



Appendix D

Public Process Documentation

Air Quality Division
December 12, 2024 Final Version

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Responsiveness Summary to Comments Received During the Public Comment Period

*Air Quality Division
December 12, 2024 Final Version*

This responsiveness summary contains the Arizona Department of Environmental Quality's (ADEQ) responses to all comments received on ADEQ's proposed 2024 Primary Annual Fine Particulate Matter (PM_{2.5}) National Ambient Air Quality Standard (NAAQS) Boundary Recommendations that was made available for a 31-day formal comment period commencing on Sept 23, 2024 and ending on Oct 24, 2024.

Comment 1: ADEQ received a comment that expressed the commenters support for a strengthened PM_{2.5} annual standard. The commenter also noted that Arizona experiences multiple negative environmental impacts including air quality, heat, wildfires, wood burning, vehicle emissions, fireworks, toxic chemicals, deforestation, and overdevelopment.

Response 1: ADEQ thanks the commenter for their comment.

Comment 2: ADEQ received a comment from a native of Arizona with COPD. Commenter expressed that they believe volatile organic compounds (VOC's) should be monitored and reported. Commenter also stated that wildfires and prescribed burns were producing the most air pollution and that it was killing people like the commenter.

Response 2: ADEQ thanks the commenter for their comment. The Environmental Protection Agency (EPA) has established the following criteria pollutants under Clean Air Act (CAA) §§ 108 and 109 for: particulate matter, ozone, carbon monoxide, lead, sulfur dioxide and nitrogen dioxide. Additionally, EPA establishes standards for hazardous air pollutants under CAA § 112. However, this boundary recommendation is responsive to EPA's final rule promulgating the revised 2024 primary annual NAAQS for PM_{2.5}. Therefore, this boundary recommendation only examined PM_{2.5}, and PM_{2.5} precursors. Ambient air monitoring networks do monitor for nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and volatile organic compounds (VOCs). For example, the State and Local Air Monitoring Stations (SLAMS), consists of monitoring sites operated for the purpose of demonstrating compliance with the NAAQS for the criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), and lead (Pb). More information regarding ADEQ's monitoring network and network plan is available <https://azdeq.gov/air-quality-annual-reports>. Lastly, prescribed burns are beyond the scope of this boundary recommendation. However, ADEQ's rules in Arizona Administrative Code (A.A.C) Title 18, Chapter 2, Article 15 cover prescribed burns.

Comment 3: ADEQ received a comment letter from the Maricopa Association of Governments (MAG) with multiple comments (Comments 3.1 to 3.3) included which are addressed below.

Comment 3.1: In their comment, MAG recommended that the entirety of Pinal County be designated as attainment/unclassifiable. MAG commented that EPA stated that the Hidden Valley and Cowtown monitoring sites were so similar in nature that the respective site's air quality data could be combined into a single record. MAG also noted that the Cowtown monitor was found to be ineligible for comparison to the annual PM_{2.5} NAAQS. MAG commented that as the Cowtown monitor was determined by EPA to be ineligible for comparison with annual PM_{2.5} NAAQS, the Hidden Valley monitor should also be found to be ineligible for comparison with the annual PM_{2.5} NAAQS. MAG comments the contingent boundary is unnecessary and is not reflective of micro-scale sources that are causing high annual PM_{2.5} concentrations at the Hidden Valley monitor.

Response 3.1: ADEQ appreciates MAG's comments on this subject. However, unless EPA approves Pinal County Air Quality Control District's (PACQCD) demonstration pursuant to 40 Code of Federal Regulations (CFR) 58.30, ADEQ believes it is unlikely that EPA would designate all of Pinal County as attainment/unclassifiable because there is a monitor located in this area that is violating the 2024 annual PM_{2.5} NAAQS.

ADEQ agrees that EPA's statements in the 2019 Determination of Attainment by the Attainment Date for the 2006 24-hour PM_{2.5} NAAQS for Pinal County (84 Fed. Reg. 52766, 52768) seem to indicate EPA's acknowledgement that Cowtown and Hidden Valley sites are similar. ADEQ disagrees with the commenter's assertion that the contingent boundary is unnecessary. Commenter points out that EPA found that the Cowtown monitor was a unique middle-scale site that met the requirements to be excluded from comparison to the annual PM_{2.5} NAAQS, but that determination has not been made for the Hidden Valley site.

On October 29, 2024 EPA denied PCAQCD's 40 CFR 58.30 demonstration for Hidden Valley monitoring site. EPA found that the data from the PM_{2.5} monitor at the Hidden Valley monitoring site is comparable to the annual PM_{2.5} NAAQS. ADEQ will retain its contingent recommendation in the event that EPA's decision is reconsidered or reversed.

Unless EPA finds that the Hidden Valley monitor is ineligible for comparison to the annual PM_{2.5} NAAQS, there will be a violating monitor with valid monitoring data within Pinal County. If there is a violating monitor, the State must recommend a nonattainment area boundary that would include the violating monitor and areas nearby a violating monitor that are contributing to the violation.

Comment 3.2: MAG's comment stated, "Since ADEQ concludes in their recommendation summary [Section 3.2.7] above that the PM_{2.5} sources that are causing the violation of the 2024 annual PM_{2.5} NAAQS at the Hidden Valley monitor are all located within 0.5 kilometers of the monitor, there is no meaningful justification

or weight of evidence for proposing a contingent nonattainment area boundary so large, with a width of approximately 30 kilometers.”

Response 3.2: ADEQ disagrees with MAG’s interpretation of Section 3.2.7. ADEQ did not state that sources that are causing, or contributing to violations of the 2024 NAAQS are only located within 0.5 kilometers of the monitor.

Rather, the draft report states, “All areas within 0.5 kilometers of the violating monitor are contained within the recommended 2024 primary annual PM_{2.5} boundary for Pinal County.” ADEQ, 2024 Primary Annual Fine Particulate Matter NAAQS Boundary Recommendations Draft Report, 104 (Sep. 23, 2024). In other words, a 0.5-kilometer radius around the monitor is entirely within ADEQ’s proposed boundary. A similar statement is made with regard to the violating monitors in Maricopa County. *Id.* at Section 3.1.6. MAG misinterprets this sentence to imply that PM_{2.5} sources causing violations of the PM_{2.5} NAAQS are only within 0.5 kilometers of the monitor. However, this is contrary to the plain meaning of the sentence.

Additionally, ADEQ disagrees that the size of the proposed boundary recommendation is not supported by meaningful justification or weight of evidence. ADEQ considered the five factors when analyzing PM_{2.5} contributions to monitor violations.

As part of the jurisdictional analysis (Section 3.2.6) and weight of evidence (Section 3.2.7), ADEQ considered EPA’s analysis for the 2006 PM_{2.5} West Pinal nonattainment area boundary. Several of the factors, such as meteorology, topography, and geography have not substantially changed since EPA’s analysis. In its 2010 technical support document (TSD), EPA examined the 2005 National Emissions Inventory (NEI) for primary PM_{2.5}. This analysis showed that agriculture (crop tilling & livestock dust) accounted for 18% of total primary PM_{2.5} emissions in Pinal County. ADEQ’s analysis of the 2020 NEI shows that crops and livestock dust account for 19.6% of PM_{2.5} emissions. As can be seen in Figure 45 (*Id.* at 89), the 2006 PM_{2.5} NAAQS boundary and ADEQ’s proposed boundary for the 2024 boundary encompass a significant portion of agriculture and feedlot lands near the monitor, which accounts for the second largest portion of the NEI. Additionally, the HYSPLIT analysis (Section 3.2.4.2) and gridded emissions analysis (Section A3.4) support retaining the 2006 PM_{2.5} nonattainment area if EPA does not approve PCAQCD’s 40 CFR § 58.30 request.

Comment 3.3: MAG’s comment expressed concerns over what size boundary EPA may propose should EPA determine that the Hidden Valley monitor is eligible for comparison with the 2024 annual PM_{2.5} NAAQS should not be the sole reason for including a contingent nonattainment area boundary.

Response 3.3: ADEQ disagrees with MAG's comment. Speculation over EPA's final boundary designations was not a factor that was considered by ADEQ, let alone being the sole reason for including a contingent nonattainment area boundary. ADEQ based its recommendations on the five factors discussed in Sections 2.2 and 3.2 of the proposed boundary recommendations.

As described above, the jurisdictional analysis did include a review of EPA's boundary designations for the 2006 PM_{2.5} NAAQS. However, consideration of EPA's past actions is distinct and separate from speculation over EPA's future actions.

Comment 4: ADEQ received a joint comment letter from the cities of Tempe, Chandler, Mesa, and Gilbert (East Valley Communities) with multiple comments (Comments 4.1 and 4.2) included which are addressed below.

Comment 4.1: Commenters expressed that they believe the Maricopa County nonattainment boundary developed by the Maricopa County Air Quality Department (MCAQD) would address the PM_{2.5} problematic areas excluding non-problematic areas (e.g., Tempe, Chandler, Mesa, and Gilbert) that are not in the "airshed". Commenters stated that PM_{2.5} data from MCAQD collected over the past 10 years shows these areas are compliant with federal standards. Commenters indicated that MCAQD has demonstrated that PM_{2.5} concentrations exceeding 9 µg/m³ are concentrated in central, southern, and western Phoenix and that the area of concern is located southwest of the violating monitors while the East Valley does not contribute to these exceedances as indicated in the Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 season. Commenters also noted that County data showed that these violations are largely attributed to winter fires and holiday activities as demonstrated by speciation modeling results from the West Phoenix air monitoring site, covering November to January from 2014 to 2020.

Response 4.1: In its response to comments, attached as Appendix C to the Proposed Draft PM_{2.5} Boundary Recommendation, ADEQ addressed the specific reasons why ADEQ disagreed with MCAQD's proposed map. ADEQ refers the commenter to Appendix C for this explanation. While the East Valley Communities are not in the same "airshed" as indicated in ADEQ's prior analysis, ADEQ updated its recommendations to include HYSPLIT back trajectory modeling and gridded emissions (see Sections 3.1.3.2 and A3.4 of ADEQ's report). EPA's designations memo recommends using HYSPLIT modeling to help understand the complex fate of transport in an area. EPA, Initial Area Designations for the 2024 Revised Primary Annual Fine Particle National Ambient Air Quality Standard, Memorandum from Joseph Goffman, Assistant Administrator, to Regional Administrators, Regions 1-10 (February 7, 2024), 11, https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-designations-memo_2.7.2024-_jg-signed.pdf.

These updated analyses demonstrate that emissions of PM_{2.5} and PM_{2.5} precursors were potentially transported from the East Valley to the violating monitors during the 2021-2023 design value period. See Sections 3.1.3.2 and A3.4. ADEQ reviewed airsheds within Maricopa County as part of the geography and topography factor (Section 3.1.4). While the airsheds can help support the weight of evidence analysis, they are not dispositive of airflow. In combination with the HYSPLIT and the gridded emissions analyses, ADEQ believes the weight of evidence shows that there may be contribution from the East Valley to the violating monitors. As mentioned in response to MCAQD's comments. EPA does not set a numerical threshold for determining significant contribution in the context of boundary designations, and ADEQ declines to do so as well.

Lastly, ADEQ agrees that the design values for the PM_{2.5} monitors located in Tempe and Mesa are below the 2024 primary annual PM_{2.5} NAAQS. There are no PM_{2.5} monitors in Chandler and Gilbert. However, CAA § 107(d)(1)(A) states in relevant part, "The Governor of each State shall . . . submit to the Administrator a list of all areas (or portions thereof) in the State, designating as – (i) nonattainment, any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant." Areas that are attaining the NAAQS, but are contributing to ambient air quality in nearby areas that do not meet the NAAQS are also to be included in the relevant nonattainment area. As discussed above, there is contribution from the East Valley to the violating monitors.

Comment 4.2: Commenters stated that the cities of Tempe, Chandler, Mesa and Gilbert are currently compliant with EPA's PM_{2.5} NAAQS, with historical data indicating annual average concentrations below 9.0 µg/m³. Commenters highlight their belief that MCAQD demonstrated that the sources effecting PM_{2.5} air monitors are very localized and that ADEQ's proposal overextends by including areas that are already meeting federal standards and do not contribute to the affected monitors. Commenters also noted that this reflects effective air quality management in these cities, which helps protect public health and maintain a healthier environment for residents.

Response 4.2: ADEQ agrees with the commenters that the 2021-2023 PM_{2.5} annual design values for the PM_{2.5} monitors located in Tempe and Mesa are below the 2024 primary annual NAAQS level of 9.0 µg/m³. There are currently no PM_{2.5} monitors in Chandler and Gilbert. As noted in the Departments' response above, the locations of violating monitors is only one of many considerations when establishing nonattainment area boundaries. As detailed in the Departments' boundary recommendation, the department believes there is sufficient evidence establishing a potential source-receptor relationship between East Valley emissions sources/activities (direct PM_{2.5} and PM_{2.5} precursors pollutants) and monitors

violating the 2024 PM_{2.5} standard based on 2021-2023 data. As detailed in Appendix C, ADEQ disagrees with MCAQD's analysis. ADEQ acknowledges that local sources of PM_{2.5} and PM_{2.5} precursors impact the monitors. However, ADEQ's analysis demonstrates that other areas in Maricopa County are likely to be contributing to nonattainment at the violating monitors. See Section 3.1. off ADEQ's Recommendation. Therefore, ADEQ disagrees with this comment's assertion that the areas included do not contribute to the violating monitors. ADEQ appreciates the work and collaboration with the East Valley Communities to protect human health and the environment.

Comment 5: ADEQ received a comment letter from the Maricopa County Air Quality Department (MCAQD) with multiple comments (Comments 5.1 to 5.23) included which are addressed below.

Comment 5.1: Commenter stated that to better identify sources that are contributing to nonattainment, months with an average PM_{2.5} concentration greater than 9 µg/m³ should be evaluated separately from months where the average PM_{2.5} concentration is below PM_{2.5}.

Response 5.1: ADEQ disagrees with MCAQD's assertion that months with an average PM_{2.5} concentration below the 2024 PM_{2.5} NAAQS level of 9.0 µg/m³ should be evaluated separately. As noted by the commenter, Section 3.1.1 of ADEQ's proposed boundary recommendation does evaluate temporal PM_{2.5} trends at the violating monitors. ADEQ's analysis includes examination of seasonal trends similar to the analyses performed by MCAQD. As seen in both ADEQ's and MCAQD's analyses, daily PM_{2.5} mass concentrations above 9.0 µg/m³ have been recorded at violating monitors in almost all months in the 2021-2023 design value period. MCAQD's assertion that PM_{2.5} values occurring in more than half the year should be set aside and analyzed separately would only obfuscate emission trends and emission sources that could be contributing to violations of the annual PM_{2.5} standard. Given that the 2024 PM_{2.5} NAAQS is calculated using an annual averaging time, ADEQ maintains that an examination of all days with concentrations above and below the numerical level of the NAAQS are integral to evaluating and establishing a boundary for the violating Maricopa County monitors.

Comment 5.2: Commenter stated that during the winter burn season, concentrations at the violating monitors are higher on the weekends which suggests the emissions are more correlated with residential activity than with industrial and transportation sources.

Response 5.2: ADEQ appreciates the analysis provided by the commenter evaluating day-of-the-week trends for the violating Maricopa County monitors during the 2021-2023 design value period. ADEQ agrees that correlating the increase in weekend PM_{2.5} concentrations to influences from residential activity may be a reasonable

interpretation of the data. However, ADEQ disagrees that this analysis would support a smaller nonattainment area boundary for Maricopa County as proposed by the commenter. As noted in EPA's 2024 Initial Area Designations memorandum, nonattainment area boundaries should include "any nearby areas with emissions of PM_{2.5} or PM_{2.5} precursors that have the potential to be transported to the violating monitor." While the commenters analysis provides insight into concentration levels on a day-of-the-week scale, it does not provide evidence that is counter to the proposed Maricopa County nonattainment area boundary. As discussed in Section 3.1 of the proposed recommendation, the Maricopa County boundary was established after careful consideration of the five factors which include emissions from sources such as residential wood combustion. As presented, Figure 2 from the commenter displays that while PM_{2.5} emissions during the months of Nov-Feb (2021-2023) are elevated on weekends, the PM_{2.5} concentrations remain well above the annual NAAQS on all days of the week. In fact, the analysis appears to present that PM_{2.5} concentrations at the Durango Complex monitor are higher on Mondays than Saturdays for the examination period. ADEQ believes the presented data will provide useful information in developing future strategies to reduce emissions of PM_{2.5} in Maricopa County but does not provide evidence for a smaller nonattainment area boundary for Maricopa County.

Comment 5.3: Commenter states that Figure 32 of the boundary recommendation shows a concentration spike in the morning as traffic and industrial activity begin, with the Durango Complex monitor (located in an industrial area) displaying the largest spike. Commenter notes nighttime spikes at Durango Complex occurs later than those at the South and West Phoenix monitors, suggesting particulate matter is being transported to the area from neighborhoods surrounding central, south, and west Phoenix. Commenter states these patterns provide evidence suggesting residential activity (such as wood burning) are among dominant sources impacting the violating monitors. Commenter notes that the concentrations are lowest between 12:00 pm and 4:00 pm suggesting that industrial sources which operate throughout the day have minimal impact on PM_{2.5} concentrations at the violating monitors.

Response 5.3: ADEQ agrees with the commenter on the stated temporal trends in PM_{2.5} concentrations as presented in Figure 32 and the boundary recommendation documentation. ADEQ provides HYSPLIT modeling results in kernel density estimation (KDE) plots in Figures 29, 30, and 31 of the report. These model results show where air has been historically transported from for each violating monitor and suggest that transport is occurring from further locations than the commenter states. ADEQ agrees that emissions data suggests that nonpoint sources, such as residential activity, could be large contributors to the violating monitors. ADEQ agrees that PM_{2.5} concentrations tend to be lowest around 12pm-4pm and that industrial point sources may have a lesser impact on PM_{2.5} concentrations at the

violating monitors than other source sectors given their relative contribution to total annual 2020 Maricopa County direct PM_{2.5} and PM_{2.5} precursor emissions.

Comment 5.4: Commenter presented that Figure 4 of its comment letter shows PM_{2.5} concentrations on holidays during the wood burning season. Commenter asserts emissions from industrial and transportation sources are significantly reduced on Christmas and New Year's Day, providing evidence that residential activities, such as wood burning and fireworks, are the primary sources on these days.

Response 5.4: ADEQ agrees with the commenter that it may be a reasonable assertion that elevated PM_{2.5} concentrations on holidays may be more influenced by nonpoint emissions. However, ADEQ disagrees that this information provides a compelling argument for establishing a smaller nonattainment area boundary. While the highest PM_{2.5} concentrations during the 2021-2023 design value period do occur around holidays, too much emphasis on these days ignores the contributions from other sources throughout the year which all factor into the calculation of the annual standard. In addition, ADEQ is not pursuing exceptional event demonstrations for holidays in the 2021-2023 design value period, as it would not have a regulatory significant impact. This fact further emphasizes that the nonattainment area should not be drawn around the subset of emission sources/activities that contribute to days with the highest 24-hour concentrations, but rather on sources/activities that have the potential to contribute to elevated PM_{2.5} concentrations throughout the year.

Comment 5.5: Commenter states that an increased spatial resolution would be useful as PM_{2.5} sources generally have short-range effects on surrounding areas. Commenter provided Figure 5, a correlogram of PM_{2.5} air monitors in Maricopa and Pinal Counties. Commenter notes that a strong correlation is generally considered to be >0.70, the highest correlation in its dataset is 0.57 and 87% of the air monitoring sites have less than 0.40 correlation. Commenter states this provides substantial evidence that the effect of sources impacting PM_{2.5} monitors is very localized because sources associated with one monitor (such as traffic or industrial activities) are not triggering substantial correlation with the nearest monitor. Commenter notes the correlation analysis is not a prescribed step in the five-factor analysis, but provides useful information about spatial patterns of PM_{2.5} concentrations. Commenter notes the weak correlation of monitoring sites has been confirmed by other MCAQD studies.

Response 5.5: As ADEQ noted in Appendix C to its draft boundary report, ADEQ is unaware of any instances where EPA either used or approved the use of the correlation analysis as part of the boundary designation process contemplated by commenter. Commenter's October 24, 2024 letter reiterates its point from its July 19, 2024 comment letter. However, commenter's October 24, 2024 letter fails to provide any evidence supporting the use of the correlation analysis outside of the monitoring

network assessment. ADEQ disagrees with the spatial patterns of PM_{2.5} concentrations showing weak correlation of monitoring sites suggests very localized sources. In the Departments' boundary recommendation, ADEQ provides HYSPLIT modeling results showing a high density of points of air being transported from areas further than south, central, and west Phoenix.

Comment 5.6: Commenter notes MCAQD conducted studies with mobile or low-cost PM_{2.5} sensors. These studies included wintertime studies conducted annually between 2013 and 2020, as well as a multi-year Phoenix as a Testbed for Air Quality Sensors (PTAQS). Commenter states the annual wintertime studies included PM_{2.5} chemical speciation and were discontinued in 2020 due to consistent year to year results. Commenter states since 2020, there has not been significant changes to sources in the area.

Response 5.6: Measuring ambient concentrations of criteria air pollutants, including PM_{2.5}, must be done by Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM) in accordance with Title 40, Part 53 of the Code of Federal Regulations (40 CFR Part 53) to ensure accuracy and validity of NAAQS compliance. While EPA regulates low-cost monitors (LCM) to ensure that they meet certain performance standards, LCMs are not approved for use in comparing measurements directly to the NAAQS. Therefore, ADEQ cannot exclusively rely on the findings from the "Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 Season" when evaluating the first factor in the five-factor analysis—air quality data. ADEQ believes this study will be helpful to identify PM_{2.5} emissions reductions strategies for Maricopa County.

Comment 5.7: Commenter provided Figure 6, a map showing interpolated PM_{2.5} values for MCAQD's "Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 Season." Commenter noted that average PM_{2.5} concentrations greater than 9 µg/m³ were generally located in central, south, and west Phoenix.

Response 5.7: Spatial interpolation is not part of EPA's five factor analysis. ADEQ disagrees with the use of interpolation for regulatory decisions as ADEQ is not aware of any prior EPA action that relies on interpolation analysis. Additionally, Figure 6 excludes data from holidays. As described above, ADEQ is not pursuing exceptional event demonstrations for these days, as it would not have a regulatorily significant impact. Therefore, as EPA has not agreed to exclude these days, commenter's analysis used incomplete data to develop its interpolated values. While average PM_{2.5} concentrations greater than 9.0 µg/m³ are generally located near central, south, and west Phoenix, this analysis fails to consider per CAA § 107(d)(1)(A)(i) and EPA's boundary recommendation guidance that nonattainment area should include areas that do not meet the NAAQS or contribute to areas that do not meet the NAAQS.

In terms of the interpolation plots developed as part of MCAQD annual wintertime studies, ADEQ notes that there is often wide variability in predicted concentration surfaces depending on which spatial interpolation method is used. While MCAQD annual wintertime studies shows one representation of a concentration surface using an inverse distance weighted (IDW) technique, there are a multitude of spatial interpolation techniques that would produce different representations (e.g., kriging, spline, global polynomial). Given the variability in predicted concentration surfaces depending on the selected spatial interpolation method, ADEQ does not believe it provides a reliable data point to establish NAAQS area designations. ADEQ also has concerns that MCAQD annual wintertime studies' removal of holiday data could further bias the results given that they represent some of the highest daily PM_{2.5} values and may not be eligible for exclusion as exceptional events under EPA's 2016 Exceptional Events Rule.

Based on these data quality and approvability concerns, ADEQ does not believe the PTAQS project provides justification to modify the proposed Maricopa County area designations.

Comment 5.8: Commenter states that data from non-regulatory sensors are not commonly used to develop boundary recommendations, all available information should be considered. Commenter emphasized that data from the PTAQS project should be considered because care was taken to ensure sensors were sited in appropriate locations and the sensors were subjected to rigorous quality assurance evaluations.

Response 5.8: ADEQ appreciates the commenters work on the PTAQS project and the collaboration with EPA to collect more information about air sensors. ADEQ agrees with the commenter that the air sensor data is useful for informational purposes. However, ADEQ disagrees that corrected air sensor data should be considered in the development of area designations for the 2024 PM_{2.5} annual NAAQS. The primary venue where EPA currently presents air sensor data is through the AirNow Fire and Smoke Map V4. In this tool, EPA explicitly lists in its disclaimer that the "EPA will not use the sensor data on the map to make regulatory decisions" and that the sensor data "should be used for informational purposes only". ADEQ acknowledges that the air sensor data in the PTAQS project were held to a higher quality assurance and siting criteria than the publicly available air sensor data on the AirNow Fire and Smoke Map. However, ADEQ is unaware of EPA ever relying upon or confirming the use of corrected air sensor data for regulatory purposes including NAAQS area designations.

Comment 5.9: Commenter stated ADEQ's emissions analysis examined annual emissions. At the annual scale, transportation and point sources are minor contributors to PM_{2.5} concentrations, and nonpoint sources are significant contributors.

Response 5.9: ADEQ agrees with the commenter that based on the 2020 National Emissions Inventory (NEI) with adjustments made from Maricopa County's 2020 Periodic Emissions Inventory (PEI) for Maricopa County that the annual PM_{2.5} emissions for the onroad and point source categories represent 3.7% and 4.6% of total annual PM_{2.5} emissions, respectively. However, when combining PM_{2.5} emissions from the separate source sector categories associated with transportation such as: paved road dust, unpaved road dust, and onroad sources (diesel and non-diesel vehicles); emissions from transportation account for 3,264.5 of the 15,809.7 tons per year or approximately 20.6% of the annual total.

ADEQ disagrees that emissions from source sectors that appear to be minor contributors should not be taken into consideration or given less weight in the Department's five factor analysis. As noted in EPA's 2024 Initial Area Designations memorandum, nonattainment area boundaries should include "any nearby areas with emissions of PM_{2.5} or PM_{2.5} precursors that have the potential to be transported to the violating monitor." Further, EPA's Initial Area Designations memorandum states that PM_{2.5} components "can be transported many hundreds of miles". Given that combined emissions from transportation and point source sector categories represent approximately 25% of the total annual Maricopa County PM_{2.5} emissions, the magnitude of PM_{2.5} emissions from these source categories preclude them from being considered de minimis or otherwise excluded from consideration.

ADEQ notes that the commenter does not provide direct evidence to support the assertion that "emissions from freeways located north of Glendale and east of the City of Phoenix boundaries do not impact the violating monitors". The air quality, emissions, and meteorological analyses presented in the proposed boundary recommendation for Maricopa County indicate that a source-receptor relationship may exist between these emission source categories and the violating Maricopa County monitors based on data from the 2021-2023 design value period. Therefore, ADEQ believes that the current geographic extent of the proposed Maricopa County PM_{2.5} nonattainment area recommendation is adequately supported by the five-factor analysis.

Comment 5.10: MCAQD's Periodic Emissions Inventory show PM_{2.5} emissions from airports were 77.8 tons (0.4% of total PM_{2.5} emissions). Commenter states MCAQD's local estimates were significantly lower than EPA's estimates. Commenter stated ADEQ should not rely on EPA estimates of airport emissions. Commenter asserted ADEQ should use local estimates which more accurately capture PM_{2.5} emissions from small airports.

Response 5.10: ADEQ acknowledges the comments from MCAQD regarding potential discrepancies between the National Emissions Inventory (NEI) and locally

derived estimates for airport emissions. ADEQ has updated PM_{2.5} emissions from airports in Maricopa County to reflect 77.8 tons per year, in alignment with MCAQD's PEI 2020.

Comment 5.11: Commenter notes emissions from on-road vehicles (including exhaust, tire wear, brake wear but excluding paved and unpaved fugitive dust) were 636.2 tons in 2020 or 3% of the total PM_{2.5} emissions. Commenter supports inclusion of major highways near the violating monitors in the PM_{2.5} nonattainment area. Commenter states emissions from freeways north of Glendale and east of the City of Phoenix do not impact the monitors and should not be included.

Response 5.11: ADEQ appreciates MCAQD's comment on the contribution of mobile source emissions to the annual total of PM_{2.5} in Maricopa County. However, ADEQ disagrees and believes that mobile sources north of Glendale and east of the City of Phoenix have the potential to impact the violating PM_{2.5} monitors and therefore should be included in the nonattainment boundary.

Additionally, ADEQ provides HYSPLIT modeling in Section 3.1.3.2 in Figures 29-31 that shows air is likely to be transported from north of Glendale and east of the City of Phoenix towards the violating monitors. This implies that emissions generated in those areas are likely to be transported to the violating monitors and therefore should be included in the nonattainment boundary area.

When combining PM_{2.5} emissions from the separate mobile source sector categories: paved road dust, unpaved road dust, and onroad sources (diesel and non-diesel vehicles); these emissions account for 3,264.5 of the 15,809.7 tons per year or approximately 20.6% of the annual total.

Furthermore, ADEQ believes that mobile source contributions are also supported by the urban increment's compositional analysis that showcases nitrates and carbonaceous mass (organic carbon and elemental carbon) account for 92% of the composition of PM_{2.5} found at the JLG Supersite Monitor, which is north and east of the violating monitors. Nitrates and carbonaceous mass are associated with mobile sources. ADEQ acknowledges that carbonaceous mass is also a signature of wood or biomass burning; therefore, contributions from mobile sources are not explicitly responsible for nor can they be negated from contributions to PM_{2.5} concentrations at the violating monitors.

Comment 5.12: Commenter states the urban increment analysis confirms crustal material does not significantly contribute to the urban increment, suggesting that emissions from construction, agriculture, paved and unpaved road dust, and non-metallic mineral processing operations are not driving nonattainment.

Response 5.12: ADEQ thanks MCAQD for their comment on the urban increment analysis. While ADEQ agrees that the urban increment analysis does not indicate that crustal material significantly contributed to PM_{2.5} monitor violations during the averaged spring months of March, April, and May from 2021-2023; ADEQ believes that crustal material does contribute to PM_{2.5} nonattainment of the primary annual NAAQS.

ADEQ's urban increment analysis displays that the average crustal material mass concentration was higher than zero during the winter, summer, and fall seasons of 2021-2023. In this analysis winter, summer, and fall seasons include the months: January, February, June, July, August, September, October, November, and December. Therefore, ADEQ believes that it cannot be stated that emissions from sources such as construction, agriculture, paved and unpaved road dust, and non-metallic mineral processing operations are not contributing to Maricopa County's PM_{2.5} nonattainment of the primary annual NAAQS as a whole.

ADEQ acknowledges that contributions from crustal material during the spring months from 2021-2023 might also be artificially low in the urban increment analysis due to the fact that the average crustal material for regional background concentration is highest at this time of year. Since the regional background concentration is subtracted from the urban concentration to find the urban increment of crustal material, this number was deduced more during the spring than it was in other seasons of the year.

Comment 5.13: Commenter states when adjusting the temporal scale to examine winter months, residential wood burning (as well as fireworks during the holidays) become important sources. When allocated by heating degree days, the typical PM_{2.5} emissions from residential wood combustion are 10,335 lbs./day, which is higher than the 3,578 lbs./day from all point sources in Maricopa County. Commenter notes fireworks are not quantified in the NEI or PEI. Commenter notes these temporal patterns are not apparent in NEI data, but are noted in MCAQD's annual wintertime PM_{2.5} studies. Commenter states a significant portion of these studies included speciation and modeling, demonstrating residential wood burning and fireworks as a source of major impact. Commenter states the speciation data were modeled using EPA's positive matrix factorization model.

Response 5.13: ADEQ acknowledges that information provided in MCAQD comment regarding temporal scale can be helpful for identifying spatial and temporal patterns in the design values of the three violating monitors found in Maricopa County. However, when temporal trends are combined with other emissions information from the five-factor analysis, ADEQ found there to be other emissions sources that contribute to the areas with a monitored violation. Emissions data from the 2020 NEI with adjustments from MCAQD 2020 PEI suggests that residential

wood combustion accounts for 10.2% of the total PM_{2.5} emissions for Maricopa County.

ADEQ appreciates the analysis that MCAQD has provided for winter month exceedances, although the department believes that such seasonal fluctuations does not excuse the state from evaluating emissions that occur during the entire design value period. The design values for the 2024 revised primary annual PM_{2.5} NAAQS are calculated using the 3-year average (e.g., 2021 to 2023) of the annual mean concentrations, in which the annual mean concentrations are calculated using the mean of daily averages of each quarter in the given year.

ADEQ agrees that fireworks are not quantified in the NEI or MCAQD PEI and therefore emissions from this source sector have not been thoroughly evaluated for boundary designation purposes.

Comment 5.14: Commenter asserts focusing on point and transportation sources is counterproductive and will result in a larger than necessary boundary area. Commenter notes a large boundary will create unnecessary regulatory burden on industries that are relatively minor sources of PM_{2.5} at the violating monitors.

Response 5.14: As noted above, ADEQ disagrees that emissions from the point and onroad source categories should not be taken into consideration or given less weight in the Department's five factor analysis. As noted in EPA's 2024 Initial Area Designations memorandum, nonattainment area boundaries should include "any nearby areas with emissions of PM_{2.5} or PM_{2.5} precursors that have the potential to be transported to the violating monitor." Further, EPA's Initial Area Designations memorandum states that PM_{2.5} components "can be transported many hundreds of miles". Given that combined these source categories represent more than 8% of total annual county PM_{2.5} emissions, the magnitude of PM_{2.5} emissions from these source categories preclude them from being considered de minimis or otherwise excluded from consideration. The air quality, emissions, and meteorological analyses presented in the proposed boundary recommendation for Maricopa County indicate that a source-receptor relationship may exist between these emission source categories and the violating Maricopa County monitors based on data from the 2021-2023 design value period. Therefore, ADEQ believes that the current geographic extent of the proposed Maricopa County PM_{2.5} nonattainment area recommendation is adequately supported by the five-factor analysis.

Comment 5.15: Commenter states its 2013-2020 annual wintertime studies provide evidence on the location of wood burning sources and how smoke emissions are transported to the violating monitors. Commenter states its studies show that much of the wintertime residential burning is taking place in west, south, and midtown Phoenix and smoke from these emissions is often transported overnight through

atmospheric subsidence toward the lower-elevation southwest valley where it lingers until morning.

Response 5.15: As discussed above, ADEQ has concerns with relying upon interpolated prediction surfaces derived in-part using corrected air sensor data as a primary piece of evidence to show that $PM_{2.5}$ and $PM_{2.5}$ precursors are not being transported to the violating monitors throughout the 2021-2023 design value period. In contrast to the MCAQD wintertime studies, the five-factor analysis presented in the proposed boundary recommendation for Maricopa County indicates that a source-receptor relationship may exist between more emission sources over a broader geographic region and the violating Maricopa County monitors. As noted in EPA's 2024 Initial Area Designations memorandum, nonattainment area boundaries should include "any nearby areas with emissions of $PM_{2.5}$ or $PM_{2.5}$ precursors that have the potential to be transported to the violating monitor." Further, EPA's Initial Area Designations memorandum states that $PM_{2.5}$ components "can be transported many hundreds of miles". Given the aforementioned data quality and approvability concerns with relying upon the interpolation plots and associated data in the MCAQD wintertime studies, ADEQ believes that the current geographic extent of the proposed Maricopa County $PM_{2.5}$ nonattainment area recommendation is adequately supported by the department's five factor analysis.

Comment 5.16: Commenter also states inspectors documented residential wood burning at 155 locations between 1/1/2022 and 10/15/2024, with 87 locations in Phoenix with remaining locations north (2), west (40), and east (26) of Phoenix.

Response 5.16: ADEQ notes that commenter did not provide the data referenced in this letter, or describe how this data was generated. Additionally, the commenter does not describe how many of these documented residential wood burnings occurred during the winter burn season. ADEQ agrees that wood burning occurs in the Phoenix metropolitan area. However, as noted in commenter's July 19, 2024 letter, there is a substantial portion of housing in the Phoenix area that was constructed prior to the 1998 restriction on wood burning fireplaces. See Appendix C; see also A.R.S. 11-875. Additionally, wood burning can occur outside in fire pits/chimineas/other outdoor wood burning devices. While ADEQ will consider this information in making its final determination, the limited scope of information provided limits its value.

Comment 5.17: Commenter states industrial sources north of Glendale, and east of the City of Phoenix boundaries do not meaningfully contribute to elevated $PM_{2.5}$ in the southwest and western part of Phoenix. Commenter's Figure 9 shows population density is highest in the southern, central, and western parts of Phoenix which are in close proximity to the West Phoenix and South Phoenix monitors.

Response 5.17: ADEQ disagrees with commenter's assertion here that there is a specific numerical threshold utilized in determining contribution to elevated PM_{2.5}. Here commenter describes it here as "meaningfully contribute" to elevated PM_{2.5} concentrations at the violating monitors. As ADEQ previously described in Appendix C, ADEQ declines to utilize a specific threshold to determine contribution (as opposed to meaningful/significant contribution as urged by commenter) to nonattainment.

Regarding population density, ADEQ agrees that southern, central, and western Phoenix have a high concentration of population density. However, Figure 17 of ADEQ's proposal shows that high concentrations of population density is present throughout much of the valley and is not just restricted to the area around the monitors.

Comment 5.18: Commenter stated ADEQ's Section 3.1.3.1 was well done. Commenter states ADEQ's Figures 20-26 illustration that Maricopa County's PM_{2.5} issues are due to seasonal wood burning relatively close to the exceeding monitors. Commenter asserts that a finer, time-of-day scale provides evidence of sources and transport of PM_{2.5}.

Response 5.18: ADEQ agrees that a finer time-of-day scale is helpful for analysis of PM_{2.5} sources and transport. In Section A4.1 and Section A4.2 of Appendix A ADEQ provides additional wind rose analyses for days where the 24-hour average concentration exceeded the primary annual standard of 9.0 µg/m³.

Comment 5.19: Commenter states that Section 3.1.3.2 created 24-hour back trajectories terminating at 500 m in height over each of the violating monitoring sites, twice a day from 2021 to 2023, but only for days that had a 24-hour average over 9 µg/m³. Commenter agrees it is important to only consider days that are contributing to the violation of the annual NAAQS. However, commenter believes there is a scaling problem from the days in from November through February. Commenter provided Figures 10a and Figure 10b to illustrate the scaling problem, stating that Figure 10a illustrates the November to February burn season contains 54% of the analyzed days, the weight of this is more accurately depicted in Figure 10b. Commenter states that average difference of the analyzed days during the burn season had 3.5 times more impact on the annual average PM_{2.5} concentration.

Response 5.19: ADEQ thanks the commenter for their comment. ADEQ followed the HYSPLIT methodology provided by EPA in the Memorandum on the Area Designations for the 2024 Revised Annual PM_{2.5} NAAQS. EPA specifies to investigate HYSPLIT runs for all days within the design value period and a subset of all days within the design value period that have a 24-hour PM_{2.5} average exceeding the annual standard. EPA has not observed HYSPLIT runs

exclusively for the winter burn season in past area designations and has given no indication that they will for the 2024 PM_{2.5} NAAQS Revision.

Comment 5.20: Commenter states that it is possible the HYSPLIT model was run incorrectly these days. Commenter states the National Oceanic and Atmospheric Administration (NOAA) recommends HYSPLIT back trajectories be terminated at a height that is 0.5 times the planetary boundary level (PBL), though NOAA also recommends staying above a height of 250 meters to reduce interference with ground-level terrain. Commenter asserts that it is necessary that the termination height is below the PBL, because atmospheric conditions would isolate particles above the PBL from the monitors. Commenter asserts there is a similar phenomenon with the beginning and route of the trajectory. Commenter states that Table 1 shows the lowest PBL average heights occurring in November through January and are approximately 3.8 times lower than the months with the highest PBL (April through June). Commenter states this pattern is similar that demonstrated in Figure 10 and illustrates how seasonal weather needs to be considered when modeling back trajectories. Commenter obtained PBL height data from the Copernicus Climate Change Service Climate Data Store, and extracted that data to create Table 1, showing monthly PBL heights for 2021. Commenter provides Table 2, showing seasonal patterns of PBL heights. Commenter notes that every one of the averaging periods, a back trajectory terminating at 500 m does not meet HYSPLIT modeling guideline of 0.5 times the PBL. Commenters states it is observed that the 500 m termination height it well outside the average mixing height for any time of year, but especially the winter burn season. Commenter states another problem with the HYSPLIT modeling for this draft report is two dimensional. Commenter stated there is no information, statistical, or otherwise regarding the starting height of the 24-hour back trajectories. Commenter asserts it is reasonable to assume that many starting heights are above 500 m and outside the average mixing layer height, especially during the winter burn season. Commenter states it understands ADEQ's methodology is similar to what EPA said they will provide in the PM_{2.5} Designations Mapping Tool. Commenter states while 500 meters may be an appropriate HYSPLIT elevation for some portions of the county, the analysis of PBL data indicates it is not appropriate for the West Phoenix site or for either of the nearby violating monitors.

Response 5.20: ADEQ thanks the commenter for their comment. While there are many ways to run HYSPLIT, ADEQ follows HYSPLIT methodology provided by EPA in the Memorandum on the Area Designations for the 2024 Revised Annual PM_{2.5} NAAQS. EPA specifies in their methodology to run HYSPLIT at a release height of 500m above ground level. EPA does not specify to consider the height of the PBL in their methodology. The starting elevation for each trajectory in ADEQ's HYSPLIT analysis is 500m. When courts review factual disputes where the resolution implicates the substantial agency expertise, Courts apply the arbitrary

and capricious standard. When those disputes involve primarily issues of fact and the Court's analysis of relevant documents requires a high level of technical expertise, Courts typically defer to the "informed discretion of the responsible federal agencies." *Kleppe v. Sierra Club*, 427 U.S. 390, 412 (1976). Commenter asserts that a different height would have been more appropriate in the HYSPLIT model. However, as this is a factual dispute requiring a high level of technical expertise, ADEQ believes a reviewing Court would be likely to defer to EPA (as the federal agency acting within its substantial agency expertise), absent a showing of arbitrary action.

Comment 5.21: Commenter notes the draft boundaries tend to follow the structure of the Lower Salt River Airshed identified in ADEQ's draft report. Commenter recommends ADEQ place greater weight on natural topographical boundaries that limit local transport of PM_{2.5} such as South Mountain, Tempe and Papago Buttes, Camelback Mountain, Phoenix Mountains Preserve, North Mountain, and Shaw Butte. Commenter asserts that these are natural boundaries identified by MCAQD's wintertime studies. Commenter states that the PTAQS study, MCAQD's 2013-2020 wintertime studies, as well as regulatory data from Eastwood, Tempe, and Mesa air monitoring sites confirm that the areas to the north and east of the natural boundaries are not major contributors to wintertime PM_{2.5} concentrations.

Response 5.21: While ADEQ supported the use of South Mountain as a natural topographical boundary during early stakeholder engagement, ADEQ later discovered through HYSPLIT modeling that South Mountain is not a significant enough topological break to prevent transport of air from the area south of South Mountain to the violating monitors. ADEQ is not aware of data that proves Tempe and Papago Buttes, Camelback Mountain, Phoenix Mountains Preserve, North Mountain, or Shaw Butte to be sufficient topological breaks that prevent the transport of PM_{2.5}. The HYSPLIT modeling can be found in Section 3.1.3.2 in Figures 29-31 of ADEQ's proposed recommendations. HYSPLIT modeling in these figures show a high density of trajectory endpoints at and beyond the mentioned natural topological features, meaning a large portion of air parcels are surpassing this topography. While the HYSPLIT kernel density plots vary for each monitor, generally speaking, most of the mentioned topological features fall in the 50%-75% of the maximum density range meaning that a high density of HYSPLIT plot points came from areas at and beyond the mentioned topological features at some point within 24 hours before the morning or evening PM_{2.5} spikes for the corresponding violating monitor.

ADEQ also disagrees that MCAQD's wintertime studies provide evidence to identify these natural boundaries and use them while making regulatory decisions. MCAQD's wintertime studies rely on data that uses a correction factor, meaning there is a degree of uncertainty associated with the corrected data.

Also, results of the study may vary depending on which interpolation method is used and the wintertime burn study does not offer any reason as to why inverse distance weighted interpolation was the selected method. The wintertime burn study also excludes all holidays occurring during the winter burn season, which improperly assumes that EPA will automatically grant exceptional event determinations to all of these days.

ADEQ appreciates the commenters work on the PTAQS project and the collaboration with EPA to collect more information about air sensors. ADEQ agrees with the commenter that the air sensor data is useful for informational purposes. However, ADEQ disagrees that corrected air sensor data should be considered in the development of area designations for the 2024 PM_{2.5} annual NAAQS.

Comment 5.22: Commenter stated the proposed boundary should not necessarily be along county lines as that would encompass a larger area than necessary. Commenter states EPA's guidance provides that where existing jurisdictional boundaries are not adequate, other clearly defined and permanent landmarks are recommended to be used. Commenter notes that in the West, counties are large and contain urban suburban, and rural areas. Commenter states that nonattainment boundaries are not frequently associated with county lines, but in correlation to source locations and the geography/topography. Commenter agrees that the draft boundary of the nonattainment should not cross Maricopa County boundaries or the sovereign tribal nation boundaries. Commenter proposes the appropriate boundary should be along the eastern borders of the City of Phoenix, along the previously mentioned topographical borders.

Response 5.22: ADEQ thanks the commenter for their comment. Per EPA guidance in the Memorandum on the Area Designations for the 2024 Revised Annual PM_{2.5} NAAQS, partial county boundaries are recommended to be defined by readily identifiable permanent landmarks such as townships and major roadways, which ADEQ primarily followed for the partial county boundary for Maricopa County. ADEQ considered all five factors (air quality data, emissions and emissions related data, meteorology, geography and topography, jurisdictional boundaries) when making its boundary recommendation. As such, jurisdictional boundaries were considered once the geographic extent of the area violating the PM_{2.5} standard and the nearby area contributing to violations was determined.

ADEQ believes MCAQD's boundary (to be along the eastern borders of the City of Phoenix, along with the previously mentioned topographical borders) cannot be justified, as the five-factor analysis that ADEQ performed indicates that emissions beyond MCAQD's suggested boundary are contributing to exceedances at the violating monitors. Additionally, city boundaries are not

permanent and are subject to change which further implicates that municipalities are not a solid basis for a jurisdictional boundary.

Comment 5.23: Commenter states the PM_{2.5} nonattainment boundary should be focused on violating air monitors and areas impacting those sites. Commenter asserts residential wood burning in areas of central, south and west Phoenix, as well as adjacent towns are major contributors to violations at the PM_{2.5} monitors. Commenter states its annual wintertime studies show smoke is generated in central, south and west Phoenix and generally transported to lower elevations in the southeast valley. Commenter states data indicate north Phoenix and areas to the east of the Phoenix, such as Scottsdale, Tempe, and Mesa are not major contributors to the violating PM_{2.5} nonattainment. Commenter states ADEQ's proposed boundary gives too much weight to the HYSPLIT analysis, and not enough weight to the location of PM_{2.5} sources. Commenter states demonstrating air moves from one location to the violating monitors is insufficient to demonstrate the area is contributing to nonattainment. If the air that is moving to the violating monitors is not transporting significant amounts of PM_{2.5} (and therefore not contributing significantly to nonattainment), those areas should not be included in the nonattainment boundary. Commenter provides Figure 11 as an alternative configuration for the proposed boundaries, based on EPA's 5 factors. Commenter's alternative boundary covers 256 square miles, compared to the 1,071 square miles proposed by ADEQ.

Response 5.23: As noted above, ADEQ disagrees that it has assigned too much weight to its HYSPLIT analysis. ADEQ believes that its five-factor analysis, as a whole, supports the proposed boundary. As noted above, CAA 107 does not require the recommendation to demonstrate significant contribution. Rather, the statute only requires the demonstration of contribution. It appears that commenter conflates the standards between CAA 107 and CAA 110(a)(2)(D)(i) ("the Good Neighbor" provision). While CAA 107 defines nonattainment to include areas that contribute (and does not use the word "significant"), CAA 110(a)(2)(D)(i) requires state implementation plans to contain adequate provisions to prohibit the emissions activity within the State from emitting any air pollutant in amounts which will significantly contribute to nonattainment or interfere with maintenance. EPA has interpreted the requirements of the Good Neighbor Provision (CAA 110(a)(2)(D)(i)) to define significantly contributing as interstate pollution that exceeds 1% of the NAAQS. However, EPA has expressly declined to impose a bright line defining contribution in the CAA 107 context. Therefore, ADEQ disagrees with utilizing EPA's Good Neighbor "significantly contribute" framework in the context of determining contribution under CAA 107.

Comment 6: ADEQ received a comment from the Sierra Club – Grand Canyon Chapter with multiple comments (Comments 6.1 to 6.3) included which are addressed below.

Comment 6.1: Commenter emphasizes the importance of addressing unhealthy air quality in Arizona. They highlight the health risks of PM_{2.5} and the potential for disproportionate impacts to harm communities of color. They advocate for identifying and implementing plans for the locations in Arizona that are not meeting the 2024 PM_{2.5} NAAQS to reduce pollution and save lives.

Response 6.1: ADEQ thanks the commenter for their comment.

Comment 6.2: Commenter supports including parts of Maricopa County in the nonattainment area as ADEQ has proposed and urges ADEQ to consider a partial county nonattainment recommendation for Pinal County, rather than a “contingency-based” partial county nonattainment area recommendation, due to increasing pollution sources in the county. Commenter states that fine particulate pollution is a known problem in western Pinal County, as shown by the designation of the West Central Pinal nonattainment area for the 2006 24-hour PM_{2.5} NAAQS.

Response 6.2: ADEQ believes that a contingent based recommendation is appropriate for Pinal County given the evidence to support that the spatial scale and the uniqueness of the Hidden Valley monitoring site may result in it being ineligible for comparison to the annual PM_{2.5} NAAQS. ADEQ yields to EPA in making that determination and therefore provides a partial county nonattainment area boundary recommendation for Pinal County, as described in Section 1.1.2 of the main document, should EPA find that the Hidden Valley monitor is comparable to the annual PM_{2.5} NAAQS. On October 29, 2024, EPA made a formal determination to not approve Pinal County Air Quality Control District’s (PACQCD) 40 CFR § 58.30 request for the Hidden Valley monitor to be excluded from comparison to the Annual PM_{2.5} NAAQS.

Comment 6.3: Commenter supports the inclusion of a partial county nonattainment area for Santa Cruz County.

Response 6.3: ADEQ thanks the commenter for their comment.

Comment 7: ADEQ received a comment from the City of Scottsdale. Commenter states that in their submitted comments MCAQD demonstrated PM_{2.5} concentrations exceeding 9µg/m³ are concentrated in central, southern, and western Phoenix. Commenter states MCAQD’s Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 seasons shows the East valley does not contribute to those exceedances. Commenter states MCAQD’s data show these violations are largely attributed to winter fires and holiday activities as demonstrated by speciation modeling. Comments states ADEQ’s proposed nonattainment area boundary includes most of the City of Scottsdale, but there is no evidence that the city is currently non-compliant with EPA PM_{2.5} standards. Commenter states Scottsdale has a history of effective air quality management, which helps protect public health and maintain a healthier environment for residents. Commenter asserts ADEQ’s proposed boundary

overextends by including areas that are already meeting federal standards and do not contribute to the affected monitors. Commenter supports MCAQD's proposed alternative boundaries for the PM_{2.5} nonattainment area.

Response 7: ADEQ thanks the commenter for their comment. ADEQ disagrees with MCAQD's wintertime burn study. As discussed above, ADEQ has concerns with relying upon interpolated prediction surfaces derived in-part using corrected air sensor data as a primary piece of evidence to show that emissions of direct PM_{2.5} and PM_{2.5} precursor pollutants are not being transported to the violating monitors throughout the 2021-2023 design value period.

ADEQ has concerns about relying on using data from MCAQD's wintertime burn study, as it was not done through FRM or FEM methods. While EPA regulates LCM to ensure that they meet certain performance standards, LCMs are not approved for use in comparing measurements directly to the NAAQS so therefore ADEQ cannot rely on MCAQD's wintertime burn study for these boundary designations.

While the City of Scottsdale does not have a violating PM_{2.5} monitor, CAA § 107(d)(1)(A) that states in relevant part, "The Governor of each State shall . . . submit to the Administrator a list of all areas (or portions thereof) in the State, designating as – (i) nonattainment, any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant." Areas that are attaining the NAAQS, but are contributing to ambient air quality in nearby areas that do not meet the NAAQS are also to be included in the relevant nonattainment area. ADEQ's analysis provides evidence that PM_{2.5} and precursor emissions are being generated within the City of Scottsdale and that those emissions have potential to be transported to the violating PM_{2.5} monitors.

Comment 8: ADEQ received a comment from the City of Tempe. Commenter supports MCAQD's direction in focusing a narrower boundary on the areas with violating monitoring sites and the areas immediately impacting them. Commenter states the broader boundary recommendation by ADEQ has potential implications for future stringent air quality regulations to east valley cities and their business communities. Commenter notes that these communities and their businesses have potential to be negatively impacted by requirements to provide modeling demonstrations during the permitting process, despite air quality sites in these jurisdictions not experiencing violations and business demonstrating to be providing minimal, if any, impact to the violating monitor sites. Commenter requests ADEQ to forward MCAQD's more conservative proposal for the PM_{2.5} boundary to the governor for recommendation to EPA.

Response 8: ADEQ thanks the commenter for their comment. While MCAQD's narrower boundary focuses on the violating monitoring sites and the immediate surrounding

area, CAA § 107(d)(1)(A)(i) and EPA's boundary recommendation guidance states that nonattainment areas should include areas that do not meet the NAAQS or contribute to areas that do not meet the NAAQS. ADEQ's analysis demonstrates in section 3.1 that other areas in Maricopa County are likely to be contributing to nonattainment at the violating monitors than just the area immediately surrounding the monitors.

With regard to Commenter's statement that ADEQ's boundary recommendation has potential implications for both East Valley cities and their business communities, ADEQ agrees that there is the potential for regulatory costs associated with every nonattainment area. However, the exact costs are not known at this point, as costs will likely depend on the specific nonattainment plan developed for the final designated areas. Under A.R.S. § 49-406, MAG will likely have primary planning authority for any PM_{2.5} nonattainment area within Maricopa County.

Additionally, CAA § 107 does not specifically authorize states to consider the cost of implementing nonattainment requirements when recommending nonattainment area boundaries, and EPA's five factor analysis for determining area designations does not list cost as a part of the analysis. Furthermore, as discussed above, Section 3.1 of ADEQ's analysis demonstrates there is likely contribution to nonattainment to the violating monitors from the East Valley.

ADEQ notes that the U.S. Supreme Court in *Whitman v. American Trucking Associations* unanimously found that the Administrator of the Environmental Protection Agency (EPA) may not consider the costs of implementation in setting national primary ambient air quality standards under §§ 109(b)(1) and (2) of the CAA. 531 U.S. 457 (2001). The *Whitman* court stated, "Because the CAA often expressly grants EPA the authority to consider implementation costs, a provision for costs will not be inferred from its ambiguous provisions." *Id.* at 462. While *Whitman* examined CAA § 109(b), CAA § 107(d) is similar in that the statute does not expressly list costs as a factor for states to consider when making their recommendations. ADEQ believes it is unlikely a court would interpret any ambiguous provisions in CAA § 107(d) to allow for the consideration of cost. ADEQ is not aware of any legal authority that allows for cost considerations in the boundary recommendation process.

ADEQ notes that costs can be considered during the nonattainment state implementation planning process that will occur following EPA's final area designations.

Pursuant to A.R.S. § 49-405(C)(4), ADEQ intends to provide a copy of MCAQD's comment letter to the Governor's office.

Comment 9: ADEQ received a comment from the City of Phoenix. Commenter believes the proposed draft PM_{2.5} boundary should be restricted to areas with substantial emissions sources and activity levels near the exceeding monitors for the boundary to be effective. Commenter notes ADEQ's Figure 3 shows areas with sources of emissions and activities that are significantly lower or nonexistent near the proposed draft PM_{2.5} boundary recommendation as compared to areas near the exceeding monitors. Commenter states that ADEQ's Figures 29-31 (showing back trajectories to the three exceeding monitors), show that more of the air parcels arriving at the monitors originates in areas surrounding the monitors. Commenter notes that some simulations have little to no parcels originating from the edges of the proposed boundary recommendation. Lastly, Commenter states Figure 3 in ADEQ's TSD shows many of the point sources from the 2020 NEI, are located near the exceeding monitors, while Figures 6 - 9 show a similar pattern. Commenter states, based on the above information, that the proposed draft PM_{2.5} boundary should be constrained down to those areas with greater levels of emissions and activity levels that are closer to the exceeding air monitors. Commenter concludes this will ensure programs addressing PM_{2.5} will be more effective and resources meant to improve air quality will not be diluted by encompassing areas with minimal impact on air quality at the exceeding monitors.

Response 9: ADEQ thanks the commenter for their comment. The proposed boundary includes all areas near the exceeding monitors with substantial activity levels. CAA § 107(d)(1)(A)(i) and EPA's boundary recommendation guidance states that nonattainment areas should include areas that do not meet the NAAQS or contribute to areas that do not meet the NAAQS, so ADEQ's proposed boundary includes contributing sources that are further away from the violating monitors. Figure 3 is just one static image showing some of the data sets ADEQ considered. There are other data not in Figure 3 that contributed to where the boundary is proposed. For example, Figure 18 in ADEQ's boundary recommendations draft report shows land use types. When comparing ADEQ's Figure 3 to Figure 18, some of the areas in Figure 3 that show significantly less sources of emissions and activity correspond to agriculture and industrial land use types in Figure 18, which contribute to PM_{2.5}, but are not portrayed in Figure 3.

Figures 29-31 show HYSPLIT modeling. HYSPLIT modeling is just one part of the meteorology factor in EPA's five factor analysis. ADEQ's proposed boundary was created from a weight-of-evidence approach of the five factors, so HYSPLIT was just one of many influences in the proposed boundary.

While there are point source emissions that occur close to the violating monitors, it is important to note that point sources only account for 4.6% of PM_{2.5} emissions in Maricopa County from the 2020 NEI with adjustments from the MCAQD's 2020 PEI. Nonpoint sources account for 85.9% of PM_{2.5} emissions as noted in Section 3.1.2.1 of the Department's 2024 Primary Annual Fine Particulate Matter NAAQS Boundary

Recommendations Report, and can occur from many sources such as combustion and agriculture which are not restricted to the area closely surrounding the exceeding monitors and occur throughout most of the valley.

Comment 10: ADEQ received a comment from the City of Maricopa with multiple comments included which are addressed below.

Comment 10.1: Commenter notes that EPA previously concluded that the old Cowtown Road site was unique in its PM_{2.5} sources and should be excluded from comparison with the annual PM_{2.5} NAAQS. Commenter highlights that the Hidden Valley Site is not representative of the air quality in our immediate regions, especially within the City of Maricopa. Commenter states the Hidden Valley monitor is located adjacent to very large feedlot, dairy operations, and agricultural fields. Commenter states it stands to reason that higher PM_{2.5} readings would be found at this site given its unique and distinct location, in comparison to urbanized areas like the City of Maricopa. Commenter notes PM_{2.5} emissions in Pinal County are almost entirely from non-point sources. Commenter points out 94.3% of emissions are nonpoint sources. with wildfires making up almost 50% of total PM_{2.5} emissions with crops and livestock dust following with just under 20%. The next highest category of emissions is construction dust, comprising just 7.5% of total emissions.

Response 10.1: ADEQ thanks the commenter for their comment. Unless EPA approves Pinal County Air Quality Control District's (PACQCD) demonstration for the Hidden Valley monitor pursuant to 40 CFR § 58.30, ADEQ believes it is unlikely that EPA would designate all of Pinal County as attainment/unclassifiable because a regulatory monitor located in this area is violating the 2024 annual PM_{2.5} NAAQS. The final decision on approving 40 CFR 58.30 requests rests solely with EPA. While ADEQ agrees with PCAQCD's demonstration, ADEQ does not have the authority to approve the demonstration that would exclude Hidden Valley from comparison to the annual PM_{2.5} NAAQS.

On October 29, 2024 EPA denied PCAQCD's 40 CFR 58.30 demonstration for Hidden Valley monitoring site. EPA found that the data from the PM_{2.5} monitor at the Hidden Valley monitoring site is comparable to the annual PM_{2.5} NAAQS.

ADEQ agrees that EPA's statements in the 2019 Determination of Attainment by the Attainment Date for the 2006 24-hour PM_{2.5} NAAQS for Pinal County (84 FR 52766, 52768) seem to indicate EPA's acknowledgement that Cowtown and Hidden Valley sites are similar.

ADEQ agrees with the breakdown of nonpoint sources in Pinal county, however, per CAA § 107(d)(1)(A)(i) and EPA's boundary recommendation guidance, areas contributing to a nearby violation should be included in nonattainment areas. Even though some nonpoint categories such as construction dust do not

generate as much PM_{2.5} emissions within Pinal County as wildfires and crops and livestock dust, smaller categories should still be considered in the five-factor analysis.

Comment 10.2: Commenter states EPA should treat the Hidden Valley PM_{2.5} monitor in the same manner as the Cowtown monitor, and exclude it from comparison. Commenter states if EPA does not exclude the Hidden Valley data, the proposed boundary draft does not contain ample explanation for including the City of Maricopa within the proposed Pinal County NAA. Commenter notes the unique sources present at the Hidden Valley PM_{2.5} monitor reflects the immediate rural agricultural setting, and it is clear from the data presented in the proposed boundary draft report that urban sources are not contributing to the elevated PM_{2.5} concentrations.

Response 10.2: The final decision on 40 CFR 58.30 requests rests solely with the EPA. While ADEQ agrees with PCAQCD's demonstration, ADEQ does not have the authority to approve the demonstration that would exclude Hidden Valley from comparison to the NAAQS. There is not any speciation data associated with the Hidden Valley monitor. As such, ADEQ is not able to determine which source categories of PM_{2.5} based on chemical speciation are reaching the Hidden Valley monitor and contributing to the monitor violation.

Comment 10.3: Commenter notes that the Hidden Valley PM_{2.5} monitor is located in a sparsely populated area, and the PM_{2.5} emissions inventory by source category show that vehicular traffic is not a meaningful contributor to PM_{2.5} at this location. The City of Maricopa has over 75,000 residents and is largely a residential community with a traffic volume that reflects that. Land use within the city is not generally agricultural and roads are paved. The unique sources found at the Hidden Valley PM_{2.5} monitor would not be found within the City of Maricopa. Comparing the rural agricultural location of the monitor to the area within the City of Maricopa produces no similarities. In fact, the City of Maricopa is more like the neighboring City of Casa Grande, which has a monitor that is compliant with the new annual PM_{2.5} NAAQS. It is very likely that if a monitor were placed in the City of Maricopa, PM_{2.5} concentrations would be aligned with those seen in Casa Grande and therefore also in compliance.

Response 10.3: ADEQ thanks the commenter for their comment. ADEQ agrees that the population density near the Hidden Valley monitor is lower than the population density in the City of Maricopa. However, ADEQ would like to clarify that the emissions inventory by source is representative of PM_{2.5} emissions for all of Pinal County. County-wide data is the most granular emissions inventory data available for the area and cannot be solely used to determine exactly which source sectors are contributing to a violating monitor. ADEQ provides HYSPLIT modeling in the form of KDE to help identify areas potentially contributing to the

monitored violations. The modeling results show that PM_{2.5} and PM_{2.5} precursor emissions being generated in the City of Maricopa have a high probability of being transported toward the Hidden Valley monitor. The modeling also shows that air is less likely to be transported from Casa Grande toward the Hidden Valley monitor.

Comment 10.4: Commenter states it is not reasonable to include the City of Maricopa within the proposed Pinal NAA if compliance is based exclusively on the Hidden Valley PM_{2.5} monitor. Commenter states the conditions present at the monitor would not be replaced within the City and sources found at that site are unique to specific rural agricultural settings. Commenter states if EPA chooses to not exclude the Hidden Valley monitoring data from comparison to the annual NAAQS, the size of the proposed Pinal NAA should be reduced to what is actually necessary to attain the new annual PM_{2.5} NAAQS. Commenter concludes by stating at the very least, since the PM_{2.5} emission sources within City of Maricopa have not been shown in the draft report to be significant contributors to the high PM_{2.5} concentrations observed at the Hidden Valley monitor, the City of Maricopa should not be included within the Pinal NAA.

Response 10.4: ADEQ thanks the commenter for their comment. Without speciation data, a sure conclusion is not able to be made about what PM_{2.5} sources are contributing to the monitor violation at Hidden Valley. As stated above HYSPLIT modeling provided by ADEQ shows it is likely that air is being transported from the City of Maricopa to the Hidden Valley Monitor. Per CAA § 107(d)(1)(A)(i) and EPA's boundary recommendation guidance, areas contributing to a nearby violation should be included in nonattainment areas.

ADEQ disagrees that the size of the proposed boundary recommendation should be reduced as the boundary is supported by meaningful justification or weight of evidence. Evidence that supports inclusion of the City of Maricopa in the nonattainment area includes diurnal air quality patterns, wind and pollution roses that demonstrate multidirectional wind patterns, emissions inventory and gridded emission inventory data showing emission activity in and near the City of Maricopa, and HYSPLIT trajectories that show historical air parcels have been transported to the violating monitor on days when the concentration exceeded the revised 2024 PM_{2.5} annual standard. ADEQ believes this evidence is sufficient to establish that a source-receptor relationship may exist between the violating monitor and emissions of PM_{2.5} and PM_{2.5} precursors in and near the City of Maricopa. While ADEQ agrees that the monitoring site is a unique middle scale monitor, ADEQ considered the five factors discussed in Sections 2.2 and 3.2 of the boundary recommendations.

On October 29, 2024 EPA denied PCAQCD 40 CFR § 58.30 demonstration for Hidden Valley monitoring site. EPA found that the data from the PM_{2.5} monitor at

the Hidden Valley monitoring site is comparable to the annual PM_{2.5} NAAQS. ADEQ will retain its contingent recommendation in the event that EPA's decision is reconsidered or reversed.



Copies of Comments Received During the Public Comment Period

Air Quality Division
December 12, 2024 Final Version



AirPlanning - AZDEQ <airplanning@azdeq.gov>

EPA Arizona air quality comment

Don Scott <Don.L.Scott@sbcglobal.net>
To: airplanning@azdeq.gov

Mon, Sep 23, 2024 at 3:31 PM

Dear AZDEQ Air Planning:

I am pleased to learn of the EPA's strengthened position on air quality particulate standards from 12 to 9 micrograms per cubic meter. I support this position and ADEQ's support of and commitment to this not stringent standard.

Arizona is known for some of the country's most beautiful and historic landmarks and natural treasures. Sadly, it's also known for some of the country's worst air quality. Heat, wildfires, wood burning, vehicle emissions and fossil fuel greenhouse gases, fireworks and their toxic chemicals, deforestation/overdevelopment.... This state and all living creatures — now and for the future — deserve better!

Sincerely,
Don Scott
Fountain Hills, AZ

Sent via mobile



AirPlanning - AZDEQ <airplanning@azdeq.gov>

ADQ response

Jeffrey Brooks <jhanananda@gmail.com>
To: airplanning@azdeq.gov

Mon, Sep 23, 2024 at 11:41 AM

I'm a native of Arizona, 71 years old, and a non-smoker with a COPD diagnosis. I have come to realize there is more to air pollution than PM 2.5. Air pollution includes acid gasses (NOX and SOX) and VOCs. VOCs should be monitored and reported. Also wildfires and prescribed burns produce the most air pollution, and it is killing people like me.

October 18, 2024

Arizona Department of Environmental Quality
Air Quality Division, Air Quality Improvement Planning Section
1110 W. Washington St.
Phoenix, AZ 85007

RE: Comments on the September 23, 2024, Arizona Department of Environmental Quality 2024 Primary Annual Fine Particulate Matter NAAQS Boundary Recommendations Draft Report

The Maricopa Association of Governments (MAG) is pleased to provide comments on the September 23, 2024, Arizona Department of Environmental Quality 2024 Primary Annual Fine Particulate Matter NAAQS Boundary Recommendations Draft Report. MAG's comments are focused on the proposed boundary designations for Pinal County, Arizona.

MAG recommends that the entirety of Pinal County be designated as attainment/unclassifiable. Currently, only the Hidden Valley monitor in Pinal County is violating the 2024 annual PM-2.5 standard of 9.0 µg/m³ based on 2021-2023 air quality data. As noted on page 70 of the Draft Report, the Hidden Valley monitor was approved by EPA in October 2015 as a replacement monitoring site for the Cowtown monitor. EPA strongly reaffirmed this decision on October 3, 2019, in a final Federal Register notice stating,

"To summarize our response to the commenter's first point challenging our use of data from relocated monitors, in order to locate a site that constituted a "nearby location with the same scale of representation" under § 58.14(c)(6), Pinal County and the EPA engaged in a cooperative multi-year process to review alternative locations and relocate the Cowtown PM_{2.5} SLAMS monitoring site due to logistical problems beyond the control of the State or the District. Pinal County and the EPA analyzed the data from candidate locations to determine if the proposed monitoring site locations met the applicable system modification requirements in 40 CFR 58.14 for monitoring site relocation. Specifically, based on an assessment of PM_{2.5} concentrations (which concurrent ambient monitoring demonstrated to track closely), land use, and nearby sources, the EPA approved the relocation of the Cowtown PM_{2.5} SLAMS monitoring site to the new Hidden Valley location. As noted in the EPA's Relocation Approval Letter, the data from the Cowtown and Hidden Valley monitoring site locations are suitable for combination to form one continuous data record for design value calculations. This approach is both authorized by the EPA's monitoring regulations, and consistent with the EPA's longstanding practice." (84 Fed. Reg. 52,766)

As indicated in the quotation above, EPA determined that the Hidden Valley and Cowtown monitoring sites were so similar in nature that the respective site's air quality monitoring data

could be combined into a single record. The similarity of these two sites is critical as earlier in 2010, EPA determined that air quality data from the Cowtown monitor was ineligible for comparison against the annual PM-2.5 NAAQS. EPA reasoning for excluding the Cowtown monitor from comparison against the annual PM-2.5 NAAQS is stated on page 70 of the Draft Report and requoted here,

"40 CFR 58.30 – states that a "relatively unique population-oriented microscale, or localized hot spot, or unique population-oriented middle-scale impact sites" is only eligible for comparison to the 24-hour PM_{2.5} NAAQS, not the annual PM_{2.5} NAAQS. Based on the analysis above, the Cowtown site should be considered a relatively unique, population-oriented, microscale site. Furthermore, the monitoring site is located in close proximity to a "unique dominating local PM_{2.5} source" and is likely to have "concentrations representative of a smaller than neighborhood spatial scale." Therefore, the PM_{2.5} data from the Cowtown site in Pinal County should not be compared to the annual PM_{2.5} NAAQS." (Technical Support Document for Determination that the Cowtown Monitor is Ineligible for Comparison with the Annual PM-2.5 NAAQS, EPA Region 9, April 2010).

EPA's logic was sound in 2010 and remains so today. The Hidden Valley monitor has been proven by EPA to be a nearly identical replacement site for the Cowtown monitor, representative of the same micro-scale sources that exist near the Cowtown site. Since the Cowtown monitor was determined by EPA to be ineligible for comparison with annual PM-2.5 NAAQS, the Hidden Valley monitor should also be found to be ineligible for comparison with the annual PM-2.5 NAAQS. Therefore, a nonattainment area for the 2024 annual PM-2.5 NAAQS around the Hidden Valley does not need to be proposed by ADEQ.

MAG understands that EPA has yet to make an official determination as to whether the Hidden Valley is eligible for comparison against the 2024 annual PM-2.5 NAAQS. In the Draft Report, ADEQ proposes a draft annual PM-2.5 NAAQS nonattainment area around the Hidden Valley monitor that would be identical to the nonattainment area for the 24-hour PM-2.5 NAAQS that currently exists in Pinal County, contingent on EPA finding that the Hidden Valley monitor is eligible for comparison.

MAG contends that this contingent boundary is unnecessary and is not reflective of the micro-scale sources that are causing the high annual PM-2.5 concentrations at the Hidden Valley monitor. The Draft Report states in Section 3.2.7, Weight of Evidence Analysis and Recommendation Summary,

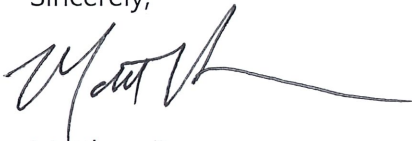
"As described above in Section 3.2.1, ADEQ and PCAQCD believes that the Hidden Valley site is a middle scale (100 meters to 0.5 kilometers) site with a unique sole source contributing the vast majority of the PM_{2.5}. Given the spatial scale and the unique sole source contributing the vast majority of PM_{2.5}, and that there are no other violating monitors within Pinal County, it is reasonable to conclude that the air quality violations are confined to a small geographic area. All areas within 0.5 kilometers of the violating monitor are contained

within the recommended 2024 primary annual PM_{2.5} boundary for Pinal County.” (Page 104, ADEQ Draft Report)

Since ADEQ concludes in their recommendation summary above that the PM-2.5 sources that are causing the violation of the 2024 annual PM-2.5 NAAQS at the Hidden Valley monitor are all located within 0.5 kilometers of the monitor, there is no meaningful justification or weight of evidence for proposing a contingent nonattainment area boundary so large, with a width of approximately 30 kilometers. Concern over what sized boundary EPA may propose should EPA determine that the Hidden Valley monitor is eligible for comparison with the 2024 annual PM-2.5 NAAQS should not be the sole reason for including a contingent nonattainment area boundary.

Thank you for your consideration of our comments. We look forward to working cooperatively with the Arizona Department of Environmental Quality in our efforts to address PM-2.5 pollution and improve air quality. If you have any questions about our comments, please do not hesitate to contact me at 602-452-5096.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matthew', with a long horizontal flourish extending to the right.

Matthew Poppen
Environmental Director

October 22, 2024

2024 Primary Annual PM_{2.5} NAAQS Boundary Recommendation

The cities of Tempe, Chandler, Mesa, and Gilbert appreciate the opportunity to comment on the PM_{2.5} Draft Boundary Recommendation for the new PM_{2.5} nonattainment area in Maricopa County.

The Maricopa County Air Quality Department (MCAQD) proposed a map whose boundary would address the PM_{2.5} problematic areas excluding non-problematic areas (Tempe, Chandler, Mesa, and Gilbert) that are not in the “airshed”. PM_{2.5} data by MCAQD collected over the past 10 years shows these areas are compliant with federal standards.

MCAQD has demonstrated that PM_{2.5} concentrations exceeding 9 µg/m³ are concentrated in in central, southern, and western Phoenix. The area of concern is located southwest of the violating monitors while the East valley does not contribute to these exceedances as indicated in the Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 season. Additionally, County data showed that these violations are largely attributed to winter fires and holiday activities as demonstrated by speciation modeling results from the West Phoenix air monitoring site, covering November to January from 2014 to 2020.

Cities of Tempe, Chandler, Mesa and Gilbert are currently compliant with EPA PM_{2.5} standards, with historical data indicating annual average concentrations below 9.0 µg/m³. This reflects effective air quality management in these cities, which helps protect public health and maintain a healthier environment for residents.

MCAQD also demonstrated that the sources effecting PM_{2.5} air monitors is very localized. The new ADEQ proposal overextends by including areas that are already meeting federal standards and do not contribute to the affected monitors. It would be prudent to exclude these non-problematic areas from the proposal.

Please direct any questions to Christina Hoppes, Environmental Program Supervisor, City of Tempe at 480-350-8255 or christina_hoppes@tempe.gov, Kenya Lugo-Waite, Environmental Services Manager, City of Chandler at 480-782-2387 or kenya.lugo@chandleraz.gov, Scott Bouchie, Energy and Sustainability Director, City of Mesa at 480-644-366 or scott.bouchie@mesaaz.gov, Hondo Judd, Environmental Compliance Manager at 480-620-1012 or hondo.judd@gilbertaz.gov.

Sincerely,

City of Tempe, Chandler, Mesa and Gilbert



October 24, 2024

Ms. Karen Peters
Deputy Director
Arizona Department of Environmental Quality
1110 W. Washington St.
Phoenix, AZ 85007

Dear Ms. Peters,

The Maricopa County Air Quality Department (MCAQD) thanks the Arizona Department of Environmental Quality (ADEQ) for preparing the 2024 Primary Annual Fine Particulate Matter NAAQS Boundary Recommendations Draft Report. MCAQD appreciates the opportunity to comment on the report, the technical support document, and the response to informal comments received during consultation on the draft boundaries.

We acknowledge and appreciate that the U.S. Environmental Protection Agency (EPA) requires a five-factor analysis to be used in developing the boundary recommendation¹. However, the five-factor analysis must be conducted in a manner that elucidates the primary causes of PM_{2.5} nonattainment and must take local knowledge of air pollution sources into consideration. The five-factor analysis prepared by ADEQ fails to do this. Specifically, the spatiotemporal scales of some of the analyzed factors obfuscate the sources of PM_{2.5} emissions on days when the highest concentrations are measured, thus making the draft nonattainment area unnecessarily large. While the data from the entire year must be considered, the focus must be on months when average PM_{2.5} concentration is highest and the boundaries should primarily be based on emissions during those periods. With this in mind, MCAQD offers the following comments on the five-factor analysis and resulting proposed PM_{2.5} boundaries.

Air Quality Data

ADEQ's analysis looks at the available regulatory ambient PM_{2.5} air monitoring data, the location of violating monitors, contributions from sources impacting the violating monitor(s), and official annual design values. However, this analysis would be strengthened

¹ EPA Office of Air and Radiation, Initial Area Designations for the 2024 Revised Primary Annual Fine Particle National Air Standard, February 7, 2024, accessed at https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-designations-memo_2.7.2024-_jg-signed.pdf.



by focusing on finer temporal scale periods that demonstrate that a substantial portion of the elevated levels are attributable to winter residential wood-burning and fireworks activities and not to industrial or transportation sources. The following paragraphs discuss how the data lead to this conclusion and why they do not support a significant expansion of the nonattainment area boundary.

Temporal Analysis

Section 3.1.1 of ADEQ's Draft Report includes a temporal analysis of PM_{2.5} in Maricopa County. In this analysis, ADEQ divided the year into seasons, where winter was defined as December, January, and February; spring was defined as March, April, and May; summer was defined as June, July, and August; and fall was defined as September, October, and November. To better identify sources that are contributing to nonattainment, months where the average PM_{2.5} concentration is greater than 9 µg/m³ should be evaluated separately from months where the average PM_{2.5} concentration is less than 9 µg/m³ (Figure 1).

During the winter burn season, when monthly averages have a more significant impact on the annual average, concentrations at the violating monitors are higher on the weekends, which suggests the emissions are more correlated with residential activity than with industrial and transportation sources. To illustrate this, Figure 2 through 3 display PM_{2.5} concentrations on a time-of-week and time-of-day basis for both November through February (the wood burning season) and March through October, respectively. Figure 2 clearly shows that PM_{2.5} concentrations are significantly elevated on weekends during the wood burning season, while PM_{2.5} concentrations are consistent throughout the week during the rest of the year. Note that Figure 3 below displays a similar pattern to the Figure 7 in ADEQ's report, but in this instance the data shows the pattern during the wood burning season compared to the rest of the year.

Figure 3 shows a concentration spike in the morning as traffic and industrial activity begin. The Durango Complex monitor, being in an industrial area, displays the largest morning spike; however, unlike the annual data shown in the Draft Report, the nighttime spikes at the South and West Phoenix sites are higher and nighttime concentration increase more quickly during the wood burning season. Also note that the nighttime spike at Durango Complex occurs later than those at South and West Phoenix, suggesting that particulate matter is being transported to the area from the neighborhoods surrounding central, south, and west Phoenix. The pattern outside of the wood burning season is different; and though there is still a small spike in the morning centered on Durango Complex, the evening concentration spike is greatly reduced. These patterns provide evidence suggesting that residential activity, such as recreational wood burning, are among the dominant sources impacting the violating monitors during months that have the largest impact on the annual PM_{2.5} concentrations. Additionally, PM_{2.5} concentrations are lowest between 12:00 p.m. and 4:00 p.m. (throughout the year) which further suggests that industrial sources, which operate throughout the workday, have minimal impact on PM_{2.5} concentrations at the violating monitors.



Figure 1. Interquartile range of monthly PM_{2.5} averages for the period 2014 to 2023 at the three violating monitors in Maricopa County. Note that the monthly mean only exceeds 9 $\mu\text{g}/\text{m}^3$ for the months November through February (Durango Complex is an exception with a monthly mean of 9.45 $\mu\text{g}/\text{m}^3$ for October).

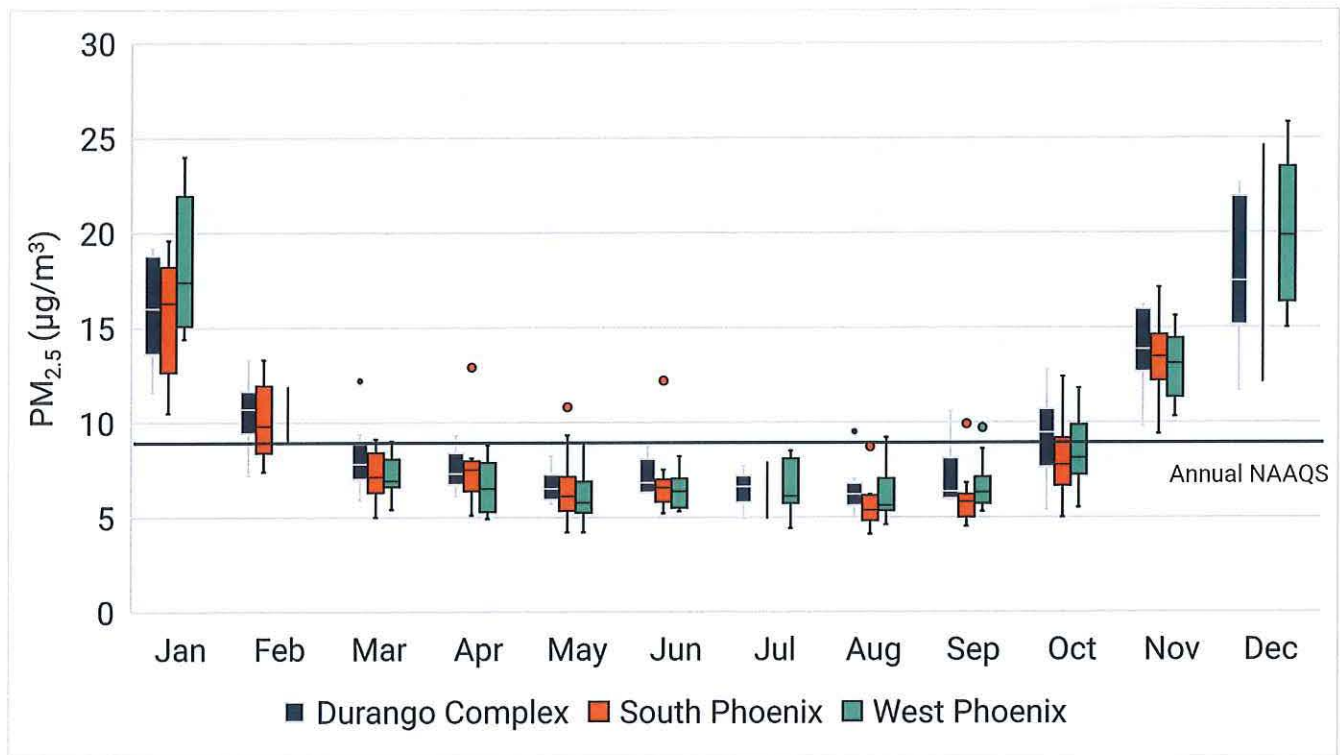


Figure 2. Average PM_{2.5} by day of the week for 2021 to 2023. Solid bars are the averages for the months where the median PM_{2.5} is higher than 9 µg/m³ at all three sites, i.e., November through February. Pattern bars are the averages for March through October.

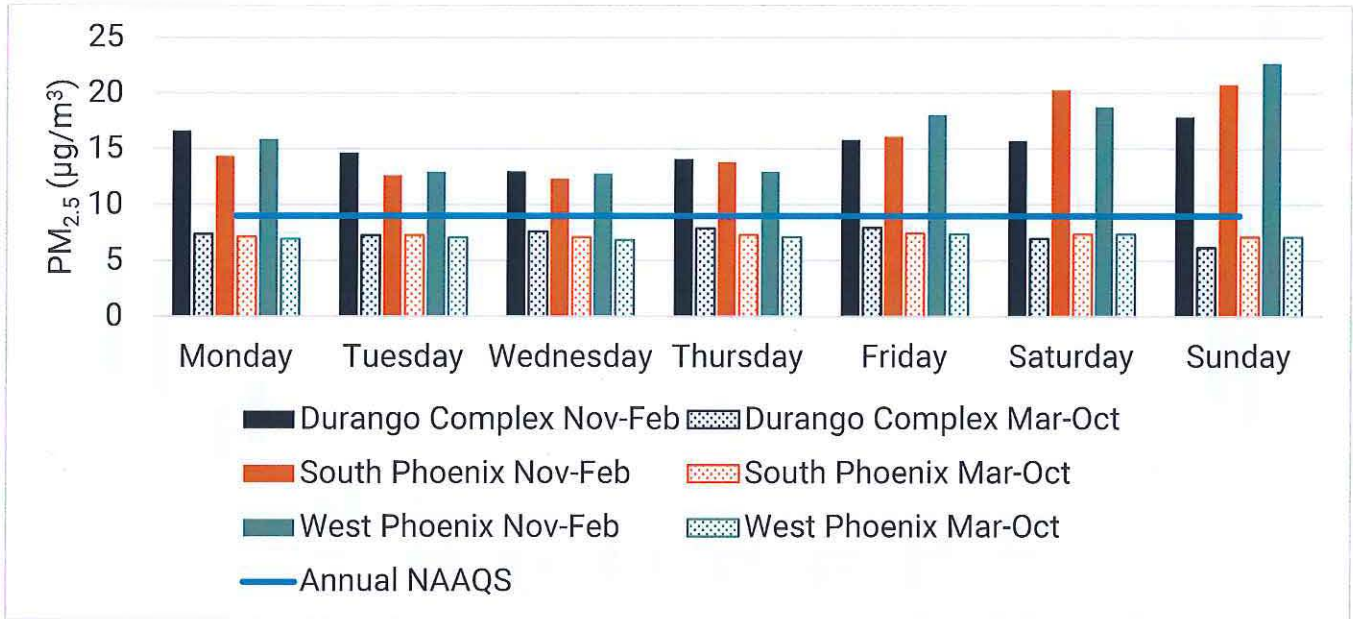
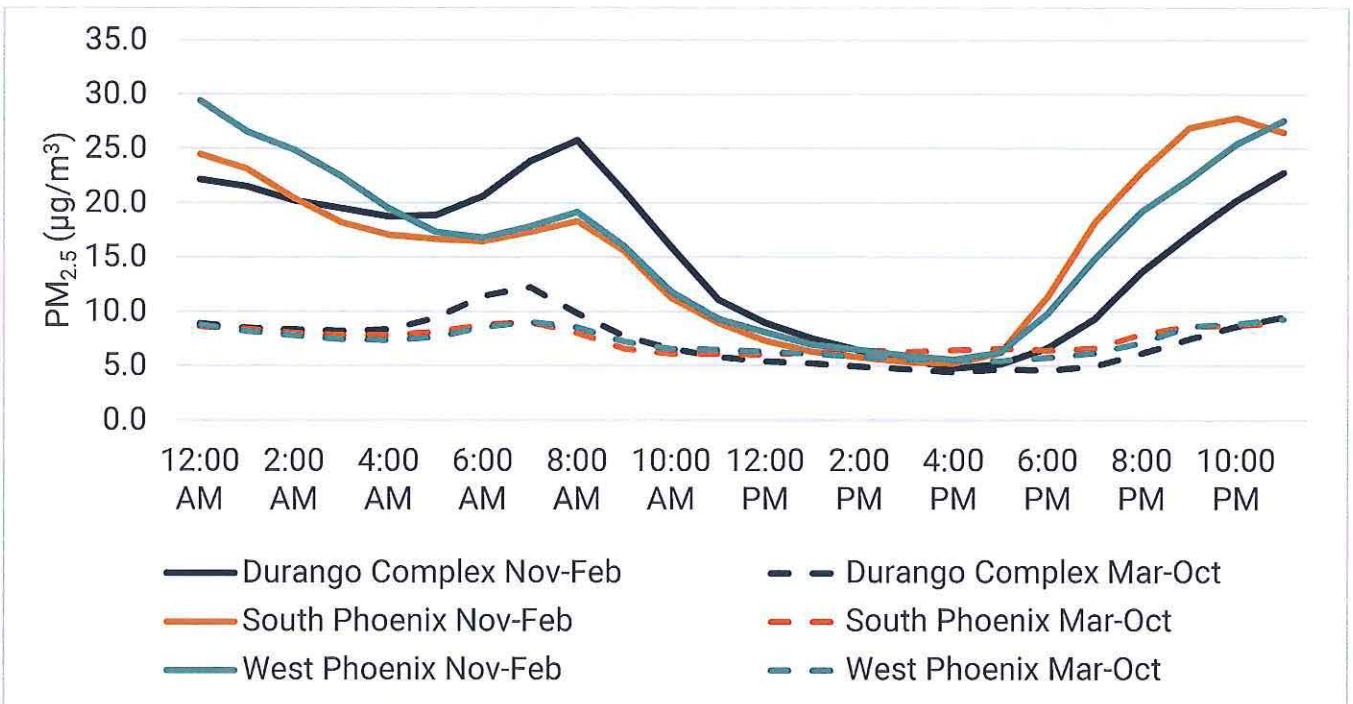
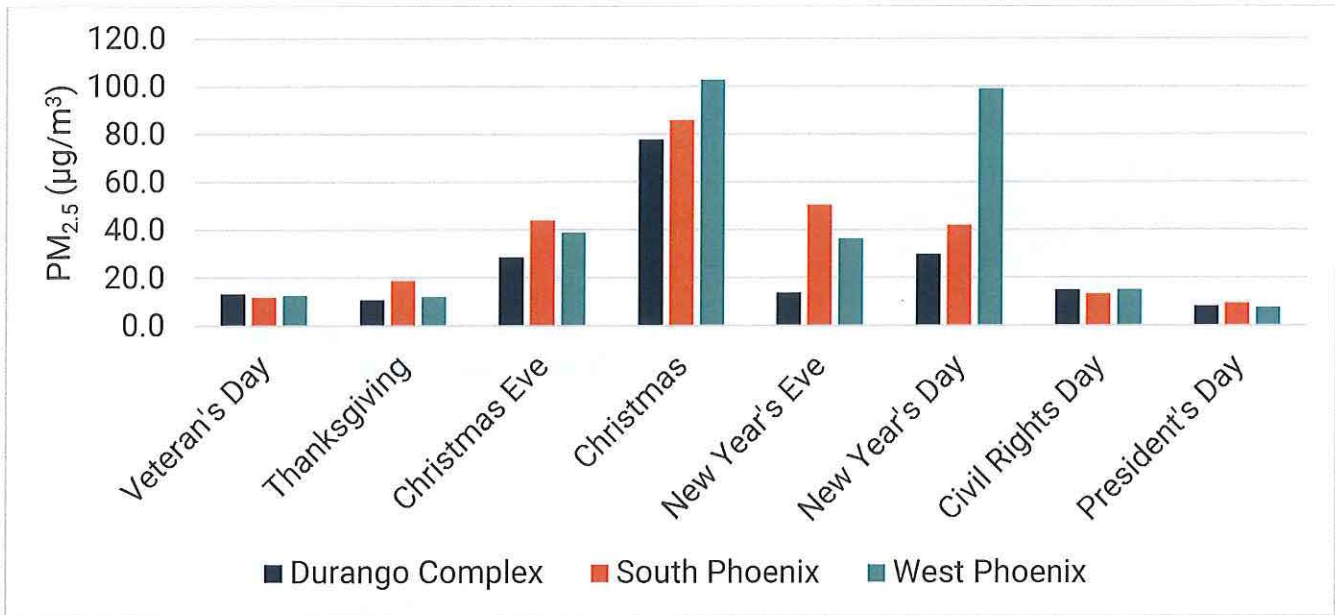


Figure 3. Average PM_{2.5} by time of day for 2021 to 2023. November through February are solid lines and March through October are dashed lines.



Another example showing the prevalence of residential activity at this time of year is from holiday data, as demonstrated in Figure 4, which shows PM_{2.5} concentrations on holidays during the wood burning season. Since emissions from industrial and transportation sources are significantly reduced on Christmas and New Year's Day, it provides strong evidence that residential activities, such as wood burning and fireworks, are the primary sources on these days.

Figure 4. Average PM_{2.5} on holidays in 2021-2023.

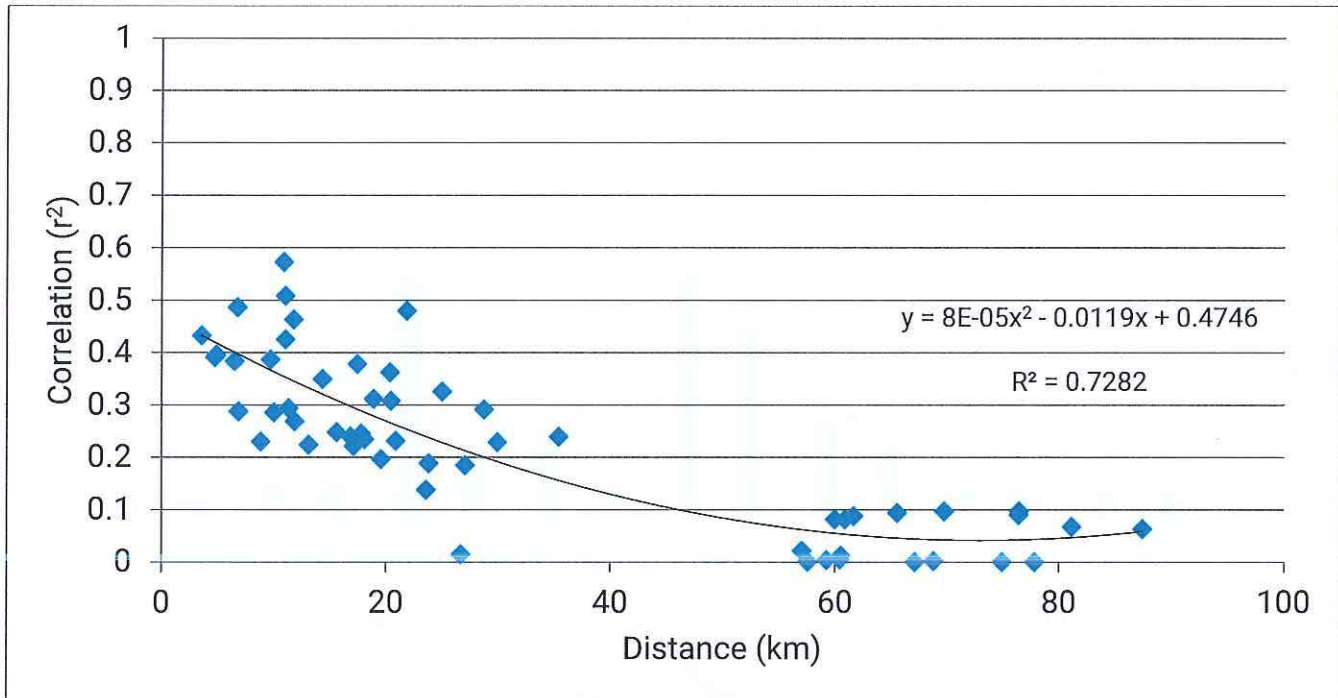


Spatial Analysis

Increased spatial resolution would also be a very useful component to this analysis because PM_{2.5} sources generally have a short-range effect on surrounding areas. For example, Figure 5 is a visual display of a correlation matrix, or correlogram, between PM_{2.5} monitoring sites in Maricopa and Pinal Counties. Strong correlation is generally considered to be >0.70, whereas the highest correlation in this dataset is 0.57 and 87% of the air monitoring sites have less than 0.40 correlation. Even if considering Maricopa County alone where the average distance between PM_{2.5} monitoring sites is only 16 km, the average correlation is only 0.31. This provides substantial evidence that the effect of sources impacting PM_{2.5} monitors are very localized because sources associated with one monitor, such as traffic or industrial activities, are not triggering substantial correlation with the nearest neighboring monitoring sites.



Figure 5. Correlogram of PM_{2.5} air monitors in Maricopa and Pinal Counties. This chart was taken from the Maricopa County Air Monitoring Network Assessment 2015 - 2019 and represents a five-year average of PM_{2.5} concentrations in that time period.



While correlation analysis is not a prescribed step in the five-factor analysis, it provides useful information about spatial patterns of PM_{2.5} concentrations that should be considered when developing nonattainment boundaries, particularly because this weak correlation has been confirmed by other MCAQD studies. Over the years, MCAQD has conducted many studies with mobile and/or low-cost PM_{2.5} sensors which can greatly augment data from regulatory PM_{2.5} monitors in showing the extent of problem areas. These various studies include wintertime only studies that were conducted annually between 2013 and 2020, as well as the multi-year Phoenix as a Testbed for Air Quality Sensors (PTAQS) study that was done in conjunction with EPA. EPA did not publish the results from PTAQS, other than some internal reports focusing on sensor performance and correction factor creation, but MCAQD has created presentations which describe the project². Note that the annual wintertime studies, which included PM_{2.5} chemical speciation, source identification, and pattern analysis, were discontinued in 2020 because results were so consistent from year to year. Since 2020, there have been no significant changes to the type and quantity of sources in the areas where the wintertime studies were conducted.

² Pope, R. and Domsy, I. 2022. PurpleAir and the Phoenix Testbed for Air Quality Sensors Project. Presentation prepared for Maricopa County Air Quality Department.



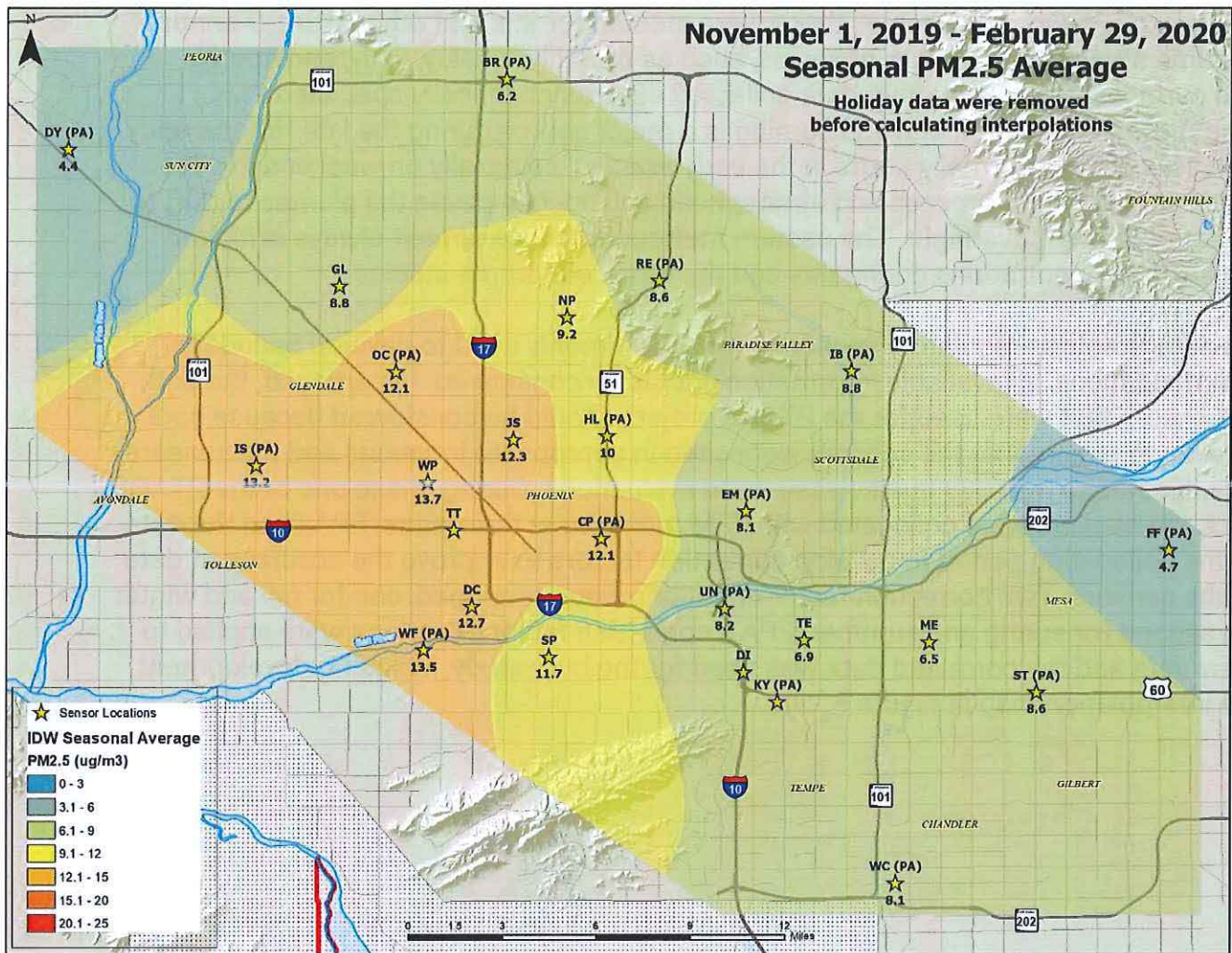
Figure 6 displays a map that was created for one of MCAQD's wintertime studies³. This map utilized official PM_{2.5} air monitoring data, as well as data from the air sensors that were part of EPA's PTAQS project, to create an interpolated surface showing the patterns of PM_{2.5} during the study period. Note that average PM_{2.5} concentrations greater than 9 µg/m³ were generally located in central, southern, and western Phoenix. Numerous spatially explicit surfaces such as these were created for this and other MCAQD annual wintertime studies at a number of scales, such as monthly, weekly, daily, and hourly. These surfaces, along with other data collected such as chemically-speciated PM_{2.5}, demonstrate that residential wood burning is a major source during the late fall and early winter. This activity normally starts in the early evening, especially on weekends, in the Phoenix area and light breezes and atmospheric subsidence cause the plumes to drift to the west-southwest overnight. The eastern metropolitan area almost always exhibited much lower concentrations during this and the other wintertime studies.

While data from non-regulatory sensors are not commonly used to develop boundary recommendations, all available information should be considered. In particular, the data from sensors that were used for the PTAQS project should be considered because care was taken to ensure that the sensors were sited in appropriate locations and the sensors were subjected to rigorous quality assurance evaluations. During phase one of the PTAQS project, the sensors were collocated with FEM monitors at three sites. EPA used the data from the collocation period to develop correction factors to improve the accuracy of data from the sensors. Two correction factor equations were developed, one for fall and winter and a second for spring and summer. EPA's correction factor equations were applied to the raw data and the corrected data was used for the burn study, including development of the interpolation map in Figure 6.

³ Maricopa County Air Quality Department. 2021. Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 Season. White paper created for internal review of the project.



Figure 6. Interpolated PM_{2.5} values that were created for MCAQD’s report “Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 Season”. This report focused on data that were collected from November 2019 through February 2020 and included data from the PTAQS air sensors.

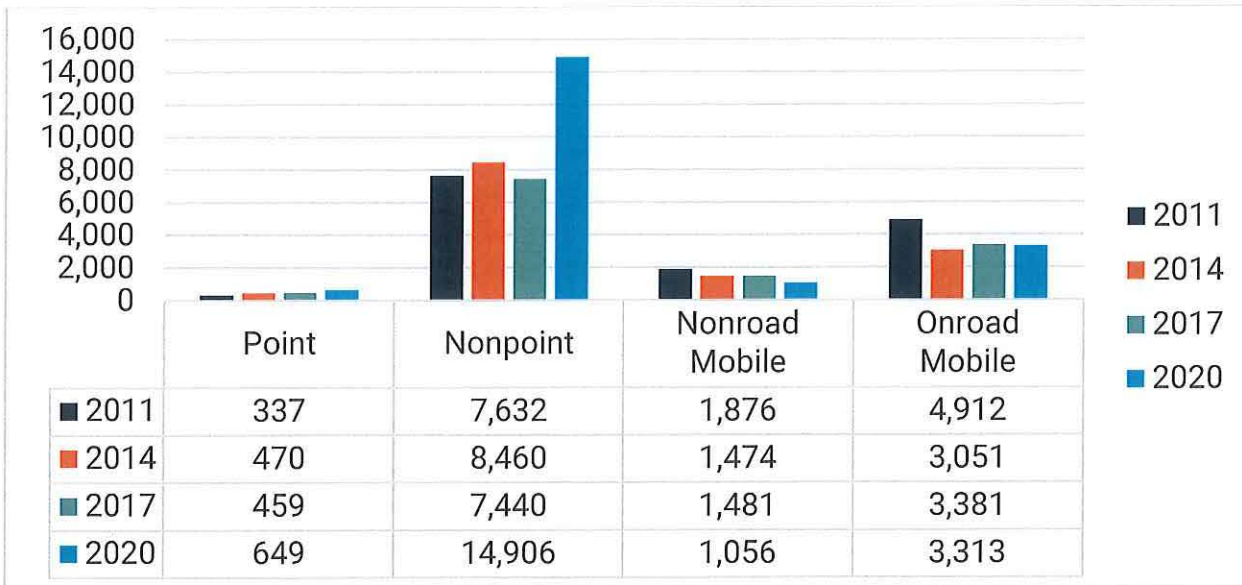


Emissions Inventory

The emissions analysis prepared by ADEQ examined annual emissions. At this scale, it is apparent that transportation and point sources are minor contributors to PM_{2.5} concentrations, and that nonpoint sources are more significant contributors (Figure 7).



Figure 7. PM_{2.5} emissions (tons/year) within Maricopa County by source category in 2011, 2014, 2017, and 2020.



Mobile Sources

MCAQD’s 2020 Periodic Emissions Inventory for Particulate Matter shows that PM_{2.5} emissions from airport operations (including ground support equipment, auxiliary power units, and aircraft) were 77.8 tons in 2020, or 0.4% of the total PM_{2.5} emissions in Maricopa County. It is important to note that local estimates of airport PM_{2.5} emissions (77.8 tons in 2020) are significantly lower than EPA estimates of airport emissions (136.6 tons in 2020). In addition, if ADEQ relies on PM_{2.5} emissions from airports as a factor for determining boundaries of the PM_{2.5} nonattainment area, ADEQ should use local emissions estimates. Specifically, ADEQ should not rely on EPA estimates⁴ which suggest that PM_{2.5} emissions from small airports, such as Falcon Field and Phoenix Deer Valley, are as high as or higher than emissions from Phoenix Sky Harbor International Airport. Local estimates indicate that PM_{2.5} emissions from Falcon Field (4 tons in 2017 and 2020) and Phoenix Deer Valley (5 tons in 2017 and 2020) are significantly lower than PM_{2.5} emissions from Phoenix Sky Harbor (28 tons in 2017 and 20 tons in 2020)⁵.

Similarly, emissions from onroad vehicles (including exhaust, tire wear, break wear, but excluding paved and unpaved road fugitive dust) were 636.2 tons in 2020, or 3% of the total PM_{2.5} emissions in Maricopa County. MCAQD supports the inclusion of major

⁴ EPA used generic estimating procedures to estimate emissions from air taxis, auxiliary power units, and general aviation aircraft with piston engines at Falcon Field and Phoenix Deer Valley.

⁵ Local emission estimates were developed using the Aviation Environmental Design Tool for the 2017 and 2020 Periodic Emissions Inventories.



freeways located near the violating monitors in the PM_{2.5} nonattainment area; however, emissions from freeways located north of Glendale and east of the City of Phoenix boundaries do not impact the violating monitors and should not be included in the PM_{2.5} nonattainment area.

Industrial Sources

While it is not clear from ADEQ's emissions inventory analysis, the urban increment analysis confirms that crustal material does not contribute significantly to the urban increment, suggesting that emissions from construction, agriculture, paved and unpaved road dust, and non-metallic mineral processing operations are not driving nonattainment.

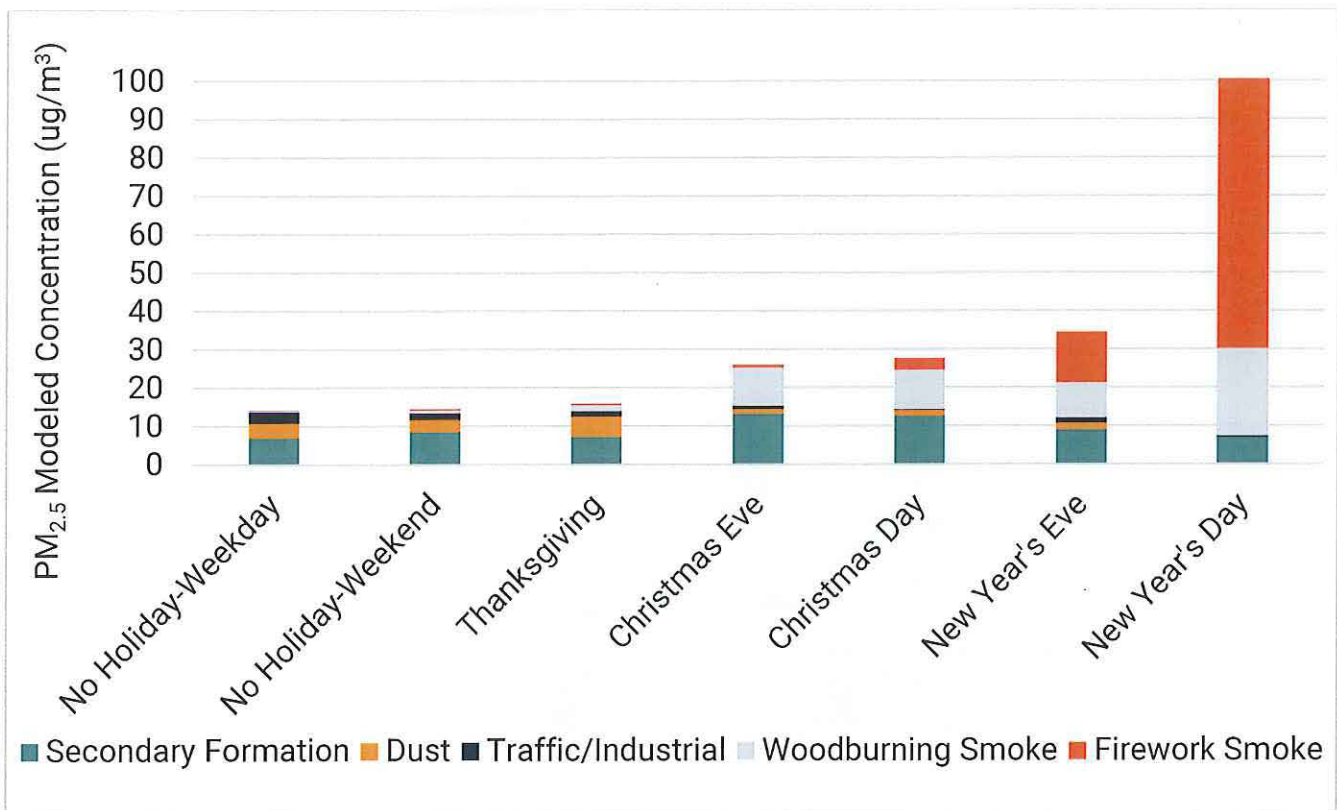
Residential Wood Combustion

When adjusting the temporal scale to look at the winter months, which contribute most to the elevated annual average, residential wood burning (as well as fireworks during the holidays) become important sources. When residential wood combustion emissions are temporally allocated by heating degree days, the typical daily PM_{2.5} emissions from residential wood combustion are 10,335 pounds per day. This is significantly higher than the typical daily emissions from all point sources in Maricopa County (3,578 pounds per day). Unfortunately, emissions from fireworks are not quantified in the National Emissions Inventory or the Periodic Emissions Inventory due to lack of available data.

While these temporal patterns are not apparent in the national emissions inventory data, they are noted in data from the above-mentioned annual wintertime PM_{2.5} studies conducted by MCAQD. A significant portion of these studies included PM_{2.5} speciation and modeling, which demonstrated residential wood burning and fireworks as a source of major impact during the wood burning season and especially during holidays (Figure 8). Note that all the PM_{2.5} speciation data that were collected in MCAQD's wintertime studies, which took place annually between 2013 and 2020, were modeled with EPA's Positive Matrix Factorization (PMF) model which allows for source identification and quantification. Most of the PM_{2.5} speciation sampling occurred at the West Phoenix site, but some sampling was also done at the Durango Complex, South Phoenix, and Tempe sites, as well as a temporary site in Laveen.



Figure 8. Speciation modeling results from the West Phoenix air monitoring site, 2014-2020 (November through January only). PM_{2.5} concentrations are averaged for weekdays (Monday through Thursday), weekends (Friday through Sunday), and holidays.



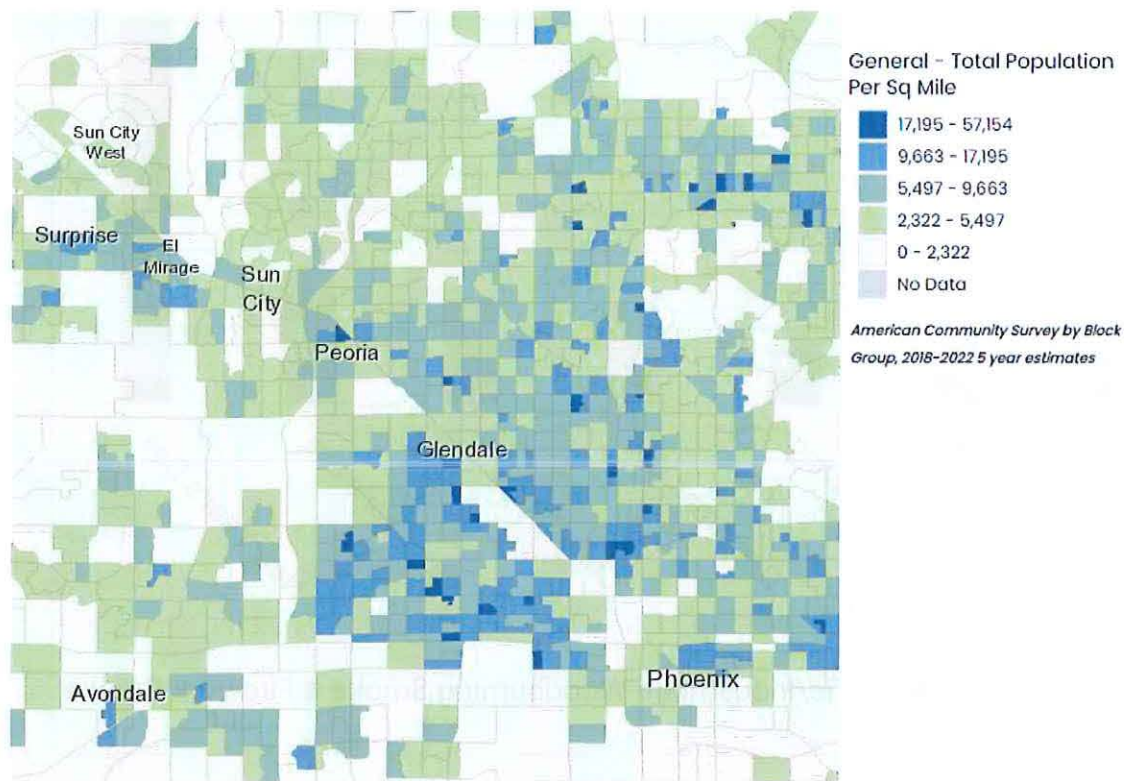
Focusing too much on point and transportation sources is counterproductive and will result in a boundary area that is too large, which will create unnecessary regulatory burden on industries that are relatively minor sources of PM_{2.5} at the violating monitors. While data regarding the location of residential wood burning is relatively sparse, MCAQD does have the specialized 2013-2020 annual wintertime studies that provide evidence on the location of wood burning sources and how smoke emissions are transported toward the violating monitors. The studies suggest that much of the wintertime residential wood burning is taking place in west, south, and midtown Phoenix and the smoke from these emissions is often transported overnight through atmospheric subsidence toward the lower-elevation southwest valley, where it lingers until the morning (Figure 6). In addition, data from MCAQD’s database indicates that inspectors documented residential wood burning at 155 locations (between January 1, 2022 and October 15, 2024). Of these, 87 locations were in Phoenix, and the remaining were located north (2), west (40), and east (26) of Phoenix.

Based on consideration of these factors, industrial sources north of Glendale and east of the City of Phoenix boundaries do not contribute meaningfully to elevated PM_{2.5} in the



southwest and western part of Phoenix. Figure 9, shows that population density is highest in the southern, central and western parts of Phoenix, in close proximity to the West Phoenix and South Phoenix monitors.

Figure 9. Population density (total population per square mile) in the area around the violating PM_{2.5} monitors.⁶



Meteorology

The meteorological analyses of Section 3.1.3.1 of ADEQ’s Draft Report, which break down conditions by season and PM_{2.5} conditional probability factors, are well done. Figures 20-26 in the ADEQ’s report illustrate perfectly that Maricopa County’s PM_{2.5} issues are a seasonal wood burning problem due to sources located relatively close to the exceeding monitors. When broken down to an even finer scale of time-of-day, as was done in many of MCAQD’s 2013-2020 annual wintertime studies (e.g., Figures 17-20 in MCAQD’s Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 Season), it provides further evidence about the sources and transport of PM_{2.5}.

⁶ Maricopa Association of Governments. Arizona Demographics. October 23, 2024. <https://geo.azmag.gov/maps/azdemographics/>

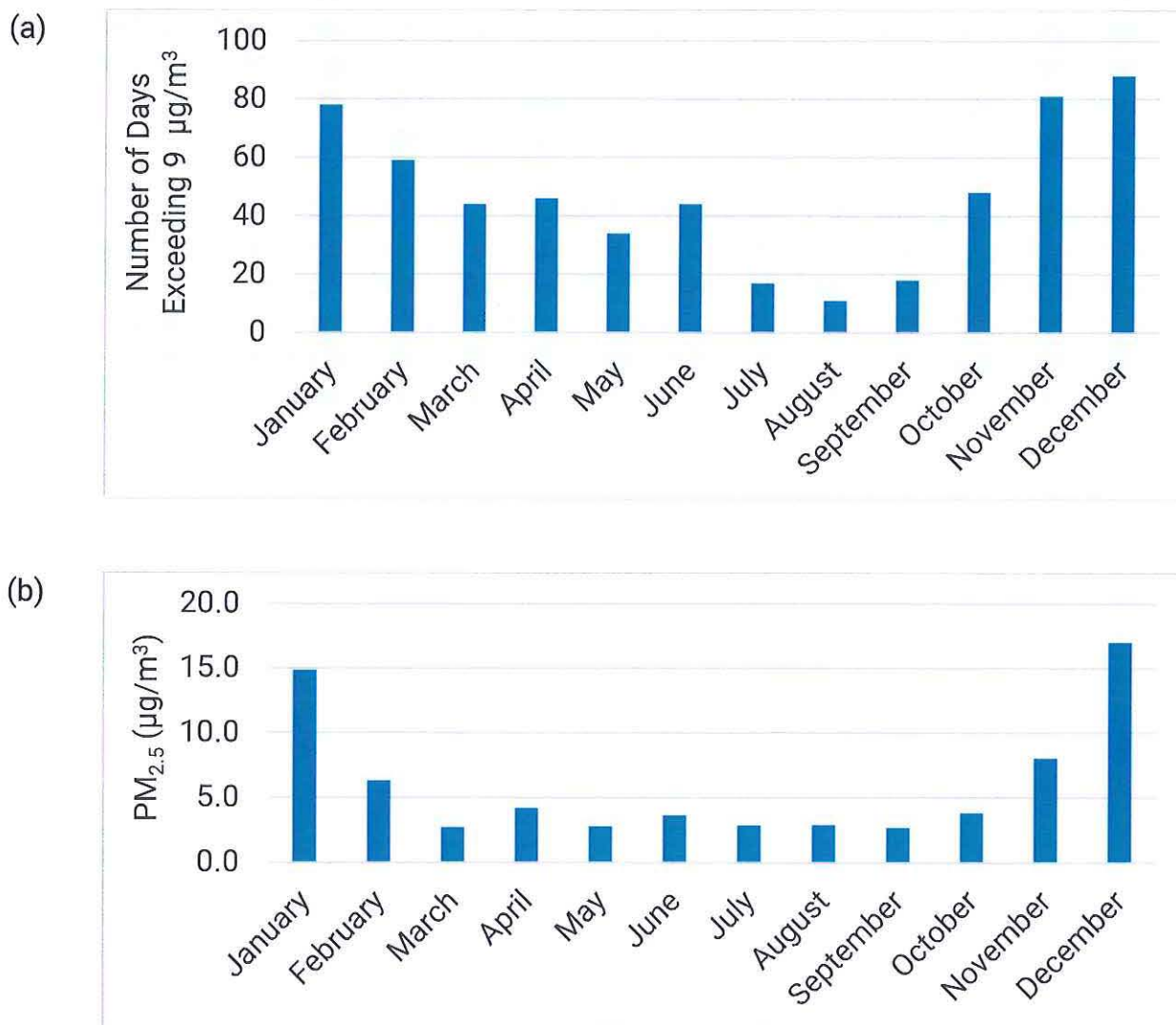


The HYSPLIT analysis of Section 3.1.3.2 created 24-hour back trajectories terminating at 500 m in height over each of the violating monitoring sites. The trajectories were run twice a day for 2021 to 2023, but only for days that had a 24-hour average over $9 \mu\text{g}/\text{m}^3$. While MCAQD agrees that it is important to only consider days that are contributing to the violation of the annual NAAQS, we also believe there is a large scaling problem between the influence of the days in the winter burn season, November through February, and the other days of the year. The source location of particles that impact the violating monitors during months that have the biggest impact on the annual average should be given much more weight than the source location of particles at other times of the year.

To illustrate this scaling problem, MCAQD analyzed the days in 2021 to 2023 which averaged more than $9 \mu\text{g}/\text{m}^3$ (analyzed days) (Figure 10a). The difference, or delta, between the 24-hour average and $9 \mu\text{g}/\text{m}^3$ was also analyzed (Figure 10b). While Figure 10a illustrates that the November to February burn season contains 54% of the analyzed days, the weight of this is more accurately displayed in Figure 10b. The average delta of the analyzed days during the burn season had more than 3.5 times more impact on the annual average $\text{PM}_{2.5}$ concentration.



Figure 10. (a) Number of days per month between 2021 and 2023 in which the 24-hour average PM_{2.5} concentration exceeded 9 µg/m³. (b) The average difference (delta) between the 24-hour average PM_{2.5} concentration and 9 µg/m³ for days in 2021 to 2023 which exceeded 9 µg/m³.



In addition to the scaling problem regarding the influence of days during the burn season, it is possible that the HYSPLIT model was run incorrectly for these days. The National Oceanic and Atmospheric Association (NOAA) recommends that HYSPLIT back trajectories be terminated at a height that is 0.5 times the planetary boundary level (PBL), though they also recommend staying above a height of 250 meters to reduce interference with ground-level terrain.⁷ In any event, since the assumption is that fine particles are being transported along the back trajectory and are affecting the air monitor, it is necessary that the termination

⁷ https://www.arl.noaa.gov/documents/reports/Trajectory_Starting_Heights_ver_01.pdf;
https://www.ready.noaa.gov/documents/ppts/Cheat_Sheet_2020.pdf



height is below the PBL, because atmospheric conditions would isolate particles above the PBL from the monitors. A similar phenomenon exists with the beginning and route of the trajectory, as this needs to enter the mixing layer to make the modeling assumption that particles emitted at ground level are being transported toward the termination.

To analyze the PBL conditions during the HYSPLIT modeling period, MCAQD obtained PBL height data for 2021 to 2023 from Copernicus Climate Change Service (C3S) Climate Data Store (CDS).⁸ Integrated Data Viewer software from UCAR/Unidata⁹ was then used to extract grid data from C3S's GRIB file type. The grid has a resolution of 0.25° × 0.25° and the closest grid point corresponding to the West Phoenix air monitoring site, +33.55, -112.25, was selected for the analysis. Due to time constraints, only hourly data for 2021 were extracted (Table 1).

Table 1. Monthly averaged PBL heights for 2021. The data source was the C3S CDS 1-hour estimates of daily PBL conditions derived from a combination of modeled and observed data. Averages at 8 a.m. and 11 p.m. represent all hourly averages at that time during the averaging period.

Month	Average PBL (m)	Average PBL (m) at 8:00 a.m.	Average PBL (m) at 11:00 p.m.
January	283.4	67.2	96.4
February	493.0	60.3	114.2
March	784.0	152.5	218.3
April	1022.4	231.2	278.3
May	1086.8	344.1	345.1
June	1035.2	393.3	314.1
July	783.7	433.4	309.3
August	743.6	318.2	175.8
September	738.7	185.1	147.7
October	620.1	142.3	191.6

⁸ <https://cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels?tab=overview>

⁹ <https://www.unidata.ucar.edu/software/idv/>



Month	Average PBL (m)	Average PBL (m) at 8:00 a.m.	Average PBL (m) at 11:00 p.m.
November	274.1	62.9	41.0
December	259.3	52.7	116.0

As can be seen in Table 1, the months with the lowest PBL average height, November through January, is around 3.8 times lower than the months with the highest PBL, April through June. This pattern is quite similar to the pattern demonstrated in Figure 10 and demonstrates how important seasonal weather is in influencing pollution patterns and why these weather patterns need to be considered when modeling back trajectories.

These seasonal patterns of PBL heights can be averaged as shown in Table 2. Note that in every one of these averaging periods a back-trajectory terminating at 500 m does not meet the HYSPLIT modeling guideline of 0.5 times the PBL. When the averages are calculated for only 8:00 a.m. or 11:00 p.m., the two daily times that the HYSPLIT model was run for the West Phoenix site, it is observed that the 500 m termination height is well outside the average mixing height for any time of the year, but especially during the winter burn season.

Another issue with the HYSPLIT modeling for this draft report is that it is two dimensional in nature. There is no information, statistical or otherwise, given regarding the starting height of the 24-hour back trajectories. Given the termination height of 500 m, it is reasonable to assume that many of the starting heights are above 500 m and well outside the average mixing layer height, especially during the winter burn season.

Table 2. Annual and seasonally averaged PBL for 2021.

Averaging Period	Average PBL (m)	Average PBL (m) at 8:00 a.m.	Average PBL (m) at 11:00 p.m.
Annual	677.6	204.6	196.3
Burn Season (January, February, November, and December)	323.8	60.8	91.9
Spring (March through June)	981.3	280.3	289.0
Monsoon Season (July through August)	763.7	375.8	242.6
Fall (September through October)	678.4	163.7	169.7

MCAQD understands that ADEQ's methodology is similar to what EPA has said they will



provide in the PM_{2.5} Designations Mapping Tool. However, while 500 meters may be an appropriate HYSPLIT elevation for some portions of the country, the analysis of PBL data indicates that it is not appropriate for the West Phoenix site or for either of the nearby violating monitors.

Geography/Topography

MCAQD notes that the draft boundaries tend to follow the structure of the Lower Salt River Airshed that was identified in the Draft Report. MCAQD recommends that ADEQ place greater weight on natural topographical boundaries that limit local transport of PM_{2.5}. These natural boundaries include South Mountain, the Tempe and Papago Buttes, Camelback Mountain, Phoenix Mountains Preserve, North Mountain, and Shaw Butte. These natural boundaries surround the area that MCAQD's wintertime studies have identified as contributing to the PM_{2.5} violations, i.e., central, south, and west Phoenix. The PTAQS study, MCAQD's 2013-2020 annual wintertime studies, as well as regulatory PM_{2.5} data from the Eastwood, Tempe, and Mesa air monitoring sites, confirms that areas to the north and east of these natural boundaries are not major contributors to wintertime PM_{2.5} concentrations.

Jurisdictional Boundaries

The proposed boundary should not necessarily be along county lines, as that would encompass a larger area than necessary and is not where the sources of PM_{2.5} are located. EPA's guidance provides that where existing jurisdictional boundaries (e.g. county lines, air district boundaries, etc.) are not adequate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates are recommended to be used¹⁰. As counties in the West are large and contain areas that are urban, suburban, and rural, nonattainment boundaries are frequently not associated with county lines or air district boundaries, but in correlation to areas where sources are located and geography/topography. This approach has been considered with several prior nonattainment areas in Arizona, including the Maricopa County PM₁₀ nonattainment area and the West Pinal PM₁₀ nonattainment area. MCAQD agrees that the draft boundary of the nonattainment area should not cross the borders of Maricopa County or the boundaries of sovereign tribal nations. MCAQD proposes that the appropriate boundary should be along the eastern borders of the City of Phoenix, which is very near to the previously mentioned topographical borders.

¹⁰ EPA Office of Air and Radiation, Initial Area Designations for the 2024 Revised Primary Annual Fine Particle National Ambient Air Quality Standard, February 7, 2024, p. 11, accessed at https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-designations-memo_2.7.2024_-jg-signed.pdf.



Conclusion

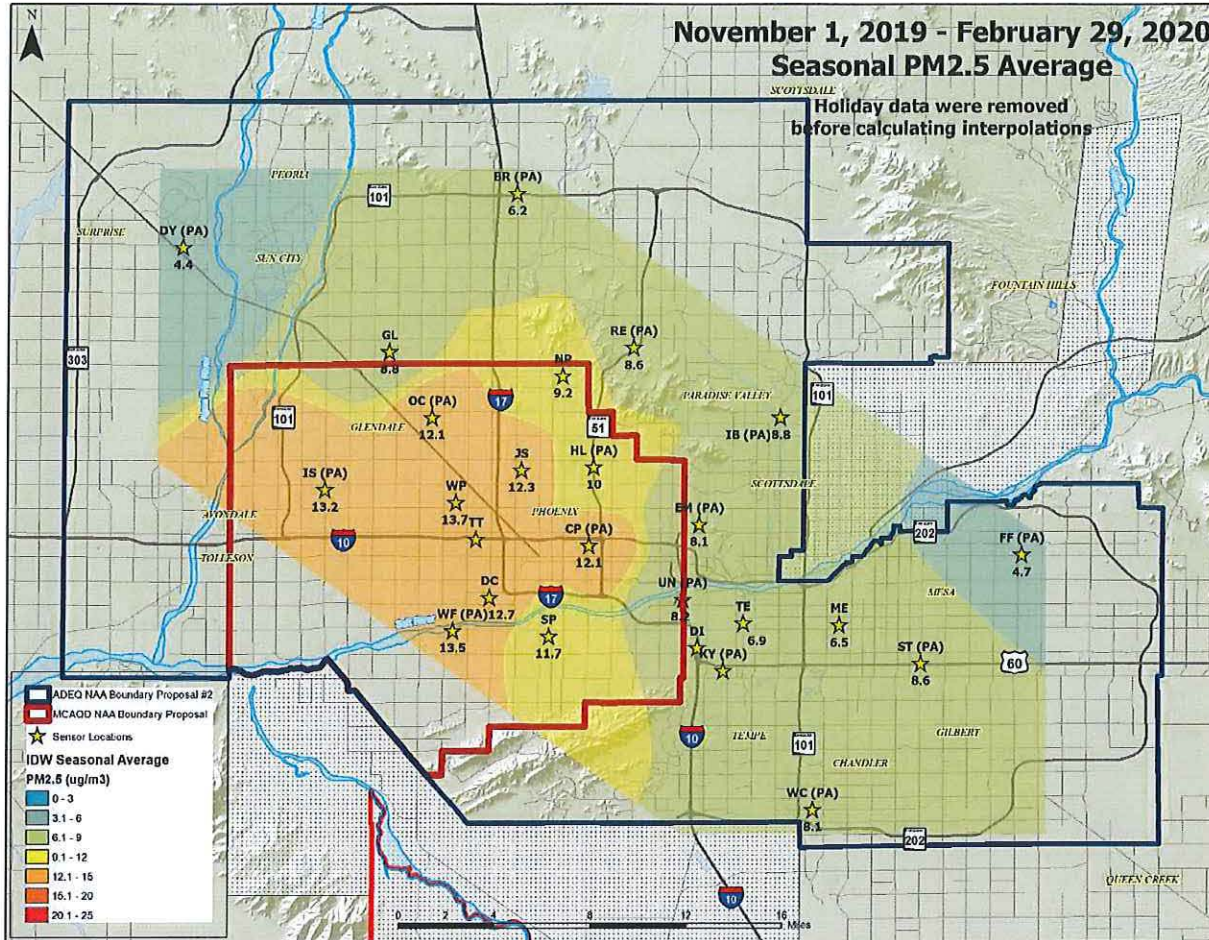
The PM_{2.5} nonattainment area boundary recommendation should be focused on the violating air monitoring sites and the areas impacting those sites, as wintertime studies have shown that residential wood burning in areas of central, south, and west Phoenix, as well as adjacent towns, are a major contributor to violations at the PM_{2.5} monitors. Our annual wintertime studies show that smoke is generated in central, south, and west Phoenix during the wood burning season and generally transported to the lower elevations in the southwest valley. The data indicate that north Phoenix and areas to the east of Phoenix, such as Scottsdale, Tempe, and Mesa, are not major contributors to the violating PM_{2.5} air monitors. Rather, the topography of the central valley creates appropriate natural boundaries for the south, east, and north sides of the proposed nonattainment area; these natural boundaries include South Mountain, the Tempe and Papago Buttes, Camelback Mountain, Piestewa Peak/Phoenix Mountains Preserve, North Mountain, and Shaw Butte.

Additionally, ADEQ's proposed boundaries give too much weight to the HYSPLIT analysis and not enough weight to the location of PM_{2.5} sources that are contributing to nonattainment. Simply demonstrating that air moves from one location to the violating monitors is insufficient to demonstrate that the area is contributing to nonattainment. If the air that is moving to the violating monitors is not transporting significant amounts of PM_{2.5}, then that air does not contribute significantly to nonattainment, and those areas do not warrant inclusion within the nonattainment boundaries.

Figure 11 shows an alternative configuration for the proposed boundaries. This proposal is based upon EPA's five-factored analysis and includes the violating air monitors and the major emissions (residential wood burning, traffic, and industrial areas) that are likely impacting those monitors. Meteorology and topography are considered, as the area is surrounded to the south, east, and northeast by mountains and buttes, and this valley contains the daytime westerly wind currents and nighttime easterly katabatic winds. Lastly, jurisdiction is considered as the proposed boundary does not cross into sovereign tribal nations nor over county borders. MCAQD's proposed nonattainment area covers 256 square miles, compared to the 1,071 square miles for the nonattainment area proposed by ADEQ.



Figure 11. Map of interpolated PM_{2.5} values that were created for MCAQD’s report “Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 Season” with the MCAQD recommended boundaries and the ADEQ proposed boundaries added.



Thank you for considering the information provided in these comments. You may direct any questions to Kimberly Butler, Manager of the Planning and Analysis Division, at 602-525-4414 or Kimberly.Butler@Maricopa.Gov.

Sincerely,

Philip A. McNeely
Director

Cc email: Daniel Czecholinski





Grand Canyon Chapter • 514 W. Roosevelt St. • Phoenix, AZ 85003

Phone: (602) 253-8633 • Email: grand.canyon.chapter@sierraclub.org

October 24, 2024

Arizona Department of Environmental Quality
Air Quality Division, Air Quality Improvement Planning Section
1110 W. Washington St.
Phoenix, AZ 85007
airplanning@azdeq.gov

Re: Proposed Draft PM_{2.5} Boundary Recommendation

Dear Air Quality Division:

Please accept these brief comments on ADEQ's Proposed Draft PM_{2.5} Boundary Recommendation on behalf of Sierra Club's Grand Canyon (Arizona) Chapter. The Grand Canyon Chapter has members and supporters throughout Arizona, including in the proposed PM_{2.5} nonattainment areas.

The boundaries of nonattainment areas for the 2024 revised primary annual PM_{2.5} national ambient air quality standards (NAAQS) are important in order to call attention to Arizona communities that are breathing unhealthy air, and to initiate and implement actions to reduce these harmful pollutants. These smaller particles -- 30 times smaller than human hair -- consist of a mix of substances, much of it from combustion, including from the burning of fossil fuels via power plants, trucks and automobiles, fireworks and fireplaces, and more. These small particles get deep in our lungs and travel into our bloodstream resulting in significant and harmful health consequences, including aggravating asthma, reducing lung function, making it difficult to breathe, contributing to premature death and heart disease, among others. Communities of color are often disproportionately affected by this pollutant. That is why it is so important that the areas with poor air quality be identified and plans implemented to reduce this harmful pollution. It will save lives!

Sierra Club supports the inclusion of portions of Maricopa County in the PM_{2.5} nonattainment area as ADEQ has proposed. ADEQ's proposed boundaries appear to include the areas that are not meeting the primary annual NAAQS for PM_{2.5}. We ask that ADEQ also consider recommending a partial county nonattainment area for Pinal County, rather than a "contingency-based" partial county nonattainment area, especially considering the significant increase in the number of fossil gas plants and other air pollution sources in Pinal County. Fine particulate pollution is already a significant problem in western Pinal County, as shown by the designation of the West Central Pinal nonattainment area for the 2006 24-hour PM_{2.5} NAAQS. Finally, we support ADEQ's proposal to include a portion of Santa Cruz County in a nonattainment area as well. We understand that Tribal Nations have been excluded from the proposed nonattainment areas due to their sovereign nature.

Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in black ink that reads "Sandy Bahr". The signature is written in a cursive style with a vertical line through the middle of the name.

Sandy Bahr
Chapter Director
Sierra Club – Grand Canyon Chapter





"Most Livable City"
U.S. Conference of Mayors

Office of
DAVID D. ORTEGA
Mayor

October 24, 2024

Ms. Karen Peters
Chief Executive Officer, Arizona Department of Environmental Quality (ADEQ)
1110 W Washington Street
Phoenix, Arizona, 85007

Dear Ms. Peters,

The City of Scottsdale appreciates the opportunity to comment on the PM_{2.5} Draft Boundary Recommendation for the new PM_{2.5} nonattainment area in Maricopa County.

In their submitted comments, the Maricopa County Air Quality Department (MCAQD) has demonstrated that PM_{2.5} concentrations exceeding 9 µg/m³ are concentrated in central, southern, and western Phoenix, southwest of the violating PM_{2.5} monitoring sites. As indicated in the Holiday/Burn Season Fine Particulate Matter Study for the 2019-2020 season, the East valley does not contribute to these exceedances. Additionally, MCAQD data showed that these violations are largely attributed to winter fires and holiday activities as demonstrated by speciation modeling results from the West Phoenix air monitoring site, covering November to January from 2014 to 2020. MCAQD also demonstrated that the sources effecting PM_{2.5} air monitors is very localized.

The proposed Arizona Department of Environmental Quality (ADEQ) non-attainment area includes most of the City of Scottsdale, but there is no evidence that the city is currently non-compliant with EPA PM_{2.5} standards. Scottsdale has a history of effective air quality management, which helps protect public health and maintain a healthier environment for residents. The new ADEQ proposal overextends by including areas that are already meeting federal standards and do not contribute to the affected monitors.

For these reasons, the City of Scottsdale fully supports the MCAQD proposed alternative boundaries for the PM_{2.5} nonattainment area. Please direct any questions to Tim Conner, Environmental Policy Manager, City of Scottsdale at 480-312-7833 or tconner@scottsdalez.gov.

Thank you for your consideration.

Sincerely,

David D. Ortega
Mayor of Scottsdale

City of Tempe
Public Works Department
Environmental Services Section
Mail Stop 3801
PO Box 5002
Tempe, AZ 85280
tempe.gov/PublicWorks



Arizona Department of Environmental Quality
Air Quality Division
1110 W. Washington Street
Phoenix, AZ 85007
Email: airplanning@azdeq.gov

To Whom It May Concern:

The City of Tempe appreciates the opportunity to provide written formal comments to Arizona Department of Environmental Quality's (ADEQ) proposed 2024 PM_{2.5} National Ambient Air Quality Standard Boundary Recommendations for the nonattainment area in Maricopa County. Tempe recognizes the vast amount of information ADEQ developed in "ADEQ's Proposed Draft PM_{2.5} Boundary Recommendation and Appendix A" within a very short amount of time following the EPA's standard revision in February 2024.

In addition to ADEQ's proposals, Tempe has reviewed information provided to ADEQ by Maricopa County Air Quality Division (MCAQD), the primacy agency for air quality regulations in Maricopa County and regional air quality expert, which demonstrates PM_{2.5} concentrations exceeding 9 µg/m³ and sources effecting PM_{2.5} air monitors is very localized in central, southern and western Phoenix. MCAQD data shows the violations are largely attributed to residential activities and sources such as winter fires and holiday activities. MCAQD proposed an alternate nonattainment area covering 256 square miles, as compared to ADEQ's proposal of 853 square miles. Tempe supports MCAQD's direction in focusing a narrower boundary on the areas with violating monitoring sites and the areas immediately impacting them.

The broader boundary proposed by ADEQ has potential implications for future stringent air quality regulations to east valley cities and their business communities. These communities and their businesses have potential to be negatively impacted by requirements to provide modeling demonstrations during the permitting process, despite air quality sites in these jurisdictions not experiencing violations and businesses demonstrating to be providing minimal, if any, impact to the violating monitoring sites.

Tempe respectfully requests ADEQ to forward MCAQD's more conservative proposal for PM_{2.5} boundary to the governor for recommendation to the EPA.

Sincerely,

Christina Hoppes
Environmental Program Supervisor – City of Tempe



City of Phoenix

OFFICE OF ENVIRONMENTAL PROGRAMS

October 24, 2024

Ms. Karen Peters
Deputy Director
Arizona Department of Environmental Quality (ADEQ)
1110 W. Washington St.
Phoenix, AZ 85007

RE: City of Phoenix Formal Comments on the proposed 2024 PM2.5 NAAQS Boundary Recommendation Draft Report

Dear Ms. Peters,

The City of Phoenix thanks you for the opportunity to comment on the Arizona Department of Environmental Quality's proposed draft PM2.5 boundary recommendation for the new PM2.5 nonattainment area in Maricopa County. We acknowledge that the new PM2.5 nonattainment area is prompted by EPA adjusting the National Ambient Air Quality Standard (NAAQS) for PM2.5 in early 2024 and by three air quality monitors that are located within Phoenix that now, as a result of the adjusted standard, are exceeding the NAAQS for PM2.5. We understand that the proposed boundary will include a portion of Phoenix so that appropriate regulatory tools can be developed to improve air quality for our residents. However, we believe that the proposed draft PM2.5 boundary should be restricted to those areas with substantial emissions sources and activity levels located near the exceeding monitors for the proposed draft PM2.5 boundary to be effective based on our review of the information provided in the 2024 PM2.5 NAAQS Boundary Recommendations Draft Report and technical support document.

In the 2024 Primary Annual Fine Particulate Matter NAAQS Boundary Recommendations Draft Report *Figure 3, Maricopa County Recommended (Partial) NAA with Relevant Data*, shows areas with sources of emissions and activity levels that are significantly lower or nonexistent near the proposed draft PM2.5 boundary recommendation as compared to the areas near the exceeding monitors. This includes the emissions from permitted point sources, both by ADEQ and the Maricopa County Air Quality Department (MCAD), the average annual daily traffic (AADT), all of which are higher in number and magnitude near the exceeding monitors.

Figures 29-31, HYSPLIT Analyses, show the back trajectories to the three exceeding monitors when the concentration of PM2.5 exceeded the new standard. These figures indicate that more of the air parcels arriving at these monitors originate in the areas surrounding the monitors. We also note that some of the simulations having little to no air parcels originating from the edges of the proposed draft PM2.5 boundary recommendation.

In the technical support document, *Figure 3, Point Sources in the Proposed Maricopa County NAA*, shows that many of the point sources from the 2020 National Emissions Inventory (NEI), particularly many of the larger sources, are located near the exceeding monitors, while *Figures 6-9 in section A3.3.1.1 Precursor Emissions from Permitted Sources*, show a similar pattern.

Based on the information from both the report and the technical support document, we believe the proposed draft PM2.5 boundary should be constrained down to those areas with greater levels of emissions and activity levels that are closer to the exceeding air monitors. This will ensure that the programs addressing PM2.5 will be more effective and resources meant to improve air quality will not be diluted by encompassing areas with minimal impact on air quality at the exceeding monitors.

Sincerely,



Nancy Allen
Environmental Programs Administrator
200 West Washington Street, 14th Floor Phoenix, AZ 85003
602-290-6066 (m)

CC:

Anita Lee, Manager, Air and Radiation Division, U.S. Environmental Protection Agency Region 9
Daniel Czecholinski, Director, Air Quality Division, Arizona Department of Environmental Quality
Philip McNeely, Director, Maricopa County Air Quality Department

October 24, 2024

ADEQ
Air Quality Division
Air Quality Improvement Planning Section
1110 W Washington Street
Phoenix, AZ 85007

To Whom It May Concern:

On behalf of the City of Maricopa, I am providing the following comments regarding the proposed 2024 PM_{2.5} National Ambient Air Quality Standard Boundary Recommendations Draft Report and Technical Support Document. These comments are specific to the proposed Pinal County non-attainment area (NAA), and the Hidden Valley PM_{2.5} monitor.

As noted in the proposed boundary draft report, the EPA previously concluded that the old Cowtown Road site was unique in its PM_{2.5} sources and should be excluded from comparison with the annual NAAQS for PM_{2.5}. The premise of accepting the subsequent replacement Hidden Valley PM_{2.5} monitor site was its distinct similarity to the prior site at Cowtown Road, and the EPA has since been asked to exclude the Hidden Valley site from comparison with the new annual PM_{2.5} NAAQS as well. While that action is pending, I wish to highlight the fact that this site is not representative of the air quality in our immediate region, especially within the City of Maricopa.

The Hidden Valley PM_{2.5} monitor is located adjacent to very large feedlot and dairy operations and agricultural fields. It stands to reason that higher PM_{2.5} readings would be found at this site given its unique and distinct location in comparison to those found in an urbanized area like the City of Maricopa. In fact, the proposed boundary draft report notes that PM_{2.5} emissions at in Pinal County are almost entirely from nonpoint sources. In fact, 94.3% of the emissions fall within this classification, with wildfires making up almost 50% of total PM_{2.5} emissions with crops and livestock dust following with just under 20%. The next highest category of emissions is construction dust, comprising just 7.5% of total emissions.

The Environmental Protection Agency should treat the Hidden Valley PM_{2.5} monitor the same as the previous Cowtown monitor and exclude it from comparison. However, if it were not excluded, the proposed boundary draft does not contain ample explanation for including the City of Maricopa within the proposed Pinal County NAA. The unique sources present at the Hidden Valley PM_{2.5} monitor reflects the immediate rural agricultural setting, and it is clear from the data presented in the proposed boundary draft report that urban sources are not contributing to the elevated PM_{2.5} concentrations.



It is noted within the draft that the Hidden Valley PM_{2.5} monitor is located in a sparsely populated area, and the PM_{2.5} emissions inventory by source category show that vehicular traffic is not a meaningful contributor of PM_{2.5} at this location. The City of Maricopa has over 75,000 residents and is largely a residential community with a traffic volume that reflects that. Land use within the city is not generally agricultural and roads are paved. The unique sources found at the Hidden Valley PM_{2.5} monitor would not be found within the City of Maricopa. Comparing the rural agricultural location of the monitor to the area within the City of Maricopa produces no similarities. In fact, the City of Maricopa is more like the neighboring City of Casa Grande, which has a monitor that is compliant with the new annual PM_{2.5} NAAQS. It is very likely that if a monitor were placed in the City of Maricopa, PM_{2.5} concentrations would be aligned with those seen in Casa Grande and therefore also in compliance.

It is not reasonable to include the City of Maricopa within the proposed Pinal NAA if compliance is based exclusively on the Hidden Valley PM_{2.5} monitor. The conditions present at the monitor would not be replicated within the City, and the sources found at that site are unique to that specific rural agricultural setting. If the EPA chooses not to exclude the Hidden Valley PM_{2.5} monitor from comparison, the size of the proposed Pinal NAA should be reduced to what is actually necessary to attain the new annual PM_{2.5} NAAQS. At the very least, since the PM_{2.5} emission sources within City of Maricopa have not been shown in the draft report to be significant contributors to the high PM_{2.5} concentrations observed at the Hidden Valley monitor, the City of Maricopa should not be included within the Pinal NAA. Please let me know if you have any questions or if I can provide any additional information. Thank you for your consideration.

Sincerely,



Benjamin Bitter
City Manager
City of Maricopa