6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA-R09-OAR-2021-0408; FRL-8902-02-R9]

Clean Air Plans; Base Year Emissions Inventories for the 2015 Ozone Standards; California

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is taking final action to approve revisions to the California State Implementation Plan (SIP) concerning the base year emissions inventories for 18 areas designated as nonattainment areas (NAAs) for the 2015 ozone national ambient air quality standards ("2015 ozone NAAQS") submitted on July 24, 2020. The areas include Amador County, Butte County, Calaveras County, Imperial County, Kern County (Eastern Kern), Los Angeles – San Bernardino Counties (West Mojave Desert), Los Angeles – South Coast Air Basin, Mariposa County, Nevada County (Western part), Riverside County (Coachella Valley), Sacramento Metro, San Francisco Bay Area, San Joaquin Valley, San Luis Obispo (Eastern part), Sutter Buttes, Tuolumne County, Tuscan Buttes, and Ventura County. We are approving these revisions under the Clean Air Act (CAA), which establishes emissions inventory requirements for all ozone nonattainment areas.

DATES: This rule is effective on **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA-R09-OAR-2021-0408. All documents in the docket are listed on the *https://www.regulations.gov* website. Although listed in the index, some information is not publicly available, e.g., Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available

through *https://www.regulations.gov*, or please contact the person identified in the **FOR FURTHER INFORMATION CONTACT** section for additional availability information. If you need assistance in a language other than English or if you are a person with disabilities who needs a reasonable accommodation at no cost to you, please contact the person identified in the **FOR FURTHER INFORMATION CONTACT** section.

FOR FURTHER INFORMATION CONTACT: Ben Leers, Air Planning Office (AIR-2), EPA Region IX, 75 Hawthorne Street, San Francisco, CA 94105, (415) 947-4279, or by email at *leers.ben@epa.gov*.

SUPPLEMENTARY INFORMATION: Throughout this document, "we," "us," and "our" refer to the EPA.

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I. Summary of Proposed Action

On October 5, 2021, in accordance with CAA sections 172(c)(3) and 182(a)(1), the EPA proposed to approve a July 27, 2020 SIP submittal from the California Air Resources Board (CARB) to address the ozone-related emissions inventory requirements for the following 18 ozone nonattainment areas for the 2015 ozone NAAQS: Amador County, Butte County, Calaveras County, Imperial County, Kern County (Eastern Kern), Los Angeles – San Bernardino Counties (West Mojave Desert), Los Angeles – South Coast Air Basin, Mariposa County, Nevada County (Western part), Riverside County (Coachella Valley), Sacramento Metro, San Francisco Bay Area, San Joaquin Valley, San Luis Obispo (Eastern part), Sutter Buttes,

Tuolumne County, Tuscan Buttes, and Ventura County.[1] We refer to our October 5, 2021 proposed rulemaking as the "proposed rule."

On October 28, 2021, the EPA extended the comment period for the proposed rule by 30 days in response to a stakeholder request for an extension.[2] The original deadline to submit comments was November 4, 2021. This action extended the comment period to December 6, 2021.

In our proposed rule, we provided background information on the 2015 ozone standards, area designations in California, and related base year emissions inventory SIP revision requirements under the CAA and the EPA's implementing regulations for the 2015 ozone standards, referred to as the 2015 ozone SIP Requirements Rule ("2015 Ozone SRR").[3]

On July 27, 2020, the California Air Resources Board (CARB) submitted the "70 ppb Ozone SIP Submittal" ("2020 CARB SIP Submittal") to the EPA.[4] As explained in our proposed rule, the 2020 CARB SIP Submittal contains a staff report with a release date of May 22, 2020, and attachments of emissions inventories that address base year inventory requirements for 18 of the 21 NAAs in California.[5] In our proposed rule, we provided a summary of the 2020 CARB SIP Submittal, evaluated the submittal for compliance with statutory and regulatory requirements, and proposed to find that the submittal meets all applicable requirements.

The emissions inventories we are approving into the SIP in this final action are detailed in Table 1 of the proposed rule. The EPA finds that CARB developed approvable inventories of oxides of nitrogen (NO_X) and volatile organic compounds (VOC) emissions for the 18 ozone

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[1] 86 FR 54887 (October 5, 2021).
[2] 86 FR 59678 (October 28, 2021).
[3] "Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements," Final Rule, 83 FR 62998 (December 6, 2018).
[4] Letter dated July 24, 2020, from Richard W. Corey, Executive Officer, CARB, to John Busterud, Regional Administrator, EPA Region IX (submitted electronically July 27, 2020).
[5] CARB's submittal does not include the San Diego NAA, which was submitted separately via the State Planning Electronic Collaboration System (SPeCS) for SIPs on January 12, 2021. The EPA will take action on the emissions inventory for the San Diego NAA in a separate rulemaking. Because the State of California does not have regulatory authority over the Pechanga and Morongo NAAs, CARB's submittal does not include emissions inventories for these areas.

nonattainment areas as required under the CAA and 2015 Ozone SRR (40 CFR 51.1315; see also CAA section 172(c)(3)).

Refer to our proposed rule for more information concerning the background for this action and for a more detailed discussion of the rationale for approval.

II. Public Comments and EPA Responses

The EPA's proposed rule provided a 30-day public comment period that ended on November 4, 2021. As explained in section I of this preamble, on October 28, 2021, we extended the comment period by 30 days to December 6, 2021, in response to a stakeholder request for an extension.[6] We received eight sets of comments, including seven comment submissions from private individuals[7] and one comment letter from the Center for Biological Diversity (CBD).[8] All comments received in response to our proposed rulemaking are available in the docket for this rulemaking.[9] Four of the comment submissions from private individuals generally support our proposal to approve the 2020 CARB SIP Submittal as meeting the base year emissions inventory requirements.[10] These four supportive comments do not require a response. We respond to the remainder of the comments received on our proposed rulemaking in this action.

A. Comments from Private Individuals

Comment A.1: Two private individual commenters[11] question how the proposed rulemaking will improve air pollution in the nonattainment areas. Additionally, one of the commenters[12] suggests that there should be a call to action for these nonattainment areas to

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[6] Email dated October 7, 2021, from Robert Ukeiley, Center for Biological Diversity, to Khoi Nguyen, EPA Region IX.

[7] Comments from private individuals were made to Docket ID No. EPA-R09-OAR-2021-0408 as follows: (1) comment dated October 6, 2021, from Saida Lopez Williams; (2) comment dated October 8, 2021, from Annie Miller; (3) comment dated October 11, 2021, from Tristan Sommers; (4) comment dated October 16, 2021, from Taylor W.; (5) comment dated November 3, 2021, from Lindsey H.; (6) comment dated November 3, 2021, from Alexander Mata; (7) comment dated November 3, 2021, from Tom Loch.

[8] Letter dated December 1, 2021, from Nathan Donley, Center for Biological Diversity, to Docket ID No. EPA-R09-OAR-2021-0408, Subject: "Re: Comments on Clean Air Plans; Base Year Emission Inventories for the 2015 Ozone Standards; California (Docket #: EPA-R09-OAR-2021-0408)."

[9] Comments are publicly available at *https://www.regulations.gov/docket/EPA-R09-OAR-2021-0408/comments*.

[10] Docket ID No. EPA-R09-OAR-2021-0408-0011, EPA-R09-OAR-2021-0408-0014, EPA-R09-OAR-2021-0408-0015, and EPA-R09-OAR-2021-0408-0016.

[11] Docket ID No. EPA-R09-OAR-2021-0408-0007 and EPA-R09-OAR-2021-0408-0008.

[12] Docket ID No. EPA-R09-OAR-2021-0408-0008.

implement some forms of regulation or change in activities to actively pursue attainment of environmental goals.

Response A.1: The EPA appreciates the commenters' questions regarding how air pollution will be improved. As explained in our proposed rule, CAA section 182(a)(1) and 40 CFR 51.1315 require states to develop and submit, as SIP revisions, emissions inventories for all areas designated as nonattainment for the 2015 ozone NAAQS. An emissions inventory for an ozone nonattainment area is comprised of typical weekday actual emissions of ozone precursors in the area's ozone season. Emissions inventories provide emissions data for a variety of air quality planning tasks, including establishing baseline emissions levels (i.e., the level of emissions associated with violations of the ozone standards), calculating emissions reduction targets needed to attain the NAAQS and to achieve reasonable further progress (RFP) toward attainment of the ozone standards, determining emissions inputs for ozone air quality modeling analyses, and tracking emissions over time to determine progress toward achieving air quality and emissions reduction goals.

The EPA also appreciates the commenters' concerns about nonattainment areas needing to actively pursue attainment via implementation of regulations or change in activities. The EPA promulgates NAAQS for certain air pollutants, such as ozone, under section 109 of the CAA. The NAAQS are concentration levels that the EPA has determined to be requisite to protect public health and welfare. Under CAA section 107(d), the EPA designates areas as nonattainment if they are violating the NAAQS or contributing to a violation of the NAAQS in nearby areas. State and local governments with nonattainment areas must develop implementation plans outlining how these areas will attain and maintain the NAAQS by reducing air pollutant emissions. Sections 110, 172, and 182 of the CAA require states to develop and submit SIPs to implement, maintain, and enforce the NAAQS.[13] These SIPs address

[13] For more information on the NAAQS implementation process, please see *https://www.epa.gov/criteria-air-pollutants/naaqs-implementation-process*.

requirements for emissions inventories, attainment demonstrations, reasonable further progress, reasonably available control measures, contingency measures, and motor vehicle emissions budgets to improve air quality. Although the base year emissions inventories submitted pursuant to CAA sections 172(c)(3) and 182(a)(1) are not intended to result directly in reductions of emissions or ozone concentration levels, they inform the development and implementation of the SIP submittals that are required under the CAA to actively pursue attainment of environmental goals, as suggested by the commenter.

Comment A.2: One private individual commenter[14] suggests that, within the requirements for base year inventories, a fifth class of anthropogenic sources should be added. The commenter explains that this fifth class will cover emissions contributions from agriculture livestock, agricultural soils, and rice production. The commenter indicates that by adding this fifth class, the proposed rule will gain a more thorough overview of ozone creation within California, allowing the EPA to make better decisions based on nonattainment areas.

Response A.2: As explained in our proposed rule, CAA section 182(a)(1) and 40 CFR 51.1315 contain the requirements for ozone base year emissions inventories. The EPA's guidance for the preparation of ozone base year emissions inventories ("EI Guidance")[15] also indicates that, traditionally, the term "source category" has been used to identify the major types of emissions inventory groupings: stationary point sources, stationary area (or nonpoint) sources, on-road mobile sources, and nonroad mobile sources.[16] Accordingly, our proposed rule identifies four general classes of anthropogenic sources: stationary point sources; area sources; on-road mobile sources; and off-road mobile sources.

Potentially referring to section A.2 of our proposed rulemaking titled "Requirements for Base Year Inventories," the commenter proposes that the requirements for base year inventories

[14] Docket ID No. EPA-R09-OAR-2021-0408-0009.
[15] EPA, "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations" (May 2017).
[16] EI Guidance, 19.

should be amended to add a requirement for a separate category of anthropogenic sources encompassing emissions from agriculture livestock, agricultural soils, and rice production. The requirements for base year emissions inventories established at 40 CFR 51.1315 and at CAA sections 172(c)(3) and 182(a)(1) do not define specific "classes" of sources in which to sort reported emissions. However, we note that the source categories cited by the commenter for inclusion in a "fifth class," i.e., agricultural livestock, agricultural soils, and rice production, are already included in California's base year emissions inventories for the 2015 ozone NAAQS. Emissions from these sources are accounted for in the 2020 CARB SIP Submittal under diesel agricultural equipment, agricultural diesel irrigation pumps, pesticides, farming operations (including livestock husbandry), and agricultural burning.[17]Additionally, we note that the EPA's EI Guidance addresses emissions from agricultural livestock[18] and from certain agricultural soil sources (e.g., direct emissions of pesticides and fertilizers[19]) under the area source category. Emissions from rice production are addressed under various source categories, including the area source category for processes such as direct application of pesticides and fertilizers[20] and the non-road mobile source category for mobile agricultural equipment.[21]

Comment A.3: One private individual commenter[22] expresses concerns about the lack of base year emissions inventory updates for attainment areas and questions why emissions reductions or new emissions standards are not required for attainment areas.

Response A.3: While establishing requirements for nonattainment and attainment areas is outside the scope of this rulemaking action, the EPA agrees that protection of air quality in all areas is of vital importance. We note that the CAA imposes various requirements on nonattainment areas for ozone national ambient air quality standards. The requirements that apply to ozone nonattainment areas, including the requirement for states to submit base year

[17] 2020 CARB SIP Submittal, Staff Report, 13, 15, 20-22.
[18] EI Guidance, 87 and B-1.
[19] EI Guidance, 87-88.
[20] Id.
[21] EI Guidance, 27.
[22] Docket ID No. EPA-R09-OAR-2021-0408-0008.

emissions inventories for these areas, are established in CAA sections 172 and 182. These statutes apply specifically to areas that the EPA has determined to be in nonattainment with respect to a NAAQS and are intended to restore air quality in these areas to levels that the EPA has determined to be requisite to protect public health and welfare with an adequate margin for safety. Accordingly, the SIP submittal that the EPA is evaluating for this action was submitted to fulfill requirements specific to ozone nonattainment areas. The requirements in CAA sections 172 and 182 do not apply to areas designated as attainment, and there is no CAA requirement for states to submit base year emissions inventories for attainment areas.

We do note, however, that recent emissions information is available for all areas of the United States, including attainment areas, in the EPA's national emissions inventory (NEI). The NEI contains comprehensive and detailed information on air emissions of criteria pollutants, criteria pollutant precursors, and hazardous air pollutants from air emissions sources nationwide.[23] The NEI is released every three years and is based primarily upon data provided by state, local, and tribal air agencies for sources in their jurisdictions in accordance with the air emissions reporting requirements (AERR) at 40 CFR part 51, subpart A. At the state level, CARB also collects and provides statewide emissions via the California emissions inventory data analysis and reporting system (CEIDARS), which is a database management system developed to track statewide criteria pollutant and air toxics emissions.[24] Similarly to the NEI, CEIDARS includes emissions information for all areas in California and is not limited to nonattainment areas.

B. Comment from Center for Biological Diversity

Comment B.1: CBD asserts that CARB's base year emissions inventories must be corrected to account for anthropogenic sources of soil-based NO_X emissions related to fertilizer

[23] For more information on the NEI, please see *https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei*.
[24] See *https://ww2.arb.ca.gov/criteria-pollutant-emission-inventory-data*.

and pesticide use in California before the EPA may approve the inventories.[25] Throughout its comment letter, CBD refers to soil NO_X resulting from fertilizer and pesticide use as an anthropogenic emissions source. CBD implies that CARB assumes NO_X emissions from fertilizers and pesticides to be zero and argues that doing so is unacceptable and contrary to science. While the commenter acknowledges the challenges associated with quantifying NO_X emissions resulting from fertilizer and pesticide use, they consider the quantification of these emissions to be no more complex than CARB's quantification of VOC emissions from pesticides in its base year emissions inventories. CBD's comment letter discusses the impacts that both fertilizer and pesticide use have on NO_X emissions and cites 13 research manuscripts to support their comment, 11 of which are included as attachments to the comment letter.

With respect to fertilizer use, the commenter first references two studies: one concluding that non-fossil fuel NO_X emissions should be equally considered as fossil fuel NO_X emissions when designing NO_X pollution mitigation,[26] and another estimating that 600,000 to 800,000 tons of nitrogen from inorganic fertilizer were used in California each year between 2000 and 2008.[27] Additionally, the commenter cites a study finding that, while soils are always producing background NO_X in California, NO_X production rises considerably in croplands with high fertilizer use, and the NO_X emitted through soil could produce over 50 percent of the atmospheric NO_X present in rural California regions.[28] The commenter also references a review of studies conducted in California counties to suggest that between 0.2 and 10.4 percent of the nitrogen applied as fertilizer is emitted as NO_X, depending on the application method and

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[25] CBD's comment letter and attachments ("CBD comment") are available at *https://www.regulations.gov/* under Docket ID No. EPA-R09-OAR-2021-0408-0017.

[26] Song et al. (2021). Important contributions of non-fossil fuel nitrogen oxides emissions, Nature Communications, 12(1), doi:10.1038/s41467-020-20356-0; available at *https://www.nature.com/articles/s41467-020-20356-0*.

[27] Rosenstock et al. (2013). Nitrogen fertilizer use in California: Assessing the data, trends and a way forward, California Agriculture, 67(1), 68-79, doi:10.3733/ca.e.v067n01p68; available at *https://escholarship.org/uc/item/5mk2q1sm*.

[28] Sha et al. (2021). Impacts of soil NO_X emission on O_3 air quality in rural California, Environmental Science & Technology, 55(10), 7113-7122, doi:10.1021/acs.est.0c06834; available at *https://pubs.acs.org/doi/10.1021/acs.est.0c06834*.

region.[29] Further, the commenter cites a recent study finding that fertilized croplands account for 32 percent of NO_X emissions across California.[30] Lastly, the commenter references a study indicating that California has measured fluxes in NO_X in the San Joaquin Valley in the past and correlated these changes with fertilizer use.[31]

With respect to pesticide use, the commenter cites two recent studies to suggest that pesticides of all types can have negative impacts on soil invertebrates or microorganisms by killing or inducing sublethal effects on growth, behavior, or reproduction.[32,33] Additionally, the commenter references research studies to suggest that the fumigant pesticide chloropicrin was found to increase soil NO_X emissions by 8-fold and 7-fold in laboratory and field conditions, respectively,[34] that multiple herbicides, one fungicide, and one adjuvant all increased NO_X emissions in agricultural soils two months after crop harvest,[35] that the herbicide butachlor increased NO_X emissions from citrus fields by 56-85 percent,[36] that application of the insecticide sulfoxaflor to greenhouse vegetables drives changes to soil microbial communities leading to increased NO_X emissions,[37] and that application of the fungicide chlorothalonil has similar impacts to soil microbial communities leading to increases of NO_X emissions in tea fields by

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[29] Verhoeven et al. (2017). N_2O emissions from California farmlands: A review, California Agriculture, 71(3), 148-159, doi:10.3733/ca.2017a0026; *available at https://escholarship.org/uc/item/0kb4505k*.
[30] Almaraz et al. (2018). Agriculture is a major source of NO_X pollution in California, Science Advances, 4(1), doi:10.1126/sciadv.aao3477, 2018; available at *https://advances.sciencemag.org/content/4/1/eaao3477*.
[31] Matson et al. (1997). Agricultural Systems in the San Joaquin Valley: Development of Emissions Estimates for Nitrogen Oxides; available at *https://ww2.arb.ca.gov/sites/default/files/classic//research/apr/past/94-732.pdf*.
[32] Puglisi, E. (2012). Response of microbial organisms (aquatic and terrestrial) to pesticides, EFSA Supporting Publications, 9(11), doi:10.2903/sp.efsa.2012.en-359; available at *https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/sp.efsa.2012.EN-359*.
[33] Gunstone et al. (2021). Pesticides and soil invertebrates: A hazard assessment, Frontiers in Environmental Science, 9, doi:10.3389/fenvs.2021.643847; available at *https://www.frontiersin.org/articles/10.3389/fenvs.2021.643847/full*.
[34] Spokas and Wang. (2003). Stimulation of nitrous oxide production resulted from soil fumigation with chloropicrin, Atmospheric Environment, 37(25), 3501-3507, doi:10.1016/s1352-2310(03)00412-6; available at *https://www.sciencedirect.com/science/article/abs/pii/S1352231003004126*.
[35] Jezierska-Tys et al. (2021). Microbiological nitrogen transformations in soil treated with pesticides and their impact on soil greenhouse gas emissions, Agriculture, 11(8), 787, doi:10.3390/agriculture11080787; available at https://www.mdpi.com/2077-0472/11/8/787.
[36] XiangZhou et al. (2018). Effects of herbicides on urea nitrogen transformation and greenhouse gas emission of soil in citrus orchards with different planting years, Chinese Journal of Eco-Agriculture, 26(3), 338-346; available at https://www.cabdirect.org/cabdirect/abstract/20183141714.
[37] Fang et al. (2021). Effects of sulfoxaflor on greenhouse vegetable soil N2O emissions and its microbial driving mechanism, Chemosphere, 267, 129248, doi:10.1016/j.chemosphere.2020.129248; available at *https://pubmed.ncbi.nlm.nih.gov/33321281/*.

380-830 percent.[38]

Response B.1: We appreciate CBD's comment regarding the inclusion of soil NO_X emissions resulting from fertilizer and pesticide use in CARB's 2015 ozone base year emissions inventories. We acknowledge the studies cited by CBD in their comment letter finding that these types of soil NO_X emissions contribute to atmospheric NO_X levels in California. Particularly, the EPA acknowledges the growing body of research surrounding the identification and quantification of soil NO_X emissions induced by fertilizer application in agricultural soils. The EPA encourages CARB and the districts governing California's ozone nonattainment areas to perform and keep abreast of research on NO_X emissions from agriculture and their implications for air quality modeling and planning. However, as highlighted by our discussion in the following paragraphs, in light of EPA guidance and regulations related to the classification of emissions sources in base year emissions inventories and uncertainties and disagreements among studies regarding the contribution of fertilized cropland soils to NO_X emissions in California, the EPA disagrees with the commenter's assertion that the emissions inventories in the 2020 CARB SIP Submittal must be amended to account for soil NO_X emissions before the EPA may approve them as meeting the base year emissions inventory requirements for the 2015 ozone NAAQS.

The 2020 CARB SIP Submittal specifies that the emissions inventories in the submittal include only emissions from anthropogenic sources, i.e., they do not include biogenic emissions.[39] CBD's comment letter frequently refers to soil NO_X from agricultural sources as an anthropogenic emissions source, suggesting that these soil NO_X emissions must be categorized as anthropogenic and thereby included in CARB's base year emissions inventories. However, the techniques currently available for the estimation of soil NO_X emissions induced by fertilizer application, including the techniques used in the studies cited by CBD in its comment letter,

[38] Su et al. (2020). Long-term effects of chlorothalonil on microbial denitrification and N2O emission in a tea field soil, Environmental Science and Pollution Research, 27(14), 17370-17381, doi:10.1007/s11356-020-07679-7; available at *https://link.springer.com/article/10.1007%2Fs11356-020-07679-7*.
[39] 2020 CARB SIP Submittal, Staff Report, 8.

present substantial uncertainty and variability with respect to the magnitude and proportion of soil NO_X emissions that can be attributed to agricultural fertilizer application. Thus, at this time, we do not find CARB's base year emissions inventories to be deficient for not including soil NO_X as an anthropogenic emissions source.

In its comment letter, CBD acknowledges the "highly variable" nature of soil NO_X emissions and notes that estimating such emissions requires data on fertilizer or pesticide use in a particular region and is dependent on application method, amount of moisture in the soil and "a whole host of other variables."[40] In a study cited by the commenter, Almaraz et al. highlight the uncertainty present in the soil NO_X estimation techniques relied upon in the study.[41] While Almaraz et al. suggest that soil NO_X emissions may be significantly underestimated using currently employed techniques, the study acknowledges the limited number of surface measurements that were available for purposes of comparing the model results and that, where observations exist, there is a large range of observed values due to varying soil conditions (e.g., relating to temperature, moisture, fertilizer application, etc.). The "top-down" NO_X emissions estimates derived from aircraft measurements relied upon in the study also reflect a significant degree of uncertainty, reported at 190 tons per day plus or minus 130 tons per day, i.e., plus or minus 68 percent. The authors acknowledge the difficulty in comparing the model results to the observations and note the need for more field measurements.

The challenges associated with quantifying the contribution of fertilizer application to NO_X emissions using currently available datasets are also highlighted in a separate study not cited by the commenter evaluating the impacts of soil NO_X to atmospheric levels of particulate matter in the San Joaquin Valley.[42] In this study, Guo et al. expressed that obtaining an emission factor correlating NO_X emissions to fertilizer application from the data available in various

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[40] CBD comment, 3.
[41] Almaraz et al. (2018).
[42] Guo et al. (2020). Assessment of Nitrogen Oxide Emissions and San Joaquin Valley $PM_{2.5}$ Impacts From Soils in California, Journal of Geophysical Research: Atmospheres, 125(24), doi: 10.1029/2020JD033304; available at *https://doi.org/10.1029/2020JD033304*, 2.

studies (including Almaraz et al.) would be "difficult or impossible" due to the sparsity of data collected in terms of, sampling length, sampling frequency, and the episodic nature of nitrogen gases from soil.

Additionally, estimates of the magnitude of agricultural soil NO_X emissions in California vary greatly from study to study. For example, Almaraz et al. estimated that soil NO_X emissions from fertilized croplands account for 32 percent of NO_X emissions across California, Sha et al. estimated soil NO_X emissions to comprise 40.1 percent of California's total NO_X emissions, and Guo et al., estimated that soil NO_X emissions in California equate to only 1.1 percent of anthropogenic NO_X emissions in the State.[43] Similarly, estimates of the fraction of nitrogen applied as fertilizer released as NO_X to the atmosphere was estimated by Almaraz et al. to be 15 percent, while seven other studies reviewed by Guo et al. estimated 2 percent or less.[44] Almaraz et al., Sha et al., and Guo et al. each evaluated the performance of the soil NO_X estimation model used in the respective studies by comparing modeled soil NO_X emissions to observed soil NO_X emission values. Sha et al. and Guo et al. also used photochemical models to compare the resulting predicted NO_2 concentrations to satellite observations of NO_2. Despite producing drastically different estimates of the portion of California's NO_X emissions inventories attributable to soil NO_X, each of these studies report high agreement between modeled and observed soil NO_X emissions.[45] This discrepancy highlights the uncertainty surrounding the available observations, given that agreement between modeled and observed soil NO_X emissions are not sufficient to constrain these disparate model results. Thus, at this time, the EPA does not believe that available research provides sufficient certainty about the magnitude and proportion

[43] Guo et al. (2020).
[44] Guo et al. (2020), 7, table 2.
[45] For example, in evaluating model performance against satellite-observed NO_2 observations over croplands, Sha et al. reported that the soil NO_X estimation technique employed in the study decreased mean bias by nearly 23% compared to the default model employed by MEGAN version 2.04, concluding that the model employed in the study demonstrated "good agreement" with tropospheric NO_2 column observations. Guo et al. validated its soil NO_X model by comparing modeled values to field measurements of soil NO_X flux rates in croplands, finding that "the model predicted the measured soil NO_X emissions closely, with an r^2 of 0.69 and a p value of <0.001, demonstrating again that the model is capable of reasonably simulating N speciation and emissions from California agricultural ecosystems."

of soil NO_X emissions attributable to agricultural fertilizer application for the EPA to require that a state categorize these emissions as biogenic or anthropogenic when developing its base year emissions inventories.

While the base year emissions inventories in the 2020 CARB SIP Submittal do not include soil NO_X emissions, the EPA disagrees with the commenter that CARB has assumed the NO_X emissions attributed to soils to be zero. Biogenic emissions (including soil NO_X emissions, if categorized as such) are generally accounted for in the modeled attainment demonstrations submitted for nonattainment areas as recommended in the EPA's "Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze."[46] Modeled attainment demonstrations have not yet been submitted to the EPA for California nonattainment areas for the 2015 ozone NAAQS. However, publicly available draft SIP materials for one nonattainment area in California, the Los Angeles-South Coast Air Basin, indicate that soil NO_X emissions have been quantified and will be accounted for in the photochemical modeling relied upon in the area's attainment demonstration.[47] Additionally, CARB has accounted for soil NO_X emissions in modeled attainment demonstrations for recent SIP submittals, including the "2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards" for the San Joaquin Valley ("2018 SJV $PM_{2.5}$ Plan"),[48] which shows that CARB develops estimates for soil NO_X emissions and will account for these emissions and their impacts on modeled ozone design values in the upcoming attainment plans required for 2015 ozone NAAQS nonattainment areas.

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[46] EPA, "Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze" (November 2018), section 2.7.7.5.

[47] South Coast Air Quality Management District, 2022 Draft Air Quality Management Plan, Appendix V, V-4-16, V-4-17. Soil NO_X emissions are quantified by running the Model of Emissions of Gases and Aerosols from Nature version 3.0 (MEGAN3.0), which uses the Yienger-Levy model for soil NO_X production. The Yienger-Levy model includes a linear dependence of NO_X emission rates on nitrogen fertilizer application rate for agricultural soils and accounts for NO_X emission pulses observed following the wetting of dry soils. See Yienger, J. J.; Levy, H. Empirical model of global soil-biogenic NOx emissions. J. Geophys. Res. 1995, 100, 11447−11464.

[48] See the EPA's "Response to Comments Document for the EPA's Final Action on the San Joaquin Valley Serious Area Plan for the 2006 $PM_{2.5}$ NAAQS" (June 2020), 149-150. Upon reviewing the 2018 SJV $PM_{2.5}$ Plan, the EPA determined that California used the Model of Emissions of Gases and Aerosols from Nature (MEGAN) and the Model for Ozone and Related chemical Tracers, version 4 (MOZART-4) to generate inputs for photochemical models relied upon in the 2018 SJV Plan. MEGAN and MOZART-4 each include models to estimate soil NO_X emissions. The EPA confirmed with CARB that the photochemical modeling in the 2018 SJV $PM_{2.5}$ Plan accounted for soil NO_X emissions from agricultural sources.

Consistent with applicable emissions inventory requirements and EPA guidance, the EPA generally grants flexibility to states in preparing their base year emissions inventories to comport with the structure and feasibility of their emissions collecting mechanisms, including with respect to the allocation of an emissions source to a particular source category. The requirements for base year emissions inventories in CAA sections 172(c)(3) and 182(a)(1) and at 40 CFR 51.1315 do not include requirements pertaining to the allocation of emissions to source categories, and the EPA's EI Guidance does not suggest whether agricultural soil NO_X emissions should be categorized as an anthropogenic emissions source.[49] The EPA generally grants discretion to states to allocate emissions sources to source categories as they deem appropriate for the development of their emissions inventory SIP submittals. Additionally, the EPA's national emissions inventory also does not distinguish naturally occurring soil NO_X emissions from fertilizer-induced soil NO_X emissions, and it categorizes soil NO_X emissions as a biogenic emissions source in name, because emissions are generated from the Biogenic Emissions Inventory System model.[50,51] Thus, we find it acceptable that CARB did not include soil NO_X emissions as an anthropogenic emissions source in the 2020 CARB SIP Submittal.

With respect to the impact of pesticides on soil NO_X emissions, CBD's comment letter cites numerous studies to suggest that pesticide application increases NO_X emissions from soils. We note that each of these studies correlates pesticide use to nitrous oxide (N_2O) emissions rather than NO_X emissions. These studies include Verhoeven et al. (2017), Spokas and Wang (2003), Jezierska-Tys et al. (2021), XiangZhou et al. (2018), Fang et al. (2021), and Su et al.

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[49] EI Guidance, 100-101. "Biogenic sources are a subset of natural emissions sources that may contribute significantly to an emissions inventory. Vegetation (i.e., forests and agriculture) is the predominant biogenic source of VOC and is typically the only source that is included in a biogenic VOC emissions inventory. Microbial activity in the soil contributes to natural biogenic NO_X and CO emissions."

[50] See 2017 National Emissions Inventory Technical Support Document (TSD), section 4.4 Agriculture – Fertilizer Application, 4-49—4-56 (January 2021).

[51] The EPA's EI Guidance clarifies that source category groupings relate more to how emissions inventory data are created than to the features of the actual emissions sources included in the category. See EI Guidance, 19. For the purpose of the national emissions inventory, soil NO_X emissions are calculated using the Biogenic Emissions Inventory System, a model that produces estimates of total soil NO_X emissions that are not disaggregated into anthropogenic and biogenic contributions. Thus, the classification of soil NO_X emissions as biogenic in the NEI is a matter of practicality rather than a policy statement.

(2020). These studies do not review pesticide impacts on NO_X emissions, nor do they relate soil N_2O emissions to NO_X emissions. While N_2O is known to contribute to greenhouse climate warming effects and atmospheric ozone depletion, N_2O is not known to be active in the chemical processes contributing to ground-level ozone production and is relatively inert in the troposphere.[52] It is therefore not included in the EPA's definition for NO_X.[53] Because the studies cited by the commenter do not correlate pesticide use (or the resultant N_2O emissions) to NO_X emissions, the EPA disagrees that the information provided by the commenter suggests that CARB's emissions inventories must be modified to include NO_X emissions resulting from pesticide application.

The EPA does not find that CARB assumed NO_X emissions from fertilizers to be zero in its base year emissions inventories. Rather, the EPA understands that CARB included only anthropogenic emissions in its base year inventories and therefore did not include soil NO_X emissions in the base year inventories as a result of considering those emissions to be biogenic. Upon review of applicable statutes and regulations, EPA guidance, studies cited by the commenter, and additional research, the EPA does not find that it must require a particular categorization of soil NO_X emissions in base year emissions inventories at this time. Furthermore, documentation related to various California area SIPs indicates that CARB accounts for NO_X emissions resulting from fertilizer application in its attainment demonstration modeling for nonattainment areas. The studies cited by the commenter related to pesticide application address N_2O emissions rather than NO_X emissions and thus do not indicate that CARB's emissions inventories should be modified to include NO_X emissions resulting from pesticide application. For these reasons, we conclude that the emissions inventories in CARB's

[52] Seinfeld, J., & Pandis, S. (2016). "Atmospheric Chemistry and Physics: From Air Pollution to Climate Change," John Wiley & Sons, 28.
[53] Per 40 CFR 51.1300, "Nitrogen Oxides (NO_X) means the sum of nitric oxide and nitrogen dioxide in the flue gas or emission point, collectively expressed as nitrogen dioxide."

submittal do not need to be amended before the EPA may approve them as meeting the applicable base year emissions inventory requirements.

III. Final Action

The comments submitted in response to our proposed action do not change our assessment of the 2020 CARB SIP Submittal as described in our notice of proposed rulemaking. Therefore, for the reasons discussed in detail in the proposed rule and summarized herein, we are finalizing our approval of the 2020 CARB SIP Submittal to address the ozone-related base year emissions inventory requirements for the following 18 ozone nonattainment areas for the 2015 ozone NAAQS in accordance with CAA sections 172(c)(3) and 182(a)(1): Amador County, Butte County, Calaveras County, Imperial County, Kern County (Eastern Kern), Los Angeles – San Bernardino Counties (West Mojave Desert), Los Angeles – South Coast Air Basin, Mariposa County, Nevada County (Western part), Riverside County (Coachella Valley), Sacramento Metro, San Francisco Bay Area, San Joaquin Valley, San Luis Obispo (Eastern part), Sutter Buttes, Tuolumne County, Tuscan Buttes, and Ventura County.

IV. Statutory and Executive Order Reviews

Under the Clean Air Act, the Administrator is required to approve a SIP submission that complies with the provisions of the CAA and applicable Federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, the EPA's role is to approve state choices, provided that they meet the criteria of the Clean Air Act. Accordingly, this action merely approves state law as meeting Federal requirements and does not impose additional requirements beyond those imposed by state law. For that reason, this action:

- Is not a significant regulatory action subject to review by the Office of Management and Budget under Executive Orders 12866 (58 FR 51735, October 4, 1993) and 13563 (76 FR 3821, January 21, 2011);
- Does not impose an information collection burden under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*);

- Is certified as not having a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq*.);
- Does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4);
- Does not have federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);
- Is not an economically significant regulatory action based on health or safety risks subject to Executive Order 13045 (62 FR 19885, April 23, 1997);
- Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001); and
- Is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the Clean Air Act.

The State did not evaluate environmental justice considerations as part of its SIP submittal. There is no information in the record inconsistent with the stated goals of Executive Order 12898 (59 FR 7629, February 16, 1994) of achieving environmental justice for people of color, low-income populations, and indigenous peoples.

In addition, the SIP is not approved to apply on any Indian reservation land or in any other area where the EPA or an Indian tribe has demonstrated that a tribe has jurisdiction. In those areas of Indian country, the rule does not have tribal implications and will not impose substantial direct costs on tribal governments or preempt tribal law as specified by Executive Order 13175 (65 FR 67249, November 9, 2000).

The Congressional Review Act, 5 U.S.C. section 801 *et seq*., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a

copy of the rule, to each House of the Congress and to the Comptroller General of the United States. The EPA will submit a report containing this action and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the *Federal Register*. A major rule cannot take effect until 60 days after it is published in the *Federal Register*. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

Under section 307(b)(1) of the Clean Air Act, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. This action may not be challenged later in proceedings to enforce its requirements. (See section 307(b)(2).)

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Incorporation by reference, Intergovernmental relations, Ozone, Reporting and recordkeeping requirements, Volatile organic compounds.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: September 8, 2022.

Martha Guzman Aceves,
Regional Administrator,
Region IX.

For the reasons stated in the preamble, the EPA amends chapter I, title 40 of the Code of Federal Regulations as follows:

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart F—California

2. Section 52.220 is amended by adding paragraph (c)(589) to read as follows:

§52.220 Identification of plan—in part.

* * * * *

(c) * * *

(589) The following plan was submitted on July 27, 2020 by the Governor's designee.

(i) [Reserved]

(ii) *Additional materials*. (A) California Air Resources Board.

(*1*) California Air Resources Board, "70 ppb Ozone SIP Submittal," excluding section III, "VMT Offset Demonstration," release date: May 22, 2020.

(*2*) [Reserved]

(B) [Reserved]

[FR Doc. 2022-20586 Filed: 9/28/2022 8:45 am; Publication Date: 9/29/2022]