Sacramento Regional 2015 NAAQS 8-Hour Ozone Attainment & Reasonable Further Progress Plan

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SACRAMENTO REGIONAL

2015 NAAQS

8-HOUR OZONE ATTAINMENT &

REASONABLE FURTHER PROGRESS PLAN

August 2023

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ACCII - Advanced Clean Cars II

ACF - Advanced Clean Fleets

ACT - Advanced Clean Tricks

APCD - Air Pollution Control District

APU - auxiliary power units

AQMD - Air Quality Management District

AQMIS - Air Quality and Meteorological Information System (https://www.arb.ca.gov/aqmis2/aqmis2.php)

AQS - Air Quality System (https://www.epa.gov/aqs)

Auto GC - Automated Gas Chromatograph

AVG - Average

BACT - Best Available Control Technology

BVOC - Biogenic Volatile Organic Compound

BY - Baseline Year

CAA - Clean Air Act

CACs - County Agricultural Commissioners

CAMx - Comprehensive Air Quality Model with Extensions

CARB - California Air Resources Board

CASAC - Clean Air Scientific Advisory Committee

CDFA - California Department of Food and Agriculture

CEPAM - California Emissions Projection Analysis Model

CFR - Code of Federal Regulations

CHCs - commercial harbor crafts

CHE - Cargo Handling Equipment

CI - compression-ignition

CMAQ - Community Multiscale Air Quality Model (Chapter 6)

CMAQ - Congestion Mitigation and Air Quality Improvement (Chapter 7)

CO - Carbon Monoxide

CO_2 - Carbon Dioxide

COVID-19 - Coronavirus disease 2019

CTG - Control Techniques Guidelines

DPFs - diesel particulate filters

DPR - California Department of Pesticide Regulation

DV - Design Value

EDCAQMD - El Dorado County Air Quality Management District

EMFAC - Emissions Factor California's on-road motor vehicle emission factor model

EPA - United States Environmental Protection Agency

ERCs - Emission Reduction Credits

FHWA - Federal Highway Administration

FR - Federal Register

FRAQMD - Feather River Air Quality Management District

FY - Future Year

GDF - Gas dispensing facilities

GHG - Greenhouse Gases

HC - Hydrocarbon

HDVIP - Heavy-Duty Vehicle Inspection Program

HFC-12a - hydrofluorocarbon-152a

Hp - horsepower

ICT - Innovative Clean Transit

kW - kilowatts

MCD - Milestone Compliance Demonstrations

MEGAN - Model of Emissions of Gases and Aerosols from Nature

MPO - Metropolitan Planning Organization

MTC - Metropolitan Transportation Commission (Bay Area)

MTIP - Metropolitan Transportation Improvement Program

MTP - Metropolitan Transportation Plan

MVEB - Motor Vehicle Emissions Budget

NAAQS - National Ambient Air Quality Standard

NNSR - New Source Review

NO_x - Nitrogen Oxides

NO_y - NO_X plus nitric acid, nitrous acid (HONO), dinitrogen pentoxide (N_2O_5), peroxyacetyl nitrate (PAN), alkyl nitrates ($RONO_2$), peroxyalkyl nitrates ($ROONO_2$), the nitrate radical (NO_3), and peroxynitric acid (HNO_4)

NYQ - Not yet quantified.

O_3 - Ozone

OEHHA - Office of Environmental Health Hazard Assessment

PAMS - Photochemical Assessment Monitoring Stations

PCAPCD - Placer County Air Pollution Control District

PM - Particulate Matter

$PM_{2.5}$ - Particulate Matter with diameter less than 2.5 micrometer

ppb - parts per billion

ppm - parts per million

PSIP - Periodic Smoke Inspection Program

RACM - Reasonably Available Control Measure

RACT - Reasonably Available Control Technology

RFP - Reasonable Further Progress

ROG - Reactive Organic Gases

RPP - Regional Planning Partnership

RRF - Relative Response Factor

RTG - Rubber Tired Gantry

RY - Reference Year

SACOG - Sacramento Area Council of Governments

SACSIM - SACOG's Activity-Based Travel Simulation Model

SFNA - Sacramento Federal Nonattainment Area

SMAQMD - Sacramento Metropolitan Air Quality Management District

SIP - State Implementation Plan

SORE - Small Off-Road Engine

SO_X - Sulfur Oxides

SV - Sacramento Valley

TCMs - Transportation Control Measures

TIF- totally impermeable film

TNCs - transportation network companies

tpd - tons per day

tpy - tons per year

TRU - Transport Refrigeration Unit

VMT - Vehicle Miles Traveled

VOC - Volatile Organic Compounds

WOE - Weight of Evidence

YSAQMD - Yolo-Solano Air Quality Management District

ZE - Zero-Emission

1 EXECUTIVE SUMMARY

In 2015, the United States Environmental Protection Agency (EPA) promulgated a new National Ambient Air Quality Standard (NAAQS) for ozone (O_3) at a maximum daily 8-hour average concentration of 70 parts per billion (ppb). The O_3 design value, which is a 3-year average of the fourth highest O_3 concertation at the peak ozone monitoring site, in the Sacramento Federal Ozone Nonattainment Area (SFNA) exceeded the 2015 O_3 NAAQS. The SFNA, which comprised of Sacramento and Yolo counties, western portion of El Dorado and Placer counties, southern portion of Sutter County, and northeastern portion of Solano County, is classified as a “serious” nonattainment area for the 2015 standard. Preliminary photochemical modeling results showed that attainment of the standard by the serious attainment date of August 3, 2027, was not practical or achievable, and additional time is necessary to allow for the adoption and implementation of state measures to get the needed emission reductions in the Sacramento region. The SFNA air districts have requested a reclassification to "severe” with attainment deadline of August 3, 2033. Attainment of the 2015 O_3 standard will be shown by the data from the last full O_3 season prior to the attainment deadline, referred to as the attainment year, or 2032. The chapters and appendices in this plan address the Clean Air Act (CAA) requirements associated with the “severe” classification and how the SFNA can attain the standard by the attainment date.

The SFNA has made great strides reducing O_3 concentrations as it progresses to meeting its clean air goals. It has seen a declining trend of the number of exceedance days in the last two decades from 66 days in 2000 to 34 days in 2021, and a decrease in the design value from 107 ppb in 2000 to 82 ppb in 2021 at the region’s peak air monitoring site. This decline is expected to continue, which is supported by the forecasted emissions inventories. Emissions for both O_3 precursors, nitrogen oxides (NO_X) and volatile organic compounds (VOC), are expected to significantly decrease between the baseline year 2017 and attainment year 2032. The forecasted emissions inventories for 2032 will be 34 and 80 tons per day (tpd) for NO_X and VOC, respectively. These represent a 52% decrease of NO_X and 17% decrease of VOC from the 2017 base year levels of about 71 and 97 tpd of NO_X and VOC, respectively. These emission reductions are results of new statewide control measures and the current existing federal, state, regional, and local control programs. During the same period, the SFNA population is expected to increase by 16% from 2.4 million to 2.9 million and an increase of vehicle miles traveled (VMT) by 12% from 61 to 68 million miles.

The photochemical modeling results confirmed that existing air quality control programs, including the continuation of the Spare the Air Program, with the new statewide control measures are sufficient to demonstrate attainment by the end of 2032. New control measures at the regional and local levels are not needed to attain the standard by the attainment date. Supplemental analysis in the Weight of Evidence supported the

attainment demonstration. Further sensitivity analysis through the photochemical modeling indicated that the NO_X emission reductions are more effective than VOC emission reductions in reducing ambient ozone concentrations. The sensitivity analysis results also confirmed that the combination of NO_X and VOC estimated emissions reductions from all reasonably available control measures (RACM) are less than the threshold for advancing attainment.

The forecasted emission reductions in SFNA also meet reasonable further progress (RFP), which is a requirement to show the minimum VOC emissions reduction of 3% per year are achieved through VOC and NO_X substitution reductions for the 2023, 2026, and 2029 milestone years, and the 2032 attainment year. If EPA makes a finding that the SFNA fails to meet RFP or fails to attain the NAAQS by the attainment date, contingency measures are triggered. In this plan, CARB is proposing amendments to the current Smog Check Program as a statewide contingency measure. At the local levels, the SFNA air districts make a commitment to amend their existing architectural coating rules to add contingency measure provisions. Each district will take its amended rule to its respective air district board for adoption prior to submitting the amended rule to CARB and EPA. The SFNA air districts also commit to evaluate additional potential options for contingency measures after EPA finalizes its guidance on contingency measures.

In the SFNA, one of the main emissions source categories that contributes to the ozone problem is motor vehicles. This plan establishes motor vehicle emissions budgets (MVEB) for the milestone years and attainment year to ensure that motor vehicles emissions from regional transportation plans and projects will not interfere with timely attainment of the standard. When the regional transportation planning agencies, Sacramento Area Council of Governments and Metropolitan Transportation Commission, develop their metropolitan transportation plans and transportation improvement programs, the SFNA aggregate transportation emissions must be equal to or less than the approved MVEB. In addition, a VMT offset demonstration was performed that showed that the current transportation control strategies and measures in the SFNA are sufficient to offset the increase in motor vehicle emissions in the attainment year due to the projected growth in VMT.

This plan meets the CAA requirements for the ozone nonattainment area with a “severe” classification and includes ozone trends, emissions inventories, photochemical modeling, attainment demonstration, ozone transport, transportation and general conformity, MVEB, and RFP demonstration. The attainment demonstration is supported by photochemical modeling, weight of evidence, and RFP. With existing federal, state, regional and local control programs, new statewide control and contingency measures, and local contingency measures, the SFNA is expected to attain the 2015 ozone NAAQS by the attainment year of 2032.

2 BACKGROUND AND NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) OVERVIEW

The Sacramento Regional 2015 National Ambient Air Quality Standards (NAAQS) 8-Hour Ozone Attainment and Reasonable Further Progress (RFP) Plan (referred to as the 2015 Ozone NAAQS Plan) demonstrates how the Sacramento Federal Nonattainment Area (SFNA) meets the Clean Air Act (CAA) and RFP requirements and attainment of the 2015 ozone NAAQS of 70 parts per billion (ppb). This plan addresses attainment demonstration requirements based on the severe-15 classification of the SFNA for the 2015 ozone NAAQS. It includes an updated emissions inventory, new motor vehicle emissions budgets (MVEB), results of the photochemical modeling used to support the attainment demonstration, and reasonably available control measure (RACM) evaluation.

The 2015 Ozone NAAQS Plan will be part of California's State Implementation Plan (SIP). The California SIP includes plans for each of the state's nonattainment areas, along with rules, regulations, and other control strategies adopted by air districts and the California Air Resource Board (CARB). After this plan is reviewed and approved by CARB, it will be submitted to the United States Environmental Protection Agency (EPA) for federal review and approval.

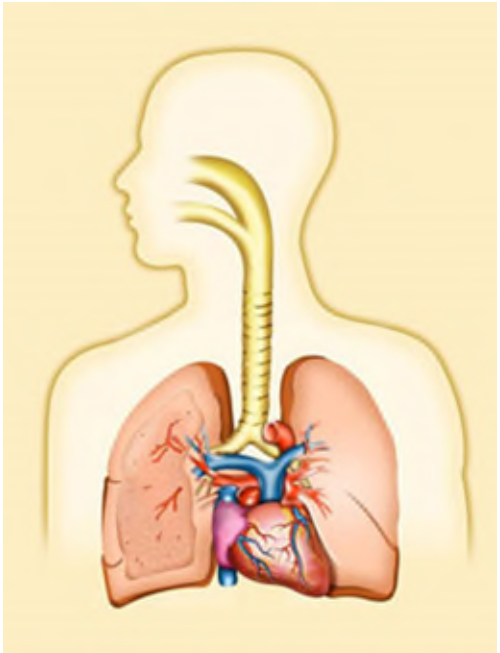
2.1 Background Information

2.1.1 Ozone Health Effects

Ground-level ozone is one of the air pollutants regulated by both federal and state laws. It is a colorless gas formed when nitrogen oxides (NO_X) and volatile organic compounds (VOC) (known as precursor pollutants) react in the presence of sunlight.

Ozone is a strong irritant that adversely affects human health. Ozone exposure can cause respiratory problems, especially in sensitive groups: children, the elderly, people suffering from chronic diseases, and outdoor workers. Children are at greater risk from exposure to ozone, especially at higher concentrations, because their respiratory systems are still developing, and they are likely to be outdoors and more active.

Breathing ozone can trigger a variety of respiratory problems, which may:



Effects on the Airways. Ozone is a powerful oxidant that can irritate the air ways causing coughing, a burning sensation, wheezing and shortness of breath and it can aggravate asthma and other lung diseases.

- Create difficulty breathing deeply and vigorously
- Create shortness of breath and pain when taking a deep breath
- Cause coughing and create a sore or scratchy throat
- Inflame and damage the airways and lung tissue
- Exacerbate lung diseases such as asthma, emphysema, and chronic bronchitis
- Increase risk of cardiovascular problems, such as heart attacks and strokes
- Make the lungs more susceptible to infection
- Continue to damage the lungs even when the symptoms have disappeared

These effects may lead to an increase in school absences, medication use, visits to doctors and emergency rooms, and hospital admissions. Research suggests a correlation between air pollutant exposure (ozone and $PM_{2.5}$) and the increased occurrence of mental health conditions (Nguyen, 2021) including neurotic/stress, substance use, depression, bipolar and other mental health conditions. Research also indicates that ozone exposure may increase the risk of premature death from heart or lung diseases (EPA, 2020).

Ground level ozone is absorbed by the leaves of plants, where it can reduce photosynthesis, damage leaves and slow growth. It can also make sensitive plants more susceptible to certain diseases, insects, harsh weather and other pollutants.

Reducing ground-level ozone to concentrations below federal and state standards is one of the primary goals of the air districts in the SFNA.

2.1.2 Ecosystem Effects

In addition to health effects, ozone also affects vegetation and ecosystems, such as forests, parks, wildlife refuges, and wilderness areas. Ozone harms sensitive vegetation by reducing photosynthesis, which is the process that plants use to convert sunlight to energy to live and grow. This can slow down tree and plant growth, especially during the prime growing season.

Plant species that are sensitive to ozone are potentially at an increased risk from exposure, disease, damage from insects, and harm from severe weather. This includes trees such as black cherry, quaking aspen, ponderosa pine, and cottonwood, which are found in many areas of the country, including the SFNA.

When sufficient ozone enters the leaves of a plant, it can:

- Interfere with the ability to produce and store food; and
- Visibly damage the leaves of trees and other plants, degrading the appearance of vegetation in urban areas, national parks, and recreation areas.

These effects can also have adverse impacts on ecosystems, including loss of species diversity and changes to habitat quality, water, and nutrient cycles (EPA, 2020).

2.1.3 Ozone Formation and Precursor Pollutants

Ozone is not emitted directly into the air from pollution sources. Instead, it is a gas composed of three oxygen atoms. At ground level, it is generated through a chemical reaction between VOCs (also known as reactive organic gases, ROG) and NO_X in the presence of sunlight. VOCs and NO_X are known as ozone precursors.

These precursors are emitted by different types of anthropogenic (man-made) sources but are also emitted by biogenic sources such as trees and crops. Anthropogenic sources include on-road and off-road combustion engine vehicles, power plants, industrial facilities, gasoline stations, organic solvents, and consumer products.

2.2 Planning Boundaries

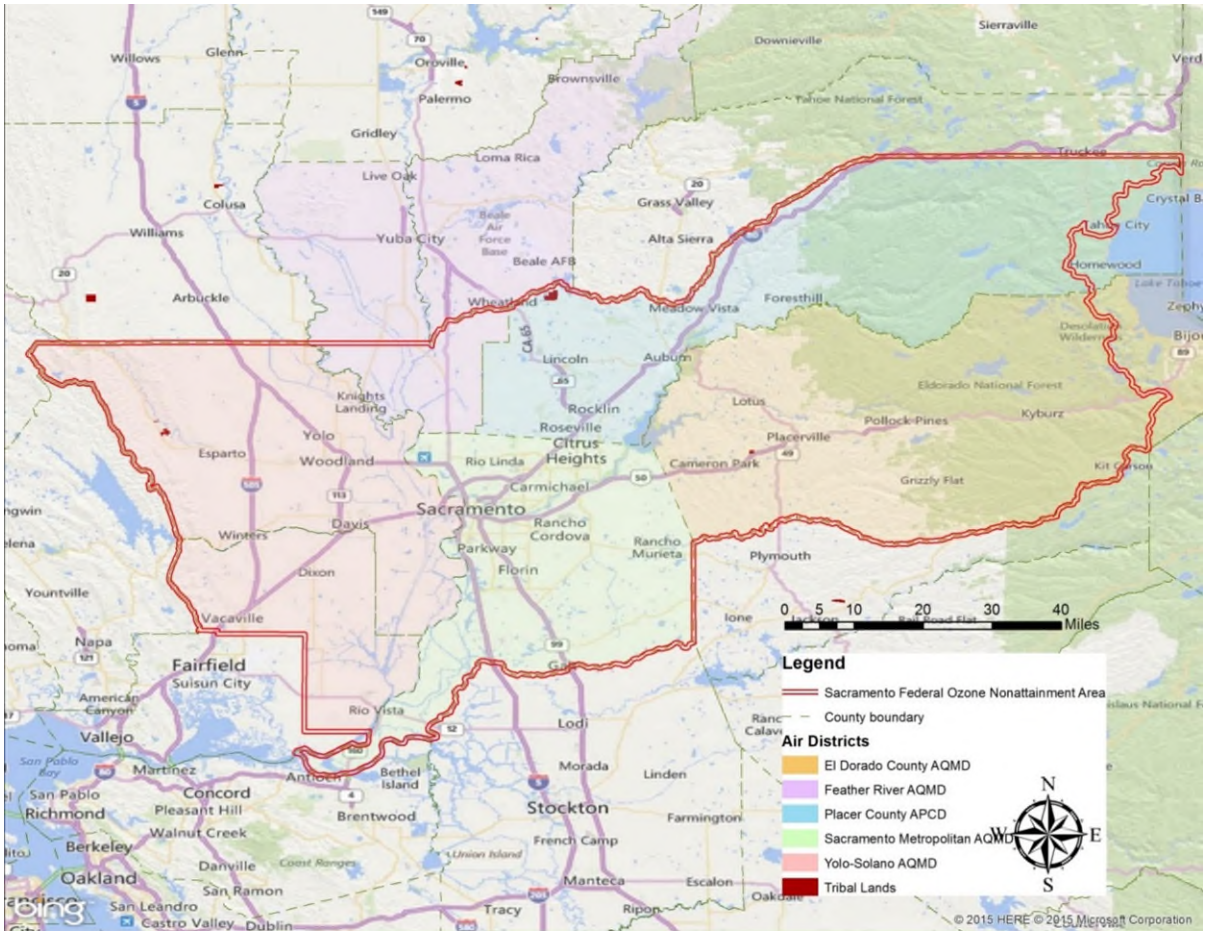
Figure 2-1 shows the SFNA boundaries, which include all of Sacramento and Yolo counties and portions of Placer, El Dorado, Solano, and Sutter counties. The ozone non-attainment area boundaries have not changed and are the same boundaries as they were for the 1997 and 2008 8-hour ozone standards (69 FR 23858, 77 FR 30088).

The SFNA planning boundaries for ozone include five air districts: El Dorado County Air Quality Management District (EDCAQMD), Feather River Air Quality Management District (FRAQMD), Placer County Air Pollution Control District (PCAPCD), Sacramento Metropolitan Air Quality Management District (SMAQMD), and Yolo-Solano Air Quality Management District (YSAQMD).

2.3 NAAQS for Ozone

The CAA requires that EPA review the NAAQS for all criteria pollutants, including ozone, once every 5 years to determine if each standard adequately protects public health and the environment (CAA Sections 108 and 109). EPA must conduct a comprehensive review of the most policy-relevant science and evaluate whether it is appropriate to maintain or revise a health standard, considering all risks and impacts to human health or the environment. As required by the CAA Section 109, this review process is also supported by an independent body known as the Clean Air Scientific Advisory Committee (CASAC). The CASAC's role is to provide EPA with advice and recommendations on retention of the existing standard or revisions that may be appropriate to consider based on science. EPA may establish a new NAAQS after considering information from this review process as well as from public and agency comments.

Figure 2-1 Sacramento Federal Ozone Nonattainment Area



After a new standard has been set, EPA is required to designate areas as attainment or nonattainment based on how measured pollutant levels compare to the NAAQS. For ozone, nonattainment areas are classified as marginal, moderate, serious, severe, or extreme (Figure 2-2) based on “such factors as the severity of nonattainment in such area and the availability and feasibility of the pollution control measures that the Administrator (EPA) believes may be necessary to provide for attainment of such standard in such area” (CAA Section 172).

Figure 2-2 Air Quality Classifications

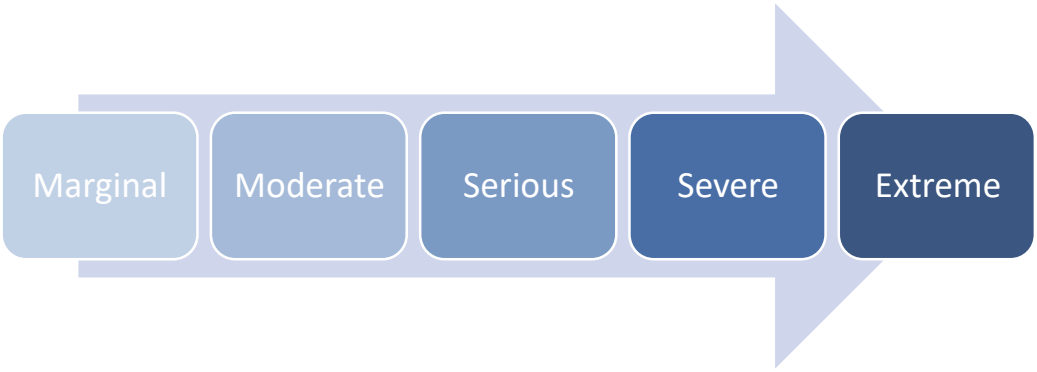


Table 2-1 Overview of Ozone Standards, Classification and Attainment Status

	1979	1997	2008	2015
Standard	120 ppb (44 FR 8202)	80 ppb (62 FR 38856)	75 ppb (73 FR 16436)	70 ppb (80 FR 65292)
Averaging Time	1 hour	8 hours	8 hours	8 hours
Standard Status	Revoked[1] (69 FR 23951)	Revoked[1] (80 FR 12264)	Active	Active
Classification	Severe-15 (60 FR 20237)	Severe-15 (75 FR 24409)	Severe-15 (77 FR 30088)	Severe-15[2] (see footnote)
Attainment Date (month-year)	11/2005	06/2019	07/2025	08/2033
Approved Attainment Demonstration and RFP Plan	01/08/1997 (62 FR 1150)	01/29/2015 (80 FR 4795)	10/22/2021 (86 FR 58581)[3]	The purpose of this plan
Status	Clean data finding issued on 01/18/2012 (77 FR 64036)	2020-2022 design value is less than standard	In progress	In progress

1. Nonattainment areas designated for a revoked standard are required to meet the Clean Air Act requirements before the nonattainment area can be redesignated to attainment.
2. The SFNA is currently classified as serious (86 FR 59648). The SFNA air districts have requested the area to be voluntarily reclassified to severe.
3. EPA approved all plan elements except for the contingency measures elements where EPA is deferring action.

Ozone NAAQS were developed in 1979 for a 1-hour standard, and in 1997, 2008, and 2015 for an 8-hour standard. Table 2-1 provides the following information for all ozone standards, and Sections 2.3.1 and 2.3.2 provide a summary of the active 2008 and 2015 ozone standards:

- Standard and averaging time,
- status (revoked or active),

- classification and corresponding attainment date,
- approval date for the Attainment Demonstration and RFP Plan; and
- attainment status.

2.3.1 2008 8-hour Ozone NAAQS

On March 27, 2008, EPA promulgated an 8-hour ozone NAAQS of 75 ppb based on findings from the health studies available at the time (73 FR 16436). EPA classified the SFNA as a severe-15 (77 FR 30088), which gave an attainment deadline of July 2027 according to the schedule outlined in CAA Section 181. This attainment deadline requires that the SFNA demonstrate attainment one full year prior to the attainment date, referred to as the attainment year, or 2026. Photochemical modeling (SMAQMD, 2017, Appendix B) conducted by CARB showed that the SFNA could attain the 2008 ozone NAAQS earlier than 2026. Based on the modeling results and discussion with the SFNA air districts, CARB, and EPA, the attainment year was determined to be 2024 (where July 2025 is the attainment date). The SFNA air districts submitted the Sacramento Regional 2008 NAAQS 8-hour Ozone Attainment and Reasonable Further Progress Plan (2008 Ozone Plan) to CARB, and CARB approved and submitted it to EPA on December 18, 2017 (CARB, 2017).

Actions by EPA to approve or disapprove the 2008 Ozone Plan were delayed by two court decisions[1, 2]. These decisions affected the approvability of specific SIP elements, which included the ozone RFP, baseline inventory years, and contingency measures. In collaboration with affected nonattainment areas, including the SFNA, CARB developed and adopted the 2018 Updates to the California State Implementation Plan (2018 SIP Update) (CARB, 2018), to address the issues identified by the court findings. In addition, CARB developed an updated version of its on-road mobile source EMission FACtor model, EMFAC2017, which included updated activity levels and emission rates for on-road heavy-duty vehicles and other mobile sources. EMFAC2017 was used to update the motor vehicle emission budgets, which were included as part of the 2018 SIP Update.

A Final Rule was issued by the EPA in the Federal Register (86 FR 58581) on October 22, 2021, approving all revisions to the SIP except for the contingency measures revision where EPA is deferring final action due to a court decision on approving SIP contingency measures[3]. On June 15, 2023, EPA disapproved the SFNA SIP contingency measures

1 United States, Court of Appels for the Ninth Circuit. *Bahr v. U.S. Environmental Protection Agency*. Docket no: 14-72327, Citation: 836.F3d 1218, United States Court of Appels for the Ninth Circuit,

2 United States, Court of Appels for the D.C. Circuit. *South Coast Air Quality Management District v. U.S. Environmental Protection Agency.* Docket no. 15-1115,C/w 15-1123, Citation: 882 F3d 1138, 16 February 2018. United States Court of Appels for the D.C. Circuit.

3 United States, Court of Appels for the Ninth Circuit. *Association of Irritated Residents v. U.S. Environmental Protection Agency*. Docket No. 19-71223, 26 August 2021, United States Court of Appeals for the Ninth Circuit.

because the 2008 Ozone Plan did not include measures that would be triggered if the area fails to attain the NAAQS or make reasonable further progress (88 FR 39179).

Responding to the court decision, EPA proposed updates to the contingency measure guidance on March 17, 2023 (88 FR 17571) to help state and local air agencies identify technological feasible and reasonably available contingency measures. The draft guidance titled, "Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter" is currently under EPA's review and is expected to be finalized by the end of 2023. When EPA finalizes its guidance, the SFNA air districts will continue to work with CARB and EPA to meet the contingency measure requirements and submit the necessary documentations to EPA to receive full approval for the 2008 Ozone Plan.

2.3.2 2015 8-hour Ozone NAAQS

On October 26, 2015, EPA issued a revised, more stringent 8-hour standard of 70 ppb (80 FR 65292). The revised NAAQS strengthens the nation's air quality standards for ground-level ozone to improve public health and environmental protection, especially for at-risk groups including children and older adults.

On June 4, 2018, EPA classified the SFNA as a moderate nonattainment area based on the SFNA design value using air quality data from 2013 – 2015 and a request from CARB and the SFNA air districts (83 FR 25776). On May 26, 2020, the SFNA air districts requested a voluntary reclassification because more recent ambient air quality data and modeling did not support the moderate attainment deadline of August 2024. This attainment deadline was also one year before the attainment date of the less stringent 2008 NAAQS of 75 ppb discussed in Section 2.3.1. Data and modelling now demonstrate that the SFNA needs additional time to attain and a reclassification to serious extends the attainment deadline to August 2027. This request was forwarded by CARB to EPA and was approved by EPA on October 28, 2021 (effective November 29, 2021) (86 FR 59648).

In May 2022, during the SIP development process, CARB conducted photochemical modeling that showed that the SFNA cannot attain the 2015 ozone NAAQS by the serious attainment date of August 2027. Because of this conclusion, the SFNA air districts have submitted another request to be voluntarily reclassified to severe-15, which will allow the region until August 2033 to demonstrate attainment. The request was forwarded by CARB and is pending action by EPA. This plan was developed to meet the requirements of a severe-15 nonattainment classification.

2.4 Development of the 2015 8-hour Ozone NAAQS Plan

2.4.1 Responsible Agencies

This 2015 8-hour Ozone NAAQS Plan was developed for the Sacramento region by the five air districts in the nonattainment area in collaboration with the CARB, the Sacramento

Area Council of Governments (SACOG), and the Bay Area Metropolitan Transportation Commission (MTC)[4]. The five local air districts include: EDCAQMD, FRAQMD, PCAPCD, SMAQMD, and YSAQMD. SACOG and MTC are the metropolitan planning organizations (MPO) for transportation planning in the SFNA.

2.4.2 Interagency Collaboration

Several committees and working groups provided input on technical and policy issues during the development of this plan.

- The Regional Planning Partnership (RPP) consisted of participants from the California Department of Transportation (CDOT), EPA, and Federal Highways Administration (FHWA). The RPP was assembled to coordinate the efforts of the local, state, and federal government agencies directly involved in the preparation or review of the Metropolitan Transportation Plan (MTP) and was responsible for interagency consultation on motor vehicle emissions budgets, conformity determinations and transportation control measures.
- The State Implementation Plan Inventory Working Group (SIPIWG) provided a platform for sharing information and updating status regarding the emissions inventory development among the air districts, EPA, and CARB.

2.4.3 Public Input and Review Process

This plan meets the requirements of CAA Section 110(a)(2), which requires reasonable notice and public hearings before plan adoptions. The Board of Directors for each of the air districts in the SFNA will provide a public notice, accept public comments, and hold a hearing prior to acting on the plan.

Stakeholder groups will help to disseminate information and seek input during the development of the plan. These include the SACOG's Regional Planning Partnership and other stakeholder groups throughout the SFNA. These stakeholders represent citizens in the region, business interests, environmental groups, transportation agencies, local government, and other community organizations. In addition, representatives for the various Native American tribes in the Sacramento region were contacted and invited to participate in the process.

2.5 Contents of 8-Hour Ozone Plan

This document includes information and analyses that fulfill the 2015 8-hour ozone NAAQS attainment demonstration and reasonable further progress planning requirements for the SFNA.

[4] MTC is the MPO for the east Solano County portion of the Sacramento nonattainment area.

Table 2-2 SIP Plan Chapter Description

Chapter	Title	Descriptions
1	Executive Summary	Executive summary of the Attainment and Reasonable Further Progress Plan for the 2015 8-hour ozone NAAQS
2	Background Information and National Ambient Air Quality Standards (NAAQSs) Overview	An introduction that contains background information on ozone health effects, ozone formation, the federal ozone standards, and an overview of the plan's development process
3	Clean Air Act Plan Requirements	Discusses the CAA and Attainment Plan Requirements for the 2015 ozone NAAQS
4	8-Hour Ozone Air Quality Trends	Analyzes and illustrates 8-hour ozone air quality trends in the SFNA
5	Emissions Inventory	Presents the 2017 base year emissions inventory and the emission forecasts that are based on existing control strategies and growth assumptions
6	Air Quality Modeling and Attainment Demonstration	Characterizes the air quality modeling simulations and predictions, and shows the 8-hour ozone attainment demonstration for the SFNA using the emission forecasts, photochemical modeling results, and the proposed control strategies
7	Control Measures	Describes the existing control programs and control measure commitments. Discuss the Reasonable Available Control Measure (RACM) analysis that was conducted
8	Contingency Measures	Explains contingency measures and discuss the status of developing these measures
9	Transport Analysis	Discusses inter-basin pollutant transport issues and addresses transport assumptions included in the photochemical modeling
10	Transportation Conformity and Emissions Budget	Documents the motor vehicle emissions budgets for transportation conformity purposes
11	General Conformity	Explains general conformity requirements
12	Reasonable Further Progress Demonstrations	Demonstrates how the Reasonable Further Progress emission reduction requirements will be achieved
13	Summary and Conclusions	Summarizes the key points and major conclusions of this plan, and discusses expected future air quality planning efforts by the air districts

Additional documentation for the more technical sections of the 8-hour ozone attainment plan is contained in the following Appendices.

Table 2-3 SIP Plan Appendix Description

Appendix	Title	Descriptions
A	Emissions Inventory	Includes the spreadsheet from CEPAM 2019 v1.04 Outputs and CARB's emissions inventory writeup
B	Photochemical Modeling	Photochemical modeling documentations: conceptual model, modeling protocol, modeling results, attainment demonstration, and gridded emissions inventory development
C	Current Control Programs	Detail descriptions for CARB's proposed statewide control measures and existing regional and local control measures
D	Reasonably Available Control Measures (RACM) Analysis	RACM analysis from air districts, Sacramento Area Council of Governments, and attainment year VOC and NO_X trading ratio
E	Contingency Control Measures	Includes CARB's assessment of statewide contingency measures and the air districts' report for contingency measure commitments.
F	Weight of Evidence	Weight of Evidence analysis that supports the results of photochemical modeling
G	Vehicle Miles Traveled (VMT) Offset Analysis	Detailed writeup for VMT Offset demonstration

2.6 References

Nguyen, Angela-Maithy et al. "*The association between ozone and fine particles and mental health-related emergency department visits in California, 2005-2013.*" PloS one vol. 16,4 e0249675. 2 Apr. 2021, doi:10.1371/journal.pone.0249675 Web. 25 May 2023. < https://pubmed.ncbi.nlm.nih.gov/33798241/ >

CARB. *2018 Updates to the California State Implementation Plan*, 25 October 2018. Web, 25 May 2023. < https://www.arb.ca.gov/planning/sip/2018sipupdate/2018update.pdf >

CARB, Letter from Corey (CARB) to Strauss (EPA Region IX). 18 December 2017. Print.

EPA. (44 FR 8202–8237) *Revisions to the National Ambient Air Quality Standards for chemical Oxidants; Final Rulemaking*. Federal Register, Volume 44, 8 February, 1979, p. 8202 – 8237. Web 05 June 2023. < https://archives.federalregister.gov/issue_slice/1969/5/27/8206-8209.pdf#page=3 >

---. (60 FR 20237-20238) *California, Sacramento Ozone Nonattainment Area, Reclassification to Severe; Final Rule*. Federal Register, Volume 60, 25 April, 1995, p. 20237 - 20238. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-1995-04-25/pdf/95-10099.pdf >

---. (62 FR 1150-1187) *Approval and Promulgation of Implementation Plans; California—Ozone; Final Rule*. Federal Register, Volume 62, 8 January 1997, p. 1150 - 1187.

Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-1997-01-08/pdf/97-144.pdf >

---. (62 FR 38856-38896) *National Ambient Air Quality Standards for Ozone. Final Rule.* Federal Register, Volume 62, 18 July 1997., p.38856 – 38896. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-1997-07-18/pdf/97-18580.pdf >

--- (69 FR 23858-23951) *Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas With Deferred Effective Dates*. Federal Register, Volume 69, 30 April 2004, p 23858 - 23951. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2004-04-30/pdf/04-9152.pdf >

---. (69 FR 23951-24000) *Implement the 8-Hour Ozone National Ambient Air Quality Standard – Phase 1: Final Rule.* Federal Register 69, 30 April 2004, p. 23951 – 24000. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2004-04-30/pdf/04-9153.pdf >

---. (73 FR 16436-16514) *National Ambient Air Quality Standards for Ozone; Final Rule.* Federal Register, Volume 73, 17 March 2008, p. 16436 – 16514. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2008-03-27/pdf/E8-5645.pdf >

---. (75 FR 24409-24421) *Designation of Areas for Air Quality Planning Purposes; California; San Joaquin Valley, South Coast Air Basin, Coachella Valley, and Sacramento Metro 8-Hour Ozone Nonattainment Areas; Reclassification: Final Rule*. Federal Register, Volume 75, 5 May 2010, p. 24409 - 24421. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2010-05-05/pdf/2010-9599.pdf >

---. (77 FR 30088-30160) *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards; Implementation of the 2008 National Ambient Air Quality Standards: Final Rule*. Federal Register, Volume 77, 21 May 2012, p. 30088-30160. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2012-05-21/pdf/2012-11618.pdf >

---. (77 FR 64036-64039) EPA. *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Stand* Determination of Attainment of the 1-Hour Ozone National Ambient Air Quality Standards in the Sacramento Metro Nonattainment Area in California. Federal Register, Volume 77, 21 May 2012, p. 64036-64039. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2012-10-18/pdf/2012-25547.pdf >

---. (80 FR 4795-4799) *Approval and Promulgation of Implementation Plans; State of California; Sacramento Metro Area; Attainment Plan for 1997 8-Hour Ozone Standard. Final Rule.* Federal Register, Volume 80, 29 January 2015, p. 4795 –

4799. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2015-01-29/pdf/2015-01609.pdf >

---. (80 FR 12264-12319) *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 80, 6 March 2015, p. 12264-12319. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2015-03-06/pdf/2015-04012.pdf >

---. (80 FR 65292-65467) *National Ambient Air Quality Standards for Ozone*; Final Rule. Federal Register, Volume 80, 26 October 2015, p. 65292 – 65467. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf >

---. (83 FR 25776–25848) *Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards: Final Rule.* Federal Register, Volume 83, 4 June 2018, p. 25776 – 25848. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf >

---. (86 FR 58581–58592) *Approval of Air Quality Implementation Plans; California; Sacramento Metro Area; 2008 8-Hour Ozone Nonattainment Area Requirements; Final Rule.* Federal Register, Volume 86, 22 October 2021, p. 58581 - 58592. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2021-10-22/pdf/2021-22661.pdf >

---. (86 FR 59648–59651) *Approval of Air Quality Implementation Plans; California; Sacramento Metro Area; 2008 8-Hour Ozone Nonattainment Area Requirements; Final Rule.* Federal Register, Volume 86, 28 October 2021, p. 59648 - 59651. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2021-10-28/pdf/2021-23454.pdf >

---. (88 FR 17571-17572) *Draft Guidance on the Preparation of State Implementation Plan Provisions That Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter, Notice of availability and public comment period.* Federal Register, Volume 88, 23 March 2023, p. 17571 - 17572. Web 11 July 2023. < https://www.govinfo.gov/content/pkg/FR-2023-03-23/pdf/2023-06010.pdf >

---. (88 FR 39179-39182) *Disapproval of Clean Air Plans; Sacramento Metro, California; Contingency Measures for 2008 Ozone Standards, Final Rule.* Federal Register, Volume 88, 15 June 2023, p. 39479 - 39182. Web 11 July 2023. < https://www.govinfo.gov/content/pkg/FR-2023-06-15/pdf/2023-12634.pdf >

---. *Heath Effects of Ground-level Ozone,* 26 November 2020. Web, 25 May 2023. < https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution >

SMAQMD, *Sacramento Regional 2008 NAAQS 8-hour Ozone Attainment and Reasonable Further Progress Plan*, 24 July [2017.] Web, 25 May 2023. < https://www.airquality.org/ProgramCoordination/Documents/Sac%20Regional%202008%20NAAQS%20Attainment%20and%20RFP%20Plan%20-%20Plan%20Only.pdf >

3 CLEAN AIR ACT PLAN REQUIREMENTS

The Clean Air Act (CAA), Sections 171-193 and 211 outline the plan requirements for a nonattainment area. In addition, the U.S. Environmental Protection Agency (EPA) published the 2015 ozone National Ambient Air Quality Standard (NAAQS) State Implementation Plan (SIP) Requirement Rule on December 6, 2018 (83 FR 62998), which includes requirements for specific elements of the SIP, including attainment demonstrations, reasonable further progress (RFP) and associated milestone demonstrations, reasonably available control technology (RACT), reasonably available control measures (RACM), nonattainment new source review (NSR), emissions inventories, vehicle miles traveled offset demonstrations, the timing of required SIP submissions and compliance with emission control measures in the SIP. The requirements that were addressed outside of the scope of this plan, unless otherwise specified, are discussed below.

3.1 Reasonably Available Control Technology (RACT)

CAA Sections 182(b)(2) and 182(f) require the nonattainment area to implement RACT for:

- Each category of volatile organic compound (VOC) sources covered by a Control Techniques Guidelines (CTG) document issued by EPA[5]; and
- All major stationary sources of VOC or nitrogen oxides (NO_X)

RACT (44 FR 53762) is "the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility." EPA is retaining the existing general RACT requirements for purposes of the 2015 ozone NAAQS SIP Requirements Rule (83 FR 63007), which requires each state or district to submit a SIP revision that meets the RACT requirements for VOC and NO_X in CAA Sections 182(b)(2) and 182(f). To address this requirement, each air district in the Sacramento Federal Nonattainment Area (SFNA) prepared a document called a Reasonably Available Control Technology State Implementation Plan (RACT SIP), which demonstrated how each air district implemented RACT for the affected sources and source categories. If a source or source category does not meet RACT, then the air district will need to commit to adopt or amend regulations as needed to meet RACT. RACT SIPs are not included in this plan and were prepared separately by each air district for submittal. RACT SIPs were due on August 3, 2020.

[5] CTG provide EPA's recommendations on how to control emissions of VOCs from a specific type of product or process (source category) in an ozone nonattainment area. Each CTG includes emissions limitations based on RACT to address ozone nonattainment. This list can be found at https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques

3.2 Milestone Compliance Demonstrations (MCD)

CAA Sections 182(g) and 189(c)(2) require that six years after designation and at three-year intervals thereafter through the region's attainment year, each nonattainment area submit an MCD to demonstrate a reduction in emissions and a control measures adoption schedule for the preceding intervals. The MCD includes a periodic emissions inventory of emissions sources in the area to meet CAA Section 182(a)(3)(A) requirements. The purpose of the MCD is to ensure that the region achieves the incremental emissions reductions projected in RFP demonstrations. The actual emissions reductions must equal or exceed the emissions reductions shown in the RFP analysis. CAA Section 182(g)(2) requires the nonattainment area to submit an MCD within 90 days after the date on which an applicable RFP milestone occurs. For the 2015 NAAQS, the first MCD is due March 30, 2024, which is for the milestone year 2023, six years after the designation/baseline year (83 FR 63011). CAA Section 182(g)(3) states that failure of the nonattainment area to submit an adequate MCD by the deadline could cause the nonattainment area to be reclassified to the next higher classification, forced to implement contingency measures, or forced to adopt an economic incentive program.

CAA Section 182(c)(5) requires that six years after the designation and at three-year intervals thereafter, the State submit a demonstration as to whether current aggregate vehicle mileage, aggregate vehicle mileage, aggregate vehicle emissions, congestion levels, and other relevant parameters are consistent with those used for the area's demonstration of attainment. This will also be addressed in the upcoming MCD.

3.3 Vehicle Miles Travelled (VMT) Offset Demonstration

CAA Section 182(d)(1)(A) applies to nonattainment areas classified as severe or extreme. It requires SIPs to adopt "specific enforceable transportation control strategies and transportation control measures to offset any growth in vehicle miles traveled or numbers of vehicle trips in such area." The VMT offset demonstration is due two years after the area's initial designation or August 3, 2020. A VMT offset demonstration has not yet been submitted because EPA has not acted on the air districts' request to voluntarily reclassify the SFNA to severe. A VMT offset demonstration is included in this plan in Appendix G and was prepared using EPA's guidance (EPA, 2012).

3.4 Severe or Extreme Area Fee Program

CAA Section 185 is a fee program applied to all major stationary sources when a nonattainment area with a classification of severe and extreme failed to attain the standard by the attainment deadline. The CAA Section 185 fee program requires a fee to be assessed each year after the attainment date until the area is redesignated to attainment (CAA Section 182(d)(3)). This fee rule is required to be in place 10 years after the area's initial designation or August 2028. The SFNA air districts have adopted rules or will be developing rules that will satisfy the CAA Section 185 fee rule requirement.

3.5 Nonattainment New Source Review (NNSR) for Major Sources

CAA 172(c)(5) requires permits for the construction or operation of new or modified major stationary sources[6] of air pollution in a nonattainment area regardless of classification. For a severe area, the major source threshold is 25 tons per year (tpy) of VOC or NO_X emissions (CAA Sections 182(d) and 182(f)). This SIP element was due on August 3, 2021.

These NNSR requirements are established in rules adopted by each air district. Since the SFNA was classified as severe for the 1997 and 2008 8-hour Ozone NAAQS, all SFNA air districts have in place a NNSR rule with the severe area thresholds for NO_X and VOC. The SFNA air districts can certify their existing SIP-approved NNSR rule as meeting the 2015 ozone NAAQS SIP requirements unless EPA has found deficiencies in their NNSR rule, in which case, the air district will be required to amend their NNSR rule. NNSR rule certifications or amendments are not included in this plan and are prepared separately by each air district for submittal.

3.6 Periodic Emissions Inventory

CAA Section 182(a)(3) requires all nonattainment areas to submit emissions inventories every 3 years until the nonattainment area is designated to attainment. In collaboration with all air districts, CARB periodically revises the emissions inventory. The last emission inventory update was completed on July 24, 2020. CARB's submittal satisfies the requirements of Sections 172(c)(3) and 182(a)(1).

3.7 Emission Statement

CAA Section 182(a)(3)(B) requires all ozone nonattainment areas to have a program that requires emissions statements from stationary sources of NO_X and VOC. Specifically, CAA Section 182(a)(3)(B)(i) requires air agencies to submit to the EPA a SIP revision requiring the owner or operator of each stationary source to report and certify the accuracy of their reported NO_X and VOC emissions, beginning in 1993 and annually thereafter. This SIP element was due on August 3, 2020.

All SFNA air districts have established an emission reporting program for NO_X and VOC sources through their respective rules and programs and fulfilled the CAA Section 182(a)(3)(B) emissions statement requirements by certifying that the existing SIP-approved rules remain adequate to meet these requirements. Emission statement certifications are not included in this plan and are prepared separately by each air district for submittal.

[6] For severe ozone nonattainment areas, a major source is defined by CAA §182(d) as a source that has the potential to emit 25 tons or more per year of NO_X or VOC.

3.8 Gasoline Vapor Recovery

CAA Section 182(b)(3) requires owners and operators of gasoline dispensing systems in nonattainment areas with moderate or above classification to install and operate a system for gasoline vapor recovery of emissions from the fueling of motor vehicles. The California legislature and California Air Resources Board (CARB) passed laws, executive orders, and regulations to address this requirement. The gasoline vapor recovery program details are available on CARB's webpage (https://ww2.arb.ca.gov/our-work/programs/vapor-recovery). In addition, all SFNA air districts have SIP-approved rules for gas dispensing facilities (GDFs) where owner or operators of GDFs are required to install and operate gasoline vapor recovery systems. All nonattainment areas in California, including the SFNA, have satisfied this requirement.

3.9 Enhanced Ambient Monitoring

CAA Section 182(c)(1) requires areas classified as serious, severe, or extreme to establish Photochemical Assessment Monitoring Stations (PAMS) sites, which provide enhanced monitoring of ozone, NO_X, VOCs, and meteorological parameters. New PAMS requirements took effect with the 2015 revision of the NAAQS for Ozone (80 FR 65292). The Sacramento Metropolitan Air Quality Management District (SMAQMD) 2022 Annual Network Plan (SMAQMD, 2022) discusses its air monitoring network, including PAMS network, and addresses future year changes and requirements. EPA approved the SMAQMD's 2022 Annual Network Plan SMAQMD on January 4, 2023. SMAQMD PAMS network and how it meets the new PAMS requirement are also discussed in Appendix A of CARB's 2020 Monitoring Network Assessment (CARB, 2020). For the air monitoring network in the SFNA outside of Sacramento County, CARB prepared a 2022 Annual Network Plan (CARB, 2022) for the remaining SFNA air districts to address future year changes and requirements[7]. EPA approved CARB's 2022 Annual Network Plan on October 28, 2022.

3.10 Enhanced Vehicle Inspection and Maintenance Program

CAA Section 182(c)(3) applies to all nonattainment areas classified as serious or above. The enhanced vehicle inspection and maintenance program includes emissions testing with an inspection to detect tampering with emissions control devices and misfuelling, and program administration to assure adequate management resources, tools, and practices. The state of California adopted the program in the mid-1990s and revised it in 2009. EPA approved the original inspection and maintenance program in January 1997 (62 FR 1150) and subsequently the revised program in July 2010 (75 FR 38023). CARB adopted the Smog Check Program Certification for the 2015 O_3 NAAQS SIP on March

[7] The SMAQMD is the only air district in the SFNA that has its own monitoring network plan. All the other plans are covered in CARB's monitoring network plan.

23, 2023. The enhanced vehicle inspection and maintenance program are available on CARB's webpage (https://ww2.arb.ca.gov/resources/documents/smog-check-psm-certification).

3.11 Clean Fuels for Fleets

CAA Section 182(c)(4) applied to all nonattainment areas classified as serious or above. The program requires the implementation of a clean-fuel vehicle program for fleets. A specified portion of all new covered fleet vehicles purchased by fleet operators must be clean-fuel vehicles and use clean fuels when operating in the nonattainment area. CARB has submitted the California Clean Fuels for Fleets Certification for the 70 ppb Ozone Standard for ozone nonattainment in California and adopted the certification in January 2022. The certification was submitted to EPA, and EPA approved the certification on May 25, 2023 (88 FR 33830). The Clean Fuels for Fleets details are available on CARB's webpage (https://ww2.arb.ca.gov/70ppb-clean-fuels-fleet-certification).

3.12 Reformulated Gasoline

CAA Section 211(k) requires reformulated gasoline to be used in gasoline-fueled vehicles in specified nonattainment areas, including the SFNA. CARB implemented the first phase of the reformulated gasoline requirements in January 1992, the second phase in March 1996, and the third phase in May 2003. SFNA was reclassified from serious to severe classification for the 1-hour standard in June 1995 and became a reformulated gasoline area in June 1996 (60 FR 20237). The details of the reformulated gasoline are available on CARB's webpage (https://ww2.arb.ca.gov/our-work/programs/fuels-enforcment-program/california-reformulated-gasoline).

3.13 References

CARB. *2020 Monitoring Network Assessment.* California Air Resources Board: Sacramento, CA. October [2020.] Print.

---. *Annual Network Plan. Covering monitoring Operations in 25 California Air Districts.* California Air Resources Board: Sacramento, CA. July [2022.] Print.

EPA. 2012 *Implementing Clean Air Act Section 182(d)(1)(A): Transportation Control Measures and Transportation Control Strategies to Offset Growth in Emissions Due to Growth in Vehicle Miles Travelled*. United States Environmental Protection Agency - Office of Transportation and Air Quality, [2012.] Web. 11 August 2023. < https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZ4X.PDF?Dockey=P100EZ4X.PDF >

---. (44 FR 53761 - 53763) *State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas-Supplement*

(on Control Techniques Guidelines). Federal Register, Volume 44, 16 September 1979, p. 53761-53763. Web. 01 June 2023. < https://archives.federalregister.gov/issue_slice/1979/9/17/53760-53764.pdf#page=2 >

---. (60 FR 20237 - 20238) *California, Sacramento Ozone Nonattainment Area, Reclassification to Severe: Final Rule.* Federal Register, Volume 60, 25 April 1995, p. 20237 - 20238. Web. 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-1995-04-25/pdf/95-10099.pdf >

---. (62 FR 1150 – 1187) *Approval and Promulgation of Implementation Plans; California—Ozone. Final Rule.* Federal Register, Volume 62, 08 January 1997, p. 1150 - 1187. Web. 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-1997-01-08/pdf/97-144.pdf >

---. (75 FR 38023 – 38026) *Approval and Promulgation of Air Quality Implementation Plans; California; Motor Vehicle Inspection and Maintenance Program: Final Rule.* Federal Register, Volume 75, 01 July 2010, p. 38023-38026. Web. 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2010-07-01/pdf/2010-16028.pdf >

---. (80 FR 65292-65467) *National Ambient Air Quality Standards for Ozone*; Final Rule. Federal Register, Volume 80, 26 October 2015, p. 65292 – 65467. Web. 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf >

---. (83 FR 62998–63036) *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 83, 06 December 2018, p. 62998 – 63006. Web 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf >

---. (88 FR 33830 - 33831) *Clean Air Plans; 2015 8-Hour Ozone Nonattainment Area Requirements; Clean Fuels for Fleets; California: Final rule.* Federal Register, Volume 88, 25 May 2023, p. 33830 - 33831. Web. 09 August 2023. < https://www.govinfo.gov/content/pkg/FR-2023-05-25/pdf/2023-11006.pdf >

SMAQMD. *2022 Annual Network Plan*. Sacramento Metropolitan Air Quality Management District, Sacramento, CA. 01 August [2022.] Web. 14 February 2023. < https://www.airquality.org/ProgramCoordination/Documents/2022%20Annual%20Monitoring%20Network%20Plan.pdf >

4 8-HOUR OZONE AIR QUALITY TRENDS

4.1 Introduction

This chapter evaluates the ambient ozone concentrations collected at the air monitoring stations in the Sacramento Federal Nonattainment Area (SFNA) between 2000 – 2021 and compares the concentrations to the 2015 Ozone National Ambient Air Quality Standards (NAAQS) of 70 parts per billion (ppb). This evaluation analyzed the number of days exceeding the federal standard and the design values from the past 22 years. A design value is a mathematically determined pollutant concentration at a particular air monitoring site that must be reduced to or maintained at or below the NAAQS to reach and remain in attainment. For the 2015 8-hour ozone NAAQS, it is calculated by averaging the fourth-highest daily 8-hour ozone concentration for each of the three most recent years at a monitoring site[8]. For example, the 2021 8-hour ozone design value for an air monitoring site is calculated by taking the average of the fourth highest daily 8-hour average ozone concentrations in 2019, 2020, and 2021. The peak design value for the SFNA is the highest design value of all the SFNA sites.

Ambient ozone data collected between January 2015 through a portion of May 2019 at the Auburn, Colfax, and Lincoln air monitoring stations were invalidated as a result of a United States Environmental Protection Agency (EPA) technical systems audit finding that the calibration procedures did not fully meet EPA's data quality regulations. These stations are located in the eastern portion of the SFNA, which are typically the highest ozone sites in the SFNA. Correlation and regression analyses in the Weight of Evidence (Appendix F) of this plan concluded that using invalidated data for these sites was more conservative compared with using values determined from regression analyses. Thus, for the purposes of this plan, the invalidated data at the Auburn, Colfax, and Lincoln monitoring station were used in the ozone trend analyses.

4.2 Ozone Monitoring Sites

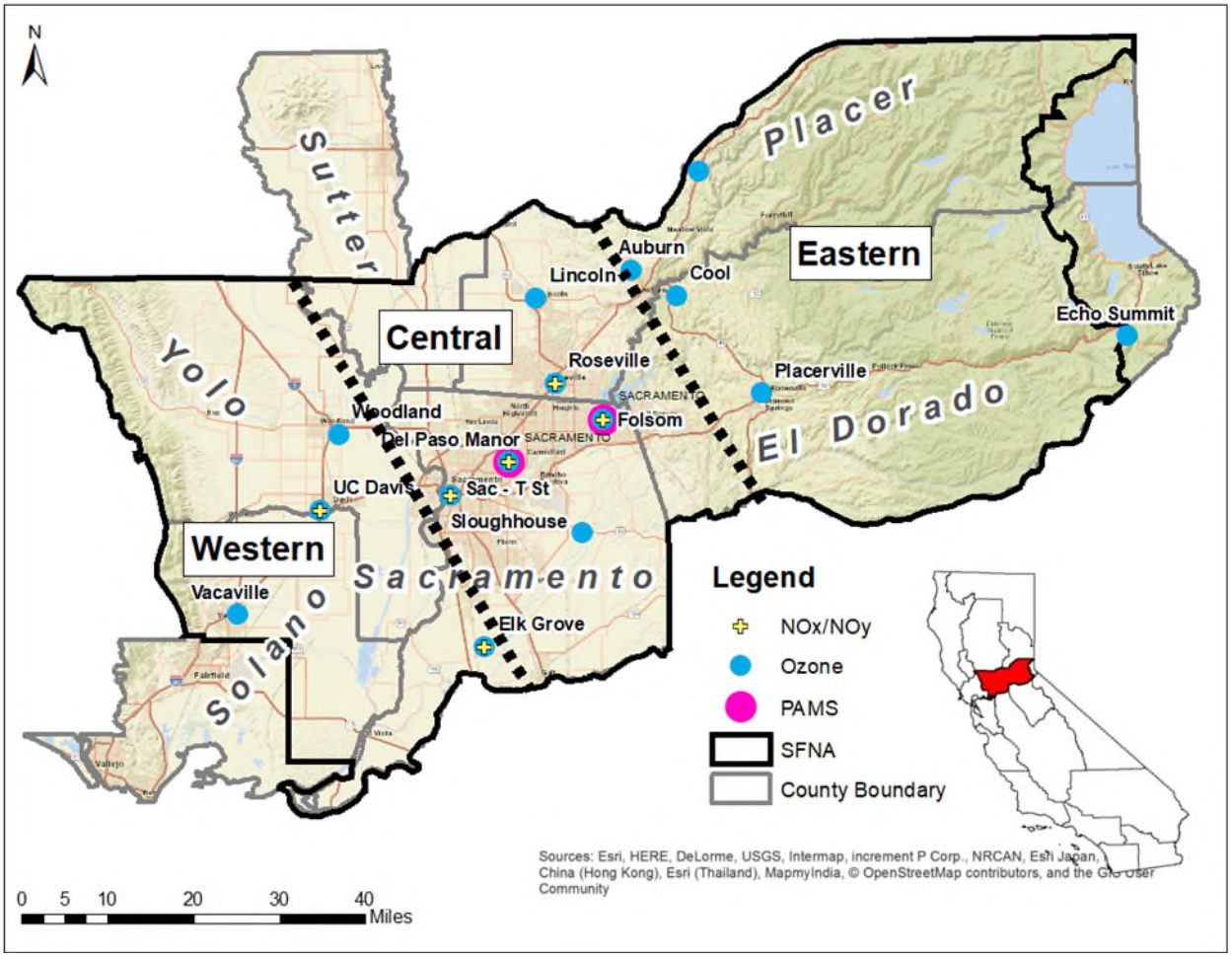
The SFNA has 15 active ozone monitoring stations[9] that are operated by either the air districts or the California Air Resources Board (CARB). Figure 4-1 shows the ozone monitoring stations that were operating in the SFNA at the end of 2022. Most ozone monitoring sites are also equipped with meteorological instruments, and some sites also measure ambient concentrations of ozone precursors, nitrogen oxides (NO_X) and volatile

[8] The calculation methodology is shown in 40 CFR 50 Appendix U. Due to truncation, EPA uses the value of 70.9 ppb to determine attainment.

[9] More information about the monitoring sites in Sacramento County can be found at http://www.airquality.org/Air-Quality-Health/Air-Monitoring, and the monitoring sites in the other districts at http://www.arb.ca.gov/aqd/amnr/amnr.htm.

organic compounds[10] (VOCs). Figure 4-2 shows the 2021[11] design value contours for 75 ppb (2008 standard) and 70 ppb (2015 standard). The highest measured ozone concentrations are consistently in the eastern portion of the SFNA. As shown in Table 4-2, the peak design value site has shifted over the years from the Folsom air monitoring station (2005 through 2014) to the Placerville air monitoring station (2015 to 2016) to the Auburn air monitoring station (2017 to 2021).

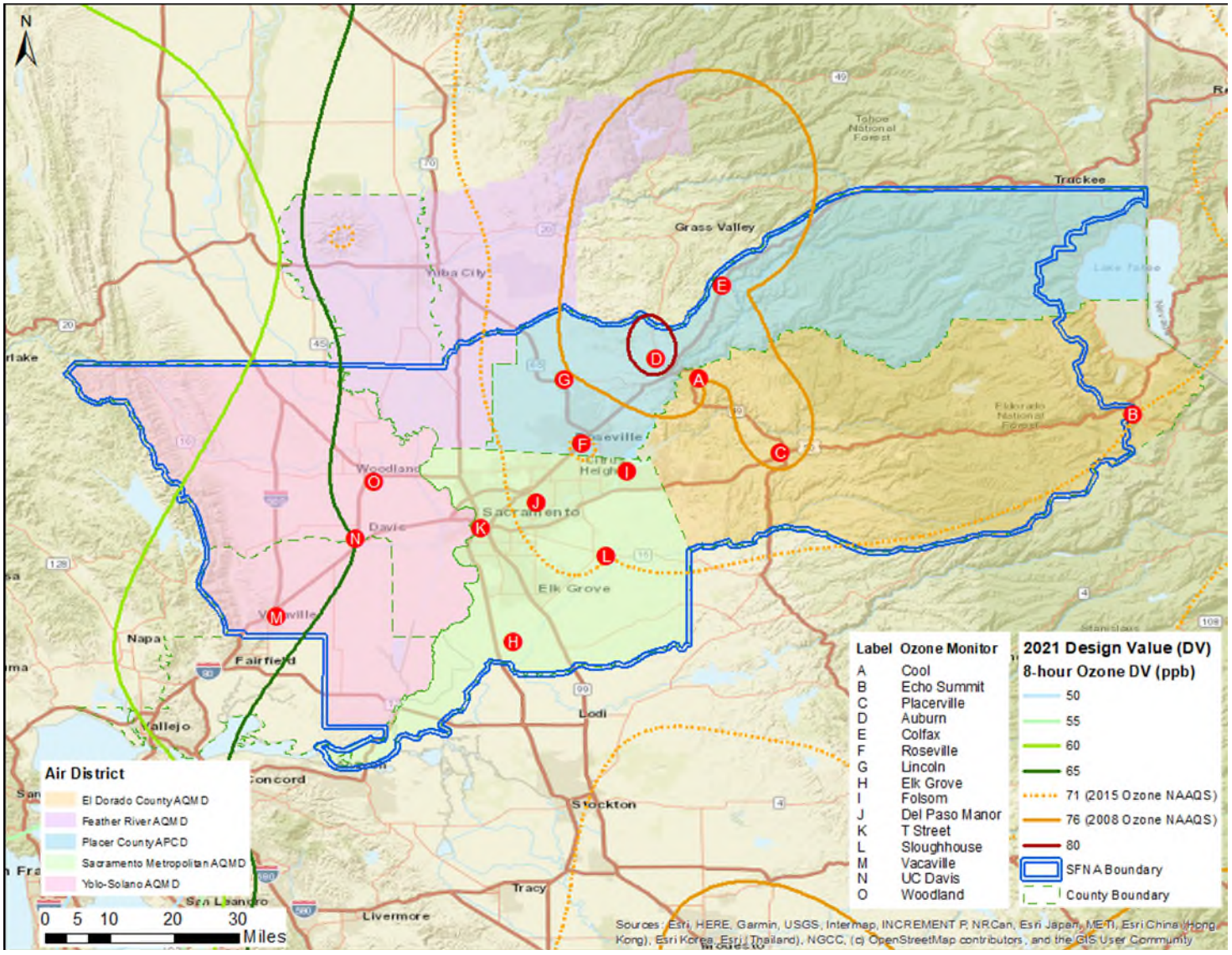
Figure 4-1 SFNA Subregions and Monitoring Station Locations



[10] The Del Paso Manor monitoring station is currently undergoing renovation and as a result, VOC data has not been collected since January 2021. VOC monitoring will resume once renovation has been completed in 2023 with an Automated Gas Chromatograph (Auto GC) and Carbonyls sampling.

[11] Contour lines were created by Golden Software Surfer 24 using Kriging gridding method with resolution of 0.01 degree.

Figure 4-2 SFNA Ozone Monitoring Stations and 2021 Design Value Contours



Note: The area inside a contour line is estimated to be higher than the specified design value

4.3 Annual Number of Exceedance Days and Trend

Table 4-1 shows the number of days that exceeded the 2015 ozone NAAQS of 70 ppb at the monitoring sites in the SFNA between 2000 and 2021. The highest number of exceedances mainly occurred at the region's eastern monitoring sites (Cool, Placerville, Auburn, and Colfax). The year-to-year differences in which monitoring station has the highest number of exceedances are caused by meteorological variability and changes in concentrations of precursor emissions.

Figure 4-3 shows the highest number of exceedance days each year recorded at a monitoring station in the SFNA from 2000 to 2021. The trendline has a downward slope of 2.73 days per year, which indicates an annual decline in the number of exceedance days over the past 22 years. The number of days exceeding 70 ppb decreased from a high of 97 days in 2002 down to 34 days in 2021. Figure 4-3 shows that the Auburn monitoring site had the highest number of exceedances in 2021 (see Table 4-1).

Table 4-1 Number of Days exceeded the 2015 NAAQS of 70 ppb for the SFNA Monitoring Sites

The site with the highest number of exceedance days for the year is in red.

County	Monitoring Site	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
El Dorado	Cool	66	72	97	61	47	54	73	41	39	35	17	39	15	9	33	13	19	28	26	3	7	13
El Dorado	Echo Summit [1]	13	19	22	5	11	0	10	7	9	1	0	1	9	1	2		2	1	10	0	7	6
El Dorado	Placerville	53	58	62	57	35	47	62	20	52	31	19	16	41	21	32	19	41	18	28	4	20	10
Placer	Auburn [2, 3]	56	46	53	41	56	42	66	19	35	26	18	29	30	6	15	15	27	29	35	8	22	34
Placer	Colfax[3]	0	9	53	45	42	45	64	24	29	12	10	10	15	5	6	12	14	14	30	4	18	17
Placer	Lincoln[3,4]													13	1	3	4	11	11		3	9	15
Placer	Roseville	21	29	32	24	13	27	38	19	38	30	21	21	27	6	19	6	20	9	11	1	3	4
Sacramento	Elk Grove	6	22	3	26	10	22	29	12	12	11	6	6	10	0	1	2	1	3	2	4	2	5
Sacramento	Folsom[5]	30	55	60	56	40	39	61	34	63	47	25	46	53	16	34	11	23	17	18	2		29
Sacramento	North Highlands[6]	33	32	36	21	14	11	40	4	4	18	10	20	20	6	12	8	16	8	10	2	5	0
Sacramento	Sacramento-Del Paso Manor[6]	27	26	57	51	22	28	35	16	22	30	7	8	21	6	16	8	10	5	6	0	10	17
Sacramento	Sacramento-Airport Rd -> Goldenland Ct[7]	18	9	12	6	2	8	11	6	15	11	1	1	7	1	3	4	8	0				
Sacramento	Sacramento-T Street	10	7	12	7	2	4	14	7	17	13	1	5	9	0	3	4	3	3	1	1	3	1
Sacramento	Sloughhouse	42	40	43	50	37	29	44	16	36	32	13	26	23	5	10	14	17	6	4	1	5	13
Solano	Vacaville[8]	5	5	6	7	3	5	9	4	7	2	2	2	3	2	1	0	1	2	1	0	2	2
Yolo	UC Davis	15	7	6	8	5	5	8	4	9	6	2	1	4	0	0	1	1	1	1	0	0	2
Yolo	Woodland	15	8	21	19	3	11	23	4	12	8	0	1	8	0	1	3	4	2	2	0	2	2
	Peak Site	66	72	97	61	56	54	73	41	63	47	25	46	53	21	34	19	41	28	35	8	22	34

Data source: EPA AQS database (https://www.epa.gov/aqs) downloaded on 02/02/2023.

1 This is a seasonal monitor that only operates during the summer months.

2 Auburn monitor was moved from 108 C Ave, Auburn to 11645 Atwood St, Auburn in 2011.

3 Data invalidation issues at the Auburn, Colfax, and Lincoln monitoring stations from January 1, 2015, through May 20, 2019 –data highlighted in **blue** reflects use of invalidated data. Ozone data was disqualified by EPA.

4 The Lincoln Monitoring Station began operations in 2012. No data was collected from September 30, 2017 to October 31, 2018.

5 No data was available for the Folsom Monitoring Station as it was under construction in 2021.

6 Orange highlighted areas indicate data that is currently under review at North Highlands and Del Paso Manor and may be invalidated. Del Paso Manor data may be invalidated from 2/27/2020 to 3/4/2020 and 3/29/2021 to 6/23/2021, and the North Highlands Station from 5/4/2021 to1/18/2022. The North Highlands Station was also closed in July 2022.

7 Sacramento-Goldenland Ct monitor was moved from Airport Road in 2009. This monitor was closed in 2017.

8 Vacaville monitor was moved from 1001 Allison Drive to 2012 Ulatis Drive in 2003.

Figure 4-3 2015 O_3 NAAQS Exceedance Days Count Trend at the highest count monitor in SFNA

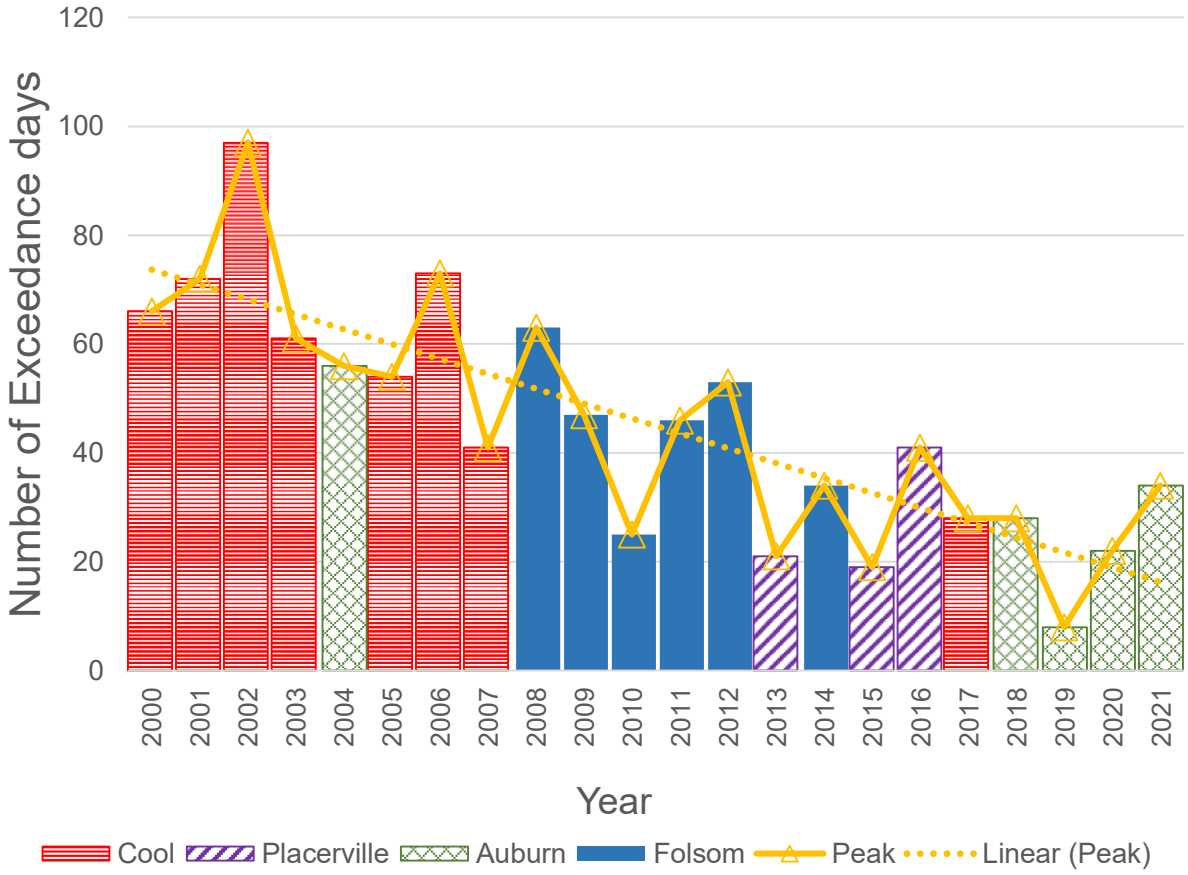


Table 4-2 8-Hour Ozone Design Values (ppb) Sacramento Nonattainment Area – Ozone Monitoring Sites

The peak site for the year is highlighted in red.

County	Monitoring Site	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
El Dorado	Cool	107	104	106	107	102	97	95	96	98	93	89	84	83	81	80	79	82	80	84	80	80	76
El Dorado	Echo Summit [1]	74	75	75	75	74	71	72	72	75	73	71	67	69	69	69	67	69	68	70	66	69	71
El Dorado	Placerville	99	96	94	95	94	94	94	93	96	92	90	80	81	82	84	81	85	83	88	81	84	77
Placer	Auburn [2,3]	102	101	101	99	95	92	93	89	90	86	87	85	84	80	78	80	84	84	88	86	87	82
Placer	Colfax[3]	79	73	77	88	92	91	97	94	89	79	78	74	75	73	73	73	76	78	85	82	83	76
Placer	Lincoln[3,4]													77	71	71	72	77	79		70	74	75
Placer	Roseville	93	90	92	90	87	86	89	89	90	89	90	86	85	81	81	77	80	79	81	75	72	70
Sacramento	Elk Grove	85	84	75	80	77	82	82	83	82	79	77	74	74	71	70	66	68	68	67	68	68	70
Sacramento	Folsom[5]	104	99	100	100	97	97	97	98	102	100	102	95	95	90	85	80	83	82	82	75		
Sacramento	North Highlands[6]	89	89	92	91	85	80	82	80	78	74	75	77	77	76	75	74	77	78	78	74	72	71
Sacramento	Sacramento-Del Paso[6]	95	92	95	97	95	92	90	90	87	86	85	81	78	77	77	76	77	77	75	71	73	75
Sacramento	Sacramento-Airport Rd -> Sacramento-Goldenland Ct[7]	82	79	78	77	74	73	73	76	78			69	69	70	71	69	71					
Sacramento	Sacramento-T Street	82	80	79	79	75	73	76	78	79	77	75	71	71	70	69	68	69	69	67	67	65	66
Sacramento	Sloughhouse	105	98	95	95	94	94	96	93	95	91	92	87	88	84	80	76	79	78	75	70	70	71
Solano	Vacaville[8]	85	77	72	72	71	71	73	74	75	72	71	68	69	67	66	66	67	67	65	64	63	65
Yolo	UC Davis	85	81	77	76	74	73	74	75	76	74	72	70	70	66	64	62	64	63	62	62	63	65
Yolo	Woodland	84	82	83	83	79	77	79	80	79	74	72	69	69	69	68	67	69	69	68	66	66	67
	Peak Site	107	104	106	107	102	97	97	98	102	100	102	95	95	90	85	81	85	84	88	86	87	82

Data source: EPA AQS database (https://www.epa.gov/aqs) downloaded on 02/01/2023.

1 This is a seasonal monitor that only operates during the summer months.

2 Auburn monitor was moved from 108 C Ave, Auburn to 11645 Atwood St, Auburn in 2011.

3 Data invalidation issues at the Auburn, Colfax, and Lincoln monitoring stations from January 1, 2015, through May 20, 2019 –DV highlighted in blue reflects use of invalidated data. Ozone data was disqualified by EPA.

4 The Lincoln Monitoring Station began operations in 2012. No data was collected from September 30, 2017, to October 31, 2018.

5 The Folsom Monitoring Station was temporarily closed in 2020 so no Design Value is available in 2020 and 2021.

6 Orange highlighted areas indicate years when the design value may be impacted from data that have been proposed to be invalidated. Del Paso Manor data may be invalidated from 2/27/2020 to 3/4/2020 and 3/29/2021 to 6/23/2021, and the North Highlands Station from 5/4/2021 to1/18/2022. The North Highlands Station was also closed in July 2022.This data is currently under review.

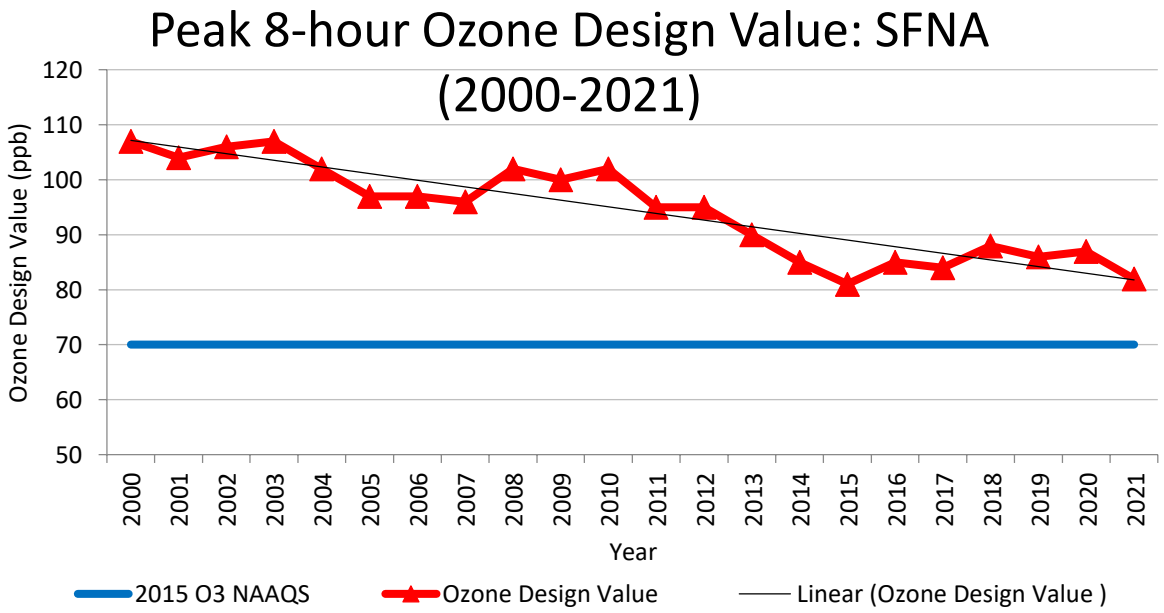
7 Sacramento-Goldenland Ct monitor was moved from Airport Road in 2009. This monitor was closed in 2017.

8 Vacaville monitor was moved from 1001 Allison Drive to 2012 Ulatis Drive in 2003.

4.4 Ozone Design Values and Trend

Table 4-2 lists the 8-hour ozone design value concentrations for each of the ozone monitoring sites in the SFNA from 2000 to 2021. Figure 4-4 shows the peak ozone design value trend (based on the annual peak design values shown in Table 4-2 from 2000 to 2021). The trendline indicates a decline from a peak design value of 107 ppb in 2000 at the Cool monitoring station to 82 ppb in 2021 at the Auburn monitoring station. This is a declining trend rate of about 1.5 ppb per year. Design value trends will be discussed below in more detail categorically as the eastern, central, and western regions of the SFNA.

Figure 4-4 Peak 8-Hour Ozone Design Value Trends in the SFNA (2000 – 2021)



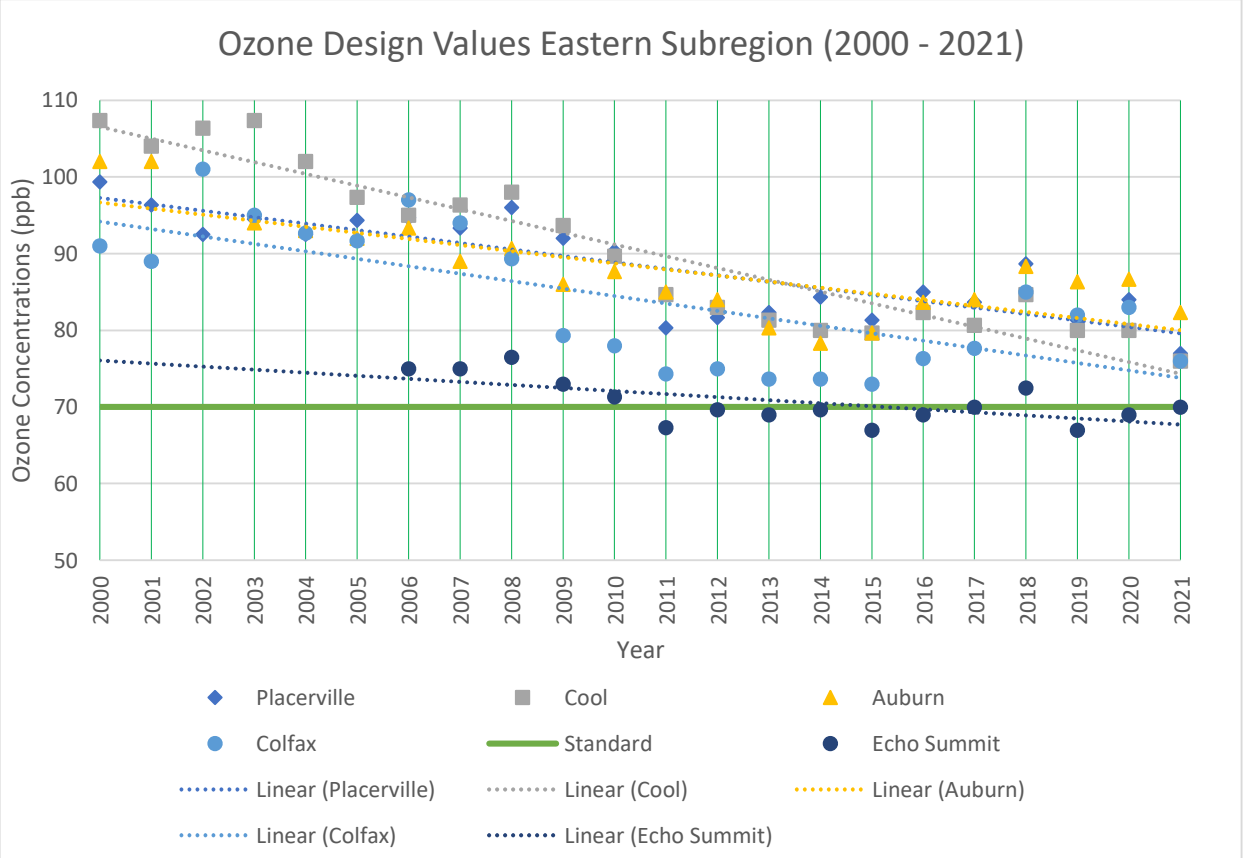
Sources: 1990-2020 Design Values were extracted from AQS Report (AMP 480) and downloaded on December 22, 2021. 2021 DV is calculated based on the combination of the AQS data and preliminary AQMIS data downloaded on 02/16/2022.

Notes: The SFNA was impacted by wildfires in summer 2018 which causes unusual high 4th highest ozone concentration for 2018. The peak design value calculation in this chart included the days impacted by wildfires and demonstrated a declining trend, despite smoke impacts.

4.4.1 Eastern SFNA

Figure 4-5 shows the 8-hour ozone design values and trends from 2000 – 2021 for each of the five monitoring stations in the eastern SFNA: Echo Summit, Placerville, Cool, Auburn, and Colfax monitoring stations. Although all stations in the SFNA demonstrated a decline in ozone concentrations, concentrations at most of these monitoring stations in the eastern portion remained higher compared to the other two regions of the SFNA. The following observations were made regarding ozone trends at each of these sites:

Figure 4-5 Eastern Subregion Ozone Design Value Trends in the SFNA (2000 – 2021)



- The Echo Summit monitoring station data showed that the design value has gradually decreased from 75 ppb in 2006 to 70 ppb in 2021 with a downward trendline slope of 0.40 ppb per year.
- The Placerville monitoring station data showed a gradual decline in the ozone design value from a high of 99 ppb in 2000 to 77 ppb in 2021. Placerville's trendline displays a downward slope of 0.84 ppb per year.
- The Cool monitoring station data demonstrated a more considerable decrease in design value from a high of 107 ppb in 2000 to 76 ppb in 2021 with a downward slope of 1.53 ppb per year.
- The Auburn monitoring station data showed a decrease from a design value of 102 in 2000 to 82 in 2021, and the trendline slope for the design value at this site indicates a downward trend of 0.79 ppb per year. Although Auburn data showed a decline in concentrations from 2000 to 2021, the design values from 2021 indicated that Auburn is the peak design value site in the SFNA. This is consistent with the design value contour map shown in Figure 4-2.
- The Colfax monitoring station data demonstrated a similar pattern in design value trends compared with values from the Auburn and Cool monitoring sites. The

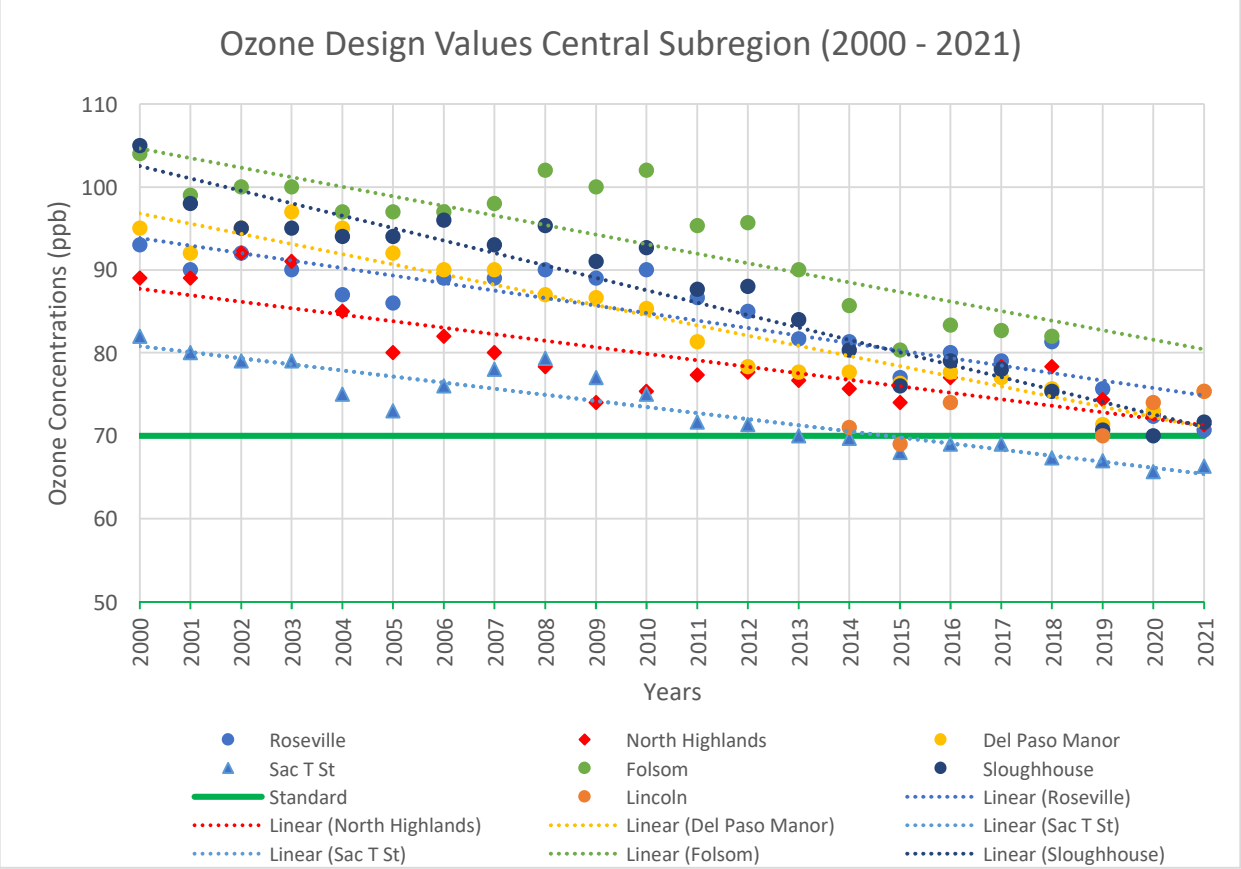
design values have decreased from 91 ppb in 2000 to 76 ppb in 2021 with a downward trendline slope of 0.97 ppb per year.

The decline rates of the design value for each station in the eastern subregion vary greatly from site to site with approximate downward trendline slopes ranging from 0.40 to 1.53 ppb per year.

4.4.2 Central SFNA

Figure 4-6 shows the 8-hour ozone design values and trends for the seven monitoring stations in the central SFNA: Folsom, Roseville, Sloughhouse, Lincoln, Del Paso Manor, T-Street, and North Highlands monitoring stations. The following observations were made regarding ozone trends at each of these sites:

Figure 4-6 Central Subregion Ozone Design Value Trends in the SFNA (2000 – 2021)



- The Folsom monitoring station data[12] showed that the design value decreased from a high of 104 ppb in 2000 to 75 ppb with a downward trendline slope of 1.15 ppb per year. The Folsom monitoring station was the peak monitoring site for the Sacramento Regional 2008 NAAQS 8-hour Ozone Attainment and Reasonable

[12] Data for 2020 were not available due to construction at the Folsom monitoring station, so the trendline goes through 2019.

Further Progress Plan, but concentrations have significantly decreased over the past several years. This has allowed the peak site to shift to a different station.

- The Roseville monitoring station data showed that the design value decreased from 93 ppb in 2000 to 71 ppb in 2021 with a downward trendline slope of 0.9 ppb per year.
- The Sloughhouse monitoring station data showed a decrease in the design value from 95 ppb in 2000 to 67 ppb in 2021. The trendline slope for this site demonstrates a more significant improvement in concentrations at a declining rate of 1.50 ppb per year.
- The T Street monitoring station data showed a more gradual improvement in concentrations as they decreased from a design value of 82 ppb in 2000 to 66 ppb in 2021 with a downward trendline slope of 0.73 ppb per year.
- The Del Paso Manor[13] monitoring station data demonstrated a downward trend in concentrations with a design value of 97 ppb in 2003 to 75 ppb in 2021 and a downward trendline slope of 1.23 ppb per year.
- The North Highlands[14] monitoring station data showed a decline in the design values from 92 ppb in 2002 to 71 ppb in 2021 with a downward trendline slope of 0.78 ppb per year.

Overall, the sites in the central subregion had greater improvements in ozone concentrations compared to the other two subregions, with downward trendline slopes ranging from 0.73 to 1.50 ppb per year.

4.4.3 Western SFNA

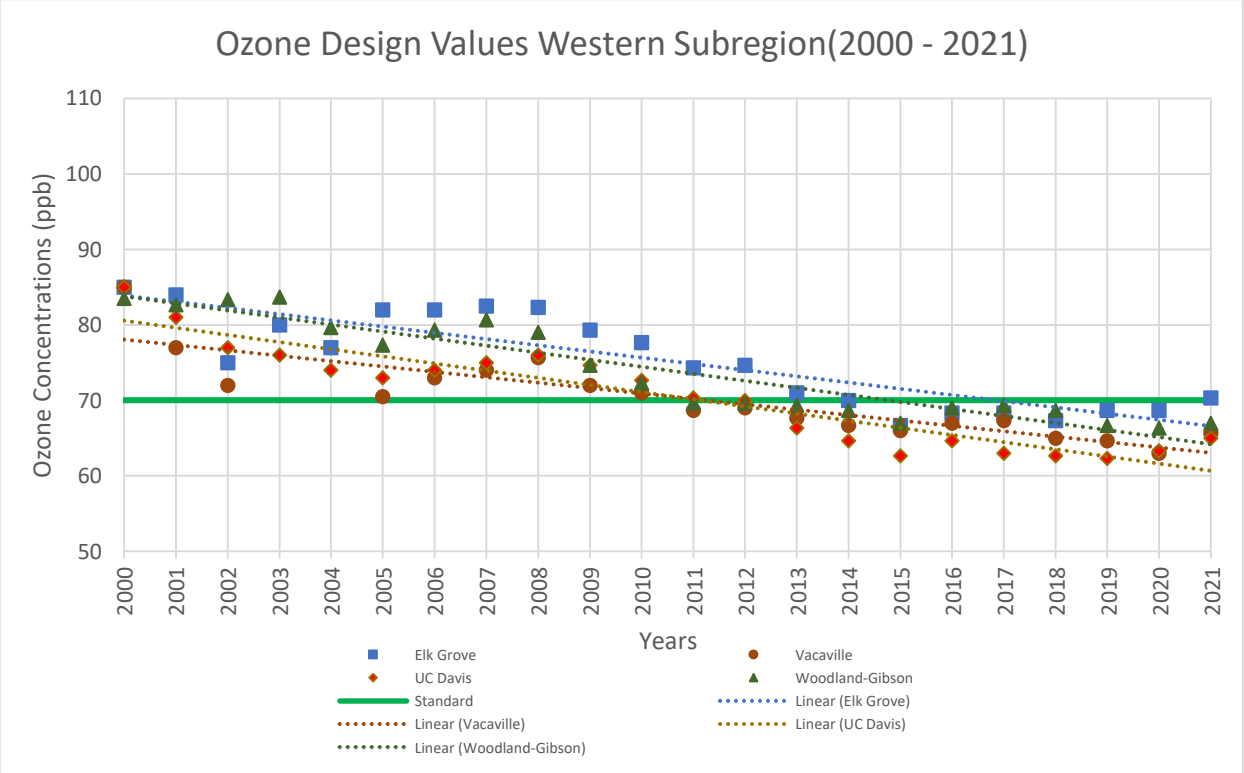
Figure 4-7 shows the 8-hour ozone design values and trends from 2000 - 2021 for each of the four monitoring stations in the western SFNA: Elk Grove, Woodland, Vacaville, and UC Davis. The 2021 design value of the monitoring stations in the Western SFNA were all at or below the 2015 NAAQS standard of 70 ppb. The following observations were made at each of these sites in the western portion:

- The highest 2021 design value in the western SFNA was 70 ppb at the Elk Grove monitoring station. The Elk Grove monitoring design value has decreased from a design value of 85 ppb in 2000 to 70 ppb in 2021 with a downward trendline slope of 0.82 ppb per year.

[13] The Del Paso Manor monitoring station trend includes data that are proposed to be invalidated during the period from 2/27/2020-3/4/2020 and 3/29/2021 to 6/23/2021. The data is currently under review. Historically, the Del Paso Manor Station has not been a peak monitoring site for the SFNA and evaluation of both use and exclusion of invalidated data does not impact the peak design values for the SFNA.

[14] North Highlands data includes data that are proposed to be invalidated from 5/4/2021 to 1/18/2022. This station also shut down on July 31, 2022. The data is currently under review. Historically, the North Highlands Station has also not been a peak monitoring site for the SFNA and evaluation of both use and exclusion of invalidated data does not impact the peak design values for the SFNA.

Figure 4-7 Western Subregion Ozone Design Value Trends in the SFNA (2000 – 2021)



- The Woodland monitoring station design value decreased from 84 ppb in 2000 to 67 ppb in 2021 with a downward trendline slope of 0.93 ppb per year.
- The Vacaville monitoring station data showed a decrease in a design value of 85 ppb in 2000 to 64 ppb in 2019 with a downward trendline slope of 0.72 ppb per year.
- The UC Davis monitoring station data showed that the design value decreased from 85 ppb in 2000 to 66 ppb in 2021 with a downward trendline slope of 0.95 ppb per year.

The sites in the western subregion had a more gradual improvement in ozone design value with downward trendline slopes ranging from 0.72 to 0.95 ppb per year.

4.5 Wildfire Impacts

In a 2016 study, Sonoma Technology Institute (STI) evaluated the smoke impacts and transport patterns in the Sacramento region on multiple days between 2011 – 2015 when ozone concentrations exceeded 70 ppb. This study found that wildfire smoke impacts on ozone concentrations at the Auburn, Colfax, Folsom and/or Placerville monitoring sites were likely substantial on 35% of those days. One conclusion from this study was that "given that smoke contributed to ozone concentrations on many high ozone days, including days that are considered in design value calculations, smoke events are likely to impact the Districts toward future attainment of the NAAQS" (STI, 2016).

In 2018, the SFNA experienced multiple days at multiple sites where high ozone concentrations coincided with high fine particulate matter ($PM_{2.5}$) concentration, indicating that the area was impacted by wildfire smoke. The following days were identified as dates likely impacted by smoke from wildfires and therefore, affected the ambient concentrations at many of the sites (especially in the eastern portion of the SFNA). These values were included in the trend analyses to demonstrate that despite wildfire impacts, the number of days exceeding the standard and ozone design values continue to show a downward linear trend since 2000.

- July 31, and August 1, 2, 8, 9 and 10 in 2018 were identified as days impacted by the Carr Wildfires, Mendocino Complex Wildfire, and/or Ferguson Wildfire

Wildfire Impacts on ozone concentrations are discussed in further detail in the Weight of Evidence (Appendix F.6.2). Ozone concentrations impacted by wildfires are allowed to be excluded from attainment demonstrations if concurred by the EPA under its exceptional event rule.[15]

4.6 Summary

Ozone air quality data trends for all monitoring stations in the SFNA between 2000 – 2021 demonstrate a decline in design values and a reduction in the number of days that exceeded the 2015 NAAQS of 70 ppb. Despite wildfire impacts in 2018, all stations continue to experience a downward trend in concentrations with trendline slopes ranging from approximately 0.40 ppb per year to as much as 1.53 ppb per year. In 2021, the air quality data showed that the four highest design values were measured in the eastern portion at the Auburn, Colfax, Placerville, and Cool monitoring stations. Concentrations at these sites were approximately 10 to 15 percent higher than monitoring stations in the central or western portions. Collectively, the SFNA design values and exceedances have decreased over time and analyses indicate that concentrations will continue to follow this trend barring any substantial impacts from wildfires.

4.7 References

EPA, *40 CFR Appendix U – Part 50 Interpretation of the Primary and Secondary National Ambient Air Quality Standards for Ozone,* Web 01 June 2023. < https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-50/appendix-Appendix%20U%20to%20Part%2050 >

STI, *Impacts of Wildfires on Ozone Concentrations in Sacramento (prepared for Sacramento Air Quality Management District).* Petaluma, CA: Sonoma Technology Institute. [2016.] Print.

[15] Treatment of Data Influenced by Exceptional Events are described in 40 CFR Parts 50 and 51.

5 EMISSIONS INVENTORY

5.1 Introduction to Emissions Inventory

Planning efforts to evaluate and reduce ozone air pollution include identifying and quantifying the various processes and sources of volatile organic compound (VOC) emissions (such as solvents, surface coatings, and motor vehicles) and nitrogen oxides (NO_X) emissions (such as motor vehicles and other fuel combustion equipment). VOC pollutants are also known as reactive organic gases (ROG), and the two are considered to be synonymous for this report. By understanding the emissions inventories over time, it can help determine whether existing, planned, or new emission reduction strategies are needed to reach the attainment deadline.

Tables and figures show a summary of VOC and NO_X emissions estimates by different air pollutant source categories for each of the State Implementation Plan (SIP) planning years (2017 base year, 2023, 2026, 2029 milestone years, and 2032 attainment year). The emission inventories are based on the latest planning assumptions and emissions data in California Air Resources Board's (CARB's) California Emission Projection Analysis Model (CEPAM) 2019 v1.04 with External Adjustment, abbreviated CEPAM 2019 v1.04. These inventories, presented in tons per day (tpd) for an average summer day, are forecasted using the latest socio-economic growth indicators and applying for the emission reduction benefits from adopted control strategies. Emission reduction credits are then added to the emissions inventory forecasts. More detailed information and emissions inventory tables are provided in Appendix A – Emissions Inventory.

5.2 Emission Inventory Requirements

Emissions are required to be updated to include "a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants" under Clean Air Act (CAA) Sections 172(c)(3) and 182(a)(1). The baseline year for the 2015 ozone SIP planning emissions inventory is identified as 2017.

The U.S. Environmental Protection Agency (EPA) emission inventory guidance (EPA, 2017) and 2015 O_3 NAAQS SIP Requirement Rule (83 FR 62998) set specific planning requirements pertaining to future milestone years for reporting reasonable further progress (RFP) and attainment demonstration. The emissions inventory years included in this plan are 2017 (base year), 2023, 2026, 2029 (milestone and Reasonable Further Progress years), and 2032 (attainment year). EPA emission inventory guidance (EPA, 2017, p.21) also requires the SIP planning emissions inventory to be based on estimates of actual emissions for an average summer weekday, typical of the ozone season (May – October).

5.3 Emission Inventory Source Categories

Due to the large number and wide variety of emission processes and sources, a hierarchical system of emission inventory categories was developed for more efficient use of the data. The anthropogenic (man-made) emissions inventory is divided into four broad categories: stationary, area-wide, on-road motor vehicles, and other mobile sources. These major categories are subdivided into more descriptive subcategories and further defined into more specific emission processes.

5.3.1 Stationary Sources

The stationary sources category of the emissions inventory includes non-mobile, fixed sources of air pollution. They are mainly comprised of individual industrial, manufacturing, and commercial facilities called "point sources." The more descriptive subcategories include fuel combustion (e.g., electric utilities and agricultural processing), waste disposal (e.g., landfills and soil remediation), cleaning and surface coatings (e.g., printing and laundering), petroleum production and marketing, and industrial processes (e.g., chemical and metal processes). The facility operators report the process and emissions data to their local air district, which uses the information to calculate emissions from point sources. More detailed information on the stationary source emissions can be found in Appendix A.2.4.

5.3.2 Area-Wide Sources

The area-wide sources category includes aggregated emissions data from processes that are individually small and widespread or not well-defined point sources. The area-wide subcategories include solvent evaporation (e.g., consumer products and architectural coatings) and miscellaneous processes (e.g., residential fuel combustion and farming operations). Emissions from these sources are calculated from product sales, population, employment data, and other parameters for a wide range of activities that generate air pollution across the Sacramento Federal Nonattainment Area (SFNA). More detailed information on the area-wide source emissions category can be found in Appendix A.2.5 and CARB's website: https://ww2.arb.ca.gov/emission-inventory-documentation.

5.3.3 On-Road Motor Vehicles

The on-road motor vehicles inventory category consists of trucks, automobiles, buses, and motorcycles. On-road motor vehicle emission estimates were developed using the latest available transportation data and California's EMFAC2017 model. EMFAC (EMission FACtor) is California's model for estimating emissions from on-road motor vehicles operating in California. Pollutant emissions for hydrocarbons (HC), carbon monoxide (CO), NO_X, coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), lead, carbon dioxide (CO_2), and sulfur oxides (SO_X) are output from the model. Emissions are calculated for different vehicle classes composed of passenger cars, various types of

trucks and buses, motorcycles, and motor homes. EMFAC has undergone many revisions over the years and the current emissions inventory uses EMFAC2017. More detailed information on the on-road mobile source emissions categories can be found in Appendix A.2.3.1.1.

5.3.3.1 Motor Vehicle Emissions Model, EMFAC2017

CARB has continued to update and improve its EMFAC on-road motor vehicle emissions model. Effective August 15, 2019, EPA has approved the EMFAC2017 emissions model (CARB, 2017) for SIP and conformity purposes (84 FR 41717). EMFAC2017 replaced EMFAC2014 and the model's major improvements include updated emissions factors and data on car and truck activities and emissions reductions associated with new regulations supporting new estimates of emissions from heavy-duty diesel trucks and buses. EMFAC2017 software and detailed information on the vehicle emission model can be found on the CARB website: https://arb.ca.gov/emfac/2017/.

5.3.3.2 Motor Vehicle Emissions Model, EMFAC2021

CARB released EMFAC2021 in January 2021. Effective November 15, 2022, EPA has approved the EMFAC2021 emissions model (87 FR 68483). The new model includes the features of plug-in hybrid and natural gas-powered vehicles, ammonia emissions, and new forecasting approaches for heavy-duty and light-duty vehicles. Although EPA has approved EMFAC2021, the data to support this plan (including the development of the emission inventory and motor vehicle emissions budgets and the inputs into photochemical modeling) was based on EMFAC2017. This new model EMFAC2021 will be used for all new regional emissions analyses for transportation conformity purposes starting on or after November 15, 2024, and any future SIPs. EMFAC2021 software, web interface, and technical information on the motor vehicles emissions model can be located on CARB's website: https://arb.ca.gov/emfac/.

5.3.3.3 Vehicle Activity Data

The on-road motor vehicle emissions are from CARB's CEPAM 2019 v1.04, which were generated using EMFAC2017 with vehicle activity data from the Sacramento Area Council of Governments' (SACOG) 2020 Metropolitan Transportation Plan (2020 MTP)(SACOG, 2019) and the Plan Bay Area 2050 from the Metropolitan Transportation Commission (MTC). Although there are small differences between the on-road inventory and the motor vehicle emissions budgets included for eastern Solano as part of the 2050 Bay Area Plan (MTC, 2021), these differences do not impact the RFP or attainment demonstration.

5.3.4 Other Mobile Sources

The emission inventory category for other mobile sources includes aircraft, trains, ships, and off-road vehicles and equipment used for construction, farming, commercial,

industrial, and recreational activities. Like EMFAC, the off-road emissions model underwent a significant update. The OFFROAD2007 model is being replaced by category-specific methods. The categories listed below have been or are being updated with new methods and data. Where available, new inventories and models are provided. If a category is not listed below, OFFROAD2007 is the current tool for estimating emissions.

- The Gasoline-Fueled equipment categories using the category-specific method include: Pleasure Craft, Recreational Vehicles, Outboard Marine Tanks, Portable Fuel Tanks, and Lawn and Garden equipment.
- The diesel equipment categories using the category-specific method include: In-Use Off-Road Equipment (Construction, Mining, Industrial, Ground Support, and Oil Drilling); Cargo Handling Equipment; In-Use Mobile Agricultural Equipment; Locomotives; Forestry, Forklift, Transport Refrigeration Units; Locomotives, Commercial Harbor Craft; Ocean Going Vessels; Portable Engine, and Stationary Commercial Engines.

In general, emissions are calculated by using estimated equipment population, engine size and load, usage activity, and emissions factors.

More detailed information on the latest off-road motor vehicle emissions inventory, including can be found in Appendix A.2.3.1.2 and CARB's website: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools.

5.3.5 Natural Sources

Biogenic emissions are emissions from natural sources, such as plants and trees. CARB estimated the emissions of biogenic volatile organic compounds (BVOC) from vegetation for natural areas, agricultural crops, and urban landscapes using the MEGAN (Model of Emissions of Gases and Aerosols from Nature) 3.0 biogenic emissions model. BVOC emissions vary with temperature. CARB did not estimate biogenic nitric oxide emissions from soils; therefore, the biogenic emissions estimate is strictly BVOC.

5.4 Base Year Emissions Inventory

Anthropogenic Emissions Table by Source Category

Tables 5-1 and 5-2 show the anthropogenic emissions inventory of VOC and NO_X by source categories for the SFNA. The SFNA includes emissions from Sacramento and Yolo Counties, the eastern portion of Solano County, Placer and El Dorado Counties excluding the Lake Tahoe Air Basin, and the southern portion of Sutter County[16]. The emissions inventory for ozone planning purposes represents emissions for a summer seasonal average day in units of tons per day. Inventories were generated using CEPAM: 2019 SIP Baseline Emission Projections (CARB, 2022) and do not include emission reduction credits (ERCs).

[16] Southern Sutter County emissions include:
1) all point sources located in the area,
2) 3.6% of the county total of area and aggregated point sources that are projected by population where, which is the percent of Sutter County population in the Sutter portion of the SFNA based on the 2010 Census. This ratio has slightly dropped to 3.3% after the 2020 Census.
3) 41% of the county total for emissions from agriculture, where 41% is the ag land ratio in the Sutter portion of the SFNA,
4) 34% of the county total for emissions from off-road equipment, where 34% is the percent of Sutter County land area in the Sutter portion of the SFNA,
5) 56% of the total railroad emissions, where 56% of the train tracks are located in the South Sutter Split,
6) 0% of the county total for emissions from oil and gas operations categories.

Table 5-1 Emissions of VOC (tons per day) SFNA

	2017	2023	2026	2029	2032
TOTAL EMISSIONS[a]	96.64	87.20	84.24	81.49	79.92
STATIONARY	22.55	22.48	23.00	23.28	23.93
AREA-WIDE	27.37	29.05	29.94	30.74	31.68
ON-ROAD MOTOR VEHICLES	19.38	12.88	11.48	10.67	9.69
OTHER MOBILE SOURCES	27.34	22.80	19.81	16.80	14.61
STATIONARY					
Cleaning and Surface Coatings	7.46	8.14	8.53	8.69	8.96
Fuel Combustion	0.59	0.56	0.55	0.54	0.53
Industrial Processes	4.49	4.60	4.83	5.03	5.32
Petroleum Production and Marketing	5.71	4.85	4.53	4.30	4.14
Waste Disposal	4.31	4.33	4.57	4.72	4.98
AREA-WIDE					
Consumer Products	15.22	16.24	17.03	17.73	18.57
Architectural Coatings	2.60	2.68	2.76	2.84	2.92
Pesticides/Fertilizers	1.23	1.11	1.10	1.08	1.07
Livestock Waste	3.70	3.66	3.65	3.64	3.64
Ag Burn/Other Managed Burn	1.08	1.59	1.58	1.58	1.58
Other	3.54	3.77	3.82	3.86	3.91
ON-ROAD					
Automobiles	6.45	3.98	3.50	3.25	2.97
Lt/Med Duty Trucks	9.97	6.59	5.74	5.19	4.52
Heavy Duty Gas Trucks	0.01	0.00	0.00	0.00	0.00
Heavy Duty Diesel Trucks	0.58	0.16	0.17	0.17	0.17
Motorcycles	2.28	2.11	2.04	2.03	2.01
Buses/Motor Homes	0.09	0.03	0.03	0.03	0.02
OTHER MOBILE					
Aircraft	0.52	0.55	0.56	0.58	0.59
Commercial Harbor Craft	0.07	0.06	0.05	0.05	0.05
Farm Equipment	1.36	0.88	0.74	0.62	0.53
Fuel Storage and Handling	1.41	1.23	1.17	1.14	1.13
Ocean Going Vessels	0.01	0.01	0.01	0.01	0.01
Off-Road Equipment	9.52	8.92	7.40	5.61	4.43
Off-Road Equipment (Perp)	0.16	0.11	0.10	0.10	0.10
Off-Road Recreational Vehicles	0.76	0.64	0.57	0.48	0.41
Recreational Boats	13.33	10.21	9.00	8.01	7.16
Trains	0.19	0.20	0.20	0.21	0.20

Source: (CARB, 2022), The table does not include ERCs identified in Section 5.6.

[a] TOTAL EMISSIONS are the rounded sum of reported emissions, as shown in Appendix A1.

Table 5-2 Emissions of NO_X (tons per day) SFNA

	2017	2023	2026	2029	2032
TOTAL EMISSIONS[a]	70.60	47.62	40.39	36.93	34.16
STATIONARY	6.49	6.29	6.18	6.09	5.97
AREA-WIDE	2.34	2.16	2.14	2.15	2.15
ON-ROAD MOTOR VEHICLES	35.85	19.35	13.89	11.64	9.90
OTHER MOBILE SOURCES	25.93	19.83	18.19	17.05	16.14
STATIONARY					
Cleaning and Surface Coatings	0.01	0.01	0.01	0.01	0.01
Fuel Combustion	5.81	5.61	5.48	5.39	5.25
Industrial Processes	0.55	0.55	0.56	0.56	0.58
Petroleum Production and Marketing	0.02	0.02	0.02	0.02	0.02
Waste Disposal	0.09	0.10	0.10	0.10	0.11
AREA-WIDE					
Residential Fuel Combustion	2.00	1.81	1.80	1.81	1.82
Ag Burn/Other Managed Burn	0.33	0.34	0.34	0.34	0.34
ON-ROAD					
Heavy Duty Diesel Trucks	11.42	6.80	4.18	3.56	3.15
Lt/Med Duty Trucks	18.89	9.46	7.14	5.75	4.62
Automobiles	3.88	1.95	1.59	1.44	1.36
Heavy Duty Gas Trucks	0.02	0.01	0.01	0.01	0.01
Buses/Motor Homes	1.19	0.73	0.59	0.49	0.38
Motorcycles	0.45	0.40	0.38	0.38	0.38
OTHER MOBILE					
Aircraft	1.78	1.98	2.08	2.18	2.29
Commercial Harbor Craft	0.78	0.68	0.67	0.65	0.62
Farm Equipment	6.86	3.72	3.06	2.52	2.09
Ocean Going Vessels	0.12	0.12	0.13	0.14	0.15
Off-Road Equipment	8.19	5.52	4.55	3.77	3.21
Off-Road Equipment (Perp)	1.92	1.03	0.83	0.72	0.70
Off-Road Recreational Vehicles	0.03	0.03	0.03	0.03	0.04
Recreational Boats	2.15	2.00	1.94	1.90	1.87
Trains	4.11	4.75	4.90	5.14	5.17

Source: (CARB, 2022), does not include NO_X ERCs identified in Section 5.6.

[a] TOTAL EMISSIONS are the rounded sum of reported emissions, as shown in Appendix A1.

2017 Emissions Pie Charts

The following pie charts (Figures 5-1 to 5-2) show the 2017 VOC and NO_X emission inventory categories as a percentage of the total inventory for the SFNA. In 2017, the VOC inventory includes 20% on-road mobile sources, 28% other mobile sources, 26% area-wide sources, and 23% stationary sources.

The NO_X inventory is predominately mobile source combustion emissions. In 2017, the NO_X inventory includes 51% on-road mobile sources, 37% other mobile sources, 9% stationary sources, and 3% area-wide sources.

2017 Top 10 Emission Categories

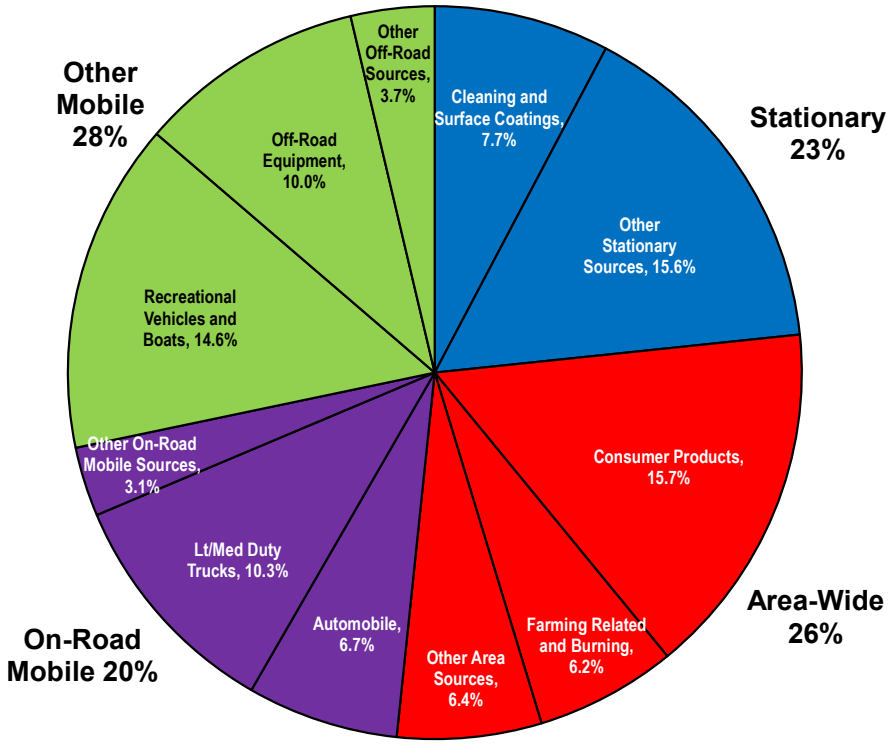
Figures 5-3 and 5-4 contain bar charts that display the 2017 top 10 emission inventory categories for VOC and NO_X, respectively. The largest three source categories for VOC are consumer products, recreational boats, and off-road equipment. The largest three source categories for NO_X are light-duty trucks, heavy duty diesel trucks, and off-road equipment.

State and federal laws limit local air district authority to regulate certain emissions sources, notably motor vehicles, off-road engines, pesticides, and consumer products. EPA retains almost exclusive regulatory authority for emissions from trains, aircraft, and ships. The largest source categories that air districts have regulatory authority over include architectural coatings, solvents and coatings, waste composting, petroleum marketing, stationary fuel combustion, and agricultural irrigation pumps.

Emissions Contribution by Agency Responsibility

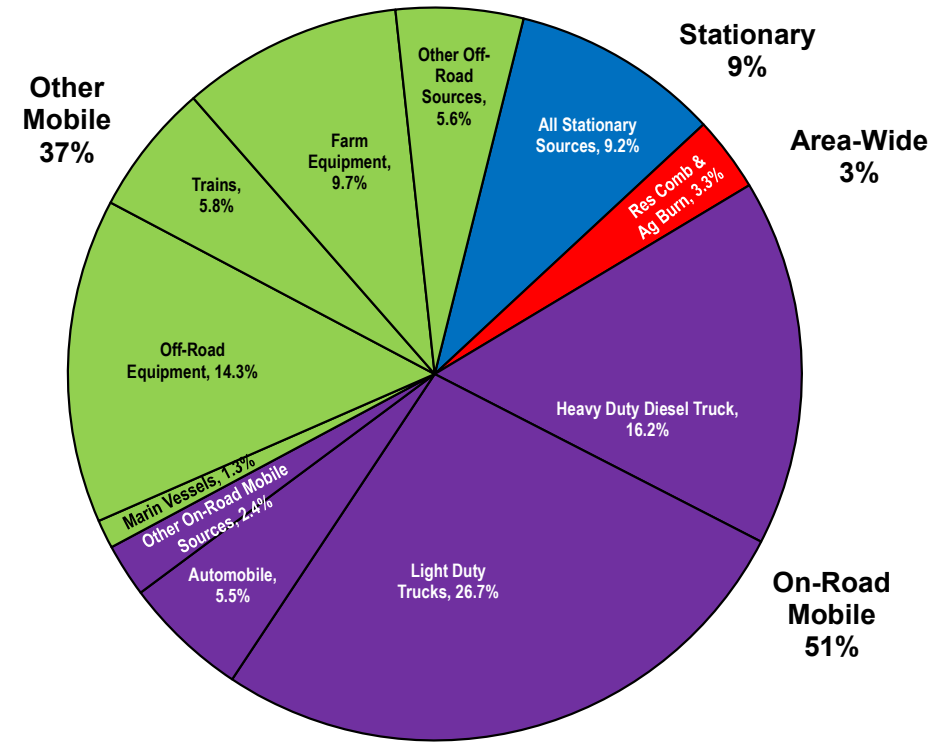
Figure 5-5 shows pie charts that identify the VOC and NO_X emissions contributions by primary agency responsibility (District, and CARB and EPA combined). In terms of emissions, local air districts have direct regulatory authority for only 34.6% of VOC emissions and 12.5% of NO_X emissions in the SFNA. CARB and EPA have the most regulatory responsibility over emissions, 65.4% of VOC and 87.5% of NO_X, due to their authority over mobile source emissions. To help the SFNA attain by the attainment deadline, significant emission reductions will need to come from mobile sources. Since a large portion of mobile source emissions is under CARB's authority, CARB has committed to new mobile source control measures that will help the SFNA meet its attainment goals. See Chapter 7 for more information on CARB's control measure commitments.

Figure 5-1 2017 VOC Inventory SFNA 96.64 tpd



Source: (CARB, 2022) does not include VOC ERCs identified in Section 5.6.

Figure 5-2 2017 NO_X Inventory SFNA 70.60 tpd



Source: (CARB, 2022) does not include NO_X ERCs identified in Section 5.6.

Figure 5-3 Top 10 Categories for VOC Planning Emissions – SFNA 2017

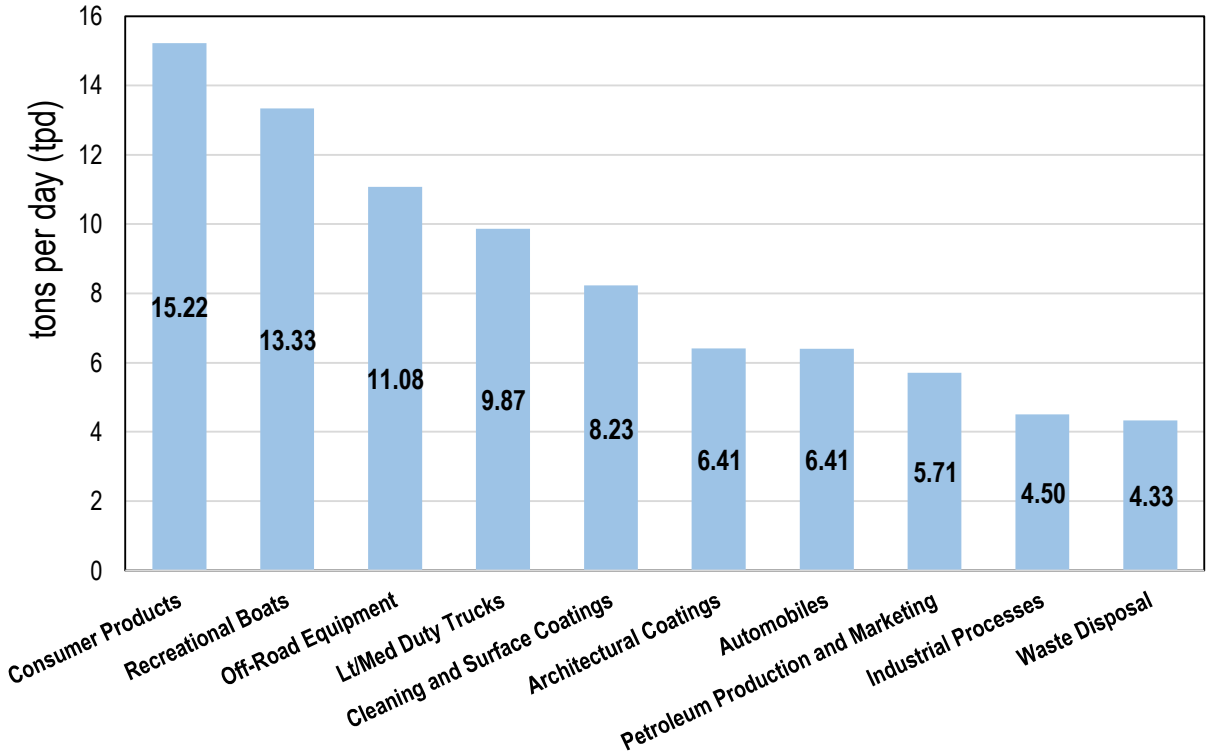


Figure 5-4 Top 10 Categories for NO_X Planning Emissions – SFNA 2017

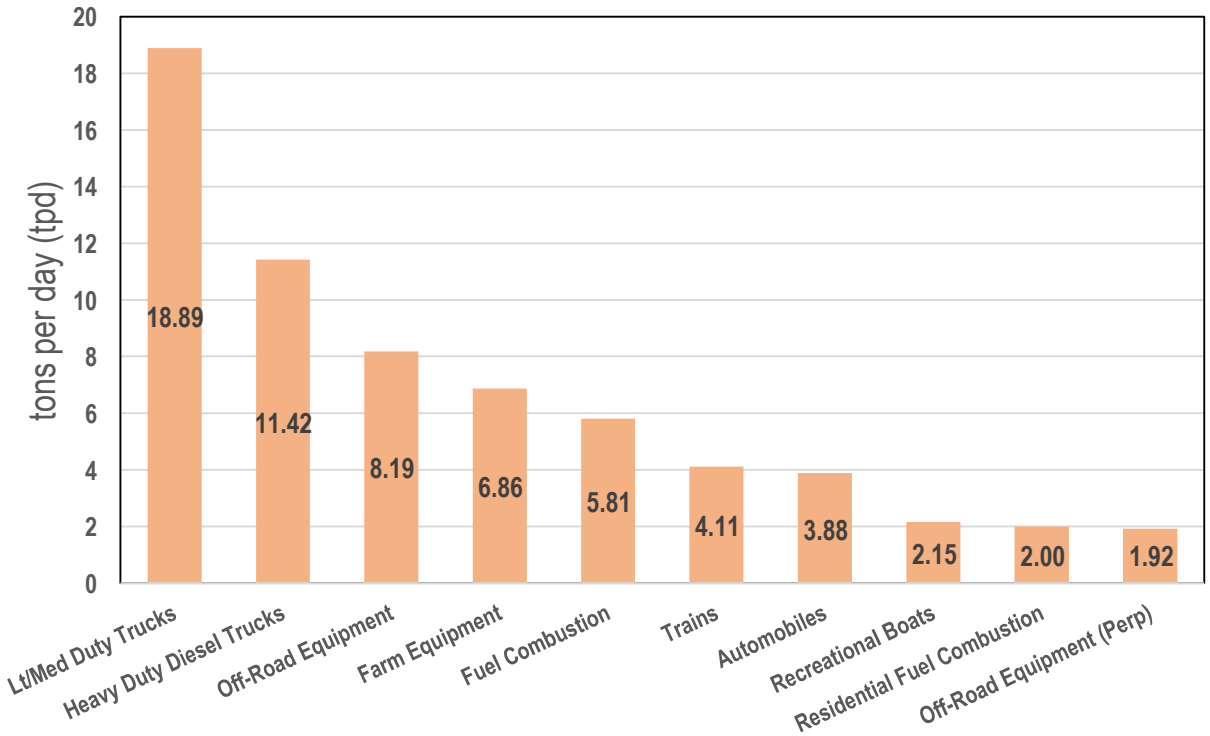
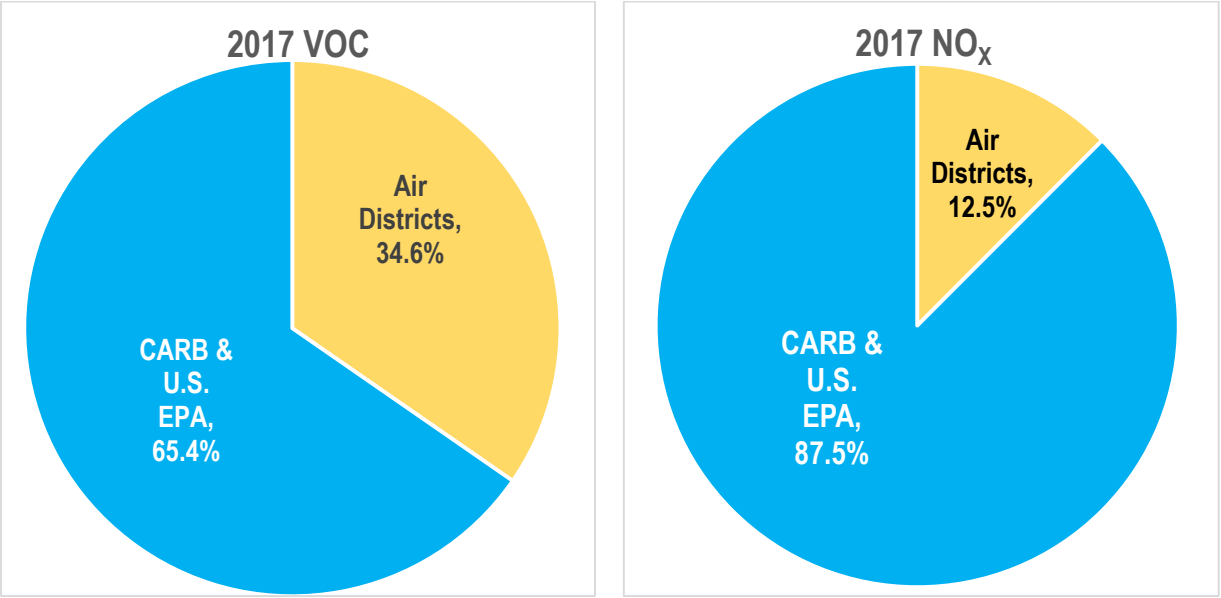


Figure 5-5 VOC and NOx Emissions Contribution by Primary Agency Responsibility – SFNA



Total VOC = 96.64 tpd

Total NOx = 70.60 tpd

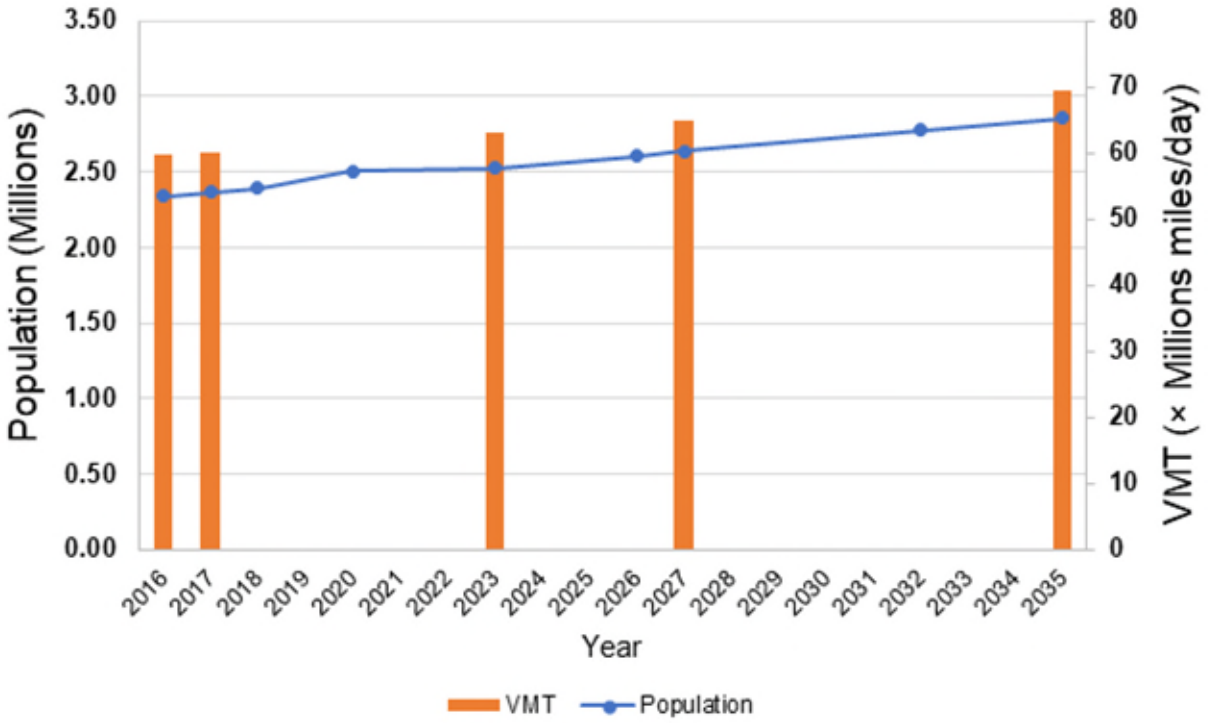
5.5 Emission Inventory Forecasts

The emission inventory forecasts take into account various growth parameters including forecasts for population, housing, employment, energy demand, motor vehicle travel, and other industrial and commercial outputs along with emission benefits from the federal, state, and local control measures. In order to forecast emissions for various future milestone and attainment analysis years, growth parameters and the post-2017 emission reduction effects of control measures are applied to the 2017 emissions inventory at the emission process level for stationary and area-wide sources.

Off-road motor vehicle emissions are forecasted separately by off-road category-specific models using growth rates that were based on category-specific economic indicators such as employment, expenditures, and fuel use. Future on-road emissions are determined by using VMT forecasts in SACOG's 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) (SACOG, 2019).[17] Figure 5-6 shows the population and VMT growth for the Sacramento region. The SFNA population is expected to increase by 16% from 2.4 million to 2.9 million and an increase of vehicle miles traveled (VMT) by 12% from 61 to 68 million miles between 2017 base year and 2032 attainment. Existing control strategies continue to reduce future VOC and NOx emissions from stationary and area sources, on-road motor vehicles, and some other mobile source categories (such as off-road equipment).

[17] The 2020 MTP/SCS was adopted by the SACOG Board on November 18, 2019.

Figure 5-6 SFNA Population and VMT Historic and Forecast



Note:

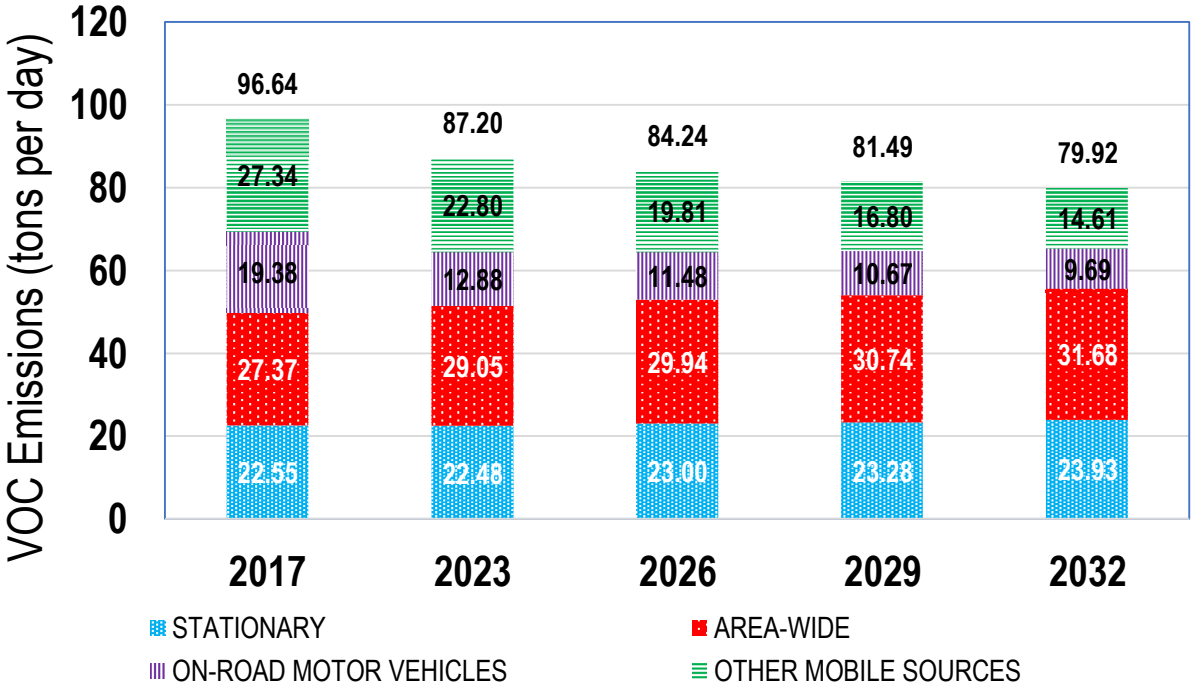
1. 2023 VMT data are interpolated from 2017 and 2027 data except Solano County
2. The population of Solano in Sacramento Valley is calculated based on the ratios developed using Census Data of 2010 and 2020 Census Block data.

Sources:

1. VMT of SACOG area from SACOG in 04/24/2023
2. VMT of Solano County (SV) for future years from SACOG 04/24/2023
3. VMT of Solano County (SV) for past years from the 2008 O3 NAAQS SIP Plan
4. Population of SACOG Counties from SACOG in 09/02/2021
5. Solano County Population data from CA Dept of Finance population data P2A. Download on 04/26/2023.
6. 2020 SFNA population is from Census 2020

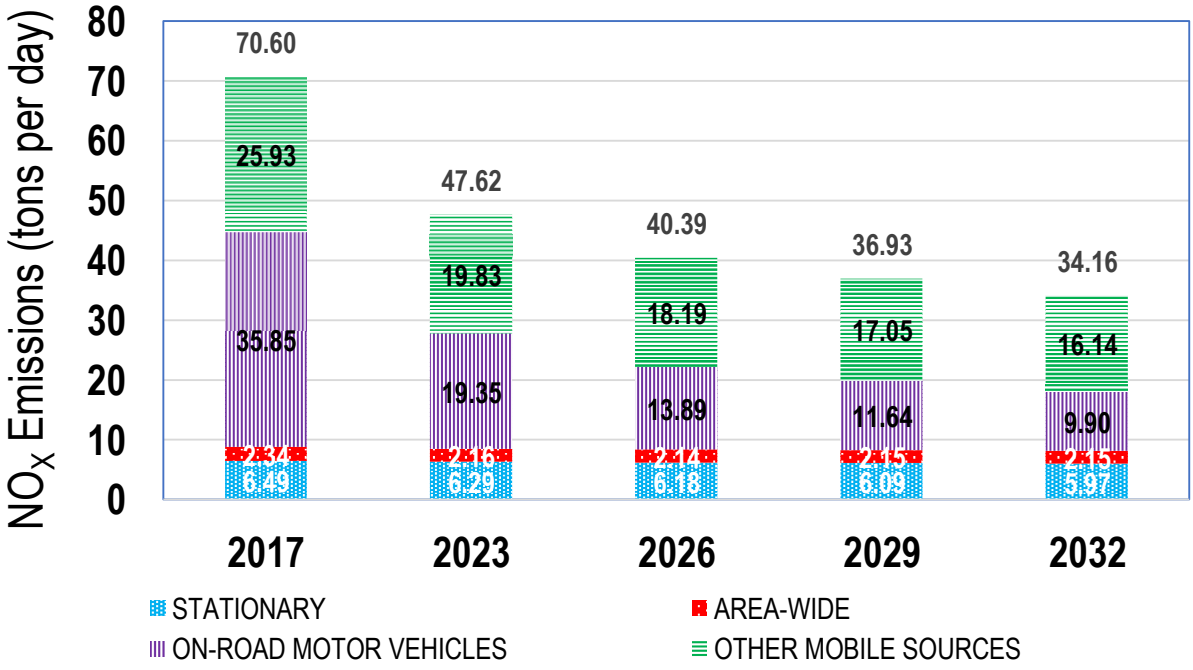
The following bar charts (Figures 5-7 and 5-8) show the VOC and NO_X emission inventory forecasts for stationary sources, area-wide sources, on-road motor vehicles, and other mobile sources for the SFNA. Bar charts are given for the 2017 base year and compared to the milestone RFP years of 2023, 2026, and 2029, and to the attainment year of 2032. The VOC and NO_X emission forecasts show significant declines in mobile source emissions, despite increasing population, vehicle activity, and economic development.

Figure 5-7 VOC Planning Inventory Forecasts – SFNA



Source: (CARB, 2022), does not include VOC ERCs identified in Section 5.6.

Figure 5-8 NO_X Planning Inventory Forecasts – SFNA



Source: (CARB, 2022), does not include NO_X ERCs identified in Section 5.6.

5.6 ERCs Added to Emission Inventory Forecasts

Certain pollutant emission reductions due to equipment shutdown or voluntary control may be converted to ERCs and registered with the air districts. These ERCs may then be used as "offsets" to compensate for an increase in emissions from a new or modified emission source regulated by the air districts. ERCs, in limited cases, may also be used as an alternative method to show compliance with specified rules. Thus, if a permitted source cannot meet the applicable emission standard requirements, usually because it is technically infeasible or not cost effective, the source may lease or purchase ERCs to achieve the required reductions.

Since ERCs represent potential emissions, they need to be accounted for in the emission inventories. One method is to assume that the use of ERCs will already be included within the projected rate of stationary source growth in the emissions inventory. However, if the use of available ERCs exceeds anticipated emissions growth, future emissions could be underestimated. Therefore, to ensure that the use of ERCs will be consistent with the future reasonable further progress and attainment goals, ERCs issued prior to the 2017 base year (as of January 1, 2018) are added to the forecasts (2023, 2026, 2029, and 2032) for VOC and NO_X planning emissions inventories.

5.6.1 Emissions Reduction Credits

For this attainment plan, the amount of unused banked ERCs that occurred prior to the 2017 baseline year for the Sacramento nonattainment area are 3.6 tons per day of VOC and 2.8 tons per day of NO_X (see Table 5-3 average of second and third quarters emissions which reflect the ozone season). The ERCs consist of emissions reduced from stationary sources. These ERCs were determined for each air district and adjusted based on their boundaries in the nonattainment area. Emissions were then added to the existing stationary and area sources to determine the future planning emissions inventory (for 2023, 2026, 2029, and 2032) and used in photochemical modeling.

5.6.2 Future Bankable Rice Burning ERCs

California legislation[18] in 1991 (known as the Connelly bill) required rice farmers to phase down rice field burning on an annual basis, beginning in 1992. A burn cap of 125,000 acres in the Sacramento Valley Air Basin was established, and growers with 400 acres or less were granted the option to burn their entire acreage once every four years. Since the rice burning reductions were mandated by state law, they would ordinarily not be "surplus" and eligible for banking. However, the Connelly bill included a special provision declaring that the reductions qualified for banking even though they are statutorily mandated, so long as they otherwise met the State and local banking rules.

[18] Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991 (California Health and Safety Code Section 41865).

Some rice straw burning reductions have been banked as ERCs. Other pre-2017 reductions in rice straw burning may be banked in the future under an ERC rule[19] once developed. The total amounts of potential bankable rice straw burning ERCs for the SFNA are estimated at 0.12 ton per day of VOC and 0.13 ton per day of NO_X and have not changed since the previous SIP was developed. The only district with unbanked rice straw burning ERCs is the SMAQMD as shown in Table 5-3. Other districts have already banked their rice straw burning emissions and the rice straw burning ERCs are included as part of the total for each district.

5.6.3 Summary of Emission Reduction Credits

ERCs issued for reductions that occurred prior to January 1, 2018, and potential future bankable rice burning ERCs are summarized in Table 5-3 for the SFNA. ERCs are based on tons per day (tpd) and will be added to the NO_X and VOC planning emission inventory forecasts in 2023, 2026, 2029, and 2032 used in attainment demonstration modeling and RFP demonstration.

Table 5-3 Emissions Reduction Credits for NO_X and VOC

	NO_X (tpd)				VOC (tpd)			
Quarters	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
El Dorado County AQMD[1]	---	---	---	---	---	---	---	---
Feather River AQMD	0.37	0.25	0.14	0.41	0.42	0.33	0.64	0.43
Placer APCD	0.58	0.55	0.53	0.56	0.45	0.41	0.40	0.40
Sac Metro AQMD	1.74	1.14	1.65	1.35	2.39	2.09	2.33	2.28
--- Future Bankable Rice Burning ERCs	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12
Yolo-Solano AQMD	0.69	0.72	0.36	0.87	0.63	0.54	0.28	0.73
SFNA Total	3.51	2.79	2.82	3.31	4.01	3.49	3.77	3.97

[1] There are no banked ERCs for El Dorado County AQMD as of 01/01/2018.

5.7 Emissions Inventory Documentation

More detailed documentation of the estimated 2017, 2023, 2026, 2029 and 2032 emission inventories for VOC and NO_X in each county and air basin combination in the SFNA is provided in Appendix A.

Emission inventories are constantly being updated to incorporate new and better information and methodologies. Many improvements, especially in the mobile source categories, and the addition of previously un-inventoried emission sources, have been made to the inventory. Detailed information on emission methodologies, changes, and forecasts can be found on CARB websites: http://www.arb.ca.gov/ei/ei.htm and https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory.

[19] This rice burning ERC rule must be approved by EPA into the SIP for the rice ERCs to be used for compliance with federal air quality requirements.

5.8 Summary

This plan includes an emissions inventory for ozone precursor emissions: NO_X and VOC, in the baseline year (2017), milestone years (2023, 2026, and 2029), and attainment year (2032). Between 2017 and 2032, the emission inventories are expected to decrease by about 17% for VOC and by about 52% for NO_X despite an increase in vehicle miles traveled and SFNA population during the same period. These emissions decreases are due to the emission benefits from existing federal, state, and local air quality programs and newly committed state control measures. The planning emission inventory also includes NO_X and VOC ERCs in the milestone and attainment years to account for any potential future growth using ERCs in the SFNA. The summary of the NO_X and VOC planning inventories for the summer season, including ERCs in the SFNA, is shown in Tables 5-4 and 5-5.

Table 5-4 SFNA Summer Planning Emission Inventory for NO_X (tpd)

	2017	2023	2026	2029	2032
Emission inventory	70.60	47.62	40.39	36.93	34.16
NO_X ERCs		2.80	2.80	2.80	2.80
Total Planning Emission Inventory	70.60	50.42	43.19	39.73	36.96

Table 5-5 SFNA Summer Planning Emission Inventory for VOC (tpd)

	2017	2023	2026	2029	2032
Emission inventory	96.64	87.20	84.24	81.49	79.92
VOC ERCs		3.63	3.63	3.63	3.63
Total Planning Emission Inventory	96.64	90.83	87.87	85.12	83.55

5.9 References

CA Dept of Finance. *P2-A Total Population for California and Counites.* Sacramento, CA: State of California, Department of Finance. Web 26 April 2023. < https://dof.ca.gov/wp-content/uploads/sites/352/2023/07/P2A_County_Total.xlsx >

CARB *EMFAC.* Sacramento, CA: California Air Resources Board. [2017.] Web 25 May 2022. < https://arb.ca.gov/emfac/ >

---. *EMFAC2017 Web Database.* Sacramento, CA: California Air Resources Board. [2017.] Web 25 May 2022. < https://arb.ca.gov/emfac/2017/ >

---. CEPAM: External Adjustment Reporting Tool. Base Year: 2017. 28 April 2022. Web. 5 May 2022.
< https://www.arb.ca.gov/app/emsinv/2019ozsip/fcmasterdetail_sip2019.php >

---. *Emission Inventory Documentation.* Sacramento, CA: California Air Resources Board. Web. 05 June 2023. < https://ww2.arb.ca.gov/emission-inventory-documentation >

---. *Mobile Source Emissions Inventory*. Sacramento, CA: California Air Resources Board. Web 05 June 2023. < https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory >

---. *MSEI - Modeling Tool.* Sacramento, CA: California Air Resources Board. Web 05 June 2023. < https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools >

EPA (83 FR 62998–63006) *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 83, 06 December 2018, p. 62998 – 63006. Web 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf >

---. (84 FR 41717 - 41720) *Official Release of EMFAC2017 Motor Vehicle Emission Factor Model for Use in the State of California: Notice of availability.* Federal Register, Volume 84, 15 August 2019, p. 41717 – 41720. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2019-08-15/pdf/2019-17476.pdf >

---. (87 FR 68483 - 68489) *Official Release of EMFAC2021 Motor Vehicle Emission Factor Model for Use in the State of California: Notice of availability.* Federal Register, Volume 87, 15 November 2022, p. 68483 – 68489. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2022-11-15/pdf/2022-24790.pdf >

---. 2017. *Emission Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*. Research Triangle Park: United States Environmental Protection Agency,. May [2017.] Web. 06 June 2023. < https://www.epa.gov/sites/default/files/2017-07/documents/ei_guidance_may_2017_final_rev.pdf >

MTC. *Plan Bay Area 2050*. San Francisco, CA: Metropolitan Transportation Commission. October [2021.] Web 05 June 2023. < https://mtc.ca.gov/planning/long-range-planning/plan-bay-area-2050 >

SACOG. *2020 Metropolitan Transportation Plan/Sustainable Communities Strategy*. Sacramento, CA: Sacramento Area Council of Governments. 18 November [2019.] Web. 23 March 2020. < https://www.sacog.org/sites/main/files/file-attachments/2020_mtp-scs.pdf?1580330993 >

---. Email to Steven Lau (SMAQMD). 2 September 2021.

---. Email to Steven Lau (SMAQMD). 24 April 2023.

U.S. Census Bureau. “2020 Census Results” United States Census Bureau. Web 16 August 2023. < https://www.census.gov/programs-surveys/decennial-census/decade/2020/2020-census-results.html >

6 AIR QUALITY MODELING and ATTAINMENT DEMONSTRATION

6.1 Introductions

Clean Air Act (CAA) Section 182(c)(2)(A) requires that attainment demonstrations for "serious and higher" nonattainment areas be based on photochemical grid modeling or any other analytical method determined to be at least as effective by the United States Environmental Protection Agency (EPA). EPA provided guidance (EPA, 2018) on how to use an air quality model to generate results for demonstrating attainment of an ozone National Ambient Air Quality Standard (NAAQS). EPA's modeling guidance does not name any specific photochemical grid models for attainment demonstration, but EPA recognizes two commonly used models, CMAQ[20] and CAMx[21]. The California Air Resources Board (CARB) selected the CMAQ model to demonstrate attainment of the 2015 ozone NAAQS for the Sacramento Federal Nonattainment Area (SFNA), using the single relative response factor (RRF) method (see Section 6.5 below) to predict the future design values (DVs). This chapter provides an overview of the modeling input data, modeling year selection, modeling results, and modeling uncertainties. The ultimate goal of the photochemical modeling is to determine whether the SFNA can attain the ozone standard by the severe attainment year of 2032.

6.2 Photochemical Modeling

Ground level ozone is formed by a series of complex chemical reactions, which involve nitrogen oxides (NO_X), volatile organic compounds (VOCs), and ultraviolet radiation. Ozone formation is also affected by meteorological characteristics (e.g. temperature, wind, vertical mixing, pressure, cloud cover, and humidity) and land surface features (e.g., land use, surface roughness, albedo[22], and terrain). It is the result of a large number of atmospheric interactions and different emissions sources, which combine together over vast spatial area. Computer modeling is used to simulate the formation of ozone through mathematical descriptions of atmospheric processes and photochemical reactions of pollutants over large regional air basins. CARB prepared separate technical documents to address the conceptual modeling, modeling protocol, model performance evaluation,

[20] CMAQ: **C**ommunity **M**ultiscale **A**ir **Q**uality Modeling System is an active open-source development project of the EPA that consists of a suite of programs for conducting air quality model simulations. CMAQ combines current knowledge in atmospheric science and air quality modeling, multi-processor computing techniques, and an open-source framework to deliver fast, technically sound estimates of ozone, particulates, toxics, and acid deposition. https://www.cmascenter.org/cmaq/

[21] CAMx: **C**omprehensive **A**ir Quality **M**odel with E**x**tensions is an open-source photochemical grid model that comprises a "one-atmosphere" treatment of tropospheric air pollution over spatial scales ranging from neighborhoods to continents. https://www.camx.com/

[22] Albedo is a measure of how much light that hits a surface is reflected without being absorbed.

attainment demonstration, and modeling emissions inventory. These technical documents are included in Appendix B – Photochemical Modeling.

6.3 Baseline and Future Year Model Runs

To evaluate when the SFNA will attain the 2015 8-hour ozone NAAQS, future ozone concentrations were determined based on the summer planning inventory of 2018 baseline year[23] and the 2032 attainment year.

Extensive air monitoring and emissions data was collected for the ozone season of 2018 to provide information for developing the base case model simulations. Data from 2018 was also evaluated to determine specific days and monitoring sites that were impacted from wildfires, and these high ozone concentrations were excluded from the modeling base year DV calculation. Air quality modeling simulations were conducted based on future year emissions data to determine if the SFNA would be in attainment of the 2015 ozone standard and how reductions of VOC and NO_X emissions in SFNA would decrease ambient ozone concentrations at different monitoring sites.

6.4 Emission Reduction Credits (ERCs) Added to Future Year Emissions

ERCs for the SFNA are discussed and quantified in Section 5.6. Since ERCs are potential future emissions, it is not currently known what emission sources they will be applied to and where the emission sources will be located. Due to the uncertainty of the type and location of future sources using ERCs, the VOC and NO_X ERCs (as of January 01, 2018) for the SFNA were added to the future year (2032) gridded modeling inventory as stationary and area-wide emissions. Existing inventories for stationary emissions are gridded for modeling by using the point source facility locations. Estimated area-wide emissions are gridded for modeling using related spatial surrogate parameters, such as population and land use types. The ERCs from each district were distributed to its stationary and area-wide emission inventory categories using an across-the-board percent increase calculated by adding the ERCs to total stationary and area-wide emissions inventories.

6.5 Forecasted Ozone Design Value

The results from the baseline and future year modeling run were evaluated at each ozone nonattainment monitor to determine the predicted future ozone DV. The method for calculating the predicted future ozone DVs is described by the following equation (EPA, 2018, p. 100):

[23] There is a deviation between the modeling baseline year and the emissions inventory baseline year. When preparing the baseline year modeling, CARB found that the overall model performance for 2018 is better than 2017. In consideration of model performance and uniformity for the State, CARB selected an alternative year of 2018 as the modeling baseline year.

DV_{future} = RRF x (DV_{base}) where,

DV_{future} = the estimated future DV at the monitor used to predict attainment of the 8-hour ozone NAAQS (rounded to tenths of a ppb)

RRF = the **relative response factor** is the ratio of the future year (FY) modeled average 8-hour daily maximum ozone (rounded to tenths of a ppb) to the reference year (RY) modeled average 8-hour daily maximum ozone (rounded to tenths of a ppb) for the monitor. Reference year model simulation is similar to base year model simulation except emissions from random events or from events that cannot be projected to the future are removed from the modeling emissions inventory. For example, wildfires emissions are excluded from reference year modeling. The top 10 days with reference year modeled maximum daily average 8-hr ozone greater than or equal to 60 ppb are selected to calculate the RRF. If less than 10 days satisfy the requirements, then it uses all the available days to calculate the FY_{AVG} and RY_{AVG}.

$$RRF = \frac{FY_{AVG}}{RY_{AVG}}$$

DV_{base} = the three-year average of the actual observed average base year DVs (2018, 2019, and 2020) at the monitor for 8-hour ozone (rounded to tenths of a ppb)[24]

6.5.1 Alternate Modeling Base Year Design Value

For the modeling base year 2018, the modeling DV is the average of DV_{2018}, DV_{2019}, and DV_{2020}. Because 2020 was an atypical year with large societal changes in response to a world-wide pandemic (COVID-19), an alternative method was used to calculate the baseline DV, which excluded 2020 data. In consultation with the EPA, CARB used an alternative way to calculate the 2018 modeling design value. The equation below describes the alternative modeling base year DV calculation:

$$DV_{Base,Alternative} = \frac{DV_{2018} + DV_{2019} + \frac{4\text{th highest MDA8 } O_3\ (2018 + 2019)}{2}}{3}$$

$DV_{base,Alternative}$ = An alternative method calculating the base year modeling DV, which does not include the fourth highest ambient maximum daily average 8-hour (MDA8) ozone concentration of 2020.

[24] The discussion here and in the following sections uses three related terms: design value, peak design value, and weighted design value. The design value is the average of the 4th highest emission concentration measured at a monitoring station for each year in any consecutive 3-year period. The peak design value is the highest design value in a given year at all stations in the SFNA. The weighted design value is calculated by averaging the design value each year for a three-year period. The weighted design value is only used in photochemical grid modeling and is intended to account for year-to-year meteorological variability (Appendix B, Section B.1.2).

4^{th} highest MDA8 O_3 = Annual fourth highest maximum daily average 8-hour ozone concentration for 2018 or 2019.

6.6 Attainment Demonstration

Attainment demonstration describes how a nonattainment area achieves the NAAQS by the attainment year. The future year corresponds to the analysis year for the severe nonattainment area attainment year of 2032. The future year emission forecasts incorporate growth assumptions and estimated reductions associated with all existing federal, state, regional, and local control measures. Proposed and adopted statewide measures in the 2022 State Strategy for the State Implementation Plan (SIP)(CARB, 2022) were also included in the future year modeling emissions inventory. No new federal and local control measures commitments besides the statewide strategies are needed to attain the standard by 2032. The details of the modeling emissions inventory are described in Appendix B.2.

The baseline design values were calculated using the method discussed in Section 6.5.1. High ozone concentrations (six days) caused by wildfires in 2018 were excluded from the baseline DV calculation at the Auburn monitoring site. Once these values were excluded, the highest calculated 8-hour weighted baseline DV was 84 parts per billion (ppb), which was measured at the Placerville monitoring site[25].

The RRFs at the SFNA monitoring sites were determined by the photochemical modeling. Applying the RRF to the baseline DV, the future ozone DV for each SFNA monitor was determined. The results for the future ozone DVs are presented in Table 6-1. Demonstrating attainment of the 2015 ozone NAAQS means that the future ozone DVs from all monitoring sites in the attainment year must be less than or equal to 70 ppb[26]. The future DVs were predicted to be less than 70 ppb at all SFNA ozone monitoring sites in 2032. The highest future DV for the region is forecasted to be 69.8 ppb at the Colfax monitoring site.

[25] The Auburn monitoring site had an original baseline design value of 87.3 but six high ozone concentrations from 2018 were removed from the baseline design value calculation because of fire impacts. After these six days from 2018 (7/31, 8/1, 8/2, 8/8, 8/9 and 8/10) were excluded the baseline design value was 81.7 at Auburn. The SFNA was heavily impacted by the smoke of Mendocino Complex Wildfire and Carr Wildfires. These wildfires brought large amount of ozone precursors pollutant into SFNA. The centers of both wildfires were less than 200 miles away from SFNA, started in late July 2018, and burned over 30 days. In August 2018, various air monitoring sites in SFNA recorded daily average 8-hour ozone concentrations over 0.090ppm or 90ppb. An extensive long high ozone episode is not common in SFNA after 2015.

[26] For attainment demonstration purposes, all the decimal points for the projected future ozone DVs are truncated consistent with 40 CFR Part 50 Appendix P. For example, 70.9 ppb is truncated to 70 ppb.

Table 6-1 Baseline (2018) and Future Design Value (2032) Ozone Concentrations

Region	Site	RRF	DV2018	DV2032	DV2032t[3]
Eastern	Colfax	0.8334	83.7	69.8	69
	Placerville	0.8283	84.0	69.6	69
	Auburn[1]	0.8356	81.7	68.3	68
	Cool	0.8353	81.7	68.2	68
Central	North Highlands	0.8674	74.7	64.8	64
	Folsom	0.8433	76.7	64.7	64
	Roseville	0.8408	76.3	64.2	64
	Del Paso Manor	0.8662	72.0	62.4	62
	Sloughhouse	0.8708	71.3	62.1	62
	Sac T Street	0.9053	66.3	60.0	60
Western	Elk Grove	0.9127	67.7	61.8	61
	Woodland	0.8750	66.7	58.4	58
	Vacaville	0.9100	64.0	58.2	58
	Davis-UCD	0.9063	62.3	56.5	56

1 There were 6 days in 2018 (7/31/18, 8/1/18, 8/2/18, 8/8/18, 8/9/18, 8/10/18) which were excluded from Auburn monitoring site RRF calculation because of wildfires impact.

2 Echo Summit monitoring site is a seasonal monitor site and only operates during the ozone season, i.e. April through October. The annual 4th highest ozone concentration will never satisfy the data completeness requirement. In addition, the calculated design value is usually below the 2015 Ozone NAAQS of 70 ppb. Therefore, the base year design value and RRF are not included in this table.

3 DV2023t is the truncated value for DV2032.

6.7 Air Quality Modeling Uncertainties

EPA's modeling guidance document (EPA, 2018, p.169) states that, "models are simplistic approximations of complex phenomena. The modeling analyses used to assess whether emission reduction measures will bring an individual area into attainment for the NAAQS contain many elements that are uncertain. These uncertain aspects of the analyses can sometimes prevent definitive assessments of future attainment status." Uncertainty arises for a variety of reasons; for example, incomplete representation in the atmospheric physical and chemical processes may cause limitations in the model's scientific formulation. Modeling uncertainties can also result from meteorological conditions, emissions projections, and other input database limitations, such as land use, microclimate, background ozone concentrations, etc.

Other *factors* adding to air quality modeling uncertainties include:

1. How well the meteorological simulation represents the severity of future meteorological conditions conducive to high ozone formation,

2. How well the methodology for forecasting ozone design values corresponds to actual future monitored ozone design values, and
3. How well domain-wide emission reductions in the SFNA attainment analysis are achieved, especially during the time when pollutant transport is significant.

The impact of future climate change is not included in the photochemical modeling assumptions. Any effects from climate changes, like changes of ambient temperature or return frequency of heat wave, during the timeframe of this SIP (14 years, from 2018 to 2032) will likely be too insignificant to have an impact on the modeling results. If in the future, the ozone concentrations are impacted by natural events related to climate change like wildfires, EPA has a mechanism to excluded data impacted by wildfires or other natural events under its exceptional event rule[27].

EPA modeling guidance (EPA, 2018, p. 32) states that "there are significant uncertainties regarding the precise location and timing of climate change impacts on air quality." To mitigate potential air quality modeling uncertainties, the modeling guidance suggests using corroborative methods and analyses to support the air quality modeling results and attainment demonstration. In response to higher frequency and increased magnitudes of wildfires in recent years due to possible results of climate change, CARB considered the uncertainty of wildfires impacts. In the modeling, CARB conducted a simulation using the base year and an additional simulation for the base year that excluded wildfire emissions. This simulation without the wildfire impacts was labeled as the reference year. The relative response factor for the future DV projection is based on the comparison of future year using the reference year. Also, the base year DV excluded the days with obvious wildfires impacts when calculating the annual fourth highest ambient concentration at the peak monitoring sites at the Auburn monitoring site.

In addition, a weight-of-evidence (WOE) report developed by CARB and the SFNA air districts is included in this plan (Appendix F). The WOE report provides additional information outside of photochemical modeling to support the finding of the photochemical modeling results.

6.8 Summary

The photochemical modeling results show that attainment of the 2015 NAAQS can be achieved at the end of 2032 with a future design value of 69 ppb at the peak monitoring site.

[27] Treatment of Data Influenced by Exceptional Events are described in 40 CFR Parts 50 and 51.

6.9 References

CARB. *2022 State Implementation Plan Strategy*. Sacramento, CA: California Air Resources Board. 20 September 2022. Web 7 November 2022 < https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf >

EPA. *Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze*. Washington, D.C.: United States Environmental Protection Agency. EPA 454/R-18-009. November, [2018.] Web. 05 June 2023. < https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf >

7 CONTROL MEASURES

7.1 Introduction to Control Measures

The photochemical modeling and results discussed in Chapter 6 indicate that the Sacramento Federal Nonattainment Area (SFNA) will attain the 2015 Ozone National Ambient Air Quality Standard (NAAQS) by the end of 2032. The SFNA will rely on existing federal, state, and local control programs along with the committed state control measures to reduce ozone precursor emissions. California Air Resources Board (CARB) will continue to implement existing control strategies and the commitments outlined in its 2022 State Implementation Plan (SIP) Strategy (CARB, 2022). The SFNA air districts and Sacramento Area Council of Governments (SACOG) will continue to implement existing local and regional strategies and transportation control measures (TCMs). This chapter provides a summary of the 2022 SIP Strategy and discussions on existing state, local and regional control programs as it relates to the SFNA. This chapter also summarizes the results of the reasonably available control measures (RACM) analysis, which will determine whether the implementation of all RACM can advance attainment by one year.

7.2 State Control Measure Commitments

SIPs must contain enforceable commitments to reduce emissions necessary to meet the federal air quality standard, as defined by the attainment demonstration. The 2022 State SIP Strategy listed new SIP measures and commitments and quantified their potential emissions reductions for the State, including the potential benefits to the SFNA. Adoption of the 2022 State SIP Strategy, including the schedule to adopt the measures, by the CARB formed the basis of the commitments for emission reductions by the applicable attainment deadlines for each nonattainment area. These commitments will be considered by the CARB Board alongside the respective nonattainment area's SIP. The commitments consist of two components:

1. A commitment to bring an item to the CARB Board for defined new measures or take other specified actions within CARB's authority; and
2. A commitment to achieve emission reductions by specific dates.

The commitments and associated emission reductions specified in 2022 State SIP Strategy and included as part of the air districts' SIP needed for attainment of the standard will become federally enforceable when the U.S. Environmental Protection Agency (EPA) takes formal action to approve the air districts' SIP. Furthermore, the specific state measures and actions would still be subject to CARB's formal approval process and would not be final until the CARB Board has adopted the measures.

7.2.1 State Commitment to Act on Measures

On September 22, 2022, the CARB adopted the 2022 State SIP Strategy, which included a list of measures and their corresponding adoption and implementation schedule. For

each SIP measure from the 2022 State SIP Strategy shown in Table 7-1, CARB describes its commitments to address each measure, which includes the proposed actions that CARB will take to achieve the emission reductions. In the instance of measures that involve the development of a rule under CARB's regulatory authority, CARB commits to bring a publicly noticed item before the CARB Board that is either a proposed rule or a recommendation that the CARB Board direct staff to not pursue a rule. If the recommendation is not to pursue a measure, CARB would explain why such a rule is unlikely to achieve the relevant emission reductions in the relevant timeframe and would include a demonstration that the overall emissions reduction commitments will be achieved despite that rule not being pursued or through adoption of an alternative reduction measure. This public process and CARB hearing would provide additional opportunities for public and stakeholder input, ongoing technology review, and assessments of costs and environmental impacts.

The measures, as proposed by staff to the CARB Board or adopted by the Board, may provide more or less than the initial emissions reduction estimates. In addition, an action by the CARB Board may include any action within its discretion.

7.2.2 State Commitment to Achieve Emission Reductions

The following section describes the estimated emission reductions and commitments from the SIP measures identified and quantified for the SFNA. The emissions reduction commitments from State sources are analyzed in CARB's staff report for the Sacramento Metro nonattainment area 70 ppb 8-hour ozone SIP. CARB's staff report and this plan will be presented to the CARB Board for adoption. While the 2022 State SIP Strategy includes estimates of the emission reductions from each of the individual new measures, CARB's overall commitment is to achieve the total emission reductions necessary from State-regulated sources to attain the federal air quality standards, reflecting the combined reductions from the existing control strategies and new measures.

Therefore, if a particular measure does not get its expected emission reductions, the State's overall commitment to achieving the total emission reductions still remains intact. If the actual emission reductions exceed the projections reflected in the current emission inventory and the 2022 State SIP Strategy, CARB will submit an updated emissions inventory to EPA as part of a SIP revision. The SIP revision would outline the changes that have occurred and provide tracking to demonstrate that total emission reductions sufficient for attainment are being achieved through enforceable emission reduction measures. CARB's emission reduction commitments may be achieved through a combination of actions including but not limited to the implementation of control measures; the expenditure of local, State, or federal incentive funds; or other enforceable measures.

Table 7-1 Measures and Schedule

Measure	Agency	Action	Implementation Begins
On-Road Heavy-Duty			
Advanced Clean Fleets Regulation	CARB	2023	2024
Zero-Emissions Trucks Measure	CARB	2028	2030
On-Road Light-Duty			
On-Road Motorcycle New Emissions Standards	CARB	2022	2025
Clean Miles Standard	CARB	2021	2023
Off-Road Equipment			
Tier 5 Off-Road Vehicles and Equipment	CARB	2025	2029
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	CARB	2022	2024
Transport Refrigeration Unit Regulation Part 2	CARB	2026	2028
Commercial Harbor Craft Amendments	CARB	2022	2023
Cargo Handling Equipment Amendments	CARB	2025	2026
Off-Road Zero-Emission Targeted Manufacturer Rule	CARB	2027	2031
Clean Off-Road Fleet Recognition Program	CARB	2025	2027
Spark-Ignition Marine Engine Standards	CARB	2029	2031
Other			
Consumer Products Standards	CARB	2027	2028
Zero-Emission Standard for Space and Water Heaters	CARB	2025	2030
Enhanced Regional Emission Analysis in State Implementation Plans[28]	CARB	2025	2023
Pesticides: 1,3-Dichloropropene Health Risk Mitigation	DPR[29]	2022	2024
Primarily-Federally and Internationally Regulated Sources – CARB Measures			
In-Use Locomotive Regulation	CARB	2023	2024
Future Measures for Aviation Emission Reductions	CARB	2027	2029

Air quality modeling indicated that Nitrogen Oxides (NO_X) emissions reductions are needed in the SFNA by 2032 in order to attain the standard by the attainment date. A significant fraction of the needed reductions will come from the existing control program. In addition, although most of the 2016 State SIP Strategy measure commitments have been adopted, there is one (Zero-Emission Forklift) that the CARB Board will be acting upon in 2023, and two that were recently adopted but are not yet accounted for in the baseline emissions inventory (Advanced Clean Cars II, Transport Refrigeration Unit Part 1), as outlined in Table 7-2 below.

[28] CARB finalization
[29] California Department of Pesticide Regulation

Table 7-2 Reductions from Remaining 2016 State SIP Strategy Measures

Measure	Action	Implementation Begins	2032 NO_X (tpd)	2032 ROG[30] (tpd)
Advanced Clean Cars II	2022	2026	0.4	0.4
Transport Refrigeration Unit Part I	2022	2023-2024	<0.1	<0.1
Zero-Emission Forklift	2023	2026	<0.1	<0.1
Total			0.5	0.4

Numbers may not add up due to rounding. Table 7-3 shows that, collectively, emissions reductions from CARB's current control program, reductions from the 2016 State SIP Strategy measures, and reductions estimated from the measures in the 2022 State SIP Strategy provide the emissions reductions needed from State sources to support attainment of the 70 parts per billion (ppb) 8-hour ozone standard in the SFNA. The measures in Table 7-4 reflect CARB commitments for State actions and the estimated emissions reductions for SFNA.

Table 7-3 SFNA NO_X Emission Reductions from CARB Programs

CARB Programs in the SFNA	2032 NO_X Emission Reductions (tons per day)[2]
Current Mobile Source Control Program[1]	31.5
Potential CARB Emissions Reductions	6.1
2016 State SIP Strategy Measures (Not yet in baseline inventory)	0.5
2022 State SIP Strategy Measures	5.6
Total Reductions	**37.5**

[1]Source: CARB 2019 CEPAM v1.04[31]
[2]Numbers may not add up due to rounding.

[30] Reactive Organic Gaseous
[31] California Emission Projection Analysis Model

Table 7-4 SFNA Expected Emissions Reductions from the 2022 State SIP Strategy Measures. (Unit: tons per day)

Measure	2032 NO_X (tpd)	2032 ROG (tpd)
On-Road Heavy-Duty		
Advanced Clean Fleets Regulation	0.8	<0.1
Zero-Emissions Trucks Measure	NYQ[1]	NYQ
Total On-Road Heavy-Duty Reductions	0.8	<0.1
On-Road Light-Duty		
On-Road Motorcycle New Emissions Standards	0.1	0.2
Clean Miles Standard	<0.1	<0.1
Total On-Road Light-Duty Reductions	0.1	0.2
Off-Road Equipment		
Tier 5 Off-Road Vehicles and Equipment	0.2	NYQ
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	0.5	0.1
Transport Refrigeration Unit Regulation Part 2	0.4	<0.1
Commercial Harbor Craft Amendments	0.3	<0.1
Cargo Handling Equipment Amendments	<0.1	<0.1
Off-Road Zero-Emission Targeted Manufacturer Rule	NYQ	NYQ
Clean Off-Road Fleet Recognition Program	NYQ	NYQ
Spark-Ignition Marine Engine Standards	<0.1	0.1
Total Off-Road Equipment Reductions	1.5	0.3
Other		
Consumer Products Standards	-	NYQ
Zero-Emission Standard for Space and Water Heaters	NYQ	NYQ
Enhanced Regional Emission Analysis in State Implementation Plans	NYQ	NYQ
Pesticides: 1,3-Dichloropropene Health Risk Mitigation	-	NYQ
Total Other	NYQ	NYQ
Primarily-Federally and Internationally Regulated Sources – CARB Measures		
In-Use Locomotive Regulation	3.2	0.1
Future Measures for Aviation Emission Reductions	NYQ	NYQ
Total Primarily-Federally and Internationally Regulated Sources – CARB Measures Reductions	3.2	0.1
Aggregate Emissions Reductions[2]	**5.6**	**0.7**

[1] Not yet quantified.
[2] Numbers may not add up due to rounding.

As a part of the emissions reduction commitments for the SFNA, CARB commits to reduce emissions specifically from on-road mobile sources that will be used for transportation conformity. CARB continues to have a total emissions reduction commitment, which is a sum of emissions reductions from on- and off-road mobile sources, consumer products, and other State-regulated sources as outlined in Table 7-4. The on-road mobile source commitment in the 2022 State SIP Strategy will provide the enforceability needed to establish the motor vehicle emissions budgets (MVEB) that already account for the emissions reductions from the on-road mobile source measures. The emissions reductions shown in Table 7-5 from the proposed on-road mobile source commitment are a subset of the total emissions reductions from the state's emission reduction commitments.

Table 7-5 Emissions Reduction from On-Road Mobile Source Measures

On-Road Mobile Source Reductions	**2032** NO_x (tpd)	**2032** ROG (tpd)
Sacramento Metro	1.2	0.4

7.2.3 On-Road Heavy-Duty

7.2.3.1 Advanced Clean Fleets Regulation

This measure accelerates zero-emission vehicle (ZEV) adoption in the medium- and heavy-duty sectors by setting zero-emission requirements for fleets and 100 percent ZEV sales requirement in California for manufacturers of Class 2b through 8 vehicles. The Advanced Clean Fleets Regulation will focus on strategies to ensure that the cleanest vehicles are deployed by government, business, and other entities in California to meet their transportation needs. The requirements would be phased-in on varying schedules for different fleets including public, drayage trucks, and high priority private and federal fleets. Public fleets would be required to phase-in purchase requirement starting at 50 percent of new purchases in 2024 and 100 percent starting in 2027. All drayage trucks operating at seaports and intermodal railyards would be required to be zero-emission by 2035. Drayage trucks will also have new registration and reporting requirements, starting in 2023. High priority private and federal fleets would be required to phase-in zero-emission vehicles as a percentage of the total fleet. The fleet requirements are based on zero-emission suitability and are phased-in by vehicle body type. The Advanced Clean Fleets Regulation would also include a requirement that 100 percent of Class 2b and above vehicle manufacturer sales in California are zero-emissions starting in 2040.

7.2.3.2 Zero-Emission Trucks Measure

This measure would increase the number of ZEVs and require cleaner engines to achieve emissions reductions from fleets that are not affected by the proposed Advanced Clean Fleets measure. This would include potential zero-emissions zone concepts around warehouses and sensitive communities if CARB is given new authority to enact indirect source rules in combination with strategies to upgrade older trucks to newer and cleaner

engines. This would be a transitional strategy to achieve zero-emissions medium- and heavy-duty vehicles everywhere feasible by 2045.

7.2.4 On-Road Light-Duty

7.2.4.1 On-Road Motorcycles New Emissions Standards

This measure would reduce emissions from new, on-road motorcycles by adopting more stringent exhaust and evaporative emissions standards along with limited on-board diagnostics requirements and zero-emissions sales thresholds with an associated credit program to help accelerate the development of zero emissions motorcycles. The new exhaust emissions standards include substantial harmonization with the more stringent European motorcycle emissions standards already in place. The new evaporative emissions standards are based on more aggressive CARB off-highway recreational vehicle emissions standards that exist today. This measure also proposes significant zero-emission motorcycle sales thresholds beginning in 2028 and increasing gradually through 2035.

7.2.4.2 Clean Miles Standard

The Clean Miles Standard was adopted by CARB on May 20, 2021. The primary goals of this measure are to reduce greenhouse gases (GHG) emissions from ride-hailing services offered by transportation network companies (TNCs) and promote electrification of the fleet by setting an electric vehicle mile target, while achieving criteria pollutant co-benefits. TNCs would be required to achieve zero grams carbon dioxide (CO_2) emissions per passenger mile traveled and 90 percent electric vehicle miles traveled (VMT) by 2030.

7.2.5 Off-Road Equipment

7.2.5.1 Tier 5 Off-Road Vehicles and Equipment

This measure would reduce NO_X and particulate matter (PM) emissions from new off-road compression-ignition (CI) engines by adopting more stringent exhaust standards for all power categories, including those that do not currently utilize exhaust aftertreatment such as diesel particulate filters and selective catalytic reduction. This measure would be more stringent than required by current EPA and European Stage V nonroad regulations and would require the use of best available control technologies.

For this measure, CARB staff would develop and propose standards for new off-road CI engines including the following: aftertreatment-based PM standards for engines less than 19 kilowatt (kW) (25 horsepower [hp]), aftertreatment-based-NO_X standards for engines greater than or equal to 19kW (25hp) and less than 56 kW (75 hp), and more stringent PM and NO_X standards for engines greater than or equal to 56 kW (75 hp). Other possible elements include enhancing in-use compliance, proposing more representative useful life periods, and developing a low load test cycle. It is expected that this comprehensive off-road Tier 5 regulation would rely heavily on technologies manufacturers are

developing to meet the recently approved low NO_X standards and enhanced in-use requirements for on-road heavy-duty engines.

7.2.5.2 Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation

Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation were approved by CARB on November 17, 2022. This measure will further reduce emissions from the in-use off-road diesel equipment sector by adopting more stringent requirements to the In-Use Off-Road Diesel-Fueled Fleets Regulation. These amendments create additional requirements to the currently regulated fleets by targeting the oldest and dirtiest equipment that is allowed to operate indefinitely under the current regulation's structure.

The amendments include an operational backstop to the current In-Use Off-Road Diesel-Fueled Fleets Regulation for most Tiers 0, 1, and 2 engines between 2024 and 2032. This will allow a 12-year phase out of these oldest engines. Along with the operational backstop, adding vehicle provisions in the current regulation will be extended to phase in a limitation on the adding of Tier 3 and Tier 4i vehicles to fleets. The amendments also include proposed new requirements for most fleets to use renewable diesel, proposed requirements for prime contractors and public works awarding bodies to increase the enforceability of the regulation, and optional flexibility provisions for fleet adoption of zero-emission vehicles.

7.2.5.3 Transport Refrigeration Unit Regulation Part 2 (Non-Truck TRUs)

This measure is the second part of a two-part rulemaking to transition diesel-powered transport refrigeration units (TRUs) to zero-emission technologies. This measure would require zero-emission equipment for non-truck TRUs (trailer TRUs, domestic shipping container TRUs, railcar TRUs, TRU generator sets, and direct-drive refrigeration units).

7.2.5.4 Commercial Harbor Craft Amendments

The Commercial Harbor Craft Amendments were approved by CARB on March 24, 2022. This measure proposes that starting in 2023 and phasing in through 2031, most commercial harbor crafts (CHCs) (except for commercial fishing vessels and categories listed below) would be required to meet the cleanest possible standard (Tier 3 or 4) and retrofit with diesel particulate filters (DPFs) based on a compliance schedule. The current regulated CHC categories are ferries, excursion, crew and supply, tug/tow boats, barges, and dredges. The amendments would impose in-use requirements on the rest of vessel categories except for commercial fishing vessels, including workboats, pilot vessels, commercial passenger fishing, and all barges over 400 feet in length or otherwise meeting the definition of an ocean-going vessel. The amendments would also remove the current exemption for engines less than 50 hp.

The measure also proposes that, starting in 2025, all new excursion vessels be required to be plug-in hybrid vessels that are capable of deriving 30 percent or more of combined

propulsion and auxiliary power from a zero-emission tailpipe emission source. Starting in 2026, all new and in-use short run ferries would be required to be zero-emission; and starting in 2030 and 2032, all commercial fishing vessels would need to meet a Tier 2 standard at minimum.

7.2.5.5 Cargo Handling Equipment Amendments

This measure would start transitioning Cargo Handling Equipment (CHE) to full zero-emission in 2026, with over 90 percent penetration of ZE equipment by 2036. Based on the current state of zero-emission CHE technological developments, the transition to zero-emission would most likely be achieved largely through the electrification of CHE. This assumption about aggressive electrification is supported by the fact that currently some electric Rubber Tired Gantry (RTG) cranes, electric forklifts, and electric yard tractors are already commercially available. Other technologies are in early production or demonstration phases.

7.2.5.6 Off-Road Zero-Emission Targeted Manufacturer Rule

The Off-Road Zero-Emission Targeted Manufacturer Rule would accelerate the development and production of zero-emission off-road equipment and powertrains. Existing zero-emission regulations and regulations currently under development target a variety of sectors (e.g., forklifts, cargo handling equipment, off road fleets, Small Off-Road Engines (SORE), etc.). However, as technological advancements occur, more sectors including wheel loaders, excavators, and bulldozers could be accelerated. Fully addressing control of emissions from new farm and construction equipment under 175 hp that are preempted, will require partnership on needed Federal zero-emission standards for off-road equipment.

This measure would require manufacturers of off-road equipment and/or engines to produce for sale zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume. Sales/production mandate levels would be developed based on the projected feasibility of zero-emission technology to enter and grow in the various off-road equipment types currently operating in California. This measure is expected to increase the availability of zero-emission options in the off-road sector and support other potential measures that promote and/or require the purchase and use of such options. A targeted manufacturer regulation will need to take into account parameters such as the number of equipment and engine manufacturers producing off-road equipment for sale in California, along with sales volumes, to ensure that such an effort is cost effective and technologically feasible.

7.2.5.7 Clean Off-Road Fleet Recognition Program

This measure would create a non-monetary incentive to encourage off-road fleets to go above and beyond existing regulatory fleet rule compliance and adopt advanced technology equipment with a strong emphasis on zero-emission technology. The Clean

Off-Road Fleet Recognition Program would provide a standardized methodology for contracting entities, policymakers, state and local government, and other interested parties to establish contracting criteria or require participation in the program to achieve their individual policy goals.

The Clean Off-Road Fleet Recognition Program framework would encourage entities with fleets to incorporate advanced technology and zero-emission vehicles into their fleets, prior to or above and beyond regulatory mandates based on fleet size. The program would provide standardized criteria or a rating system for participation at various levels to reflect the penetration of advanced technology and zero-emission vehicles into a fleet. Levels could be scaled over time as zero-emission equipment becomes more readily available. CARB anticipates the next several years of technological advancements and demonstrations to drive the stringency of the rating system. Participation in the program would be voluntary for entities with fleets, however, designed in a manner that provides them motivation to go beyond business as usual. The program would offer value for entities with fleets to participate by potentially providing them increased access to jobs/contracts, public awareness, and marketing opportunities.

7.2.5.8 Spark-Ignition Marine Engine Standards

For this measure, CARB will develop and propose catalyst-based standards for outboard and personal watercraft engines less than or equal to 40 kW in power that will gradually reduce emission standards to approximately 70 percent below current levels. For outboard and personal watercraft engines under 40 kW, more stringent exhaust standards will be developed and proposed based on the incorporation of electronic fuel injection that will gradually reduce emission standards 40 percent below current levels. This measure would require a 5.0 grams per kW hour of hydrocarbon (HC) and NO_X (g/kW-hr HC+NO_X) standard for outboard engines and personal watercraft engines at or above 40 kW in power and a 10.0 g/kW-hr HC+NO_X standard for engines less than 40 kW.

In addition to requiring more stringent exhaust standards, CARB is considering actions consistent with Executive Order N-79-20 that would require a percentage of outboard and personal watercraft vessels to be propelled by zero-emission technologies for certain applications. Outboard engines less than 19 kW, which are typically not operated aggressively or for extended periods, could potentially be phased-out and gradually replaced with zero-emission technologies. Some personal watercraft applications could also potentially be replaced with zero-emission technologies.

7.2.6 Others

7.2.6.1 Consumer Products Standards

This measure will further reduce Volatile Organic Compounds (VOC) and equivalent VOC emissions from consumer products to expedite attainment of national ambient air quality

standards for ozone. As with previous rulemakings, emission reductions will be achieved by setting regulatory standards applicable to the content of consumer products. To meet emission reduction targets for the measure, CARB staff will evaluate categories with relatively high contributions to ozone formation, whether currently regulated or unregulated. Staff will consider the merits of proposing VOC content standards as well as reactivity limits. Staff developing proposed amendments to the Consumer Products Regulation will also consider investigating concepts for expanding manufacturer compliance options, market-based approaches, and reviewing existing exemptions. Staff will work with stakeholders to explore mechanisms that would encourage the development, distribution, and sale of cleaner, very low, or zero-emitting products. In undertaking these efforts staff will prioritize strategies that achieve the maximum feasible reductions in ozone forming, toxic air contaminant, and GHG emissions. This measure complements a parallel measure in CARB's Climate Change Scoping Plan Update, approved by the CARB Board in December 2022, to phase down use of HFC-152a[32] and other GHGs in consumer products.

7.2.6.2 Zero-Emission Standard for Space and Water Heaters

For this measure, CARB would develop and propose zero GHG emission standards for space and water heaters sold in California; CARB could also work with air districts to further tighten district rules to drive zero-emission technologies. This measure would not mandate retrofits in existing buildings, but some buildings would require retrofits to be able to use the new technology that this measure would require. Beginning in 2030, 100 percent of sales of new space and water heaters (for either new construction or replacement of burned-out equipment in existing buildings) would need to meet zero-emission standards. It is expected that this regulation would rely heavily on heat pump technologies currently being sold to electrify new and existing homes.

7.2.6.3 Enhanced Regional Emissions Analysis in SIPs

The primary goal of this measure is to reduce criteria pollutant and GHG emissions that come from on-road mobile sources through reductions in VMT. In addition, lowering VMT will help alleviate traffic congestion, improve public health, reduce consumption of fossil fuels, and reduce infrastructure costs. CARB is exploring three options to reduce ROG and NO_X emissions through reductions in VMT. First, CARB will consider whether and how to change the process for developing MVEB by evaluating the existing MVEB development process to meet NAAQS. In addition, CARB will assess and improve the RACM analysis in the SIP by providing a comprehensive list of TCMs and emission quantification methodology. Finally, CARB will consider updating the guidelines for the California Motor Vehicle Registration Fee (MV Fees) Program and the Congestion

[32] HFC-152a is an abbreviation of hydrofluorocarbon-152a and its chemical formula is $C_2H_4F_2$. It is a colorless organofluorine compound and mainly used as a refrigerant and propellant for aerosol sprays and in gas duster products.

Mitigation and Air Quality Improvement (CMAQ) Program to fund a broader range of transportation and air quality projects that advance new approaches and technologies in reducing air pollution.

7.2.6.4 Pesticides: 1,3-Dichloropropene Health Risk Mitigation

Pesticides are regulated under both federal and state law. DPR is the agency responsible for regulating the sale and use of pesticides in California. DPR can generally reduce exposures to pesticides through the development and implementation of necessary restrictions on pesticide sales and use and by encouraging integrated pest management. Considered a VOC, 1,3-Dichloropropene (1,3-D) is a fumigant used to control nematodes, insects, and disease organisms in soil.

DPR is developing a regulation to address both cancer and acute risk to non-occupational bystanders from the use of 1,3-D. DPR released their regulatory package and noticed their rulemaking hearing for 1,3-D on November 15, 2022. The regulation will be developed in consultation with the County Agricultural Commissioners (CACs), the local air districts, CARB, the Office of Environmental Health Hazard Assessment (OEHHA), and the California Department of Food and Agriculture (CDFA). Once implemented, DPR's regulation would require applicators to use totally impermeable film (TIF) tarpaulins or other mitigation measures that provide a comparable degree of protection from exposure.

7.2.7 Primarily-Federally and Internationally Regulated Sources – CARB Measures

In addition to reducing emissions from the above sources, it is critical to achieve emissions reductions from sources that are primarily regulated at the federal and international level. It is imperative that the federal government and other relevant regulatory entities act decisively to reduce emissions from these primarily-federally and internationally regulated sources of air pollution. CARB and the air districts in California have taken actions to not only petition federal agencies for action, but also to directly reduce emissions using programmatic mechanisms within our respective authorities. CARB continues to explore additional actions, many of which may require a waiver or authorization under the Clean Air Act (CAA), as described below.

7.2.7.1 In-Use Locomotive Regulation

This measure would use mechanisms available under CARB's regulatory authority to accelerate the adoption of advanced, cleaner technologies, and include zero emission technologies, for locomotive operations. The In-Use Locomotive Regulation would apply to all locomotives operating in the State of California with engines that have a total rated power of greater than 1,006 horsepower, excluding locomotive engines used in training of mechanics, equipment designed to operate both on roads and rails, and military

locomotives. The measure reduces emissions by increasing use of cleaner diesel locomotives and zero emission locomotives through a spending account, in-use operational requirements, and by an idling limit. By July 1, 2024, a spending account would be established for each locomotive operator. Funds in the account would only be used toward Tier 4 or cleaner locomotives until 2030, and at any time toward zero-emission locomotives, zero-emission pilot or demonstration projects, or zero-emission infrastructure.

For the in-use operational requirements, beginning January 1, 2030, only locomotives built after January 1, 2007, may operate in California. Each year after January 1, 2030, only locomotives less than 23 years old may operate in California. Additionally, under the in-use operational requirements, starting January 1, 2030, all switch, industrial, and passenger locomotives operating in California with an original engine build date 2030 or newer will be required to be zero emission. Starting January 1, 2035, all freight line haul locomotives operating in California with an original engine build date 2035 or newer must be zero emission. Locomotives equipped with automatic engine stop/start systems are to idle no more than 30 minutes unless an exemption applies. Also, locomotive operators would report locomotive engine emissions levels and activity on an annual basis.

7.2.7.2 Future Measures for Aviation Emissions Reductions

Future measures for aviation would reduce emissions from airport and aircraft related activities. The identified emission sources for the aviation sector are main aircraft engines, auxiliary power units (APU), and airport ground transportation. Emission reductions can be achieved by pursuing incentive and regulatory measures.

CARB would evaluate federal, state, and local authority in setting operational efficiency practices to achieve emission reductions. Operational practices include landing, takeoff, taxiing, and running the APU, and contribute to on-ground and near-ground emissions. Near ground emissions are emissions between ground level up to 3,000 feet. Operational practices such as de-rated take-off and reduced power taxiing have the potential to achieve emission reductions.

CARB would similarly work with EPA, Air Districts, airports, and industry stakeholders in a collaborative effort to develop regulations, voluntary measures, and incentive programs. CARB would evaluate the incentive amounts that would be required to encourage aircrafts to voluntarily use cleaner engines and fuels. Incentives to encourage the use of cleaner engines and fuels for aircraft in California would involve identification of funding sources and implementation mechanisms such as development of new programs.

7.3 Existing Statewide Mobile Source Program

Given the severity of California's air quality challenges and the need for ongoing emission reductions, CARB has implemented the most comprehensive mobile source emissions control programs in the nation. These programs have achieved significant emission

reductions across all mobile source sectors that go far beyond national programs or programs in other states. These efforts extended back to the first mobile source regulations adopted in the 1960s, and predated the CAA of 1970, which established the basic national framework for controlling air pollution. In recognition of the pioneering nature of CARB's efforts, the CAA provides California unique authority to regulate mobile sources more stringently than the federal government by providing a waiver of preemption for its new vehicle emission standards under CAA Section 209(b). Appendix C.I provides a detailed discussion of all the new statewide control measures and incentive programs. These current control measures and incentive programs are essential emissions strategies for the SFNA SIP to achieve attainment by 2032.

7.4 Existing Local Control Program

The California Health and Safety Code §40000 delegates authority to local air districts for control of air pollution from all stationary and some area-wide sources. Local air districts can adopt and implement rules for controlling the emissions from these sources. The SFNA air districts have been regulating air pollution sources since the 1970s. Existing rules and their emission benefits have helped and will continue to help make progress toward achieving the region's clean air goals. Tables 7-6 and 7-7 summarize the existing control measures from each SFNA air district, and Appendix C.II briefly describes the existing VOC and NO_X measures.

The benefits from these existing measures are already reflected in the baseline year 2017 and attainment year 2032 emissions inventory (see Chapter 5). The photochemical modeling results show that the SFNA will rely on existing federal, state, and local control programs along with committed state control measures to attain the standard by the attainment deadline. No new local control measures are committed in this plan for attainment purposes.

Table 7-6 Summary of existing local control measures for VOC

VOC Source Category	El Dorado AQMD	Feather River AQMD	Placer County APCD	Sacra-mento Metro AQMD	Yolo-Solano AQMD
Adhesives	X		X	X	X
Architectural Coatings	X	X	X	X	X
Asphalt Paving Material	X		X	X	X
Bakeries				X	
Bulk Terminal	X	X	X	X	X
Confined Animal Facility	X	X	X	X	X
Drying Cleaning	X			X	X
Fugitive Emissions	X			X	X
Gasoline Dispensing Facility	X	X	X	X	X
Graphic Arts	X		X	X	X
Landfill Gas		X		X	X
Polyester Resin Operations	X		X	X	X
Semiconductor Manufacturing			X		
Surface Coating Operations	X	X	X	X	X
Surface Preparation and Cleanup	X	X	X	X	X
Synthetic Organic Chemical Manufacturing Industry				X	X

Table 7-7 Summary of existing local control measures for NO_X

NO_X Source Category	El Dorado AQMD	Feather River AQMD	Placer County APCD	Sacra-mento Metro AQMD	Yolo-Solano AQMD
Boilers & Steam Generators	X	X	X	X	X
Gas Turbines			X	X	X
Internal Combustion Engines	X	X	X	X	X
Residential & Small Water Heaters	X	X	X	X	X
Central Furnace/Miscellaneous Combustion Unit				X	X

7.5 Local New Source Review (NSR) Program

In addition to the local existing VOC and NO_X control measures described in Section 7.4, the SFNA air districts have established local new source review programs that require new or modified stationary sources to implement the most stringent emission limit and/or offset their emissions impacts. The program requirements are established in the New Source Review rules adopted for each SFNA district shown below. These rules set the

requirements for reviewing permit applications for new and modified sources for Best Available Control Technology (BACT)[33], emission offsets, emission calculation procedures, and other administrative permitting requirements.

Table 7-8 SFNA Air Districts' New Source Review Program

SFNA Air District	New Source Review Program (Initial Adoption Date)
El Dorado AQMD	Rule 523 – New Source Review (4/26/1994)
Feather River AQMD	Rule 10.1 – New Source Review (2/8/1993)
Placer County APCD	Rule 502 – New Source Review (11/12/1974)
Sacramento Metro AQMD	Rule 202 – New Source Review (9/20/1976)
Yolo-Solano AQMD	Rule 3.4 – New Source Review (12/11/1996)

7.6 TCMs

TCMs are strategies used to reduce motor vehicle emissions. TCMs may reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion. SACOG is the Metropolitan Planning Organization (MPO) for the greater Sacramento region (includes Sacramento, Yolo, Placer, El Dorado, Sutter, and Yuba Counties). SACOG provides transportation planning and funding for the region and has worked with local governments and the SFNA air districts to develop and implement TCMs. For example, one of the TCMs developed for the previous attainment plans for the SFNA is the Spare The Air program, a program that has achieved a high level of public awareness.

Implemented TCMs are included in the measured baseline activity in the SACOG transportation model. This baseline activity data was used to forecast future projections for the motor vehicle inventory.

There are transportation planning implications associated with including TCMs in a SIP. Each time the MPO makes a conformity determination to accompany a new Metropolitan Transportation Plan (MTP), a new Metropolitan Transportation Improvement Program (MTIP), or an amendment to either document, it must demonstrate that all TCMs are still on track to be implemented in a timely fashion. If a TCM does not stay on schedule, the MPO must show that all State and local agencies with influence over approvals or funding for TCMs are giving maximum priority to approve or fund TCMs over other projects within their control. The MPO and other responsible agencies would have to either ensure that the TCM is able to get back on schedule or substitute for another TCM. The MPO may

[33] Best Available Control Technology (BACT) is the requirement that certain air pollution sources install equipment or employ administrative practices that will result in the lowest achievable emission rate. The lowest achievable emission rate is defined by the California state law as: 1) The most stringent emission limitation contained the State Implementation Plan for the particular class or category of source, unless the owner of the source demonstrates that the limitation is not achievable, or 2) The most stringent emission limitation that is achieved in practice by that class or category or source.

not be able to demonstrate conformity on a new or amended MTP or MTIP if a TCM is failing.

In addition, the Transportation Conformity Rule (40 CFR 93.103) states that "When assisting or approving any action with air quality-related consequences, Federal Highway Authority (FHWA) and Federal Transit Administration shall give priority to the implementation of those transportation portions of an applicable implementation plan prepared to attain and maintain the NAAQS."

Based on suggestions received from interagency consultation and discussions with transportation and air quality stakeholders via the Regional Planning Partnership (RPP), SACOG formally refines the types of projects to be included as TCMs during the SIP and/or MTIP and MTIP Guidelines development process. During the regular update cycle for the MTP and MTIP, SACOG, in coordination with the RPP, will refine and revise TCM descriptions and definitions to clarify the general TCM process as well as resolve specific implementation issues. SACOG works with the project implementing agencies, air quality stakeholders, and any other interested parties, primarily through the RPP, to facilitate the TCM process and implement TCMs appropriately.

SACOG is responsible for ensuring that TCM strategies are funded in a manner consistent with the implementation schedule established in the MTIP at the time a project is identified as a TCM commitment. The transportation conformity process is designed to ensure timely implementation of TCM strategies. If the implementation of a TCM strategy is delayed, or if a TCM strategy is only partially implemented, the emission reduction shortfall must be made up by either substituting a new TCM strategy or by enhancing other control measures. The criterion for this process is discussed in the Guidance for implementing the CAA Section 176 (c)(8) Transportation Control Measure Substitution and Addition Provision (EPA, 2009).

SACOG conducted an evaluation of transportation control measures (SACOG, 2022), which consisted of: 1) strategies identified through a comprehensive review of implemented TCMs in California, as well as other states; and 2) statewide and mobile source emission reduction strategies. Since no new local or regional measures are needed for achieving or accelerating attainment, SACOG did not commit to any TCMs, except the continuation of the Spare The Air Program from the last ozone attainment plan.

7.6.1 Spare the Air program

The Spare the Air program is included as a TCM commitment in this attainment plan. This program is a public education program with an episodic ozone reduction element during the summer ozone season, plus general awareness throughout the rest of the year. This program was originally created in 1995 to engage the general public in voluntarily helping to solve the problem of ozone air pollution. The program is designed to protect public health by informing residents when air quality is unhealthy and achieving voluntary

emission reductions. This is done by encouraging residents to reduce vehicle trips, reduce their commute time, take public transportation, and spend less time in their cars.

This program is implemented by the SMAQMD and benefits all the air districts within the SFNA. Information conveyed through Spare The Air, such as alerts, further encourages people to use alternative modes by promoting public transits and alternative modes of transportation. The Spare the Air program is included in the 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) as an air quality improvement program to reduce vehicle miles traveled on bad air quality days and as a strategy contained under Policy 8[34] (SACOG, 2019). This 2020 MTP/SCS was adopted by the SACOG Board on November 18, 2019.

The Spare The Air program is a non-regulatory transportation control measure. The air districts receive approximately $600,000 per year from a Congestion Mitigation & Air Quality Improvement (CMAQ) grant. The funding is provided by the Federal Highway Administration but appropriated through SACOG. SACOG secured funding for Spare The Air program as a TCM from 2025 thru 2032, which is the SFNA's attainment year for the 2015 ozone NAAQS.

7.7 RACM Analysis

EPA's final 2015 NAAQS SIP Requirement Rule (83 FR 62998) requires that the attainment demonstration include a demonstration that it has adopted all RACM necessary to demonstrate attainment "as expeditiously as practicable" and to meet any Reasonable Further Progress (RFP) requirements. EPA interprets "as expeditiously as practicable" to mean measures that, when considered cumulatively, could advance attainment by a year. The evaluation of RACM was completed by CARB for source categories under the State's control, by the SFNA air districts for local stationary and some area-wide sources, and by SACOG for TCMs.

CARB evaluated RACM for different source categories under the State's control, including mobile sources, consumer products, and pesticides. Evaluation of mobile sources category included the analyses of light- and medium-duty vehicles, heavy-duty vehicles, off-road vehicles and engines, marine sources, and mobile source fuels. CARB found that with the current mobile source control program and new commitments in the 2022 State SIP Strategy, there are no additional RACMs. For consumer products and pesticides, California's Consumer Products Program with the most stringent VOC requirement and Department of Pesticide Regulation's pesticide regulations represent all measures that are technologically and reasonably available. There are no additional RACMs for consumer products or pesticides. RACM analysis for State sources is discussed in detail in Appendix D.1.

[34] This policy state that it is necessary to support and invest in strategies to reduce vehicle emissions that can be shown as cost effective to help achieve and maintain clean air and better public health.

The analysis of stationary and some area-wide source control measures included an initial 210 local measures that potentially could be implemented by the SFNA air districts, as shown in Appendix D.2. For each measure, the emissions inventory, potential reductions, and cost effectiveness were estimated. Ninety-six measures were removed from further consideration because either there were no emission sources, or the cost effectiveness of the measure was excessive and beyond reasonable. These measures included limited NO_X reductions from already well-controlled emission sources, such as boilers, IC engines, flares, miscellaneous combustion devices, and open burning. The VOC and NO_X emissions of the remaining measures were summed.

For TCMs, out of the approximately 200 measures identified as candidate RACM, none were found to meet the criteria for RACM implementation. Based on a comprehensive review of TCM projects in other nonattainment areas, it was determined that the TCMs being implemented in the Sacramento region represent all TCM RACM. None of the candidate measures reviewed, and determined to be infeasible, meet the criteria for RACM implementation. These measures were found to be economically infeasible, or the agency had no authority to implement the measures (Seitz, 1999). SACOG's TCMs RACM analysis is included in Appendix D.3.

To determine if the SFNA can advance attainment by one year, the amount needed to advance attainment is determined by comparing the emissions inventories for 2031 and 2032. The emissions differences between those years are 0.815 tpd of NO_X and 0.427 tpd of VOC. However, advancement may also be achieved by a greater reduction in NO_X emissions and a smaller reduction in VOC emissions, and vice versa. Therefore, the amounts needed to advance attainment were put on a common basis of "NO_X equivalents" to perform the analysis. A sensitivity analysis performed by CARB for the 2019, 2020, and 2021 peak design value site, Auburn, showed that NO_X emissions reductions are 41.9 times more effective in reducing ozone concentrations than VOC emissions reductions. See Appendix D.4 for the results of the sensitivity analysis performed by CARB. The difference in NO_X equivalents between 2031 and 2032 is $0.815 + 0.427/41.9 \approx 0.825$ tpd.

The potential RACM measures, in total, could achieve 0.457 tpd of NO_X reductions and 3.04 tpd in VOC reductions. The reduction in NO_X equivalents is $0.457 + 3.04/41.9 \approx 0.530$ tpd. This is less than the 0.825 tpd amount required to advance attainment by a year. Therefore, the conclusion of this analysis is there are no RACM measures, when considered cumulatively, that can advance attainment by one year.

7.8 Summary

The SFNA relies on existing federal, state, and local programs that have been reducing and will continue to reduce ozone precursor emissions to attain the 2015 ozone standard by the end of 2032. In addition to the existing programs, CARB has committed to adopting

and implementing statewide control measures. These state strategies include on-road light-duty and heavy-duty vehicles regulations and emissions standards, off-road equipment control strategies, consumer products, emissions standards for space and water heaters, enhanced emissions analysis, and pesticides. For regional measures, SACOG will continue the current Spare The Air Program TCM and fund the program through 2032. Aside from the continuation of the TCM, no new local or regional control measures were needed for attainment purposes, including meeting the requirements for demonstrating RFP. CARB, the SFNA air districts and SACOG also conducted a RACM analysis that showed the collection of all reasonably available control measures would not advance attainment by one year.

7.9 References

CARB. *2022 State Implementation Plan Strategy*. Sacramento, CA: California Air Resources Board. 20 September 2022. Web 7 November 2022 < https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf >

EPA. (83 FR 62998–63006) *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 83, 6 December 2018, p. 62998 – 63006. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf >

---. *Guidance for implementing the Clean Air Act Section 176 (c)(8) Transportation Control Measure Substitution and Addition Provision, EPA-420-B-09-002*. Washington, D.C.: U.S. Environmental Protection Agency Transportation and Regional Programs Division Office of Transportation and Air Quality. January [2009.] Web. 05 June 2023. < http://www.scag.ca.gov/Documents/Section176-Guide-Jan08.pdf >

---. *Procedures for Determining Regional Transportation Related Emissions*, 40 CFR §93.103. Web 05 June 2023 < https://www.govinfo.gov/content/pkg/CFR-1996-title40-vol9/html/CFR-1996-title40-vol9-sec93-130.htm >

Seitz, John. *Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Area.* U.S. EPA, Office of Air Quality Planning and Standards. 30 November [1999.] Web. 13 April 2017. < https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/19991130_seitz_racm_guide_ozone.pdf >

SACOG. *2020 Metropolitan Transportation Plan/Sustainable Communities Strategy*. *Sacramento, CA: Sacramento Area Council of Governments.* 18 November [2019.] Web. 23 March 2020. < https://www.sacog.org/sites/main/files/file-attachments/2020_mtp-scs.pdf?1580330993 >

---. *Reasonably Available Control Measure Analysis for the 2015 Ozone Standard.* Sacramento, CA: Sacramento Area Council of Governments. 22 September [2022.] Web. 05 June 2023 < https://www.sacog.org/sites/main/files/file-attachments/092822-rpp-racm_analysis_2015_ozone.pdf?1664226931 >

8 CONTINGENCY MEASURES

8.1 Opportunities for Contingency Measures

Contingency measures are required by the Clean Air Act (CAA) Sections 172 and 182 to be implemented quickly if triggered when an area fails to make reasonable further progress (RFP) or attain the National Ambient Air Quality Standards (NAAQS) by the required date. Over the last few years, multiple court decisions by the United States Court of Appeals for the Ninth Circuit (Ninth Circuit) and in other parts of the country have effectively disallowed the State Implementation Plan (SIP-)approved approach which the California Air Resources Board (CARB), the local air districts and the rest of the country have historically used to meet contingency measure requirements. The U.S Environmental Protection Agency (EPA) released new draft guidance on March 17, 2023 (EPA, 2023)(88 FR 17571) to provide states direction in response to the court decisions. Unfortunately, the draft guidance does not comprehensively address all of the issues related to contingency measures and will not be final for months. Timely, comprehensive, and practical final guidance is needed for CARB, local air districts, and other air agencies across California and the country, to ensure that the significant resources devoted to creating, adopting, and implementing a contingency measure result in a measure or measures that meets federal requirements and can be approved into the SIP. To meet our commitment to satisfy the contingency planning requirements, while recognizing the impracticality of doing so before final guidance is adopted, contingency measure commitments are included in this SIP, as well as a commitment to review the final EPA contingency measure guidance and adopt additional measures necessary to satisfy the final guidance provisions.

California faces the most difficult air quality challenges in the nation and, accordingly, leads the country with the most stringent air pollution control programs. Historically, EPA guidance required contingency measures to achieve approximately one year's worth of emission reductions in the context of RFP. The new draft guidance proposes to change the calculation of one year's worth of emissions reductions such that it connects more directly to attainment inventories (termed now as "one year's worth of progress") and thereby reduces the amount needed for contingency measures. However, CARB's and local air districts' control programs are advanced, and primarily-federally regulated sources contribute over half of the mobile source Nitrogen Oxides (NO_X) emissions. Thus, opportunities for a triggered contingency measure that can be implemented by the State and local air districts and can result in one year's worth of progress in the required time frame are not readily available. Further, if any State measure that could achieve this level of emission reductions existed, it would be adopted to improve air quality and support attainment of the NAAQS and would not be withheld for contingency purposes. While EPA finalizes its draft guidance, California has continued to work towards meeting contingency measure requirements, conducting an in-depth analysis of all CARB

regulations to identify potential contingency measures. Based on the evaluation of possible measures to address contingency measure requirements, CARB has identified the proposed California Smog Check Contingency Measure[35], which, if adopted by the CARB Board, will be submitted to EPA for incorporation into the SIP. CARB is currently developing this statewide contingency measure to help fulfill contingency measure requirements for the Sacramento Metro and other nonattainment areas, with a target for Board consideration in October 2023. At the local levels, the SFNA air districts commit to amend their architectural rules by May/June 2024. If adopted by the air districts' boards, the measures will be forwarded to CARB for review and then, the EPA to be included into the SIP. The air districts also commit to perform a detailed and thorough analysis of all available control measures and to re-evaluate the contingency measure requirements upon EPA's issuance of the final guidance.

8.2 Background

The CAA specifies that SIPs must provide for contingency measures, defined in section 172(c)(9) as "specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date…." The CAA is silent though on the specific level of emission reductions that must flow from contingency measures. In the absence of specific requirements for the amount of emission reductions required, in 1992, EPA conveyed that the contingency measures should, at a minimum, ensure that an appropriate level of emissions reduction progress continues to be made if attainment of RFP is not achieved and additional planning by the State is needed (57 FR 13510, 13512 (April 16, 1992)). Further, EPA ozone guidance states that "contingency measures should represent one year's worth of progress amounting to reductions of 3 percent of the baseline emissions inventory for the nonattainment area". EPA, though, has accepted contingency measures that equal less than one year's worth of RFP when the circumstances fit under "EPA's long-standing recommendation that states should consider 'the potential nature and extent of any attainment shortfall for the area' and that contingency measures 'should represent a portion of the actual emissions reductions necessary to bring about attainment in the area[36].'"

Historically, EPA allowed contingency measure requirements to be met via excess emission reductions from ongoing implementation of adopted emission reduction programs, a method that CARB and local air districts have used to meet contingency measure requirements and EPA has approved in the past. In 2016, in Bahr v. EPA[37] (Bahr), the Ninth Circuit determined EPA erred in approving a contingency measure that relied on an already-implemented measure for a nonattainment area in Arizona, thereby

35 https://ww2.arb.ca.gov/resources/documents/california-smog-check-contingency-measure
36 See 78 FR. 37741- 37750 (Jun. 24, 2013), approval finalized with 78 FR 64402 (Oct. 29, 2013).
37 Bahr v. U.S. Environmental Protection Agency, (9th Cir. 2016) 836 F.3d 1218.

rejecting EPA's longstanding interpretation of section 172(c)(9). EPA staff interpreted this decision to mean that contingency measures must include a future action triggered by a failure to attain or failure to make RFP. This decision was applicable to the states covered by the Ninth Circuit. In the rest of the country, EPA still allowed contingency measures using their pre-Bahr stance. In January 2021, in Sierra Club v. Environmental Protection Agency[38], the United States Court of Appeals for the D.C. Circuit, ruled that already implemented measures do not qualify as contingency measures for the rest of the country (Sierra Club).

In response to Bahr and as part of the 75 ppb 8-hour ozone SIPs due in 2016, CARB developed the statewide Enhanced Enforcement Contingency Measure (Enforcement Contingency Measure) as a part of the 2018 Updates to the California State Implementation Plan to address the need for a triggered action as a part of the contingency measure requirement. CARB worked closely with EPA regional staff in developing the contingency measure package that included the triggered Enforcement Contingency Measure, a district triggered measure and emission reductions from implementation of CARB's mobile source emissions program. However, as part of the San Joaquin Valley 2016 Ozone Plan for 2008 8-hour Ozone Standard SIP action, EPA wrote in their final approval that the Enforcement Contingency Measures did not satisfy requirements to be approved as a "standalone contingency measure" and approved it only as a "SIP strengthening" measure. EPA did approve the district triggered measure and the implementation of the mobile reductions along with a CARB emission reduction commitment as meeting the contingency measure requirement for this SIP.

Subsequently, the Association of Irritated Residents filed a lawsuit against EPA for their approval of various elements within the San Joaquin Valley 2016 Ozone Plan for 2008 8-hour Ozone Standard, including the contingency measure. The Ninth Circuit issued its decision in Association of Irritated Residents v. EPA[39] (AIR) that EPA's approval of the contingency element was arbitrary and capricious and rejected the triggered contingency measure that achieves much less than one year's worth of RFP. Most importantly, the Ninth Circuit said that, in line with EPA's longstanding interpretation of what is required of a contingency measure and the purpose it serves, together with Bahr, all reductions needed to satisfy the CAA's contingency measure requirements need to come from the contingency measure itself and the amount of reductions needed for contingency should not be reduced by the fact of surplus emission reductions from ongoing programs absent EPA formally changing its historic stance on the amount of reductions required. EPA staff has interpreted AIR to mean that triggered contingency measures must achieve the entirety of the required one year's worth of emission reductions on their own. In addition,

[38] Sierra Club v. Environmental Protection Agency, (D.C. Cir. 2021) 985 F.3d 1055.
[39] Association of Irritated Residents v. U.S. Environmental Protection Agency, (9th Cir. 2021) 10 F.4th 937

surplus emission reductions from ongoing programs cannot reduce the amount of reductions needed for contingency.

In response to Bahr and Sierra Club, in 2021, EPA convened a nation-wide internal task force to develop guidance to support states in their development of contingency measures. The draft guidance released in March 2023 is currently undergoing a public review process. The draft guidance proposes a new method for how to calculate one year's worth of progress for the targeted amount of reductions needed for contingency and provides new clarification on the reasoned justification that would be needed for measures to be approved with a lesser amount of reductions. Per the draft guidance, the reasoned justification would need to include an infeasibility analysis detailing why there are insufficient measures to meet one year's worth of progress.

Since Bahr, CARB and air districts across California have worked closely with our EPA regional office in developing contingency measures with little success. CARB and local air districts will continue to work closely with our regional EPA partners and is committed to meeting the CAA requirements for contingency measures. EPA needs to finalize national guidance on this complex issue to ensure states can effectively develop approvable contingency measures consistent with the new guidance.

8.3 CARB's Opportunities for Contingency Measures

Much has changed since EPA's 1992 guidance on contingency measures. Control programs across the country have matured as have health-based standards. Ozone standards have been strengthened in 1997, 2008 and 2015 with attainment dates going out to 2037. California has the only three extreme ozone nonattainment areas in the country. Thus, control measures are needed for meeting the NAAQS as expeditiously as possible rather than being held in reserve.

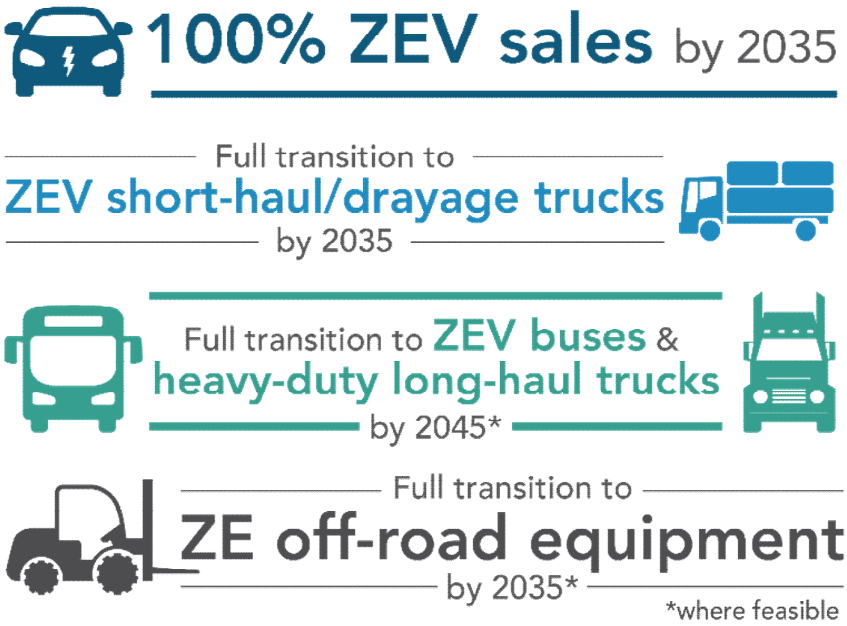
To address contingency measure requirements given the courts' decisions and draft EPA guidance, CARB and local air districts would need to develop a measure or measures that, when triggered by a failure to attain the NAAQS or failure to meet RFP, will achieve one year's worth of progress for the given nonattainment area unless it is determined that it is infeasible to achieve one year's worth of emission reductions. Several factors indicate that, once the final guidance is approved, California may be able to support an infeasibility finding. Given CARB's wide array of mobile source control programs, the relatively limited portion of emissions primarily regulated by the local air districts, and the fact that primarily-federally regulated sources are expected to account for approximately 54 percent of statewide nitrogen oxides (NO_X) emissions by 2032, finding triggered measures that will achieve the required reductions is nearly impossible. That said, even discounting the amount to reflect the proportion of sources that are primarily federally regulated, additional control measures that can be identified by CARB that would achieve the required emissions reductions needed for a contingency measure are scarce.

Adding to the complexity of identifying available control measures, not only does the suite of contingency measures need to achieve a large amount of reductions, but they will also need to achieve these reductions in the year following the year in which the failure to attain or meet RFP has been identified. Although the newly released draft guidance proposes allowing for up to two years to achieve those reductions, control measures achieving the level of reductions required often take more than two years to implement and will likely not result in immediate reductions. In California's 2022 State SIP Strategy, CARB's three largest NO_X reduction measures, In-Use Locomotive Regulation, Advanced Clean Fleets, and Transportation Refrigeration Unit II, rely on accelerated turnover of older engines/trucks and a shift to zero-emission equipment. The buildup of infrastructure and equipment options limits the availability to have significant emission reductions in a short amount of time. Options for a technically and economically feasible triggered measure that can be implemented and achieve the necessary reductions in the time frame required are scarce in California and may not be possible.

CARB has over 50 years of experience reducing emissions from mobile sources like cars and trucks, as well as other sources of pollution under State authority. The Reasonably Available Control Measures for State Sources analysis illustrates the reach of CARB's current programs and regulations, many of which set the standard nationally for other states to follow. Few sources CARB has primary regulatory authority over remain without a control measure, and all control measures that are in place support the attainment of the NAAQS. There is a lack of additional control measures that would be able to achieve the necessary reductions for a contingency measure. Due to the unique air quality challenges California faces, should such additional measures exist, CARB would pursue those measures to support expeditious attainment of the NAAQS and would not reserve such measures for contingency purposes. Nonetheless, CARB continues to explore options for potential statewide contingency measures utilizing its authorities and applying EPA's draft guidance.

A central difficulty in considering a statewide contingency measure under CARB's authority, is that CARB is already fully committed to driving sources of air pollution in California to zero emission everywhere feasible and as expeditiously as possible. In 2020, Governor Newsom signed Executive Order N-79-20 (Figure 8-1) that established a first-in-the-nation goal for 100 percent of California sales of new passenger cars and trucks to be zero-emission by 2035. The Governor's order set a goal to transition 100 percent of the drayage truck fleet to zero emission by 2035, all off-road equipment where feasible to zero-emission by 2035, and the remainder of the medium and heavy-duty vehicles to zero emission where feasible by 2045.

Figure 8-1 Governor Newsom Executive Order N-79-20



California is committed to achieving these goals and CARB is pursuing an aggressive control program in conjunction with other state and local agencies to turn the Executive Order into reality. Thus, CARB's programs not only go beyond emissions standards and programs set at the federal level, but many include zero-emissions requirements that drive mobile sources to zero-emissions, as listed in Table 8-1 below, or otherwise, achieve zero-emissions through incentives and voluntary programs. CARB is also exploring and developing a variety of new measures to drive more source categories to zero-emissions and reduce emissions even further, as detailed in CARB's 2022 State SIP Strategy. With most source categories being driven to zero-emissions as expeditiously as possible, opportunities for having triggered measures that could reduce emissions by the amount required for contingency measures are scarce.

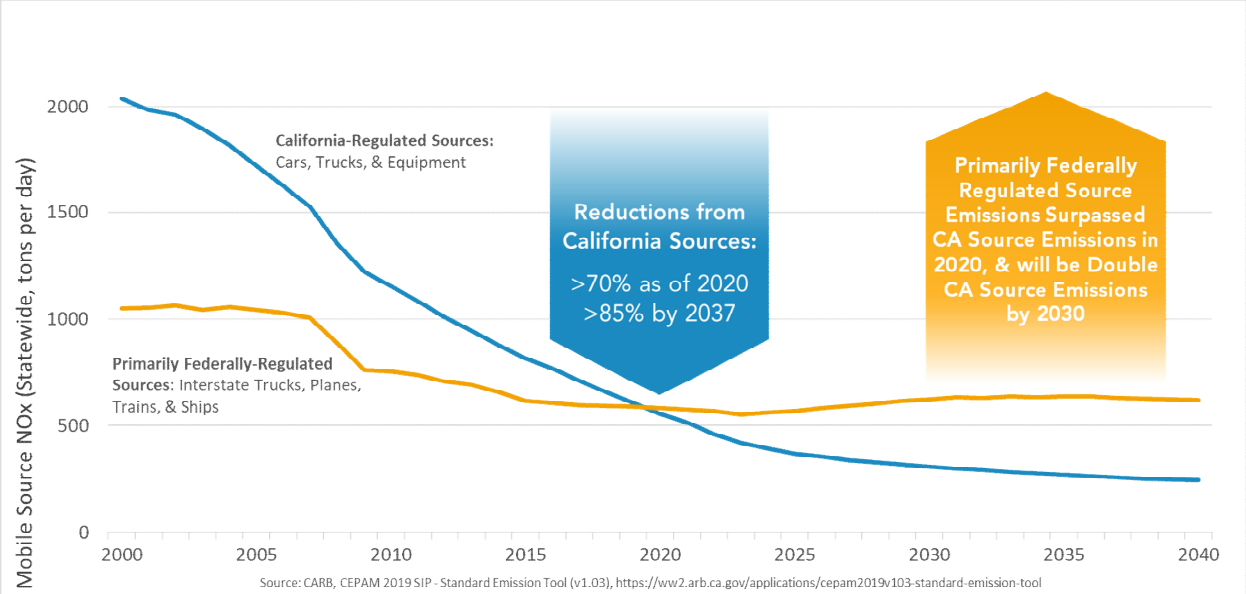
Table 8-1 Emissions Sources and Respective CARB Programs with a Zero-Emissions Requirement/Component

Emission Source	Regulatory Programs
Light-Duty Passenger Vehicles and Light-Duty Trucks	• Advanced Clean Cars Program (I and II), including the Zero Emission Vehicle Regulation • Clean Miles Standard
Motorcycles	• On-Road Motorcycle Regulation*
Medium Duty-Trucks	• Advanced Clean Cars Program (I and II), including the Zero Emission Vehicle Regulation • Zero-Emission Powertrain Certification Regulation • Advanced Clean Trucks Regulation • Advanced Clean Fleets Regulation
Heavy-Duty Trucks	• Zero-Emission Powertrain Certification Regulation • Advanced Clean Trucks Regulation • Advanced Clean Fleets Regulation
Heavy-Duty Urban Buses	• Innovative Clean Transit • Advanced Clean Fleets Regulation
Other Buses, Other Buses – Motor Coach	• Zero-Emission Airport Shuttle Regulation • Advanced Clean Fleets Regulation
Commercial Harbor Craft	• Commercial Harbor Craft Regulation
Recreational Boats	• Spark-Ignition Marine Engine Standards*
Transport Refrigeration Units	• Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (Parts I and II*)
Industrial Equipment	• Zero-Emission Forklifts* • Off-Road Zero-Emission Targeted Manufacturer Rule*
Construction and Mining	• Off-Road Zero-Emission Targeted Manufacturer Rule*
Airport Ground Support Equipment	• Zero-Emission Forklifts*
Port Operations and Rail Operations	• Cargo Handling Equipment Regulation • Off-Road Zero-Emission Targeted Manufacturer Rule*
Lawn and Garden	• Small Off-Road Engine Regulation • Off-Road Zero-Emission Targeted Manufacturer Rule*
Ocean-Going Vessels	• At Berth Regulation
Locomotives	• In-Use Locomotive Regulation

*Indicates program or regulation that is in development

There are few sources of air pollution remaining in California that are not already being aggressively controlled by CARB or the local air districts, and as mentioned previously, those sources that are not as well controlled are primarily-federally regulated sources. This includes interstate trucks, ships, locomotives, aircraft, and certain categories of off-road equipment, constituting a large source of potential emissions reductions. Since these are primarily regulated at the federal and, in some cases, international level, options to implement a contingency measure with reductions approximately equivalent to one year's worth of progress are limited.

Figure 8-2 Statewide Emissions trendline for California and Federally regulated sources



Additionally, CARB is currently working across the agency on efforts to advance racial equity and alleviate the environmental burdens priority communities in California experience. For contingency, like with all of CARB's programs, any measure considered must be evaluated to understand whether there could be any disparate impacts on priority communities. Given the existing disproportionate impacts overburdened communities already face, CARB must ensure that any new measure adopted does not have a disproportionate impact or place any further burden on these communities.

8.4 CARB Measure Analysis

Despite these challenges, CARB has analyzed control measures for all sources under CARB authority to identify potential contingency measure options. CARB currently has programs in place or under development for most of these sources, and staff have evaluated a variety of regulatory mechanisms within existing and new programs for potential contingency triggers.

8.4.1 Criteria for Contingency Feasibility

CARB has evaluated potential options for a contingency measure within each of CARB's regulations (Appendix E.1 Table E-1) using criteria to determine its feasibility given the contingency measure requirements under the CAA, recent court decisions and EPA draft guidance. First, each measure was evaluated on whether it could be implemented within 60 days of being triggered and achieve the necessary reductions within 1-2 years of being triggered. Second, the technological feasibility of each option was considered to assess whether the measure would be technically feasible to implement. Measure requirements may be unavailable or cost prohibitive to implement, especially in the time frame required for contingency measures.

8.4.2 Challenges for CARB Measures

Based on CARB's feasibility analysis, there are a few common components of CARB regulations that limit the options for contingency measures. CARB regulations that require fleet turnover or new engine standards require a long lead time for implementation. Engine manufacturers would need lead time to design, plan, certify, manufacture, and deploy cleaner engines to meet a new or accelerated engine standard, while fleet regulations necessitate that manufacturing is mature so that there is enough supply available to meet that demand. Fleet regulations also require vehicle and equipment owners and operators to plan, purchase and deploy new, often zero-emission, equipment which may require changes to their business operations and the installation of new infrastructure. Thus, measures that require fleet turnover or new engine standards are not appropriate to be used as a triggered contingency measure.

CARB regulations are also technological forcing, which makes it difficult to amend regulations or pull compliance timelines forward with only 1-2 years notice as industry needs time to plan, develop, and implement these new technologies. It would be infeasible to require industry to turn over their fleets within one year if the technology is not readily available at a reasonable cost. Further, because they are technology forcing, many CARB regulations require an interim technology or implementation review and assessment to ensure that the requirements are achievable; as a part of these reviews, CARB routinely considers whether regulations can be accelerated or strengthened. CARB regulations are the most stringent air quality control requirements in the country, so there are few opportunities to require additional stringency. CARB is driving sources under its authority to zero-emission everywhere feasible to ensure attainment of air quality standards across the State, and to support near-source toxics reductions and climate targets. However, the zero-emissions targets also eliminate opportunities for contingency based on more stringent standards.

8.4.3 Smog Check Contingency Measure

Nonetheless, CARB continues to explore options for potential statewide contingency measures utilizing its authorities and applying EPA's draft guidance. After an in-depth evaluation of all sources under CARB authority, CARB identified the proposed Smog Check Contingency Measure as a viable option to meet contingency measure requirements. The proposed Smog Check Contingency Measure, if triggered, would change the exemption from the existing eight or less model-years old to seven or less model-years old in the applicable nonattainment area. The Smog Check Contingency Measure can be triggered a second time for a nonattainment area where the smog check exemption would apply to vehicles six or less model-years old. CARB is currently developing the proposed Smog Check Contingency Measure and plans to bring the measure to the Board for consideration in October 2023.

8.5 Districts' Opportunities for Contingency Measures

The SFNA air districts continue to work to improve air quality in the Sacramento region and work towards meeting multiple active federal ozone health standards, including the 2015 ozone NAAQS. The improvements in lowering ambient ozone concentrations in the SFNA are, in part, a result of adopting and implementing many rules and regulations that limit ozone precursor emissions from stationary and areawide sources under the local air districts' authorities. Because of the robust existing local control programs, finding technologically feasible and effective measures for reducing ambient ozone concentrations for contingency purposes poses some challenges. As discussed in this chapter, EPA's draft guidance for contingency measures calls for control measures that can be triggered within 60 days and achieve one year's worth of emission reductions within 2 years. These requirements for contingency measures limit the available local opportunities. While EPA's draft guidance allows air agencies to justify using less than one year's worth of emission reduction provided, they conduct a feasibility analysis of the available control measures, the SFNA air districts will wait until final guidance from EPA to perform this thorough and detailed analysis. The SFNA air districts, along with CARB and other air agencies across the country, have raised concerns and provided comments to EPA on the draft guidance (Ayala et al., 2023). With these concerns and comments, there's an uncertainty as to which measures can be considered feasible for contingency purposes because EPA's draft contingency measure guidance is undergoing review and will not be final for months.

While waiting for final EPA guidance, the SFNA air districts will move forward with one control measure that has been evaluated by CARB and the SFNA air districts and is ready to be implemented if EPA finds the SFNA fails to meet RFP or fails to attain the NAAQS by the attainment date.

The SFNA air districts commit to amend their architectural coating rules to include triggering provisions that lower the volatile organic compounds (VOC) limits for several coating categories, delete the coating categories for non-flats, stains floor, and some other specialty coatings, and establish new VOC content limits for colorants to be consistent with the Architectural Coatings Suggested Control Measure adopted by CARB on May 21, 2019 (CARB, 2019). These proposed changes will go into effect within 60 days if EPA makes a finding that the SFNA has failed to meet RFP or has failed to attain the NAAQS by the attainment deadline. Additional details of the contingency measure commitments can be found in Appendix E.2. Table 8-2 reflects the estimated reductions for different future years and proposed adoption date for these contingency measures for the SFNA districts. Each air district will take its amended rule to its respective air district board for adoption prior to submitting the amended rule to CARB and EPA.

Table 8-2 Contingency Measure Commitments

District Rule	Estimated VOC Reductions (tpd) in SFNA			Proposed Adoption Date
	2028	**2031**	**2035**	
FRAQMD Rule 3.15	< 0.001	< 0.001	< 0.001	June 2024
EDAQMD Rule 215	0.003	0.003	0.003	May 2024
SMAQMD Rule 442	0.119	0.122	0.126	May 2024
PCAPCD Rule 218	0.004	0.004	0.004	May 2024
YSAQMD Rule 2.14	0.027	0.028	0.029	May 2024
Total Reductions	**0.154**	**0.158**	**0.162**	

Note: EPA's draft guidance on contingency measure allows the emission benefits to be realized within two years if the area fails to meet RFP (2026 and 2029) or fails to attain the NAAQS by the attainment date (August 2033), which corresponds to 2028, 2031, and 2035.

In addition, the SFNA air districts commit to evaluate potential local control measures in accordance with EPA's guidance on contingency measures once it is finalized and will continue to work with CARB and EPA to evaluate the available options for contingency measures.

8.6 Summary

At this time, CARB is including a zero-emission component in most of its regulations, both those already adopted and those that are in development, and the vast majority of these regulations are statewide in scope. Beyond the wide array of sources CARB has been regulating over the last few decades, and especially considering those CARB is driving to zero-emission, there are few sources of emissions left for CARB to implement additional controls upon under its authorities for ozone contingency purposes in the SFNA. The few source categories that do not have control measures are primarily-federally and internationally regulated.

Given the courts' decisions over the last few years, CARB and the local air districts will need to implement contingency measures that, when triggered, would achieve one year's worth of progress, or at least the relevant portion equivalent to the contribution of sources primarily regulated at the State and local level, unless a reasoned justification for achieving a lesser amount of emission reductions can be provided. Considering the air quality challenges California faces, if a measure achieving such reductions were feasible, CARB would implement the measure to support expeditious attainment of the NAAQS as the CAA requires rather than withhold it for contingency measure purposes. Further, should there be a measure achieving the required emission reductions, the measure would likely take more than 1-2 years to implement during which time the expected emission benefits would be reduced due to natural turnover of equipment. Despite the challenges, CARB has identified the proposed Smog Check Contingency Measure as its most viable option given the requirements. CARB staff plans to bring the proposed Smog

Check Contingency Measure to the CARB Board for consideration in October 2023, and if adopted, it will be submitted to EPA for incorporation into the California SIP.

For sources under local air districts' authorities, the SFNA air districts have been implementing many control measures through their robust stationary source regulatory programs. Preliminary review of currently available, technological feasible, and effective local measures indicates limited opportunities for contingency measures that meet the requirements of EPA's draft guidance. As the air districts wait for EPA's final guidance on contingency measures, the SFNA air districts, at this stage, commit to amend their architectural coatings rules to include triggering provisions that make more restrictive requirements go into effect if EPA finds that the SFNA has failed to meet RFP or has failed to attain the NAAQS by the attainment deadline. Each air district will take its amended rule to its respective air district board for adoption prior to submitting the amended rule to CARB and EPA. The SFNA air districts further commit to perform a detailed and thorough analysis of all available control measures and to re-evaluate the contingency measure requirements upon EPA's issuance of the final guidance. If additional contingency measures are needed, the SFNA air districts will amend the SIP to include them.

8.7 References

Ayala, Alberto (SMAQMD), et al. Letter to Michael S. Regan, EPA Administrator. "*Air Districts of the Sacramento Federal Ozone Nonattainment Area (SFNA) Comments on the Draft Guidance on the Preparation of State Implementation Plan Provisions That Address the Nonattainment Area Contingency Measures Requirements for Ozone and Particulate Matter, Docket ID No. EPA-HQ-OAR-2023-0063."* 24 April 2023. [Print.]

CARB. *2019 CARB SCM for Architectural Coatings.* Sacramento, CA: California Air Resources Board. May [2019.] Web 07 June 2023. < https://ww2.arb.ca.gov/sites/default/files/2020-05/10602_scm_final.pdf >

---. *2022 State Implementation Plan Strategy*. Sacramento, CA: California Air Resources Board. 20 September 2022. Web 7 November 2022 < https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf >

EPA. (57 FR 13498 – 13570) *State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990: Proposed Rule.* Federal Register, Volume 57, 16 April 1992, p. 13498 – 13570. Web 07 June 2023. < https://archives.federalregister.gov/issue_slice/1992/4/16/13412-13570.pdf >

---. *Draft: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter.* U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Air Quality Policy Division. 16 March, [2023.] Web 07 June

2023. < https://www.epa.gov/system/files/documents/2023-03/CMTF%202022%20guidance%203-17-23.pdf >

Newsom, Gavin. Executive Order N-79-20: Zero-Emission by 2035. 19 January 2021. Web 06 June 2023. < https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf >

9 TRANSPORT ANALYSIS

9.1 Introduction to Pollutant Transport

The air quality in the Sacramento Federal Nonattainment area (SFNA) can be impacted by pollutant transport from the San Francisco Bay Area and the San Joaquin Valley. Delta breezes carry air pollutants from coastal Bay Area and San Joaquin Valley emission sources downwind to the inland areas of the Sacramento region, and these pollutants may contribute to ozone formation during the same day or the following days. The California Air Resources Board (CARB) has determined that the relative impact on air quality in the SFNA from the Bay Area and San Joaquin Valley pollutant transport can be considered overwhelming, significant, or inconsequential on various days depending on meteorological conditions (CARB, 2001, pp. 25, 37). Various studies in the past two decades also reaffirmed that a strong sea breeze within the deep marine boundary layer from the San Francisco Bay Area enhanced pollutant transport into the Sacramento Delta Region and that the air flow pattern in the Sacramento Valley (Schultz eddy) causes pollutants to recirculate and become trapped within the Sacramento region. The delta breeze also transports emissions towards the eastern portion of the Sacramento region, where the highest ozone concentrations have been observed during the past 15 years (also see Appendix F: Weight of Evidence for more information).

Various photochemical modeling sensitivity simulations confirmed that emissions reduction outside the SFNA would reduce the ambient ozone concentration at the SFNA peak monitors. The actual impacts from the upwind area are very difficult to quantify. The influence of air pollutant transport on ozone concentrations can involve many different, complex methodologies with varying limitations and uncertainties. Surface wind flow data from ambient monitors and wind flow patterns can reveal where pollutants are coming from, but the amount of ozone formation will depend on other factors, like temperature and vertical convection. Thus, impacts cannot be quantified on just the pollutant transport alone. Photochemical grid modeling can quantify a more precise transport contribution to downwind ozone areas and account for pre-existing conditions, but they may only be representative of a specific ozone season and subject to various modeling performance uncertainties.

9.2 EPA Rules and Regulations on Intrastate Transport

The 2015 Ozone National Ambient Air Quality Standard (NAAQS) State Implementation Plan (SIP) Requirement Rule (83 FR 62998) states that air agencies must consider the intrastate transport impacts of emissions from sources outside of the ozone nonattainment area but within the state. United States Environmental Protection Agency (EPA) notes that these upwind sources may have significant impact on downwind nonattainment areas, and the 2015 Ozone NAAQS SIP Requirement Rule requires

control measures for these emission sources outside of the nonattainment area if it will help the area attain the NAAQS by the attainment date.

9.3 Attainment Assumptions of Domain-wide Reductions

Transported pollutants from upwind areas can contribute to the ozone problem further downwind across geographic areas. CARB, as the state air agency, is responsible for submitting SIPs for California in which it must address intrastate transport for California's nonattainment areas. As discussed in Chapter 7, CARB has committed to adopting and implementing statewide mobile source control measure in its 2022 State SIP Strategy (CARB, 2022). These commitments to reduce mobile sources emissions in California will help reduce intrastate transport for California's nonattainment areas, including the SFNA.

CARB's photochemical modeling simulations include the northern and central regions of California in the modeling domain (see Appendix B.1 Modeling Protocol & Attainment Demonstration). Within each domain, the model includes emission reductions from statewide and upwind regions' existing programs and new statewide control measures. The use of domain-wide emissions and emissions benefits from air quality programs in the air quality modeling accounts for air pollutant transport impacts across northern California, including in the SFNA. These existing local and state emission reduction programs and new state control measures have been reducing and will continue to reduce ozone precursors from intrastate transport and help reduce ambient ozone concentrations.

9.4 Summary

CARB continues to adopt, enforce, and implement the state control measures as described in Chapter 7. Since the mobile source emission inventory is the largest emission source of ozone precursor emissions in the state, reducing mobile source emissions will help reduce intrastate transports. These statewide control measures, especially the mobile source measures, will continue to bring emission reduction benefits to all nonattainment areas in California, including the SFNA. Other upwind air districts will also continue their efforts to implement air quality programs to reduce emissions. The total emission reductions from existing federal, state, regional, and local programs along with new state commitments will ensure the Sacramento region will meet the 2032 attainment deadline.

9.5 References

CARB. *Ozone Transport: 2001 Review.* Sacramento, CA: California Air Resources Board, April [2001.]

---. *2022 State Implementation Plan Strategy*. Sacramento, CA: California Air Resources Board. 20 September 2022. Web 7 November 2022 < https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf >

EPA. (83 FR 62998–63006) *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 83, 06 December 2018, p. 62998 – 63006. Web 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf >

10 TRANSPORTATION CONFORMITY AND MOTOR VEHICLE EMISSIONS BUDGETS

10.1 Introduction to Transportation Conformity

Transportation conformity is the federal regulatory procedure for linking and coordinating air quality and transportation planning. Transportation conformity analysis and findings are required under federal Clean Air Act (CAA) Section 176 to ensure that transportation activities do not impede an area's ability to attain the air quality standards. The CAA requires that transportation plans, programs, and projects that obtain federal funds or require approval be consistent with, or conform to, applicable state implementation plans (SIPs) before they can be approved. This coordination between air quality and transportation plans ensures that transportation activities will not: (1) cause or contribute to new air quality violations, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of National Ambient Air Quality Standards (NAAQS).

Transportation planning is the responsibility of local metropolitan planning organizations (MPOs). For the Sacramento Federal Nonattainment Area (SFNA), transportation projects, programs and plans are approved by two MPOs: Sacramento Area Council of Governments (SACOG) and Metropolitan Transportation Commission (MTC). SACOG's jurisdiction includes Sacramento, Sutter, Yolo counties and portions of Placer and El Dorado counties (excluding the portion in the Tahoe Basin). MTC has jurisdiction over nine Bay Area counties, including SFNA portion of Solano County. CAA Section 176(c) states that a MPO cannot approve any federally funded project, program, or plan, which does not conform to a SIP approved by the United States Environmental Protection Agency (EPA).

To conform to the SIP, SACOG and MTC must demonstrate that projected regional motor vehicle emissions from transportation activities will be less than or equal to the motor vehicle emissions budgets (MVEB), which are the on-road mobile source portion of the total emissions inventory used to demonstrate RFP and attainment of the 2015 ozone NAAQS. Transportation projects, programs or plans cannot be federally funded or approved if the total emissions in the transportation activities exceed the MVEB. This chapter discusses transportation conformity and the establishment of the proposed MVEB.

10.2 Conformity Rule

Implementation of the CAA Section 176(c) requirements is outlined in the Conformity Rule (40 CFR §93.100 - §93.165). The Conformity Rule:

- Establishes criteria and procedures for determining whether the long-range metropolitan transportation plan (MTP) and the metropolitan transportation improvement program (MTIP); a short-term listing of surface transportation projects

that receive federal funds, are subject to a federally required action, are regionally significant, or conform to the SIP.

- Ensures that transportation plans and projects are consistent with the applicable SIP. This means that transportation emissions are less than or equal to the MVEB.
- Ensures that transportation plans, programs, and other individual projects do not cause new air quality violations, exacerbate existing ones, or delay attainment of air quality standards.

MPOs are required to update their MTP every 4 years and their MTIP is updated every 2 years on a separate schedule; both are amended as necessary. Before adopting the MTP/MTIP and associated amendments, MPOs must prepare a regional conformity analysis based on the projects in the proposed MTP/MTIP and programs as specified in the federal Conformity Rule. Those emissions are compared to the MVEBs in the latest EPA-approved SIP. The MPO must determine if the emissions from the proposed projects in the MTP/MTIP are less than the emissions budgets in the approved SIP. The Conformity Rule (40 CFR 93.105) also includes the interagency consultation procedures for the development and approval of the MVEB (See Section 10.3.1).

10.3 Proposed MVEB

The MVEB are based on Conformity Analysis: Amendment #2 to the SACOG's 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and the 2023 Metropolitan Transportation Improvement Program, which was adopted by SACOG's Board of Directors on September 15, 2022 (SACOG, 2019 and SACOG, 2022). The MTP/SCS included the latest planning assumptions, which were projections of population, housing units, and employment growth in the Sacramento Region, as well as land use allocations, and transportation system improvements. These growth projections were further applied to SACOG's Activity-Based Travel Simulation Model (SACSIM) (Bradley et al, 2007), and the model forecasted the regional vehicle miles traveled (VMT) and the average weekday travel patterns for several future years. These data were used as inputs into California Air Resources Board's (CARB's) EMFAC2017 model[40] to estimate the MVEB. Emissions for SFNA portion of Solano County were estimated in the EMFAC2017 model separately based on data provided by MTC.

The MVEB are used to ensure that transportation planning activities conform to the SIP and are set for each Reasonable Further Progress (RFP) milestone year (2023, 2026, and 2029) and the attainment year (2032). MVEB are established for both ozone pollutants precursors: volatile organic compounds (VOC) and nitrogen oxides (NO_X). Reductions of both precursors are needed to demonstrate attainment of the ozone

[40] EMFAC2017 is a California specific on-road emissions inventory model, which calculates the on-road mobile emission rates. Effective August 15, 2019, the EPA approved the EMFAC2017 emissions model for SIP and conformity purposes (84 FR 41717).

standard. Table 10-1 shows the transportation conformity motor vehicle emissions budgets for VOC and NO_X in the SFNA. Emissions are based on an average summer day consistent with the ozone attainment and progress demonstrations, using the following method:

1) Calculate the on-road motor vehicle emissions totals for the appropriate pollutants (VOC and NO_X) from the EMFAC2017 model.
2) Subtract emissions from: a) reductions from recently adopted regulations using off-model adjustments; and b) reductions from developing regulations using off-model adjustments.
3) Sum each pollutant (VOC and NO_X) and round each total up to the nearest tenth of ton.

Table 10-1 Transportation Conformity Budgets for the 2015 8-hour Ozone standard in the SFNA, tons per average summer day

Sacramento Totals (Tons/Day)	**2023**		**2026**		**2029**		**2032**	
	VOC	**NO_X**	**VOC**	**NO_X**	**VOC**	**NO_X**	**VOC**	**NO_X**
Vehicular Exhaust (on road emissions)	12.9	19.5	11.5	17.4	10.7	16.4	9.7	15.7
Reductions from recently adopted regulations using off-model adjustments[a]	0.0001	0.1717	0.0045	3.597	0.018	4.897	0.0436	5.9087
Reductions from developing regulations using off-model adjustments[b]	-	-	-	-	-	-	0.41	1.16
Total[c]	12.88	19.35	11.48	13.84	10.67	11.53	9.28	8.60
Motor Vehicle Emission Budgets[d,e]	**12.9**	**19.4**	**11.5**	**13.9**	**10.7**	**11.6**	**9.3**	**8.6**

Source: EMFAC2017 v1.03

[a] This reflects the adjustment factor for Heavy-Duty Vehicle Warranty Phase 1, Innovative Clean Transit (ICT), Heavy-Duty Vehicle Inspection Program (HDVIP)/Periodic Smoke Inspection Program (PSIP), Advanced Clean Trucks (ACT), and Heavy-Duty Omnibus regulations.

[b] This reflects the on-road commitments for Advanced Clean Cars II (ACCII) and Advanced Clean Fleets (ACF) from the 2022 State SIP Strategy.

[c] Values may not add up due to rounding.

[d] Motor vehicle emission budgets calculated are rounded up to the nearest tenth of a tpd.

[e] The budgets are calculated with EMFAC2017 v1.03 using SACOG 2020 MTP/SCS Amendment #2 activity data and MTC activity data for SFNA portion of Solano County. Since there is an update for the activity data, small differences between the budgets and planning inventory (Chapter 5) for the mobile source emissions are observed. These differences do not impact the RFP or attainment demonstrations.

10.3.1 Interagency Consultation

The conformity rule requires an interagency consultation (40 CFR 93.105) for developing and implementing any provisions related to transportation conformity, including the MVEB. The purpose of the interagency consultation process is to align the air quality and transportation plans as it relates to conformity with all agencies involved and to resolve any issues before making conformity determinations. This process includes consultation among the MPOs, local, State, and federal departments of transportation, and local and State air quality planning agencies.

The proposed MVEB have been developed through SACOG's Regional Planning Partnership (RPP), which serves as the forum for interagency consultation procedure required by 40 CFR 93.105, and these forums are open to the public. Agencies represented on the RPP include the SFNA air districts, SACOG, California Department of Transportation (Caltrans), EPA Region IX, Department of Transportation – Federal Highway Administration, Federal Transit Administration, local transportation agencies, and CARB.

The MVEB in Table 10-1 were presented at the SACOG RPP meeting on February 22, 2023. No changes were made to the MVEB, and the RPP approved by consensus that the MVEB be included in the 2015 Ozone NAAQS SIP.

10.4 MVEB Approval and Use

The MVEB, included as part of this plan, will be submitted to EPA for approval. Before the EPA approves the MVEB, EPA will conduct an adequacy review to determine if the MVEB are adequate for conformity purposes. The EPA can make an adequacy finding on the new MVEB prior to approving other elements of this plan. This adequacy review process is subject to public participation and review requirements (40 CFR 93.118(f)).

The EPA will only find the MVEB to be adequate if the criteria are satisfied under 40 CFR 93.118(e)(4). This includes endorsement of the attainment plan by CARB after a public hearing (40 CFR 93.118(e)(4)(i)). The new emissions budgets developed as part of the 2015 ozone NAAQS Plan cannot supersede the MVEB already in an approved SIP (for the 2008 ozone NAAQS) for the years addressed by the previously approved implementation plan. Once the MVEB in this plan are approved by EPA, the MPOs in the SFNA must use the approved budgets to determine ozone conformity (40 CFR 93.109(c)(1)).

10.5 References

Bradley, M.A., et al. *Development and application of the SACSIM activity-based model system*. Submitted for presentation at the 11th World Conference on Transport Research, Berkeley, California. June [2007.]

---. 40 CFR (§93.100 - §93.152), *Determining Conformity of Federal Actions to State or Federal Implementation Plans. Subpart A—Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws.* Title 40 Code of Federal Regulations, Sec. 93. Revised as of 24 November 1993. Available at: < https://www.ecfr.gov/cgi-bin/text-idx?SID=8b2b0a46e78f13f33a2f0dbfa1b65288&mc=true&node=pt40.22.93&rgn=div5 >; Accessed: 07 June 2023.

SACOG. *2020 Metropolitan Transportation Plan/Sustainable Communities Strategy*. *Sacramento, CA: Sacramento Area Council of Governments.* 18 November [2019.] Web. 23 March 2020. < https://www.sacog.org/sites/main/files/file-attachments/2020_mtp-scs.pdf?1580330993 >

---. *Conformity Analysis. SACOG 2023-26 Metropolitan Transportation and Improvement Program (MTIP), Amendment #2 to the Metropolitan Transportation Plan – Sustainable Communities Strategy (MTP).* Sacramento, CA: Sacramento Area Council of Governments. 15 September 2022. Web 07 June 2023. < https://www.sacog.org/sites/main/files/file-attachments/final_2023-26_mtip_air_quality_conformity_analysis_0.pdf >

11 GENERAL CONFORMITY

11.1 Introduction to General Conformity

General conformity is the federal regulatory process that ensures major federal actions[41] or projects will not interfere with air quality planning goals. Clean Air Act (CAA) Section 176(c)(1) states that "no department, agency, or instrumentality of the Federal Government shall engage in, support in any way for provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated."

The 2015 National Ambient Air Quality Standard (NAAQS) State Implementation Plan (SIP) Requirements Rule (83 FR 62998) requires that federal agencies use the emissions inventory from an approved SIP's attainment or maintenance demonstration to support a conformity determination. Upon approval of this SIP, general conformity determinations will be based on the emissions inventory used to develop this plan[42].

The general conformity regulations and thresholds did not change as part of the 2015 NAAQS SIP Requirements Rule. The existing general conformity thresholds (also known as *de minimis* threshold levels) for an ozone severe nonattainment area of 25 tons per year of volatile organic compounds (VOC) or nitrogen oxides (NO_X) contained in 40 CFR 93.153(b)(1) will continue to apply for this plan. In practicality, this means that the emissions from any new major projects like transportation, construction, or other work where the federal government provides funding will need to be less than 25 tons per year for VOC or NO_X. Otherwise, the project must perform a general conformity demonstration.

This chapter summarizes general conformity requirements and emissions criteria for demonstrating general conformity.

11.2 General Conformity Requirements

The United States Environmental Protection Agency (EPA) established the conformity regulations for general federal actions (40 CFR 51.851 and 40 CFR 93 subpart B) under CAA section 176(c). The General Conformity Rule sets the requirements a federal agency must meet to make a conformity determination. General conformity does not allow federal agencies and departments to support or approve an action that does any of the following (40 CFR 93.153(g)(1)):

- Causes or contributes to new violations of any NAAQS in an area;
- Interferes with provisions in the applicable SIP for maintenance of any standard;

[41] Federal actions are defined as any activity engaged in by a department, agency, or instrumentality of the Federal government, or any activity that they support, fund, license, permit, or approve, other than activities related to transportation plans, programs, and projects that are applicable to transportation conformity requirements. (40 CFR 93.152)

[42] Otherwise, general conformity determination will be based on the last EPA SIP-approved plan.

- Increases the frequency or severity of an existing violation of any NAAQS; or
- Delays timely attainment of any NAAQS or any required interim emission reductions or other milestone.

11.3 Types of Federal Actions Subject to General Conformity Requirements

Examples of general federal actions that may require a conformity determination include, but are not limited to, the following: leasing of federal land, private construction on federal land, reuse of military bases, airport construction and expansions, construction of federal office buildings, highway construction and expansion, and construction or modifications of dams or levees. These actions are further discussed in 40 CFR 93.153.

General conformity requirements apply if direct or indirect emissions from a federal action have the potential to exceed the *de minimis* threshold levels established for each criterion or precursor pollutant in a nonattainment area or maintenance area. The thresholds are shown in 40 CFR 93.153(b)(1)(2). For a severe nonattainment area, the threshold level is 25 tons per year of VOC or NO_X.

Direct emissions of a criteria pollutant or its precursors are emissions that are caused or created by the federal action and occur at the same time and place as the action. Indirect emissions are reasonably foreseeable emissions that occur within the same nonattainment area as the project but are further removed from the federal action in time and/or distance and can be practicably controlled by the federal agency due to a continuing program responsibility (40 CFR 93.152). A federal agency can indirectly control emissions by placing conditions on federal approval or federal funding.

There are certain federal actions listed in 40 CFR 93.153 (c)(2)(i-xxii) that would result in no emissions increase, or an increase in emissions that is clearly *de minimis*. These actions include but are not limited to continuing and recurring activities such as permit renewals where activities conducted will be similar in scope and operation to the activities currently being conducted, and rulemaking and policy development and issuance.

11.4 Emissions Criteria for Demonstrating General Conformity

To meet the conformity determination emissions criteria, the total of direct and indirect emissions from a federal action must meet all relevant requirements and milestones contained in the applicable SIP (40 CFR 93.158(c)), and must meet other specified requirements, such as:

- For any criteria pollutant or precursor, the total of direct and indirect emissions from the action must be specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration (40 CFR 93.158(a)(1)); or
- For precursors of ozone, nitrogen dioxide, volatile organic compounds, or particulate matter, the total of direct and indirect emissions from the action must be fully offset

within the same nonattainment (or maintenance) area through a revision to the applicable SIP or a similarly enforceable emissions control measure in the SIP (40 CFR 93.158(a)(2)); or

- For ozone, the California Air Resources Board (CARB) or the local air district(s) must make a determination that either:
  - the total of direct and indirect emissions from the action will result in a level of emissions that, together with all other emissions in the nonattainment (or maintenance) area, will not exceed the emissions budget specified in the applicable SIP (40 CFR 93.158(a)(5)(i)(A)); or
  - the total of direct and indirect emissions from the action will result in a level of emissions that, together with all other emissions in the nonattainment (or maintenance) area, will exceed the emissions budget specified in the applicable SIP but the State Governor or designee for SIP actions makes a written commitment to EPA to take specific future actions[43] (40 CFR 93.158(a)(5)(i)(B)).

No additional emissions will be included in this plan for projects that would trigger general conformity thresholds. If general conformity is triggered, the project would be required to reduce or offset emissions to show that there is no emissions increase.

11.5 References

EPA. (83 FR 62998–63006) *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 83, 06 December 2018, p. 62998 – 63006. Web 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf >

[43] This includes the following: 1) A specific schedule for adoption and submittal of a revision; 2) Identification of specific measures for incorporation into the SIP; 3) A demonstration that all existing applicable SIP requirements are being implemented in the area; 4) A determination that the responsible Federal agencies have required all reasonable mitigation measures associated with their action; and 5) Written documentation including all air quality analyses supporting the conformity determination.

12 REASONABLE FURTHER PROGRESS (RFP) DEMONSTRATIONS

12.1 Introduction to RFP

Clean Air Act (CAA) Sections 172(c)(2), 182(b)(1), and 182(c)(2)(B) specifies the reasonable further progress (RFP) requirements for reducing emissions in ozone nonattainment areas. The purpose of the RFP demonstration is to ensure the area achieves a certain level of annual incremental reductions in emissions. The federal 2015 8-hour ozone National Ambient Air Quality Standard (NAAQS) State Implementation Plan (SIP) Requirements Rule requires that areas classified as "serious and above" must submit an RFP demonstration for the SIP (83 FR 63004).

12.2 RFP Demonstration Methodology

The methodology for demonstrating RFP is:

1) Prepare the base year and forecasted emissions inventories
2) Include available emission reduction credits (ERCs) in the future years
3) Assess creditable control measure reductions that are not included in the emission inventory
4) Calculate RFP emission reduction targets from the required precent reduction
5) Compare the emission reductions to RFP emission targets, and
6) Use nitrogen oxides (NO_X) substitution for volatile organic compounds (VOC) reduction shortfalls, if needed.

Step-by-step calculations are outlined in Section 12.3. The key elements to the RFP demonstration are described below:

12.2.1 Base Year and Forecasted Emissions Inventories

CAA Section 182(b)(1)(B) defines the baseline emissions as the total amount of actual VOC or NO_X emissions from all anthropogenic sources in the nonattainment area. For this RFP demonstration, the baseline emissions are from the 2017 base year VOC and NO_X inventories. These baseline emissions were used to calculate the required percent reduction targets in the future years. The forecasted VOC and NO_X emission inventory for the milestone years (2023, 2026, and 2029) and attainment year (2032) are used to quantify the emission reductions that are expected to be achieved since the 2017 base year. The future year emission forecasts are derived by projecting the baseline emissions using socio-economic growth indicators[44] and the effects of adopted control measures. See Chapter 5 for more information about the emission inventories.

[44] Socio-economic growth indicators include, but not limited to population, housing units, employment, vehicle miles traveled, and land use changes.

12.2.2 Available ERCs

ERCs that were created prior to the 2017 baseline year for the Sacramento Federal Nonattainment Area (SFNA) are added to the emission forecasts to ensure they will not interfere with RFP if they are used in the future. ERCs may be used as "offsets" to compensate for an increase in emissions from a new or modified major source regulated by the air districts or meet general conformity requirements. The amount of available ERCs are 3.63 tons per day of VOC and 2.8 tons per day of NO_X. See Section 5.6 of Chapter 5 for more information.

12.2.3 Creditable Control Measure Reductions

In the federal 2015 8-hour ozone NAAQS SIP Requirements Rule (83 FR 63004), all emission reductions from SIP-approved rules or federally promulgated measures that occur after the base year are creditable for purposes of the RFP, provided the reductions meet the requirements for creditability, i.e., that they are enforceable, permanent, quantifiable, and surplus. The emissions reductions from existing control regulations adopted and implemented after the 2017 base year and submitted to U.S. Environmental Protection Agency (EPA) for approval are applied to meet the RFP requirements. Most of these emission reductions were already accounted for in the forecasted emission inventories.

12.2.4 RFP Emission Reduction Targets

The RFP emission reduction targets are determined by the required percent reduction specified in the federal 2015 8-hour ozone NAAQS SIP Requirements Rule (83 FR 63004). It requires a nonattainment area to show a VOC emission reduction of at least 18% from the base year emissions inventory averaged over the first six years of the planning period, and additional 3% per year from base year emissions, averaged over consecutive 3-year period thereafter until attainment of the standard. For this plan, the SFNA must show 45% reduction of emissions between 2017 and 2032 (an 18% reduction from 2017 to 2023 and a 27% reduction between 2023 and 2032).

12.2.5 NO_X Substitution for VOC Reduction Shortfalls

CAA Section 182(c)(2)(C) allows for the substitution of NO_X emission reductions in place of VOC reductions to meet the RFP requirements. According to EPA's NO_X Substitution Guidance (EPA, 1993), the substitution of NO_X reductions for VOC reductions must be done on a percentage basis, rather than a straight ton-for-ton exchange[45].

[45] According to the guidance, substitution of NO_X reduction for VOC on a ton-for-ton basis could yield calculated NO_X reduction requirements, which exceed the available NO_X inventory in cases where the base VOC inventory greatly exceeds the NO_X inventory. In addition, the percentage basis is consistent with the RFP "percent" reduction requirements.

Thus, if there is a certain percent VOC reduction shortfall, an equal percentage reduction in NO_X emissions can be substituted to provide the equivalent reductions necessary for meeting the RFP goals toward attainment. For example, the 11.7% apparent shortfall in VOC in the 2023 milestone year can be met by substituting 11.7% NO_X reductions.

CAA Section 182(c)(2)(C) also states that NO_X may be substituted for VOC if the substitution will achieve ozone reductions equivalent to those that would be achieved using VOCs. EPA's NO_X Substitution Guidance (EPA, 1993) states that any combination of VOC and NO_X reductions is "equivalent" so long as the reductions are consistent with those identified as necessary to attain the NAAQS in the modeling demonstration and provide for steady progress in leading to the emission reductions identified as necessary to attain the NAAQS by the specified attainment year. Therefore, the cumulative amount of NO_X substitution reductions used toward the RFP requirement cannot be greater than the total NO_X reductions dictated by the modeled attainment demonstration. This attainment consistency requirement is meant to prevent the substitution of NO_X reductions that would not lead to progress toward attaining the ozone standard.

The current air quality modeling analysis performed by the California Air Resources Board shows attainment in 2032 with reductions from existing and already adopted VOC and NO_X control measures and committed statewide control measures. Furthermore, CARB conducted a sensitivity modeling analysis to determine how the changes of each ozone anthropogenic precursor in the baseline year will change the ozone DV at a particular monitoring site. This analysis was conducted by reducing NO_X or VOC by 45% from the baseline emissions in the SFNA. The sensitivity analysis results showed that both VOC and NO_X reductions provide ozone benefits in the Sacramento region, but NO_X reductions generally provide greater ozone benefits than VOC reductions. More details of the sensitivity analysis are available in Appendix B.1.3.6.

Therefore, a substantial use of NO_X substitution would be consistent with current analyses of ozone attainment strategies in the SFNA.

12.3 RFP Demonstrations

Tables 12-1 and 12-2 summarize the RFP calculations and whether the SFNA can demonstrate RFP. The first step in RFP demonstration shown in Table 12-1 is to determine whether the SFNA VOC reduction alone can meet the RFP requirements. The total VOC emissions were used, which included the VOC emission inventory for the milestone and attainment year, available ERCs, and consideration of other creditable control measure reductions that were not included in the emissions inventory (Row D). For this RFP demonstration, only the available ERCs are included. The total VOC emissions are compared to the RFP target VOC levels. The RFP target VOC levels for the milestone and attainment years (Row F) are calculated by applying the required RFP precent reduction (Row E) to base year total emissions (Row D Base Year). If the

milestone and attainment years VOC emissions are less than the corresponding target VOC levels (indicated as a zero or negative amount), the RFP is met for that milestone or attainment year; otherwise, the difference (indicated as a positive amount) is the shortfall in VOC reduction. The VOC reduction shortfalls were compared with the baseline emissions and converted to percent shortfalls (Row H). The NO_X percent change in reduction in next table will be compared to the VOC percent shortfall to determine if the SFNA can demonstrate RFP. The row description shows the details for each calculation step.

Table 12-1 VOC Calculation for RFP Demonstration

Row	Calculation Steps	2017	2023	2026	2029	2032
A	VOC Emissions (tons /day)	96.64	87.20	84.24	81.49	79.92
B	VOC ERCs (tons/day)		3.63	3.63	3.63	3.63
C	Motor Vehicle Emissions Budgets (MVEB) Rounding Margin		0.02	0.02	0.03	0.00
D	Total VOC Emissions (tons/day)	96.64	90.86	87.89	85.15	83.55
E	Required Percent Change Since Previous Milestone Year (%)	--	18	27	36	45
F	RFP Target VOC Level (tons/day)	--	79.24	70.55	61.85	53.15
G	Cumulative Milestone Year Shortfall (tons/day)	--	11.61	17.34	23.30	30.40
H	Cumulative Shortfall in VOC (%)	--	12.0	17.9	24.1	31.5

Row Description

A VOC emission inventory used for RFP demonstration; Baseline, milestone, and attainment year Emission Inventory (Chapter 5), which includes the benefits of existing rules and accounts for projected growth in the future years

B VOC ERCs are the VOC ERCs weighted averaged between Quarters 2 and 3 and added to the future years. See Chapter 5.6 for a detailed discussion on ERCs

C In order to demonstrate consistency between the RFP demonstration and the MVEB, a line item adjustment is made in the RFP demonstration to account for the differences in the on road mobile source emissions projections in the CEPAM inventory and the MVEB, which is rounded up to the nearest tenth of a ton

D Total VOC Emissions are the VOC emission inventory plus the VOC ERCs (Row A + Row B + Row C)

E RFP requires 18% reduction 6 years after base year; future milestone years are every 3 years until the attainment year; and RFP requires reductions of 3% per year at each milestone year (e.g., for every 3 years, required 9% reduction)

F RFP Target VOC Level = [(2017 Base Year Row D) x (1 – Row E/100)]; e.g., for 2032, 96.64 tpd x (1 – 45/100)= 53.15 tpd

G [(Row D) – (Row F)] or (Baseline – Target); zero or negative number meets target level and positive number is a shortfall of target level; e.g., for 2032, 83.55 tpd - 53.15 tpd = 30.40 tpd

H [(Row G) / (Row D Base Year) x 100]; e.g., for 2032, cumulative shortfall is 30.40 tpd /96.64 tpd = 31.5%

Table 12-1 shows that VOC reductions are not sufficient to meet the RFP requirements as the milestone and attainment year VOC emission levels are above the target VOC levels. As discussed in Section 12.2.3, the CAA Section 182(c)(2)(C) allows for NO_X reductions to substitute for emission reductions needed to demonstrate RFP. Therefore, projected milestone and attainment year NO_X emission reductions are used to substitute the VOC reduction shortfall and to meet the target VOC levels.

Table 12-2 shows the steps for NO_X reduction substitution. Similar to Table 12-1, the total SFNA NO_X emissions were calculated, which included the NO_X emission inventories and the available NO_X ERCs (Row L). The milestone and attainment years NO_X emissions were compared to the 2017 baseline NO_X emissions. The differences in NO_X emissions between the milestone and attainment years and the baseline emissions are reductions in NO_X emissions since 2017 (Row M) and are reflected as percentage reductions (Row N). The percent of NO_X emissions reduction was compared to the percent of VOC reduction shortfall (Row O). If the percent of NO_X emissions reduction is greater than the percent of VOC reduction shortfall (if Row P is a positive number), then it indicates that there is a surplus of emission reductions, and RFP is met.

Table 12-2 NO_X Substitution Calculation for RFP Demonstration

Row	Calculation Steps	2017	2023	2026	2029	2032
I	NO_X Emissions (tons/day)	70.6	47.62	40.39	36.93	34.16
J	NO_X ERCs (tons/day)		2.80	2.80	2.80	2.80
K	MVEB Rounding Margin		0.05	0.01	0.00	0.00
L	Total NO_X Emissions (tons/day)	70.6	50.42	43.19	39.73	36.96
M	Reductions in NO_X Emissions since Base Year (tons/day)	--	20.18	27.41	30.87	33.64
N	Percent Reductions in NO_X Emissions since Base Year (%)	--	28.6	38.8	43.7	47.6
O	Cumulative Shortfall in VOC (%) (Row G in Table 12-1)	--	12.0	17.9	24.1	31.5
P	Percent Surplus Reduction (%)	--	16.6	20.9	19.6	16.2
Q	**RFP Met?**	**--**	**YES**	**YES**	**YES**	**YES**

Row Description

I NO_X emission inventory used for RFP demonstration; Baseline, milestone, and attainment year emission inventory (Chapter 5), which includes the benefits of existing rules and accounts for projected growth in the future years

J NO_X ERCs are the NO_X ERCs averaged between quarters 2 and 3 and added to the future years. See Chapter 5.6 for a detailed discussion on ERCs

K Same as Row C

L Total NO_X Emissions are the NO_X emission inventory plus the NO_X ERCs (Row I + Row J + Row K)

M Reductions achieved since 2017 base year: [(Row L Base Year) – (Row L Milestone Year or Attainment Year)]; e.g., for 2032: 70.60 tpd – 34.16 tpd = 33.64 tpd

N Percent reductions achieved since 2017 base year: [(Row M) / (Row L Base Year)] x 100; e.g., for 2032: (33.64/70.6) x 100 = 47.6

O Cumulative VOC shortfall from Row H in Table 12-1

P Surplus reductions achieved [(Row N) – (Row O)]; e.g., for 2032: 47.6 % – 31.5% = 16.2%

Q Positive numbers in Row P represent surplus for each milestone year or attainment year, thus indicating that the SFNA meets the RFP.

The demonstration evaluated RFP to 2032, which is the 2015 ozone standard attainment year for the SFNA. For each of the milestone years, the required progress is met based on the reductions from the existing control program using a combination of VOC and NO_X substitution reductions within the SFNA. The SFNA meets the RFP targets for the milestone years (2023, 2026, 2029) and attainment year (2032) for this plan.

12.4 References

EPA. *NO_X Substitution Guidance*. Research Triangle Park, NC: United States Environmental Protection Agency Office of Air Quality Planning and Standards, December [1993.] Web 08 June 2023. < https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/19931201_oaqps_nox_substitution_guidance.pdf >

---. (83 FR 62998–63036) *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements: Final Rule.* Federal Register, Volume 83, 06 December 2018, p. 62998 – 63006. Web 01 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf >

13 SUMMARY AND CONCLUSIONS

13.1 2015 8-hour Ozone Designation and Classification

The United State Environmental Protection Agency (EPA) lowered the health-based 8-hour ozone National Ambient Air Quality Standards (NAAQS) in 2015 from 75 parts per billion (ppb) to 70 ppb. The Sacramento Federal Nonattainment Area (SFNA), which includes all of Sacramento and Yolo counties and portions of Placer, El Dorado, Solano, and Sutter counties, was classified as a serious nonattainment for this standard. Attainment of the 2015 ozone standard by the serious attainment date was not practical, and the SFNA air districts have requested to be reclassified to Severe-15. This plan was developed for the Severe-15 classification, which gives the SFNA an attainment deadline of no later than August 3, 2033.Attainment of the 2015 ozone standard will be shown by the data from the last full year prior to the attainment deadline, referred to as the attainment year, or 2032.

13.2 Ozone Trends

Ambient air quality data are collected at multiple monitoring sites throughout the SFNA. As of the end of 2022, the air quality monitoring network in the SFNA included 15 active ozone monitoring stations that are operated by local air districts or the California Air Resources Board (CARB). Ozone data and trends from 2000 to 2021 were used for the analysis in this plan to assess the progress the SFNA has made in improving air quality and determine if the region can attain the standard by the attainment date. This analysis evaluated the number of days exceeding the 8-hour ozone standard and compared the design values to the 2015 ozone standard.

The number of days exceeding the 8-hour 2015 ozone standard recorded at the peak monitoring sites fluctuated from year to year due to meteorological variability and changes in precursor emission patterns. Most exceedances of the 2015 ozone standard occurred at the following monitoring sites - Cool, Folsom, Placerville, Lincoln, and Auburn. From 2000 to 2021, the number of exceedance days declined from the peak of 66 days in 2000 to 34 days in 2021 (Figure 13-1). In addition, the SFNA peak design value, three-year average of the fourth highest concentrations, was calculated to be 107 ppb in 2000 and decreased to 82 ppb in 2021 (Figure 13-2), a 25 ppb reduction. Although the reductions in ozone concentration occurred at varying rates depending on the site, a downward trend was observed at all SFNA monitoring stations. It ranged per site from a declining rate of 0.40 ppb per year to as high as 1.53 ppb per year. These analyses were conducted with all data, despite wildfire impacts during several years.

This downward trend in the number of days exceeding the 8-hour ozone standard and the design value indicate that the SFNA will continue to progress towards attainment barring any substantial impacts from wildfires.

Figure 13-1 3 2015 O_3 NAAQS Exceedance Days Count Trend at the highest count monitor in SFNA

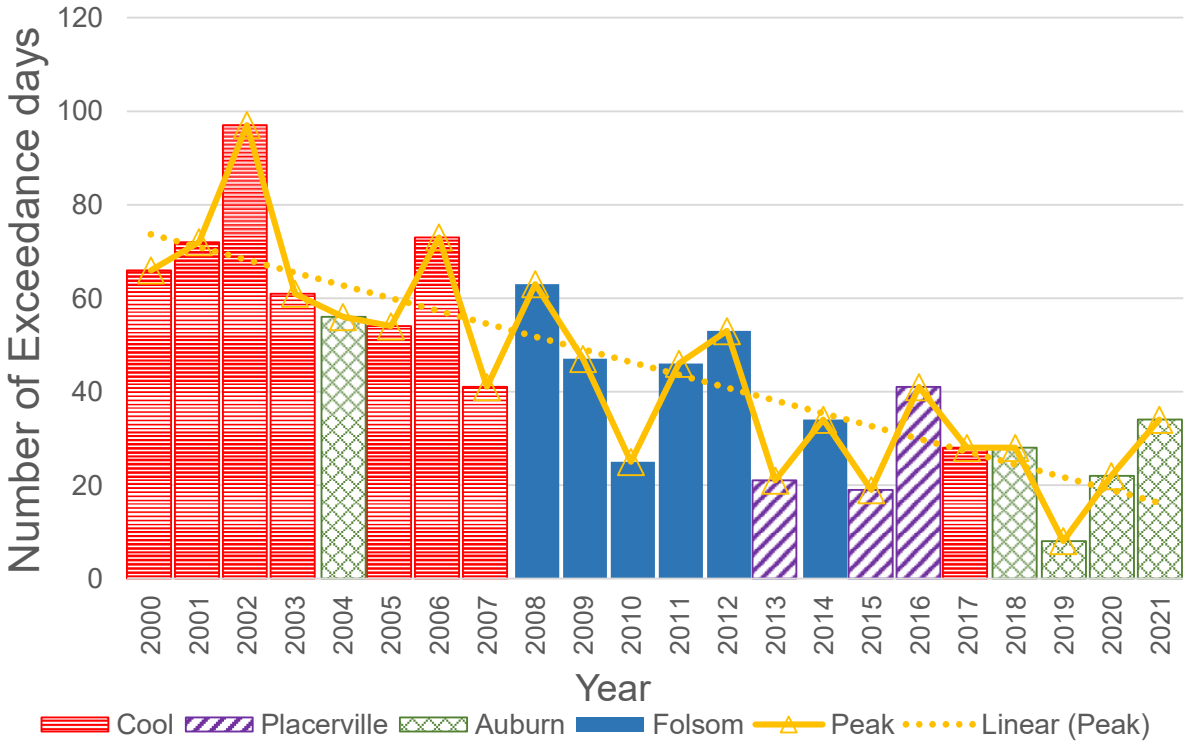
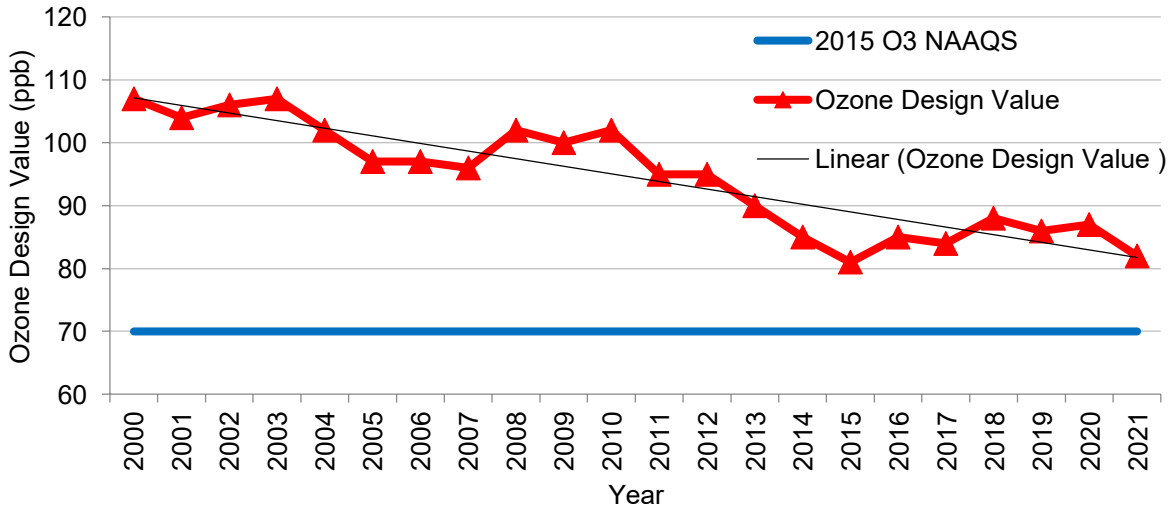


Figure 13-2 Peak 8-Hour Ozone Design Value Trends in the SFNA (2000 – 2021)

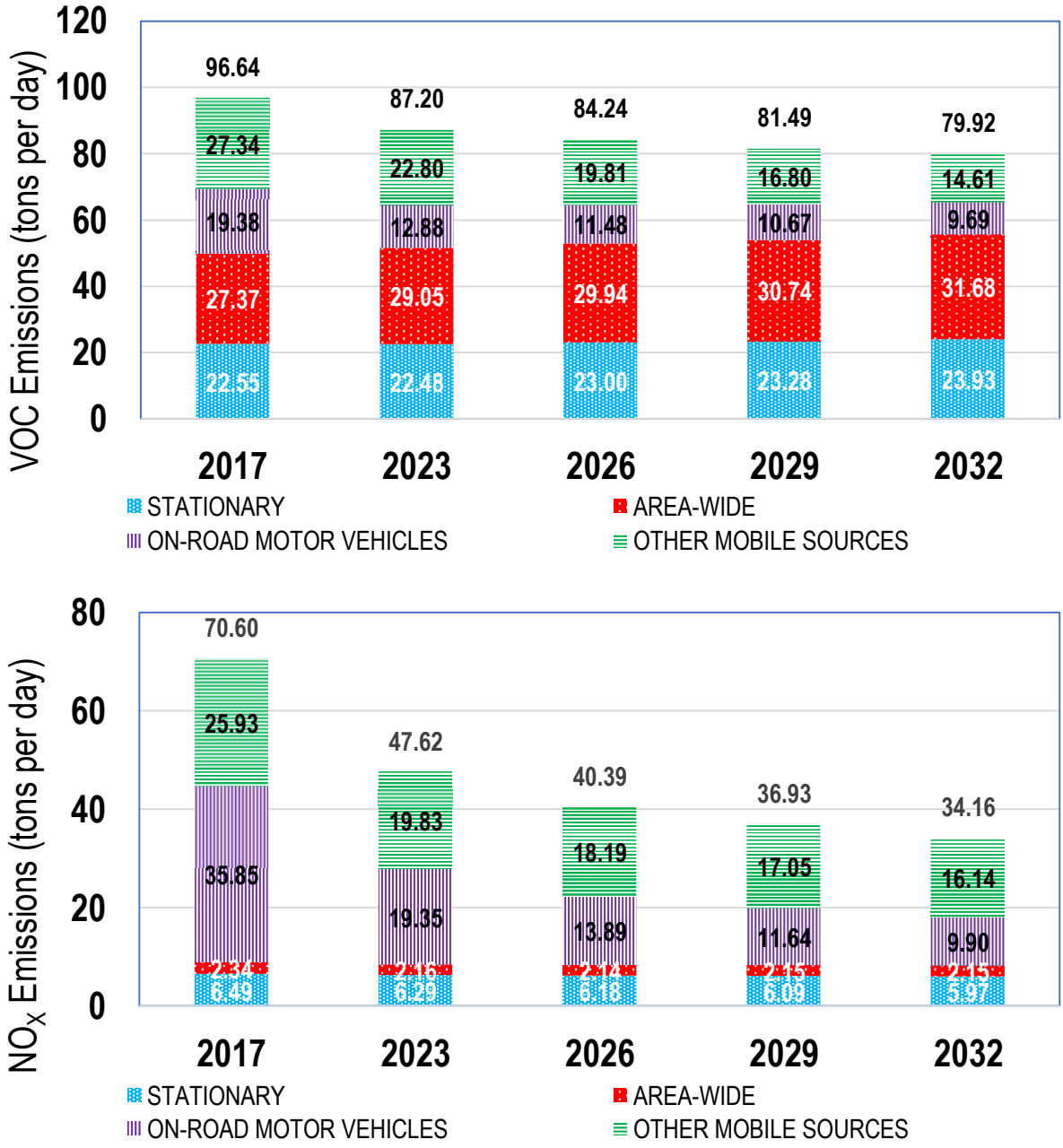


Sources: 1990-2020 Design Values were extracted from AQS Report (AMP 480) and downloaded on December 22, 2021. 2021 DV is calculated based on the combination of the AQS data and preliminary AQMIS data downloaded on 02/16/2022.
Notes: The SFNA was impacted by wildfires in summer 2018 which causes unusual high 4th highest ozone concentration for 2018. The peak design value calculation in this chart included the days impacted by wildfires and demonstrated a declining trend, despite smoke impacts.

13.3 VOC and NO_X Emissions Inventory

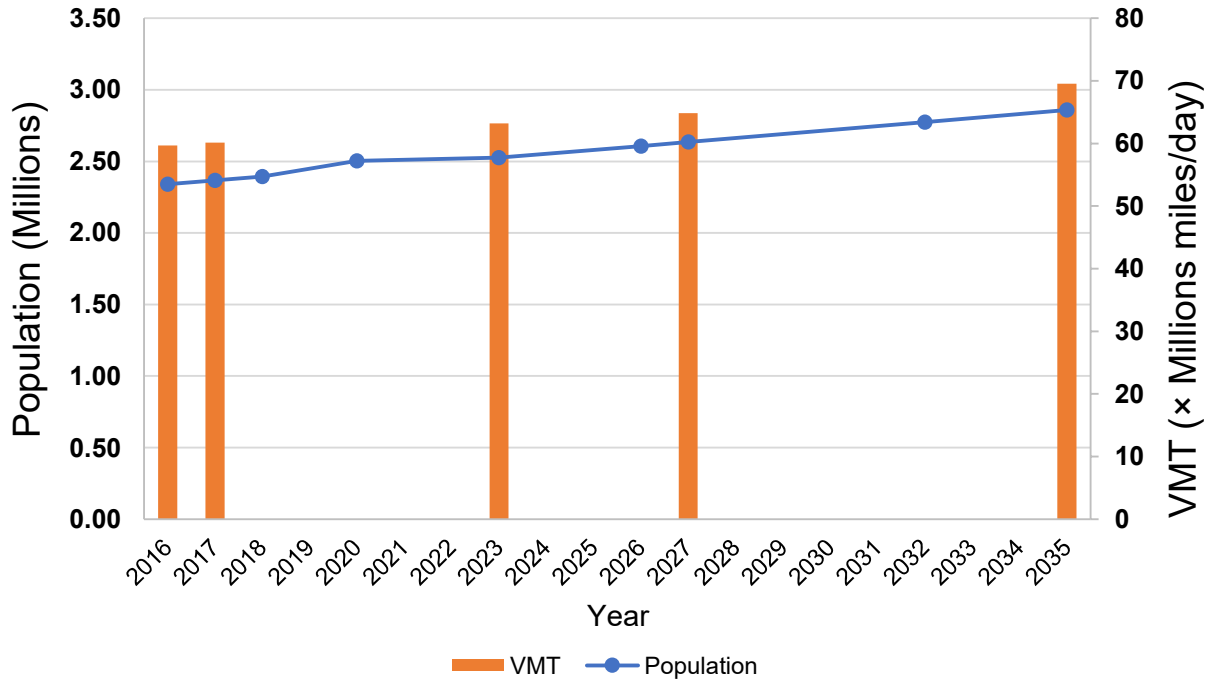
This plan provides the emissions inventories for 2017 (baseline), 2023, 2026, 2029 (milestone years), and 2032 (attainment year), which are summarized in Figure 13-3. The 2017 base year anthropogenic planning emissions inventory for the SFNA was estimated to be 97 of Volatile Organic Compounds (VOC) and 71 tons per day (tpd) of Nitrogen Oxides (NO_X). In 2032, the forecasted emissions inventory will be 80 tpd and 34 tpd of VOC and NO_X, respectively. Between 2017 and 2032, the emissions inventory is expected to decrease by about 17% for VOC and by about 52% for NO_X due to implementation of existing and future controls despite the increases in vehicle miles traveled (VMT) and population in the SFNA during the same period (Figure 13-4).

Figure 13-3 SFNA VOC and NO_X Planning Inventory Forecasts



Source: (CARB, 2022), does not include NO_X Emissions Reduction Credits (ERCs) identified in Section 5.6.

Figure 13-4 SFNA Population Growth and VMT Forecast



Sources:

1. VMT of Sacramento Area Council of Governments (SACOG) area from SACOG in 04/24/2023
2. VMT of Solano County – Sacramento Valley (SV) for future years from SACOG 04/24/2023
3. VMT of Solano County (SV) for past years from the 2008 O3 NAAQS SIP Plan
4. Population of SACOG Counties from SACOG in 09/02/2021
5. Solano County Population data from CA Dept of Finance population data P2A. Download on 04/26/2023.
6. 2020 SFNA population is from Census 2020

The planning emissions inventories also include NO_X and VOC ERCs in the milestone and attainment years as shown in Table 13-1. This inclusion accounts for any potential future growth that uses ERCs to offset the emissions in the SFNA.

Table 13-1 SFNA Summer Planning Emissions Inventory (tons per day)

Year	VOC Emissions Inventory	VOC ERCs	Total VOC Planning Emissions Inventory	NO_X Emissions Inventory	NO_X ERCs	Total NO_X Planning Emissions Inventory
2017	96.64		96.64	70.60		70.60
2023	87.20	3.63	90.83	47.62	2.80	50.42
2026	84.24		87.87	40.39		43.19
2029	81.49		85.12	36.93		39.73
2032	79.92		83.55	34.16		36.96

13.4 Attainment Modeling and Analysis

Photochemical modeling (Appendix B) was conducted to simulate base case episodes of high ozone formation. The photochemical model used the 2018 baseline year emissions inventories and 2032 future year emissions forecasts to determine if the SFNA could attain the 2015 ozone standard by the attainment date with existing control programs and new statewide control measures.

The modeling results showed a relative decline in future ozone concentrations and predicted attainment at all ozone monitors by 2032[46] as shown in Table 13-2. It showed that the peak design value of 69.8 ppb was at the Colfax monitoring station in 2032. In addition, the modeling results indicated that both VOC and NO_X reductions provide ozone benefits in the SFNA, but that NO_X reductions are much more effective than VOC reductions. The modeling results were also supported by a Weight of Evidence analysis.

Table 13-2 Baseline (2018) and Future Design Value (DV) (2032) Ozone Concentrations

Region	Site	DV2018	DV2032	DV2032t*
Eastern	Colfax	83.7	69.8	69
	Placerville	84.0	69.6	69
	Auburn[1]	81.7	68.3	68
	Cool	81.7	68.2	68
Central	North Highlands	74.7	64.8	64
	Folsom	76.7	64.7	64
	Roseville	76.3	64.2	64
	Del Paso Manor	72.0	62.4	62
	Sloughhouse	71.3	62.1	62
	Sac T Street	66.3	60.0	60
Western	Elk Grove	67.7	61.8	61
	Woodland	66.7	58.4	58
	Vacaville	64.0	58.2	58
	Davis-UCD	62.3	56.5	56

* DV2023t is the truncated value for DV2032.

13.5 Control Measures

The photochemical modeling showed that the SFNA can attain the standard by 2032 by relying on existing control programs and new commitments for statewide control

[46] The statutory attainment date for a "Severe-15" nonattainment area is August 3, 2033 (83 FR 25776). To demonstrate attainment by this date, data is used from 2030, 2031 and 2032 to determine the design value.

measures. Federal, state, regional, and local air management programs will continue to do their part by reducing ozone precursor emissions. One of the existing programs is the transportation control measure, the Spare the Air Program, which was approved and is funded by SACOG and will continue through 2032. For new control measure commitments, CARB is working on measures for on-road heavy-duty and light-duty vehicle, off-road equipment, and other non-mobile sources like consumer products, space and water heaters, and pesticides (Table 13-3).

Table 13-3 Statewide Control Measures and Schedule

Measure	Agency	Action	Implementation Begins
On-Road Heavy-Duty			
Advanced Clean Fleets Regulation	CARB	2023	2024
Zero-Emissions Trucks Measure	CARB	2028	2030
On-Road Light-Duty			
On-Road Motorcycle New Emissions Standards	CARB	2022	2025
Clean Miles Standard	CARB	2021	2023
Off-Road Equipment			
Tier 5 Off-Road Vehicles and Equipment	CARB	2025	2029
Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation	CARB	2022	2024
Transport Refrigeration Unit Regulation Part 2	CARB	2026	2028
Commercial Harbor Craft Amendments	CARB	2022	2023
Cargo Handling Equipment Amendments	CARB	2025	2026
Off-Road Zero-Emission Targeted Manufacturer Rule	CARB	2027	2031
Clean Off-Road Fleet Recognition Program	CARB	2025	2027
Spark-Ignition Marine Engine Standards	CARB	2029	2031
Other			
Consumer Products Standards	CARB	2027	2028
Zero-Emission Standard for Space and Water Heaters	CARB	2025	2030
Enhanced Regional Emission Analysis in State Implementation Plans[47]	CARB	2025	2023
Pesticides: 1,3-Dichloropropene Health Risk Mitigation	DPR[48]	2022	2024
Primarily-Federally and Internationally Regulated Sources – CARB Measures			
In-Use Locomotive Regulation	CARB	2023	2024
Future Measures for Aviation Emission Reductions	CARB	2027	2029

CARB, the SFNA air districts and SACOG conducted a Reasonably Available Control Measures (RACM) analysis as required by CAA Sections 172(a)(2)(A) and 181(a) to see if the SFNA can meet the air quality standards "as expeditiously as practicable." This is

47 CARB finalization
48 California Department of Pesticide Regulation

interpreted to mean whether other measures would enable the SFNA to advance attainment by an additional year and have an attainment year of 2031 instead of 2032. Results from the RACM analysis showed that the collection of all reasonably available control measures could not advance attainment by one year.

13.6 Contingency Measures

The SFNA air districts and CARB are committed to meeting the contingency measures requirements required by the CAA. EPA has drafted updates to its guidance to help local and state agencies identify and develop contingency measures, and this draft guidance is undergoing a public review. As the final EPA guidance is awaiting finalization, CARB is proposing amendments to the Smog Check program as a statewide contingency measure. At the local levels, the SFNA air districts commit to amend the architectural coatings rules to include contingency provisions and more restrictive requirements that will go into effect if EPA finds that the SFNA has failed to meet RFP or failed to attain the NAAQS by the attainment deadline. Each air district will take its amended rule to its respective air district board for adoption prior to submitting the amended rule to CARB and EPA. The SFNA air districts also commit to re-evaluate the contingency measure requirements upon EPA's issuance of the final guidance on contingency measures. If additional contingency measures are needed, the SFNA air districts will amend the SIP to include them.

13.7 Ozone Transport

The air quality in the SFNA can be impacted by pollutant transport from the San Francisco Bay Area and the San Joaquin Valley. CARB's photochemical modeling included both transported emissions and emission reductions from statewide and upwind regions' control measures. These statewide control measures, especially the mobile source measures, will continue to bring emission reduction benefits to all nonattainment areas in California, including the SFNA. Other upwind air districts will also continue their efforts to implement air quality programs to reduce emissions. The total emission reductions from existing federal, state, regional, and local programs along with new state commitments will ensure the Sacramento region will meet the 2032 attainment deadline.

13.8 Transportation Conformity

Conformity with the SIP requires that transportation activities not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. This plan establishes the motor vehicle emissions budgets (MVEB) for demonstrating conformity with the SIP. When the MVEB are approved by EPA, the local Metropolitan Planning Organizations must ensure that the aggregate transportation emissions in the SFNA stay below or equal to these levels when approving new metropolitan transportation plans and transportation improvement programs. Table 13-4 summarizes the proposed MVEB for the 2023, 2026, and 2029 milestone years, and the 2032 attainment year.

Table 13-4 SFNA Proposed New MVEB

Sacramento Totals (Tons/Day)	2023		2026		2029		2032	
	VOC	NO_X	VOC	NO_X	VOC	NO_X	VOC	NO_X
MVEB	12.9	19.4	11.5	13.9	10.7	11.6	9.3	8.6

13.9 General Conformity

There were no changes to the general conformity regulations made as part of the 2015 NAAQS implementation rule. The existing de minimis emissions levels of 25 tons per year of VOC or NO_X as specified in 40 CFR 93.153(b)(1) continues to apply in the SFNA. If general conformity is triggered, the project would be required to reduce emissions to show that there is no emissions increase, or that those emissions are already accounted for in this plan.

13.10 Reasonable Further Progress Demonstration

The SFNA is required to demonstrate reasonable further progress (RFP), which is 3% reduction of VOC per year until the attainment date or a total of 45% VOC reduction from baseline in 2032. The RFP demonstration is performed for 2023, 2026, 2029 (milestone years), and 2032 (attainment year).

In the SFNA, NO_X emission reductions are more effective in reducing ozone concentrations. Because of this, the SFNA is allowed to use NO_X substitution to help show RFP. The NO_X substitution is used on a percentage basis to cover any VOC percentage shortfalls for the RFP demonstration. Using both VOC and NO_X substitution reductions, the SFNA has the emission reductions to meet RFP for the milestone and attainment years.

The SFNA is also required to develop a progress report (also known as milestone compliance demonstration) to evaluate whether actual emission reductions meet the RFP targets. These reports will be required to be submitted no later than 90 days after the date of the milestone years (2023, 2026, and 2029). The first milestone report will be due on March 31, 2024.

13.11 Overall Conclusion

The Sacramento Regional 2015 NAAQS 8-Hour Ozone Attainment and Reasonable Further Progress Plan satisfies the federal ozone planning requirements for Sacramento Federal Nonattainment Area for the severe classification. This plan includes ozone trends, emissions inventories, photochemical modeling, attainment demonstration, ozone transport, transportation and general conformity, MVEB, and RFP demonstration. This plan relies on existing federal, state, regional and local control programs and includes commitments for new statewide control and contingency measures and local contingency

measures to attain the 2015 ozone standard by the end of 2032. The attainment of the standard is supported by photochemical modeling and the weight of evidence, which show that all future design values of the SFNA ozone monitors are below 70 ppb.

13.12 References

CA Dept of Finance. *P2-A Total Population for California and Counites.* Sacramento, CA: State of California, Department of Finance. Web 26 April 2023. < https://dof.ca.gov/wp-content/uploads/sites/352/2023/07/P2A_County_Total.xlsx >

CARB. CEPAM: External Adjustment Reporting Tool. Base Year: 2017. 28 April 2022. Web. 5 May 2022. < https://www.arb.ca.gov/app/emsinv/2019ozsip/fcmasterdetail_sip2019.php >

EPA. (83 FR 25776–25848) *Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards: Final Rule.* Federal Register, Volume 83, 4 June 2018, p. 25776 – 25848. Web 05 June 2023. < https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf >

SACOG. Email to Steven Lau (SMAQMD). 2 September 2021.

---. Email to Steven Lau (SMAQMD). 24 April 2023.

U.S. Census Bureau. “2020 Census Results” United States Census Bureau. Web 16 August 2023. < https://www.census.gov/programs-surveys/decennial-census/decade/2020/2020-census-results.html >