

Technical Support Document:

Chapter 6

Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for California

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, we, or us) must designate areas as either “nonattainment,” “attainment,” or “unclassifiable” for the 2010 1-hour sulfur dioxide (SO₂) primary national ambient air quality standard (NAAQS) (2010 SO₂ NAAQS). The CAA defines a nonattainment area as an area that does not meet the NAAQS or that contributes to a nearby area that does not meet the NAAQS. An attainment area is defined by the CAA as any area that meets the NAAQS and does not contribute to a nearby area that does not meet the NAAQS. Unclassifiable areas are defined by the CAA as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS. In this action, the EPA has defined a nonattainment area as an area that the EPA has determined violates the 2010 SO₂ NAAQS or contributes to a violation in a nearby area, based on the most recent 3 years of air quality monitoring data, appropriate dispersion modeling analysis, and any other relevant information. An unclassifiable/attainment area is defined by the EPA as an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO₂ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS¹. An unclassifiable area is defined by EPA as an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO₂ NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

This technical support document (TSD) addresses designations for all areas in California for the 2010 SO₂ NAAQS. In previous final actions, the EPA has issued designations for the 2010 SO₂

¹ The term “designated attainment area” is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA’s approval of a state-submitted maintenance plan.

NAAQS for selected areas of the country.² No areas in California were designated in these previous final actions. The EPA is under a deadline of December 31, 2017, to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.³ We are referring to the set of designations being finalized by December 31, 2017, as “Round 3” of the designations process for the 2010 SO₂ NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state has installed and begun timely operation of a new SO₂ monitoring network meeting EPA specifications referenced in EPA’s SO₂ Data Requirements Rule (DRR) (80 FR 51052). The EPA is required to designate those remaining undesignated areas by December 31, 2020.

California submitted its recommendations regarding designations for the 2010 SO₂ NAAQS on June 20, 2011, and recommended all air basins in California be designated as attainment.⁴ The Pechanga Band of Luiseño Indians (Pechanga Band) submitted a recommendation letter for the 2010 SO₂ NAAQS on May 31, 2011, recommending a designation of attainment for its reservation.⁵ The Pechanga Reservation covers approximately 6,700 acres in southern Riverside County and 119 acres in San Diego County. On December 17, 2015, California submitted a 2013 inventory of the 30 largest emitters of SO₂ in California, indicating that no facility alone emits SO₂ in excess of 2,000 tons per year (tpy).⁶ On March 18, 2016, the EPA notified California that the EPA had identified three sources, located in close proximity to each other, that together emit over 2,000 tons of SO₂ per year, that the EPA would be adding to the list of sources under the DRR requiring characterization.⁷ On June 29, 2016, California notified the EPA that the Bay Area Air Quality Management District (the District) would characterize air quality around the three facilities using an existing ambient air quality monitor.⁸ On September 29, 2016, the District submitted a modeling analysis of the suitability of the existing SO₂ monitoring station in Martinez, Contra Costa County, California, to fulfill the monitoring requirement in the SO₂ DRR, and on October 5, 2016, the District provided additional information regarding its modeling analysis.⁹ The District posted its submittal, dated September 29, 2016, on its website for public comment until October 31, 2016, and did not receive any comments on its analysis. On December 6, 2016, the EPA approved the location of the existing Martinez monitoring

² A total of 94 areas throughout the U.S. were previously designated in actions published on August 5, 2013 (78 FR 47191), July 12, 2016 (81 FR 45039), and December 13, 2016 (81 FR 89870).

³ *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

⁴ See letter dated June 20, 2011, from James Goldstene, California Air Resources Board, to Jared Blumenfeld, EPA Region IX.

⁵ See letter dated May 31, 2011, from Mark Macarro, Tribal Chairman, to Jared Blumenfeld, EPA Region IX.

⁶ See letter dated December 17, 2015, from Karen Magliano, California Air Resources Board, to Jared Blumenfeld, EPA Region IX.

⁷ See letter dated March 18, 2016, from Jared Blumenfeld, EPA Region IX, to Kurt Karperos, California Air Resources Board.

⁸ See letter dated June 29, 2016, from Karen Magliano, California Air Resources Board, to Elizabeth J. Adams, EPA Region IX.

⁹ See the modeling analysis attached to the letter dated September 29, 2016, from Eric D. Stevenson, Bay Area Air Quality Management District, to Anita Lee, EPA Region IX, and additional information in the Interoffice Memorandum dated October 3, 2016 from Ted Hull, Bay Area Air Quality Management District, to Katherine Hoag, Bay Area Air Quality Management District, provided to the EPA by electronic mail on October 5, 2017.

station to satisfy monitoring requirements under the DRR.¹⁰ On March 23, 2017, the District provided additional information in response to a request for clarifying information from the EPA.¹¹ In our intended designations, we have considered all the submissions from the state.

For the areas in California, Table 1 identifies the EPA's intended designations and the counties or portions of counties to which they would apply. We intend to designate each Air Basin as defined by California as a separate designated area. The EPA intends to include areas of Indian country in the designations for the counties or air basins within which the tribe is geographically located. Table 1 also lists California's recommendations. The EPA's final designation for these areas will be based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Summary of the EPA's Intended Designations and the Designation Recommendations by California

Area/County	California's Recommended Area Definition	California's Recommended Designation	EPA's Intended Area Definition*	EPA's Intended Designation
San Francisco Bay Area <ul style="list-style-type: none"> • Sonoma County (p) • Napa County • Solano County (p) • Contra Costa County • Alameda County • Santa Clara County • San Mateo County • San Francisco County • Marin County 	San Francisco Bay Area Air Basin	Attainment	San Francisco Bay Area Air Basin	Unclassifiable/Attainment

¹⁰ See letter dated December 6, 2016, from Gwen Yoshimura, EPA Region IX, to Eric Stevenson, Bay Area Air Quality Management District.

¹¹ See email from Katherine Hoag, Bay Area Air Quality Management District, to Carol Bohnenkamp, EPA Region IX, dated March 23, 2017 that includes two attachments.

Area/County	California's Recommended Area Definition	California's Recommended Designation	EPA's Intended Area Definition*	EPA's Intended Designation
Remaining Areas in California**	<ul style="list-style-type: none"> • North Coast Air Basin • North Central Coast Air Basin • South Central Coast Basin • South Coast Air Basin • Northeast Plateau Air Basin • Sacramento Valley Air Basin • San Joaquin Valley Air Basin • Great Basin Valleys Air Basin • Mojave Desert Air Basin • San Diego Air Basin • Mountain Counties Air Basin • Lake County Air Basin • Lake Tahoe Air Basin • Salton Sea Air Basin 	Attainment	<ul style="list-style-type: none"> • Remaining Air Basins as recommended by California 	Unclassifiable/Attainment

* Includes areas of Indian country located within each county or air basin.

** The EPA intends to designate the remaining I Air Basins in California as “unclassifiable/attainment” as these areas were not required to be characterized by the state and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. The areas included in each of these Air Basins are identified more specifically in Section 4 of this TSD.

For states that elect to install and begin operation of a new, approved SO₂ monitoring network, the EPA is required to designate these areas, pursuant to a court ordered schedule, by December 31, 2020. California has not elected to install a new SO₂ monitoring network.

Areas that the EPA previously designated unclassifiable in Round 1 (*See* 78 FR 47191) and Round 2 (*See* 81 FR 45039 and 81 FR 89870) are not affected by the designations in Round 3 unless otherwise noted. No areas in California were designated in Rounds 1 or 2.

2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a memorandum dated July 22, 2016, and a memorandum dated March 20, 2015, from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. These memoranda supersede earlier designation guidance for the 2010 SO₂ NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO₂ NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. These factors include: 1) air quality characterization via ambient monitoring or dispersion modeling results; 2) emissions-related data; 3) meteorology; 4) geography and topography; and 5) jurisdictional boundaries.

To assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling for sources that emit SO₂, the EPA released its most recent version of a draft document titled, “SO₂ NAAQS Designations Modeling Technical Assistance Document” (Modeling TAD) in August 2016.¹²

Readers of this chapter of this TSD should refer to the additional general information for the EPA’s Round 3 area designations in Chapter 1 (Background and History of the Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the court order dated March 2, 2015, the EPA is required to designate by December 31, 2017, all “remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO₂ monitoring network meeting EPA specifications referenced in EPA’s” SO₂ DRR. The areas to be designated by December 31, 2017, include the area associated with a cluster of three sources in California that were listed sources under the DRR that the state has chosen to be characterized using an existing ambient air monitor, and other areas not specifically required to be characterized by the state under the DRR. The District submitted a modeling demonstration and additional supporting information to show that the location of the existing ambient air monitor is appropriate to satisfy DRR monitoring

¹² <https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf>. In addition to this TAD on modeling, the EPA also has released a technical assistance document addressing SO₂ monitoring network design, to advise states that have elected to install and begin operation of a new SO₂ monitoring network. *See* Draft SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, <https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf>.

requirements for the cluster of three sources, because it captures the maximum highest concentration areas resulting from SO₂ emissions from the cluster of three sources.

The EPA does not plan to revise this TSD after consideration of state and public comment on our intended designation. A separate TSD will be prepared as necessary to document how we have addressed such comments in the final designations.

The following are definitions of important terms used in this document:

- 1) 2010 SO₂ NAAQS – The primary NAAQS for SO₂ promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. *See* 40 CFR 50.17.
- 2) Design Value - a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
- 3) Designated nonattainment area – an area that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, EPA has determined either: (1) does not meet the 2010 SO₂ NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
- 4) Designated unclassifiable/attainment area – an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO₂ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS..¹³
- 5) Designated unclassifiable area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO₂ NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS..
- 6) Modeled violation – a violation of the SO₂ NAAQS demonstrated by air dispersion modeling.
- 7) Recommended attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as attainment.
- 8) Recommended nonattainment area – an area that a state, territory, or tribe has recommended that the EPA designate as nonattainment.
- 9) Recommended unclassifiable area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable.

¹³ The term “designated attainment area” is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA’s approval of a state-submitted maintenance plan.

- 10) Recommended unclassifiable/attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable/attainment.
- 11) Violating monitor – an ambient air monitor meeting 40 CFR parts 50, 53, and 58 requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
- 12) We, our, and us – these refer to the EPA.

3. Technical Analysis for the San Francisco Bay Area

3.1. Introduction

The EPA must designate the San Francisco Bay Area Air Basin, California, by December 31, 2017, because the area has not been previously designated and California has not installed new SO₂ monitoring to characterize air quality in the vicinity of any source in the Air Basin. The state and District have chosen to rely on an existing ambient air monitoring site to characterize air quality in the vicinity of the cluster of three sources in Martinez, Contra Costa County, California.

3.2. Air Quality Monitoring Data for the San Francisco Bay Area

This factor considers the SO₂ air quality monitoring data in the San Francisco Bay Area. In 2011, in support of its recommended attainment designation, California submitted air quality trends and 2008-2010 design value information for the monitoring sites located in the San Francisco Bay Area Air Basin. After the cluster of three sources in the San Francisco Bay Area were listed under the DRR, in 2016, the District submitted an analysis to demonstrate that the following monitor captures the highest concentrations resulting from SO₂ emissions from the cluster of sources:

- Air Quality System (AQS) monitoring site 06-013-2001. This monitor is located at 521 Jones Street, Martinez, California, in Contra Costa County, and is approximately 0.5 miles west of Shell Martinez Refinery, 1.6 miles southwest of Rhodia USA Inc., and 3.7 miles west of Tesoro Refining and Marketing Company. SO₂ data collected at this monitor between 2013 and 2015 is available in AQS, was certified by the District, and meets completeness requirements outlined in 40 CFR 50 Appendix T. The 2013-2015 design value at this site of 14 ppb indicates that the area is in attainment of the 1-hour SO₂ NAAQS. The District chose to use air dispersion modeling to determine the location of maximum expected SO₂ hourly concentrations as part of its analysis to determine whether this monitor is appropriately sited for comparison to the NAAQS and meets DRR monitoring requirements with respect to this cluster of sources; the discussion of these modeled results follows immediately below. Since the District's submittal, the 2014 to 2016 data for this monitor are also available in AQS, have been certified, and meet data completeness. The 2014-2016 design value is 13 ppb.

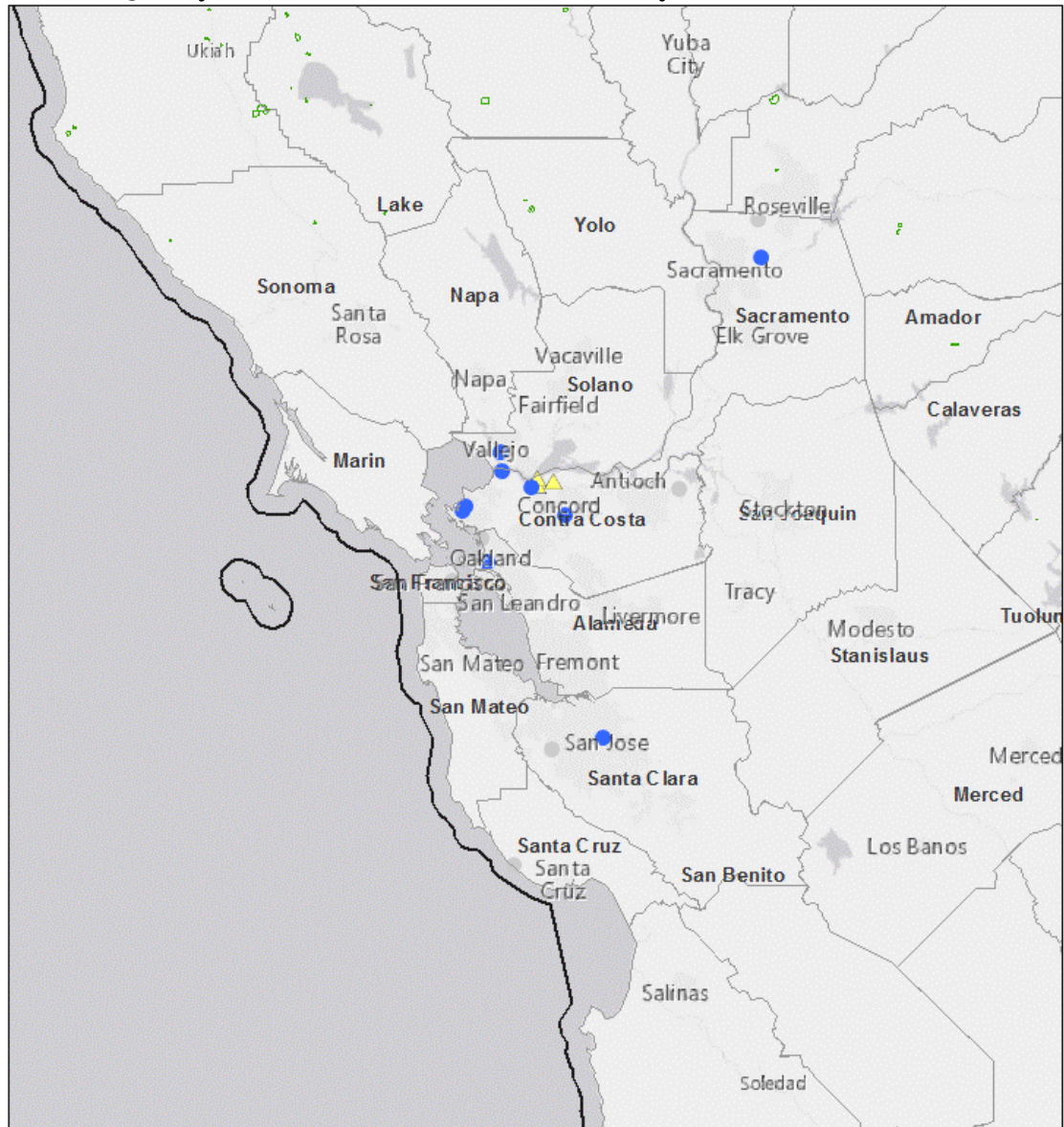
The District did not provide information on other existing SO₂ monitors in the San Francisco Air Basin in its analysis.

The District operates eight additional SO₂ monitoring sites in the San Francisco Air Basin: five in Contra Costa County, one in Solano County, one in Alameda County, and one in Santa Clara County. These monitoring sites and the corresponding data are described below. Except where noted, SO₂ data collected between 2014 and 2016 for each monitor is available in AQS, was certified by the District, and meets completeness requirements outlined in 40 CFR 50 Appendix T. Design values for this period at all sites were below the 2010 SO₂ NAAQS:

- AQS monitor 06-001-0011. This monitor is located at 1100 21st Street, Oakland, California, in Alameda County, and is approximately 17 miles southwest of the source cluster. The design value at this site for this 3-year period is 11 ppb.
- AQS monitor 06-013-0002. This monitor is located at 2956A Treat Boulevard, Concord, California, in Contra Costa County, and is approximately 5 miles south of the source cluster. The design value at this site for this 3-year period is 8 ppb.
- AQS monitor 06-013-0006. This monitor is located at 1065 7th Street, Richmond, California, in Contra Costa County, and is approximately 14 miles southwest of the source cluster. The design value at this site for this 3-year period is 12 ppb.
- AQS monitor 06-013-1001. This monitor is located off of Kendall Avenue (GPS coordinates 38.054920, -122.233229), Crockett, California, in Contra Costa County, and is approximately 6 miles northwest of the source cluster. This monitor is classified as a special purpose monitor because the distance to the nearest tree drip line does not meet siting requirements described in 40 CFR 58 Appendix E. The design value at this site for this 3-year period is 14 ppb.
- AQS monitor 06-013-1002. This monitor is located at 5551 Bethel Island Road, Bethel Island, California, in Contra Costa County, and is approximately 21 miles east of the source cluster. The design value at this site for this 3-year period is 4 ppb.
- AQS monitor 06-013-1004. This monitor is located at 1865D Rumrill Boulevard, San Pablo, California, in Contra Costa County, and is approximately 13 miles southwest of the source cluster. The design value at this site for this 3-year period is 7 ppb.
- AQS monitor 06-085-0005. This monitor is located at 158 Jackson Street, San Jose, California, in Santa Clara County, and is approximately 46 miles south of the source cluster. The design value at this site for this 3-year period is 2 ppb.
- AQS monitor 06-095-0004. This monitor is located at 304 Tuolumne Street, Vallejo, California, in Solano County, and is approximately 8 miles northwest of the source cluster. The design value at this site for this 3-year period is 5 ppb.

These monitors and the three sources (Shell Martinez Refinery, Rhodia USA Inc., and Tesoro Refining and Marketing Company, depicted as yellow triangles, *i.e.*, DRR sources using monitoring to characterize air quality as described in the legend) are shown in Figure 1 below.

Figure 1. Air Quality Monitors in the San Francisco Bay Area



March 8, 2017

1:2,054,366

State Boundaries

USA_Counties

USA_Counties

Federal/American Indian Reservations and Off Reservation Lands

SO2 2015 Site Level DVs

No valid value

0 - 75

76 and above

DRR_Sources

Modeling

Limit

Monitoring

TBD

U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS), U.S. Census Bureau Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

indards (OAQPS) | OAR/OAQPS/OAQD/OAQG | U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS), U.S. Census Bureau | Source: U.S. Census Bureau | Esri, HERE |

California chose to characterize air quality in the vicinity of the sources subject to the DRR using the existing monitoring site located in Martinez, California. The District submitted an analysis of a 16 km by 16 km square modeling domain centered on UTM (580,124 m, 4,208,805 m) to demonstrate that the Martinez monitor is appropriately sited for comparison to the 1-hour SO₂ NAAQS.¹⁴ The District's submittal included a description of the complex topography and meteorology surrounding the facilities, and analysis of modeling results. Figure 2, below, provided by the District, is a map of the Martinez area that shows the location of the Martinez SO₂ SLAMS monitoring site and the three facilities subject to the DRR. The figure also shows the 16 km by 16 km square domain. The results of the analysis, shown in Figure 3, indicate that the highest predicted 99th percentile daily maximum 1-hour concentration within the modeling domain is approximately 0.5 km southwest of the existing Martinez SO₂ monitor. Given the limited access to power in the area, the District stated that the existing monitoring location is the "closest feasible location to the modeled concentration maximum, given power and siting constraints".¹⁵ The District provided a public comment period for the analysis and did not receive any comments. On December 6, 2016, based on the information we received from the District, the EPA approved the current location of the Martinez SO₂ monitor to satisfy the monitoring requirements under the DRR.¹⁶

¹⁴ See letter dated September 29, 2016, from Eric D. Stevenson, Bay Area Air Quality Management District, to Anita Lee, EPA Region IX, and Interoffice Memorandum dated October 3, 2016 from Ted Hull, Bay Area Air Quality Management District, to Katherine Hoag, Bay Area Air Quality Management District, provided to the EPA by electronic mail on October 5, 2017. See also email from Katherine Hoag, Bay Area Air Quality Management District, to Carol Bohnenkamp, EPA Region IX, dated March 23, 2017 that includes two attachments.

¹⁵ See page 2 of the modeling analysis attached to the letter dated September 29, 2016, from Eric D. Stevenson, Bay Area Air Quality Management District, to Anita Lee, EPA Region IX.

¹⁶ See letter dated December 6, 2017, from Gwen Yoshimura, EPA Region IX, to Eric Stevenson, Bay Area Air Quality Management District.

Figure 2. Map of the San Francisco Bay Area Addressing Shell, Tesoro, and Rhodia (formerly known as Eco Services) DRR Cluster



Figure 1: Area overview including the AERMOD modeling domain (blue rectangle), facilities subject to the SO₂ DRR, and nearby SO₂ monitoring sites

Figure 3. Map of the San Francisco Bay Area Addressing Shell, Tesoro, and Rhodia (formerly known as Eco Services) DRR Cluster with Normalized Modeled Concentration ¹⁷

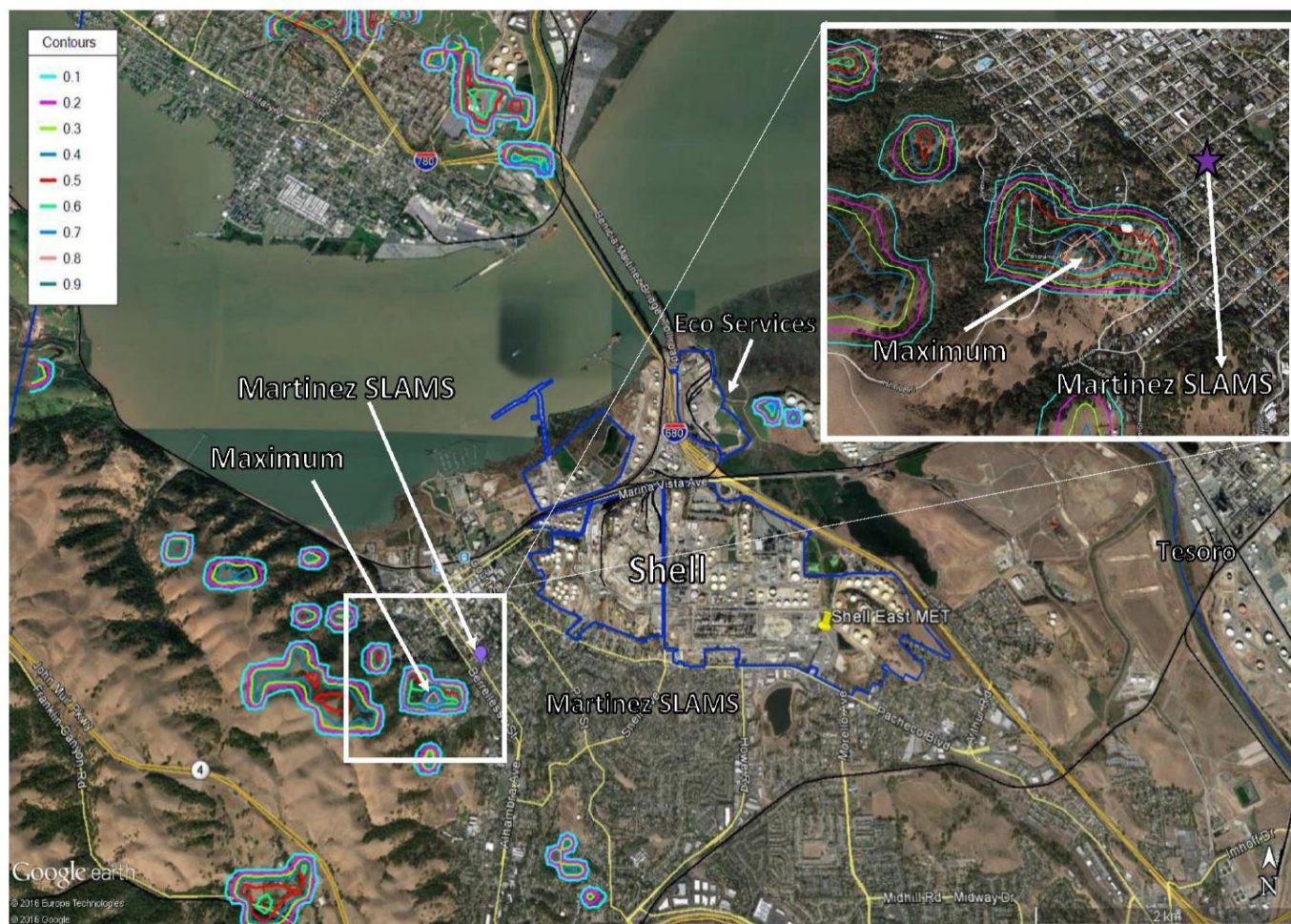


Figure 2: Maximum normalized 1-hour SO₂ concentrations from AERMOD modeling using emissions from Shell, Tesoro, and Eco Services, and 2009-2013 Shell-East meteorological data

3.3. Emissions and Emissions-Related Data for the San Francisco Bay Area

No single facility located in the nine-county San Francisco Bay Area Air Basin emits SO₂ in excess of 2,000 tpy. In Contra Costa County, within the San Francisco Bay Area Air Basin, total emissions from three facilities combined exceed 2,000 tpy. These three facilities are the Shell Refinery, the Tesoro Refinery, and Rhodia Inc., located in Martinez, California. (This portion of Contra Costa County will often be referred to as “the Martinez area” within this section.) The Shell Refinery emitted 1,369 tons of SO₂ in 2014; the Tesoro Refinery emitted 748 tons of SO₂ in 2014; and the Rhodia Inc., facility emitted 383 tons SO₂ in 2014. Because of the close proximity of these sources to each other, and because the combined SO₂ emissions from these sources exceeded 2,000 tpy, the EPA utilized the provision in 40 CFR 51.1203(a) to revise the list of sources subject to the DRR and included these sources on the SO₂ DRR Source list. In the

¹⁷ AERMOD Version 15181, using 2009-2013 surface and Oakland International Airport upper air meteorological data, and maximum 1- hour potential to emit data. September 29, 2016, Eric D. Stevenson, BAAQMD, and October 3, 2016 from Ted Hull.

letter dated March 18, 2016, the EPA notified the state that we were adding these sources to be characterized under the DRR. The letter notes the presence of the nearby SO₂ monitor, and states, “If modeling is completed and results indicate that the existing monitor is appropriately located to characterize peak 1-hour SO₂ concentrations, the existing monitor could be used to meet the DRR requirements for these sources.” As discussed in the previous section, this analysis was completed and the EPA approved the existing monitor as meeting the DRR requirements by letter dated December 6, 2016.

California recommended that the San Francisco Bay Area Air Basin be designated as attainment for the 2010 SO₂ NAAQS. The San Francisco Bay Area Air Basin is composed of seven full counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara counties) and two partial counties (southern portion of Sonoma County and southwestern portion of Solano County). California provided information showing a decrease in SO₂ emissions in the Air Basin by one-third between 1998 to 2008, from 19,161 tpy to 12,744 tpy. The state discussed various stationary source rules, permitting requirements, and consent agreements from the District that have reduced emissions of SO₂.¹⁸

Table 2 presents county-level emissions information for the San Francisco Bay Area Air Basin counties based on the 2014 National Emissions Inventory (NEI). The NEI for SO₂ includes emissions from the following source categories: point, nonpoint, on-road, non-road, and event.¹⁹

As shown in Table 2, emissions of SO₂ from Contra Costa County represent nearly 64 percent of total emissions from the nine San Francisco Bay Area Air Basin counties in 2014. Emissions of SO₂ in 2014 from the DRR-cluster of sources in Martinez, California represented approximately 41 percent of total county-wide emissions of SO₂ in Contra Costa County, and approximately 26 percent of total SO₂ emissions from the nine counties of the San Francisco Bay Area Air Basin. Nonpoint sources of SO₂ emissions represent nearly 23 percent of total SO₂ emissions in Contra Costa County, and over 14 percent of total SO₂ emissions from the nine counties of the San Francisco Bay Area Air Basin.

¹⁸ See Appendix 1 to the CARB Staff Report, Enclosure 1 to the letter from ARB to the EPA dated June 20, 2011.

¹⁹ Event emissions include emissions from wildfires and prescribed fires. See <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>.

Table 2: County-level SO₂ Emissions for San Francisco Bay Area

County	Total SO₂ Emissions (tpy)	Point (tpy)	Nonpoint (tpy)	Nonroad (tpy)	Onroad (tpy)	Event (tpy)
Alameda	841	592	176	3	69	0
Contra Costa	5,832	4,469	1,317	3	38	5
Marin	102	57	26	1	10	8
Napa	128	14	13	1	6	95
San Francisco	90	17	56	2	15	0
San Mateo	506	399	79	1	25	1
Santa Clara	1,298	1,046	177	5	67	4
Solano	225	119	38	1	23	44
Sonoma	119	12	59	2	19	28
Total Emissions from Nine Counties	9,142	6,724	1,942	19	273	185
Emissions from DRR-Cluster	2,399					

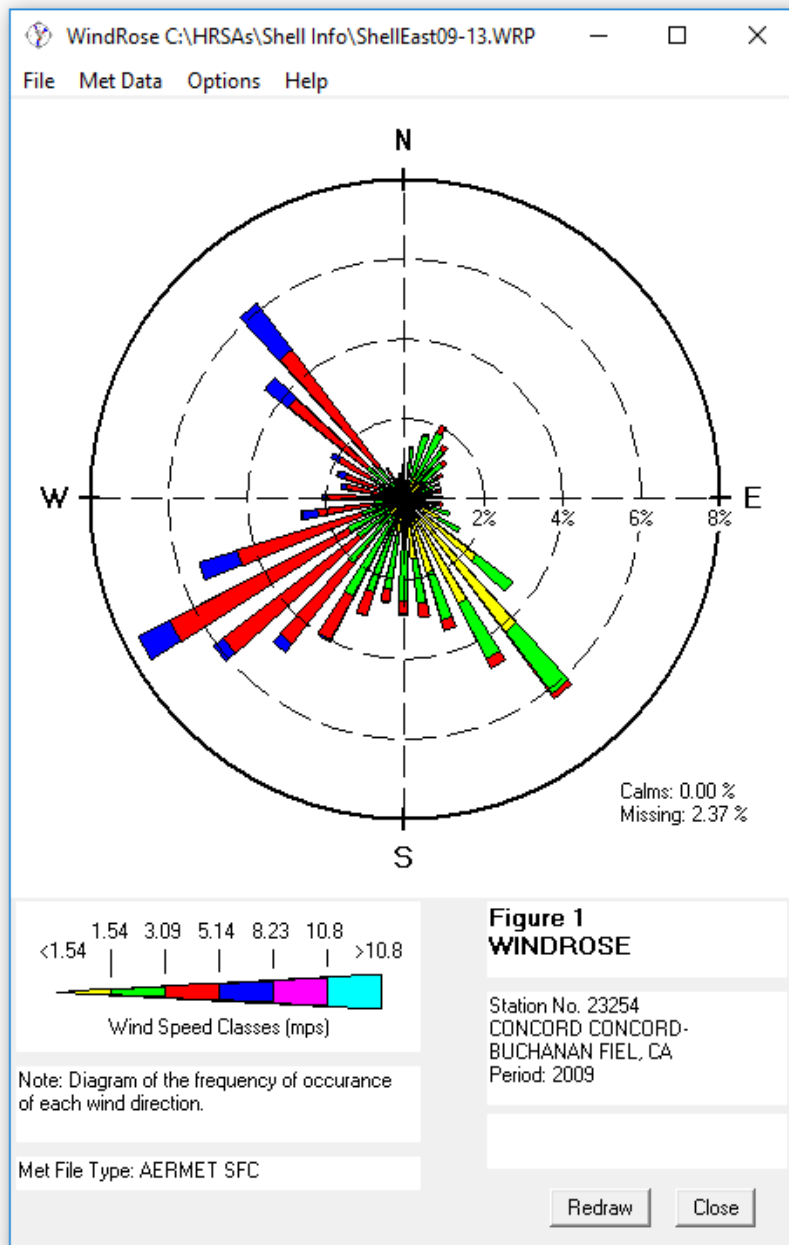
3.4. Meteorology for the San Francisco Bay Area

The wind rose for the Martinez area, based on the Shell East meteorological station, is shown in Figure 4. The predominant wind direction is from the southwest, with wind speed most often in the range of 3-5 miles per hour. The wind direction is also frequently from the southeast, with wind speed most often in the range of 0-3 miles per hour, or from the northwest, with wind speed most often in the range of 3-5 miles per hour. As discussed in Section 3.5, the terrain in the Martinez area is complex, with hills in height from 200-400 m to the southwest and east. Although the predominant wind direction is from the southwest, the maximum modeled concentrations, as shown in Figure 3, occur on the nearby terrain to the southwest of the facility. Highest modeled concentrations are often predicted where the modeled plume impinges on terrain. This is consistent with the analysis presented by the District, where the model predicts highest concentrations on the terrain, shown in Figure 5, to the southwest.

The District characterized meteorology in the Martinez area using an existing meteorological station, and used this station in the modeling, and processed this data using AERMET following EPA guidance.²⁰ We believe that the District appropriately characterized meteorology for this area.

²⁰ Addendum to EPA-454/B-03-002, November 2004 and EPA-454/B-03-002 November 2004.

Figure 4. Cumulative Annual Wind Rose for 2009-2013



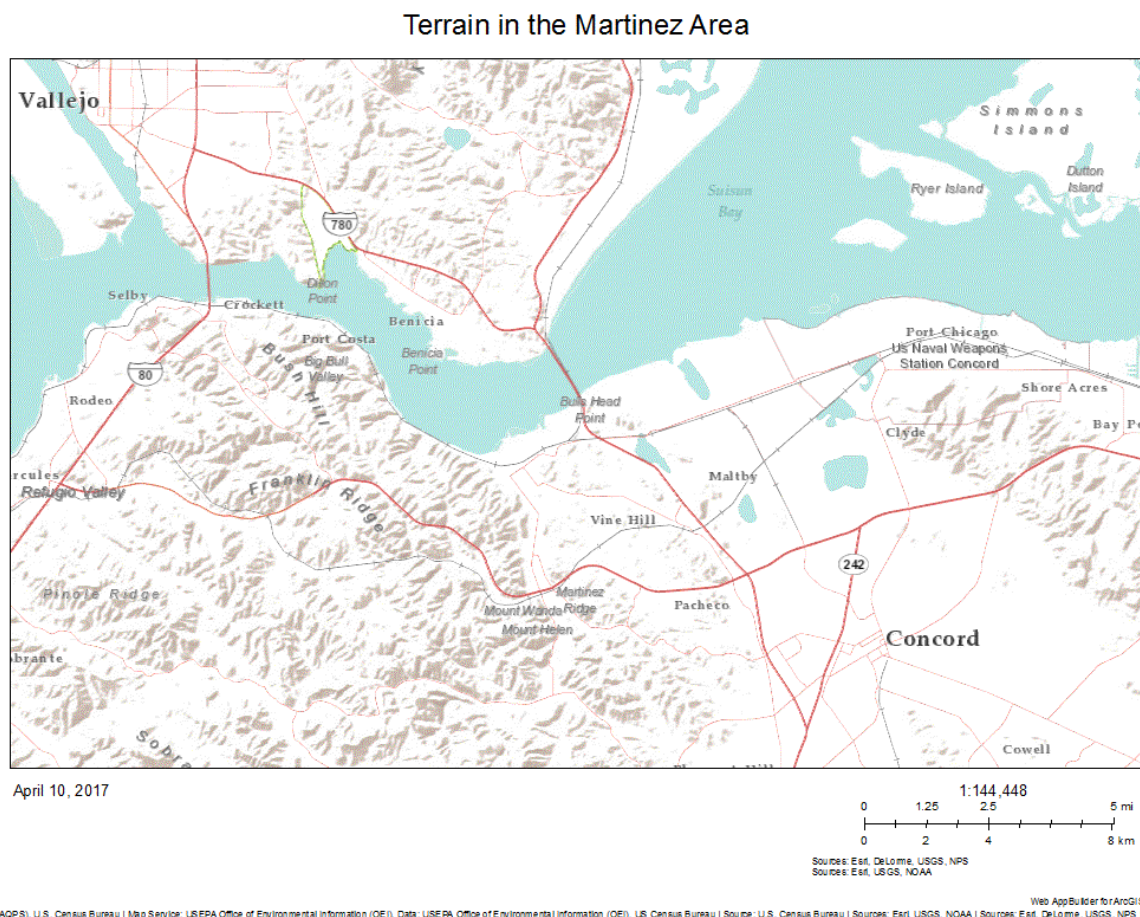
3.5. Geography, and Topography for the San Francisco Bay Area

The terrain in the area is shown in Figure 5, and is best described as complex. Martinez is situated in a small basin bordered on the north by the Carquinez Strait, connecting the San Pablo and Suisun Bays. As described in the District's letter dated September 29, 2016, this area has "complicated topography and meteorology...heavily influenced by sea-breezes and orographic

forcing.²¹” The basin is surrounded by hills in height from 200-400 meters to the southwest and east.

As shown in Figure 5, the terrain to the southwest is in close proximity to the DRR sources. The modeled concentrations as shown in Figure 3 are highest in the area to the southwest where the plume impinges on this terrain, illustrating the effect of the nearby terrain. The complex topography influences meteorology, which is reflected in the distribution of wind directions, shown in the wind rose in Figure 4. We conclude that the District adequately characterized the terrain of the Martinez area because the effects of the terrain were appropriately accounted by the AERMOD, and the elevations for receptors were appropriately processed using AERMAP.

Figure 5. Map of Terrain in the Martinez, California area



²¹ Orographic lift occurs when an air mass is forced from a low elevation to a higher elevation as it moves over rising terrain.

3.6. Jurisdictional Boundaries in the San Francisco Bay Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for the San Francisco Bay Area. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

California recommended an attainment designation for the San Francisco Bay Area Air Basin, which encompasses nine counties in California. The Bay Area Air Quality Management District has primary jurisdiction for air quality programs, including rules and regulations to control SO₂ emissions from stationary sources, in the San Francisco Bay Area Air Basin.

3.7. Other Information Relevant to the Designations for the San Francisco Bay Area

There are no areas in California that were designated for the 2010 SO₂ NAAQS in Rounds 1 or 2, and there are no areas in California that will be designated in Round 4. The EPA intends to designate all areas of the state in this current Round 3 of designations. As discussed in Section 4, the EPA intends to designate the remaining portions of California as unclassifiable/attainment for the 2010 SO₂ NAAQS.

The San Francisco Bay Area Air Basin was previously designated as "better than national standards" for the 1971 SO₂ NAAQS. Previous designations for other NAAQS, in limited instances, have used partial county boundaries based on the urbanized areas of counties in the San Francisco-Oakland-San Jose Area (*e.g.*, carbon monoxide NAAQS). Most designations for other NAAQS have relied on air basin boundaries to designate the San Francisco Bay Area (*e.g.*, 1-hour ozone NAAQS, 1997 and 2006 Annual and 24-hour PM_{2.5} NAAQS, 1971 and 2010 NO₂ NAAQS, and the 1997 and 2008 8-hour ozone NAAQS).

3.8. The EPA's Assessment of the Available Information for the San Francisco Bay Area

As noted previously, on December 6, 2016, the EPA approved the location of the existing Martinez monitoring station to satisfy monitoring requirements under the DRR.²² Therefore, because no violations of the 2010 SO₂ NAAQS were observed at the Martinez monitor, the EPA intends to designate an area around the existing Martinez monitoring station as unclassifiable/attainment. It is appropriate for this designated area to encompass at least the portions of Contra Costa County and Solano County that consisted of the modeling domain in the District's analysis as unclassifiable/attainment for the 2010 SO₂ NAAQS. The following paragraphs address what other areas should be included in this unclassifiable/attainment area.

California developed the boundaries for its air basins based on regions with similar meteorology and topography. The entire San Francisco Bay Area Air Basin is within the jurisdiction of the

²² See letter dated December 6, 2016, from Gwen Yoshimura, EPA Region IX, to Eric Stevenson, Bay Area Air Quality Management District.

Bay Area Air Quality Management District. None of the eight SO₂ monitors located in the San Francisco Bay Area Air Basin show violations of the 2010 SO₂ NAAQS, and emissions of SO₂ have decreased from 1997 to 2014. Therefore, California recommended the entire San Francisco Bay Area Air Basin be designated attainment for the 2010 SO₂ NAAQS.

No other sources, or cluster of sources, in the San Francisco Bay Area Air Basin were subject to the DRR; therefore, the District did not provide any additional modeling to demonstrate that the other SO₂ monitors are appropriately sited for comparison to the 2010 SO₂ NAAQS. As discussed in Section 4, the EPA intends to designate the remaining portions of the San Francisco Bay Area Air Basin as unclassifiable/attainment for the 2010 SO₂ NAAQS because the remaining counties or portions of counties in the San Francisco Bay Area Air Basin were not required to be characterized under 40 CFR 51.1203(c) or (d), and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Because the EPA intends to designate the portions of Contra Costa County and Solano County affected by the DRR-cluster of sources in Martinez, California, as unclassifiable/attainment for the 2010 SO₂ NAAQS, and because the EPA also intends to designate the remaining counties and partial counties in the San Francisco Bay Area Air Basin, which did not have any sources listed under the DRR, as unclassifiable/attainment, the EPA intends to designate all of the San Francisco Bay Area Air Basin as one unclassifiable/attainment area based on the existing jurisdictional considerations.

3.9. Summary of Our Intended Designation for the San Francisco Bay Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the San Francisco Bay Area Air Basin as unclassifiable/attainment. Figure 6 shows the boundary of this intended unclassifiable/attainment area.

Figure 6. Boundary of the Intended San Francisco Bay Area Unclassifiable/Attainment Area



4. Technical Analysis for the Rest of California

4.1. Introduction

No sources or additional cluster of sources emit SO₂ in excess of 2,000 tpy in the rest of California. The state has not installed and timely begun operation of a new, approved SO₂ monitoring network for any sources of SO₂ emissions in the counties and portions of counties identified in Table 3. Accordingly, the EPA must designate these counties by December 31, 2017. At this time, there are no air quality modeling results available to the EPA for these counties and portions of counties. In addition, there is no air quality monitoring data that indicate any violation of the 1-hour SO₂ NAAQS. The EPA intends to designate, by air basin, the counties and portions of counties in Table 3 in the state as “unclassifiable/attainment” because these counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Table 3. Counties and Portions of Counties that the EPA Intends to Designate Unclassifiable/Attainment

Air Basin	California's Recommended Area Definition (County or Partial County (p))	California Recommended Designation	EPA's Intended Area Definition*	EPA's Intended Designation
North Coast Basin	Del Norte County, Humboldt County, Mendocino County, Trinity County, Sonoma County (p)	Attainment	Same as State's	Unclassifiable/Attainment
North Central Coast Air Basin	Santa Cruz County, San Benito County, Monterey County	Attainment	Same as State's	Unclassifiable/Attainment
South Central Coast Basin	San Luis Obispo County, Santa Barbara County, Ventura County	Attainment	Same as State's	Unclassifiable/Attainment

Air Basin	California's Recommended Area Definition (County or Partial County (p))	California Recommended Designation	EPA's Intended Area Definition*	EPA's Intended Designation
South Coast Air Basin	Orange County, Riverside County (p), San Bernardino County (p), Los Angeles County (p)	Attainment	Same as State's	Unclassifiable/Attainment
Northeast Plateau Basin	Modoc County, Lassen County, Siskiyou County	Attainment	Same as State's	Unclassifiable/Attainment
Sacramento Valley Basin	Tehama County, Glenn County, Butte County, Colusa County, Yolo County, Sutter County, Yuba County, Sacramento County, Shasta County, Solano County (p)	Attainment	Same as State's	Unclassifiable/Attainment
San Joaquin Valley Basin	San Joaquin County, Stanislaus County, Merced County, Madera County, Fresno County, Kings County, Tulare County, Kern County (p)	Attainment	Same as State's	Unclassifiable/Attainment
Great Basin Valleys Basin	Alpine County, Mono County, Inyo County	Attainment	Same as State's	Unclassifiable/Attainment
Mojave Desert Air Basin	Riverside County (p), San Bernardino County (p), Los Angeles County	Attainment	Same as State's	Unclassifiable/Attainment

Air Basin	California's Recommended Area Definition (County or Partial County (p))	California Recommended Designation	EPA's Intended Area Definition*	EPA's Intended Designation
	(p), Kern County (p)			
San Diego Air Basin	San Diego County	Attainment	Same as State's	Unclassifiable/Attainment
Mountain Counties Air Basin	Plumas County, Sierra County, Nevada County, Amador County, Calaveras County, Tuolumne County, Mariposa County, El Dorado County (p), Placer County (p)	Attainment	Same as State's	Unclassifiable/Attainment
Lake County Air Basin	Lake County	Attainment	Same as State's	Unclassifiable/Attainment
Lake Tahoe Air Basin	El Dorado County (p), Placer County (p)	Attainment	Same as State's	Unclassifiable/Attainment
Salton Sea Air Basin	Imperial County, Riverside County (p)	Attainment	Same as State's	Unclassifiable/Attainment

* Includes areas of Indian country geographically located within the county or air basin.

Table 3 also summarizes California's recommendations for these areas. Specifically, the state recommended that all counties in California be designated as attainment based on its review of the statewide SO₂ monitoring network demonstrating no violations of the 2010 SO₂ NAAQS and that the highest monitored concentrations in California are well below the NAAQS. The state also argued that switching from fuel oil to natural gas for electric generation and industrial boilers, combined with requirements that all highway, off-road, locomotive, and marine engines use ultra-low sulfur diesel fuel have resulted in a 45 percent reduction in statewide SO₂ emissions since 1990.²³

²³ See CARB SO₂ Staff Report, dated June 2011.

After careful review of the state's assessment, supporting documentation, and all available data, the EPA agrees with the state's recommendation for these areas, and intends to designate the areas as unclassifiable/attainment. Figure 7 shows the locations of these areas within California.

The Pechanga Band submitted a letter dated May 31, 2011, recommending that the Pechanga Indian Reservation be designated as attainment for the 2010 SO₂ NAAQS. In its letter, the tribe noted that it does not conduct ambient monitoring for SO₂ on the reservation, and therefore, it reviewed monitoring data from the nearby monitoring sites in Costa Mesa, Riverside, and San Diego Counties. Because the maximum 1-hour SO₂ concentrations over 2006-2008 measured at these monitors were below the 2010 NAAQS, the Pechanga Band recommended an attainment designation for the Pechanga Indian Reservation. The EPA intends to modify the recommended attainment designation from the Pechanga Band and intends to designate the respective portions of the reservations lands of the Pechanga Band as unclassifiable/attainment with the surrounding South Coast and San Diego Air Basin multi-jurisdictional areas.

Figure 7. The EPA's Intended Unclassifiable/Attainment Designations for Air Basins in California



4.2. Air Quality Monitoring Data for Rest of State

California provided air quality trends and 1-hour SO₂ design values for 2008-2010 for monitoring sites located in the South Coast, San Joaquin Valley, Mojave Desert, South Central Coast, Sacramento, San Diego, Salton Sea, North Central Coast, and North Coast air basins, all indicating no violations of the 2010 SO₂ NAAQS.²⁴

SO₂ data collected between 2014 and 2016 for each monitor listed in Table 4 is available in AQS, is certified, and meets completeness requirements outlined in 40 CFR 50 Appendix T. Design values for this period at all sites were below the NAAQS. These data were available to EPA for consideration in the designations process. However, EPA does not have information indicating this data is in an area of maximum concentration, so this data cannot be used as the basis for designation.

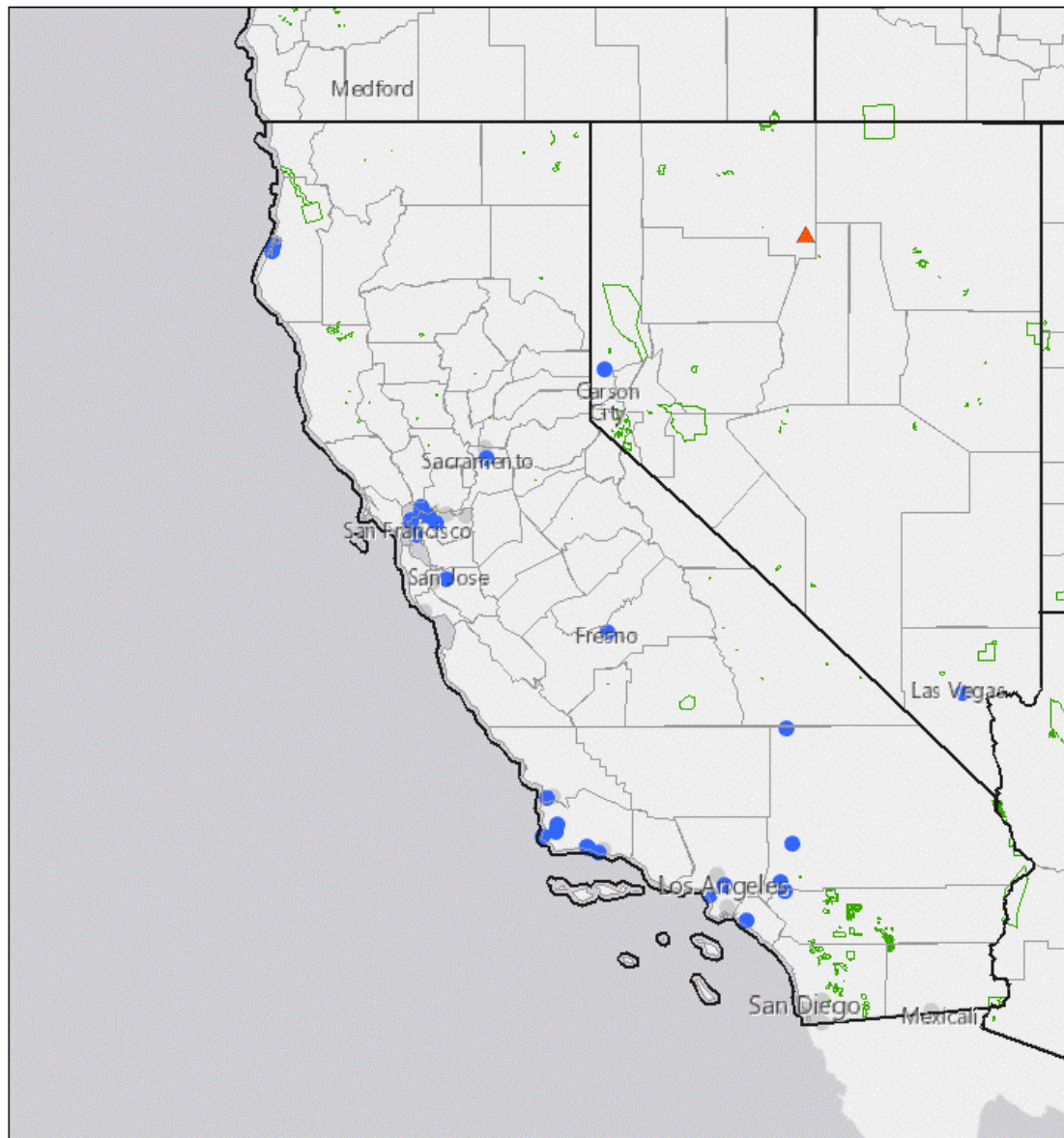
Table 4. Air Quality Data in California.

State	County	AQS ID	Address	2014-2016 Design Value (parts per billion)
CA	Fresno	06-019-0011	3727 N First St., Fresno	6
CA	Humboldt	06-023-1004	717 South Avenue	1
CA	Humboldt	06-023-1005	170 meters SE of Donna Dr. & Humboldt Hill Rd., Eureka	1
CA	Imperial	06-025-0005	1029 Ethel St, Calexico High School	8
CA	Los Angeles	06-037-1103	1630 N. Main St., Los Angeles	4
CA	Los Angeles	06-037-5005	7201 W. Westchester Parkway	7
CA	Orange	06-059-1003	2850 Mesa Verde Dr. East, Costa Mesa	3
CA	Riverside	06-065-8001	5888 Mission Blvd., Rubidoux	2
CA	Sacramento	06-067-0006	Des Paso-2701 Avalon Dr., Sacramento	7
CA	San Bernardino	06-071-0306	14306 Park Ave., Victorville	18
CA	San Bernardino	06-071-1234	Corner of Athol and Telescope, Trona	6
CA	San Bernardino	06-071-2002	14360 Arrow Blvd., Fontana	3
CA	San Luis Obispo	06-079-2004	1300 Guadalupe Rd., Nipomo	3
CA	Santa Barbara	06-083-0008	El Capitan St Park, HWY 10	3
CA	Santa Barbara	06-083-1013	HS & P Facility-500 M SW, Lompoc	0
CA	Santa Barbara	06-083-1020	UCSB West Campus-ARCO Tank, Isla Vista	1
CA	Santa Barbara	06-083-1025	LFC #1-Las Flores Canyon	7
CA	Santa Barbara	06-083-2004	128 S 'H' St, Lompoc	3
CA	Santa Barbara	06-083-4003	STS Power Plant, Vandenberg AFB	5

²⁴ See Appendix 1 to Enclosure 1 to the letter from CARB to EPA, dated June 20, 2011.

Figure 8 below shows all monitors in California – those listed in Table 4 above, and those discussed in the San Francisco Bay Area section of this document.

Figure 8. Air Quality Monitors in California



March 8, 2017

- State Boundaries
- USA_Counties
- Federal American Indian Reservations and Off Reservation Lands
- SO2 2015 Site Level DVs
 - No valid value
 - 0 - 75
 - 76 and above

U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS), U.S. Census Bureau
 U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS)
 Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the

indards (OAQPS) | OAR/OAQPS/AQAD/AQAG | U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS), U.S. Census Bureau | Source: U.S. Census Bureau | Esri, HERE |

4.3. Jurisdictional Boundaries in the Rest of State

Existing jurisdictional boundaries are considered for the purposes of informing the EPA's designation action. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

California recommended that all air basins in the state be designated attainment for the 2010 SO₂ NAAQS. The 15 air basins in California fall under the jurisdiction of 32 separate air quality management districts or air pollution control agencies.

The Pechanga Band is a federally-recognized tribe and the Pechanga Reservation covers approximately 6,700 acres in southern Riverside County and 119 acres in San Diego County. The Pechanga Band recommended an attainment designation, but did not request that the lands of the Pechanga Band be designated separately from the surrounding areas.

4.4. Other Information Relevant to the Designations for the Rest of State

Previous designations for other NAAQS for areas in California have generally relied on air basin boundaries to define attainment or nonattainment area boundaries (*e.g.*, 1-hour ozone NAAQS, 1997 and 2006 Annual and 24-hour PM_{2.5} NAAQS, 1971 and 2010 NO₂ NAAQS, and the 1997 and 2008 8-hour ozone NAAQS). In limited instances, designations have used partial county boundaries based on the urbanized areas of counties (*e.g.*, carbon monoxide NAAQS).²⁵

The reservation of the Pechanga Band, referred to as the Pechanga Band of Luiseño Mission Indians in previous designations for other NAAQS, is designated as a separate unclassifiable/attainment area for the 2012 Annual PM_{2.5} NAAQS, a separate attainment area for the 1997 8-hour ozone NAAQS, and a separate nonattainment area for the 2008 8-hour ozone NAAQS.²⁶ For all other NAAQS, respective portions of the reservation lands of the Pechanga Band are designated with the surrounding multi-jurisdictional areas.

4.5. The EPA's Assessment of the Available Information for the Rest of State

After careful evaluation of the recommendation and supporting information we received from California and the Pechanga Band, as well as all available relevant information, the EPA intends to designate the areas in the above Table 3 as unclassifiable/attainment for the 2010 SO₂ NAAQS.

Our intended unclassifiable/attainment areas, bounded by air basin boundaries, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment areas.

²⁵ 40 CFR 81.305 – California.

²⁶ *Id.*

For the areas in Table 3, the state was not required to characterize these areas under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Because California has defined air basins by similar meteorology and topography, and because air basin boundaries have been used for numerous previous designations and jurisdiction for air planning programs are well defined, the EPA considers the air basin boundaries in California to be appropriate boundaries for separate unclassifiable/attainment areas.

The reservation lands of the Pechanga Band are geographically located within the southern portion of Riverside County and in the northern portion of San Diego County. Although the Pechanga Band submitted a recommendation that the tribe be designated attainment for the 2010 SO₂ NAAQS based on nearby monitoring data located on non-reservation lands, the tribe did not include a recommendation that the reservation lands be designated separately from the surrounding areas. Because this area was not required to be characterized under the DRR, the EPA intends to designate the reservation lands of the Pechanga Band as unclassifiable/attainment for the 2010 SO₂ NAAQS. Because the tribe did not request a separate designation from the surrounding areas, the EPA intends to designate the respective portions of the reservations lands of the Pechanga Band with the surrounding South Coast Air Basin and San Diego Air Basin unclassifiable/attainment multi-jurisdictional areas.

As discussed in section 3, in the San Francisco Bay Area Air Basin, the EPA intends to designate portions of Contra Costa County and Solano County affected by the DRR-cluster of sources as unclassifiable/attainment. The EPA also intends to designate the remaining portions of Contra Costa County and Solano County, and the remaining counties and partial counties in the San Francisco Bay Area Air Basin, as unclassifiable/attainment because the remaining areas were not required to be characterized and the EPA does not have information that suggests it is not meeting the NAAQS or contributing to an area that does not meet the NAAQS.

The EPA's intended designations for Round 3 for the rest of California would designate all areas in the state. Following the completion of the Round 3 designations, no undesignated areas would remain in California.

4.6. Summary of Our Intended Designation for the Rest of State

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the San Francisco Bay Area Air Basin, and the remaining 14 air basins in California, as separate unclassifiable/attainment areas for the 2010 SO₂ NAAQS. Figure 7 above shows the locations and boundaries of these areas within California.