EXCEPTIONAL EVENTS DEMONSTRATION FOR 2023 AND 2024 $PM_{2.5}$ EXCEEDANCES AT EL PASO COUNTY

August 5, 2025

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
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SECTION 1: INTRODUCTION AND EXCEPTIONAL EVENT CRITERIA

1.1 OVERVIEW

Exceptional events are unusual or naturally occurring events that affect air quality and are not reasonably controllable or preventable. An exceptional event may also be caused by human activity that is unlikely to recur at a particular location. Under §319 of the federal Clean Air Act (FCAA), states are responsible for identifying air quality monitoring data affected by an exceptional event and requesting the United States (U.S.) Environmental Protection Agency (EPA) exclude the data from consideration when determining whether an area is in attainment or nonattainment of a National Ambient Air Quality Standard (NAAQS). EPA has promulgated an exceptional events rule, 40 Code of Federal Regulations (CFR) §50.14, as well as guidance to implement the requirements of the FCAA regarding exceptional events. States are required to identify air quality monitoring data potentially affected by exceptional events by flagging the data submitted into the EPA Air Quality System (AQS) database. If EPA concurs with this demonstration, the flagged data will not be eligible for consideration when making NAAQS compliance determinations.

This document discusses the Texas Commission on Environmental Quality's (TCEQ) proposed exceptional event day flags for fine particulate matter ($PM_{2.5}$) occurring on various dates in 2024, in El Paso County (El Paso Chamizal monitor). This demonstration shows that concentrations of $PM_{2.5}$ at these air monitoring sites were impacted by exceptional events on 22 days in 2024.

The particulate matter measurements on the proposed exceptional event days are listed below in Table 1-1: *Proposed Exceptional Events in 2024*. The event days are also categorized into groups by event type. A map of Texas with the referenced monitors is shown in Figure 1-1: *Map of Texas with El Paso Chamizal Monitor Identified for Exceptional Events*, and Table 1-2: *Monitor Details* provides additional information for each monitoring site.

Table 1-1: Proposed Exceptional Events in 2024 at the El Paso Chamizal Monitor.

EE Group	Date	Exceedance Concentration (µg/m³)	Type of Event	Tier
1	1/10/2023	28.3	Other - Dust	2
2	1/28/2023	23.2	Structural Fire	2
3	2/5/2023	31.2	Other - Dust	1
4	2/26/2023	23.0	High Winds	2
5	11/5/2023	24.5	Structural Fire	2
6	11/23/2023	25.6	Other - Dust	2
7	12/31/2023	28.5	Fireworks	2
8	1/7/2024	31.9	High Winds	1
9	1/11/2024	36.8	High Winds	1
10	2/28/2024	33.0	Other - Dust	1

EE Group	Date	Exceedance Concentration ($\mu g/m^3$)	Type of Event	Tier
11	3/24/2024	48.0	High Winds	1
12	3/31/2024	36.6	High Winds	1
13	4/25/2024	29.2	High Winds	2
14	4/25/2024	25.2	High Winds	2
15	6/19/2024	30.2	Wildfire - U.S.	1
16	7/24/2024	35.4	Wildfire - U.S.	1
16	7/25/2024	35.4	Wildfire - U.S.	1
16	7/25/2024	24.5	Wildfire - U.S.	2
17	8/1/2024	25.3	African Dust	2
18	8/23/2024	39.0	Wildfire - U.S.	1
19	10/3/2024	24.9	Wildfire - U.S.	2
20	10/29/2024	44.8	High Winds	1

($\mu g/m^3$) = micrograms per cubic meter

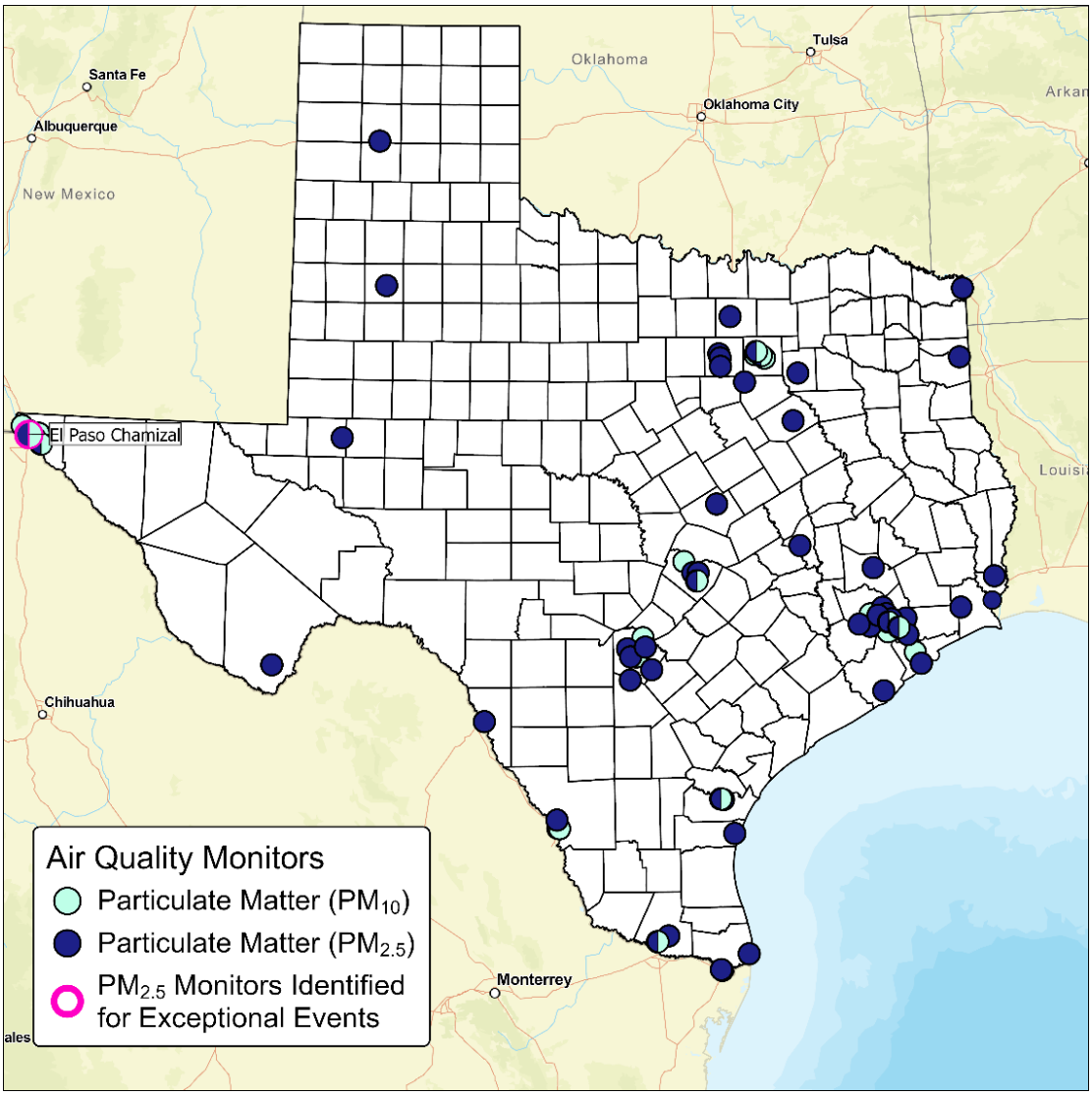

Figure 1-1: Map of Texas with the El Paso Chamizal Monitor Identified for Exceptional Events

Table 1-2: Monitor Details

Site Name	El Paso Chamizal
Air Quality System (AQS) Number	481410044
Activation Date	April 1, 1988
Address	800 S San Marcial Street
County	El Paso
Latitude/Longitude	31.7657056, -106.4552420
Pollutant Instrumentation	$PM_{2.5}$, $PM_{2.5}$ Speciation, O3, NOX, NOY, SO2
Meteorological Instrumentation	Temperature, Wind, Dew Point, Relative Humidity, Solar Radiation

1.2 CLEAN AIR ACT REQUIREMENTS

In 2024, EPA promulgated a lower primary annual $PM_{2.5}$ standard of 9.0 µg/m³. The 2024 primary annual $PM_{2.5}$ standard is met when the three-year average of annual weighted quarterly means is less than or equal to 9.0 µg/m^3 (40 CFR §50.20).

Texas is submitting this exceptional events demonstration to exclude certain data from the 2023-2025 timeframe.

1.3 EXCEPTIONAL EVENTS RULE REQUIREMENTS

On October 3, 2016, EPA revised its Exceptional Events Rule (EER) (40 Code of Federal Regulations (CFR) §50.14(c)(3)), to specify six fundamental elements that a state's demonstration must contain. Those elements and the parts of this demonstration that fulfill those requirements are shown in Table 1-3: *40 CFR §50.14(c)(3) Exceptional Event Demonstration Requirements*.

Table 1-3: 40 CFR §50.14(c)(3) Exceptional Event Demonstration Requirements

40 CFR §50.14(c)(3) Requirement	Demonstration Section
A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s).	Section 2
A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation.	Section 3
Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times. The Administrator shall not require a State to prove a specific percentile point in the distribution of data.	Section 3
A demonstration that the event was both not reasonably controllable and not reasonably preventable.	Section 4
A demonstration that the event was caused by human activity that is unlikely to recur at a particular location or was a natural event.	Section 5
Documentation that the submitting air agency followed the public comment process.	Section 7

Compliance with the EER mitigation requirements in 40 CFR §51.930 with respect to public notification, public education, and implementation of appropriate measures to protect health is documented in Table 1-4: *40 CFR §51.930 Exceptional Event Demonstration Requirements*.

Table 1-4: 40 CFR §51.930 Exceptional Event Demonstration Requirements

40 CFR §51.930 Requirement	Demonstration Section
Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard.	Section 6

40 CFR §51.930 Requirement	Demonstration Section
Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event.	Section 6
Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events	Section 6

EPA has provided several documents and tools that address exceptional events demonstration requirements, including those listed below.

- The 2016 revisions to the 2007 Exceptional Events Rule (U.S. EPA, 2016a)[1]
- "Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations" (U.S. EPA, 2016b)[2]
- "2016 Revisions to the Exceptional Events Rule: Update to Frequently Asked Questions" (U.S. EPA, 2020)[3]
- "Initial Area Designations for the 2024 Revised Primary Annual Fine Particle National Ambient Air Quality Standard" (U.S. EPA, 2024)[4]
- "$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document" (U.S. EPA, 2024)[5]
- $PM_{2.5}$ Designations Mapping Tool[6]

1.4 INITIAL NOTIFICATION AND FLAGGING DATA IN AQS

The Exceptional Events Rule at 40 CFR §50.14(c)(2) requires an initial notification by the air agency to EPA of a potential exceptional event for which the agency is considering preparing a demonstration. On July 8, 2025, TCEQ submitted an initial notification to EPA Region 6. An addendum was sent to EPA Region 6 revising event types for certain dates on July 15, 2025. An additional addendum was sent to EPA Region 6 revising event types for additional dates on July 29, 2025. A copy of the initial notification letter and addendums are provided in Appendix D.

1.5 REGULATORY SIGNIFICANCE

The annual $PM_{2.5}$ design value (DV) is the weighted annual mean concentration averaged over three consecutive years. Removing the days impacted by exceptional events from 2022, 2023, and 2024 has regulatory significance because those days impact the 2024 annual $PM_{2.5}$ DVs.

Table 1-5: *2024 DVs for the 2024 Annual $PM_{2.5}$ NAAQS* shows the 2024 design values at each monitor without EPA concurrence on TCEQ's 2022, 2023, and 2024 exceptional events demonstrations and the potential design value if EPA concurs on the proposed exceptional event days.

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[1] https://www.epa.gov/sites/default/files/2018-10/documents/exceptional_events_rule_revisions_2060-as02_final.pdf
[2] https://www.epa.gov/system/files/documents/2023-12/guidance-on-the-preparation-of-ee-wf-ozone.pdf
[3] https://www.epa.gov/sites/default/files/2019-07/documents/updated_faqs_for_exceptional_events_final_2019_july_23.pdf
[4] https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-designations-memo_2.7.2024-_-jg-signed.pdf
[5] https://www.epa.gov/system/files/documents/2024-04/final-pm-fire-tiering-4-30-24.pdf
[6] https://www.epa.gov/air-quality-analysis/pm25-tiering-tool-exceptional-events-analysis

Table 1-5: 2024 DVs for the 2024 Annual $PM_{2.5}$ NAAQS

Monitoring Site	2024 DV without EPA Concurrence (µg/m³)	2024 DV with EPA Concurrence (µg/m³)
El Paso Chamizal (481410044)	9.6	9.0

1.6 ACTION REQUESTED

This document meets all EPA documentation standards for exceptional events, and TCEQ requests EPA concurrence that the dates and concentrations shown in Table 1-1 were caused by exceptional events and should be excluded from regulatory decisions for the 2024 annual $PM_{2.5}$ NAAQS. The data being requested for exclusion have regulatory significance and affect the DVs. This demonstration provides detailed evidence to support concurrence by EPA for the $PM_{2.5}$ exceptional events for the days included in the initial notification letter (Appendix D), which shows “r” flag applied for all types.

SECTION 2: NARRATIVE CONCEPTUAL MODEL

2.1 OVERVIEW

This section satisfies the Exceptional Events Rule Requirement at 40 CFR §50.14(c)(3)(iv)(A): "A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor." Included in this section is a description of the 2024 events and the general meteorological conditions that caused smoke and dust to travel to the monitoring sites. As identified in Table 1-1, events were categorized into 20 distinct groups based on single day events or episodes with types of events (African Dust, Other - Dust, Fireworks, and High Winds).

2.2 EL PASO COUNTY BACKGROUND

The El Paso County area is located in the Trans-Pecos region of West Texas. The county is part of both a core based statistical area (CBSA) as well as a combined statistical area (CSA) and has a population of approximately 865,657 people.[7] The area covers 1,015 square miles and is geographically characterized by its Chihuahuan Desert environment, with the Franklin Mountains running through the county and the Hueco Mountains to the east. The Rio Grande River acts as a geographical border on the county's south-western side. El Paso County experiences a semi-arid desert climate, characterized by hot, dry summers and mild winters. Rainfall is influenced by the area's monsoonal season, which occurs from June through September.

2.3 NARRATIVE FOR EACH GROUP OF EVENT DAYS

All weather maps, graphs, and smoke layer maps are included in Appendix A. The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) forecasts are included in Appendix B. Imagery and data used for the narrative conceptual model comes from multiple sources:

- Weather maps (surface analysis) were downloaded from NOAA NWS Weather Predication Center: https://www.wpc.ncep.noaa.gov/archives/web_pages/wpc_arch/get_wpc_archives.php.
- Weather maps (500 millibar (mb) height) were downloaded from NOAA NWS Storm Predication Center: https://www.spc.noaa.gov/obswx/maps/.
- Upper air soundings were downloaded either from the University of Wyoming or Plymouth State University: https://weather.uwyo.edu/upperair/sounding.html and https://vortex.plymouth.edu/myowxp/upa/raobplt-a.html.
- As part of its Hazard Mapping System (HMS), NOAA produces daily fire and smoke plume maps depicting the location of fires and smoke plumes detected by satellites (NOAA, 2003). The KML files were downloaded from NOAA and displayed on Google Earth: https://www.ospo.noaa.gov/products/land/hms.html#data.
- NWS forecasts were downloaded from: https://mesonet.agron.iastate.edu/wx/afos/list.phtml. The NWS Weather Forecasts office primarily used is the El Paso office.
- Reported fire data from Mexico is archived by the Mexican government and is available at: https://monitor_incendios.cnf.gob.mx/incendios_tarjeta_semanal. The data contains information about fires from each Mexican state, such as the cause of fire and acreage burned.

[7] https://www.census.gov/library/stories/state-by-state/texas.html

2.3.1 Group 1 - Summary of January 10, 2023, Dust (Other) $PM_{2.5}$ Event

Dust affected monitors in West Texas during the day on January 10, 2023. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 111.3 µg/m³ at 20:00 local time, as seen on the hourly time series in Figure 2-1: *Hourly $PM_{2.5}$ Concentrations on Days around Event (January 10, 2023) at the El Paso Chamizal Monitor.*

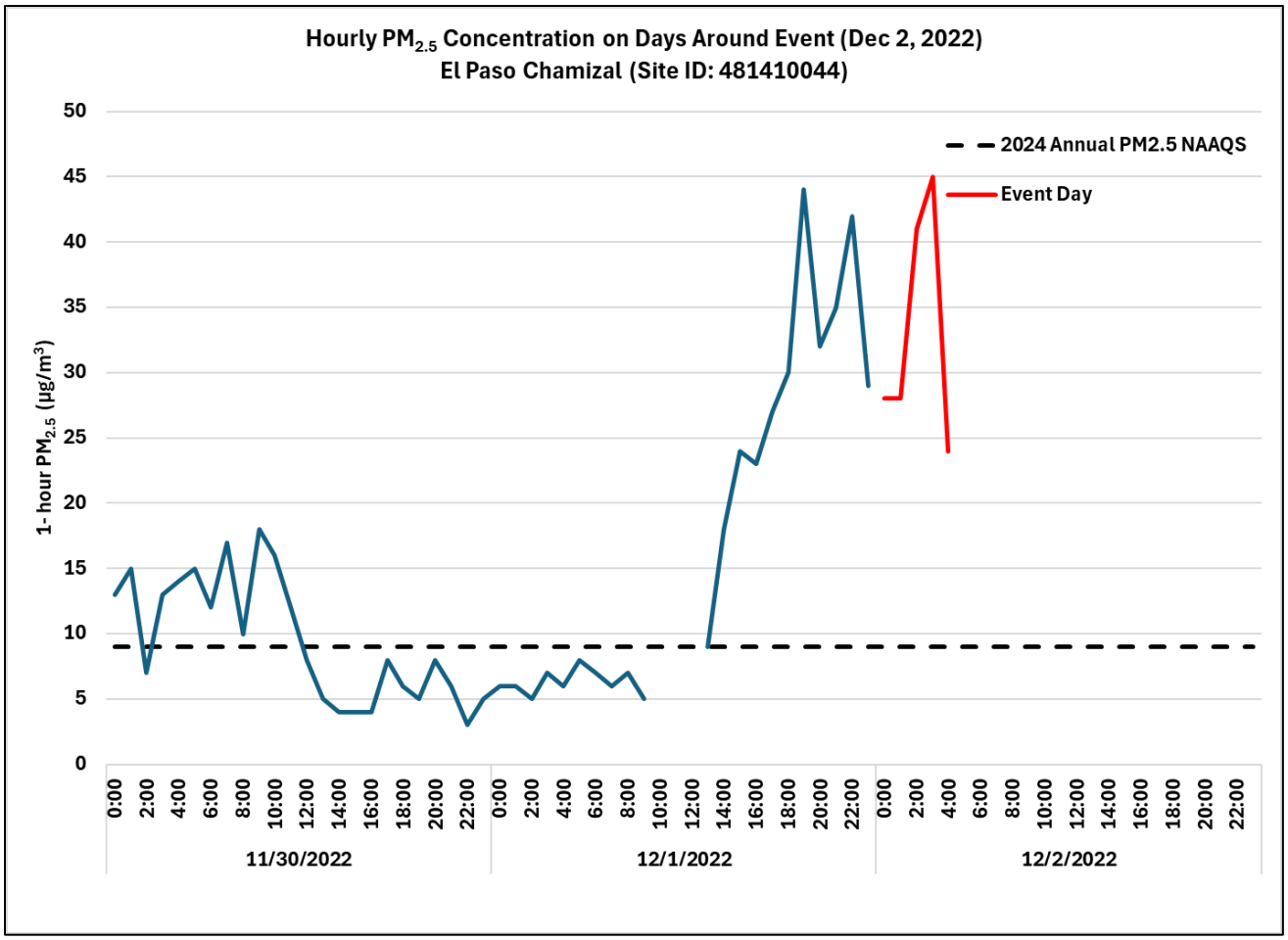

Figure 2-1: Hourly $PM_{2.5}$ Concentrations on Days around Event (January 10, 2023) at the El Paso Chamizal Monitor

On January 10, 2023, there was 500 mb troughing over the west coast of the U.S., with ridging over the Central U.S. and Texas, and westerly winds over Texas (Figure A-2) On the surface, there was high pressure over El Paso, with winds from the southwest (Figure A-1). This high pressure brought subsidence and downward forcing in the area that can be seen on the sounding in the form of a large radiation inversion and dry air in the bottom portion of the atmosphere (Figure A-3). These conditions were conducive for bringing any particulate matter from the upper atmosphere to the El Paso Chamizal monitor at the surface. NWS archived discussions mention some dust events and cloud covering during the date of interest (Figure B-1).

2.3.2 Group 2 - Summary of January 28, 2023, Structural Fire $PM_{2.5}$ Event

A structural fire event affected $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on January 28, 2023, during the early hours of the day. The $PM_{2.5}$ concentration reached 87.3 µg/m³ at

00:00 local time, as seen on the hourly time series in Figure 2-2: *Hourly $PM_{2.5}$ Concentrations on Days around Event (January 28, 2023) at the El Paso Chamizal Monitor.*

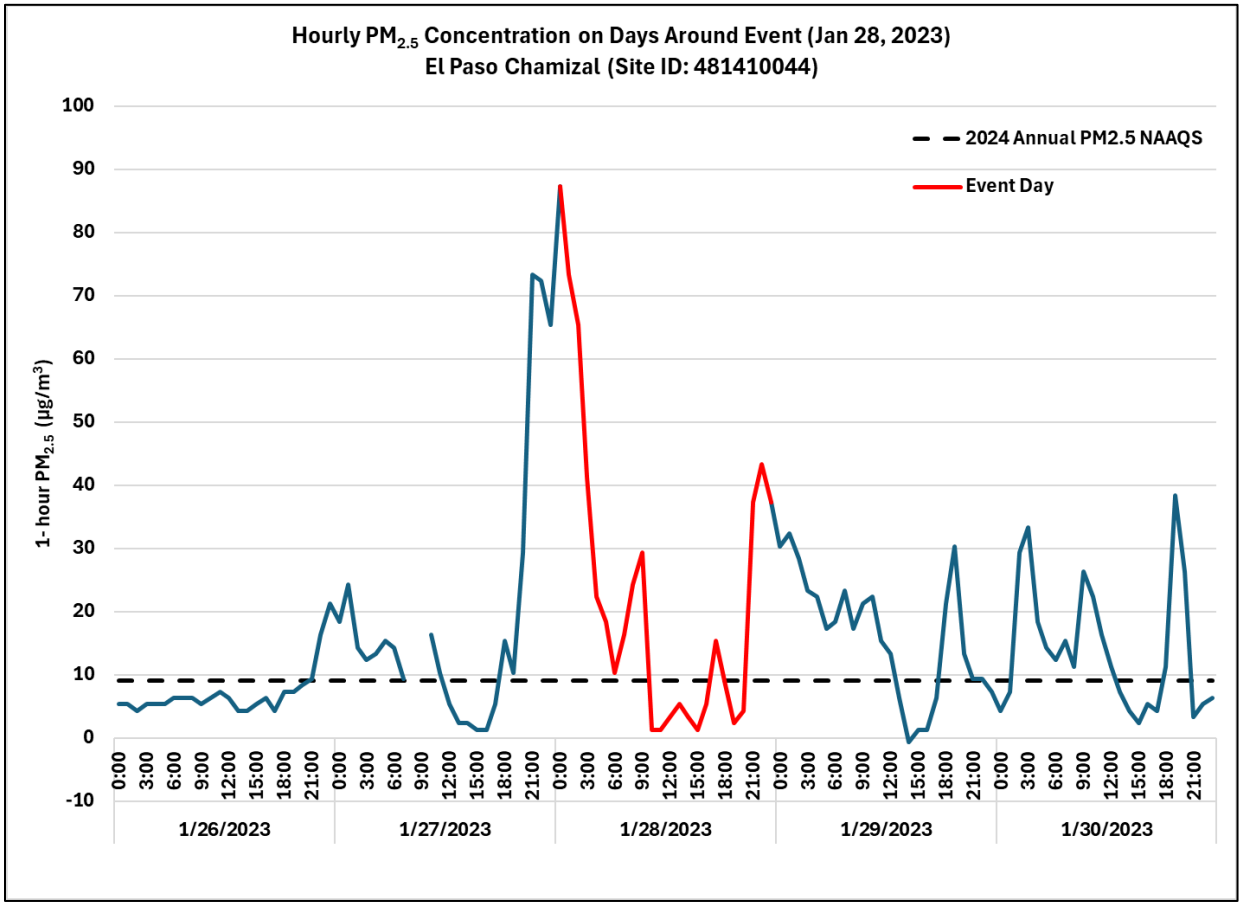

Figure 2-2: Hourly $PM_{2.5}$ Concentrations on Days around Event (January 28, 2023) at the El Paso Chamizal Monitor

On January 28, 2023, there was strong, longwave troughing over the entire U.S. with flow from the southwest over Texas at 500 mb (Figure A-6). There is a surface trough that had just passed over El Paso on the surface chart at 06:00 local time, with high pressure building over the area (Figure A-5). This is corroborated by the subsidence inversion seen on the sounding at Santa Teresa in the El Paso area (Figure A-7). The subsidence pushed smoke from the structural fire in the area towards the surface, resulting in high levels of particulate matter at the El Paso Chamizal monitor.

2.3.3 Group 3 – Summary of February 5, 2023, Dust (Other) $PM_{2.5}$ Event

A regional dust event occurred in western Texas on February 5, 2023. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 84.3 µg/m³ at 19:00 local time, as seen on the hourly time series in Figure 2-3: *Hourly $PM_{2.5}$ Concentrations on Days around Event (February 5, 2023) at the El Paso Chamizal Monitor.*

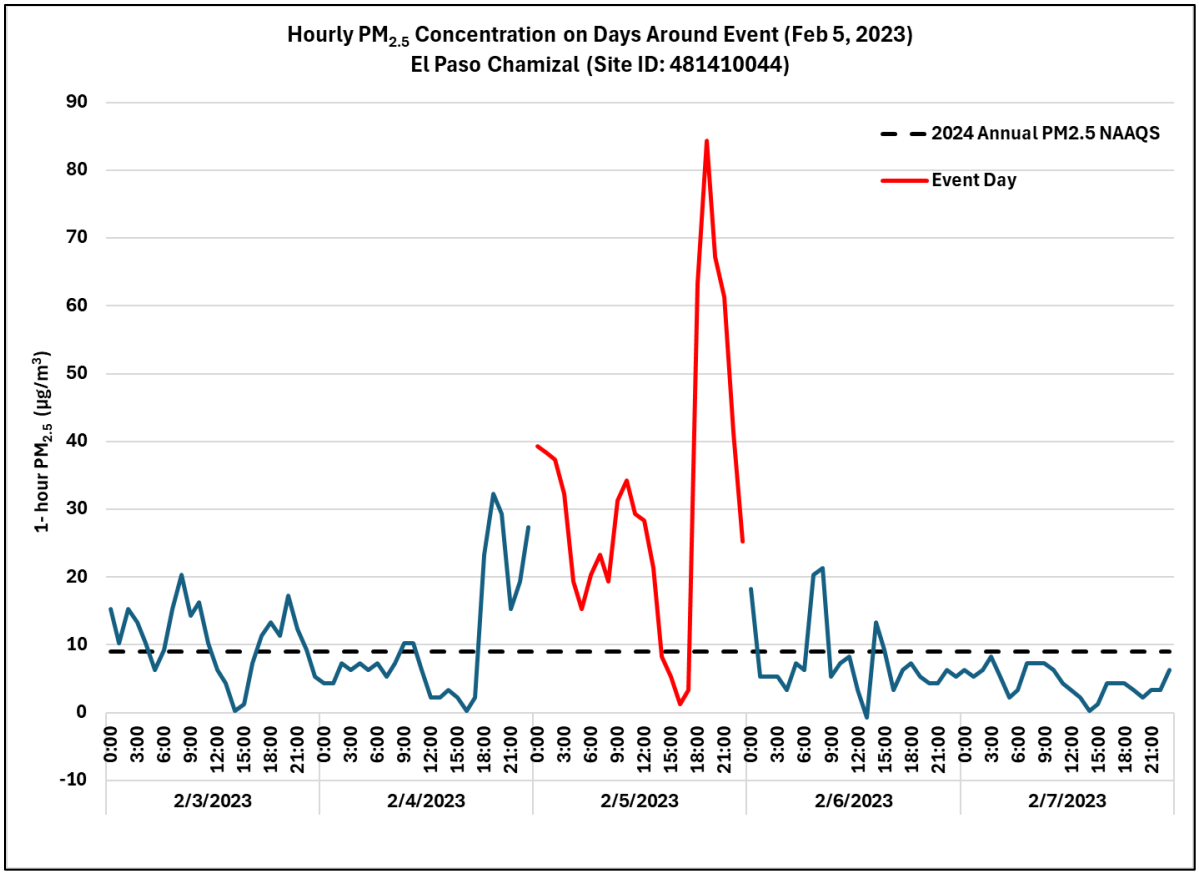

Figure 2-3: Hourly $PM_{2.5}$ Concentrations on Days around Event (February 5, 2023) at the El Paso Chamizal Monitor

On February 5, 2023, the 500 mb pattern over the U.S. was trough-ridge-trough (Figure A-9). The flow over Texas was from the northwest as it was at the inflection point of the ridge and second trough. The pressure gradient over West Texas is distorted on the surface chart, which shows high pressure at 1020 mb (Figure A-8). The observed sounding that morning shows a strong radiation inversion at the surface with a subsidence inversion around 700 mb (Figure A-8). High pressure and subsidence pushed any particulate matter towards the surface and limited dissipation into the upper atmosphere. Low and slow winds exacerbated this issue, preventing smoke ventilation and reducing air quality conditions (Table C-3). Smoke was reported in the media as being present around 17 miles from the monitor of interest on the day prior to the event (Figure C-4).

2.3.4 Group 4 – Summary of Feburary 26, 2023, High Wind $PM_{2.5}$ Event

Blowing dust due to a high wind event affected West Texas on February 26, 2023. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 84.3 µg/m^3 at 19:00 local time, as seen on the hourly time series in *Figure 2-4: Hourly $PM_{2.5}$ Concentrations on Days around Event (February 5, 2023) at the El Paso Chamizal Monitor.* A peak sustained five-minute wind speed of 49 mph was recorded in the El Paso area on February 26, 2023.

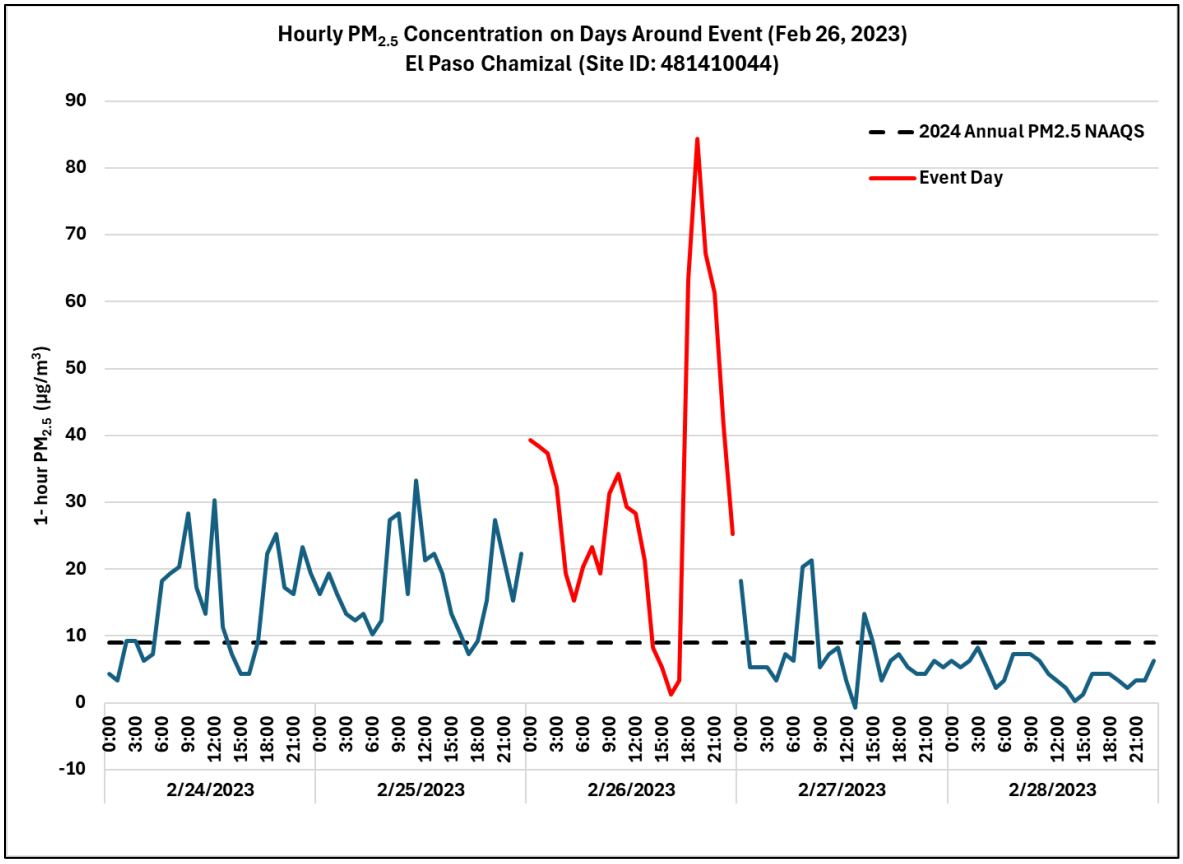

Figure 2-4: Hourly $PM_{2.5}$ Concentrations on Days around Event (February 5, 2023) at the El Paso Chamizal Monitor

On February 26, 2023, surface analysis showed that a cold front passed over the El Paso (Figure A-11). A tight surface pressure gradient associated with the front resulted in gusty winds in the area out of the west-southwest direction. The 500 mb heights map shows a strong jet streak over the El Paso area with 50-80 knot winds out of the southwest direction (Figure A-12). These gusty conditions caused blowing dust in the area which resulted in elevated $PM_{2.5}$ concentrations. TCEQ forecasts and NWS archived discussions both suggested that winds from this strong storm system generated blowing dust (Figure B-3 and Table C-5).

Figure 2-5: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on February 26, 2023* shows that El Paso area wind speeds began to rise around 08:00 local time. Two hours later at 10:00 local time, $PM_{2.5}$ concentrations began to rise and eventually peak during the hour of 11:00 local time. Although wind speeds remained high for the remainder of the day and peaked at 18:20 local time, at 14:00 local time $PM_{2.5}$, concentrations decreased to levels at which they had been recorded earlier in the day prior to the increase in $PM_{2.5}$ concentrations at 10:00 local time. The fact that high winds continued yet $PM_{2.5}$ concentrations dropped provides an indication that dust that resulted in high $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on January 11, 2024, was transported, and once it had passed through the area, despite high winds continuing locally, the $PM_{2.5}$ concentrations dropped.

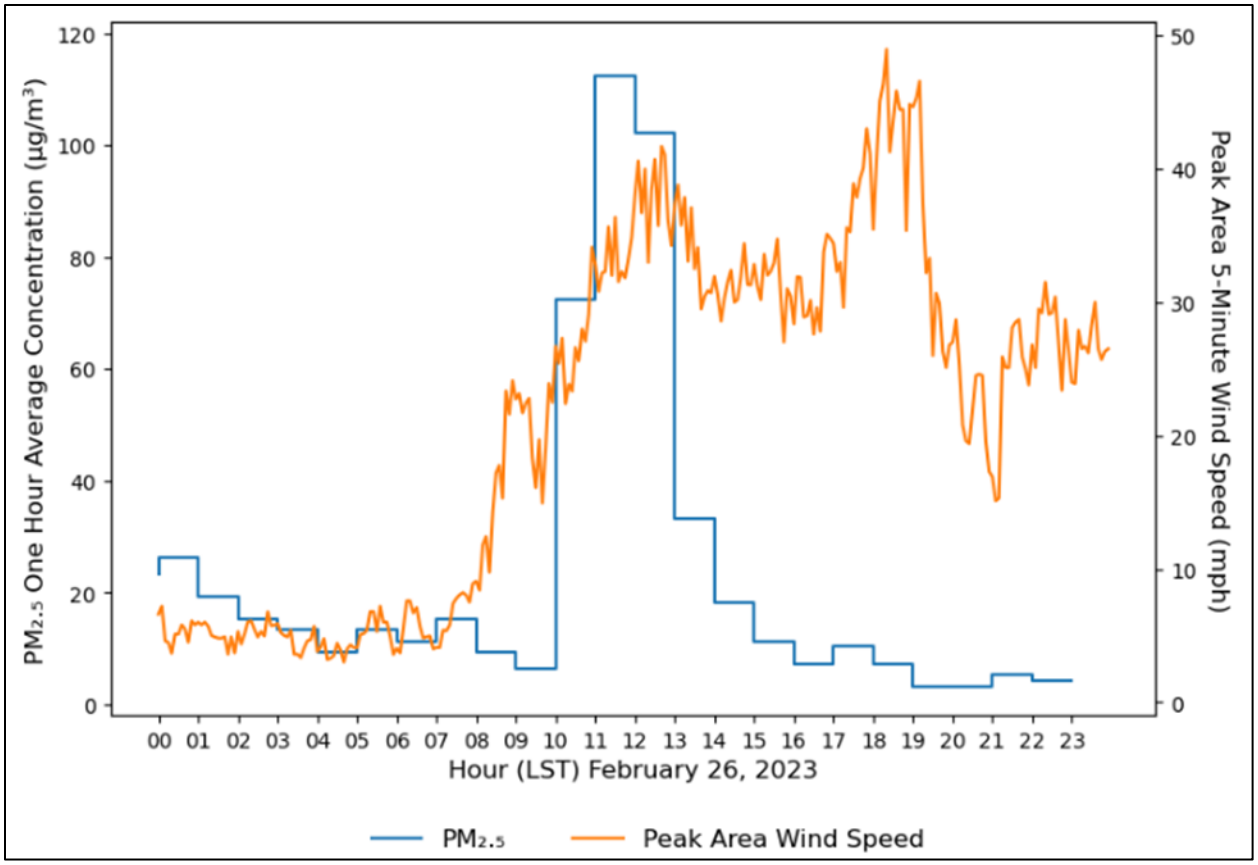

Figure 2-5: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on February 26, 2023

2.3.5 Group 5 – Summary of November 5, 2023, Structural Fire $PM_{2.5}$ Event

Elevated $PM_{2.5}$ concentrations measured at the El Paso Chamizal monitor on November 5, 2023, were due to structural fires in the El Paso area. The hourly $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 74.1 µg/m³ at 22:00 local time, as seen on the hourly time series in Figure 2-6: *Hourly $PM_{2.5}$ Concentrations on Days around Event (November 5, 2023) at the El Paso Chamizal Monitor*.

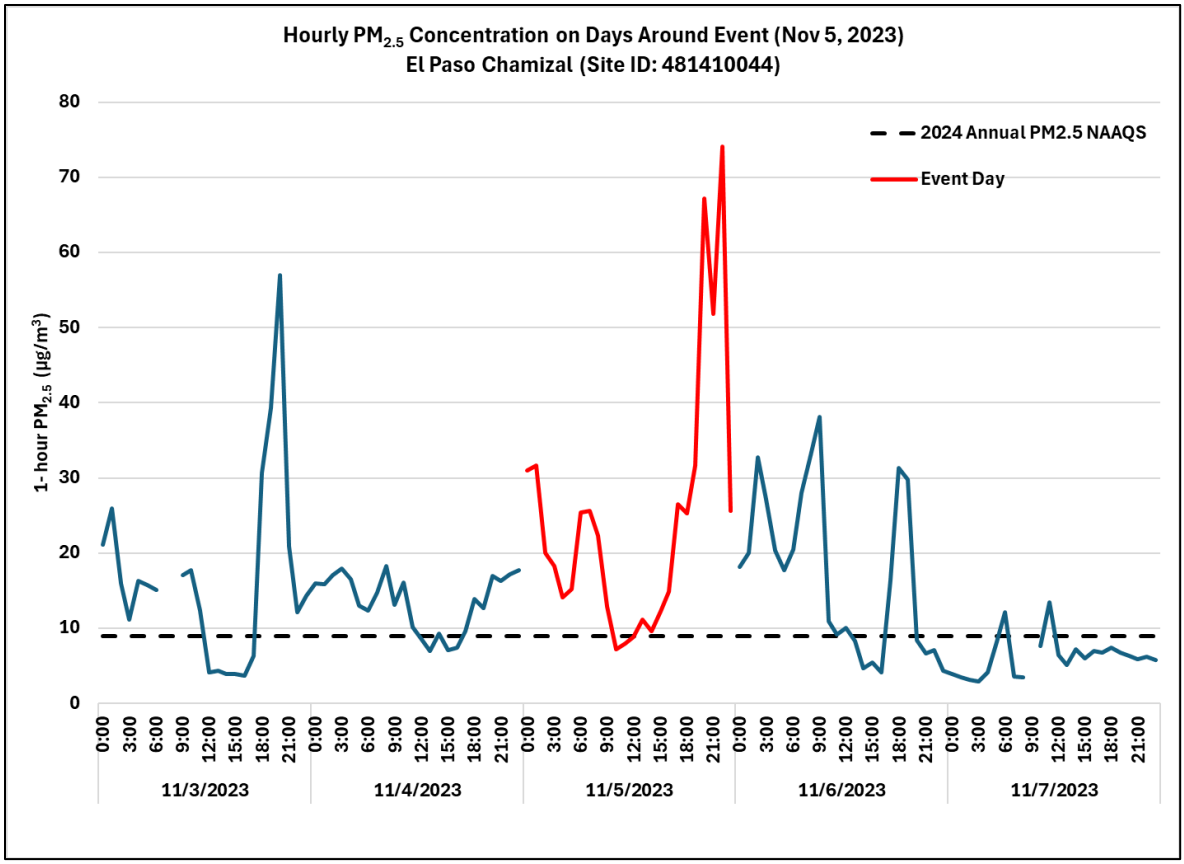

Figure 2-6: Hourly $PM_{2.5}$ Concentrations on Days around Event (November 5, 2023) at the El Paso Chamizal Monitor

On November 5, 2023, the El Paso area was influenced by the Baja Low as seen in the 500 mb heights chart (Figure A-14). This system brought breezy winds out of the south into the El Paso area both near the surface and at the mid-levels of the atmosphere (Figure A-13). Temperatures were above normal for the area with light cloud cover.

2.3.6 Group 6 – Summary of November 23, 2023, Dust (Other) $PM_{2.5}$ Event

Elevated $PM_{2.5}$ concentrations were recorded at the El Paso Chamizal monitor on November 23, 2023, likely due to regional dust. The hourly $PM_{2.5}$ concentration reached 74.1 µg/m³ at 22:00. local time, as seen on the hourly time series in Figure 2-6: *Hourly $PM_{2.5}$ Concentrations on Days around Event (November 23, 2023) at the El Paso Chamizal Monitor*.

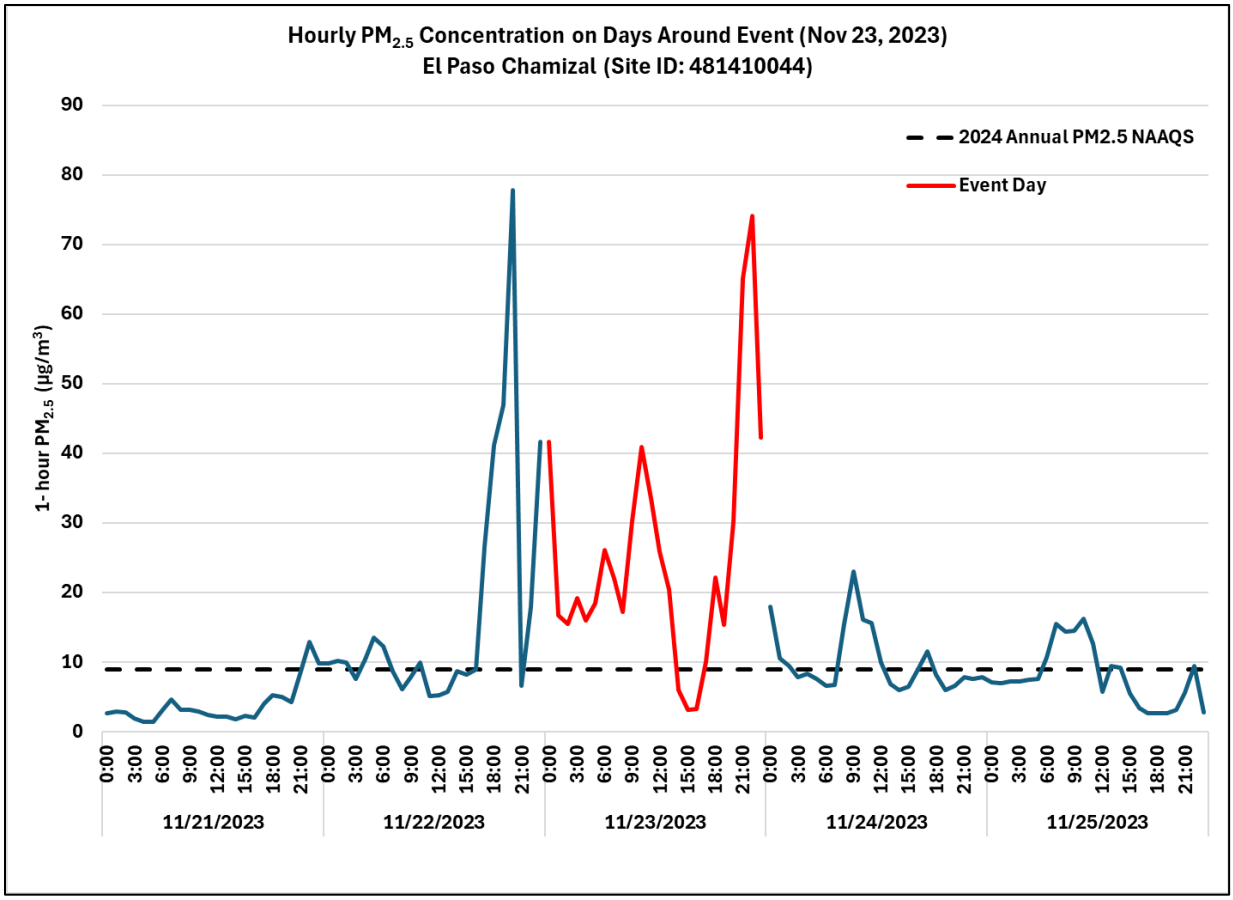

Figure 2-7: Hourly $PM_{2.5}$ Concentrations on Days around Event (November 23, 2023) at the El Paso Chamizal Monitor

Conditions were dry and cool in El Paso on November 23, 2023, with modest winds out of the southwest ahead of a trough approaching from the northwest (Figure A-15). At the mid-levels, winds had a light zonal flow over the area (Figure A-16). The breezy conditions helped transport dust from northern Mexico into the El Paso area. This led to elevated particulate matter concentrations at the El Paso Chamizal monitor. NWS archives suggest that calm and stable weather conditions would allow for a rise in $PM_{2.5}$ concentration (Figure B-4).

2.3.7 Group 7 – Summary of December 31, 2023, Fireworks $PM_{2.5}$ Event

New Year's Eve fireworks produced elevated concentrations of $PM_{2.5}$ in the El Paso area in the early morning of December 31, 2023, and close to midnight on the same day. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 86.2 µg/m^3 at 01:00 local time, as seen on the hourly time series in Figure 2-7: *Hourly $PM_{2.5}$ Concentrations on Days around Event (December 31, 2023) at the El Paso Chamizal Monitor.*

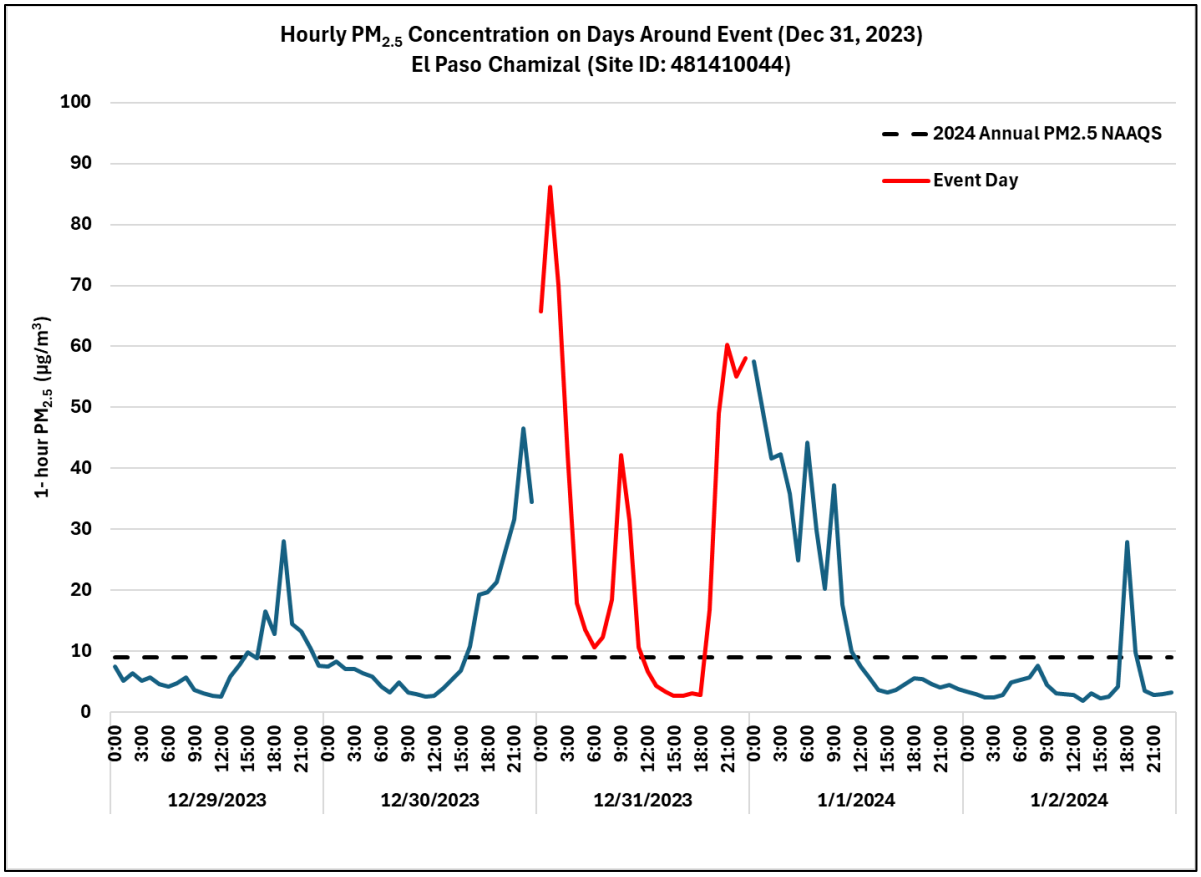

Figure 2-8: Hourly $PM_{2.5}$ Concentrations on Days around Event (December 31, 2023) at the El Paso Chamizal Monitor

On December 31, 2023, a zonal flow was prevalent over much of Texas, as seen in the 500 mb heights map (Figure A-18). In El Paso, winds increased ahead of a cold front approaching from the north (Figure A-17). As night fell and temperatures cooled, subsidence was present over the area. Smoke and particulate matter associated with celebratory fireworks for New Year's Eve lingered in the near surface layer and resulted in elevated $PM_{2.5}$ concentrations at the El Paso Chamizal monitor.

2.3.8 Group 8 – Summary of January 7, 2024, High Wind $PM_{2.5}$ Event

Blowing dust from a high wind event affected West Texas on January 7, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 147.6 µg/m^3 at 18:00 local time, as seen on the hourly time series in Figure 2-8: *Hourly $PM_{2.5}$ Concentrations on Days around Event (January 7, 2024) at the El Paso Chamizal Monitor*. A peak sustained five-minute wind speed of 38 mph was recorded in the El Paso area on January 7, 2024.

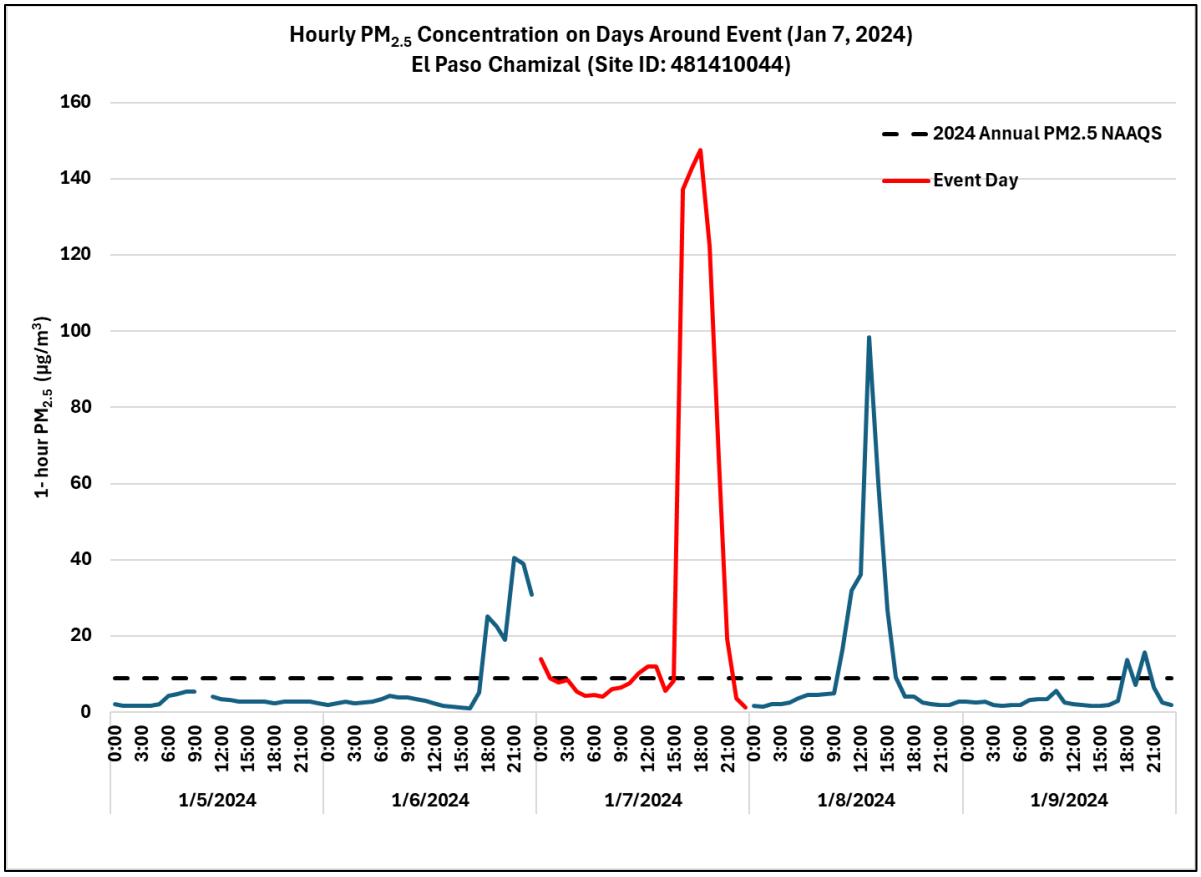

Figure 2-9: Hourly $PM_{2.5}$ Concentrations on Days around Event (January 7, 2024) at the El Paso Chamizal Monitor

On January 7, 2024, there was ridging at 500 mb over the Central U.S. and Texas (Figure A-20). This ridging stacks down to a high-pressure center over Louisiana at the surface that brought dry air across Texas (Figure A-19). Additionally, 65 knot winds are seen over El Paso at this level, indicating the presence of the jet stream at 200-300 mb. However, the observed sounding (Figure A-21) shows no subsidence inversion, or any inversion in the El Paso area. This indicates that upper and mid-level winds were able to mix down to the surface in the form of strong gusts. These strong winds were likely the cause of increased particulate matter concentrations at the El Paso Chamizal monitor through the movement of dry dust. A dewpoint depression of 14 degrees Celsius, and a lack of any precipitation around El Paso, enhanced the conditions for windblown dust.

Figure 2-10: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on January 7, 2024* shows that, locally, wind speeds fluctuated slightly but primarily increased starting at 08:00 local time. At 15:00 local time $PM_{2.5}$ concentrations rapidly increased. This wind and $PM_{2.5}$ pattern along with the fact that $PM_{2.5}$ concentrations decreased to their lowest levels on the day when local winds were still increasing with the peak wind speed in El Paso County recorded at 23:50 local time, provides evidence that the plume of dust blowing through the area and recorded at the El Paso Chamizal monitor was from a source outside of the El Paso area. Locally sourced dust would be expected to rise and fall in conjunction with the increase and subsequent decrease in local wind speeds. The pattern seen on January 7, 2024, is what would be expected when dust has already been entrained in the air by high winds prior to reaching the area in which that dust is recorded by an air monitor.

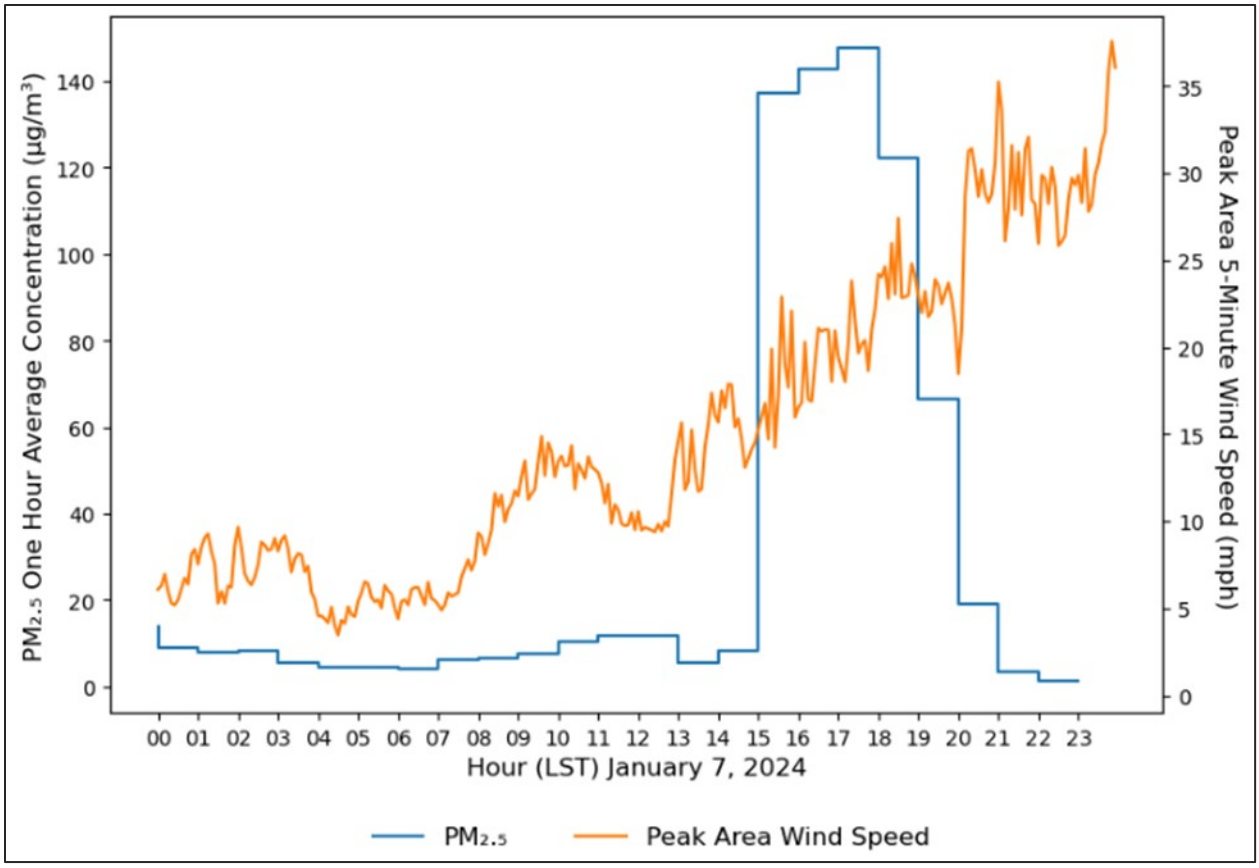

Figure 2-10: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on January 7, 2024

2.3.9 Group 9 – Summary of January 11, 2024, High Wind $PM_{2.5}$ Event

Blowing dust from a high wind event affected West Texas on January 11, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 203.3 µg/m^3, as shown in Figure 2-10: *Hourly $PM_{2.5}$ Concentrations on Days around Event (January 11, 2024) at the El Paso Chamizal Monitor*. A peak sustained five-minute wind speed of 34 mph was recorded in the El Paso area on January 11, 2024.

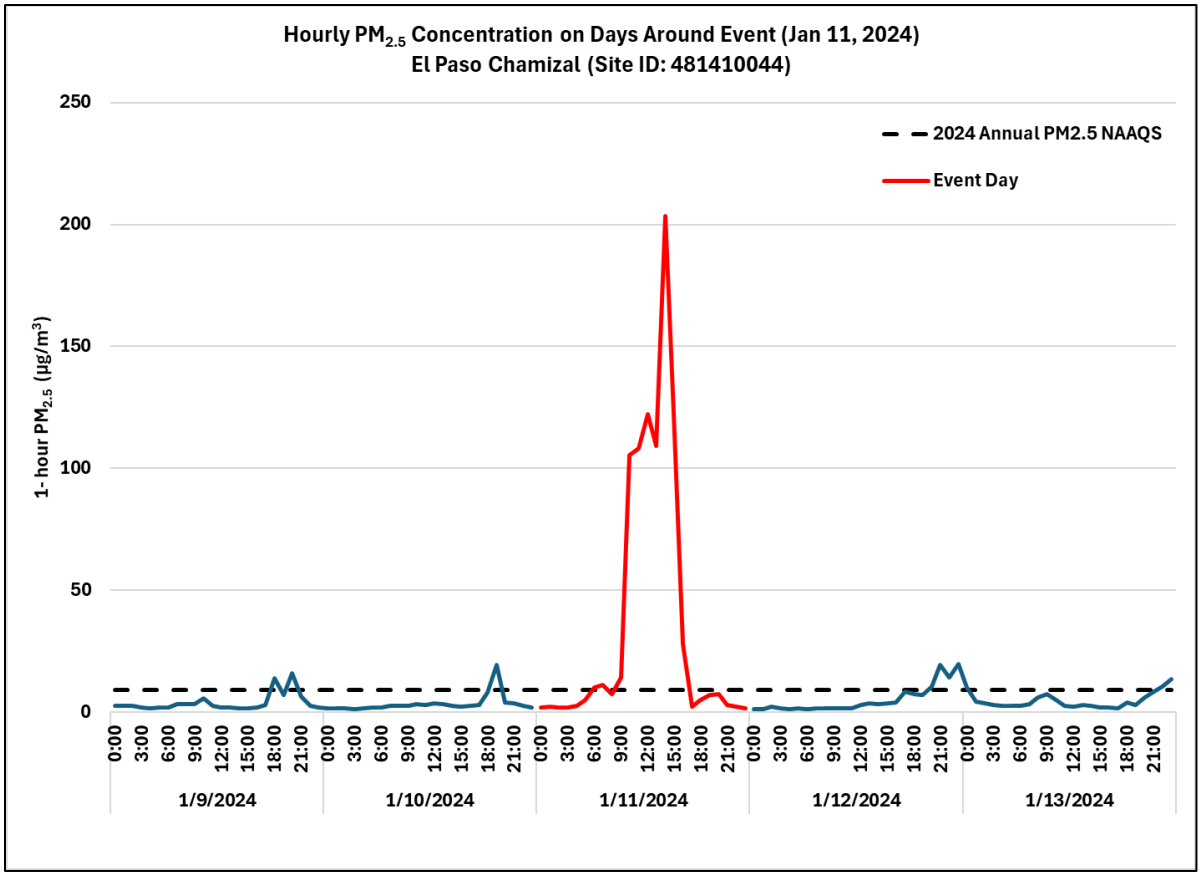

Figure 2-11: Hourly $PM_{2.5}$ Concentrations on Days around Event (January 11, 2024) at the El Paso Chamizal Monitor

On January 11, 2024, there was troughing over the western U.S. with weak ridging over the Central U.S. and Texas at 500 mb (Figure A-23). The presence of 70 knot winds at this level strongly suggests a jet stream at 300 mb. The surface chart (Figure A-22) shows an extremely large dew-point depression of 25 degrees Celsius, indicating a dry atmosphere and absence of precipitation in the area around El Paso. Furthermore, the observed sounding shows that the winds are in-phase throughout the vertical column and there are no inversions present (Figure A-24). This pattern indicates that the higher wind speeds from the jet stream were able to mix down in the atmosphere and result in strong surface gusts. These conditions led to an increase in windblown dust, resulting in high concentrations of measured $PM_{2.5}$.

Figure 2-11: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on January 11, 2024*, shows that, locally, wind speeds were relatively high for most of the day. Despite these consistently high wind speeds, $PM_{2.5}$ concentrations didn't start to show a large increase until 09:00 local time. Even though wind speeds remained high throughout the day, $PM_{2.5}$ concentrations began to decrease rapidly at 15:00 local time. This pattern provides evidence that the plume of dust blowing through the area and recorded at the El Paso Chamizal monitor was from a source outside of the El Paso area. Locally sourced dust would be expected to rise and fall in conjunction with the increase and subsequent decrease in local wind speeds. The pattern seen on January 11, 2024, is what would be expected when dust had already been entrained in the air by high winds prior to reaching the area in which that dust is recorded by an air monitor.

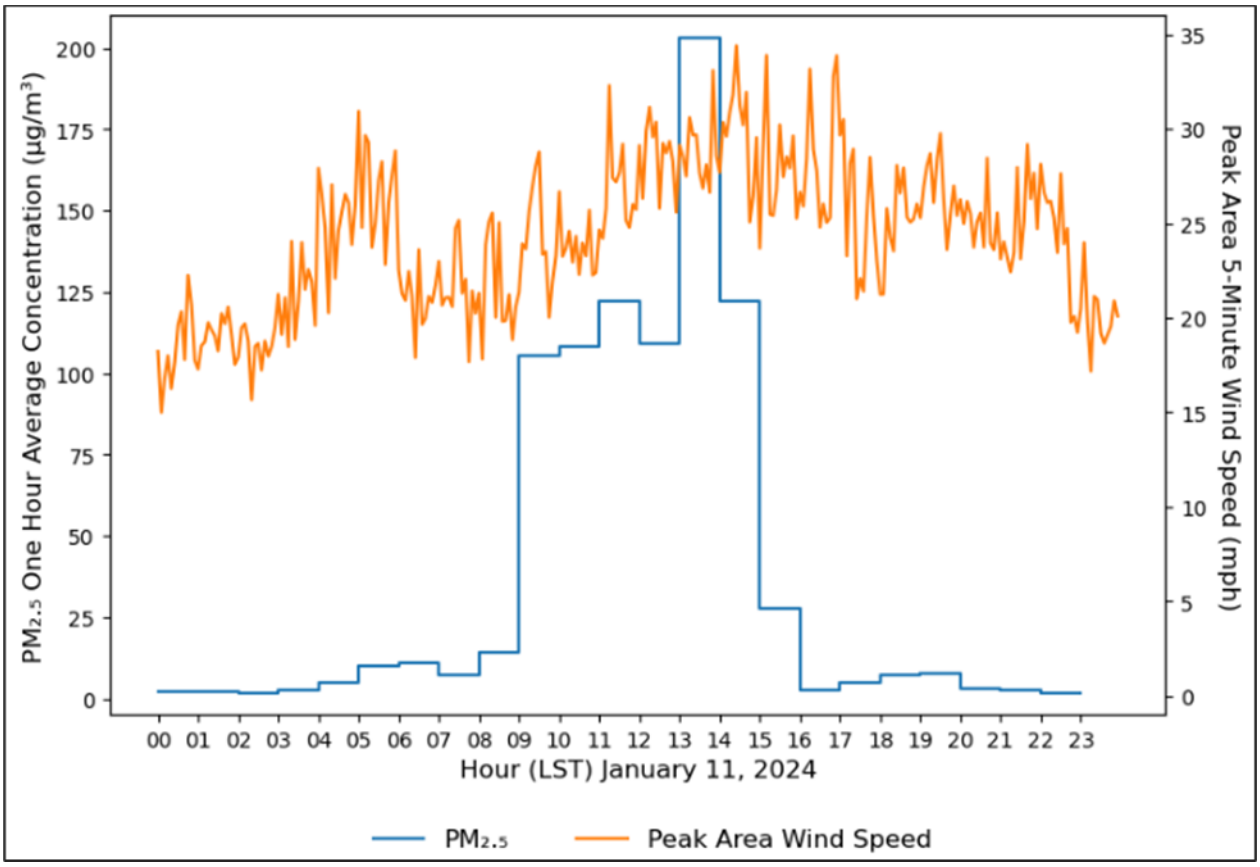

Figure 2-12: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on January 11, 2024

2.3.10 Group 10 – Summary of February 28, 2024, Wildfire – U.S. Event

A U.S. wildfire event affected West Texas on February 28, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 111.9 µg/m³ at 11:00 local time, as seen on the hourly time series in Figure 2-12: *Hourly $PM_{2.5}$ Concentrations on Days around Event (February 28, 2024) at the El Paso Chamizal Monitor.*

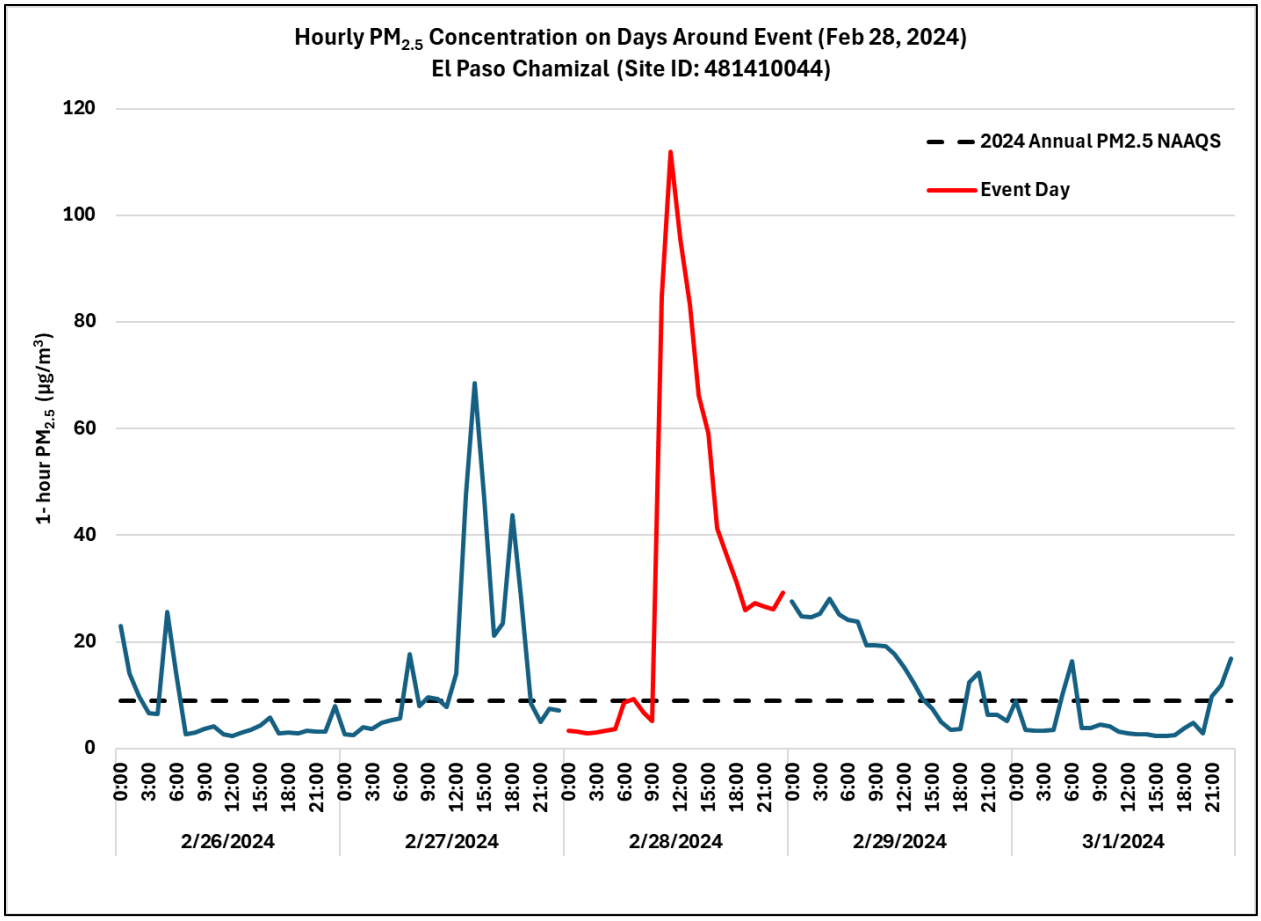

Figure 2-13: Hourly $PM_{2.5}$ Concentrations on Days around Event (February 28, 2024) at the El Paso Chamizal Monitor

On February 28, 2024, the 500 mb chart shows a longwave trough over the western U.S. with a cutoff low-height center off the coast of southern California (Figure A-26). There is also 500 mb ridging over the Central U.S. and Texas with winds from the southwest at this level. On the surface chart, the pressure gradient is oriented from the west to the south over Texas with winds coming from the south (Figure A-25). The observed sounding in the El Paso area shows that the winds are in-phase throughout the vertical column with no inversions present (Figure A-27). This pattern indicates that there was high potential for upper and mid-level winds to mix down in the atmosphere and produce surface gusts resulting in windblown dust at the El Paso Chamizal monitor.

2.3.11 Group 11 – Summary of March 24, 2024, High Wind $PM_{2.5}$ Event

Blowing dust from a high wind event affected West Texas on March 24, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 117.1 µg/m^3 at 15:00 local time, as seen on the hourly time series in Figure 2-13: *Hourly $PM_{2.5}$ Concentrations on Days around Event (March 24, 2024) at the El Paso Chamizal Monitor*. A peak sustained five-minute wind speed of 35 mph was recorded in the El Paso area on March 24, 2024.

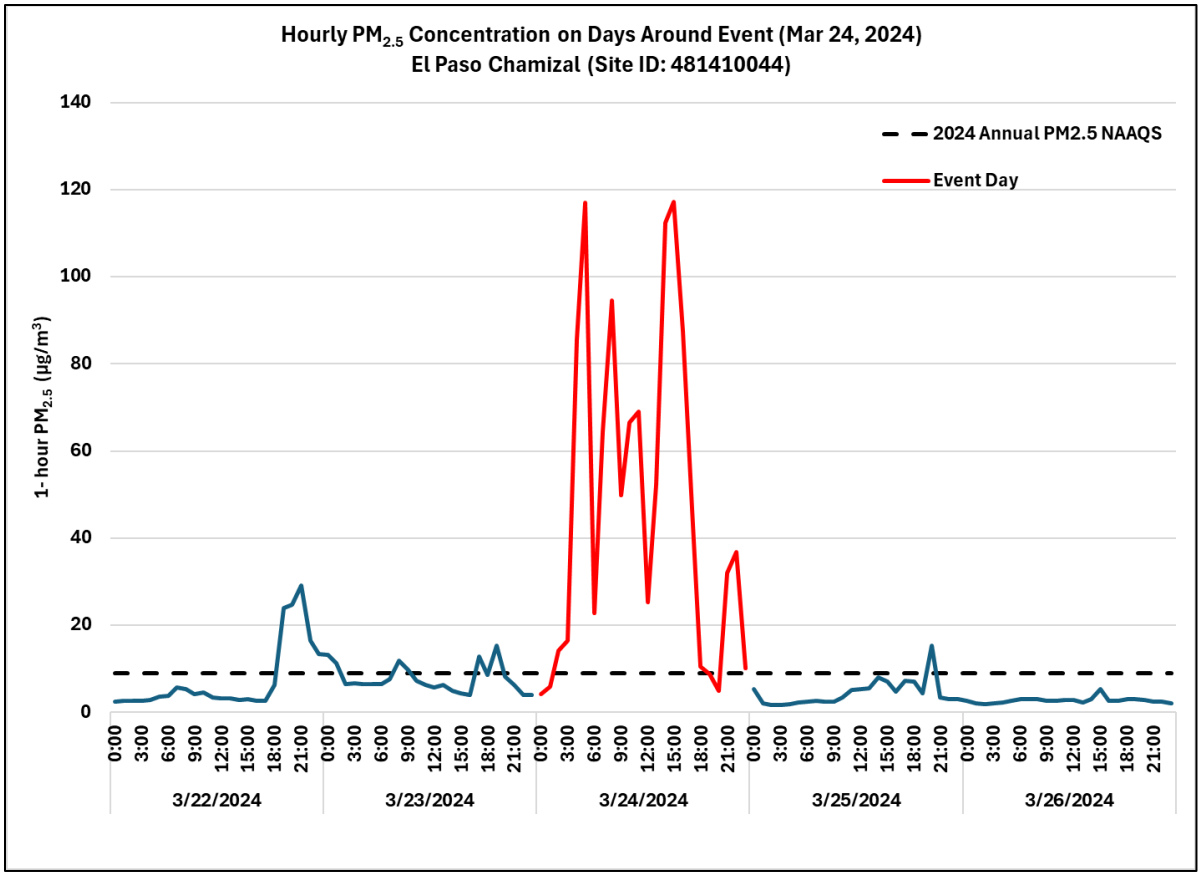

Figure 2-14: Hourly $PM_{2.5}$ Concentrations on Days around Event (March 24, 2024) at the El Paso Chamizal Monitor

On March 24, 2024, the 500 mb chart shows troughing over the western U.S. with weak ridging over Texas (Figure A-29). This trough stacks down to a strong low-pressure center over Colorado on the surface chart (Figure A-28). This caused a strong pressure gradient over West Texas, which was conducive to the formation of strong surface winds. Additionally, the observed sounding in the El Paso area shows winds vertically in-phase throughout the column and no inversions (Figure A-30). This indicates the high potential for strong mid-level winds to mix down to the surface in the form of gusts, creating windblown dust at the El Paso Chamizal monitor. NWS archived discussions referenced that a cold front's strong winds, in the area of 50-60 mph, will disrupt dust in the El Paso region (Figure B-8).

Figure 2-14: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on March 24, 2024* shows that, locally, five-minute wind speeds were not directly proportional to $PM_{2.5}$ concentrations, which helps demonstrate the $PM_{2.5}$ was from a source outside of the El Paso area. If $PM_{2.5}$ was from a local source, increased wind speeds would be expected to coincide with increased $PM_{2.5}$ concentrations.

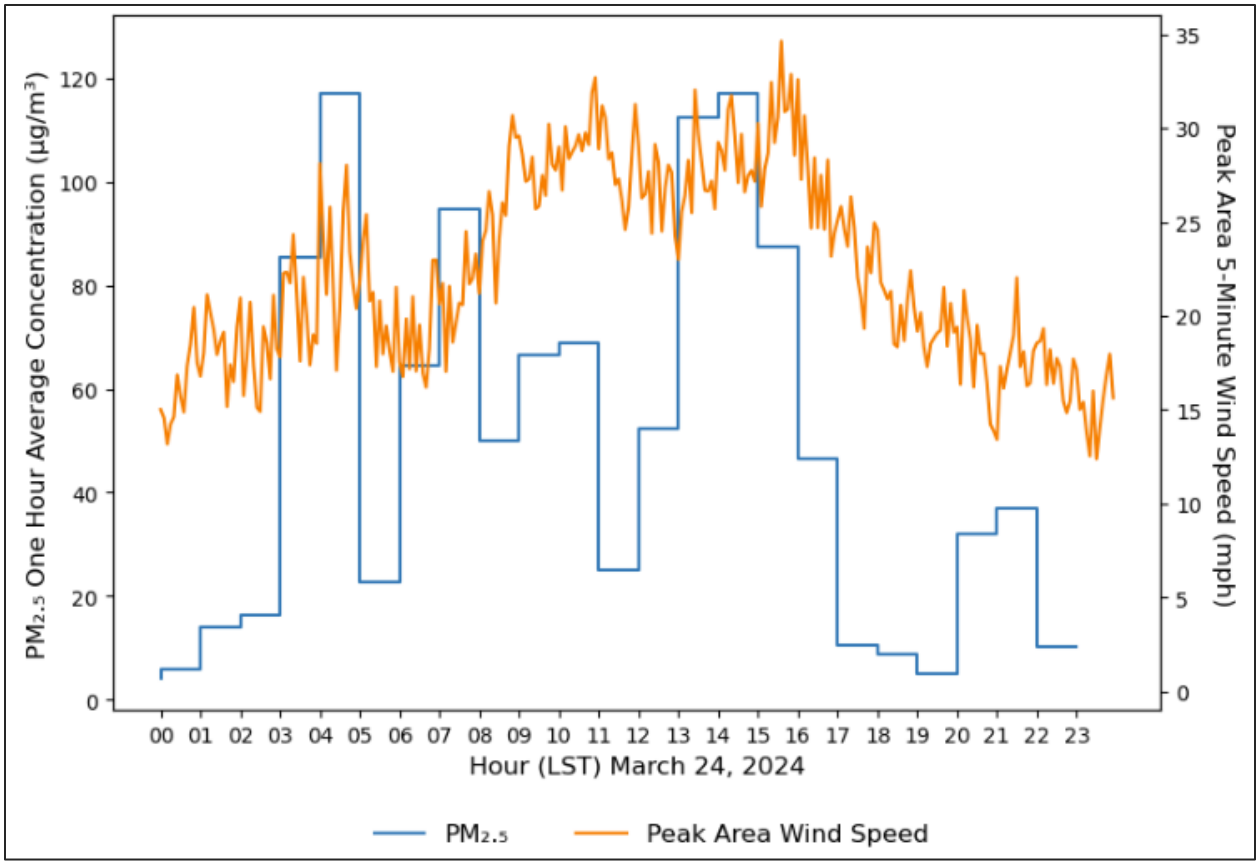

Figure 2-15: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on March 24, 2024

2.3.12 Group 12 – Summary of March 31, 2024, High Wind $PM_{2.5}$ Event

Blowing dust from a high wind event affected West Texas on March 31, 2024. On this date, the $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 183.3 µg/m³ at 18:00 local time, as seen on the hourly time series in Figure 2-15: *Hourly $PM_{2.5}$ Concentrations on Days around Event (March 31, 2024) at the El Paso Chamizal Monitor*. A peak sustained five-minute wind speed of 25 mph was recorded in the El Paso area on March 31, 2024.

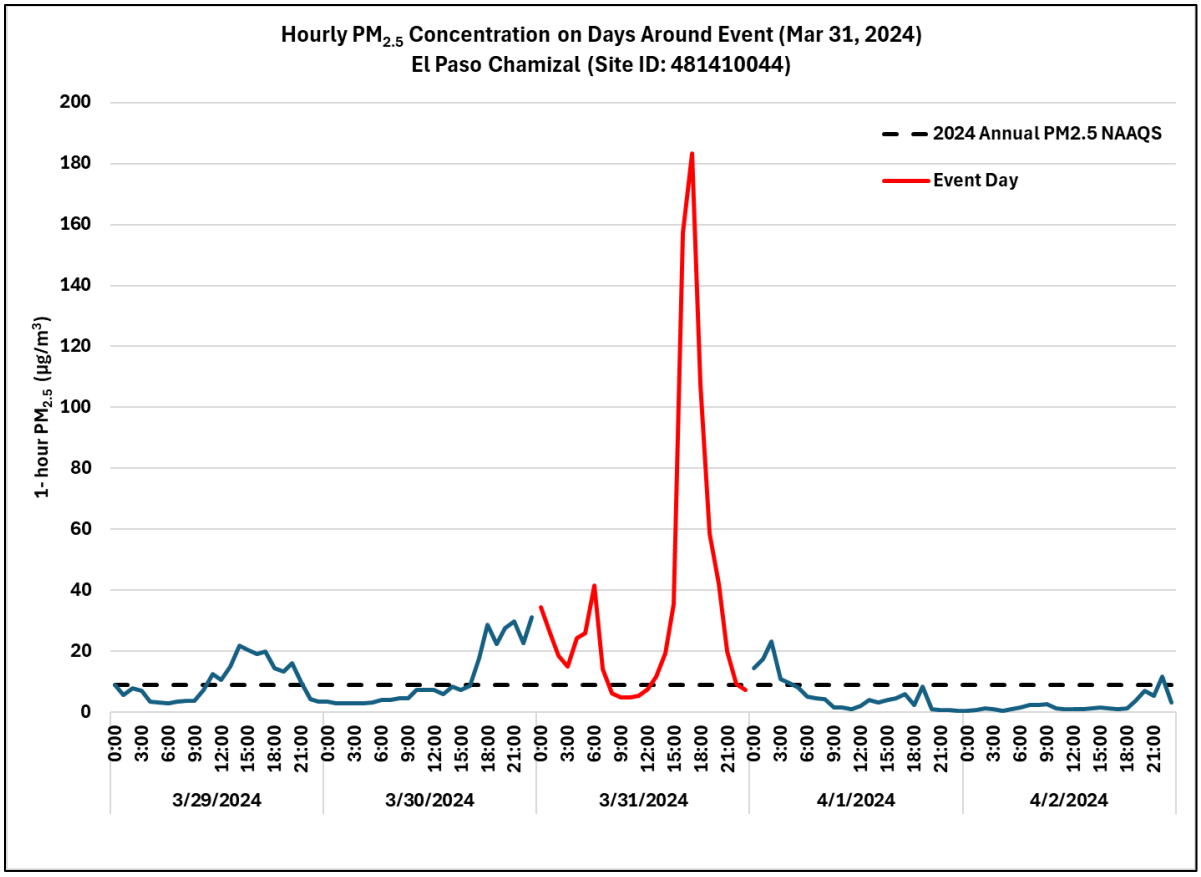

Figure 2-16: Hourly $PM_{2.5}$ Concentrations on Days around Event (March 31, 2024) at the El Paso Chamizal Monitor

On March 31, 2024, the 500 mb pattern showed a strong trough over the western U.S. with weak ridging over the Central U.S. and Texas (Figure A-32). Winds were from the southwest at 60-70 knots over El Paso at this level, indicating the presence of the jet stream at 300 mb (Figure A-31). The observed sounding in the El Paso area shows winds in-phase throughout the vertical column with no inversions, indicating that mid-level winds were able to mix to the surface in the form of gusts (Figure A-33). This likely caused wind-blown dust and increased particulate matter concentrations at the El Paso Chamizal monitor.

Figure 2-16: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on March 31, 2024* shows that, locally, wind speeds rose at 08:00 local time. Despite this increase in wind speeds, $PM_{2.5}$ concentrations didn't start to show a large increase until 15:00 local time. Even though wind speeds remained high throughout the day and peaked at 20:35, $PM_{2.5}$ concentrations began to decrease rapidly at 18:00 local time. This pattern provides evidence that the plume of dust blowing through the area and recorded at the El Paso Chamizal monitor was from a source outside of the El Paso area. Locally-sourced dust would be expected to rise and fall in conjunction with the increase and subsequent decrease in local wind speeds. The pattern seen on January 11, 2024, is what would be expected when dust had already been entrained in the air by high winds prior to reaching the area in which that dust is recorded by an air monitor.

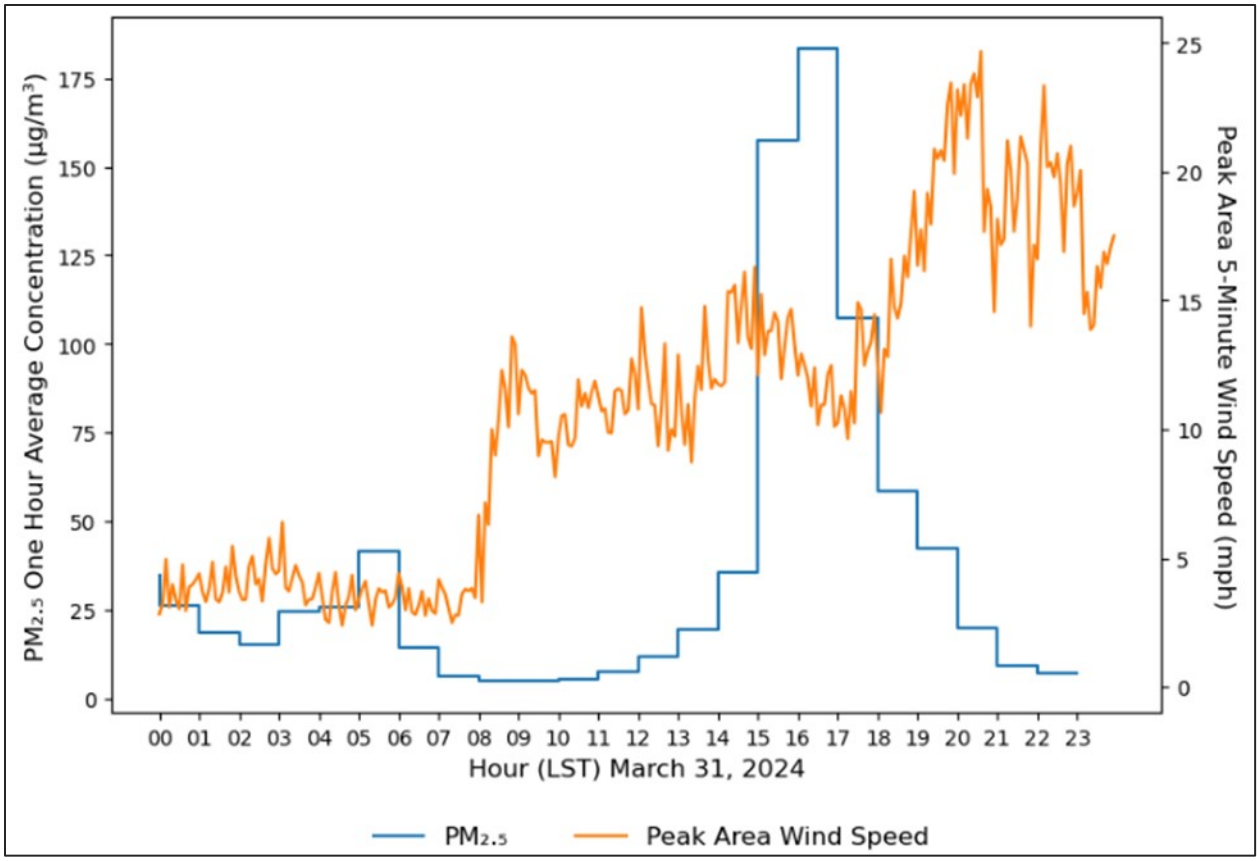

Figure 2-17: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on March 31, 2024

2.3.13 Group 13 – Summary of April 15, 2024, High Wind $PM_{2.5}$ Event

A high-wind event affected West Texas on April 15, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 105 µg/m³ at 14:00 local time, as seen on the hourly time series in Figure 2-16: *Hourly $PM_{2.5}$ Concentrations on Days around Event (April 15, 2024) at the El Paso Chamizal Monitor*. The five-minute sustained wind speed in the El Paso area was recorded at 30.57 mph at peak $PM_{2.5}$ concentration levels.

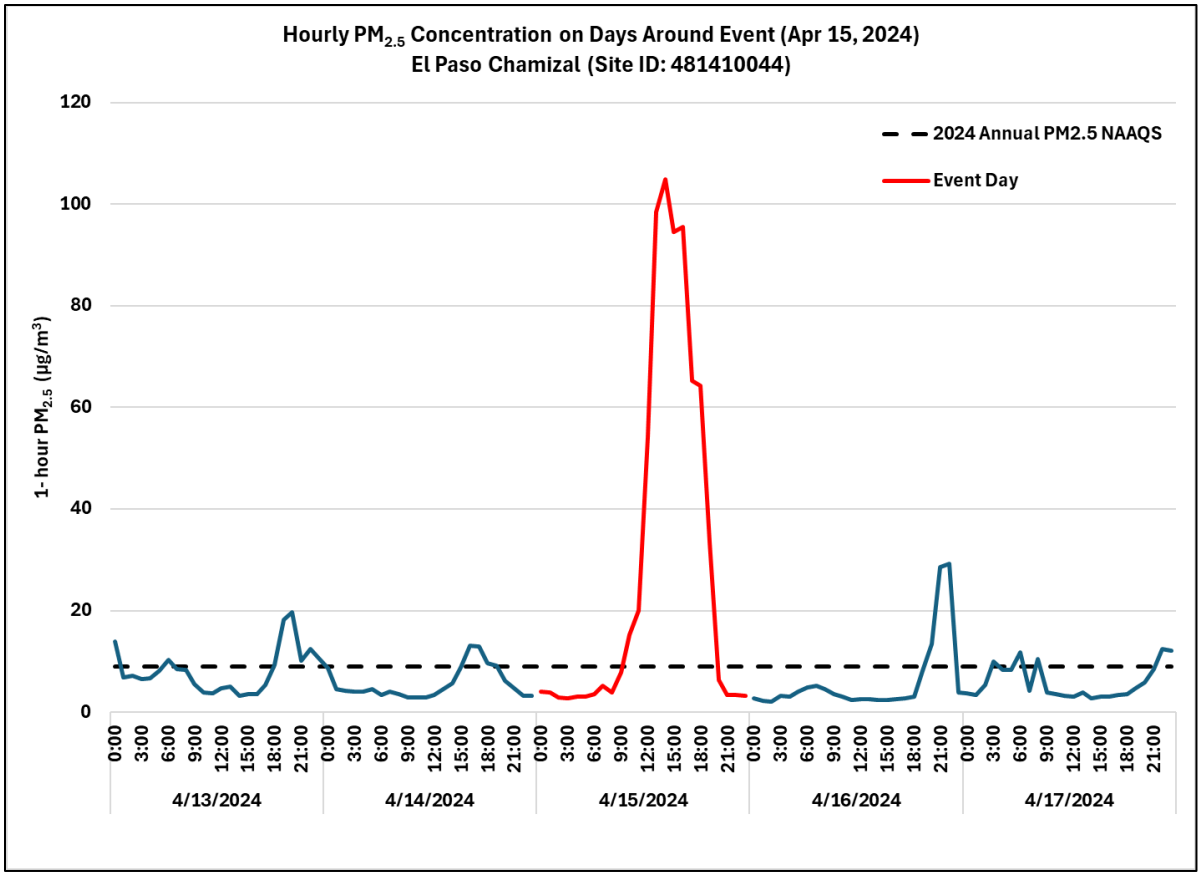

Figure 2-18: Hourly $PM_{2.5}$ Concentrations on Days around Event (April 15, 2024) at the El Paso Chamizal Monitor

On April 15, 2024, there was troughing and a low-height center over the western U.S. and ridging over Texas. This low height center likely had jet support, indicated by 60 knot wind speeds at 500 mb over El Paso (Figure A-35). This is corroborated by the observed sounding in the El Paso area, showing over 100 knot wind speeds at 300 mb, with winds in-phase throughout the vertical column (Figure A-36). This allowed strong mid-level winds to mix down towards the surface, likely resulting in strong gusts, which caused blowing dust and high particulate matter concentrations at the El Paso Chamizal monitor. NWS archived forecast indicates that wind speeds were in the 30 to 40 mph range with gusts around 50 mph with the lack of precipitation making it likely that dust will be lofted. The NWS forecast issued a Blowing Dust Advisory for part of the day (Figure B-10).

Figure 2-17: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on April 15, 2024* shows that, locally, five-minute wind speeds slowly increased from around 03:00 to 15:00 local time. Local winds then decreased around the time $PM_{2.5}$ concentrations began to increase at the El Paso Chamizal monitor. This pattern provides an indication that elevated $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on April 15, 2024, originated from a source outside of the local area and were transported to the monitor via high winds that entrained the $PM_{2.5}$ in the air at the original source location. As displayed in Figure 2-17, the increase in $PM_{2.5}$ concentrations did not occur until several hours later than the time that wind speeds had risen relative to the early portion of the day, $PM_{2.5}$ concentrations from a local source would be expected to mirror local wind-speed patterns and rise and fall in conjunction with the same pattern in wind speeds. Conversely, local wind speeds will rise prior to the increase in $PM_{2.5}$ concentrations when the particulate matter is transported from a distant source, as was the case on April 15, 2024.

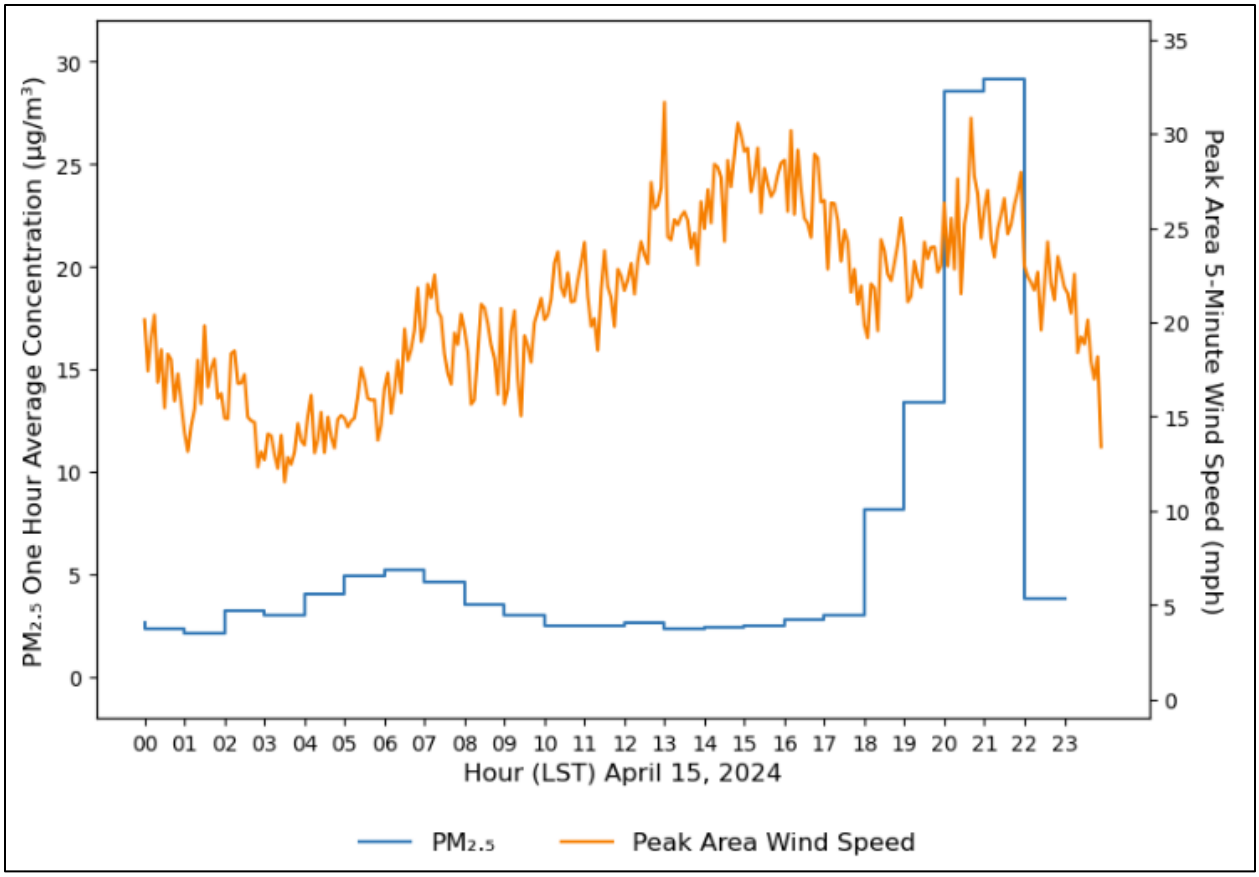

Figure 2-19: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on April 15, 2024

2.3.14 Group 14 – Summary of April 25, 2024, High Wind $PM_{2.5}$ Event

Blowing dust from a high wind event affected West Texas on April 25, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 158.4 µg/m³ at 15:00 local time, as seen on the hourly time series in Figure 2-18: *Hourly $PM_{2.5}$ Concentrations on Days around Event (April 25, 2024) at the El Paso Chamizal Monitor*. A peak sustained five-minute wind speed of 31 mph was recorded in the El Paso area on April 25, 2024.

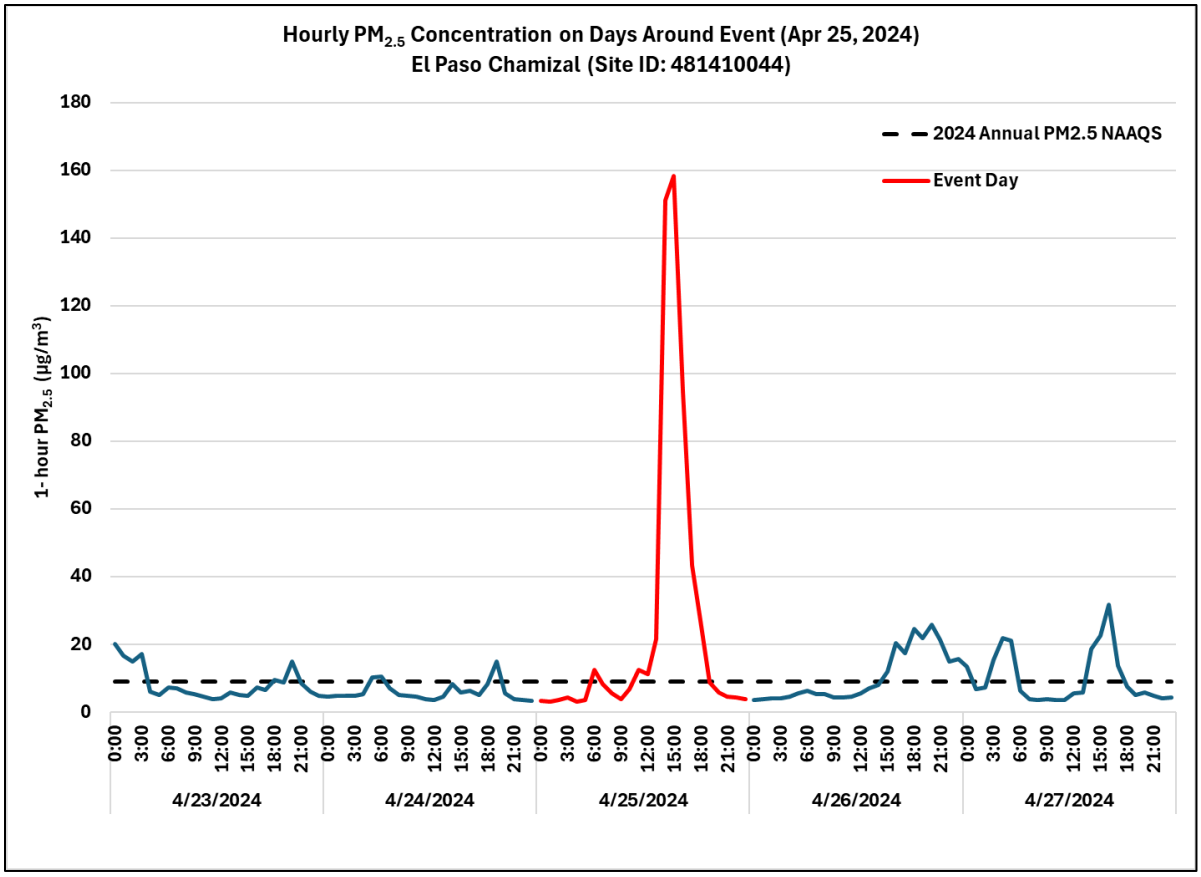

Figure 2-20: Hourly $PM_{2.5}$ Concentrations on Days around Event (April 25, 2024) at the El Paso Chamizal Monitor

On April 25, 2024, there was 500 mb ridging over the Central U.S. and Texas with winds blowing from the southwest. Throughout the week, the ridge progressed downstream, and troughing moved over the Central U.S. and Texas by the April 29, 2024 (Figures A-37 and A-38). NWS archived discussions reference winds blowing dust in the El Paso area (Figure B-11).

Figure 2-20: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on April 25, 2024* shows that, locally, after decreasing from 03:00 until 06:00, wind speeds began to steadily rise until 16:00 local time. Despite this increase in wind speeds, $PM_{2.5}$ concentrations didn't start to show a large increase until 13:00 local time. Even though wind speeds stayed relatively high for the remainder of the day, $PM_{2.5}$ concentrations began to decrease rapidly at 16:00 local time, shortly after wind speeds peaked at 15:20. This pattern provides evidence that the plume of dust blowing through the area and recorded at the El Paso Chamizal monitor was from a source outside of the El Paso area. Locally sourced dust would be expected to rise and fall in conjunction with the increase and subsequent decrease in local wind speeds. The pattern seen on April 25, 2024, is what would be expected when dust had already been entrained in the air by high winds prior to reaching the area in which that dust is recorded by an air monitor.

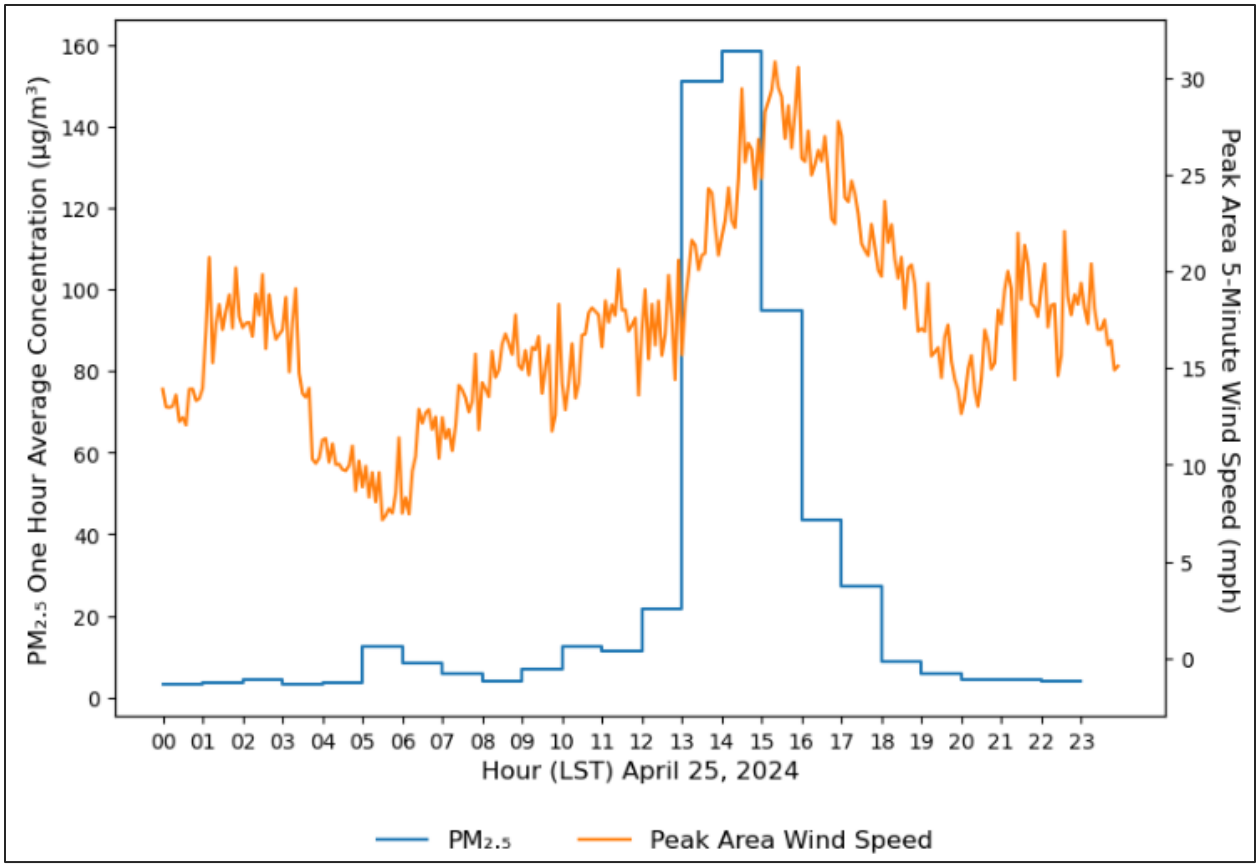

Figure 2-21: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on April 25, 2024

2.3.15 Group 15 – Summary of June 19, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

Elevated $PM_{2.5}$ concentrations were measured at the El Paso Chamizal monitor, which reached 299.4 µg/m^3 at 16:00 local time, as seen on the hourly time series in Figure 2-19: *Hourly $PM_{2.5}$ Concentrations on Days around Event (June 19, 2024). at the El Paso Chamizal* Monitor*).* These elevated levels were likely the result of wildfires in the United States, and NOAA HMS Fire and Smoke map show smoke plumes in the area (Figure A-39).

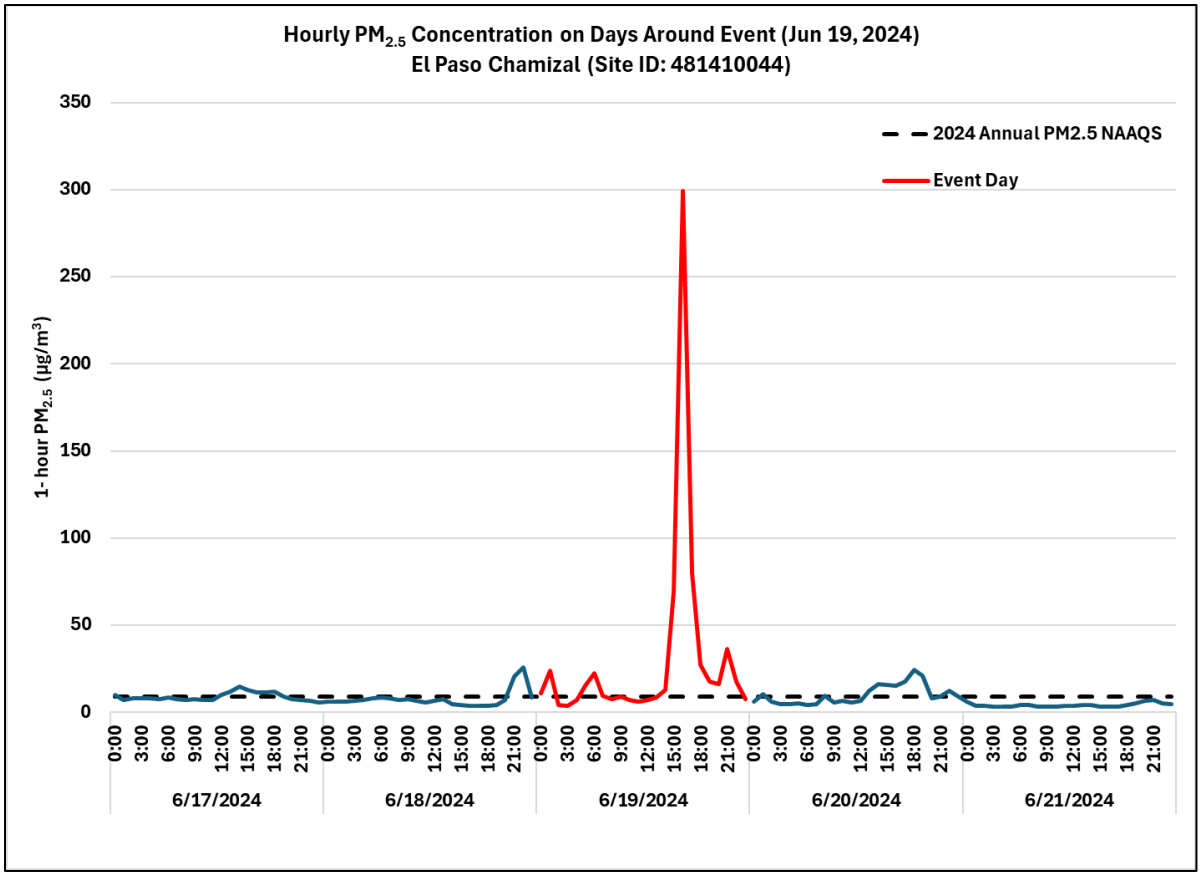

Figure 2-22: Hourly $PM_{2.5}$ Concentrations on Days around Event (June 19, 2024). at the El Paso Chamizal Monitor

Gusty winds were present on June 19, 2024, in the El Paso area, particularly along the border and in the mountain pass due to outflow from thunderstorms associated with a low-pressure system to the west and increasing moisture flowing in from the east (Figure A-40 and Figure A-41). Residual smoke associated with wildfires in southern New Mexico was also present. The gusty winds and downdrafts associated with the outflow from storms in the area helped bring smoke to the surface. As a result of the winds, dust, and smoke, the El Paso Chamizal monitor experienced elevated $PM_{2.5}$ concentrations. NWS archived discussions indicate that wildfires were present in the area on the event date (Figure B-12).

2.3.16 Group 16 – Summary of July 24, July 25, July 26, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

Smoke from a U.S. Wildfire affected $PM_{2.5}$ concentrations at the El Paso Chamizal monitor from July 24, 2024, through July 26, 2024, as seen in NOAA HMS Fire and Smoke Maps (Figures A-42 through A-44). For each of these days, the highest $PM_{2.5}$ concentrations were measured at 20:00 local time: 48.5 µg/m^3 on July 24, 2024, 47.5 µg/m^3 on July 25, 2024, and 32.0 µg/m^3 on July 26, 2024. The full timeline of $PM_{2.5}$ concentrations can be found in Figure 2-23**:** *Hourly $PM_{2.5}$ Concentrations on Days around Event (July 24 through July 26, 2024). at the El Paso Chamizal Monitor).*

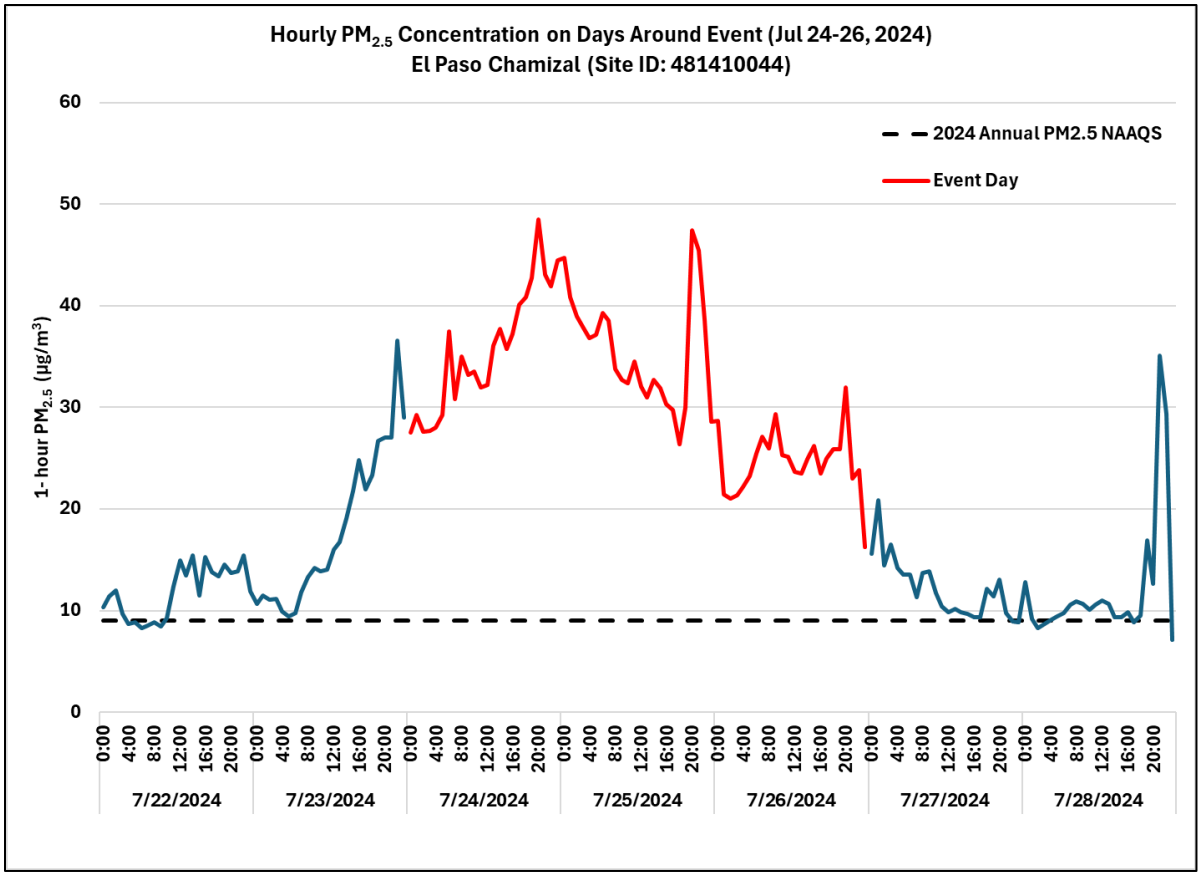

Figure 2-23: Hourly $PM_{2.5}$ Concentrations on Days around Event (July 24 through July 26, 2024). at the El Paso Chamizal Monitor

Slightly unsettled weather was present in El Paso on July 24, 2024, through July 26, 2024, due to a weak trough and increased moisture flow in the area. Temperatures were warm with humidity levels near normal for the time of year. An area of high pressure to the northwest of El Paso as well as a low-pressure system over southern British Columbia were present on event dates (Figure A-48, A-49, and A-50). These systems helped funnel wildfire smoke from southern British Columbia and the northwestern U.S. into the mid-western U.S. then into West Texas. This transport, as well as downdrafts associated with storms resulted in smoke reaching the surface and elevated $PM_{2.5}$ concentrations at the El Paso Chamizal monitor (Figures A-45 through A-47). NWS archives also reference smoke transported from the wildfires in the Canada Rockies and Pacific Northwest (Figure B-13).

2.3.17 Group 17 – Summary of August 1, 2024, African Dust $PM_{2.5}$ Event

An African Dust event impacted West Texas throughout the day on August 1, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 61.4 µg/m^3 at 04:00 local time, as seen on the hourly time series in Figure 2-21: *Hourly $PM_{2.5}$ Concentrations on Days around Event (August 1, 2024) at the El Paso Chamizal* Monitor).

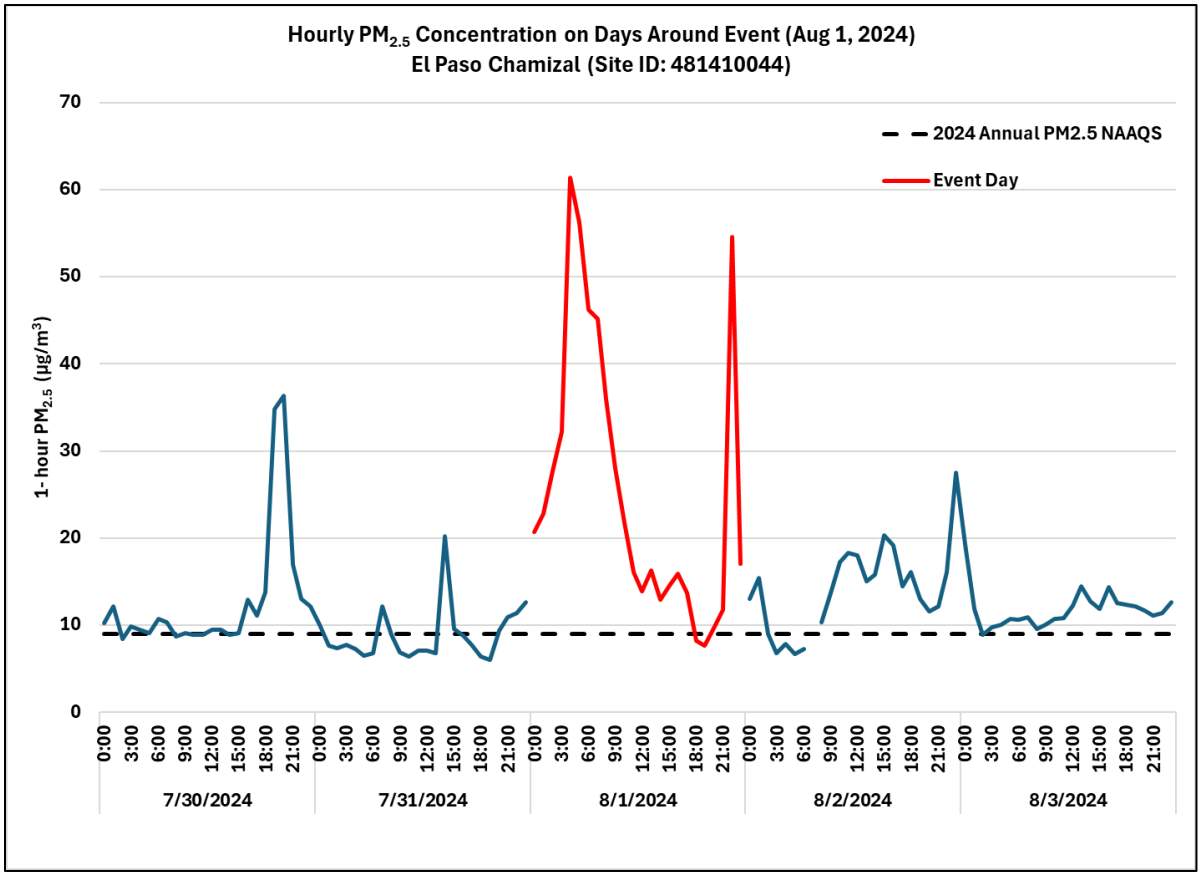

Figure 2-24: Hourly $PM_{2.5}$ Concentrations on Days around Event (August 1, 2024) at the El Paso Chamizal Monitor

Meteorological conditions on August 1, 2024, depicted the typical pattern seen with large Saharan dust events in Texas. Near the surface, there was onshore flow over much of the coast of Texas continuing with winds out of the south and southeast over much of the state (Figure A-51). Similar conditions were present at mid-levels with a broad area of high pressure centered over northern Texas (Figure A-52). These conditions bring Saharan dust west across the southern Gulf of America before moving north and northeast into Texas. As a result of this large, broad Saharan dust event, elevated $PM_{2.5}$ concentrations were measured in El Paso. The TCEQ forecast indicated that there was sufficient Saharan/African dust throughout Texas as to affect visibility and air quality.

2.3.18 Group 18 – Summary of August 23, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

Smoke from a U.S. wildfire impacted $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on August 23, 2024, and smoke plumes can be seen in the area (Figure A-53). A $PM_{2.5}$ concentration of 110.0 µg/m^3 was measured at 03:00 local time, as seen on the hourly time series in Figure 2-22: *Hourly $PM_{2.5}$ Concentrations on Days around Event (August 23, 2024) at the El Paso Chamizal* Monitor*).*

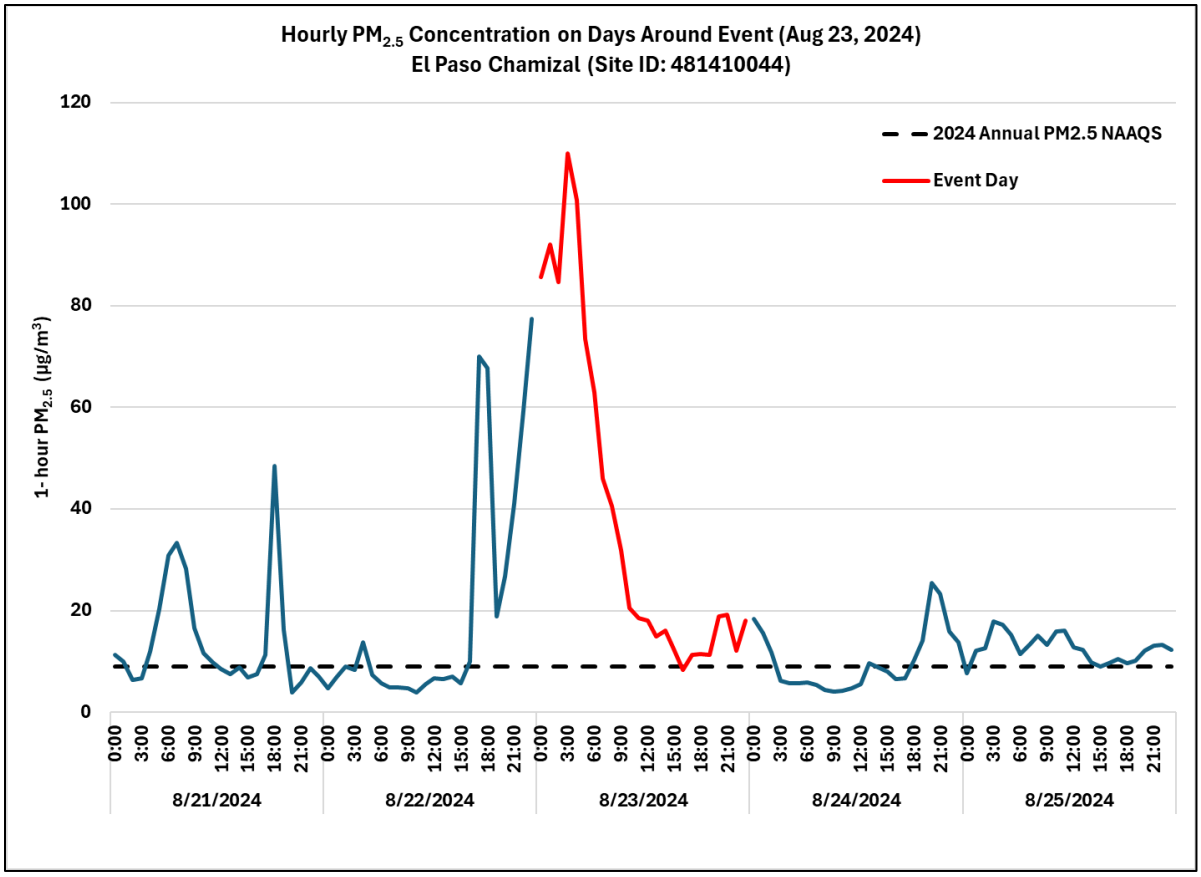

Figure 2-25: Hourly $PM_{2.5}$ Concentrations on Days around Event (August 23, 2024) at the El Paso Chamizal Monitor

On August 23, El Paso was warm and dry with a dryline, a weather boundary that separates a moist air mass from a dry air mass, located over western Central Texas. El Paso was on the western side of a mid-level high pressure system, which helped circulate smoke from the central U.S. into the El Paso area (Figures A-54 and A-55). This smoke resulted in elevated $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on August 23, 2024.

2.3.19 Group 19 – Summary of October 3, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

Smoke from a U.S. wildfire impacted $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on October 3, 2024, and a smoke plume was present over eastern and central portions of Texas (Figure A-56). The peak $PM_{2.5}$ concentration of 63.6 µg/m^3 was measured at 21:00 local time, as seen on the hourly time series in Figure 2-23: *Hourly $PM_{2.5}$ Concentrations on Days around Event (October 3, 2024) at the El Paso Chamizal* Monitor*).*

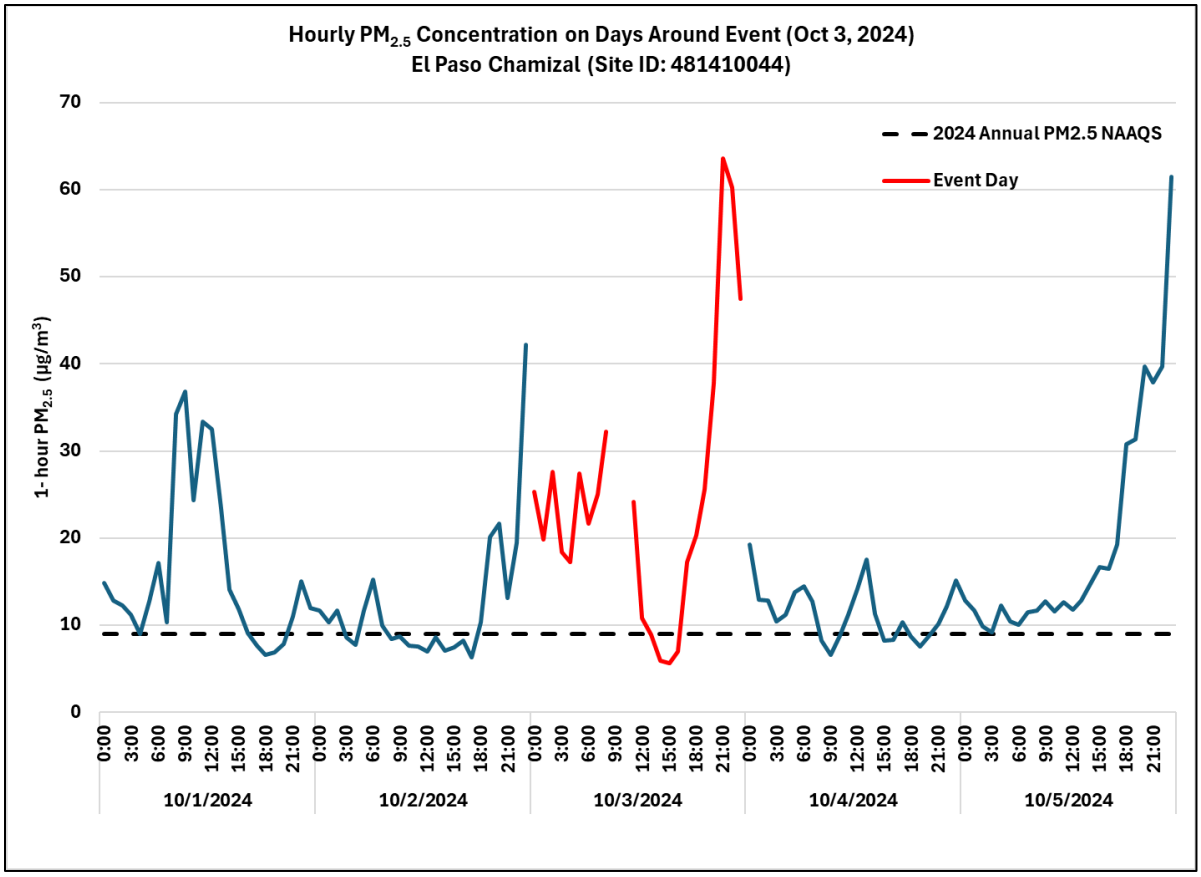

Figure 2-26: Hourly $PM_{2.5}$ Concentrations on Days around Event (October 3, 2024) at the El Paso Chamizal Monitor

On October 3, 2024, the El Paso area experienced above-average temperatures and light winds due to influence from a high-pressure system in the Four Corners, and these conditions allowed for subsidence over the area. Additionally, light upper-level winds may have helped transport residual smoke into the El Paso area from fires to the north (Figures A-57 and A-58).

2.3.20 Group 20 – Summary of October 29, 2024, High Wind $PM_{2.5}$ Event

Blowing dust from a high wind event affected West Texas on on October 29, 2024. The $PM_{2.5}$ concentration at the El Paso Chamizal monitor reached 165.6 µg/m^3 at 16:00 local time, as seen on the hourly time series in Figure 2-24: *Hourly $PM_{2.5}$ Concentrations on Days around Event (October 29, 2024) at the El Paso Chamizal Monitor*. A peak sustained five-minute wind speed of 27 mph was recorded in the El Paso area on October 29, 2024.

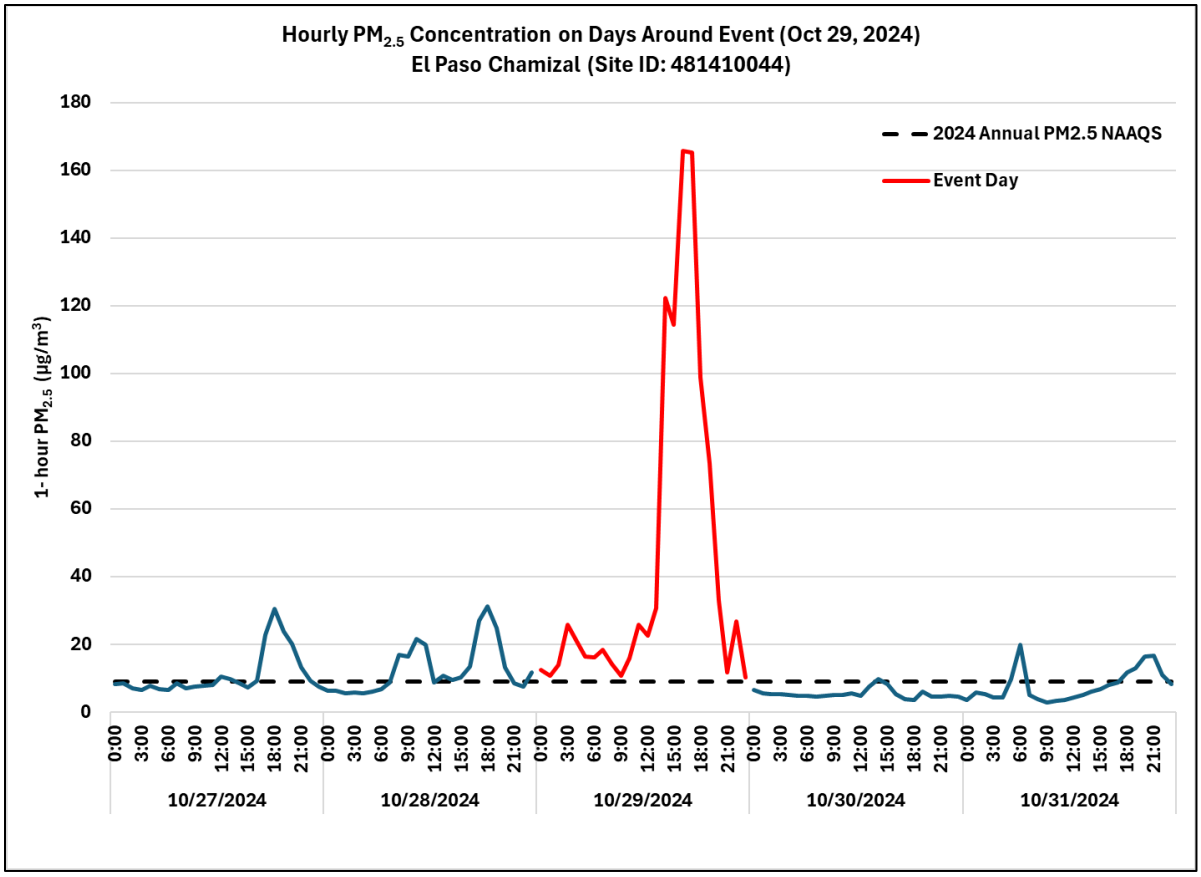

Figure 2-27: Hourly $PM_{2.5}$ Concentrations on Days around Event (October 29, 2024) at the El Paso Chamizal Monitor

On October 29, 2024, a strong upper-level ridge moved into the El Paso area with a tight pressure gradient at the surface, and these conditions resulted in gusty winds and blowing dust in the area, with gusts over 40 mph (Figure A-59 and Figure A-60). These conditions resulted in elevated $PM_{2.5}$ concentrations at the El Paso Chamizal monitor. The NWS archived forecast discusses windy and dusty conditions as a result of a cold front in West Texas (Figure B-14).

Figure 2-27: *Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on October 29, 2024*, shows that after previously rising and falling in the early morning, El Paso area wind speeds began to steadily rise around 05:00 local time. Several hours later, at 13:00 local time, $PM_{2.5}$ concentrations began to rise, and eventually peak, during the hour of 15:00 local time. Although wind speeds remained high for the remainder of the day, at 18:00 local time, $PM_{2.5}$ concentrations decreased. The fact that high winds continued while $PM_{2.5}$ concentrations dropped provides an indication that dust that resulted in high $PM_{2.5}$ concentrations at the El Paso Chamizal monitor on October 29, 2024, was transported, and once it had passed through the area, despite high winds continuing locally, the $PM_{2.5}$ concentrations dropped.

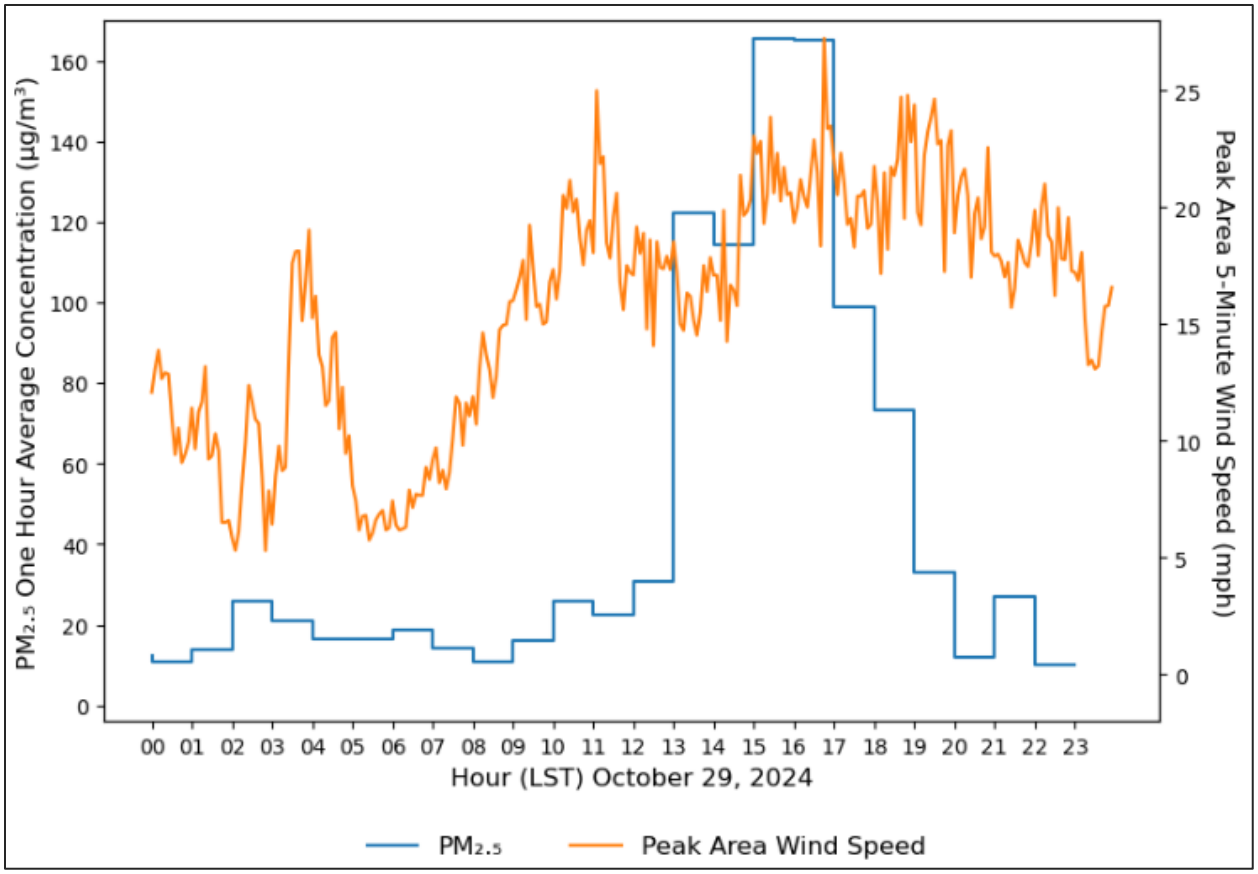

Figure 2-28: Hourly $PM_{2.5}$ Concentrations at the El Paso Chamizal Monitor Compared to Peak Area Hourly Wind Speed in El Paso County 5-Minute Wind Speeds on October 29, 2024

SECTION 3: CLEAR CAUSAL RELATIONSHIP

3.1 OVERVIEW

This section satisfies the Exceptional Events Rule Requirements at 40 CFR §50.14(c)(3)(iv)(B) and 40 CFR §50.14(c)(3)(iv)(C): "The event affected air quality in such a way that there exists a clear, causal relationship between the specific event and the monitored exceedance(s) or violations(s); and analyses comparing the claimed event-influenced concentrations to concentrations at the same monitoring site(s) at other times."

The analyses presented in this section vary depending on the event type (Prescribed Fire, Wildland Fire, African Dust, Other-Dust, and High Winds Events) as well the tier level, based on observed concentrations, associated with each event day. The analyses include a comparison of the event-related concentration to historical concentrations, evidence that the emissions from the events were transported to the monitor, and evidence that the events related emissions affected the monitor.

TCEQ determined the tier levels for the event days using EPA's *$PM_{2.5}$ Tiering Tool - for Exceptional Events Analysis.*[8] Tiering thresholds, established for each site, are used to classify event days as Tier 1 or Tier 2 or Tier 3 days. All 2024 event days are Tier 1 or Tier 2 days.

- Tier 1 event days are those when monitored $PM_{2.5}$ exceedances or violations are clearly influenced by causal events. Tier 1 event days require fewer pieces of evidence to establish the clear causal relationship. This tier is associated with a $PM_{2.5}$ concentration that is greater than or equal to 1.5x the tiering threshold.
- Tier 2 event days are those with $PM_{2.5}$ concentrations that are less extreme than Tier 1 days but still higher than concentrations on most non-event related concentrations, typically between 1 to 1.5x the tiering threshold. Tier 2 event days require more evidence than Tier 1 days to establish the clear causal relationship.

The determination of the appropriate tiering level began with an analysis of the measured $PM_{2.5}$ air quality associated with the candidate event in relation to historical concentrations. Distinct high levels of monitored 24-hour $PM_{2.5}$ concentrations when compared to historical monthly or annual 24-hour levels of $PM_{2.5}$. TCEQ compared the concentration of each event day to the lesser value with all "Request Exclusion" (R) qualifiers excluded of either (a) the most recent 5-year month-specific 98th percentile for 24-hour $PM_{2.5}$ data, or (b) the minimum annual 98th percentile for 24-hour $PM_{2.5}$ data for the most recent 5-year period.

Figure 3-1: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event days and Tier 1 and Tier 2 Thresholds for the El Paso Chamizal Monitor* show 24-hour $PM_{2.5}$ concentrations on 2024 event days compared to non-event days relative to the tier levels for the monitor.

[8] https://www.epa.gov/air-quality-analysis/pm25-tiering-tool-exceptional-events-analysis

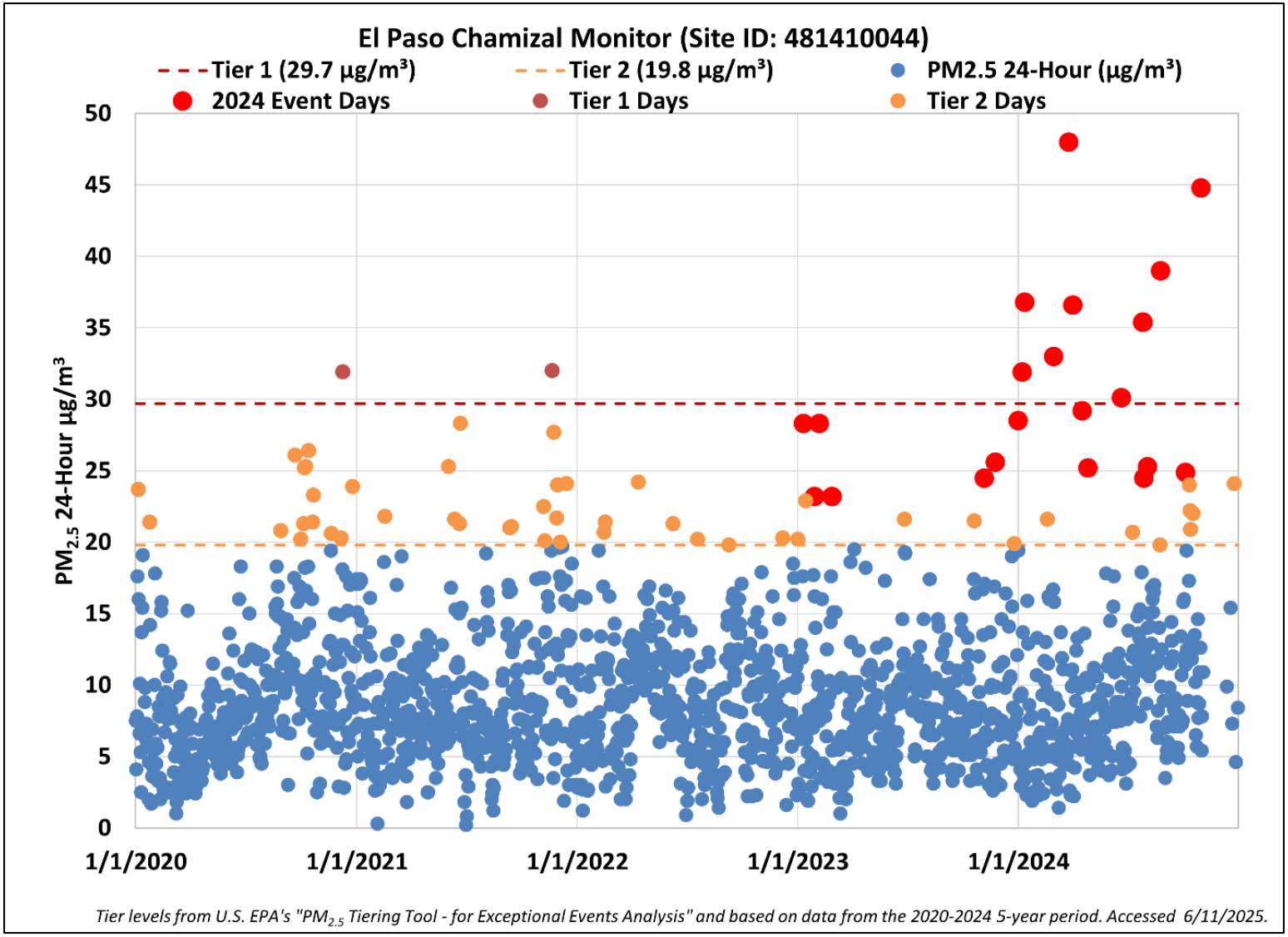

Figure 3-1: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event days and Tier 1 and Tier 2 Thresholds for the El Paso Chamizal Monitor

3.2 CLEAR CAUSAL EVIDENCE

In addition to Figure 3-1, which show 24-hour $PM_{2.5}$ concentrations on event and non-event days at each monitor, additional data are used to demonstrate a clear causal relationship between the $PM_{2.5}$ concentrations observed on an event day and the identified exceptional event. Imagery and data used for the clear causal evidence come from multiple sources:

- Air parcel trajectories were produced using the National Oceanic and Atmospheric Administration (NOAA) Applied Research Laboratory (ARL) HYSPLIT model available on the ARL HYSPLIT webpage: https://www.arl.noaa.gov/hysplit/. HYSPLIT models simulate the dispersion and trajectory of substances transported and dispersed through the atmosphere over local to global scales. The backward trajectory analyses presented in this document were used to determine the origin of air masses and establish source-receptor relationships.
  - For the combined trajectory and fire maps, these trajectories show the modeled path of the air mass from 72 hours arriving at different heights (100 meters, 500 meters, 800 meters above ground level (AGL)) to the monitor and arriving at the hour with the highest concentration on the relevant date. The meteorological data input used for these trajectories comes from the Global Data Assimilation System (GDAS), which is run by the National Weather Service's National Centers for Environmental Prediction (NCEP). Additional information is available at: https://www.ready.noaa.gov/gdas1.php
  - For the dust trajectories from Africa, forward trajectories started from a matrix that was placed over western Africa. With the matrix utility, the user specifies the southwest point and northeast point of a four-sided polygon as well as the time at which trajectories are to be generated. When the matrix utility is run, trajectories for all points within the polygon are simultaneously initiated. In this application, there were approximately 200 trajectory starting points. The duration of each trajectory was 240 to 360 hours (10 to 15 days) depending on how long it took for the air parcels to reach Texas. The meteorological data input used is also GDAS.
  - For forward trajectories on days impacted by fires in Mexico/Central America, trajectories were started 72 hours ahead of the event day at 500 meters AGL using the GDAS meteorological data.
- Hourly $PM_{2.5}$ event concentrations were compared with typical concentrations (Tier 3 median) for each hour. A "typical" concentration was defined as the median hourly $PM_{2.5}$ concentration at a particular monitor for all Tier 3 dates that had available data from 2020 through 2024. Tier 1 and Tier 2 dates were not included in this dataset because these two classifications are commonly associated with exceptional events and were therefore not considered as "typical." Tiering classifications were based on 2020 through 2024 data available via the EPA's tiering tool: https://www.epa.gov/air-quality-analysis/pm25-tiering-tool-exceptional-events-analysis.
- Data are from Texas Air Monitoring System (TAMIS) files sourced from EPA's Air Quality System (AQS) Raw Data Report: https://www.epa.gov/outdoor-air-quality-data. Data were downloaded on October 31, 2024.
- Smoke plume maps are from the AirNow Fire and Smoke Map: https://fire.airnow.gov/.[9] This map also shows the Air Quality Index (AQI) for each monitor. Additional information about AQI is available on the AirNow website: https://www.airnow.gov/aqi/aqi-basics/.
- Media reports and TCEQ forecast discussions are provided in Appendix C. Media report links are referenced with the figure. TCEQ forecasts for event days are archived and available at: https://amdaftp.tceq.texas.gov/exceptional_events/.

[9] AirNow is a partnership of the U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration (NOAA), National Park Service, NASA, Centers for Disease Control, and tribal, state, and local air quality agencies.

- Satellite imagery from NASA Worldview: https://worldview.earthdata.nasa.gov/ was captured using Corrected Reflectance (True Color) layers from the MODIS (Moderate Resolution Imaging Spectroradiometer) instrument on either Aqua or Terra satellites. The Terra satellite travels north to south across the equator in the late morning where the Aqua satellite travels south to north across the equator in the early afternoon. The satellites used for each event date were chosen based on the best representation of potential evidence.

3.2.1 Group 1 – Evidence for January 10, 2023, Dust (Other) $PM_{2.5}$ Event

January 10, 2023, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 28.3 µg/m³; one-hour daily maximum 111.3 µg/m³ recorded at 20:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a regional dust event. Hourly concentrations on January 10, 2023, can be compared against typical/non-event days in Figure 3-2: *Hourly $PM_{2.5}$ Concentrations on January 10, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor.*

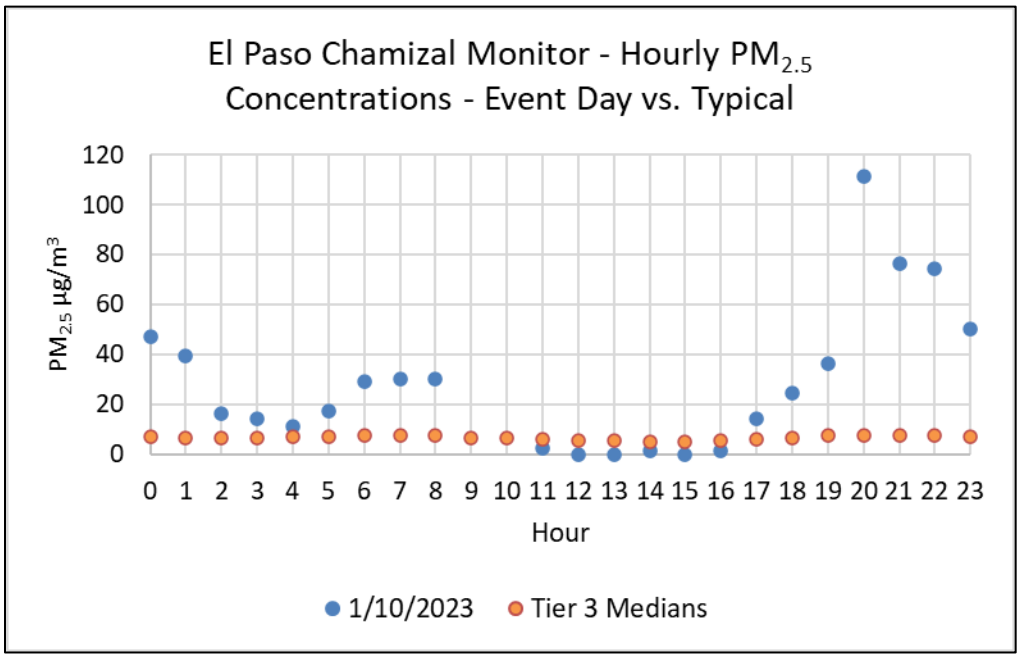

Figure 3-2: Hourly $PM_{2.5}$ Concentrations on January 10, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for January 10, 2023, mention light residual smoke extending north from northwest Mexico towards the Central U.S. TCEQ forecasts also report some light winds and vertical mixing that may carry light urban pollutants from previous days (Table C-1). NWS archived forecasts discuss winds blowing dust in the El Paso area (Figure B-1). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show winds passing through desert areas in Mexico before reaching the monitor (Figure 3-3*: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 10, 2023*). HYSPLIT forward trajectories show that winds originating from northwestern Mexico traveled through far West Texas (Figure 3-4*: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Area in Northern Mexico, Starting on January 8, 2023)*

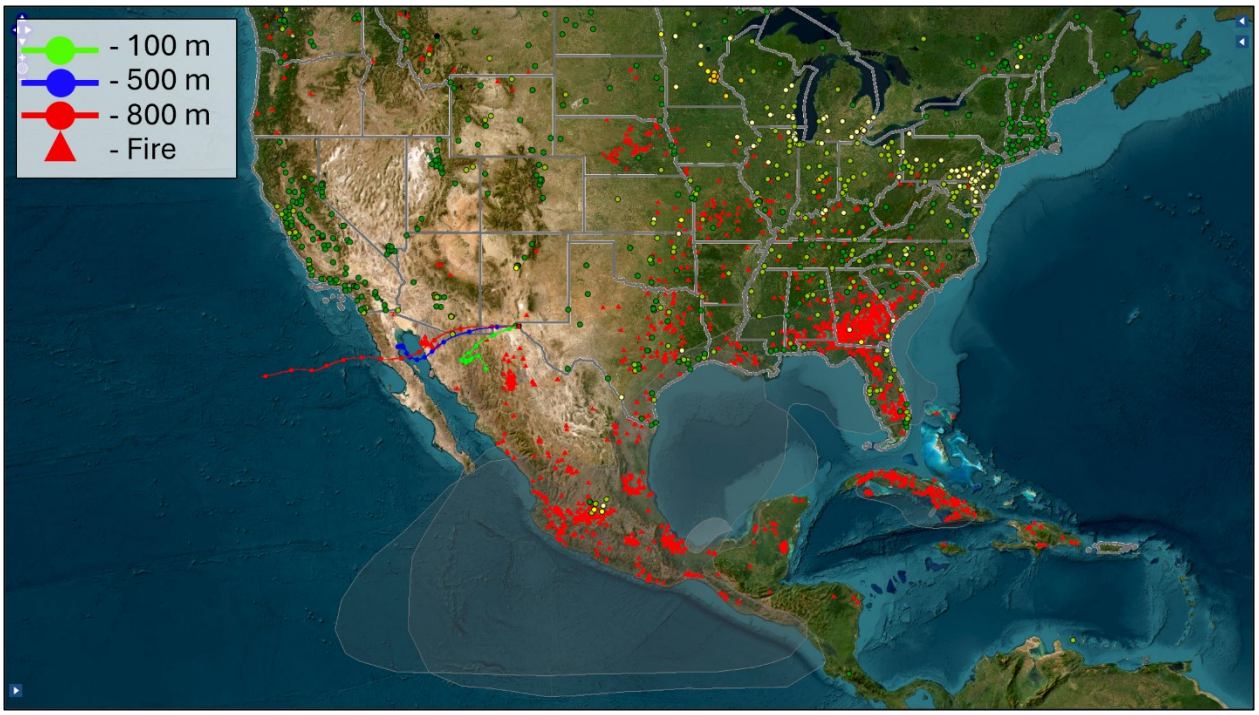

Figure 3-3: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 10, 2023

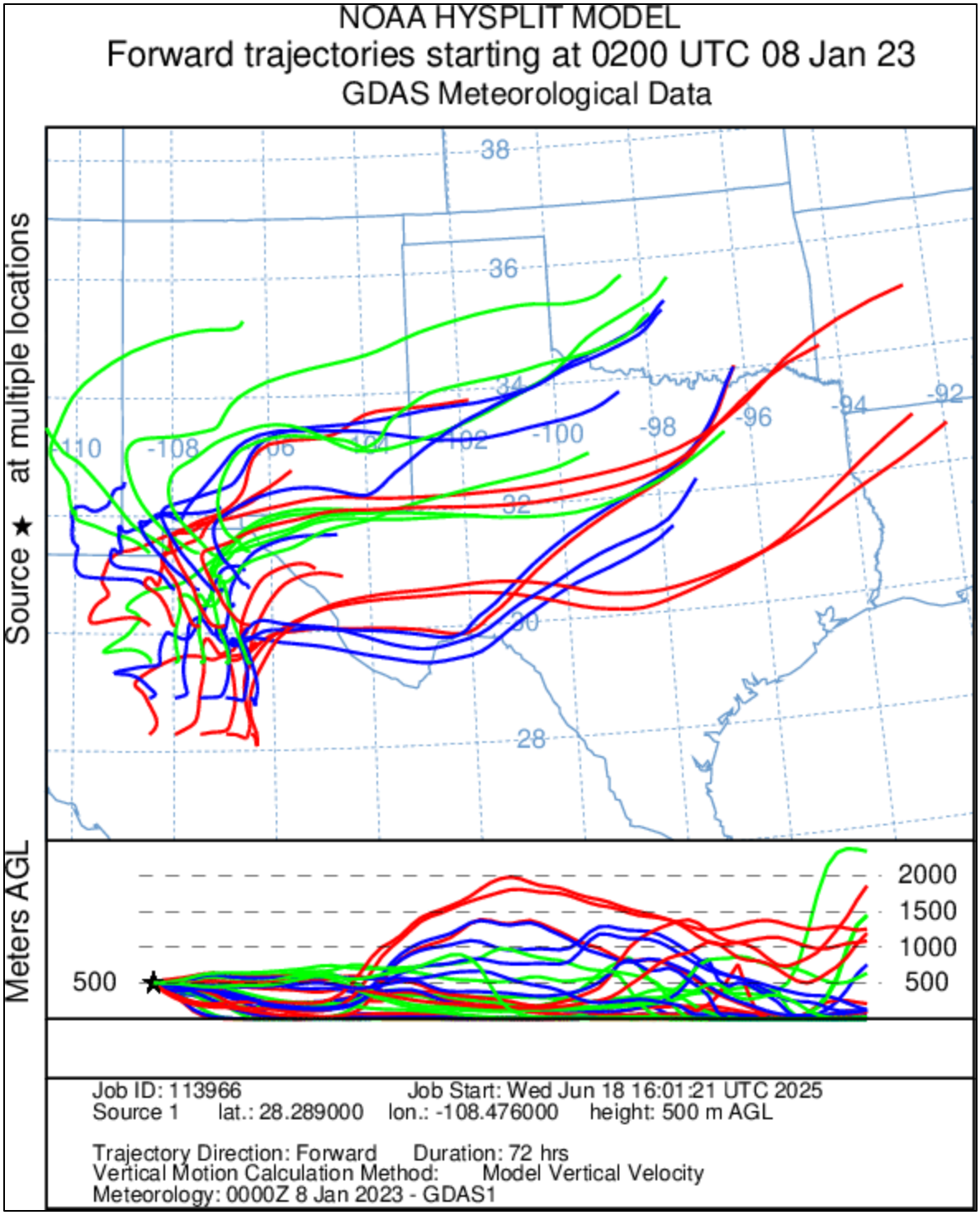

Figure 3-4: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Area in Northern Mexico, Starting on January 8, 2023

3.2.2 Group 2 – Evidence for January 28, 2023, Structural Fire $PM_{2.5}$ Event

January 28, 2023, is identified as a Tier 2 structural fire event at the El Paso Chamizal monitor (24-hour average concentration 23.2 µg/m^3; one-hour daily maximum 87.3 µg/m^3 recorded at 00:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with a structural fire.

Hourly concentrations on January 28, 2023, can be compared against typical/non-event days in Figure 3-5: *Hourly $PM_{2.5}$ Concentrations on January 28, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

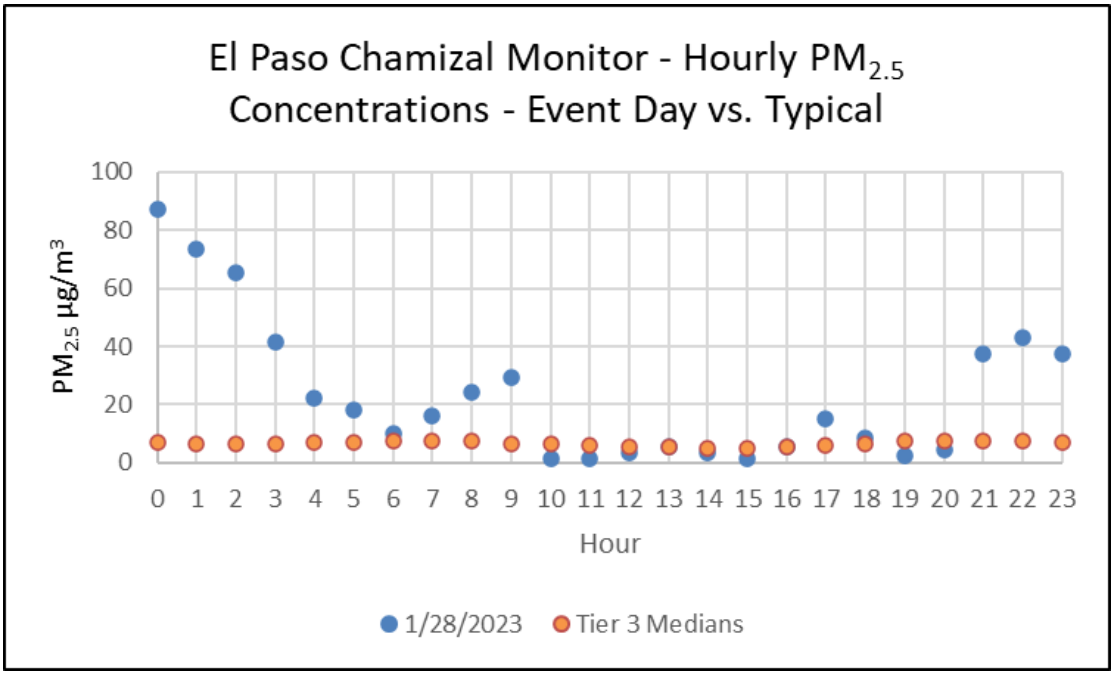

Figure 3-5: Hourly $PM_{2.5}$ Concentrations on January 28, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for January 28, 2023, mention a cold front pushing through the Texas Panhandle bringing southerly winds ahead of it. These winds traveled through smoke sources from seasonal fires and industrial activity in Texas, which elevated $PM_{2.5}$ concentrations (Table C-2). Media reports mention two fires in the El Paso area: an unspecified fire on January 27 and a residential fire on January 28, 2023 (Figure C-1 and C-2). HMS smoke plumes (Figure 3-6*: AirNow HMS Smoke Plume for January 28, 2023*) show that monitors in El Paso had AQI readings of Moderate on January 28, 2023. HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration showed high altitude winds traveling from the American Northwest down to the northwestern coast of Mexico and then pivoting back north to the El Paso Chamizal monitor. The trajectory from the lowest altitude traveled from Kansas through the Texas Panhandle, and then made a westerly turn at almost a ninety-degree angle en route to the El Paso Chamizal monitor (Figure 3-7: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 28, 2023).*

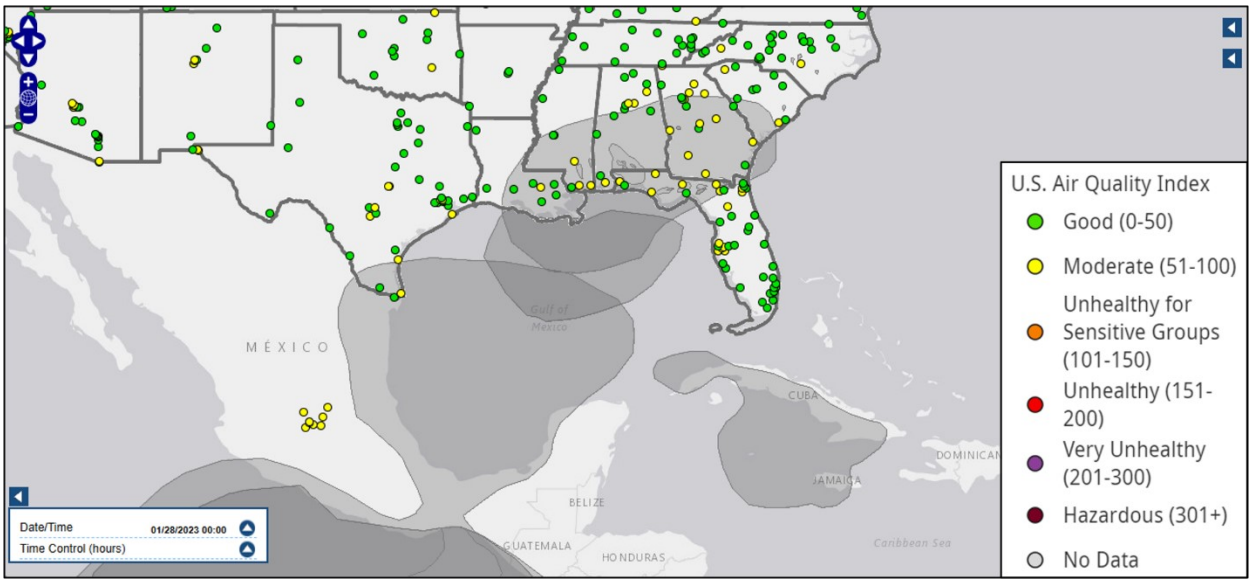

Figure 3-6: AirNow HMS Smoke Plume for January 28, 2023

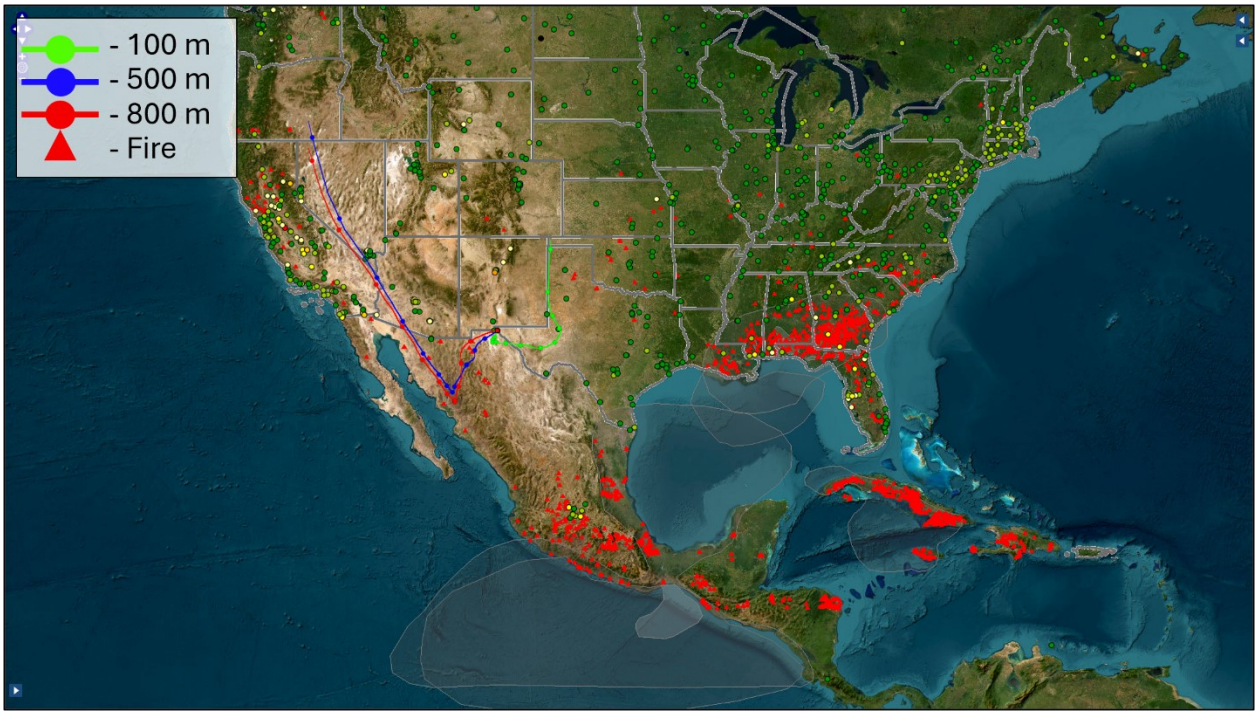

Figure 3-7: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 28, 2023

3.2.3 Group 3 – Evidence for February 5, 2023, Dust (Other) $PM_{2.5}$ Event

February 5, 2023, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 31.2 µg/m^3; one-hour daily maximum 84.3 µg/m^3 recorded at 19:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a regional dust event. Hourly concentrations on February 5, 2023, can be compared against typical/non-event days in Figure 3-8: *Hourly $PM_{2.5}$ Concentrations on February 5, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

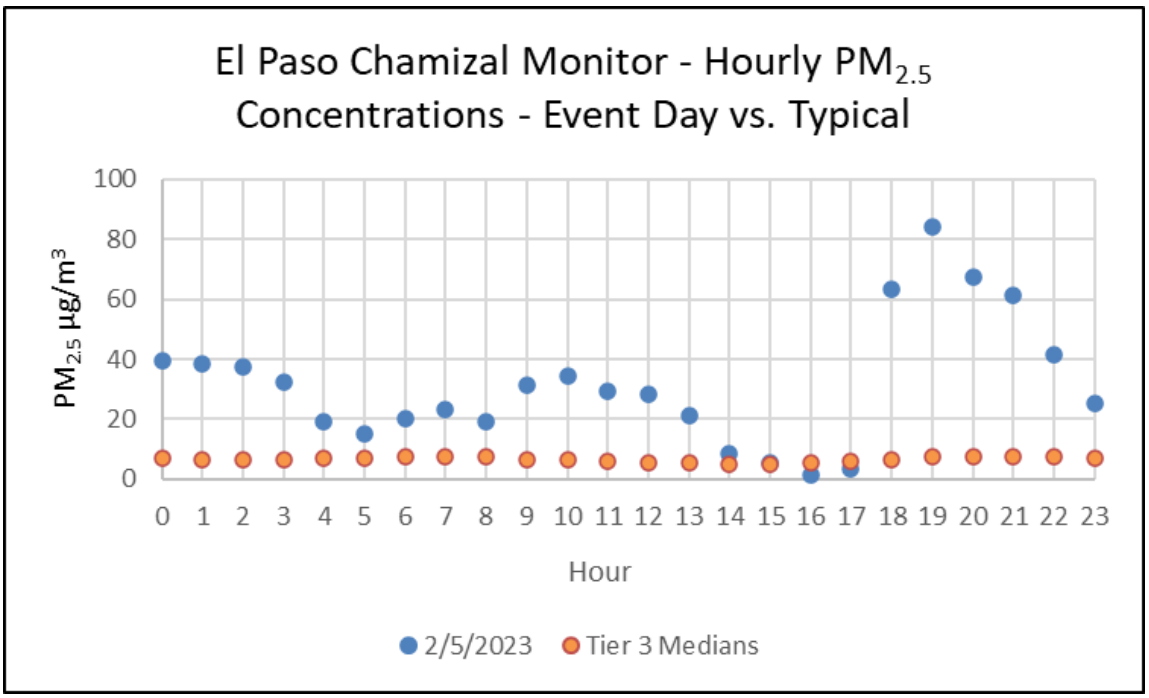

Figure 3-8: Hourly $PM_{2.5}$ Concentrations on February 5, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for February 5, 2023, report minimal dispersion of fine particulate matter from light winds and limited vertical mixing, producing higher $PM_{2.5}$ concentrations (Table C-3). NWS archived discussions reported poor to fair ventilation for smoke and dust in the days around the event (Figure B-2). A media report stated that there was a fire in Canutillo in El Paso the day before the event, which sent plumes of smoke it the air. With the limited air mixing the next day, the particulate matter from this event may have recirculated, contributing to higher $PM_{2.5}$ levels (See Figure C-4). The aerosol optical depth (AOD) image corroborates the existence of dust in the El Paso area, with the yellow dot in El Paso denoting air quality in the moderate category (Figure 3-9: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on February 5, 2023*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show slow recirculating winds traveling from western Mexico before reaching the El Paso Chamizal monitor (Figure 3-10: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 28, 2023*).

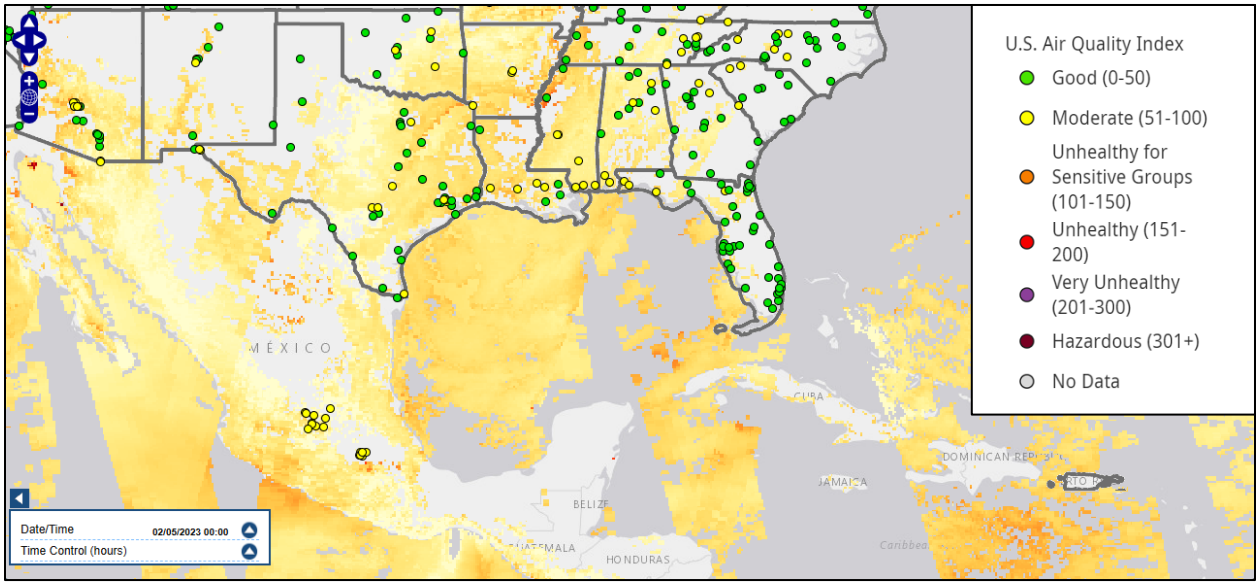

Figure 3-9: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on February 5, 2023

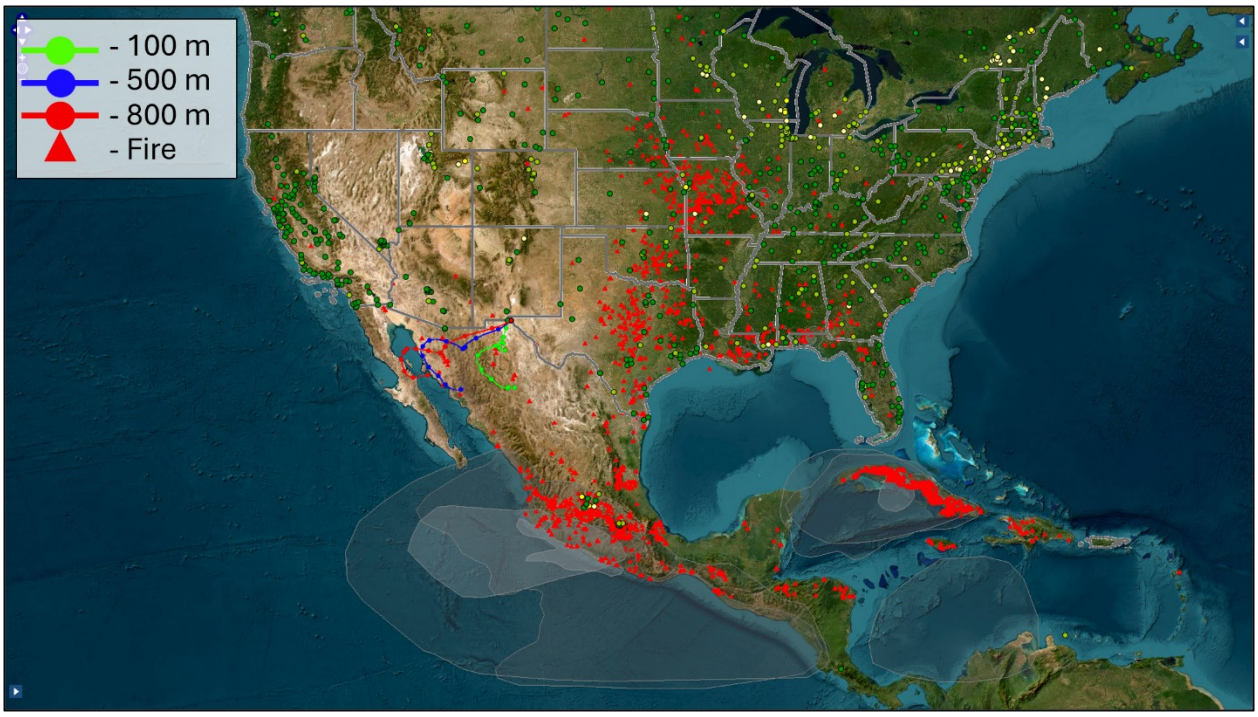

Figure 3-10: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on February 5, 2023

3.2.4 Group 4 – Evidence for Feburary 26, 2023, High Wind $PM_{2.5}$ Event

February 26, 2023, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 23 µg/m^3; one-hour daily maximum 84.3 µg/m^3 recorded at 19:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event that caused blowing dust. Hourly concentrations on February 26, 2023, can be compared against typical/non-event days in Figure

3-11*: Hourly $PM_{2.5}$ Concentrations on February 26, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor.*

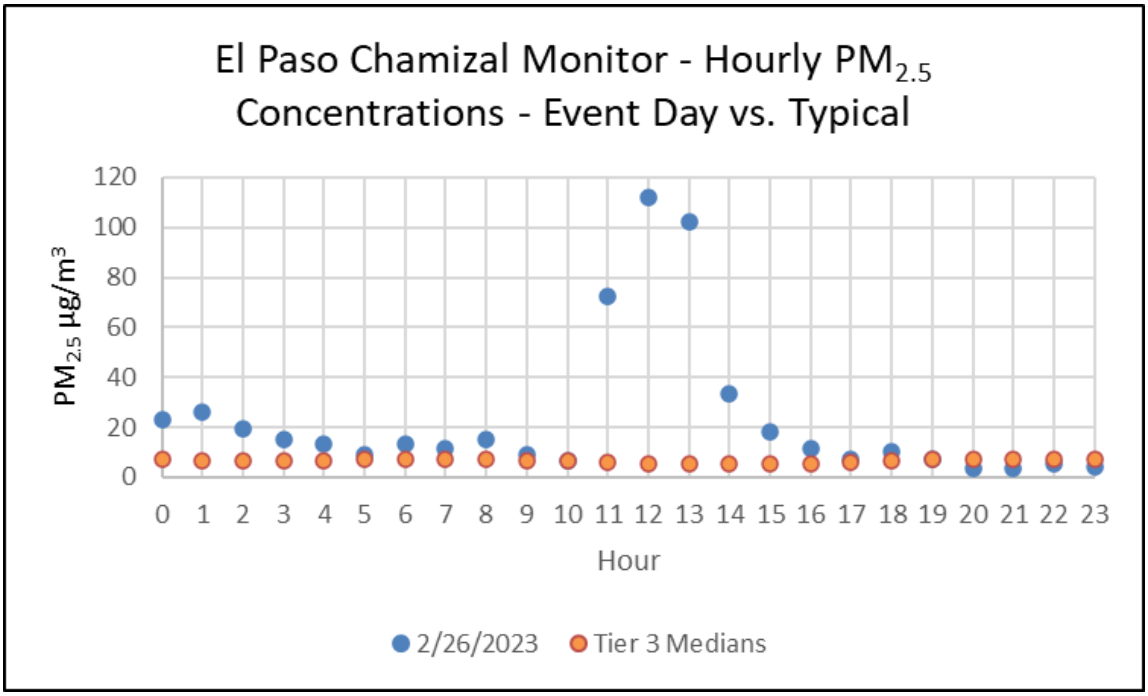

Figure 3-11: Hourly $PM_{2.5}$ Concentrations on February 26, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for February 26, 2023, reported that a fast-moving cold front tied to a strong upper/middle-level storm system pushed through the Texas Panhandle, Permian Basin, and far west Texas as strong winds blew dust in the El Paso area (Table C-4). NWS archived discussions also reported the same strong storm system, whose high winds blew dust across the El Paso area (Figure B-3). Media reports corroborated the presence of destructive winds and high-speed dusty winds (Figures C-3, C-4, C-5). Satellite imagery shows possible dust over the El Paso area (Figure 3-12: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from February 26, 2023, Showing Dust Over the El Paso Region*). The AOD image, meanwhile, shows the presence of dust with the yellow dot denoting air quality in the moderate category (Figure 3-13: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on February 26, 2023*) HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show slow winds originating from the Pacific Ocean and Gulf of California, which pick up speed over Mexico before reaching the monitor (Figure 3-14: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on February 26, 2023.* Forward trajectories flow southwest over the Atlantic Ocean to reach the El Paso Chamizal monitor (Figure 3-15 *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from the Atlantic Ocean, Starting on February 23,* 2023).

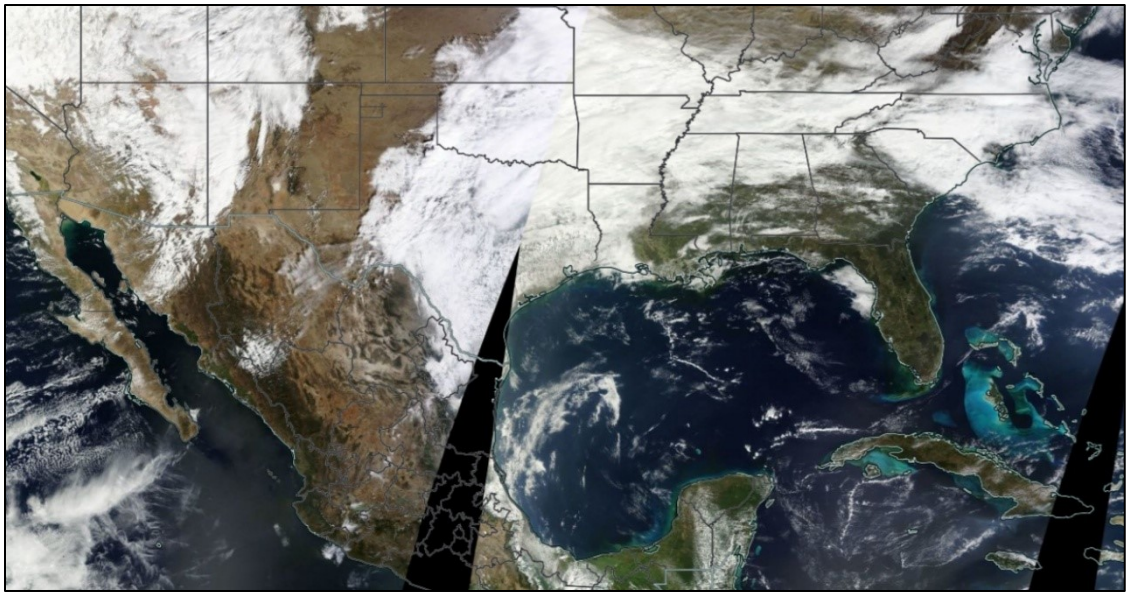

Figure 3-12: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from February 26, 2023, Showing Dust Over the El Paso Region

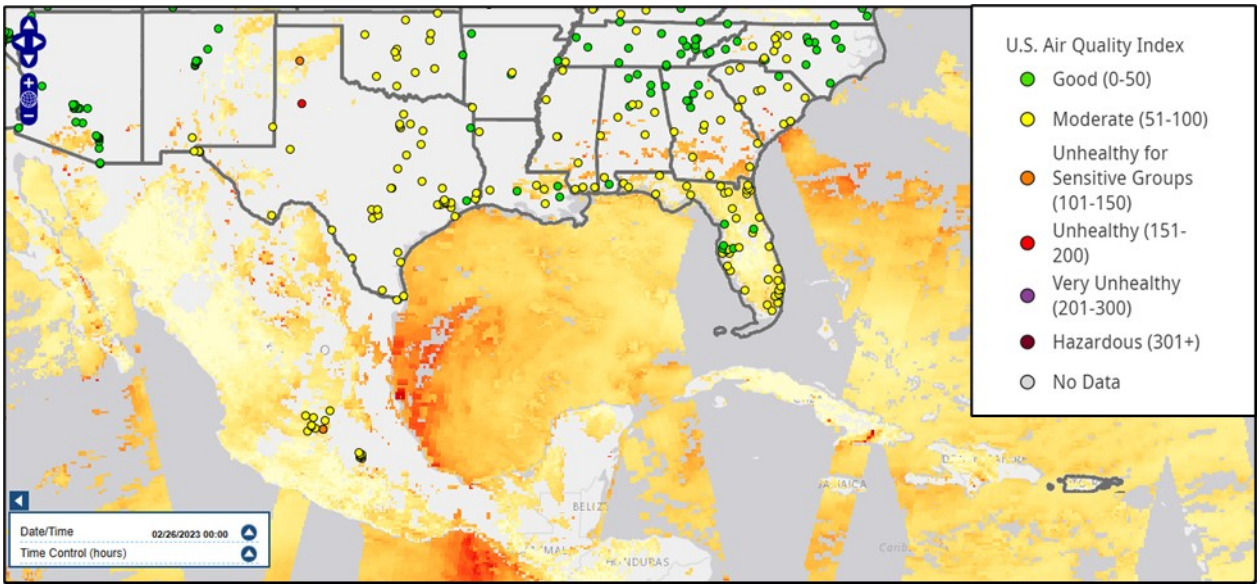

Figure 3-13: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on February 26, 2023

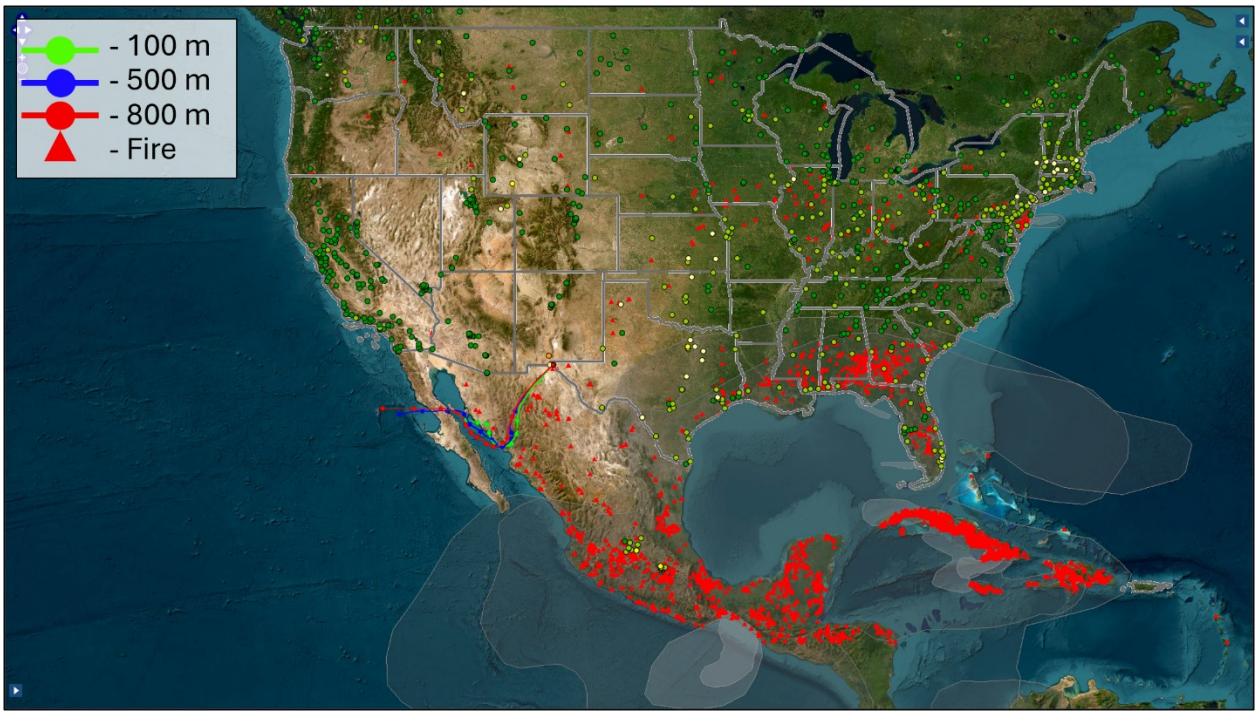

Figure 3-14: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on February 26, 2023

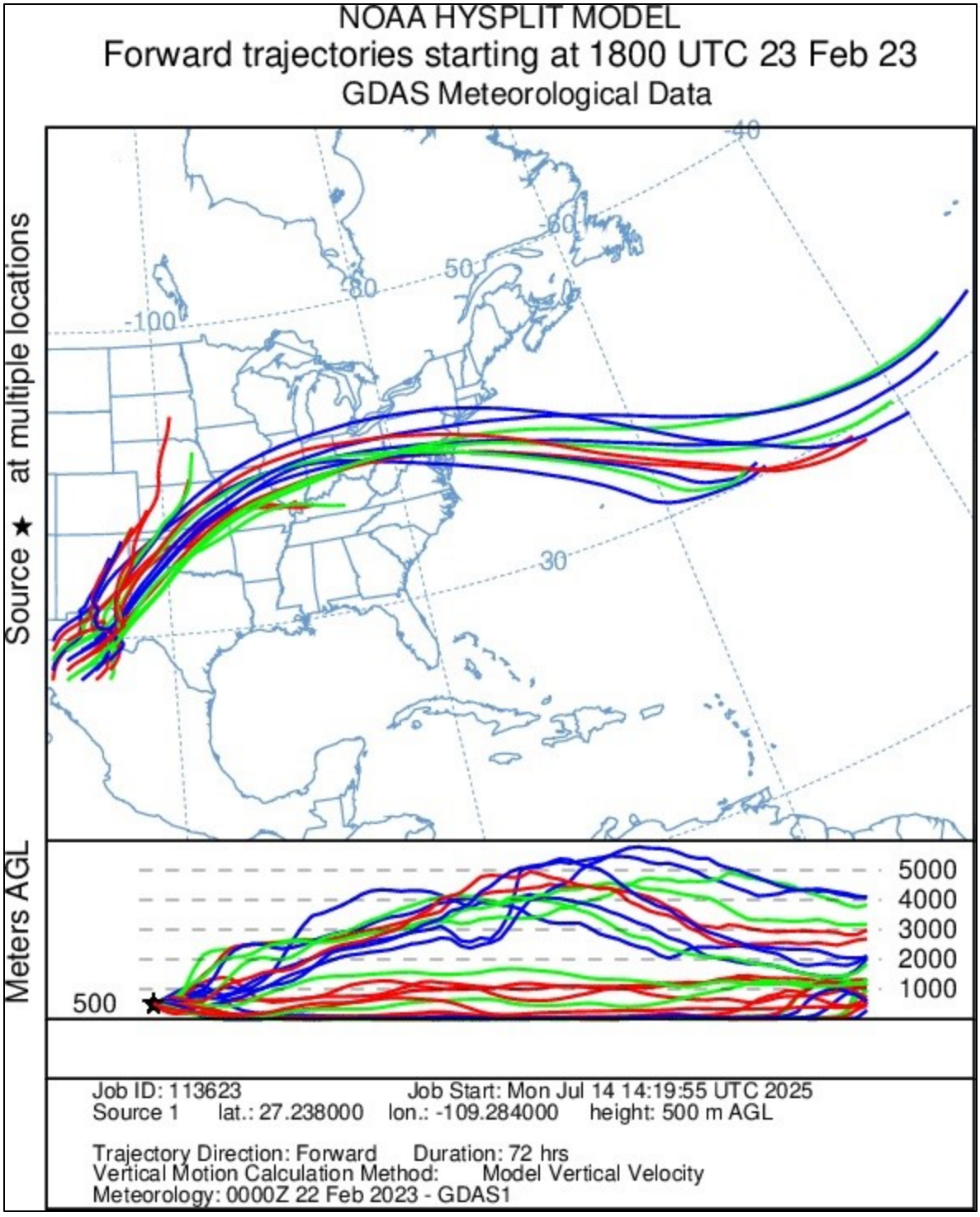

Figure 3-15 NOAA HYSPLIT 72-Hour Forward Trajectories Originating from the Atlantic Ocean, Starting on February 23, 2023

3.2.5 Group 5 – Evidence for November 5, 2023, Structural Fire $PM_{2.5}$ Event

November 5, 2023, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 24.6 μg/m³; one-hour daily maximum 74.1 μg/m³ recorded at 22:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a structural fire event. Hourly concentrations on

November 5, 2023, can be compared against typical/non-event days in Figure 3-16: *Hourly $PM_{2.5}$ Concentrations on November 5, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor.*

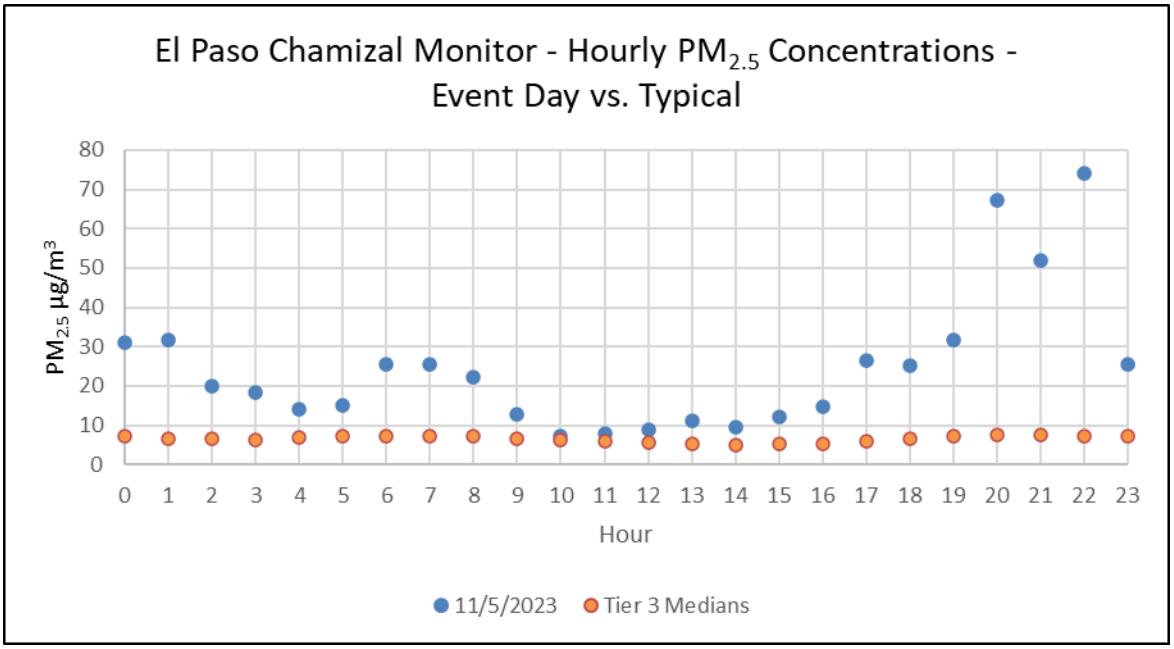

Figure 3-16: Hourly $PM_{2.5}$ Concentrations on November 5, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for November 5, 2023, mention residual smoke from burning activities and slightly elevated particulate background levels; however, the forecast did not anticipate the smoke would be long-lived due to increasing winds and vertical mixing (Table C-5). NWS archived discussions had no relevant reports. In the media, two fires were reported in the area surrounding El Paso, one involving a structural fire in Southcentral El Paso and an incident of a train engine catching fire (Figure C-4). HMS smoke plume imagery, meanwhile, shows significant smoke over the southeastern U.S but none over the El Paso area (Figure 3-17: *AirNow HMS Smoke Plume for November 5, 2023*). This pattern suggests that any smoke in the El Paso area was due to local sources rather than larger systems. HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ show winds passing through Central Mexico before arriving at the El Paso Chamizal monitor (Figure 3-18: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on November 5, 2023*). HYSPLIT forward trajectories show that winds originating from northwestern Mexico traveled through far West Texas towards the Panhandle (Figure 3-19: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Area in Mexico, with Fires, Starting on November 3, 2024*). The forward trajectories show the direction wind traveled from northwestern Mexico, but the primary contribution to $PM_{2.5}$ concentrations at the El Paso Chamizal monitor was believed to be local fires. The relatively close proximity of the fires to the monitor makes the longer-distance forward trajectories less relevant. From the lack of evidence from multiple sources, it seems reasonable to rely primarily on the media reports of fires as the likely cause of elevated $PM_{2.5}$ levels.

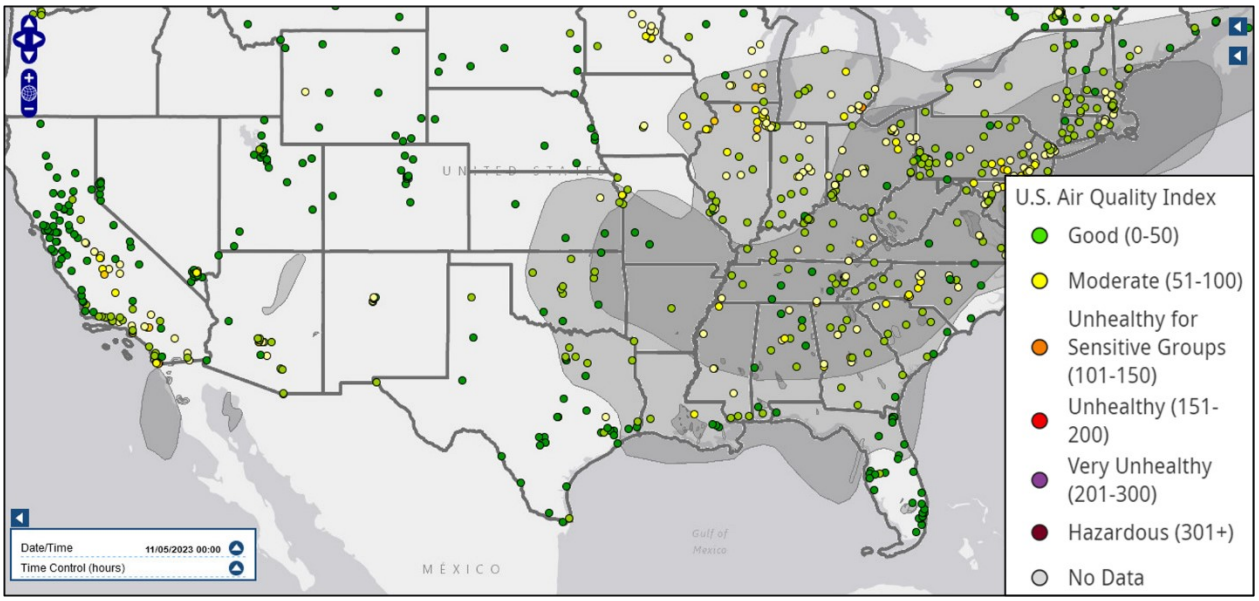

Figure 3-17: AirNow HMS Smoke Plume for November 5, 2023

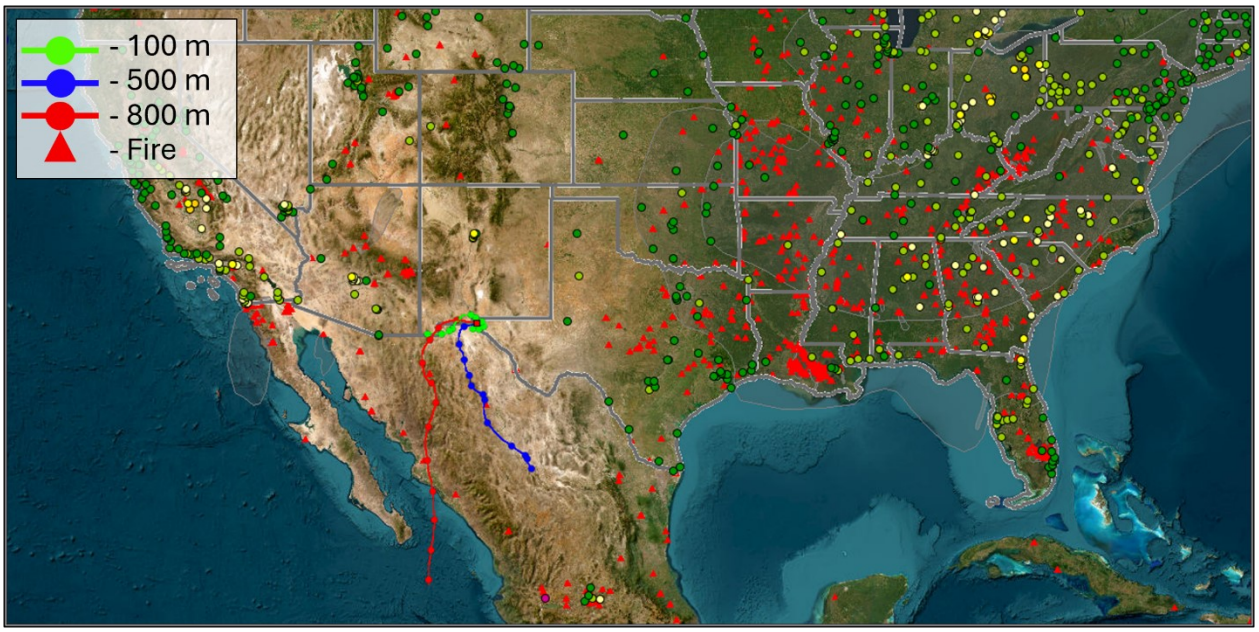

Figure 3-18: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on November 5, 2023

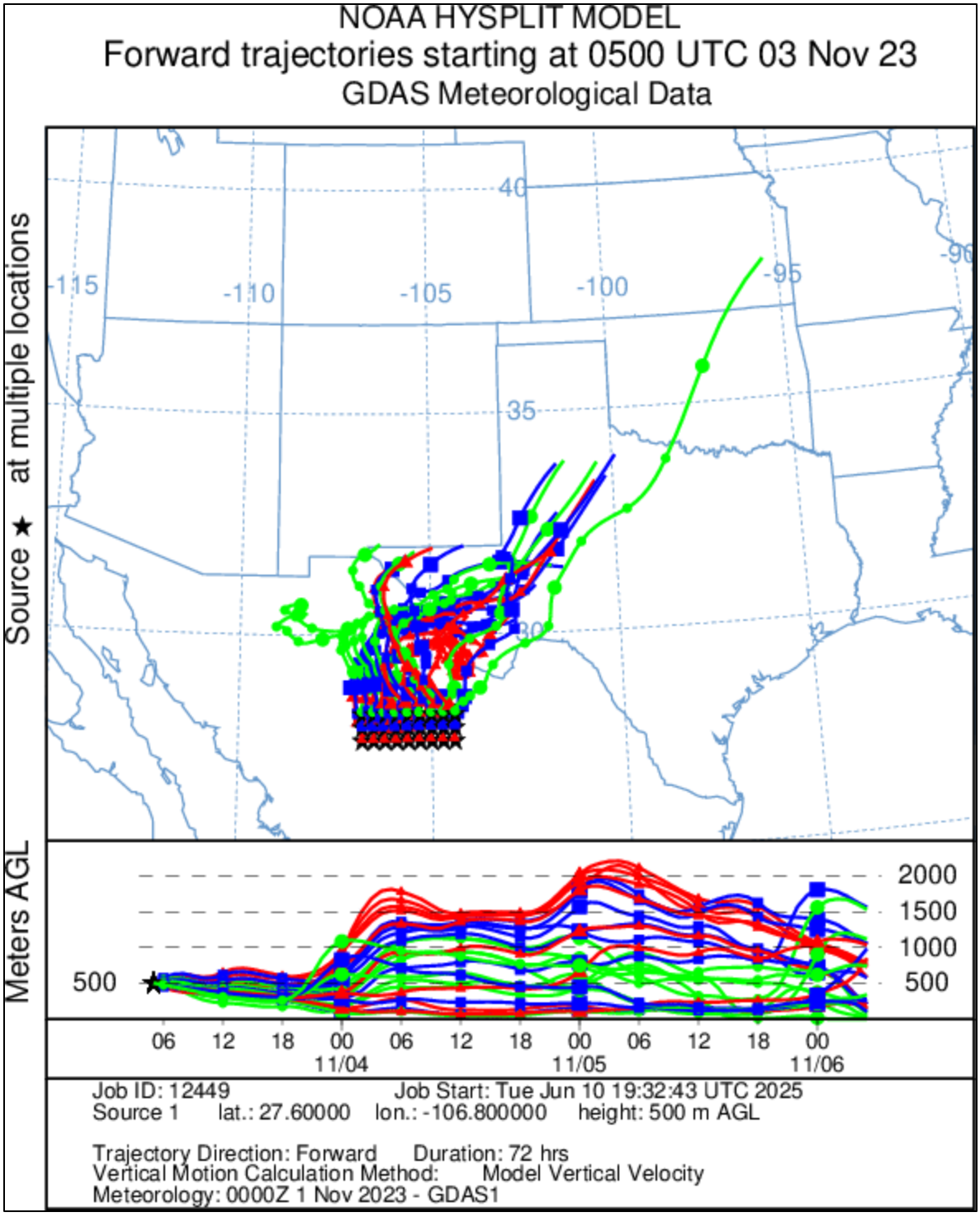

Figure 3-19: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Area in Mexico, with Fires, Starting on November 3, 2024

3.2.6 Group 6 – Evidence for November 23, 2023, Dust (Other) $PM_{2.5}$ Event

November 23, 2023, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 25.6 µg/m^3; one-hour daily maximum 74.1 µg/m^3 recorded at 22:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a regional dust event. Hourly concentrations on

November 23, 2023, can be compared against typical/non-event days in Figure 3-20: *Hourly $PM_{2.5}$ Concentrations on November 23, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor.*

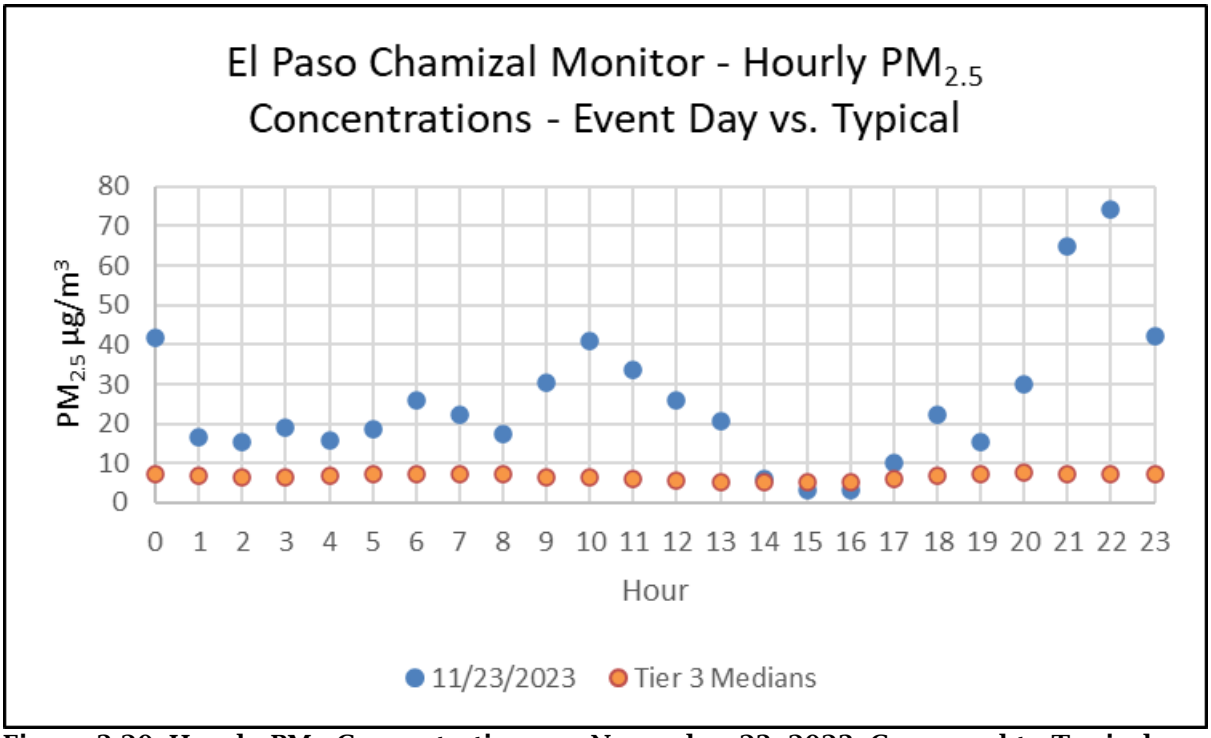

Figure 3-20: Hourly $PM_{2.5}$ Concentrations on November 23, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for November 23, 2023, report minimal dispersion of fine particulate matter from light winds and limited vertical mixing, producing higher $PM_{2.5}$ concentrations (Table C-6). NWS archived discussions reported patchy blowing dust downwind of typical dust source regions (Figure B-4). There was a single media report that mentions calm and stable weather conditions, with light winds and limited vertical mixing (Figure C-8). Satellite imagery shows dust and/or smoke in the area around the El Paso Chamizal monitor (Figure 3-21: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from November 23, 2023, Showing Dust Over the El Paso Region*). The AOD image, meanwhile, shows the presence of dust over portions of Texas with the yellow dot in El Paso denoting air quality in the moderate category (Figure 3-22: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on* November 23, 2023*).* HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show the highest altitude winds passing from New Mexico and lower altitude winds from Nebraska traveling to northern Mexico before circling back to the El Paso Chamizal monitor (Figure 3-23: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal* Monitor on November 23, 2023*).* Forward trajectories show winds traveling north past the El Paso Chamizal monitor from northern Mexico (Figure 3-24: *NOAA HYSPLIT 24-Hour Forward Trajectories Originating from in Mexico, Starting on November 23, 2023*).

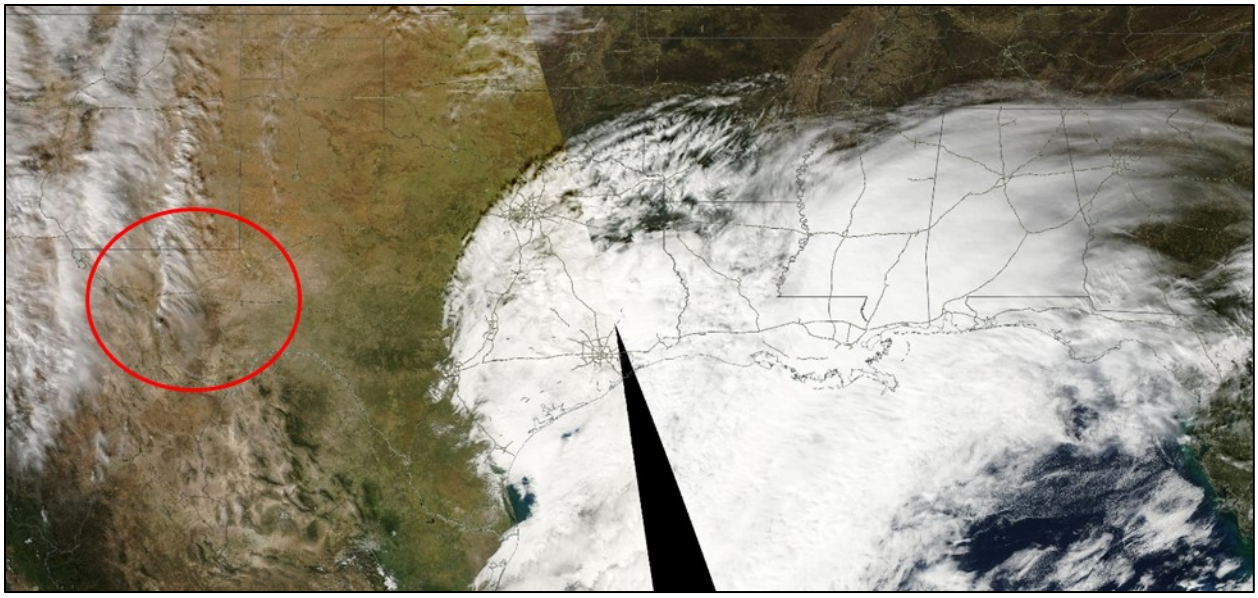

Figure 3-21: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from November 23, 2023, Showing Dust Over the El Paso Region

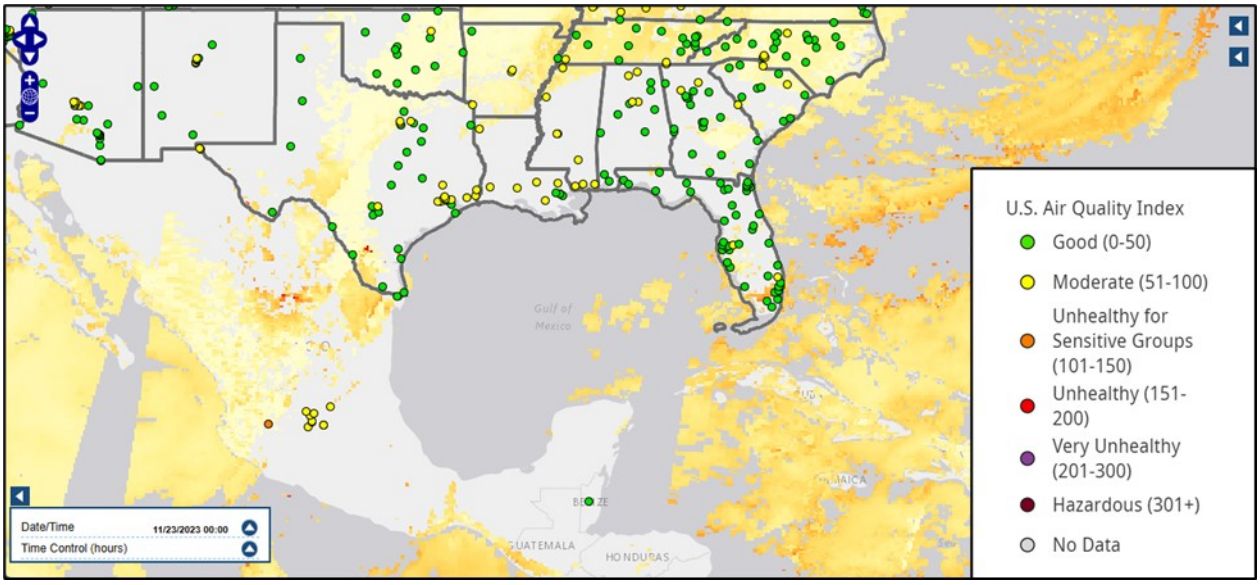

Figure 3-22: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on November 23, 2023

Figure 3-23: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on November 23, 2023

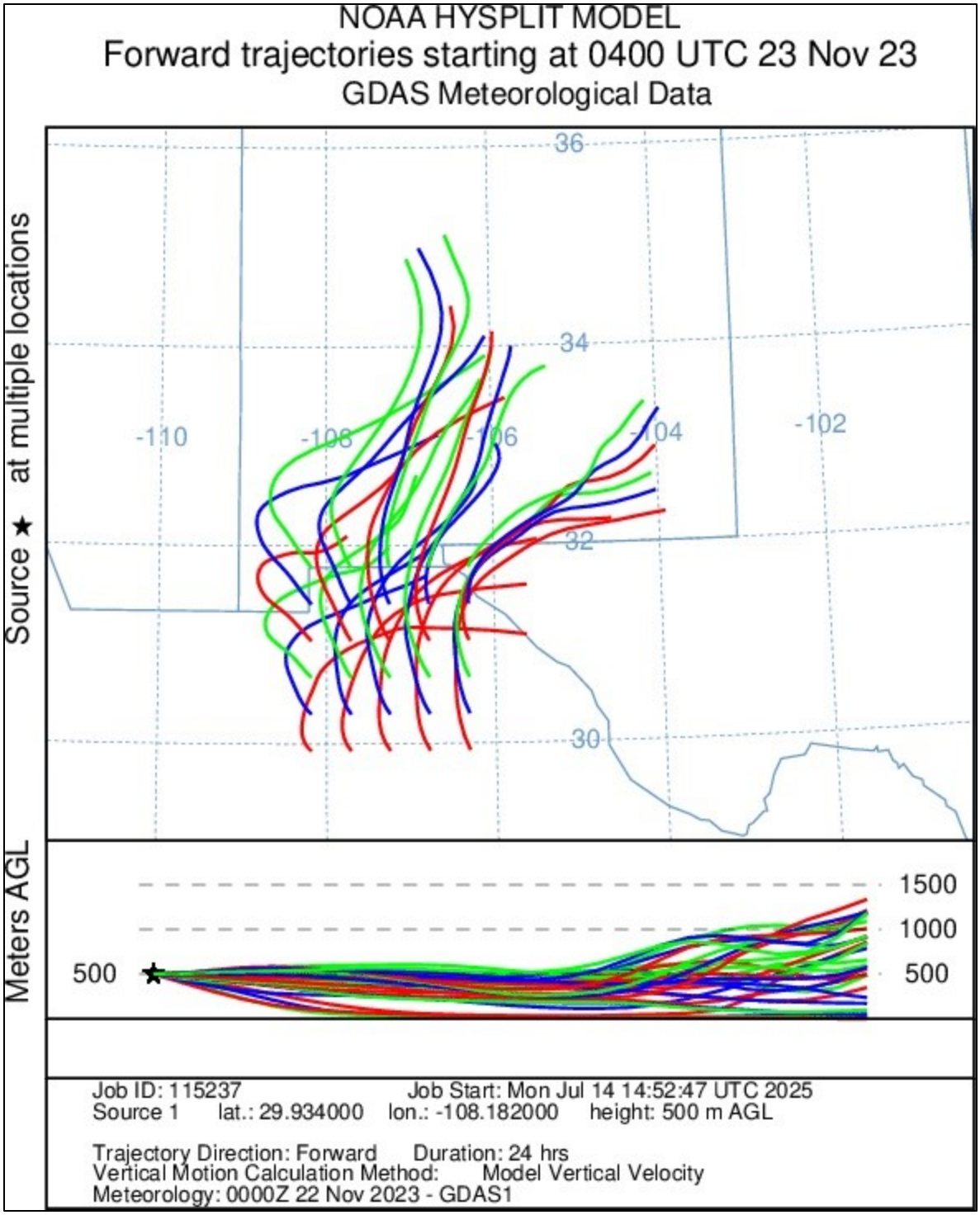

Figure 3-24: NOAA HYSPLIT 24-Hour Forward Trajectories Originating from in Mexico, Starting on November 23, 2023

3.2.7 Group 7 – Evidence for December 31, 2023, Fireworks $PM_{2.5}$ Event

December 31, 2023, is identified as a Tier 2 fireworks event day at the El Paso Chamizal monitor (24-hour average concentration 28.5 µg/m3; one-hour daily maximum 86.2 µg/m3 recorded at 01:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with New

Year's Eve fireworks. Hourly concentrations on December 31, 2023, can be compared against typical/non-event days in Figure 3-25: *Hourly $PM_{2.5}$ Concentrations on December 31, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

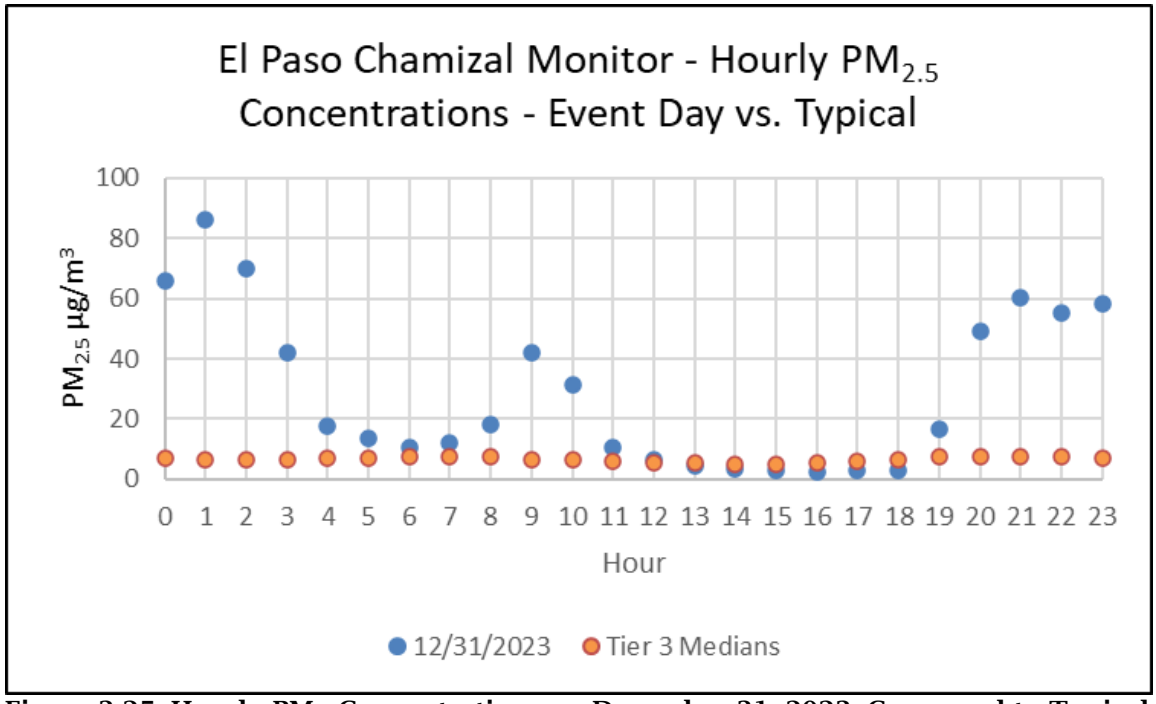

Figure 3-25: Hourly $PM_{2.5}$ Concentrations on December 31, 2023, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for December 31, 2023, mention likely heavy local smoke from New Year's Eve fireworks celebrations, which would have air quality fluctuating throughout the day (Table C-7). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration showed slow circulating winds traveling from Utah, Colorado, or Arizona and traveling to northern Mexico before doubling back to the El Paso Chamizal monitor (Figure 3-26: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on December 31, 2023*). HYSPLIT forward trajectories show winds slowly circulating in the El Paso region (Figure 3-27: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from El Paso with Fireworks, Starting on December 28, 2023).* Because $PM_{2.5}$ from fireworks is locally sourced, the longer range trajectories are less relevant from a transport standpoint. However, indications in the trajectories that wind speeds were slow and circulating, provides evidence that the El Paso area would be poorly ventilated on this date, and smoke plumes could accumulate prior to wind carrying the smoke out of the area.

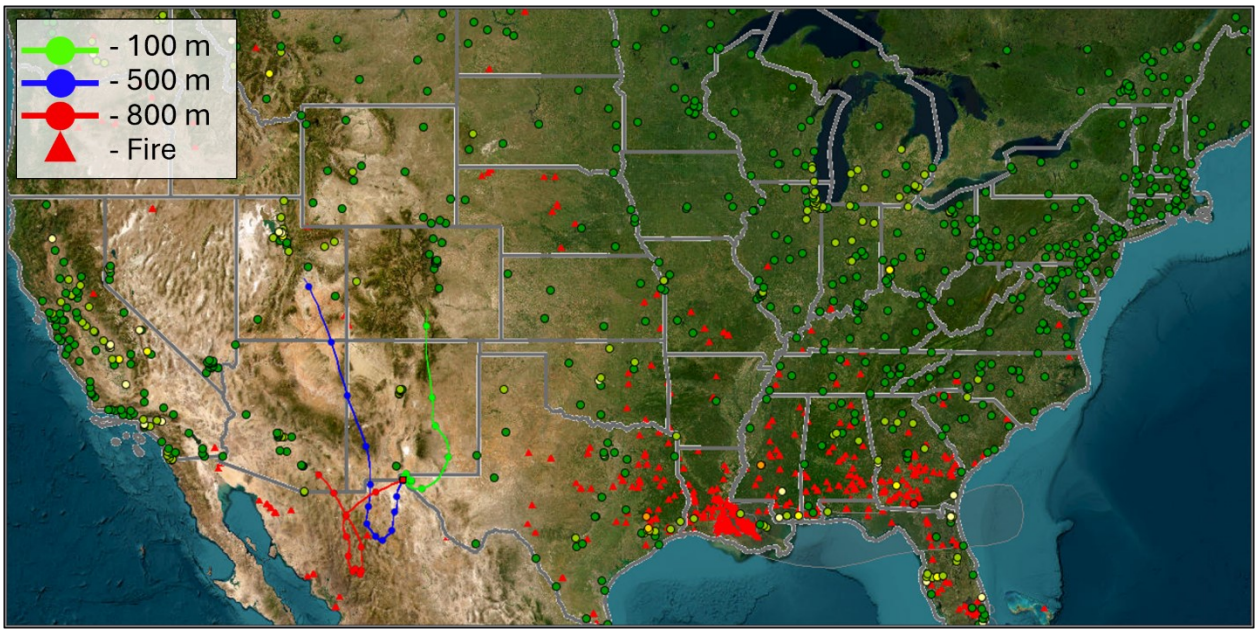

Figure 3-26: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on December 31, 2023

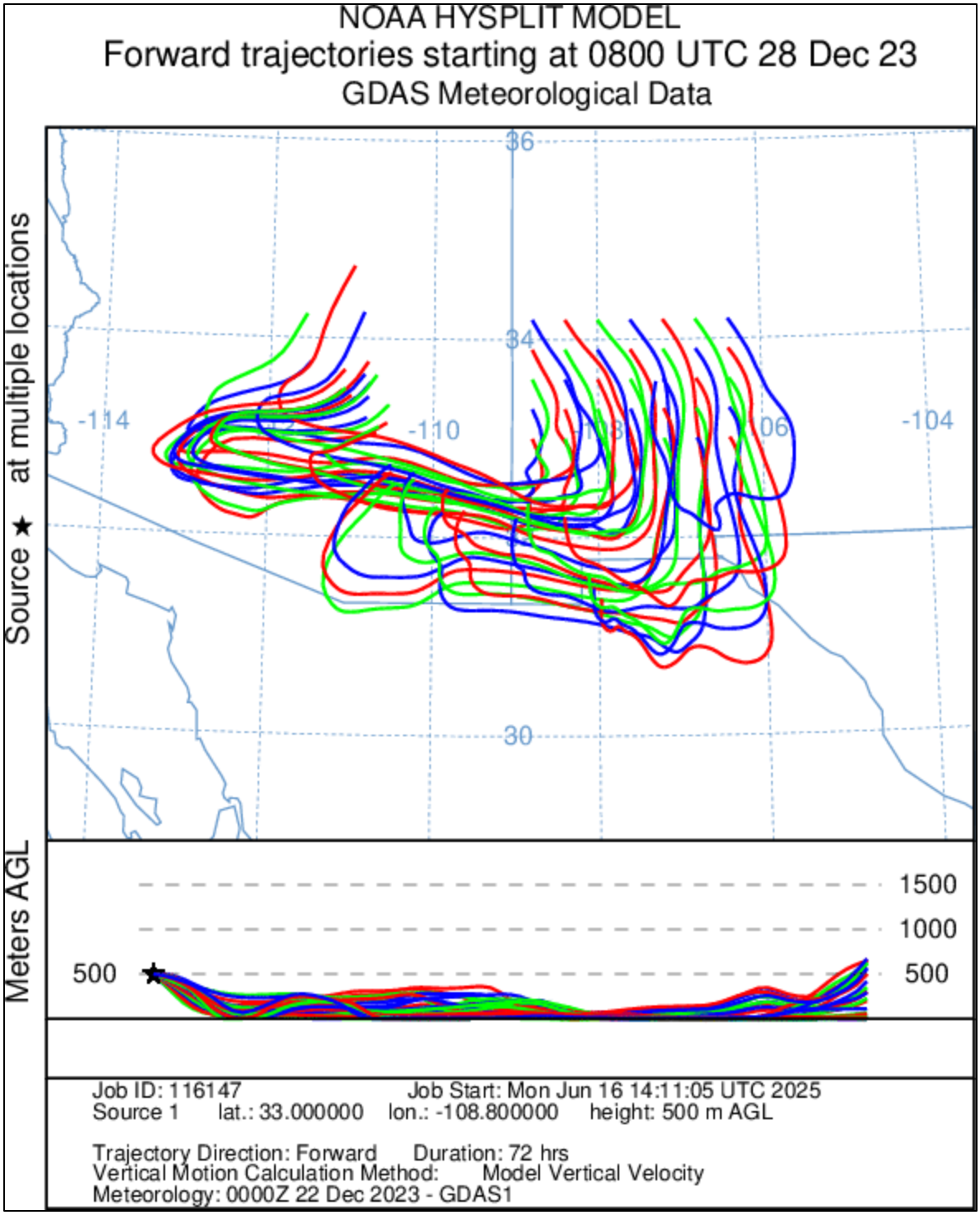

Figure 3-27: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from El Paso with Fireworks, Starting on December 28, 2023

3.2.8 Group 8 – Evidence for January 7, 2024, High Wind $PM_{2.5}$ Event

January 7, 2024, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 31.9 µg/m^3; one-hour daily maximum 147.6 µg/m^3 recorded at 18:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event that caused blowing dust. Hourly

concentrations on January 7, 2024, can be compared against typical/non-event days in Figure 3-28: *Hourly $PM_{2.5}$ Concentrations on January 7, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

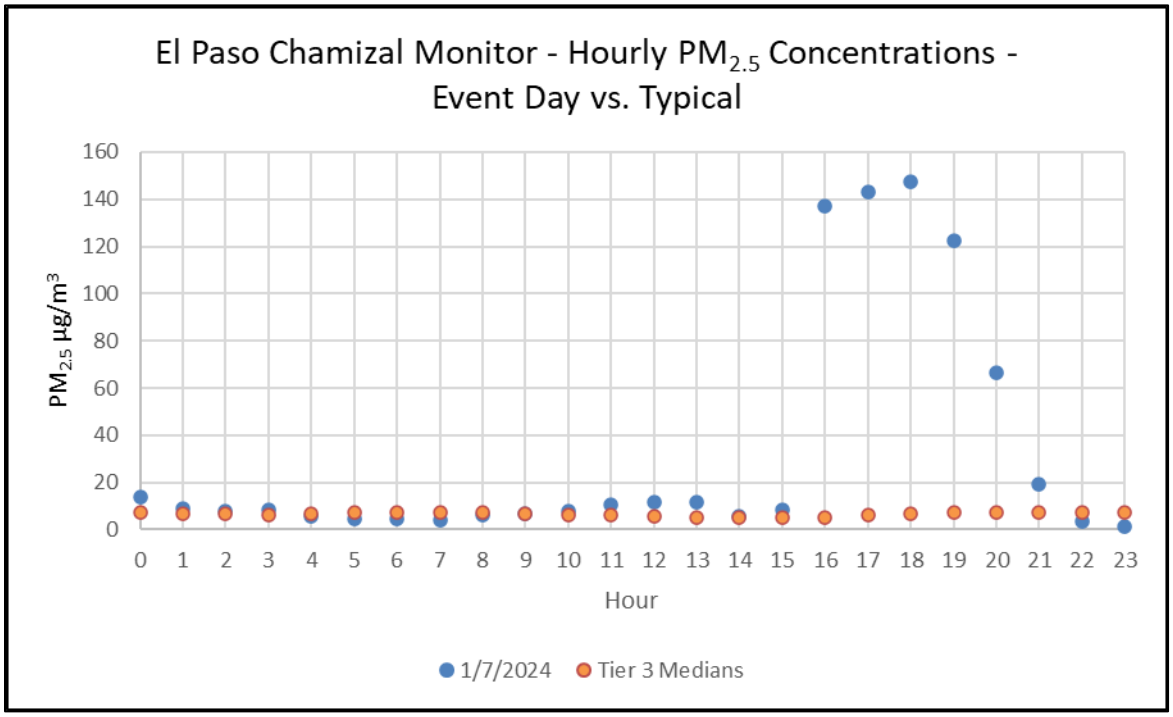

Figure 3-28: Hourly $PM_{2.5}$ Concentrations on January 7, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for January 7, 2024, reports increasing afternoon and evening winds, which may stir up patchy blowing dust and increase fine particulate levels (Table C-8). NWS archived forecasts discussed 25-35 mph winds, with likely gusts moving up to 50 mph during the afternoon (Figure B-5). Media reports corroborated these predictions by reporting high dusty winds resulting from a cold front, which prompted an air quality advisory for vulnerable groups (Figures C-9 and C-10). Satellite imagery shows an indication of dust over the El Paso area (Figure 3-29: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from January 7, 2024, Showing Dust Over the El Paso Region*). The AOD image, meanwhile, shows the presence of dust over portions of Texas with the yellow dot in El Paso denoting air quality in the moderate category (Figure 3-30: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on January 7, 2023*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show winds traveling from the Pacific Ocean to the El Paso Chamizal monitor (Figure 3-31: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 4, 2024.*

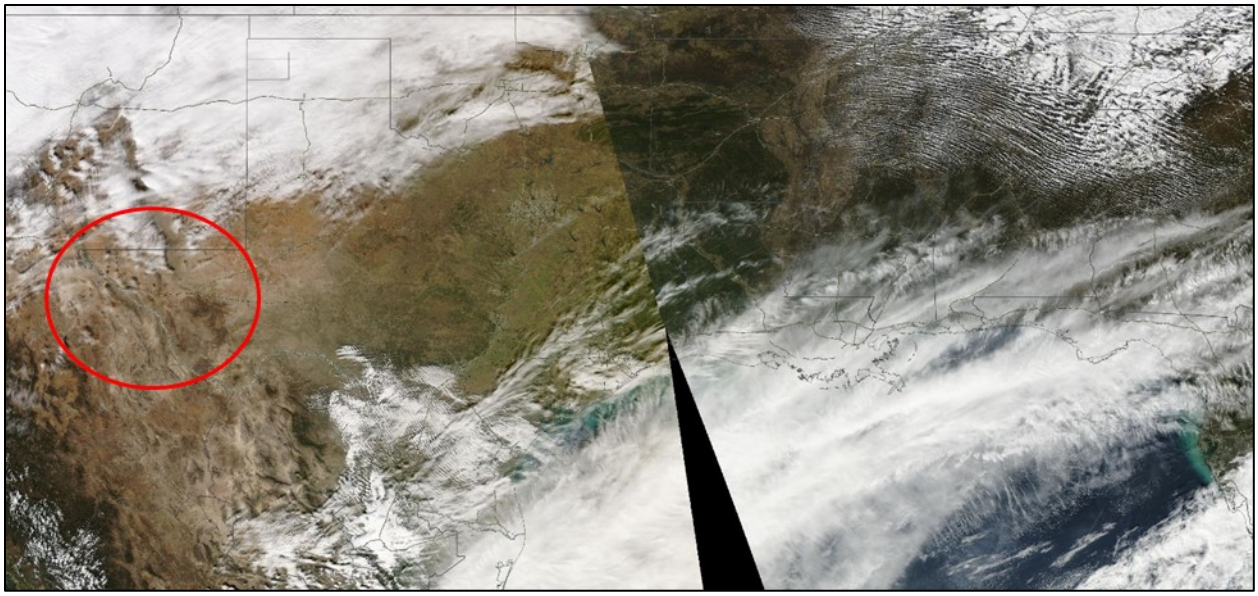

Figure 3-29: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from January 7, 2024, Showing Dust Over the El Paso Region

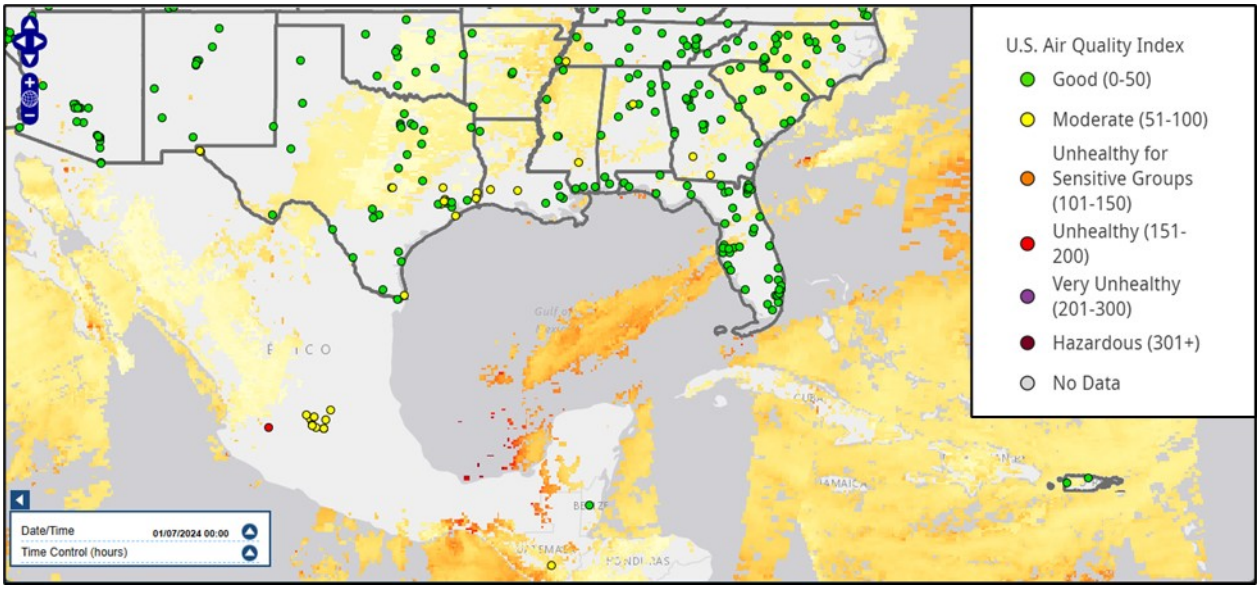

Figure 3-30: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on January 7, 2023

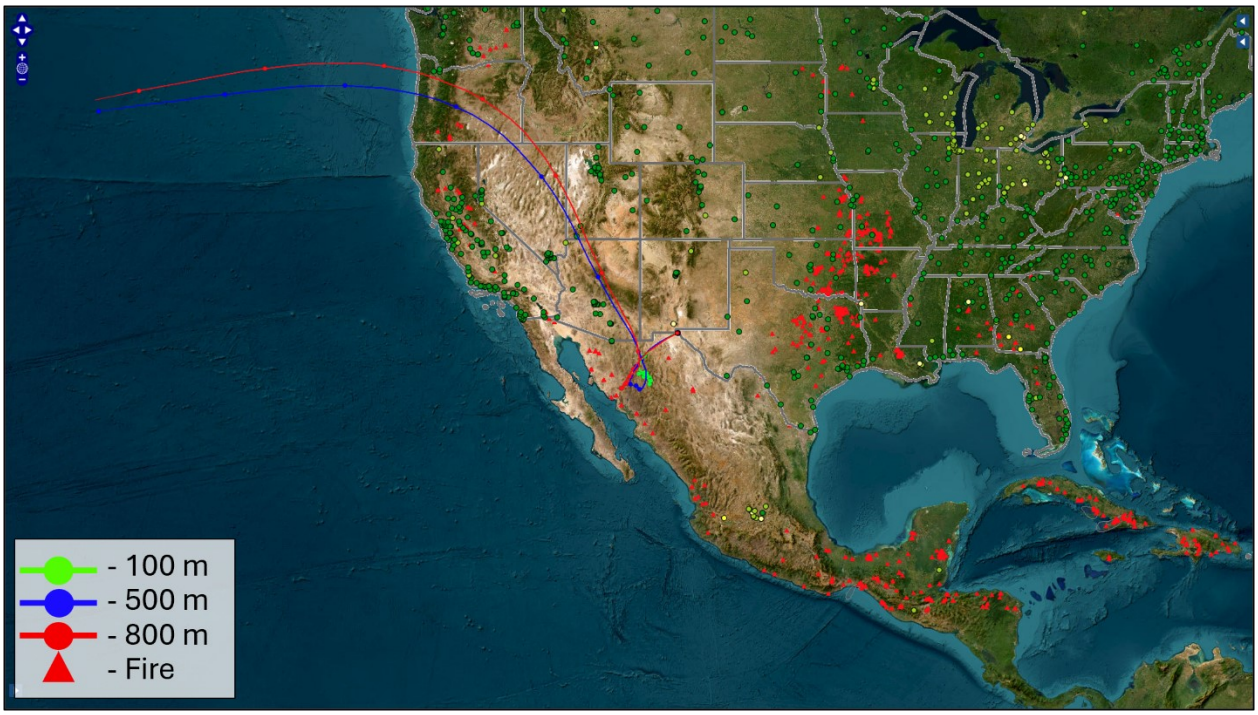

Figure 3-31: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 7, 2024

3.2.9 Group 9 – Evidence for January 11, 2024, High Wind $PM_{2.5}$ Event

January 11, 2024, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 36.9 µg/m^3; one-hour daily maximum 203.3 µg/m^3 recorded at 14:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event that caused blowing dust. Hourly concentrations on January 11, 2024, can be compared against typical/non-event days in Figure 3-32: *Hourly $PM_{2.5}$ Concentrations on January 11, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

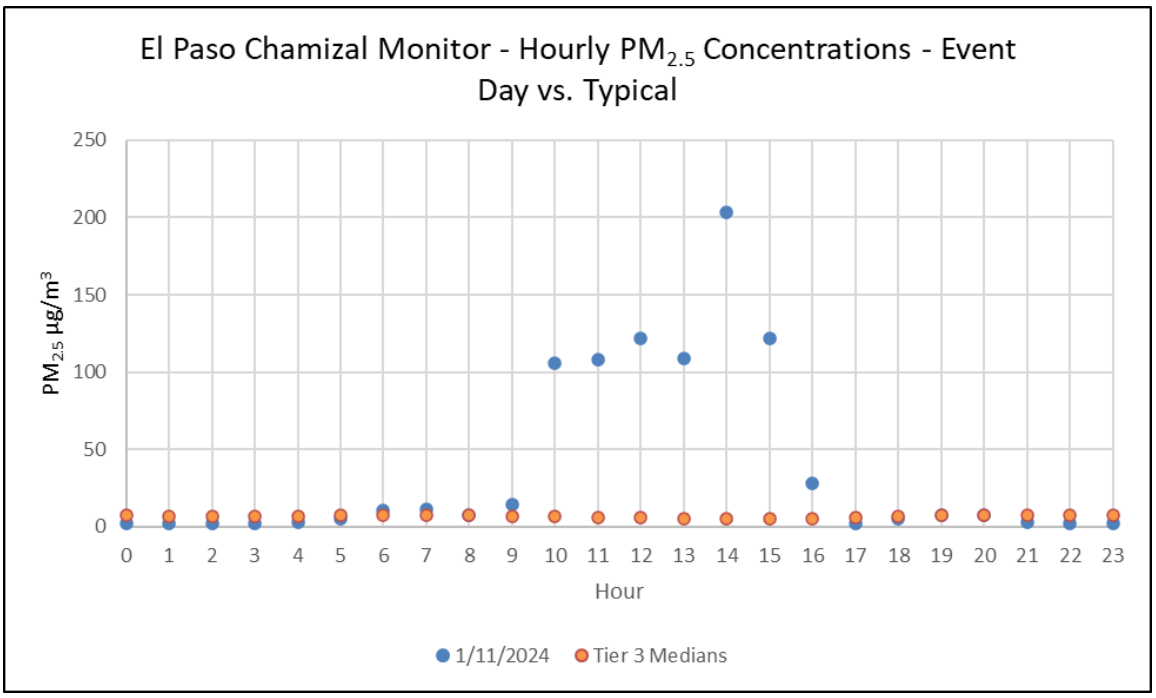

Figure 3-32: Hourly $PM_{2.5}$ Concentrations on January 11, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for January 11, 2024, reports a strong cold front and accompanying very windy conditions, which were expected to generate and transport blowing dust from the Permian Basin, northern Chihuahua, and southern New Mexico. Reportedly, these conditions may significantly elevate $PM_{2.5}$ levels (Table C-9). NWS archived discussions reported a powerful winter storm system bringing strong, damaging winds, widespread blowing dust, and reduced visibility in the El Paso area (Figure B-6). Media reports corroborated these predictions by reporting the effects of severe winds, including significant damage such as ripped-off roofs and displaced residents (Figures C-11 and C-12). Satellite imagery shows streaks of blowing dust over the El Paso area (Figure 3-33*: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from January 11, 2024, Showing Dust Over the El Paso Region*). The AOD image, meanwhile, shows the presence of dust over portions of Texas with the orange dot in El Paso denoting air quality in the Unhealthy for Sensitive Groups category (Figure 3-34: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on* January 11, 2024). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show fast winds traveling from northern Mexico prior to reaching the El Paso Chamizal monitor (Figure 3-35: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal* Monitor on January 11, 2024).

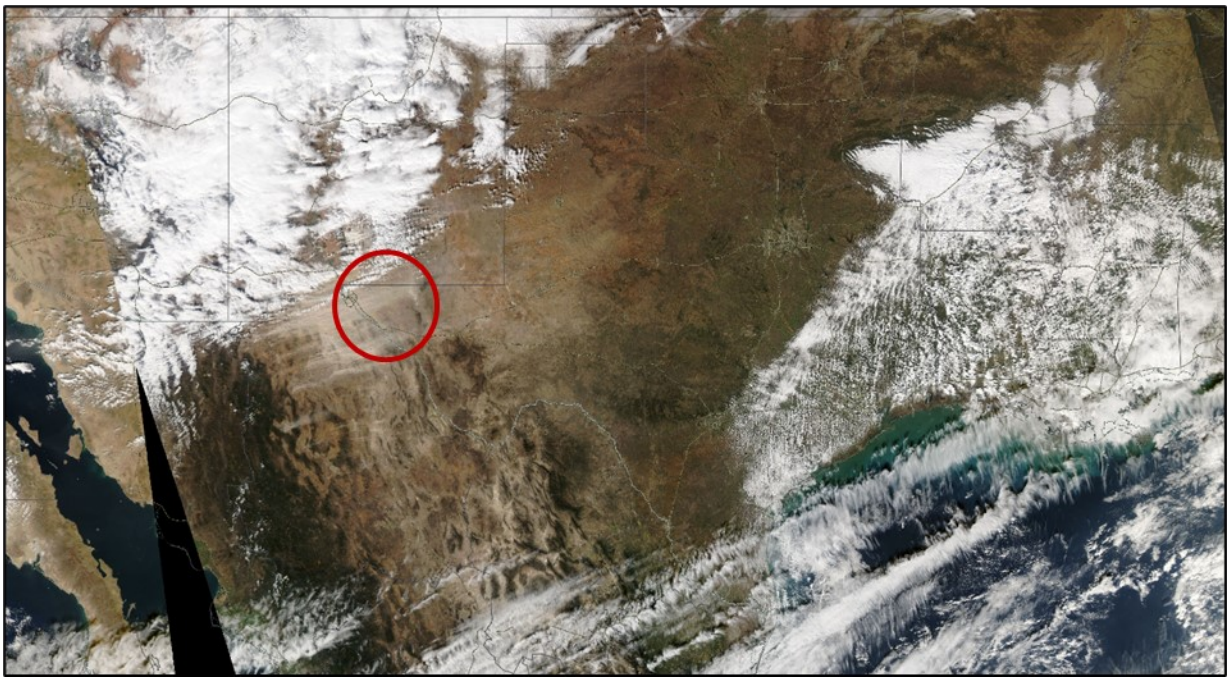

Figure 3-33: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from January 11, 2024, Showing Dust Over the El Paso Region

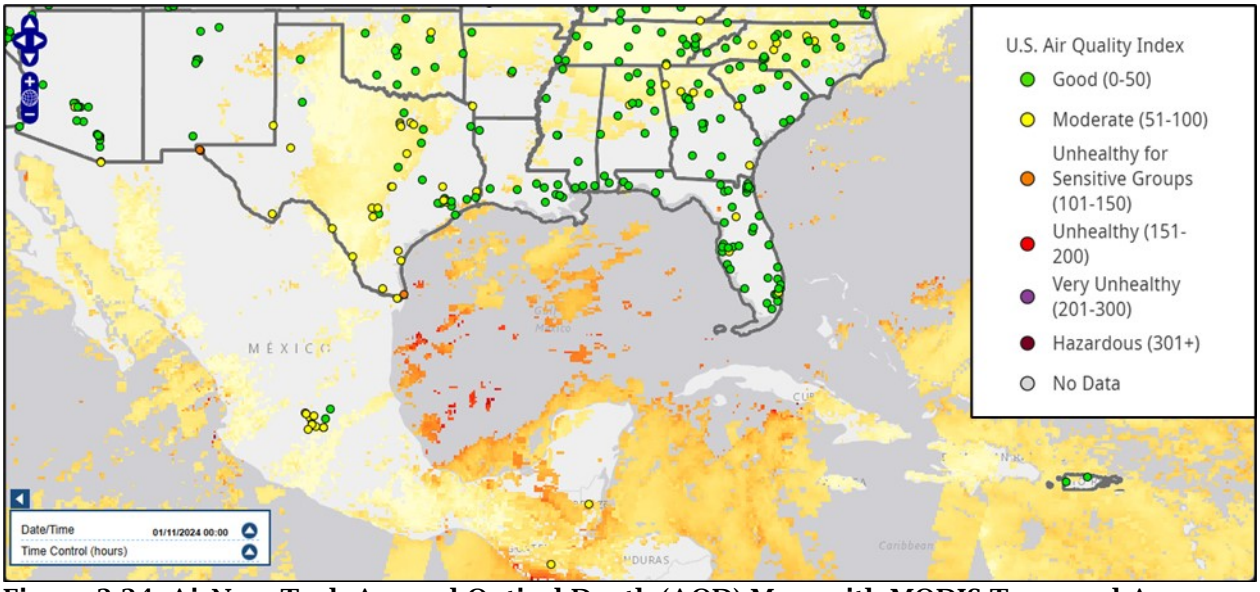

Figure 3-34: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on January 11, 2024

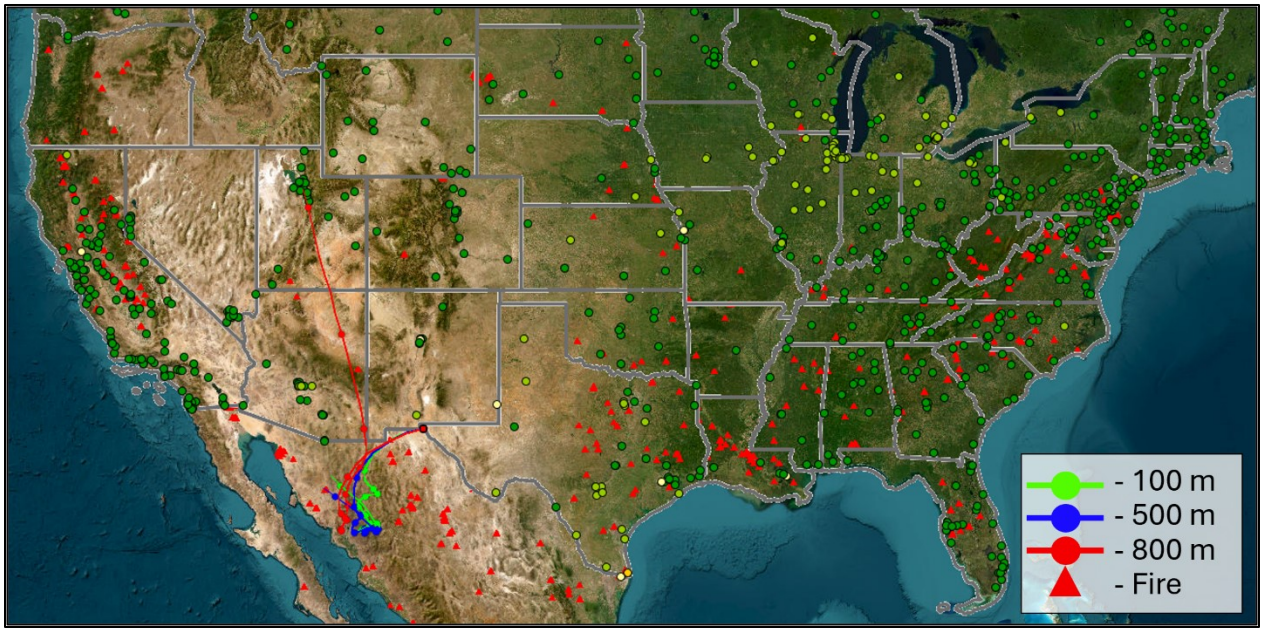

Figure 3-35: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on January 11, 2024

3.2.10 Group 10 – Evidence for February 28, 2024, Wildfire – U.S. $PM_{2.5}$ Event

February 28, 2024, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 33.0 µg/m³; one-hour daily maximum 111.9 µg/m³ recorded at 11:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a U.S. wildfire event in the Texas Panhandle. Hourly concentrations on February 28, 2024, can be compared against typical/non-event days in Figure 3-36: *Hourly $PM_{2.5}$ Concentrations on February 28, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

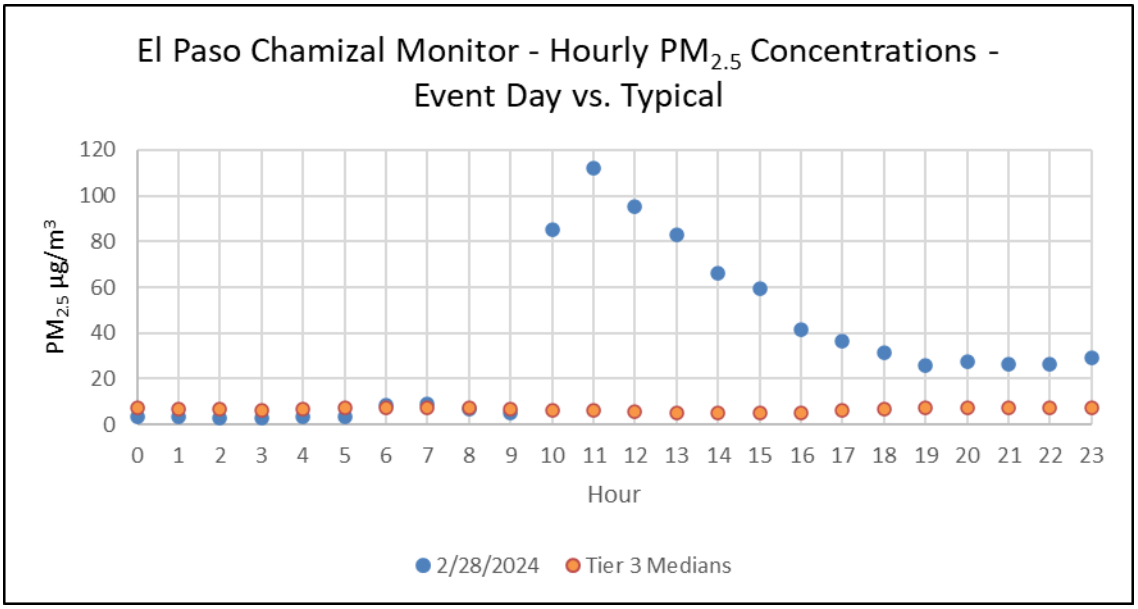

Figure 3-36: Hourly $PM_{2.5}$ Concentrations on February 28, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for February 28, 2024, report some lingering dust from the previous day (sustained, hourly wind speeds of greater than 25 mph were recorded in El Paso on February 27, 2024) combined with elevated fine particulate levels from regional wildfire smoke. (Table C-10). NWS archived discussions reported very windy conditions that may blow dust in the El Paso area (Figure B-7). Media reports confirm that El Paso experienced strong winds and widespread haze, with smoke from wildfires in the Texas Panhandle significantly impacting local air quality. High wind warnings were issued for parts of El Paso, and smoke blown in from large-scale wildfires from the north prompted air quality alerts. Residents reported hazy skies and breathing discomfort across the Texas-Mexico border area (Figure C-13). HMS smoke plume mapping showed some smoke around southern Mexico and the Gulf of America (Figure 3-37: *AirNow HMS Smoke Plume for February 28, 2024*). Figure 3-38: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on February 28, 2024*, shows that backward wind trajectories were initiated at 17:00 local time, which was close to when $PM_{2.5}$ concentrations began leveling off after having peaked at 11:00 and steadily descended thereafter. In Figure 3-37, the lowest-level trajectory can be seen traveling through fires in the Texas Panhandle and traveling to the El Paso Chamizal monitor. The trajectories from higher altitudes traveled from the west and shifted to northwesterly flow along the Texas-Mexico border. Figure 3-38: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on February 28, 2024* shows that winds traveled south and shifted to the west, which would have distributed smoke to the vicinity of El Paso.

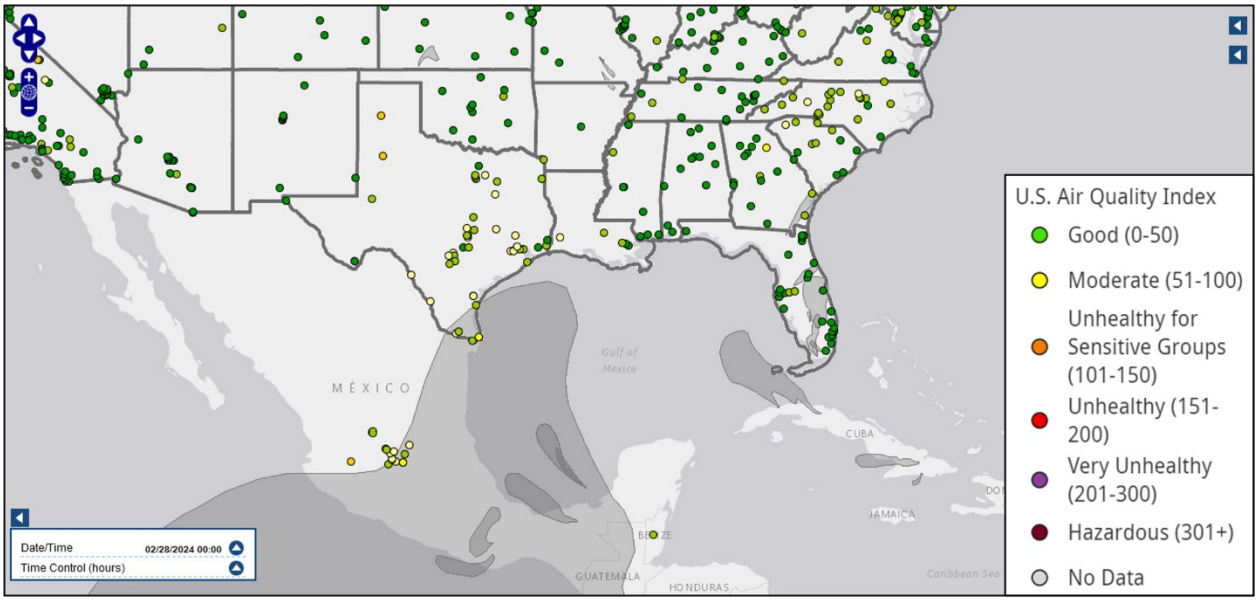

Figure 3-37: AirNow HMS Smoke Plume for February 28, 2024

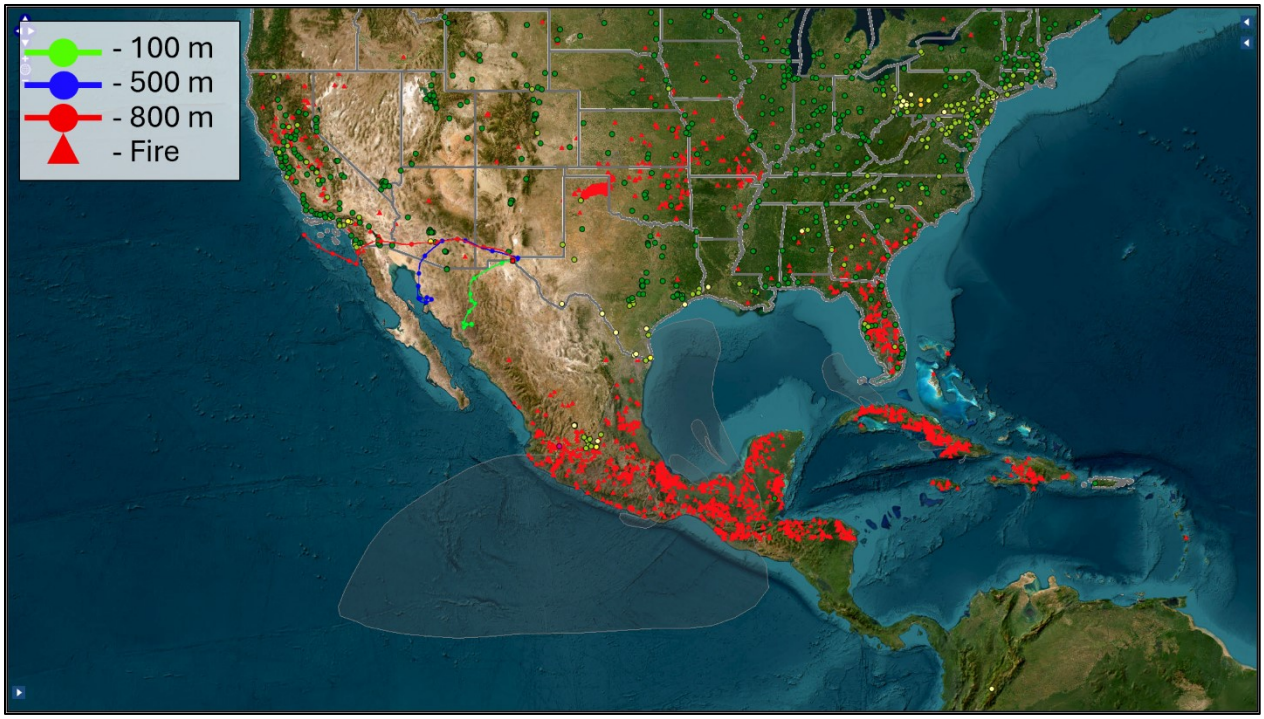

Figure 3-38: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on February 28, 2024

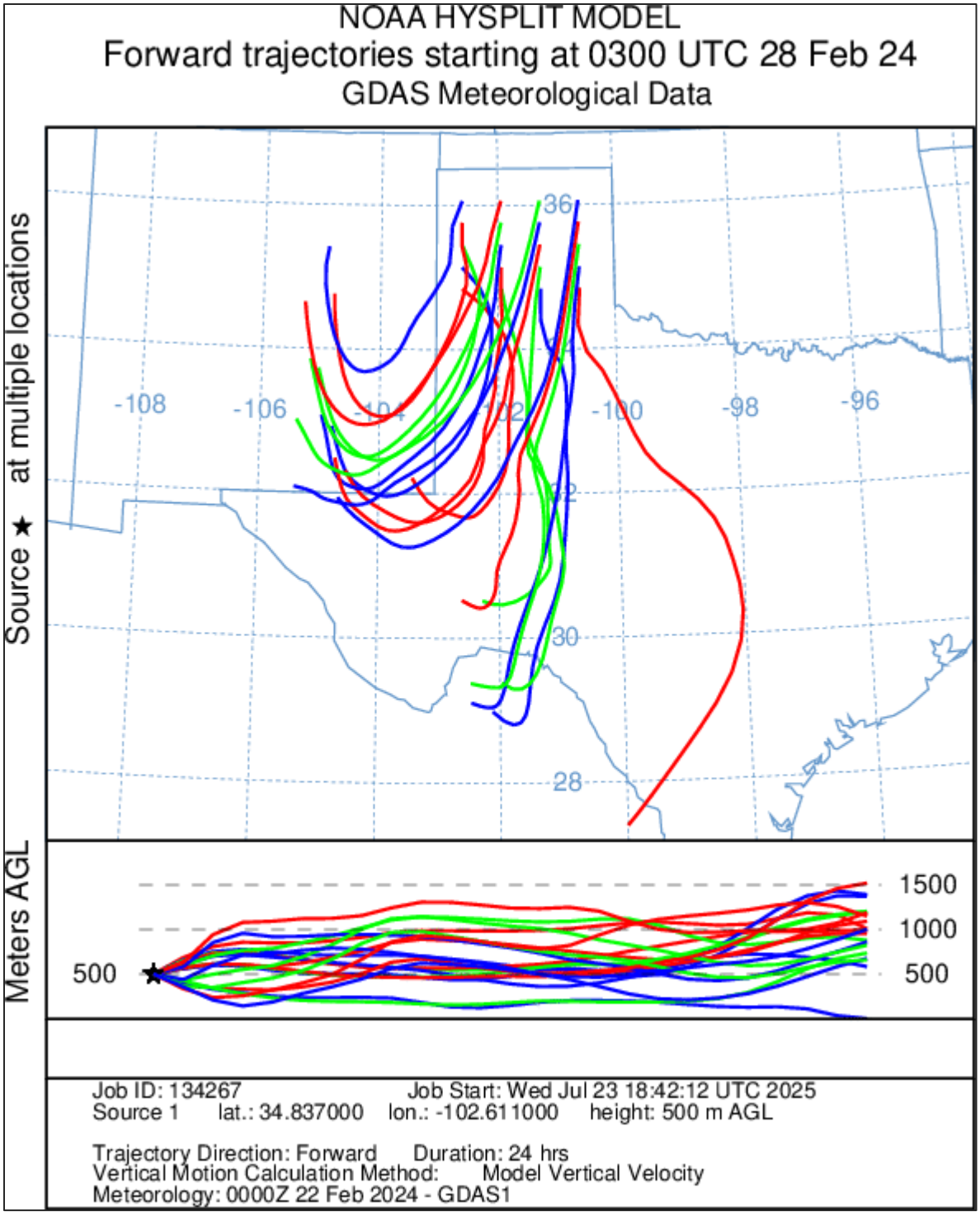

Figure 3-39: Figure 3-38: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the Texas Panhandle on February 28, 2024

3.2.11 Group 11 – Evidence for March 24, 2024, High Wind $PM_{2.5}$ Event

March 24, 2024**,** is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 48.1 µg/m^3; one-hour daily maximum 117.1 µg/m^3 recorded at 15:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event that resulted in blowing dust.

Hourly concentrations on March 24, 2024, can be compared against typical/non-event days in Figure 3-40: *Hourly $PM_{2.5}$ Concentrations on March 24, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

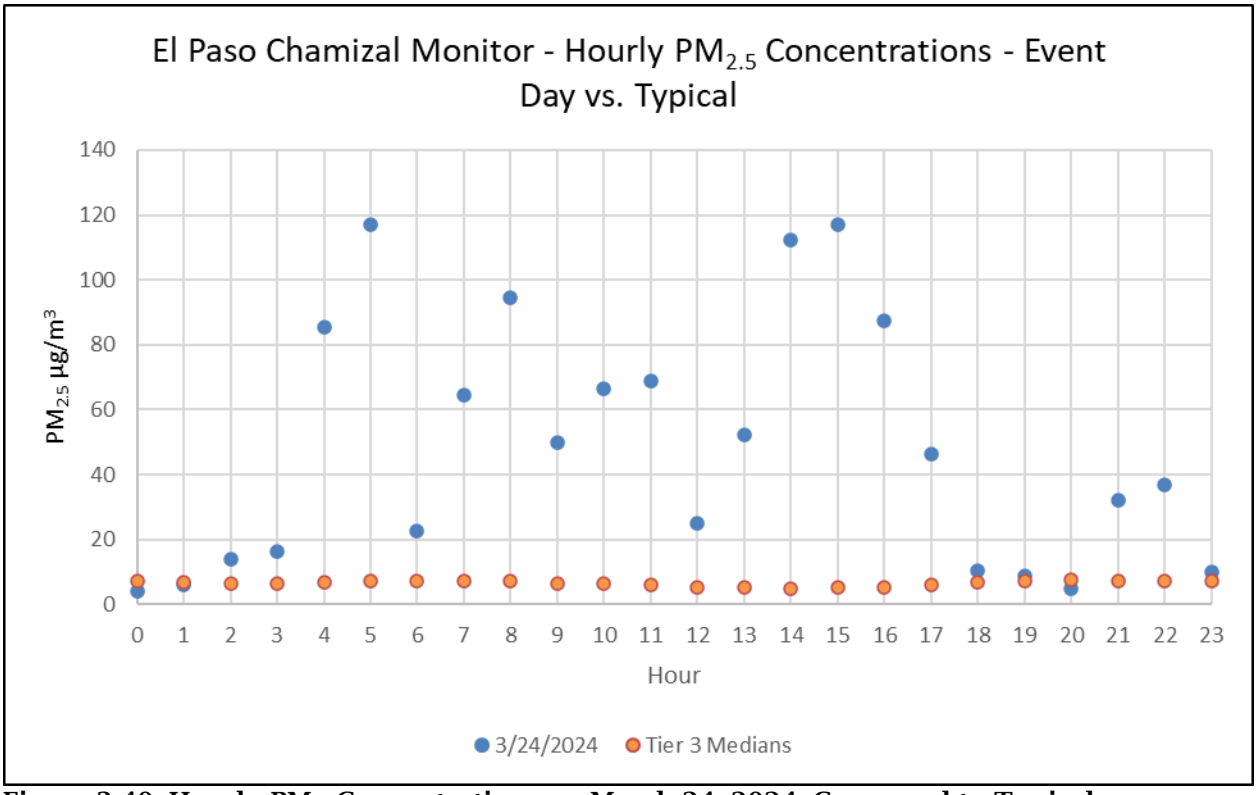

Figure 3-40: Hourly $PM_{2.5}$ Concentrations on March 24, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for March 24, 2024, reported that strong daytime winds were expected to transport dust from southern New Mexico and northern Mexico and combine with preexisting suspended dust in the region. As such, overall $PM_{2.5}$ concentrations were likely to be increased, with the possibility of short-term spikes in concentrations throughout the day (Table C-11). NWS archived discussions reported multiple active dust plumes in the El Paso area, and wind gusts of up to 60 mph (Figure B-8). Media reports corroborated these predictions by reporting strong-to-damaging winds and widespread blowing dust in the region. These dust storms reduced visibility and led to deteriorated air quality throughout the day, leading to the issuance of high wind warnings with elevated fire weather concerns, particularly east of the Franklin Mountains (Figures C-14 and C-15). Satellite imagery shows dust over the El Paso area (Figure 3-41: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 24, 2024, Showing Smoke/Dust Over the El Paso Region*). The AOD image shows the presence of dust over portions of Texas with the orange dot in El Paso denoting air quality in the Unhealthy for Sensitive Groups category (Figure 3-42: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on March 24, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show fast winds traveling from the Pacific Ocean through northern Mexico to the El Paso Chamizal monitor (Figure 3-43: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on March 24, 2024).*

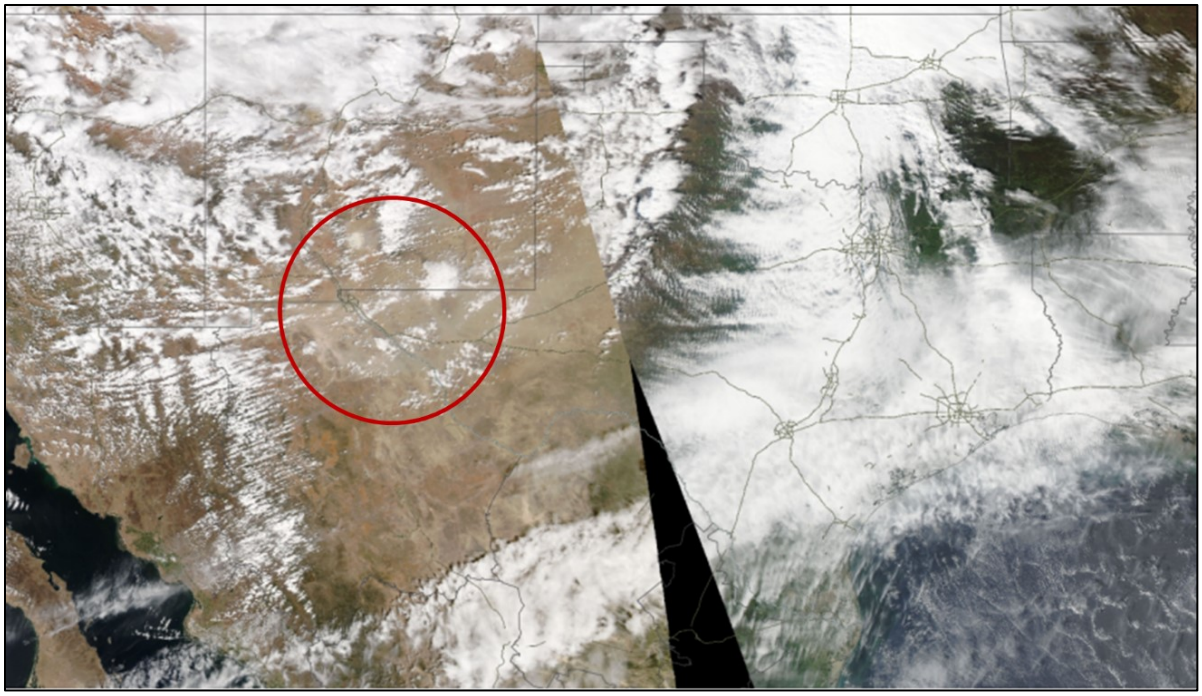

Figure 3-41: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 24, 2024, Showing Smoke/Dust Over the El Paso Region

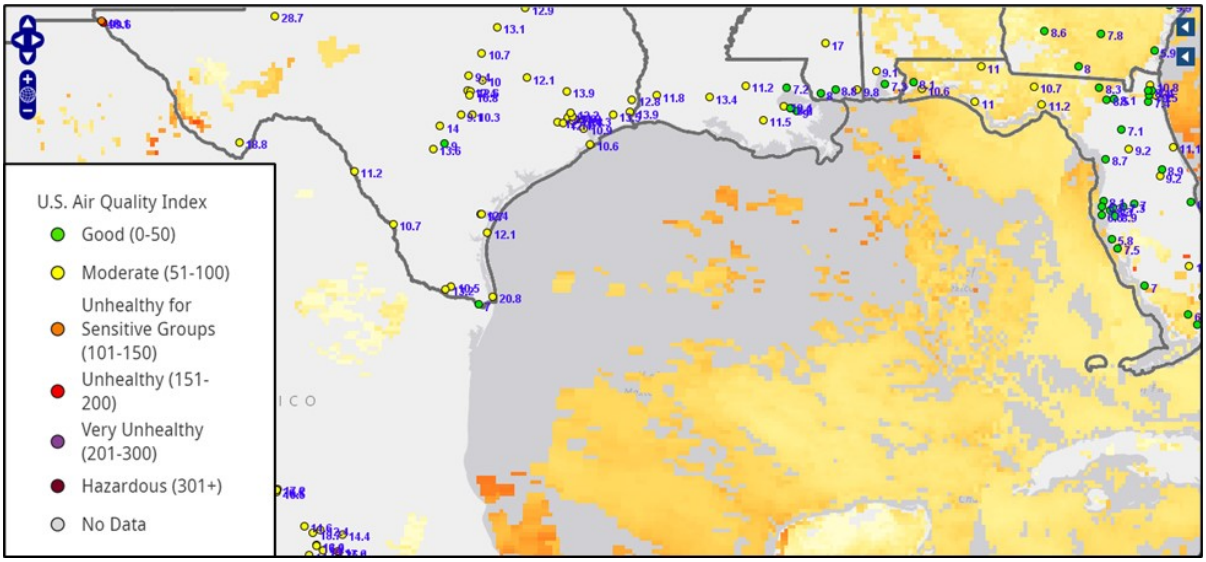

Figure 3-42: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on March 24, 2024

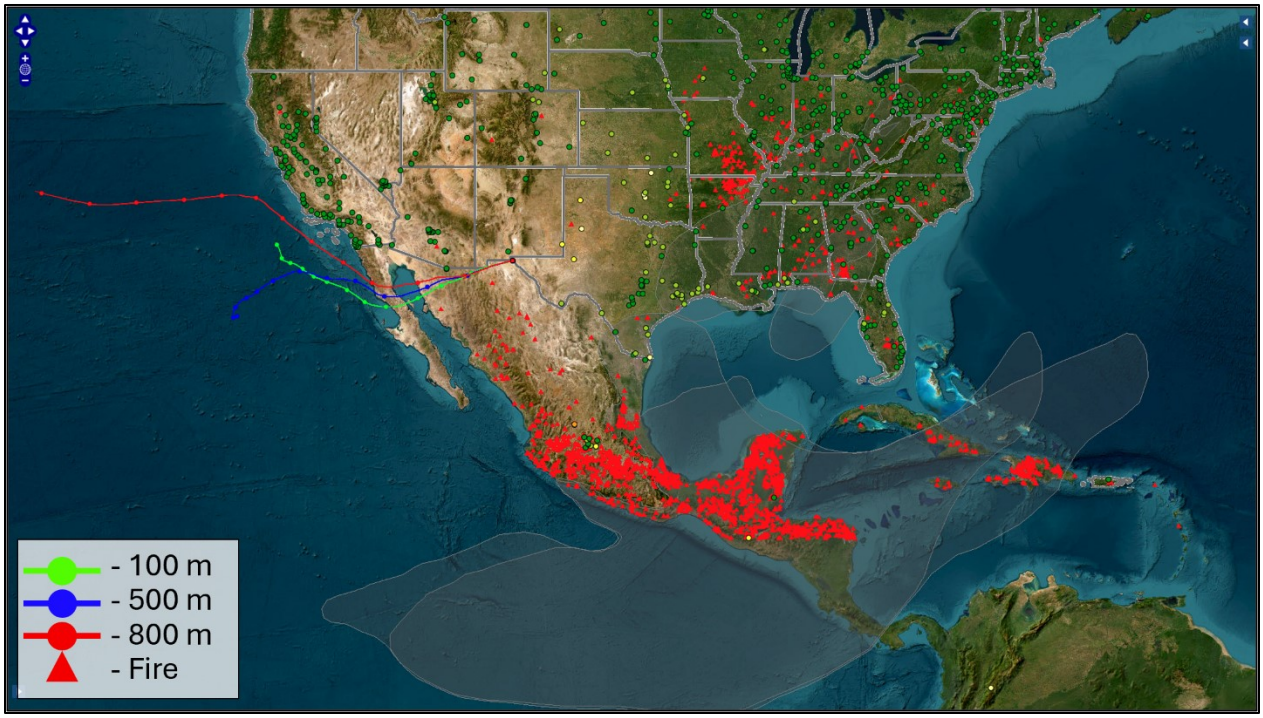

Figure 3-43: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on March 24, 2024

3.2.12 Group 12 – Evidence for March 31, 2024, High Wind $PM_{2.5}$ Event

March 31, 2024, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 36.7 µg/m^3; one-hour daily maximum 183.3 µg/m^3 recorded at 17:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high-wind event that caused blowing dust. Hourly concentrations on March 31, 2024, can be compared against typical/non-event days in Figure 3-44: *Hourly $PM_{2.5}$ Concentrations on March 31, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

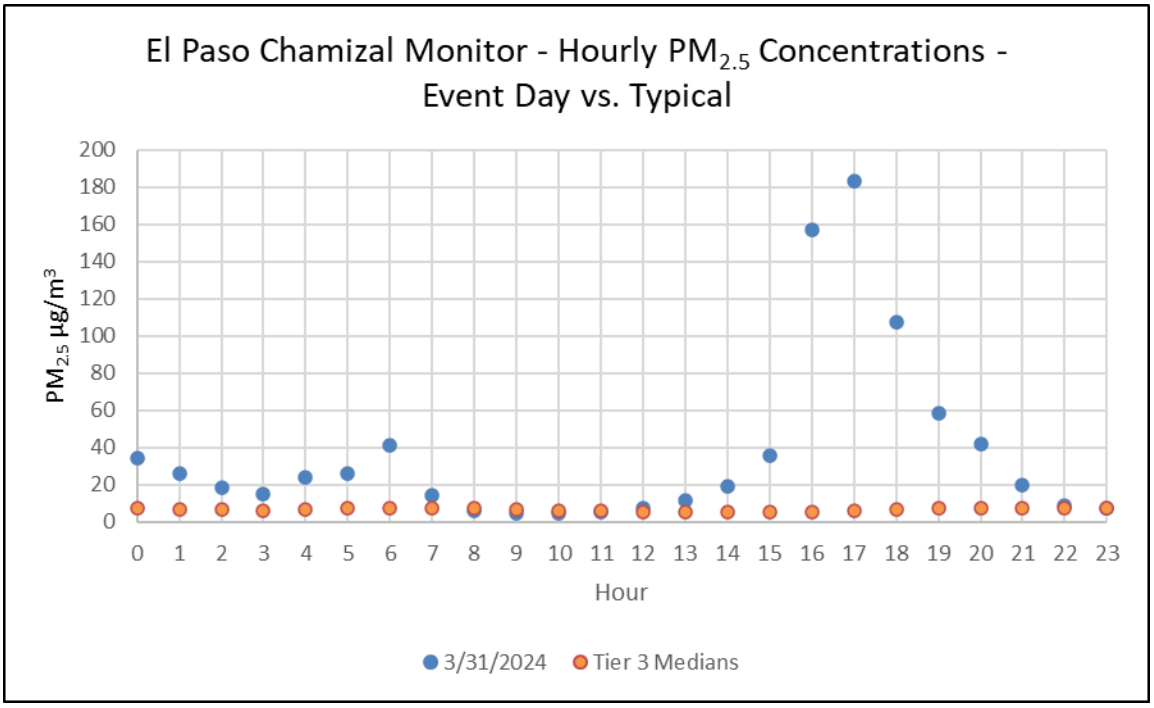

Figure 3-44: Hourly $PM_{2.5}$ Concentrations on March 31, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

TCEQ forecasts for March 31, 2024, referenced that winds blew dust that was transported out of southern New Mexico and northern Mexico, (Table C-12). NWS archived forecasts discussed blowing dust that would reduce visibility to 3-5 miles (Figure B-9). The AOD image appears incomplete as it does not show the presence of dust over Texas despite much evidence to the contrary, and the orange dot in El Paso denotes air quality in the Unhealthy for Sensitive Groups category. (Figure 3-45: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on March 31, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ show that winds passed through desert regions of northern Mexico before reaching the El Paso Chamizal monitor (Figure 3-46: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on March 31, 2024).*

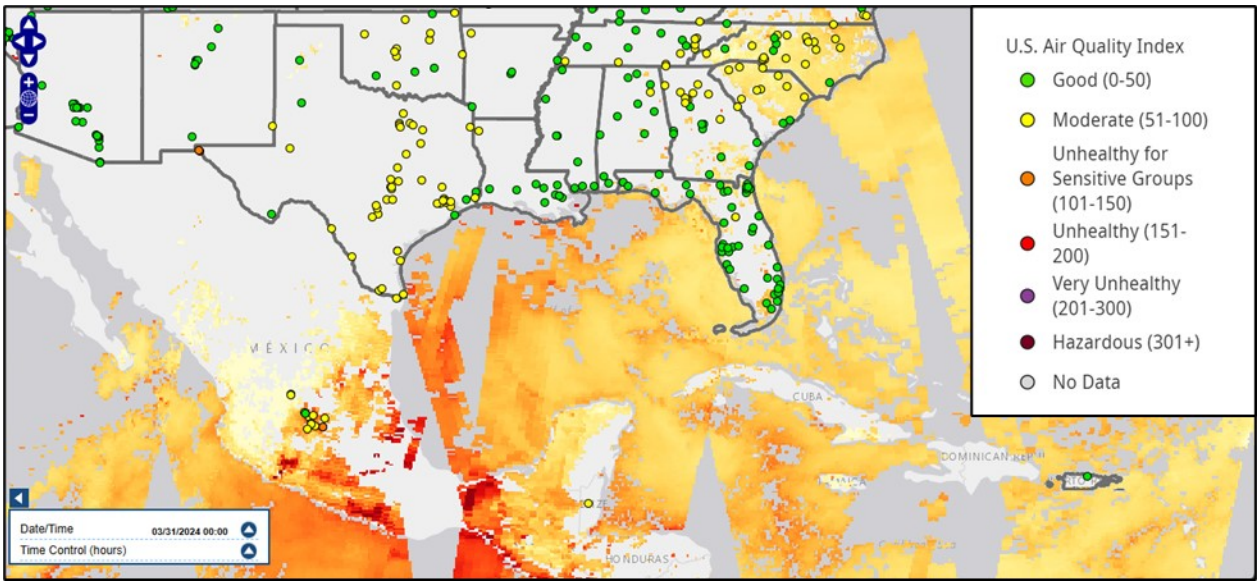

Figure 3-45: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on March 31, 2024

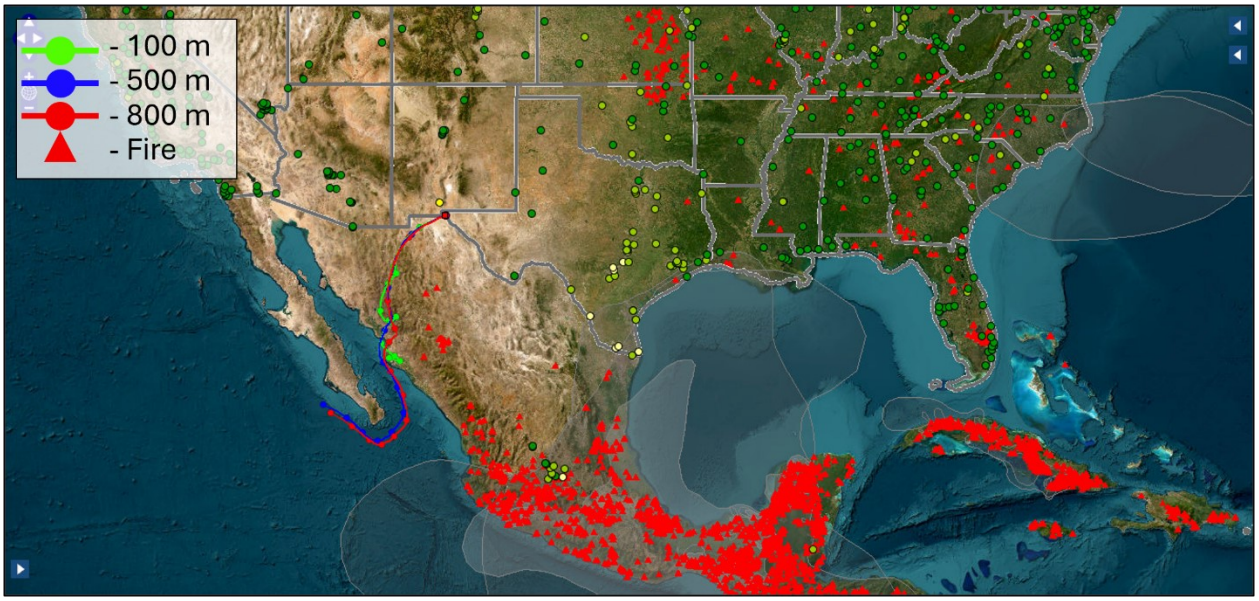

Figure 3-46: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on March 31, 2024

3.2.13 Group 13 – Evidence for April 15, 2024, High Wind $PM_{2.5}$ Event

April 15, 2024**,** is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 29.2 µg/m^3; one-hour daily maximum 104.9 µg/m^3 recorded at 14:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event. Hourly concentrations on April 15, 2024, can be compared against typical/non-event days in Figure 3-47: *Hourly $PM_{2.5}$ Concentrations on April 15, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*. The sustained 5-minute wind speed at the one-hour daily maximum $PM_{2.5}$ concentration was 30.6 mph.

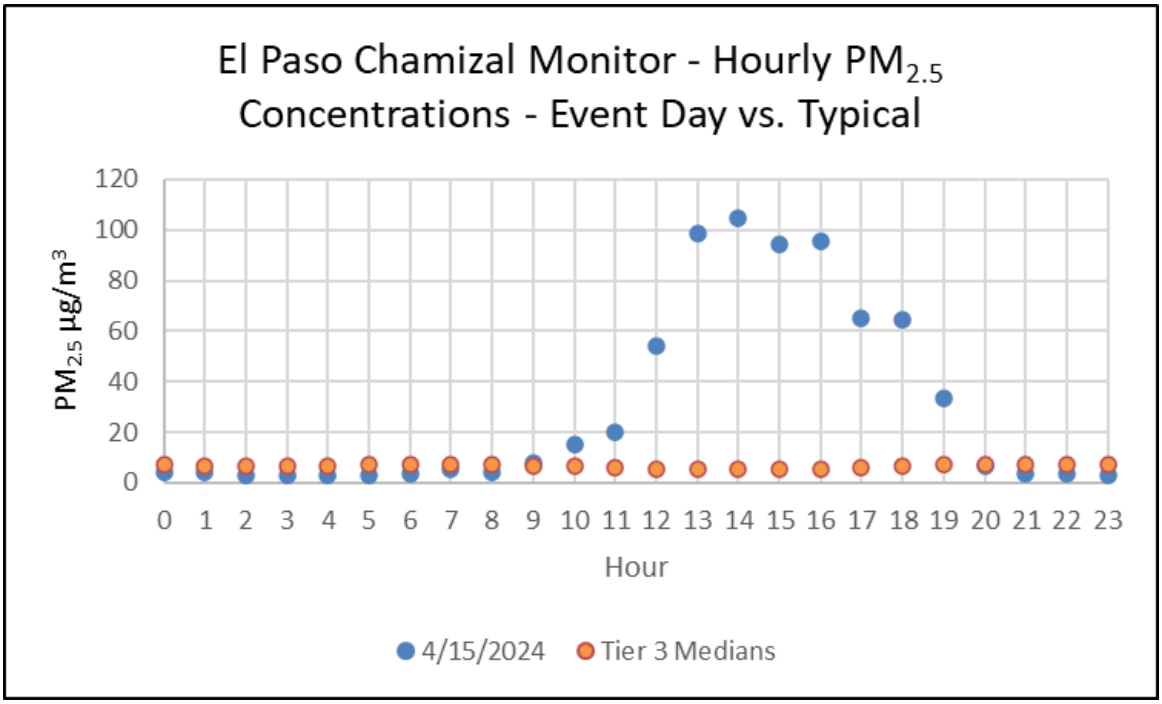

Figure 3-47: Hourly $PM_{2.5}$ Concentrations on April 15, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for January 11, 2024, reported suspended blowing dust originating from northern Chihuahua in Mexico and southern New Mexico, which was expected to affect the western third of Texas (Table C-13). NWS archived discussions reported that a passing Pacific storm system would deliver a dry, windy, and dusty day, with winds up to 40 mph blowing dust in the El Paso area. These conditions would be exacerbated by a lack of precipitation, which made the terrain dry and easily moved, which is why a Blowing Dust Advisory was issued (Figure B-10).

The AOD image appears incomplete as it does not show the presence of dust over Texas despite much evidence to the contrary, and the yellow dot in El Paso denotes air quality in the Moderate category (Figure 3-48: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on April 15, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show fast winds traveling from the Pacific Ocean through northern Mexico to the El Paso Chamizal monitor (Figure 3-49: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on April 15, 2024).*

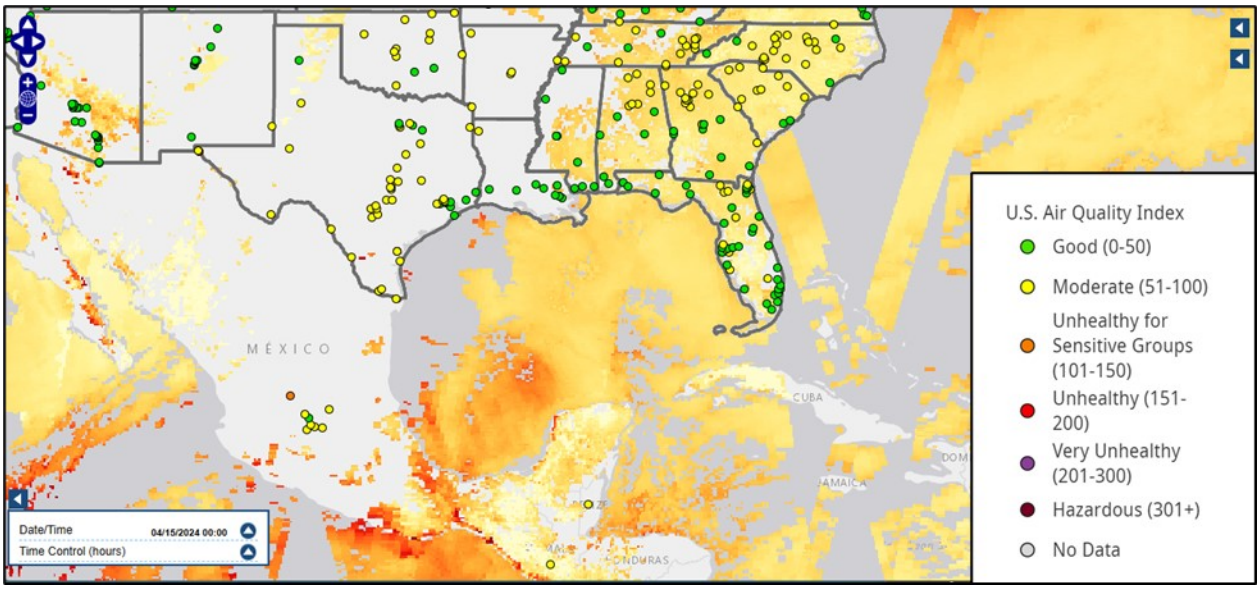

Figure 3-48: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on April 15, 2024

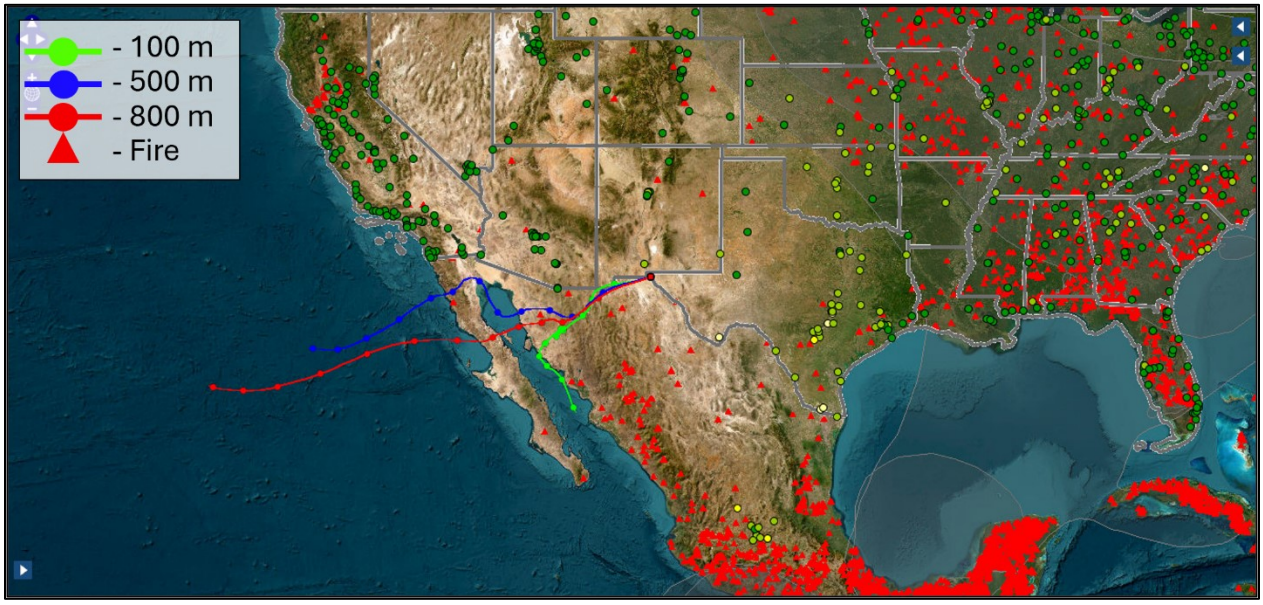

Figure 3-49: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on April 15, 2024

3.2.14 Group 14 – Evidence for April 25, 2024, High Wind $PM_{2.5}$ Event

April 25, 2024, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 25.2 µg/m^3; one-hour daily maximum 158.4 µg/m^3 recorded at 15:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event that caused blowing dust. Hourly concentrations on April 25, 2024, can be compared against typical/non-event days for the monitor in Figure 3-50: *Hourly $PM_{2.5}$ Concentrations on April 25, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

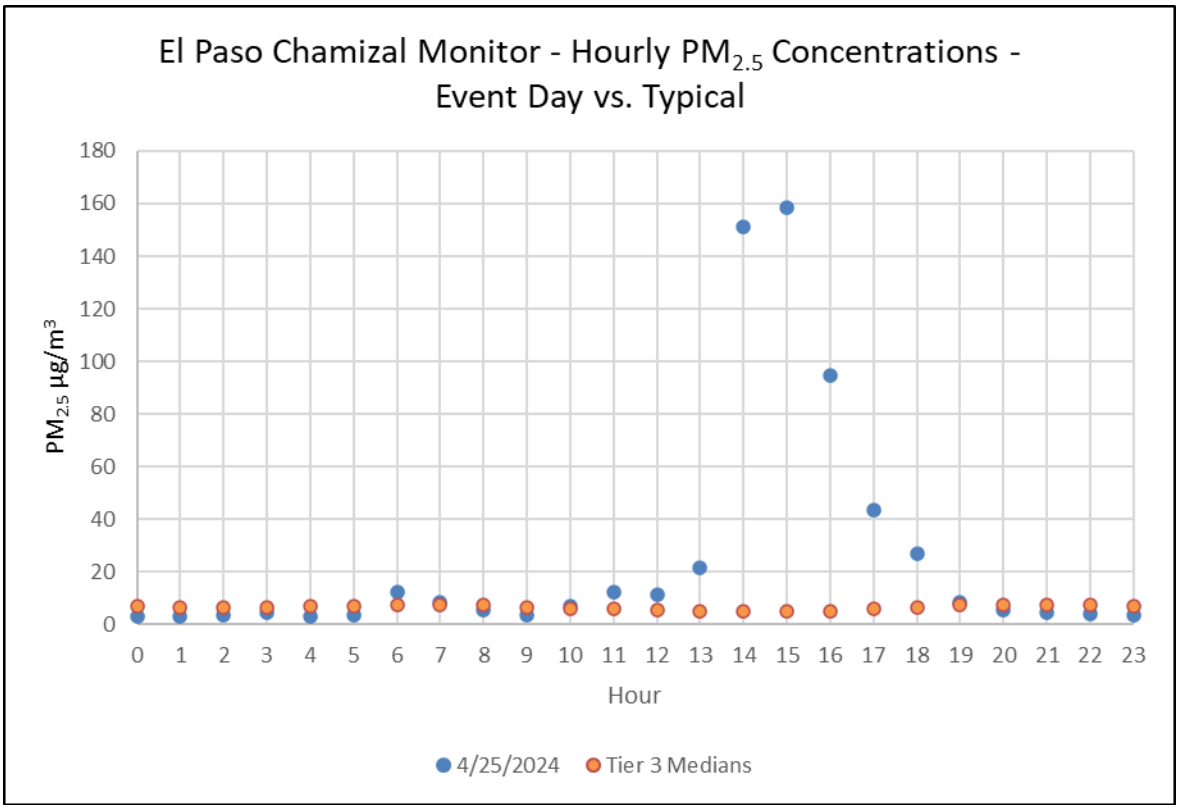

Figure 3-50: Hourly $PM_{2.5}$ Concentrations on April 25, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for April 25, 2024, reported both that higher density smoke would advect out of Mexico and cover a large portion of the state, and that breezy and gusty winds could kick up areas of patchy blowing dust across the state (Table C-14). NWS archived forecasts discuss blowing dust from northern Chihuahua in Mexico to the El Paso area (Figure B-11). The AOD image shows the presence of dust over portions of Texas, with the yellow dot in El Paso denoting air quality in the Moderate category (Figure 3-51: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on April 25, 2024).* HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ show winds passing through desert regions of northern Mexico before reaching the El Paso Chamizal monitor (Figure 3-52: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal* Monitor *on April 25, 2024*).

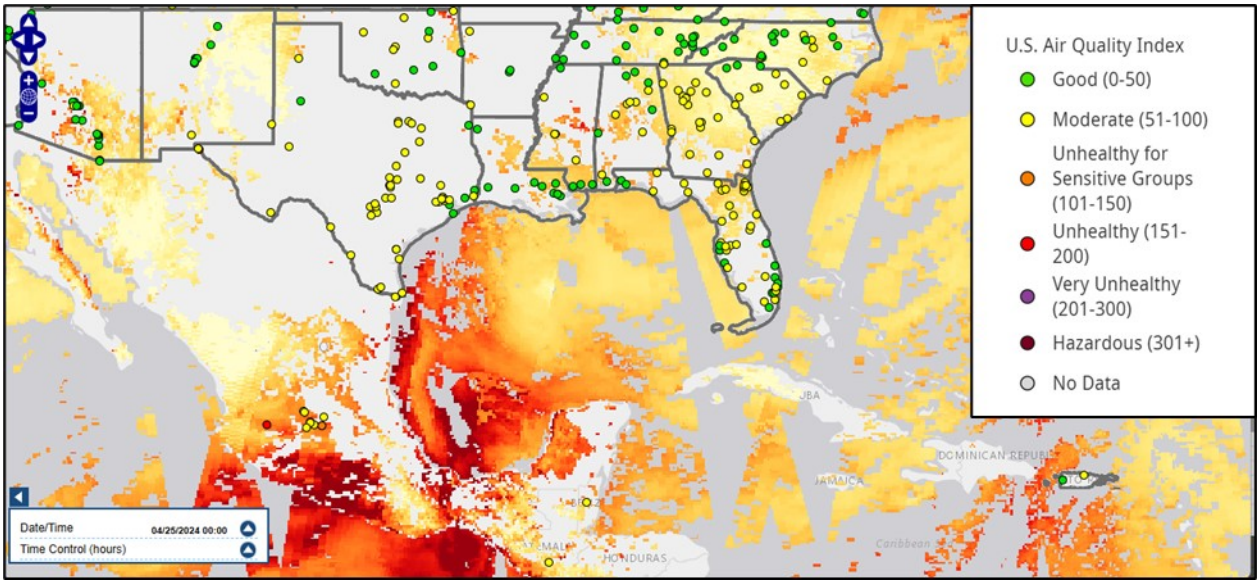

Figure 3-51: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on April 25, 2024

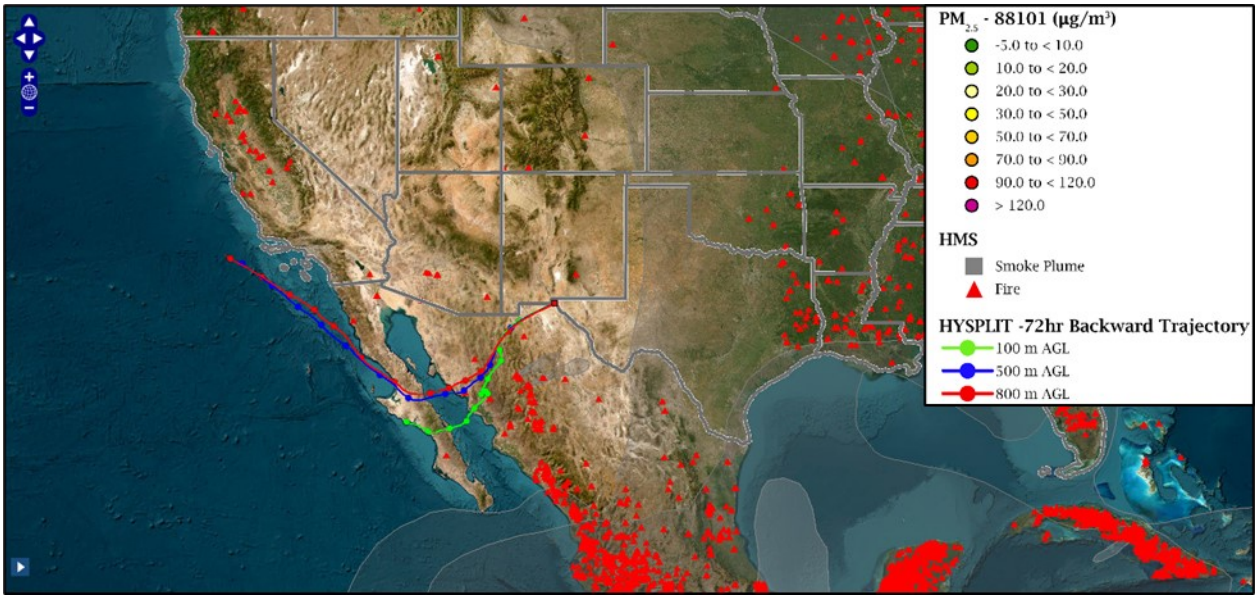

Figure 3-52: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on April 25, 2024

3.2.15 Group 15 – Evidence for June 19, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

June 19, 2024, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 30.2 µg/m³; one-hour daily maximum 299.4 µg/m³ recorded at 16:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke from wildfires in the U.S. Hourly concentrations on June 19, 2024, can be compared against typical/non-event days for the monitor in Figure 3-53: *Hourly $PM_{2.5}$ Concentrations on June 19, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

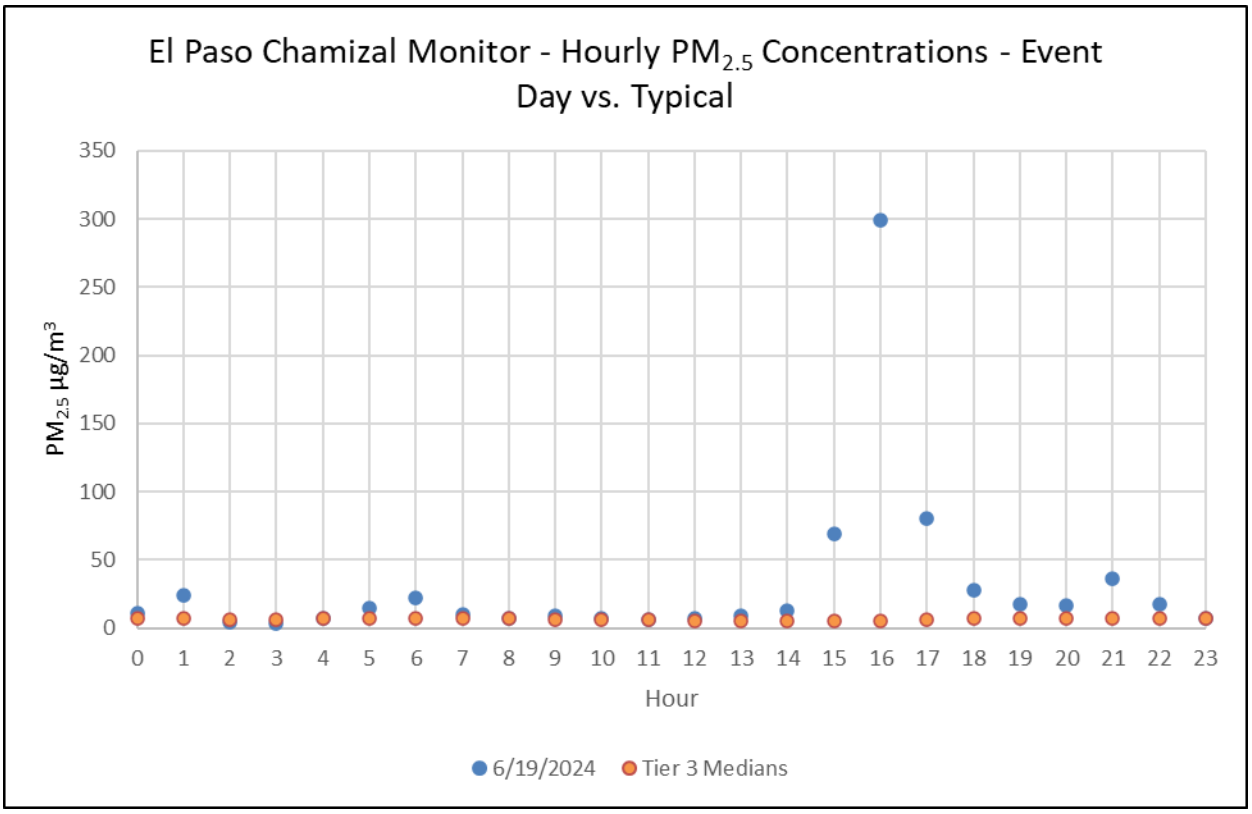

Figure 3-53: Hourly $PM_{2.5}$ Concentrations on June 19, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

$PM_{2.5}$ concentrations appear to spike around 15:00 to 17:00 LST before returning to normal. The TCEQ forecast for June 19, 2024, reported pockets of light dust that might affect far West Texas, but it concluded that this was unlikely to affect daily $PM_{2.5}$ (Table C-15). Meanwhile, NWS archived discussions reported repeatedly that conditions were ideal for wildfires, with gusty and erratic outflow winds, and that some wildfires were already extant in the vicinity of El Paso (Figure B-12). Media reports confirm that there were multiple fires in southern New Mexico, including the towns of South Fork and Salt, which are both approximately 150 miles from El Paso. These wildfires were extreme enough to call for evacuation of those areas and were not able to be contained fully until late August (Figures C-17 and C-18). HMS smoke plume imagery, meanwhile, shows heavy smoke coverage over the majority of the American southeast and East Texas and moderate smoke coverage over western Texas. The AQI index showed Unhealthy for Sensitive Individuals levels in El Paso (Figure 3-54: *AirNow HMS Smoke Plume for June 19, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show winds passing from the Gulf of America through smoke coverage in northern Mexico before reaching the El Paso Chamizal monitor (Figure 3-55: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on June 19, 2024.*

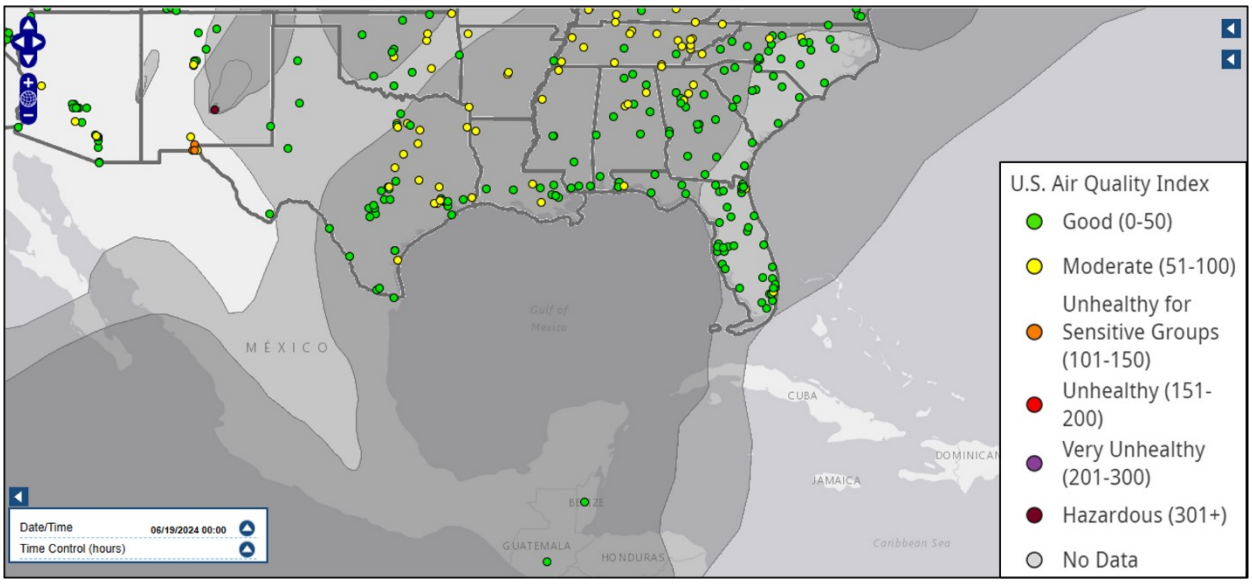

Figure 3-54: AirNow HMS Smoke Plume for June 19, 2024

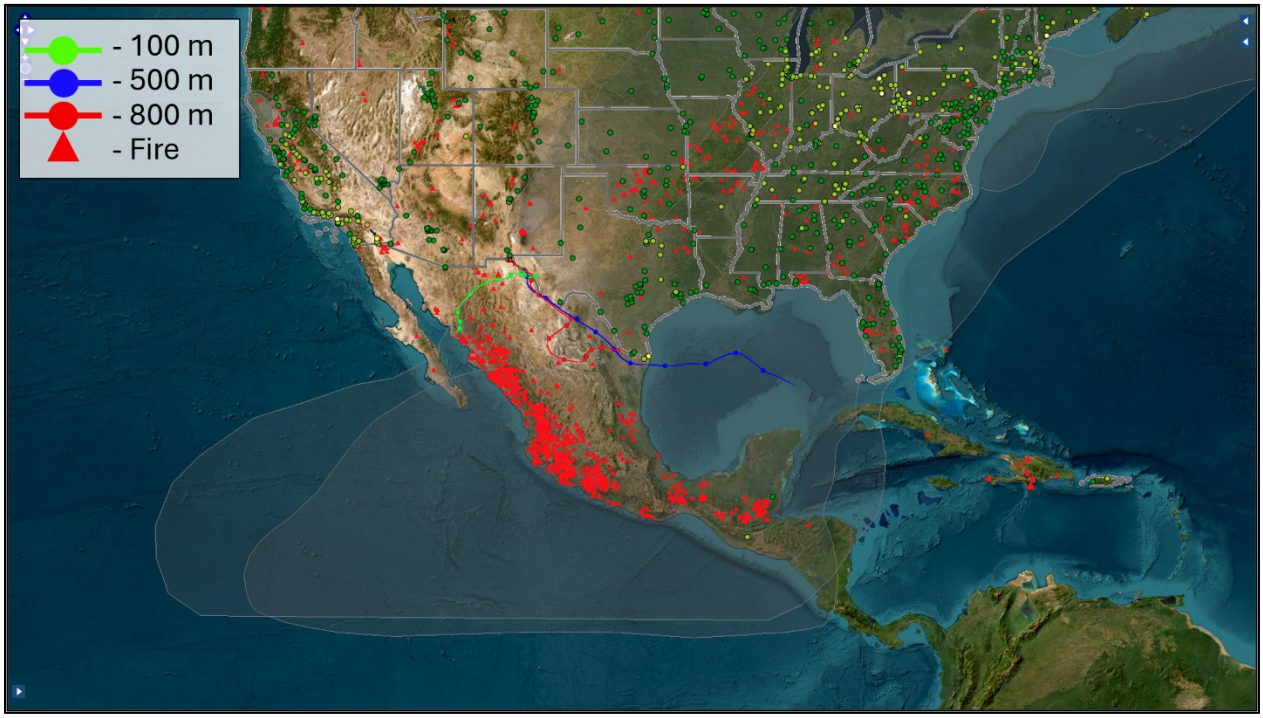

Figure 3-55: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on June 19, 2024

3.2.16 Group 16 – Evidence for July 24, July 25, and July 26, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

July 24, 2024, and July 25, 2024, were both identified as a Tier 1 days at the El Paso Chamizal monitor (July 24: 24-hour average concentration 25.5 µg/m³; one-hour daily maximum 48.5 µg/m³ recorded at 20:00 LST; and July 25: 24-hour average concentration 35.4 µg/m³; one-hour daily maximum 47.5 µg/m³ recorded at 20:00 LST). July 26, 2024, was identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 24.5 µg/m³; one-hour daily maximum 32.0 µg/m³ recorded at 20:00 LST). Elevated $PM_{2.5}$ concentrations on all three days

resulted from smoke from wildfires in the U.S. Hourly concentrations on July 24 through July 26 are compared against typical/non-event days in Figure 3-56: *Hourly $PM_{2.5}$ Concentrations on July 24, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*, Figure 3-57*: Hourly $PM_{2.5}$ Concentrations on July 25, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*, and Figure 3-58: *Hourly $PM_{2.5}$ Concentrations on July 26, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor.*

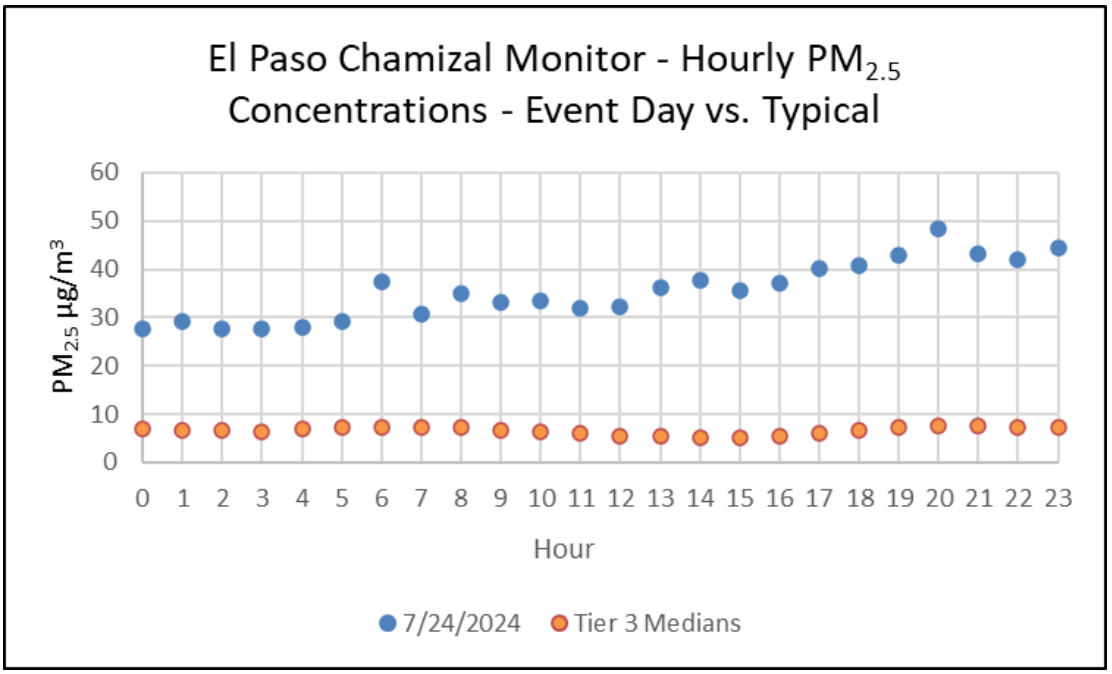

Figure 3-56: Hourly $PM_{2.5}$ Concentrations on July 24, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

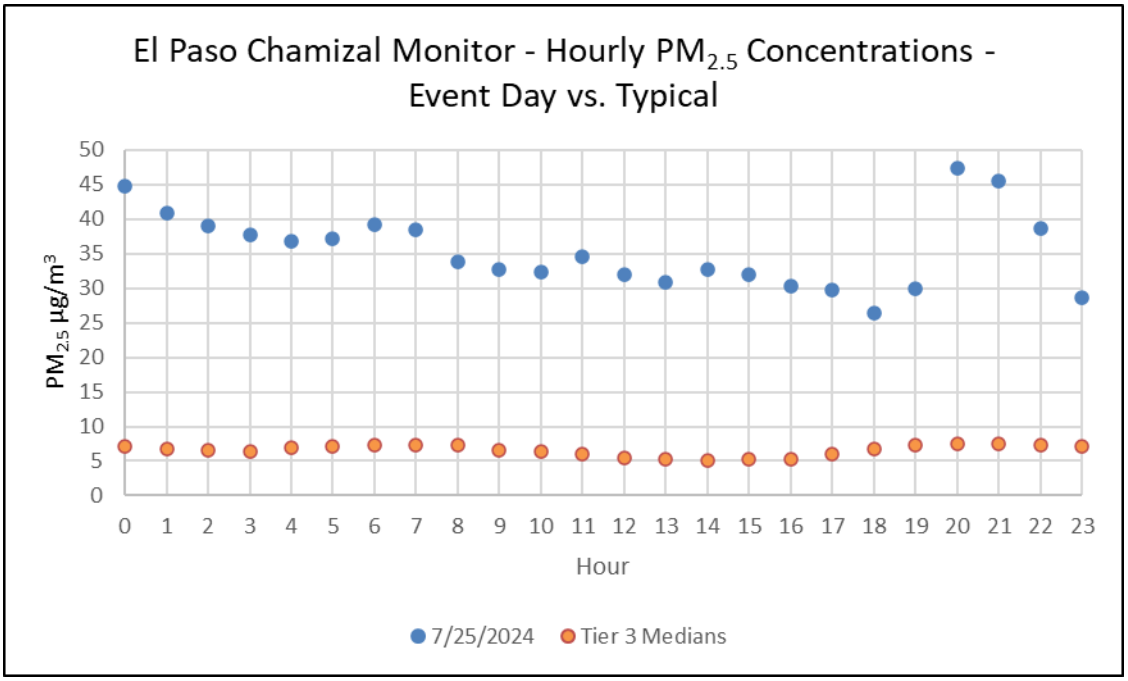

Figure 3-57: Hourly $PM_{2.5}$ Concentrations on July 25, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

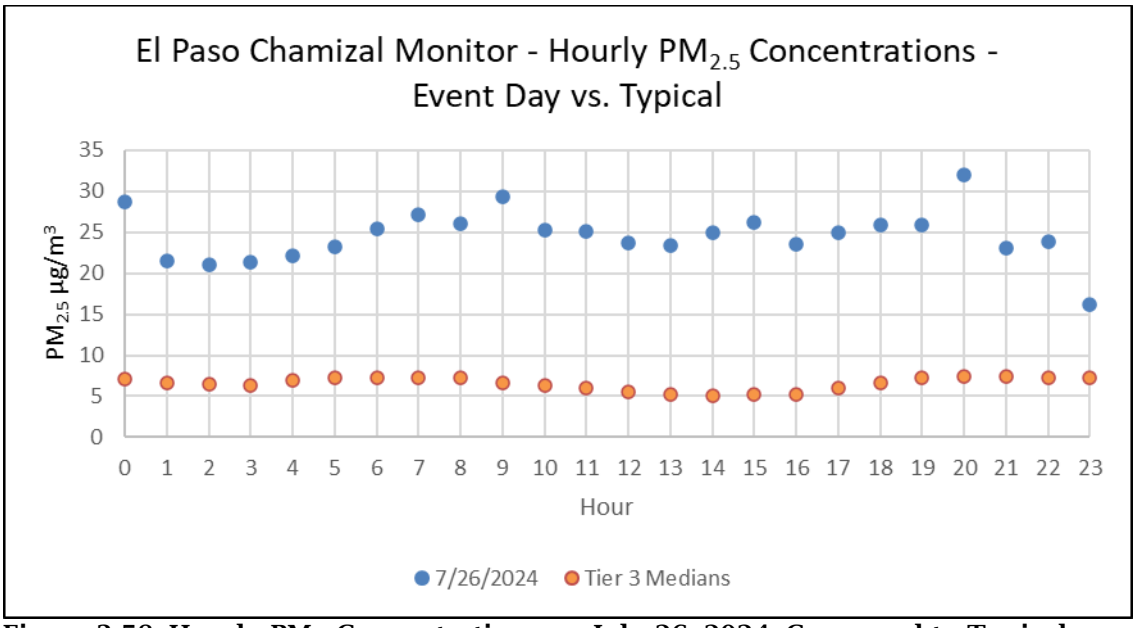

Figure 3-58: Hourly $PM_{2.5}$ Concentrations on July 26, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for July 24, 2024, reported light to moderate smoke from seasonal fires in the northern U.S. as well as possible African dust filtering through the state; both of which could raise the $PM_{2.5}$ levels for El Paso (Table C-16). Meanwhile, NWS archived discussions for July 24 and July 25 reported that winds would transport smoke from large wildfires in the Canadian Rockies and Pacific Northwest (Figure B-13). No relevant NWS archived discussions were found for July 26, 2024. Media reports confirm that there was smoke and haze filtering through Texas during the dates of interest, which affected visibility, air quality and public health (Figures C-19 and C-20). Satellite imagery for all three days shows light smoke over the El Paso area (Figure 3-59*: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 24, 2024, Showing Light to Moderate Smoke Over the El Paso Region,* Figure 3-60: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 25, 2024, Showing Light to Moderate Smoke Over the El Paso Region,* and Figure 3-61: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 26, 2024, Showing Light to Moderate Smoke Over the El Paso Region).* HMS smoke plume imagery, meanwhile, shows heavy smoke starting over northern Texas on July 24 and traveling further south to encompass the western two-thirds of the state over the next few days with AQI showing moderate air quality at the monitor (Figure 3-62: *AirNow HMS Smoke Plume for July 24, 2024*, Figure 3-63*: AirNow HMS Smoke Plume for July 25, 2024,* and Figure 3-64*: AirNow HMS Smoke Plume for July 26, 2024).* HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration for July 24 and 25 show winds passing south from Nebraska and northern Texas before reaching the El Paso Chamizal monitor (Figure 3-65: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on July 24, 2024* and Figure 3-66: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on July 25, 2024*). On July 26, the trajectories traveled into Mexico prior to reversing and reaching the El Paso Chamizal monitor (Figure 3-67*: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on July 26, 2024*).

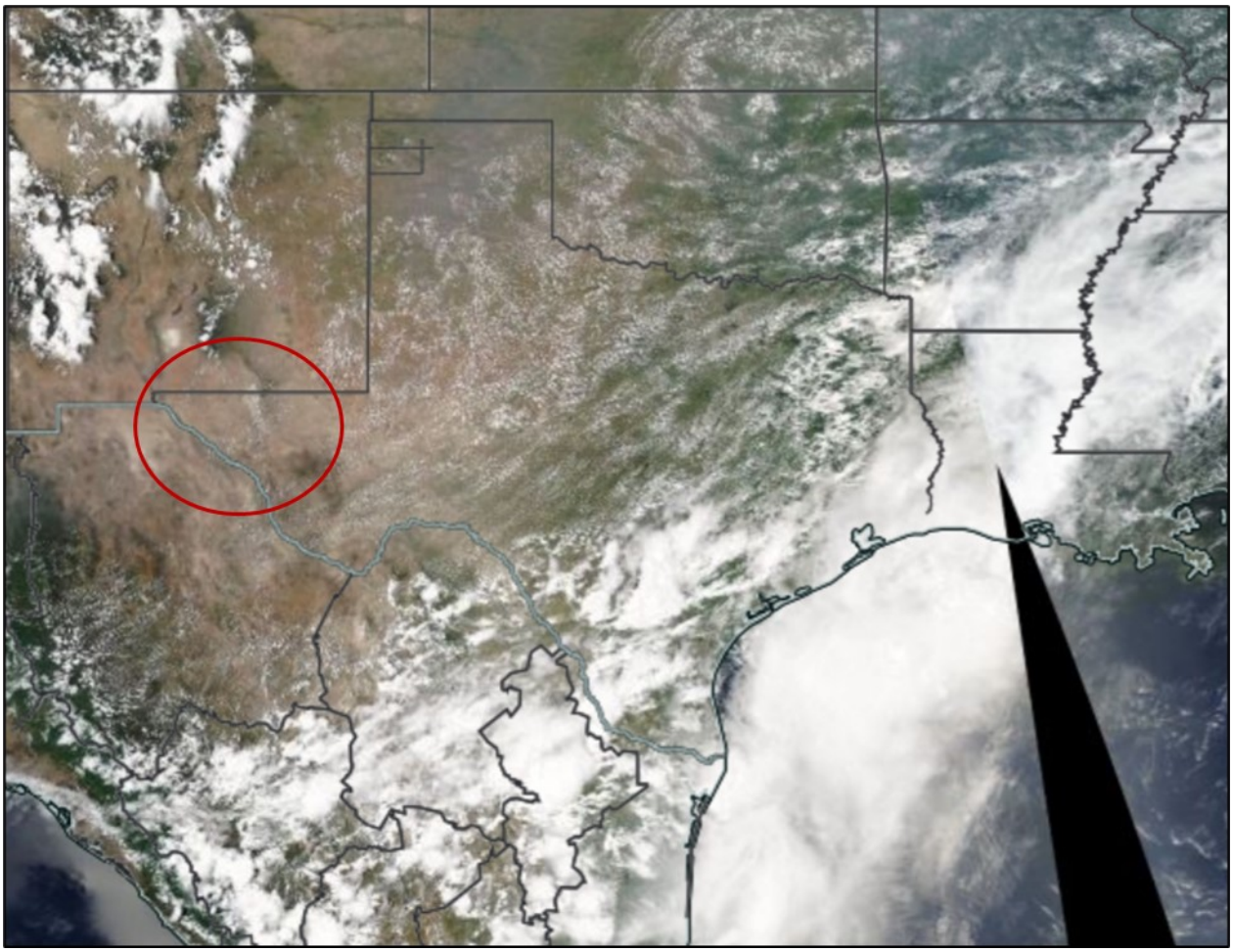

Figure 3-59: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 24, 2024, Showing Light to Moderate Smoke Over the El Paso Region

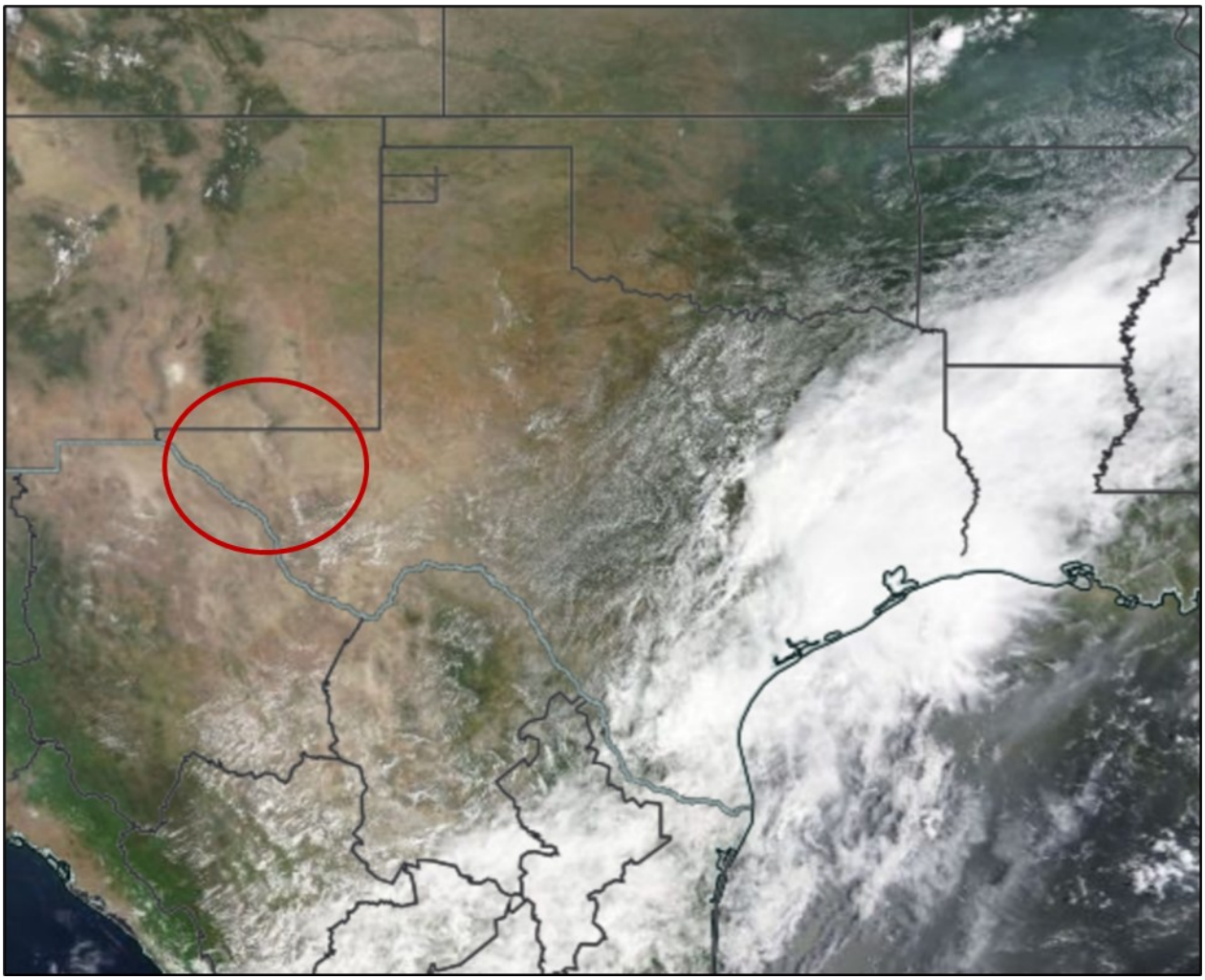

Figure 3-60: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 25, 2024, Showing Light to Moderate Smoke Over the El Paso Region

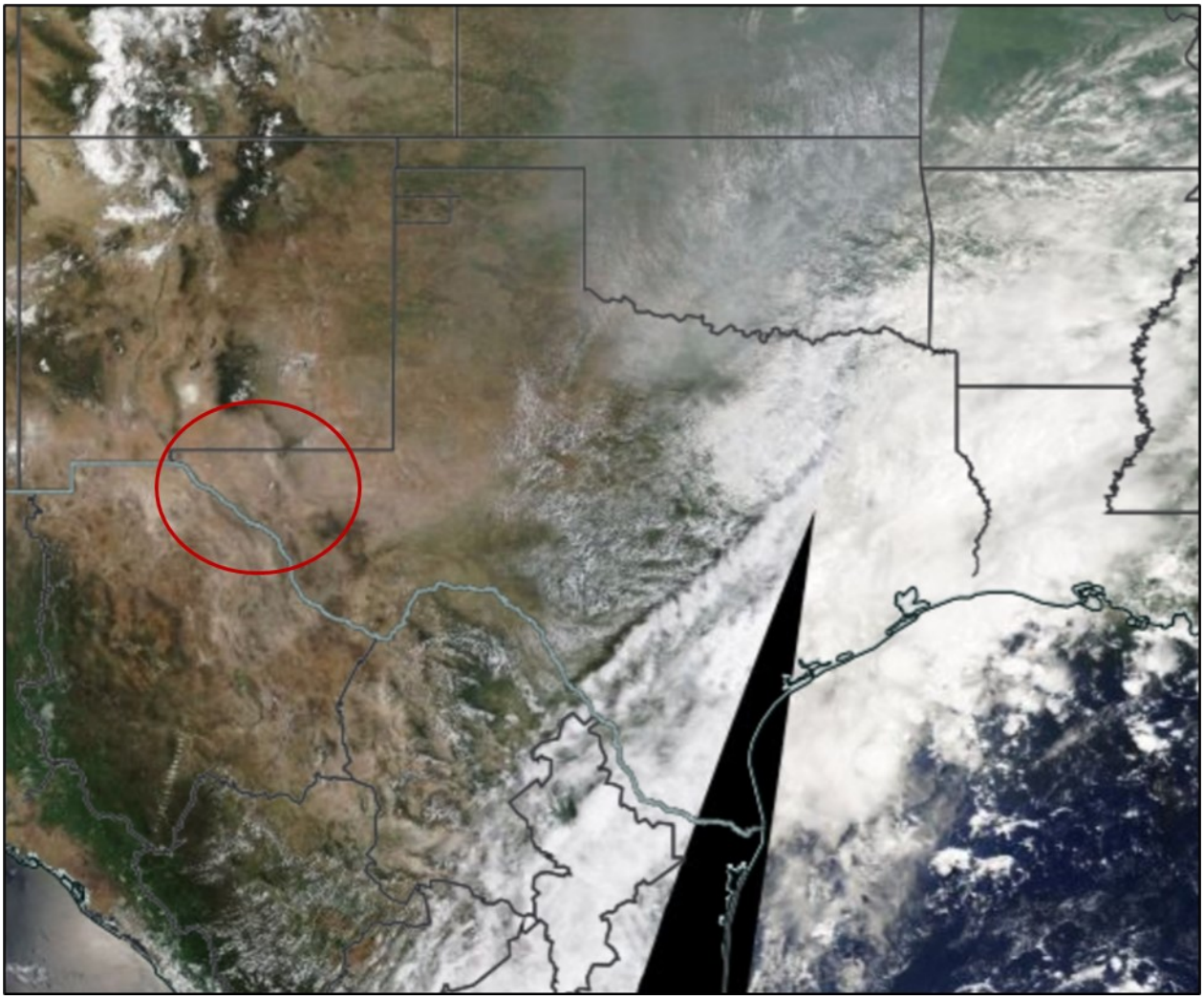

Figure 3-61: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 26, 2024, Showing Light to Moderate Smoke Over the El Paso Region

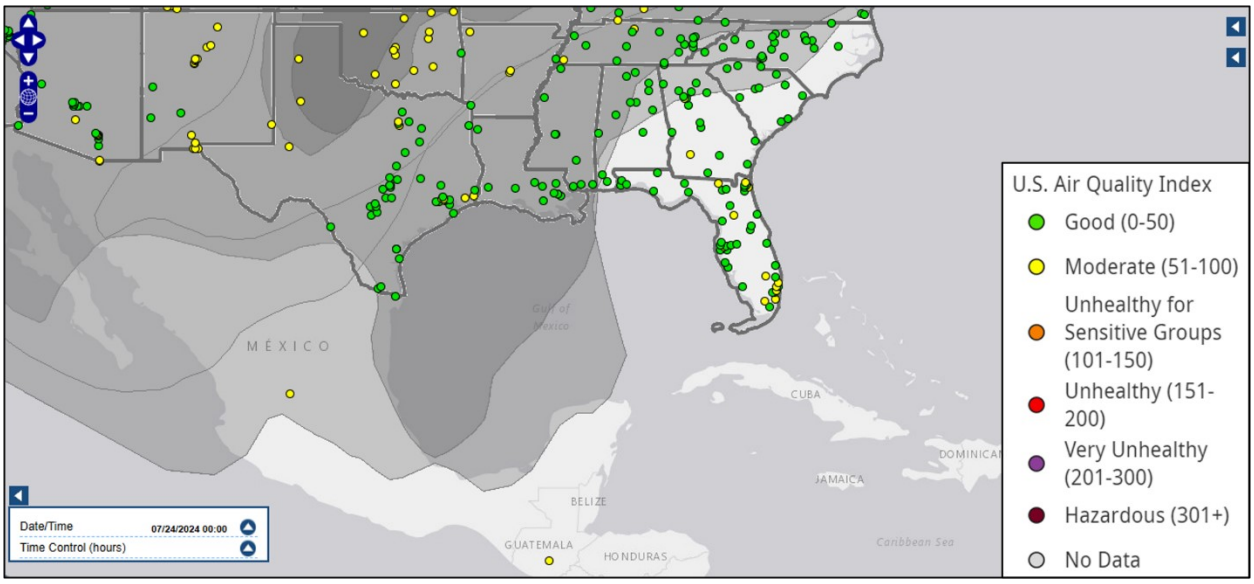

Figure 3-62: AirNow HMS Smoke Plume for July 24, 2024

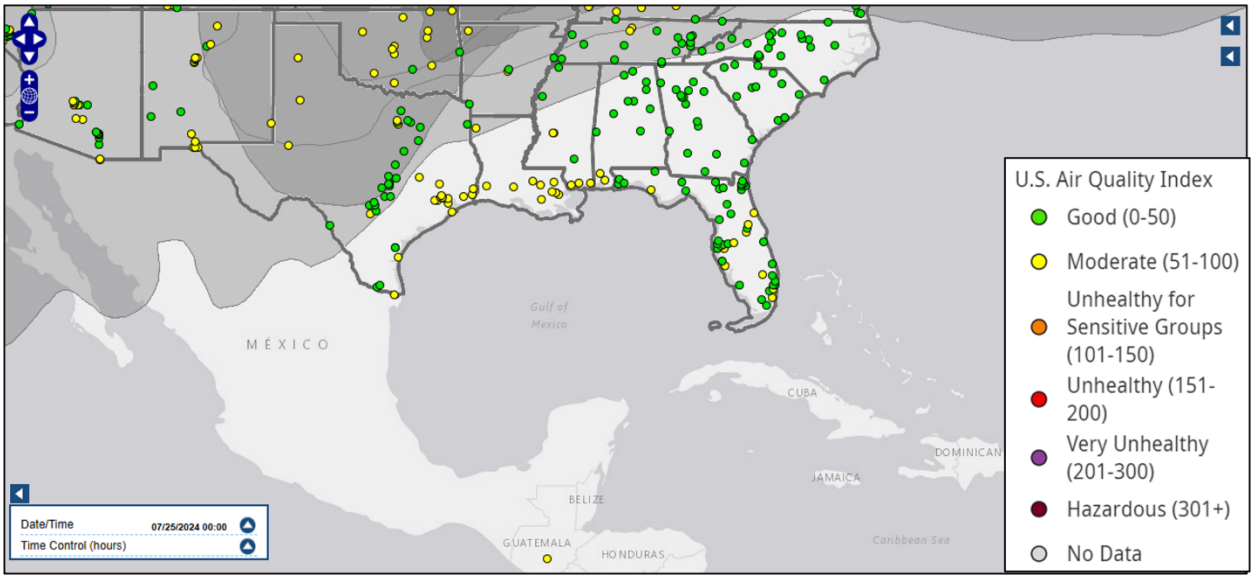

Figure 3-63: AirNow HMS Smoke Plume for July 25, 2024

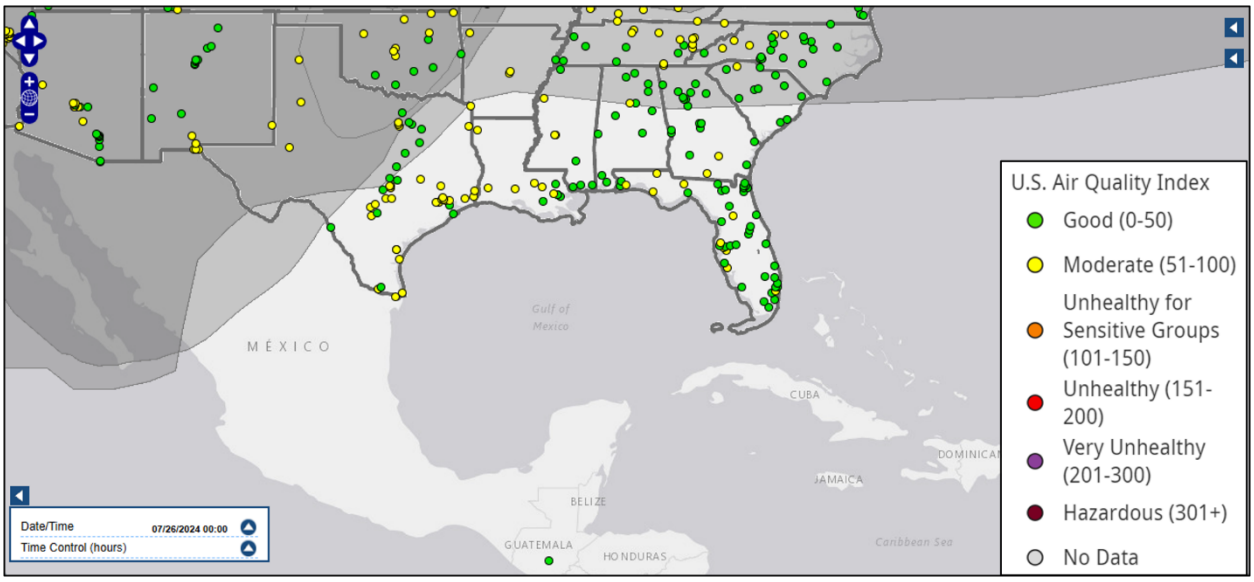

Figure 3-64: AirNow HMS Smoke Plume for July 26, 2024

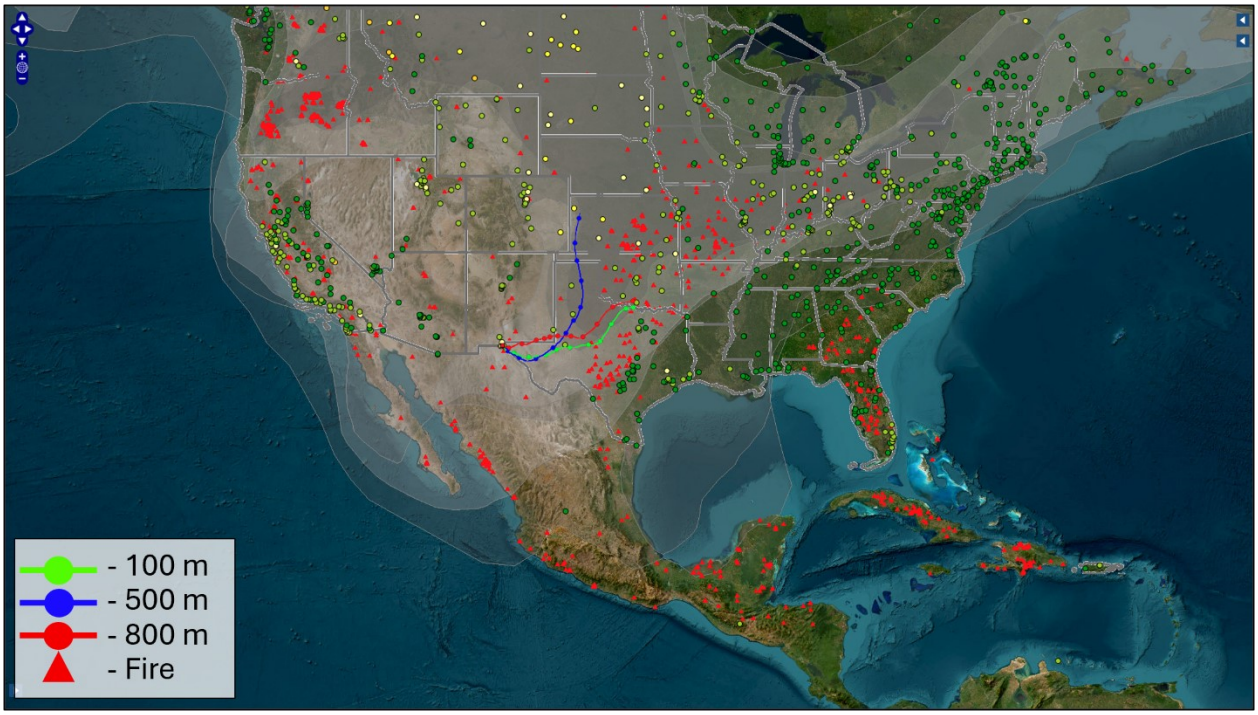

Figure 3-65: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on July 24, 2024

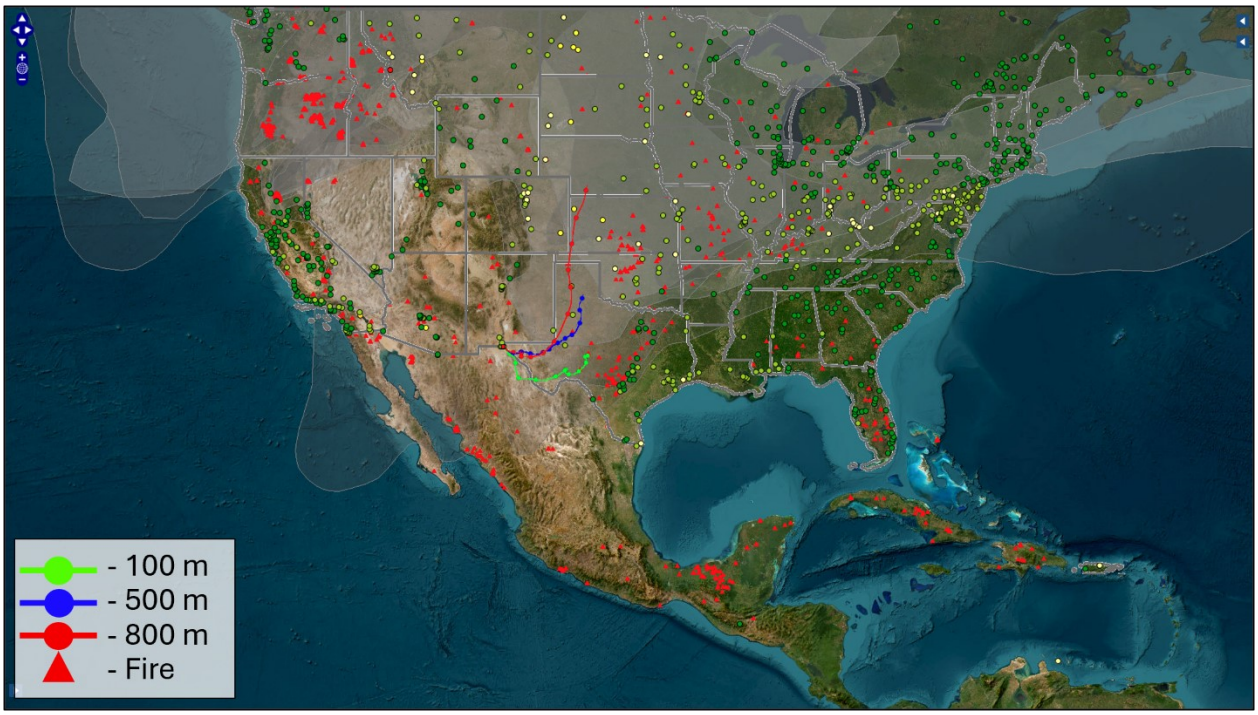

Figure 3-66: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on July 25, 2024

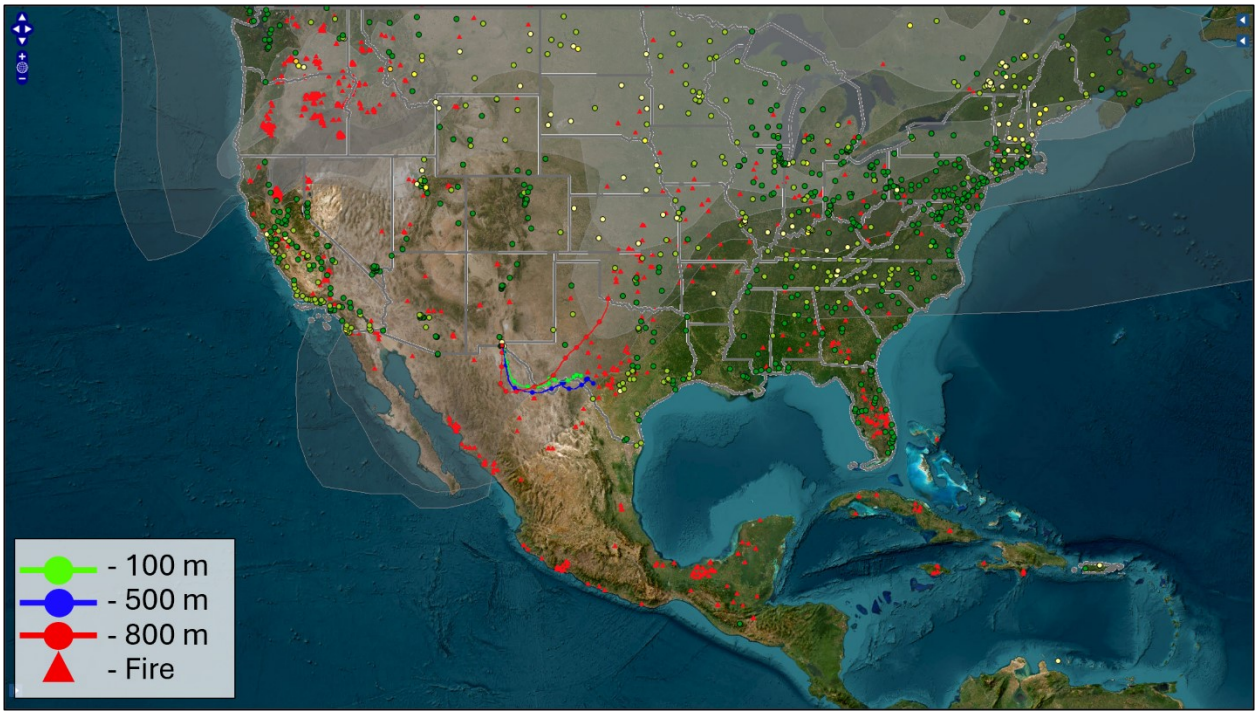

Figure 3-67: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on July 26, 2024

3.2.17 Group 17 – Evidence for August 1, 2024, African Dust $PM_{2.5}$ Event

August 1, 2024, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 25.4µg/m^3; one-hour daily maximum 61.4 µg/m^3 recorded at 04:00 LST). Elevated $PM_{2.5}$ concentrations resulted from an African Dust event. Hourly concentrations on August 1 can be compared against typical/non-event days in Figure 3-68: *Hourly $PM_{2.5}$ Concentrations on August 1, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

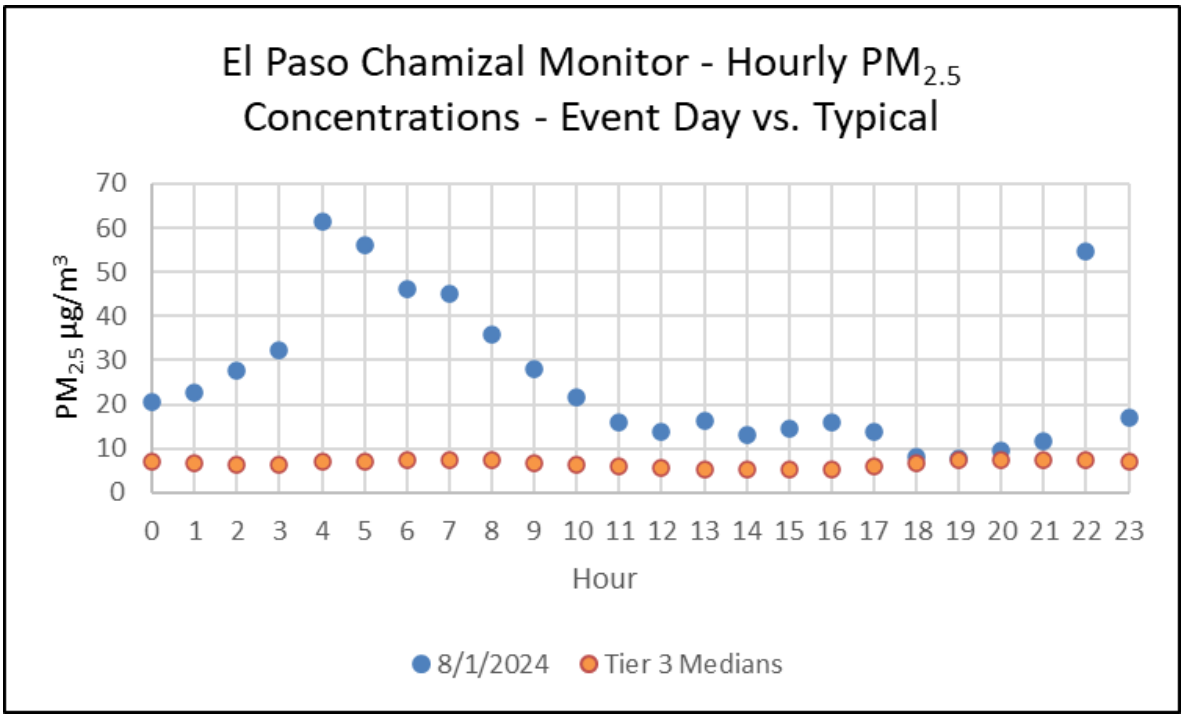

Figure 3-68: Hourly $PM_{2.5}$ Concentrations on August 1, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for August 1, 2024, reported Saharan dust plumes affecting the majority of the state, causing hazy skies and producing higher $PM_{2.5}$ concentrations (Table C-17). Multiple media reports mention African/Saharan dust filtering through Texas on the day of and a few days prior to the event. In general, poor conditions were reported throughout the early week, including effects on visibility, air quality, and, potentially, public health (Figures C-21 and C-22). Satellite imagery showed dust over the coastal regions of Texas and travelling inland (Figure 3-69: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from August 1, 2024, Showing Smoke/Dust Over the El Paso Region*). The AOD image shows the presence of dust over portions of Texas, with the yellow dot in El Paso denoting air quality in the Moderate category. (Figure 3-70: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on August 1, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show slow circulating winds over Mexico before reaching the El Paso Chamizal monitor (Figure 3-71: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on August 1, 2024*). Forward trajectories show winds traveling west from dust source regions in Africa over a two-week period with select trajectories reaching Texas (Figure 3-72: *NOAA HYSPLIT 14-Day Forward Trajectories Originating from Western Africa, Starting on July 18, 2024*.

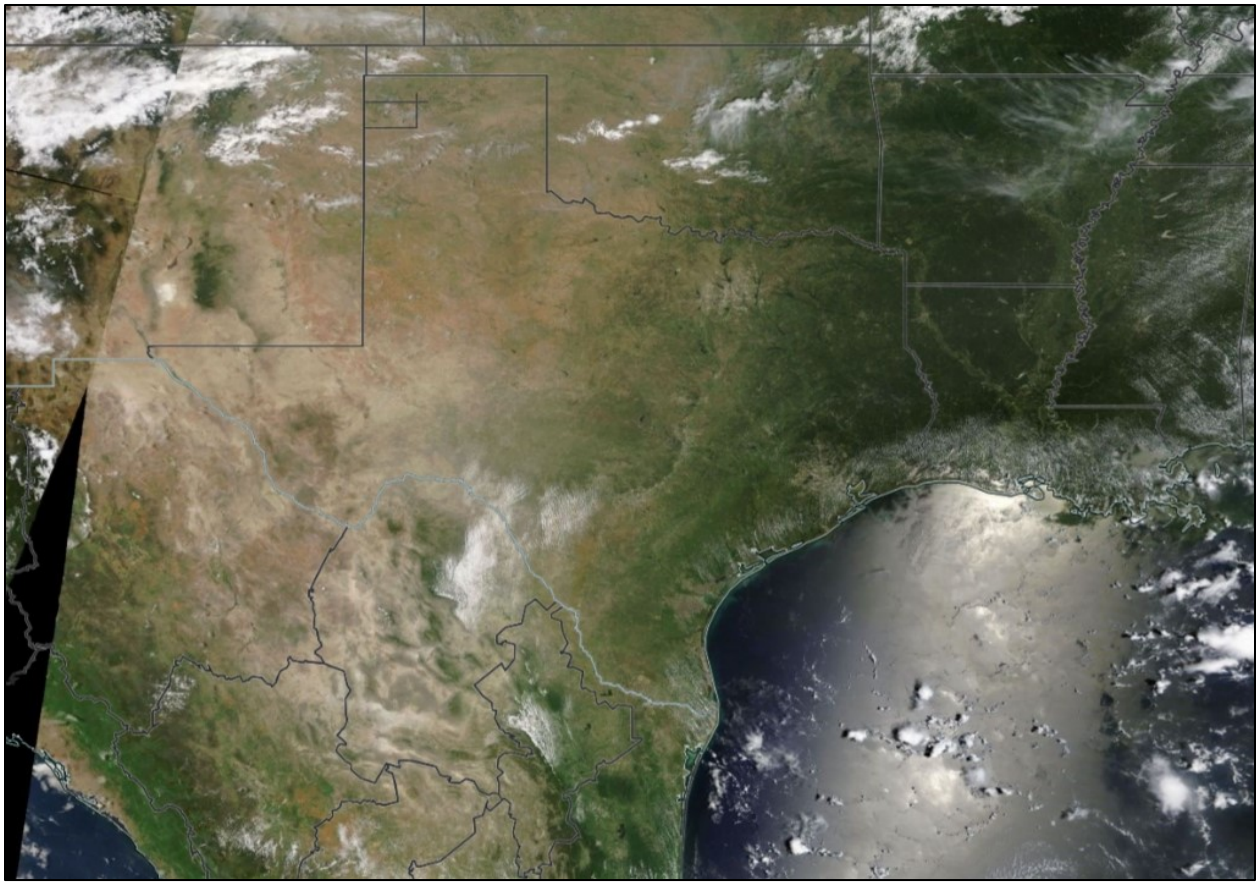

Figure 3-69: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from August 1, 2024, Showing Smoke/Dust Over the El Paso Region

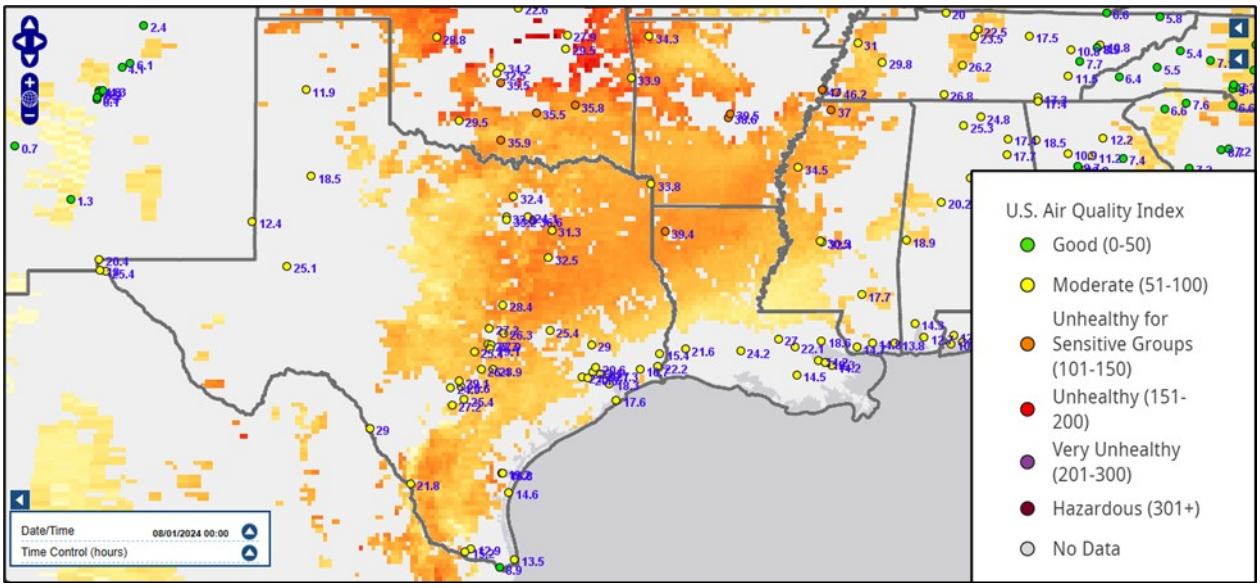

Figure 3-70: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on August 1, 2024

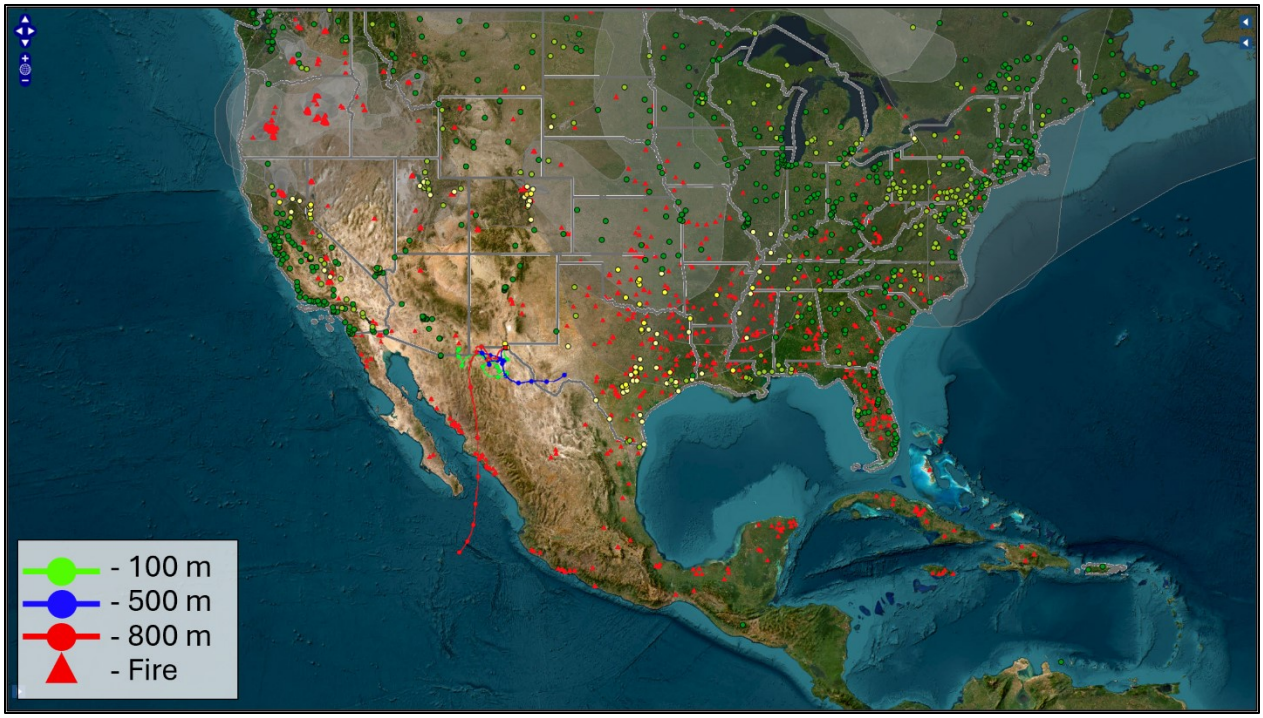

Figure 3-71: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on August 1, 2024

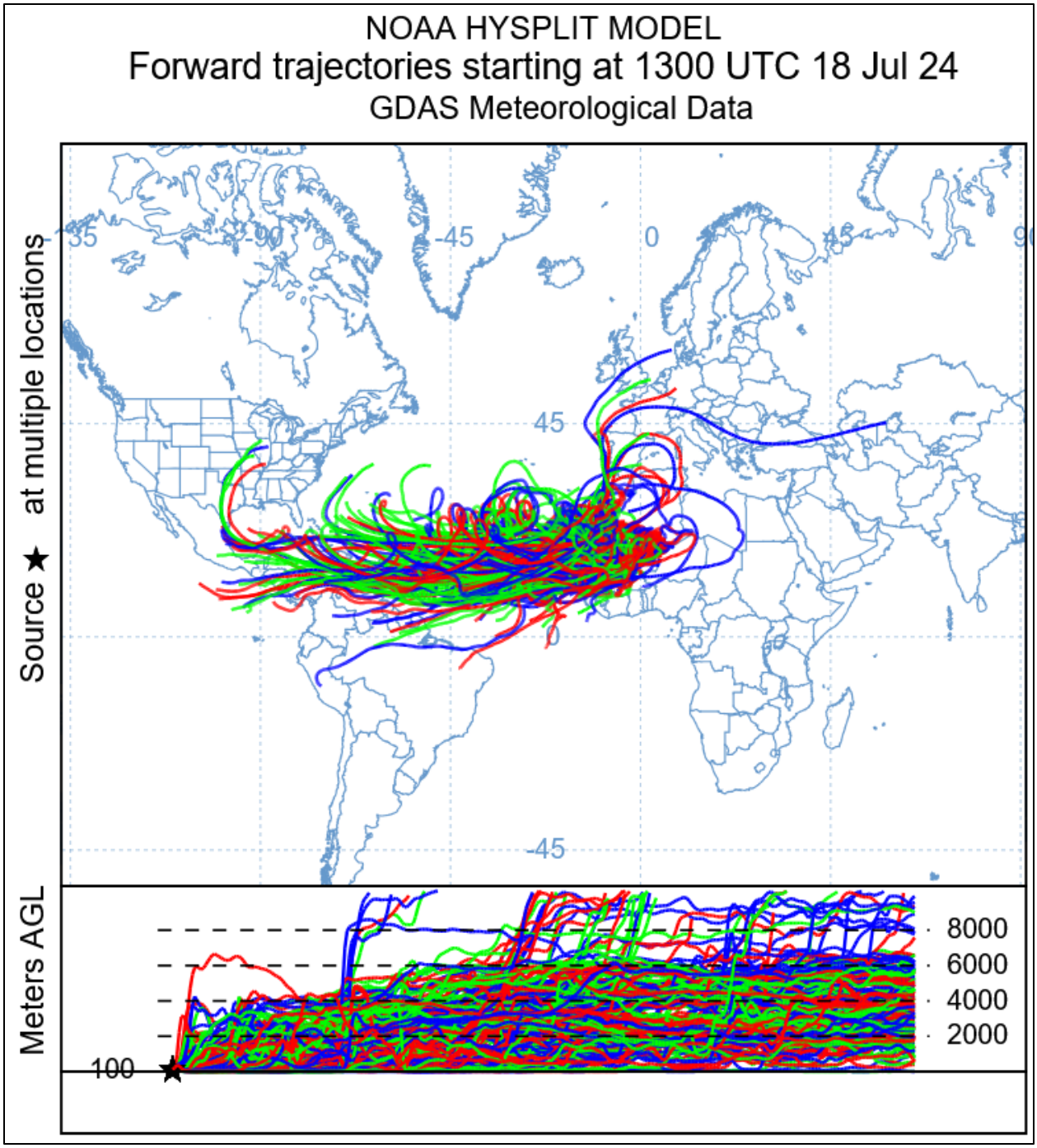

Figure 3-72: NOAA HYSPLIT 14-Day Forward Trajectories Originating from Western Africa, Starting on July 18, 2024

3.2.18 Group 18 – Evidence for August 23, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

August 23, 2024, was identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 39.1 µg/m^3; one-hour daily maximum 109.9 µg/m^3 recorded at 03:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a wildfire (U.S.) event. Hourly concentrations on August 23, 2024, can be compared against typical/non-event days in Figure 3-73: *Hourly*

$PM_{2.5}$ Concentrations on August 23, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor.

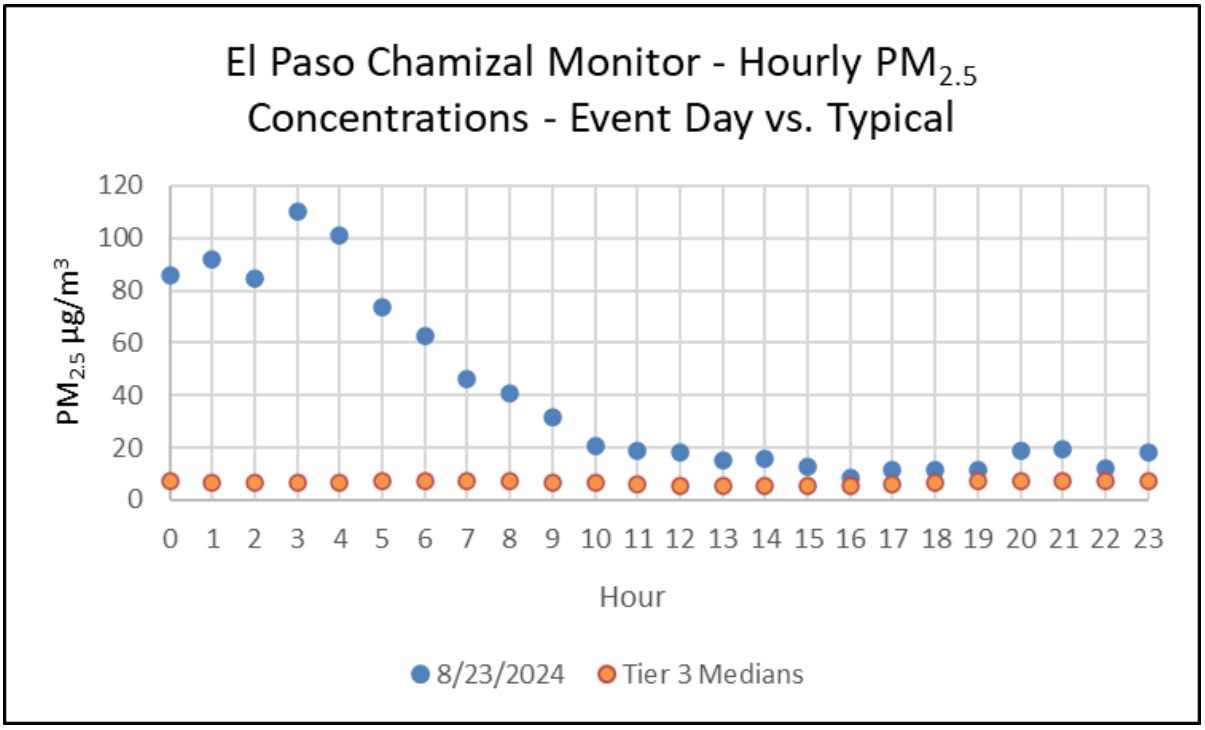

Figure 3-73: Hourly $PM_{2.5}$ Concentrations on August 23, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for August 23, 2024, reported incoming moderate-to-light density smoke from wildfire activity in the southeastern U.S. and regions of Texas. Some lingering smoke from existing wildfires was also expected, such that moderate $PM_{2.5}$ levels were anticipated for much of the state (Table C-18). Media reports confirmed the presence of smoke due to the widespread wildfires in the U.S. (Figures C-23, C-24, and C-25). Satellite imagery also shows the presence of dust or smoke in the El Paso area (Figure 3-74: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from August 23, 2024, Showing Smoke/Dust Over the El Paso Region*). HMS smoke plume imagery, meanwhile, shows heavy smoke coverage over the majority of the American Southeast and Midwest, with AQI showing moderate air quality at the El Paso Chamizal monitor (Figure 3-75: *AirNow HMS Smoke Plume for August 23, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show trajectories at the highest two altitudes traveling from the Gulf of America west before turning north in Mexico at which point they were joined by the trajectory at the lowest altitude prior to finishing north to the El Paso Chamizal monitor. (Figure 3-76: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on August 23, 2024*).

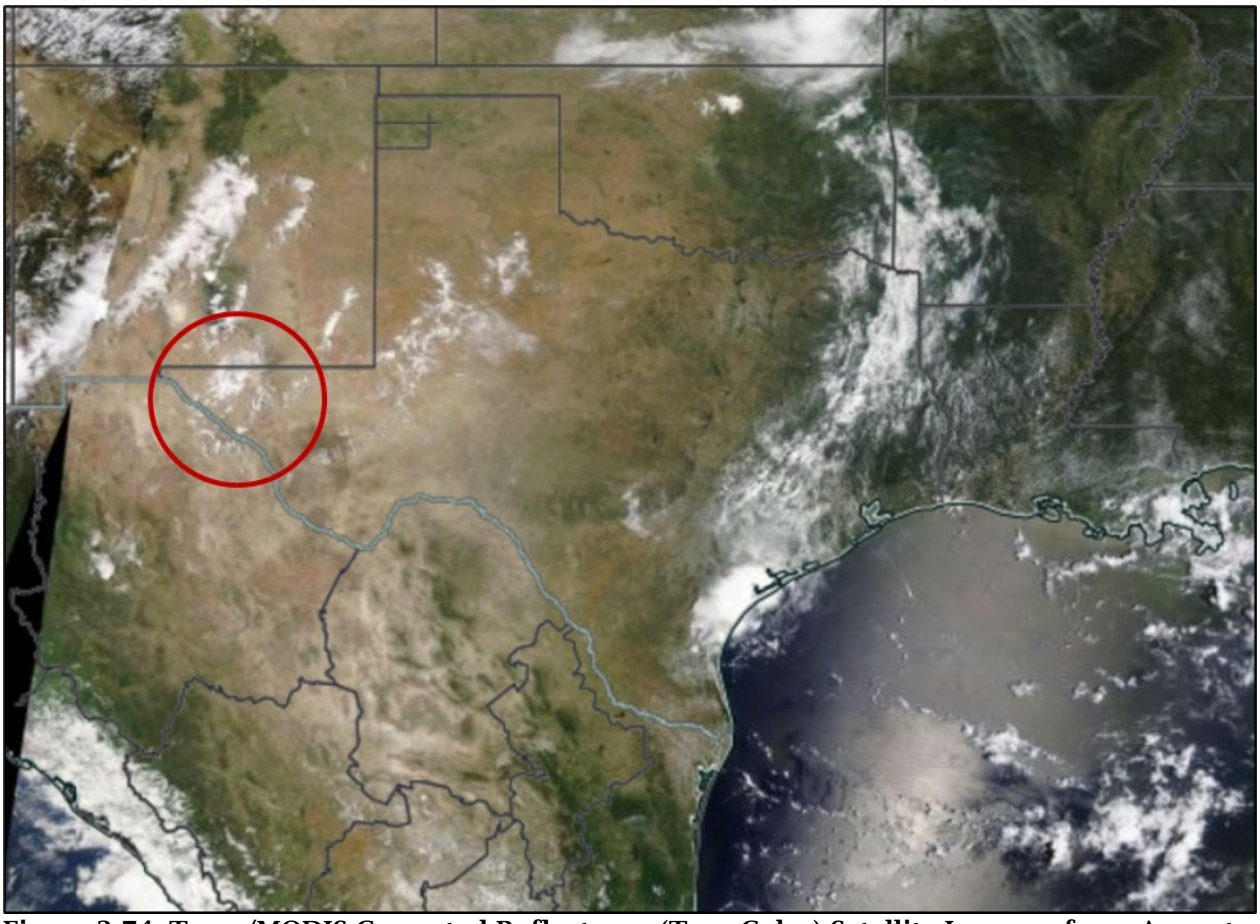

Figure 3-74: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from August 23, 2024, Showing Smoke/Dust Over the El Paso Region

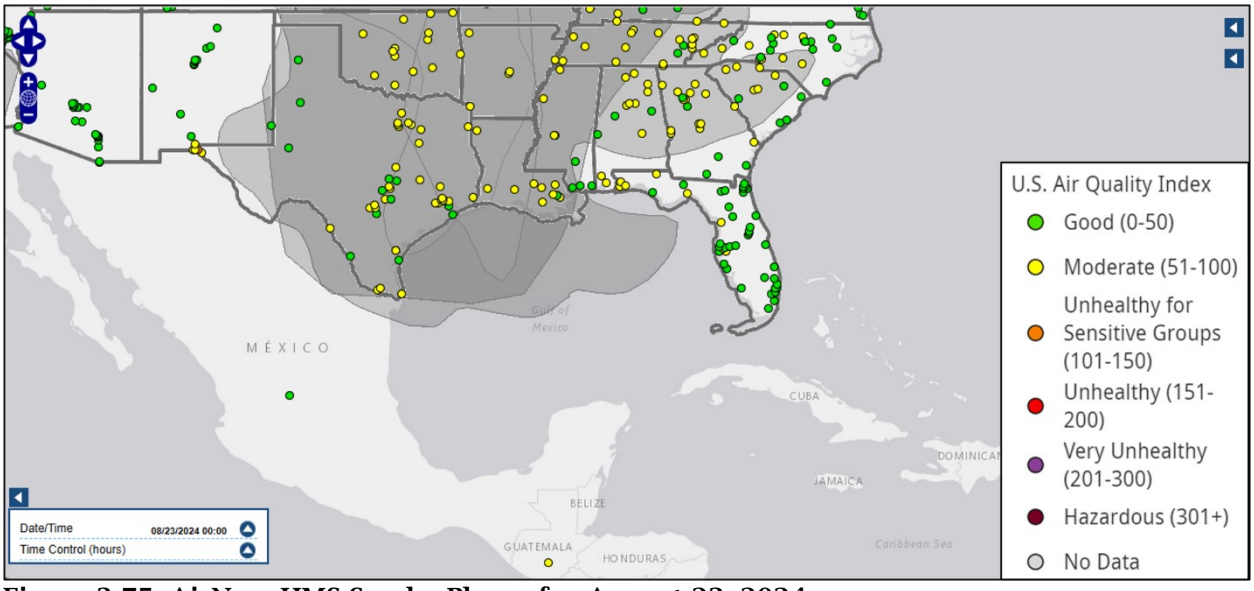

Figure 3-75: AirNow HMS Smoke Plume for August 23, 2024

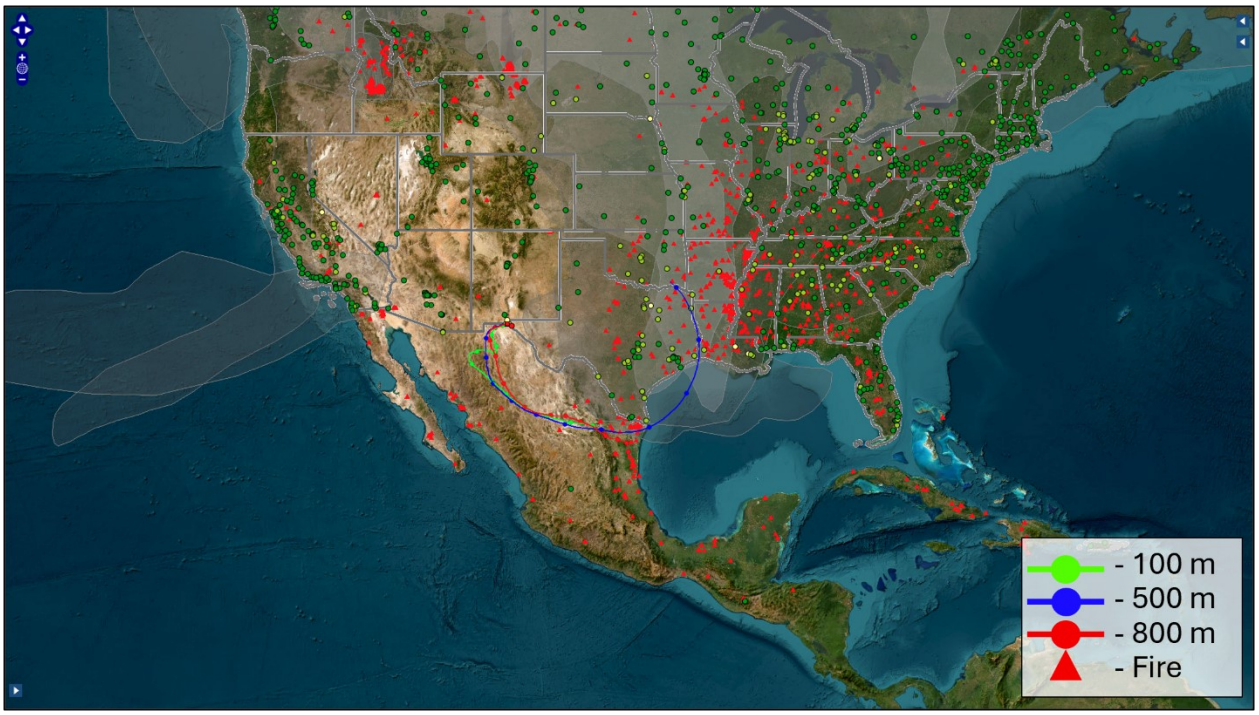

Figure 3-76: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on August 23, 2024

3.2.19 Group 19 – Evidence for October 3, 2024, Wildfire (U.S.) $PM_{2.5}$ Event

October 3, 2024, is identified as a Tier 2 day at the El Paso Chamizal monitor (24-hour average concentration 24.9 µg/m^3; one-hour daily maximum 64.0 µg/m^3 recorded at 21:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke from U.S. wildfires. Hourly concentrations on June 19, 2024, can be compared against typical/non-event days in Figure 3-77*: Hourly $PM_{2.5}$ Concentrations on October 3, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor*.

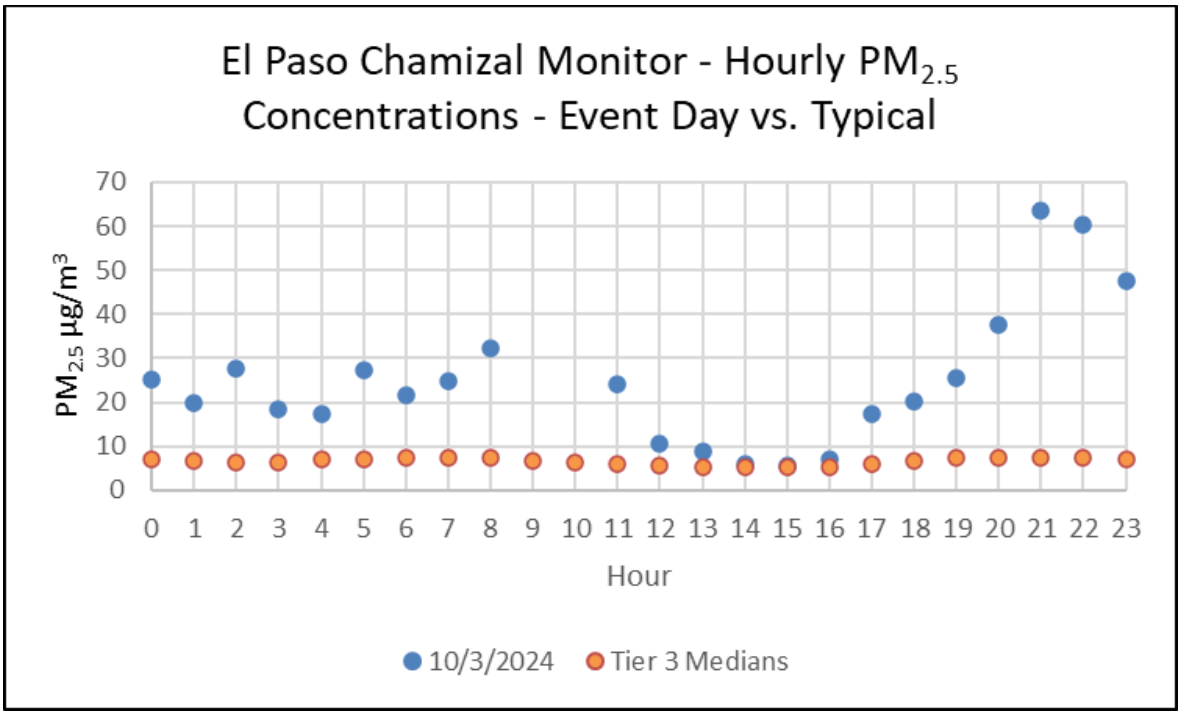

Figure 3-77: Hourly $PM_{2.5}$ Concentrations on October 3, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for October 3, 2024, reported that smoke from burning activities across Texas and the northwestern U.S. would travel to the El Paso area and affect daily $PM_{2.5}$ (Table C-19). Neither relevant NWS archived discussions nor relevant media reports were found for the El Paso area. HMS smoke plume imagery, meanwhile, shows heavy smoke coverage over the El Paso area, as well as the western two-thirds of the State of Texas, with AQI showing moderate air quality at the El Paso Chamizal monitor. Meanwhile, lighter smoke coverage can be seen over the southeast (Figure 3-78: *AirNow HMS Smoke Plume for October 3, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration show winds traveling through Central Texas, into Mexico, and then to the El Paso Chamizal monitor (Figure 3-79*: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on October 3, 2024).*

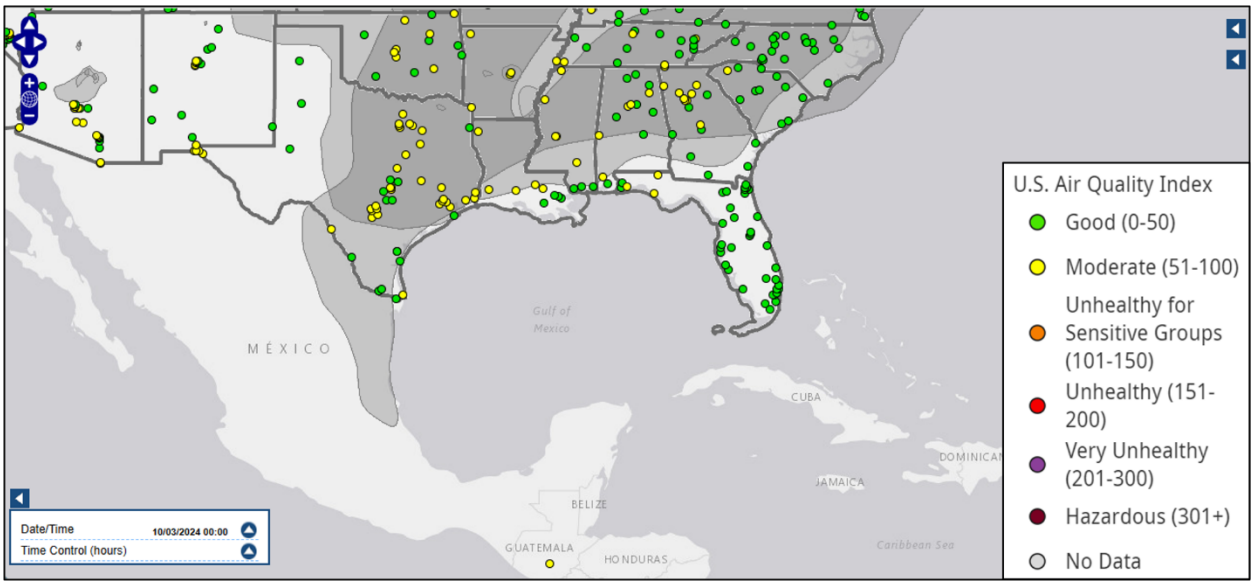

Figure 3-78: AirNow HMS Smoke Plume for October 3, 2024

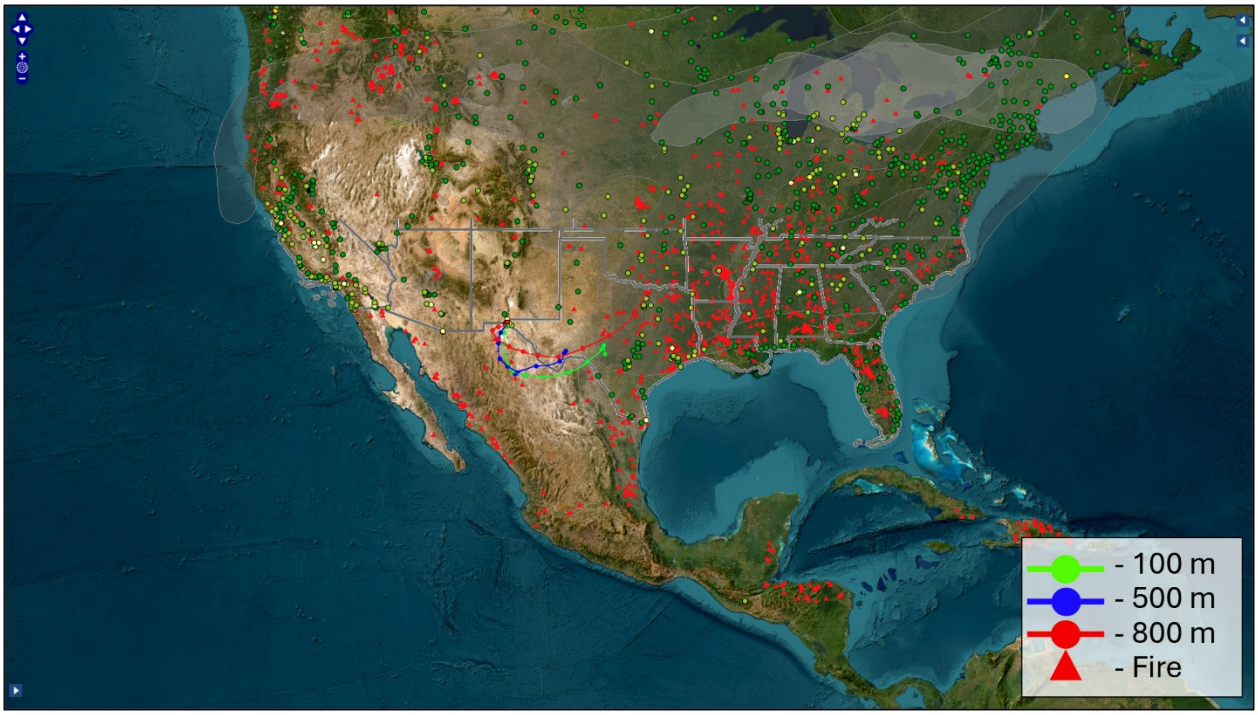

Figure 3-79: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on October 3, 2024

3.2.20 Group 20 – Evidence for October 29, 2024, High Wind $PM_{2.5}$ Event

October 29, 2024, is identified as a Tier 1 day at the El Paso Chamizal monitor (24-hour average concentration 44.8 µg/m³; one-hour daily maximum 165.5 µg/m³ recorded at 16:00 LST). Elevated $PM_{2.5}$ concentrations resulted from a high wind event that caused blowing dust. Hourly concentrations on October 29, 2024, can be compared against typical/non-event days in Figure 3-80: *Hourly $PM_{2.5}$ Concentrations on October 29, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor.*

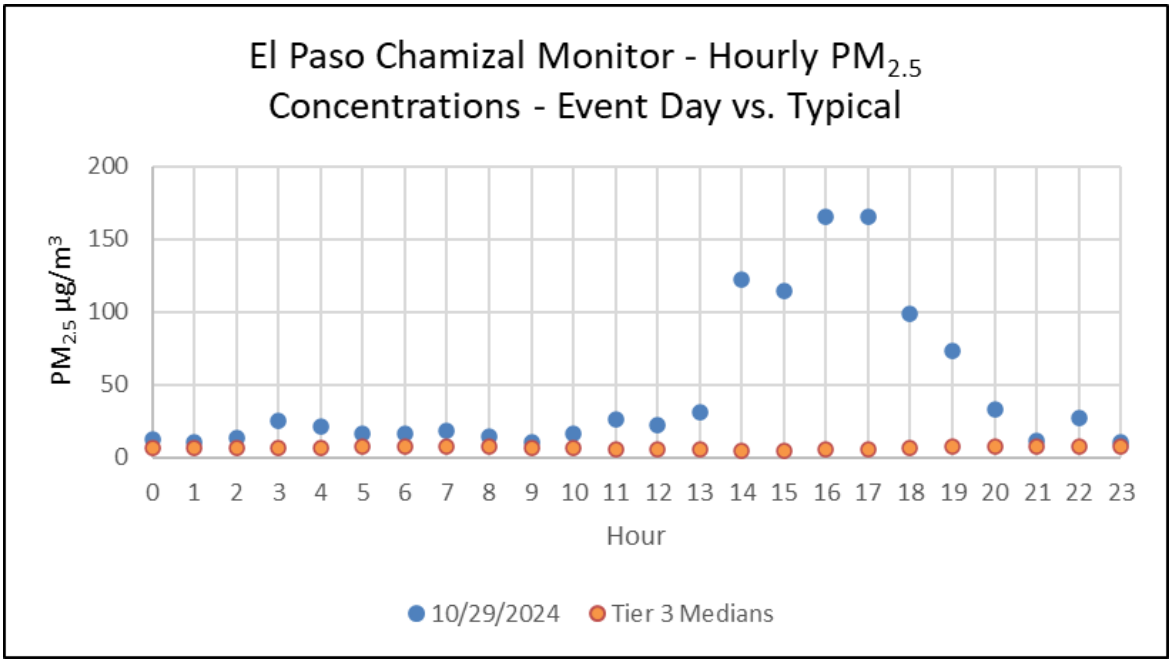

Figure 3-80: Hourly $PM_{2.5}$ Concentrations on October 29, 2024, Compared to Typical Concentrations at the El Paso Chamizal Monitor

The TCEQ forecast for October 29, 2024, reported that light density residual smoke from wildfire activities across the southeastern U.S. was expected to raise $PM_{2.5}$ levels. Additionally, breezy conditions from a cold front in the panhandle were expected to transport suspended blowing dust into West Texas (Table C-20). NWS archived discussions also reported blowing dust as a result of a strong upper-level system (Figure B-14). The AOD image shows the presence of dust over portions of Texas with the red and orange dots in El Paso denoting air quality in the Unhealthy and Unhealthy for Sensitive Groups categories, respectively (Figure 3-81: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on October 29, 2024*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ showed winds passing through desert regions of northern Mexico before reaching the El Paso Chamizal monitor (Figure 3-82: *AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on October 29, 2024).*

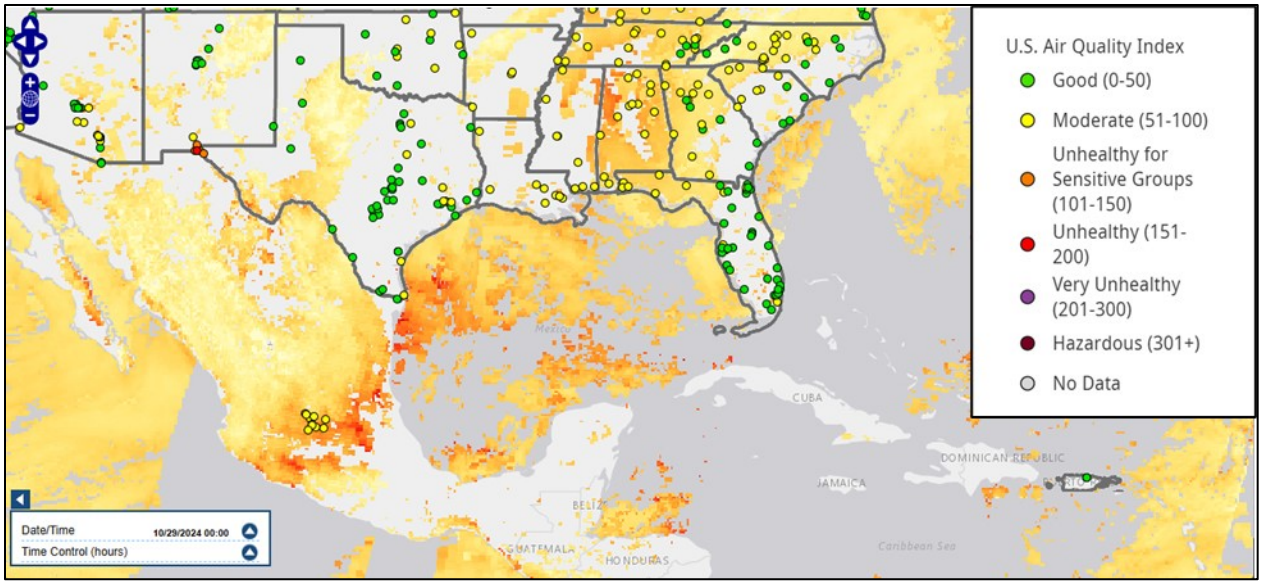

Figure 3-81: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on October 29, 2024

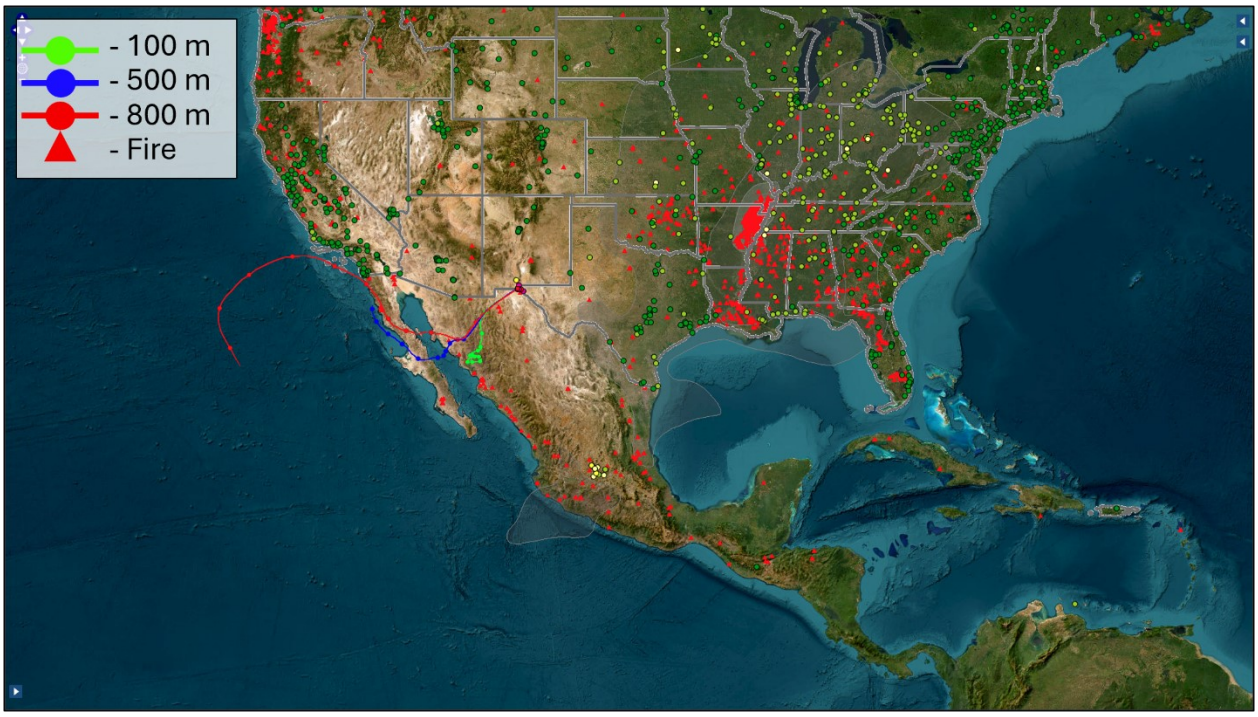

Figure 3-82: AirNow Tech HYSPLIT 72-Hour Back Trajectories Originating from the El Paso Chamizal Monitor on October 29, 2024

SECTION 4: NOT REASONABLY CONTROLLABLE OR NOT REASONABLY PREVENTABLE

4.1 OVERVIEW

This section satisfies the Exceptional Events Rule Requirements at 40 CFR §§50.14(c)(3)(iv)(A), 50.1(j), 50.14(c)(3)(iv)(D), and 50.14(b)(4): "The event was caused by a natural event; an exceptional event is one that is not reasonably controllable or preventable."

4.2 NATURAL AND ANTHROPOGENIC SOURCE CONTRIBUTIONS

Stationary point source emissions data are collected annually from sites that meet the reporting requirements of 30 Texas Administrative Code (TAC) §101.10, and the emissions data are compiled in TCEQ's State of Texas Environmental Electronic Reporting System (STARS). STARS fine particulate matter ($PM_{2.5}$) emissions data are presented for each county. Emissions for other sectors from the 2020 National Emissions Inventory (NEI) are presented for each county.[10]

The wind rose at each monitor is from the EPA *$PM_{2.5}$ Designations Mapping Tool*.[11] The wind rose shows the general wind direction and speed for each monitor during the period from 2021 to 2023. The circular format of the wind rose shows the direction the winds blew from and the length of each "spoke" around the circle shows how often the wind blew from that direction.[12]

4.2.1 El Paso County

The El Paso Chamizal monitor is located in the City of El Paso, within El Paso County, Texas. The major point sources of $PM_{2.5}$ (as defined in 40 CFR §§51.165 and 51.166) are located in approximately north and southwest El Paso County (Figure 4-1: *Point Sources in El Paso County, from 2023*); however, a majority of the $PM_{2.5}$ emissions are non-point, as shown in Table 4-1: *Emission Inventory in El Paso County, from 2020*.

[10] https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data
[11] https://experience.arcgis.com/experience/a2ca272ce9fc4019a88ce35b863e2cab
[12] https://www.epa.gov/sites/default/files/2019-01/documents/how_to_read_a_wind_rose.pdf

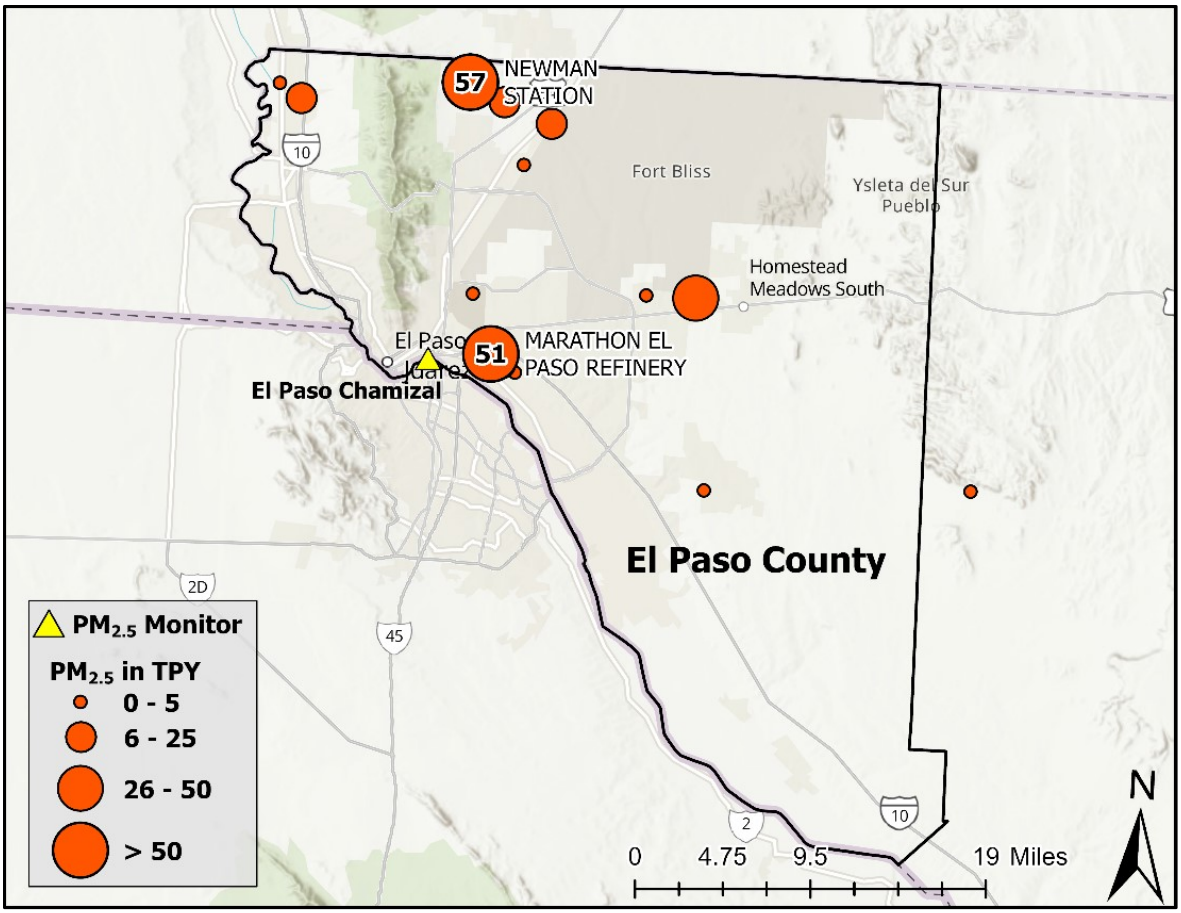

Figure 4-1: Point Sources in El Paso County, from 2023

Table 4-1: Emissions Inventory in El Paso County, from 2020

Emissions Categories	Emissions (tons per year)
On-road	190.70
Nonroad	91.00
Nonpoint	2,427.97
Point	214.29
Total	2923.96

Figure 4-2: *Wind Roses in El Paso County 2021-2023* shows that in El Paso County, a higher percentage of winds is coming from the southwest direction, with relatively strong spokes facing due north, east, and south, suggesting occasional strong winds from each direction. Figure 4-3: *Hourly Average Continuous $PM_{2.5}$ Concentrations at El Paso Chamizal Monitor by Peak Area Hourly Wind Speed in El* Paso County for 2022, 2023, and 2024 displays hourly wind speeds plotted against $PM_{2.5}$ concentrations at the El Paso Chamizal monitor. While there are a few high $PM_{2.5}$ concentrations at relatively low wind speeds, there is no other definitive pattern in Figure 4-3, and this due to the fact that the characteristically small particles of $PM_{2.5}$ can be transported great distances where local wind conditions are less of a factor than wind conditions at the point from which the $PM_{2.5}$ was initially entrained in the air.

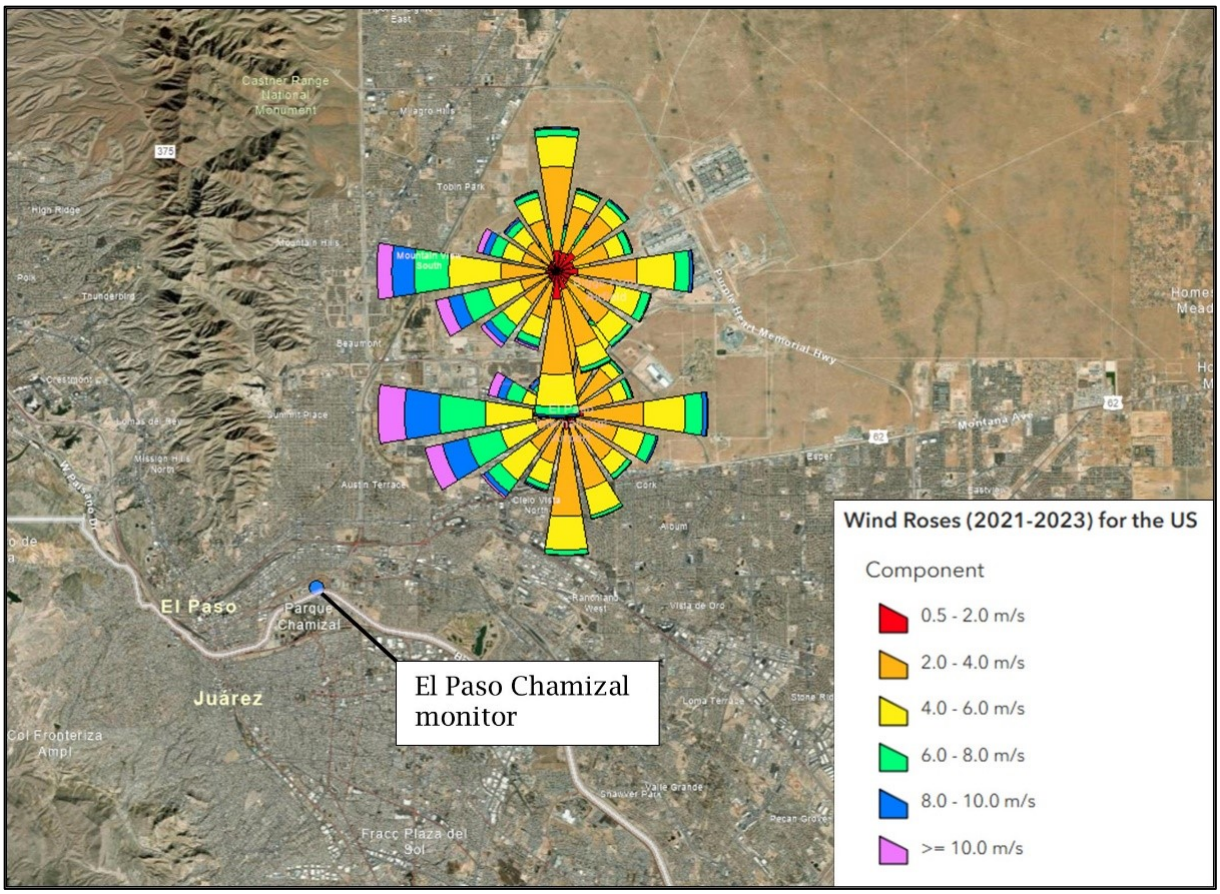

Figure 4-2: Wind Roses in El Paso County 2021-2023

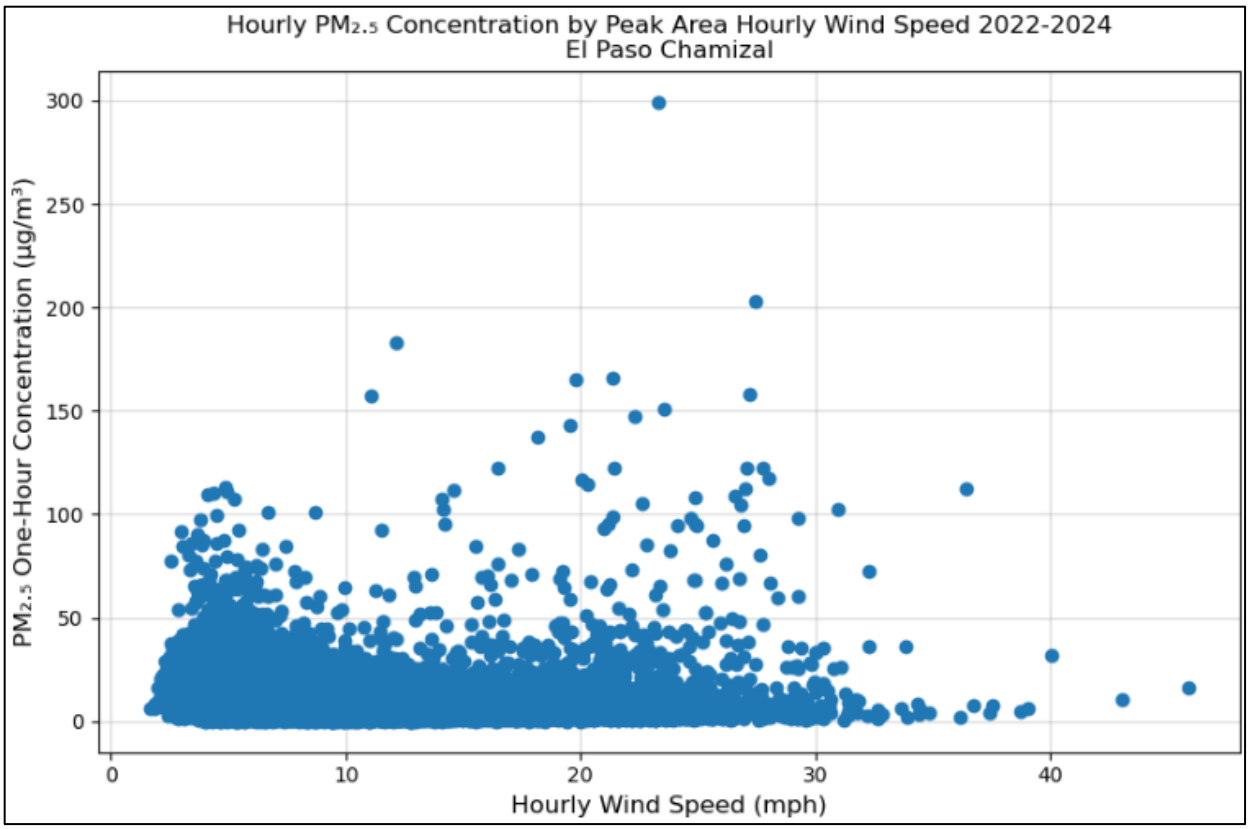

Figure 4-3: Hourly Average Continuous $PM_{2.5}$ Concentrations at El Paso Chamizal Monitor by Peak Area Hourly Wind Speed in El Paso County for 2022, 2023, and 2024

4.3 ATTAINMENT STATUS AND CONTROL MEASURES

El Paso County is currently designated as attainment for the 2012 primary annual $PM_{2.5}$ standard of 12.0 µg/m³. In February 2024, EPA lowered the primary annual standard to 9.0 µg/m³, and 2023 design values show that $PM_{2.5}$ concentrations in the aforementioned county are above the revised standard. In this document, TCEQ demonstrates that the $PM_{2.5}$ concentrations at monitors on dates listed in Table 1-1 were caused by exceptional events and requests that these dates be excluded from regulatory decisions for the 2024 annual $PM_{2.5}$ NAAQS.

As a part of the state implementation plan (SIP) strategy, Texas has established statewide rules to attain or maintain the National Ambient Air Quality Standards for particulate matter (PM). Title 30 TAC §111, Subchapter A includes statewide regulations for visible emissions and PM.[13] These regulations contain control requirements that apply to various sources of PM emissions and monitoring, testing, and recordkeeping requirements for affected sources. Title 30 TAC §111, Subchapter B is a statewide regulation that addresses outdoor burning and is applicable to particulate matter control.[14]

4.4 PRESCRIBED FIRES AND SMOKE MANAGEMENT PLANS

The Texas A&M Forest Service (TFS, formally called Texas Forest Service) coordinates fire and smoke management issues in Texas to address basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke

[13] https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=111&sch=A
[14] https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=111&sch=B&rl=Y

management programs pursuant to the requirements under the Regional Haze Rule 40 CFR §51.308(f)(2)(iv)(D).[15] The 34th Texas Legislature created the TFS in 1915. The legal mandate of the TFS includes the responsibility to "assume direction of all forest interests and all matters pertaining to forestry within the jurisdiction of the state." The TFS has developed a voluntary approach called the Texas Forest Service Smoke Management System, under which all land managers in Texas, including the National Park Service, inform the TFS before performing prescribed burns.

The Regional Haze Rule allows for states to have smoke management programs that are comparable to smoke management plans (SMP) without being certified as SMPs. The following list is documentation that Texas has a structure in place, with rules, communication systems, and data collection to help reduce particulate matter, which reduces visibility. The following are documents, rules, memorandums of understanding, etc., that help establish that Texas has a working smoke management program to help reduce smoke and fires throughout the state. This list is not exhaustive and is only a sample. The documents are updated periodically.

- Texas Forest Service (TFS), 2023. Texas Wildfire Protection Plan.[16]
- TFS, 2018. Texas A&M Forest Service Smoke Management Plan.[17]
- TCEQ, 2015. Outdoor Burning in Texas, publication number: RG-049.[18]
- Texas Administrative Code (TAC), Title 30, Environmental Quality, Part 1, Texas Commission on Environmental Quality, Chapter 111, Control of Air Pollution from Visible Emissions and Particulate Matter, Subchapter B, Outdoor Burning.[19]
- Texas Parks and Wildlife Department, 2015. General Plan for Prescribed Burning on Texas Parks and Wildlife Department Lands.[20]
- Master Cooperative Wildland Fire Management and Stafford Act Response Agreement with U.S. Forest Service, National Park Service, U.S. Fish & Wildlife Service, Bureau of Indian Affairs, Texas Forest Service, and Texas Parks and Wildlife Department, 2015.[21]

4.5 SAHARAN DUST, OTHER - DUST AND WILDFIRE – U.S.

Section 40 CFR §50.14 (a)(8)(vii) provides that a state would not be required to provide case-specific justification to support the not reasonably controllable or preventable portion of the rule when the emissions-generating event was outside the state. Specifically, Section 40 CFR §50.14 (a)(8)(vii) states:

> *The Administrator shall not require a State to provide case-specific justification to support the not reasonably controllable or preventable criterion for emissions-generating activity that occurs outside of the State's jurisdictional boundaries within which the concentration at issue was monitored.*

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[15] https://tfsweb.tamu.edu/
[16] https://tfsweb.tamu.edu/uploadedFiles/TFSMain/Wildfires_and_Disasters/Contact_Us(3)/Texas%20Wildfire%20Protection%20Plan_May%202023%20Revision.pdf
[17] https://tfsweb.tamu.edu/uploadedFiles/TFS_Main/Manage_Forests_and_Land/Prescribed_Fires/TFS%20SMP.pdf
[18] https://www.tceq.texas.gov/downloads/publications/rg/outdoor-burning-in-texas-rg-49.pdf
[19] https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=111&sch=B&rl=Y
[20] https://tpwd.texas.gov/publications/pwdpubs/media/pwd_lf_w7000_1818_general_plan_for_burning_on_tpwd_lands.pdf
[21] https://gacc.nifc.gov/swcc/management_admin/incident_business/docs/25.Texas%20Master%20Agreement.pdf

SECTION 5: HUMAN ACTIVITY UNLIKELY TO RECUR AT A PARTICULAR LOCATION OR NATURAL EVENT

5.1 OVERVIEW

This section satisfies the Exceptional Events Rule Requirement at 40 CFR §50.14(c)(3)(iv)(E): "A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event."

5.2 AFRICAN DUST – NATURAL EVENT

Based on the documentation provided in Section 3 of this demonstration, the event qualifies as a natural event due to dust originating from the Sahara Desert, which is relatively undisturbed by human activity and has commonly occurring dust storms.

EPA generally considers the emissions of $PM_{2.5}$ from dust events to meet the regulatory definition of a natural event under 40 CFR §50.1(k), defined as one 'in which human activity plays little or no direct causal role.'

Saharan dust impacts monitors in Texas every year, mainly in the summer. The three to six episodes per year are typically intense and characterized by high incoming background levels that last one to three days or more. Satellite imagery provides good visual evidence of African dust moving across the Atlantic Ocean, through the Caribbean, and into the Gulf of America. Current NASA Worldview satellite imagery of dust surface mass concentration layers created from time-averaged 2-dimensional mean data collections from July 2021, 2022 and 2023, present an annual trend of dust being transported from West Africa through the Caribbean and into Texas (Figure 5-1: *July 2021 Monthly Average Dust Surface Mass Concentration (MERRA-2)*, Figure 5-2: *July 2022 Monthly Average Dust Surface Mass Concentration (MERRA-2)*, and Figure 5-3: *July 2023 Monthly Average Dust Surface Mass Concentration (MERRA-2)*).[22]

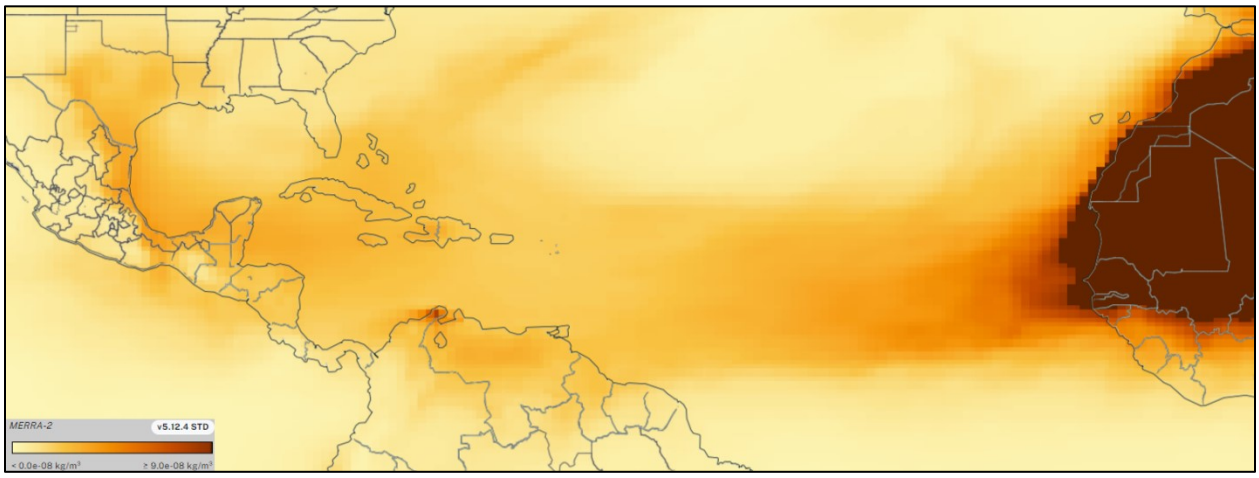

Figure 5-1: July 2021 Monthly Average Dust Surface Mass Concentration (MERRA-2)

[22] https://worldview.earthdata.nasa.gov/, accessed July 8, 2025

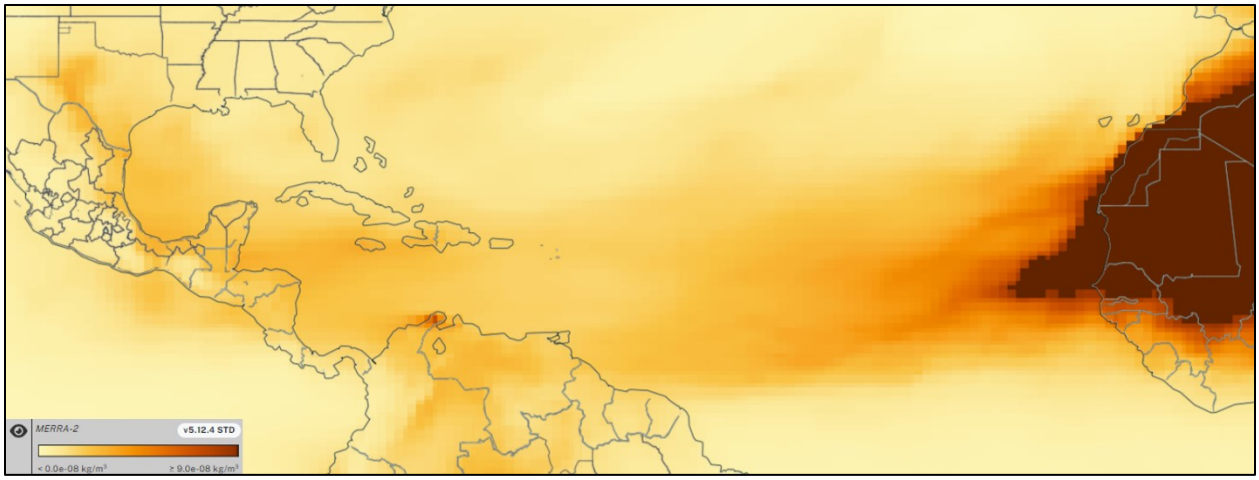

Figure 5-2: July 2022 Monthly Average Dust Surface Mass Concentration (MERRA-2)

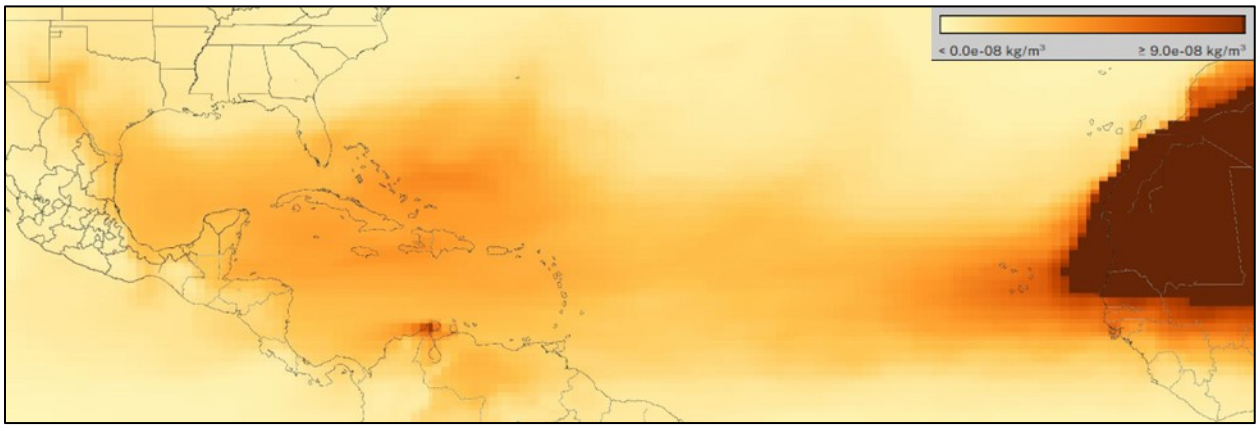

Figure 5-3: July 2023 Monthly Average Dust Surface Mass Concentration (MERRA-2)

5.3 PRESCRIBED FIRES – HUMAN ACTIVITY UNLIKELY TO RECUR AT A PARTICULAR LOCATION

Prescribed fires are recognized as being caused by human activity and therefore must satisfy the 'human activity unlikely to recur at a particular location' portion of the rule. Recurrence for prescribed fires is defined by either "the natural fire return interval or the prescribed fire frequency needed to establish, restore and/or maintain a sustainable and resilient wildland ecosystem contained in a multi-year land or resource management plan with a stated objective to establish, restore and/or maintain a sustainable and resilient wildland ecosystem and/or to preserve endangered or threatened species through a program of prescribed fire." Thus, the recurrence frequency for prescribed fire is specific to the ecosystem and resource needs of the affected area.

The Texas A&M Forest Service coordinates prescribed fires and establishes smoke management plans for the state, as described in Section 4.4. Smoke from prescribed fires in other states may impact Texas monitors as well. The prescribed fires impacting monitors in Texas occurred in Texas and Louisiana. Any prescribed fires occurring outside the State of Texas were not reasonably controllable or preventable by the State of Texas and are essentially treated as wildfires in this demonstration. The State of Louisiana maintains robust programs aimed at

responding to wildfires and preventing future ones. The Louisiana Department of Agriculture and Forestry maintains information for prescribed burning on its Prescribed Burning webpage.[23]

Based on the documentation provided in Section 3 of this submittal, the prescribed fire events satisfied the 'human activity unlikely to recur at a particular location' criterion by describing the transitory nature of the fire smoke and the high $PM_{2.5}$ concentration on event days.

5.4 HIGH WINDS – NATURAL EVENT

High wind dust events are considered to be natural events in cases where windblown dust is entirely from natural undisturbed lands in the area or where all anthropogenic sources are reasonably controlled (40 CFR §50.14(b)(5)(ii)). An event involving windblown dust solely from natural undisturbed landscapes is considered a natural event.

Based on the documentation provided in Section 3 of this submittal, the high wind events qualify as a natural event. The exceedances of $PM_{2.5}$ associated with the high wind events listed in Table 1-1 meet the regulatory definition of a natural event at 40 CFR §50.14(b)(8). These events transported windblown dust from natural lands in West Texas and, accordingly, TCEQ has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

[23] https://www.ldaf.la.gov/land/fire/prescribed-burning

SECTION 6: PUBLIC NOTIFICATION AND MITIGATION ACTIONS

6.1 OVERVIEW

This section satisfies the requirements in 40 CFR §51.930(a): "A state requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the NAAQS." These are commonly referred to as mitigation actions.

Each of the specific requirements are addressed individually below.

6.2 PROMPT PUBLIC NOTIFICATION

The first mitigation requirement is to "provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard." TCEQ provided (and continues to provide) ozone, $PM_{2.5}$, and particulate matter less than or equal to 10 microns in diameter (PM_{10}) AQI forecasts for the current day and the next three days for 14 areas in Texas. These forecasts are available to the public on the Today's Texas Air Quality Forecast webpage of the TCEQ website and on EPA's AirNow website.[24, 25]

TCEQ provides near real-time hourly $PM_{2.5}$ measurements from monitors across the state which the public may access on the Latest Hourly $PM_{2.5}$ Levels webpage of the TCEQ website.[26] TCEQ also publishes an AQI Report for many Texas metropolitan areas on the AQI and Data Reports webpage of the TCEQ website, which displays current and historical daily AQI measurements.[27]

Finally, TCEQ publishes daily updates to its air quality forecast to interested parties through e-mail and social media platforms. Any person wishing to receive these updates may register on the Air Quality Forecast and Ozone Action Day Alerts webpage on the TCEQ website.[28] These measures provide daily and near real-time notification to the public, including the media, of current, expected, and changing air quality conditions.

6.3 PUBLIC EDUCATION

The second mitigation requirement is to "provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event." Through its website, TCEQ provides the public with technical, health, personal activity, planning, and legal information and resources concerning particulate matter (PM) pollution. Besides its website, TCEQ publishes daily updates to its air quality forecast to interested parties through e-mail and social media platforms to provide daily and near real-time notification to the public of current, expected, and changing air quality conditions.

TCEQ maintains a particulate matter webpage, which provides important information regarding the health effects of particulate matter, steps that individuals can take to limit particulate matter emissions, and actions they may wish to take to reduce their exposure to higher levels of particulate matter.[29] The webpage also addresses the latest air quality planning for the particulate matter NAAQS.

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[24] http://www.tceq.texas.gov/airquality/monops/forecast_today.html
[25] http://airnow.gov
[26] https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_curlev.pl?user_param=88101
[27] https://www.tceq.texas.gov/airquality/monops/data-reports
[28] http://www.tceq.texas.gov/airquality/monops/ozone_email.html
[29] https://www.tceq.texas.gov/airquality/sip/criteria-pollutants/sip-pm

TCEQ's main Air webpage provides air quality information on topics such as advisory groups, emissions inventories, air quality modeling and data analysis, scientific field studies, state implementation plan (SIP) revisions, air permits, rules, air monitoring data, and how to file complaints.[30]

TCEQ's website provides a hyperlink to the Texas AirNow website operated by EPA. This website links the public to additional information regarding health effects of PM, strategies for reducing one's exposure to PM, and actions that individuals can take to reduce pollution levels.[31]

The Texas Department of Transportation (TxDOT) sponsors the public education and awareness through the Drive Clean Across Texas campaign.[32] The campaign raises awareness about the impact of vehicle emissions on air quality and motivates drivers to take steps to reduce air pollution.

TCEQ sponsors the Take Care of Texas program, which addresses air quality and provides the public with proactive steps to reduce air pollution particularly on days when air quality forecasts are issued predicting greater potential for high PM concentrations.[33]

6.4 IMPLEMENTATION OF MEASURES TO PROTECT PUBLIC HEALTH

The third requirement is to "provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events."

Particulate matter regulations are in place in Title 30 Texas Administrative Code Chapter 111 that are applicable to particulate matter control statewide. These regulations are previously described in Section 4: *Not Reasonably Controllable or Preventable*.

6.5 MITIGATION PLAN REQUIREMENTS

Section 319(b) of the federal Clean Air Act (FCAA) governs the identification of air quality monitoring data as exceptional events and how that data may be excluded from consideration for air quality regulatory purposes. EPA has adopted rules in 40 Code of Federal Regulation (CFR) §§50.14 and 51.930 to implement FCAA, §319, requiring states to adopt and implement mitigation plans in areas with historically documented or known seasonal events.

For $PM_{2.5}$, TCEQ has developed mitigation plans for exceptional events in Harris County and El Paso County that can be found on the TCEQ website.[34]

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[30] http://www.tceq.texas.gov/agency/air_main.html
[31] https://www.airnow.gov
[32] http://www.drivecleanacrosstexas.org
[33] http://takecareoftexas.org/air-quality
[34] https://www.tceq.texas.gov/downloads/air-quality/modeling/exceptional/texas-ee-mitigation-plan-final.pdf

SECTION 7: PUBLIC COMMENT PERIOD

7.1 OVERVIEW

This section satisfies the Exceptional Events Rule Requirement at 40 CFR §50.14(c)(3)(iv)(A), (B), (C): "document that the air agency followed the public comment process and that the comment period was open for a minimum of 30 days, which could be concurrent with the beginning of EPA's initial review period of the associated demonstration provided the air agency can meet all requirements in this paragraph; submit the public comments received along with its demonstration to the Administrator; and address in the submission to the Administrator those comments disputing or contradicting factual evidence provided in the demonstration."

7.2 PUBLIC COMMENT PROCESS

The public comment period for this demonstration is from August 5, 2025, through September 5, 2025. During this comment period, the demonstration will be available on TCEQ's website at https://www.tceq.texas.gov/airquality/monops/pm_flags.html. Written comments will be accepted via mail or e-mail. TCEQ will include all comments received or postmarked by 5:00 p.m. CDT on September 5, 2025, with the final demonstration submitted to EPA. TCEQ will also address those comments disputing or contradicting factual evidence provided in the final demonstration.

SECTION 8: CONCLUSION

This exceptional events demonstration shows that the El Paso Chamizal monitor was impacted by smoke and dust from prescribed fires, fires in the U.S., high winds, fireworks, and African dust. These exceptional events caused the elevated $PM_{2.5}$ concentrations on the dates listed in Table 1-1, as explained in Section 3: *Clear Causal Relationship*.

This demonstration shows that the exceptional events that influenced $PM_{2.5}$ concentrations are consistent with EPA's definition of an exceptional event under the 2016 Exceptional Events Rule. TCEQ requests that EPA concur with the exclusion from regulatory decisions the $PM_{2.5}$ concentration(s) in Table 1-1. The days and sites for which TCEQ is requesting concurrence were impacted by events consistent with EPA's definition of "unusual or naturally occurring events" that can affect air quality but are not reasonably controllable using techniques that tribal, state, or local air agencies may implement in order to attain and maintain the 2024 primary annual $PM_{2.5}$ NAAQS.