APPENDIX F

PUBLIC COMMENTS

EXCEPTIONAL EVENTS DEMONSTRATION FOR 2022 $PM_{2.5}$ EXCEEDANCES AT HARRISON COUNTY, TRAVIS COUNTY, AND KLEBERG COUNTY

February 7, 2025

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. BOX 13087
AUSTIN, TEXAS 78711-3087

PUBLIC COMMENTS

The public comment period for this demonstration opened December 19, 2024, and closed January 21, 2025. During the comment period, the commission received comments from the Capital Area Metropolitan Planning Organization (CAMPO), CapMetro, Midwest Ozone Group, Ramboll, Texas Department of Transportation (TxDOT), Air Alliance Houston, Earth Justice, Rio Grande International Study Center, Lone Star Chapter of the Sierra Club, Save our Springs Alliance, Rethink35, Coalition for Responsible Environmental Aggregate Mining (CREAM), Texas Streets Coalition, Environment Texas, Save Barton Creek Association, Earthworks, Midlothian Breathe, and two individuals.

Five commentors (CAMPO, CapMetro, MOG, Ramboll, and TxDOT) supported the exceptional event demonstrations, and Ramboll provided additional supporting technical information. The two individual commentors had general comments about air quality in Texas and did not provide any technical comments about the exceptional events demonstrations.

Air Alliance Houston and Earth Justice provided relevant technical comments about the exceptional events demonstrations. TCEQ made changes, where needed, to the demonstration in response to their comments.[1]

All comments received by 5:00 p.m. CST on January 21, 2025, are attached in the following pages.

CHANGES DUE TO COMMENTS RECEIVED

TCEQ updated Section 3.2, *Clear Causal Evidence* to add additional key methodology/parameters for HYSPLIT (forward and backward) models used to support exceptional events. Additionally, (100 m, 500 m, and 800 m AGL) HYSPLIT back trajectories were included in the demonstration starting from each hour for the Tier 2 days as further evidence that particulate matter was transported to the monitoring site. These additions were made in response to comments from Air Alliance Houston and Earth Justice.

TCEQ added Appendix D, which includes Navy Aerosol Analysis and Prediction System (NAPPS) model plots showing smoke concentrations for fire related days as further evidence in response to Air Alliance Houston and Earth Justice comments that smoke was present on the surface and impacted the monitor.

TCEQ independently verified and added additional details on the number of reported fires and possible causes of these fires in 2022 from the Government of Mexico's National Concentration of Forest Fires website. Updates were made in Section 2.5, *Narrative for Each Group of Event Days*, the narrative conceptual model for event days impacted by fires in Mexico/Central America, and Section 5.5, *Fires in Mexico/Central America-Human Activity Unlikely to Recur at a Particular Location* in response to Air Alliance Houston and Earth Justice comments on TCEQ's reliance on unpublished data/reports.

[1] Signatories to this comment also included Rio Grande International Study Center, Lone Star Chapter of the Sierra Club, Save our Springs Alliance, Rethink35, Coalition for Responsible Environmental Aggregate Mining (CREAM), Texas Streets Coalition, Environment Texas, Save Barton Creek Association, Earthworks, and Midlothian Breathe.

From:	Ashby Johnson
To:	amda
Cc:	Cynthia Long; Chad McKeown; Nirav Ved
Subject:	2022 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties and/or 2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date:	Tuesday, January 21, 2025 4:54:00 PM

Dear Ms. Saculla,

The Capital Area Metropolitan Planning Organization (CAMPO) supports the 2022 and 2023 exceptional event demonstrations for Harrison County, Travis County and Kleberg County dated December 19, 2024. CAMPO is the six-county metropolitan transportation planning organization responsible for regional transportation planning and allocation of suballocated federal transportation funding. Part of our responsibilities are to improve safety, mobility, and quality of life while maintaining the natural and built environments. We would also be responsible for demonstrating air quality conformity should the region fall into non-attainment for any regulated pollutants. New PM 2.5 nonattainment designations would greatly impact our ability to meet the goals and requirements expected of us under federal and state law by creating costly delays in project delivery and driving up costs.

We agree that exceptional events beyond our control such as transport of Saharan dust and soot particles from fields being burned in Mexico contributed to the Webberville monitor exceeding the standard. We also agree with TCEQ's recommendations to not use the readings from the Austin North Interstate 35 monitor in the calculations of the averages. We concur that the monitor is not representative of the region's air quality.

Once again, CAMPO supports TCEQ in appropriately using regulatory mechanisms like this exceptional events package to prevent unnecessary designation and the associated deleterious impacts.

Ashby Johnson
Executive Director
CAMPO

From:	Ashby Johnson
To:	amda
Cc:	Cynthia Long; Chad McKeown; Nirav Ved
Subject:	2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties and/or 2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date:	Tuesday, January 21, 2025 4:56:00 PM

Dear Ms. Saculla,

The Capital Area Metropolitan Planning Organization (CAMPO) supports the 2022 and 2023 exceptional event demonstrations for Harrison County, Travis County and Kleberg County dated December 19, 2024. CAMPO is the six-county metropolitan transportation planning organization responsible for regional transportation planning and allocation of suballocated federal transportation funding. Part of our responsibilities are to improve safety, mobility, and quality of life while maintaining the natural and built environments. We would also be responsible for demonstrating air quality conformity should the region fall into non-attainment for any regulated pollutants. New PM 2.5 nonattainment designations would greatly impact our ability to meet the goals and requirements expected of us under federal and state law by creating costly delays in project delivery and driving up costs.

We agree that exceptional events beyond our control such as transport of Saharan dust and soot particles from fields being burned in Mexico contributed to the Webberville monitor exceeding the standard. We also agree with TCEQ's recommendations to not use the readings from the Austin North Interstate 35 monitor in the calculations of the averages. We concur that the monitor is not representative of the region's air quality.

Once again, CAMPO supports TCEQ in appropriately using regulatory mechanisms like this exceptional events package to prevent unnecessary designation and the associated deleterious impacts.

Ashby Johnson
Executive Director
CAMPO

From:	Alloway, Leroy
To:	amda
Cc:	Trevino, Lawrence
Subject:	2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date:	Tuesday, January 21, 2025 1:06:16 PM
Attachments:	Outlook-A picture .png TCEQ Air Modeling and Data Analysis Letter - D Watkins Jan 2025 (1).pdf

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Dear Ms. Saculla,

Please find attached comments on behalf of CapMetro for the above referenced matter.

Sincerely,

Dr. Leroy D. Alloway, AICP, ENV-SP
Vice President, Government Affairs

Dr. Leroy D. Alloway, AICP (pronouns: he/him)
Vice President, Government Affairs
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January 21, 2025

Ms. Emily Saculla
TCEQ Air Modeling and Data Analysis Section
MC164
P.O. Box 13087
Austin, TX 78711-3087

Re: Public Comment on Exceptional Events Demonstration for Fine Particulate Matter ($PM_{2.5}$) Exceedances in 2022 and 20223 at Harrison County, Travis County, and Kleberg County

Dear Ms. Saculla,

On behalf of CapMetro, please accept this letter as our support for the public comments on exceptional events demonstration for Fine Particulate Matter ($PM_{2.5}$) exceedances in 2022 and 2023 at Harrison County, Travis County, and Kleberg County. As an agency, CapMetro is committed to doing our part to help reduce air pollution by providing efficient and effective public transportation within Central Texas, including transitioning our agency to a carbon neutral state by 2040. We recognize, however, that even the best developed plans have to give away to the reality that some aspects are beyond the control of agencies and individuals.

We acknowledge how impactful clean air is for public health and a thriving community. We also know that when an exceedance occurs of the National Ambient Air Quality Standards, which is outside of the control of the community, be it unusual or do to naturally occurring event, the exceptional event needs to be viewed in such a way that the community is not penalized for actions beyond their control.

CapMetro is supportive of the TCEQ determination of the exceptional events package proposed for 2022 and 2023, dated December 19, 2024, to prevent unnecessary designations as our entire region works together to continue advancing a healthy, prosperous community and environment.

Sincerely,

Dottie L. Watkins
President & CEO

From:	Lauren Godshall
To:	amda
Cc:	Vanessa De Arman; Laramie Mahan; Richard Goertz; Jen Powis; Jennifer Hadayia; Inyang Uwak; Brandy Deason
Subject:	2023 and 2022 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date:	Friday, January 17, 2025 3:39:27 PM
Attachments:	2025.01.17 TCEQ Exceptional Events Comments.pdf Exhibits A-C.pdf

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Good afternoon,

Attached please find Comments in response to the 2022 and 2023 Harrison, Kleberg, and Travis Counties PM2.5 Exceptional Events Demonstrations, submitted on behalf of the signatories on the last page. We appreciate the opportunity to submit these comments and look forward to your response.

Lauren E. Godshall
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+1 773-828-0836

Because the earth needs a good lawyer

EARTHJUSTICE

January 17, 2025

Via email: amda@tceq.texas.gov
TCEQ Air Modeling and Data Analysis Section
Attn: Emily Saculla
MC164
P.O. Box 13087
Austin, TX 78711-3087

Re: 2023 $PM_{2.5}$ Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties and 2022 $PM_{2.5}$ Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties

Dear TCEQ Air Modeling and Data Analysis Section members:

The Texas Commission on Environmental Quality (TCEQ) requested comments on 2023 and 2022 PM2.5 Exceptional Events Demonstrations for Harrison, Travis, and Kleberg Counties. This request for comments followed the release of TCEQ's recommendations for areas in attainment and nonattainment under the new PM2.5 NAAQS standard. These comments are submitted on behalf of Air Alliance Houston, a clean air advocacy nonprofit organization based in Houston, Texas, along with the additional nonprofit signatories below ("Commenters").

A. Comment Period Does Not Meet Statutory Requirements

TCEQ announced these demonstrations and posted them for public comment on December 19, 2024. On the agency website, TCEQ states that it "will submit all comments received or postmarked by 5:00 p.m. CDT on **Jan. 21**, 2025, to the [Environmental Protection Agency] ("EPA")] along with the final demonstration."[1] Within both the 2023 and 2022 demonstration documents themselves, however, TCEQ states that the public comment period is December 19 through January 21, but then further states that it "will **include** all comments received or postmarked by 5:00 p.m. CST on **January 17,** 2025, with the final demonstration submitted to EPA. TCEQ will also address those comments disputing or contradicting factual evidence provided in the final demonstration."[2] A comment period of December 19 – January 17 is clearly short of

[1] TCEQ, "Exceptional Event Demonstrations for Particulate Matter," available at https://www.tceq.texas.gov/airquality/monops/pm_flags.html

[2] TCEQ, "Exceptional Events Demonstration for 2022 PM2.5 Exceedances at Harrison County, Travis County, and Kleberg County," December 19, 2024 (p. 129), available at https://www.tceq.texas.gov/downloads/air-quality/air-monitoring/pm/2022-ee-pm25-harrison-kleberg-travis.pdf; TCEQ, "Exceptional Events Demonstration for 2023 PM2.5 Exceedances at Harrison County, Travis County, and Kleberg County," December 19, 2024 (p. 97), available at https://www.tceq.texas.gov/downloads/air-quality/air-monitoring/pm/2023-ee-pm25-harrison-kleberg-travis.pdf.

statutory requirements.[3] Keeping the comment period "open" until January 21 while actually closing down consideration of any comments four days before the comment period ends does not meet federal requirements, nor does it appear to allow TCEQ time to respond to the concerns articulated below, or receive additional modeling or evidence in opposition to the demonstrations that surprisingly ensure certain counties, like Kleberg, are now proposed for attainment. As such, Commenters request that TCEQ respond to all comments received by January 21 and incorporate them all in the submission to the EPA.

B. Multiple Exceptional Events Identified in the 2022 and 2023 Demonstration Reports Do Not Meet Requirements under the EPA's Exceptional Events Rule

Exceptional events ("EEs") are defined as unusual occurrence that can affect air quality and which are not reasonably controllable or preventable.[4] Importantly, these events are either natural events or caused by human activity but defined as unlikely to recur at a particular location.[5] 42 U.S.C. § 7619(b) contains rules regarding "exceptional events" for the purposes of air quality monitoring. Under the statute, an event is exceptional if it meets the following four statutory conditions:[6]

(1) It affects air quality;
(2) It is not reasonably controllable or preventable;
(3) It is an event that is caused by human activity that is unlikely to recur at a particular location or a natural event; and
(4) EPA has certified, through the process established in the applicable regulations, that exceptional event criteria have been met.

If all of these conditions are met, the EPA may exclude certain air-quality monitoring data when designating an area as nonattainment or attainment. Importantly, the occurrence of an exceptional event must be demonstrated by "reliable, accurate data that is promptly produced and provided by Federal, State, or local government agencies."[7]

Because TCEQ's proposed determinations do not provide adequate support for claiming high PM days as EEs, nor properly account for all existing monitors as required under federal law, and because the demonstration is not supported by reliable and accurate data, the proposed EEs should be disregarded for TCEQ's initial determination of counties for nonattainment. As such, TCEQ

[3] *See* 40 C.F.R. § 50.14(c)(3)(v) (requiring 30 day public notice and comment period; requiring the state to address comments received).
[4] 42 U.S.C. § 7619(b).
[5] *Id*.
[6] 42 U.S.C. § 7619(b)(1)(A).
[7] 42 U.S.C. § 7619(b)(3)(B)(i).

should amend its recommendations to the TCEQ Commissioners to reflect its initial conclusion that twelve (12) counties are in nonattainment under the new PM2.5 rule.[8]

1. *TCEQ has not provided key methodology/parameters for HYSPLIT models used to support exceptional event demonstrations.*

Throughout its 2022 and 2023 demonstrations, TCEQ submits modeled forward and backward air trajectories computed using the National Oceanic and Atmospheric Administration's (NOAA) HYSPLIT tool as evidence of exceptional events impacting certain monitors.[9] The modeled trajectories of air parcels generated by HYSPLIT represent paths PM2.5 could take from where it becomes airborne as a result of an alleged exceptional event—*e.g.*, fires in Mexico/Central America, dust storm in the Saharan Dessert—to where the model predicts one or more trajectories may have eventually encountered monitors in Harrison, Travis, and Kleburg counties, causing exceedances of the PM2.5 NAAQS (describes a forward trajectory model; reverse is true for backward trajectory model). Yet, nowhere in its 2022 and 2023 exceptional events demonstrations does TCEQ offer any details on the operational parameters and methodology of its HYSPLIT models, information without which reviewers cannot properly consider the showings put forth by the models.

HYSPLIT requires numerous meteorological inputs, including wind speed and direction, temperature, humidity, and precipitation, to run a simulation.[10] There is a wide variety of meteorological data a user can select as input for their model, incorporating various meteorological models; horizontal, vertical, and temporal resolutions; and meteorological variables.[11] NOAA's HYSPLIT guidance recommends performing the analysis with different meteorological data sets and examining the differences: if different meteorological datasets produce similar results, the meteorological uncertainties are not playing a significant role in the model.[12] However, if the use of different meteorological datasets produces very different results, then some of the modeled trajectory uncertainty is due to meteorological data uncertainties. TCEQ does not provide any information about the inputs and variables used in its models. This omission makes it impossible for commenters to validate findings of the included HYSPLIT models and weakens TCEQ's claim to exceptional events.

TCEQ includes several examples of a type of HYSPLIT graphic known as a "spaghetti plot," showing multiple potential forward trajectories of an air parcel, as evidence to support some of its claims of exceptional events related to Saharan dust.[13] Aside from a starting date and time,

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[8] TCEQ, "Public Information Meeting: Particulate Matter (PM) Standard Revision, June 26, 2024, Houston Area," p. 9, available at https://www.tceq.texas.gov/downloads/air-quality/sip/pm/designations/naaqs-pm25-2012/pm-naaqs-revision-outreach_houston_2024.pdf.
[9] 2022 EE Demonstration at p. 3-1; 2023 EE Demonstration at p. 3-1.
[10] NOAA, HYSPLIT Cheat Sheet at p. 5 (updated Sept. 8, 2020), *available at* https://www.ready.noaa.gov/documents/ppts/Cheat_Sheet_2020.pdf.
[11] *Id.*
[12] *Id.*
[13] *See* 2023 EE Demonstration at pp. 3-31 and 3-34 (concerning Group 10, impacts National Seashore monitor on July 15-16, 2023, due to African dust) and at 2022 EE Demonstration at pp. 3-31, 3-36, 3-41, 3-45, 3-49, 3-56 (concerning Group 7, impacts National Seashore, Karnack, and Webberville monitors on June 11-17, 2022, due to African dust), 3-60, 3-65, 3-68 (concerning Group 8, impacts National Seashore, Karnack, and Webberville monitors

readers are given no information about the parameters and inputs for these plots. The plots do not specify what exactly each line represents, whether this be one full day, a 12-hour period, a 1-hour period, or some other time duration, how many lines there are total, or what meteorological inputs were used. The spaghetti plots offered in the 2022 and 2023 exceptional events demonstrations each show a couple (out of some unknown number, but at least a hundred) trajectory lines possibly contacting the southeastern portion of Texas. The trajectory lines that do touch Texas in these plots occur at some unspecified altitude. This matters, because PM2.5 — even if truly traceable to a dust storm in the Saharan Desert — will not impact ground-level monitors if it simply passes over at altitude. More specifically, TCEQ's forward trajectories illustrate that Saharan dust are on the order of 2,000-8000 meters above ground level.[14] Air parcels at these levels do not generally descend to ground level under normal atmospheric conditions, which is made clear when reviewing atmospheric principles and dynamics of transport and deposition.[15] Indeed, air parcels at this range are more likely to remain as vertical mixing is less common at higher altitudes.

The mere presence of PM2.5 at high altitude does not qualify as an exceptional event. TCEQ does not make clear in its plots or elsewhere in the documentation the relevant altitude of these alleged Texas-contacting trajectories, as the representation of trajectory altitudes provided at the bottom of each graphic are impossible to parse one from the other. On this small number of trajectories that reach Texas out of an unknown number of hundreds, TCEQ bases its claims that PM2.5 originating outside the U.S. has impacted monitors at ground level. TCEQ, however, does not provide enough information about its models to back up this assertion.

TCEQ needs to show its work. HYSPLIT projections are probabilistic, not deterministic: they can help illustrate where an air parcel *may* end up only, and the trajectories can vary significantly depending on the inputs chosen. A selection of HYSPLIT trajectories where one or two out of hundreds reaches the target area in no way proves that the monitor in question was affected. TCEQ provides no information about model inputs, parameters, or uncertainty analysis to help the reader understand what is being shown. TCEQ cannot produce graphics with little to no context and expect them to pass muster. The purported evidence of exceptional events cannot be verified and the conclusions cannot be accepted.

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on July 16-18 2022, due to African dust), and 3-71 (Group 9, impacts National Seashore monitor on July 21, 2022, due to African dust); *see* specific figures as follows: 2023 EE Demonstration: Fig 3-48, HYSPLIT forward trajectories from Western Africa starting on July 1, 2023 (p. 3-31); Fig. 3-52, HYSPLIT forward trajectories from Western Africa, starting on July 2, 2023 (p. 3-34). 2022 EE Demonstration: Fig. 3-47, starting at 1200 UTC 5/28/22 (p. 3-31); Fig. 3-54, starting at 1200 UTC 5/29/22 (p. 3-36); Fig. 3-62, starting at 1200 UTC 5/31/22 (p. 3-41); Fig. 3-68, starting at 1200 UTC 6/1/22 (p. 3-45); Fig. 3-74, starting at 1200 UTC 6/3/22 (p. 3-49); Fig. 3-85, starting at 1200 UTC 6/3/22 (p. 3-56); Fig. 3-91, starting at 1200 UTC 7/2/22 (p. 3-60); Fig. 3-98, starting at 1200 UTC 7/3/22 (p. 3-65); Fig. 3-103, starting 1200 UTC 7/4/22 (p. 3-68); and Fig. 3-107, starting 1200 UTC 7/7/22 (p. 3-71).

[14] *Id.* at Fig 3-48 and Fig 3-52.

[15] Danielsen, Edwin F., "In situ evidence of rapid, vertical, irreversible transport of lower tropospheric air into the lower tropical stratosphere by convective cloud turrets and by larger-scale upwelling in tropical cyclones." *Journal of Geophysical Research: Atmospheres* 98.D5 (1993): 8665-8681. Available at: https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/92JD02954?saml_referrer.

2. *HYSPLIT forward trajectories from Western Africa do not satisfy the exceptional events determination*

NOAA describes the HYSPLIT model as a means for "computing simple air parcel trajectories as well as complex transport, dispersion, chemical transformation, and deposition simulations."[16] It allows its users to identify and trace the origins of air masses to establish "source-receptor relationships."[17] While it has been used in combination with other tools, like satellite imaging, or even paired with other modeling tools like EPA's Community Multiscale Air Quality Modeling System,[18] it is not an adequate single means for making deterministic conclusions regarding the deposition of air parcels with source provenance from the Saharan Desert. As described above, the HYSPLIT dust model is a largely probabilistic model in that it integrates stochastic processes that simulate random variations in particle movement, which can produce large variability in the model output. Neither variability nor an uncertainty analysis were described or discussed in TCEQ's exceptional events demonstrations, and the demonstrations failed to produce data that support the exclusion of air monitor data from the 2016 exceptional events rule.

TCEQ is excluding PM monitoring data due to exceptional events from Saharan dust purported detected by monitors on June 11-17, July 16-18 and July 21 of 2022 and July 15-16 and 25-28 of 2023. TCEQ has not demonstrated that its reliance on the HYSPLIT model forward trajectories provide adequate evidence that the PM2.5 monitoring data was in fact mainly influenced by Saharan dust nor does the science regarding air dispersal dynamics support its claims.

3. *EPA Requirement to Provide Details About Specific Fires*

Texas's 2022 and 2023 exceptional events demonstrations both claim that fires originating in Mexico/Central America caused sixteen (16) exceptional events, and both demonstration reports adopt identical language about the source of such international fires. Both demonstration reports use identical language about how fires in Mexico are generally nonrecurring and non-agricultural, and therefore the fires affecting Texas air monitors should be considered exceptional events every time they impacted particulate matter counts.

TCEQ has ***not*** demonstrated that the 16 proposed fires meet all of EPA's requirements to qualify as exceptional events.

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[16] Stein, Ariel F., et al. "NOAA's HYSPLIT atmospheric transport and dispersion modeling system." *Bulletin of the American Meteorological Society* 96.12 (2015): 2059-2077. Available at: https://journals.ametsoc.org/view/journals/bams/96/12/bams-d-14-00110.1.xml?tab_body=supplementary-materials.

[17] *Id.*

[18] *See* Kim, Hyun Cheol, et al. "Inverse modeling of fire emissions constrained by smoke plume transport using HYSPLIT dispersion model and geostationary satellite observations." *Atmospheric Chemistry and Physics* 20.17 (2020): 10259-10277. Available at: https://acp.copernicus.org/articles/20/10259/2020/acp-20-10259-2020-discussion.html; Pouyaei, Arman, et al. "Concentration trajectory route of air pollution with an integrated Lagrangian model (C-TRAIL model v1. 0) derived from the community Multiscale Air quality model (CMAQ model v5. 2)." *Geoscientific Model Development* 13.8 (2020): 3489-3505. Available at: https://gmd.copernicus.org/articles/13/3489/2020/gmd-13-3489-2020.html.

The EPA's guidance on how to calculate and describe exceptional events was recently updated in April 2024 following opportunity for public comments.[19] In this guidance document, EPA describes its expectation that sufficient information will be provided about ***each*** fire to justify the exceptional event. Generic conclusions and national statistical data about fires in Mexico or Central America are unlikely to be considered as sufficient to conform with EPA's requirements:

> To be meaningful and clearly interpreted, air agencies should tie all supporting technical analyses to this simple narrative describing how emissions from a *specific* fire (or group of fires) caused PM2.5 exceedances or violations at a particular location and how these event-related emissions and resulting exceedances or violations differ from typical high PM2.5 episodes in the area resulting from other natural and anthropogenic sources of emissions.[20]

EPA expects that, in most cases, the conceptual model of the event will be a brief narrative of the *specific* facts leading up to, and directly relevant to, the exceedance or violation date(s). Again – this was a recently updated guidance; EPA sought comments on the new guidance document and Texas responded that:

> EPA should clarify that fires from outside of the United States, even if related to the planned burning of agricultural fields, can be considered for PM2.5 exceptional events . . . TCEQ appreciates the acknowledgement of fires outside the country impacting Texas and other states. EPA *should* allow states to pursue exceptional event demonstrations for days when international fires, including planned agricultural burning, cause elevated PM2.5 concentrations at monitors within the United States. Further, EPA should provide guidance on developing exceptional event demonstrations for days impacted by agricultural fires.[21]

In its own comment to EPA, TCEQ recognizes that generic descriptions of fire events in Mexico and Central America does not meet EPA's requirement for specific facts about the origin and causes of individual fires.

TCEQ's 2022 and 2023 demonstrations do not describe or identify any one of the fires. Instead, TCEQ repeats generalized statements, with limited support, about fires in Mexico, and does not include any evidence (news articles, satellite imagery, or otherwise) to prove that each specifically-detected fire event falls under its assumption that smoke detected in Texas came from qualifying exceptional events. This is insufficient to meet the statutory conditions for exceptional events, as the state has the burden to produce such evidence to EPA.[22]

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[19] The docket for comments on this is available here: EPA, "Exceptional Events Documents and Tools" Docket ID Number: EPA-HQ-OAR-2023-0586, https://www.regulations.gov/docket/EPA-HQ-OAR-2023-0586. The final document is available here: https://www.epa.gov/system/files/documents/2024-04/final-pm-fire-tiering-4-30-24.pdf.

[20] EPA, Office of Air Quality Planning and Standards, "PM2.5 Wildland Fire Exceptional Events Tiering Document" [EPA-457/D-24-001], April 2024, Section 4, p.10; available at https://www.epa.gov/system/files/documents/2024-04/final-pm-fire-tiering-4-30-24.pdf.

[21] Exhibit A, TCEQ Letter to EPA, Feb. 2, 2024, Comments by the Texas Commission on Environmental Quality (TCEQ) on Exceptional Events Documents and Tools.

[22] 42 U.S.C. § 7619(b)(3)(B)(i).

4. Conflicting Descriptions About Origins of Individual Fires

TCEQ's demonstration reports for exceptional events have categorized six (6) and ten (10) fire events in 2022 and 2023, respectively, as "Fire – Mexico/Central America." A deeper review of TCEQ's forecast discussions contained in Appendix C of each demonstration report reveals much greater uncertainty about the origin and source of each fire. This uncertainty and missing information about individual fires in Mexico/Central America was identified by TCEQ as a specific technical limitation in its letter to EPA on February 2. Table 1 provides some examples of the conflicting descriptions about individual fires which TCEQ provided in Appendix C versus the "wildfire" description in the body of the report. Some of the descriptive language in Appendix C indicates anthropogenic origins or a recurring activity for fires claimed as exceptional events.

Table 1. Examples of TCEQ's Conflicting Descriptions in Appendix C About the Origin of Fires in Mexico/Central America vs. Assignment as a "Wildfire"

Anthropogenic or Recurring Activity Mentioned in Appendix C	Dates in 2022 of Proposed Exceptional Event as a Wildfire	Dates in 2023 of Proposed Exceptional Event as a Wildfire
Agricultural or Seasonal Burnings	4/11, 4/12, 4/13, 5/6, 5/7, 5/20	5/8, 7/15, 7/16
Oil & Gas Flaring	4/11, 4/12, 4/13, 6/11	1/3
Other Industrial Activities	4/11, 4/12, 4/13, 6/11	1/16, 1/18, 2/27, 3/2

TCEQ's own documentation in Appendix C reveals the uncertainty and lack of appropriate data from Mexico to properly categorize individual fires as wildfires.

5. TCEQ's Reliance on Unpublished Reports

In both of TCEQ's 2022 and 2023 demonstration reports, when justifying the exclusion of days involving purported particulate matter from fires in Mexico and/or Central America, TCEQ has relied almost exclusively on one report, "Fires in Mexico as Exceptional Events."[23] Neither demonstration report identifies the author or source of this report, nor is it attached. However, this report is cited in a comment from Ramboll Corporation submitted earlier this year in response to the TCEQ's call for informal comments on potential county nonattainment designations for the newly adopted fine particulate matter ($PM_{2.5}$) standard under the National Ambient Air Quality Standards (NAAQS).

Ramboll attached to its statewide comments on $PM_{2.5}$ attainment a report on fires in Mexico, cited as "Rodriguez, M. and R. Morris, 2024. Fires in Mexico as Exceptional Events: Documentation

[23] TCEQ, "Exceptional Events Demonstration for 2022 PM2.5 Exceedances at Harrison County, Travis County, and Kleberg County," December 19, 2024 (p. 126), available at https://www.tceq.texas.gov/downloads/air-quality/air-monitoring/pm/2022-ee-pm25-harrison-kleberg-travis.pdf; TCEQ, "Exceptional Events Demonstration for 2023 PM2.5 Exceedances at Harrison County, Travis County, and Kleberg County," December 19, 2024 (p. 94), available at https://www.tceq.texas.gov/downloads/air-quality/air-monitoring/pm/2023-ee-pm25-harrison-kleberg-travis.pdf.

and Implications. Ramboll, Novato, California and Fort Collins, Colorado. August."[24] This report, of such significance that TCEQ relies almost exclusively on it in justifying its designation of certain days as exceptional events, is by two Ramboll employees and there is no indication of peer review or independent evaluation by TCEQ.[25] This report does not specify the sources of each of the fires in Mexico, as further discussed below, and does not address fires in Central America whatsoever.

6. Conflicting Descriptions of Agricultural Fires

Per the 2016 Exceptional Events Rule,[26] EPA requires the following of TCEQ:

> The air agency should then affirmatively state that in characterizing the event, it has satisfied the "human activity unlikely to recur at a particular location or a natural event" criterion.

In Section 5.5 of TCEQ's two proposed submittals to EPA, TCEQ attempts to address this requirement by citing the Ramboll report and generically claiming that:

> A majority of the observed fires are forest fires or burns performed to clear land for development, and these are also *not expected to recur* at a particular location. Once the forest is burned at a specific location, the biomass is consumed and the land is not prime for additional fires in the following years.

The Ramboll report[27] that TCEQ relies on for these statements contains a different definition of "Agricultural" fires where Ramboll indicates that these fires can recur in the same location:

> Agricultural: Includes fires started by traditional slash-and-burn farming methods where the *crop residue from the previous year* is burned to provide fertilizer and prepare the field for planting. Farmers also clear small plots of land by cutting down vegetation and burning it to develop a new field for planting of crops.

Figure 3 in the Ramboll Report[28] shows that a large majority of fires in Mexico had unknown, intentional or agricultural origins per CONAFOR (Comision Nacional Forestal). Only 2% on average had natural causes. Almost all of the remaining identified causes would not qualify the fires as exceptional events in the absence of additional evidence.

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[24] Ramboll, "Justification and Evidence for an Exceptional Events Demonstration," Sept. 6, 2024, available at https://www.tceq.texas.gov/downloads/air-quality/sip/pm/designations/pm2-5-all-informal-comments.pdf (p. 188).
[25] Exhibit B, Rodriguez, M. and R. Morris, Ramboll, "Fires in Mexico as Exceptional Events: Documentation and Implications," Sept. 2024. Note that the Ramboll citations to this report indicated it was from August of 2024.
[26] EPA, "Treatment of Data Influenced by Exceptional Events," 81 Fed. Reg. 68216, 68234, Oct. 3, 2016, available at: https://www.federalregister.gov/d/2016-22983.
[27] Exhibit B, p. 6.
[28] Ibid, page 7.

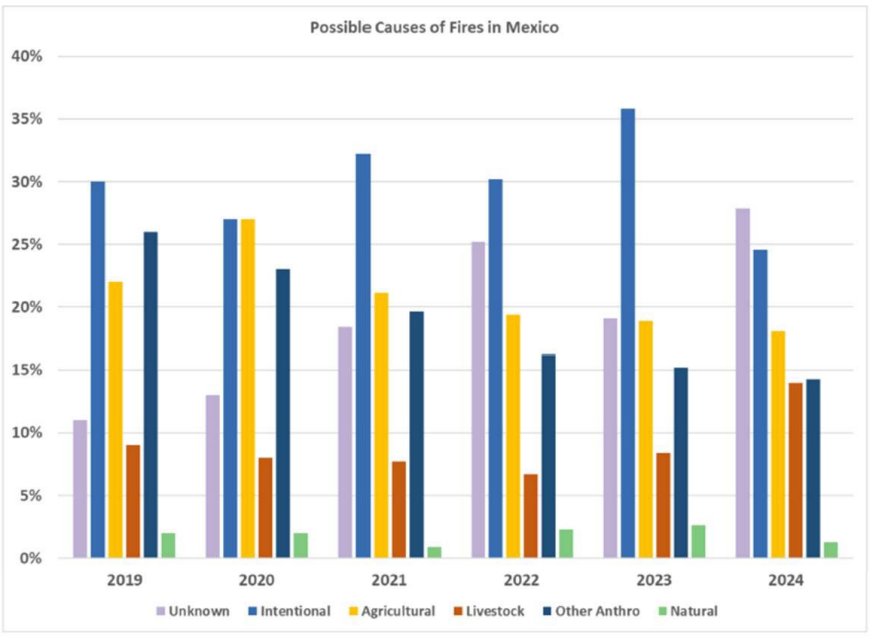

Figure 3. Possible causes of fires in Mexico from 2019 to 2024. Partial data for 2024 (January to August).

TCEQ seems to be relying upon national data from CONAFOR that lacks specificity to meet EPA's criteria about individual fires.

7. *TCEQ's Addition of Central America as a Source of Fires Without Supporting Documentation*

TCEQ's demonstration reports from 2022 and 2023 also add all of Central America to its claim about the origin of fires, in addition to Mexico. This has expanded the demonstration report's conclusions about fires to multiple additional countries without any additional citations or supporting data.

The six dates in 2022 and 10 dates in 2023 that TCEQ claims reflect fires in Mexico and Central America should be excluded from the exceptional events demonstration submission to EPA unless additional information, consistent with the EPA guidance to justify the explanations, is provided.

8. *Inconsistencies With Kleburg Monitor*

In addition, there is an inconsistency as to the Kleberg monitor on the National Seashore. In both the 2022 and 2023 demonstrations, TCEQ includes multiple days in which the Kleberg monitor recorded exceptional events. However, in the submission to the Commissioners, TCEQ states that "TCEQ continues to evaluate if the National Seashore monitor in Kleberg County has days in 2021 through 2023 that were impacted by exceptional events."[29] To the extent that the report will be

[29] TCEQ, "Commission Approval for the 2024 Primary Annual Fine Particulate Matter (PM2.5) National Ambient Air Quality Standard (NAAQS) State Designations," Nov. 26, 2024, Docket No. 2024-1660-MIS (p. 9), available at https://www.tceq.texas.gov/downloads/air-quality/sip/pm/designations/2024025oth_2024pm_statedesig_backup.pdf.

altered based on the two new demonstration reports, the public should be permitted time to review such an amendment before it is considered by the Commissioners.

C. TCEQ's Proposed Designations Under the New PM2.5 NAAQS Standard are Inadequate

Although the opportunity for informal public comment on the TCEQ's designations with regard to the 2024 PM2.5 NAAQS standard has closed, the fact that these exceptional events demonstrations may result in the revising of the designation report to the Commissioners suggests this is an important opportunity to highlight other concerns with the designations. Unfortunately, after providing multiple public information and meeting opportunities, TCEQ ended up disregarding public input, federal and state monitoring data and, most importantly, the EPA guidance, in proposing only four (4) counties for nonattainment even though initially, it sought the designation of twelve (12) counties.

1. TCEQ improperly disregards federal monitoring data

TCEQ stated its intent to identify only those counties for nonattainment that currently had at least one regulatory monitor exceeding the newly imposed 9.0 ug/m3 standard for PM2.5 once the design values were adopted. This is inappropriate and does not meet the baseline requirement for compliance with NAAQS.[30] Data suggests that at least 12 counties in Texas have FRM monitors averaging PM2.5 emissions above the 9.0 standard. These monitors are part of the EPA-approved state monitoring plan. One of the several problems with TCEQ's exclusion of much of the FRM data was its claim that it could preemptively ignore the date from its federally-approved monitor in Travis County as being not reflective of local air quality and thus not part of the state monitoring plan. That monitor was placed by the state in compliance with federal guidelines, it was included in TCEQ's state monitoring plan year after year, and it was approved year after year by the EPA as a local air quality monitor. To decide now that it is inaccurate when the only thing that has changed is a reduced PM standard is highly inappropriate.[31]

2. TCEQ Relies on Non-Transparent Third-Party Data

TCEQ relies heavily in its recommendations to the Commission on modeling and data submitted in the public comment period by Ramboll Corporation; it is very unclear from the record whether TCEQ conducted any of its own modeling and analysis, or whether it accepted this third-party privately-sourced submission at face value. In its comments, Ramboll did not identify the client that paid for this work, nor what the scope and parameters of the contract entailed, nor whether any data sets were to be relied on or excluded in its analysis. This issue continues to affect and influence the state, as now the comments from Ramboll are being used by TCEQ in this exceptional events demonstration.

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[30] 42 U.S.C. §7409(b)(describing air quality standards set for the protection of public health and welfare).
[31] According to TCEQ's public meetings, TCEQ is planning on drafting and implementing a transportation-specific State Implementation Plan following approval of the new designations. This means there is a plan to address the very type of transportation-related emissions that this monitor apparently detects – unless, of course, approved monitor data is disregarded.

3. *The Boundary Lines Selected by TCEQ are unrealistic and not in line with EPA guidance*

The 4 proposed areas of nonattainment are set strictly along county boundary lines. This is not required under current EPA guidance nor does it reflect what this state is doing for ozone. The recommendations from the EPA are clear: "The analytical starting point for the 2024 PM2.5 designations is the entire metropolitan area where the violating monitor is located (Core Based Statistical Area and Combined Statistical Area)."[32] The EPA method of drawing boundaries around nonattainment areas would ensure that areas like Williamson County and Ellis County, which are massive sources of PM emissions and which are adjacent to and part of other nonattainment areas, but which do not have FRM monitors themselves, would be included in a nonattainment designation.[33]

In addition, EPA has instructed states that "Data from non-FRM/FEM monitors (e.g., sensors) and air quality modeling, where available, may help define an appropriate boundary for areas contributing to FRM/FEM based monitored violations."[34] For example, the Capital Area Council of Governments (CAPCOG) reported a design value above the new 9.0 ug/m3 standard by examining several robust data sets.[35] TCEQ, however, not only failed to include any non-FRM/FEM monitor data in its supporting report to the Commission, it disregarded data from actual FRM monitoring.

4. *TCEQ's exclusions of the Texas border area are inappropriate*

TCEQ has excluded border areas because HYSPLIT modeling demonstrated that those counties are impacted by significant amounts of international emissions. If HYSPLIT or other S.A.M. modeling is appropriate for use – as EPA suggests and as TCEQ appears to concede on the border, then it should be used statewide. This would help capture actual air quality conditions in non-monitored areas adjacent to monitored areas.

And, more importantly for border purposes, there is no Clean Air Act exception to compliance for international emissions. International emissions – and Texas' inability to control or limit them – are a consideration for the state implementation plans (SIPs), rather than for the designation of

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[32] EPA, "PM2.5 Designations Memorandum and Implementation Resources: Informational Overview Webinar, State and Local Air Agencies, February 21, 2024," p. 11, available at https://www.epa.gov/system/files/documents/2024-02/pm-designations-memo-state-and-local-air-agencies-webinar_final.pdf

[33] In addition, Ellis County is supposed to have an FRM monitor, but TCEQ has failed for over a year to install the monitor. *See* MidlothianBreathe website at https://www.midlothianbreathe.org/. Using Core Based Statistical Area and Combined Statistical Area boundaries would ensure that designations are geographically appropriate and protective of public health notwithstanding incomplete construction delays and incomplete data sets.

[34] EPA, "PM2.5 Designations Memorandum and Implementation Resources: Informational Overview Webinar, State and Local Air Agencies, February 21, 2024," p. 13, available at https://www.epa.gov/system/files/documents/2024-02/pm-designations-memo-state-and-local-air-agencies-webinar_final.pdf

[35] Exhibit C, CAPCOG, 2023 Air Quality Annual Report for the Austin-Round Rock-San Marcos Metropolitan Statistical Area, July 31, 2024, Figure 1.4 (p.14).

attainment and nonattainment areas.[36] Thus, the exclusion of border counties, for example El Paso County, is inappropriate.

C. Conclusion

The draft 2022 and 2023 exceptional event demonstrations do not provide adequate justification regarding the exclusion of air quality monitoring data for those days associated by TCEQ with international fires. Because the exclusion of this data is specifically intended to avoid a nonattainment designation and the series of pollution reduction measures that such a designation would require, this error exposes the people of Texas to excessive levels of fine particle pollution while stripping these areas of the environmental protections necessary to achieve clean air going forward.

Commenters respectfully request that the TCEQ revise the draft 2022 and 2023 demonstrations to ensure that its requests for exclusion of air quality monitoring data includes only those days for which the agency has provided an adequate narrative conceptual model and sufficient evidence to demonstrate a clear causal relationship between the international wildfires or dust and the monitored exceedances of the PM2.5 NAAQS. Commenters further request that TCEQ consider revisions to the nonattainment and attainment area designations currently under consideration so that such designations utilize all existing monitors, and boundaries beyond county lines. The State of Texas and the health of its citizens will benefit if TCEQ uses all available scientific data and modeling methods and follows EPA guidance when determining the attainment status of each county.

Respectfully submitted by,

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[36] *See, e.g.,* EPA, "Guidance on the Preparation of Clean Air Act Section 179B Demonstrations for Nonattainment Areas Affected by International Transport of Emissions," available at https://www.epa.gov/sites/default/files/2020-12/documents/final_caa_179b_guidance_december_2020_with_disclaimer_ogc.pdf

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 2, 2024

U.S. Environmental Protection Agency
Docket ID No. EPA-HQ-OAR-2023-0586
[Submitted electronically through www.regulations.gov]

Re: Comments by the Texas Commission on Environmental Quality (TCEQ) on Exceptional Events Documents and Tools

Dear Gobeail McKinley:

TCEQ appreciates the opportunity to comment on the fine particulate matter ($PM_{2.5}$) Wildland Fire Exceptional Events Tiering Document and exceptional events analysis and visualization tools. Detailed comments on the draft materials are enclosed. If there are any questions concerning TCEQ's comments, please contact Donna F. Huff, Deputy Director, Air Quality Division, at 512-239-6628 or donna.huff@tceq.texas.gov.

Sincerely,

Kelly Keel
Executive Director

Enclosure

EXHIBIT A

Comments by the Texas Commission on Environmental Quality (TCEQ) on the Exceptional Events Documents and Tools

Docket ID No. EPA-HQ-OAR-2023-0586

I. Summary

On November 29, 2023, the U.S. Environmental Protection Agency (EPA) released a memorandum that authorized posting EPA-HQ-OAR-2023-0586, *Public Comments on Exceptional Events Documents and Tools* for the forthcoming fine particulate matter ($PM_{2.5}$) Wildland Fire Exceptional Events Tiering Document (Tiering Document) and exceptional events analysis and visualization tools. On January 11, 2024, the Tiering Document, tools, and test data were posted in the docket to support $PM_{2.5}$ exceptional event identification, analysis, and demonstrations for wildland fire-related events. The Tiering Document is a supplement to EPA's September 2016 guidance, *Guidance on the preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations*[1].

TCEQ provides the following comments on the draft Tiering Document and tools.

II. Comments

General

EPA did not provide adequate time for air agencies to test and comment on tools and documents.

Though the comment period started November 29, 2023, the tools and Tiering Document were only made available for review on January 11, 2024. With the comment period closing on February 2, 2024, air agencies did not have sufficient time to review and evaluate the Tiering Document or tools. EPA should provide a second 30-day comment period for air agencies to sufficiently review the materials and provide input.

TCEQ supports the three-tier approach for $PM_{2.5}$ exceptional events demonstrations associated with wildfire and prescribed fire events as well as the associated data visualization and analysis tools.

EPA's draft tiering methodology simplifies exceptional event demonstrations related to wildfires by clearly recommending the level of technical analysis needed for the clear causal relationship component for each tier. The guidance will promote consistency and understanding between states and EPA regional offices on what level of technical analysis is needed for each tier. Further, it allows states to develop approvable demonstrations for each tier without expending unnecessary resources developing overly complex technical analyses for Tier 1 and Tier 2 events.

[1] EPA's September 2016 Wildfire Exceptional Events Ozone Guidance (EPA-457/B-16-001), https://www.epa.gov/air-quality-analysis/final-guidance-preparation-exceptional-events-demonstrations-wildfire-events.

EPA should commit to a timeline for reviewing the appropriateness of the tier for a proposed $PM_{2.5}$ exceptional event demonstration and should provide assurance that determinations are final, once communicated to states.

The current guidance document does not provide a deadline by which EPA must inform states of its determination of the appropriate tier for a particular exceptional event demonstration. The guidance also does not provide assurance that a determination, once given, will not be changed. Both states and EPA would benefit from further clarity and commitment regarding the tier determination process. Further, the timelines EPA establishes to communicate concurrence to states should consider deadlines states need to meet to complete and submit the associated demonstrations for designations or other actions with regulatory significance.

TCEQ urges EPA to conduct rulemaking to formally establish the tiering and threshold structure for $PM_{2.5}$ exceptional event demonstrations.

TCEQ supports EPA's efforts to provide for a more quantifiable threshold metric for evaluating the level of evidence needed to support exceptional event demonstrations. To ensure that EPA's intent and application of the guidance is consistent when evaluating states' demonstrations, EPA should perform rulemaking to officially define the threshold metrics, tier structure requirements, relevant terms, and EPA-air agency consultation process.

EPA should clarify that fires from outside of the United States, even if related to the planned burning of agricultural fields, can be considered for $PM_{2.5}$ exceptional events.

The Tiering Document states, "*Large fires in Quebec have affected air quality in the northeast United States, fires from Mexico and Central America can impact Texas.*"[2] TCEQ appreciates the acknowledgement of fires outside the country impacting Texas and other states. EPA should allow states to pursue exceptional event demonstrations for days when international fires, including planned agricultural burning, cause elevated $PM_{2.5}$ concentrations at monitors within the United States. Further, EPA should provide guidance on developing exceptional event demonstrations for days impacted by agricultural fires.

Tiering Plot and Design Value Tool

TCEQ recommends improvements to the Tiering Plot tool.

The following improvements to the Tiering Plot tool should be made:

- the capability to include multiple monitors to determine regional impacts of an event;
- an option to generate graphs for specific months to benefit trend analyses; and
- the ability to compare both tiering thresholds (5-year month specific 98th percentile, minimum annual 5-year 98th percentiles) on the spreadsheet to help validate the results.

TCEQ recommends an improvement to the Design Value tool.

The Design Value tool should include the ability to test the regulatory significance of specific days (or set of days) by uploading a text file containing days to be excluded in the design value calculation.

[2] From Page 6 of $PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document (EPA-457/D-24-001), https://www.regulations.gov/document/EPA-HQ-OAR-2023-0586-0003.

September 6, 2024

Fires in Mexico as Exceptional Events: Documentation and Implications

Exhibit B

RAMBOLL Bright ideas. Sustainable change.

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Dr. Marco Rodriguez is a Managing Consultant with Ramboll. Dr. Rodriguez obtained his PhD in Mechanical and Aerospace Engineering from the University of California Irvine and his bachelor's from the Universidad Autonoma Metropolitana-Iztapalapa in Mexico. Marco was born and raised in Mexico City and has firsthand experience with air quality issues both in the U.S. and Mexico. He is an expert in the use and interpretation of photochemical grid models and has over 20 years of experience working in atmospheric pollution problems. Dr. Rodriguez is fully bilingual and can read and write in both English and Spanish.

Mr. Ralph Morris is a Principal in Ramboll's Northern California offices where he directs air quality, meteorological and emissions modeling and data analysis projects. He has almost 45 years' experience in air quality consulting and started his career modeling ozone in Los Angeles in the 1970s. He has conducted numerous studies related to the effects of emissions from fires on air quality from developing fire emissions and chemical mechanisms to fire impact assessments on ozone and $PM_{2.5}$ concentrations including modeling and Exceptional Events Demonstrations. Mr. Morris has a Masters degree in mathematical modeling from the University of California and is an internationally recognized expert in air quality modeling.

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Contents

1. Executive Summary

Southeast Texas occasionally observes elevated fine particulate matter ($PM_{2.5}$) concentrations due to smoke from fires in Mexico and elsewhere in Central America. Measured daily $PM_{2.5}$ concentrations that result from Exceptional Events can be excluded when considering attainment/nonattainment of the NAAQS. As stated in Section 319(b)(1)(A) of the Clean Air Act:

> "The term 'exceptional event' means an event that –
>
> 1. affects air quality;
> 2. is not reasonably controllable or preventable;
> 3. is an event caused by human activity that is unlikely to recur at a particular location or a natural event; and
> 4. is determined by the administrator through a process established in the regulations promulgated under paragraph (2) to be an exceptional event."

The most common $PM_{2.5}$ Exceptional Events are due to windblown dust and wildfires. This document provides evidence that the vast majority of the fires in Mexico and even more of the smoke from the fires are not caused by agricultural burning, that they do not recur at the same location, and that they therefore satisfy the third prong of the statutory test and can be considered as Exceptional Events. This evidence includes statistics on the source of fires from the Mexican government and other sources. Chapter 2 reviews the data from these sources. Chapter 3 demonstrates that the source of fires in Mexico—especially on the Yucatan peninsula—are mostly not caused by agricultural activity and that are unlikely to reoccur at a particular location.

The Mexican Government has collected detailed statistics and information about the incidences and area burned by fires since the 1970s. This information—publicly available—has been used by several Mexican agencies to guide policies for fire management, fire mitigation and to establish programs to reduce fire incidences.

Among the data provided by the Mexican Government are the activities reported to be likely causes of fires. These statistics are reported every year and indicate that 98% of the fires are due to anthropogenic activities with only 2% due to natural causes. The Mexico government reports in more recent years (e.g., 2021-2024) approximately 20% of the fires are agricultural burning with approximately 10% due to burning for livestock. Of the roughly 30% that are agricultural or livestock-related, many are for one-time clearing and there is no evidence that they recur in the same location. The remaining 70% of the fires are wildland fires that also do not recur at the same location. This means that the great majority of the fires experienced every year in Mexico are caused by human activity that does not recur at the same location.

Furthermore, several programs have been established since 2020 with the intent to educate farmers to modify practices and decrease the number of fires started by agricultural and livestock activities. These programs appear to be successful at reducing the number of fires due to agricultural practices in more recent years (e.g., 2021-

2024). Accordingly, the minority of historic fires that might be expected to recur at a location has been reduced over time and can be expected to continue to decline.

In Mexico, a substantial proportion of the observed fires are forest fires or burns performed to clear land for development. These are not expected to recur at a particular location, as once the forest is burned at a specific location the biomass is consumed and not available for additional fires in the following years. Global Forest Watch is a website that documents deforestation due to forest fires across the globe and shows that areas in Mexico with tree loss due to forest fires occur in the east coast states adjacent to the Gulf of Mexico (e.g., Yucatán, Veracruz, and Tabasco) having some of the highest rate of loss due to forest fires.

Fires in Mexico have a seasonality that follows a known climatology with a dry season typically in the period of January to May that affects Mexico and Central America. The dry season favors the conditions for the start of fires and makes it is more likely for them to get out of control. However, as the data presented in this document shows, less than a third of these fires are caused by agricultural activities and most fires in Mexico are of uncontrollable anthropogenic origin. Given that agricultural fires tend to be small and controlled, they will produce much less smoke than many other types of fires. Thus, most of the fires and even more of the smoke from fire in Mexico during this dry season should be considered non-recurring.

2. Mexican Government Data on Fires in Mexico

Fire plays a significant role in the dynamics of several ecosystems. Fires can be part of a natural process that contributes to the health of ecosystems, but when out of control they can cause severe damage in a brief time. Mexico often experiences fires due to a combination of natural and human factors. Over the last decade, changes to precipitation intensity, increased temperatures, and other factors due to climate change have affected the frequency and extent of fires in Mexico.

The Mexican institution in charge of the development of policies and practices that preserve Mexico's forests in a sustainable manner is the Comisión Nacional Forestal (CONAFOR) and was created by executive order on April 4, 2001[1]. One of CONAFOR's responsibilities is the development and maintenance of a database of fire statistics to establish fire management practices and to facilitate collaboration among other Mexican agencies on this issue. Figure 1 — taken from CONAFOR's fire management main page[2]—shows the incidence of forest fires in Mexico from 1970 to 2023. The information in orange shows the total number of fires, while the green indicates the total area burned in hectares (ha[3]). The time series at the bottom right shows that the area burned remains approximately constant from 1970 to 2015 at around 190,000 ha per year, with three major exceptions in 1988-1989 (500,000 ha), 1998 (849, 632 ha) and 2011 (956,405 ha). Since 2015 there has been a substantial increase in burned area with 2023 having a historic maximum of 1,047,493 ha. At the same time, the number of fires since 2015 has not increased and has fluctuated between 6,000 and 9,000 fires per year. This seems to imply that recent fires are now more intense and capable to burn larger areas indicating fires that are not controlled, possibly influenced by climate change leading to persistent drought conditions in Mexico.

Fires in Mexico are not only confined to states along the Gulf Coast and can occur over the entire country including in Central Mexico. State of Mexico, Jalisco, Michoacan, Chihuahua and Mexico City are the top five entities with the most fire incidences from 2021 to 2023[4]. Under the right meteorological conditions, the smoke from these fires along with those on the Yucatan Peninsula and Gulf of Mexico coastal areas (e.g., Veracruz) can be transported north and affect the air quality in the U.S., especially those located in the southern U.S. along the Gulf of Mexico like southeast Texas.

[1] Comisión Nacional Forestal (CONAFOR). Mission Statement. Accessed August 2024 at: https://www.gob.mx/conafor/que-hacemos

[2] Comisión Nacional Forestal (CONAFOR). Fire Management Statistics and Maps. Accessed August 2024 at: https://snif.cnf.gob.mx/incendios/

[3] A hectare is 100 m x 100 m and is approximately 2.5 acres.

[4] Comisión Nacional Forestal (CONAFOR). Fire Management Program CONAFOR Annual Summaries from 2019 to 2023 and partial 2024.Accessed August 2024 at: https://www.gob.mx/conafor/documentos/reporte-semanal-de-incendios

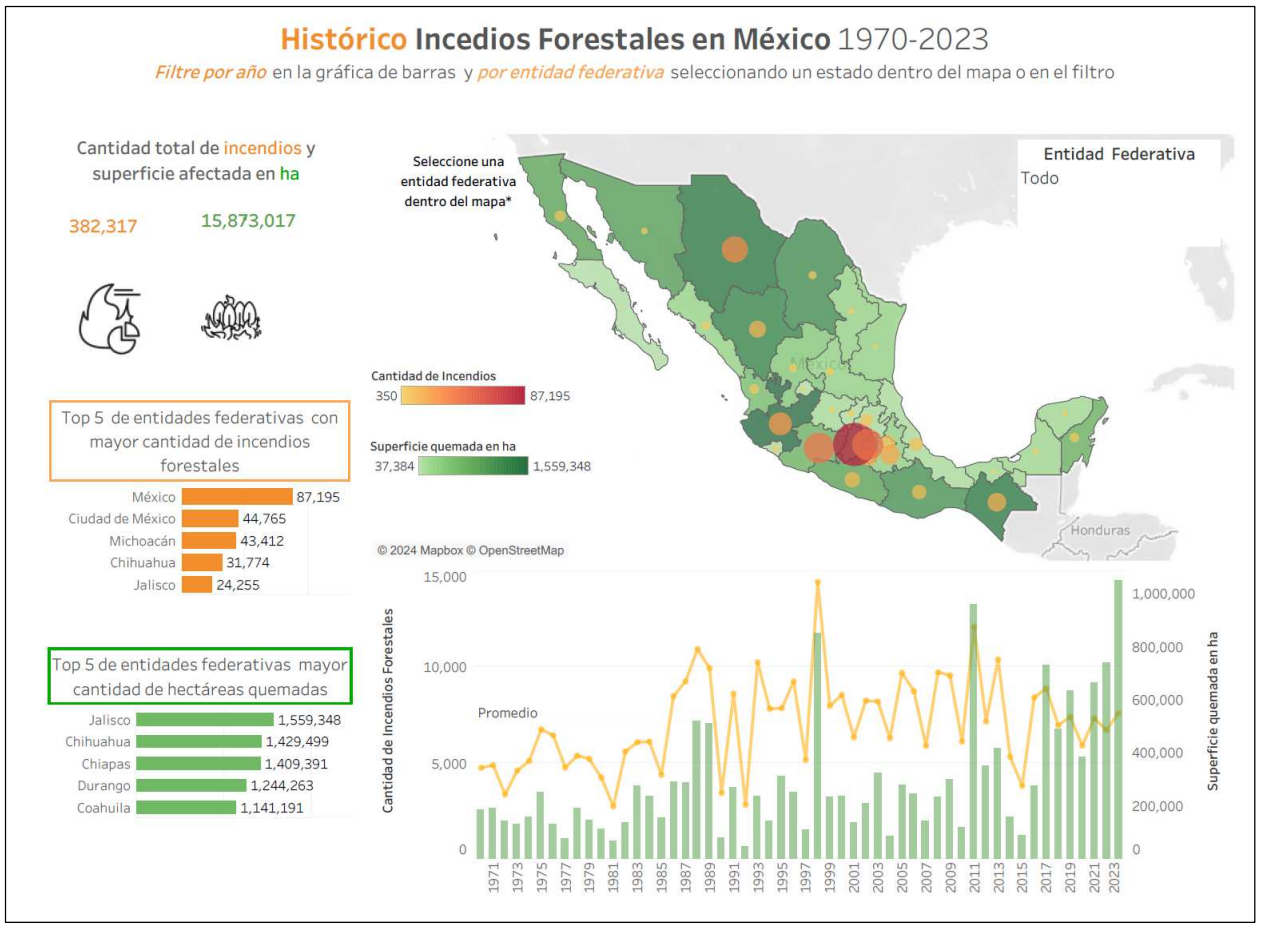


Figure 1. Incidence of Forest Fires in Mexico from 1970 to 2023[2]. In the time series at the bottom of the figure orange indicates number of fires, green shows area burned in hectares.

There are two main fire seasons identified in Mexico: the first from January to June occurs in central, north, northeast, south and southeast Mexico; the second, from May to September, in the northwest[5]. Both occur when the country experiences the dry or drought season. This is shown in Figure 2 that presents a heat map of the average fire incidences per month with data from 2015 to 2023 for all the Mexican States. Higher incidences are colored in red and orange shades. During the climatological dry season, high temperatures and low precipitation increase the probability to experience severe fires due to a combination of natural and human factors.

[5] Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT). Fire Seasons in Mexico. Accessed August 2024 at: https://www.gob.mx/semarnat/es/articulos/temporadas-de-incendios-forestales-en-mexico?idiom=es#:~:text=En%20M%C3%A9xico%20se%20tienen%20identificadas,sequ%C3%ADa)%20en%20el%20territorio%20nacional.

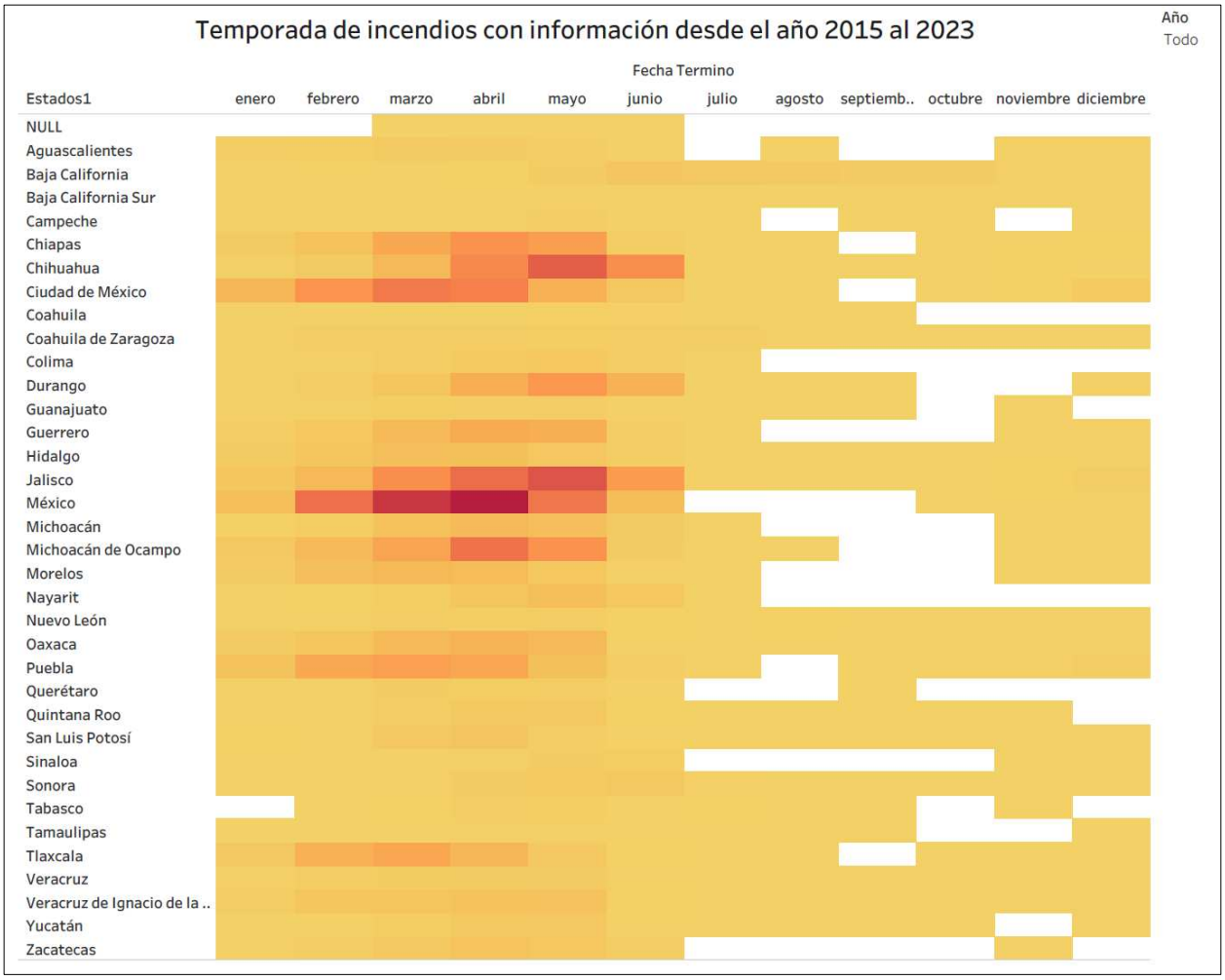


Figure 2. Heat map with the monthly average fire incidence from 2015 to 2023 for each state in Mexico. Red and orange color indicate higher number of fires.

According to CONAFOR, most fires in Mexico are started by human activity. During 1998-2019 anthropogenic causes were responsible for 98% of the fires with only 2% due to natural causes. Figure 3 shows the probable causes of fires in Mexico from 2019 to 2023 and partial data for 2024 (Jan to Aug). These are the main factors in the figure that contribute to occurrence of fires:

- Unknown: Includes accidental ignitions and fires started with no specific or unknown causes.
- Intentional: Includes efforts to clear land for development or other land use changes, vandalism and fires started by disputes over land.
- Agricultural: Includes fires started by traditional slash-and-burn farming methods (roza y quema) where the crop residue from the previous year is burned to provide fertilizer and prepare the field for planting. Farmers also clear small plots of land by cutting down vegetation and burning it to develop a new

field for planting of crops. This land-clearing is not recurring. Once the land is in agricultural use, the clearing is not a recurring need. Sometimes these agricultural fires can get out of control and spread to larger areas and become wildfires.

- Livestock: Similar to agricultural fires for land clearing, but the land is cleared to support livestock. This land-clearing is also likely not recurring. Once the land is in livestock use, the clearing is no longer needed on a recuring basis.
- Other Anthropogenic Causes: Includes fires caused by improper disposal of cigarette butts, campfires left unattended, or burning debris during windy conditions that can spread flames to unintended areas. It also includes fires started by hunters, fireworks at festivities, clearing land for other economic reasons or to open and clean roads from debris. It also includes prescribed fires.
- Natural: Includes fires started mostly by lightning during storms, but also volcanic activity in central Mexico (Popocatépetl, Volcán de Colima).

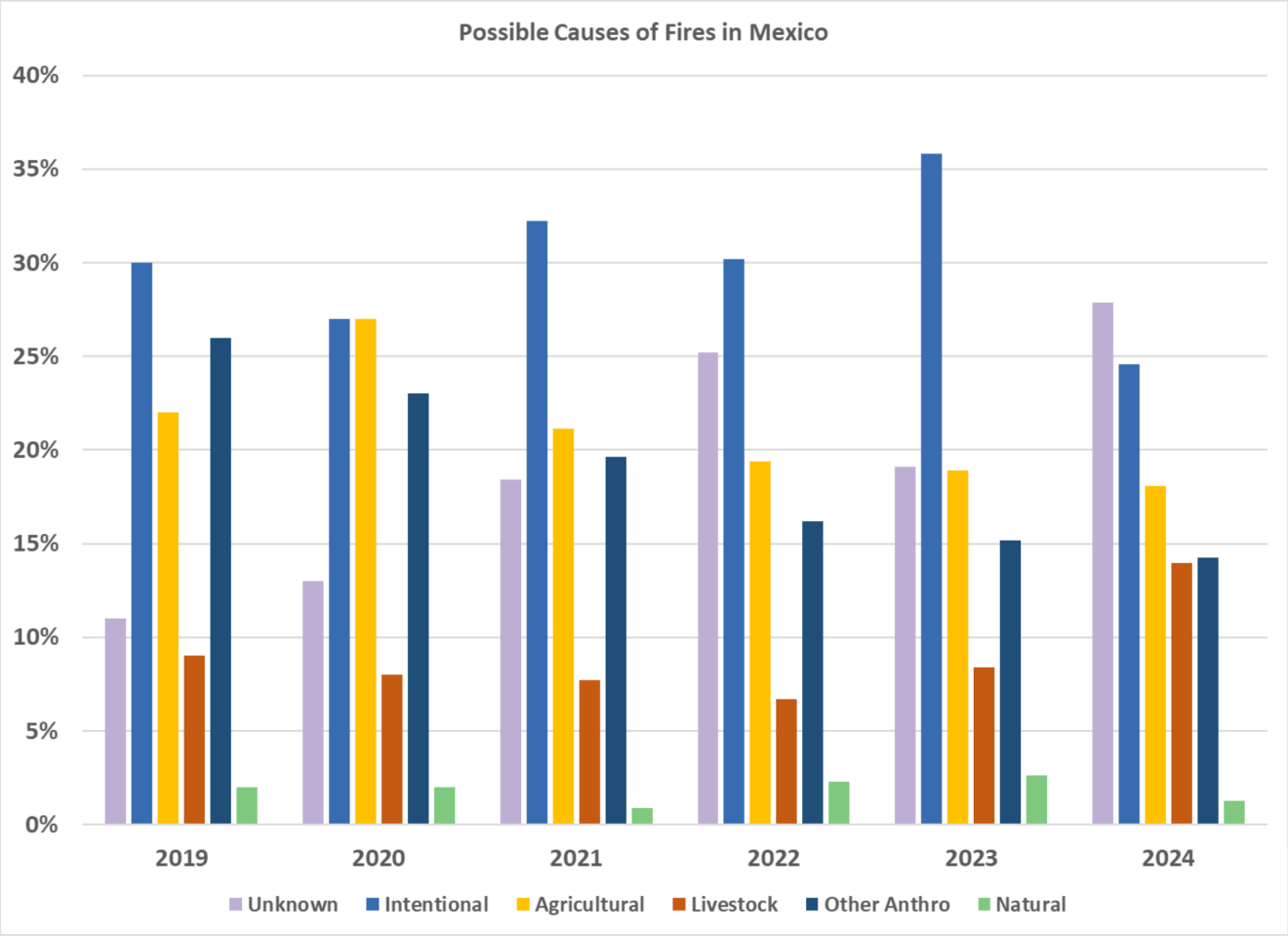


Figure 3. Possible causes of fires in Mexico from 2019 to 2024. Partial data for 2024 (January to August).

Figure 3 shows that agricultural fires are 18-21% of the fires in most recent years (2021-2024). Given that agricultural burning tends to be small fires that are under control, the amount of smoke produced by them is much less than most other types of fires (e.g., forest fires) so the contribution of smoke from agricultural fires would be much less than 20%. Fires to clear land for use by livestock are likely non-recurring as once the land is cleared and being used by livestock it does not need to be cleared. In the past EPA has classified burns for livestock as prescribed fires and approved them as Exceptional Events.[6] Agricultural and livestock activities account for approximately 30% of the fires each year in Mexico and would be much less than 30% of the smoke produced by fires in Mexico as they are much smaller and burn less biomass than most other types of fires. This means that over 70% of the fires and well over 70% of the smoke produced by fires in Mexico every year are caused by human activity but they are not "reasonably controllable or preventable" and are "unlikely to recur at a particular location." The combination of these factors contributes to the risk and occurrence of fires in Mexico sometimes resulting in significant environmental and economic impacts. Efforts to address these fires often involve improving agricultural practices, promoting sustainable land management, and enhancing fire prevention and suppression capabilities.

Forest fires caused by unintended agricultural burning put the lives of producers at risk, damage ecosystems and degrade soils, which translates into erosion and lower crop yields. According to the UN[7], many farmers consider agricultural burning to be the most efficient and cost-effective way to clear, fertilize and prepare land for new planting. The problem is that these burnings often get out of hand leading to wildfires and are the largest source of black carbon in the world, a threat to both human and environmental health. The Mexican Government has set goals with the intent to reduce the recurring burning of agricultural land by 40 percent by 2024[8]. The Secretaría de Agricultura y Desarrollo Rural (SADER) is the Mexican Ministry of Agriculture and Rural Development and launched the program "Mi Parcela no se quema" (my plot does not burn) in 2020[9] to promote the use of sustainable alternatives that reduce agricultural burning, such as waste management practices. This program involves other federal agencies like CONAFOR and state and local governments. The program organizes workshops for farmers with information to improve farming practices like reducing and composting organic matter into farmland without the need of burning. The number of workshops was initially small with only five provided in the entire country in 2020 but has

[6] https://www.kdhe.ks.gov/DocumentCenter/View/2209/Environmental-Protection-Agency-Region-7-Exceptional-Event-Flag-Concurrence-Letter-PDF

[7] https://www.unep.org/es/noticias-y-reportajes/reportajes/el-impacto-de-las-quemas-agricolas-un-problema-de-calidad-del-aire

[8] Mexico Business. SADER to Reduce Recurring Burning of Agricultural Land. Accessed August 2024 at: https://mexicobusiness.news/agribusiness/news/sader-reduce-recurring-burning-agricultural-land

[9] Secretaria de Agricultura y Desarrollo Rural (SADER). Mi Parcela No Se Quema. Accessed August 2024 at: https://www.gob.mx/agricultura/acciones-y-programas/miparcelanosequema

increased substantially since to 493 workshops in 2023[10]. As a direct result of these efforts the program has reduced the areas that used to be subjected to agricultural fires by 47,200 ha between 2021 and 2023[10]. Figure 3 indicates the success of these programs as the percentage of fires caused by agricultural activities alone has been decreasing since 2020 (the program's inception) to 2024.

Conclusions of Mexico Government Statistics on Fires: In summary, the Mexico government reports on the causes of fires in Mexico and in more recent years (e.g., 2021-2024) approximately 20% of the fires are agricultural burning with approximately 10% due to burning for livestock. Of the roughly 30% of the fires that are agricultural or livestock-related, many are for one-time clearing and there is no evidence that they recur in the same location. The remaining 70% of the fires that are not for agriculture or livestock are wildland fires that also do not recur at the same location. Furthermore, most other types of fires (e.g., forest fires) produce more smoke per fire than agricultural/livestock fires as they burn larger areas and consume more biomass. Thus, smoke from fires in Mexico are primarily non-recurring and are clearly not reasonably controllable by U.S. agencies so satisfy the criteria required to be classified as Exceptional Events.

[10] Statistics on the implementation of the Mi Parcela No se Quema program. Accessed August 2024 at: https://www.datos.gob.mx/busca/dataset/campana-mi-parcela-no-se-quema/resource/9b505ab0-b6bf-444f-bd73-33779f99a010

3. Additional Evidence Most Fires in Mexico are not Recurring Agricultural Fires

Below we provide supporting information that most of the fires in Mexico are not agricultural burning so are not recurring.

Global Forest Watch Indicates Frequent Forest Fires on The Yucatan Peninsula and Eastern Mexico

Forest fires in Mexico are mainly caused by human activities either on purpose (e.g., to clear land for development) or by accident. In either event, such forest fires will not recur as once the forest is burned at a specific location the biomass is consumed. Global Forest Watch[11] is a website that documents deforestation due to forest fires across the globe, including Mexico. Figure 4 from the Global Forest Watch website shows areas in Mexico with tree loss due to forest fires in pink with the east coast states adjacent to the Gulf of Mexico (e.g., Yucatán, Veracruz, and Tabasco) having some of the highest rate of tree loss due to forest fires. Figures 5 and 6 show an average yearly tree loss of approximately 17,000 ha (~42,000 acres) in the states of Veracruz and 14,000 ha (~35,000 acres) in Yucatán respectively.

Conclusions from Global Watch Deforestation: Large amounts of deforestation by prescribed burns and wildfires occur on the Yucatan Peninsula and southeast coastal states in Mexico (e.g., Veracruz) that do no reoccur so satisfy the requirements for being an Exceptional Event.

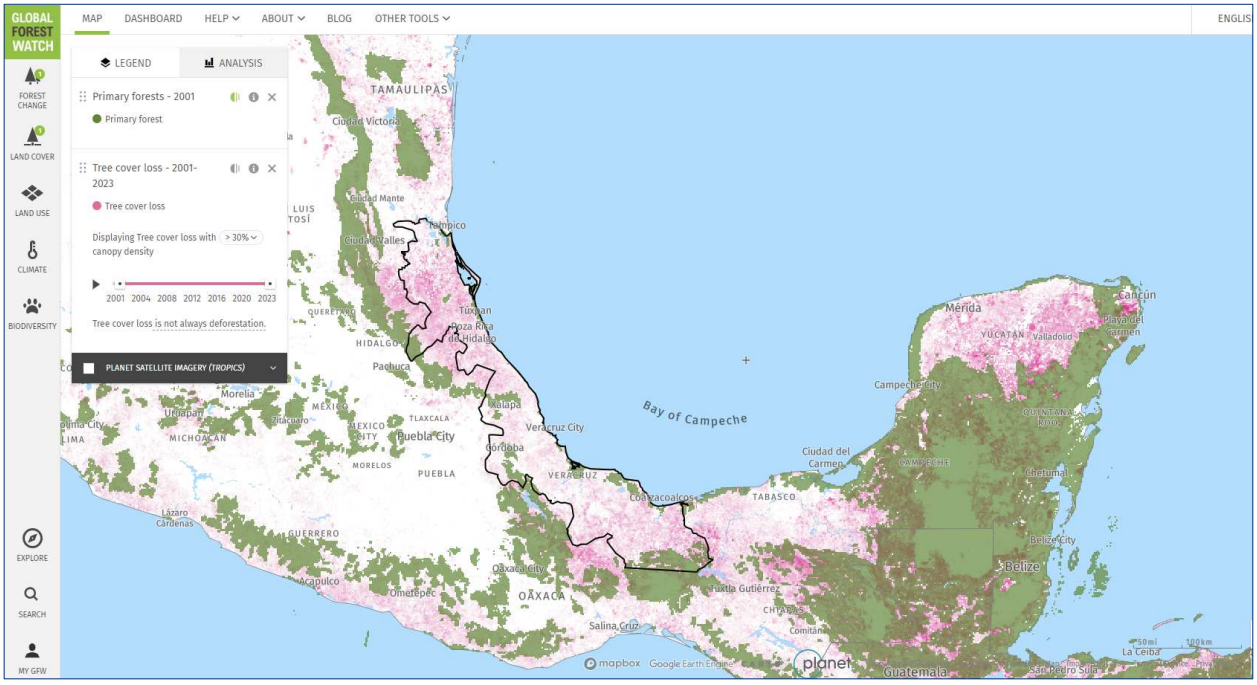


Figure 4. Locations of tree cover loss in southeastern Mexico (pink areas) that is primarily caused by Forest Fires.

[11] https://www.globalforestwatch.org/

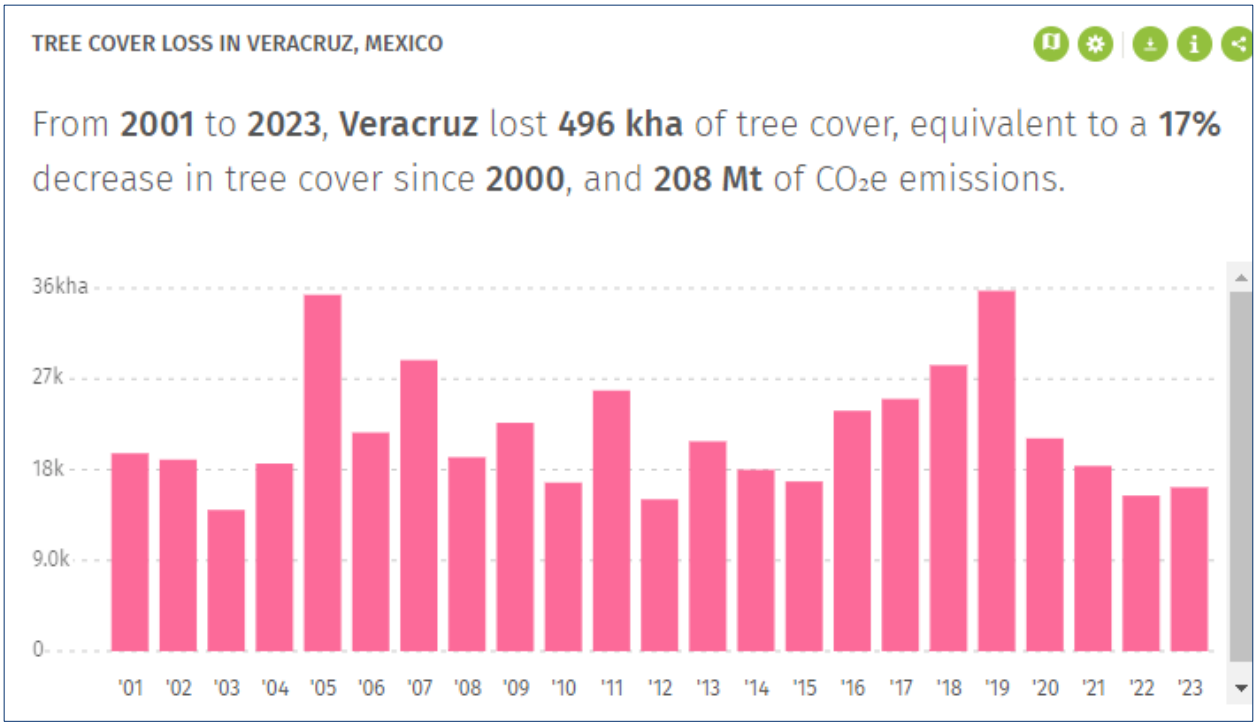


Figure 5. 2001-2023 annual tree cover loss in the state of Veracruz, Mexico.

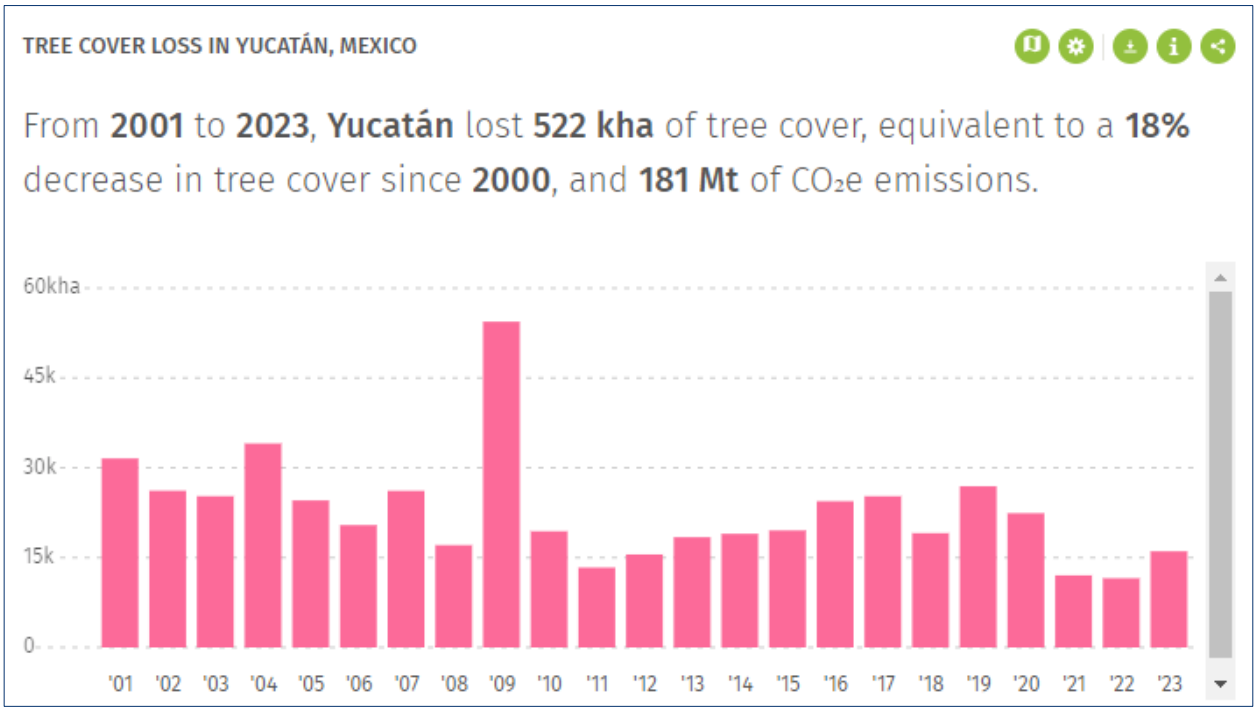


Figure 6. 2001-2023 annual tree cover loss in the state of Yucatán, Mexico.

Example Articles on the Causes of Fires on the Yucatan Peninsula

Numerous articles document fires in Mexico that are not controlled agricultural burning and are not recurring. Examples include:

- A March 29, 2024, article in Yucatan Magazine entitled Fires Rage Out of Control In And Around Merida[12] notes the extreme heat of early 2024 has caused many more fires than usual such as:
    - Fires starting from glass bottles on the side of the road that act as magnifying glasses when hit by the sun.
    - Fires at several warehouses along Meridas Periferico attributed to faulty wiring.
    - Fires started by fireworks at a wedding.
    - Agricultural fires that get out of control due to winds carrying sparks into nearby dry areas.
- A May 16, 2024 article in the Yucatan Times reported that a forest fire consumed 250 hectares of jungle in Cancún.[13]
- A July 2022 article about Modernización Sustentable de la Agricultura Tradicional (MasAgro) program, states that MasAgro has implemented practices that had reduced the area subjected to slash and burn in Mexico by 200,000 ha. The article states how agricultural fire is not a sustainable practice and lists several alternatives that have reduced agricultural burning in Mexico in more recent years.[14]

Conclusions From Articles on Fires in Mexico: Numerous publicly available articles reference fires in Mexico, and in particular on the Yucatan Peninsula, that are wildfires that are not recuring at the same location.

[12] https://yucatanmagazine.com/fires-rage-out-of-control-in-and-around-merida/

[13] https://www.theyucatantimes.com/2024/05/forest-fire-consumes-250-hectares-of-jungle-in-cancun/

[14] https://www.gob.mx/agricultura/articulos/el-fuego-ya-no-es-una-alternativa

2023 Air Quality Annual Report for the Austin-Round Rock-San Marcos Metropolitan Statistical Area

Prepared by the Capital Area Council of Governments

July 31, 2024

The preparation of this report was financed through funding provided by local governments participating in the Central Texas Clean Air Coalition. The content, findings, opinions, and conclusions are the work of the author(s) and do not necessarily represent findings, opinions, or conclusions of the individual members of the Coalition.

Exhibit C

EXECUTIVE SUMMARY

This is the annual air quality report for the Austin-Round Rock-San Marcos Metropolitan Statistical Area (MSA) prepared by the Capital Area Council of Governments (CAPCOG) for the members of the Central Texas Clean Air Coalition (CAC), the Texas Commission on Environmental Quality (TCEQ), and the U.S. Environmental Protection Agency (EPA). This report serves as the region's annual "check-in" with EPA as part of the CAC's participation in the Ozone (O_3) and fine particulate matter ($PM_{2.5}$) Advance Programs (OAP). The report covers January 1, 2023, through December 31, 2023. Under the most recent MSA definitions promulgated by the Office of Management and Budget (OMB) in June 2023, the Austin-Round Rock-San Marcos MSA consists of Bastrop, Caldwell, Hays, Travis, and Williamson Counties, which are the same five counties that have been participating in regional air quality planning efforts since 2002.

The report is intended to do the following:

- Provide an update to EPA, TCEQ, and local stakeholders on the status of air quality in the Austin-Round Rock-San Marcos MSA through the end of 2023 (Section 1);
- Provide an update on the latest understanding of the contribution of the region's emissions to high O_3 levels when they occur (Section 2);
- Summarize the status of emission reduction measures implemented in the region in 2023 (Section 3);
- Detail ongoing planning activities in the region (Section 4); and
- Identify new issues affecting air quality planning efforts in 2024 and beyond (Section 5).

Some of the highlights of the report are listed below:

- The region's 2023 8-hr. ozone pollution levels exceeded the 2015 federal air quality standard for the first time;
- There was a total of 21 days that were consider "unhealthy for sensitive groups", and another 170 days when air pollution levels were considered "moderate," according to EPA's Air Quality Index (AQI),
- Overall emissions of nitrogen oxides (NO_X) continued to trend downward, and emissions from regional power plants were lower during the 2023 O_3 season than they were in 2022;
- Emission reduction measures implemented by the state and local partners in 2023 continued to help control regional O_3 levels and $PM_{2.5}$;
- Odor complaints rose compared to 2022, largely due to an issue with a specific facility in Bastrop County;
- The EPA lowered the annual $PM_{2.5}$ standard and the region is at greater risk of a nonattainment designation;
- CAPCOG received multiple grants to fund PM planning projects in the region.

TABLE OF CONTENTS

LIST OF ACRONYMS

- AFFP: Alternative Fueling Facilities Program
- AQI: Air Quality Index
- CAC: Clean Air Coalition
- CACAC: Clean Air Coalition Advisory Committee
- CAMPO: Capital Area Metropolitan Planning Organization
- CAPCOG: Capital Area Council of Governments
- CapMetro: Capital Metropolitan Transit Authority
- CAMS: Continuous Air Monitoring Station
- CAPP: Clean Air Partners Program
- CO: Carbon Monoxide
- CTRMA: Central Texas Regional Mobility Authority
- CTT: Clean Transportation Triangle
- DACM: Drive a Clean Machine
- DERI: Diesel Emission Reduction Incentive
- DTIP: Drayage Truck Incentive Program
- EAC: Early Action Compact
- EE/RE: Energy efficiency and renewable energy
- EPA: U.S. Environmental Protection Agency
- ERIG: Emission Reduction Incentive Grant Program
- FEM: Federal Equivalent Method
- FRM: Federal Reference Method
- I/M: Inspection and maintenance
- ILA: Inter-Local Agreement
- kWh: Kilowatt-Hour
- LCRA: Lower Colorado River Authority
- LDPLIP: Light Duty Motor Vehicle Purchase or Lease Incentive Program
- LIRAP: Low-Income Vehicle Repair, Retrofit, and Accelerated Vehicle Retirement Program
- LSCFA: Lone Star Clean Fuels Alliance
- MDA8: Maximum Daily 8-Hour Average
- µg/m_3: Micrograms per cubic meter
- MOVES: Motor Vehicle Emissions Simulator
- MSA: Metropolitan Statistical Area
- NAAQS: National Ambient Air Quality Standards
- NO_X: Nitrogen oxides
- NO_2: Nitrogen Dioxide
- NTIG: New Technology Implementation Grant
- O_3: Ozone
- OAD: Ozone Action Day
- OAP: Ozone Advance Program
- PACE: Property-Assessed Clean Energy
- Pb: Lead
- PM: Particulate matter
- $PM_{2.5}$: Particulate matter with a diameter of 2.5 microns or less
- PM_{10}: Particulate matter with a diameter of 10 microns or less
- ppb: Parts per billion
- ppm: Parts per million
- SIP: State Implementation Plan
- SO_2: Sulfur dioxide
- SPRYP: Seaport and Rail Yard Areas Grant
- TCAWG: Texas Clean Air Working Group
- TCEQ: Texas Commission on Environmental Quality
- TCFP: Texas Clean Fleet Program
- TCSB: Texas Clean School Bus Program
- TDM: Travel Demand Management
- TERP: Texas Emission Reduction Plan
- TexN: Texas NONROAD Model
- TNGVGP: Texas Natural Gas Vehicle Grant Program
- tpd: tons per day
- TWG: Texas Working Group for Mobile Source Emissions
- TxDOT: Texas Department of Transportation
- TxVEMP: Texas Volkswagen Environmental Mitigation Program
- VOC: Volatile Organic Compound

1 AIR QUALITY STATUS

The following bullet points summarize the status of the Austin-Round Rock-San Marcos MSA's air quality status as of the end of 2023:

- 8-hr. ozone pollution levels in the region exceeded the current National Ambient Air Quality Standard (NAAQS) for the pollutant and the region's 2023 Design Value is not in compliance with this standard. All other pollutants throughout the metro area remained in compliance with the NAAQS. All five of the counties in the Austin-Round Rock-San Marcos MSA remain designated as "attainment/unclassifiable" for all NAAQS.
- The region's air pollution levels that are at the highest risk of nonattainment designations for exceeding NAAQS are the 8-hr. O_3 NAAQS and the annual $PM_{2.5}$ NAAQS:
    - the region's 2021-2023 8-hour O_3 "design value" of 71 parts per billion (ppb) was 1% above the 70 ppb 2015 O_3 NAAQS
    - the region's 2021-2023 annual $PM_{2.5}$ design value level of 9.6 micrograms per cubic meter ($\mu g/m^3$) was 20% below the 2012 annual $PM_{2.5}$ NAAQS of 12.0 $\mu g/m^3$.
        - On February 7, 2024, the EPA revised[1] the annual $PM_{2.5}$ NAAQS to 9 $\mu g/m^3$. The region is currently 7% above this new standard.
- The region recorded 19 days when O_3 levels were considered "unhealthy for sensitive groups", and two days when $PM_{2.5}$ levels were considered "unhealthy for sensitive groups". In additional there were 170 days when either O_3 or $PM_{2.5}$ levels were considered "moderate," based on EPA's AQI.
- The region's cumulative seasonal O_3 levels in 2023 were below the levels that EPA considers harmful to vegetation.
- TCEQ's most recent review[2] of air toxics data collected at CAMS 171 found that all air toxics levels measured were below the levels that would be expected to cause adverse health or environmental impacts.
- There was a total of 115 odor complaints reported to the TCEQ from within the Austin-Round Rock-San Marcos MSA in 2023, up from 89 in 2022.

The following map shows the locations of all the Continuous Air Monitoring Stations (CAMS) that collected air pollution and meteorological data around the Austin-Round Rock-San Marcos MSA in 2022, including the monitors operated by TCEQ, CAPCOG, and St. Edward's University. In 2023, CAPCOG established two new ozone monitoring sites:

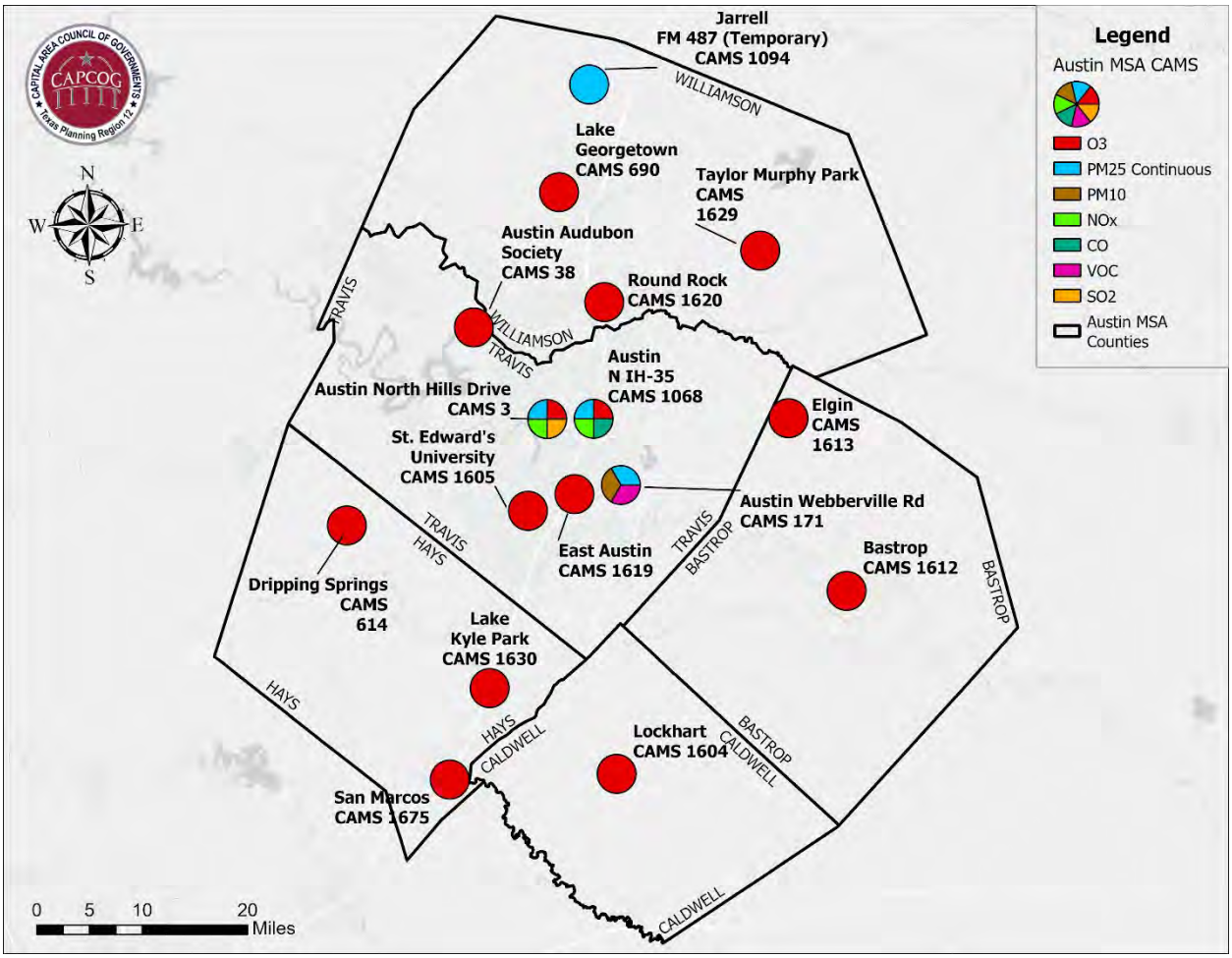
[1] EPA's PM NAAQS Revision: https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm [accessed July 31, 2024]

[2] TCEQ. Toxicological Evaluations of Ambient Air Monitoring Data: https://www.tceq.texas.gov/toxicology/regmemo/AirMain.html/ [accessed July 31, 2024]

- CAMS 1629 – Taylor Murphy Park, and
- CAMS 1630 – Lake Kyle Park.

The total number of CAPCOG operated ozone monitoring sites is now 10, with multiple sites in all counties expect Caldwell.

Figure 1-1. 2023 Air Quality Monitors in the Austin-Round Rock-San Marcos MSA and CAPCOG Counties



1.1 COMPLIANCE WITH THE NAAQS

The Austin-Round Rock-San Marcos MSA's 2023 design values for CO, NO_2, $PM_{2.5}$, PM_{10}, and SO_2 standards were in compliance with the applicable NAAQS. However, the 2023 8-hour O_3 design value exceeded the standard with a design value of 71 ppb and thus the region is unofficially out of compliance with the 8-hour O_3 NAAQS. Lead is not monitored within the region. Appendix B details all the NAAQS currently in effect.

There are four "regulatory" monitoring stations in the Austin-Round Rock-San Marcos MSA, all located in Travis County, that reported data to EPA and are used for comparisons to the NAAQS. Table 1-2 summarizes the Federal Reference Method (FRM)/Federal Equivalent Method (FEM) monitors in the region and the years for which data are available from 2012-2023. CAMS 1068 is the region's designated "near-road" monitor.

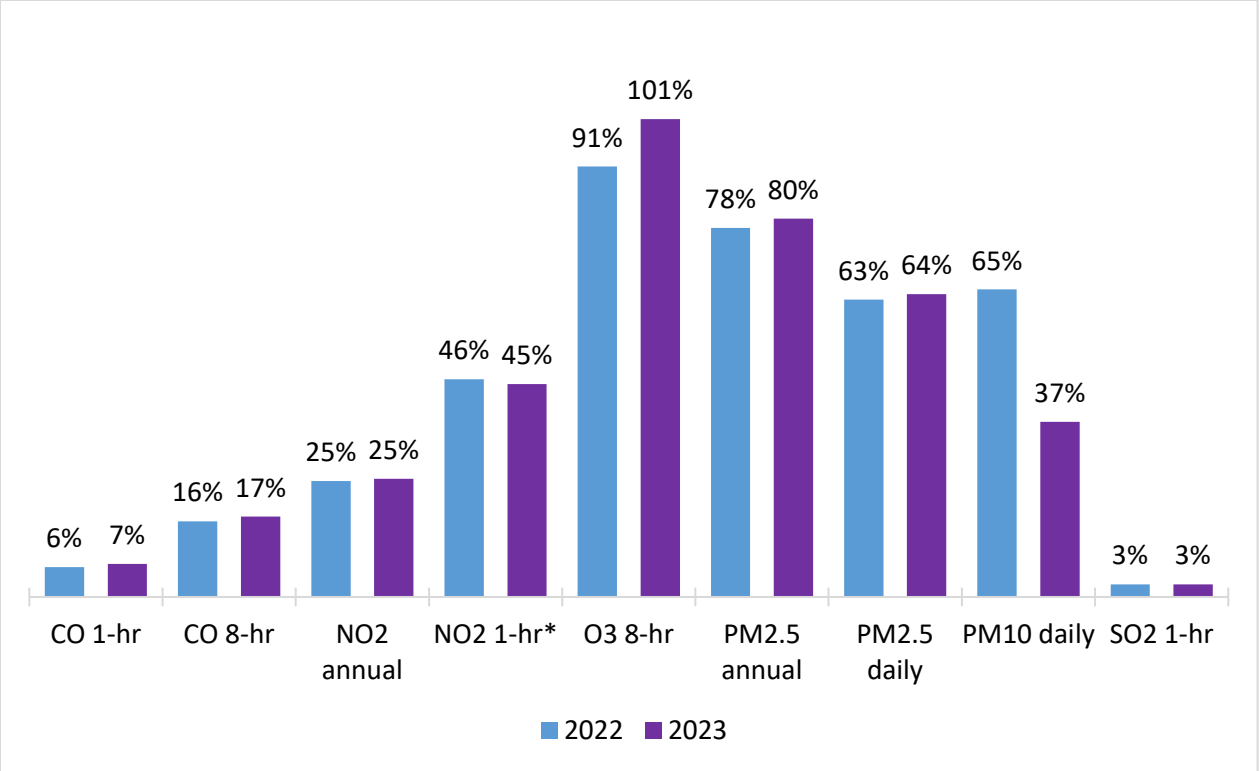
Table 1-1. Summary of Criteria Pollutant Measurement Periods at Federal Reference Method (FRM) Monitors in the Austin-Round Rock-San Marcos MSA, 1/1/2020 – 12/31/2023

Pollutant	Sampler Type	CAMS 3 (AQS Site Number 484530014)	CAMS 38 (AQS Site Number 484530020)	CAMS 171 (AQS Site Number 484530021)	CAMS 1068 (AQS Site Number 484531068)
CO	Continuous, regulatory	n/a	n/a	n/a	1/1/2019 – 10/17/2022; 1/25/2023 – 12/31/2023
NO_2	Continuous, regulatory	1/1/2020 - 2/17/2020; 10/21/2020 – 10/19/2022; 3/17/2023 – 12/31/2023	n/a	n/a	1/1/2020– 6/28/2022; 8/17/2022 – 9/15/2022; 10/21/2022 - 12/27/2022; 2/16/2023 – 12/31/2023
O_3	Continuous, regulatory	1/1/2020 - 2/17/2020; 10/22/2020 – 12/31/2023	1/1/2020 – 12/31/2023	n/a	n/a
$PM_{2.5}$	Continuous, regulatory	10/16/2020 – 12/31/2023	n/a	1/1/2019 – 12/31/2023	1/1/2019 – 12/31/2023
$PM_{2.5}$	Non-continuous, regulatory	n/a	n/a	1/1/2019 – 12/31/2023	n/a
PM_{10}	Non-continuous, regulatory	n/a	1/1/2019 – 12/31/2022	1/1/2019 – 12/31/2023	n/a

Pollutant	Sampler Type	CAMS 3 (AQS Site Number 484530014)	CAMS 38 (AQS Site Number 484530020)	CAMS 171 (AQS Site Number 484530021)	CAMS 1068 (AQS Site Number 484531068)
SO_2	Continuous, regulatory	1/1/2020 - 2/17/2020; 10/22/2020 – 10/19/2022; 3/17/2023 – 12/31/2023	n/a	n/a	n/a

Figure 1-2 shows the metro area's 2022 and 2023 design values compared to each primary NAAQS.

Figure 1-2. Austin-Round Rock-San Marcos MSA Design Values as a Percentage of Primary NAAQS



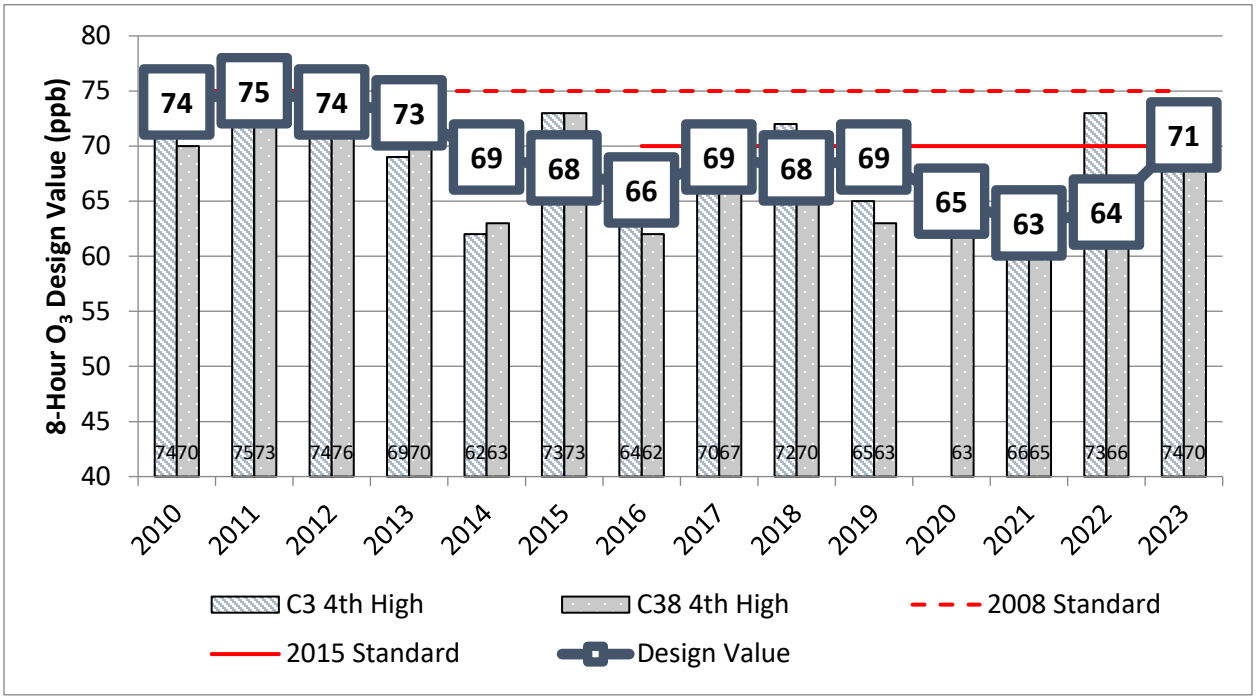
The asterisks next to the 1-hour NO_2 NAAQS signifies the fact that the 2022 and 2023 design values for these NAAQS are considered invalid due to not meeting EPA's data completeness standards, as CAMS 1068 had only 3 quarters of valid NO_2 data in 2022.

O_3 reached non-compliant levels by exceeding the EPA's 8-hour 70 ppb standard in 2023, which puts the region at risk of being designated non-attainment by the EPA. The 4th-highest value of O_3 in 2024 would need to be below 66 ppb for our region to reach compliant O_3 levels with the EPA standard. The region's 2023 $PM_{2.5}$ annual level stayed below the EPA's 2012 annual standard but is now out of compliance with the updated 2024 annual standard.

1.2 O_3 Design Value Trend

Figure 1-3 below shows the trend in the Austin-Round Rock-San Marcos MSA's 8-hour O_3 design values from 2010-2023 compared to the 2008 and 2015 8-hour O_3 NAAQS, along with the 4th-highest Maximum Daily 8-Hour Average (MDA8) O_3 at each regulatory O_3 station. MDA8 is the daily maximum 8-hour concentration for a given calendar day that is the highest of the twenty-four possible 8-hour average concentrations computed for that day.

Figure 1-3. Austin-Round Rock-San Marcos MSA 8-Hour O_3 Design Value and 4th-Highest MDA O_3 Trend 2010-2023



In 2023, CAMS 3 was the monitor used for the 2023 O_3 design value and it showed an increase of 7 ppb from 2022 to 2023 for the region. This increase was expected, as CAMS 3[3] had been used for the O_3 design value prior to 2020 and its levels were in the 66-69 ppb range. CAMS 38 was used for the 2022 O_3 design value but was the only monitor in the region that did not record an 8-hour daily maximum O_3 concentration above 70 ppb, which explains the increase from 2022 to 2023. This was the first year in the region's history to exceed the federal standard for O_3.

[3] Due to construction at the area of the CAMS 3 monitoring site at Murchison Middle School, CAMS 3 was re-located to another location on the school property during 2020. CAMS 3 data collection was paused in February, and the data collection did not resume until October. As a result of the CAMS 3 re-location, the primary O_3 monitor for the region was offline for 89% of the region's ozone season in 2020.

1.3 Maximum Daily 8-Hour O_3 Averages in the Region

While compliance with the O_3 NAAQS is based on readings recorded at "regulatory" Federal Reference Method (FRM) or Federal Equivalent Method (FEM) O_3 samplers, there are also several non-regulatory O_3 monitoring stations in the region that are used to understand regional O_3 levels.

In addition to the two regulatory O_3 monitors that TCEQ operates, CAPCOG collects O_3 data at eight monitoring stations. St. Edward's University collected data at one additional O_3 monitoring station between 2019 and 2021. These monitoring stations use EPA-approved O_3 sampling methods and data collected during this period and followed a Quality Assurance Project Plan (QAPP) approved by TCEQ. However, these monitors were not operated as FRM or FEM monitors, and they are not reported to EPA's Air Quality System (AQS).

Table 1-3 summarizes the fourth highest MDA8 O_3 measurements collected at each monitoring station in the CAPCOG region in 2021, 2022, and 2023, as well as the three-year average for each station. CAMS 3 and 38 are the "regulatory" monitoring stations operated by TCEQ, while CAMS 614, 690, 1604, 1612, 1613, 1619, 1620, 1629, 1630, and 1675 are research monitoring stations operated by CAPCOG. CAMS 1629 and CAMS 1630 were new sites for CAPCOG in 2023.

Table 1-2. Fourth Highest MDA8 Measurements at All O_3 Monitoring Stations in the CAPCOG Region, 2021-2023 (ppb)

CAMS	AQS Site Number	County	2021	2022	2023	2021-2023 Average[4]	2021-2023 St. Dev.
3 – Austin NW	484530014	Travis	66	73	74	71	4.4
38 – Audubon Society	484530020	Travis	65	66	70	67	2.6
614 – Dripping Springs	482090614	Hays	69	81	78	76	6.2
690 – Lake Georgetown	484910690	Williamson	65	74	74	71	5.2
1604 - Lockhart	480551604	Caldwell	63	69	70	67	3.8
1605 – St. Edwards	484531605	Travis	57	69	67	64	6.4
1612 - Bastrop	480211612	Bastrop	64	67	69	67	2.5
1613 - Elgin	480211613	Bastrop	63	69	68	67	3.2
1619 - East Austin	484531619	Travis	62	74	75	70	7.2
1620- Round Rock	484916602	Williamson	59	77	71	69	9.2
1629 – Taylor Murphy Park[5]	484911629	Williamson	n/a	n/a	70	n/a	n/a

[4] Truncated, as is done in calculating O_3 design values

[5] CAMS 1629 began operations in 2023, thus 2021 and 2022 values for the monitor are not available.

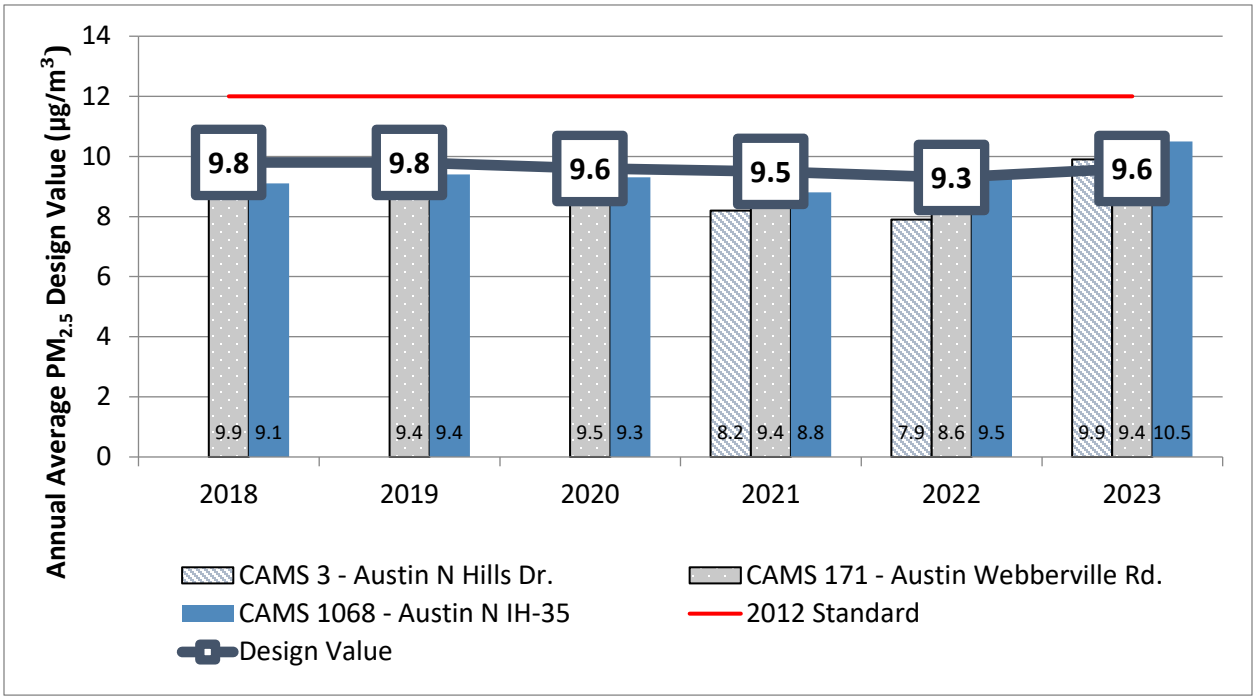
CAMS	AQS Site Number	County	2021	2022	2023	2021-2023 Average[4]	2021-2023 St. Dev.
1630 - Lake Kyle Park[6]	482091630	Hays	n/a	n/a	71	n/a	n/a
1675 – San Marcos	482091675	Hays	63	63	69	65	3.5

These data show the 2021-2023 three-year average of the fourth highest MDA8 values in the region ranged from 64 ppb – 76 ppb, with CAMS 614 recording the highest three-year average of 76 ppb. The three-year averages at CAMS 614, CAMS 690, and regulatory CAMS 3 were all above the 2015 8-hour O_3 standard, with CAMS 3 putting the region out of compliance with the standard for the first time in the region's history.

1.4 $PM_{2.5}$ Design Value Trend

Figure 1-4 below shows the trend in the Austin-Round Rock-San Marcos MSA's annual $PM_{2.5}$ design values from 2018-2023 compared to the 2012 annual $PM_{2.5}$ NAAQS, along with the annual average at each regulatory $PM_{2.5}$ station.

Figure 1-4. Austin-Round Rock-San Marcos MSA Annual $PM_{2.5}$ Design Value and Annual Average $PM_{2.5}$ Trend 2018-2023



In 2023, CAMS 1068 was the monitor used for the 2023 $PM_{2.5}$ design value and it showed an increase of 0.3 µg/m^3 from 2022 to 2023 for the region, which falls in range with previous $PM_{2.5}$ levels. While the

[6] CAMS 1630 began operations in 2023, thus 2021 and 2022 values for the monitors are not available.

2023 $PM_{2.5}$ design value of 9.6 µg/m^3 was below the 2012 annual $PM_{2.5}$ NAAQS of 12 µg/m^3, it is currently exceeding the new 2024 annual $PM_{2.5}$ NAAQS of 9 µg/m^3.

1.5 Annual $PM_{2.5}$ Averages in the Region

The region's compliance with the annual $PM_{2.5}$ NAAQS is based on readings recorded at the three "regulatory" FRM or FEM $PM_{2.5}$ monitors that TCEQ operates.

Table 1-3 summarizes the annual average $PM_{2.5}$ measurements collected at each monitoring station in the CAPCOG region in 2021, 2022, and 2023, as well as the three-year average for each station. CAMS 3, 171, and 1068 are the "regulatory" monitoring stations operated by TCEQ, while CAMS 1094 is a temporary monitor located in the City of Jarrell operated by TCEQ.

Table 1-4. Fourth Highest MDA8 Measurements at All O_3 Monitoring Stations in the CAPCOG Region, 2021-2023 (ppb)

CAMS	AQS Site Number	County	2021	2022	2023	2021-2023 Average	2021-2023 St. Dev.
3 – Austin NW	484530014	Travis	8.2	7.9	9.9	8.7	1.1
171 – Austin Webberville Rd	484530021	Travis	9.4	8.6	9.5	9.2	0.5
1068 – Ausitn N IH 35	484531068	Travis	8.9	9.5	10.5	9.6	0.8
1094 – Jarrell FM 487	484911094	Williamson	7.6	7.5	9.1	8.1	0.9

1.6 Daily Pollution Levels Compared to EPA's AQI

While regulatory compliance is an important indicator of the region's air quality, it is possible for an area to experience numerous NAAQS exceedances multiple times each year and still have a compliant design value.

A design value also does not directly indicate how frequently a region experiences high pollution levels. Another indicator that can be used to characterize a region's air quality is the number of days a region experiences air pollution levels that fall within each of the AQI categories established by EPA. Table 1-4 shows the concentrations of NO_2, O_3, and $PM_{2.5}$ that correspond to each AQI level.

Table 1-3. Summary of AQI for NO_2, O_3, $PM_{2.5}$, and PM_{10}

AQI Level	AQI Number	NO_2 (1-Hr., ppb)	O_3 (8-Hr., ppb)	$PM_{2.5}$ (24 hr., µg/m^3)	PM_{10} (24 hr., µg/m^3)
Good	0-50	0-53	0-54	0.0-12.0	0-54
Moderate	51-100	54-100	55-70	12.1-35.4	55-154
Unhealthy for Sensitive Groups	101-150	101-360	71-85	35.5-55.4	155-254
Unhealthy	151-200	361-649	86-105	55.5-150.4	255-354
Very Unhealthy	201-300	650-1249	106-200	150.5-250.4	355-424

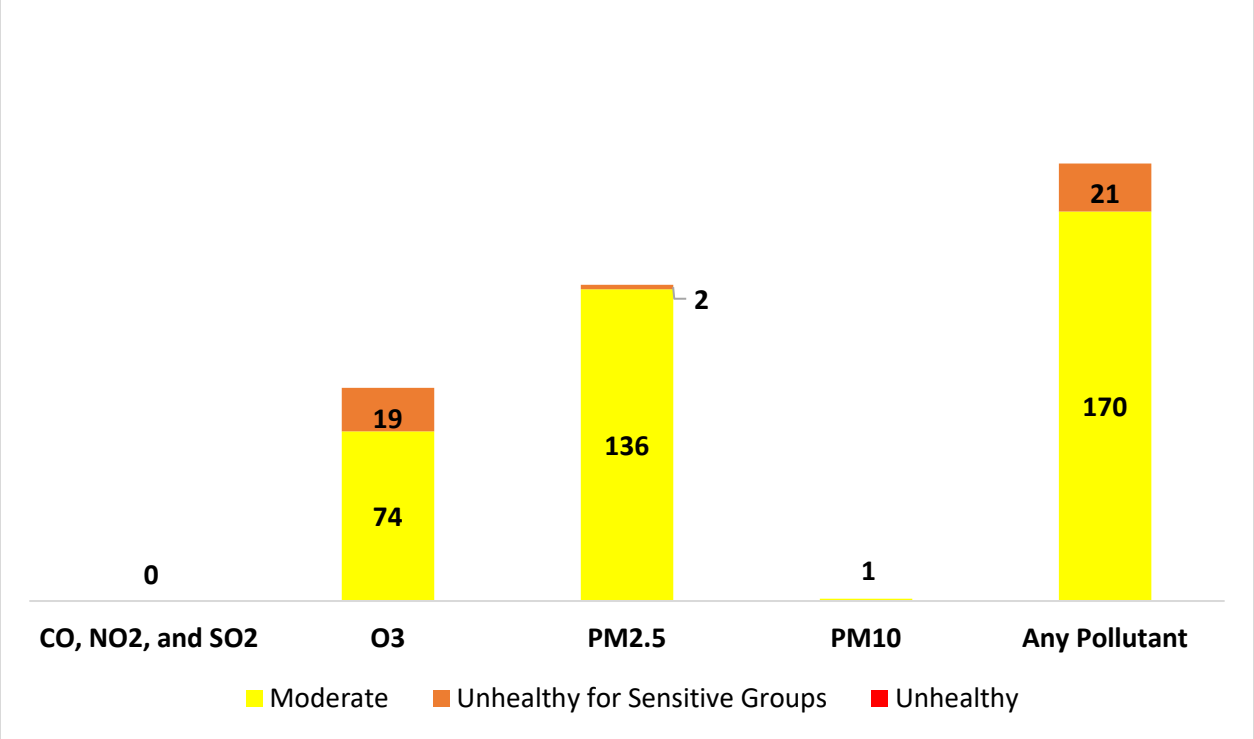
AQI Level	AQI Number	NO_2 (1-Hr., ppb)	O_3 (8-Hr., ppb)	$PM_{2.5}$ (24 hr., µg/m³)	PM_{10} (24 hr., µg/m³)
Hazardous	301-500	1250-2049	201-600	250.5-500	425-604

This report includes data from all the air pollution monitoring stations in the region, not just the TCEQ regulatory monitors. Therefore, the number of days in the "moderate" and "unhealthy for sensitive groups" categories described below are higher than if only the TCEQ regulatory monitors were used.

1.6.1 High AQI Days by Pollutant

The following figures show the number of days in 2023 when $PM_{2.5}$, PM_{10}, or O_3 concentrations measured in the CAPCOG region were high enough to be considered "moderate" or "unhealthy for sensitive groups." Monitored pollution levels for CO, NO_2, and SO_2 all remained in the "good" range throughout the year. In total, the region experienced moderate or worse air quality on 62% of days in 2023, with 20 of those days reaching "unhealthy for sensitive groups" levels, and one day reaching "unhealthy" levels. It is important to note that PM_{10} sampling only occurs once every six days. While there was one recorded "moderate" PM_{10} days in 2023, there could have been more days that were "moderate" or "unhealthy for sensitive groups" that were not captured in the sampling window.

Figure 1-3. Number of "Moderate" or "Unhealthy for Sensitive Groups" Air Pollution Days in the MSA in 2023 by Pollutant

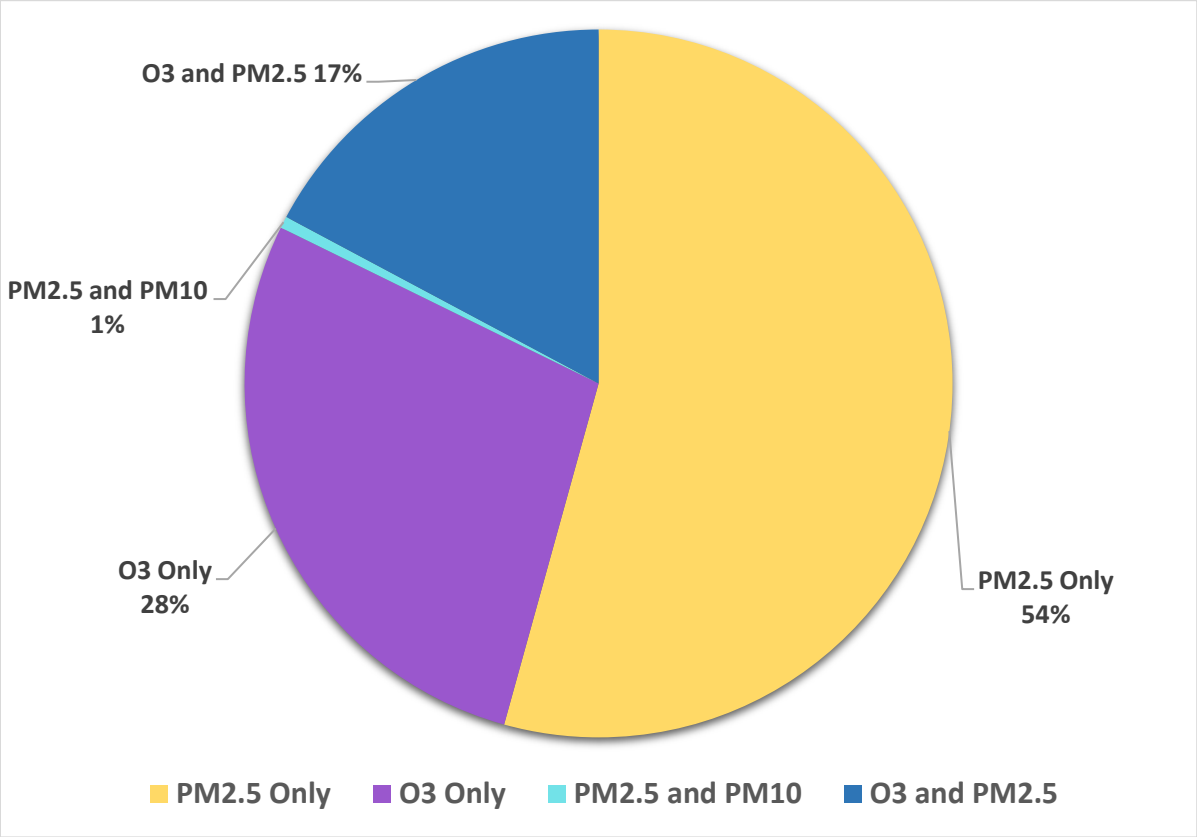


The region recorded 19 days when O_3 levels were considered "unhealthy for sensitive groups", two days when $PM_{2.5}$ levels were considered "unhealthy for sensitive groups". In additional there were 170 days when either O_3 or $PM_{2.5}$ levels were considered "moderate," 2 days when it was "moderate" for both O_3 and $PM_{2.5}$, and one day considered "moderate," for both PM_{10} and $PM_{2.5}$. This is also notable because PM_{10} is only sampled every 6 days, so one "moderate" day represented 5% of all samples collected in

2023, proportionate to 6 out of 365 days. For the third year in a row, “moderate” levels for PM_{10} were recorded.

Figure 1-4 shows the distribution of days when O_3 or $PM_{2.5}$ air pollution was considered at least “moderate” by pollutant.

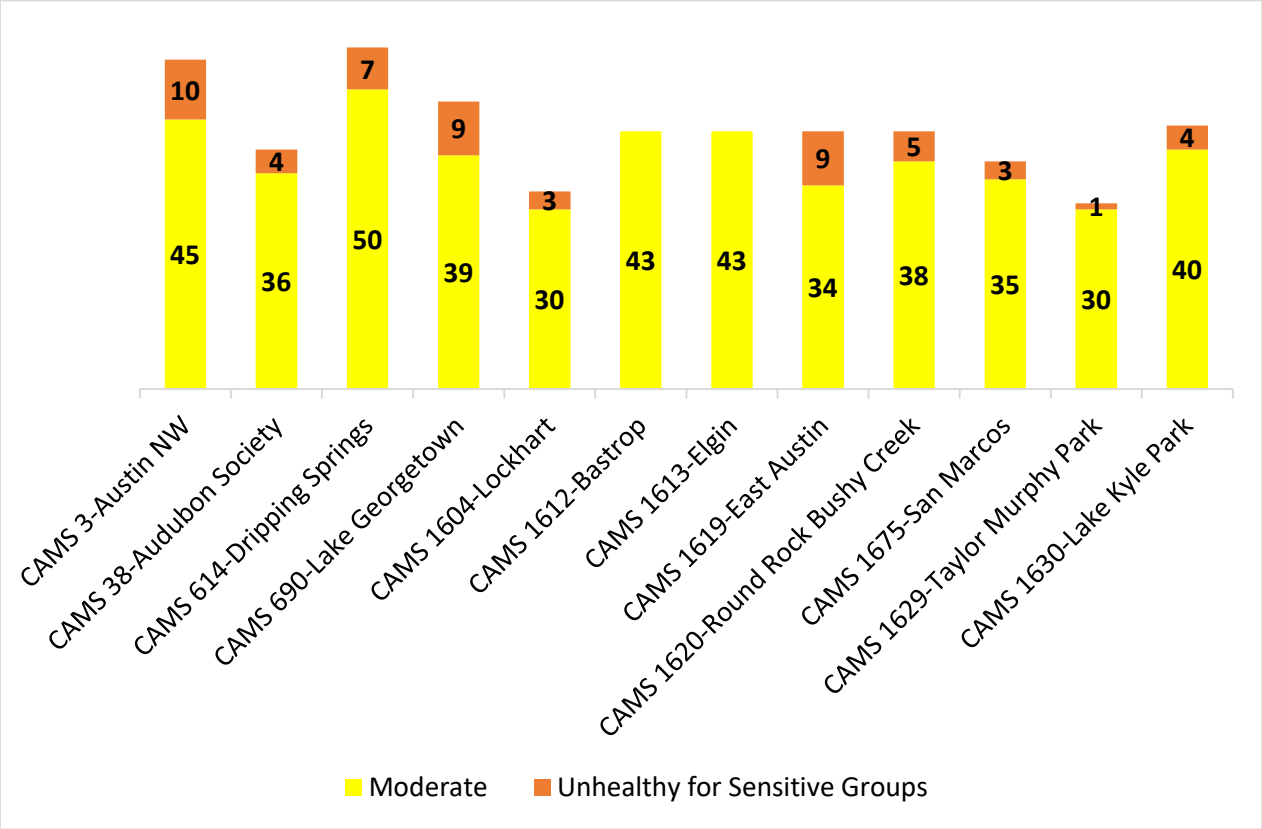
Figure 1-4. Days in 2023 When O_3 or $PM_{2.5}$ AQI Levels in the MSA Were "Moderate" or Worse



1.6.2 High O_3 AQI Days by Monitoring Station

The following figure shows the number of days when O_3 levels were considered “moderate” or “unhealthy for sensitive groups” at each O_3 monitoring station in the region in 2023. All ozone CAMS other than CAMS 1612-Bastrop and 1613-Elgin recorded at least one day when ozone levels were “unhealthy for sensitive groups” in 2023.

Figure 1-5. Number of Days when MDA8 O_3 Pollution was "Moderate" or Worse by Monitoring Station, 2023

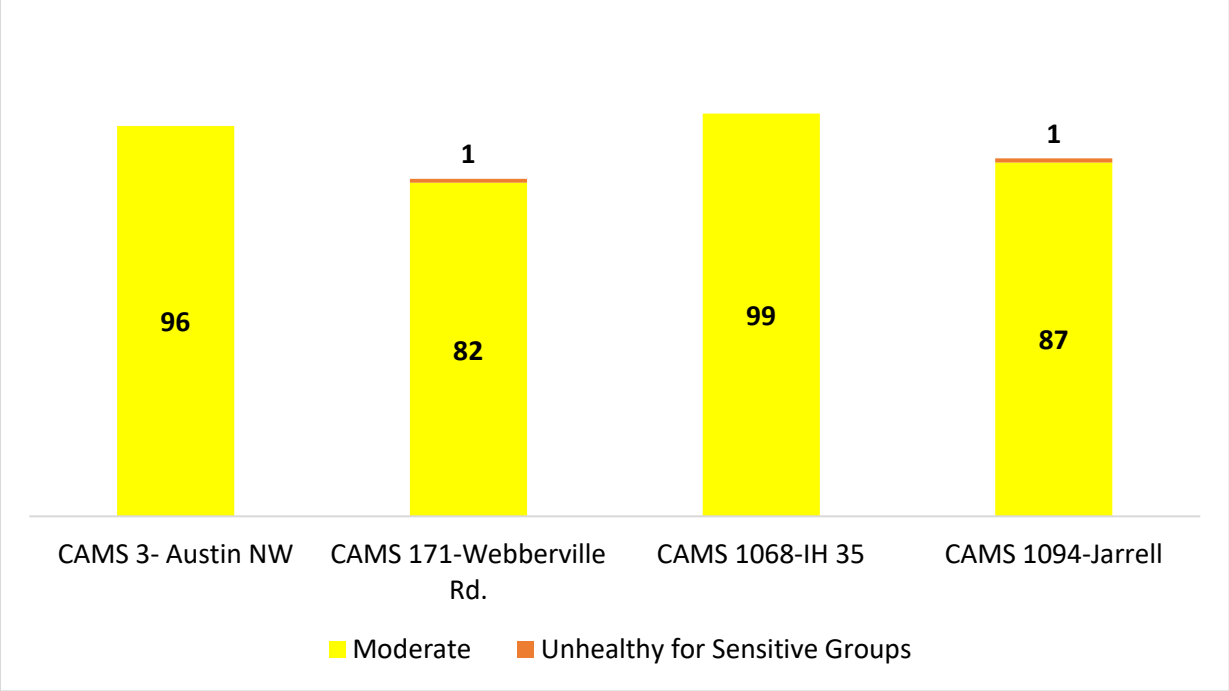


1.6.3 High PM AQI Days by Monitoring Station

1.6.3.1 $PM_{2.5}$ AQI Days

Figure 1-6 shows the number of days when $PM_{2.5}$ levels were considered “moderate” and “unhealthy for sensitive groups” at each $PM_{2.5}$ monitoring station in the region in 2023. Data is based on the daily average $PM_{2.5}$ levels collected from four continuous samplers. CAMS 3, CAMS 171, and CAMS 1068, are all located within the City of Austin, and CAMS 1094 is a temporary monitor that is in the City of Jarrell in Williamson County. CAMS 1094 started data collection on July 23, 2020. According to the TCEQ from August 2020, “The continuous $PM_{2.5}$ monitor in Jarrell was deployed because the TCEQ is working on a complaint investigation. This is a temporary monitor that will be deployed for approximately 90 days. This monitor is a state-initiative monitor and is not part of TCEQ’s federal network of monitors.” However, CAMS 1094 continued to collect data for all of 2023 and remains in operation in 2024.

Figure 1-6. Number of Days when $PM_{2.5}$ Pollution was "Moderate" or Worse by Monitoring Station, 2023

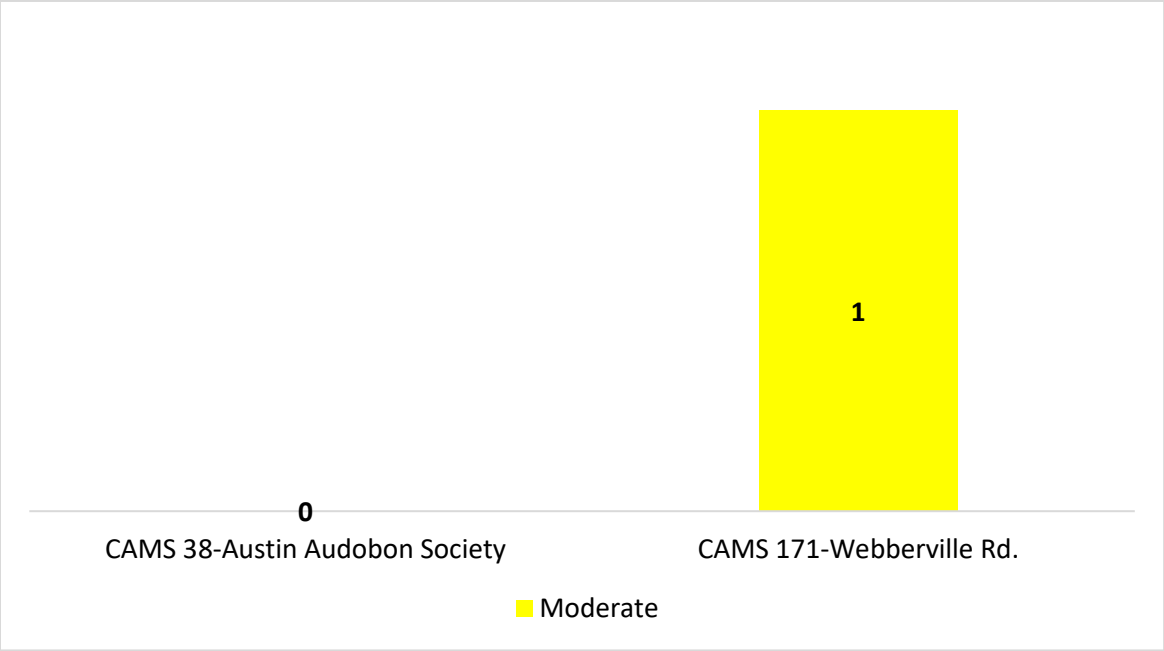


CAMS 1068-IH 35 continued to record the highest number of "moderate or worse" days for $PM_{2.5}$ pollution followed closely by CAMS 3-Austin NW. CAMS 1094-Jarrell and 171-Webberville Rd. recorded the highest number of "unhealthy for sensitive groups" day for $PM_{2.5}$ pollution.

1.6.3.2 PM_{10} AQI Days

There was one recorded day at a PM_{10} monitor in the region that measured "moderate" levels. It is important to note that PM_{10} sampling only occurs once every six days. While there was one recorded "moderate" PM_{10} days in 2023, there could have been more days that were "moderate" or "unhealthy for sensitive groups" that were not captured in the sampling window. The figure below displays the number of "moderate" days by monitor for PM_{10}.

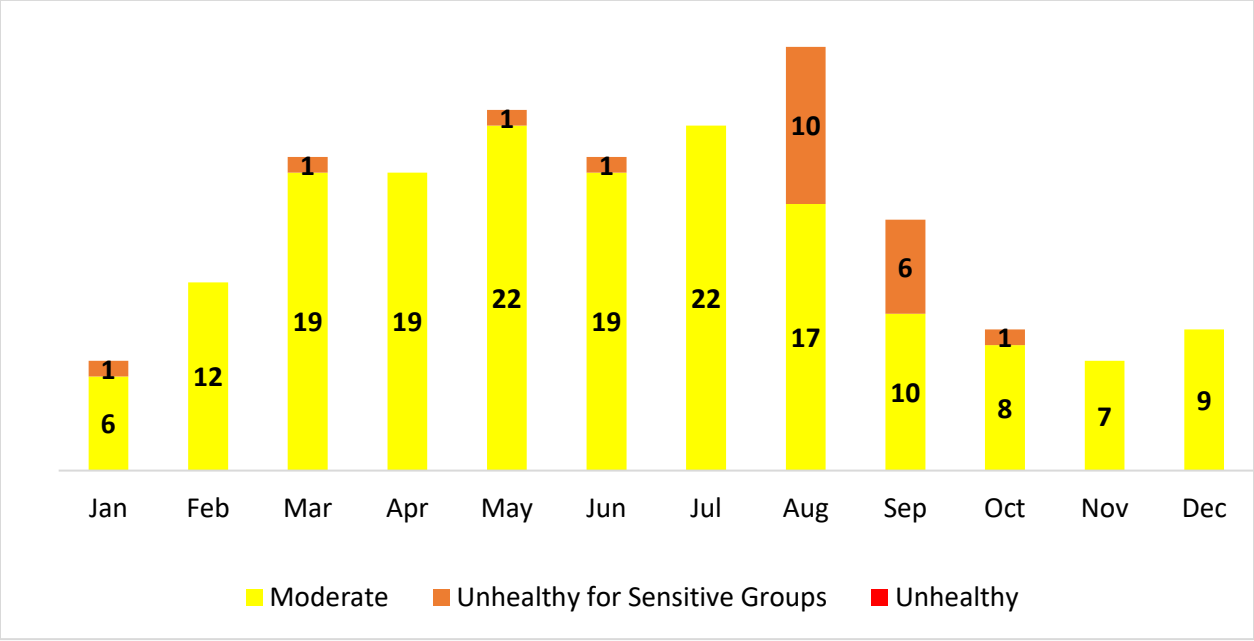
Figure 1-7. Number of Days when PM_{10} Pollution was "Moderate" by Monitoring Station, 2023



1.6.4 Distribution of "Moderate" or Worse AQI Days by Month

Air pollution levels vary significantly by month in the MSA. Figure 1-8 shows the number of days when air pollution levels were "moderate", "unhealthy for sensitive groups", or "unhealthy" within the MSA by month.

Figure 1-8. Number of Days when Air Pollution was "Moderate" or Worse in the Austin-Round Rock-San Marcos MSA by Month, 2023

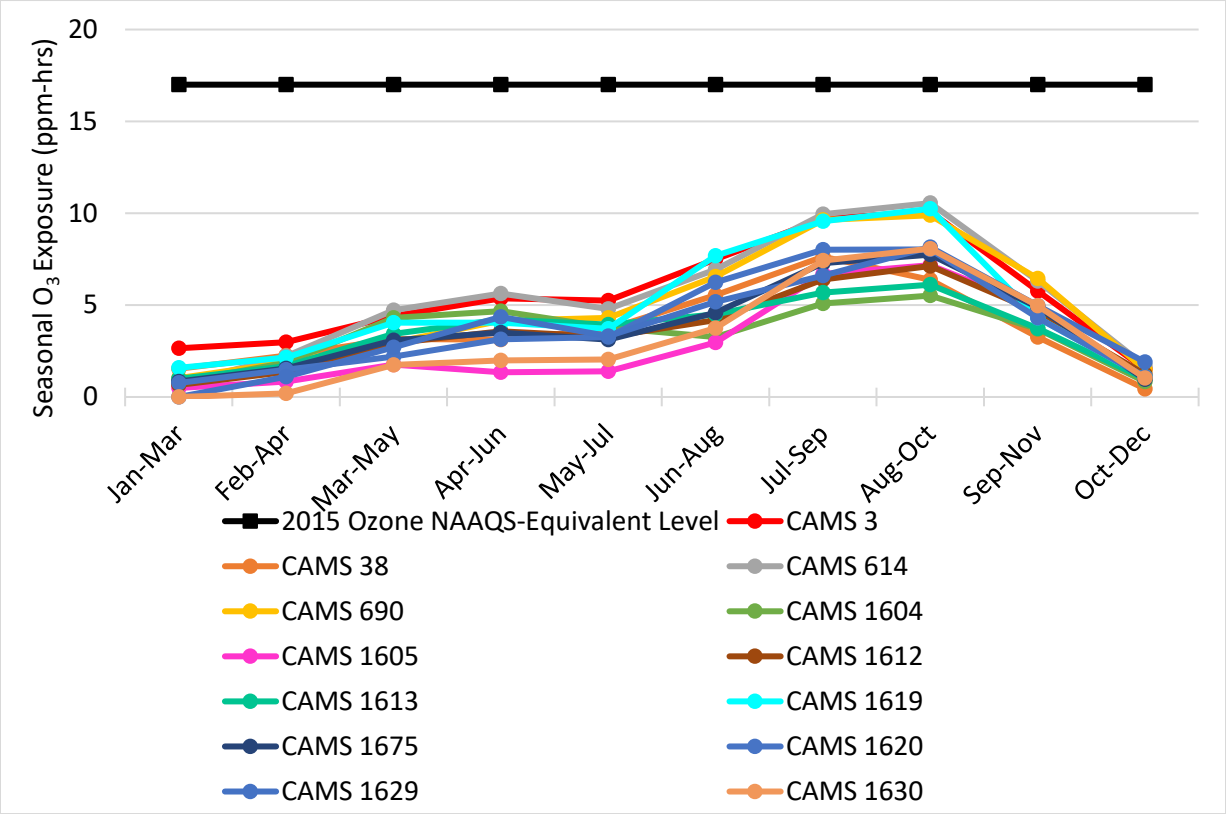


1.6.5 Seasonal O_3 Exposure

While EPA set the 2015 secondary O_3 standard identical to the 2015 primary O_3 standard, the preamble to the rulemaking states that, "the requisite protection will be provided by a standard that generally limits cumulative seasonal exposure to 17 ppm-hours (ppm-hrs.) or lower, in terms of a 3-year W126 index."[7] EPA did not set a separate secondary standard set to protect public welfare, as opposed to public health, because, "such control of cumulative seasonal exposure will be achieved with a standard set at a level of 0.070 ppm, and the same indicator, averaging time, and form as the current standard."[8]

The region's seasonal O_3 exposure levels were 31%-99% below the 17 ppm-hr. levels EPA referenced in the final 2015 O_3 NAAQS rulemaking. Figure 1-9 shows the 3-month seasonal exposure levels at each monitoring station.

Figure 1-9. Weighted Seasonal O_3 Exposure by Monitoring Station and 3-Month Period, 2022 (W126 ppm-hrs.)



1.7 Air Quality Forecasting

One of the factors that influences the risks associated with air pollution is the extent to which air pollution can be accurately and successfully predicted. For the MSA, there are two types of forecasting

[7] 80 FR 65294

[8] Ibid.

tools that can be used to help reduce the exposure of sensitive populations to high air pollution levels – Ozone Action Days (OADs) and daily Air Quality Forecasts.

1.7.1 Ozone Action Days

TCEQ issues OADs the afternoon before the next day when TCEQ believes that O_3 levels may exceed the level of the NAAQS.

There are two ways that CAPCOG measures the performance of OAD forecasting for the region:

1. Accuracy in correctly predicting an OAD; and
2. Success in predicting when actual monitored O_3 levels were high enough to be considered "unhealthy for sensitive groups."

Using the AQI for O_3, CAPCOG calculates these metrics as follows:

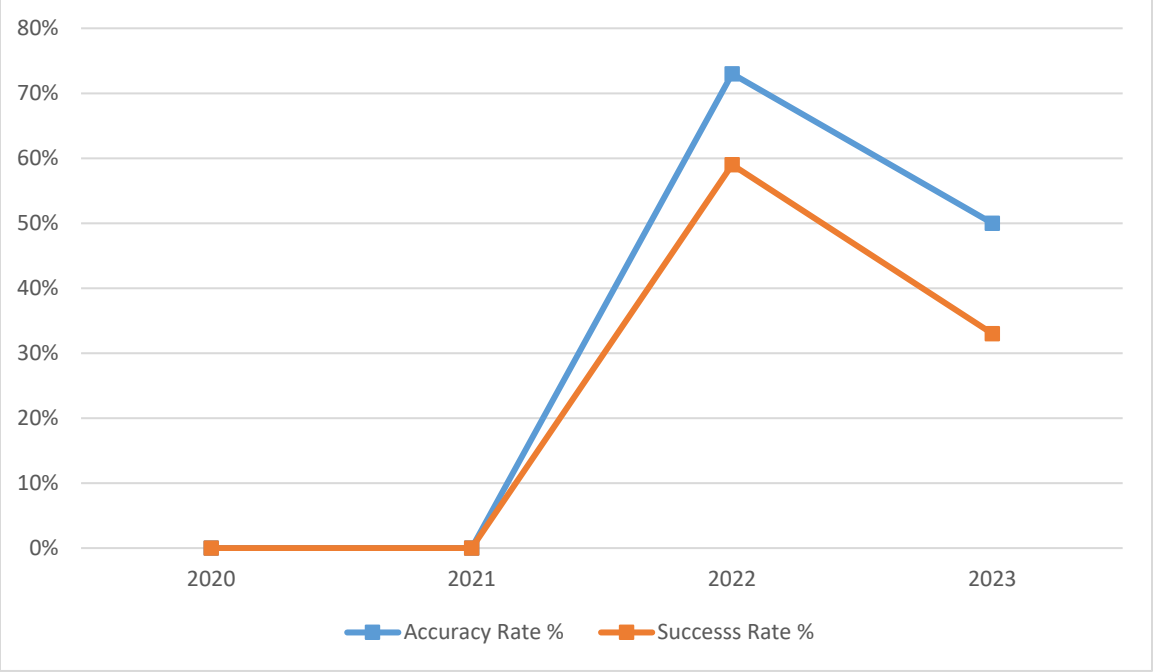
$$OAD\ Accuracy\ Rate = \frac{Days\ OAD\ Declared\ When\ Actual\ MDA8 > 70\ ppb}{Days\ OAD\ Declared}$$

$$OAD\ Success\ Rate = \frac{Days\ OAD\ Declared\ When\ Actual\ MDA8 > 70\ ppb}{Days\ When\ Actual\ MDA8 > 70\ ppb}$$

Using these formulas for accuracy and success, TCEQ's OAD forecasting efforts for the region were 50% accurate and 33% successful in 2023. The days used to determine this rate are presented in Table 1-5. These 2023 metrics only account for days when TCEQ issued an OAD or actual O_3 measured >70 ppb. It does not account for the other days when TCEQ correctly did not issue an OAD and O_3 did not exceed 70 ppb.

From 2021-2023, TCEQ issued 43 OAD alerts for the MSA –five in 2021, 26 in 2022, 12 in 2023. During this time frame, there were 26 days when O_3 levels exceeded the level of the relevant O_3 NAAQS: one in 2021, 19 in 2022, eighteen in 2023. Table 1-5 lists each of these dates.

Figure 1-10. 2020-2023 OAD Accuracy and Success Rate



Looking at the 2023 data compared to previous years, the accuracy and success rate is lower than 2022 but higher than 2020-2021.

Table 1-4. OAD Dates and Dates when O_3 Exceeded Level of NAAQS, 2021-2023

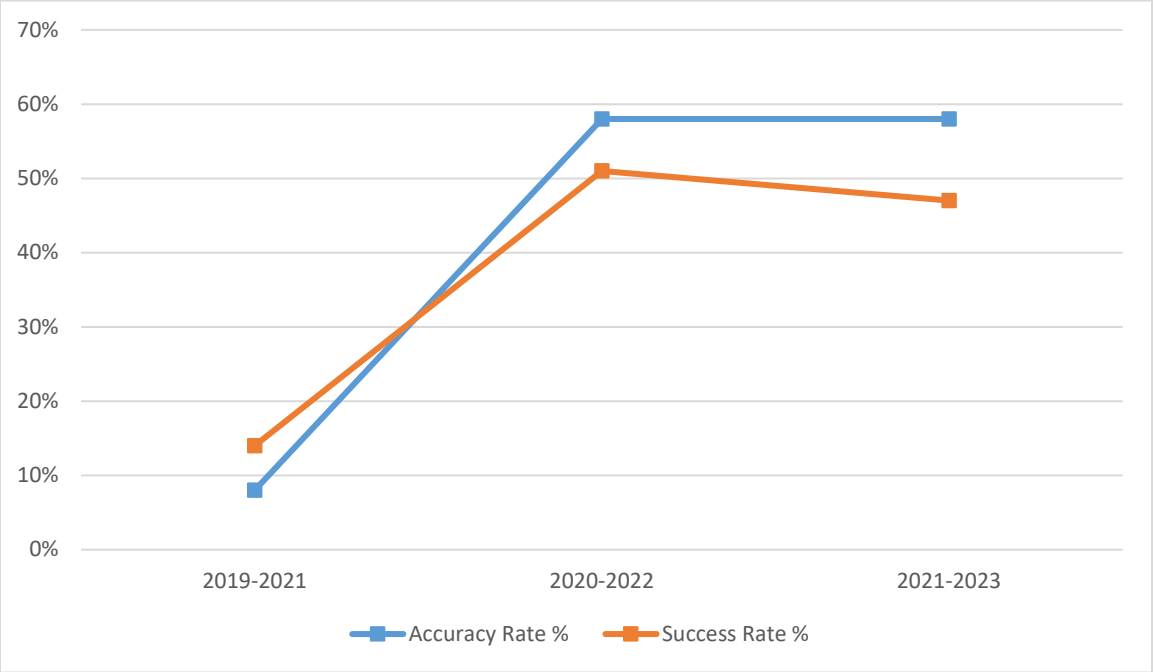
Date	OAD Issued for this Date?	Highest O_3 MDA8 Value Recorded in MSA	Station where Highest O_3 MDA8 Value Recorded
4/11/2021	No	71	CAMS 614
6/16/2021	Yes	66	CAMS 614
6/18/2021	Yes	66	CAMS 614
6/19/2021	Yes	61	CAMS 614
9/10/2021	No	75	CAMS 614
9/25/2021	Yes	70	CAMS 1612
9/26/2021	Yes	63	CAMS 690
10/8/2021	No	76	CAMS 1620
3/1/2022	No	75	CAMS 614
3/2/2022	No	82	CAMS 614
3/3/2022	No	76	CAMS 614
3/16/2022	No	72	CAMS 1675
3/19/2022	Yes	61	CAMS 1613
3/25/2022	Yes	73	CAMS 614
4/3/2022	Yes	63	CAMS 690
5/26/2022	Yes	99	CAMS 1604
5/27/2022	Yes	75	CAMS 614
5/28/2022	Yes	58	CAMS 614
6/4/2022	No	75	CAMS 1675

Date	OAD Issued for this Date?	Highest O_3 MDA8 Value Recorded in MSA	Station where Highest O_3 MDA8 Value Recorded
6/29/2022	No	88	CAMS 690
7/1/2022	No	74	CAMS 690
7/10/2022	Yes	66	CAMS 1620
7/12/2022	No	71	CAMS 614
7/13/2022	Yes	76	CAMS 1620
8/11/2022	No	72	CAMS 1620
8/12/2022	Yes	74	CAMS 690
9/9/2022	Yes	79	CAMS 1675
9/10/2022	Yes	73	CAMS 1613
9/11/2022	No	74	CAMS 1613
9/12/2022	No	76	CAMS 1613
9/13/2022	No	79	CAMS 1675
9/14/2022	Yes	81	CAMS 690
9/15/2022	Yes	82	CAMS 1613
9/22/2022	Yes	66	CAMS 1619
9/23/2022	Yes	72	CAMS 690
9/27/2022	Yes	73	CAMS 690
9/28/2022	Yes	67	CAMS 690
9/29/2022	Yes	85	CAMS 614
9/30/2022	Yes	77	CAMS 690
10/1/2022	Yes	81	CAMS 614
10/2/2022	Yes	72	CAMS 614
10/3/2022	Yes	81	CAMS 614
10/4/2022	Yes	78	CAMS 614
10/5/2022	Yes	73	CAMS 614
10/6/2022	Yes	76	CAMS 614
10/7/2022	Yes	66	CAMS 614
10/13/2022	No	71	CAMS 614
3/4/2023	No	72	CAMS 3
5/17/2023	No	73	CAMS 1604
5/18/2023	Yes	68	CAMS 1604
6/7/2023	Yes	74	CAMS 3
6/8/2023	Yes	62	CAMS 1620
8/15/2023	Yes	69	CAMS 1675
8/16/2023	No	78	CAMS 614
8/17/2023	Yes	74	CAMS 1619
8/24/2023	No	72	CAMS 1619
8/25/2023	No	79	CAMS 1619
8/28/2023	No	84	CAMS 1619
8/29/2023	No	72	CAMS 1619
8/30/2023	No	75	CAMS 1619
8/31/2023	Yes	81	CAMS 614
9/1/2023	Yes	79	CAMS 614

Date	OAD Issued for this Date?	Highest O_3 MDA8 Value Recorded in MSA	Station where Highest O_3 MDA8 Value Recorded
9/2/2023	No	79	CAMS 614
9/3/2023	Yes	61	CAMS 3
9/11/2023	No	72	CAMS 690
9/18/2023	Yes	74	CAMS 3/690/1630
9/19/2023	Yes	80	CAMS 690
9/20/2023	No	71	CAMS 690
9/28/2023	Yes	54	CAMS 1629
10/19/2023	No	79	CAMS 38
10/21/2023	Yes	69	CAMS 38

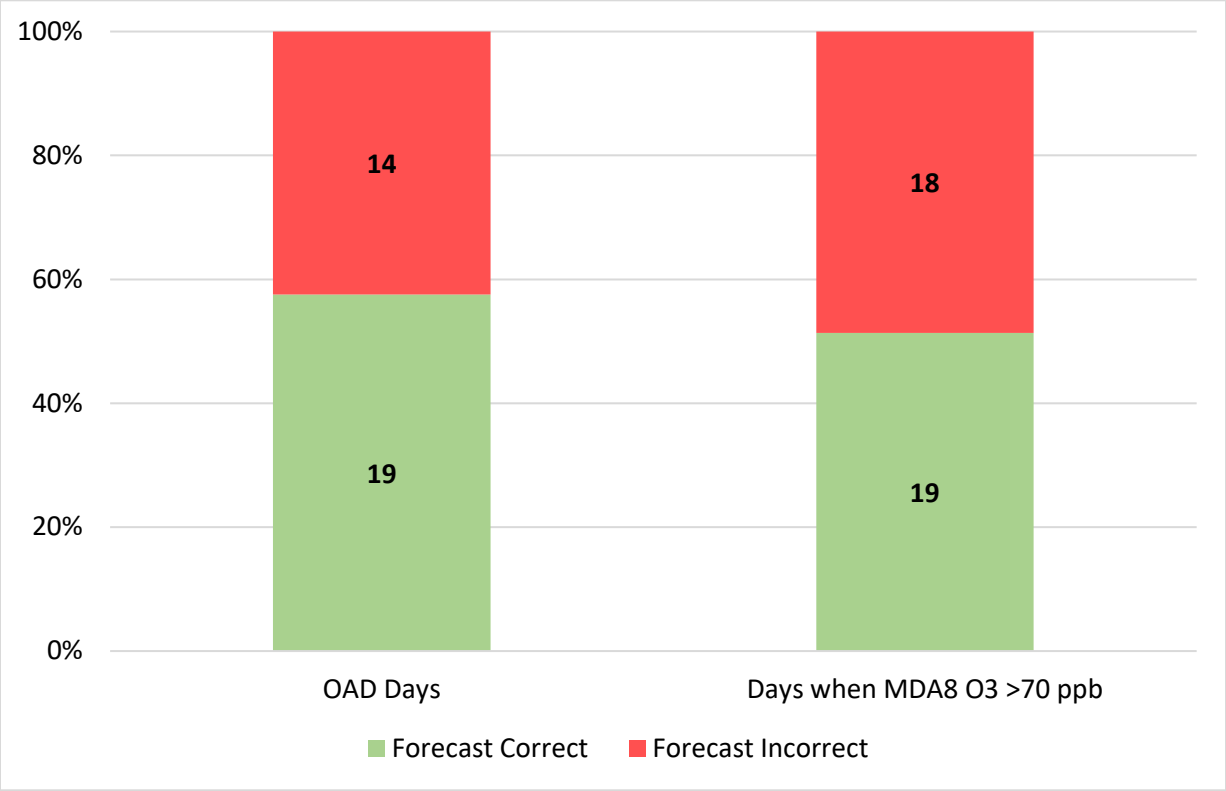
Over the three-year period of 2021-2023, 25 out of the 43 OAD forecasts correctly predicted O_3 levels over the applicable NAAQS – a 58% accuracy rate. Conversely, there was a 47% "success rate" in predicting actual MDA8 O_3 levels over the NAAQS from 2021-2023 (25 correctly predicted OAD out of 28 days with actual O_3 >70 ppb).

Figure 1-11. 2019-2023 Three Year Periods of Accuracy and Success Rate



The accuracy rate of the 2021-2023 period has remained constant in comparison with last year's three-year period (2020-2022). The success rate of the 2021-2023 period decreased in comparison to the 2020-2022 period. Compared to 2019-2021 the recent three-year period of 2021-2023 has a higher accuracy and success rate.

Figure 1-12. OAD Forecast Accuracy and Success, 2021-2023



1.7.2 Daily Air Quality Forecasts

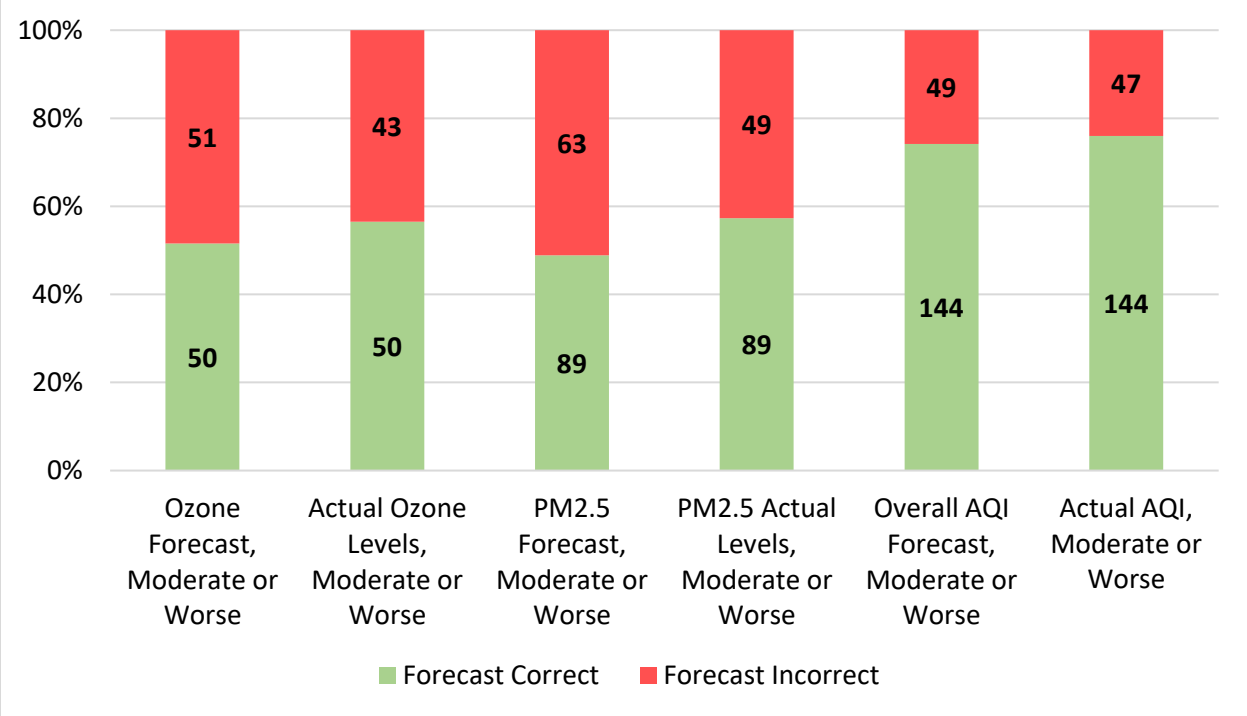
TCEQ issues OADs when TCEQ believes that O_3 will reach levels considered "unhealthy for sensitive groups." However, the TCEQ issues daily AQI forecasts for O_3, $PM_{2.5}$ and, rarely, PM_{10}. The performance of these forecasts can be measured using the same type of metrics that were used for OADs – accuracy and success. In this case, CAPCOG evaluated the accuracy and success rate in terms of the number of days when air quality was forecast to be "moderate" or worse. The equations below explain these terms in terms of the daily AQI forecast.

$$AQI\ Forecast\ Accuracy\ Rate = \frac{Days\ When\ AQI\ Forecast\ to\ be\ Moderate\ or\ Worse\ and\ was\ Actually\ Moderate\ or\ Worse}{Days\ Forecast\ to\ be\ Moderate\ or\ Worse}$$

$$AQI\ Forecast\ Success\ Rate = \frac{Days\ When\ AQI\ Forecast\ to\ be\ Moderate\ or\ Worse\ and\ was\ Actually\ Moderate\ or\ Worse}{Days\ When\ Actual\ AQI\ Was\ Moderate\ or\ Worse}$$

Since the daily AQI forecasts for the region included forecasts for both O_3 and $PM_{2.5}$, it is possible to analyze these accuracy and success rates by pollutant, as well as for the overall AQI. Figure 1-11 presents the results of this AQI forecast analysis for 2023.

Figure 1-13. Accuracy and Success of AQI Forecasts for 2023



In summary, TCEQ's forecasts for "moderate" or higher O_3 levels were 67% accurate and 71% successful and forecasts for "moderate" or higher $PM_{2.5}$ levels were 61% accurate and 67% successful. Overall AQI forecasts were 74% accurate and 75% successful in 2023, compared to 2022 where overall AQI forecasts were 73% accurate and 78% successful.

1.8 Environmental Complaints

The Regional Air Quality Plan is intended to be a comprehensive plan for air quality. Therefore, it includes a section on nuisance complaints sent to TCEQ[9]. This section of the annual report summarizes the compliant data from the region in 2023 county-by-county.

The table below summarizes the number of complaints filed from each county in 2023, along with each county's population, and the number of odor complaints per 10,000 residents.

Table 1-5. 2023 Complaints and Number of Complaints Per 10,000 Residents by County

County	Bastrop	Caldwell	Hays	Travis	Williamson	Total
Burning Complaints	3	1	4	1	3	12
Odor Complaints	48	4	9	48	6	115
Dust Complaints	4	2	2	24	25	57

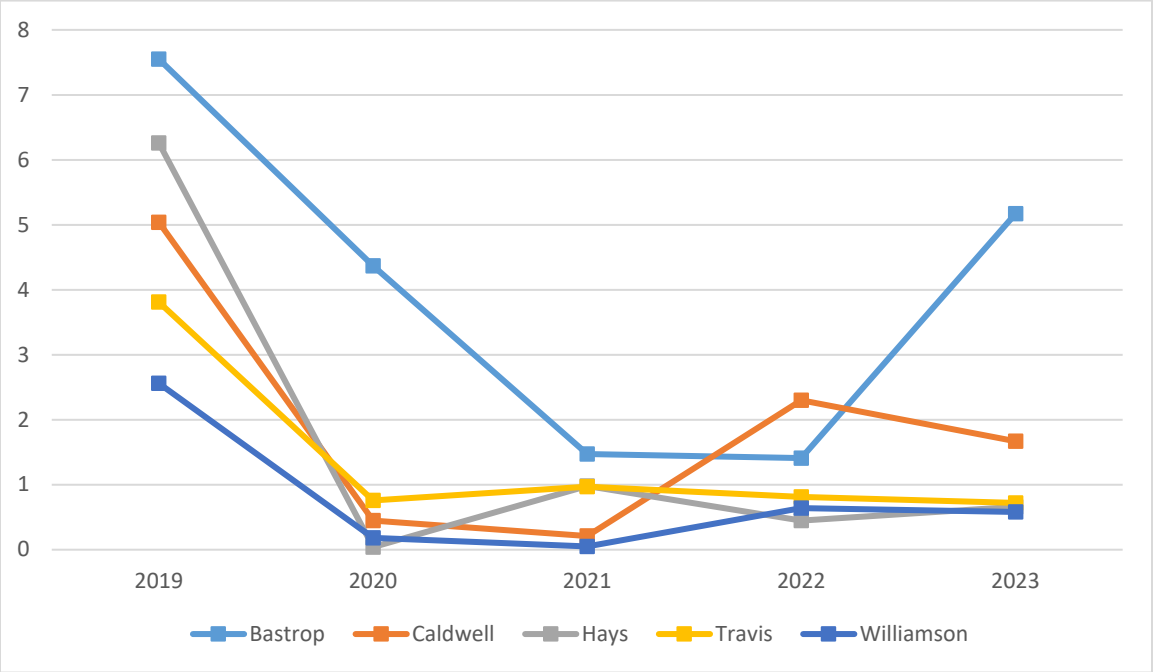
[9] Obtained by querying for "Air Quality High Level, on TCEQ's complaint tracking website at: https://www2.tceq.texas.gov/oce/waci/index.cfm

County	Bastrop	Caldwell	Hays	Travis	Williamson	Total
Smoke Complaints	0	0	0	11	0	11
Other Complaints[10]	0	1	3	12	5	21
Complaints/ 10,000 Residents	**5.17**	**1.67**	**0.66**	**0.72**	**0.58**	**0.89**

As evident in Table 1-6, Bastrop County had the highest number of complaints per 10,000 residents. This is largely due to 46 complaints related to odors coming from Darling Ingredients in Bastrop County11. Even though Darling Ingredients received odor complaints from Bastrop County residents over the past 20 years they have not been issued a violation for odor from TCEQ since 2008. The company has attempted to resolve this by investing more than $3 million in upgrades to eliminate odors.12

As detailed in Figure 1-15, the number of complaints fluctuates throughout the years, in 2023 there were a high number of complaints out of Bastrop County (per resident). Typically, Bastrop County has the highest rate of complaints per resident, the county has led the region four out of the last five years.

Figure 1-14. 2019-2023 Number of Complaints Per 10,000 Residents by County



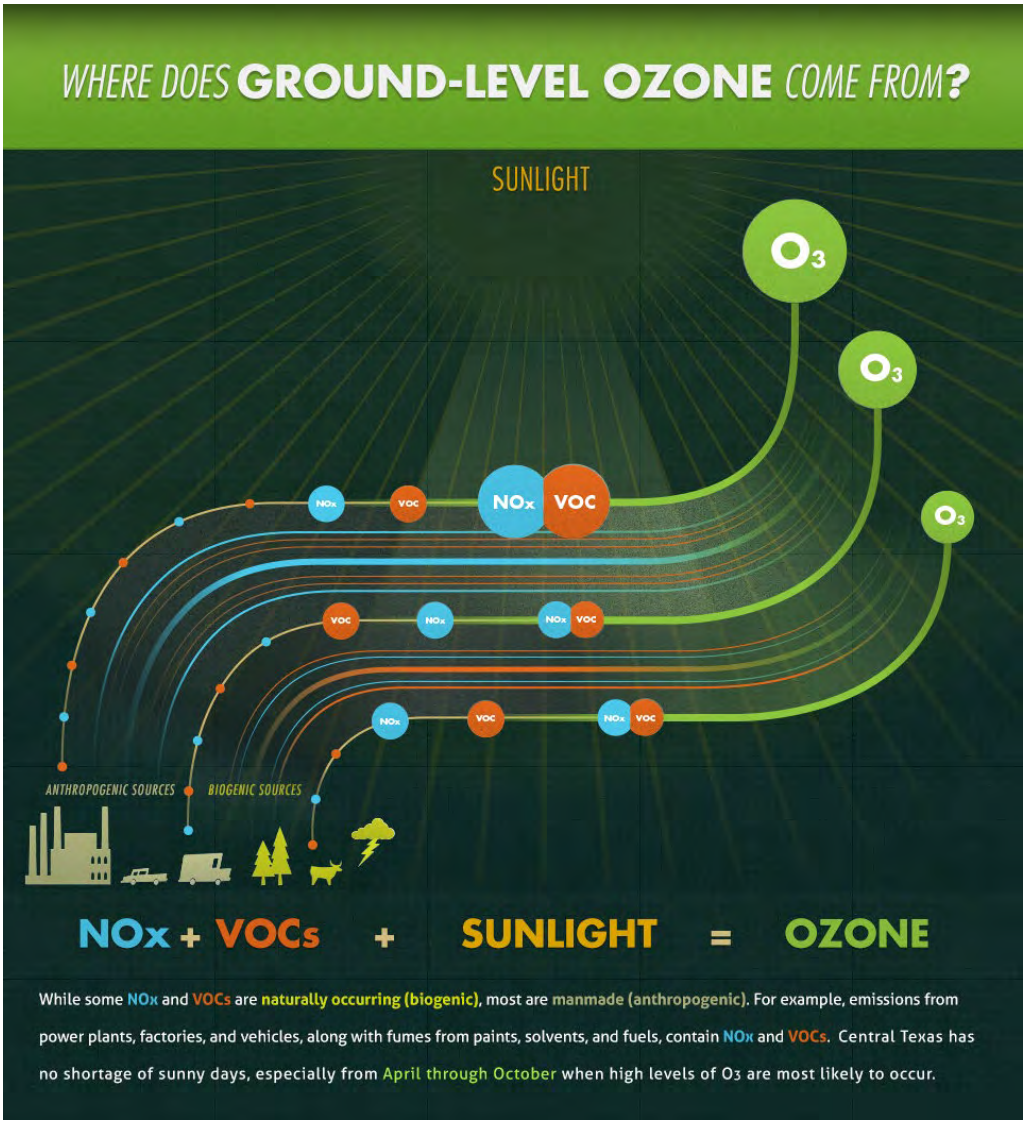
Reviewing 2023 data compared to previous years, Bastrop County saw a large increase in complaints from 2022 to 2023. Caldwell County had a notable decrease in complaints from 2022 to 2023 but the rest of the counties remained relatively like their 2022 number of complaints.

[10] Other Complaints include those categorized by TCEQ as Wastewater, Municipal (non-industrial), Construction, and undefined.

2 2022 Regional Ozone Season Weekday NO_X Emissions Profile

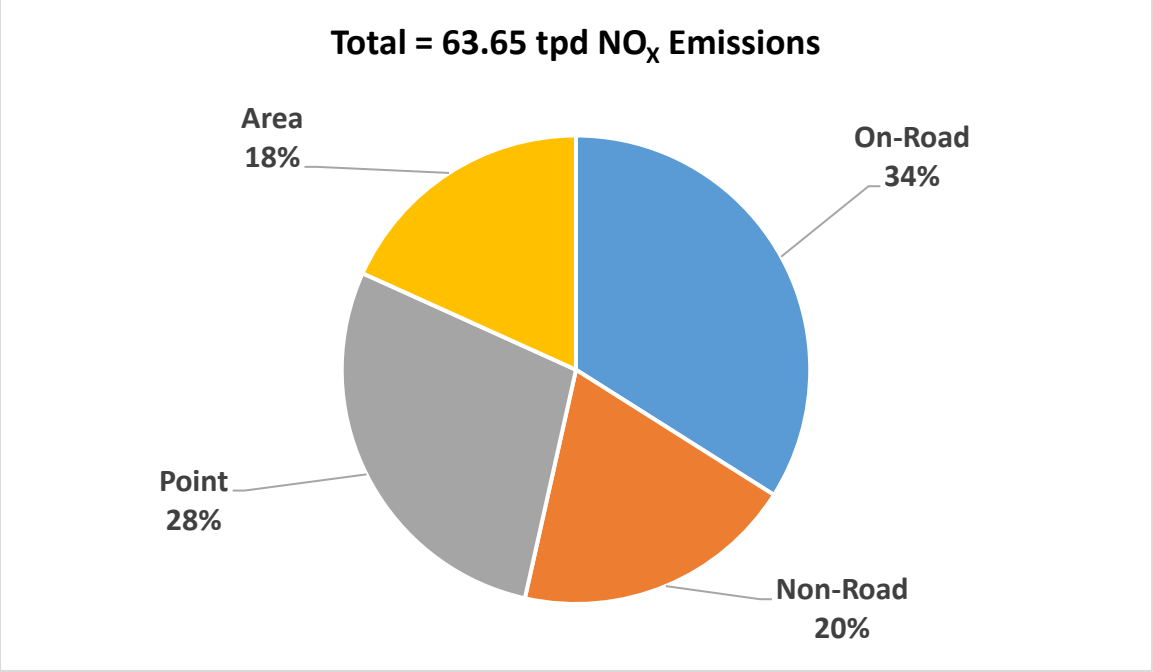
NO_X emissions react with volatile organic compounds (VOC) in the presence of sunlight to form ground-level O_3. Depending on local conditions, an area's O_3 problems can be influenced more by NO_X emissions or VOC emissions. In the MSA, it is understood that NO_X emissions account for about 99% of all locally generated O_3. Therefore, an understanding of the contribution of different sources of NO_X emissions to the region's overall daily NO_X emissions during Ozone Season will elucidate the relative importance of these sources to O_3 formation.

Figure 2-1. Ozone Formation



The following pie chart shows the estimated average 2022 O_3 season weekday anthropogenic NO_X emissions in the region by major source type – on-road mobile, non-road mobile, point source, and area source emissions.

Figure 2-2 2023 O_3 Season Weekday NOX Emissions for the Austin-Round Rock-San Marcos MSA (tpd)



2.1 NO_X Emissions by Source Type by County

Table 2-1 shows the break-down of the region's ozone season day (OSD) weekday NO_X emissions by county and source type.

Table 2-1. 2023 OSD Weekday NO_X Emissions by Source Type and County (tons per day)

County	On-Road	Non-Road	Point	Area	Total
Bastrop	1.20	0.93	4.81	0.46	**7.40**
Caldwell	0.80	0.78	1.68	1.89	**5.15**
Hays	3.18	0.94	6.25	0.80	**11.17**
Travis	10.58	7.06	5.13	6.47	**29.24**
Williamson	5.86	2.73	0.11	1.99	**10.69**
Total	**21.62**	**12.43**	**17.98**	**11.61**	**63.65**

2.2 On-Road Sources

The on-road sector includes mobile sources that are registered to operate on public roads. On-road vehicles remain the largest source of NO_X emissions within the region, accounting for 21.62 tons per day (tpd) of NO_X emissions on a typical 2023 OSD weekday, based on CAPCOG's most recent on-road trends emissions inventories project completed in 2023. Table 2-2 shows the typical 2023 O_3 season weekday NO_X emissions for the region by source use type.

Table 2-2. Regional 2023 OSD Weekday On-Road NO_X Emissions by Source Use Type (tpd)

Source Use Type	NO_X
Motorcycle	0.10

Source Use Type	NO_X
Passenger Car	2.98
Passenger Truck	3.39
Light Commercial Truck	0.70
Intercity Bus	0.47
Transit Bus	0.14
School Bus	0.11
Refuse Truck	0.11
Single-Unit Short-Haul Truck	1.49
Single-Unit Long-Haul Truck	0.12
Motor Home	0.21
Combination Short-Haul Truck	4.67
Combination Long-Haul Truck	7.14
Total	**21.63**

Passenger cars and passenger trucks combined to account for 6.37 tpd of NO_X emissions, while heavy-duty commercial trucking accounted for 13.63 tpd NO_X emissions. The remaining sources accounted for 1.63 tpd NO_X emissions, most of which come from light commercial trucks.

2.3 Non-Road Sources

The non-road sector consists of any mobile source that is not registered to be operated on a public road, including sources such as agricultural equipment, construction and mining equipment, locomotives, aircraft, and drill rigs. Non-road sources made up the 3rd largest source of NO_X emissions within the region in 2023, accounting for 12.43 tpd of NO_X emissions on a typical O_3 season weekday. There are four different types of non-road data sets: equipment modeled in the MOVES2014b and TexNv2 models, locomotives/rail equipment, aircraft (including ground support equipment), and drill rigs.

Table 2-3. 2023 OSD Weekday Non-Road NO_X Emissions by County (tpd)

County	MOVES2014b	Rail	Aircraft	Drill Rigs	Total
Bastrop	0.55	0.38	0.00	0.00	0.93
Caldwell	0.36	0.39	0.01	0.02	0.78
Hays	0.58	0.36	0.00	0.00	0.94
Travis	4.08	0.39	2.59	0.00	7.06
Williamson	2.24	0.47	0.02	0.00	2.73
Total	**7.81**	**1.99**	**2.61**	**0.02**	**12.43**

- For MOVES2014b sources, CAPCOG used the 2017 OSD estimates prepared by TCEQ for the AERR,[11] then adjusted the totals for each SCC and county based on the ratios between the 2021 "Trends" inventory and the 2017 "Trends" inventory.[12]
- For aircraft, CAPCOG used ERG's estimated O_3 season daily 2023 NO_X emissions.[13]

[11] Available online here: https://amdaftp.tceq.texas.gov/EI/nonroad/aerr/2017/for_EPA/
[12] Available online here: https://amdaftp.tceq.texas.gov/EI/nonroad/trends/
[13] Available online here: https://amdaftp.tceq.texas.gov/EI/offroad/airport/edms/

- For rail and drill rigs, CAPCOG used TCEQ's existing 2023 trends inventories.[14]

2.4 Point Sources

The point source sector consists of any stationary source that reports its emissions to TCEQ. The most recent point source data that is publicly available from TCEQ is for 2022. In that year, there were 27 facilities in the Austin-Round Rock-San Marcos MSA that reported emissions to TCEQ.[15] Emissions data specific to 2023 are available for each electric generating unit (EGU) that reports to EPA. CAPCOG estimated an average of 17.98 tpd NO_X emissions from point sources in the MSA in 2023:

- Except for the turbines at Decker Creek Power Plant, CAPCOG used the average daily NO_X emissions reported to EPA for May 1, 2022 – September 30, 2022, for all EGUs that report emissions to EPA,[16] (5.70 tpd);
- For the eight turbine units at Decker Creek Power Plant, CAPCOG used the average daily NO_X emissions reported to EPA for May 1, 2022 – September 30, 2022, adjusted to reflect the ratio between the average OSD NO_X emissions reported in TCEQ's EIQ for 2021 to the average OSD (May 1 – September 30) NO_X emissions reported to EPA for 2023[17] (1.74 tpd);
- For all other sources of NO_X emissions, including sources at non-EGU facilities, CAPCOG used the OSD NO_X emissions reported in the facility's 2022 EIQ (10.53 tpd).

Table 2-4 shows the estimated OSD NO_X emissions by county for EGU and non-EGU sources.

Table 2-4. Estimated 2022 Point Source OSD NO_X Emissions by County (tpd)

County	EGU[18]	Non-EGU	Total
Bastrop	4.71	0.10	**4.81**
Caldwell	0.00	1.68	**1.68**
Hays	0.68	5.57	**6.25**
Travis	2.05	3.08	**5.13**
Williamson	0.00	0.11	**0.11**
Total	**7.44**	**10.54**	**17.98**

The table below shows the facility-level OSD NO_X emissions estimates.

[14] Available online here: https://amdaftp.tceq.texas.gov/EI/offroad/locomotive/trends/ and https://amdaftp.tceq.texas.gov/EI/oil_gas/drilling/trends/ .
[15] "State Summary" file available online here: https://www.tceq.texas.gov/downloads/air-quality/point-source/2010_2022statesum.xlsx
[16] Accessible online here: https://ampd.epa.gov/ampd/
[17] The adjustment for the Decker Turbines is due to a known issue with data substitution required for reporting data to EPA that does not apply to the annual EIQs.
[18] Includes all sources at these facilities, including sources that do not report to AMPD.

Table 2-5. Estimated Average 2023 OSD Point Source Emissions in the Austin-Round Rock-San Marcos MSA (tpd)

RN	Company	Site	2022 NO_x Emission (tpy)	2022 OSD NO_x (ppd)
RN100211689	Hays Energy LLC	Hays Energy Facility	202.22	1,389.13
RN100212034	Meridian Brick	Elgin Facility	21.30	116.71
RN100214337	Austin White Lime	McNeil Plant & Quarry	458.78	2,486.70
RN100215052	Austin Energy	Sand Hill Energy Center	95.23	676.70
RN100215938	Waste Management	Austin Community Landfill	48.15	254.02
RN100219872	Austin Energy	Decker Creek Power Plant	106.24	468.48
RN100220177	Oasis Pipeline	Prairie Lea Compressor Station	609.10	3,355.07
RN100225754	Waste Management	Williamson County Recycling and Disposal Facility	14.04	77.66
RN100225846	Acme Brick Company	Elgin Plant	14.04	76.94
RN100518026	Samsung Austin Semiconductor	Austin Fabrication Facility	105.83	575.10
RN100542752	BFI Waste Systems of North America	BFI Sunset Farms Landfill	15.75	86.73
RN100723915	Gentex Power	Lost Pines Power Plant	218.22	1,301.82
RN100725712	Seminole Pipeline Company	Coupland Pump Station	21.25	121.81
RN100728179	Durcon Laboratory Tops	Durcon Laboratory Tops	3.16	17.99
RN100843747	NXP USA	Ed Bluestein Site	19.80	102.87
RN101056851	Bastrop Energy Partners	Bastrop Energy Center	284.54	2,086.85
RN101059673	Flint Hills Resources Corpus Christi	Austin Terminal	0.29	2.15
RN102016698	Texas Disposal System Landfill	Texas Disposal System Landfill	14.96	81.94
RN102038486	Lower Colorado River Authority	Sim Gideon Power Plant	877.33	7,141.51
RN102204427	Lower Colorado River Authority	Hilbig Gas Storage Facility	0.51	2.67
RN102533510	University of Texas at Austin	Hal C Weaver Power Plant	310.20	2,521.57
RN102597846	Texas Lehigh Cement Company	Texas Lehigh Cement	1,945.72	11,142.51

RN	Company	Site	2022 NO_x Emission (tpy)	2022 OSD NO_x (ppd)
RN102752763	NXP USA	Integrated Circuit MFG Oak Hill Fab	7.62	34.56
RN105074561	Texas Materials Group	Austin Hot Mix	0.21	1.14
RN105366934	Flint Hills Resources Corpus Christi	Mustang Ridge Terminal	1.13	5.88
RN106897036	130 Environmental Park LLC	130 Environmental Park	0.0	0.00
RN109992479	Valero Terminaling & Distribution Co.	Truck Loading Terminal	0.09	0.42
Total	**n/a**	**n/a**	**5,391.71**	**34,128.93**

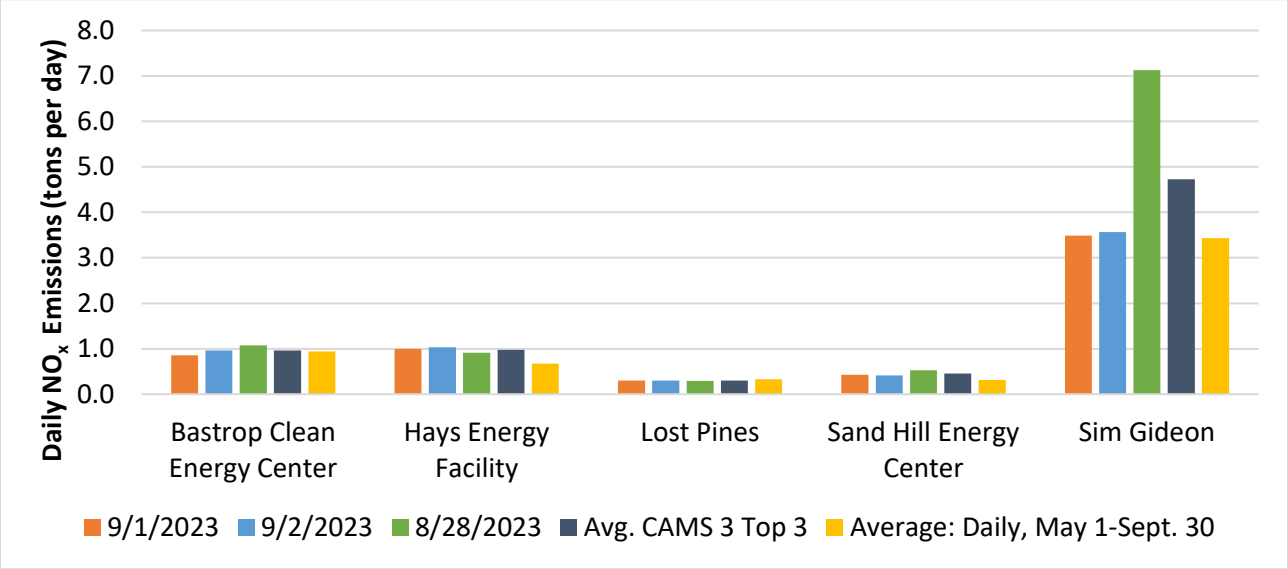
Since EPA data for EGUs are available at the daily level, CAPCOG analyzed the regional EGU NO_X emissions on the top four days at Continuous Air Monitoring Site (CAMS) 3 with the highest 8-hour O_3 averages for 2023, since these days affect National Ambient Air Quality Standard (NAAQS) compliance.

The top three days at CAMS 3, the current monitor used for the region's design value, were the following:

- 9/1/2023: 76 ppb
- 9/2/2023: 76 ppb
- 8/28/2023: 75 ppb

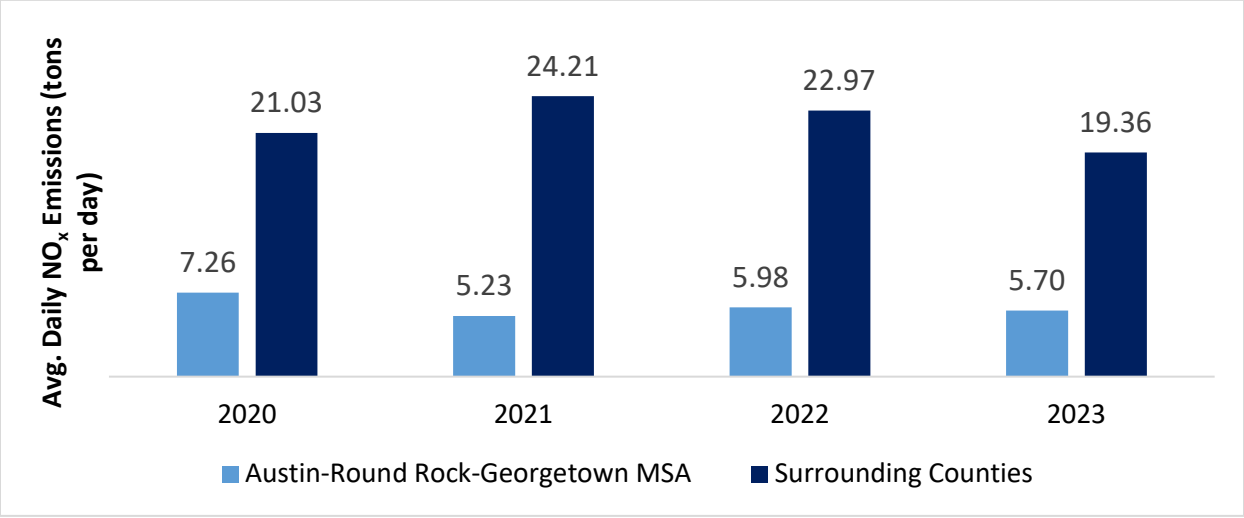
On these days, EGU NO_X emissions averaged 1.48 tpd, which is 17% higher than the May 1st – September 30th daily average of 1.23 tpd, with the highest NO_X emissions reaching 7.13 tpd on 8/28/2023 at the Sim Gideon Power Plant. This suggests that the relationship between these EGUs and the highest ozone concentrations at CAMS 3 was not particularly strong. Unlike in most prior years, the EGU emissions on the top 3 days don't stand out as being significantly higher than what is typical for May – September.

Figure 2-3. Comparison of EGU NO_X Emissions on Top 3 O3 Days at CAMS 3 Compared to Average Daily NO_X Emissions May 1 – September 30, 2023



Looking at the 2023 data compared to previous years, average OSD emissions from EGUs within the MSA were slightly lower in 2023 than 2022. Emissions in the surrounding counties also decreased in 2023 from 2022, due predominantly to emission reductions at the Sam Seymour power plant. The figure below compares the OSD NO_x emissions from EGUs within the MSA and EGUs in surrounding counties. Note that the figure does not include the emissions from the Decker Creek as the turbine units have a known issue and those are the only emissions from the facility during this time.

Figure 2-4. Average Daily May – September NO_X Emissions from EGU Point Sources in Austin-Round Rock-San Marcos MSA and Surrounding Counties, 2020-2023



2.5 Area Sources

CAPCOG estimated the 2022 area sources using TCEQ's 2020 summer weekday NO_X emissions from its 2020 National Emissions Inventory submission.

Table 2-6. Area Source NO_X Emissions by County and Source Type (tpd)

County	Industrial Combustion	Commercial & Institutional Combustion	Residential Combustion	Oil & Gas	Other	Total
Bastrop	0.10	0.10	0.00	0.16	0.09	0.46
Caldwell	0.09	0.04	0.00	1.73	0.02	1.89
Hays	0.31	0.35	0.00	0.00	0.13	0.80
Travis	2.34	4.04	0.02	0.01	0.05	6.47
Williamson	0.89	1.03	0.01	0.03	0.03	1.99
Total	3.74	5.57	0.04	1.94	0.33	11.61

3 Implementation of 2019-2026 Regional Air Quality Plan and Other Measures

This section provides details on emission reduction measures implemented within the Austin-Round Rock-San Marcos MSA in 2023. This includes both measures that had been included in the 2019-2026 Regional Air Quality Plan and other measures that were not explicitly committed to in that plan.

3.1 Regional and State-Supported Measures

Regional and state-supported measures involve multi-jurisdictional programs or state involvement in an emission reduction measure within the region. These include:

- The Vehicle Emissions Inspection and Maintenance (I/M) Program
- Texas Emission Reduction Plan (TERP) grants
- Volkswagen Environmental Mitigation Trust Beneficiary Mitigation Plan for Texas
- Lone Star Clean Fuels Alliance – Clean Cities Program
- The Clean Air Partners Program
- Movability
- Outreach and Education Measures
- Regional Commuter Programs
- Property-Assessed Clean Energy (PACE)

3.1.1 Vehicle Emissions Inspection and Maintenance Program

The Austin-Round Rock-San Marcos MSA is home to Travis and Williamson Counties – the two largest "attainment" counties in the country that have a vehicle emissions inspection and maintenance (I/M) program. The I/M program has been in place since September 1, 2005, and it was implemented as part of the region's participation in the Early Action Compact (EAC) program. The program's rules are found in Title 30, Part 1, Texas Administrative Code (TAC) Chapter 114, Subchapter C, Division 3: Early Action Compact Counties. Under the program, all gasoline-powered vehicles (including heavy-duty vehicles but excluding motorcycles) that are 2-24 years old are required to undergo an annual emissions inspection along with their annual safety inspection. Vehicles model year 1995 and older are required to pass a "two-speed idle" (TSI) test, and vehicles model year 1996 and newer are required to pass an "on-board diagnostic" (OBD) test. 2019 was the last year in which TSI tests will be conducted for the I/M program

due to the model year coverage. Up until the end of state fiscal year 2021, the inspection cost $18.50 per test:

- The station may retain $11.50
- $4.50 is remitted to the state and deposited into the Clean Air Account (Fund 151):
    - $2.50 is for state administration of the I/M program

If a vehicle fails an emissions inspection, the owner is required to fix the vehicle as a condition of registration. As described in 37 TAC § 23.52(a), "an emissions testing waiver defers the need for full compliance with vehicle emissions standards of the vehicle emissions inspection and maintenance (I/M) program for a specified period of time after a vehicle fails an emissions test." The following waivers are available in certain circumstances:

- A "low-mileage" waiver if a motorist has paid at least $100 for emissions-related repairs and is driven less than 5,000 per year
- An "individual vehicle" waiver if a motorist has paid at least $600 in emissions-related repairs

Under 37 TAC § 23.53(a), time extensions are also available:

- A "low-income time extension" is available if the motorist has income at or below the federal poverty level and the motorist hadn't previously received a time extension in the same cycle
- A "parts-availability time extension" is available if an applicant can show problems in obtaining the needed parts for repair

Some of the key metrics for the I/M program year-to-year are the number of emissions inspections and the failure rates. Table 3-1 summarizes the number and disposition of emissions inspections in 2023:

Table 3-1. I-M Program Statistics for 2023[19]

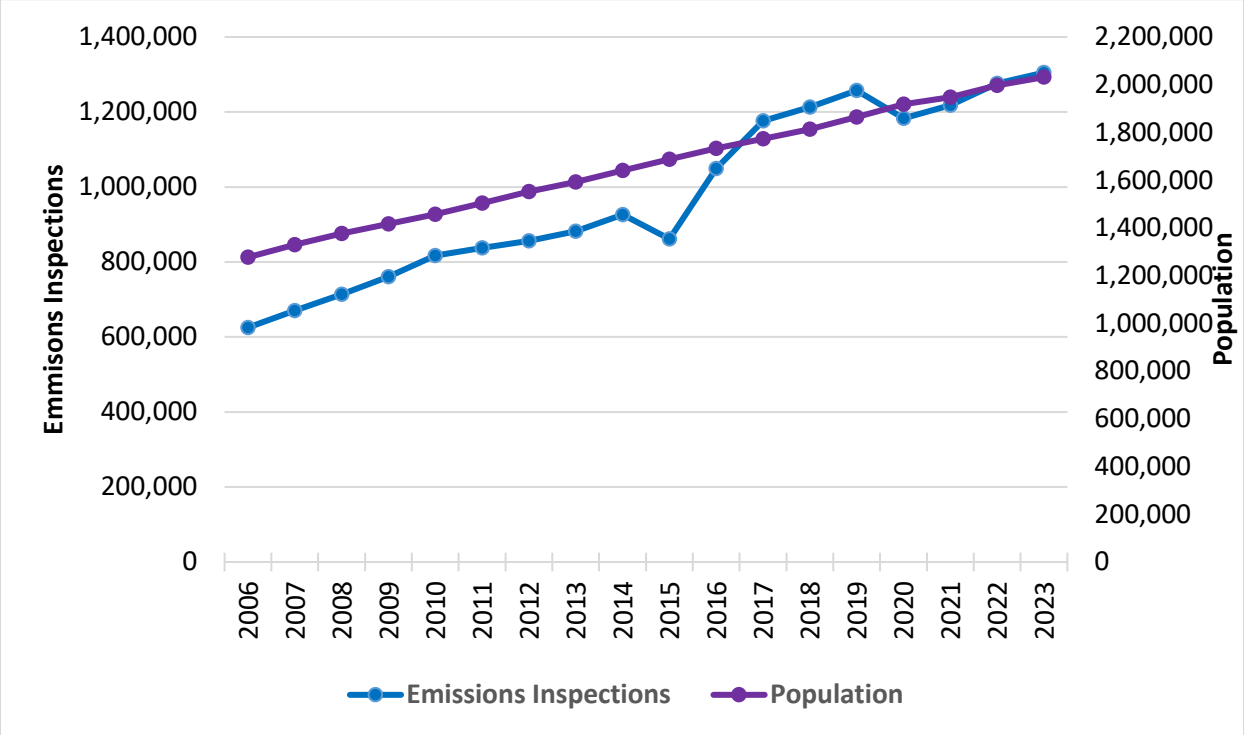
Metric	Travis County	Williamson County	Combined
Total Emission Tests	862,519	442,598	1,305,117
Initial Emission Tests	812,021	419,039	1,231,060
Initial Emission Test Failures	53,710	25,108	78,818
Initial Emission Test Failure Rate	6.6%	6.0%	6.4%
Initial Emission Retests	44,244	20,980	65,224
Initial Emission Retest Failures	5,801	2,272	8,073
Initial Emission Retest Failure Rate	13.1%	10.80%	12.4%
Other Emission Retests	6,254	2,579	8,833
Other Emission Retest Failures	1,814	703	2,517
Other Emission Retest Failure Rate	29.0%	27.3%	28.5%

In general, there have been year-over-year increases in the number of emissions inspections tracking with population increases, except for 2015 and 2020. The difference in 2015 was due to a transition period in the state's move from a two-sticker (registration and inspection) system to a one-sticker system, some vehicles were able to skip a cycle of inspections if they had a January 2015 or February 2015 registration renewal deadline. By March 1, 2016, however, all vehicles should have "caught up." However, due to the COVID-19 pandemic, there were less emissions inspections in 2020 and 2021 than in 2019. This decrease in inspections was most likely due to the statewide vehicle registration renewal

[19] Data e-mailed from David Serrins, TCEQ, to CAPCOG staff on 5/22/2024.

waiver.[20] The waiver allowed vehicle owners to avoid penalties for failure to timely register a vehicle. The waiver began on March 16, 2020, and it was in place until April 14, 2021.[21] Overall, emissions inspections increased from 2022 to 2023.

Figure 3-1. Trend in Emissions Inspections Compared to Population in Travis and Williamson Counties 2006-2023



The initial failure rate for 2023 increase slightly from 2023. This follows a trend of increase in failed tests from 2019. This increase in the failure rate could be attributed to people's hesitancy to visit mechanics for vehicle repairs or maintenance because of the COVID-19 pandemic issues, either financial, medical, or other.

[20] https://gov.texas.gov/news/post/governor-abbott-waives-certain-vehicle-registration-titling-and-parking-placard-regulations-in-texas

[21] http://ftp.txdmv.gov/pub/txdmv-info/media/2021/02_12_21-End_of_Vehicle_Title_Registration_Waiver.pdf

Figure 3-2. Initial Emissions Inspection Failure Rate Trend 2006-2023

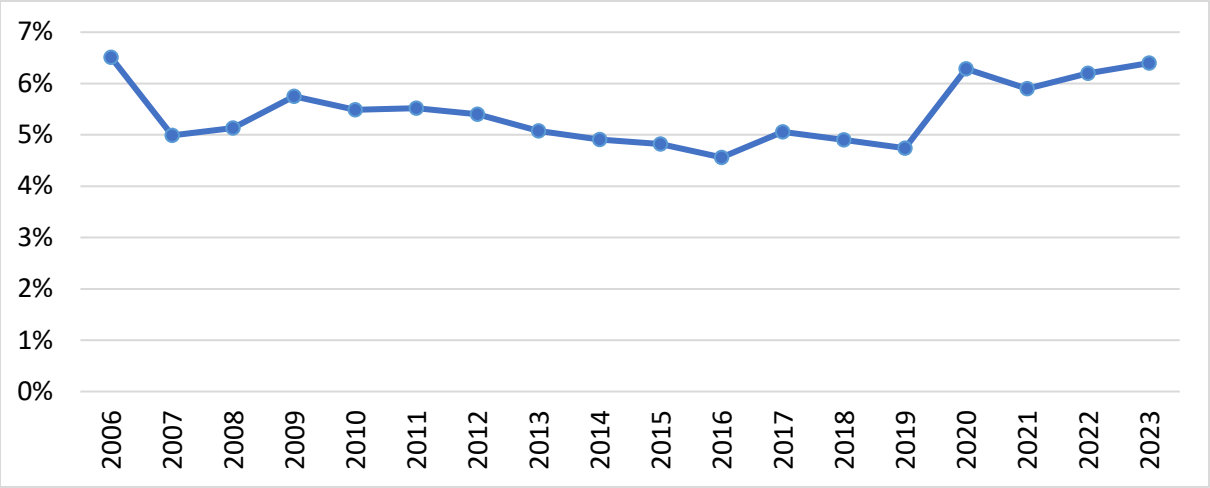
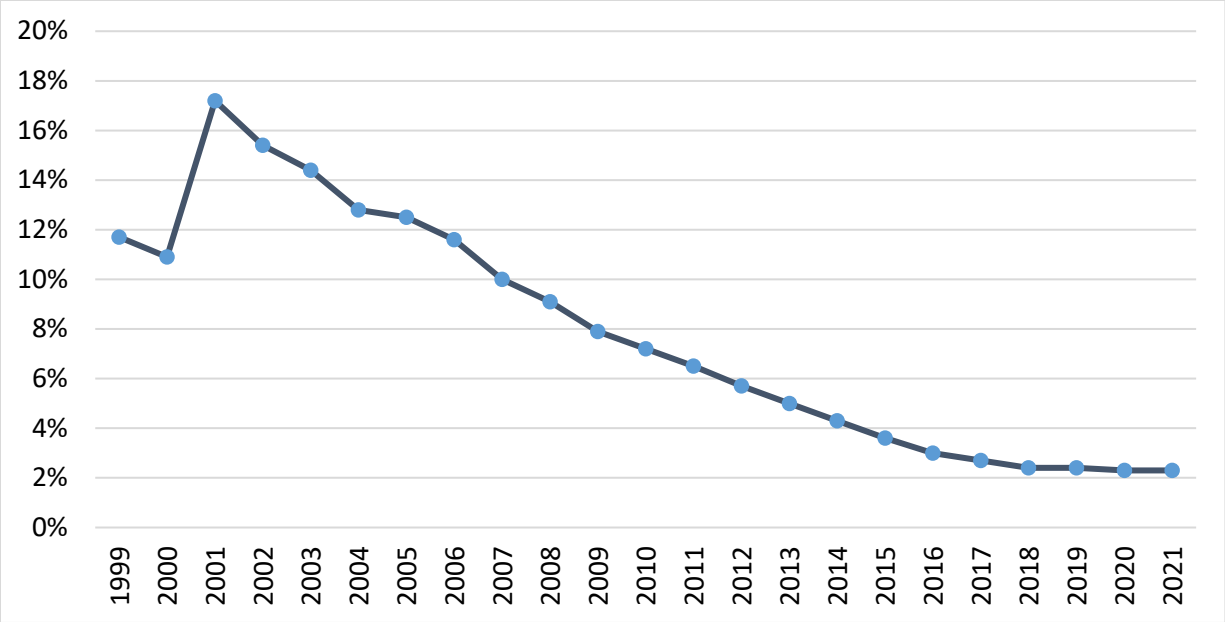


Figure 3-3 shows the emissions test failure rates of each model year based on tests conducted in 2022. As the figure below shows, the chances of older model year vehicles failing an emissions test are significantly higher than a newer model year vehicle failing a test. In 2023, model year 2021 vehicles had a failure rate of only about 2.3%, whereas the failure rate for model year 2001 vehicles was 17.2%.

Figure 3-3. 2023 Emission Test Failure Rate by Model Year



As described above, under certain circumstances, a vehicle subject to annual testing requirements is allowed to continue operating under an I/M program waiver. Table 3-2 summarizes the waivers issued in 2020-2023.

Table 3-2. 2020-2023 I-M Program Waivers

Waiver Type	2020	2021	2022	2023
Total Tests	1,114,305	1,152,576	1,211,610	1,231,084

Waiver Type	2020	2021	2022	2023
Failing Vehicles	50,274	48,643	52,772	56,443
Total Waivers	31	74	66	55
Total Waiver Rate	0.06%	0.15%	0.13%	0.10%
Individual Waivers	11	30	29	17
Low Mileage Waivers	8	27	22	27
Low Income Time Extensions	12	17	14	11
Parts Availability Time Extensions	0	0	0	0
Other (Special Test)	0	0	1	0

3.1.2 Texas Emission Reduction Plan Grants

Texas Emission Reduction Plan (TERP) grants provide funding for a variety of types of projects designed to reduce emissions, particularly NO_X. These include:

- The Diesel Emissions Reduction Incentive (DERI) program, designed to achieve emission reductions by incentivizing the early replacement or repowering of older diesel-powered engines with newer engines:
    - The Emission Reduction Incentive Grant (ERIG) program is a competitive grant program based on the cost/ton of NO_X reduced.
    - The Rebate Grant program is a first-come, first-served grant program based on fixed rebate dollar amounts based on fixed cost/ton of NO_X reduced assumptions.
- The Texas Clean Fleet Program (TCFP) incentivizes owners of large fleets to replace a significant portion of their conventionally fueled vehicles with alternative-fueled vehicles, achieving emission reductions by replacing the older, dirtier engines with newer, cleaner engines.
- The Texas Natural Gas Vehicle Grant Program (TNGVGP) incentivizes the replacement of diesel-powered trucks with natural gas vehicle-powered trucks, with the newer engine needing to achieve at least a 25% reduction in emissions compared to the diesel power it is replacing.
- The Seaport and Rail Yard Areas Emission Reduction (SPRY) Program provides funding for the early replacement of drayage trucks and equipment at eligible in ports and class I railyards in nonattainment areas (this program was formerly known as the Drayage Truck Incentive Program or DTIP). The Austin area is not eligible for this program.
- The Alternative Fueling Facilities Program (AFFP) provides grants for the construction, reconstruction, or acquisition of public and private facilities to store, compress, or dispense alternative fuels including CNG, LNG, LPG, biodiesel, hydrogen, methanol (85 percent by volume), and electricity. To be eligible, facilities must be in an area designated as the Clean Transportation Zone[22].

[22] Map of the Clean Transportation Zone: https://www.tceq.texas.gov/downloads/air-quality/terp/map-20-clean-transportation-zone.pdf

- The Texas Clean School Bus (TCSB) program provides funding for the retrofit and replacement of older school buses.
- The Light Duty Motor Vehicle Purchase or Lease Incentive Program (LDPLIP) provides rebate incentives statewide to purchase or lease an eligible new light-duty motor vehicle powered by natural gas, propane, hydrogen fuel cell, or electric drive.
- The Governmental Alternative Fuel Fleet (GAFF) Program was a new TERP program in 2021. The GAFF Program assists state agencies or political subdivisions, that own or operate a fleet of >15 vehicles, in purchasing or leasing new alternative fuel or hybrid vehicles.
- The New Technology Implementation Grants (NTIG) program provides funding for new/innovative technology to reduce emissions from stationary sources.
- Energy Efficiency Programs
    - Goal for Energy Efficiency requires electric utilities to acquire energy efficiency savings through the administration of standard offer programs, market transformation programs, pilot programs, and self-directed programs.
    - Energy Efficiency Programs in Institutions of Higher Education and Certain Government Entities are required to report to the State Energy Conservation Office (SECO) within the Comptroller of Public Accounts on the implementation of energy efficiency measures that meet the standards established for a contract for energy conservation measures.
    - Texas Building Energy Performance Standards requires local governments to administer and enforce the standards found in the International Energy Conservation Code and the Energy Efficiency chapter of the International Residential Code. The ESL is responsible for determining the energy savings from energy code adoption and, when applicable, form more stringent or above-code performance ratings

In May 2023, TCEQ posted a series of reports on their program website that summarizes the estimated OSD weekday NO_X emission reductions achieved by each program for 2023 – 2028, based on grants awarded through August 31, 2023. Table 3-3 summarizes these data for the Austin area.[23]

Table 3-3. Austin Area Quantified OSD Weekday NO_X Emissions from TERP Grants by Program from Grants Awarded through August 31, 2023 (tpd).

Program	2023	2024	2025	2026	2027	2028
DERI[24]	2.07	1.71	1.23	1.24	1.08	0.80
TCFP[25]	0.02	0.02	0.02	0.02	0.01	0.01

[23] TCEQ develops OSD weekday NO_X emission reduction estimates by dividing the annual NO_X reductions by 260, which corresponds roughly to the number of weekdays in a year.
[24] TCEQ. "Diesel Emission Reduction Incentive (DERI) Program Projects by Area 2001 through August 2023" Prepared by Air Grants Division, May 2023. Available online at: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-deri.pdf, Accessed 7/10/2024.
[25] TCEQ. "Texas Clean Fleet Program (TCFP) Projects by Area 2009 through August 2023." Prepared by Air Grants Division, May 2023. Available online at: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-tcfp.pdf. Accessed 7/10/2024.

Program	2023	2024	2025	2026	2027	2028
TNGVGP[26]	0.02	0.01	0.01	0.01	0.01	0.01
TCSB-Replace[27]	0.01	0.01	0.01	0.01	0.01	0.01
TOTAL	**2.14**	**1.99**	**1.72**	**1.25**	**.79**	**0.61**

Table 3-4 shows the TERP funding awarded to the Austin-Round Rock-San Marcos MSA in FY 2021, along with any quantified NO_X emissions reductions from those grants. TCEQ does not provide NO_X estimates for funding awarded for the NTIG, AFFP, GAFF, or LDPLIP grant programs.

Table 3-4. TERP Grants Awarded in the Austin Area in FY 2023[28]

Grant Program	Total Funding Awarded[29]	Funding Awarded to the Austin Area	Percent of Funding Going to MSA	Austin Area NO_X Emissions Reductions (tons)	Cost Per Ton of NO_X Emissions Reductions in Austin Area
AFFP[30]	$39,246,421	$4,890,595	12%	N/A	N/A
DERI	$1,394,595,876	$128,937,846	9%	11,840	$10,890
GAFF[31]	$9,976,000.00	$742,143.00	7%	N/A	N/A
LDPLIP[32]	$19,393,500	$5,931,097	31%	N/A	N/A
NTIG[33]	$25,134,010	$1,000,000	4%	N/A	N/A
SPRYP[34]	$37,137,755	$0.00	0%	0.00	N/A
TCFP	$81,617,123	$17,909,184	22%	165	$108,533
TCSB - Replace	$42,067,207	$3,149,320	7%	21.43	$146,952

[26] TCEQ. "Texas Natural Gas Vehicle Grant Program (TNGVGP) Projects by Area 2012 through August 2023." Prepared by Air Grants Division, May 2023. Available online at: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-tngvgp.pdf. Accessed 7/10/2024.

[27] TCEQ. "Texas Clean School Bus (TCSB) Program Replacement Projects by Area 2018 through August 2023." Prepared by Air Grants Division, May 2023. Available online at: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-replacement-projects-by-area-tcsb.pdf. Accessed 7/10/2024.

[28] Based on information provided by Nate Hickman, TCEQ, on 5/13/2022, by e-mail to CAPCOG staff.

[29] For the purposes of this table, the fiscal year award is identified as the fiscal year in which a grant contract was executed, rather than the fiscal year in which an award announcement was made or the fiscal year in which funding was awarded.

[30] TCEQ. List of projects awarded under the AFFP. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-affp.pdf. Accessed 7/11/2024

[31] TCEQ. List of projects awarded under the GAFF. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-project-list-gaff.pdf. Accessed 7/18/2023.

[32]TCEQ. Summary of projects awarded under the LDPLIP by area. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-ldplip.pdf. Accessed 7/11/2024.

[33] TCEQ. Summary of projects awarded under the NTIG by area. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-project-list-ntig.pdfAccessed 7/11/2024.

[34]TCEQ. List of projects awarded under the SPRY. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-spry.pdf. Accessed 7/11/2024.

Grant Program	Total Funding Awarded[29]	Funding Awarded to the Austin Area	Percent of Funding Going to MSA	Austin Area NO_X Emissions Reductions (tons)	Cost Per Ton of NO_X Emissions Reductions in Austin Area
TCSB - Retro[35]	$29,864,522	$2,081,715	7%	N/A	N/A
TNGVGP[36]	$59,690,445	$3,404,690	6%	65	$52,540
TOTAL	**$1,738,722,859**	**$168,046,590**	**10%**	**12,091.43**	**$13,897.99**

3.1.3 Texas Volkswagen Environmental Mitigation Program (TxVEMP)

In 2018, the TCEQ released the final version of their Beneficiary Mitigation Plan which identified the Austin metro area as a "priority" area and allocated $16,297,602 of the $169,548,522 total available funds to the Austin-Round Rock-San Marcos MSA. The funds are for the replacement or repower of diesel vehicles and equipment to new diesel, alternative fuel (compressed natural gas, propane, or hybrid electric), or all-electric vehicles and equipment. The Zero Emission Vehicle Supply Equipment Grants are available statewide, and they are a separate funding source from the priority area funds. In spring 2019, TCEQ began opening their grant rounds for the Texas Volkswagen Environmental Mitigation Program (TxVEMP). The table below shows the vehicle types for each grant found, the grant amount available for the MSA, and total grant amount requested as of 12/31/2023. As of 12/31/2023, the NO_X reduction for Austin area projects is estimated to total 94.9 tons. The Beneficiary Mitigation Plan for Texas and information about the grants can be found at www.TexasVWFund.org.

Table 3-5. TxVEMP Grant Funding for Austin Area as of 7/11/2024[37]

Vehicle Grants	Grant Amount Available for Austin Area	Grant Amount Awarded in Austin Area as of 6/30/2022
School Buses, Shuttle Buses, and Transit Buses[38]	$7,600,915.30	$5,660,619.30
Refuse Vehicles including Garbage Trucks, Recycling Trucks, Dump Trucks, Chipper Trucks, Street Sweepers, and Roll-Off Trucks[39]	$1,023,820.00	$659,560.00
Local Class 4-8 Freight and Drayage Trucks[40]	$897,281.00	$199,804.00

[35]TCEQ. Summary of retrofit projects awarded under the TCSB program by area. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-retrofits-projects-by-area-tcsb.pdf. Accessed 7/11/2024.

[36]TCEQ. Summary of TNGVGP projects awarded by area. Access here: https://www.tceq.texas.gov/downloads/air-quality/terp/reports/reports-projects-by-area-tngvgp.pdf. Accessed 7/11/2024.

[37] Includes projects pending execution

[38] TCEQ. TxVEMP Projects for School Buses, Transit Buses, and Shuttle Buses. Access here: https://www.vwenvironmentalmitigationtrust.com/sites/default/files/2024-02/2023%20Q3-Q4%20TxVEMP%20SA%20Report_DEC%202023.pdf. Accessed 7/11/2024.

[39] Ibid.

[40] Ibid

Vehicle Grants	Grant Amount Available for Austin Area	Grant Amount Awarded in Austin Area as of 6/30/2022
Zero Emission Vehicle Supply Equipment Grants - Level 2 Charging (Available statewide)[41]	$747,500.00	$32,500.00
Zero Emission Vehicle Supply Equipment Grants - Direct Current Fast Charging (Available statewide)[42]	$1,800,000.00	$0.00
Total	**$12,069,516.30**	**$6,552,483.30**

3.1.4 Lone Star Clean Fuels Alliance Clean Cities Program

CAPCOG worked closely with Lone Star Clean Fuels Alliance (LSCFA) in 2023. LSCFA is the region's Clean Cities Coalition and as such is one of more than 75 DOE-designated coalitions working in communities across the country to implement alternative fuels, electric vehicles, idle-reduction technologies, efficiency improvements, new mobility choices, and emerging transportation technologies.

CAPCOG has been a key partner in LSCFA's work to educate organizations and government entities about the options for decreasing emissions, improving fuel efficiency and reducing vehicle miles traveled. LSCFA has been a long-standing member of the CACAC and Outreach and Education subcommittee.

In 2023 LSCFA partnered with CAPCOG for a Hydrogen and Electric Medium- and Heavy-duty Showcase at the University of Texas's Pickle Research Center, a first-of-its-kind event for our area with a presentation track and hydrogen fuel cell electric heavy-duty trucks and medium-duty electric trucks available for drive-alongs. This event was key for planners and funding agencies at the state and local levels to understand the technologies and how they could impact air quality and transpiration in the region.

LSCFA members include:

- Air Products
- Ayro
- eCab of North America
- Henna Chevrolet-Nissan
- ONE Gas
- Opal Fuels
- Propane Council of Texas
- Roush
- Texas Gas Service
- Texas Natural Gas Foundation
- University of Texas – Parking and Transportation Services
- Xos Electric Trucks

In addition, LSCFA held several meetings and workshops throughout 2023.

- Board Meetings:

[41] Ibid.
[42] Ibid.

  - January 18, 2023
  - April 12, 2023
  - October 11, 2023
- Conferences hosted:
  - Hydrogen and Electric Medium and Heavy-Duty Vehicle Showcase – March 7, 2023
- Conference participation:
  - Energy Thought Leaders – April 3-6, 2023
  - EV Charging Infrastructure – South – July 25, 2023
  - Global Energy Trends & Transitions – August 31, 2023
  - MOVE USA – September 26, 2023
  - Electrify Expo – November 10, 2023
  - Texas Energy Summit – November 15-16, 2023
- Site Visits:
  - Hyliion's manufacturing facility in Cedar Park with Texas Clean Cities Coalition – June 6, 2023
  - AYRO's manufacturing facility in Round Rock – September 14, 2023
- Webinars:
  - EV Readiness Roundtable with Xos Trucks – February 22, 2023
  - EV Readiness Roundtable with Austin Energy – March 23, 2023
  - Renewable Natural Gas and Propane Lunch & Learn Webinar – August 23, 2023
  - Natural Gas & Propane Federal Motor Fuel Tax Incentive Workshop – December 5, 2023
- Grant Projects:
  - Department of Energy's Rural Mobility Project in Bastrop, Texas; demonstration project using Low Speed Electric Vehicles to test micro-transit applications
  - Department of Energy project with The University of Texas; demonstrating electric box trucks in real world applications
  - H_2@Scale Hydrogen – Department of Energy, University of Texas at Austin, Frontier Energy and GT Energy

3.1.5 Clean Air Force of Central Texas and the Clean Air Partners Program

In 2023, CAPCOG worked closely with the Clean Air Force of Central Texas (CAF) to enhance outreach, education, and technical knowledge of air quality in Central Texas. CAF, CAPCOG, and the City of Austin partnered to hold the 2023 CLEAN AIR Luncheon for Meteorologists in Central Texas on June 28, 2023. The luncheon gathered 15 local meteorologists, weather forecasters, and guests from Central Texas news outlets. The presentations during the 2023 luncheon included Dr. Paul Walter of St. Edwards University discussing award-winning research using ozone sonde launches to understand ozone formation and concentrations in the atmosphere and a CAPCOG review of the previous year's regional air quality.

In 2023, CAF continued its Air Quality Professional's Forum (AQPF). The AQPF brings together air quality practitioners from CAF's Clean Air Partners to network and learn. Quarterly lunch meetings with technical presentations by air quality experts provide training and interaction with other professionals from various industries. CAPCOG presented a quarterly regional air quality update of monitoring and NAAQS updates and participated in the 2023 AQPF meetings. The 2023 AQPF meetings were held in January, April, August, and October.

CAPCOG sits on the CAF Board of Directors, representing a broad spectrum of community, business, and government organizations. The CAF Board reviews and makes recommendations on air quality policy, public outreach, and technical issues. In 2023, the CAF Board met in February, May, and November.

CAF's Clean Air Partners Program includes organizations outside of the CAC. The Clean Air Partners Program is a way to encourage businesses to act and positively impact air quality. The CAF Clean Air Partners include:

1. AECOM
2. Austin Community College
3. Austin Independent School District
4. Chemical Logic
5. Earn-A-Bike
6. Emerson Automation Solutions
7. Environmental Defense Fund
8. H-E-B
9. Huston-Tillotson University
10. NXP Semiconductors
11. Power Engineers
12. St. David's Health Care Partnership
13. Tokyo Electron (TEL)
14. University of Texas at Austin

In addition, several CAC members also participate in the Clean Air Partners Program:

1. CAPCOG
2. City of Austin
3. Central Texas Regional Mobility Authority (CTRMA)
4. Movability
5. Lone Star Clean Fuels Alliance (LSCFA)
6. Lower Colorado River Authority (LCRA)
7. Public Citizen – Texas
8. St. Edward's University
9. Travis County

3.1.6 Movability

In 2023, CAPCOG worked closely with Movability to provide alternative commuting solutions for individuals and employers to improve air quality in the region. Movability is Central Texas' first and only transportation management association, working with employers and individuals to improve the region through commuter options that save time and money.

In 2023, CAPCOG and Movability partnered on the Get There with Clean Air campaign, where CAPCOG awarded $10 HEB e-gift cards to commuters on Ozone Action Days utilizing My Commute Solutions through Get There Central Texas. There were 36 individual Ozone Action Day participants with $700 total awarded by CAPCOG.

In 2023, Movability introduced the Movability Quarterly networking series, fast pitch Pecha-Kucha-style events that welcome regional thought leaders for networking and conversations. Participants have twenty slides with twenty seconds each to present best practices, new research, product offerings, program updates, funding opportunities or emerging solutions in the mobility space.

Movability hosted the Movability Breakfast & Awards to recognize and celebrate Best Workplaces for Commuters employers. The event was held at the Austin Central Library on February 8, 2023, and drew 200 attendees.

They also hosted the Movability Summit, a signature annual event that offers networking and panel discussions about mobility and transportation challenges. The Summit focused on the Central TX Construction Partnership Program (CPP), with panelists from Austin Transit Partnership, CapMetro, the City of Austin, TxDOT, and Texas State University. There were approximately 150 attendees.

In addition, the LSCFA held several meetings and workshops throughout 2023.

- Webinars:
  - Transportation 101 – August 31, 2023
  - Best Workplaces for Commuters – October 25, 2023
  - How to Host a Mobility Camp – November 16, 2023
- Speaking engagements:
  - Association for Commuter Transportation (ACT) Red River Chapter's TDM Summit panel – September 20, 2023
  - Smart Cities Speaker Series at UT Austin – October 20, 2023
  - Who's Your City presentation at UT Austin – November 8, 2023
  - Vision Zero Texas Summit – November 28, 2023
  - Movability Overview: Capital Area Metropolitan Planning Organization (CAMPO)'s Regional Transit Coordinating Committee RTCC – December 5, 2023
- Programmatic events:
  - Tabling at Red Line station with Austin Transportation & Public Works and CapMetro – February 16, 2023
  - Tabling for TxDOT employees, Stassney campus – May 14, 2023
  - Bike to Workday tabling at Red Line Station – May 19, 2023
  - Pop-Up Commuter Breakfast at Red Line Station – June 18, 2023
  - AISD employee ice cream social – July 18, 2023
  - Tabling at Westgate Park & Ride – October 5, 2023
  - Tabling at Lakeline Park & Ride – October 13, 2023
  - Commute lunch & learn for Ballet Austin employees – October 17, 2023
  - Commute lunch & learn for Paramount Theatre employees – November 1, 2023
  - Tabling on the Pfluger Pedestrian Bridge – November 14, 2023
- Networking events:
  - Movability Summer Mixer – June 29, 2023
  - Movability Member Happy Hour – October 19, 2023

Movability partners in 2023 included:

1. Actionfigure
2. AGE of Central Texas
3. Asterisk Design
4. Austin Chamber of Commerce
5. Austin Community College District
6. Austin Creative Reuse
7. Austin LGBT Chamber of Commerce
8. Austin Technology Council
9. Austin Transit Partnership (ATP)
10. Austin Young Chamber

11. Ballet Austin
12. Bird
13. Bitlocks
14. Block by Block
15. BOE Consulting
16. Burns McDonnell
17. BusUp
18. Capital Areas Council of Governments (CAPCOG)
19. Capital Area Rural Transportation System (CARTS)
20. Cherrywood Coffeehouse
21. Chez Zee Bistro
22. Central Texas Regional Mobility Authority (CTRMA)
23. Circles X
24. City of Round Rock
25. Civil Corp
26. CivTech
27. Commute with Enterprise
28. Cushman and Wakefield
29. Danielle Skidmore Consulting, PLLC
30. DKS
31. Electric Cab of Austin (eCab)
32. Fetii
33. Fleet
34. Flexigo
35. Ghisallo Cycling Initiative
36. Give One Studio, LLC (The Mosaic Workshop)
37. Google
38. Greater Austin Asian Chamber of Commerce
39. Greater Austin Black Chamber of Commerce
40. Greater Austin Hispanic Chamber of Commerce
41. Hahn Public
42. Halff
43. Hallcon
44. HNTB
45. Huitt-Zollars
46. Indeed
47. Institute for Community Micromobility
48. Jackson Walker
49. K. Friese + Associates
50. Leander Chamber of Commerce & Visitors Center
51. Liftango
52. Lockwood, Andrews & Newnam, Inc.
53. Love to Ride
54. Luum
55. Maxwell Locke & Ritter
56. MOD Bikes
57. Out Youth
58. Pavemint
59. Quantum Mobility
60. Redline Parkway Initiative
61. Rekab Technologies
62. Ride Amigos
63. Rifeline
64. Sabot Development
65. Samsung Austin Semiconductor
66. San Marcos Area Chamber of Commerce
67. Sensis
68. Shop LC
69. Silicon Labs
70. Southwest Strategies Group
71. Spaces
72. STV
73. Texas Department of Transportation
74. Texas Gas Service
75. The Paramount Theater
76. Thrival Company
77. Tokyo Electron, Ltd.
78. Trakk
79. TransWest
80. Uber Transit
81. University of Texas at Austin
82. Via
83. WeDriveU
84. Whole Foods Market

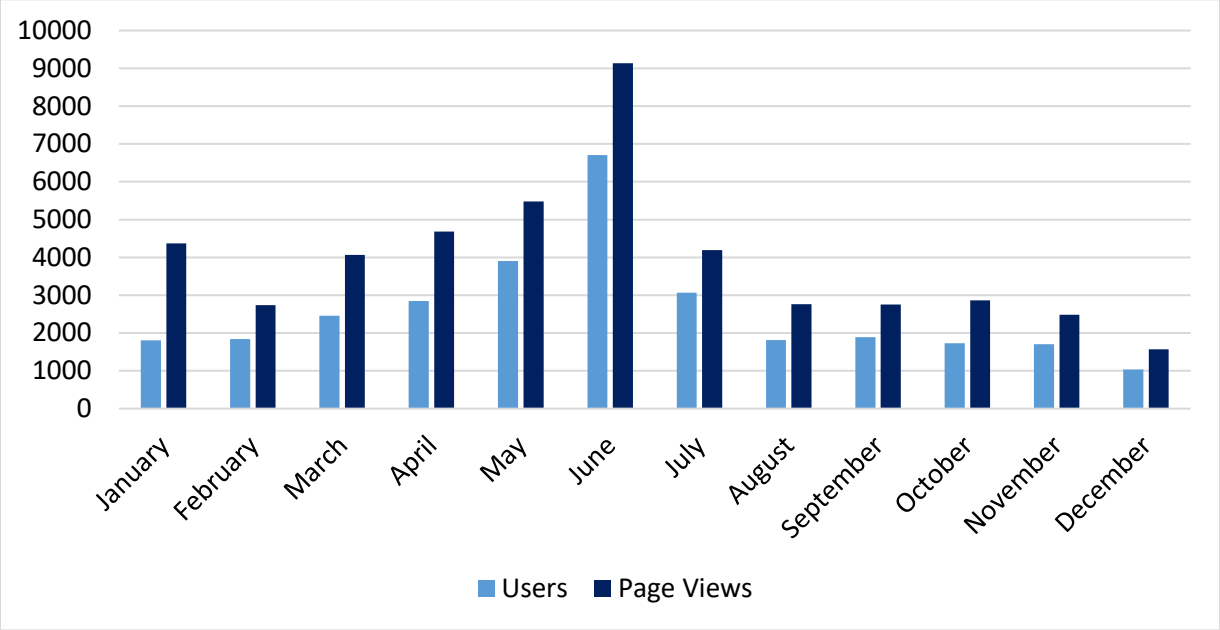
3.1.7 Air Central Texas Program Outreach and Education

One of the primary ways CAPCOG staff accomplished outreach goals during this period was through electronic outreach. Electronic outreach allows the program to provide air quality information to a large audience with limited resources. Electronic outreach completed during this period was carried out through the Air Central Texas (ACT) website, social media accounts, digital advertising, and ACT newsletters.

3.1.7.1 Air Central Texas Website

The ACT website (www.aircentraltexas.org) provides the public with information about Central Texas air quality, supports existing air quality programs, and promotes activities to protect local air quality. The goal is to motivate everyone to make decisions that are "Air Aware." In 2023, CAPCOG continued to maintain and update the ACT website. Figure 3-4 shows the number of users and page views for each month.

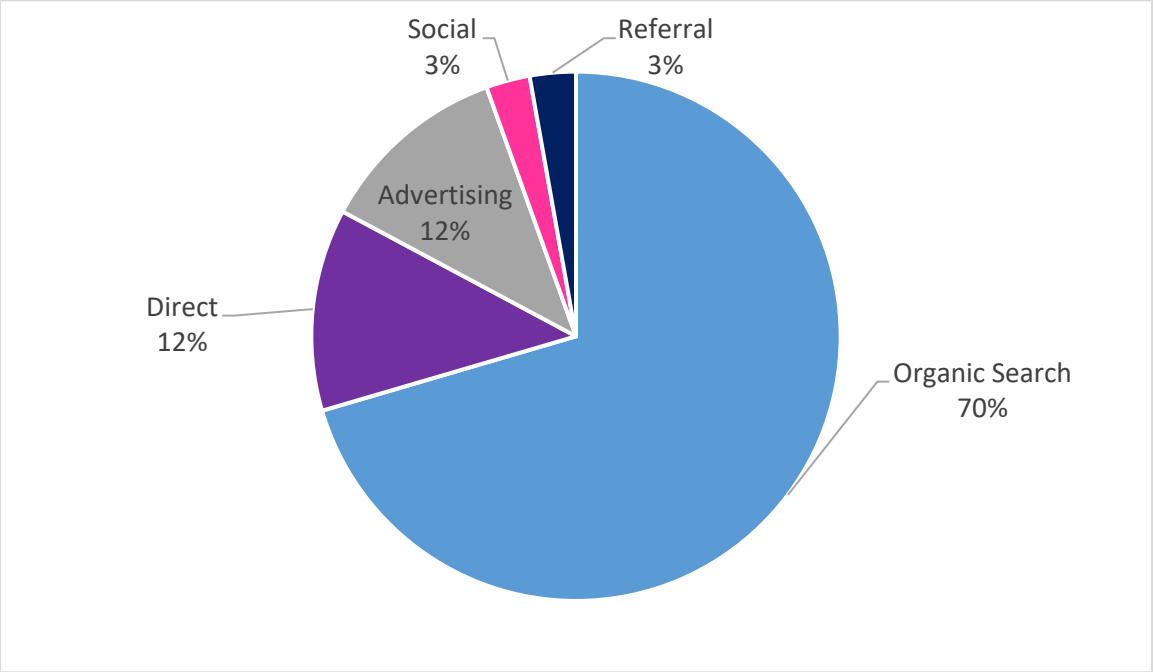
Figure 3-4. Air Central Texas Website Traffic, 2023



The increase in website visits during March coincides with the beginning of O_3 season. Paid advertising for Be Air Smart helped increased page views in the summer months, and May 2023 was the start of Air Quality Awareness Week. An increase in high ozone concentrations, compared to previous years, continued into August and September.

Figure 3-5 shows how website visitors found the site. 70% of all visitors found the website from an organic search of air quality terms in a search engine (e.g., Google or Bing). 12% of visitors used a direct web search in which the users typed in an ACT URL or were directed from an email or newsletter. Also, visitors found the site through paid advertising, social media links, and referrals from other websites – mainly the City of Austin and CAPCOG websites.

Figure 3-5. Air Central Texas Website Acquisition Method, 2023



The top ACT Webpages viewed in 2023 are listed below. Besides the homepage, the most visited pages were those that detail ground-level ozone in English and Spanish, Be Air Smart, and the Air Quality Index (AQI). It is notable that four of the top pages, #2, 7, 8 and 10, are in Spanish.

Table 3-6. Top Air Central Texas Website Pages by Page Views, 2023

Page Rank	Page Title	Page Views
1	What is Ground-Level Ozone?	3,331
2	El Ozono Troposférico	2,615
3	Be Air Smart	2,552
4	Air Quality Index (AQI)	1,765
5	Homepage (English)	1,587
6	Who is at Risk?	1,396
7	La Contaminación por Partículas	971
8	Índice de Calidad del Aire (AQI)	844
9	Ozone Action Days	795
10	¿Quién está en Riesgo?	523

3.1.7.2 Air Central Texas Newsletter

The ACT newsletter is CAPCOG's public facing air quality newsletter. It provides the public with relevant air quality news, events, tips, and AQI data. Table 3-10 shows the data associated with each newsletter. Figure 3-6 displays an example of an ACT newsletter article.

Table 3-10. Air Central Texas Monthly Newsletters Campaign Summary, 2023

Campaign Name	Send Date	Recipients	Opens	Clicks
February 2023 Air Central Texas Newsletter	2/7/2023	193	34.7%	7.3%
March 2023 Air Central Texas Newsletter	3/6/2022	190	31.1%	6.8%
April 2023 Air Central Texas Newsletter	4/6/2023	184	37.5%	6.5%
May 2023 Air Central Texas Newsletter	5/3/2023	181	34.8%	5.0%
June 2023 Air Central Texas Newsletter	6/5/2023	191	34.0%	7.3%
July 2023 Air Central Texas Newsletter	7/6/2023	187	36.9%	5.3%
August 2023 Air Central Texas Newsletter	8/14/2023	185	34.1%	5.9%
September 2023 Air Central Texas Newsletter	9/8/2023	182	40.7%	6.0%
October 2023 Air Central Texas Newsletter	10/18/2023	176	30.7%	7.4%
November 2023 Air Central Texas Newsletter	11/3/2023	227	48.0%	7.0%
Clean Air Coalition honors 2023 Air Central Texas Award Recipients	12/14/2023	956	39.0%	2.9%
December 2023 Air Central Texas Newsletter	12/27/2023	217	54.4%	8.3%

Figure 3-6. Sample Newsletter Article from the July 2023 ACT Newsletter

Fireworks: Air Quality & Health Effects

Brilliant fireworks displays are fun to watch but have the potential for high concentrations of smoke, which can have negative health effects. This is especially true around the 4th of July, when extensive fireworks are part of large events and smaller displays taking place at neighborhood and family gatherings.

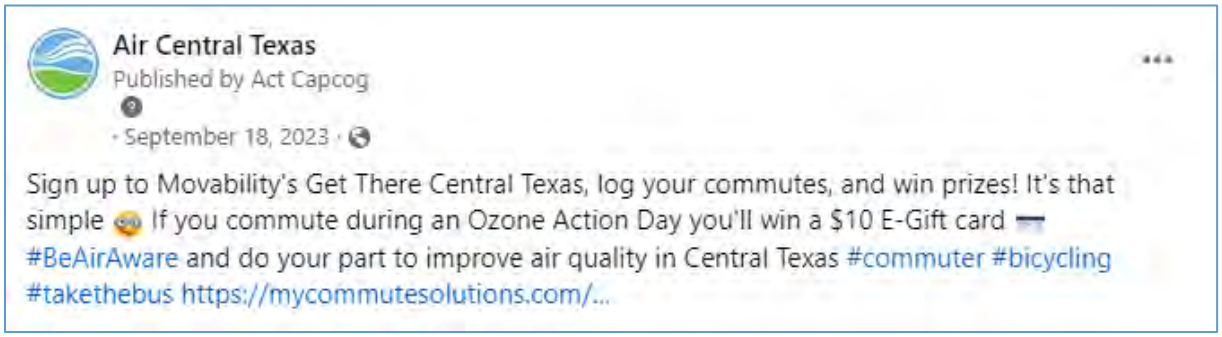
Smoke & Particulate Matter

The smoke from fireworks is comprised of coarse and fine particles. There are typically spikes of extremely high concentrations of these particles, called particulate matter (PM), during and immediately after fireworks displays. Nitrogen and sulfur, used to create color and special effects, can combine with oxygen to form nitric and sulfuric acids which are very hard on the lungs. The smoke from the displays generally dissipates within a few hours, but individuals may feel lingering health effects.

3.1.7.3 Social Media

CAPCOG maintains an ACT Facebook account with 736 followers, an Instagram account with 200 followers, and an ACT Twitter account with 265 followers. Figure 3-7 shows an example of a social media post. For 2023, the total impressions – the number of times a user saw a post – was 227,011 for social media.[43]

Figure 3-7. Air Central Texas Facebook Post Example



3.1.7.4 Air Central Texas Advertising

Radio and digital ads were run in 2023 to promote ACT and air quality awareness. These ads are useful to reach people who are not active on social media or the internet. Radio ads were run on 4-5 radio stations per month, including two Spanish stations (KLZT-FM and LATINO). The ads were run from March through October, when air quality is expected to be the worst in the MSA. Table 3-7 displays the relevant ad data for the radio ads.

Table 3-7. 2023 ACT Radio Ad Results

Ad Theme	Radio Station	Commercials	Reach[44]	Frequency[45]	Impressions[46]
Ozone Season 2023	Radio: KLBJ-AM	20	61,000	1.6	96,400
Ozone Season 2023	Radio: KBPA-FM	20	134,000	1.3	170,100
Ozone Season 2023	Radio: KLZT-FM	20	50,900	1.3	67,900
Ozone Season 2023	Radio: ESPN-FM	50	12,800	1.4	17,600
	Radio: KLBJ-AM	98	124,800	3	346,600
	Radio: KBPA-FM	54	384,300	1.5	435,900
	Radio: KLZT-FM	72	124,800	2	222,700
	Radio: LATINO	77	84,300	1.3	84,100
Total		**411**	**976,900**	**1.7**	**1,441,300**

[43] X no longer shares account analytics without a premium account, so these total impressions do not include X impressions.

[44] Reach is the number of unique users that see or hear the ad.
[45] Frequency is the average number of times a user sees or hears the ad.
[46] Impressions are the total number of times a user saw or heard the ad.

Additionally, ACT ran two digital ads for the Be Air Smart campaign, using Google Ads. Google Ads places digital ads above or below Google search results on its various platforms. Table 3-8 displays the relevant ad data for the digital ads. Figure 3-8 displays an example of a digital ad for ACT.

Table 3-8. 2023 ACT Digital Ad Results

Ad Theme	Ad Display	Impressions
Be Air Smart	Google Ads	300,868
Ozone Action Days	Meta	66,220
Air Quality Awareness Week	Meta	48,181
PM Site Survey	Meta	127,654
Total	**n/a**	**542,923**

Figure 3-8. 2023 Be Air Smart Digital Ad Example

3.1.7.5 In-Person Outreach and Education

In addition to electronic outreach, CAPCOG staff usually engage the public in-person at community events. Many events were scheduled in 2023 after having been on hiatus due to the COVID-19 pandemic and CAPCOG was able to attend several of these. Table 3-9 displays these attended events.

Event Attended	Date	County
ZEV Showcase with LSCFA	3/7/2023	Travis
Lightning eMotors Demo at St. Edwards University	4/20/2023	Travis
UT Bike to School Day at University of Texas - Austin	4/20/2023	Travis
Earth Day ATX at Huston-Tillotson University	4/22/2023	Travis
Movability Pecha Kucha	4/26/2023	Travis
Williamson County AQAW Proclamation	5/1/2023	Williamson
AQAW Press Conference at Austin City Hall	5/4/2023	Travis
Bike to Workday Event at Austin City Hall	5/19/2023	Travis
Summer Health, Safety & Lifestyle Expo	6/28/2023	Travis
Clean Air Force Meteorological Luncheon	6/28/2023	Travis

Event Attended	Date	County
Golden Age Health Fair	9/13/2023	Caldwell
Total: 11	**n/a**	**n/a**

3.1.7.6 2023 Air Central Texas Awards

The Air Central Texas Awards celebrate the positive contributions of organizations and individuals to regional air quality in Central Texas. The goal is to recognize the great work happening across the region and to inspire future actions that support the region's ongoing air quality planning efforts. Below are details about the award recipients:

- **Outstanding Organization Award:** *Movability* - for their exceptional efforts to help reduce local air pollution. Movability currently has 86 member organizations, representing roughly 30,000 employees. Through their work, these organizations offer commuter benefits and reduce demand for drive-alone trips and parking resources. Members have logged 7,500 commute trips a year, which has resulted in a 24-ton reduction in CO2, a 31.4 lb. reduction in NOX, and saved commuters roughly $34,000.
- **Media Award:** *Rich Segal* – for his exceptional media coverage of air quality or air quality issues within the past year as a meteorologist at KXAN TV.
- **Environmental Education Award:** *Dr. Peter Beck (posthumous)* - for his exceptional leadership in air quality and environmental education. Dr. Beck was an Associate Professor of Environmental Science and Policy (ENSP) at St. Edward's University from 2003-2023. Dr. Beck was responsible for starting the ENSP program at St. Edward's, which has taught thousands of students about the effects of environmental pollution on ecosystems and human communities, and the pros and cons of various policy solutions.
- **2023 Air Aware Student Leadership Award:** *Olivia Prior* – for her exceptional leadership and lasting impact on Central Texas air quality. Olivia is a St. Edwards University student in the Environmental Science and Policy program. She is the Governmental Affairs Director for Students for Sustainability and a Senator for the Student Government Association. She is also an Officer for the Ecology Club at St. Edwards University.
- **2023 Bill Gill Central Texas Air Quality Leadership Award**: *Bill Gibbs* **-** for his distinguished work as the Execute Director of the Clean Air Force of Central Texas. A lifelong advocate of sustainability, he is committed to keeping air quality in Central Texas in compliance with EPA standards so all can enjoy healthy air. As leader of the Clean Air Force, Bill reached out to local businesses, non-profits, educational institutions, and government agencies to bring them together as advocates for reduction of air pollution.

Additional details and photos are available at https://aircentraltexas.org/en/about/act-awards.

3.1.7.7 Be Air Smart Program

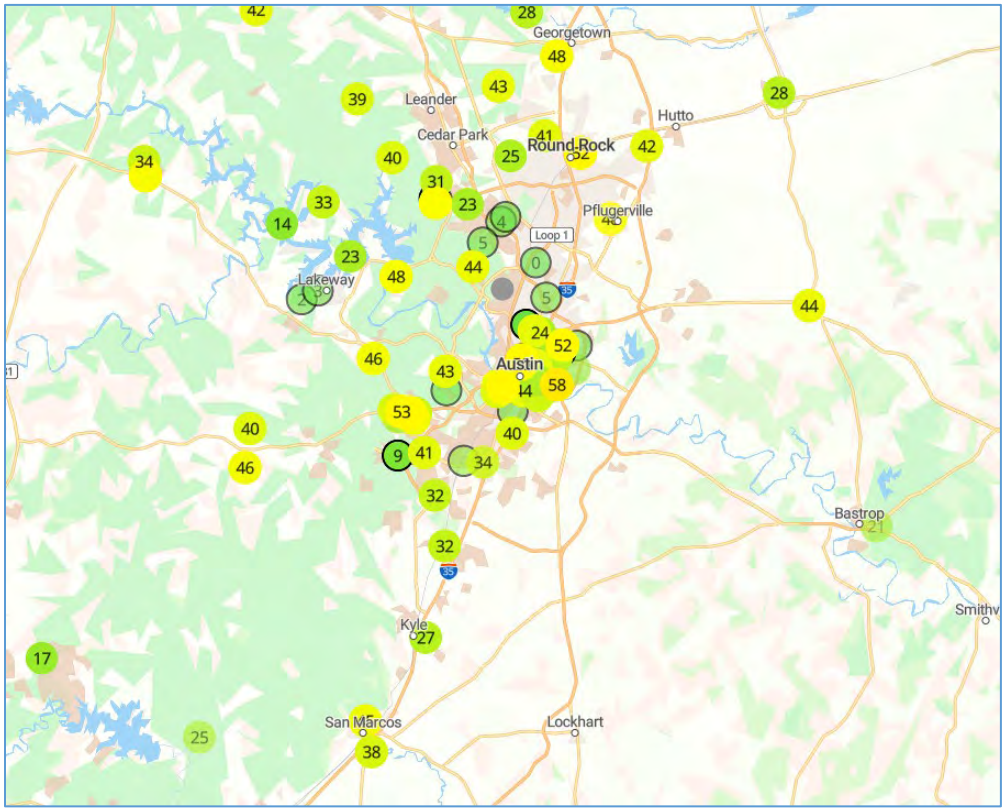
In 2022, the Air Central Texas Program launched the Be Air Smart program, an on-going collaboration with the Clean Air Force of Central Texas, and Austin FC |Atlas to support air quality education by providing free Particulate Matter (PM) sensors to local organizations throughout Central Texas. This program empowers children, a sensitive group to air pollution, with the tools to better understand air quality by using a hyper-local outdoor particulate matter (PM) sensor that provides real-time information on air quality conditions. The program uses PurpleAir sensors that provide real-time PM

concentrations with built-in Wi-Fi that enables the device to transmit data to the PurpleAir map, where it is stored and made publicly available online.

Be Air Smart partners in 2023 included:

- Civil Air Patrol, U.S. Air Force Auxiliary;
- AISD Outdoor Learning Center – Metz;
- Ridgetop Elementary School – AISD;
- YMCA – Camp Moody; and
- Maplewood Elementary School – AISD.

Figure 3-9. PurpleAir Real Time Data Map, captured on July 26, 2023



3.1.7.8 Air Quality Permit Notice Map

In 2022, we created the Air Quality Permit Notice Map[47] which provide the public data about air quality permit request that are filed with the TCEQ. The map shows residents the locations of the permit requests and provides general information about what is being requested for the permits. Note that this map only includes the permit request that are required to complete public notice which per 30 TAC

[47] Access the Permit Notice Map here: https://capcog.maps.arcgis.com/apps/Embed/index.html?webmap=73da9259d0de409da8e07a7e8543375c&extent=-102.167,27.7982,-94.2513,31.7403&zoom=true&scale=true&search=true&searchextent=true&legendlayers=true&disable_scroll=false&theme=light

Chapter §122.320(a), applies to all initial issuances, significant permit revisions, reopening's, and renewals.

3.1.8 Commute Solutions Program

The Commute Solutions program is the region-wide Travel Demand Management (TDM) program that promotes activities to increase the efficiency and use of existing roadways. This goal encouraging shifts from less efficient travel behaviors like, single occupant vehicle use, vehicle use during peak congestion hours, and travel on high-congestion roadways, to more efficient behaviors like, the use of public transit, carpools, vanpools, walking, biking, teleworking, alterative work schedules, and travel on less congested roadways. Apart from air quality, other benefits of the program and other TDM activities include:

- Improved regional mobility;
- Improved safety outcomes;
- Reduced fuel consumption;
- Reduced time wasted in traffic;
- Improved workforce and economic development outcomes;
- Improved public quality of life; and
- Reduced space needed to service the transportation system

CAMPO operates the program; however, Movability's "*Get There Central Texas*" and Travis County's "*Trip Reduction Incentive Program*" are the main users to the Commute Solutions program's main element for reaching its goal – myCommuteSolutions[48].

*3.1.8.1 Movability's "*Get There Central Texas*"*

Movability is a 501(c)6 non-profit in Central Texas that is dedicated to working with employers and individuals to improve the region through TDM solutions. Movability's "*Get There Central Texas"* program uses myCommuteSolutions to incentive sustainable trip modes like carpool, vanpool, bike, and transit trips. Below are 2023 stats from the program:

Table 3-9. Get There Central Texas Usage Stats, 2023

Mode	Trips Logged	Vehicle Miles Travel (VMT)	NO_x Emissions Saved (grams)	CO_2 Emissions Saved (grams)	$PM_{2.5}$ Emissions Saved (grams)
Bike	3,187	13,216	15,104	22,926,820	24,677
Bikeshare	171	479			
Bus	1,009	5,381			
Rail	305	6,437			
Telework	2,378	33,164			
Carpool	590	8,832			
Walk	247	715			
TOTAL	**7,887**	**68,224**	**15,104**	**22,926,820**	**24,677**

[48] myCommuteSolutions Website: https://mycommutesolutions.com/#/

The Get There Central Texas is open to individuals but there is added focus given to Movability Member. Movability's membership includes CAC members, Austin Community College, CAPCOG, CapMetro, CTRMA, City of Austin, and City of Round Rock. See all their members on the Movability website[49].

*3.1.8.2 Travis County's "*Trip Reduction Incentive Program*"*

Travis County's "Trip Reduction Incentive Program" uses myCommuteSolutions to offers County employees incentives to use and record sustainable commutes. Below are 2023 stats from the program:

Table 3-10. Trip Reduction Incentive Program Usage Stats, 2023

Mode	Trips Logged	Vehicle Miles Travel (VMT)	NO_x Emissions Saved (grams)	CO_2 Emissions Saved (grams)	$PM_{2.5}$ Emissions Saved (grams)
Bike	379	3,307	228,422	711,535,638	151,044
Bikeshare	2	21			
Bus	3,344	38,032			
Rail	547	11,746			
Telework	104,581	1,906,021			
Carpool	2,133	42,362			
Scooter Share	16	24			
TOTAL	**111,002**	**2,001,513**	**228,422**	**711,535,638**	**151,044**

3.1.9 PACE Program

The PACE program provides an innovative mechanism for financing renewable energy and energy-efficiency improvements to industrial, commercial, multi-family residential, and non-profit buildings in participating jurisdictions. To address pay-back periods for energy efficiency and renewable energy (EE/RE) projects that may not align properly with a private property owner, the PACE program enables jurisdictions to put a property tax lien on a piece of property where an EE/RE improvement is made using private financing until the loan for the project has been paid back. PACE is authorized under state law in Section 399 of the Texas Local Government Code Chapter 399.50 Projects include:

- HVAC modification or replacement;
- Light fixture modifications such as LED;
- Solar panels;
- High-efficiency windows or doors;
- Automated energy control systems;
- Insulation, caulking, weather-stripping or air sealing;
- Water-use efficiency improvements;
- Energy- or water-efficient manufacturing processes and/or equipment;
- Solar hot water;

[49] Movability Members: https://movabilitytx.org/members

[50] http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.399.htm

- Gray water reuse; and
- Rainwater collection systems.

In 2022, Bastrop, Hays, Travis, and Williamson Counties participated in PACE. Travis County and Williamson County adopted PACE in 2016. Hays County adopted it in 2017. Lastly, Bastrop County adopted PACE on September 24, 2018. Therefore, Caldwell County is the only county in the MSA that does not participate in PACE.

As of June 2024, 11 of the 75 completed PACE projects in the state were in Bastrop, Hays, Travis, and Williamson Counties. Table 3-12 summarizes key data from the projects for each county[51]. For more information on PACE, visit http://www.texaspaceauthority.org/.

Table 3-12. PACE Project Summary for Austin-Round Rock-San Marcos MSA as of June 2024

County	Projects	Investments	Jobs Created	CO_2 Reduced (tons/yr.)	Water Saved (gallons/yr.)	Energy Saved (kWh/yr.)
Bastrop	1	$120,000	2.2	48.90	N/A	94,081
Hays	1	$1,884,449	9.6	429.30	3,139	824,903
Travis	7	$17,168,134	213.3	1,866.31	3,181	3,326,396
Williamson	2	$1,675,065	13.8	1,018.20	1,760	1,956,657
TOTAL	**11**	**$20,847,648**	**238.9**	**3362.71**	**8,080**	**6,202,037**

3.2 Organization-Specific Measures and Updates

This section provides updates on measures implemented by CAC members. Supplemental electronic files provide detailed, measure-by-measure, organization-by-organization details. These measures are based on reports collected from CAC members in May and June 2023.

Organizations that provided a report to CAPCOG included:

1. Bastrop County;
2. CAPCOG;
3. City of Austin;
4. City of Bastrop;
5. City of Bee Cave;
6. City of Cedar Park;
7. City of Georgetown;
8. City of Hutto;
9. City of Kyle;
10. City of Lago Vista;
11. City of Lakeway;
12. City of Leander;
13. City of Pflugerville;
14. City of Round Rock;
15. City of San Marcos;
16. City of Sunset Valley;

[51] https://pace.harcresearch.org/

17. City of Taylor;
18. Clean Air Force;
19. Central Texas Regional Mobility Authority (CTRMA);
20. Capital Area Rural Transportation System (CARTS)
21. CAMPO;
22. Movability;
23. Public Citizen;
24. Texas Commission on Environmental Quality (TCEQ);
25. Texas Department of Transportation (TxDOT);
26. SPEER;
27. St. Edwards University; and
28. Travis County.

Organizations that did not report as of the date of this report included:

1. Austin White Lime Company;
2. Caldwell County;
3. CapMetro;
4. City of Buda;
5. City of Elgin;
6. City of Lockhart;
7. City of Luling;
8. Hays County;
9. Huston-Tillotson University;
10. Federal Highway Administration;
11. Lone Star Clean Fuels Alliance (LSCFA);
12. Lower Colorado River Authority (LCRA);
13. Lone Star Chapter of the Sierra Club;
14. Texas Lehigh Cement Company;
15. Texas Parks and Wildlife Department (TPWD); and
16. Williamson County.

3.2.1 Emission Reduction Measures

A total of 28 CAC members reported on their implementation of Tier 1 and 2 NO_X emissions reduction measures as well as $PM_{2.5}$ emission reduction measures in 2023. A summary of the number of organizations that implemented each measure is listed below. Organization-specific information is available in the Appendix.

- Tier 1
    - Educating employees about regional air quality and encouraging them to sign up for daily air quality forecasts and Ozone Action Day alerts = **18 organizations**
    - Where feasible, encourage employees to telecommute at least once a week and on all Ozone Action Days = **13 organizations**
    - When employees are not telecommuting, encourage them to take low-emission modes of transportation, such as carpooling, vanpooling, transit, biking, and walking = **14 organizations**
    - Where flexible schedules are allowed, encourage employees to consider work schedules with start times earlier than 8 am rather than later in the morning due to the higher impact of emissions on O_3 levels later in the morning = **16 organizations**

  - Conserve energy, particularly on Ozone Action Days = **21 organizations**
  - Establish and enforce idling restriction policies for use of organization's vehicles, equipment, and property = **13 organizations**
  - Establish fleet management policies that prioritize the use of vehicles and equipment with low NO_X rates = **8 organizations**
  - Educate fleet users on driving and equipment operation practices that can reduce NO_X emissions = **8 organizations**
  - Reschedule discretionary emission-generating activities such as engine testing and refueling to late afternoon rather than the morning, particularly on Ozone Action Days = **6 organizations**
  - Seek funding to accelerate replacement of older, higher-emitting vehicles and equipment with newer, cleaner vehicles and equipment, such as Texas Emission Reduction Plan (TERP) grants = **13 organizations**
- Tier 2
  - Establish low-NO_X purchasing policies for new on-road vehicles, non-road equipment, and stationary equipment = **6 organizations**
  - Establish "green" contracting policies to encourage the use of low-NO_X vehicles and equipment and avoid the use of engines during the morning on Ozone Action Days = **3 organization**
  - Purchase higher-grade gasoline with lower sulfur content in August and September = **1 organizations**
  - Provide incentives to employees to avoid single-occupancy vehicle commuting, particularly on Ozone Action Days = **5 organization**
  - Optimize combustion and pollution controls for NO_X reductions, particularly on Ozone Action Days = **0 organizations**
  - Enforce vehicle idling restrictions within the community [either through an ordinance if a city or a memorandum of agreement with TCEQ if a county] = **7 organizations**
  - Educating the public about regional air quality and encouraging them to sign up for daily air quality forecasts and Ozone Action Day alerts = **17 organizations**
- $PM_{2.5}$ Emission Reduction Measures
  - Reduce PM emissions from construction and demolition activities
    - Implement within own organization's operations = **14 organizations**
    - Encourage or require 3rd party organizations to implement = **15 organizations**
    - Educate and encourage the public at large to implement = **9 organizations**
  - Reduce PM emissions from commercial cooking/charbroiling
    - Implement within own organization's operations = **0 organizations**
    - Encourage or require 3rd party organizations to implement = **1 organizations**
    - Educate and encourage the public at large to implement = **2 organization**
  - Reduce PM emissions from road dust
    - Implement within own organization's operations = **13 organizations**
    - Encourage or require 3rd party organizations to implement = **16 organizations**

        - Educate and encourage the public at large to implement = **11 organizations**
    - Reduce PM emissions from mining and quarrying activities
        - Implement within own organization's operations = **1 organization**
        - Encourage or require 3rd party organizations to implement = **3 organization**
        - Educate and encourage the public at large to implement = **3 organization**
    - Reducing PM emissions from open burning
        - Implement within own organization's operations = **6 organizations**
        - Encourage or require 3rd party organizations to implement = **10 organizations**
        - Educate and encourage the public at large to implement = **11 organizations**
    - Reduce PM emissions or impact of PM emissions from prescribed burning on high PM days
        - Implement within own organization's operations = **4 organizations**
        - Encourage or require 3rd party organizations to implement = **9 organizations**
        - Educate and encourage the public at large to implement = **10 organizations**
    - Reduce emissions from mobile sources year-round
        - Implement within own organization's operations = **8 organizations**
        - Encourage or require 3rd party organizations to implement = **7 organizations**
        - Educate and encourage the public at large to implement = **9 organizations**
    - Reduce emissions from stationary combustion sources year-round
        - Implement within own organization's operations = **5 organizations**
        - Encourage or require 3rd party organizations to implement = **6 organizations**
        - Educate and encourage the public at large to implement = **6 organizations**
    - Installation additional PM2.5 monitors/sensors within the region
        - Implement within own organization's operations = **9 organizations**
        - Encourage or require 3rd party organizations to implement = **9 organizations**
        - Educate and encourage the public at large to implement = **9 organizations**
    - Promote awareness of health effects of PM air pollution
        - Implement within own organization's operations = **17 organizations**
        - Encourage or require 3rd party organizations to implement = **14 organizations**
        - Educate and encourage the public at large to implement = **18 organizations**

If these organizations provide data after this report, CAPCOG will provide an updated version of this report.

3.2.2 Idling Restrictions

The following jurisdictions implement idling restrictions, either with a local ordinance, through a memorandum of agreement (MOA) with TCEQ, or both.

Table 3-13. Jurisdictions Implementing Idling Restrictions in the Austin-Round Rock-San Marcos MSA, 2022

Jurisdiction	Local Ordinance	TCEQ MOA
City of Austin	☒	☒
City of Bastrop	☒	☐
City of Elgin	☒	☐
City of Georgetown	☒	☐
City of Hutto	☒	☐

Jurisdiction	Local Ordinance	TCEQ MOA
City of Lockhart	☒	☐
City of Round Rock	☒	☐
City of San Marcos	☒	☐
Bastrop County	☐	☒
Travis County	☐	☒

These idling restrictions are "passive" controls in that the jurisdictions will respond to complaints when they are made, but they don't devote dedicated resources to idling restriction enforcement.

4 ONGOING PLANNING ACTIVITIES

This section documents notable air quality planning milestones and activities completed in 2023.

4.1 REGIONAL $PM_{2.5}$ MONITORING

On December 13, 2021, EPA announced the availability of $20 million in American Rescue Plan funding through competitive grants to enhance ambient air quality monitoring in and near underserved communities across the United States. CAPCOG applied for and received funding for two projects under this grant:

1. Fund seven continuous $PM_{2.5}$ research-grade monitors and 20 PurpleAir PM sensors to improve the understanding of PM concentrations around the region.
2. Fund one speciated $PM_{2.5}$ research-grade monitor to understand the composition of PM2.5 in the region.

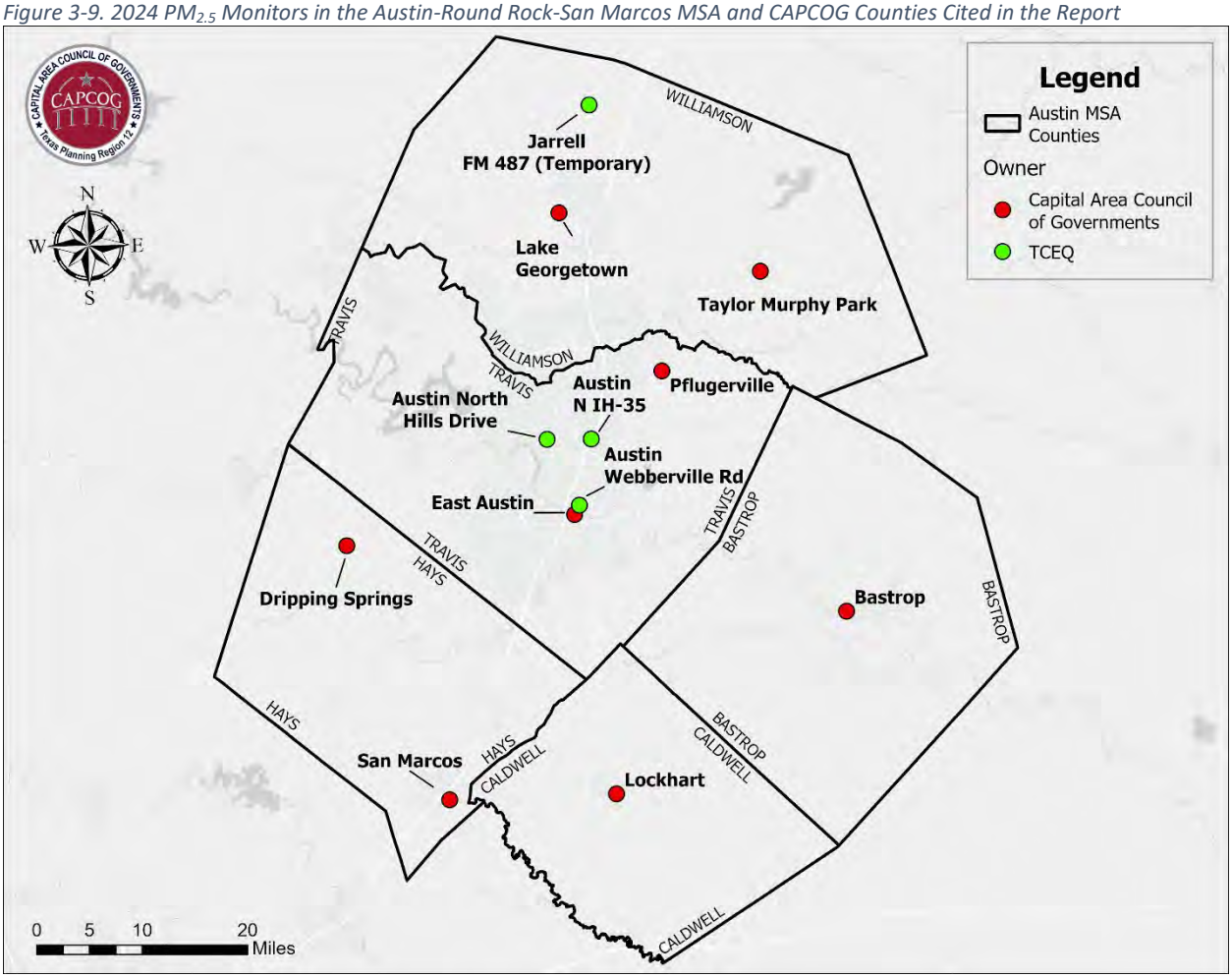
CAPCOG conducted a suitability analysis in Fall 2023 to determine locations in the region for the eight $PM_{2.5}$ monitors, considering several risk factors and existing monitoring locations. These risk factors included:

- $PM_{2.5}$ modeling concentrations;
- Diesel $PM_{2.5}$ modeling concentrations;
- Distance from existing $PM_{2.5}$ monitors;
- Health factors (heart disease, cancer, asthma, and chronic obstructive pulmonary disease (COPD));
- Socioeconomic and demographic factors;
- Social vulnerability;
- Wildfire risk; and
- Distance from public schools.

After narrowing down three sitting scenarios for the monitors, CAPCOG conducted an online public survey to receive feedback on each scenario and presented these findings to the CACAC. The CACAC agreed on a siting scenario for CAPCOG to present to the CAC and the CAC agreed with the CACAC's decision. The continuous $PM_{2.5}$ monitors locations chosen include five existing CAPCOG monitoring sites (San Marcos, Georgetown, Bastrop, Taylor, Lockhart Dripping Springs) and one new site in Pflugerville. The speciated $PM_{2.5}$ monitor location chosen was CAPCOG's east Austin monitoring site.

These new monitoring locations spread throughout the region will provide us with a better understanding of $PM_{2.5}$ and conditions that lead to higher levels of the pollutant. The map below shows both TCEQ's existing $PM_{2.5}$ monitors as well as CAPCOG's newly procured $PM_{2.5}$ monitors.

Figure 3-9. 2024 $PM_{2.5}$ Monitors in the Austin-Round Rock-San Marcos MSA and CAPCOG Counties Cited in the Report



4.2 EPA Reconsideration of the 2020 Ozone NAAQS Review

In October 2021, EPA announced a reconsideration of the previous Administration's decision to retain the NAAQS for ozone. EPA's goal in this review was to incorporate the latest science and consider the advice and recommendations of the Clean Air Scientific Advisory Committee (CASAC) in that review. However, in August 2023, EPA announced that they would suspense this review and instead start a full review as required by the Clean Air Act. The Clean Air Coalition was tracking the reconsideration since if it resulted in the 8-hour ozone standard being lowered, it would potentially impact the region's attainment designation as soon as 2026. Now that the EPA has ended the reconsideration, it is likely that ozone designation will not occur until 2028, if the standard is announced in 2026.

4.3 Clean Air Coalition Meetings

During 2023, there were a total of four Clean Air Coalition meetings:

- February 8, 2023

- May 10, 2023
- August 9, 2023
- November 8, 2023

Significant policy-related actions taken by the CAC in 2023 included:

- A comment letter to EPA regarding a revised Heavy Duty Vehicle Engine Standard
- A comment letter to EPA regarding the Cross State Air Pollution Rule Revision

The Clean Air Coalition Advisory Committee (CACAC) met four times:

- January 19, 2023
- April 27, 2023
- July 27, 2023
- October 24, 2023

4.4 Statewide and Regional Collaborative Initiatives

CAPCOG participated in several statewide and regional air quality-related initiatives in 2023, which are listed below.

4.4.1 Air Quality, Equity, and EV Working Group

CAPCOG participated in a statewide "Air Quality, Equity, and EV Working Group" that is comprised of staff from other COGs, non-profits, universities, and other stakeholders. The group discusses air quality-related issues as it pertains to general air quality, EVs, and equity. The group met at least monthly in 2023.

4.4.2 SPEER's City Efficiency Leadership Council

CAPCOG participated in the South-central Partnership for Energy Efficiency as a Resource's (SPEER's) City Efficiency Leadership Council (CELC). The CELC is a collaborative network of Texas cities, school districts, and other government entities engaged in partnership and resource exchange to expand the adoption of energy management best practices in the public sector. CAPCOG participated in quarterly CELC meetings and participated in several CELC webinars.

4.4.3 Texas Clean Air Working Group

CAPCOG participated in Texas Clean Air Working Group (TCAWG) meetings in 2023. This is a state-wide group that presents and discussions local air quality planning efforts across the state of Texas.

4.5 Regional Air Quality Technical Research Activities

CAPCOG completed several air quality technical research activities in 2023 including:

- 2022 Austin-Round Rock-San Marcos MSA Air Quality Report
- Monitoring Projects:
    - Continued O_3 and meteorological data collection at ten CAPCOG-owned monitoring stations in the region to supplement the two TCEQ O_3 monitors in the region;
    - Collection of PM monitoring data from PurpleAir sensors at all CAPCOG CAMS;
    - 2023 Air Quality Monitoring Report; and

    - Mobile Monitoring Study with the University of Houston, Baylor University, and St. Edward's University.
- Data Analysis Project:
    - 2022 Air Quality Monitoring Data Analysis; and
    - Improved Characterization of MOVES Source Use Types with Texas A&M Transportation Institute (TTI).
- Emission Inventory Projects:
    - Review of 2021 Emissions and Activity Data;
    - Review of 2021 and 2022 Point Source Emissions Inventory;
    - Point Source Emissions Inventory Refinement;
    - 2023 Emissions Inventory Conference Report;
    - Review of 2020 National Emissions Inventory Public Release;
    - Update Trends Emissions Inventories with TTI;
    - Development and Comparison of MOVES4 Trends Emissions Inventories to MOVES3 EI with TTI; and
    - Non-Road Mine and Quarry Emissions Inventory Work.

5 PLANNING FOR THE FUTURE

This section details some important issues to note for the region's air quality plan moving forward, including new issues that have arisen between the end of 2023 and the completion of this report.

5.1 EPA DESIGNATIONS FOR THE REVISED ANNUAL $PM_{2.5}$ NAAQS

On February 7, 2024, EPA announced its revision of the primary (health-based) annual $PM_{2.5}$ standard from its current level of 12.0 $\mu g/m^3$ to 9.0 $\mu g/m^3$.

CAMS 1068 – Austin North IH 35 currently has the highest 2023 annual $PM_{2.5}$ design value of 9.6 $\mu g/m^3$ in the region and does not meet the revised standard. TCEQ is responsible for submitting recommended designations for every county in the state by February 7, 2025. In Fall 2024 the TCEQ plans to work with local stakeholders before submitting the state's recommendations to EPA. It will be important for the Clean Air Coalition to work closely with TCEQ as the agency prepares its recommendations to the EPA.

In 2024, CAPCOG started collected monitoring data from seven continuous $PM_{2.5}$ monitoring sites and one speciated $PM_{2.5}$ monitoring site around the region, as detailed in section 4.1 and using state air quality funds on $PM_{2.5}$ planning, detailed in section 5.3. These monitors are non-regulatory and have collected less than the needed 3-years of data to generate design values, however, the monitor may be useful to better understand if annual PM2.5 levels are an issue across the region or if it's isolated to the specific monitors in Travis County.

Additionally, during the State of Texas' 88th Legislative session, the state approved an expansion to the Rider 7 Grant Program which added funding for a 2024-2025 $PM_{2.5}$ planning program, further detailed in section 5.3.

5.2 Climate Pollution Reduction Grant

On March 1, 2023, EPA announced the availability of $250 via the Climate Pollution Reduction Grant (CPRG) Planning grant to provide states and urban areas funds to create regional climate plans.[52] This was a noncompetitive grant of $1 million to TCEQ which was charged with developing the statewide plan for Texas and another $1 million to the city of Austin which was charged with developing the plan for the Austin MSA. Both the state and the city of Austin have submitted a plan which details their short-term priorities called the Priority Climate Action Plan[53] [54].

In September 2023, EPA announced the availability of $4.6 billion in CPRG competitive grants for the implementation of tasks included in the Priority Climate Action Plan. The City of Austin Transportation Department lead a coalition application which included Texas Department of Transportation, Capital Metro, Capital Area Rural Transportation System (CARTS), CAPCOG, and Movability. The project's goal is to mitigate the negative climate and air quality consequences cause by expected increases in traffic congestion from major transportation projects, namely Austin Transit Partnership's Project Connect and TXDOT's I-35 Capital Express Central construction projects that are expected to begin over the next decade by supporting transportation alternatives like transit, vanpool, active transportation, and more.

In July 2024, EPA announced that the agency would award the project $47.9 million to implement the project. CAPCOG is expected to work on the air quality component of the project which includes analysis of data from 100 new air quality sensors, as well as a wearable air quality sensor pilot program. CAPCOG is expecting to begin work on this project in 2025.

5.3 Rider 7 $PM_{2.5}$ Grant Program

During the State of Texas' 88th Legislative session, the state approved an expansion to the Rider 7 Grant Program which added funding for a 2024-2025 $PM_{2.5}$ planning program. This expansion allows for $PM_{2.5}$ planning activities which includes the inventorying emissions, monitoring of pollution levels, air pollution and data analysis; modeling pollution levels; and administration of the program. [55] CAPCOG was awarded $229,902 for 2024-2025 activities. CAPCOG's expects to use the funds to complete an emissions inventory on concrete batch plants, a data analysis project to better understand trends that may occur when there are higher levels of $PM_{2.5}$ and improve our $PM_{2.5}$ monitoring network by adding more metrological equipment and audits checks to improve data quality.

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[52] EPA News Room: Biden-Harris Administration Announces Over $250 Million to Fund Innovative Projects That Tackle Climate Pollution https://www.epa.gov/newsreleases/biden-harris-administration-announces-over-250-million-fund-innovative-projects-tackle [accessed July 28, 2024]

[53] Austin MSA Priority Climate Action Plan: Priority Climate Action Plan https://www.austintexas.gov/sites/default/files/files/Sustainability/Climate/CPRG/Austin-Round%20Rock-Georgetown%20MSA%20PCAP%20(5.2%20MB).pdf [accessed July 28, 2024]

[54] Texas Priority Climate Action Plan: https://www.tceq.texas.gov/downloads/agency/climate-pollution-reduction-grants/20240301-texas-priority-action-plan.pdf [accessed July 28, 2024]

[55] State of Texas' 88th Legislative, H.B. 1 General Appropriations Act https://capitol.texas.gov/tlodocs/88R/billtext/pdf/HB00001F.pdf#navpanes=0 [accessed July 28, 2024]

6 CONCLUSION

In general, like 2022, 2023 air quality conditions in the Austin metro were among the worst the region experienced in the last 12 years. While the region did not have as many "unhealthy for sensitive groups" days or "moderate" days due to O_3 and $PM_{2.5}$ levels in 2023 compared to 2022, from a NAAQS compliance point of view, 2023 will look worse for the region versus 2022. This is due to how EPA calculates compliance with the 8-hr O3 NAAQS, looking at the 4th highest measured reading each year.

This year also marked the first time the region has exceeded the 8-hr. O_3 NAAQS, meaning the region is currently out of compliance for the pollutant. As of Feb. 2024, when the EPA issued the revised annual $PM_{2.5}$ NAAQS, the region is also out of compliance for $PM_{2.5}$ as well. These factors increase the region's potential of being designated nonattainment in the future.

There is increased funding for air quality planning in the region but particularly for $PM_{2.5}$ planning, from both the state and the EPA. The region will begin to see the projects implemented in 2024 ranging from increase monitoring to emission inventory project.

Emissions in the region continue to decline as older equipment is replaced with newer cleaner technologies. There was an increase in vehicles failing emission inspections in Travis and Williamson County indicating that residents may be keeping vehicles for longer and possibly not maintaining them to the levels they were maintain previously.

Moving forward, CAPCOG and the CAC should work to:

- Expand the monitoring network for both $PM_{2.5}$ and O_3 in the region.
- Promote activities that reduce NO_x emissions in the region.
- Work to better understand PM emission in the region.
- Continue to monitor regulatory activities at the state and federal levels.

7 Appendix A – Clean Air Coalition Measures

CAC members reported on their implementation of Tier 1 and 2 emissions reduction measures in 2023. Organization-specific measures and information that were implemented is provided in this Appendix as an Excel workbook.

2023 Clean Air Coalition Membership Actions Survey Results

8 APPENDIX B – 2023 NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Standard Type	Averaging Time	Level	Form	Impacts of Violating the NAAQS
CO	Primary	8 hours	9 parts per million (ppm)	Not to be exceeded more than once per year	Neurological and cardiovascular impacts, particularly for individuals who are exercising or under stress
	Primary	1 hour	35 ppm	Not to be exceeded more than once per year	
Pb	Primary and Secondary	Rolling 3-month average	0.15 micrograms per cubic meter ($\mu g/m^3$)	Not to be exceeded	Primarily neurological problems for children and cardiovascular problems for adults, but numerous other health impacts as well; ecological damage from deposition
NO_2	Primary	1 hour	100 parts per billion (ppb)	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Respiratory impacts to people with lung disease such as asthma, children and teens, older adults, and people who are active outdoors; contributes to acid rain, visibility impairment, and nutrient pollution in coastal waters
	Primary and Secondary	1 year	53 ppb	Annual mean	
O_3	Primary and Secondary	8 hours	0.070	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	Respiratory impacts to people with lung disease such as asthma, children and teens, older adults, and people who are active outdoors; impacts on plant growth
$PM_{2.5}$	Primary	1 year	9.0 $\mu g/m^3$	Annual mean, averaged over 3 years	Respiratory and cardiovascular impacts on people with lung or heart disease (respectively), older adults, children, and teenagers; visibility impairment
	Secondary	1 year	15.0 $\mu g/m^3$	Annual mean, averaged over 3 years	
	Primary and Secondary	24-hr	35.0 $\mu g/m^3$	98th percentile, averaged over 3 years	
PM_{10}	Primary and Secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years	
SO_2	Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Respiratory impacts to people with lung disease such as asthma, children and teens, older adults, and people who are active outdoors; impacts plant growth and contributes to acid rain

From:	Ralph Morris
To:	amda
Subject:	2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis and Kleberg Counties
Date:	Thursday, January 16, 2025 3:04:06 PM
Attachments:	Ramboll_Comment#1_TCEQ-EED_2025-01-21.docx Ramboll_Comment#2_TCEQ-EED_2025-01-21.docx

---

Ramboll is pleased to submit the attached two comments on TCEQ's 2022 and 2023 Exceptional Events Demonstrations for Harrison, Travis and Kleberg Counties. Our comments pertain to the National Seashore PM2.5 monitoring site in Kleberg County.

Please do not hesitate to contact me if you have any questions.

Ralph

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ADDITIONAL EVIDENCE IN SUPPORT OF DAYS TCEQ IDENTIFIED AS IMPACTED BY SAHARAN DUST AND SMOKE FROM MEXICAN FIRES

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FIGURES

1.0 Introduction

The Texas Commission on Environmental Quality (TCEQ) has submitted an Exceptional Events Demonstration for public comment for the National Seashore monitor in Kleberg County. The TCEQ includes 21 days in 2022 and 18 days in 2023 of regulatory significance in their analysis. If the U.S. Environmental Protection Agency (EPA) concurs with the TCEQ on the days selected for the EED, the 2021-2023 annual particulate matter less than 2.5 microns ($PM_{2.5}$) design value would be 9.0 $\mu g/m^3$.

Ramboll provides the following comment that provides additional evidence to further support TCEQ's analysis for those days the agency has identified as impacted by the presence of dust from the Saharan desert and smoke from fires in Mexico and Central America in both 2022 and 2023 (shown in Table 1-1). These days are a subset of the total number included in the EED: 10 days in 2022 and 6 days in 2023 that are impacted by Saharan dust; 6 days in 2022 and 10 days in 2023 that are impacted by smoke from fires in Mexico and Central America.

Table 1-1. Days TCEQ identifies in 2022 and 2023 as days at the National Seashore monitor in Kleberg County when $PM_{2.5}$ concentrations are impacted by Saharan dust and fires from Mexico/Central America.

Date	Location	Type of Event
2022		
April 11, 2022	Kleberg County	High winds blowing dust and smoke from fires in Mexico/Central America
April 12, 2022	Kleberg County	High winds blowing dust and smoke from fires in Mexico/Central America
April 13, 2022	Kleberg County	High winds blowing dust and smoke from fires in Mexico/Central America
May 6, 2022	Kleberg County	Smoke from fires in Mexico/Central America
May 7, 2022	Kleberg County	Smoke from fires in Mexico/Central America
May 20,2022	Kleberg and Travis Counties	Smoke from fires in Mexico/Central America
June 11, 2022	Kleberg County	Dust from Saharan desert
June 12, 2022	Kleberg County	Dust from Saharan desert
June 13, 2022	Harrison, Kleberg, and Travis Counties	Dust from Saharan desert
June 14, 2022	Harrison and Kleberg Counties	Dust from Saharan desert
June 15, 2022	Harrison and Kleberg Counties	Dust from Saharan desert
June 16, 2022	Harrison, Kleberg, and Travis Counties	Dust from Saharan desert
June 17, 2022	Kleberg and Travis Counties	Dust from Saharan desert
July 16, 2022	Kleberg County	Dust from Saharan desert
July 17, 2022	Harrison, Kleberg, and Travis Counties	Dust from Saharan desert
July 21, 2022	Kleberg County	Dust from Saharan desert
2023		

Date	Location	Type of Event
January 3, 2023	Kleberg County	Smoke from fires in Mexico/Central America
January 16, 2023	Kleberg County	Smoke from fires in Mexico/Central America
January 18, 2023	Kleberg County	Smoke from fires in Mexico/Central America
February 14, 2023	Kleberg County	Smoke from fires in Mexico/Central America
May 5, 2023	Kleberg County	Smoke from fires in Mexico/Central America
June 14, 2023	Kleberg and Travis Counties	Smoke from fires in Mexico/Central America
July 15, 2023	Kleberg County	Dust from Saharan desert
July 16, 2023	Kleberg County	Dust from Saharan desert
July 25, 2023	Kleberg County	Dust from Saharan desert
July 26, 2023	Kleberg County	Dust from Saharan desert
July 27, 2023	Kleberg County	Dust from Saharan desert
July 28, 2023	Kleberg County	Dust from Saharan desert

Ramboll's comment augments TCEQ's analysis to establish clear causal relationship between the exceptional event and the observed $PM_{2.5}$ concentrations. Specifically, it provides evidence that dust from the Saharan regions in northern Africa can be transported across the Atlantic and reach the Texas coastline at the surface, increasing the $PM_{2.5}$ surface concentrations at the National Seashore monitoring site. It also provides a clear causal relationship that smoke from fires in Mexico and Central America is advected across the Gulf of Mexico and is at the surface to impact the National Seashore monitoring site. This additional uses the Navy Aerosol Analysis and Prediction System (NAAPS), a global forecast model designed to predict the concentrations of sulfate, dust, and smoke aerosols in the troposphere.[1] NAAPS was developed by the U.S. Naval Research Laboratory (NRL) in Monterey, California, and integrates meteorological data from the Navy Operational Global Atmospheric Prediction System (NOGAPS), and employs dedicated models for sulfate, smoke, and dust emissions.[1] NAAPS provides archives of modeled dust and smoke concentrations simulated on a $1° \times 1°$ grid at 6-hour intervals. The model outputs include surface-level dust and smoke concentrations, which are color-coded for ease of interpretation. These simulations are instrumental in understanding the distribution, transport, and potential impacts of aerosols in smoke and dust plumes, making them a crucial resource for air quality monitoring, forecasting, and other purposes.

[1] https://www.nrlmry.navy.mil/aerosol/index_frame.html

For each day in Table 1-1, we provide figures from the NAAPS global model archive during the first day of the 5-day forecast at 18Z (12 noon CST) of the day under study showing the modeled aerosol optical depth (AOD) at a wavelength of 0.55 micron and the modeled near-surface concentrations in $\mu g/m^3$ due to fine particulates associated with Saharan dust or smoke. Notice that the modeled AOD is meant to estimate the impacts across the entire troposphere and not just the surface, but combined with the plots of near-surface dust and smoke concentrations provides a more complete picture of each dust or smoke episode and how the dust or smoke made it to the surface to impact the National Seashore monitoring site.

2.0 Day-Specific Modeling Evidence

2.1 NAAPS near surface smoke on April 11, 2022

Figure 2-1 shows the NAAPS forecast at 18Z for the smoke surface concentrations on April 11, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-1 indicates the presence of several fires in Veracruz and the Yucatan peninsula in Mexico, and Central America that produce smoke that is transported along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 4 and 8 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

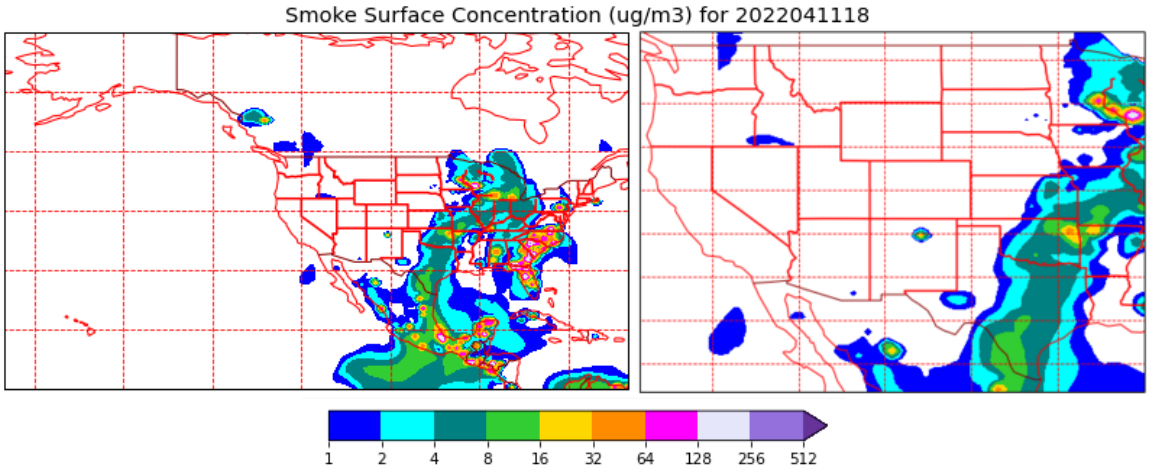

Figure 2-1. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on April 11, 2022. North America regional plot on the left and western U.S. plot on the right.

2.2 NAAPS near surface smoke on April 12, 2022

Figure 2-2 shows the NAAPS forecast at 18Z for the smoke surface concentrations on April 12, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-2 indicates the presence of several fires in Veracruz and the Yucatan peninsula in Mexico, and Central America that produce smoke that is transported along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 4 and 8 µg/m^3 (dark green shading) to the modeled $PM_{2.5}$ concentrations.

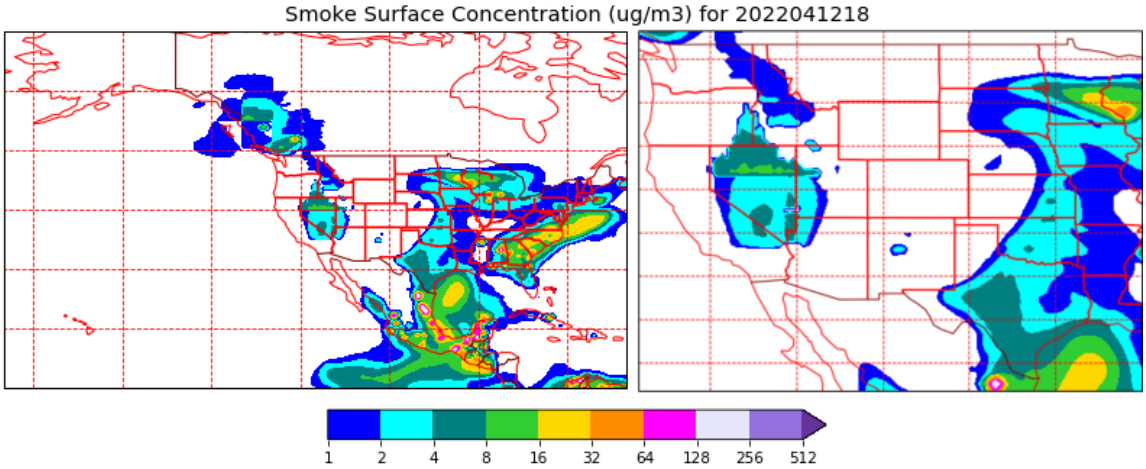

Figure 2-2. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on April 12, 2022. North America regional plot on the left and western U.S. plot on the right.

2.3 NAAPS near surface smoke on April 13, 2022

Figure 2-3 shows the NAAPS forecast at 18Z for the smoke surface concentrations on April 13, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-3 indicates the presence of several fires in the Yucatan peninsula in Mexico and Central America that produce smoke that is transported along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 8 and 16 µg/m^3 (light green) to the modeled $PM_{2.5}$ concentrations.

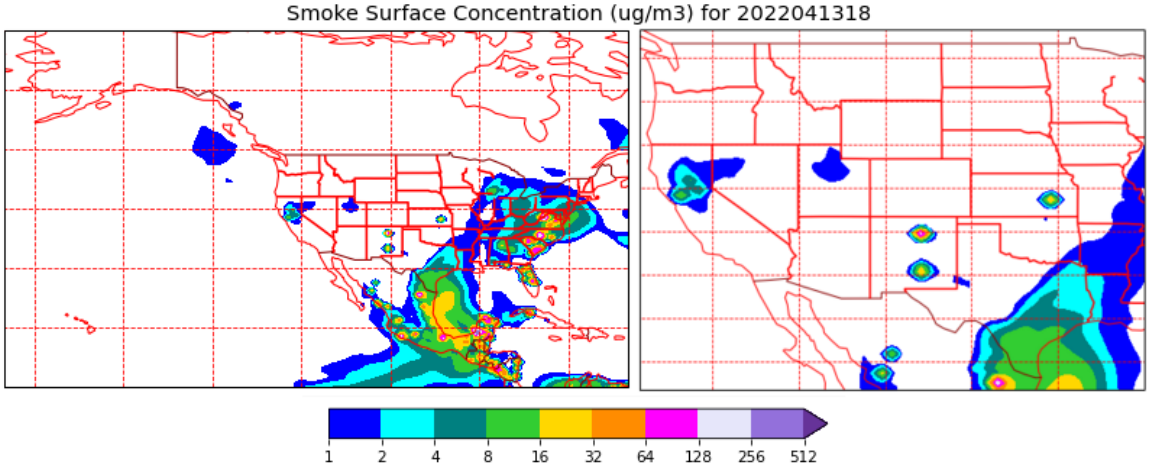

Figure 2-3. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on April 13, 2022. North America regional plot on the left and western U.S. plot on the right.

2.4 NAAPS near surface smoke on May 6, 2022

Figure 2-4 shows the NAAPS forecast at 18Z for the smoke surface concentrations on May 6, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region.

Figure 2-4 indicates the presence of several fires in the Mexican Pacific Coast and Central America that produce smoke that is transported north to northeast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 16 and 32 µg/m^3 (yellow) to the modeled $PM_{2.5}$ concentrations.

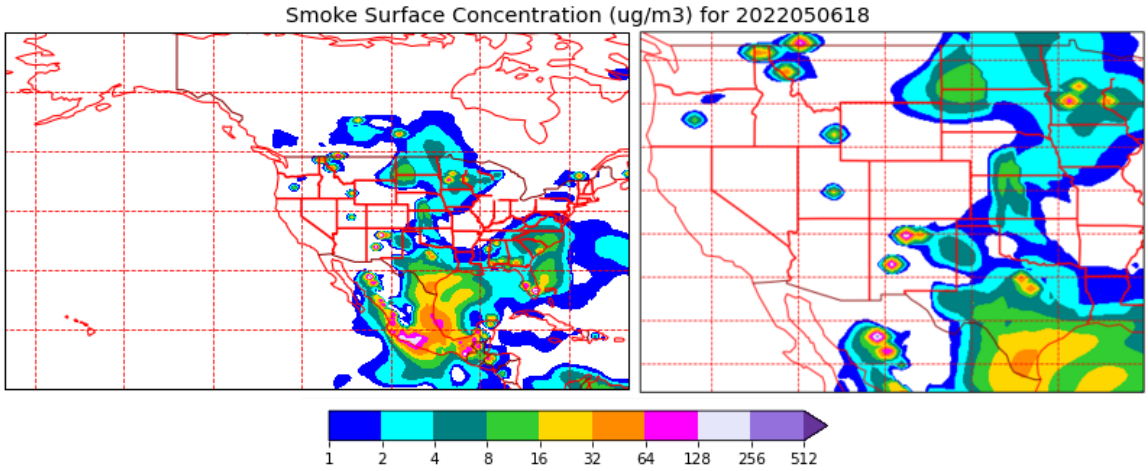

Figure 2-4. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on May 6, 2022. North America regional plot on the left and western U.S. plot on the right.

2.5 NAAPS near surface smoke on May 7, 2022

Figure 2-5 shows the NAAPS forecast at 18Z for the smoke surface concentrations on May 7, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-5 indicates the presence of several fires along both the Mexican Pacific and Atlantic Coasts, and Central America that produce smoke that is transported north to northeast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 32 and 64 µg/m^3 (orange) to the modeled $PM_{2.5}$ concentrations.

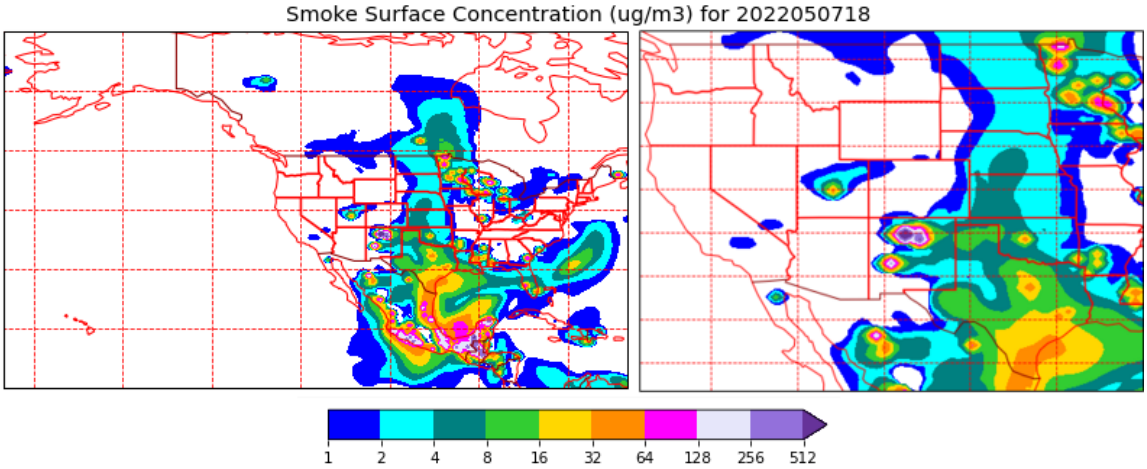

Figure 2-5. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on May 7, 2022. North America regional plot on the left and western U.S. plot on the right.

2.6 NAAPS near surface smoke on May 20, 2022

Figure 2-6 shows the NAAPS forecast at 18Z for the smoke surface concentrations on May 20, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-6 indicates the presence of several fires over central Mexico, including states along the Pacific and Atlantic coasts, the Yucatan peninsula, and Central America that produce smoke that is transported north and along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 64 and 128 µg/m^3 (purple) to the modeled $PM_{2.5}$ concentrations.

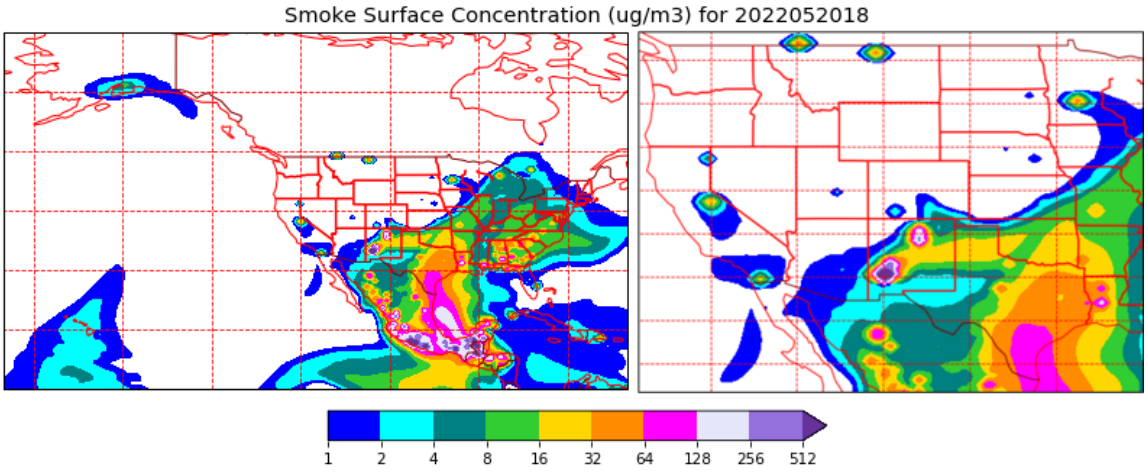

Figure 2-6. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on May 20, 2022. North America regional plot on the left and western U.S. plot on the right.

2.7 NAAPS near surface dust on June 11, 2022

Figure 2-7 shows the NAAPS forecast at 18Z for the AOD on June 11, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-8 shows a similar figure arrangement but shows the NAAPS surface dust concentrations in µg/m^3. Figure 2-7 indicates the presence of dust originated in northwest Africa leading to a regional event that spans several days reaching the Gulf of Mexico. Figure 2-8 shows that modeled surface dust concentrations reach the Texas Gulf Coast on June 11, 2022. The figure also shows that dust surface concentrations range between 20 and 40 µg/m^3 (dark blue) near the National Seashore monitor in Kleberg County.

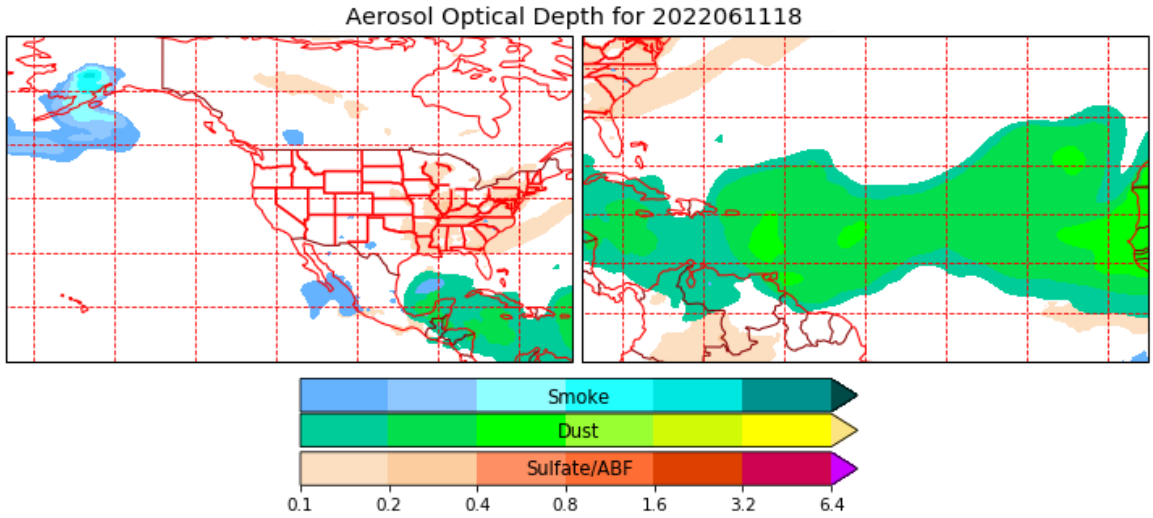

Figure 2-7. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 11, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

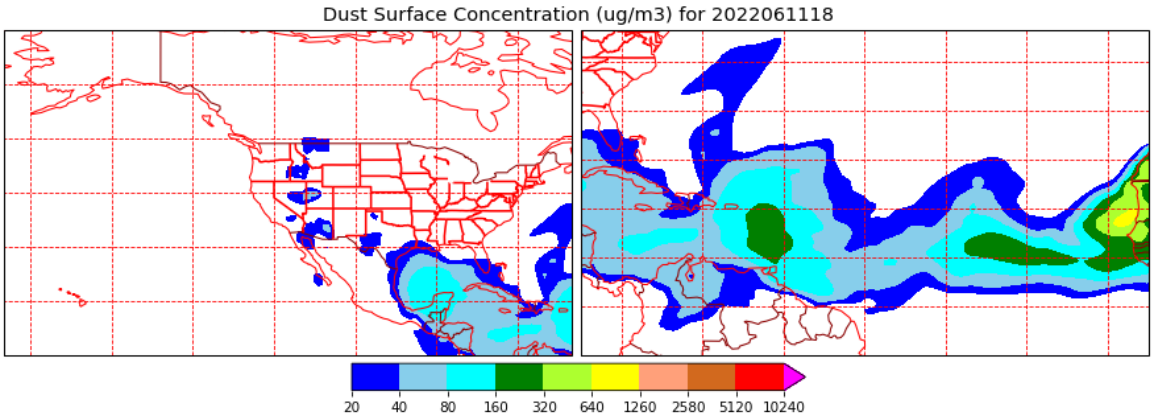

Figure 2-8. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 11, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.8 NAAPS near surface dust on June 12, 2022

Figure 2-9 shows the NAAPS forecast at 18Z for the AOD on June 12, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-10 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-9 indicates the presence of dust originated in northwest Africa leading to a regional event that by June 12 has reached the Gulf of Mexico and starts to move west into the Mexican coastline. Figure 2-10 shows that modeled surface concentrations reach and move beyond the Texas Gulf Coast on June 12, 2022. The figure also shows that dust surface concentrations range between 40 and 160 µg/m^3 (light blue) near the National Seashore monitor in Kleberg County.

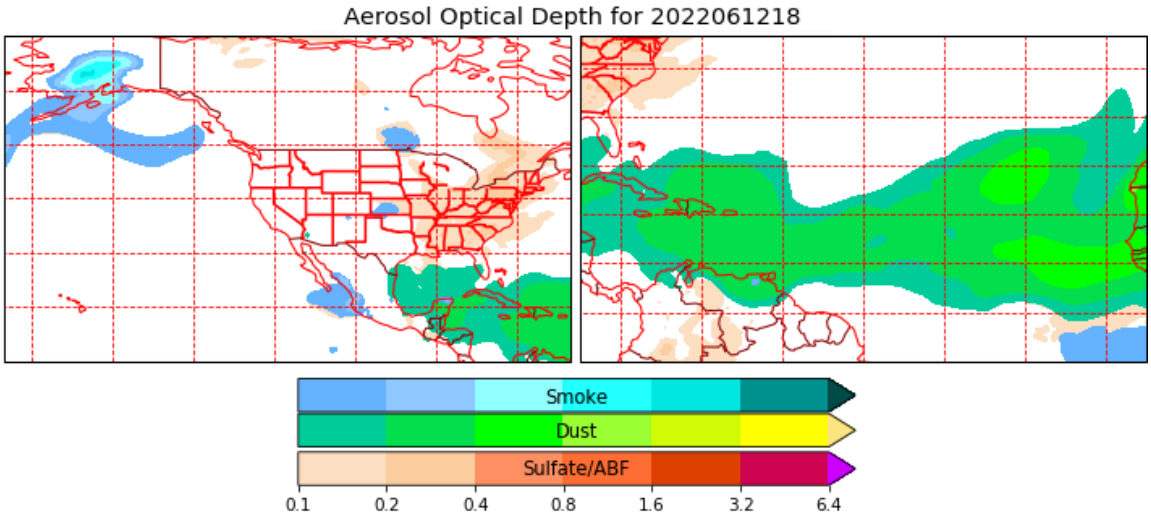

Figure 2-9. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 12, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

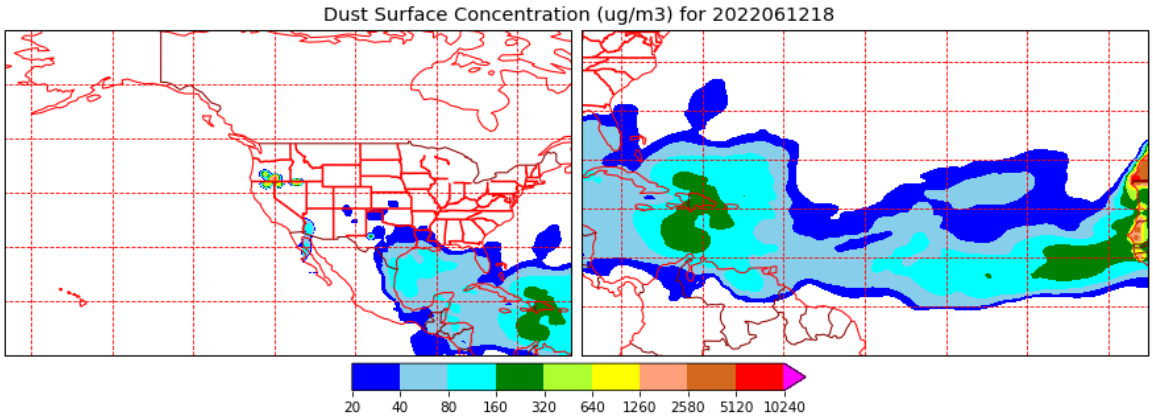

Figure 2-10. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 12, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.9 NAAPS near surface dust on June 13, 2022

Figure 2-11 shows the NAAPS forecast at 18Z for the AOD on June 13, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-12 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-11 indicates the presence of dust originated in northwest Africa leading to a regional event that by June 13 not only has reached the Gulf of Mexico but starts to impact the southeastern U.S. Figure 2-12 shows that modeled surface concentrations affect almost the entire state of Texas on June 13, 2022. The figure also shows that dust surface concentrations range between 40 and

80 µg/m^3 near the National Seashore monitor in Kleberg County, but Harrison and Travis Counties are also impacted by this event.

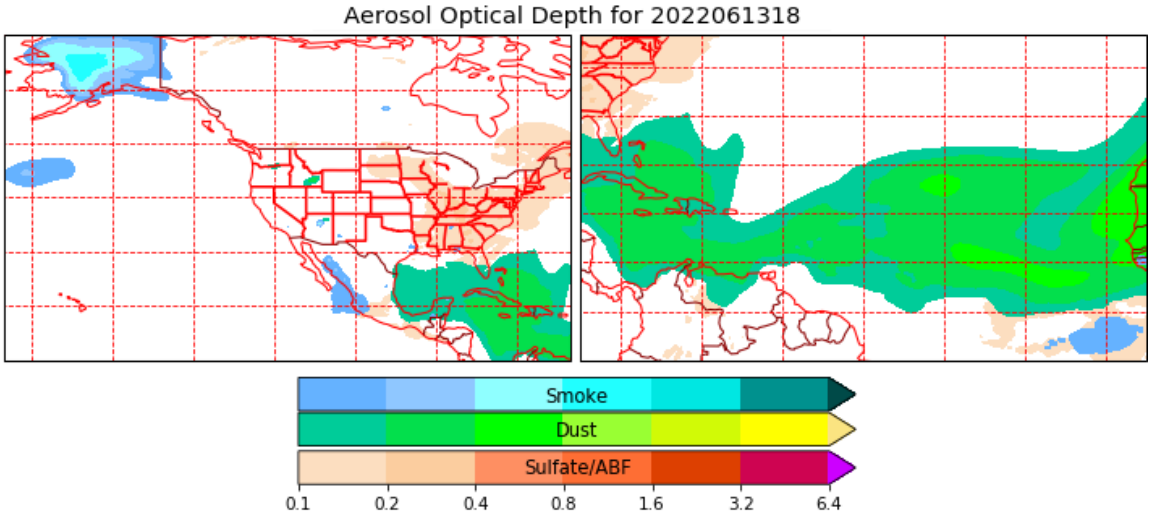

Figure 2-11. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 13, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

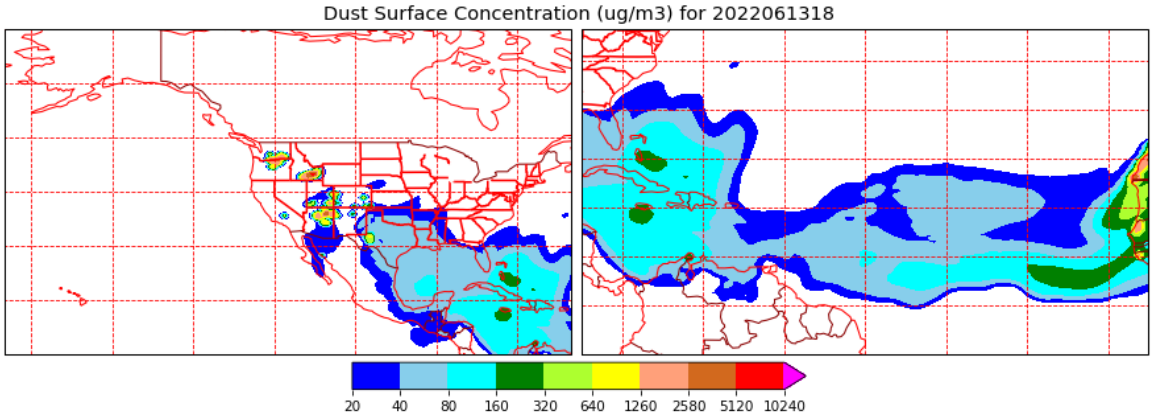

Figure 2-12. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 13, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.10 NAAPS near surface dust on June 14, 2022

Figure 2-13 shows the NAAPS forecast at 18Z for the AOD on June 14, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-14 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-13 indicates the presence of dust originated in northwest Africa leading to a regional event that by June 14 continues to impact the southeastern U.S. Figure 2-14 shows that modeled surface concentrations affect almost the entire state of Texas on June 14, 2022. The figure also shows that dust surface

concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County, but Harrison County is also impacted by this event.

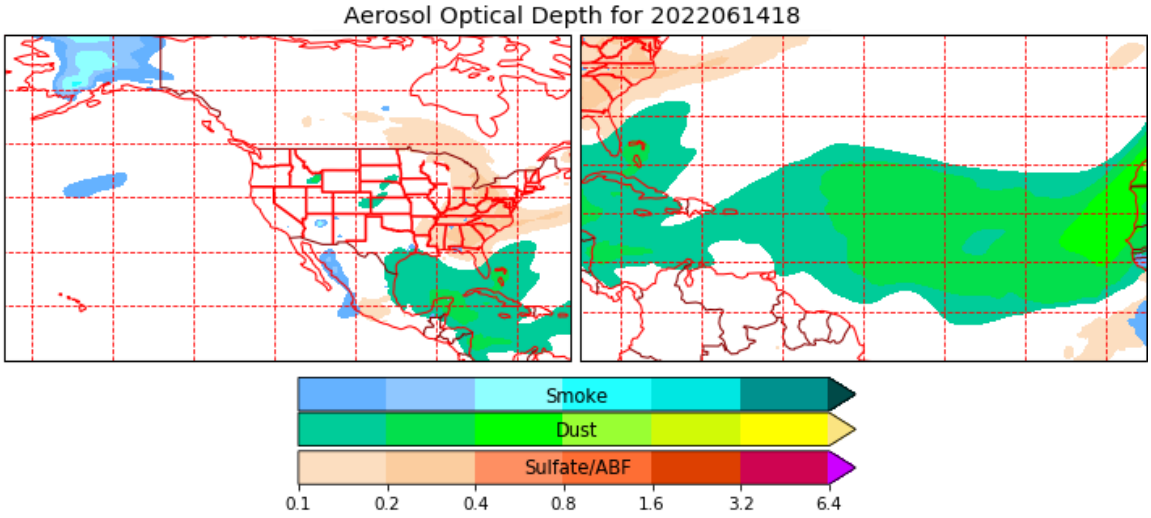

Figure 2-13. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 14, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

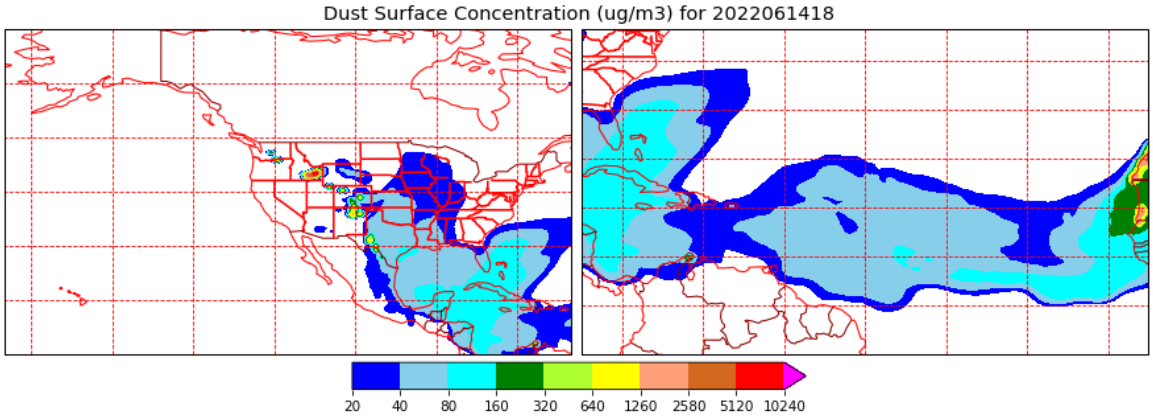

Figure 2-14. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 14, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.11 NAAPS near surface dust on June 15, 2022

Figure 2-15 shows the NAAPS forecast at 18Z for the AOD on June 15, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-16 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-15 indicates the presence of dust originated in northwest Africa leading to a regional event that by June 15 continues to impact the southeastern U.S and starts to impact Midwest states too. Figure 2-16 shows

that modeled surface concentrations affect almost the entire state of Texas on June 15, 2022. The figure also shows that dust surface concentrations range between 40 and 160 µg/m^3 near the National Seashore monitor in Kleberg County, but Harrison County is also impacted by this event.

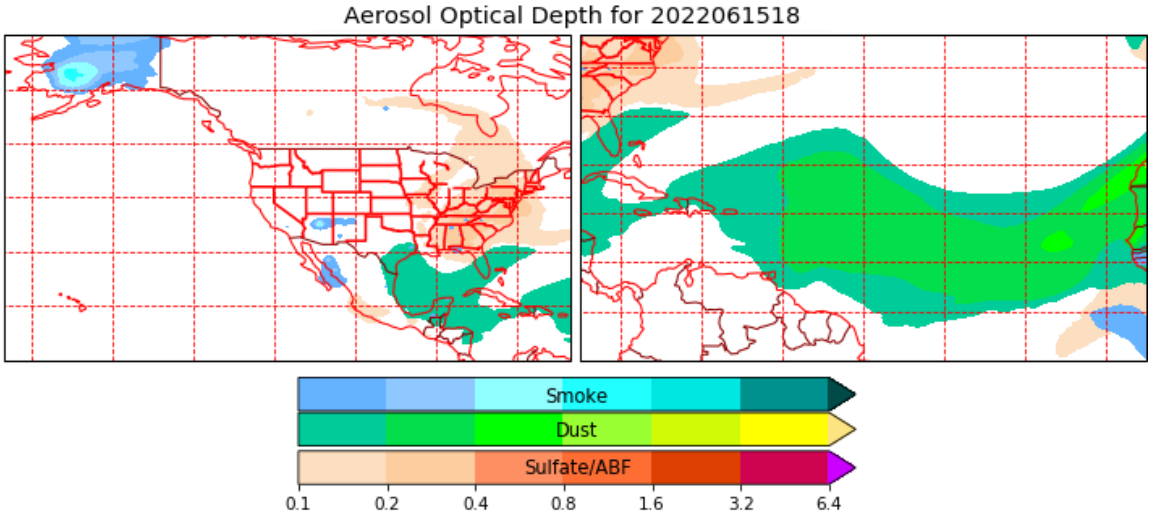

Figure 2-15. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 15, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

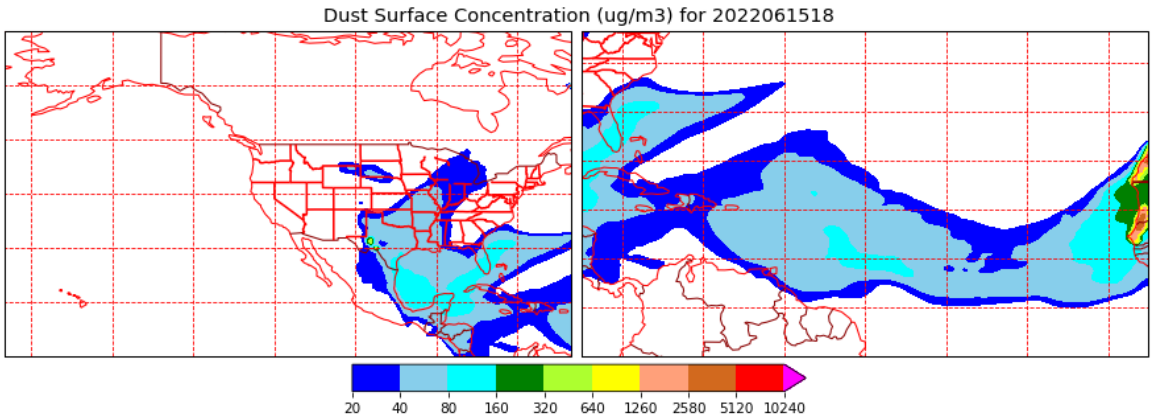

Figure 2-16. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 15, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.12 NAAPS near surface dust on June 16, 2022

Figure 2-17 shows the NAAPS forecast at 18Z for the AOD on June 16, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-18 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-17 indicates the presence of dust originated in northwest Africa leading to a regional event that by June 16 continues to

impact the southeastern U.S. Figure 2-18 shows that modeled surface concentrations affect the entire state of Texas on June 16, 2022. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County, but Harrison and Travis Counties are also impacted by this event.

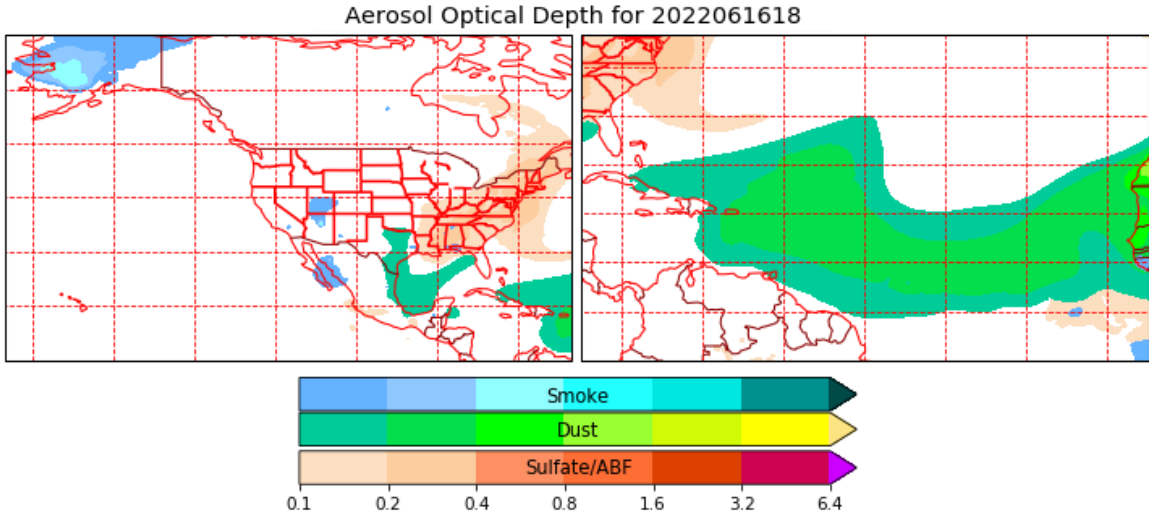

Figure 2-17. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 16, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

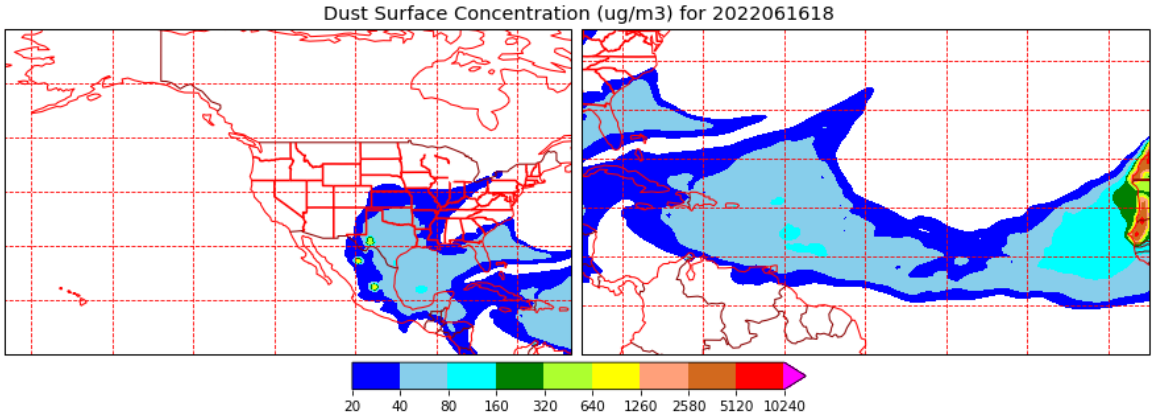

Figure 2-18. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 16, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.13 NAAPS near surface dust on June 17, 2022

Figure 2-19 shows the NAAPS forecast at 18Z for the AOD on June 17, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-20 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-19 indicates the presence of dust originated in northwest Africa leading to a regional event that by June 17 starts to decrease

its impact in the southeastern U.S. Figure 2-20 shows that modeled surface concentrations affect the entire state of Texas on June 17, 2022. The figure also shows that dust surface concentrations range between 20 and 40 µg/m^3 near the National Seashore monitor in Kleberg County, but Travis County is also impacted by this event.

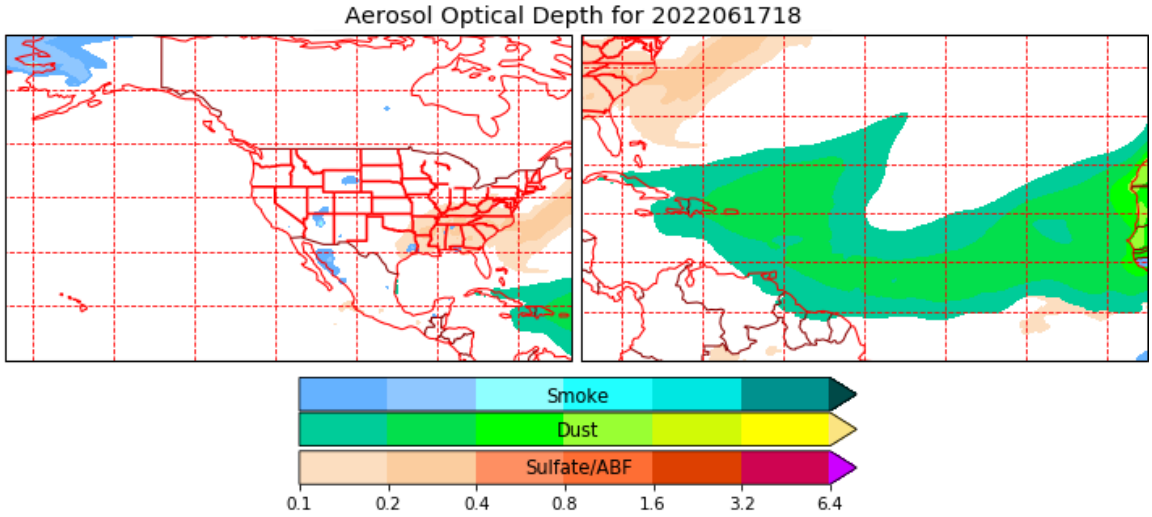

Figure 2-19. NAAPS modeled aerosol optical depth (AOD) at 18Z on June 17, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

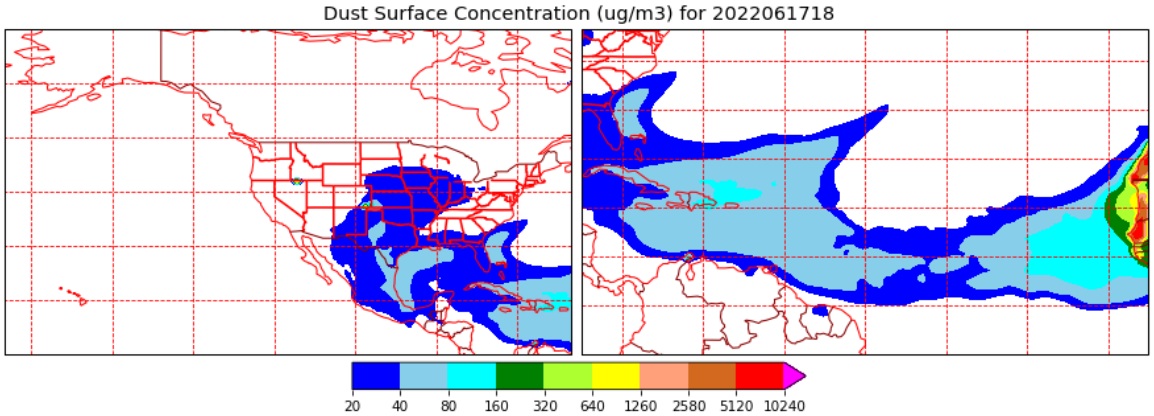

Figure 2-20. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on June 17, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.14 NAAPS near surface dust on July 16, 2022

Figure 2-21 shows the NAAPS forecast at 18Z for the AOD on July 16, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-21 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-22 indicates the presence of dust

originated in northwest Africa leading to a regional event that by July 16 has some isolated impacts in the Gulf of Mexico. Figure 2-22 shows that modeled surface concentrations affect the Texas coastline on July 16, 2022. The figure also shows that dust surface concentrations range between 40 and 160 µg/m^3 near the National Seashore monitor in Kleberg County.

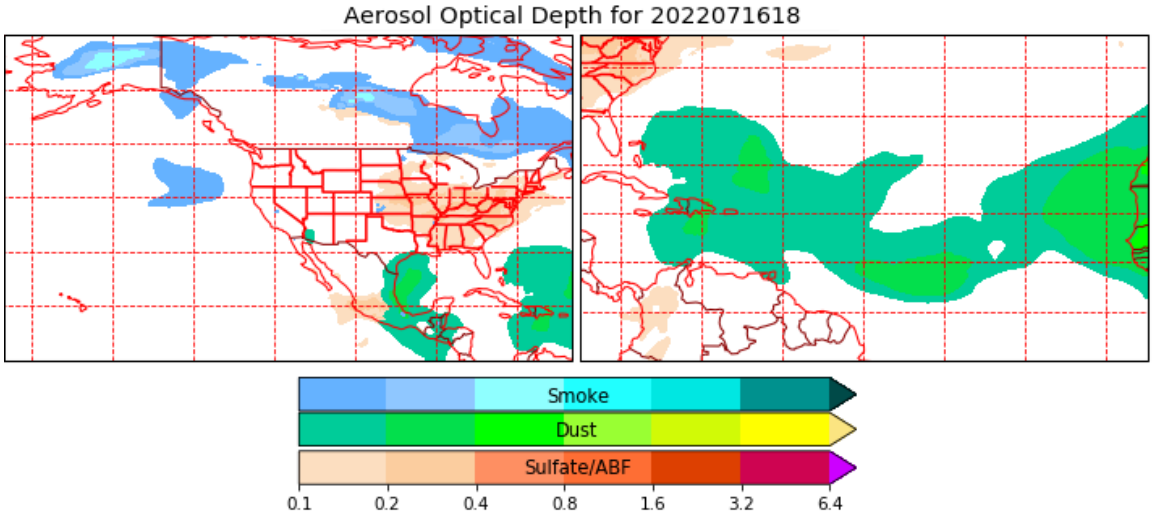

Figure 2-21. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 16, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

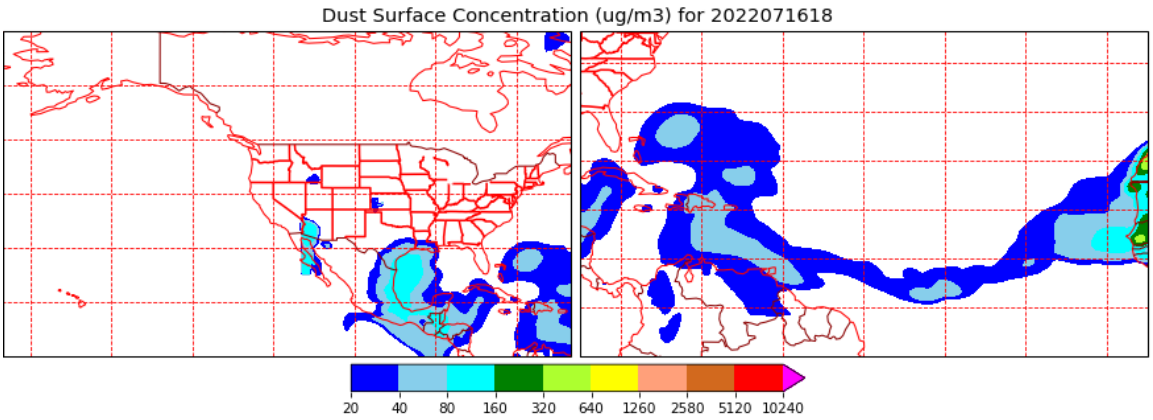

Figure 2-22. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 16, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.15 NAAPS near surface dust on July 17, 2022

Figure 2-23 shows the NAAPS forecast at 18Z for the AOD on July 17, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-24 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-23 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 17 has some isolated

impacts in the Gulf of Mexico, but importantly it affects the area where the National Seashore monitor is located. Figure 2-24 shows that modeled surface concentrations affect the Texas coastline on July 17, 2022. The figure also shows that dust surface concentrations range between 80 and 160 µg/m^3 near the National Seashore monitor in Kleberg County.

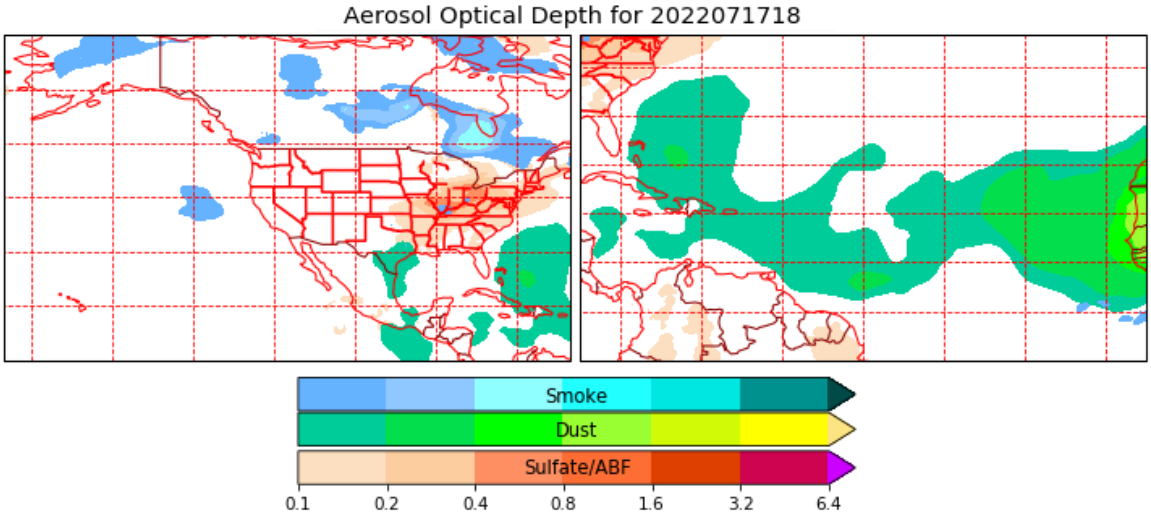

Figure 2-23. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 17, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

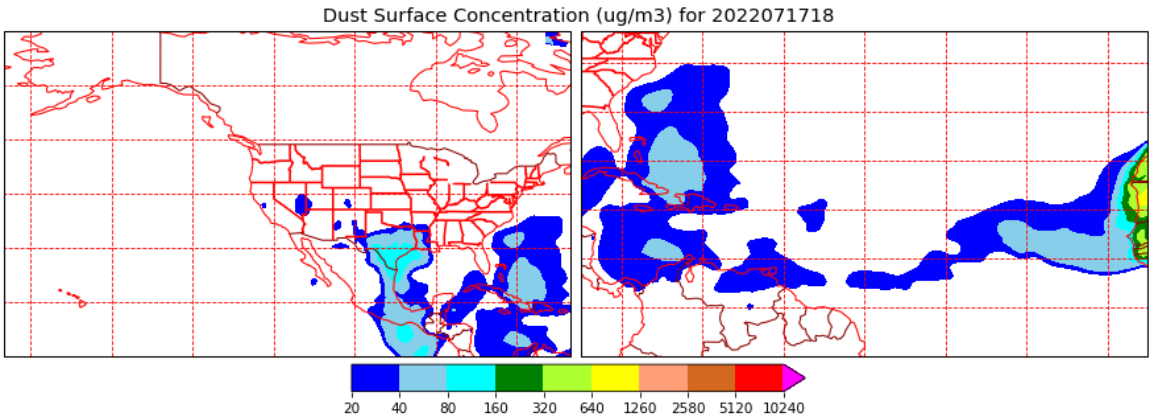

Figure 2-24. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 17, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.16 NAAPS near surface dust on July 21, 2022

Figure 2-25 shows the NAAPS forecast at 18Z for the AOD on July 21, 2022. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-26 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-25 indicates the presence of dust

originated in northwest Africa leading to a regional event that by July 21 has some isolated impacts in the Gulf of Mexico. Figure 2-26 shows that modeled surface concentrations affect the Texas coastline on July 21, 2022. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

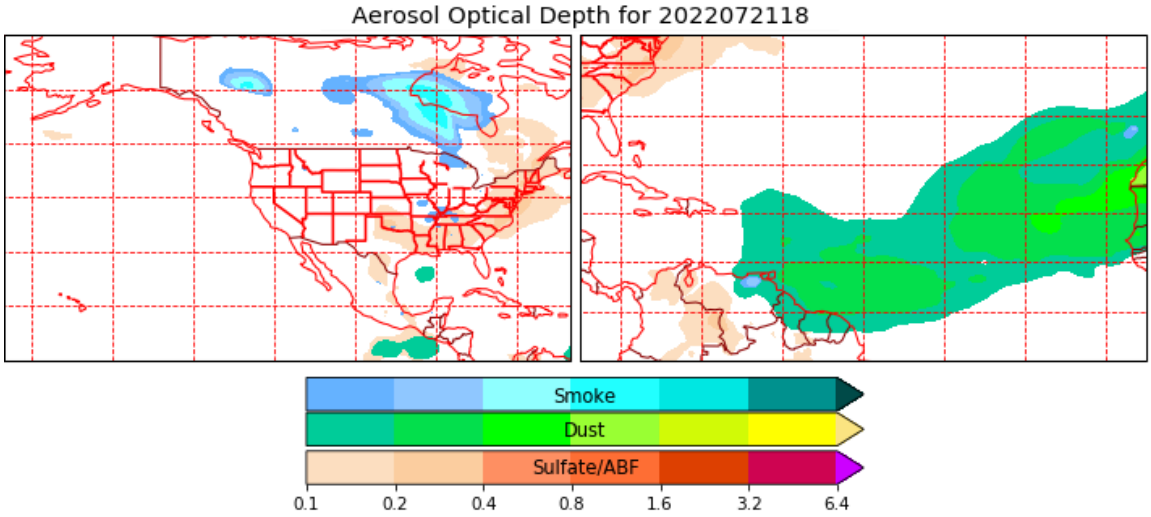

Figure 2-25. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 21, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

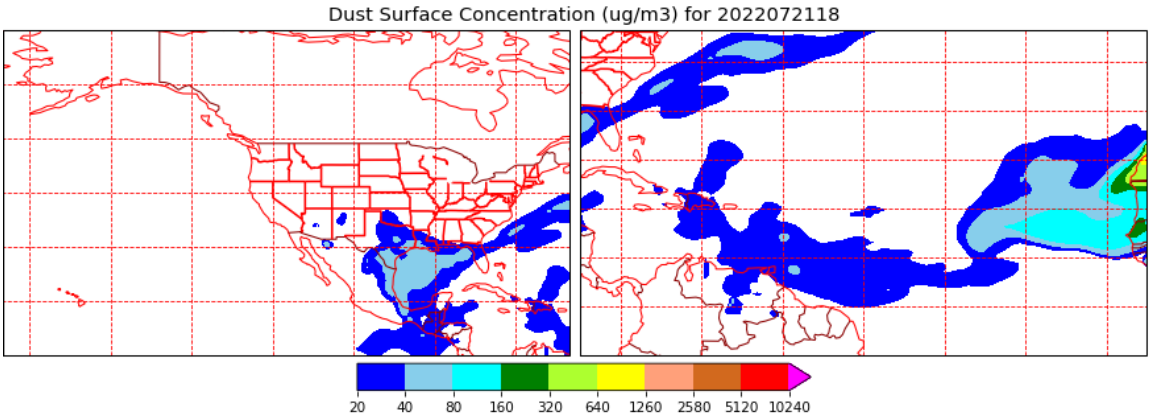

Figure 2-26. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 21, 2022. North America regional plot on the left and tropical Atlantic plot on the right.

2.17 NAAPS near surface smoke on January 3, 2023

Figure 2-27 shows the NAAPS forecast at 18Z for the smoke surface concentrations on January 3, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-27 indicates the presence of isolated fires in Veracruz and Central America that produce smoke that is transported along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 2 and 8 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

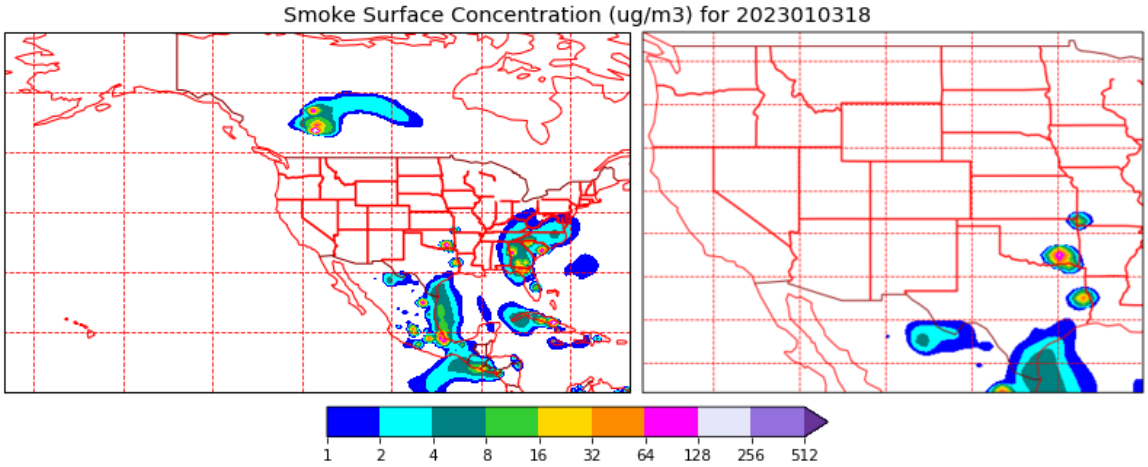

Figure 2-27. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on January 3, 2023. North America regional plot on the left and western U.S. plot on the right.

2.18 NAAPS near surface smoke on January 16, 2023

Figure 2-28 shows the NAAPS forecast at 18Z for the smoke surface concentrations on January 16, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-28 indicates the presence of isolated fires in Central Mexico that produce smoke that is transported north and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 1 and 2 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

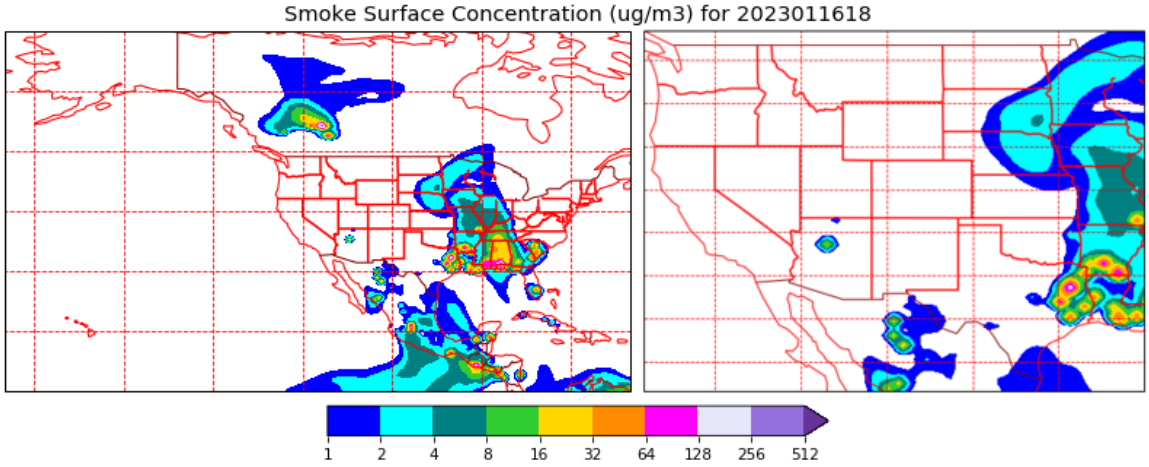

Figure 2-28. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on January 16, 2023. North America regional plot on the left and western U.S. plot on the right.

2.19 NAAPS near surface smoke on January 18, 2023

Figure 2-29 shows the NAAPS forecast at 18Z for the smoke surface concentrations on January 18, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western

U.S. region. Figure 2-29 indicates the presence of isolated fires in Central Mexico and Central America that produce smoke that is transported north, along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 1 and 4 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

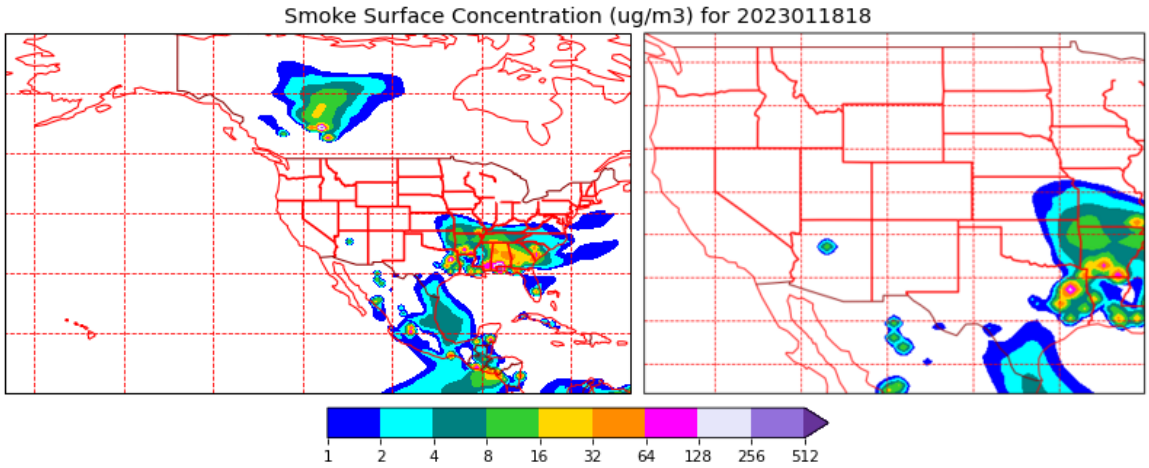

Figure 2-29. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on January 18, 2023. North America regional plot on the left and western U.S. plot on the right.

2.20 NAAPS near surface smoke on February 14, 2023

Figure 2-30 shows the NAAPS forecast at 18Z for the smoke surface concentrations on January 18, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-30 indicates the presence of isolated fires in Central Mexico and Central America that produce smoke that is transported north, along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 1 and 4 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

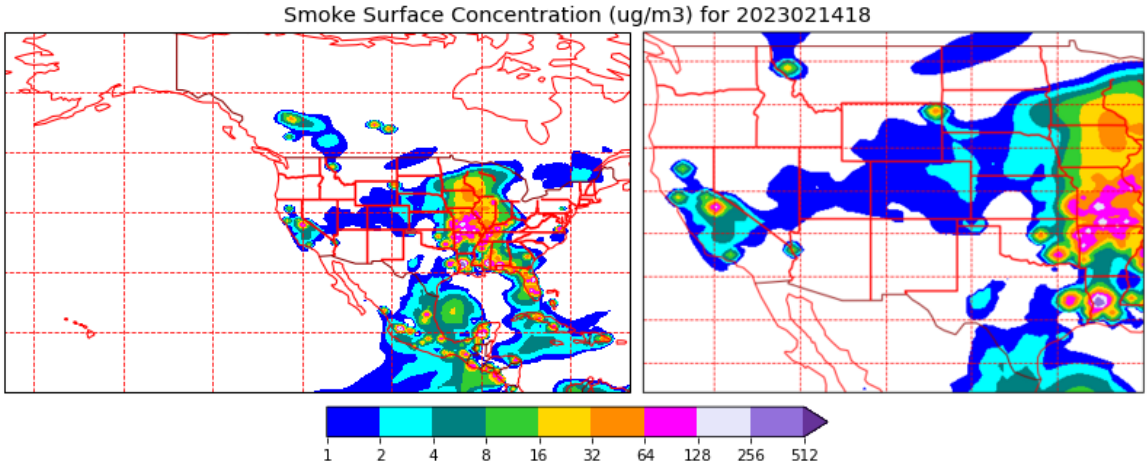

Figure 2-30. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on February 14, 2023. North America regional plot on the left and western U.S. plot on the right.

2.21 NAAPS near surface smoke on May 5, 2023

Error! Reference source not found. shows the NAAPS forecast at 18Z for the smoke surface concentrations on May 5, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. **Error! Reference source not found.** indicates the presence of several intense fires along the Mexican Atlantic coast, the Yucatan peninsula and Central America that produce smoke that is transported north, along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 32 and 64 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

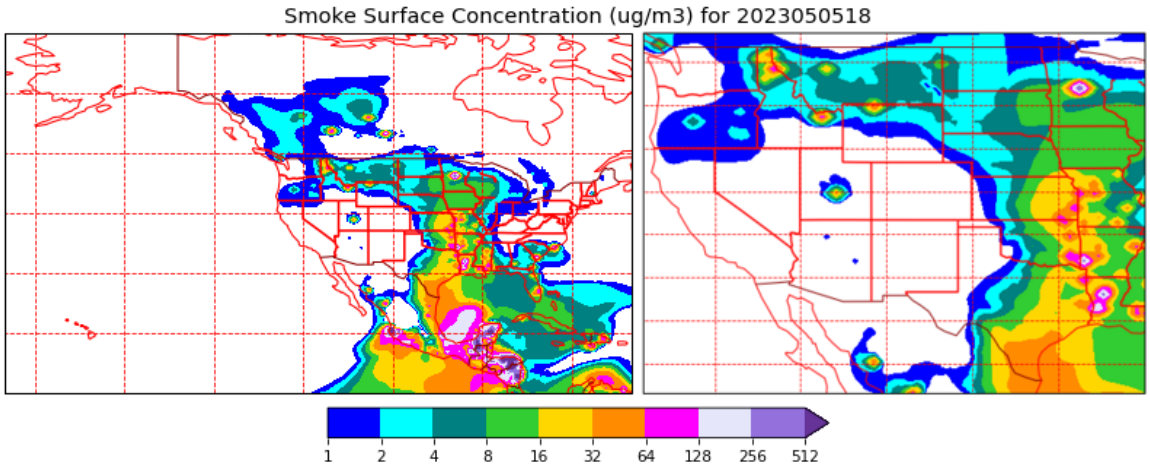

Figure 2-31. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on May 5, 2023. North America regional plot on the left and western U.S. plot on the right.

2.22 NAAPS near surface smoke on June 14, 2023

Figure 2-32 shows the NAAPS forecast at 18Z for the smoke surface concentrations on June 14, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the western U.S. region. Figure 2-32 indicates the presence of several intense fires along the Mexican states of Chiapas, Veracruz and Campeche in the Atlantic coast, and Central America that produce smoke that is transported north, along the Gulf Coast and impacts the National Seashore monitor in Kleberg County, where this smoke can contribute between 16 and 64 µg/m^3 to the modeled $PM_{2.5}$ concentrations.

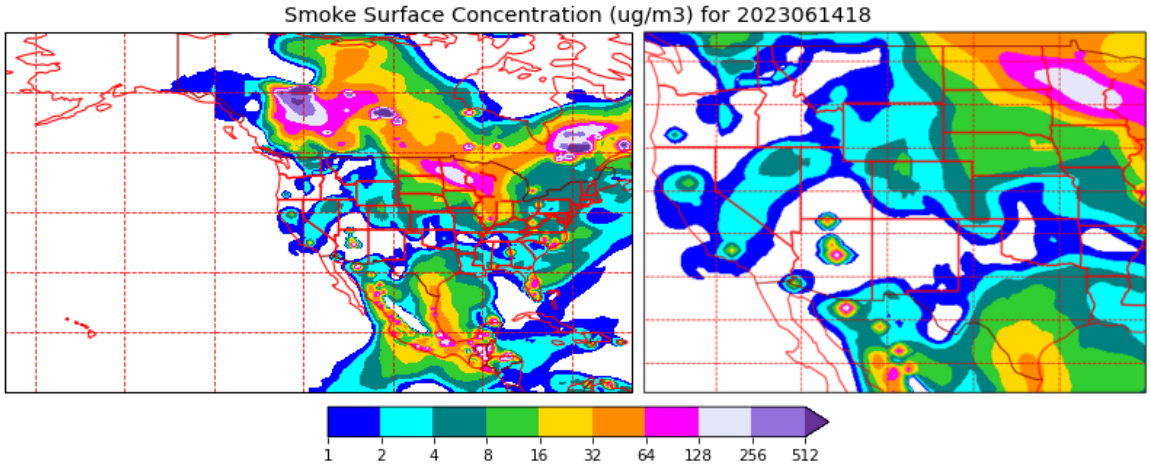

Figure 2-32. NAAPS modeled near-surface smoke concentrations (µg/m^3) at 18Z on June 14, 2023. North America regional plot on the left and western U.S. plot on the right.

2.23 NAAPS near surface dust on July 15, 2023

Figure 2-33 shows the NAAPS forecast at 18Z for the AOD on July 15, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-34 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-33 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 15 has some isolated impacts in the Gulf of Mexico. Figure 2-34 shows that modeled surface concentrations affect the Texas coastline on July 15, 2023. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

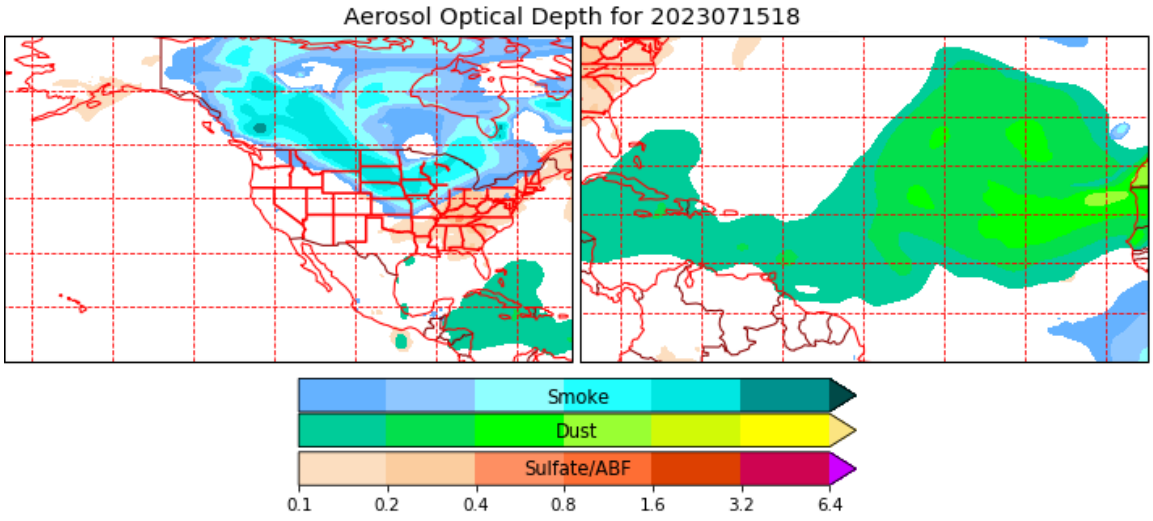

Figure 2-33. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 15, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

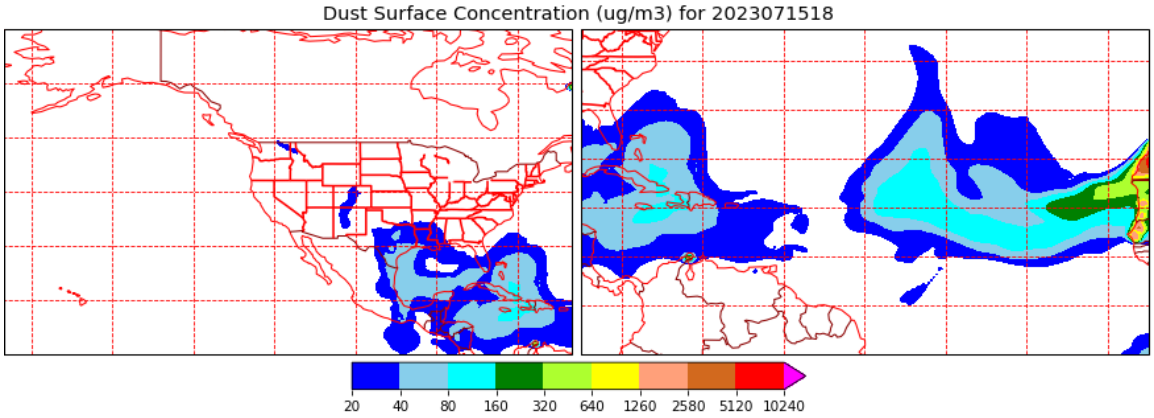

Figure 2-34. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 15, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

2.24 NAAPS near surface dust on July 16, 2023

Figure 2-35 shows the NAAPS forecast at 18Z for the AOD on July 16, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-36 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-35 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 16 has some isolated impacts in the Gulf of Mexico. Figure 2-36 shows that modeled surface concentrations affect the Texas coastline on July 16, 2023. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

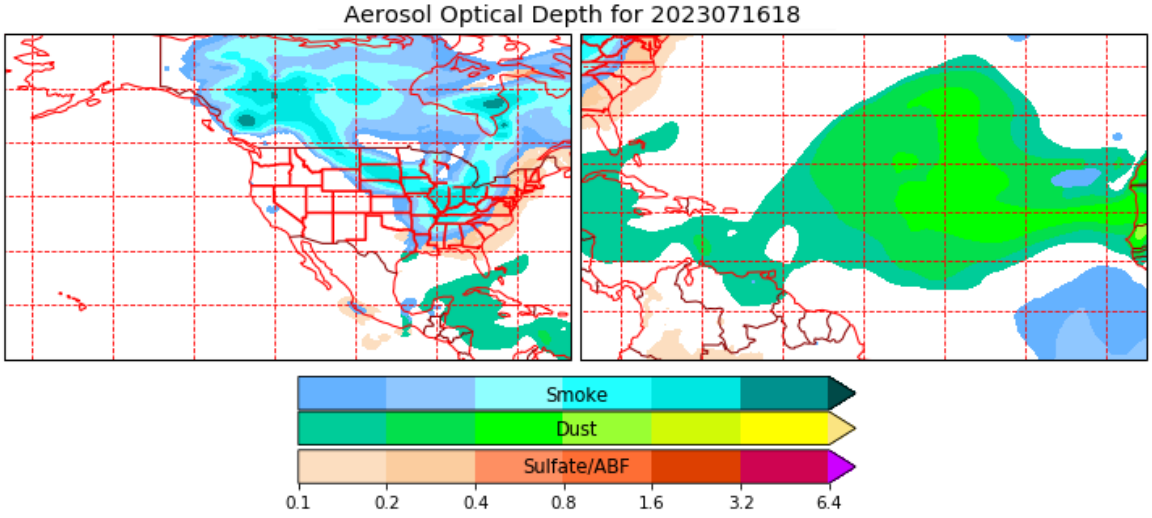

Figure 2-35. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 16, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

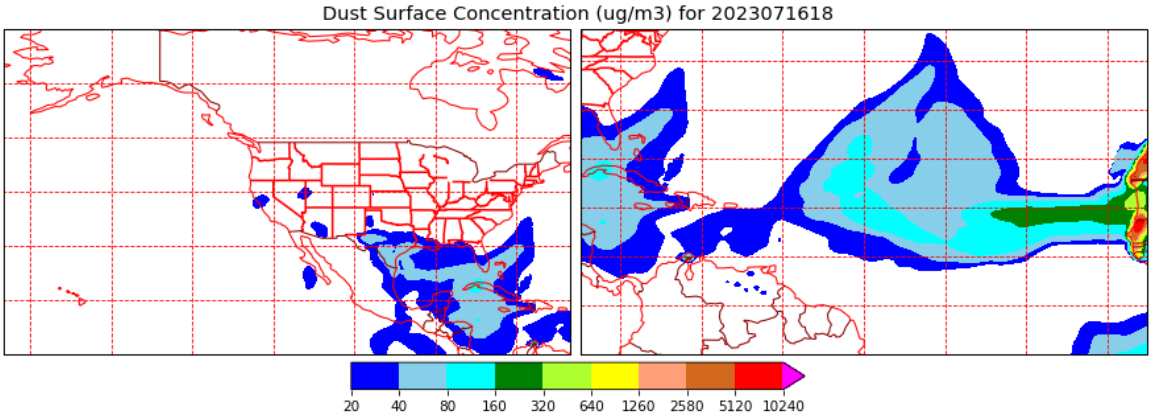

Figure 2-36. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 16, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

2.25 NAAPS near surface dust on July 25, 2023

Figure 2-37 shows the NAAPS forecast at 18Z for the AOD on July 25, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-38 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-37 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 25 has impacts in the Gulf of Mexico and the Texas coastline. Figure 2-388 shows that modeled surface concentrations affect the Texas coastline on July 25, 2023. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

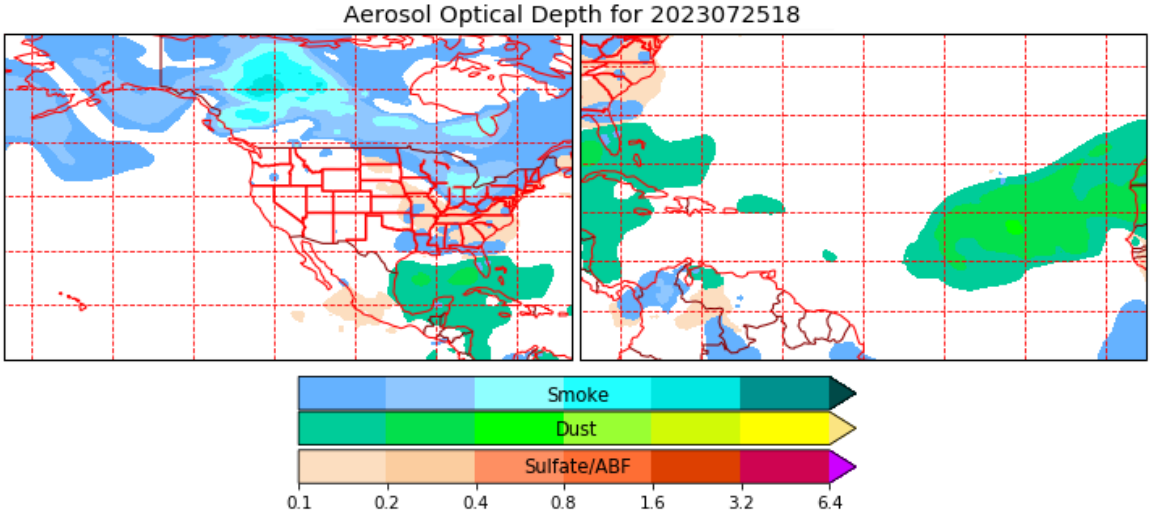

Figure 2-37. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 25, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

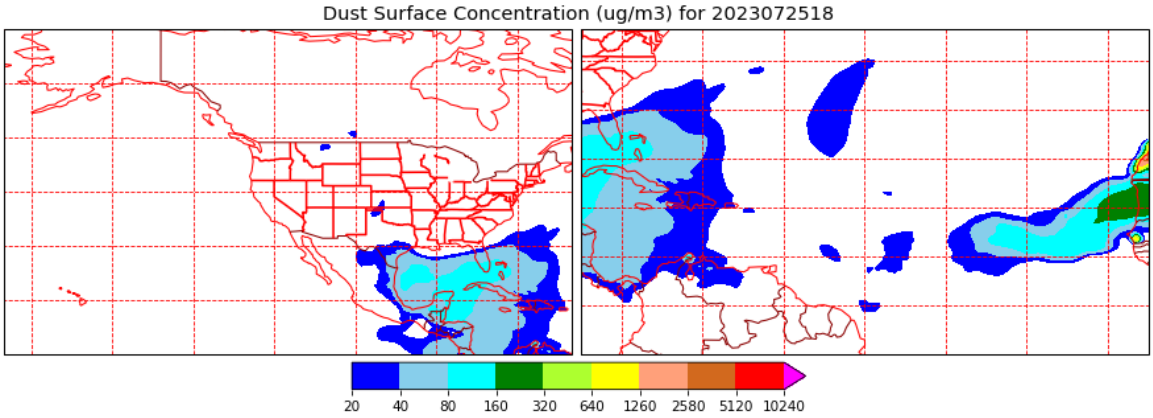

Figure 2-38. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 25, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

2.26 NAAPS near surface dust on July 26, 2023

Figure 2-39 shows the NAAPS forecast at 18Z for the AOD on July 26, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-40 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-39 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 26 has some impacts in the Gulf of Mexico. Figure 2-40 shows that modeled surface concentrations affect the Texas coastline on July 26, 2023. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

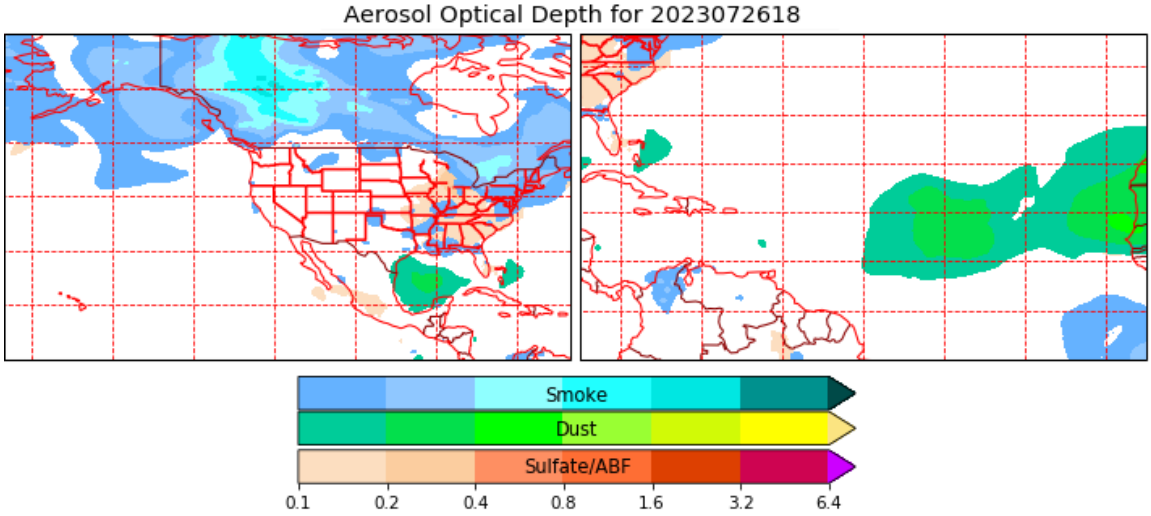

Figure 2-39. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 26, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

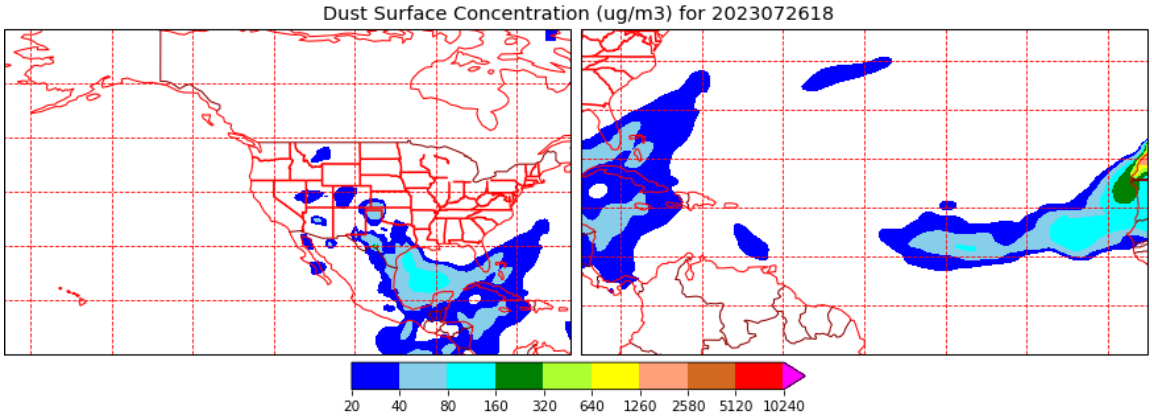

Figure 2-40. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 26, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

2.27 NAAPS near surface dust on July 27, 2023

Figure 2-41 shows the NAAPS forecast at 18Z for the AOD on July 27, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-42 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-41 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 27 has some isolated impacts in the Gulf of Mexico. Figure 2-42 shows that modeled surface concentrations affect the Texas coastline on July 27, 2023. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

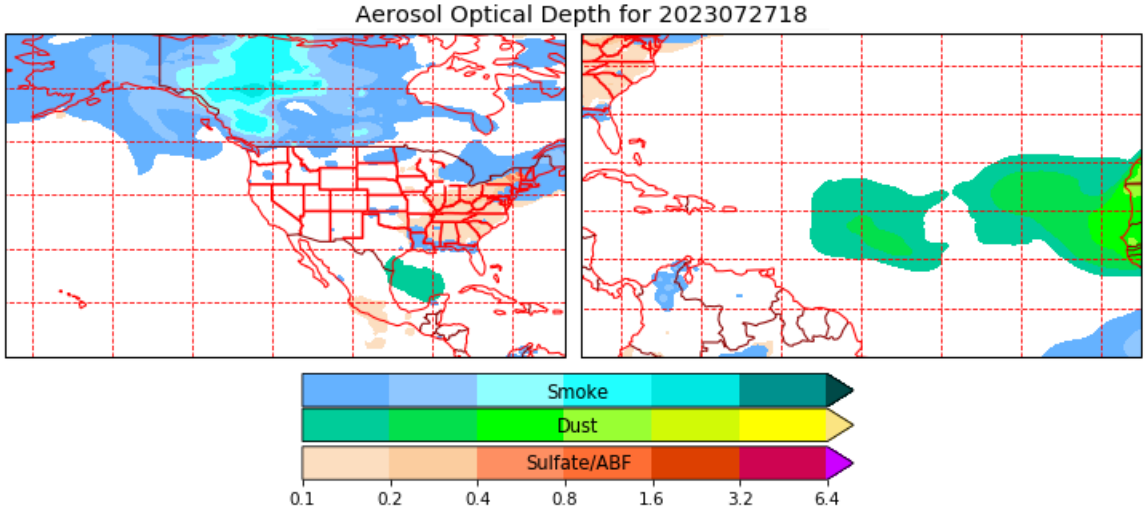

Figure 2-41. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 27, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

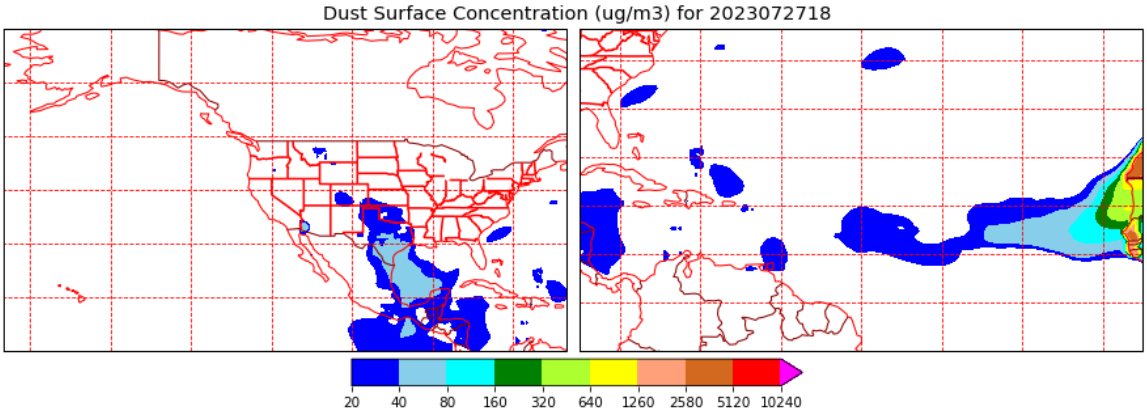

Figure 2-42. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 27, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

2.28 NAAPS near surface dust on July 28, 2023

Figure 2-43 shows the NAAPS forecast at 18Z for the AOD on July 28, 2023. On the left we show the product that corresponds to modeled results for the North America region while on the right is the corresponding product for the Tropical Atlantic region. The smoke optical depth is shown in shades of blue, the dust optical depth in shades of green and the smoke optical depth in shades of red. Figure 2-44 shows a similar figure arrangement but shows the NAAPS dust surface concentrations in µg/m^3. Figure 2-43 indicates the presence of dust originated in northwest Africa leading to a regional event that by July 28 has some isolated impacts in the Gulf of Mexico. Figure 2-44 shows that modeled surface concentrations affect the Texas coastline on July 28, 2023. The figure also shows that dust surface concentrations range between 40 and 80 µg/m^3 near the National Seashore monitor in Kleberg County.

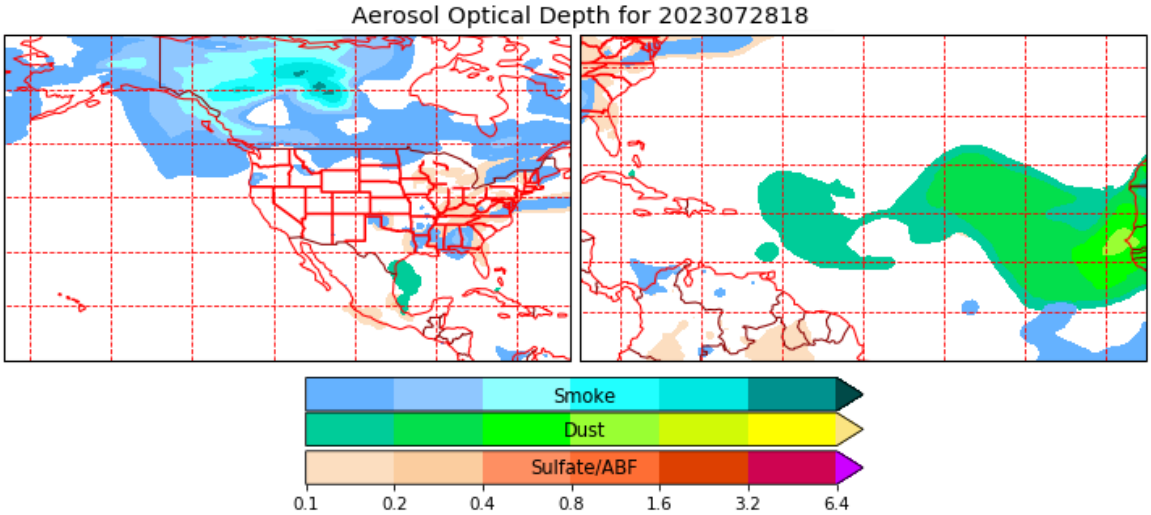

Figure 2-43. NAAPS modeled aerosol optical depth (AOD) at 18Z on July 28, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

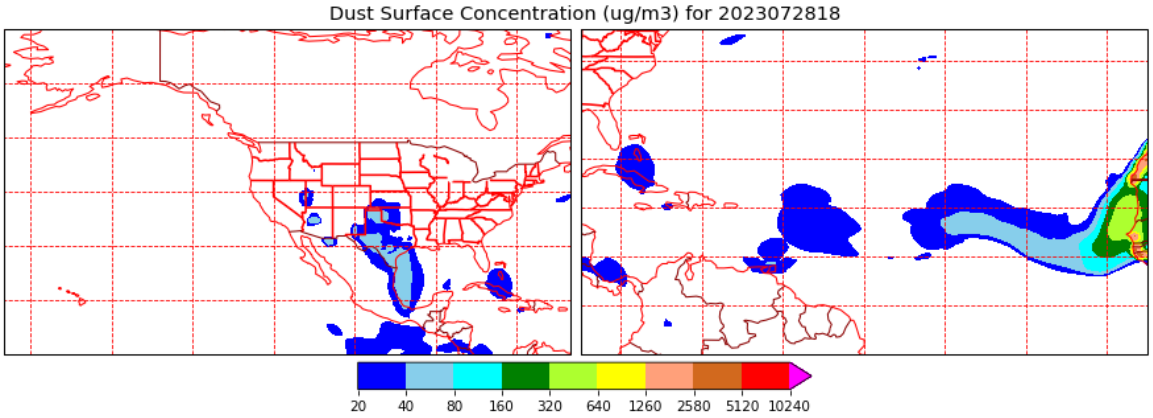

Figure 2-44. NAAPS modeled near-surface dust concentrations (µg/m^3) at 18Z on July 28, 2023. North America regional plot on the left and tropical Atlantic plot on the right.

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Novato, California 94945
January 21, 2025

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DAYS RAMBOLL IDENTIFIED AS CANDIDATES FOR EXCEPTIONAL EVENTS AT KLEBERG COUNTY

Contents

TABLES

1.0 Introduction

The Texas Commission on Environmental Quality (TCEQ) has submitted an Exceptional Events Demonstration (EED) for public comment for the National Seashore monitor in Kleberg County. The TCEQ includes 21 days in 2022 and 18 days in 2023 of regulatory significance in their analysis. If the U.S. Environmental Protection Agency (EPA) concurs with the TCEQ on the days selected for the EED, the 2021-2023 annual particulate matter less than 2.5 microns ($PM_{2.5}$) design value would be 9.0 µg/m^3 and the area would have a basis to be classified as attaining the 2024 $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS).

Ramboll provides the following comment with a list of days for 2022 and 2023 that our independent analysis has identified the evidence unequivocally supports that there is a clear causal relationship between the observed elevated daily $PM_{2.5}$ concentration at the National Seashore monitoring site and an Exceptional Event (e.g., fires from Mexico and Central America). Our analysis identified all the days that TCEQ identified and an additional 8 days in 2022 and 13 days in 2023 that we believe could be valid Exceptional Event days. Table 1-1 and Table 1-2 show the date, Tier Level[1] and type of event at the National Seashore monitor in Kleberg County. Rows highlighted in orange correspond to days that TCEQ has already included in their EED. Although we find the evidence presented by TCEQ for the 2022 and 2023 Exceptional Event days at National Seashore compelling and convincing and their exclusion is sufficient to attain the 2024 9.0 µg/m^3 annual $PM_{2.5}$ NAAQS, Tables 1-1 and 1-2 provide a list of additional days that could be substituted as Exceptional Event days if needed.

[1] The Tier Level is based on EPA's Tiering Tool that classifies 24-hour $PM_{2.5}$ concentrations from highest concentrations (Tier 1) that are most likely to be Exceptional Events so limited evidence is required to demonstrate that the day is an Exceptional Event to lower concentrations (Tier 3) where more evidence is required to show that the day is an Exceptional Event (https://www.epa.gov/air-quality-analysis/pm25-tiering-tool-exceptional-events-analysis).

Table 1-1. Days Ramboll identified in 2022 where $PM_{2.5}$ concentrations at the National Seashore monitor in Kleberg County have evidence that there is a clear causal relationship they are impacted by Exceptional Events. Rows in orange indicate days TCEQ includes in their EED.

Date	24-hour $PM_{2.5}$ ($\mu g/m^3$)	Tier Level	Type of Event
1/1/2022	30	1	Smoke from fires in Mexico
3/25/2022	30.5	1	Smoke from fires in Mexico
3/30/2022	20.1	2	Smoke from fires in Mexico and windblown dust
3/31/2022	19.1	2	Smoke from fires in Mexico
4/10/2022	19.2	2	Smoke from fires in Mexico
4/11/2022	21.7	2	Smoke from fires in Mexico
4/12/2022	21.7	2	Smoke from fires in Mexico
4/13/2022	27.7	1	Smoke from fires in Mexico
4/14/2022	18.9	2	Smoke from fires in Mexico
5/6/2022	21.7	2	Smoke from fires in Mexico
5/7/2022	23.1	2	Smoke from fires in Mexico
5/20/2022	26.6	2	Smoke from fires in Mexico
5/28/2022	18.3	2	Smoke from fires in Mexico
6/11/2022	23.6	2	Smoke from fires in Mexico
6/12/2022	48.5	1	Smoke from fires in Mexico
6/13/2022	36.4	1	Smoke from fires in Mexico
6/14/2022	29.8	1	Smoke from US wildfires
6/15/2022	38.5	1	Smoke from US wildfires
6/16/2022	46	1	Smoke from US wildfires
6/17/2022	28.8	1	Smoke from US wildfires
6/23/2022	18.5	2	Smoke from US wildfires
7/16/2022	27.3	1	Dust from Saharan desert
7/17/2022	34.6	1	Dust from Saharan desert
7/21/2022	24.7	2	Smoke from fires in Mexico
11/29/2022	16.9	2	Smoke from fires in Mexico
12/29/2022	19.7	2	Smoke from fires in Mexico

Table 1-2. Days Ramboll identified in 2023 where $PM_{2.5}$ concentrations at the National Seashore monitor in Kleberg County have evidence that there is a clear causal relationship they are impacted by Exceptional Events. Rows in orange indicate days TCEQ includes in their EED.

Date	24-hour $PM_{2.5}$ ($\mu g/m^3$)	Tier Level	Type of Event
1/3/2023	25.1	2	Smoke from fires in Mexico
1/16/2023	24	2	Smoke from fires in Mexico
1/18/2023	25.3	2	Smoke from fires in Mexico
2/14/2023	21.8	2	Smoke from fires in Mexico
2/22/2023	21.2	2	Smoke from fires in Mexico
3/2/2023	21.5	2	Smoke from fires in Mexico
4/4/2023	18.4	2	Smoke from fires in Mexico
4/5/2023	20.1	2	Smoke from fires in Mexico
5/5/2023	22.2	2	Smoke from fires in Mexico
5/6/2023	18.3	2	Smoke from fires in Mexico
5/7/2023	19.4	2	Smoke from fires in Mexico
5/8/2023	19.2	2	Smoke from fires in Mexico
6/13/2023	19	2	Smoke from fires in Mexico
6/14/2023	22.2	2	Smoke from fires in Mexico
6/19/2023	19.3	2	Smoke from fires in Mexico
7/14/2023	18.5	2	Smoke from fires in Mexico
7/15/2023	24.2	2	Smoke from fires in Mexico
7/16/2023	24.6	2	Smoke from fires in Mexico
7/18/2023	19.2	2	Smoke from fires in Mexico
7/19/2023	20.1	2	Smoke from fires in Mexico
7/25/2023	22.3	2	Dust from Saharan desert
7/26/2023	26.5	2	Dust from Saharan desert
7/27/2023	29.6	1	Dust from Saharan desert
7/28/2023	23.3	2	Dust from Saharan desert

From:	Skipp Kropp
To:	amda
Cc:	Skipp Kropp
Subject:	2022 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date:	Monday, January 20, 2025 2:41:16 PM
Attachments:	image001.png MOG Comments on TX EE DEMO (1.20.25).pdf

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Dear Ms. Saculla,
Attached on behalf of the Midwest Ozone Group (MOG) are comments in support of the 2022 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties. These comments are in support of both the 2022 and 2023 demonstrations and I will email them to you also using the 2023 comment link.
Thanks,
Skipp Kropp

Skipp Kropp
Attorney
Steptoe & Johnson PLLC
PO Box 36425
Indianapolis, Indiana 46236
Phone: 317-946-9882

Skipp.Kropp@steptoe-johnson.com
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From:	Skipp Kropp
To:	amda
Cc:	Skipp Kropp
Subject:	2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date:	Monday, January 20, 2025 2:38:52 PM
Attachments:	image001.png MOG Comments on TX EE DEMO (1.20.25).pdf

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Dear Ms. Saculla,
Attached on behalf of the Midwest Ozone Group (MOG) are comments in support of the 2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties. These comments are in support of both the 2022 and 2023 demonstrations and I will email them to you also using the 2022 comment link.
Thanks,
Skipp Kropp

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January 20, 2025

TCEQ Air Modeling and Data Analysis Section (Attn: Emily Saculla)
MC164
P.O. Box 13087
Austin, TX 78711-3087

Re: EXCEPTIONAL EVENTS DEMONSTRATION FOR 2022 AND 2023 PM2.5 EXCEEDANCES AT HARRISON COUNTY, TRAVIS COUNTY, AND KLEBERG COUNTY

Dear Ms. Saculla:

The Midwest Ozone Group[1]("MOG") is pleased to provide comments in support of this proposed demonstration and the use of the data involved in support of other demonstrations related to the events involved.

While the Clean Air Act (the "Act") requires States to meet certain air quality standards, the Act also recognizes that exceptional events, including wildfires and prescribed burns, may sometimes prevent that from happening. Exceptional events can cause air quality monitoring data to exceed permissible concentrations of a

[1] The membership of the Midwest Ozone Group includes: Ameren, American Electric Power, American Forest & Paper Association, American Iron and Steel Institute, American Wood Council, Appalachian Region Independent Power Producers Association, Associated Electric Cooperative, Berkshire Hathaway Energy, Big Rivers Electric Corp., Buckeye Power, Inc., Citizens Energy Group, City Water, Light & Power (Springfield IL), Cleveland-Cliffs Inc., Council of Industrial Boiler Owners, Duke Energy Corp., East Kentucky Power Cooperative, ExxonMobil, FirstEnergy Corp., Indiana Energy Association, Indiana-Kentucky Electric Corporation, Indiana Municipal Power Agency, Indiana Utility Group, Hoosier Energy REC, inc., LGE/ KU, Marathon Petroleum Company, National Lime Association, North American Stainless, Nucor Corporation, Ohio Utility Group, Ohio Valley Electric Corporation, Olympus Power, Steel Manufacturers Association, and Wabash Valley Power Alliance.

pollutant, also called an exceedance. When that happens, the Act directs the Administrator of the United States Environmental Protection Agency (USEPA) to exclude that data from further consideration if the state demonstrates to USEPA's satisfaction that the event caused the exceedance.

On December 19, 2024, the Texas Commission on Environmental Quality (TCEQ) issued a public notice regarding the availability for comment of a proposed "Exceptional Events for 2022 $PM_{2.5}$ exceedances at Harrison County, Travis County, and Kleberg County" and a proposed "Exceptional Events for 2023 PM 2.5 exceedances at Harrison County, Travis County, and Kleberg County." The deadline for the submittal of comments on both is January 21, 2025.

The proposed exceptional event demonstrations detail the $PM_{2.5}$ episodes occurring in the state of Texas on 23 days in 2022 and 18 days in 2023. The proposed demonstrations address the $PM_{2.5}$ episodes occurring at three monitors located in Harrison County (Karnack monitor), Travis County (Austin Webberville Rd. monitor), and Kleberg County (National Seashore monitor). Specifically, for these three monitors, the proposed demonstrations provide technical documentation to support the TCEQ request to U.S. Environmental Protection Agency (EPA) to exclude $PM_{2.5}$ monitoring data for certain days in 2022 and 2023 strongly influenced by wildfires, prescribed fires, high winds blowing dust, dust from the Sahara Desert, and fireworks to celebrate days such as July 4th. In 2022 and 2023, air quality at these locations in Texas were impacted by $PM_{2.5}$ exceptional events on multiple dates.

The following comments are offered on behalf of MOG in support of these proposed exceptional event demonstrations and the demonstrations of other states seeking to recognize the same events.[2]

MOG is an affiliation of companies and associations that draws upon its collective resources to seek solutions to the development of legally and technically sound air quality programs that may impact on their facilities, their employees, their communities, their contractors, and the consumers of their products. MOG's primary efforts are to work with policy makers in evaluating air quality policies by encouraging the use of sound science. MOG has been actively engaged in a variety of issues and initiatives related to the development and implementation of air quality policy, including the development of transport rules (including exceptional events demonstrations, implementation of NAAQS standards, nonattainment designations, petitions under Sections 126, 176A and 184(c) of the Clean Air Act ("CAA"), NAAQS implementation guidance, the development of Good Neighbor State Implementation Plans ("SIPs"), the development of greenhouse gas and Mercury

[2] These comments were prepared with the technical assistance of Alpine Geophysics, LLC.

and Air Toxics Standards Rules and related regional haze issues. MOG Members and Participants own and operate numerous stationary sources that are affected by air quality requirements including the $PM_{2.5}$ NAAQS.

By way of background, when amending the Clean Air Act in 2005, Congress intended to provide regulatory relief for NAAQS nonattainment resulting from exceptional events negatively affecting air quality that were outside of a state's control. That concern led to enactment of provisions specifically establishing the process by which USEPA could exclude air quality monitoring data directly related to an exceptional event. *See* 42. U.S.C. § 7619. Subsequently, USEPA promulgated the exceptional events rule. 40 C.F.R. § 50.14. Under the exceptional events rule, USEPA excludes "any data of concentration of a pollutant above the NAAQS (exceedances) if the air quality was influenced by exceptional events." *Bahr v. Regan,* 6 F.4th 1059, 1066 (9th Cir. 2021) (cleaned up).

A state requesting data exclusion under the exceptional events rule must demonstrate "to the Administrator's satisfaction that such event caused a specific air pollution concentration at a particular air quality monitoring location." 40 C.F.R. § 50.14(a)(1)(ii). That demonstration must include certain regulatory required information:

> (A) A narrative conceptual model that described the event(s) causing the exceedance or violation and a discussion of how emissions form the event(s) led to the exceedance or violation at the affected monitor(s);
>
> (B) A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation;
>
> (C) Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section. The Administrator shall not require a State to prove a specific percentile point in the distribution of data;
>
> (D) A demonstration that the event was both not reasonably controllable and not reasonably preventable; and
>
> (E) A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

40 C.F.R. § 50.14(c)(3)(iv).

A state must also comply with pre-request requirements, which include notifying USEPA of the intent to request exclusion, flagging data to be excluded, engaging in public comments, and implementing mitigation measures. See 40 C.F.R. § 50.14(c)(2)(i); 40 C.F.R. § 50.14(c)(3)(v); 40 C.F.R. § 51.930. In short, there are three core statutory elements: (1) a clear causal relationship; (2) a showing that the event was not controllable, and (3) a showing that the event was human activity unlikely to recur a particular location or was a natural event.

Depending on the circumstances of a particular exceptional event, a particular tier of evidence is required to provide a compelling case to USEPA to exclude data under the Exceptional Events Rule. In instances where a state provides sufficient evidence to showcase that a given event is indeed an irregularity, USEPA will make a concurring determination and issue an exclusion of that specific event from the dataset. 40 C.F.R. 50.14(c)(2)(ii).

Wildland fires make up 44% of primary $PM_{2.5}$ emissions. See 89 Fed. Reg. 16214. As such, these events can cause exceedances that impact design values in a particular area.

USEPA has recognized that these particular events are exceptional and that states may request to exclude them from the dataset, given that a sufficient evidentiary standard is met. *Id*; see generally, 81 Fed. Reg. 68216. There are several tiers of evidentiary showings related to $PM_{2.5}$ demonstrations. These three tiers create a ladder of increasing evidentiary burdens on the states to convince USEPA that an event merits exclusion.

- Tier 1 clear causal analyses are intended for wildland fire events that cause unambiguous $PM_{2.5}$ impacts well above historical 24-hour concentrations, thus requiring less evidence to establish a clear causal relationship.

- Tier 2 clear causal analyses are likely appropriate when the impacts of the wildland fire on $PM_{2.5}$ concentrations are less distinguishable from historical 24-hour concentrations, and require more evidence, than Tier 1 analyses.

- Tier 3 clear causal analyses should be used for events in which the relationship between the wildland fire and $PM_{2.5}$ 24-hour concentrations are more complicated than a Tier 2 analysis, when 24-hour $PM_{2.5}$ concentrations are near or within the range of historical concentrations, and thus require more evidence to establish the clear causal relationship than Tier 2 or Tier 1.

U.S. Environmental Protection Agency, *$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document* (April 2024) at 5. It is important to note that the overall processes for exceptional event demonstrations for wildfire ozone and wildland fire $PM_{2.5}$ are the same. See *id*. at 6. EPA has also acknowledged that, "[a]lthough the O3-specific tiering structure does not apply to PM, nearly all of the same types of individual analyses may apply to PM…" [3] MOG also agrees with TCEQ's analysis of the impact of holiday fireworks, citing 40 CFR 50.14(b)(2), which states that "The Administrator shall exclude data from use in determinations of exceedances and violations where a State demonstrates to the Administrator's satisfaction that emissions from fireworks displays caused a specific air pollution concentration in excess of one or more national ambient air quality standards at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Such data will be treated in the same manner as exceptional events under this rule, provided a State demonstrates that such use of fireworks is significantly integral to traditional national, ethnic, or other cultural events including, but not limited to, July Fourth celebrations that satisfy the requirements of this section."

MOG notes that the proposed demonstrations show that the exceptional events affected the Harrison County (Karnack monitor), Travis County (Austin Webberville Rd. monitor), and Kleberg County (National Seashore monitor) monitors during each of the documented episodes. This caused average $PM_{2.5}$ concentrations at those three monitors to experience multiple daily Tier 1 and 2 level exceedances as defined in EPA's Tiering Tool[4] during the relevant episodes.

MOG fully supports the TCEQ request that the USEPA Administrator exclude the ambient $PM_{2.5}$ concentrations measured at the Harrison County (Karnack monitor), Travis County (Austin Webberville Rd. monitor), and Kleberg County (National Seashore monitor) monitoring sites from calculation of annual $PM_{2.5}$ design values and from other regulatory determinations.

As set forth in its proposed demonstrations, TCEQ has shown that transported smoke and dust from the exceptional events caused the $PM_{2.5}$ exceedances at the Harrison County (Karnack monitor), Travis County (Austin Webberville Rd. monitor), and Kleberg County (National Seashore monitor) monitors. TCEQ

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[3] "Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations" August 2019 (https://www.epa.gov/sites/default/files/2019-08/documents/ee_prescribed_fire_final_guidance_-_august_2019.pdf)

[4] U.S. Environmental Protection Agency. "Tiering Tool – for Exceptional Events Analysis". Air Quality Analysis. U.S. Environmental Protection Agency, March 26, 2024, https://www.epa.gov/air-quality-analysis/tiering-tool-exceptional-events-analysis

correctly notes that exclusion of the data on the relevant dates would result in continued attainment of the 2024 revised primary annual $PM_{2.5}$ NAAQS.

The proposed demonstrations go on to address such remaining factors as a narrative conceptual model describing the event as not reasonably controllable and not caused by human activity and satisfies requirements related to notification of the public of the events and participation of the public in the submission of this request.

The monitors and episode days that are carefully addressed in the proposed TCEQ demonstrations are far from the only ones that have influenced air quality during those time frames. Many $PM_{2.5}$ monitors in the same area also observed 24-hour average $PM_{2.5}$ concentrations at significantly elevated levels on the same exclusion dates, as well as on days around these dates. As has been noted, additional days, even if not currently 'regulatorily significant,' may in the future be relevant and significant not only to Texas but also to other states. USEPA should consider allowing this proposed demonstration to stand for those additional monitors and days, as needed.

MOG appreciates this opportunity to offer comments in support of the proposed TCEQ exceptional events demonstrations for the exceedances of the 2022 and 2023 Annual $PM_{2.5}$ NAAQS at the Harrison County (Karnack monitor), Travis County (Austin Webberville Rd. monitor), and Kleberg County (National Seashore monitor) monitors due to smoke from Canadian Wildfires, smoke from prescribed burning, high winds blowing dust, dust from the Sahara Desert, and smoke from fireworks. MOG also appreciates the opportunity to express support for consideration of this data in the development of demonstrations by other states related to these events. Congress has made it clear that data of the nature described in this proposed demonstration cannot and should not be used to implement a National Ambient Air Quality Standard and other matters of regulatory significance.

Very truly yours,

Edward L Kropp

Edward L. Kropp
Legal Counsel
Midwest Ozone Group

From:	Glendora Lopez
To:	amda
Cc:	Tim Wood; Doug Booher
Subject:	2022 PM2.5 Exceptional Events Demonstration- Harrison, Travis, and Kleberg Counties
Date:	Friday, January 17, 2025 10:50:57 AM
Attachments:	image001.png TCEQ Public Comment for EE Demonstrations.pdf

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Good morning,

Please see attachment which includes The Texas Department of Transportation Environmental Affairs Division's (TxDOT ENV's) public comment on exceptional events demonstration for fine particulate matter (PM2.5) exceedances in 2022 at Harrison County, Travis County, and Kleberg County.

Thank you,

Glendora Lopez| Environmental Specialist
Environmental Affairs Division |6230 E Stassney Ln, Austin, Texas 78744
Office: (512) 840-9720 |Email: Glendora.Lopez@TxDOT.gov

From:	Glendora Lopez
To:	amda
Cc:	Tim Wood; Doug Booher
Subject:	2023 PM2.5 Exceptional Events Demonstration- Harrison, Travis, and Kleberg Counties
Date:	Friday, January 17, 2025 10:50:50 AM
Attachments:	image001.png TCEQ Public Comment for EE Demonstrations.pdf

Good morning,

Please see the attachment which includes The Texas Department of Transportation Environmental Affairs Division's (TxDOT ENV's) public comment on exceptional events demonstration for fine particulate matter (PM2.5) exceedances in 2023 at Harrison County, Travis County, and Kleberg County.

Thank you,

Glendora Lopez| Environmental Specialist
Environmental Affairs Division |6230 E Stassney Ln, Austin, Texas 78744
Office: (512) 840-9720 |Email: Glendora.Lopez@TxDOT.gov

Docusign Envelope ID: 5B0501CA-5E16-45F5-8958-89B392803EDD

125 E 11th St | Austin, Texas 78701
512.463.8588
txdot.gov

January 17, 2025

Ms. Emily Saculla
TCEQ Air Modeling and Data Analysis Section
MC164
P.O. Box 13087
Austin, TX 78711-3087

Re: Public Comment on Exceptional Events Demonstration for Fine Particulate Matter ($PM_{2.5}$) Exceedances in 2022 and 2023 at Harrison County, Travis County, and Kleberg County

Dear Ms. Saculla,

The Texas Department of Transportation Environmental Affairs Division (TxDOT ENV) supports the 2022 and 2023 exceptional event demonstrations for Harrison County, Travis County, and Kleberg County dated December 19, 2024. TxDOT's mission is to deliver mobility, enable economic opportunity, and enhance the quality of life for all Texans while prioritizing environmental stewardship. New $PM_{2.5}$ nonattainment designations will directly impact TxDOT's primary mission of moving people and goods by creating delays to the delivery of transportation projects over the next several decades. As such, ENV appreciates TCEQ's use of all regulatory tools available, including this exceptional events package, to avoid any unnecessary designations and the associated impacts.

State designations use the three-year average of $PM_{2.5}$ emissions from regulatory monitors to determine nonattainment, attainment, and unclassifiable areas. The 2024 primary annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) is met when the three-year average is less than or equal to 9.0 $\mu g/m^3$ (40 CFR § 50.20). The exceptional events demonstration aims to remove exceptional events from the design value calculation because those exceedances are due to unusual or naturally occurring events that affect air quality which are not reasonably controllable or preventable.

According to Texas Commission on Environmental Quality's (TCEQ's) exceptional events demonstrations for 2022 and 2023 for Harrison, Travis and Kleberg Counties, the 2021-2023 design values are 9.0 $\mu g/m^3$ at the Karnack Monitor (Harrison County), 9.0 $\mu g/m^3$ at the Austin Webberville Road Monitor (Travis County), and 9.0 $\mu g/m^3$ at the National Seashore Monitor (Kleberg County), thereby meeting the 2024 primary annual $PM_{2.5}$ standard.

Once again, TxDOT ENV supports TCEQ in appropriately using regulatory mechanisms like this exceptional events package to prevent unnecessary designations and the associated deleterious impacts. We appreciate the opportunity to comment.

Sincerely,

DocuSigned by:
Doug Booher
FF2EB9A2A91645A...

Doug Booher
Director of Environmental Affairs Division

From: Cyral Miller
To: amda@tceq.texas.gov
Subject: 2022 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date: Wednesday, January 15, 2025 1:05:49 PM

Since we know that we will have Saharan dust in our air, and that it will bring particulates that are harmful to our health, doesn't it seem like a good idea to work even harder to clean our air so that these events don't throw us into dangerous levels of pollution, rather than simply disregard the high levels of matter that we are breathing in?

And why aren't there more particulate monitors statewide, so that we don't exempt areas due to no data?

The goal is to ensure really clean air, not to pass or dodge clean air requirements!

Sent from my iPad

From: Alan Cherepon
To: amda
Subject: 2023 PM2.5 Exceptional Events Demonstration - Harrison, Travis, and Kleberg Counties
Date: Tuesday, January 21, 2025 10:13:51 AM

I am submitting my comments as not only a longtime citizen of Texas who has lived in Tyler, Karnes City, Austin, Corpus Christi, and Cedar Park, but also as a career and licensed geologist (I have also been a [redacted] employee since 1998). I have worked both in Texas and in NY/NJ for programs that included Superfund, LPST, RCRA, Real Estate Assessments, and FIFRA. Having first come to Texas in 1976 from NJ, I have worked all parts of the state, also conducting work for uranium and Oil & Gas exploration, and have seen the Austin area grow from a small city in 1979 to a major metropolitan area. It has become more like NYC in recent years as millions of people have moved here, traffic never seems to end, and the air quality in comparison to what it was like in 1979, especially on a hot summer day, has become much worse, and I doubt it is due to Sahara Dust or smoke from Mexico. You can't add this many people and vehicles, and the urban sprawl that comes with it, and expect air quality to remain acceptable, especially in the hot summer months. I recall conducting environmental work in Downtown NYC in the mid-80s, and not being able to get my air monitoring instrument to zero out on the sidewalk. It required purified air cylinders. Do we want Austin, our Capitol, to become like NYC in respect to air quality, traffic, and other issues? Looking at the daily bumper-to-bumper traffic, and the dust clouds from numerous construction sites, I am surprised that someone is attempting to blame the poor air quality on exceptional events. It would be interesting to see statistics on the number of people with lung/breathing issues and doctor/hospital visits for such from about 10 or20 years ago vs the past five years, as well as a graph showing increases in such over time. Having a daughter with lung issues in the Dallas area, I recommended she get an air purifier at least for her bedroom, so she can have clean air to breath while she is sleeping. She has since been using one, and it helps. I know (including at least one other [redacted] employee) others who do the same, especially for pollen (like cedar), which adds to the air quality issues. I would guess anyone who has lived in the major metropolitan areas for a long time, with asthma or other breathing issues, has likely noticed more days with breathing problems now than in the past. Regardless, some medical statistics and more extensive air quality data seem to be needed before making this decision on whether or not our air quality is seriously impacted and requires more attention and not lessening regulations for the sake of continued growth. I don't consider myself a staunch environmentalist by any stretch of the imagination, just someone who has seen changes here, and has enough experience to know when there is an environmental problem that requires some action.

Alan Cherepon, P.G., P.H., Geologist III
[redacted]