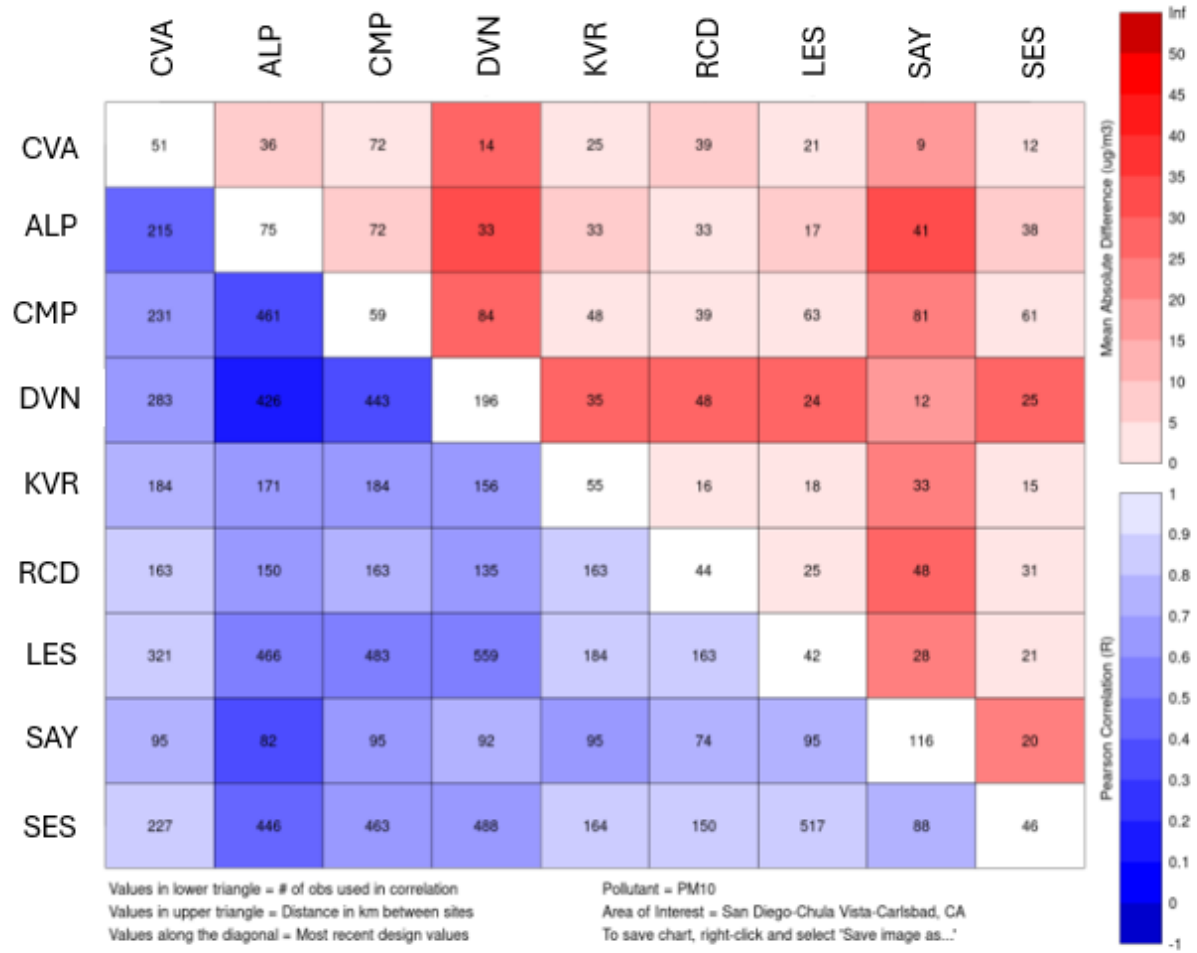


Figure 12-2: Correlation Matrix of PM_{10} Sites in San Diego

12.3 PM_{10} Removal Bias

The PM_{10} Removal Bias Map is shown in **Figure 12-3**. The removal bias value for each site is calculated using the nearest neighboring sites to estimate the concentration and compares it to the actual concentration from the selected site. If the removal bias value is small, that may indicate that the monitor may be redundant and could be removed. Red indicates that there is a positive bias. Blue indicates that there is a negative bias. As the bias increases in each direction, the deeper the color will appear. The lighter color indicates that there is a small bias, and these may be redundant sites. The removal bias is determined based on removal bias data from the EPA Network Assessment tool. This data is presented in **Table 12-1**, below.

Similar to $PM_{2.5}$, PM_{10} at the Donovan and the San Ysidro monitors also measure higher PM_{10} concentrations and are shown as a deep blue color on the Removal Bias Map below in **Figure 12-3**. The removal of these sites would result in a negative removal bias for PM_{10} in the Regional Monitoring Network. These monitors provide valuable data to compare to the Network's $PM_{2.5}$ data due to their proximity to the international border. The District seeks to add an additional PM monitor, which will include PM_{10} in Escondido, located in the North Inland region of the County.

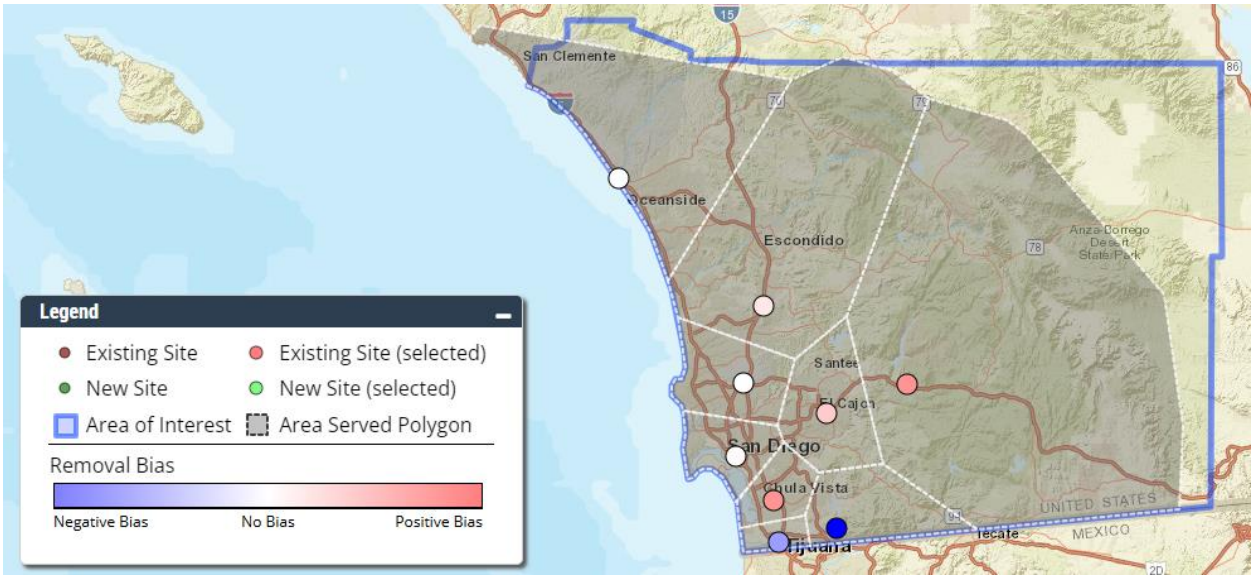


Figure 12-3: Removal Bias Map for PM_{10} Sites

Table 12-1: Removal Bias Data for PM_{10} Ozone Sites

Site	Neighbors Included	Daily Obs Count	Mean Removal Bias ($\mu g/m^3$)	Removal Bias Standard Deviation ($\mu g/m^3$)	Min Removal Bias ($\mu g/m^3$)	Max Removal Bias ($\mu g/m^3$)	Mean Relative Bias (%)	Min Relative Bias (%)	Max Relative Bias (%)
CVA	4	324	10	11	-7	67	41.7	-21	318
ALP	7	466	10	9.8	-75	44	83.6	-56	646
CMP	7	483	0.1	7.2	-68	32	3	-73	162
DVN	6	573	-23.8	26.8	-207	46	-39.6	-93	152
KVR	4	184	0	3.7	-20	8	3.5	-42	61
RCD	7	163	2.3	2.7	-6	14	13.1	-32	75
LES	6	613	5	8	-17	64	23.9	-54	305
SAY	10	95	-9.2	13.3	-57	22	-16.3	-69	60
SES	6	572	0.4	4.2	-14	19	2.8	-43	108

12.4 PM_{10} Area Served

Figure 12-4 is a pictorial representation of the area served by the PM_{10} monitors in the Regional Monitoring Network. Each grey polygon represents the area that is closer to the monitor within it than any other monitor in the network. The elimination of any station will correspond to a decrease in coverage and a decrease in the District's ability to warn and inform the public of any health concerns.

Since the last Network Assessment, the District has expanded the number of PM_{10} monitors. This is due to the real-time PM sampler (Teledyne T640x) monitors for both $PM_{2.5}$ and PM_{10} simultaneously. This allows for more coverage throughout the Regional Monitoring Network. The District plans to add an additional sampler in Escondido when a site is established (TBD). Currently, the site that covers the most area and population (**Table 13-2**) is the Rancho Carmel Drive site. The proposed monitor in Escondido will provide additional coverage to the North Inland region.

The demographics for each area served by monitoring sites is detailed in **Table 12-2**, **Table 12-3**, and **Table 12-4** below.

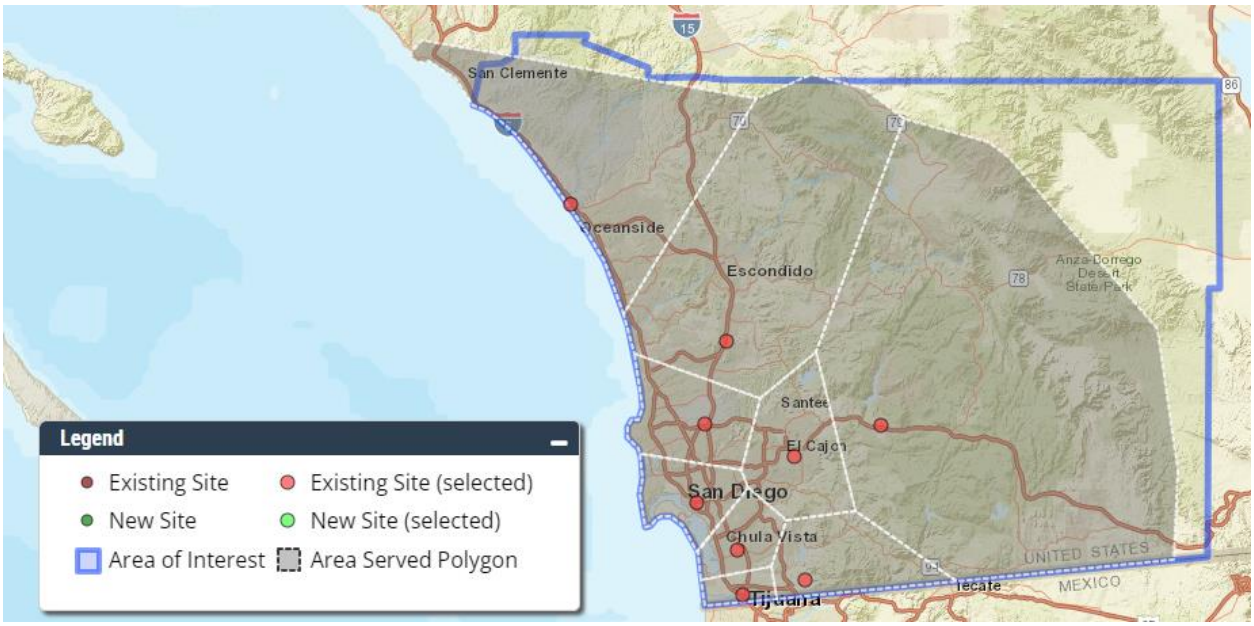


Figure 12-4: Area Served Map – PM_{10}

Table 12-2: Area Served for PM_{10} and Population

Site Name	Area (km^2)	Total Population
Chula Vista	172	402,257
Alpine	5,305	68,983
Camp Pendleton	1,122	610,733
Donovan	545	67,689
Kearny Villa Rd.	329	454,048
Rancho Carmel Drive	1,606	689,961
Lexington Elementary School	374	435,315
Sherman Elementary School	186	542,846
San Ysidro	55	122,978

Table 12-3: PM_{10} Area Served Demographics

Site Name	Male	Female	Caucasian/ White	African/ Black	Native American	Asian	Pacific Islander	Other Race	Multiple Races	Hispanic/ Latino
Chula Vista	195,183	207,074	100,389	27,432	5,638	70,910	2,803	104,012	91,073	228,016
Alpine	34,594	34,389	49,434	891	2,598	1,204	150	5,738	8,968	14,907
Camp Pendleton	308,717	302,016	366,262	16,411	8,294	35,728	3,821	88,985	91,232	196,028
Donovan	36,655	31,034	20,136	5,962	622	12,017	289	13,055	15,608	31,769
Kearny Villa Rd.	227,236	226,812	250,227	17,376	2,803	95,207	1,751	29,406	57,278	79,560
Rancho Carmel Drive	337,842	352,119	375,405	12,778	8,423	115,704	1,753	82,654	93,244	173,381
Lexington Elementary School	212,069	223,246	260,539	25,985	4,386	23,721	2,299	52,169	66,216	121,469
Sherman Elementary School	278,172	264,674	254,630	45,277	6,837	49,057	2,066	107,052	77,927	202,034
San Ysidro	59,582	63,396	28,670	4,320	2,022	11,156	474	43,639	32,697	89,947

Table 12-4: PM_{10} Area Served Demographics (Cont.)

Site Name	Age 0 to 4	Age 5 to 9	Age 10 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 29	Age 30 to 34	Age 35 to 39
Chula Vista	22,235	25,404	27,830	27,983	28,552	29,199	28,263	27,413
Alpine	3,437	4,001	4,284	4,041	3,288	3,266	3,896	4,188
Camp Pendleton	32,198	34,155	36,739	39,852	54,320	43,058	39,460	38,690
Donovan	3,441	4,533	5,235	5,070	4,469	4,556	4,995	5,469
Kearny Villa Rd.	22,590	22,048	20,972	28,113	51,912	43,239	38,932	33,271
Rancho Carmel Drive	36,915	45,006	50,288	48,572	40,674	37,629	40,062	45,904
Lexington Elementary School	25,548	27,688	28,831	26,368	27,213	29,654	31,465	30,997
Sherman Elementary School	25,605	24,940	25,870	30,979	49,327	59,860	56,541	46,352
San Ysidro	6,829	7,879	8,953	9,392	9,536	9,818	8,812	8,089

Site Name	Age 50 to 54	Age 55 to 59	Age 60 to 64	Age 65 to 69	Age 70 to 74	Age 75 to 79	Age 80 to 84	Age 85 and Over
Chula Vista	25,108	25,669	24,356	19,954	15,304	9,979	7,345	7,793
Alpine	4,407	5,547	5,918	5,232	4,272	2,602	1,444	1,251
Camp Pendleton	37,254	40,738	39,042	33,579	27,395	17,847	11,773	13,766
Donovan	4,956	4,130	3,167	2,374	1,886	978	639	513
Kearny Villa Rd.	24,844	24,946	23,729	19,966	17,261	11,979	8,541	9,699
Rancho Carmel Drive	47,338	47,286	43,914	36,839	29,903	19,286	12,304	13,603
Lexington Elementary School	26,640	29,135	28,344	23,110	18,559	11,720	7,749	8,606
Sherman Elementary School	30,909	30,357	27,179	23,274	18,188	11,539	7,077	7,365
San Ysidro	7,656	7,582	6,954	5,634	4,233	2,870	1,993	1,881

12.5 PM_{10} Rating Summary

Table 12.5 is a summary of the District's PM_{10} monitor rating for the regional monitoring network. The scores are based on the analysis from the Network Assessment tool for PM_{10}. The analysis includes scores for correlation between sites, removal bias, and area served.

Table 12-5: PM_{10} Monitor Summary Rating

Station	Overall Scoring	Correlation	Removal Bias	Area Served	Comments
Alpine (ALP)	10	3	5	2	Located in East region of the County.
Camp Pendleton (CMP)	13	3	1	9	Located in North Inland region of the County
Chula Vista (CVA)	13	2	5	6	High correlation with nearby SES monitor.
Otay-Mesa Donovan (DVN)	17	6	10	1	Located in South region of the County. High PM concentrations.
Kearny Villa Rd. (KVR)	10	2	1	7	Located in North Central region of County. District's collocated monitor site.
Lexington Elementary School (LES)	12	2	3	7	Part of NCore requirement. Used to collect PM coarse (10-2.5) data.
Rancho Carmel Dr (RCD)	14	3	1	10	Located at Districts Near-road site #1.
San Ysidro (SAY)	11	5	4	2	Located at Districts Near-road site #2. High PM concentrations.
Sherman Elementary School (SES)	11	2	1	8	Located in Central region of County.

12.6 PM_{10} Conclusion

Since the last Network Assessment was published in 2020, the District expanded on PM_{10} monitors in the Regional Monitoring Network. All sites with $PM_{2.5}$ monitors are also PM_{10} monitors. This is due to the fact that PM monitors measure both $PM_{2.5}$ and PM_{10} simultaneously. This allows for a comparison of particulate matter measurements throughout the County. Similar with $PM_{2.5}$, the Donovan site is also the Design Value site for the Network and the highest PM_{10} concentrations have been recorded in Donovan. The correlation matrix, area served study statistics, and removal bias helped assess the PM_{10}monitoring throughout San Diego County. The District will seek to deploy an additional PM monitor that will include PM_{10} in Escondido.

13 Other Air Monitoring Programs in the Network

13.1 Other Air Monitoring Programs – Introduction

In addition to the District's monitoring of the NAAQS criteria pollutants, which were discussed in previous chapters, the District operates additional monitoring programs. These other monitoring program include the Photochemical Assessment Monitoring Station (PAMS) Program, the National Core (NCore) Program, the Near-road program, as well monitoring for the California Air Resources Board (CARB).

13.2 Photochemical Assessment Monitoring Stations (PAMS) Program

The purpose of the Photochemical Assessment Monitoring Stations (PAMS) Program is to help understand, predict, and control ozone concentrations. Ozone is not emitted directly; it is created by the interactions of several different pollutants/emissions, e.g. oxides of nitrogen (NOx), and volatile organic compounds (VOC), some carbonyls, etc. This enhanced monitoring network to track these different emissions has several different monitoring requirements (e.g. laboratory needs, meteorological needs, etc.) that the District operates. The site designated as the PAMS monitoring site is located at Lexington Elementary School (LES) in El Cajon found in **Figure 13-1**. The District meets or exceeds all minimum requirements for PAMS monitoring. For additional information on the PAMS program, please refer to the District's Annual Network Report.

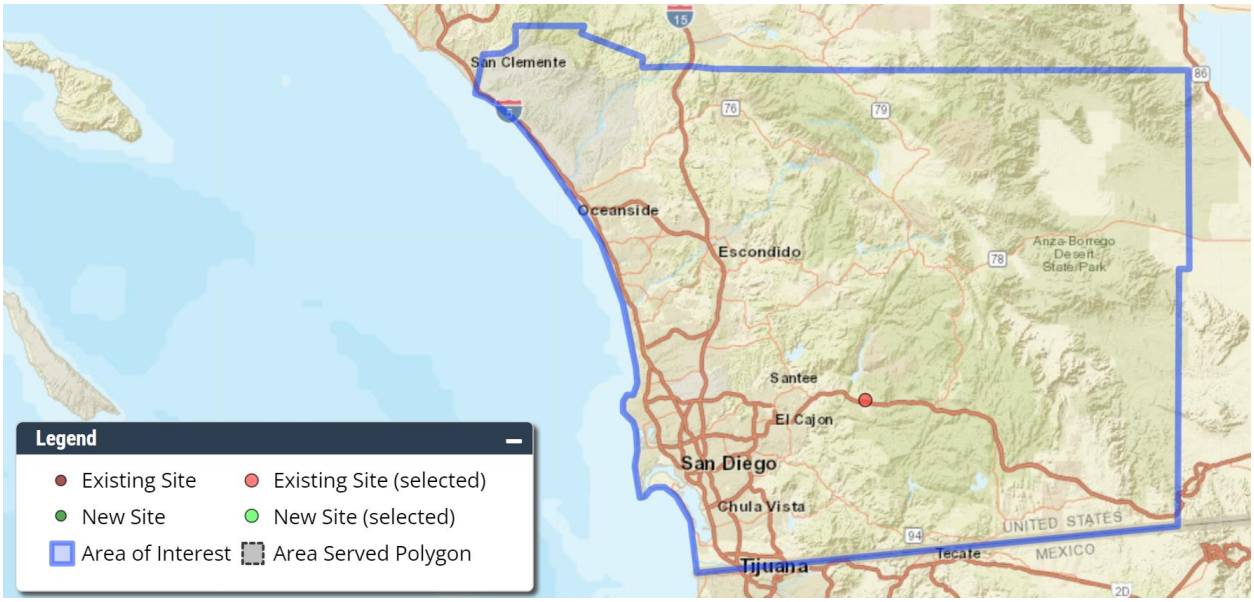


Figure 13-1: PAMS Monitoring Site in San Diego County

As part of the PAMS program, the District monitors for parameters including volatile organic compounds (VOCs), carbonyls (including formaldehyde), true-NO_2, total reactive nitrogen (NOy), nitrogen monoxide (NO), and several meteorological parameters. The meteorological parameters include ambient temperature, wind direction, wind speed, pressure, relative humidity, precipitation,

mixing height, solar radiation and ultraviolet radiation. Since the last Network Assessment, the District has deployed a ceilometer at the LES site to measure mixing height. Future changes to the PAMS monitoring site include the deployment of a continuous formaldehyde analyzer, which will replace the cartridge-based carbonyl sampling with real-time formaldehyde measurements. The VOCs are sampled continuously (24 hours per day, 7 days per week) and measured near real-time using gas chromatography (AutoGC) during the official PAMS season (June to August).
The list of VOC and carbonyl compounds of interest for the PAMS program are listed in **Tables 13-1** and **Table 13-2** respectively.

Table 13-1: PAMS VOC Parameter Codes

Compound	Parameter
Ethylene	43203
Acetylene	43206
Ethane	43202
Propylene	43205
Propane	43204
Isobutane	43214
1-Butene	43280
n-Butane	43212
trans-2-Butene	43216
cis-2-Butene	43217
Isopentane	43221
1-Pentene	43224
n-Pentane	43220
Isoprene	43243
Trans-2-pentene	43226
cis-2-Pentene	43227
2.2-Dimethylbutane	43244
Cyclopentane	43242
2.3-Dimethylbutane	43284
2-Methylpentane	43285
3-Methylpentane	43230
1-Hexene	43245
n-Hexane	43231
Methylcyclopentane	43262
2.4-Dimethylpentane	43247
Benzene	45201
cyclohexane	43248
2-Methylhexane	43263
2.3-Dimethylpentane	43291
3-Methylhexane	43249

Compound	Parameter
2.2.4-Trimethylpentane	43250
n-Heptane	43232
Methylcyclohexane	43261
2.3.4-Trimethylpentane	43252
Toluene	45202
2-Methylheptane	43960
3-Methylheptane	43253
n-Octane	43233
Ethylbenzene	45203
m-Xylene	45205
p-Xylene	45206
Styrene	45220
o-Xylene	45204
n-Nonane	43235
Isopropylbenzene	45210
α-Pinene	43256
n-Propylbenzene	45209
m-Ethyltoluene	45212
p-Ethyltoluene	45213
1.3.5-Trimethylbenzene	45207
o-Ethyltoluene	45211
A-Pinene	43257
1.2.4-Trimethylbenzene	45208
n-Decane	43238
1.2.3-Trimethylbenzene	45225
m-Diethylbenzene	45218
p-Diethylbenzene	45219
Undecane	43954
Total PAMS	43000
Total NMOC	43102

Table 13-2: PAMS Carbonyls Parameter Codes

Compound	Parameter
Formaldehyde	43502
Acetaldehyde	43503
Acetone	43551

Table 13-3: PAMS Gaseous Pollutants Parameter Codes

Compound	Parameter
Ozone	44201
True-NO_2	42602

Table 13-4: PAMS Meteorological Parameter Codes

Parameter	
Temperature	62101
Wind direction	61104
Wind speed	61103
Pressure	64101
Relative humidity	62201
Precipitation	65102
Mixing layer height	61301
Solar radiation	63301
Ultraviolet radiation	63302

13.3 National Core Monitoring Network (NCore) Program

The National Core monitoring network (NCore) is designed to enhance monitoring with multi-pollutant monitoring to help provide a better understanding of the atmosphere. The District's designated NCore site is located at Lexington Elementary School in El Cajon. The additional pollutants monitored for the NCore Program include total reactive nitrogen (NO_y), nitrogen oxide, trace-level carbon monoxide, and trace-level sulfur dioxide. A full list of the pollutants that are monitored for the NCore Program are listed in the table below.

Table 13-5: NCore Program List of Pollutants

NCore Pollutants	
$PM_{2.5}$ Speciation (Organic and elemental carbon, ions, and trace metals)	Carbon monoxide (CO) – trace level measurements by continuous analyzer
$PM_{2.5}$ measurements by gravimetric analysis using FRM sampler	Sulfur dioxide (SO_2) – trace level measurements by continuous analyzer
$PM_{2.5}$ measurements by continuous sampler	Nitrogen oxide (NO) – trace level measurements by continuous analyzer
PM (10-2.5) coarse measurements by continuous analyzer	Total reactive nitrogen (NO_Y) – trace level measurements by continuous analyzer
Ozone (O_3) by continuous analyzer	Meteorology (Wind speed & wind direction, temperature, and relative humididty)

13.4 Near-road Monitoring Program

The Near-road Program is designed to add monitoring along major roadways to help better understand the exposure to pollutants from roadways with high vehicle miles traveled (VMT). The District's designated Near-road monitoring sites are located at the Rancho Carmel Drive (RCD) site along the Interstate 15 freeway off Carmel Mountain Road and at the San Ysidro (SAY) site along the 5 freeway near San Ysidro Blvd and the Port of Entry (POE). The POE is one of the largest Points of Entry in the world. The Near-road monitoring sites monitor nitrogen dioxide (true-NO_2), $PM_{2.5}$, and carbon monoxide (CO). These pollutants are included in the Network Assessment analysis in the previous chapters since these are also criteria pollutants. The pollutants that are monitored for the Near-road Program are listed in the table below.

Table 13-6: Near-road Program List of Pollutants

Near-road Pollutants
Nitrogen Dioxde (NO_2)
Particulate Matter ($PM_{2.5}$)
Carbon Monoxide (CO)

13.5 CARB Toxic Air Contaminants Program

The District hosts California Air Resources Board (CARB) Toxic Air Contaminants samplers at the Chula Vista (CVA) site and the Lexington Elementary School site. The pollutants that are sampled

include toxic metals, toxic carbonyls, and toxic volatile organic compounds (VOCs). The samples are collected and sent to the CARB laboratory for analysis. A list of the pollutants that are monitored for are listed in the table below and additional information can be found at the CARB Toxic Air Contaminants site (CARB Identified Toxic Air Contaminants | California Air Resources Board)

Table 13-7: Near-road Program List of Pollutants

CARB Toxic Air Contaminants
Carbonyls
Metals
Volatile Organic Compounds

13.6 Other Air Monitoring Programs - Conclusion

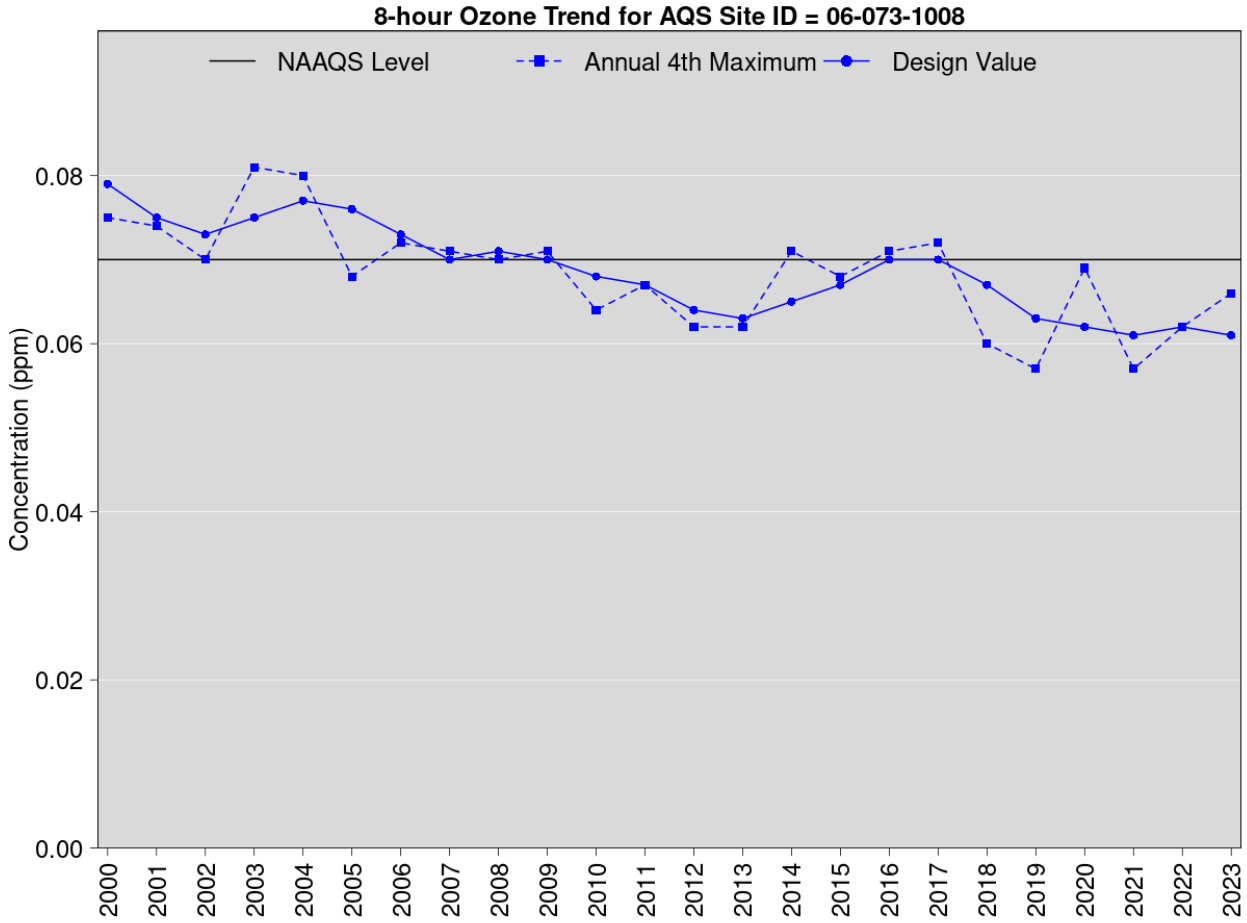
In addition to the criteria monitoring programs, which have established National Ambient Air Quality Standards (NAAQS), the District also has additional monitoring, which includes the PAMS Program, NCore Program, Near-road Program, and the CARB Toxic Air Contaminants Monitoring Program. The additional air monitoring programs help provide valuable information regarding the composition of the ambient air throughout San Diego's Regional Air Monitoring Network. The PAMS Program provides insight into the formation of ozone. The Near-road Program provides additional information on emissions from highly trafficked highways. The NCore Program provides valuable information to trace-level pollution. The CARB Toxics Air Contaminants Program provides data on pollutants such as metals, carbonyls, and volatile organic compounds (VOCs).

Appendix A: 2025 Network Assessment Pollution Trends by Site

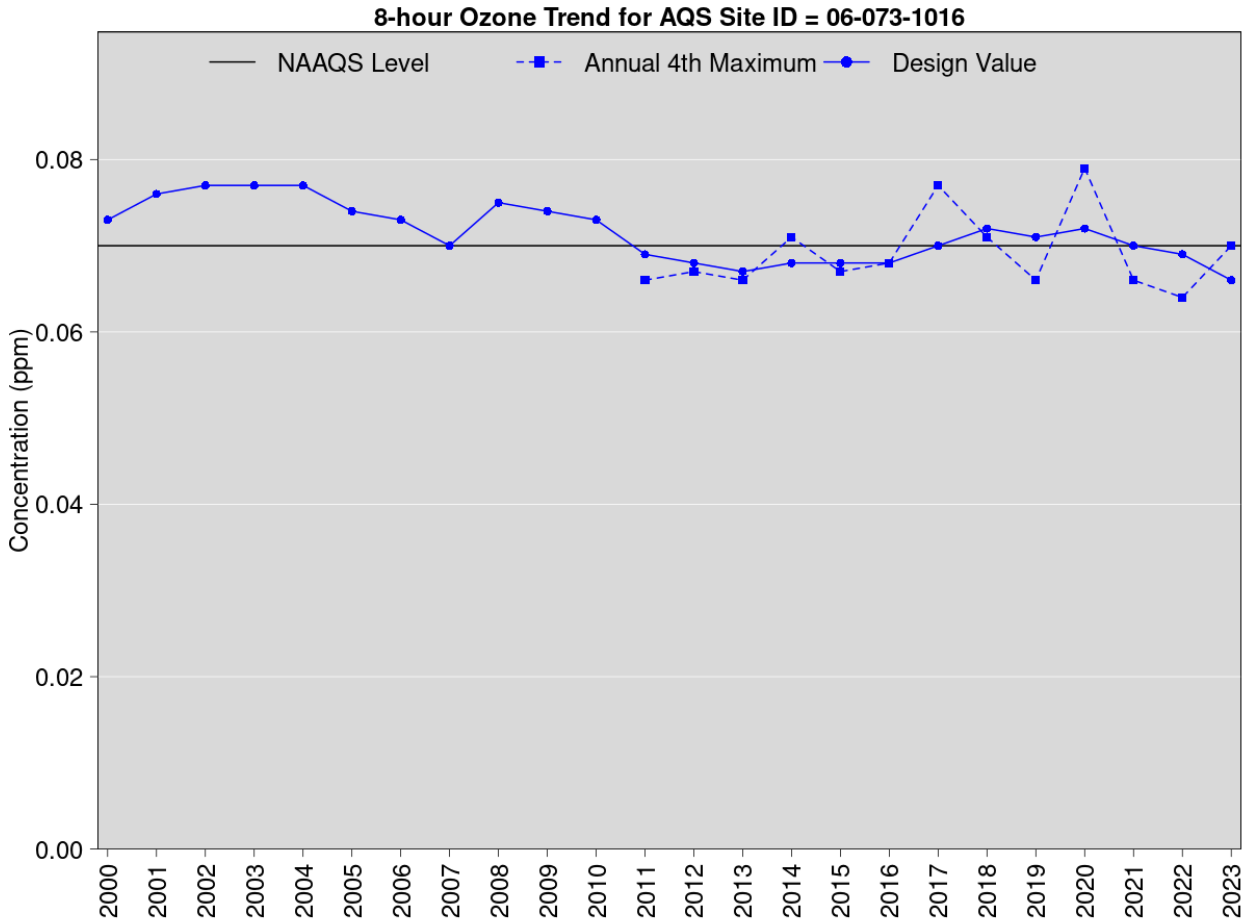
This section includes the trends for each pollutant by site. Some sites may not have pollution trends because a monitor was deployed recently and it is not included in this most recent EPA Network Assessment (e.g. sites with continuous particulate matter, $PM_{2.5}$ and PM_{10}).

A-1 Pollutant: Ozone

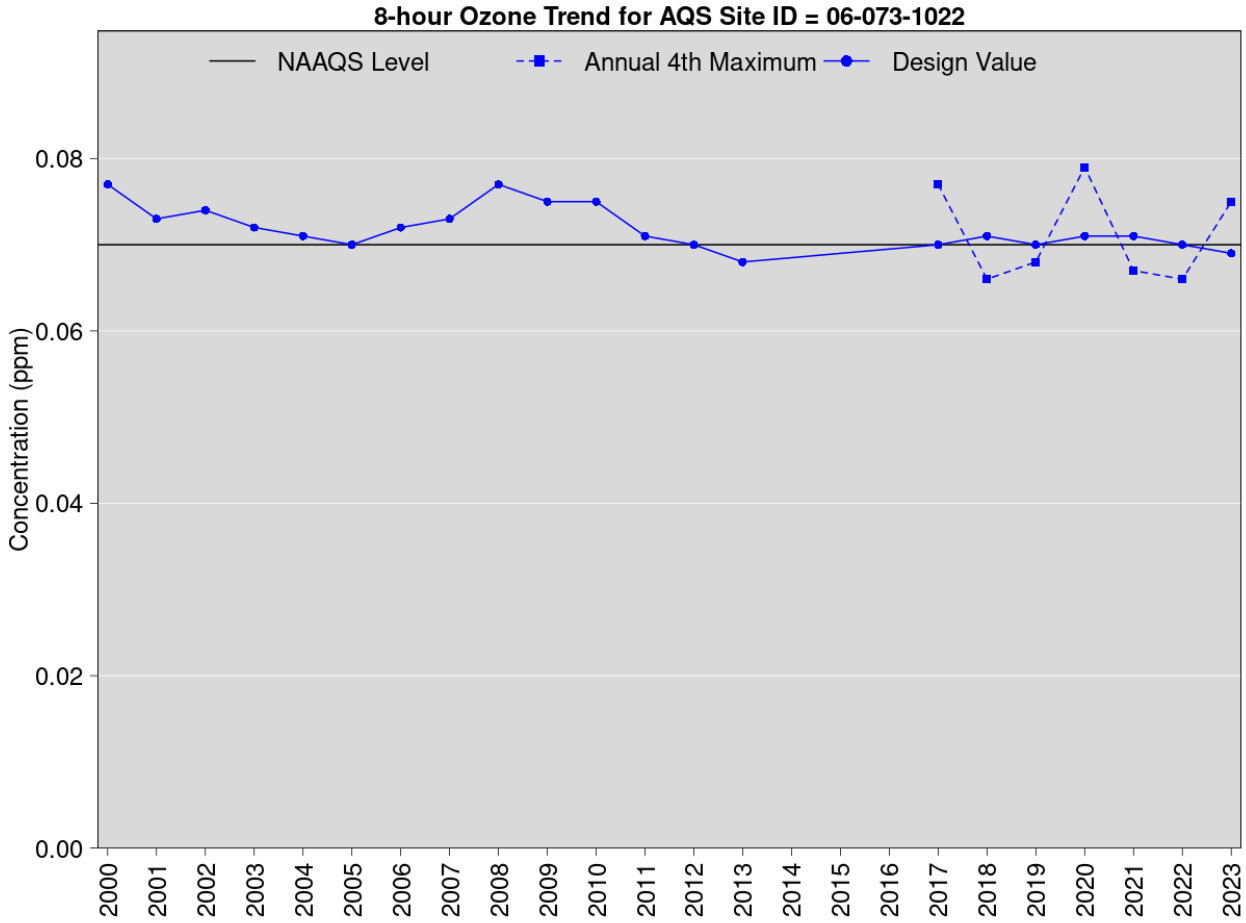
Site: Camp Pendleton



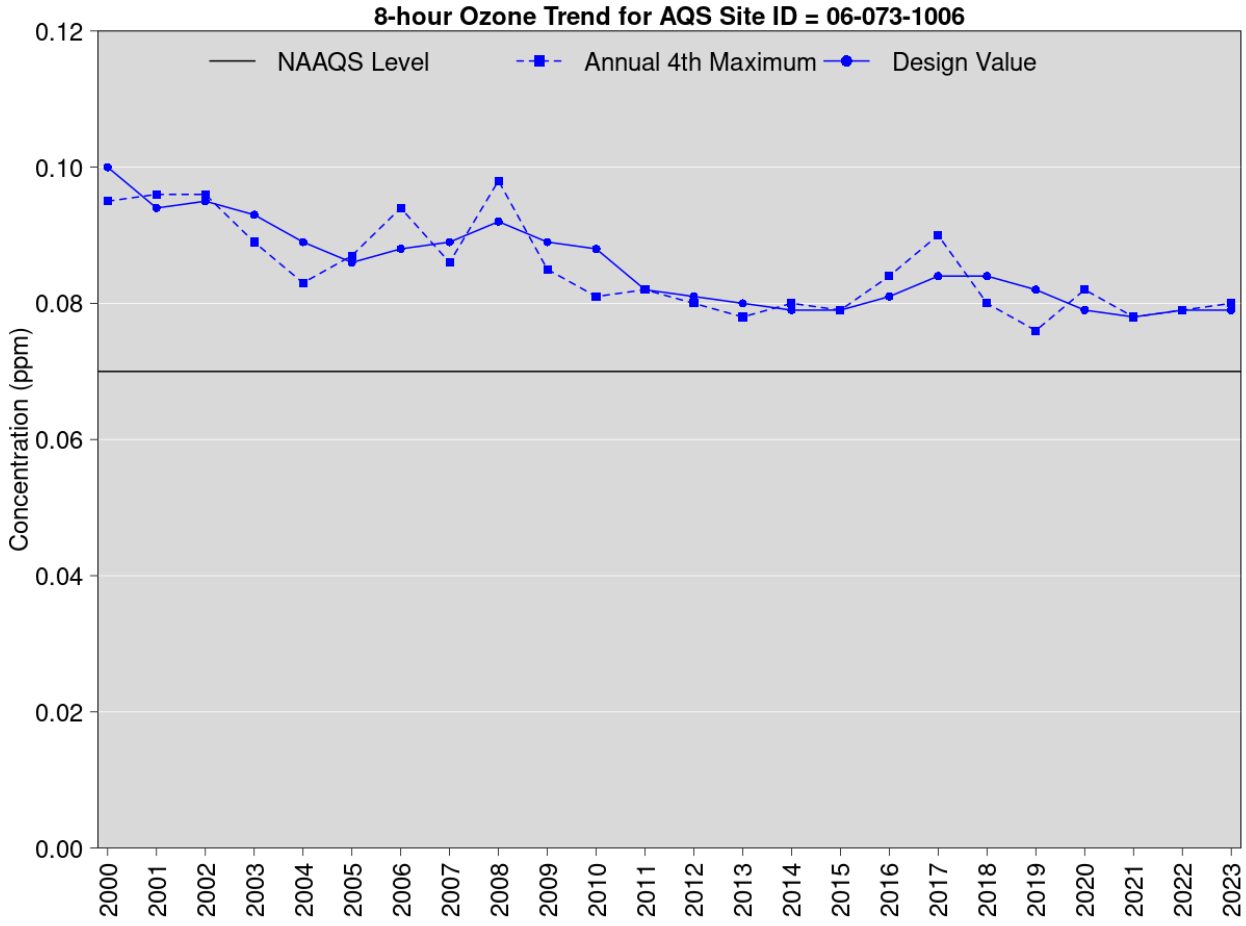
Site: Kearny Villa Road



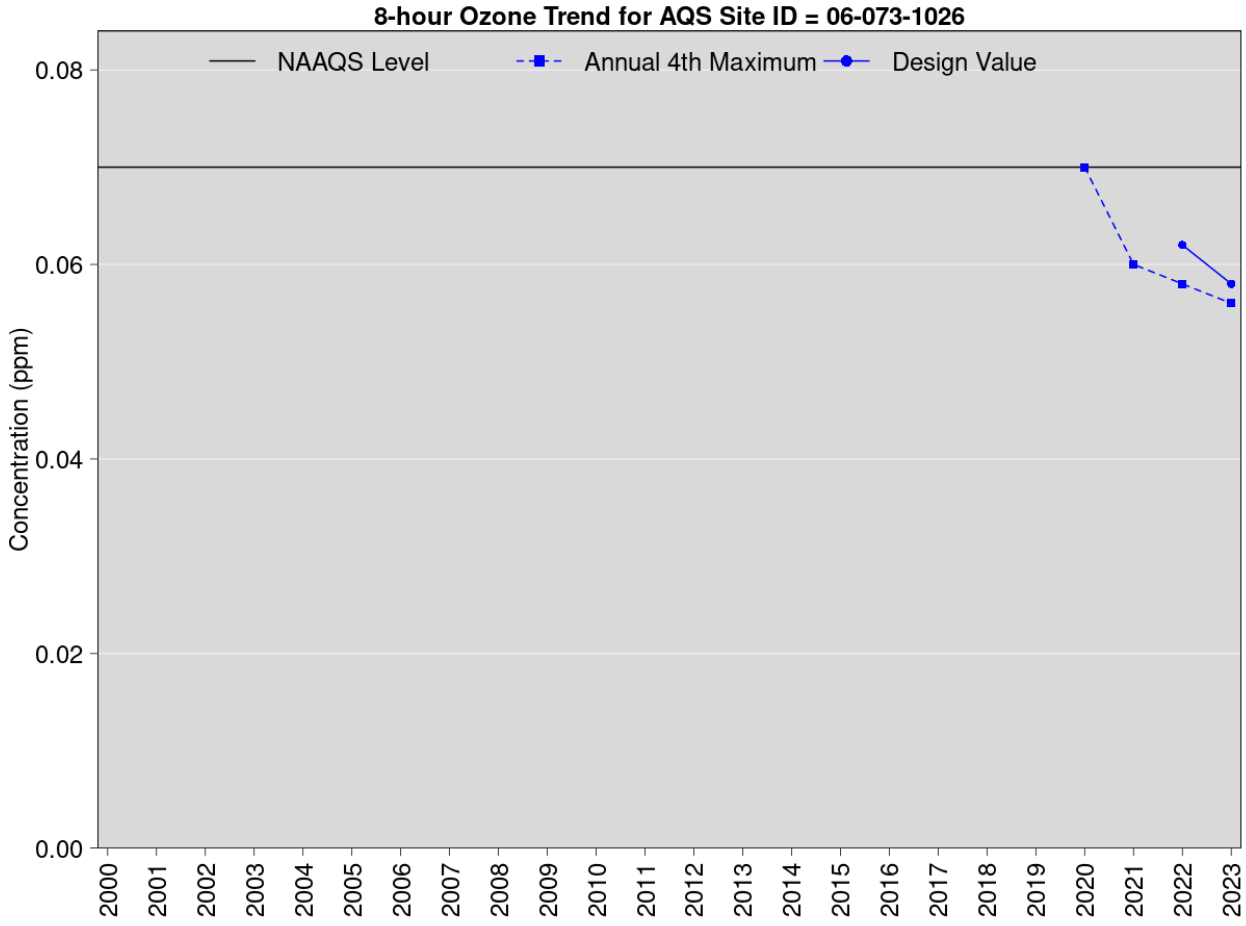
Site: Lexington Elementary School



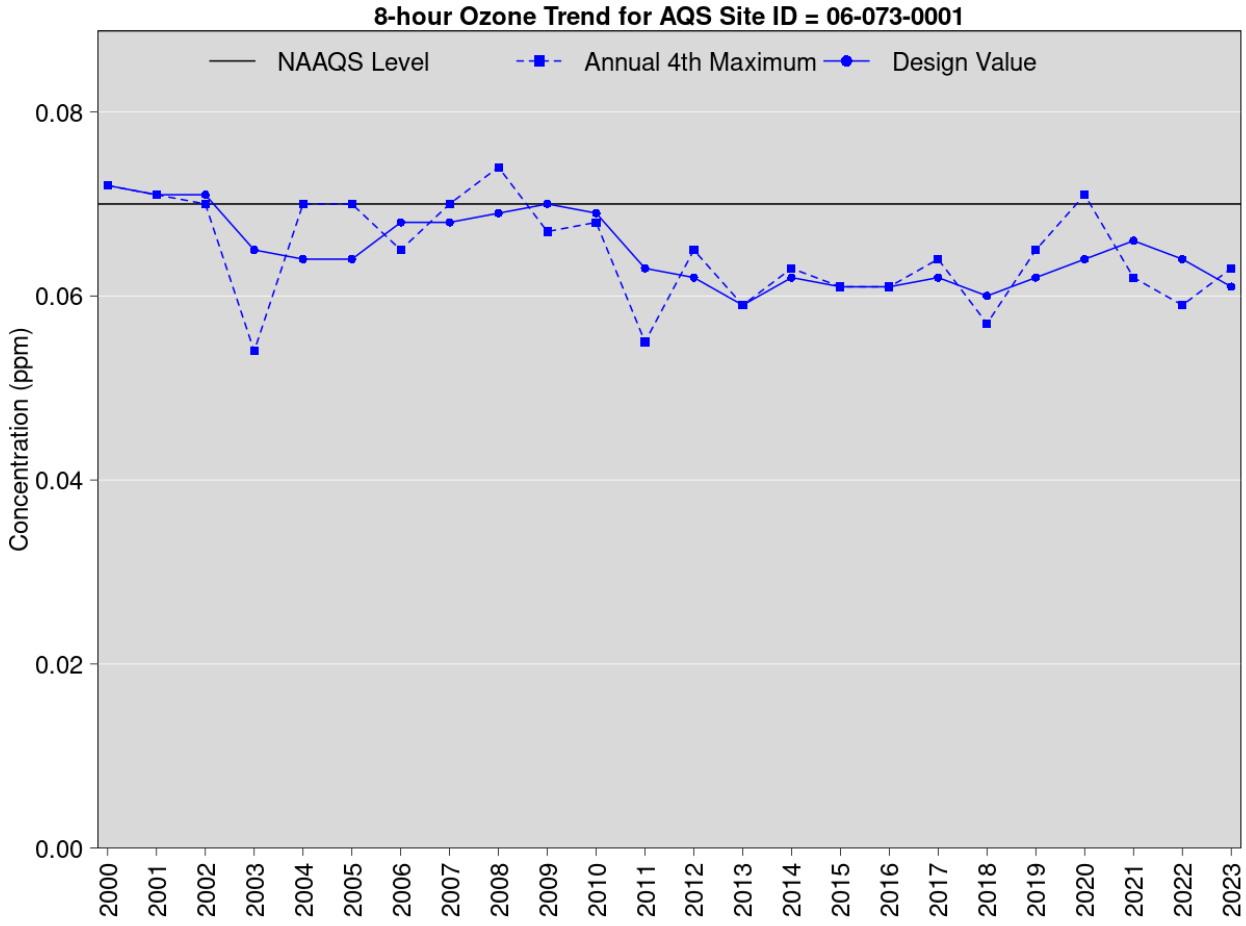
Site: Alpine


8-hour Ozone Trend for AQS Site ID = 06-073-1006
NAAQS Level
Annual 4th Maximum
Design Value
Concentration (ppm)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023

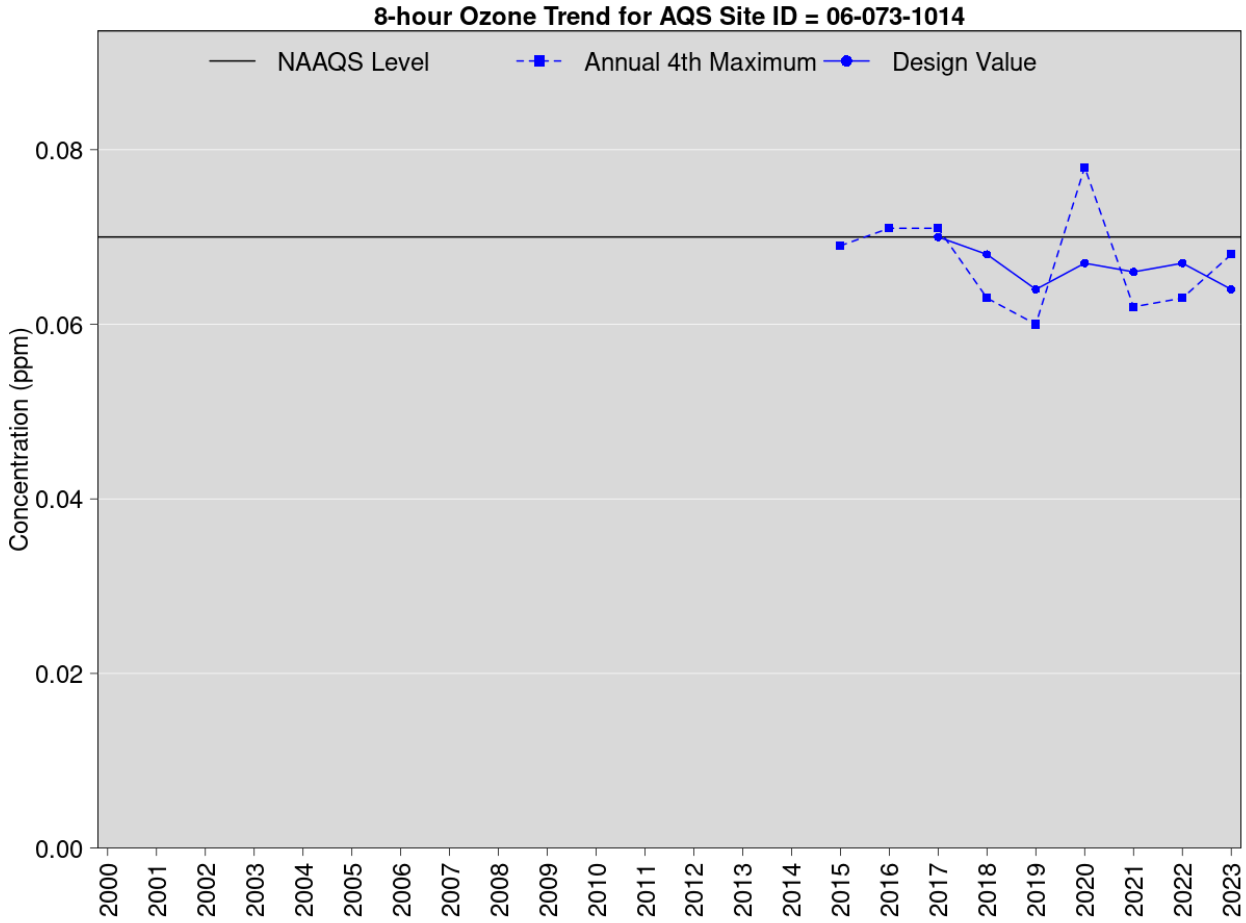
Site: Sherman Elementary School



Site: Chula Vista

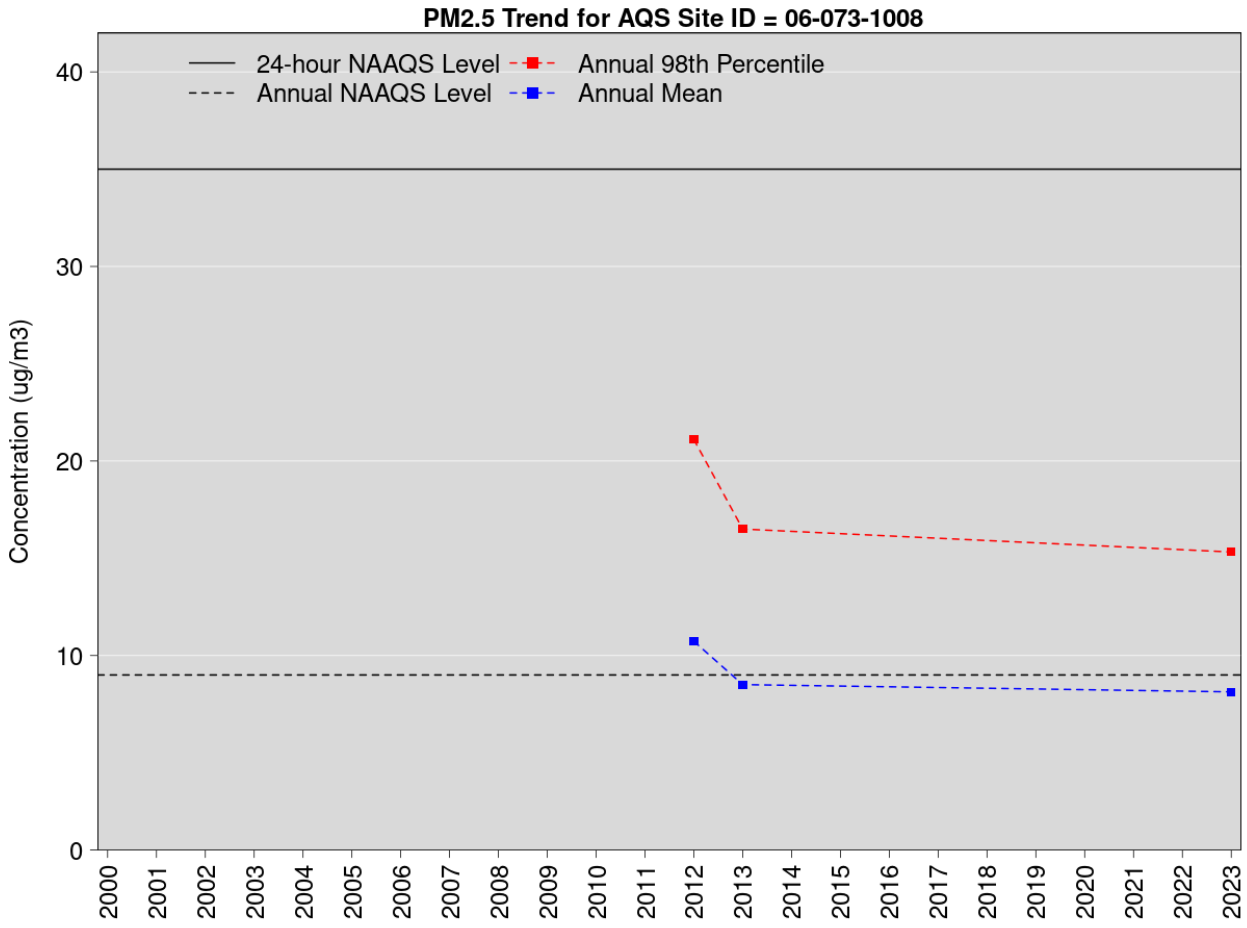


Site: Otay Mesa- Donovan

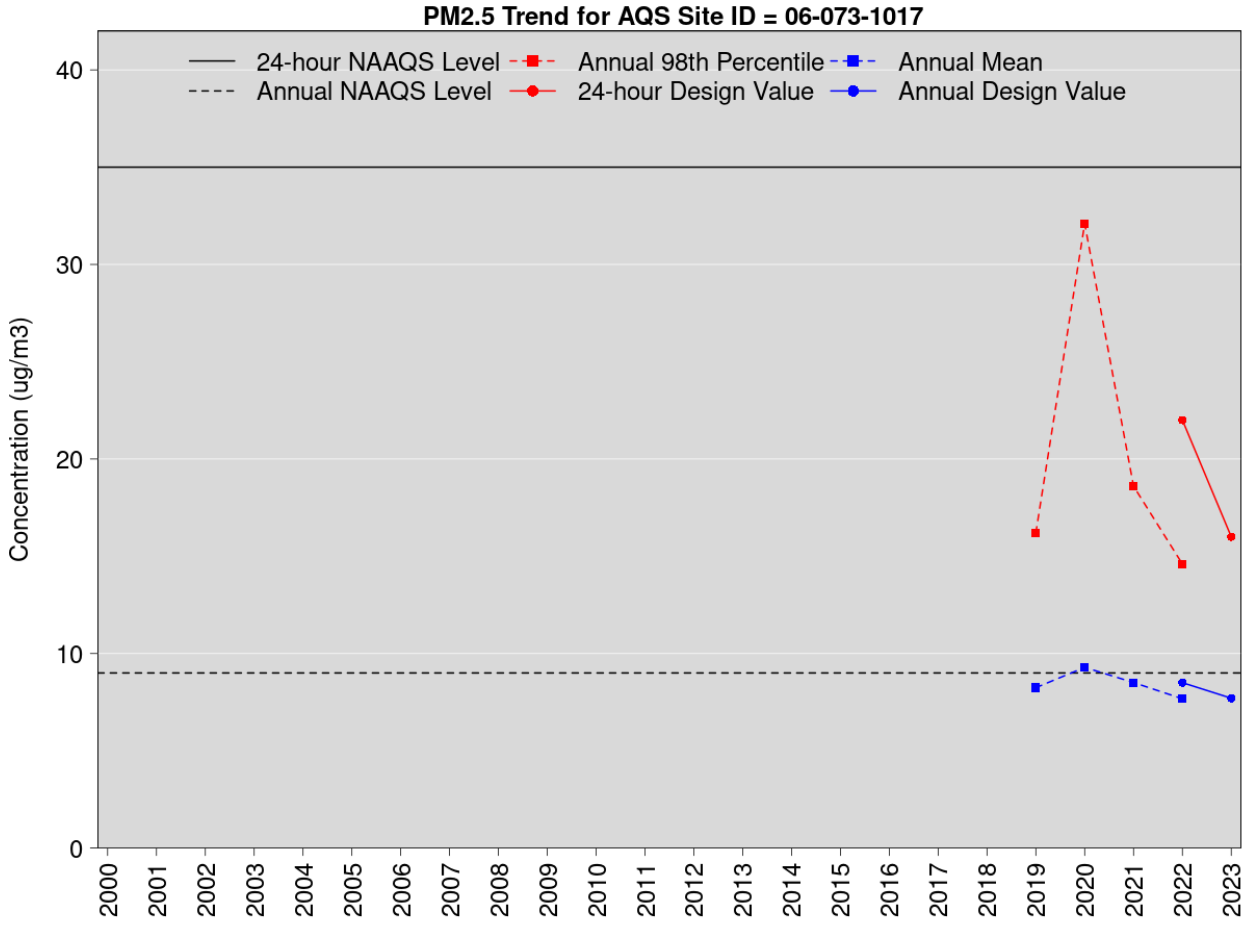


A-2 Pollutant: PM2.5

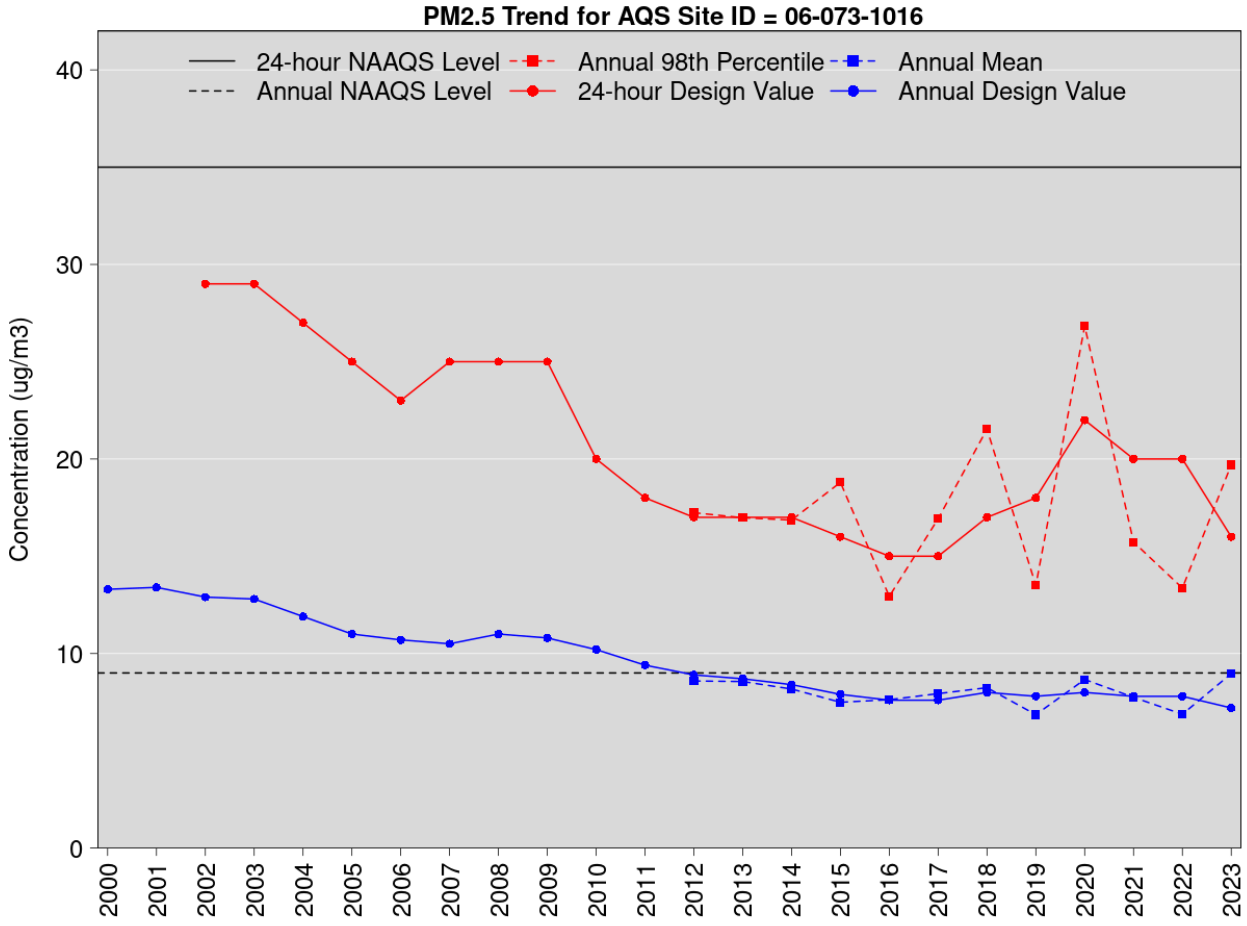
Site: Camp Pendleton



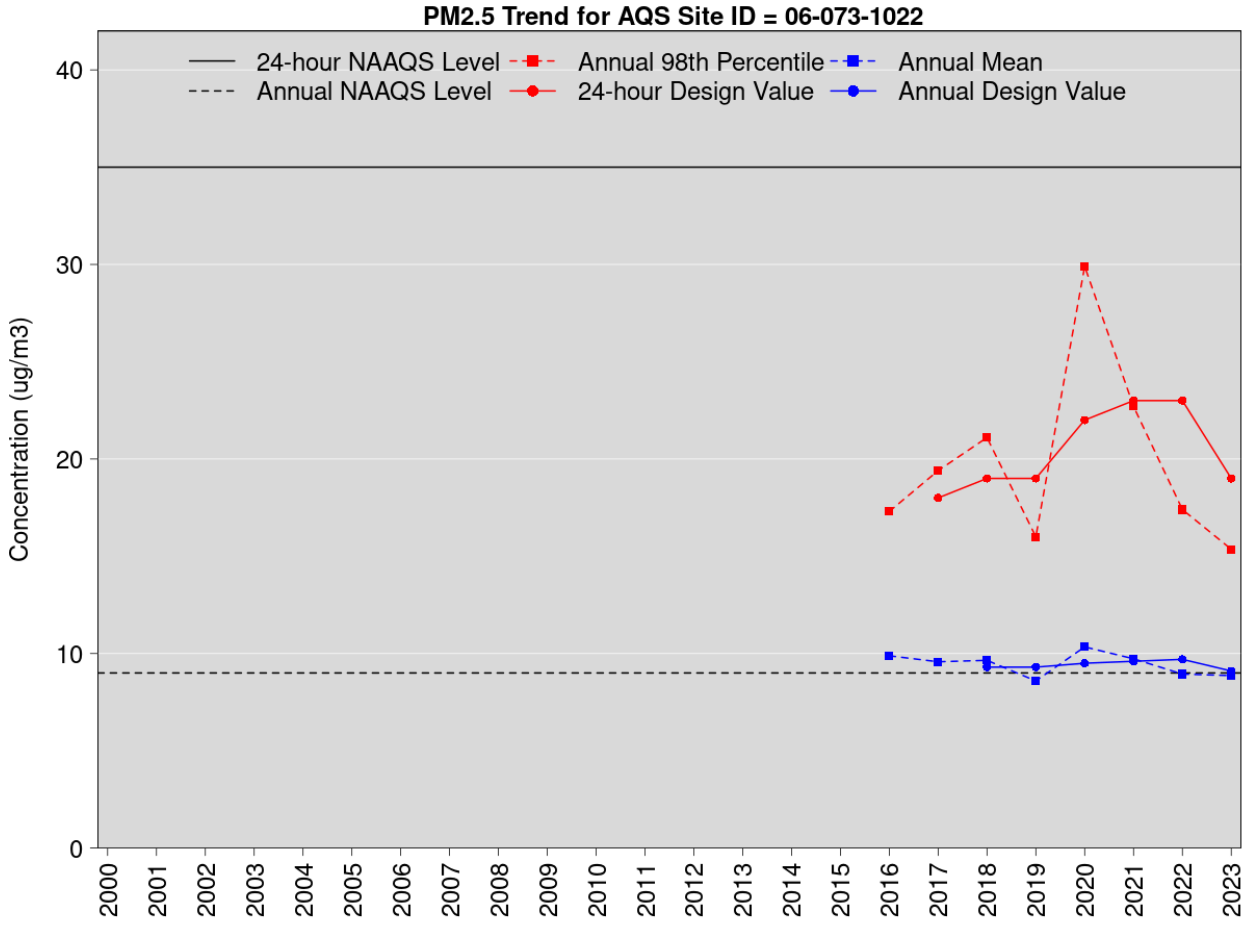
Site: Rancho Carmel Drive



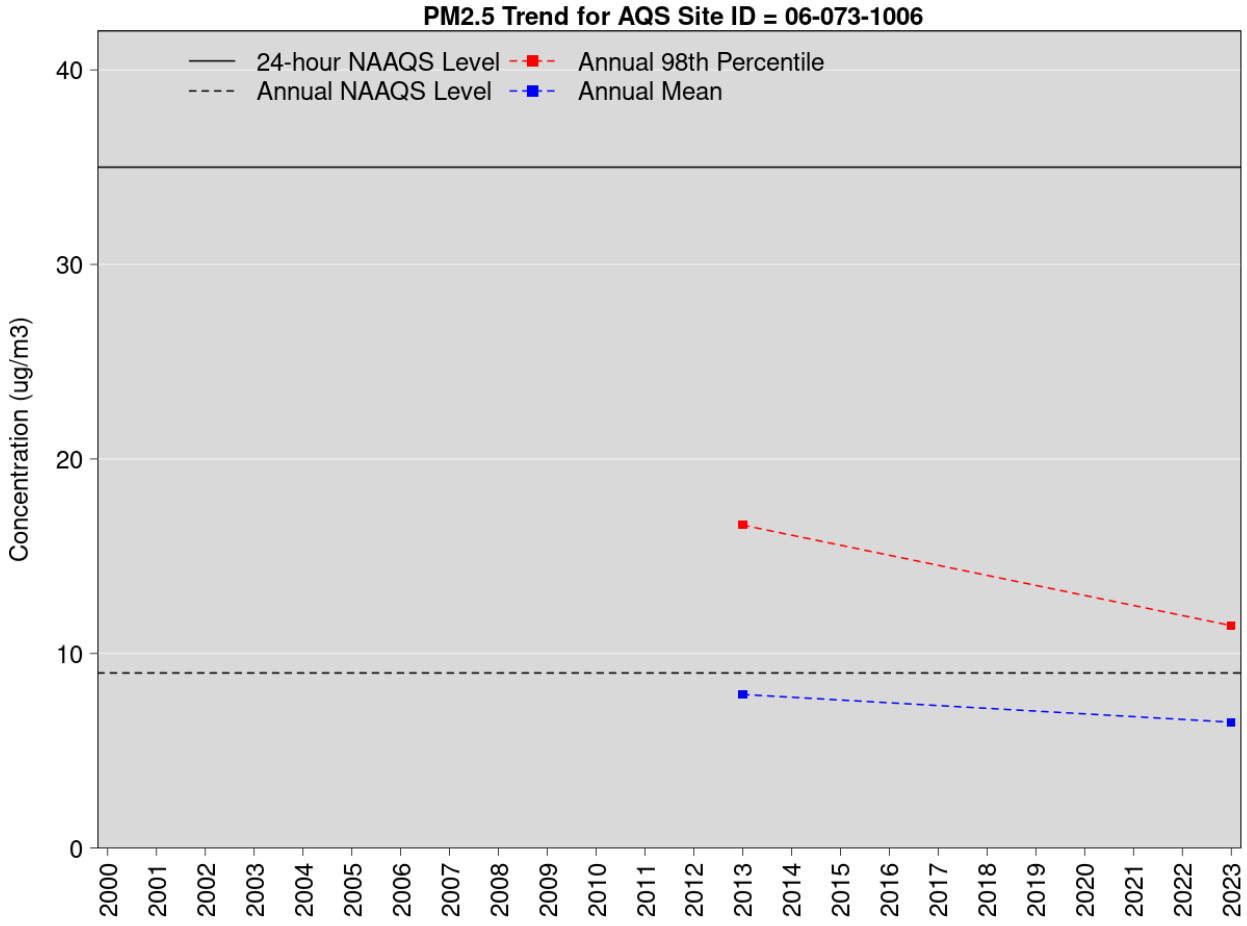
Site: Kearny Villa Road



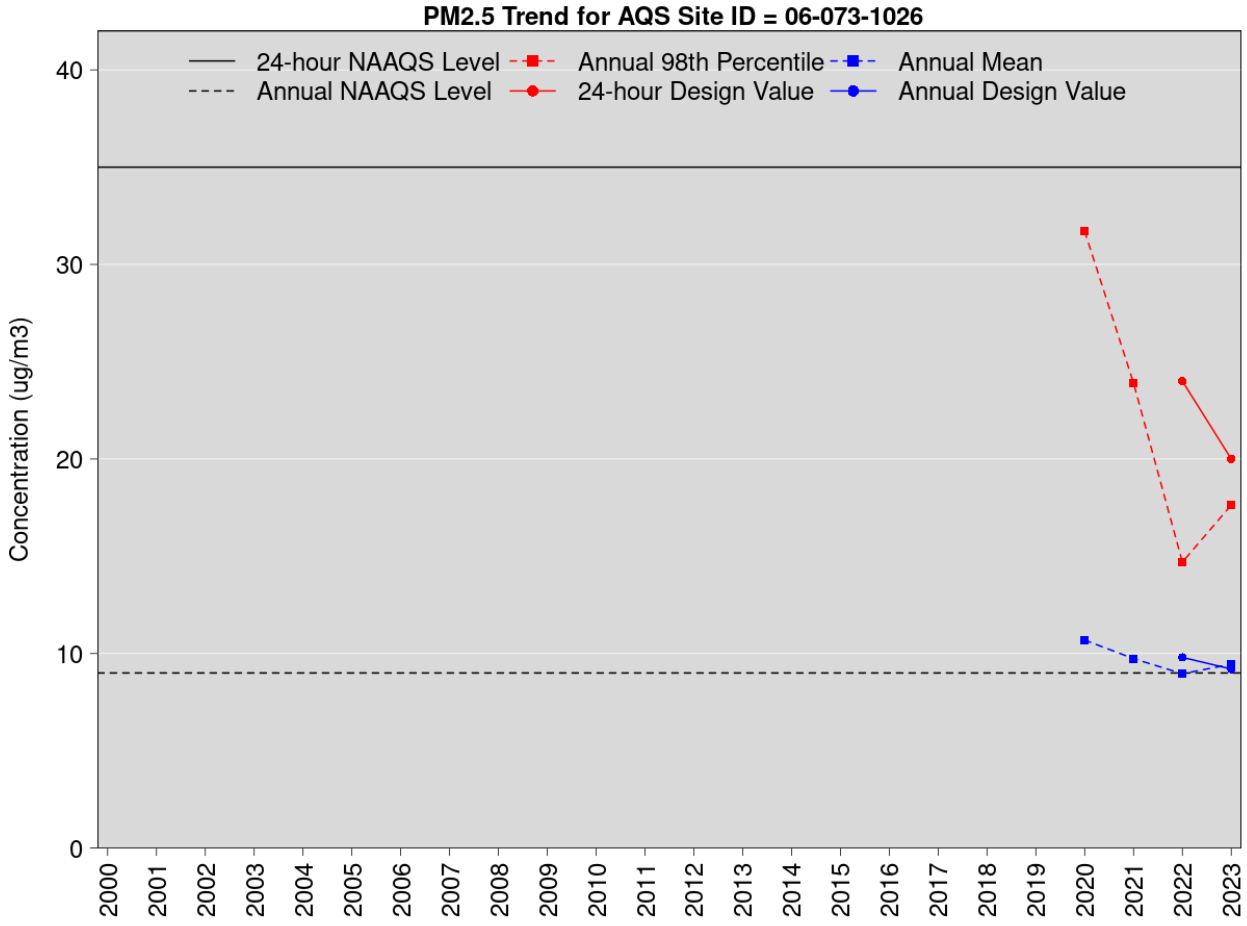
Site: Lexington Elementary School



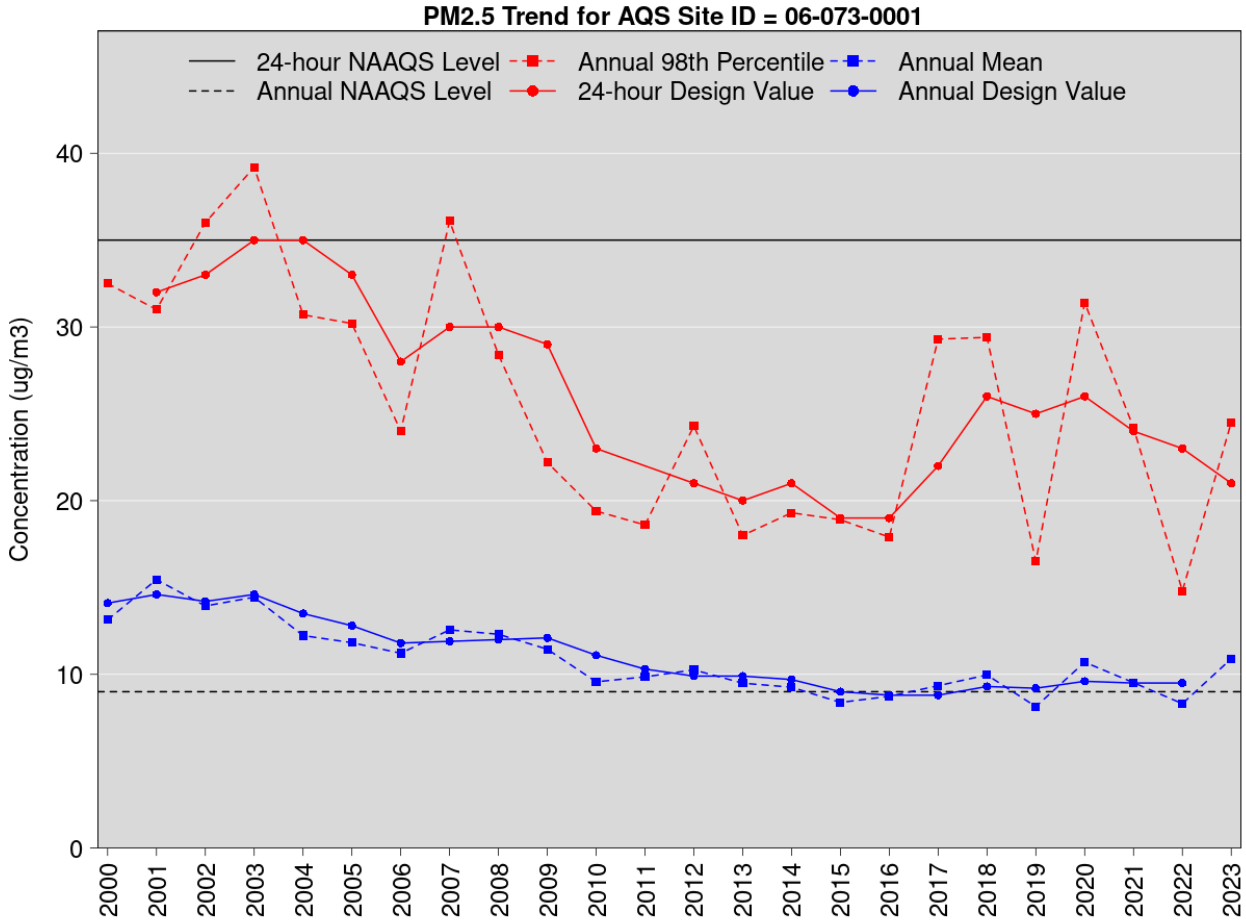
Site: Alpine


PM2.5 Trend for AQS Site ID = 06-073-1006
24-hour NAAQS Level
Annual NAAQS Level
Annual 98th Percentile
Annual Mean
Concentration (ug/m3)
0
10
20
30
40
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023

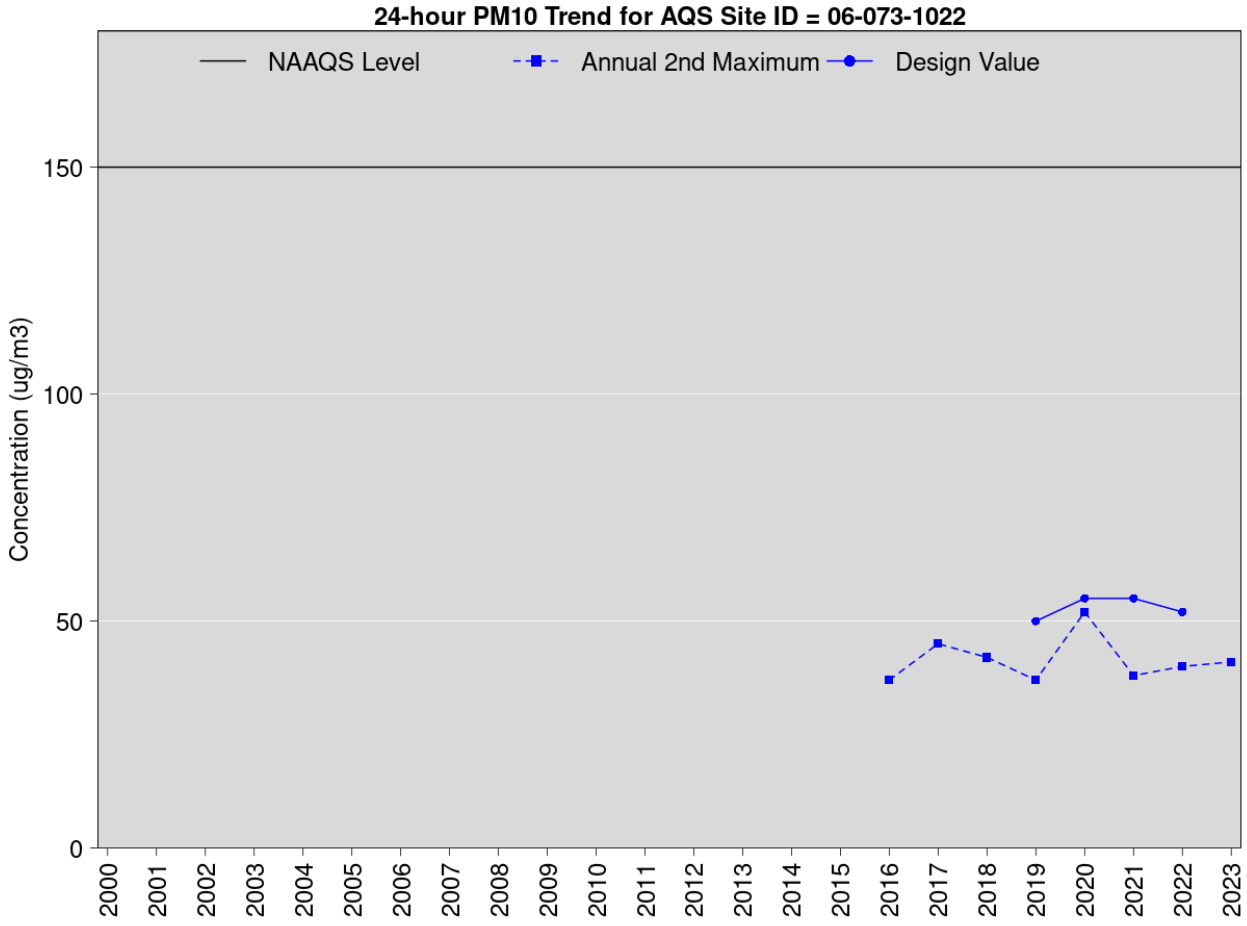
Site: Sherman Elementary School



Site: Chula Vista

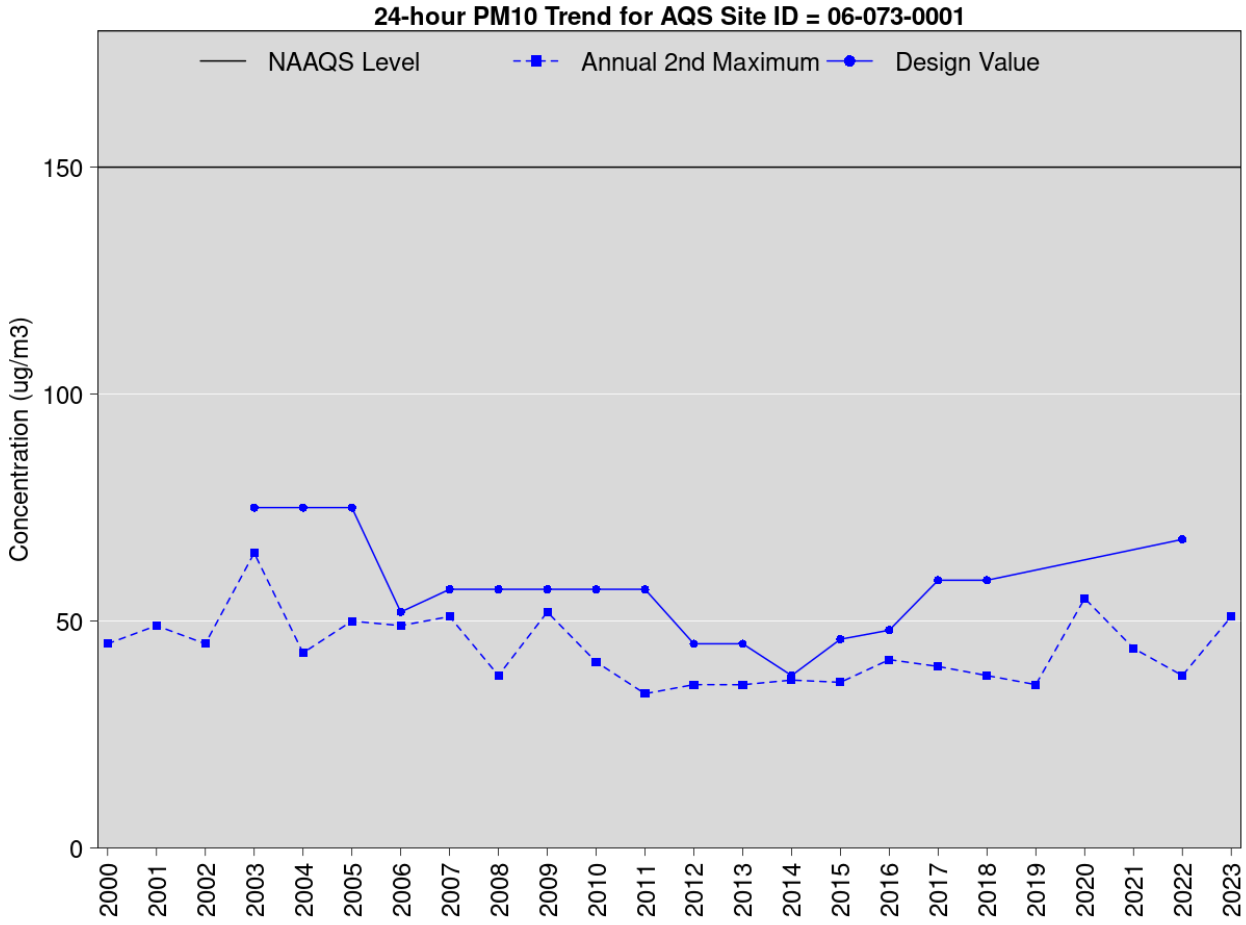


Site: Lexinton Elementary School

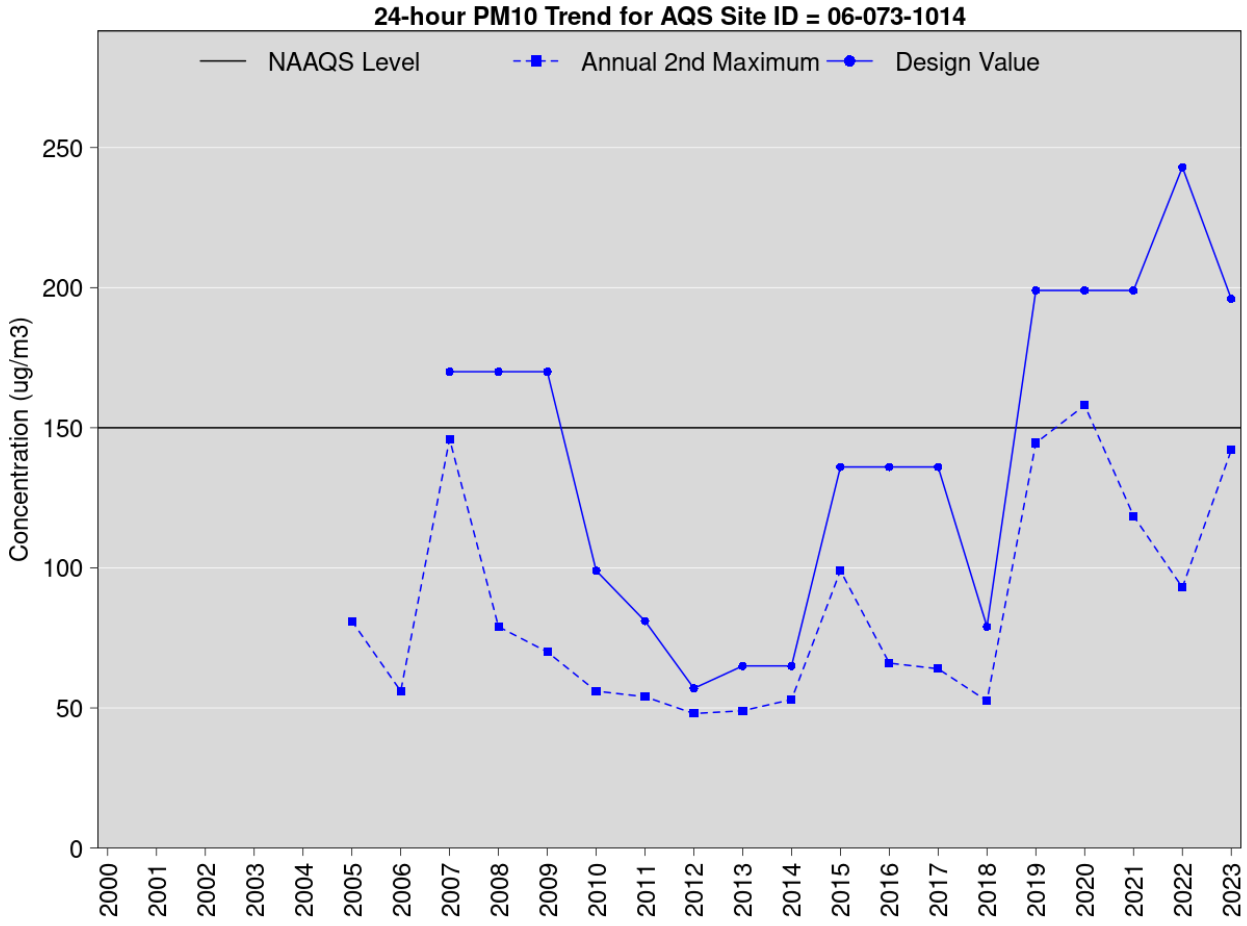


A-3 Pollutant: PM10

Site: Chula Vista

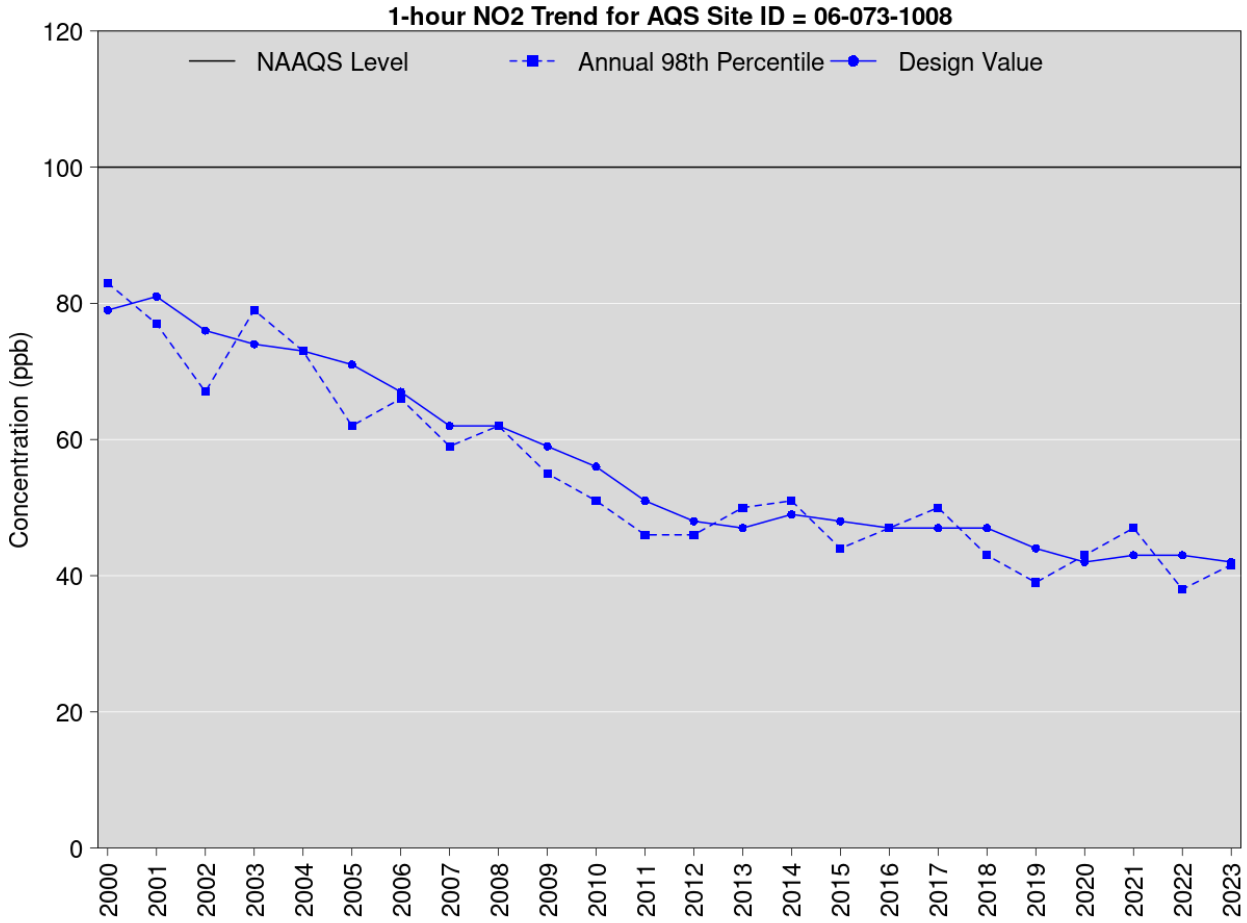


Site: Otay Mesa- Donovan

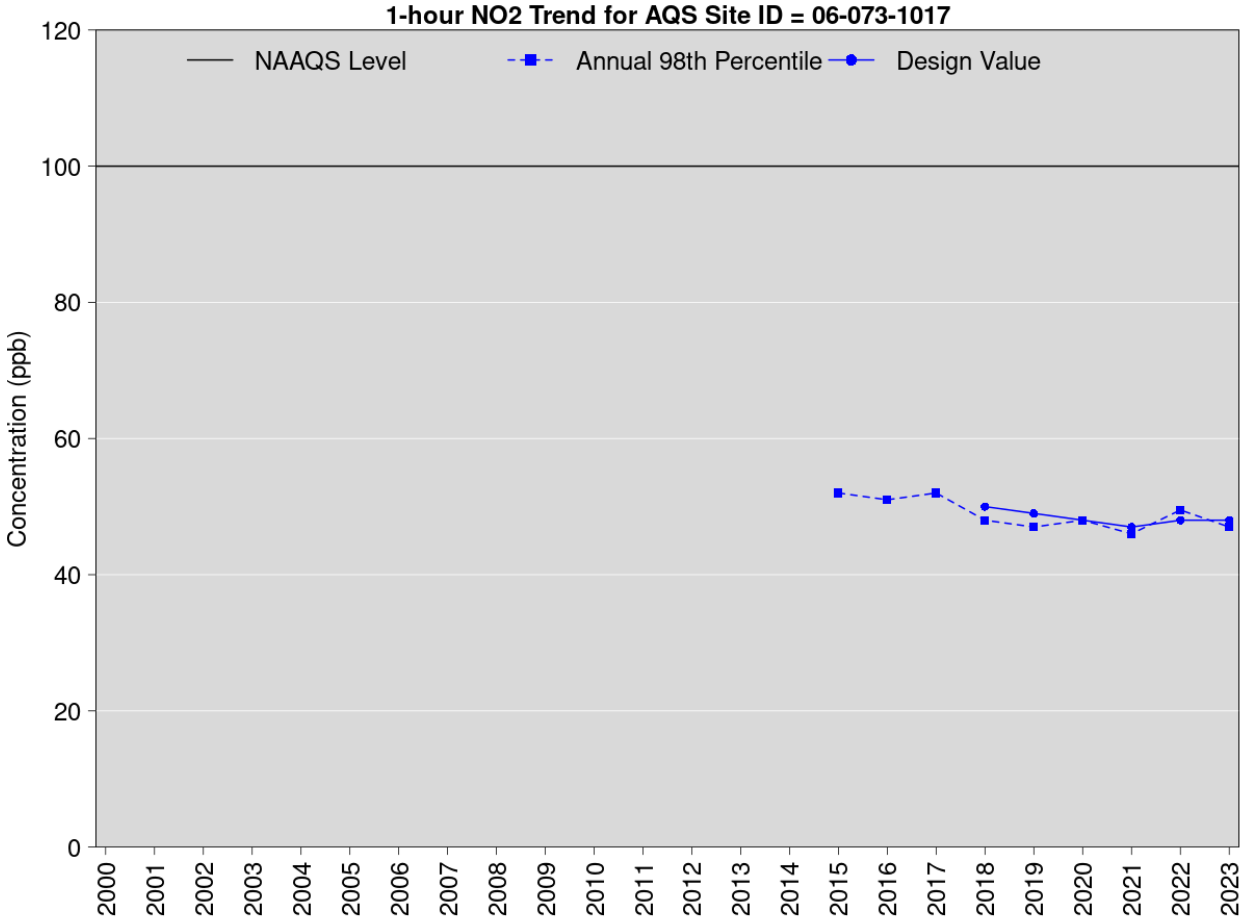


A-4 Pollutant: NO2

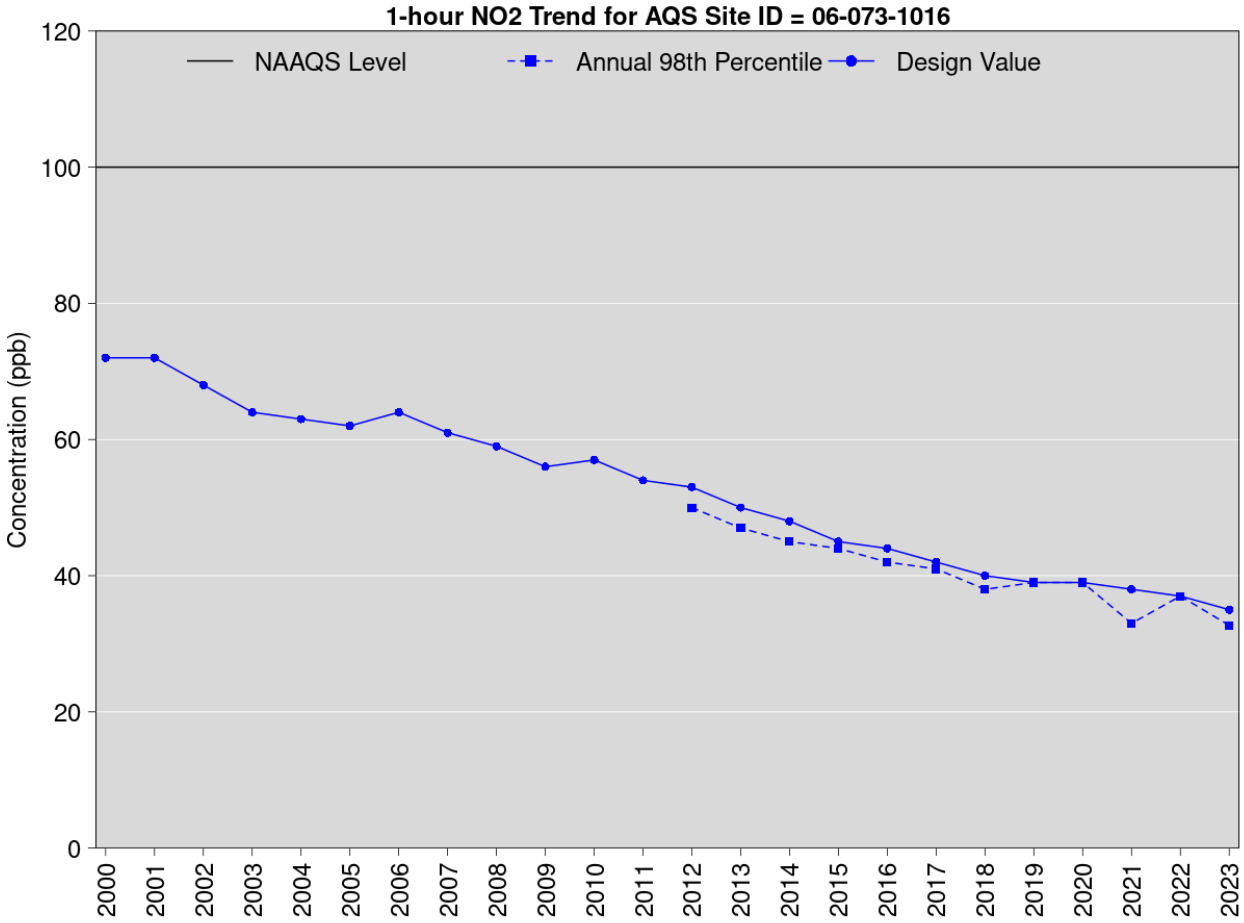
Site: Camp Pendleton



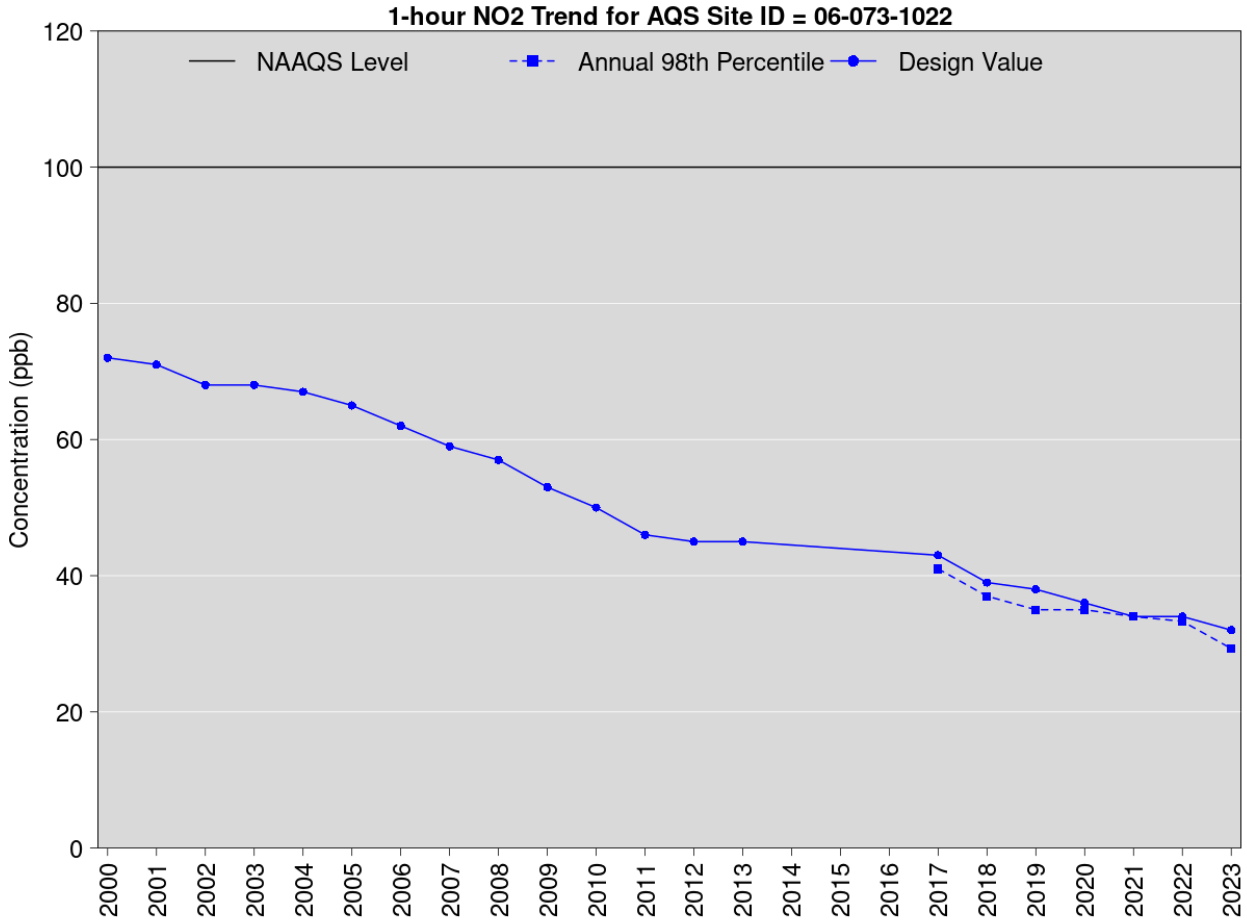
Site: Rancho Carmel Drive



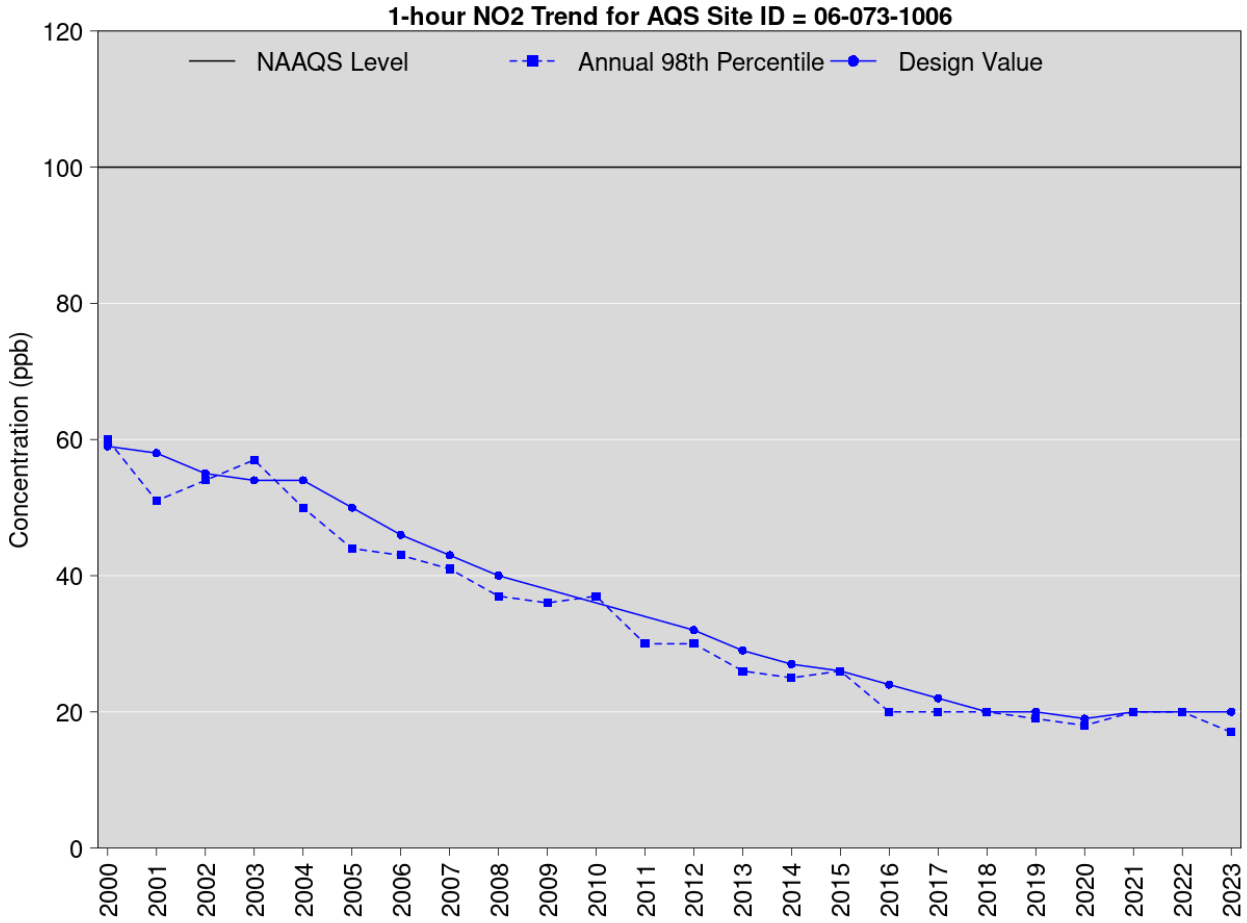
Site: Kearny Villa Road



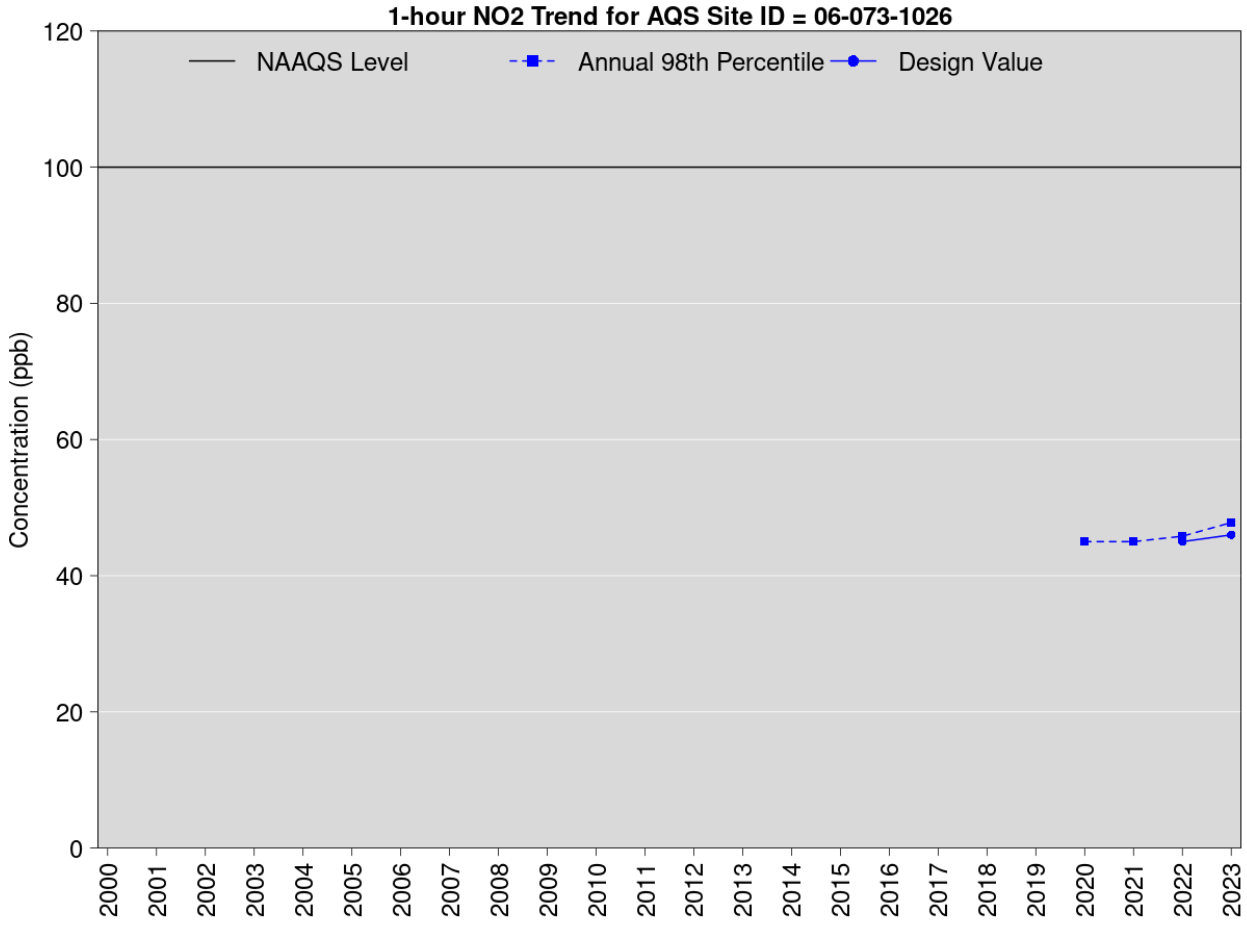
Site: Lexington Elementary School



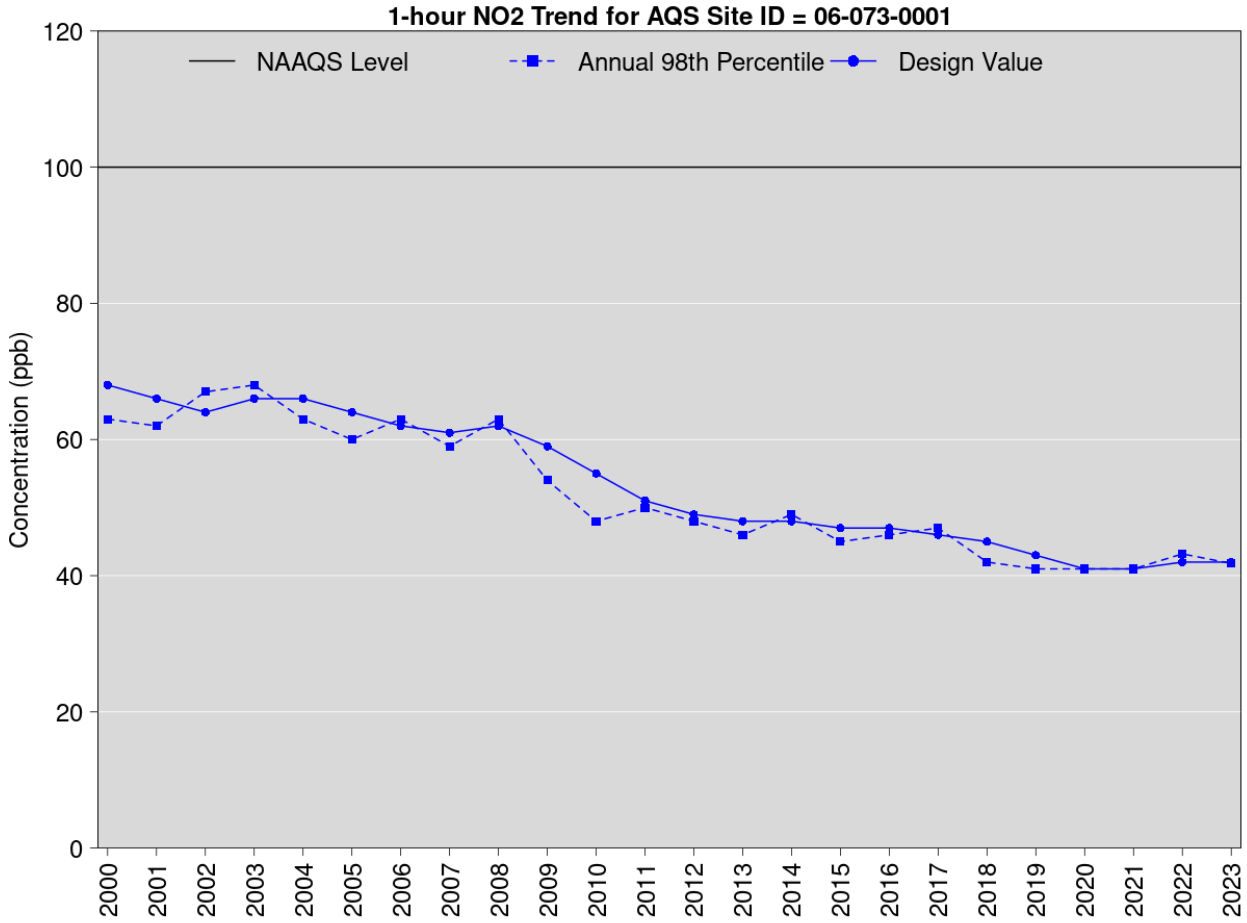
Site: Alpine


1-hour NO2 Trend for AQS Site ID = 06-073-1006
NAAQS Level
Annual 98th Percentile
Design Value
Concentration (ppb)
120
100
80
60
40
20
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023

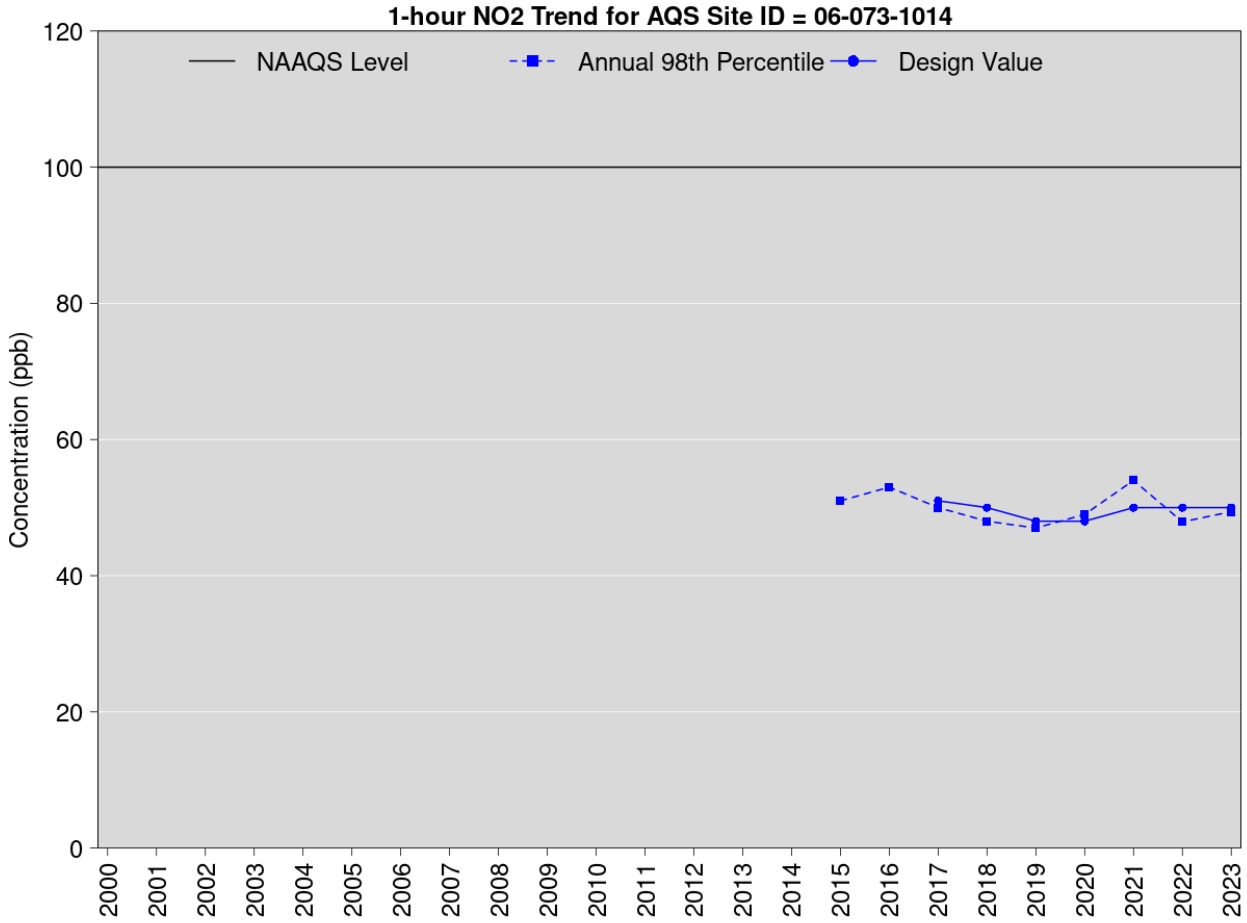
Site: Sherman Elementary School



Site: Chula Vista

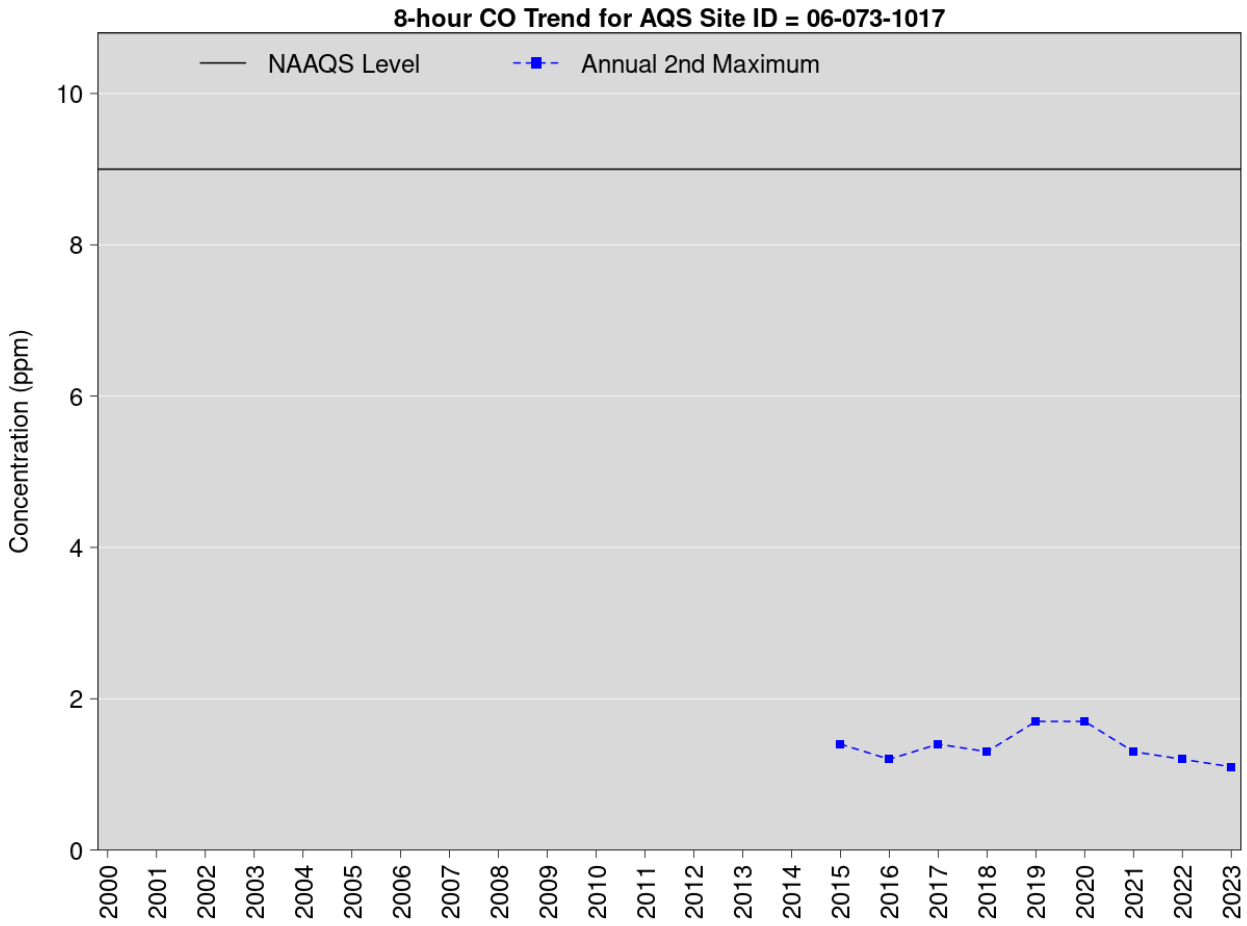


Site: Otay Mesa – Donovan

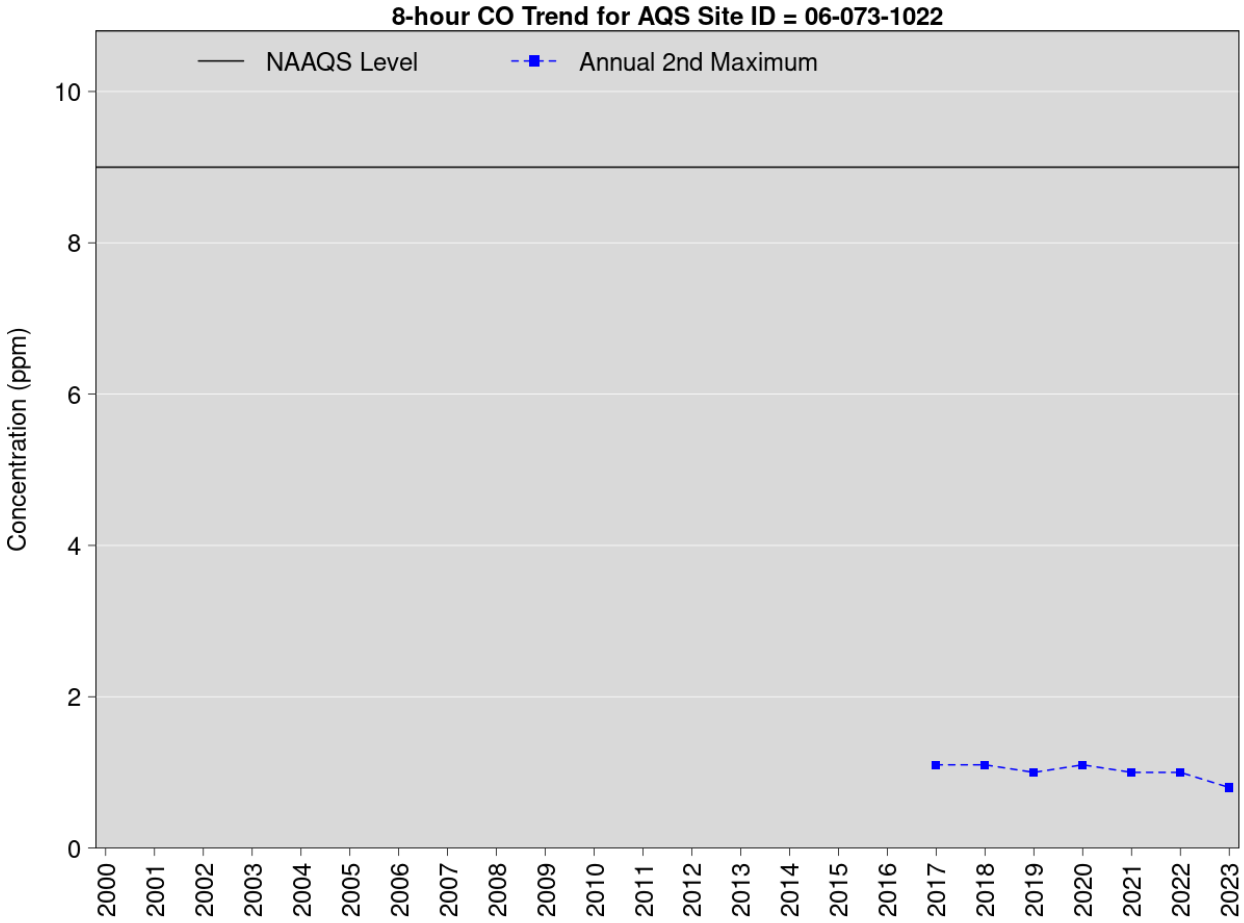


A-5 Pollutant: CO

Site: Rancho Carmel Drive

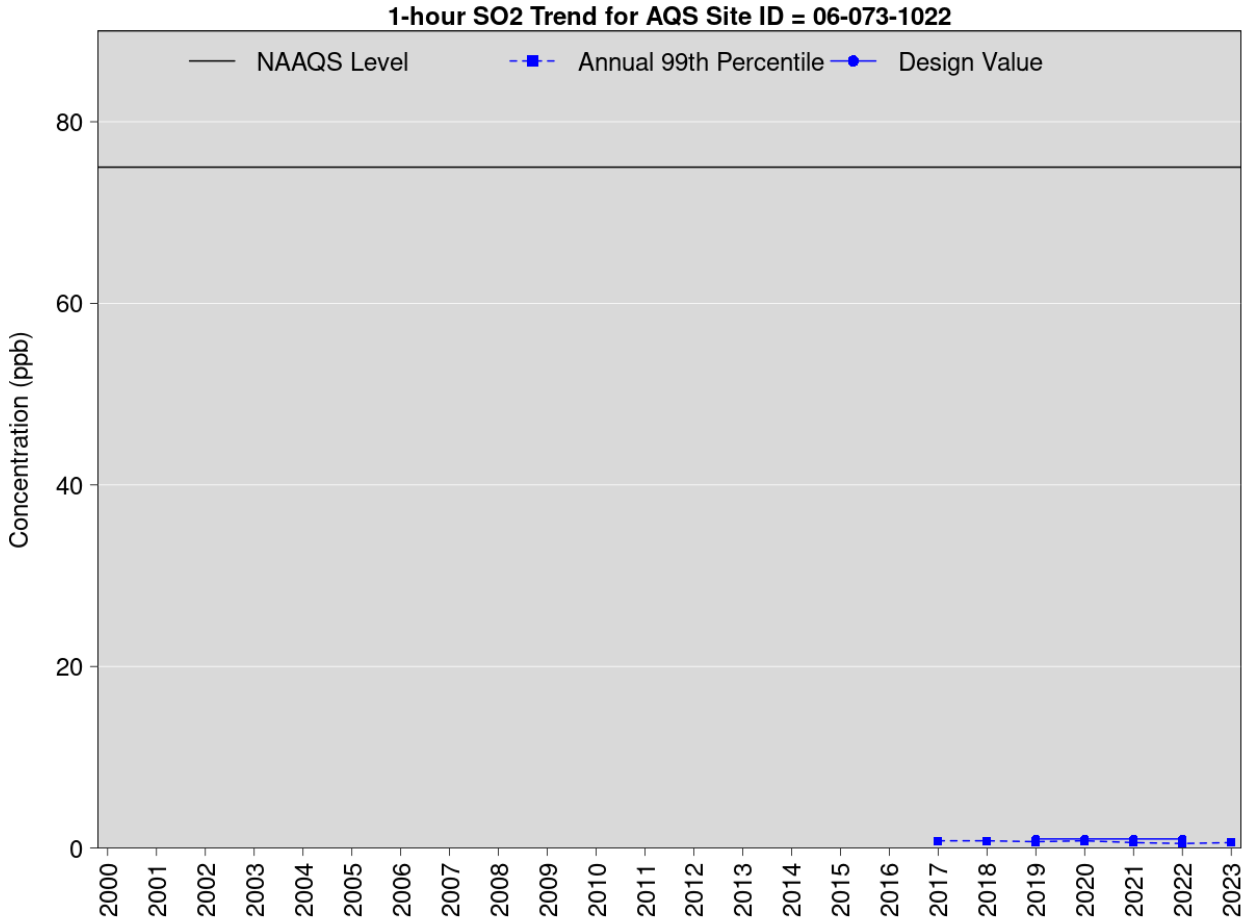


Site: Lexington Elementary School



A-6 Pollutant: Sulfur Dioxide

Site: Lexington Elementary School



A-7 Pollutant: Lead

Site: Palomar Airport