EXCEPTIONAL EVENTS DEMONSTRATION FOR 2024 $PM_{2.5}$ EXCEEDANCES AT ATASCOSA, HIDALGO, NUECES, TARRANT, AND WEBB COUNTIES

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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 Section 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 Atascosa County (Von Ormy Highway 16 monitor), Hidalgo County (Edinburg East Freddy Gonzalez Drive monitor), Nueces County (Corpus Christi Huisache and Dona Park monitors), Tarrant County (Fort Worth Northwest and Haws Athletic Center monitors), and Webb County (World Trade Bridge monitor). This demonstration shows that concentrations of $PM_{2.5}$ at seven air monitoring sites across Atascosa County, Hidalgo County, Nueces County, Tarrant County and Webb County were impacted by exceptional events on 53 days in 2024. While 53 unique dates were identified for exceptional events, select dates had impacts on multiple monitors.

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 Seven Monitors 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

EE Group	Date	Monitor Site	Exceedance Concentration (µg/m³)	Type of Event	Tier
1	02/27/24	Edinburg East Freddy Gonzalez Drive	26.3	Fire - Mexico/Central America	2
2	03/04/24	Edinburg East Freddy Gonzalez Drive	25.6	Fire - Mexico/Central America	2
2	03/05/24	Edinburg East Freddy Gonzalez Drive	33.3	Fire - Mexico/Central America	1
2	03/06/24	Edinburg East Freddy Gonzalez Drive	30.4	Fire - Mexico/Central America	1
2	03/08/24	Edinburg East Freddy Gonzalez Drive	28.4	Fire - Mexico/Central America	2
3	03/14/24	Edinburg East Freddy Gonzalez Drive	26.6	Fire - Mexico/Central America	2

EE Group	Date	Monitor Site	Exceedance Concentration (µg/m^3)	Type of Event	Tier
3	03/15/24	Edinburg East Freddy Gonzalez Drive	27.8	Fire - Mexico/Central America	2
3	03/15/24	World Trade Bridge	28.5	Fire - Mexico/Central America	2
4	04/01/24	Von Ormy Highway 16	32.1	Fire - Mexico/Central America	2
4	04/01/24	Edinburg East Freddy Gonzalez Drive	31.4	Fire - Mexico/Central America	1
4	04/01/24	World Trade Bridge	29.1	Fire - Mexico/Central America	2
5	04/08/24	Edinburg East Freddy Gonzalez Drive	25.9	Fire - Mexico/Central America	2
5	04/09/24	Edinburg East Freddy Gonzalez Drive	28.6	Fire - Mexico/Central America	2
5	04/09/24	World Trade Bridge	28.9	Fire - Mexico/Central America	2
6	04/17/24	Edinburg East Freddy Gonzalez Drive	25.6	Fire - Mexico/Central America	2
7	04/26/24	Von Ormy Highway 16	27.5	Fire - Mexico/Central America	2
7	04/26/24	Edinburg East Freddy Gonzalez Drive	26.4	Fire - Mexico/Central America	2
7	04/27/24	Von Ormy Highway 16	28.2	Fire - Mexico/Central America	2
7	04/27/24	Edinburg East Freddy Gonzalez Drive	32.6	Fire - Mexico/Central America	1
7	04/27/24	World Trade Bridge	37.5	Fire - Mexico/Central America	1
7	04/28/24	Edinburg East Freddy Gonzalez Drive	28.0	Fire - Mexico/Central America	2
7	04/29/24	Edinburg East Freddy Gonzalez Drive	27.3	Fire - Mexico/Central America	2
8	05/02/24	Edinburg East Freddy Gonzalez Drive	25.6	Fire - Mexico/Central America	2
8	05/02/24	World Trade Bridge	31.9	Fire - Mexico/Central America	1
8	05/03/24	Edinburg East Freddy Gonzalez Drive	28.5	Fire - Mexico/Central America	2
9	05/07/24	Edinburg East Freddy Gonzalez Drive	32.1	Fire - Mexico/Central America	1
9	05/07/24	World Trade Bridge	29.3	Fire - Mexico/Central America	2
9	05/08/24	Von Ormy Highway 16	41.6	Fire - Mexico/Central America	1
9	05/08/24	Edinburg East Freddy Gonzalez Drive	39.5	Fire - Mexico/Central America	1

EE Group	Date	Monitor Site	Exceedance Concentration (µg/m^3)	Type of Event	Tier
9	05/08/24	Corpus Christi Huisache	40.6	Fire - Mexico/Central America	1
9	05/08/24	Dona Park	46.4	Fire - Mexico/Central America	1
9	05/08/24	World Trade Bridge	29.5	Fire - Mexico/Central America	2
9	05/09/24	Von Ormy Highway 16	35.8	Fire - Mexico/Central America	1
9	05/09/24	Edinburg East Freddy Gonzalez Drive	38.7	Fire - Mexico/Central America	1
9	05/09/24	Corpus Christi Huisache	45.8	Fire - Mexico/Central America	1
9	05/09/24	Dona Park	54.9	Fire - Mexico/Central America	1
9	05/10/24	Edinburg East Freddy Gonzalez Drive	49.3	Fire - Mexico/Central America	1
9	05/10/24	Dona Park	38.2	Fire - Mexico/Central America	1
9	05/11/24	Edinburg East Freddy Gonzalez Drive	32.5	Fire - Mexico/Central America	1
9	05/12/24	Edinburg East Freddy Gonzalez Drive	26.0	Fire - Mexico/Central America	2
9	05/12/24	Dona Park	36	Fire - Mexico/Central America	1
9	05/13/24	Edinburg East Freddy Gonzalez Drive	32.9	Fire - Mexico/Central America	1
9	05/15/24	Edinburg East Freddy Gonzalez Drive	29.6	Fire - Mexico/Central America	1
9	05/16/24	Edinburg East Freddy Gonzalez Drive	46.6	Fire - Mexico/Central America	1
9	05/16/24	Dona Park	39.4	Fire - Mexico/Central America	1
9	05/18/24	Edinburg East Freddy Gonzalez Drive	24.2	Fire - Mexico/Central America	2
9	05/19/24	Von Ormy Highway 16	29.0	Fire - Mexico/Central America	2
9	05/19/24	Edinburg East Freddy Gonzalez Drive	30.5	Fire - Mexico/Central America	1
9	05/19/24	Dona Park	35.9	Fire - Mexico/Central America	1
9	05/19/24	World Trade Bridge	30.5	Fire - Mexico/Central America	2
9	05/20/24	Edinburg East Freddy Gonzalez Drive	35.7	Fire - Mexico/Central America	1
9	05/20/24	World Trade Bridge	34.7	Fire - Mexico/Central America	1

EE Group	Date	Monitor Site	Exceedance Concentration (µg/m^3)	Type of Event	Tier
9	05/21/24	Von Ormy Highway 16	33.4	Fire - Mexico/Central America	2
9	05/21/24	Edinburg East Freddy Gonzalez Drive	36.2	Fire - Mexico/Central America	1
9	05/21/24	Dona Park	41.1	Fire - Mexico/Central America	1
9	05/21/24	Haws Athletic Center	26.3	Fire - Mexico/Central America	1
9	05/21/24	World Trade Bridge	39.2	Fire - Mexico/Central America	1
9	05/22/24	Von Ormy Highway 16	35.5	Fire - Mexico/Central America	1
9	05/22/24	Edinburg East Freddy Gonzalez Drive	30.7	Fire - Mexico/Central America	1
9	05/22/24	Fort Worth Northwest	32.5	Fire - Mexico/Central America	1
9	05/22/24	World Trade Bridge	41.9	Fire - Mexico/Central America	1
9	05/23/24	Von Ormy Highway 16	30.6	Fire - Mexico/Central America	2
9	05/23/24	Edinburg East Freddy Gonzalez Drive	32.1	Fire - Mexico/Central America	1
9	05/23/24	Dona Park	35.2	Fire - Mexico/Central America	1
9	05/23/24	World Trade Bridge	39	Fire - Mexico/Central America	1
9	05/24/24	Von Ormy Highway 16	39.6	Fire - Mexico/Central America	1
9	05/24/24	Edinburg East Freddy Gonzalez Drive	46.9	Fire - Mexico/Central America	1
9	05/24/24	Dona Park	37.4	Fire - Mexico/Central America	1
9	05/24/24	Haws Athletic Center	24.7	Fire - Mexico/Central America	1
9	05/24/24	World Trade Bridge	39.1	Fire - Mexico/Central America	1
9	05/25/24	Von Ormy Highway 16	35.5	Fire - Mexico/Central America	1
9	05/25/24	Edinburg East Freddy Gonzalez Drive	38.2	Fire - Mexico/Central America	1
9	05/25/24	Dona Park	39.6	Fire - Mexico/Central America	1
9	05/25/24	Haws Athletic Center	27.2	Fire - Mexico/Central America	1
9	05/25/24	World Trade Bridge	42.7	Fire - Mexico/Central America	1

EE Group	Date	Monitor Site	Exceedance Concentration (µg/m^3)	Type of Event	Tier
9	05/26/24	Von Ormy Highway 16	37.9	Fire - Mexico/Central America	1
9	05/26/24	Edinburg East Freddy Gonzalez Drive	49.5	Fire - Mexico/Central America	1
9	05/26/24	Dona Park	46.9	Fire - Mexico/Central America	1
9	05/26/24	World Trade Bridge	36.9	Fire - Mexico/Central America	1
9	05/27/24	Von Ormy Highway 16	38.1	Fire - Mexico/Central America	1
9	05/27/24	Edinburg East Freddy Gonzalez Drive	51.6	Fire - Mexico/Central America	1
9	05/27/24	Corpus Christi Huisache	45.0	Fire - Mexico/Central America	1
9	05/27/24	Dona Park	58.8	Fire - Mexico/Central America	1
9	05/27/24	Haws Athletic Center	25.4	Fire - Mexico/Central America	1
9	05/28/24	Edinburg East Freddy Gonzalez Drive	30.8	Fire - Mexico/Central America	1
9	05/28/24	World Trade Bridge	29.1	Fire - Mexico/Central America	2
9	05/30/24	Edinburg East Freddy Gonzalez Drive	23.3	Fire - Mexico/Central America	2
9	05/31/24	Edinburg East Freddy Gonzalez Drive	26.0	Fire - Mexico/Central America	2
10	05/27/24	World Trade Bridge	38.3	High Winds	1
11	06/02/24	Edinburg East Freddy Gonzalez Drive	23.6	Fire - Mexico/Central America	2
11	06/03/24	Edinburg East Freddy Gonzalez Drive	28.2	Fire - Mexico/Central America	2
11	06/04/24	Von Ormy Highway 16	34.7	Fire - Mexico/Central America	1
11	06/04/24	Edinburg East Freddy Gonzalez Drive	31.2	Fire - Mexico/Central America	1
11	06/04/24	Dona Park	37.8	Fire - Mexico/Central America	1
11	06/04/24	Haws Athletic Center	24.9	Fire - Mexico/Central America	1
11	06/04/24	World Trade Bridge	35.1	Fire - Mexico/Central America	1
11	06/05/24	Edinburg East Freddy Gonzalez Drive	49.8	Fire - Mexico/Central America	1
11	06/05/24	World Trade Bridge	34	Fire - Mexico/Central America	1
11	06/06/24	Edinburg East Freddy Gonzalez Drive	38.1	Fire - Mexico/Central America	1

EE Group	Date	Monitor Site	Exceedance Concentration (µg/m^3)	Type of Event	Tier
11	06/06/24	World Trade Bridge	36.9	Fire - Mexico/Central America	1
12	06/05/24	Corpus Christi Huisache	37.4	High Winds	1
12	06/05/24	Dona Park	50.5	High Winds	1
13	07/30/24	Edinburg East Freddy Gonzalez Drive	23.0	African Dust	2
13	07/31/24	Von Ormy Highway 16	38.5	African Dust	1
13	07/31/24	Edinburg East Freddy Gonzalez Drive	33.8	African Dust	1
13	07/31/24	Dona Park	42.8	African Dust	1
13	07/31/24	Haws Athletic Center	31.5	African Dust	1
13	07/31/24	World Trade Bridge	36.3	African Dust	1
13	08/01/24	Fort Worth Northwest	32.6	African Dust	1
13	08/01/24	Haws Athletic Center	33.2	African Dust	1
14	10/03/24	Fort Worth Northwest	34.8	Wildfire U.S.	1

(µg/m^3) = micrograms per cubic meter

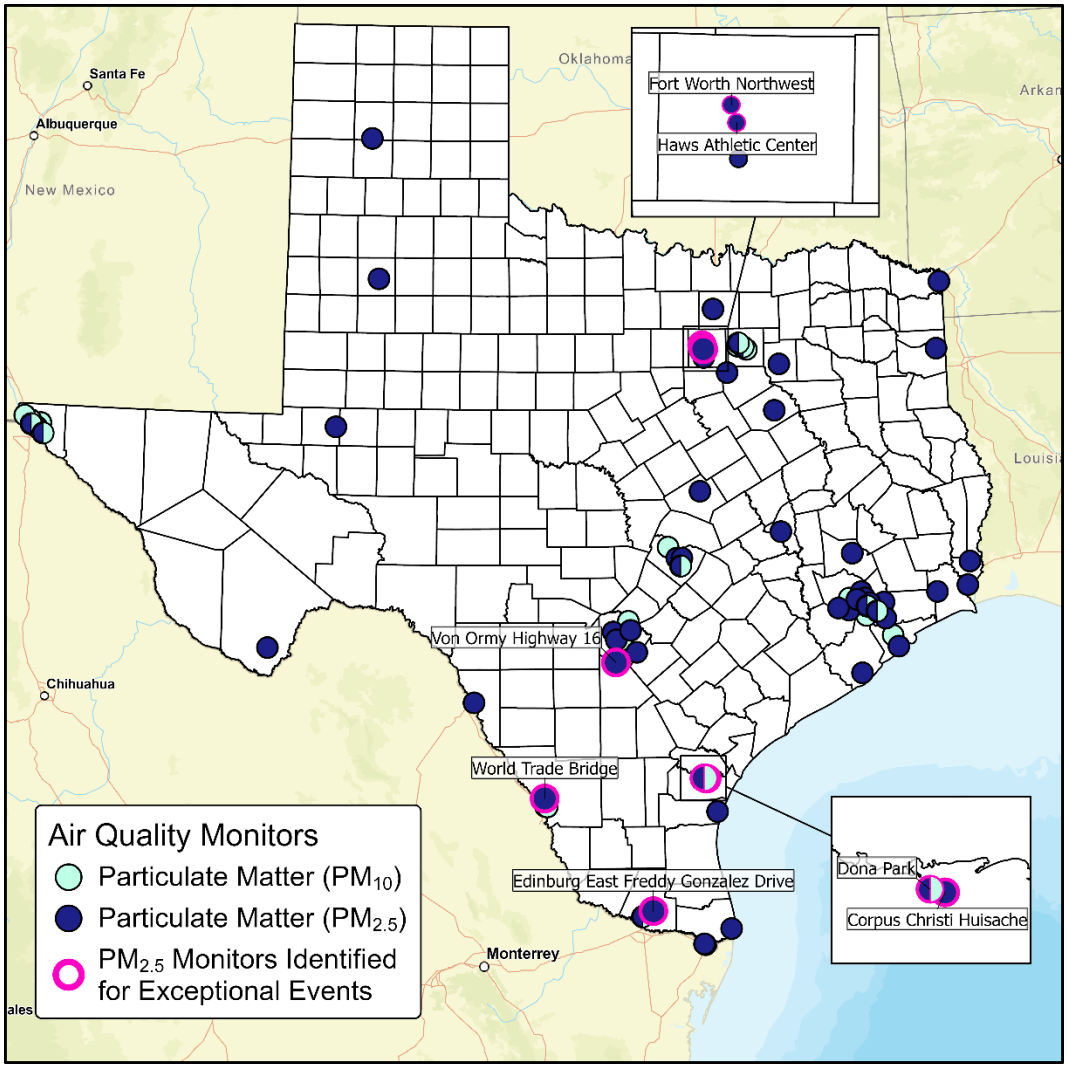

Figure 1-1: Map of Texas with Seven Monitors Identified for Exceptional Events

Table 1-2: Monitor Details

Site Name	Von Ormy Highway 16	Edinburg East Freddy Gonzalez Drive	Corpus Christi Huisache	Dona Park	Haws Athletic Center	Fort Worth Northwest	World Trade Bridge
Air Quality System (AQS) Number	480131090	482151046	483550032	483550034	484391006	484391002	484790313
Activation Date	5/29/2020	7/8/2015	8/6/1997	1/31/2001	4/1/2001	1/1/1975	8/13/2002
Address	17534 North State Highway 16	1491 East Freddy Gonzalez Drive	3810 Huisache Street	5707 Up River Rd	600 1/2 Congress St	3317 Ross Ave	Mines Road 11601 FM 1472
County	Atascosa	Hidalgo	Nueces	Nueces	Tarrant	Tarrant	Webb
Latitude/ Longitude	29.1628698, -98.5891166	26.2884857, -98.1520588	27.8044885, -97.4315277	27.8118332, --97.4657062	32.7591555, -97.3422980	32.8058061, -97.3565215	27.5996022, -99.5334135
Pollutant Instrumentation	$PM_{2.5}$	$PM_{2.5}$	VOC, H_2S, $PM_{2.5}$, SO_2	VOC, $PM_{2.5}$	$PM_{2.5}$	VOC, Carbonyl, NO_x, O2, $PM_{2.5}$	$PM_{2.5}$
Meteorological Instrumentation	Temperature, Wind	Temperature, Wind	Temperature, Wind	Temperature, Wind	--	Dew Point, Relative Humidity, Solar Radiation, Temperature, Wind	--

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/m³ (40 CFR §50.20).

Texas is submitting this exceptional events demonstration to exclude certain data from the 2022-2024 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 June 18, 2025, TCEQ submitted an initial notification to EPA Region 6. A copy of the initial notification letter is 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. The 2022 and 2023 days impacted by exceptional events at these monitors and the details of the events are available in TCEQ's Exceptional Event Demonstration for 2022 $PM_{2.5}$ Exceedances at Atascosa, Hidalgo, Nueces, Tarrant and Webb Counties and Exceptional Event

[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

Demonstration for 2023 $PM_{2.5}$ Exceedances at Atascosa, Hidalgo, Tarrant and Webb Counties, respectively.

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)
Von Ormy Highway 16 (480131090)	9.5	9.0
Edinburg East Freddy Gonzalez Drive (482151046)	10.3	9.0
Corpus Christi Huisache (483550032)	9.1	9.0
Dona Park (483550034)	9.3	9.0
Fort Worth Northwest (484391002)	9.1	9.0
Haws Athletic Center (484391006)	9.4	9.0
World Trade Bridge (484790313)	9.7	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. This section describes the 2024 events and the general meteorological conditions that caused smoke and dust to travel to the seven monitoring sites. As identified in Table 1-1, events were categorized into 14 distinct groups based on single day events or episodes with types of events (Fire [Mexico/Central America], Wildfire, High Winds, and African Dust). The Fire -Mexico/Central America event type descriptor is used to denote fire related flags in AQS to ensure consistency in the indication of the jurisdictional origin of the fire (Outside of the United States in Mexico and/or Central America). Unless otherwise specified, all the Fire-Mexico/Central America exceptional events represent fires with origin only in Mexico that impacted monitors in Texas in this demonstration.

2.2 ATASCOSA COUNTY BACKGROUND

The Atascosa County area is located in the Rio Grande Plain region of South Texas. The county is part of the San Antonio-New Braunfels metropolitan statistical area (MSA) and has a population of approximately 48,981 people[7]. The area covers 1,221 square miles, and is geographically characterized by plains and rolling hills, with the Atascosa River running through its entirety. Atascosa County experiences a subtropical climate, characterized by hot, humid summers and mild winters. Rainfall is fairly distributed throughout the year, with a peak storm season from March to May.

2.3 HIDALGO COUNTY BACKGROUND

The Hidalgo County area is located in the Rio Grande Valley region of South Texas. The county is part of both a Metropolitan Statistical Area (MSA) as well as a Combined Statistical Area (CSA) with a population of approximately 870,781 people.[7] The area covers 1,583 square miles and is geographically characterized by predominantly flat terrain with the Rio Grande River forming a natural border. Hidalgo County experiences a subtropical climate with hot, humid summers and mild winters. Rainfall is fairly distributed throughout the year, with a peak storm season from March to May.

2.4 NUECES COUNTY BACKGROUND

The Nueces County area is located in the Coastal Prairies of the South Texas Region. The County is part of the Corpus Christi Metropolitan Statistical Area (MSA) as well as the Corpus Christi-Kingsville-Alice Combined Statistical Area (CSA) and has a population of approximately 353,178 people.[7] The area covers 1,166 square miles and is geographically characterized flat, coastal prairies, with several waterbodies that make up the Nueces Estuary. Nueces County experiences a humid, subtropical climate with hot, humid summers and mild winters, influenced by prevailing Southeast winds. Rainfall typically peaks in May and September.

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

2.5 TARRANT COUNTY BACKGROUND

The Tarrant County area is located in the North Texas Region. The county is part of the Dallas-Fort Worth-Arlington Metropolitan Statistical Area (MSA) and has a population of approximately 2,110,640 people[7]. The area covers 902 square miles and is geographically characterized by several lakes, as well as the Trinity River that flows through the county. Tarrant County experiences a subtropical climate with hot, humid summers and mild winters, with two distinct rainy seasons in spring and fall.

2.6 WEBB COUNTY BACKGROUND

The Webb County area is located in the South Texas Plains of the South Texas Region. The county is part of the Laredo Metropolitan Area; a Core Based Statistical Area (CBSA) and has a population of approximately 267,114 people[7]. The area covers 3,376 square miles and is geographically characterized by its flat terrain and the Rio Grande River that acts as a natural border to Mexico. Webb County experiences a semi-arid climate with hot, dry summers and mild winters. Rainfall is low, with a short but intense peak storm season in spring.

2.7 NARRATIVE FOR EACH GROUP OF EVENT DAYS

All weather maps, graphs, and smoke layer maps are included in Appendix A and are referenced in this section as Figure A-#. The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) area forecast discussions are included in Appendix B and are referenced in this section as Figure 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, and below are the corresponding NWS Weather Forecasts offices used for each monitoring area:
  - Austin/San Antonio office: Von Ormy Highway 16 monitor
  - Brownsville office: Edinburg East Freddy Gonzalez Drive monitor
  - Corpus Christi office: Corpus Christi Huisache, Dona Park, and World Trade Bridge monitors
  - Dallas/Fort Worth office: Fort Worth Northwest and Haws Athletic Center monitors
- 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.

2.7.1 Group 1 – Summary of February 27, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive Monitor

Transported smoke from fires in Mexico affected the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on February 27, 2024. The elevated 24-hour average $PM_{2.5}$ conditions were reported to be 26.3 µg/m^3. Figure 2-1: *Hourly $PM_{2.5}$ Concentrations on Days around Event (February 27, 2024) for the Edinburg East Freddy Gonzalez Drive Monitor* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between February 25, 2024, and February 29, 2024, with the hours on February 27, 2024, highlighted in orange. As seen in Figure 2-1, on February 27, 2024, hourly concentrations increased substantially around 14:00 LST and remained clearly elevated until approximately 22:00 LST.

On the surface chart (Figure A-1), the pressure gradient is oriented from the west to the south over Texas with winds coming from the south. These southerly winds at the surface aided the transport of smoke from Mexico to the Edinburg East Freddy Gonzalez Drive monitor. The 500 mb chart (Figure A-2) shows a longwave trough over the western U.S. with a cutoff low-height center off the coast of southern California. There is also 500 mb ridging over the central U.S. and Texas with winds from the southwest at this level.

On February 27, 2024, NOAA HMS smoke maps reveal light to medium smoke levels in deep south Texas covering the area where the monitor is located, the Gulf of America, and southern Mexico (Figure A-3). Figure 2-2: *Percentage of Reported Fire Instances by the Mexican Government, on and around February 27, 2024*, shows the reported fire types in Mexico, with around 38% of the reported fires considered unlikely to recur, including intentional sources.

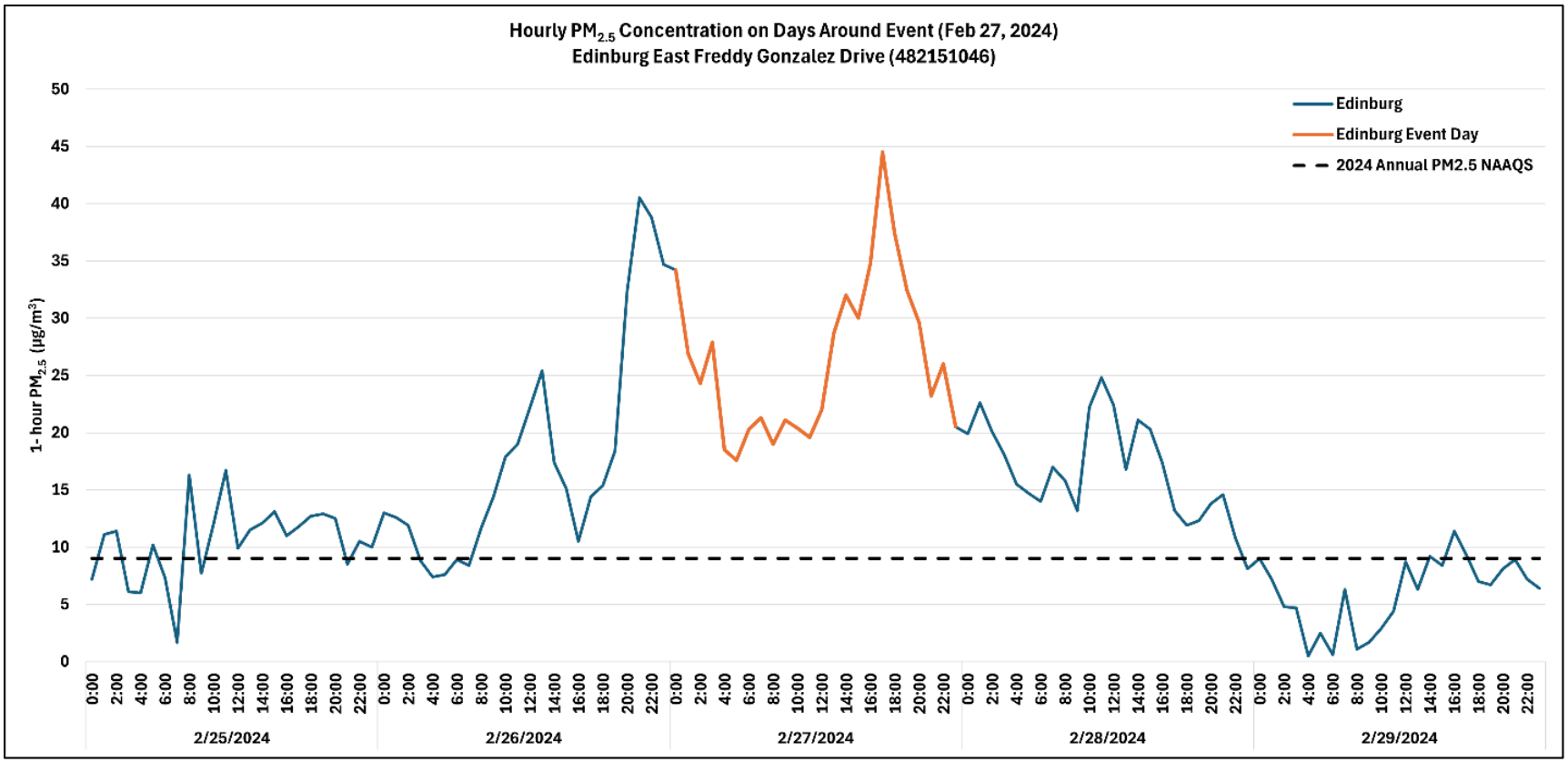

Figure 2-1: Hourly $PM_{2.5}$ Concentrations on Days around Event (February 27, 2024) for the Edinburg East Freddy Gonzalez Drive Monitor

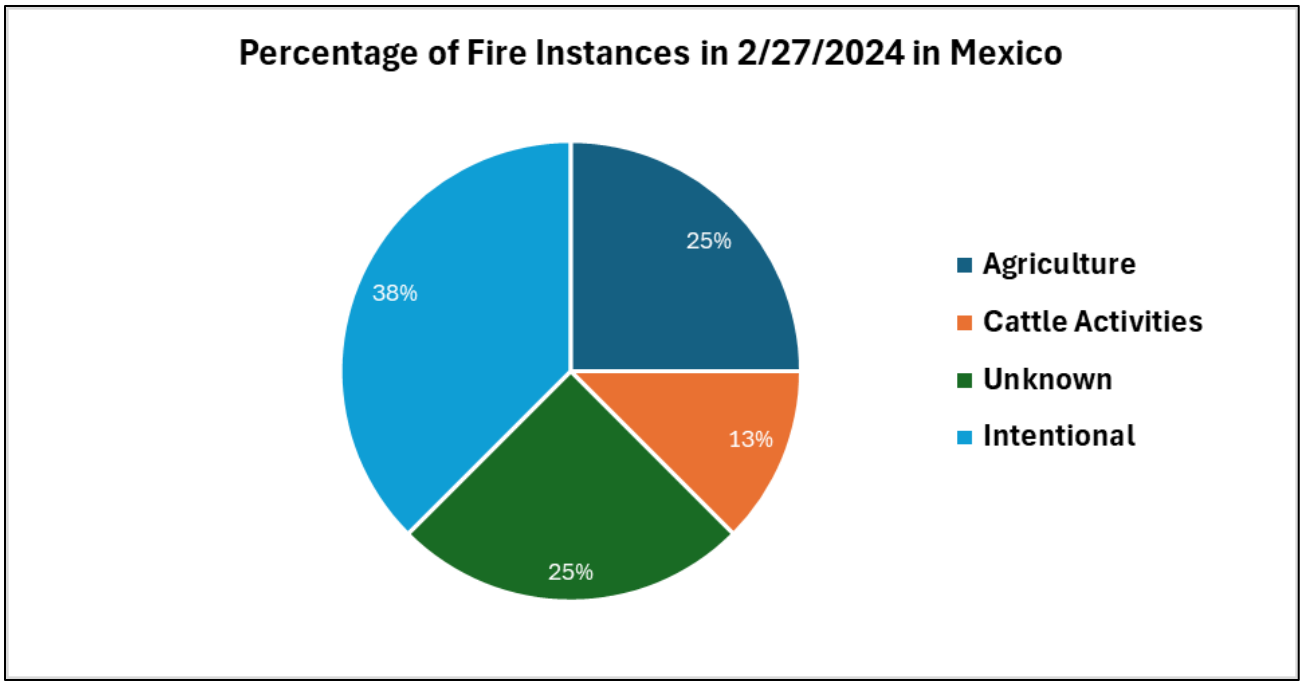

Figure 2-2: Percentage of Reported Fire Instances by the Mexican Government, on and around February 27, 2024

2.7.2 Group 2 – Summary of March 4 through March 6, 2024, and March 8, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive Monitor

Transported smoke from fires in Mexico affected the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on March 4, March 5, March 6, and March 8, 2024. The elevated 24-hour average $PM_{2.5}$ conditions were reported to be 25.6 µg/m^3, 33.3 µg/m^3, 30.4 µg/m^3 and 28.4 µg/m^3 respectively. Figure 2-3: *Hourly $PM_{2.5}$ Concentrations on Days around Event (March 4 through March 8, 2024) for the Edinburg East Freddy Gonzalez Drive Monitor* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between March 2, 2024, and March 10, 2024, with the hours of March 4, March 5, March 6, and March 8, 2024, highlighted in orange. As seen in Figure 2-3, hourly concentrations increased substantially around 00:00 LST on March 4 and remained clearly elevated until approximately 08:00 LST on March 6. Concentrations again rose on March 8 at approximately 00:00 LST and remained elevated until 00:00 LST on March 9.

On March 4, 2024, the surface chart (Figure A-4) shows southerly winds over Texas, which aided in the transportation of particulate matter from fires in Mexico. The 500 mb chart (Figure A-5) shows troughing over the Rocky Mountains and the central U.S. with winds from the southwest over Texas. Over the next two days, the meteorological pattern remained similar at 500 mb and the surface, continuing the transport of smoke to the Edinburg East Freddy Gonzalez Drive monitor on March 5 and 6. On March 8, 2024, the surface chart (Figure A-6) shows southwesterly winds over south Texas that aided in the transport of particulate matter from Mexican fires to the Edinburg East Freddy Gonzalez Drive monitor. The 500 mb (Figure A-7) chart shows troughing over the Rocky Mountains and the central U.S. with winds from the southwest over Texas.

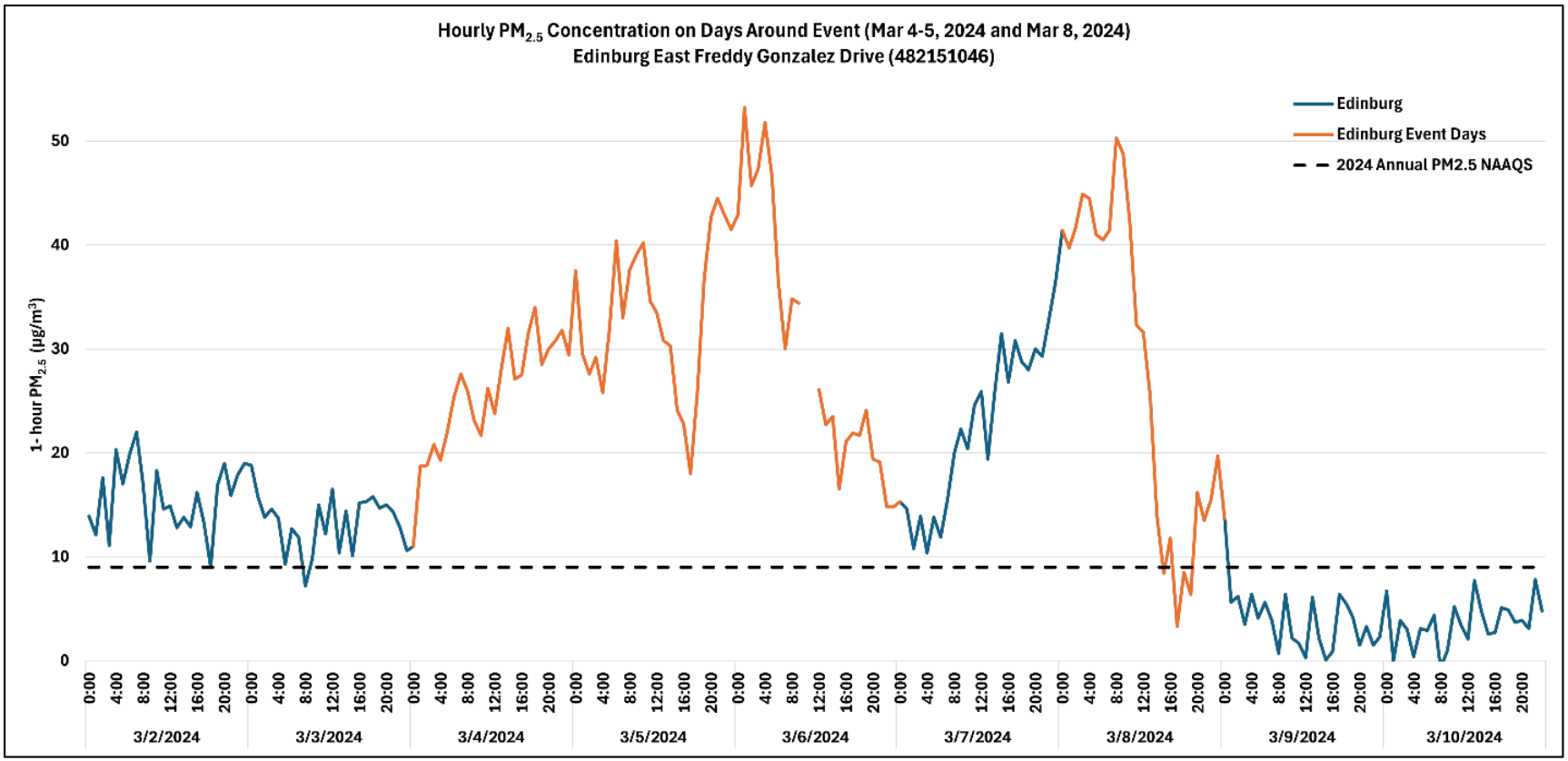

Figure 2-3: Hourly $PM_{2.5}$ Concentrations on Days around Event (March 4 through March 8, 2024) for the Edinburg East Freddy Gonzalez Drive Monitor

On March 4 through March 8, 2024, NOAA HMS smoke maps reveal medium levels of smoke along the east coast of Mexico and the Gulf of America, while on March 5 and March 6, 2024, light to medium levels of smoke cover Mexico, the Gulf of America, and South and East Texas, including the monitoring area (Figure A-8, Figure A-9, Figure A-10, and Figure A-11). Figure 2-4: *Percentage of Reported Fire Instances by the Mexican Government, on and around March 4 and March 8, 2024*, shows the reported fire types in Mexico, with around 39% of the reported fires considered unlikely to recur including intentional, hunting, smoking, and campfire sources.

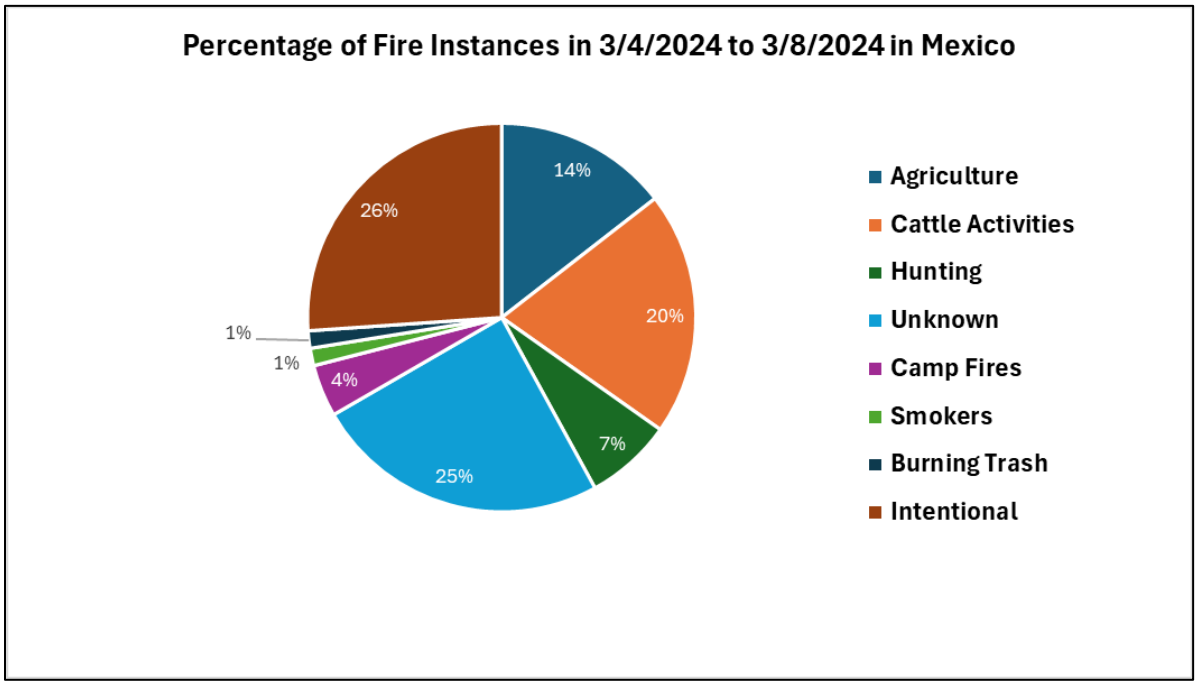

Figure 2-4: Percentage of Reported Fire Instances by the Mexican Government, on and around March 4 and March 8, 2024

2.7.3 Group 3 – Summary of March 14, 2024, and March 15, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

Transported smoke from fires in Mexico affected the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on March 14 and March 15, 2024, and the World Trade Bridge monitor in Webb County March 15, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the Edinburg East Freddy Gonzalez Drive monitor were reported to be 26.6 µg/m^3 for March 14 and 27.8 µg/m^3 for March 15. The elevated 24-hour average $PM_{2.5}$ conditions for the World Trade Bridge monitor were reported to be 28.5 µg/m^3 for March 15, 2024.

Figure 2-5: *Hourly $PM_{2.5}$ Concentrations on Days around Event (March 14 through March 15, 2024) for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring sites between March 12, 2024, and March 17, 2024, with the hours of March 14 and March 15, 2024, highlighted with a dotted green line for Edinburg East Freddy Gonzalez Drive monitor and dotted blue line for the World Trade Bridge monitor. As seen in Figure 2-5, hourly concentrations increased substantially around 00:00 LST on March 14 and remained clearly elevated until approximately 21:00 LST on March 15 for the Edinburg monitor. For the World Trade Bridge monitor, hourly concentrations increased substantially around 00:00 LST on March 15 and remained clearly elevated until approximately 21:00 LST on March 15.

On March 14, 2024, the surface chart (Figure A-12) also shows southerly winds over south Texas that aided the transport of particulate matter from Mexican fires to the Edinburg East Freddy Gonzalez Drive and World Trade Bridge monitors on March 14 and March 15, 2024. The 500 mb chart (Figure A-13) shows longwave troughing over the Rocky Mountains with a low-height center over Arizona. Winds are from the southwest over Texas at this level.

On March 14 and March 15, 2024, NOAA HMS smoke maps reveal light to medium levels of smoke along southern Mexico, the Gulf of America, and deep south Texas, covering the Edinburg East Freddy Gonzalez Drive monitor (Figure A-14 and Figure A-15). Figure 2-6: *Percentage of Reported Fire Instances by the Mexican Government, on and around March 14 and March 15, 2024*, shows the reported fire types in Mexico, with around 57% of the reported fires considered unlikely to recur including intentional and hunting sources.

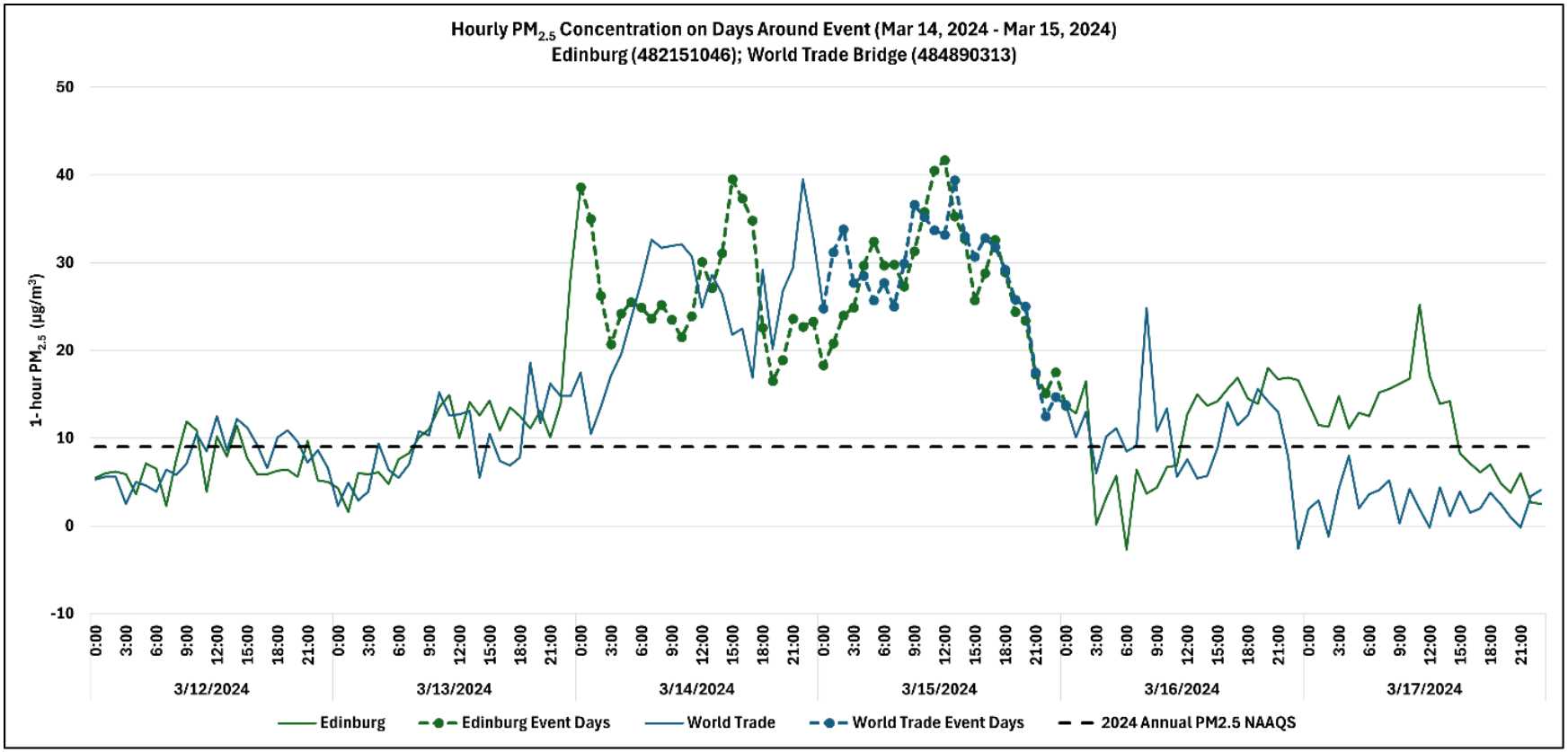

Figure 2-5: Hourly $PM_{2.5}$ Concentrations on Days around Event (March 14 through March 15, 2024) for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

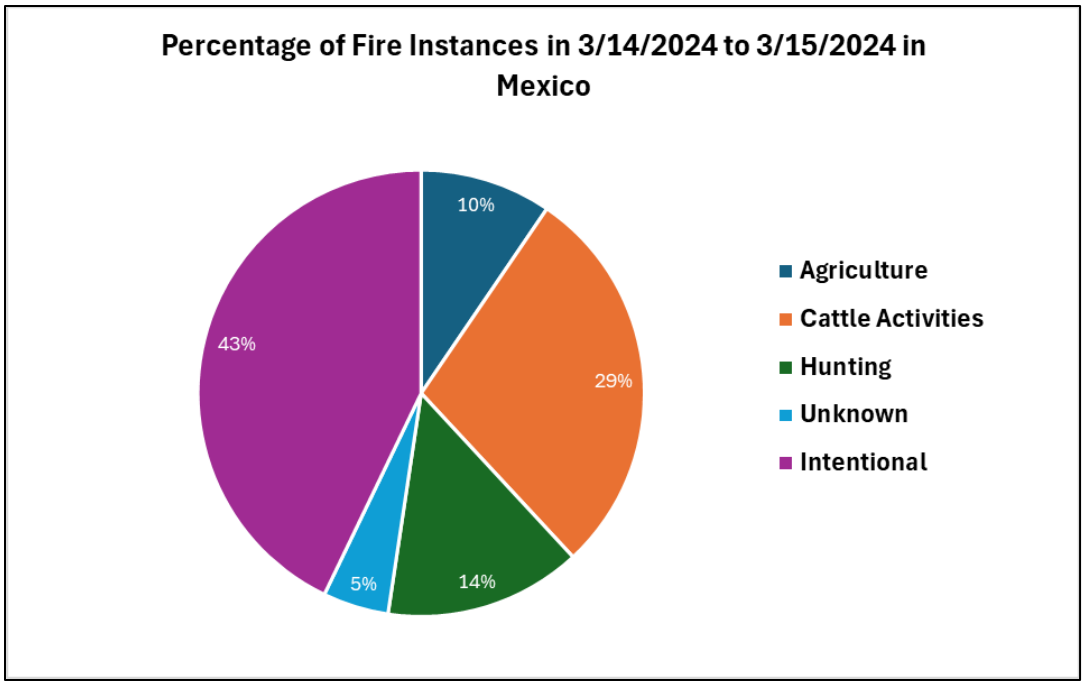

Figure 2-6: Percentage of Reported Fire Instances by the Mexican Government, on and around March 14 and March 15, 2024

2.7.4 Group 4 – Summary of April 1, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, and World Trade Bridge Monitors

Transported smoke from fires in Mexico affected the Von Ormy Highway 16 monitor in Atascosa County, the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County and the World Trade Bridge monitor in Webb County on April 1, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the monitors were reported to be 32.1 µg/m^3 for the Von Ormy Highway 16 monitor, 31.4 µg/m^3 for the Edinburg East Freddy Gonzalez Drive monitor, and 29.1 µg/m^3 for the World Trade Bridge monitor. Figure 2-7: *Hourly $PM_{2.5}$ Concentrations on Days around Event (April 1, 2024) for the Edinburg East Freddy Gonzalez Drive, World Trade Bridge, and Von Ormy Highway 16 Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring sites between March 30, 2024, and April 3, 2024, with the hours of April 1, 2024, highlighted with a dotted green line for Edinburg East Freddy Gonzalez Drive monitor, a dotted line for the World Trade Bridge monitor, and a dotted purple line for the Von Ormy Highway 16 monitor. As seen in Figure 2-7, hourly concentrations began increasing substantially around 00:00 LST on April 1 and remained clearly elevated until approximately 00:00 LST on April 2 across all three monitors.

On the surface chart (Figure A-16), winds were from the south, aiding the transport of smoke from Mexican fires to the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, and World Trade Bridge monitors, all located in south Texas. On April 1, 2024, there was longwave troughing at 500 mb (Figure A-17) over the western U.S. with ridging over Texas. The winds were from the southwest at this level showing speeds up to 70 kt, indicating a jet stream at 300 mb.

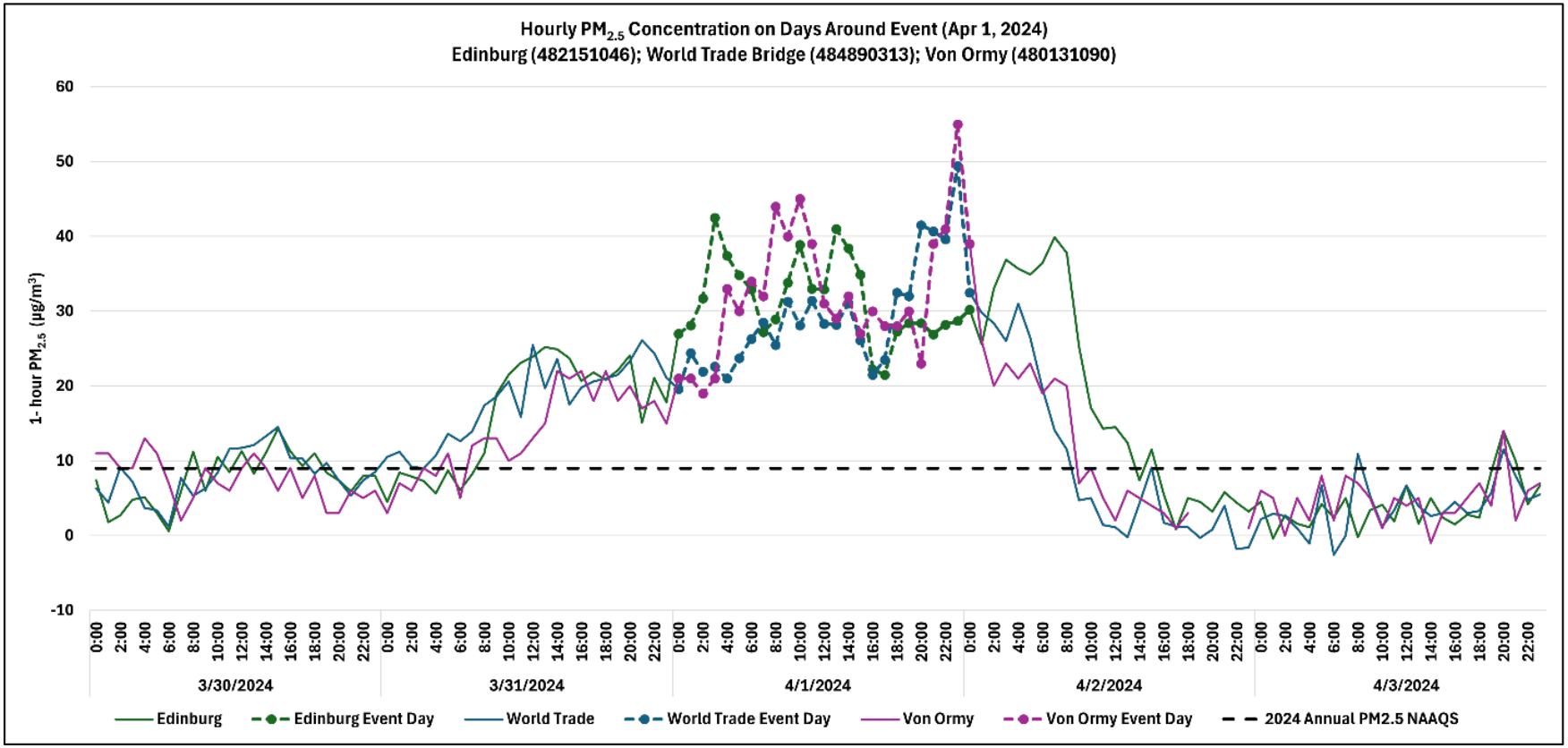

Figure 2-7: Hourly $PM_{2.5}$ Concentrations on Days around Event (April 1, 2024) for the Edinburg East Freddy Gonzalez Drive, World Trade Bridge, and Von Ormy Highway 16 Monitors

On April 1, 2024, NOAA HMS smoke maps reveal light medium levels across the Gulf of America and south Mexico, extending into southern Texas (Figure A-18 and Figure A-19). Figure 2-8: *Percentage of Reported Fire Instances by the Mexican Government, on and around April 1, 2024*, shows the reported fire types in Mexico, with around 50% of the reported fires considered unlikely to recur including intentional, hunting, and campfire sources.

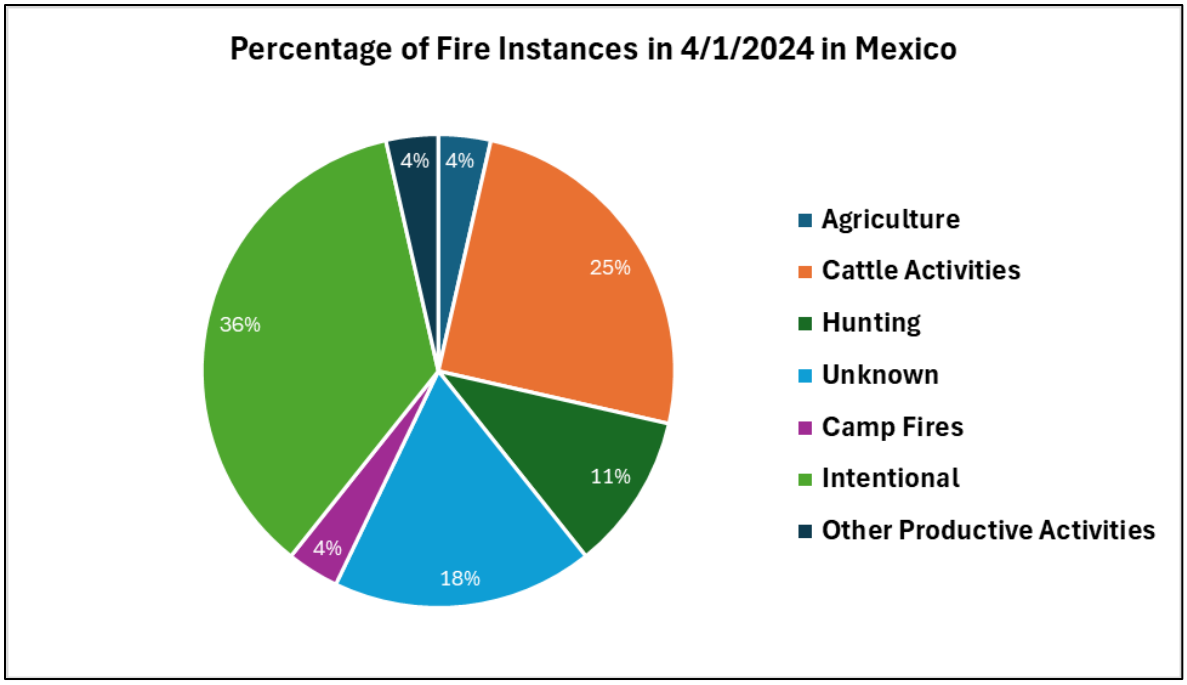

Figure 2-8: Percentage of Reported Fire Instances by the Mexican Government, on and around April 1, 2024

2.7.5 Group 5 – Summary of April 8, 2024, and April 9, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

Transported smoke from fires in Mexico affected the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on April 8 and April 9, 2024, and World Trade Bridge monitor in Webb County on April 9, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the Edinburg East Freddy Gonzalez Drive monitor were reported to be 25.9 µg/m^3 for April 8 and 28.6 µg/m^3 for April 9, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the World Trade Bridge monitor were reported to be 28.9 µg/m^3 for April 9, 2024. Figure 2-9: *Hourly $PM_{2.5}$ Concentrations on Days around Event (April 8 through April 9, 2024) for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring sites between April 6, 2024, and April 11, 2024, with the hours of April 8 and April 9, 2024, highlighted with a dotted green line for Edinburg East Freddy Gonzalez Drive monitor and April 9, 2024, highlighted with a dotted blue line for the World Trade Bridge monitor. As seen in Figure 2-9, hourly concentrations increased substantially around 09:00 LST on April 8 and remained clearly elevated until approximately 18:00 LST on April 9 for the Edinburg monitor. For the World Trade Bridge monitor, hourly concentrations increased substantially around 00:00 LST on April 9 and remained clearly elevated until approximately 00:00 LST on April 10, 2024.

On April 8, 2024, there was 500 mb (Figure A-20) troughing over the western U.S. and the Rocky Mountains with a low height center over Minnesota. There was weak ridging over the eastern U.S. due to 500 mb winds from the southwest over Texas, the transportation of smoke from

Central American fires to the Edinburg East Freddy Gonzalez Drive, and World Trade Bridge monitors was possible.

On April 8 and April 9, 2024, NOAA HMS smoke maps reveal light to medium levels of smoke along the Gulf of America extending towards south Texas, with light smoke covering the Edinburg East Freddy Gonzalez Drive and World Trade Bridge monitoring areas (Figure A-22 and Figure A-23). Figure 2-10: *Percentage of Reported Fire Instances by the Mexican Government, on and around April 8 and April 9, 2024*, shows the reported fire types in Mexico, with around 47% of the reported fires considered unlikely to recur including intentional and smoking sources.

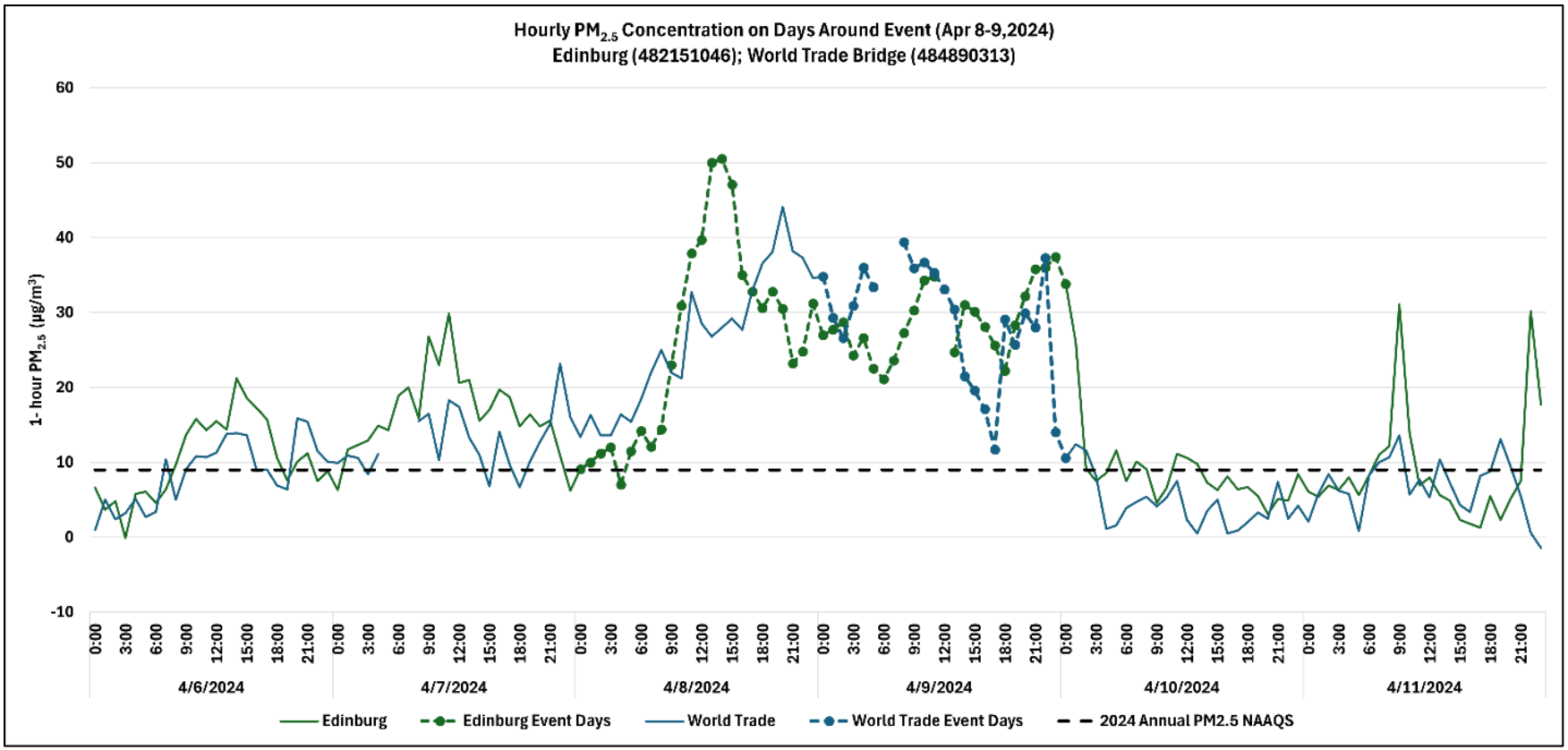

Figure 2-9: Hourly $PM_{2.5}$ Concentrations on Days around Event (April 8 through April 9, 2024) for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

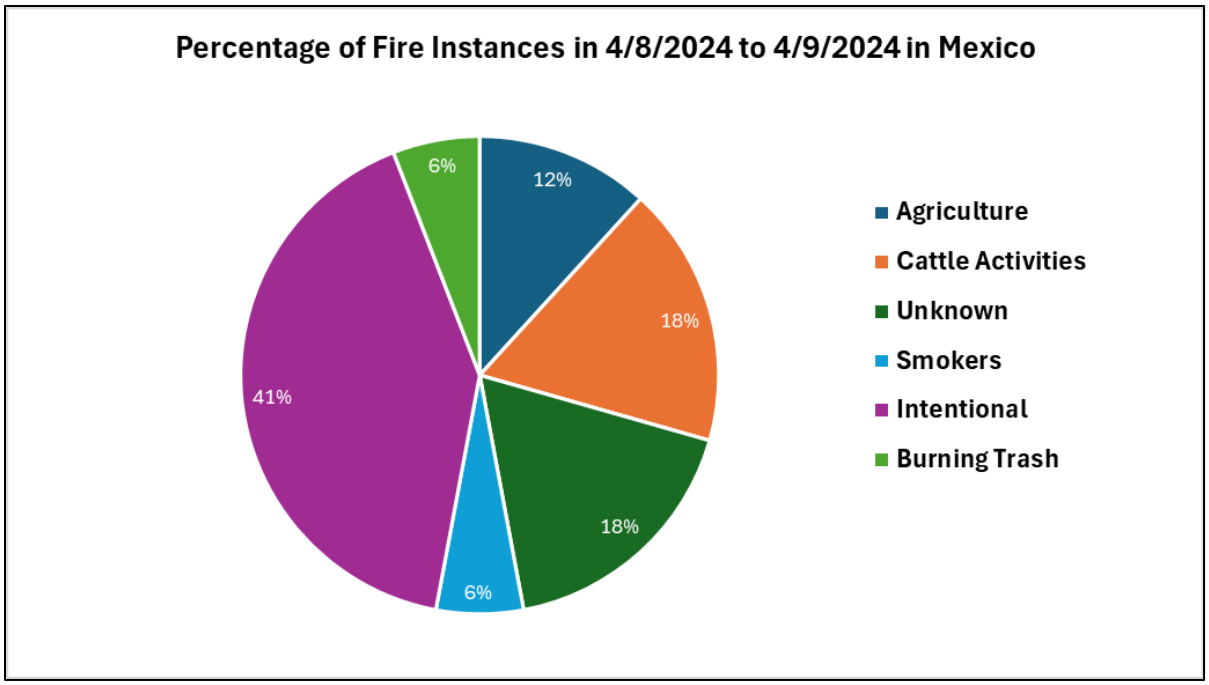

Figure 2-10: Percentage of Reported Fire Instances by the Mexican Government, on and around April 8 and April 9, 2024

2.7.6 Group 6 – Summary of April 17, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive Monitor

Transported smoke from fires in Mexico affected the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on April 17, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the Edinburg East Freddy Gonzalez Drive monitor were reported to be 25.6 µg/m^3 for April 17, 2024. Figure 2-11: *Hourly $PM_{2.5}$ Concentrations on Days around Event (April 17, 2024) for the Edinburg East Freddy Gonzalez Drive Monitor* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between April 15, 2024, and April 19, 2024, with the hours on April 17, 2024, highlighted in orange. As seen in Figure 2-11, on April 17th, hourly concentrations increased substantially around 12:00 LST and remained clearly elevated until approximately 16:00 LST.

On April 17, 2024, the surface chart (Figure A-24) displayed southerly winds. The 500 mb pattern (Figure A-25) was zonal with weak ridging over the central U.S. Winds at 500 mb were from the southwest over Texas. This enabled the transportation of smoke from Central American fires to the Edinburg East Freddy Gonzalez Drive monitor in south Texas.

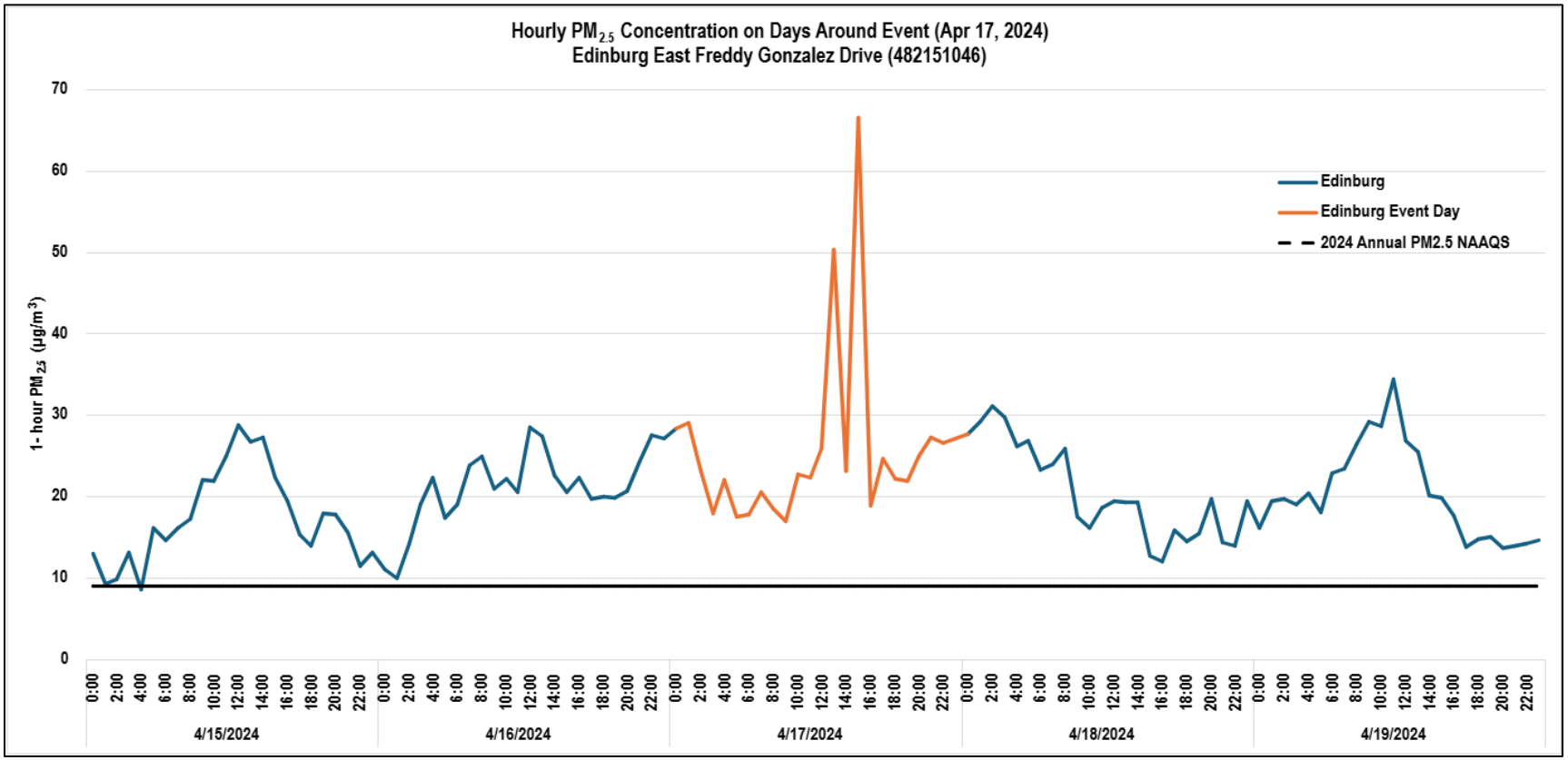

Figure 2-11: Hourly $PM_{2.5}$ Concentrations on Days around Event (April 17, 2024) for the Edinburg East Freddy Gonzalez Drive Monitor

On April 17, 2024, light to medium levels of smoke can be seen extending across the Gulf of America towards south Texas, covering the Edinburg East Freddy Gonzalez Drive monitoring area (Figure A-26). Figure 2-12: *Percentage of Reported Fire Instances by the Mexican Government, on and around April 17 and April 18, 2024*, shows the reported fire types in Mexico, with around 38% of the reported fires considered unlikely to recur including intentional and smoking.

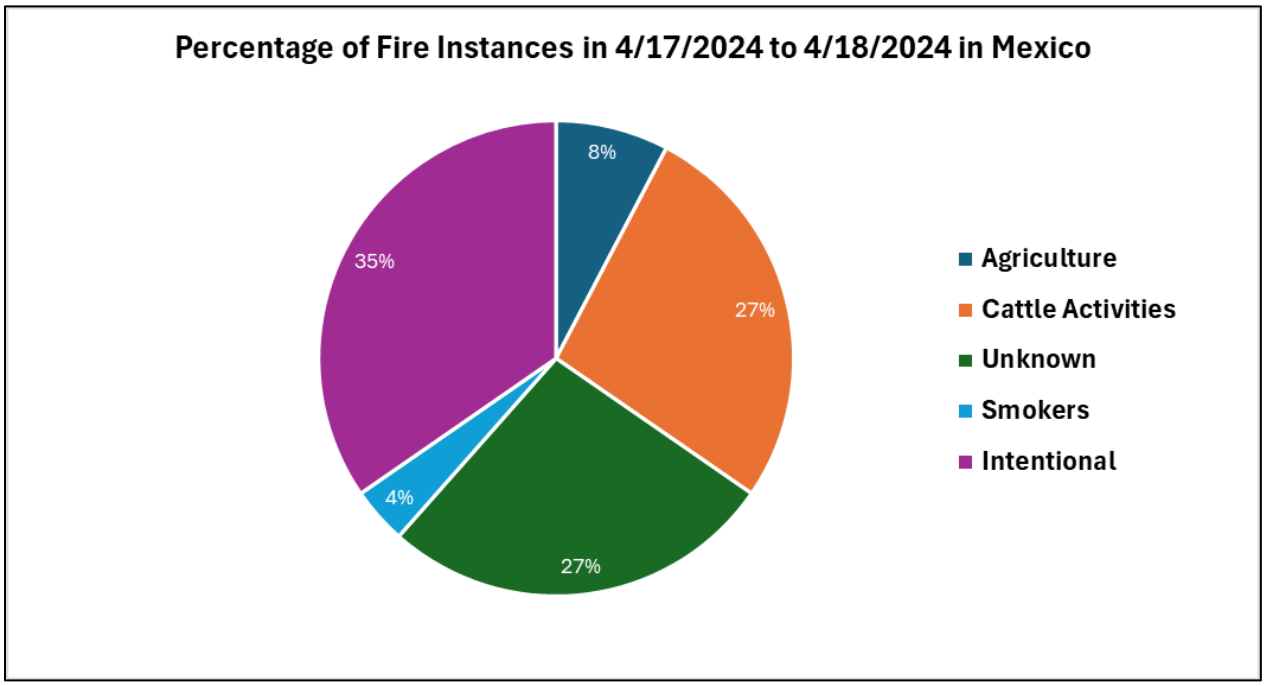

Figure 2-12: Percentage of Reported Fire Instances by the Mexican Government, on and around April 17 and April 18, 2024

2.7.7 Group 7 – Summary of April 26, 2024, through April 29, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, and World Trade Bridge Monitors

From April 26 through April 29, 2024, smoke from fires in Mexico affected the:

- Von Ormy Highway 16 monitor in Atascosa County on April 26 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 27.5 µg/m³) and April 27, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 28.2 µg/m³);
- Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on April 26 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 26.4 µg/m³), April 27 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 32.6 µg/m³), April 28 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 28.0 µg/m³), and April 29, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 27.3 µg/m³); and
- World Trade Bridge monitor in Webb County on April 27, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 37.5 µg/m³).

Figure 2-13: *Hourly $PM_{2.5}$ Concentrations on Days around Event (April 26 through April 29, 2024) for the Edinburg East Freddy Gonzalez Drive, World Trade Bridge, and Von Ormy Highway 16 Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring sites between April 24, 2024, and May 1, 2024, with the hours of April 26, April 27, April 28, and April 29, 2024 highlighted with a dotted green line for Edinburg East Freddy Gonzalez Drive monitor, a dotted blue line for the World Trade Bridge monitor, and a dotted purple line for the Von Ormy

Highway 16 monitor. As seen in Figure 2-13, hourly concentrations for the Edinburg East Freddy Gonzalez Drive monitor increased substantially around 00:00 LST on April 26 and remained elevated with some variable levels, especially around 06:00 LST on April 28, until finally decreasing around 12:00 LST on April 29, 2024. For the World Trade Bridge monitor, hourly concentrations increased substantially around 00:00 LST on April 27 and remained clearly elevated until approximately 00:00 LST on April 28, 2024. For the Von Ormy Highway 16 monitor, hourly concentrations increased substantially around 00:00 LST on April 26 and remained highly variable until approximately 00:00 LST on April 28. The lowest drop in concentration for this monitor occurred around 18:00 LST on April 26.

On April 25, 2024, there was 500 mb ridging over the central U.S. and Texas (Figure A-27, Figure A-28). Winds at this level were from the southwest, which allowed the transport of smoke from Central American fires to be transported to Texas. Throughout the week, the ridge progressed downstream and troughing moved over the central U.S. and Texas by April 29, 2024 (Figure A-29, Figure A-30). However, winds were still from the southwest at the 500 mb level, enabling the continued transport of particulate matter to the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, and World Trade Bridge monitors.

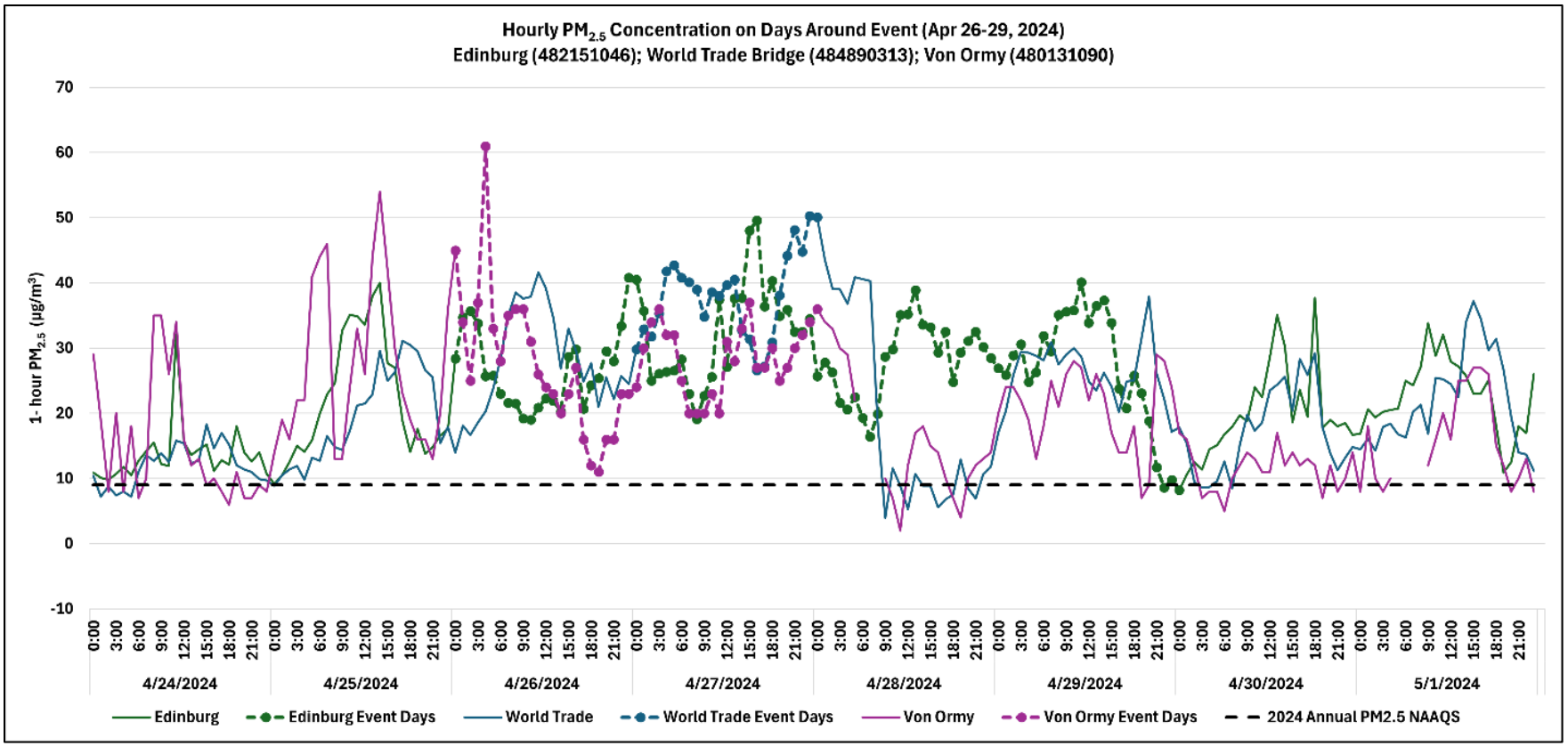

Figure 2-13: Hourly $PM_{2.5}$ Concentrations on Days around Event (April 26 through April 29, 2024) for the Edinburg East Freddy Gonzalez Drive, World Trade Bridge, and Von Ormy Highway 16 Monitors

From April 26 through April 29, 2024, NOAA smoke maps reveal light to medium smoke extending from Mexico and the Gulf of America towards Texas, covering each monitoring area of interest (Figure A-31, Figure A-32, Figure A-33, and Figure A-34). Figure 2-14: *Percentage of Reported Fire Instances by the Mexican Government, on and around April 26 through April 28, 2024*, shows the reported fire types in Mexico, with around 50% of the reported fires considered unlikely to recur including intentional, hunting, and smoker sources.

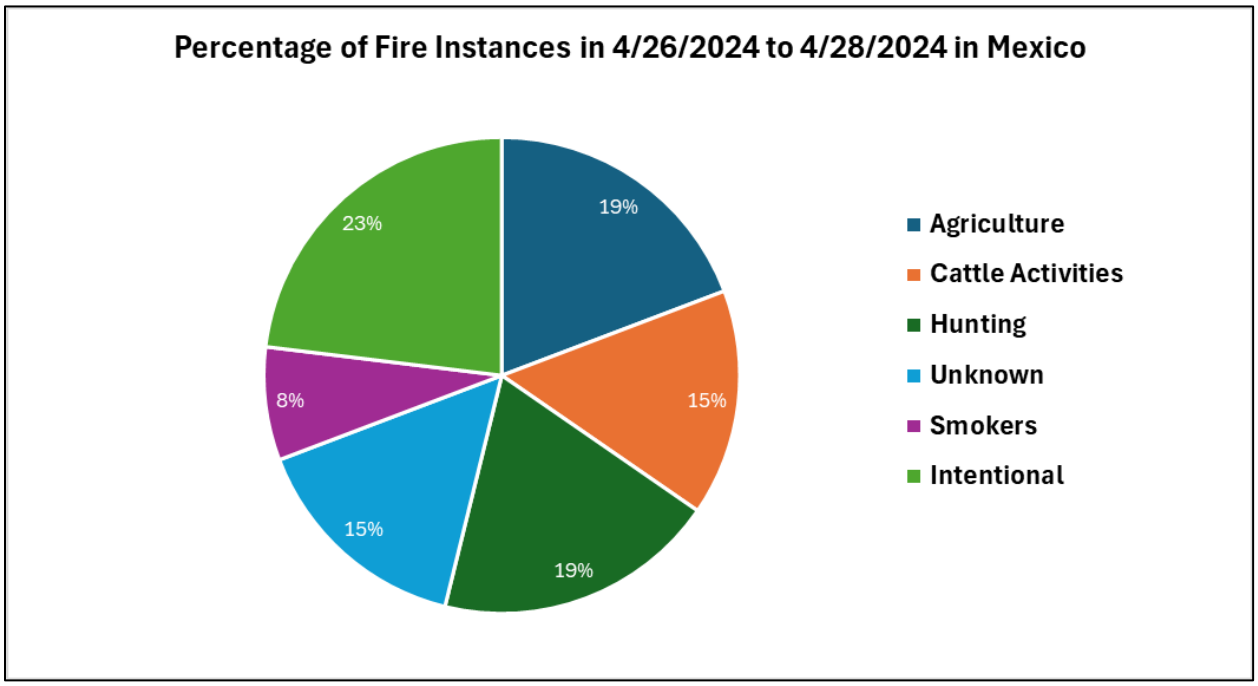

Figure 2-14: Percentage of Reported Fire Instances by the Mexican Government, on and around April 26 through April 28, 2024

2.7.8 Group 8 – Summary of May 2, 2024, and May 3, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

Transported smoke from fires in Mexico affected the Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on May 2 and May 3, 2024. and World Trade Bridge monitor in Webb County on May 2, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the Edinburg East Freddy Gonzalez Drive monitor were reported to be 25.6 µg/m³ for May 2 and 28.5 µg/m³ for May 3, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the World Trade Bridge monitor were reported to be 31.9 µg/m³ for May 2, 2024. Figure 2-15: *Hourly $PM_{2.5}$ Concentrations on Days around Event (May 2 through May 3, 2024) for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring sites between April 30, 2024, and May 5, 2024, with the hours of May 2 and May 3, 2024, highlighted with a dotted green line for Edinburg East Freddy Gonzalez Drive monitor and a dotted blue line for the World Trade Bridge monitor. As seen in Figure 2-15, hourly concentrations increased substantially around 00:00 LST on May 2 and remained elevated until approximately 12:00 LST on May 3, 2024, for the Edinburg East Freddy Gonzalez Drive monitor. There was some variability in concentration visible, with the lowest drop noted around 15:00 LST on May 2, 2024. For the World Trade Bridge monitor, hourly concentrations increased substantially around 06:00 LST on May 2 and remained clearly elevated until approximately 21:00 LST on May 3, 2024.

On May 2, 2024, there was 500 mb troughing over the Rocky Mountains extending into Texas. This led to winds from the southwest over Texas which enabled the transport of smoke from Mexican fires to south Texas. The pattern remained similar on May 3, 2024, influencing winds coming into Texas from the southwest (Figure A-35 and Figure A-36).

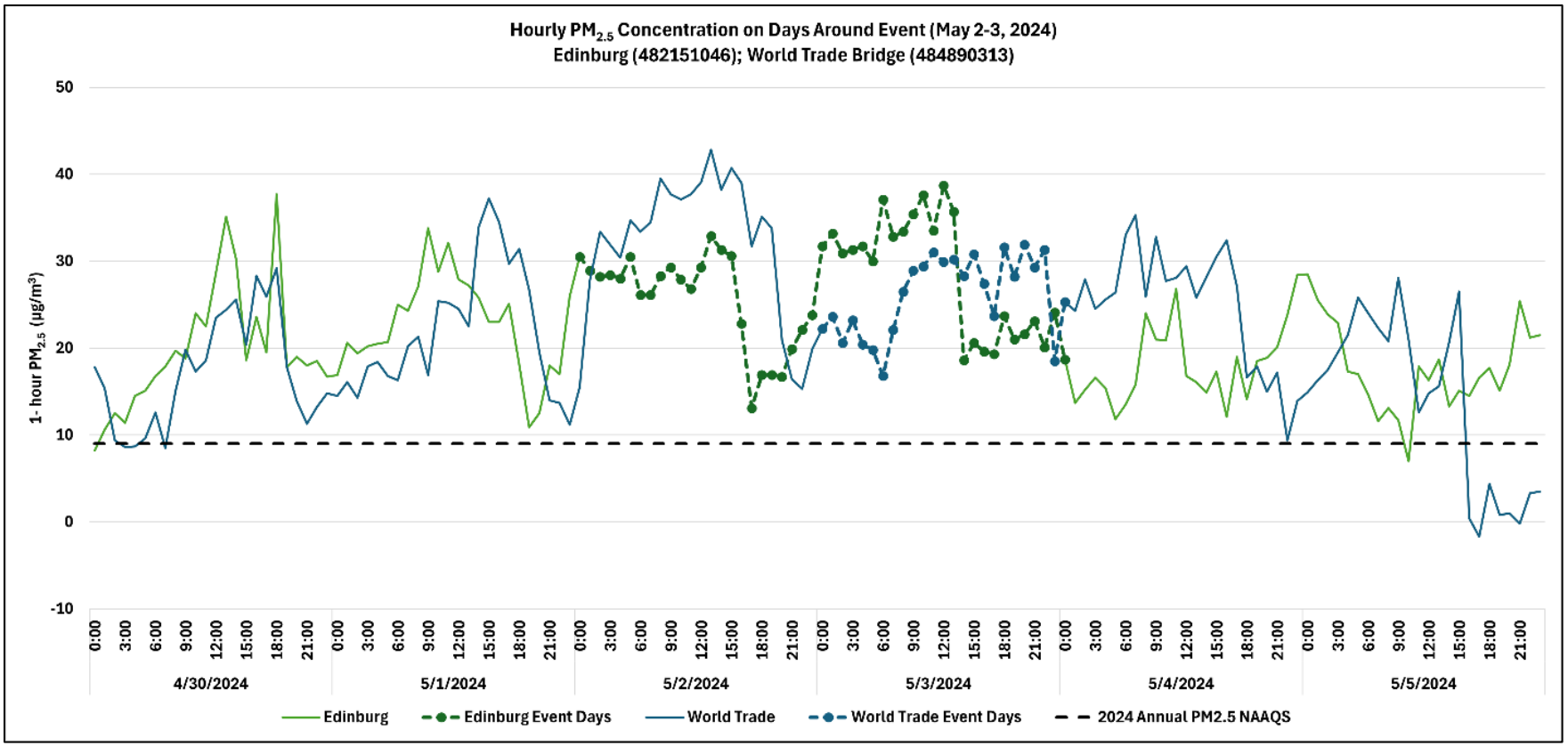

Figure 2-15: Hourly $PM_{2.5}$ Concentrations on Days around Event (May 2 through May 3, 2024) for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

From April 26 through April 29, 2024, NOAA smoke maps reveal light to medium smoke extending from Mexico and the Gulf of America towards Texas, covering each monitoring area of interest (Figure A-37 and Figure A-38). Figure 2-16: *Percentage of Reported Fire Instances by the Mexican Government, on and around May 2 and May 3, 2024*, shows the reported fire types in Mexico, with around 39% of the reported fires considered unlikely to recur including intentional, hunting and other productive activity sources.

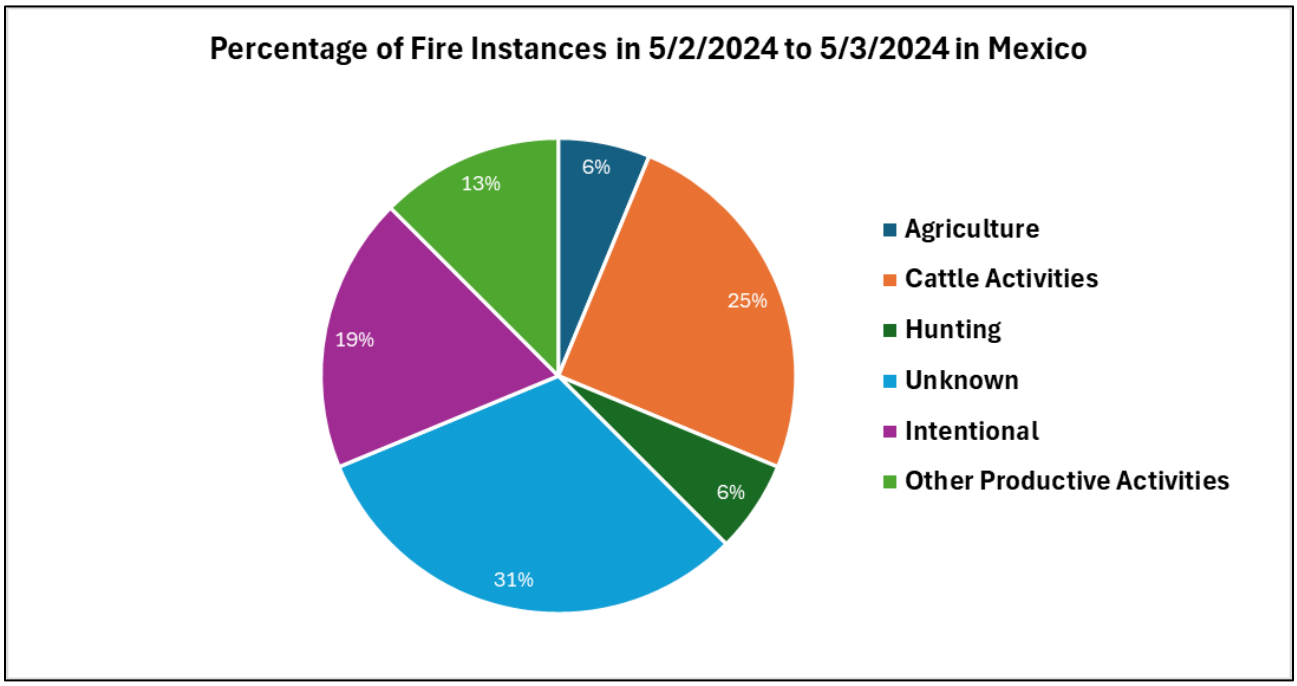

Figure 2-16: Percentage of Reported Fire Instances by the Mexican Government, on and around May 2 and May 3, 2024

2.7.9 Group 9 – Summary of May 7 through May 13, 2024, May 15, 2024, May 16, 2024, May 18 through May 28, 2024, May 30, 2024 and May 31, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Corpus Christi Huisache, Dona Park, Edinburg East Freddy Gonzalez Drive, Fort Worth Northwest, Haws Athletic Center, Von Ormy Highway 16, and World Trade Bridge Monitors

From May 7 through May 31, 2024, smoke from fires in Mexico affected the:

- Corpus Christi Huisache monitor in Nueces County on May 8, May 9, and May 27, 2024;
- Dona Park monitor in Nueces County on May 8 through May 10, May 12, May 16, May 19, May 21, and May 23 through May 27, 2024;
- Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on May 7 through May 13, May 15, May 16, May 18 through May 28, May 30, and May 31, 2024;
- Fort Worth Northwest monitor in Tarrant County on May 22, 2024;
- Haws Athletic Center monitor in Tarrant County on May 21, May 24, May 25, and May 27, 2024;
- Von Ormy Highway 16 monitor in Atascosa County on May 8, May 9, May 19, and May 21 through May 27, 2024; and
- World Trade Bridge monitor in Webb County on May 7, May 8, May 19 through May 26, and May 28, 2024.

Figure 2-17: *Hourly $PM_{2.5}$ Concentrations on Days around Event (May 5 through May 11, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Corpus Christi Huisache,*

Dona Park, and World Trade Bridge Monitors, Figure 2-18: *Hourly $PM_{2.5}$ Concentrations on Days around Event (May 12 through May 19, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, and World Trade Bridge Monitors*, Figure 2-19: *Hourly $PM_{2.5}$ Concentrations on Days around Event (May 20 through May 24, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Fort Worth Northwest, Haws Athletic Center, and World Trade Bridge Monitors*, and Figure 2-20: *Hourly $PM_{2.5}$ Concentrations on Days around Event (May 25 through June 2, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Corpus Christi Huisache, Dona Park, Haws Athletic Center, and World Trade Bridge Monitors* show hourly concentrations at the seven monitors during this group of days. Overall trends across monitors reveal higher hourly concentrations of fine particulate matter during event days. On May 20, 2024, there was a maximum one-hour $PM_{2.5}$ concentration of 206.4 µg/m^3 at the Haws Athletic Center monitor (Figure 2-19); the 24-hour average $PM_{2.5}$ concentration was not significant; therefore the date is not being submitted as an exceptional event in correlation with the Haws Athletic Center monitor.

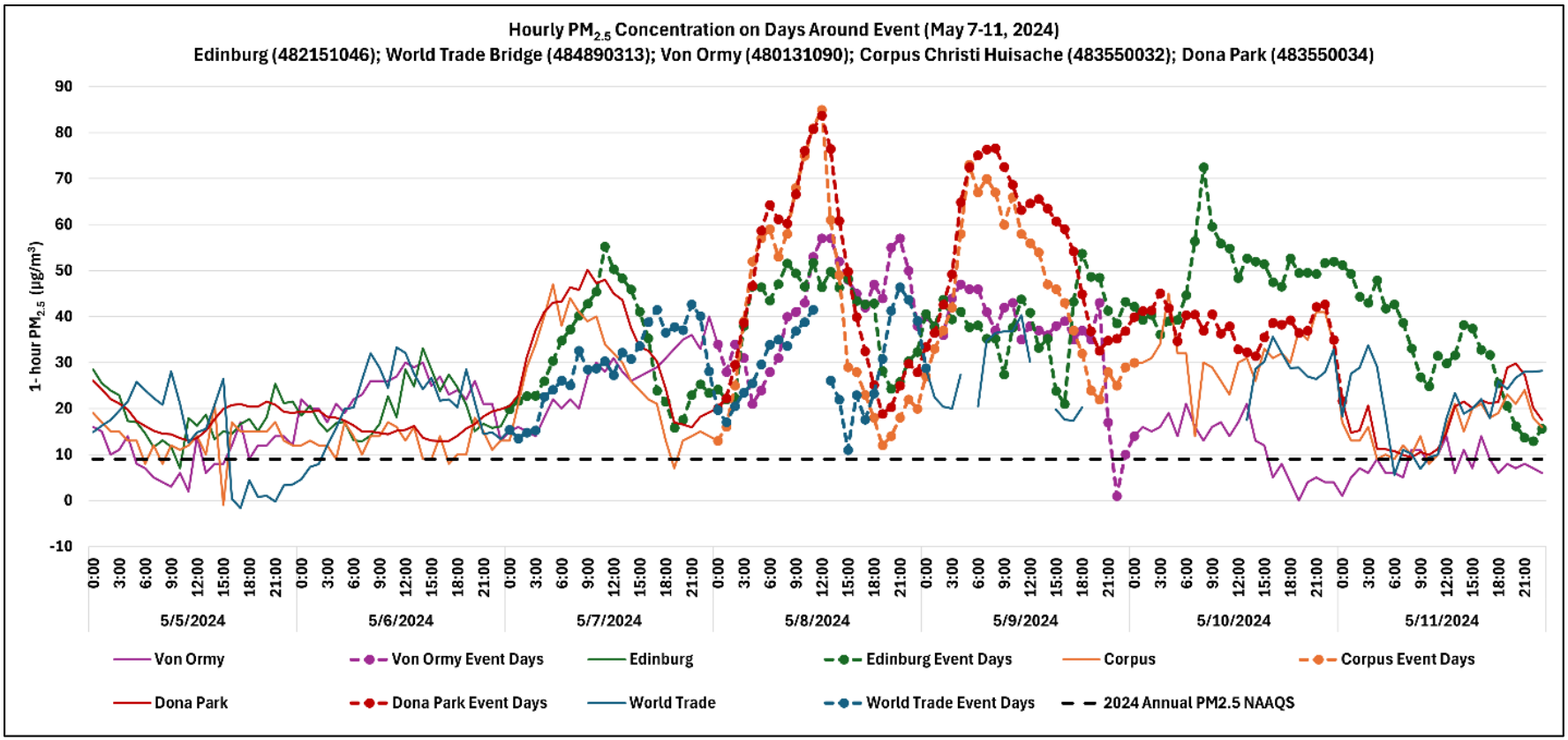

Figure 2-17: Hourly $PM_{2.5}$ Concentrations on Days around Event (May 5 through May 11, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Corpus Christi Huisache, Dona Park, and World Trade Bridge Monitors

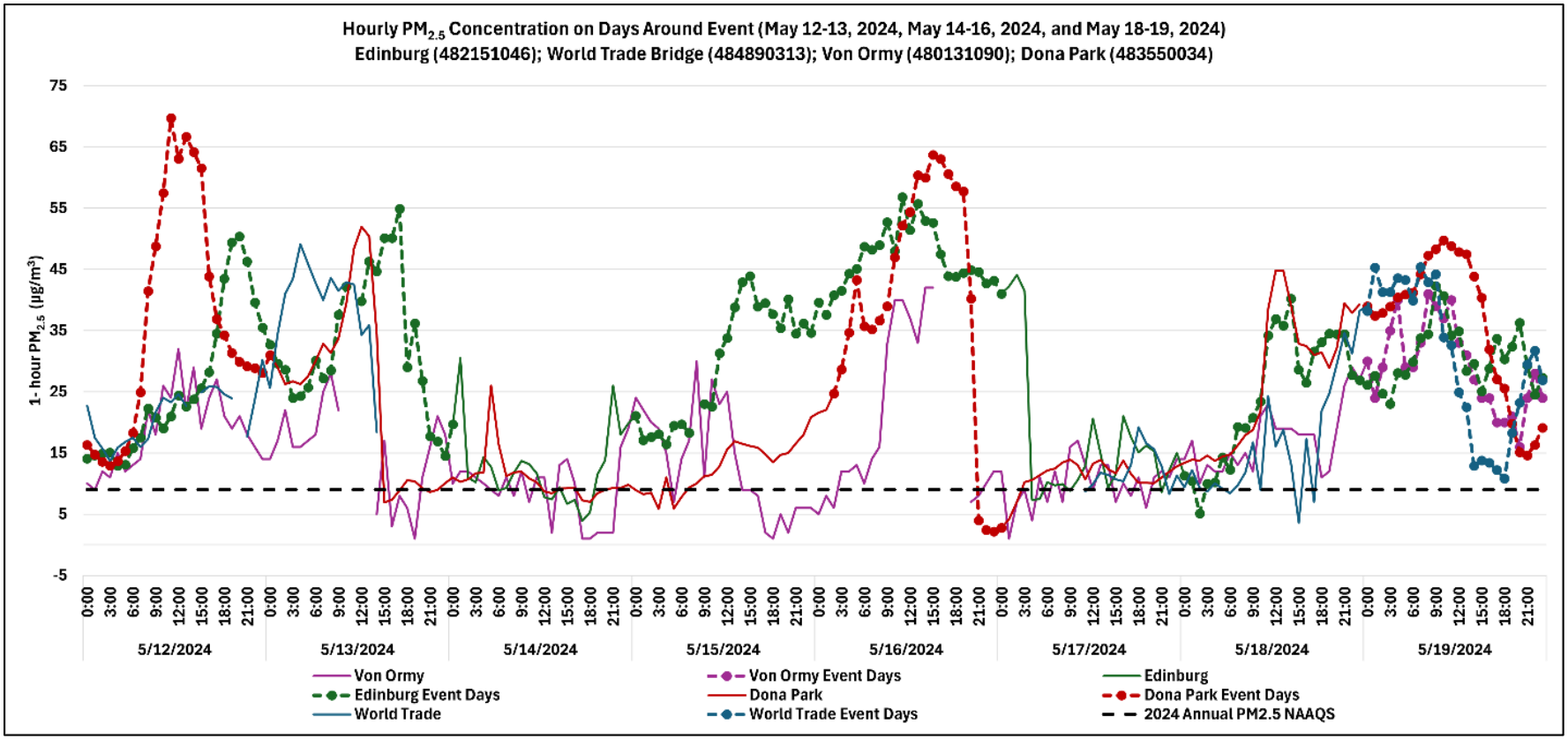

Figure 2-18: Hourly $PM_{2.5}$ Concentrations on Days around Event (May 12 through May 19, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, and World Trade Bridge Monitors

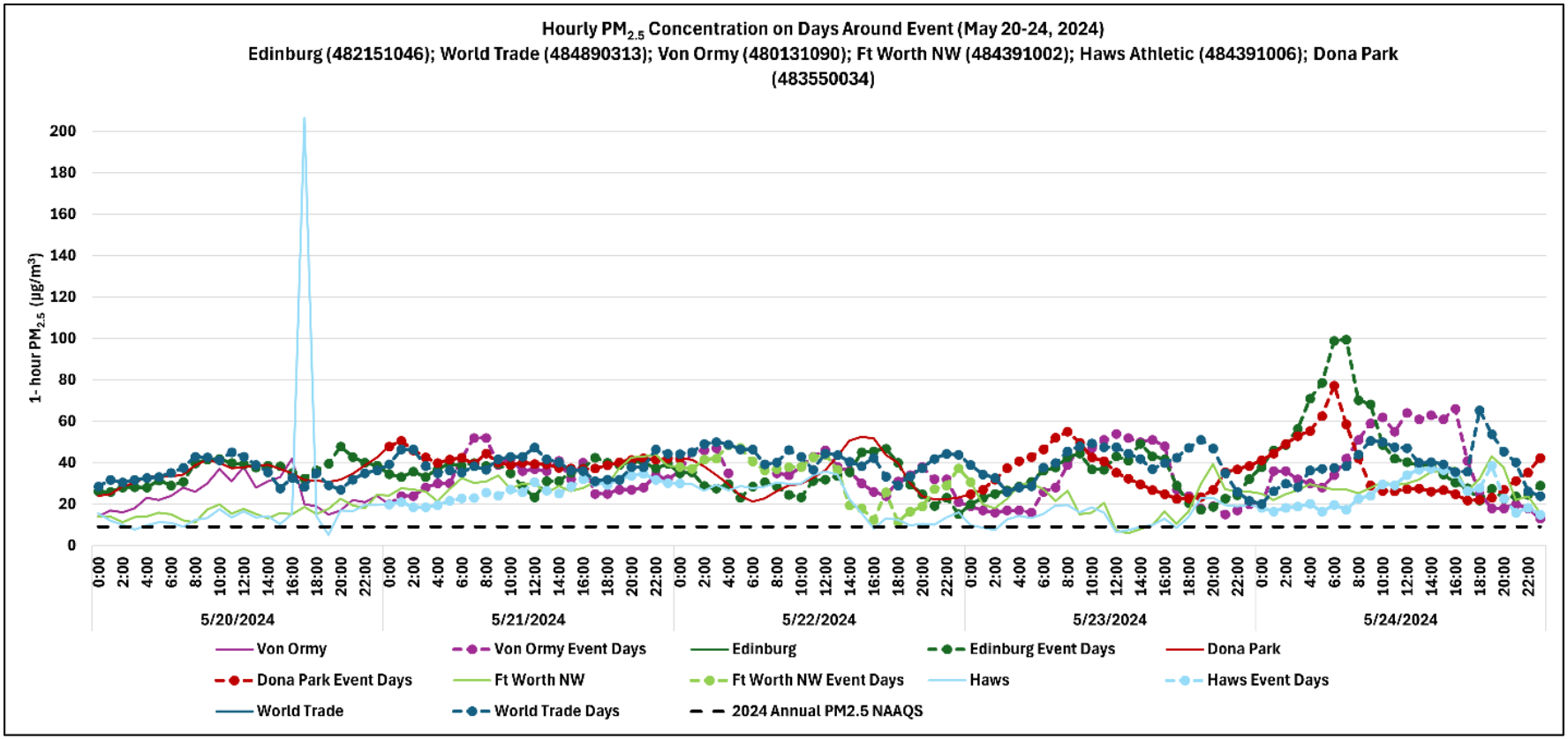

Figure 2-19: Hourly $PM_{2.5}$ Concentrations on Days around Event (May 20 through May 24, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Fort Worth Northwest, Haws Athletic Center, and World Trade Bridge Monitors

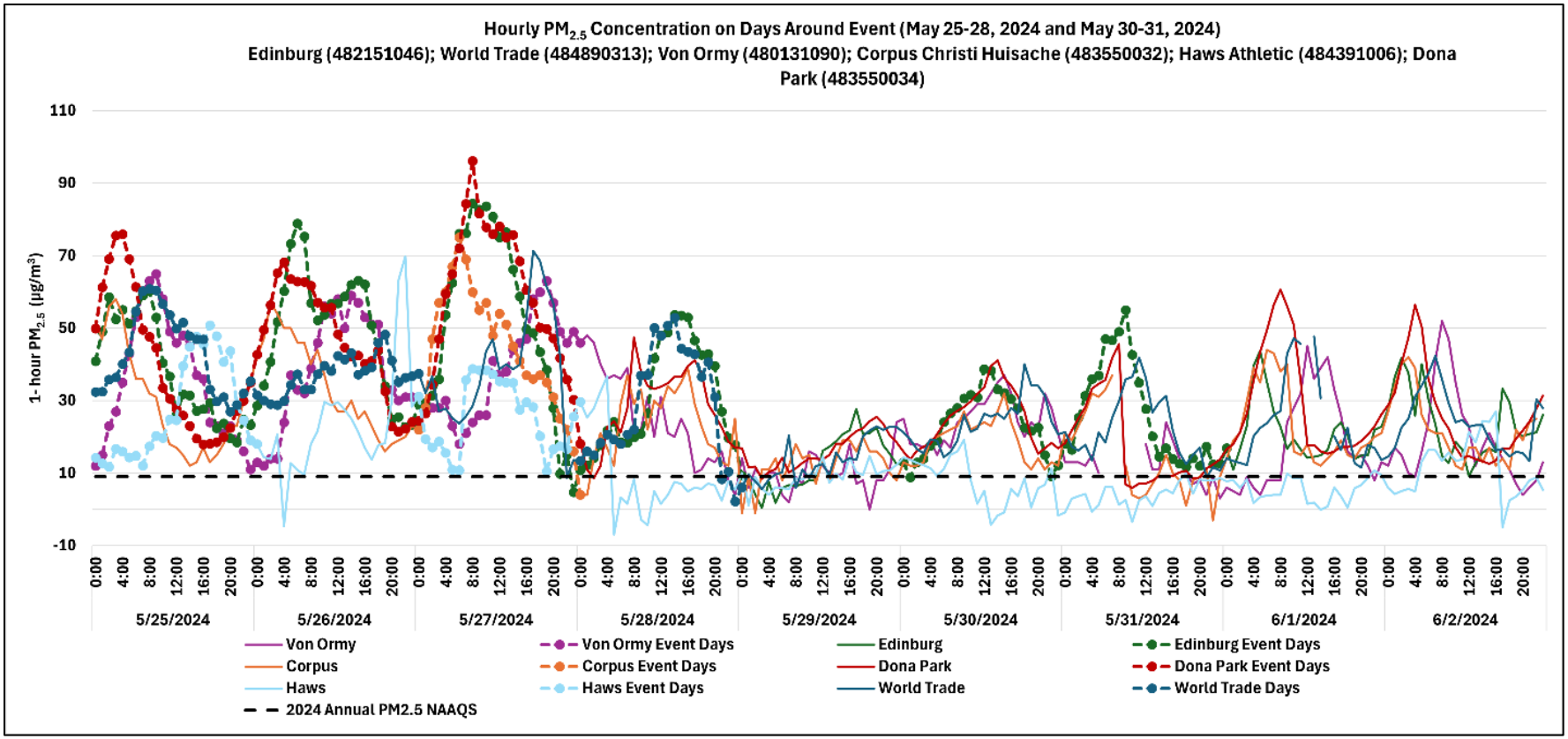

Figure 2-20: Hourly $PM_{2.5}$ Concentrations on Days around Event (May 25 through June 2, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Corpus Christi Huisache, Dona Park, Haws Athletic Center, and World Trade Bridge Monitors

On May 7, 2024, there was longwave troughing at 500 mb over the central U.S. that stacked down to a low-pressure center over the Dakotas. This trough created winds from the southwest over Texas that enabled the transport of smoke from Central American fires to monitors in south Texas. Throughout the rest of the week, the low-pressure center weakened and moved downstream, however, the flow at 500 mb over Texas remained from the southwest (Figure A-39, Figure A-40, Figure A-41 and Figure A-42).

On May 15, 2024, there was weak 500 mb ridging over Texas with winds from the west over southern Texas and winds from the northwest in East Texas. This led to particulate matter being transported from Mexican fires to the Edinburg East Freddy Gonzalez Drive monitor. While these winds enabled the transport of smoke in the upper atmosphere to Texas, ridging and higher pressure created subsidence which pushed the particulate matter towards the surface (Figure A-43 and Figure A-44).

On May 18, 2024, the longwave pattern at 500 mb over the U.S. is troughing over the western U.S. with a ridge over the eastern U.S. There is a major shortwave trough over East Texas at this level, but the flow is from the southwest over south Texas where the affected monitoring sites are located. This flow facilitated the transport of smoke from Mexican fires to the southern monitors. Throughout the next week, the pattern shifted as both the longwave trough and major shortwave troughs moved downstream; however, the flow over southern Texas remained from the southwest at 500 mb. By May 28, ridging had progressed over the western U.S. and Texas with high heights over south Texas and Mexico bringing subsidence. This subsidence likely pushed any particulate matter in the upper atmosphere towards the surface and kept any residual pollutants from dissipating upward (Figure A-45, Figure A-46, Figure A-47, Figure A-48, Figure A-49 and Figure A-50).

On May 30, 2024, there was 500 mb troughing over the western U.S. with ridging over the central U.S. Flow over southern Texas is from the west at this level, which enabled the transportation of smoke from Mexican fires. At the surface, there is high pressure over south Texas which brought subsidence and pushed any particulate matter in the upper atmosphere towards south Texas, affecting the southern monitors on May 30 and 31, 2024 (Figure A-51 and Figure A-52).

For each event date, NOAA HMS smoke maps reveal light to heavy levels of smoke originating from Mexico and covering each monitoring area of interest: Figure A-53 through Figure A-74.

Figure 2-21: *Percentage of Reported Fire Instances by the Mexican Government, on and around May 7 and May 15, 2024*, shows the reported fire types in Mexico, with around 38% of the reported fires considered unlikely to recur including intentional, hunting, campfires, road clearing, smoker, and natural sources.

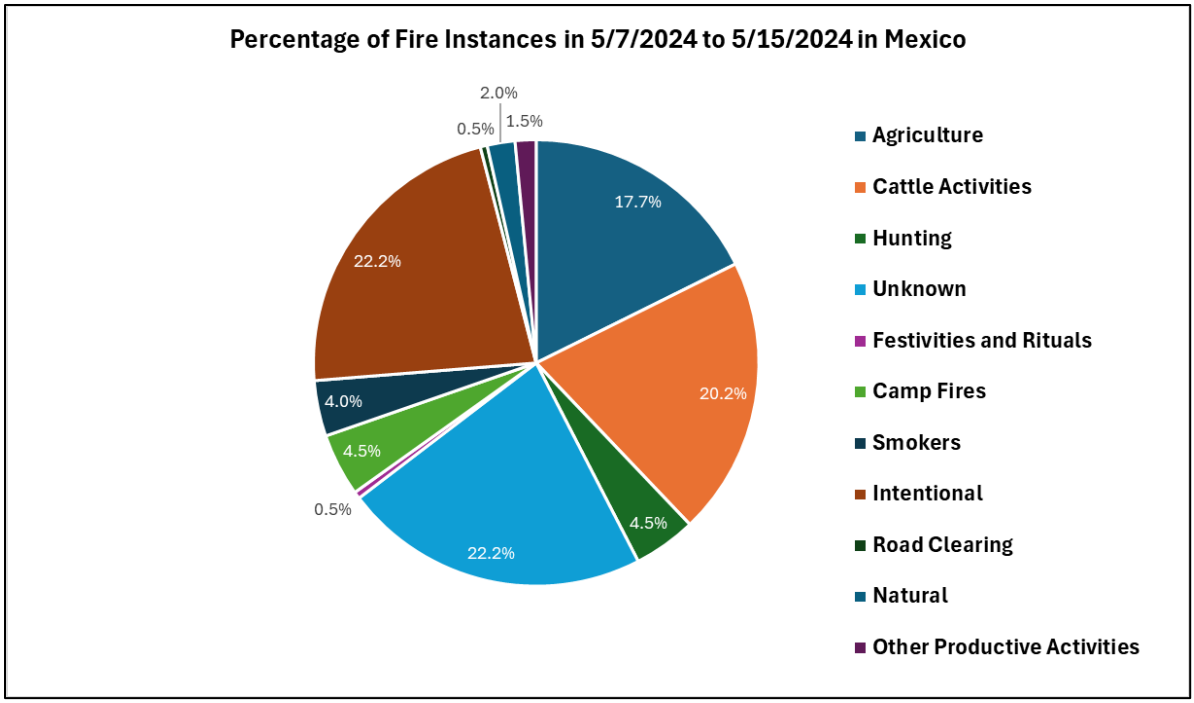

Figure 2-21: Percentage of Reported Fire Instances by the Mexican Government, on and around May 7 and May 15, 2024

Figure 2-22: *Percentage of Reported Fire Instances by the Mexican Government, on and around May 16 and May 31, 2024*, shows the reported fire types in Mexico, with around 37% of the reported fires considered unlikely to recur, including intentional, hunting, campfires, natural, forest harvesting waste, and smoker sources.

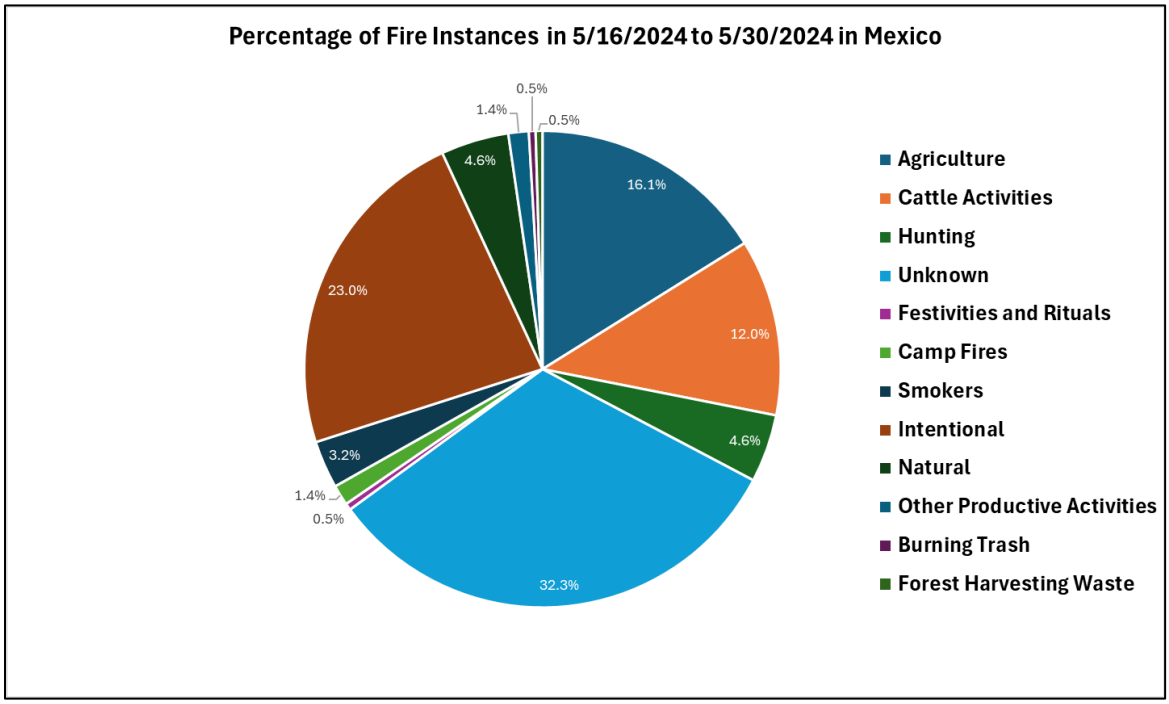

Figure 2-22: Percentage of Reported Fire Instances by the Mexican Government, on and around May 16 and May 31, 2024

2.7.10 Group 10 – Summary of May 27, 2024, High Wind $PM_{2.5}$ Event for the World Trade Bridge Monitor

High winds affected the World Trade Bridge monitor in Webb County on May 27, 2024. The elevated 24-hour average $PM_{2.5}$ conditions were reported to be 38.3 µg/m^3. Five-minute sustained windspeeds recorded at the time of the peak daily one-hour $PM_{2.5}$ concentration value were reported to be 26.69 mph.

Figure 2-23: *Hourly $PM_{2.5}$ Concentrations on Days around Event (May 27, 2024) for the World Trade Bridge Monitor* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between May 25, 2024, and May 29, 2024, with the hours on May 27, 2024, highlighted in orange. As seen in Figure 2-23, on May 27, hourly concentrations increased substantially around 06:00 LST and remained clearly elevated until approximately 22:00 LST.

Throughout the week, a longwave trough and major shortwave troughs moved downstream. However, the flow over southern Texas remained from the southwest at 500 mb (Figure A-49 and Figure A-50). The ridging had progressed over the west U.S. and Texas with high heights over south Texas and Mexico bringing subsidence. This subsidence likely pushed any particulate matter in the upper atmosphere towards the surface and kept any residual pollutants from dissipating upward.

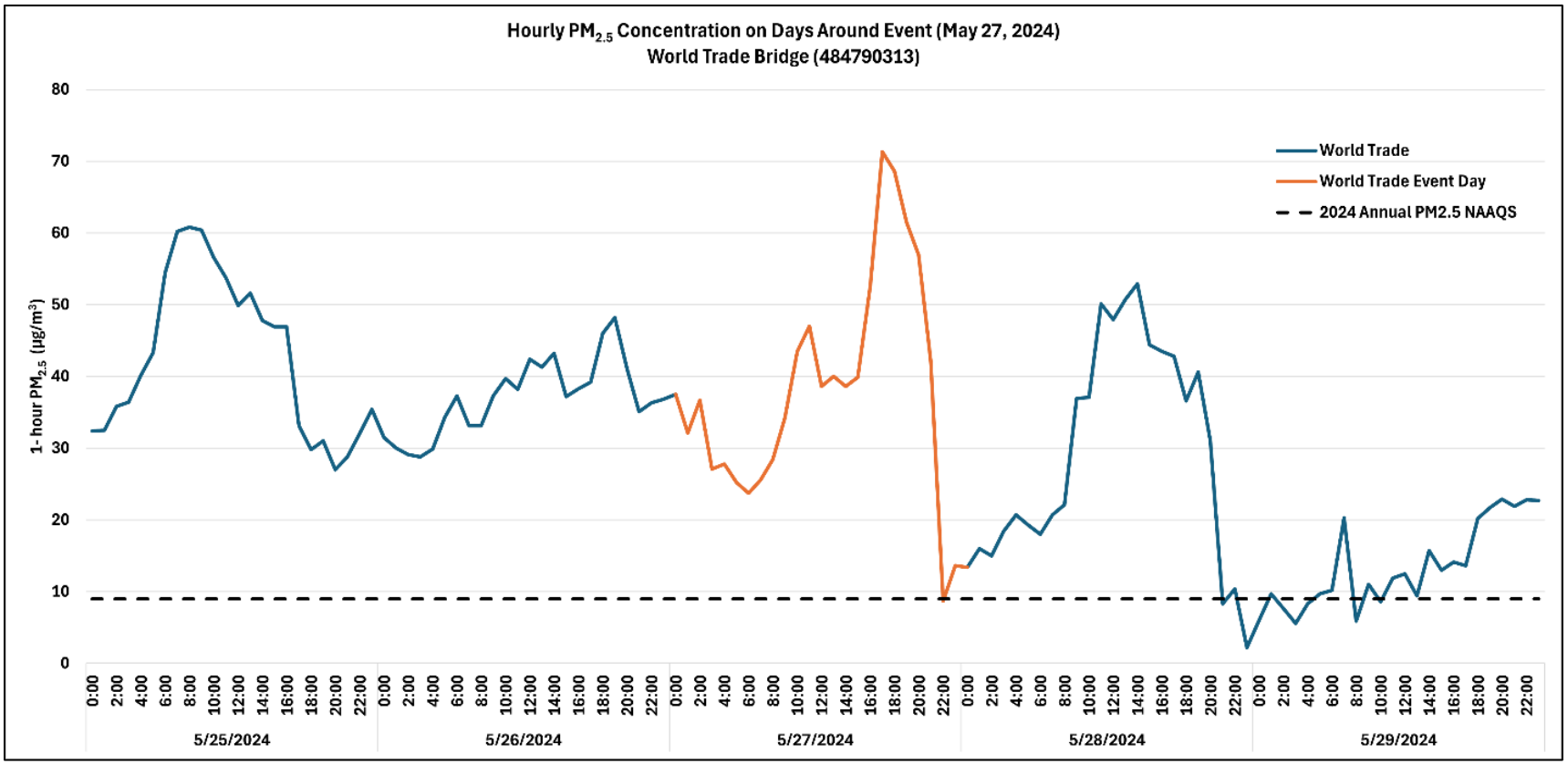

Figure 2-23: Hourly $PM_{2.5}$ Concentrations on Days around Event (May 27, 2024) for the World Trade Bridge Monitor

2.7.11 Group 11 – Summary of June 2, 2024, through June 6, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Haws Athletic Center, and World Trade Bridge Monitors

From June 2 through June 6, 2024, smoke from fires in Mexico affected the:

- Von Ormy Highway 16 monitor in Atascosa County on June 4, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 34.7 µg/m^3);
- Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on June 2 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 23.6 µg/m^3), June 3 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 28.2 µg/m^3), June 4 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 31.2 µg/m^3), June 5 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 49.8 µg/m^3), and June 6, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 38.1 µg/m^3);
- Dona Park monitor in Nueces County on June 4, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 37.8 µg/m^3);
- Haws Athletic Center in Tarrant County on June 4, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 24.9 µg/m^3); and
- World Trade Bridge monitor in Webb County on June 4 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 35.1 µg/m^3), June 5 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 34.0 µg/m^3), and June 6 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 36.9 µg/m^3), 2024.

Figure 2-24: *Hourly $PM_{2.5}$ Concentrations on Days around Event (June 2 through June 6, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Haws Athletic Center, and World Trade Bridge Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring sites between May 31, 2024, and June 8, 2024, with the hours on June 2, June 3, June 4, June 5, and June 6, 2024, highlighted with a dotted purple line for the Von Ormy Highway 16 monitor, a dotted dark green line for the Edinburg East Freddy Gonzalez Drive monitor, a dotted red line for the Dona Park monitor, a dotted lime green line for the Haws Athletic Center monitor, and a dotted blue line for the World Trade Bridge monitor. As seen in Figure 2-24, hourly concentrations for the Edinburg East Freddy Gonzalez Drive monitor rose around 00:00 LST on June 2 and stayed variably high, except for the drop at 12:00 LST on June 2, until about 00:00 LST on June 7, 2024. Hourly concentrations for the Von Ormy monitor increased around 02:00 LST on June 4 and stayed high till about 20:00 LST. Hourly concentrations for the Dona Park monitor increased around 20:00 LST on June 3 and remained high until about 12:00 LST on June 5. Hourly concentrations for the Haws monitor increased around 00:00 LST on June 4 and stayed high till about 00:00 LST on June 5. Hourly concentrations for the World Trade monitor increased around 00:00 LST on June 4 and stayed high till about 00:00 LST on June 7, 2024.

On June 2 through June 4, 2024, south Texas and the Rio Grande Valley experienced hot and humid conditions with moderate surface winds largely out of the south with some variation from the southwest and southeast. A dryline extended from the Panhandle area south towards Laredo, Texas (Figure A-75, Figure A-77, and Figure A-79). On June 2 through June 4, 2024, at the mid-levels of the atmosphere, the winds were moderate flowing generally from the west to the east over South Texas and the Rio Grande Valley, helping transport smoke from fires in northern Mexico into Atascosa, Hidalgo, Nueces, and Webb Counties (Figure A-76, Figure A-78, and Figure A-80).

On June 5, 2024, a cold front briefly approached the region from the north before retreating on June 6, 2024, as high pressure regained control of the area (Figure A-81 and Figure A-83). On June 5 and June 6, 2024, a mid-level ridge settled into the area, increasing subsidence and trapping particulate matter close to the surface level. The combined smoke transport and subsidence, as well as the high humidity in the area resulted in elevated $PM_{2.5}$ concentrations in

Atascosa, Hidalgo, Nueces, and Webb counties during this period of time (Figure A-82 and Figure A-84).

From June 2 through June 6, 2024, NOAA HMS smoke maps reveal light to medium concentrations of smoke throughout Mexico, the Gulf of America, extending through South and East Texas, covering the monitoring areas of interest (Figure A-85, Figure A-86, Figure A-87, Figure A-88, Figure A-89, and Figure A-90). Figure 2-25: *Percentage of Reported Fire Instances by the Mexican Government, on and around June 2 through June 6, 2024*, shows the reported fire types in Mexico, with around 44% of the reported fires considered unlikely to recur including intentional, hunting, smoking, campfire, natural, and forest harvesting waste sources.

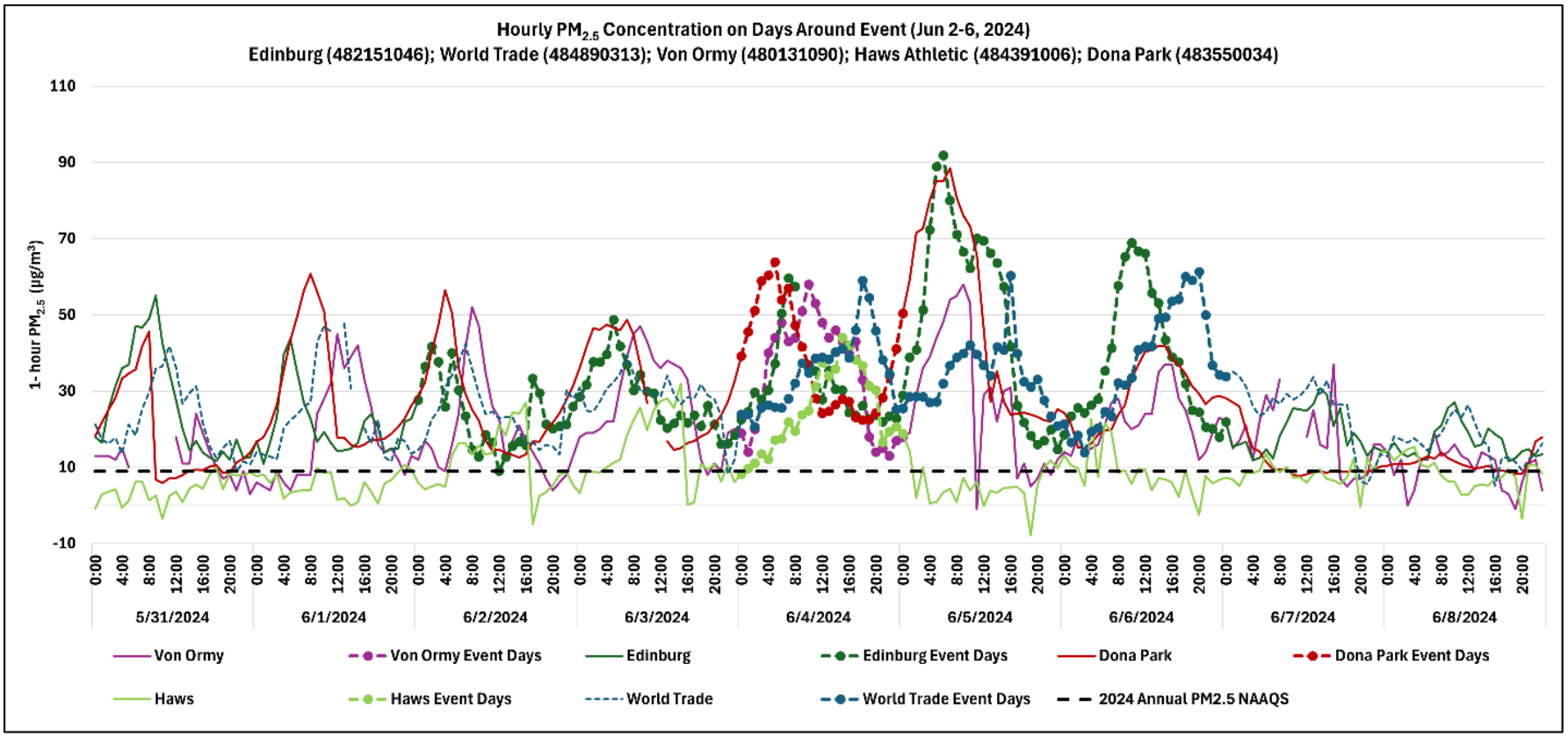

Figure 2-24: Hourly $PM_{2.5}$ Concentrations on Days around Event (June 2 through June 6, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Haws Athletic Center, and World Trade Bridge Monitors

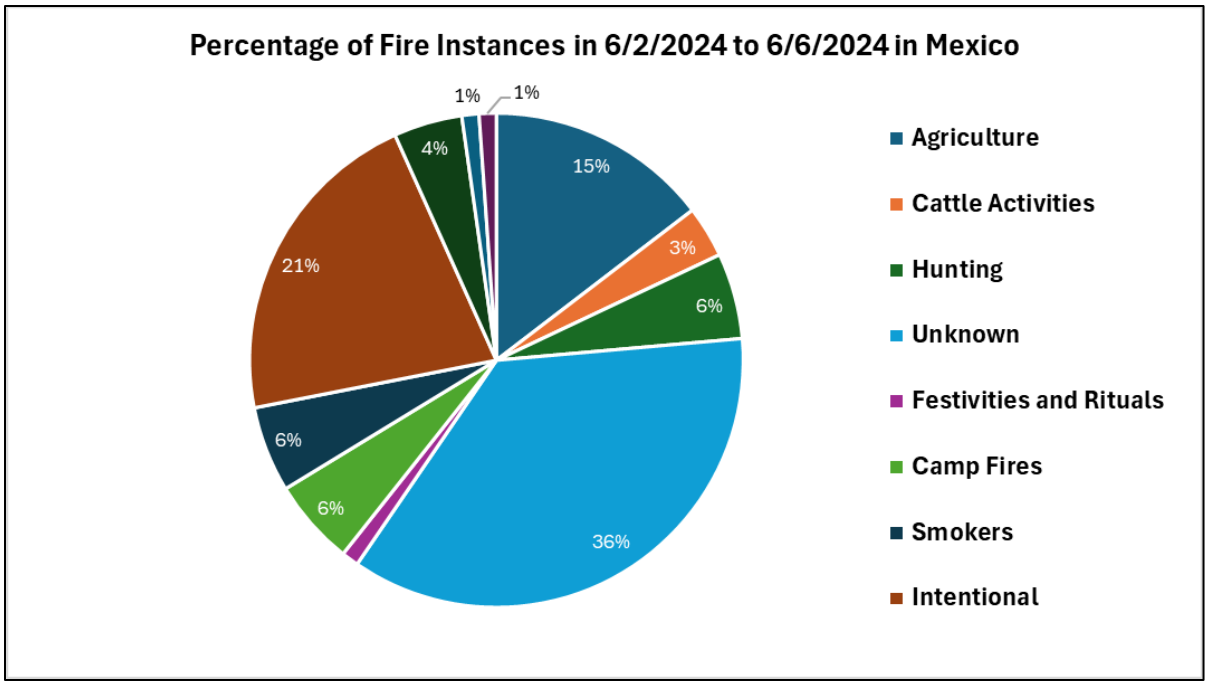

Figure 2-25: Percentage of Reported Fire Instances by the Mexican Government, on and around June 2 through June 6, 2024

2.7.12 Group 12 – Summary of June 5, 2024, High Wind $PM_{2.5}$ Event for Corpus Christi Huisache and Dona Park Monitors

High winds affected the Corpus Christi Huisache monitor, and Dona Park monitor in Nueces County on June 5, 2024. The elevated 24-hour average $PM_{2.5}$ conditions were reported to be 37.4 µg/m^3 for the Corpus Christi Huisache monitor and 50.5 µg/m^3 for the Dona Park monitor. Five-minute sustained windspeeds recorded at the time of the peak daily one-hour $PM_{2.5}$ concentration value were reported to be 26.21 mph for the Corpus Christi Huisache monitor and 30.87 mph for the Dona Park monitor.

Figure 2-26: *Hourly $PM_{2.5}$ Concentrations on Days around Event (July 5, 2024) for the Corpus Christi Huisache and Dona Park Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between July 3, 2024, and July 7, 2024, with the hours on July 5, 2024, highlighted in a dotted orange line for Corpus Christi Huisache monitor and a dotted blue line for the Dona Park monitor. As seen in Figure 2-26, on July 5, 2024, hourly concentrations increased substantially around 00:00 LST and remained clearly elevated until approximately 14:00 LST.

On June 5 and June 6, 2024, a mid-level ridge settled into the area, increasing subsidence and trapping particulate matter close to the surface level. On June 5, a cold front briefly approached the region from the north before retreating on June 6, 2024, as high pressure regained control of the area. The combined smoke transport and subsidence, as well as the high humidity in the area resulted in elevated $PM_{2.5}$ concentrations in Nueces County during this period of time (Figure A-81 and Figure A-82).

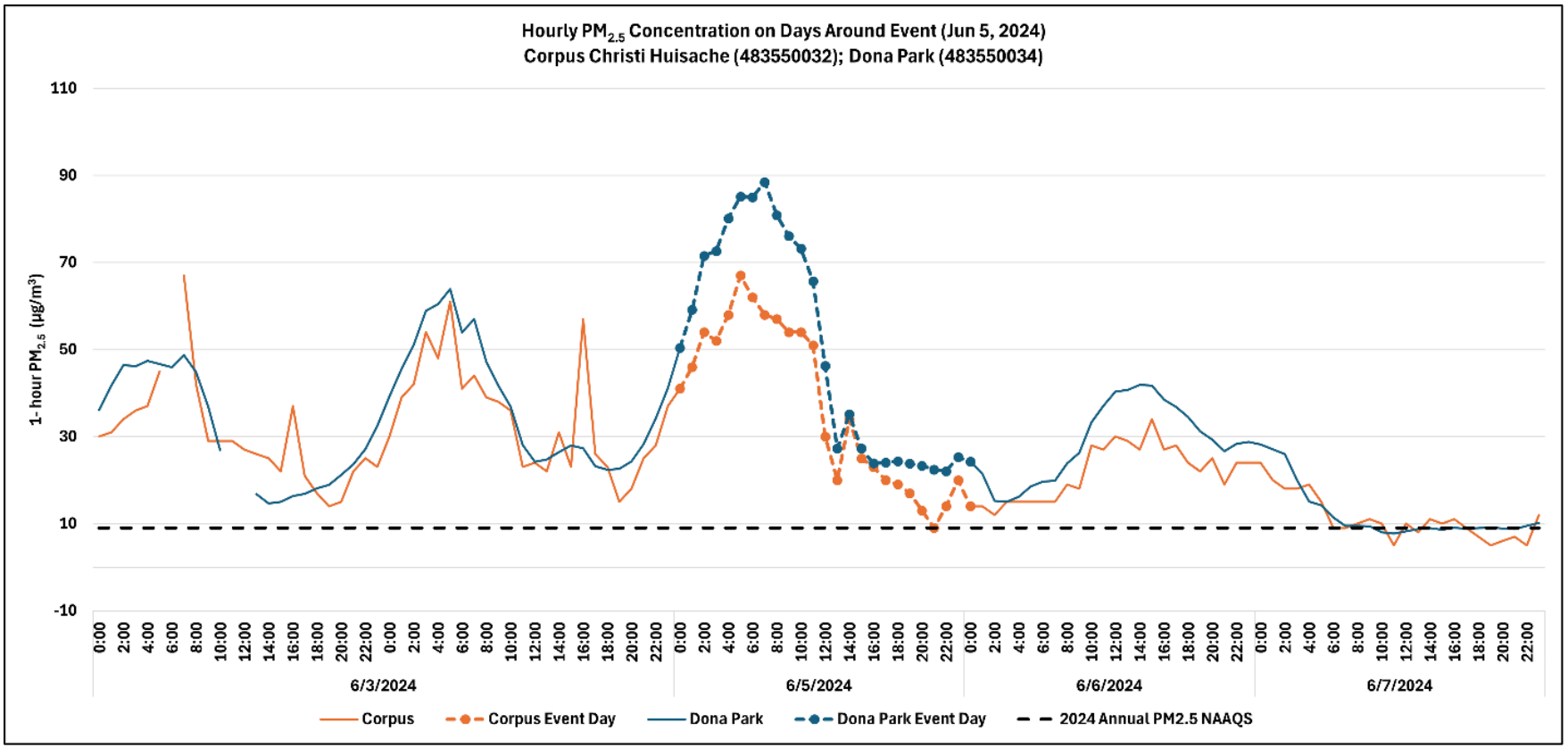

Figure 2-26: Hourly $PM_{2.5}$ Concentrations on Days around Event (July 5, 2024) for the Corpus Christi Huisache and Dona Park Monitors

2.7.13 Group 13 – Summary of July 30, 2024, through August 1, 2024, African Dust Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Fort Worth Northwest, Haws Athletic Center, and World Trade Bridge Monitors

From July 30 through August 1, 2024, African dust affected the:

- Von Ormy Highway 16 monitor in Atascosa County on July 31, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 38.5 µg/m^3);
- Edinburg East Freddy Gonzalez Drive monitor in Hidalgo County on July 30 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 23.0 µg/m^3) and July 31, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 33.8 µg/m^3);
- Dona Park monitor in Nueces County on July 31, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 42.8 µg/m^3);
- Fort Worth Northwest in Tarrant County on August 1, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 32.6 µg/m^3);
- Haws Athletic Center monitor in Tarrant County on July 31 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 31.5 µg/m^3) and August 1, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 33.2 µg/m^3); and
- World Trade Bridge monitor in Webb County on July 31, 2024 (Elevated 24-hour average $PM_{2.5}$ conditions were reported to be 36.3 µg/m^3).

Figure 2-27: *Hourly $PM_{2.5}$ Concentrations on Days around Event (July 30 through August 1, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Haws Athletic Center, Fort Worth Northwest, and World Trade Bridge Monitors* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between July 30, 2024, and August 1, 2024, with the hours on July 30, July 31, and August 1 2024, highlighted in a dotted purple line for the Von Ormy Highway 16 monitor, a dotted dark green line for the Edinburg monitor, a dotted red line for the Dona Park monitor, a dotted dark red line for the Fort Worth monitor, a dotted light blue line for the Haws monitor, and a dotted dark blue line for the World Trade Bridge monitor. As seen in Figure 2-27, on July 5, 2024, hourly concentrations increased substantially around 00:00 LST on July 30 and remained clearly elevated for most monitors until approximately 09:00 LST on August 1, 2024 when they decreased. The Haws Athletic Center and Fort Worth Northwest monitors remained elevated until decreasing around 00:00 that night on the eve of August 2, 2024.

Figures A-91 through A-96 show that July 30 through August 1, 2024, depicted the typical pattern seen with large African Dust events in Texas. Near the surface, there was an onshore flow over much of the coast of Texas continuing with winds out of the south and southeast over much of the state. Similar situations were present at mid-levels with a broad area of high pressure centered over northern Texas. These conditions bring African dust west across the southern Gulf before moving north and northeast into Texas. As a result of this large, broad African Dust event, elevated $PM_{2.5}$ concentrations were measured in Hidalgo and Nueces Counties along the coast, in Webb and Atascosa Counties in western and central-western Texas, and Tarrant County in north Texas.

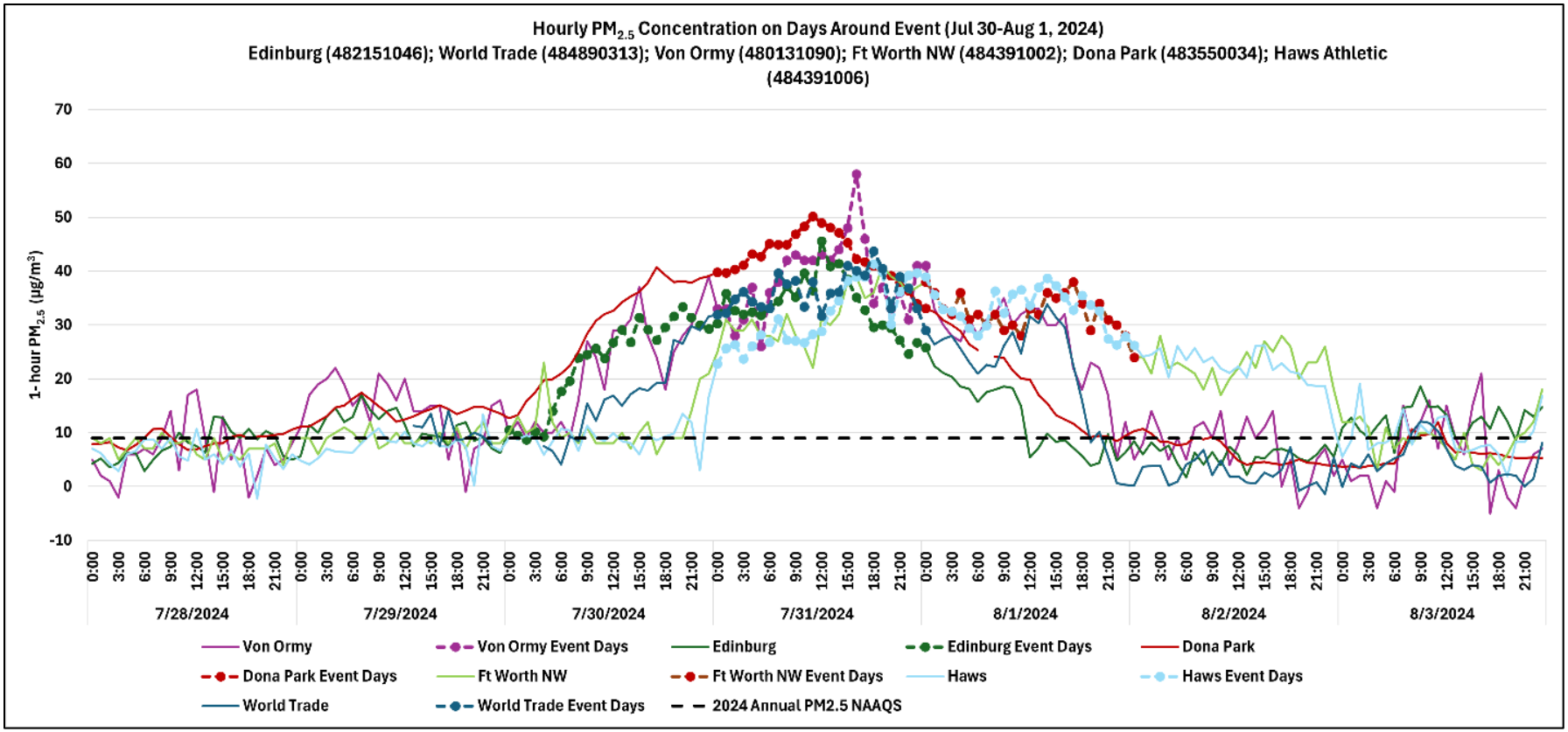

Figure 2-27: Hourly $PM_{2.5}$ Concentrations on Days around Event (July 30 through August 1, 2024) for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Dona Park, Haws Athletic Center, Fort Worth Northwest, and World Trade Bridge Monitors

2.7.14 Group 14 – Summary of October 3, 2024, U.S. Wildfire $PM_{2.5}$ Event for the Fort Worth Northwest Monitor

U.S. wildfires affected the Fort Worth Northwest monitor in Tarrant County on October 3, 2024. The elevated 24-hour average $PM_{2.5}$ conditions for the monitor were reported to be 34.8 µg/m3 on October 3, 2024. Figure 2-28: *Hourly $PM_{2.5}$ Concentrations on Days around Event (October 3, 2024) for the Fort Worth Northwest Monitor* shows the hourly $PM_{2.5}$ concentrations measured at the monitoring site between October 1 and October 5, 2024, with the hours of October 3 highlighted with an orange line. As shown in Figure 2-28, concentrations rose significantly between the hours of 12:00 through 18:00 LST on the event day. While most concentrations recorded that day fell below 50.0 µg/m^3, concentrations rose to over 450.0 µg/m^3 during the time of the event.

On October 3, 2024, Tarrant County was primarily influenced by high pressure over the area, with fairly light winds aloft. Subsidence and light winds at the Fort Worth Northwest monitor allowed for residual smoke from fires in the Midwest to settle in the area and increase $PM_{2.5}$ concentrations (Figure A-97 and Figure A-98). NOAA HMS smoke maps reveal light to moderate smoke in North and East Texas, covering the Fort Worth Northwest monitoring area (Figure A-99).

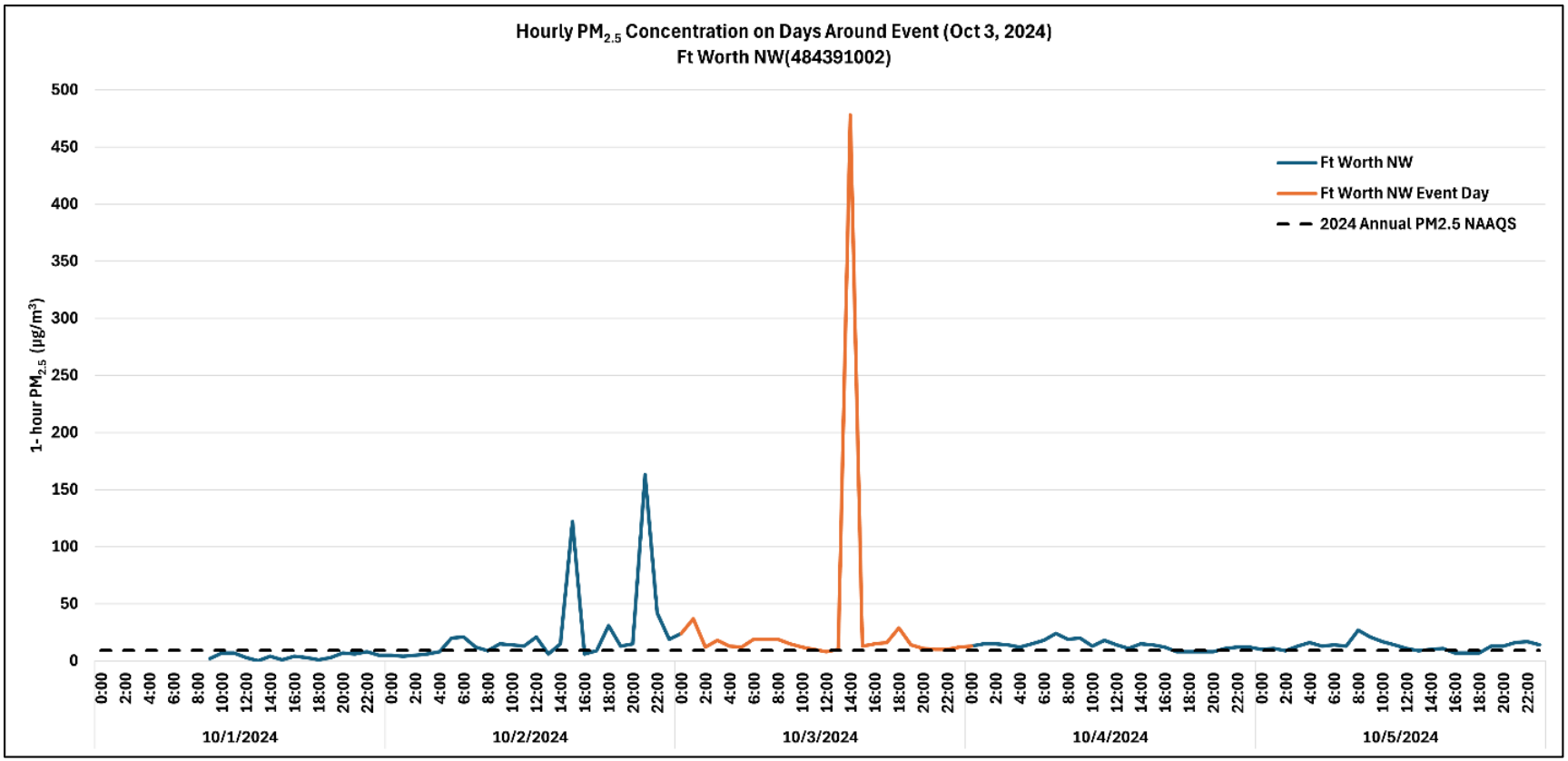

Figure 2-28: Hourly $PM_{2.5}$ Concentrations on Days around Event (October 3, 2024) for the Fort Worth Northwest Monitor

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, 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 Corpus Christi Huisache Monitor*, Figure 3-2: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Dona Park Monitor*, Figure 3-3: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-4: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Fort Worth Northwest Monitor*, Figure 3-5: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Haws Athletic Center Monitor*, Figure 3-6: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Von Ormy Highway 16 Monitor*, and Figure 3-7: *24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the World Trade Bridge Monitor* illustrate the 24-hour $PM_{2.5}$ concentrations on 2024 event days compared to non-event days relative to the Tier levels for each monitor.

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

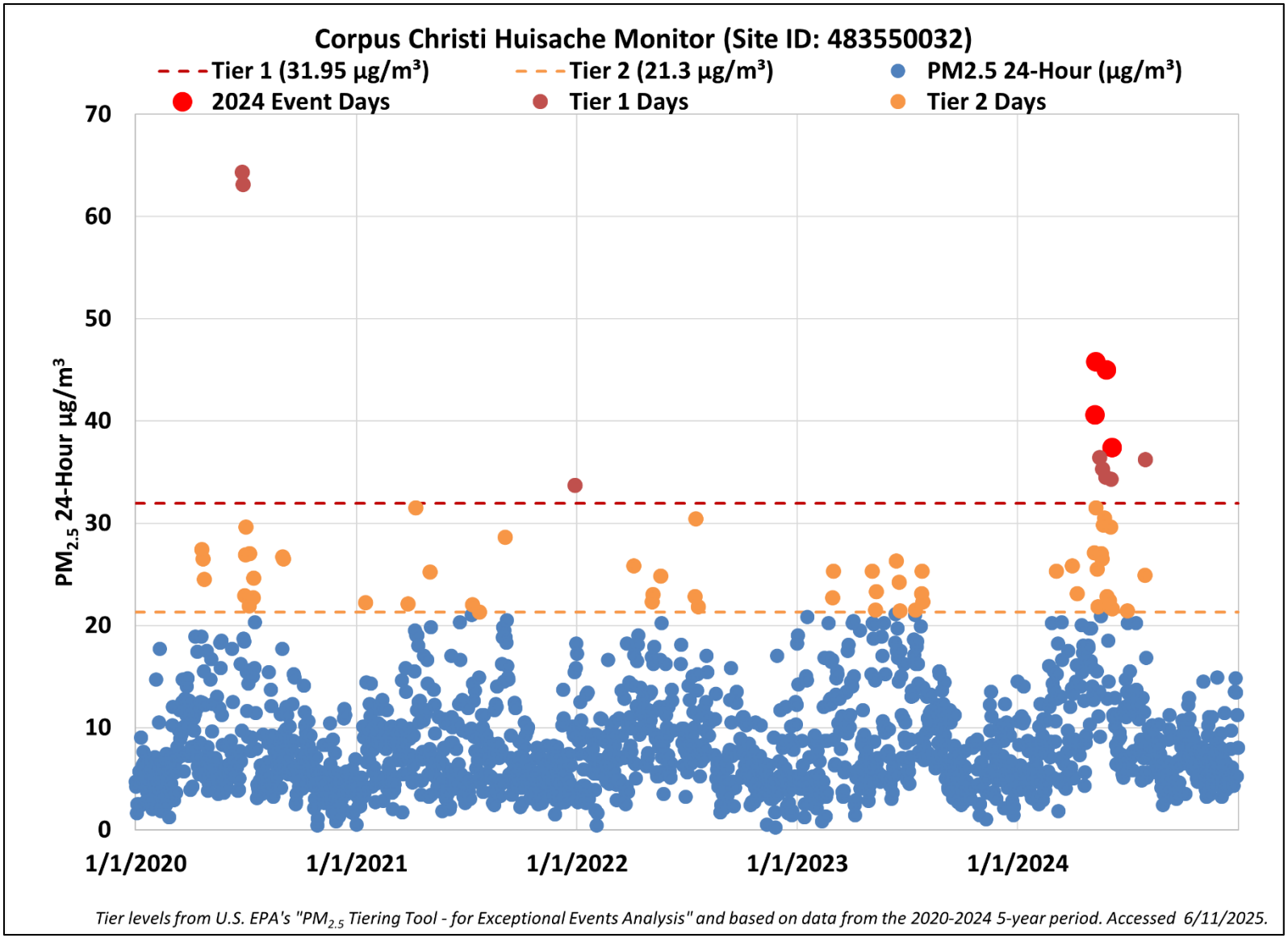

Figure 3-1: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Corpus Christi Huisache Monitor

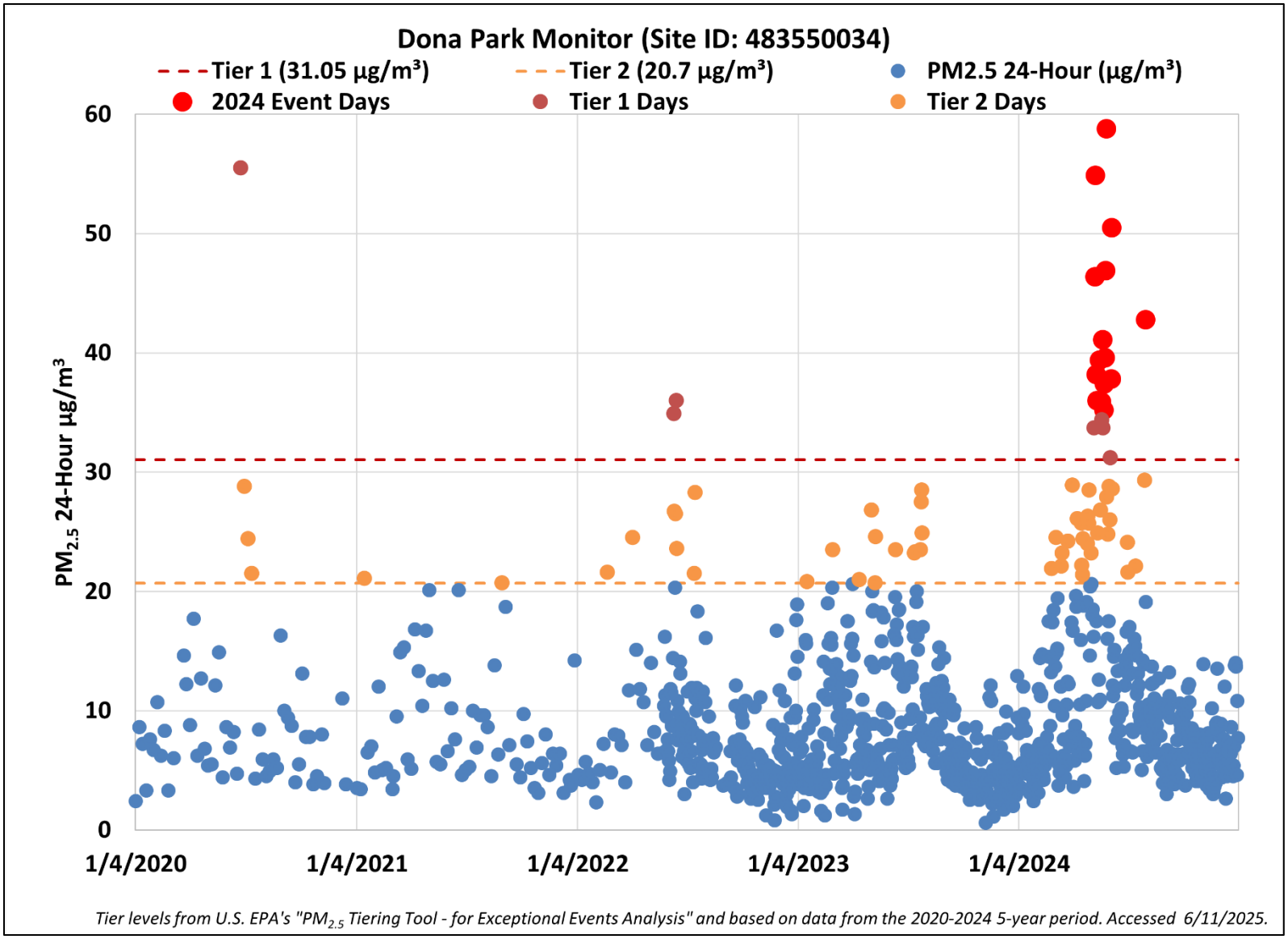

Figure 3-2: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Dona Park Monitor

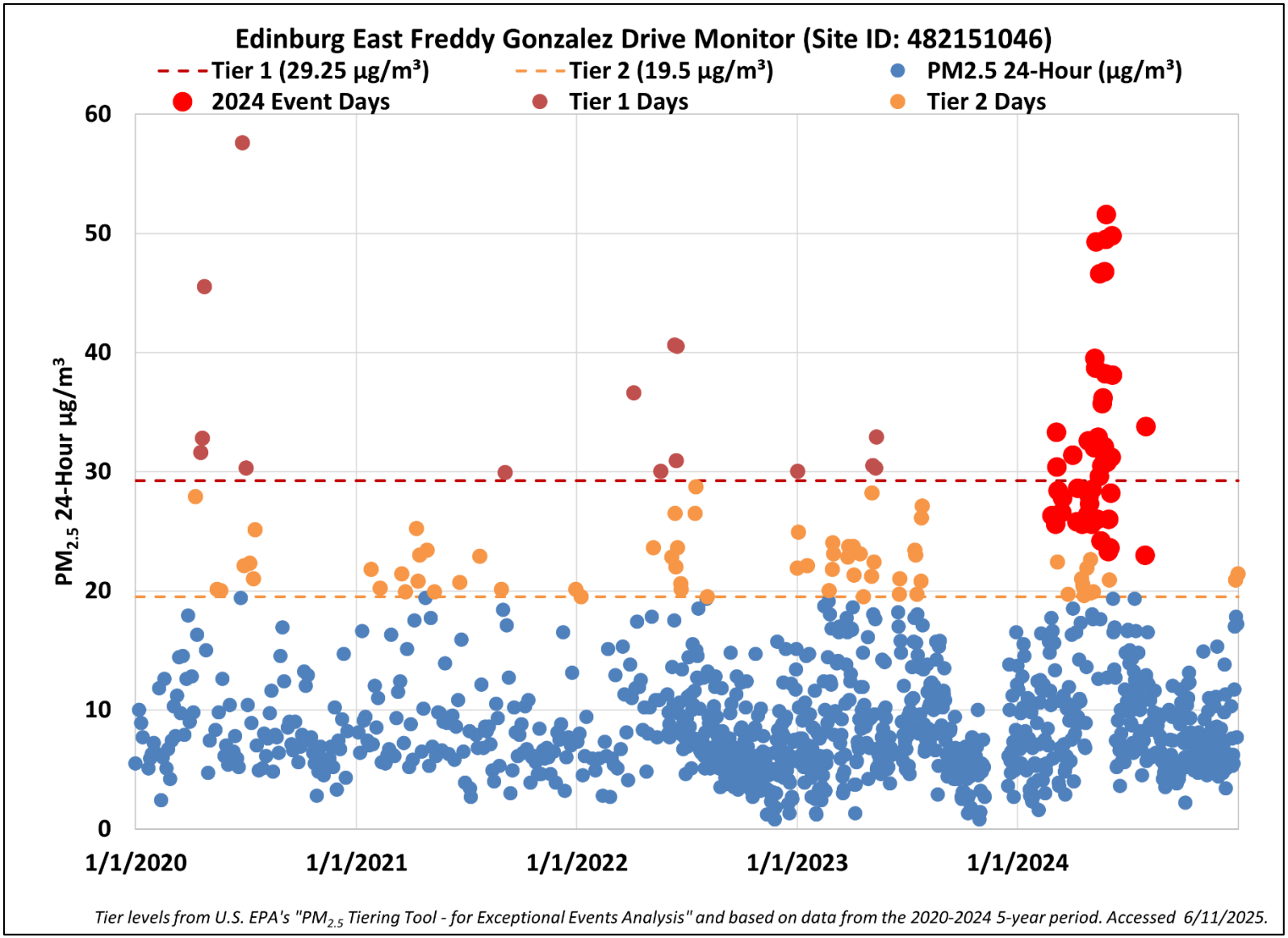

Figure 3-3: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Edinburg East Freddy Gonzalez Drive Monitor

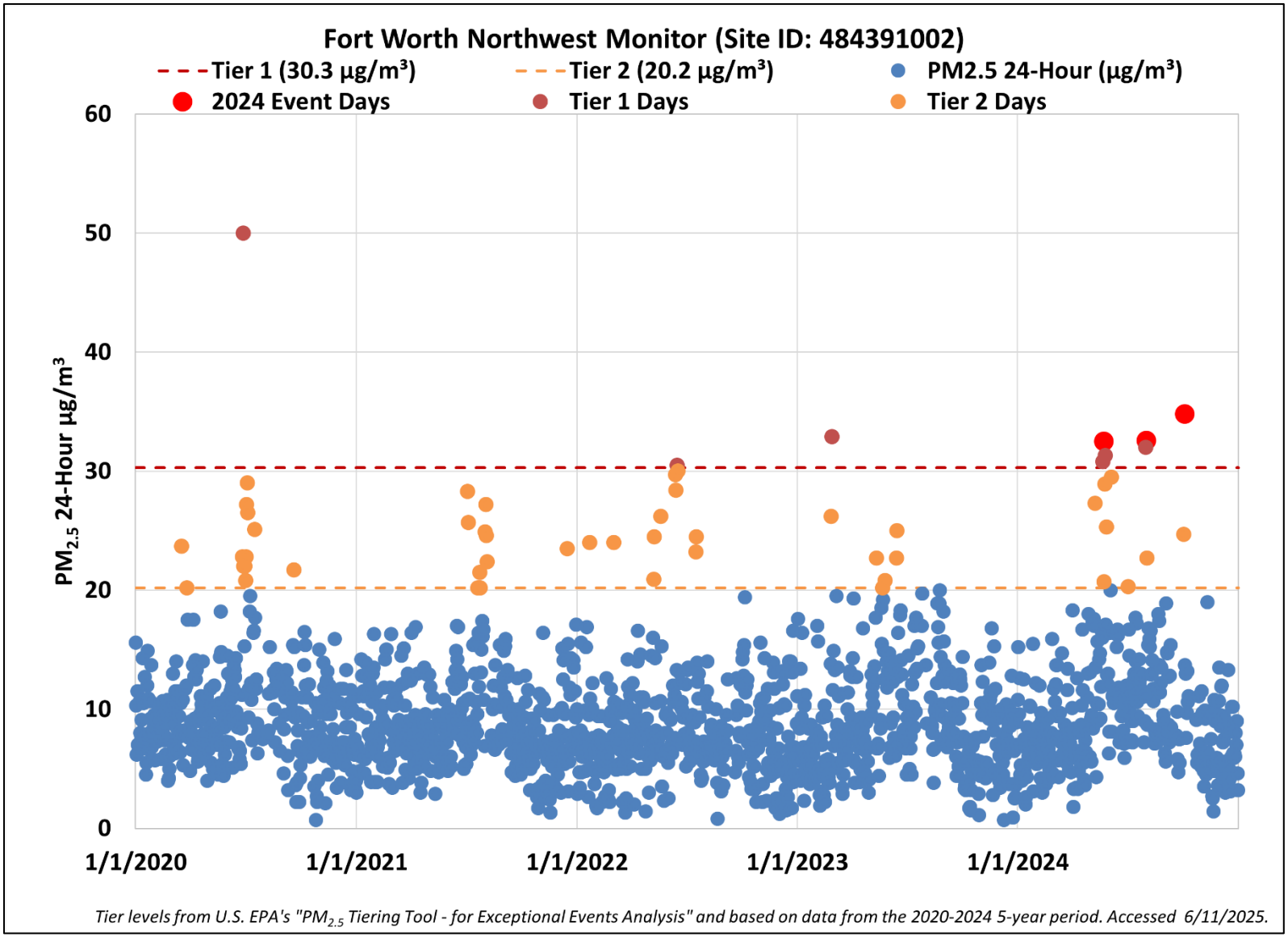

Figure 3-4: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Fort Worth Northwest Monitor

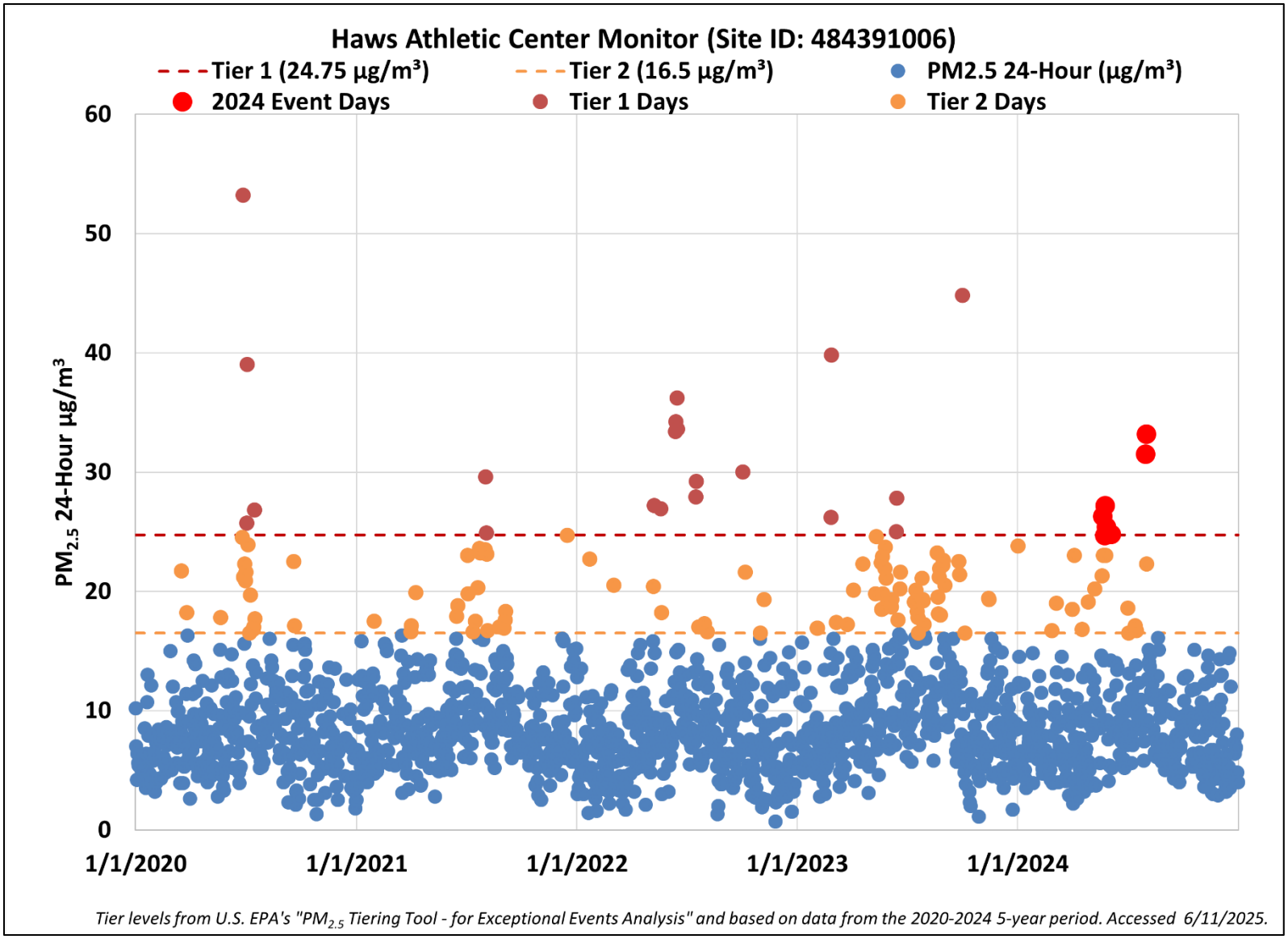

Figure 3-5: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Haws Athletic Center Monitor

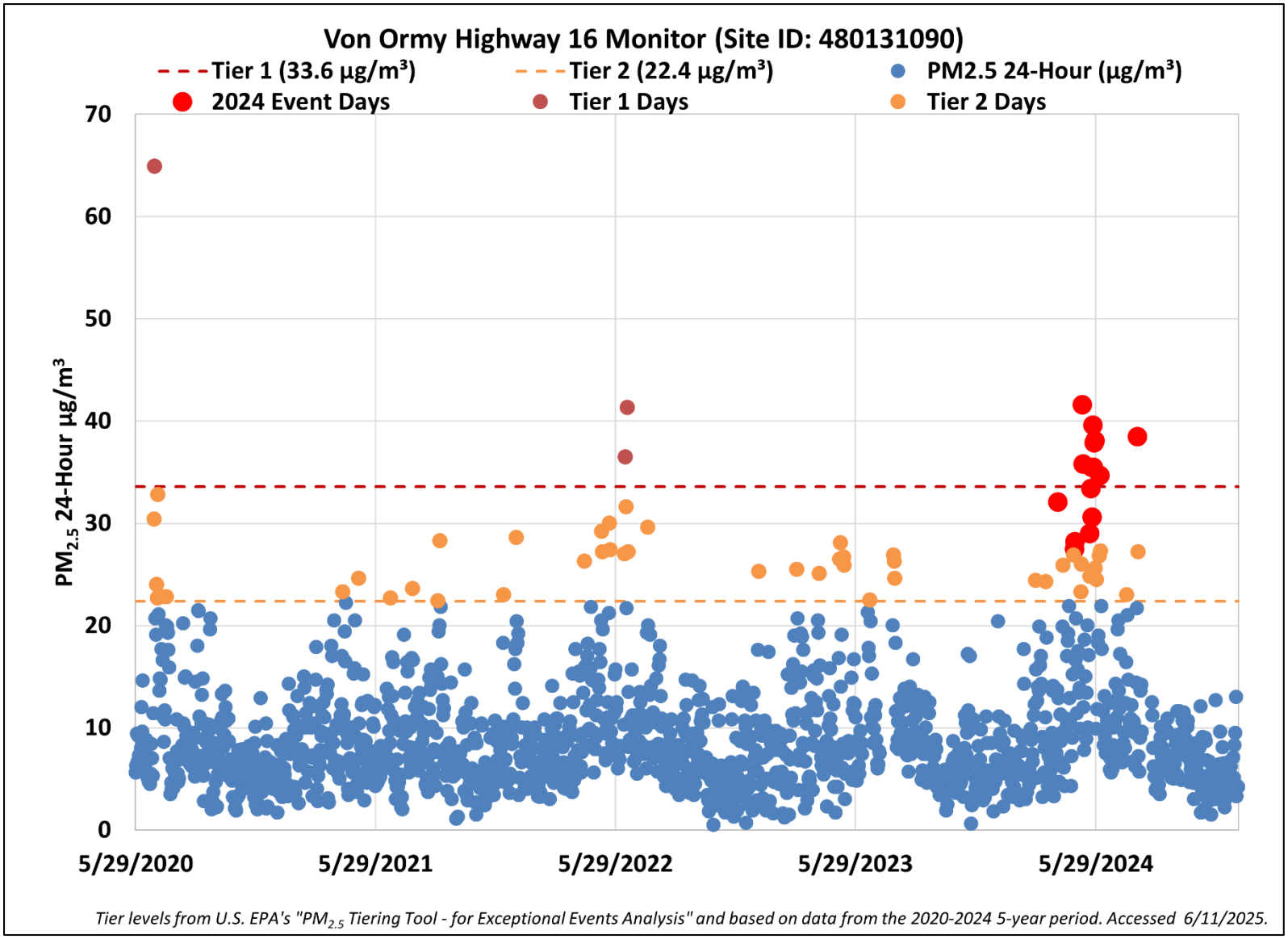

Figure 3-6: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the Von Ormy Highway 16 Monitor

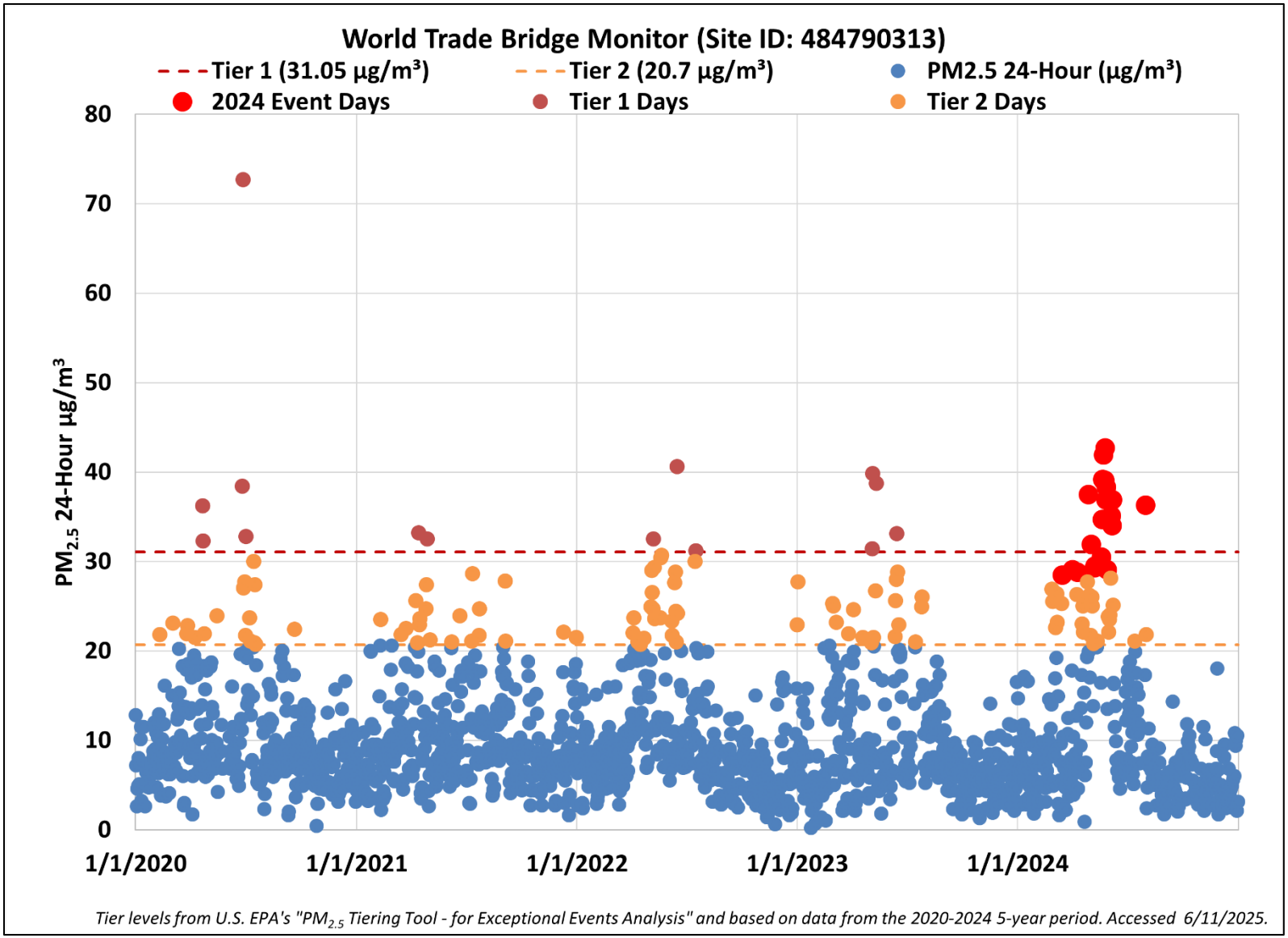

Figure 3-7: 24-Hour $PM_{2.5}$ Concentrations, 2024 Event Days and Tier 1 and Tier 2 Thresholds for the World Trade Bridge Monitor

3.2 CLEAR CAUSAL EVIDENCE

In addition to Figure 3-1, Figure 3-2, Figure 3-3, Figure 3-4, Figure 3-5, Figure 3-6, and Figure 3-7, 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 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.
  - Forward trajectories on days impacted by fires in Mexico, 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 May 23, 2025.
- 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 and are referenced in this chapter as Figure 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 travel 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 the February 27, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive Monitor

February 27, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 26.3 µg/m³; one-hour daily maximum 44.5 µg/m³ recorded at 17:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on February 27, 2024, can be compared against typical days for the monitor in Figure 3-8: *Hourly $PM_{2.5}$ Concentrations on February 27, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

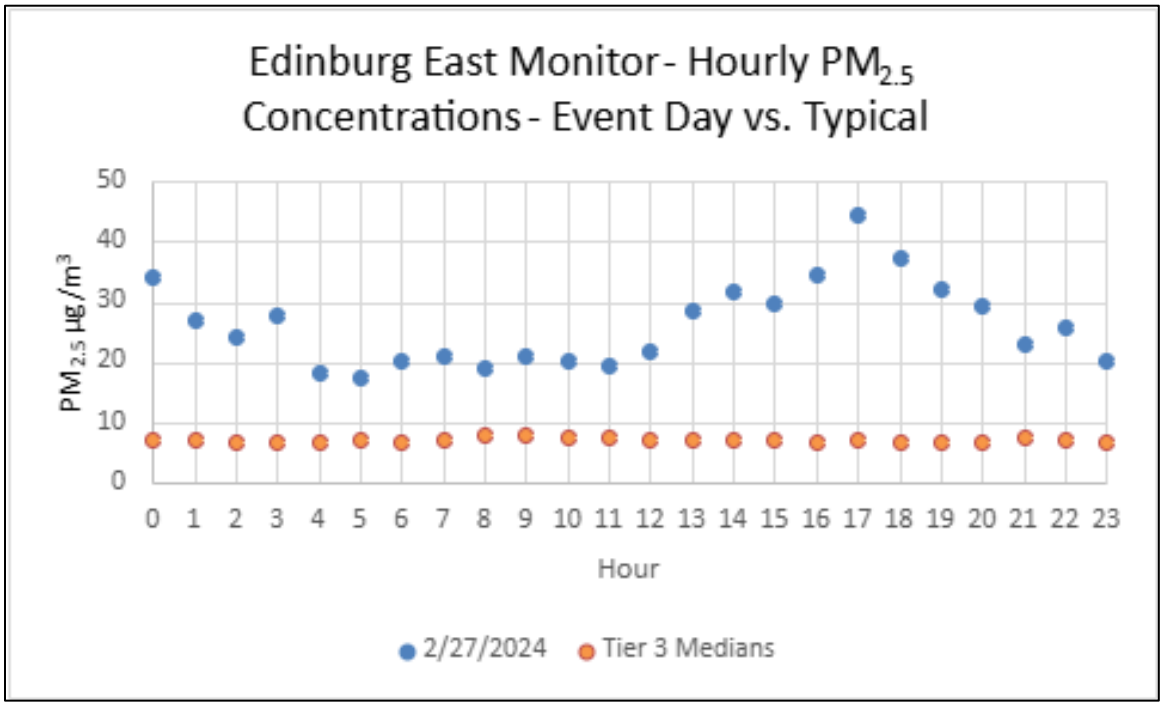

Figure 3-8: Hourly $PM_{2.5}$ Concentrations on February 27, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

The NWS forecast (Figure B-1) summary and TCEQ forecasts (Table C-1) revealed that high winds affected the area, potentially increasing fine particulate matter concentration values near the monitor. TCEQ forecasts additionally mention that moderate density smoke from seasonal fire activity combined with high humidity and southerly winds, converged with smoke from seasonal south U.S. fires across the Mississippi Valley, increasing fine particulate levels. Satellite imagery is obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images. (Figure 3-9: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from February 27, 2024, Showing Heavy Cloud Cover*). Smoke plumes (Figure A-3 and Figure 3-10: *AirNow HMS Smoke Plume for February 27, 2024*) and HYSPLIT backward wind trajectories (Figure 3-11: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on February 27, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light smoke was transported into south Texas from Mexico on the date of interest. On

that same day, monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from central Mexico traveled through South and East Texas (Figure 3-12: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on February 24, 2024*).

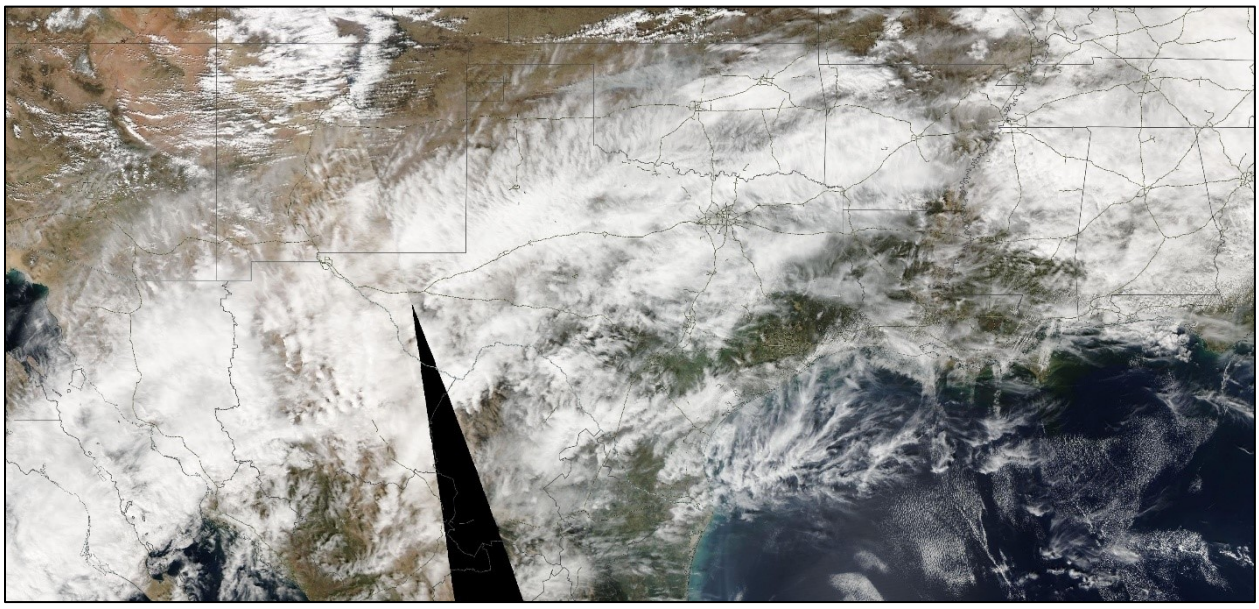

Figure 3-9: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from February 27, 2024, Showing Heavy Cloud Cover

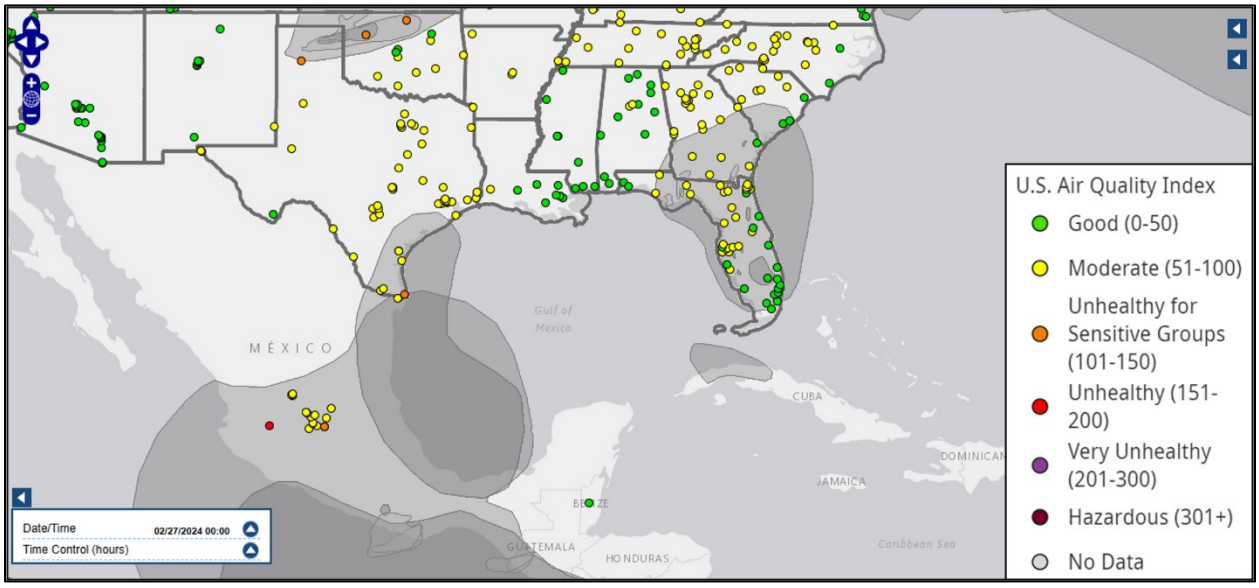

Figure 3-10: AirNow HMS Smoke Plume for February 27, 2024

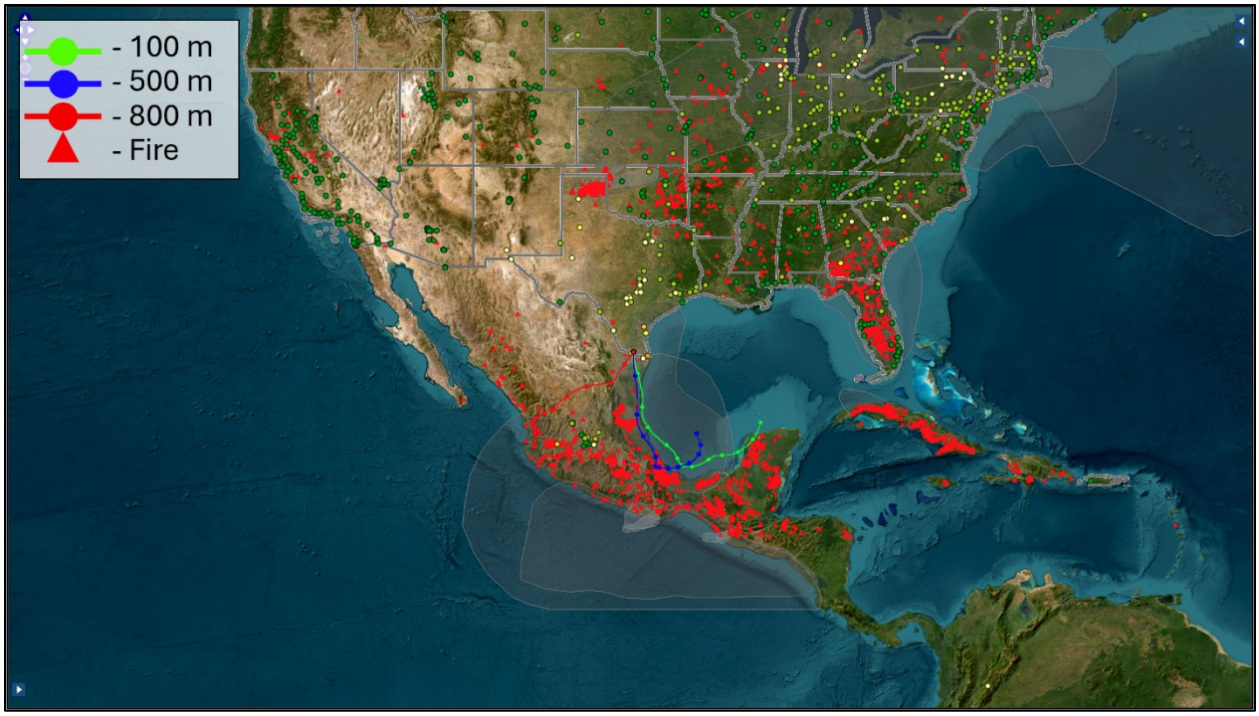

Figure 3-11: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on February 27, 2024

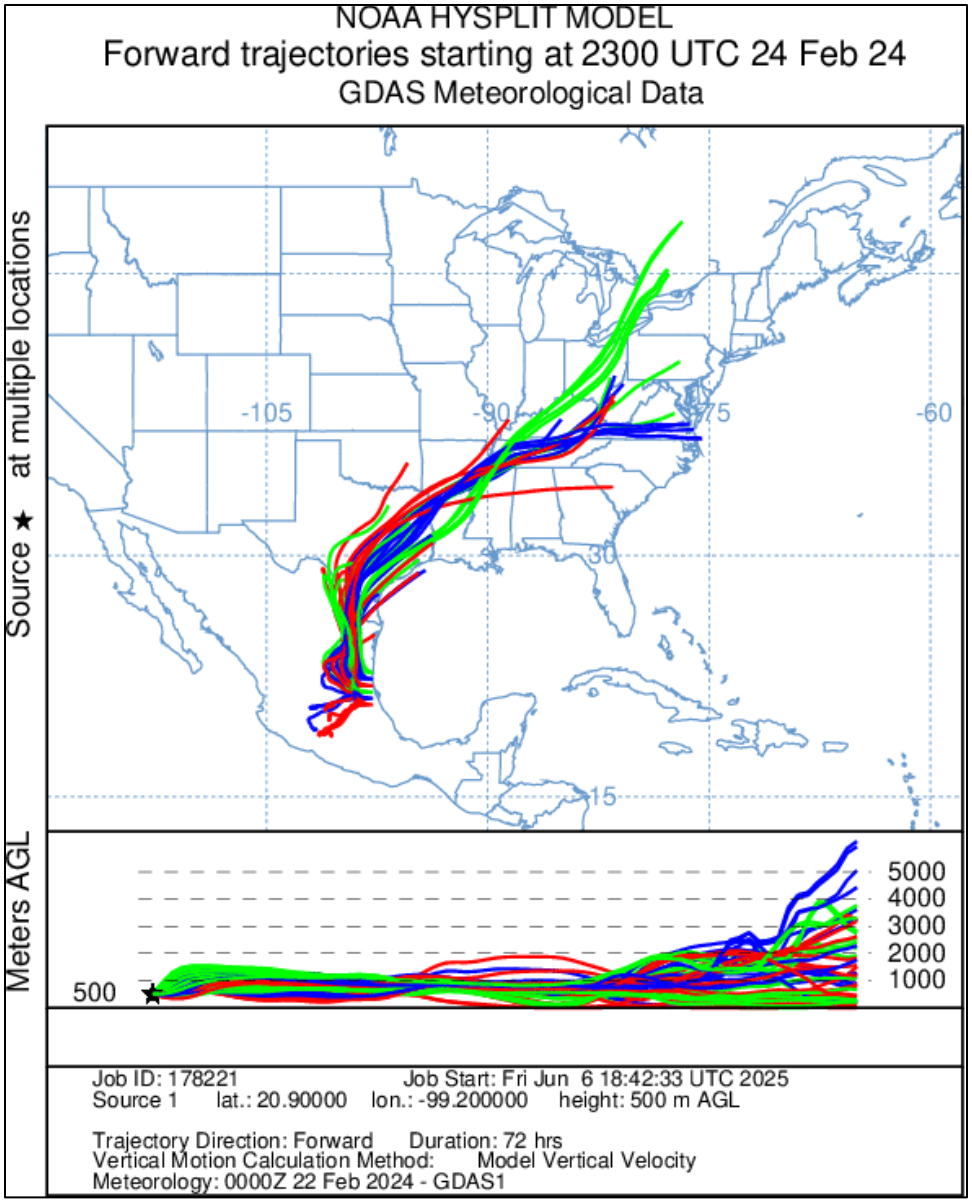

Figure 3-12: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on February 24, 2024

3.2.2 Group 2 – Evidence for the March 4 through March 6, 2024, and March 8, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive Monitor

March 4, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 25.6 µg/m^3; one-hour daily maximum 34.0 µg/m^3 recorded at 18:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on March 4, 2024, can be compared against typical/non-event days for the monitor in Figure 3-13: *Hourly $PM_{2.5}$ Concentrations on March 4, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

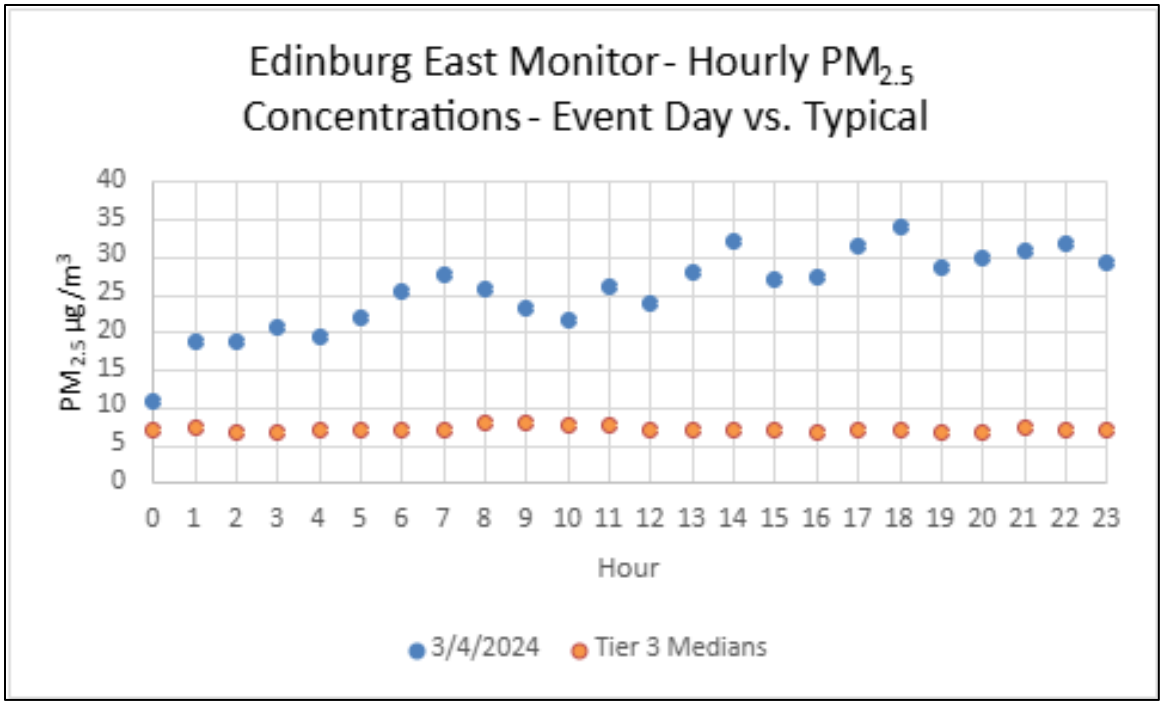

Figure 3-13: Hourly $PM_{2.5}$ Concentrations on March 4, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

The NWS forecast (Figure B-2) summary mentions patchy haze present in the region. TCEQ forecasts (Table C-2) reveal that smoke from agricultural burning and industrial activities from Mexico and Central America affected south Texas. They also reveal that limited vertical mixing and elevated relative humidity were additionally responsible for increasing fine particulate matter levels. Satellite imagery displays heavy smoke from Mexico lingering over the Gulf and southern portions of the state, however imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in south Texas in the satellite images (Figure 3-14: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 4, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-8, and Figure 3-15: *AirNow HMS Smoke Plume for March 4, 2024*) and HYSPLIT backward wind trajectories (Figure 3-16: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 4, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value, indicate light to moderate smoke was transported into south Texas from Mexico on the date of interest. On the same day, monitors in south Texas had AQI levels of Moderate to Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from southern Mexico traveled through south Texas (Figure 3-17: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 2, 2024*).

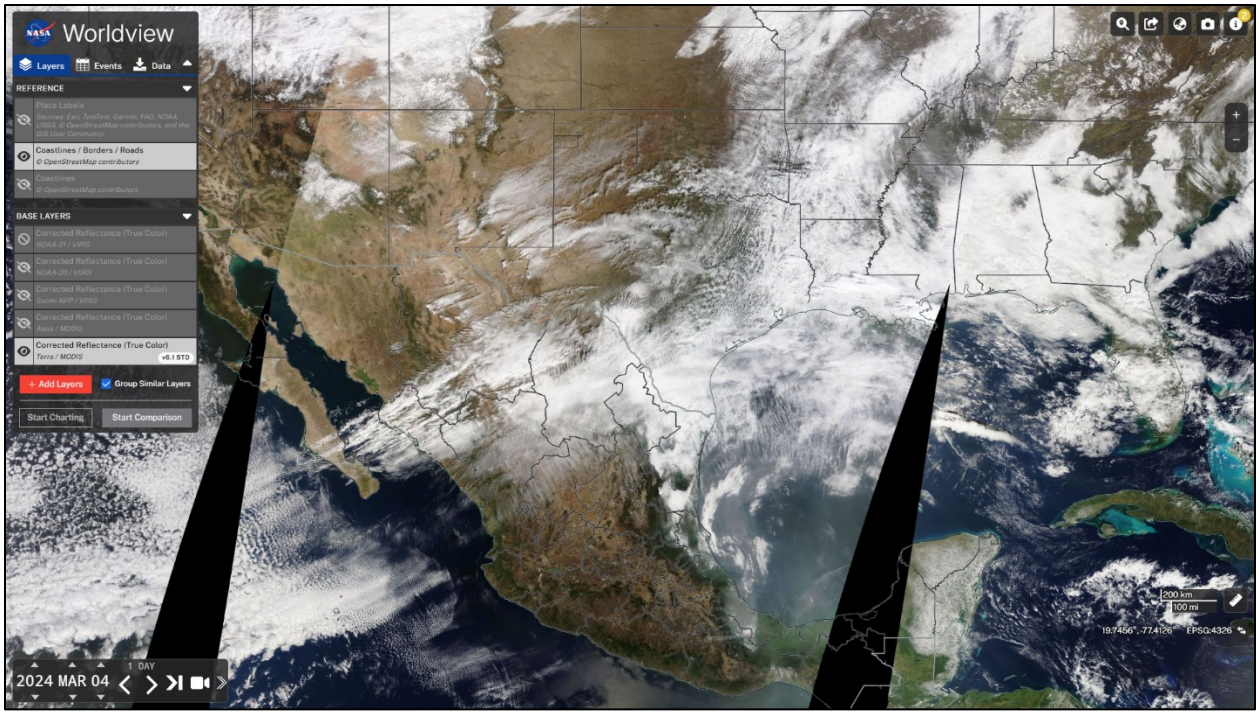

Figure 3-14: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 4, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

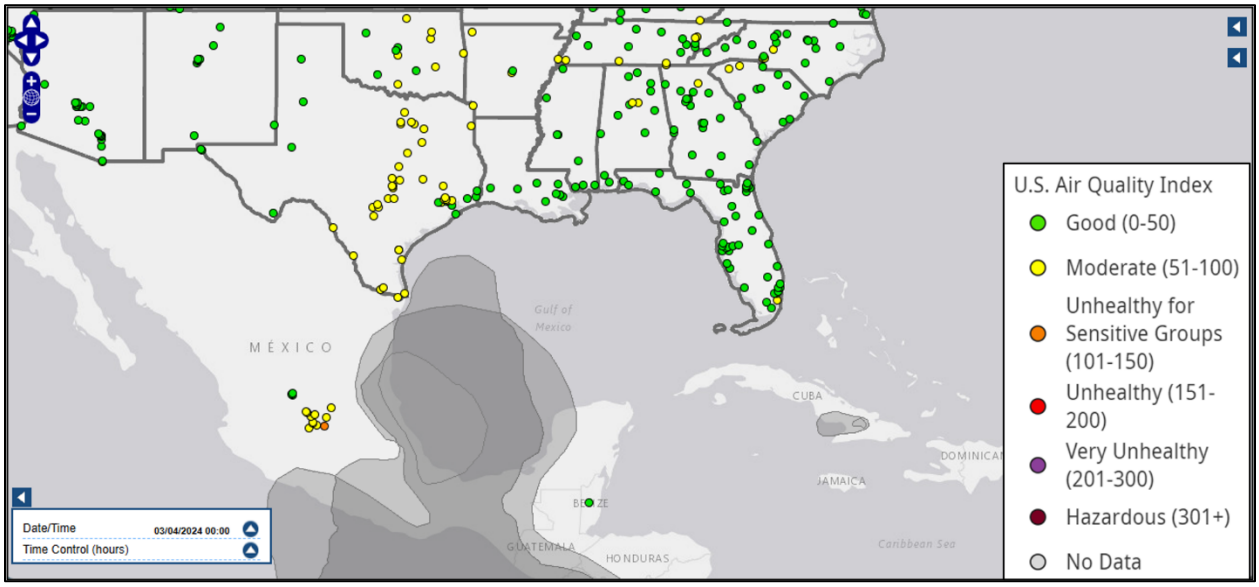

Figure 3-15: AirNow HMS Smoke Plume for March 4, 2024

Figure 3-16: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 4, 2024

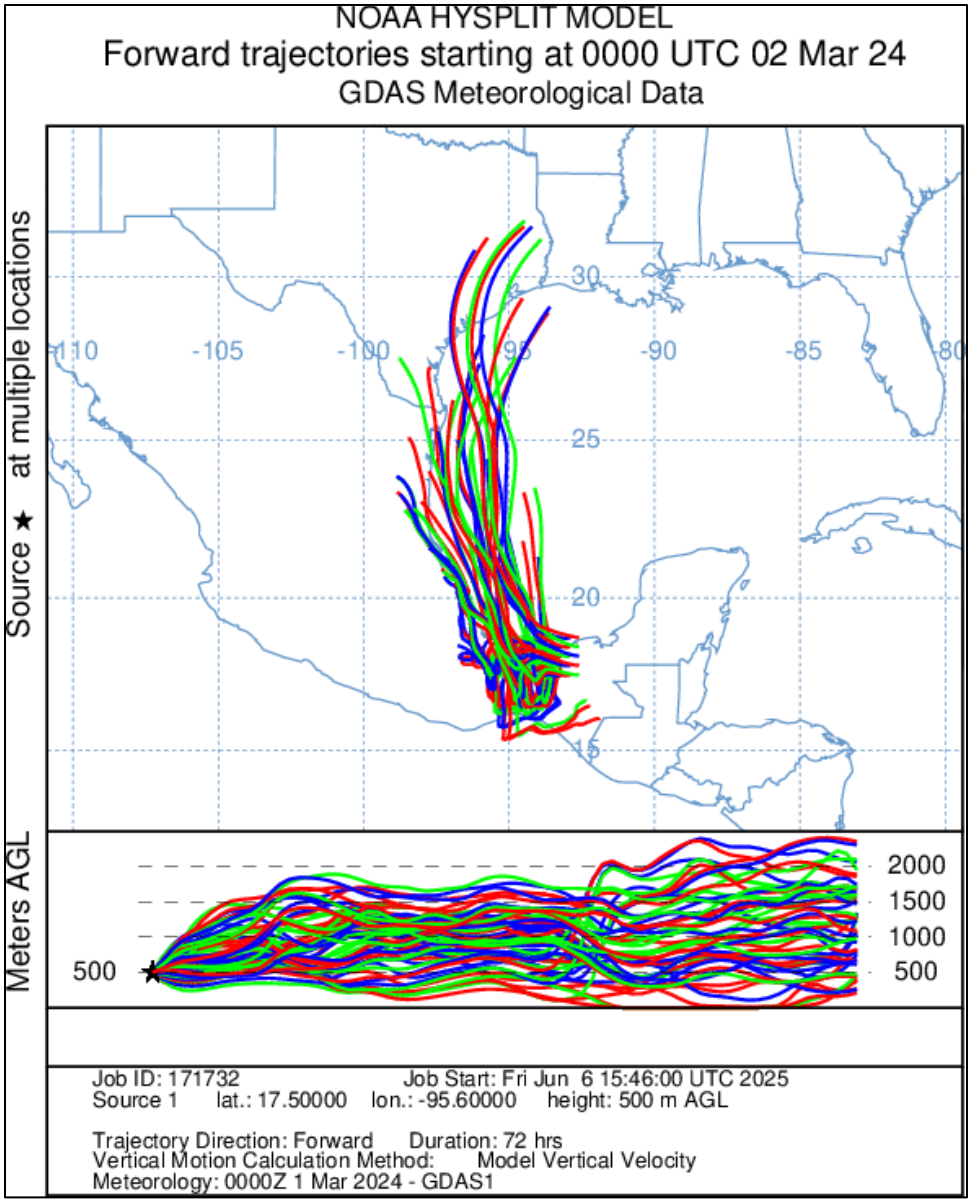

Figure 3-17: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 2, 2024

March 5, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 33.3 µg/m^3; one-hour daily maximum 80.0 µg/m^3 recorded at 18:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on March 5, 2024, can be compared against typical/non-event days for the monitor in Figure 3-18: *Hourly $PM_{2.5}$ Concentrations on March 5, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

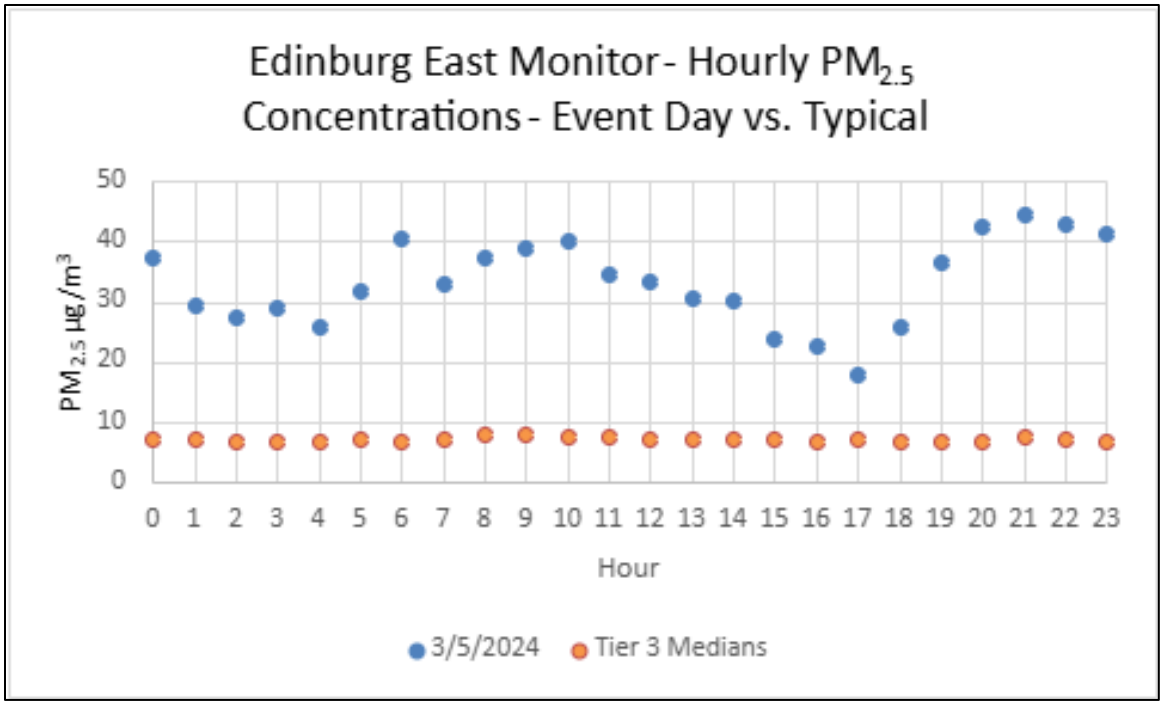

Figure 3-18: Hourly $PM_{2.5}$ Concentrations on March 5, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-2) reveal that smoke from agricultural burning and industrial activities from Mexico and Central America affected south Texas. They also reveal that limited vertical mixing and elevated relative humidity were additionally responsible for increasing fine particulate matter levels. Satellite imagery displays smoke from Mexico lingering over the gulf and southern portions of the state; however, imagery is partially obscured by cloud cover on the day of exceedance**,** making smoke/haze cover difficult to identify visually in the satellite images. (Figure 3-19: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 5, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-9 and *Figure 3-20: AirNow HMS Smoke Plume for March 5, 2024*) and HYSPLIT backward wind trajectories (Figure 3-21: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 5, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light to moderate smoke was transported into south Texas from Mexico on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups.

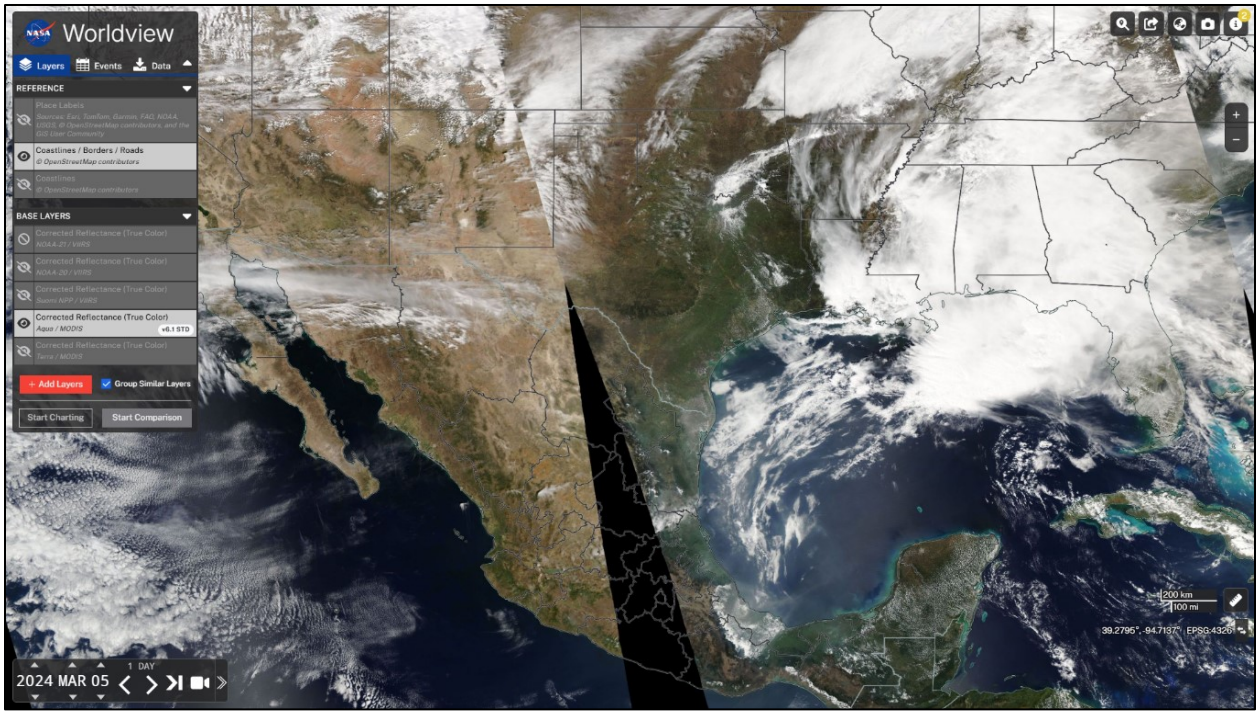

Figure 3-19: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 5, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

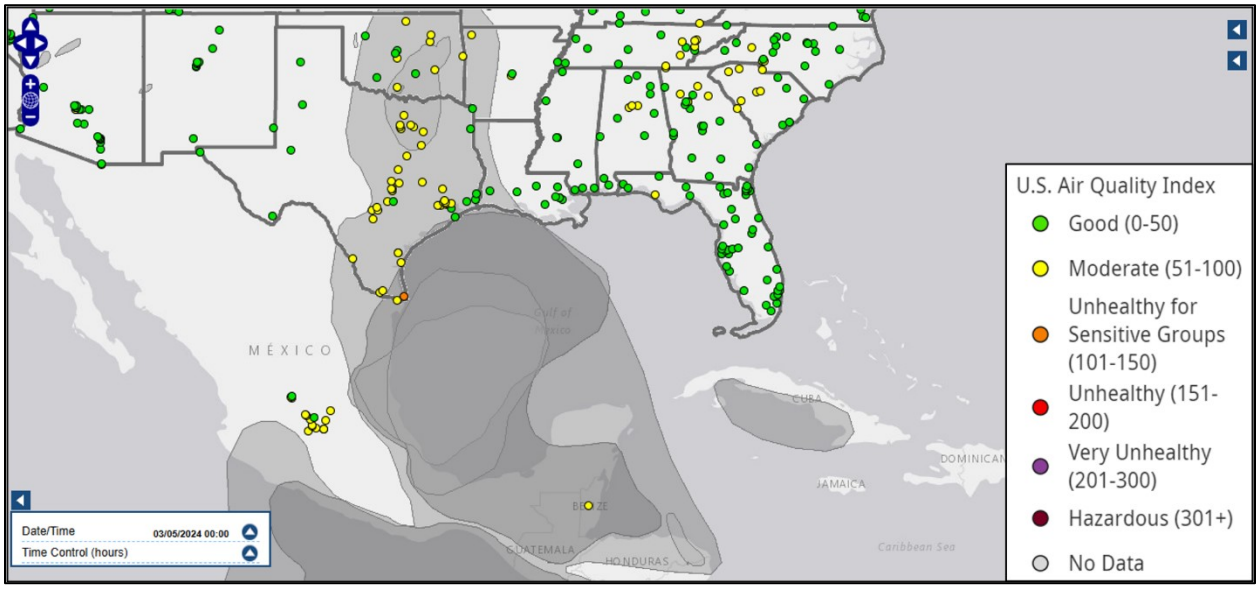

Figure 3-20: AirNow HMS Smoke Plume for March 5, 2024

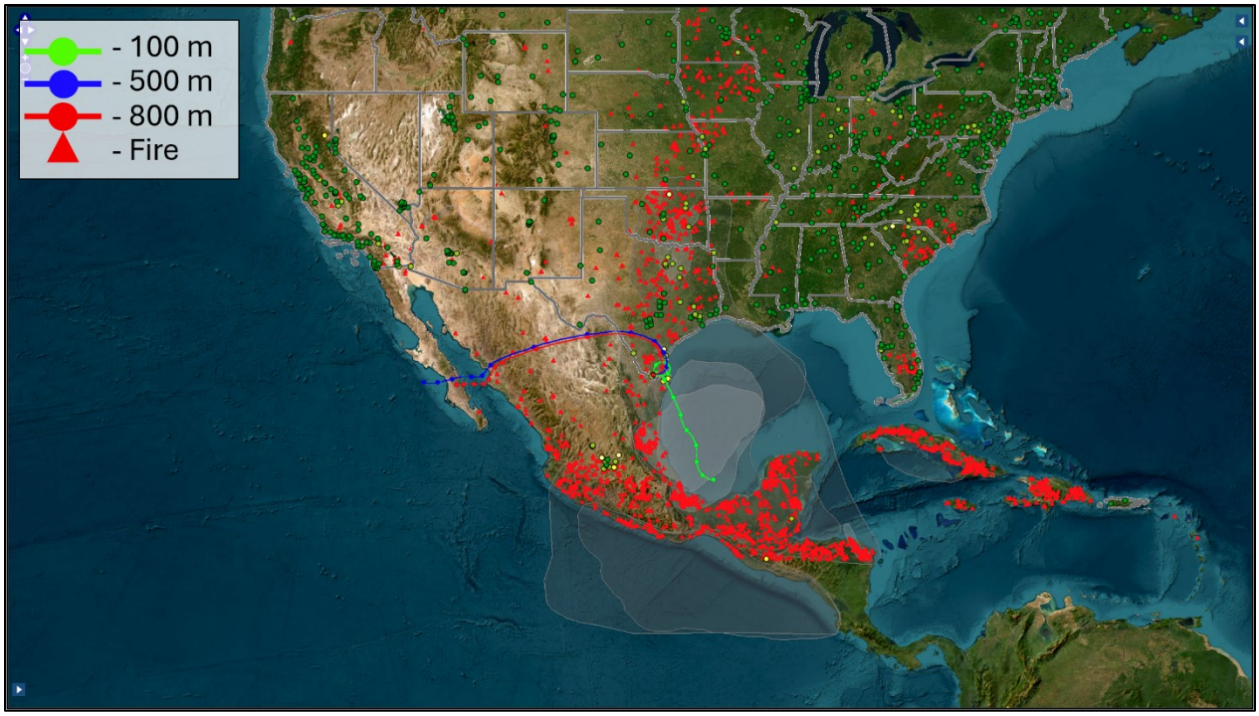

Figure 3-21: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 5, 2024

March 6, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 30.4 µg/m^3; one-hour daily maximum 53.2 µg/m^3 recorded at 01:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on March 6, 2024, can be compared against typical/non-event days for the monitor in Figure 3-22: *Hourly $PM_{2.5}$ Concentrations on March 6, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

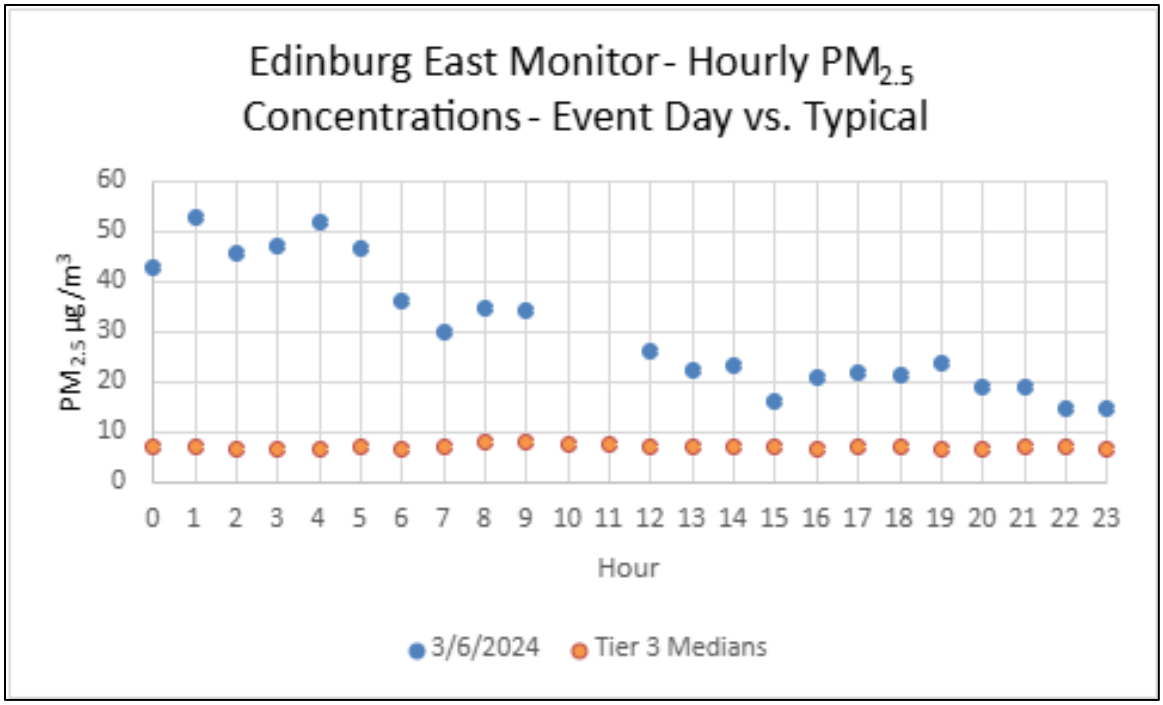

Figure 3-22: Hourly $PM_{2.5}$ Concentrations on March 6, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-2) reveal that smoke from agricultural burning and industrial activities from Mexico and Central America affected south Texas. They also reveal that limited vertical mixing and elevated relative humidity were additionally responsible for increasing fine particulate matter levels. These forecasts also describe smoke potentially introduced over the eastern portion of the state from seasonal U.S. fires. Satellite imagery displays smoke from Mexico lingering over the Gulf and southern portions of the state; however imagery is partially obscured by cloud cover on the day of exceedance**,** hindering smoke/haze cover difficult to identify visually in the satellite images (Figure 3-23: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 6, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-10 and Figure 3-24: *AirNow HMS Smoke Plume for March 6, 2024*) and HYSPLIT backward wind trajectories (Figure 3-25: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 6, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to dense smoke was transported into south Texas from Mexico on the date of interest. On that same day, most air quality monitors in South Texas had Moderate AQI levels.

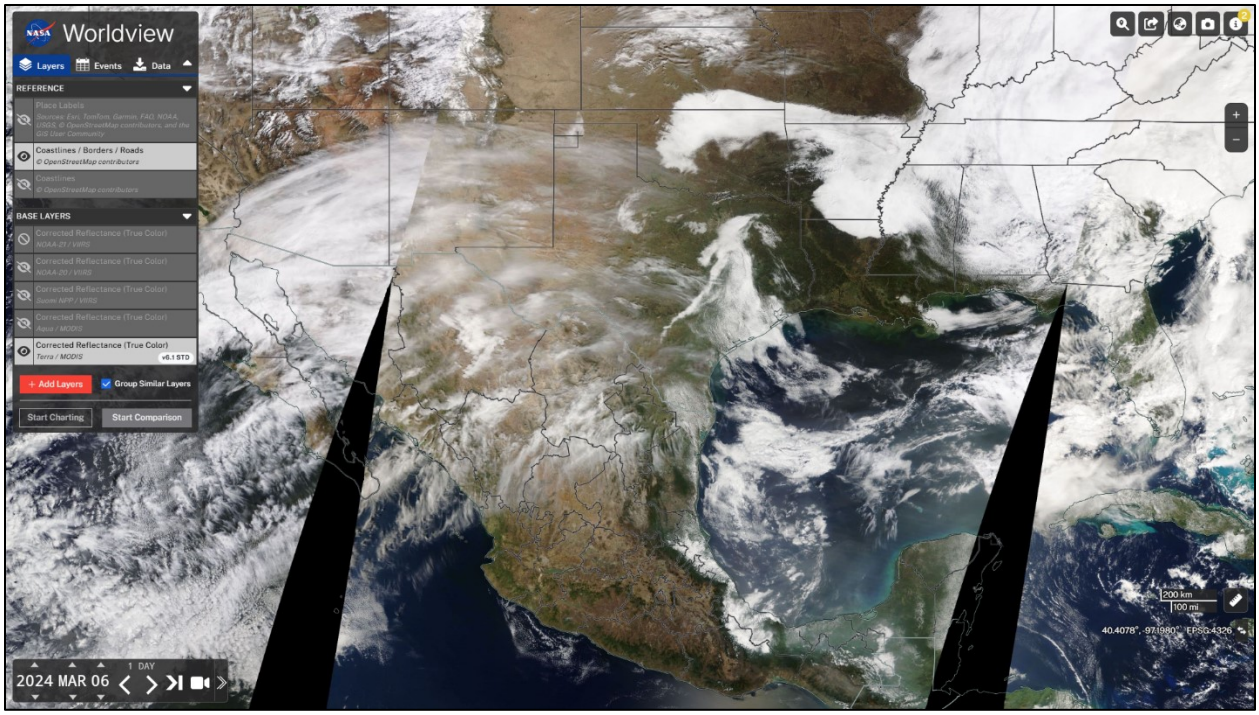

Figure 3-23: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 6, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

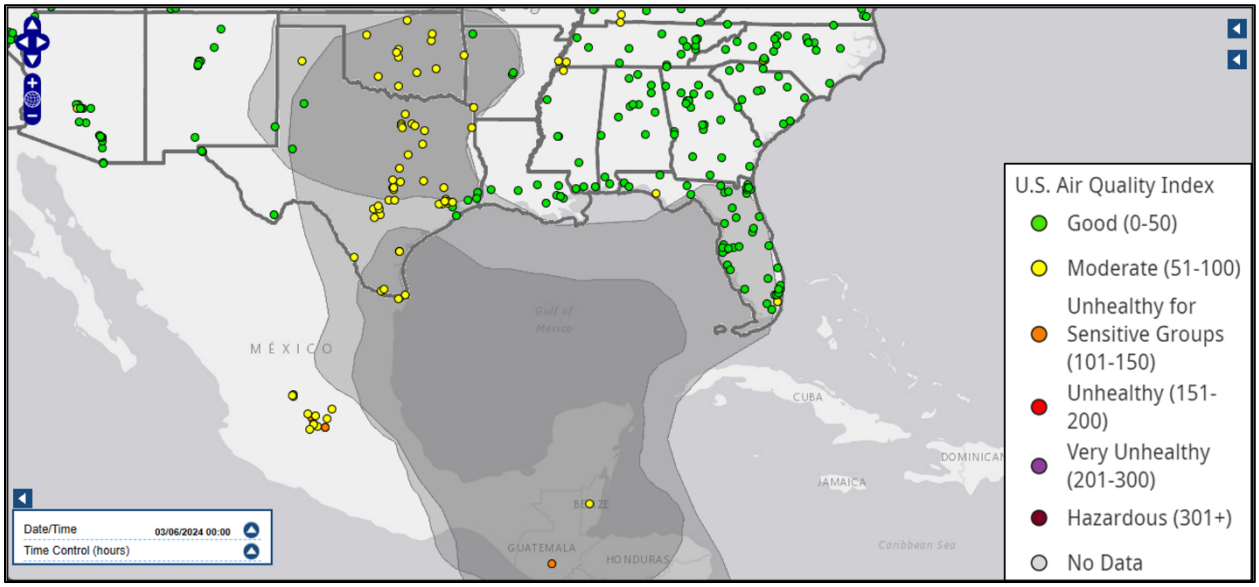

Figure 3-24: AirNow HMS Smoke Plume for March 6, 2024

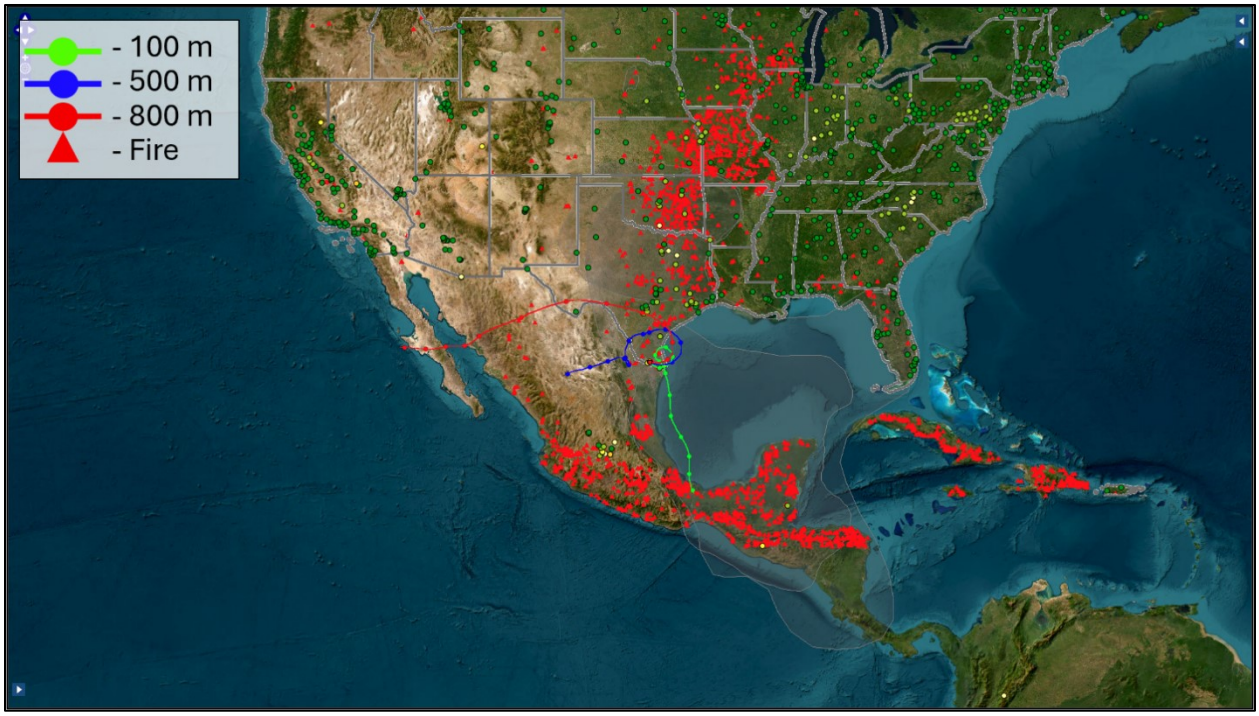

Figure 3-25: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 6, 2024

March 8, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 28.4 µg/m^3; one-hour daily maximum 50.3 µg/m^3 recorded at 08:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on March 8, 2024, can be compared against typical/non-event days for the monitor in Figure 3-26: *Hourly $PM_{2.5}$ Concentrations on March 8, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

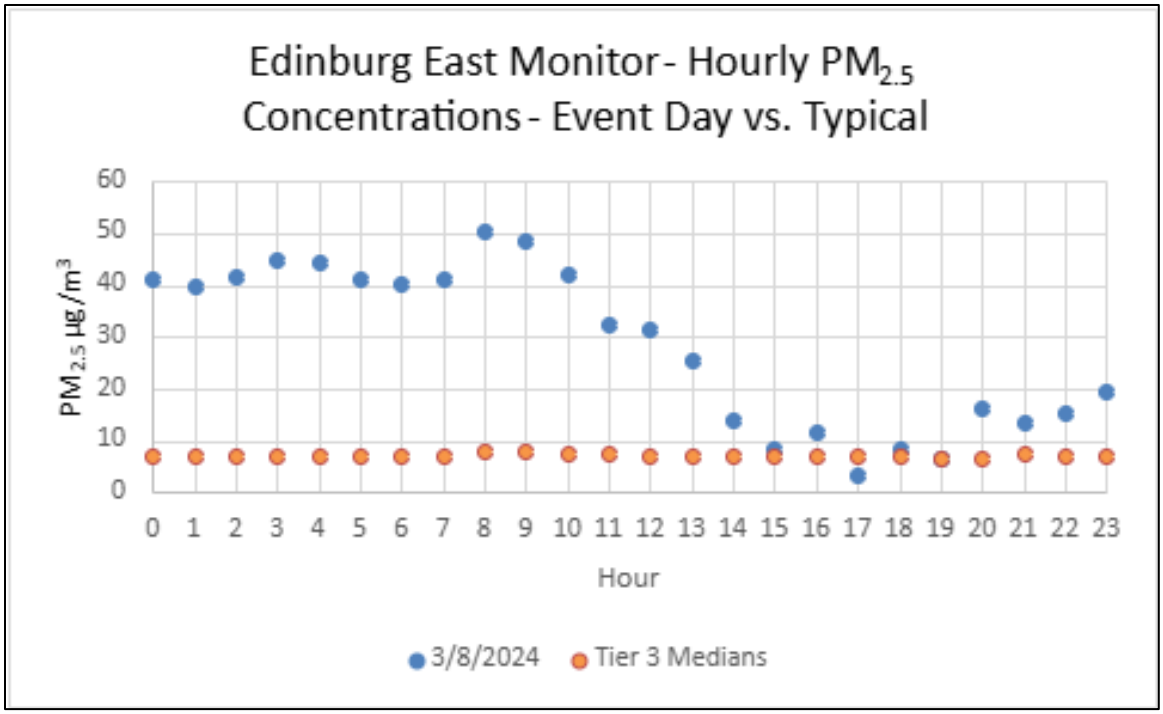

Figure 3-26: Hourly $PM_{2.5}$ Concentrations on March 8, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-2) mention that smoke from agricultural burning and industrial activities from Mexico and Central America affected south Texas, increasing fine particulate levels. Satellite imagery is partially obscured by cloud cover on the date of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-27: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 8, 2024*). Smoke plumes (Figure A-11 and Figure 3-28: *AirNow HMS Smoke Plume for March 8, 2024*) and HYSPLIT backward wind trajectories (Figure 3-29: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 8, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to dense smoke was transported into the gulf from Mexico on the date of interest. On that same day, monitors in south Texas had AQI Moderate to Unhealthy for Sensitive Groups levels. HYSPLIT forward trajectories show that winds originating from central Mexico traveled through South and East Texas (Figure 3-30: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 5, 2024*).

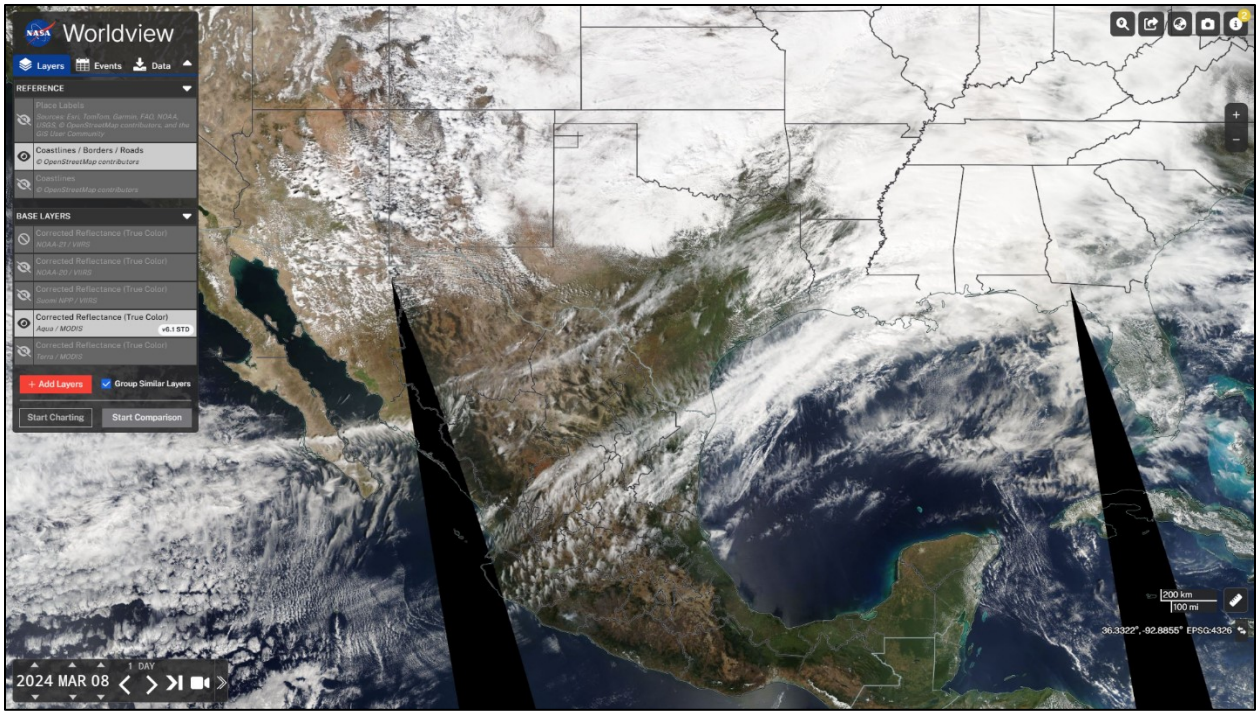

Figure 3-27: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 8, 2024

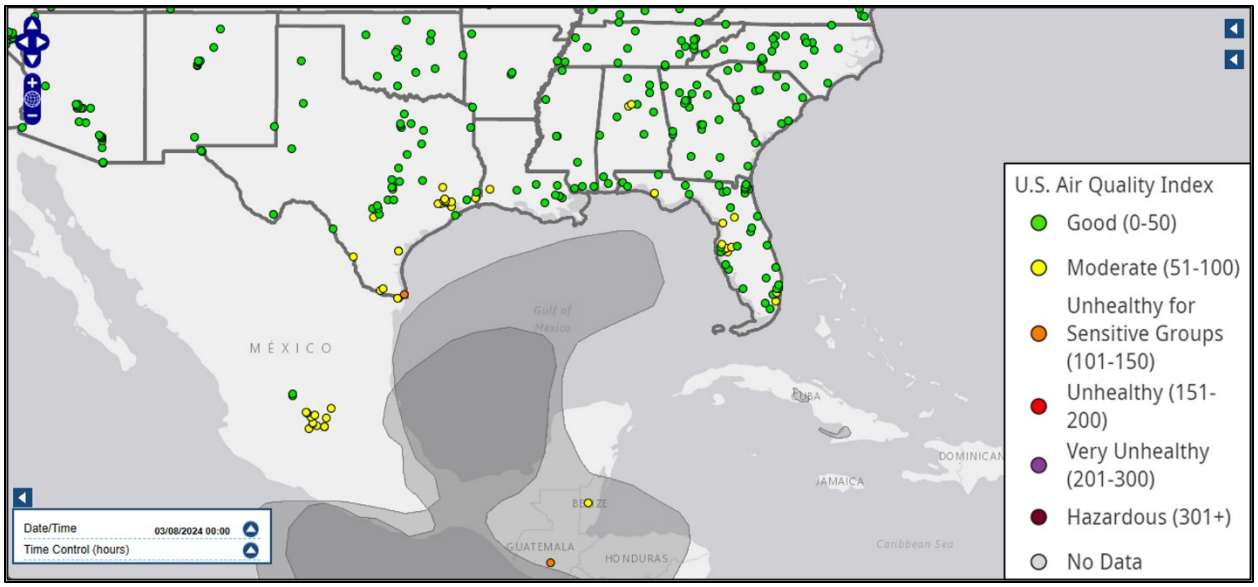

Figure 3-28: AirNow HMS Smoke Plume for March 8, 2024

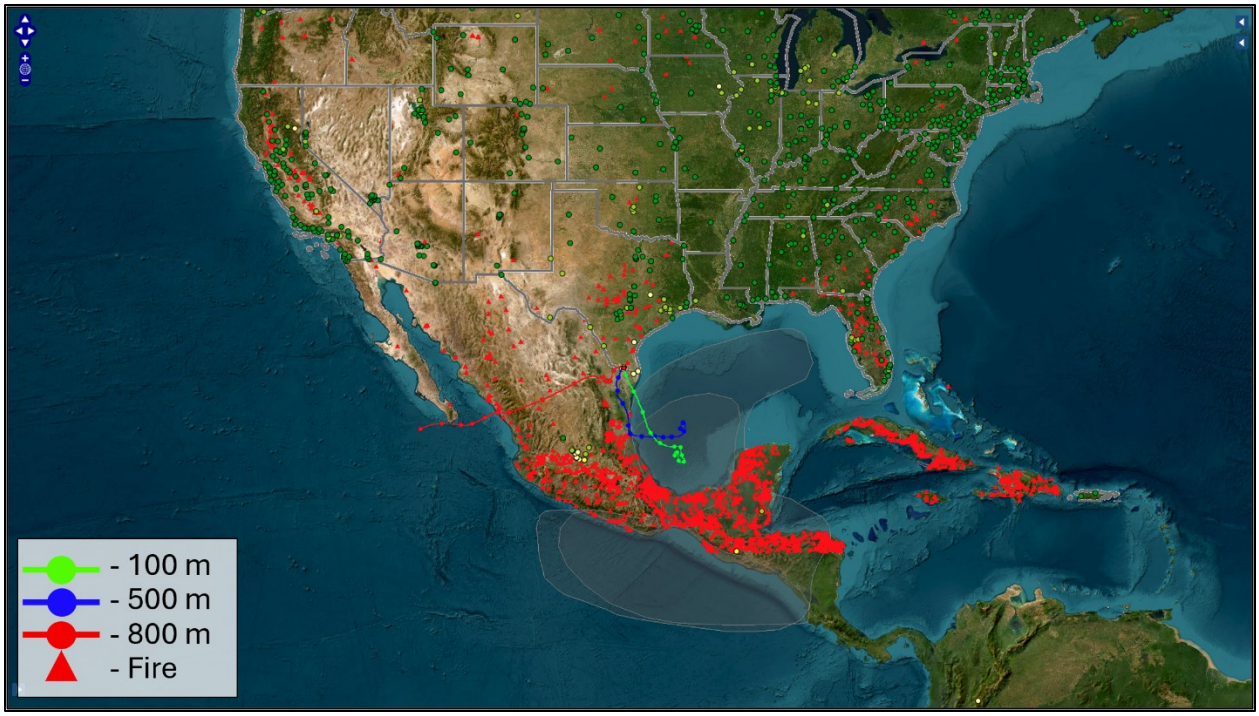

Figure 3-29: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 8, 2024

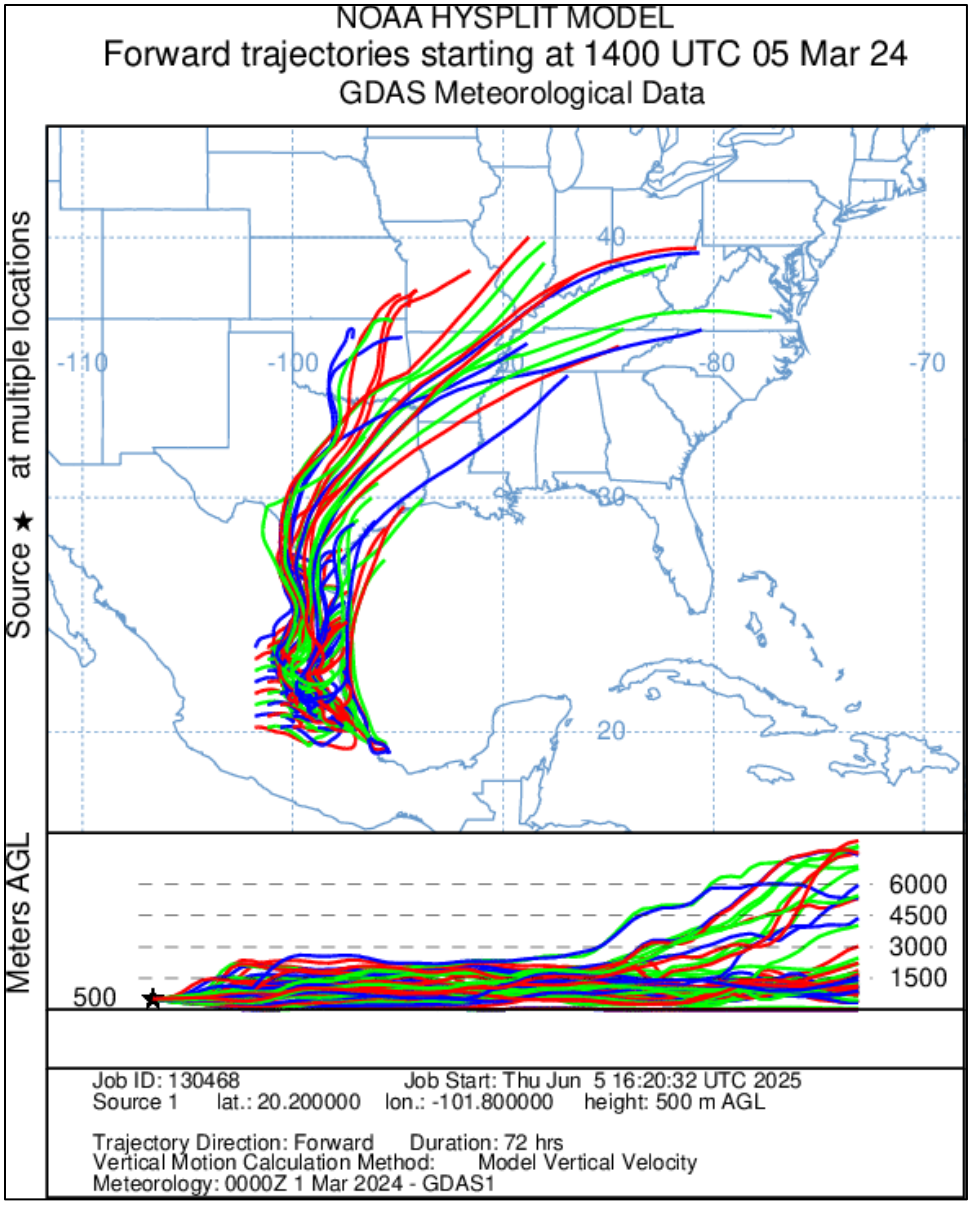

Figure 3-30: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 5, 2024

3.2.3 Group 3 – Evidence for the March 14, 2024, and March 15, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

March 14, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 26.6 µg/m^3; one-hour daily maximum 39.5 µg/m^3 recorded at 15:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on March 14, 2024, can be compared against typical/non-event days for the monitor in Figure 3-31: *Hourly $PM_{2.5}$ Concentrations on March 14, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

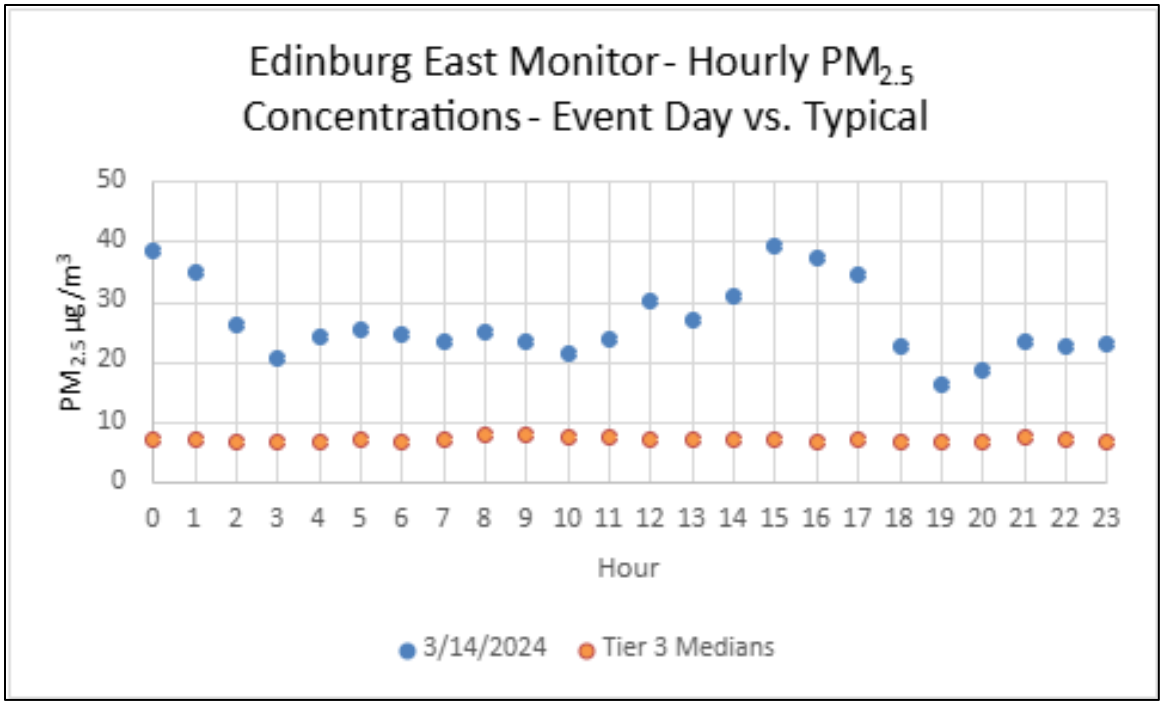

Figure 3-31: Hourly $PM_{2.5}$ Concentrations on March 14, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

The NWS forecast (Figure B-3) summary mentions regional haze obstructing visibility was present within the region on the days of exceedance. TCEQ forecasts (Table C-3) revealed that moderate to high density smoke moved northward into the region originating from fires were present in Mexico and Central America, increasing fine particulate levels. The forecasts additionally mention that smoke from U.S. fires in the Midwest and Mississippi Valley was moving into the northern portion of the state, though it's worth noting that the monitors which exceeded are located in south Texas. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-32: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 14, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-14 and Figure 3-33: *AirNow HMS Smoke Plume for March 14, 2024*) and HYSPLIT backward wind trajectories (Figure 3-34: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 14, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into south Texas from Mexico on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from southern Mexico traveled through south Texas (Figure 3-35: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 11, 2024*).

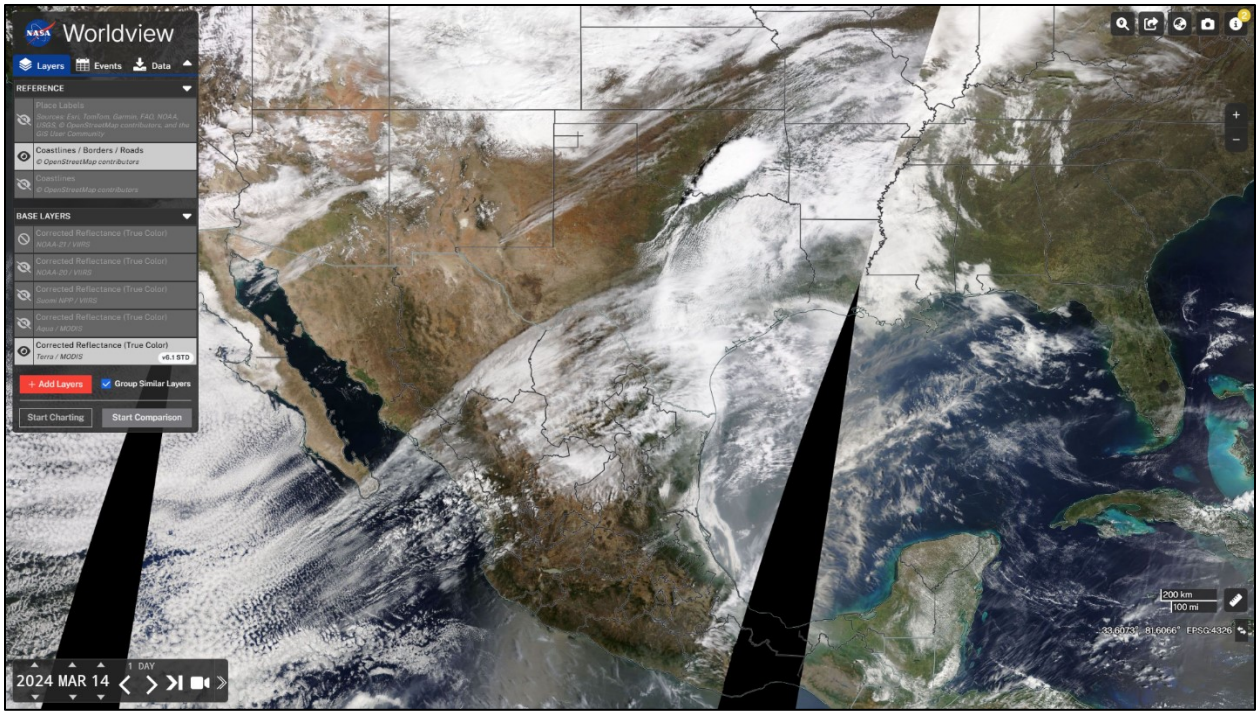

Figure 3-32: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 14, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

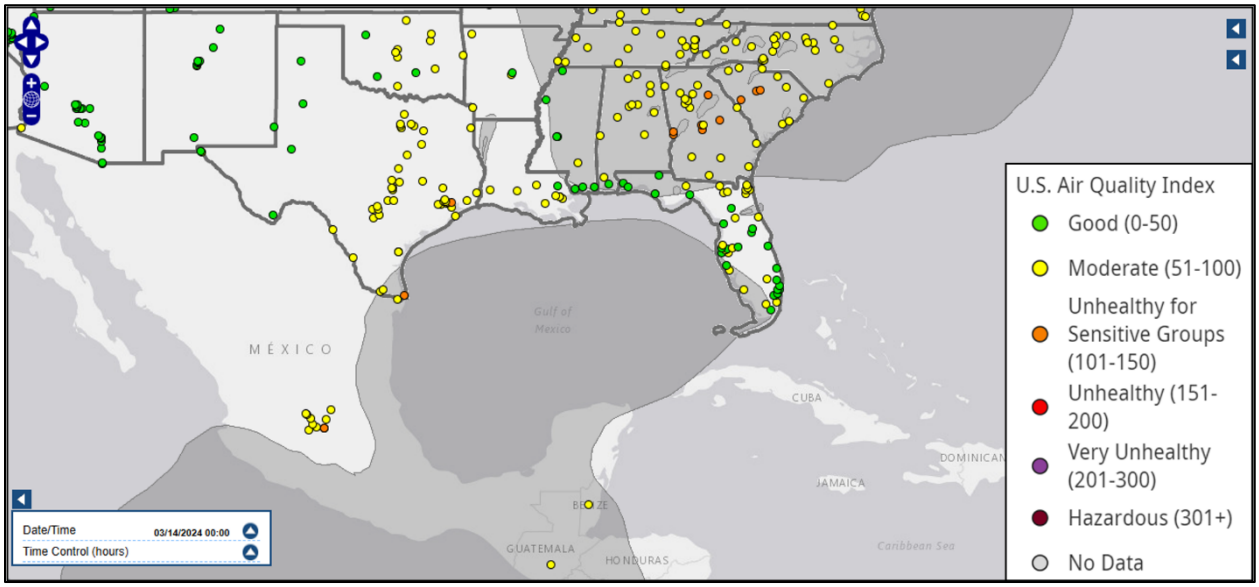

Figure 3-33: AirNow HMS Smoke Plume for March 14, 2024

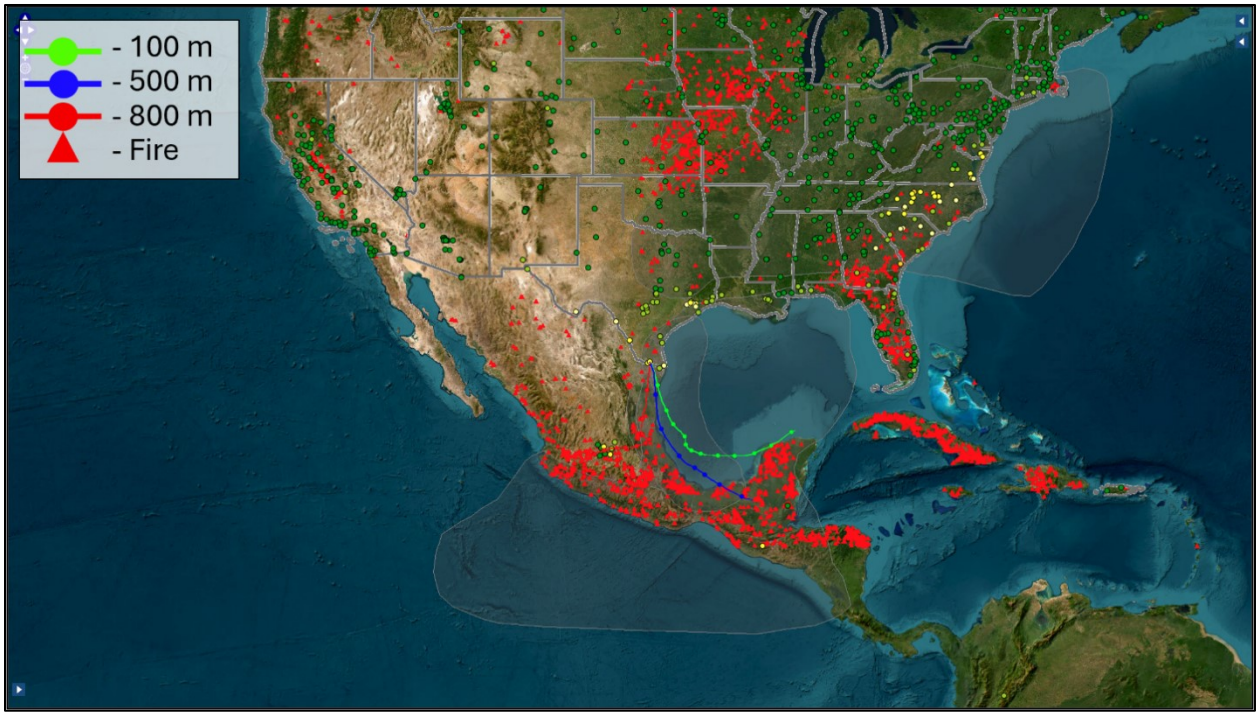

Figure 3-34: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 14, 2024

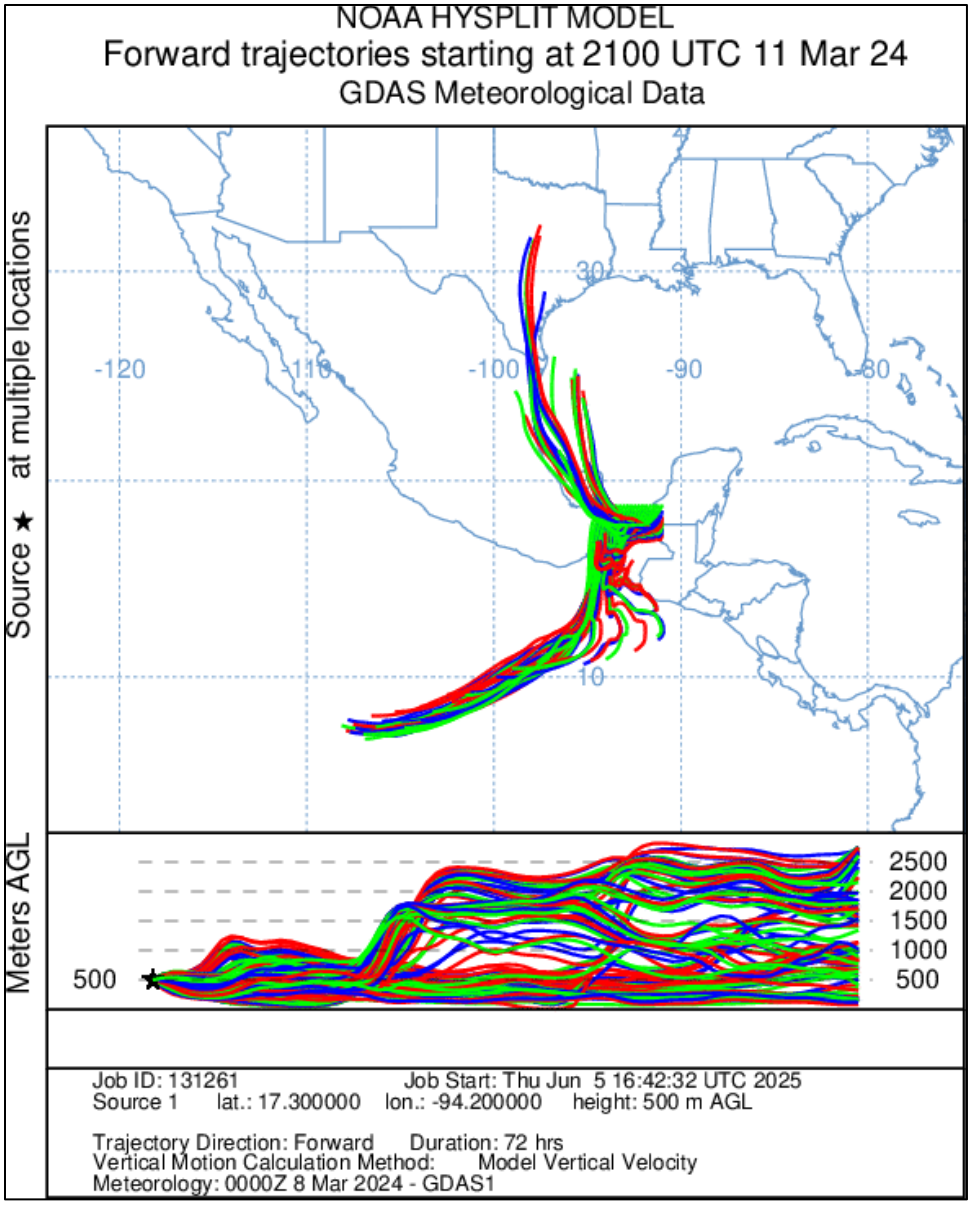

Figure 3-35: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 11, 2024

March 15, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 27.8 µg/m^3; one-hour daily maximum 41.7 µg/m^3 recorded at 12:00 LST) and the World Trade Bridge monitor (24-hour average concentration 28.5 µg/m^3; one-hour daily maximum 39.4 µg/m^3 recorded at 13:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on March 15, 2024, can be compared against typical/non-event days for the monitors in Figure 3-36: *Hourly $PM_{2.5}$ Concentrations on March 15, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-37**:** *Hourly $PM_{2.5}$ Concentrations on March 15, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

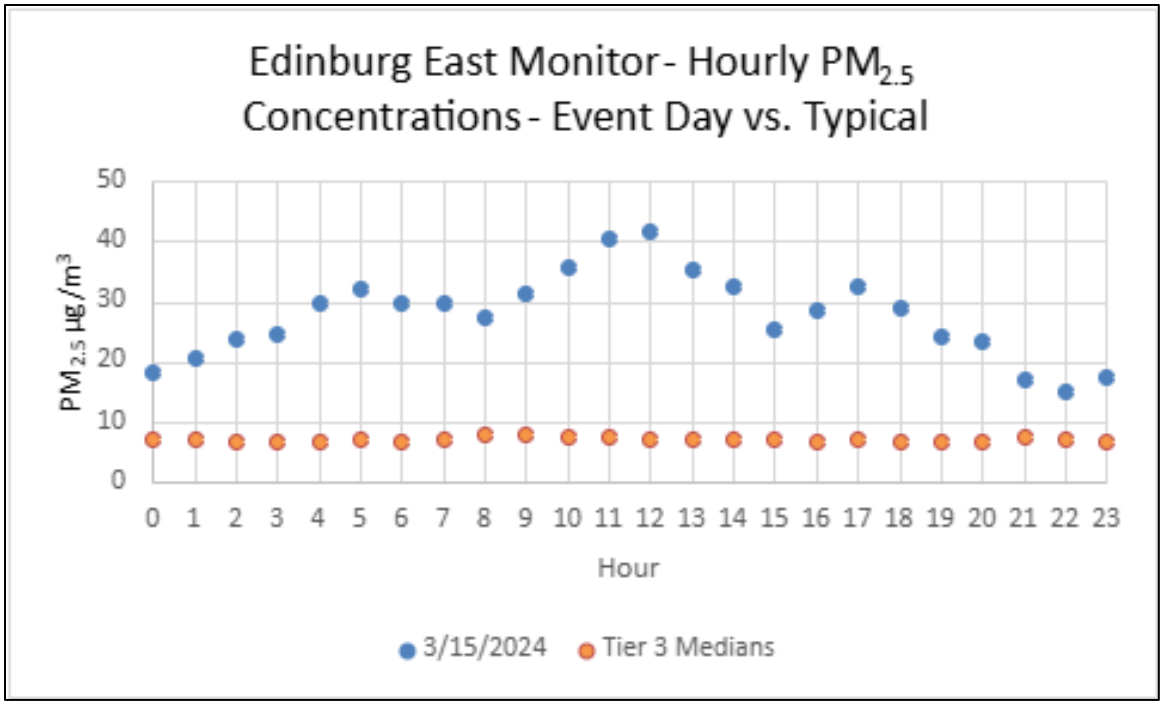

Figure 3-36: Hourly $PM_{2.5}$ Concentrations on March 15, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

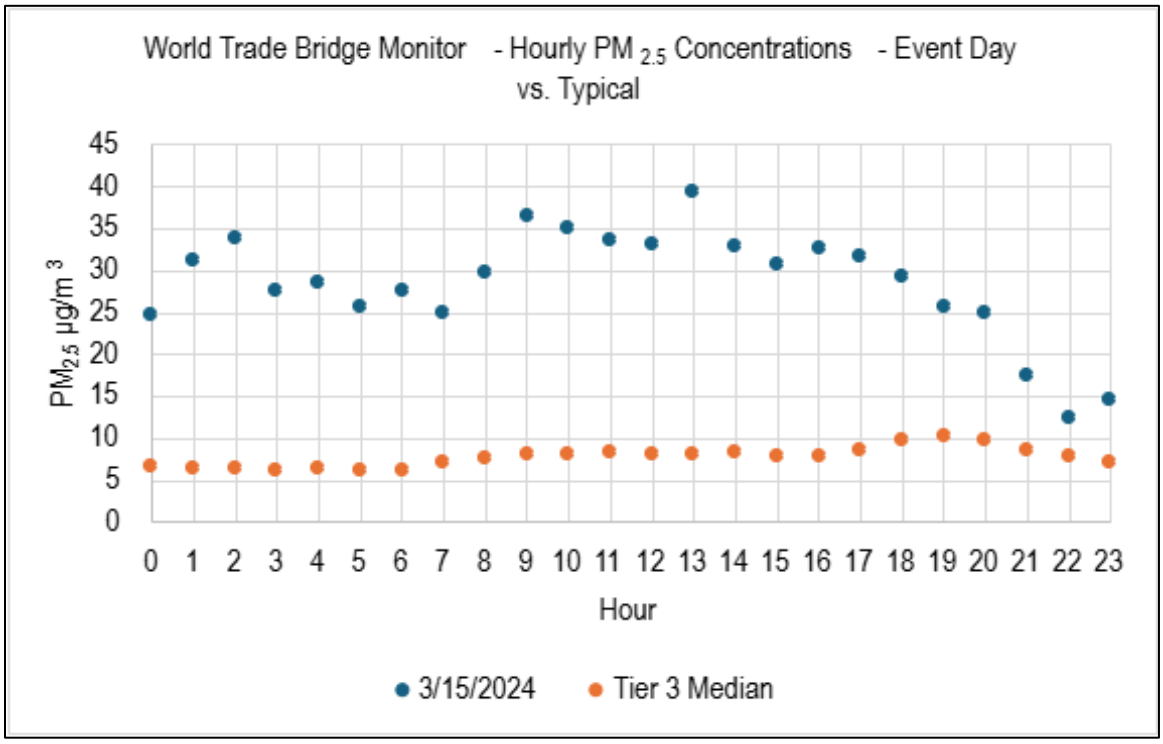

Figure 3-37: Hourly $PM_{2.5}$ Concentrations on March 15, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

The NWS forecast (Figure B-3) summary mentions regional haze obstructing visibility was present over southern and western portions of the state on the days of exceedance. TCEQ forecasts (Table C-3) revealed that moderate to high density smoke from fires and aerosols

from volcanic and industrial activity in Mexico moved northward into the region, increasing fine particulate levels. The forecasts additionally mention that smoke from U.S. fires in the Midwest and Mississippi Valley was moving into the northern portion of the state, though it's worth noting that the monitors which exceeded are located in south Texas. Satellite imagery is mostly obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-38: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 15, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-15 and Figure 3-39: *AirNow HMS Smoke Plume for March 15, 2024*) and HYSPLIT backward wind trajectories (Figure 3-40: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 15, 2024* and Figure 3-41: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on March 15, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into south Texas from Mexico on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from southern Mexico traveled through South and East Texas (Figure 3-42: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 12, 2024*).

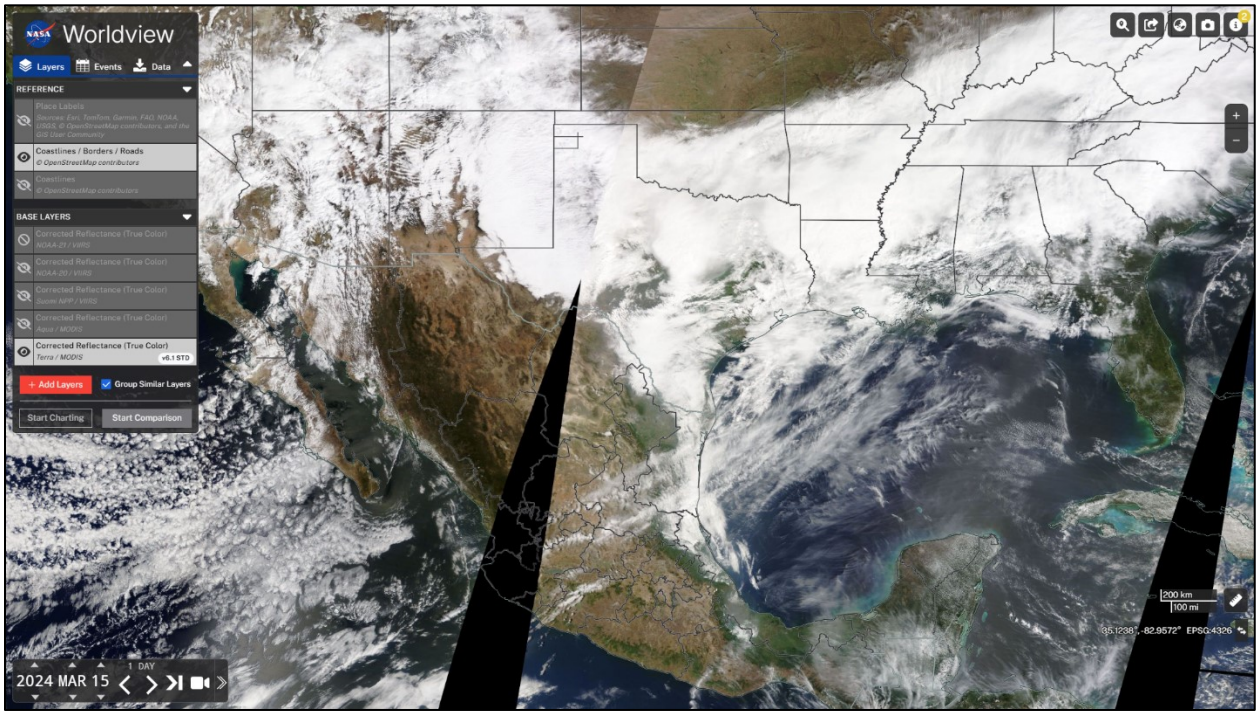

Figure 3-38: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from March 15, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

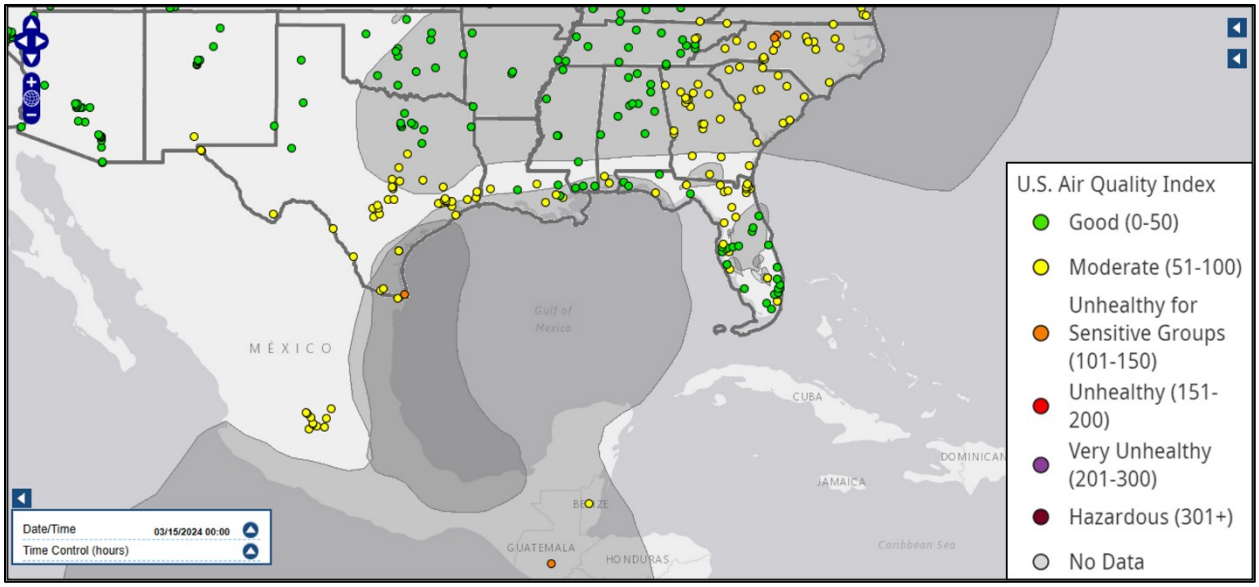

Figure 3-39: AirNow HMS Smoke Plume for March 15, 2024

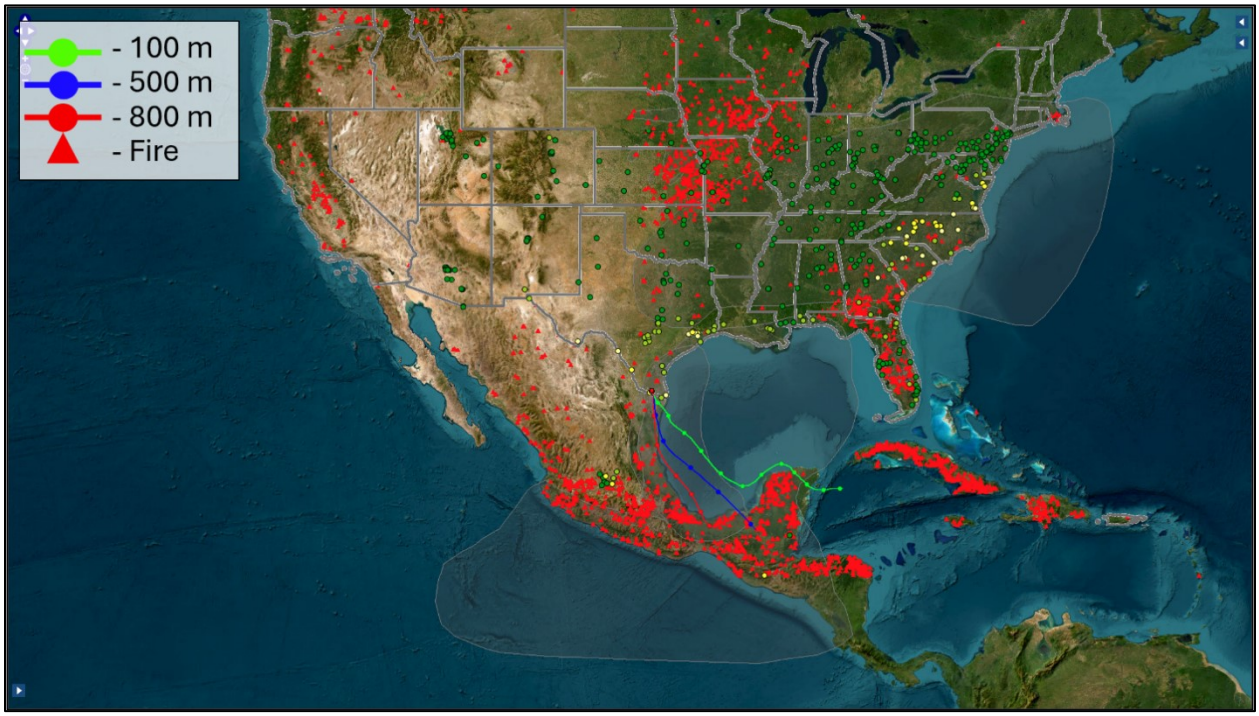

Figure 3-40: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on March 15, 2024

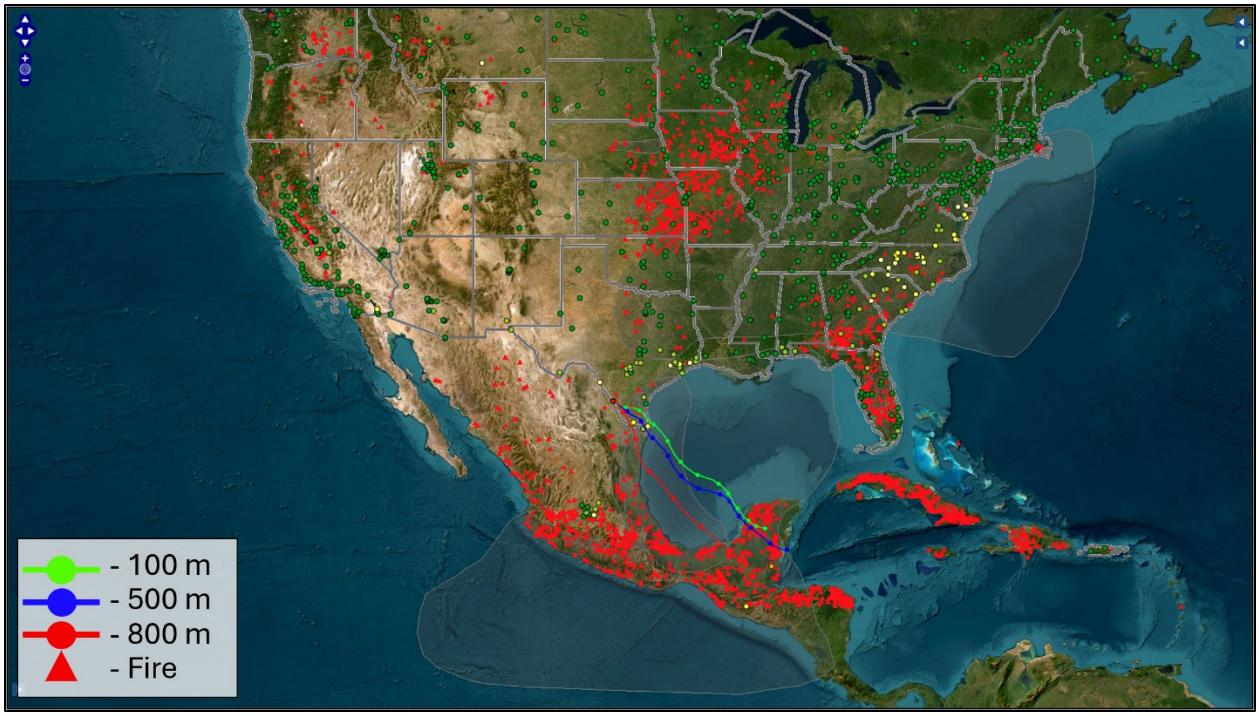

Figure 3-41: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on March 15, 2024

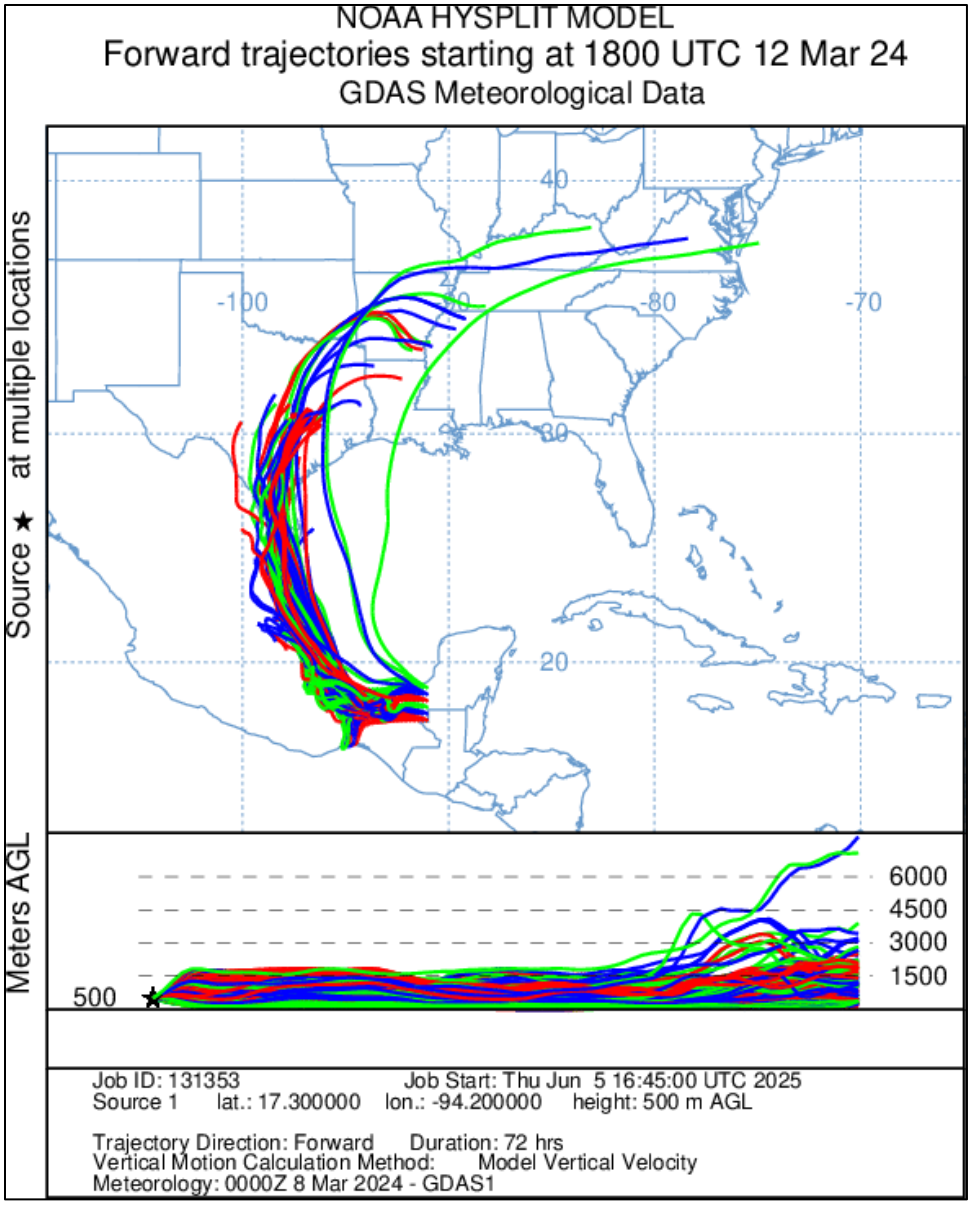

Figure 3-42: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 12, 2024

3.2.4 Group 4 – Evidence for the April 1, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, and World Trade Bridge Monitors

April 1, 2024**,** is identified as a Tier 2 day at the Von Ormy Highway 16 monitor (24-hour average concentration 32.1 µg/m^3; one-hour daily maximum 55.0 µg/m^3 recorded at 23:00 LST), a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 31.4 µg/m^3; one-hour daily maximum 42.5 µg/m^3 recorded at 03:00 LST), and a Tier 2 day at the World Trade Bridge monitor (24-hour average concentration 29.1 µg/m^3; one-hour daily maximum 49.4 µg/m^3 recorded at 23:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 1, 2024, can be compared against typical/non-event days for the monitors in Figure 3-43: *Hourly $PM_{2.5}$ Concentrations on April 1, 2024, Compared to Typical Concentrations at the Von Ormy Highway*

16 Monitor, Figure 3-44: *Hourly $PM_{2.5}$ Concentrations on April 1, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, and Figure 3-45: *Hourly $PM_{2.5}$ Concentrations on April 1, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

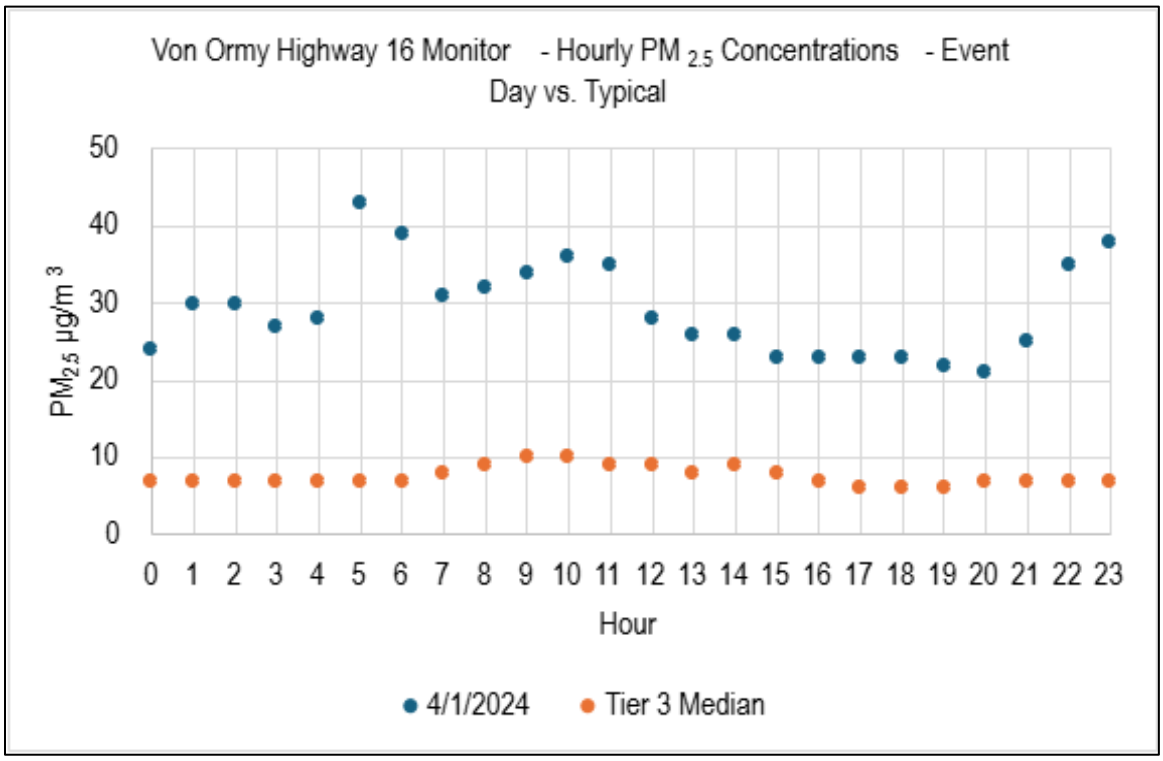

Figure 3-43: Hourly $PM_{2.5}$ Concentrations on April 1, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

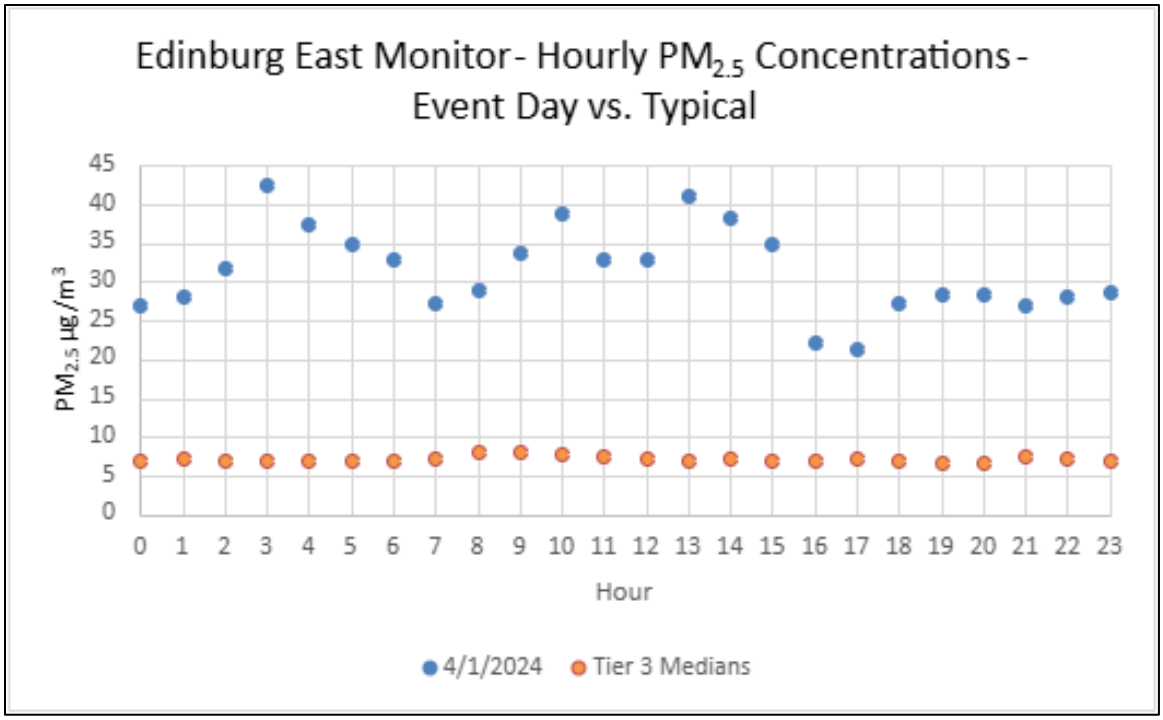

Figure 3-44: Hourly $PM_{2.5}$ Concentrations on April 1, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

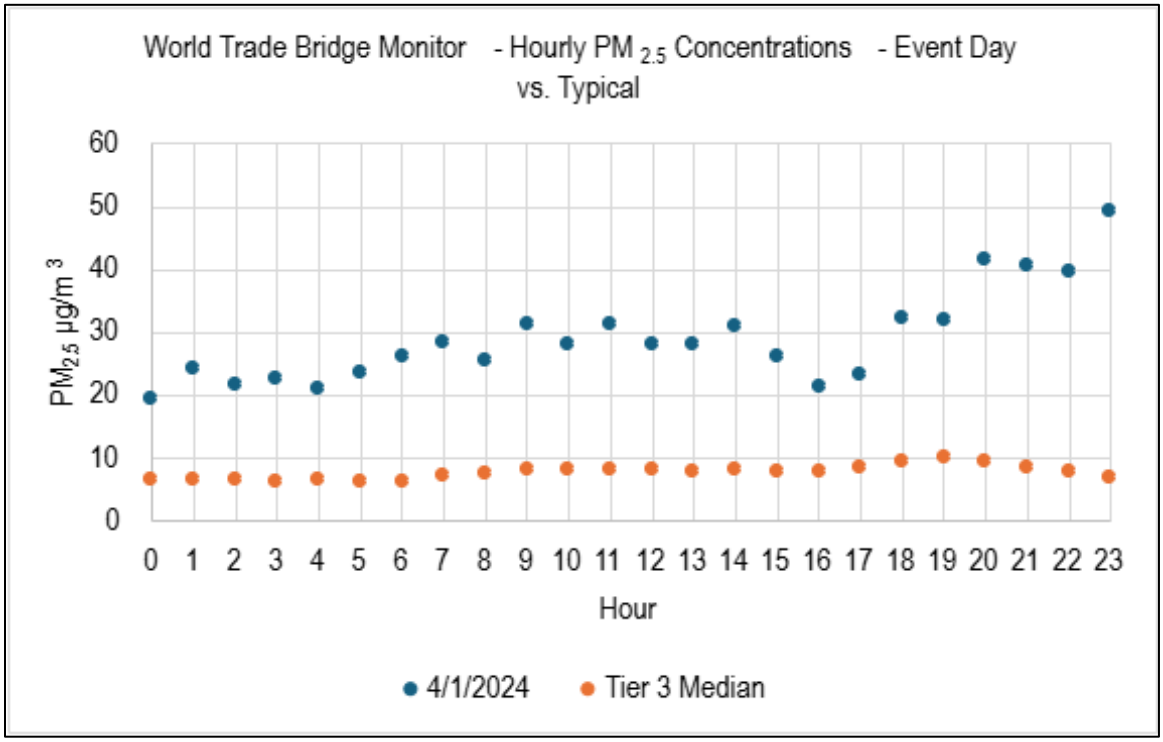

Figure 3-45: Hourly $PM_{2.5}$ Concentrations on April 1, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts (Table C-4) reveal that moderate to high density smoke was transported northward into the state from seasonal agricultural burning activities across central and

southern Mexico, the Yucatan Peninsula, and Central America, increasing fine particulate matter concentration values near the monitor. TCEQ forecasts additionally mention that aerosols from gas flaring activity in the Bay of Campeche and other urban sources in central Mexico mixed with the present particulate matter in the smoke. Satellite imagery is obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-46: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 1, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-19, Figure A-18, and Figure 3-47: *AirNow HMS Smoke Plume for April 1, 2024)* and HYSPLIT backward wind trajectories (Figure 3-48: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on April 1, 2024*, Figure 3-49: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 1, 2024, and Figure 3-50: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on April 1, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light smoke was transported into south Texas from Mexico on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through South, Central, and East Texas (Figure 3-51: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 30, 2024*).

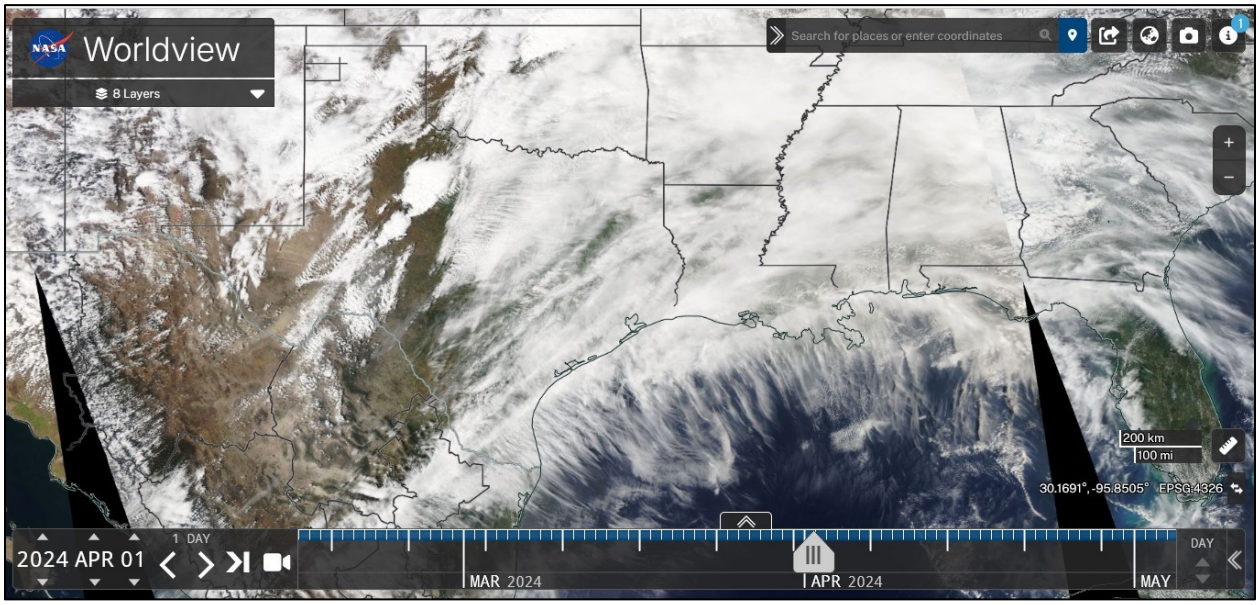

Figure 3-46: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 1, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

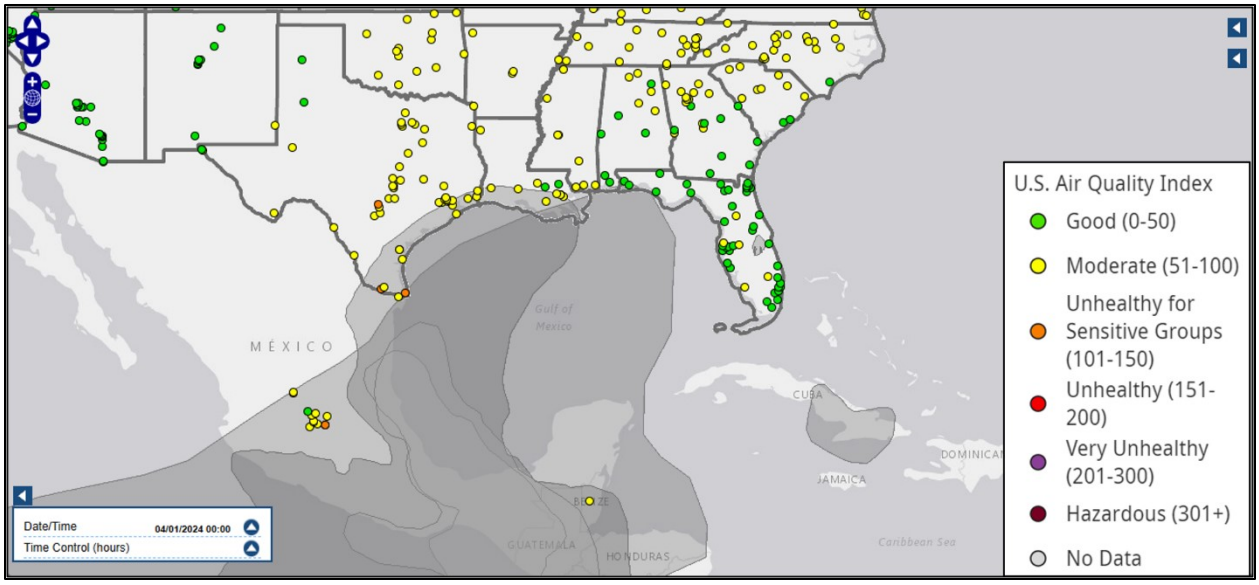

Figure 3-47: AirNow HMS Smoke Plume for April 1, 2024

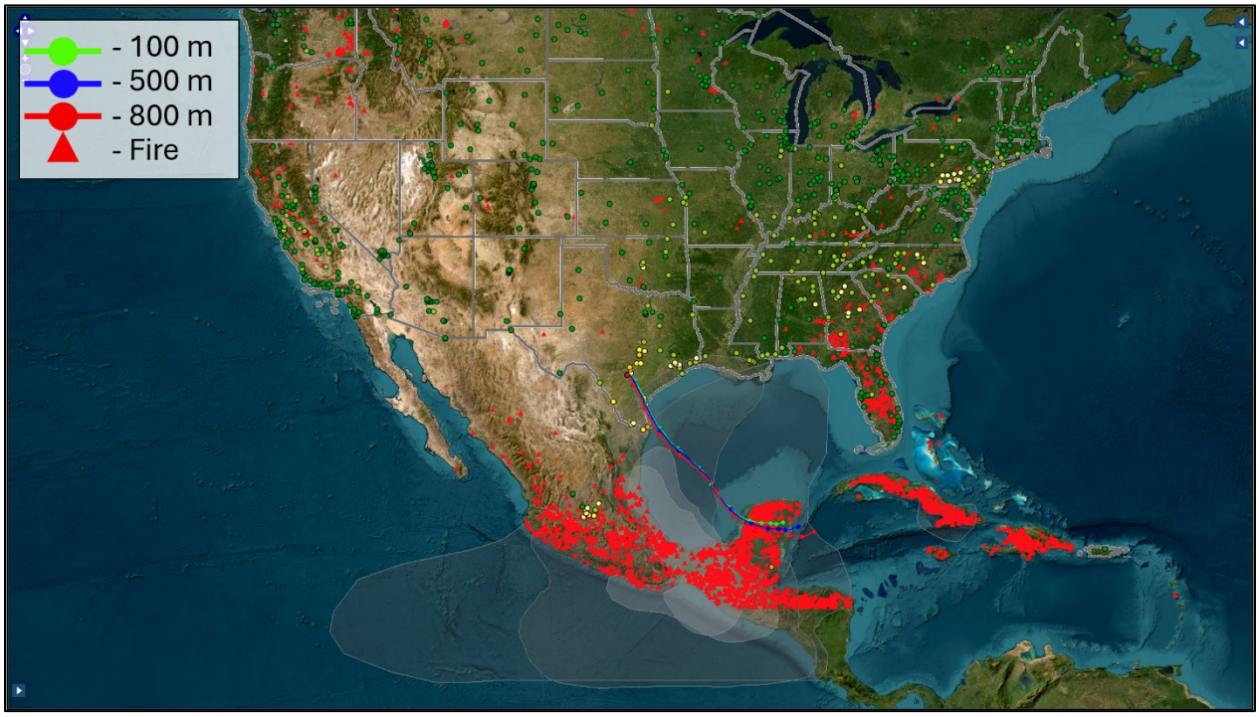

Figure 3-48: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on April 1, 2024

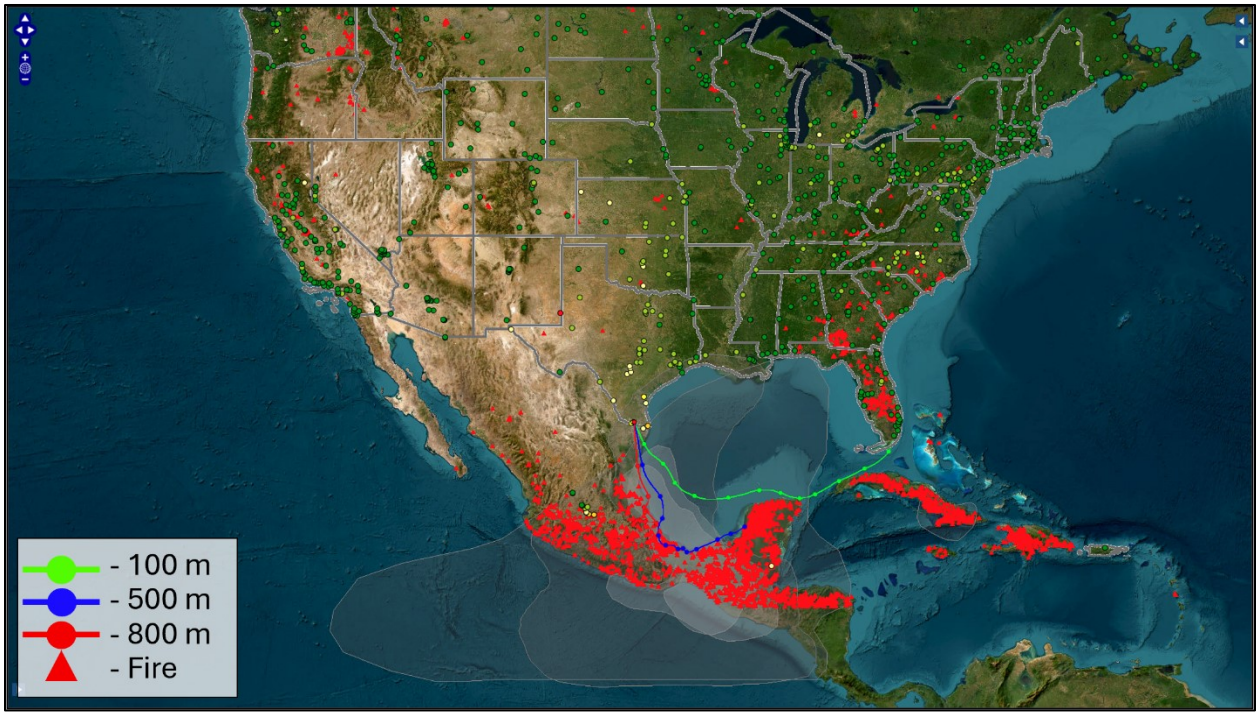

Figure 3-49: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 1, 2024

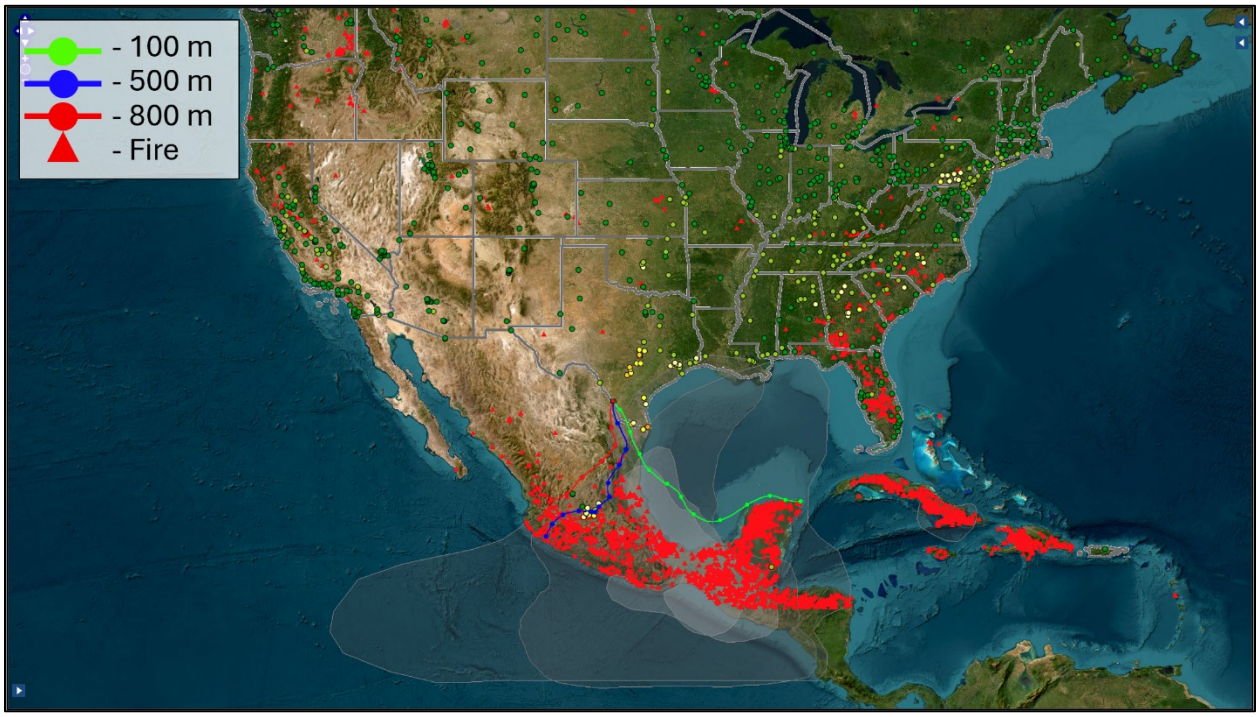

Figure 3-50: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on April 1, 2024

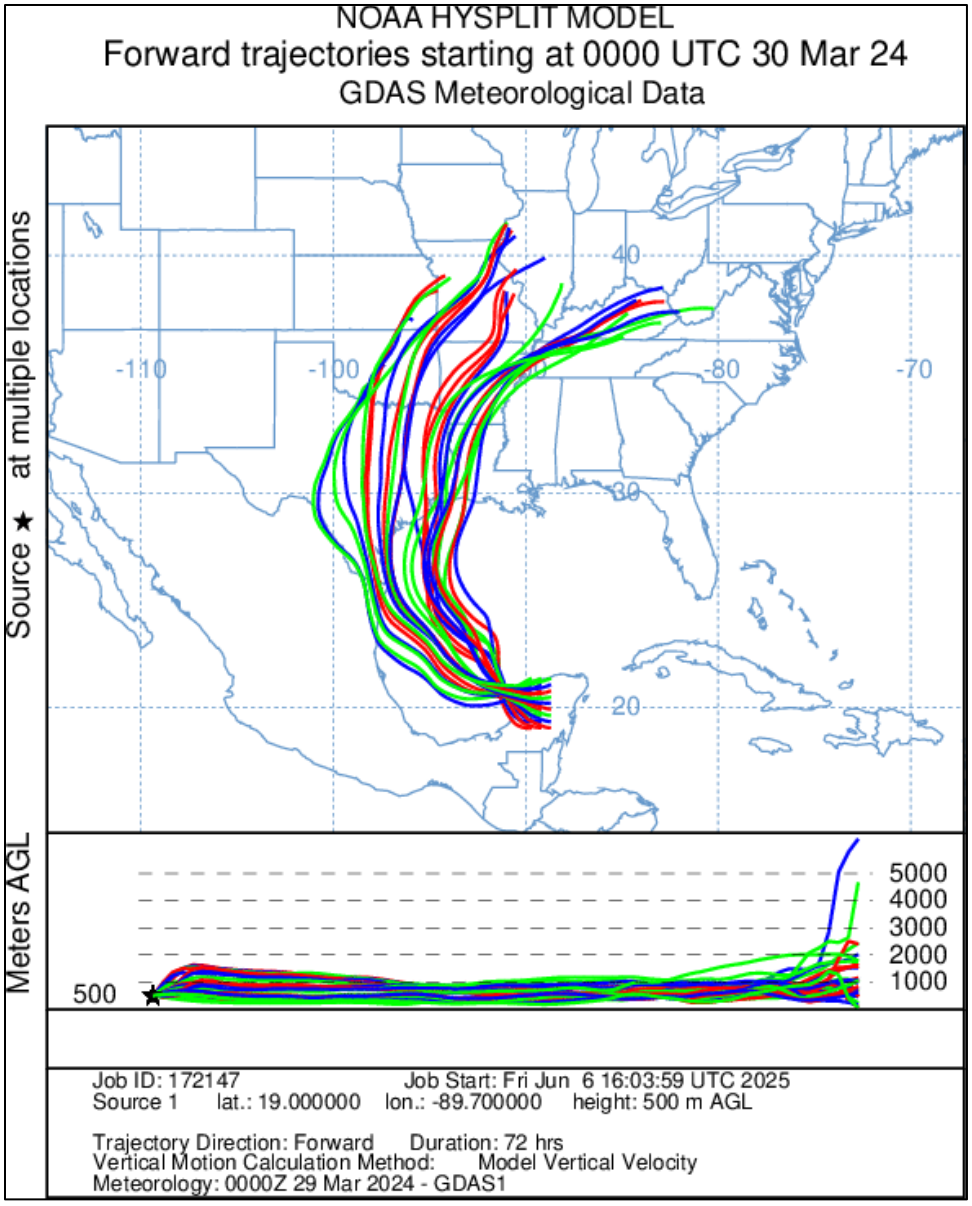

Figure 3-51: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 30, 2024

3.2.5 Group 5 – Evidence for the April 8, 2024, and April 9, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

April 8, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 25.9 µg/m^3; one-hour daily maximum 50.5 µg/m^3 recorded at 14:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 8, 2024, can be compared against typical/non-event days for the monitor in Figure 3-52: *Hourly $PM_{2.5}$ Concentrations on April 8, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

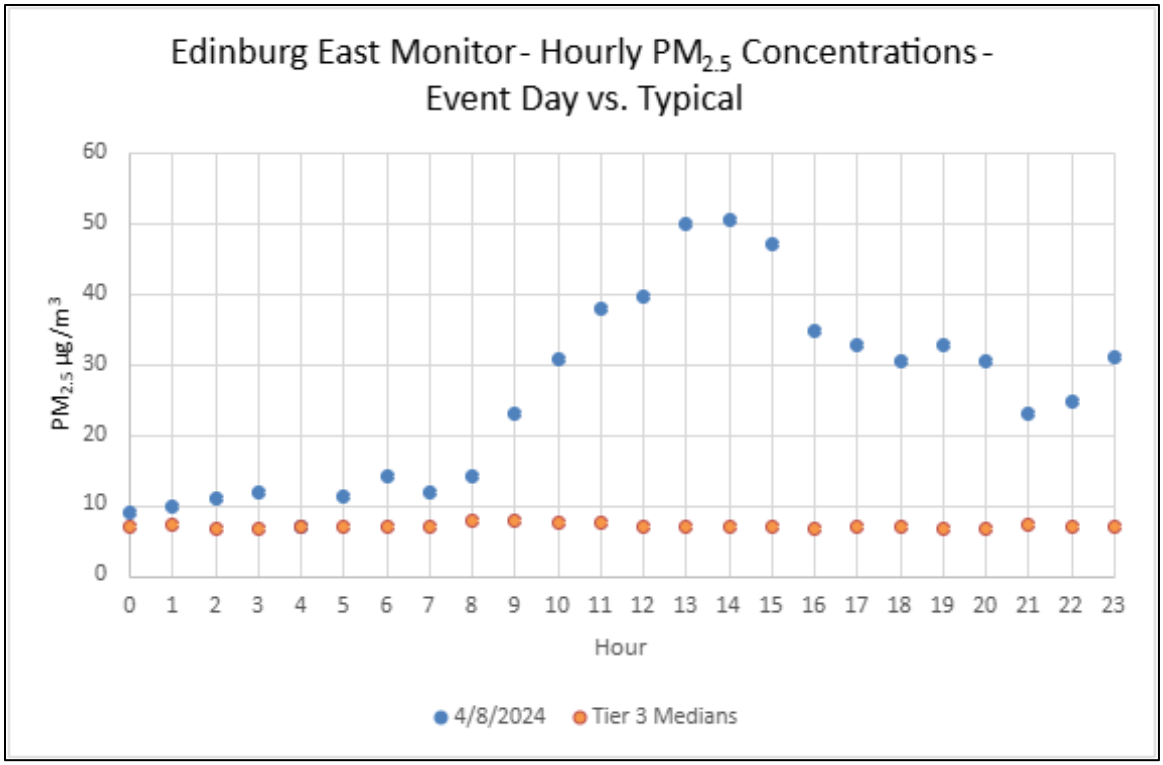

Figure 3-52: Hourly $PM_{2.5}$ Concentrations on April 8, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-5) revealed that light to moderate to high density smoke moved northward into the region originating from fires were present in Mexico, the Yucatan, Central America and northern South America, increasing fine particulate levels. The forecasts additionally mention that smoke, exacerbated by high humidity levels, increased the fine particulate matter levels recorded. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images. (Figure 3-53: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 8, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*. Smoke plumes (Figure A-22 and Figure 3-54: *AirNow HMS Smoke Plume for April 8, 2024*) and HYSPLIT backward wind trajectories (Figure 3-55: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Monitor on April 8, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light to moderate density smoke was transported into south Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through South and East Texas (Figure 3-56: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 5, 2024*).

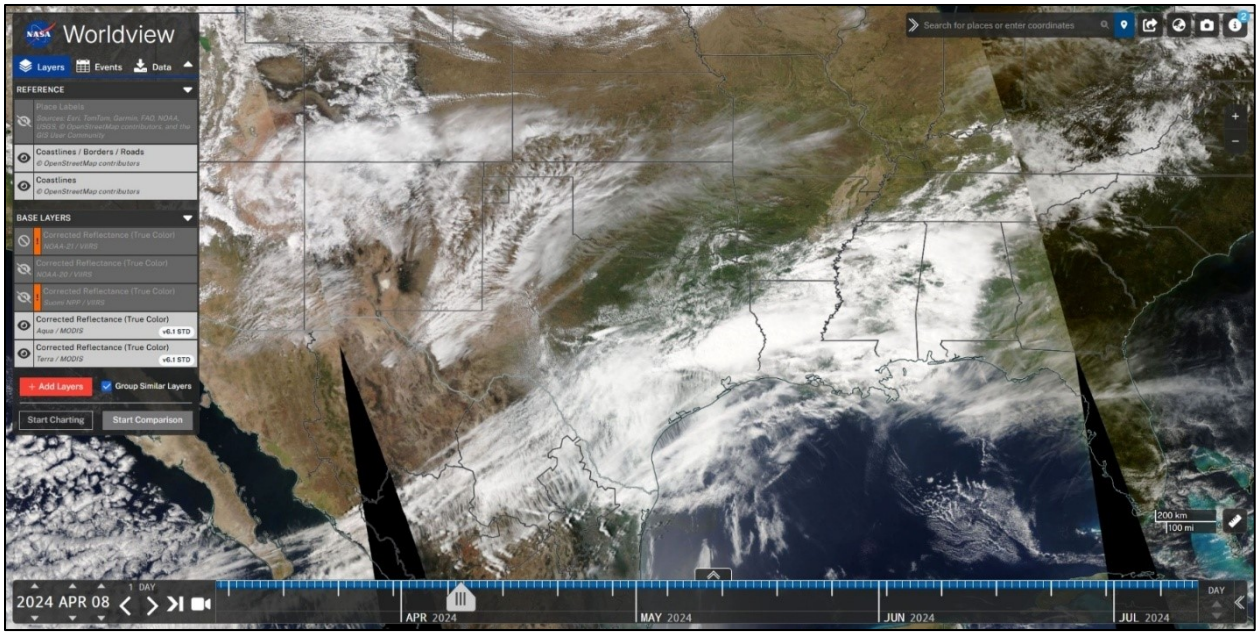

Figure 3-53: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 8, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

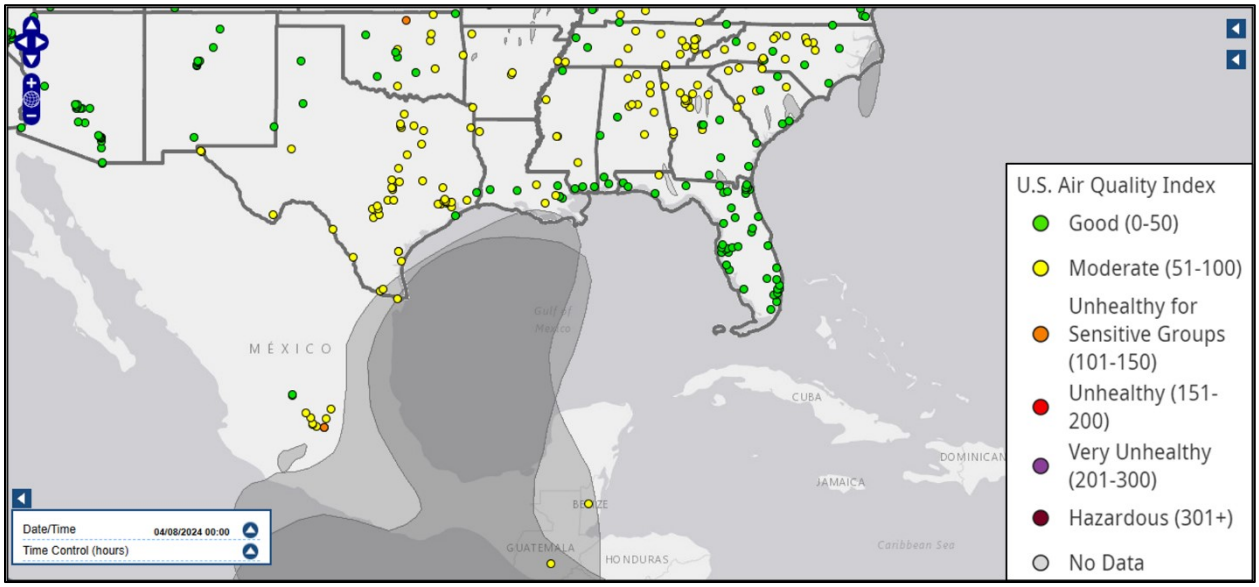

Figure 3-54: AirNow HMS Smoke Plume for April 8, 2024

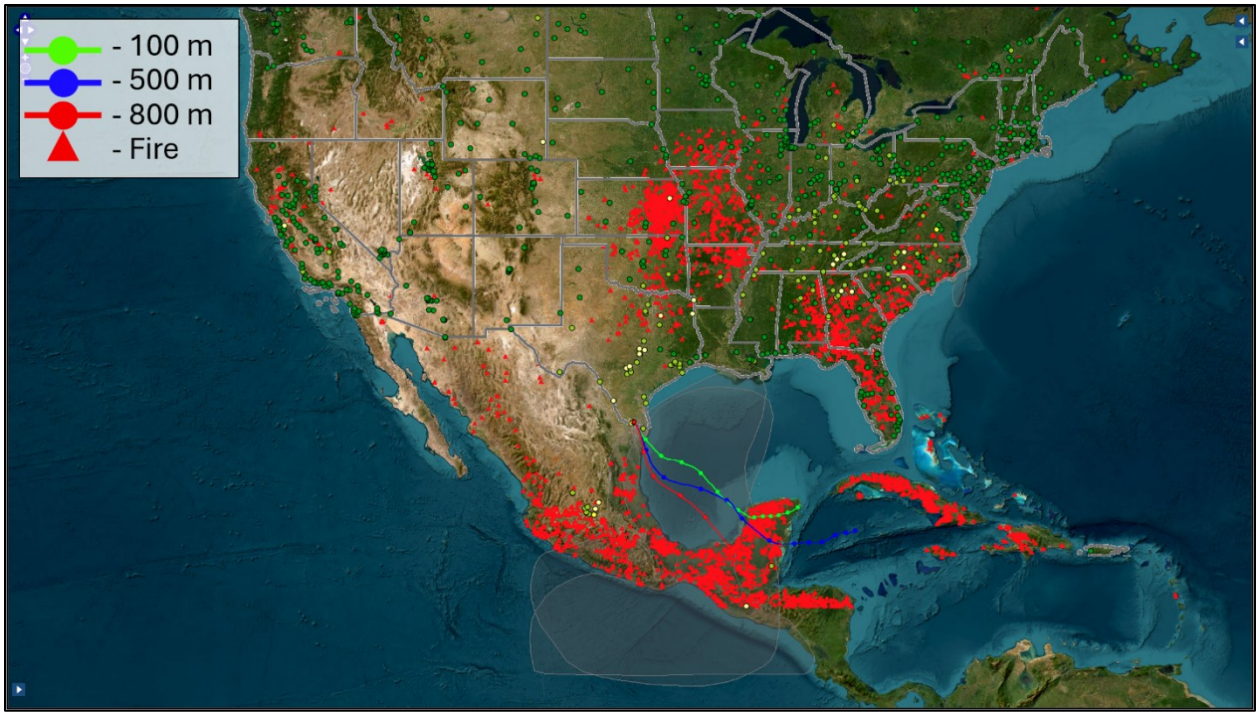

Figure 3-55: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Monitor on April 8, 2024

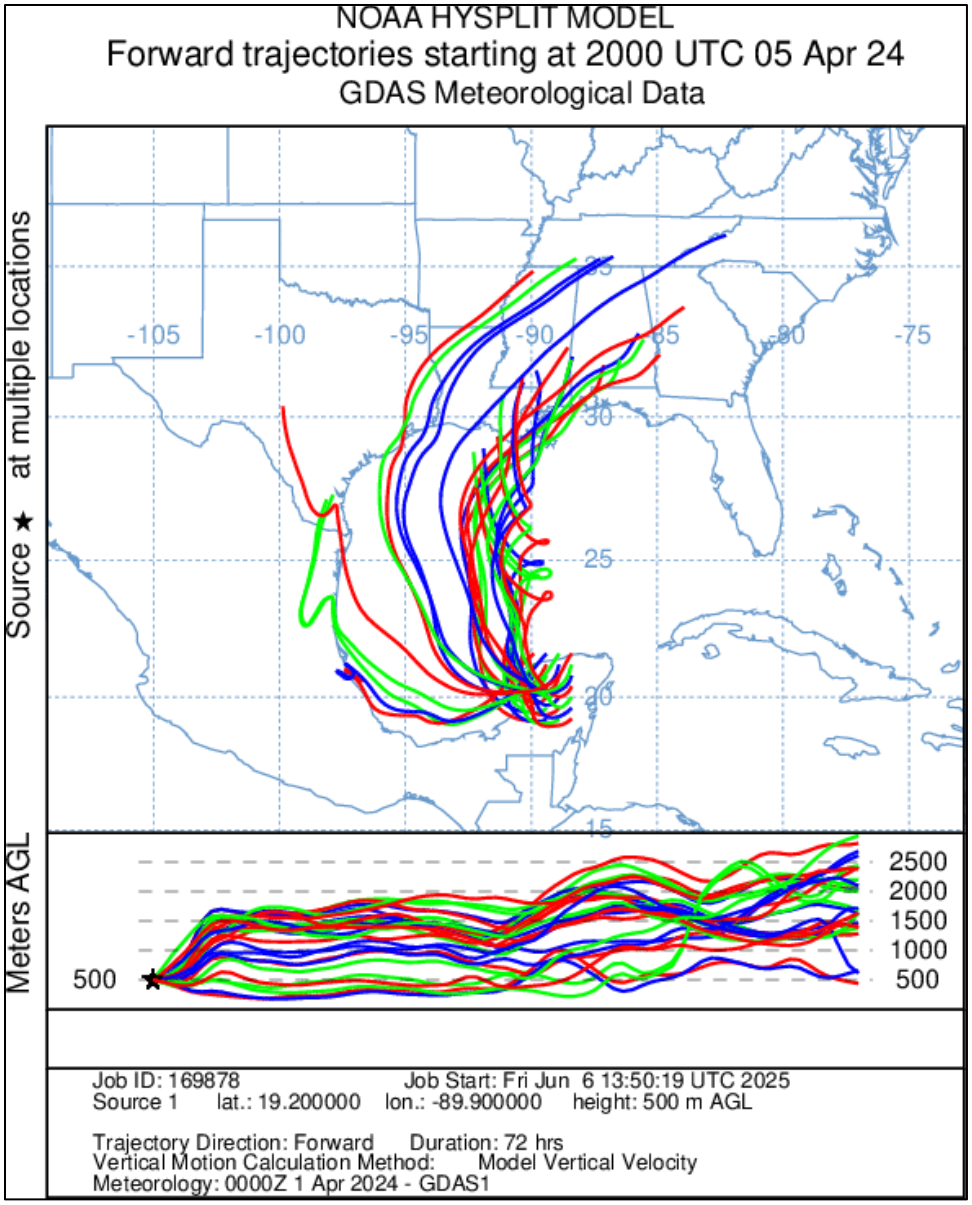

Figure 3-56: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 5, 2024

April 9, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 28.6 µg/m^3; one-hour daily maximum 37.4 µg/m^3 recorded at 23:00 LST) and the World Trade Bridge monitor (24-hour average concentration 28.9 µg/m^3; one-hour daily maximum 39.4 µg/m^3 recorded at 08:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 9, 2024, can be compared against typical/non-event days for the monitors in Figure 3-57: *Hourly $PM_{2.5}$ Concentrations on April 9, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-58: *Hourly $PM_{2.5}$ Concentrations on April 9, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

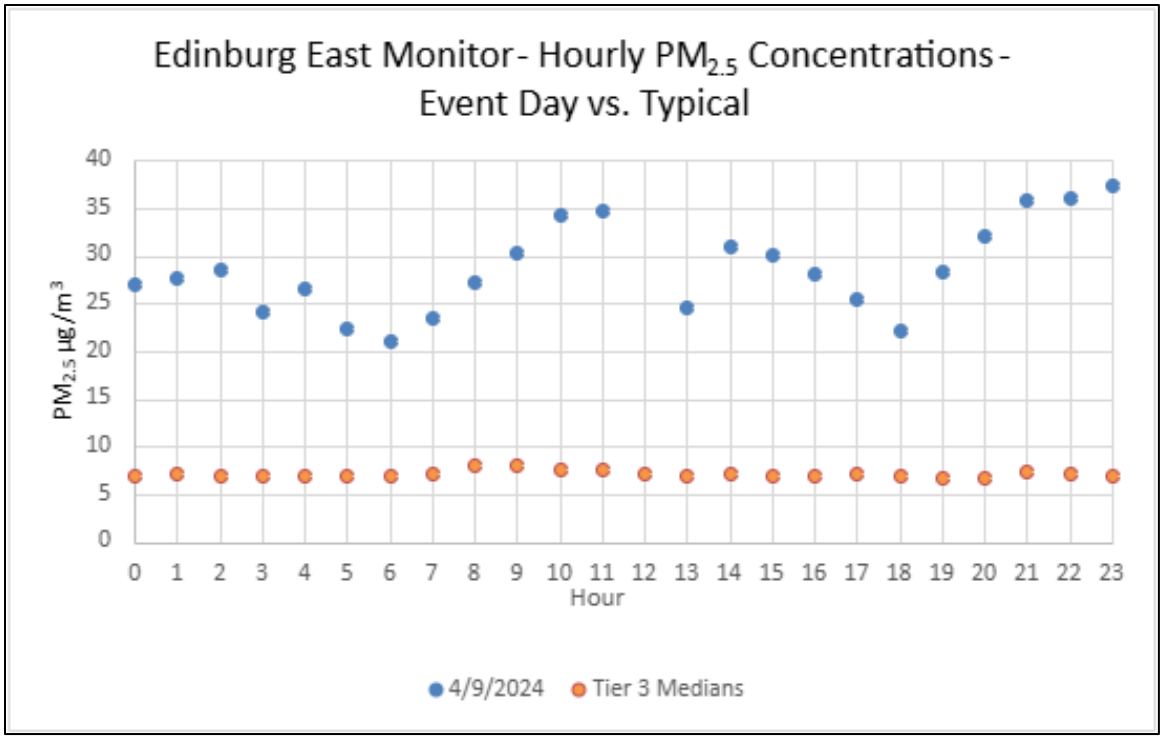

Figure 3-57: Hourly $PM_{2.5}$ Concentrations on April 9, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

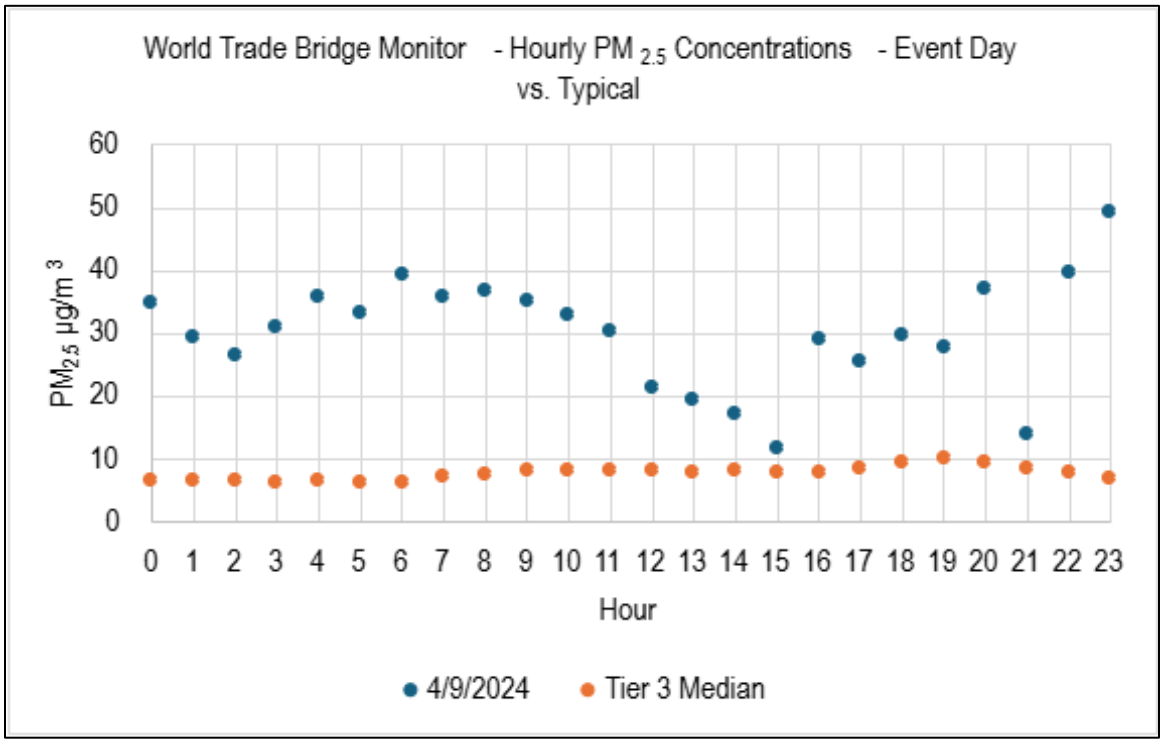

Figure 3-58: Hourly $PM_{2.5}$ Concentrations on April 9, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts (Table C-5) revealed that light to moderate density smoke moved northward into the region originating from fires present in Mexico, the Yucatan, Central America, and

northern South America, increasing fine particulate levels. The forecasts additionally mention that smoke, exacerbated by high humidity levels, increased the fine particulate matter levels recorded. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure A-23 and Figure 3-59: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 9, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-23 and Figure 3-60: *AirNow HMS Smoke Plume for April 9, 2024*) and HYSPLIT backward wind trajectories (Figure 3-61: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 9, 2024* and Figure 3-62: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on April 9, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light to moderate density smoke was transported into south Texas from the Yucatan Peninsula and southern Mexico on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through South and East Texas (Figure 3-63: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 7, 2024*).

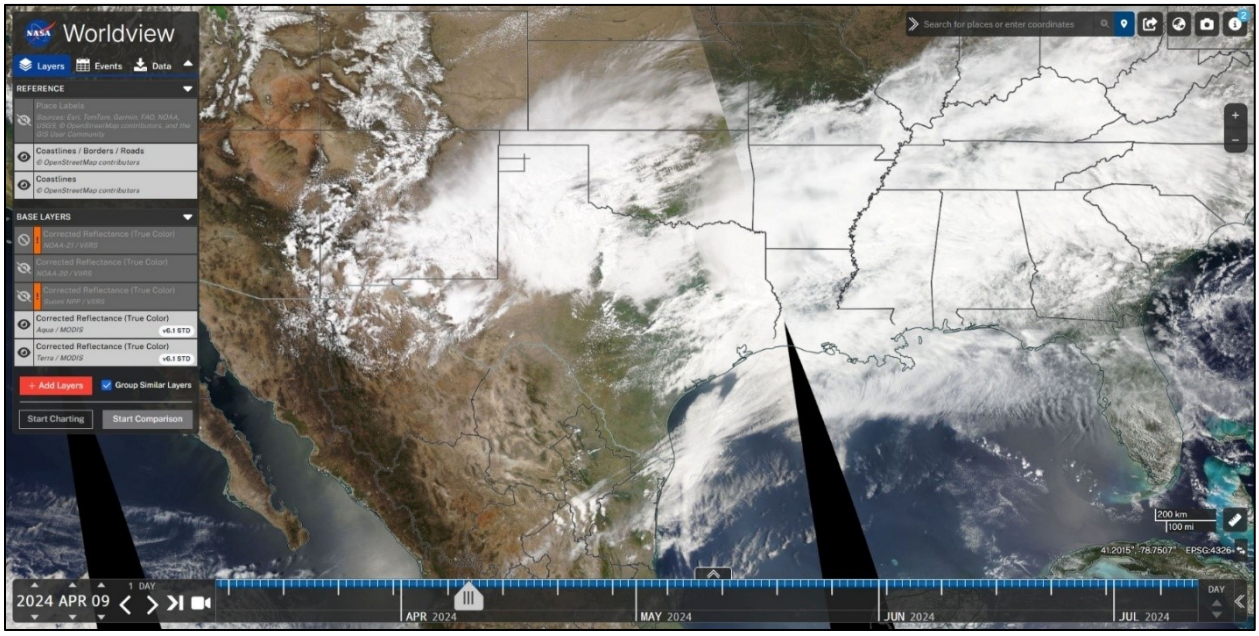

Figure 3-59: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 9, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

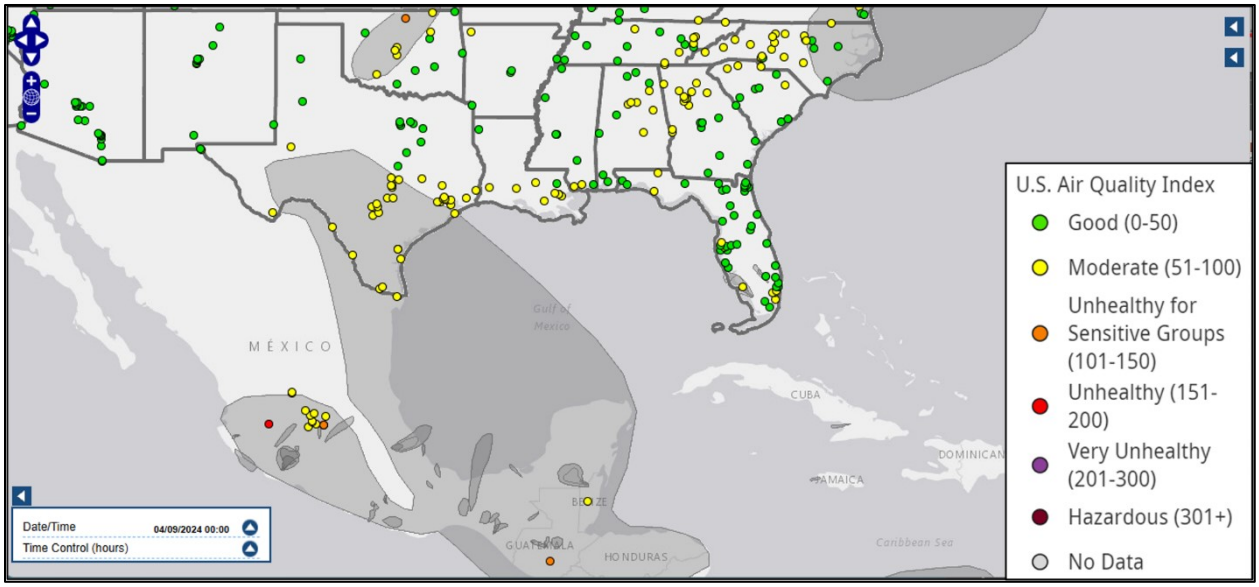

Figure 3-60: AirNow HMS Smoke Plume for April 9, 2024

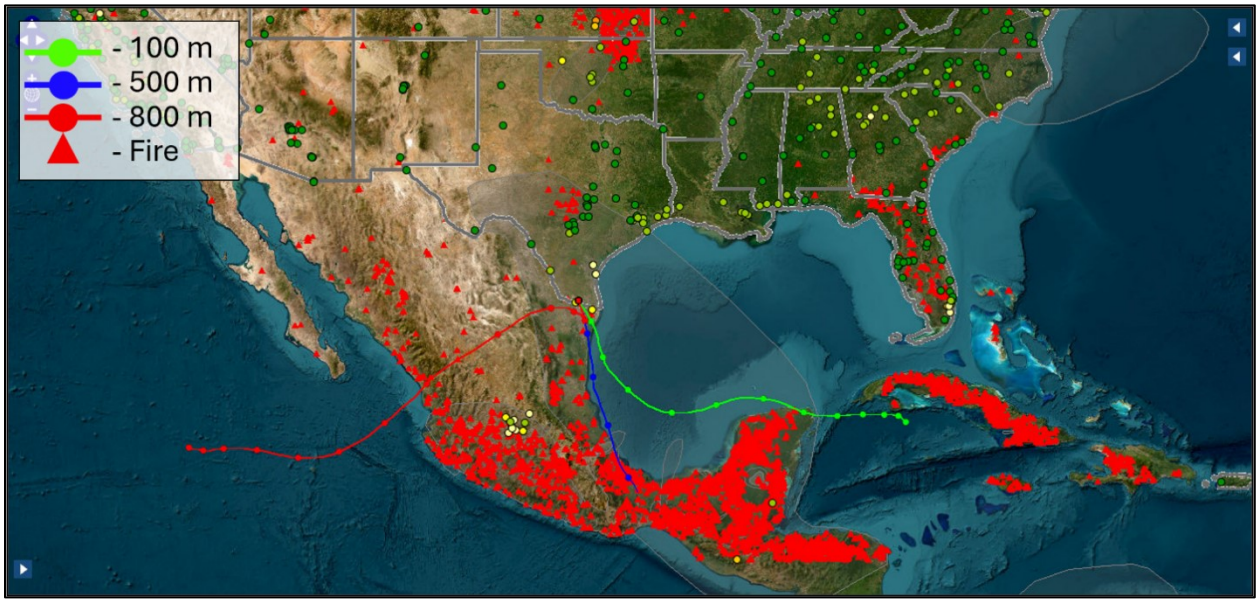

Figure 3-61: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 9, 2024

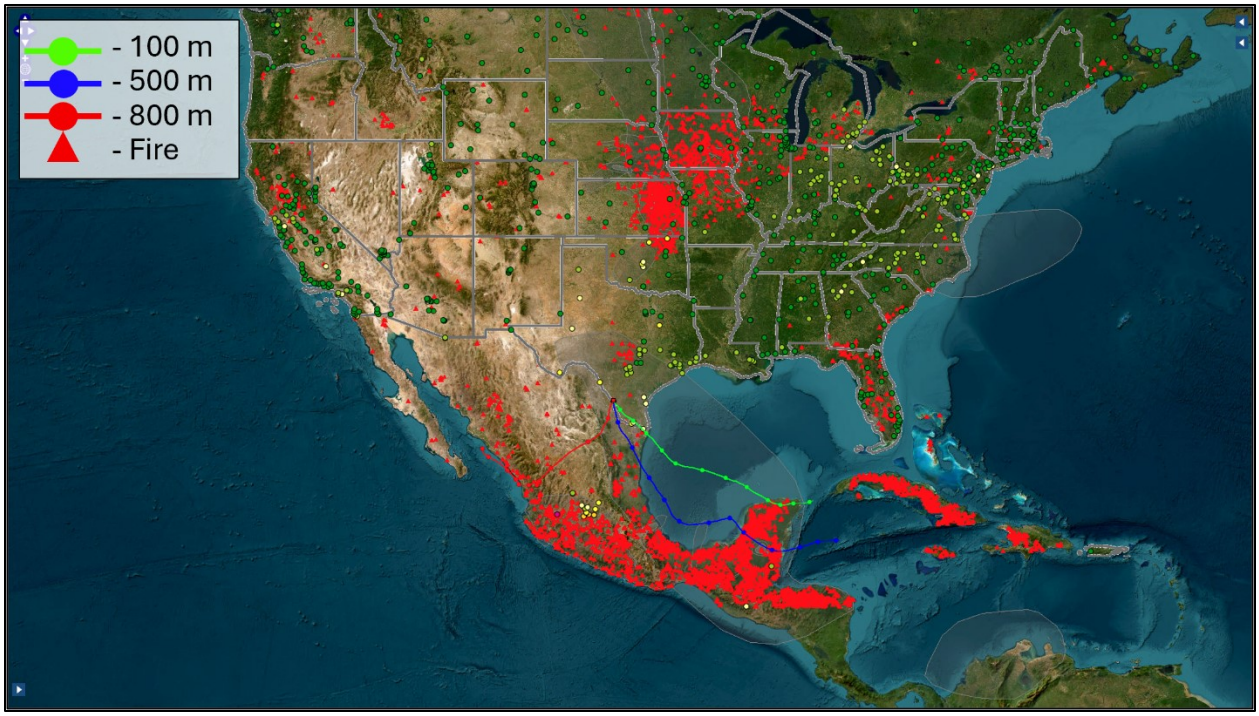

Figure 3-62: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on April 9, 2024

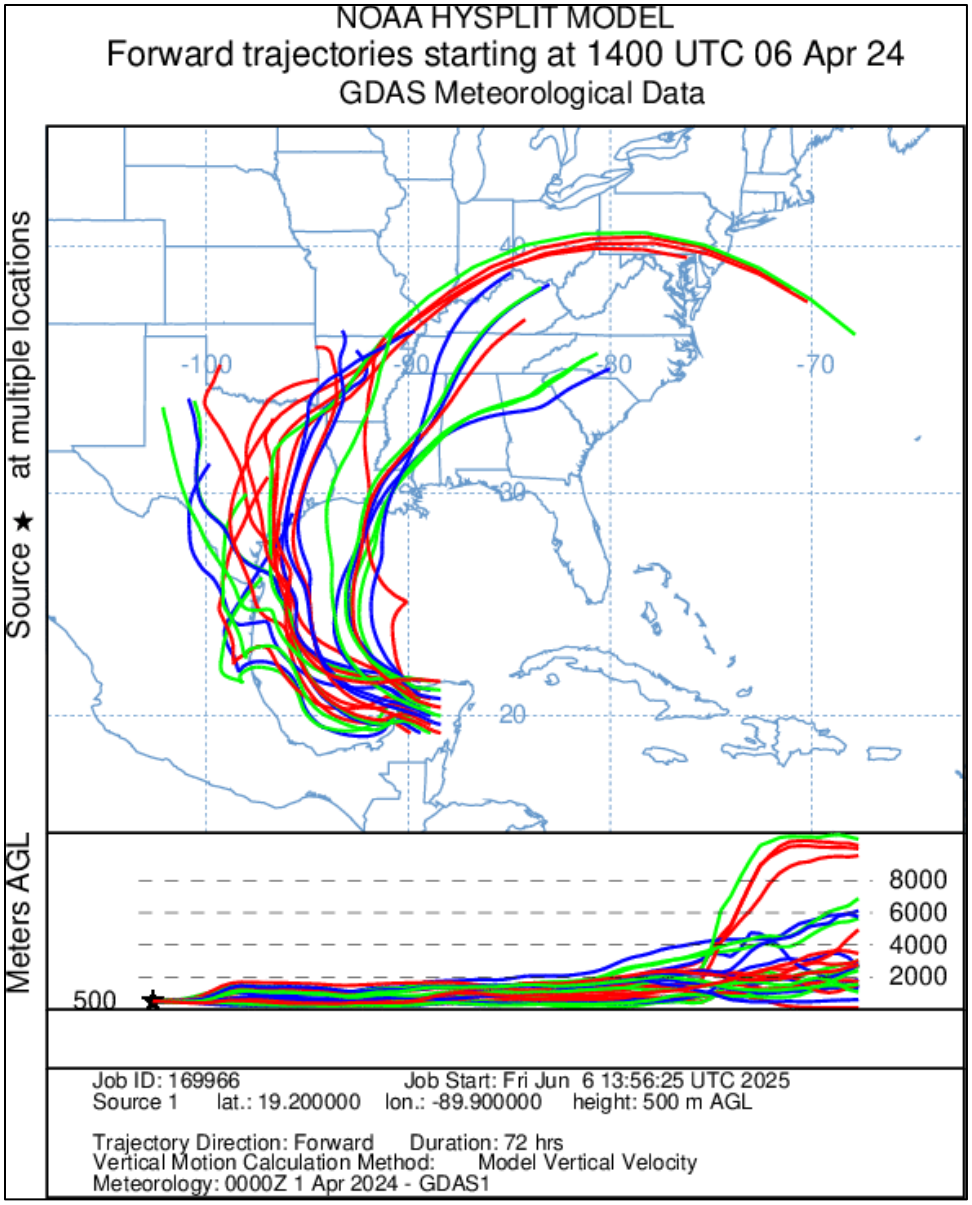

Figure 3-63: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 7, 2024

3.2.6 Group 6 – Evidence for the April 17, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive Monitor

April 17, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 25.6 µg/m3; one-hour daily maximum 66.5 µg/m3 recorded at 15:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 17, 2024, can be compared against typical/non-event days for the monitor in Figure 3-64: *Hourly $PM_{2.5}$ Concentrations on April 17, 2024, compared to typical concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

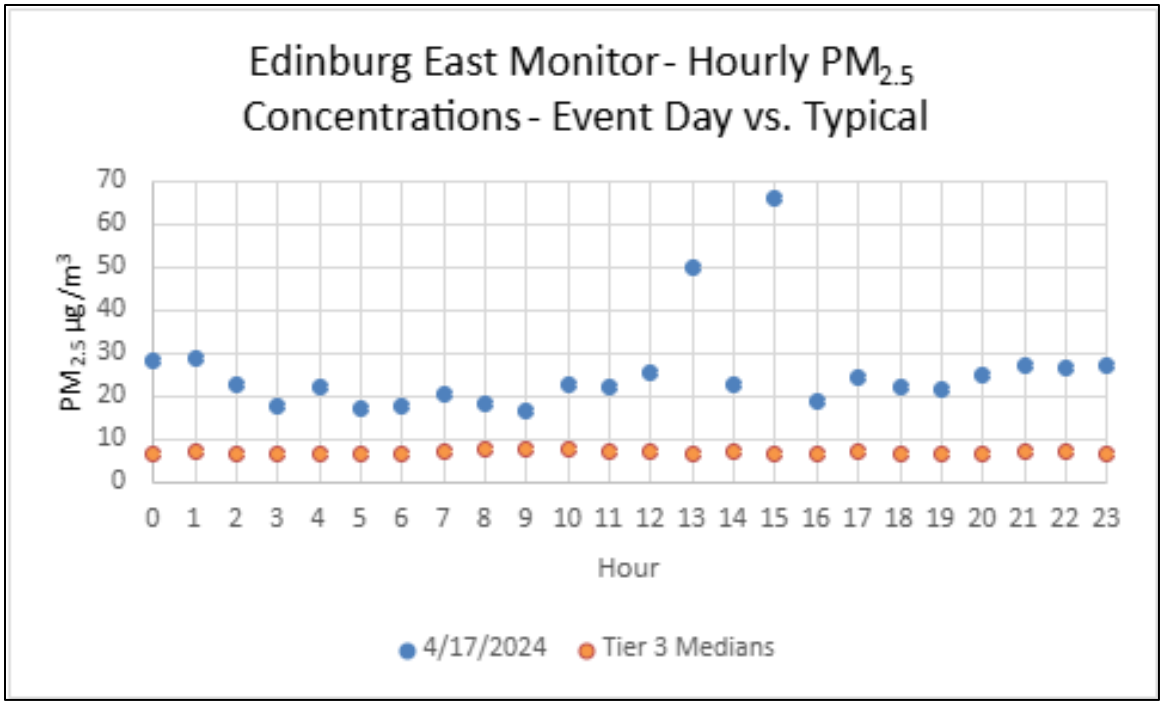

Figure 3-64: Hourly $PM_{2.5}$ Concentrations on April 17, 2024, compared to typical concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-6) revealed that moderate to high density smoke moved northward into the region originating from fires in Mexico and Central America, increasing fine particulate matter levels. The forecasts additionally mention that smoke, exacerbated by high humidity levels, increased the fine particulate matter levels recorded. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-53: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 8, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*. Smoke plumes (Figure A-26 and Figure 3-66: *AirNow HMS Smoke Plume for April 17, 2024*) and HYSPLIT backward wind trajectories (Figure 3-67: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Monitor on April 17, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light to moderate density smoke was transported into south Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula/southern Mexico traveled through South and East Texas (Figure 3-68: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 14, 2024*).

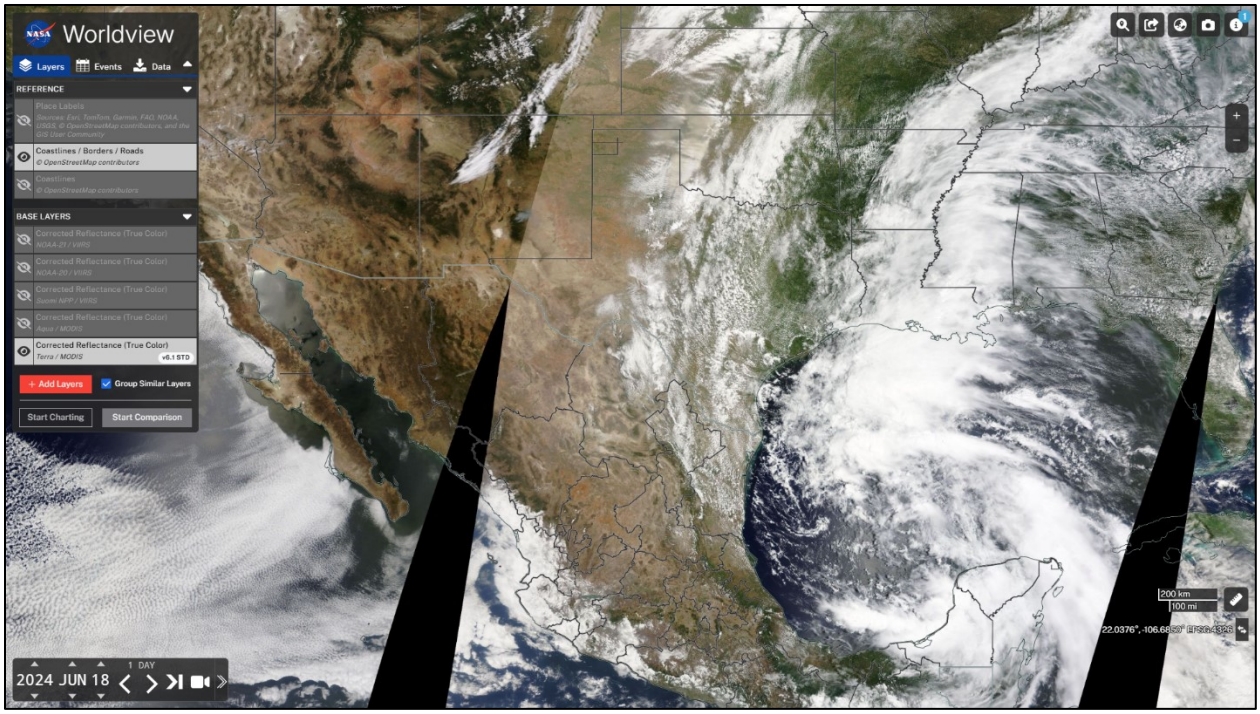

Figure 3-65: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 17, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

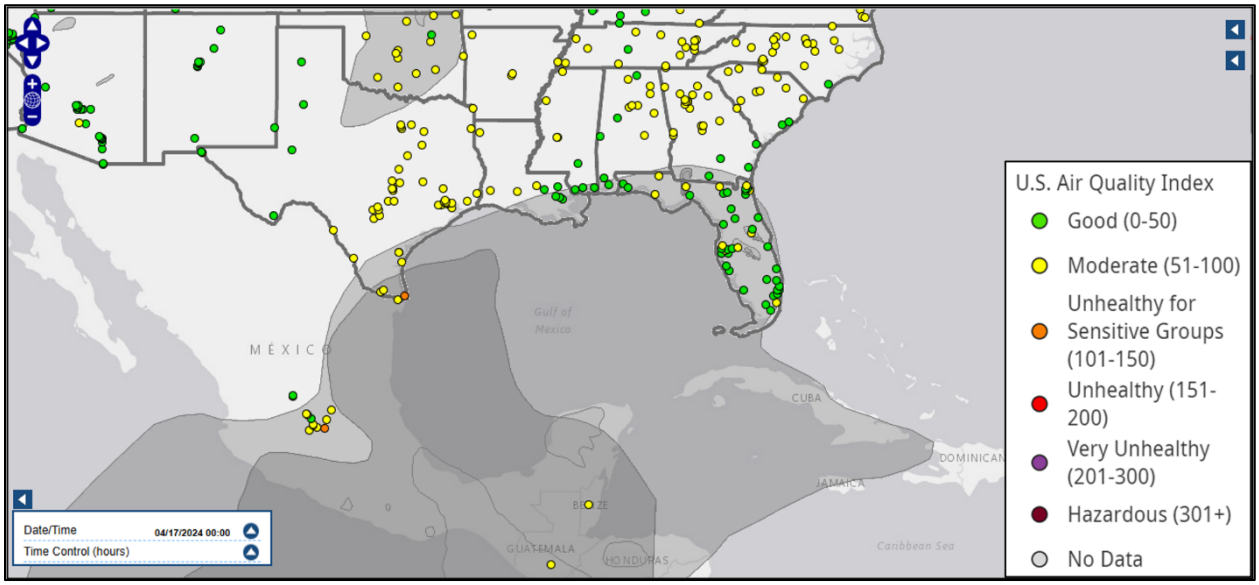

Figure 3-66: AirNow HMS Smoke Plume for April 17, 2024

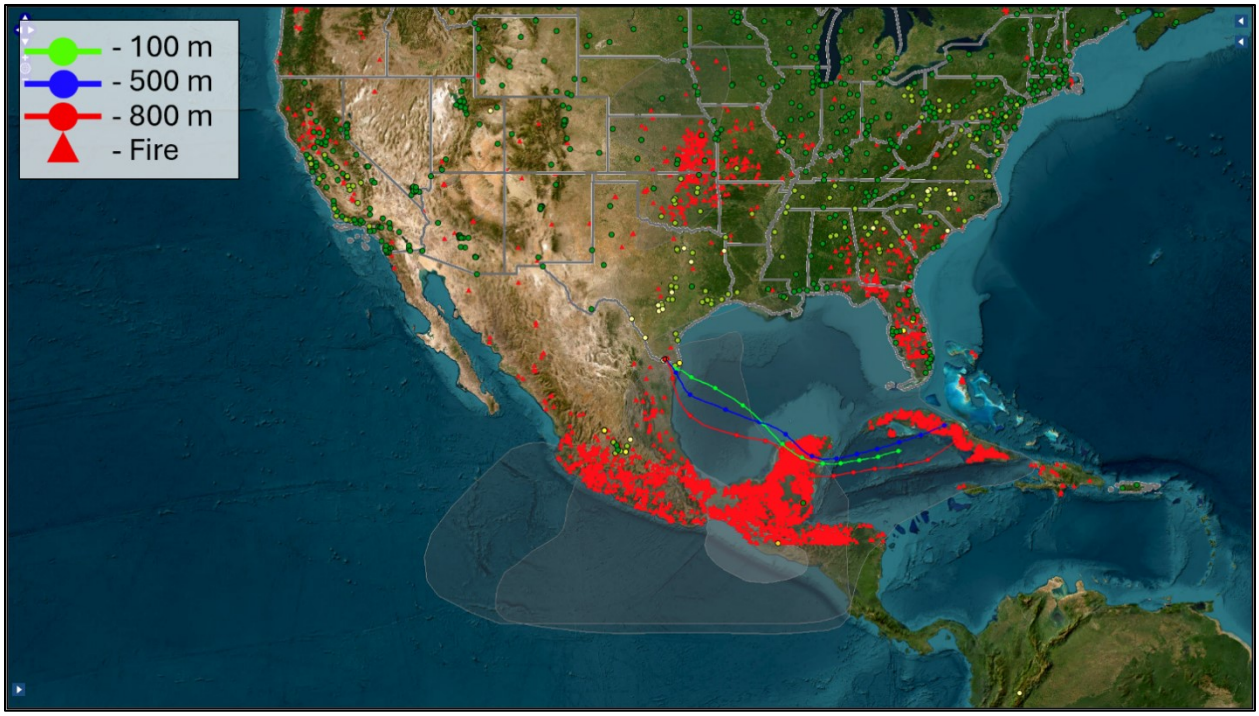

Figure 3-67: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Monitor on April 17, 2024

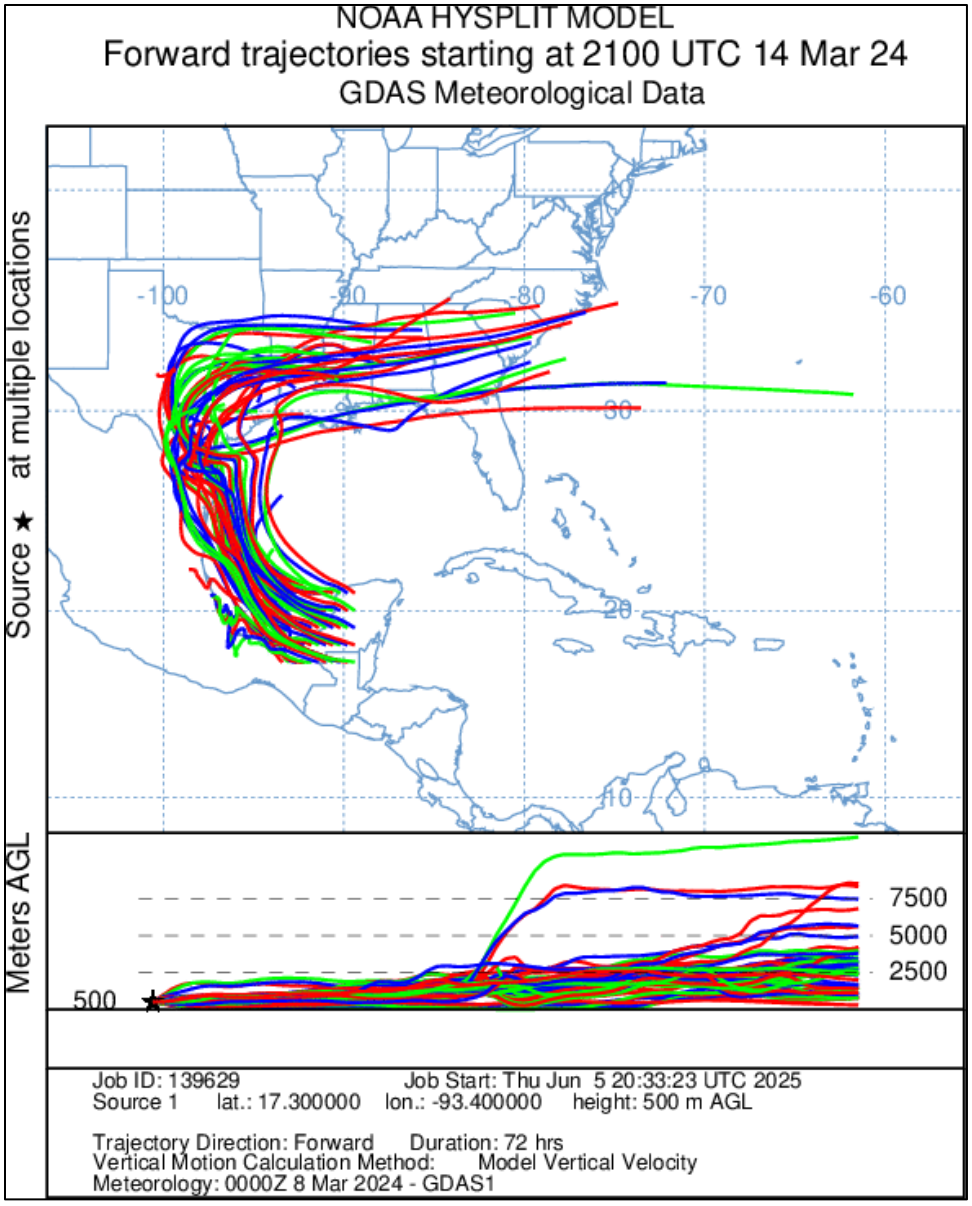

Figure 3-68: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on March 14, 2024

3.2.7 Group 7 – Evidence for the April 26, 2024, through April 29, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, and World Trade Bridge Monitors

April 26, 2024, is identified as a Tier 2 day at the Von Ormy Highway 16 monitor (24-hour average concentration 27.5 µg/m^3; one-hour daily maximum 61 µg/m^3 recorded at 04:00 LST) and the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 26.4 µg/m^3; one-hour daily maximum 40.8 µg/m^3 recorded at 23:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 26, 2024, can be compared against typical/non-event days for the monitor in Figure 3-69: *Hourly $PM_{2.5}$ Concentrations on April 26, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor* and Figure 3-70: *Hourly $PM_{2.5}$ Concentrations on April 26, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

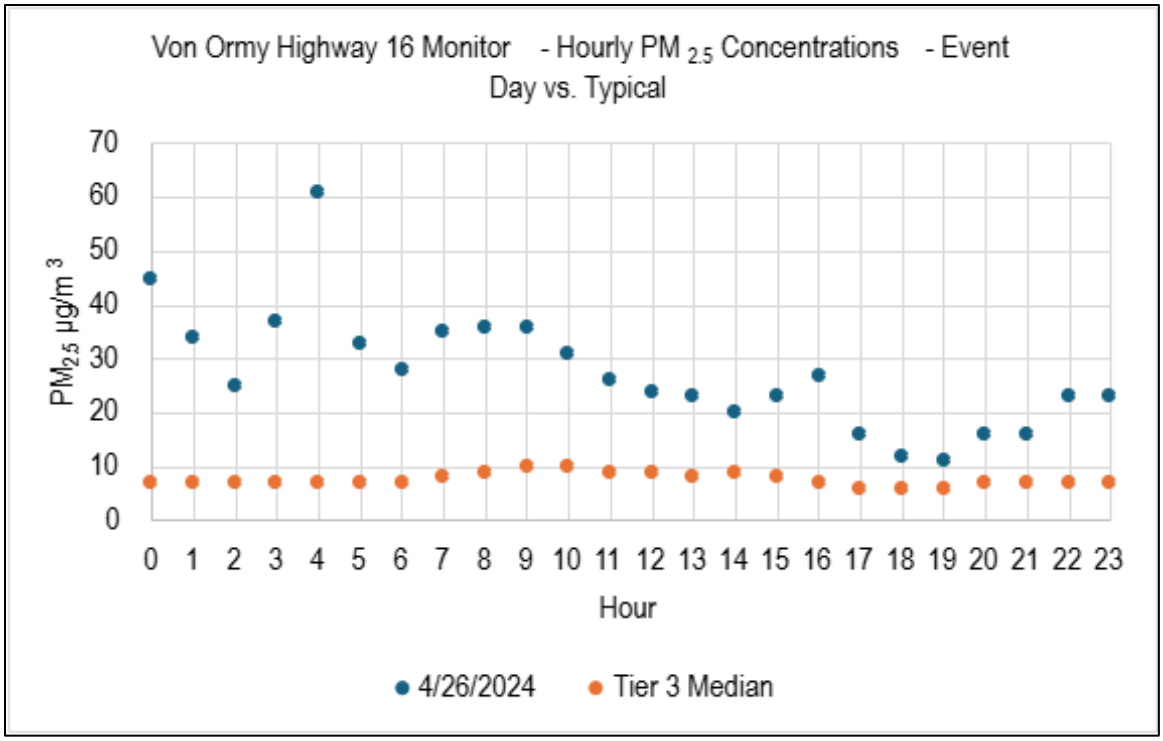

Figure 3-69: Hourly $PM_{2.5}$ Concentrations on April 26, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

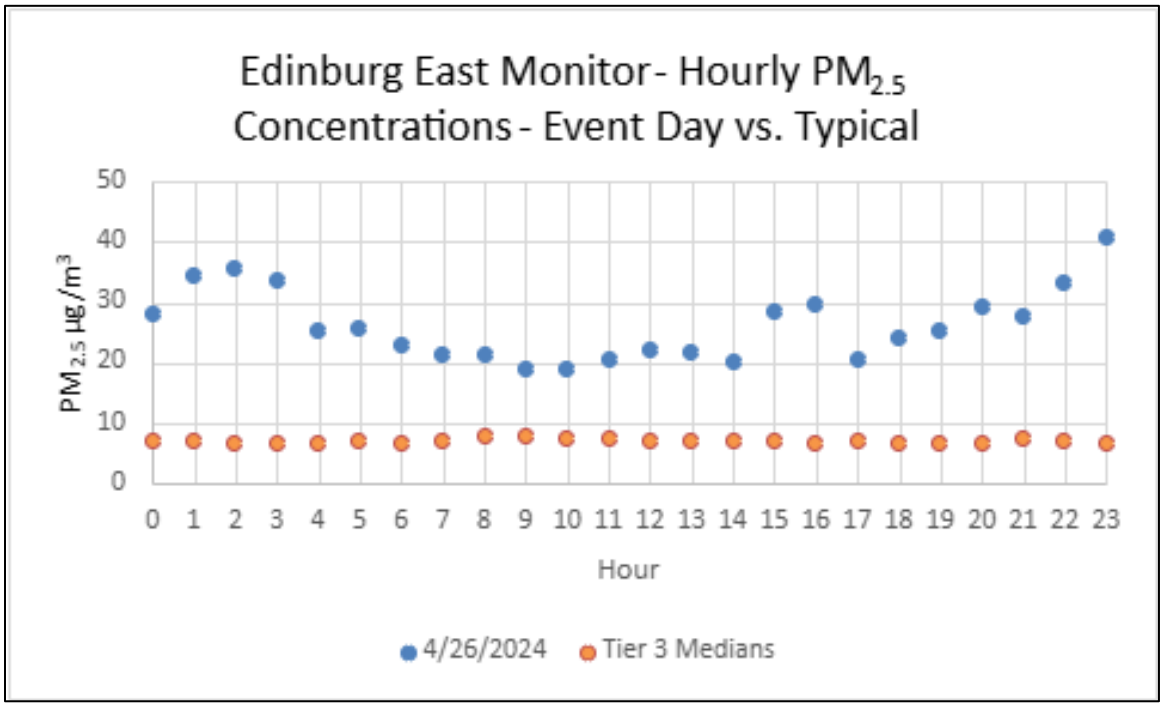

Figure 3-70: Hourly $PM_{2.5}$ Concentrations on April 26, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-7) revealed that moderate to high density smoke and aerosols moved northward into the region originating from fires present in Mexico and Central America, increasing the value of fine particulate matter levels recorded. Satellite imagery is partially

obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-71: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 26, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-31 and Figure 3-72: *AirNow HMS Smoke Plume for April 26, 2024*) and HYSPLIT backward wind trajectories (Figure 3-73: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on April 26, 2024* and Figure 3-74: AirNow *Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Monitor on April 26, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through Texas (Figure 3-75: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 23, 2024*).

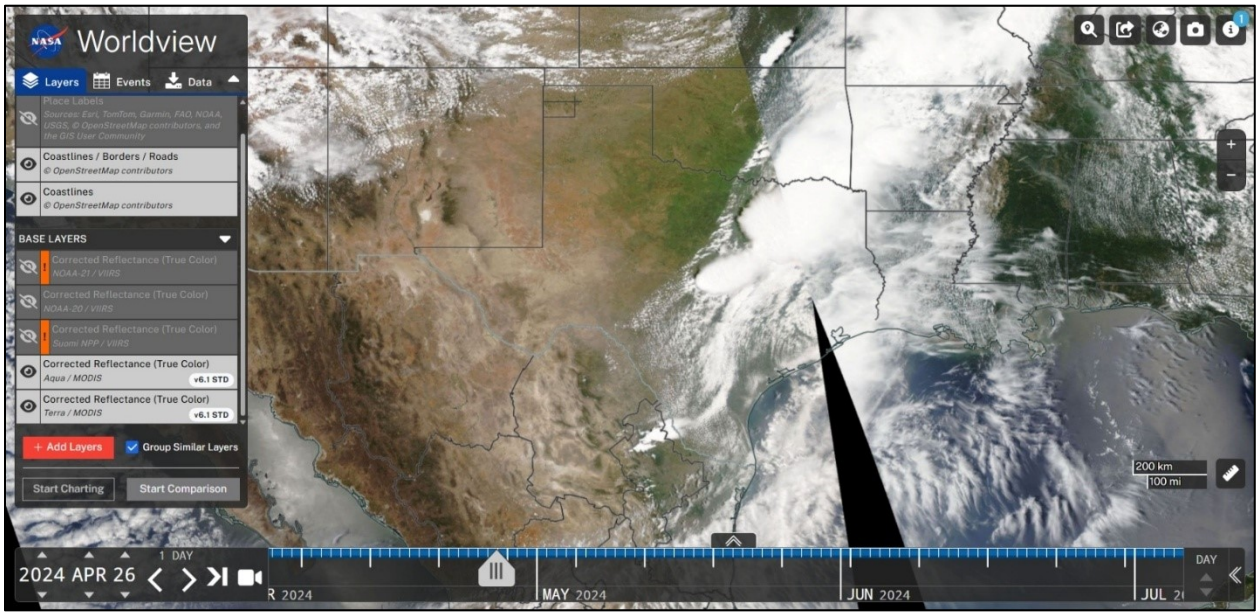

Figure 3-71: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 26, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

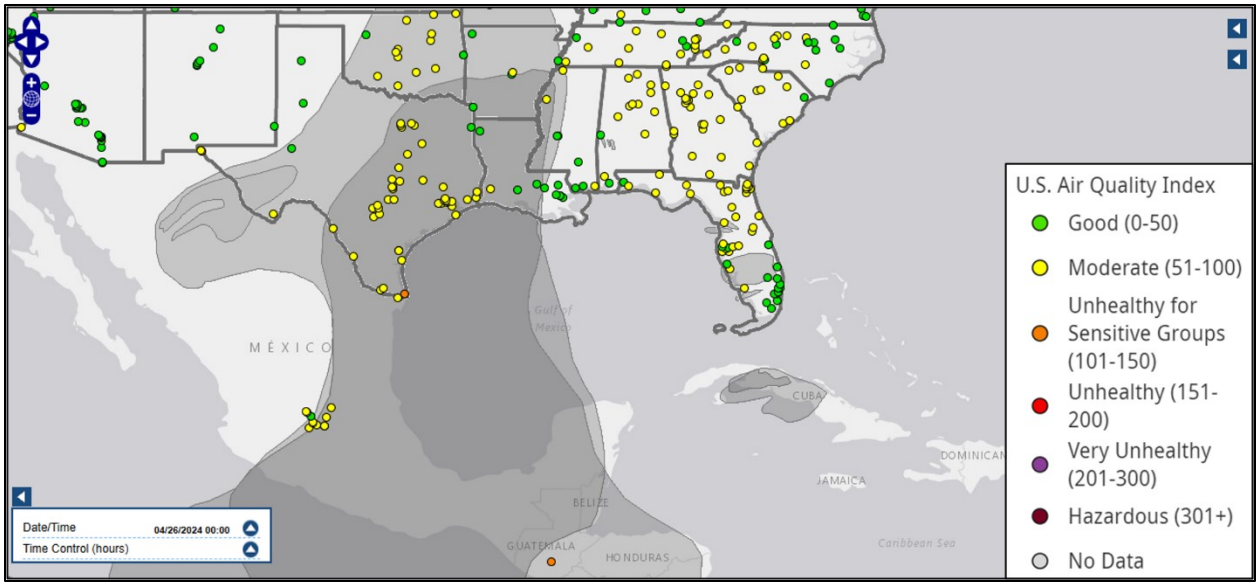

Figure 3-72: AirNow HMS Smoke Plume for April 26, 2024

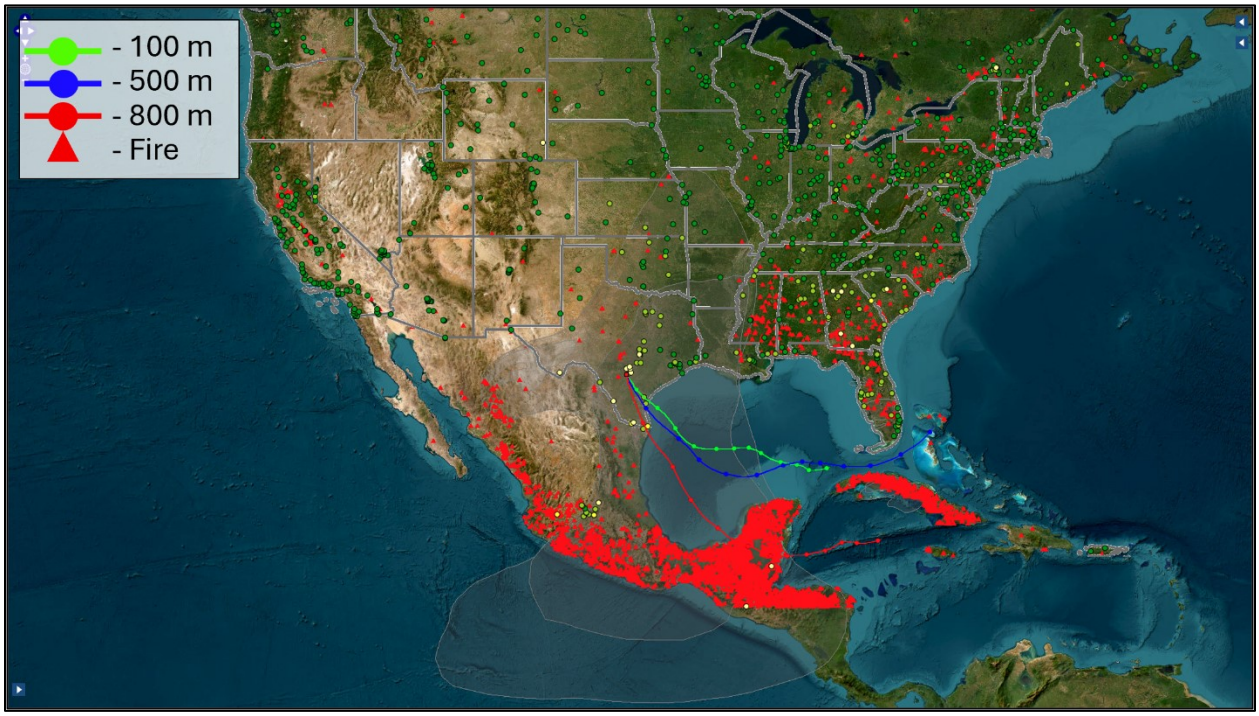

Figure 3-73: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on April 26, 2024

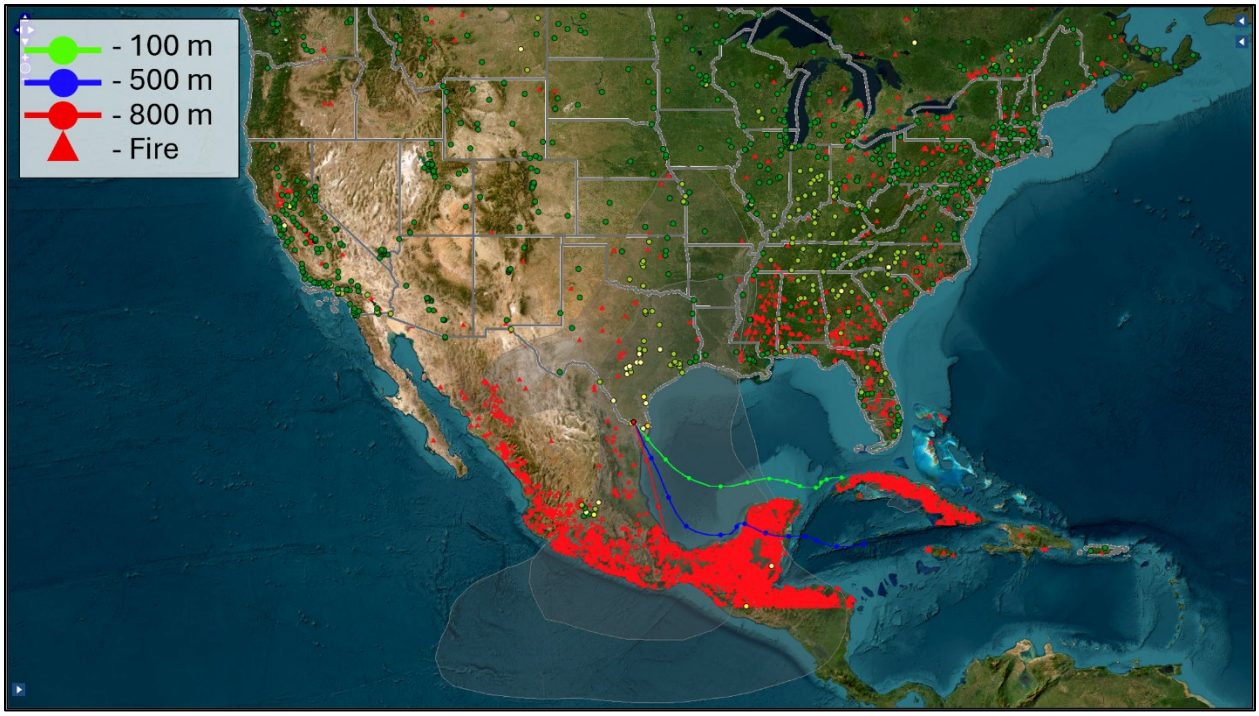

Figure 3-74: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Monitor on April 26, 2024

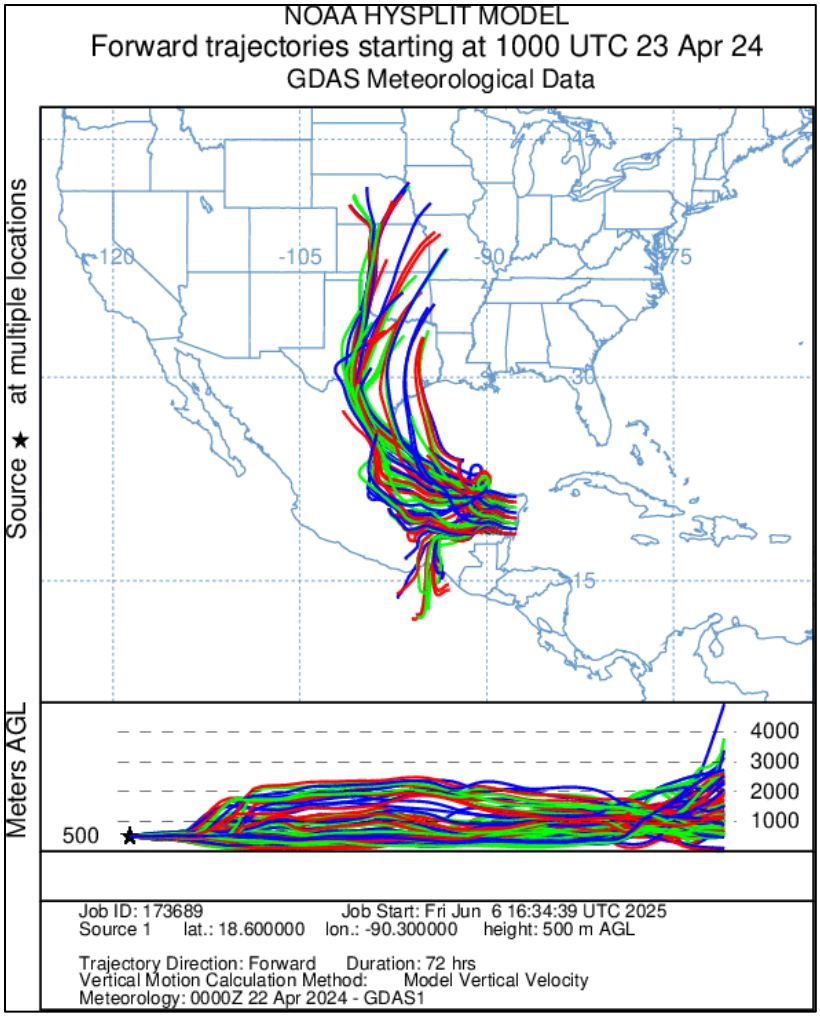

Figure 3-75: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 23, 2024

April 27, 2024 is identified as a Tier 2 day at the Von Ormy Highway 16 monitor (24-hour average concentration 28.2 µg/m3; one-hour daily maximum 37.0 µg/m^3 recorded at 15:00 LST), a Tier 1 day for the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 32.6 µg/m^3; one-hour daily maximum 49.6 µg/m^3 recorded at 16:00 LST), and a Tier 1 day for the World Trade Bridge monitor (24-hour average concentration 37.5 µg/m3; one-hour daily maximum 50.3 µg/m^3 recorded at 23:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 27, 2024, can be compared against typical/non-event days for the monitors in Figure 3-76: *Hourly $PM_{2.5}$ Concentrations on April 27, 2024, compared to typical concentrations at Von Ormy Highway 16 Monitor*, Figure 3-77: *Hourly $PM_{2.5}$ Concentrations on April 27, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, and Figure 3-78: *Hourly $PM_{2.5}$ Concentrations on April 27, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

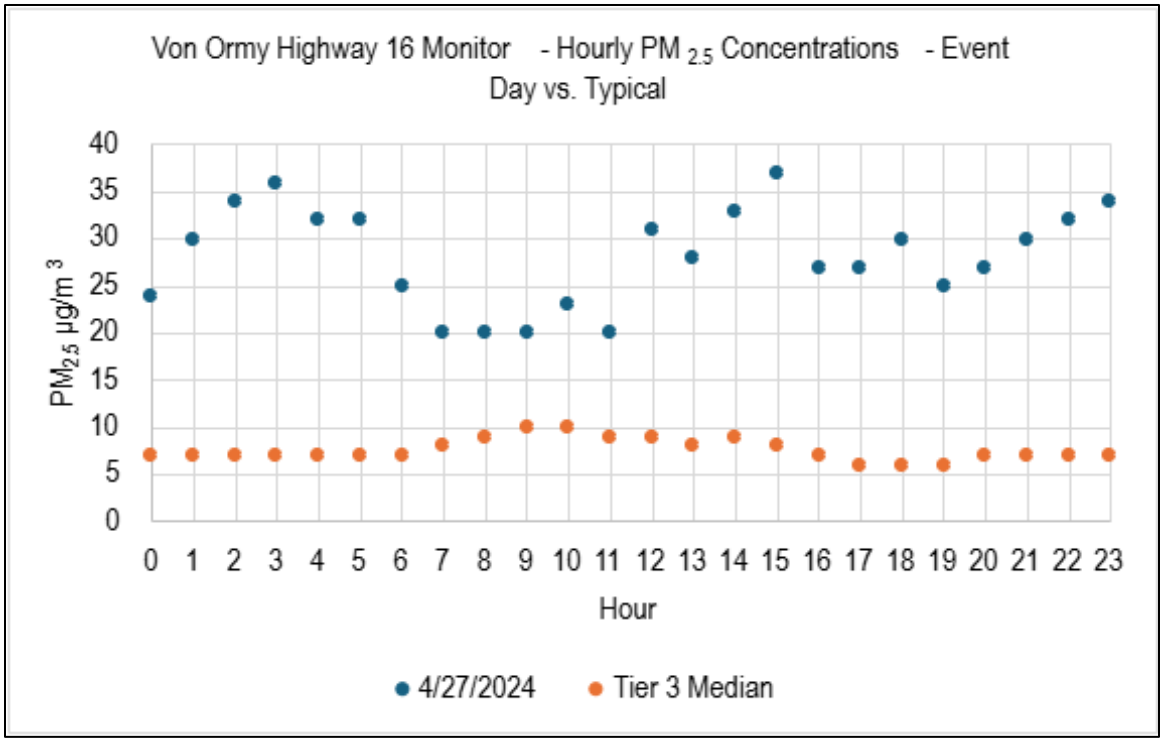

Figure 3-76: Hourly $PM_{2.5}$ Concentrations on April 27, 2024, compared to typical concentrations at Von Ormy Highway 16 Monitor

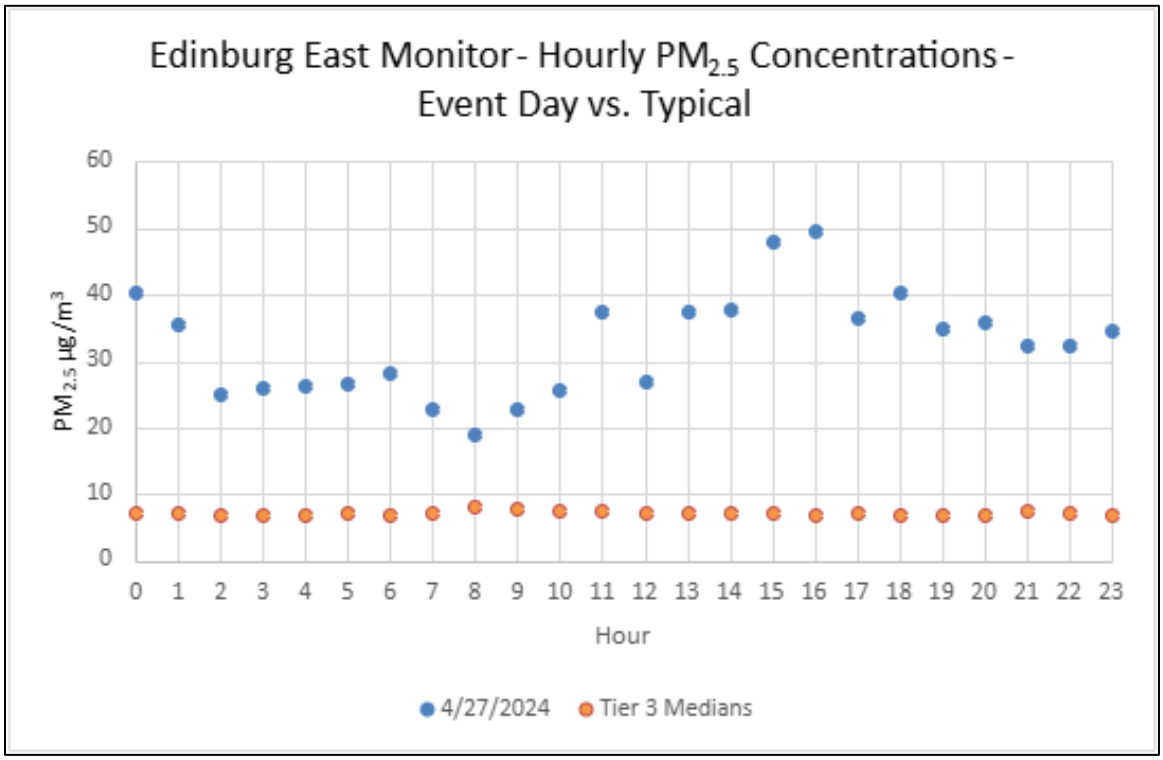

Figure 3-77: Hourly $PM_{2.5}$ Concentrations on April 27, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

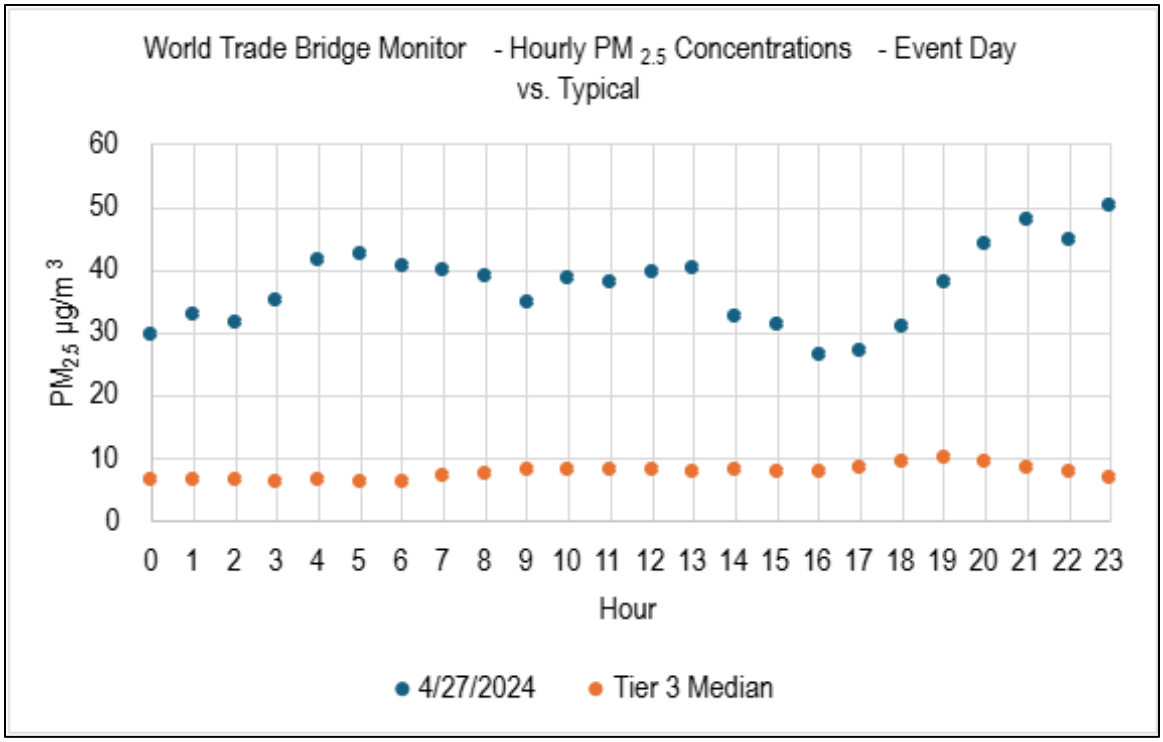

Figure 3-78: Hourly $PM_{2.5}$ Concentrations on April 27, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts (Table C-7) revealed that moderate to high density smoke and aerosols moved northward into the region originating from fires present in Mexico and Central America, increasing the value of fine particulate matter levels recorded. They revealed that higher density smoke was set to affect the southern portions of the state and the Coastal Bend. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-79: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 27, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-32 and Figure 3-80: *AirNow HMS Smoke Plume for April 27, 2024*) and HYSPLIT backward wind trajectories (Figure 3-81: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on April 27, 2024*, Figure 3-82: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 27, 2024*, and Figure 3-83: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on April 27, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into Texas from the Yucatan Peninsula, southern Mexico, and Cuba on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through Texas (Figure 3-84: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 24, 2024*).

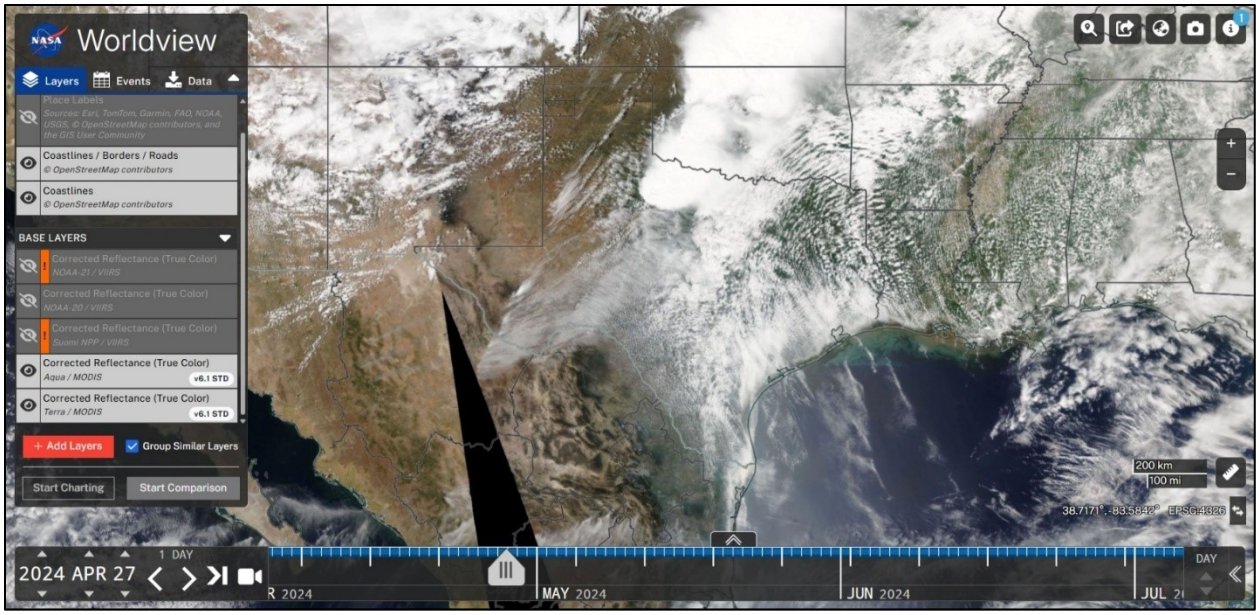

Figure 3-79: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 27, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

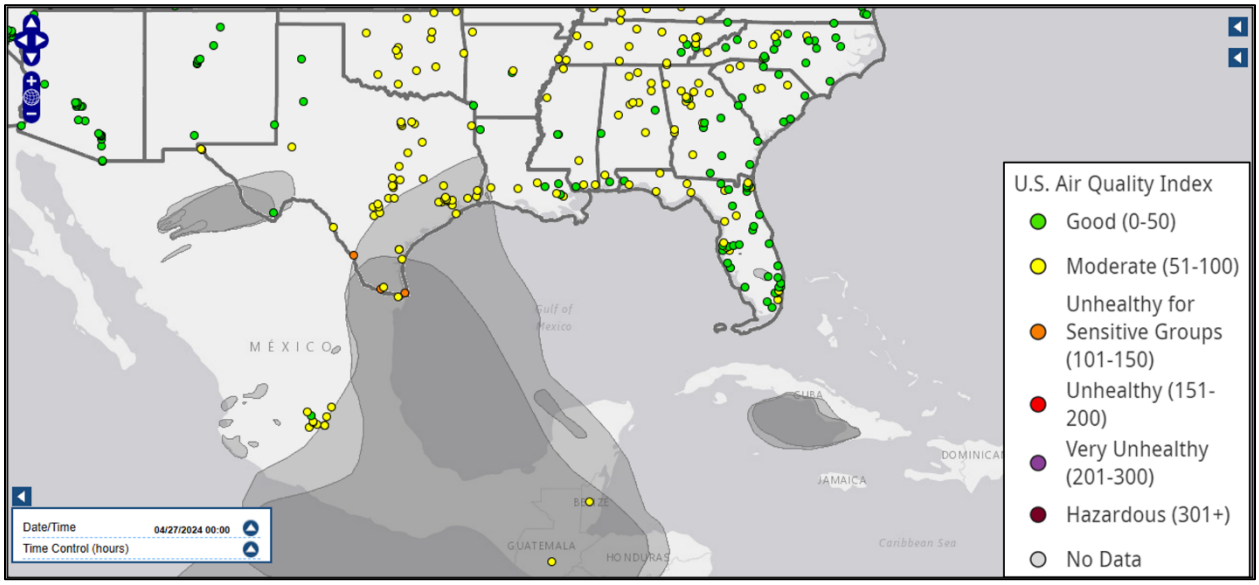

Figure 3-80: AirNow HMS Smoke Plume for April 27, 2024

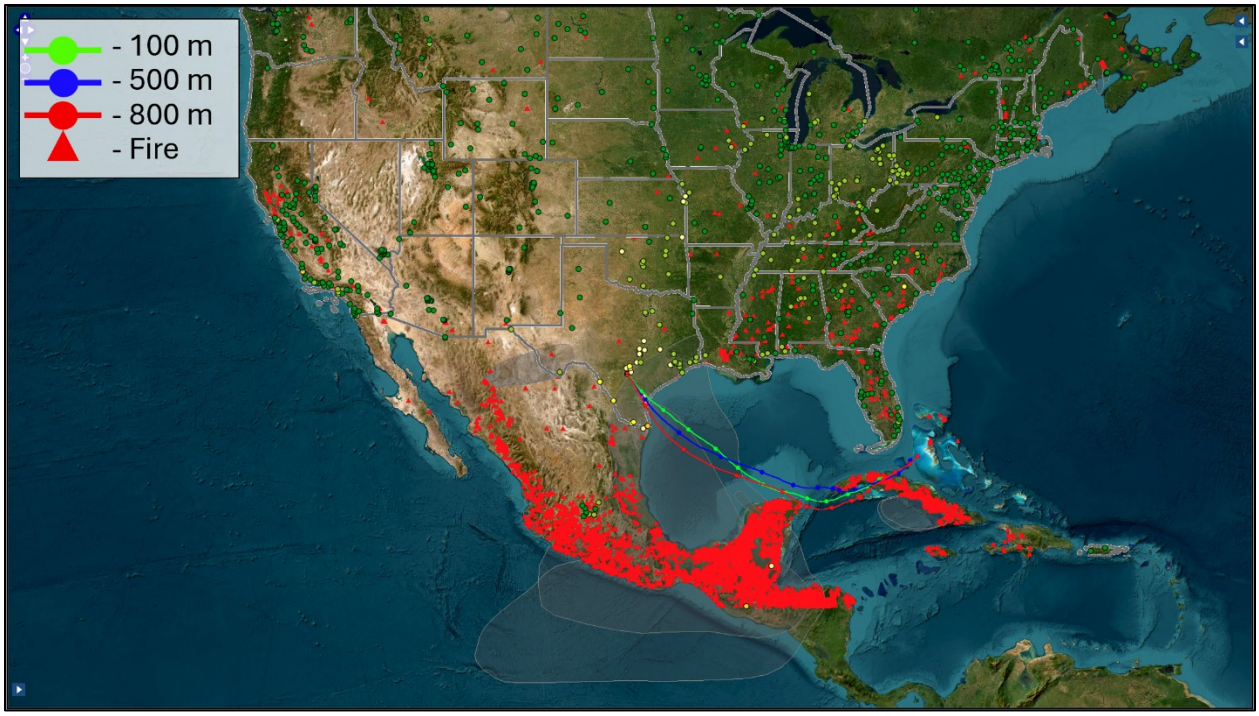

Figure 3-81: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on April 27, 2024

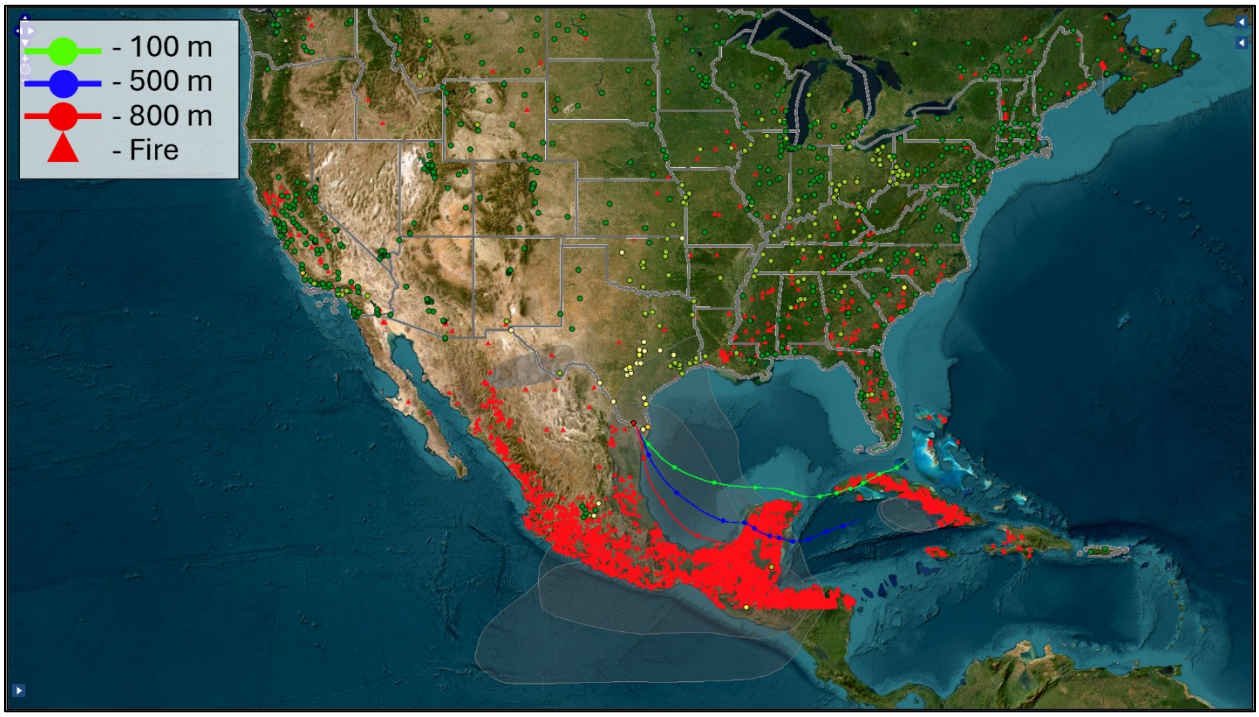

Figure 3-82: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 27, 2024

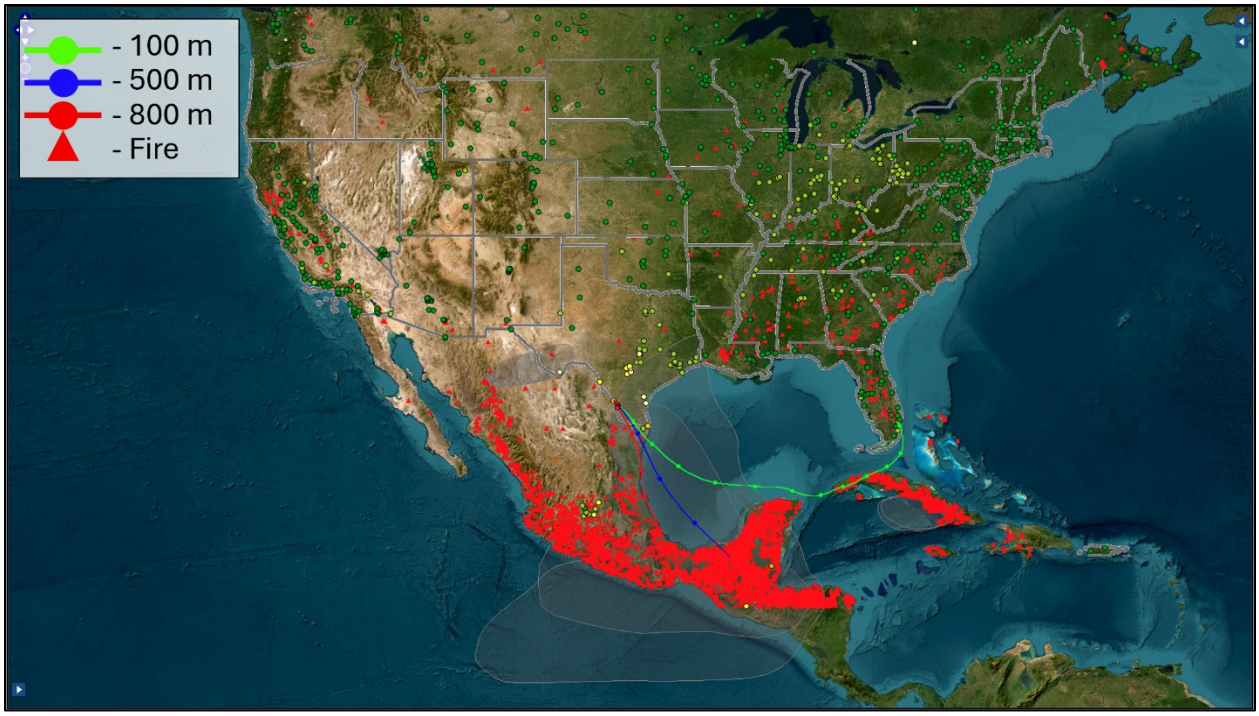

Figure 3-83: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on April 27, 2024

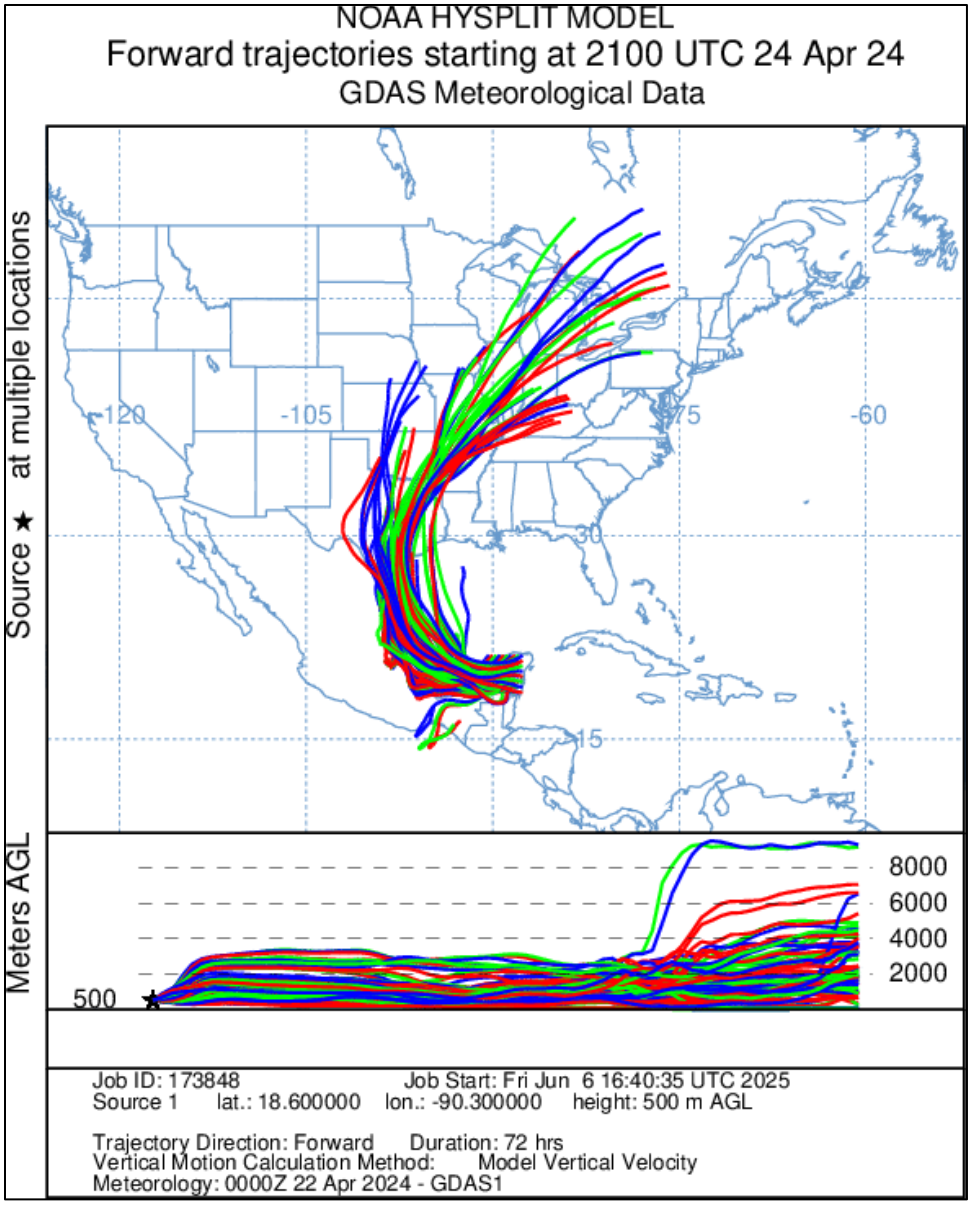

Figure 3-84: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 24, 2024

April 28, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 28.0 µg/m^3; one-hour daily maximum 38.9 µg/m^3 recorded at 13:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 28, 2024, can be compared against typical/non-event days for the monitors in Figure 3-85: *Hourly $PM_{2.5}$ Concentrations on April 28, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

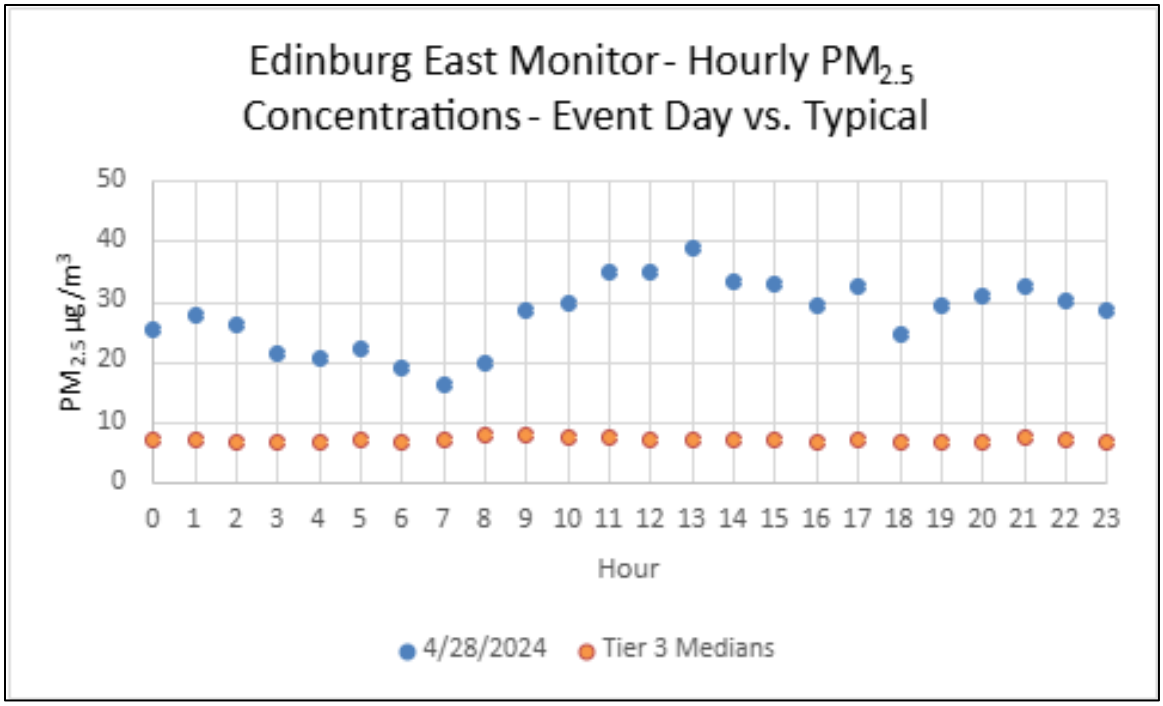

Figure 3-85: Hourly $PM_{2.5}$ Concentrations on April 28, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-7) revealed that high density smoke and aerosols were concentrated over the Deep South and portions of the Coastal Bend as compared to other parts of the state, which saw light to moderate smoke from fires in Mexico filtering through. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-86: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 28, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-33 and Figure 3-87: *AirNow HMS Smoke Plume for April 28, 2024*) and HYSPLIT backward wind trajectories (Figure 3-88: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 28, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into Texas from the Yucatan Peninsula and southern Mexico on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through Texas (Figure 3-89: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 25, 2024*).

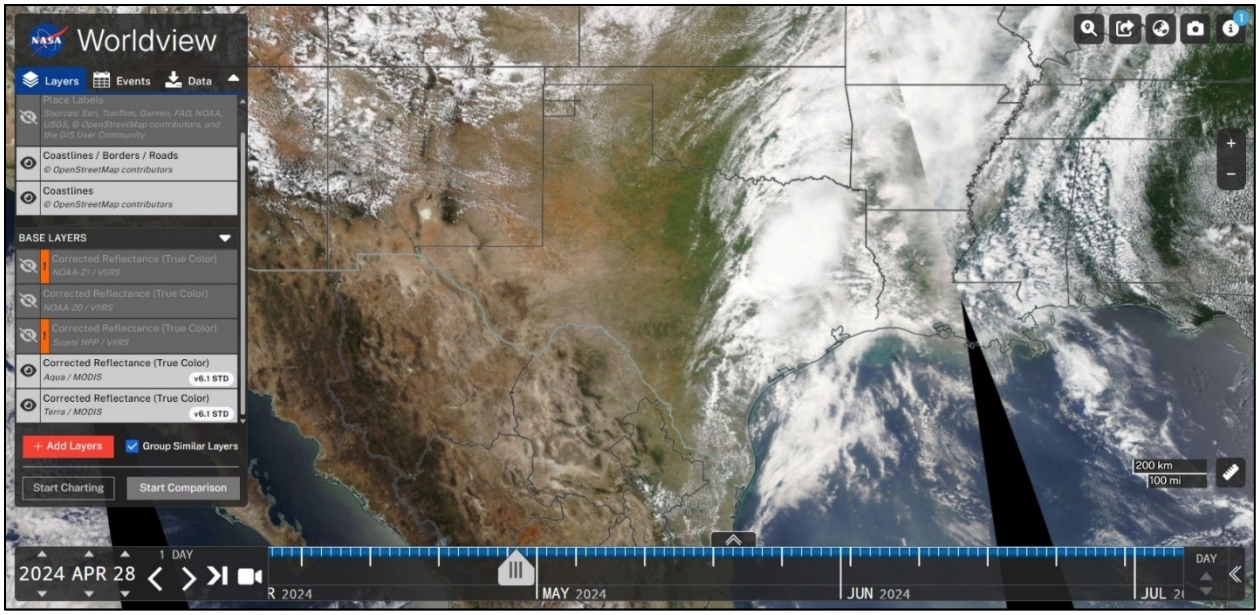

Figure 3-86: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 28, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

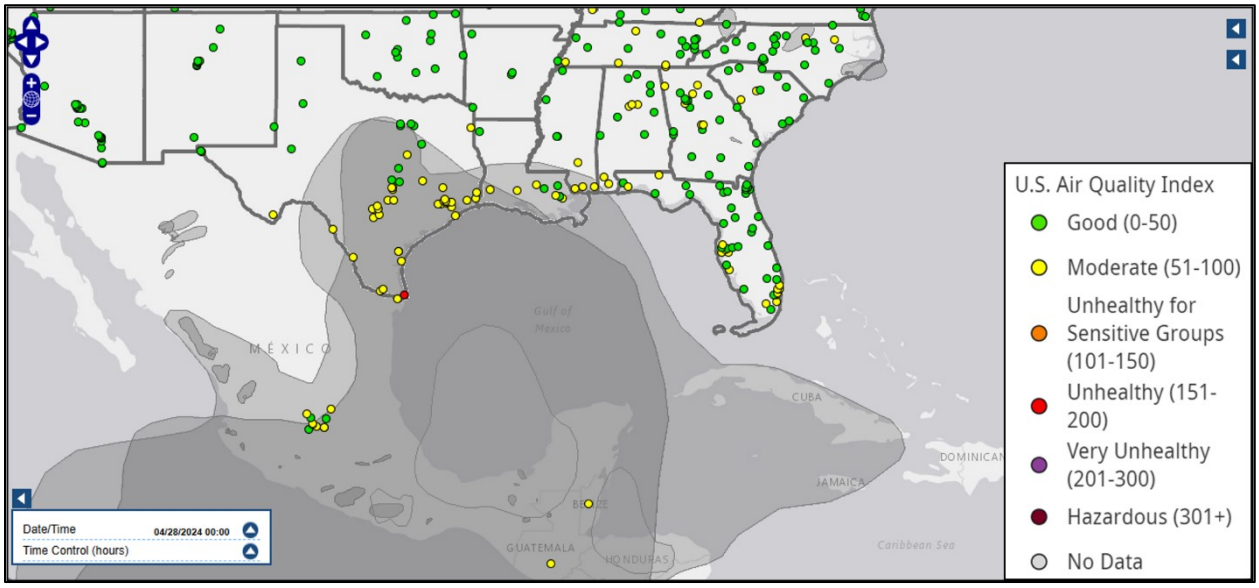

Figure 3-87: AirNow HMS Smoke Plume for April 28, 2024

Figure 3-88: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 28, 2024

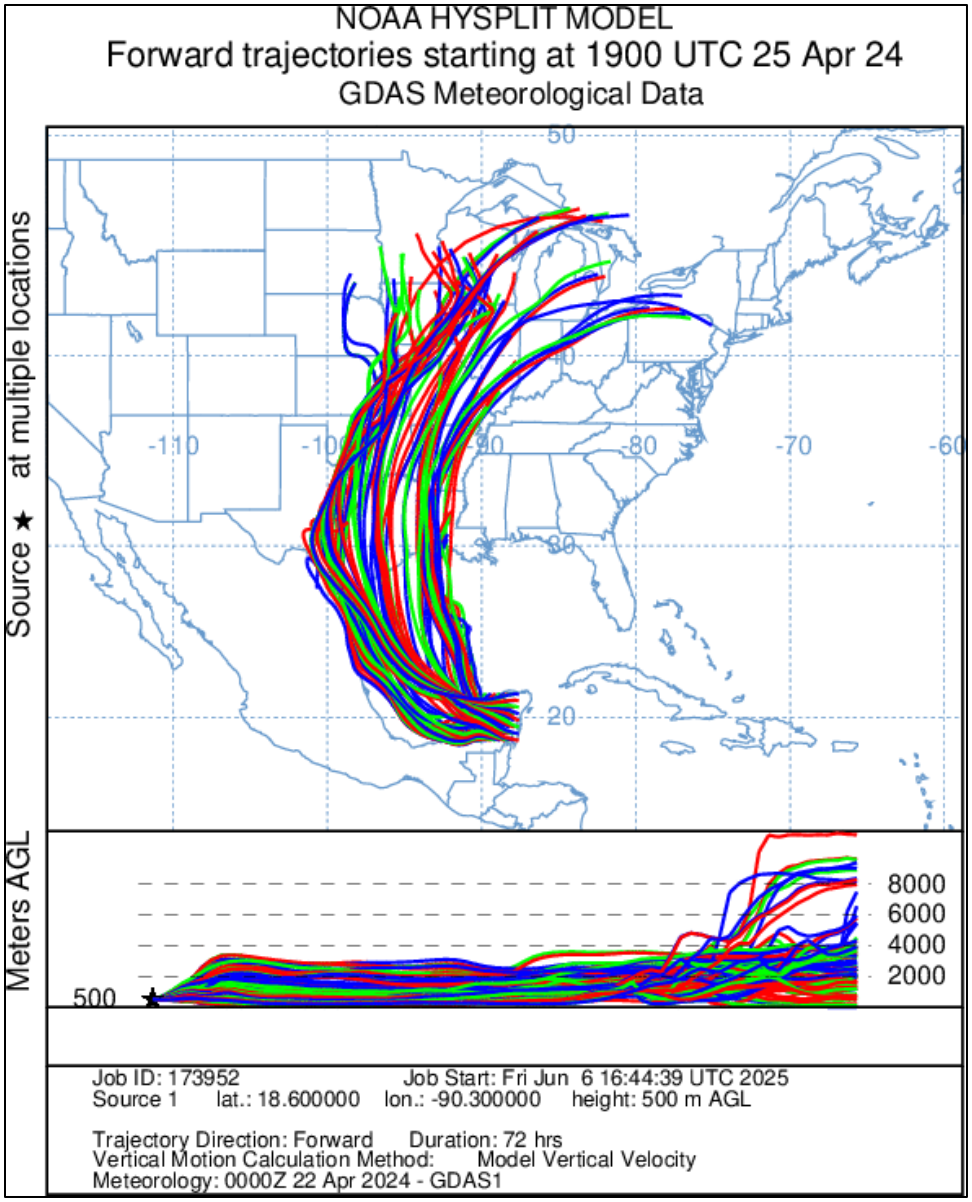

Figure 3-89: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 25, 2024

April 29, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 27.3 µg/m^3; one-hour daily maximum 40.1 µg/m^3 recorded at 11:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on April 29, 2024, can be compared against typical/non-event days for the monitors in Figure 3-90: *Hourly $PM_{2.5}$ Concentrations on April 29, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

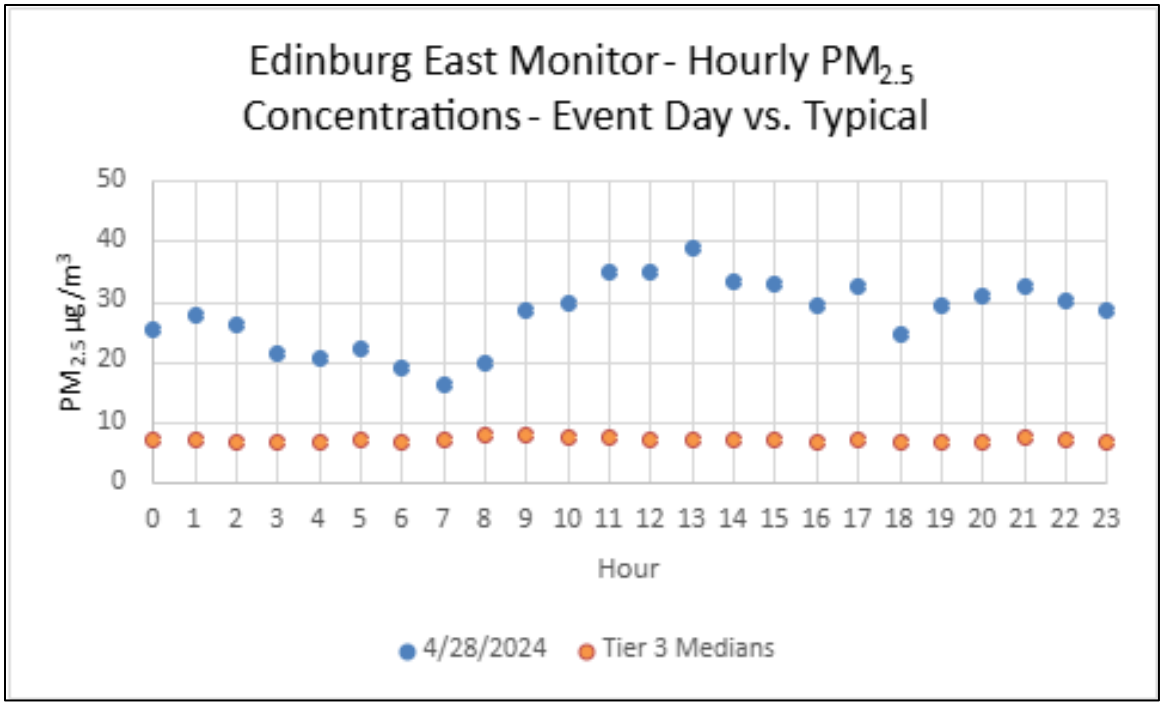

Figure 3-90: Hourly $PM_{2.5}$ Concentrations on April 29, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-7) revealed that light to moderate density smoke and aerosols were concentrated over the Deep South and portions of the Coastal Bend as compared to other parts of the state, which saw residual light smoke filtering out. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-91: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 29, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-34 and Figure 3-92: *AirNow HMS Smoke Plume for April 29, 2024*) and HYSPLIT backward wind trajectories (Figure 3-93: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 29, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate density smoke was transported into Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through Texas (Figure 3-94: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 26, 2024*).

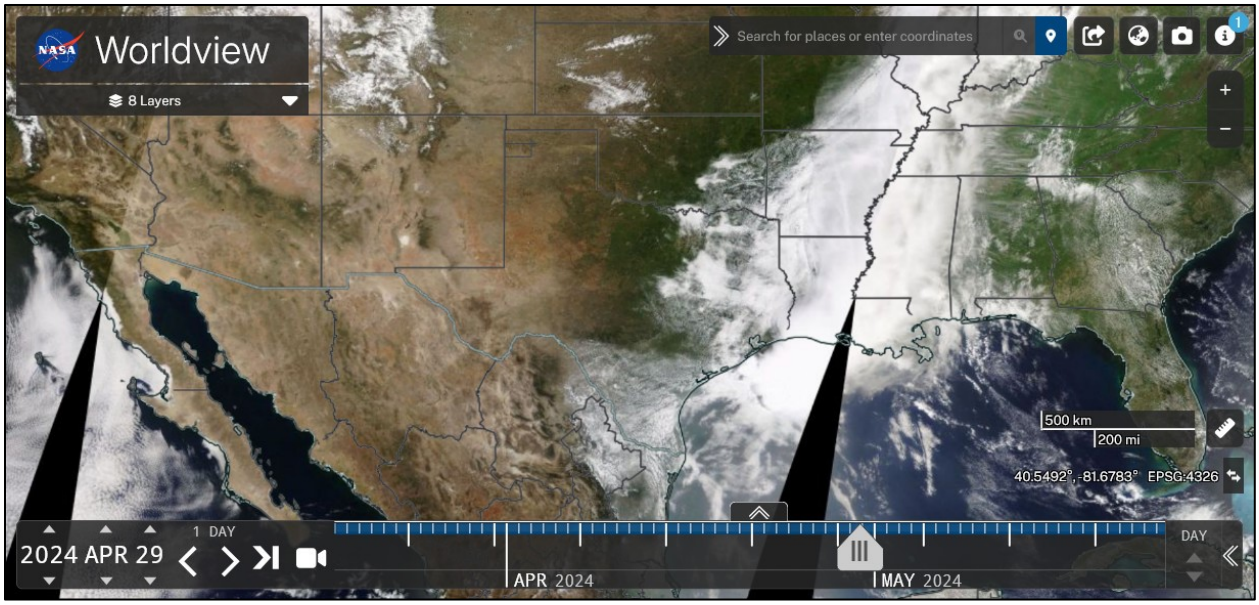

Figure 3-91: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from April 29, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

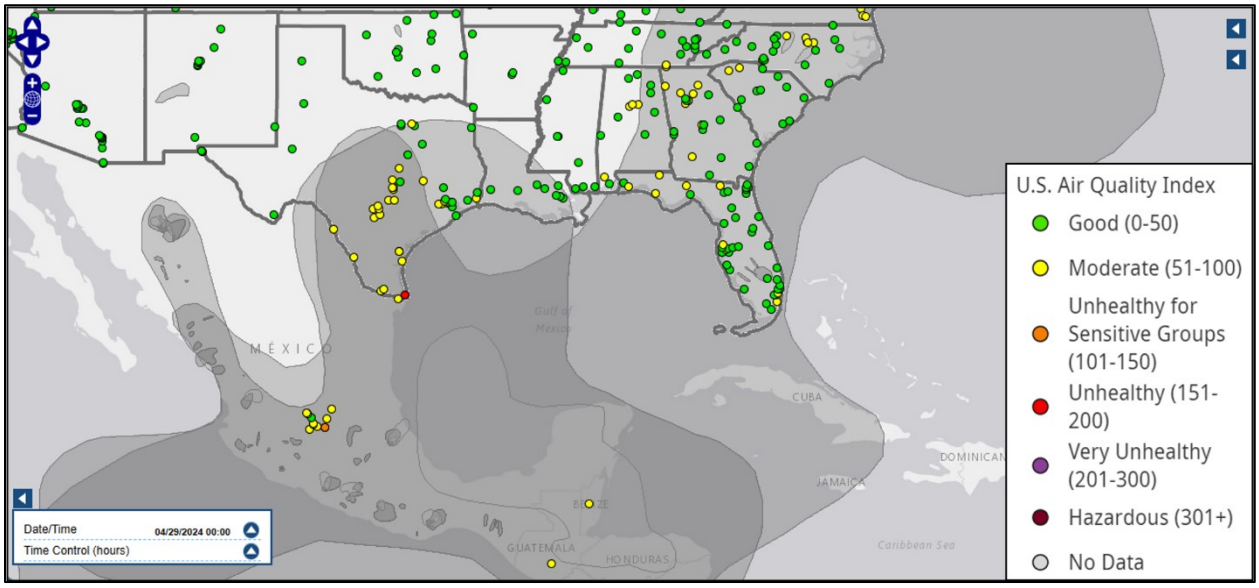

Figure 3-92: AirNow HMS Smoke Plume for April 29, 2024

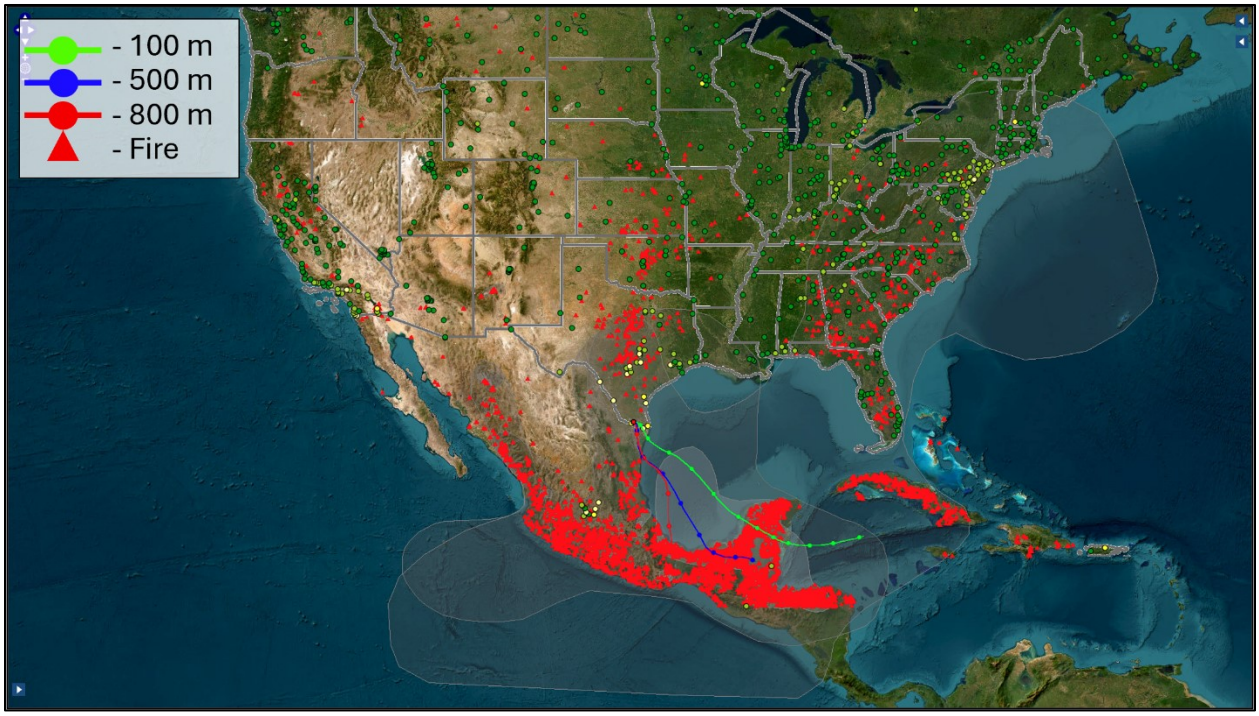

Figure 3-93: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on April 29, 2024

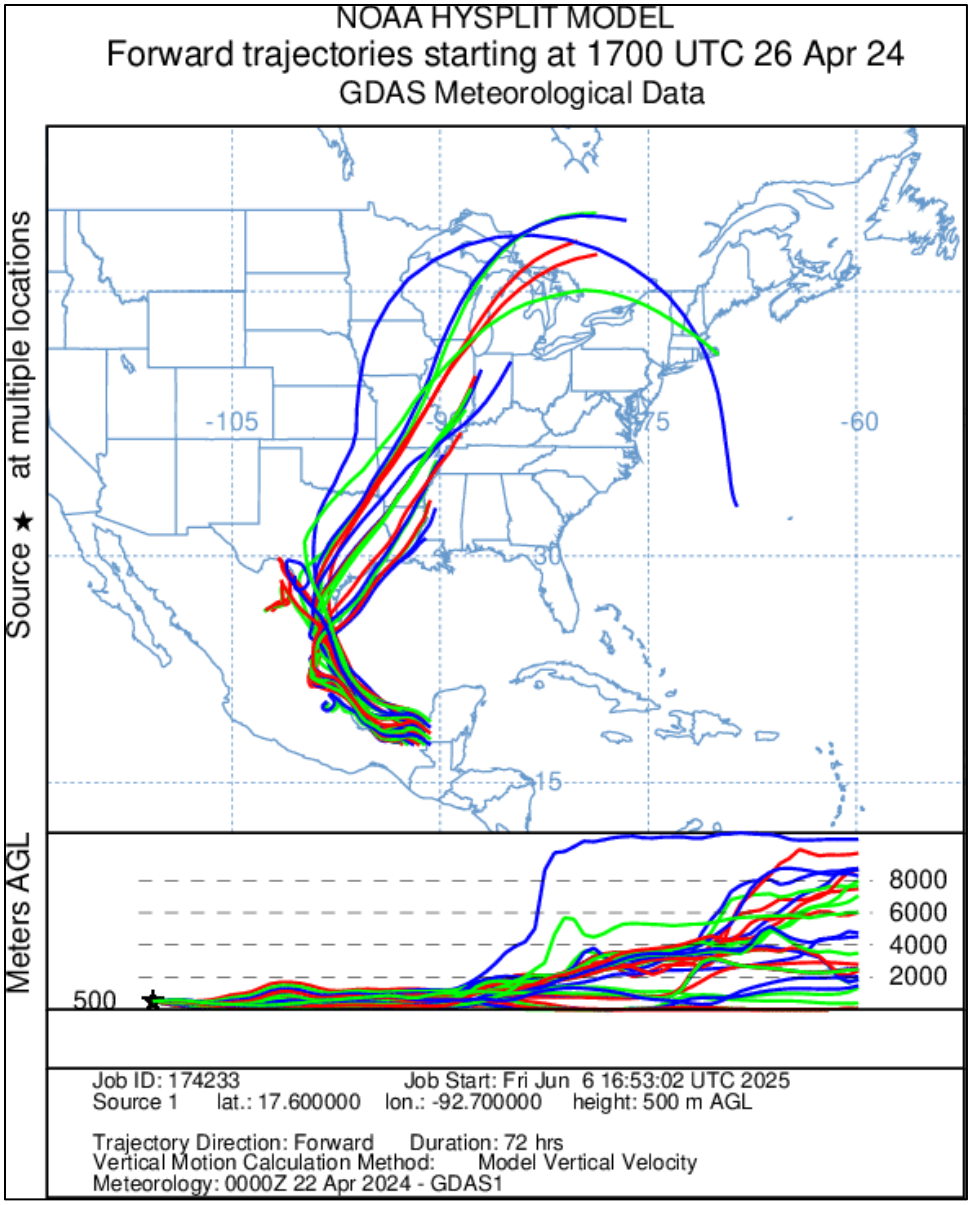

Figure 3-94: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 26, 2024

3.2.8 Group 8 – Evidence for the May 2, 2024, and May 3, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive and World Trade Bridge Monitors

May 2, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 25.6 µg/m^3; one-hour daily maximum 32.9 µg/m^3 recorded at 13:00 LST) and a Tier 1 day at the World Trade Bridge monitor (24-hour average concentration 31.9 µg/m^3; one-hour daily maximum 42.8 µg/m^3 recorded at 13:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 2, 2024, can be compared against typical/non-event days for the monitor in Figure 3-95: *Hourly $PM_{2.5}$ Concentrations on May 2, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-96: *Hourly $PM_{2.5}$ Concentrations on May 2, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

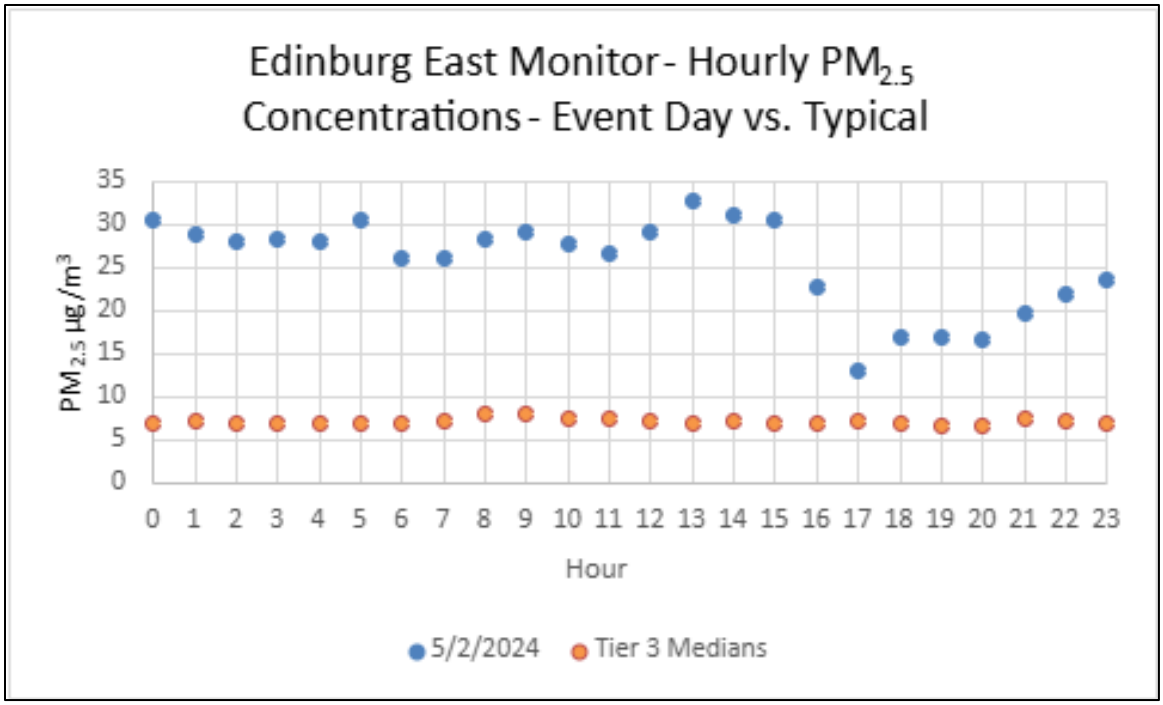

Figure 3-95: Hourly $PM_{2.5}$ Concentrations on May 2, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

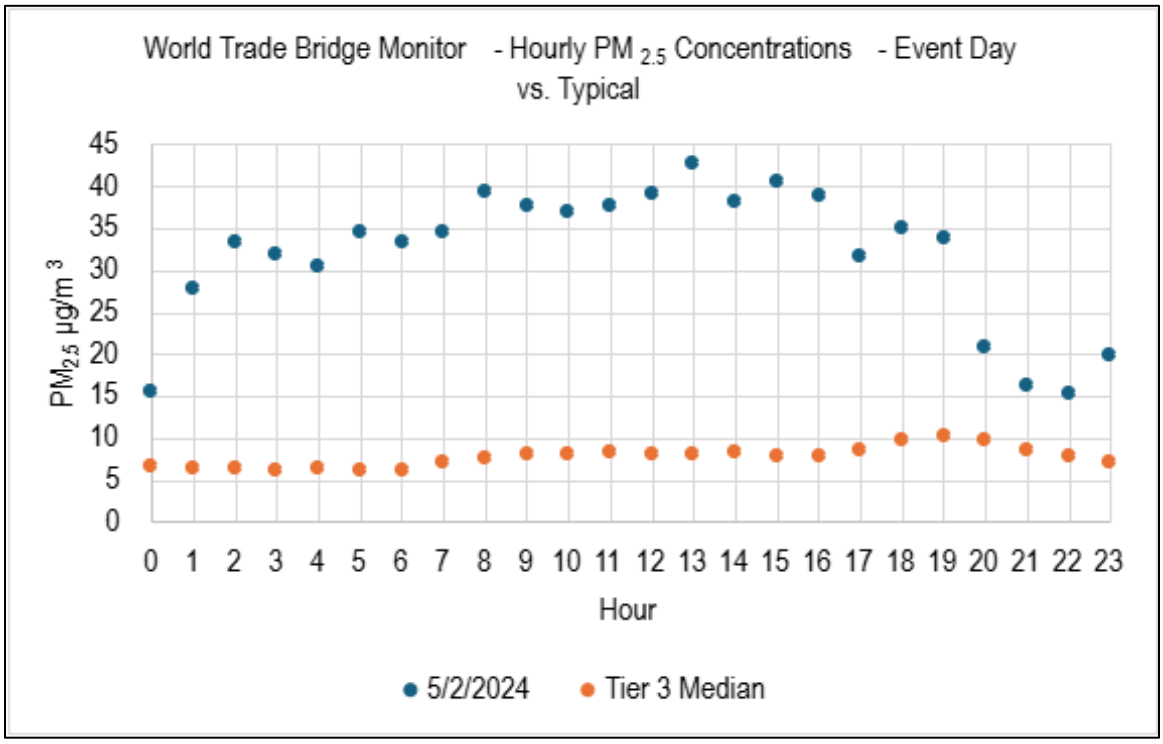

Figure 3-96: Hourly $PM_{2.5}$ Concentrations on May 2, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts (Table C-8) revealed that light to moderate density smoke from seasonal fire activities in central-southern Mexico, Central America, and the Yucatan Peninsula was filtering throughout the region. Satellite imagery is partially obscured by cloud cover on the day of

exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-97: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 2, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-37 and Figure 3-98: AirNow HMS Smoke Plume for May 2, 2024) and HYSPLIT backward wind trajectories (Figure 3-99: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 2, 2024*, and Figure 3-100: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 2, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through Texas (Figure 3-101: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 29, 2024*).

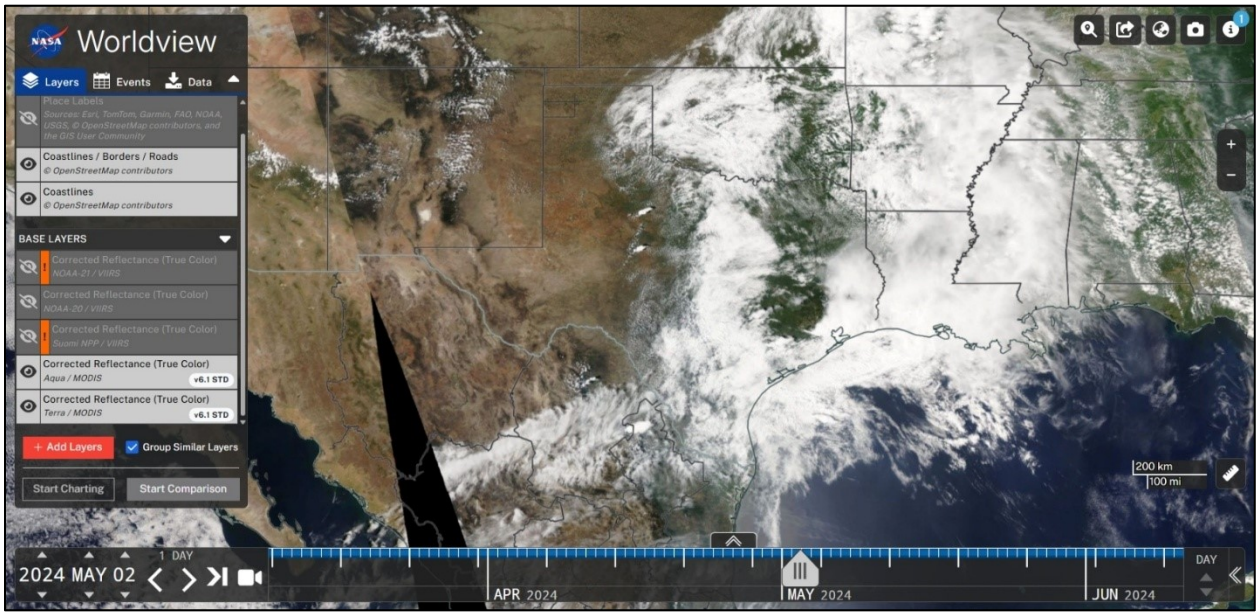

Figure 3-97: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 2, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

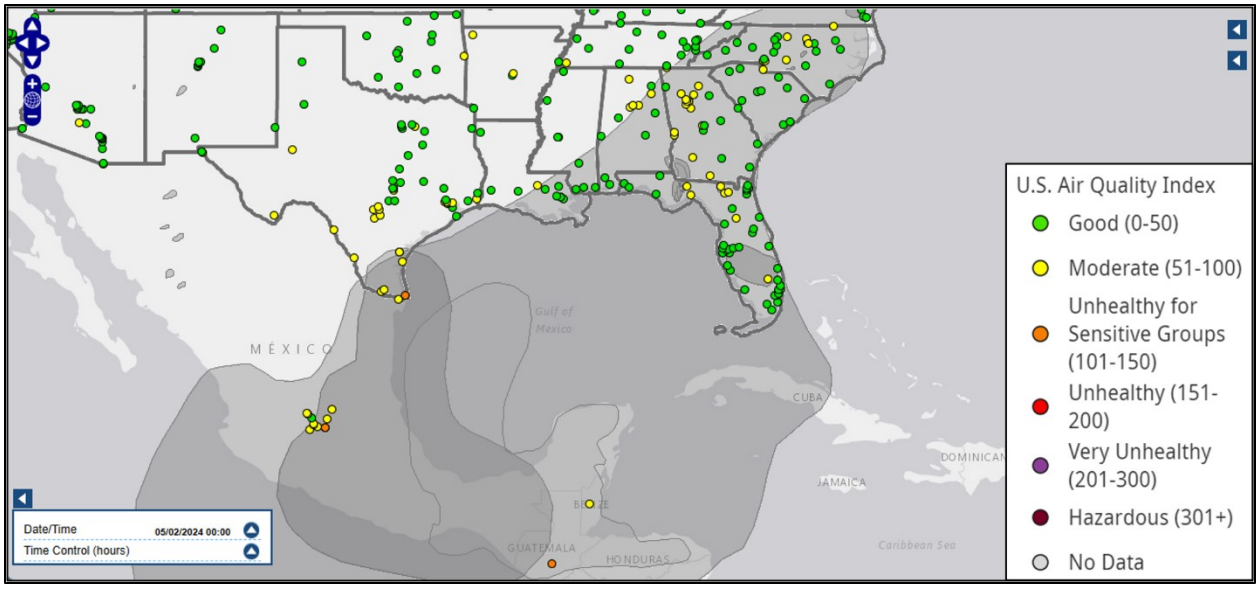

Figure 3-98: AirNow HMS Smoke Plume for May 2, 2024

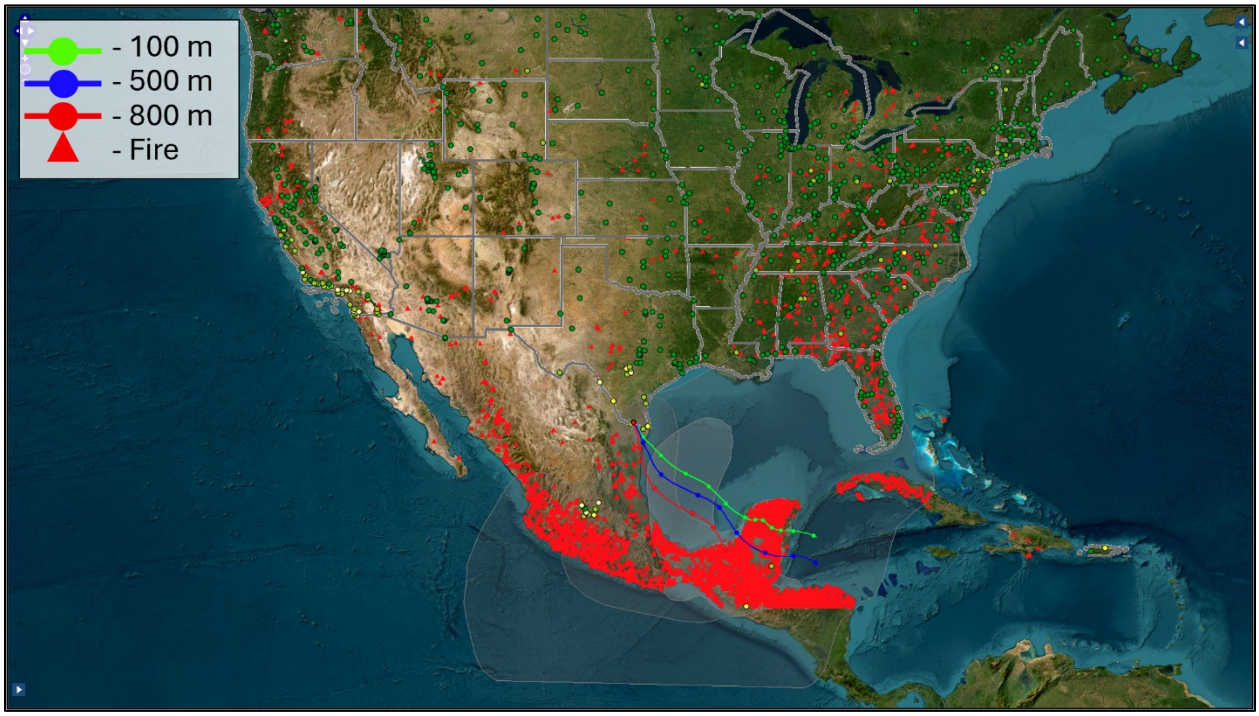

Figure 3-99: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 2, 2024

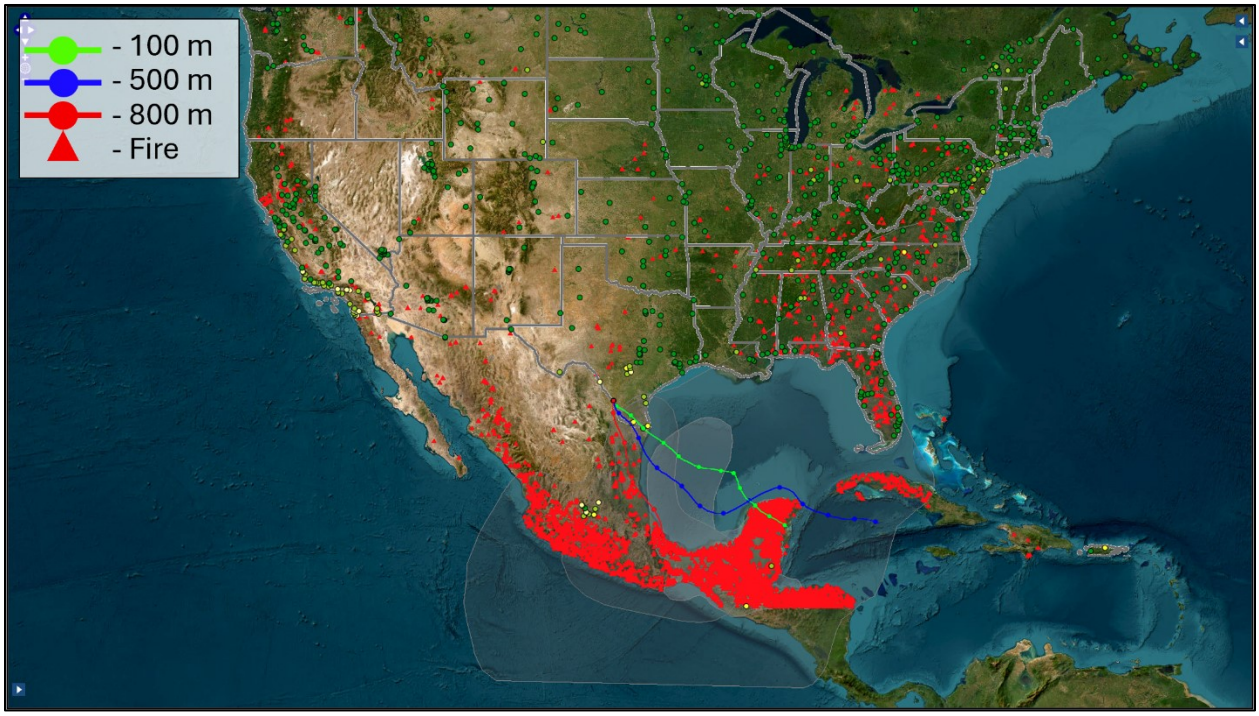

Figure 3-100: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 2, 2024

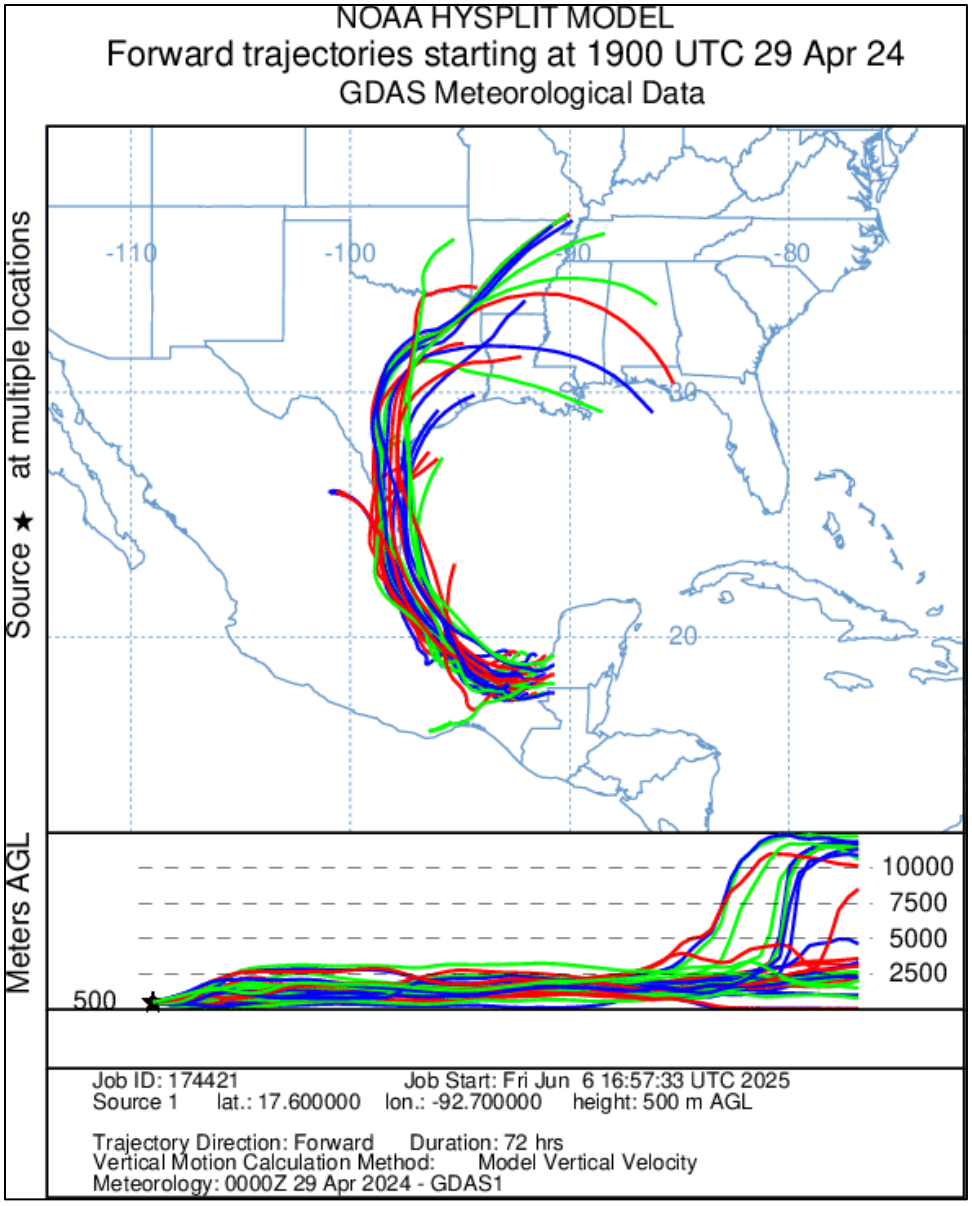

Figure 3-101: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 29, 2024

May 3, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 28.5 µg/m^3; one-hour daily maximum 32.9 µg/m^3 recorded at 13:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 3, 2024, can be compared against typical/non-event days for the monitor in Figure 3-102: *Hourly $PM_{2.5}$ Concentrations on May 3, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

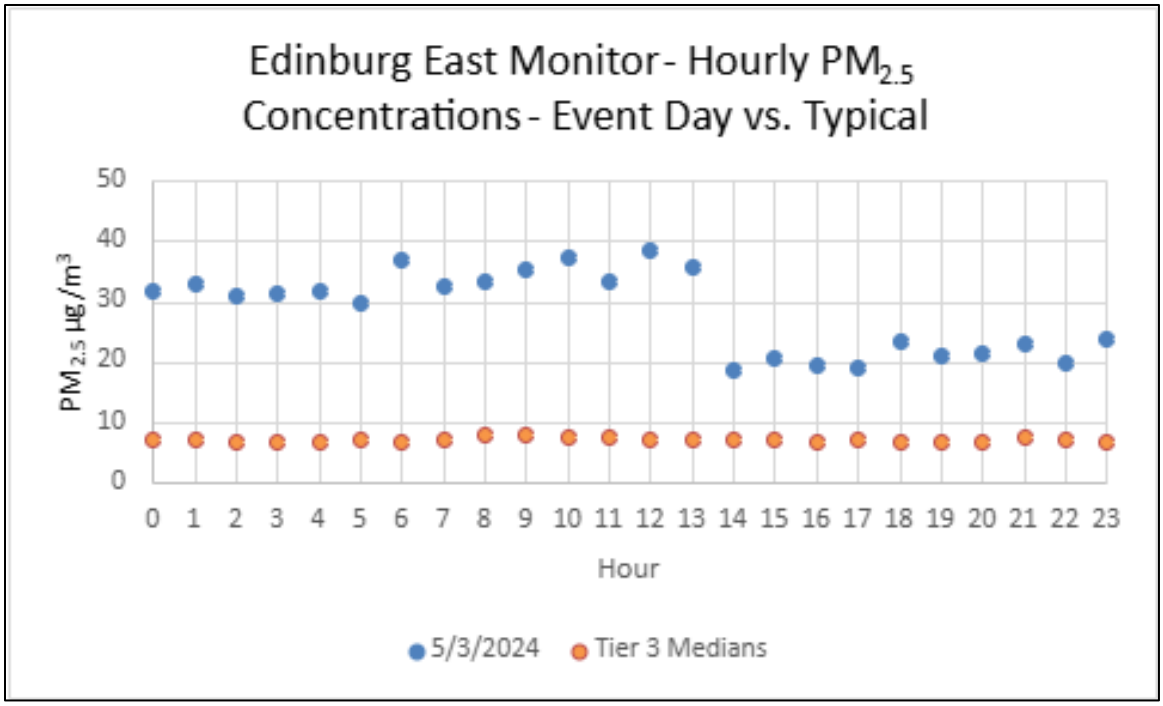

Figure 3-102: Hourly $PM_{2.5}$ Concentrations on May 3, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-8) revealed that light to moderate density smoke from seasonal fire activities in central-southern Mexico, Central America, and the Yucatan Peninsula was filtering throughout the region. Residual smoke and aerosols were continuing to elevate fine particulate matter values across most of the state. Satellite imagery is partially obscured by cloud cover on the day of exceedance, making smoke/haze cover difficult to identify visually in the satellite images (Figure 3-103: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 3, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-38 and Figure 3-104: *AirNow HMS Smoke Plume for May 3, 2024*) and HYSPLIT backward wind trajectories (Figure 3-105: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 3, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to high density smoke was transported into Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in south Texas had AQI levels of Moderate to Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through Texas (Figure 3-106: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 30, 2024*).

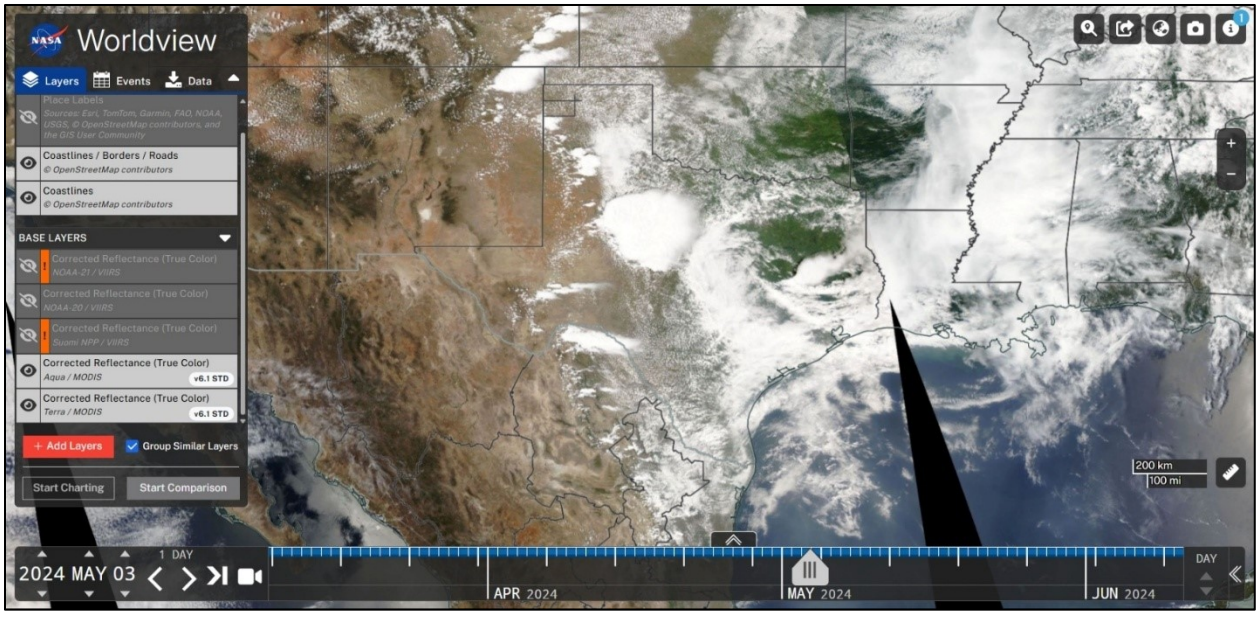

Figure 3-103: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 3, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

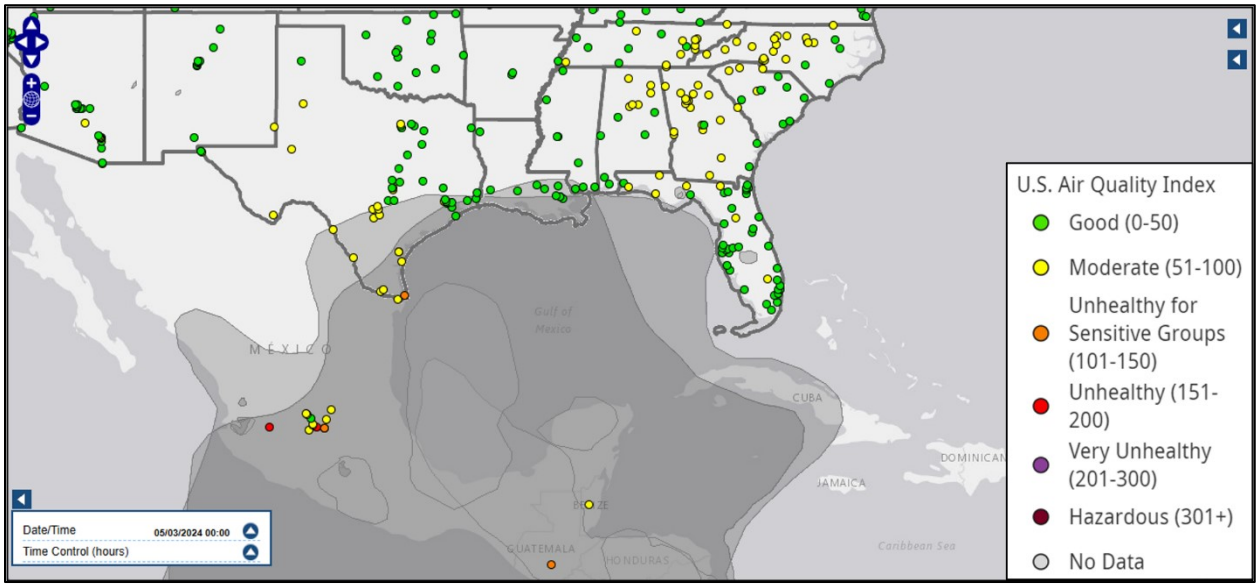

Figure 3-104: AirNow HMS Smoke Plume for May 3, 2024

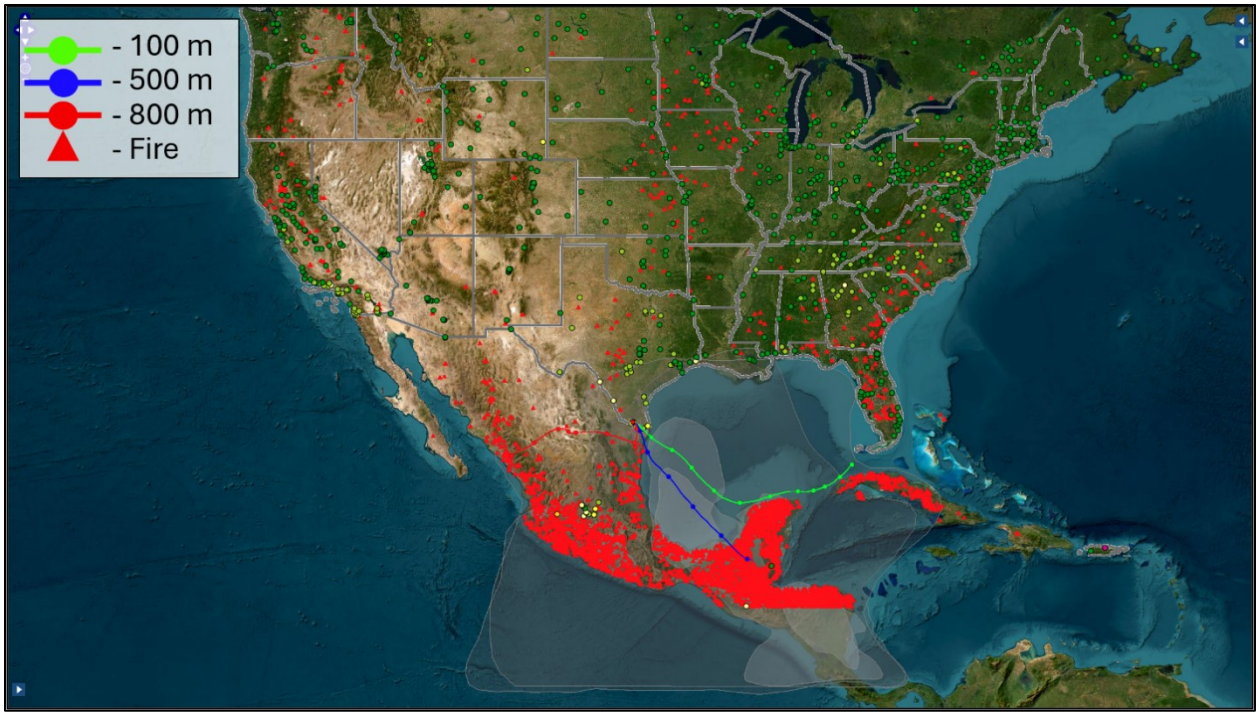

Figure 3-105: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 3, 2024

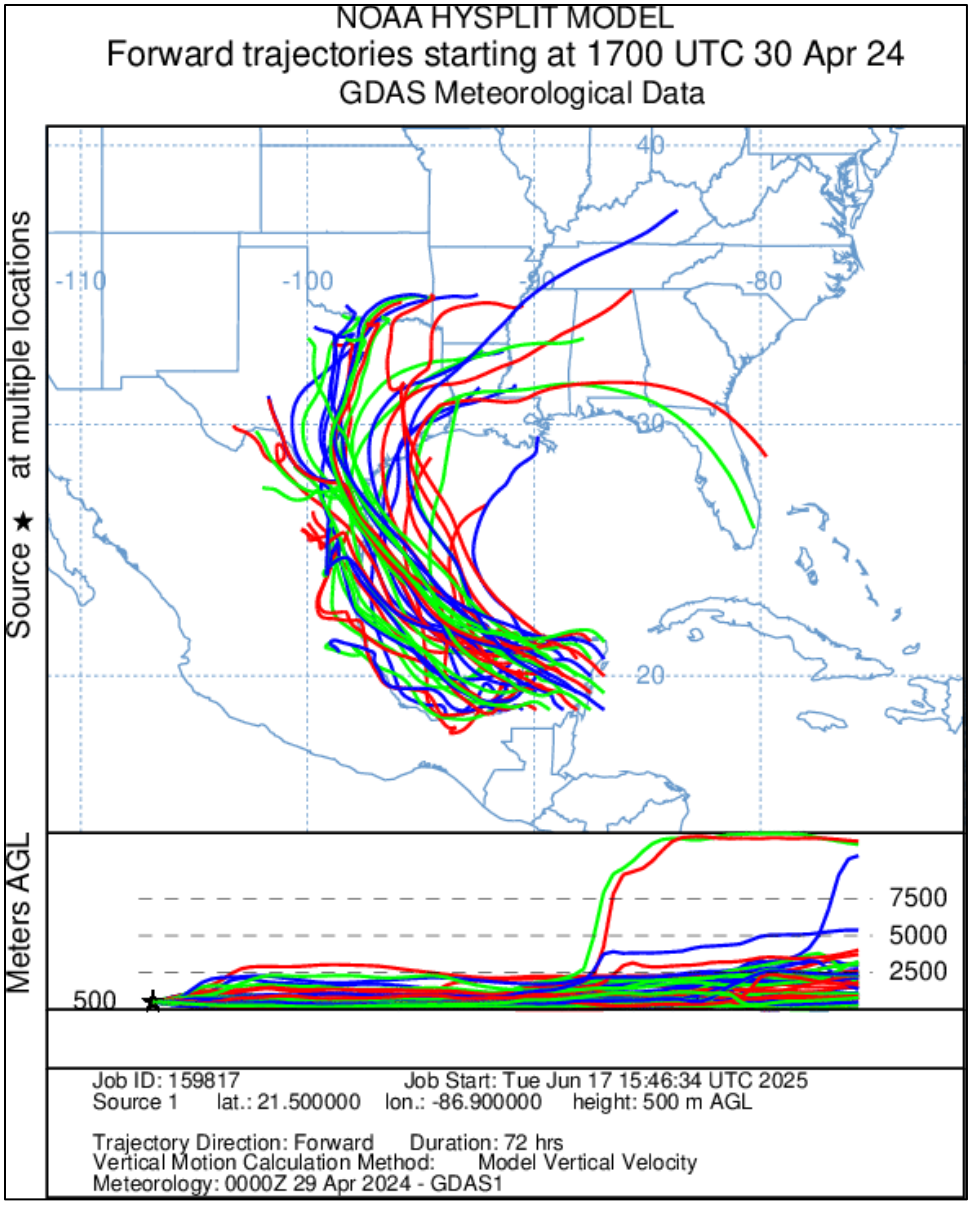

Figure 3-106: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on April 30, 2024

3.2.9 Group 9 – Evidence for the May 7 through May 13, 2024, May 15, 2024, May 16, 2024, May 18 through May 28, 2024, May 30, 2024 and May 31, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Corpus Christi Huisache, Dona Park, Edinburg East Freddy Gonzalez Drive, Fort Worth Northwest, Haws Athletic Center, Von Ormy Highway 16, and World Trade Bridge Monitors

May 7, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 32.1 µg/m^3; one-hour daily maximum 55.2 µg/m^3 recorded at 11:00 LST), and a Tier 2 day at the World Trade Bridge monitor (24-hour average concentration 29.3 µg/m^3; one-hour daily maximum 42.7 µg/m^3 recorded at 21:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 7, 2024, can be compared against typical/non-event days for each monitor in Figure 3-107: *Hourly $PM_{2.5}$ Concentrations on May 7, 2024, Compared to Typical Concentrations at the*

Edinburg East Freddy Gonzalez Drive Monitor and Figure 3-108: *Hourly $PM_{2.5}$ Concentrations on May 7, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor.*

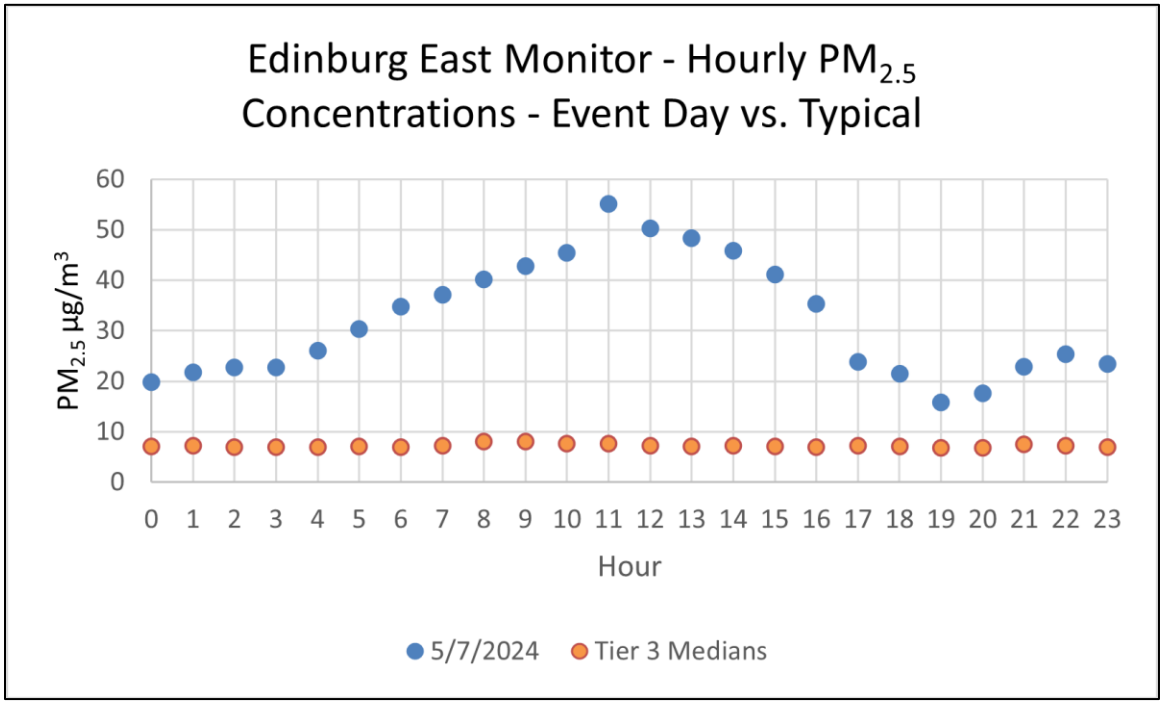

Figure 3-107: Hourly $PM_{2.5}$ Concentrations on May 7, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

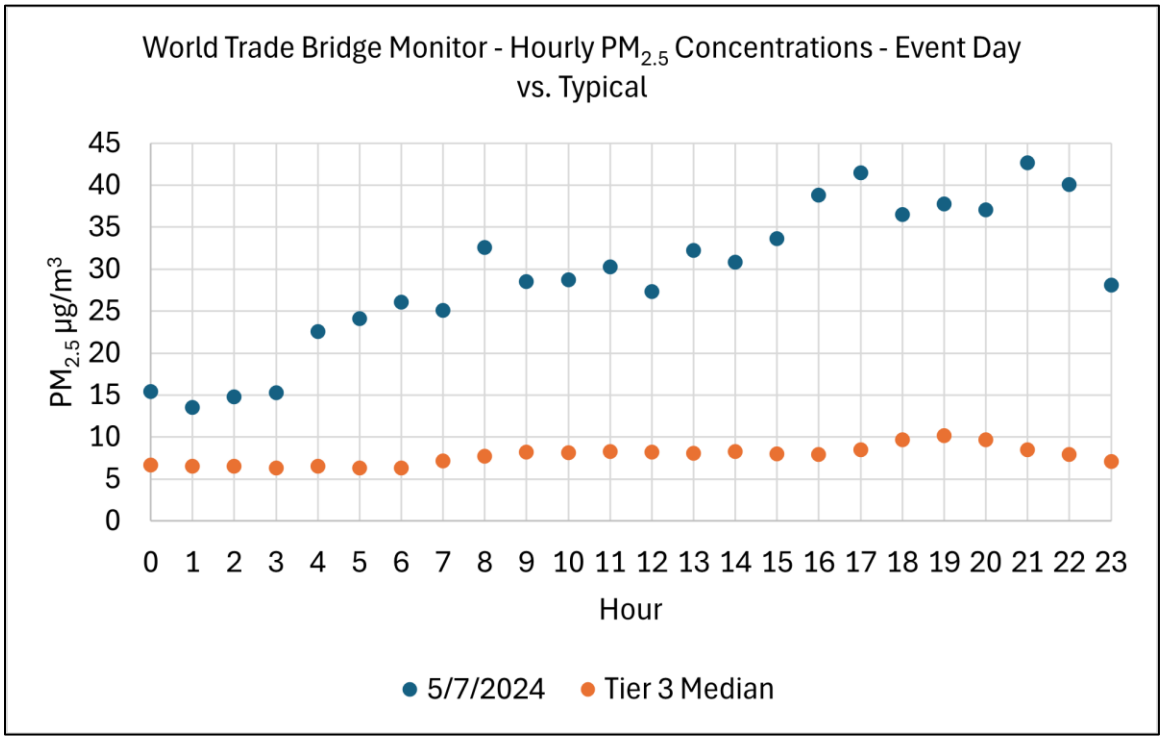

Figure 3-108: Hourly $PM_{2.5}$ Concentrations on May 7, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 7, 2024, mention moderate density smoke extending north from Mexico towards the Central U.S., potentially converging with smoke from seasonal Southern U.S. fires, increasing fine particulate matter levels (Table C-9). Media reports from May 8 and May 9, 2024, mention a decline in air quality through Central and South Texas due to incoming smoke from agricultural fires (Figure C-1, Figure C-2, and Figure C-3). Satellite imagery reveals hazy coloration and potential smoke in deep south Texas and in the Gulf of America (Figure 3-109: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 7, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-53 and Figure 3-110: *AirNow HMS Smoke Plume for May 7, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-111: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 7, 2024* and Figure 3-112: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 7, 2024*) on May 7, 2024, indicate that a medium coverage of smoke was transported into south Texas from Mexico, and monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through South and Central Texas (Figure 3-113: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 4, 2024*).

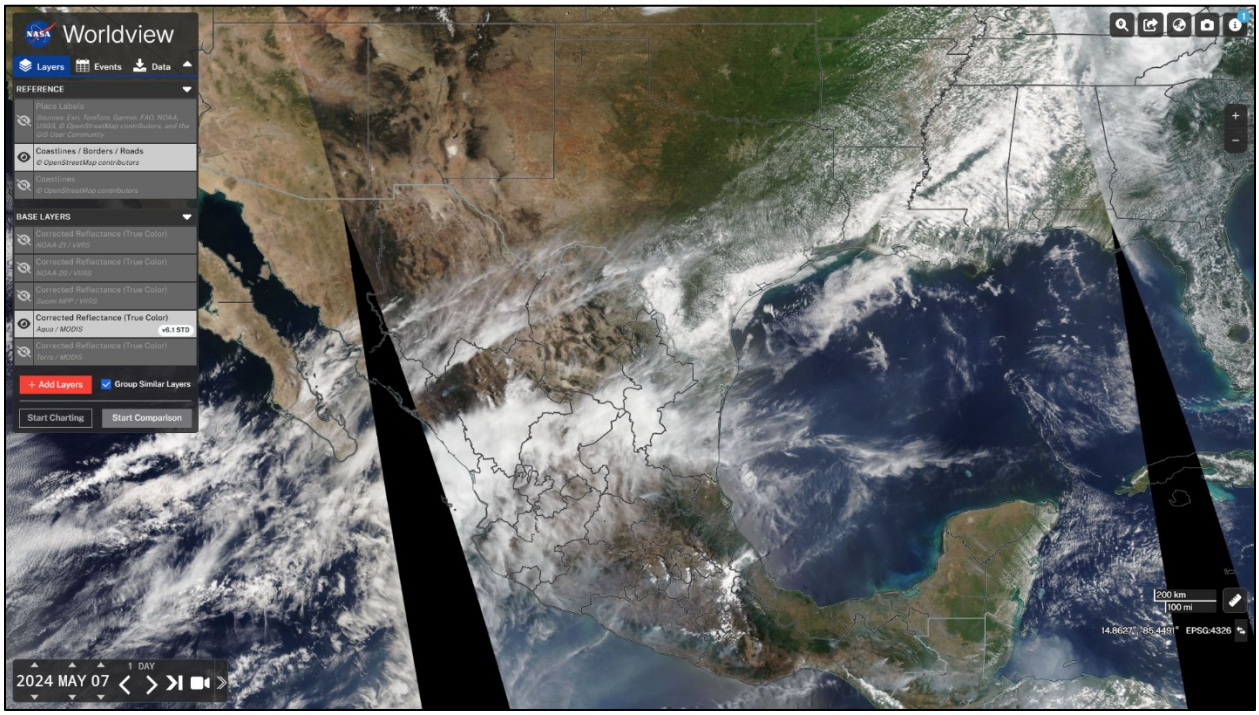

Figure 3-109: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 7, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

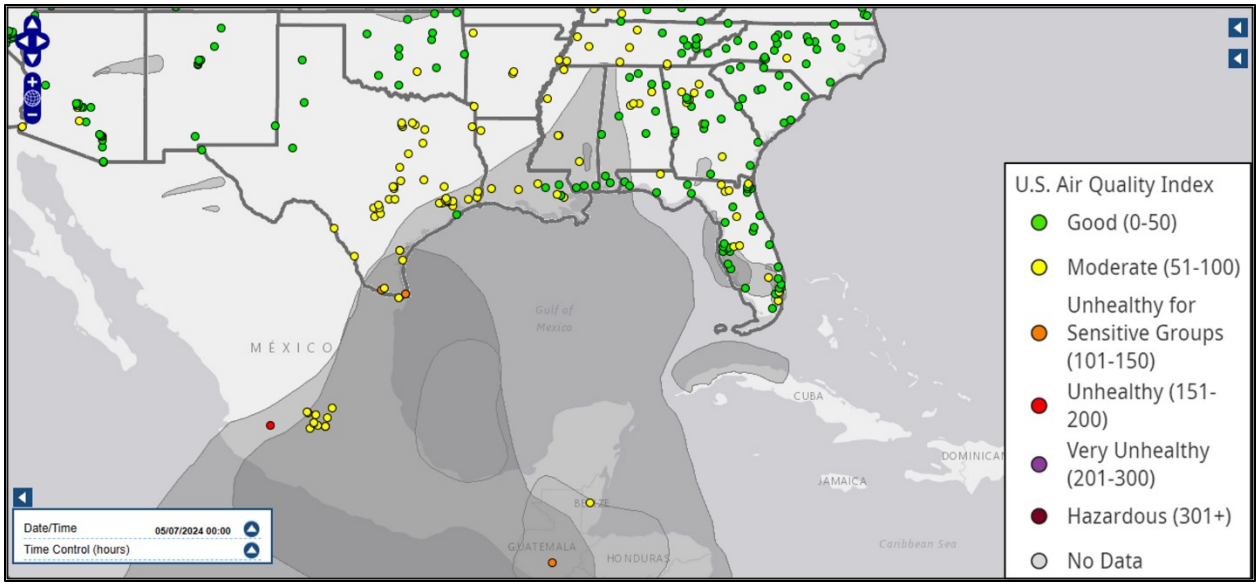

Figure 3-110: AirNow HMS Smoke Plume for May 7, 2024

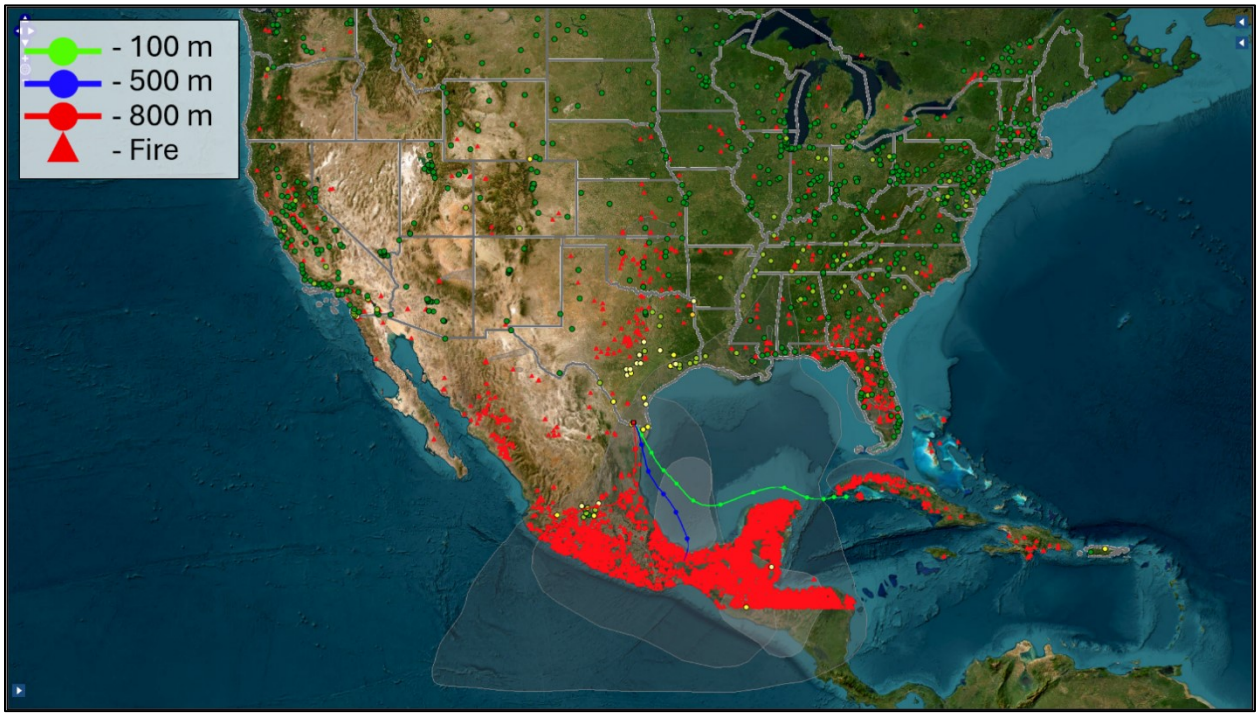

Figure 3-111: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 7, 2024

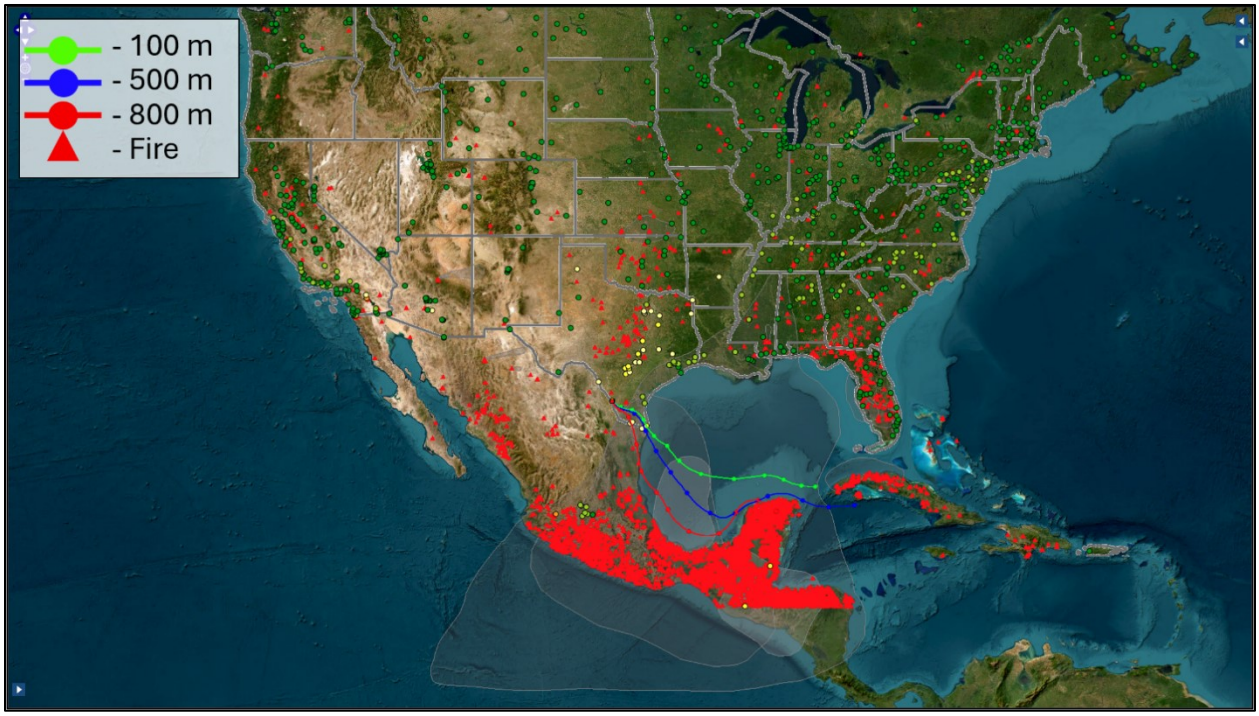

Figure 3-112: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 7, 2024

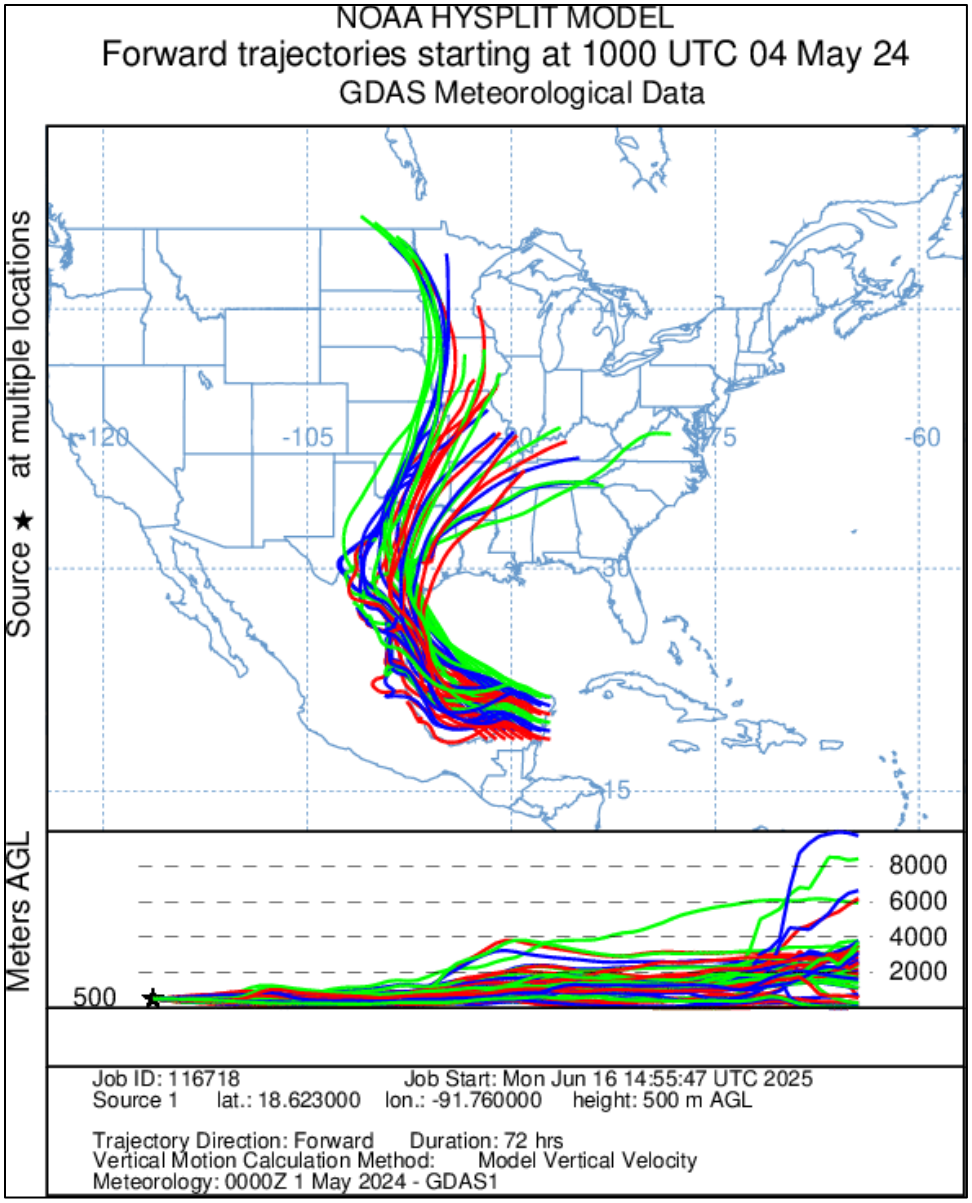

Figure 3-113: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 4, 2024

May 8, 2024 is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 41.6 µg/m^3; one-hour daily maximum 57.0 µg/m^3 recorded at 12:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 39.5 µg/m^3; one-hour daily maximum 51.7 µg/m^3 recorded at 11:00 LST);
- Corpus Christi Huisache monitor (24-hour average concentration 40.6 µg/m^3; one-hour daily maximum 85.0 µg/m^3 recorded at 12:00 LST); and
- Dona Park monitor (24-hour average concentration 46.4 µg/m^3; one-hour daily maximum 83.7 µg/m^3 recorded at 12:00 LST).

May 8, 2024, is identified as a Tier 2 day for the:

- World Trade Bridge monitor (24-hour average concentration 29.5 µg/m^3; one-hour daily maximum 46.4 µg/m^3 recorded at 21:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 8, 2024, can be compared against typical/non-event days for each monitor in Figure 3-114: *Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-115: *Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-116: *Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor*, Figure 3-117: *Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, and Figure 3-118: *Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

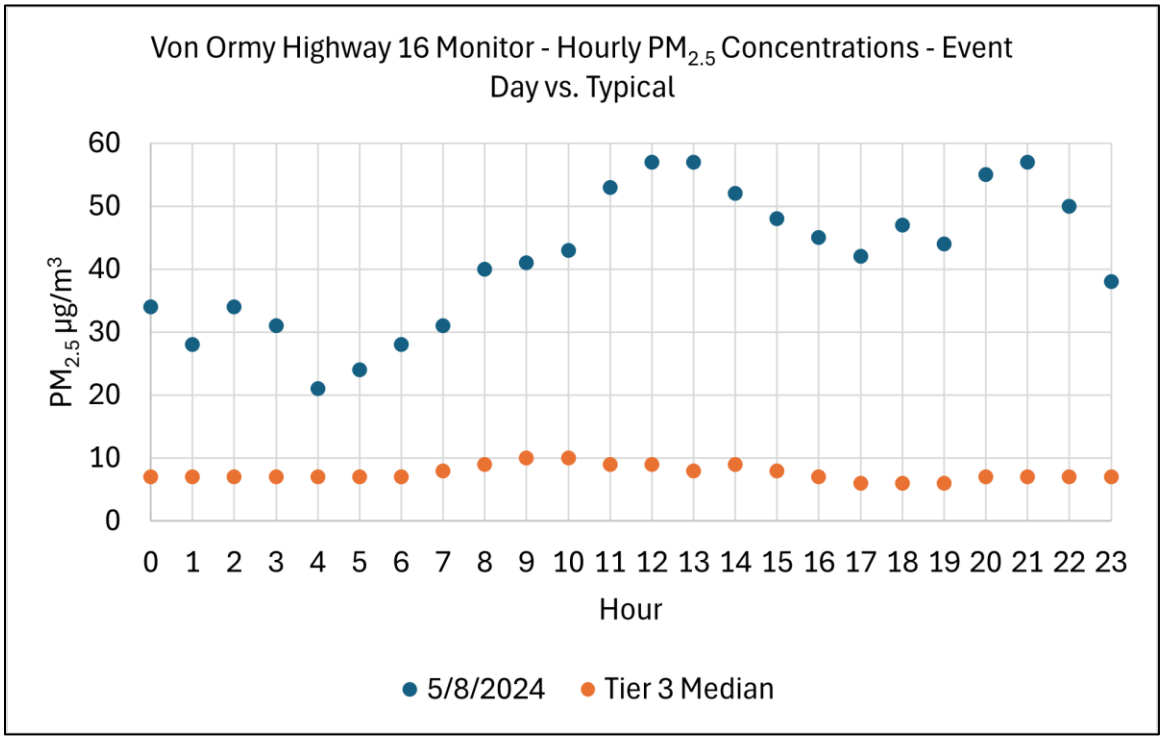

Figure 3-114: Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

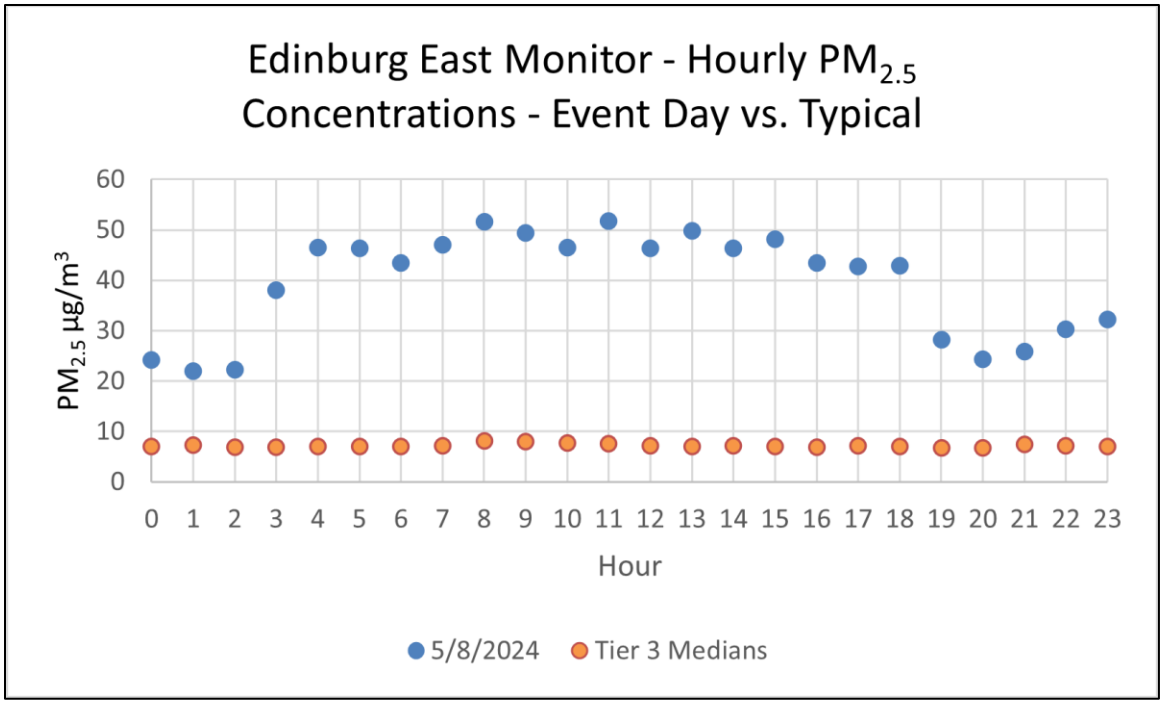

Figure 3-115: Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

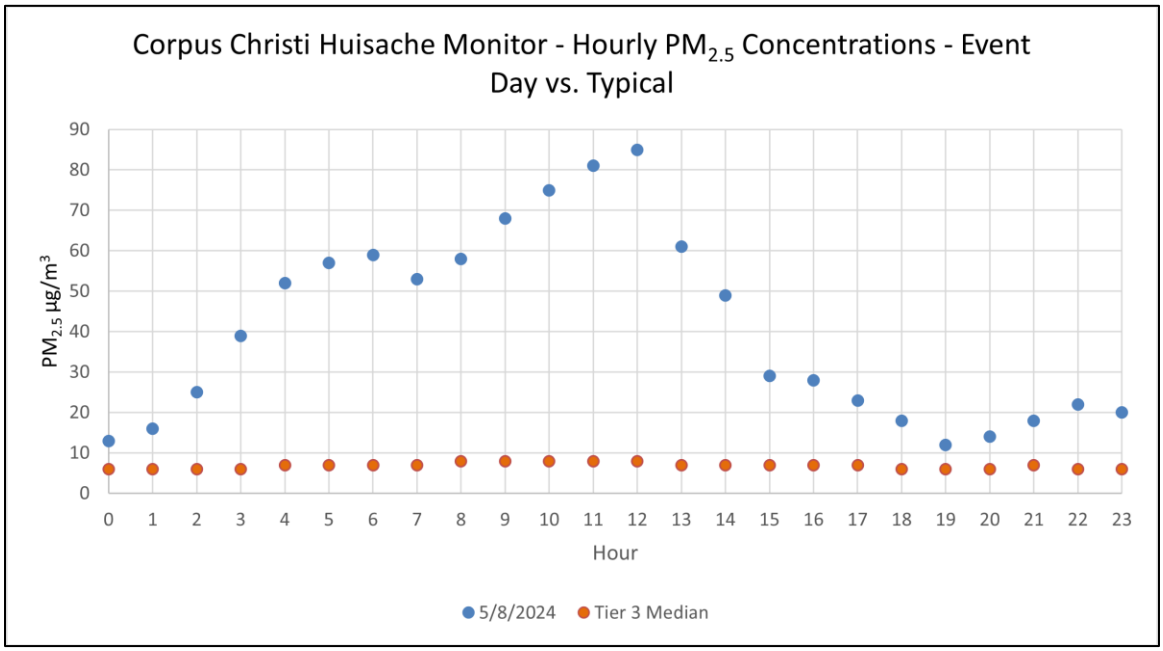

Figure 3-116: Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor

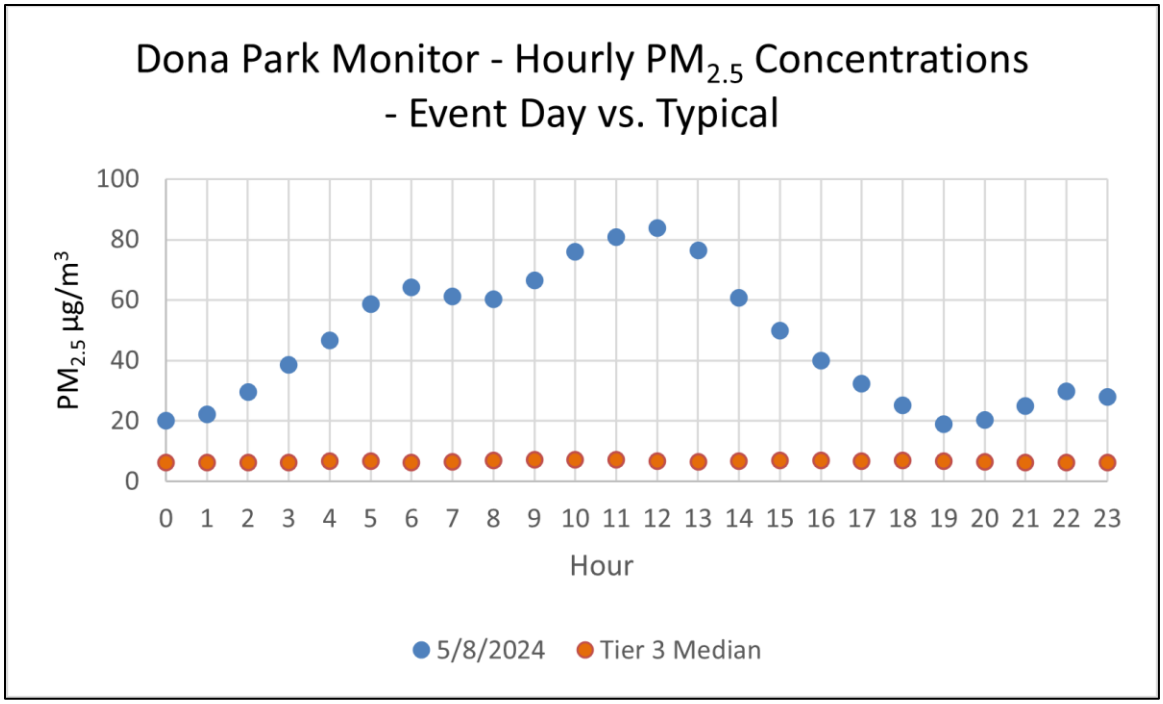

Figure 3-117: Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the Dona Park Monitor

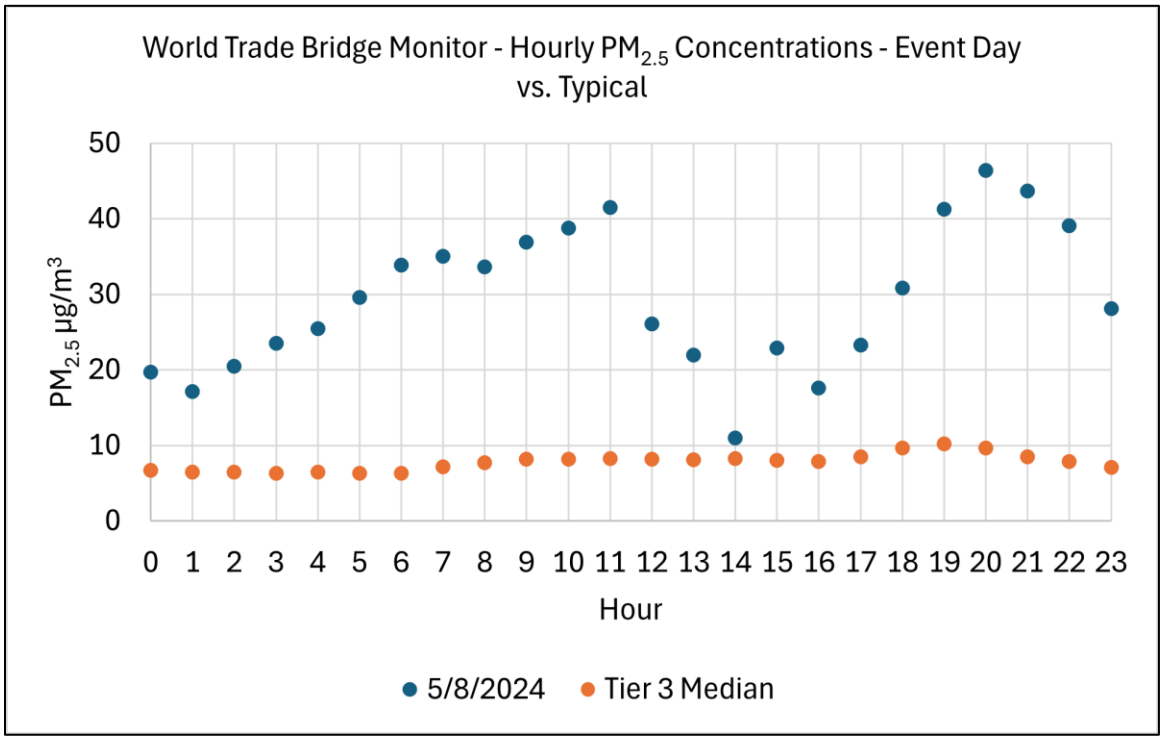

Figure 3-118: Hourly $PM_{2.5}$ Concentrations on May 8, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 8, 2024, mention residual smoke from seasonal burning and industrial activity from Mexico affecting the eastern two-thirds of Texas (Table C-9). Media reports from May 8 and May 9, 2024, mention a decline in air quality through central and south Texas due to

incoming smoke from agricultural fires (Figure C-1, Figure C-2, and Figure C-3). NWS archived weather discussions from the Brownsville and Corpus Christi NWS Weather Forecast Offices on May 8, 2024, mention hazy conditions and incoming smoke from the fires in Mexico and Central America affecting South Texas (Figure B-4 and Figure B-5). Satellite imagery reveals hazy coloration and potential smoke in deep south Texas and in the Gulf of America (Figure 3-119: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 8, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-54 and Figure 3-120: *AirNow HMS Smoke Plume for May 8, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-121: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 8, 2024*, Figure 3-122: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 8, 2024*, Figure 3-123: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache and Dona Park Monitors on* May 8, 2024, and Figure 3-124: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 8, 2024*) on May 8, 2024, indicate that light to medium smoke coverage was transported into Texas from Mexico, and monitors throughout South and East Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through South and East Texas (Figure 3-125: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 7, 2024*).

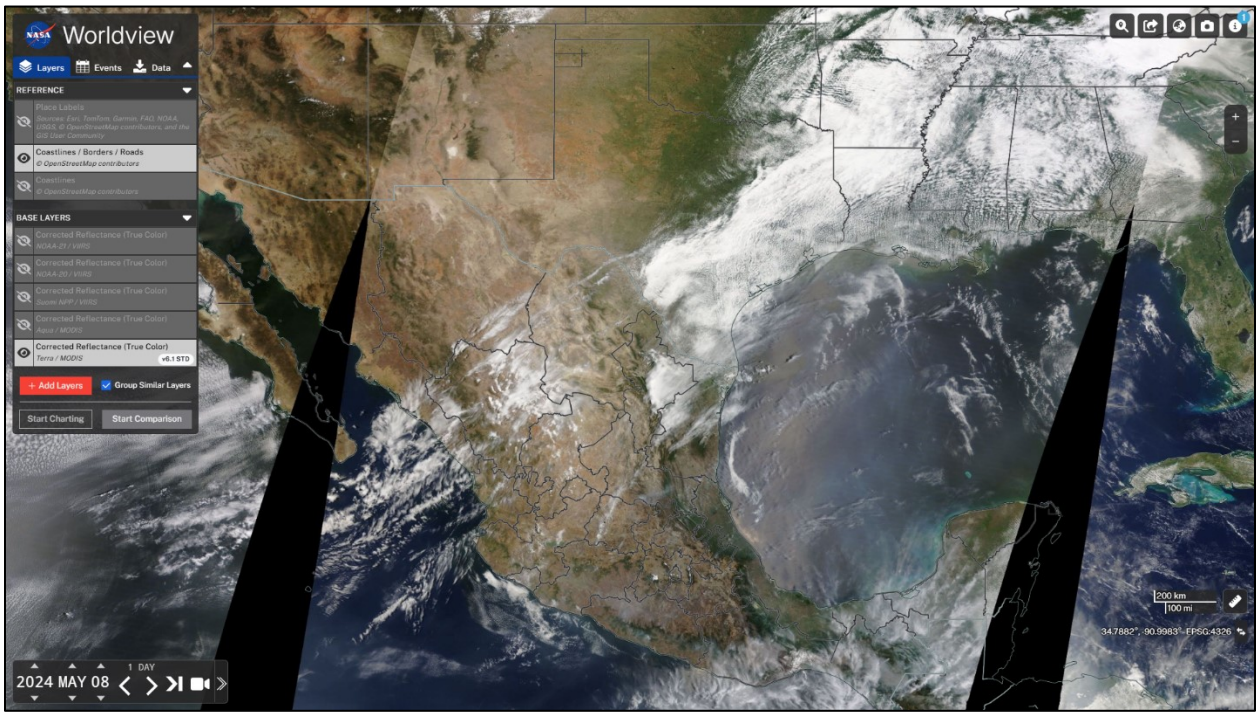

Figure 3-119: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 8, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

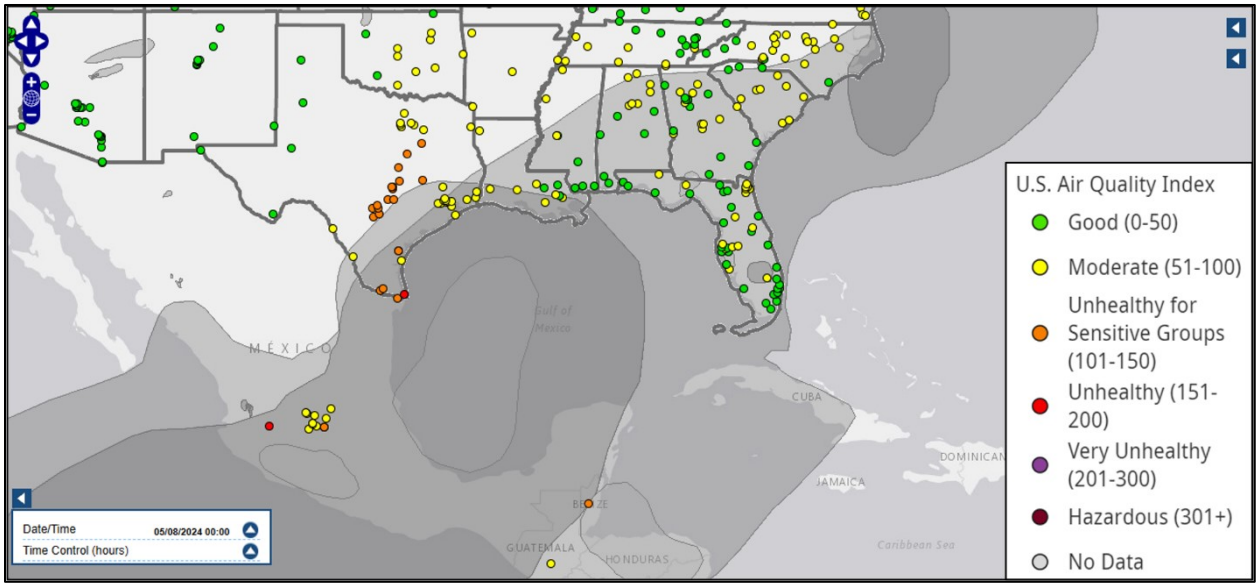

Figure 3-120: AirNow HMS Smoke Plume for May 8, 2024

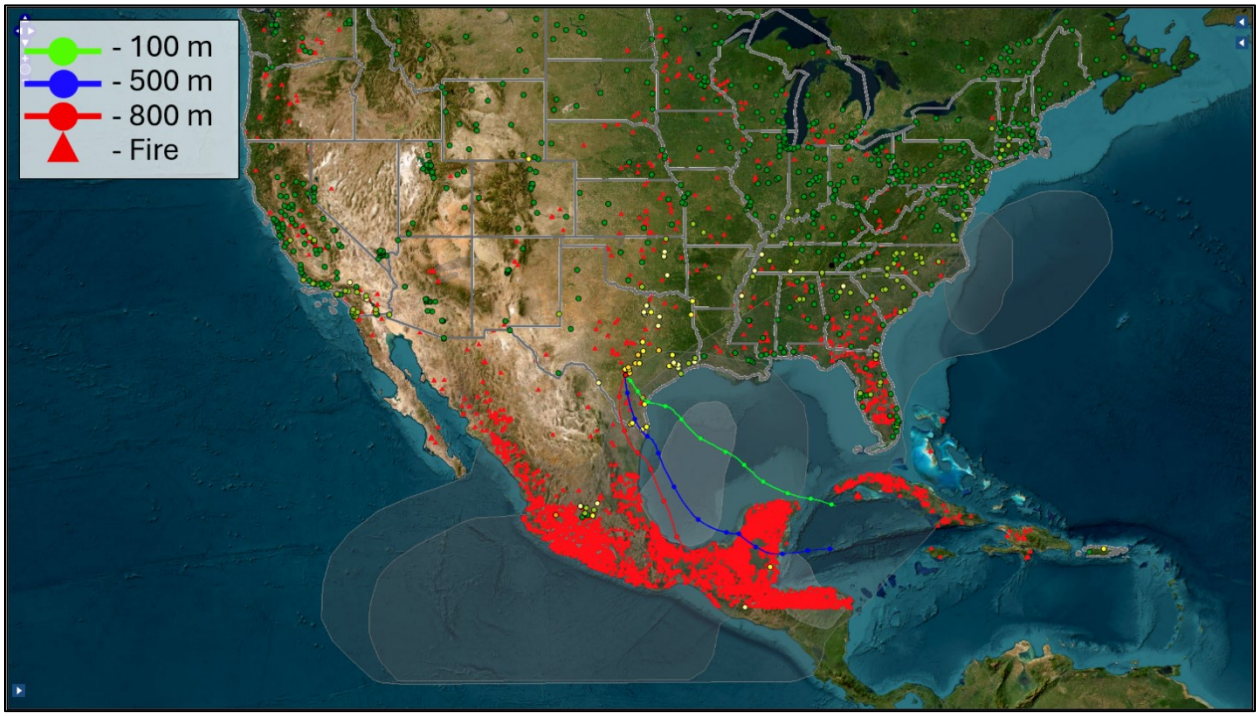

Figure 3-121: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 8, 2024

Figure 3-122: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 8, 2024

Figure 3-123: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache and Dona Park Monitors on May 8, 2024

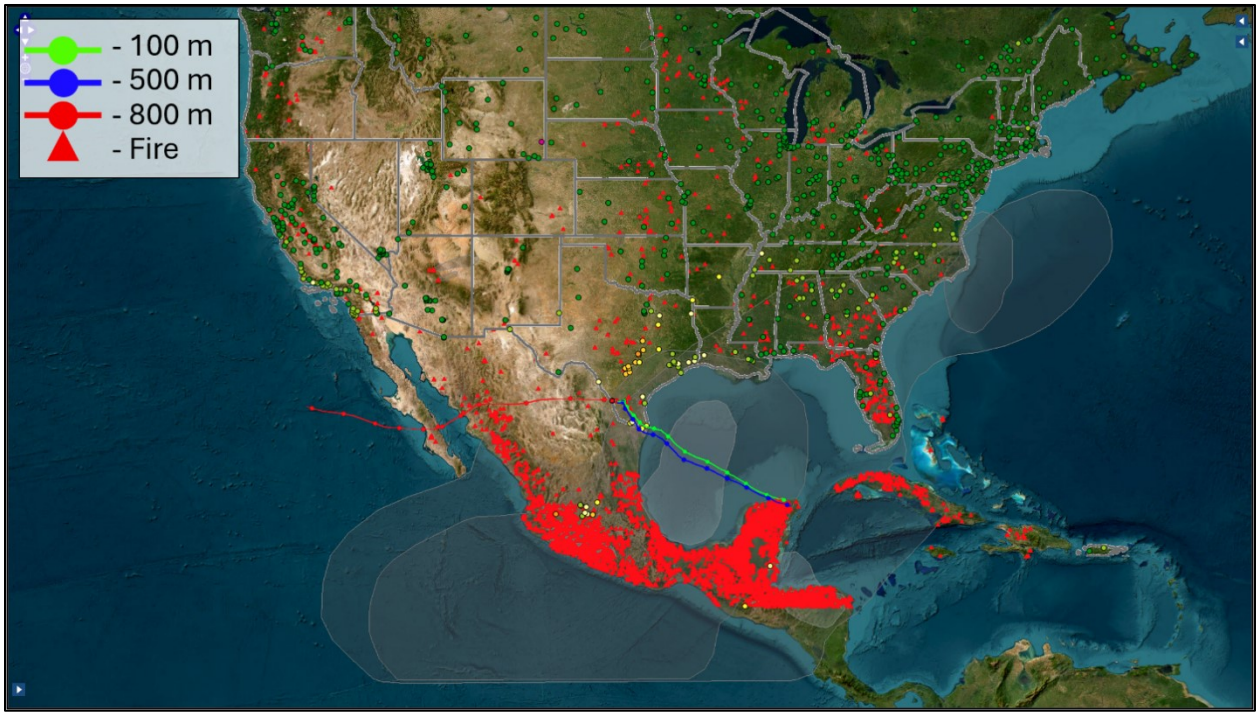

Figure 3-124: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 8, 2024

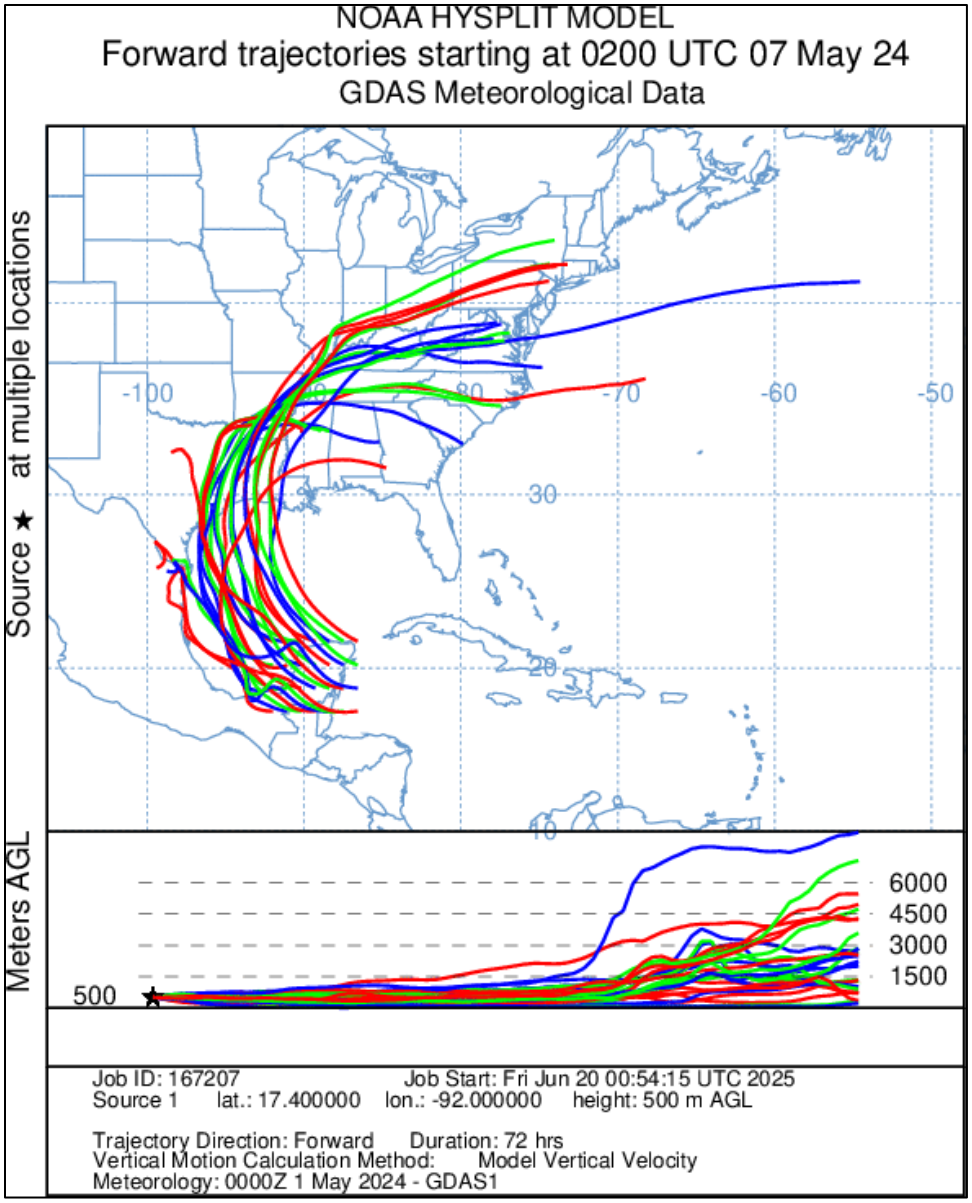

Figure 3-125: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 7, 2024

May 9, 2024, is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 35.8 µg/m^3; one-hour daily maximum 47.0 µg/m^3 recorded at 04:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 38.7 µg/m^3; one-hour daily maximum 53.7 µg/m^3 recorded at 18:00 LST);
- Corpus Christi Huisache monitor (24-hour average concentration 45.8 µg/m^3; one-hour daily maximum 76.0 µg/m^3 recorded at 05:00 LST); and
- Dona Park monitor (24-hour average concentration 54.9 µg/m^3; one-hour daily maximum 76.7 µg/m^3 recorded at 08:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 9, 2024, can be compared against typical/non-event days for each monitor in Figure 3-126: *Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical*

Concentrations at the Von Ormy Highway 16 Monitor, Figure 3-127: *Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-128: *Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor*, and Figure 3-129: *Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Dona Park Monitor*.

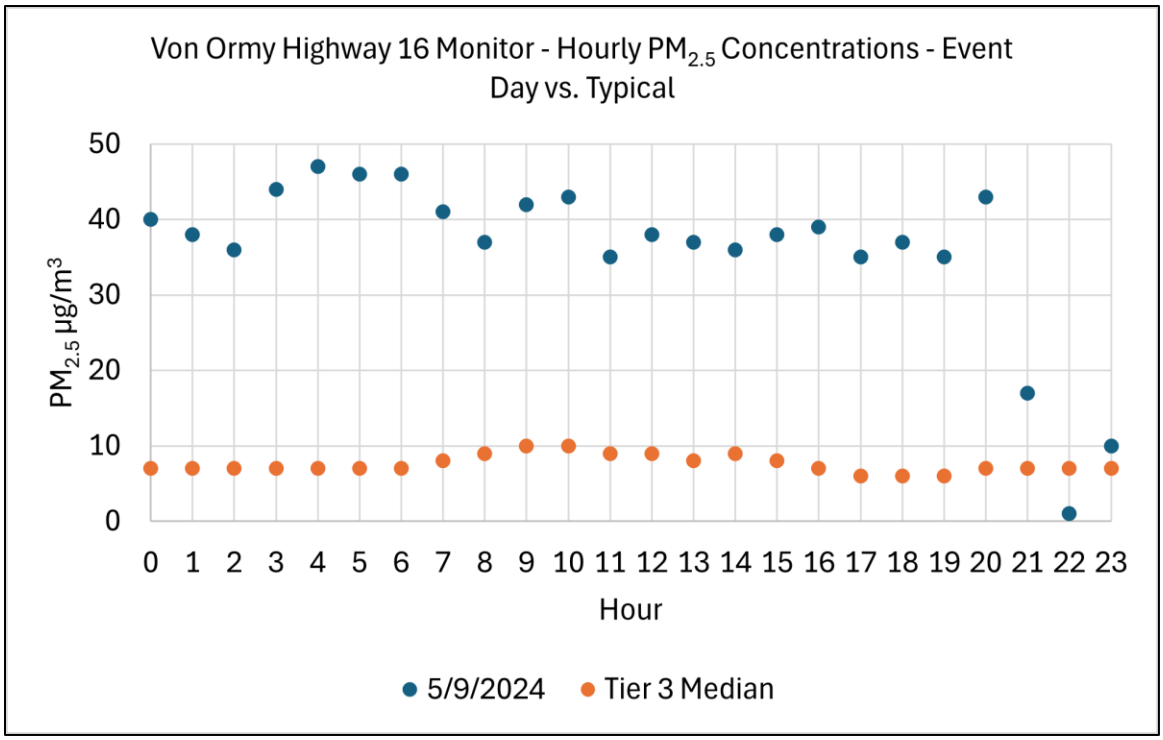

Figure 3-126: Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

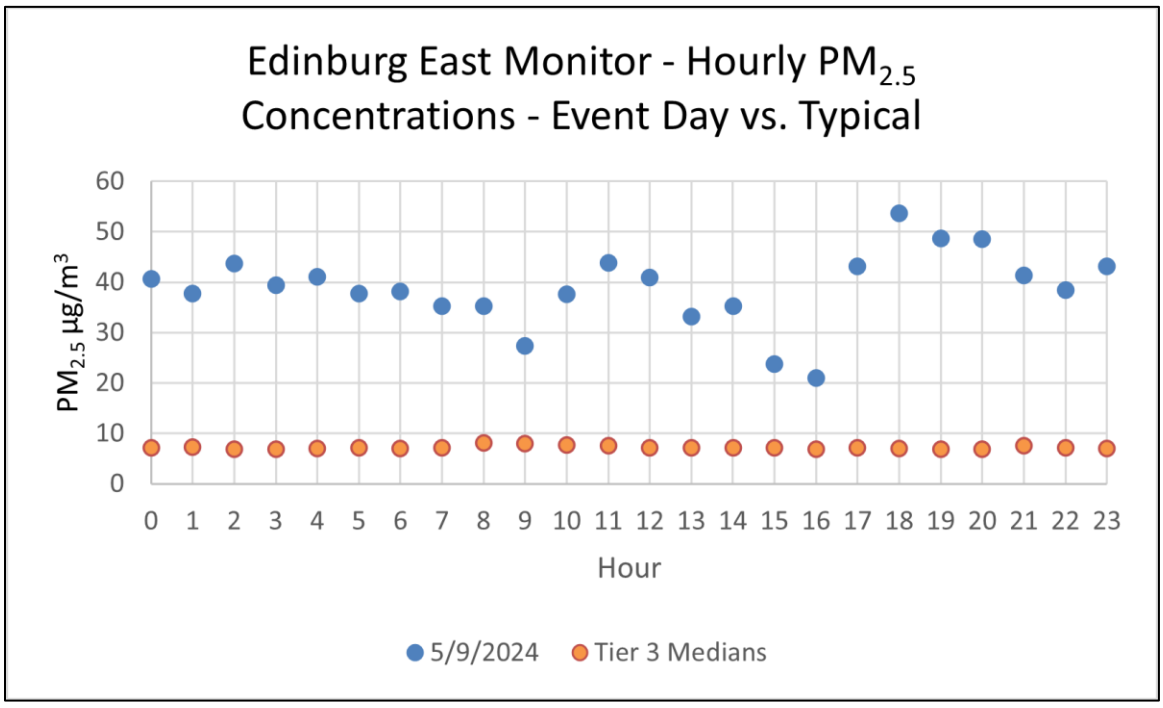

Figure 3-127: Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

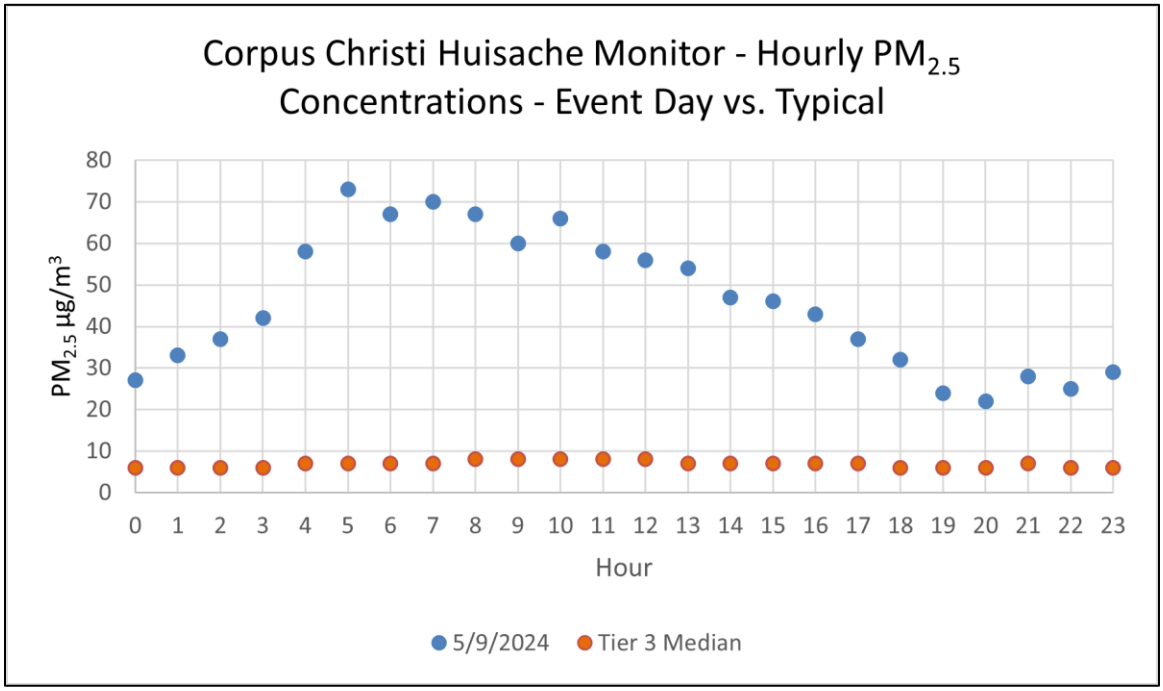

Figure 3-128: Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor

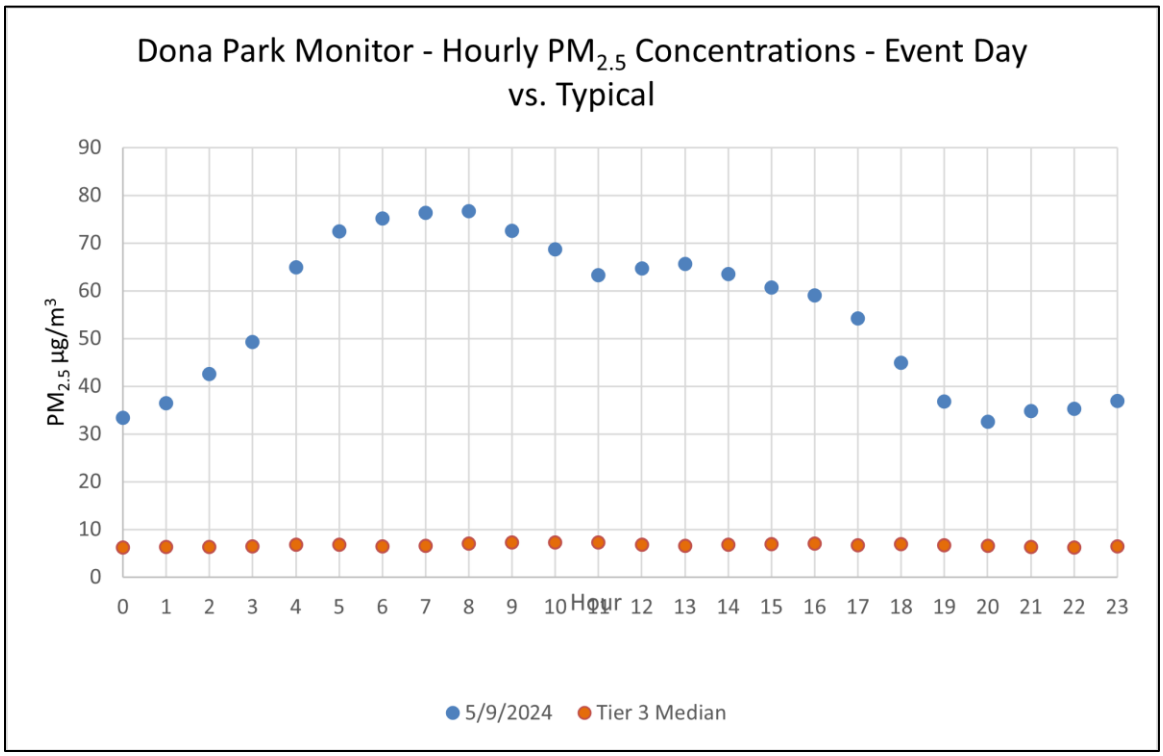

Figure 3-129: Hourly $PM_{2.5}$ Concentrations on May 9, 2024, Compared to Typical Concentrations at the Dona Park Monitor

TCEQ forecasts for May 9, 2024, mention light-moderate residual smoke over deep south and south-central Texas, and higher pollutant levels due to southerly winds ahead of a cold front advecting the residual smoke and high humidity in the eastern half of Texas (Table C-9). Media reports from May 9 and May 10, 2024, mention hazy skies and a decline in air quality throughout Texas due to incoming smoke from agricultural fires (Figure C-3 and Figure C-4). NWS archived weather discussions from the Corpus Christi and Austin/San Antonio NWS Weather Forecast Offices on May 9, 2024, mention hazy conditions and incoming smoke from the fires in Mexico and Central America affecting south and south-central Texas (Figure B-5 and Figure B-6). Satellite imagery reveals hazy coloration and heavy smoke over southern Mexico (Figure 3-130: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 9, 2024, Showing Smoke over Mexico*). Smoke plumes (Figure A-55 and Figure 3-131: *AirNow HMS Smoke Plume for May 9, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-132: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 9, 2024*, Figure 3-133: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 9, 2024*, Figure 3-134: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache Monitor on May 9, 2024*, and Figure 3-135: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 9, 2024*) on May 9, 2024 indicate that light to medium smoke coverage was transported into South and East Texas from Mexico, and monitors in South to East Texas had AQI levels of Moderate, Unhealthy for Sensitive Groups, and Unhealthy.

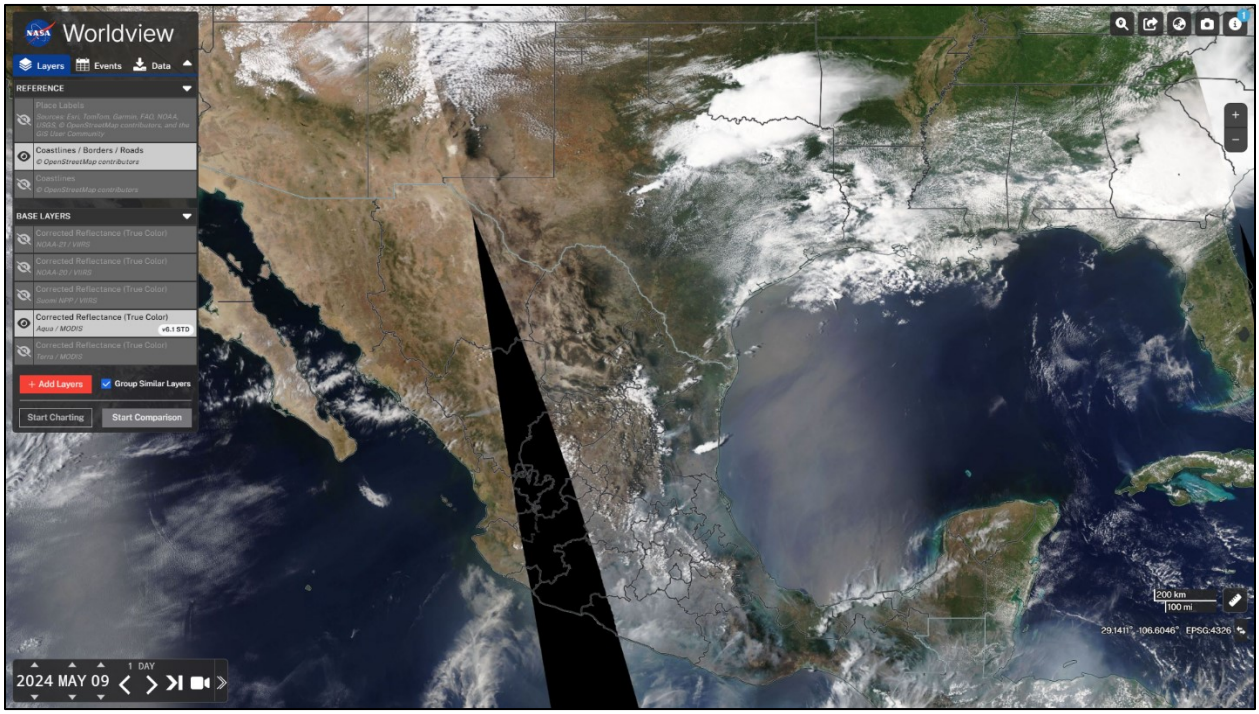

Figure 3-130: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 9, 2024, Showing Smoke over Mexico

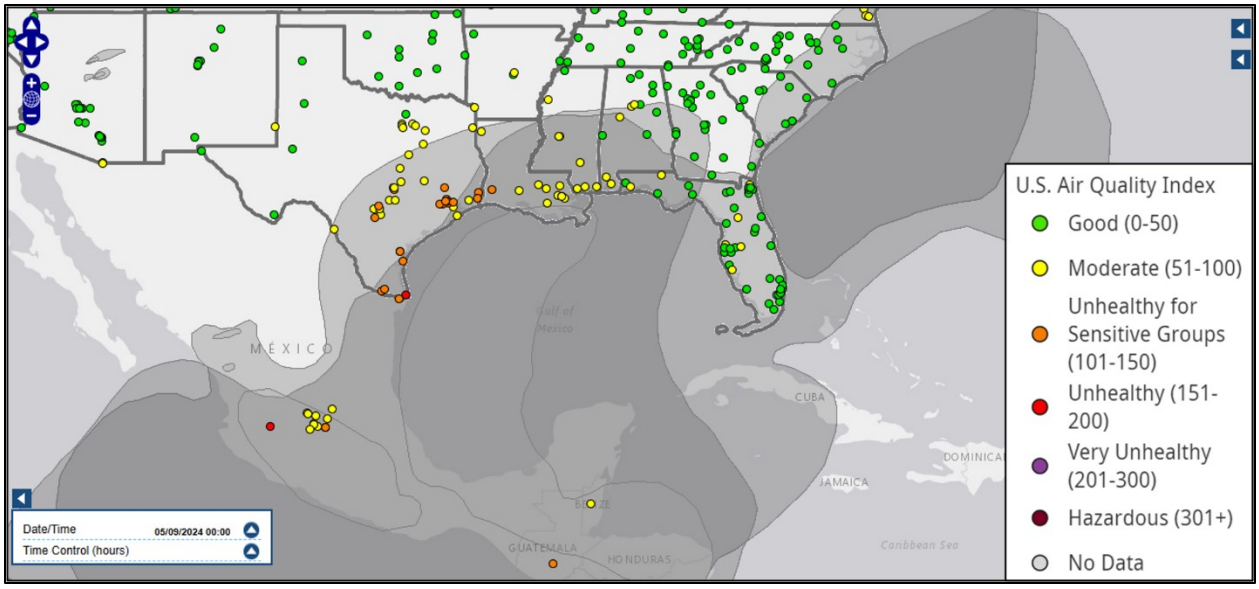

Figure 3-131: AirNow HMS Smoke Plume for May 9, 2024

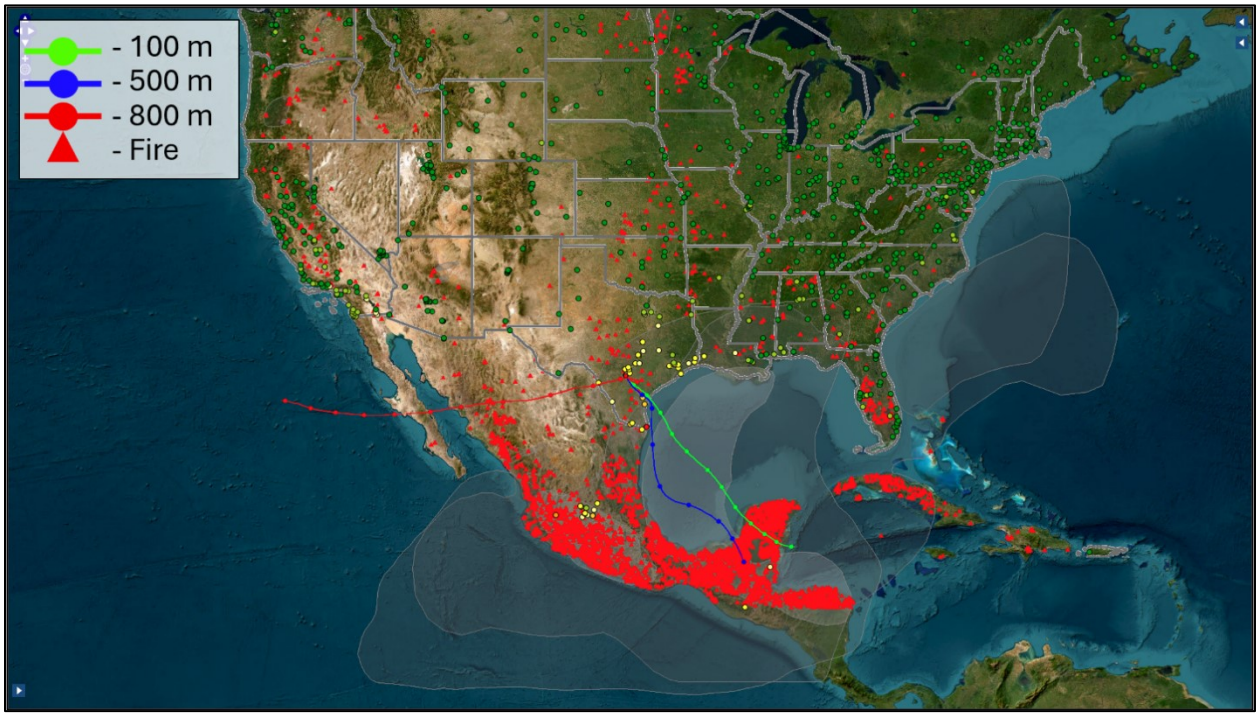

Figure 3-132: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 9, 2024

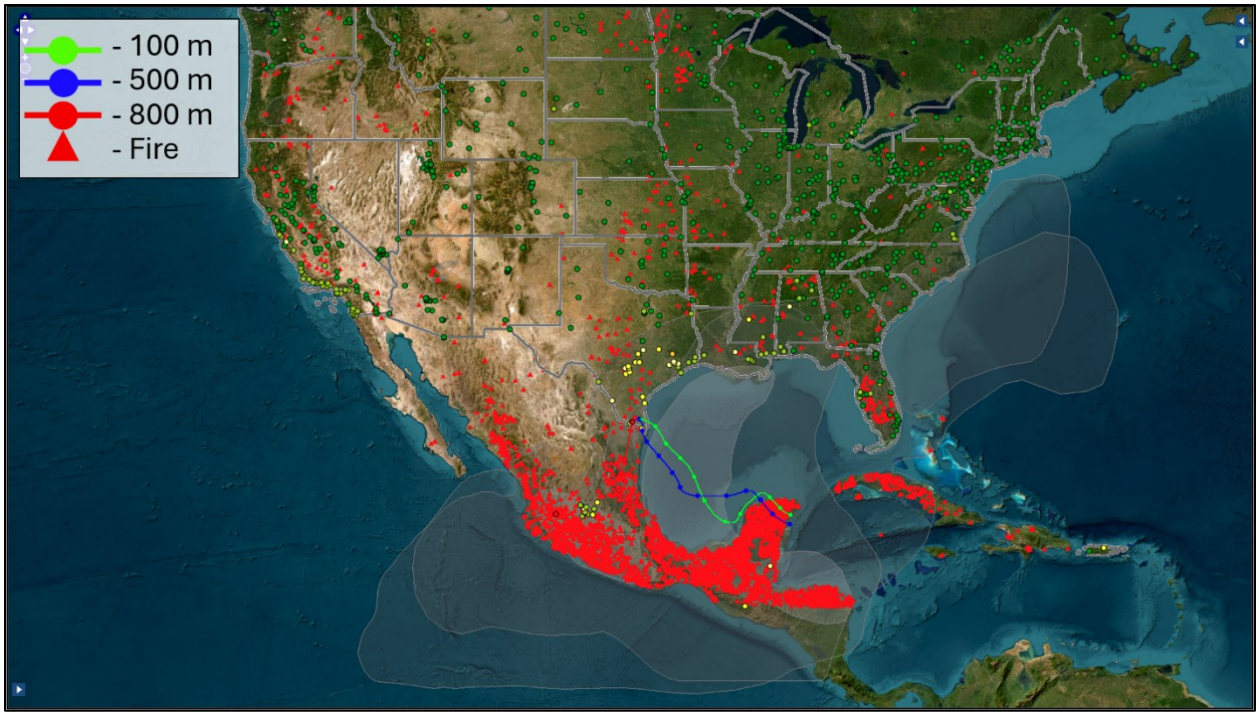

Figure 3-133: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 9, 2024

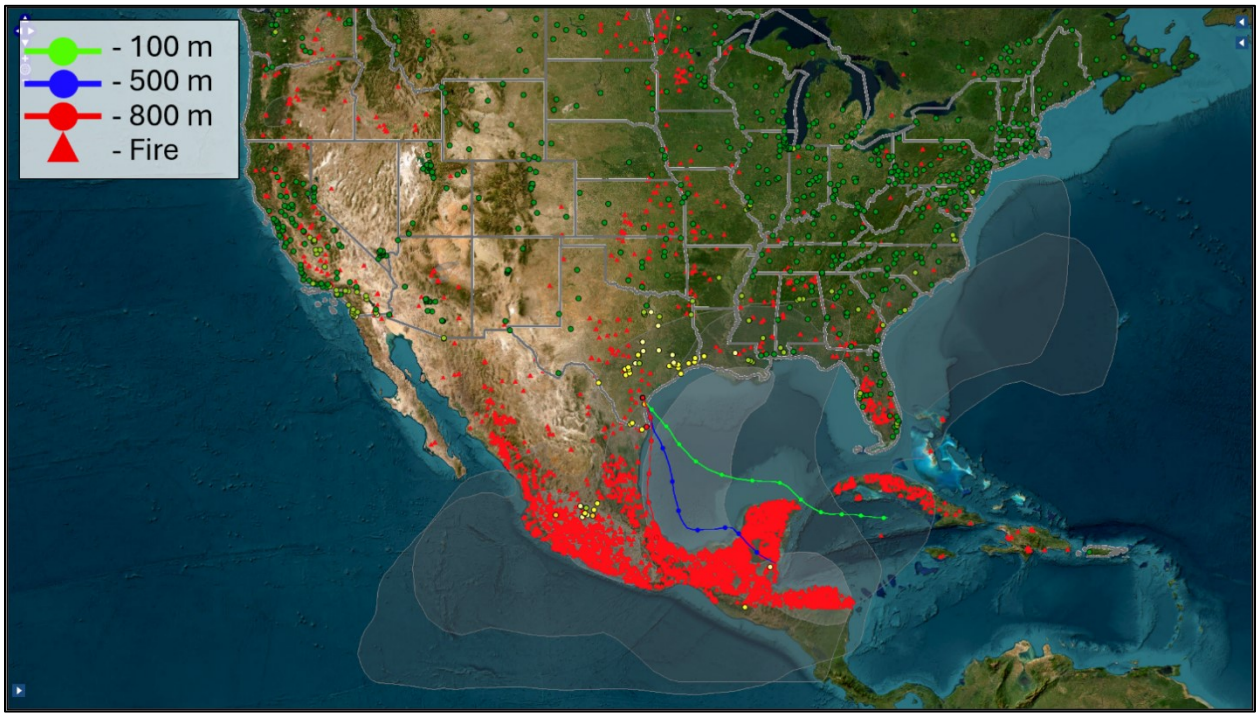

Figure 3-134: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache Monitor on May 9, 2024

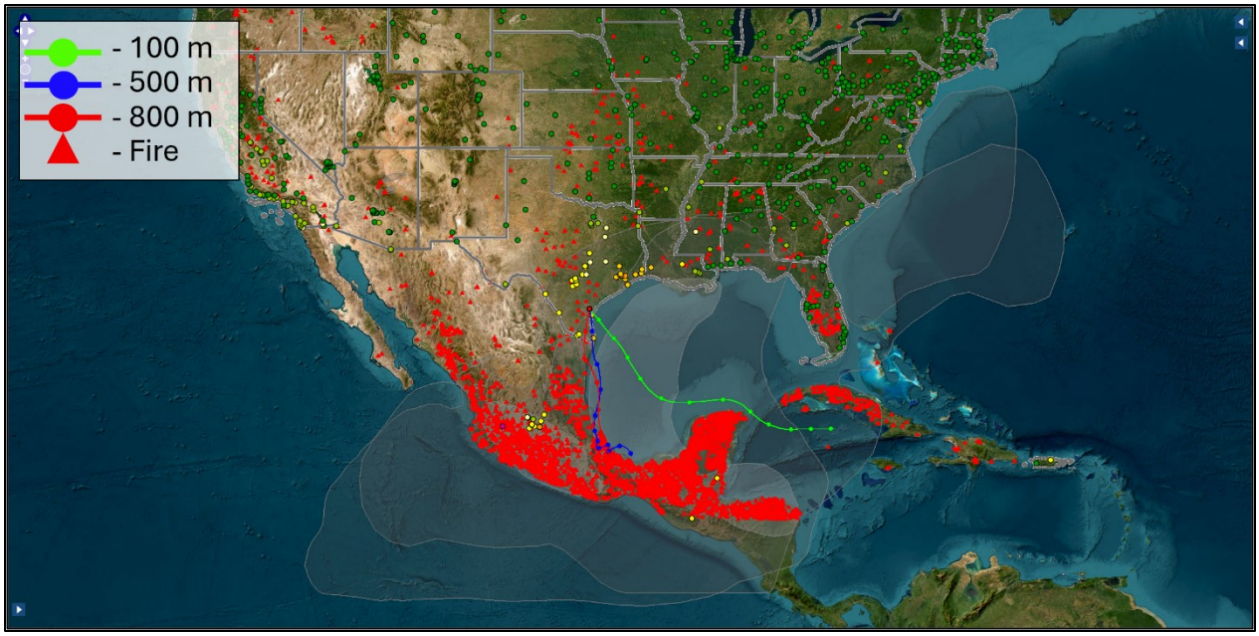

Figure 3-135: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 9, 2024

May 10, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 49.3 µg/m^3; one-hour daily maximum 72.5 µg/m^3 recorded at 08:00 LST), and a Tier 1 day at the Dona Park monitor (24-hour average concentration 38.2 µg/m^3; one-hour daily maximum 45.1 µg/m^3 recorded at 03:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 10, 2024, can be compared against typical/non-event days for each monitor in Figure 3-136: *Hourly $PM_{2.5}$ Concentrations on May 10, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-137: *Hourly $PM_{2.5}$ Concentrations on May 10, 2024, Compared to Typical Concentrations at the Dona Park Monitor.*

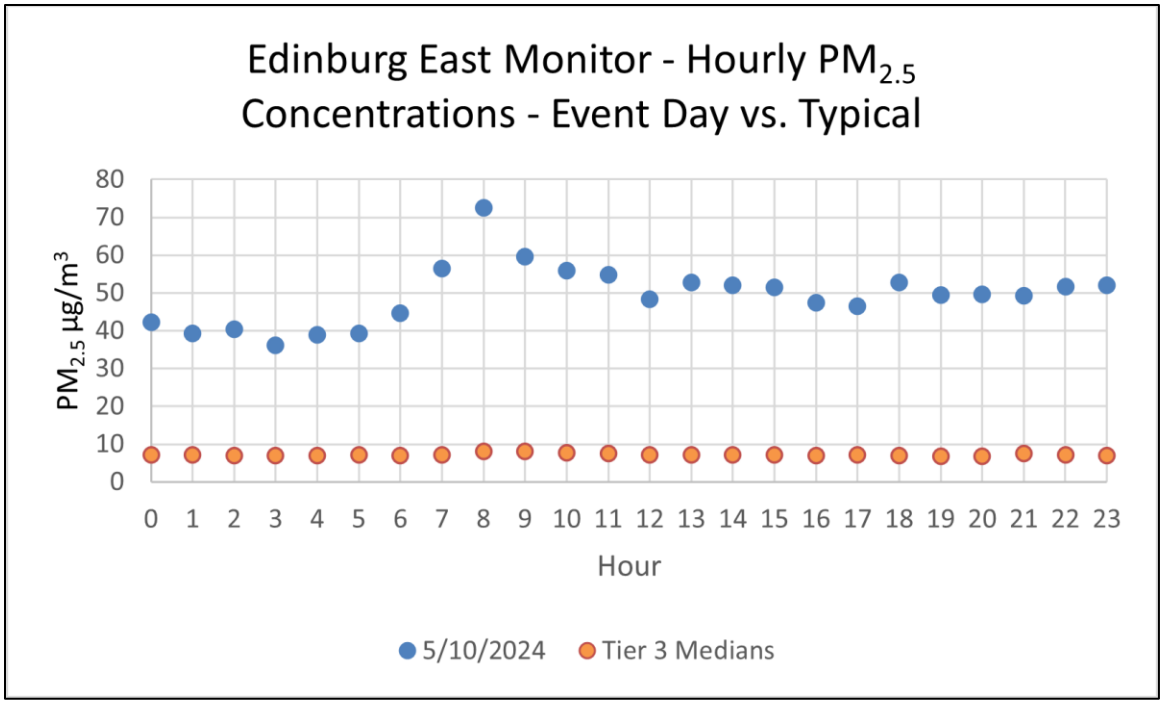

Figure 3-136: Hourly $PM_{2.5}$ Concentrations on May 10, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

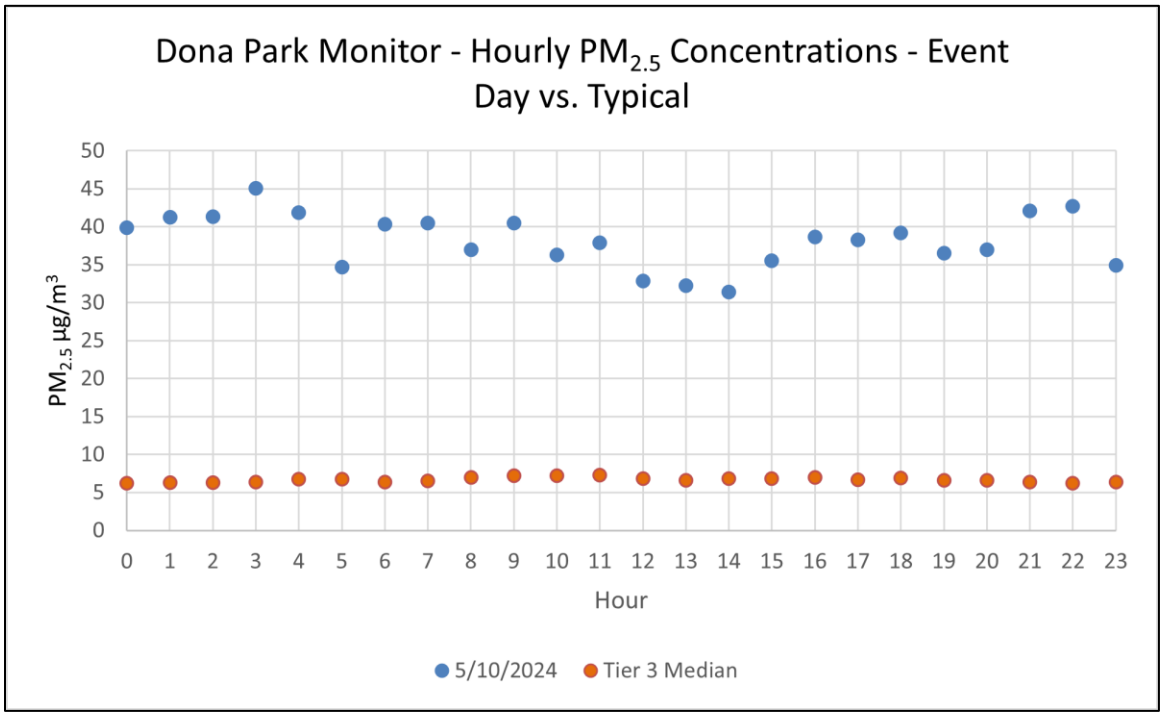

Figure 3-137: Hourly $PM_{2.5}$ Concentrations on May 10, 2024, Compared to Typical Concentrations at the Dona Park Monitor

TCEQ forecasts for May 10, 2024, mention increased concentrations of particulate matter due to the juxtaposition of high relative humidity and residual smoke, with the highest concentrations in deep South Texas (Table C-9). Media reports from May 9 and 10, 2024 mention hazy skies and a decline in air quality throughout Texas due to incoming smoke from

agricultural fires (Figure C-3 and Figure C-4). Satellite imagery reveals hazy coloration and potential smoke in deep south Texas and in the Gulf of America (Figure 3-138: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 10, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-56 and Figure 3-139: *AirNow HMS Smoke Plume for May 10, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-140: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 10, 2024* and Figure 3-141: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 10, 2024*) on May 10, 2024, indicate that medium smoke coverage was transported into South and East Texas from Mexico, and monitors in south Texas had Moderate an with AQI levels of Moderate, Unhealthy for Sensitive Groups, and Unhealthy.

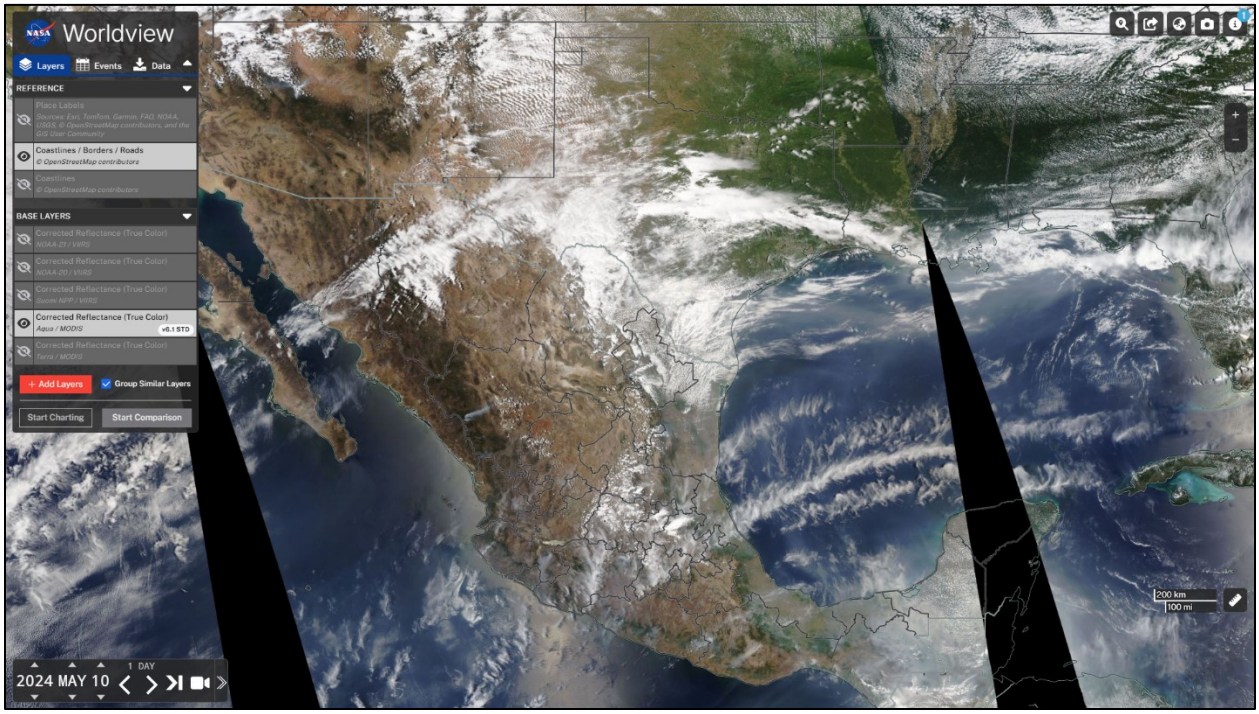

Figure 3-138: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 10, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

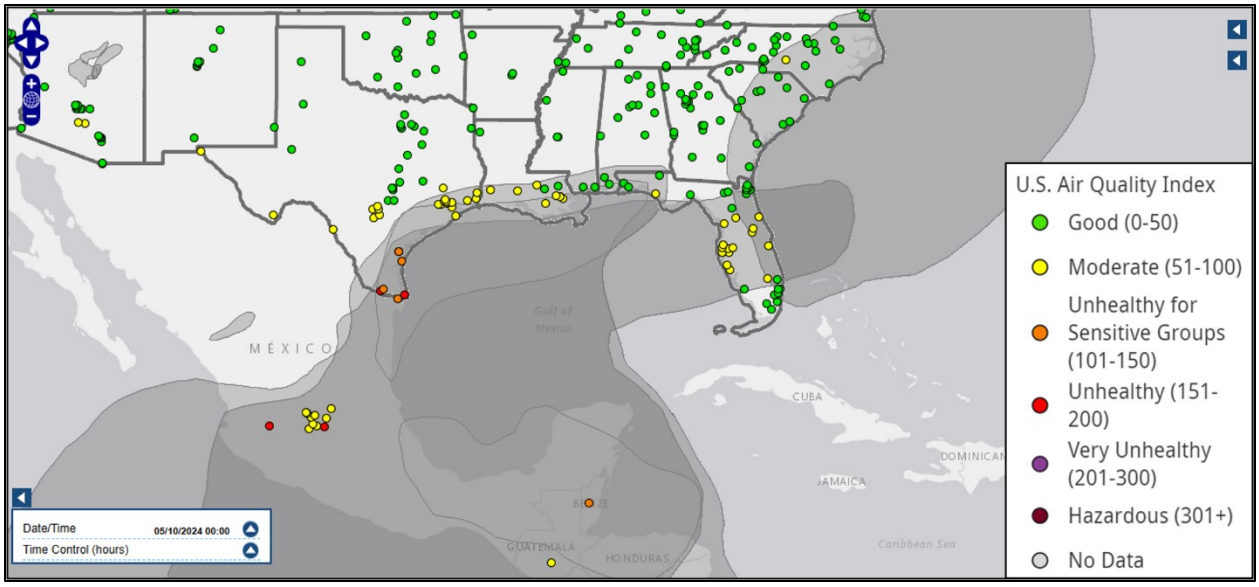

Figure 3-139: AirNow HMS Smoke Plume for May 10, 2024

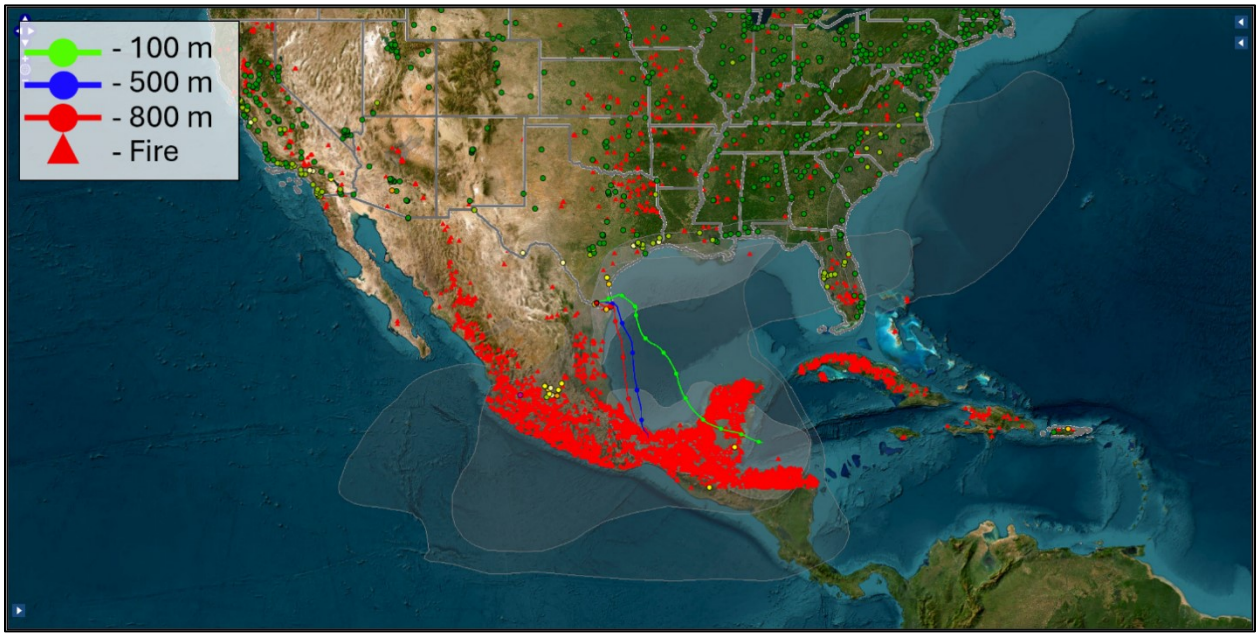

Figure 3-140: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 10, 2024

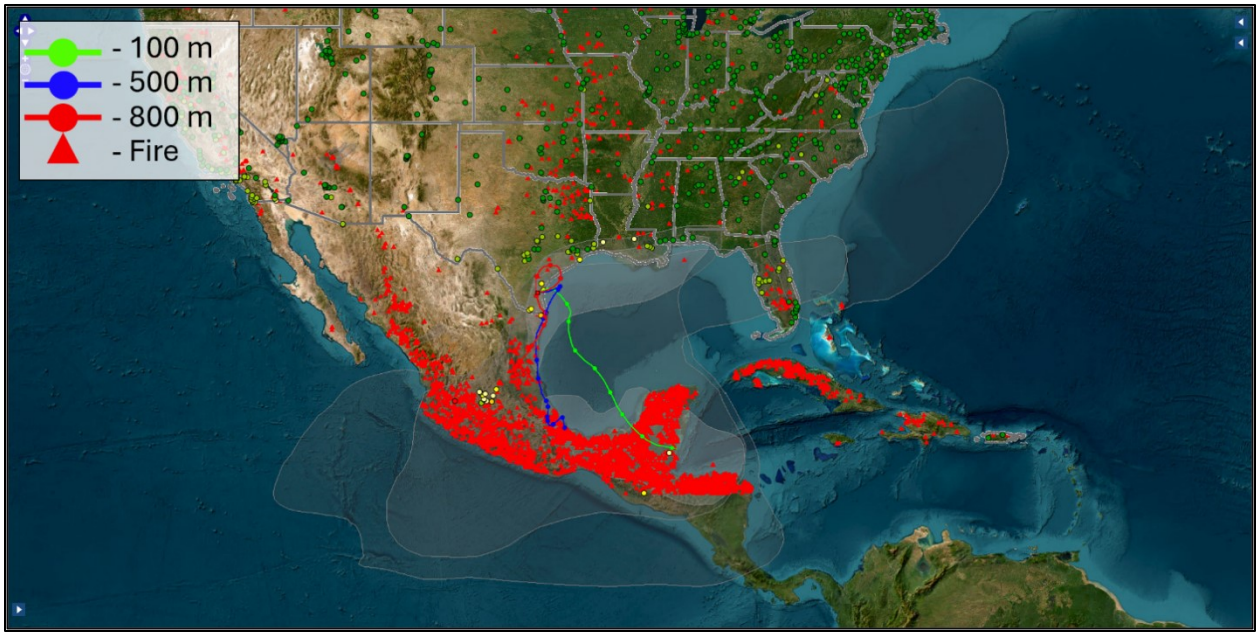

Figure 3-141: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 10, 2024

May 11, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 32.5 µg/m^3; one-hour daily maximum 51.2 µg/m^3 recorded at 00:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 11, 2024, can be compared against typical/non-event days for the Edinburg East Freddy Gonzalez Drive monitor in Figure 3-142: *Hourly $PM_{2.5}$ Concentrations on May 11, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

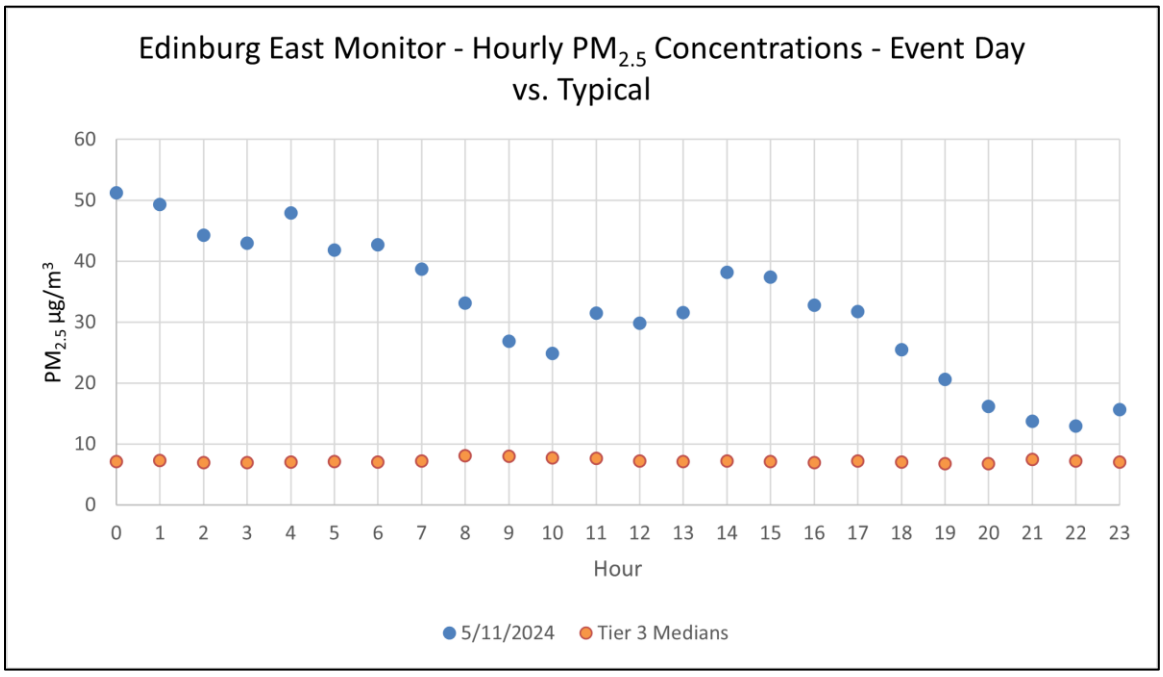

Figure 3-142: Hourly $PM_{2.5}$ Concentrations on May 11, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts for May 11, 2024, mention light to moderate density smoke transported out of Mexico affecting the Rio Grande Valley (Table C-9). Media reports from May 10, 2024, mention hazy skies and a decline in air quality throughout Texas due to incoming smoke from agricultural fires (Figure C-4). Satellite imagery reveals heavy hazy coloration and smoke in Texas and in the Gulf of America (Figure 3-143: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 11, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-57 and Figure 3-144: *AirNow HMS Smoke Plume for May 11, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-145: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 11, 2024*) on May 11, 2024, indicate that medium smoke coverage expanded over Texas and Mexico, while winds traveled north towards the monitor, and other monitors in South Texas had AQI levels of Moderate an Unhealthy for Sensitive Groups.

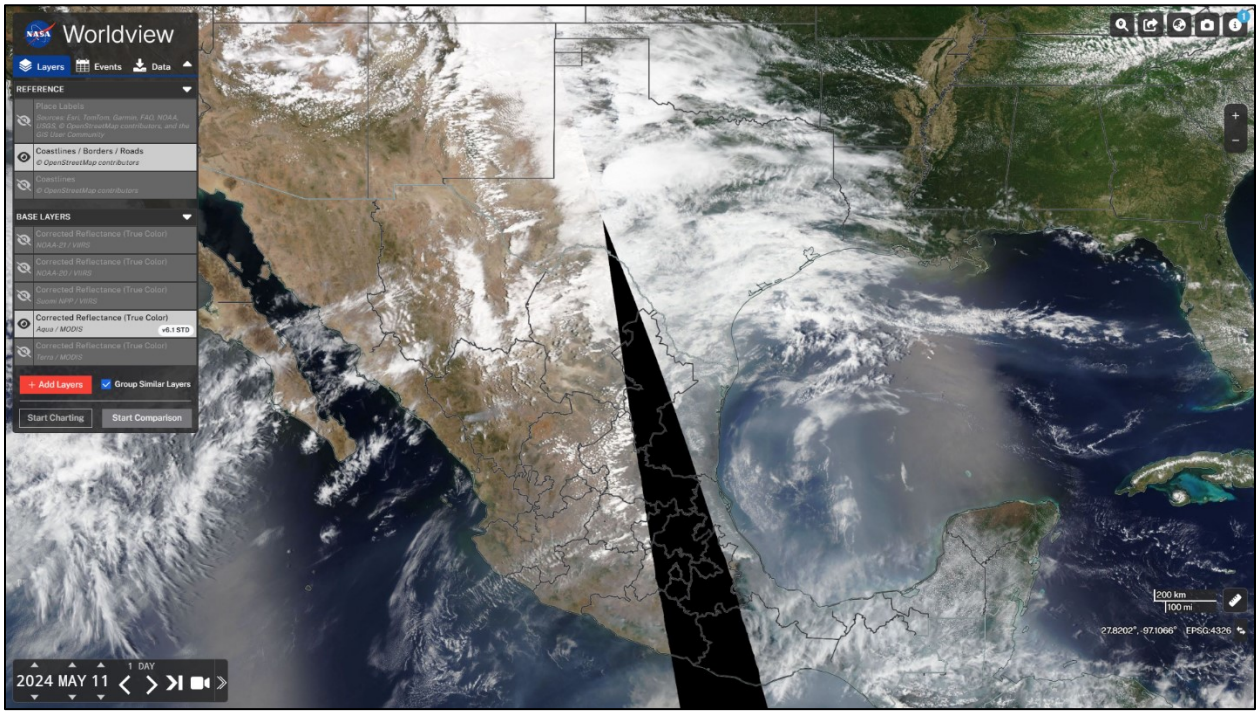

Figure 3-143: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 11, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

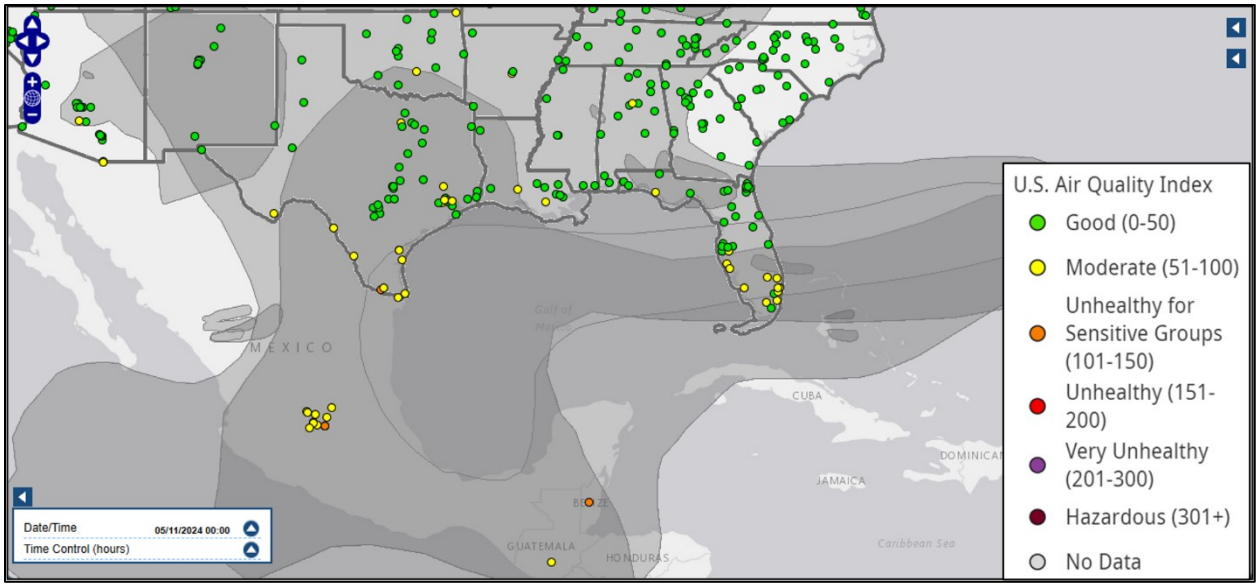

Figure 3-144: AirNow HMS Smoke Plume for May 11, 2024

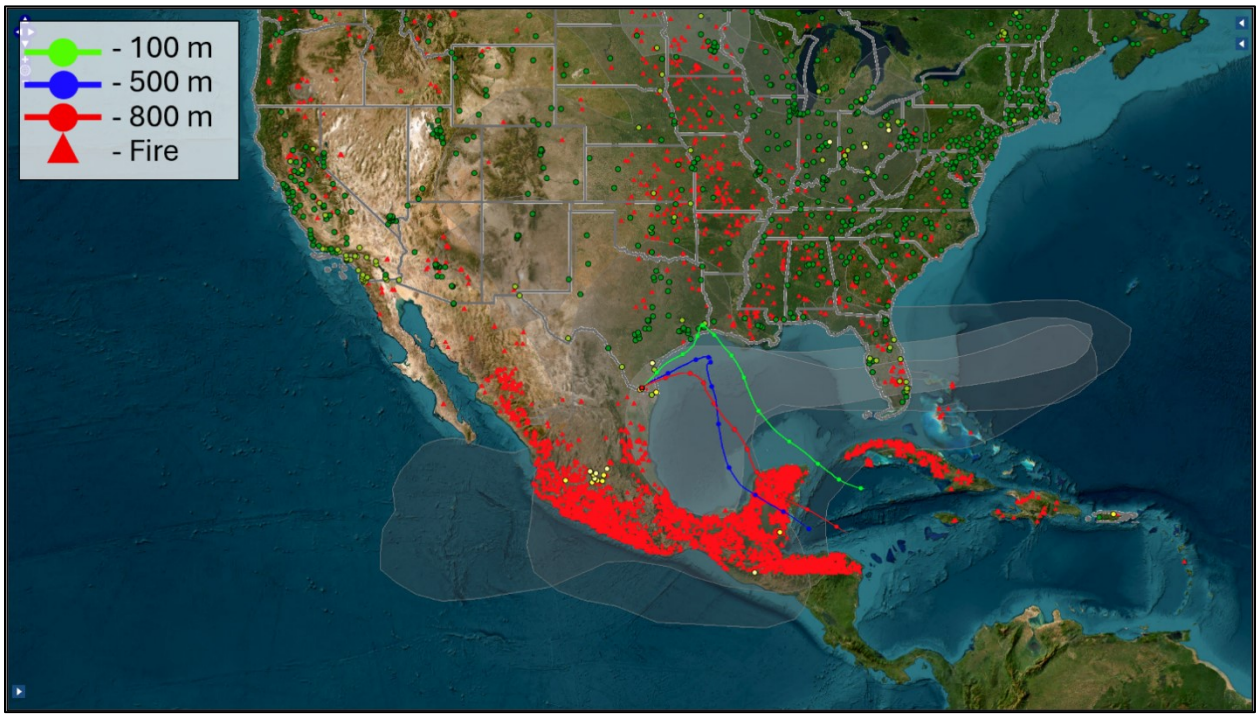

Figure 3-145: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 11, 2024

May 12, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 26.0 µg/m^3; one-hour daily maximum 50.4 µg/m^3 recorded at 20:00 LST), and a Tier 1 day at the Dona Park monitor (24-hour average concentration 36.0 µg/m^3; one-hour daily maximum 69.7 µg/m^3 recorded at 11:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 12, 2024, can be compared against typical/non-event days for each monitor in Figure 3-146: *Hourly $PM_{2.5}$ Concentrations on May 12, 2024, Compared to Typical Concentrations at the*

Edinburg East Freddy Gonzalez Drive Monitor and Figure 3-147: *Hourly $PM_{2.5}$ Concentrations on May 12, 2024, Compared to Typical Concentrations at the Dona Park Monitor.*

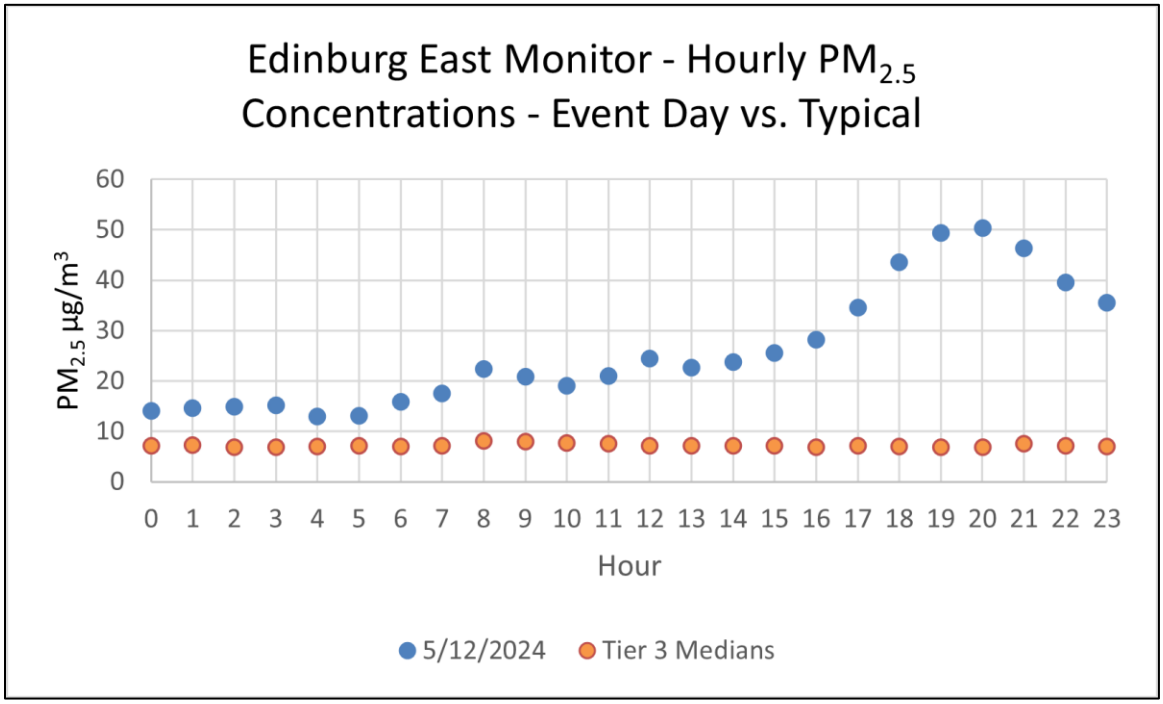

Figure 3-146: Hourly $PM_{2.5}$ Concentrations on May 12, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

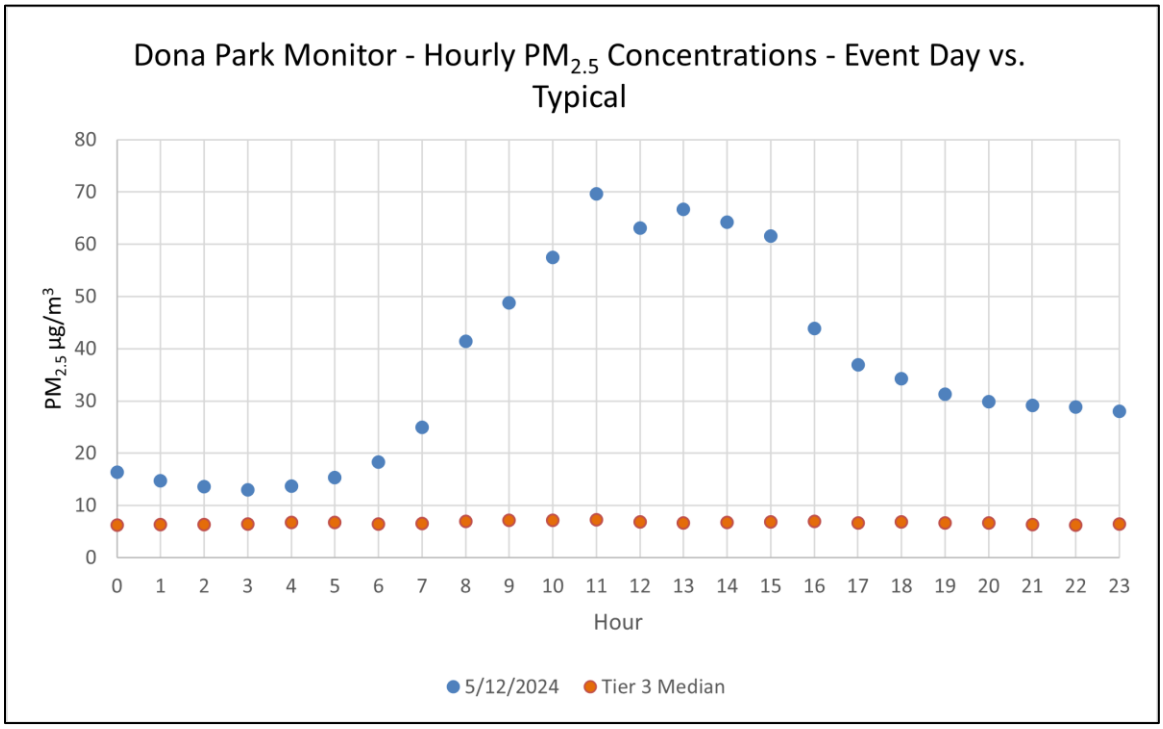

Figure 3-147: Hourly $PM_{2.5}$ Concentrations on May 12, 2024, Compared to Typical Concentrations at the Dona Park Monitor

TCEQ forecasts for May 12, 2024, mention residual smoke from Mexico traveling from south to north Texas (Table C-9). Media reports from May 10, 2024, mention hazy skies and a decline in air quality throughout Texas due to incoming smoke from agricultural fires (Figure C-4). NWS archived weather discussions from the Corpus Christi NWS Weather Forecast Offices on May 12, 2024, mention low level moisture and smoke from fires in Mexico contributing to haze (Figure B-7). Satellite imagery reveals hazy coloration and potential smoke in deep south Texas, Mexico, and the Gulf of America (Figure 3-148: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 12, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-58 and Figure 3-149: *AirNow HMS Smoke Plume for May 12, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-150: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 12, 2024* and Figure 3-151: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 12, 2024*) on May 12, 2024 indicate that medium to heavy smoke covered South and East Texas, Mexico, and the Gulf of America while winds traveled from the south before reaching the monitors, and other monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the south Mexico and the Yucatán Peninsula traveled through south and southeast Texas (Figure 3-152: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 9, 2024*).

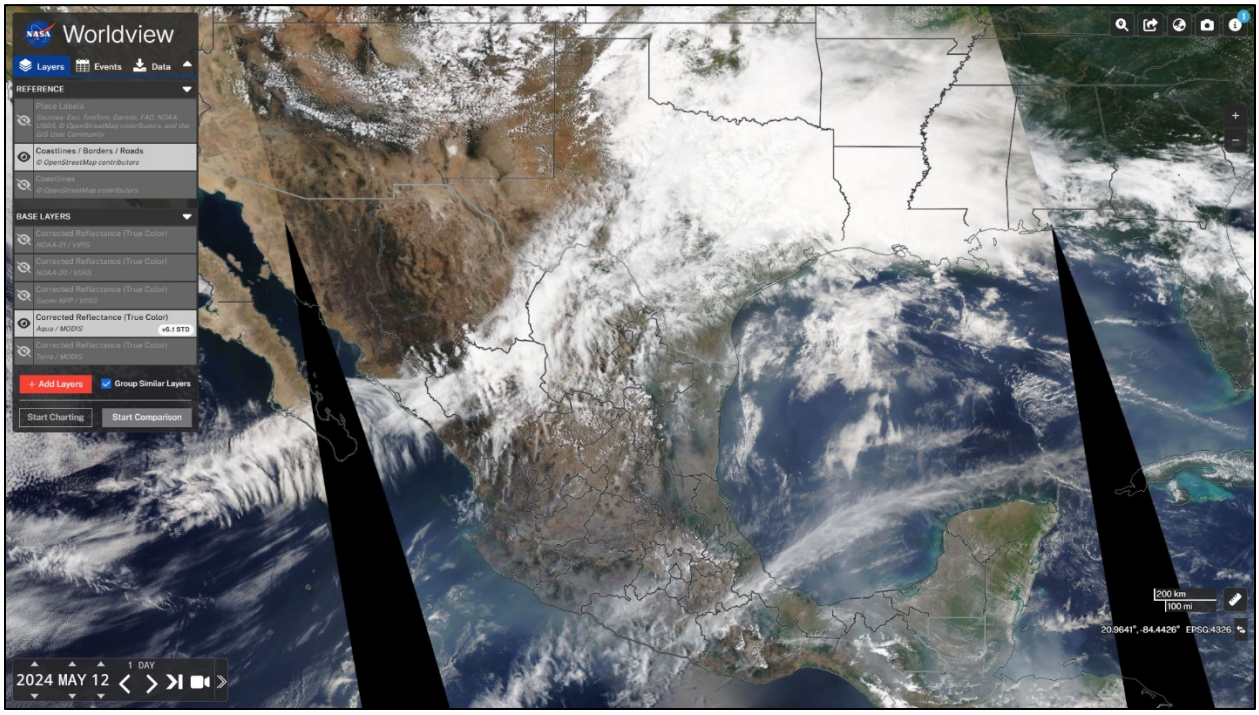

Figure 3-148: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 12, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

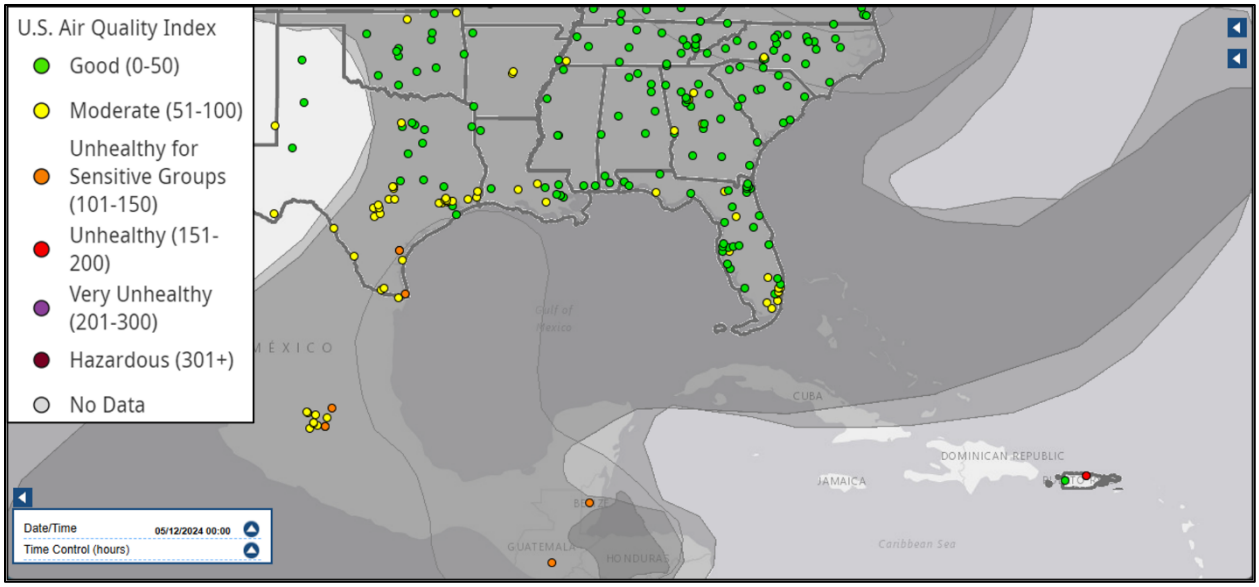

Figure 3-149: AirNow HMS Smoke Plume for May 12, 2024

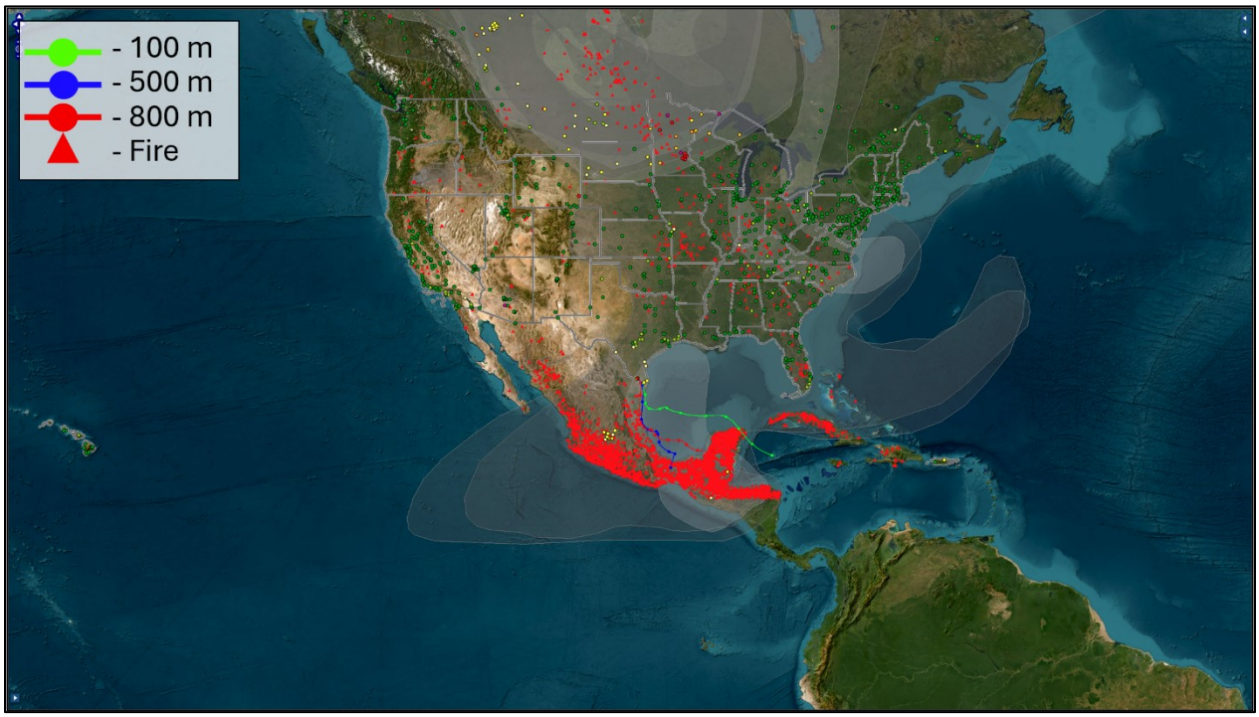

Figure 3-150: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 12, 2024

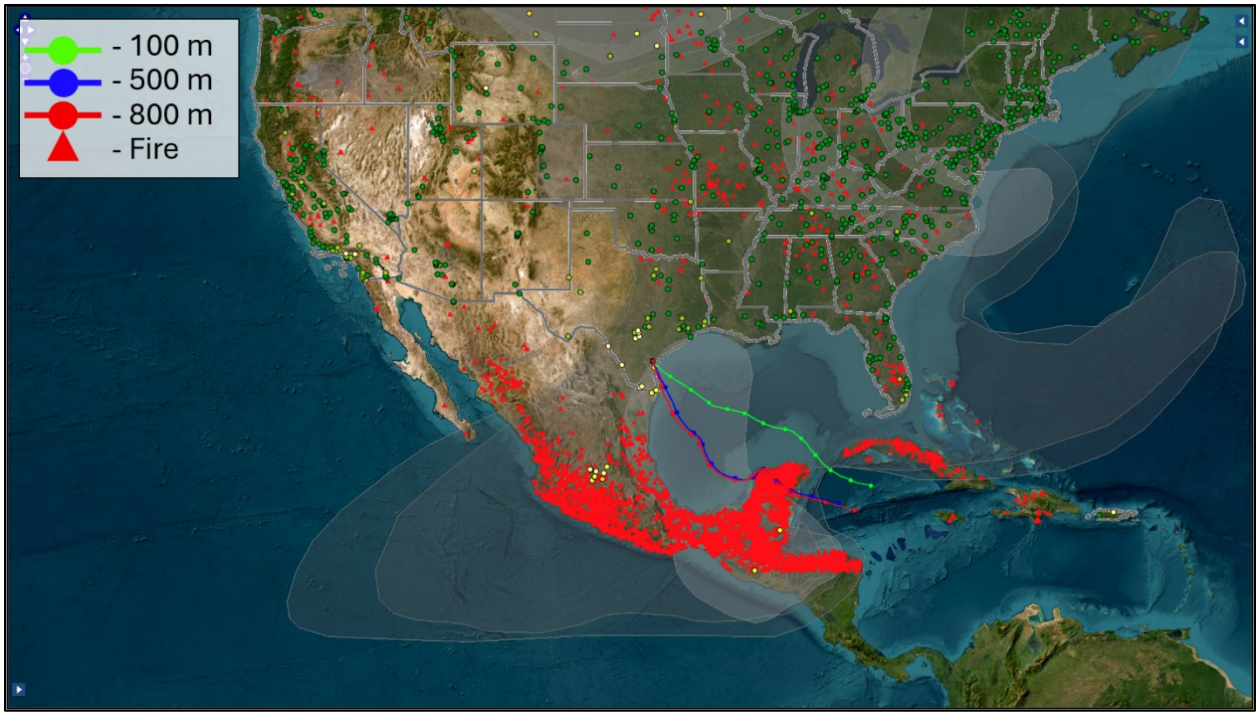

Figure 3-151: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 12, 2024

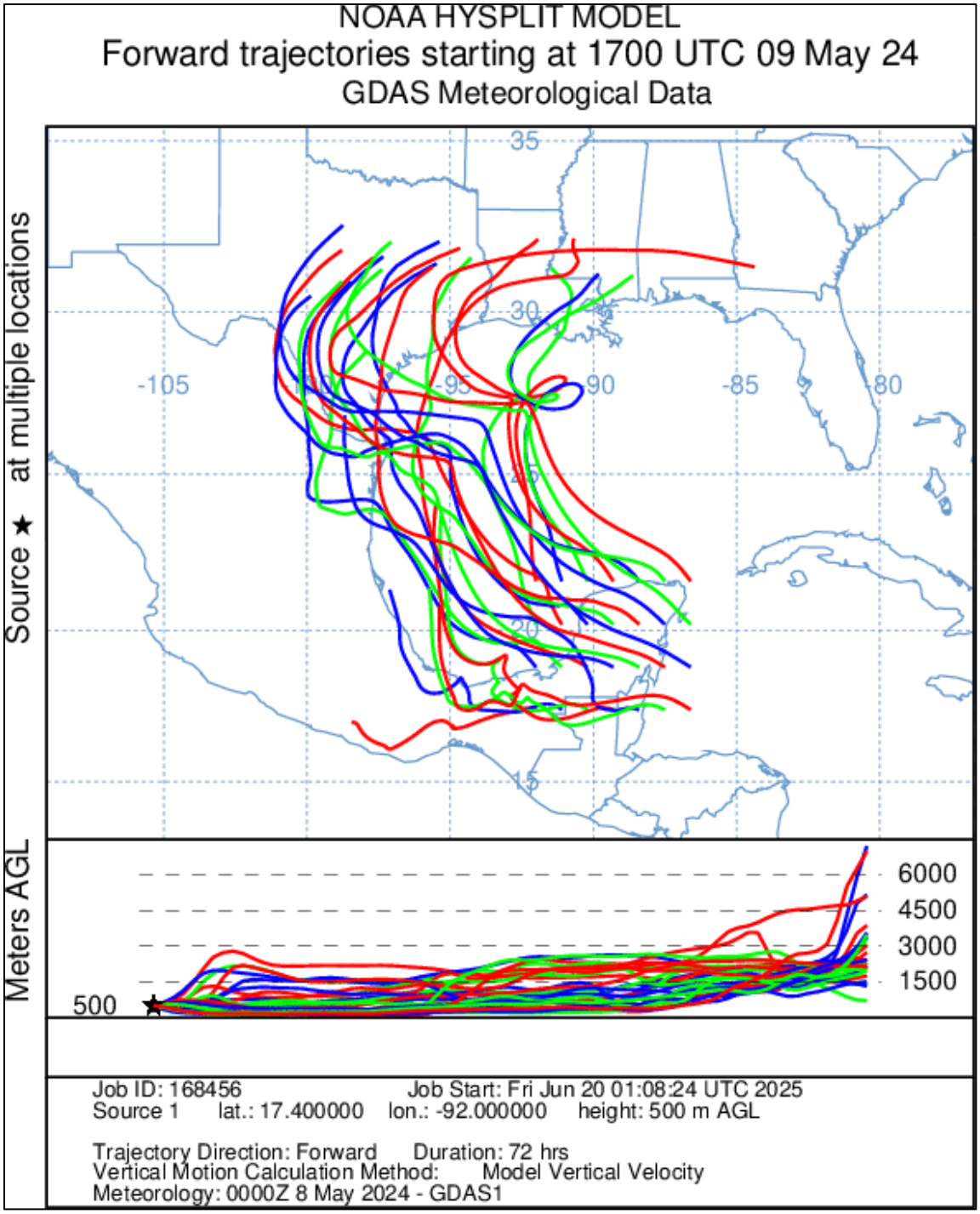

Figure 3-152: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 9, 2024

May 13, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 32.9 µg/m^3; one-hour daily maximum 54.9 µg/m^3 recorded at 17:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 13, 2024, can be compared against typical/non-event days for the Edinburg East Freddy Gonzalez Drive monitor in Figure 3-153: *Hourly $PM_{2.5}$ Concentrations*

on May 13, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.

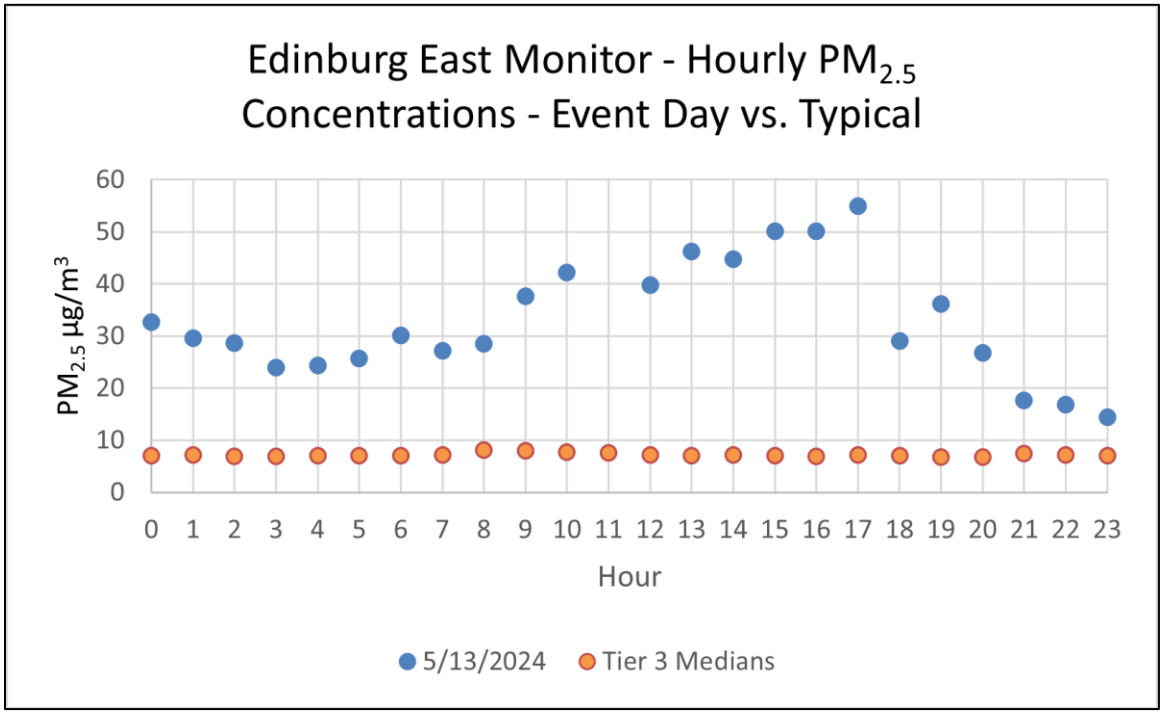

Figure 3-153: Hourly $PM_{2.5}$ Concentrations on May 13, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts for May 13, 2024, mention light to moderate density smoke from seasonal fires in Mexico and Central America covering the Gulf of America and extending over most of Texas, in addition to potential African dust affecting the coastal bend of Texas (Table C-9). Media reports from May 10, 2024, mention hazy skies and a decline in air quality throughout Texas due to incoming smoke from agricultural fires (Figure C-4). NWS archived weather discussions from the Corpus Christi NWS Weather Forecast Office on May 13, 2024, which is North-adjacent to the Brownsville forecast office covering the Edinburg East Freddy Gonzalez monitor, mention the combination of a thick stratus deck and smoke from fires in Mexico keeping temperatures relatively down and decreasing convective potential (Figure B-7). Satellite imagery reveals hazy coloration and potential smoke in the Gulf of America (Figure 3-154: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 13, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-59 and Figure 3-155: *AirNow HMS Smoke Plume for May 13, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-156: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 13, 2024*) on May 13, 2024, indicate that medium smoke coverage was transported into South and East Texas from Mexico, while monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups.

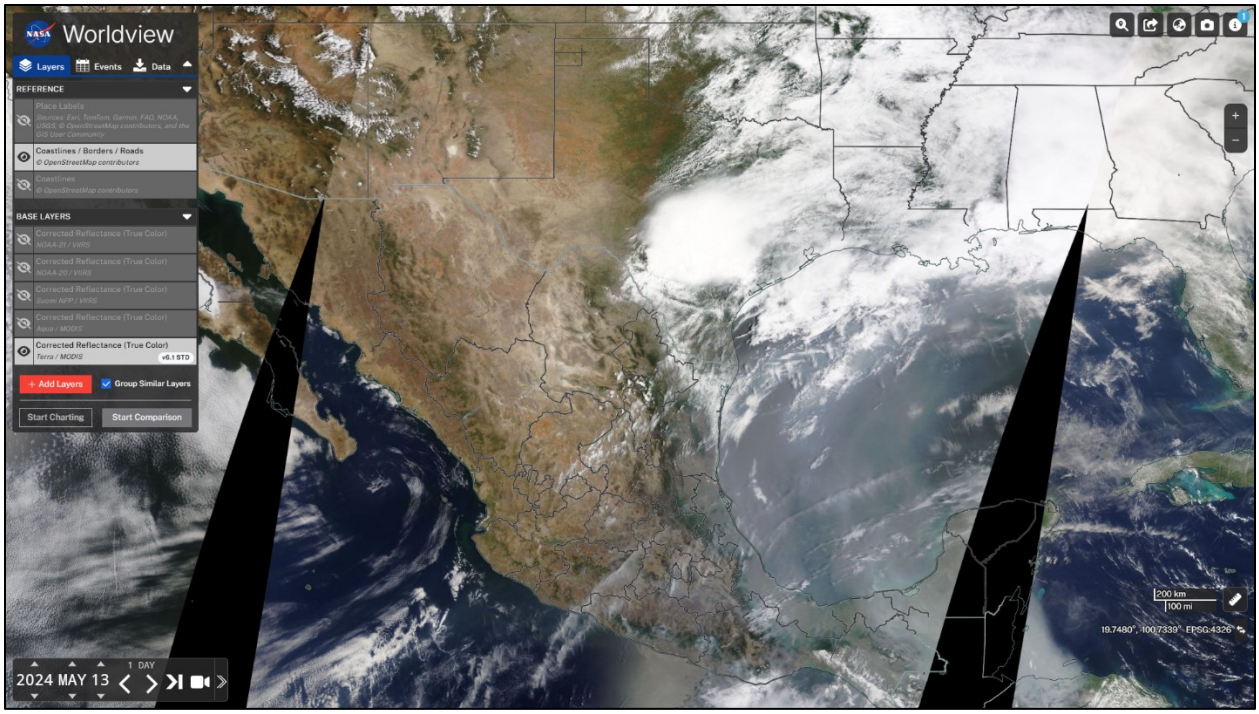

Figure 3-154: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 13, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

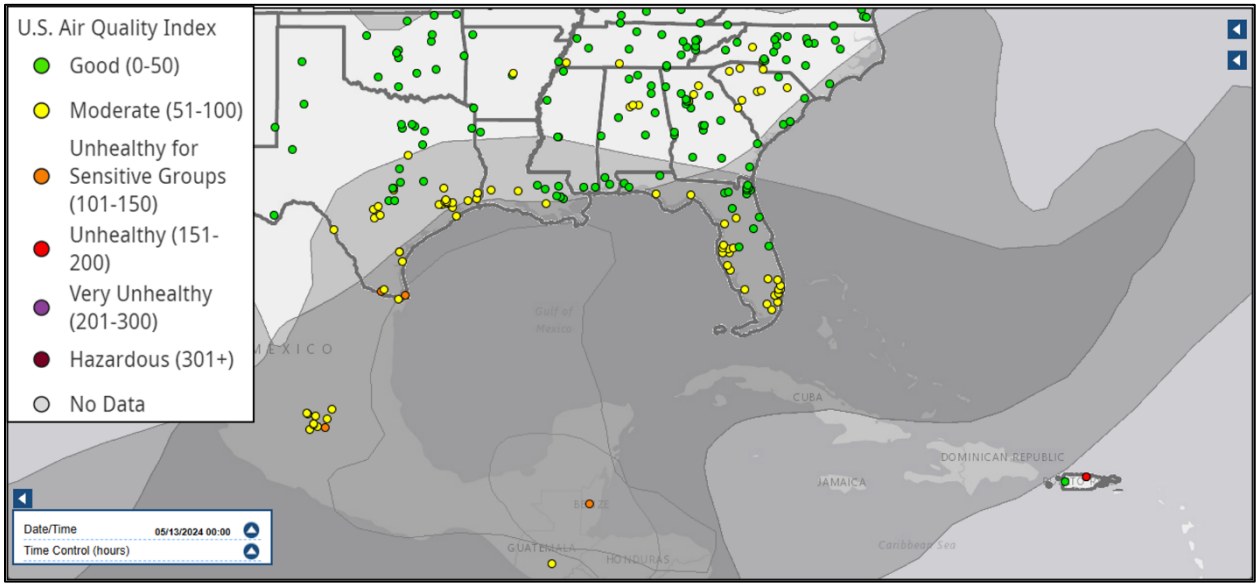

Figure 3-155: AirNow HMS Smoke Plume for May 13, 2024

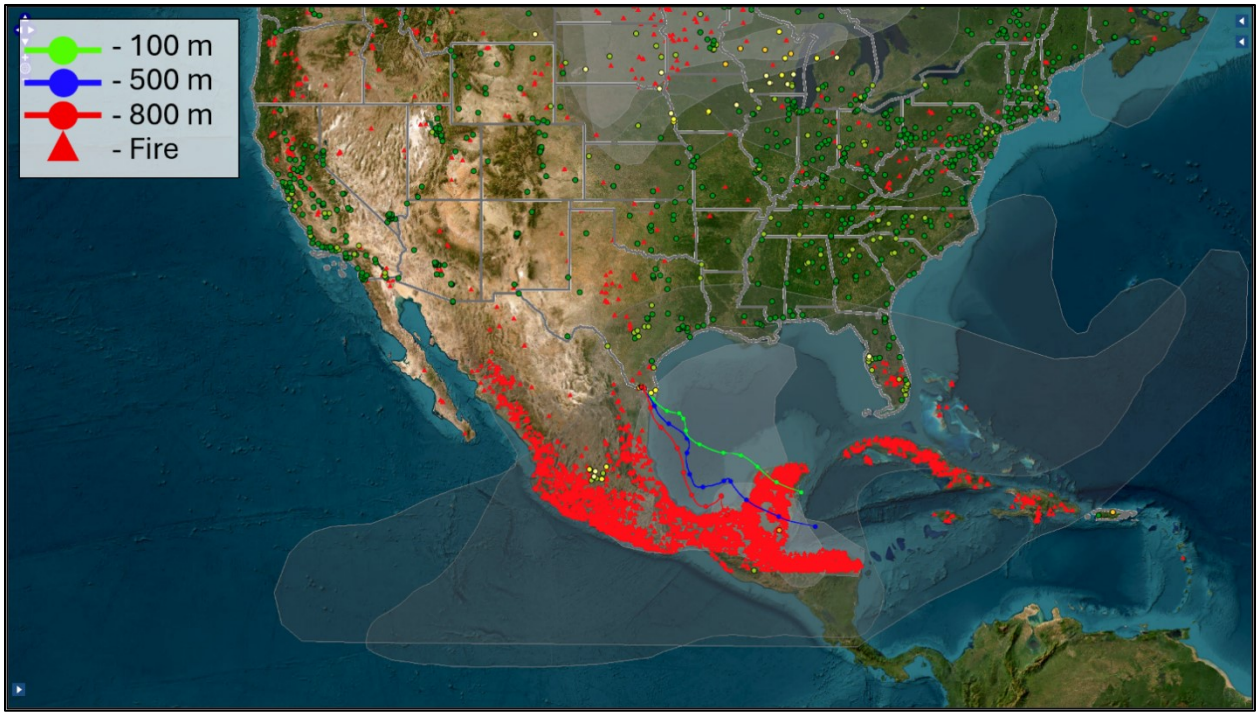

Figure 3-156: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 13, 2024

May 15, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 29.6 µg/m^3; one-hour daily maximum 43.9 µg/m^3 recorded at 15:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 15, 2024, can be compared against typical/non-event days for the Edinburg East Freddy Gonzalez Drive monitor in Figure 3-157: *Hourly $PM_{2.5}$ Concentrations on May 15, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

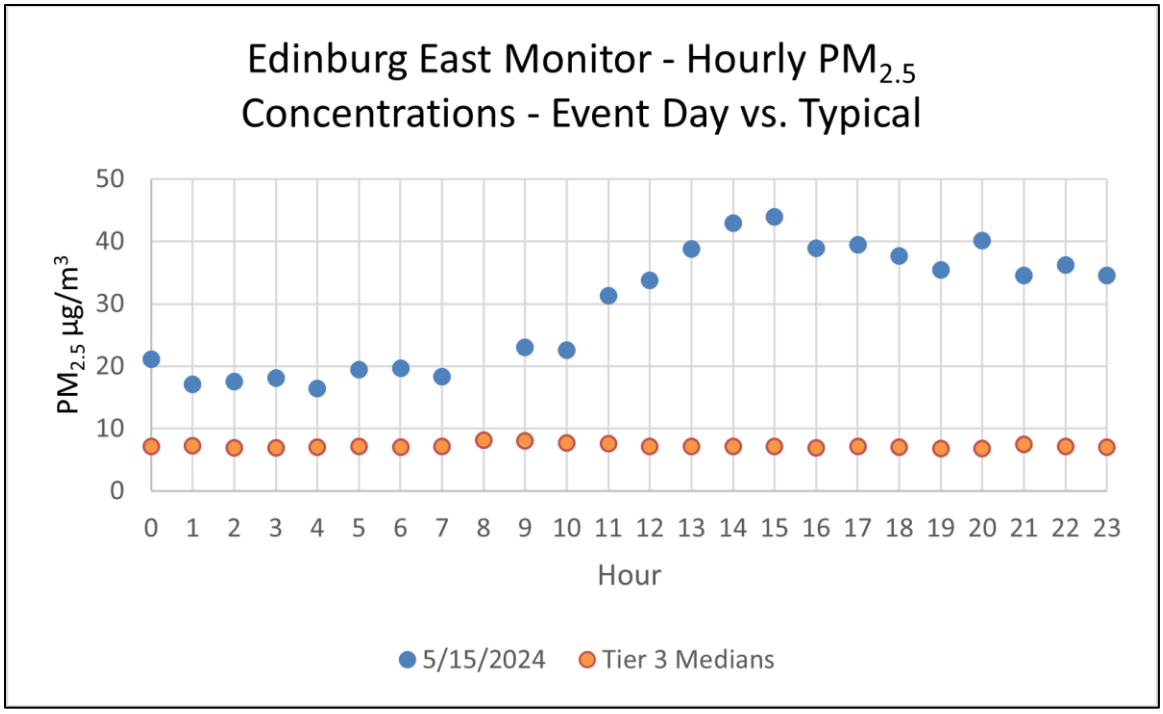

Figure 3-157: Hourly $PM_{2.5}$ Concentrations on May 15, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts for May 15, 2024, mention light to moderate density residual smoke from seasonal fires in Mexico and Central America affecting south Texas, in addition to wildfires near Del Rio, Texas and fires south of Corpus Christi also emitting smoke affecting south Texas (Table C-9). A media report from May 17, 2024 mentioned smoke from fires in Mexico reducing air quality in Texas (Figure C-5). NWS archived weather discussions from the Brownsville NWS Weather Forecast Office on May 15, 2024 mention hazy conditions due to southerly winds and fires burning in Mexico and Central America (Figure B-8). Satellite imagery reveals hazy coloration and potential smoke in the Gulf of America (Figure 3-158: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 15, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-60 and Figure 3-159: *AirNow HMS Smoke Plume for May 15, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-160: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 15, 2024*) on May 15, 2024 indicate that medium smoke coverage was transported into south Texas from Mexico, while monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups.

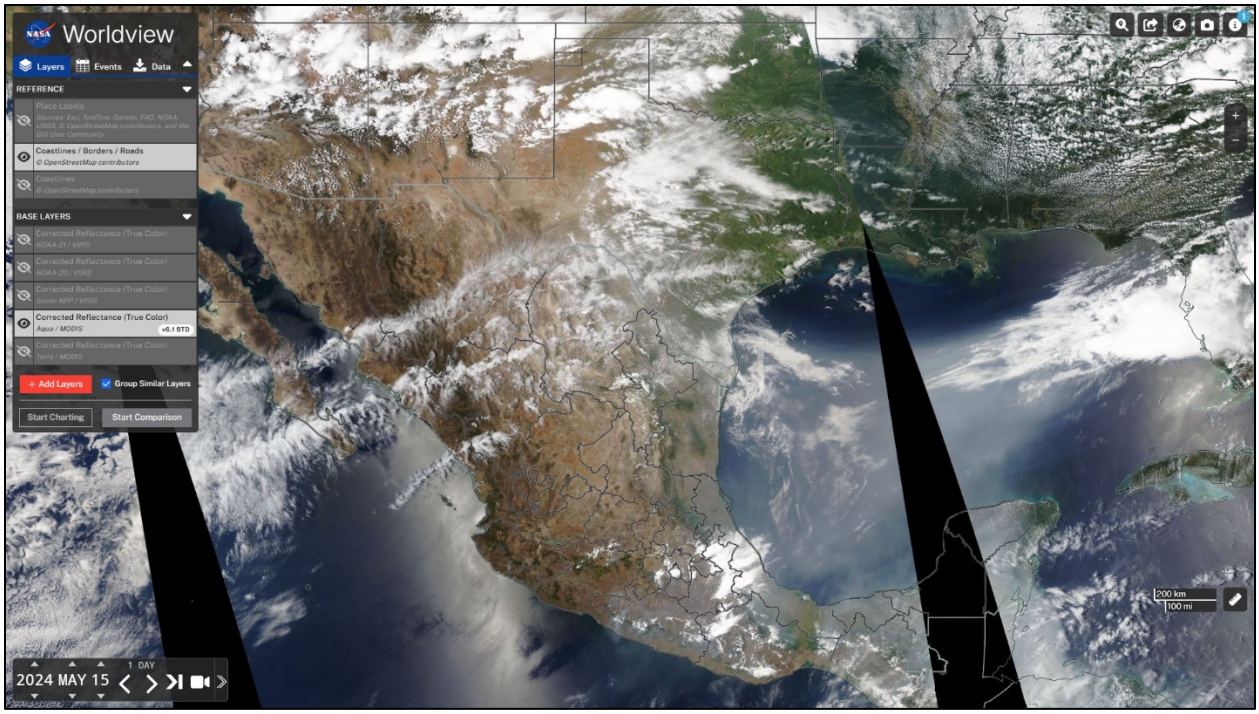

Figure 3-158: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 15, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

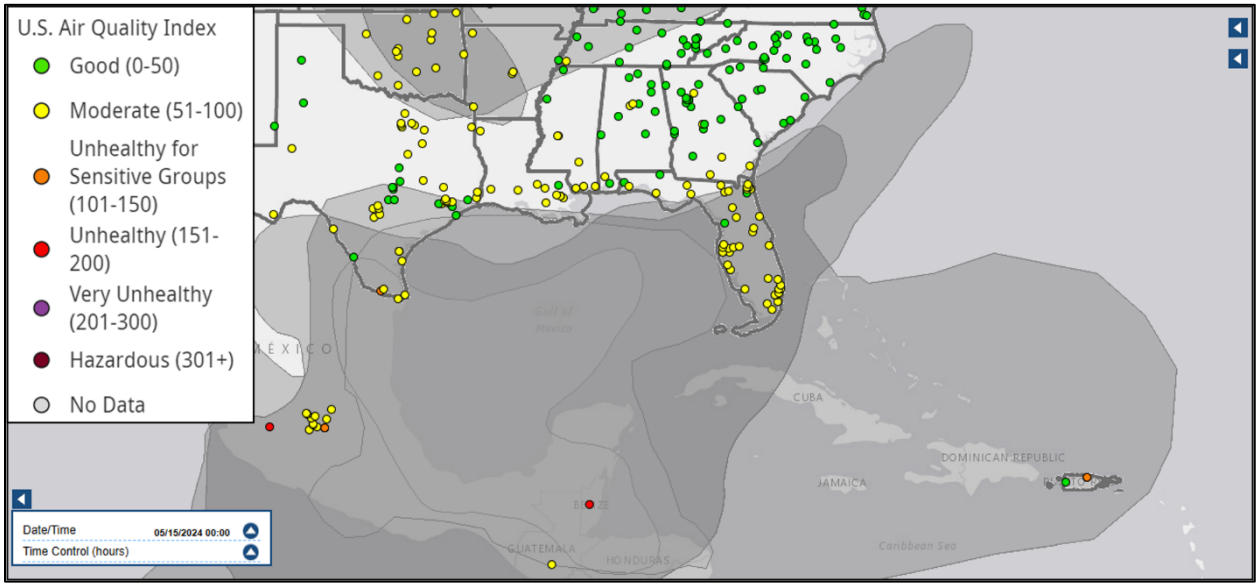

Figure 3-159: AirNow HMS Smoke Plume for May 15, 2024

Figure 3-160: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 15, 2024

May 16, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 46.6 µg/m^3; one-hour daily maximum 56.8 µg/m^3 recorded at 11:00 LST), and a Tier 1 day at the Dona Park monitor (24-hour average concentration 39.4 µg/m^3; one-hour daily maximum 63.7 µg/m^3 recorded at 15:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 16, 2024, can be compared against typical/non-event days for each monitor in Figure 3-161: *Hourly $PM_{2.5}$ Concentrations on May 16, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-162: *Hourly $PM_{2.5}$ Concentrations on May 16, 2024, Compared to Typical Concentrations at the Dona Park Monitor*.

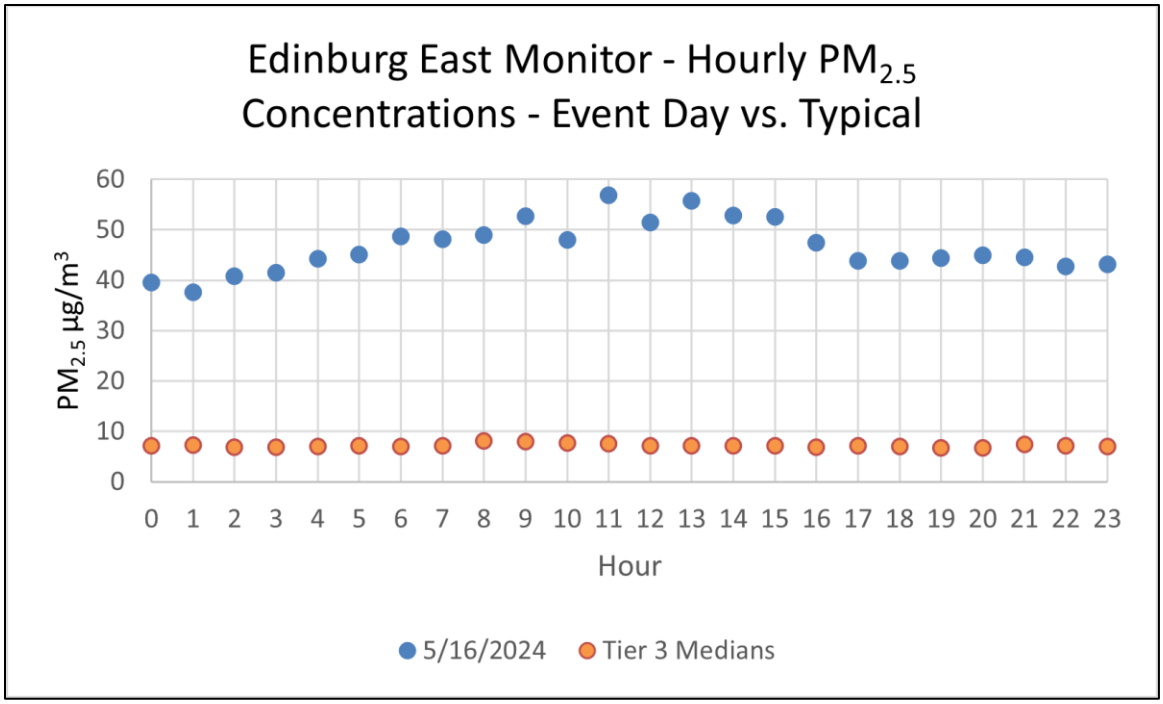

Figure 3-161: Hourly $PM_{2.5}$ Concentrations on May 16, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

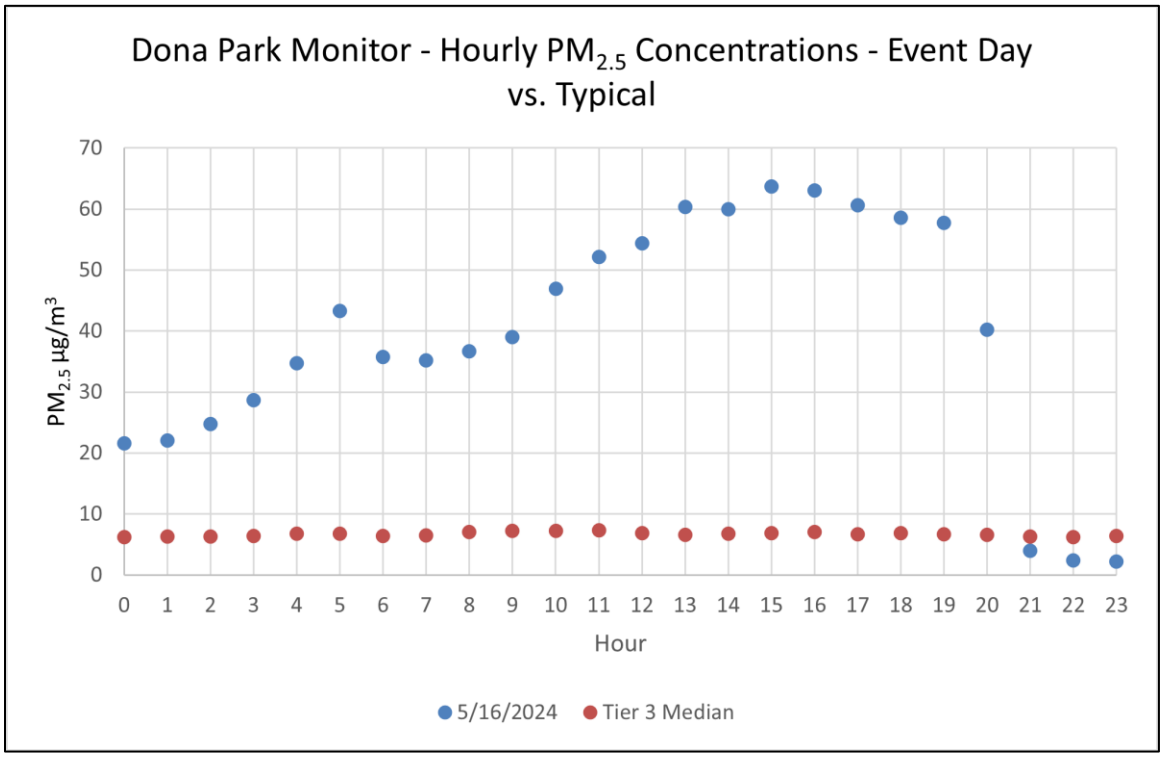

Figure 3-162: Hourly $PM_{2.5}$ Concentrations on May 16, 2024, Compared to Typical Concentrations at the Dona Park Monitor

TCEQ forecasts for May 16, 2024, mention heavier density residual smoke from the seasonal fire activities in Mexico and Central America lingering over South Texas (Table C-9). A media

report from May 17, 2024, mentioned smoke from fires in Mexico reducing air quality in Texas (Figure C-5). Satellite imagery reveals hazy coloration in south Texas and smoke in the Gulf of America (Figure 3-163: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 16, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-61 and Figure 3-164: *AirNow HMS Smoke Plume for May 16, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-165: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 16, 2024* and Figure 3-166: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 16, 2024*) on May 16, 2024 indicate that medium smoke coverage was transported into south Texas from Mexico, while monitors in south Texas had AQI levels of Moderate, Unhealthy for Sensitive Groups, and Unhealthy.

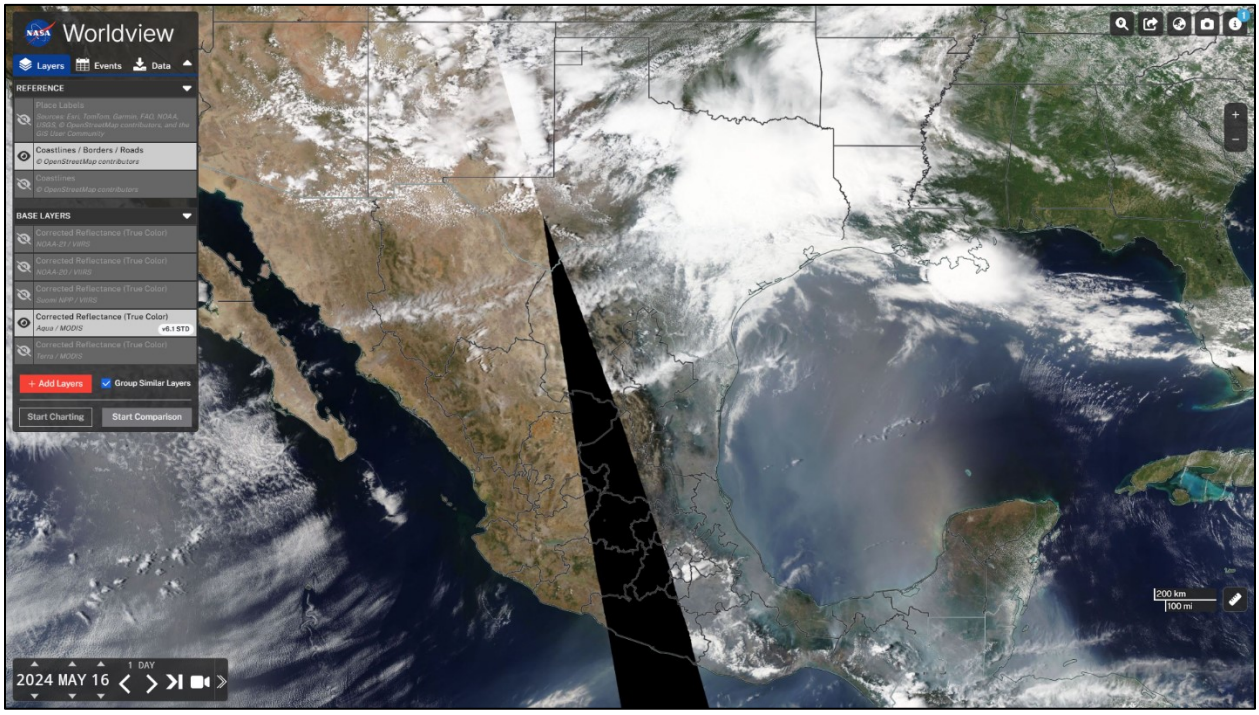

Figure 3-163: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 16, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America

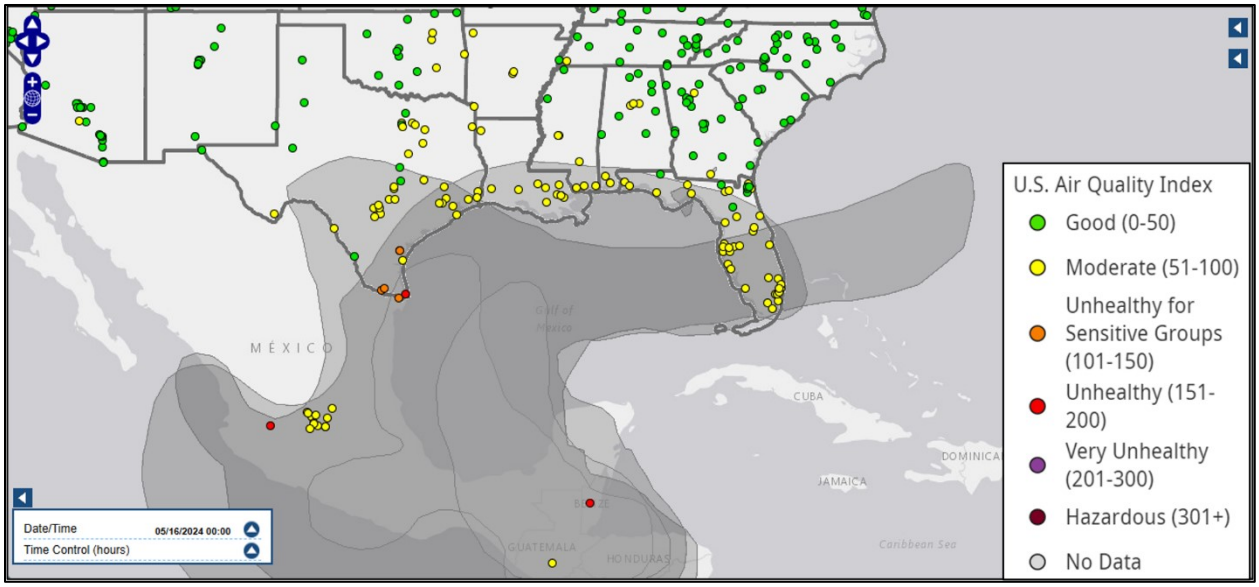

Figure 3-164: AirNow HMS Smoke Plume for May 16, 2024

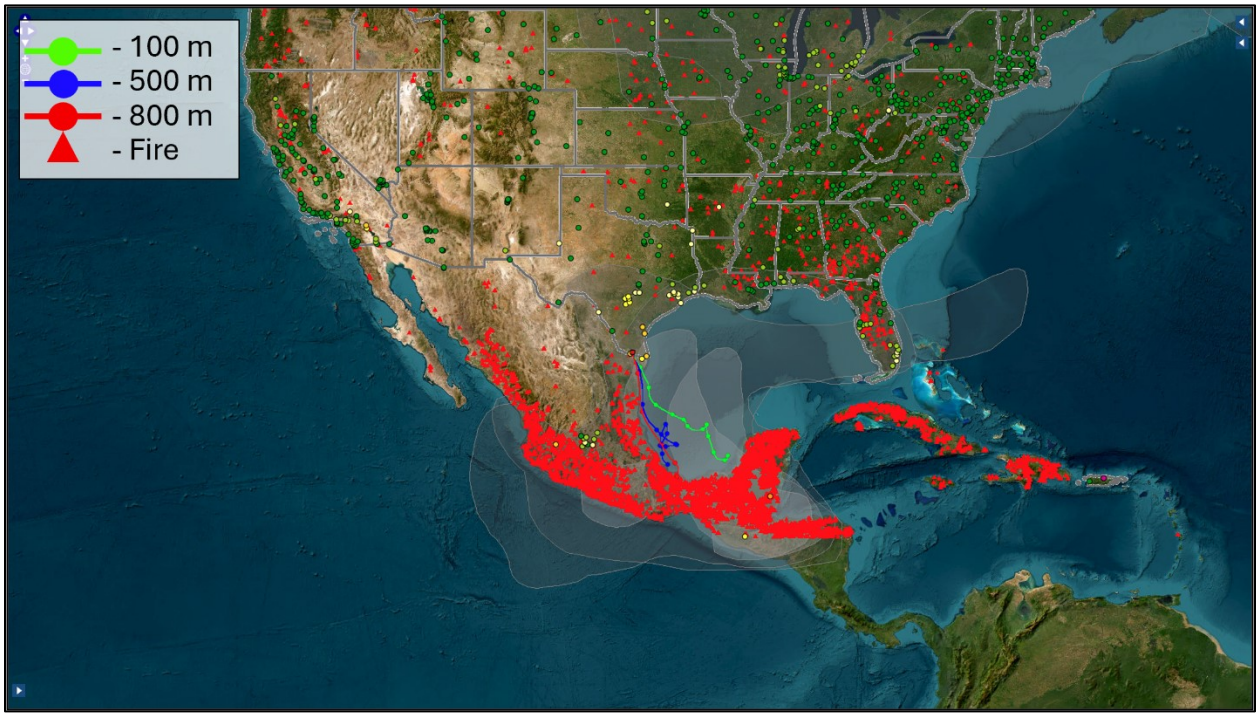

Figure 3-165: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 16, 2024

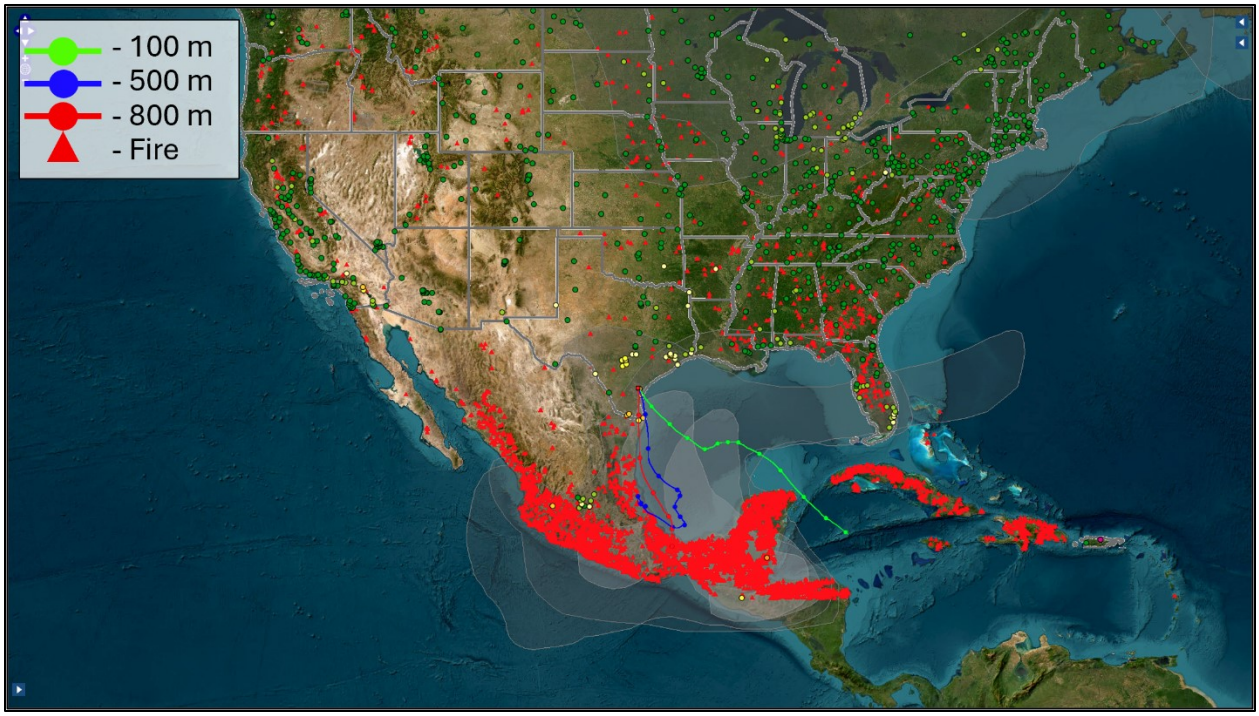

Figure 3-166: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 16, 2024

May 18, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 24.2 µg/m^3; one-hour daily maximum 40.2 µg/m^3 recorded at 14:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 18 can be compared against typical/non-event days for the Edinburg East Freddy Gonzalez Drive monitor in Figure 3-167: *Hourly $PM_{2.5}$ Concentrations on May 18, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

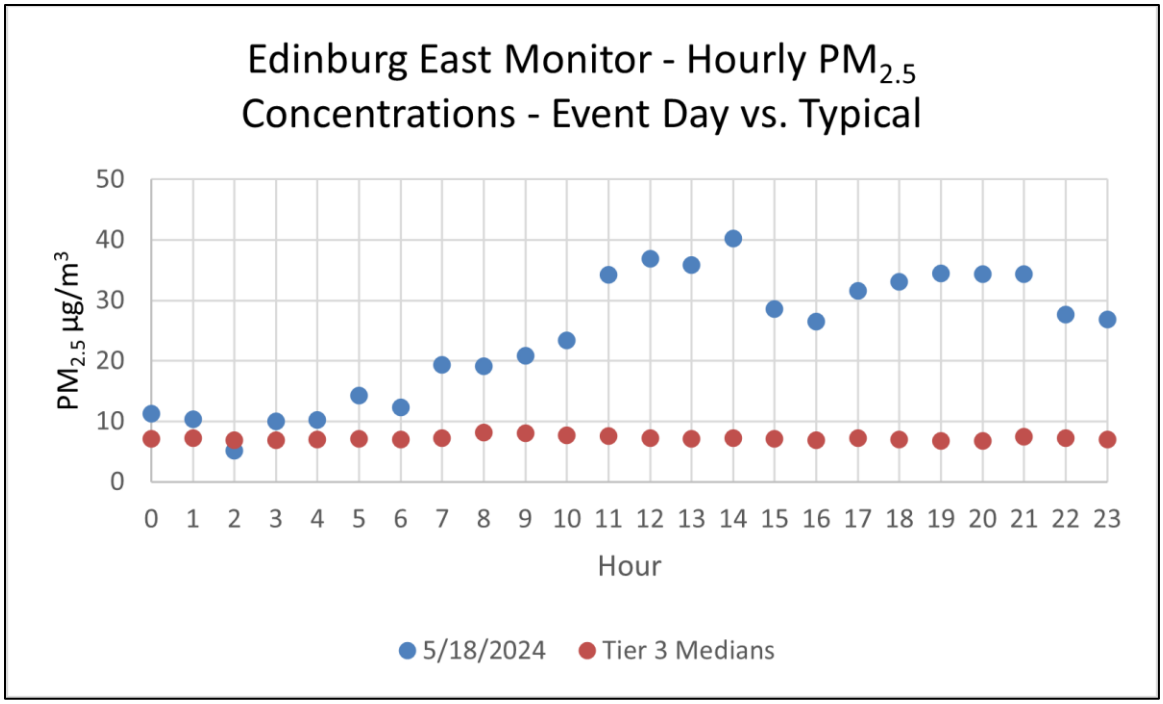

Figure 3-167: Hourly $PM_{2.5}$ Concentrations on May 18, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts for May 18, 2024, mention increased particulate matter levels due to light to moderate density smoke from seasonal fires from Mexico and Central America, and elevated relative humidity and urban fine particulate levels (Table C-9). A media report from May 17 and a Facebook post made by the U.S. National Weather Service Brownsville/Rio Grande Valley Texas page on May 19, 2024, mentioned smoke and haze from fires in Mexico affecting Texas (Figure C-5 and Figure C-6). NWS archived weather discussions from the Brownsville NWS Weather Forecast Office on May 18, 2024, mention unhealthy air due to smoke and haze across south Texas and the open Gulf (Figure B-10). Satellite imagery reveals hazy coloration in south Texas and smoke in the Gulf of America (Figure 3-168: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 18, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-62 and Figure 3-169: *AirNow HMS Smoke Plume for May 18, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-170: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 18, 2024*) on May 18, 2024 indicate that medium to heavy smoke was transported into South and East Texas from Mexico, while monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the southern Mexico traveled through deep south Texas (Figure 3-171: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 15, 2024*).

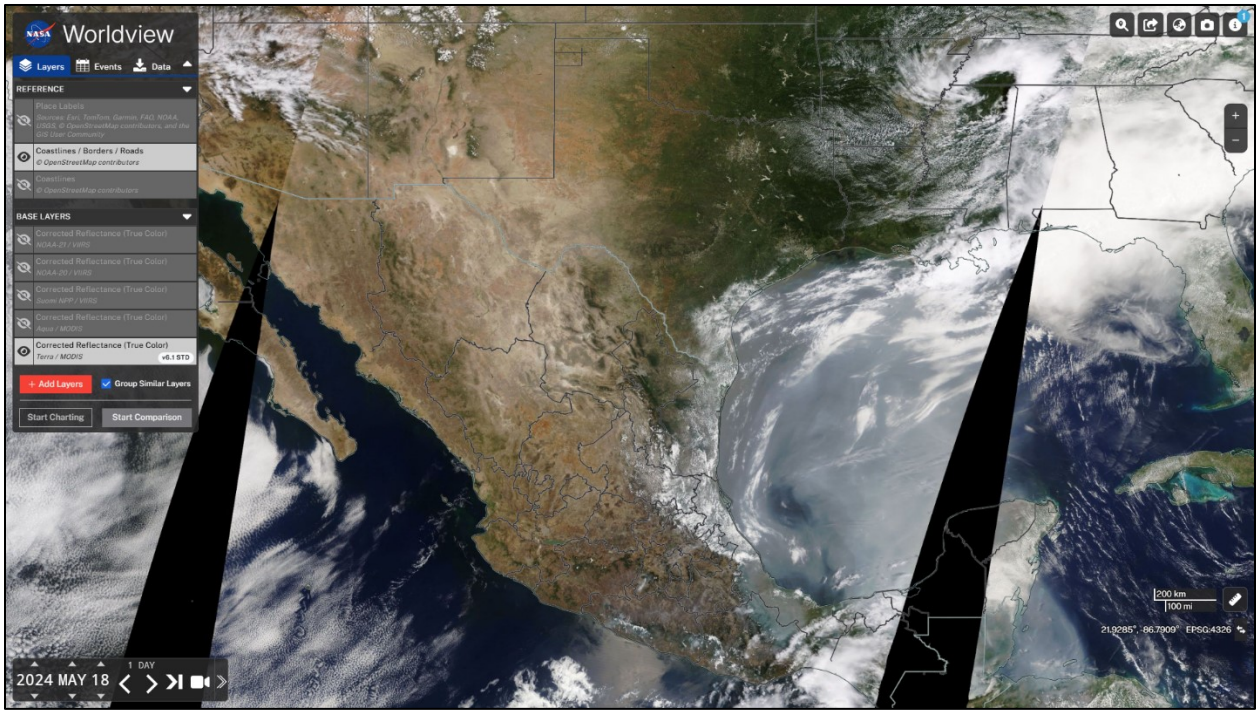

Figure 3-168: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 18, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

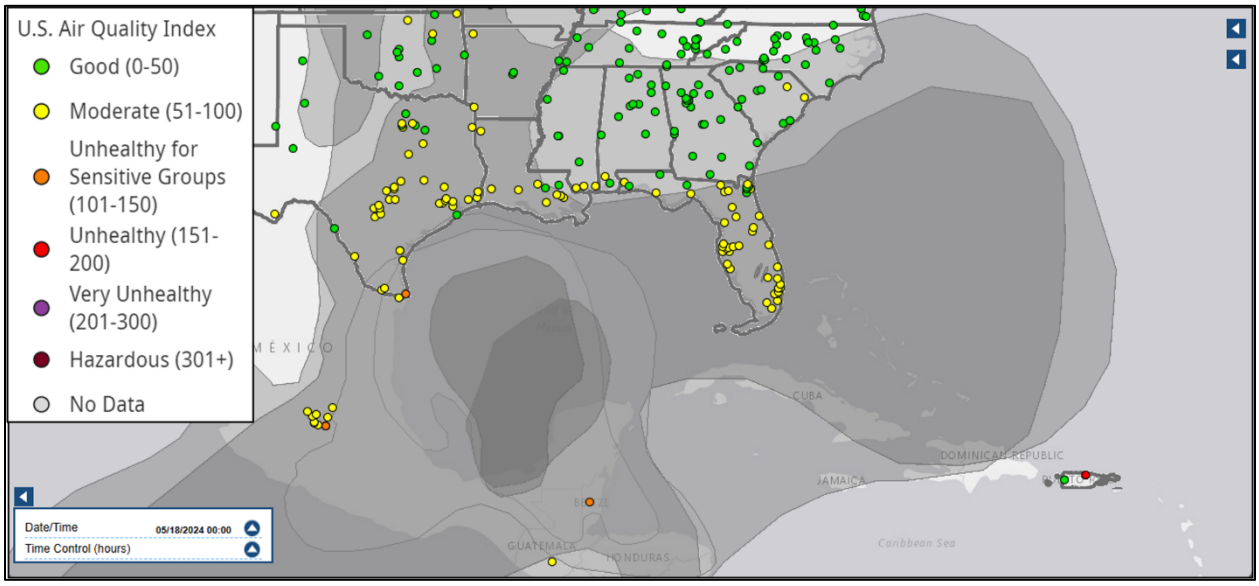

Figure 3-169: AirNow HMS Smoke Plume for May 18, 2024

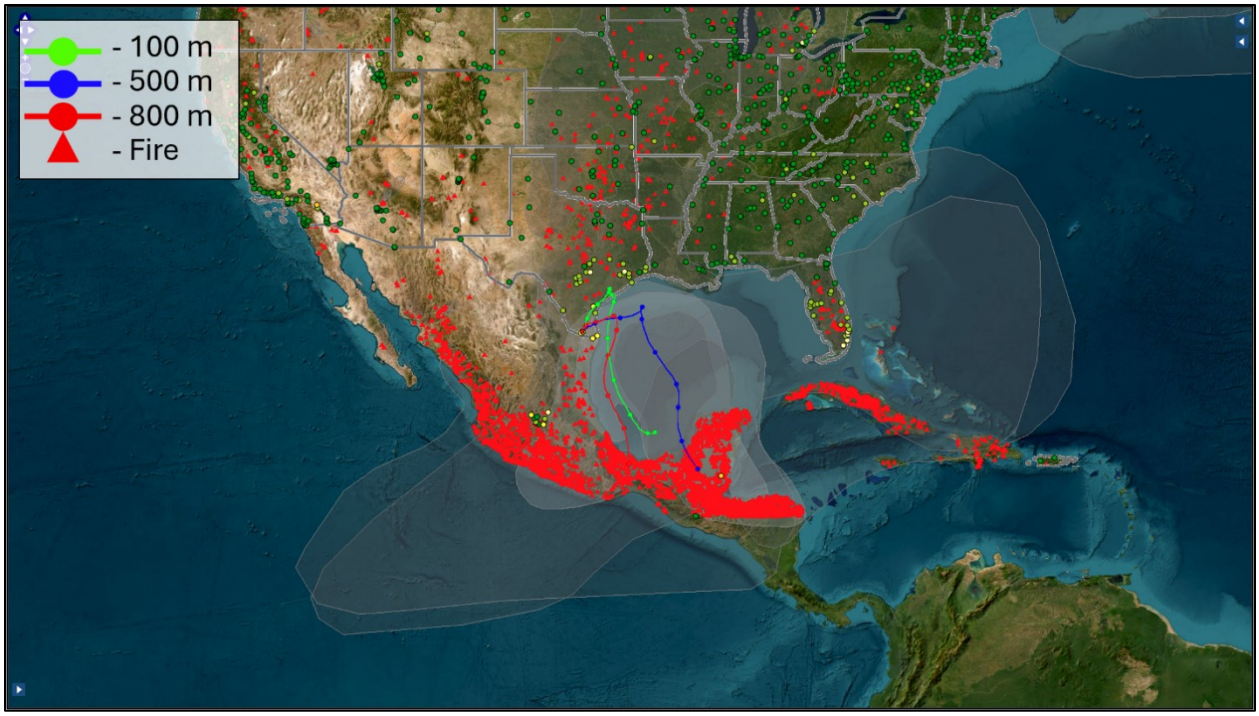

Figure 3-170: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 18, 2024

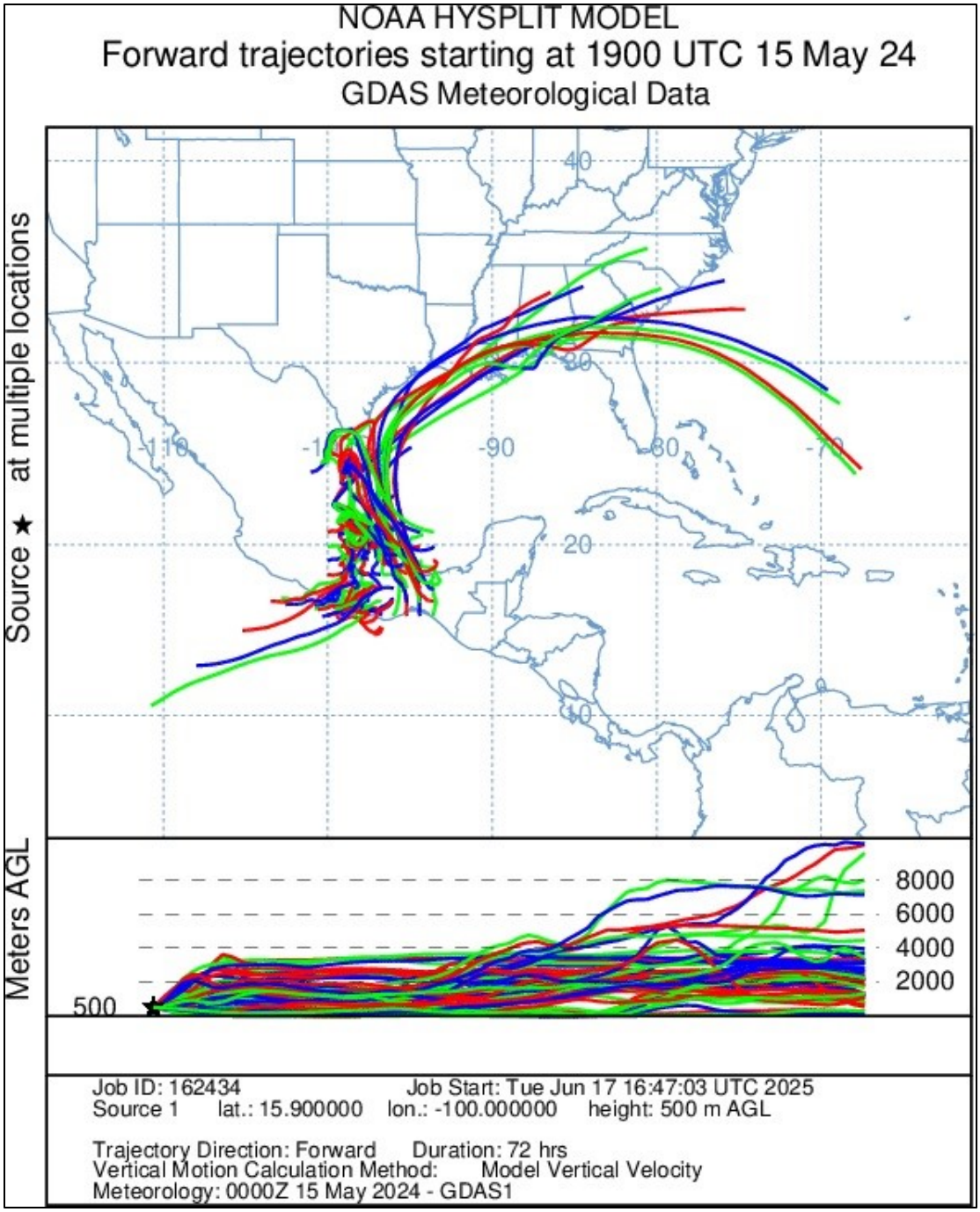

Figure 3-171: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 15, 2024

May 19, 2024, is identified as a Tier 2 day at the Von Ormy Highway 16 monitor (24-hour average concentration 29.0 µg/m^3; one-hour daily maximum 41.0 µg/m^3 recorded at 08:00 LST), a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 30.5 µg/m^3; one-hour daily maximum 42.3 µg/m^3 recorded at 09:00 LST), a Tier 1 day at the Dona Park monitor (24-hour average concentration 35.9 µg/m^3; one-hour daily maximum 49.7 µg/m^3 recorded at 10:00 LST), and a Tier 2 day at the World Trade Bridge monitor (24-hour average concentration 30.5 µg/m^3; one-hour daily maximum 45.4 µg/m^3 recorded at 07:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires

in Mexico. Hourly concentrations on May 19, 2024, can be compared against typical/non-event days for each monitor in Figure 3-172: *Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-173: *Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-174: *Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, and Figure 3-175: *Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor.*

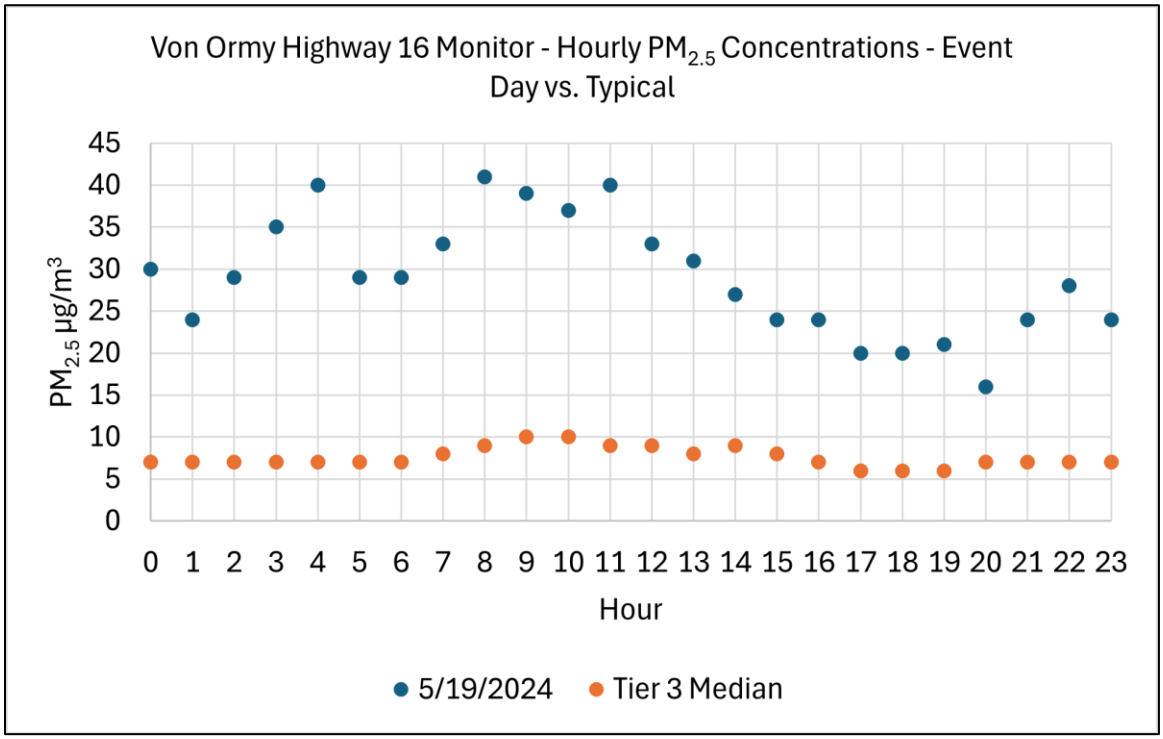

Figure 3-172: Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

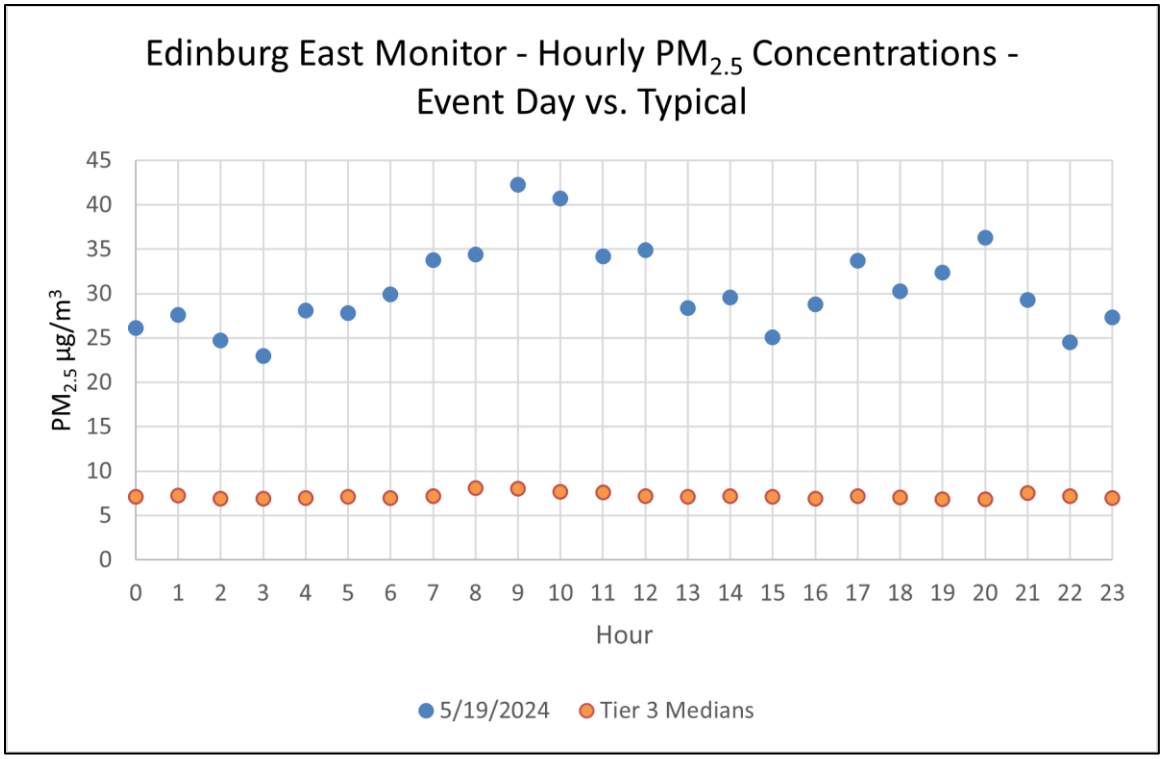

Figure 3-173: Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

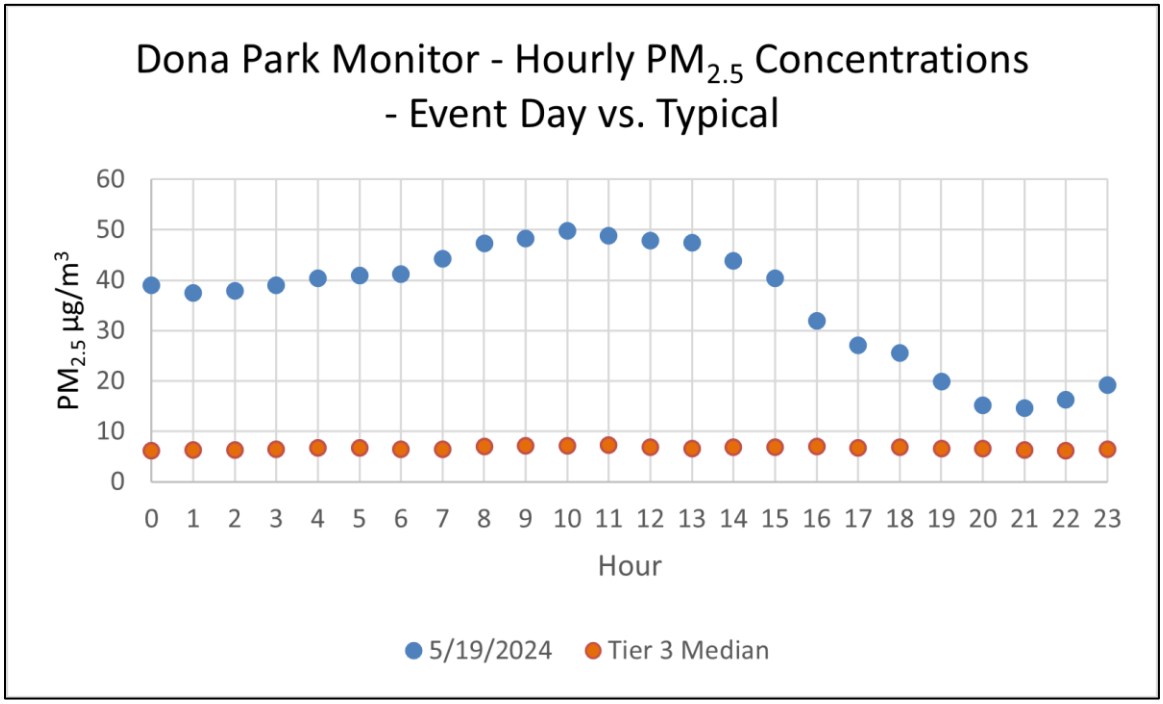

Figure 3-174: Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the Dona Park Monitor

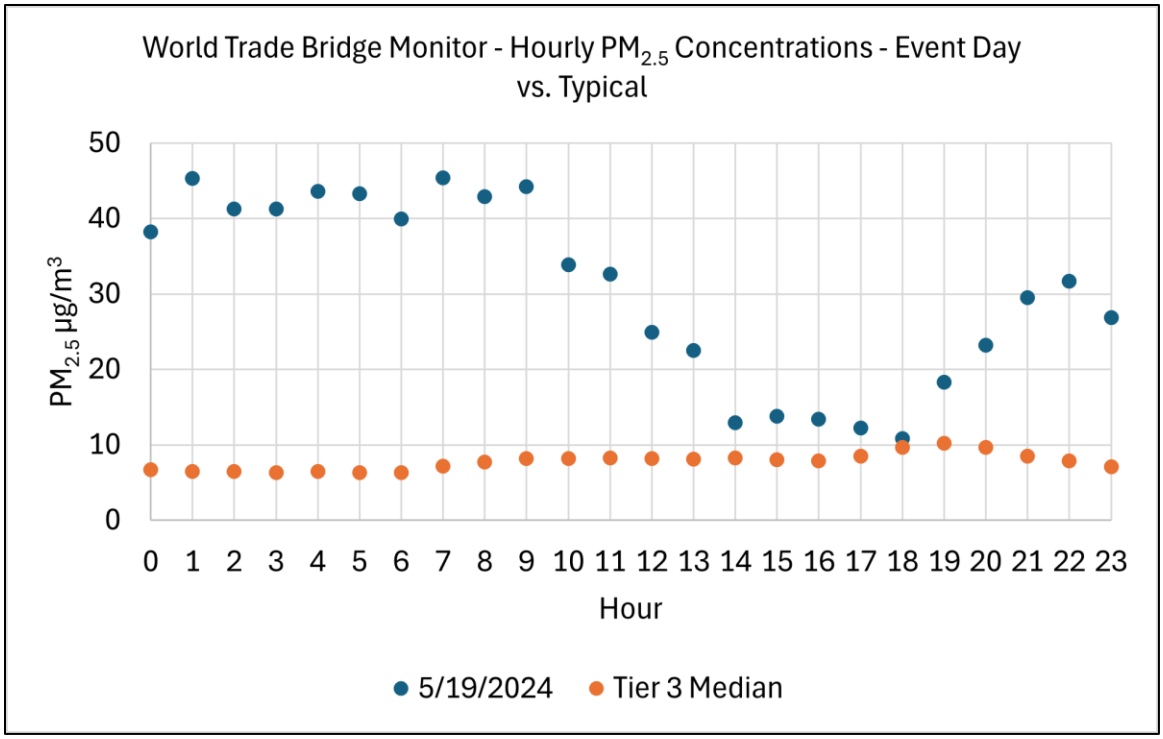

Figure 3-175: Hourly $PM_{2.5}$ Concentrations on May 19, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 19, 2024, mention increased fine particulate matter levels due to high relative humidity and urban fine particulate background aerosols associated with light winds and continental haze in the eastern two-thirds of the state in addition to light to moderate smoke from seasonal fires in Mexico and Central America affecting south Texas (Table C-9). A Facebook post made by the US National Weather Service Brownsville/Rio Grande Valley Texas page May 19, 2024, mentioned smoke and haze from fires in Mexico affecting deep South Texas (Figure C-6). NWS archived weather discussions from the Brownsville, Corpus Christi, and Austin/San Antonio NWS Weather Forecast Offices on May 19, 2024, mention poor air quality, reduced visibility, and hazy conditions due to smoke from agricultural fires in southeast Mexico and wildfires in Central America being pushed north and northwest towards Texas (Figure B-9, Figure B-10, and Figure B-11). Satellite imagery reveals hazy coloration and smoke in the Gulf of America (Figure 3-176: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 19, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-63 and Figure 3-177: *AirNow HMS Smoke Plume for May 19, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-178: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 19, 2024*, Figure 3-179: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 19, 2024*, Figure 3-180: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 19, 2024*, and Figure 3-181: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 19, 2024*) on May 19, 2024 indicate that medium to heavy smoke covered southern Texas and the Gulf of America/Mexico, respectively, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through deep South and Central Texas (Figure 3-182: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 16, 2024*).

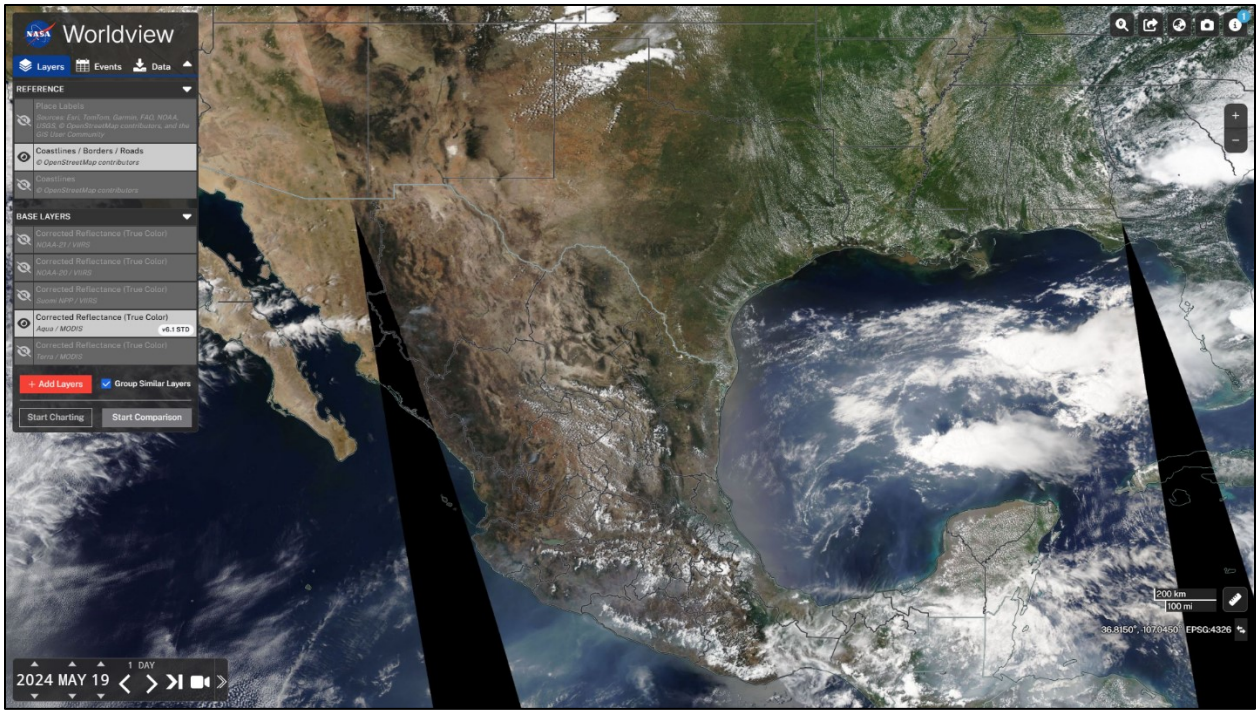

Figure 3-176: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 19, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

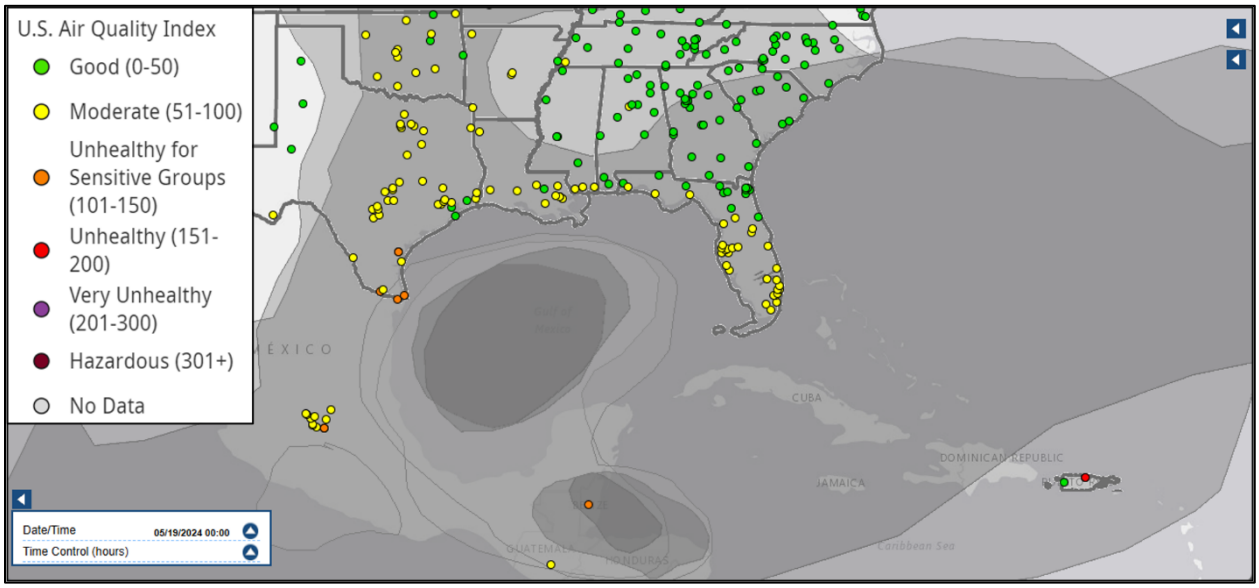

Figure 3-177: AirNow HMS Smoke Plume for May 19, 2024

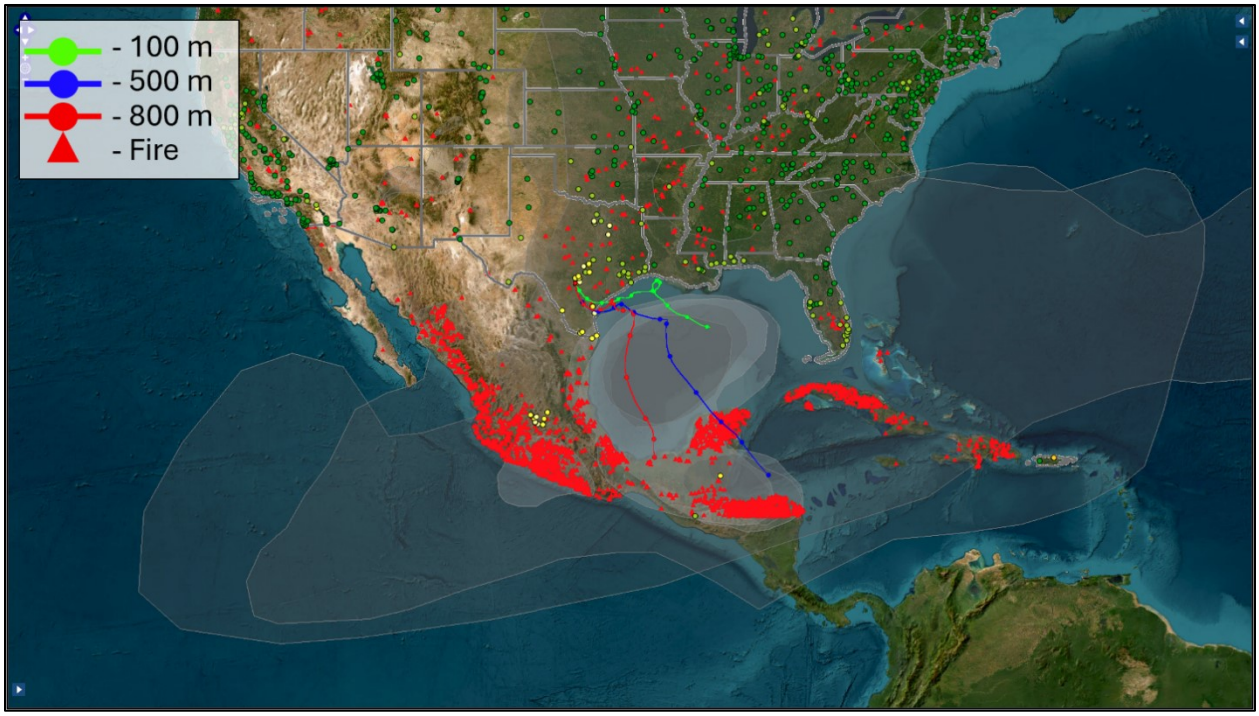

Figure 3-178: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 19, 2024

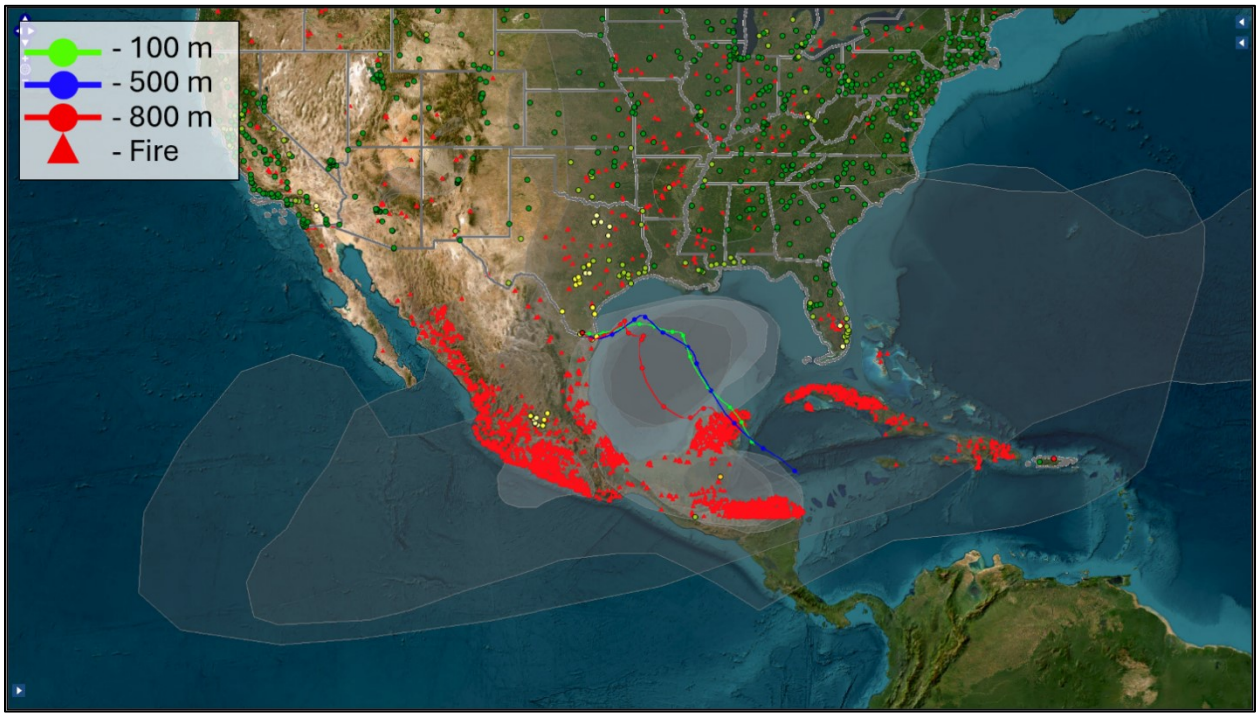

Figure 3-179: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 19, 2024

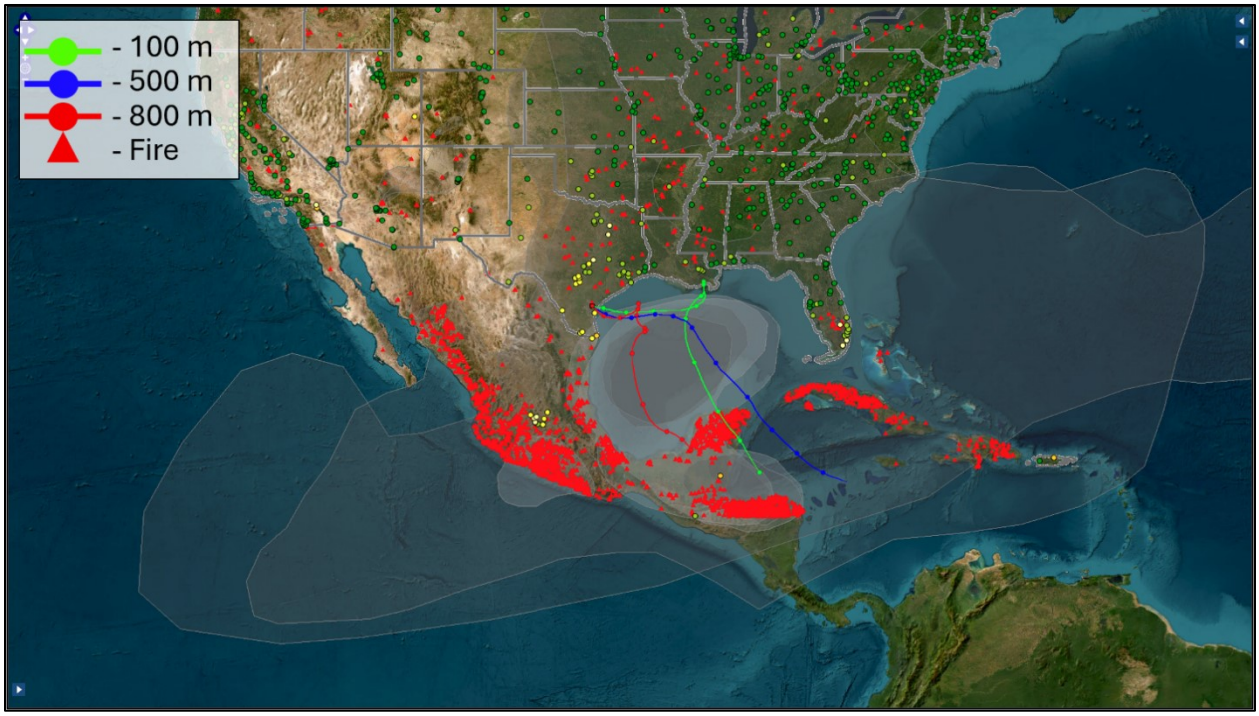

Figure 3-180: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 19, 2024

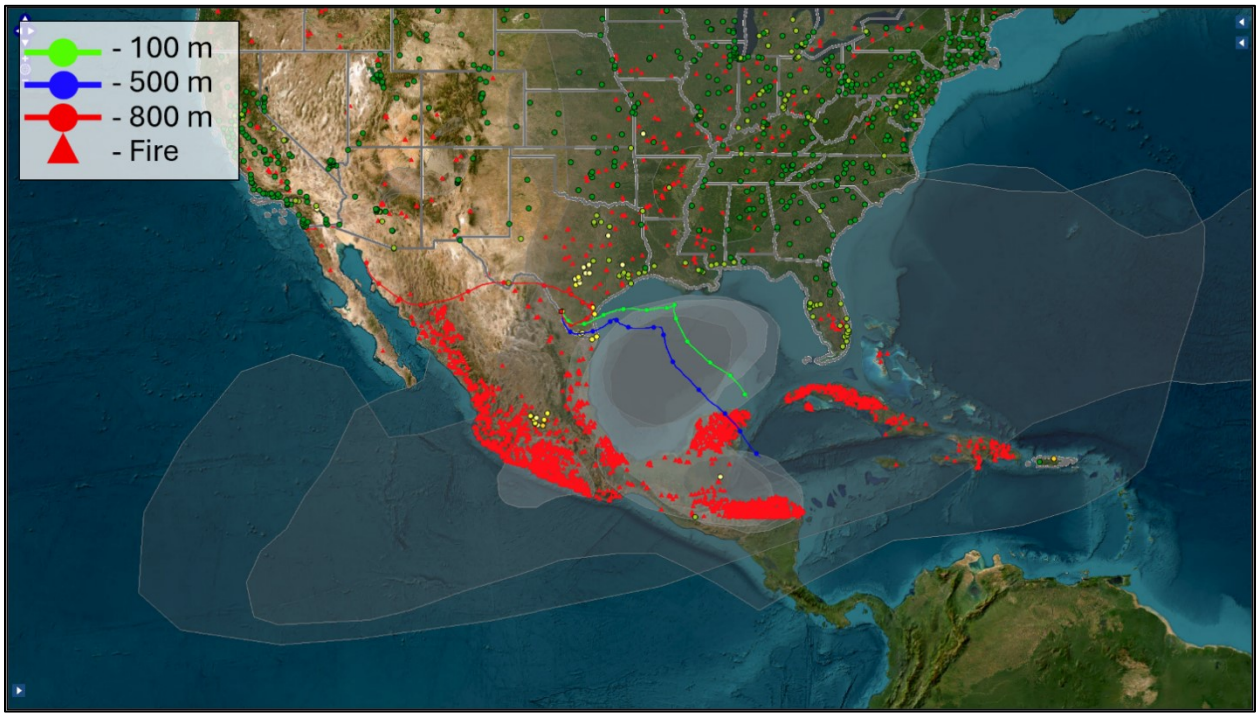

Figure 3-181: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 19, 2024

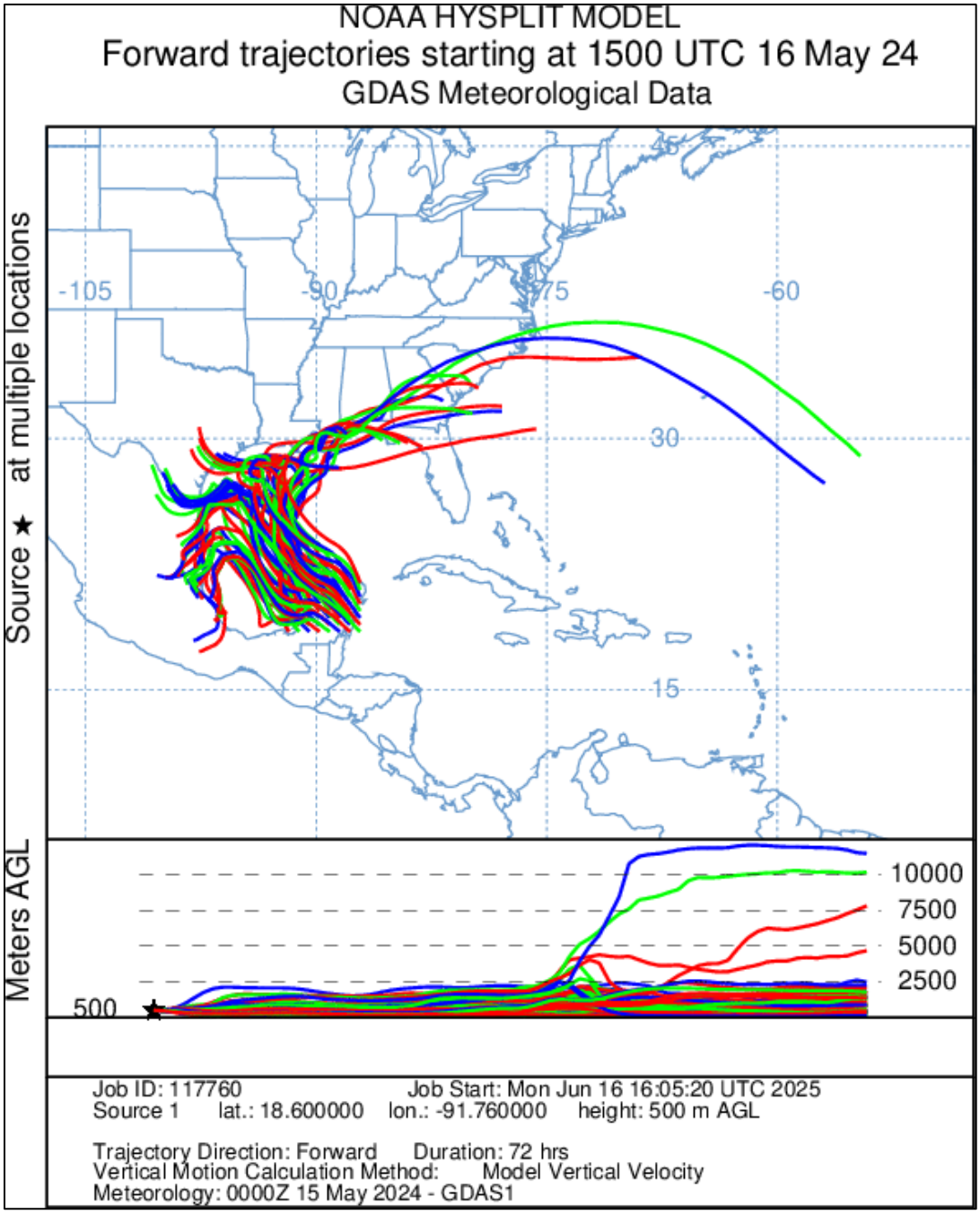

Figure 3-182: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 16, 2024

May 20, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 35.7 µg/m^3; one-hour daily maximum 47.8 µg/m^3 recorded at 20:00 LST) and a Tier 1 day at the World Trade Bridge monitor (24-hour average concentration 34.7 µg/m^3; one-hour daily maximum 45.1 µg/m^3 recorded at 11:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 20, 2024, can be compared against typical/non-event days for each monitor in Figure 3-183: *Hourly $PM_{2.5}$ Concentrations on May 20, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-184: *Hourly $PM_{2.5}$ Concentrations on May 20, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

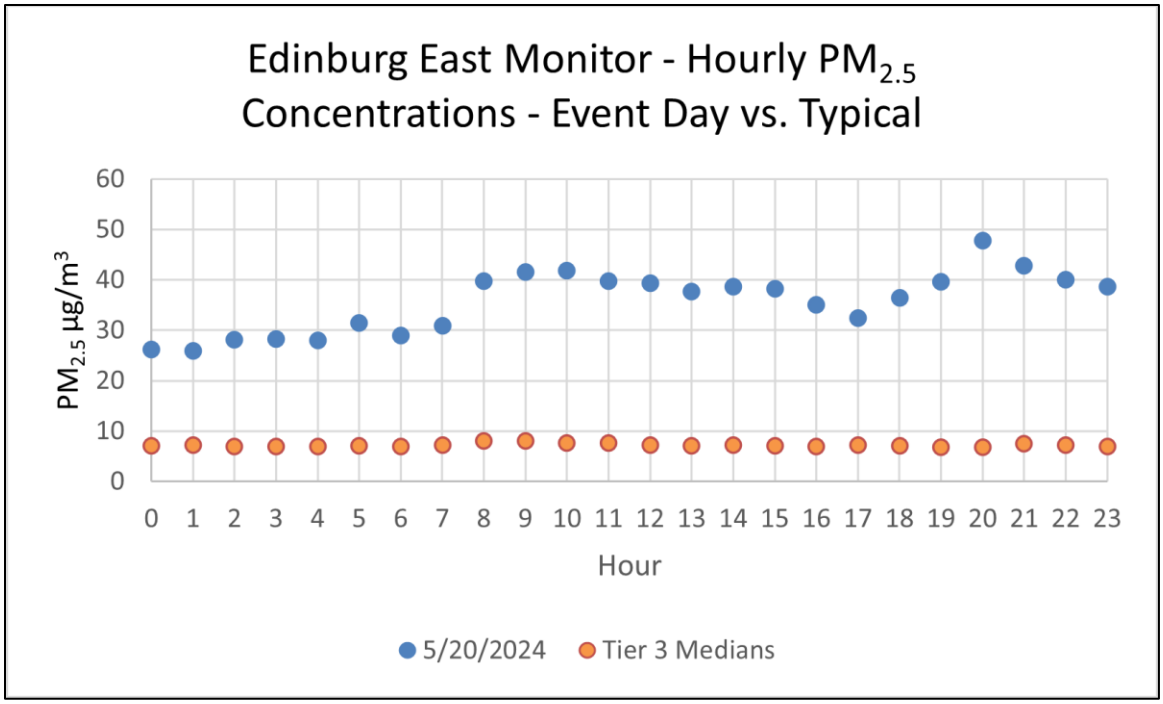

Figure 3-183: Hourly $PM_{2.5}$ Concentrations on May 20, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

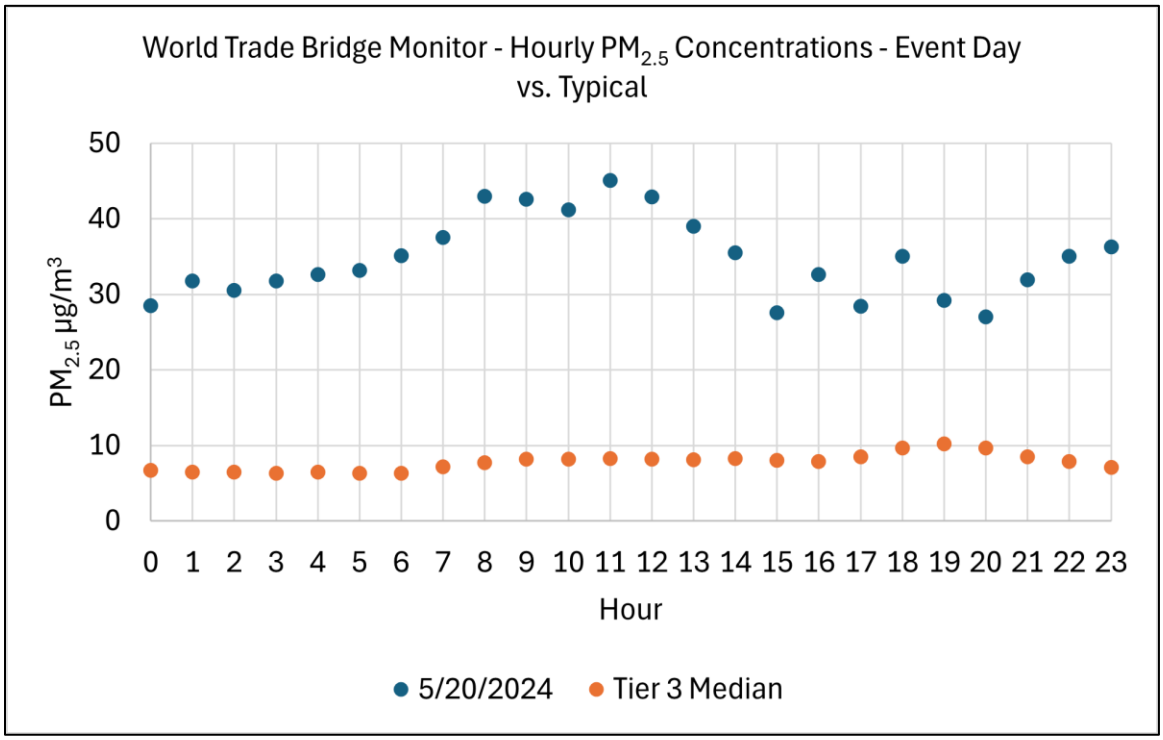

Figure 3-184: Hourly $PM_{2.5}$ Concentrations on May 20, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 20, 2024, mention light to moderate residual smoke from residual smoke from seasonal burnings in Mexico and Central America in addition to aerosols from industrial sources in Mexico, and gas flaring in the southwest Gulf of America expanding across

the majority of Texas, with highest concentrations in south Texas (Table C-9). A media report from May 21, 2024, mentioned smoke from fires in Central America filtering over Texas (Figure C-7). NWS archived weather discussions from the Brownsville and Corpus Christi NWS Weather Forecast Offices on May 20, 2024, mention hazy conditions due to the agricultural fires in southeast Mexico (Figure B-9 and Figure B-10). Satellite imagery reveals hazy coloration and smoke in the Gulf of America (Figure 3-185: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 20, 2024, Showing Haze and Smoke in Mexico and the Gulf of America*). Smoke plumes (Figure A-64 and Figure 3-186: *AirNow HMS Smoke Plume for May 20, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-187: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 20, 2024* and Figure 3-188: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 20, 2024*) on May 20, 2024 indicate that medium smoke covered south Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups.

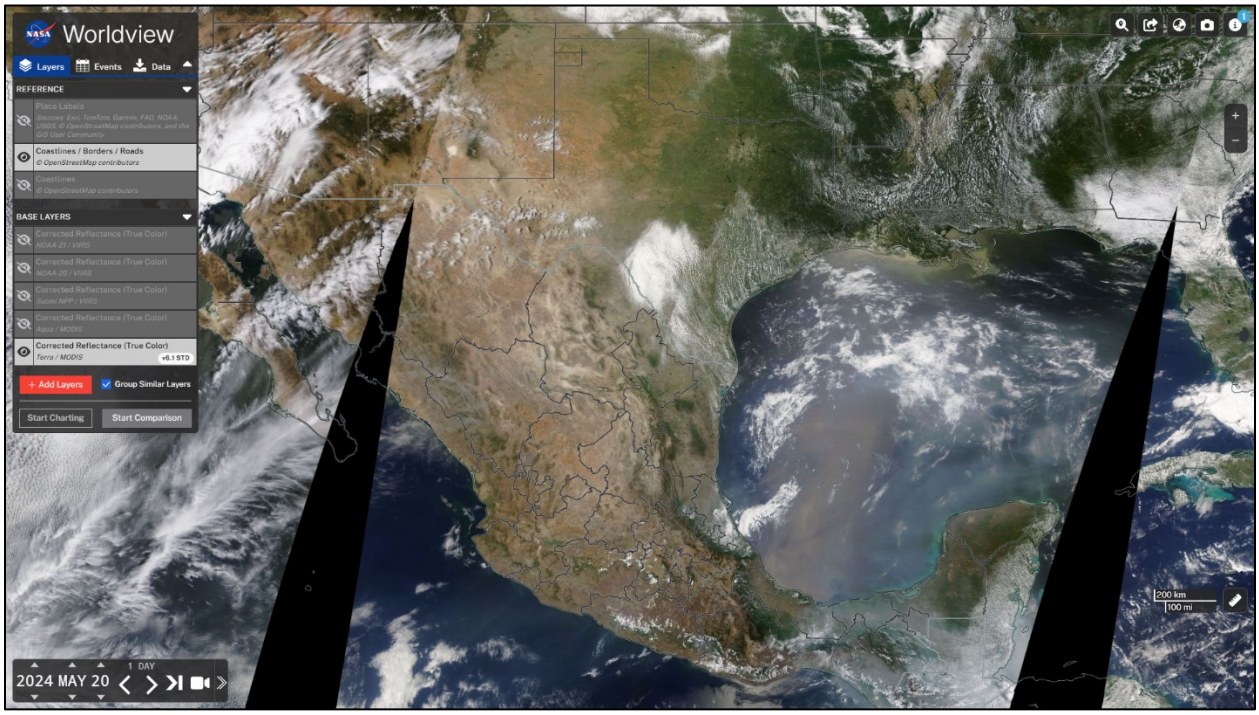

Figure 3-185: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 20, 2024, Showing Haze and Smoke in Mexico and the Gulf of America

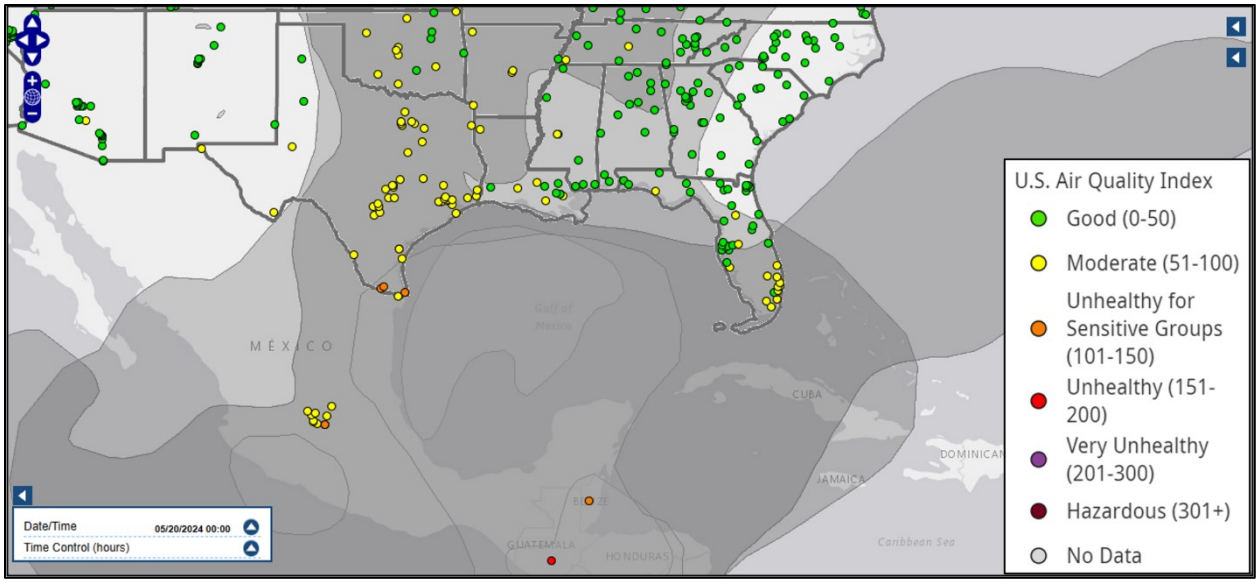

Figure 3-186: AirNow HMS Smoke Plume for May 20, 2024

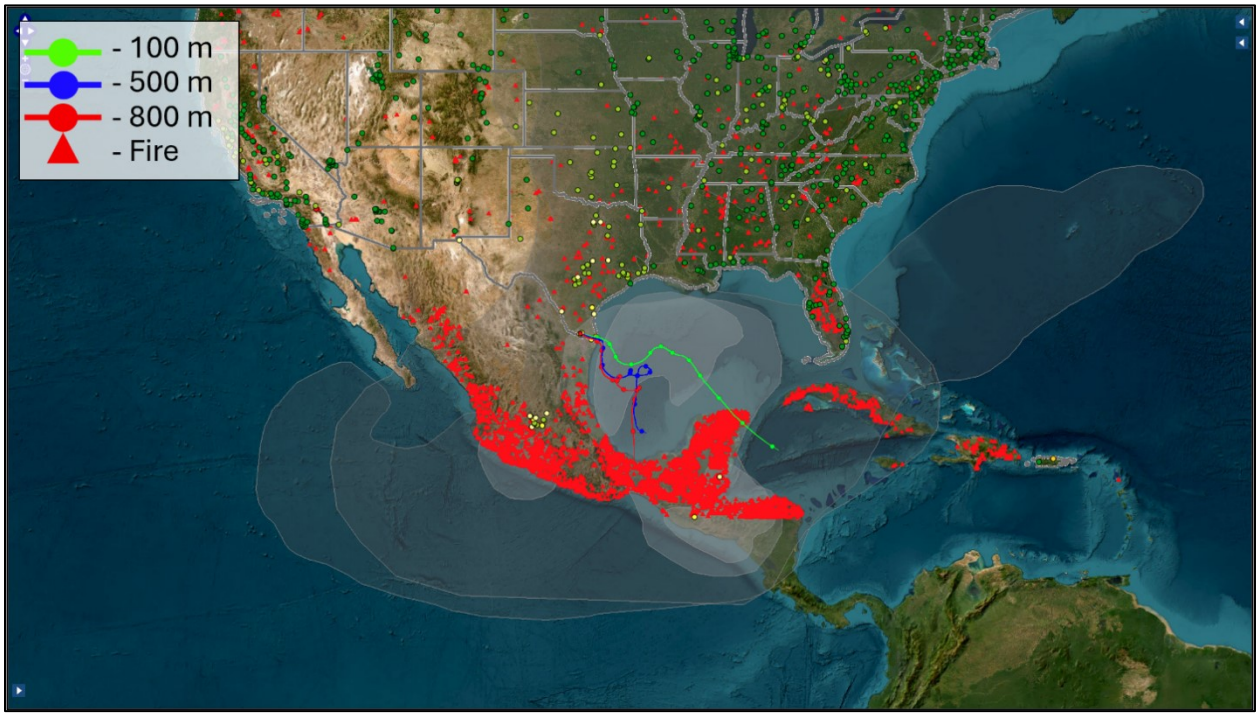

Figure 3-187: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 20, 2024

Figure 3-188: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 20, 2024

May 21, 2024, is identified as a Tier 2 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 33.4 µg/m^3; one-hour daily maximum 52.0 µg/m^3 recorded at 07:00 LST).

May 21, 2024, is identified as a Tier 1 day for the:

- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 36.2 µg/m^3; one-hour daily maximum 42.5 µg/m^3 recorded at 17:00 LST);
- Dona Park monitor (24-hour average concentration 41.1 µg/m^3; one-hour daily maximum 50.5 µg/m^3 recorded at 01:00 LST);
- Haws Athletic Center (24-hour average concentration 26.3 µg/m^3; one-hour daily maximum 34.7 µg/m^3 recorded at 21:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 39.2 µg/m^3; one-hour daily maximum 47.3 µg/m^3 recorded at 12:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 21, 2024, can be compared against typical/non-event days for each monitor in Figure 3-189: *Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-190: *Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-191: *Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, Figure 3-192: *Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor*, and Figure 3-193: *Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

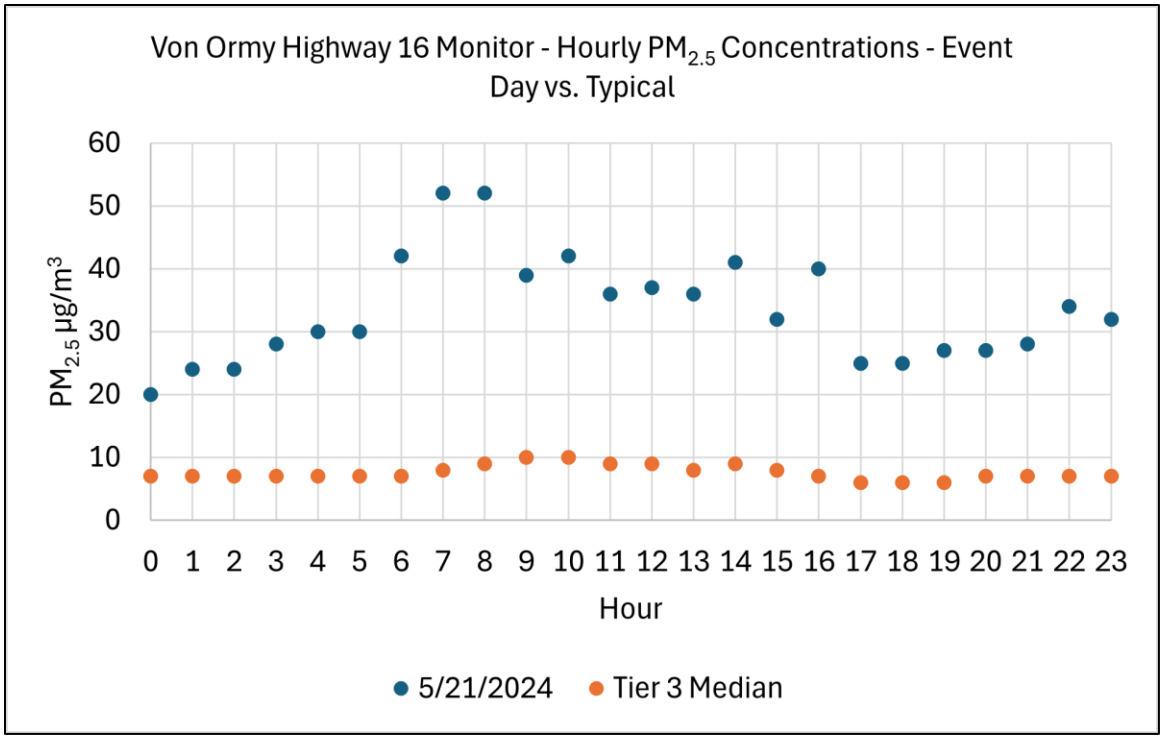

Figure 3-189: Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

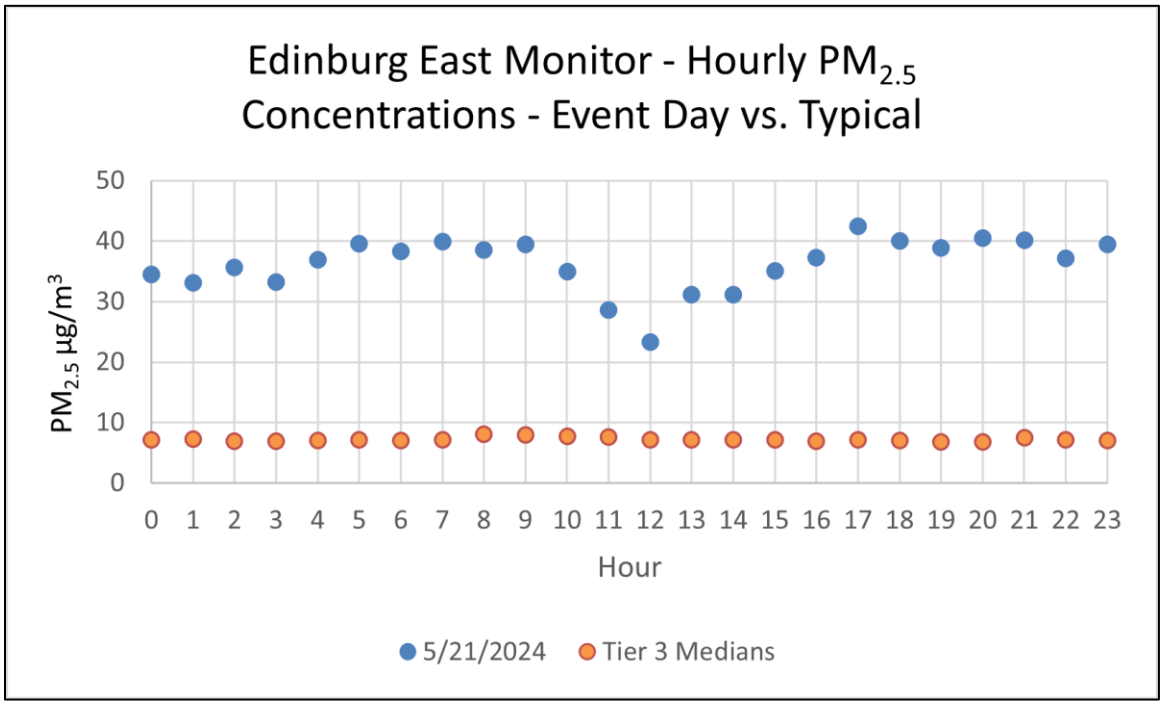

Figure 3-190: Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

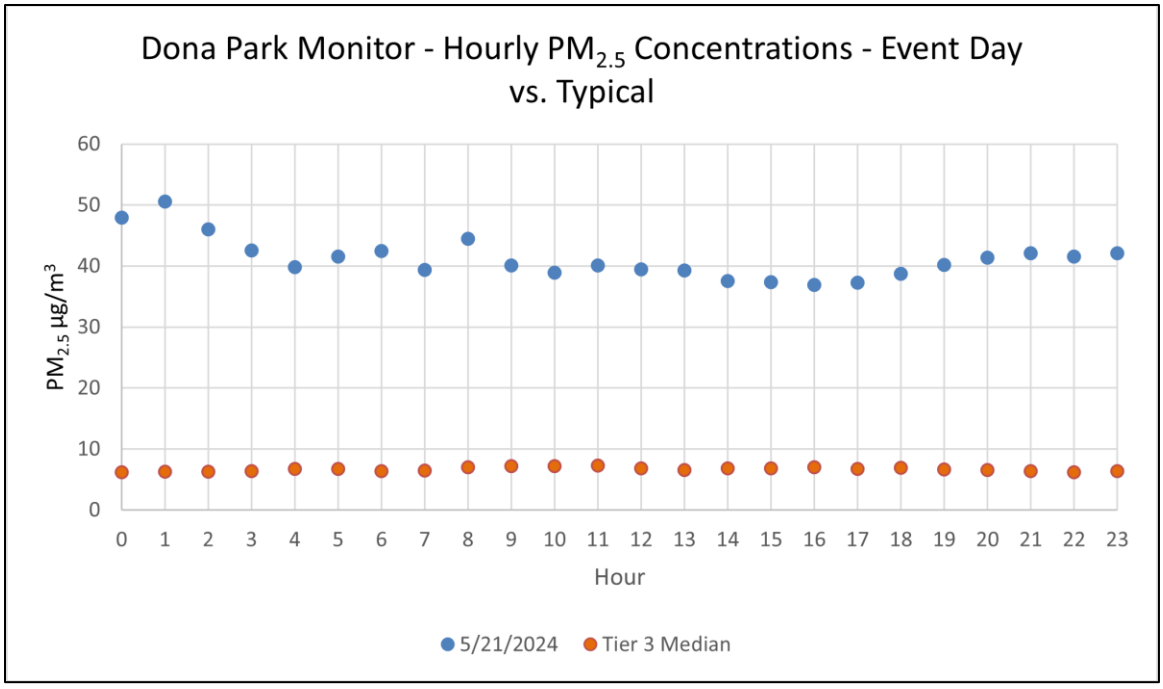

Figure 3-191: Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Dona Park Monitor

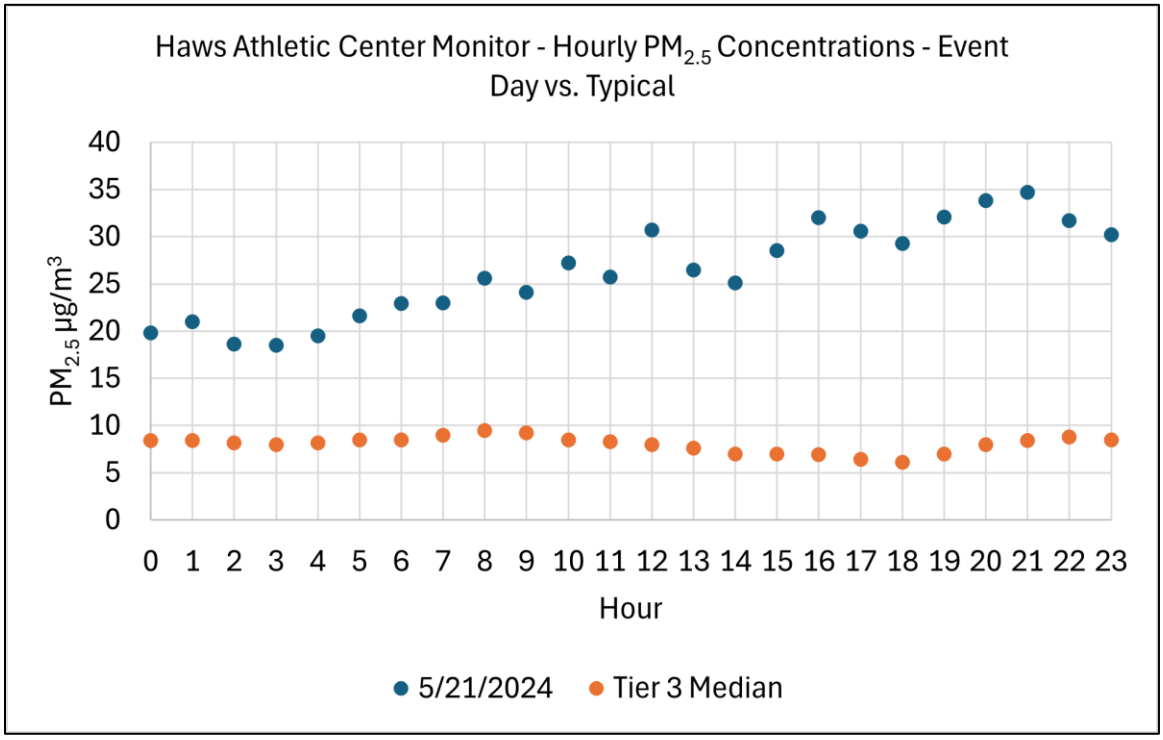

Figure 3-192: Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

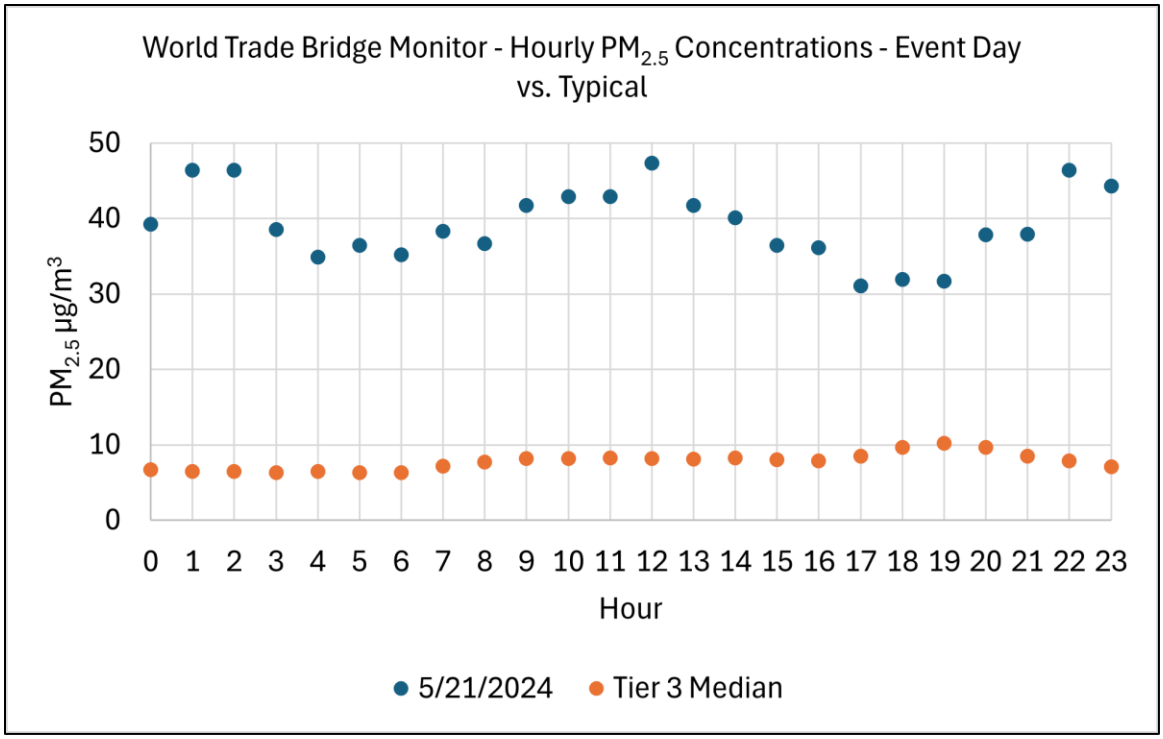

Figure 3-193: Hourly $PM_{2.5}$ Concentrations on May 21, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 21, 2024, mention moderate density residual smoke from a combination of seasonal burning in Mexico and Central America in addition to aerosols from industrial sources in Mexico and gas flaring activities in the southwest Gulf of America filtering over south central, southeast, north central Texas, and the upper Rio Grande Valley (Table C-9). A media report from May 21, 2024, mentioned smoke from fires in Central America filtering over Texas (Figure C-7). NWS archived weather discussions from the Brownsville, Corpus Christi, and Austin/San Antonio NWS Weather Forecast Offices on May 21, 2024, mention hazy conditions due to smoke from agricultural fires burning in southeast Mexico (Figure B-9, Figure B-10, and Figure B-11). Satellite imagery reveals hazy coloration in South and East Texas, and smoke in Mexico and the Gulf of America (Figure 3-194: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 21, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-65 and Figure 3-195: *AirNow HMS Smoke Plume for May 21, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-196: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 21, 2024*, Figure 3-197: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 21, 2024*, Figure 3-198: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 21, 2024*, Figure 3-199: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 21, 2024*, and Figure 3-200: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 21, 2024*) on May 21, 2024, indicate that moderate to heavy smoke covered South/East Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through South and Central Texas (Figure 3-201: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 18, 2024*).

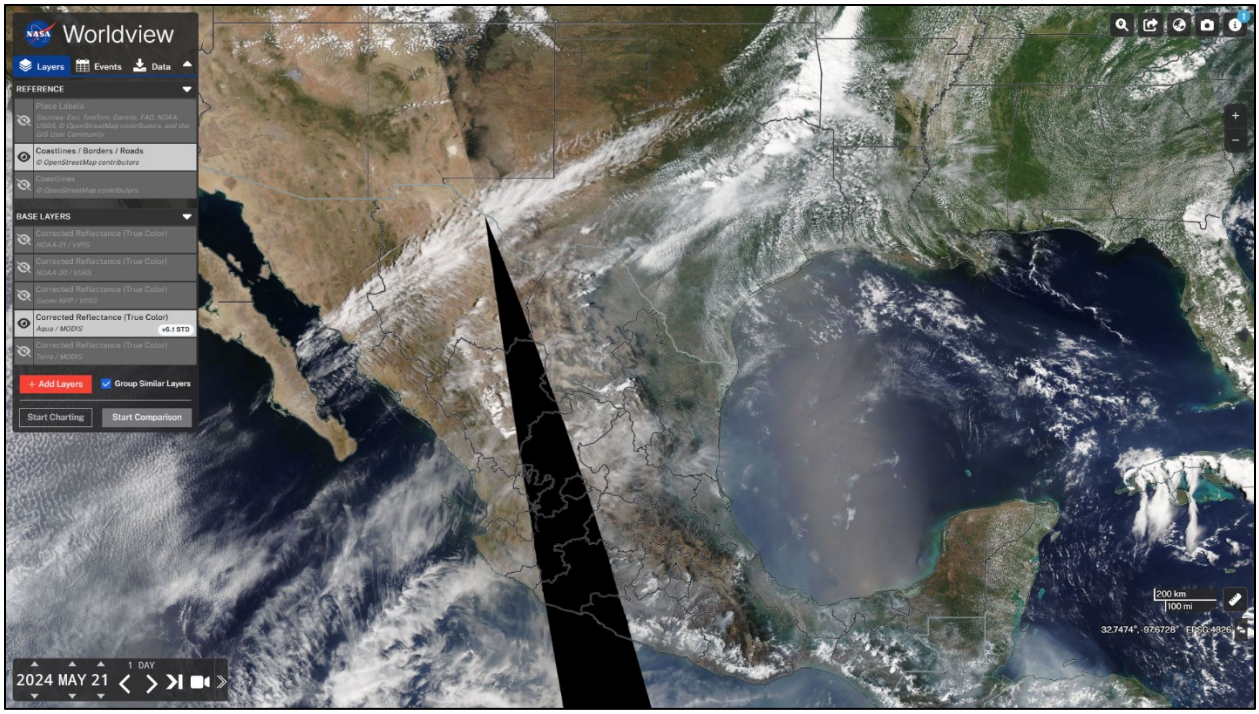

Figure 3-194: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 21, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America

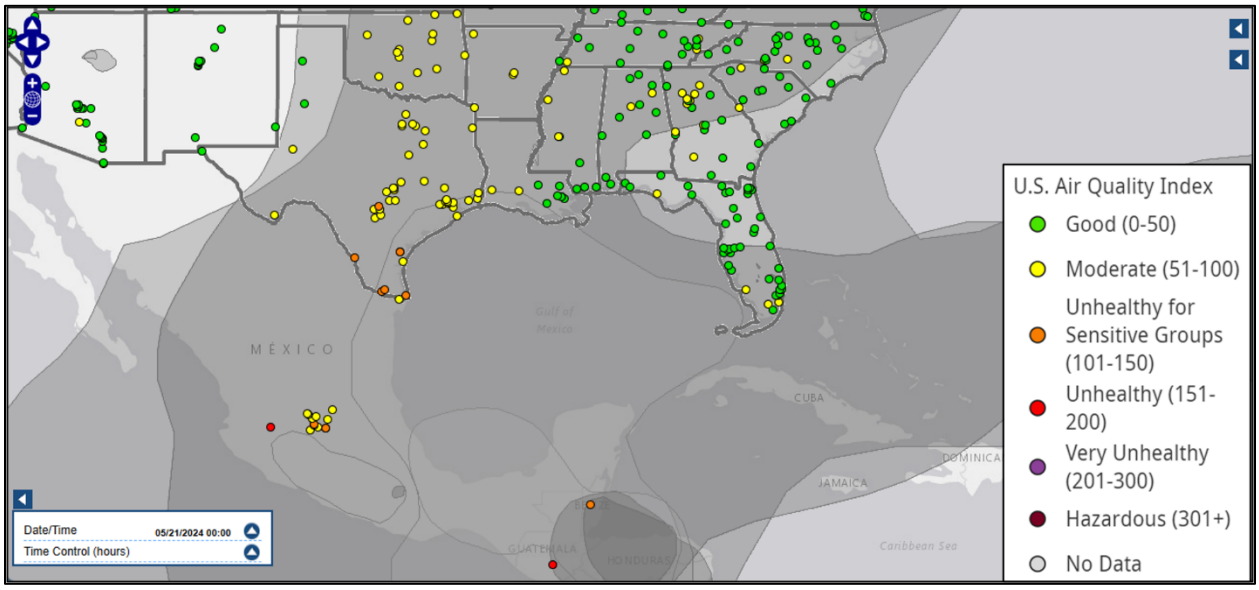

Figure 3-195: AirNow HMS Smoke Plume for May 21, 2024

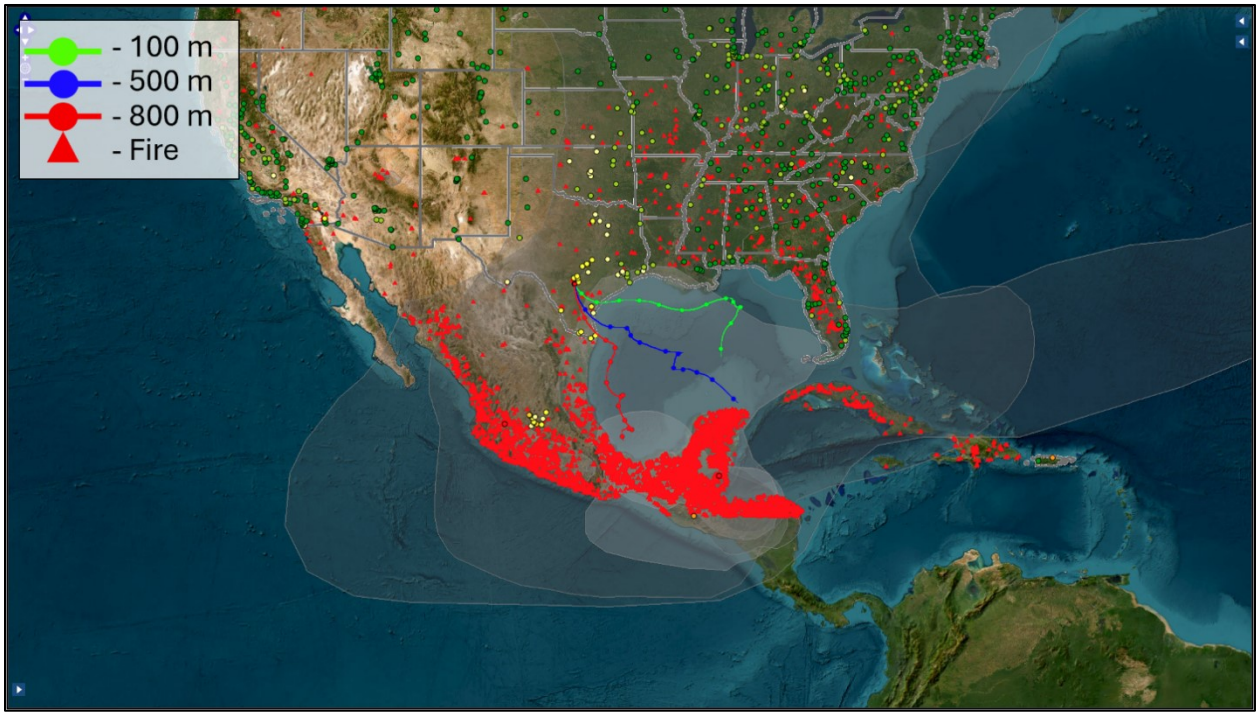

Figure 3-196: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 21, 2024

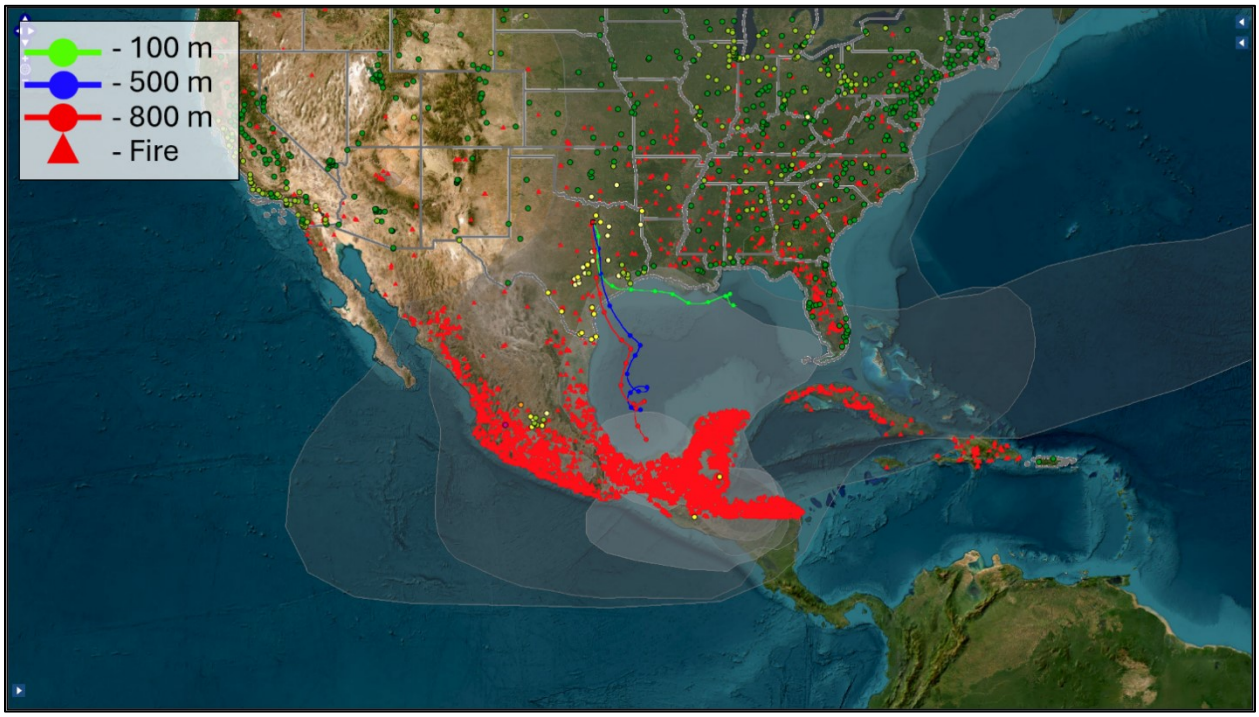

Figure 3-197: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 21, 2024

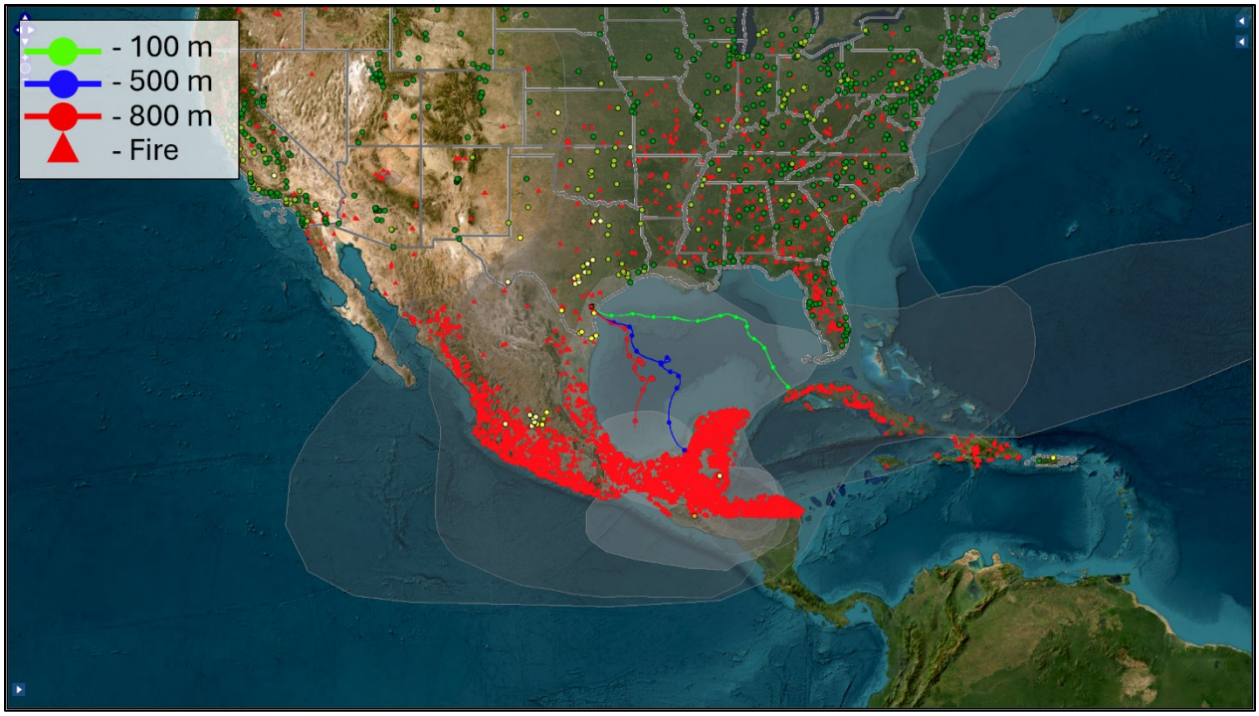

Figure 3-198: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 21, 2024

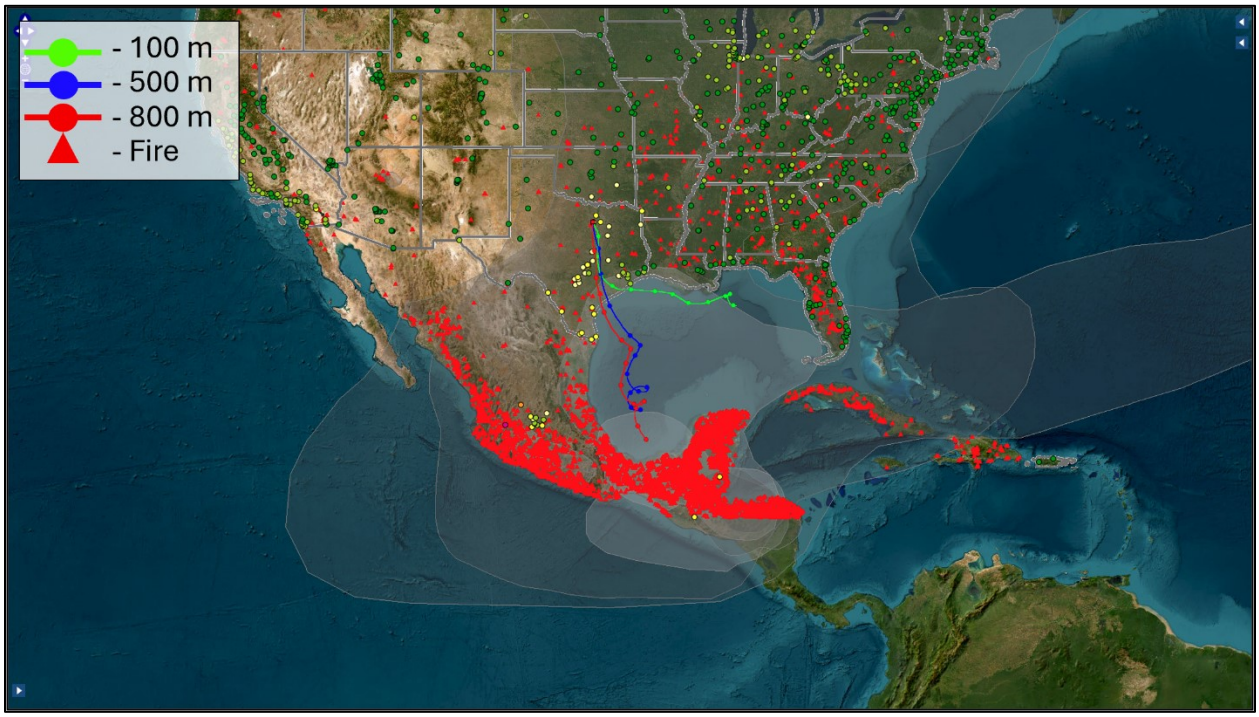

Figure 3-199: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 21, 2024

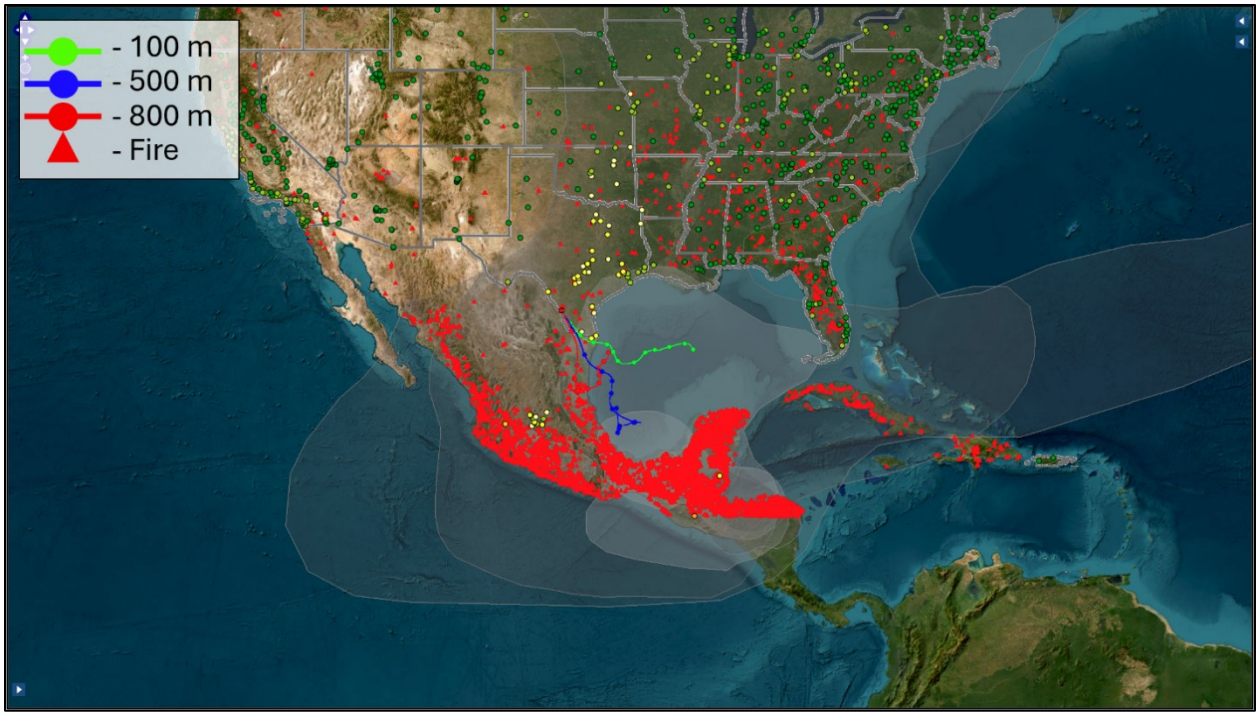

Figure 3-200: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 21, 2024

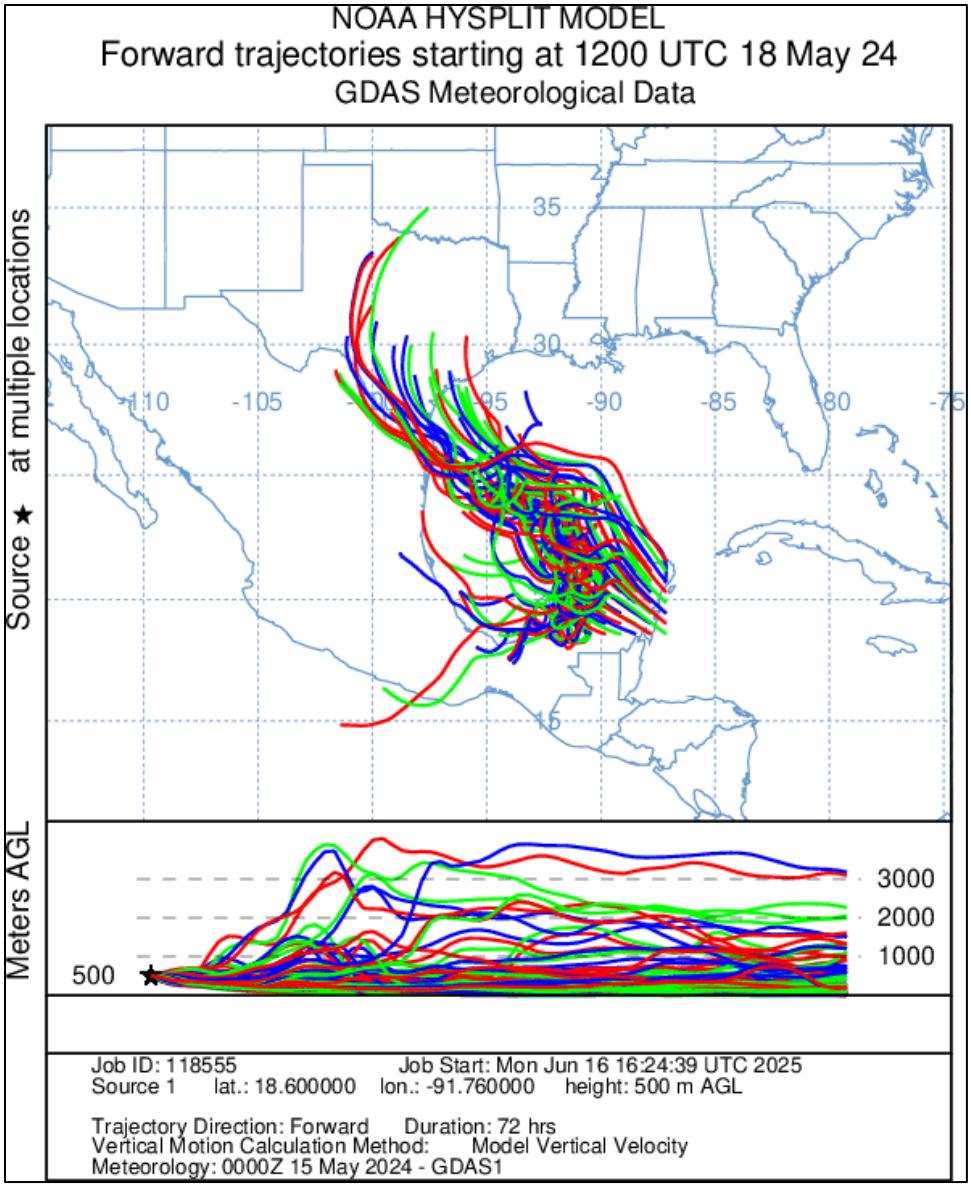

Figure 3-201: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 18, 2024

May 22, 2024, is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 35.5 µg/m^3; one-hour daily maximum 47.0 µg/m^3 recorded at 03:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 30.7 µg/m^3; one-hour daily maximum 46.8 µg/m^3 recorded at 17:00 LST);
- Fort Worth Northwest monitor (24-hour average concentration 32.5 µg/m^3; one-hour daily maximum 48.4 µg/m^3 recorded at 04:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 41.9 µg/m^3; one-hour daily maximum 50.0 µg/m^3 recorded at 03:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 22, 2024, can be compared against typical/non-event days for each monitor in Figure 3-202: *Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-203: *Hourly $PM_{2.5}$ Concentrations*

on May 22, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor, Figure 3-204: *Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the Fort Worth Northwest Monitor*, and Figure 3-205: *Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

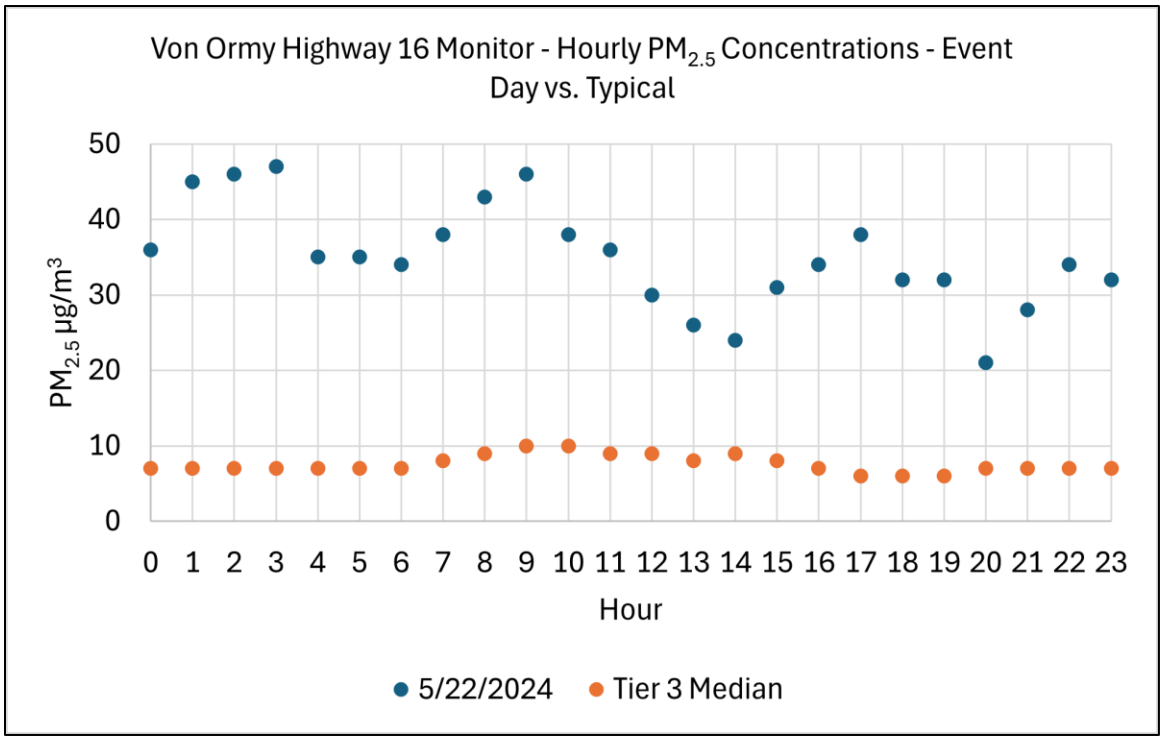

Figure 3-202: Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

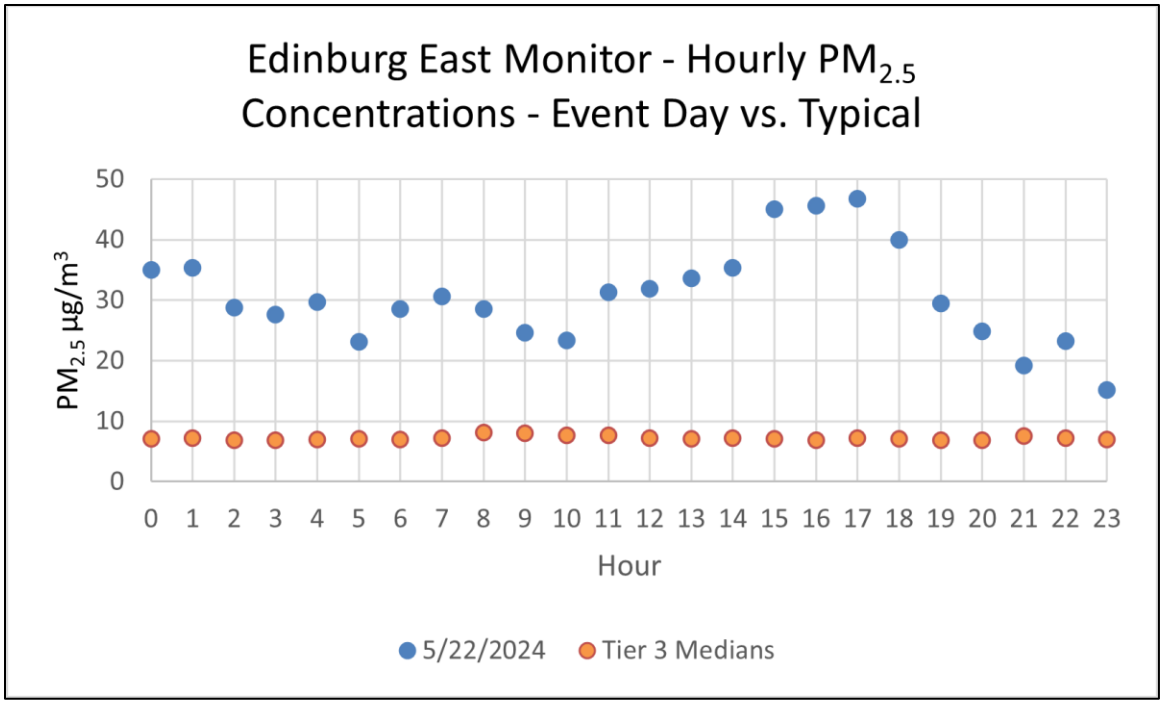

Figure 3-203: Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

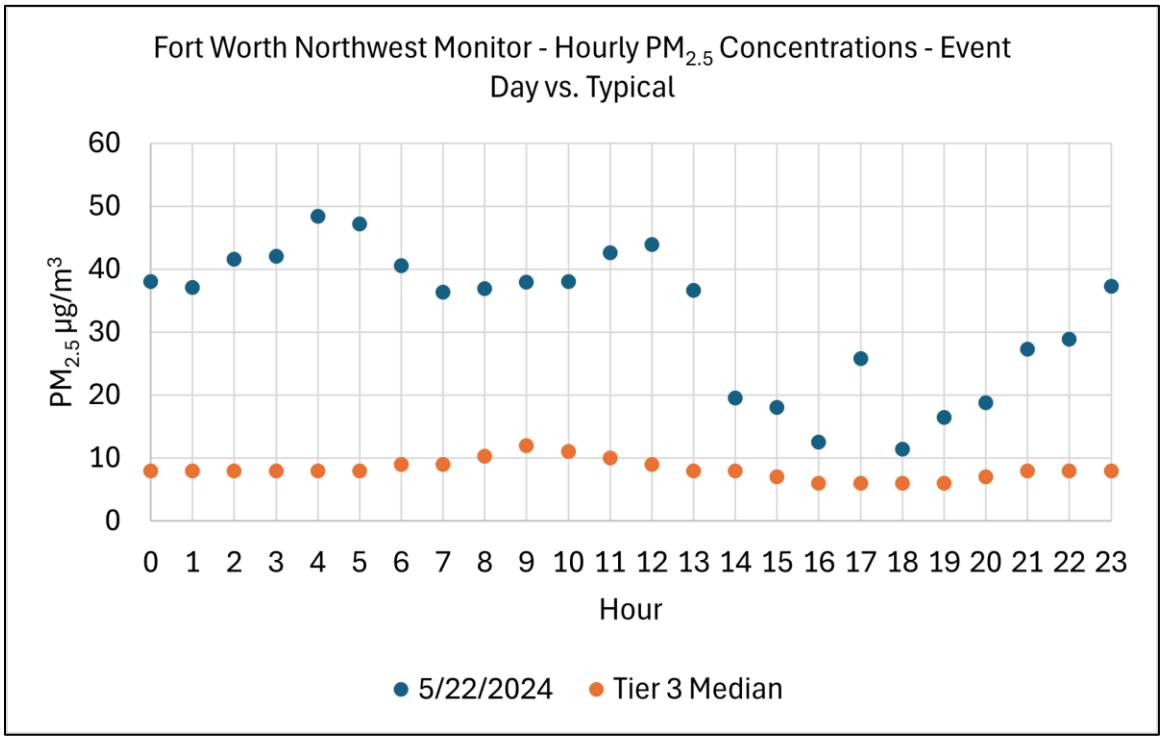

Figure 3-204: Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the Fort Worth Northwest Monitor

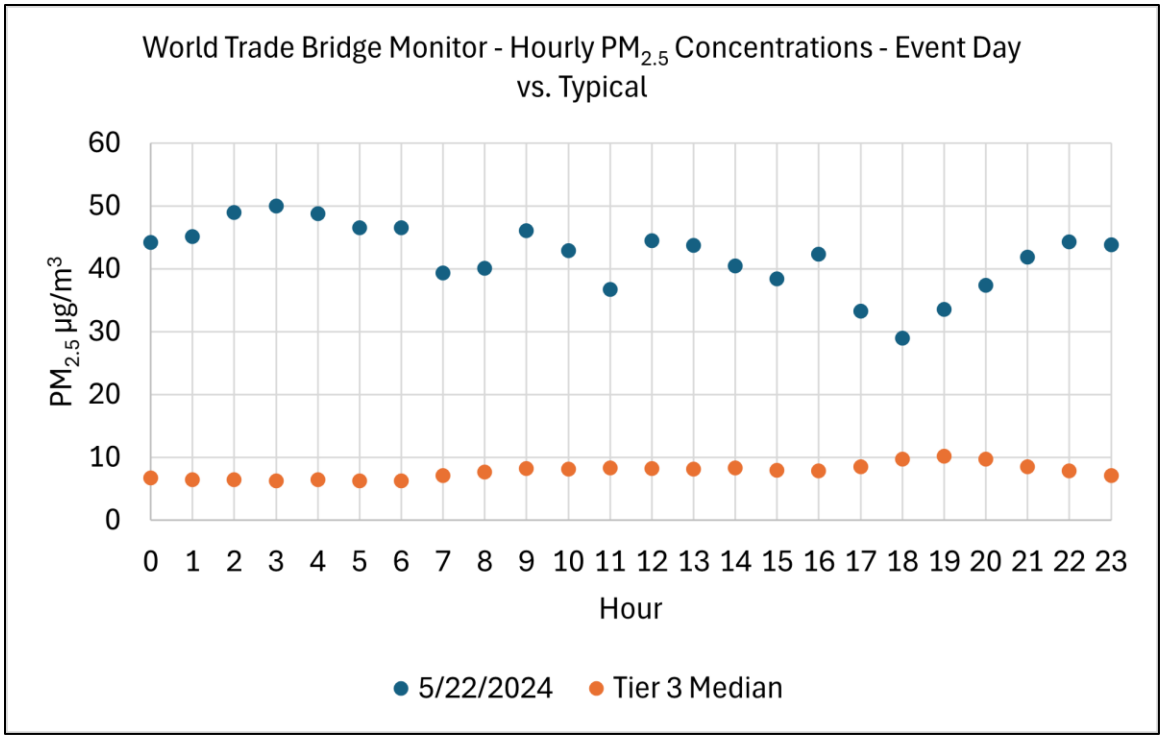

Figure 3-205: Hourly $PM_{2.5}$ Concentrations on May 22, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 22, 2024, mention light to moderate residual smoke from a combination of seasonal burnings in Mexico and Central America, aerosols from industrial sources in Mexico, and gas flaring activities in the southwest Gulf of America affecting deep south, south central, and north central Texas. A media report from May 21, 2024, mentioned smoke from fires in Central America filtering over Texas (Figure C-7). NWS archived weather discussions from the Brownsville, Corpus Christi, and Austin/San Antonio NWS Weather Forecast Offices on May 22, 2024, mention hazy conditions due to agricultural fires in Mexico and Central America (Figure B-12, Figure B-13, and Figure B-14), while archives from the Dallas/Fort Worth forecast office mention large hail and damaging wind gusts (Figure B-15). Satellite imagery reveals smoke in Mexico and the Gulf of America (Figure 3-206: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 22, 2024, Showing Haze and Smoke in Mexico and the Gulf of America*). Smoke plumes (Figure A-66 and Figure 3-207: *AirNow HMS Smoke Plume for May 22, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-208: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 22, 2024*, Figure 3-209: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 22, 2024*, Figure 3-210: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Fort Worth Northwest Monitor on May 22, 2024*, and Figure 3-211: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 22, 2024*) on May 22, 2024, indicate that medium to heavy smoke covered Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups.

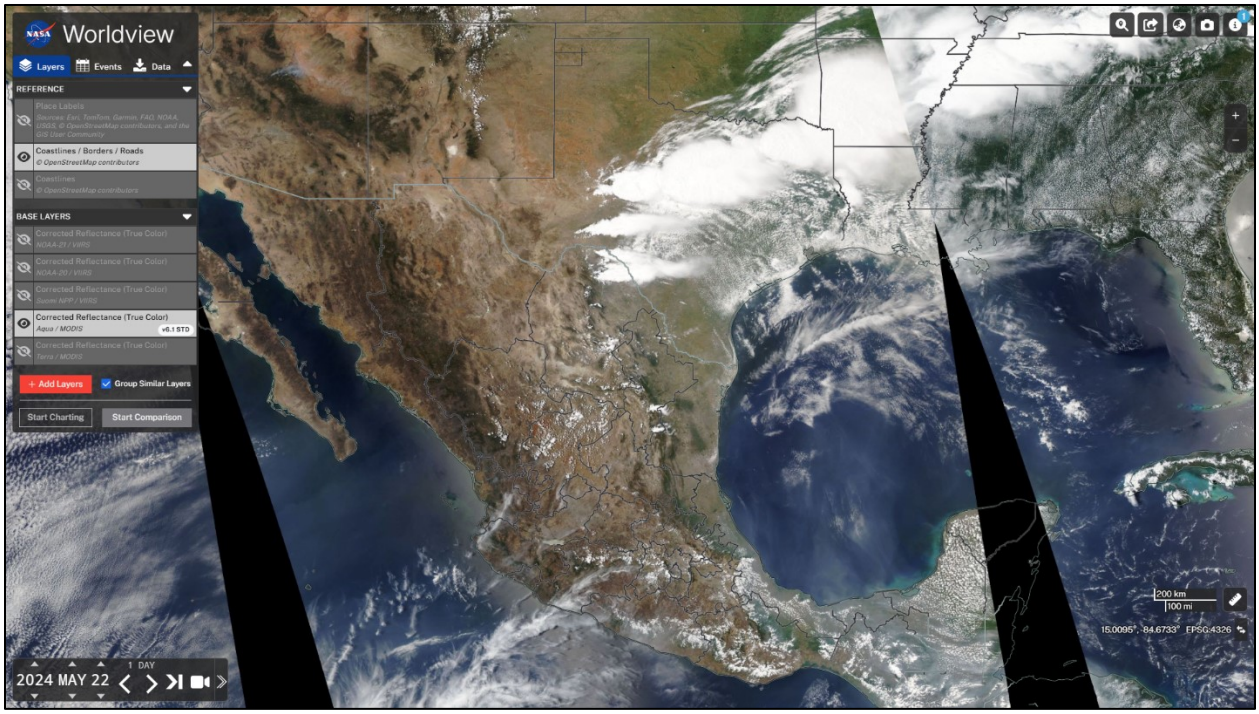

Figure 3-206: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 22, 2024, Showing Haze and Smoke in Mexico and the Gulf of America

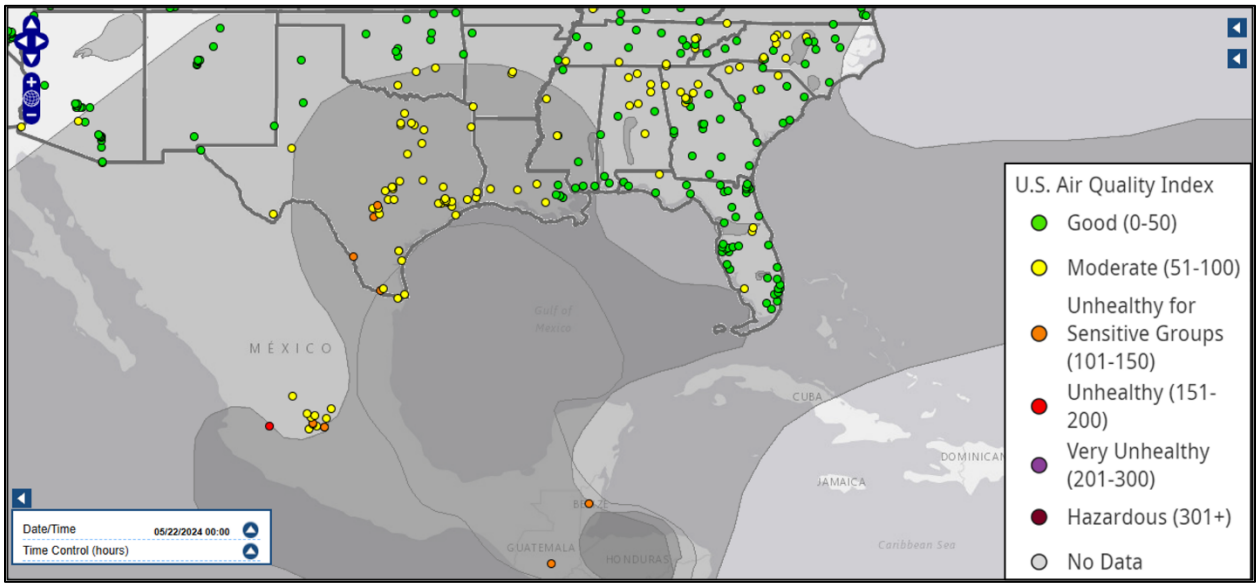

Figure 3-207: AirNow HMS Smoke Plume for May 22, 2024

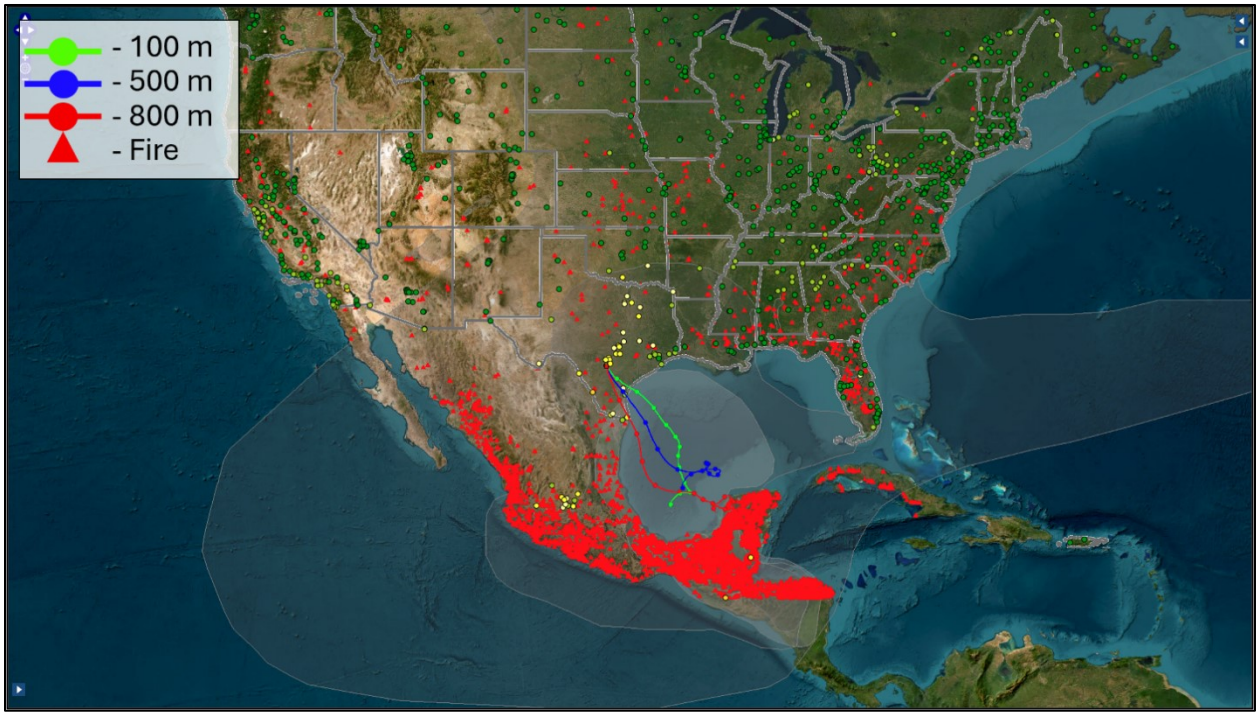

Figure 3-208: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 22, 2024

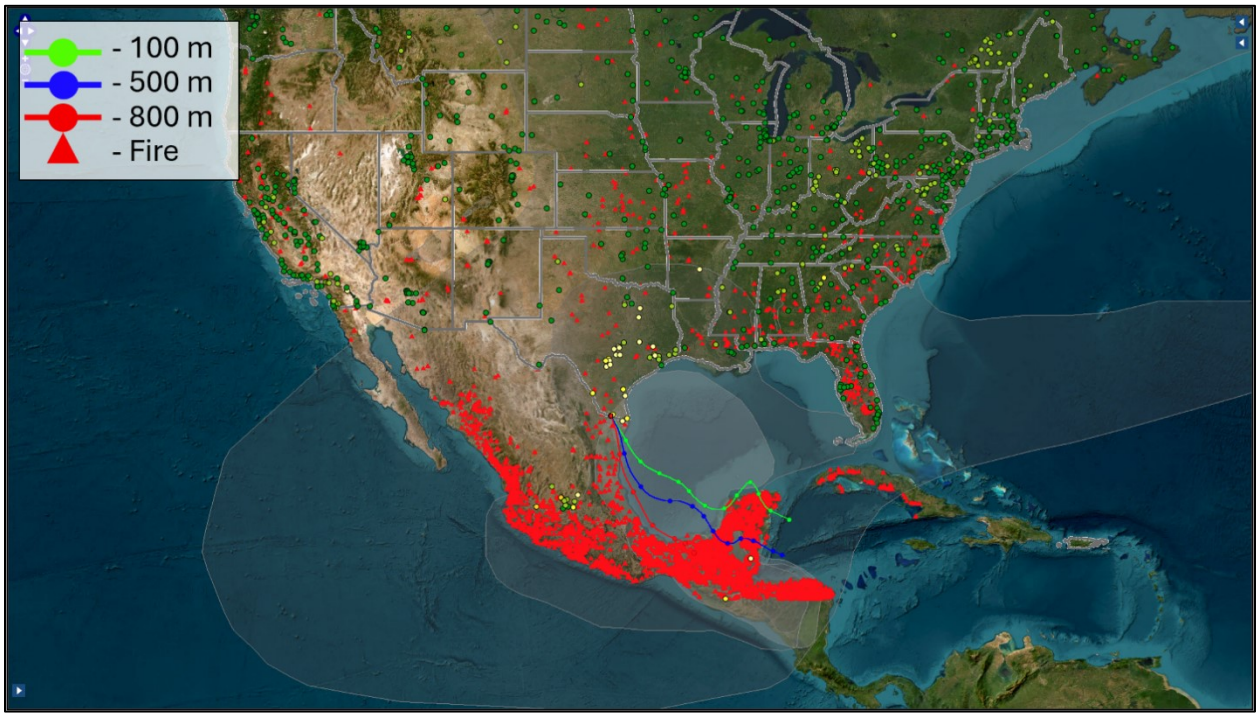

Figure 3-209: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 22, 2024

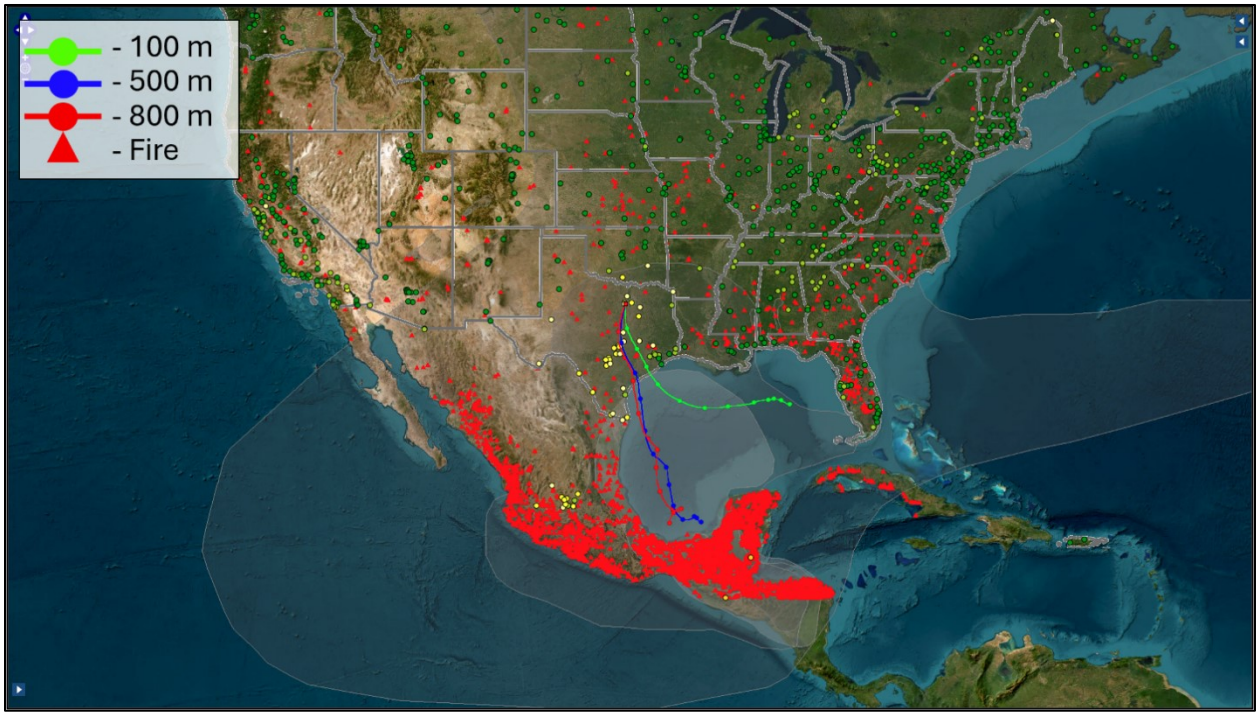

Figure 3-210: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Fort Worth Northwest Monitor on May 22, 2024

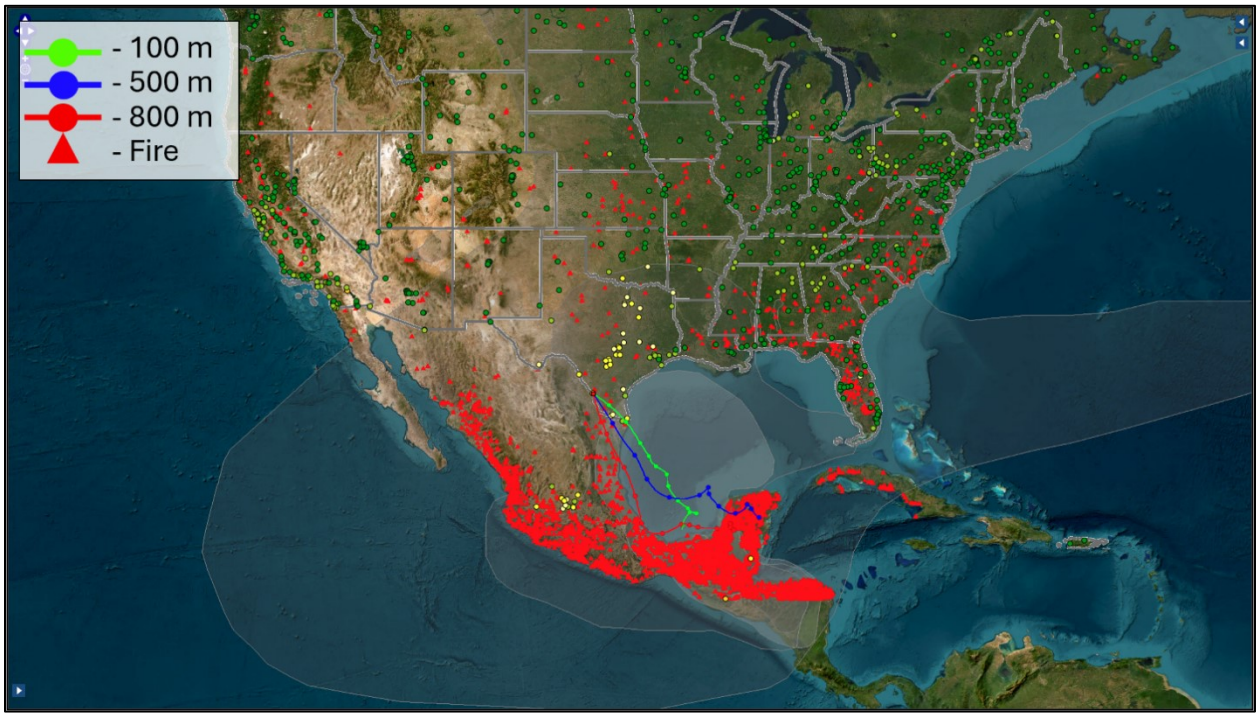

Figure 3-211: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 22, 2024

May 23, 2024, is identified as a Tier 2 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 30.6 µg/m^3; one-hour daily maximum 54.0 µg/m^3 recorded at 12:00 LST).

May 23, 2024, is identified as a Tier 1 day for the:

- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 32.1 µg/m^3; one-hour daily maximum 49.2 µg/m^3 recorded at 14:00 LST);
- Dona Park monitor (24-hour average concentration 35.2 µg/m^3; one-hour daily maximum 55.0 µg/m^3 recorded at 08:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 39.0 µg/m^3; one-hour daily maximum 51.1 µg/m^3 recorded at 19:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 23, 2024, can be compared against typical/non-event days for each monitor in Figure 3-212: *Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-213: *Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-214: *Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, and Figure 3-215: *Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

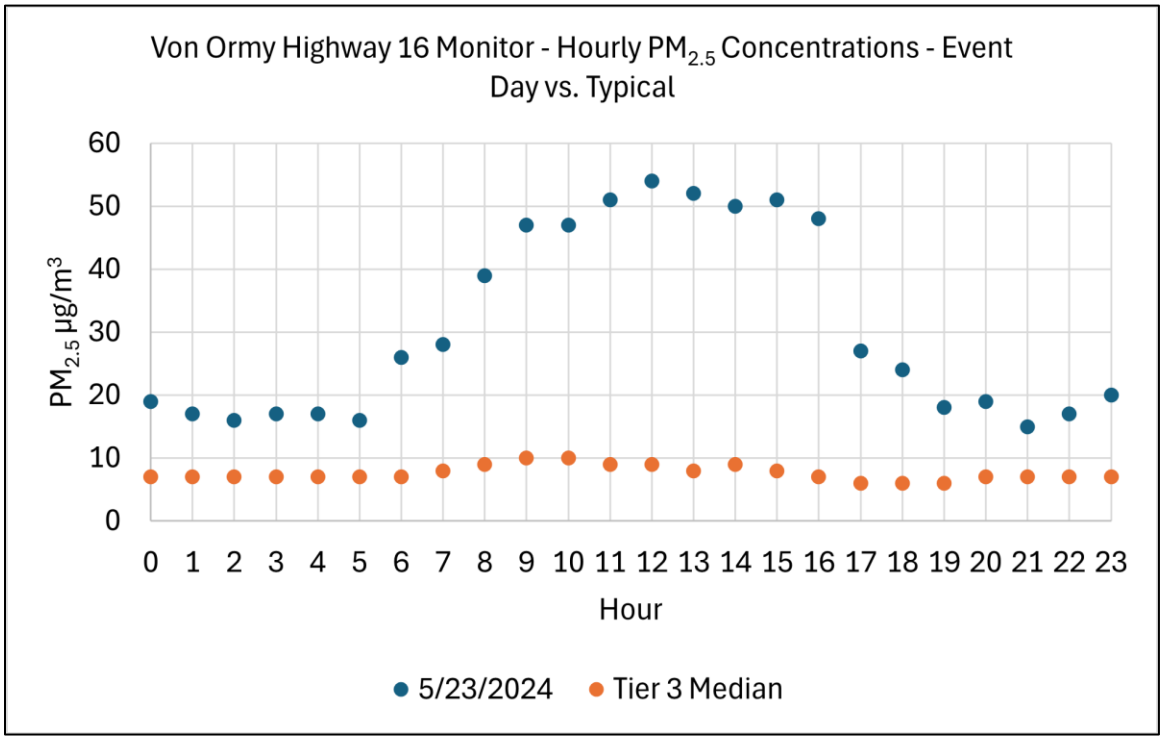

Figure 3-212: Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

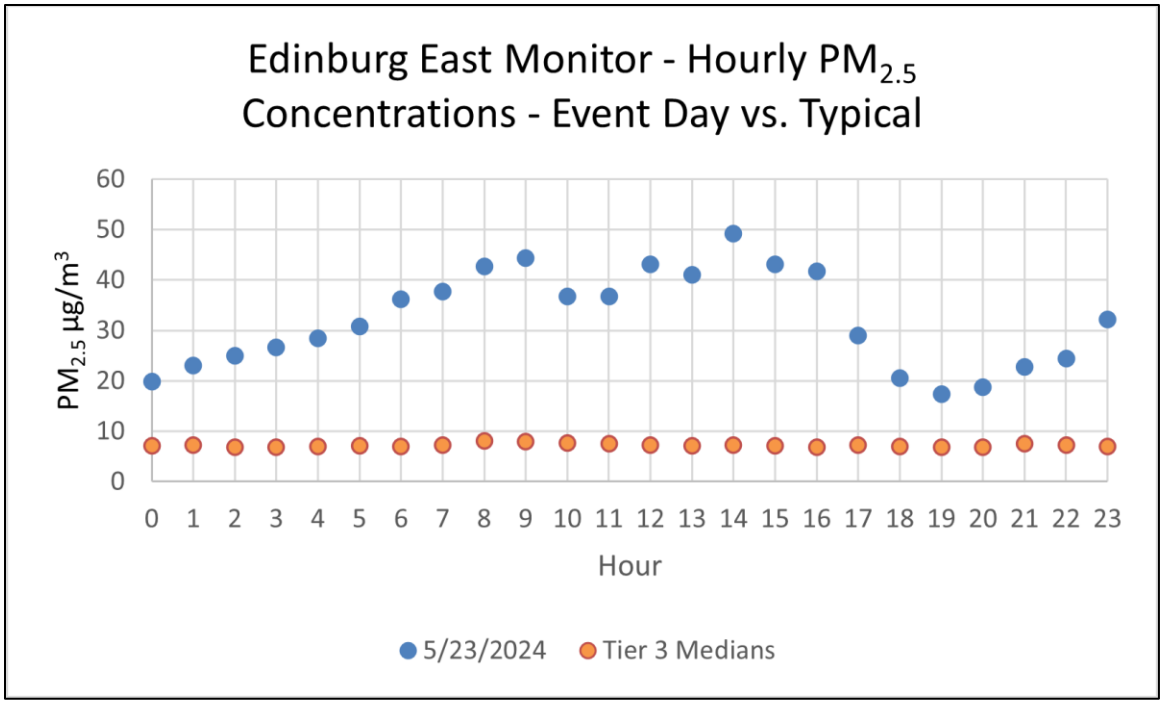

Figure 3-213: Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

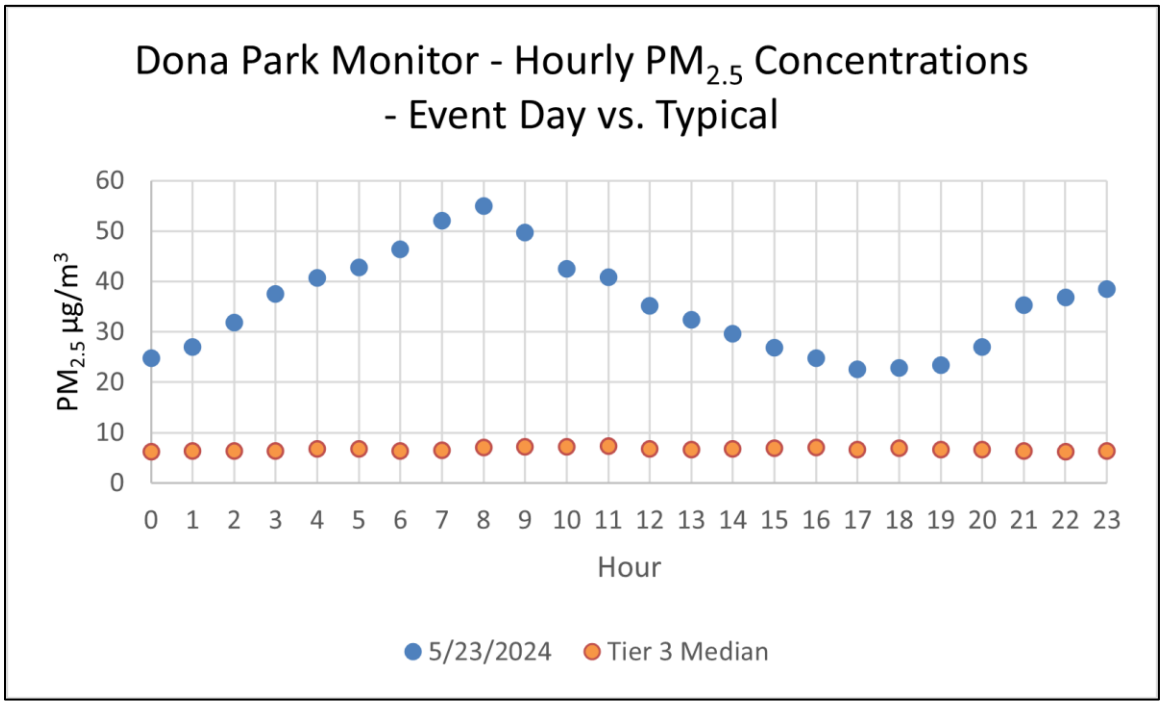

Figure 3-214: Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the Dona Park Monitor

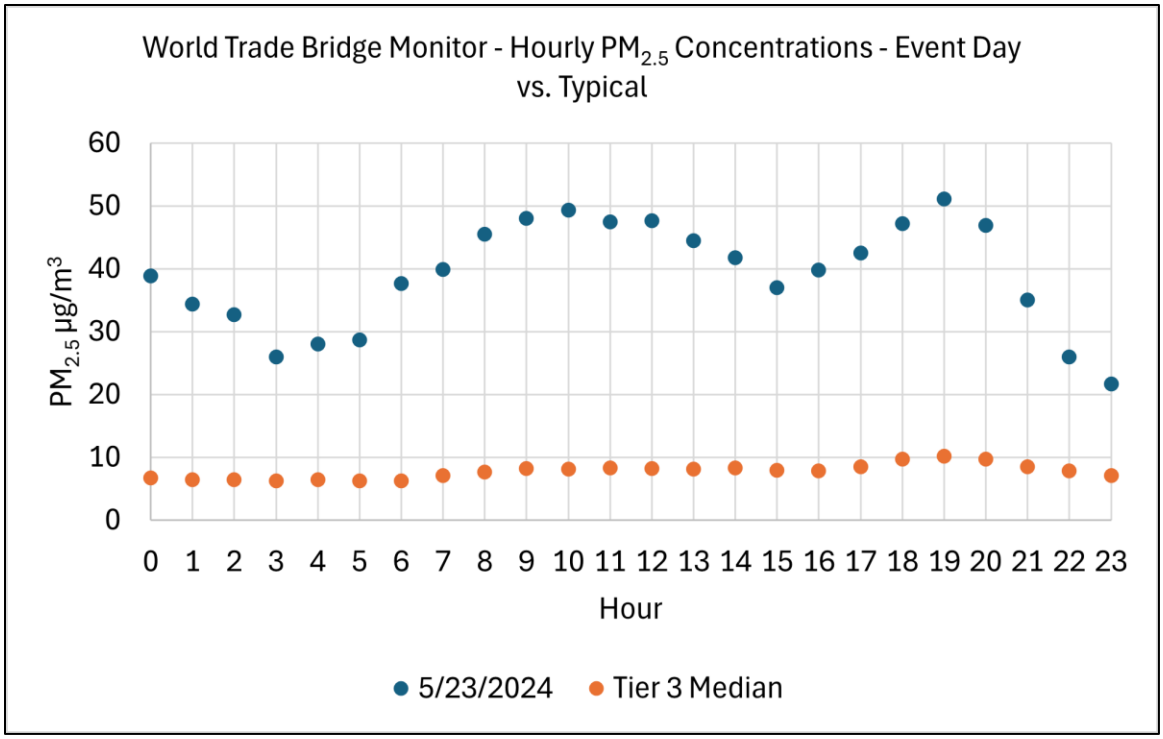

Figure 3-215: Hourly $PM_{2.5}$ Concentrations on May 23, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 23, 2024, mention moderate to high density smoke from a combination of seasonal agricultural burnings in Mexico and Central America, aerosols from industrial sources in Mexico, and gas flaring activities in the southwest Gulf of America affecting most of the state, with highest concentrations in Deep South Texas (Table C-9). A media report from May 21, 2024, mentioned smoke from fires in Central America filtering over Texas (Figure C-7). NWS archived weather discussions from the Corpus Christi NWS Weather Forecast Office on May 23, 2024, mention hazy conditions due to agricultural fires from the South, likely referring to Mexico (Figure B-12). Satellite imagery reveals smoke over South and East Texas, Mexico, and the Gulf of America (Figure 3-216: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 23, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-67 and Figure 3-217: *AirNow HMS Smoke Plume for May 23, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-218: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 23, 2024*, Figure 3-220: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 23, 2024*, Figure 3-221: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 23, 2024*, and Figure 3-222: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 23, 2024*) on May 23, 2024, indicate that medium smoke covered Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through South, East, and Central Texas (Figure 3-219: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 20, 2024*).

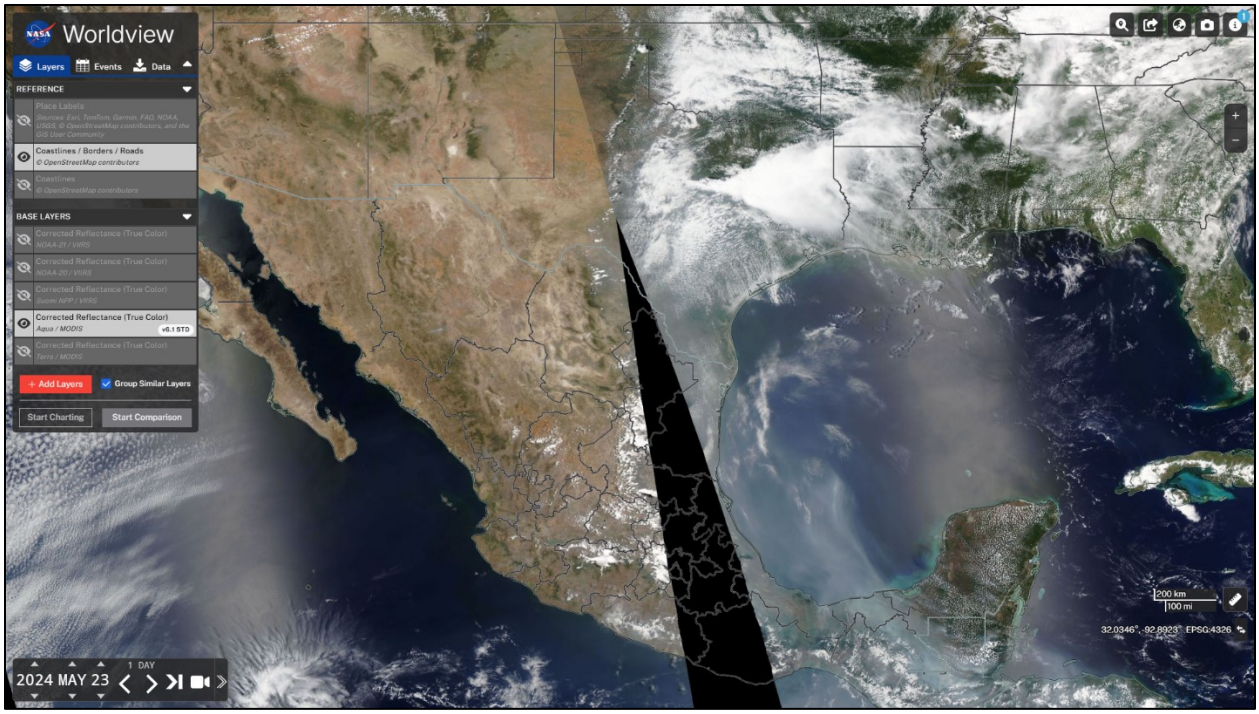

Figure 3-216: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 23, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America

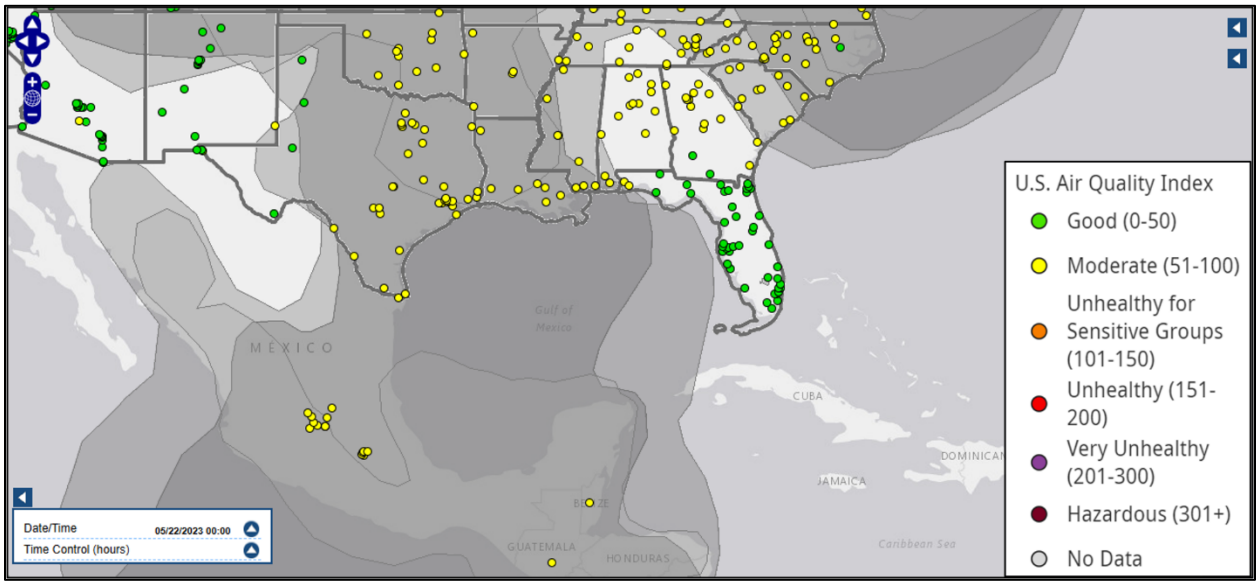

Figure 3-217: AirNow HMS Smoke Plume for May 23, 2024

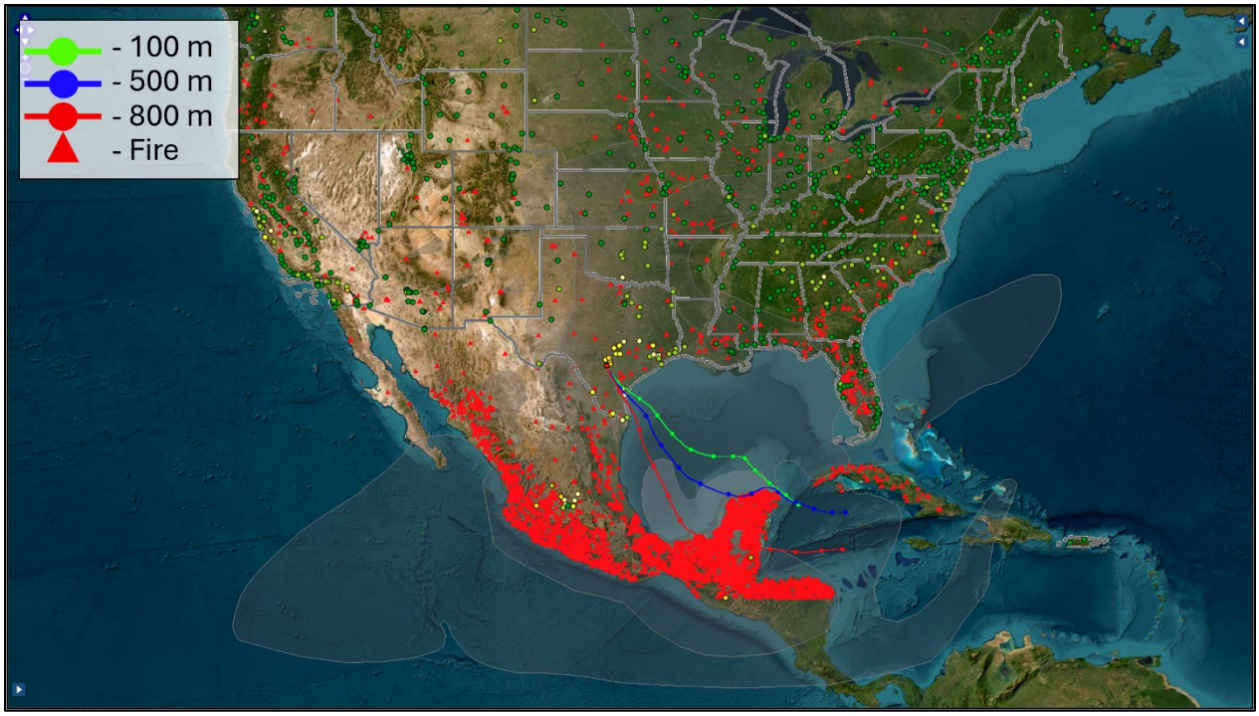

Figure 3-218: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 23, 2024

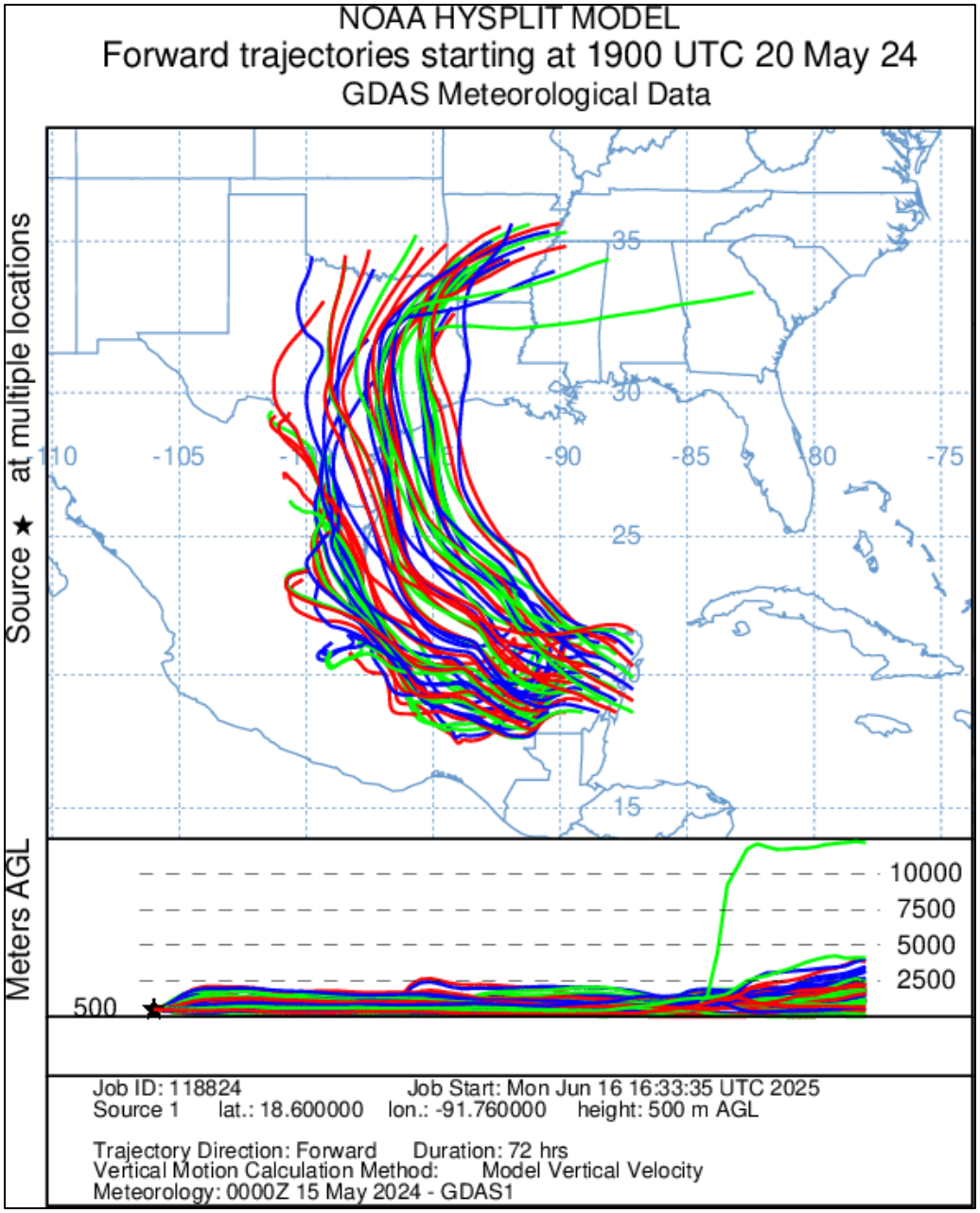

Figure 3-219: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 20, 2024

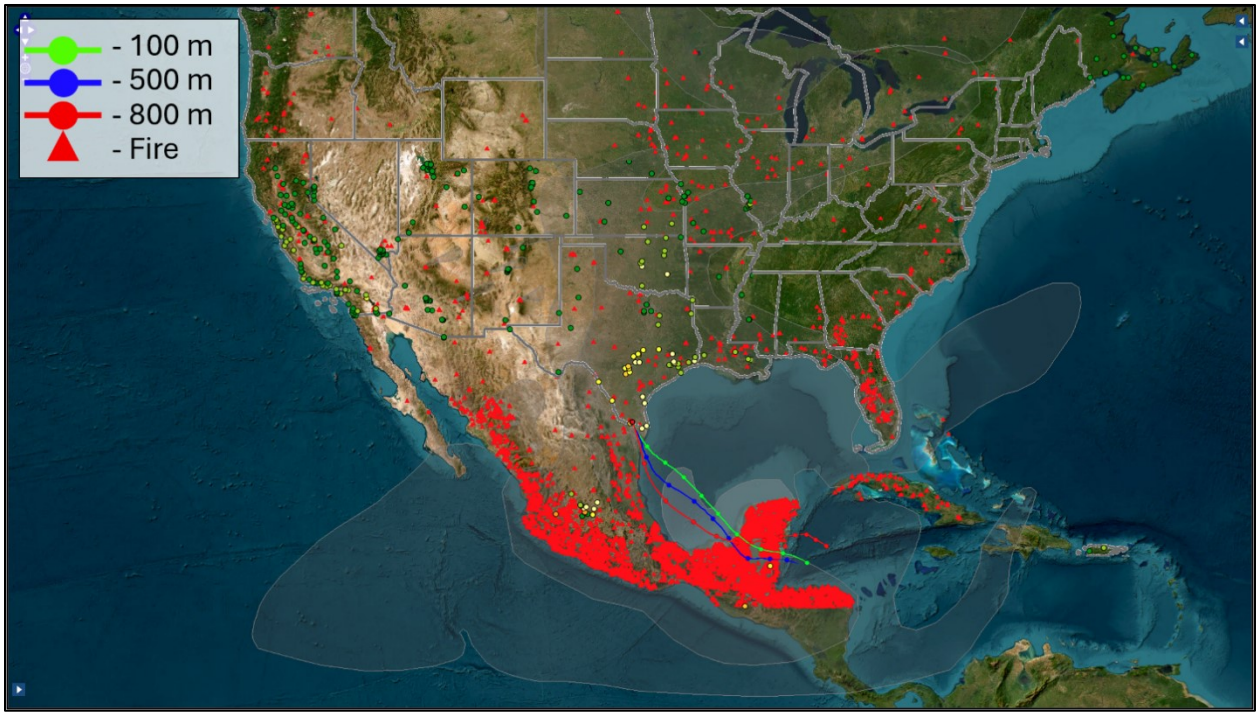

Figure 3-220: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 23, 2024

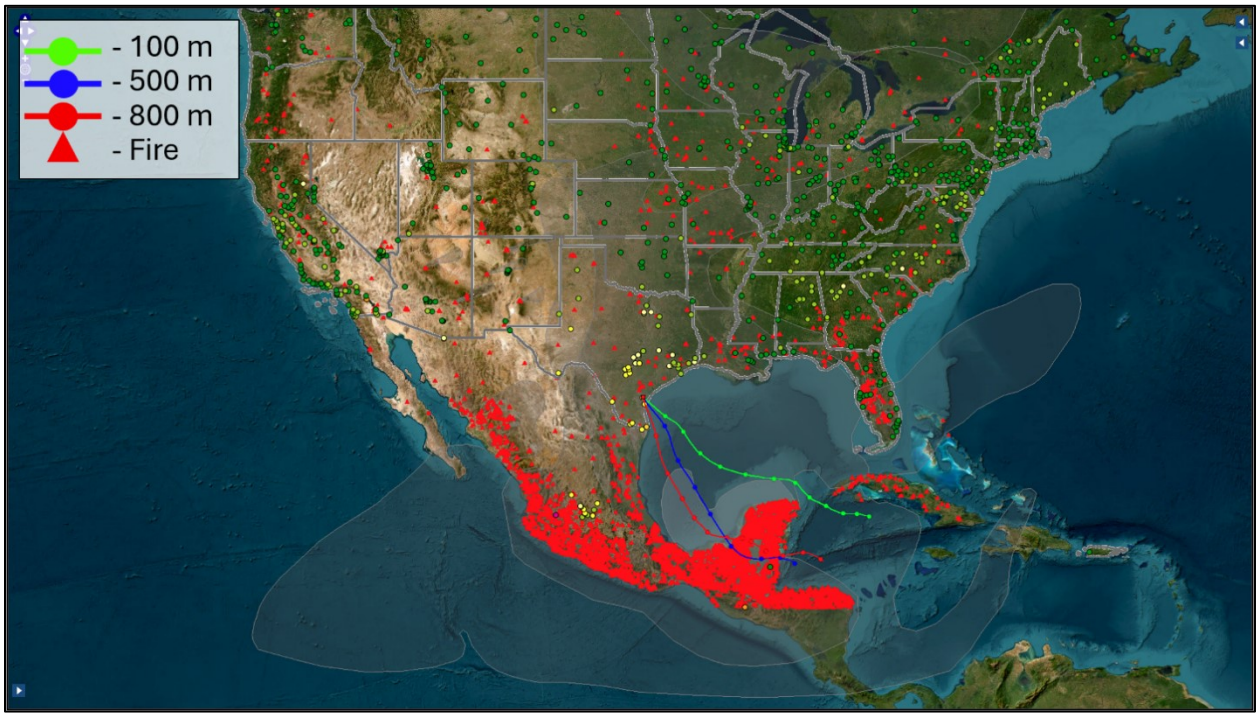

Figure 3-221: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 23, 2024

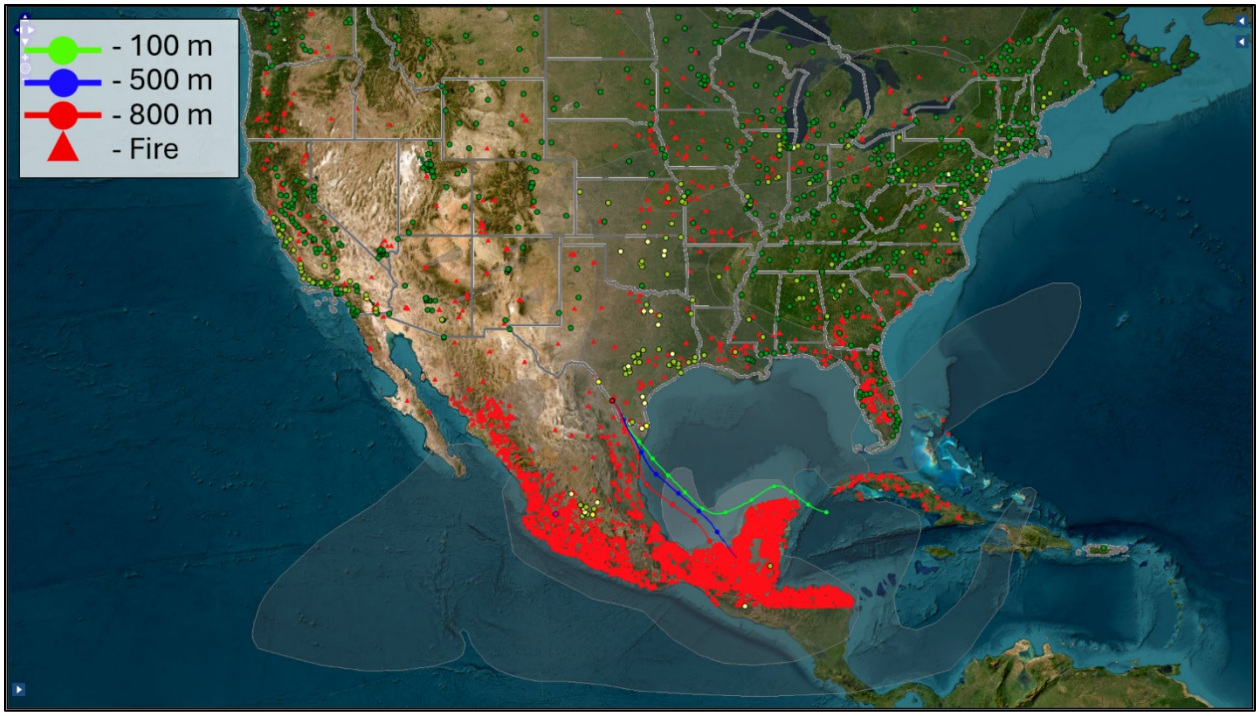

Figure 3-222: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 23, 2024

May 24, 2024, is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 39.6 µg/m^3; one-hour daily maximum 66.0 µg/m^3 recorded at 16:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 46.9 µg/m^3; one-hour daily maximum 99.5 µg/m^3 recorded at 07:00 LST);
- Dona Park monitor (24-hour average concentration 37.4 µg/m^3; one-hour daily maximum 77.3 µg/m^3 recorded at 06:00 LST);
- Haws Athletic Center (24-hour average concentration 24.7 µg/m^3; one-hour daily maximum 38.6 µg/m^3 recorded at 19:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 39.1 µg/m^3; one-hour daily maximum 65.3 µg/m^3 recorded at 18:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 24, 2024, can be compared against typical/non-event days for each monitor in Figure 3-223: *Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-224: *Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-225: *Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, Figure 3-226: *Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor*, and Figure 3-227: *Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

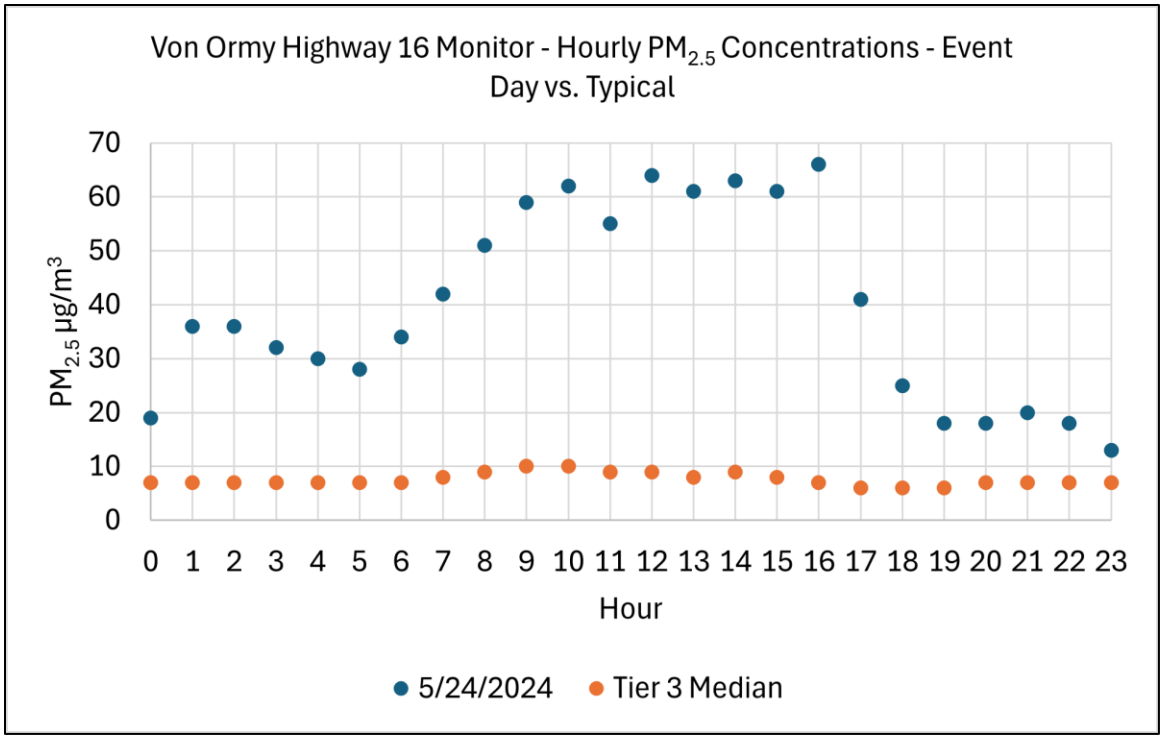

Figure 3-223: Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

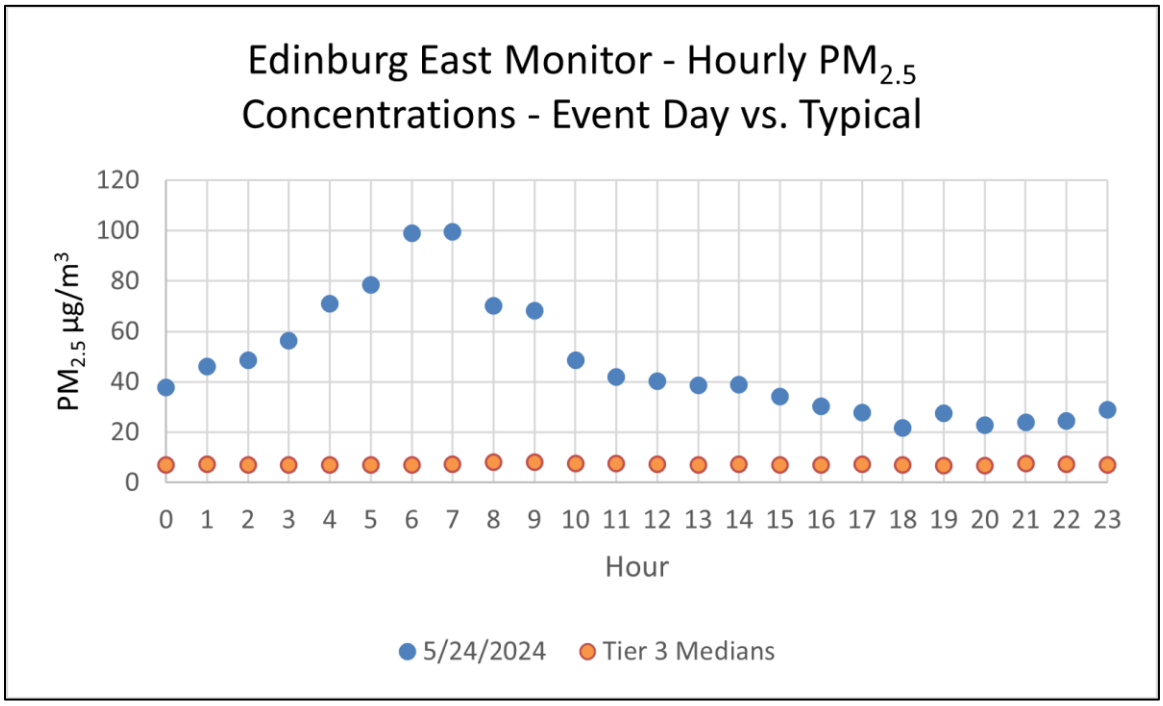

Figure 3-224: Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

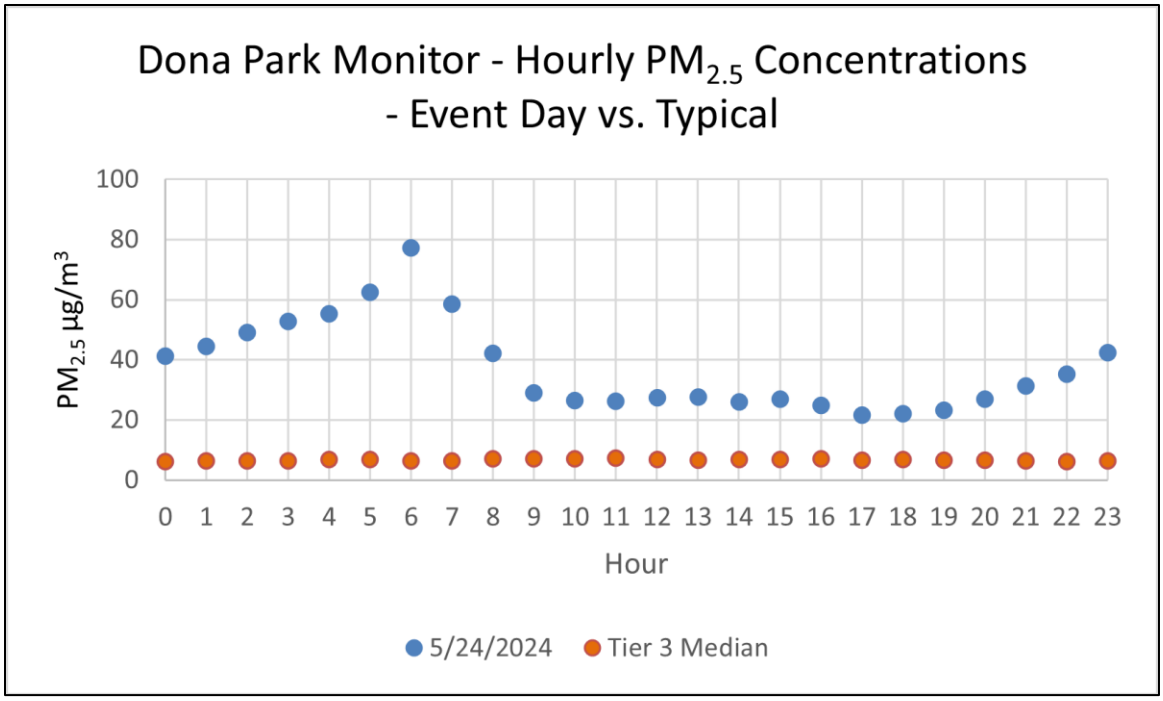

Figure 3-225: Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Dona Park Monitor

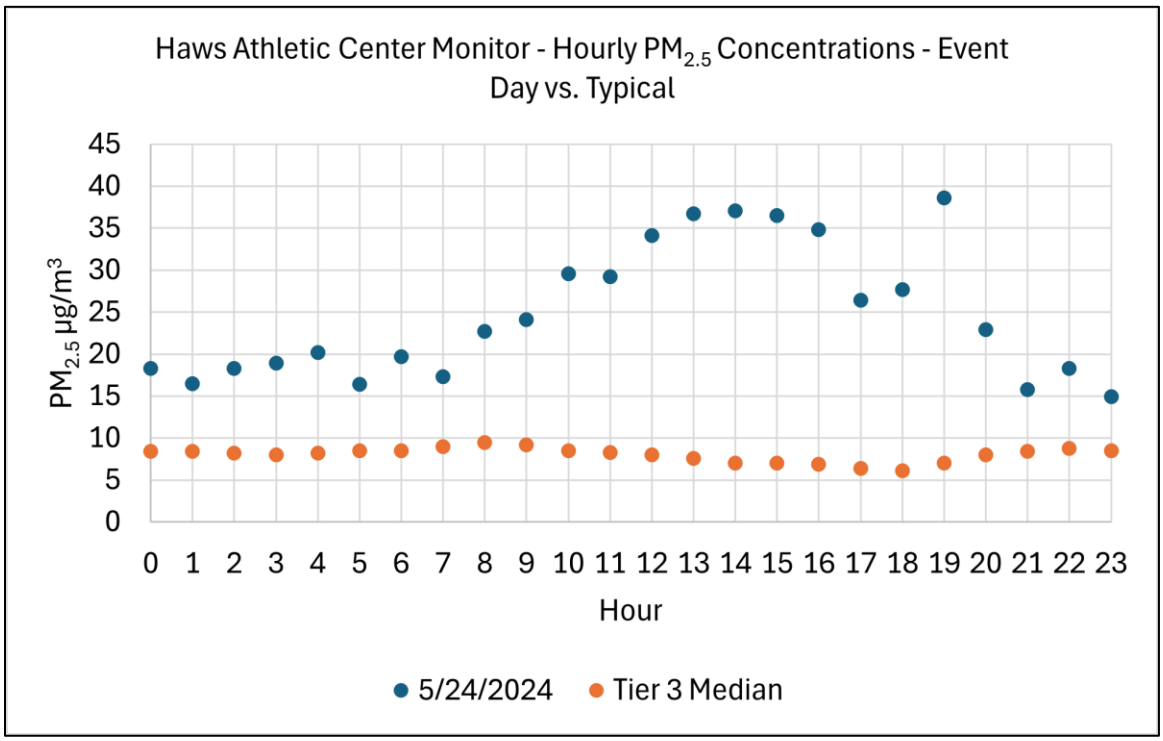

Figure 3-226: Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

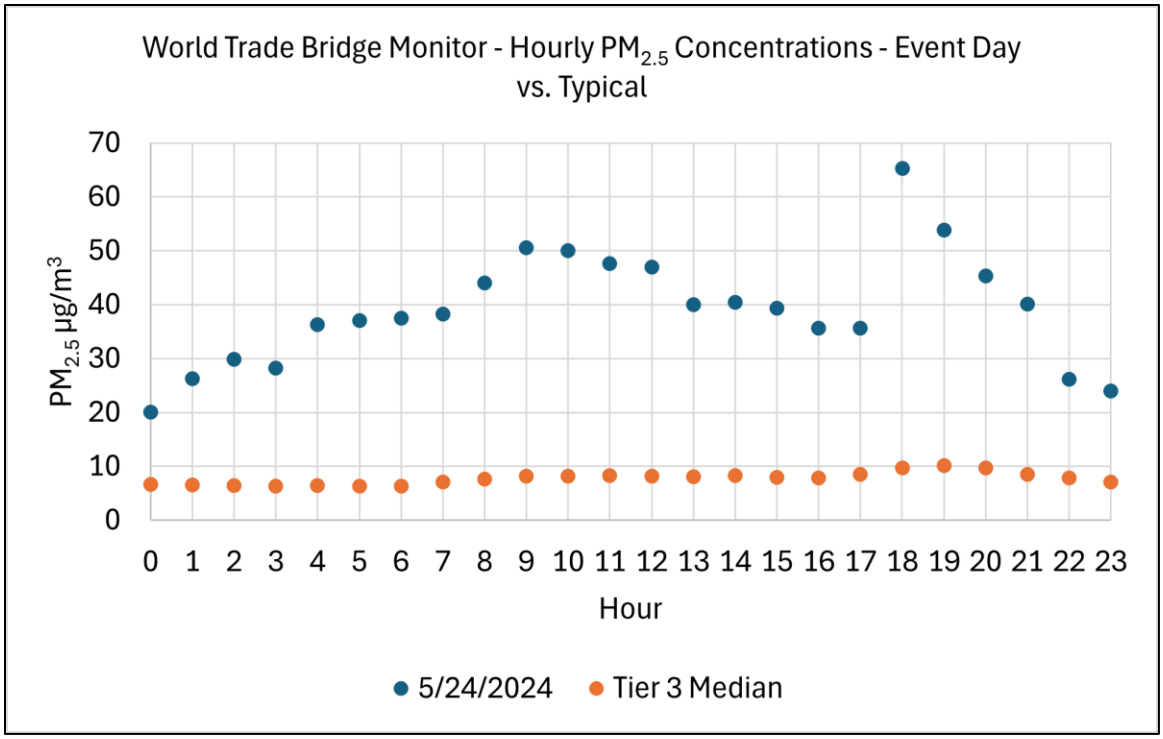

Figure 3-227: Hourly $PM_{2.5}$ Concentrations on May 24, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 24, 2024, mention moderate to high density residual smoke from both seasonal agricultural burnings in Mexico and Central America and aerosols from industrial sources in Mexico affecting south central, southwest, southeast, north central, and deep south Texas (Table C-9). Media reports from May 27, 2024, mention hazy skies due to agricultural smoke in Mexico affecting Texas (Figure C-8 and Figure C-9). NWS archived weather discussions from the Brownsville, Corpus Christi, and Austin/San Antonio NWS Weather Forecast Offices on May 24, 2024, mention reduced visibilities due to haze, likely due to the smoke from agricultural fires mentioned in prior reports (Figure B-12, Figure B-13, and Figure B-14). Satellite imagery reveals smoke in South and East Texas, Mexico, and the Gulf of America (Figure 3-228: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 24, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-68 and Figure 3-229: *AirNow HMS Smoke Plume for May 24, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-230: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 24, 2024*, Figure 3-231: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 24, 2024*, Figure 3-232: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 24, 2024*, Figure 3-233: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 24, 2024*, and Figure 3-234: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 24, 2024*) on May 24, 2024, indicate that medium smoke covered Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate, Unhealthy for Sensitive Groups, and Unhealthy.

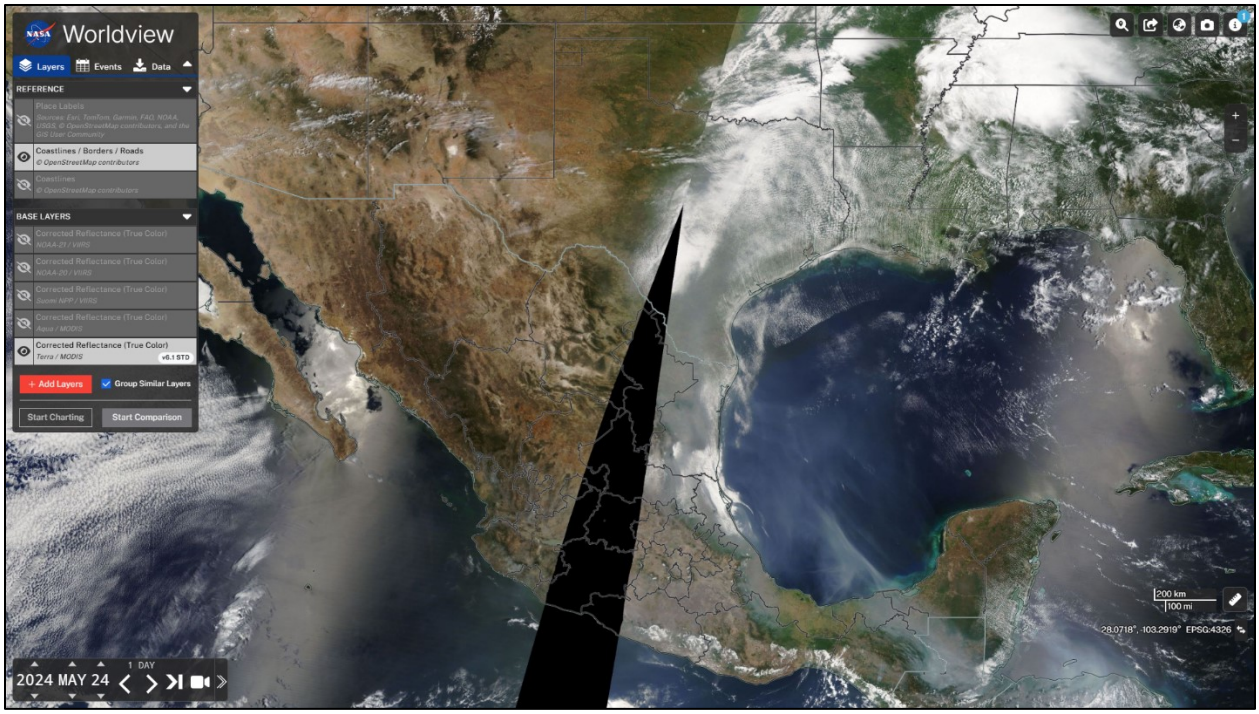

Figure 3-228: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 24, 2024, Showing Haze and Smoke in Texas, Mexico, and the Gulf of America

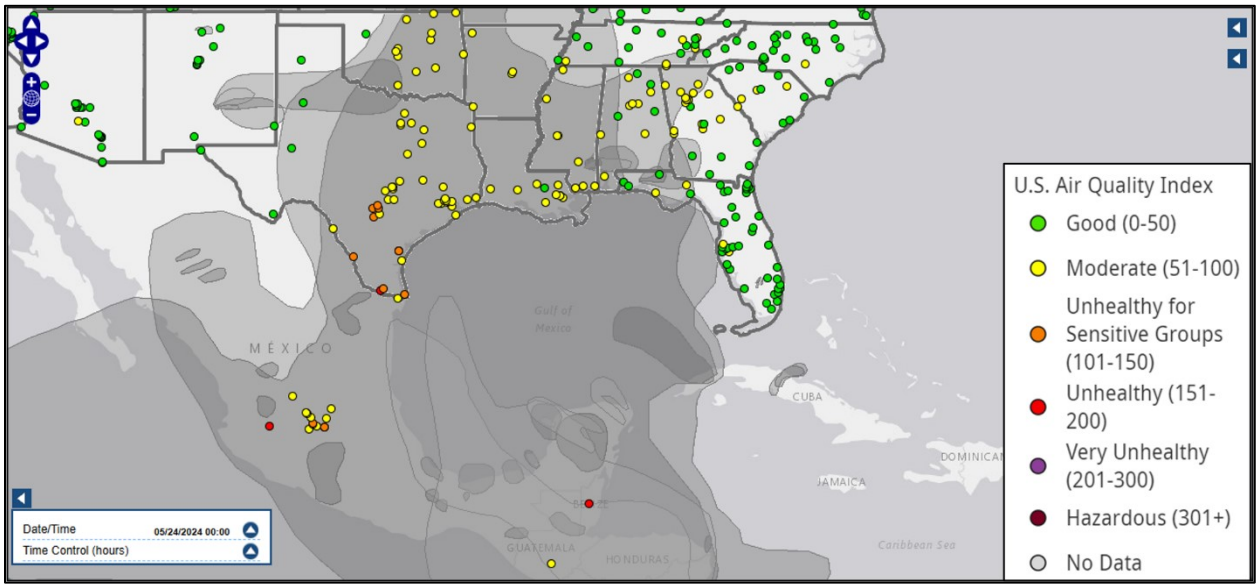

Figure 3-229: AirNow HMS Smoke Plume for May 24, 2024

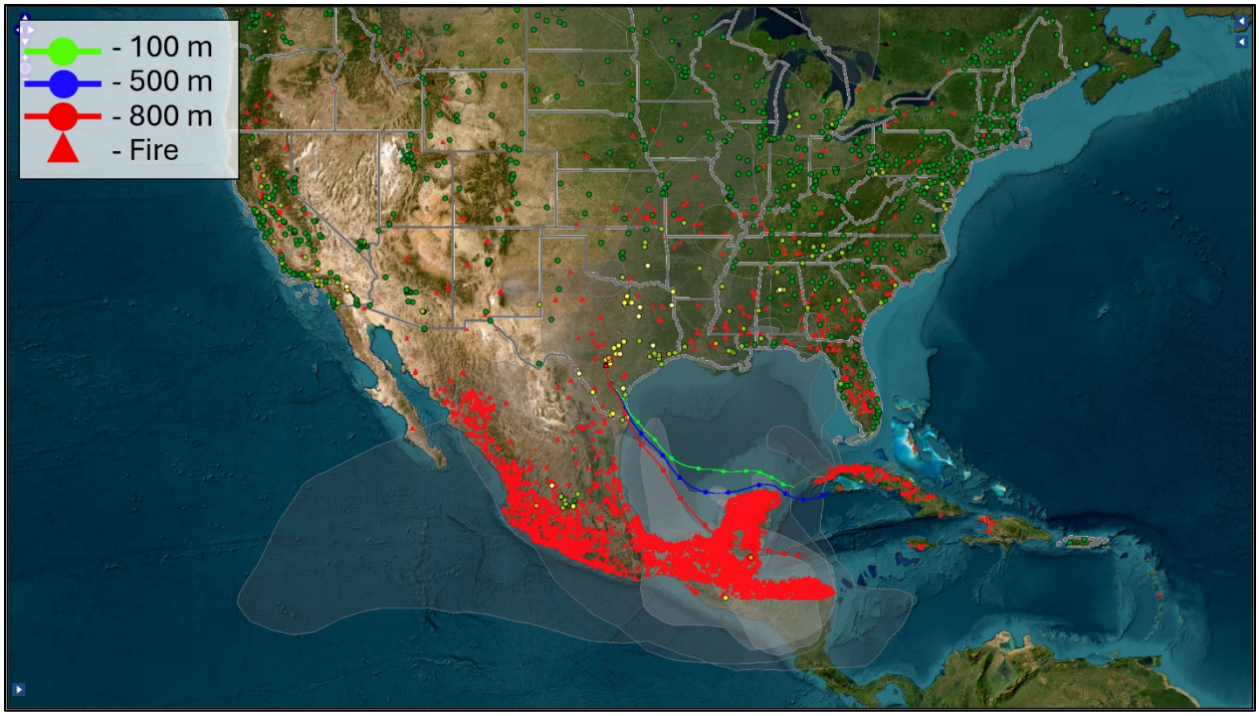

Figure 3-230: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 24, 2024

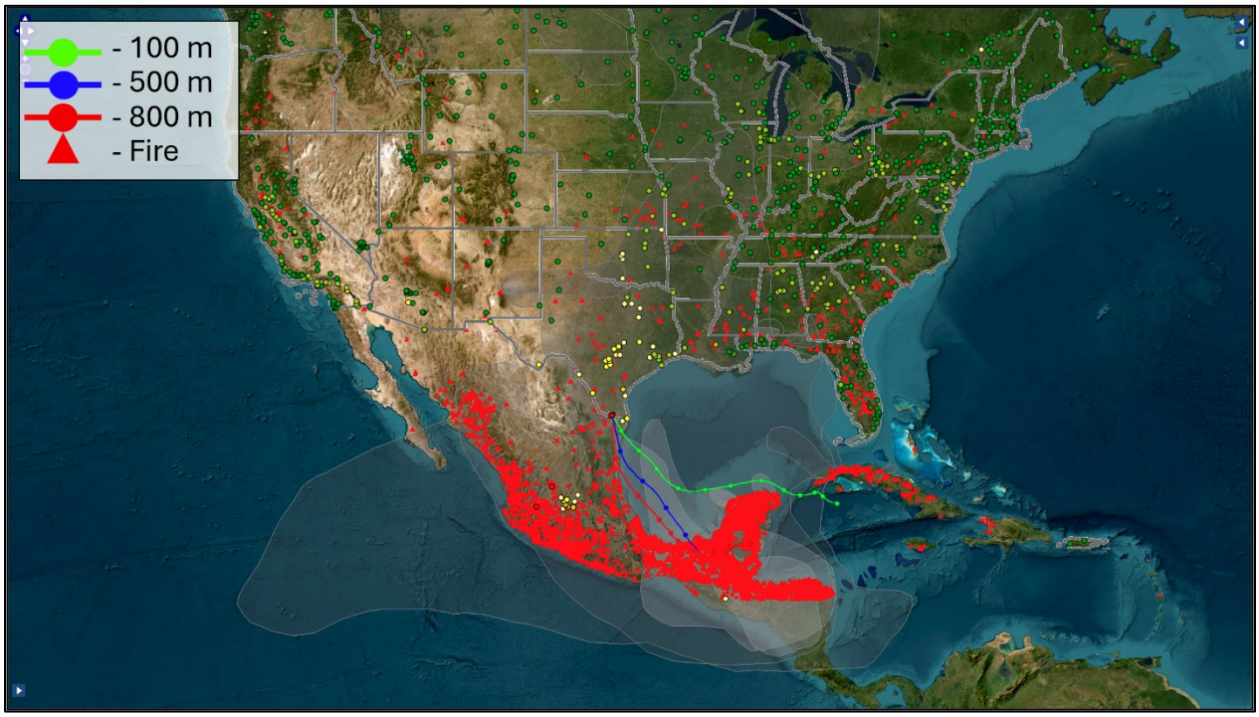

Figure 3-231: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 24, 2024

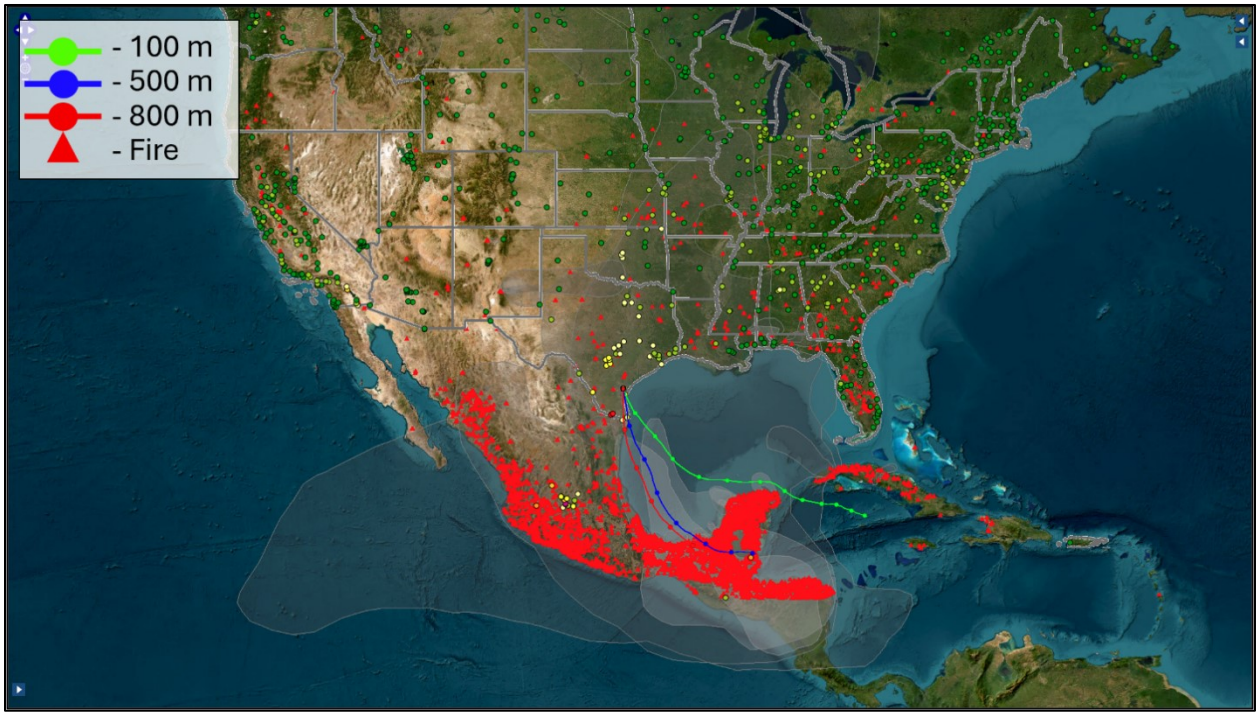

Figure 3-232: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 24, 2024

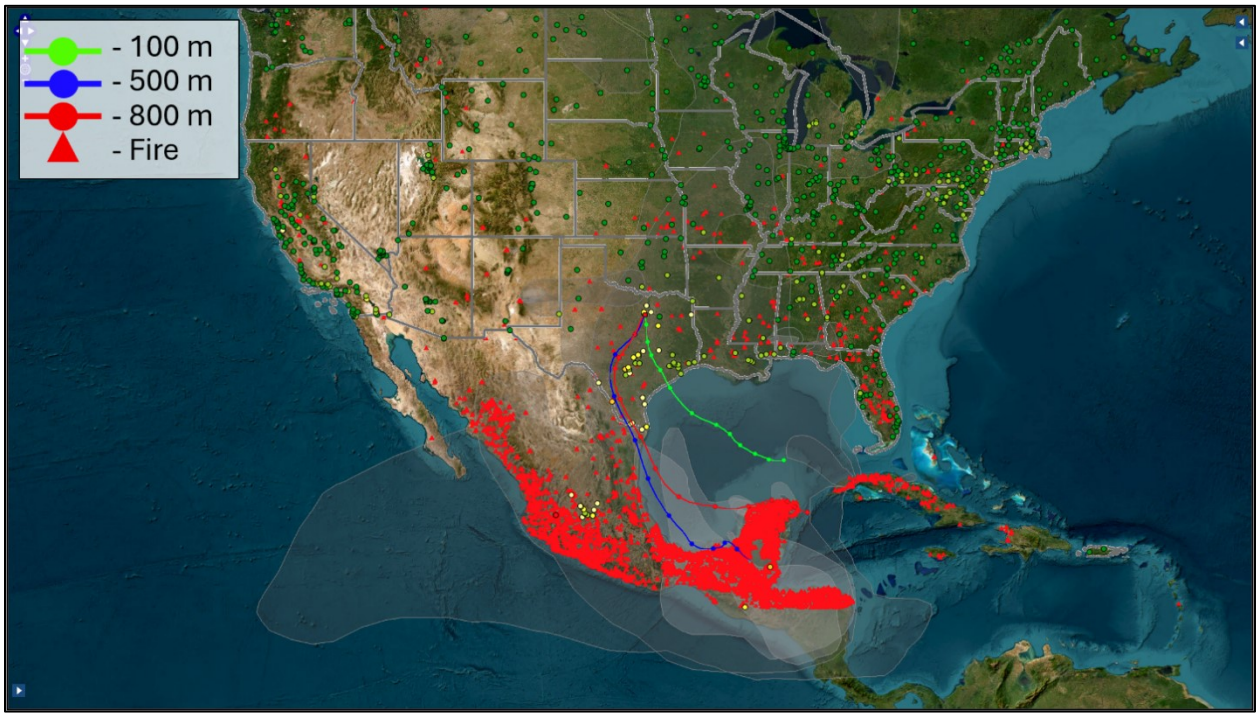

Figure 3-233: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 24, 2024

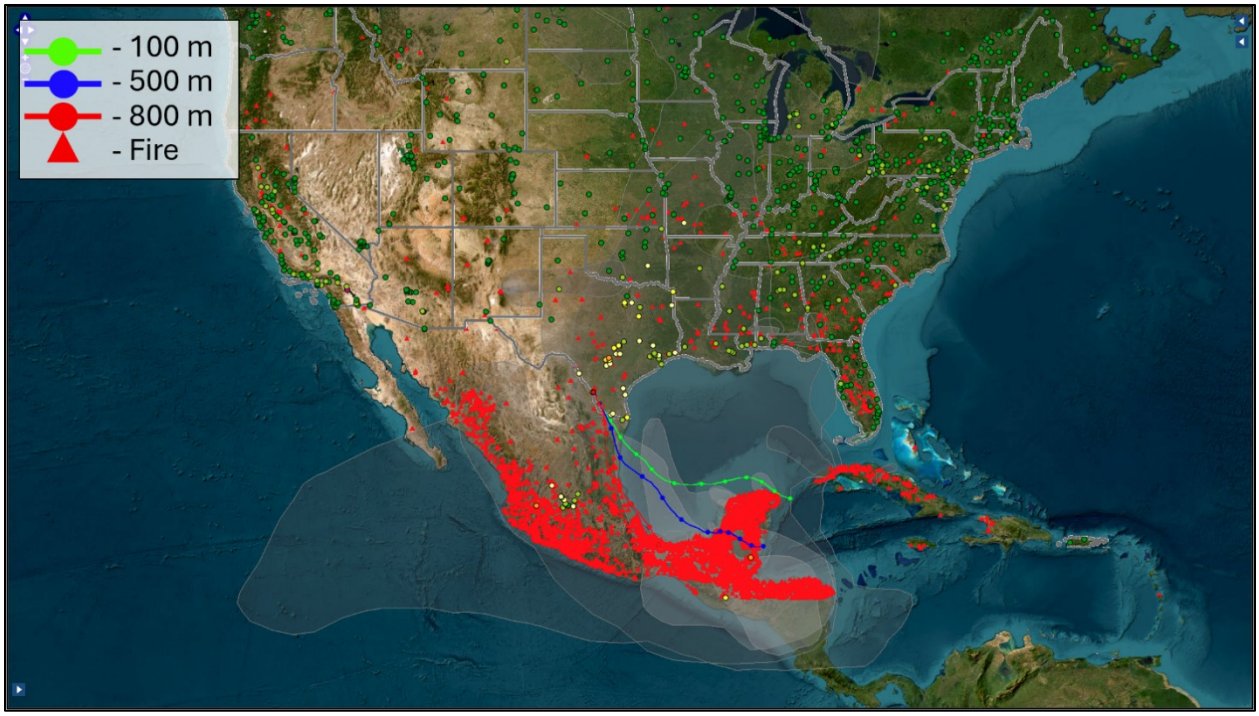

Figure 3-234: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 24, 2024

May 25, 2024, is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 35.5 µg/m^3; one-hour daily maximum 65.0 µg/m^3 recorded at 09:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 38.2 µg/m^3; one-hour daily maximum 60.2 µg/m^3 recorded at 08:00 LST);
- Dona Park monitor (24-hour average concentration 39.6 µg/m^3; one-hour daily maximum 75.9 µg/m^3 recorded at 04:00 LST);
- Haws Athletic Center monitor (24-hour average concentration 27.2 µg/m^3; one-hour daily maximum 50.8 µg/m^3 recorded at 17:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 42.7 µg/m^3; one-hour daily maximum 60.8 µg/m^3 recorded at 08:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 25, 2024, can be compared against typical/non-event days for each monitor in Figure 3-235: *Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-236: *Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-237: *Hourly $PM_{2.5}$ Concentrations on May 25, 2024,* Compared to Typical Concentrations at the Dona Park Monitor, Figure 3-238: *Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor*, and Figure 3-239: *Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

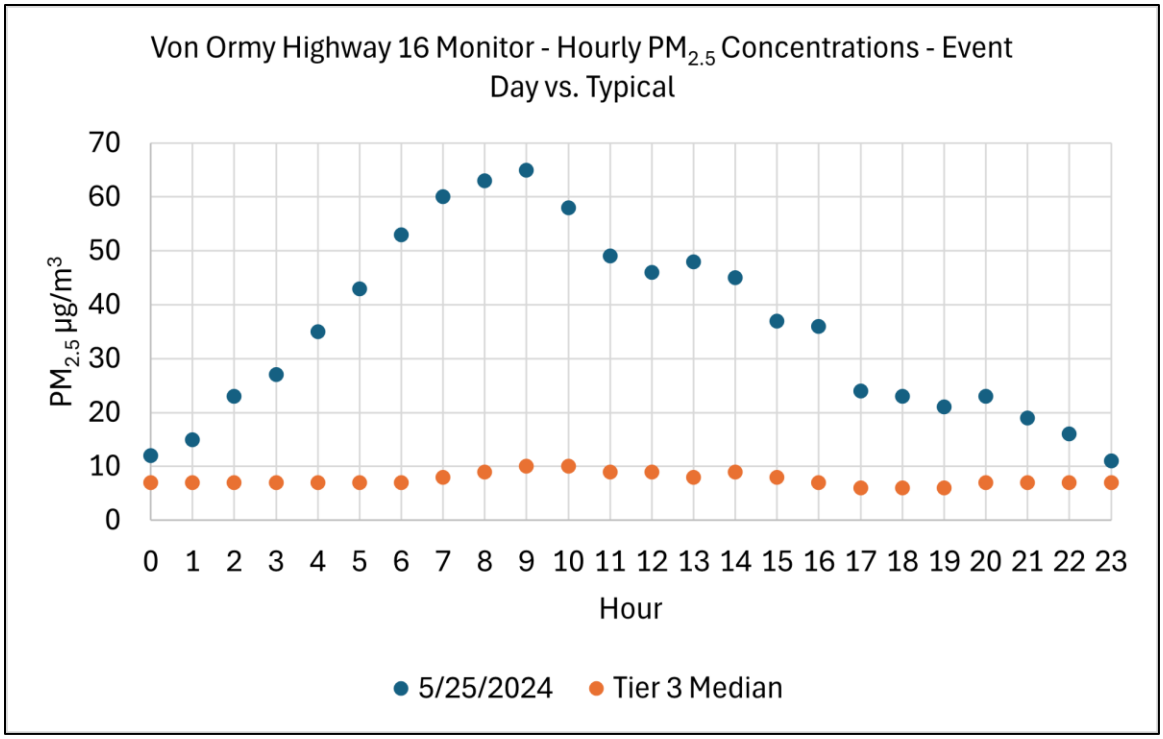

Figure 3-235: Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

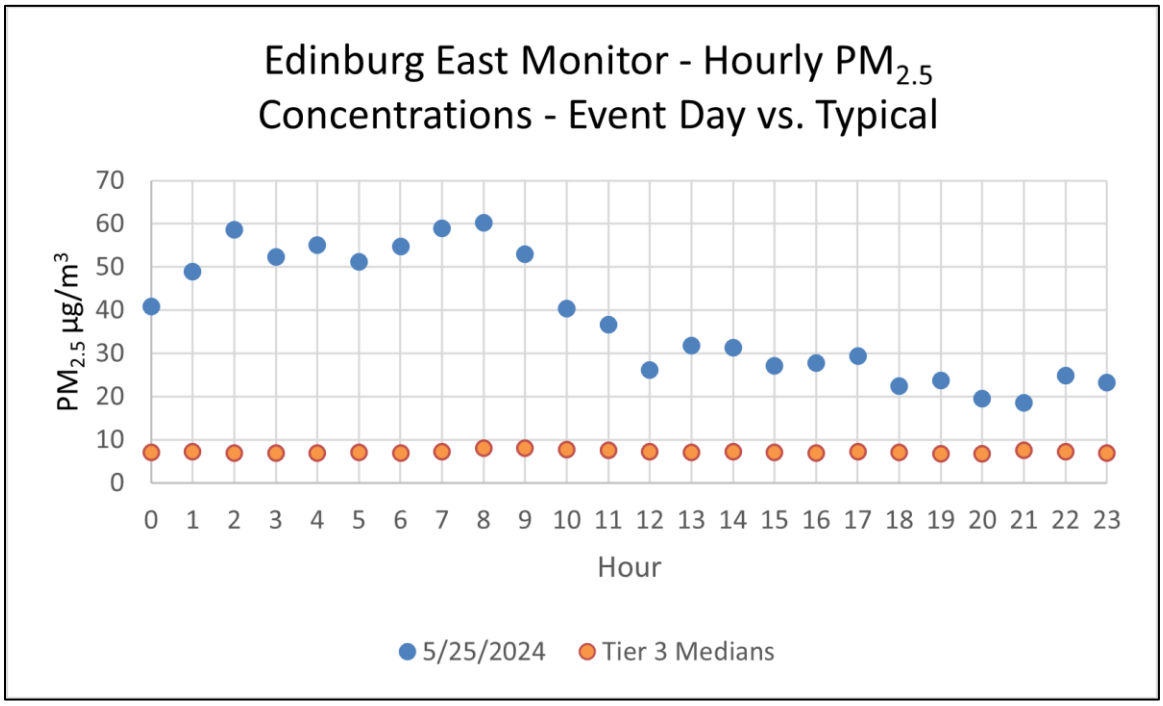

Figure 3-236: Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

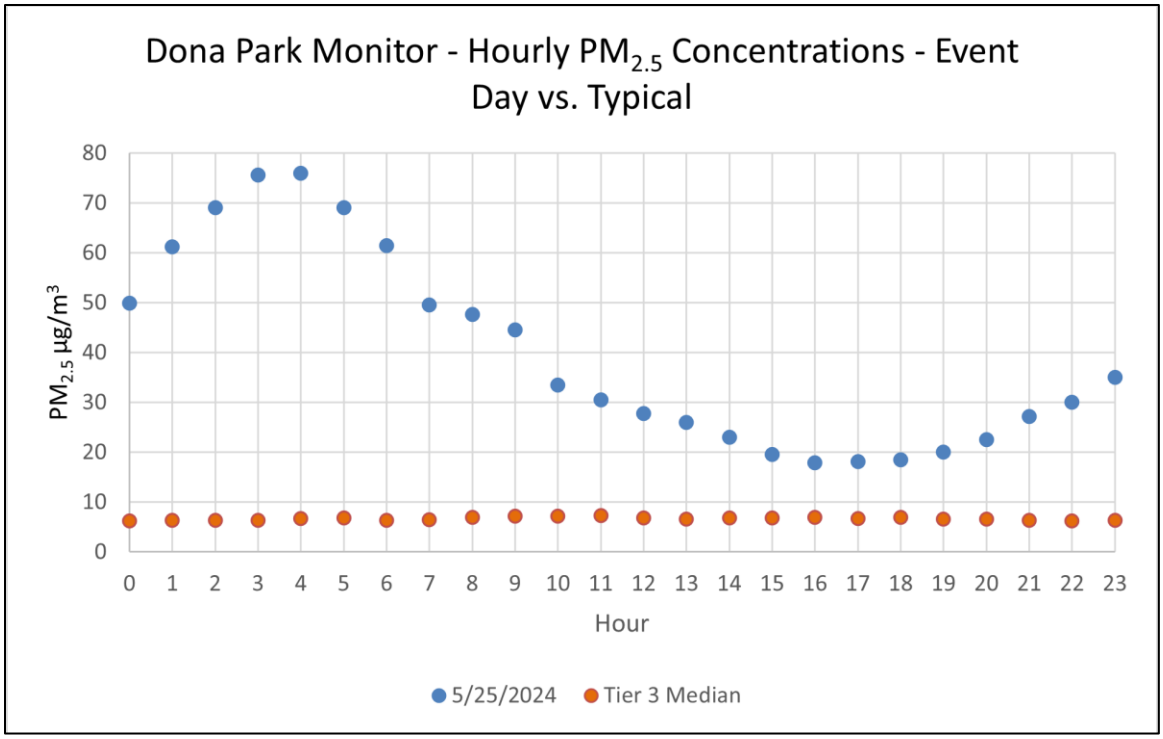

Figure 3-237: Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Dona Park Monitor

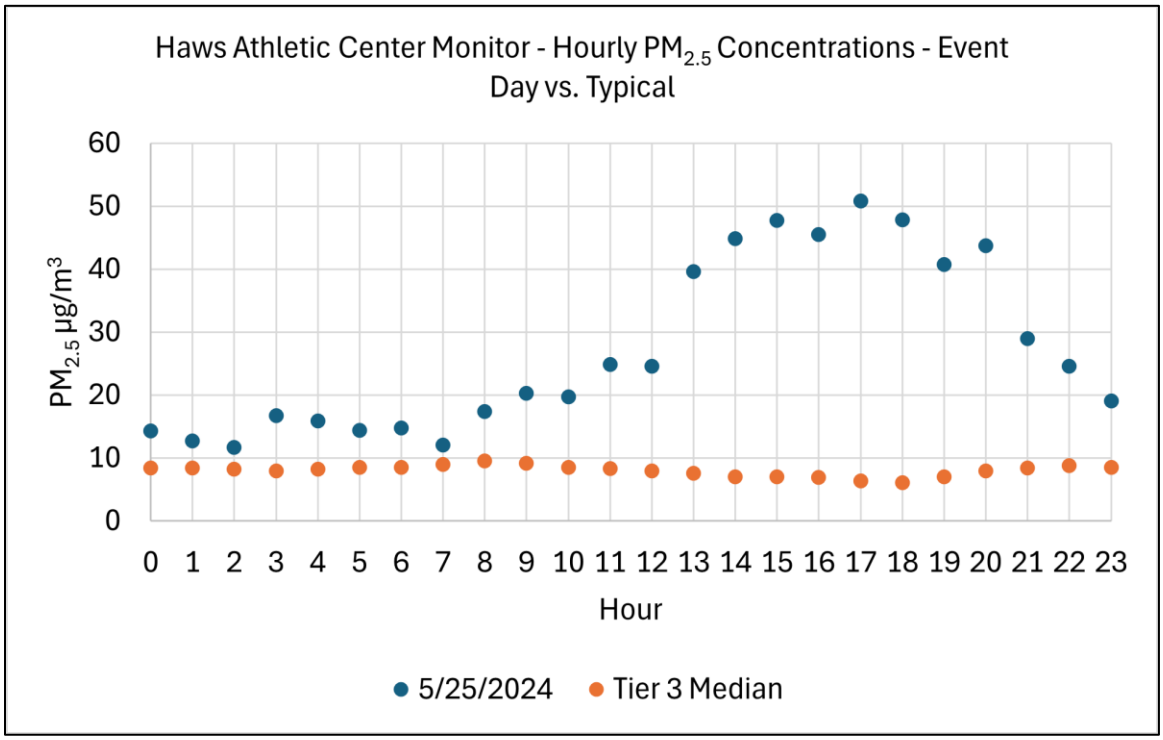

Figure 3-238: Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

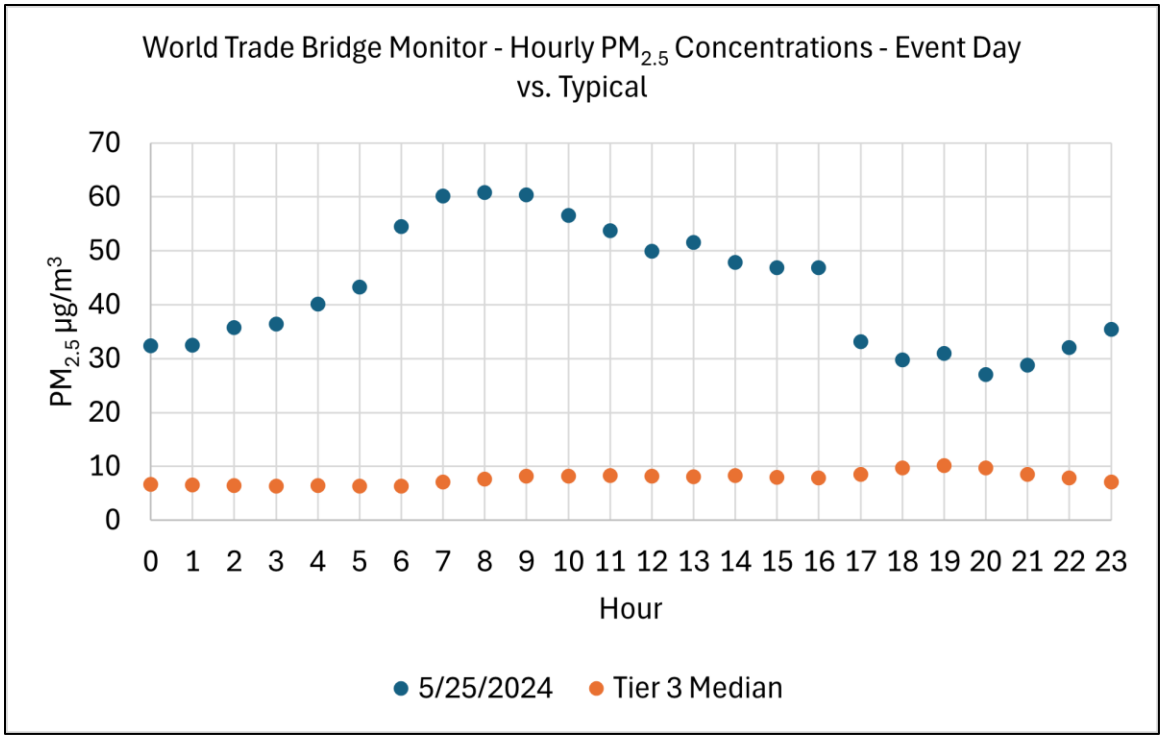

Figure 3-239: Hourly $PM_{2.5}$ Concentrations on May 25, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 25, 2024, mention moderate to high density residual smoke from both seasonal burnings in Mexico and Central America and aerosols from industrial sources in Mexico affecting South Central, Southwest, Southeast, North Central, and Deep South Texas (Table C-9). Media reports from May 27, 2024, mention hazy skies due to agricultural smoke in Mexico affecting Texas (Figure C-8 and Figure C-9). NWS archived weather discussions from the Corpus Christi and Brownsville NWS Weather Forecast Offices on May 25, 2024, mention hazy conditions and reduced visibility due to smoke from Mexico (Figure B-12 and B-14). Satellite imagery reveals hazy coloration in South Texas, and smoke in Mexico and the Gulf of America (Figure 3-240: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 25, 2024, Showing Haze and Smoke in Mexico and the Gulf of America*). Smoke plumes (Figure A-69 and Figure 3-241: *AirNow HMS Smoke Plume for May 25, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-242: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 25, 2024*, Figure 3-243: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 25, 2024*, Figure 3-244: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 25, 2024*, Figure 3-245: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 25, 2024*, and Figure 3-246: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 25, 2024*) on May 25, 2024 indicate that medium to heavy smoke covered Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups.

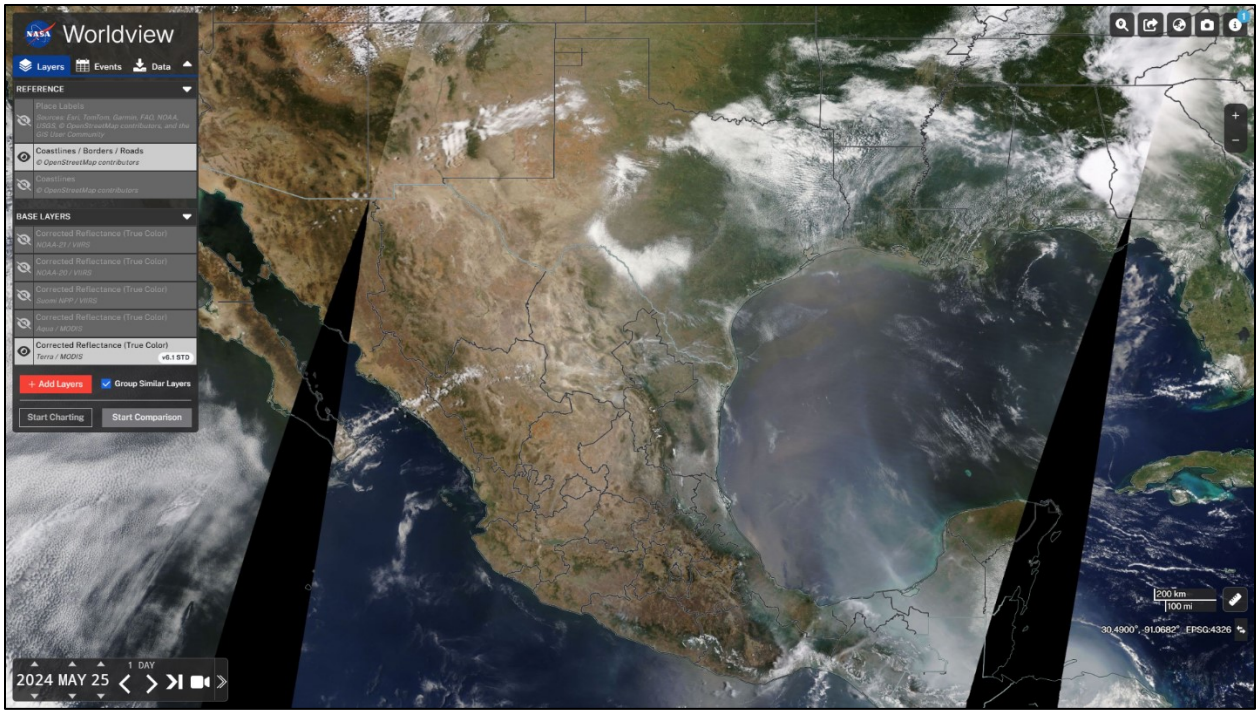

Figure 3-240: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 25, 2024, Showing Haze and Smoke in Mexico and the Gulf of America

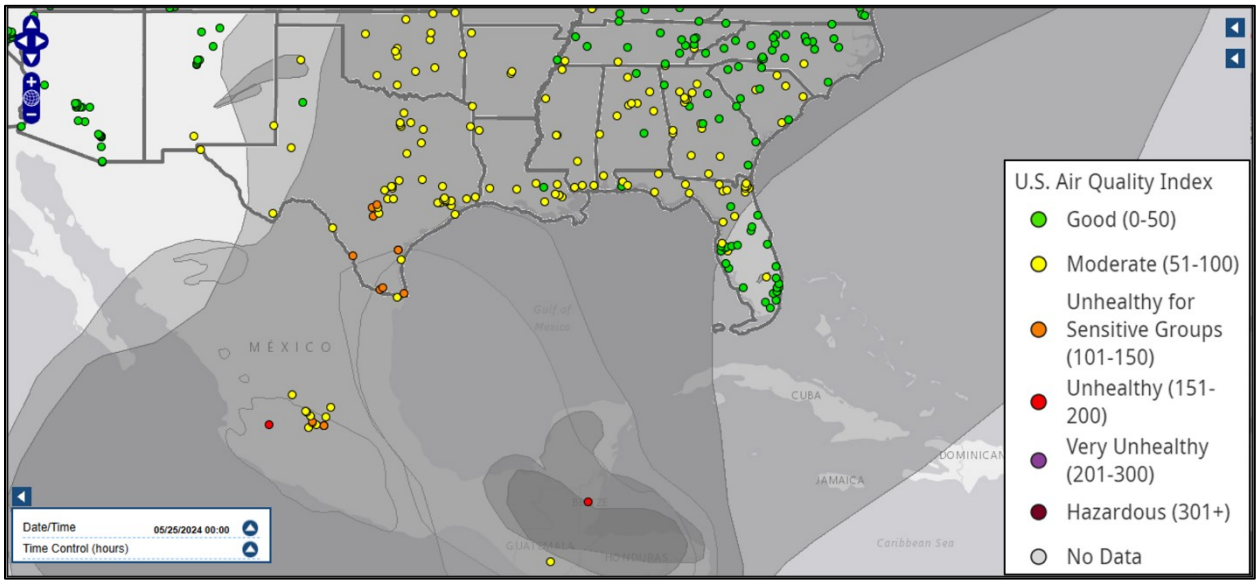

Figure 3-241: AirNow HMS Smoke Plume for May 25, 2024

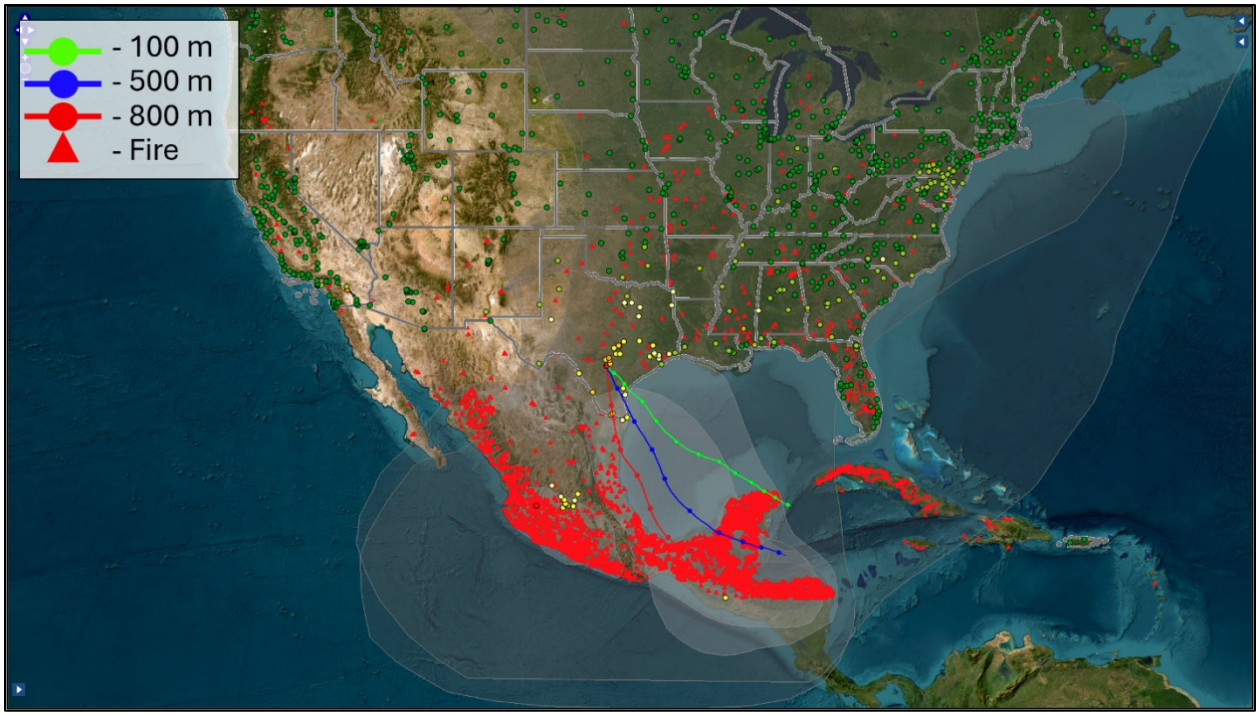

Figure 3-242: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 25, 2024

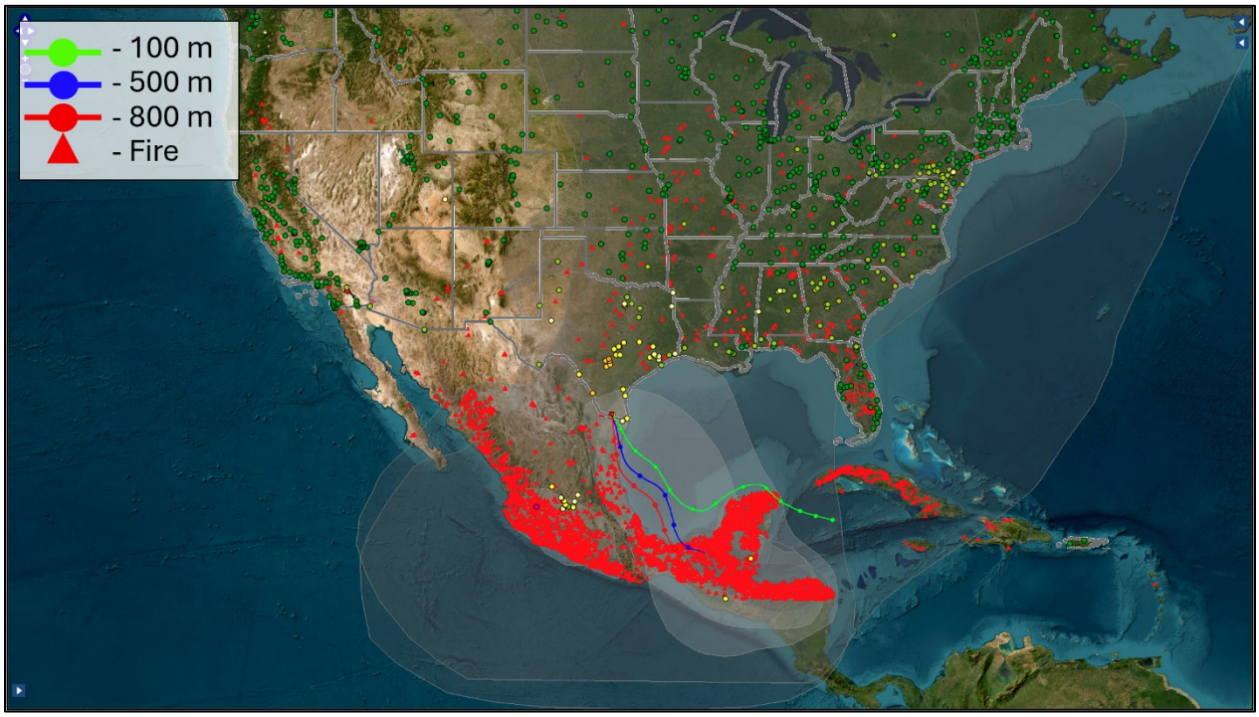

Figure 3-243: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 25, 2024

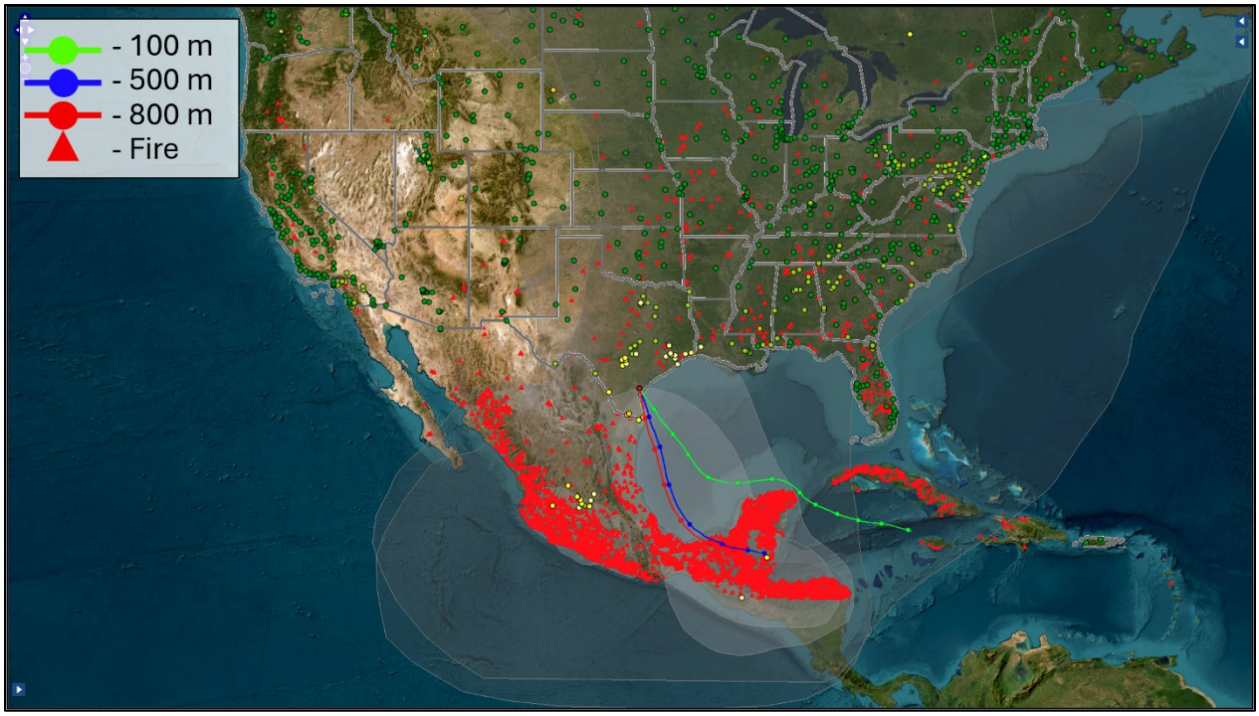

Figure 3-244: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 25, 2024

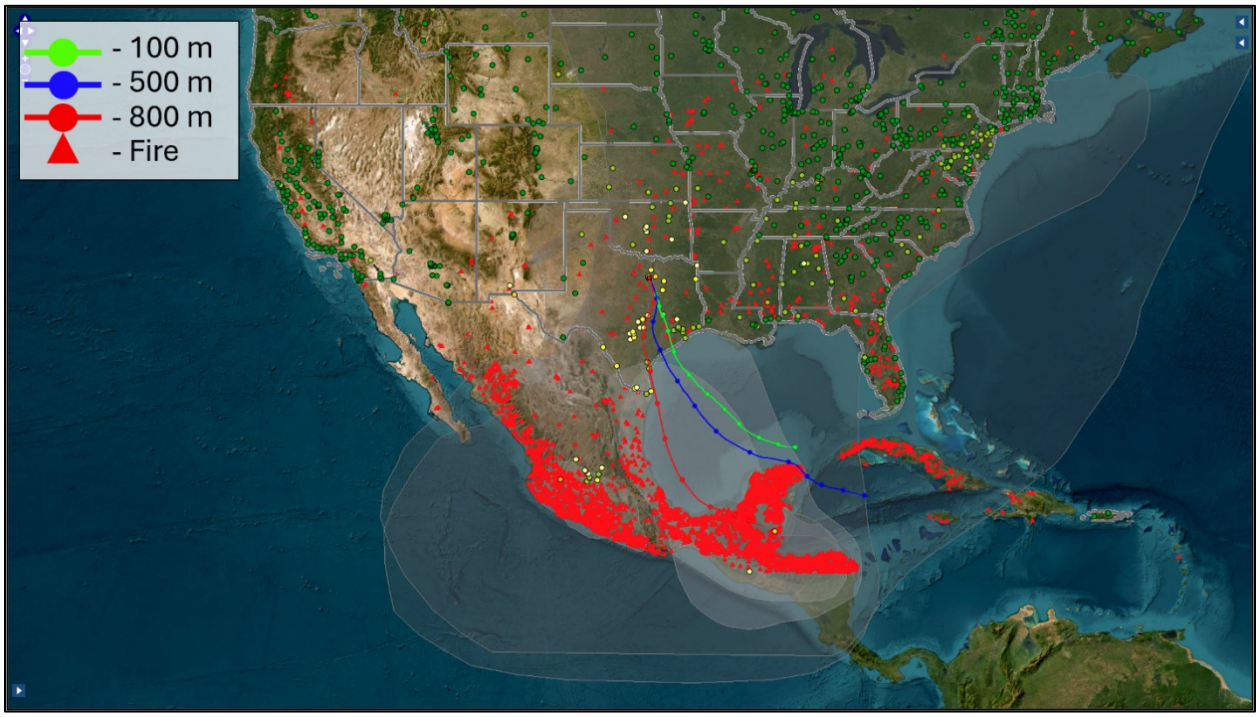

Figure 3-245: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 25, 2024

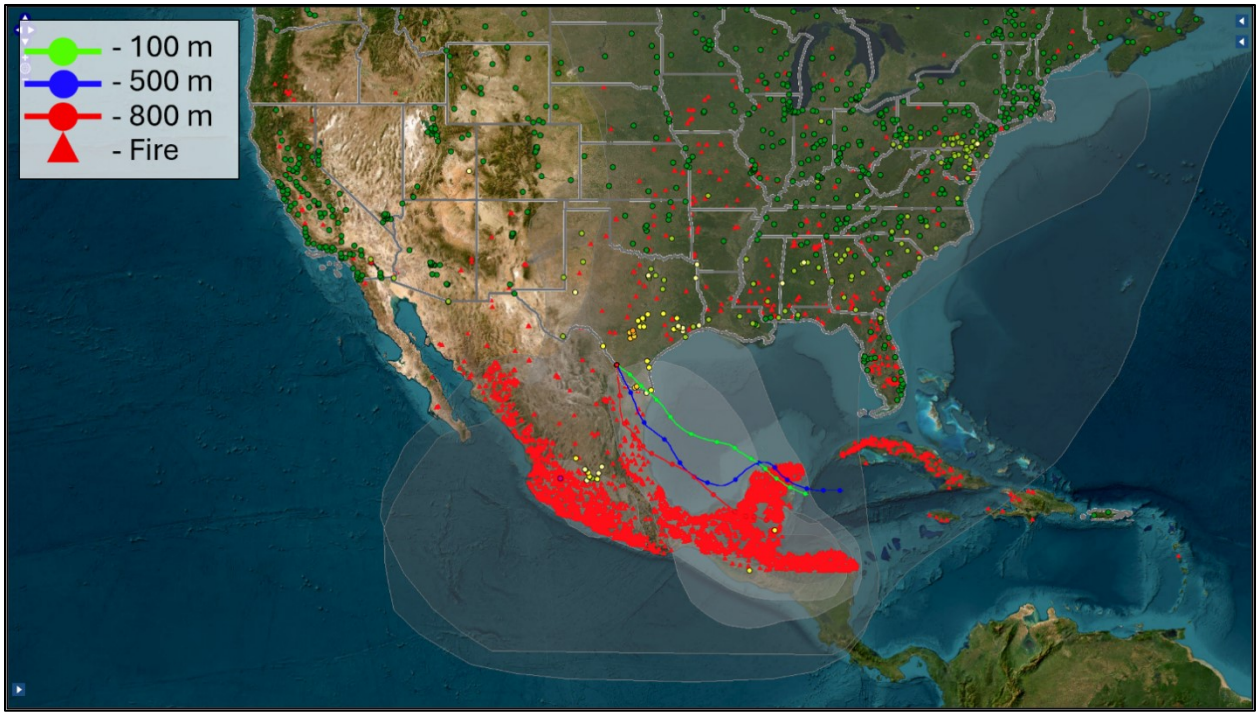

Figure 3-246: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 25, 2024

May 26, 2024, is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 37.9 µg/m^3; one-hour daily maximum 59.0 µg/m^3 recorded at 14:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 49.5 µg/m^3; one-hour daily maximum 78.9 µg/m^3 recorded at 06:00 LST);
- Dona Park monitor (24-hour average concentration 46.9 µg/m^3; one-hour daily maximum 68.2 µg/m^3 recorded at 04:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 36.9 µg/m^3; one-hour daily maximum 48.2 µg/m^3 recorded at 19:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 26, 2024, can be compared against typical/non-event days for each monitor in Figure 3-247: *Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-248: *Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-249: *Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, and Figure 3-250: *Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

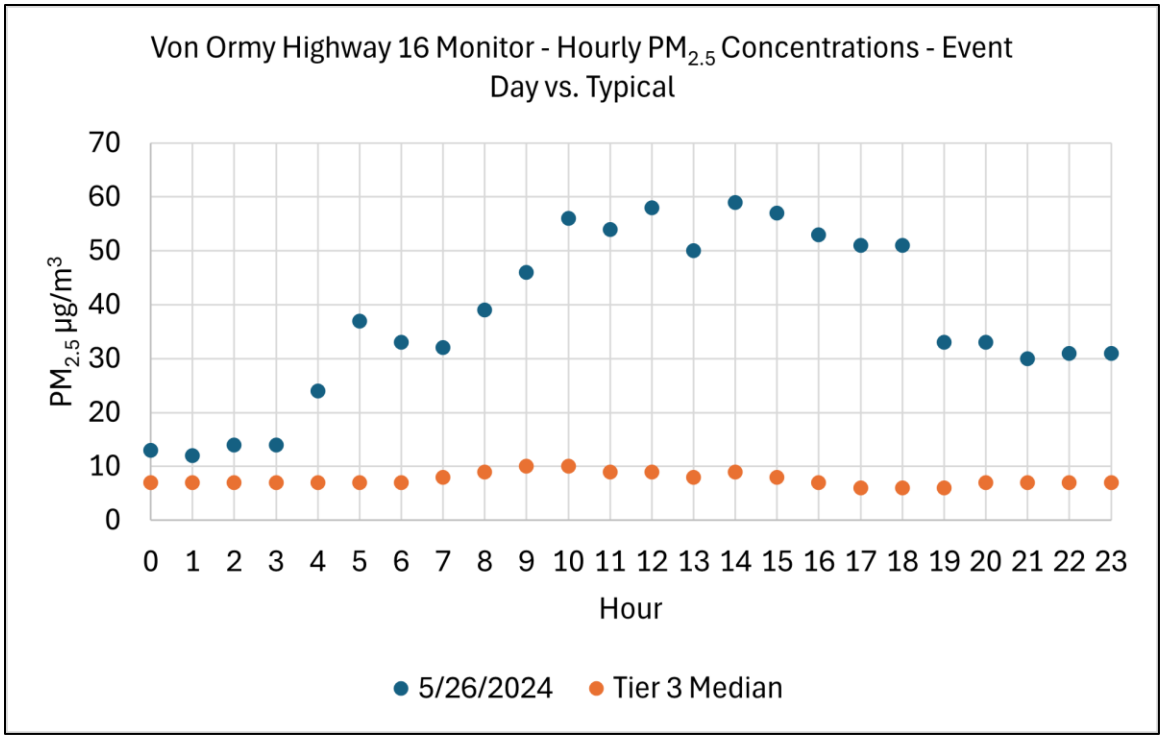

Figure 3-247: Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

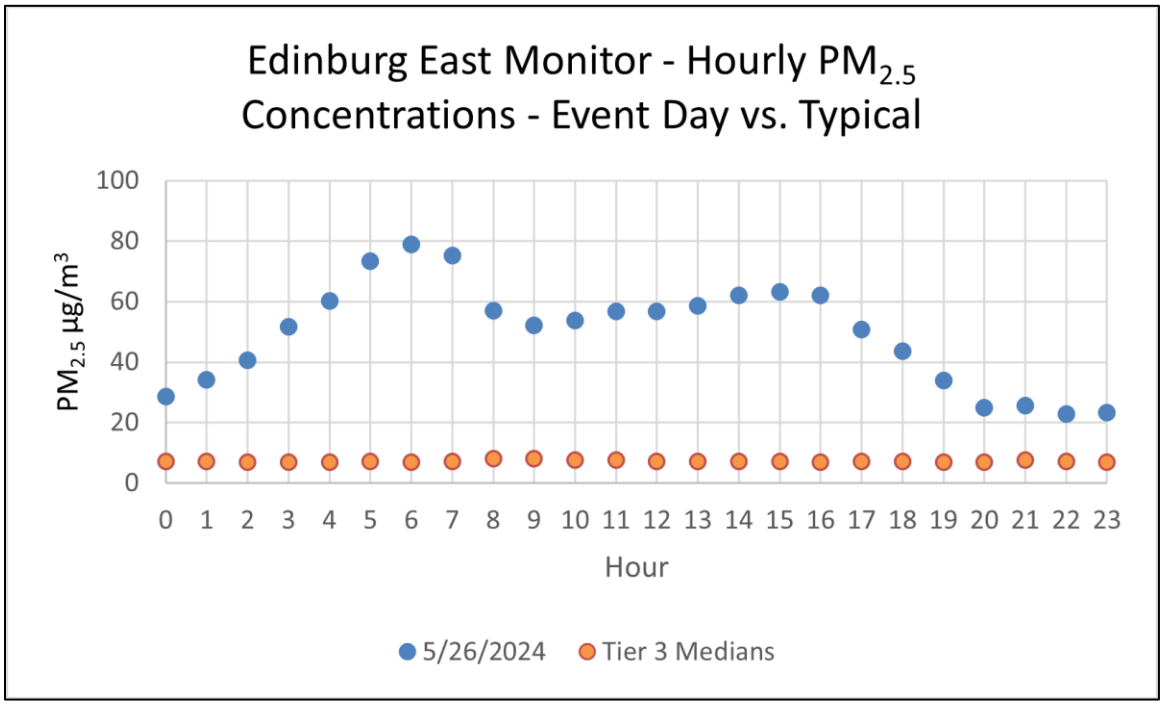

Figure 3-248: Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

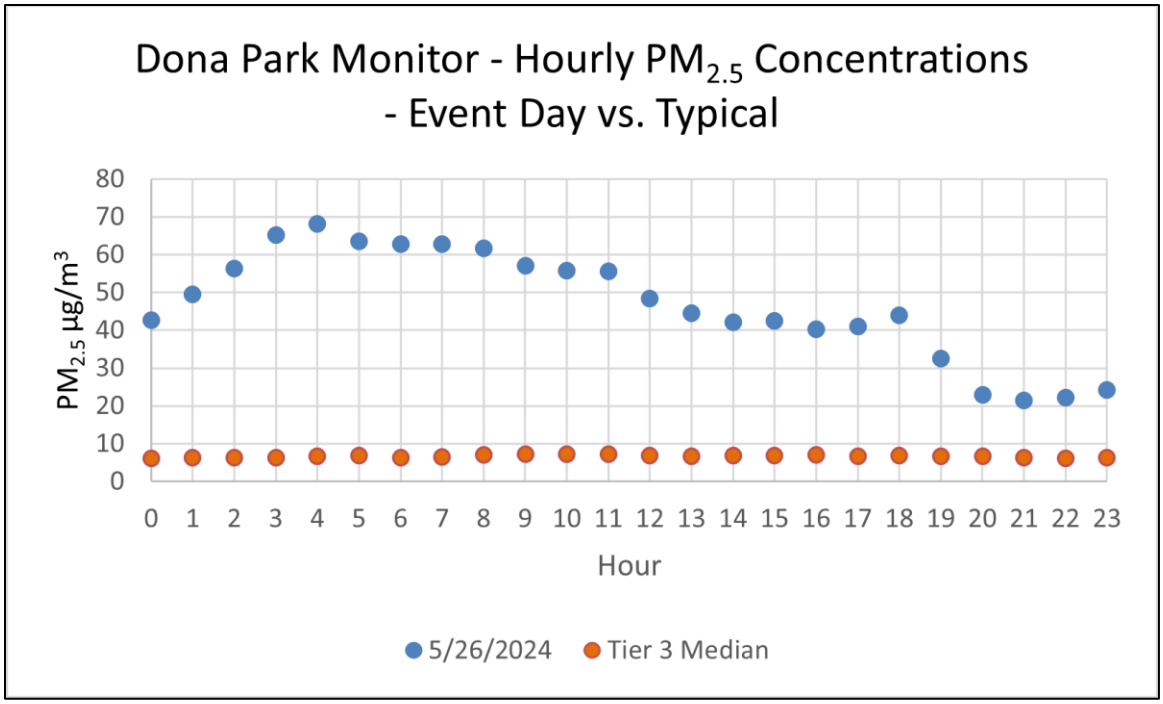

Figure 3-249: Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the Dona Park Monitor

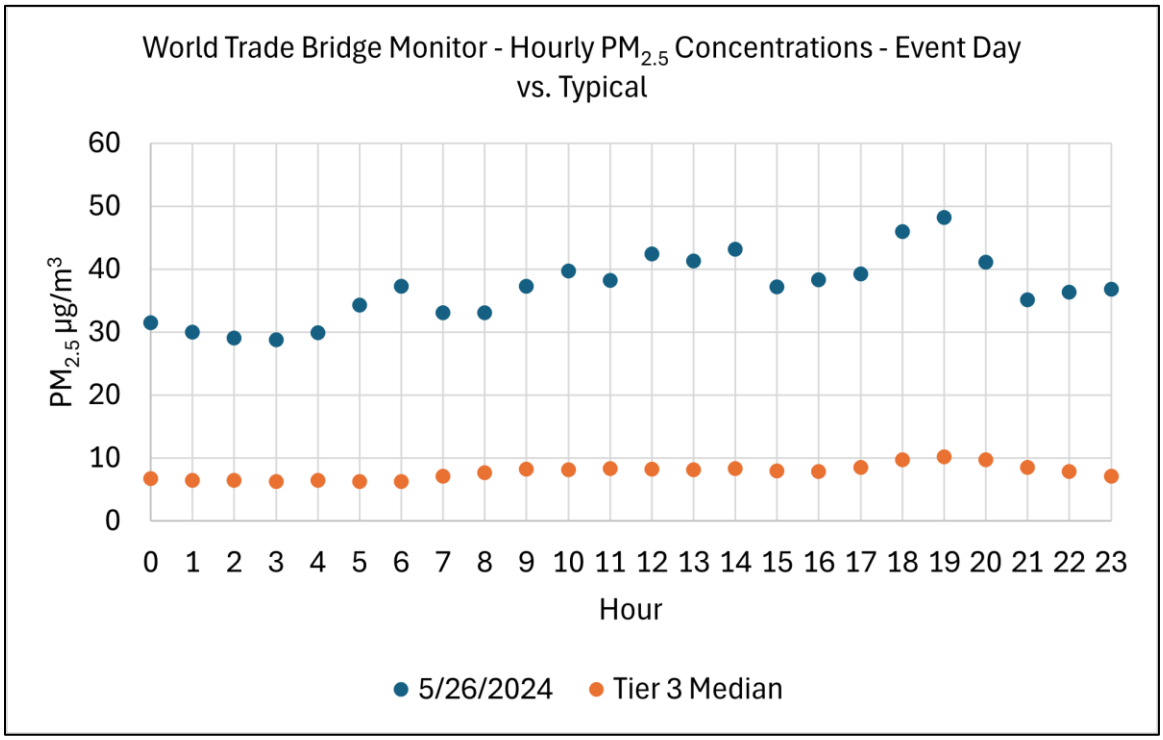

Figure 3-250: Hourly $PM_{2.5}$ Concentrations on May 26, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 26, 2024, mention hazy conditions associated with moderate density residual smoke from both seasonal burnings in Mexico and Central America and aerosols from industrial sources in Mexico affecting south central, southwest, southeast, north central, and

deep south Texas (Table C-9). Media reports from May 27, 2024, mention hazy skies due to agricultural smoke in Mexico affecting Texas (Figure C-8 and Figure C-9). NWS archived weather discussions from the Brownsville, Corpus Christi, and Austin/San Antonio NWS Weather Forecast Offices on May 26, 2024, mention hazy conditions and smoke from fires in Mexico (Figure B-16, Figure B-17, and Figure B-18). Satellite imagery reveals hazy coloration and smoke in Mexico and the Gulf of America (Figure 3-251: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 26, 2024, Showing Haze and Smoke in South/East Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-70 and Figure 3-252: *AirNow HMS Smoke Plume for May 26, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-253: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 26, 2024*, Figure 3-254: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 26, 2024*, Figure 3-255: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 26, 2024*, and Figure 3-256: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 26, 2024*) on May 26, 2024, indicate that medium to heavy smoke covered South/East Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate, Unhealthy for Sensitive Groups, and Unhealthy.

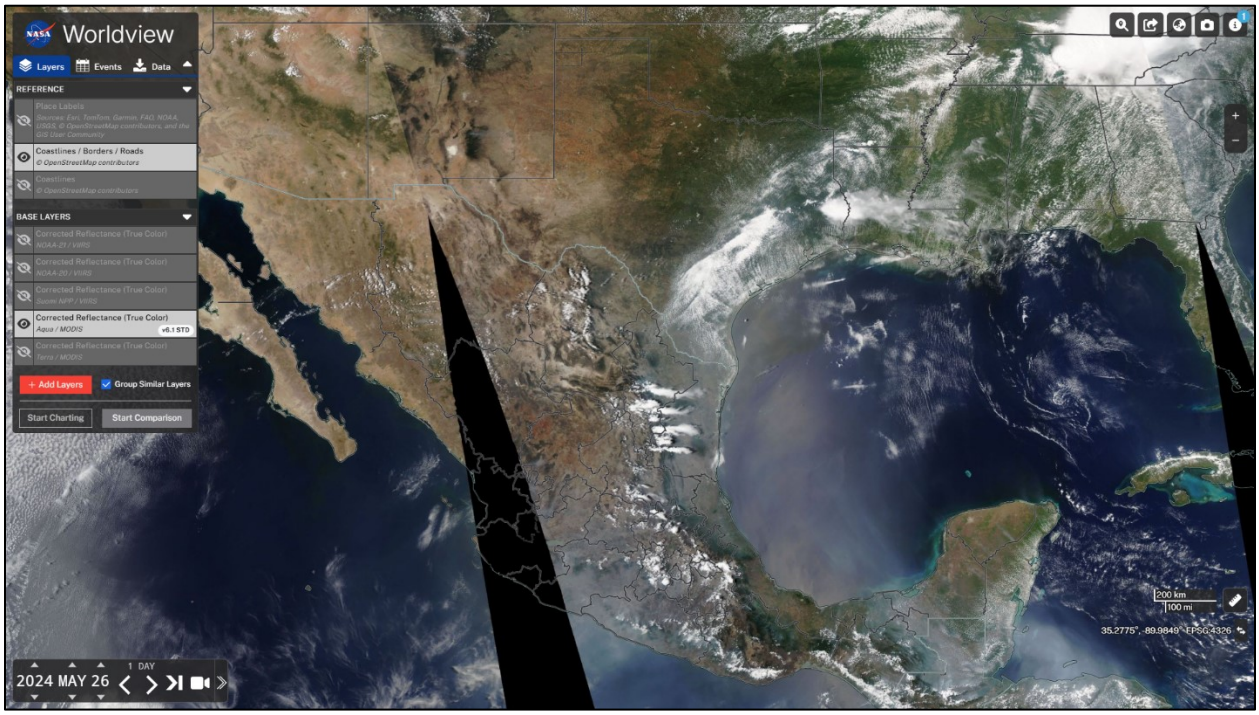

Figure 3-251: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 26, 2024, Showing Haze and Smoke in South/East Texas, Mexico, and the Gulf of America

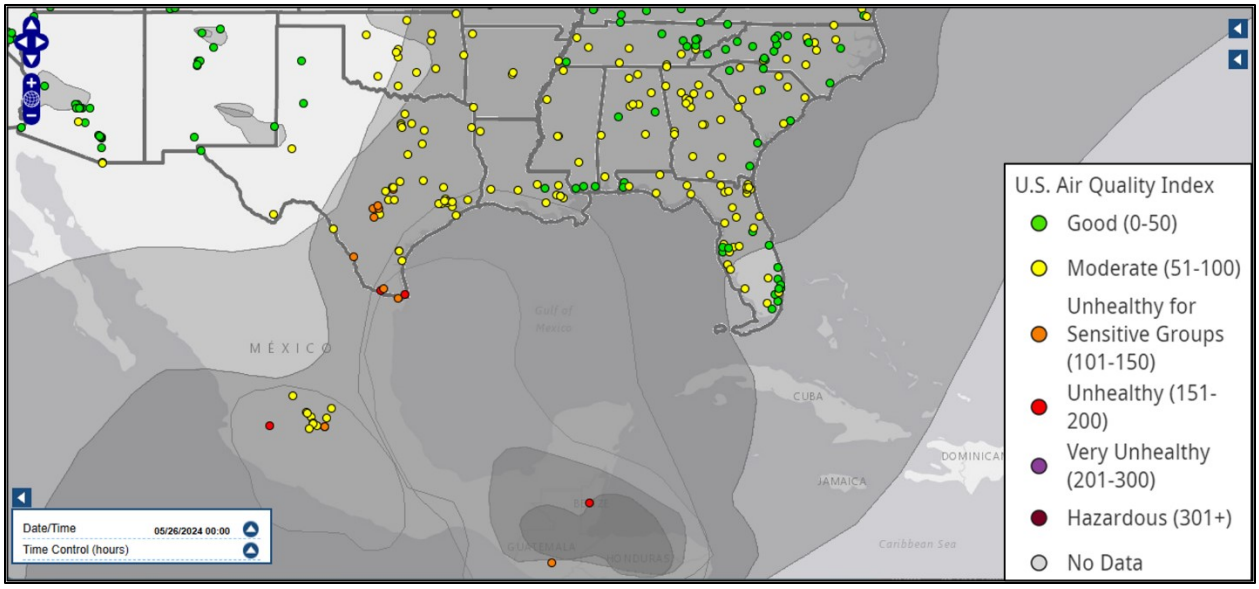

Figure 3-252: AirNow HMS Smoke Plume for May 26, 2024

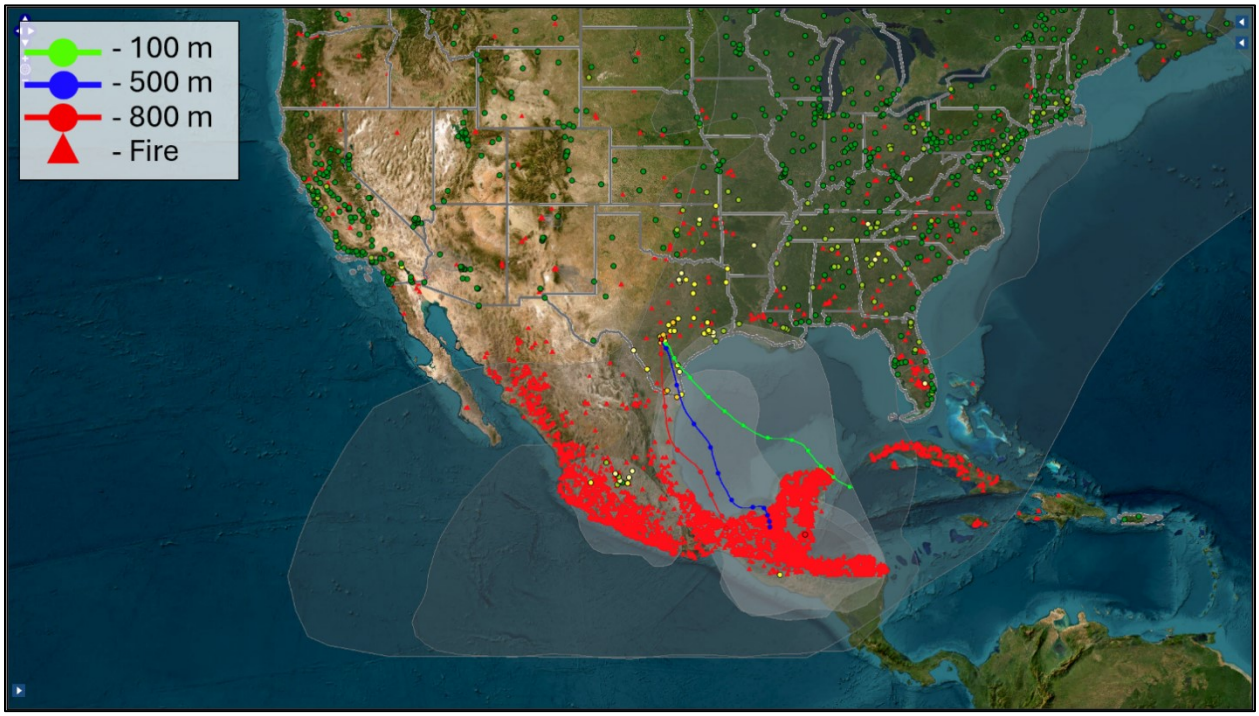

Figure 3-253: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 26, 2024

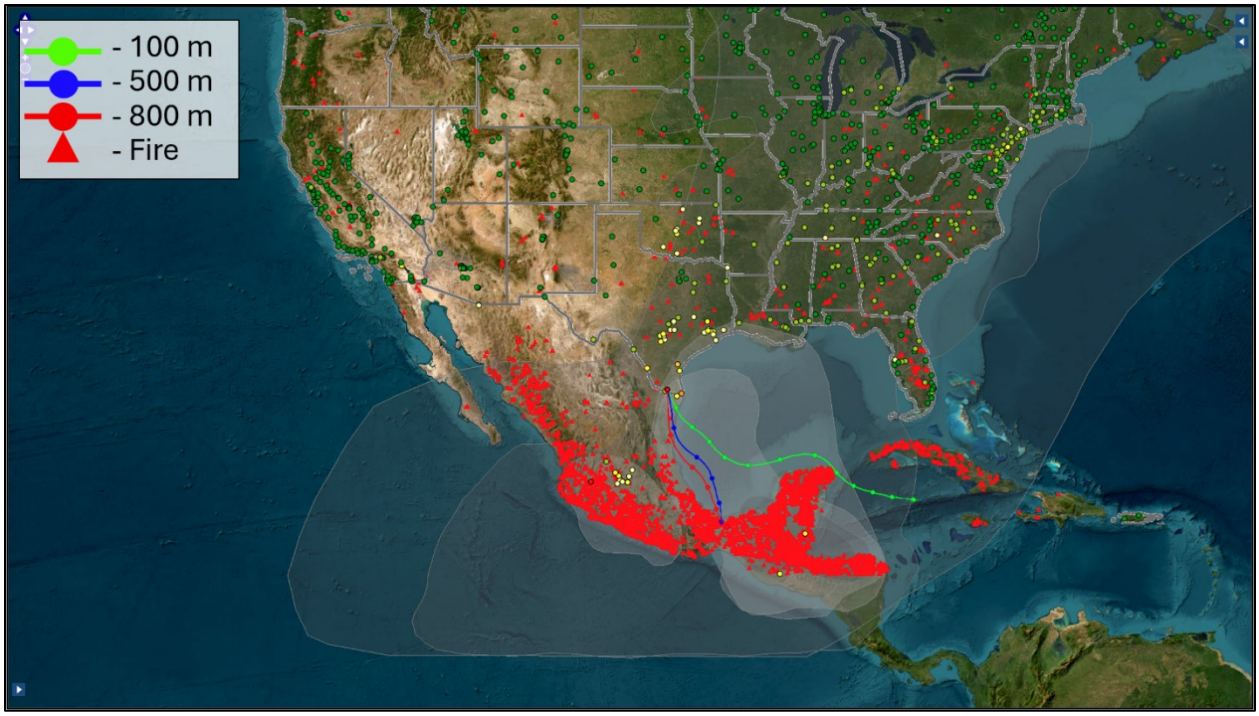

Figure 3-254: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 26, 2024

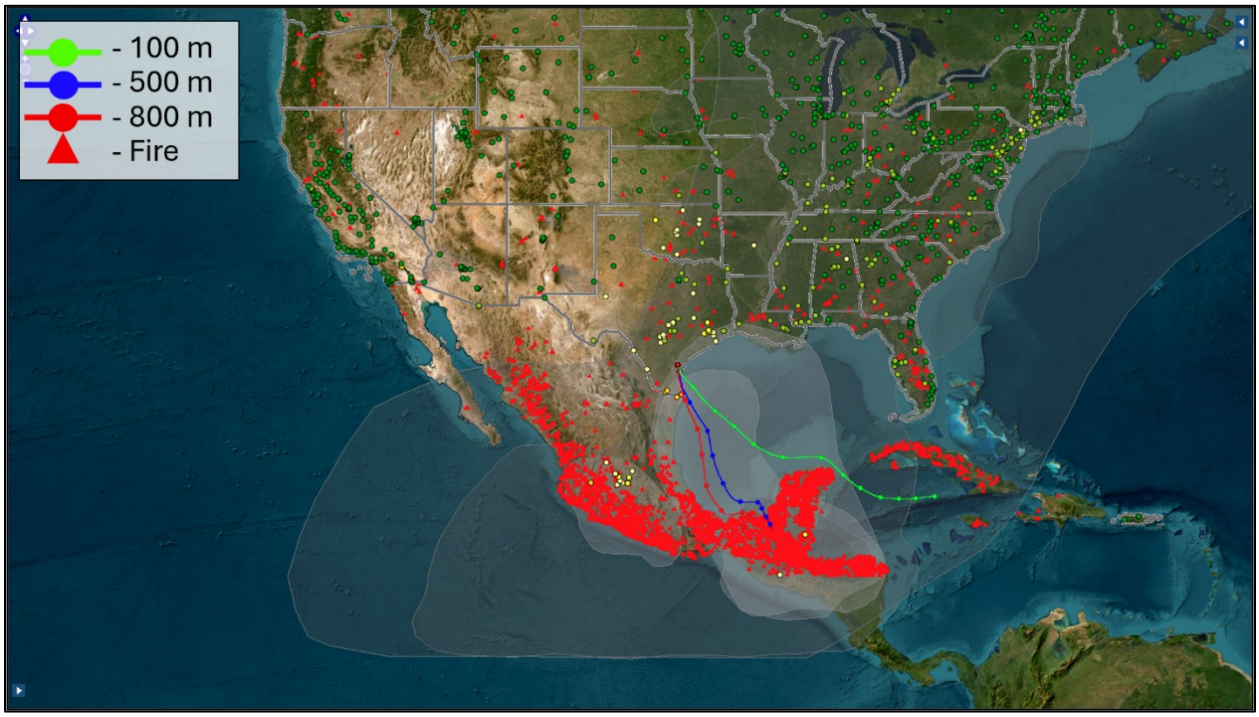

Figure 3-255: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 26, 2024

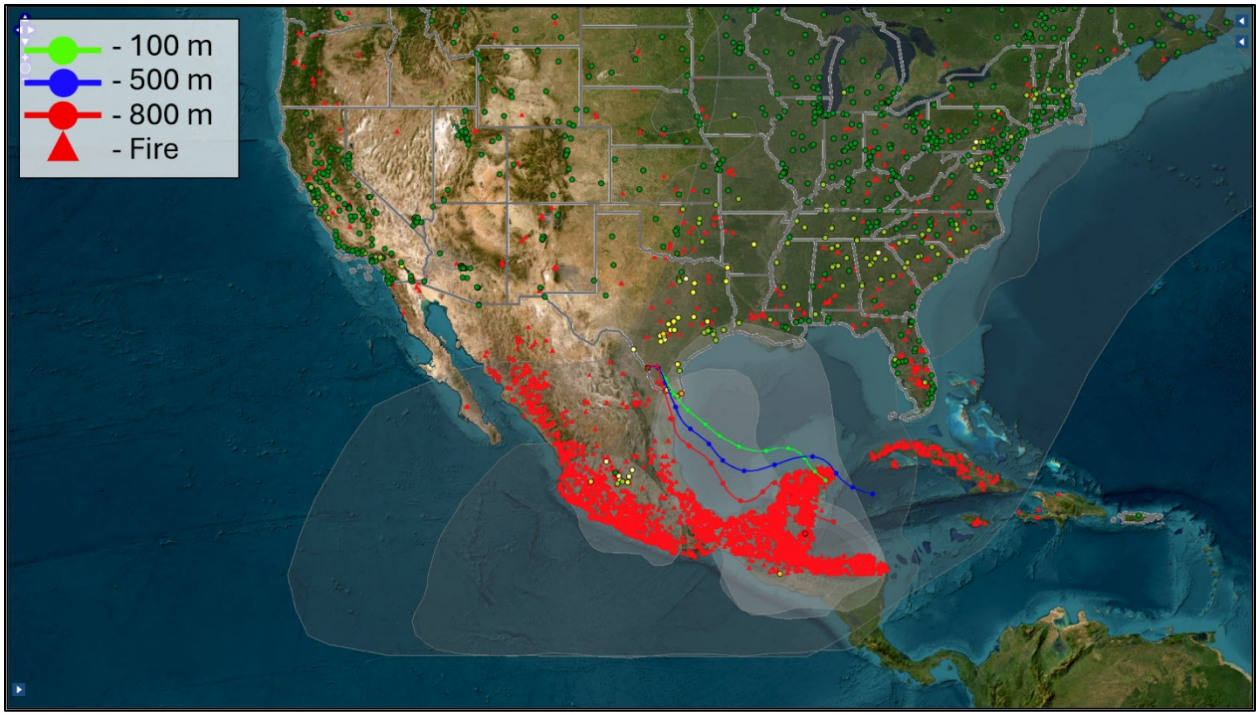

Figure 3-256: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 26, 2024

May 27, 2024, is identified as a Tier 1 day for the:

- Von Ormy Highway 16 monitor (24-hour average concentration 38.1 µg/m^3; one-hour daily maximum 63.0 µg/m^3 recorded at 19:00 LST);
- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 51.6 µg/m^3; one-hour daily maximum 84.4 µg/m^3 recorded at 08:00 LST);
- Corpus Christi Huisache monitor (24-hour average concentration 45.0 µg/m^3; one-hour daily maximum 76.0 µg/m^3 recorded at 07:00 LST);
- Dona Park monitor (24-hour average concentration 58.8 µg/m^3; one-hour daily maximum 96.1 µg/m^3 recorded at 08:00 LST); and
- Haws Athletic Center monitor (24-hour average concentration 25.4 µg/m^3; one-hour daily maximum 38.8 µg/m^3 recorded at 08:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 27, 2024, can be compared against typical/non-event days for each monitor in Figure 3-257: *Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-258: *Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-259: *Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor*, Figure 3-260: *Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, and Figure 3-261: *Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor*.

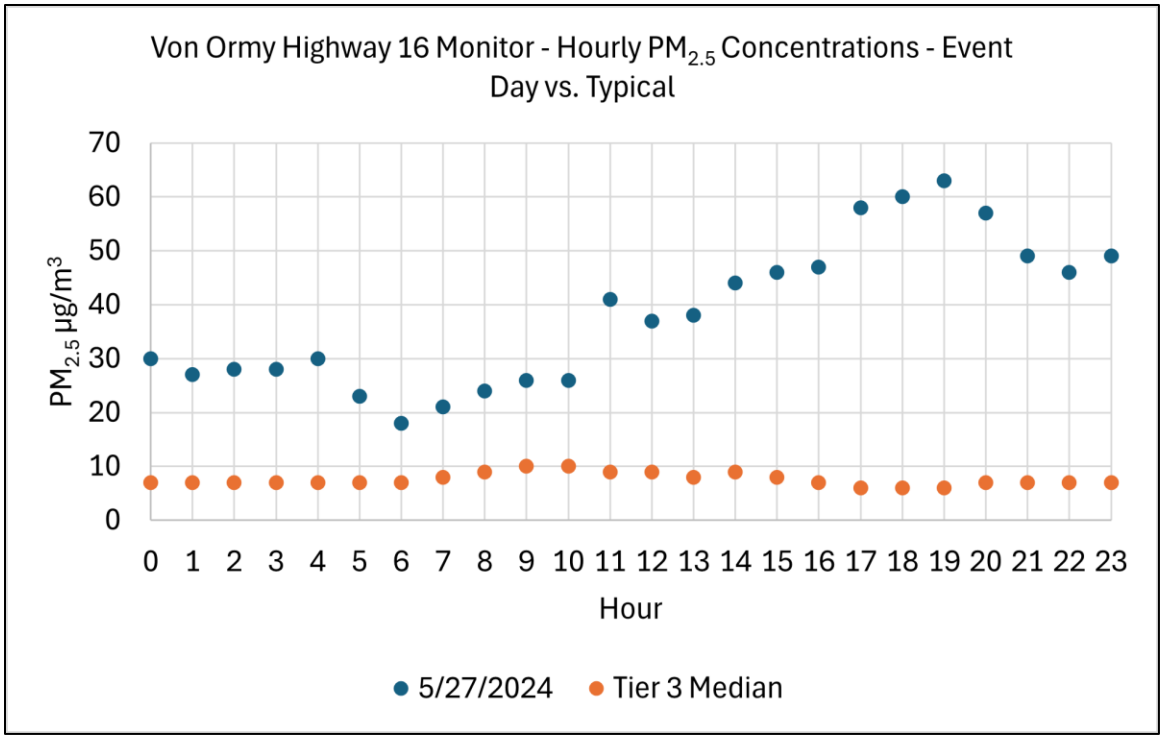

Figure 3-257: Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

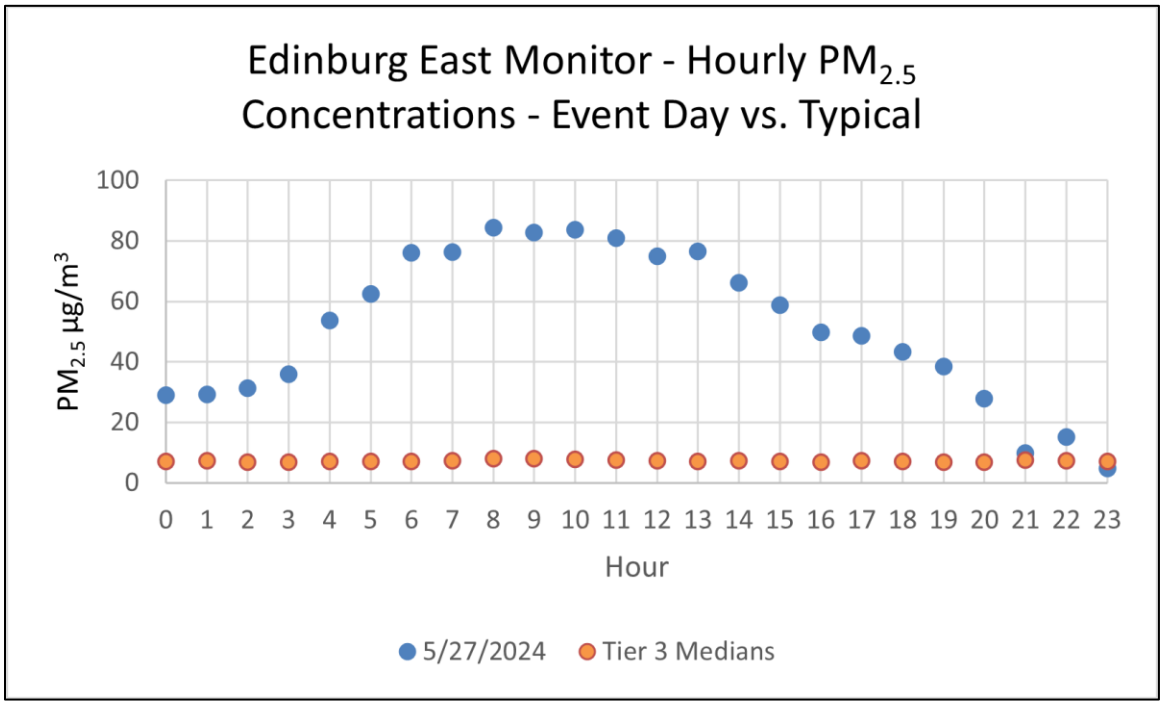

Figure 3-258: Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

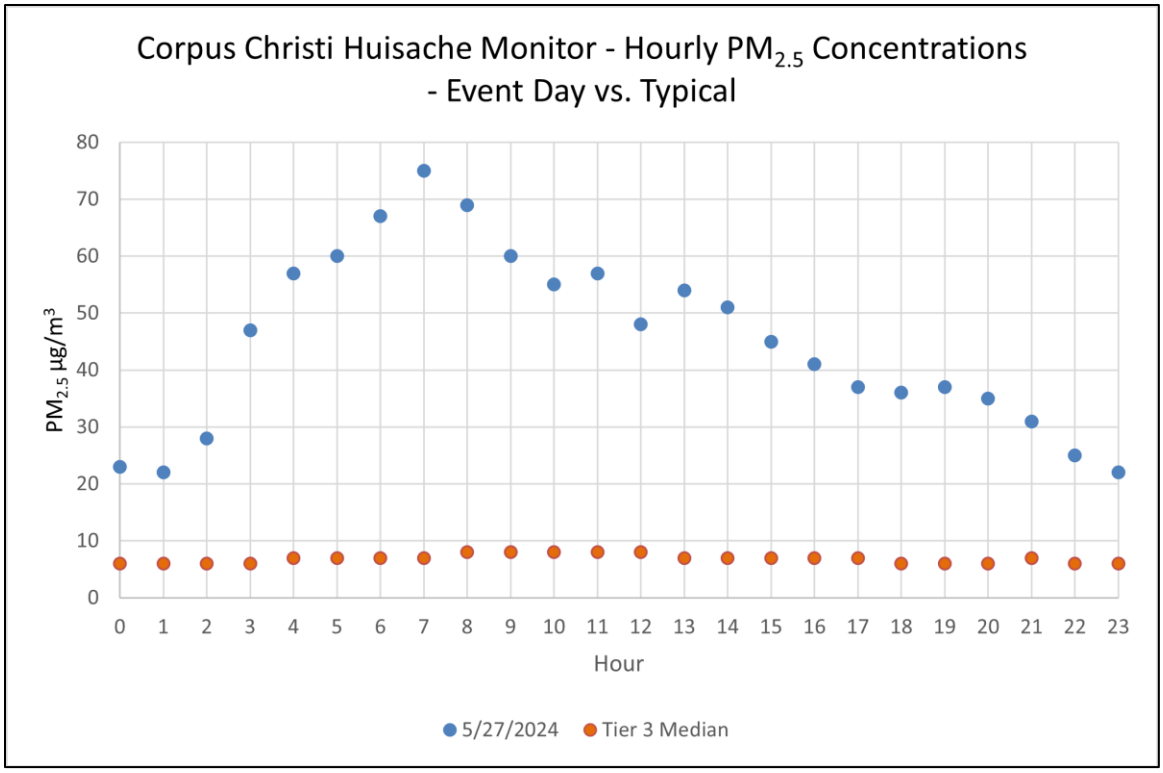

Figure 3-259: Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor

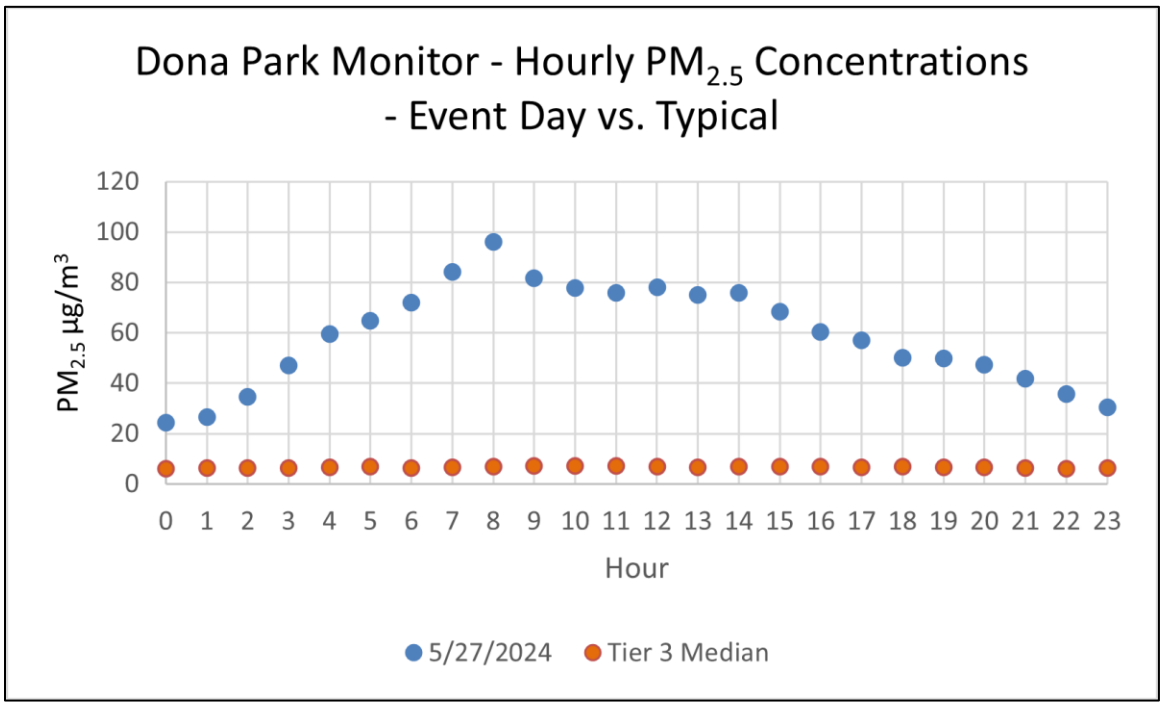

Figure 3-260: Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Dona Park Monitor

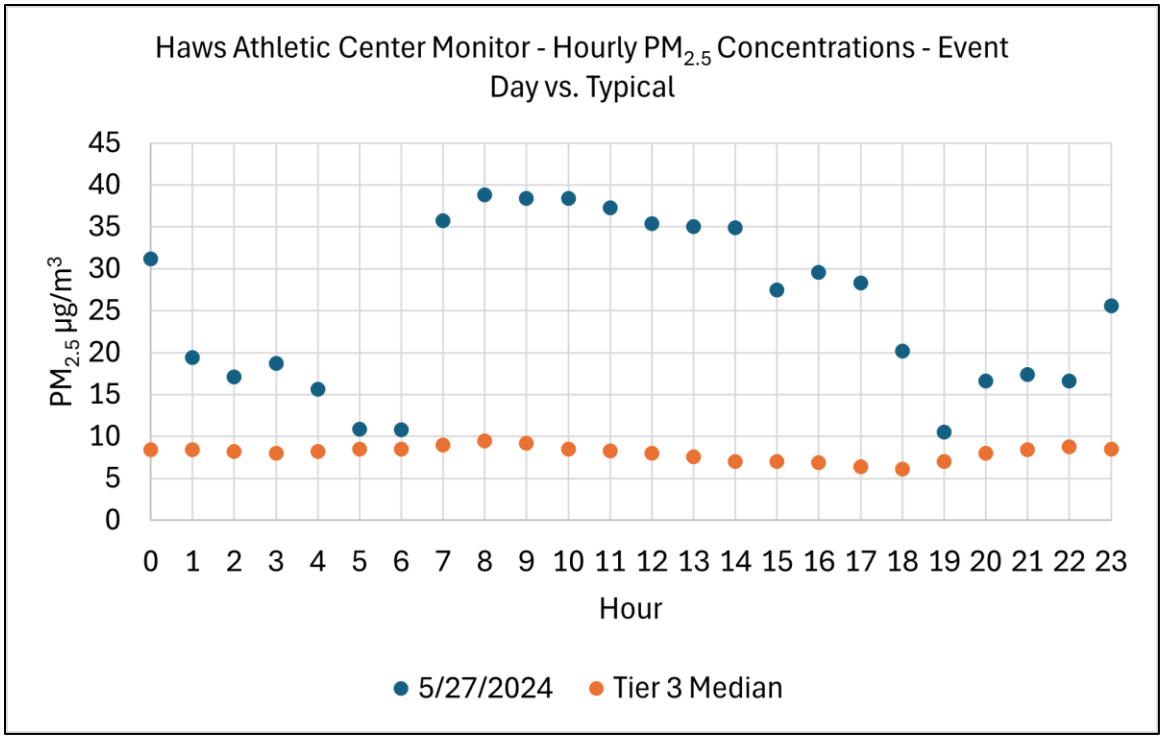

Figure 3-261: Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

TCEQ forecasts for May 27, 2024, mention increasing fine particulate matter concentrations due to high relative humidity and impacts from seasonal fires in Mexico and Central America, and aerosols from industrial sources in Mexico (Table C-9). Media reports from May 27, 2024, mention hazy skies due to agricultural smoke in Mexico affecting Texas (Figure C-8 and Figure C-9). NWS archived weather discussions from the Corpus Christi and Brownsville NWS Weather Forecast Offices on May 27, 2024, mention reduced visibility and hazy conditions due to smoke from agricultural fires in Central America (Figure B-16 and Figure B-18). Satellite imagery reveals hazy coloration in South Texas and smoke in Mexico and the Gulf of America (Figure 3-262: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 27, 2024, Showing Haze and Smoke in Southeast Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-71 and Figure 3-263: *AirNow HMS Smoke Plume for May 27, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-264: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 27, 2024*, Figure 3-265: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 27, 2024*, Figure 3-266: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache Monitor on May 27, 2024*, Figure 3-267: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 27, 2024*, and Figure 3-268: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 27, 2024*) on May 27, 2024 indicate that medium to heavy smoke covered South/East Texas and Mexico, while winds traveled from the south before reaching the monitors, and other monitors in South Texas had AQI levels of Moderate, Unhealthy for Sensitive Groups, and Unhealthy.

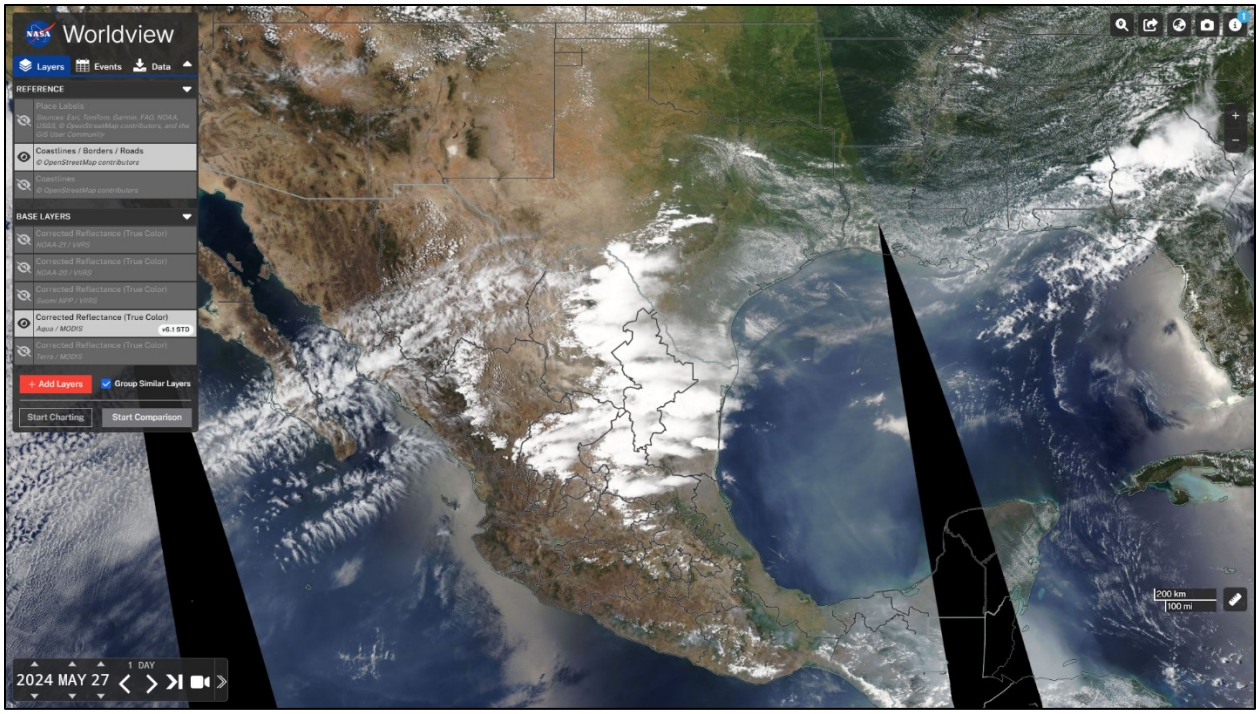

Figure 3-262: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 27, 2024, Showing Haze and Smoke in Southeast Texas, Mexico, and the Gulf of America

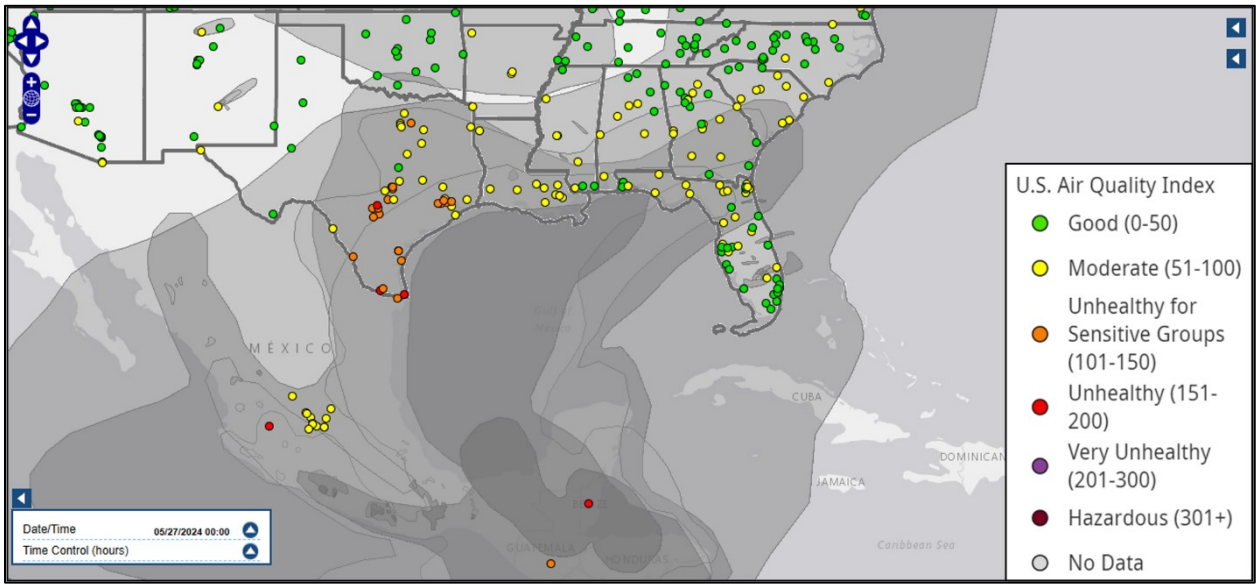

Figure 3-263: AirNow HMS Smoke Plume for May 27, 2024

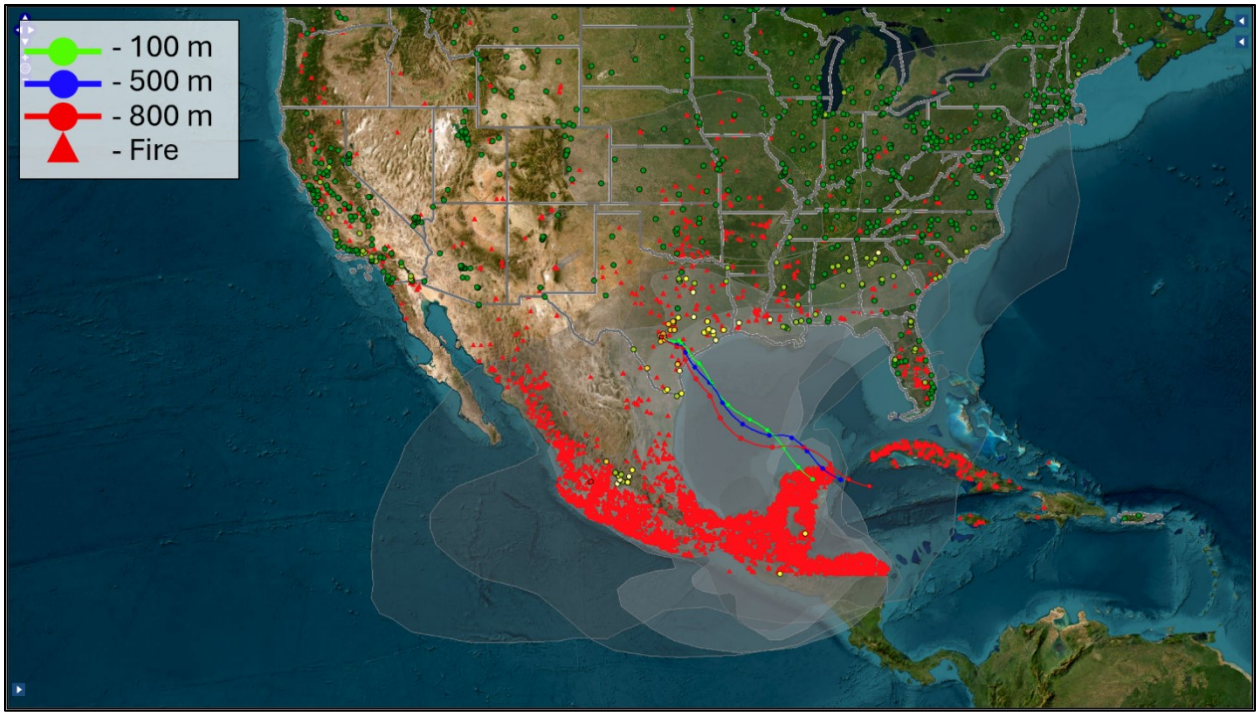

Figure 3-264: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on May 27, 2024

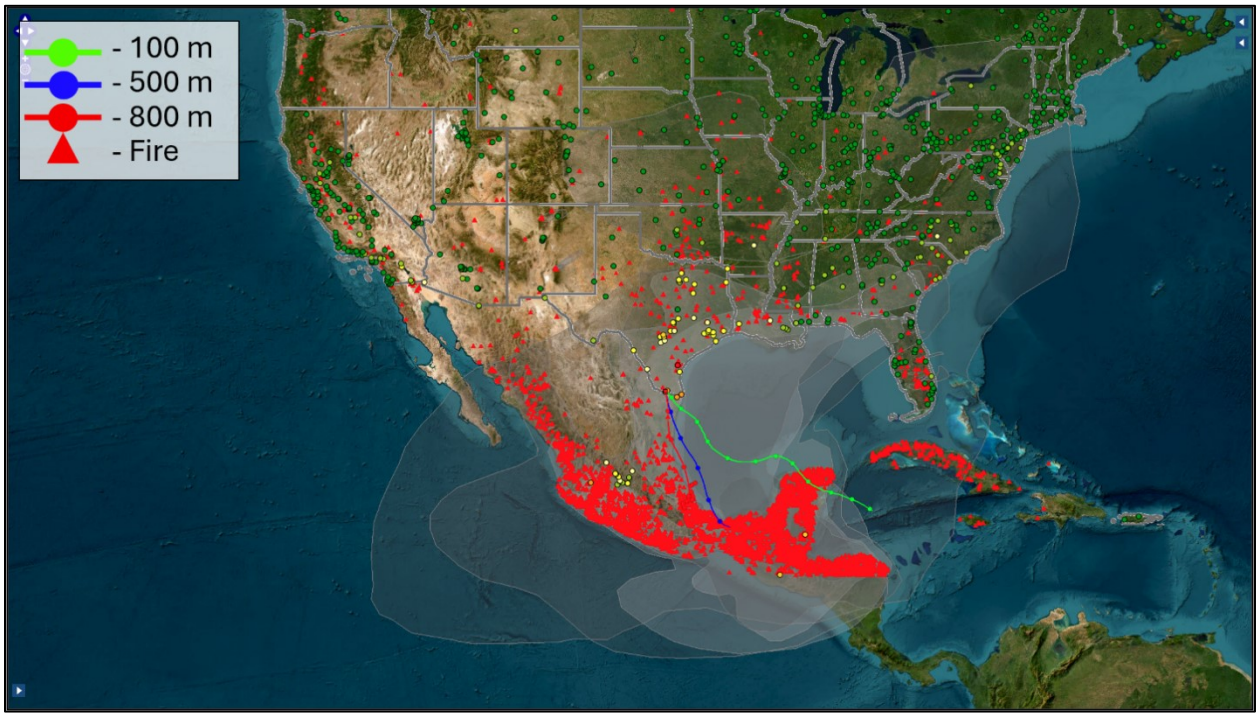

Figure 3-265: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 27, 2024

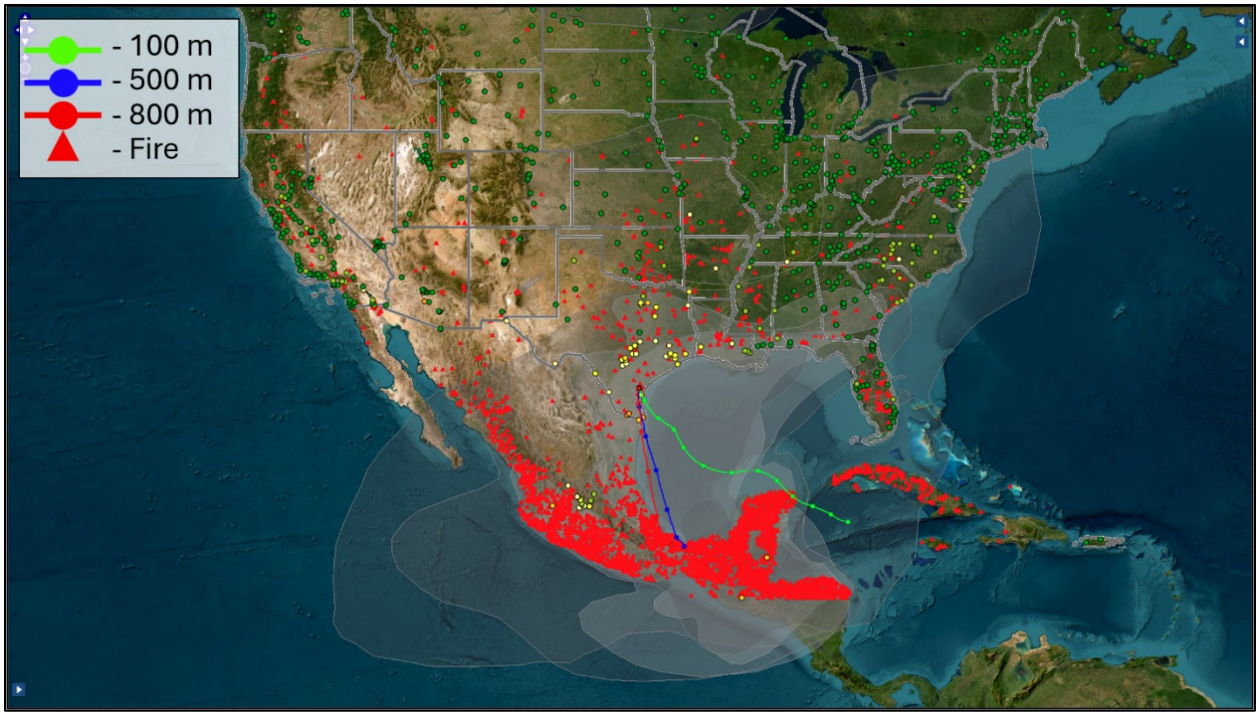

Figure 3-266: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache Monitor on May 27, 2024

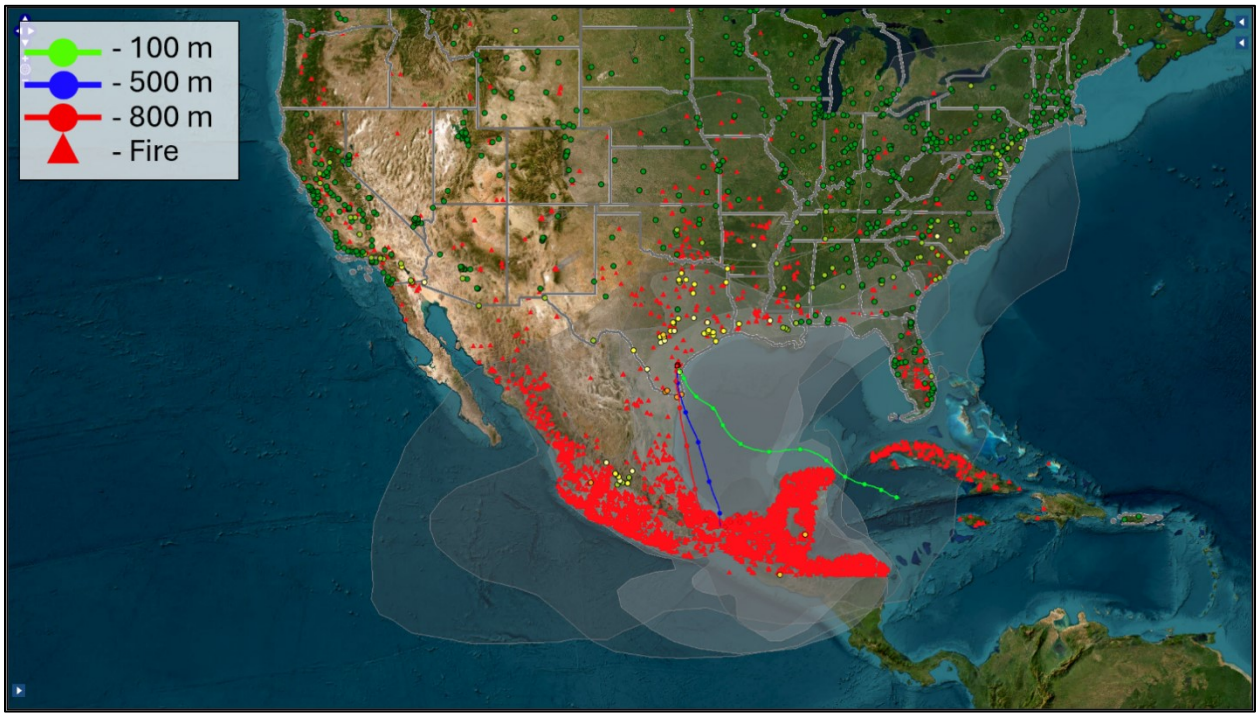

Figure 3-267: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on May 27, 2024

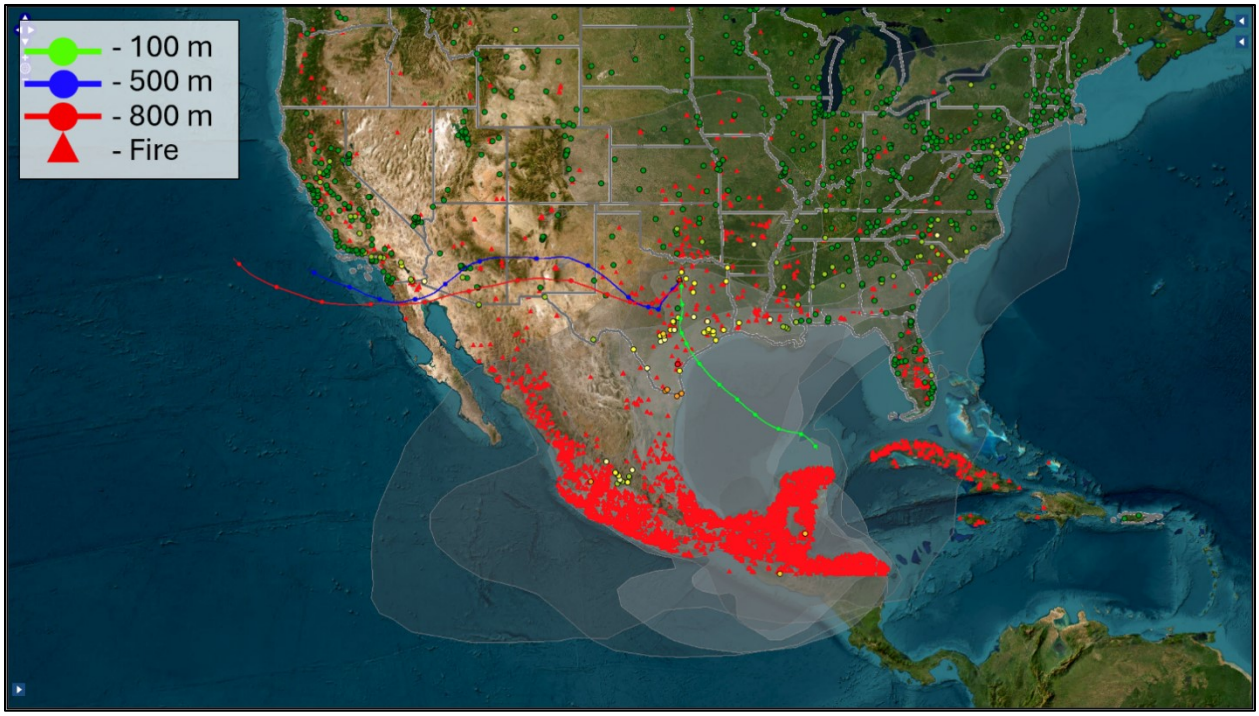

Figure 3-268: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on May 27, 2024

May 28, 2024, is identified as a Tier 1 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 30.8 µg/m^3; one-hour daily maximum 53.7 µg/m^3 recorded at 14:00 LST), and a Tier 2 day at the World Trade Bridge monitor (24-hour average concentration 29.1 µg/m^3; one-hour daily maximum 52.9 µg/m^3 recorded at 14:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 28, 2024, can be compared against typical/non-event days for each monitor in Figure 3-269: *Hourly $PM_{2.5}$ Concentrations on May 28, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-270: *Hourly $PM_{2.5}$ Concentrations on May 28, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

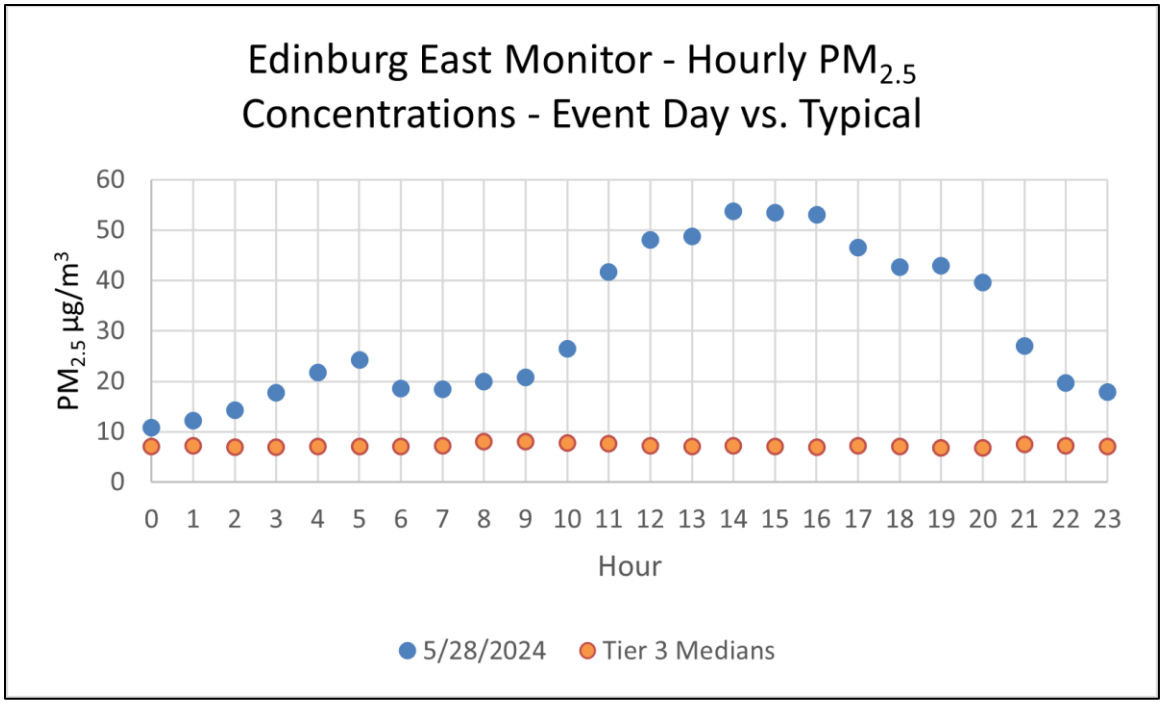

Figure 3-269: Hourly $PM_{2.5}$ Concentrations on May 28, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

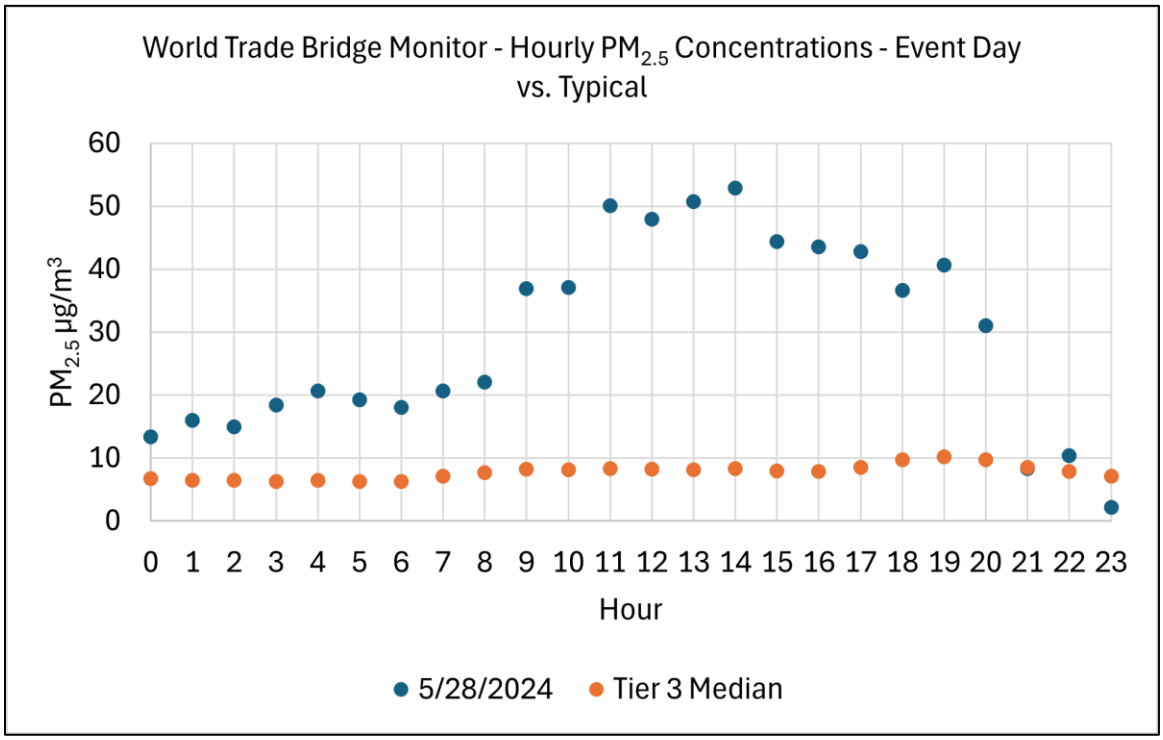

Figure 3-270: Hourly $PM_{2.5}$ Concentrations on May 28, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

TCEQ forecasts for May 28, 2024, mention a large area of medium to high density smoke associated with seasonal burnings in Mexico and Central America and aerosols from industrial sources in Mexico combined with elevated relative humidity contributing to increased fine

particulate matter concentrations (Table C-9). Media reports from May 27 and May 29, 2024, mention hazy skies and poor air quality due to agricultural smoke in Mexico affecting Texas (Figure C-8, Figure C-9, and Figure C-10). NWS archived weather discussions from the Brownsville and Corpus Christi NWS Weather Forecast Offices on May 28, 2024, mention hazy conditions and smoke traveling into South Texas from fires burning in Mexico (Figure B-16 and Figure B-18). Satellite imagery reveals hazy coloration in south Texas and smoke in Mexico and the Gulf of America (Figure 3-271: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 28, 2024, Showing Haze and Smoke in South/East Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-72 and Figure 3-272: *AirNow HMS Smoke Plume for May 28, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-273: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 28, 2024* and Figure 3-274: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 28, 2024*) on May 28, 2024, indicate that medium levels of smoke covered the eastern half of Texas and throughout Mexico, while winds traveled from the south before reaching the monitors, and other monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through South and East Texas (Figure 3-275: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 25, 2024*).

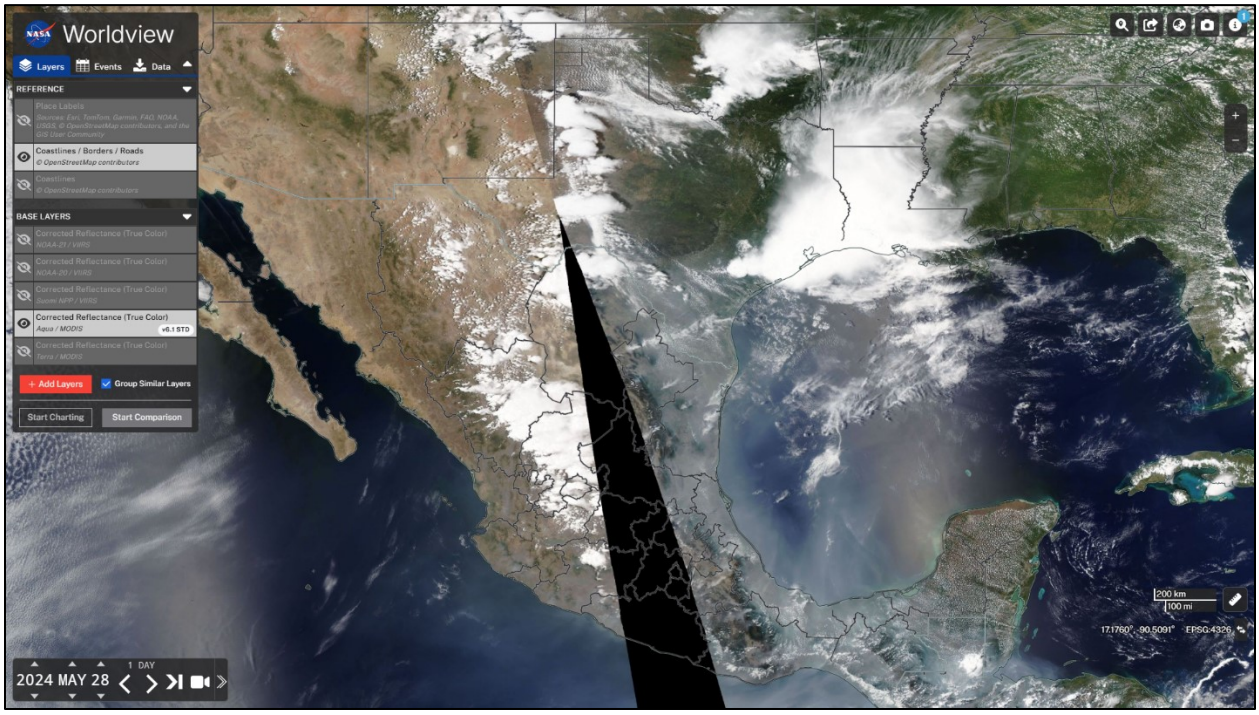

Figure 3-271: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 28, 2024, Showing Haze and Smoke in South/East Texas, Mexico, and the Gulf of America

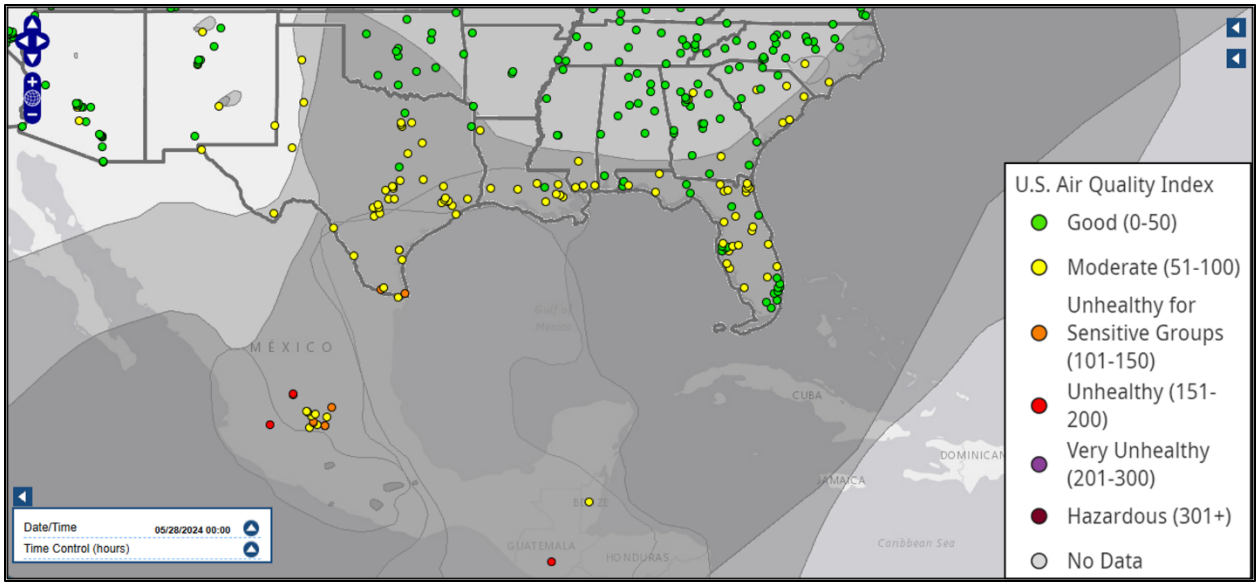

Figure 3-272: AirNow HMS Smoke Plume for May 28, 2024

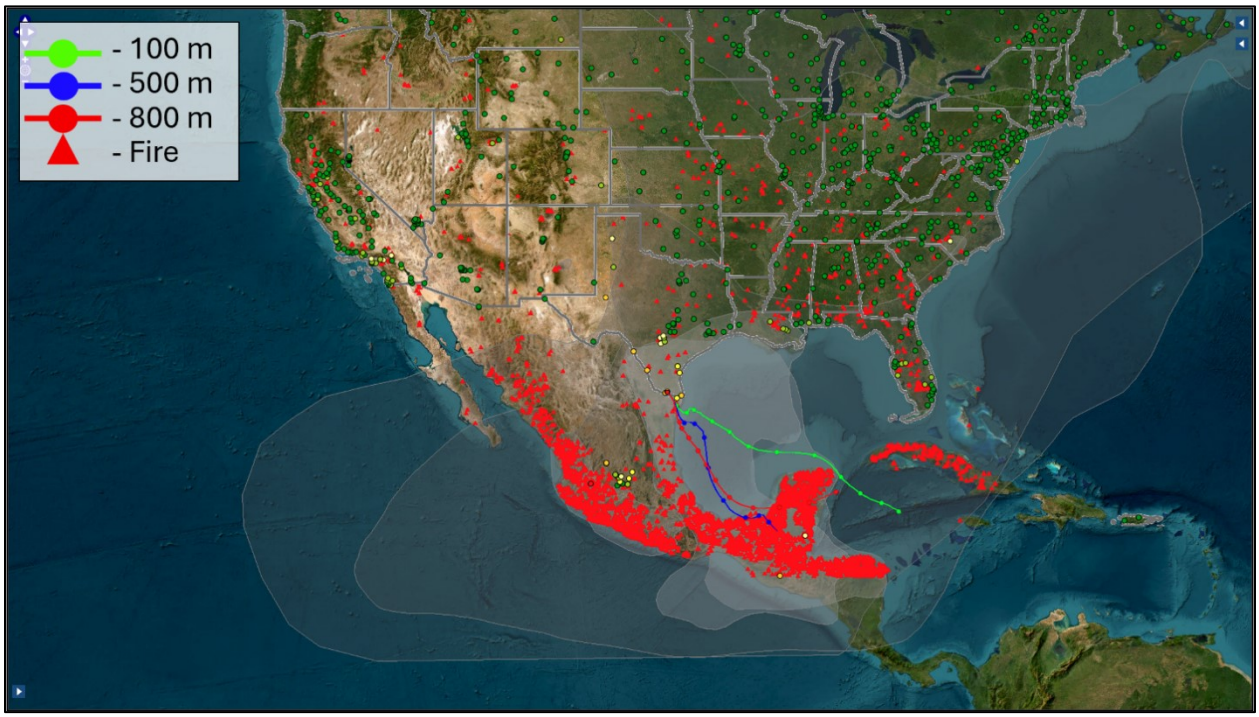

Figure 3-273: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 28, 2024

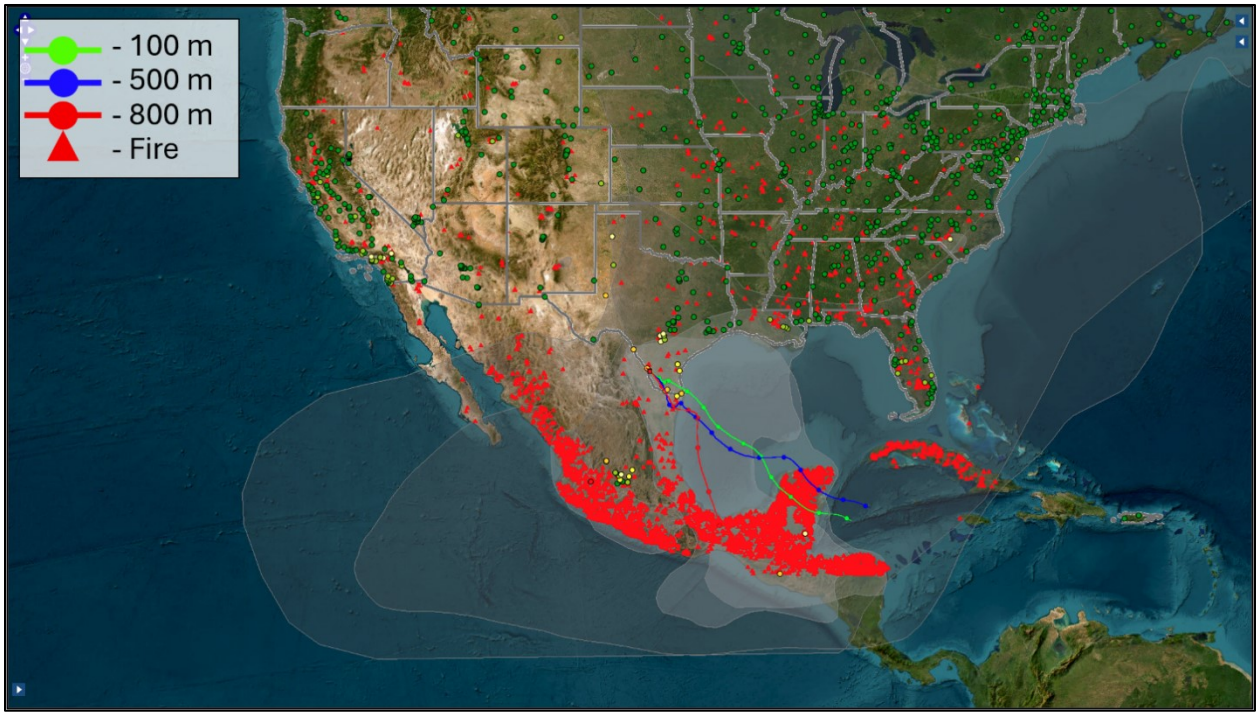

Figure 3-274: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 28, 2024

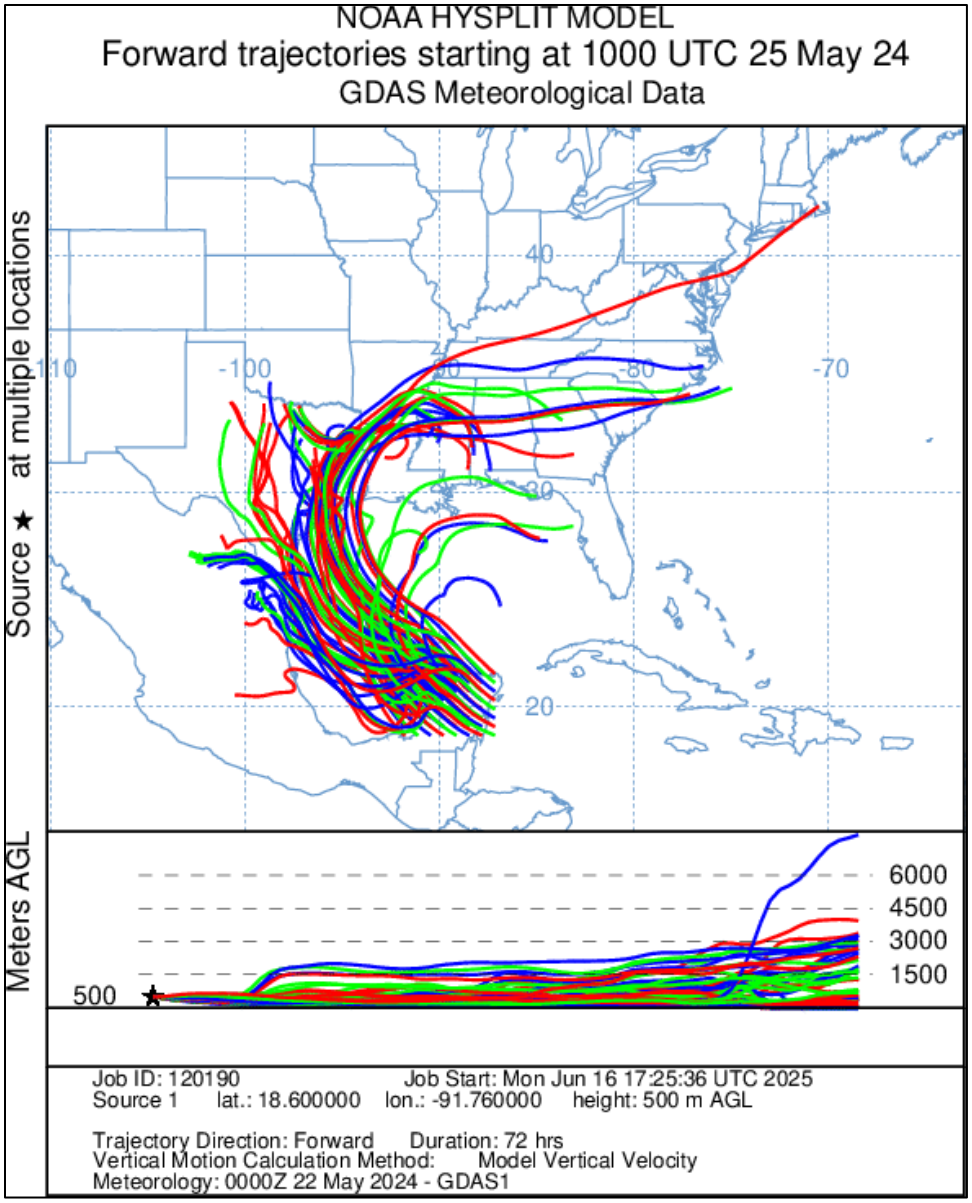

Figure 3-275: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 25, 2024

May 30, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 23.3 µg/m^3; one-hour daily maximum 38.7 µg/m^3 recorded at 12:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 30, 2024, can be compared against typical/non-event days for the Edinburg East Freddy Gonzalez Drive monitor in Figure 3-276: *Hourly $PM_{2.5}$ Concentrations on May 30, 2024*, compared to typical concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.

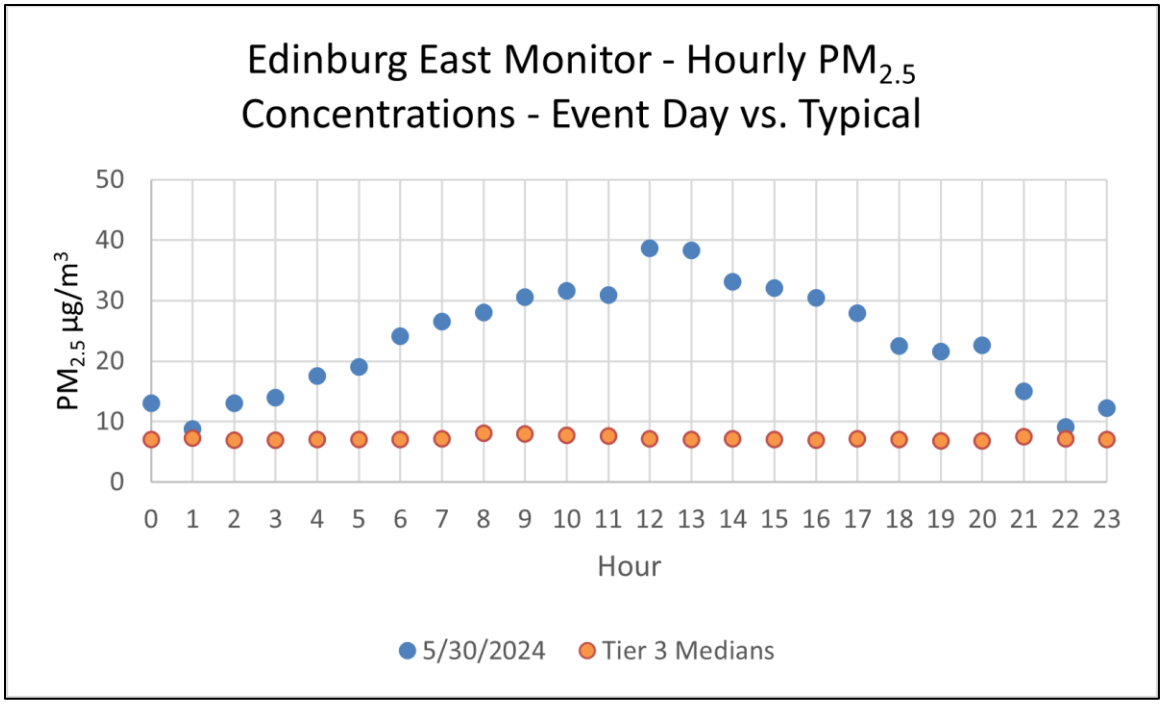

Figure 3-276: Hourly $PM_{2.5}$ Concentrations on May 30, 2024, compared to typical concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts for May 30, 2024, mention elevated relative humidity levels combined with light density residual smoke from seasonal burnings in Mexico and Central America and aerosols from industrial sources in Mexico, increasing fine particulate matter levels in the coastal bend and lower Rio Grande Valley, South Central, Southeast, North Central, and Northeast Texas (Table C-9). A media report from May 29, 2024, mentioned hazy skies and poor air quality due to agricultural smoke in Mexico affecting Texas (Figure C-10). Satellite imagery reveals smoke in Mexico and the Gulf of America (Figure 3-277: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 30, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America*). Smoke plumes (Figure A-73 and Figure 3-278: *AirNow HMS Smoke Plume for May 30, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-279: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 30, 2024*) on May 30, 2024, indicate that medium smoke covered Texas and Mexico, while winds traveled from the south before reaching the Edinburg East Freddy Gonzalez Drive monitor, and other monitors in South Texas had AQI levels of Moderate. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through South Texas (Figure 3-280: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 27, 2024*).

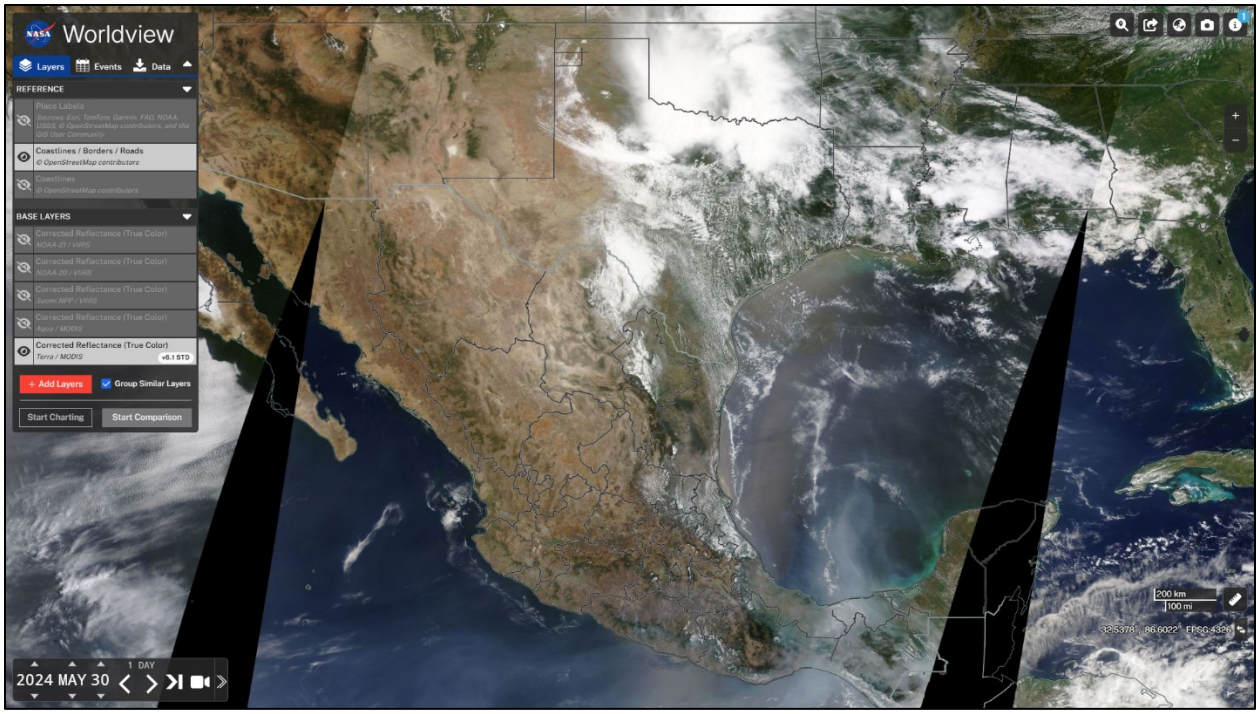

Figure 3-277: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 30, 2024, Showing Haze and Smoke in South Texas, Mexico, and the Gulf of America

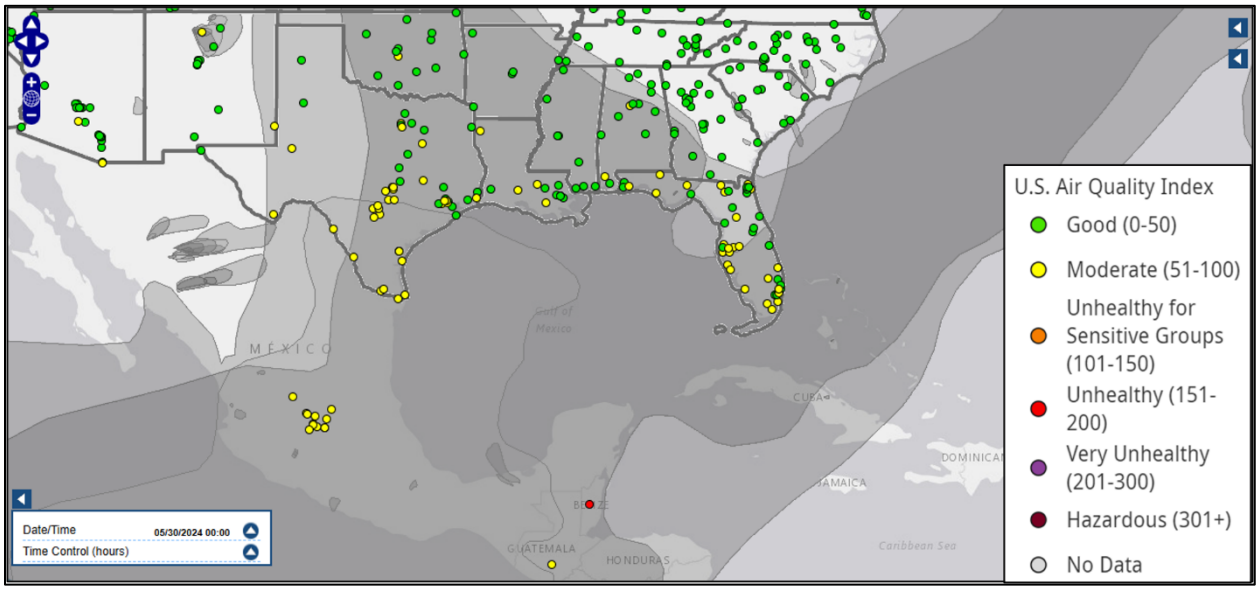

Figure 3-278: AirNow HMS Smoke Plume for May 30, 2024

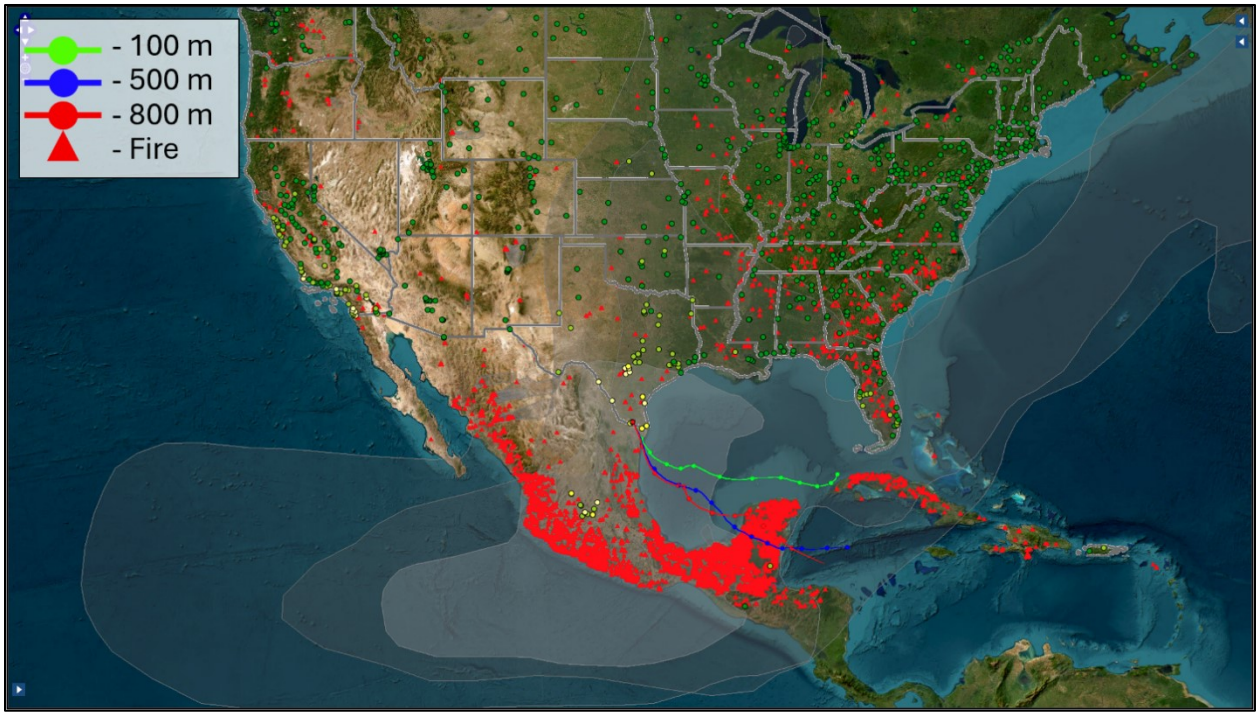

Figure 3-279: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 30, 2024

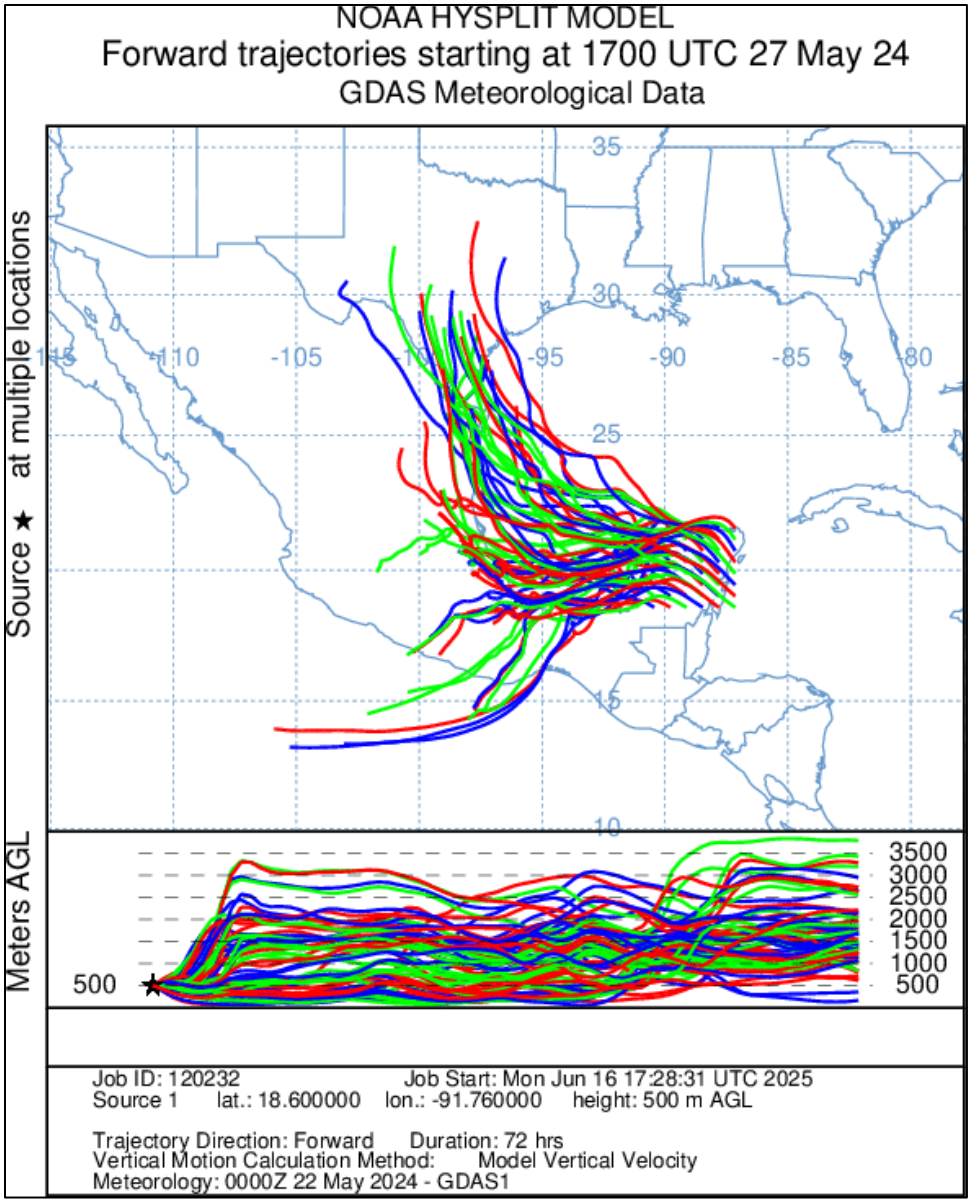

Figure 3-280: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 27, 2024

May 31, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 26.0 µg/m^3; one-hour daily maximum 55.0 µg/m^3 recorded at 09:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on May 31, 2024, can be compared against typical/non-event days for the Edinburg East Freddy Gonzalez Drive monitor in Figure 3-281: *Hourly $PM_{2.5}$ Concentrations on May 31, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor.*

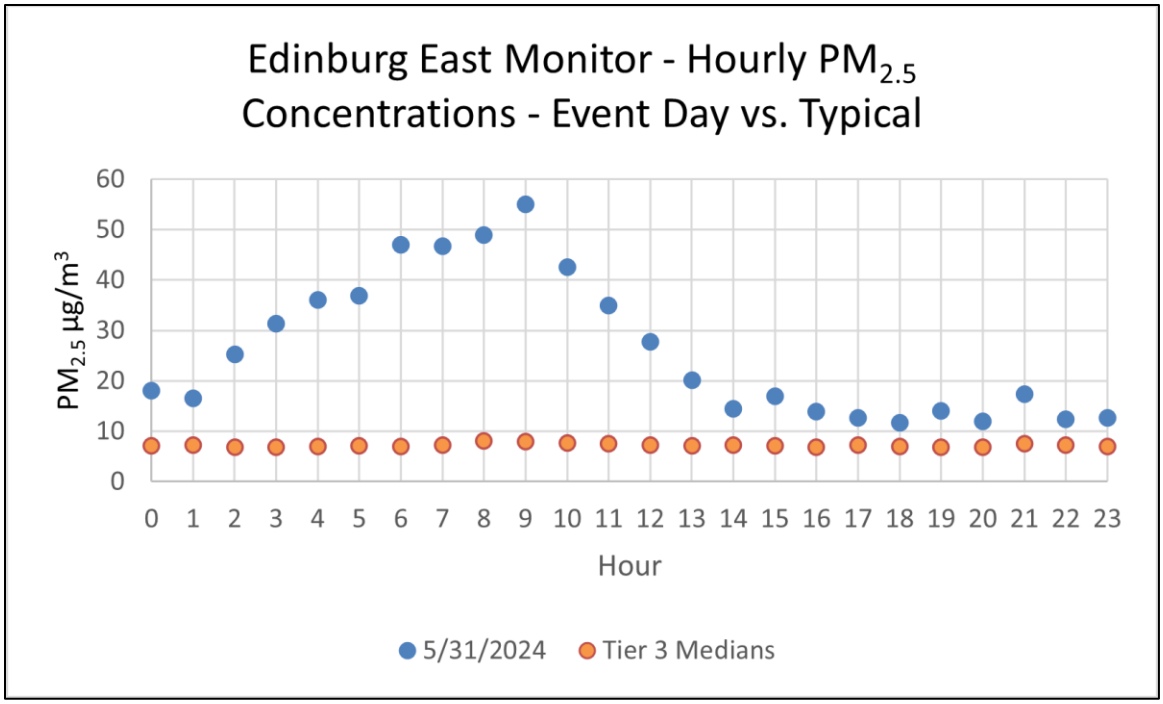

Figure 3-281: Hourly $PM_{2.5}$ Concentrations on May 31, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts for May 31, 2024, mention increased relative humidity levels combined with light density residual smoke from seasonal burnings in Mexico and Central America and aerosols from industrial sources in Mexico, elevating fine particulate matter levels in the coastal bend and lower Rio Grande Valley, South Central, Southeast, North Central, and Northeast Texas (Table C-9). A media report from May 29, 2024, mentioned hazy skies and poor air quality due to agricultural smoke in Mexico affecting Texas (Figure C-10). Satellite imagery reveals smoke in Mexico and the Gulf of America (Figure 3-282: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 31, 2024, Showing Haze and Smoke in Mexico and the Gulf of America*). Smoke plumes (Figure A-74 and Figure 3-283: *AirNow HMS Smoke Plume for May 31, 2024*) and HYSPLIT backward wind trajectories taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration (Figure 3-284: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 31, 2024*) on May 31, 2024, indicate that medium smoke covered Texas and Mexico, while winds traveled from the south before reaching the Edinburg East Freddy Gonzalez Drive monitor, and other monitors in south Texas had AQI levels of Moderate. HYSPLIT forward trajectories show that winds originating from the Yucatán Peninsula traveled through south Texas (Figure 3-285: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 28, 2024*).

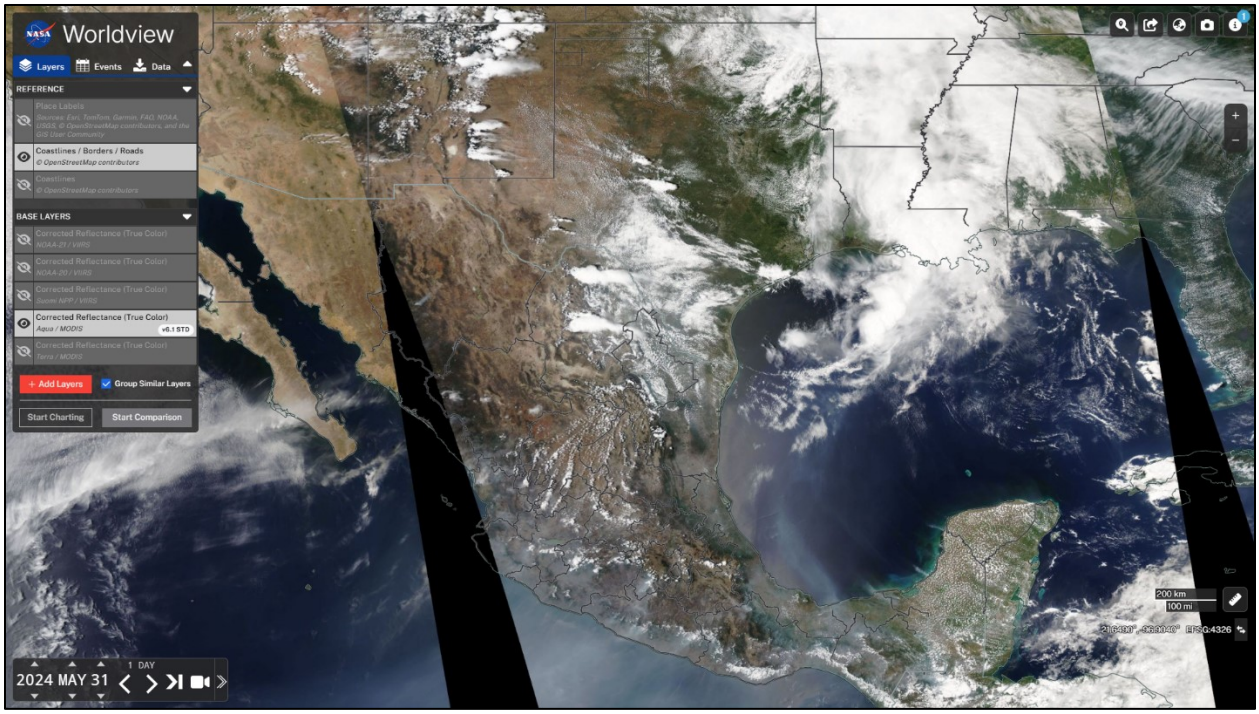

Figure 3-282: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 31, 2024, Showing Haze and Smoke in Mexico and the Gulf of America

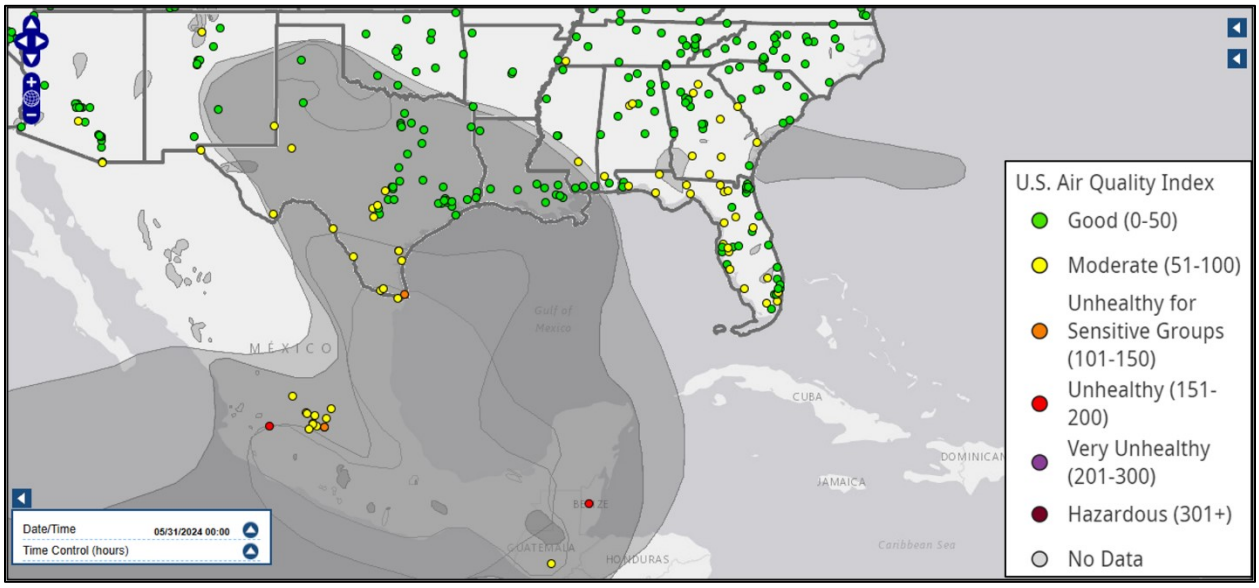

Figure 3-283: AirNow HMS Smoke Plume for May 31, 2024

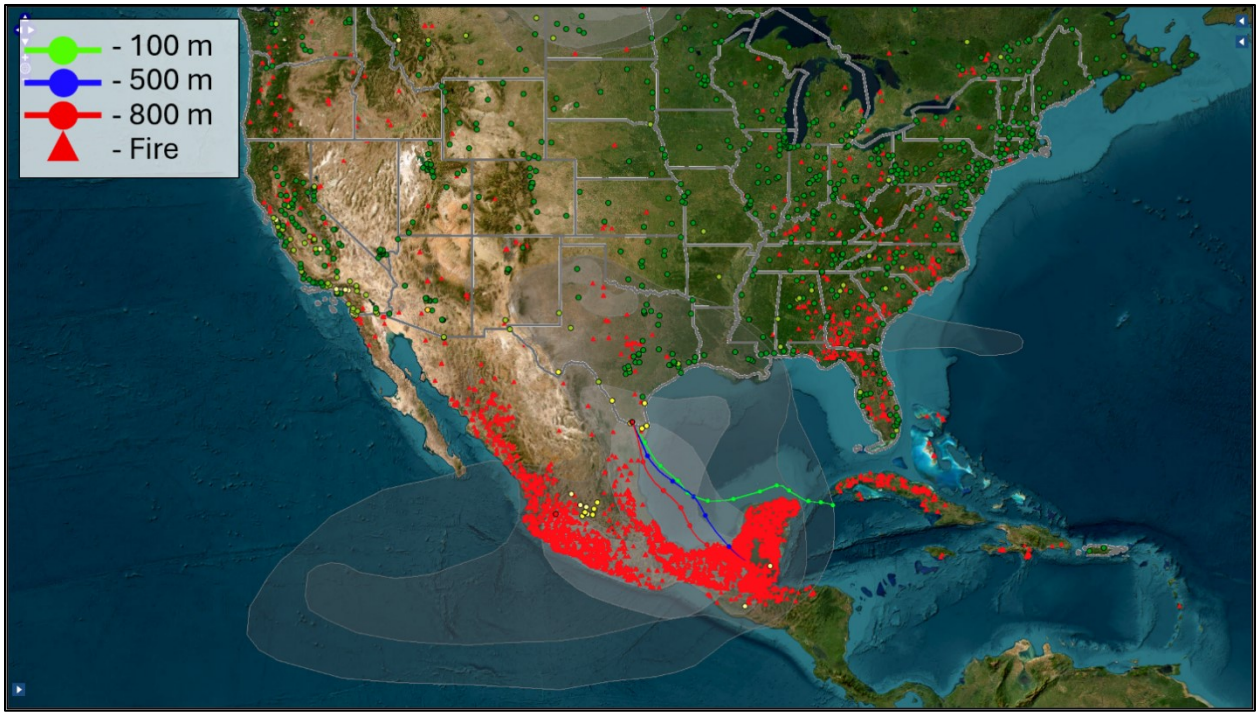

Figure 3-284: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on May 31, 2024

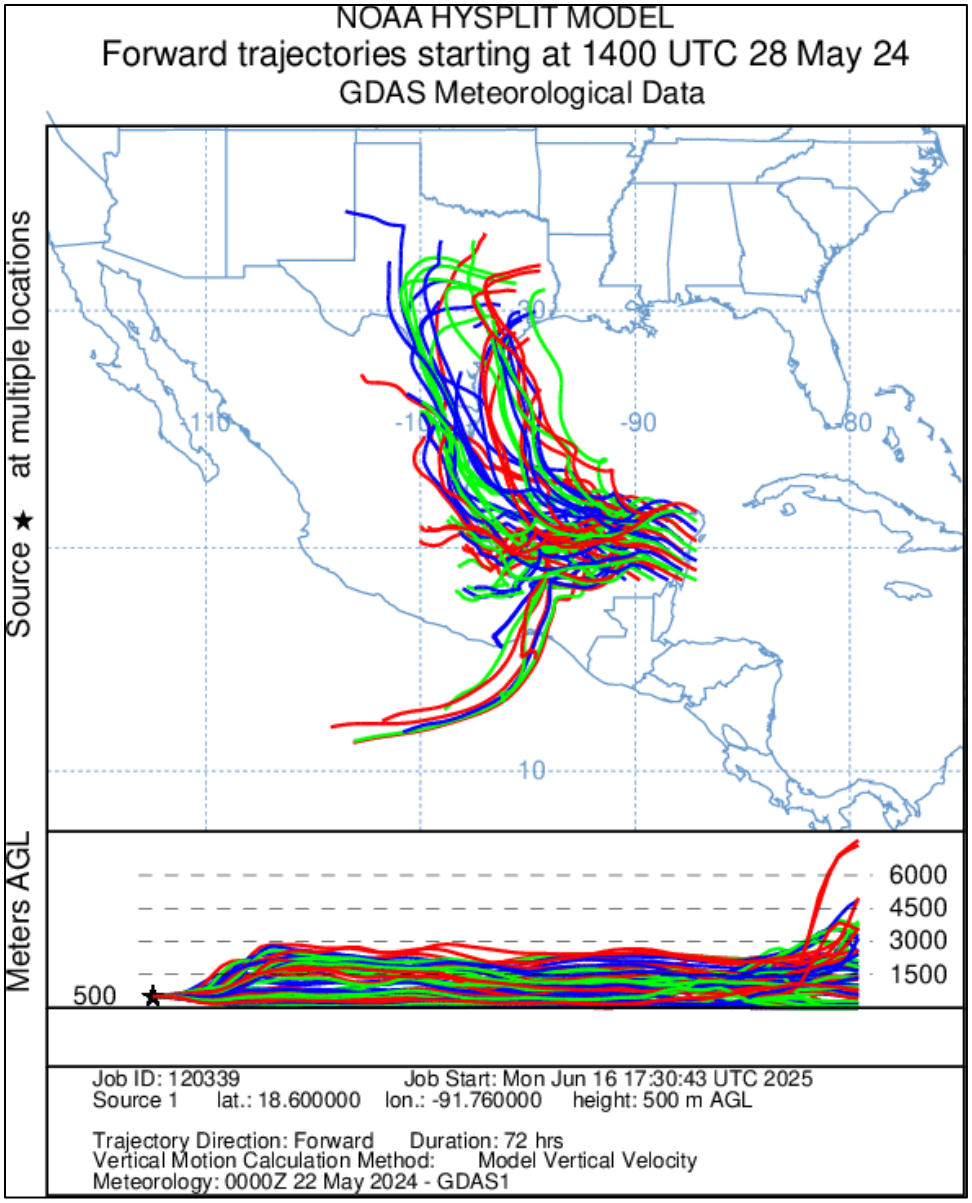

Figure 3-285: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 28, 2024

3.2.10 Group 10 – Evidence for the May 27, 2024, High Wind $PM_{2.5}$ Event for the World Trade Bridge Monitor

May 27, 2024, is identified as a Tier 1 day at the World Trade Bridge monitor (24-hour average concentration 38.3 µg/m^3; one-hour daily maximum 71.3 µg/m^3 recorded at 17:00 LST). Elevated $PM_{2.5}$ concentrations resulted from high winds. Hourly concentrations on May 27, 2024, can be compared against typical/non-event days for the monitor in Figure 3-286: *Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor.*

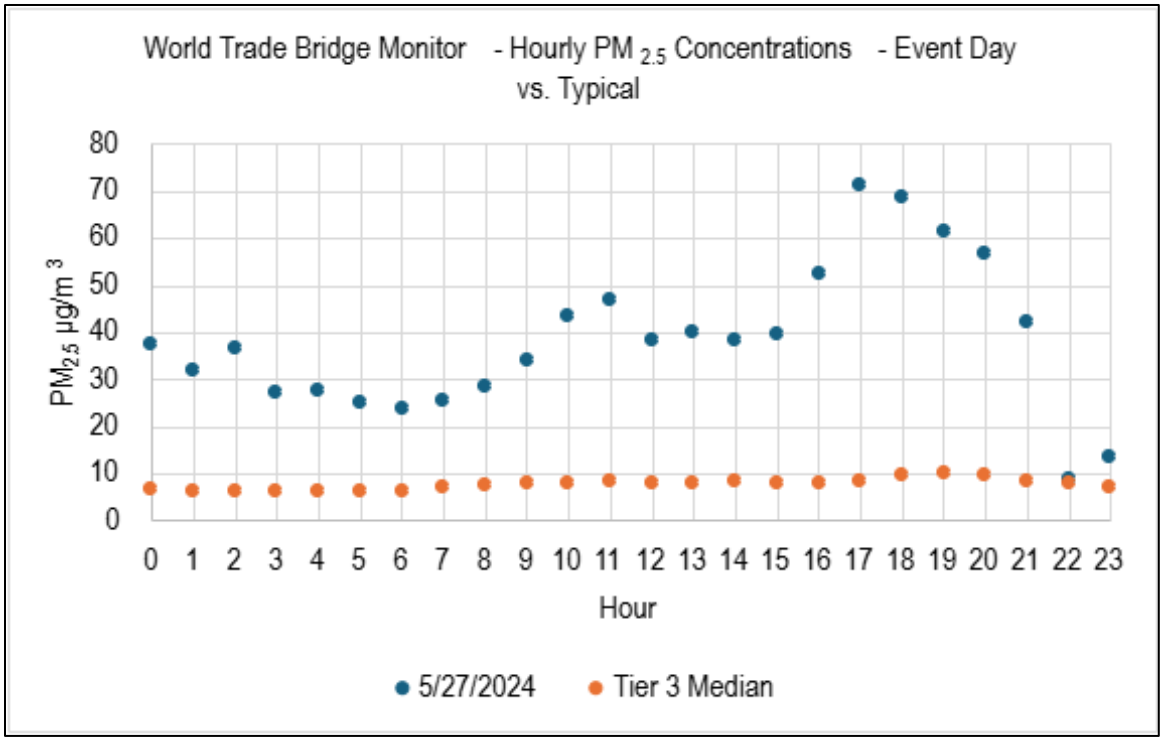

Figure 3-286: Hourly $PM_{2.5}$ Concentrations on May 27, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

National Weather Service archives (Figure B-18) mention that haze was present in the region on the day of exceedance. TCEQ forecasts (Table C-10) revealed that residual smoke associated with the widespread seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with aerosols from industrial sources in Mexico, and elevated relative humidity levels, contributed towards increasing $PM_{2.5}$ concentrations for the eastern two-thirds of the state. Satellite imagery displays thick plumes of smoke being blown over the region and Gulf of America on the day of exceedance (Figure 3-287: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 27, 2024, Showing Potential Haze in North and Central Texas*). HYSPLIT backward wind trajectories taken from the time of the maximum recorded, daily one-hour $PM_{2.5}$ concentration value (Figure 3-288: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 27, 2024*) indicate moderate to high density smoke was transported into Texas from the Yucatan Peninsula on the date of interest.

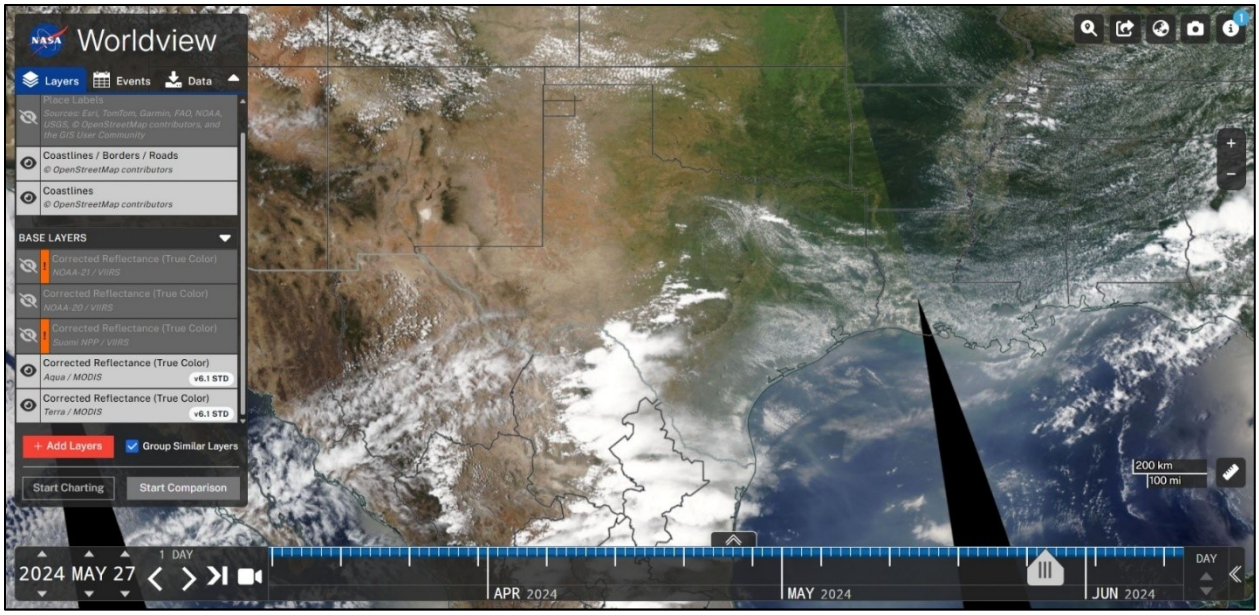

Figure 3-287: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from May 27, 2024, Showing Potential Haze in North and Central Texas

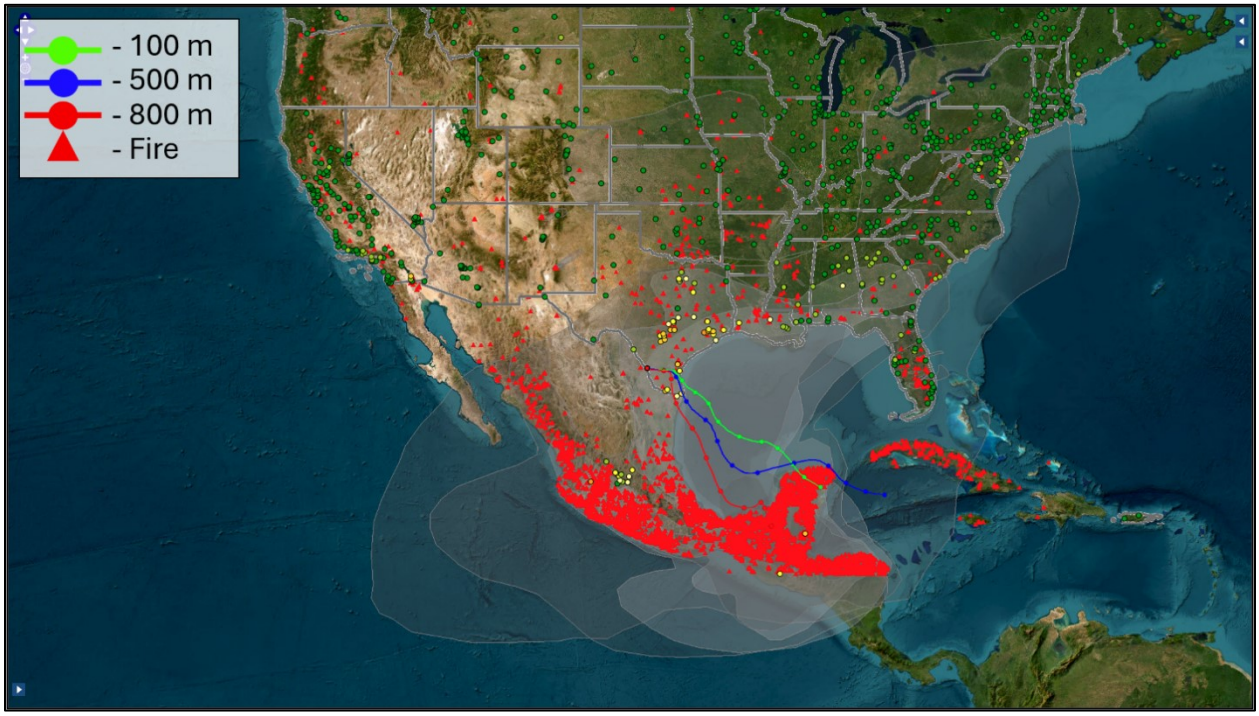

Figure 3-288: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on May 27, 2024

3.2.11 Group 11 – Evidence for the June 2, 2024, through June 6, 2024, Fire (Mexico/Central America) $PM_{2.5}$ Event for the Edinburg East Freddy Gonzalez Drive, Dona Park, Von Ormy Highway 16, Haws Athletic Center, and World Trade Center Monitors

June 2, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 23.6 µg/m^3; one-hour daily maximum 41.7 µg/m^3 recorded at

02:00 LST). Elevated PM2.5 concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on June 2, 2024, can be compared against typical/non-event days for the monitor in Figure 3-289: *Hourly $PM_{2.5}$ Concentrations on June 2, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

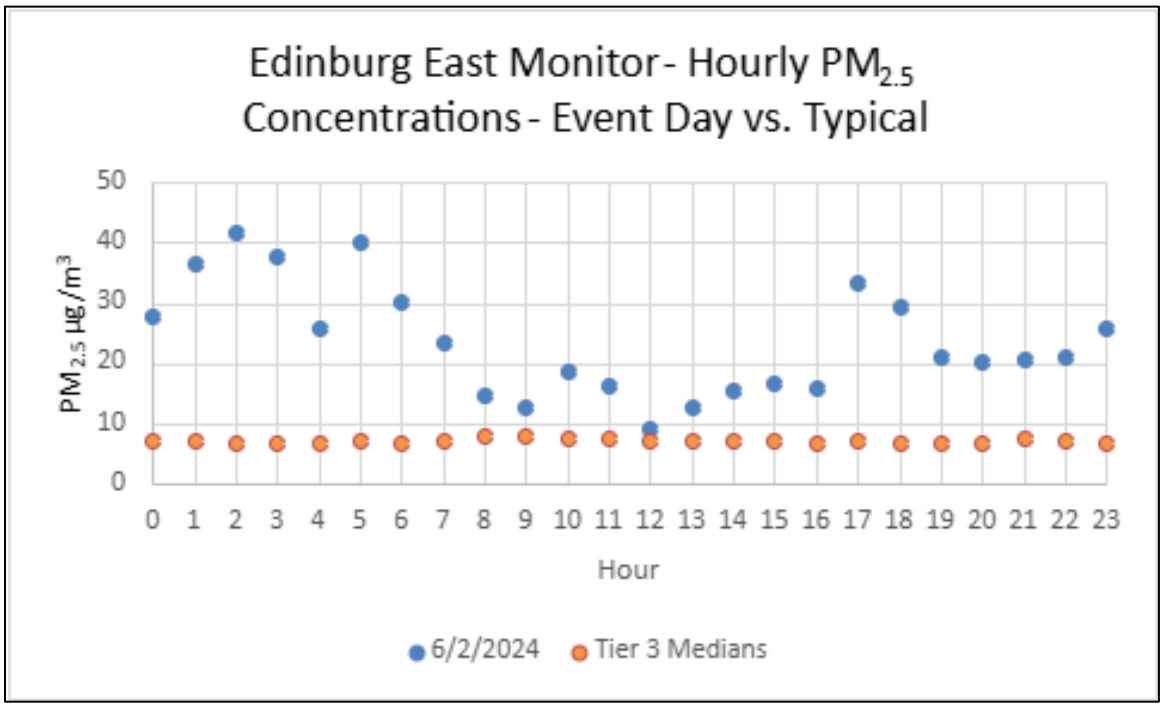

Figure 3-289: Hourly $PM_{2.5}$ Concentrations on June 2, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

TCEQ forecasts (Table C-11) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to light density residual smoke from widespread seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with industrial sources in Mexico. The forecasts also stated that elevated relative humidity levels over the entirety of the state lead to increased concentrations of particulate matter. Satellite imagery displays thick plumes of smoke being blown over the region and Gulf of America on the day of exceedance (Figure 3-290: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 2, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-85 and Figure 3-291: *AirNow HMS Smoke Plume for June 2, 2024*) and HYSPLIT backward wind trajectories (Figure 3-292: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 2, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to heavy smoke traveled into Texas on the day of exceedance from the Yucatan Peninsula. On that same day, monitors in south Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan Peninsula traveled through South and East Texas (Figure 3-293: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 30, 2024*).

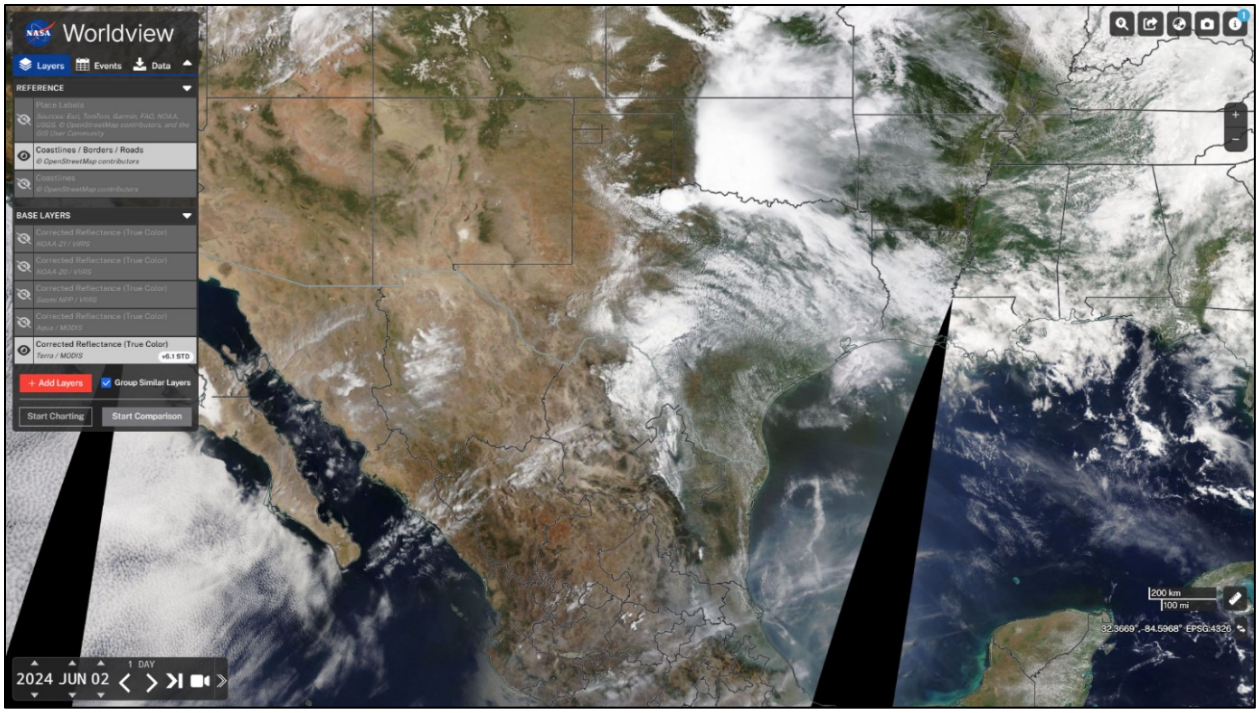

Figure 3-290: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 2, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

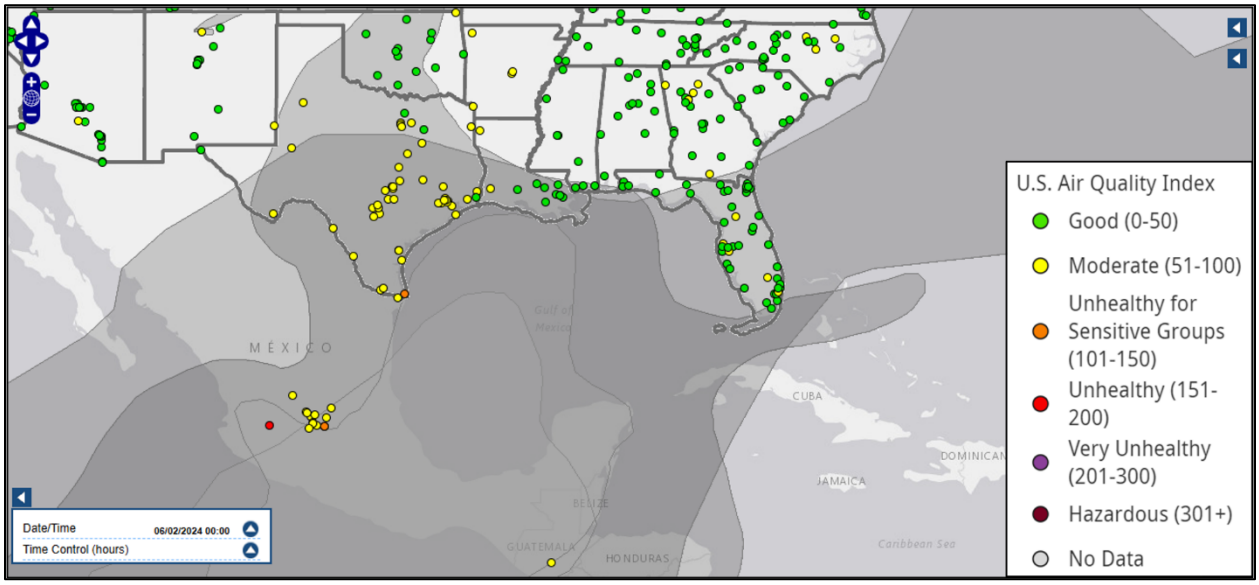

Figure 3-291: AirNow HMS Smoke Plume for June 2, 2024

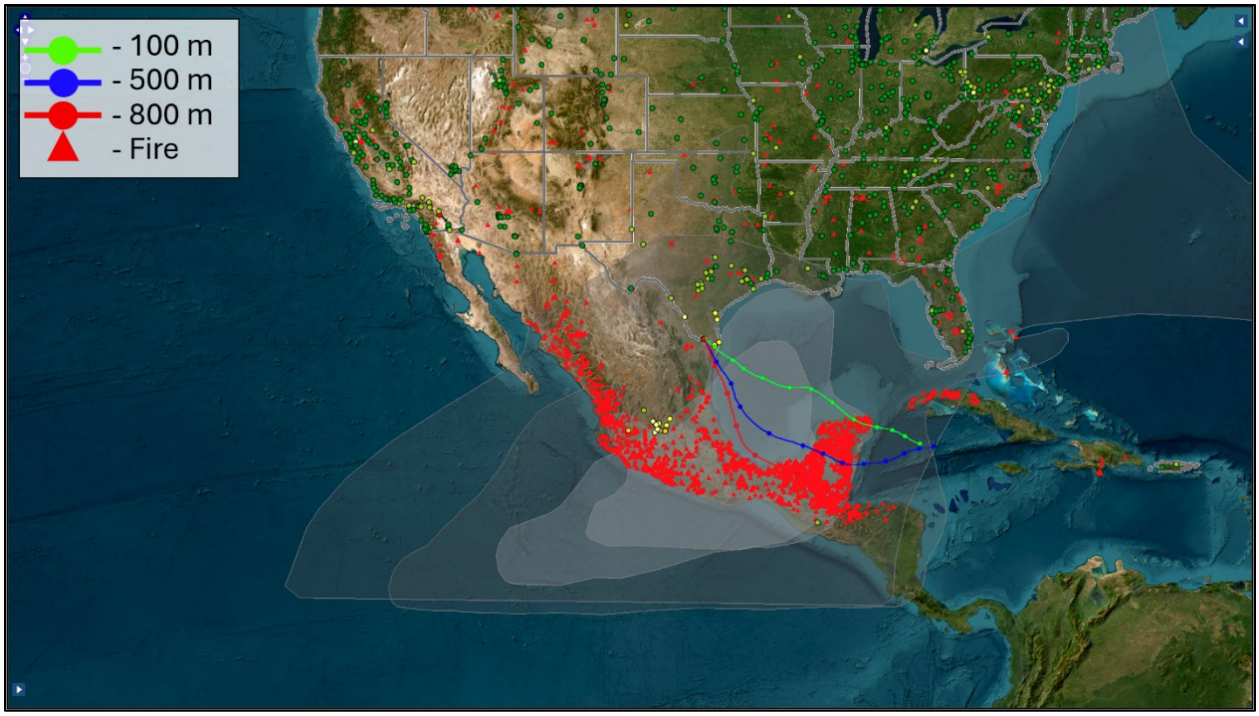

Figure 3-292: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 2, 2024

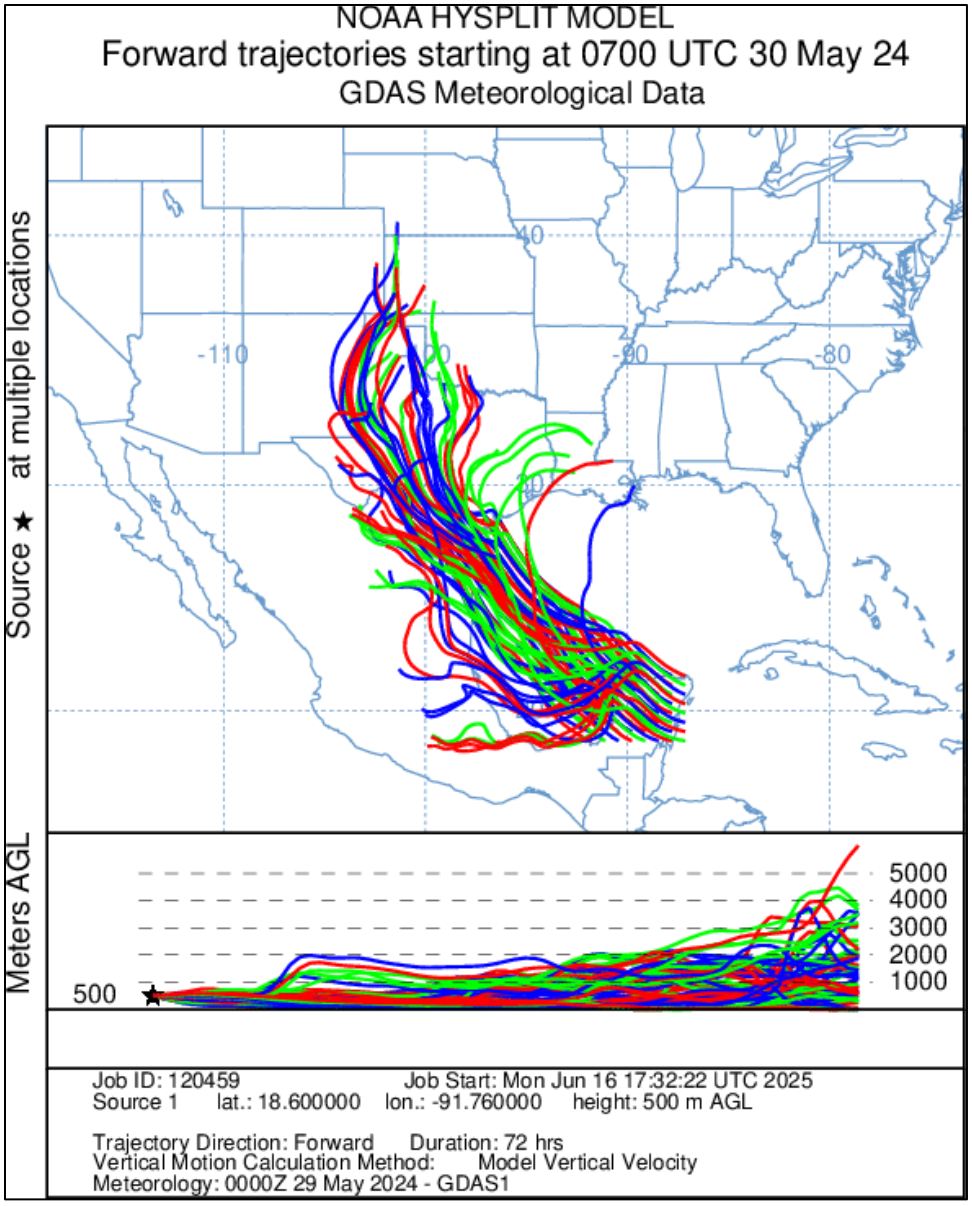

Figure 3-293: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 30, 2024

June 3, 2024, is identified as a Tier 2 day at the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 25.6 µg/m^3; one-hour daily maximum 34.0 µg/m^3 recorded at 18:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on June 3, 2024, can be compared against typical/non-event days for the monitor in Figure 3-294: *Hourly $PM_{2.5}$ Concentrations on June 3, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

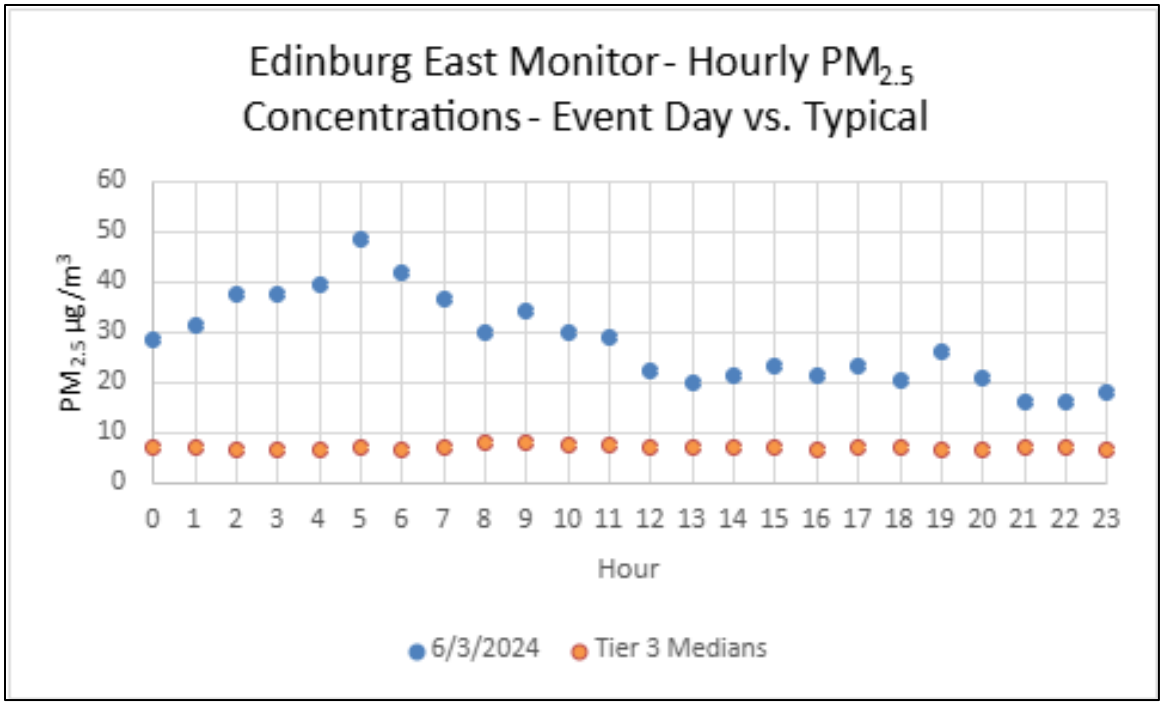

Figure 3-294: Hourly $PM_{2.5}$ Concentrations on June 3, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

National Weather Service archives mention that haze obstructed visibility in the region on the day of exceedance (Figure B-21). TCEQ forecasts (Table C-11) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to light density residual smoke from widespread seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with industrial sources in Mexico. The forecasts also stated that elevated relative humidity levels over the entirety of the state lead to increased concentrations of particulate matter. Satellite imagery displays thick plumes of smoke being blown over the region and Gulf of America on the day of exceedance (Figure 3-295: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 3, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-86 and Figure 3-296: AirNow HMS Smoke Plume for June 3, 2024) and HYSPLIT backward wind trajectories (Figure 3-297: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 3, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to heavy smoke was transported into South Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in South Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from the Yucatan traveled through South and East Texas (Figure 3-298: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024*).

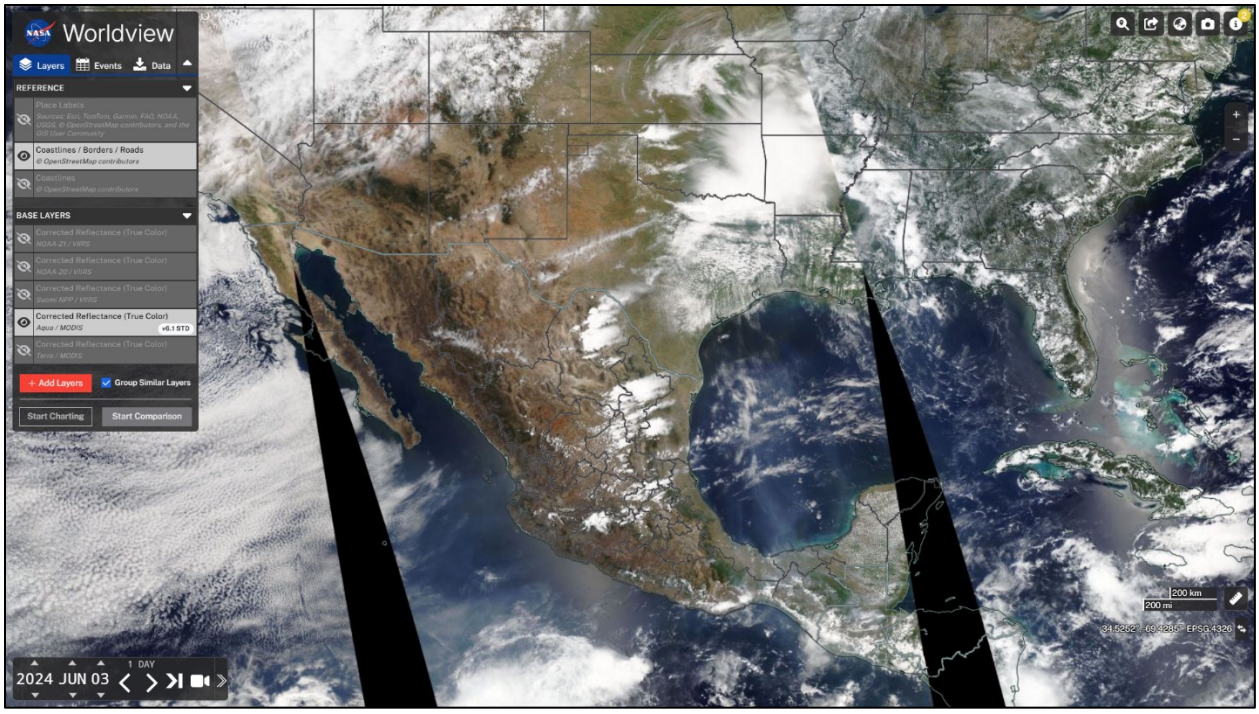

Figure 3-295: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 3, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

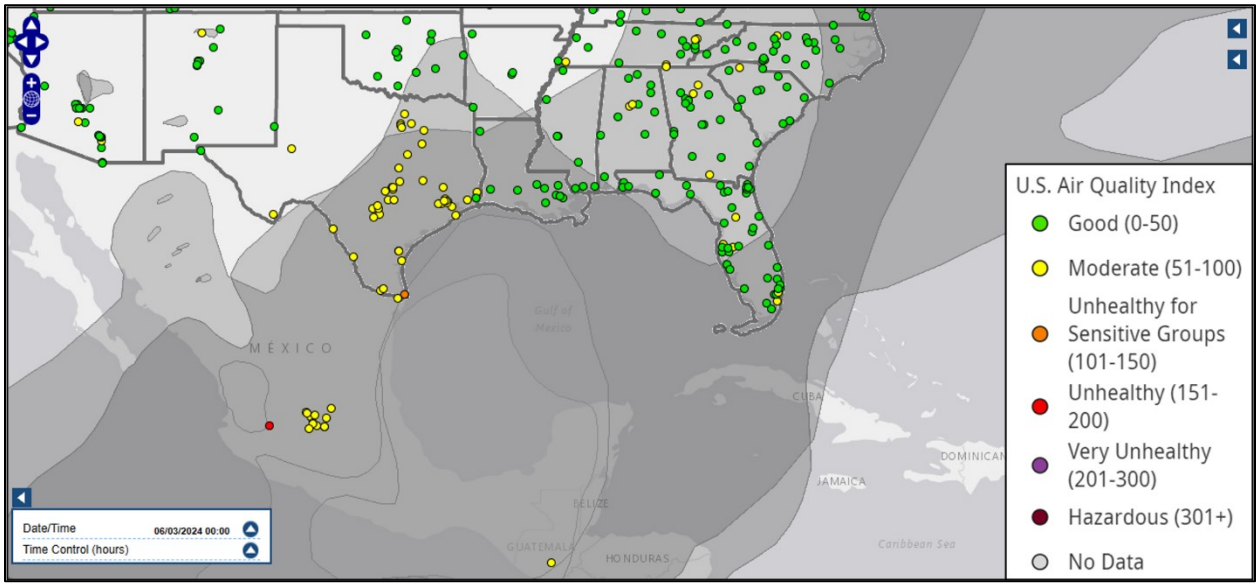

Figure 3-296: AirNow HMS Smoke Plume for June 3, 2024

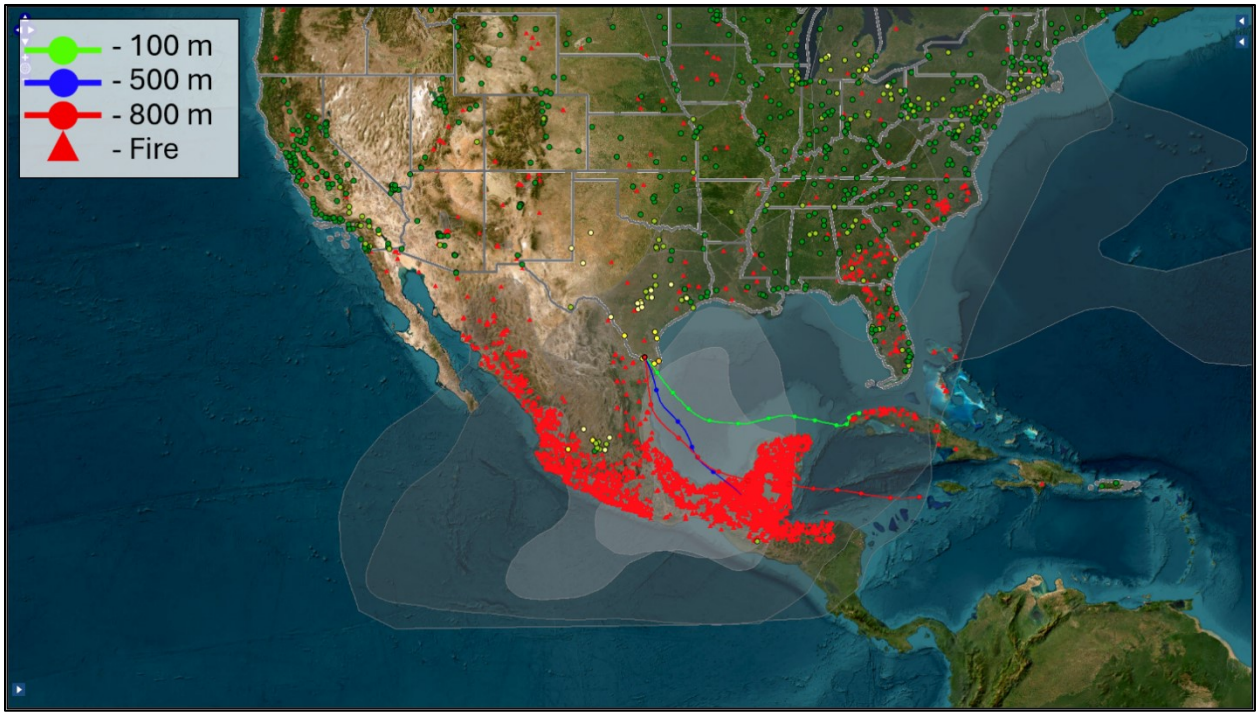

Figure 3-297: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 3, 2024

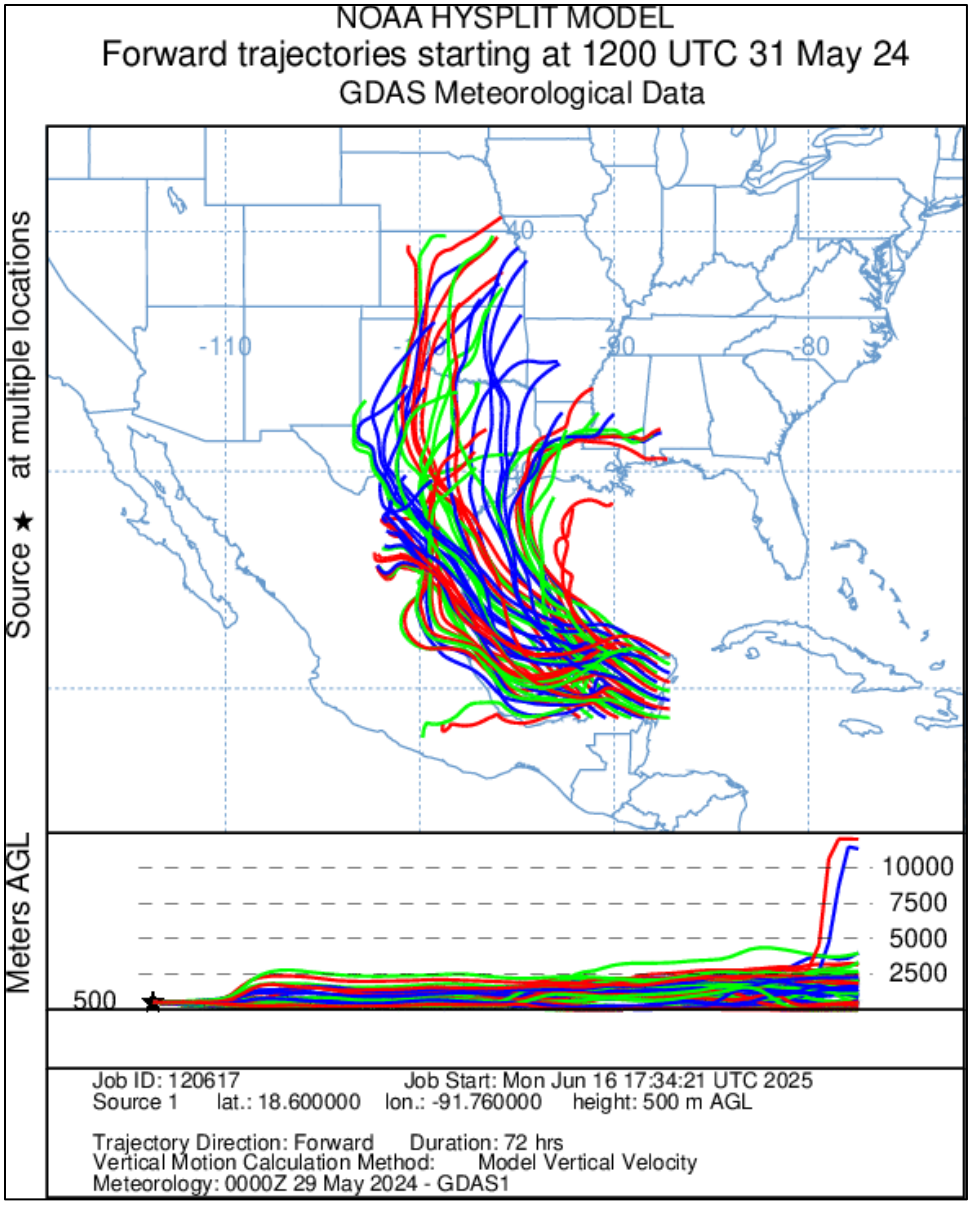

Figure 3-298: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024

June 4, 2024, is identified as a Tier 1 day for the:

- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 31.2 µg/m^3 one-hour daily maximum 59.7 µg/m^3 recorded at 07:00 LST);
- Dona Park monitor (24-hour average concentration 37.8 µg/m^3; one-hour daily maximum 63.9 µg/m^3 recorded at 05:00 LST);
- Von Ormy Highway 16 monitor (24-hour average concentration 34.7 µg/m^3; one-hour daily maximum 58.0 µg/m^3 recorded at 10:00 LST);
- World Trade Bridge monitor (24-hour average concentration 35.1 µg/m^3; one-hour daily maximum 59.0 µg/m^3 recorded at 18:00 LST); and
- Haws Athletic Center monitor (24-hour average concentration 24.9 µg/m^3; one-hour daily maximum 44.1 µg/m^3 recorded at 15:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on June 4, 2024, can be compared against typical/non-event days for the monitor in Figure 3-299: *Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*, Figure 3-300: *Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, Figure 3-301: *Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, Figure 3-302: *Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*, and Figure 3-303: *Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor*.

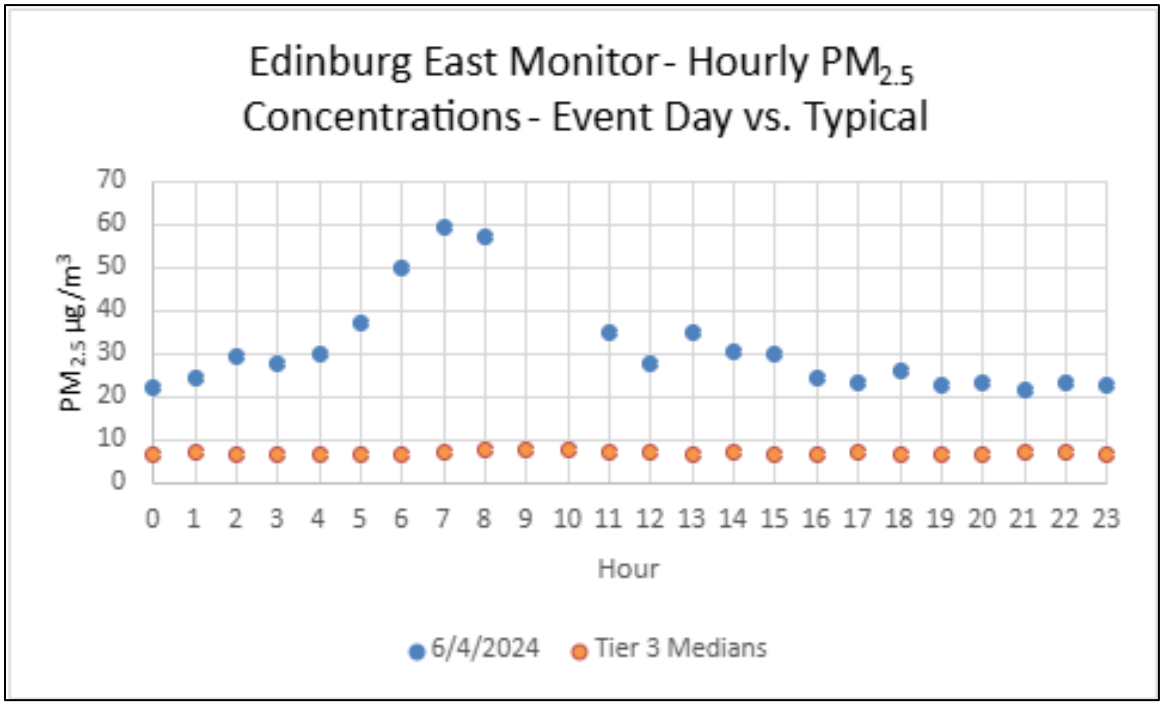

Figure 3-299: Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

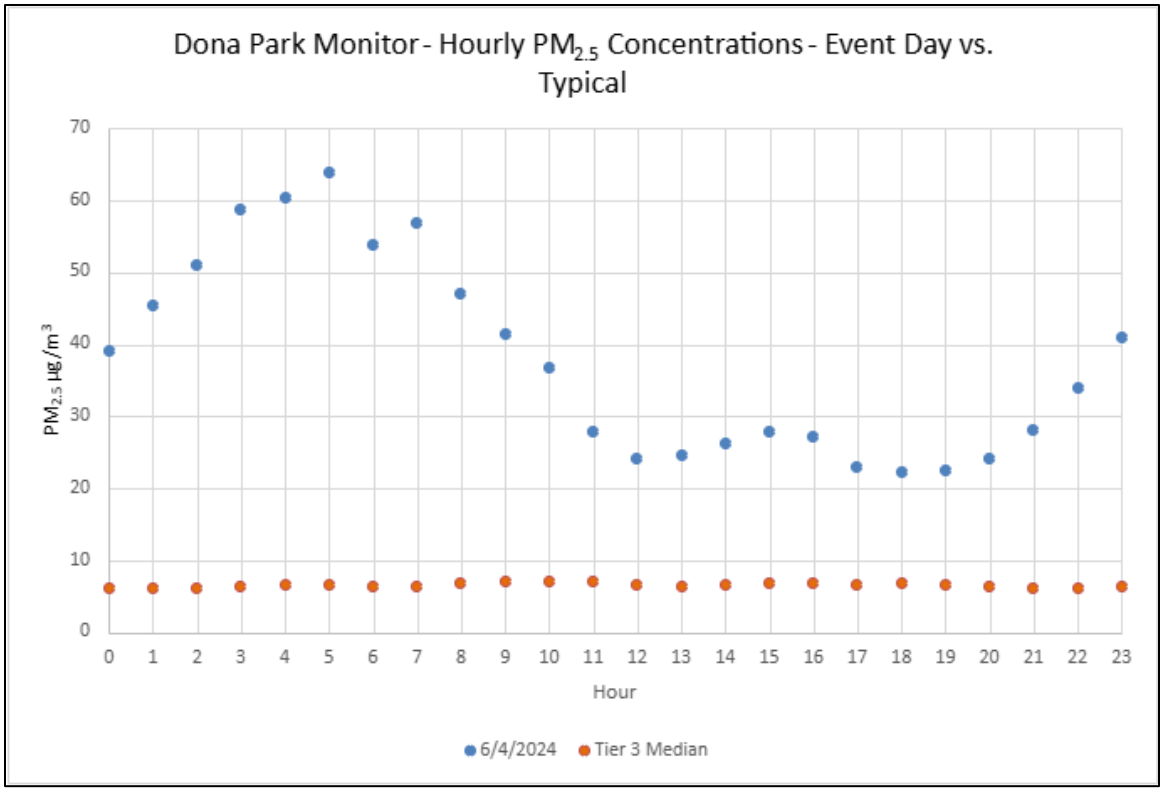

Figure 3-300: Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Dona Park Monitor

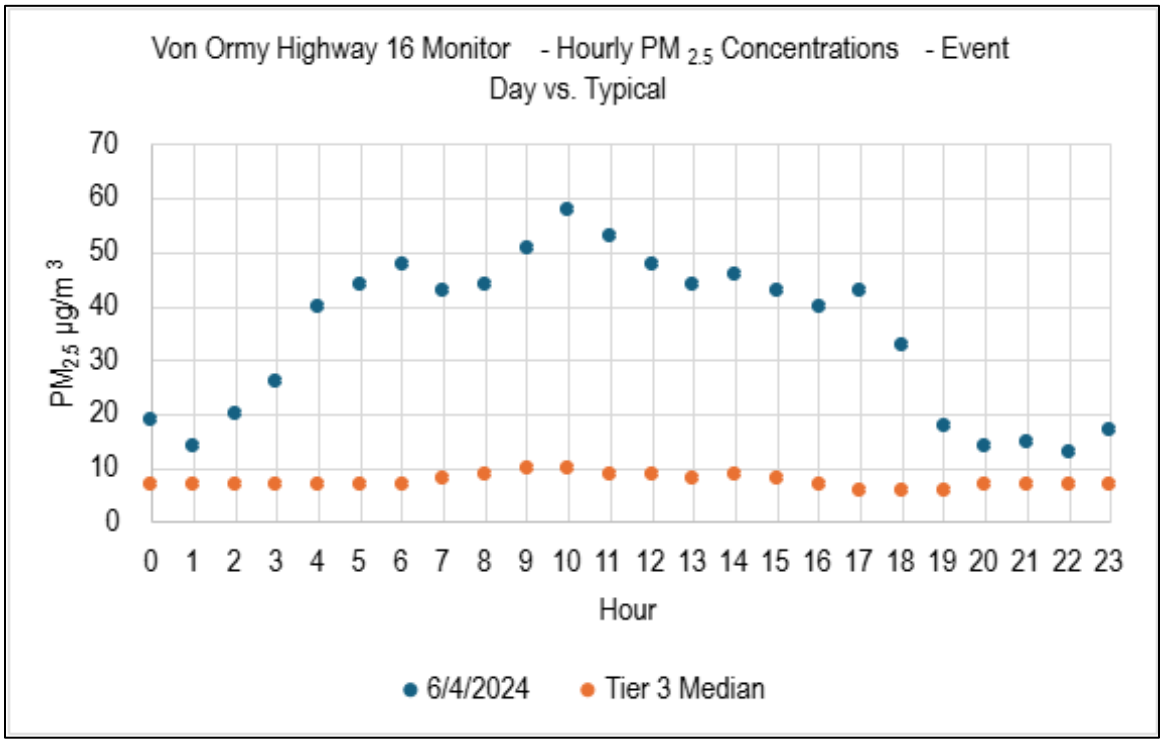

Figure 3-301: Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

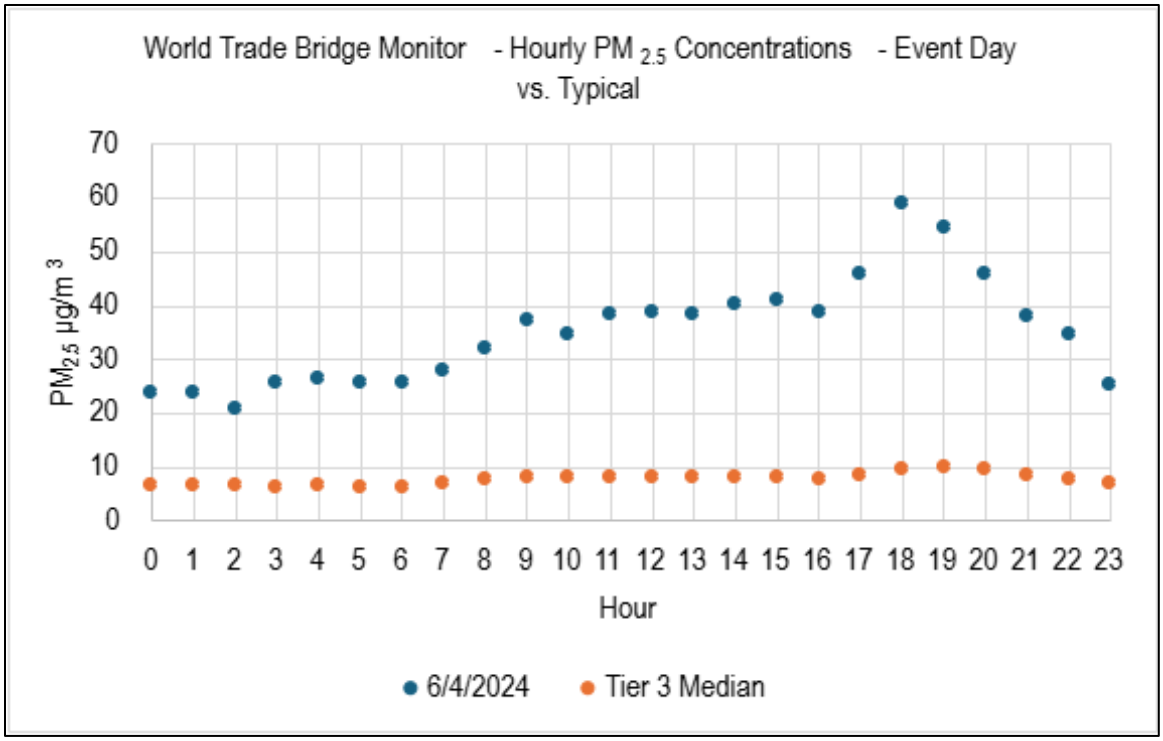

Figure 3-302: Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

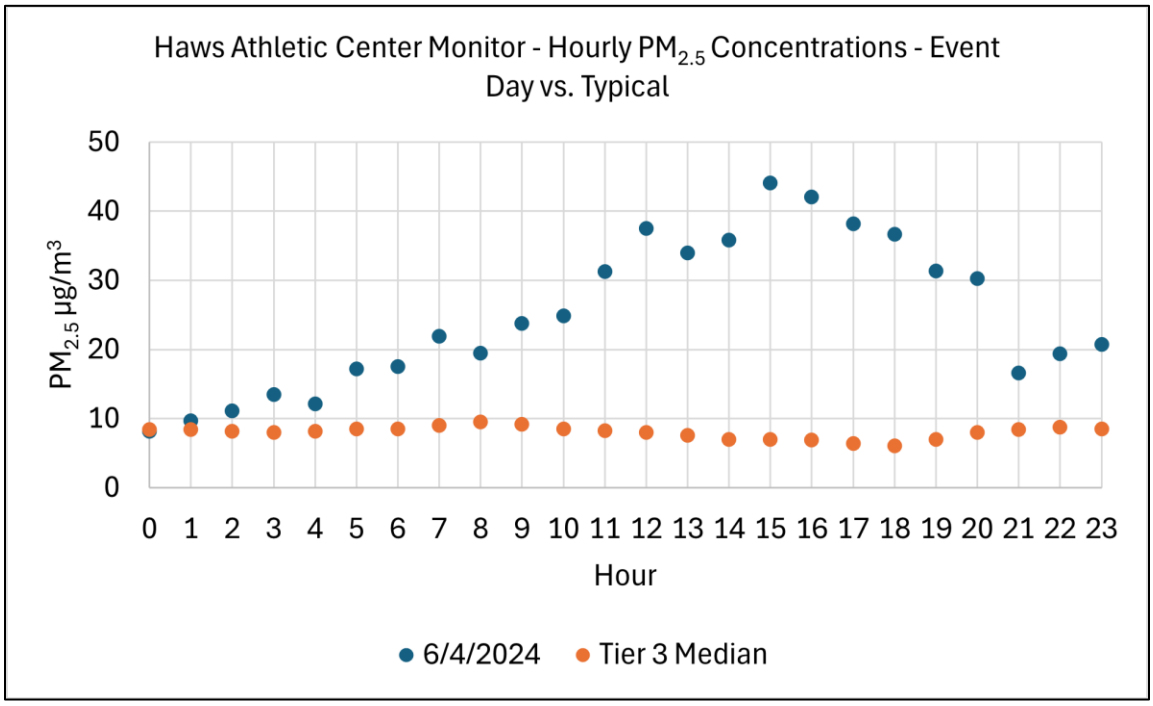

Figure 3-303: Hourly $PM_{2.5}$ Concentrations on June 4, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

National Weather Service archives (Figure B-21) reveal that haze was present in the region on the day of exceedance. TCEQ forecasts (Table C-11) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to light density residual smoke from widespread

seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with industrial sources in Mexico. The forecasts also stated that elevated relative humidity levels over the entirety of the state lead to increased concentrations of particulate matter. Satellite imagery displays thick plumes of smoke being blown over the region and Gulf of America on the day of exceedance (Figure 3-304: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 4, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-87 and Figure 3-305: *AirNow HMS Smoke Plume for June 4, 2024*) and HYSPLIT backward wind trajectories (Figure 3-306: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on June 4, 2024*, Figure 3-307: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 4, 2024*, Figure 3-308: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on June 4, 2024*, Figure 3-309: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on June 4, 2024*, and Figure 3-310: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on June 4, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to heavy smoke was transported into Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in Texas had AQI levels of Moderate and Unhealthy for Sensitive Groups. HYSPLIT forward trajectories show that winds originating from Yucatan Peninsula traveled through South and East Texas (Figure 3-311: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024*).

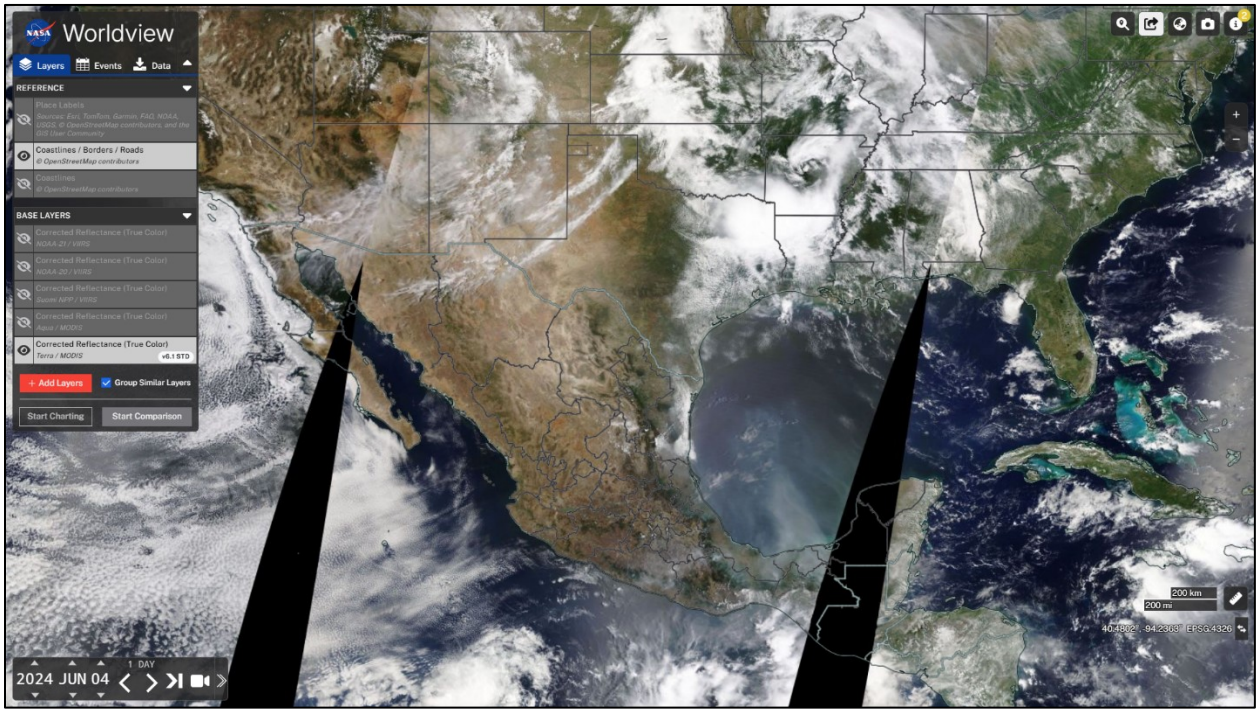

Figure 3-304: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 4, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

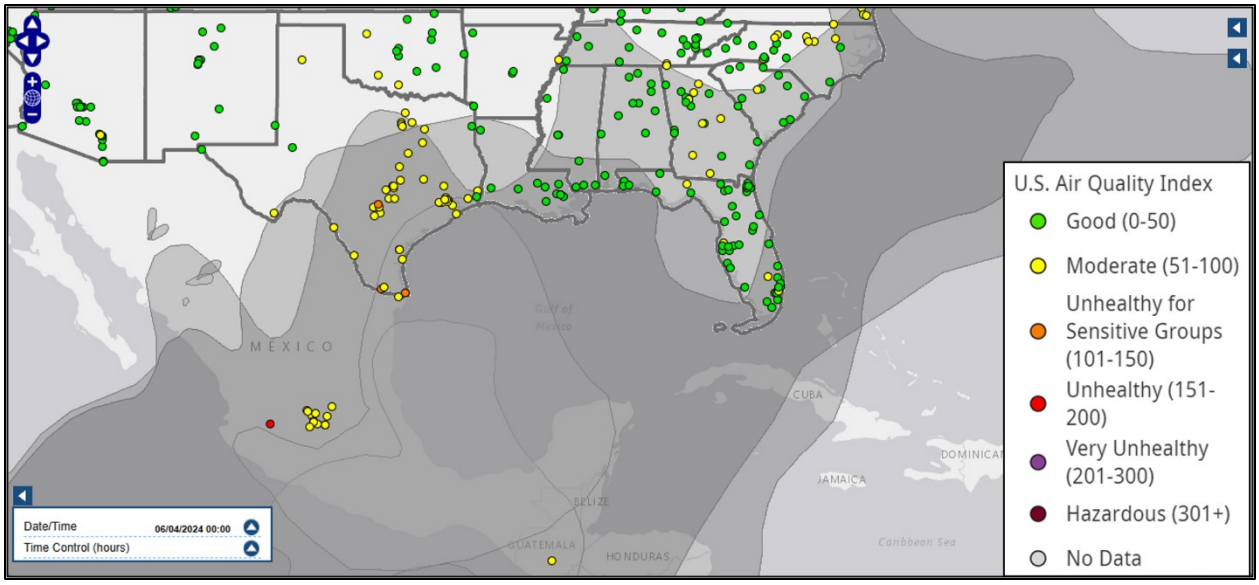

Figure 3-305: AirNow HMS Smoke Plume for June 4, 2024

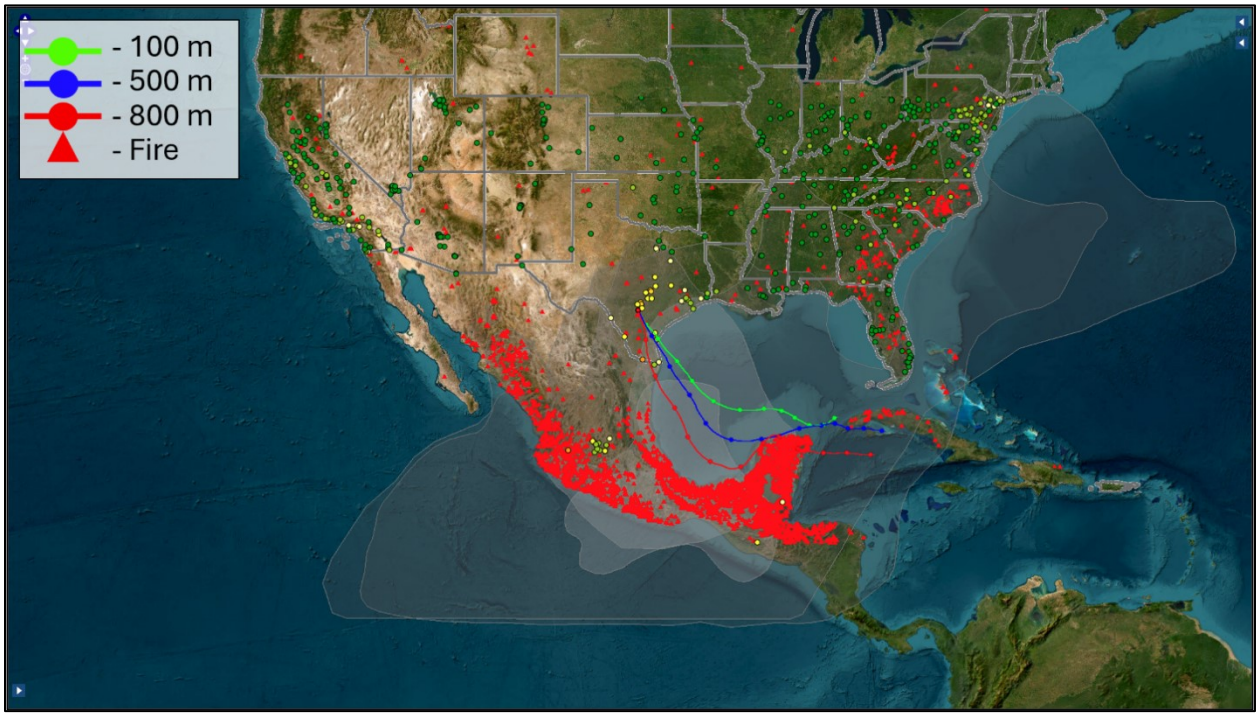

Figure 3-306: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on June 4, 2024

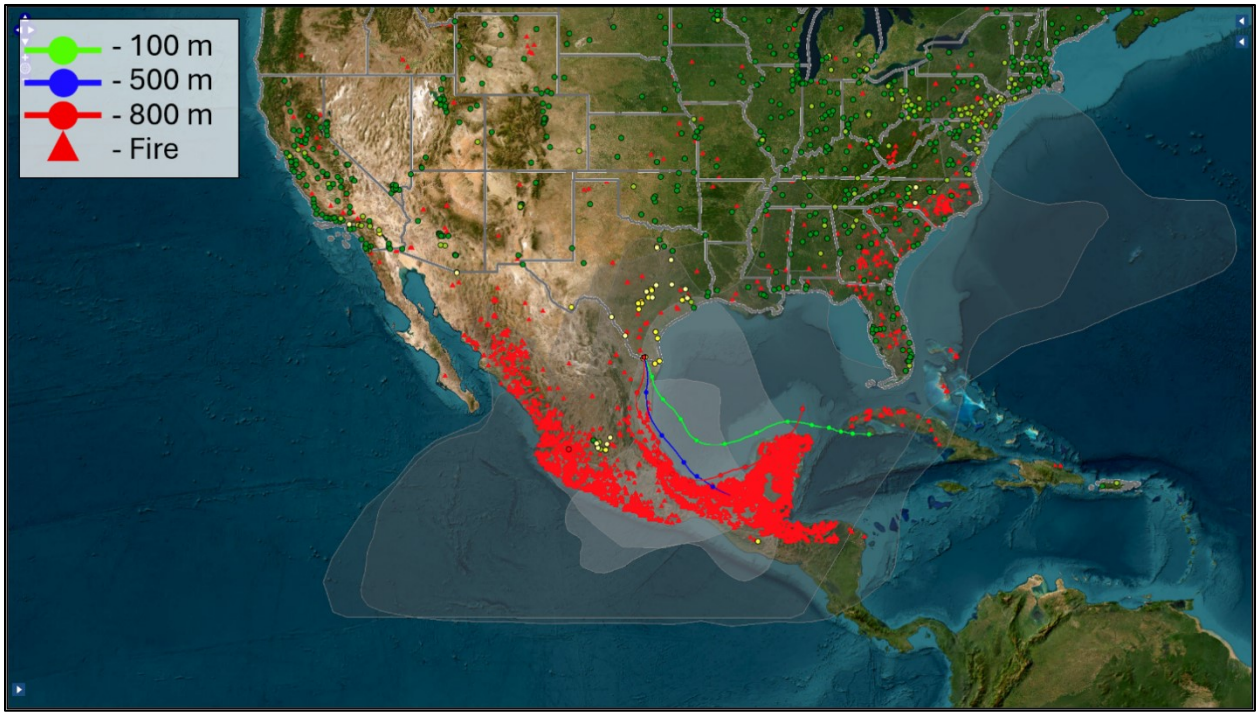

Figure 3-307: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 4, 2024

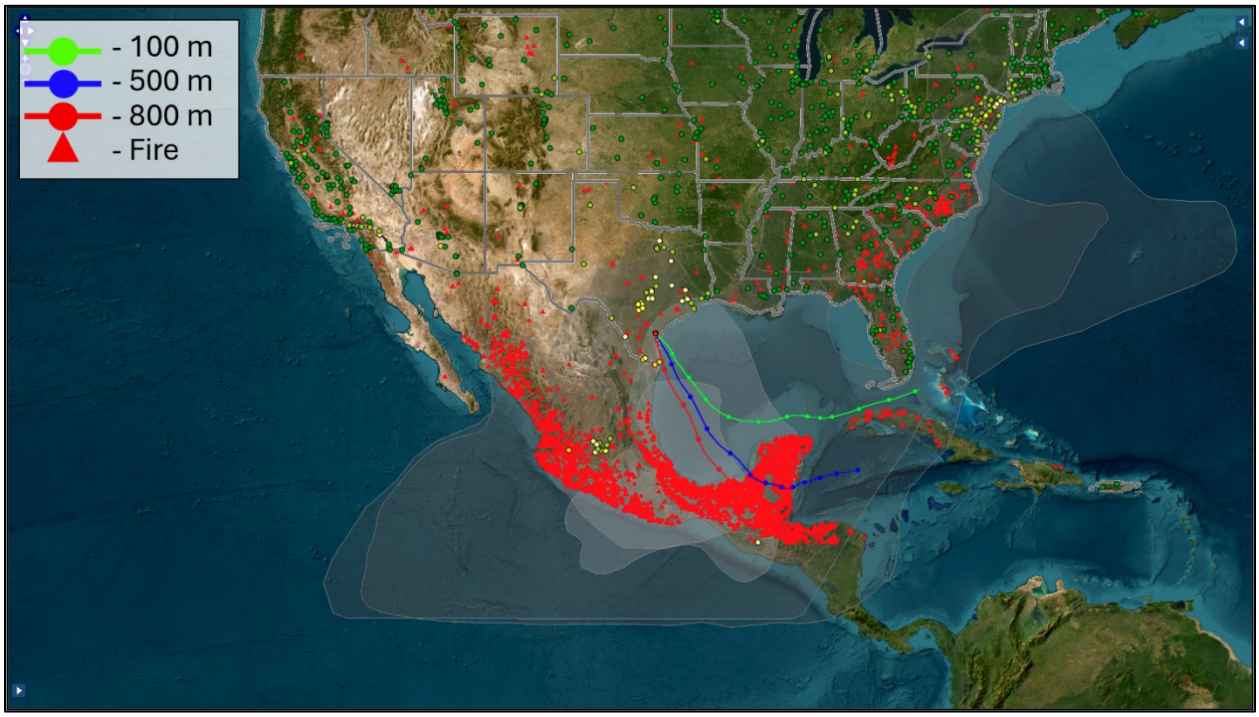

Figure 3-308: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on June 4, 2024

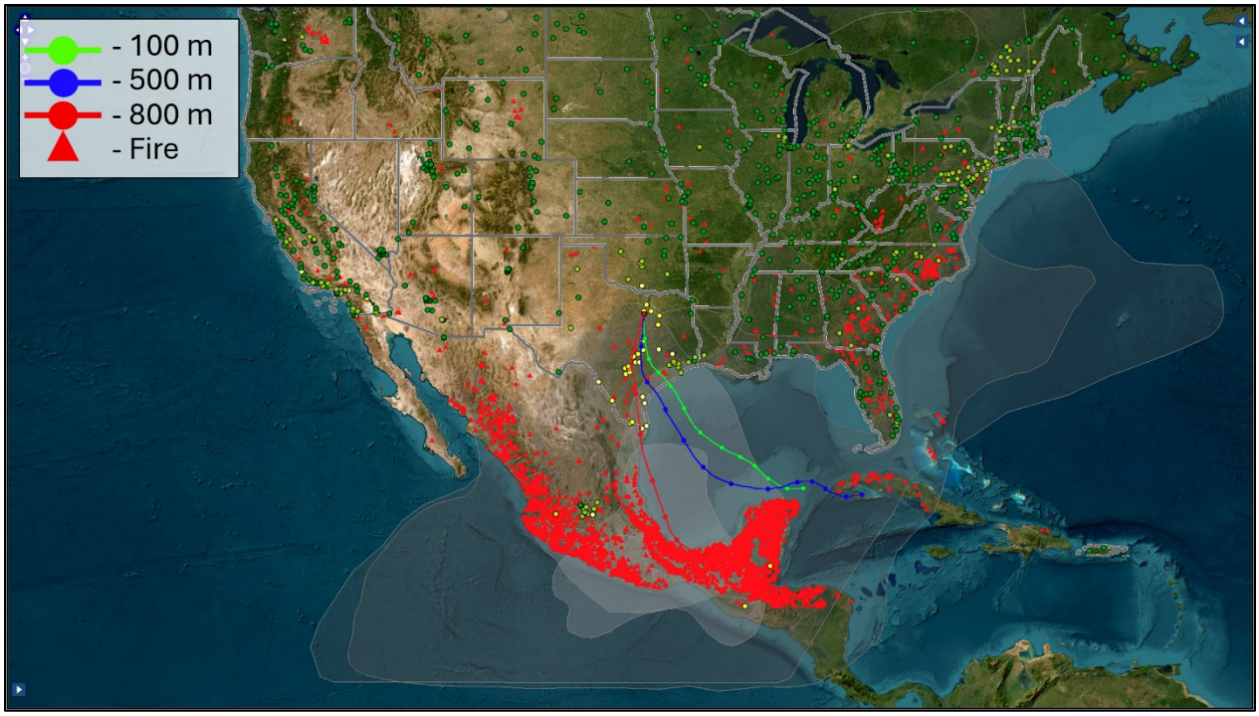

Figure 3-309: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on June 4, 2024

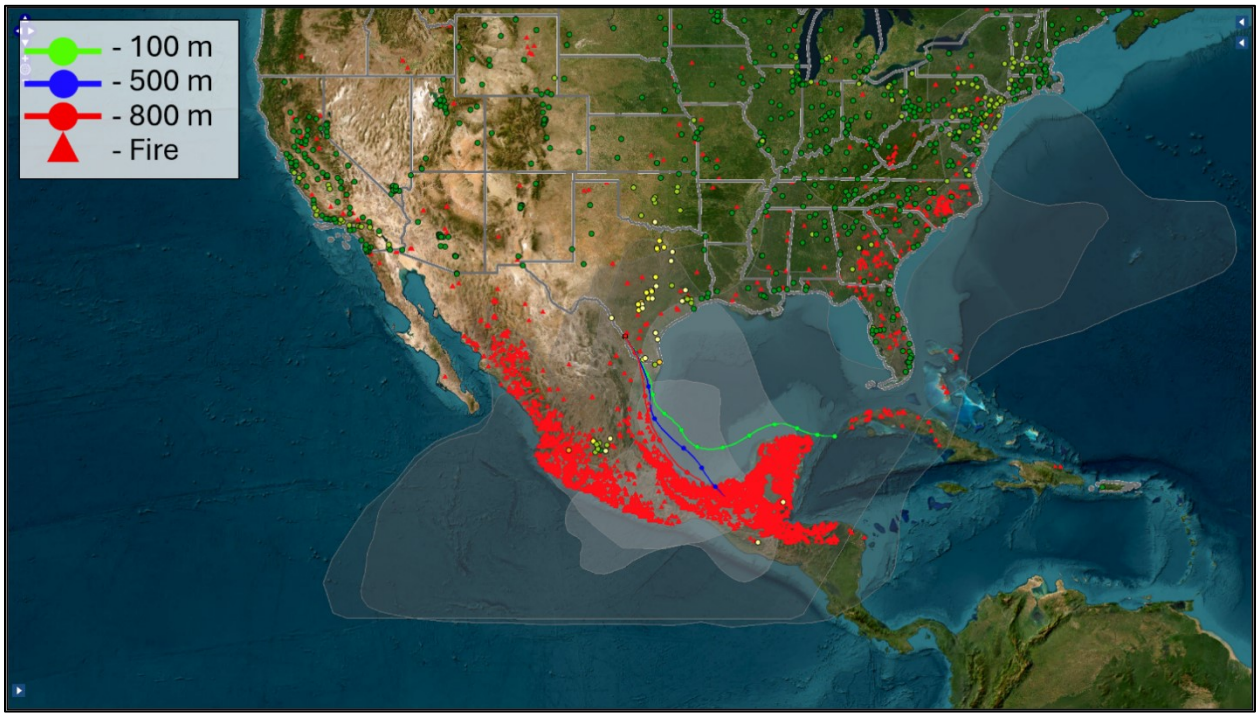

Figure 3-310: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on June 4, 2024

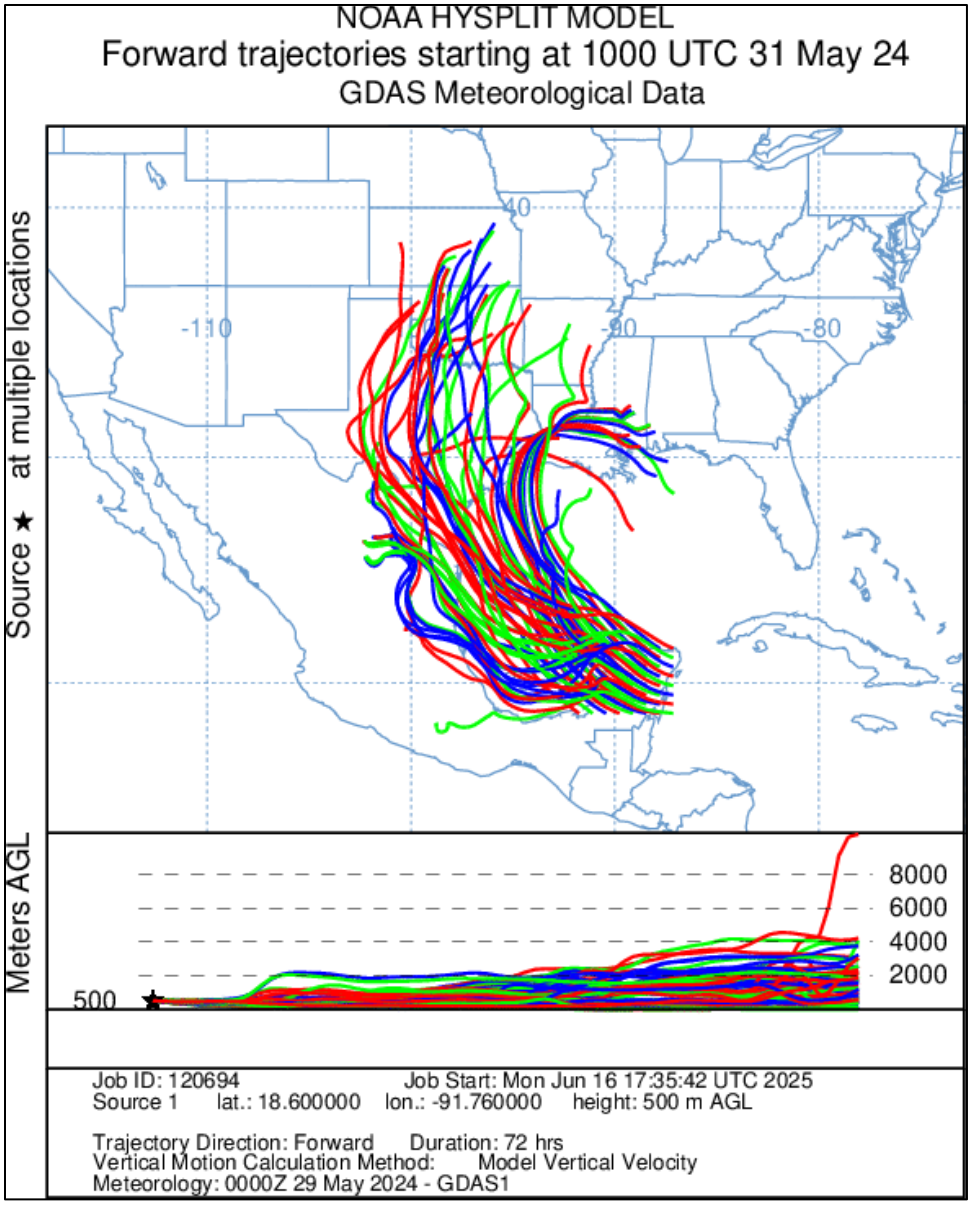

Figure 3-311: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024

June 5, 2024, is identified as a Tier 1 day at both the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 49.8 µg/m^3; one-hour daily maximum 91.9 µg/m^3 recorded at 06:00 LST) and the World Trade Bridge monitor (24-hour average concentration 34.0 µg/m^3; one-hour daily maximum 60.3 µg/m^3 recorded at 16:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on June 5, 2024, can be compared against typical/non-event days for the monitor in Figure 3-312: *Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-313: *Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

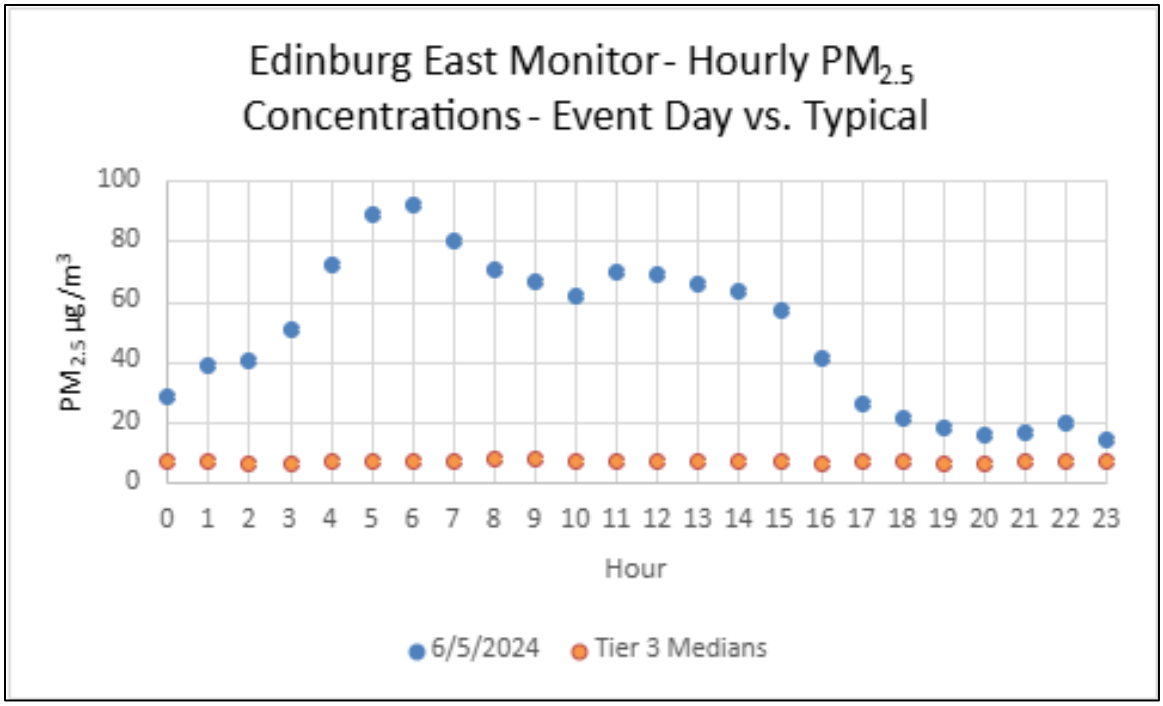

Figure 3-312: Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

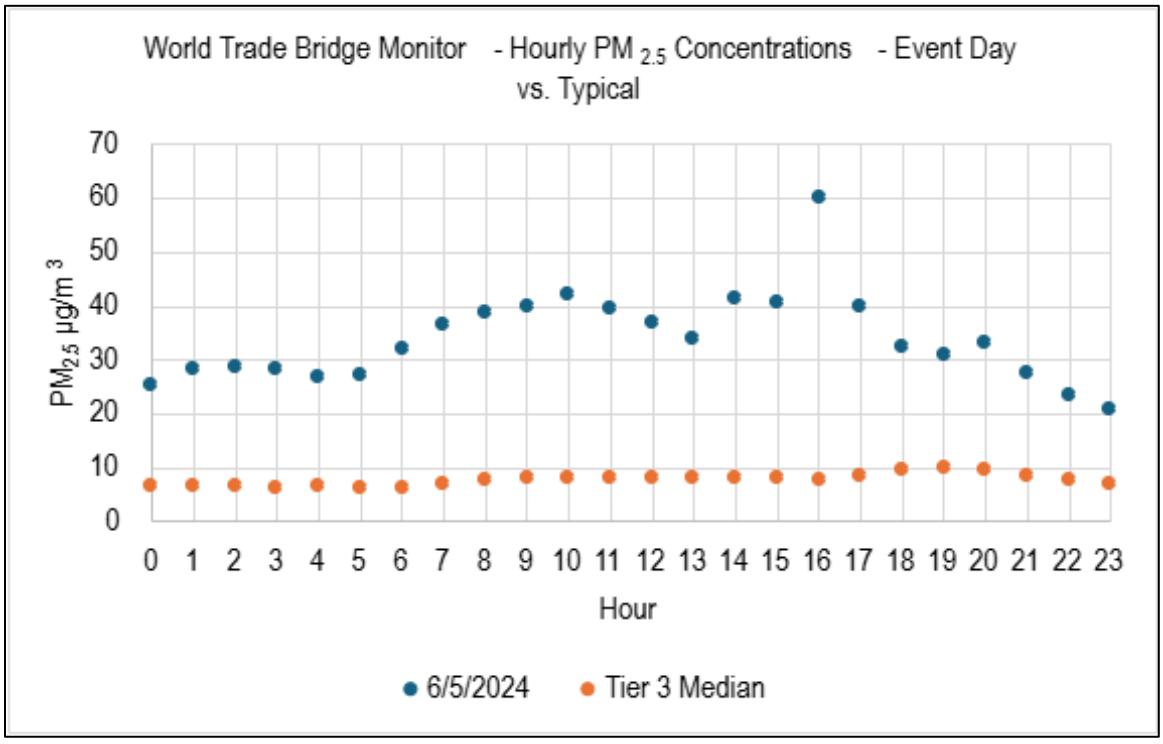

Figure 3-313: Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

National Weather Service archives (Figure B-21) reveal that haze was present in the area on the day of exceedance. TCEQ forecasts (Table C-11) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to light density residual smoke from widespread

seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with industrial sources in Mexico. The forecasts also stated that elevated relative humidity levels over the entirety of the state, lead to increased concentrations of particulate matter. Satellite imagery displays thick plumes of smoke being blown over the region and Gulf of America on the day of exceedance, but is partially obscured by cloud cover across the eastern portions of the state (Figure 3-314: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 5, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-88 and Figure 3-315: *AirNow HMS Smoke Plume for June 5, 2024*) and HYSPLIT backward wind trajectories (Figure 3-316: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 5, 2024*, Figure 3-317: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on June 5, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to heavy smoke was transported into South Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in South Texas had AQI levels of Moderate and Unhealthy. HYSPLIT forward trajectories show that winds originating from Yucatan Peninsula traveled through Texas (Figure 3-318: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024*).

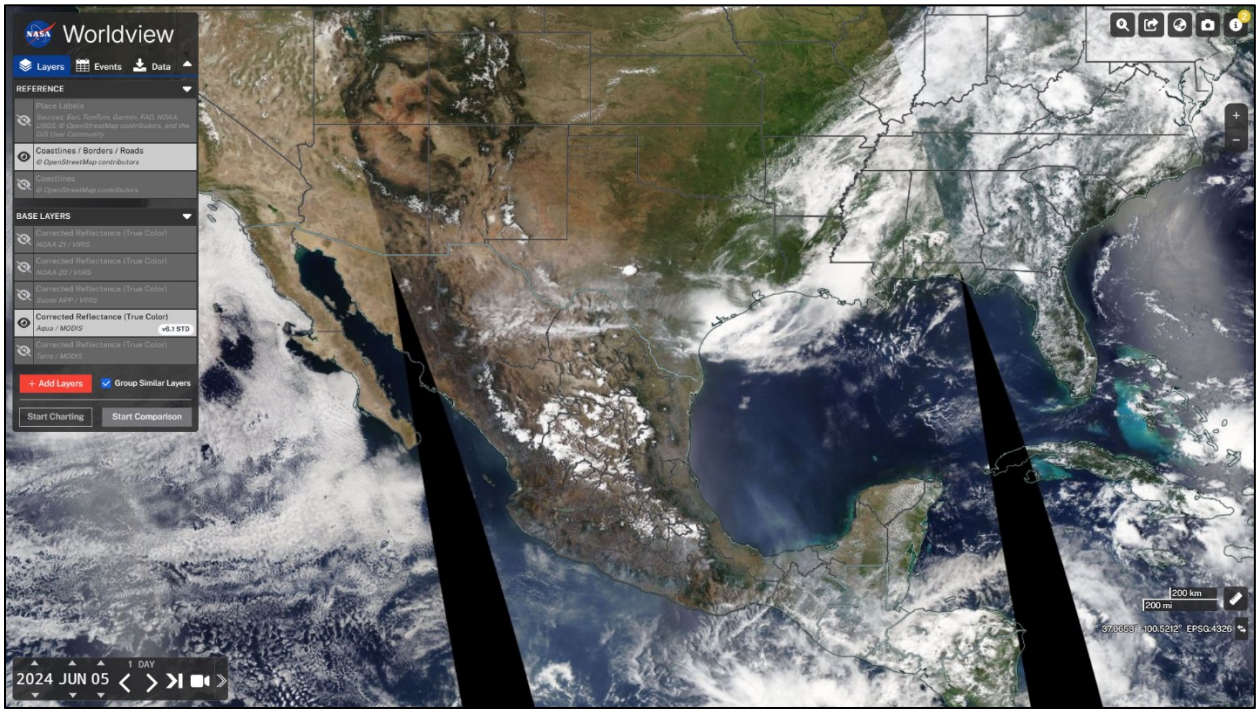

Figure 3-314: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 5, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

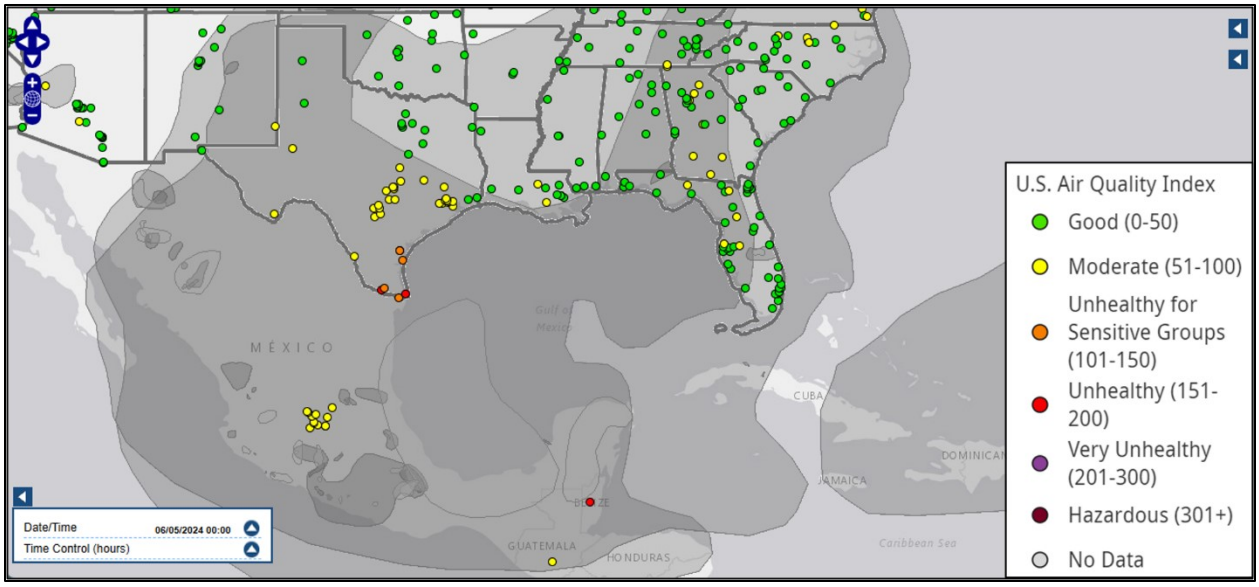

Figure 3-315: AirNow HMS Smoke Plume for June 5, 2024

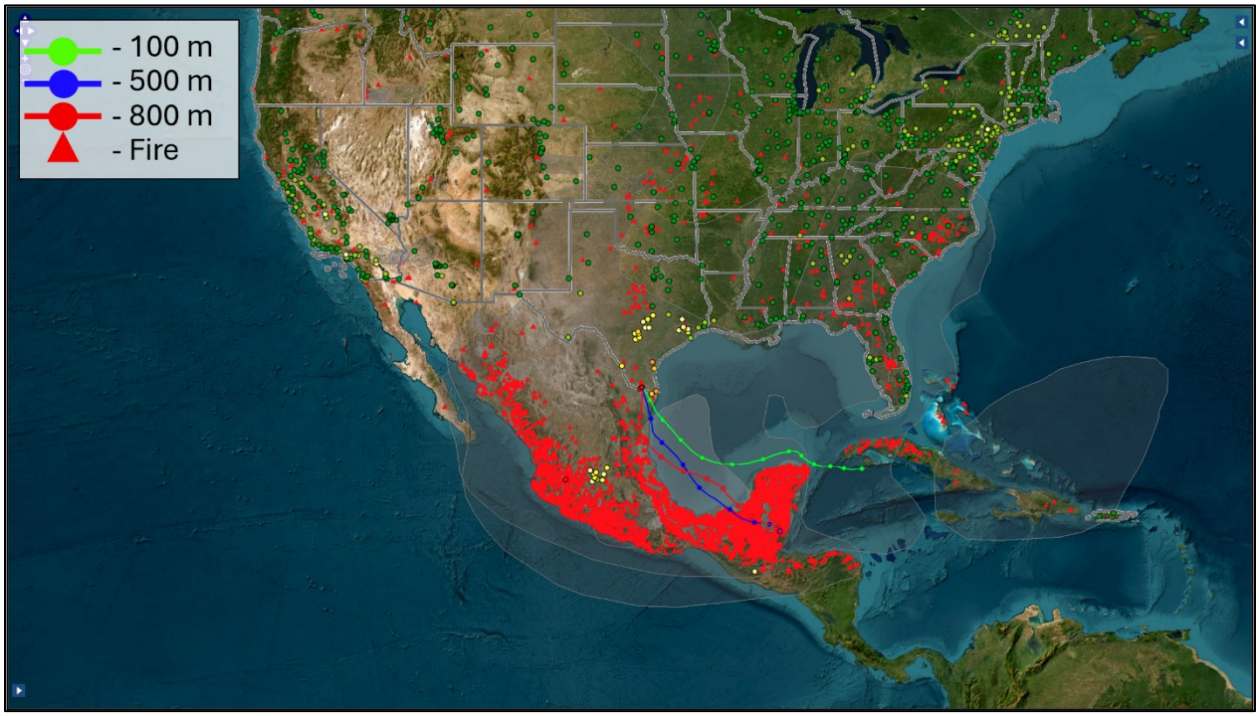

Figure 3-316: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 5, 2024

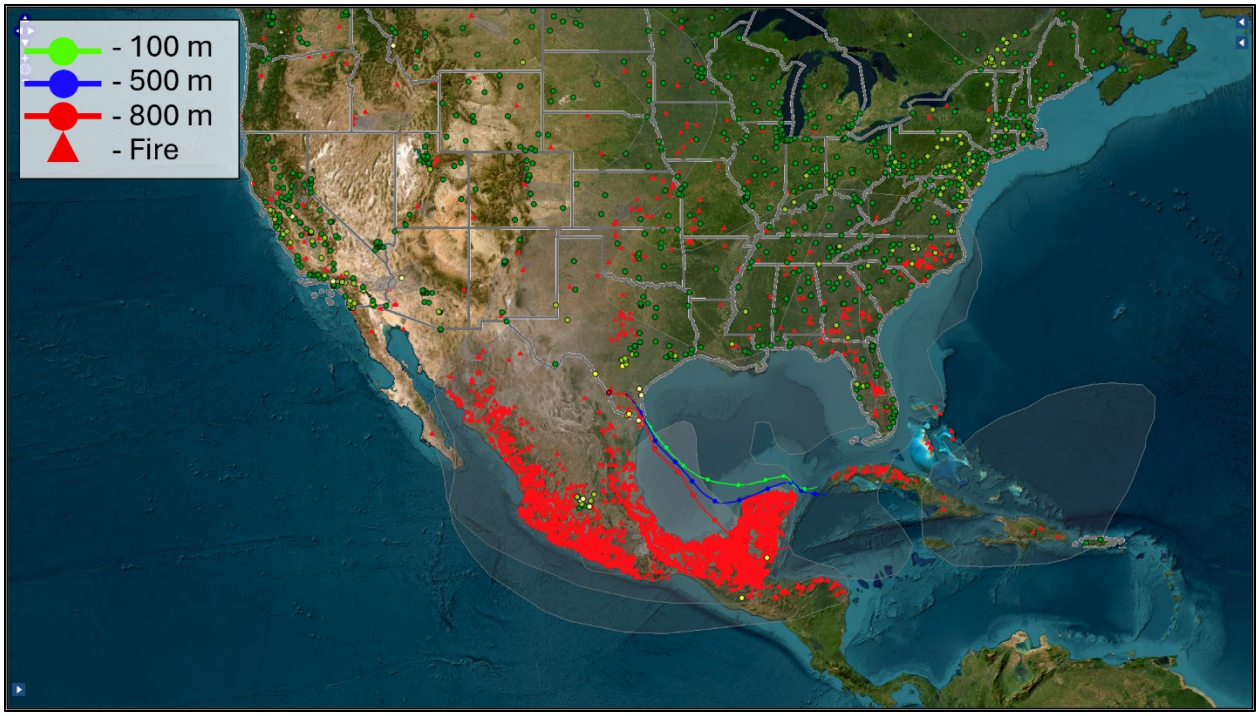

Figure 3-317: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on June 5, 2024

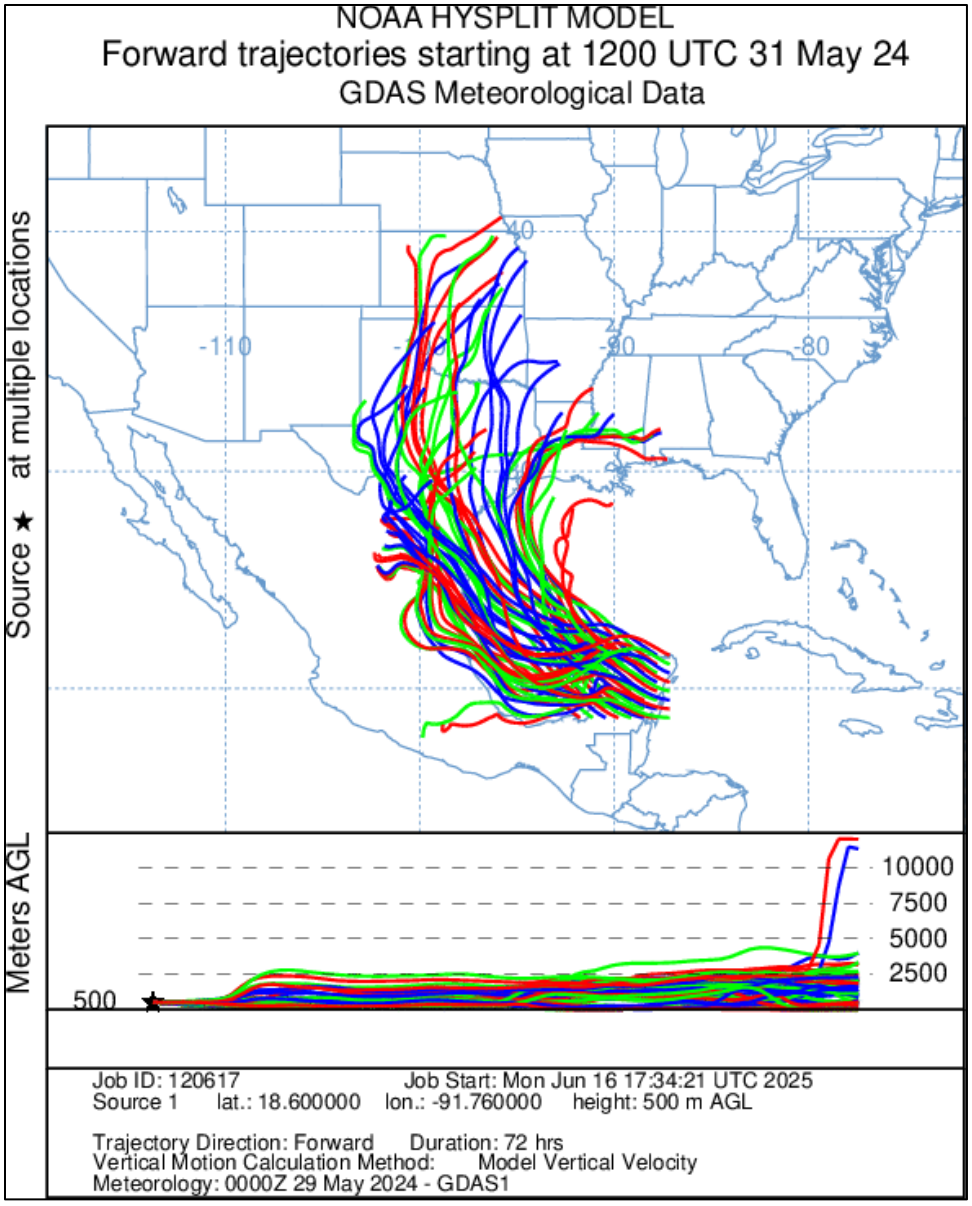

Figure 3-318: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024

June 6, 2024, is identified as a Tier 1 day at both the Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 38.1 µg/m^3; one-hour daily maximum 68.9 µg/m^3 recorded at 10:00 LST) and the World Trade Bridge monitor (24-hour average concentration 36.9 µg/m^3; one-hour daily maximum 61.3 µg/m^3 recorded at 20:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on June 6, 2024, can be compared against typical/non-event days for the monitor in Figure 3-319: *Hourly $PM_{2.5}$ Concentrations on June 6, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor* and Figure 3-320: *Hourly $PM_{2.5}$ Concentrations on June 6, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*.

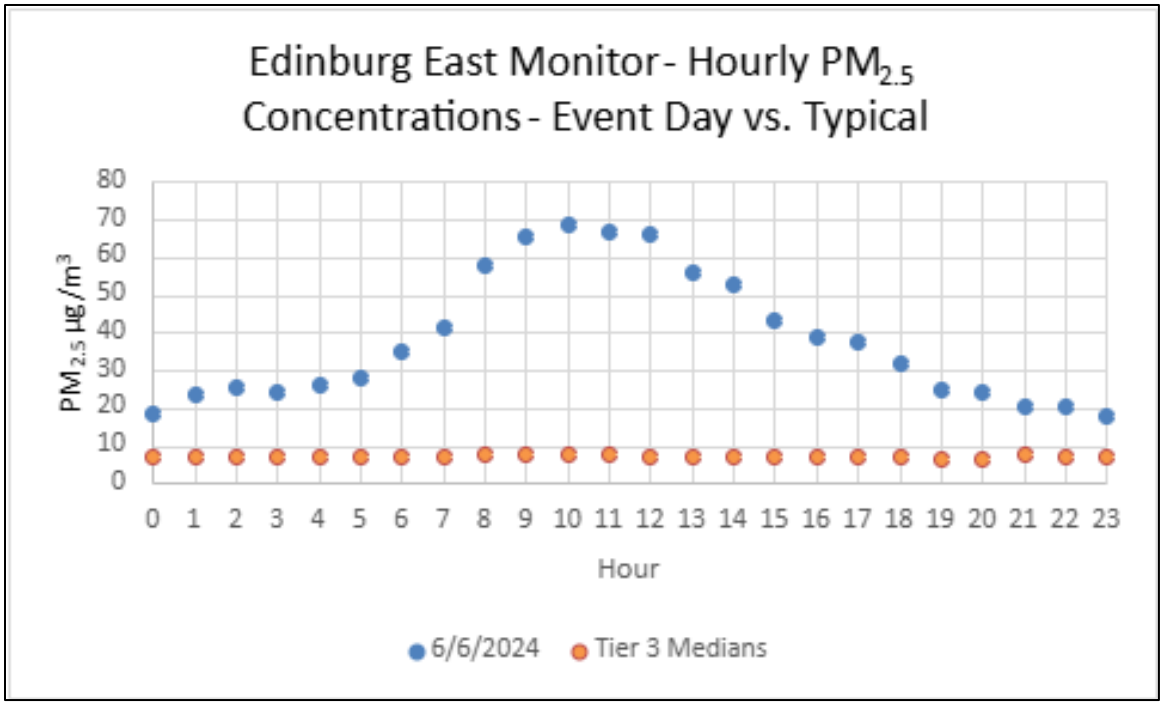

Figure 3-319: Hourly $PM_{2.5}$ Concentrations on June 6, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

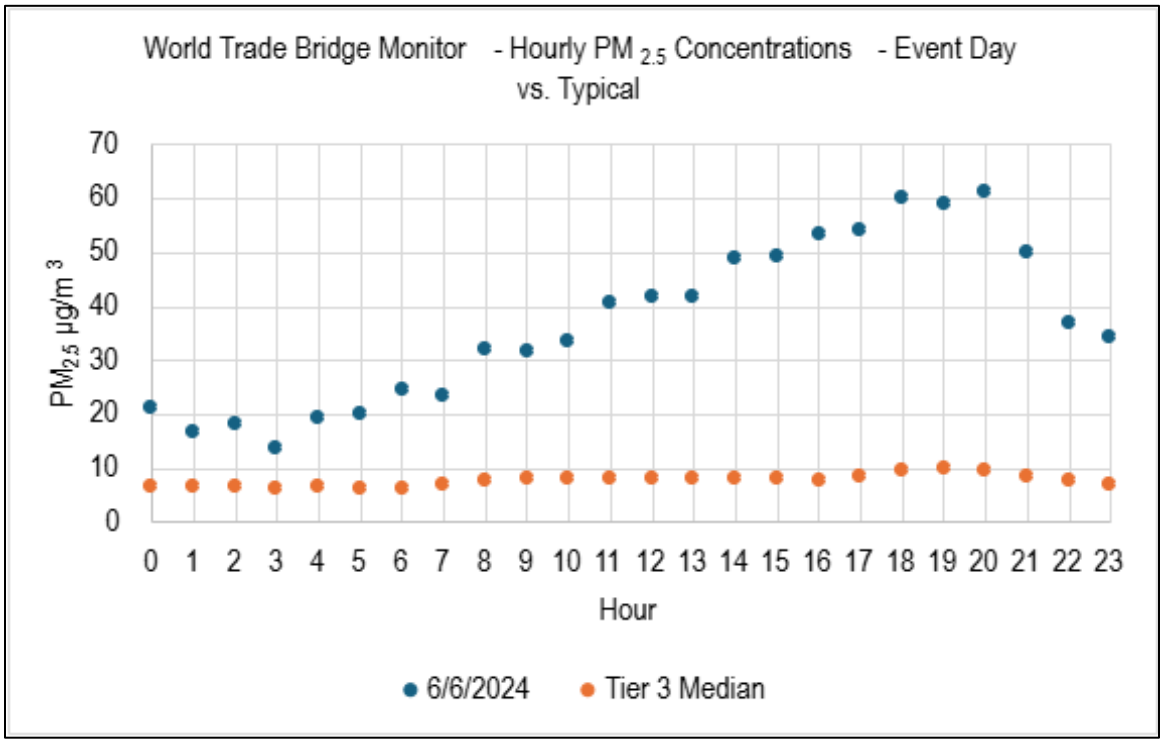

Figure 3-320: Hourly $PM_{2.5}$ Concentrations on June 6, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

National Weather Service archives (Figure B-20) reveal that haze was visible in the region on the day of exceedance. TCEQ forecasts (Table C-11) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to light density residual smoke from widespread

seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with industrial sources in Mexico. The forecasts also stated that elevated relative humidity levels over the entirety of the state lead to increased concentrations of particulate matter. Satellite imagery displays light plumes of smoke being blown over the region and Gulf of America on the day of exceedance (Figure 3-321: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 6, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*). Smoke plumes (Figure A-89, Figure A-90, and Figure 3-322: *AirNow HMS Smoke Plume for June 6, 2024*) and HYSPLIT backward wind trajectories (Figure 3-323: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 6, 2024* and Figure 3-324: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on June 6, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate moderate to heavy smoke was transported into South Texas from the Yucatan Peninsula on the date of interest. On that same day, monitors in South Texas had AQI Moderate and Unhealthy for Sensitive Groups levels. HYSPLIT forward trajectories show that winds originating from Yucatan Peninsula traveled through Texas (Figure 3-325: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on June 3, 2024*).

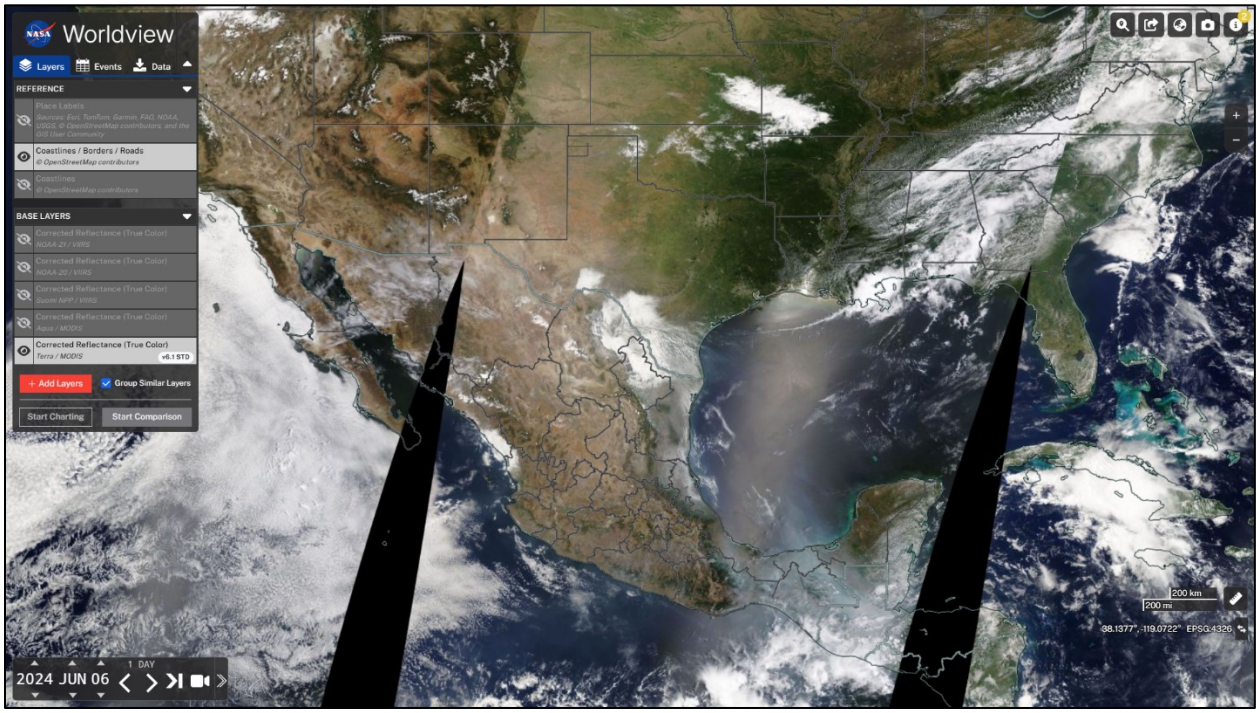

Figure 3-321: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 6, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

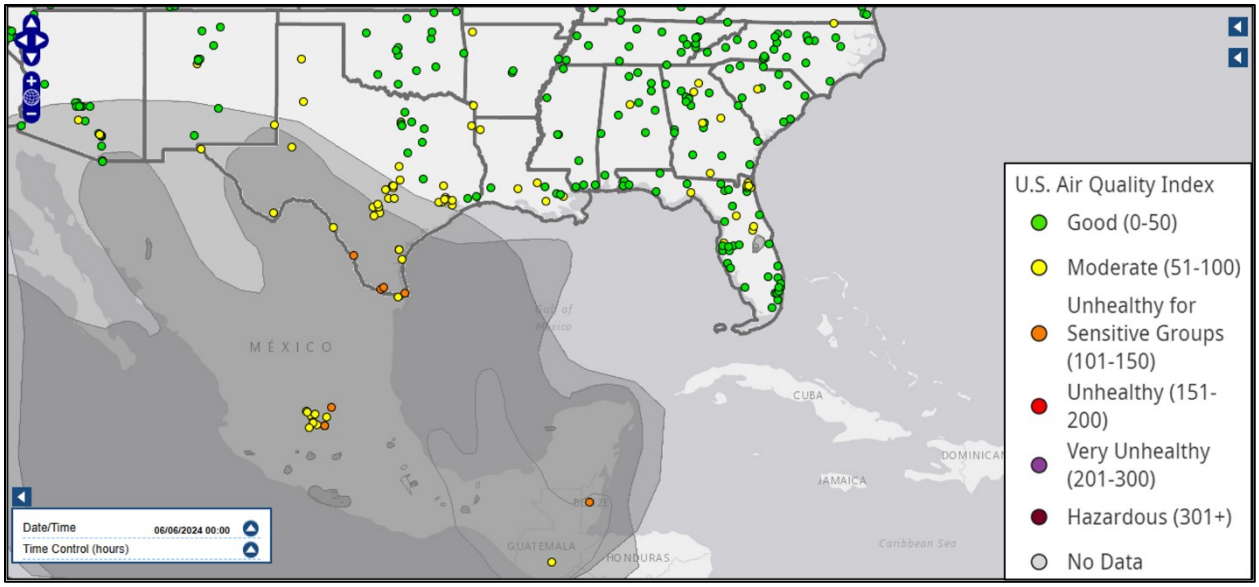

Figure 3-322: AirNow HMS Smoke Plume for June 6, 2024

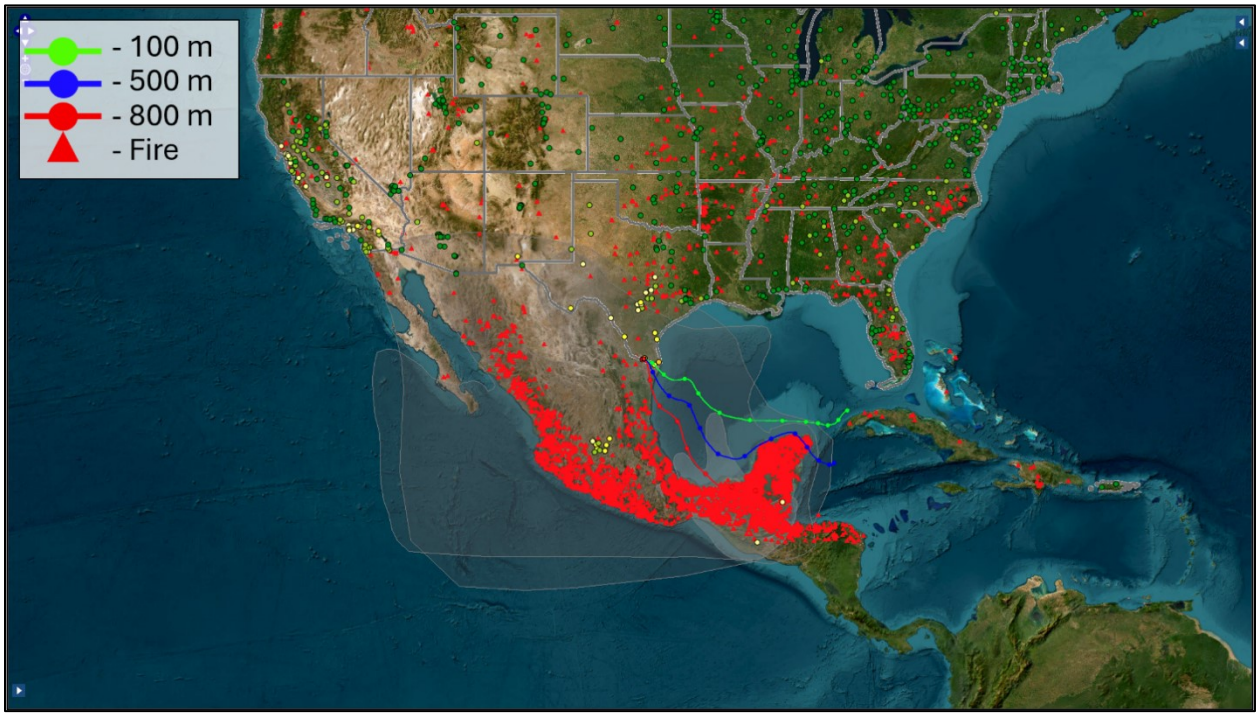

Figure 3-323: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on June 6, 2024

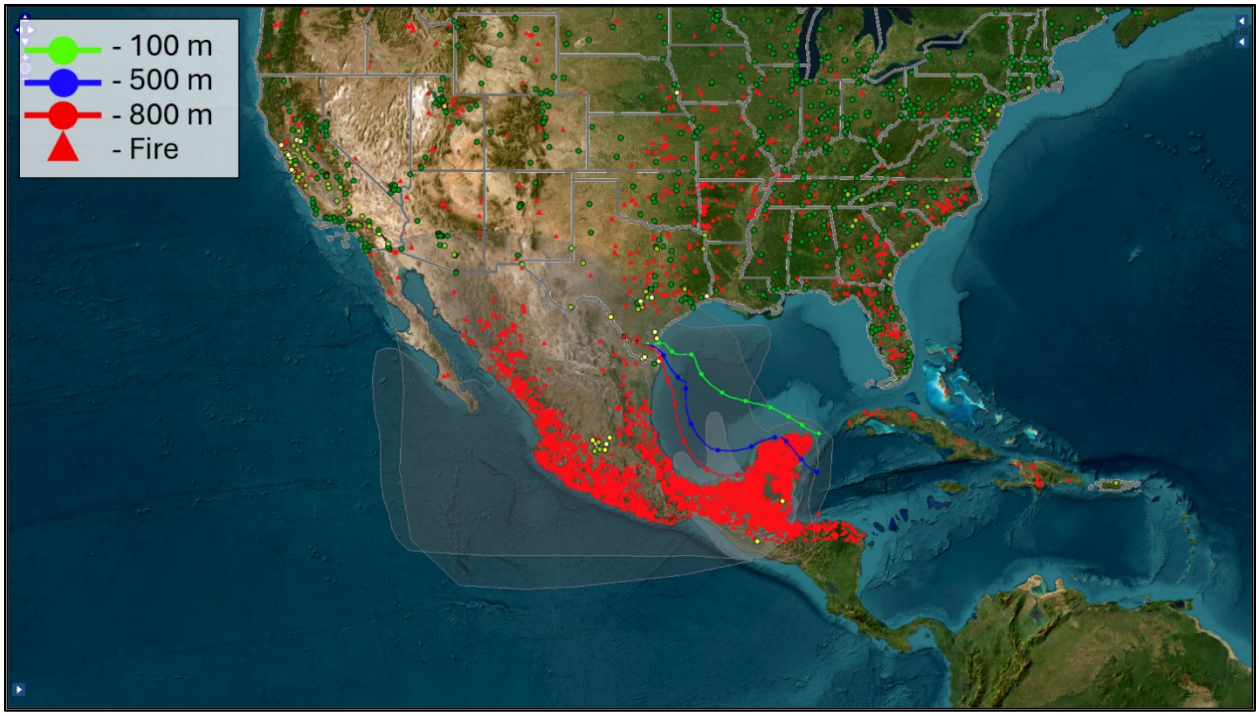

Figure 3-324: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on June 6, 2024

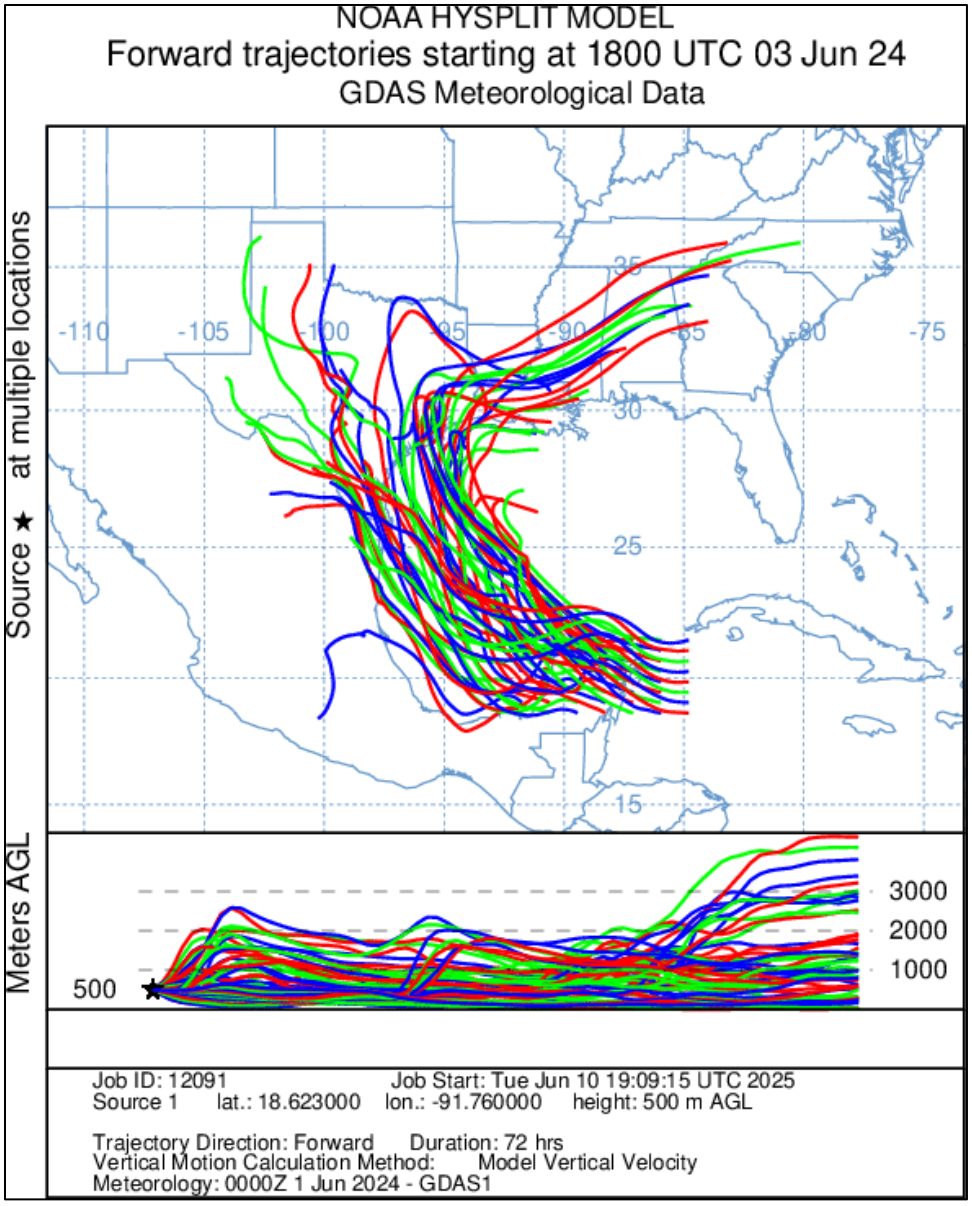

Figure 3-325: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on June 3, 2024

3.2.12 Group 12 – Evidence for the June 5, 2024, High Wind $PM_{2.5}$ Event for Corpus Christi Huisache and Dona Park Monitors

June 5, 2024, is identified as a Tier 1 day at both the Corpus Christi Huisache monitor (24-hour average concentration 37.4 µg/m^3; one-hour daily maximum 67.0 µg/m^3 recorded at 05:00 LST) and the Dona Park monitor (24-hour average concentration 50.5 µg/m^3; one-hour daily maximum 88.5 µg/m^3 recorded at 07:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with fires in Mexico. Hourly concentrations on June 5, 2024, can be compared against typical/non-event days for the monitor in Figure 3-326: *Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the Dona Park Monitor* and Figure 3-327: *Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor.*

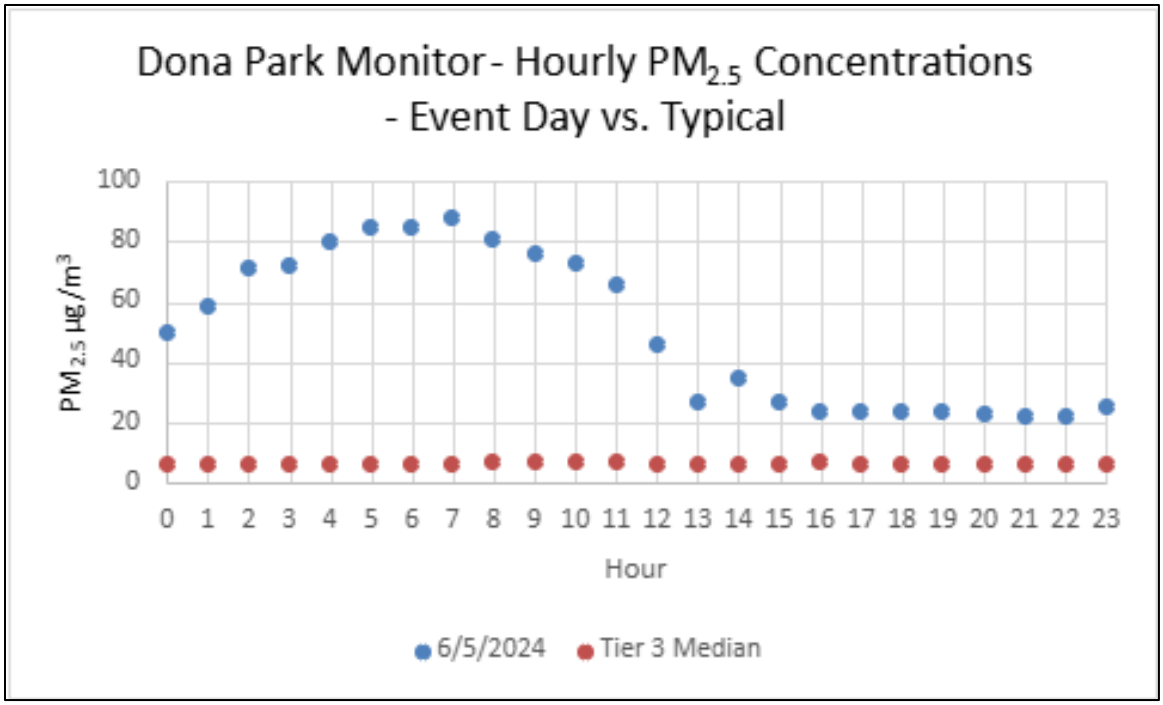

Figure 3-326: Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the Dona Park Monitor

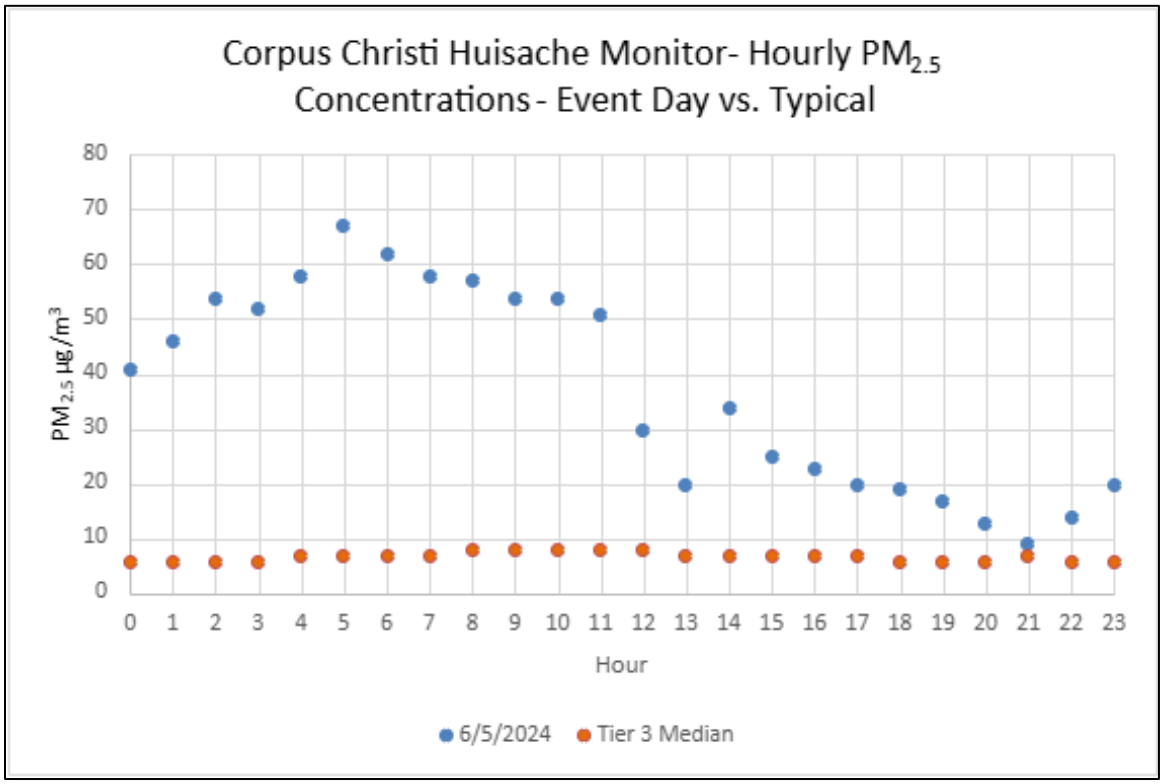

Figure 3-327: Hourly $PM_{2.5}$ Concentrations on June 5, 2024, Compared to Typical Concentrations at the Corpus Christi Huisache Monitor

National Weather Service archives (Figure B-21) reveal that haze was present in the area on the day of exceedance. TCEQ forecasts (Table C-12) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to light density residual smoke from widespread seasonal burning activities throughout central-southern Mexico, the Yucatan Peninsula, and Central America along with industrial sources in Mexico. The forecasts also stated that elevated relative humidity levels over the entirety of the state lead to increased concentrations of particulate matter. Satellite imagery displays thick plumes of smoke being blown over the region and Gulf of America on the day of exceedance, but is partially obscured by cloud cover across the eastern portions of the state (Figure 3-328: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 5, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America*)). Dona Park and Corpus Christi Huisache monitoring stations recorded five-minute sustained wind speeds greater than 25 miles per hour. At the time of Corpus Christi Huisache's peak one-hour daily maximum $PM_{2.5}$ recorded value, the monitor showed windspeeds around 26.21 mph. At the time of Dona Park's peak one-hour daily maximum $PM_{2.5}$ recorded value, the monitor showed windspeeds around 30.87 mph. HYSPLIT backward wind trajectories (Figure 3-329: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache Monitor on June 5, 2024* and Figure 3-330: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on June 5, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value and HYSPLIT forward trajectories show that winds originating from Yucatan Peninsula traveled through Texas (Figure 3-318: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in Mexico with Fires, Starting on May 31, 2024*). On that same day, monitors in South Texas had AQI Moderate and Unhealthy for Sensitive Groups levels (Figure 3-315: *AirNow HMS Smoke Plume for June 5, 2024*).

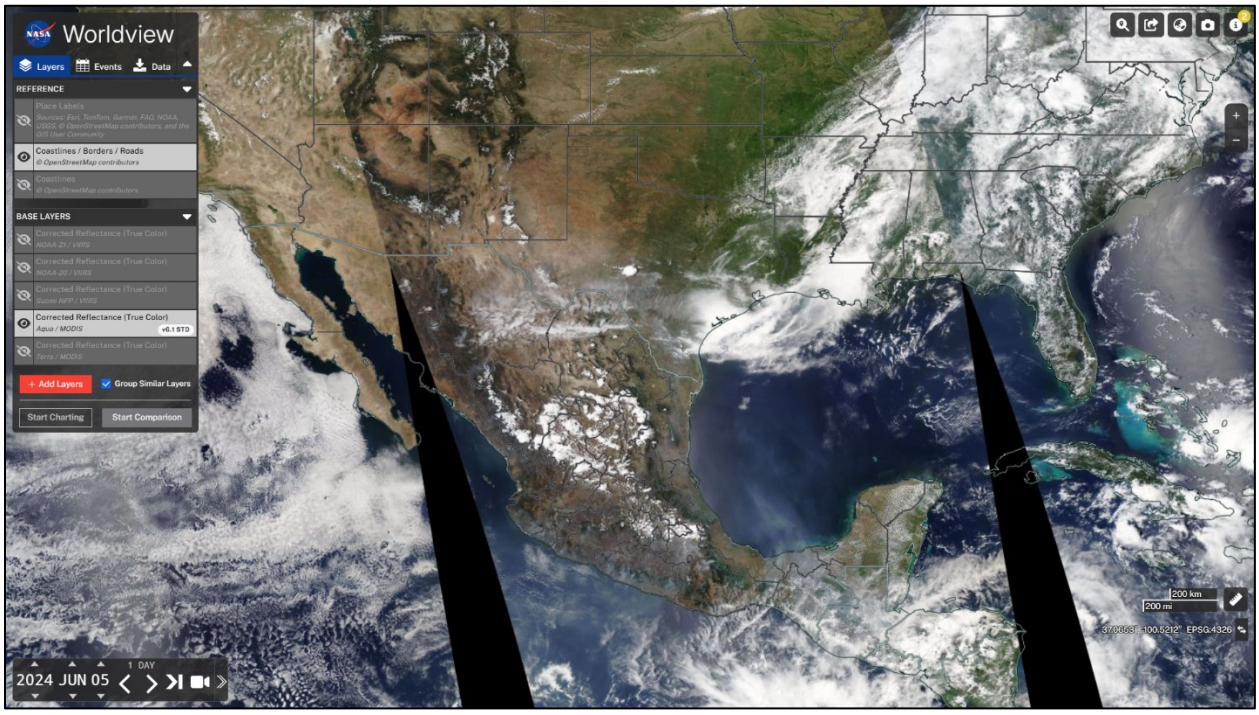

Figure 3-328: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from June 5, 2024, Showing Potential Haze in South Texas and Smoke around Mexico and the Gulf of America

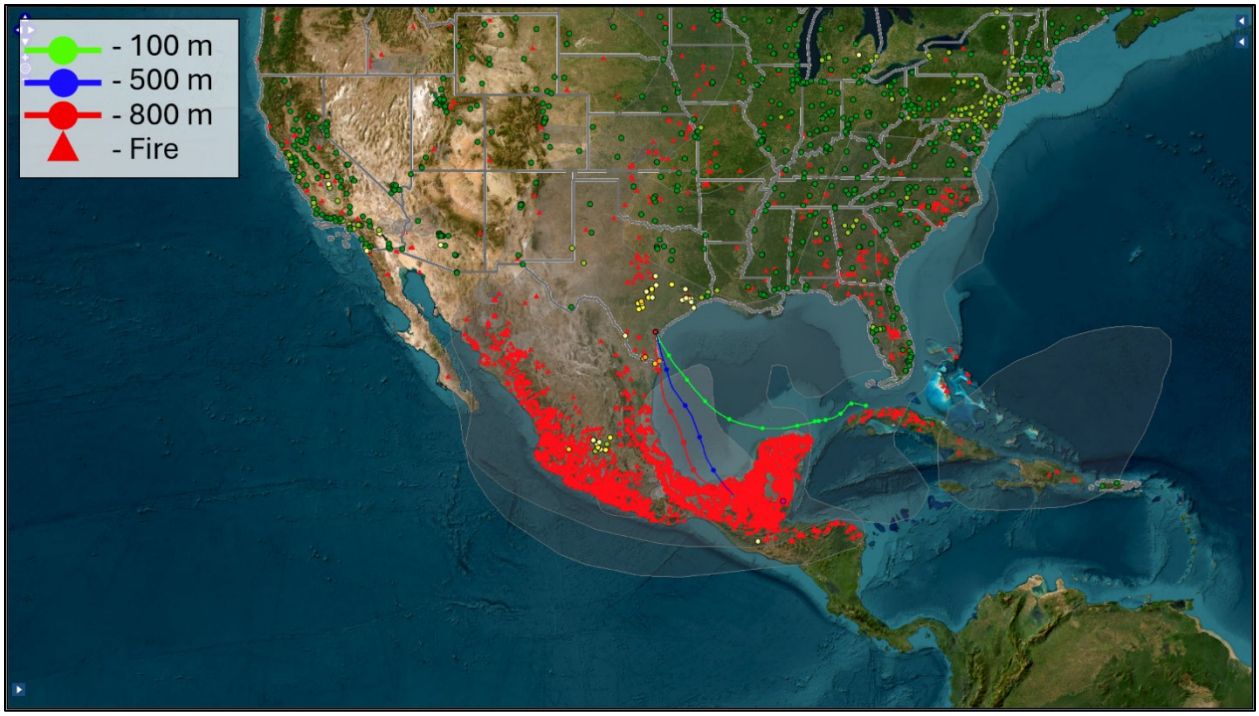

Figure 3-329: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Corpus Christi Huisache Monitor on June 5, 2024

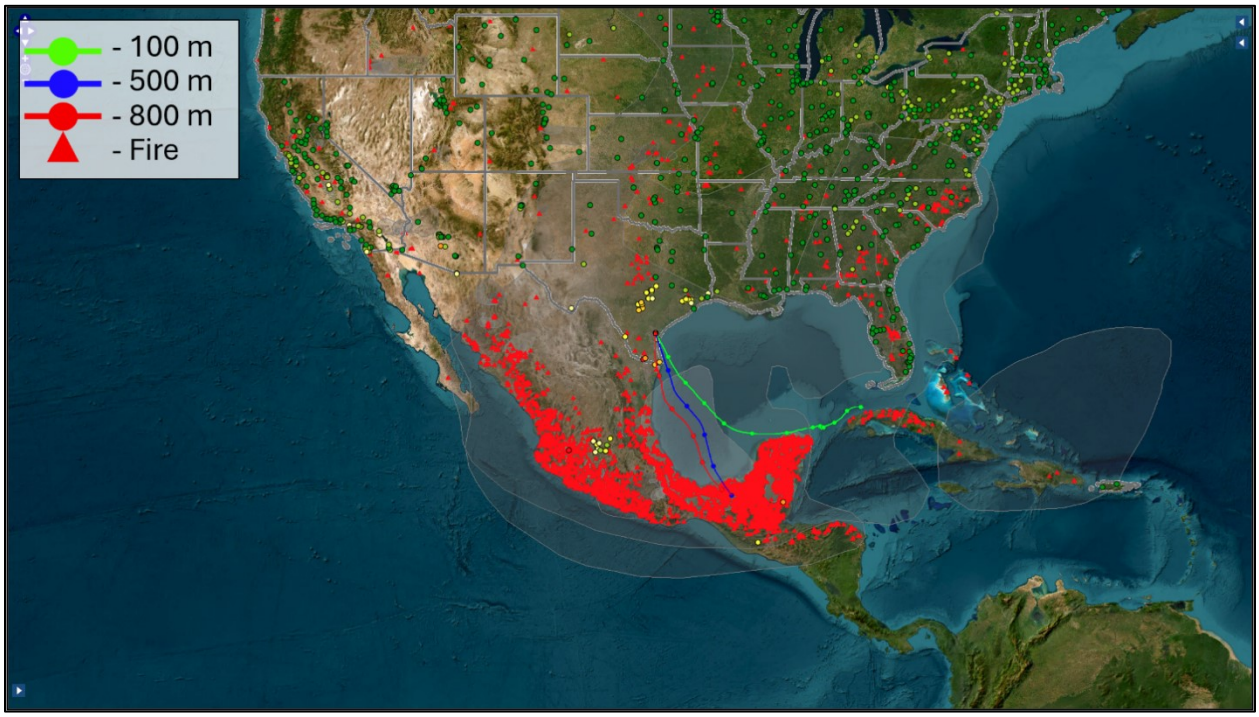

Figure 3-330: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on June 5, 2024

3.2.13 Group 13 – Evidence for the July 30, 2024, through August 1, 2024, African Dust Event for the Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, World Trade Bridge, Haws Athletic Center, Fort Worth Northwest, and Dona Park Monitors

July 30, 2024, is identified as a Tier 2 day at the East Freddy Gonzalez Drive monitor (24-hour average concentration 23.0 µg/m³; one-hour daily maximum 33.4 µg/m³ recorded at 20:00 LST). Elevated $PM_{2.5}$ concentrations resulted from African dust. Hourly concentrations on July 30, 2024, can be compared against typical/non-event days for the monitor in Figure 3-331: *Hourly $PM_{2.5}$ Concentrations on July 30, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor*.

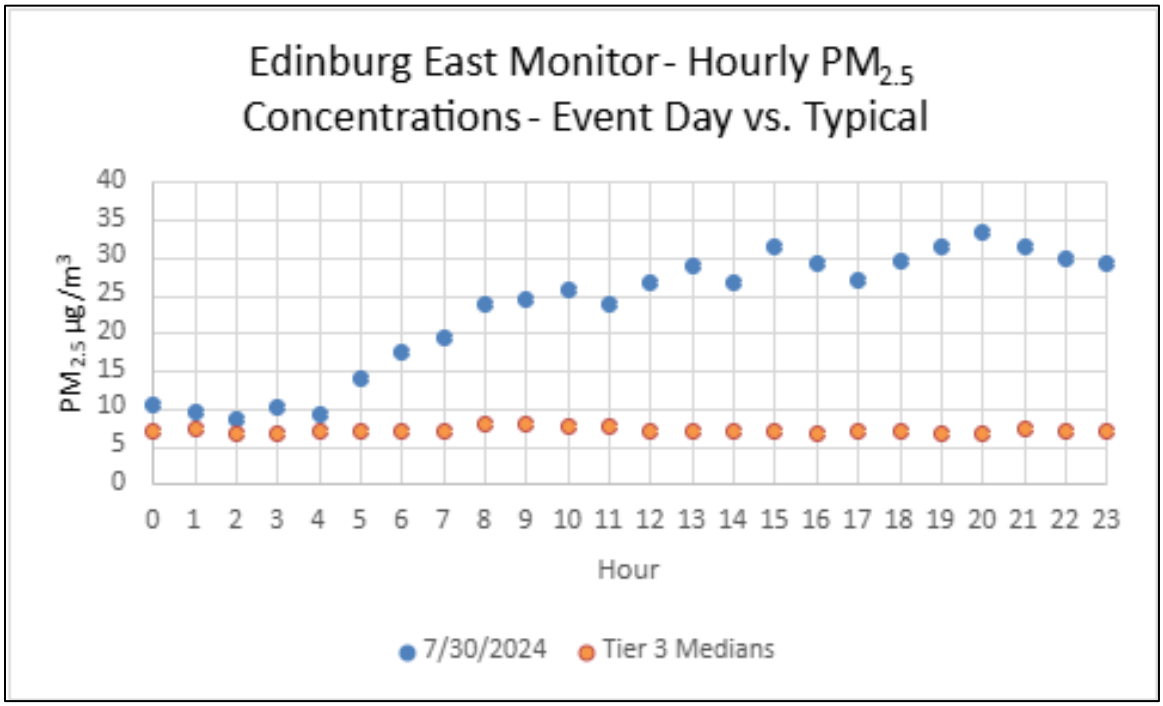

Figure 3-331: Hourly $PM_{2.5}$ Concentrations on July 30, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

NWS archives (Figure B-23) states that African dust was present in the region on the day of exceedance, leading to hazy skies. TCEQ forecasts (Table C-13) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to moderate African dust filtering throughout the state (excluding the panhandle and far west Texas) with heaviest concentrations found around the coast. Satellite imagery displays African dust being blown over the region and Gulf of America on the day of exceedance (Figure 3-332: *Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 30, 2024, Showing Potential African Dust Along the Texas Coast and the Gulf of America*). The aerosol optical depth (AOD) image displays monitors reading AQI levels of Moderate to Unhealthy for Sensitive Groups over the state due to the dust storm (Figure 3-333: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on July 30, 2024*). HYSPLIT backward wind trajectories (Figure 3-334: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Fredy Gonzalez Drive Monitor on July 30, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value and HYSPLIT forward trajectories show that winds originating from Africa traveled across the Atlantic, through the Gulf of America, and into South and East Texas (Figure 3-335: *NOAA HYSPLIT 14-Day Forward Trajectories Originating from Saharan Desert, Starting on July 16, 2024*).

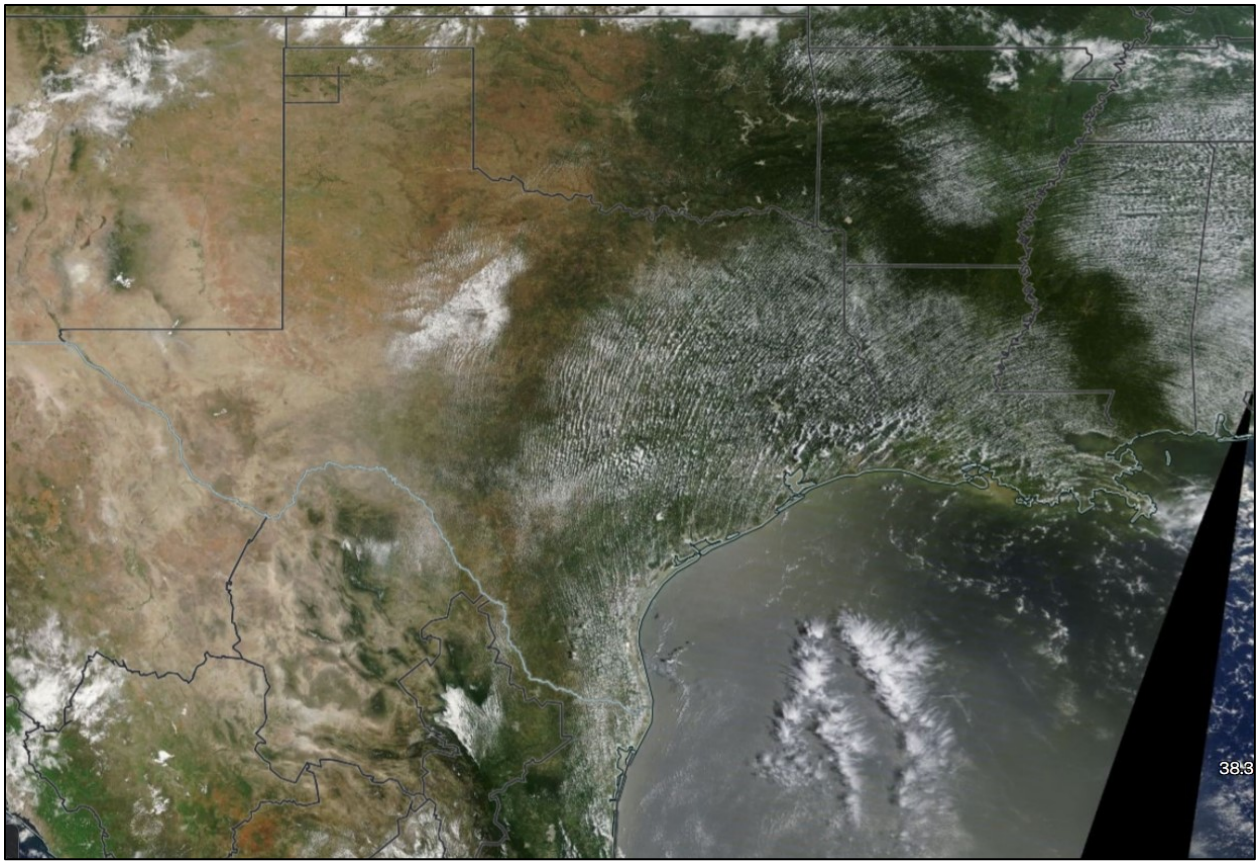

Figure 3-332: Terra/MODIS Corrected Reflectance (True Color) Satellite Imagery from July 30, 2024, Showing Potential African Dust Along the Texas Coast and the Gulf of America

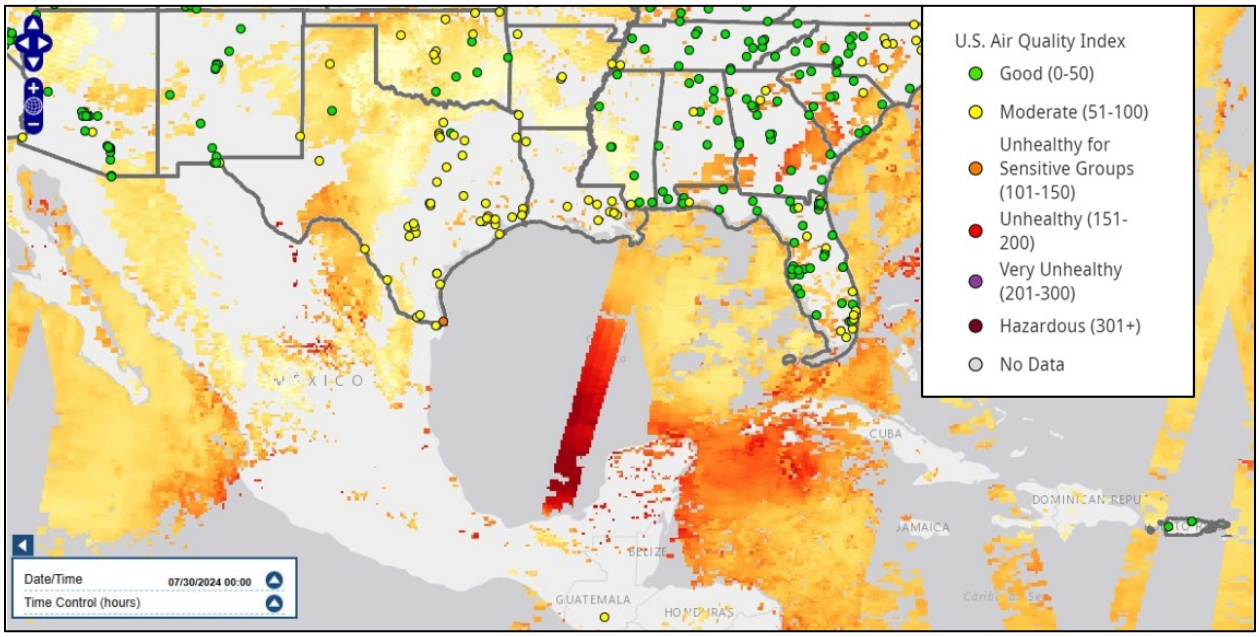

Figure 3-333: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on July 30, 2024

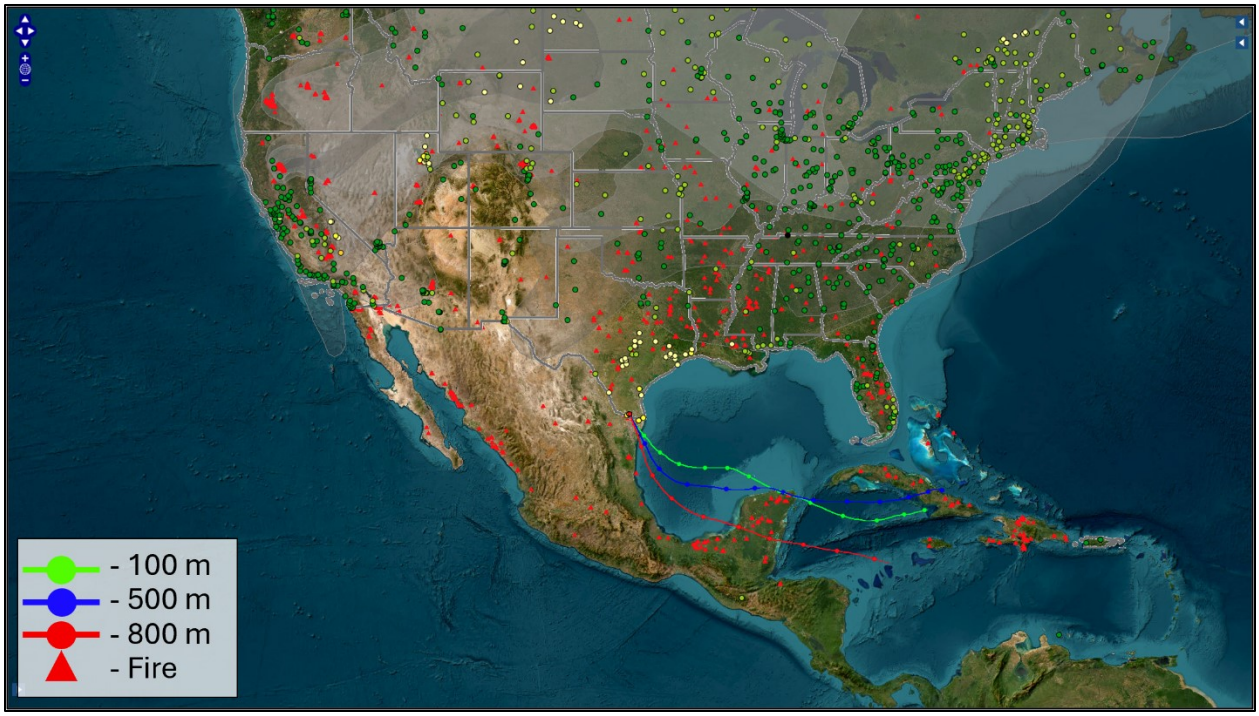

Figure 3-334: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Fredy Gonzalez Drive Monitor on July 30, 2024

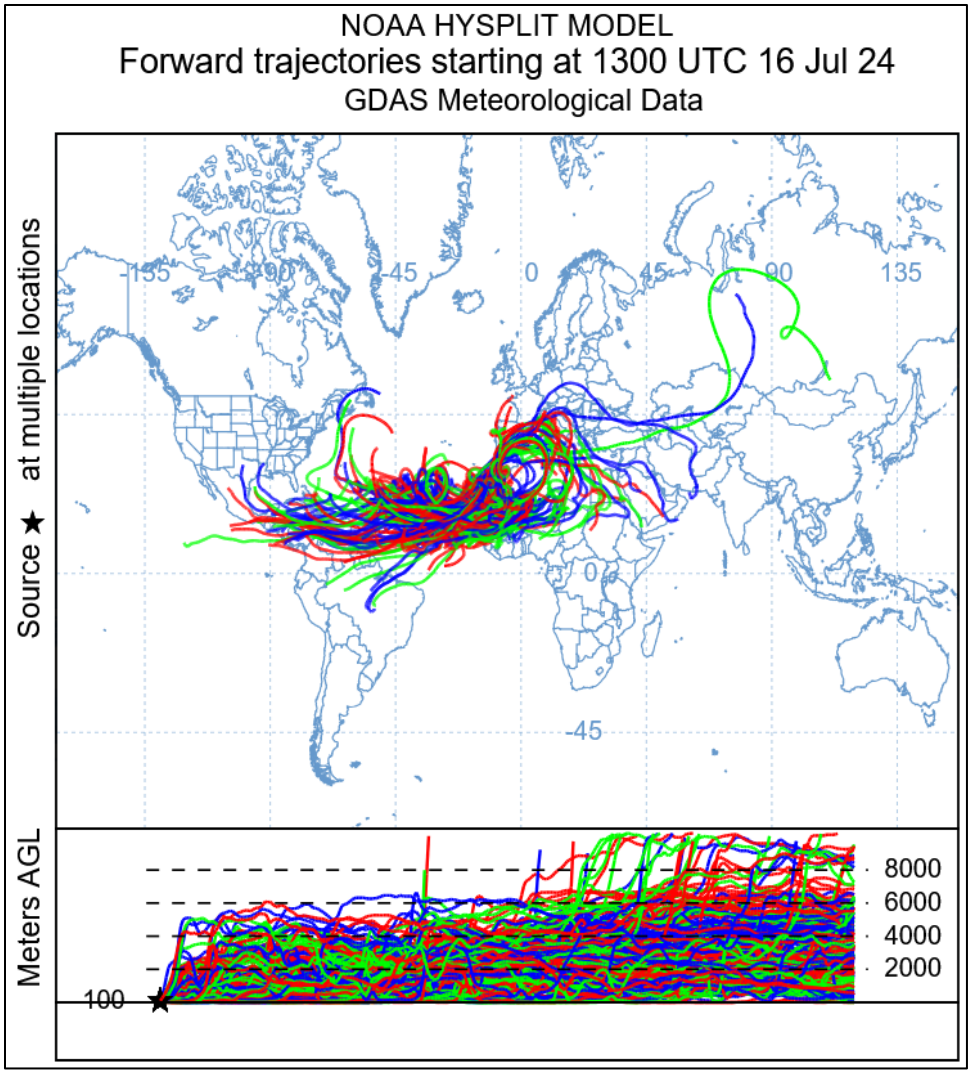

Figure 3-335: NOAA HYSPLIT 14-Day Forward Trajectories Originating from Saharan Desert, Starting on July 16, 2024

July 31, 2024, is identified as a Tier 1 day for the:

- Edinburg East Freddy Gonzalez Drive monitor (24-hour average concentration 33.8 µg/m^3; one-hour daily maximum 45.6 µg/m^3 recorded at 12:00 LST);
- Von Ormy Highway 16 monitor (24-hour average concentration 38.5 µg/m^3; one-hour daily maximum 58.0 µg/m^3 recorded at 16:00 LST);
- Dona Park monitor (24-hour average concentration 42.8 µg/m^3; one-hour daily maximum 50.1 µg/m^3 recorded at 11:00 LST);
- Haws Athletic Center monitor (24-hour average concentration 31.5 µg/m^3; one-hour daily maximum 41.3 µg/m^3 recorded at 18:00 LST); and
- World Trade Bridge monitor (24-hour average concentration 36.3 µg/m^3; one-hour daily maximum 43.7 µg/m^3 recorded at 18:00 LST).

Elevated $PM_{2.5}$ concentrations resulted from African dust. Hourly concentrations on July 312024, can be compared against typical/non-event days for the monitor in Figure 3-336: *Hourly $PM_{2.5}$ Concentrations on July 31, 2024*, Compared to Typical Concentrations at the Haws Athletic Center Monitor, Figure 3-337: *Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor*, Figure 3-338: *Hourly $PM_{2.5}$*

Concentrations on July 31, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor, Figure 3-339: *Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor*, and Figure 3-340: *Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Dona Park Monitor*, and Figure 3-340: *Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Dona Park Monitor.*

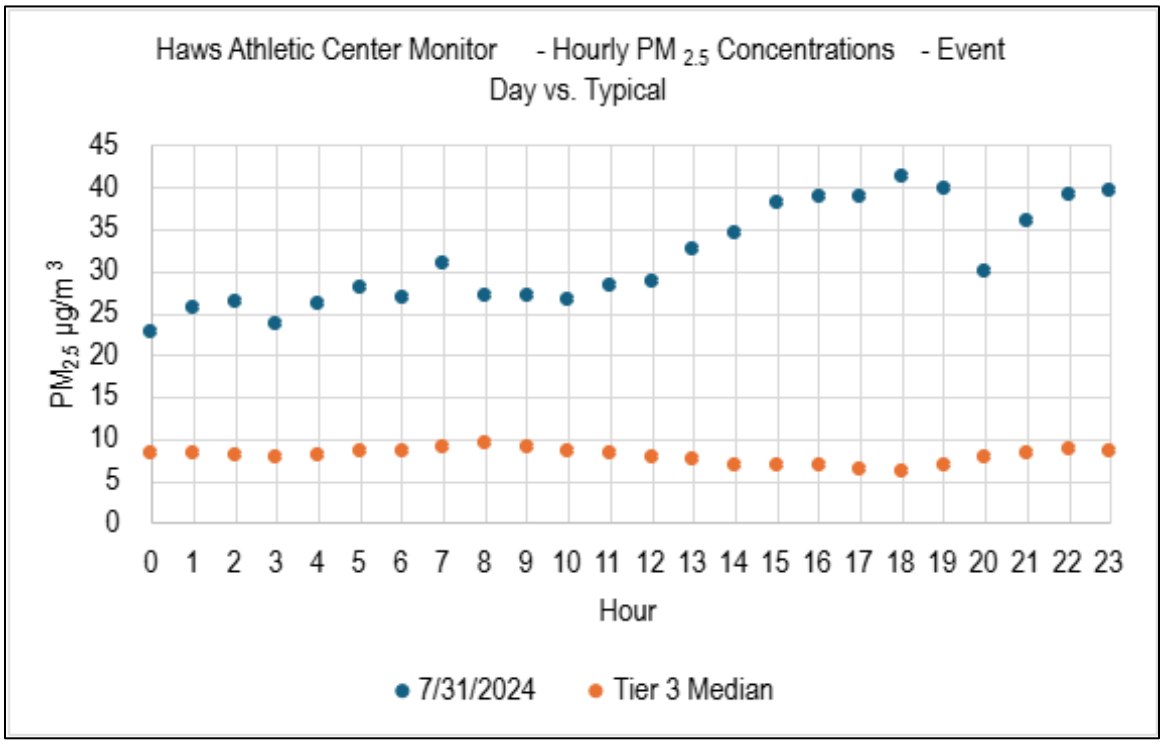

Figure 3-1: Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

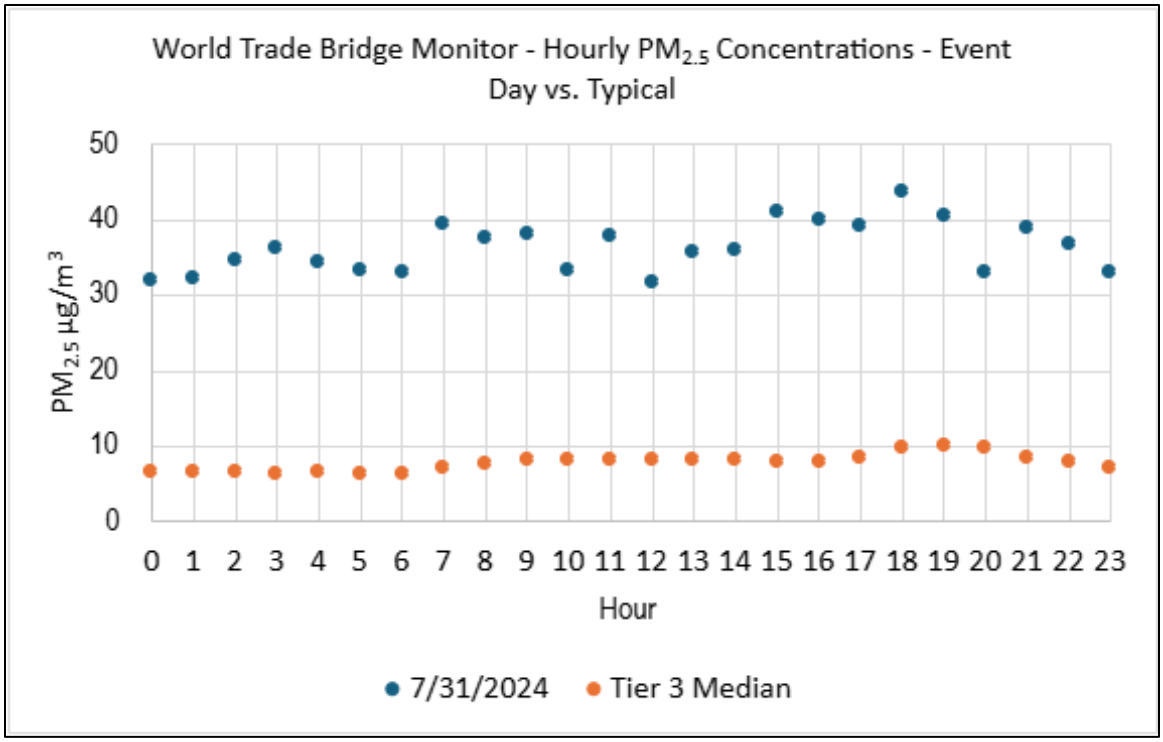

Figure 3-337: Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the World Trade Bridge Monitor

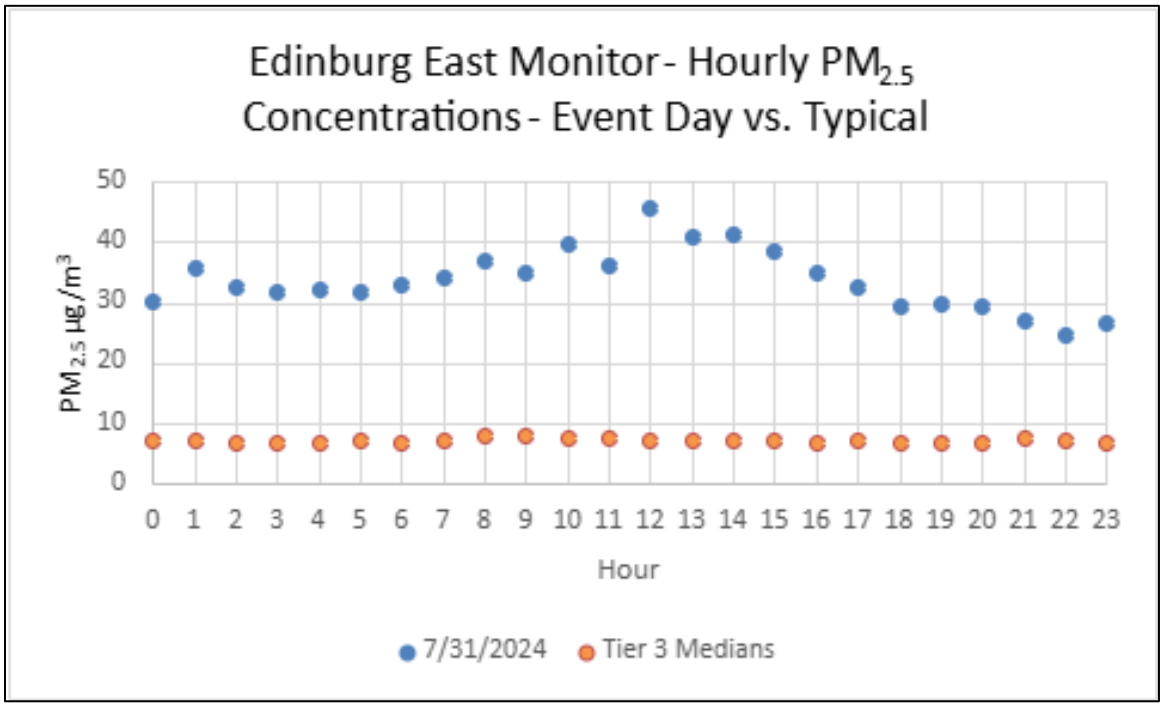

Figure 3-338: Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Edinburg East Freddy Gonzalez Drive Monitor

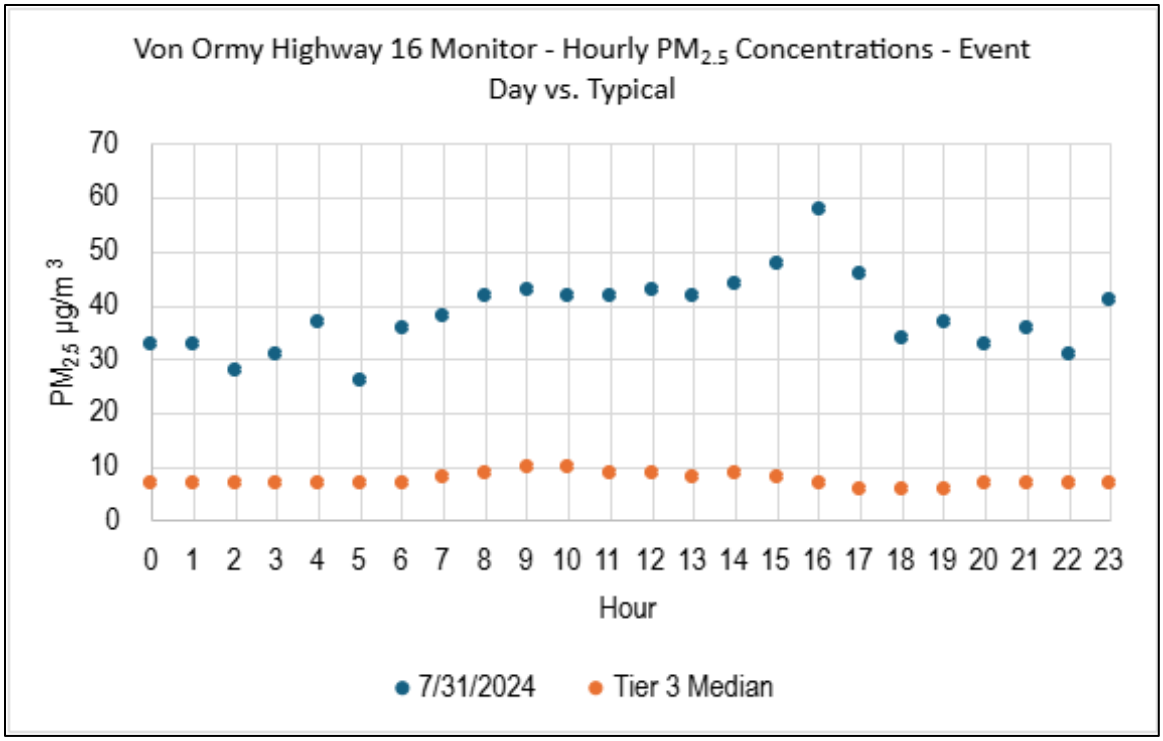

Figure 3-339: Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Von Ormy Highway 16 Monitor

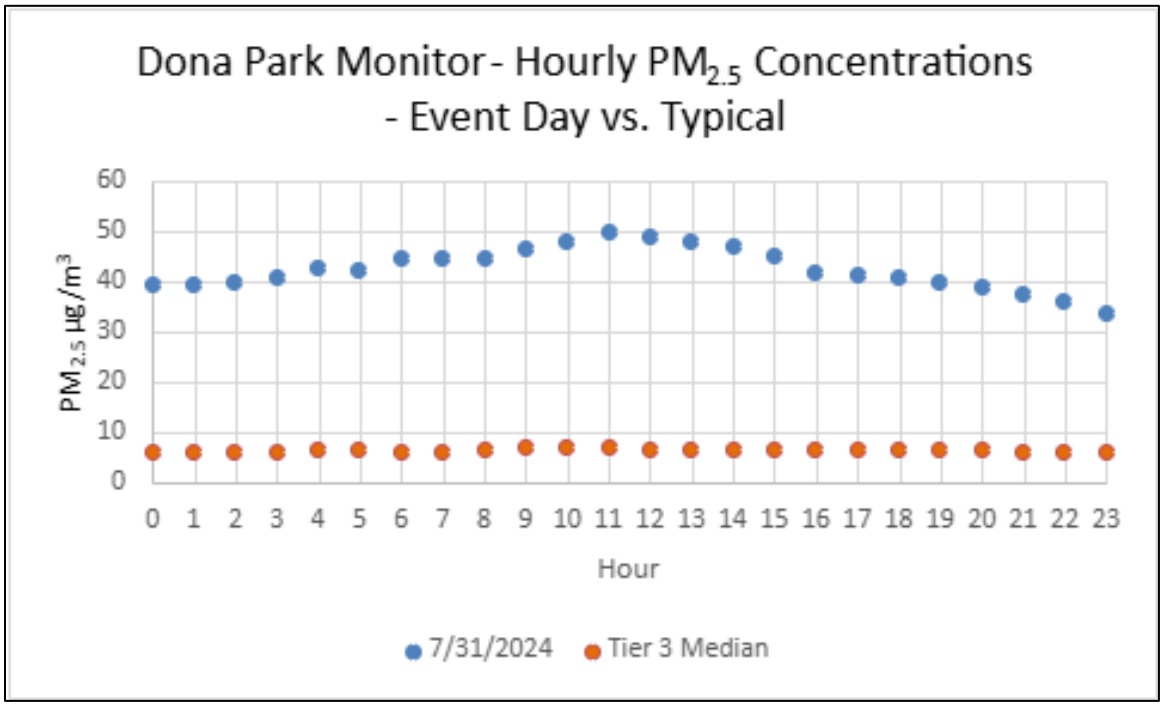

Figure 3-340: Hourly $PM_{2.5}$ Concentrations on July 31, 2024, Compared to Typical Concentrations at the Dona Park Monitor

NWS archives (Figure B-22 and Figure B-23) state that African dust was present in the region on the day of exceedance, leading to hazy skies. TCEQ forecasts (Table C-13) revealed $PM_{2.5}$ concentrations remained increased for many areas statewide due to moderate African dust

filtering throughout the state (excluding the panhandle and far west Texas) with the heaviest concentrations found in southeast Texas. Satellite imagery displays African dust being blown over the region and Gulf of America on the day of exceedance (Figure 3-341: *Satellite image from NASA Worldview on July 31, 2024, Showing Potential African Dust Along the Texas Coast and the Gulf of America*). The AOD image displays monitors reading AQI levels of Moderate to Unhealthy for Sensitive Groups over the state due to the dust storm (Figure 3-342: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on July 31, 2024*). HYSPLIT backward wind trajectories (Figure 3-343: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on July 31, 2024*, Figure 3-344: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on July 31, 2024*, Figure 3-345: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on July 31, 2024*, Figure 3-346: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on July 31, 2024*, and Figure 3-347: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on July 31, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value and HYSPLIT forward trajectories show that winds originating from Africa traveled across the Atlantic, through the Gulf of America, and into South and East Texas (Figure 3-335: *NOAA HYSPLIT 14-Day Forward Trajectories Originating from Saharan Desert, Starting on July 16, 2024*).

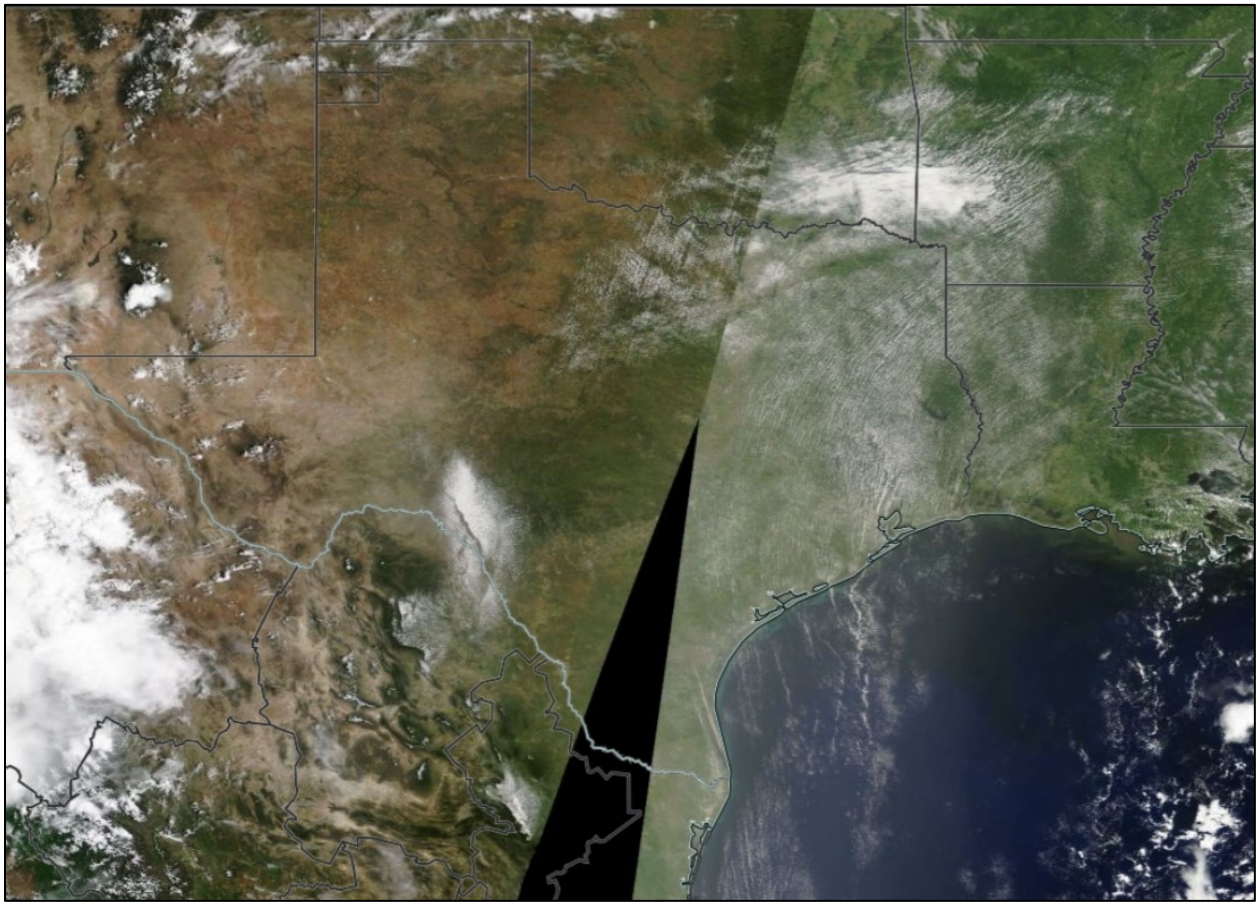

Figure 3-341: Satellite image from NASA Worldview on July 31, 2024, Showing Potential African Dust Along the Texas Coast and the Gulf of America

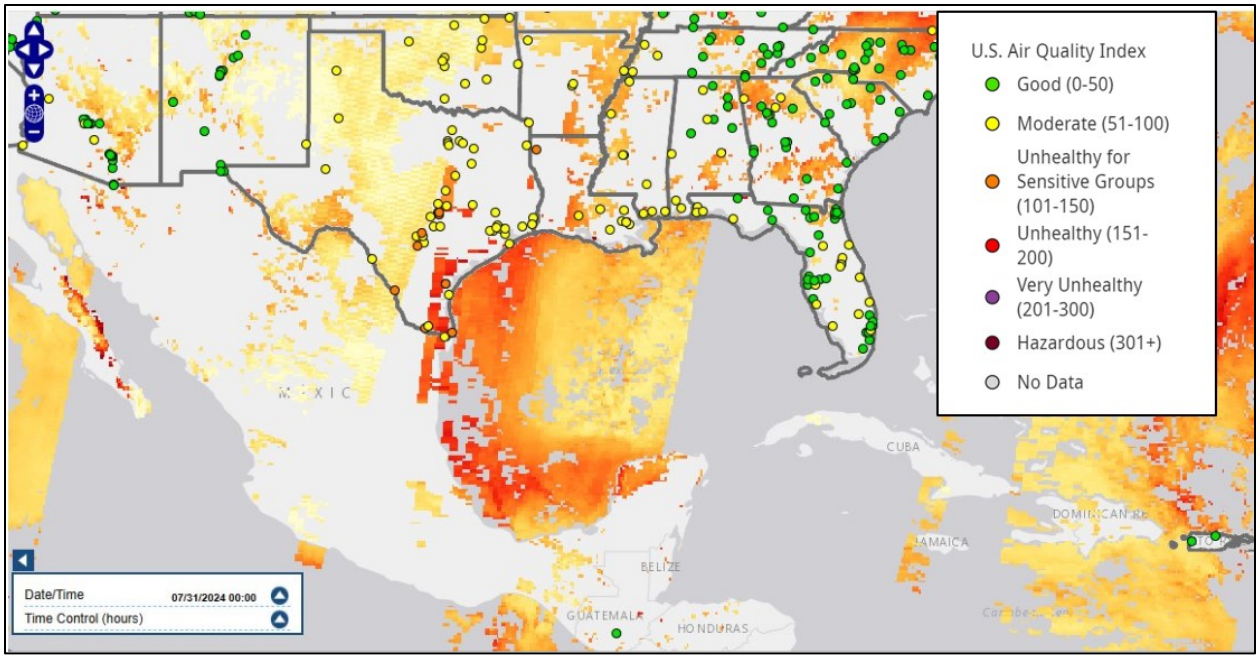

Figure 3-342: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on July 31, 2024

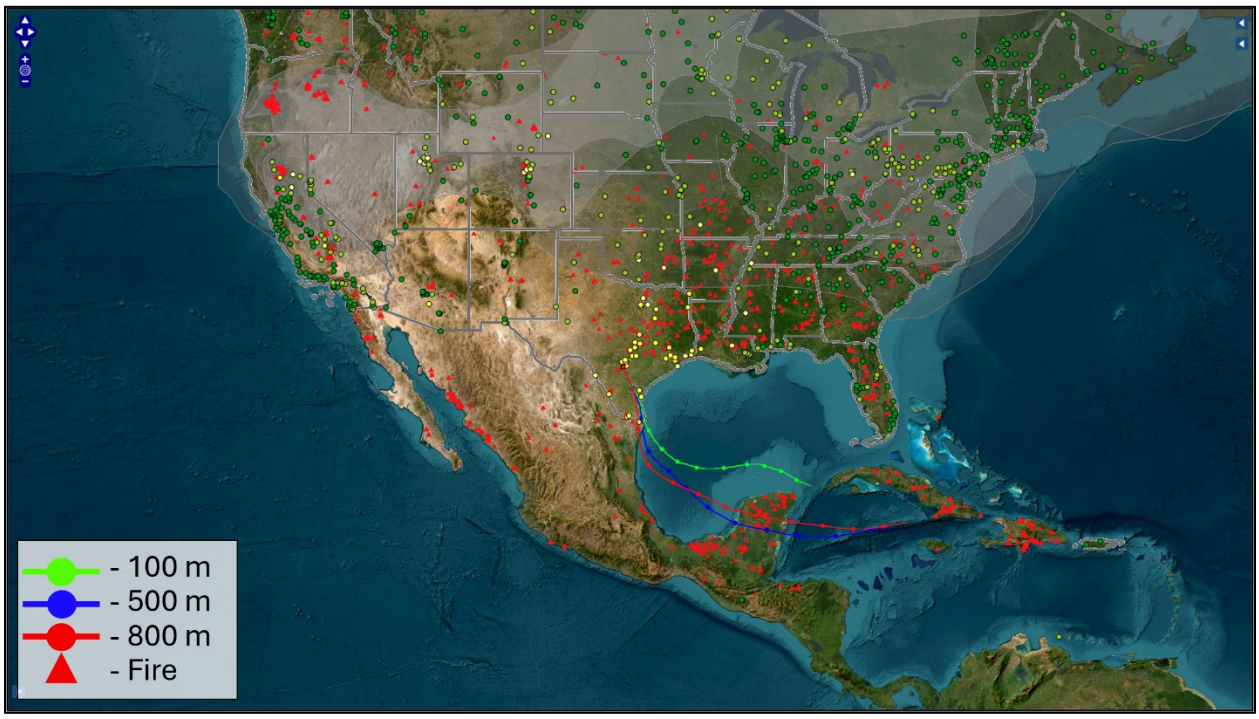

Figure 3-343: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Von Ormy Highway 16 Monitor on July 31, 2024

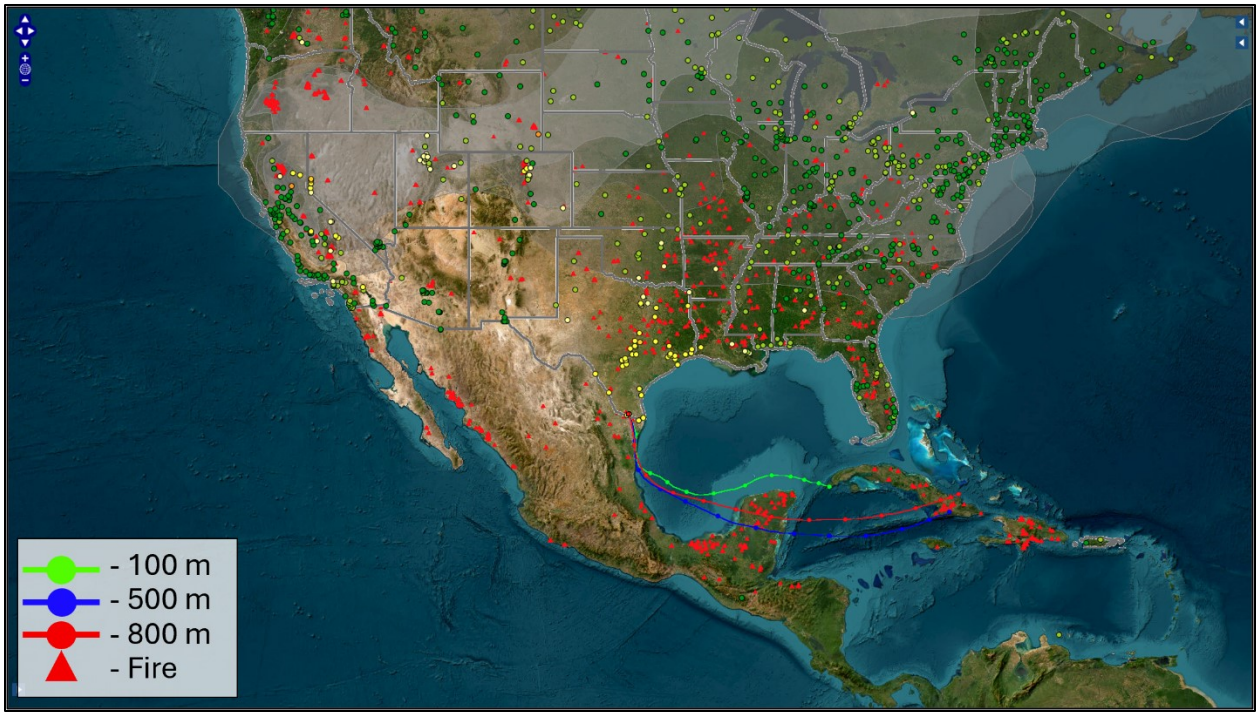

Figure 3-344: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Edinburg East Freddy Gonzalez Drive Monitor on July 31, 2024

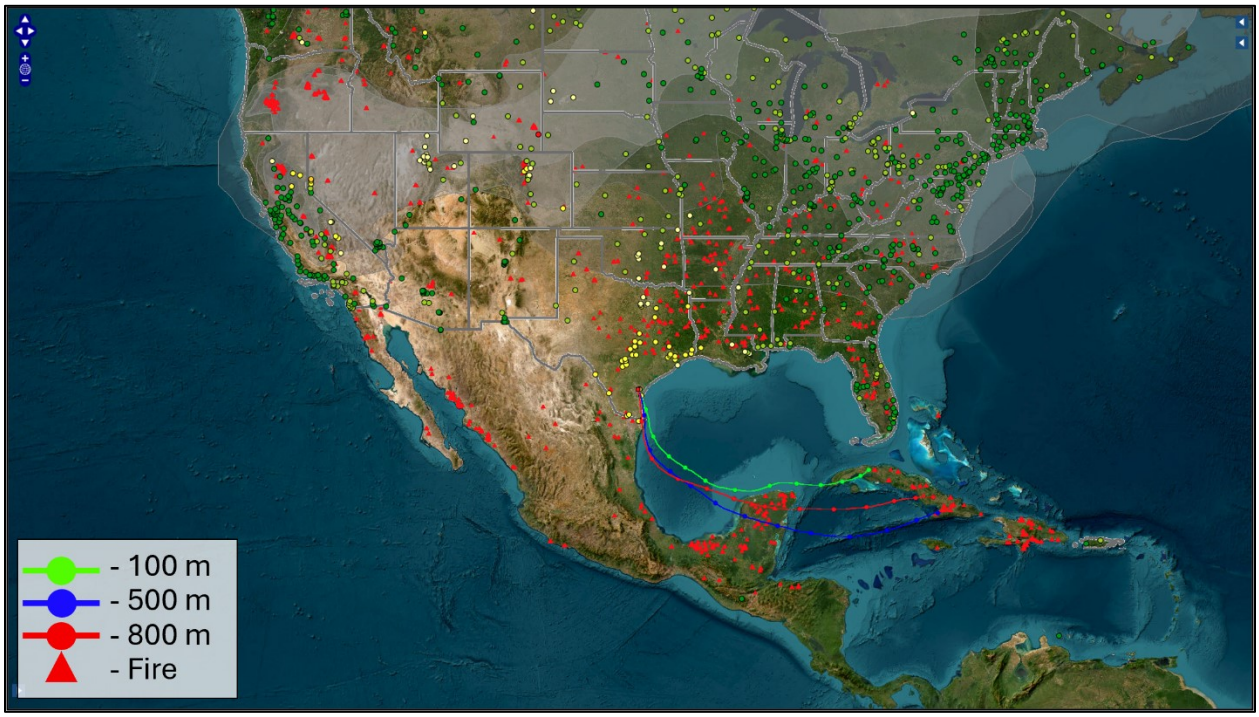

Figure 3-345: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Dona Park Monitor on July 31, 2024

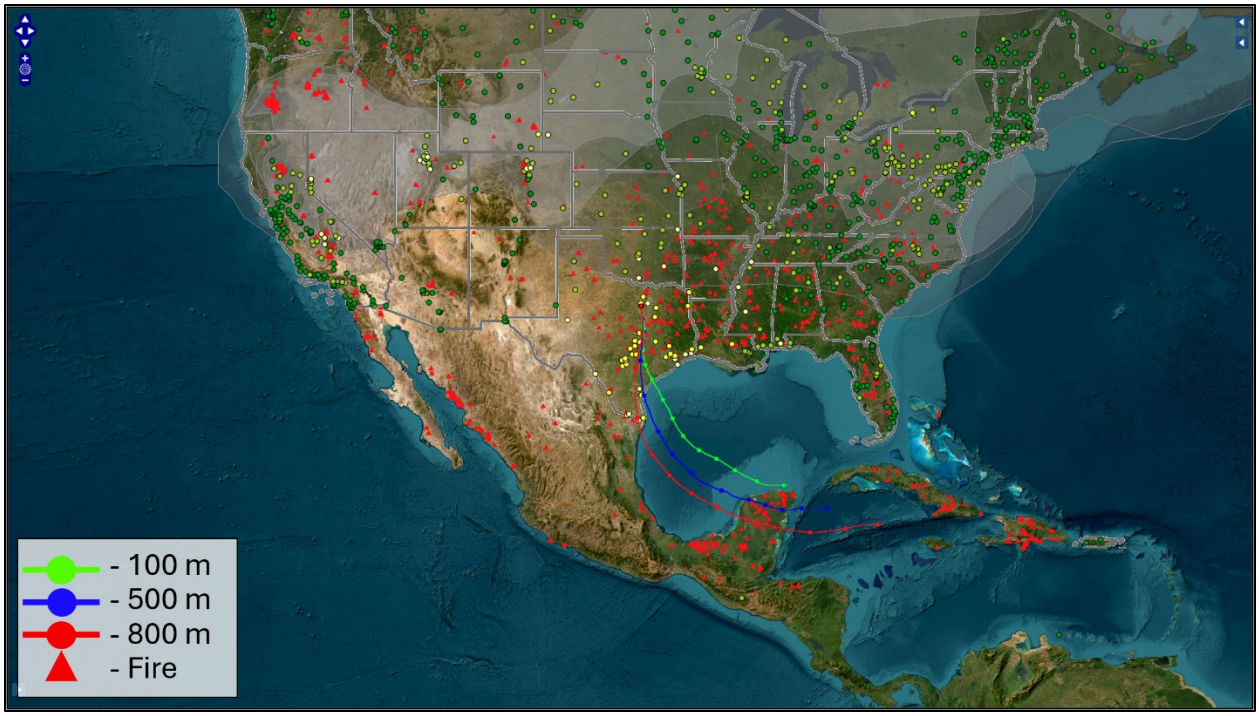

Figure 3-346: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Haws Athletic Center Monitor on July 31, 2024

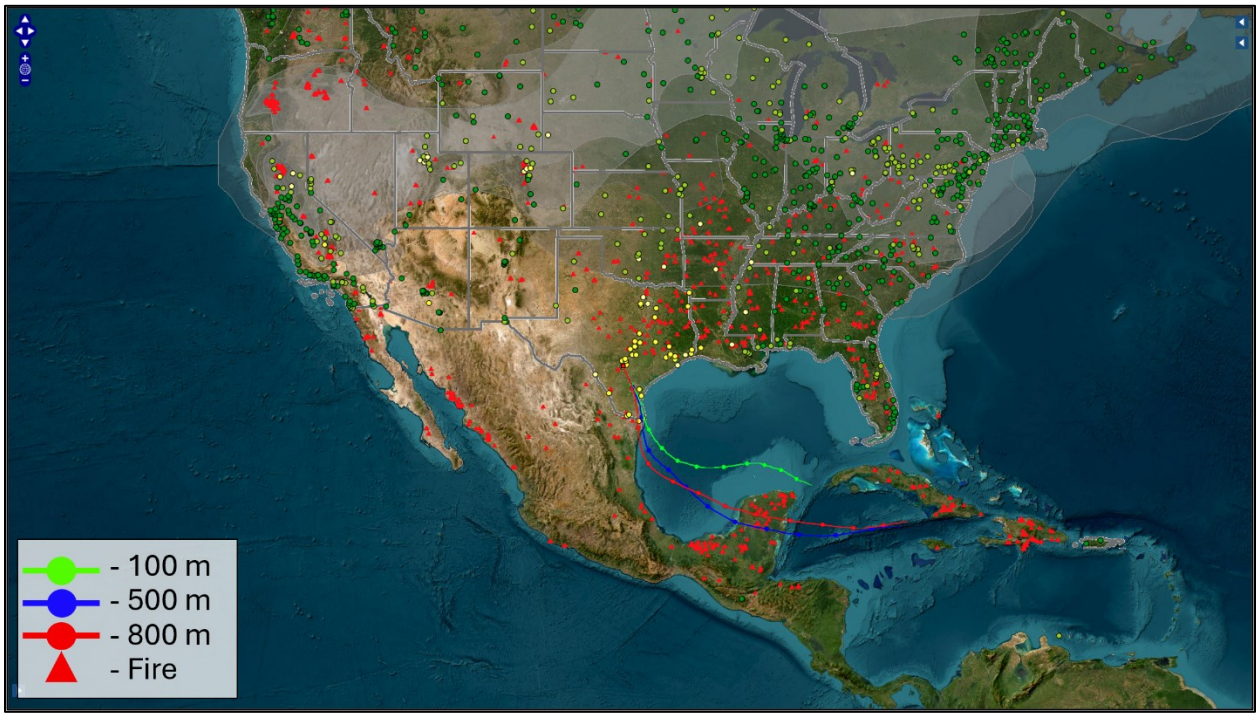

Figure 3-347: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the World Trade Bridge Monitor on July 31, 2024

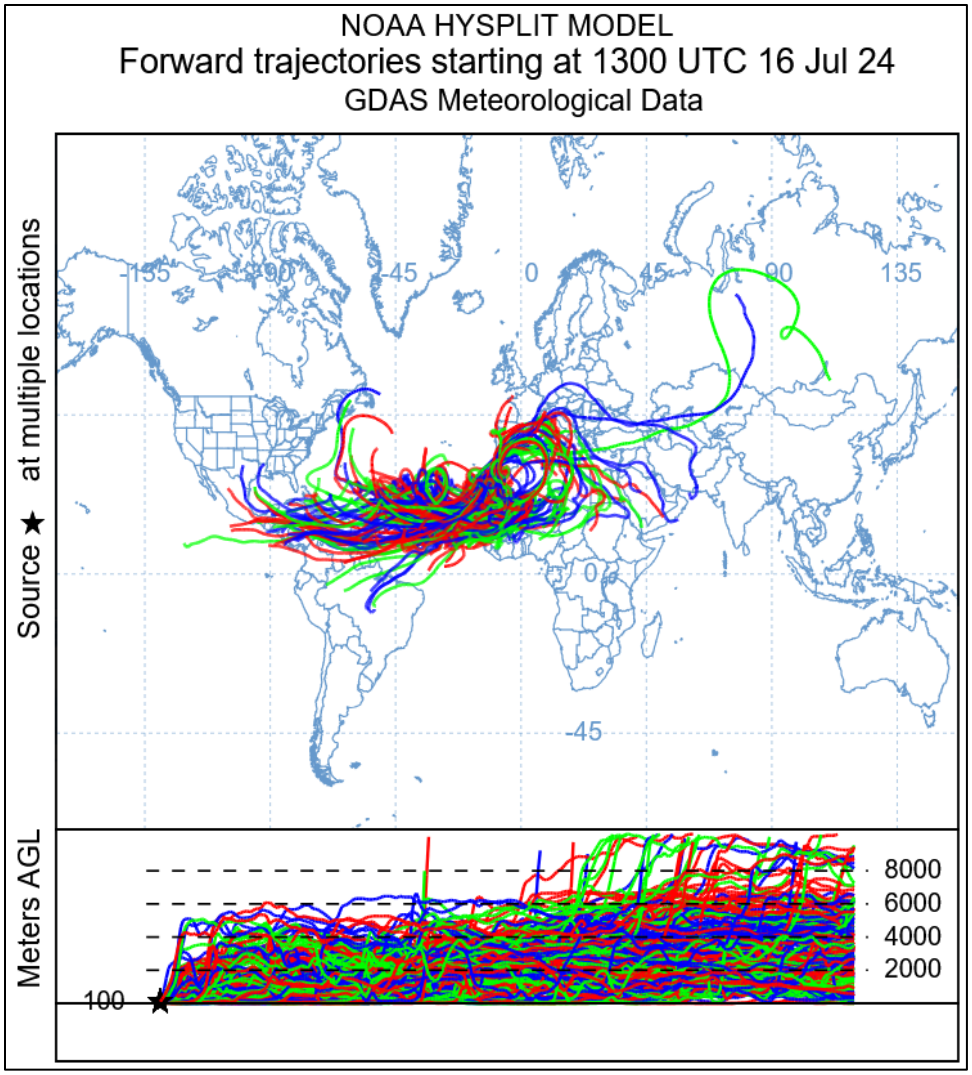

Figure 3-348: NOAA HYSPLIT 14-Day Forward Trajectories Originating from Saharan Desert, Starting on July 16, 2024

August 1, 2024, is identified as a Tier 1 day at both the Fort Worth Northwest monitor (24-hour average concentration 32.6 µg/m^3; one-hour daily maximum 38 µg/m^3 recorded at 0:00 LST) and the Haws Athletic Center monitor (24-hour average concentration 33.2 µg/m^3; one-hour daily maximum 38.9 µg/m^3 recorded at 0:00 LST) Elevated $PM_{2.5}$ concentrations resulted from African dust. Hourly concentrations on August 1, 2024, can be compared against typical/non-event days for the monitors in Figure 3-349: *Hourly $PM_{2.5}$ Concentrations on August 1, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor* and Figure 3-350: *Hourly $PM_{2.5}$ Concentrations on August 1, 2024, Compared to Typical Concentrations at the Fort Worth Northwest Monitor.*

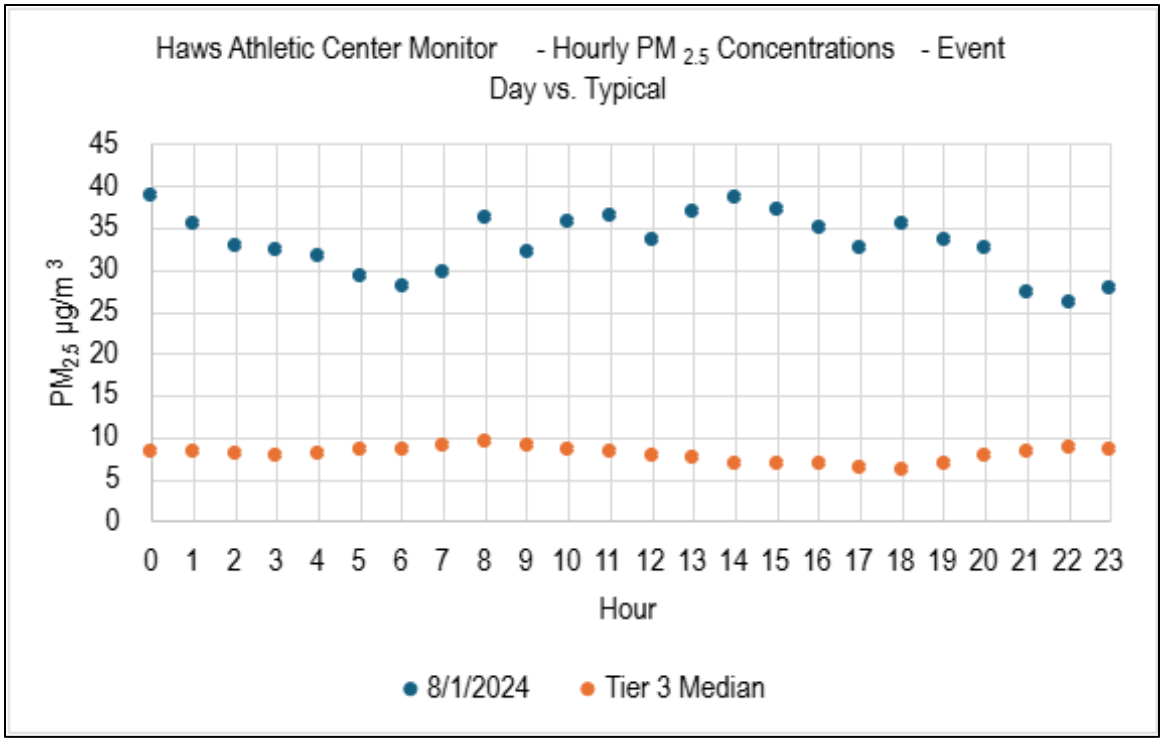

Figure 3-349: Hourly $PM_{2.5}$ Concentrations on August 1, 2024, Compared to Typical Concentrations at the Haws Athletic Center Monitor

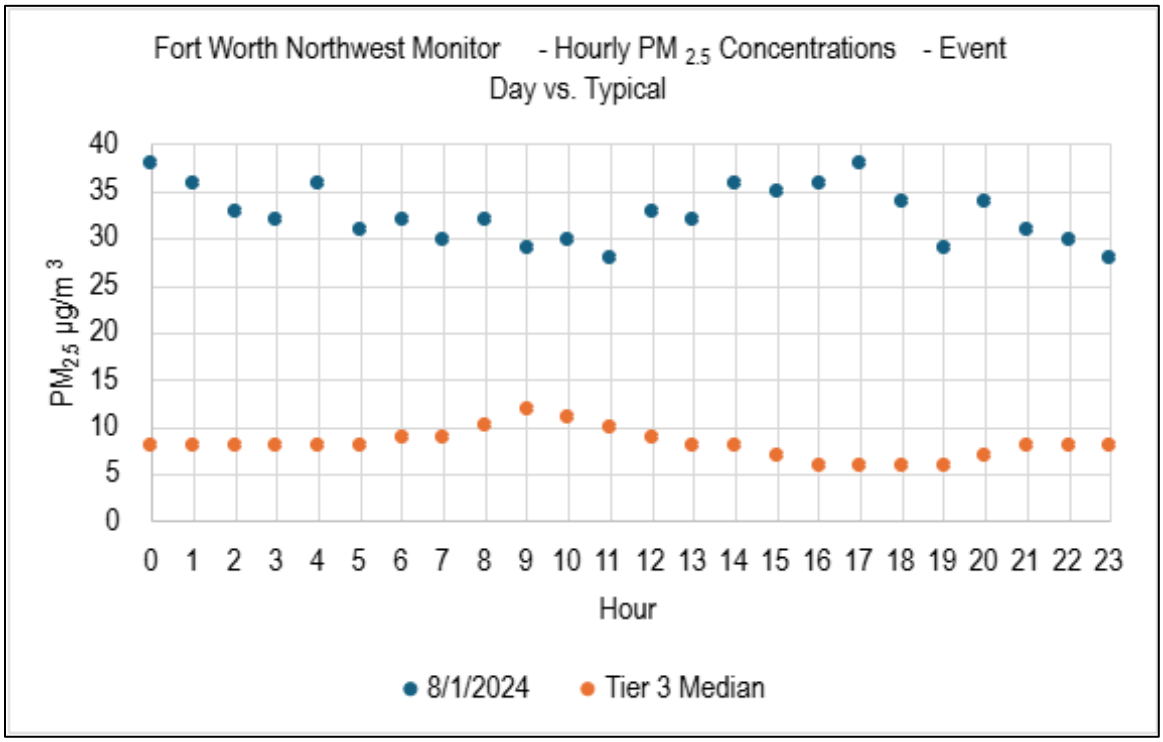

Figure 3-350: Hourly $PM_{2.5}$ Concentrations on August 1, 2024, Compared to Typical Concentrations at the Fort Worth Northwest Monitor

NWS archives (Figure B-24) states that African dust was present in the region on the day of exceedance, leading to hazy skies. TCEQ forecasts (Table C-13) revealed $PM_{2.5}$ concentrations

remained increased for many areas statewide due to moderate African dust filtering throughout the state (excluding the panhandle and far west Texas) with the heaviest concentrations found in southeast Texas. Satellite imagery displays African dust being blown over the region and Gulf of America on the day of exceedance (Figure 3-351: *Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from August 1, 2024, Showing Potential African Dust Along the Texas Coast and the Gulf of America*). The AOD image displays monitors reading AQI levels of Good, Moderate, and Unhealthy for Sensitive Groups over the state due to the dust storm (Figure 3-352: *AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on August 1, 2024*). HYSPLIT backward wind trajectories (Figure 3-353: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Fort Worth Northwest and Haws Athletic Center Monitors on August 1, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value and HYSPLIT forward trajectories show that winds originating from Africa traveled across the Atlantic, through the Gulf of America, and into South and East Texas (Figure 3-354: *NOAA HYSPLIT 14-Day Forward Trajectories Originating from Saharan Desert, Starting on July 18, 2024*).

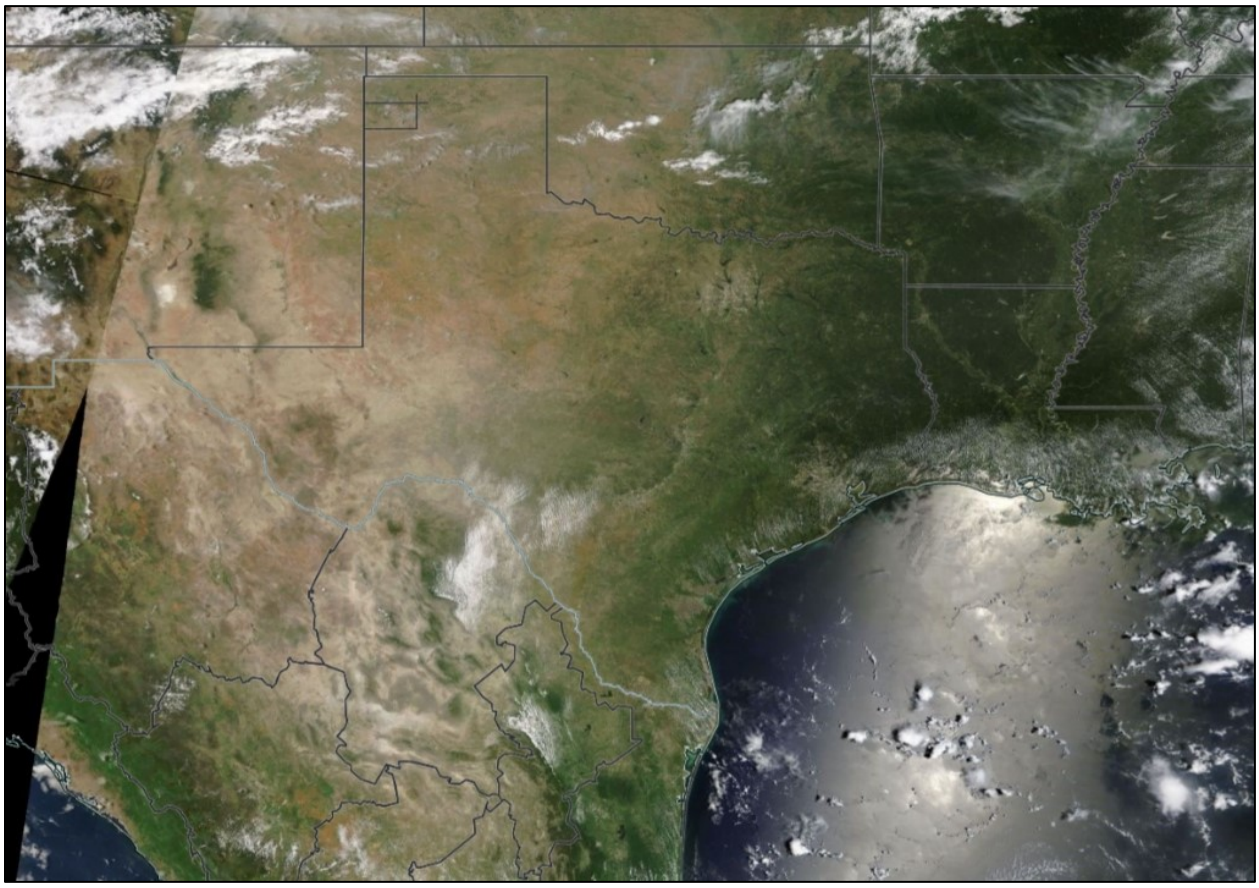

Figure 3-351: Aqua/MODIS Corrected Reflectance (True Color) Satellite Imagery from August 1, 2024, Showing Potential African Dust Along the Texas Coast and the Gulf of America

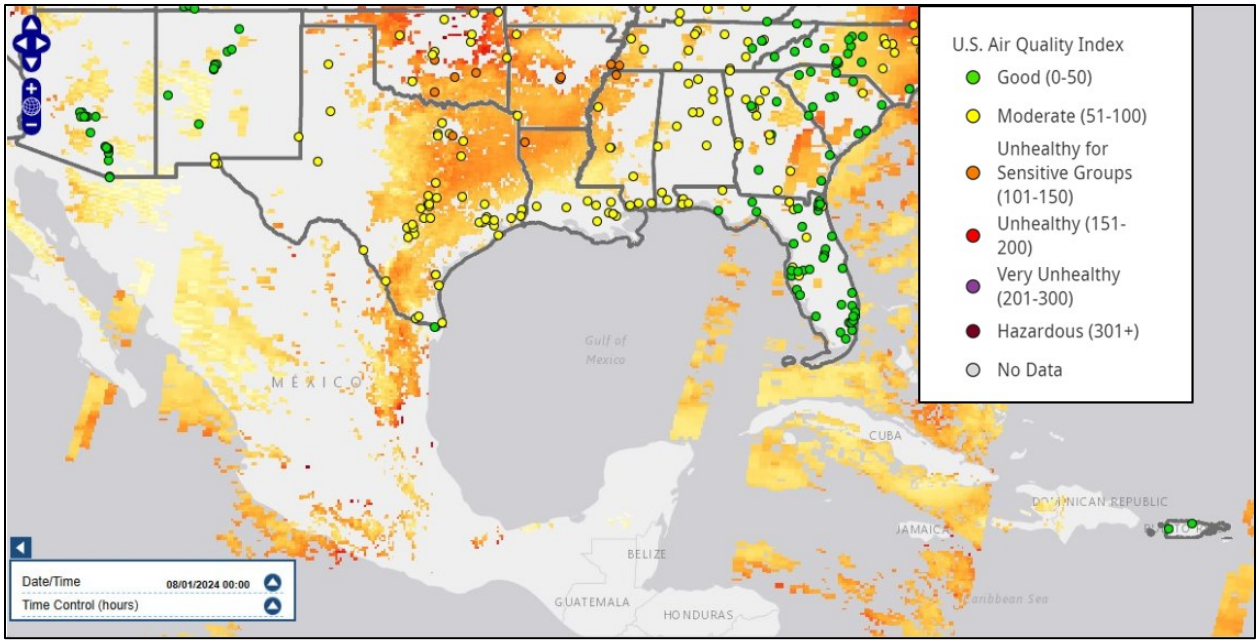

Figure 3-352: AirNow Tech Aerosol Optical Depth (AOD) Map, with MODIS Terra and Aqua Satellite Layers on August 1, 2024

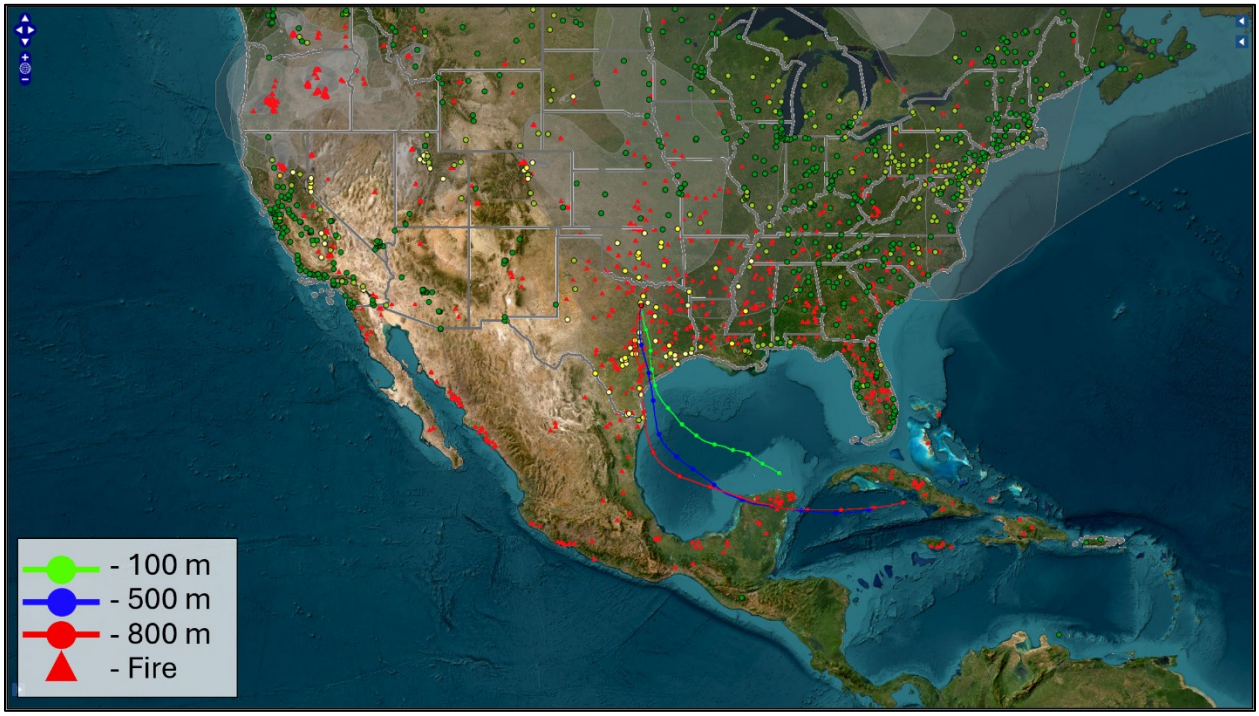

Figure 3-353: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Fort Worth Northwest and Haws Athletic Center Monitors on August 1, 2024

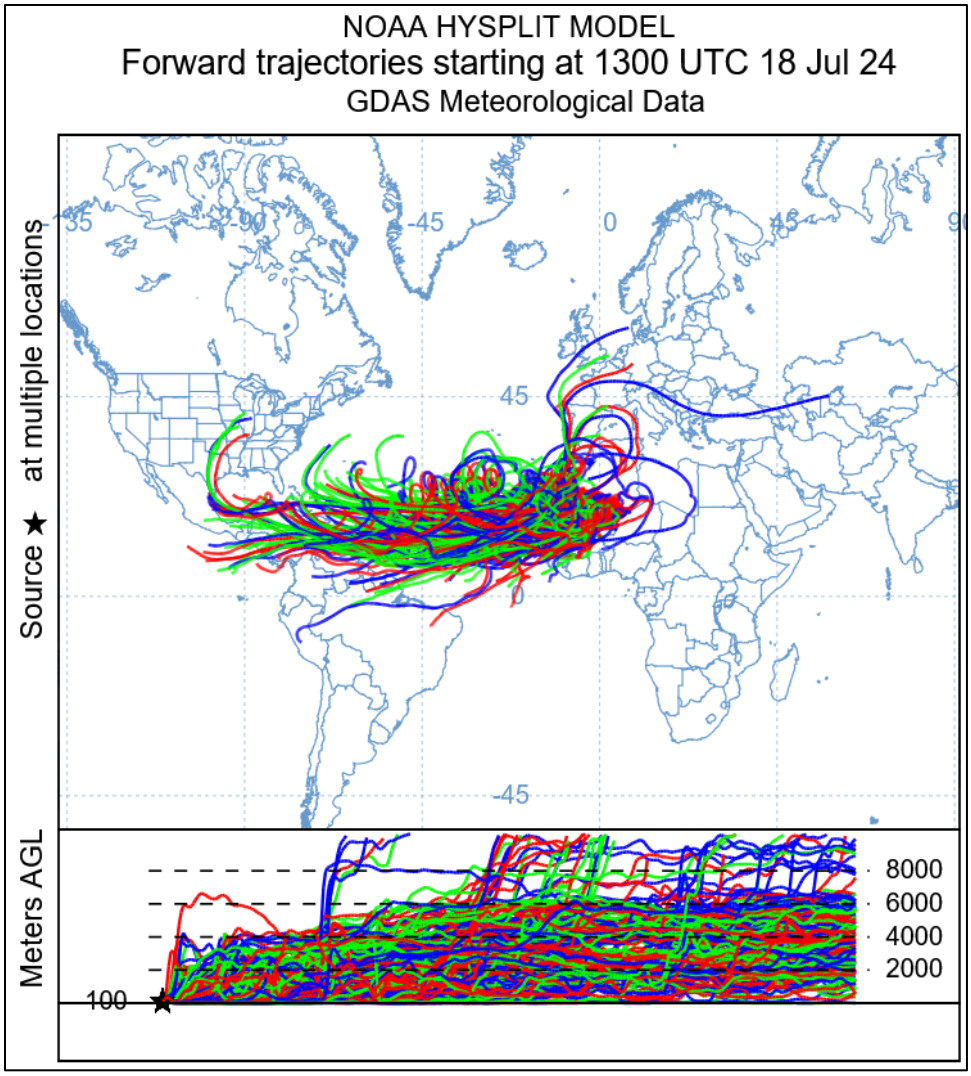

Figure 3-354: NOAA HYSPLIT 14-Day Forward Trajectories Originating from Saharan Desert, Starting on July 18, 2024

3.2.14 Group 14 – Evidence for the October 3, 2024, U.S. Wildfire $PM_{2.5}$ Event for the Fort Worth Northwest Monitor

October 3, 2024, is identified as a Tier 1 day at the Fort Worth Northwest monitor (24-hour average concentration 34.8 µg/m^3; one-hour daily maximum 478 µg/m^3 recorded at 14:00 LST). Elevated $PM_{2.5}$ concentrations resulted from smoke associated with wildfires in the U.S. Hourly concentrations on October 3, 2024, can be compared against typical/non-event days for the monitor in Figure 3-355: *Hourly $PM_{2.5}$ Concentrations on October 3, 2024, Compared to Typical Concentrations at the Fort Worth Northwest Monitor*.

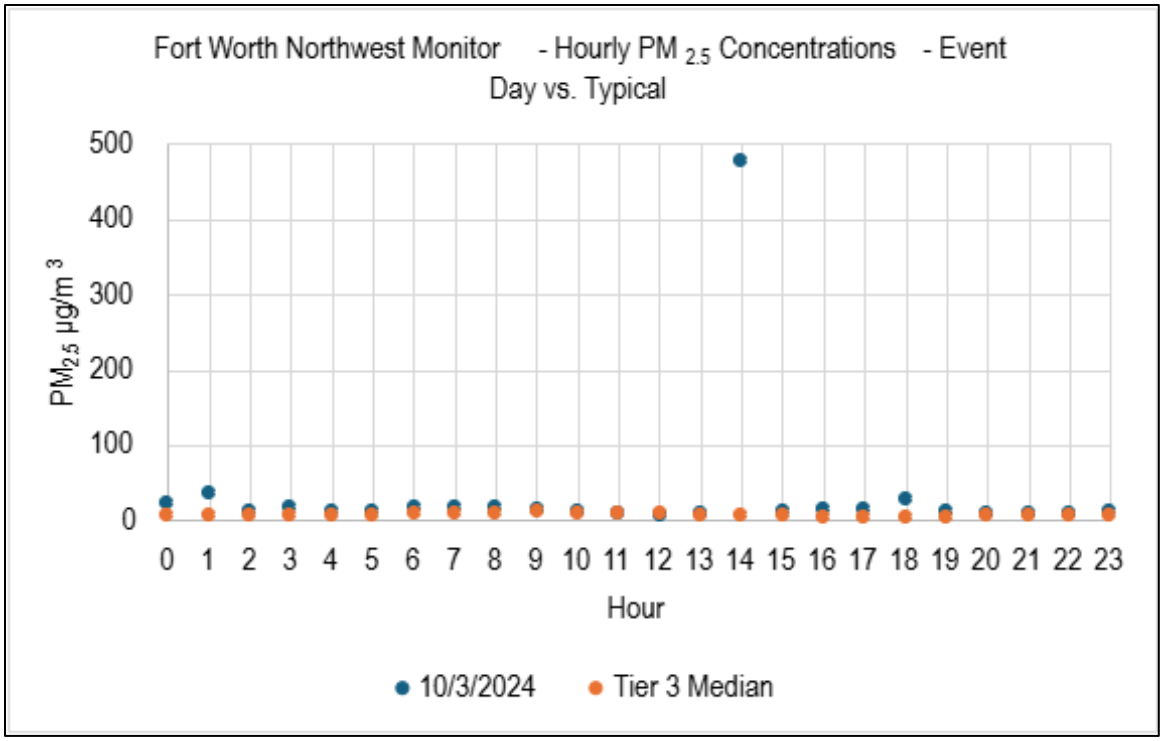

Figure 3-355: Hourly $PM_{2.5}$ Concentrations on October 3, 2024, Compared to Typical Concentrations at the Fort Worth Northwest Monitor

TCEQ forecasts (Table C-14) revealed that light daytime smoke from burning activities across portions of Idaho, Oregon, Wyoming, and Utah lingered in most of the state on the day of exceedance. They also reveal that smoke from burning activities across East Texas, Southeast Texas, the Lower Mississippi River Valley, and other portions of the southeastern U.S. continued to filter throughout the state, increasing fine particulate matter levels in eastern, northeastern, and central Texas on the day of exceedance. Slightly elevated urban fine particulate levels associated with light daytime winds may contribute enough towards increasing fine particulate matter levels. Smoke plumes (Figure A-99 and Figure 3-356: *AirNow HMS Smoke Plume for October 3, 2024*) and HYSPLIT backward wind trajectories (Figure 3-357: *AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Fort Worth Northwest Monitor on October 3, 2024*) taken from the time of the maximum recorded daily one-hour $PM_{2.5}$ concentration value indicate light to moderate smoke was transported into Texas from Southeastern U.S. wildfires. On that same day, monitors in south Texas had Moderate AQI levels. HYSPLIT forward trajectories show that winds originating from central Mexico traveled through South and East Texas (Figure 3-358: *NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in U.S. with fires, starting on October 2, 2024*).

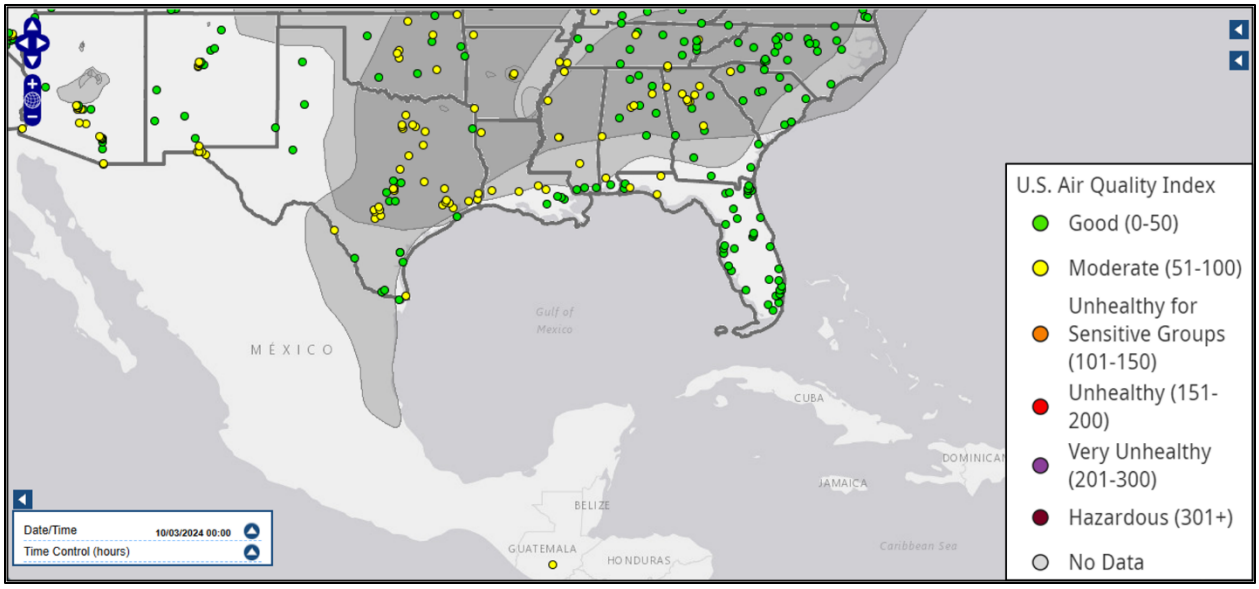

Figure 3-356: AirNow HMS Smoke Plume for October 3, 2024

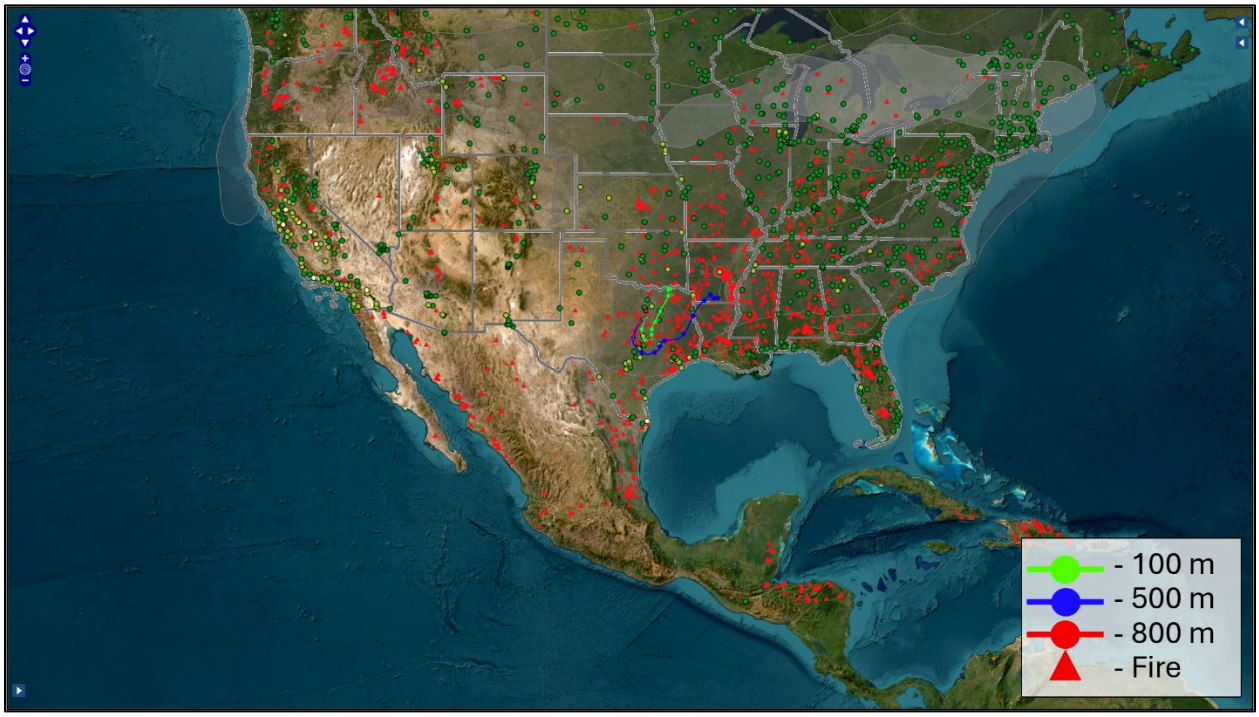

Figure 3-357: AirNow Tech HYSPLIT 72-Hour Backward Trajectories Originating from the Fort Worth Northwest Monitor on October 3, 2024

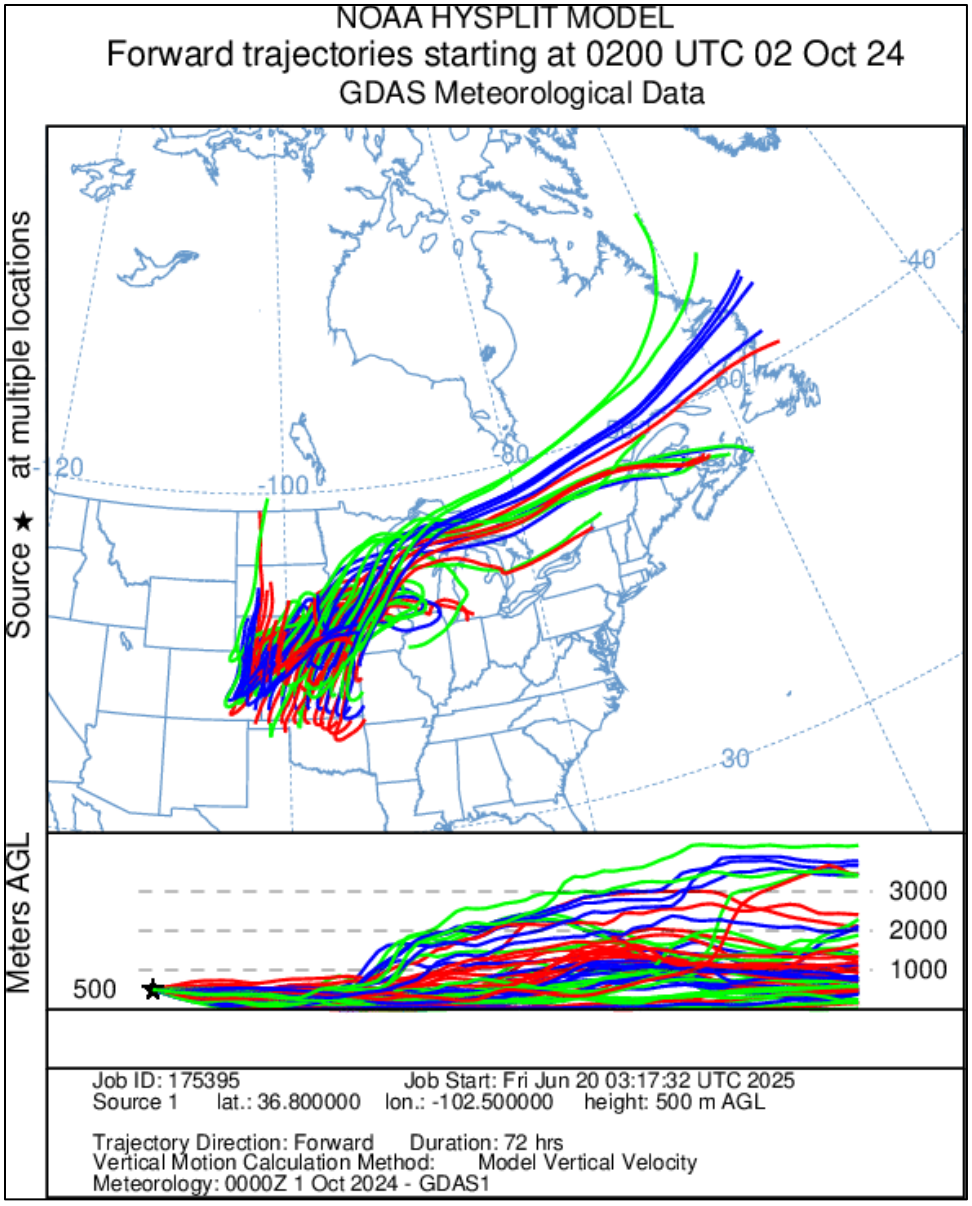

Figure 3-358: NOAA HYSPLIT 72-Hour Forward Trajectories Originating from Areas in U.S. with fires, starting on October 2, 2024

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 roses for each monitoring area are from the EPA $PM_{2.5}$ Designations Mapping Tool.[11] The wind roses show 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 Atascosa County

The Von Ormy Highway 16 monitor is located in Atascosa County, in the city of Von Ormy, Texas. The major point sources of $PM_{2.5}$ (as defined in 40 CFR §§51.165 and 51.166) are located in south Atascosa County, while other major point sources can be seen north of Atascosa County, in southern Bexar County (Figure 4-1: *Point Sources in and around Atascosa County, from 2023*); however, a majority of the $PM_{2.5}$ emissions within Atascosa County are non-point, as shown in Table 4-1: *Emissions Inventory in Atascosa 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

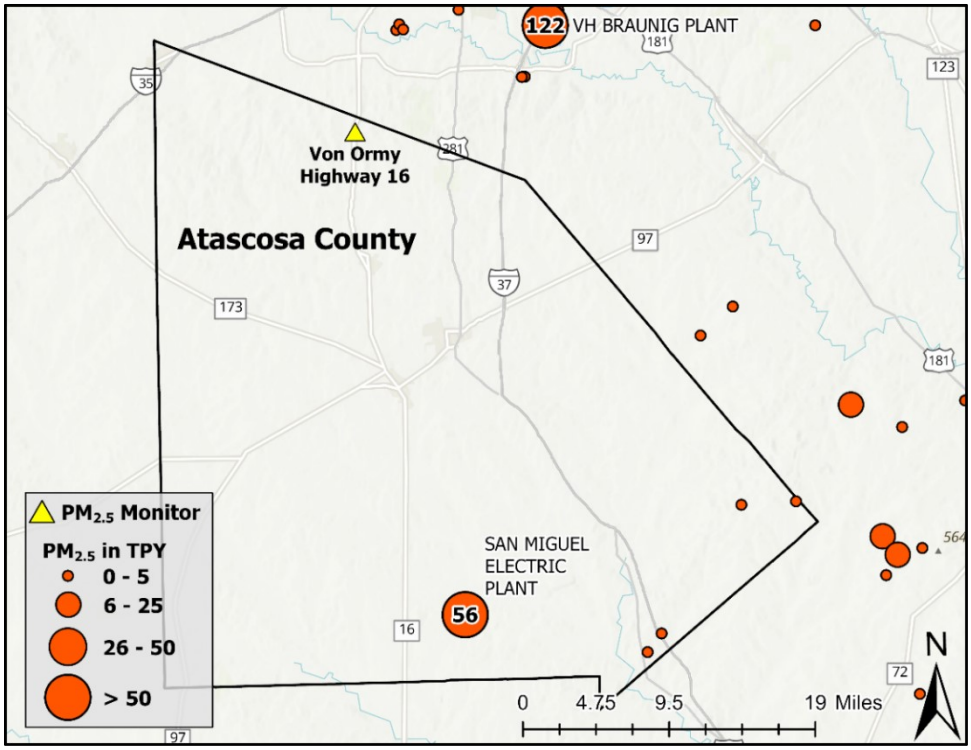

Figure 4-1: Point Sources in and around Atascosa County, from 2023

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

Emissions Categories	Emissions (tons per year)
On-road	23.10
Nonroad	8.22
Nonpoint	1,212.63
Point	88.05
Total	1,332.10

Figure 4-2: *Wind Roses around Atascosa County* shows that in monitors located in Bexar County, directly north of Atascosa County, a higher percentage of winds are coming from the south/southeast direction. Figure 4-3: *Hourly Average Continuous $PM_{2.5}$ Concentrations at Von Ormy Highway 16 by Peak Area Hourly Wind Speed in Atascosa County for 2022, 2023, and 2024* displays hourly wind speeds at the Von Ormy Highway 16 monitor plotted against $PM_{2.5}$ concentrations at the same monitor. The pattern in Figure 4-3 shows that the highest $PM_{2.5}$ concentrations were recorded when hourly wind speeds were relatively low. This pattern is believed to be due to the fact that $PM_{2.5}$ 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.

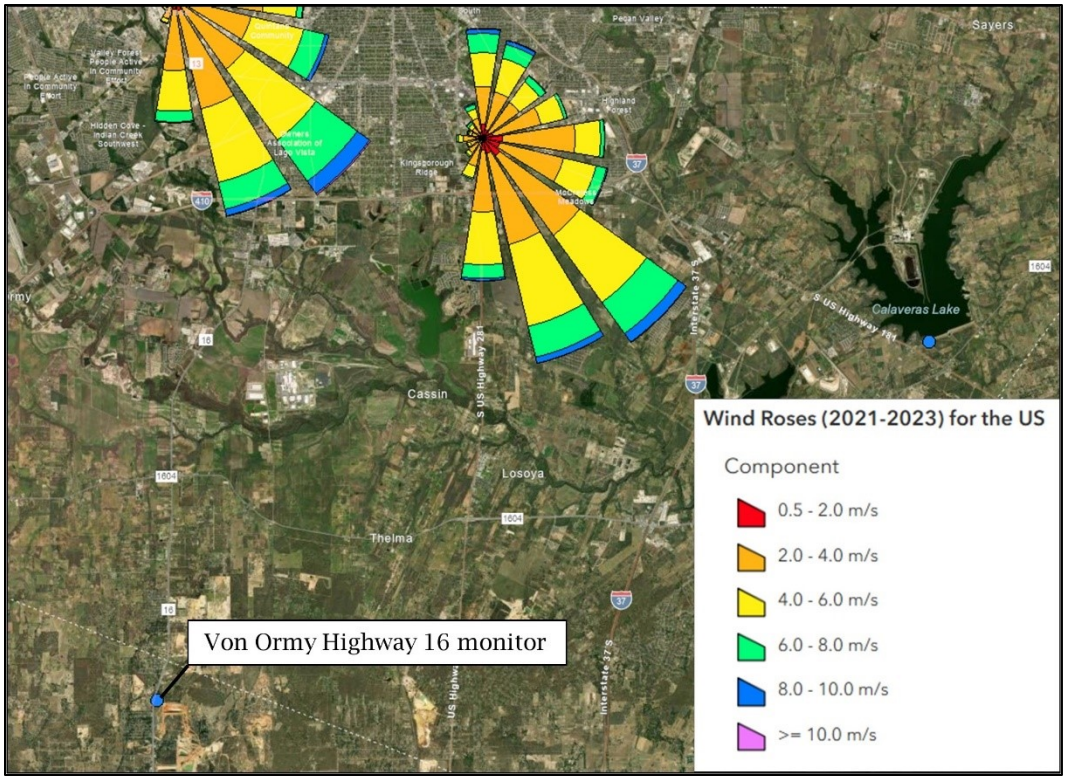

Figure 4-2: Wind Roses around Atascosa County, from 2021-2023

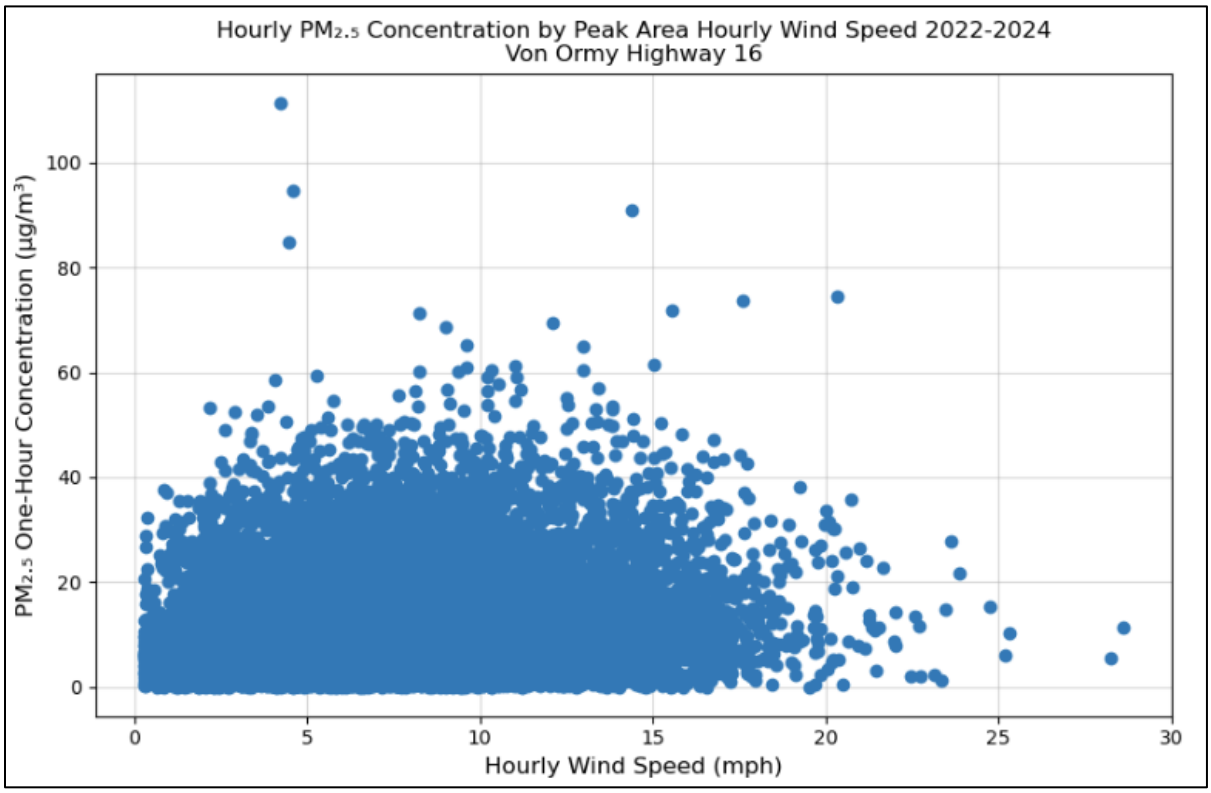

Figure 4-3: Hourly Average Continuous $PM_{2.5}$ Concentrations at Von Ormy Highway 16 by Peak Area Hourly Wind Speed in Atascosa County for 2022, 2023, and 2024

4.2.2 Hidalgo County

The Edinburg East Freddy Gonzalez Drive monitor is located in Edinburg, Texas within Hidalgo County. The highest sources of $PM_{2.5}$ emissions within Hidalgo County (less than 50 tons per year) are approximately in the south-central and southern portions of Hidalgo County (Figure 4-4: *Point Sources in and around Hidalgo County, from 2023*); however, a majority of the $PM_{2.5}$ emissions are non-point, as shown in Table 4-2: *Emissions Inventory in Hidalgo County, from 2020*.

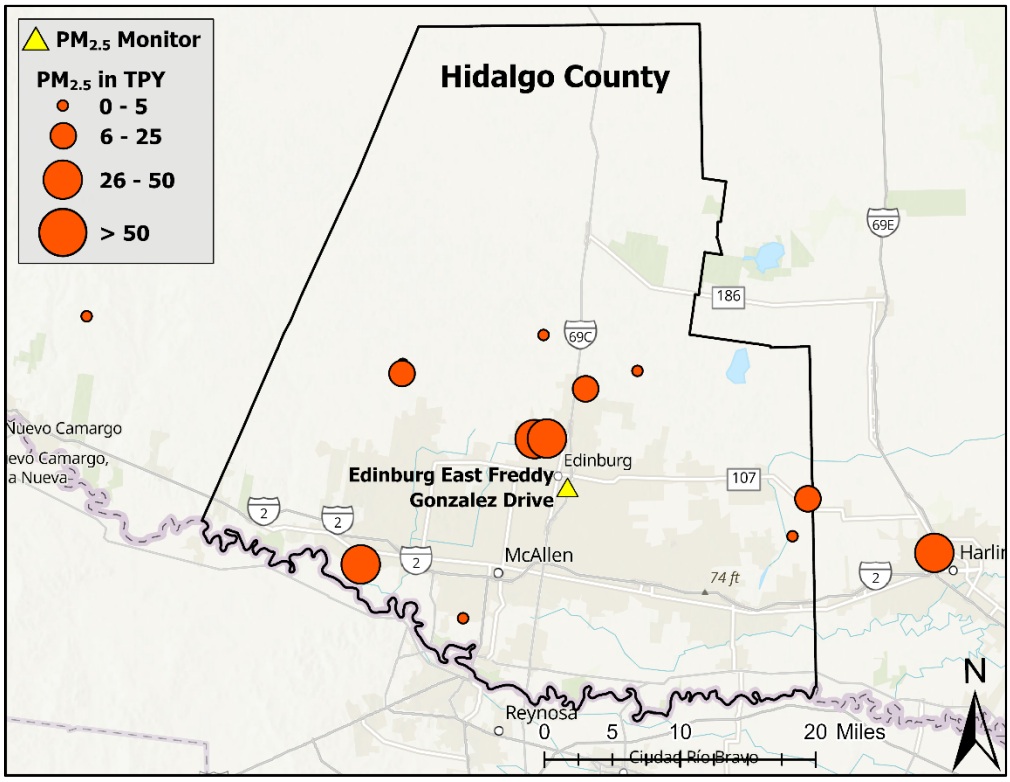

Figure 4-4: Point Sources in and around Hidalgo County, from 2023

Table 4-2: Emissions Inventory in Hidalgo County, from 2020

Emissions Categories	Emissions (tons per year)
On-road	125.52
Nonroad	84.51
Nonpoint	5,019.03
Point	235.45
Total	5,464.51

Figure 4-5: *Wind Roses in Hidalgo County, from 2021-2023* shows that at Edinburg East Freddy Gonzalez Drive and other Hidalgo County monitors, a higher percentage of winds are coming from the south and east directions. Figure 4-6: *Hourly Average Continuous $PM_{2.5}$ Concentrations at Edinburg East Freddy Gonzalez Drive by Peak Area Hourly Wind Speed in Hidalgo County for 2022, 2023, and 2024* displays peak area hourly wind speeds at Hidalgo County monitors plotted against $PM_{2.5}$ concentrations at the Edinburg East Freddy Gonzalez Drive monitor. The

pattern in Figure 4-6 shows that the highest $PM_{2.5}$ concentrations were recorded when hourly wind speeds were relatively low, or between five and 15 miles per hour.

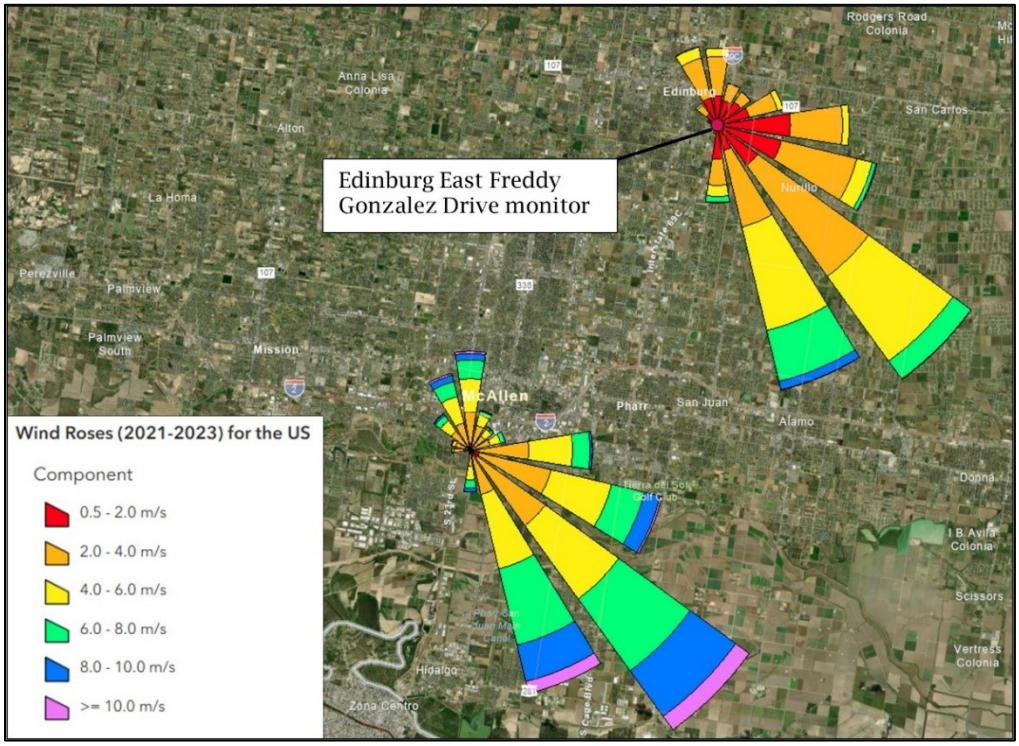

Figure 4-5: Wind Roses in Hidalgo County, from 2021-2023

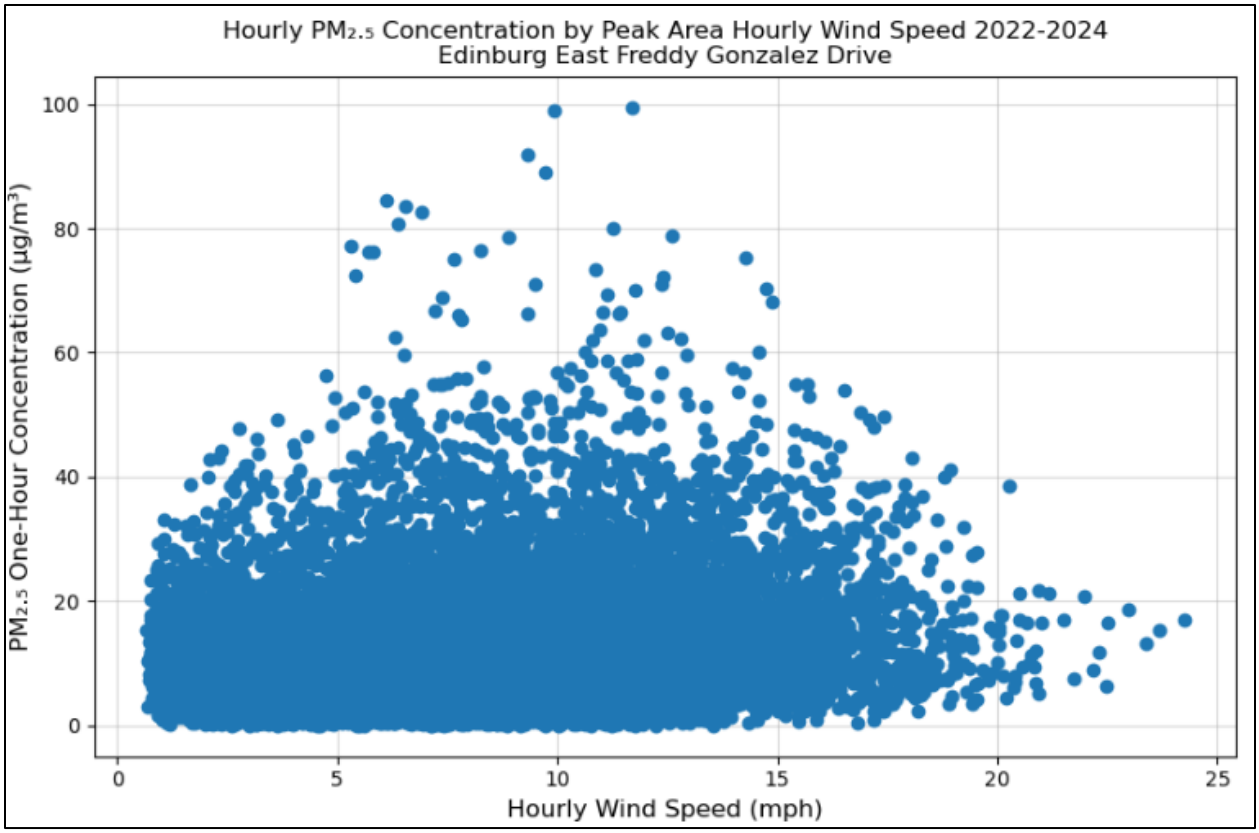

Figure 4-6: Hourly Average Continuous $PM_{2.5}$ Concentrations at Edinburg East Freddy Gonzalez Drive by Peak Area Hourly Wind Speed in Hidalgo County for 2022, 2023, and 2024

4.2.3 Nueces County

The Corpus Christi Huisache and Dona Park monitors are located in Corpus Christi, Texas within Nueces County. The major sources of $PM_{2.5}$ emissions are located in the southeast and north portions of Nueces County, while other major point sources can be seen north of Nueces County, in San Patricio County (Figure 4-7: *Point Sources in and around Nueces County, from 2023*); however, a significant portion of the $PM_{2.5}$ emissions are non-point, as shown in Table 4-3: *Emissions Inventory in Nueces County, from 2020*.

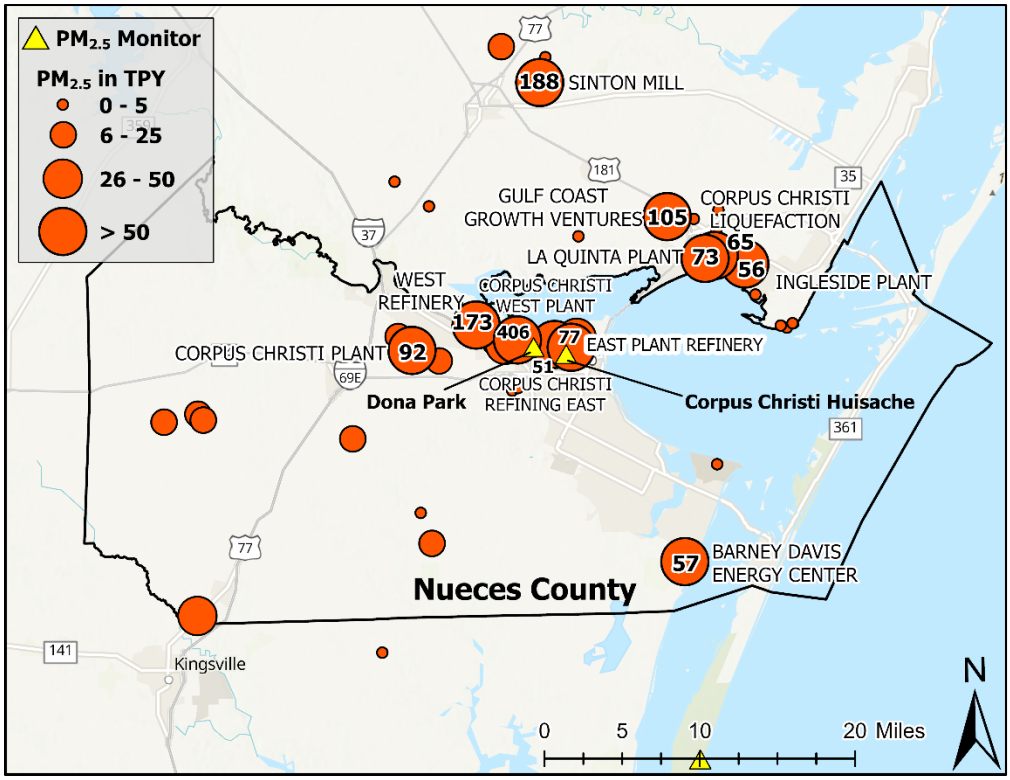

Figure 4-7: Point Sources in and around Nueces County, from 2023

Table 4-3: Emissions Inventory in Nueces County, from 2020

Emissions Categories	Emissions (tons per year)
On-road	64.59
Nonroad	76.64
Nonpoint	2,016.46
Point	1,362.19
Total	3,519.88

Figure 4-8: *Wind Rose in Nueces County, from 2021-2023* shows that at Nueces County monitors, a higher percentage of winds are coming from the south/southeast direction. Figure 4-9: *Hourly Average Continuous $PM_{2.5}$ Concentrations at Corpus Christi Huisache by Peak Area Hourly Wind Speed in Nueces County for 2022, 2023, and 2024* and Figure 4-10: *Hourly Average Continuous $PM_{2.5}$ Concentrations at Dona Park by Peak Area Hourly Wind Speed in Nueces County for 2022, 2023, and 2024* display peak area hourly wind speeds at Nueces County monitors plotted against $PM_{2.5}$ concentrations at the Corpus Christi Huisache and Dona Park monitors, respectively. While there are a few high $PM_{2.5}$ concentrations at relatively low wind speeds, there is no other definitive pattern in Figure 4-9 and Figure 4-10, 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.

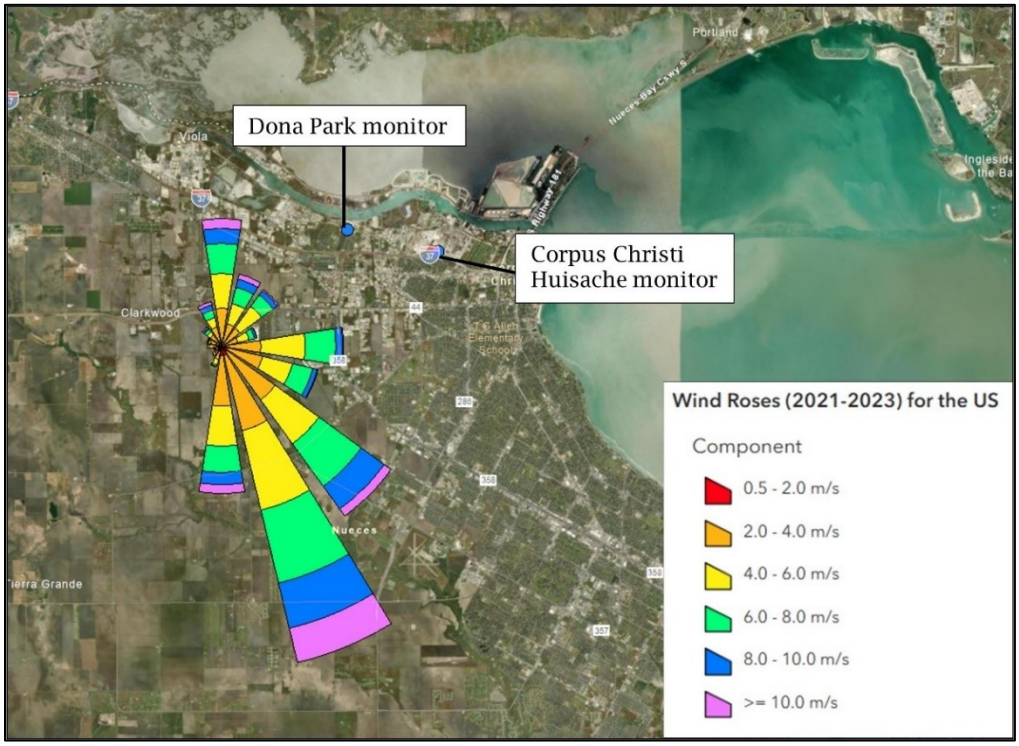

Figure 4-8: Wind Rose in Nueces County, from 2021-2023

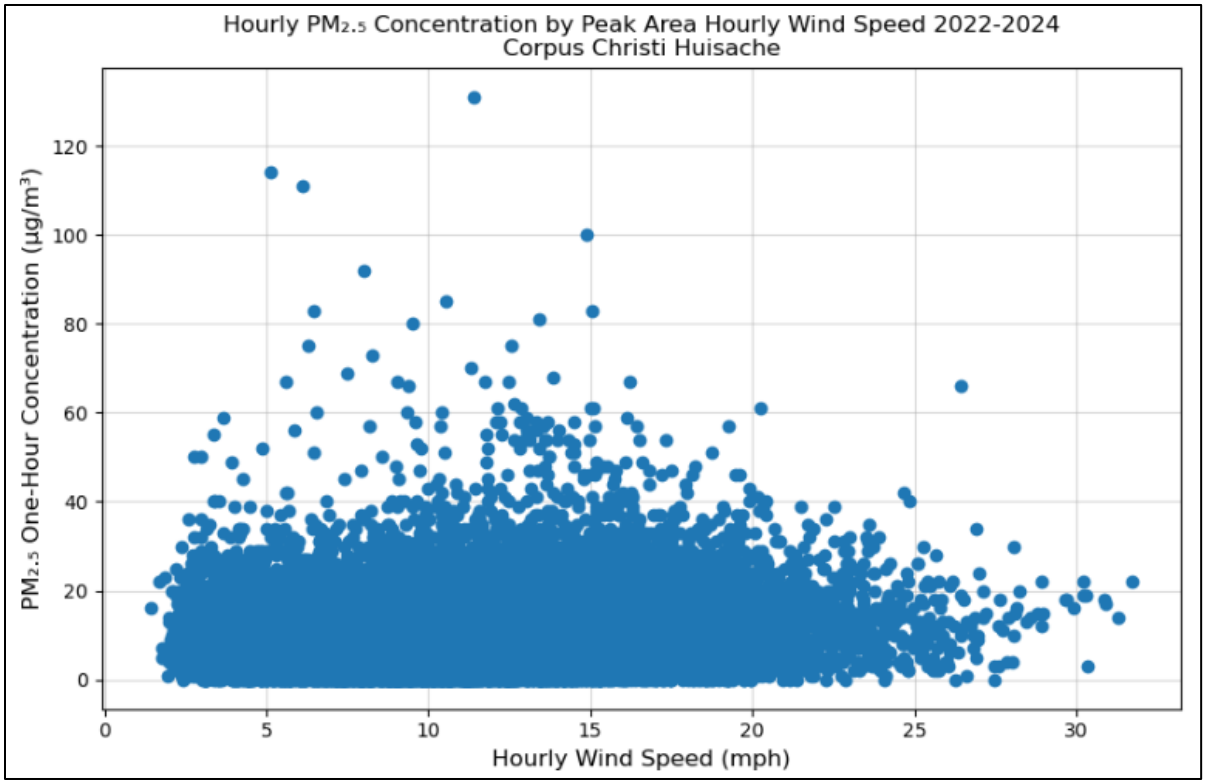

Figure 4-9: Hourly Average Continuous $PM_{2.5}$ Concentrations at Corpus Christi Huisache by Peak Area Hourly Wind Speed in Nueces County for 2022, 2023, and 2024

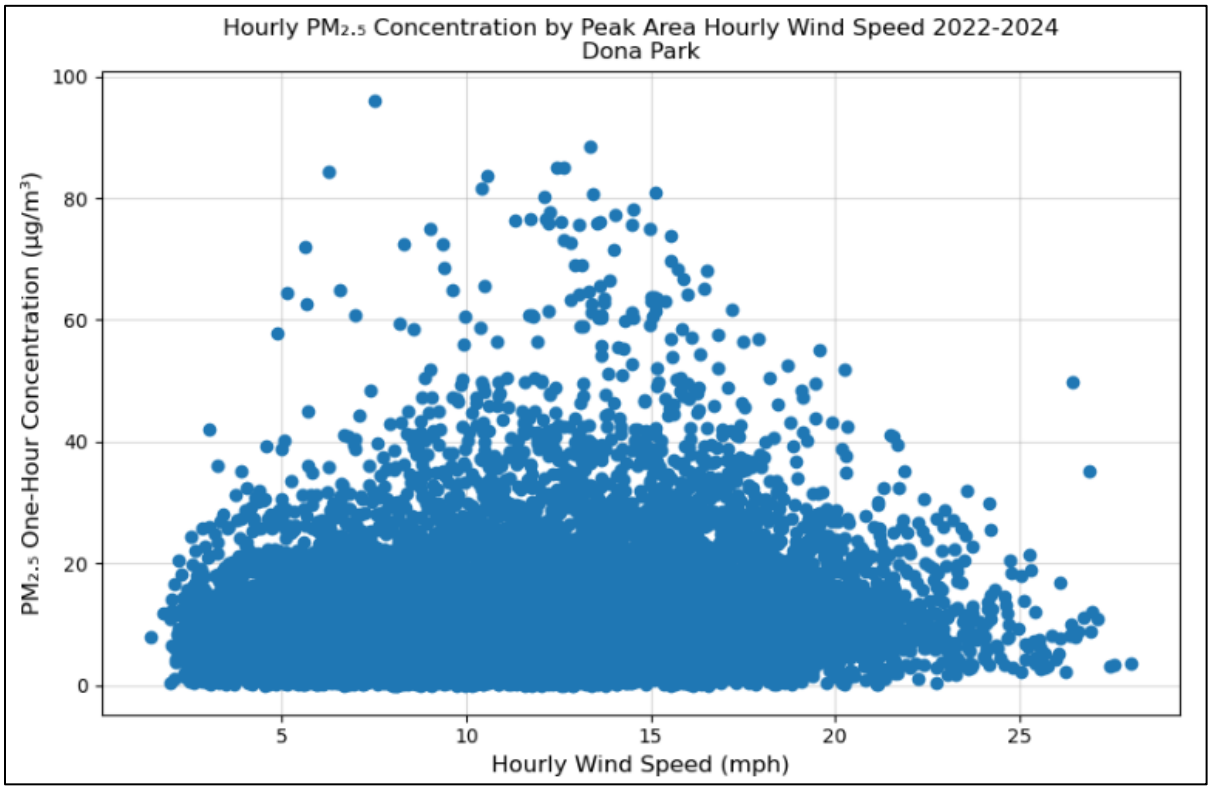

Figure 4-10: Hourly Average Continuous $PM_{2.5}$ Concentrations at Dona Park by Peak Area Hourly Wind Speed in Nueces County for 2022, 2023, and 2024

4.2.4 Tarrant County

The Fort Worth Northwest and Haws Athletic Center monitors are located in Fort Worth, Texas within Tarrant County. The major sources of $PM_{2.5}$ emissions are located approximately in the central portion of Tarrant county, while other major point sources can be seen southeast adjacent, in Ellis County (*Figure 4-11: Point Sources in and around Tarrant County, from 2023*); however, a significant portion of the $PM_{2.5}$ emissions are non-point, as shown in Table 4-4: *Emissions Inventory in Tarrant County, from 2020*.

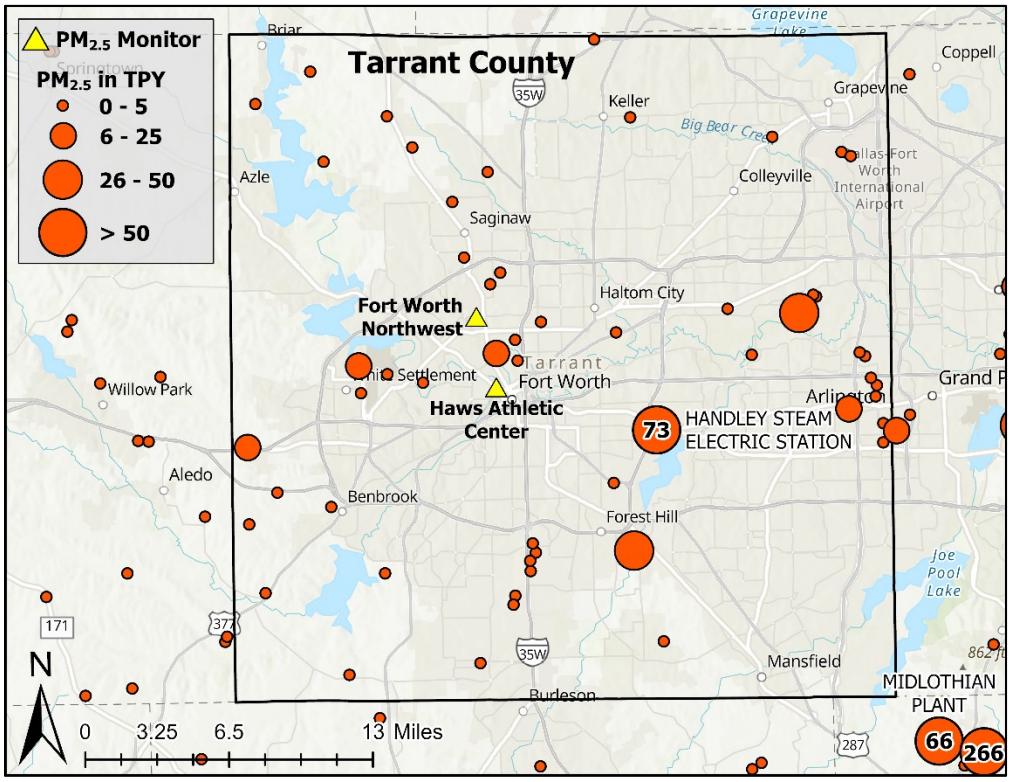

Figure 4-11: Point Sources in and around Tarrant County, from 2023

Table 4-4: Emissions Inventory in Tarrant County, from 2020

Emissions Categories	Emissions (tons per year)
On-road	319.06
Nonroad	301.17
Nonpoint	2,875.00
Point	243.57
Total	3,738.80

Figure 4-12: *Wind Roses in Tarrant County, from 2021-2023* shows that at Fort Worth Northwest and other Tarrant County monitors, a higher percentage of winds are coming from the south/southeast direction. Figure 4-13: *Hourly Average Continuous $PM_{2.5}$ Concentrations at Fort Worth Northwest by Peak Area Hourly Wind Speed in Tarrant County for 2022, 2023, and 2024* and Figure 4-14: *Hourly Average Continuous $PM_{2.5}$ Concentrations at Haws Athletic Center by Peak Area Hourly Wind Speed in Tarrant County for 2022, 2023, and 2024* displays peak area hourly wind speeds at Tarrant County monitors plotted against $PM_{2.5}$ concentrations at the Fort

Worth Northwest and Haws Athletic Center monitors, respectively. There is no definitive pattern in Figure 4-13, while Figure 4-14 displays higher $PM_{2.5}$ concentrations when wind speeds were lower.

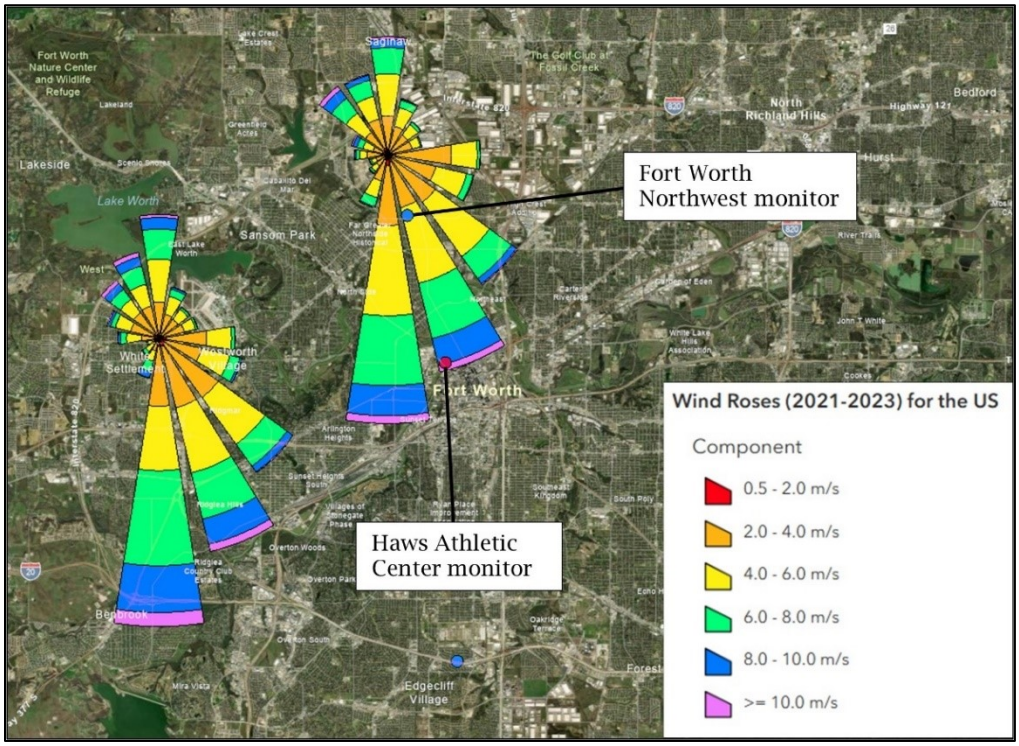

Figure 4-12: Wind Roses in Tarrant County, from 2021-2023

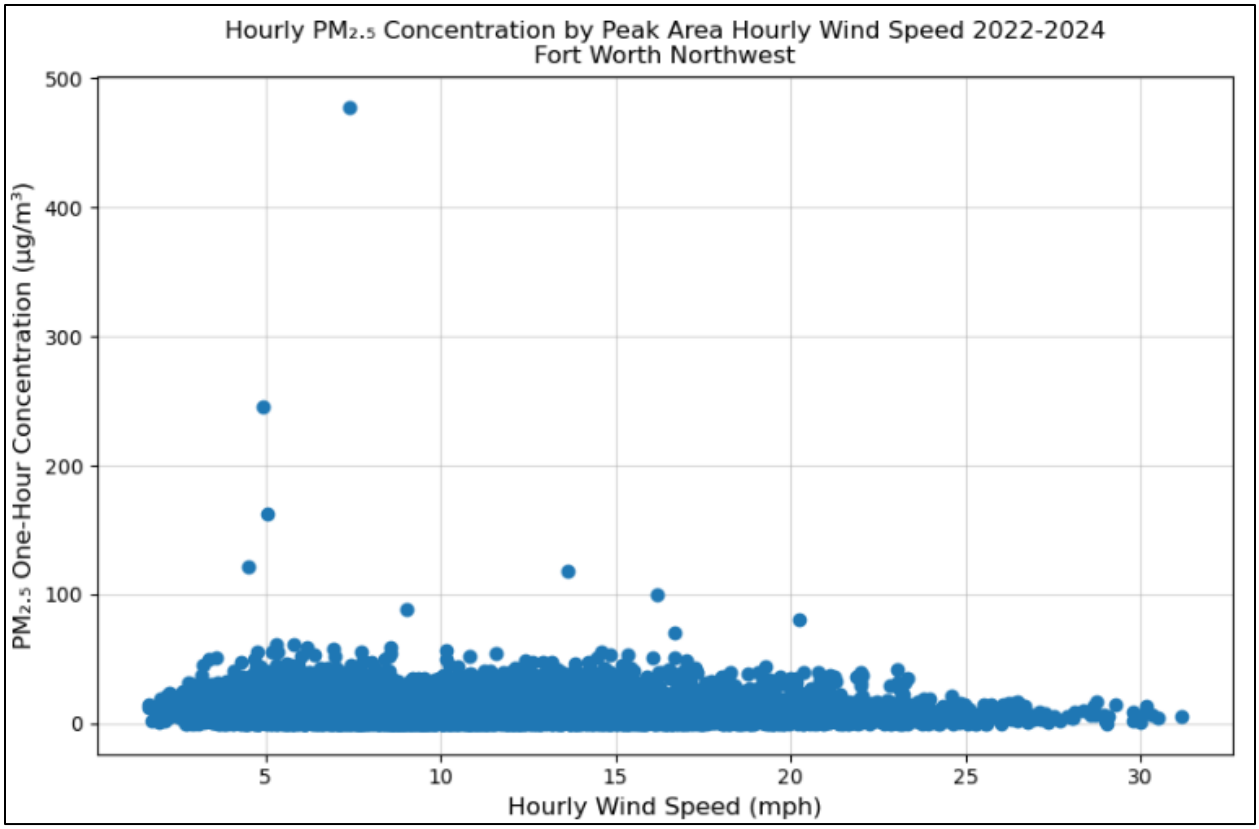

Figure 4-13: Hourly Average Continuous $PM_{2.5}$ Concentrations at Fort Worth Northwest by Peak Area Hourly Wind Speed in Tarrant County for 2022, 2023, and 2024

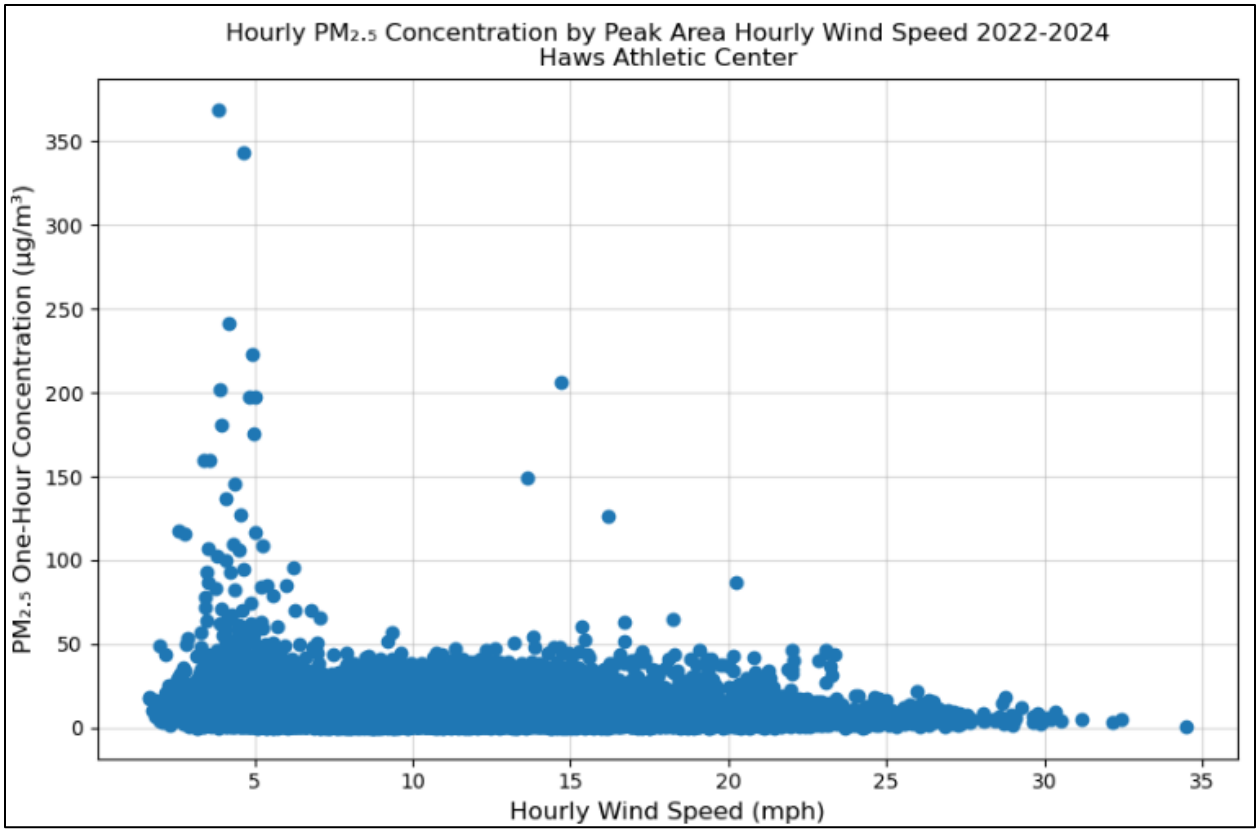

Figure 4-14: Hourly Average Continuous $PM_{2.5}$ Concentrations at Haws Athletic Center by Peak Area Hourly Wind Speed in Tarrant County for 2022, 2023, and 2024

4.2.5 Webb County

The World Trade Bridge monitor is located in Laredo Texas, within Webb County. There are no major sources of $PM_{2.5}$ emissions in Webb County, as seen in Figure 4-15: *Point Sources in and around Webb County, from 2023*, and a significant portion of $PM_{2.5}$ emissions are non-point, as shown in Table 4-5: *Emissions Inventory in Webb County, from 2020*.

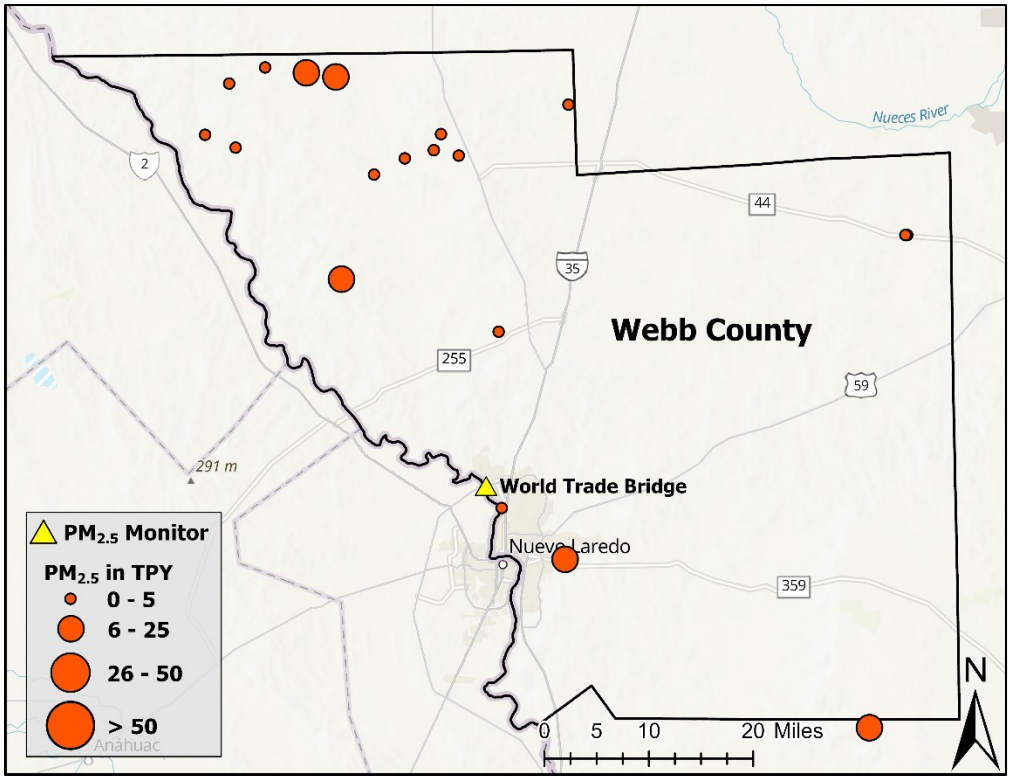

Figure 4-15: Point Sources in and around Webb County, from 2023

Table 4-5: Emissions Inventory in Webb County, from 2020

Emissions Categories	Emissions (tons per year)
On-road	70.92
Nonroad	60.04
Nonpoint	1,425.34
Point	59.34
Total	1,615.65

Figure 4-16: *Wind Roses in Webb County* shows that at Webb County monitors, a higher percentage of winds are coming from the south/southeast direction. Figure 4-17: *Hourly Average Continuous $PM_{2.5}$ Concentrations at World Trade Bridge by Peak Area Hourly Wind Speed in Webb County for 2022, 2023, and 2024* displays peak area hourly wind speeds at Webb County monitors plotted against $PM_{2.5}$ concentrations at the World Trade Bridge monitor. There is no definitive pattern in Figure 4-17, though there are a few higher concentrations of $PM_{2.5}$ associated with slower wind speeds (less than 15 miles per hour).

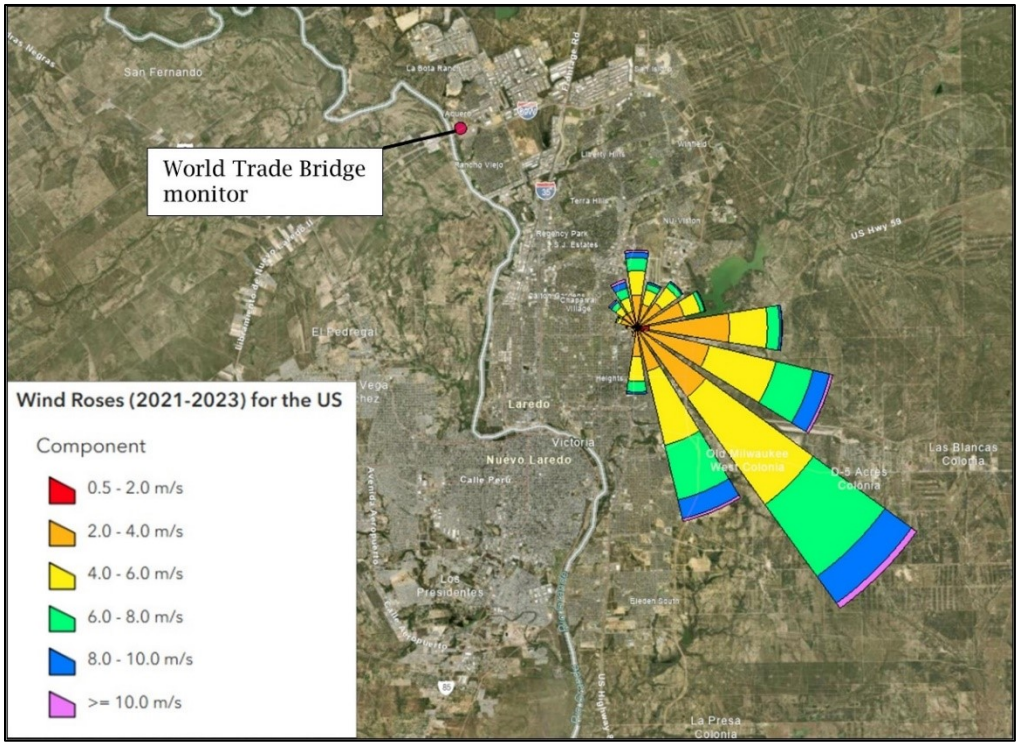

Figure 4-16: Wind Roses in Webb County, from 2021-2023

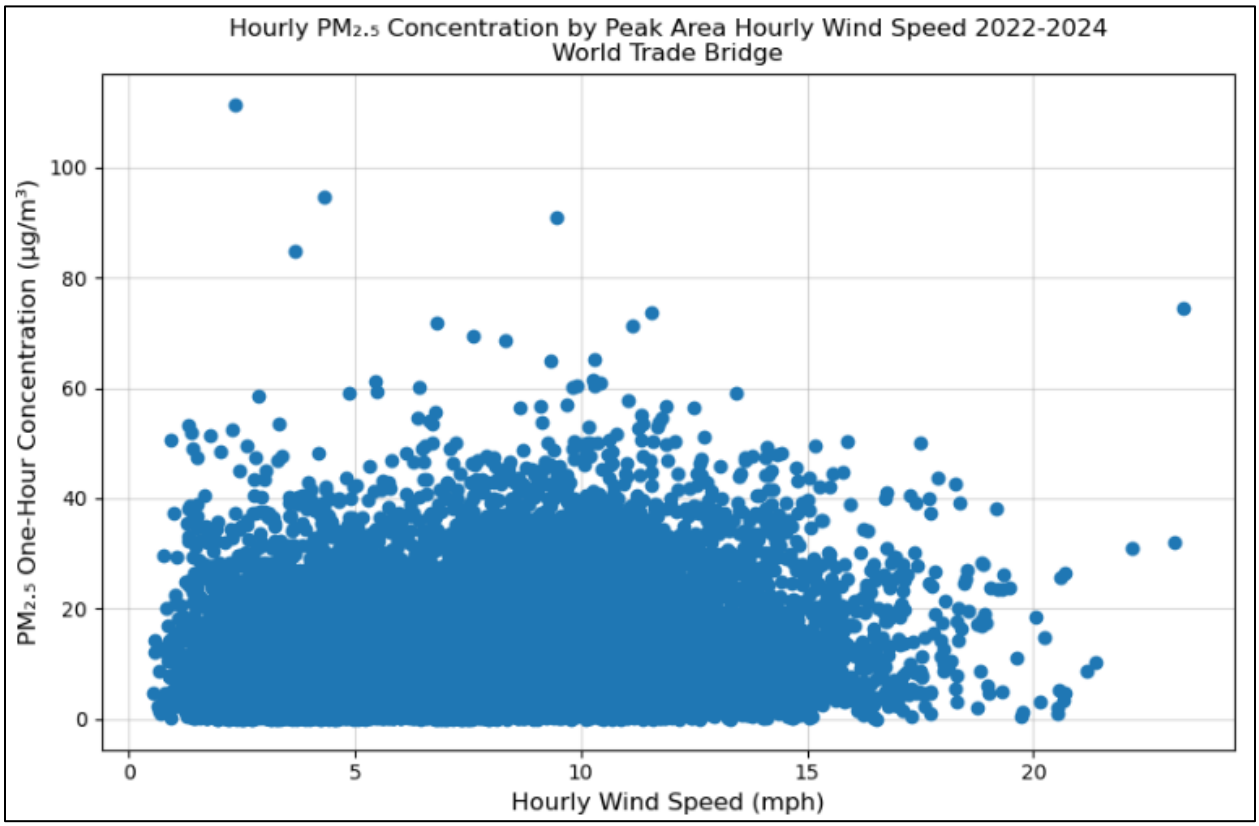

Figure 4-17: Hourly Average Continuous $PM_{2.5}$ Concentrations at World Trade Bridge by Peak Area Hourly Wind Speed in Webb County for 2022, 2023, and 2024

4.3 ATTAINMENT STATUS AND CONTROL MEASURES

Atascosa, Hidalgo, Nueces, Tarrant, and Webb Counties are currently designated as attainment for the 2012 primary annual $PM_{2.5}$ standard of 12.0 µg/m^3. In February 2024, EPA lowered the primary annual standard to 9.0 µg/m^3, and 2024 design values show that $PM_{2.5}$ concentrations in the aforementioned counties 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 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]

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[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
[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

- 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 FIRES IN MEXICO/CENTRAL AMERICA AND AFRICAN DUST

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.

[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.'

African 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 two-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]

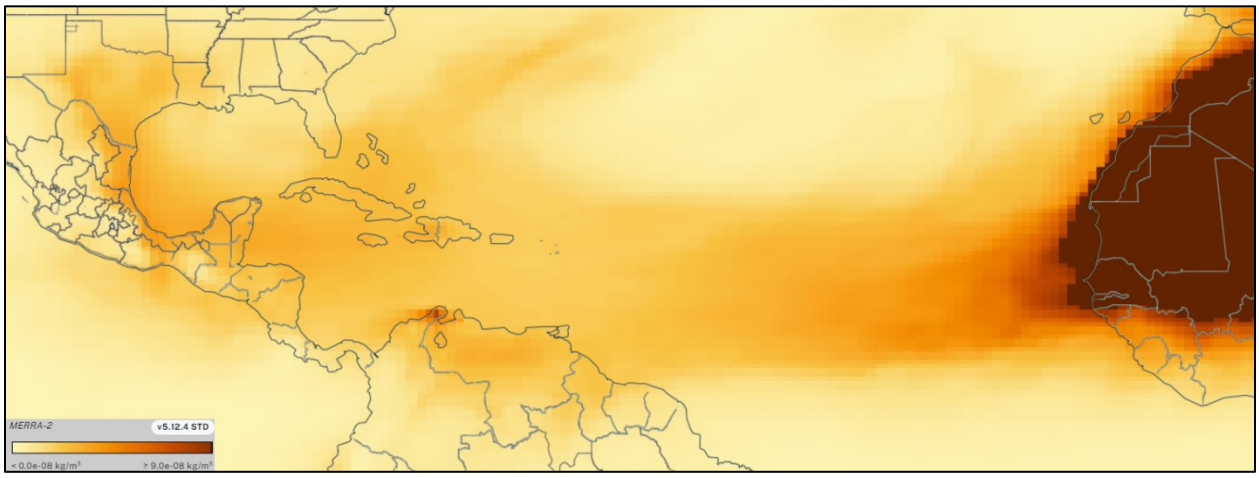

Figure 5-1: July 2021 Monthly Average Dust Surface Mass Concentration (MERRA-2)

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

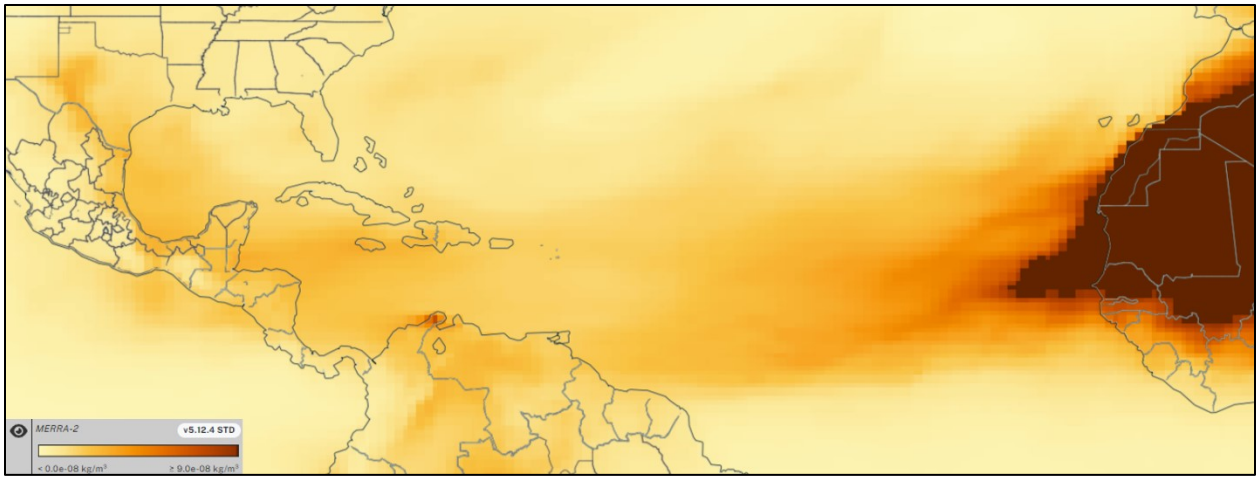

Figure 5-2: July 2022 Monthly Average Dust Surface Mass Concentration (MERRA-2)

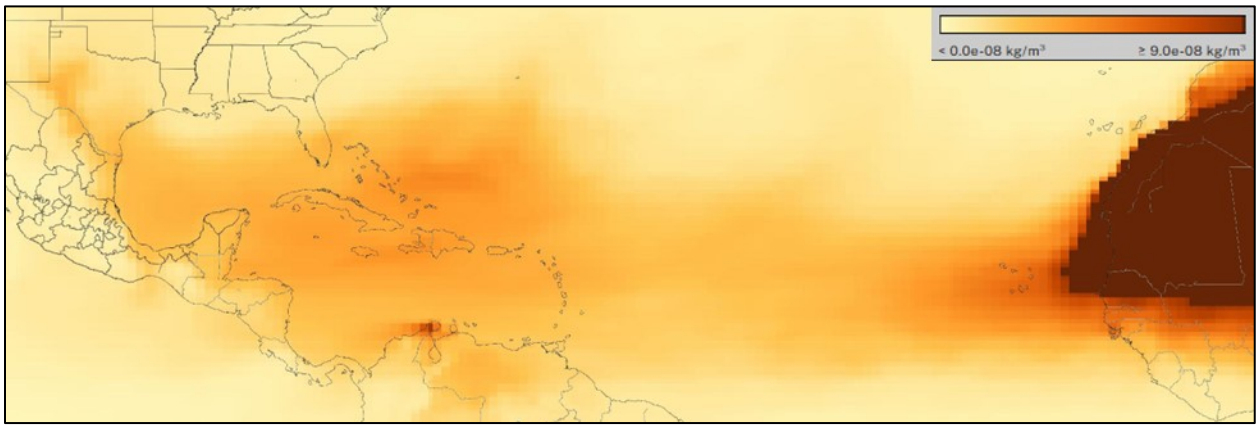

Figure 5-3: July 2023 Monthly Average Dust Surface Mass Concentration (MERRA-2)

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.

5.5 FIRES IN MEXICO/CENTRAL AMERICA – HUMAN ACTIVITY UNLIKELY TO RECUR AT A PARTICULAR LOCATION

A recent report titled "Fires in Mexico as Exceptional Events: Documentation and Implications" provided evidence that the vast majority of the fires in Mexico are not caused by agricultural burning, and that they do not reoccur at the same location.[24] The evidence includes statistics on the source of fires from the Mexican government and other sources.

A majority of the observed fires are forest fires or burns performed to clear land for development, and these are also not expected to recur at a particular location. Once the forest is burned at a specific location, the biomass is consumed, and the land is not prime for additional fires in the following years. The Global Forest Watch website shows that areas with highest rates of tree loss due to forest fires occur along the east coast of Mexico. Mexican fires show seasonality that follows known climatology with a dry season, typically in the period of January to May, that affects Mexico and Central America. This dry season favors conditions for starting of wildfires.

The report suggests that most of the fires and smoke from fire in Mexico during the dry season should be considered non-recuring and thus should be considered exceptional events as it satisfies that is an event caused by human activity that is unlikely to recur at a particular location or a natural event.

TCEQ downloaded data on the number of reported fires in 2024 and possible causes of these fires from the Gobierno de Mexico's "Concentrado Nacional de Incendios Forestales" (Government of Mexico's National Concentration of Forest Fires) webpage.[25] In 2024, a total of 8,002 instances of fires were reported with 14 unique possible causes: Campfires, Unknown, Intentional, Smokers, Transportation, Agricultural activities, Celebrations and Rituals, Hunters, Cattle Activities, Burning Trash, Natural, Other productive activities, Forest Waste, and Road

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[23] https://www.ldaf.la.gov/land/fire/prescribed-burning
[24] https://www.tceq.texas.gov/downloads/air-quality/sip/pm/ramboll_mexicanfires.pdf
[25] https://monitor_incendios.cnf.gob.mx/incendios_tarjeta_semanal, accessed on June 17, 2025.

Clearing. Of the 8,002 fires, 2,590 (32%) fires occurred in protected natural areas and are unlikely to recur. Figure 5-4: *Map of Forest Fires in Mexico in 2024* is a map of all the instances of forest fires reported in 2024. Figure 5-5: *Fires in Mexico in 2024 Classified as Unlikely or Likely to Recur Based on Possible Causes* shows that 35% of fires that occurred in 2024 are unlikely to recur based on the possible causes provided and covered a surface area of 346,504.05 hectares where fires are unlikely to recur.[26] It should be noted that the data available on the website is only forest fires and is therefore only a subset of fires that happened in 2024.

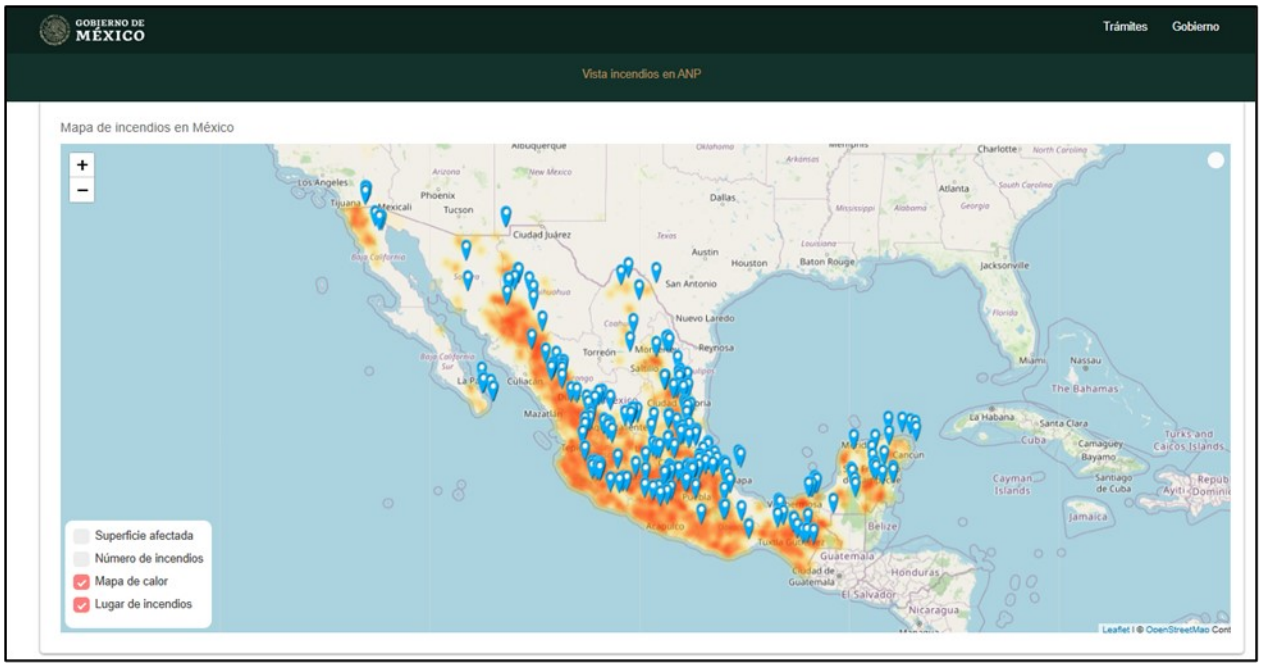

Figure 5-4: Map of Forest Fires in Mexico in 2024

[26] TCEQ classified forest fires that had possible causes of Campfires, Intentional, Smokers, Hunters, Natural, and Forest Waste as unlikely to recur.

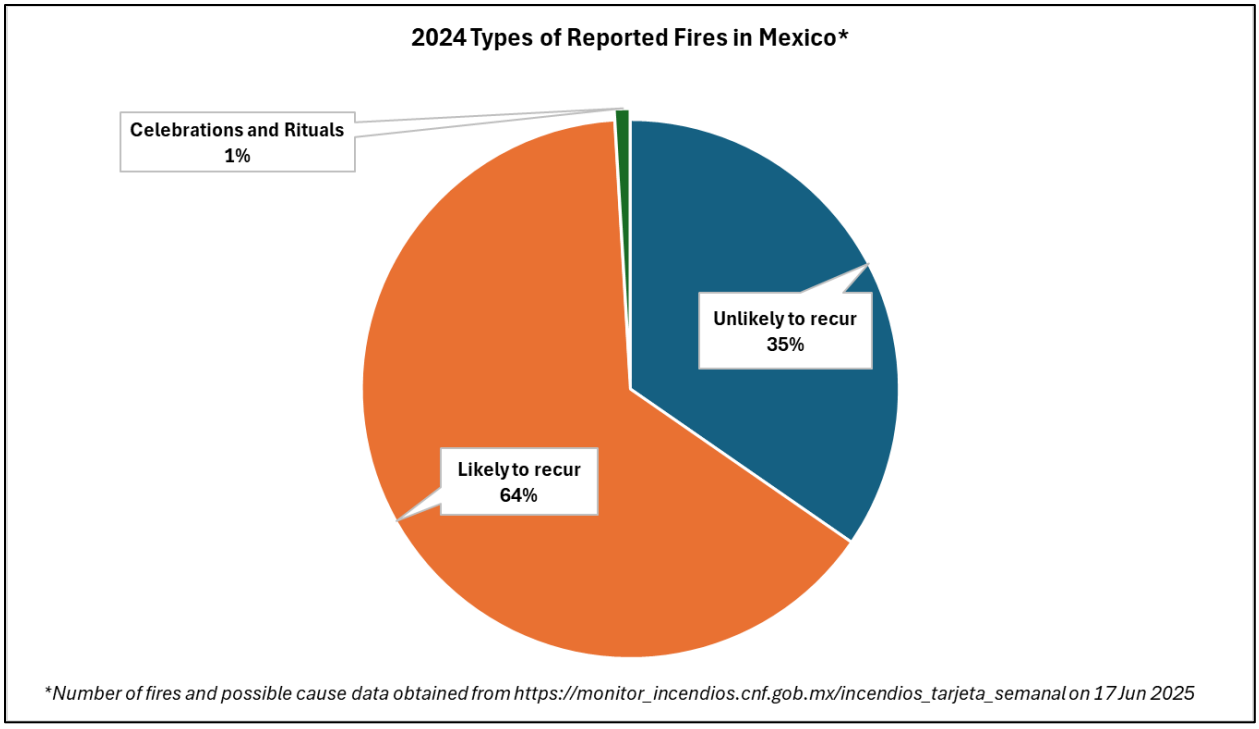

Figure 5-5: Fires in Mexico in 2024 Classified as Unlikely or Likely to Recur Based on Possible Causes

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. [27, 28]

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. [29] 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. [30]

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. [31] 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.[32] The webpage also addresses the latest air quality planning for the particulate matter NAAQS.

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[27] http://www.tceq.texas.gov/airquality/monops/forecast_today.html
[28] http://airnow.gov
[29] https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_curlev.pl?user_param=88101
[30] https://www.tceq.texas.gov/airquality/monops/data-reports
[31] http://www.tceq.texas.gov/airquality/monops/ozone_email.html
[32] 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.[33]

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.[34]

The Texas Department of Transportation (TxDOT) sponsors the public education and awareness through the Drive Clean Across Texas campaign.[35] 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.[36]

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.[37]

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[33] http://www.tceq.texas.gov/agency/air_main.html
[34] https://www.airnow.gov
[35] http://www.drivecleanacrosstexas.org
[36] http://takecareoftexas.org/air-quality
[37] 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 is 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 Von Ormy Highway 16, Edinburg East Freddy Gonzalez Drive, Corpus Christi Huisache, Dona Park, Fort Worth Northwest, Haws Athletic Center, and World Trade Bridge monitors were impacted by smoke and dust from wildfires, fires in Mexico and Central America, high winds, 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.