Triennial Assessment and Plan Update

YOLO-SOLANO
AIR QUALITY MANAGEMENT DISTRICT

5-8-2019

Triennial Assessment and Plan Update

Prepared for:

California Air Resources Board

Prepared by:

Yolo – Solano Air Quality Management District
1947 Galileo Court, Suite 103
Davis, CA 95618
Phone: (530) 757-3650

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Mat Ehrhardt, P.E.

The following individuals contributed to the preparation of the Triennial Assessment and Plan Update for the Yolo – Solano AQMD:

Matthew R. Jones, Planning Manager
Jim Antone, Associate Air Quality Planner

Executive Summary

The California Clean Air Act (CCAA) of 1988 requires submission of a plan for attaining and maintaining state ambient air quality standards for ozone with subsequent updates every three years. This Triennial Assessment and Plan Update (Plan) discusses the progress the Yolo-Solano Air Quality Management District (District) has made towards improving the air quality in its jurisdiction since its last Triennial Plan Update, which addressed the 2012-2014 time period. This Plan will examine the years 2015-2017.

This is the eighth update to the District's original 1992 Air Quality Attainment Plan (AQAP) and includes:

- Information about emission reductions achieved during the 2015-2017 period,
- District emission inventory and emission forecasts,
- Air quality data and analysis of air quality trends through 2017, and
- Proposed commitments for the 2018 - 2020 period.

The State has set two health-based standards for ozone. The 1-hour standard is exceeded when monitored ground-level ozone exceeds 0.09 parts per million (ppm) during a one hour period. The 8-hour standard is exceeded when levels exceed 0.070 parts per million over any 8-hour period. From 2015 through 2017, the State 1-hour standard was only exceeded once at monitoring stations located within the District. The 8-hour standard was exceeded on 11 days over the same 3-year time period. Examining the actual number of exceedances of State standards over time, the District has shown a steady improvement in air quality. This improvement is also evident when looking at ozone exposure indicators over the last 20 years.

The CCAA requires air districts to adopt all feasible control measures. The District has conducted an "all feasible measure" analysis for ozone control measures as part of the prior federal planning process for ozone. The District believes that this analysis represents the most up-to-date information currently available and is adequate for the all feasible measures requirement for this Triennial Plan update.

The ozone trend analysis indicates that the District will need to rely heavily on mobile source control measures implemented by the State to make significant further progress towards achieving the state ozone standard.

The District is not required to prepare an attainment plan for particulate matter measuring 10 microns or less in diameter (PM_{10}) or 2.5 microns or less in diameter ($PM_{2.5}$). However, the District continues to work to reduce particulate emissions through rules affecting stationary sources, the construction industry, and the District's agricultural burning program. The District also works with the California Air Resources Board (ARB) to identify measures that can, where possible, reduce both ozone and particulate emissions. The District has been proactive in its attempt to implement the most readily available, feasible, and cost-effective measures that can be employed to reduce emissions of PM_{10} and $PM_{2.5}$.

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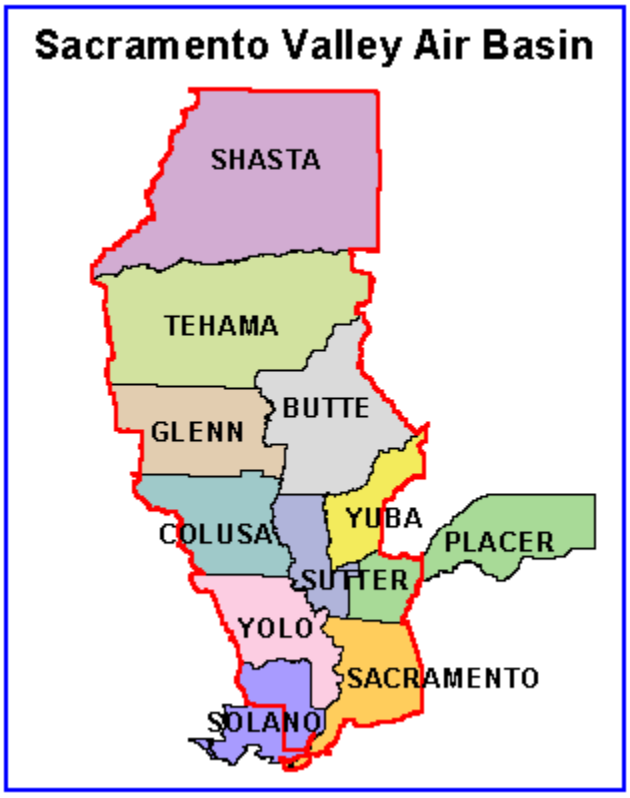
1. INTRODUCTION

The Yolo-Solano Air Quality Management District (District) is one of 35 air districts in California that were established to protect air quality. The District includes Yolo County and the northeastern portion of Solano County. Figures 1 and 2 illustrate the District's jurisdiction in relation to the Sacramento Valley Air Basin.

Figure 1: Sacramento Valley Air Basin[1]



The District is responsible for achieving and maintaining healthful air quality for its residents. This is accomplished by establishing and enforcing air pollution control rules and regulations in order to attain all state and federal ambient air quality standards and limit public exposure to airborne toxins and nuisance odors. A large portion of the District's emissions inventory is attributed to mobile sources. Although the District does not have direct jurisdiction over mobile source emissions, the District does provide some financial incentives and employs public education campaigns to encourage mobile source reductions.

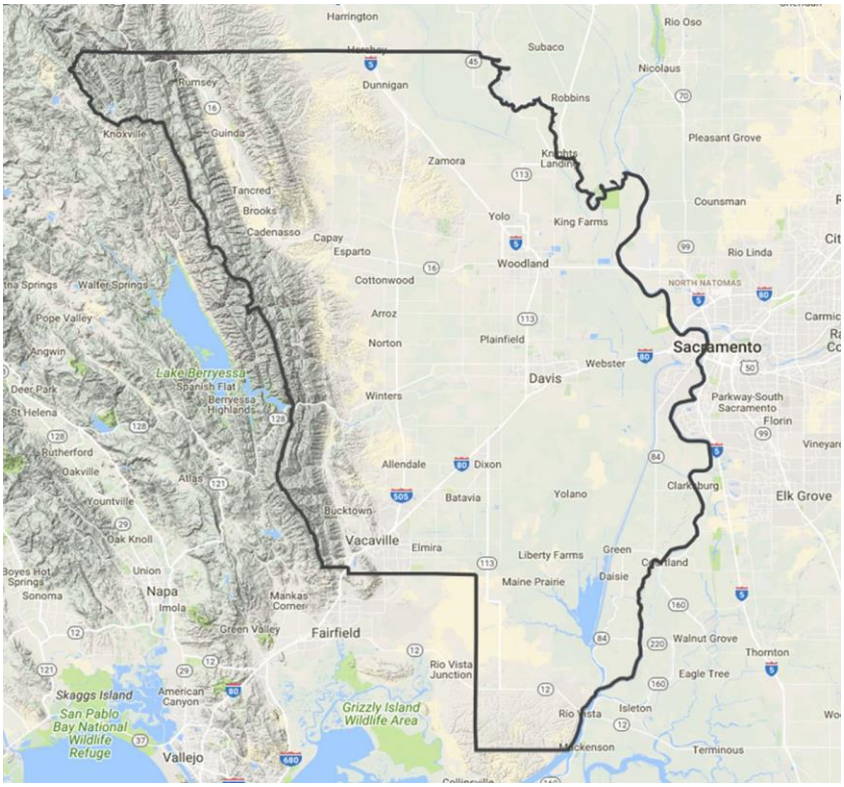
The California Clean Air Act (CCAA) includes provisions requiring areas to attain State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter (PM_{10} and $PM_{2.5}$). The District has attained each of these standards,

[1] Source: http:/www.arb.ca.gov/maps/basinmap.jpg

with the exceptions of ozone and the particulates. The CCAA includes provisions requiring areas that have not attained State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, to prepare plans to attain these standards by the earliest practicable date.[2] A plan for particulates is not required.

Accordingly, the District's original Air Quality Attainment Plan (AQAP) was developed pursuant to the CCAA requirements and identified feasible emission control measures to provide for expeditious progress towards attaining the State ozone standard. The District's Board of Directors adopted the AQAP on February 19, 1992 and the Air Resources Board (ARB) approved it on May 28, 1992. The District updated the AQAP by the end of 1994 and is required to provide reports once every three years thereafter describing the progress the District has made towards attaining the state standard. Control measures included in the original AQAP and all AQAP updates focus on emission sources under the District's authority, specifically stationary emission sources[3] and some area-wide sources[4].

Figure 2: YSAQMD Jurisdiction[5]



[2] California Health and Safety Code (H&SC) §40911(a)

[3] Examples of stationary sources include power plants, manufacturing and industrial facilities, stationary internal combustion engines, gas stations, landfills, and solvent cleaning and surface coating operations.

[4] Area-wide emission sources are individually small and are spread over a wide area. They are mostly residential sources, including water heaters, furnaces, architectural coatings, and consumer products.

[5] Source: ARB CHAPIS website

1.1 Ozone

At certain levels, ozone can impact lung function by irritating and damaging the respiratory system. Ozone can also be harmful to crops and vegetation and can damage rubber, plastic, and other materials. Ozone is not a directly emitted pollutant, but is formed in the atmosphere by certain "precursor" pollutants. Consequently, the pollutants addressed by the AQAP are the ozone precursors, reactive organic gases (ROG) and oxides of nitrogen (NOx).

In 1988, the ARB adopted a 1-hour ozone standard of 0.09 parts per million (or 180 $\mu g/m^3$). In 1997, the ARB assigned designations to individual counties for this standard, and the District was determined to be in nonattainment. On July 26, 2007, the State adopted a more stringent 8-hour ozone standard of 0.070 ppm (or 137 µg/m3) in addition to the 1-hour standard. This new 8-hour standard was developed in part to achieve greater protection for sensitive groups. The District was subsequently found to be in nonattainment of the standard by the ARB.

1.2 Particulate Matter (PM)

Particulate matter (PM) larger than 2.5 microns and less than 10 microns, often referred to as coarse PM, is mostly produced in the District by automobile tire wear, industrial processes such as cutting and grinding, and suspension of particles from the ground or road surfaces by wind and human activities such as vehicle operation, construction or agriculture.

In contrast, PM less than or equal to 2.5 microns in diameter (fine PM or $PM_{2.5}$) is mostly derived from fuel combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary combustion sources. The particles can be either directly emitted or formed secondarily in the atmosphere when gases such as NOx and sulfur oxides (SOx) combine with ammonia.

When the California Legislature passed the CCAA in 1988, it recognized the difficulty in managing PM. Therefore, State law does not require attainment plans for State PM standards. Even so, PM emissions are being reduced through enforcement of District rules, technological advancements in industry, and implementation of agricultural burning programs. In addition, pursuant to Senate Bill 656 (SB656) requirements, ARB and the local air districts have developed a list of the most readily available, feasible, and cost-effective control measures that could be employed to reduce PM emissions. The list of measures to be implemented in the District was adopted by the District's Board of Directors in July 2005. The District has adopted many of the measures originally included on the list.

1.3 Requirements of the CCAA

The CCAA requires an air quality strategy that will achieve a five percent average annual ozone precursor emission reduction or, if that is not achievable, an expeditious schedule

for adopting every feasible emission control measure under air district purview (H&SC §40914).[6]

This Plan Update addresses the progress the District has made towards achieving the 1-hour and 8-hour ozone California Ambient Air Quality Standards (CAAQS). The Plan complies with all of the following applicable progress report and plan revision requirements of the CCAA. The CCAA requires that the plan:

- Assess the extent of ozone air quality improvement achieved during the preceding three years,[7]
- Describe rates of total emission reductions over the preceding three years and incorporate updated projections of population, industry, and vehicle-related emissions growth,[8]
- Identify the proposed and actual dates for adopting and implementing District control measures,[9] and compare the expected emission reductions for each control measure to a newly revised estimate,[10]
- Include an updated schedule for expeditiously adopting every feasible control measure for emission sources under District purview,[11]
- Include an assessment of the cost-effectiveness of available and proposed control measures and contain a list which ranks the control measures from the least cost-effective to the most cost-effective,[12] and
- Determine whether a State-mandated, no-net-increase permitting program (i.e., State emission offset requirements) is necessary to achieve and maintain the State ozone standard by the earliest practicable date.[13]

Additionally, pursuant to ARB guidance, this Plan includes sections that:

- Summarize the existing financial incentive programs for reducing emissions,
- Discuss the District's schedule to have the same "no net increase" program as our downwind Districts in order to mitigate transport emissions,
- Document trends in air quality using air quality indicators, and
- Provide a long-term view of emissions projections for future years by four primary source sectors (stationary, area-wide, on- and off-road mobile sources).

[6] The term "feasible" is not specifically defined in the CCAA. However, the statutory criteria for assessing a potential control measure include cost effectiveness, technological feasibility, total emission reduction potential, the rate of emission reduction, public acceptability, and enforceability [H&SC 40922(a)].
[7] H&SC §40924(b)(1)
[8] H&SC §40925(a)
[9] H&SC §40924(a)
[10] H&SC §40924(b)(2)
[11] H&SC §40914(b)(2)
[12] H&SC §40922(a)
[13] H&SC §40918.6

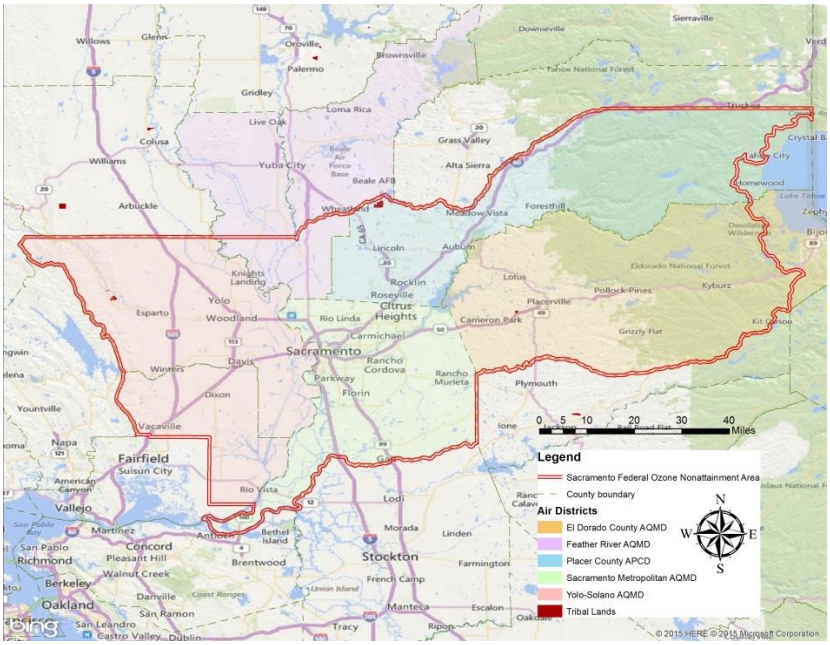
1.4 Triennial Plan History

The second, third, and fourth Triennial Progress Reports were completed in 1997, 2000, and 2003 respectively. The fifth Report combined years 2003-2008 and was completed in 2010. The 2010 report incorporated conclusions from the Sacramento Federal Nonattainment Area's (SFNA's) 2008 federal ozone plan which was prepared to address a new 8-hour ozone NAAQS. The report covering the 2009-2011 time period was adopted by the District Board of Directors in April of 2013. The most recently adopted report covered the 2012-2014 time period and was adopted by the District Board of Directors in 2016. All of the Triennial Progress Reports have concluded that the District has continued to show air quality improvements and continued to consider, review, and adopt additional control measures where appropriate. This report is the eighth update.

1.5 Federal Clean Air Act (FCAA)

Prior to development of the state's regulation of air quality, the Federal Clean Air Act (FCAA) established national ambient air quality standards (NAAQS) and requirements with respect to criteria air pollutants. One of the requirements of the FCAA that applies to areas that violate the NAAQS is the requirement for designated non-attainment areas to create attainment plans. These plans must describe the efforts that will be employed to meet the NAAQS. The District is included in the Sacramento Federal Non-attainment Area (SFNA) for ozone. Figure 3 illustrates the boundaries of the SFNA which were designated by the EPA.

Figure 3: Sacramento Federal Ozone Non-attainment Area[14]



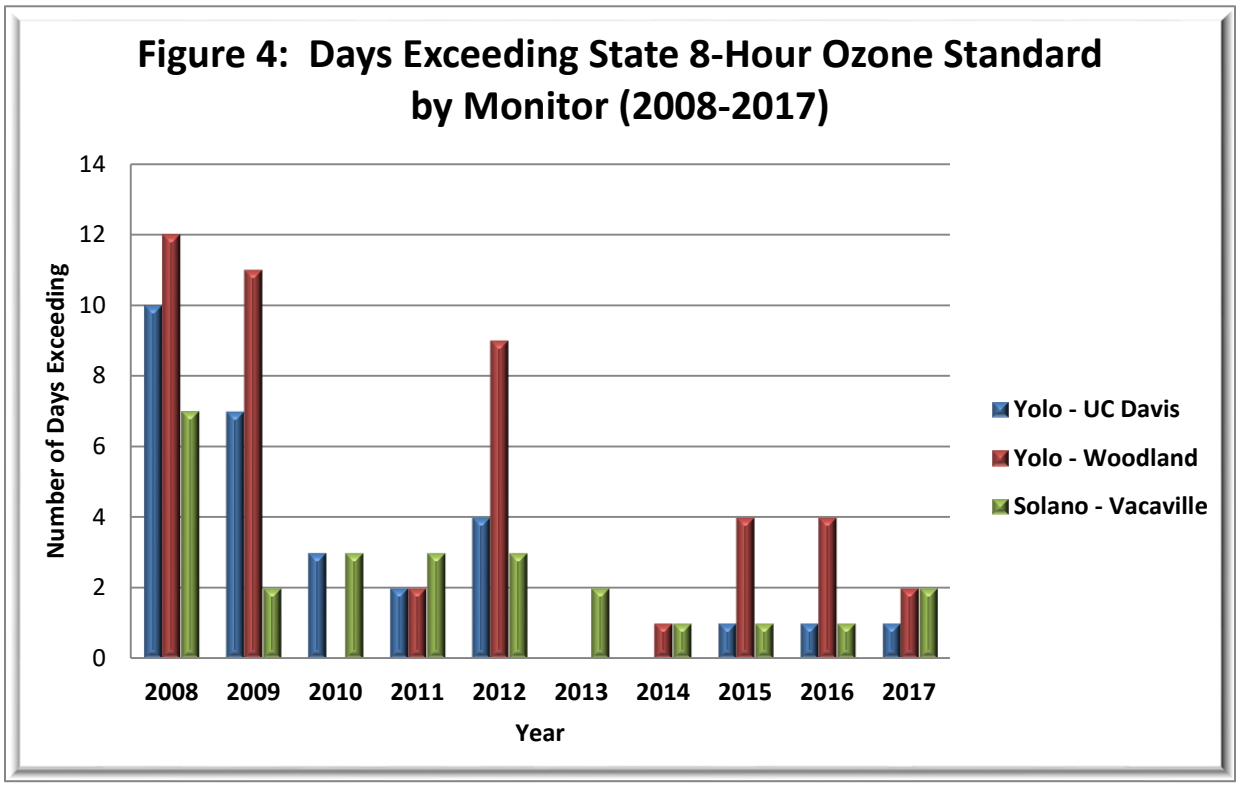
[14] Source: 2002 Milestone Report – SFNA represented by heavy shaded area

2. OZONE AIR QUALITY TRENDS

State law requires the triennial assessment of ozone air quality improvements achieved during the preceding three years to be based on ambient pollutant measurements and air quality indicators.[15] Accurate, real-time measurements of ambient air pollution, including ozone, are collected throughout the District at several sites to identify the status and trend of ambient air quality in Yolo and northeast Solano Counties. Appendix B shows the locations of monitoring stations operating in the District which satisfy the federal government's published standards for monitor siting and quality assurance. Three stations in the District monitor for ozone and were used for the purposes of this report: Davis (UCD Campus), Woodland (Gibson Road), and Vacaville (Ulatis Road).

2.1 Ozone Exceedance Trends

The ozone trends for Yolo and northeast Solano Counties are presented in Figure 4, which identifies the number of days the State 8-hour ozone standard was exceeded between 2008 and 2017. An exceedance of the 8-hour ozone standard occurs when the monitored ambient concentration level is 0.070 ppm or greater over an 8-hour period.



- Data for 2008 excludes days for which an exceptional events request was approved by EPA due to wildfires.

[15] H&SC Section 40924(b)(1)

As shown in Figure 4, ozone concentrations have been generally trending downward since 2008, and the general pattern suggests that the worst years for air quality are becoming less severe while the best air quality years are becoming cleaner.

2.2 Other Ozone Improvement Indicators

In addition to the actual number of ozone exceedances that have been observed over time, other statistical indicators can be used to assess air quality improvements for ozone based on the monitored air quality data. These indicators include: 1) population-weighted ozone exposure, 2) area-weighted ozone exposure, and 3) Expected Peak Day Concentrations (EPDC). These indicators are discussed in response to recommendations in guidance produced by ARB.

2.2.1 Exposure Indicators: Population-Weighted Exposure

The population-weighted exposure indicator consolidates hourly ozone monitoring data from all sites within the District into a single exposure value. The result is a value representing the average potential exposure in the District. The purpose of the population-weighted ozone indicator is to characterize the potential average outdoor exposure per person. That number can then be compared to the State ozone standards. The calculation methodology assumes that an "exposure" occurs when a person experiences a 1-hour concentration outdoors that is higher than 0.09 ppm or 0.07 ppm over eight hours. Population-weighted ozone exposure is a good indicator of the extent and severity of the ozone problem for human health because it indicates whether relatively few people or many people are being exposed to unhealthful ozone levels. Table 1 shows the population-weighted exposure indicators in parts per million for the years 2015, 2016, and 2017. As shown in Table 1, the population-weighted exposure for District residents was substantially below the State standards.

Table 1: Population-Weighted Ozone Exposure Indicators

	1-Hour Ozone	8-Hour Ozone
2015	**0.0000**	**0.0279**
2016	**0.0007**	**0.0429**
2017	**0.0014**	**0.0461**

2.2.2 Exposure Indicators: Area-Weighted Exposure

Area-weighted ozone exposure is similar to population-weighted exposure except that all areas are equally influential, regardless of the local population. Because rural and urban areas receive equal weight, the area-weighted exposure indicator is a more appropriate estimate of the exposure of crops and vegetation to the damaging effects of ozone. Table 2 shows the area-weighted exposure for the years 2015, 2016, and 2017 which were substantially below the State standards.

Table 2: Area-Weighted Ozone Exposure Indicators		
	1-Hour Ozone	8-Hour Ozone
2015	**0.0000**	**0.0193**
2016	**0.0000**	**0.0292**
2017	**0.0001**	**0.0180**

2.2.3 Expected Peak Day Concentration

Another useful statistical indicator that can be used to assess improvement in air quality is the Expected Peak Day Concentration (EPDC). The EPDC tracks progress in reducing daily 1-hour and 8-hour ozone concentrations at each monitoring site. This indicator represents the potential worst-case for exposure to ozone and acute adverse health impacts. The EPDC represents a statistically derived value that reflects the concentration expected to be exceeded only once per year, on average, based on the distribution of data for a particular monitoring location.

The September 1993 ARB staff report entitled: "Guidance for Using Air Quality-Related Indicators in Reporting Progress in Attaining the State Ambient Air Quality Standards," identifies the EPDC as the best indicator for tracking progress at locations in a non-attainment area.

A goal of the planning process is for all EPDCs in the District's network to be below the State standard because that is when the District will likely become an attainment area for the standard.

Figures 5 through 10 display the 1-hour and 8-hour ozone EPDC values and the corresponding yearly trends for the District's ozone monitoring sites. Overall there have been variations in the EPDC values at each site with both increasing and decreasing values. However, the data indicates that there has been a steady trend in decreasing ozone exposures throughout the District since 2000.

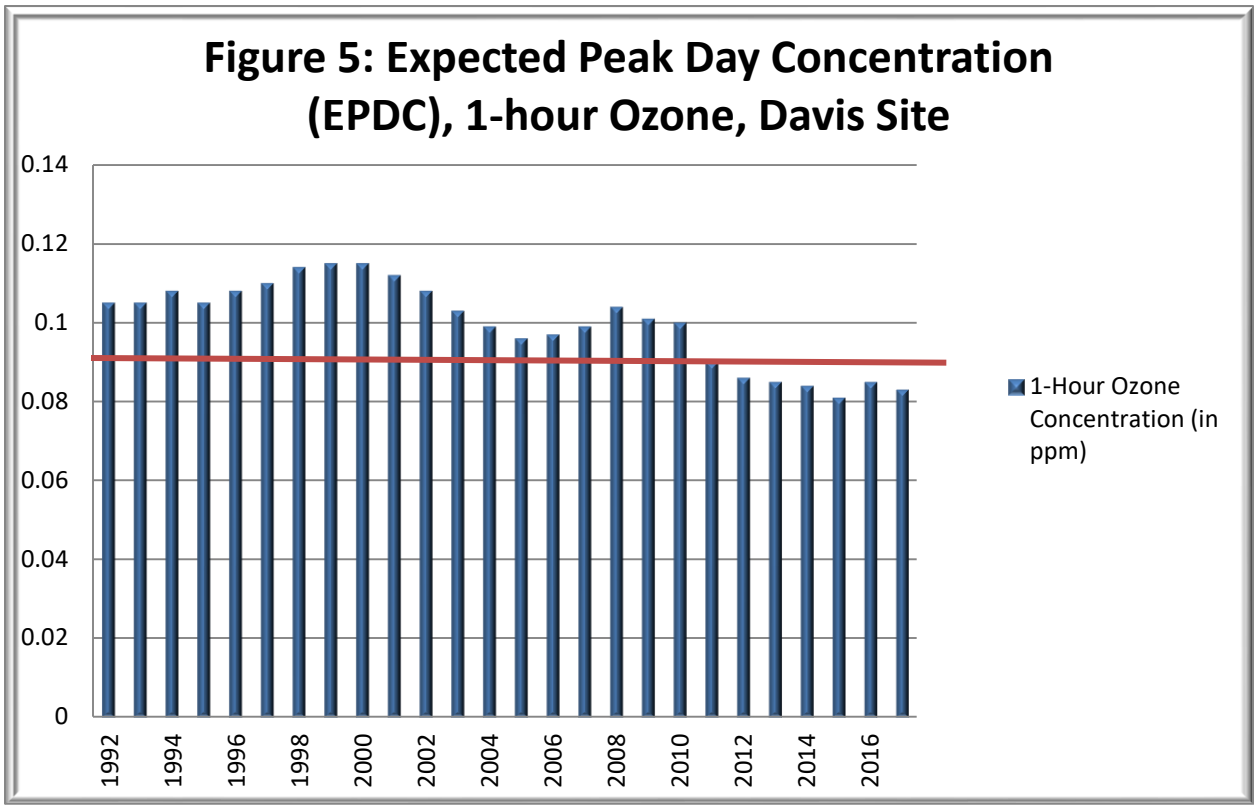


Figure 5: Expected Peak Day Concentration (EPDC), 1-hour Ozone, Davis Site
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
1-Hour Ozone Concentration (in ppm)

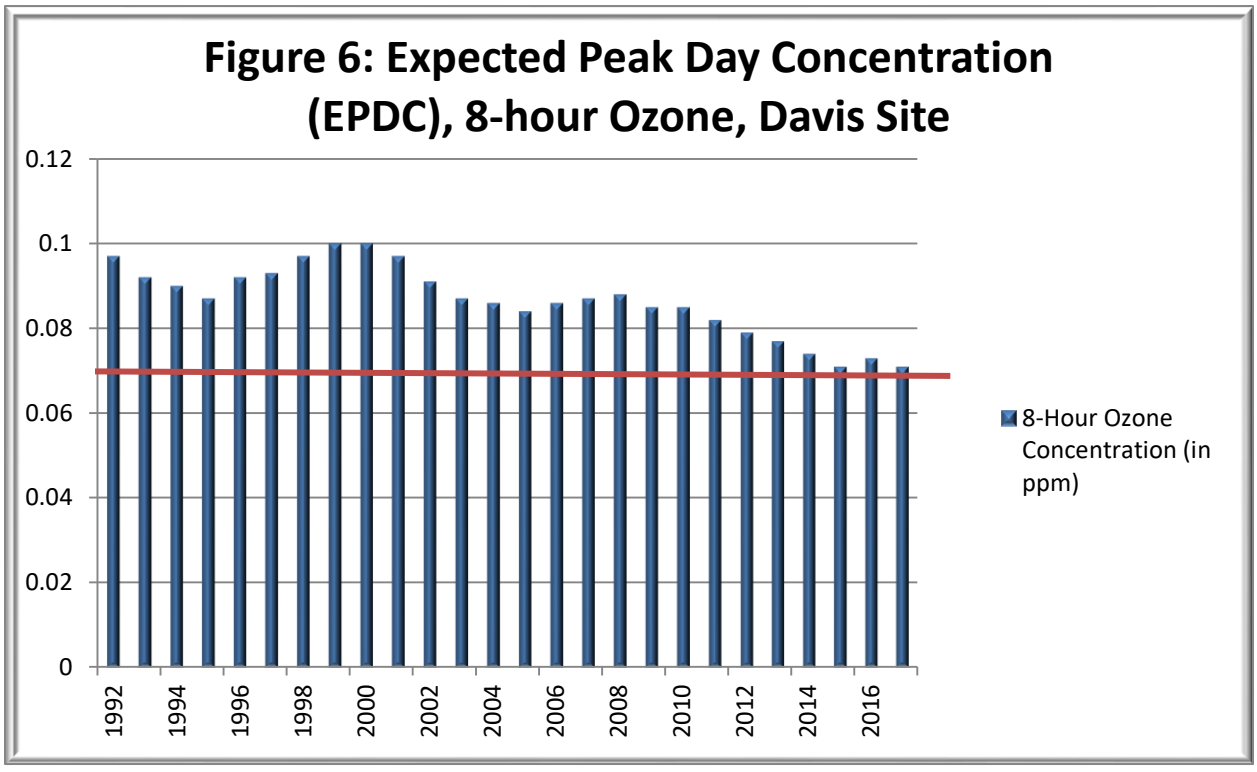


Figure 6: Expected Peak Day Concentration (EPDC), 8-hour Ozone, Davis Site
0.12
0.1
0.08
0.06
0.04
0.02
0
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
8-Hour Ozone Concentration (in ppm)

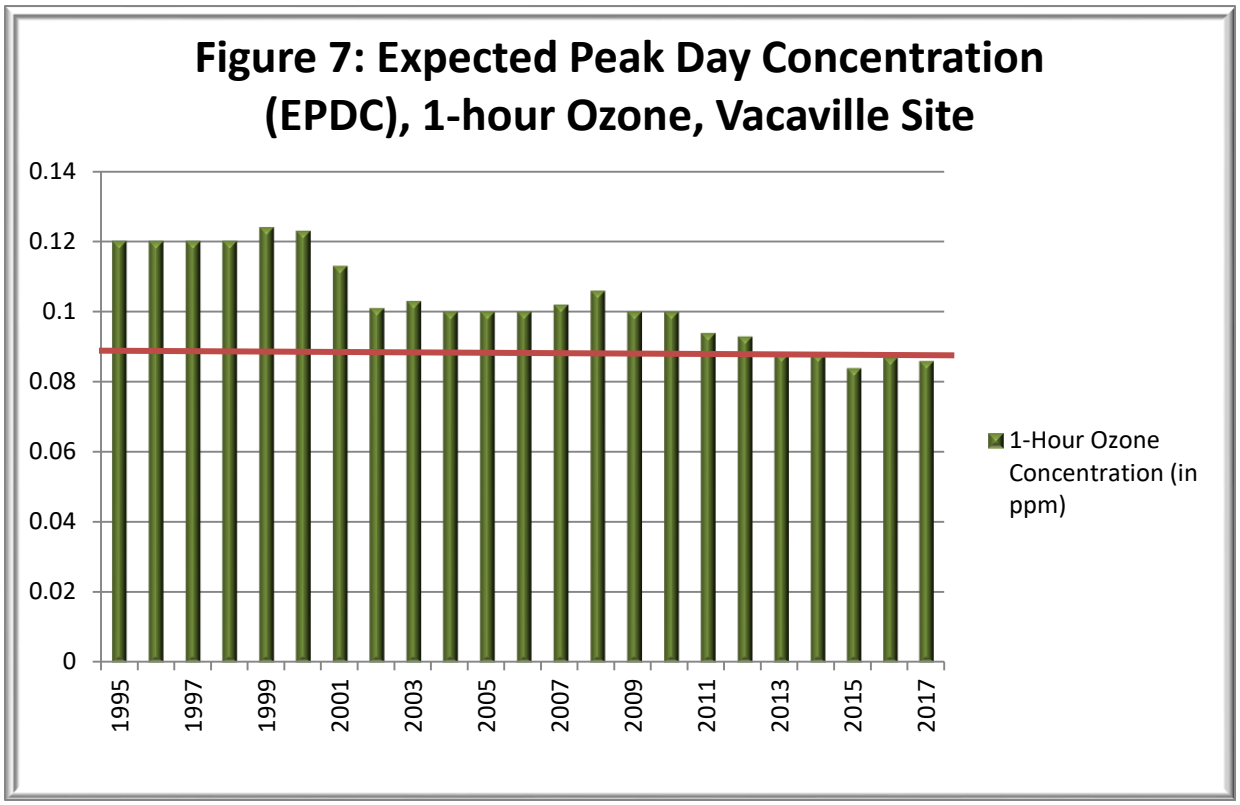


Figure 7: Expected Peak Day Concentration (EPDC), 1-hour Ozone, Vacaville Site
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
1-Hour Ozone Concentration (in ppm)

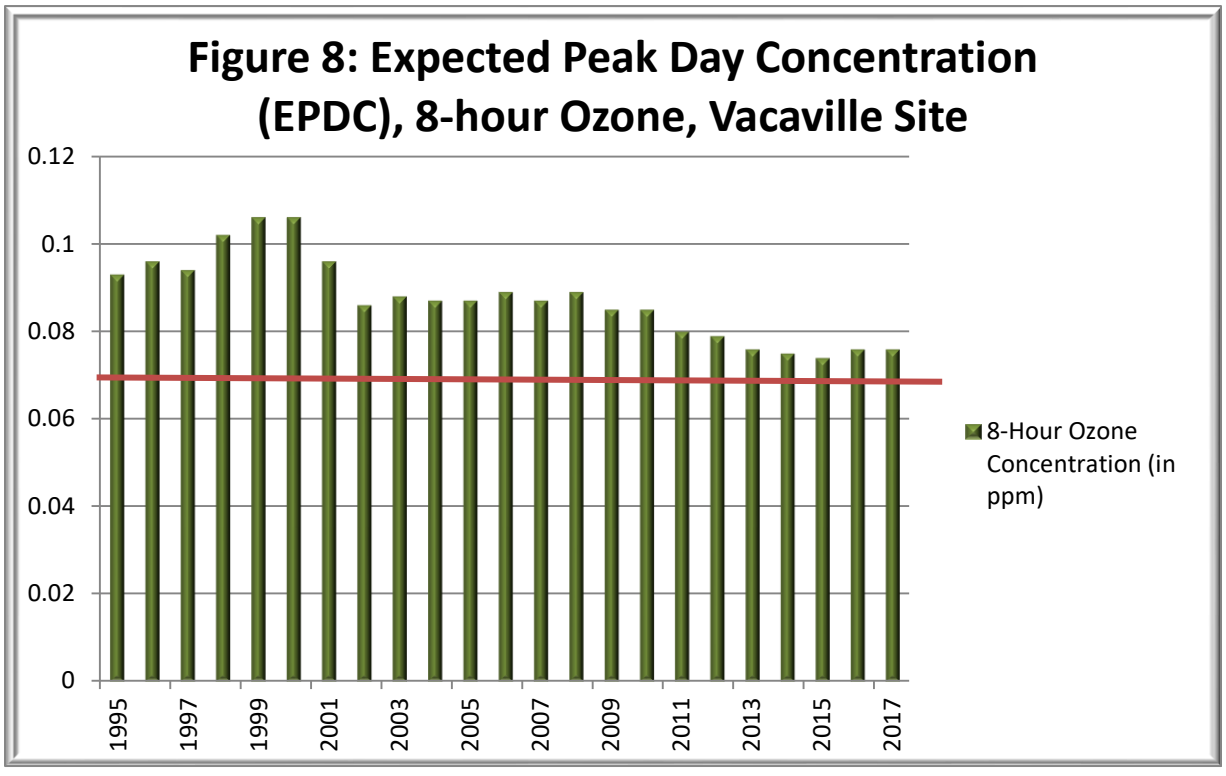


Figure 8: Expected Peak Day Concentration (EPDC), 8-hour Ozone, Vacaville Site
0.12
0.1
0.08
0.06
0.04
0.02
0
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
8-Hour Ozone Concentration (in ppm)

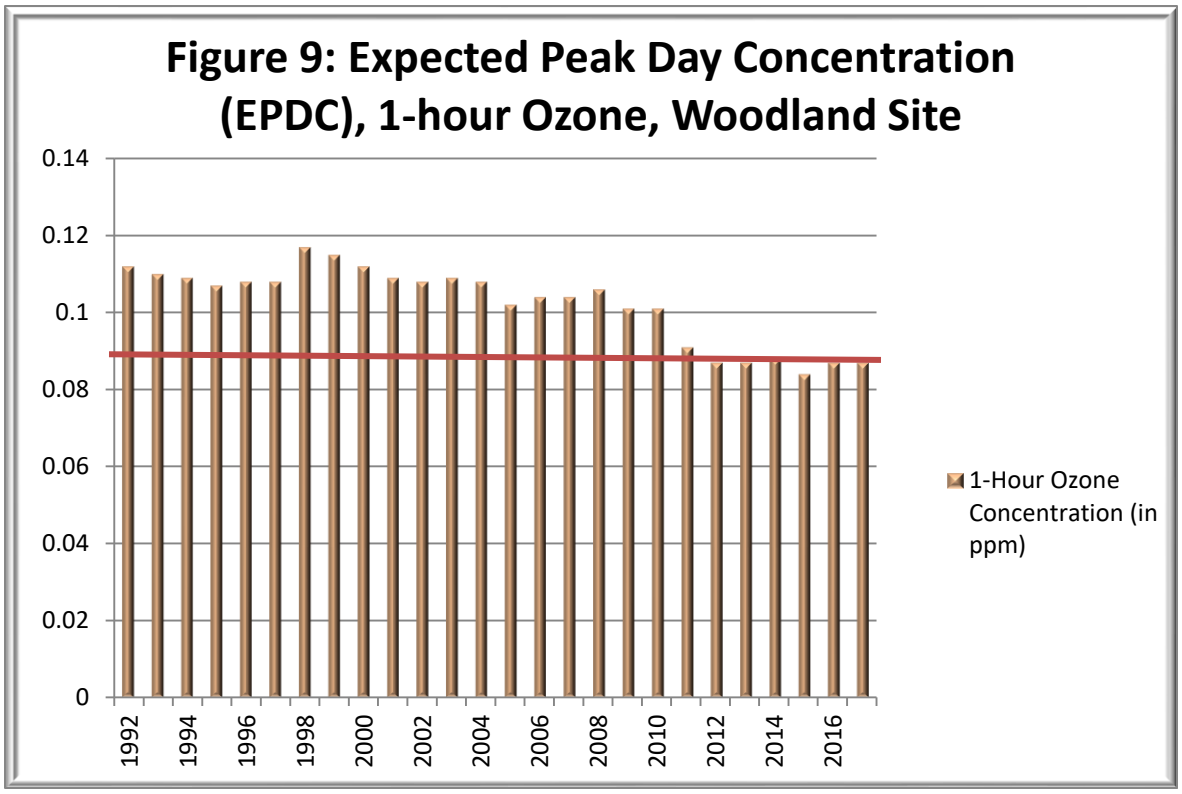


Figure 9: Expected Peak Day Concentration (EPDC), 1-hour Ozone, Woodland Site
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
1-Hour Ozone Concentration (in ppm)

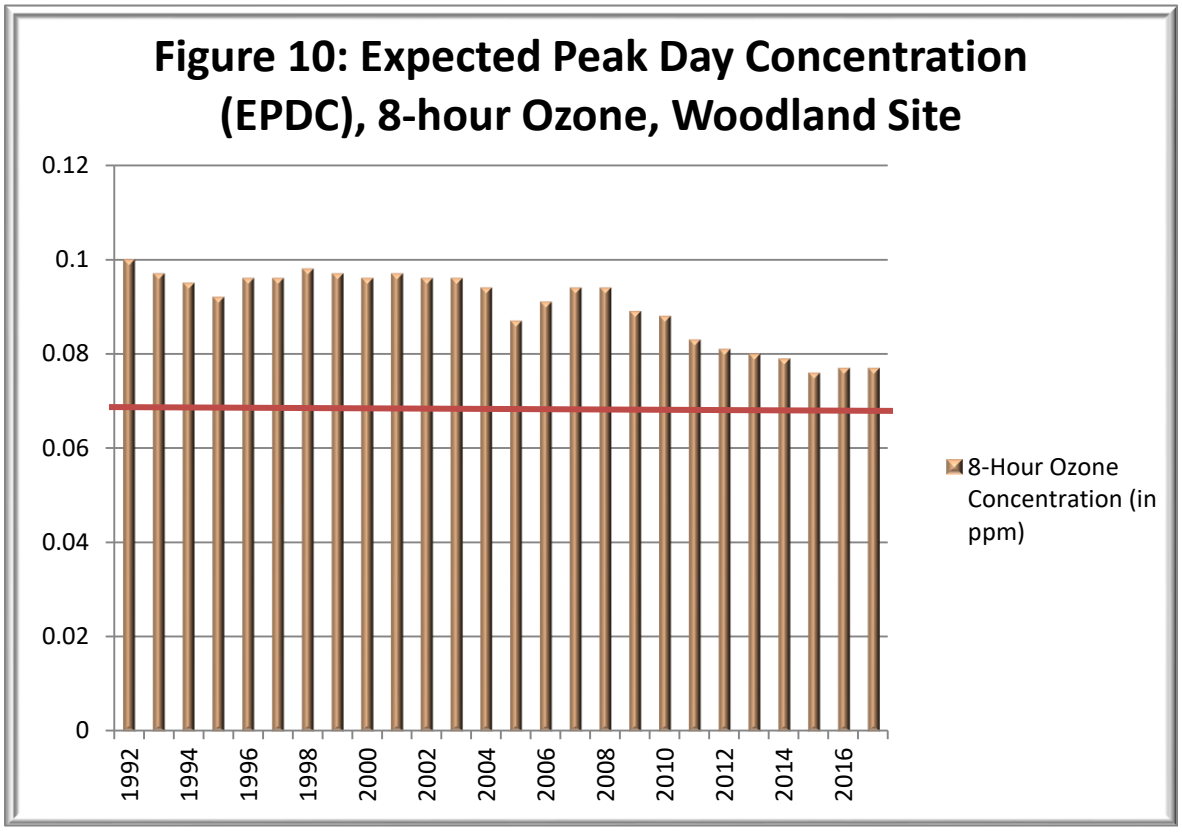


Figure 10: Expected Peak Day Concentration (EPDC), 8-hour Ozone, Woodland Site
0.12
0.1
0.08
0.06
0.04
0.02
0
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
8-Hour Ozone Concentration (in ppm)

3. EMISSION TRENDS

In order to forecast trends in emissions, the District and the ARB develop an emission inventory. The emission inventory is an estimate of ozone precursor pollutants (ROG and NOx) emitted by various sources. Trends in the emission inventory can be used to monitor progress the District is making toward attaining the California ambient ozone standards.

The emission inventory is divided into five major categories. These include stationary, area-wide, on-road mobile, other mobile, and natural source groupings. Stationary sources include facilities at fixed locations such as cogeneration plants or landfills, while "area" sources are composed of individually smaller sources which when aggregated have significant emissions. Architectural coatings (such as house paint) and consumer products are examples of area sources. On-road mobile sources consist of the numerous light and heavy-duty vehicles that travel the streets and highways. Other mobile sources include agricultural and construction equipment, trains, planes, and recreational vehicles. Natural sources include biological and geological sources, wildfires, windblown dust, and biogenic emissions from plants and trees. Within each of these major categories are a number of subcategories. Appendix A at the end of this document shows the inventory at a more detailed level.

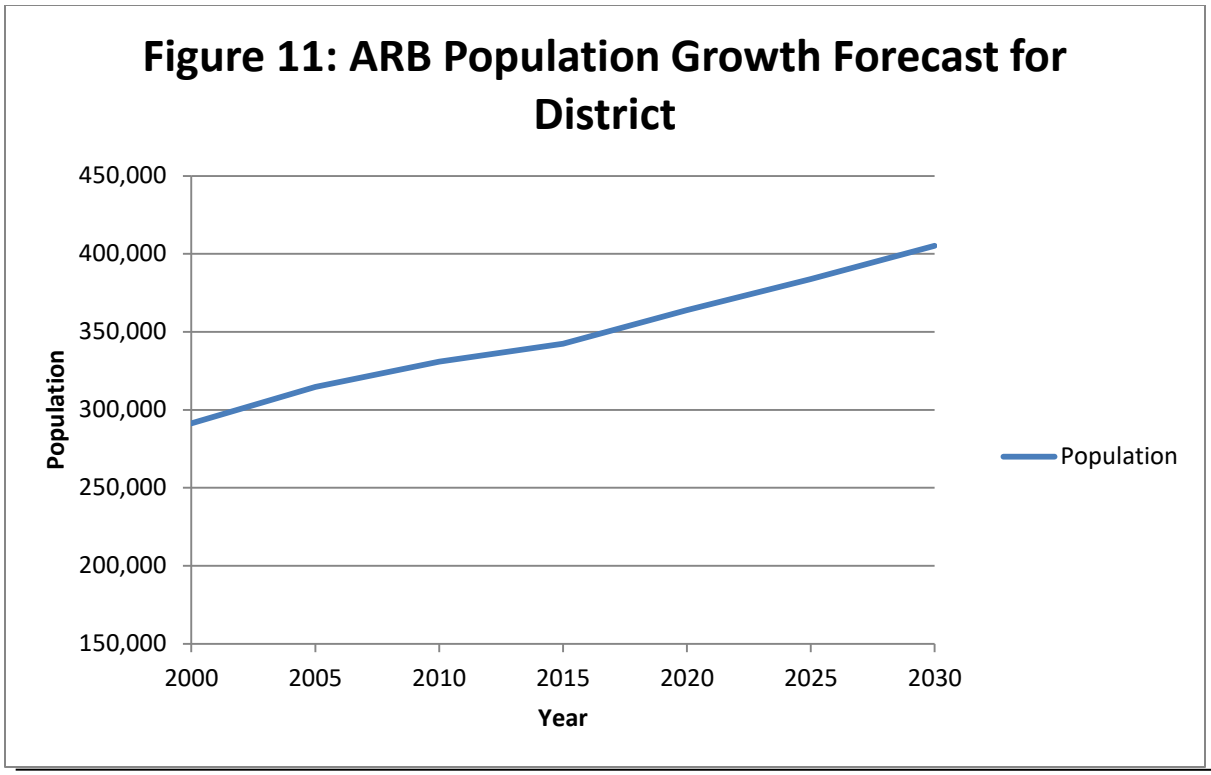
The emission inventory represents estimates of actual emissions that are calculated using reported or estimated process rates and emission factors. For example, motor vehicle emission estimates rely on calculations that include consideration of the fleet mix, vehicle miles traveled, trip starts, speeds, and vehicle emission factors. To derive future-year emission inventories, a current base-year inventory is projected forward in time, based on expected growth rates of population, travel, employment, industrial and commercial activity, and energy use. Reductions from control measures are also accounted for.

As shown in Appendix A, mobile sources are responsible for the majority of ozone precursors emitted in the District. Mobile source emissions are directly related to the overall population and the amount of vehicle miles traveled (VMT).

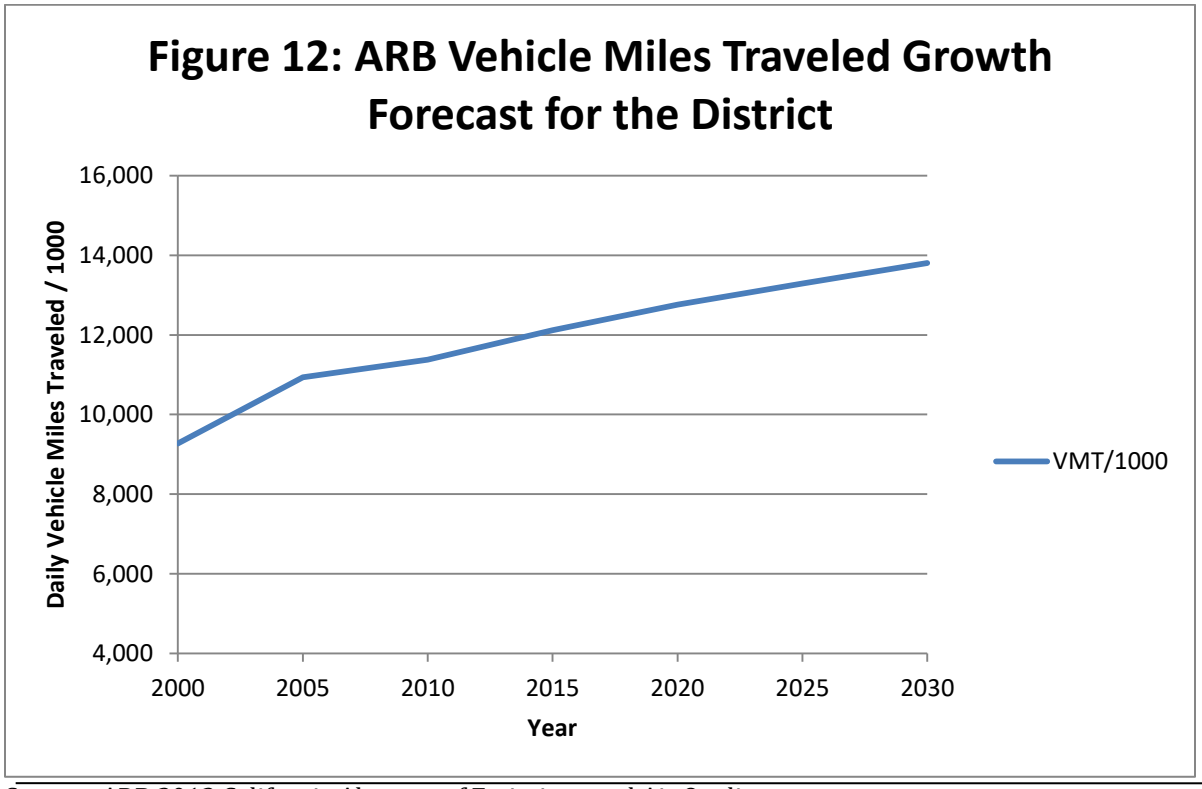
ARB estimates population and VMT increases for the various counties and air districts in California. Population for the District in 2015 was 342,451. This is in conjunction with an growth in vehicle miles traveled to just under 12 million total miles traveled in 2015.[16]

Figures 11 and 12 show the forecasted growth in population and VMT in the District in future years. As shown, both population and VMT are expected to increase through 2030.

[16] District estimates for population and vehicle miles traveled are from ARB 2013 California Almanac of Emissions and Air Quality

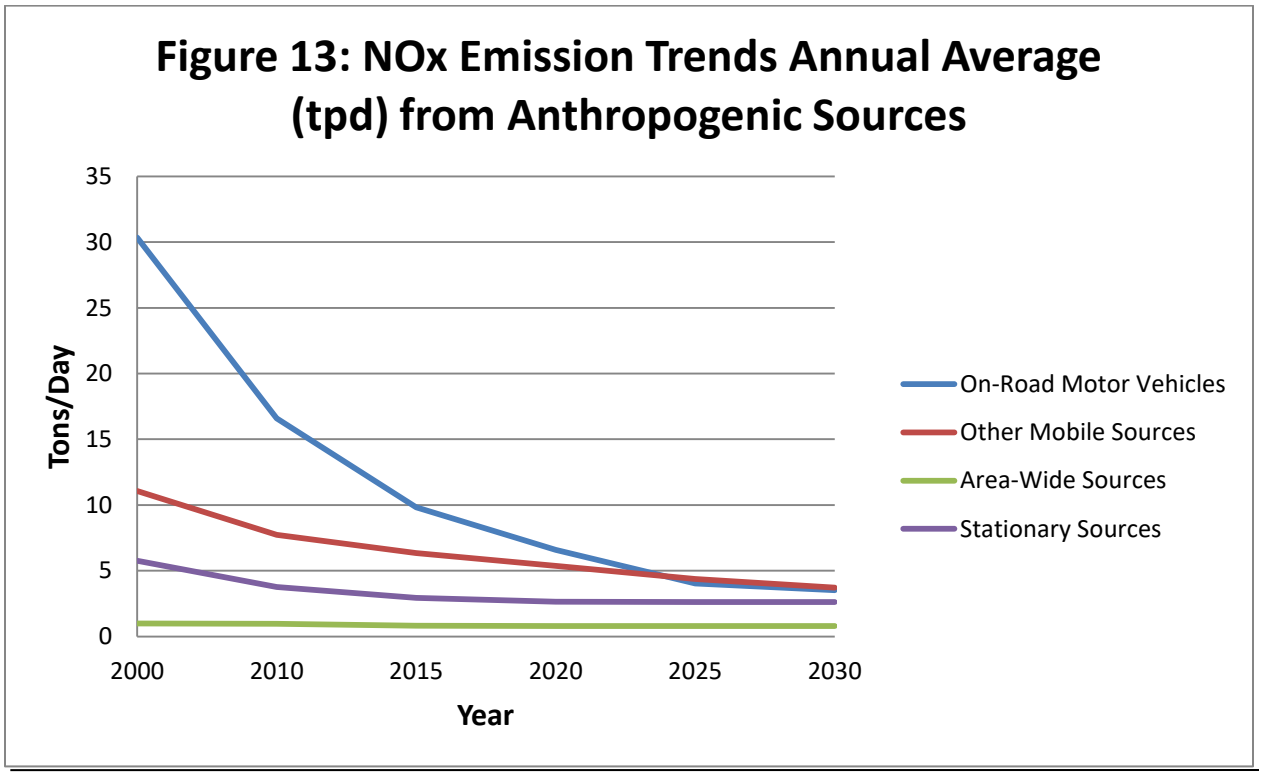


Source: ARB 2013 California Almanac of Emissions and Air Quality



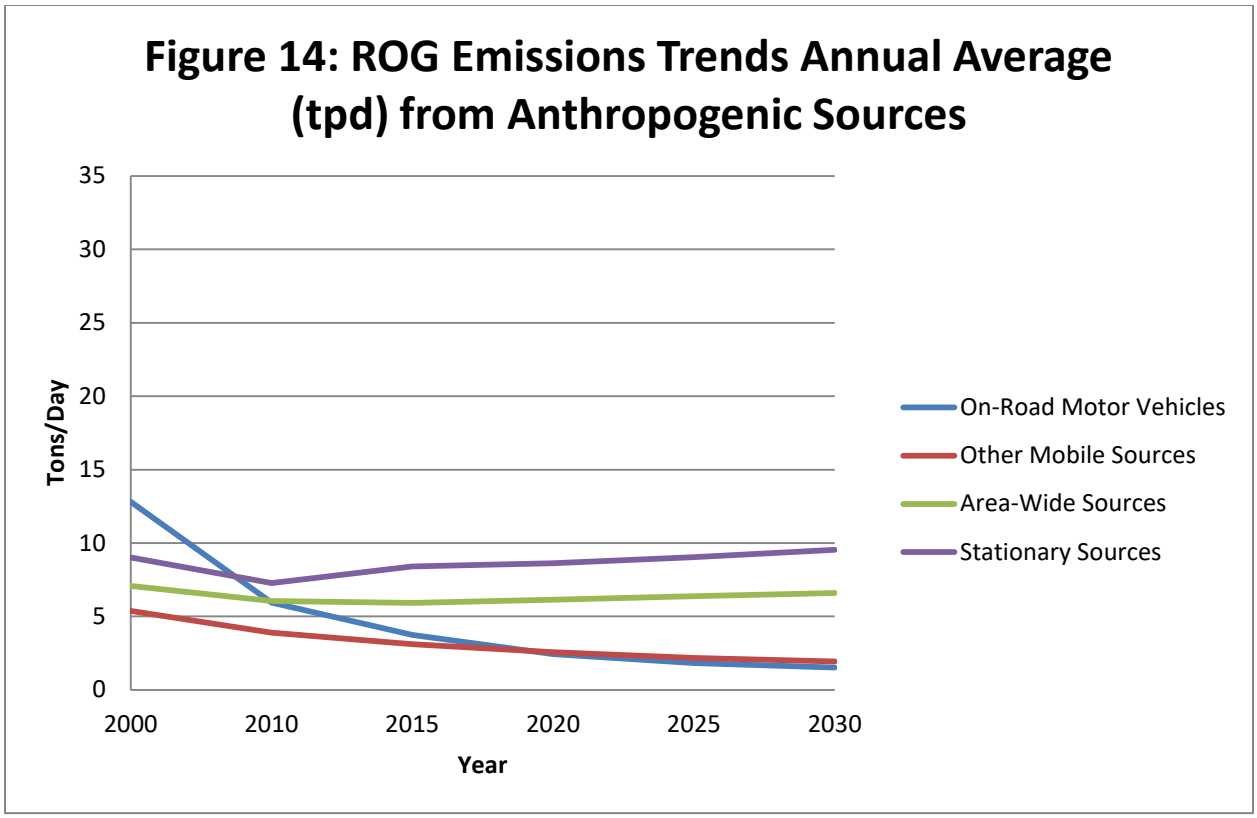
Source: ARB 2013 California Almanac of Emissions and Air Quality

Despite the increasing population and vehicle miles traveled as shown in Figures 11 and 12, the forecasted emission trends show decreases in the overall emission inventory. Figures 13 and 14 show the District's NOx and ROG emission trends, respectively, from anthropogenic (man-made) sources between 2000 and 2030.[17] These emission projections are based on currently adopted control measures and estimated growth forecasts.



Source: ARB's emission inventory website (page last updated 7/6/2018)

[17] Source: ARB's emission inventory website (7/6/2018).



Source: ARB's emission inventory website (page last updated 7/6/2018)

Using a 2000 baseline, ROG emissions are expected to decrease by roughly 43% and NOx emissions are expected to decrease by roughly 78% through 2030. These emissions decreases would occur even though the District's population and vehicle miles traveled are expected to increase roughly 32% and 49%, respectively, over the same time period. More stringent mobile source emission standards and cleaner burning fuels have largely contributed to the steady decline in NOx emissions. ROG emissions have been decreasing due to more stringent motor vehicle standards as well, but ROG emissions from cleaning and surface coatings, waste disposal operations and solvent evaporations from consumer products will slightly offset the decreased ROG emissions from motor vehicles.

ROG emissions from stationary sources are mainly due to operations at facilities that involve cleaning and surface coatings, the storage, dispensing, and transfer of petroleum, and industrial processes. The ROG emissions from the area-wide source category are primarily from consumer products and architectural coating solvents. NOx emissions are generated mostly through fuel combustion. The on-road emission estimates referred to in the tables above were developed by ARB using the EMFAC2014 emissions model. EMFAC estimates emissions from a wide variety of on-road motor vehicle types ranging from light duty passenger autos to heavy-duty urban buses. The most recent version of ARB's EMFAC model is EMFAC 2017. Emission estimates using this newer version will be available for the District's next Plan Update. ARB developed the other mobile emission estimates using the OFFROAD emission model. The OFFROAD model estimates average seasonal daily

emissions from many categories of off-road equipment. This equipment is generally diesel powered. ARB then develops forecasts based on anticipated growth and controls within each equipment category. For the Natural Sources category, ARB estimates emissions of biogenic volatile organic compounds (BVOCs) from vegetation for natural areas, crops, and urban vegetation. BVOC emissions are functions of a species leaf mass, emission factors, temperature, and light conditions.

4. STATIONARY AND AREA SOURCE EMISSION REDUCTION EFFORTS

Over the 2015 – 2017 period, the District has been working to reduce the emission inventory and improve air quality collectively with the other SFNA air districts, ARB, EPA, and local jurisdictions. These efforts have contributed to the SFNA's successful air quality improvements over the past decade. The District will continue to partner with these stakeholders and others to bring about permanent improvements towards cleaner air.

4.1 Reductions from Area-wide and Stationary Sources

The District does not have any direct regulatory control over the mobile source portion of its emission inventory. However, the District does have the authority to adopt rules regulating the stationary and area source portions of the inventory. ARB prepares emission inventories for select years for all emissions categories in their California Emission Projection Analysis Model (CEPAM) emissions inventory database. Table 3 is a comparison of the emissions inventories for area-wide and stationary sources in 2005, 2010 and 2015 and 2017 for ROG and NOx as reported in CEPAM. Although it is important to reduce both ROG and NOx, NOx has historically been the more important precursor in the SFNA in that one ton of NOx reductions can lower ozone concentrations to a greater extent than one ton of ROG reductions.

Table 3: Emission Inventory Comparison
Area & Stationary Sources Only

	2005 (tons per day)	2010 (tons per day)	2015 (tons per day)	2017 (tons per day)
ROG	14.8	13.4	14.3	14.5
NOx	5.2	4.8	3.7	3.4
Total	**20**	**18.2**	**18.0**	**17.9**

The District's emissions inventory for its area and stationary sources indicates that as of 2017, ROG and NOx emissions from area-wide and stationary sources have decreased slightly since 2005.

4.1.2 Adopted Rules Since the Last Triennial Assessment

Over the 2015 – 2017 time period covered by this triennial assessment, the District amended Rule 2.22 – Gasoline Dispensing Facilities, Rule 2.21 – Organic Liquid Storage and Transfer, Rule 2.31 – Solvent Cleaning and Degreasing, and Rule 2.14 – Architectural Coatings.

The District is proposing to amend one rule during the 2018 – 2020 time period. The proposed rule amendment is described in Section 8 – All Feasible Measures.

4.1.3 Agricultural Sources

To reduce air contaminant emissions from agricultural sources, California enacted Senate Bill (SB) 700 in 2003. SB 700 eliminated the agricultural operation permit exemption in the California Health and Safety Code. However, while the bill established guidance and required elements for permitting agricultural sources, individual air districts were to determine how to actually implement the provisions of the bill. The District adopted the following rules, shown in Table 4, consistent with SB 700.

Table 4: Senate Bill 700 (SB 700) Rule Adoptions

Rule No.	Control Category	Description	Adoption Date
11.1	Agricultural Operating Permit Program	Requires a District permit for any agricultural source with a potential to emit greater than one half of any applicable emission threshold for a major source	March 9, 2005
11.2	Confined Animal Facilities Permit Program	Requires a District permit for any large Confined Animal Facility (CAF)	June 16, 2006

The District has also adopted Rule 11.3 – Agricultural Engine Registrations to control emissions from agricultural operations. This rule was adopted as a result of the State's Airborne Toxic Control Measure for Stationary Compression Ignition Engines which required every agricultural engine to be registered. The rule applies to agricultural use engines rated at greater than 50 horsepower. Rule 11.3 was adopted in 2008 and revised in 2010.

5. MOBILE SOURCE EMISSION REDUCTION EFFORTS

As discussed in the previous section, the District does not have any direct regulatory control over the mobile source portion of its emission inventory. Nevertheless, providing financial incentives can encourage the accelerated introduction of lower emission mobile-source technologies into the SFNA. Incentive programs can also help to fund projects that reduce traditional vehicle trips and encourage alternative modes of transportation. Incentive programs are implemented either locally by the District, regionally, or sometimes at the State level. Descriptions of recent and ongoing incentive programs in the District are described below.

5.1 District Incentive Programs

The District administers several incentive programs that focus on reducing emissions from the mobile source sector. Programs assist with funding for projects that encourage cleaner on-road and off-road vehicles, alternative fuels, and alternative transportation.

5.1.1 Clean Air Funds Program

In June 1993, the District began its first year of funding projects using Clean Air Funds (CAF) Program criteria. Public or private agencies, groups, or individuals can apply for funding from the District under this program. Funding for the CAF program is generated through a vehicle registration surcharge of $4.00 per vehicle. In the Solano County portion of the District, AB 8 funds are also used to supplement the CAF program. AB 8 funds are property tax proceeds collected from the northeast portion of Solano County (Dixon, Rio Vista, and Vacaville).

The following list shows the CAF program categories under which projects can receive funding. Projects are funded based on their emission reduction potential, cost-effectiveness, community acceptance and potential for successful implementation.

- Clean Technologies/Low Emission Vehicles
- Alternative Transportation
- Transit Services
- Public Education/Information

5.1.2 FARMER Program

This program provides incentives to farmers to replace older off-road agricultural equipment using funding provided by the ARB. Eligible project types include tractors, harvesters, combines, balers, and certain other types of off-road agricultural equipment.

Projects are eligible for reimbursement for up to a maximum of 80 percent of total eligible equipment costs or the District's current cost-effectiveness threshold (as determined by the Carl Moyer Guidelines), whichever is less. The development of this program was begun in 2017. The District expects to begin the process of replacing tractors in 2018 and 2019.

5.1.3 Clean School Bus Program

The purpose of the District's Clean School Bus Program is to reduce ROG and NOx, emissions from the operation of school buses in the District. This is accomplished through a combined approach of replacing and retrofitting older high-polluting school buses. The program also seeks to limit exposure of school children to cancer-causing diesel particulate produced by school buses through this same process.

The District's Clean School Bus Program was funded through Assembly Bill 923 (AB 923) and Proposition 1B monies, and was administered consistent with the ARB's Lower Emission School Bus Guidelines. During the 2015 through 2017 time period, the District replaced 10 older high-polluting school buses with new cleaner school buses.

5.2 Regional Incentive Programs

In addition to the incentive programs that are administered locally by the District, regional incentive programs can provide funding for projects within the District as well. Most regional programs are administered by the Sacramento Metropolitan Air Quality Management District (SMAQMD) on behalf of the SFNA. Descriptions of major regional incentive programs are provided below.

5.2.1 Carl Moyer Program

The SMAQMD receives and distributes Carl Moyer funds directly from the ARB on behalf of the YSAQMD. The SMAQMD provides the incentive money to companies, fleet operators and individuals who are willing to reduce emissions from their heavy-duty vehicles and mobile off-road equipment. The primary purpose of the program is to reduce NOx and PM emissions from heavy-duty diesel engines. Typical Carl Moyer projects include repowering agricultural water pumps, off-road construction and agricultural equipment and replacing, repowering or retrofitting heavy-duty diesel engines in on-road trucks. Projects must achieve a cost effectiveness per weighted ton of NOx, ROG and PM reduction, calculated in accordance with the program cost effective methodology. Funds are allocated by ARB to air districts based on a combination of population and the district's SIP commitment to heavy-duty vehicle emission reductions.

5.2.2 Sacramento Emergency Clean Air Transportation (SECAT)

The SECAT Program is a partnership between the air districts of the SFNA and SACOG. The program's goal is to reduce harmful emissions from on-road heavy-duty vehicles operating in the SFNA. The program is administered by the SMAQMD.

Eligible types of projects include the following:

- Replacing older, higher polluting vehicles with newer, lower-emission vehicles (Fleet Modernization);
- Purchasing new, low or zero-emitting vehicles;

- Retrofitting existing heavy-duty vehicles with after-treatment systems to reduce NOx; and
- Implementing any other verifiable, enforceable, and cost-effective technology for reducing NOx emissions from heavy-duty on-road vehicles.

The SECAT Program is distinct from the Carl Moyer Program. The key difference is that the SECAT Program is not limited to financing the incremental capital costs of emission control measures, but can also pay for operating costs, facility modifications, out-of-cycle replacement, and financial incentives for participation. Also, the SECAT program may only fund on-road vehicle projects.

5.2.3 SACOG Regional Funding

The Sacramento Area Council of Governments (SACOG) conducts programming rounds every two years to allocate funds to projects based on available apportionments of regional funds. Project applications are solicited from public agencies and their partners located in the SACOG region. Projects funded under these programs have helped to improve bicycle and pedestrian infrastructure and generally encourage alternative modes of transportation. Municipalities, agencies and organizations that have received SACOG funding for bike/pedestrian and community design projects in the 2015-2017 period include:

- City of West Sacramento
- Yolo County Transportation District
- Unitrans
- City of Woodland
- City of Winters
- Yolo County
- Yolo Transportation Management Association

5.3 State and Federal Incentive Funding

State and Federal funds are also spent within the District on projects that are designed to accrue emission reductions from the mobile source sector. Federal funds are primarily distributed to jurisdictions and local agencies within the District through the Congestion Mitigation and Air Quality Improvement (CMAQ) program. CMAQ was created under the federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, and continues under the current federal surface transportation act is known as MAP-21, which reauthorizes the CMAQ program.

The District benefits from State funding primarily through the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program (HVIP). The HVIP program was formed as a result of the California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007.

The CMAQ and HVIP programs are discussed in more detail below.

5.3.1 CMAQ

The purpose of the CMAQ program is to fund transportation projects or programs that will contribute to attainment or maintenance of the national ambient air quality standards (NAAQS) for ozone, CO and PM. The CMAQ program supports two important goals: improving air quality and relieving congestion. This can include projects such as transit improvements, high-occupancy vehicle lanes, ridesharing services, public education and information, or pedestrian and bicycle programs that reduce emissions from on-road motor vehicle engines. CMAQ funds cannot be used for projects that increase the transportation system's capacity for single-occupant vehicles.

Federal CMAQ funds are allocated to states, and ultimately to local regions, based on population and air quality needs. As the federally designated Metropolitan Planning Organization, SACOG is responsible for determining which local projects receive CMAQ funding in Yolo County. For the District's portion of Solano County, CMAQ funds are distributed through a process administered by the Solano Transportation Authority (STA). The District participates in selecting projects that receive CMAQ funding during the applicable public review processes.

5.3.2 HVIP

The HVIP program offers funding for projects that support the development and deployment of advanced technologies needed to meet California's longer-term air quality goals. HVIP funds can provide financial support for the purchase of zero-emission trucks and buses by offering point-of-sale incentives. Since 2015, four heavy-duty hybrid vehicles, three medium-duty zero emission vehicles, and one zero-emission auxiliary vehicle were purchased in the District for a total incentive amount of approximately $464,000. It is expected that, going forward, the District will obtain substantial financial support from the HVIP program for the replacement of existing diesel school buses with zero-emission buses.

5.4 Transportation Control Measures

The CCAA defines transportation control measures (TCM's) as "… any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions."[18] The District coordinates with the regional transportation agencies such as Yolo County Transportation District (YCTD), Solano Transportation Authority (STA), and Sacramento Area Council of Governments (SACOG) to implement reasonable measures to reduce emissions from vehicles. This coordinated effort is producing emission reductions that will help to achieve the State health-based ambient air quality standards and the mandates of the CCAA.

[18] H&SC §40717(g)

YoloBus (Yolo County), Unitrans (Davis), City Coach (Vacaville), Delta Breeze (Rio Vista) and Fairfield-Suisun Transit operate all the fixed route bus services in the District. Readi-Ride provides curbside bus service in Dixon, and Sacramento Regional Transit provides bus service to the City of West Sacramento. Collectively, these bus services provide opportunities for alternative travel by servicing school trips, commuter trips, and providing links to paratransit services, Capitol Corridor passenger rail, Bay Area Rapid Transit, Baylink ferry, and the Sacramento International Airport. Ridership has generally increased for these transit services over time.

The Yolo Transportation Management Association and Solano Napa Commuter Information implement Transportation Demand Management by offering personalized assistance for traveling around Yolo and Solano Counties and cities in neighboring counties. They proactively support programs that are intended to encourage alternative modes of transportation.

The District supports these programs as part of its overall mission to improve air quality. Examples of TCM programs for which the District has provided financial support over the past several years include:

- YoloBus Summer Sizzler (discounted youth transit passes)
- University Airport Bikeshare
- Safe Routes to School (Winters and Vacaville)
- Extension of Vaca-Dixon Bike Route

5.5 Reductions Related to CEQA and Land Use

District staff works with land use jurisdictions to implement air quality mitigation measures for projects under the California Environmental Quality Act. Through this process, the District can realize ROG and NOx reductions by encouraging project design features that promote walking, biking, and transit and which can help to reduce total VMT. While mitigations that are implemented by land use projects as a result of the CEQA process do reduce emissions of the ozone precursors, they are difficult to quantify with any real accuracy. Also, mitigations related to site design do not accrue large up-front benefits but do continue to accrue benefits over the entire life of a project.

6. PUBLIC OUTREACH PROGRAMS

As a required element under the District's AQAP, the District continues to support public outreach programs within Yolo and Solano counties. This includes a wide range of both regional and local efforts to reduce the emissions of ozone precursors and to make the public aware of air quality conditions on a daily basis. These efforts include:

- **The Sacramento Spare The Air (STA) Campaign:** The District participates in the regional "Spare The Air" campaign in coordination with the Sacramento Metropolitan AQMD and the other members of the SFNA. The campaign is an

emission-reduction and public awareness initiative that has run for more than 20 years, with the intent of affecting behavior change on a regional basis.

There are major pieces of the Spare The Air message– a seasonal push for residents and businesses to reduce vehicle trips during the peak ozone season to decrease total ozone precursor emissions generally, and a peak-day reduction call-to-action to reduce the number of exceedances of the federal 24-hour ozone standard.

The seasonal campaign encourages residents and businesses to reduce their emissions throughout the peak ozone season by choosing clean transportation options. This includes promotion of bicycling, walking, carpools, transit and zero-emission vehicle adoption. According to survey data from the most recently completed season (2017), on a typical Spare The Air day, 20 percent of Sacramento region residents reduced their driving. Within the District, residents drove on average 27 fewer miles.

The peak-day reduction call–to-action makes a direct request to residents and businesses when ozone levels are forecast to be high. Through media buys and other avenues of information dissemination, the campaign asks residents and businesses to reduce trips specifically to prevent unhealthy levels of air pollution on that day. Survey data from the 2017 campaign indicated that 0.16 tons of ozone precursors were prevented on average when a Spare The Air alert was called.

The campaign is shared with residents through multiple avenues, including radio spots, TV commercials, information handouts, public outreach events, local partnerships, and social media. There are currently more than 340 schools, businesses and organizations who are Spare The Air partners.

- **Don't Light Tonight Program:** From November 1 through the end of February, the District runs a wood smoke reduction program called Don't Light Tonight (DLT) that asks residents to refrain from burning wood when particulate matter (PM) is forecast to reach 25 micrograms or higher to help reduce peak soot levels and protect public health. Residents can find out whether there is an advisory by either calling into a designated DLT phone line with a pre-recorded message, visiting the District's website where a notification bar will appear at the top of the page, or visiting any of the District's social media pages (Facebook or Twitter). Residents can also call the District office to file complaints if they smell smoke in their neighborhood. If possible, District staff will then investigate the source and if necessary, send notification post cards with information about the health impacts of particulate matter and the DLT program to neighboring homes around the source.

- **Clean Air Calendar Contest:** Every year the District runs a calendar contest, asking K-12 students who live within the District's boundaries to turn in artwork expressing why clean air is important to them. This yearly program engages youth to begin thinking about the effects of air pollution and its health impacts. Twelve

student winners are chosen and receive a gift card, certificate of achievement, mention in a press release, as well as their artwork featured in the following year's calendar. In 2018, more than 190 students submitted their artwork, a drastic increase from 70 entries the year before in 2017. To complement the competition, District staff provide classroom presentations that educate students on smog, particulate matter and the role of the District in reducing air pollution.

- **Clean Transportation:** In addition to funding mechanisms that boost adoption of low or zero-emission vehicles through the Clean Air Funds program and the Clean Agricultural Equipment and Public Fleet Program, the District employs public messaging to spread awareness and use of clean transportation methods. This includes participation in local Safe Routes to Schools programs; neighborhood, city-wide or regional bike and pedestrian drives and events (such as May is Bike Month); and participation on transportation demand management (TDM) efforts.

- **General Air Quality Awareness:** Through the U.S. EPA's EnviroFlash program, the District sends daily air quality forecasts and action-day alerts to more than 2,600 local residents or employers. This correspondence helps residents stay up to date on air pollution levels while at the same time offering recipients information on how to help improve air quality.

  The District also has a robust social media presence. On Facebook, the District has more than 1,100 followers with a monthly reach of ~10,000. On Twitter, the District has more than 1,200 followers and a monthly reach of ~30,000. During peak months, the District can reach more than 50,000 on Facebook and more than 75,000 on Twitter. Posts on social media include alerts, updates, articles, statistics and other educational information regarding air quality to help boost awareness and promote news and events related to low- or zero-emission transportation options.

  The District also sends out a monthly e-newsletter to more than 180 subscribers with articles on air quality, updates on District programs, and news revolving around transportation.

7. TRANSPORT MITIGATION REGULATION

The following citation relating to ozone transport is from ARB's webpage:

> "The California Clean Air Act (CCAA or Act) requires the Air Resources Board (ARB or Board) to assess the contribution of ozone and ozone precursors from upwind regions on ozone concentrations that violate the State ozone standard in downwind areas. The Act also directs ARB to establish mitigation requirements for upwind districts designed to mitigate their impact on downwind districts.

> ARB originally established mitigation requirements in 1990 which are contained in Title 17, California Code of Regulations, Sections 70600 and 70601. These regulations were amended in 1993 and more recently in 2003. The Board adopted amendments on May 22, 2003, which were approved by the Office of Administrative Law on December 4, 2003, and became effective on January 3, 2004.
>
> These amendments added two new requirements for upwind districts. These amendments require upwind districts to (1) consult with the downwind neighbors and adopt "all feasible measures" for ozone precursors and (2) amend their "no net increase" thresholds for permitting so that they are equivalent to those of their downwind neighbors no later than December 31, 2004. The amendments clarify that upwind districts are required to comply with the mitigation requirements, even if they attain the State ozone standard in their own district, unless the mitigation measures are not needed in the downwind district."

For clarification, the California Health and Safety Code §39610 actually required the ARB no later than December 31, 1989, to identify each air basin in which transported air pollutants from upwind areas outside the air basin caused or contributed to a violation of the State ambient air quality standard for ozone and to identify the district of origin for the transported air pollutants. Under Title 17, Division 3, Chapter 1, Subchapter 1.5, Article 6, Section 70500, the State did not identify the origin of transport by air district, but by region. The ARB has identified the "Broader Sacramento Area" as transporting to the Upper Sacramento Valley, the San Joaquin Valley, the San Francisco Bay Area, and the Mountain Counties. Included in the definition of "Broader Sacramento Area" is the Yolo-Solano AQMD.

The first requirement of all feasible measures was addressed during the consultation and creation of the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan. In this plan, an extensive all feasible measures analysis for each district in the SFNA was completed and is discussed in further detail in the following section. The second requirement was implemented through District Rule 3.20, Ozone Transport Mitigation, which was adopted by the Governing Board on December 8, 2004. This rule implemented a 10 ton per year "no net increase" program for VOC and NOx.

8. ALL FEASIBLE MEASURES

The CCAA requires an air quality strategy to achieve a 5% average annual ozone precursor emission reduction when implemented or, if that is not achievable, an expeditious schedule for adopting every feasible emission control measure under air district purview.[19] The District, as part of the SFNA, has estimated a 1.6% per year precursor emission reduction through 2020. Since this is less than the required 5% annual emission reduction required

[19] H&SC §40914

by the CCAA, the District is obligated to adopt every feasible measure to reduce ozone precursors.

The District is committed to reviewing feasible measures adopted across the State to obtain future emissions reductions. The District, in conjunction with ARB and the other local districts that comprise the SFNA underwent a rigorous analysis of all feasible control measures during the development of the federal State Implementation Plan for Attainment of the 2008 8-hour ozone standard. Any measure that was deemed to be feasible in our jurisdiction was identified, and further analysis of its cost-effectiveness and emissions reduction potential was conducted to determine if the measure could be slated for adoption/amendment into District Rules and Regulations. The District believes that the all feasible measure analysis conducted for the federal 8-hour plan provides an up-to-date and accurate evaluation of potential control measures.

8.1 Commitments

Table 5 shows the triennial update control measure commitments through 2020.

Table 5: List of Proposed Triennial Commitments for 2018 - 2020

Rule No.	Control Category	Description	Proposed Action and Schedule	Expected Emission Reductions by 2023 (tpd)	Cost Effectiveness ($/ton)
2.27	Boilers, Steam Generators and Process Heaters	Lower NOx emission limits	Adopt in 2019	NOx = 0.29	$13,934 – $25,718
2.32	Stationary Internal Combustion Engines	Lower NOx emission limits	Adopt in 2020	TBD	TBD

9. INTERAGENCY CONSULTATION

The District will hold an interagency meeting on 4-19-2019 to discuss the proposed plan with neighboring, upwind, and downwind air districts, as well as other interested state agencies. A list of the air districts and local agencies that received the document follows. Any comments submitted by these agencies will be included Section 10, Public Review and Workshop.

- Association of Bay Area Governments
- Amador County APCD
- Bay Area AQMD
- Butte County AQMD
- Calaveras County APCD
- California Air Resources Board
- Colusa County APCD
- El Dorado APCD
- Feather River AQMD
- Glenn County APCD
- Mariposa County APCD
- Northern Sierra AQMD
- Placer County APCD
- Sacramento Area Council of Governments
- Metropolitan Transportation Commission
- Sacramento Metropolitan AQMD
- San Joaquin Valley APCD
- Shasta County AQMD
- Tehama County APCD
- Tuolumne County APCD

10. PUBLIC REVIEW AND WORKSHOP

A public workshop was held on April 19, 2019 at the District offices. No comments were received on the proposed plan.

11. CONCLUSION

Air quality is gradually improving as the result of ozone precursors being reduced over time. As a result of these efforts, the overall exposure of District residents to ozone continues to decrease. The District has conducted an "all feasible measures" analysis for the most recent federal ozone plan to determine if additional actions can be taken to further reduce ozone precursor emissions and meet and maintain healthful levels of air quality. Since mobile sources are a large part of the District's emission inventory, a large portion of the emission reductions needed to achieve the District's goals will necessarily come from this source category. The District does not have authority to directly regulate mobile sources. However, incentive programs such as the Carl Moyer Program and the District's FARMER Program and Clean School Bus incentive programs will further assist the District in achieving the emission reductions needed to meet state and federal ambient air quality standards.

Appendix A:

District's Emission Inventory Detail

Appendix A: District's ROG Emission Inventory Detail

Source Type	ROG[a] (tons/day)					
Category	2005	2010	2015	2020	2025	2030
Stationary Sources						
Cleaning and Surface Coatings	4.62	1.5	1.63	1.76	1.94	2.17
Petroleum Production/Marketing	2.23	2.03	1.87	1.66	1.46	1.32
Industrial Processes	1.08	0.65	0.69	0.8	0.9	1.01
Waste Disposal	0.15	2.85	4.04	4.3	4.6	4.92
Fuel Combustion	0.41	0.24	0.16	0.13	0.12	0.11
Stationary Subtotal	**8.49**	**7.27**	**8.39**	**8.65**	**9.02**	**9.53**
Area-Wide Sources						
Consumer Products	2.09	1.89	1.78	1.85	1.94	2.03
Architectural Coatings/Solvents	1.02	1.09	1.12	1.16	1.21	1.27
Pesticides/Fertilizers	0.65	0.54	0.57	0.56	0.55	0.54
Asphalt Paving/Roofing	0.25	0.14	0.14	0.17	0.18	0.19
Farming Operations	0.62	0.62	0.62	0.62	0.62	0.62
Residential Fuel Combustion	1.4	1.5	1.52	1.6	1.68	1.75
Miscellaneous	2.28	2.41	2.34	2.41	2.5	2.57
Area-Wide Subtotal	**8.31**	**8.19**	**8.09**	**8.37**	**8.68**	**8.97**
On-road Mobile Sources						
Automobiles	3.26	2.04	1.17	0.67	0.51	0.43
Light/Medium Duty Trucks	2.32	1.82	1.14	0.85	0.71	0.58
Heavy Duty Gas Trucks	0.65	0.51	0.32	0.24	0.18	0.01
Heavy Duty Diesel Trucks	0.9	0.63	0.42	0.39	0.39	0.11
Motorcycles	0.52	0.51	0.43	0.38	0.33	0.31
Buses	0.06	0.04	0.03	0.02	0.02	0.01
Motor Homes	0.02	0.01	0.01	0	0	0
On-road Mobile Subtotal	**7.73**	**5.56**	**3.52**	**2.55**	**2.14**	**1.45**
Other Mobile Sources						
Aircraft	0.04	0.04	0.04	0.04	0.04	0.04
Trains	0.06	0.04	0.04	0.03	0.03	0.04
Ships & Commercial/Recreational Boats	2.26	1.91	1.57	1.31	1.1	0.69
Off-Road Recreational Vehicles	0.23	0.21	0.16	0.15	0.14	0.13
Off-Road Equipment	1.07	0.85	0.72	0.64	0.63	0.65
Farm Equipment	0.87	0.71	0.55	0.43	0.35	0.28
Fuel Storage & Handling (Gas Cans)	4.78	3.89	3.12	2.57	2.19	0.11
Other Mobile Subtotal	**9.31**	**7.65**	**6.2**	**5.17**	**4.48**	**1.94**
GRAND TOTAL[b]	**33.84**	**28.67**	**26.2**	**24.74**	**24.32**	**21.89**

[a] Data source: ARB CEPAM, downloaded 7/10/2018, for annual average data.

[b] Columns may not sum to totals due to rounding.

Appendix A: District's NOx Emission Inventory Detail

Source Type	NOx[a] (tons/day)					
Category	2005	2010	2015	2020	2025	2030
Stationary Sources						
Cleaning and Surface Coatings	0.03	0.01	0.02	0.02	0.02	0.02
Petroleum Production/Marketing	0.02	0	0.01	0.01	0.01	0.01
Industrial Processes	0.3	0.2	0.16	0.19	0.22	0.25
Waste Disposal	0.03	0.01	0.01	0.01	0.01	0.01
Fuel Combustion	3.96	3.56	2.74	2.42	2.36	2.34
Stationary Subtotal	**4.34**	**3.78**	**2.94**	**2.65**	**2.62**	**2.63**
Area-Wide Sources						
Consumer Products	0	0	0	0	0	0
Architectural Coatings/Solvents	0	0	0	0	0	0
Pesticides/Fertilizers	0	0	0	0	0	0
Asphalt Paving/Roofing	0	0	0	0	0	0
Farming Operations	0	0	0	0	0	0
Residential Fuel Combustion	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	0
Area-Wide Subtotal	**0**	**0**	**0**	**0**	**0**	**0**
On-road Mobile Sources						
Automobiles	2.64	1.54	0.89	0.49	0.32	0.23
Light/Medium Duty Trucks	4.25	3.0	1.98	1.31	0.9	0.28
Heavy Duty Gas Trucks	0.86	0.78	0.65	0.52	0.41	0.1
Heavy Duty Diesel Trucks	17.57	11.14	7.97	5.06	3.56	2.71
Motorcycles	0.15	0.16	0.13	0.12	0.1	0.1
Buses	0.46	0.35	0.32	0.28	0.25	0.09
Motor Homes	0.08	0.06	0.04	0.02	0.01	0.01
On-road Mobile Subtotal	**26.01**	**17.03**	**11.98**	**7.8**	**5.55**	**3.52**
Other Mobile Sources						
Aircraft	0.03	0.03	0.03	0.03	0.03	0.03
Trains	0.97	0.74	0.74	0.7	0.69	0.67
Ships & Commercial/Recreational Boats	2.3	2.01	1.33	1.19	1.1	1.03
Off-Road Recreational Vehicles	0.01	0.01	0.01	0.01	0.02	0.02
Off-Road Equipment	1.68	1.26	1.24	1.02	0.78	0.68
Farm Equipment	4.55	3.68	2.99	2.42	1.76	1.3
Fuel Storage & Handling (Gas Cans)	0	0	0	0	0	0
Other Mobile Subtotal	**9.54**	**7.73**	**6.34**	**5.37**	**4.38**	**3.73**
GRAND TOTAL[b]	**39.89**	**28.54**	**21.26**	**18.47**	**12.55**	**9.88**

[a] Data source: ARB CEPAM, downloaded 7/10/2018, for annual average data.

[b] Columns may not sum to totals due to rounding.

Appendix B:

District Monitoring Stations

District Monitoring Stations