2022 Exceptional Events Demonstration

High Wind Blowing Dust Events in Doña Ana and Luna Counties

Air Quality Bureau **6/19/24** **Public Review Draft**

The New Mexico Environment Department's Air Quality Bureau prepared this document. It is available for review at the website located at https://www.env.nm.gov/public-notices/ or in person at the address listed below. The Air Quality Bureau accepted public comment on this document from June 19, 2024, to July 19, 2024. For further information or to request a copy of this document, please contact the bureau by phone or in writing at:

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1. Introduction

Purpose

The U.S. Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM) with an aerodynamic diameter of 10 microns or less (PM_{10}). The level of the PM_{10} NAAQS is set at 150 $\mu g/m^3$ for a 24-hour average concentration.

From January 1 - December 31, 2022, the New Mexico Environment Department (NMED) Air Quality Bureau (AQB) recorded 39 exceedances of the PM_{10} NAAQS. The exceedances occurred on 19 days and were the result of exceptional events, specifically high wind dust events.

The AQB submits this exceptional event demonstration for the exceedances of the PM_{10} NAAQS that occurred in 2022 in Doña Ana and Luna Counties of southern New Mexico (NM); including San Juan County of northern NM. The evidence provided in this demonstration substantiates AQB's request to exclude exceedance data from a compliance determination for these counties for the PM_{10} NAAQS. Table 22-1 in Appendix A lists the dates, 24-hour average concentrations, monitoring sites and other identifying information for NM's exclusion request.

2. Background

Climatology of High Wind Blowing Dust in Southern New Mexico

Large- and small-scale weather systems provide the ideal meteorological conditions for high wind blowing dust events in Doña Ana and Luna Counties. These events can occur at any time of year, but the highest incidence of exceedances occurs during the Spring, New Mexico's traditional windy season. The most common weather system responsible for these events occurs when Pacific storms and associated cold fronts traverse the state from west to east. On the windiest days, the storm's center of low-pressure is located along the Colorado-New Mexico border and upper-level winds align in the same direction as surface winds. This alignment increases surface wind speeds in southeastern Arizona, southwestern NM and northwestern Chihuahua, MX. Diurnal heating allows higher level winds to mix down to the lower levels of the atmosphere, intensifying wind speeds and creating the turbulence required for dust entrainment and transport.

The second large-scale weather systems responsible for blowing dust in NM are back door cold fronts whose low-pressure centers and cold air approach the state from the north or the east. The last system responsible for high wind blowing dust events in NM occurs during the monsoon season when small-scale conditions create thunderstorms. These storms are the result of convective heating during the summer months that create updrafts of moist air and allow cloud formation. Rain from these clouds causes wet and dry microbursts releasing massive amounts of energy in the form of outflow winds. These events are often hard to forecast with accuracy for a given area and can cause massive damage and threats to health and safety. These events are referred to as Haboobs and often receive major news coverage due to their sudden formation and dramatic nature. The cover page provides an example of the dramatic nature of such an event that was observed from Las Cruces positioned in an eastern direction towards the Organ Mountains, February 16, 2022. Picture courtesy of LC Sun News for the February 23, 2022 event date.

High wind conditions alone do not automatically create blowing dust. Winds must also impart enough energy on dust sources to begin the erosion process with the movement of larger sand particles (PM_{90-200}). The movement of these particles (creep) creates impacts with medium sized particles (PM_{50-90}) that begin to bounce along the surface (saltation). These particles in turn collide with PM_{50} and smaller particles creating entrained dust. Particles in the PM_{20-50} size range may quickly drop out of the atmosphere whereas smaller particles (PM_{10}) may stay suspended in the atmosphere for days. Other factors affecting the erodibility of soils include surface roughness, soil moisture content, vegetative cover, nonerodable elements (e.g., clods), frequency of disturbance and crust formation.

This year's soil was particularly vulnerable to the effects of increased erodibility due to a lack of precipitation from increased drought which has resulted in decreased ground cover to help stabilize and minimize the impacts of airborne particulate matter from windblown dust sources.

Exceptional Events Rule

The EPA has recognized the need for policies and rules regarding data affected by exceptional events for which the normal planning and regulatory processes are not appropriate, since the implementation of the Clean Air Act (CAA) in 1970. In 1996 EPA formalized their response to naturally occurring events by implementing the Natural Events Policy (NEP). Under this policy, Natural Events Action Plans (NEAPs) were developed to protect public health and document data handling and exclusion requests. In response to changes in the federal CAA, EPA developed the Exceptional Events Rule (EER) in 2007 to govern exclusion requests of air quality data when determining compliance with a given NAAQS (40 CFR 50.14), superseding the requirements of NEAPs. Under the EER, the EPA may exclude data from compliance determinations if a state meets the technical and administrative requirements of the rule and demonstrates that an exceptional event caused the exceedance. EPA last revised this rule in 2016.

Technical and Administrative Criteria

The EER provides technical and administrative criteria that air quality management agencies (i.e., AQB) must follow in order for EPA to concur with a claimed event and exclude the requested data. The first requirement is to engage EPA in the Initial Notification of Potential Exceptional Event process (40 CFR 50.14(c)(2)) by flagging data and creating an initial event description in EPA's AQS database. This begins the process of regular communication and consultation between the AQB and EPA regarding the development of a demonstration to exclude data affected by high wind exceptional events. The AQB submitted a formal letter indicating our intention of submitting a demonstration to EPA on December 31, 2022. A copy of this letter may be found in Appendix C of this document.

The AQB developed this demonstration to include the following elements of the 2016 EER (40 CFR 50.14(c)(3)(iv)) to exclude high wind exceptional events:

1. A narrative conceptual model that describes the event that caused the exceedance or violation and a discussion of how emissions from the event led to the exceedance or violation at the affected monitor(s);
2. A demonstration that the event affected air quality in such a way that there exists a clear causal relationship (CCR) between the specific event and the monitored exceedance or violation;
3. Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times;
4. A demonstration that the event was both not reasonably controllable and not reasonably preventable (nRCP); and

5. A demonstration that the event was caused by human activity that is unlikely to recur at a particular location or was a natural event. High wind dust events are considered natural events when windblown dust originates from entirely natural sources or all anthropogenic sources are reasonably controlled (40 CFR 50.14(b)(5)(ii)).

In addition, under 40 CFR 50.14(c)(3)(v), the air agency must follow the public comment process and provide documentation that this requirement was fulfilled. Appendix D contains copies of public notices and listserv emails announcing the public comment period, public comments received and AQB responses to those comments. Public notification requirements under 40 CFR 50.14(c)(1) and 40 CFR 50.930(a) were also met through press releases, informational flyers and brochures, and the AQB's Dust and Monitoring websites.

High Wind Threshold and Tiered Demonstrations

The EPA uses the nRCP criteria of the EER to determine if an exceedance, due to a high wind dust event, was caused in whole or in part by anthropogenic dust sources without reasonable controls in place. Exceedances caused by uncontrolled anthropogenic dust sources may not be eligible to be treated as exceptional events under the EER (see technical requirement 5 above). Evidence provided in this demonstration for nRCP include:

1. Sustained wind speed;
2. Contributing sources of windblown dust;
3. Approved reasonable controls in the State Implementation Plan (SIP), if required; and
4. Implementation and enforcement of reasonable controls;

To address the various requirements and the degree of event-specific evidence needed to demonstrate nRCP, the AQB uses a three-tiered approach in this demonstration. Tier 1 demonstrations will be used for large-scale and high-energy high wind dust events (40 CFR 50.14(b)(5)(vi)) provided that:

1. A Dust Storm Warning was issued by the National Weather Service (NWS) due to the event;
2. Sustained wind speeds were greater than or equal to 17.8 m/s (40 mph); and
3. Visibility was reduced to 0.5 miles or less.

Tier 2 demonstrations were developed for events with sustained wind speeds at or above the high wind threshold of 11.2 m/s (25 mph) for western states found at 40 CFR 50.14(b)(5)(iii). This threshold represents the minimum wind speed capable of overwhelming reasonable controls. For exceedances that do not meet the high wind threshold, Tier 3 demonstrations were developed where the largest amount of evidence is provided in the controls analysis for the nRCP criteria. Table 2-1 below provides examples of data and information provided for each Tier described above.

Tier Level	Control Analysis Elements
Large Scale and High Energy (Tier 1)	▪ NWS Dust Storm Warning; ▪ Sustained wind speeds of 17.8 m/s; and ▪ Reduced visibility
Basic Controls Analysis (Tier 2)	▪ Anthropogenic Sources and existing controls; ▪ Natural sources and existing controls, if any ▪ Effective implementation and enforcement of reasonable control measures; ▪ Reasonableness of controls; and ▪ How emissions occurred despite controls;
Comprehensive Controls Analysis (Tier 3)	▪ All elements of a Basic Control Analysis; plus ▪ Trajectories of source area; ▪ Source-specific emissions inventories; and ▪ Transport modeling

Table 2-1. Three-tiered approach to supply evidence for nRCP analysis in Exceptional Events Demonstrations.

Designation Status and SIP requirements

The Anthony Area in Doña Ana County was designated nonattainment for the 1987 PM_{10} NAAQS in 1991 (Figure 2-1). Monitoring for PM_{10} in Doña Ana County began at the Anthony site in 1989 with exceedances of the standard recorded every year since. The CAA Amendments of 1990 (CAAA) directed EPA to designate those areas that do not meet a NAAQS as nonattainment by operation of law, regardless of the cause of nonattainment. Prior to the CAAA and nonattainment designation, EPA treated Doña Ana County as a Rural Fugitive Dust Area. Under EPA policy these areas were not required to implement control measures due to the lack of anthropogenic sources in the area. The AQB developed a SIP for the Anthony nonattainment area (NAA) in 1991 (Appendix E), requesting and receiving a waiver for implementing control measures. The status of the Anthony NAA has not changed since the development of this SIP.

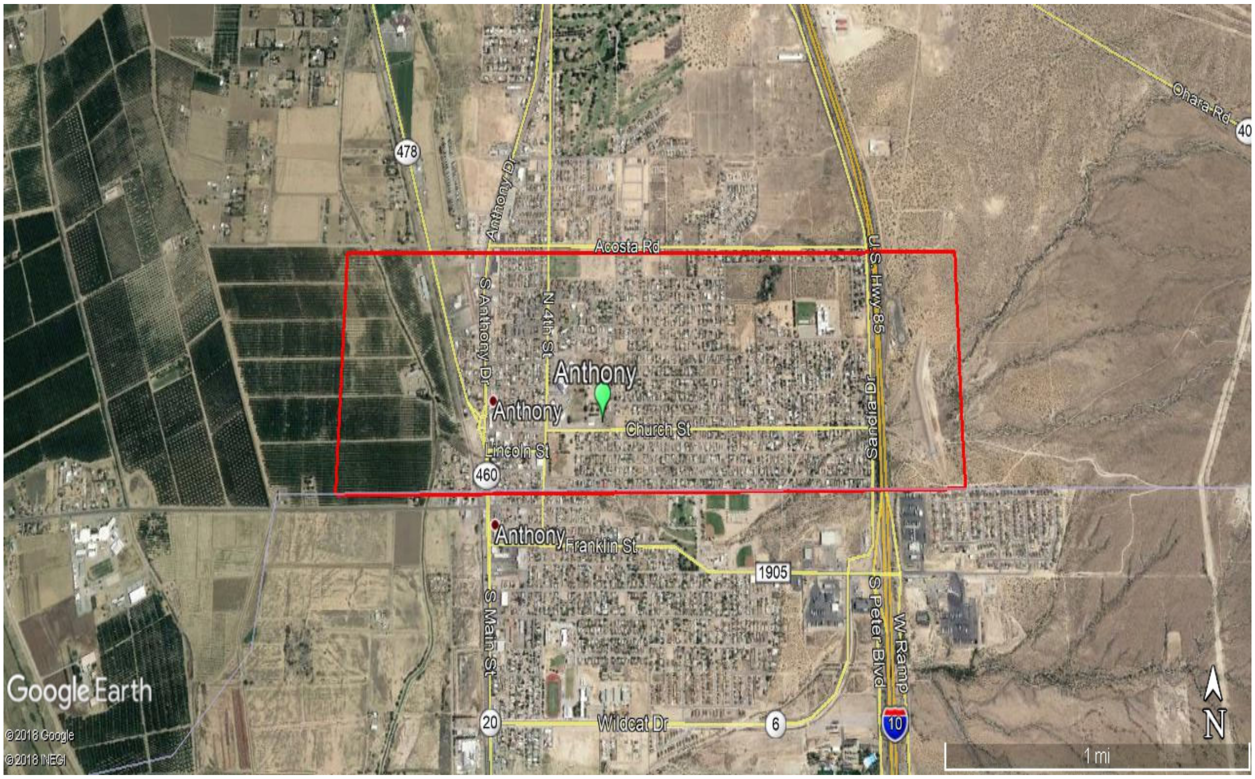


Figure 2-1. Anthony PM_{10} nonattainment area.

Natural Events Action Plans and Reasonable Control Measures

As monitoring expanded in southern New Mexico, exceedances and violations of the PM_{10} NAAQS continued to be recorded throughout Doña Ana and Luna Counties. Under the 1996 NEP, EPA required the AQB to develop and implement NEAPs in lieu of nonattainment designations for the remainder of Doña Ana County (i.e., outside of the Anthony NAA) and all of Luna County. NEAPs were developed to include five guiding principles with the protection of public health as the highest priority. Another guiding principle or element of NEAPs required reasonably available control measures (RACM) for dust sources. The AQB worked closely with local governments to adopt and implement ordinances containing RACM or better. NMED also entered into memorandums of understanding (MOUs) with large land managers, state and federal departments and agencies, the military and public institutions to ensure that dust control measures and best management practices would be used for soil disturbance and dust generating activities. Copies of the ordinances for Doña Ana County, the City of Las Cruces, Luna County and the City of Deming may be found in Appendix F. The local municipalities code enforcement officers uphold dust or erosion control ordinances in these jurisdictions. For example, the City of Las Cruces has a full-time Environmental Compliance Officer focusing efforts on controlling sources of fugitive dust during periods of high winds exceeding 11.2 m/s. The City of Anthony provided NMED a letter dated September 18, 2019, indicating the sidewalks and streets that have been paved since the incorporation of the City in 2010 (Appendix E). NMED's Fugitive Dust Control Rule, 20.2.23 New Mexico Administrative Code (Part 23), addresses fugitive dust emissions produced by sources of disturbed land in Doña Ana and Luna Counties that are greater than 1 acre and are not agricultural, military, roadways, or activities that have been issued a permit by the AQB. Part 23 is enforced on a complaint basis by the inspector based out of the Las Cruces field office. Minor sources in southern Doña Ana and Luna Counties are periodically inspected and assessed fines based on deficiencies observed. Fines are settled to include civil fines and a larger portion to Supplemental Environmental Projects that have a direct air quality improvement to either the source facility or other project(s) that improves air quality within the impacted community. In 2018, the Jobe asphalt plant in Vado was inspected and was fined a civil penalty of $19,760 with a stipulated settlement agreement and compliance order in January 2021. The Vado Speedway is a fugitive dust source that was brought to the attention of the department in May 2021 that falls under Part 23 and has been resolved. Many cases in prior years have been through the legal process to improve and protect air quality impacts by fugitive dust sources that fail to meet minimum air quality requirements. The department is actively responding to complaints, inspecting facilities and pursuing settlements based on utilizing the best available resources and most effective means to obtain compliance preferably through voluntary compliance or compliance assistance. If the department is unable to obtain voluntary compliance the severity of noncompliance increases with each step documenting the violations through notices of violation and administrative compliance orders to potentially bringing forth egregious violations before the district court.

Monitoring Network and Data Collection

The AQB operates a State and Local Air Monitoring Stations network to measure the concentration of criteria pollutants and meteorological parameters. The AQB maintains five PM_{10} monitoring sites in Doña Ana County and one monitoring site in Luna County to track windblown dust in southern New Mexico. All monitoring sites in Doña Ana and Luna Counties are equipped with continuous Federal Equivalent Method instruments, while the Anthony site (Doña Ana County) is also equipped with a Federal Reference Method instrument. In 2018, the Anthony site had installed a standard 10-meter tower for measuring meteorological parameters and data from the La Union site is used as a proxy in this demonstration. Meteorological parameters from the Santa Teresa monitoring site are also used as it informs wind speeds at nearby, upwind source areas of PM_{10}, especially those monitors located in the southern half of Doña Ana County. Figure 2-2 shows the location of monitoring sites in the border area used in this demonstration. Figure 2-3 shows the location of the monitoring sites in the northern part of the state with the San Juan Substation monitoring site located in San Juan County.

Figure 2-2. NMED monitoring network sites in Doña Ana and Luna Counties.

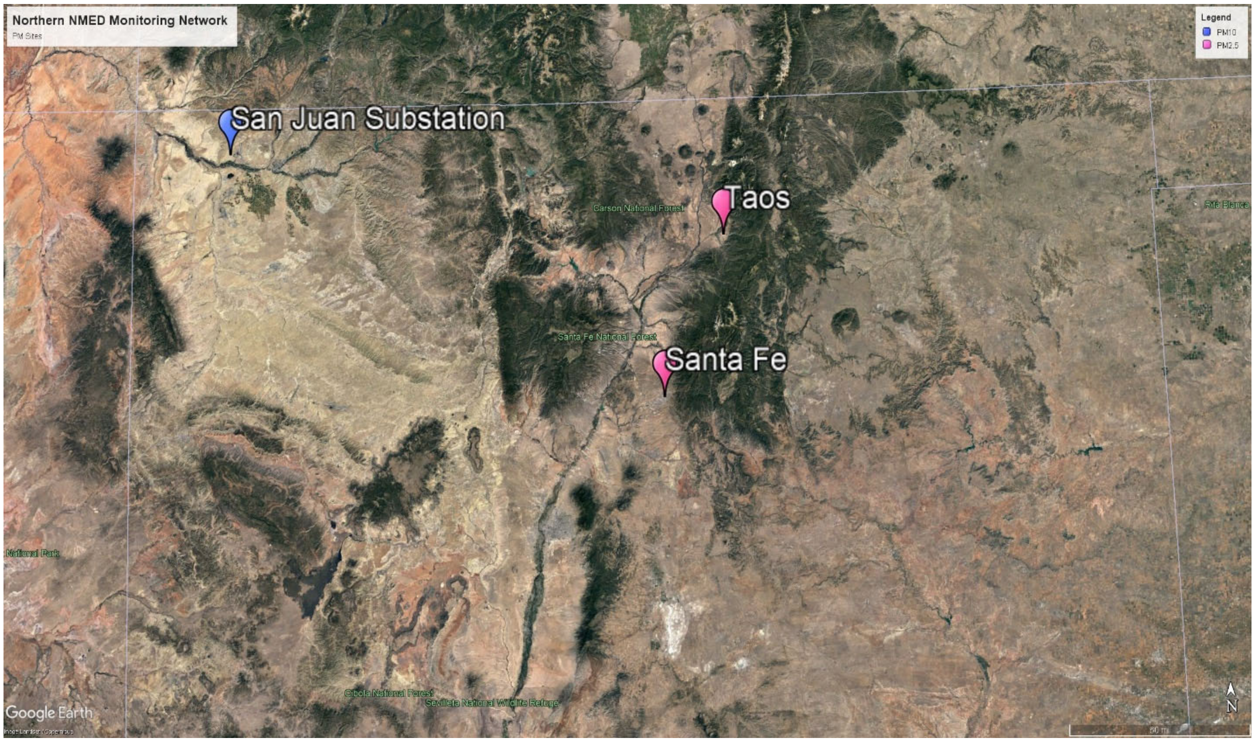


Figure 2-3. NMED monitoring network sites in the northern portion of the state.

3. HIGH WIND EXCEPTIONAL EVENT: February 16, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana and Luna Counties resulting in an exceedance of the PM_{10} NAAQS at the Anthony, Desert View, Chaparral, Holman, and Deming monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 3-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	259 μg/m^3	11 m/s	20.8 m/s
RJ	35-013-0021	6ZM Desert View	434 μg/m^3	11.4 m/s	20.5 m/s
RJ	35-013-0020	6ZK Chaparral	169 μg/m^3	13.3 m/s	22.4 m/s
RJ	35-013-0019	6ZL Holman	223 μg/m^3	14.9 m/s	29.6 m/s
RJ	35-029-0003	7E Deming	208 μg/m^3	13.5 m/s	21.1 m/s

Table 3-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Yesterday's winds were a preclude to today's windier day due to an approaching Pacific cold front. As the storm system approaches southeast Colorado a deepening surface trough will dislodge and move south creating surface mixing provided by a pressure gradient combined with a 40-55 knot jet moving from west to east. At the 1800 hour, a large area of low-pressure was located over the Four Corners extending to southeast Colorado (Figure 3-1). Aloft, the low-pressure center of the storm system hovered over the Baja of California (Figure 3-2). As the day progressed this low-pressure cold front traveled west southwest providing the momentum for increasingly westerly wind speeds east of the Rio Grande Valley especially along the east sides of mountain ranges throughout the afternoon.

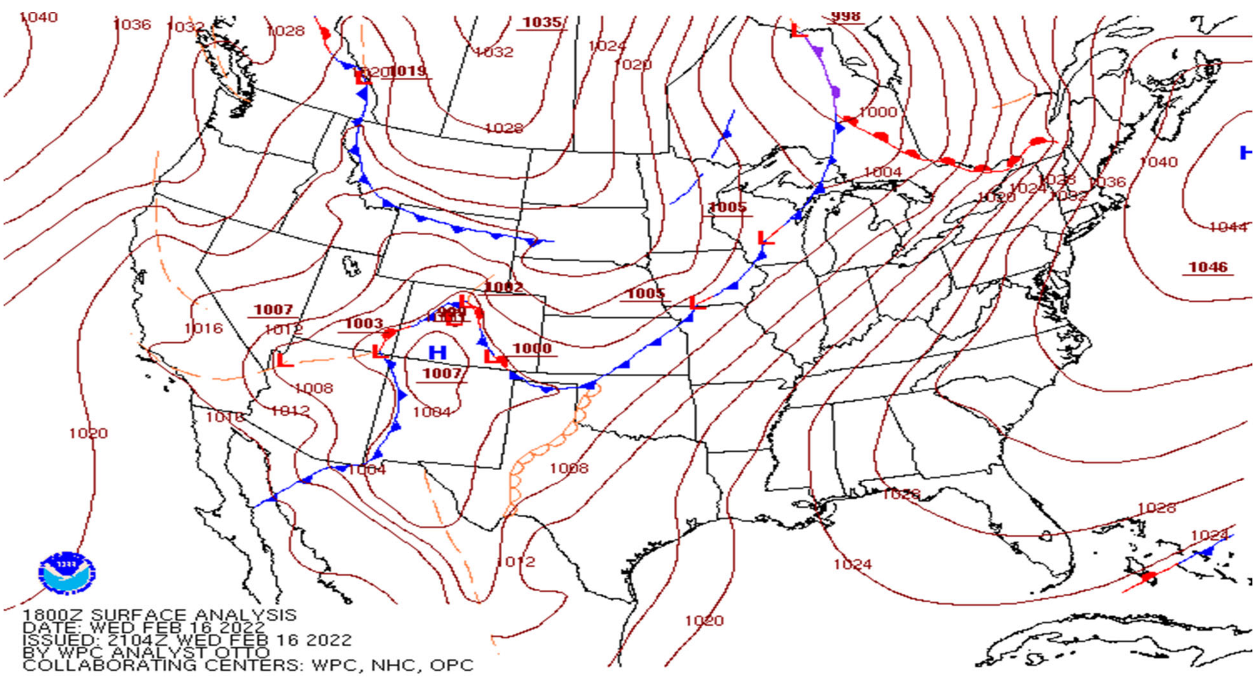


Figure 3-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

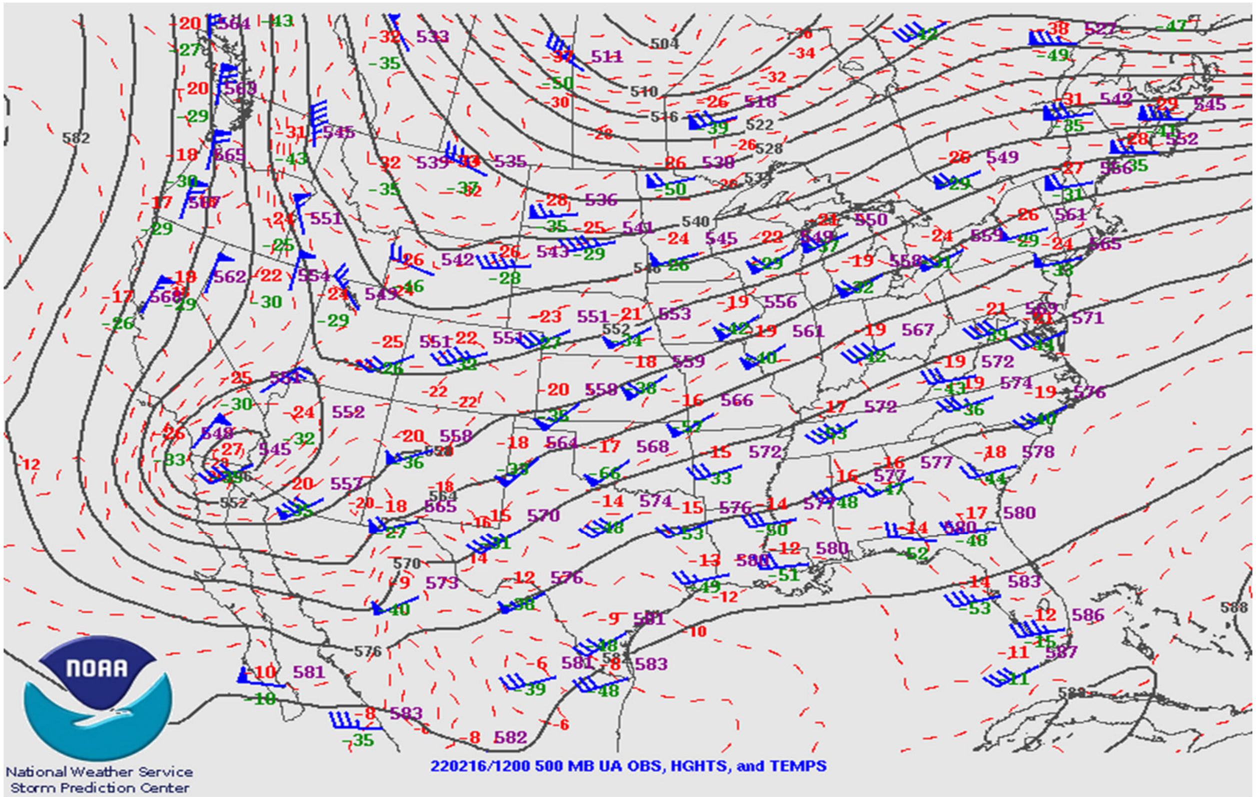


Figure 3-2. Upper air weather map for February 16, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the west southwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at Anthony, Chaparral, Desert View, Holman, West Mesa, Santa Teresa, La Union, and Deming monitoring sites beginning at the 1100 hour and lasted through the 2200 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa, and Deming monitoring sites beginning at the 0700 hour. Hourly concentrations remained elevated through the 1700 hour. Table 3-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event for the monitors in exceedance of the 24-hour PM_{10} NAAQS.

Hour	Anthony			Desert View			Holman		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
0700	168	0.6	1.6	75	2.1	5.3	14	5	7.4
0800	66	1.3	3.1	185	2.6	7.2	17	6.5	10.9
0900	63	3.2	7.3	36	5.6	11.9	12	6.4	12.1
1000	127	6.3	15.3	481	7.9	13.7	48	8.6	13.4
1100	1150	9.6	18.7	954	9.6	15.4	249	10.6	17.3
1200	361	8.7	16.9	1626	10	16.3	175	11.6	19.4
1300	342	8.4	14.5	1785	10.6	19	703	13	21.7
1400	837	9.7	16.5	1653	9.8	20.5	1592	14.9	23.6
1500	1262	11	20.8	1785	11.4	18.3	1516	13.6	29.6
1600	1238	10.4	18.1	1121	11.4	19.5	669	12.7	20.4
1700	366	7.8	16.6	464	9.6	18.1	163	11.5	17.2

Table 3-2. Hourly PM_{10}, wind speed, and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, although the spring windy season begins in March for most of the southwestern United States, high wind blowing dust events do occur in the winter months such as this Pacific cold front. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from northwest to east at the borders of Colorado and New Mexico in the morning and moving across New Mexico extending into Texas in the afternoon. The system's movement across the area timed well with daytime heating and mixing generating a deep trough moving east as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon, especially in the desert areas of southern New Mexico (Figure 3-3).

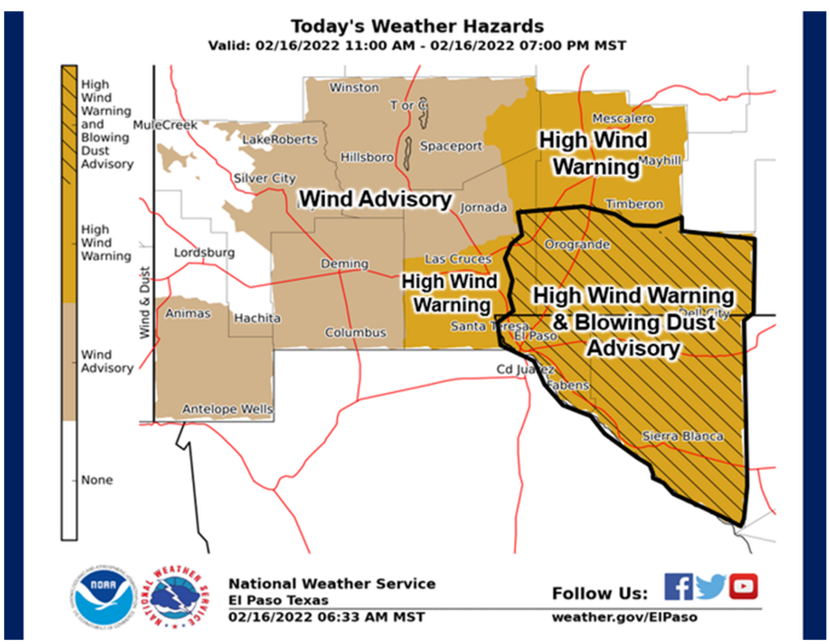


Figure 3-3. NWS Forecast Graphic with high wind warning and wind advisory for the event.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Chaparral, Desert View, Santa Teresa, La Union, and Holman monitoring sites recorded wind speeds above this threshold for eight hours from 1100 through the 1800 hours (Figure 3-4).

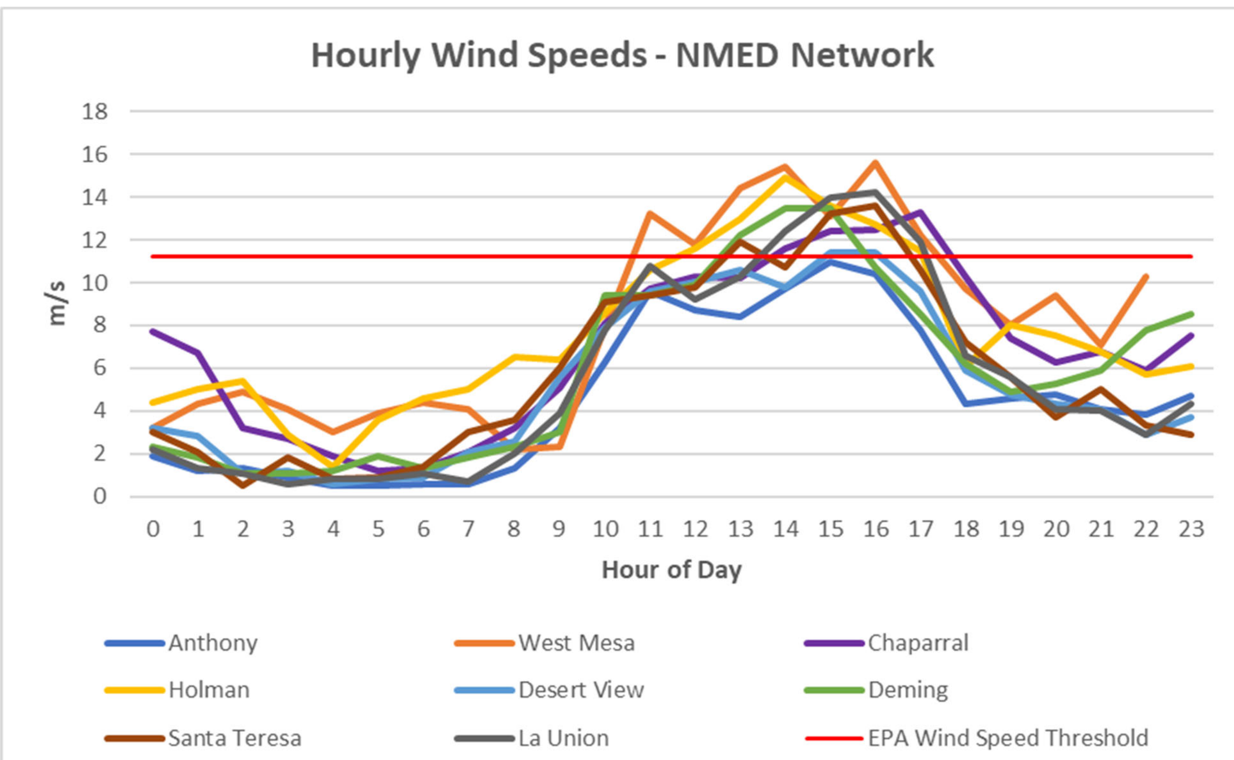


Figure 3-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Grant, and Hidalgo Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedances were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the VIIRS SNPP satellite RGB dust product imagery with dust plumes observed as bright pink bands originating upwind of NMED's monitoring site near Ascension and Janos, Chih. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 3-5). The dust plumes of interest appear to be limited to Mexico, orientated in a southwest to northeast fashion and traveling toward El Paso and NMED's monitoring sites at the time of the satellite pass (1505 MST) that captured the imagery.

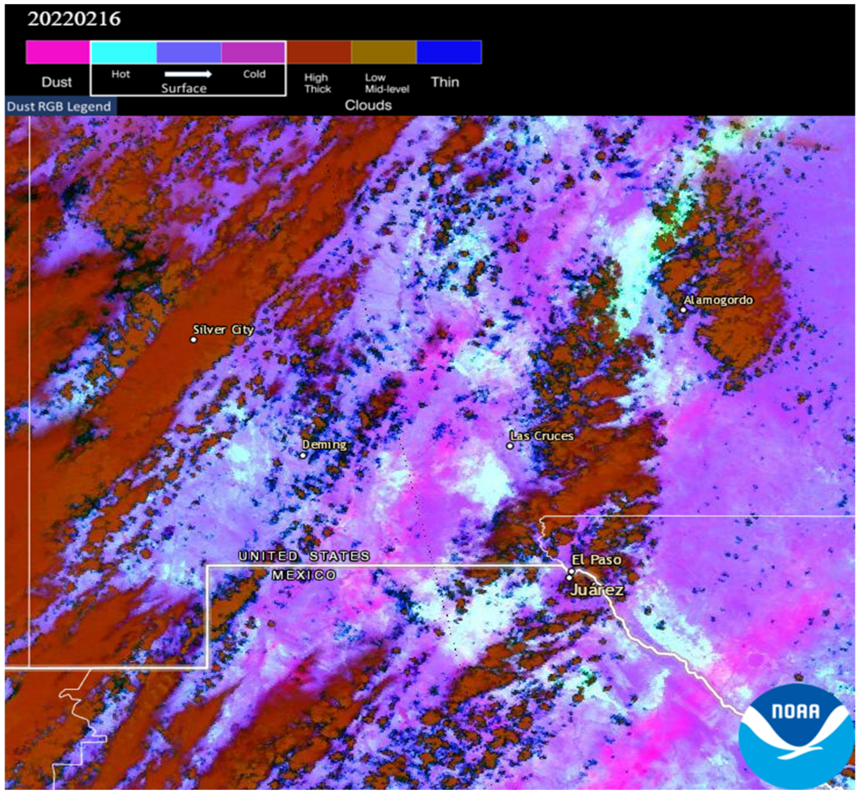


Figure 3-5. VIIRS SNPP satellite imagery demonstrating dust plumes displayed as pink bands traveling towards the NMED monitoring sites at the 1505 hour (MST). Courtesy of the NOAA Aerosol Watch.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a High Wind Warning for this date. A High Wind Warning is issued by NWS when sustained winds of 40 mph are expected for 1 hour or more OR wind gusts of 58 mph for any duration. This was in place for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS High Wind Warning can be found below:

"High Wind Warning from 11 AM this morning to 7 PM MST this evening…Wind speeds will be the biggest hazard along with blowing dust…"

Reported dust plumes were reported by the El Paso Times showing surface conditions during the high wind event (Figure 3-6).

Seen is the Westside of El Paso during a wind and sand storm in El Paso, Texas, Wednesday, February 16, 2022. *Ivan Pierre Aguirre, For El Paso Times*

Figure 3-6. El Paso Times reporting dust plumes caused by the high wind event.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from northern Mexico into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 3-7). This analysis supports the hypothesis that dust plumes originated in Texas and New Mexico before being transported to downwind monitoring sites.

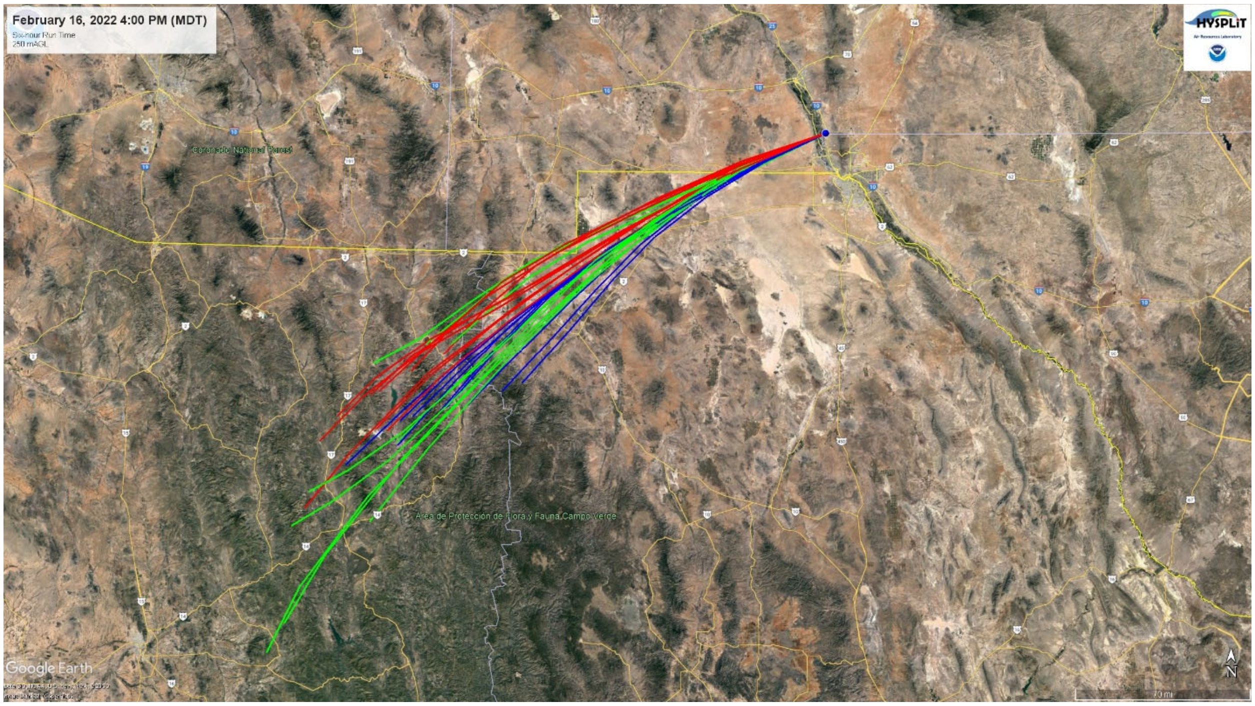


Figure 3-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony monitoring site.

Wind Direction and Elevated PM_{10} Concentrations

Pollution roses (Figures 3-8 through 3-12) for the Anthony, Chaparral, Desert View, Holman, and Deming monitoring sites were created for the hours of the event when PM_{10} concentrations exceeded 150 μg/m^3 (0700 - 1700 hours). During the event, winds blew from the west-northwest through the south-southeast direction 100% of the time coinciding with peak PM_{10} concentrations.

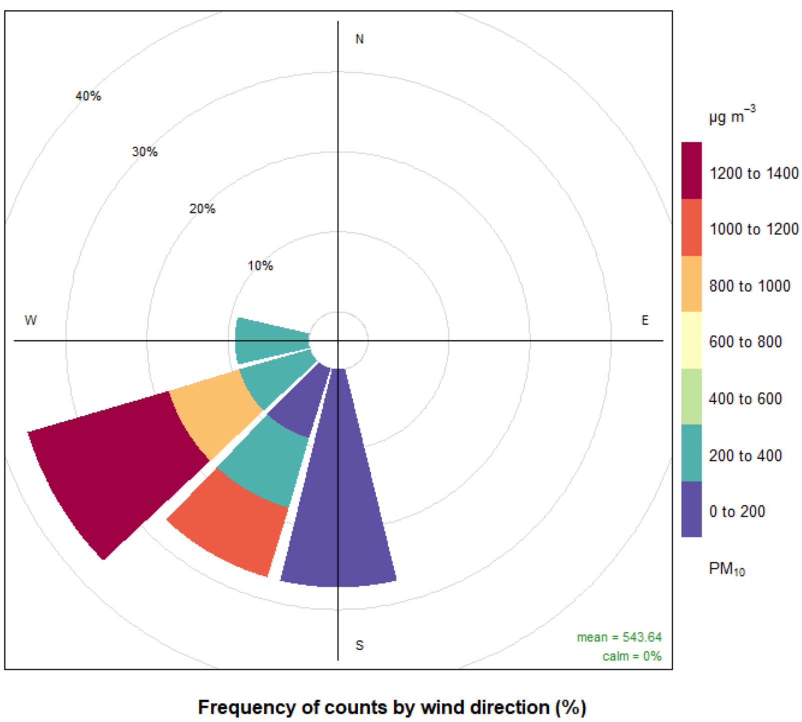


Figure 3-8. Pollution rose for the Anthony monitoring site.

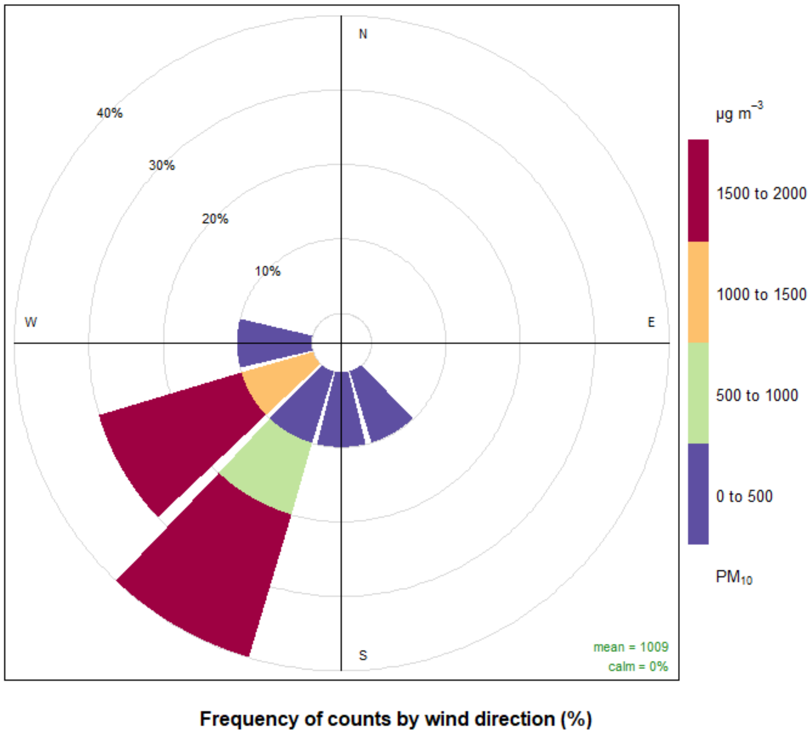


Figure 3-9. Pollution rose for the Desert View monitoring site.

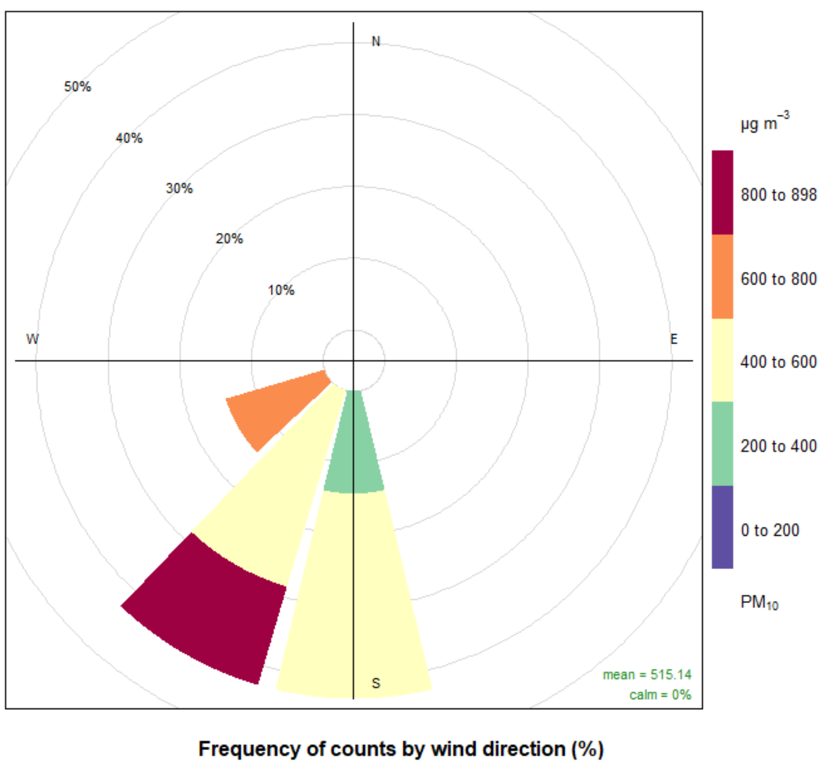


Figure 3-10. Pollution rose for the Chaparral monitoring site.

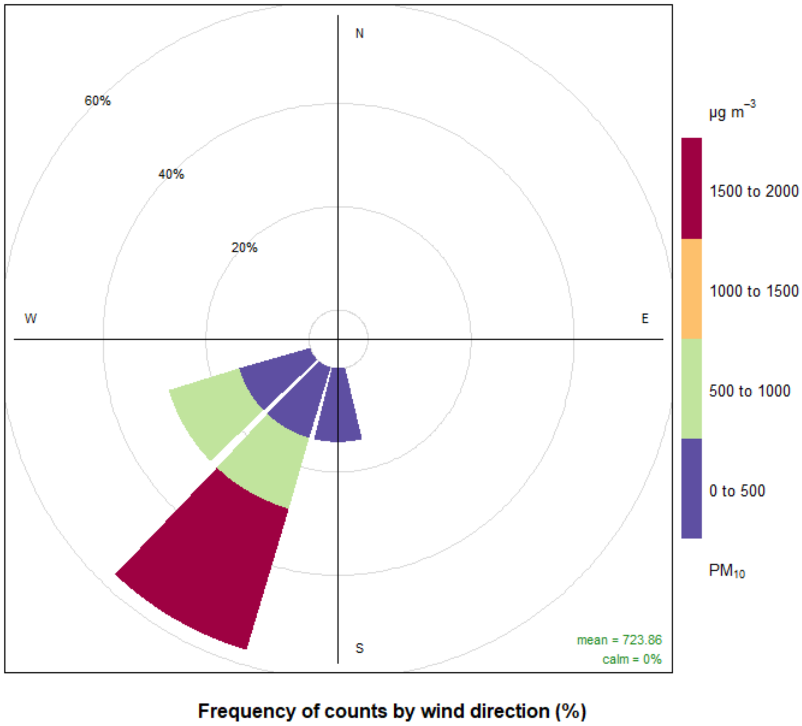


Figure 3-11. Pollution rose for the Holman monitoring site.

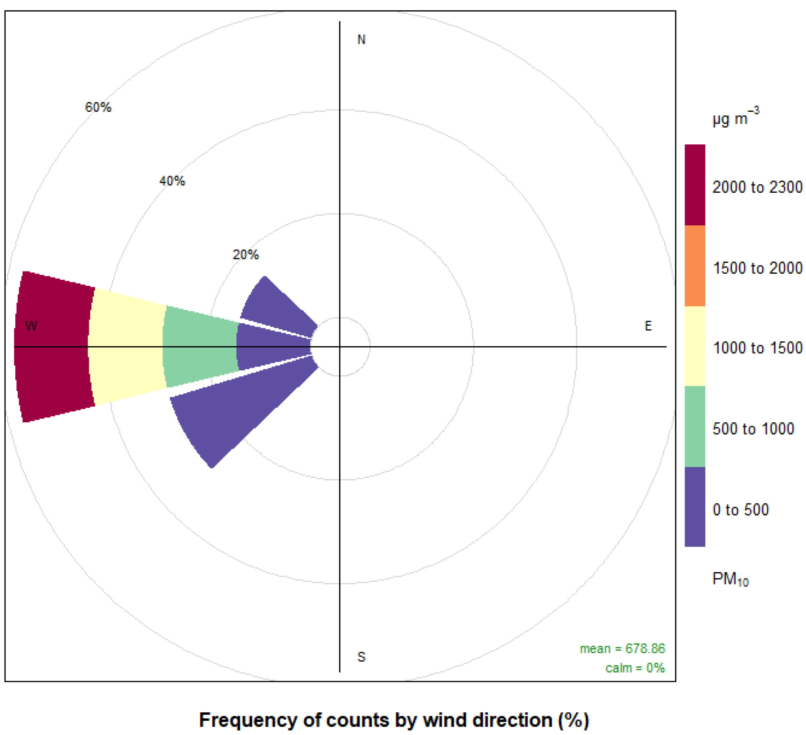


Figure 3-12. Pollution rose for the Deming monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west-southwest winds beginning at the 0700 hour and lasting through the 1700 hour. During this time, peak hourly PM_{10} concentrations ranged from 849 to 2300 µg/m^3 were recorded at the West Mesa and Deming monitoring sites, respectively (Figure 3-13). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds peaked from 11 to 15.6 m/s recorded at the Anthony and West Mesa monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figures 3-14 through 3-18 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

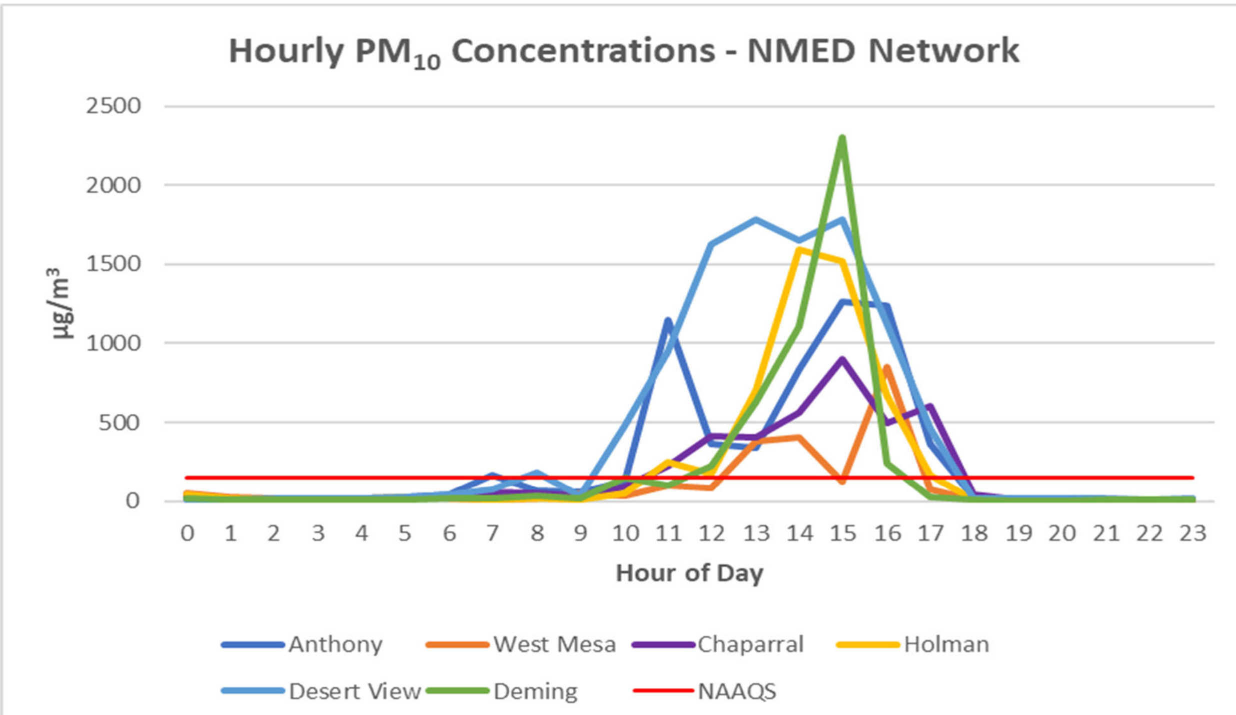


Figure 3-13. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

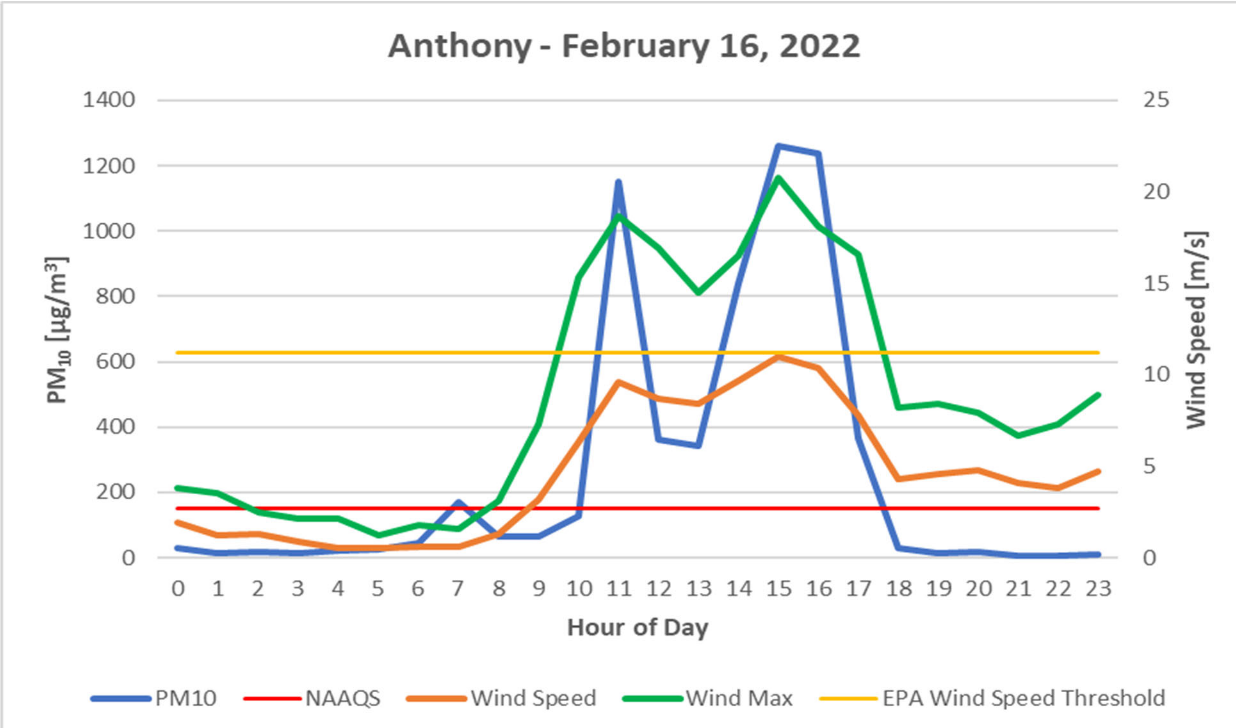


Figure 3-14. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

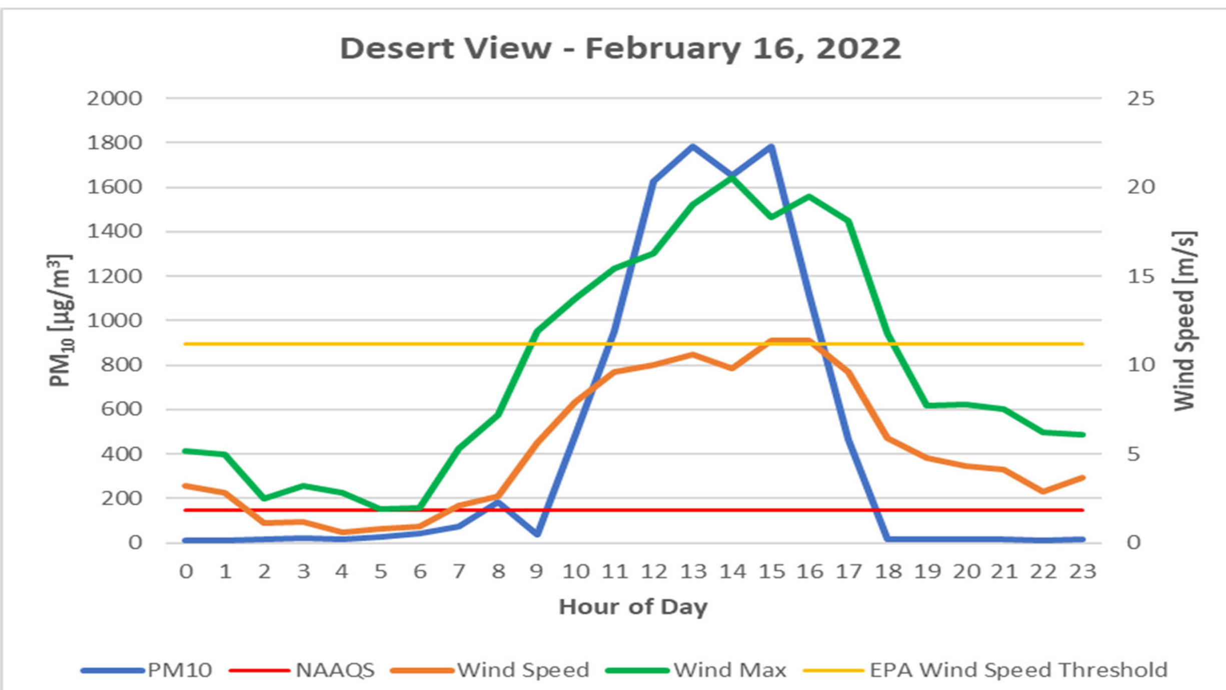


Figure 3-15. Desert View monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

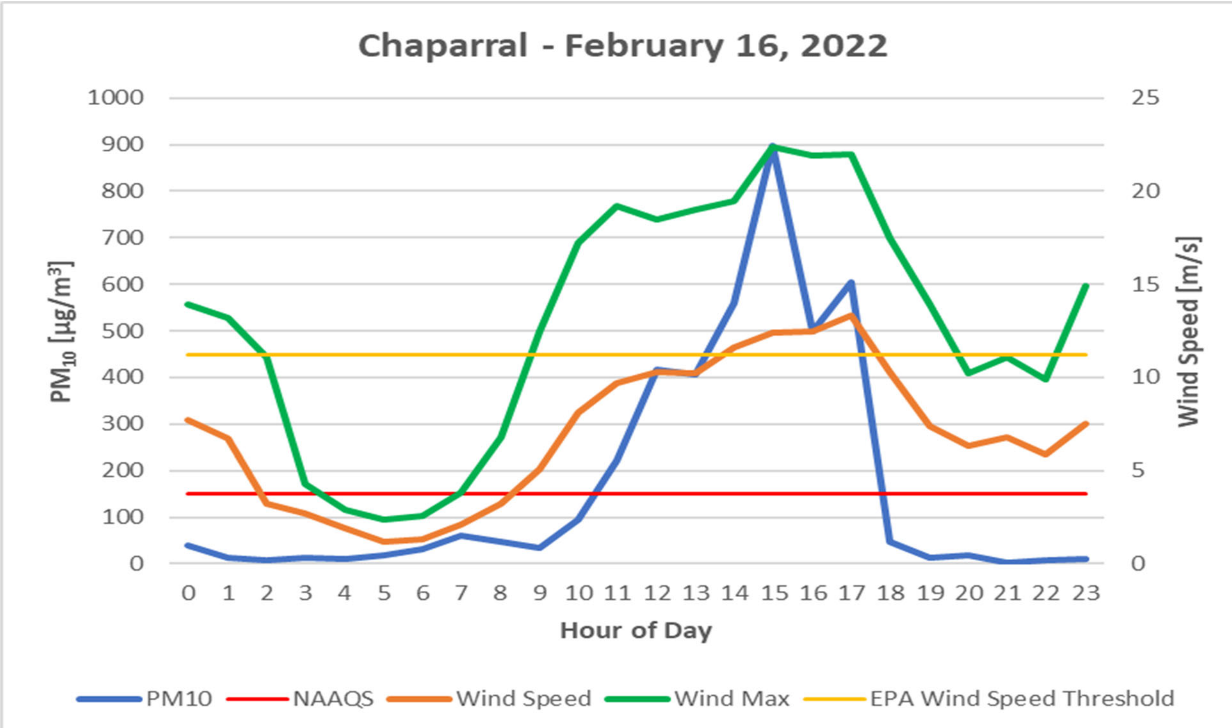


Figure 3-16. Chaparral monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

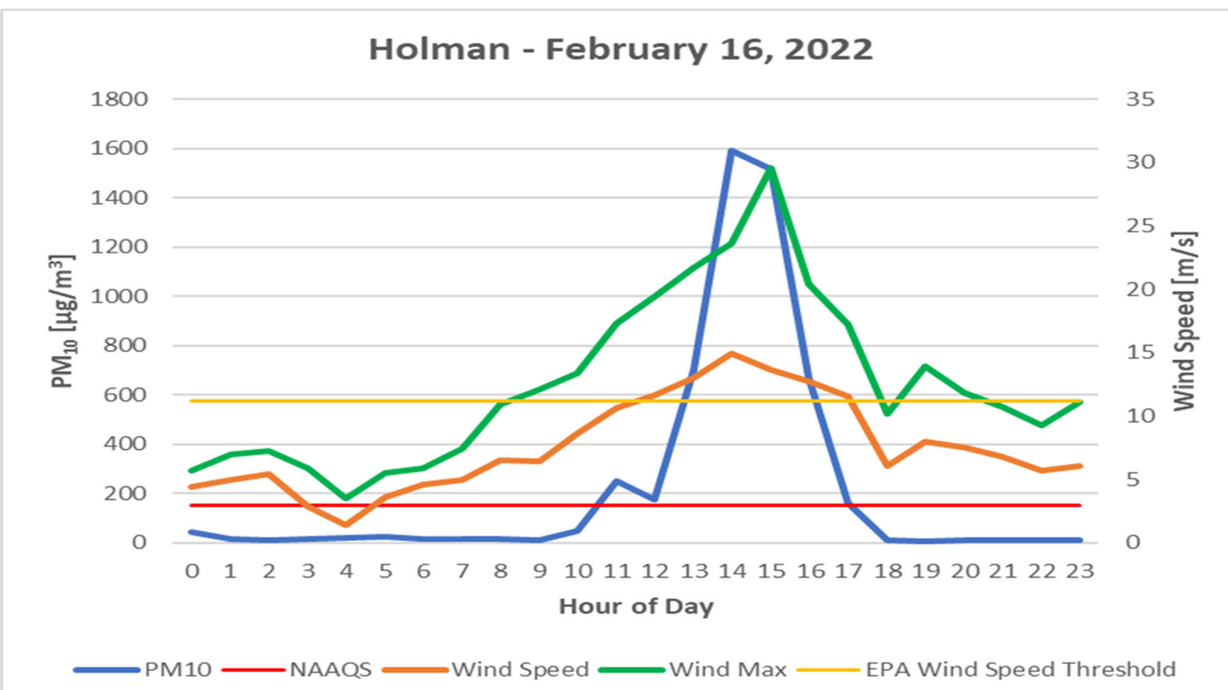


Figure 3-17. Holman monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

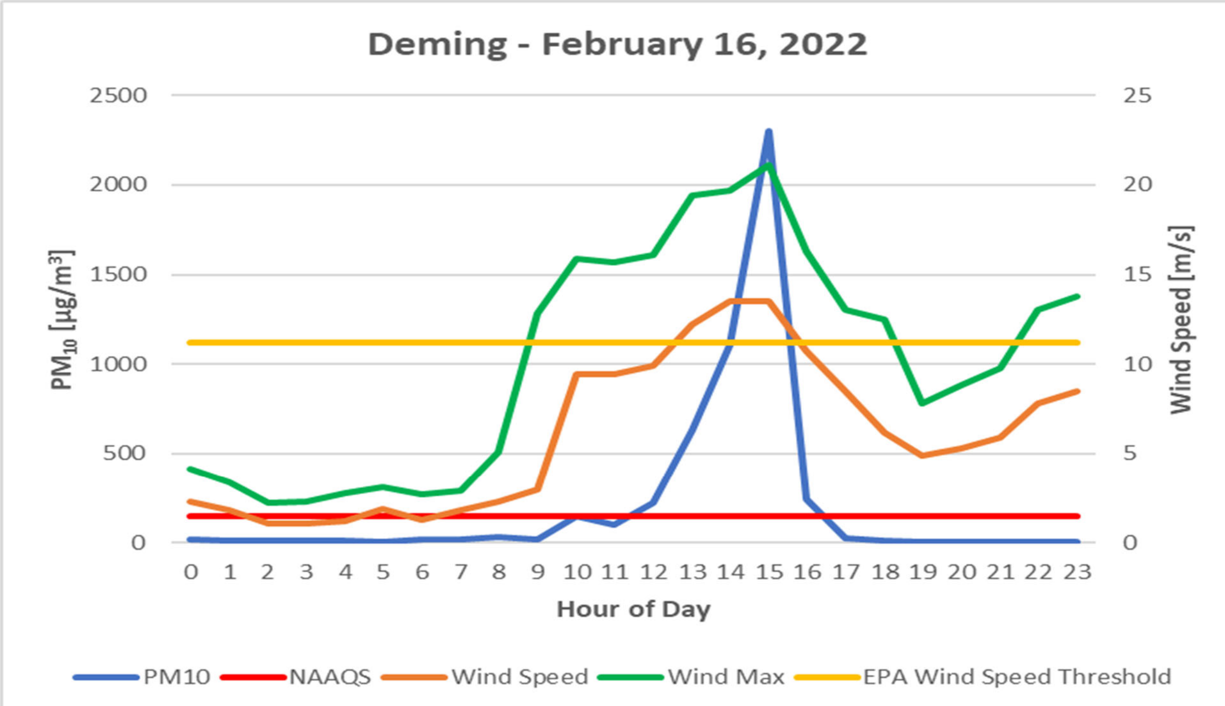


Figure 3-18. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, NMED monitoring sites recorded 22 (Anthony), 34 (Desert View), 27 (Chaparral), 12 (Holman), and 14 (Deming) exceedances of the PM_{10} NAAQS (Figures 22-1, 22-2, 22-3, 22-5, and 22-6 in Appendix B). The maximum 24-hour average PM_{10} concentrations were 541 (Anthony), 769 (Desert View), 721 (Chaparral), 691 (Holman), and 721 (Deming) µg/m^3 recorded in 2021 (Anthony and Desert View), 2017 (Chaparral), and 2019 (Holman and Deming). High wind blowing dust events in southern New Mexico can occur at any time of the year such as the Pacific cold front that occurred on this day, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 3-19, all Doña Ana County NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 85 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

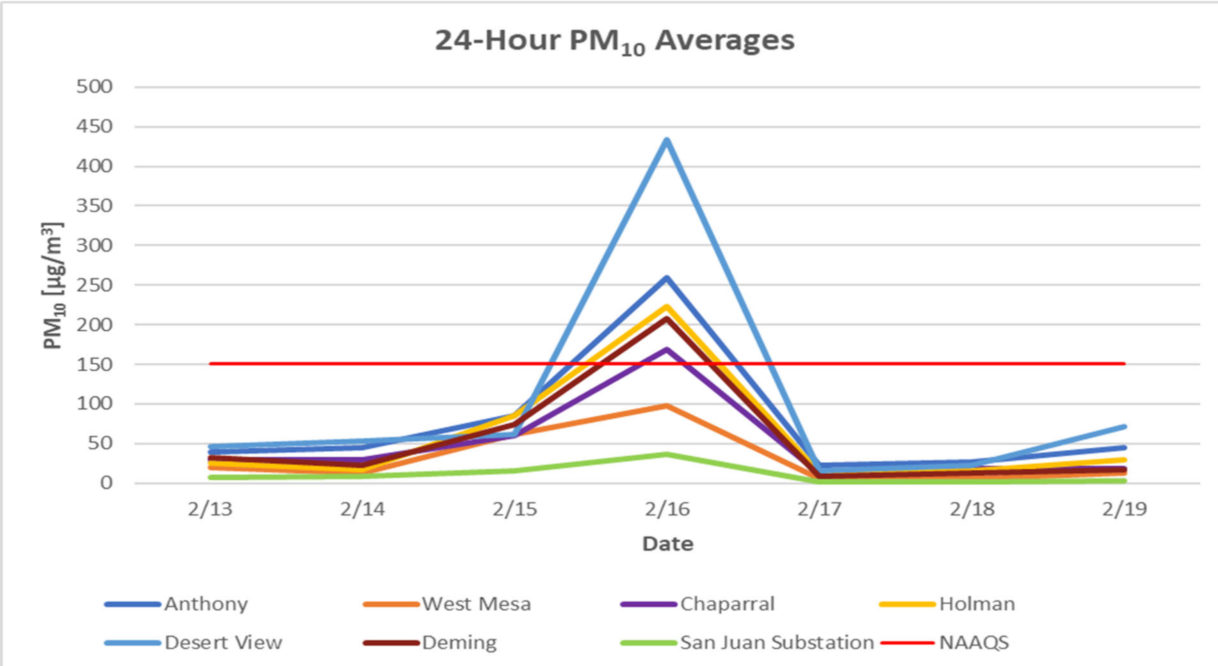


Figure 3-19. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 259 (Anthony), 434 (Desert View), 169 (Chaparral), 223 (Holman), and 208 (Deming) µg/m^3 are near and above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour averages of 259 (Anthony), 434 (Desert View), 169 (Chaparral), 223 (Holman), and 208 (Deming) µg/m^3 are near (Chaparral) and above (Anthony, Desert View, Holman, and Deming) the 99th percentile of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

4. HIGH WIND EXCEPTIONAL EVENT: February 21, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana and San Juan Counties resulting in an exceedance of the PM_{10} NAAQS at the Anthony, Desert View, and San Juan Substation monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 4-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	172µg/m^3	10.1 m/s	16.6 m/s
RJ	35-013-0021	6ZM Desert View	372 µg/m^3	11.3 m/s	18.7 m/s
RJ	35-045-1005	1H San Juan Sub	191 µg/m^3	14.5 m/s	22.3 m/s

Table 4-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A leeside trough centered over southeastern Colorado along with a weak shortwave impulse over southern New Mexico will utilize the broad upper trough over the Great Basin to send a wave of energy from northwest New Mexico into west Texas. At the 1800 hour, a large area of low-pressure moved east along the Four Corners extending into southern New Mexico and west Texas (Figure 4-1). As the day progressed increased humidity with low-pressure aloft slowly traveled east and aligned itself with New Mexico and the surface wind direction (Figure 4-2). Diurnal heating increased surface wind energy aloft to vigorously mix down, dramatically increasing the surface wind velocities especially on the western faces of mountains and providing the turbulence required for vertical mixing and entrainment of dust into plumes.

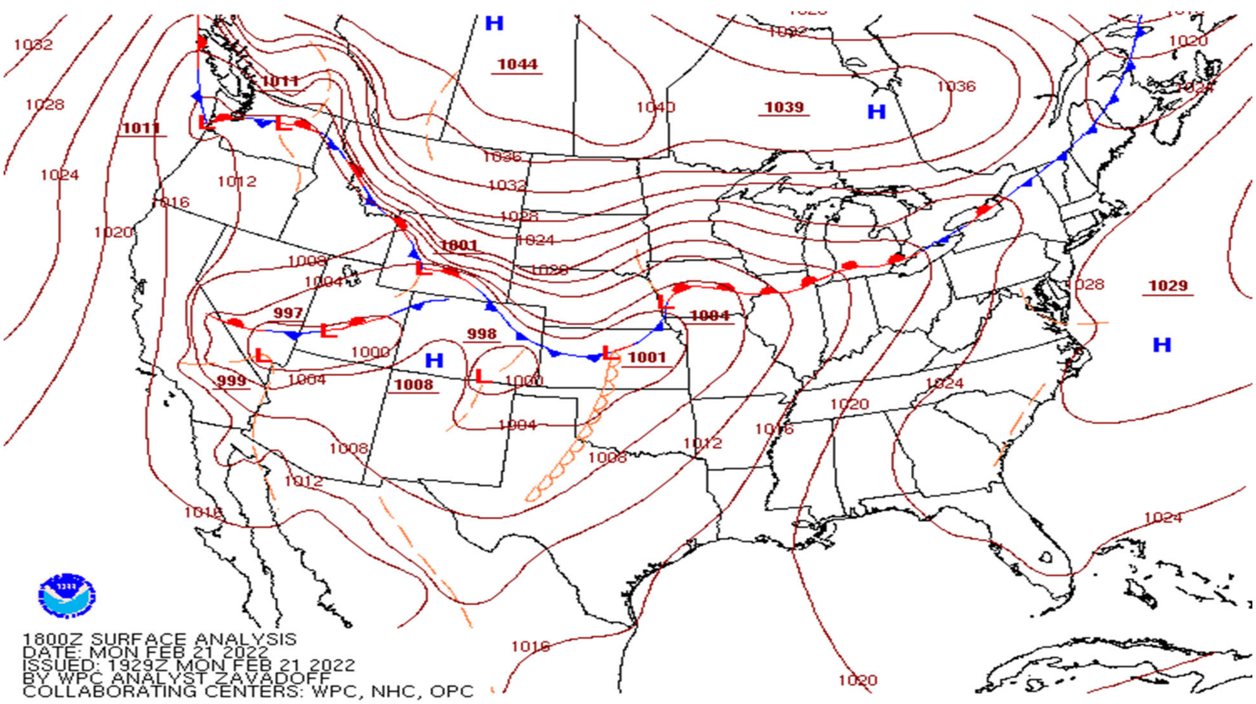


Figure 4-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

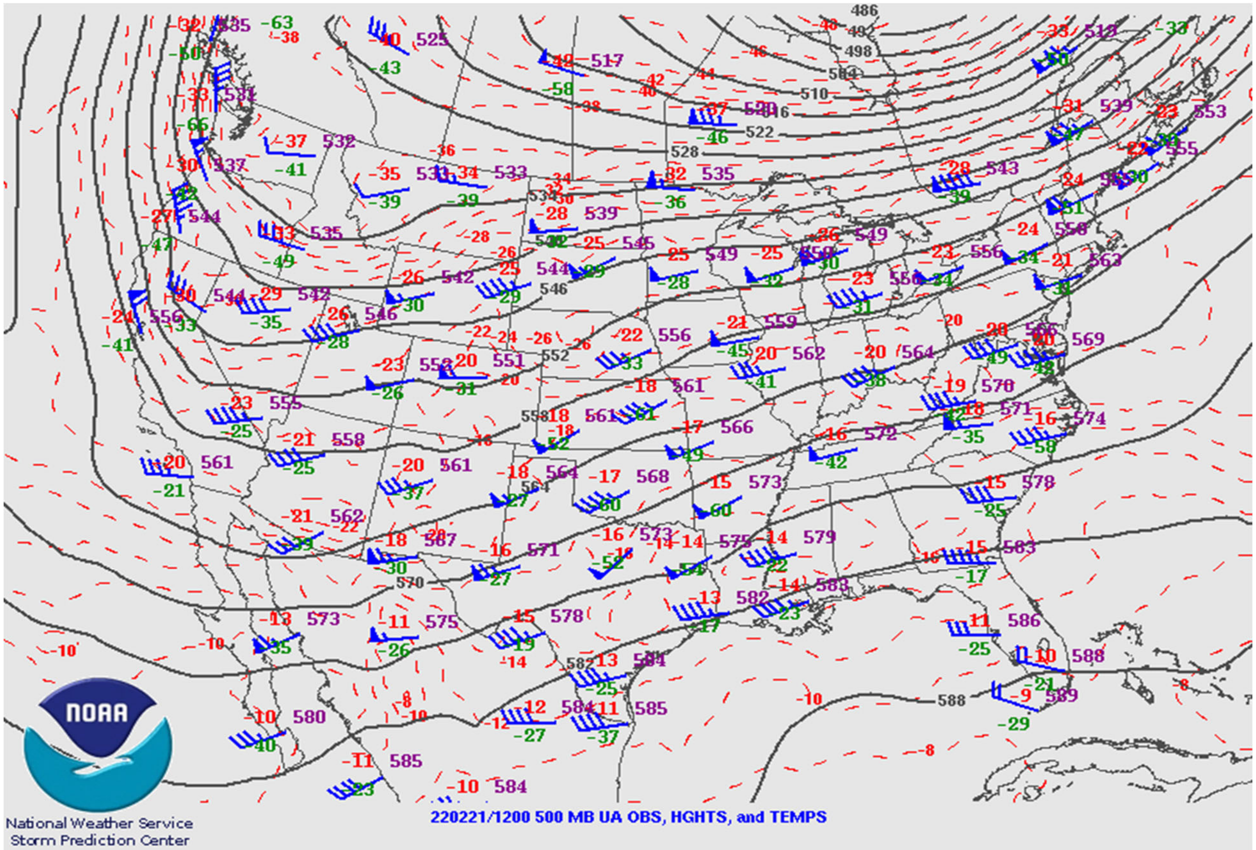


Figure 4-2. Upper air weather map for February 21, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the southern border and Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at Anthony, Desert View, Chaparral, Holman, West Mesa, La Union, Santa Teresa, Deming, and San Juan Substation monitoring sites beginning at the 1100 hour and lasted through the 2100 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, and San Juan Substation monitoring sites beginning at the 1100 hour. Hourly concentrations remained elevated through the 2200 hour. Table 4-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Anthony			Desert View			San Juan Substation		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
1300	251	6.7	12.4	48	6.5	11.9	----	2.8	5.2
1400	2149	10.1	16.6	5213	11.3	18.7	----	3.1	6.6
1500	959	9.3	16.5	1880	11	17.5	----	1.7	3.9
1600	276	8.4	14.5	915	9.9	15.5	----	6.3	18.3
1700	44	7.2	14.3	156	7.2	13.5	334	13.9	19.8
1800	19	4.9	9.1	66	3.3	7.6	1213	14.5	22.3
1900	24	2.2	4.9	53	0.9	2.7	1108	13.4	20.7
2000	24	3.2	5.8	46	3.3	5.4	332	10.7	18
2100	17	4.4	9.9	17	5.1	8.5	407	14	20.4
2200	17	2.4	5.3	14	5.3	10.5	171	7.7	15

Table 4-2 Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the Pacific cold fronts that typically occur this time of year bring. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east approaching the Four Corners aloft this morning and very slowly progressing east this afternoon. The system's movement across the area timed well with daytime heating and mixing generating a deep trough to the west as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon, especially in the desert areas of southern New Mexico (Figure 4-3).

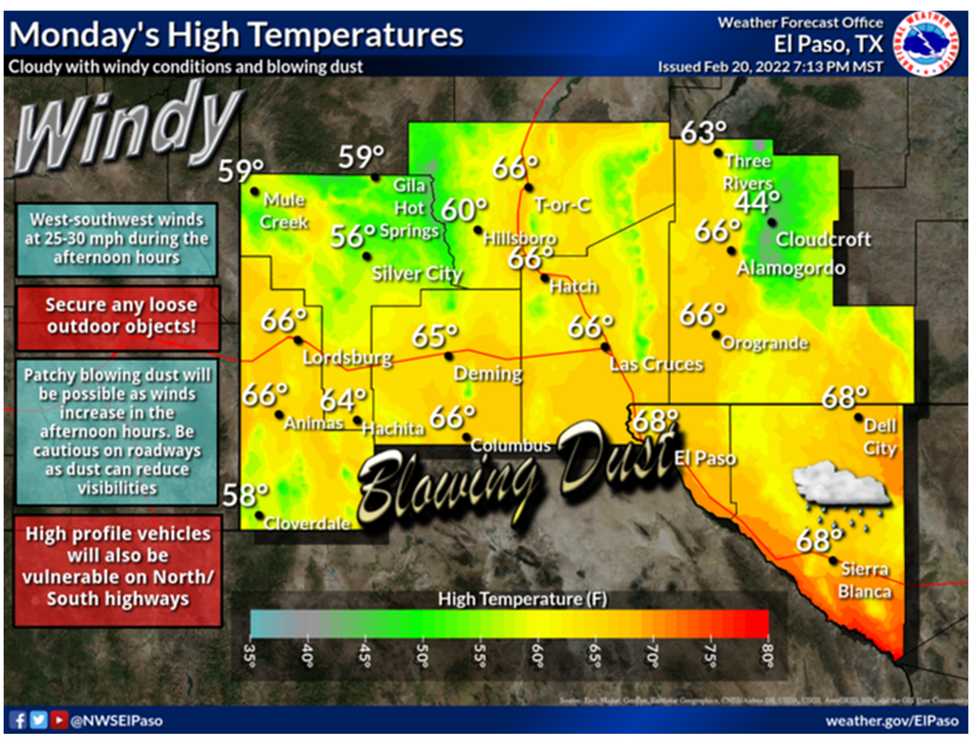


Figure 4-3. NWS GraphiCast forecasting the high wind blowing dust event for southern New Mexico.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Desert View, Chaparral, Holman, West Mesa, and San Juan Substation monitoring sites recorded wind speeds above this threshold for seven hours, beginning at the 1300 hour and lasting through the 2100 hour with an intermittent period below the threshold at the 2000 hour (Figure 4-4). The wind speeds at the upwind Deming, La Union, and Santa Teresa monitoring sites also reached the high wind threshold.

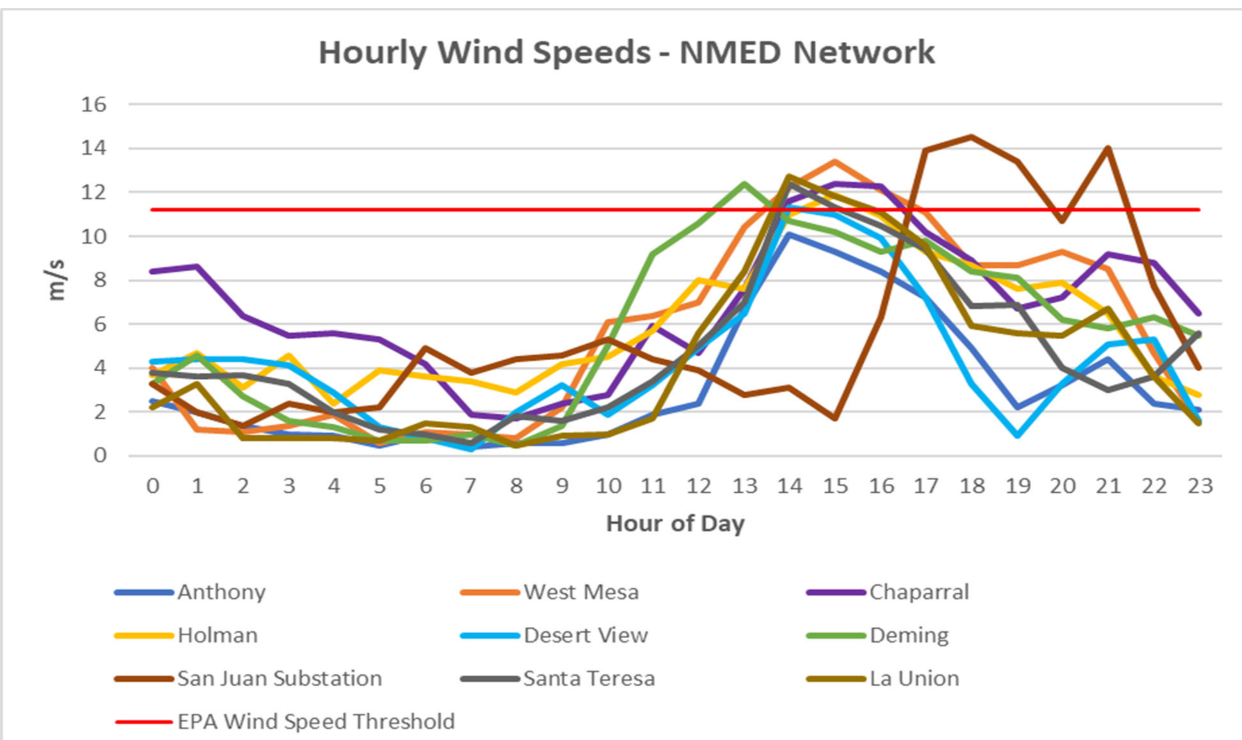


Figure 4-4. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana, and Luna Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan/Sonoran Desert in Doña Ana, Luna, Hidalgo, Grant, San Juan, and McKinley Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Sonora/Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedances were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the VIIRS SNPP satellite RGB dust product imagery with dust plumes observed as bright pink bands originating upwind of NMED's monitoring sites near Ascension and Janos, Chih and northeastern Arizona. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 4-5). The dust plumes of interest appear to be limited to Mexico and Arizona, orientated in a southwest to northeast fashion and traveling toward NMED's monitoring sites at the time of the satellite pass (1410 MST) that captured the imagery.

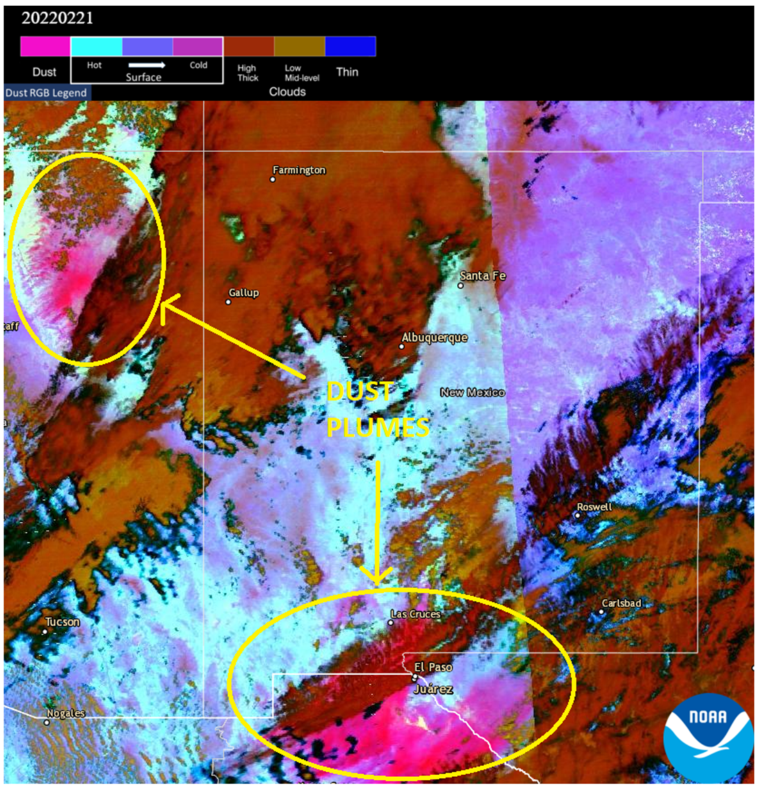


Figure 4-5. VIIRS SNPP satellite imagery demonstrating dust plumes displayed as pink bands traveling towards the NMED monitoring sites at the 1410 hour (MST). Courtesy of NOAA Aerosol Watch.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Winter Weather Advisory and a Wind Advisory for this date. A Wind Advisory is issued by NWS when sustained winds of 40 mph are expected for 1 hour or longer or gusts at 58 mph or greater. A Wind Advisory statement was issued for northwestern and southwestern New Mexico and west Texas to warn the public of the high wind event. Excerpts from the NWS Wind Advisories can be found below:

(Northwestern NM Forecast Area – Zone 202)
"Winter Weather Advisory until 5 PM MST Tuesday …Wind advisory until 7 PM MST this evening."

(Southwestern NM Forecast Area – Zone 411)
"Wind Advisory from noon today to 6 PM MST this evening... Windy conditions will begin this afternoon with patchy blowing dust..."

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from the neighboring Arizona and Sonora/Chihuahua, MX states into the southern and northern New Mexico area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 4-6). This analysis supports the hypothesis that dust plumes originated out of state before being transported to downwind monitoring sites.

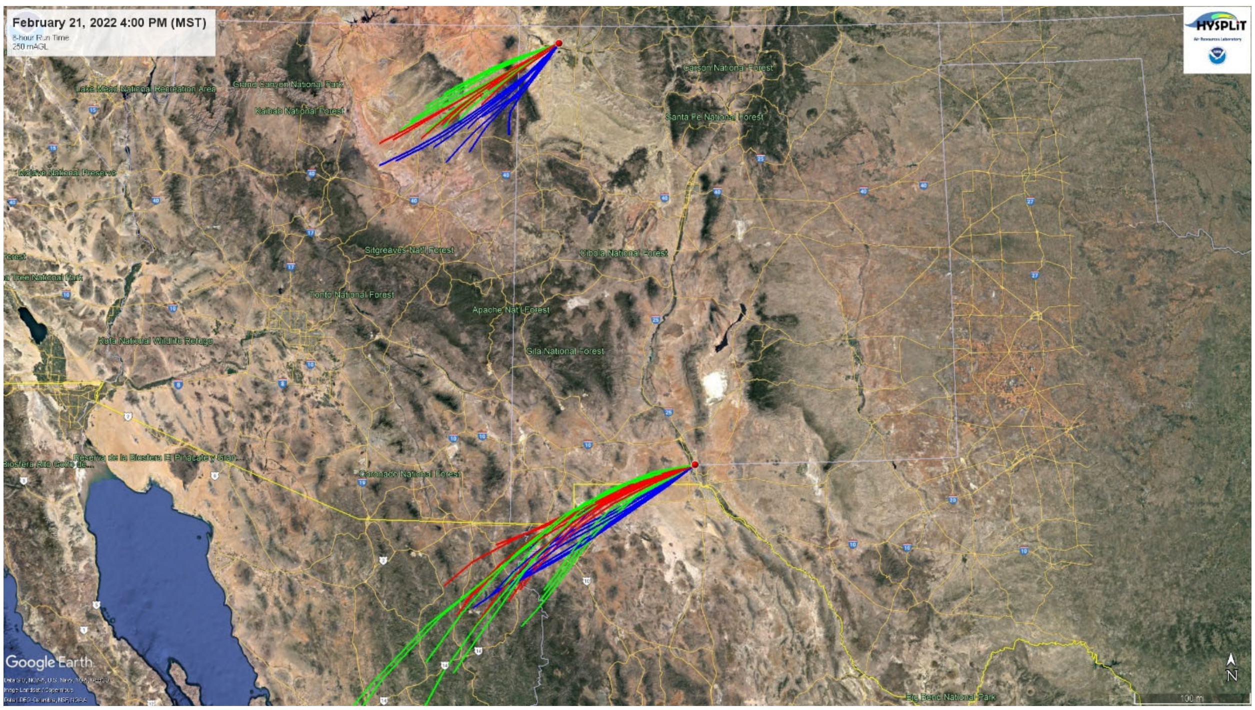


Figure 4-6. HYSPLiT back-trajectory analyses using the Ensemble mode for Desert View monitoring site

Wind Direction and Elevated PM_{10} Concentrations

A pollution rose (Figures 4-7 through 4-9) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m^3 (0900 - 2200 hour). During the event, winds blew from the west-northwest to west-southwest directions approximately 85-100% of the time coinciding with peak PM_{10} concentrations.

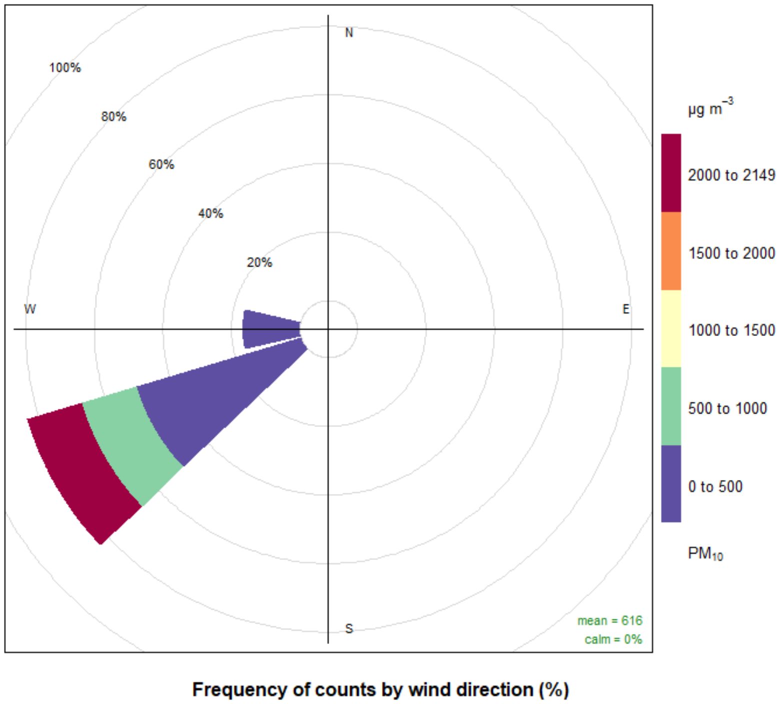


Figure 4-7. Pollution rose for the Anthony monitoring site

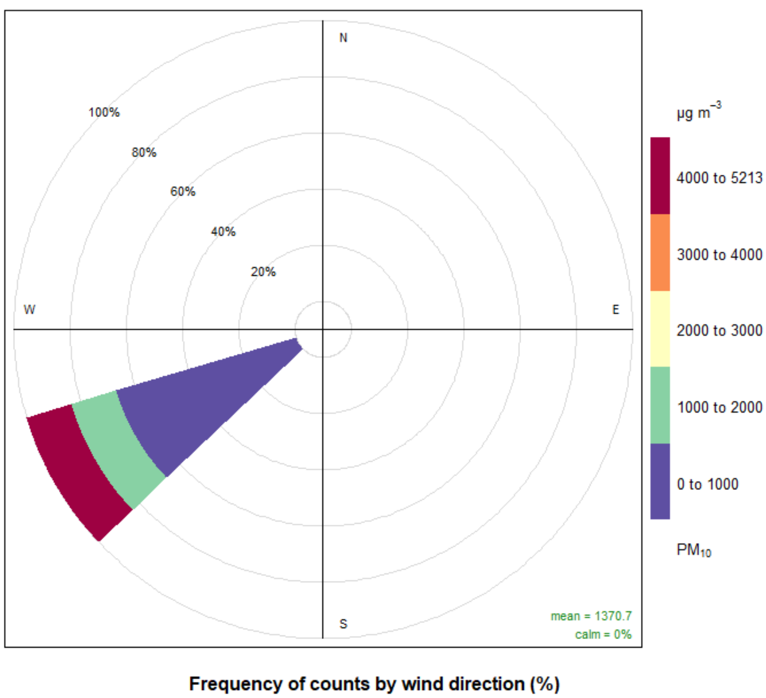


Figure 4-8. Pollution rose for the Desert View monitoring site

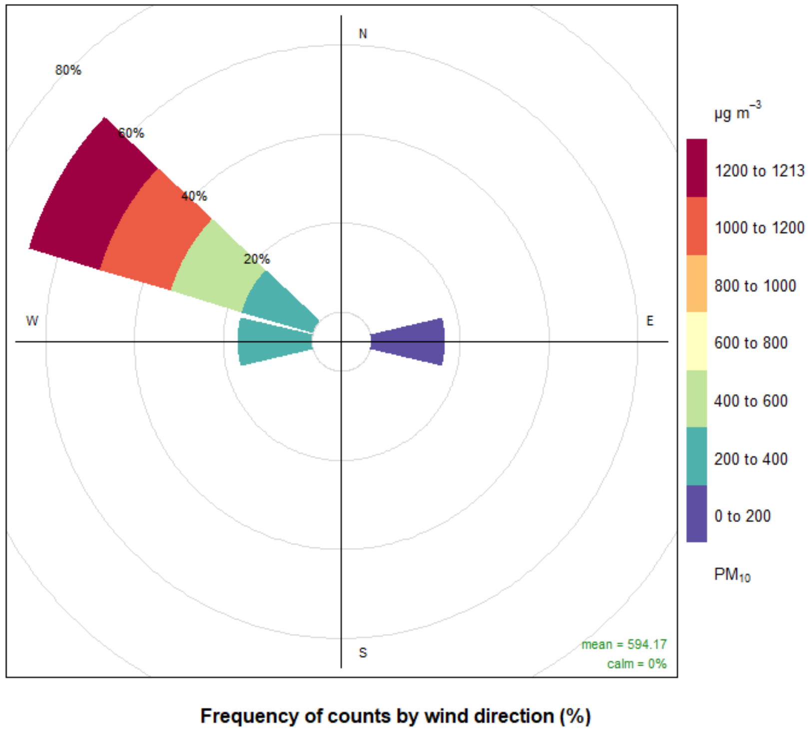


Figure 4-9. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong southwesterly to northwesterly winds beginning at the 1100 hour. During this time, peak hourly PM_{10} concentrations ranged from 178 to 5213 µg/m^3 were recorded at the West Mesa and Desert View monitoring sites, respectively (Figure 4-10). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 10.1 to 14.5 m/s were recorded at the Anthony and San Juan Substation monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figures 4-11 through 4-13 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

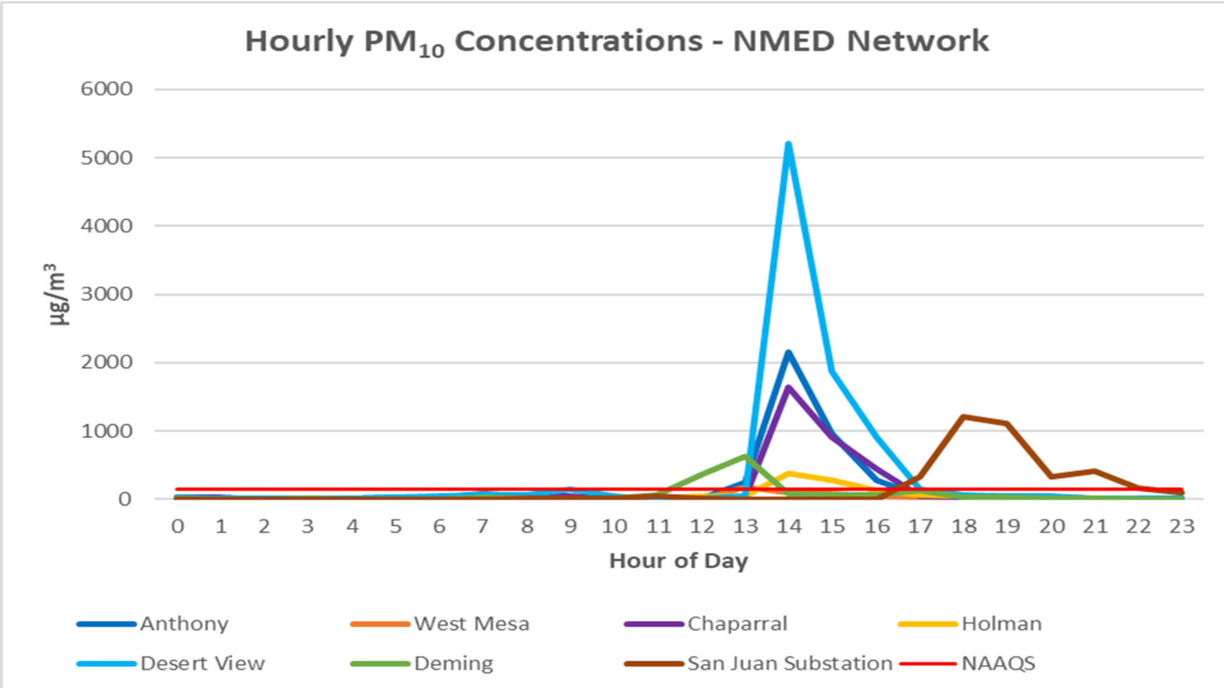


Figure 4-10. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

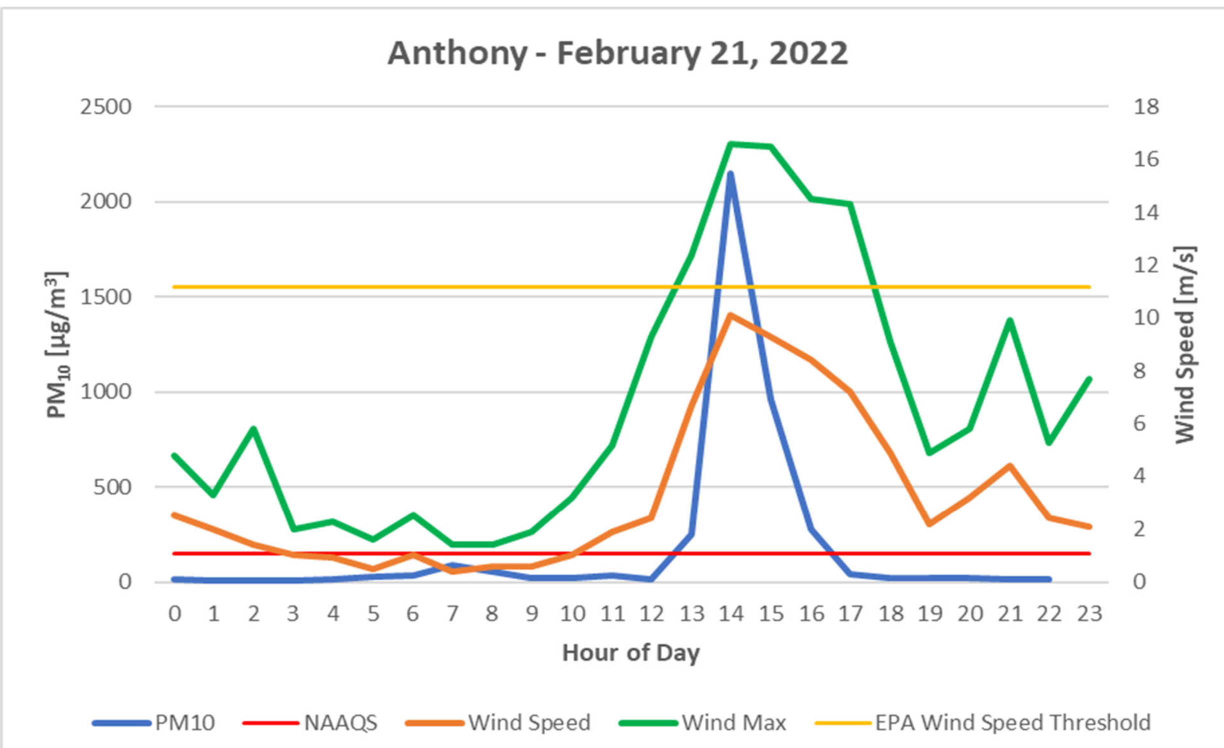


Figure 4-11. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

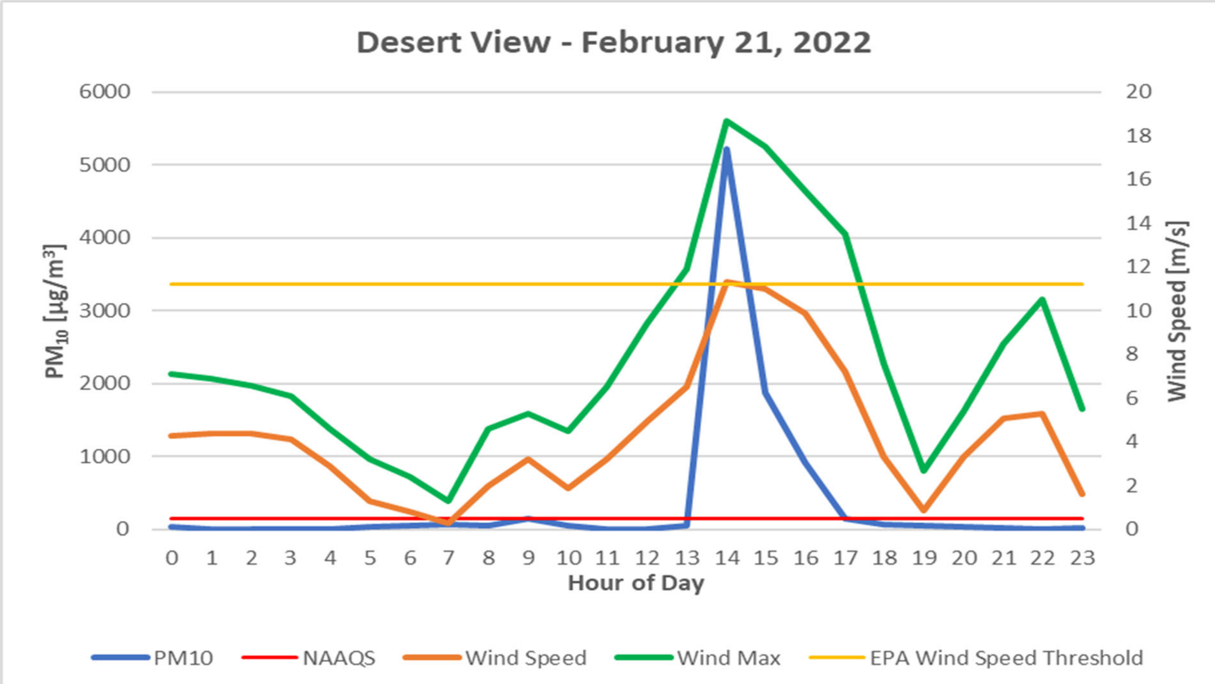


Figure 4-12. Desert View monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

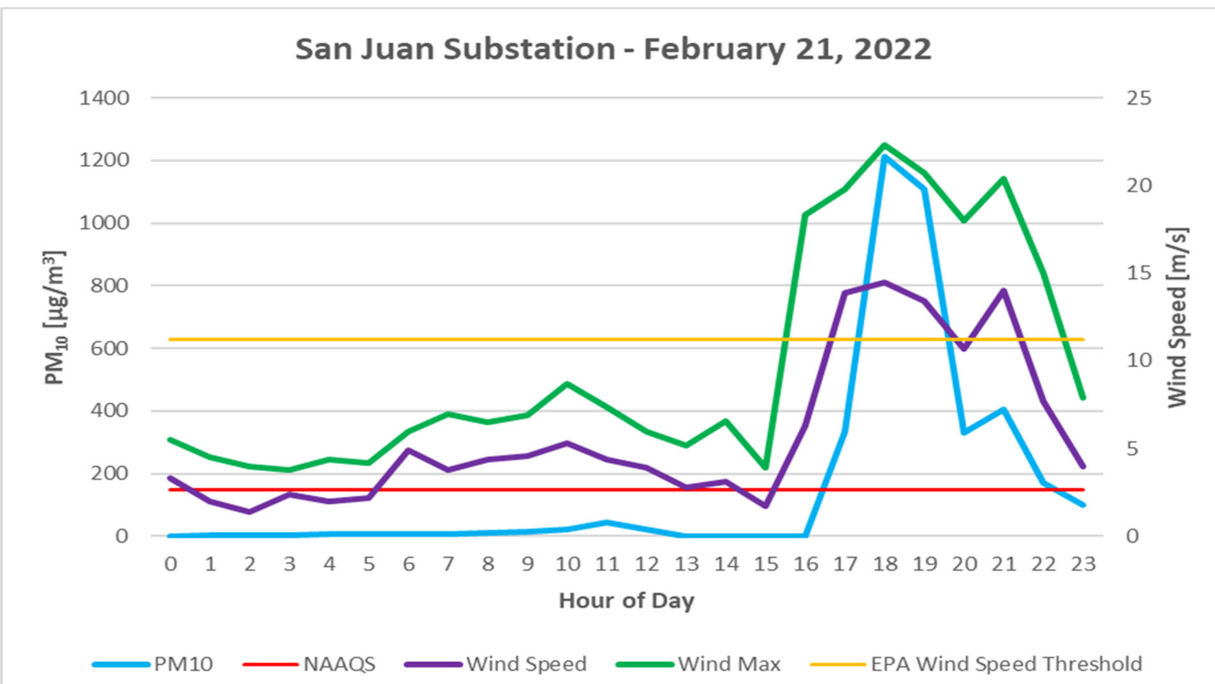


Figure 4-13. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, NMED monitoring sites recorded 22 (Anthony), 34 (Desert View), and 1 (San Juan Substation) exceedance(s) of the PM_{10} NAAQS (Figures 22-1, 22-2, and 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at these sites were 541 (Anthony), 761 (Desert View), and 171 (San Juan Substation) µg/m^3 recorded in 2020 (San Juan Substation) and 2021 (Anthony and Desert View). High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 4-14, the majority of the NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event, except for the following event date of February 23, 2022, did not surpass 62 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

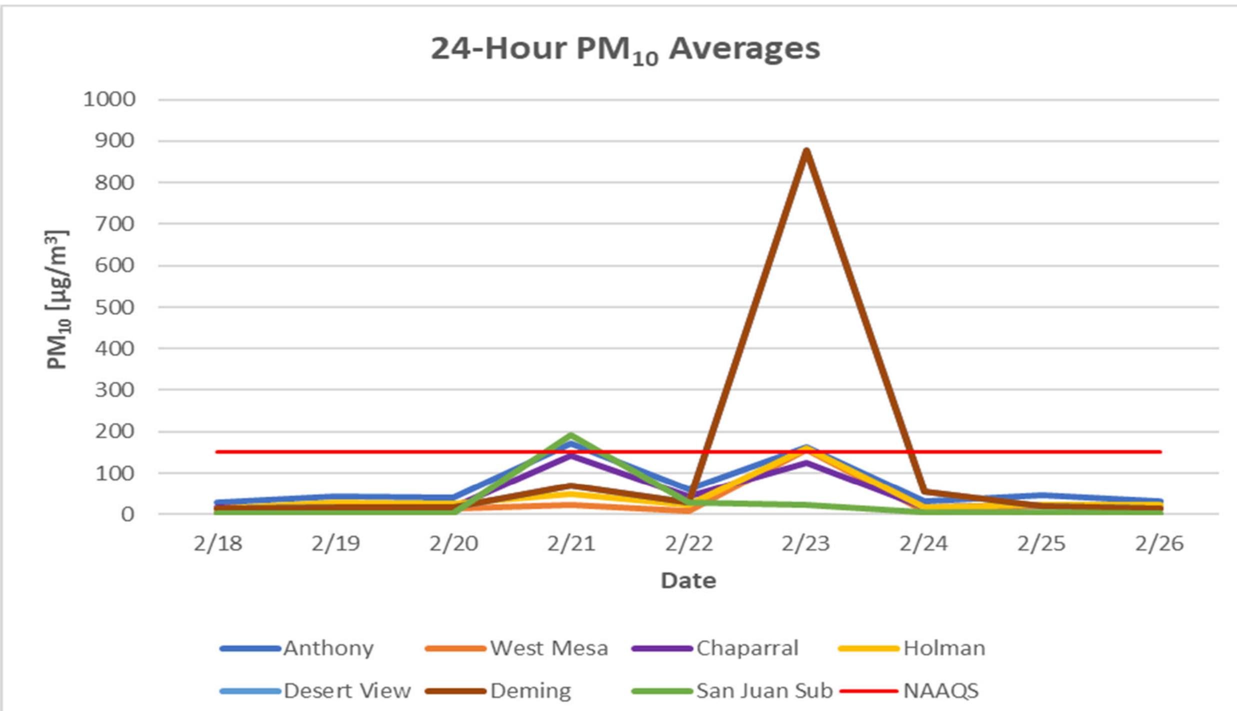


Figure 4-14. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day are 172 (Anthony), 372 (Desert View), and 191 (San Juan Substation) µg/m^3 are near (Anthony) and above (Desert View and San Juan Substation) the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour averages 172 (Anthony), 372 (Desert View), and 191 (San Juan Substation) are near (Anthony) and above (Desert View and San Juan Substation) the 99th percentile of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

5. HIGH WIND EXCEPTIONAL EVENT: February 23, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana and Luna Counties resulting in an exceedance of the PM_{10} NAAQS at the Anthony, Desert View, Holman, West Mesa and Deming monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 5-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	162 µg/m^3	7.6 m/s	15.5 m/s
RJ	35-013-0021	6ZM Desert View	222 µg/m^3	9.7 m/s	16.7 m/s
RJ	35-013-0024	6WM West Mesa	157 µg/m^3	15.2 m/s	22.8 m/s
RJ	35-013-0019	6ZL Holman	160 µg/m^3	13.7 m/s	22.9 m/s
RJ	35-029-0003	7E Deming	879 µg/m^3	15.7 m/s	23.4 m/s

Table 5-1 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

This Pacific storm system is a continuance from yesterday's remaining slow-moving cold front that slowly progressed east of the Four Corners this morning into southeast Colorado. At the 1800 hour, an area of low-pressure moved over south-eastern Colorado (Figure 5-1). Aloft, an upper-low is over southeastern Colorado. As the day progressed this low-pressure aloft traveled towards the Central Plains and aligned itself with New Mexico and the surface wind direction (Figure 5-2). Northeast New Mexico's low-pressure system plus downslope warming will sustain lee-cyclogenesis, increasing surface wind velocities and providing the turbulence required for vertical mixing and entrainment of dust, particularly along east slopes and mountain gaps.

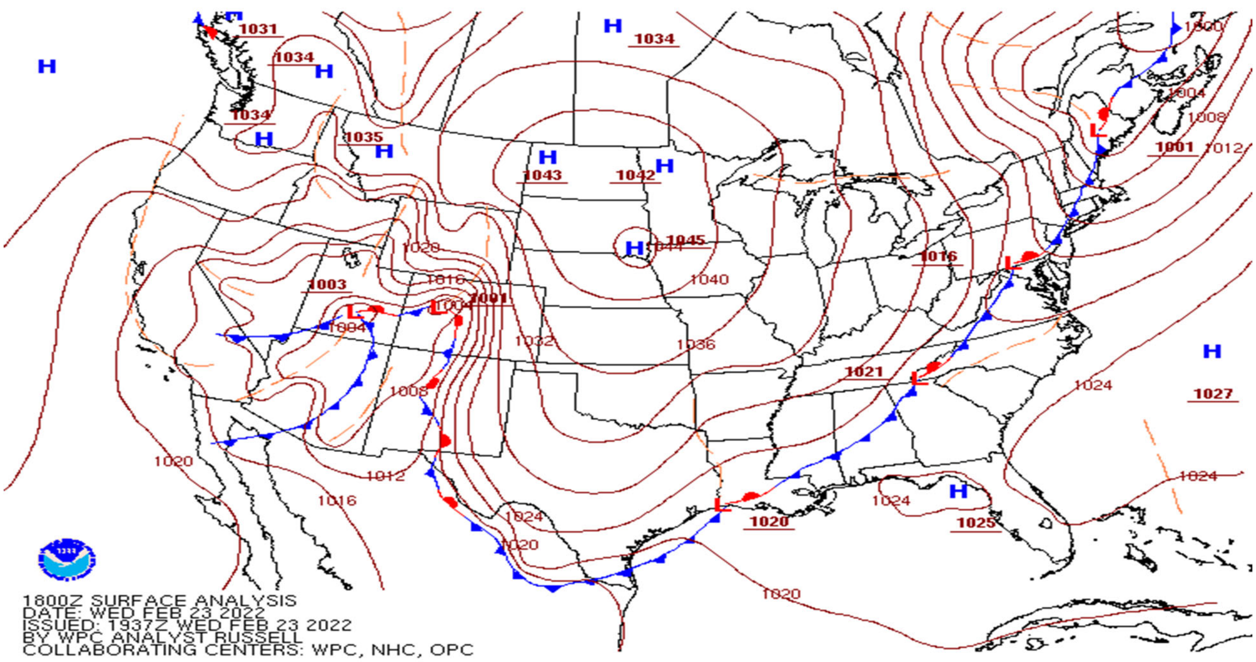


Figure 5-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

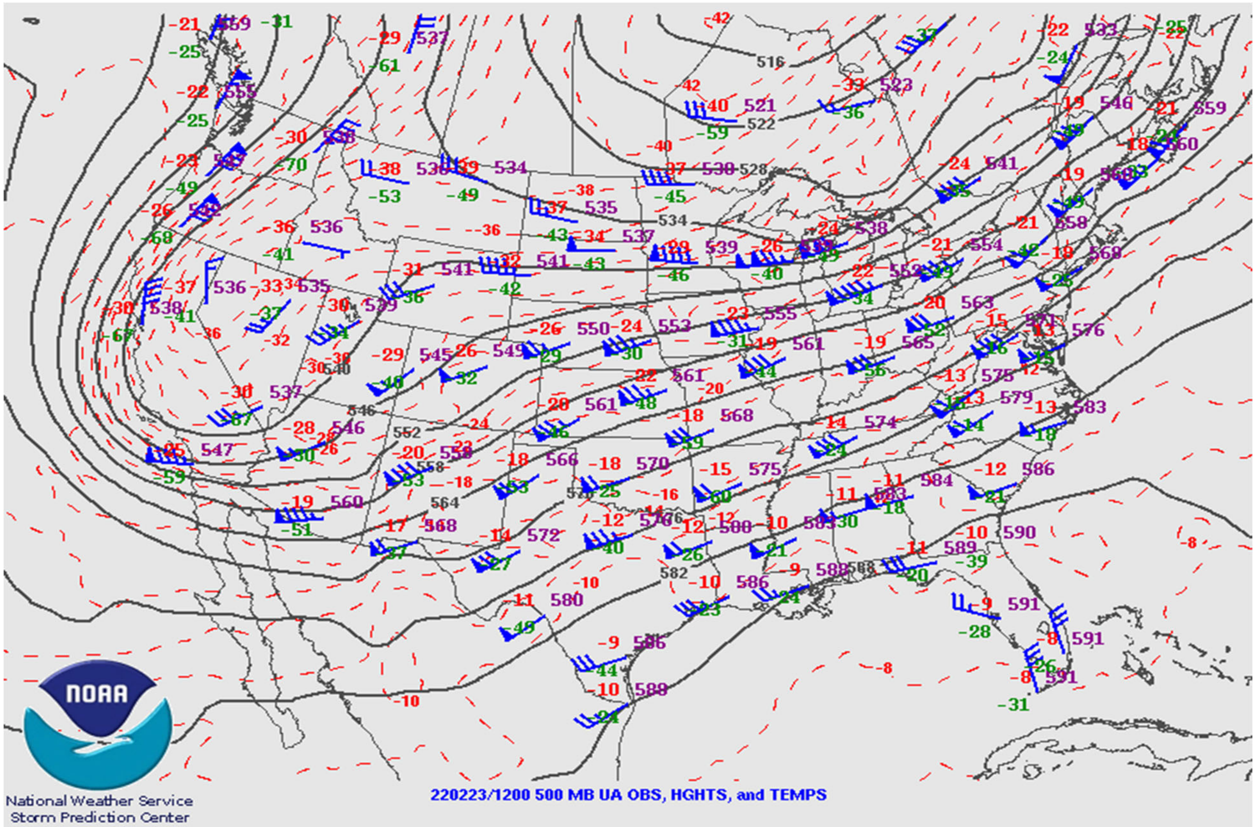


Figure 5-2. Upper air weather map for February 23, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the west-southwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Chaparral, Desert View, Holman, West Mesa, La Union, Santa Teresa and Deming monitoring sites beginning at the 0800 hour and lasted through the 2100 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa and Deming monitoring sites beginning at the 0500 hour. Hourly concentrations remained elevated through the 2100 hour. Table 5-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Desert View			Anthony			Deming		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
1300	100	8	11.8	63	4.7	7.5	1550	12.8	20.2
1400	----	8	12.2	88	4.2	7.6	6124	15.7	23.1
1500	134	7.1	12.6	119	3.9	6.8	4100	15	23.4
1600	705	7.4	16.7	1152	7.4	15.5	5399	15	22.7
1700	515	7.3	14	823	7.6	14.2	2461	13.8	21.8
1800	112	4.7	11.1	305	5.9	12.6	674	12.4	20
1900	134	4.6	9.5	219	3.4	8.4	129	10.5	16.9
2000	78	5.6	10.8	78	2.6	4.7	300	9.2	14.3
2100	251	8	13.2	53	1.5	3.9	39	7.8	11.5

Table 5-2 Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, aloft an upper-low moved across northeastern New Mexico and southeastern Colorado. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east just east of the Four Corners in the morning and moving across New Mexico in the afternoon. The system's movement across the area timed well with daytime heating and mixing sustained lee-cyclogenesis to the east as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained localized dust throughout the area, especially in the desert areas of southern New Mexico (Figure 5-3).

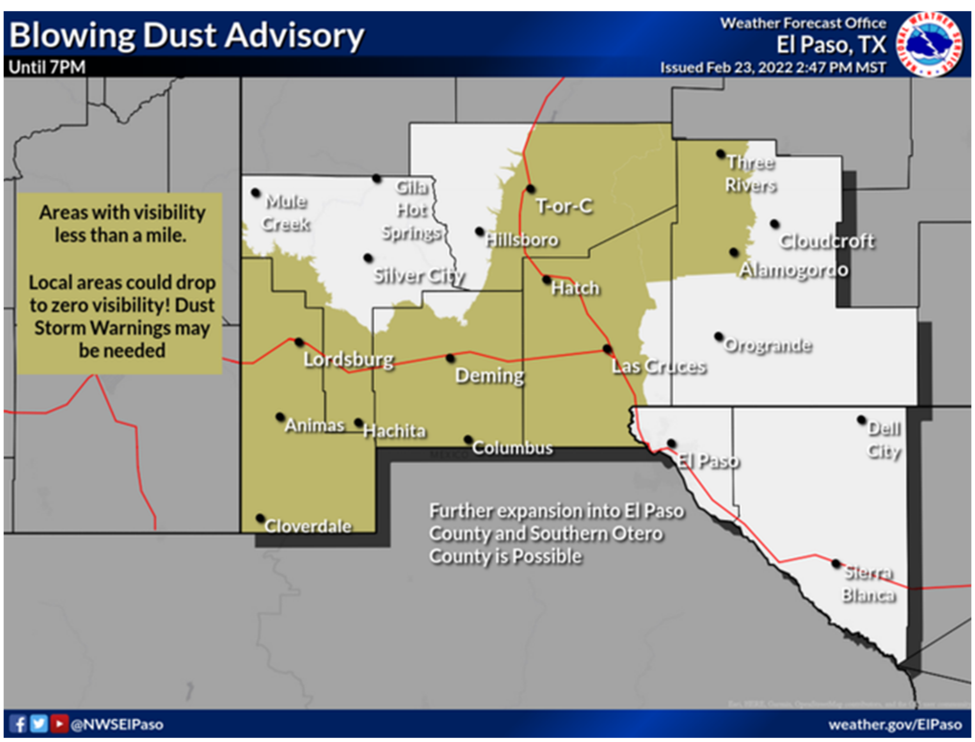


Figure 5-3. NWS Graphicast of blowing dust advisory.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Chaparral, West Mesa, and Holman monitoring sites recorded wind speeds above this threshold for eight hours from the 1300 through the 2000 hours (Figure 5-4). The wind speeds at the upwind Deming and Santa Teresa monitoring sites also reached the high wind threshold.

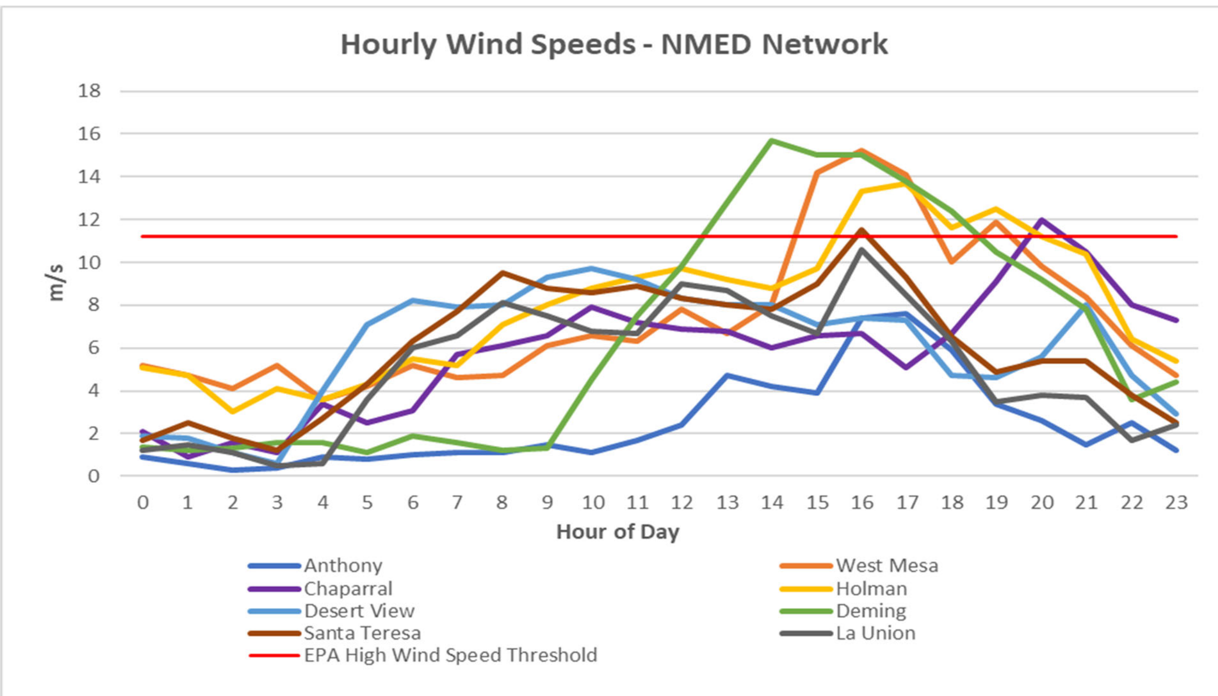


Figure 5-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Hidalgo, and Grant Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the GOES-16 geostationary satellite imagery with dust plumes originating upwind of NMED's monitoring sites near Ascension and Janos, Chih. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 5-5). The dust plumes of interest appear to be limited to Mexico, orientated in a southwest to northeast fashion and traveling toward El Paso and NMED's monitoring sites at the time of the satellite pass (1611 MST) that captured the imagery.

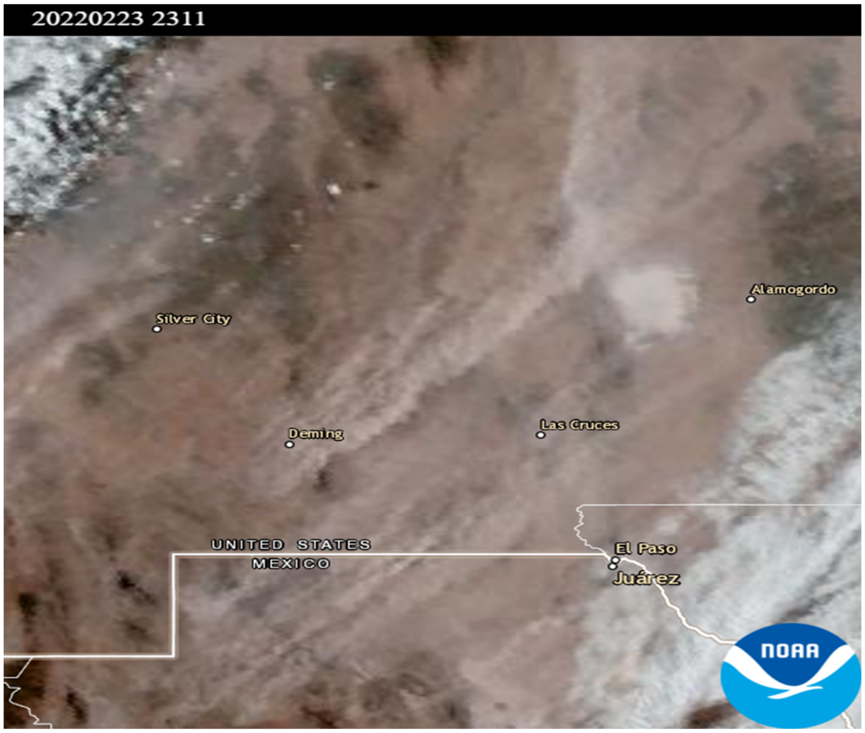


Figure 5-5. GOES-16 geostationary satellite geocolor imagery. Courtesy of Aerosol Watch.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Wind Advisory for this date. A Wind Advisory is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. This was in place for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Wind Advisory can be found below:

"...Wind Advisory from 10 AM this morning to 11 PM MST this evening…another day of strong winds and areas of blowing dust this afternoon. Winds will increase to 30 to 40 mph with gusts to 55 mph…Stronger winds will be possible for locations west of the Rio Grande…"

The Las Cruces Sun News covered a story that brought attention to the high winds on February 23, 2022 that includes the photo on the front page of the demonstration (Figure 5-6).

COMMUNITY

Dangerous winds expected in Las Cruces Wednesday

Leah Romero
Las Cruces Sun-News

Published 11:09 a.m. MT Feb. 23, 2022

Strong winds kick up dust in Las Cruces on Wednesday, Feb. 16, 2022. *Nathan J Fish/Sun-News*

LAS CRUCES - Damaging winds are expected for the Las Cruces area Wednesday with speeds potentially reaching 70 miles per hour in some places.

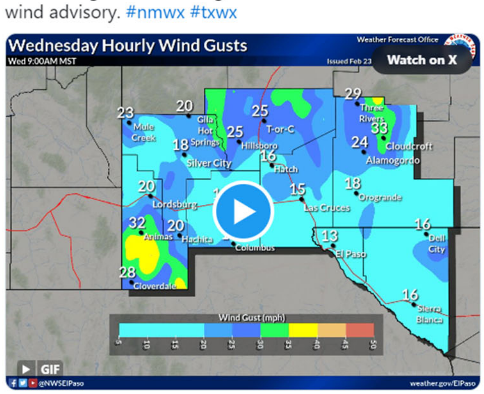
The National Weather Service issued a high wind advisory for much of southern New Mexico and west Texas Wednesday from 10 a.m. through 8 p.m. NWS Meteorologist Anthony Brown explained that a cold front from the east will delay the onset of stronger winds until mid-afternoon. At that point, winds will turn in a

The National Weather Service issued a high wind advisory for much of southern New Mexico and west Texas Wednesday from 10 a.m. through 8 p.m. NWS Meteorologist Anthony Brown explained that a cold front from the east will delay the onset of stronger winds until mid-afternoon. At that point, winds will turn in a more southwesterly direction.

Gusts are predicted to reach over 60 miles per hour within town, possibly recording as high as 65 or 70 miles per hour. San Augustin Pass on U.S. 70 can potentially experience gusts between 75 and 80 miles per hour.

NWS El Paso
@NWSElPaso · Follow

Another windy day is in store for the Borderland. Here's an hourly depiction of the potential wind gusts across the area. Notice the red shading (50+ mph values) coincide where a high wind warning is in effect. East of there? A wind advisory. #nmwx #txwx



7:00 AM · Feb 23, 2022

"Other than the late start, the event could be really similar to what happened last week," Brown said.

Winds on Feb. 16 were just shy of 60 miles per hour within the city. However, winds resulted in power outages and damage to trees and buildings.

A red flag warning is also in effect Wednesday, meaning fire danger is high. Doña Ana County government announced via social media that Wednesday is a "no burn day."

Blowing dust is a concern, especially for drivers Wednesday. The New Mexico Department of Transportation warned drivers in a news release that "blowing dust can escalate to blinding dust storms as they move quickly through remote areas."

If caught in a dust storm, NMDOT encourages drivers to:

- Avoid driving into or through a dust storm.
- Do not wait until poor visibility makes it difficult to safely pull off the roadway — do it as soon as possible. Completely exit the highway if you can.
- If you encounter a dust storm, check traffic immediately around your vehicle (front, back and to the side) and begin slowing down.
- Do not stop in the roadway; pull completely out of the travel lanes and as far into the right shoulder as possible.
- Stop the vehicle in a position ensuring it is a safe distance from the main roadway and away from where other vehicles may travel.
- Turn off all vehicle lights, including your emergency flashers.
- Set your emergency brake and take your foot off the brake.
- Stay in the vehicle with your seat belts buckled and wait for the storm to pass.
- Drivers of high-profile vehicles should be especially aware of changing weather conditions and travel at reduced speeds.

Temperatures are expected to drop Thursday as the eastern cold front retreats and a second front moves into the area from the west. Highs will be in the mid-50s Thursday and slowly warm into the 60s over the weekend.

Leah Romero is the trending reporter at the Las Cruces Sun-News and can be reached at 575-418-3442, LRomero@lcsun-news.com or @rromero_leah on Twitter.

Figure 5-6. Las Cruces Sun News story covering high winds April 23, 2022.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from southwestern Arizona and northern Chihuahua, MX into the southern New Mexico and El Paso, TX area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 5-7). This analysis supports the hypothesis that dust plumes originated in MX before being transported to downwind monitoring sites.

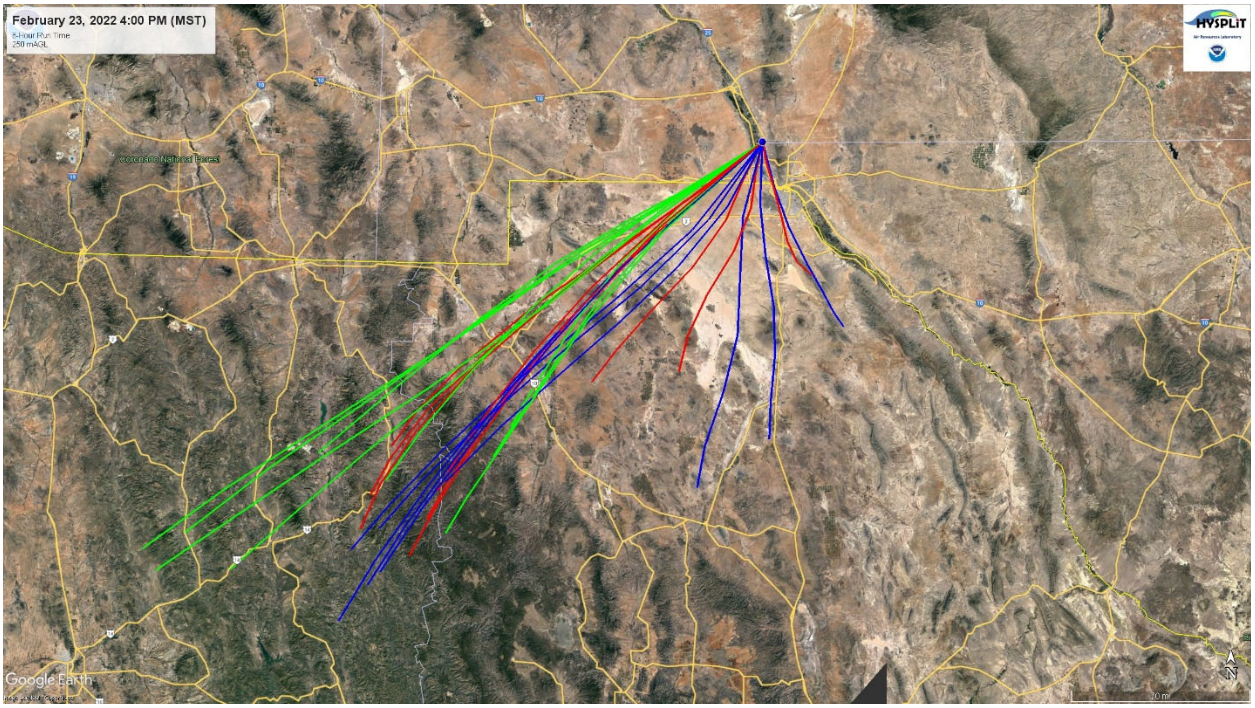


Figure 5-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony Monitoring site

Wind Direction and Elevated PM_{10} Concentrations
Pollution roses (Figures 5-8 through 5-12) were created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0500 -2100 hour). During the event, winds blew from the southeast to the southwest directions 85-100% of the time coinciding with peak PM_{10} concentrations.

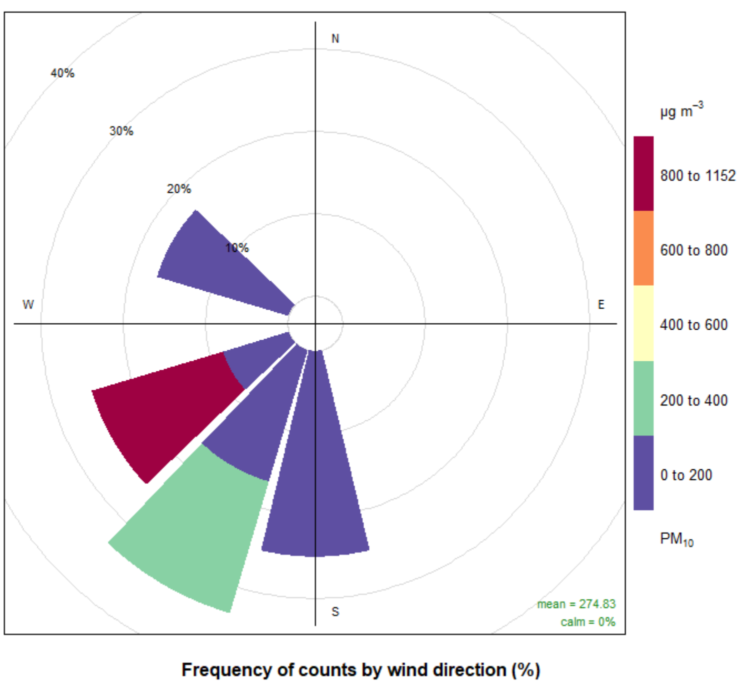


Figure 5-8. Pollution rose for the Anthony monitoring site.

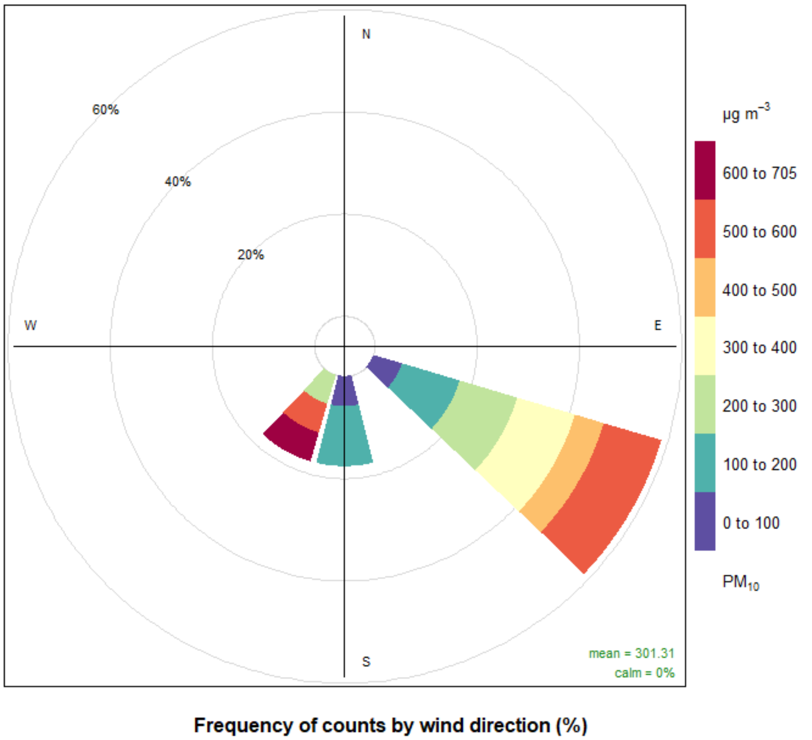


Figure 5-9. Pollution rose for the Desert View monitoring site.

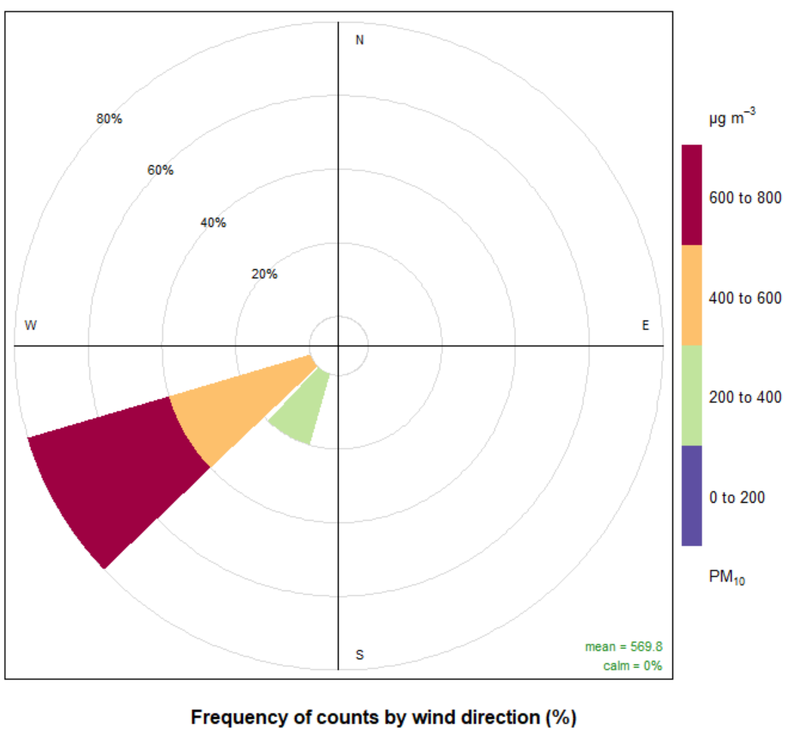


Figure 5-10. Pollution rose for the West Mesa monitoring site.

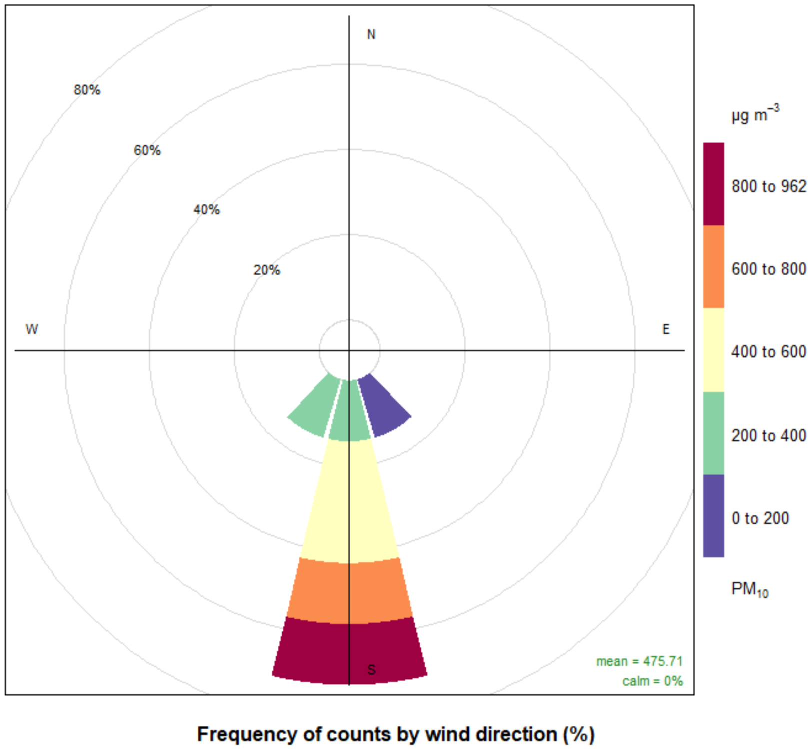


Figure 5-11. Pollution rose for the Holman monitoring site.

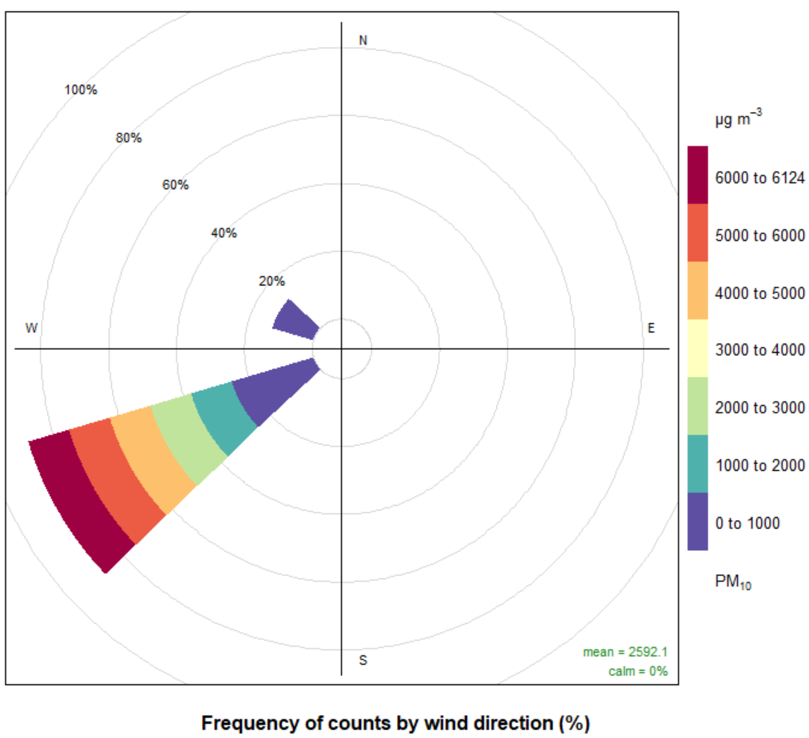


Figure 5-12. Pollution rose for the Deming monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong southwesterly winds beginning at the 0800 hour and lasting through the 2100 hour. During this time, peak hourly PM_{10} concentrations ranged from 647 to 4100 µg/m^3 were recorded at the Chaparral and Deming monitoring sites, respectively (Figure 5-13). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 7.6 to 15.7 m/s were recorded at the Anthony and Deming monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figures 5-14 through 5-18 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

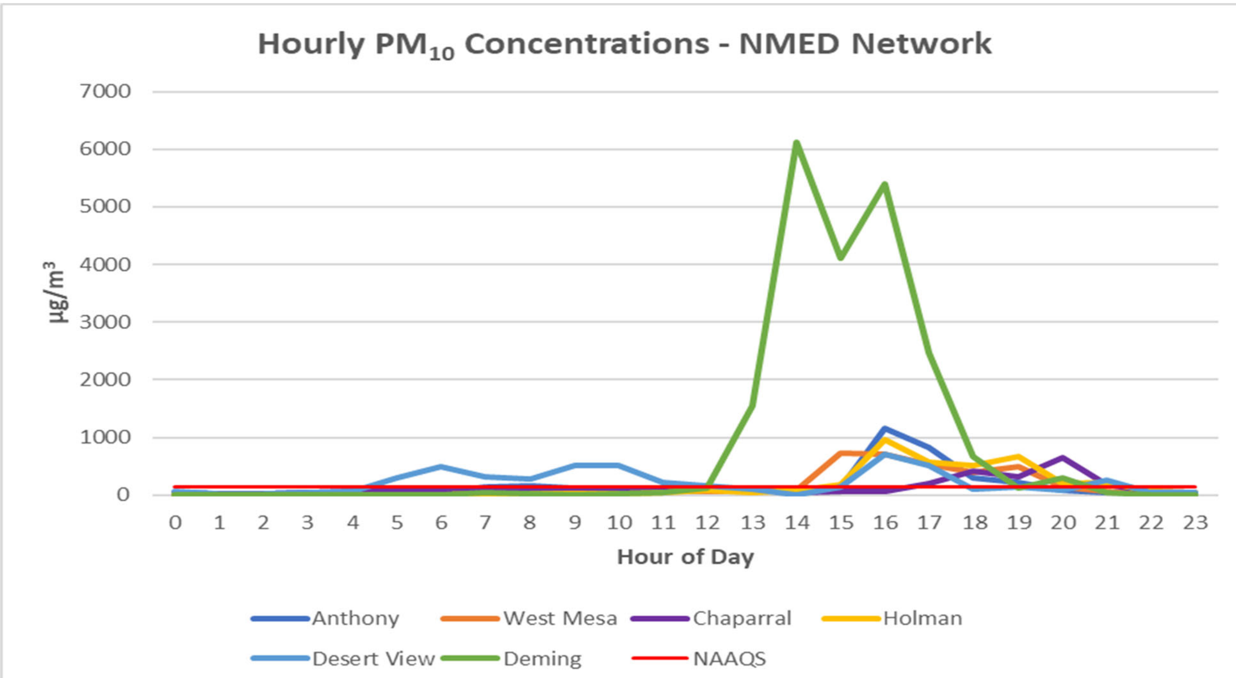


Figure 5-13. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

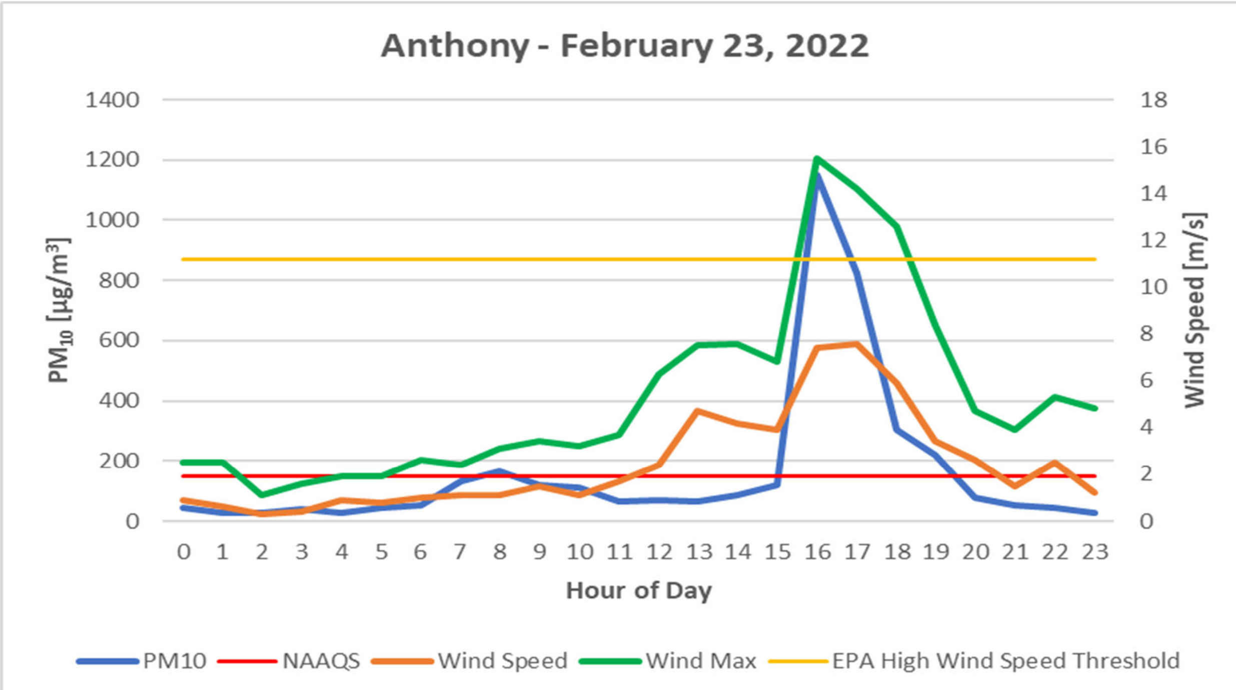


Figure 5-14. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

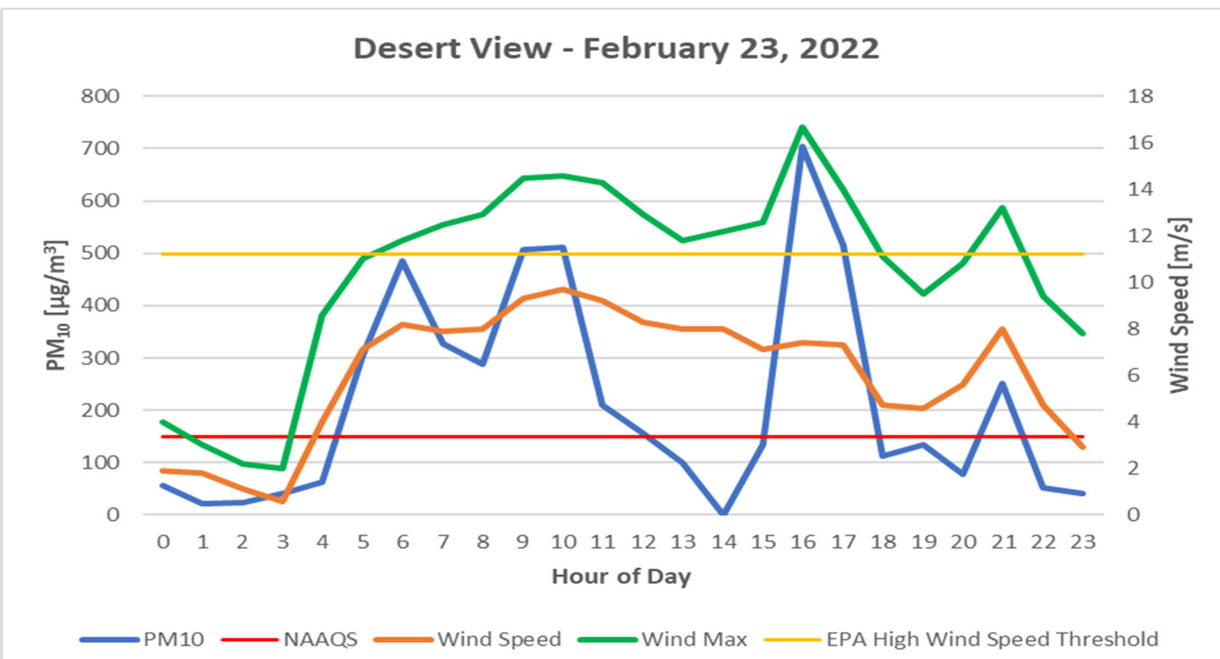


Figure 5-15. Desert View monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

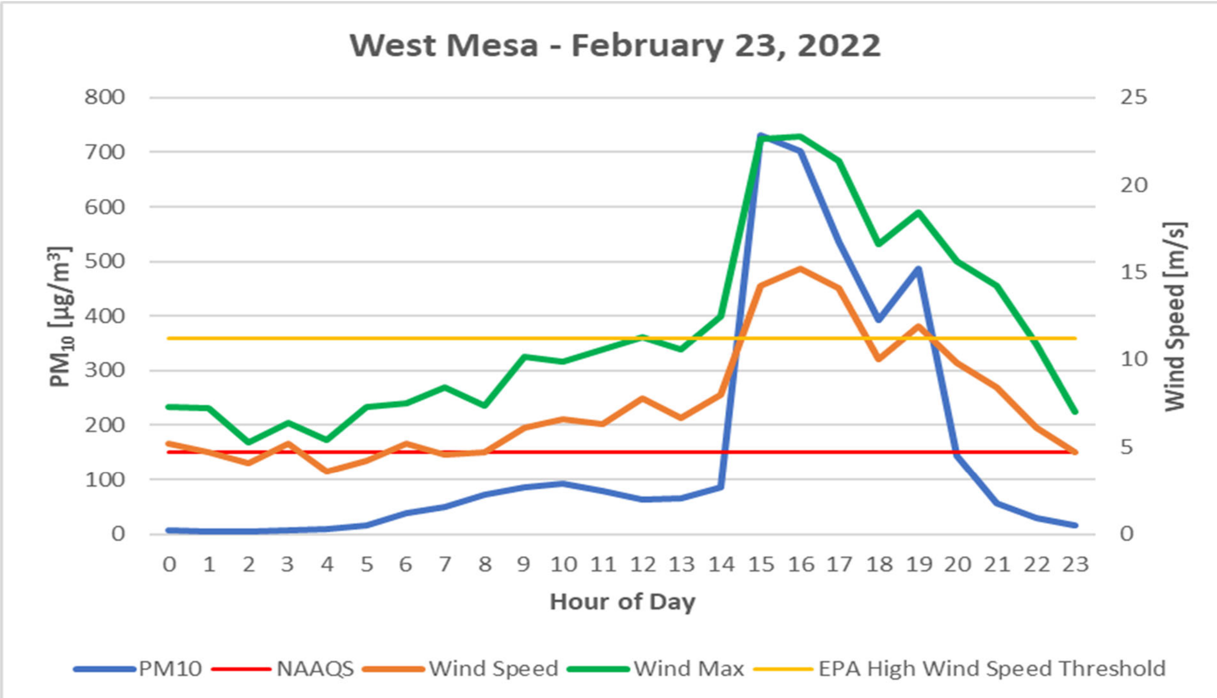


Figure 5-16. West Mesa monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

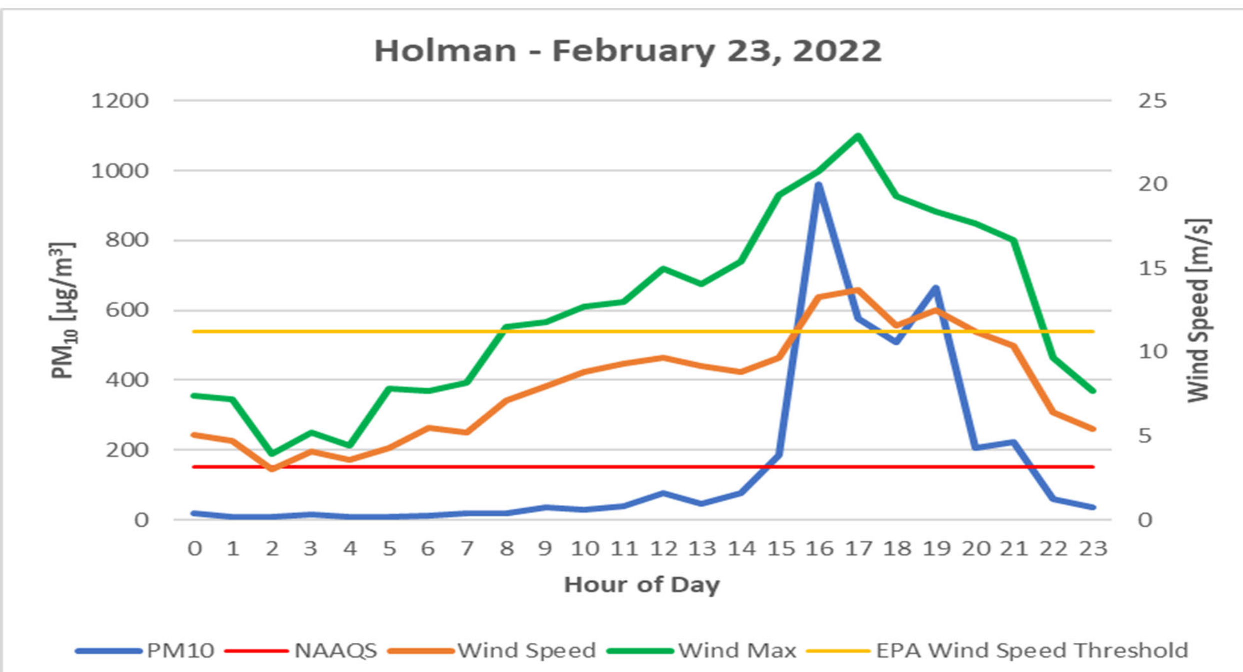


Figure 5-17. Holman monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

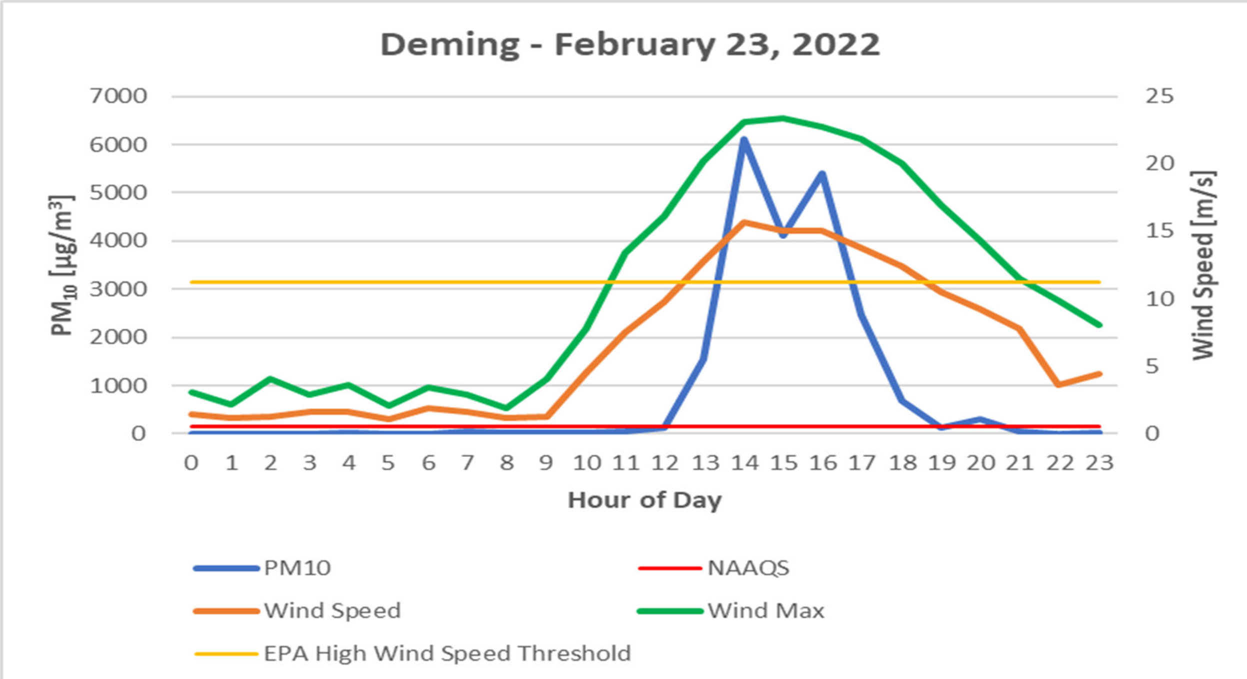


Figure 5-18. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, NMED monitoring sites recorded 22 (Anthony), 34 (Desert View), 6 (West Mesa), 12 (Holman), and 14 (Deming) exceedances of the PM_{10} NAAQS (Figures 22-1, 22-2, 22-4, 22-5, and 22-6 in Appendix B). The maximum 24-hour average PM_{10} concentrations at these sites were 541 (Anthony), 769 (Desert View), 351 (West Mesa), 691 (Holman), and 721 (Deming) µg/m^3, recorded in 2021 (Anthony and Desert View) and 2019 (West Mesa, Holman, and Deming). High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 5-19, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 62 µg/m^3, except for the previous event date of February 21, 2022, demonstrating the influence high winds have on PM_{10} concentrations in the area.

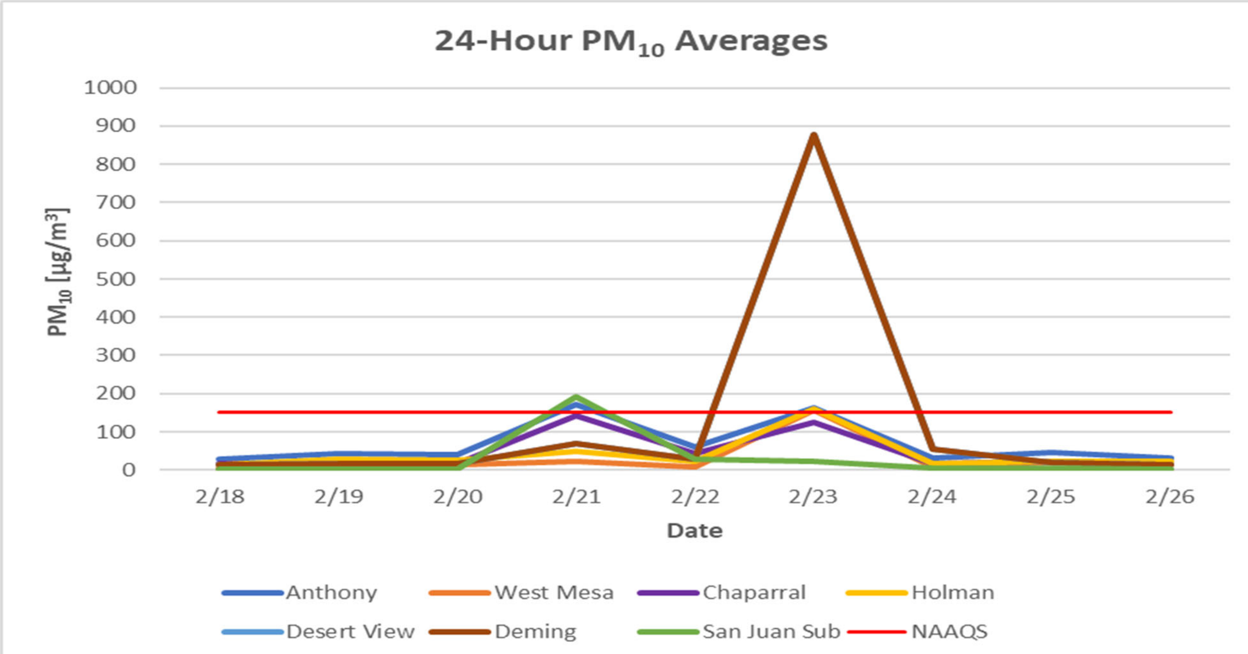


Figure 5-19. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 166 (Anthony), 222 (Desert View), 157 (West Mesa), 160 (Holman), and 879 (Deming) µg/m^3 are above the 95th (Anthony and Desert View) and 99th (West Mesa, Holman, and Deming) percentiles of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour averages 166 (Anthony), 222 (Desert View), 157 (West Mesa), 160 (Holman), and 879 (Deming) µg/m^3 are above the 95th (Anthony and Desert View) and 99th (West Mesa, Holman, and Deming) percentiles of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

6. HIGH WIND EXCEPTIONAL EVENT: March 4, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana and Luna Counties resulting in exceedances of the PM_{10} NAAQS at the Anthony and Deming monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 6-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	180 µg/m^3	8.9 m/s	16.7 m/s
RJ	35-029-0003	7E Deming	189 µg/m^3	13.9 m/s	20.2 m/s

Table 6-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A strong upper trough will track northeastward towards the Four Corners from southern California today in which lee-cyclogenesis will be ahead of the Pacific frontal boundary tightening overnight surface gradients. At the 1800 hour, an area of low-pressure centered over the Central Plains extending along the Texas and Oklahoma Panhandles (Figure 6-1). Aloft, the backside of a low-pressure center of the storm system hovered over the southern California coast. As the day progressed this low-pressure system aloft traveled east and aligned itself with New Mexico and the surface wind direction (Figure 6-2). Diurnal heating of the surface along with a lack of precipitable water allowed high velocity winds aloft to mix down, increasing surface wind velocities and providing the turbulence required for vertical mixing and entrainment of dust.

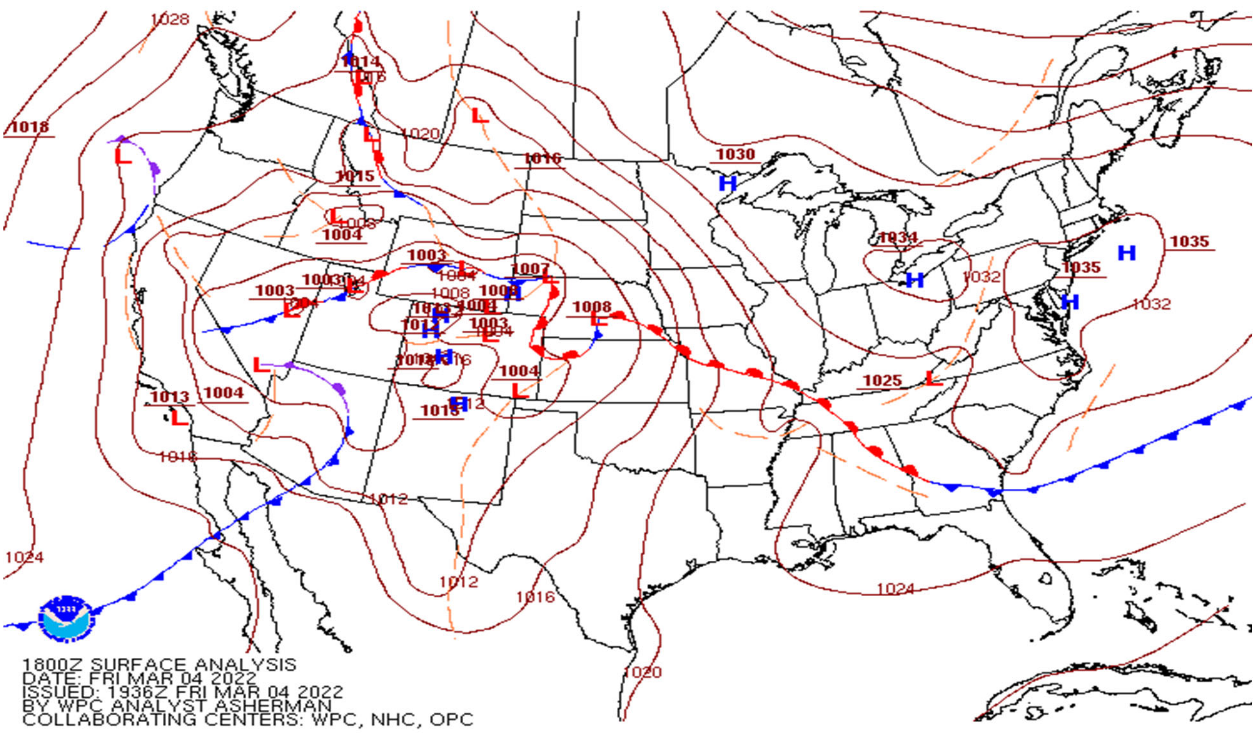


Figure 6-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

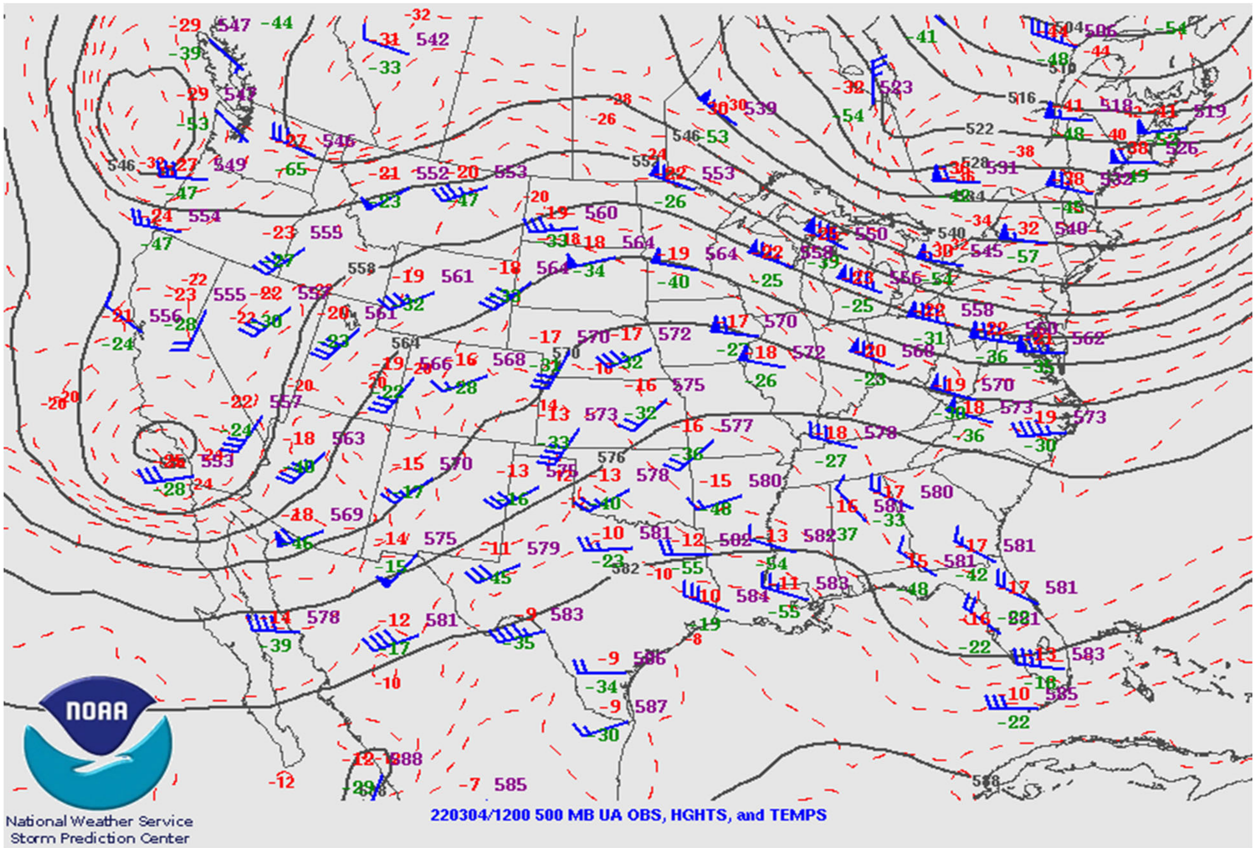


Figure 6-2. Upper air weather map for March 4, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED’s monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Desert View, Chaparral, Holman, West Mesa, La Union, Santa Teresa and Deming monitoring sites beginning at the 1000 hour and lasted through the 2000 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Chaparral, Desert View, Holman, West Mesa and Deming monitoring sites beginning at the 1100 hour. Hourly concentrations remained elevated through the 2100 hour. Table 6-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Desert View			Anthony			Deming		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
1100	105	7	12.5	166	6.5	12.6	7	7	12.3
1200	90	6.4	11.7	329	6.9	15.9	78	8.5	16.4
1300	39	5.4	10.5	161	7	14.8	356	11.6	18.6
1400	27	5	10.7	114	6.9	13.1	371	12	20.2
1500	100	6.4	12	259	6.8	15.8	1465	13.9	19.5
1600	581	8.9	15.5	928	8.5	16.7	952	13.2	20.1
1700	715	9.2	14.1	793	8.9	15.5	554	12.2	18.1
1800	210	6.4	11.2	373	8	13.9	432	11.3	16.7
1900	246	6.3	11.6	329	7.5	13	146	9.1	15
2000	153	6.5	12.6	144	5.6	11	34	8.2	12.4
2100	70	3.7	8.2	210	2.9	5.4	12	7	11.4

Table 6-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east from southern California in the morning and moving across New Mexico in the afternoon towards the Central Plains. The system's movement across the area timed well with daytime heating and mixing generating lee-cyclogenesis to the east as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon, especially in the desert areas of southern New Mexico (Figure 6-3).

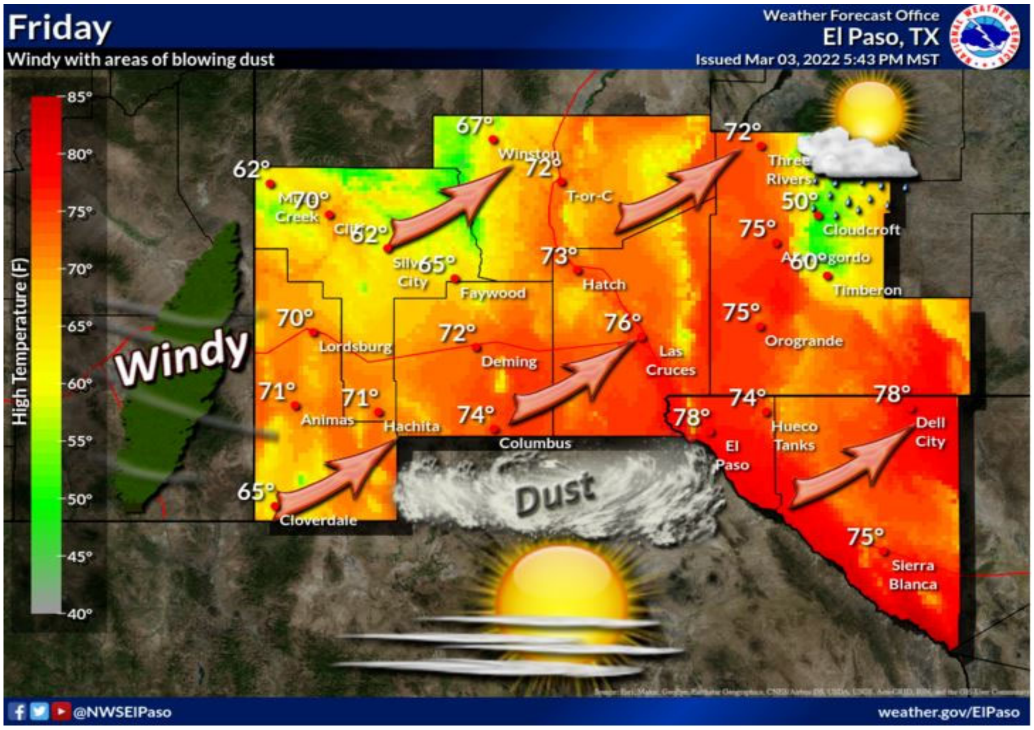


Figure 6-3. NWS GraphiCast product showing Dust Storm Warning for southern Dona Ana County, March 4, 2022.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, “the State shall not be required to provide a case-specific justification for a high wind dust event.”

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED’s monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Holman, West Mesa, and La Union monitoring sites recorded wind speeds above this threshold for six hours beginning at the 1300 hour and lasted through the 1800 hour (Figure 6-4). The wind speeds at the upwind Deming monitoring site also reached the high wind threshold.

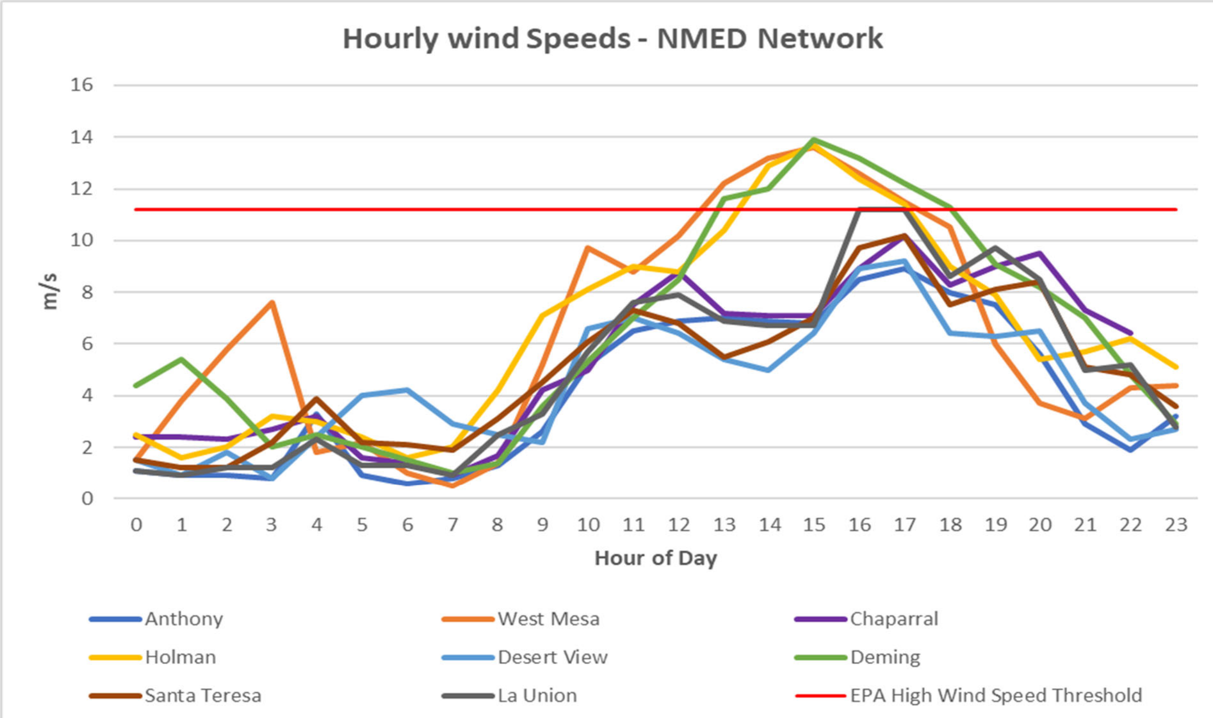


Figure 6-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures
Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual

PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Grant, Hidalgo, and Luna Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedances were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the Suomi NPP satellite VIIRS RGB dust product imagery with dust plumes originating upwind of NMED's monitoring sites near Ascension and Janos, Chih. which are represented as pink bands. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 6-5). The dust plumes of interest appear to be limited to Mexico, orientated in a southwest to northeast fashion and traveling toward El Paso and NMED's monitoring sites at the time of the satellite pass (1405 MST) that captured the imagery.

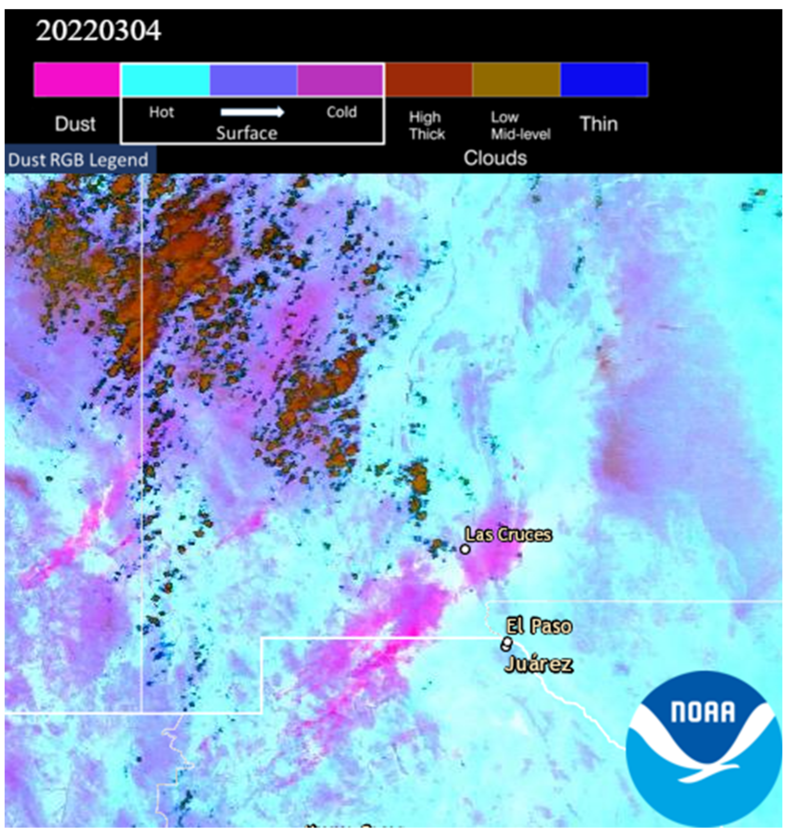


Figure 6-5. VIIRS RGB dust product imagery from the Suomi NPP Satellite showing southwestern New Mexico, northern Chihuahua and western Texas. Imagery obtained from NOAA AerosolWatch website. Pink bands show dust plumes.

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The National Weather Service (NWS) issued a Wind Advisory for this date (Figure 6-3). A Wind Advisory is issued by NWS when sustained winds of 40 mph are expected for 1 hour or longer or gusts at 58 mph or greater. This was in place for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Wind Advisory can be found below:

“...Wind Advisory from 11 AM this morning to 8 PM this evening…Windy conditions along with blowing dust are possible this afternoon…”

The New Mexico Department of Transportation’s Webcam footage from I-10 Eastbound at Union located south of Las Cruces positioned due south(Figure 6-6).

Figure 6-6. New Mexico Department of Transportation webcam depicting the extent of the March 4, 2022, high wind blowing dust event.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis
A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from Chihuahua, MX into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 6-7). This analysis supports the hypothesis that dust plumes originated in MX before being transported to downwind monitoring sites.

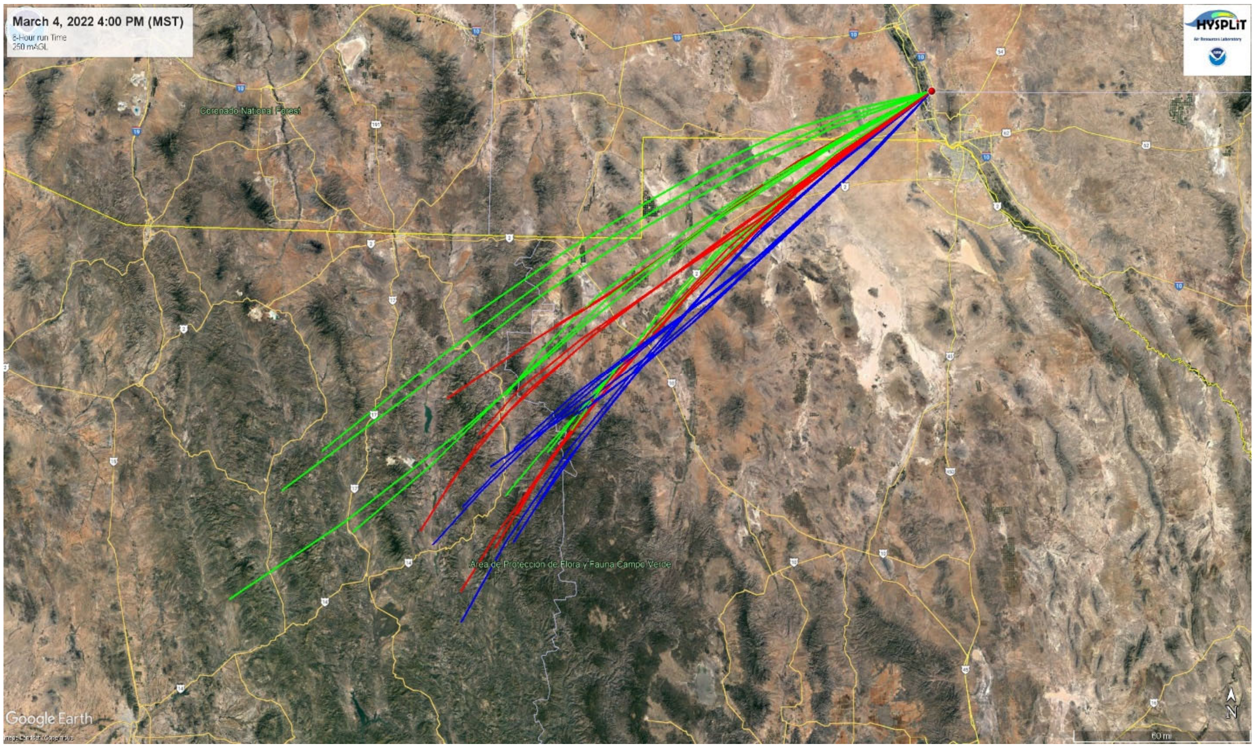


Figure 6-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony monitoring site.

Wind Direction and Elevated PM_{10} Concentrations
Pollution roses (Figures 6-8 and 6-9) were created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (1100 -2100 hour). During the event, winds primarily blew from the west southwest direction 100% of the time, coinciding with peak PM_{10} concentrations.

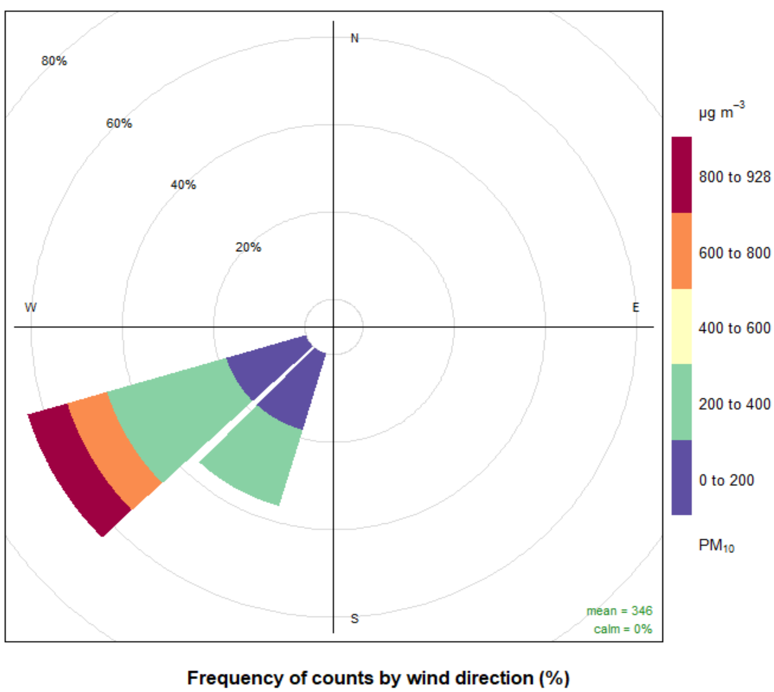


Figure 6-8. Pollution rose for the Anthony monitoring site.

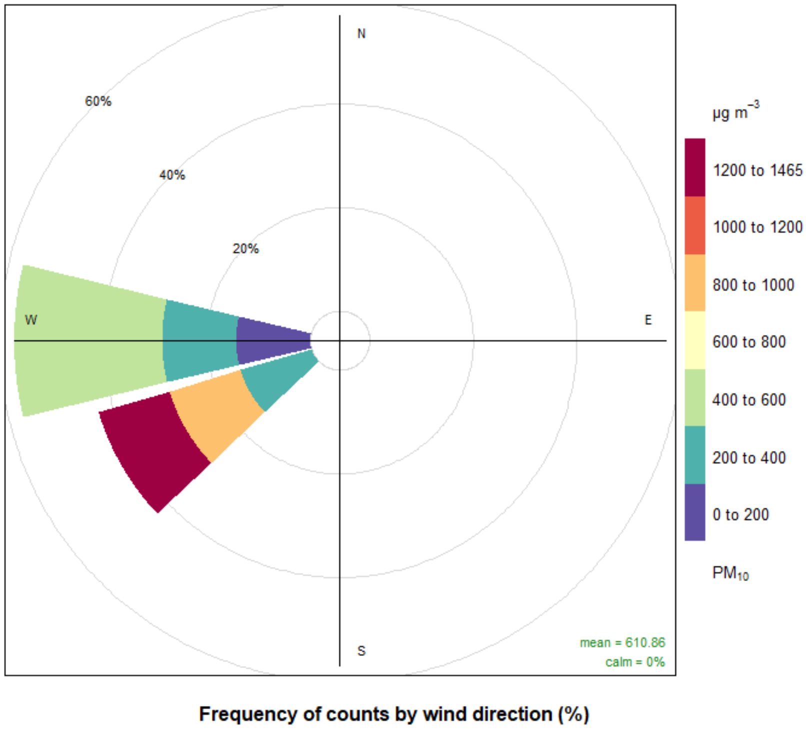


Figure 6-9. Pollution rose for the Deming monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west-southwesterly winds beginning at the 1000 hour and lasted through the 2000 hour. During this time, peak hourly PM_{10} concentrations ranged from 278 to 1465 μg/m^3 were recorded at the West Mesa and Deming monitoring sites, respectively (Figure 6-10). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 8.9 to 13.9 m/s were recorded at the Anthony and Deming monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figures 6-11 and 6-12 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

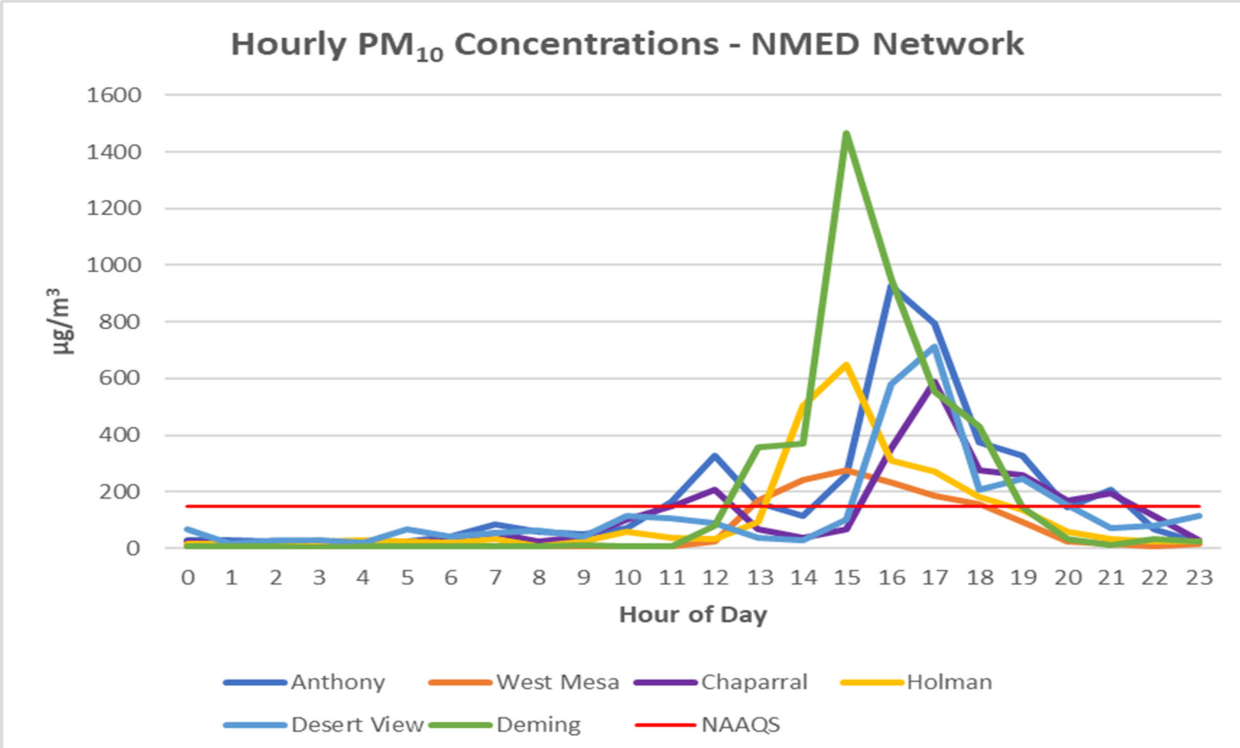


Figure 6-10. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

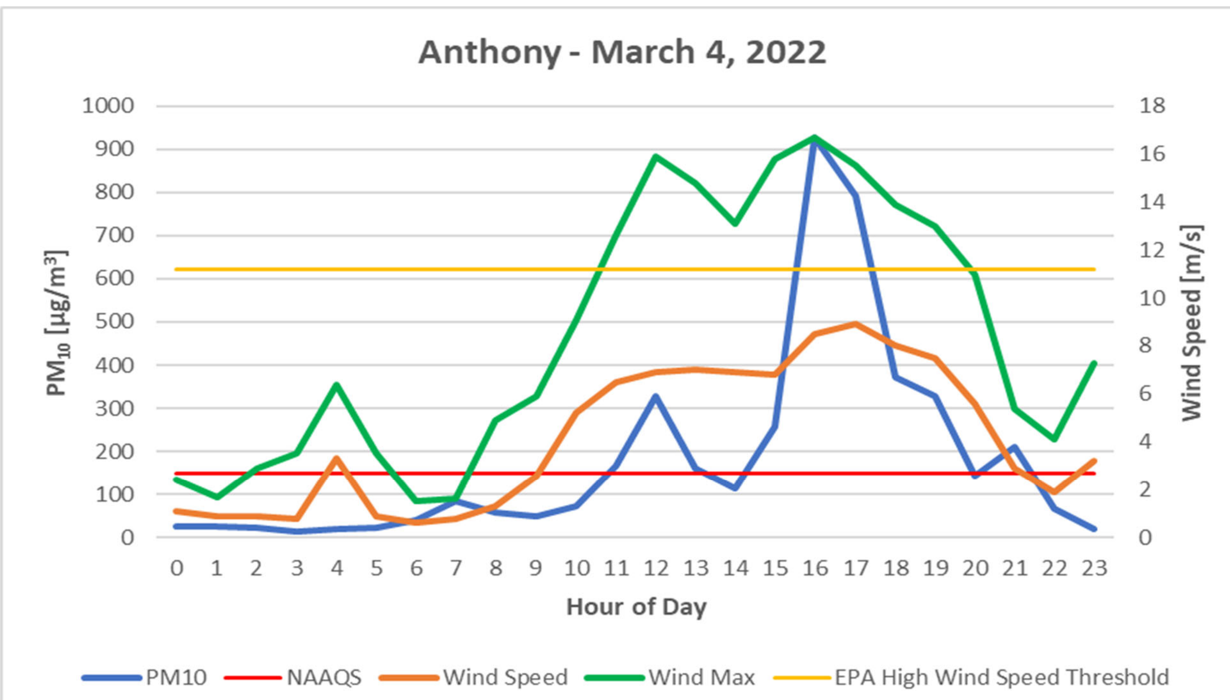


Figure 6-11. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

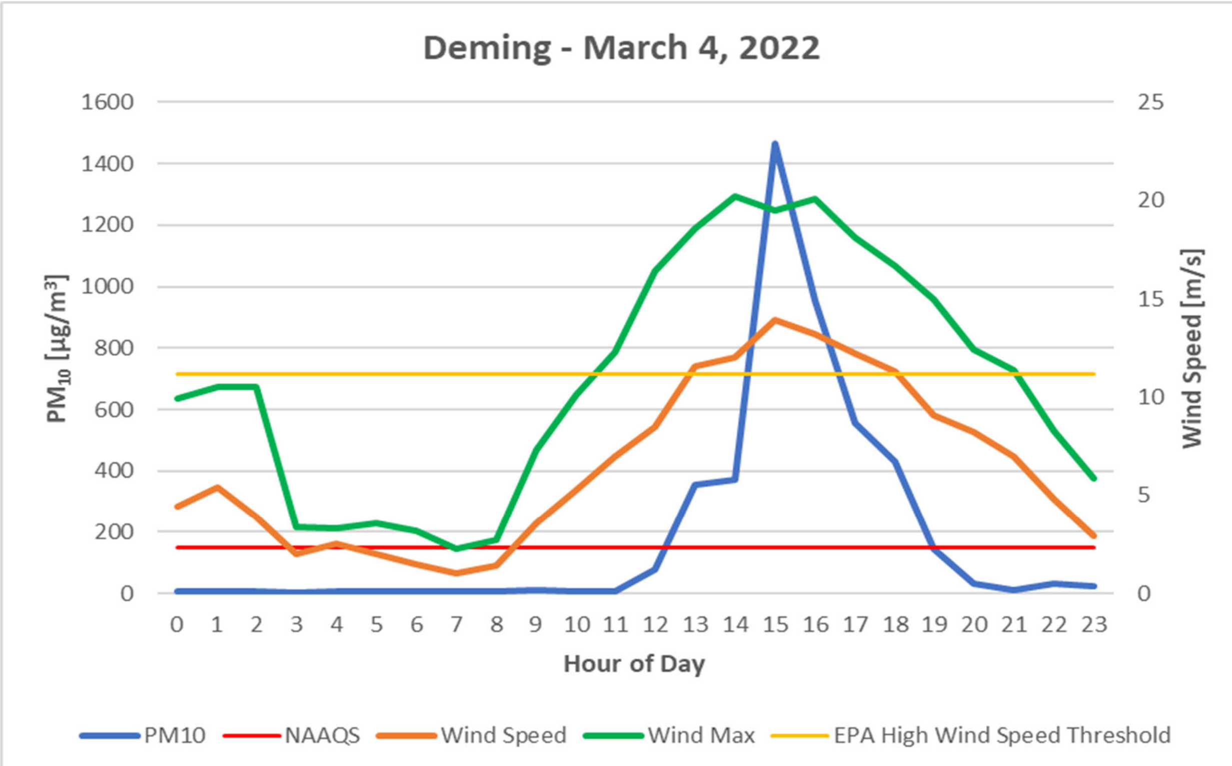


Figure 6-12. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, NMED monitoring sites recorded 22 (Anthony), and 14 (Deming) exceedances of the PM_{10} NAAQS (Figures 22-1 and 22-6 in Appendix B). The maximum 24-hour average PM_{10} concentration at these sites were 541 (Anthony), and 721 (Deming) µg/m^3 recorded in 2021 (Anthony) and 2019 (Deming). High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 6-13, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 50 µg/m^3, except for the following March 6, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

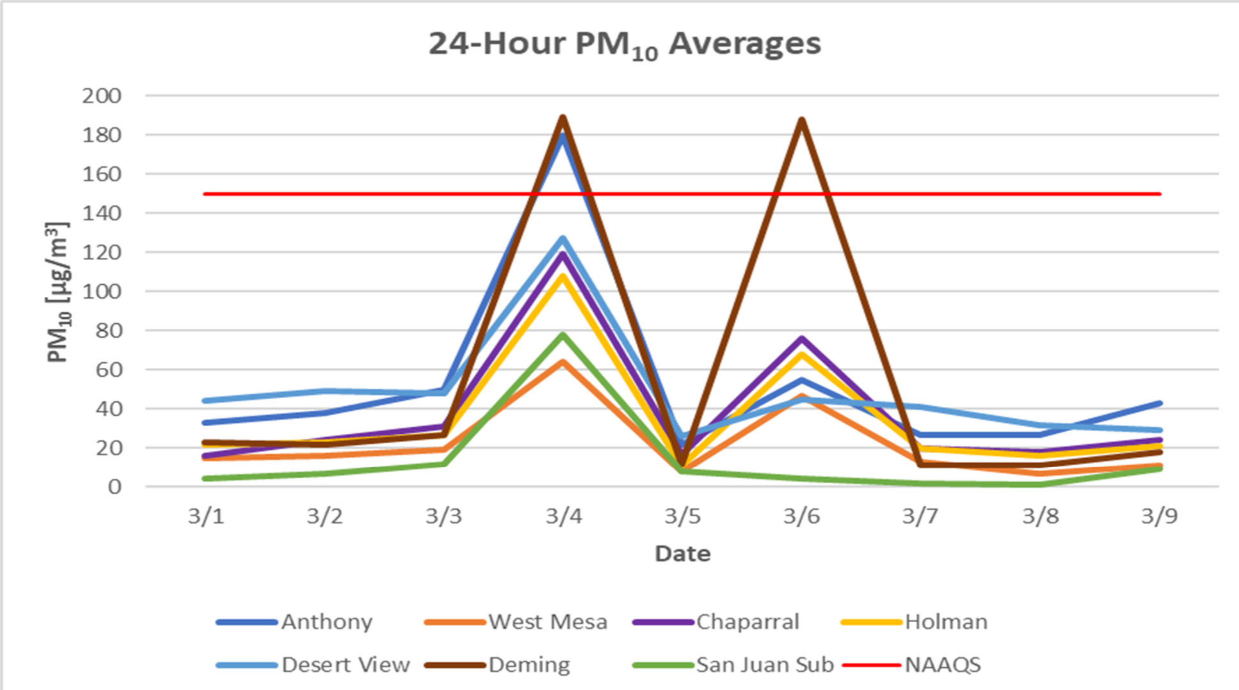


Figure 6-13. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking
Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 180 (Anthony) and 189 (Deming) µg/m^3 are near (Anthony) and above (Deming) the 99th percentile of data monitored over the previous five years.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour averages of 180 (Anthony) and 189 (Deming) µg/m^3 are near (Anthony) and above (Deming) the 99th percentile of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

7. HIGH WIND EXCEPTIONAL EVENT: March 6, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Luna County resulting in an exceedance of the PM_{10} NAAQS at the Deming monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 7-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-029-0003	7E Deming	188 $\mu g/m^3$	12.4 m/s	19.6 m/s

Table 7-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Today is expected to begin with an upper-level low pressure system swinging through the Four Corners region before opening into a trough and ejecting into the Central Plains by the evening creating strong winds. At the 1800 hour, the area of low-pressure extends into the Four Corners through southeastern New Mexico and west Texas (Figure 7-1). Aloft, the deep trough axis of the storm system hovered over the north central Arizona. As the day progressed this the lee side trough axis aloft traveled east and aligned itself with New Mexico and tapped into the surface wind direction while sustaining wind speeds (Figure 7-2). Diurnal heating of the surface at sunrise timed as to allow increased winds aloft and a small backdoor cold front enough convective energy to increase surface wind velocities providing the turbulence required for vertical mixing and entrainment of dust.

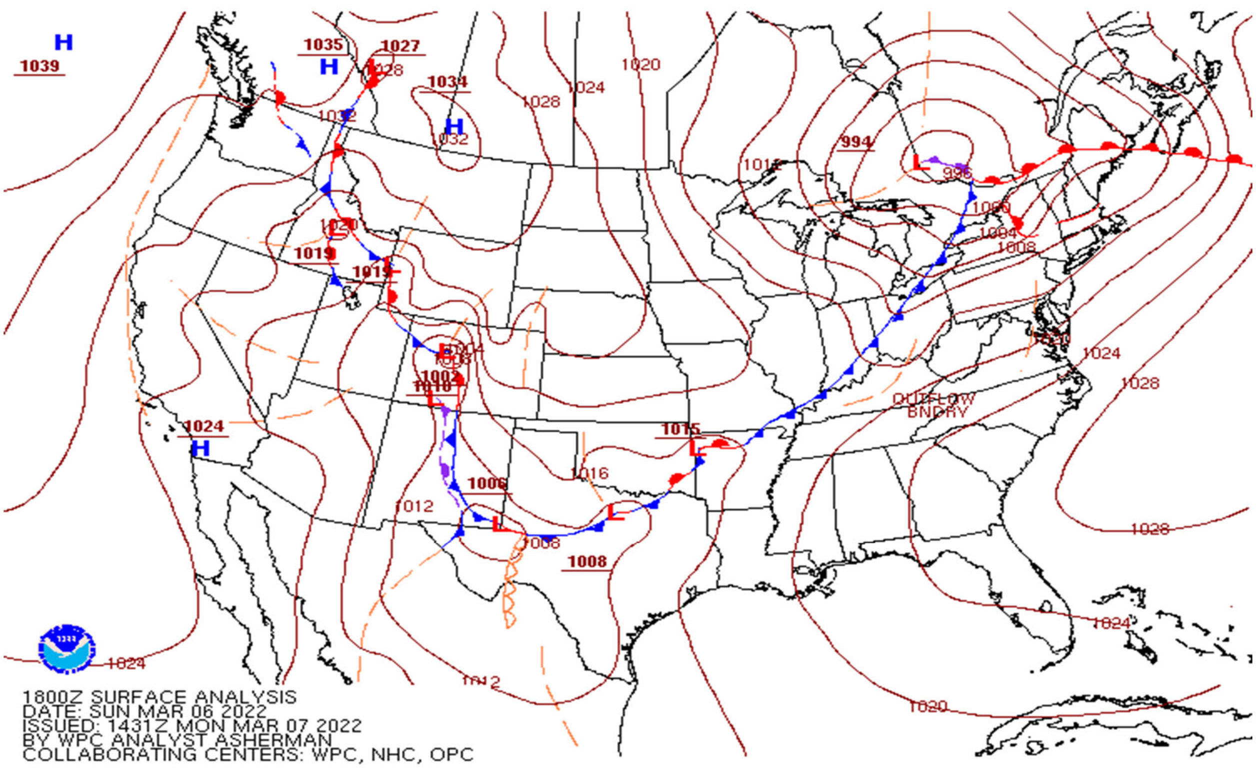


Figure 7-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

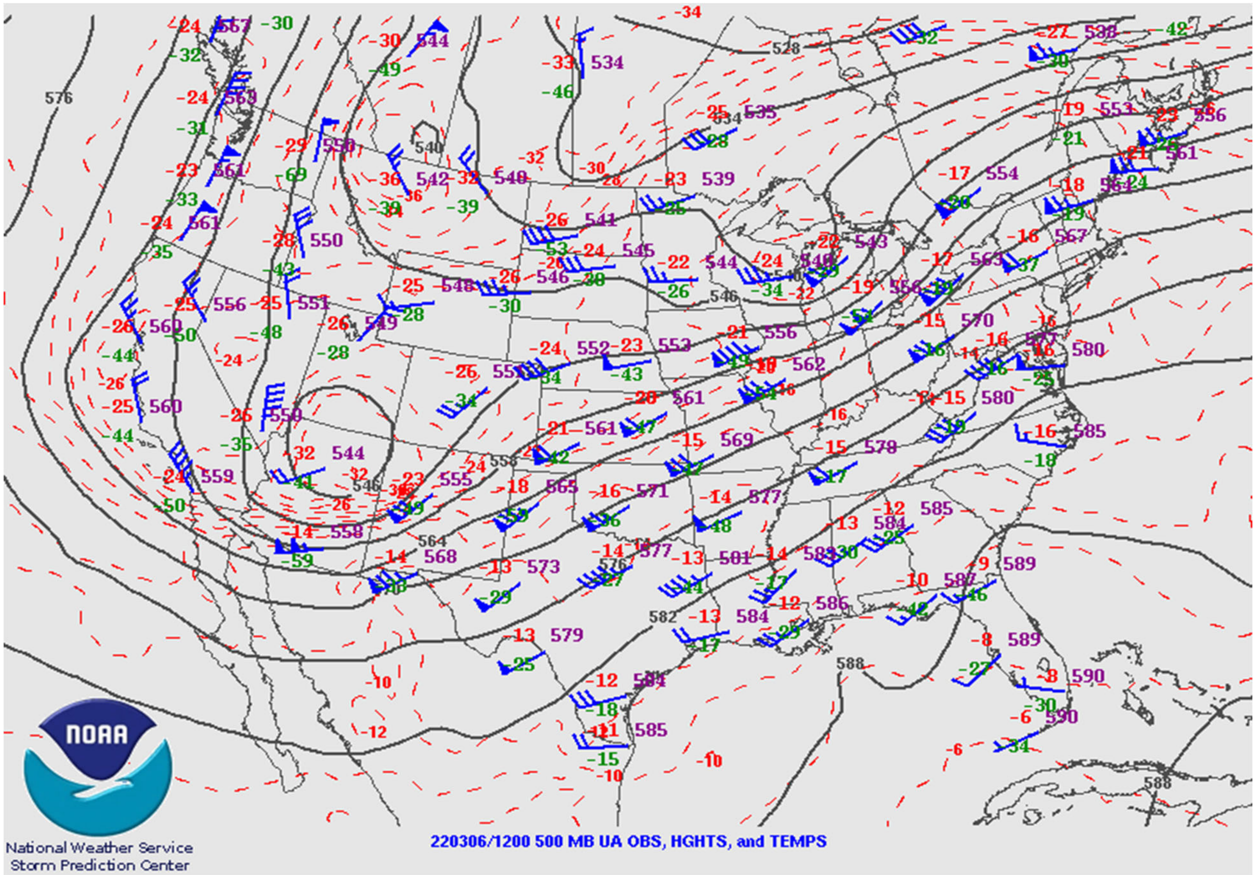


Figure 7-2. Upper air weather map for March 6, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the east-southeast throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Chaparral, Holman, West Mesa, Deming and La Union monitoring sites beginning at the 0600 hour and lasted through the 1700 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa and Deming monitoring sites beginning at the 0900 hour. Hourly concentrations remained elevated through the 1400 hour. Table 7-2 below summarizes peak hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Holman			Chaparral			Deming		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
0900	36	9	14.7	58	10.7	15.8	1250	12.4	19
1000	122	10.6	16.4	44	10.7	16.8	1223	12	18.4
1100	276	11.3	16.4	207	11.4	19.4	713	11.7	18.2
1200	449	12.4	20.3	280	11.8	19.9	652	11.7	19.6
1300	185	11.9	19	373	12.8	19.9	178	10.7	15.6
1400	51	10.4	16.1	153	11.4	18	188	10.3	15.8

Table 7-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east moving across New Mexico in the early morning hours. The system's movement across the area timed well with daytime heating and mixing generating a deep lee-side trough to the west as strong winds continued throughout the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area, especially in the desert areas of southern New Mexico (Figure 7-3).

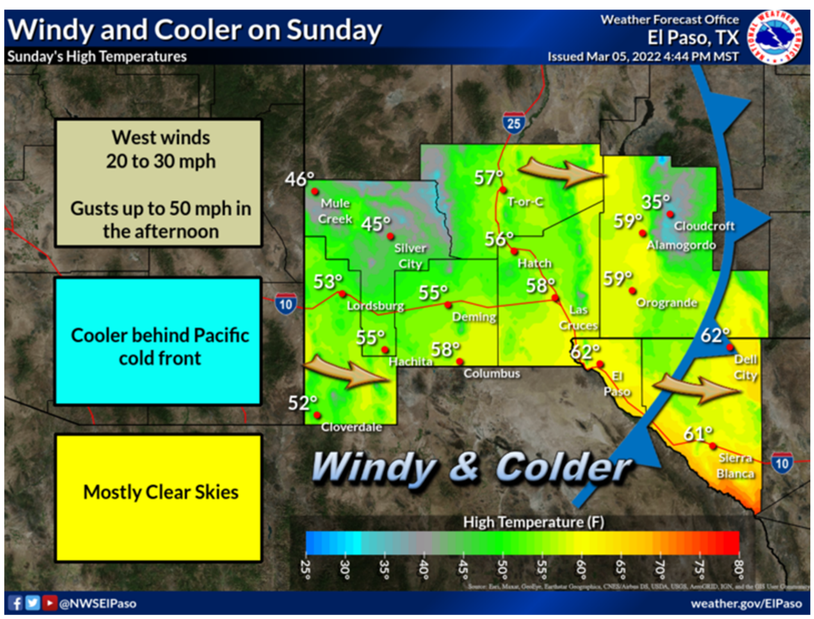


Figure 7-3. NWS Forecast Graphic for the event.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Santa Teresa monitoring site recorded wind speeds above this threshold for nine hours beginning at the 0800 hour and lasted through the 1600 hour (Figure 7-4). The wind speeds at the upwind Deming monitoring site also reached the high wind threshold.

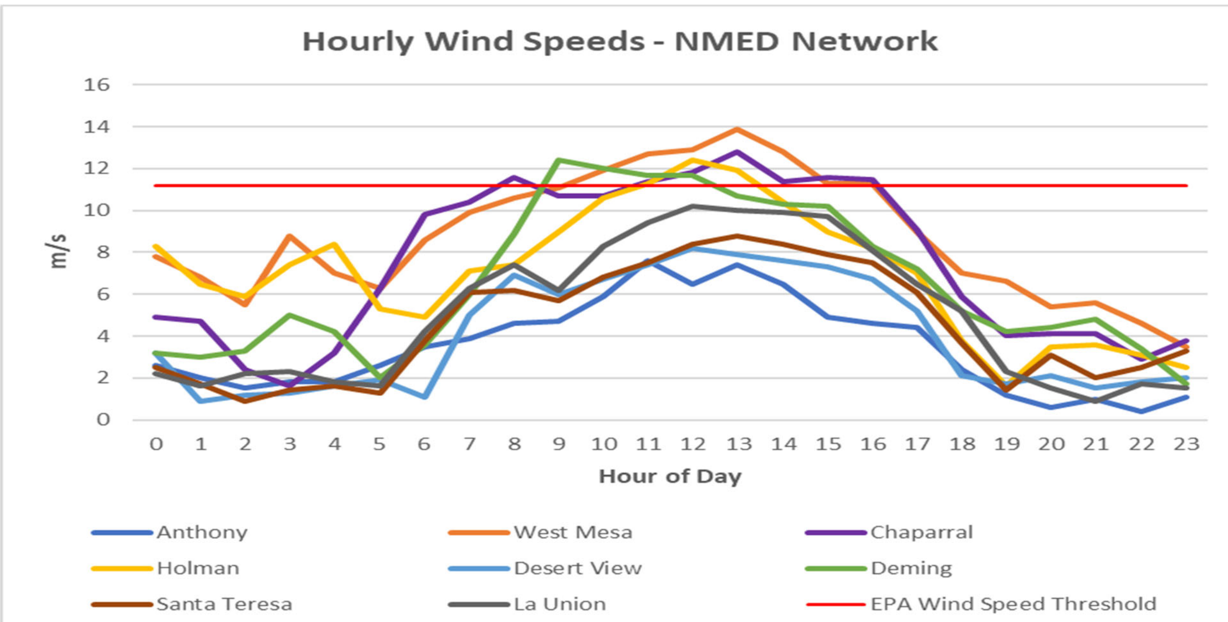


Figure 7-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Grant, Hidalgo, and Luna Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery
The event was captured on satellite imagery with dust plumes that are characterized as pink bands in the GOES-16 geostationary satellite RGB) dust product demonstrating dust plumes surrounding the Deming monitoring site. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 7-5). The dust plumes of interest appear to be limited to Arizona and New Mexico, orientated in a northwest to southeast direction and traveling toward El Paso and NMED's monitoring sites at the time of the satellite observation (1001 hour MST) that captured the imagery.

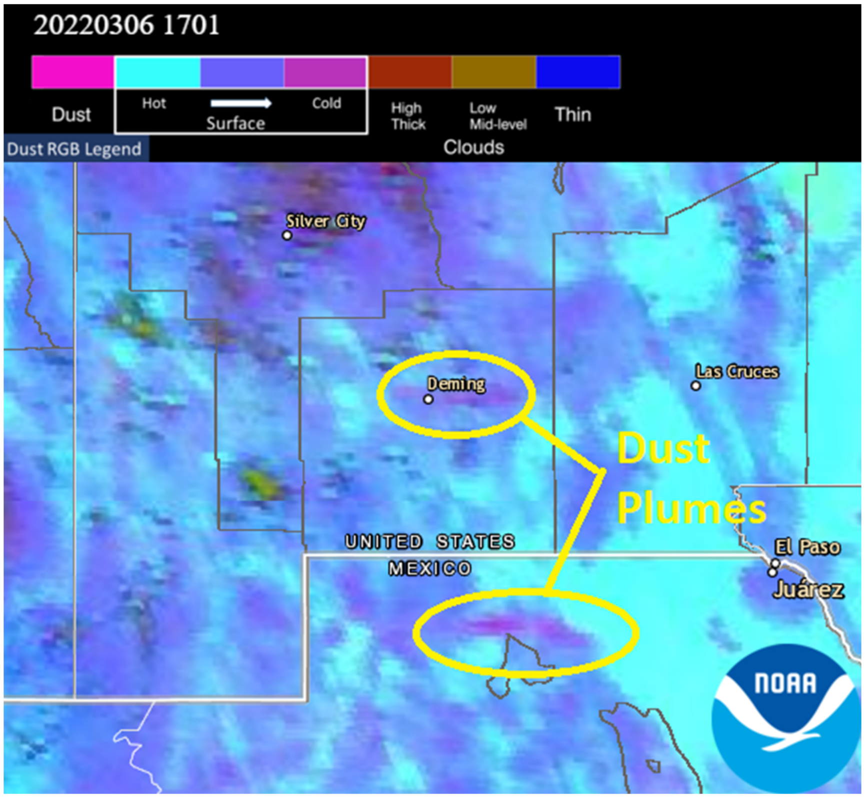


Figure 7-5. RGB dust product imagery from the GOES-16 geostationary satellite showing southwestern New Mexico, northern Chihuahua and western Texas. Imagery obtained from NASA's AerosolWatch website.

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The National Weather Service (NWS) issued a Hazardous Weather Outlook for this date. A Hazardous Weather Outlook is a statement issued by NWS to provide information to the public about potential adverse weather events. A Hazardous Weather Outlook statement was issued for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Hazardous Weather Outlook and Area Forecast Discussion can be found below:

"Breezy to windy conditions are expected…Wind Gusts could reach 50 MPH. Blowing dust is also possible…"

The El Paso NWS X posting (formerly Twitter) the morning (1040 MST) of March 6, 2022, satellite imagery demonstrates the dust plumes that were oriented from northwest to southeast as indicated by the shaded yellow areas (Figure 7-6).

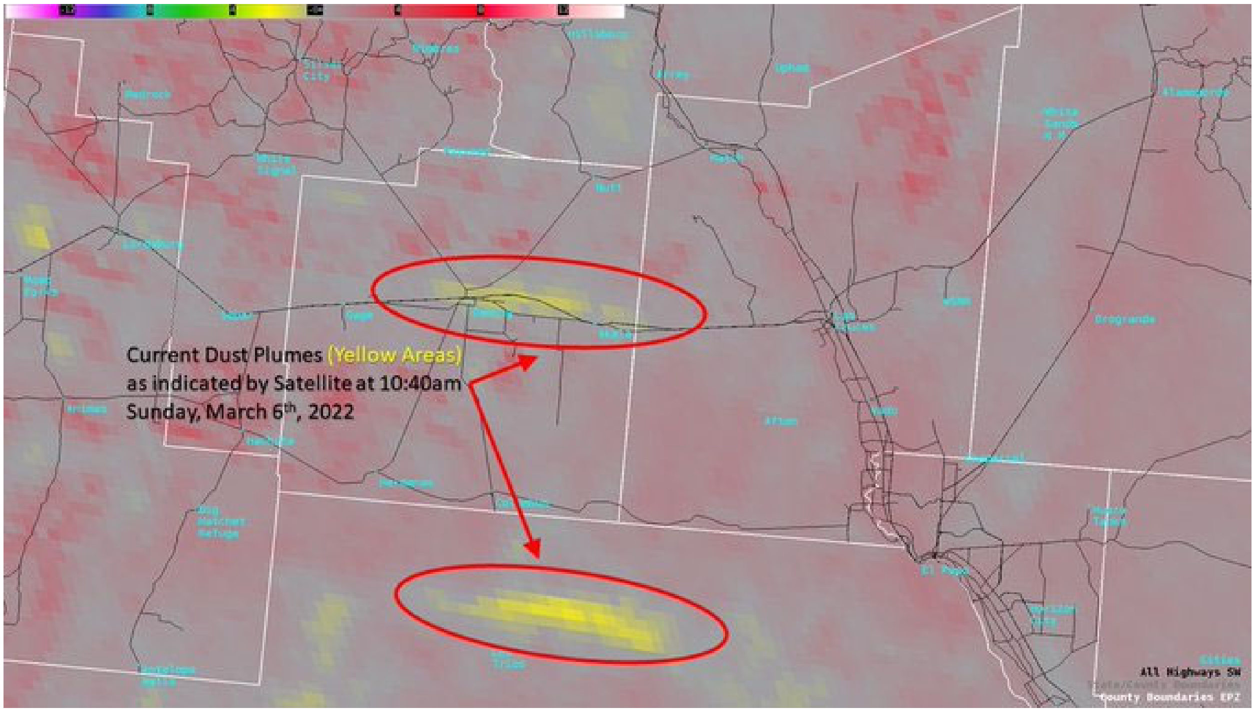


Figure 7-6. El Paso NWS X posting (formerly Twitter) posted radar images demonstrating progression of fast-moving cold front the morning of March 6, 2022.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from Chihuahua, MX and southeast Arizona into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 7-7). This analysis supports the hypothesis that dust plumes originated in Mexico and Arizona before being transported to downwind monitoring sites.

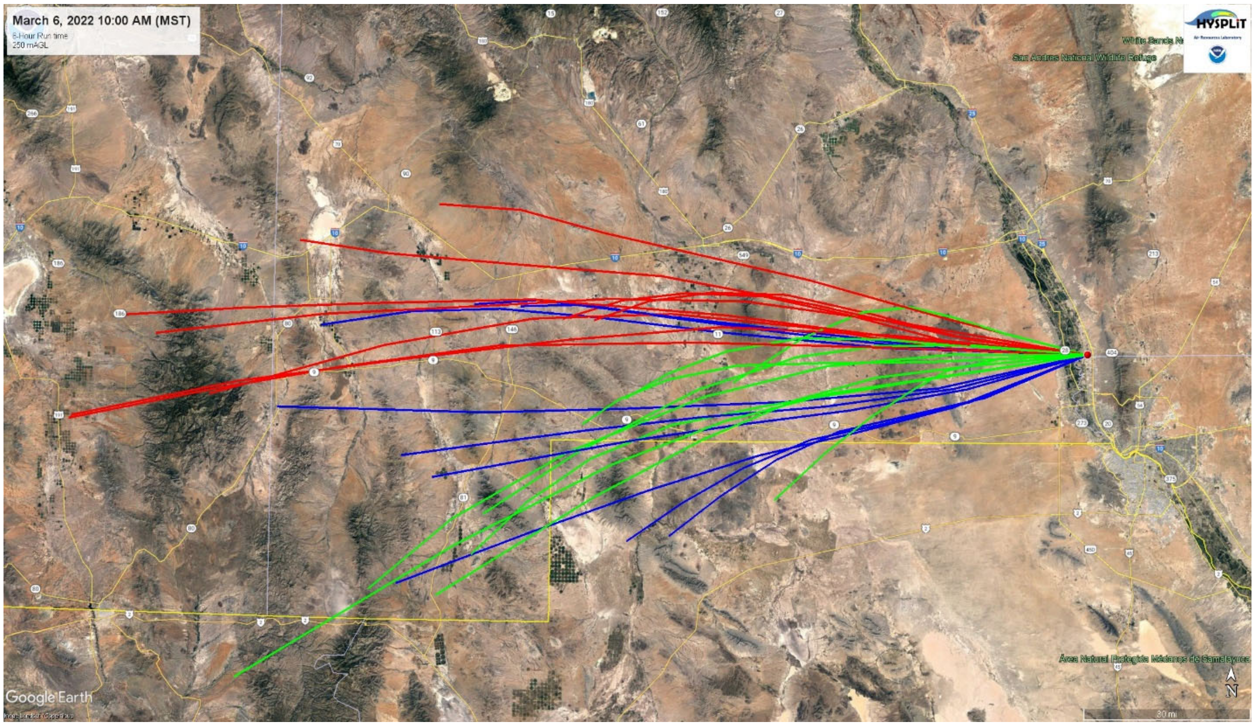


Figure 7-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony monitoring site.

Wind Direction and Elevated PM_{10} Concentrations

A pollution rose (Figure 7-8) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0900-1400 hour). During the event, winds primarily blew from the west northwest approximately 100% of time coinciding with peak PM_{10} concentrations.

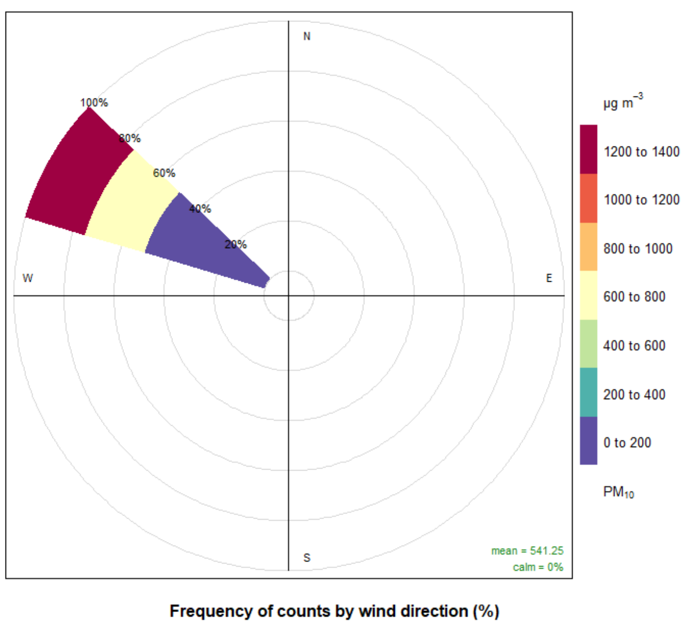


Figure 7-8. Pollution rose for the Deming monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west northwesterly winds beginning at the 0600 hour and lasted through the 1700 hour. During this time, peak hourly PM_{10} concentrations ranged from 188 to 1250 µg/m^3 were recorded at the Desert View and Deming monitoring sites, respectively (Figure 7-9). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 8.2 to 13.9 m/s were recorded at the Desert View and West Mesa monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 7-10 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

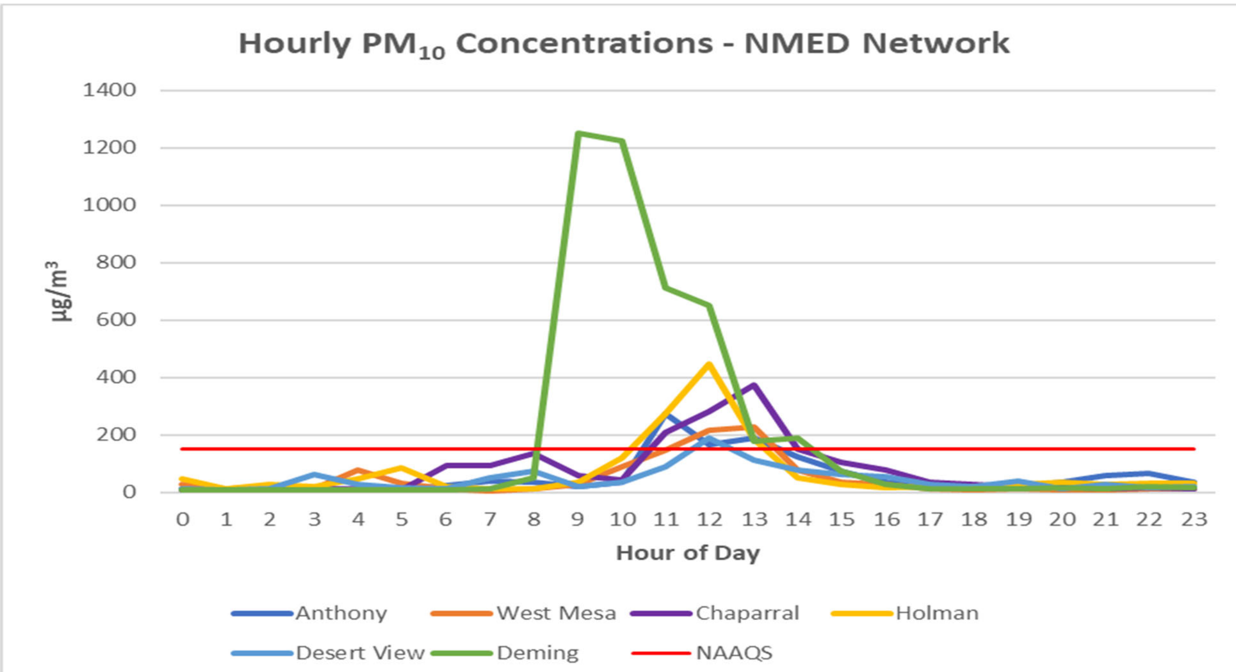


Figure 7-9. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

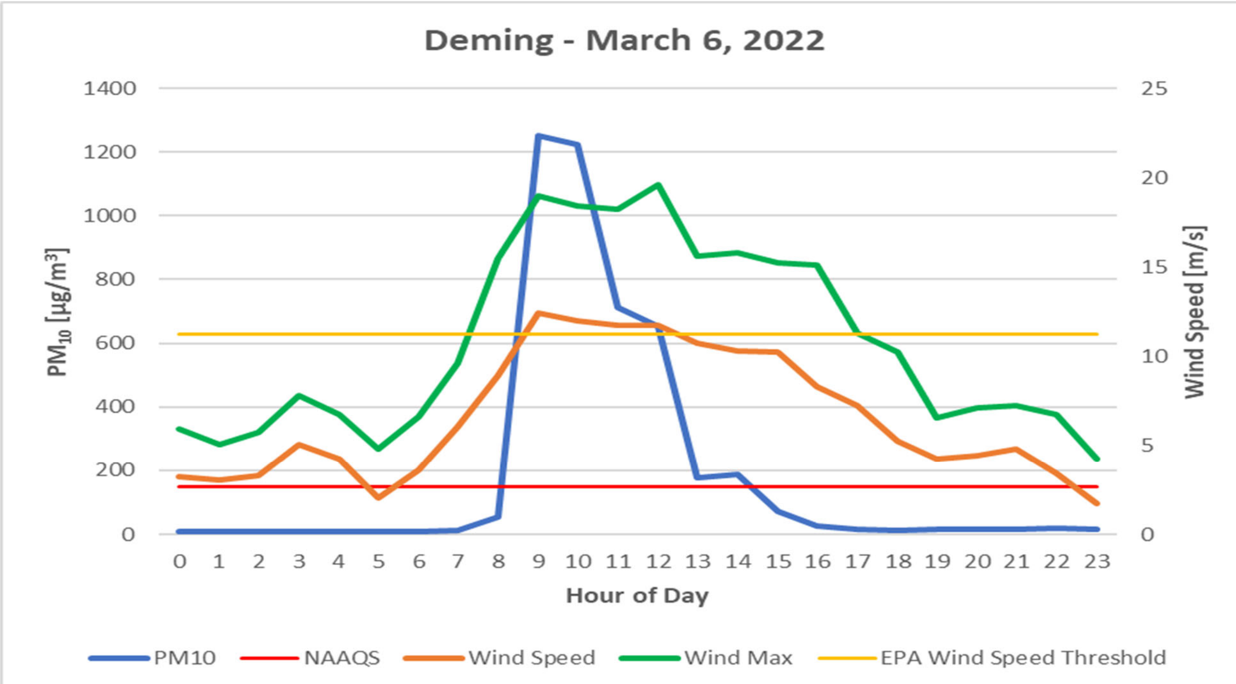


Figure 7-10. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Deming monitoring site recorded 14 exceedances of the PM_{10} NAAQS (Figure 22-6 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 721 µg/m^3, recorded in 2019. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 7-11, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 50 µg/m^3, except for the previous March 4, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

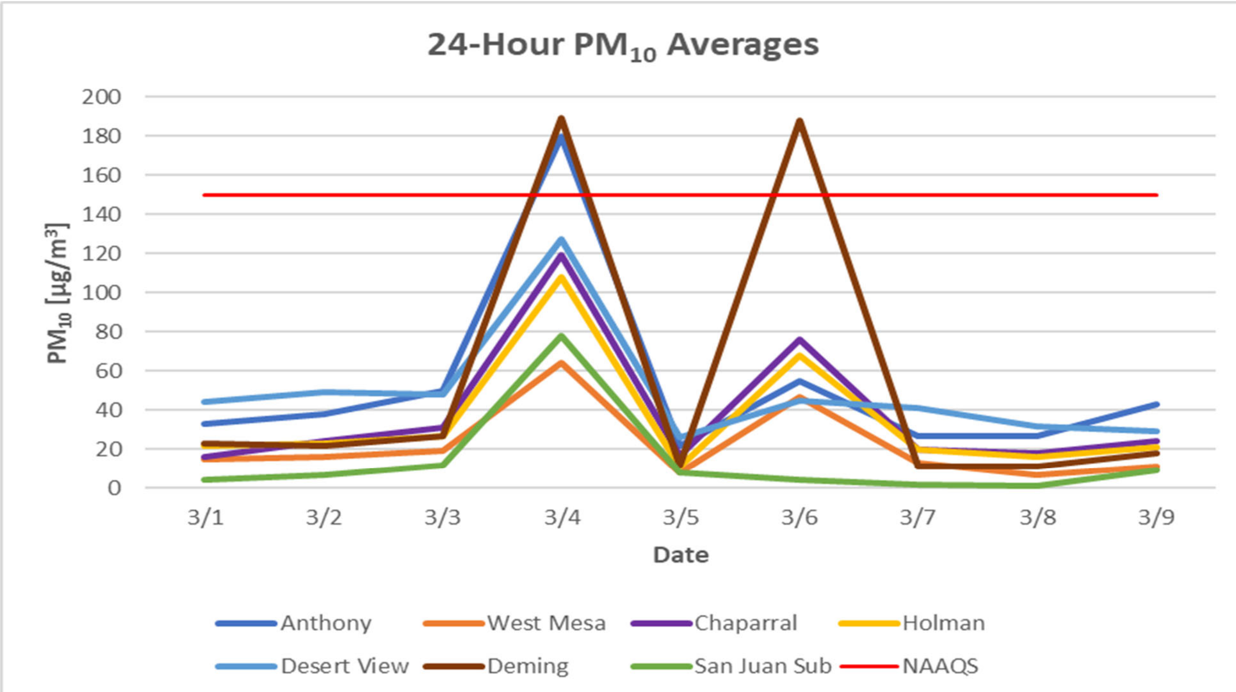


Figure 7-11. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (188 µg/m^3) is above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average (188 µg/m^3) is above the 99th percentile monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

8. HIGH WIND EXCEPTIONAL EVENT: March 29, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana County resulting in an exceedance of the PM_{10} NAAQS at the Desert View monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 8-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0021	6ZM Desert View	174 µg/m^3	10.8 m/s	22.4 m/s

Table 8-1 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A strong upper-level Pacific storm system will move into the region today from the west coast into Arizona this morning. At the 1800 hour, an area of low-pressure moved east of the Four Corners extending into the bootheel of New Mexico (Figure 8-1). Aloft, the low-pressure center of the storm system hovered over southern California and aligned itself with New Mexico and the surface wind direction (Figure 8-2). Early morning momentum transfer allowed stronger winds aloft to mix down, tightening gradients increased surface wind velocities providing the turbulence required for the suspension of localized dust into the air from the surface to subside by the evening.

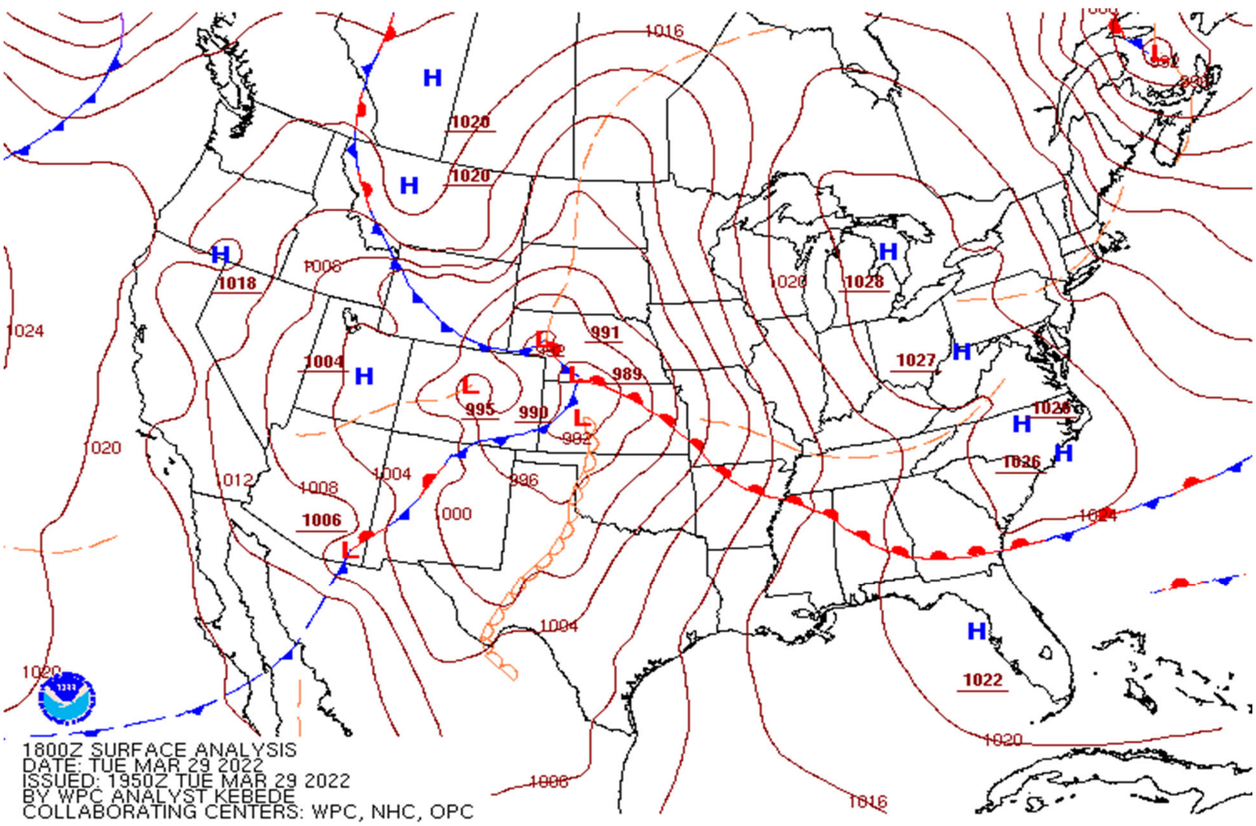


Figure 8-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

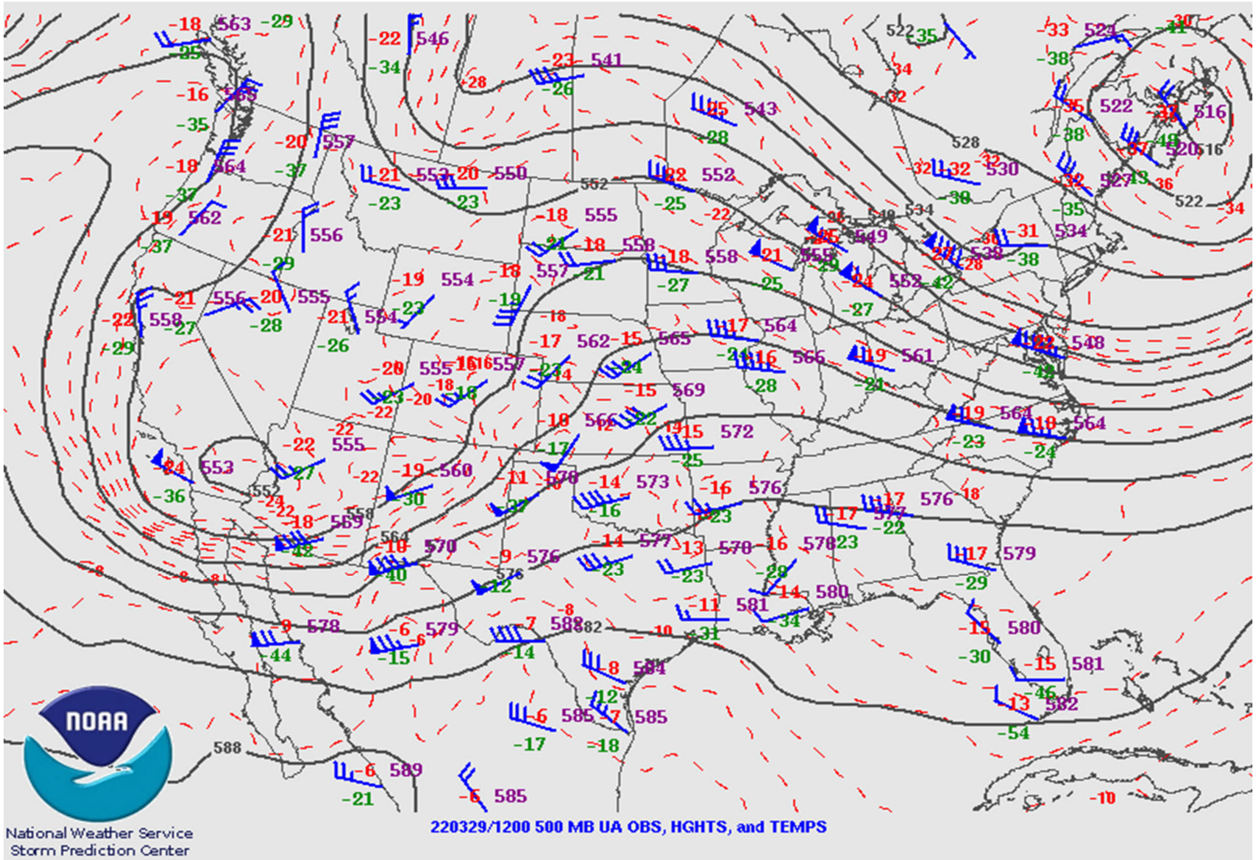


Figure 8-2. Upper air weather map for March 29, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, La Union, and Santa Teresa monitoring sites beginning at the 0800 hour and lasted through the 2300 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, and Deming monitoring sites beginning at the 0800 hour. Hourly concentrations remained elevated through the 1800 hour. Table 8-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Holman			Desert View			Deming		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
0900	36	9	13.3	237	8.9	17.4	83	10.6	15.6
1000	224	10.5	18.4	29	6.7	12.8	371	11.9	18.2
1100	1543	14.6	23.2	1221	10.2	22.4	1289	14.1	20.1
1200	114	11.7	18.6	703	10.8	20.8	102	11.2	19
1300	278	12.6	18.8	219	9.3	15.2	383	11.5	19.4
1400	----	12.4	19.3	285	9.7	16.5	17	9	15.7
1500	234	12.8	19.6	810	9.8	17.5	24	11	17.6
1600	122	11.7	19.2	215	9.6	16	5	8.4	13.6
1700	7	8.6	12.8	73	6.7	13.8	7	8.1	15.2
1800	5	7.4	12.5	151	7.7	13	5	7.5	11.8

Table 8-2 Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east just east of the Four Corners in the morning and moving across New Mexico in the afternoon. The system's movement across the area timed well with daytime heating and mixing generating a deep trough to the west as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon, especially in the desert areas of southern New Mexico. Below is the Graphicast product from the El Paso National Weather Service highlighting the Wind and Blowing Dust Advisories in place for this date (Figure 8-3).

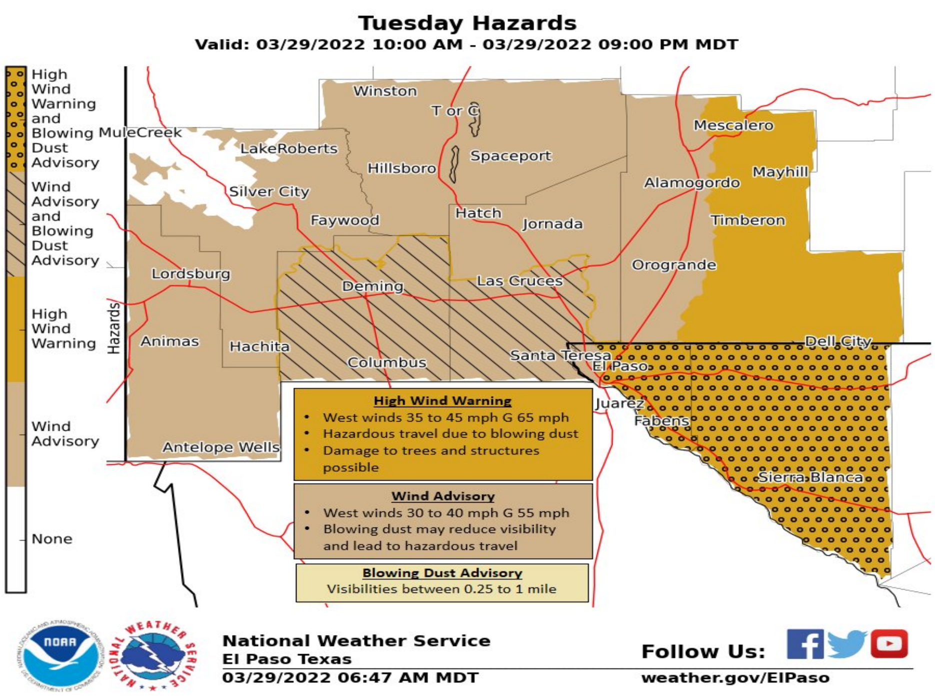


Figure 8-3. NWS GraphiCast product showing Blowing Dust Advisory forecast for southern Doña Ana and Luna Counties.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Chaparral, West Mesa, Holman, Santa Teresa and La Union monitoring sites recorded wind speeds above this threshold for a total of eleven cumulative hours beginning at the 1000 hour and lasted through the 2300 hour with an intermittent period between the 1700 hour through the 2000 hour below the high wind threshold (Figure 8-4). The wind speeds at the upwind Deming monitoring site also reached the high wind threshold.

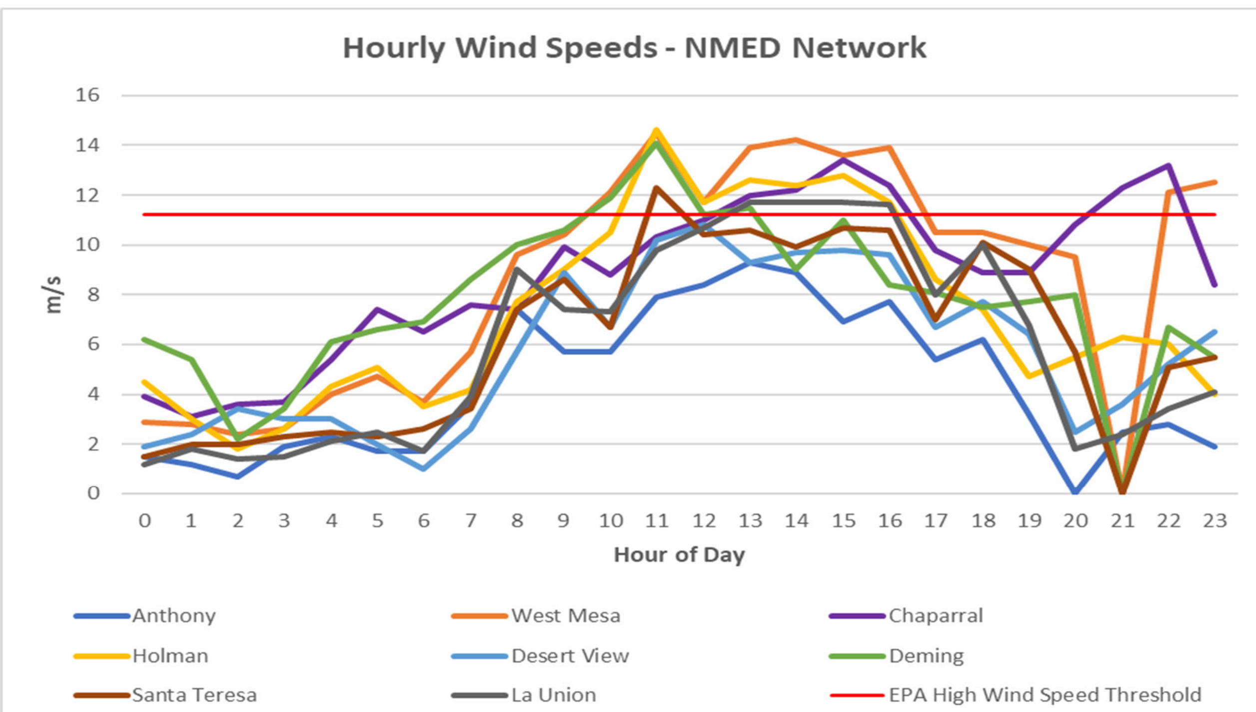


Figure 8-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Hidalgo, and Grant Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedances were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on GOES geostationary satellite imagery with dust plumes originating upwind of NMED's monitoring sites near Ascension and Janos, Chih. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 8-5). The dust plumes of interest appear to be limited to Mexico, orientated in a southwest to northeast fashion and traveling toward NMED's monitoring sites at the time of the satellite pass (1731 MDT) that captured the imagery.

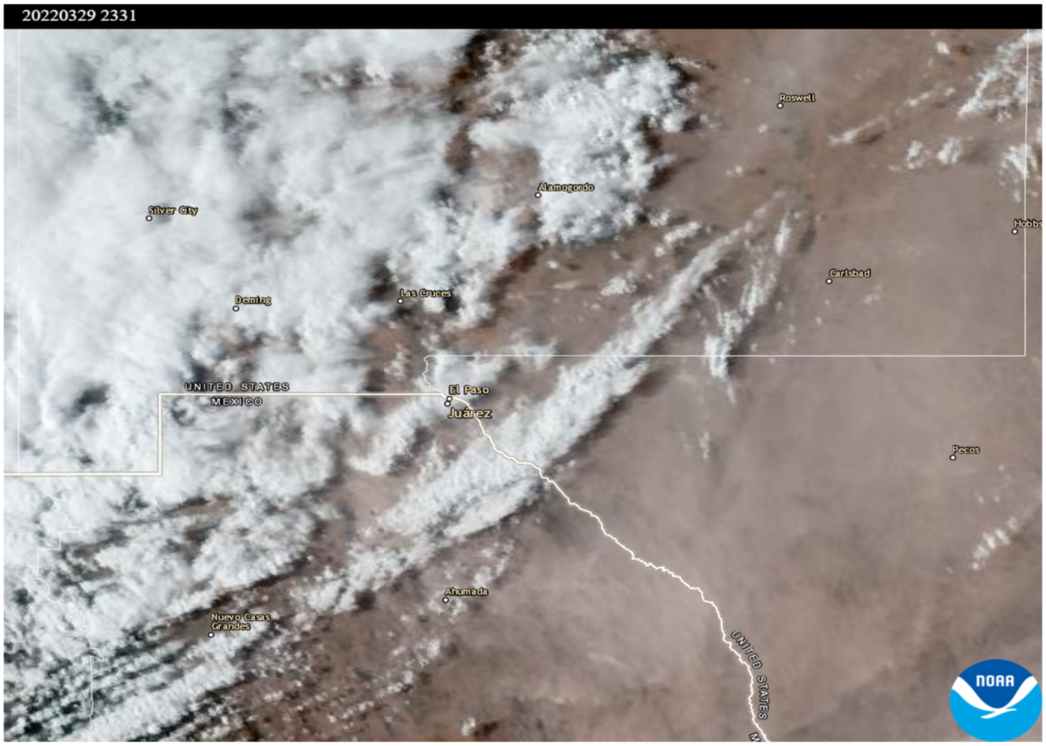


Figure 8-5. GOES geostationary satellite product imagery showing southwestern New Mexico, northern Chihuahua and far west Texas. Imagery obtained from NOAA AerosolWatch website.

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The National Weather Service (NWS) issued a Wind Advisory and a Blowing Dust Advisory. A Wind Advisory is issued by NWS when sustained winds of 40 mph are expected for 1 hour or longer or gusts at 58 mph or greater. A Blowing Dust Advisory is issued when blowing dust is expected to reduce visibility to between ¼ to 1 mile, generally with winds of 25 mph or greater. These were in place for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Wind Advisory and Blowing Dust Advisory can be found below:

"Blowing Dust Advisory…Wind Advisory from 10 AM this morning to 9 PM MDT this evening…Strong southwest to west winds with blowing dust are expected today and early evening…Wind speeds of 30 to 40 mph…Blowing dust will reduce visibilities to less than a mile in dust prone areas of Luna, Dona Ana… counties…"

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis
A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from Chihuahua, MX into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 8-6). This analysis supports the hypothesis that dust plumes originated in MX before being transported to downwind monitoring sites.

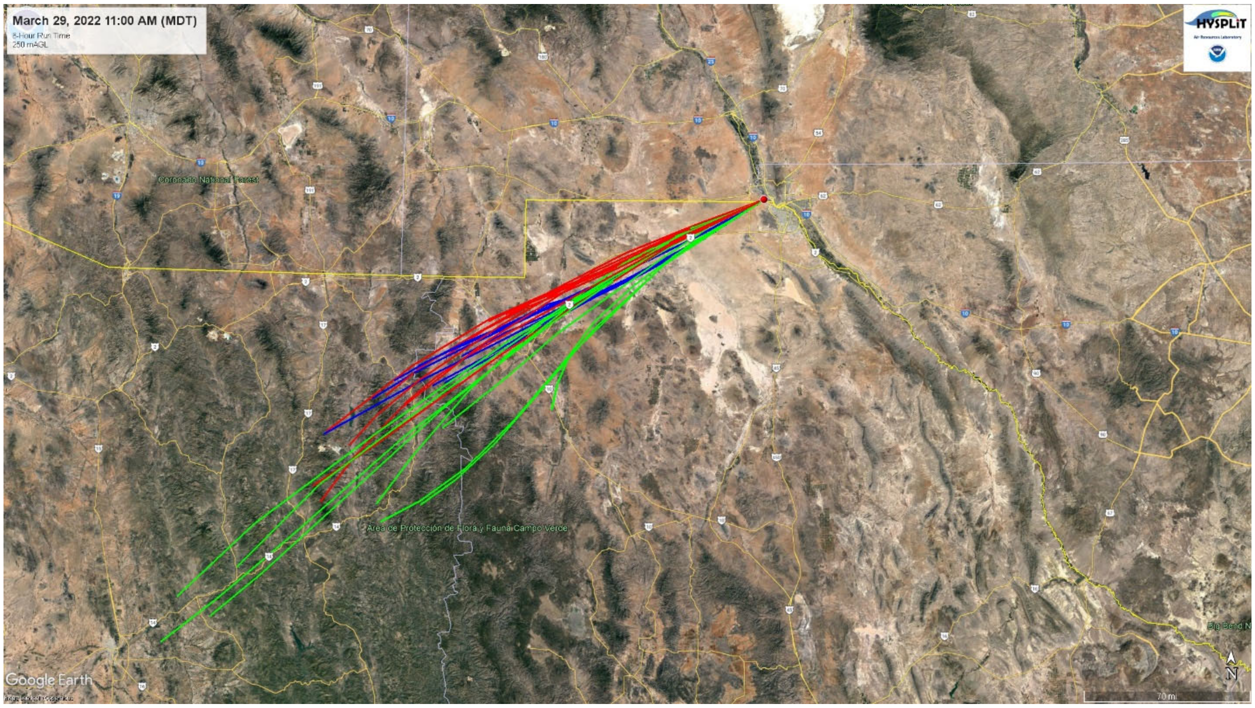


Figure 8-6. HYSPLiT back-trajectory analyses using the Ensemble mode for the Chaparral monitoring site.

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figure 8-7) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0800 -1800 hour). During the event, winds blew from the west southwest 90 - 100% of the time coinciding with peak PM_{10} concentrations.

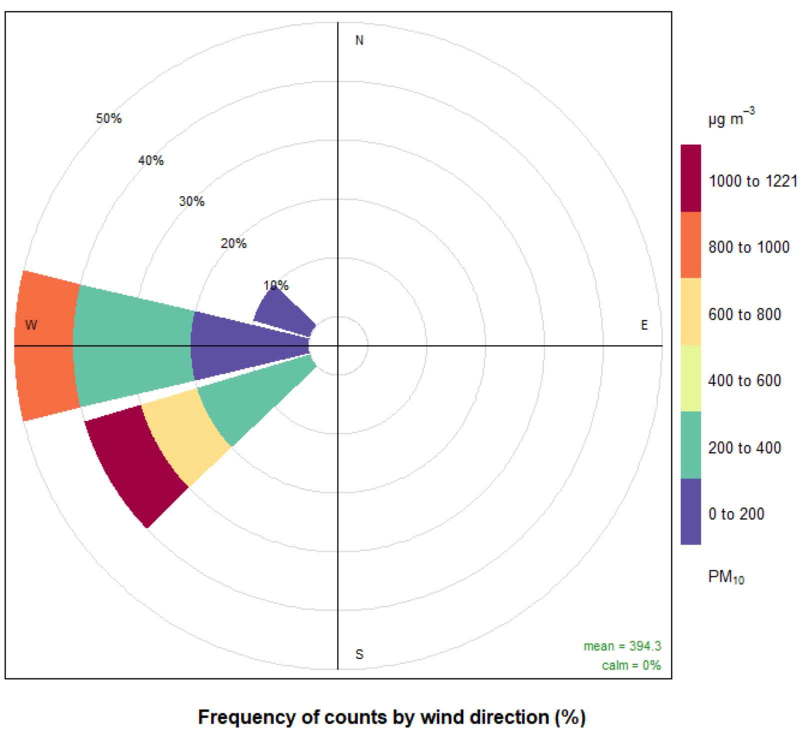


Figure 8-7. Pollution rose for the Desert View monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong southwesterly winds beginning at the 0800 hour and lasted through the 2300 hour. During this time, peak hourly PM_{10} concentrations ranged from 132 to 1543 µg/m^3 were recorded at the West Mesa and Holman monitoring sites, respectively (Figure 8-8). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 9.3 to 14.6 m/s were recorded at the Anthony and Holman monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 8-9 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

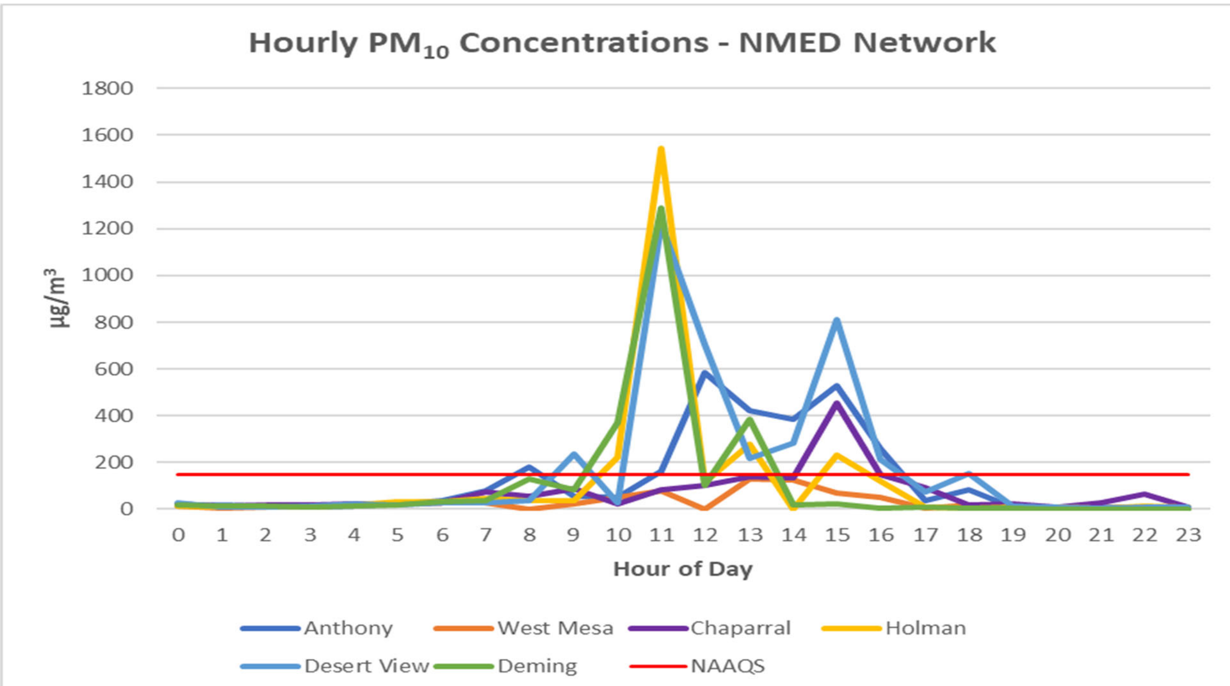


Figure 8-8. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

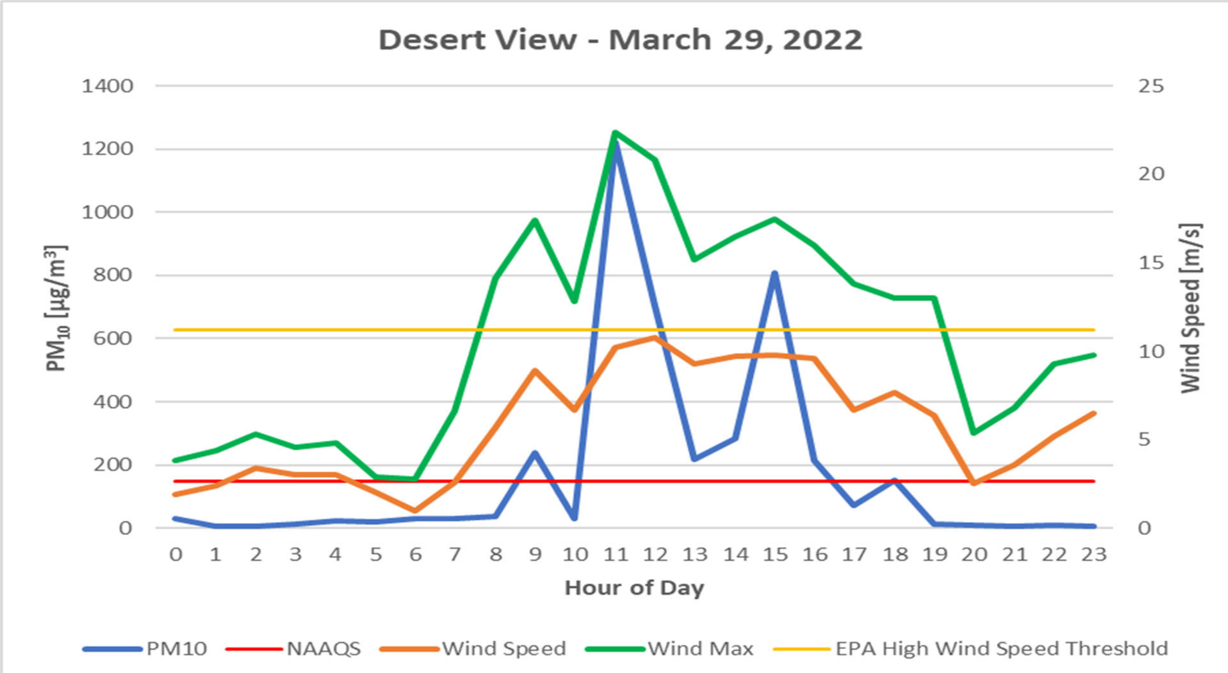


Figure 8-9. Desert View monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Desert View monitoring site recorded 34 exceedances of the PM_{10} NAAQS (Figure 22-2 in Appendix B). The maximum 24-hour average PM_{10} concentrations was 769 µg/m^3 recorded in 2021. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 8-10, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. The daily average for three days preceding and following the event did not surpass 65 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

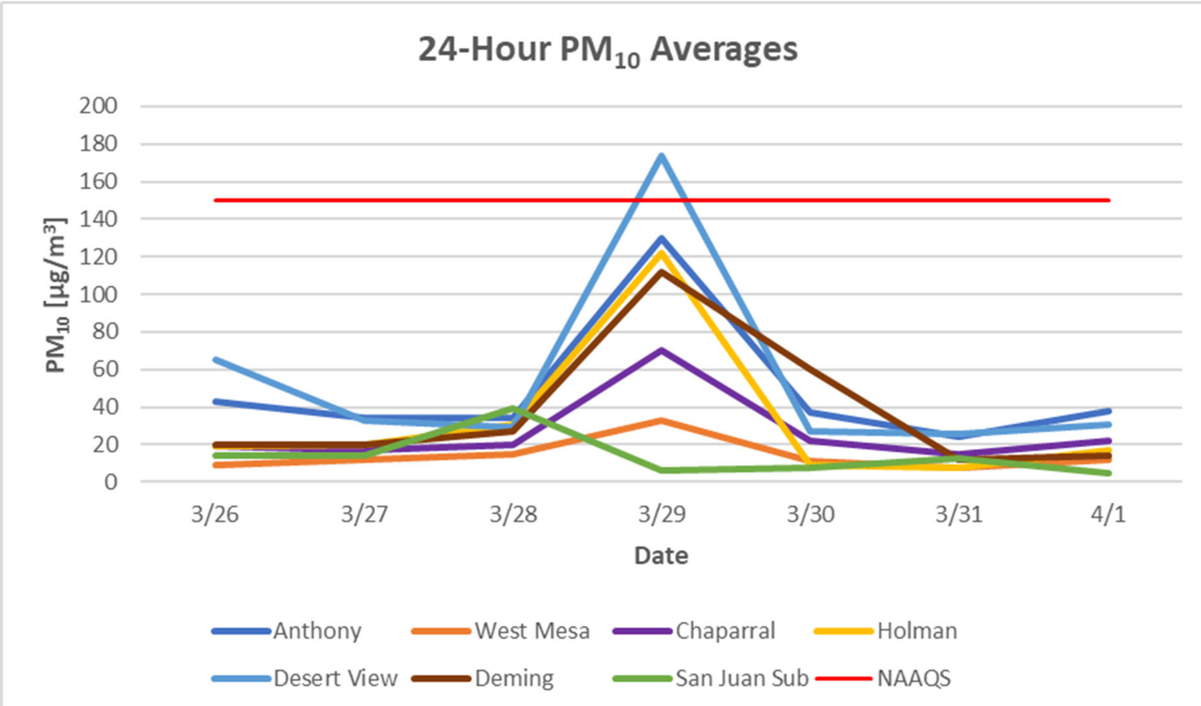


Figure 8-10. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (174 µg/m^3) is above the 95th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average (174 µg/m^3) is above the 95th percentile of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

9. HIGH WIND EXCEPTIONAL EVENT: April 11, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in San Juan County resulting in an exceedance of the PM_{10} NAAQS at the San Juan Substation monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 9-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0020	1H San Juan Sub	155 µg/m^3	14.6 m/s	20.2 m/s

Table 9-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A strong Pacific low-pressure cold front coming from the northeast will produce a surface lee trough from the tightening of gradients combined with low humidity over southeastern Colorado to create very windy conditions today. At the 1800 hour, an area of low-pressure moved over the Great Basin (Figure 9-1). Aloft, the low-pressure center of the storm system hovered over the Pacific Northwest. As the day progressed this low-pressure aloft traveled southeast creating a surface lee trough and aligned itself with New Mexico and the surface wind direction (Figure 9-2). Diurnal heating of the surface allowed winds aloft to mix down, combined with surface wind velocities and the turbulence required for vertical mixing and entrainment of dust with increasingly gusty conditions leading into the evening.

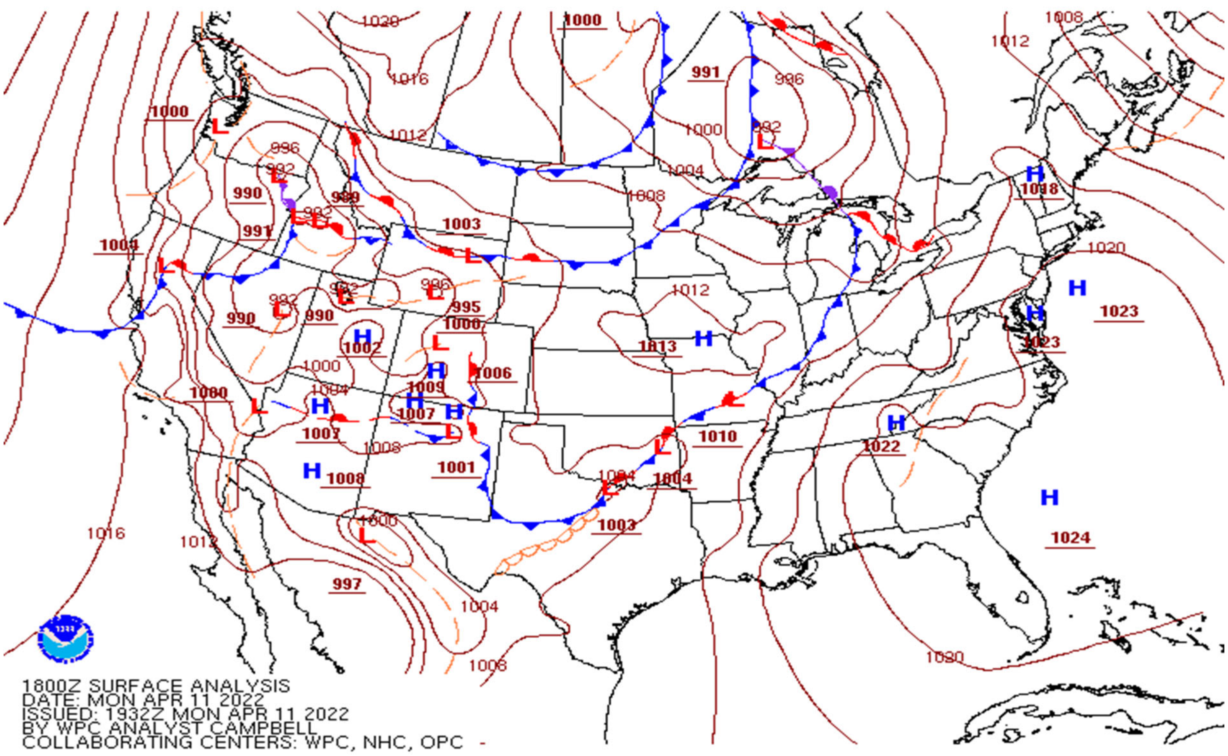


Figure 9-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

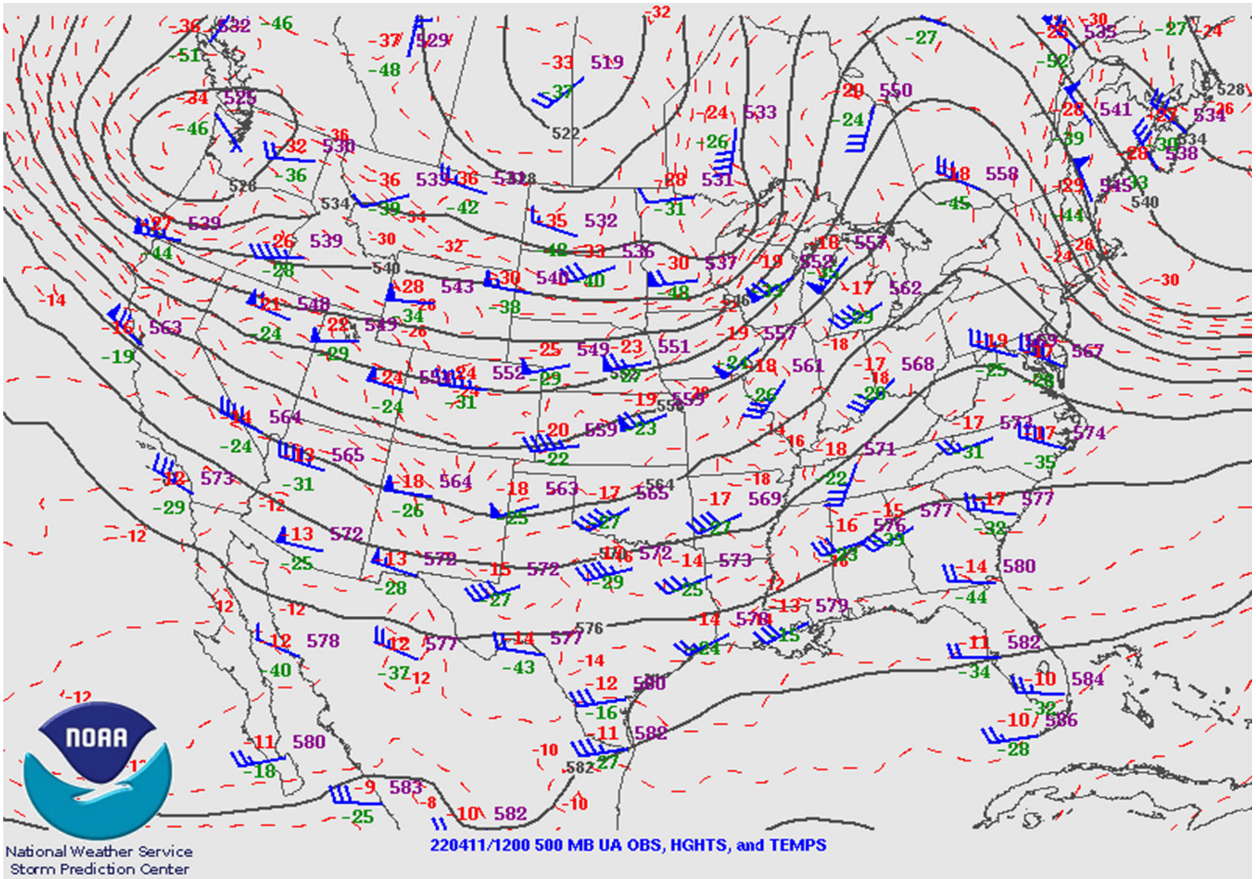


Figure 9-2. Upper air weather map for April 11, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the west southwest throughout the Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Chaparral, West Mesa, Holman, Deming, and San Juan Substation monitoring sites beginning at the 1300 hour lasting through the 2300 hour with an intermittent period dropping below 9 m/s through the 1900 and 2000 hours. PM_{10} concentrations began to exceed the NAAQS at the Desert View, Chaparral, Holman, and San Juan Substation monitoring sites beginning at the 1200 hour. Hourly concentrations remained elevated through the 2300 hour. Table 9-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Chaparral			Desert View			San Juan Substation		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
1600	134	8.7	14.7	202	7.8	13.1	171	11.4	17.3
1700	110	8.7	15.1	117	7.3	14.1	447	14.6	20.2
1800	61	8.1	14.2	58	5.6	9.7	261	12	18.1
1900	31	7.3	13.9	39	3.8	7.5	361	7.7	12
2000	58	8.8	15	44	4.2	7.1	395	6.3	10.1
2100	613	11	18.3	22	4.3	7.9	522	8.1	13.7
2200	166	10.6	17	19	4.9	9.1	503	8.4	16.2
2300	53	9.4	16	34	4.4	7.9	727	11.3	16.6

Table 9-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from the Pacific Northwest in the morning and moving across New Mexico in the afternoon. The system's movement across the area timed well with daytime heating and mixing generating a deep trough to the west as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon leading to increased intensity into the evening, especially in the Four Corners region.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The West Mesa and San Juan Substation monitoring sites recorded wind speeds above this threshold for a total of four hours beginning at the 1400 hour and lasted through the 1800 hour (Figure 9-3).

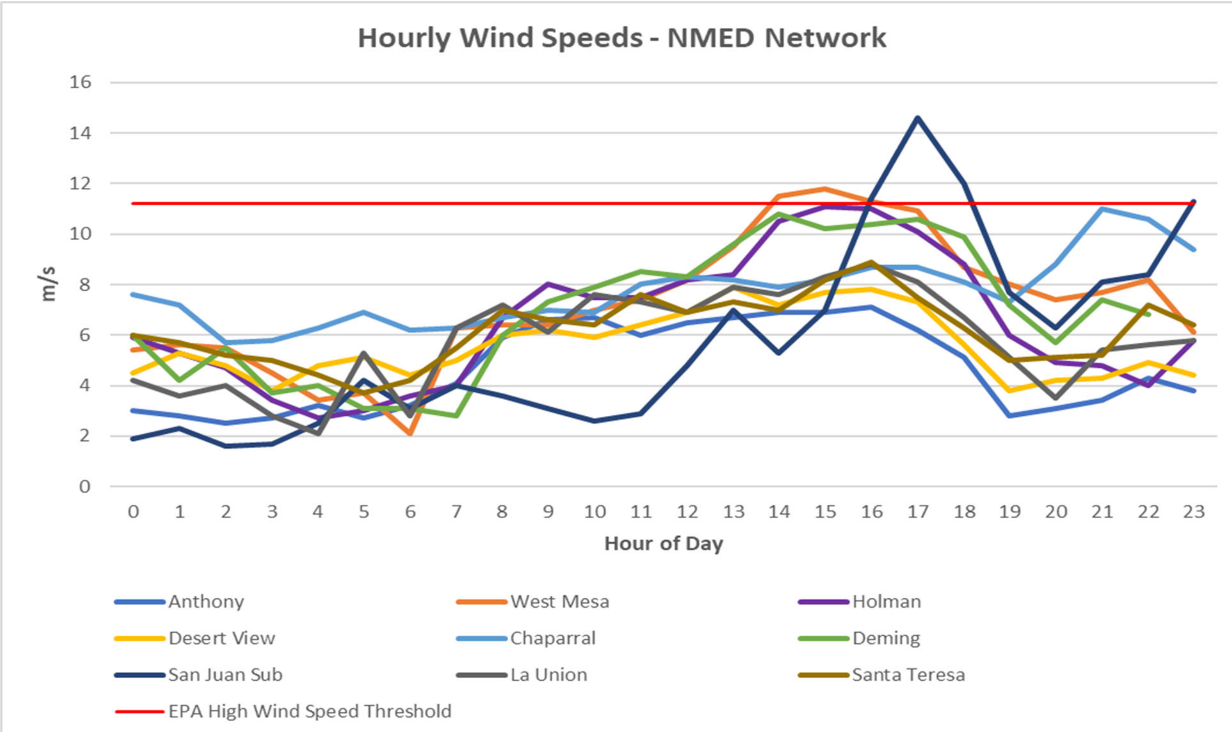


Figure 9-3. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures
Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana, and Luna

Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in San Juan and McKinley Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedances were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery
The event was captured on GOES-16 geostationary satellite RGB dust product imagery with dust plumes originating upwind of NMED's monitoring sites in the Four Corners region characterized as pink bands. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas (Figure 9-4). The dust plumes of interest appear to be limited to northwest New Mexico and northeast Arizona, orientated in a southwest to northeast fashion and traveling toward the San Juan Substation monitoring site at the time of the satellite pass (1841 MDT) that captured the imagery.

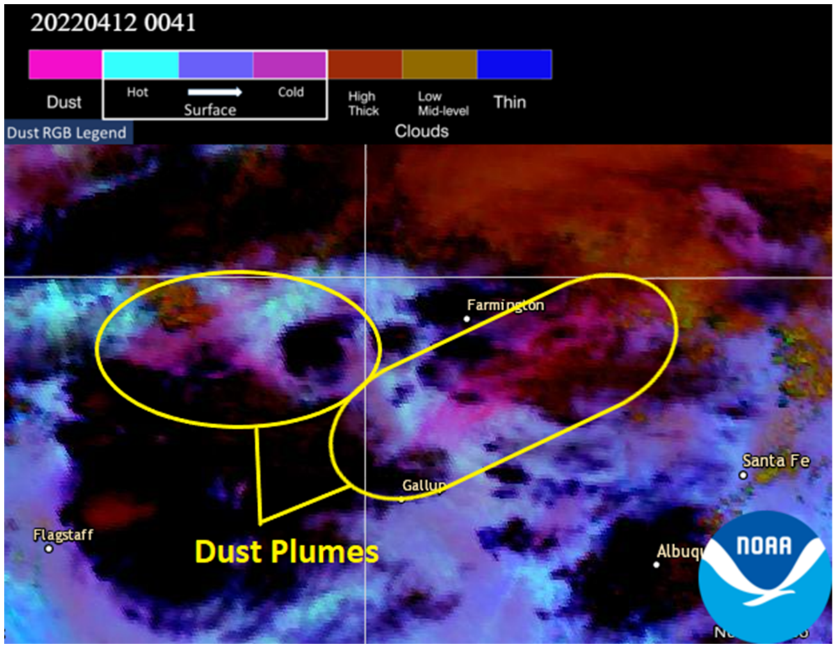


Figure 9-4. GOES-16 geostationary satellite (1841 MDT) RGB dust product imagery showing the Four Corners region. Imagery obtained from NOAA Aerosol Watch website.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a High Wind Warning for this date. A High Wind Warning is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. A High Wind Warning was issued for northwestern New Mexico to warn the public of the high wind event. An excerpt from the High Wind Warning can be found below:

"High Wind Warning from 2 PM this afternoon to 3 PM MDT Tuesday…A potent storm system will bring strong to damaging winds across the northern two-thirds of New Mexico this evening through Tuesday. Peak wind speeds will potentially exceed 70 mph…Blowing dust will also create hazardous travel for dust prone areas…"

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from northeastern Arizona into the Four Corners area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 9-5). This analysis supports the hypothesis that dust plumes originated in rural Arizona and New Mexico before being transported to the downwind monitoring site.

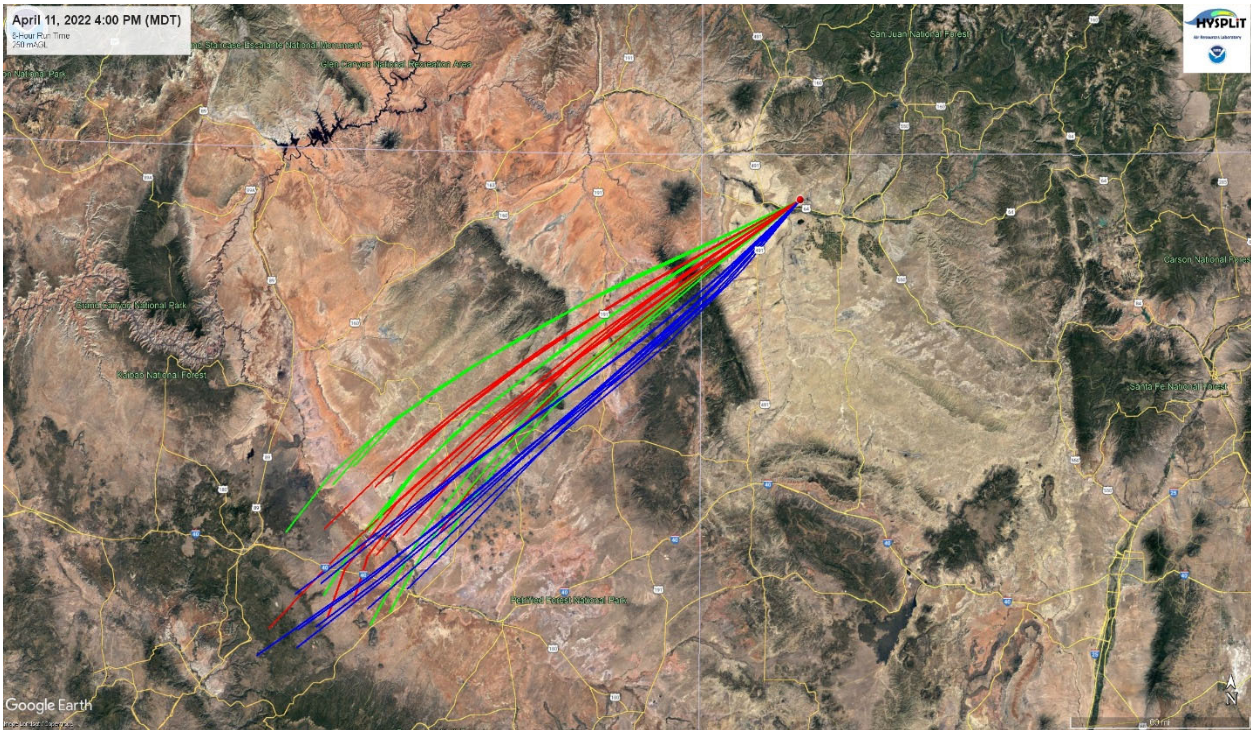


Figure 9-5. HYSPLiT back-trajectory analyses using the Ensemble mode for the San Juan Substation monitoring site.

Wind Direction and Elevated PM_{10} Concentrations

A pollution rose (Figure 9-6) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (1200 -2300 hour). During the event, winds blew from the southwest 100% of the time coinciding with peak PM_{10} concentrations.

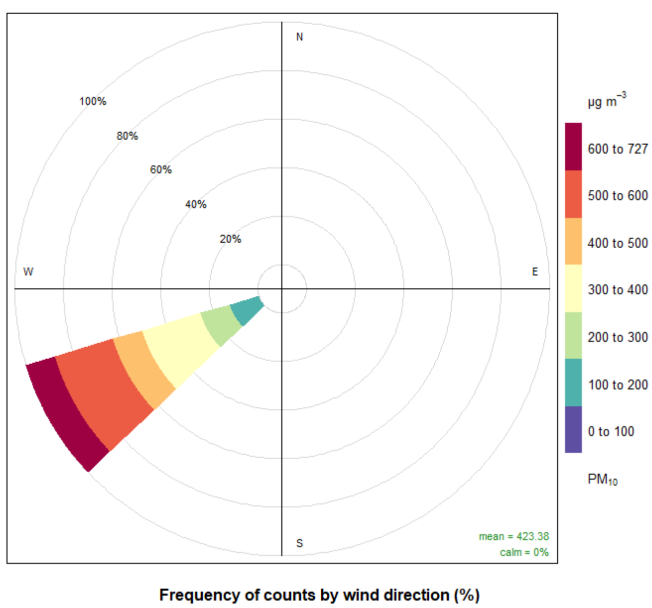


Figure 9-6. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong southwesterly winds beginning at the 1300 hour and lasting through the 2300 hour. During this time, peak hourly PM_{10} concentrations ranged from 36 to 727 µg/m^3 were recorded at the West Mesa and San Juan Substation monitoring sites, respectively (Figure 9-7). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 7.1 to 14.6 m/s were recorded at the Anthony and San Juan Substation monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figure 9-8 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

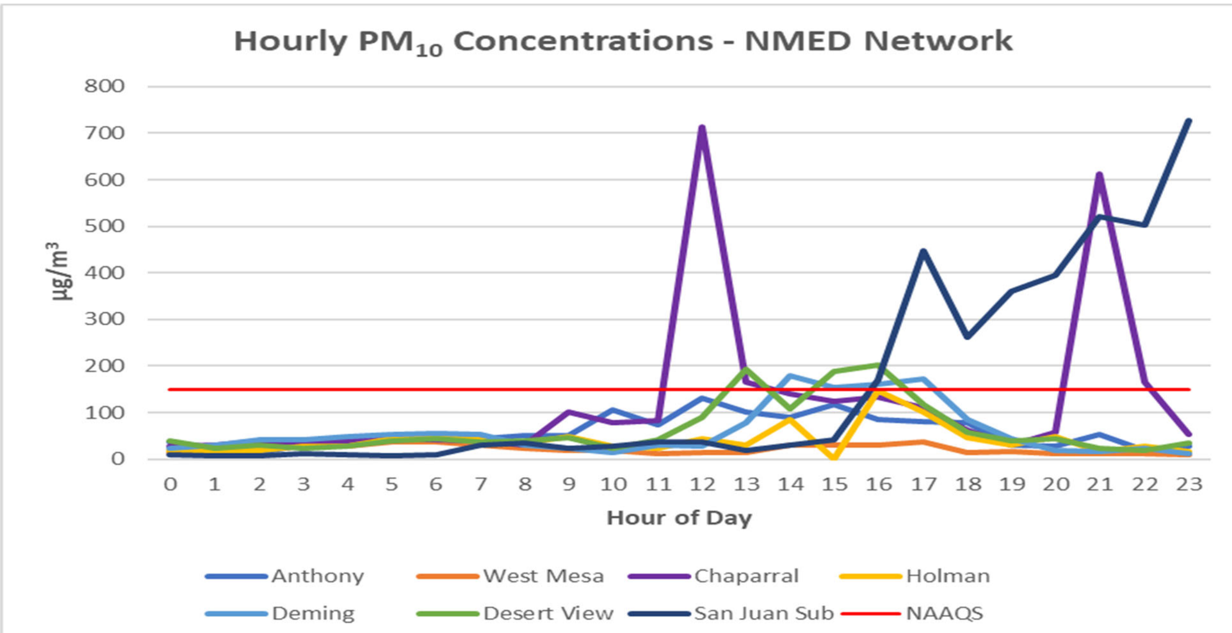


Figure 9-7. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

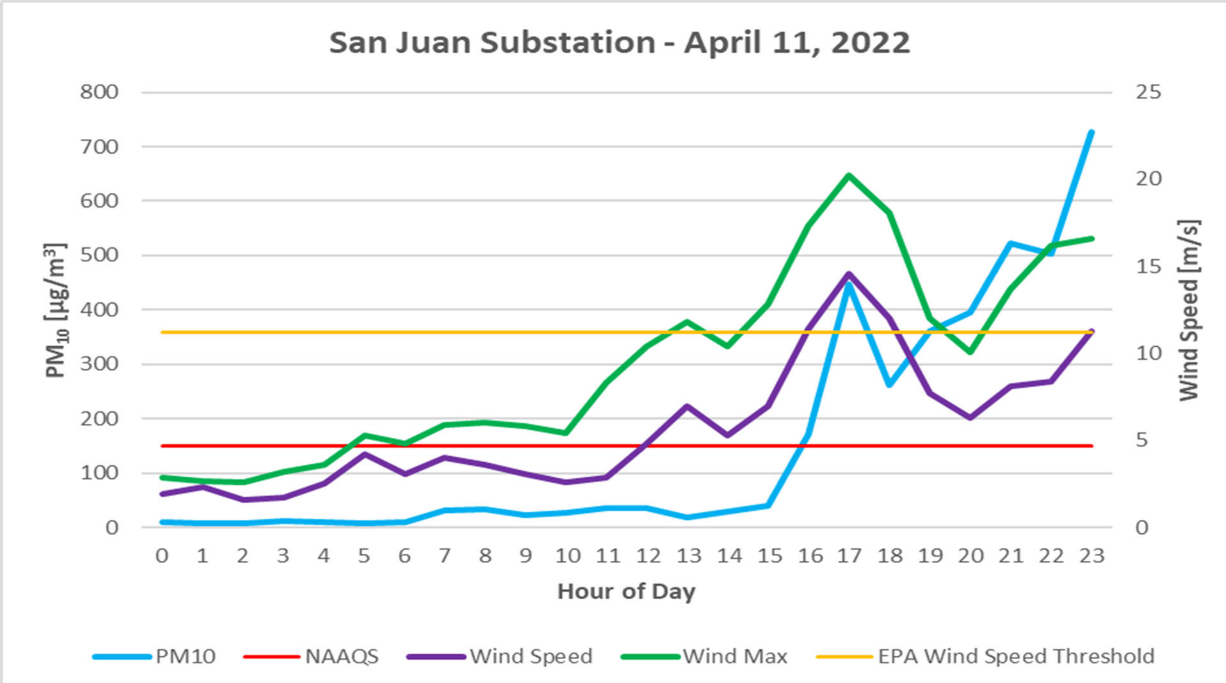


Figure 9-8. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2018-2021, the San Juan Substation monitoring site recorded only 1 exceedance of the PM_{10} NAAQS (Figure 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration was 171 µg/m^3 recorded in 2020. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 9-9, the San Juan Substation monitoring site recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. The daily average for three days preceding and following the event did not surpass 29 µg/m^3, except for the following April 12, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

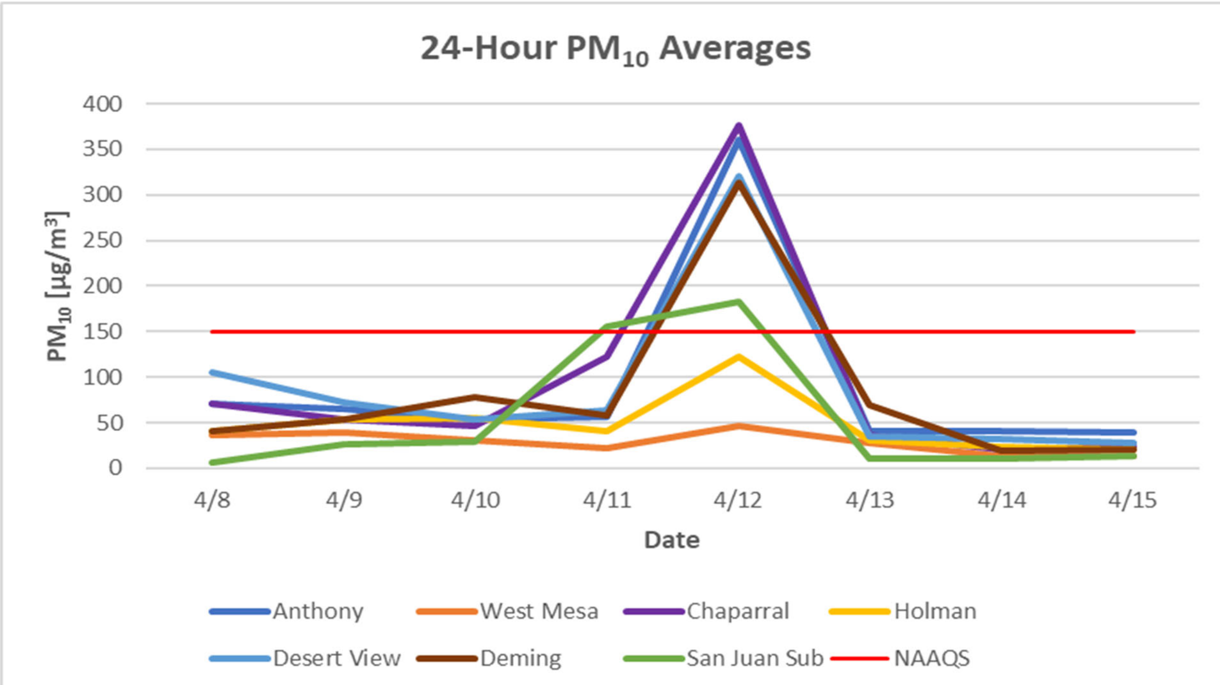


Figure 9-9. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking
Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2018-2021. The recorded value for this day (155 µg/m^3) is above the 99th percentile of historical data.

CCR Conclusion
On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average (155 µg/m^3) is above the 99th percentile of data monitored over the previous four years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

10. HIGH WIND EXCEPTIONAL EVENT: April 12, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana, Luna, and San Juan Counties resulting in an exceedance of the PM_{10} NAAQS at the Anthony, Desert View, Chaparral, Deming, and San Juan Substation monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 10-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	360 μg/m^3	9.8 m/s	17.4 m/s
RJ	35-013-0021	6ZM Desert View	320 μg/m^3	10.9 m/s	18.3 m/s
RJ	35-013-0020	6ZK Chaparral	377 μg/m^3	12.4 m/s	22.2 m/s
RJ	35-029-0003	7E Deming	313 μg/m^3	13.8 m/s	21.8 m/s
RJ	35-045-1005	1H San Juan Sub	183 μg/m^3	13 m/s	21.2 m/s

Table 10-1 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

This morning a strong low-pressure system over southeastern Colorado shifting towards Kansas this evening will induce increased surface pressure gradients that will combine with jet streak mixing to produce very windy conditions today in New Mexico. At the 1800 hour, areas of low pressure extended from northwest New Mexico and southeast Colorado into Nebraska with a pocket just south of the New Mexico bootheel (Figure 10-1). Aloft, the low-pressure center of the storm system hovered northeast of the Great Basin (Figure 10-2). As the day progressed this low-pressure aloft traveled east and aligned itself with New Mexico increasing the surface wind velocities providing the turbulence required for vertical mixing and entrainment of dust.

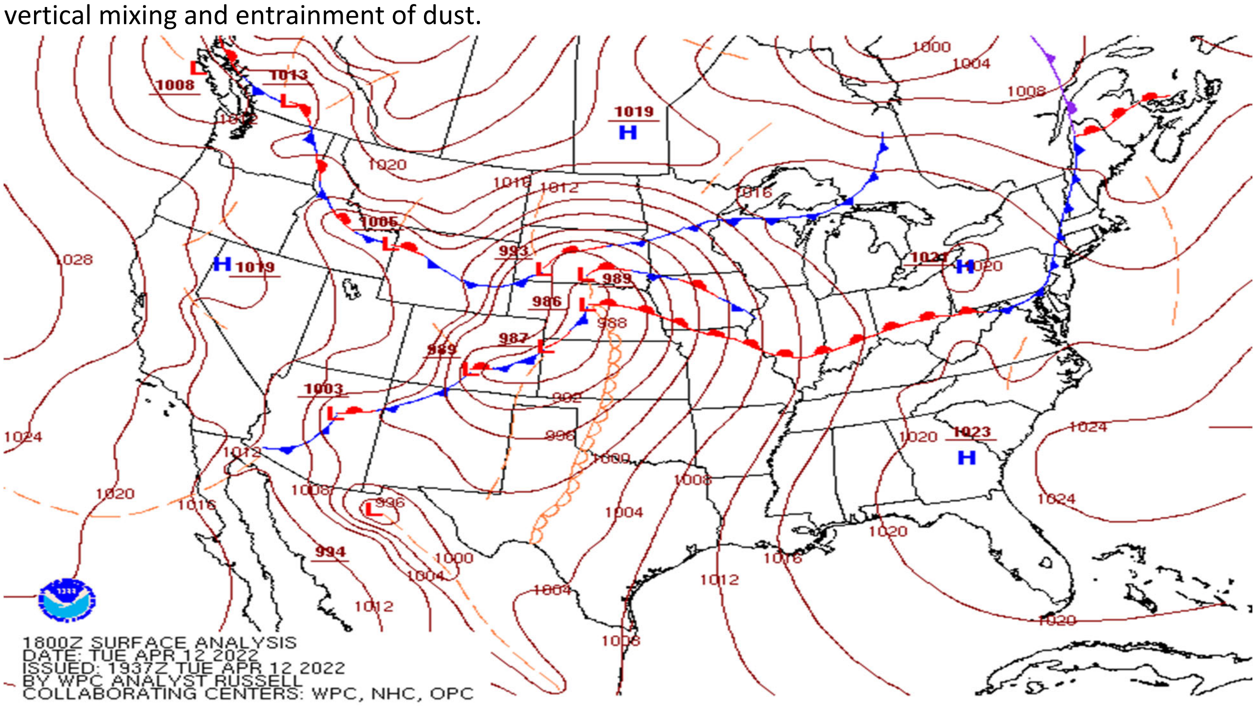


Figure 10-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

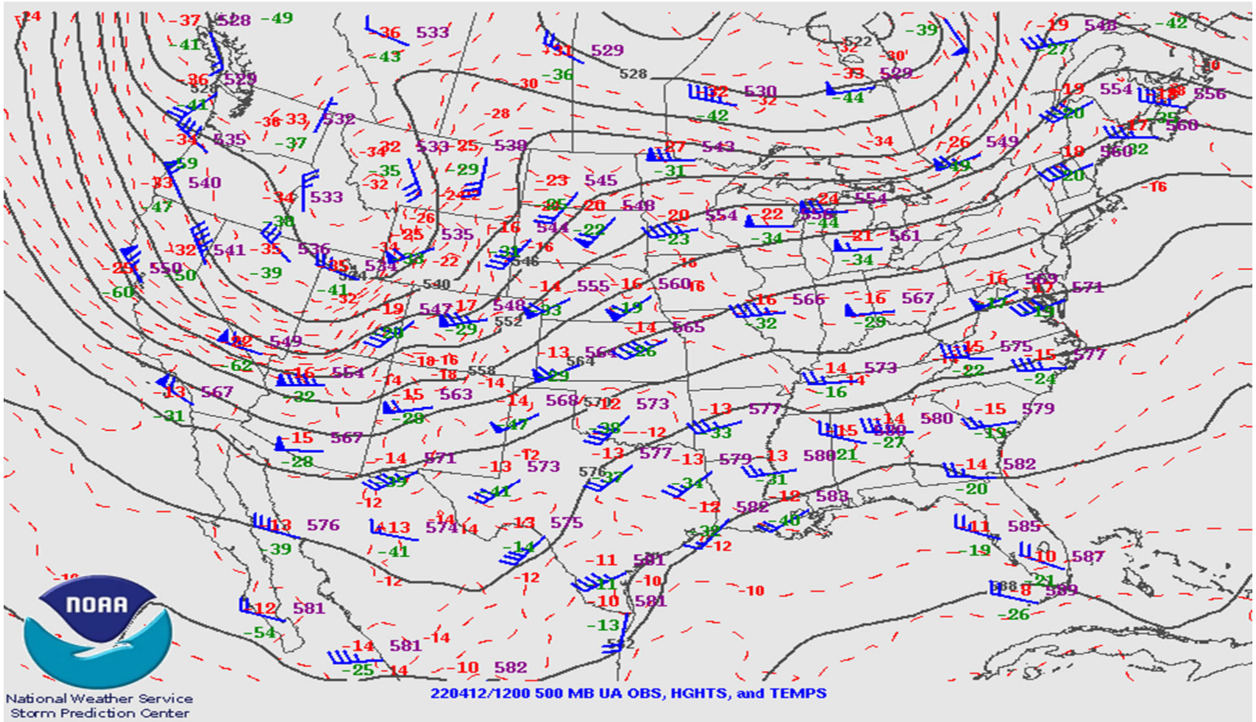


Figure 10-2. Upper air weather map for June 13, 2021, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the east-southeast throughout the southern border and Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, La Union, Santa Teresa, La Union, and San Juan Substation monitoring sites beginning at the 0000 hour and lasted through the 2100 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, La Union, Santa Teresa, and San Juan Substation monitoring sites beginning at the 0000 hour. Hourly concentrations remained elevated through the 1900 hour. Table 10-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Chaparral			Deming			San Juan Substation		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
0000	227	10.7	17.4	22	4.5	6.7	964	9.1	16
0100	256	10.9	18.1	22	3.3	8.4	493	9	13.3
0200	210	10.4	18.7	22	6.7	9.9	683	7.7	11.7
0300	534	11	17.7	24	6.8	13.1	488	8	11.5
0400	806	10.8	17.5	19	6.4	11	346	8.2	12
0500	437	8.3	16.5	19	6.3	11.4	298	8.8	16.4
0600	58	5.8	13.2	24	7.7	10.8	652	13	21.2
0700	36	6.6	16	34	8.7	13.3	27	11.5	16.4
0800	207	9.7	17.3	136	9.6	16.4	34	9.7	15.2
0900	405	10	18.1	742	12.4	19.9	31	11.8	16.3
1000	1770	11.5	19.5	454	12.5	18.2	19	11.8	17.1
1100	603	11.4	18/.7	364	11.6	18	36	11.5	15.2
1200	503	11	18.7	405	12	18	44	10.2	13.8
1300	464	11.5	20.2	693	12.6	20	39	8.9	13.4
1400	256	10.9	18.6	420	12.1	18.2	63	10.5	16.2
1500	574	12.4	22.2	1081	13.8	21.8	46	9.8	15
1600	376	11.4	19.1	1362	13.2	21.6	44	10.5	15.7
1700	349	10.8	19.6	747	12	18.9	19	10.2	14.8
1800	483	12.2	19.7	447	9.7	15	14	8	11.5
1900	205	11.2	19.3	224	8.5	14.1	9	5.9	8.9

Table 10-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from the northwest New Mexico and southeast Colorado in the morning and continuing to shift east in the afternoon with increased intensity. The system's movement across the area timed well with daytime heating and mixing generating a deep trough to the west as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon leading to decreased intensity into the evening (Figure 10-3).

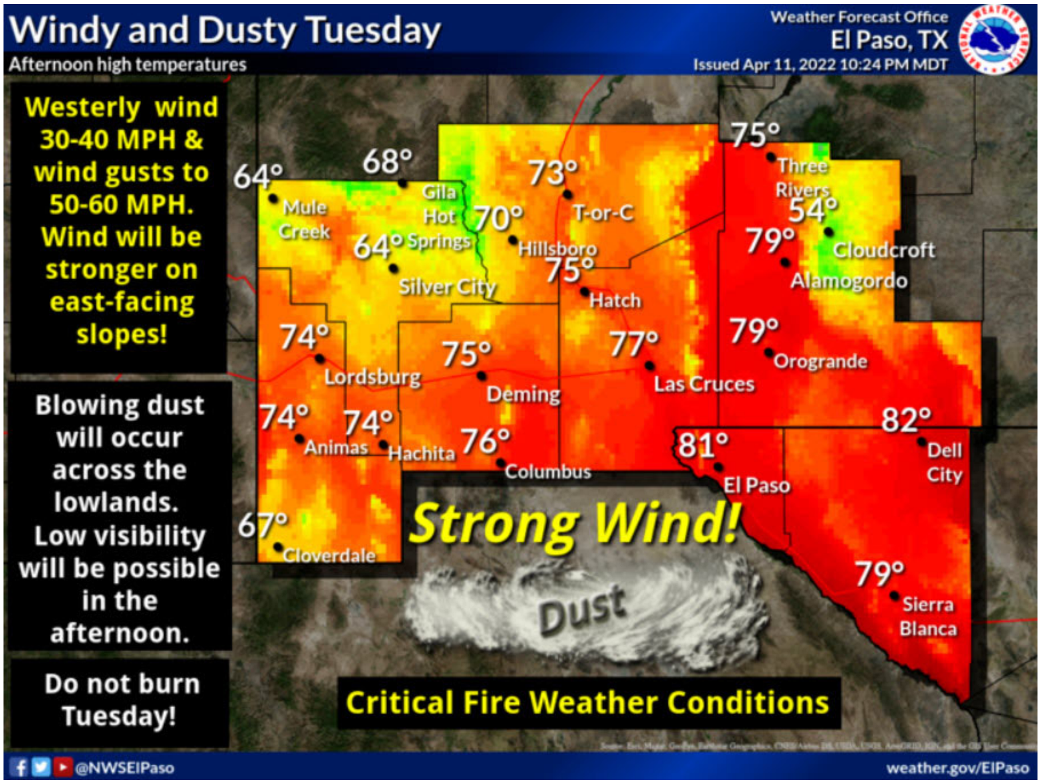


Figure 10-3. NWS GraphiCast showing dusty conditions forecasted for April 12, 2022.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, “the State shall not be required to provide a case-specific justification for a high wind dust event.”

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED’s monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Chaparral, West Mesa, Holman, Deming, La Union, Santa Teresa, and San Juan Substation monitoring sites recorded wind speeds above this threshold for a total of 14 hours that began at the 0600 hour and lasted through the 2000 hour, with an intermittent drop below the high wind threshold through the 0800 hour (Figure 10-4).

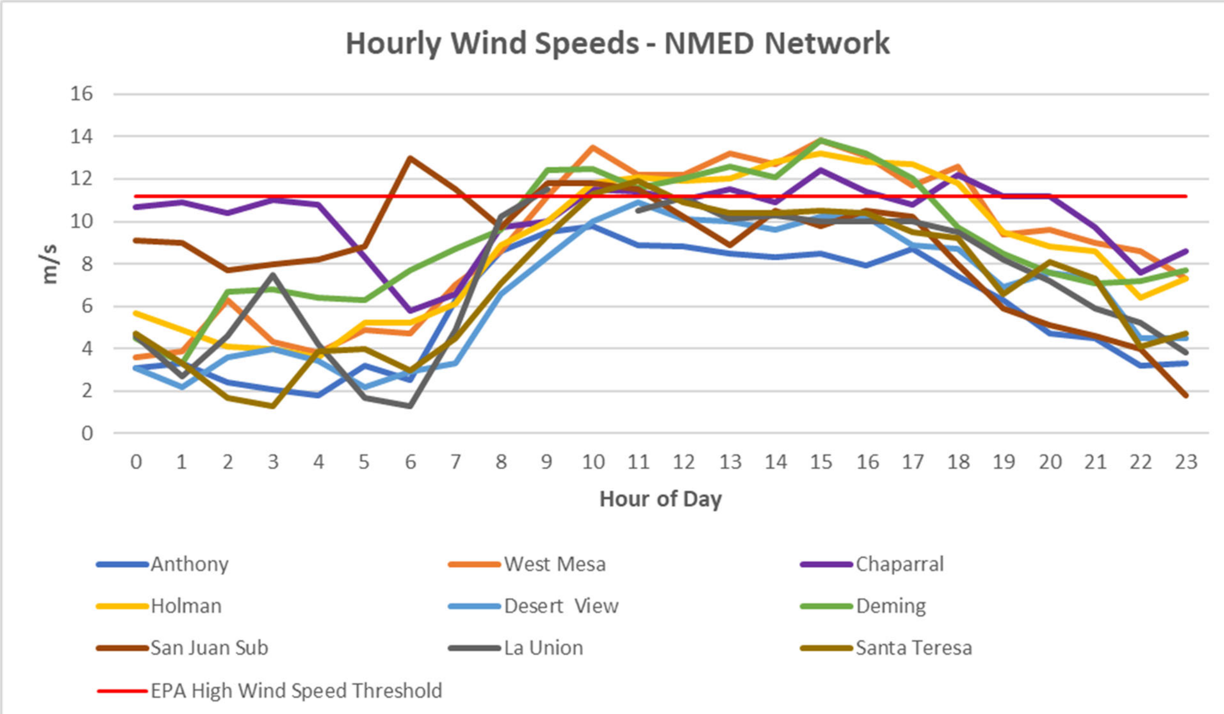


Figure 10-4. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures
Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana, and Luna counties are currently the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Hidalgo, Grant, San Juan, and McKinley Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented, and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on GOES geostationary RGB dust product and GeoColor satellite imagery with dust plumes originating upwind of NMED's monitoring sites near the Four Corners region for northwestern New Mexico and Ascension and Janos, Chih for southern New Mexico characterized as pink bands for the RGB dust product. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern New Mexico and Mexico (Figures 10-5 and 10-6). The dust plumes of interest appear to be limited to northern New Mexico and Mexico, orientated in a southwest to northeast fashion and traveling toward NMED's monitoring sites at the time of the satellite pass (0201 and 1651 MDT) that captured the imagery.

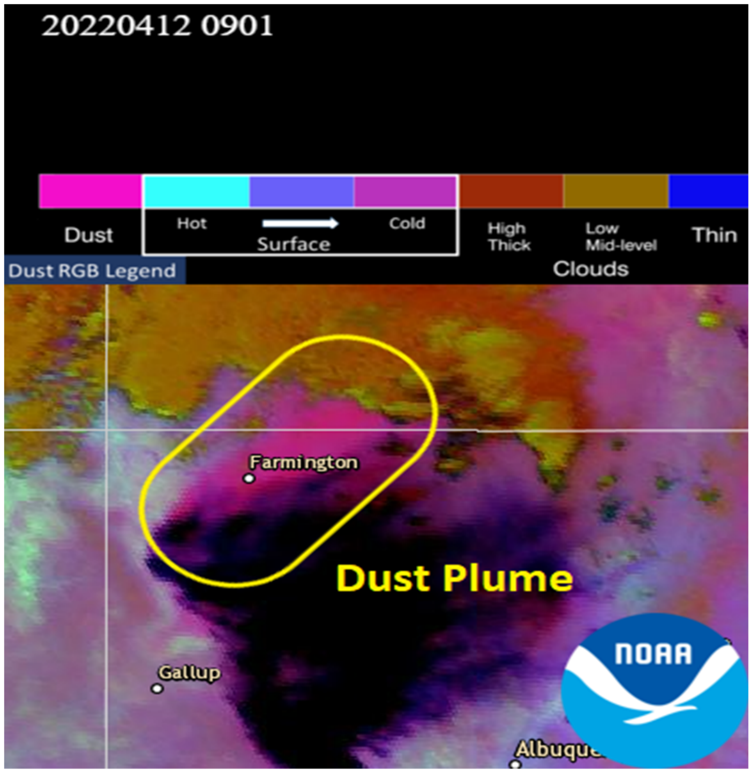


Figure 10-5. GOES-16 geostationary satellite RGB dust product imagery showing early morning dust impacts. Courtesy of NOAA Aerosol Watch.

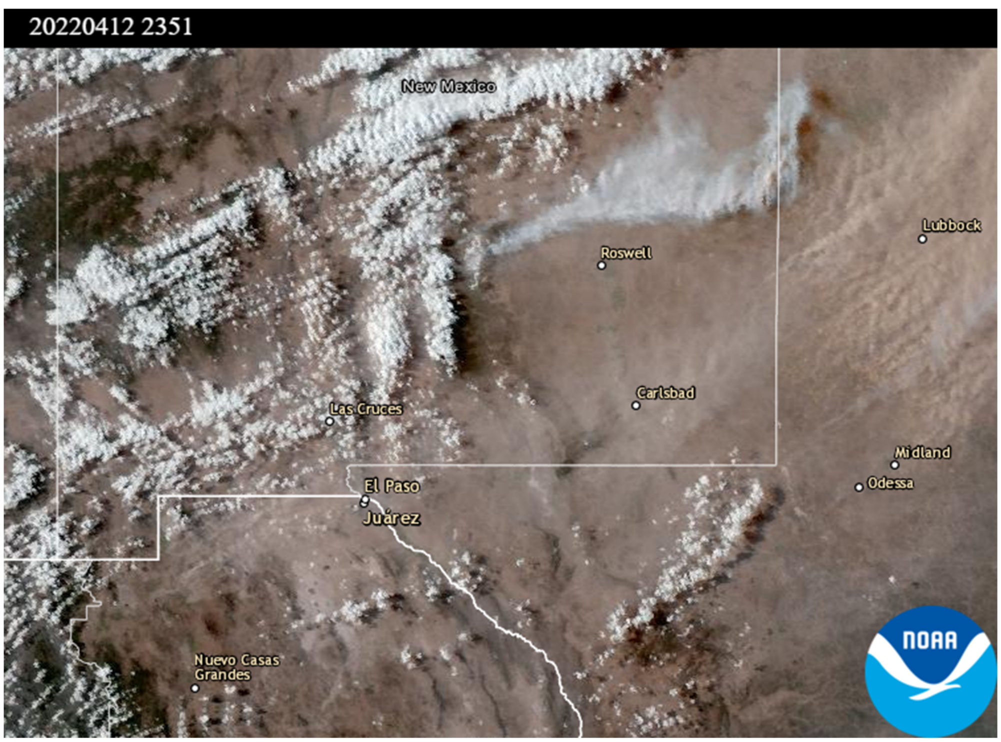


Figure 10-6. GOES-16 geostationary satellite GeoColor product imagery showing early morning dust and wildfire smoke impacts. Courtesy of NOAA Aerosol Watch.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued High Wind Warnings and a Blowing Dust Advisory for this date. A High Wind Warning is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. A Blowing Dust Advisory is issued when blowing dust is expected to reduce visibility to between ¼ to 1 mile, generally with winds of 25 mph or greater. These were in place for northwestern and southwestern New Mexico and west Texas to warn the public of the high wind event. Excerpts from the NWS High Wind Warnings and Blowing Dust Advisory can be found below:

(Northwestern NM Forecast Area – Zone 202)
"High Wind Warning until 3 PM MDT this afternoon…expect widespread areas of blowing dust and reduced visibility."

(Southwestern NM Forecast Area – Zone 411)
"Blowing Dust Advisory from 11 AM this morning to 7 PM MDT this evening…High Wind Warning until 9 PM MDT this evening…Windy to very wind conditions are expected…Damage to structures will be possible…and the potential for blowing dust…."

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

Back-trajectory analyses using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from northern Mexico into the southern New Mexico and El Paso, TX area monitoring sites; and, from northeastern Arizona and onto the northwestern NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 10-7). This analysis supports the hypothesis that dust plumes originated in Arizona and Mexico before being transported to downwind monitoring sites.

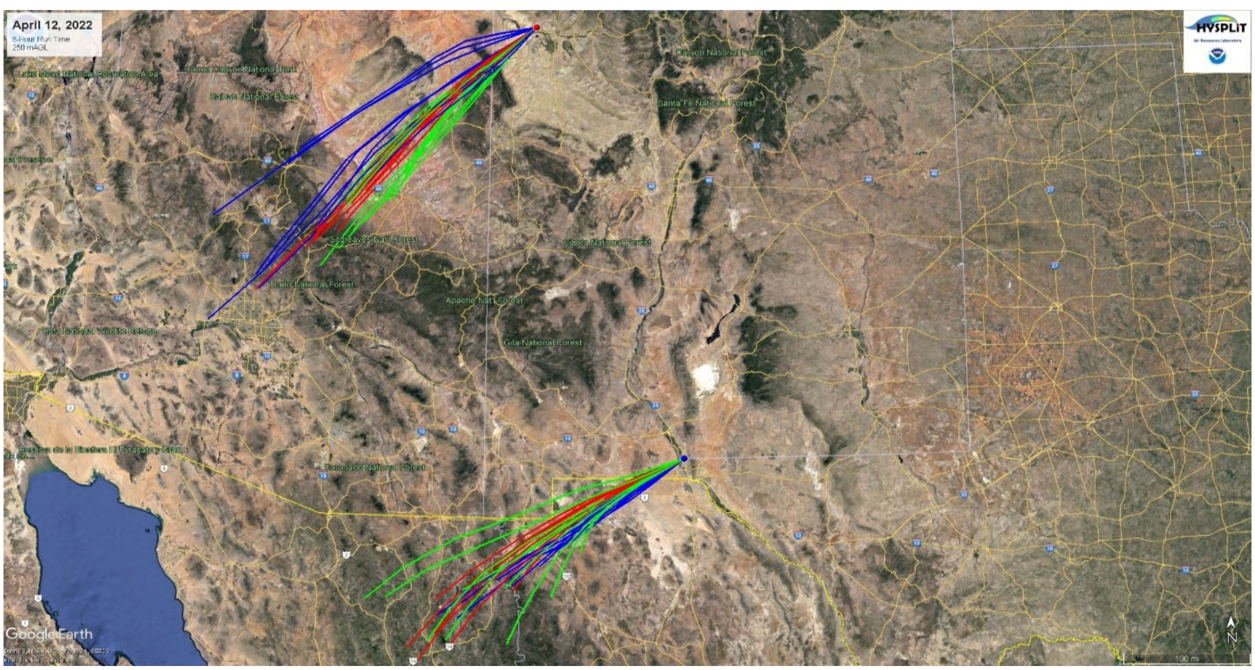


Figure 10-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony (southwest) and San Juan Substation (northwest) monitoring sites.

Wind Direction and Elevated PM_{10} Concentrations

Pollution roses (Figures 10-8 through 10-12) were created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0000 - 1900 hour). During the event, winds blew from the west northwest direction through the south direction 100% of the time, coinciding with peak PM_{10} concentrations.

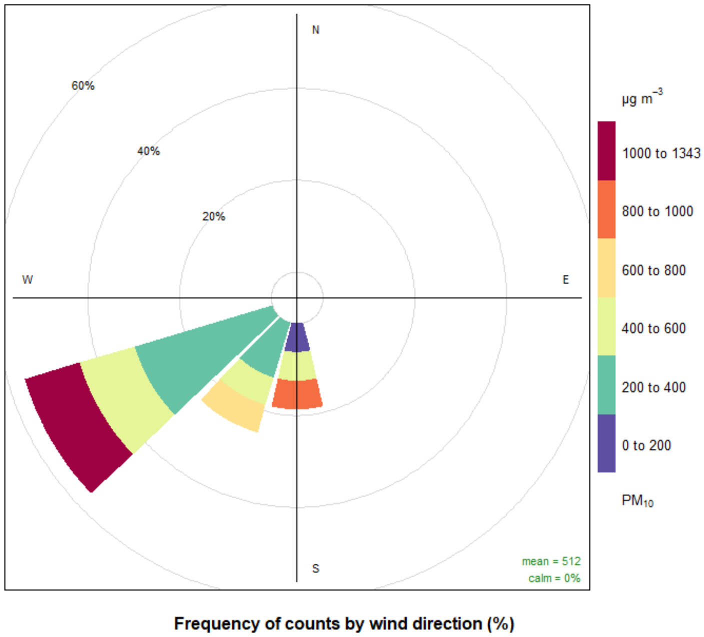


Figure 10-8. Pollution rose for the Anthony monitoring site.

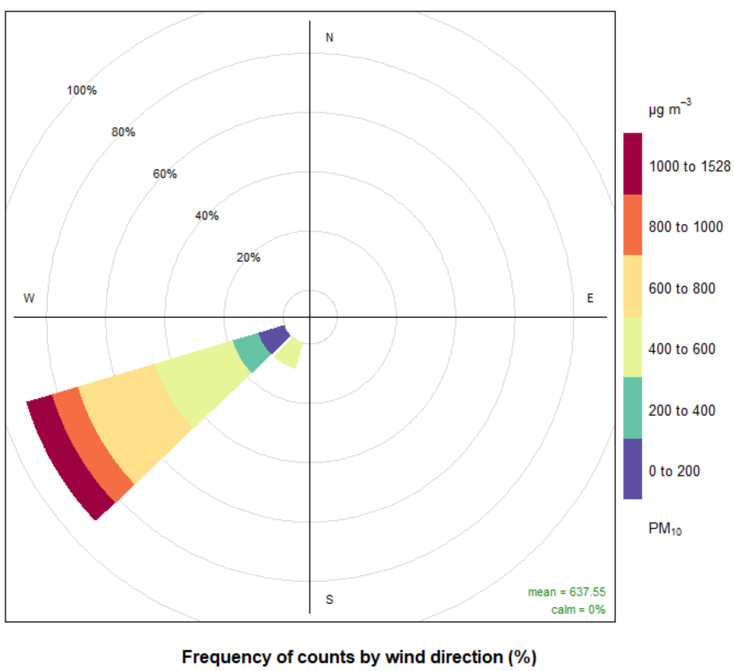


Figure 10-9. Pollution rose for the Desert View monitoring site.

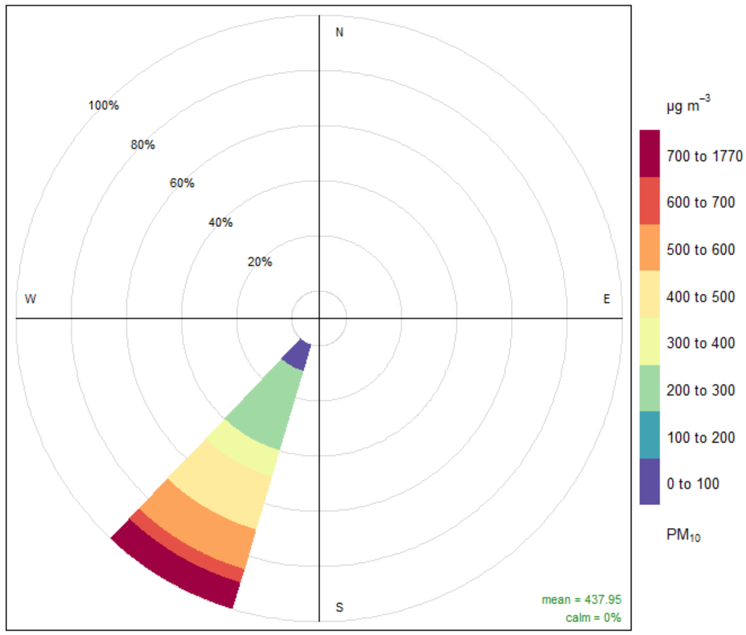


Figure 10-10. Pollution rose for the Chaparral monitoring site.

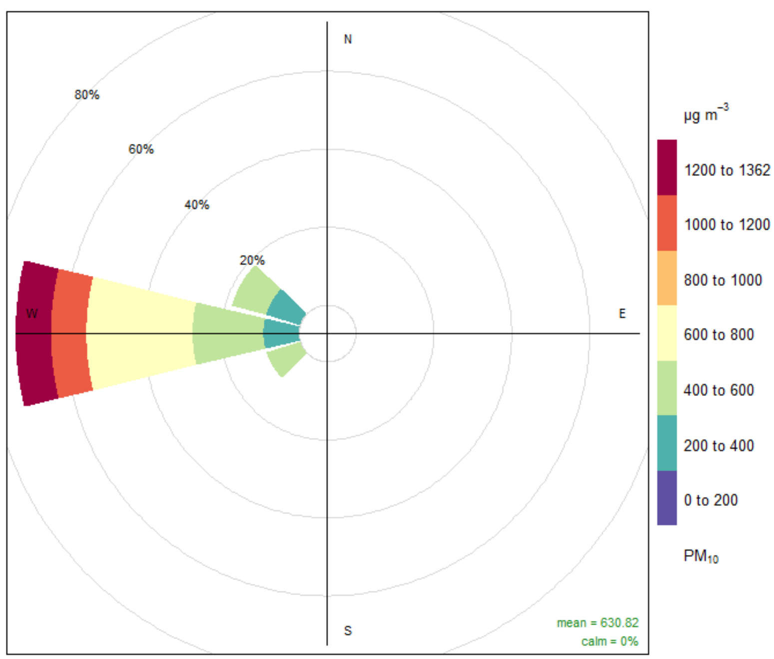


Figure 10-11. Pollution rose for the Deming monitoring site.

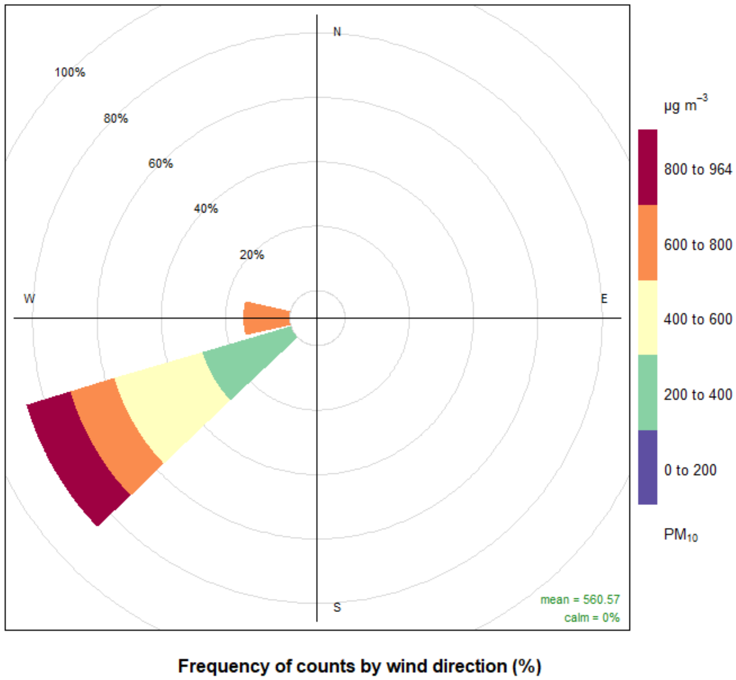


Figure 10-12. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west southwesterly winds beginning at the 0000 hour and lasting through the 2100 hour. Peak hourly PM_{10} concentrations ranged from 129 to 1770 µg/m^3 were recorded at the West Mesa and Chaparral monitoring sites, respectively (Figure 10-13). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 9.8 to 13.8 m/s were recorded at the Anthony and Deming monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figures 10-14 through 10-18 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

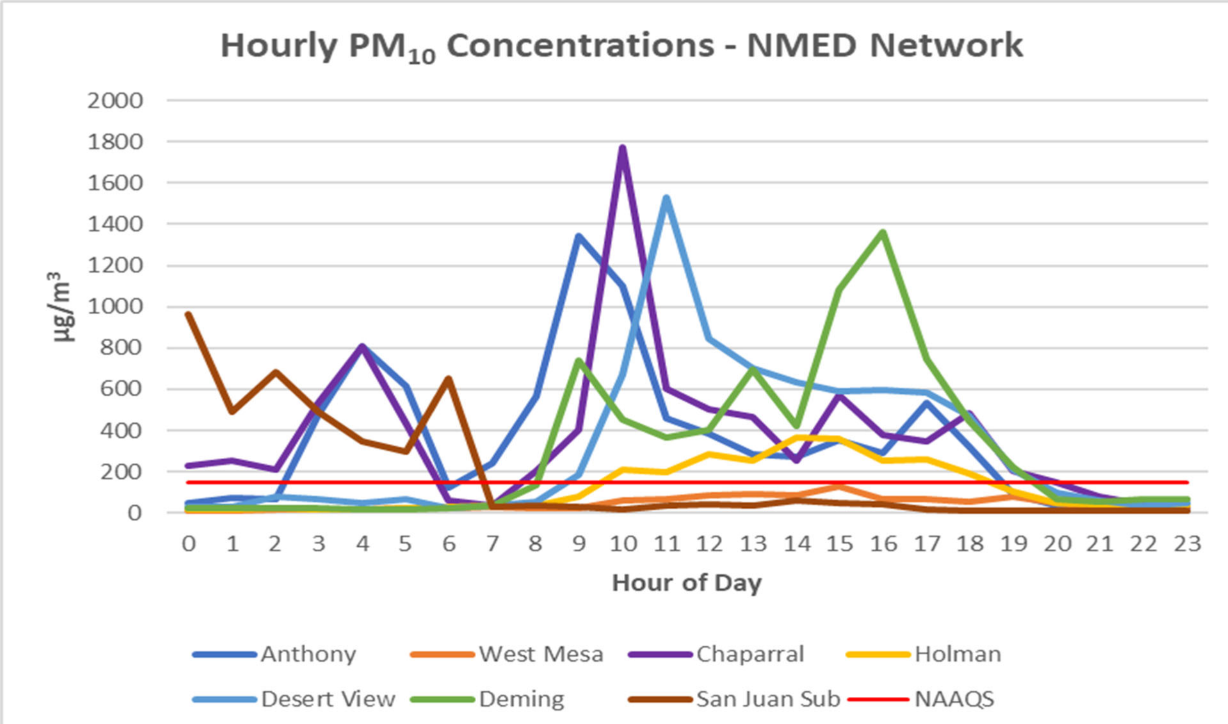


Figure 10-13. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

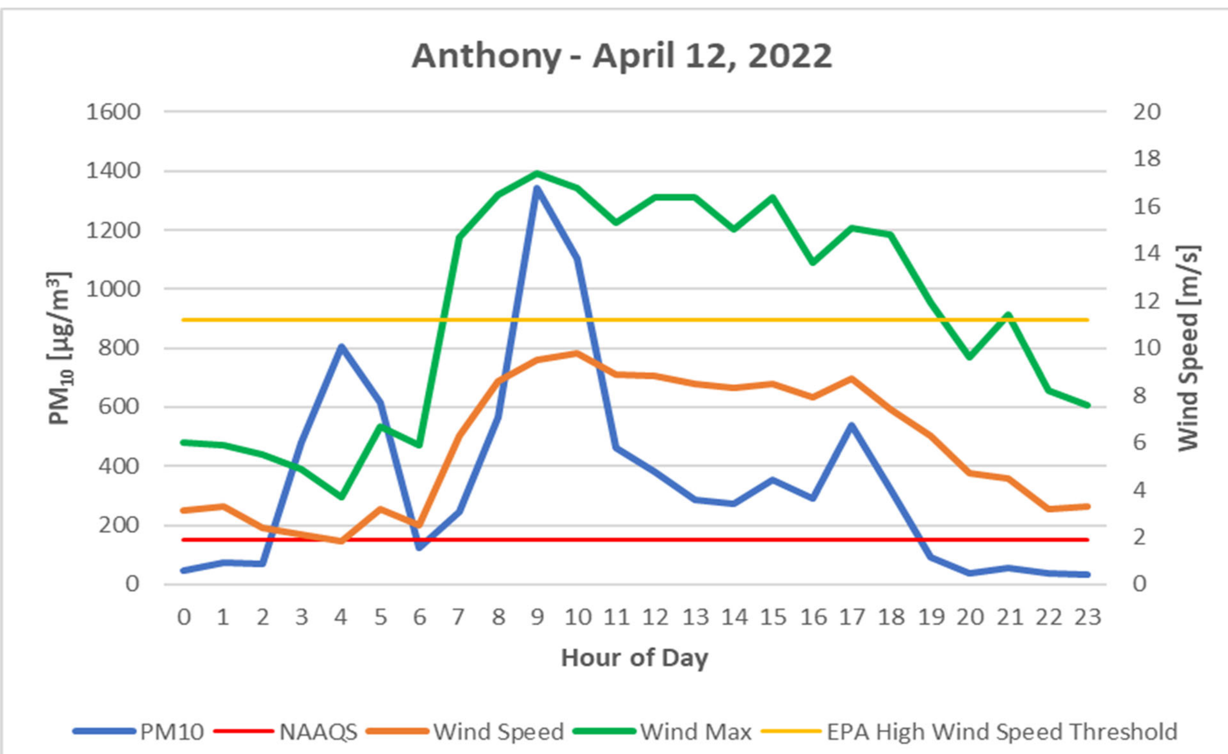


Figure 10-14. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

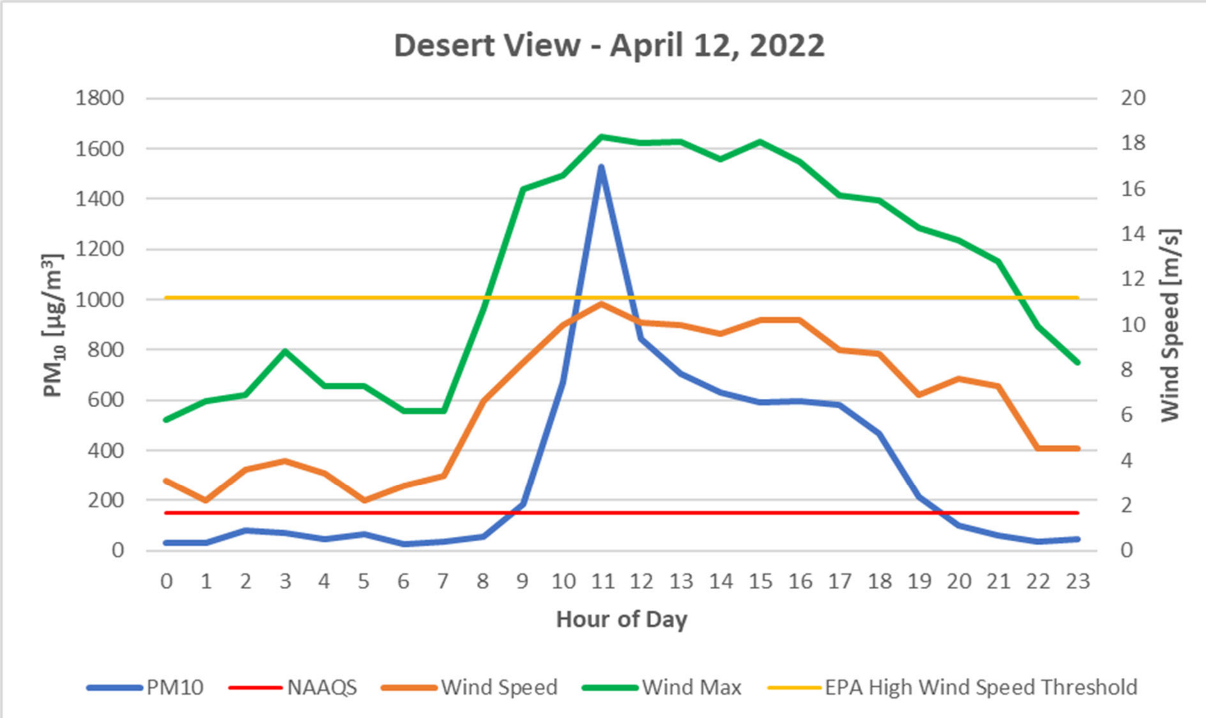


Figure 10-15. Desert View monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

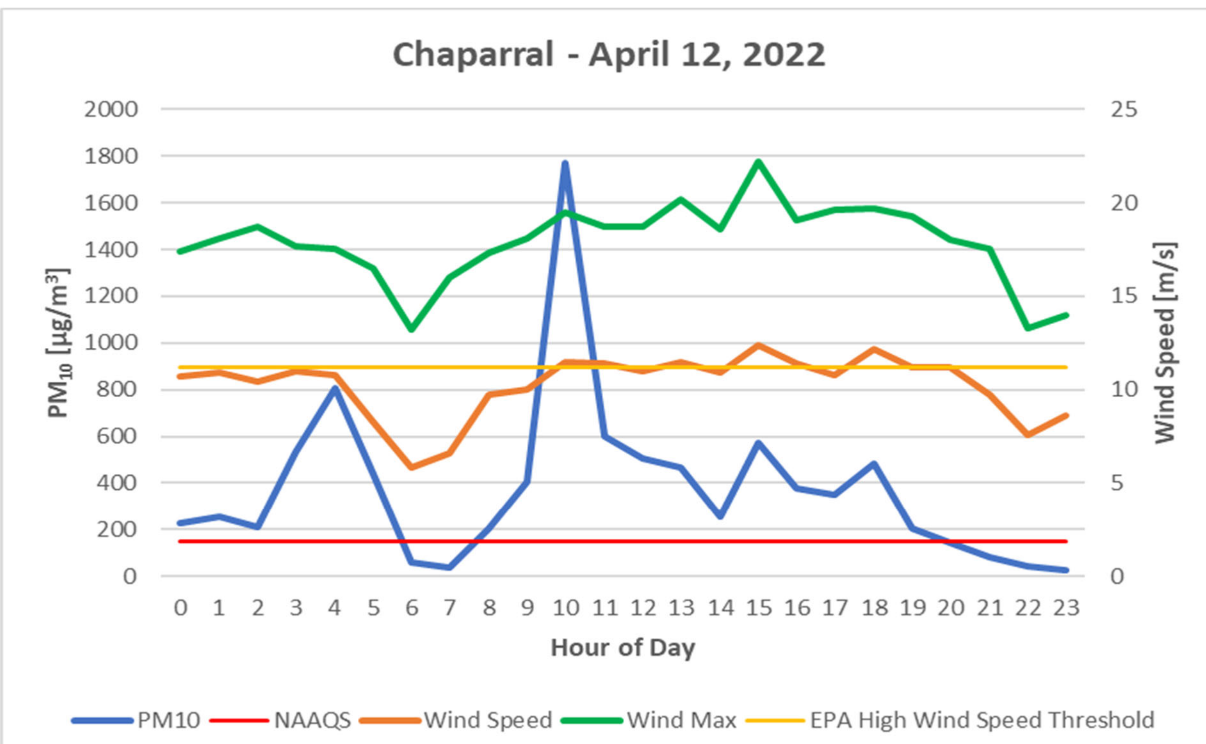


Figure 10-16. Chaparral monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

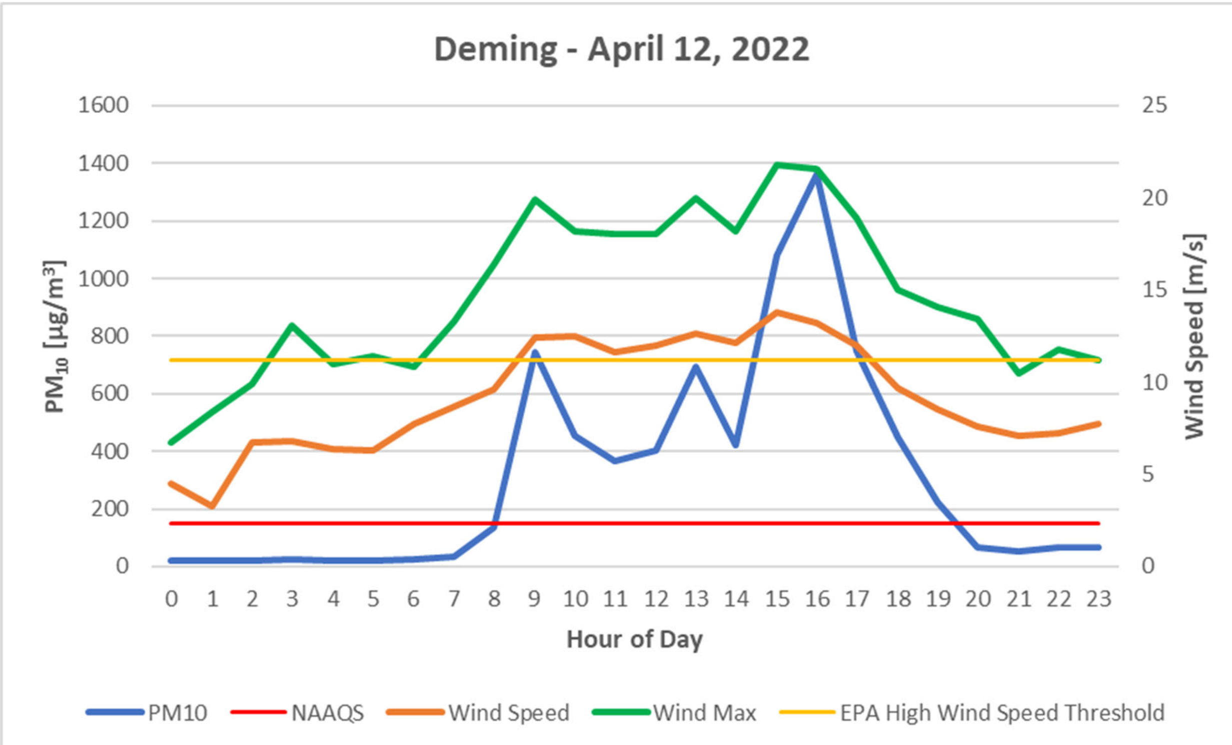


Figure 10-17. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

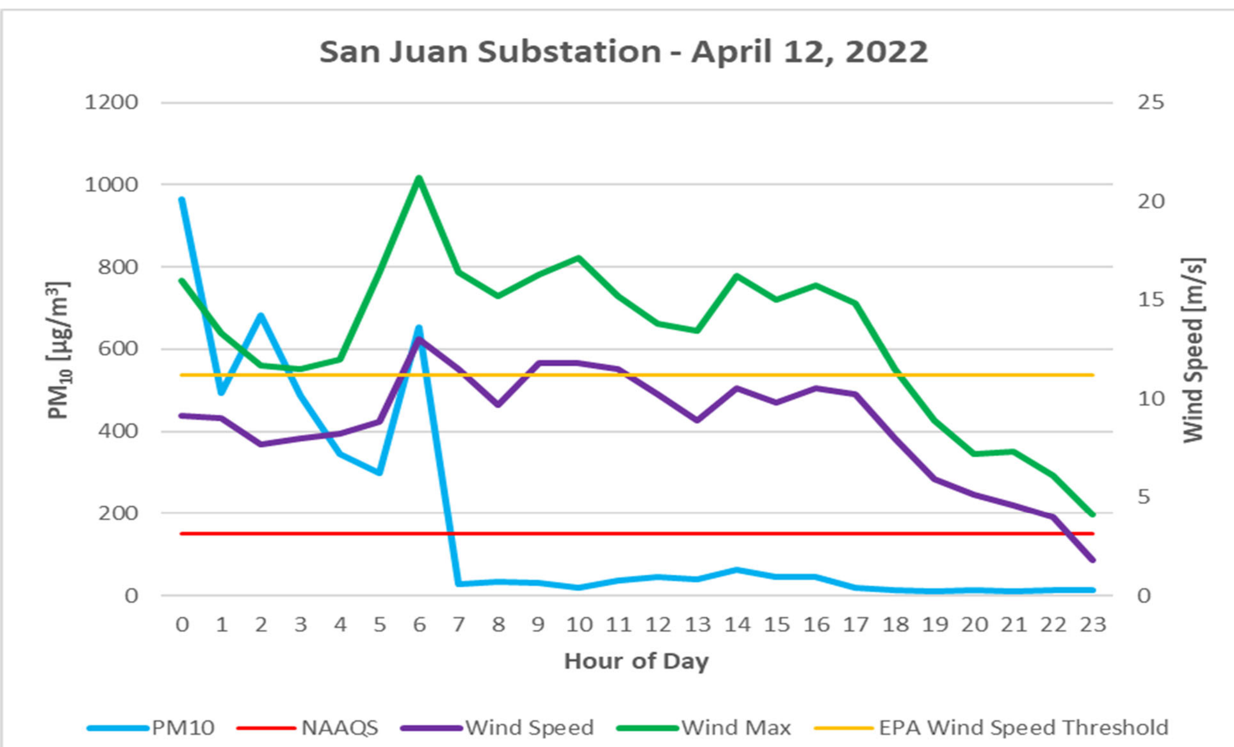


Figure 10-18. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, NMED monitoring sites recorded 22 (Anthony), 34 (Desert View), 27 (Chaparral), 14 (Deming), and only 1 (San Juan Substation) exceedance(s) of the PM_{10} NAAQS (Figures 22-1, 22-2, 22-3, 22-6, and 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at these sites were 541 (Anthony), 769 (Desert View), 721 (Chaparral and Deming), and 171 (San Juan Substation) μg/m^3 recorded in 2021 (Anthony and Desert View), 2017 (Chaparral), 2019 (Deming), and 2020 (San Juan Substation). High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events which include sporadic monsoonal events such as the case in this event.

Spatial and Temporal Variability

As demonstrated in Figure 10-19, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the three days surrounding the event did not surpass 105 μg/m^3, except for the previous April 11, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

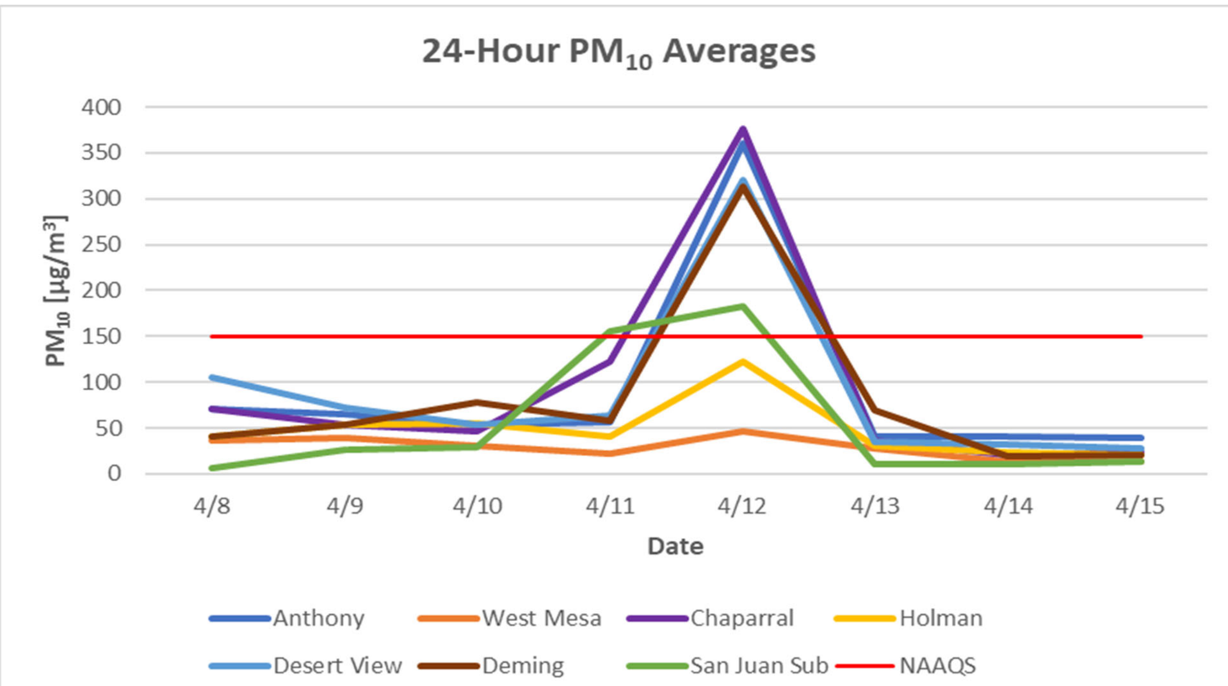


Figure 10-19. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 360 (Anthony), 320 (Desert View), 377 (Chaparral), 313 (Deming), and 183 (San Juan Substation) μg/m^3 are all above the 99th percentile of historical data monitored over the past four to five years.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average of 360 (Anthony), 320 (Desert View), 377 (Chaparral), 313 (Deming), and 183 (San Juan Substation) µg/m^3 are above the 99th percentile of data monitored over the previous four to five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

11. HIGH WIND EXCEPTIONAL EVENT: April 22, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana, Luna, and San Juan Counties resulting in an exceedance of the PM_{10} NAAQS at the Anthony, Chaparral, Deming, and San Juan Substation monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 11-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	177 µg/m^3	9.1 m/s	16.2 m/s
RJ	35-013-0020	6ZK Chaparral	161 µg/m^3	13.4 m/s	23.5 m/s
RJ	35-029-0003	7E Deming	336 µg/m^3	14 m/s	22 m/s
RJ	35-045-1005	1H San Juan Sub	270 µg/m^3	18.7 m/s	32.4 m/s

Table 11-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Today begins with a strong upper-level trough making its way from California this morning to the Central Rockies this evening along with a strong jet streak across north/southwest and central New Mexico. At the 1800 hour, a rapidly strengthening surface low moved over northern Colorado (Figure 11-1). In addition, the low-pressure center of the storm system hovered over the southern California coast. As the event progressed the low-pressure gradient traveled east and aligned itself with New Mexico and the surface wind direction (Figure 11-2). The upper-level jet streak mixing created tightening of surface gradients, dramatically increasing the surface wind velocities, and providing the turbulence required for vertical mixing and entrainment of dust.

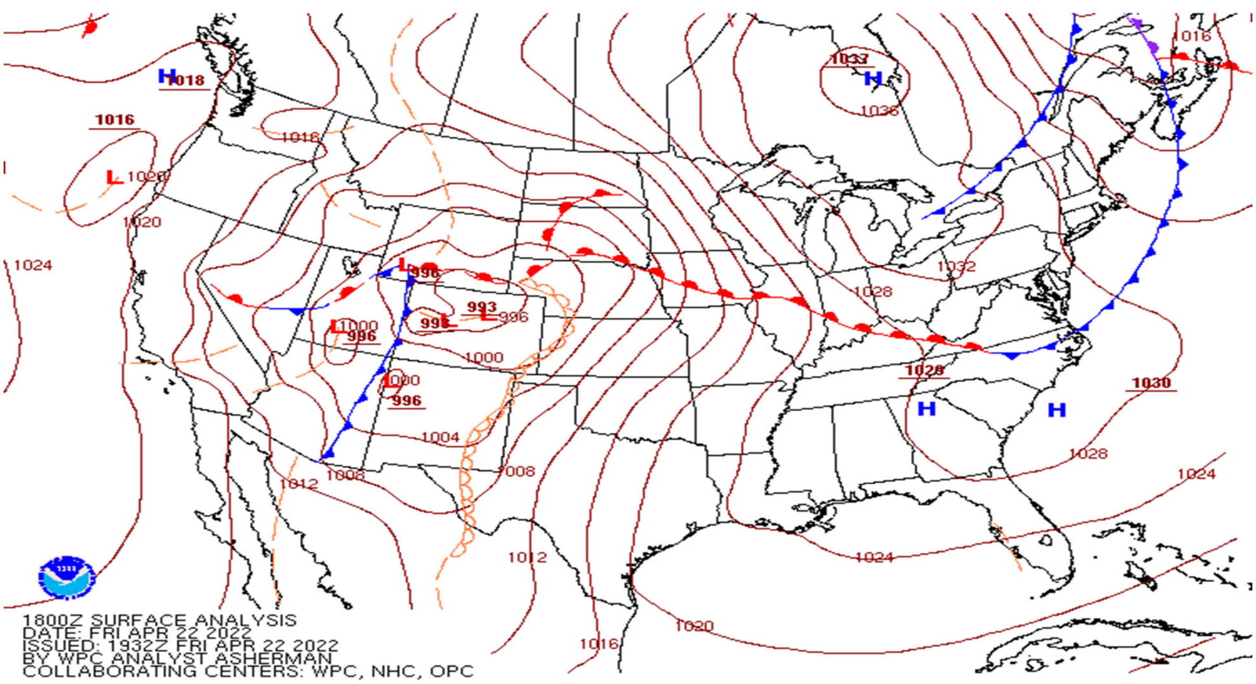


Figure 11-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

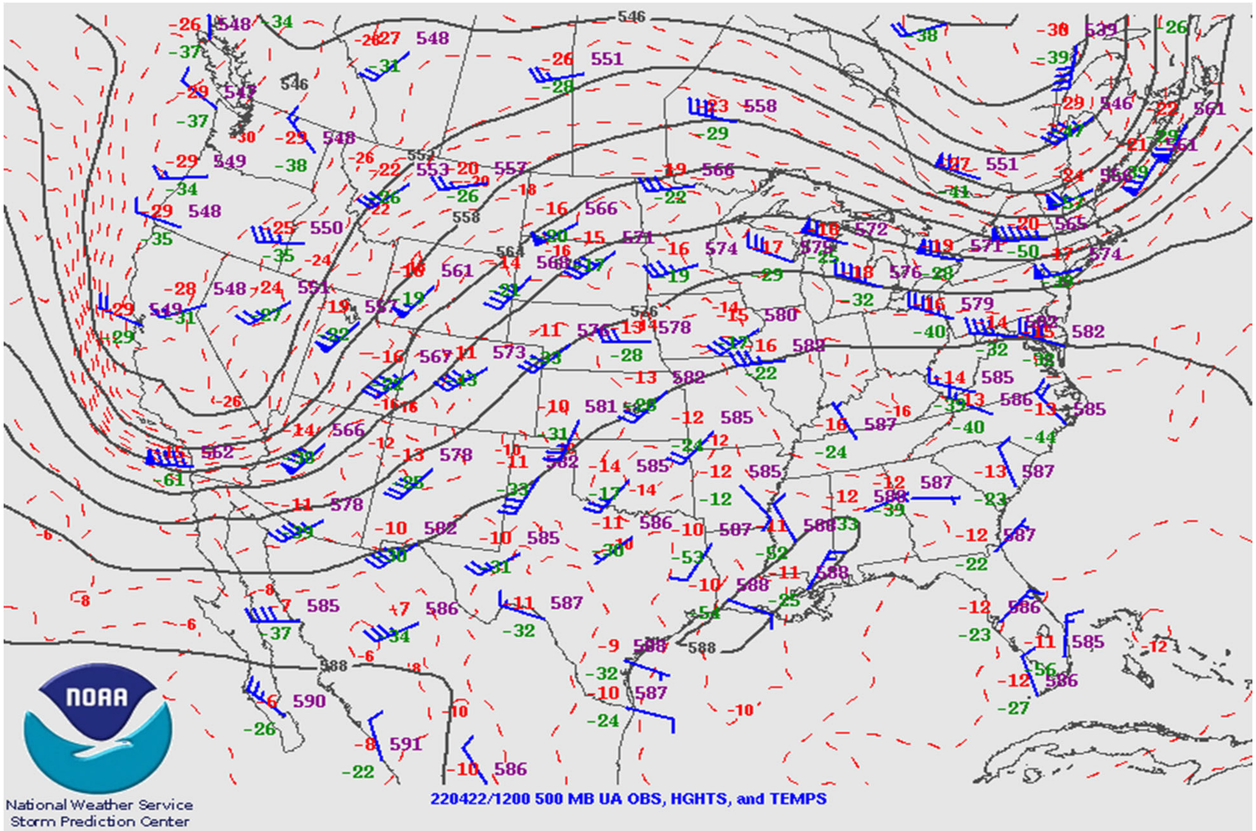


Figure 11-2. Upper air weather map for April 22, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the southern border and Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, La Union, Santa Teresa, and San Juan Substation monitoring sites beginning at the 0900 hour and lasting through the 2300 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, and San Juan Substation monitoring sites beginning at the 1000 hour. Hourly concentrations remained elevated through the 2200 hour. Table 11-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Chaparral			Deming			San Juan Substation		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
1000	36	5.4	12	63	8.5	13.4	234	10.8	16.8
1100	61	6.7	14	442	10.3	16.9	500	13.2	19.7
1200	73	7.6	15.3	532	12	18.3	979	16.3	23.3
1300	171	9.1	17.8	398	11	17.8	762	18.7	26.6
1400	56	7.7	18.8	322	10.4	16.7	----	18.7	32.4
1500	146	9	19.2	901	11.8	18.9	779	15.3	24.1
1600	339	10.2	20.4	1931	13.3	20.4	908	17.9	25.4
1700	322	10.8	17.8	2124	14	22	979	12.7	20.5
1800	293	10.3	18.6	679	12.1	17.7	215	10.6	17.9
1900	456	9.6	19.3	149	9.3	16.3	312	9.4	16.3
2000	461	11.5	20.2	90	7.9	12.6	100	4.8	8.2
2100	959	13.4	23.5	63	7.2	12.7	51	5.8	8.7
2200	205	12.5	21.4	46	6.2	9.6	24	6.9	11.9

Table 11-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking into the region from the southern California coast. The system's movement across the area timed well with daytime heating and mixing generating a deep trough to the west as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the afternoon.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Chaparral, Holman, West Mesa, Deming, and San Juan Substation monitoring sites recorded wind speeds for a total of eleven hours sustained above the threshold that began at the 1100 hour and lasted through the 2200 hour, with an intermittent period below the high wind threshold at the 1900 hour (Figure 11-3).

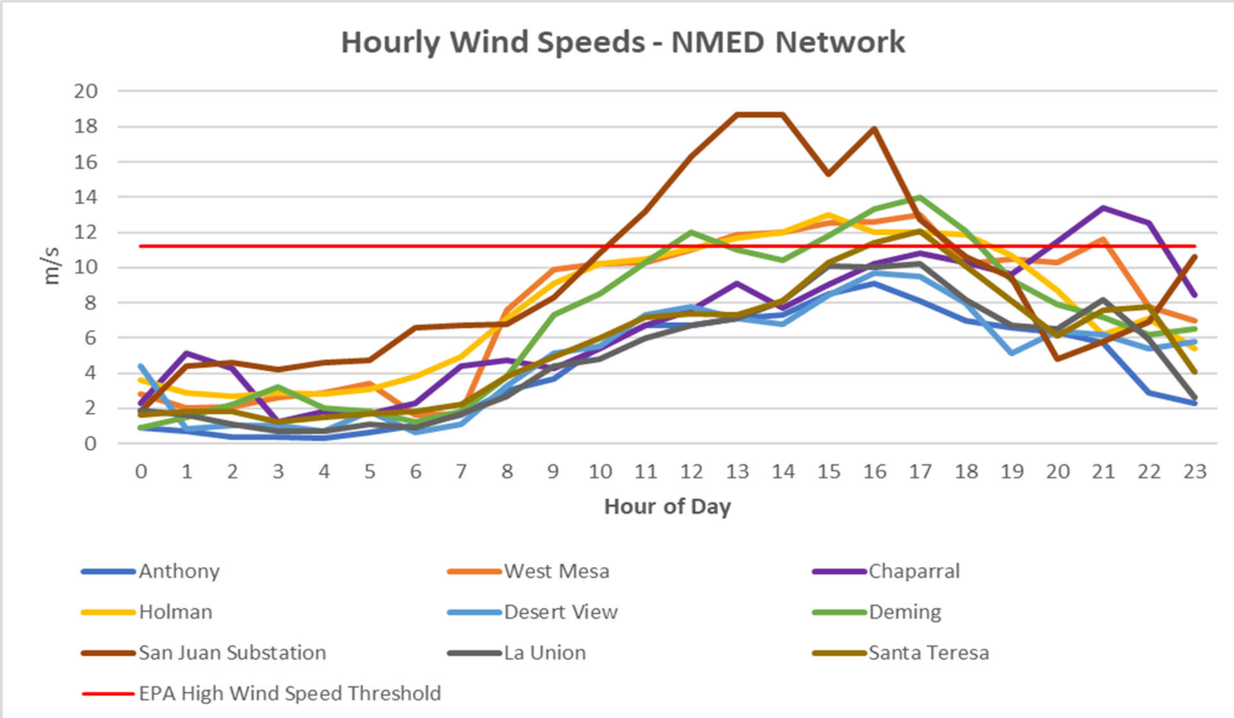


Figure 11-3. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures
Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana and Luna

Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Hidalgo, Grant, McKinley, and San Juan Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery
The event was captured on Suomi NPP satellite VIIRS RGB dust product and GOES geostationary GeoColor satellite imagery with dust plumes originating upwind of NMED's monitoring sites near the Four Corners region for northwestern New Mexico and Ascension and Janos, Chih for southern New Mexico characterized as pink bands for the VIIRS RGB dust product. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern New Mexico and Mexico (Figures 11-4 and 11-5). The dust plumes of interest appear to be limited to northern New Mexico and Mexico, orientated in a southwest to northeast direction and traveling toward NMED's monitoring sites at the time of the satellite pass (1315 and 1711 MDT) that captured the imagery.

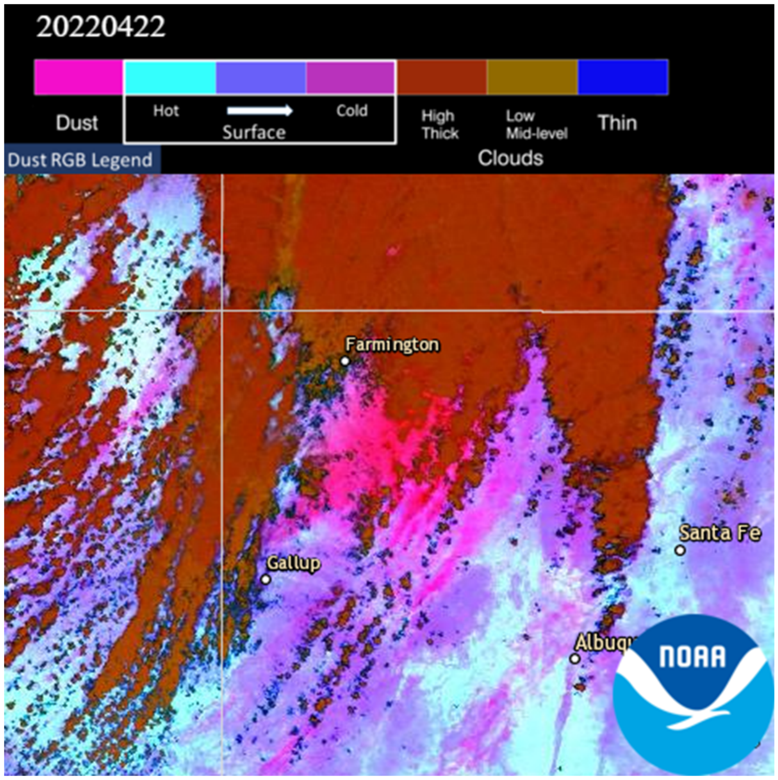


Figure 11-4. GOES-16 geostationary satellite RGB dust product imagery showing northwestern New Mexico afternoon dust impacts. Courtesy of NOAA Aerosol Watch.

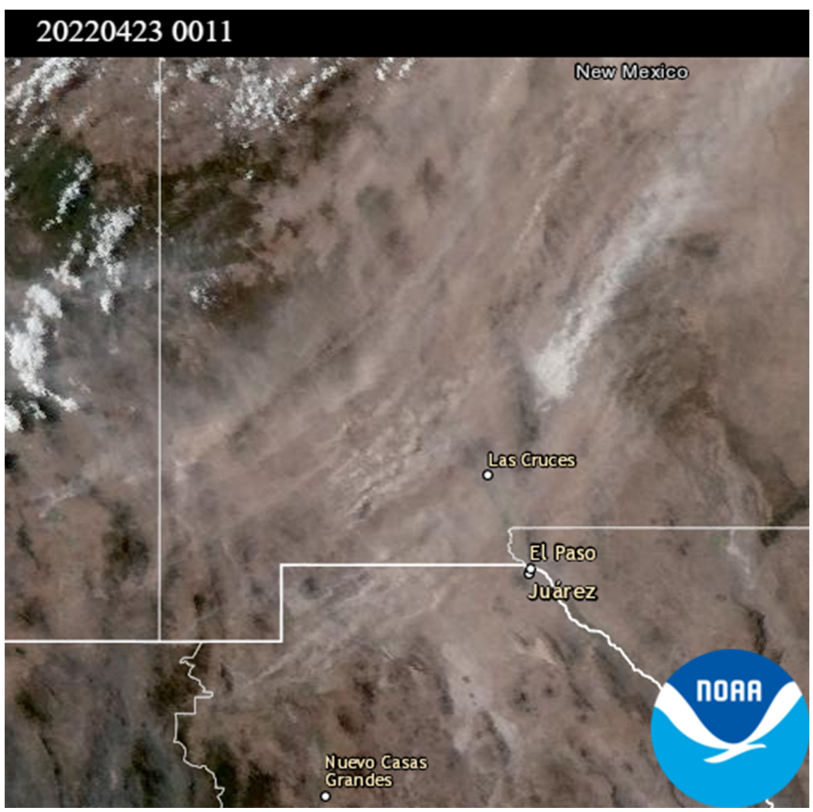


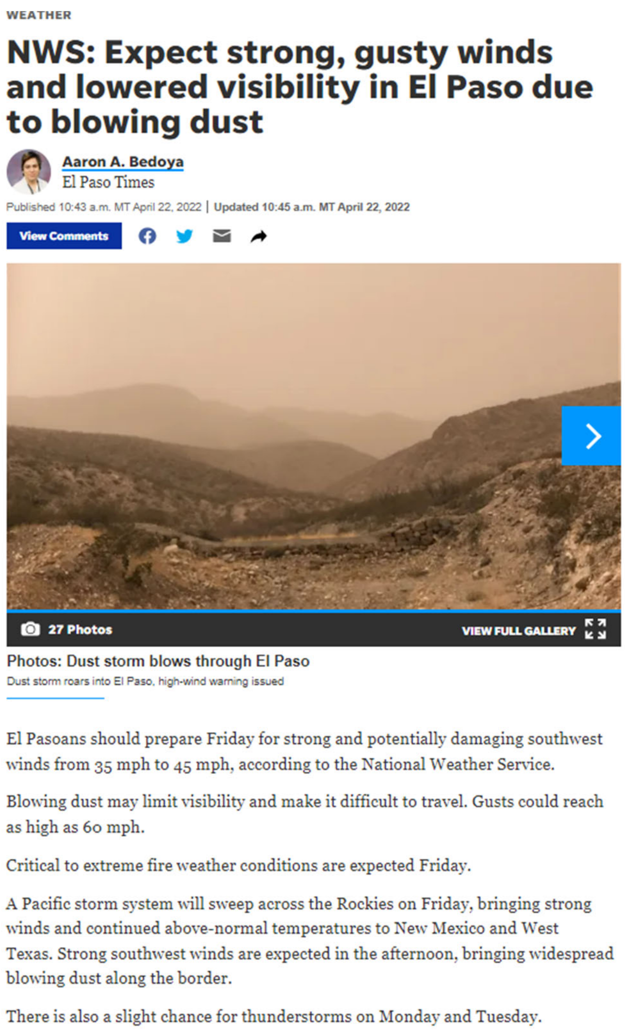
Figure 11-5. GOES-16 geostationary satellite GeoColor product imagery showing southern New Mexico afternoon dust impacts. Courtesy of NOAA Aerosol Watch.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Wind Advisory and Blowing Dust Advisory for this event. A Wind Advisory is issued by NWS when sustained winds of 40 mph are expected for 1 hour or longer or gusts at 58 mph or greater. A Blowing Dust Advisory is issued when blowing dust is expected to reduce visibility to between ¼ to 1 mile, generally with winds of 25 mph or greater. These were in place for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS can be found below:

"Blowing Dust Advisory from noon today to 8 PM this evening…Wind advisory from noon today to midnight MDT tonight…strong and gusty winds and lowered visibility due to blowing dust are expected today…"

The El Paso Times issued a press release notifying residents of the Wind and Blowing Dust Advisory issued for El Paso County the morning of April 22, 2022. (Figure 11-6).



WEATHER

NWS: Expect strong, gusty winds and lowered visibility in El Paso due to blowing dust

Aaron A. Bedoya
El Paso Times

Published 10:43 a.m. MT April 22, 2022 | Updated 10:45 a.m. MT April 22, 2022

View Comments

27 Photos VIEW FULL GALLERY

Photos: Dust storm blows through El Paso
Dust storm roars into El Paso, high-wind warning issued

El Pasoans should prepare Friday for strong and potentially damaging southwest winds from 35 mph to 45 mph, according to the National Weather Service.

Blowing dust may limit visibility and make it difficult to travel. Gusts could reach as high as 60 mph.

Critical to extreme fire weather conditions are expected Friday.

A Pacific storm system will sweep across the Rockies on Friday, bringing strong winds and continued above-normal temperatures to New Mexico and West Texas. Strong southwest winds are expected in the afternoon, bringing widespread blowing dust along the border.

There is also a slight chance for thunderstorms on Monday and Tuesday.

Figure 11-6. El Paso Times press release.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from areas extending from central to northeastern Arizona and on to the northwestern NMED monitoring site; and northern Mexico and on to the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 11-7). This analysis supports the hypothesis that dust plumes originated in Arizona and Mexico before being transported to downwind NMED monitoring sites.

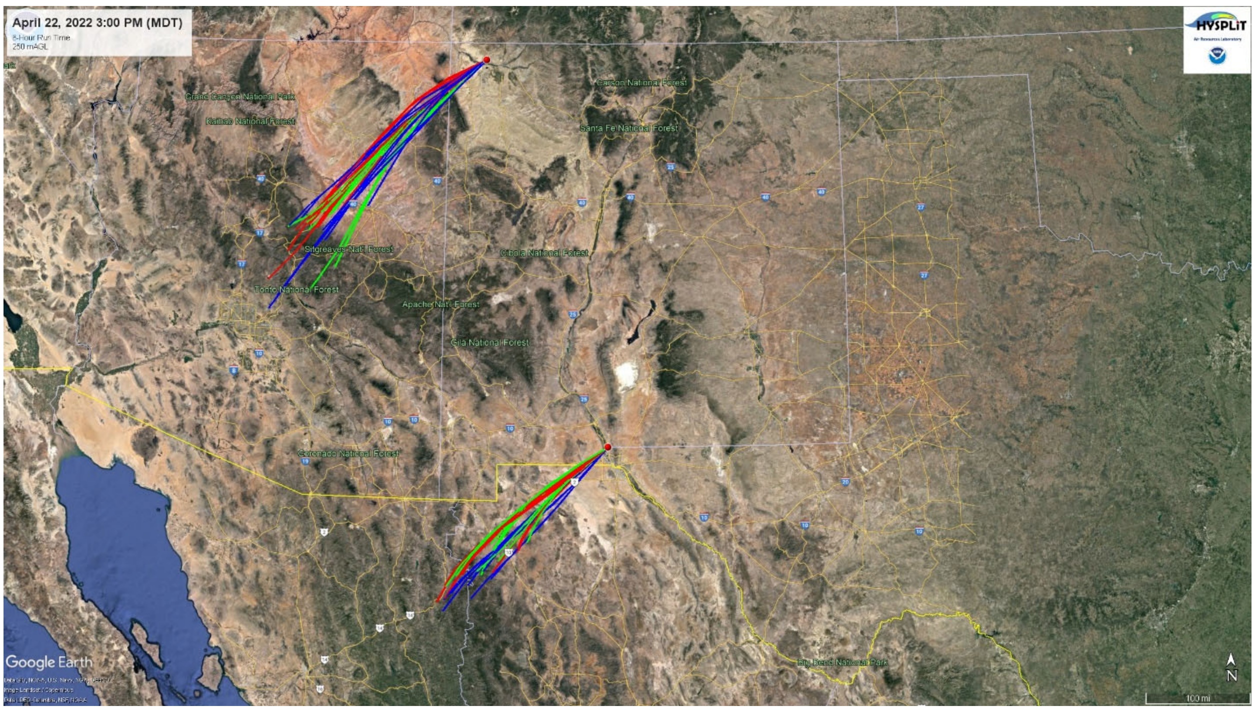
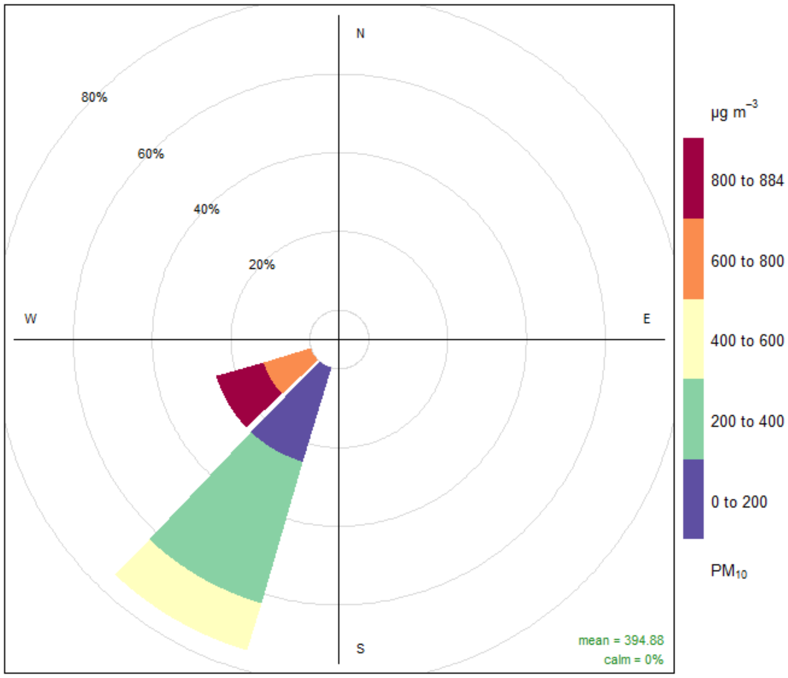


Figure 11-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony (southern) and San Juan Substation (northern) monitoring sites.

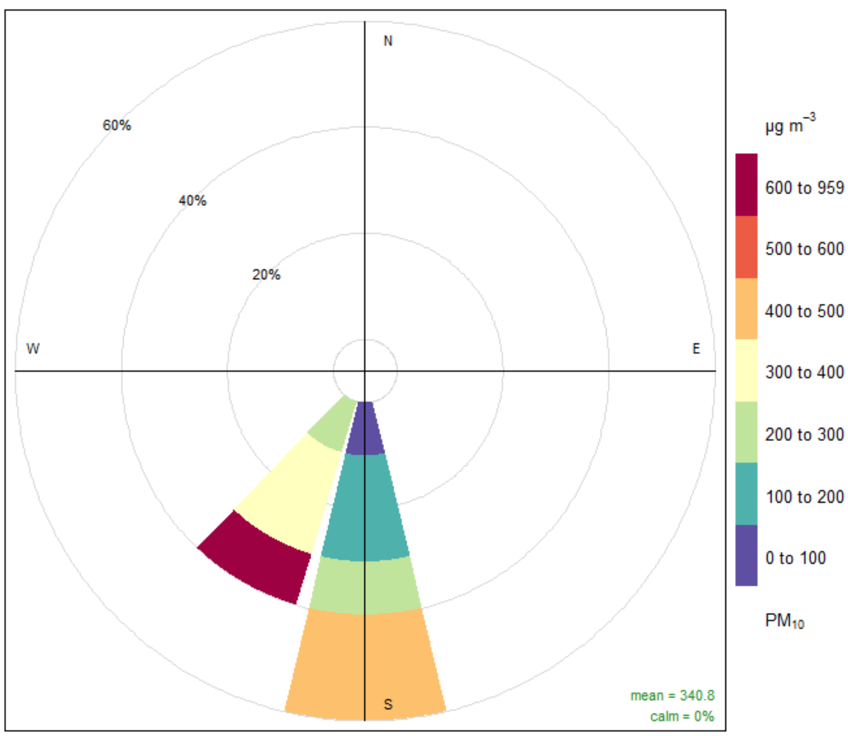
Wind Direction and Elevated PM_{10} Concentrations

Pollution roses (Figure 11-9) were created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m^3 (1100 -2200 hour). During the event, winds blew from the west northwest to the south directions 100% of the time except coinciding with peak PM_{10} concentrations.



Frequency of counts by wind direction (%)

Figure 11-8. Pollution rose for the Anthony monitoring site.



Frequency of counts by wind direction (%)

Figure 11-9. Pollution rose for the Chaparral monitoring site.

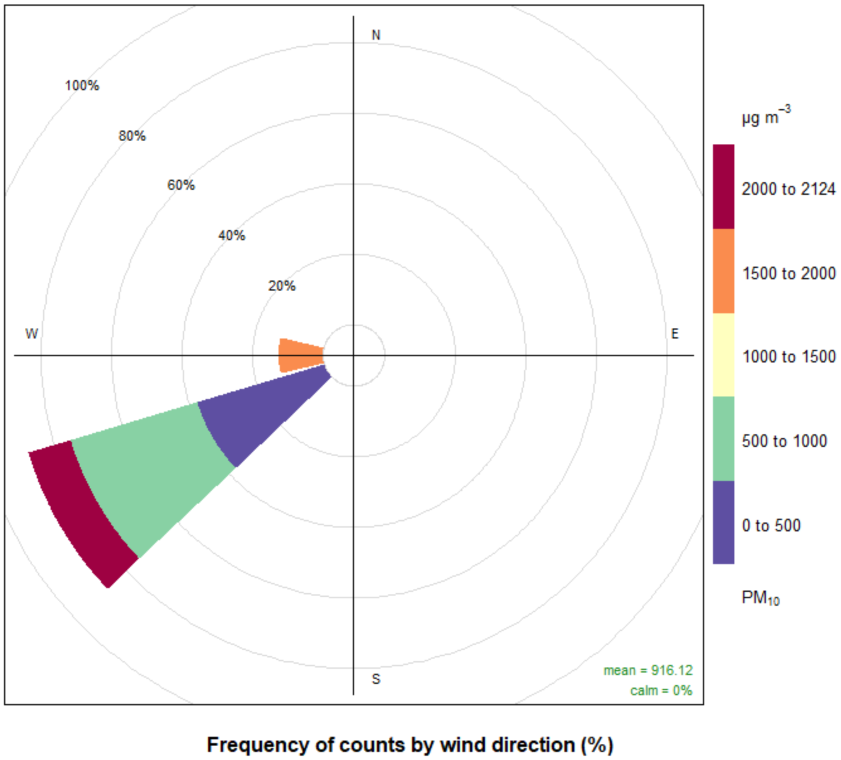


Figure 11-10. Pollution rose for the Deming monitoring site.

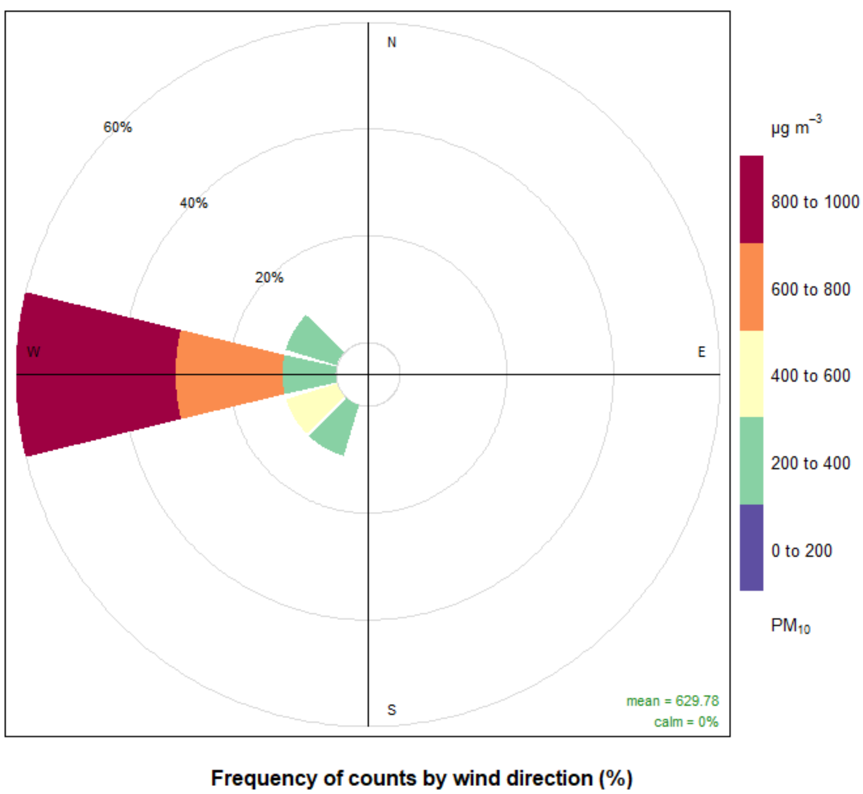


Figure 11-11. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated southwesterly winds beginning at the 1100 hour and lasting through the 2200 hour. During this time, peak hourly PM_{10} concentrations ranged from 180 to 2124 μg/m^3 were recorded at the West Mesa and Deming monitoring sites, respectively (Figure 11-12). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 9.1 to 18.7 m/s were recorded at the Desert View and San Juan Substation monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 11-12 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

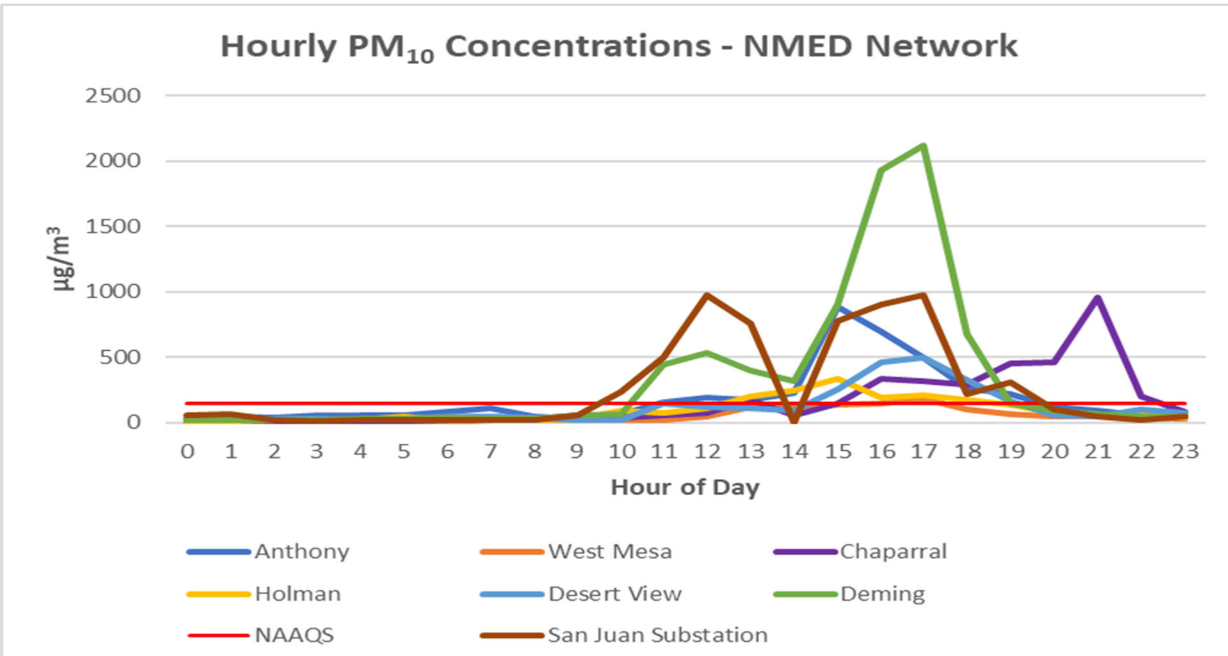


Figure 11-12. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

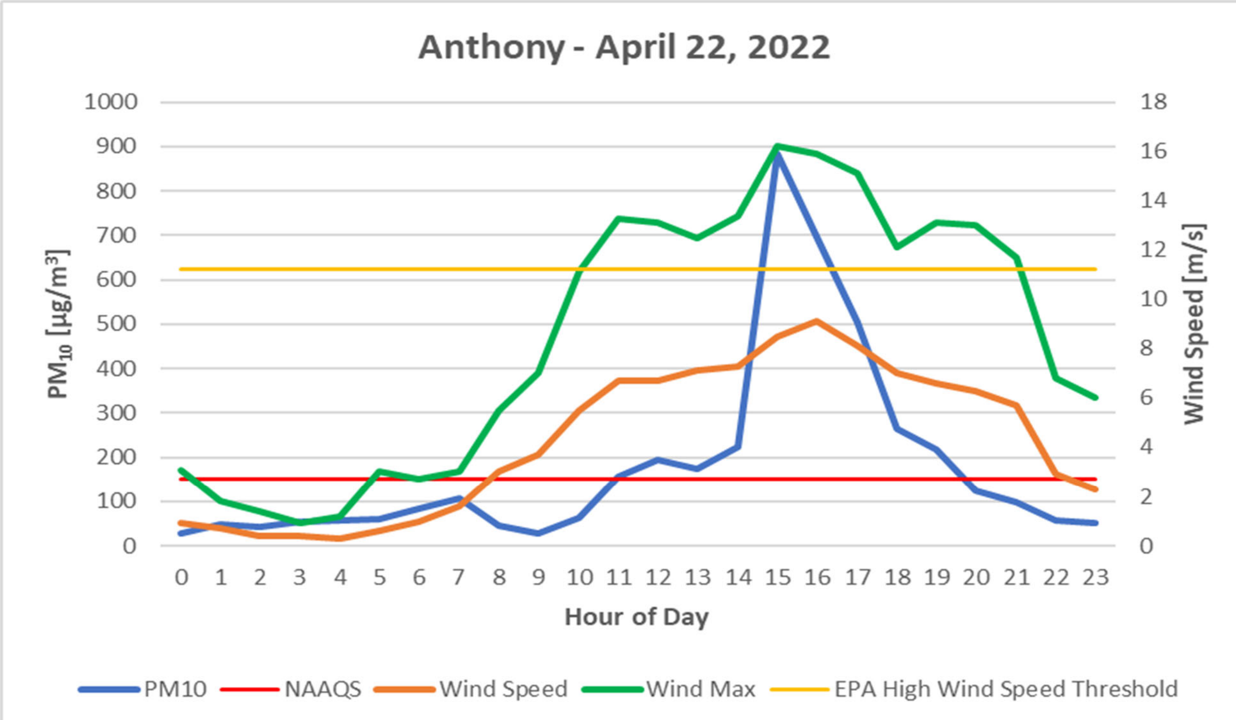


Figure 11-13. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

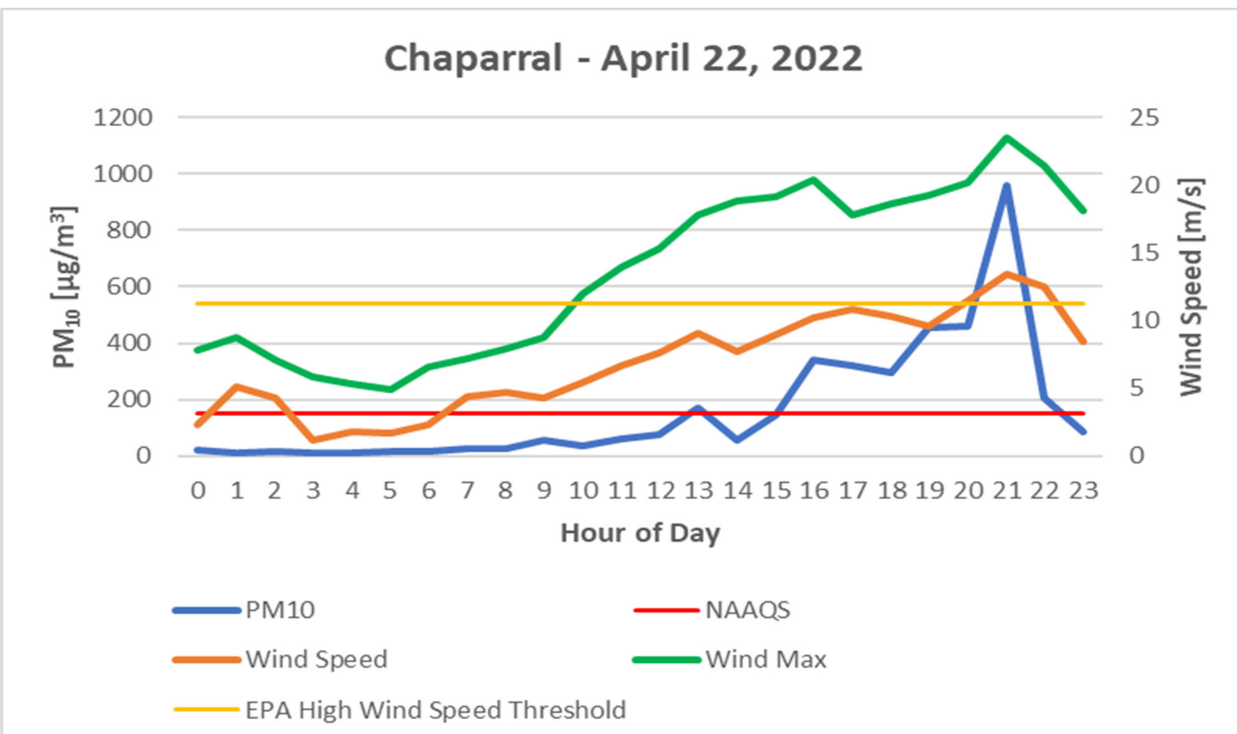


Figure 11-14. Chaparral monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

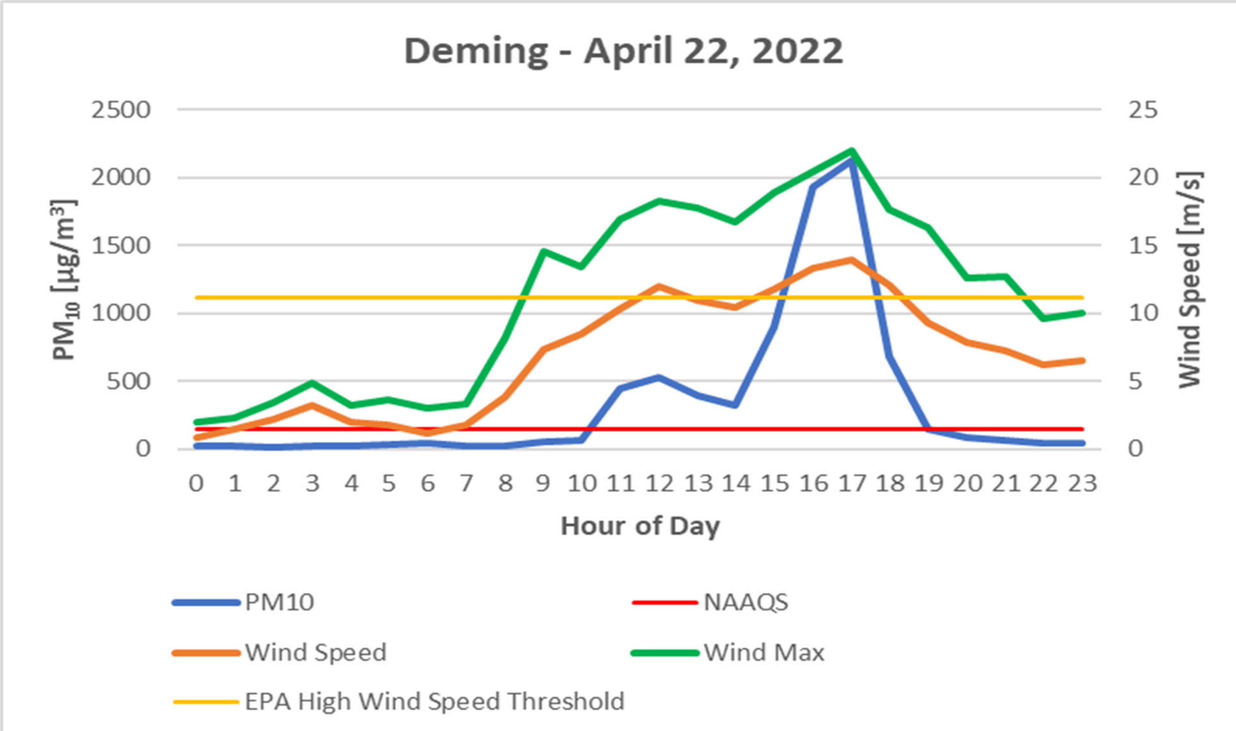


Figure 11-15. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

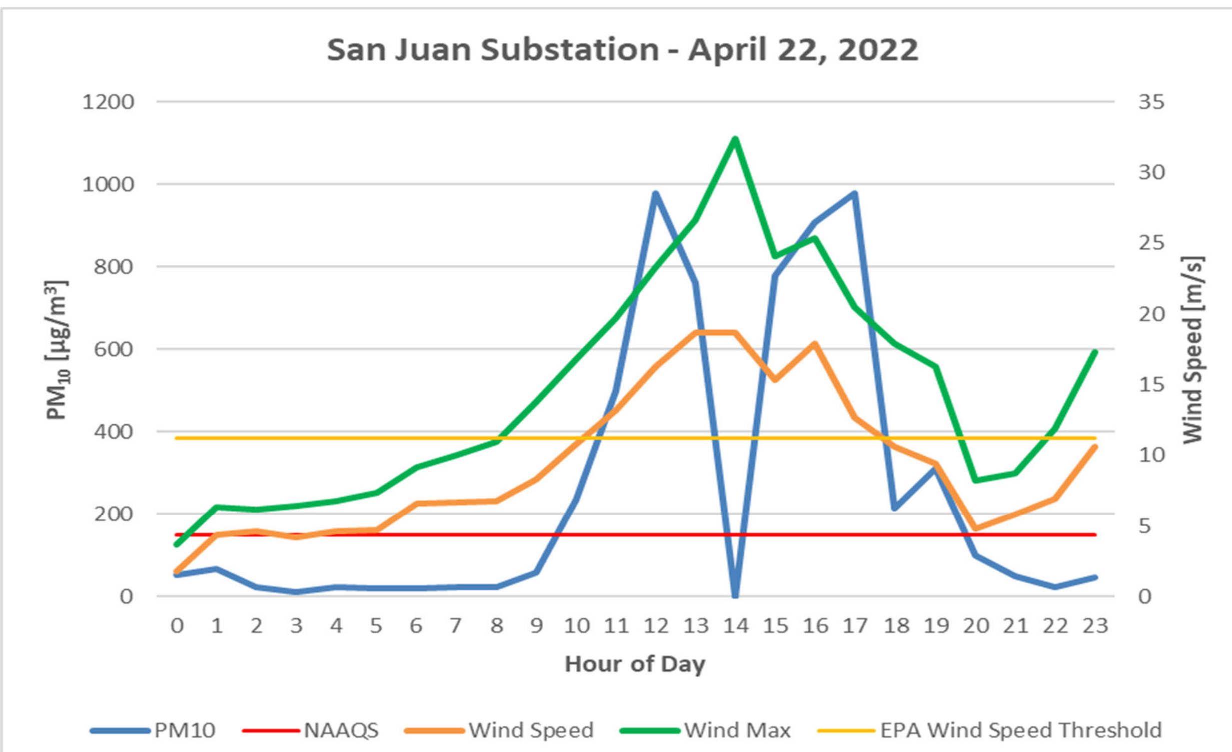


Figure 11-16. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, NMED monitoring sites recorded 22 (Anthony), 27 (Chaparral), 14 (Deming), and only 1 (San Juan Substation) exceedance(s) of the PM_{10} NAAQS (Figures 22-1, 22-3, 22-6, and 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at these sites were 541 (Anthony), 721 (Chaparral and Deming), and 171 (San Juan Substation) µg/m^3 recorded in 2021 (Anthony), 2017 (Chaparral), 2019 (Deming), and 2020 (San Juan Substation). High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 11-17, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for three days surrounding the event did not surpass 87 µg/m^3, except for the following April 25, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

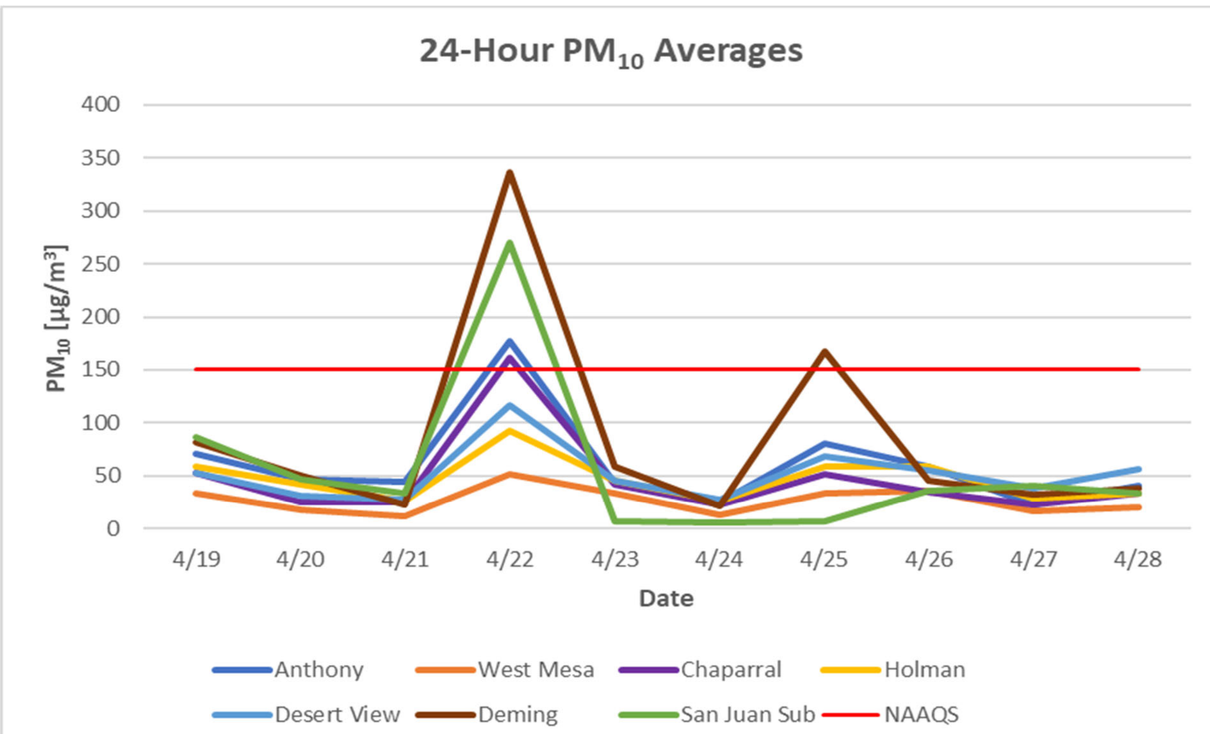


Figure 11-17. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 177 (Anthony), 161 (Chaparral), 336 (Deming), and 270 (San Juan Substation) µg/m^3 are near (Anthony and Chaparral) and above (Deming and San Juan Substation) the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour averages 177 (Anthony), 161 (Chaparral), 336 (Deming), and 270 (San Juan Substation) µg/m^3 are near (Anthony and Chaparral) and above (Deming and San Juan Substation) the 99th percentile of data monitored over the previous four to five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

12. HIGH WIND EXCEPTIONAL EVENT: April 25, 2022

Conceptual Model

A backdoor cold front caused high winds and blowing dust in Luna County resulting in an exceedance of the PM_{10} NAAQS at the Deming monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 12-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-029-0003	7E Deming	167 μg/m^3	10.2 m/s	17.8 m/s

Table 12-1 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A weak boundary will begin the day coming in from the northeast creating early morning wind activity with the approaching cold front. At the 1800 hour, an area of low-pressure moved over west Arizona pulling moisture from west Texas (Figure 12-1). Aloft, the low-pressure center of the storm system hovered over the Central US and as the event progressed this low-pressure gradient traveled west from and aligned itself with New Mexico and the surface wind direction (Figure 12-2). This early morning's cold front allowed winds aloft to suddenly mix down, dramatically increasing the surface wind gust velocities and providing the turbulence required for vertical mixing and entrainment of dust in a relatively short period of time followed by a temperature inversion that prevented the settling and dilution of particulates from the air (Figure 12-3).

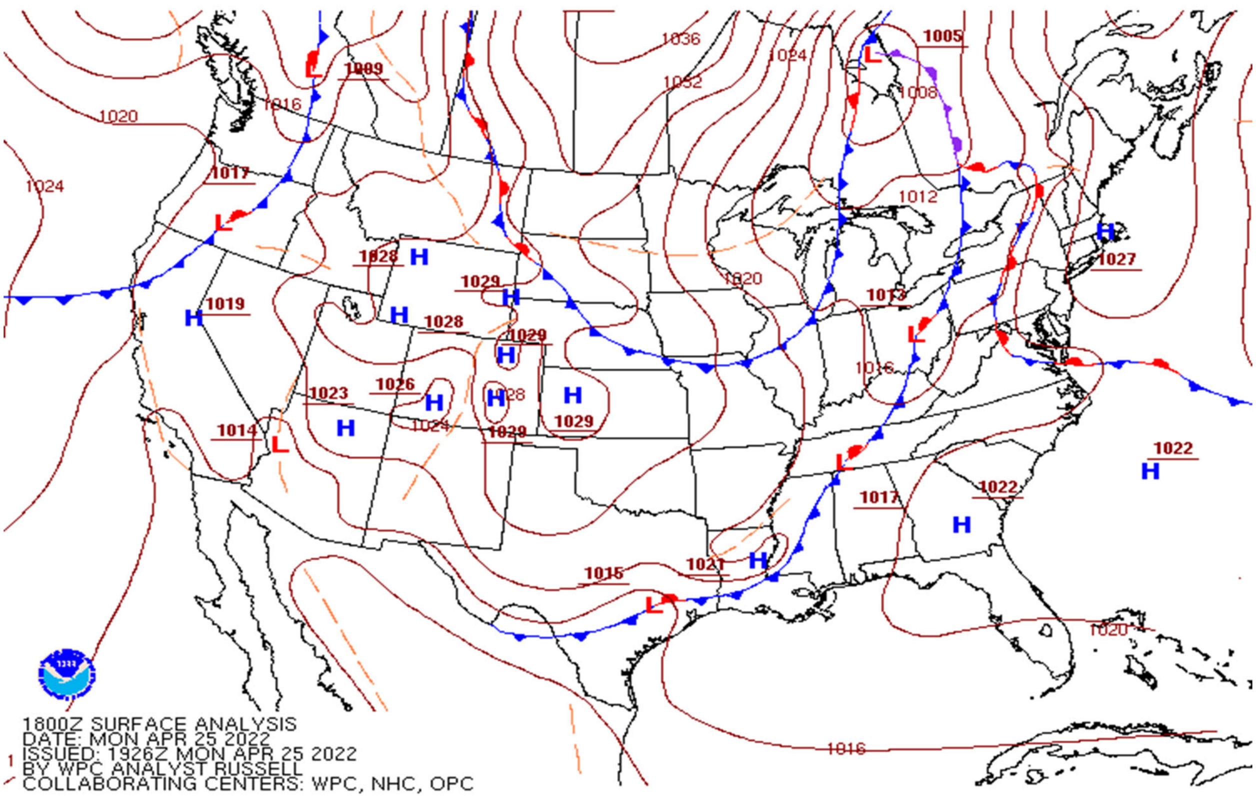


Figure 12-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

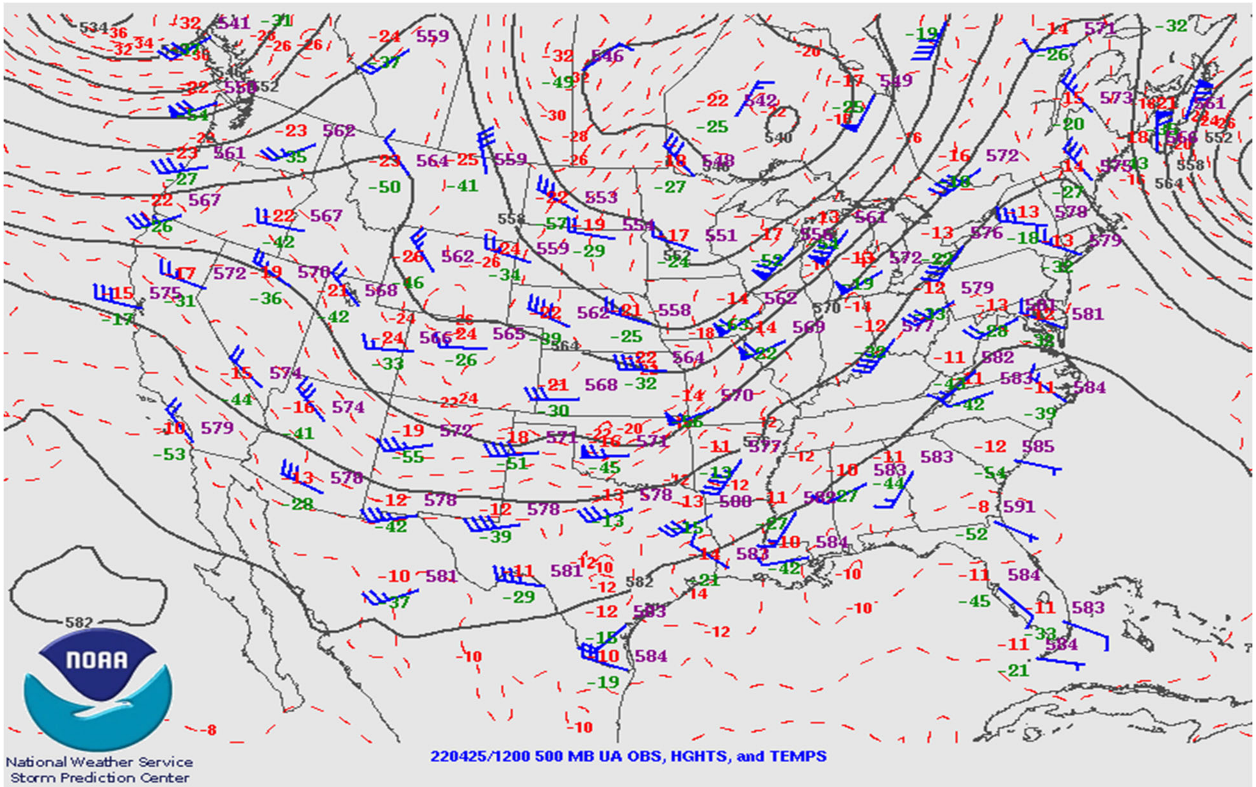


Figure 12-2. Upper air weather map for April 25, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

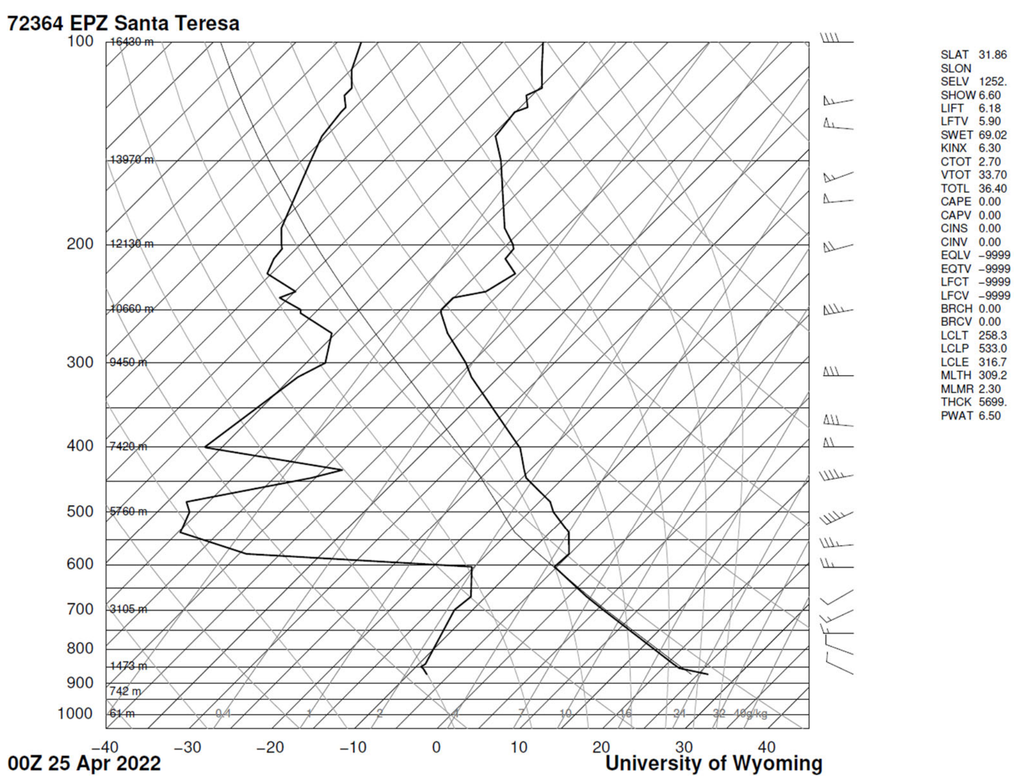


Figure 12-3. El Paso NWS upper-air column skew-t sounding for April 24, 2022 at 1800 (MDT).

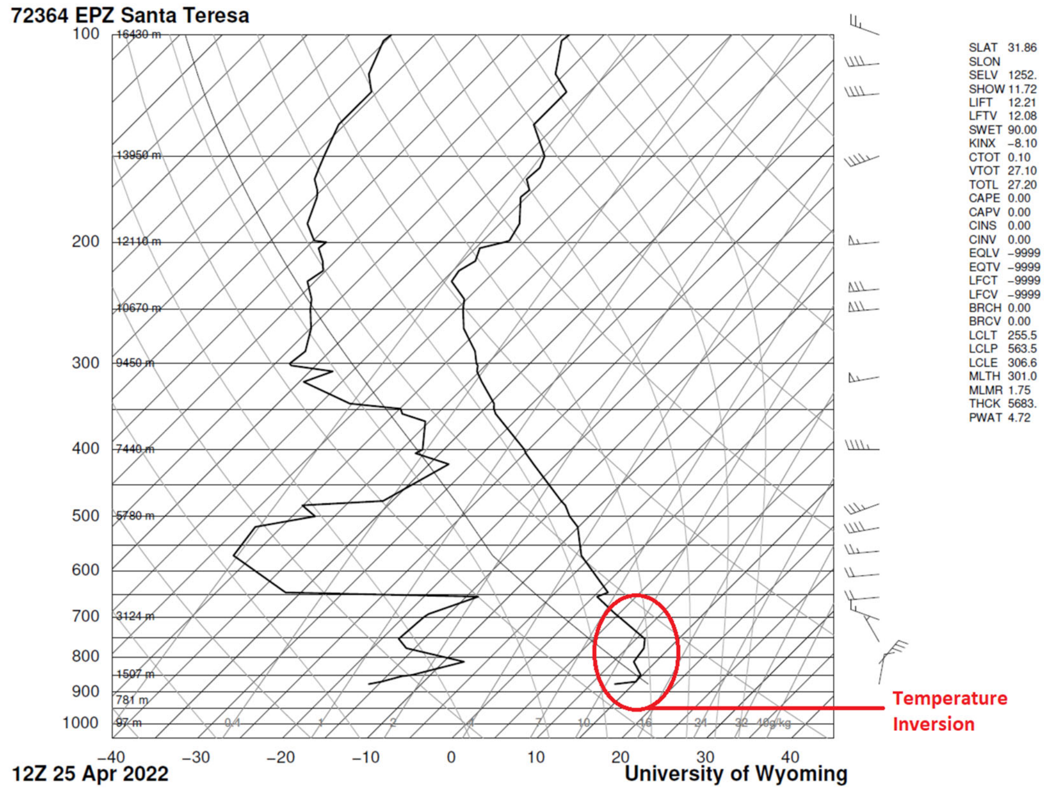


Figure 12-4. El Paso NWS upper-air column skew-t sounding for April 25, 2022 at the 0600 (MDT) hour.

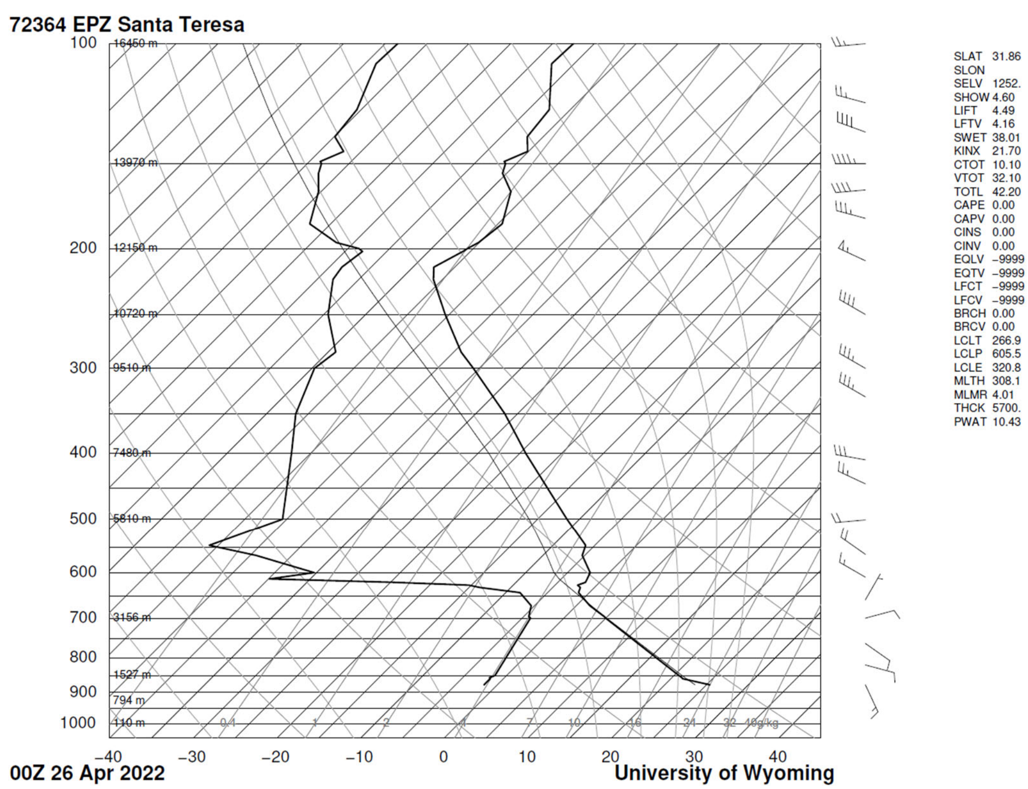


Figure 12-5. El Paso NWS upper-air column skew-t sounding for April 25, 2022 at 1800 (MDT).

As the event unfolded, the wind blew from the north northeast throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event exacerbated by wildfire smoke. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Deming monitoring site began at the 0500 hour and lasted through the 0800 hour; at the Las Cruces International Airport for the 0255 hour (Figure 12-5); at the ZiaMet's Chihuahua Desert Range RC and Lordsburg Playa weather stations maximum five-minute wind gusts reaching 29.1-33.8 mph (Figure 12-6); and at the Texas Commission of Environmental Quality's (TCEQ) Midland Avalon monitoring site that began at the 0900 hour and lasted through the 1400 hour (Figure 12-7). PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, and Deming monitoring sites beginning at the 0400 hour. Hourly concentrations remained elevated intermittently throughout the day beginning at the 0400 through the 0900 hours, the 1300 hour, then again at the 2100 through the 2300 hours. Table 12-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Anthony			Desert View			Deming		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
0400	117	5.2	9.8	29	1.7	3.6	166	8	14.7
0500	102	4.7	9.6	92	1.8	3.9	981	9.1	17.8
0600	75	5	9.1	78	2.2	6.4	320	8.4	13.8
0700	280	7.4	12.8	46	2	4.6	483	9.2	14.4
0800	383	7.2	12.5	41	4.8	8.1	837	10.2	14.5
0900	85	6.1	11.4	58	6.1	10.1	227	8.4	13.5
1000	36	5.2	9.8	51	5.4	10.2	36	6.6	11.2

Table 12-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists were able to forecast the early high wind blowing dust event because of the early morning backdoor cold front (Figure 12-6). Forecasts predicted strong winds just under advisory criteria as the cold front approached the area with the area of low-pressure tracking from northeast to southwest approaching southern New Mexico and far east Texas early in the morning and moving across New Mexico into Arizona. The northeasterly wind direction shifted to the east and southeast into the later morning dropping temperatures behind the cold front. The cold front progressed from the highlands to the lowlands in a northeast to southwest direction from the Gila National Forest and towards the Florida Mountain Range into the early morning hours. Nearby wildfire smoke impacts concentrating in the Gila National Forest from Arizona's Crooks wildfire south of Prescott, northern New Mexico's Calf and Hermit Peak wildfire near Las Vegas, New Mexico, and the Lincoln National Forest's McBride wildfire near Ruidoso, New Mexico exacerbated the PM_{10} concentrations this morning and throughout the day. The direction of the upper-air columns predominating from the northwest allowed for the transport of smoke into the Borderland through the middle- and upper-air columns on the evening of April 24, 2022 (Figure 12-3). The energy created by the negative buoyancy from the moisture laden middle-air columns increased with the approaching cold front and allowed for the smoke to continue its transport to the lower-air columns. An early morning temperature inversion allowed for PM_{10} concentrations to remain elevated and remain suspended near ground surface (850-750 mb) until thermal warming and mixing of the temperature inversion occurred (Figures 12-4 and 12-5).

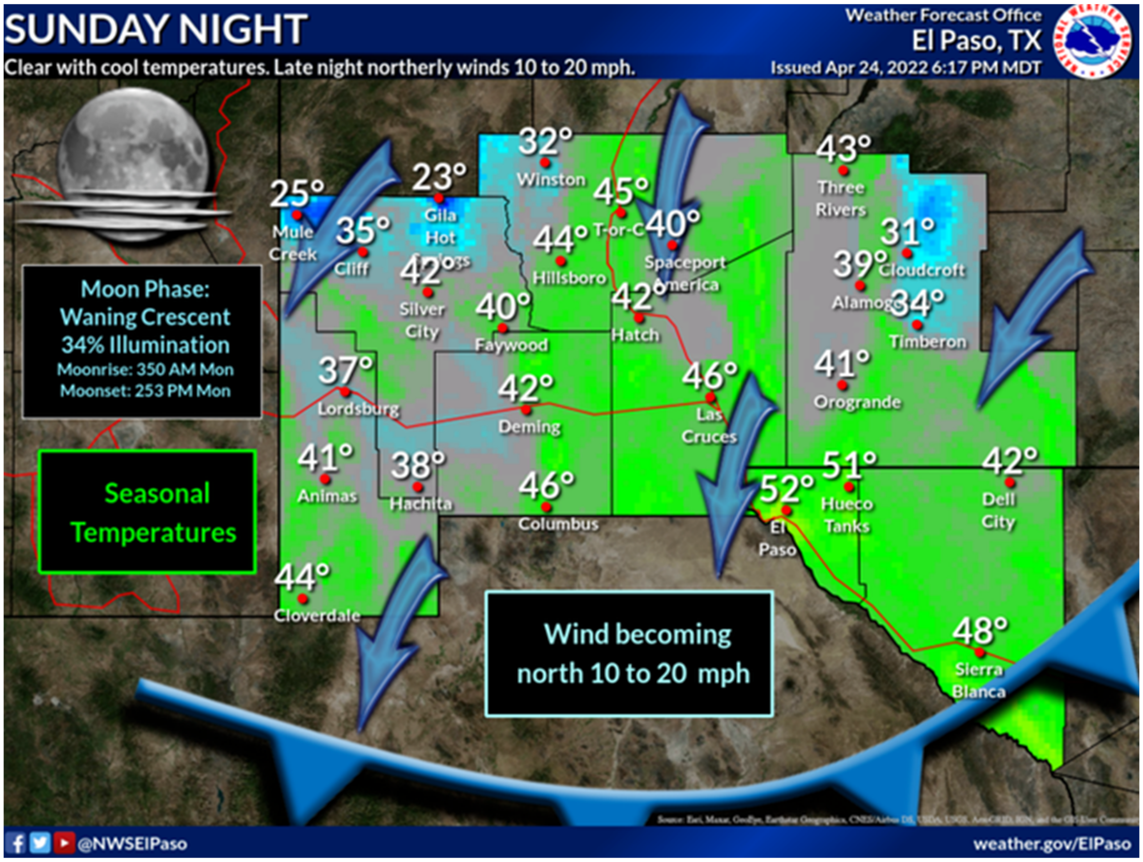


Figure 12-6. NWS GraphiCast weather forecast product for the evening of April 24, 2022.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. Unfortunately, NMED monitoring sites recorded wind speeds below this threshold for this date as there are no monitoring sites located at the source area of dust north of Silver City; however, other local sources of data are provided to demonstrate the short duration of increased winds from the cold front (Figures 12-8 and 12-9). The wind speeds at the Las Cruces International Airport reached peak wind speeds close to the threshold at the 0255 hour for 15-minutes. New Mexico State University's ZiaMet weather station network recorded maximum 3-minute wind gusts at the Chihuahua Desert Range RC and the Lordsburg Playa (Figure 12-9) at 33.8 and 29.1 mph, respectively. In addition, TCEQ's Midland Avalon Dr. monitoring site recorded sustained hourly wind speeds of 23.2 mph at the 0900 hour (Figure 12-10).

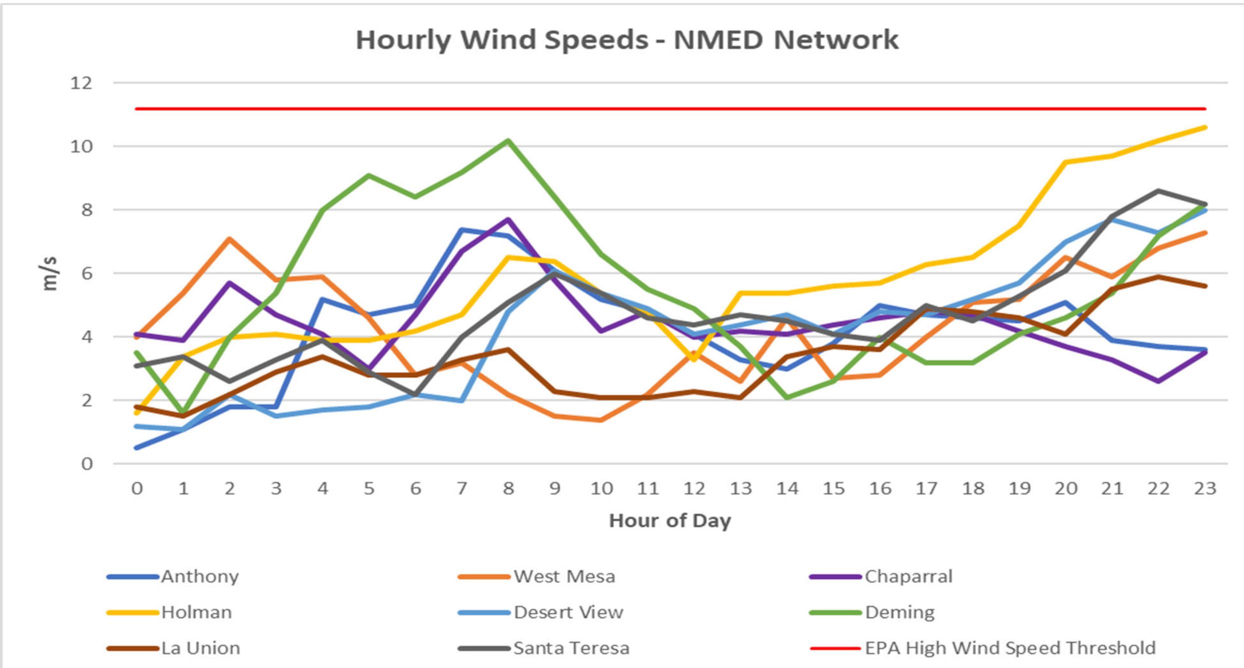


Figure 12-7. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

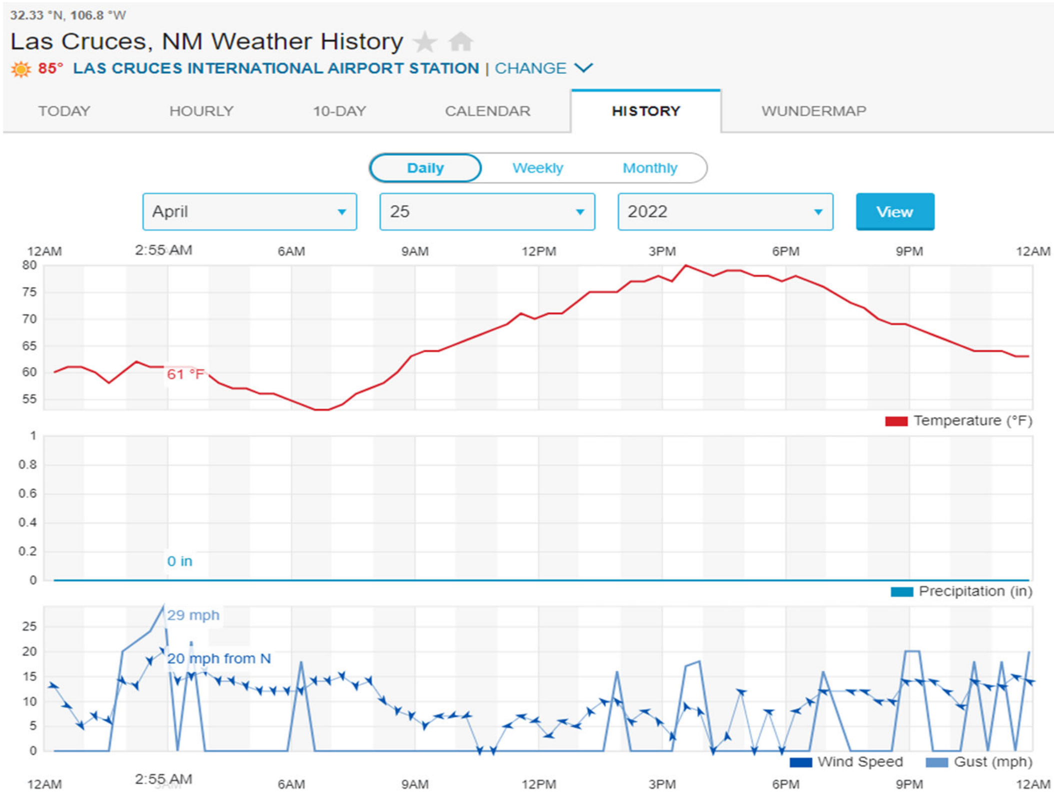


Figure 12-8. Las Cruces International Airport historic recorded 20-minute wind speed data for April 25, 2022. Obtained from weatherunderground.com

Home ZiaMet Chihuahua Desert Range RC Request Data

Chihuahua Desert Range RC Daily Surface Weather

	Air Temperature			RH			3m Wind Speed		3m Wind Direction	Rain	Solar Radiation
	F			%			MPH		deg	in	MJ/m^2
Date	Max	Min	Mean	Max	Min	Mean	Max	Mean	Mean	Total	Total
2022-04-25	76.7	49.2	64.2	32.9	9.2	20.9	33.8	7.6	183.8	0.0	27.15

Home ZiaMet Lordsburg Playa Request Data

Lordsburg Playa Daily Surface Weather

	Air Temperature			RH			3m Wind Speed		3m Wind Direction	Rain	Solar Radiation
	F			%			MPH		deg	in	MJ/m^2
Date	Max	Min	Mean	Max	Min	Mean	Max	Mean	Mean	Total	Total
2022-04-25	79.9	36.7	61.1	22.7	10.9	15.7	29.1	6.1	146.3	0.0	27.48

Figure 12-9. Chihuahua Desert Range RC (east Las Cruces) and Lordsburg Playa weather station data. Courtesy of ZiaMet.

The table below contains hourly averages for all the pollutants and meteorological conditions measured at Midland Avalon Drive C1095 for **Monday, April 25, 2022**. All times shown are in CST.

Parameter Measured	Morning												Afternoon												Parameter Measured
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	
Sulfur Dioxide	0.2	0.5	0.4	0.2	0.3	**0.6**	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.1	***-0.2***	0.1	0.1	0.1	Sulfur Dioxide
Hydrogen Sulfide	0.02	-0.03	0.02	**0.09**	-0.03	-0.02	***-0.35***	NEG	-0.25	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	Hydrogen Sulfide
Wind Speed	15.2	17.4	14.5	12.8	12.9	12.4	11.1	12.6	18.5	**23.6**	22.2	21.5	18.9	20.6	20.5	18.1	17.6	17.7	17.3	17.1	14.0	13.3	12.9	***11.0***	Wind Speed
Resultant Wind Speed	14.9	17.2	14.3	12.7	12.7	12.3	11.0	12.4	18.2	**23.2**	21.7	21.1	18.4	20.2	20.1	17.6	17.2	17.4	17.1	16.9	13.9	13.2	12.8	***10.9***	Resultant Wind Speed
Resultant Wind Direction	59	70	76	62	61	51	39	***34***	49	59	67	67	58	61	76	76	77	78	81	**83**	79	76	75	74	Resultant Wind Direction
Maximum Wind Gust	26.1	26.4	21.9	22.1	21.6	19.9	17.9	20.5	29.9	35.0	33.9	32.7	33.2	**35.4**	33.1	27.6	27.5	25.5	25.6	24.9	22.5	21.5	19.2	***17.2***	Maximum Wind Gust
Std. Dev. Wind Direction	11	8	9	9	9	8	9	11	10	10	13	12	12	12	12	**14**	11	11	9	8	***7***	7	7	7	Std. Dev. Wind Direction
Outdoor Temperature	57.9	57.6	57.2	56.4	55.6	55.1	***54.6***	55.7	58.2	60.2	61.8	63.1	64.5	65.3	67.4	68.0	**68.5**	67.7	66.2	63.4	61.2	59.3	57.8	56.6	Outdoor Temperature
Parameter Measured	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Parameter Measured
	Morning												Afternoon												

Figure 12-10. Midland, Texas Avalon Dr. monitoring data. Courtesy of Texas Commission for Environmental Quality.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Catron, Socorro, Grant, and Sierra Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona, Texas, and Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the GOES-16 satellite Aerosol Optical Depth (0801 MDT) and Dust and Smoke (0821 MDT) imagery products with dust plumes observed as warm colors originating upwind of NMED's monitoring site near Old Horse Springs, north of Silver City, for the Aerosol Optical Depth product and yellow for the Smoke and Dust product. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in central New Mexico (Figures 12-11 and 12-12). The dust plumes of interest appear to be limited to central New Mexico, southern New Mexico and west Texas, orientated from the northeast direction and traveling toward the Deming monitoring site at the time of the satellite pass (0801 MST) that captured the imagery.

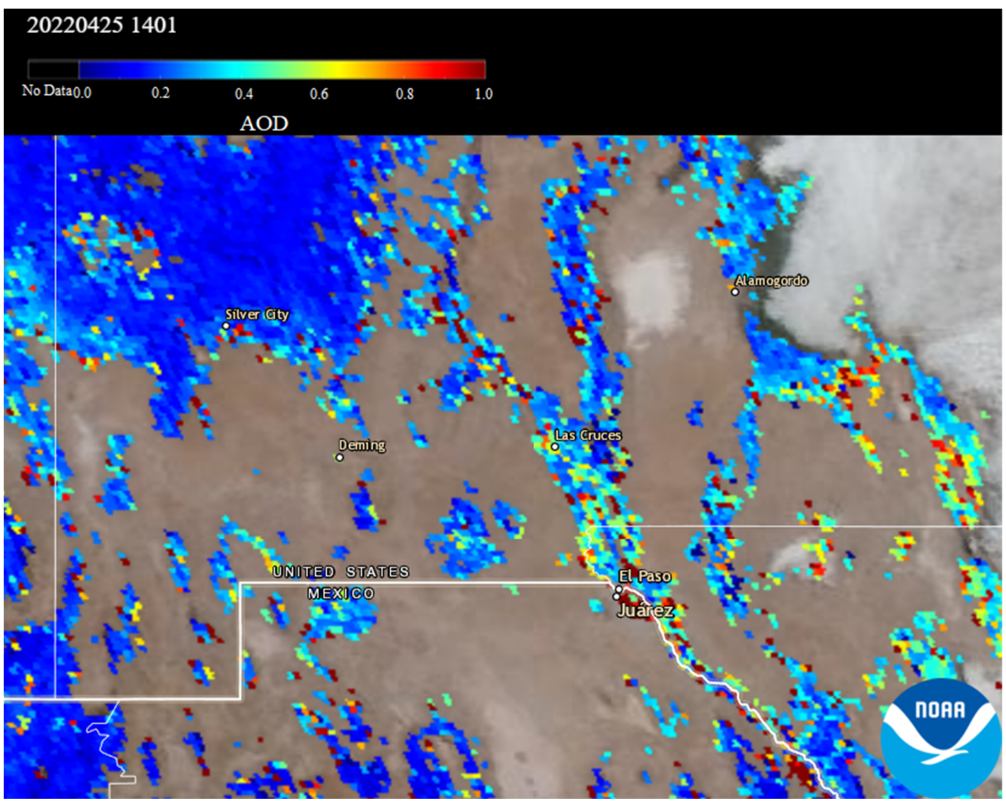


Figure 12-11. GOES-16 East geostationary satellite Aerosol Optical Depth (0801 MDT) showing southwestern New Mexico, southeast Arizona, northern Chihuahua and western Texas. Imagery obtained from NOAA Aerosol Watch website.

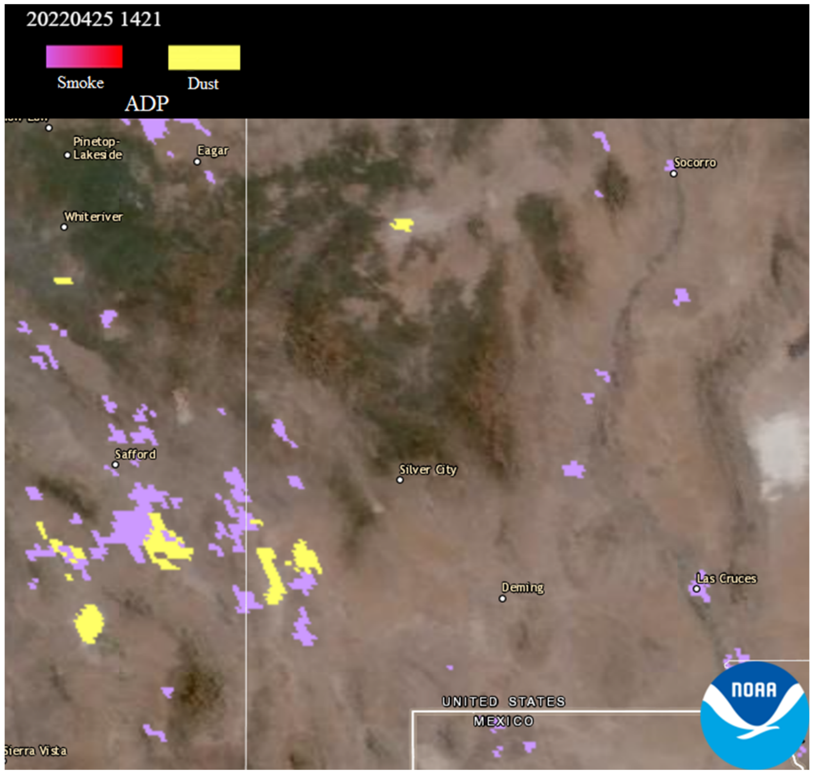


Figure 12-12. GOES-16 East geostationary satellite Dust and Smoke product showing dust source north of Silver City and west of Socorro. Courtesy of Aerosol Watch.

The VIIRS Deep Blue Aerosol Ångström Exponent product from the joint NASA/NOAA Suomi National Polar orbiting Partnership (Suomi NPP) satellite, in this case, is employed for over-land use to determine aerosol particle size and atmospheric aerosol loading. Pixels pass high-quality assurance tests and the Ångström exponent is defined between 412-470 nm for 'bright' surfaces, and 470-670 nm for 'dark' surfaces. Sensor/algorithm resolution is 6 km at nadir, imagery resolution is 2 km at nadir, and daily temporal resolution. Green colors suggest optical dominance of areas with dust or coarse particles and values less than 1. Areas with shades of blue suggest optical dominance of smoke or fine particulates associated with combustion and values greater than 1. Notice the areas around the Deming monitoring site contains a heavy presence of dust in comparison to smoke at the 1328 hour (MDT) as depicted by the large spatial coverage of green colored pixels in comparison to the minimal blue shading present for this day (Figure 12-13).

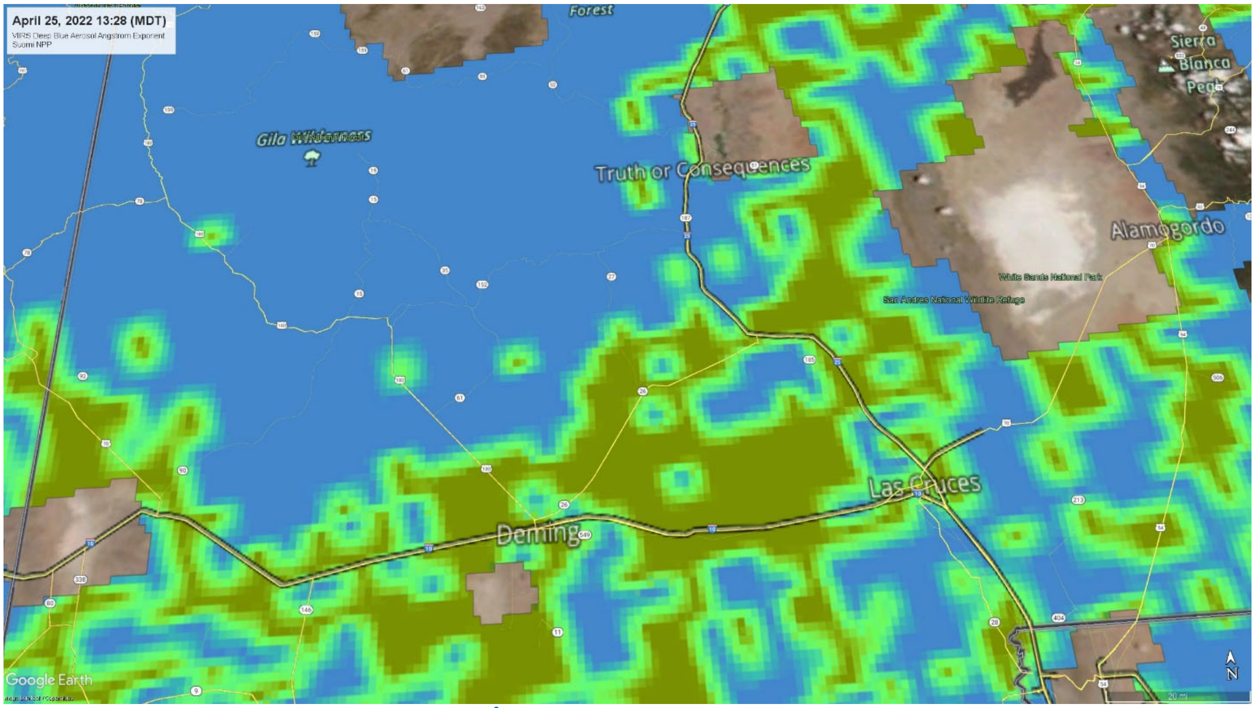


Figure 12-13. VIIRS Suomi NPP [Deep Blue Aerosol Ångström Exponent](#) product showing southeastern Arizona, northern Mexico, southwestern New Mexico, and west Texas for April 25, 2022, at the 1328 hour (MDT). Courtesy of NASA Worldview and the [Deep Blue Science Team](#).

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The National Weather Service (NWS) issued an Area Forecast Discussion for this event. An Area Forecast Discussion is issued by NWS throughout the day to notify the public of any meteorological event that is expected to occur that could potentially disrupt normal activity until the next discussion is released. A description of the potentially hazardous weather is described to warn residents and give them plenty of time to plan ahead. This was issued for southwestern New Mexico and west Texas to warn the public of the cold front event. An excerpt from the NWS Area Forecast Discussion can be found below:

"…there will be a cold front pushing in from the north starting this evening. Expect winds to pick up behind the front in the usual favored north wind areas like TCS and DMN. These areas could see 15-25 mph winds by early morning and even ELP could have a period of 10-20 mph winds. Winds will start to turn more easterly toward sunrise..."

PM_{10} concentrations were exacerbated by the wildfire smoke that was produced by the Northern New Mexico's record-breaking Cook 's Peak, Calf Canyon and Hermits Peak fires that had burned 60,000 acres by April 26, 2022 near Las Vegas, NM; and, the Lincoln County's Nogal Canyon and McBride fires near Ruidoso, NM. In addition, Arizona's Crook's Fire located in the Bradshaw Mountains 8 miles south of Prescott, AZ had burned 6,454 acres with 16% contained that contributed to wildfire smoke impacts. The fire and smoke reports provide information as to the areas impacted by the wildfire smoke and the progress made to contain the wildfires (Figures 12-14 through 12-17).

Destructive wildfires in New Mexico trigger emergency declaration

npr

By The Associated Press
Published April 25, 2022 at 9:54 AM EDT

Eddie Moore / The Albuquerque Journal Via AP

San Miguel County Sheriff's Officers patrol N.M. 94 near Penasco Blanco, N.M., as the Calf Fire burns nearby on Friday.

SANTA FE, N.M. — New Mexico Gov. Michelle Lujan Grisham has signed emergency declarations as 20 wildfires continued to burn Sunday in nearly half of the state's drought-stricken 33 counties.

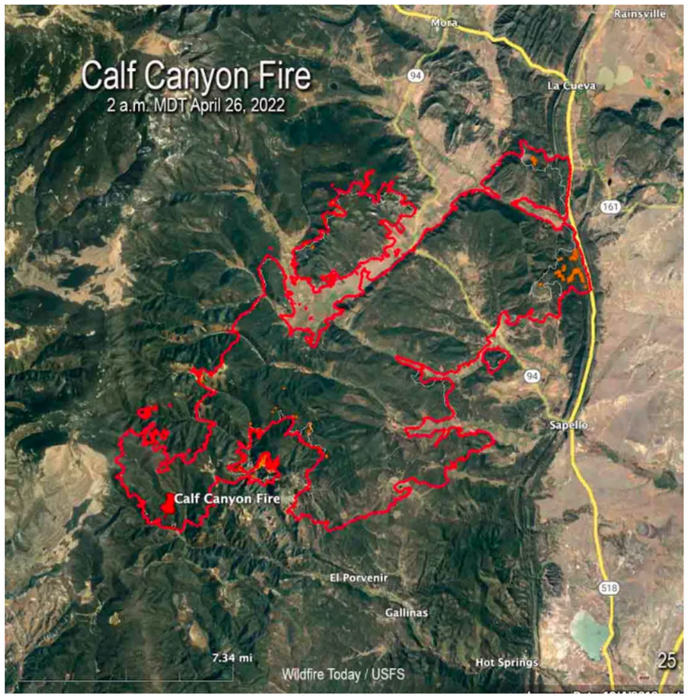
Figure 12-14. National Public Radio story covering New Mexico and Arizona wildfire destruction April 25, 2022.

Update on the Calf Canyon and Hermits Peak Fires in New Mexico

Bill Gabbert April 26, 2022 Wildfire Arizona, Calf Canyon Fire, Hermits Peak Fire

They have burned more than 60,000 acres

11:36 a.m. MDT April 26, 2022



Map of the Calf Canyon Fire after it merged with the Hermits Peak Fire. The red line was the perimeter at 2 a.m. MDT April 26, 2022. The white line was the perimeter about 24 hours before.

With more favorable weather conditions and less active fire behavior on the Calf Canyon and Hermits Peak Fires, on Monday firefighters were able to engage in operations in areas that had previously been difficult to reach safely.

Figure 12-15. Calf Canyon and Hermits Peak wildfire update. Courtesy of Wildfire Today.

McBride Fire – Friday, April 22, 2022, Daily Update

McBride Fire
News - 04/22/2022

Both the Nogal Canyon and McBride Fires were transferred to a Type 4 Command structure on April 21st at 7:00 am.

Safety: Today is an Extremely Critical Fire Weather Day. There are red flag warnings in effect. Lincoln County, the Village of Ruidoso, Otero County and the Lincoln National Forest are ALL under fire restrictions or burn bans. Please do not burn debris, weld or have campfires on red flag warning days.

Operations: Minimal fire activity was observed across the fire as crews continued to patrol and monitor the fire. An excavator was used alongside ground crews to support suppression repair work in the Eagle Creek area. Small pockets of smoldering debris will continue to produce smoke over the coming days and weeks. This is very common after a fire. As the fire continues to release resources, a group remains available for initial attack for any new fire starts.

After the Fire: Citizens whose property sustained damage in either fire and need paperwork for insurance claims can contact the Ruidoso Community Development Office at 575-258-6999.

Flooding and other adverse effects are common after a fire. A Burned Area Emergency Response (BAER) team has begun assessments for the McBride and Nogal Canyon Fires. BAER teams evaluate post-fire conditions and determine the potential for increased flooding, mudslides, and rockslides. The team consist of hydrologists, geologists, soil scientists, road engineers, botanists, biologists, and archeologists from both federal and state agencies. Efforts are focused on the protection of human life and safety, property, and critical cultural and natural resource values. The BAER assessment will take approximately two weeks to complete their burned area assessment.

Weather: Temperatures in the mid-70s and strong southwest winds are expected at 40 mph with gusts 60-70 mph.

Facebook: http://www.facebook.com/McBrideFire2022
NM Fire Information: https://nmfireinfo.com/

Figure 12-16. McBride Wildfire update for April 22, 2022. Courtesy of NM Fire Info.

WILDFIRES

Crooks Fire: Fire grows to 6,454 acres, 16% contained as officials worry about winds

P. Kim Bui
Arizona Republic

Published 10:12 a.m. MT April 25, 2022 | Updated 7:59 p.m. MT April 25, 2022

View Comments

Crooks Fire burns near Prescott

The Crooks Fire is burning near Prescott, Arizona. See photos of the wildfire.

The Crooks Fire burning near Mount Union, about 10 miles south of Prescott, grew to 6,454 acres burned. The fire was 16% contained as of Monday evening.

The fire was reported on April 18, and the cause is still under investigation.

Figure 12-17. Arizona's Crooks Fire south of Prescott April 25, 2022. Courtesy of Arizona Republic.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from areas of central New Mexico into the southern New Mexico area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 12-18). This analysis supports the hypothesis that dust plumes originated in central New Mexico before being transported to the Deming monitoring site.

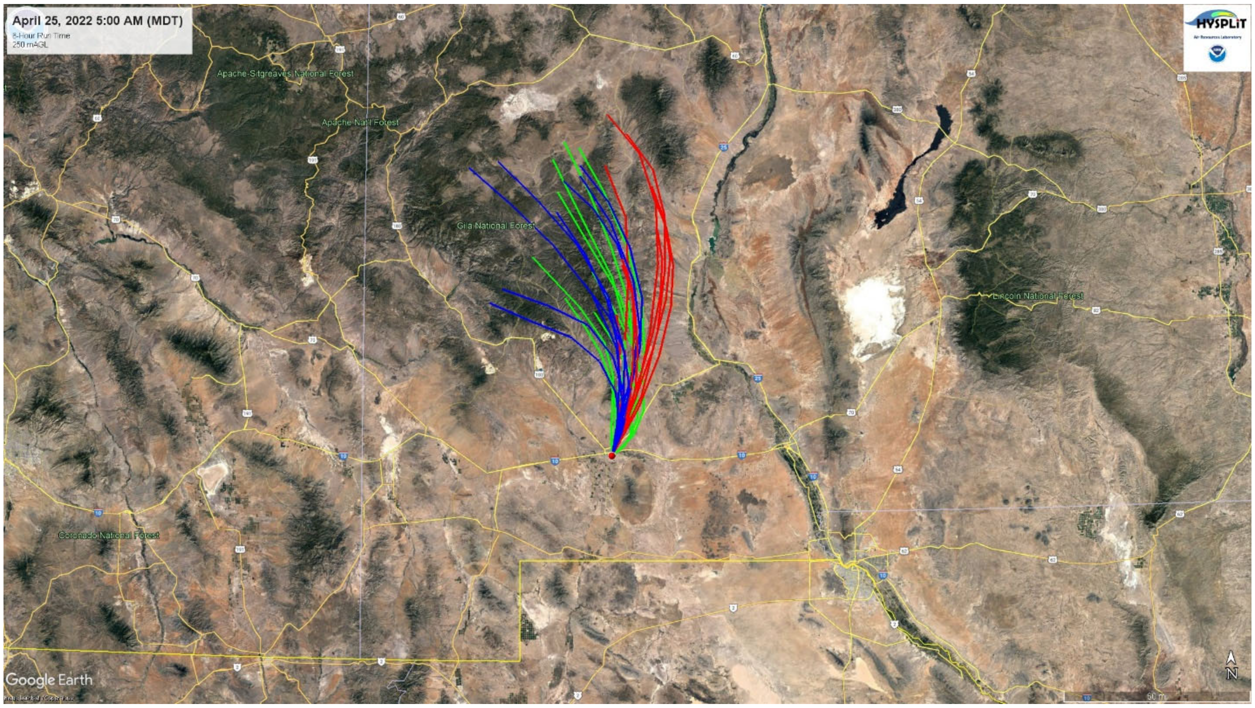


Figure 12-18. HYSPLiT back-trajectory analyses using the Ensemble mode for the Deming monitoring site.

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figure 12-19) was created for the hours of the event when PM_{10} concentrations exceeded 150 μg/m³ (0500 -2300 hour). During the event, winds blew from the northeast 10% of the time coinciding with peak PM_{10} concentrations for the Chaparral Monitoring site. In addition, winds blew from the west to the northeast through the southern directions 100% of the time coinciding with peak PM_{10} concentrations for the Deming monitoring site.

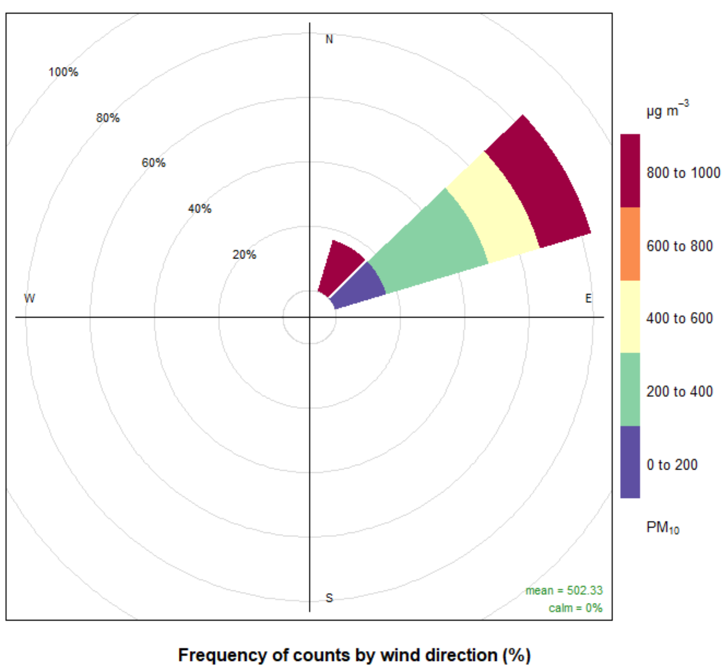


Figure 12-19. Pollution rose for the Deming monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong northeast direction winds from the beginning at the 0400 hour intermittently lasting through the 2300 hour. During this time, peak hourly PM_{10} concentrations ranged from 117 to 981 µg/m^3 were recorded at the West Mesa and Deming monitoring sites, respectively (Figure 12-20). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 5.9 to 10.6 m/s were recorded at the La Union and Holman monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 12-21 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

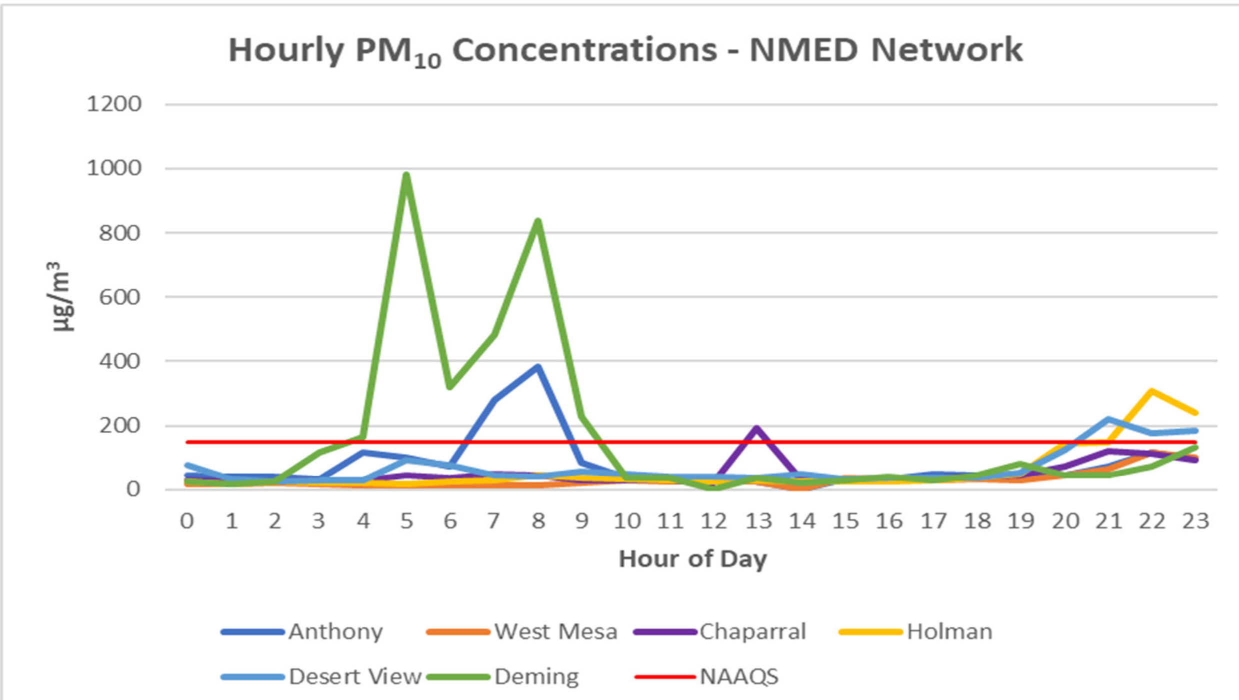


Figure 12-20. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

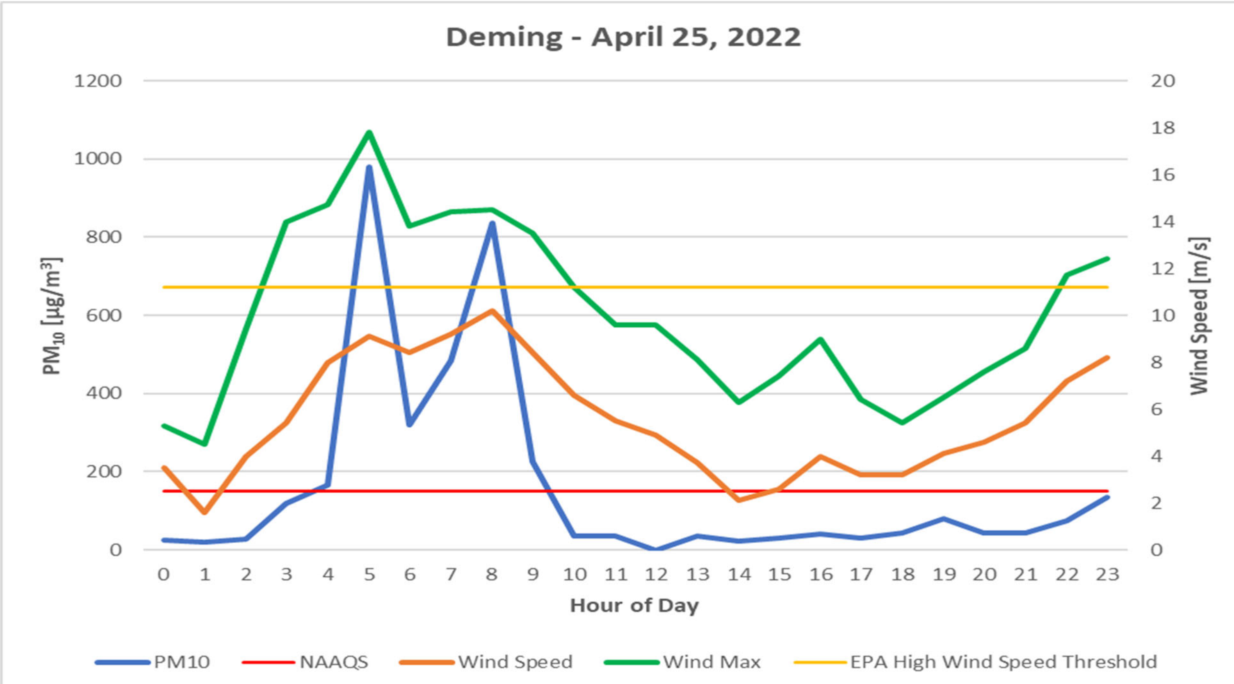


Figure 12-21. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Deming monitoring site recorded 14 exceedances of the PM_{10} NAAQS (Figure 22-6 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 721 µg/m^3 recorded in 2019. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 12-22, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 87 µg/m^3, except for the previous April 22, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

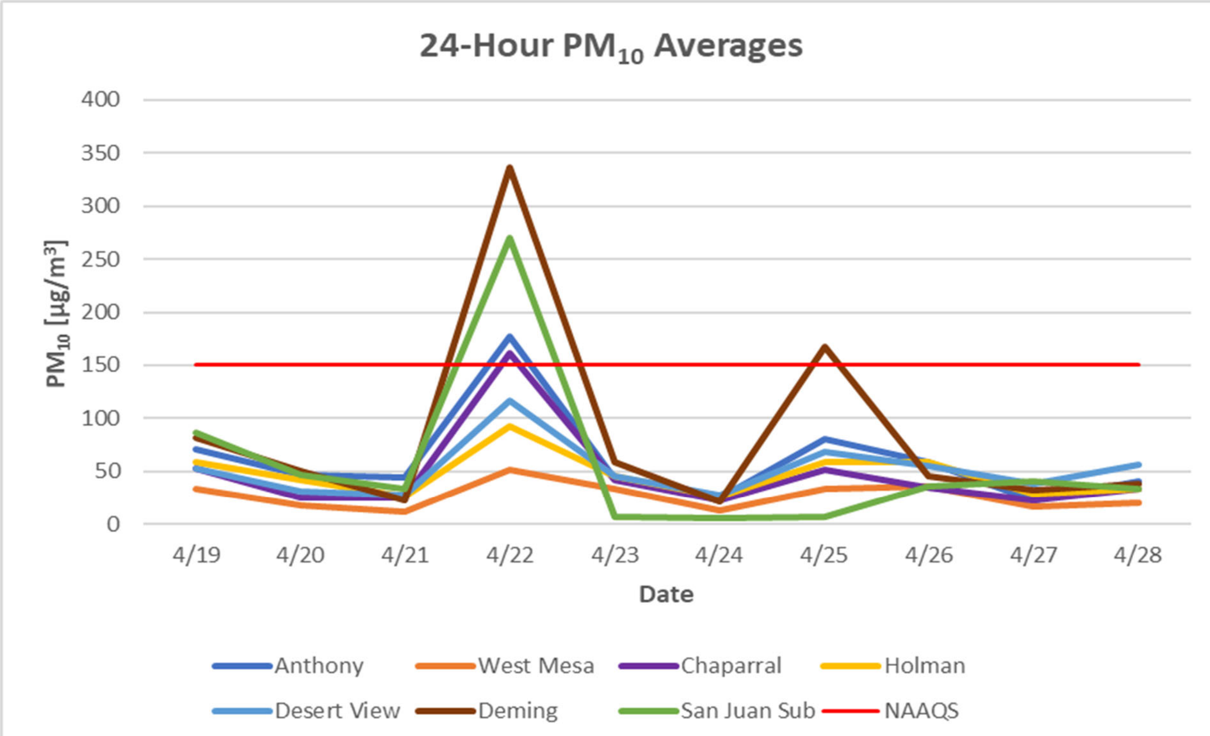


Figure 12-22. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (167 µg/m^3) is above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the Deming monitoring site. The monitored PM_{10} 24-hour average (167 µg/m^3) is above the 99th percentile of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

13. HIGH WIND EXCEPTIONAL EVENT: May 8, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in San Juan County resulting in an exceedance of the PM_{10} NAAQS at the San Juan Substation monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 13-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-045-1005	1H San Juan Sub	368 μg/m^3	15.3 m/s	21.8 m/s

Table 13-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

As a deepening upper-level trough over California starts to develop a closed low, surface winds will begin to increase in intensity later into the afternoon as the lee side of the front travels east (Figure 13-1). Aloft, the deepening low-pressure trough was sitting directly over the coast of Oregon (Figure 13-2). As the event progressed this low-pressure gradient traveled from west to east and aligned itself with northwest New Mexico and the surface wind direction. With the arrival of the Pacific cold front the winds aloft began to mix down, increasing the surface wind velocities and providing the turbulence required for vertical mixing and entrainment of dust.

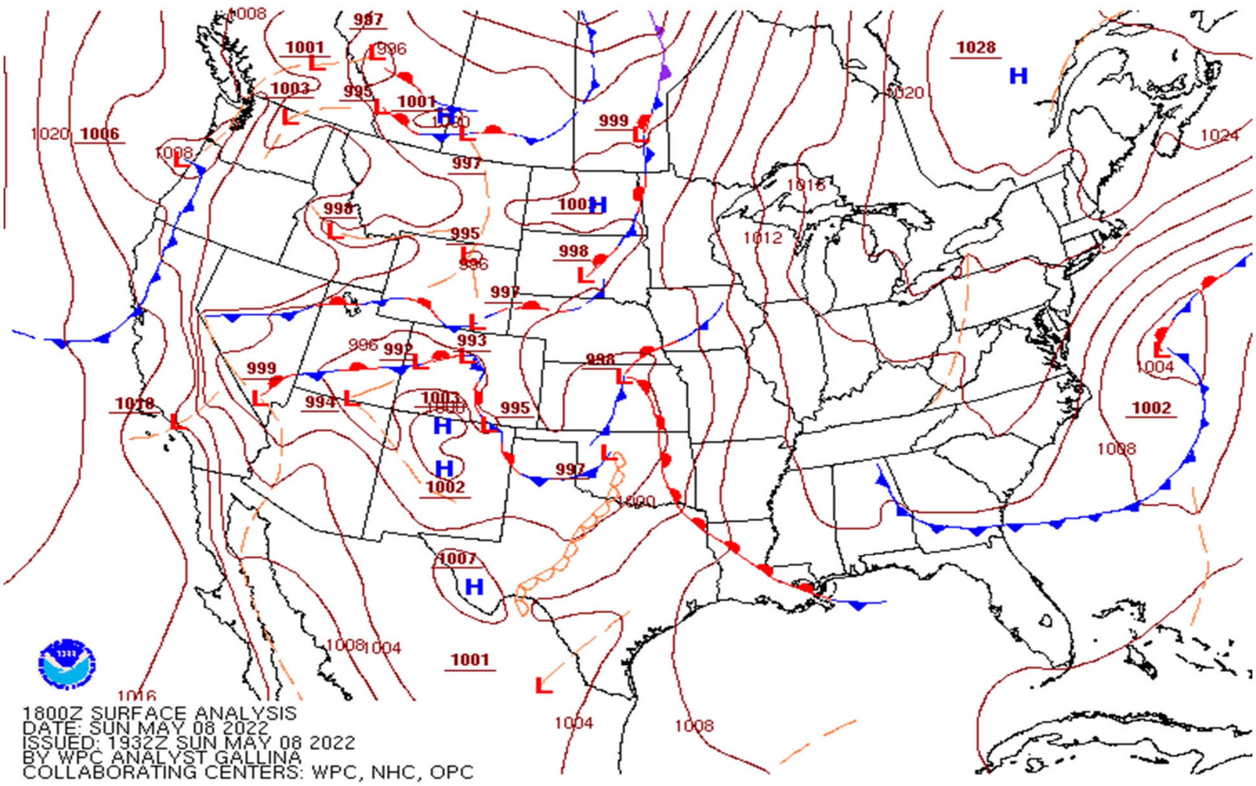


Figure 13-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

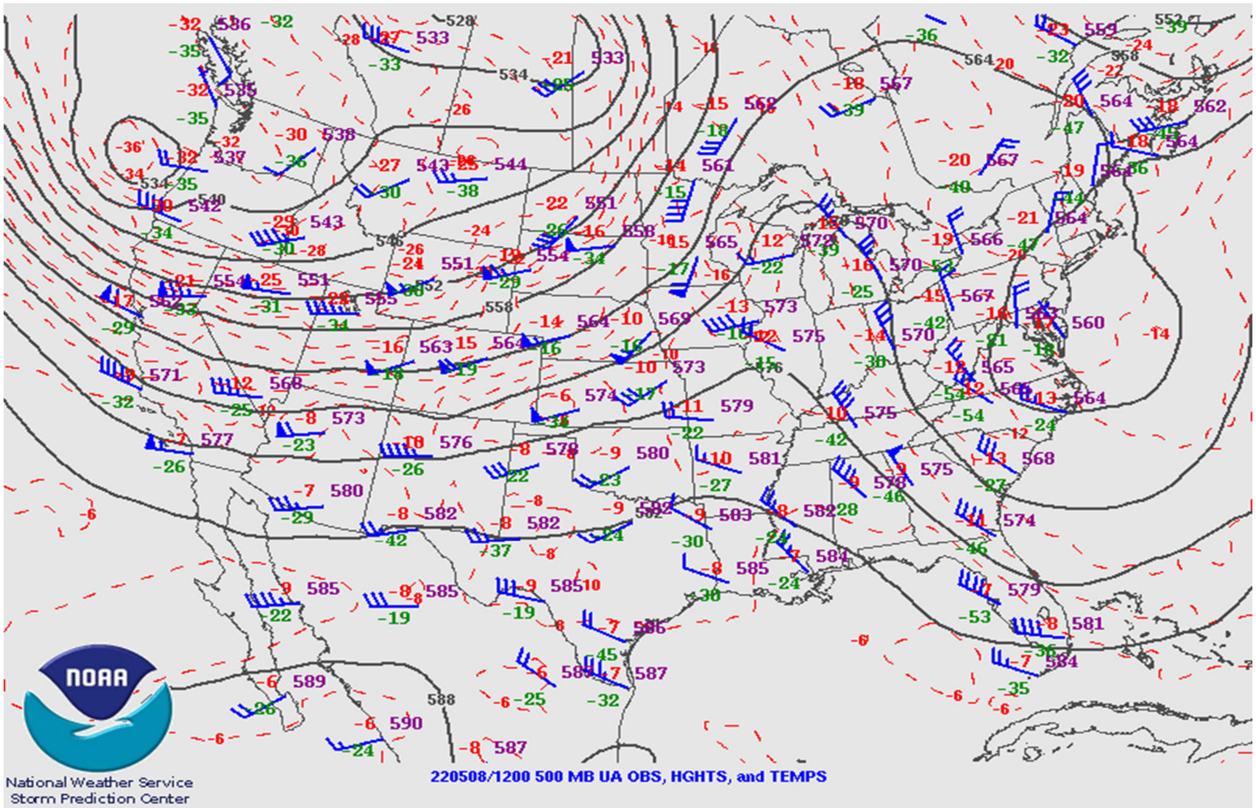


Figure 13-2. Upper air weather map for May 8, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED’s monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Chaparral, Holman, West Mesa, Deming, and San Juan Substation monitoring sites beginning at the 1100 hour, and lasted through the 1900 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, Deming, and San Jua Substation monitoring sites beginning at the 1300 hour. Hourly concentrations remained elevated through the 2300 hour. Table 13-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Desert View			Deming			San Juan Substation		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
1300	139	6.7	12	161	10.3	16.1	144	11.8	20.5
1400	178	7.3	14.3	193	10.9	17.2	263	14.2	20
1500	317	8	15	288	10.7	16.8	310	13.3	20.7
1600	437	8.3	14.8	188	10.7	18.8	410	14.5	20.3
1700	312	7.7	14.5	298	10.7	17.6	571	15.3	21.8
1800	136	6.2	12.4	119	10	15.7	459	12.7	19
1900	63	4.3	8.2	61	7.6	13.9	1672	10.9	17.7
2000	29	4	6.4	39	7	10.8	1252	8.4	14.1
2100	27	3.1	7.6	29	6.2	10.9	981	5.9	10.2
2200	31	3.7	6.6	24	3.4	5.9	1804	4.4	11.2
2300	17	4.1	6.7	27	5.2	8.7	405	5.9	11.6

Table 13-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day which normally accompanies strong upper polar jet streaks. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east at northern New Mexico in the morning and moving across the Four Corners region into southern Colorado in the afternoon. The systems movement across the area timed well with setting up the perfect conditions for high intensity winds that moved into the area this afternoon leading into the night. Many outlets also forecasted a high probability of blowing and entrained dust throughout the evening leading into the following morning, especially in the desert areas of northwest New Mexico and northeast Arizona.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, “the State shall not be required to provide a case-specific justification for a high wind dust event.”

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED’s monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The West Mesa monitoring site recorded wind speeds above this threshold for a total of 6 hours for the 1300 and 1800 hours (Figure 13-3).

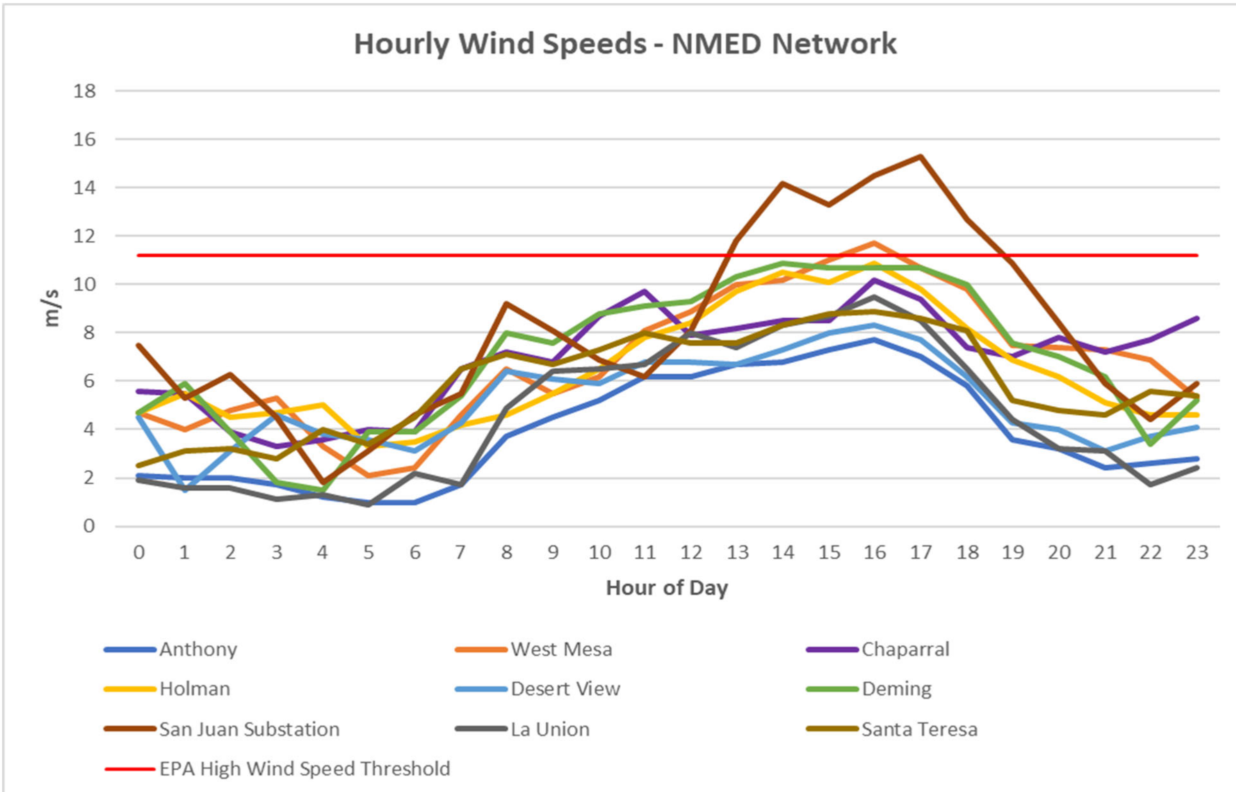


Figure 13-3. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures
Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana and Luna Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in San Juan and McKinley Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery
The event was captured on Suomi NPP satellite VIIRS RGB dust product imagery with dust plumes originating upwind of NMED's monitoring sites near the Four Corners region for northwestern New Mexico characterized as pink or magenta bands for the VIIRS RGB dust product. This area is largely rural with the largest area sources of PM originating from the vast desert areas in northwestern New Mexico (Figure 13-4). The dust plumes of interest appear to be orientated in a northeast fashion and traveling toward NMED's monitoring site at the time of the satellite observation (1445 MDT) that captured the imagery.

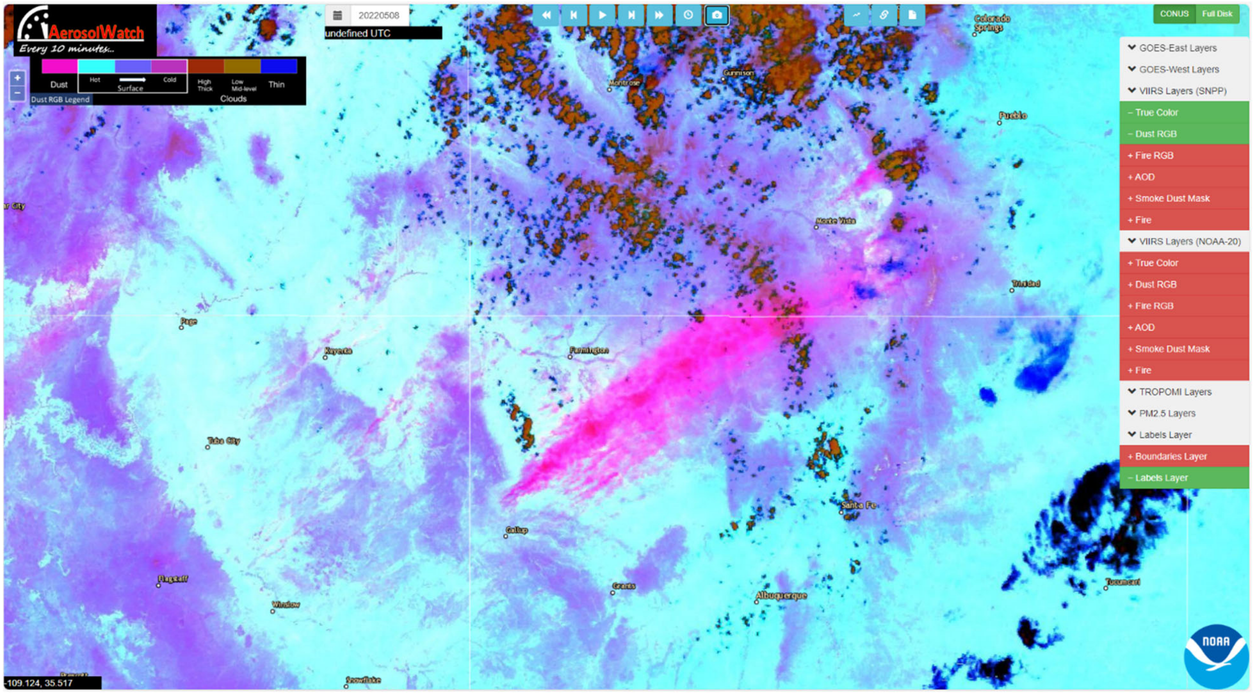


Figure 13-4. VIIRS SNPP satellite RGB dust product showing northwestern New Mexico and the Four Corners region. Imagery obtained from the NOAA AerosolWatch website.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Wind Advisory for San Juan County (NMZ201) and a High Wind Warning for McKinley County (NMZ202) for this event. A Wind Advisory is issued by NWS when sustained winds of 40 mph are expected for 1 hour or longer or gusts at 58 mph or greater. A High Wind Warning is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. These were issued for northwestern New Mexico to warn the public of the high wind event. Excerpts from the Albuquerque NWS's Wind Advisory and High Wind Warning can be found below:

"Wind Advisory from noon today to 9 PM MDT this evening…"

"High Wind Warning until 6 AM MDT Monday…"

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from areas of northeastern Arizona and into the Four Corners area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 13-5). This analysis supports the hypothesis that dust plumes originated in Arizona before being transported to the downwind monitoring site.

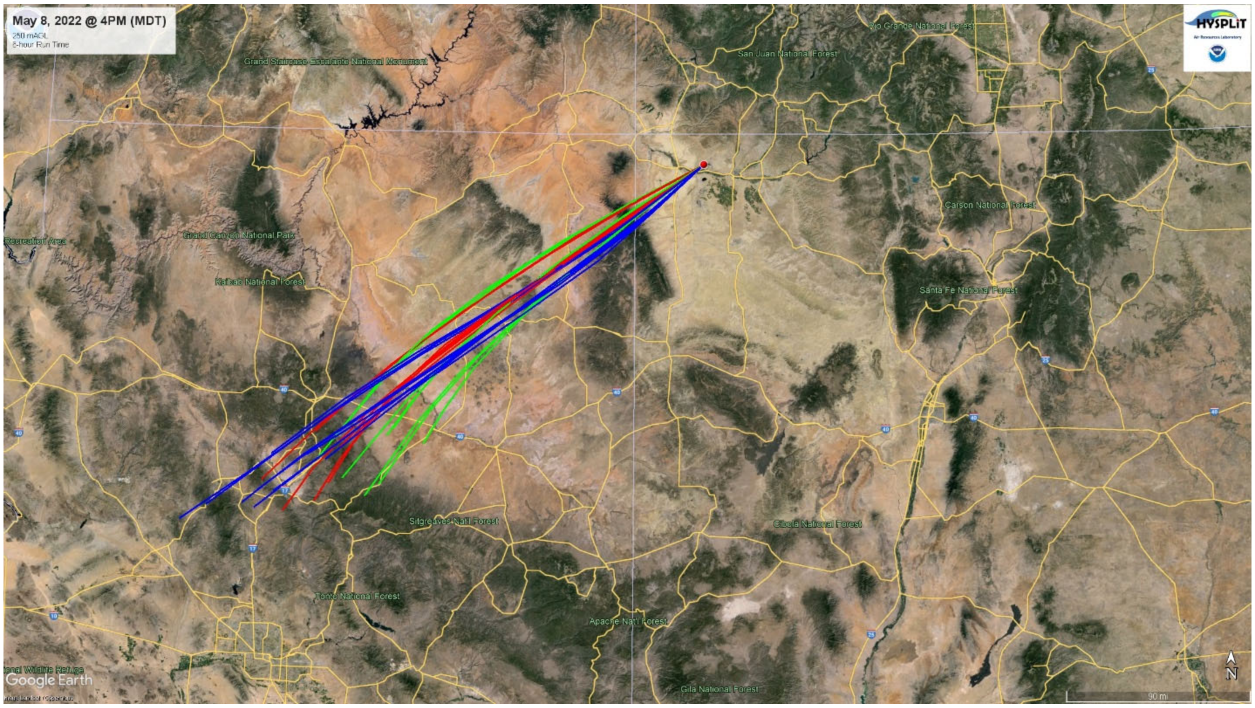


Figure 13-5. HYSPLiT back-trajectory analyses using the Ensemble mode for the Chaparral monitoring site.

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figures 13-6) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (1300 -2300 hour). During the event, winds blew from the west through the south-southwest directions 100% of the time coinciding with peak PM_{10} concentrations.

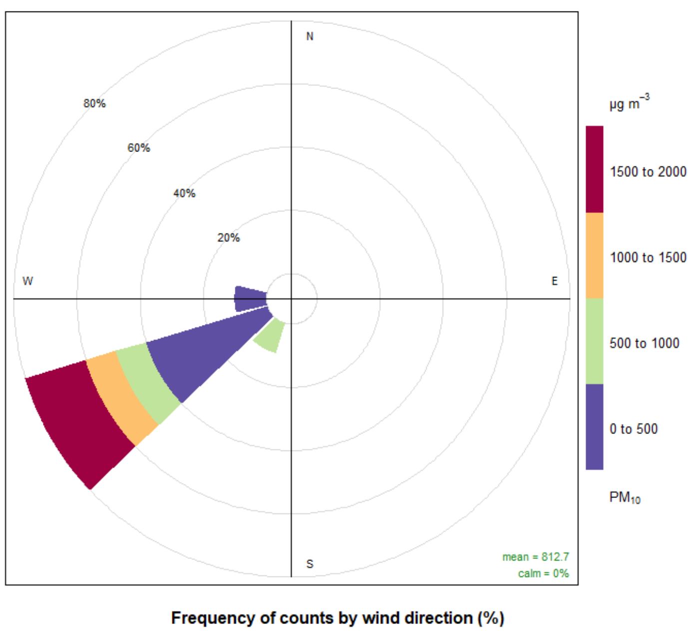


Figure 13-6. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong southwest winds beginning at the 1100 hour and lasting through the 1900 hour recorded at NMED monitoring sites. During this time, peak hourly PM_{10} concentrations ranged from 66 to 1804 µg/m^3 were recorded at the West Mesa and San Juan Substation monitoring sites, respectively (Figure 13-7). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 7.7 to 15.3 m/s were recorded at the Anthony and San Juan substation monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 13-8 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

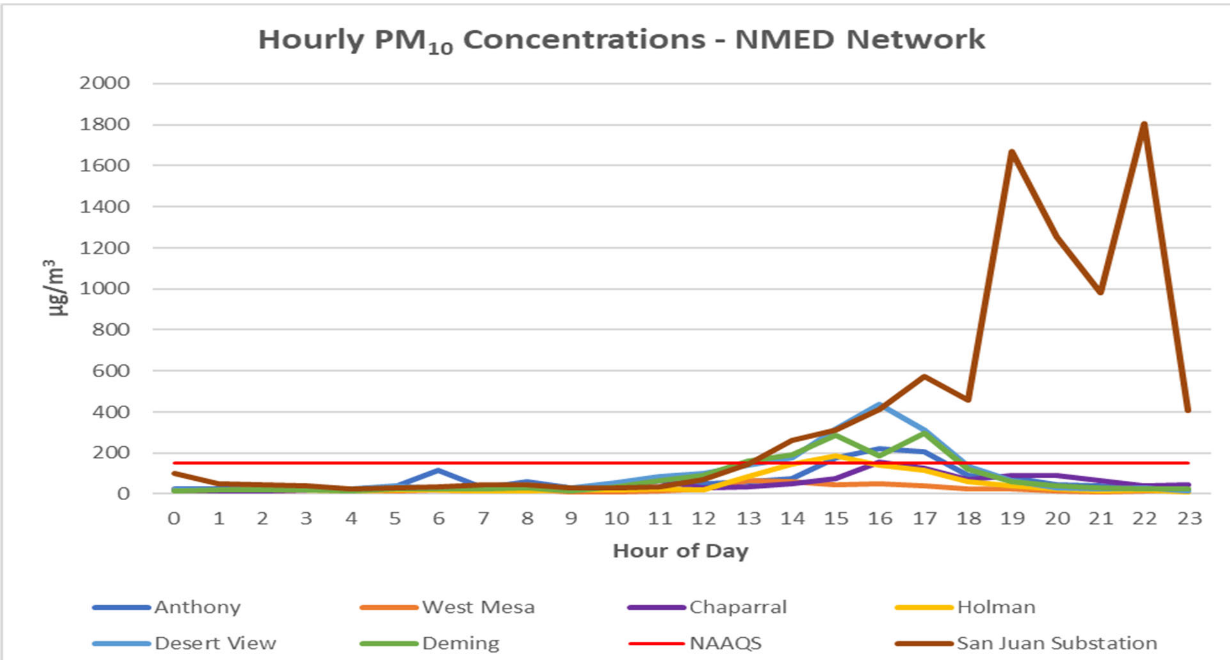


Figure 13-7. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

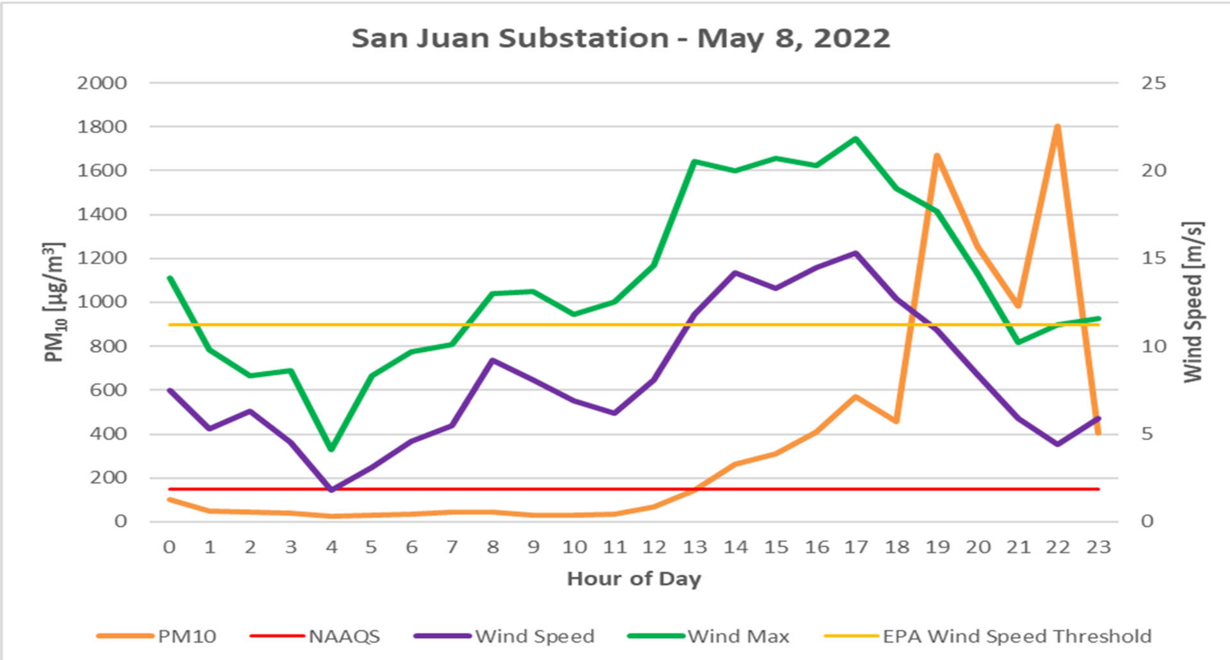


Figure 13-8. Desert View monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2018-2021, the San Juan Substation monitoring site recorded only 1 exceedance of the PM_{10} NAAQS (Figure 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 171 µg/m^3 recorded in 2020. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 13-9, the San Juan Substation monitoring site recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event days. Daily averages for the days surrounding the event did not surpass 135 µg/m^3, except for the following May 9, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

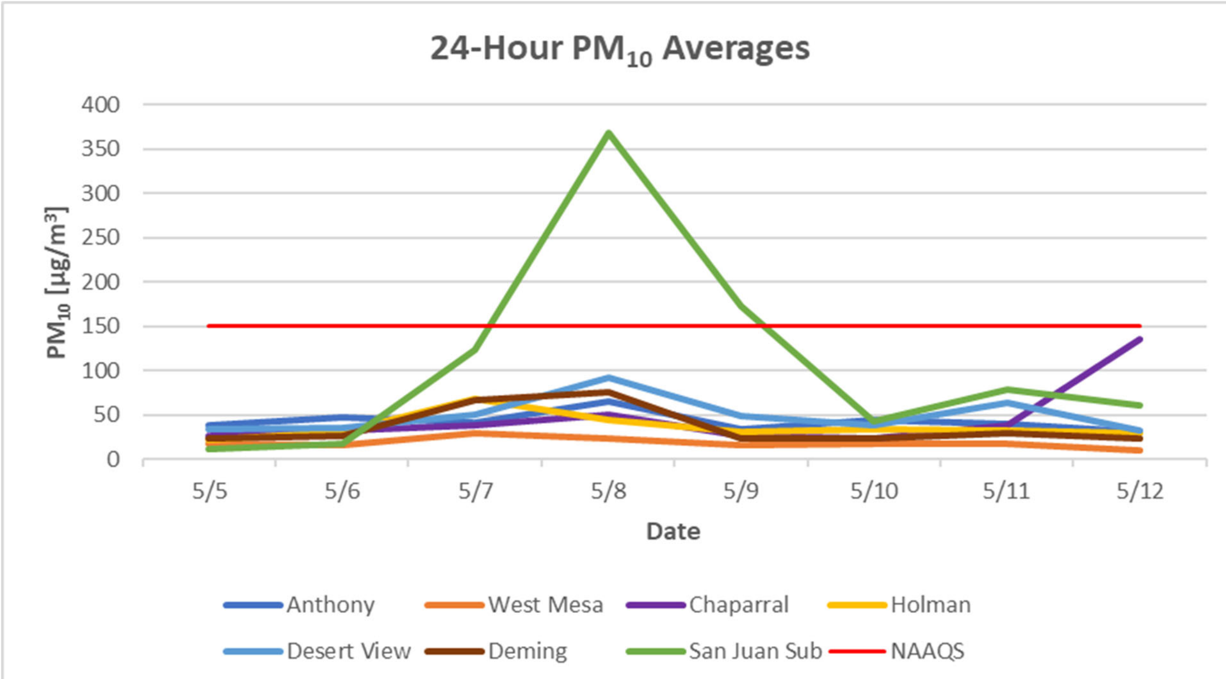


Figure 13-9. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after the three consecutive exceedance dates.

Percentile Ranking
Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2018-2021. The recorded value for this day (368 $\mu g/m^3$) is above the 99^{th} percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the San Juan Substation monitoring site. The monitored PM_{10} 24-hour average (368 $\mu g/m^3$) is above the 99^{th} percentile of data monitored over the previous four years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

14. HIGH WIND EXCEPTIONAL EVENT: May 9, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in San Juan County resulting in an exceedance of the PM_{10} NAAQS at the San Juan Substation monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 14-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-045-1005	1H San Juan Sub	172 µg/m^3	15.4 m/s	22.5 m/s

Table 14-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Another Pacific storm system is setting up right behind yesterdays that will provide the energy from the upper-level low-pressure system to keep surface winds sustained for northern and central New Mexico. At the 1800 hour, an area of low-pressure was located north of the Four Corners region (Figure 14-1). Aloft, the low-pressure center of the storm system hovered over northern California. As the event progressed this low-pressure gradient traveled down the southern coast and aligned itself with northern New Mexico and the surface wind direction (Figure 14-2). The strong upper jet streak winds aloft created strong surface early morning and afternoon winds, especially on the eastern faces of the Central Rocky Mountain Chain.

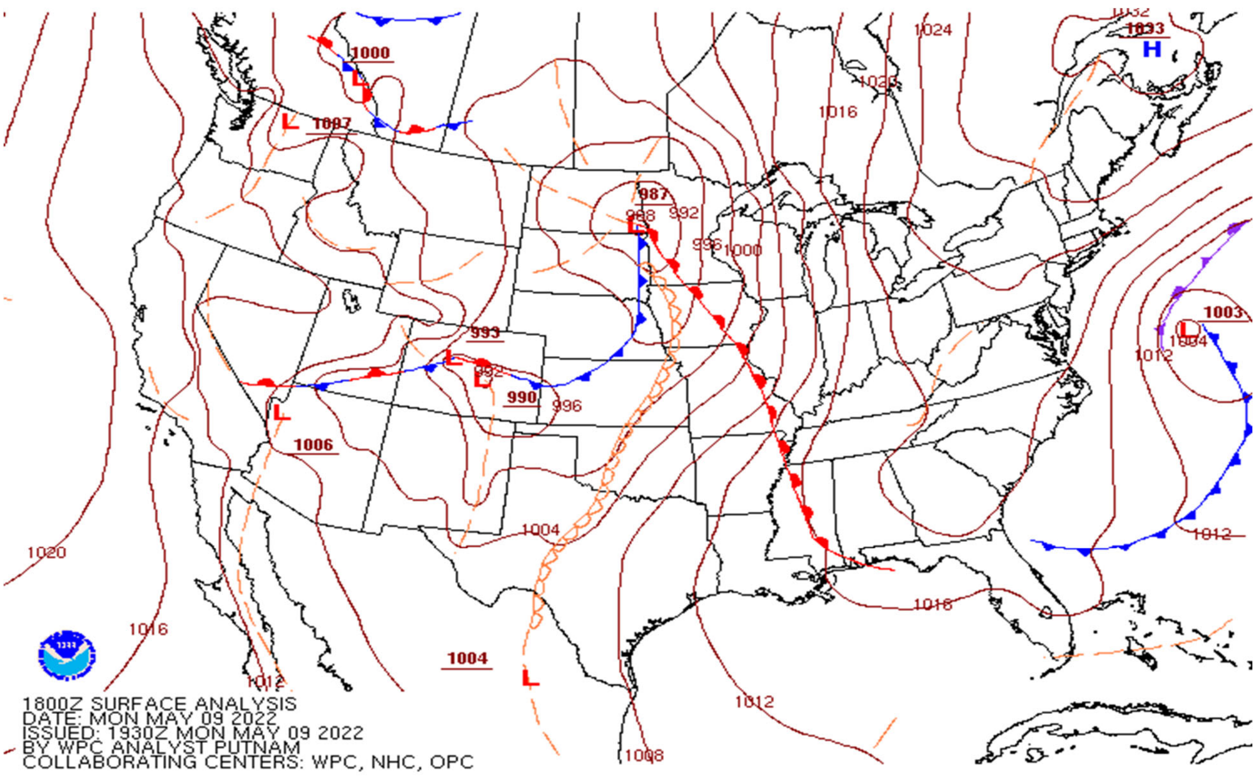


Figure 14-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

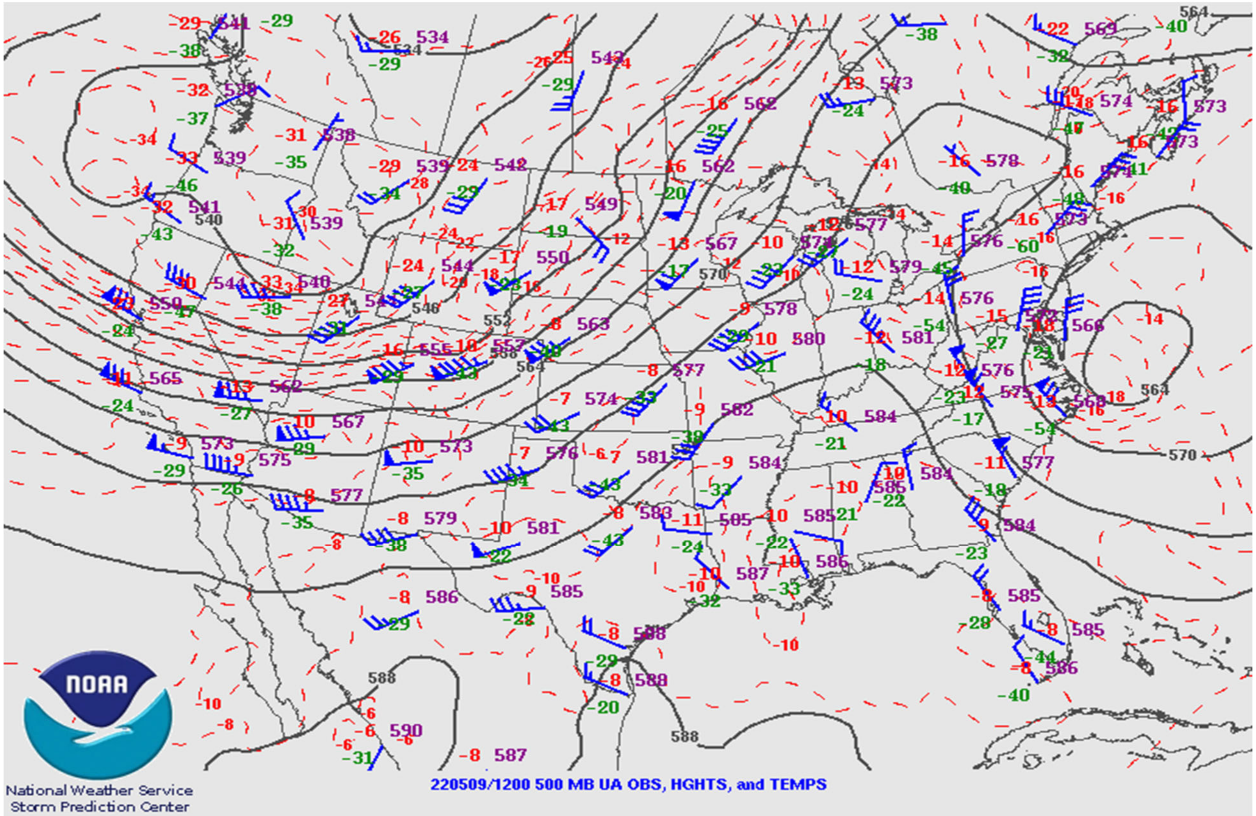


Figure 14-2. Upper air weather map for May 9, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Holman, West Mesa, Deming, and San Juan Substation monitoring sites beginning at the 0000 hour and lasting through the 0300 hour, increasing at the 0900 hour briefly, then again at the 1400 hour lasting through the 2000 hour. PM_{10} concentrations began to exceed the NAAQS at the Desert View and San Juan Substation monitoring sites beginning at the 0000 hour. Hourly concentrations remained elevated through the 0500 hour then increased again at the 1500 hour lasting through the 1800 hour. Table 14-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Anthony			Desert View			San Juan Substation		
	PM10 (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM10 (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM10 (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
0000	34	2.7	5.6	29	5.6	9.4	403	10.2	16.4
0100	17	3.5	6.1	29	5.5	8.8	732	15.4	20.6
0200	27	2.5	5.5	17	4	7.5	493	15	22.5
0300	29	2.1	4	31	4	7	193	9.1	17.7
0400	27	2.4	4.5	31	2.7	6.6	280	2.1	6.5
0500	39	2.2	4.9	66	2.4	5	215	5.1	7.4
0600	44	2.9	5.5	48	2.1	5.9	119	4.1	5.9
0700	36	3.5	6.6	46	5.1	8.8	83	5.1	8
0800	22	4.3	7.5	44	5.7	11	68	5.4	11.4
0900	27	4.7	9.2	34	5.9	10.5	73	5.2	13.5
1000	24	5.1	10.1	48	6.8	12	88	4.5	9.1
1100	19	4.8	10.1	75	7.2	12.8	68	5	12.1
1200	--	5.3	10.2	70	7.5	14.1	73	8.4	13.4
1300	73	5.3	11.4	46	5.9	12.8	110	8.7	15.2
1400	44	5.3	11.4	--	5.8	11.8	139	9.8	18
1500	63	5.3	11.1	63	6.1	11.5	249	13.1	19.7
1600	27	5	8.8	48	5.8	10.9	241	13.5	18.5
1700	27	5.2	8.9	41	6	11.2	166	12.4	18
1800	36	4.7	6.6	161	4.8	9.3	107	9.5	13.4

Table 14-2. Hourly PM10, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day which normally accompany regional Pacific storm systems. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from northern coast of California in the morning and moving south along the Pacific coast in the afternoon. This systems movement across the area timed well with jet streak winds aloft that sustained surface level winds from the previous days storm system. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the evening, especially in the desert areas of northern and central New Mexico.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, “the State shall not be required to provide a case-specific justification for a high wind dust event.”

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The San Juan Substation monitoring site recorded wind speeds above this threshold for a total of 5 hours beginning at the 0100 hour through the 0200 hour then increasing again at the 1500 hour through the 1700 hour (Figure 14-3).

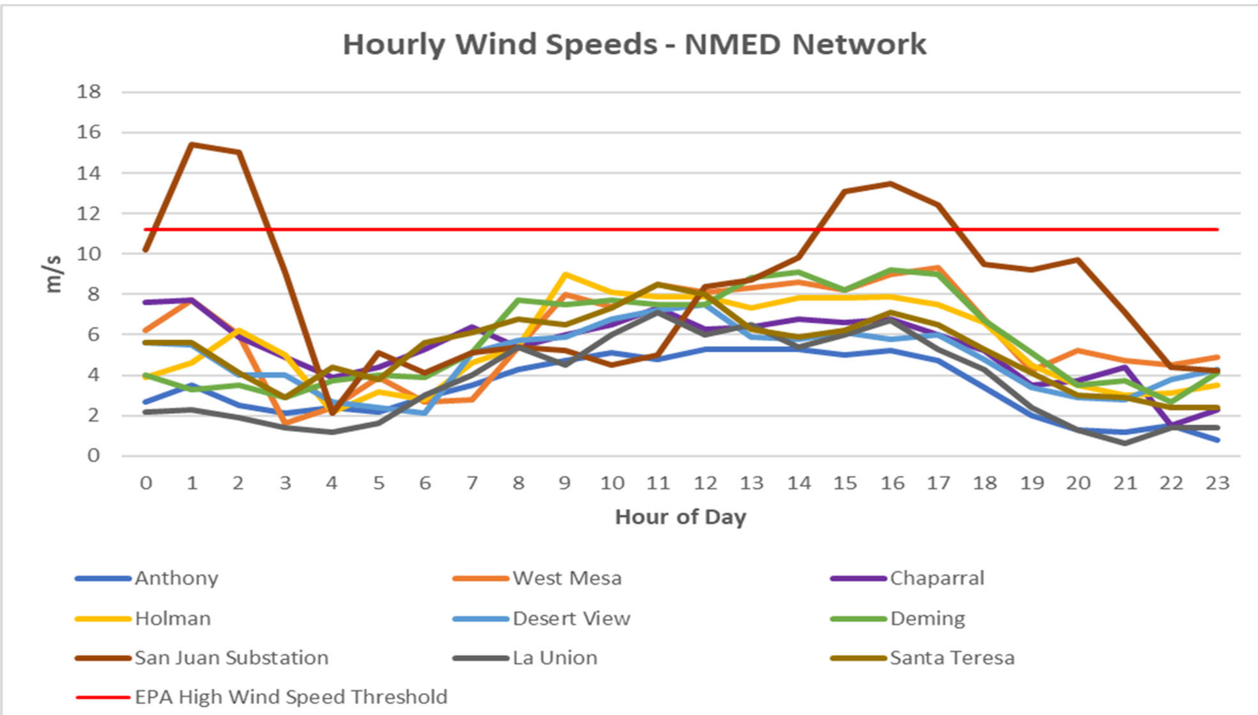


Figure 14-3. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana, and Luna Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in San Juan and McKinley Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the NOAA-20 satellite VIIRS RGB dust product with dust plumes observed as bands of pink or magenta originating upwind of NMED's monitoring site near the northwestern border of New Mexico with Arizona. This area is largely rural with the largest area sources of PM originating from the vast desert areas in northern New Mexico and Arizona (Figure 14-4). The dust plumes of interest appear to be limited to New Mexico, orientated in a northeast fashion and traveling toward NMED's monitoring site at the time of the satellite pass (1520 MDT) that captured the imagery.

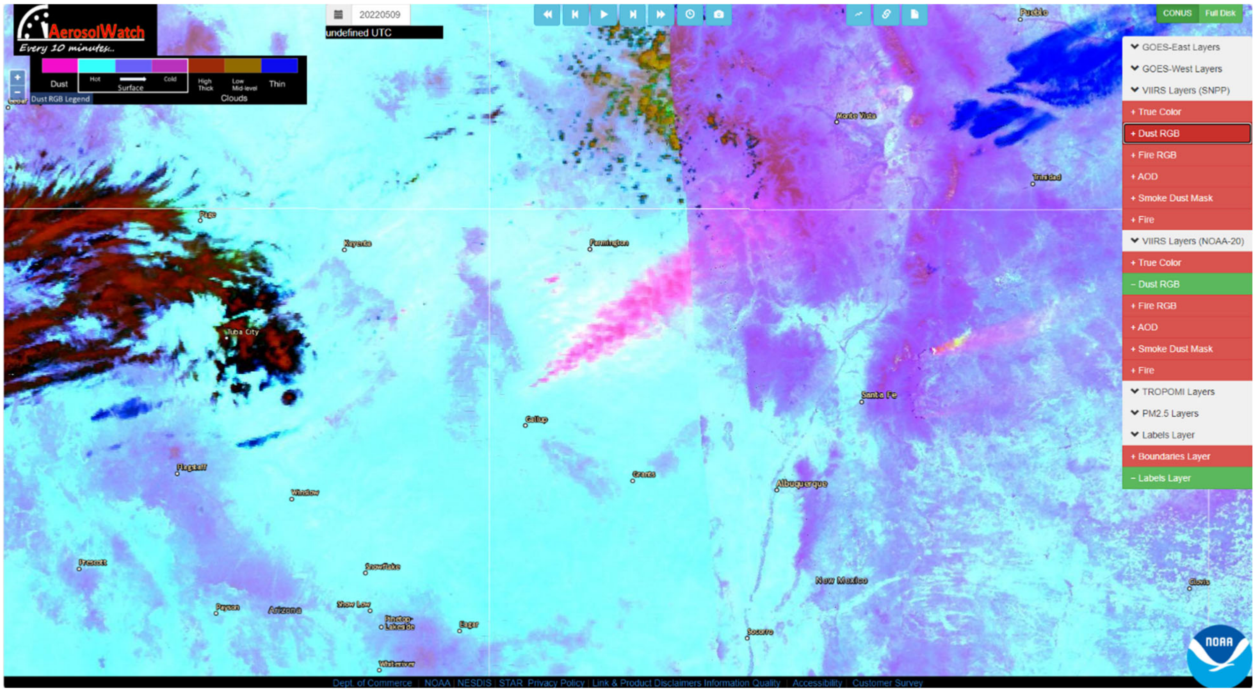


Figure 14-4. NOAA-20 satellite VIIRS RGB dust product showing northwestern New Mexico and the Four Corners region. Imagery obtained from AerosolWatch website. Note areas of pink bands are dust plumes oriented in a southwest to northeast direction.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a High Wind Warning for McKinley County (NMZ202). A High Wind Warning is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. This was in place for northwestern New Mexico to warn the public of the high wind event. An excerpt from the NWS High Wind Warning can be found below:

“High Wind Warning until 8 PM MDT this evening…”

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from areas extending from central to northeastern Arizona into the Four Corners area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 14-5). This analysis supports the hypothesis that dust plumes originated in northern Arizona and New Mexico before being transported to downwind monitoring sites.

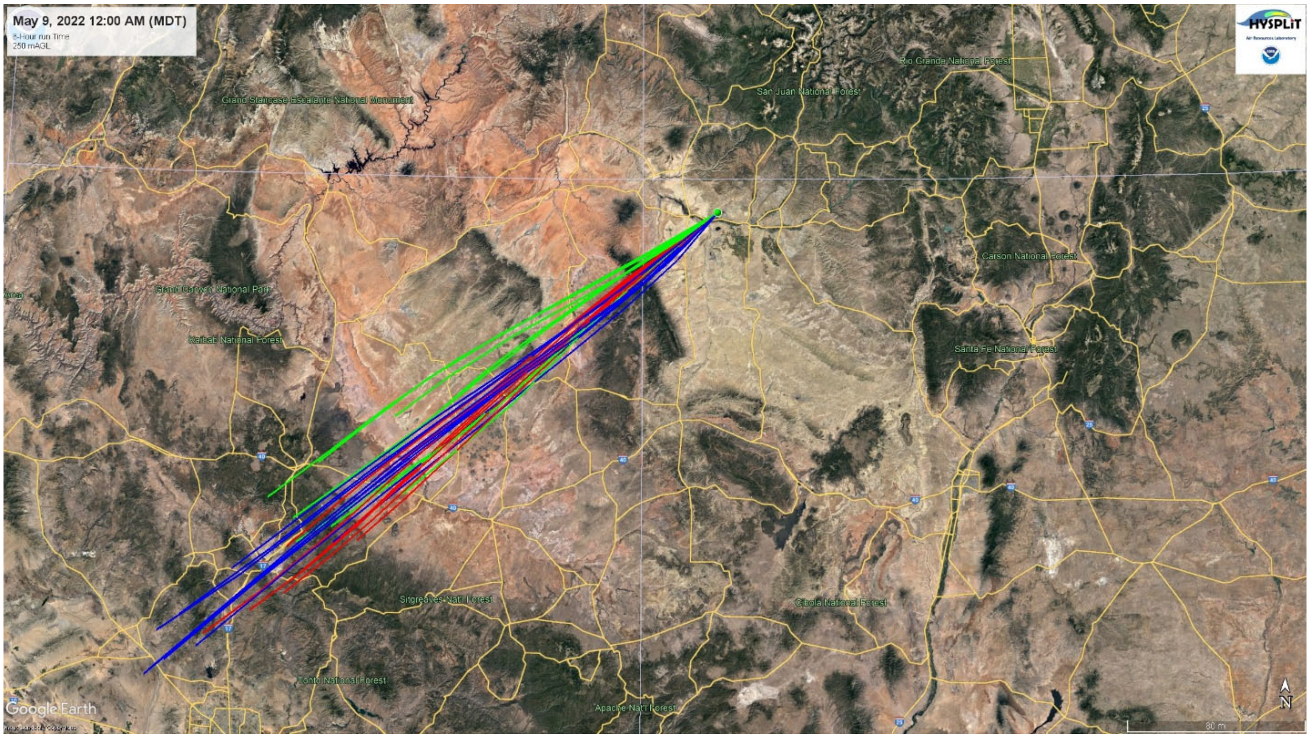


Figure 14-5. HYSPLiT back-trajectory analyses using the Ensemble mode for the San Juan Substation monitoring site.

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figure 14-6) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0000 -1700 hour). During the event, winds blew from the west through the south direction 100% of the time for the San Juan Substation monitoring site coinciding with peak PM_{10} concentrations.

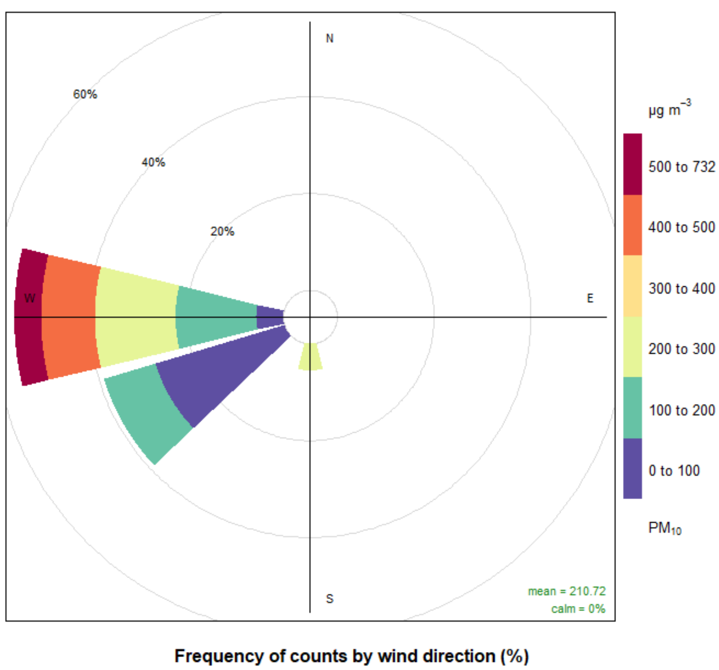


Figure 14-6. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west-southwest winds beginning at the 0000 hour and lasting through the 1700 hour. During this time, peak hourly PM_{10} concentrations ranged from 39 to 732 μg/m^3 were recorded at the West Mesa and San Juan Substation monitoring sites, respectively (Figure 14-7). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data did not spike at approximately the same time throughout the network supporting the notion that PM_{10} concentrations are dependent on the location of where the brunt of the storm system impacts the source of erodible soil upwind of the monitoring site in exceedance of the NAAQS. Sustained hourly average wind speeds of 5.3 to 15.4 m/s were recorded at the Anthony and San Juan Substation monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 14-8 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

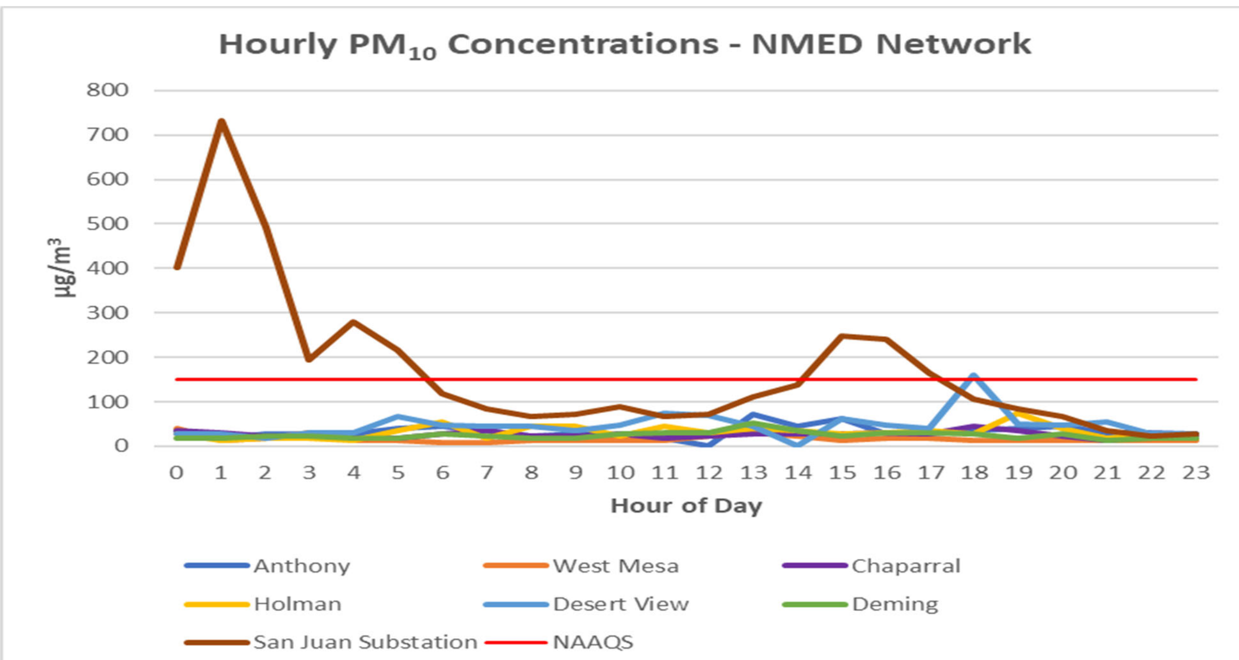


Figure 14-7. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

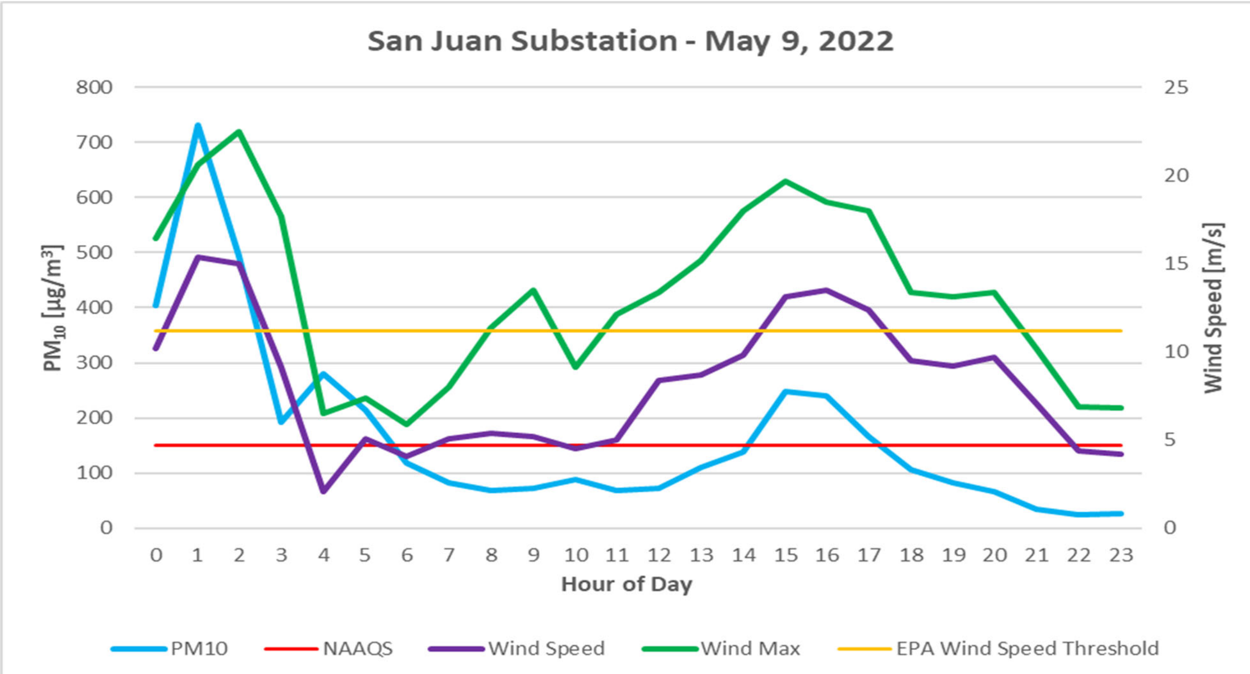


Figure 14-8. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2018-2021, the San Juan Substation monitoring site had only 1 exceedance of the PM_{10} NAAQS (Figure 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 171 µg/m^3 recorded in 2020. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 14-9, the San Juan Substation monitoring site recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 78 µg/m^3, except for the previous May 8, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

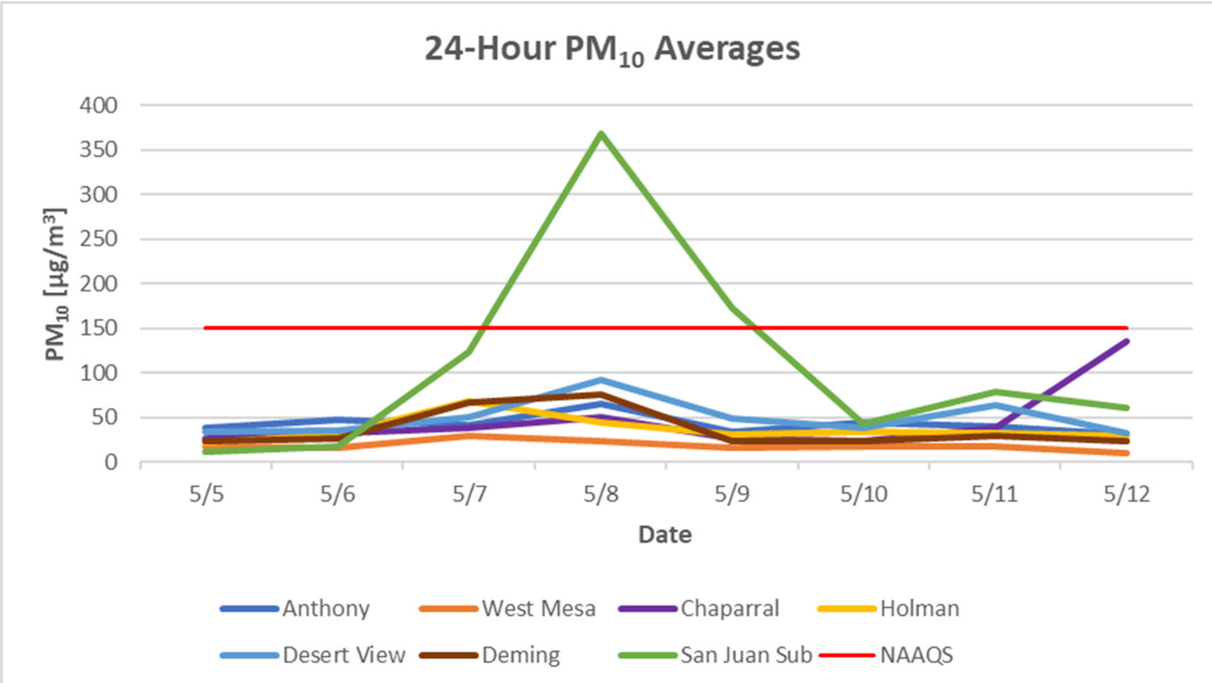


Figure 14-9. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at the San Juan Substation monitoring site, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2018-2021. The recorded value for this day (172 µg/m^3) is above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the Anthony, Desert View, Holman, West Mesa, and Deming monitoring sites. The monitored PM_{10} 24-hour average of (172 µg/m^3) is above the 99th percentile of data monitored over the previous four years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

15. HIGH WIND EXCEPTIONAL EVENT: May 20, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana County resulting in an exceedance of the PM_{10} NAAQS at the Chaparral monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 15-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0020	6ZK Chaparral	173 µg/m^3	11.3 m/s	17.8 m/s

Table 15-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

This Pacific storm system surface low will develop at its strongest over south-central Colorado and north-central New Mexico this morning along with a closed low south of the international border. Early in the morning as the main storm system moved into the state, a pressure gradient formed over the Borderland as moisture and winds increased from the tightening of gradients and a deepening of the lee surface trough shifting south into central and eastern New Mexico. At the 1800 hour, an area of low-pressure moved over the Borderland as the cold front progressed from the northwest direction (Figure 15-1). Aloft, the axis of the trough hovered over New Mexico and progressed east later into the day. (Figure 15-2). As the cold front approached, the Borderland tapped into upper jet streak mixing, increasing the surface wind velocities and providing the turbulence required for vertical mixing and entrainment of dust.

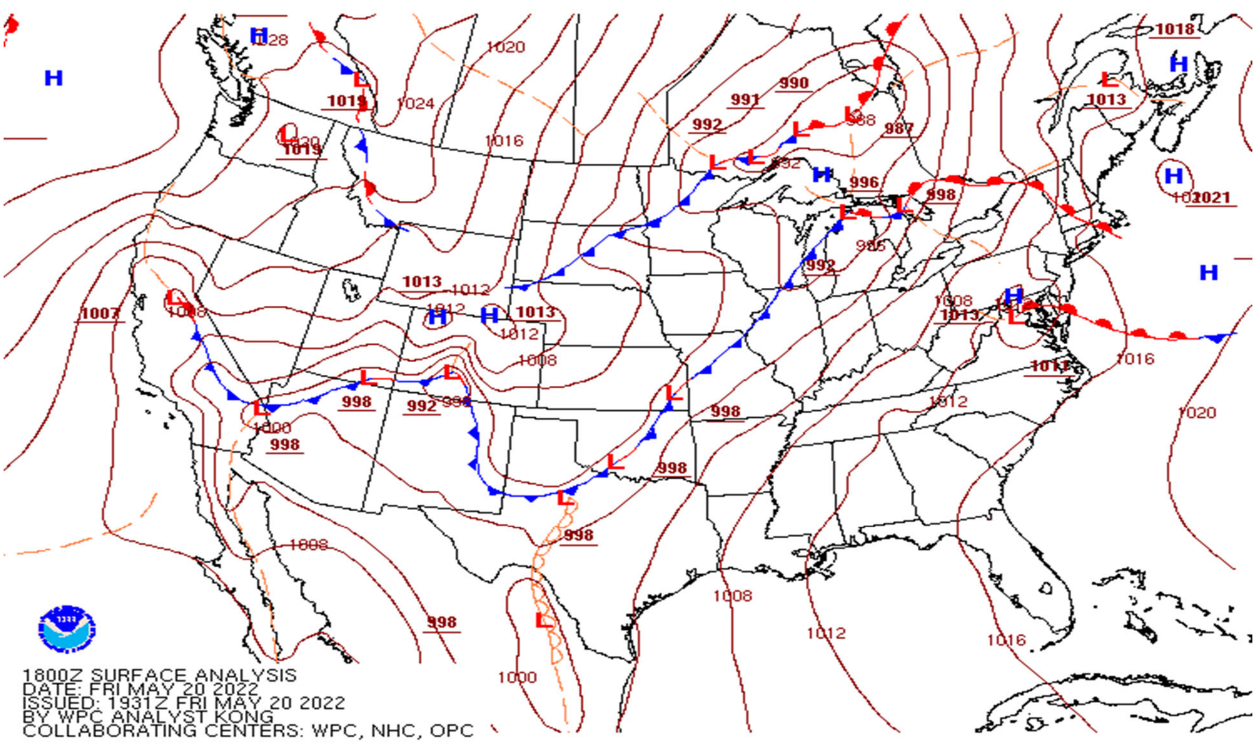


Figure 15-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

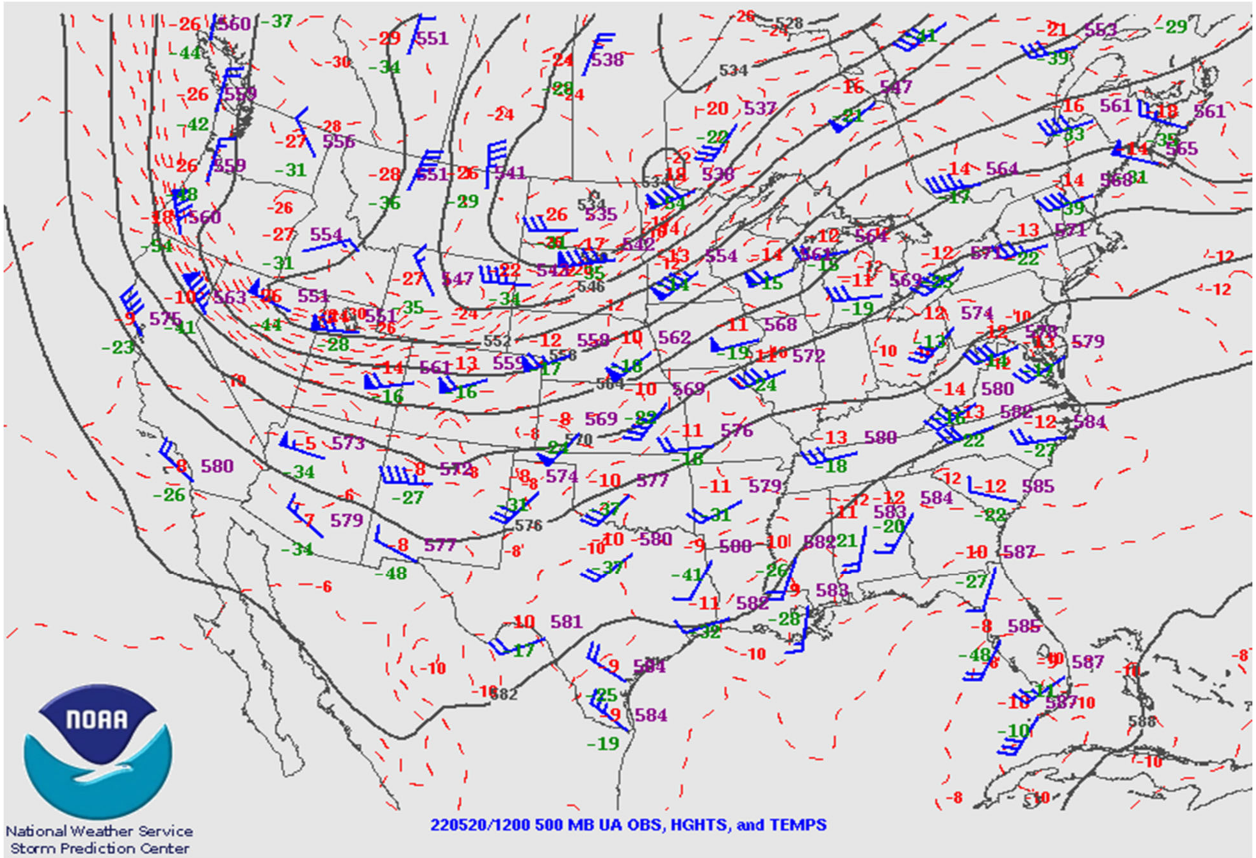


Figure 15-2. Upper air weather map for May 20, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the surface winds blew from the southwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Chaparral, Holman, West Mesa, and Deming monitoring sites beginning at the 0800 hour and lasting through the 1600 hour. PM_{10} concentrations began to exceed the NAAQS at the Chaparral monitoring site beginning at the 0900 hour. Hourly concentrations remained elevated through the 1000 hour. Table 15-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Chaparral			Holman			West Mesa		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
0800	44	6.8	10.8	36	5.1	9.3	61	9.1	14.4
0900	547	9.5	15.6	31	6.2	9.9	46	8.5	13
1000	2539	11.3	17.8	85	8.7	14.8	44	9.6	14.7
1100	144	9.3	16.4	85	9	15.8	34	9.4	14.8
1200	100	9	14.9	56	8.5	13.7	31	9.1	14.6

Table 15-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day which normally accompany regional Pacific storm systems. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from south-central Colorado and north-central New Mexico in the morning and moving southeast towards central and eastern New Mexico in the afternoon. This system's movement across the area timed well with tapping into the jet streak winds aloft to increase surface wind velocities, especially on eastern sloped mountain faces. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area and haze in the evening, especially in the desert areas of southern New Mexico due to windy and dry conditions (Figure 15-3).

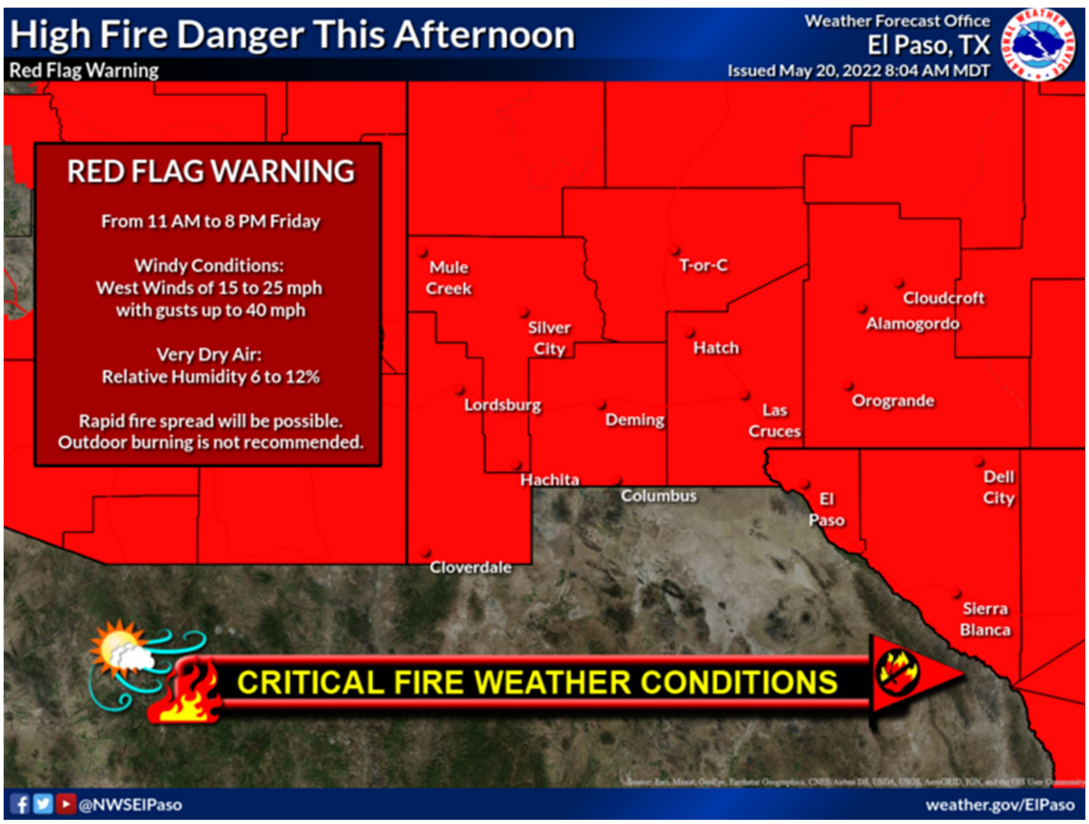


Figure 15-3. NWS GraphiCast for southern Doña Ana County showing red flag warning due to high winds and dry conditions.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, “the State shall not be required to provide a case-specific justification for a high wind dust event.”

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED’s monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Chaparral monitoring site recorded wind speeds above this threshold for a total of 1 hour for the 1000 hour (Figure 15-4).

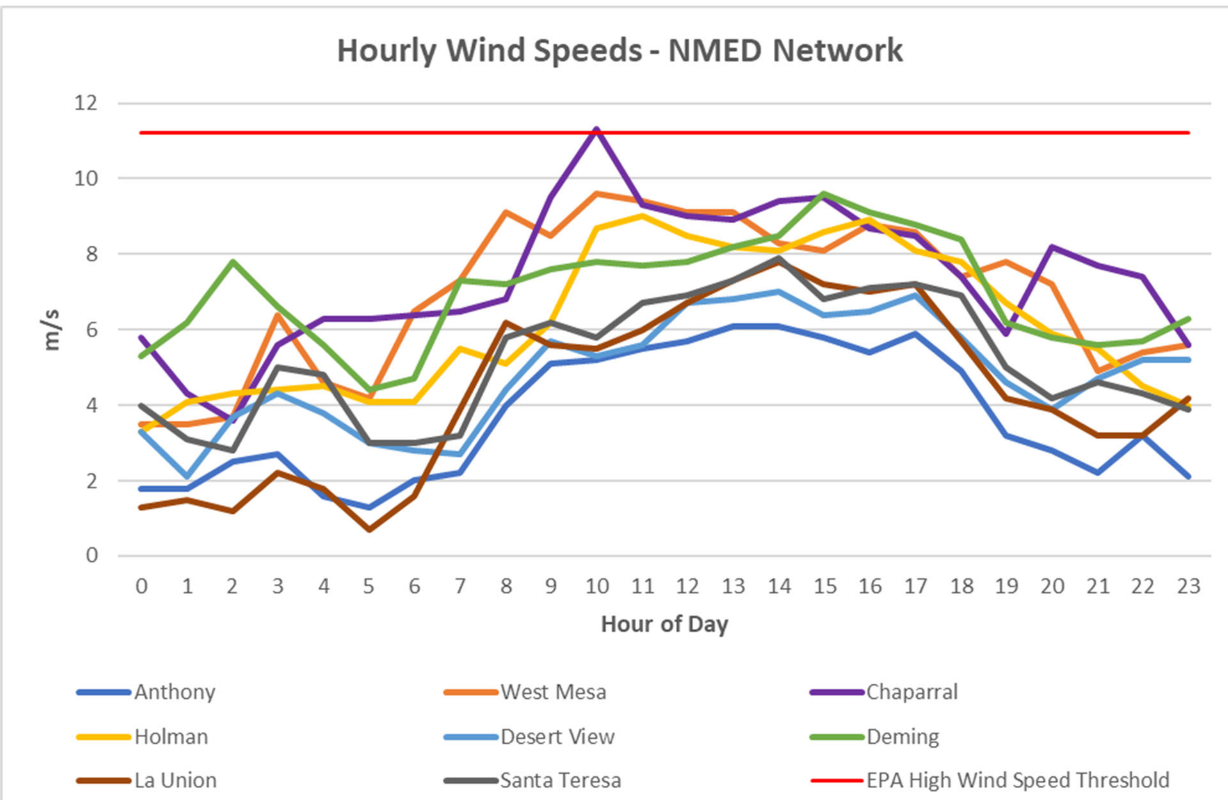


Figure 15-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Grant, and Hidalgo Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented, and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the The VIIRS Deep Blue Aerosol Ångström Exponent product from the joint NASA/NOAA Suomi National Polar orbiting Partnership (Suomi NPP) satellite, in this case, is employed for over-land use to determine aerosol particle size and atmospheric aerosol loading. Pixels pass high-quality assurance tests and the Ångström exponent is defined between 412-470 nm for 'bright' surfaces, and 470-670 nm for 'dark' surfaces. Sensor/algorithm resolution is 6 km at nadir, imagery resolution is 2 km at nadir, and daily temporal resolution. Green colors suggest optical dominance of areas with dust or coarse particles and values less than 1. Areas with shades of blue suggest optical dominance of smoke or fine particulates associated with combustion and values greater than 1. Notice the areas around the Deming monitoring site contains a heavy presence of dust in comparison to smoke at the 1328 hour

(MDT) as depicted by the large spatial coverage of green colored pixels in comparison to the minimal blue shading present for this day (Figure 15-5).

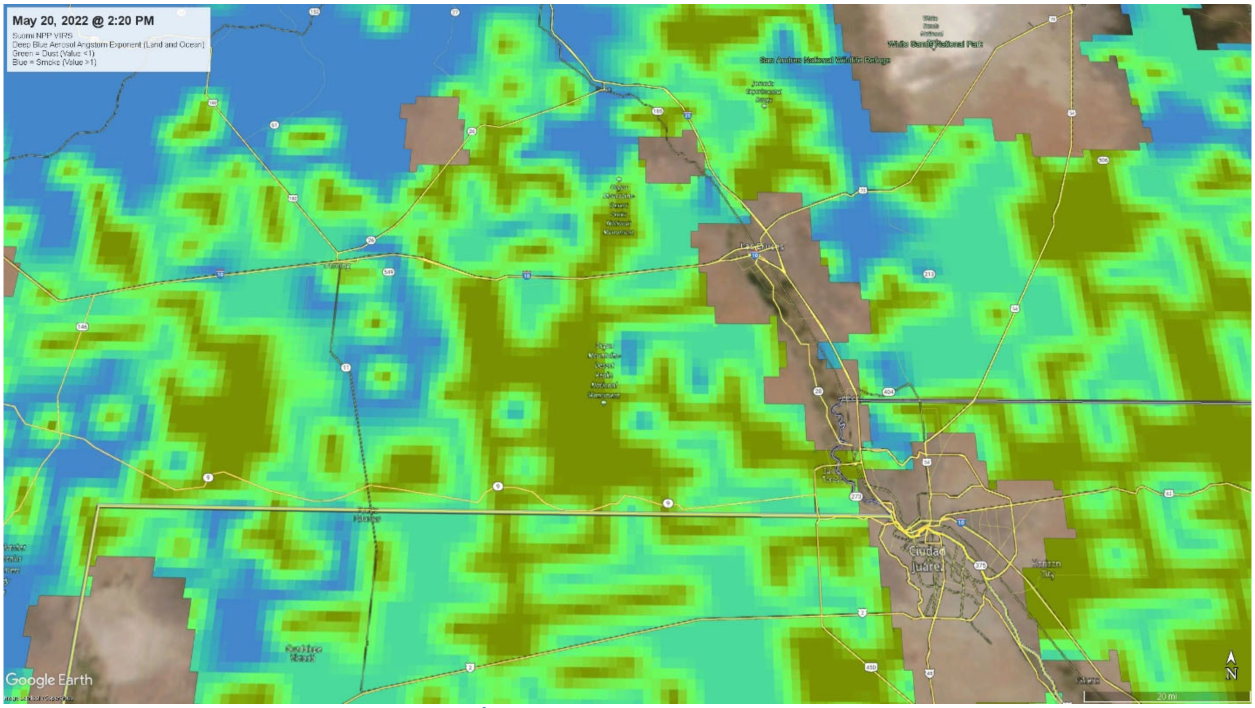


Figure 15-5. VIIRS Suomi NPP Deep Blue Aerosol Ångström Exponent product showing southeastern Arizona, northern Mexico, southwestern New Mexico, and west Texas for May 20, 2022, at the 1420 hour (MDT). Courtesy of NASA Worldview and the Deep Blue Science Team.

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The El Paso National Weather Service (NWS) did not issue a Wind Advisory for this date. A Wind Advisory is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer.

The National Oceanic and Atmospheric Administration (NOAA) Satellite Services Division provided a "Descriptive Text Narrative for Smoke/Dust Observed in Satellite Imagery Through 0130Z May 21, 2022" for Friday, May 20, 2022 which describes the dust observed from the GOES-East geostationary visible satellite imagery for the southwestern United States:

"Southwestern United States…. Areas of blowing dust were seen over the Southwestern United States and northwestern Mexico that were extending northeast to portions of northern New Mexico."

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled through Chihuahua, MX into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites from the rural areas of southwestern New Mexico, northern Mexico and eastern Arizona. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 15-6). This analysis supports the hypothesis that dust plumes originated in the eastern Arizona, northern Mexico, and southwestern New Mexico before being transported to downwind monitoring sites.

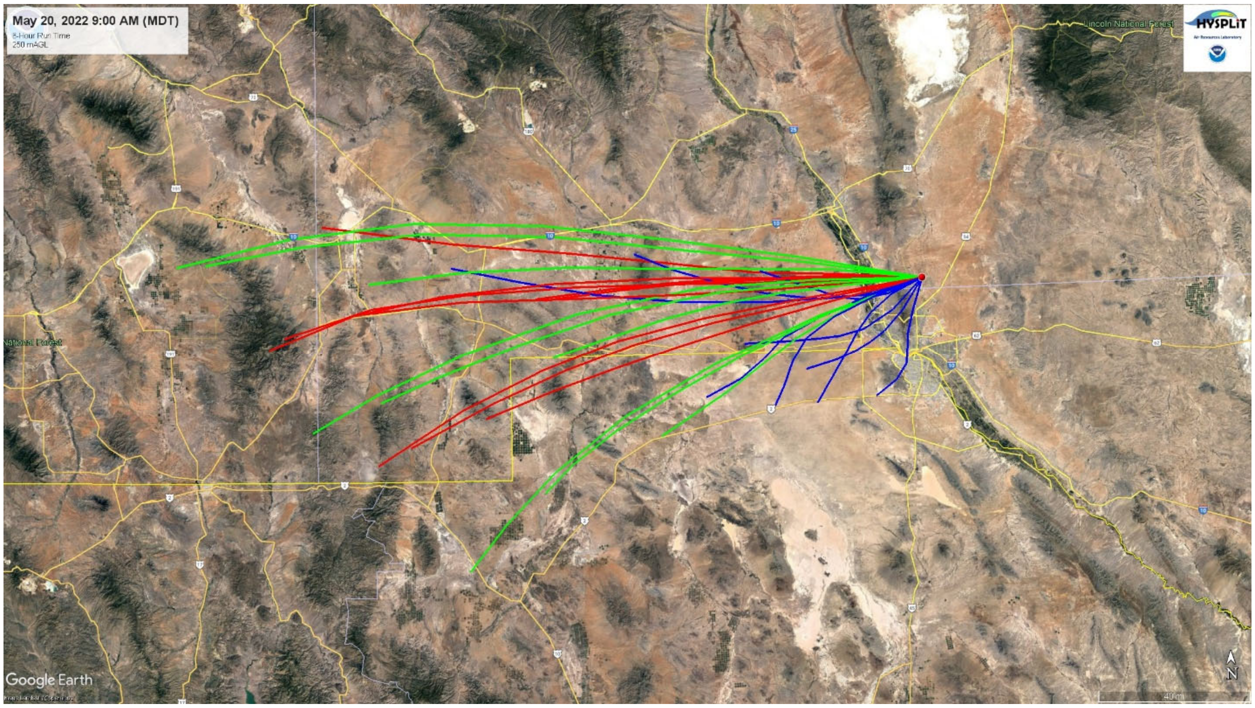


Figure 15-6. HYSPLiT back-trajectory analyses using the Ensemble mode for the Chaparral Monitoring site

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figure 15-7) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m^3 (0900 -1000 hour). During the event, winds blew from the southwest direction 100% of the time for the Chaparral monitoring site coinciding with peak PM_{10} concentrations.

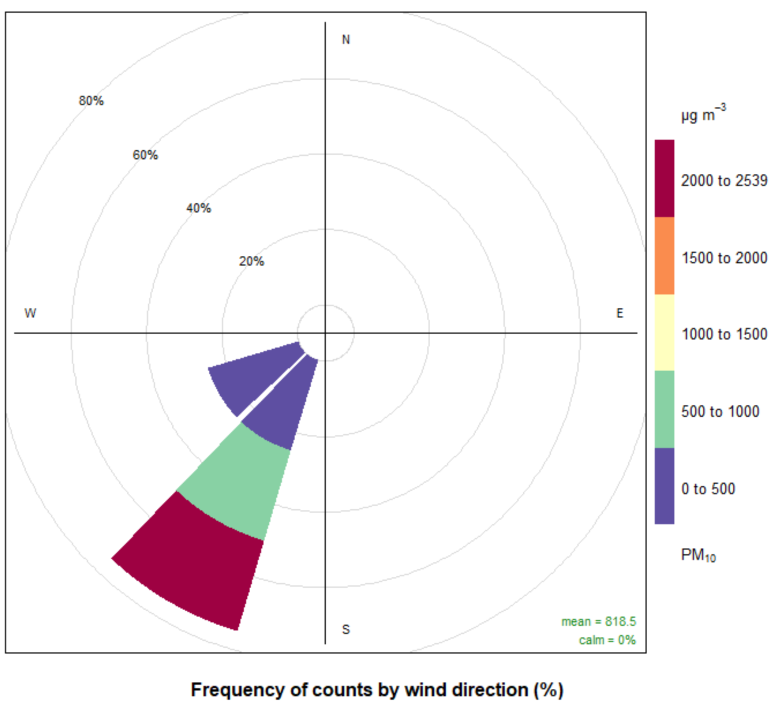


Figure 15-7. Pollution rose for the Chaparral monitoring site

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong southeasterly winds beginning at the 0800 hour and lasting through the 1600 hour. PM_{10} concentrations ranged from 61 to 2539 µg/m^3 at the West Mesa and Chaparral monitoring sites, respectively (Figure 15-8). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 6.1 to 11.3 m/s were recorded at the Anthony and the Chaparral monitoring sites, respectively, during the times that contributed to the peak PM_{10} concentrations of the event. The time series plot in Figure 15-9 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

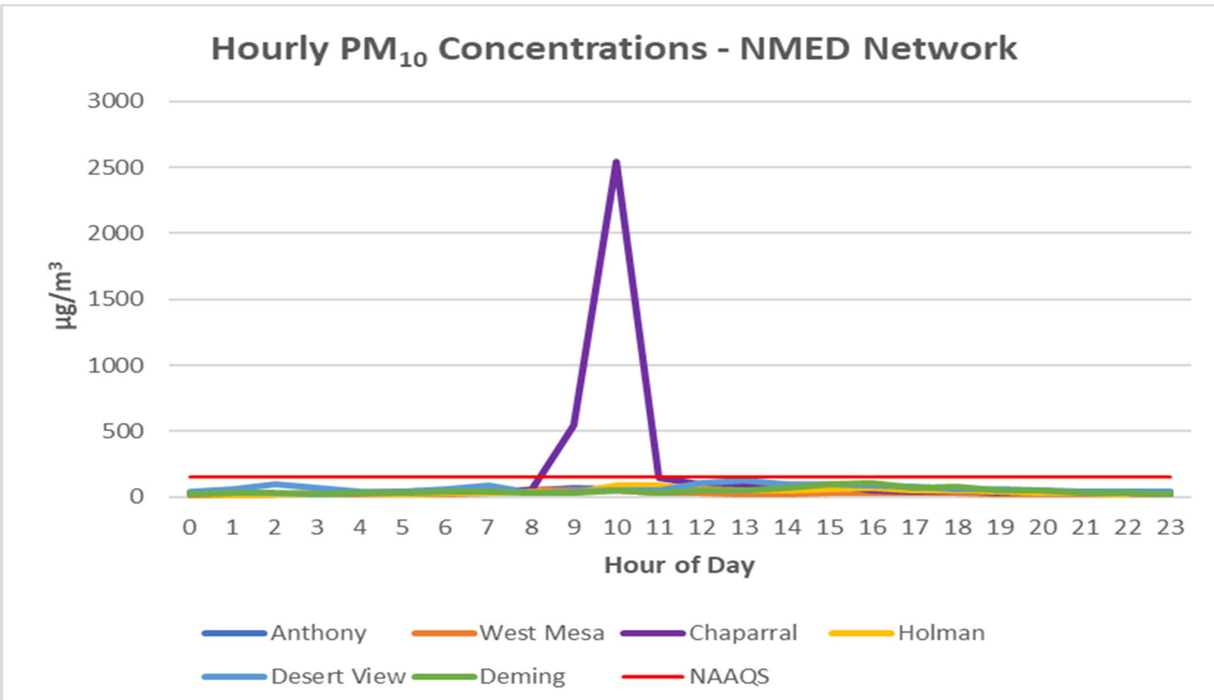


Figure 15-8. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

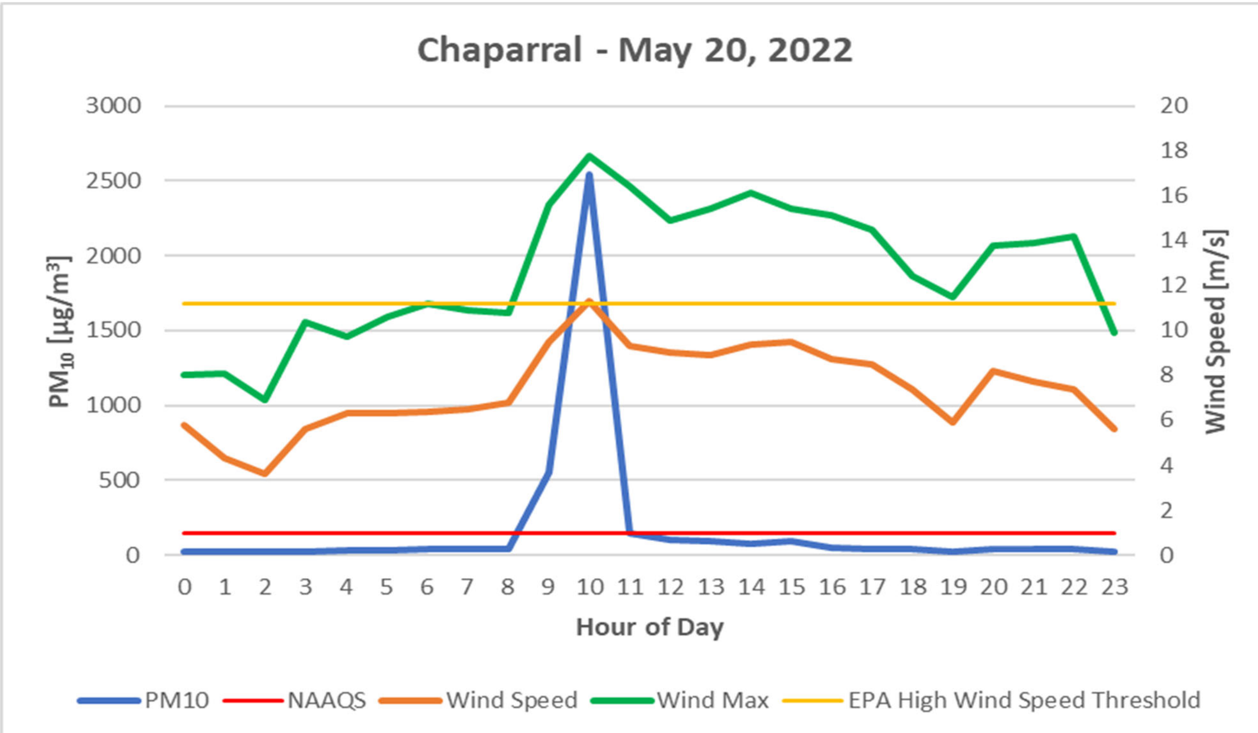


Figure 15-9. Chaparral monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Chaparral monitoring site recorded 27 exceedances of the PM_{10} NAAQS (Figure 22-3 in Appendix B). The maximum 24-hour average PM_{10} concentrations at this site was 721 µg/m^3, recorded in 2017. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 15-10, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 115 µg/m^3, except for the following May 22, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

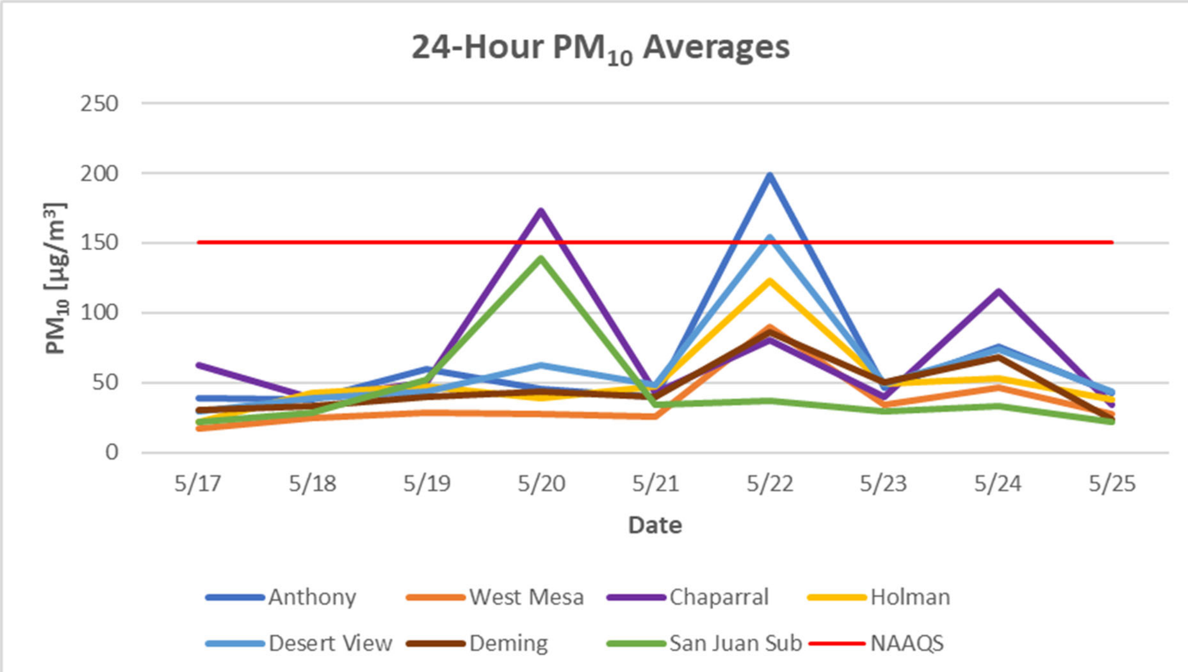


Figure 15-10. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (173 µg/m^3) is sitting right above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the Chaparral monitoring site. The monitored PM_{10} 24-hour average (173 µg/m^3) is above the 99th percentiles of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

16. HIGH WIND EXCEPTIONAL EVENT: May 22, 2022

Conceptual Model

A backdoor cold front caused high winds and blowing dust in Doña Ana County resulting in an exceedance of the PM_{10} NAAQS at the Anthony monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 16-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0019	6CM Anthony	199 µg/m^3	8.5 m/s	15.5 m/s

Table 16-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A weak early morning upper-level Pacific storm system will develop off the Coast of Baja California followed immediately with a backdoor cold front from the eastern United States as the upper-level disturbance progressed east. As the upper-level system progressed east moisture was being pulled from the west. At the 1800 hour, an area of low-pressure moved over south-central Colorado (Figure 16-1). Aloft, the trailing trough hovered over the coast of southern California. As the morning progressed this low-pressure aloft traveled west and aligned itself with New Mexico and the surface wind direction (Figure 16-2). Weak trough dynamics from the west was immediately followed by a backdoor cold front from the east, increasing the surface wind velocities and providing the turbulence required for vertical mixing and entrainment of early morning dust along west facing slopes.

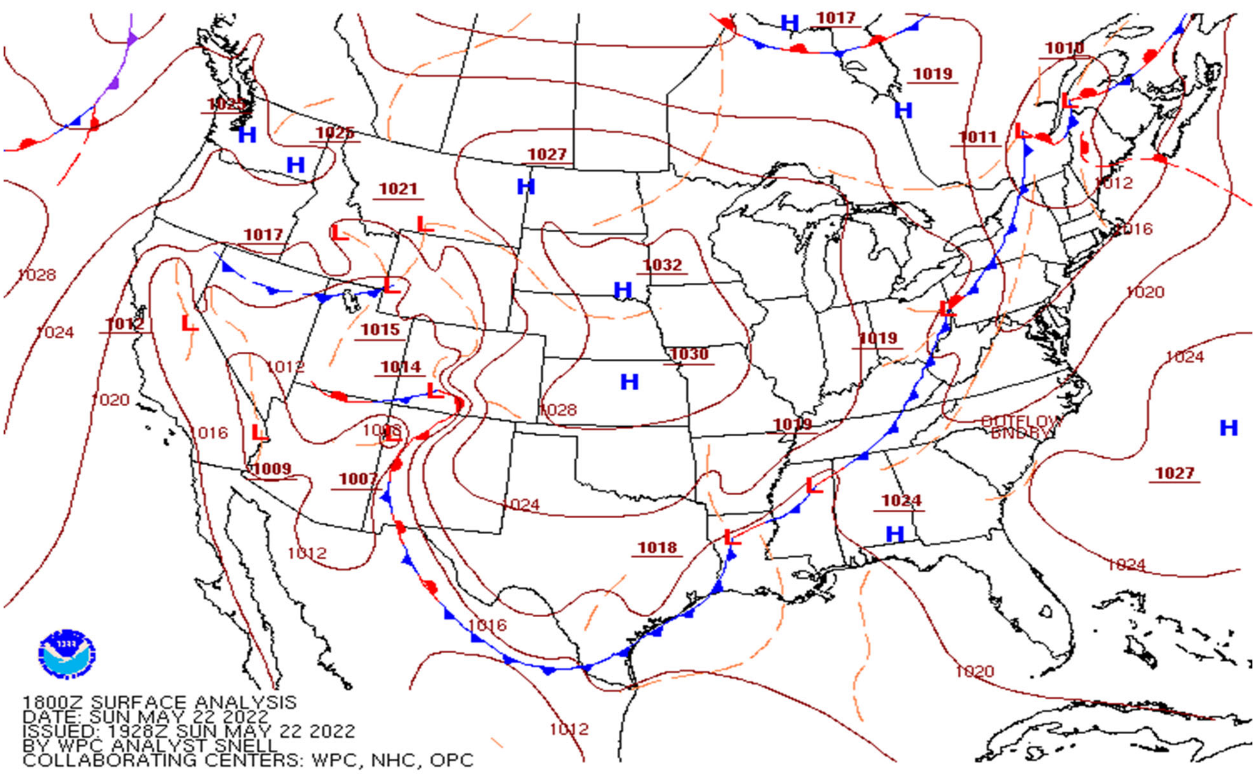


Figure 16-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

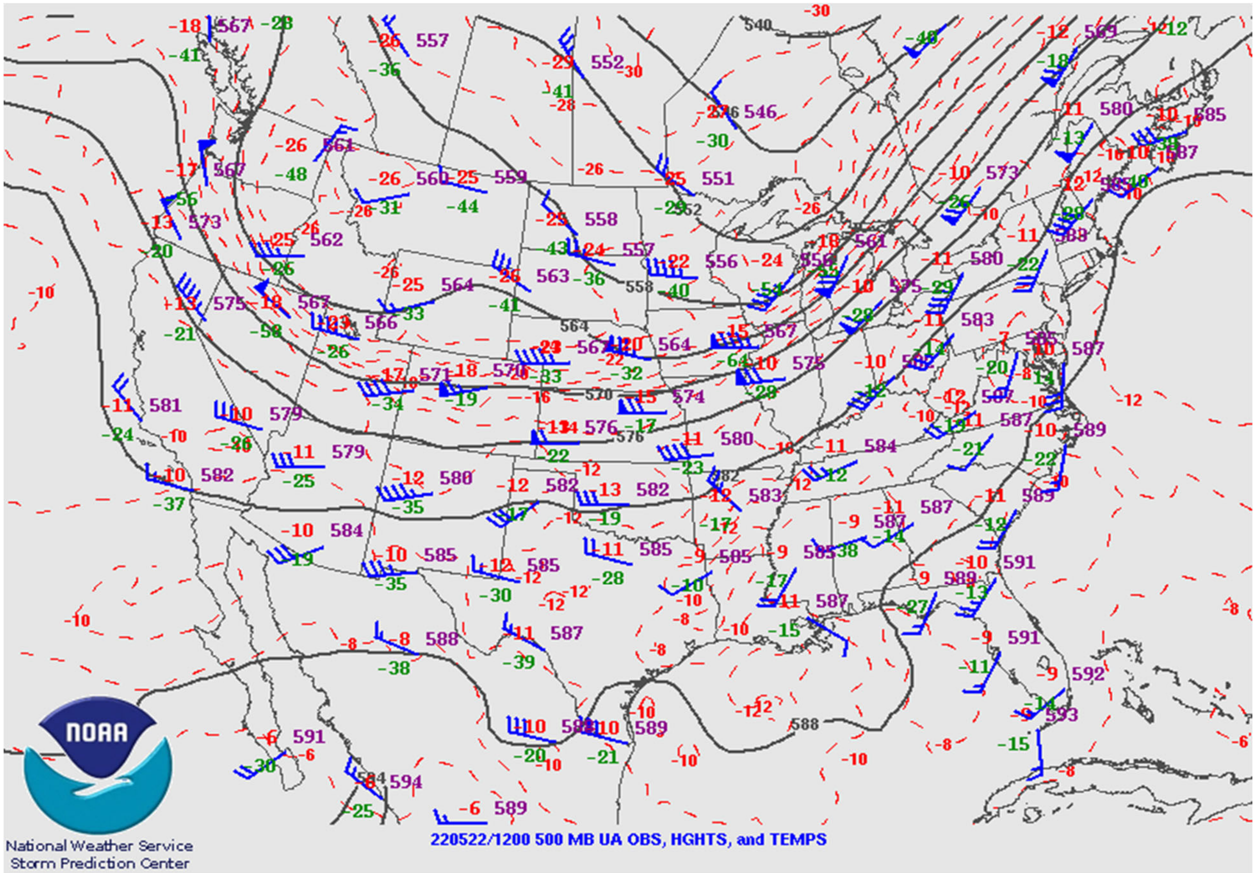


Figure 16-2. Upper air weather map for May 22, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the northwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Chaparral monitoring site beginning at the 0340 hour and lasted through the 0650 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Holman, West Mesa and Deming monitoring sites beginning at the 0000 hour. Hourly concentrations remained elevated through the 1000 hour. Table 16-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event. In addition, peak five-minute wind speed data for the Holman monitoring site provides a re-calculated one-hour wind speed from the 0430 hour through the 0525 hour, exceeding the EPA high-wind speed threshold (Table 16-3).

Hour	Desert View			Holman			Anthony		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
0000	202	6	10.5	66	3	7	112	1.9	5.1
0100	195	5.4	9.1	70	3.2	9.3	124	1.1	5.9
0200	193	6	11.6	146	7.2	12	132	2.2	7.1
0300	361	8.2	12.2	234	8.4	14.1	320	6.5	13
0400	254	8.3	14.1	527	10.9	16.3	439	7	13.6
0500	383	8.4	13.6	442	10.7	16.3	586	7.6	13.1
0600	293	9	14.6	307	9.2	13.5	517	7	12.6
0700	193	7.8	14	102	8.2	12.3	969	8.5	14.7
0800	153	7.6	12.6	141	7.6	13.4	583	8.4	15.5
0900	283	8.6	14.5	112	8.5	12.3	124	6.7	11
1000	205	8.7	13.8	83	6.7	11.1	100	6.4	11.4

Table 16-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Hour	Holman	
	Wind Speed (m/s)	Wind Gust (m/s)
0430	11	14.1
0435	10.5	14
0440	12.1	15
0445	11.7	15.2
0450	11.7	16.3
0455	11.8	14
0500	12.2	15.1
0505	11.2	13.9
0510	11.7	16.3
0515	12.3	15.6
0520	11.7	13.7
0525	10.5	13
Average	**11.5**	**14.7**

Table 16-3. One-hour average wind speed calculated from the peak five-minute wind speed data for the Holman monitoring site.

Meteorologists forecasted the high wind blowing dust event to occur this morning from a complex weather pattern beginning with a weak upper disturbance from southern California, aloft as the weak trough moved into New Mexico that was immediately followed by a strong backdoor cold front from the east. Forecasts predicted stronger winds as the storm approached the area with the area of low-pressure tracking from east to west early in the morning moving across New Mexico. The system's movement across the area timed well with early morning heating and mixing generating a weak trough from the west as stronger surface winds moved into the area from the backdoor cold front coming from the east. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area in the early morning, especially on the west facing slopes of the mountain ranges of southern New Mexico.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Holman monitoring site recorded five-minute wind speeds above this threshold for a total of one-hour from the 0430 through the 0525 hours (Table 16-3) and slightly below the windspeed threshold for the 0400 hour (Figure 16-3). The Las Cruces Airport documented peak sustained 20-minute 23 mph wind speeds at the 0915 hour with 30 mph gusts coming from the southeast direction (Figure 16-4).

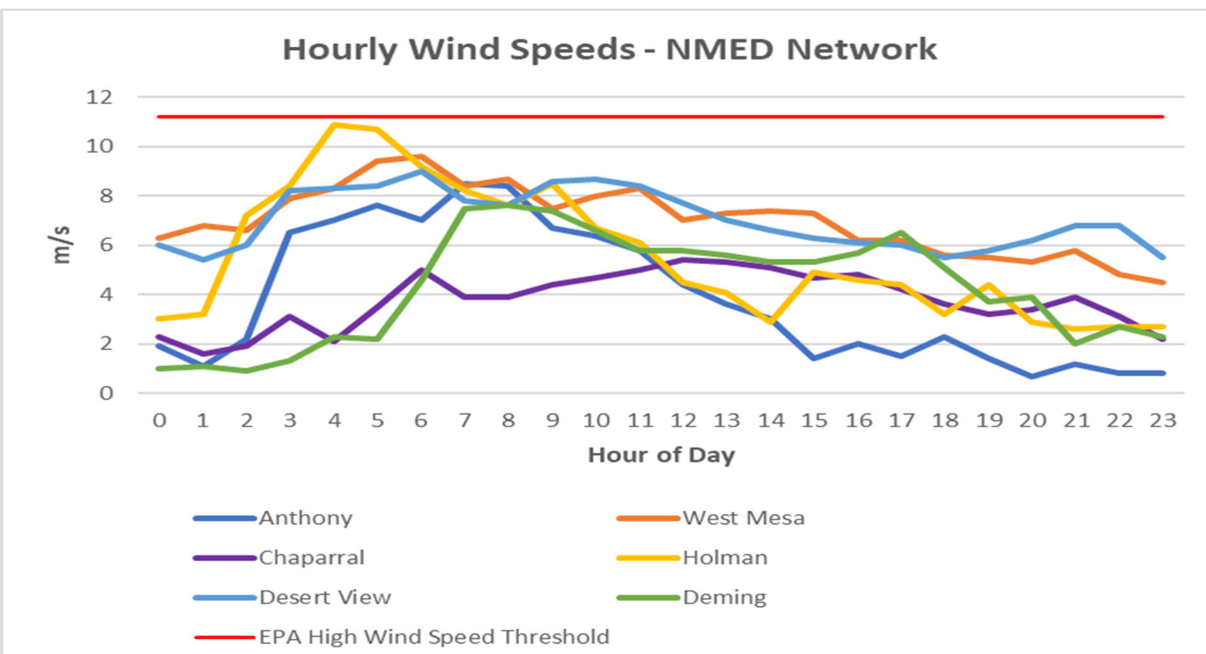


Figure 16-3. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

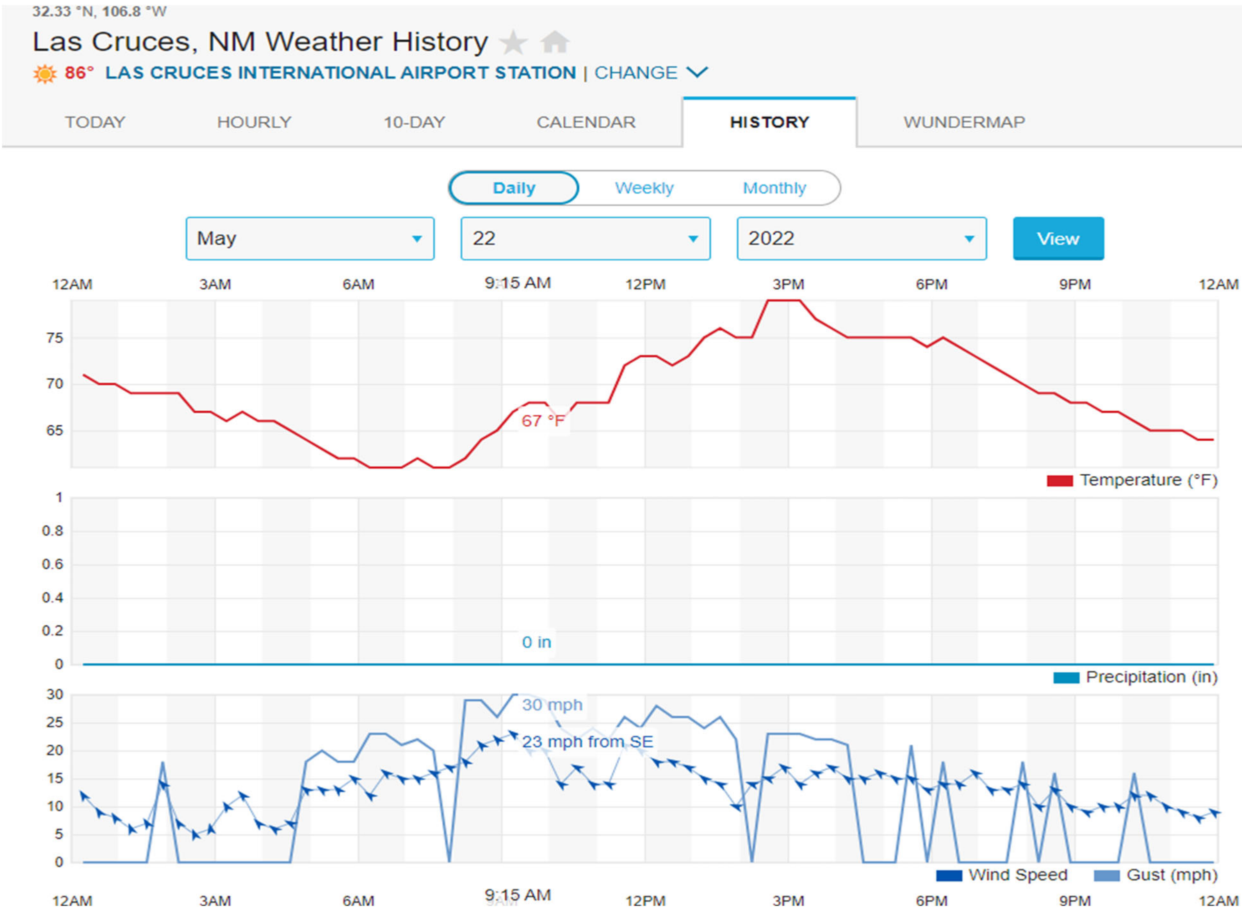


Figure 16-4. 20-minute wind speed data for the Las Cruces International Airport May 22, 2022. Courtesy of weatherunderground.com

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures
Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

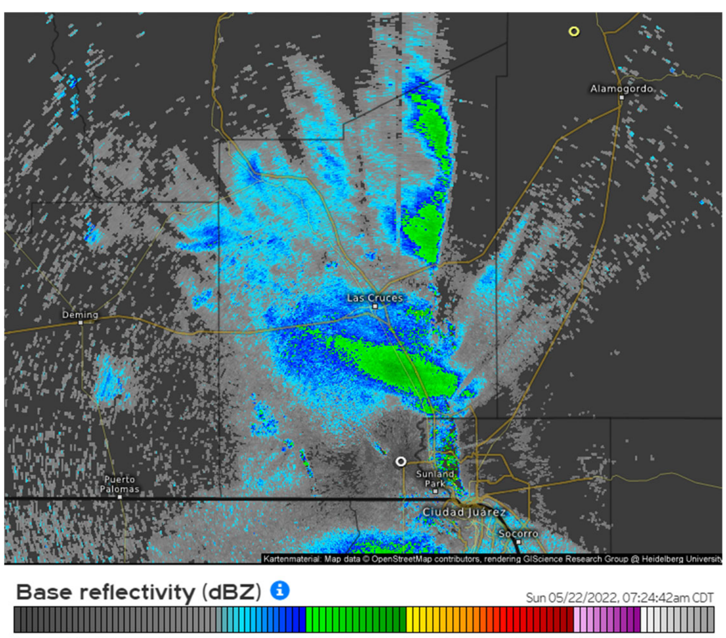
Suspected Source Areas and Categories Contributing to the Event
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Otero, Luna, Hidalgo, and Grant Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona, Texas, and Chihuahua, MX likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented, and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery
The event was captured on the High-Definition Radar product imagery with the cold front originating upwind of NMED's monitoring sites in Otero and west El Paso County and ejecting through the Anthony pass (where the Organ Mountain Range connects to the Franklin Mountain Range) which are represented as blue and green colors based on the density of the cold front observed with green being the densest. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in New Mexico, Texas, and Mexico (Figure 16-5).



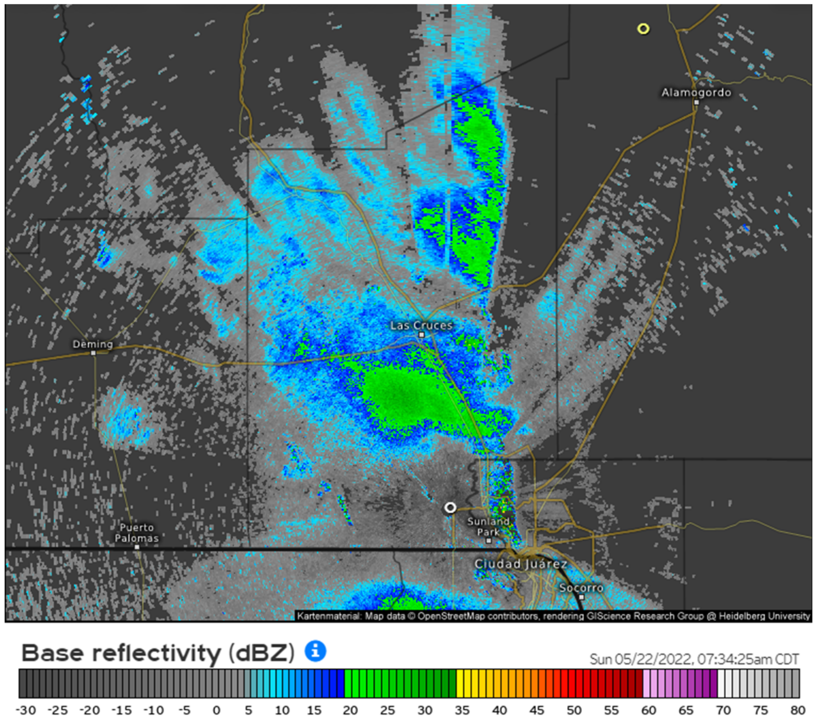


Figure 16-5. High-Definition Radar product imagery May 22, 2022, from the 0624 and the 0634 hours (MST) showing the rapid progression of the backdoor cold front through the Anthony pass. Images provided by Weather.us

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The National Weather Service (NWS) issued a Wind Advisory for this event. A Wind Advisory is issued by NWS when sustained winds of 40 mph are expected for 1 hour or longer or gusts at 58 mph or greater. This was issued for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Wind Advisory can be found below:

"Models are trending stronger with winds expected behind the cold front tonight…will begin to affect the region between 6z and 9z, which will abruptly shift winds from the east and southeast of 10 to 15 knots with gusts of 20 to 25 knots…Wind advisory from midnight tonight to 8AM MDT Sunday"

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from southwest Texas and Chihuahua, MX into the southern New Mexico and El Paso, TX area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 16-5). This analysis supports the hypothesis that dust plumes originated in Texas and Mexico before being transported to downwind monitoring sites.

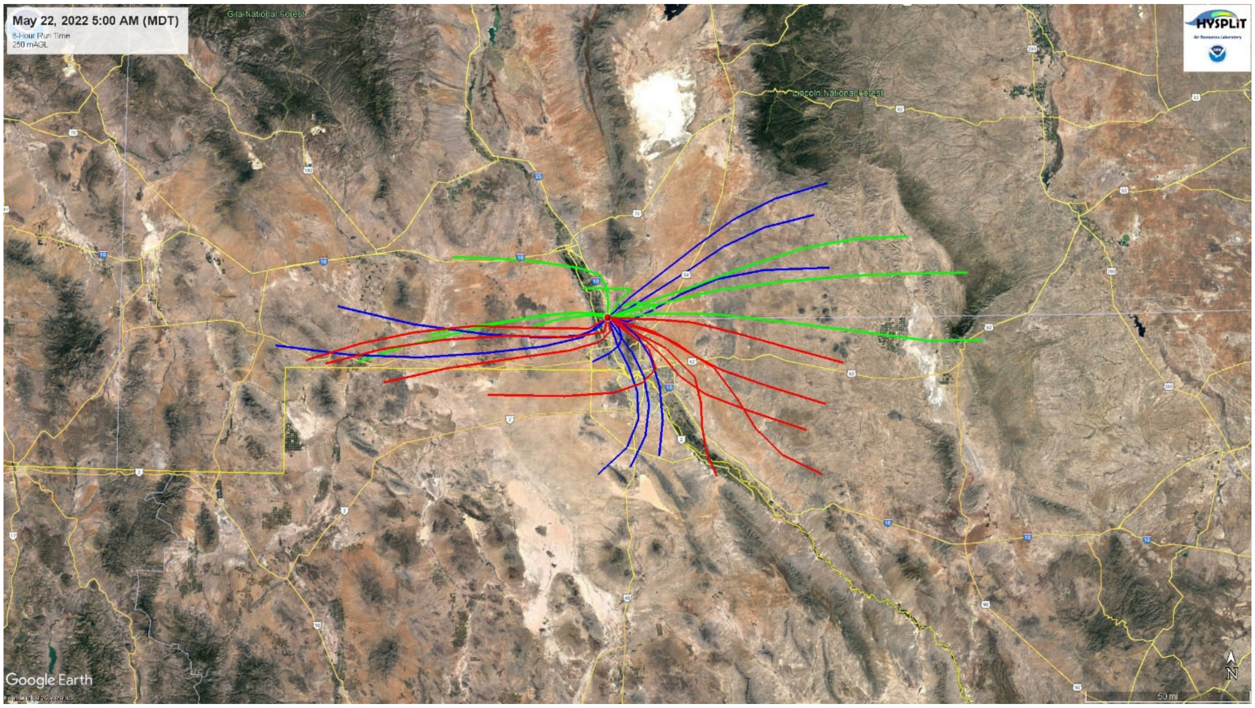


Figure 16-6. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony monitoring site

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figure 16-6) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m^3 (0000 -0800 hour). During the event, winds blew from the northwest 100% of the time coinciding with peak PM_{10} concentrations.

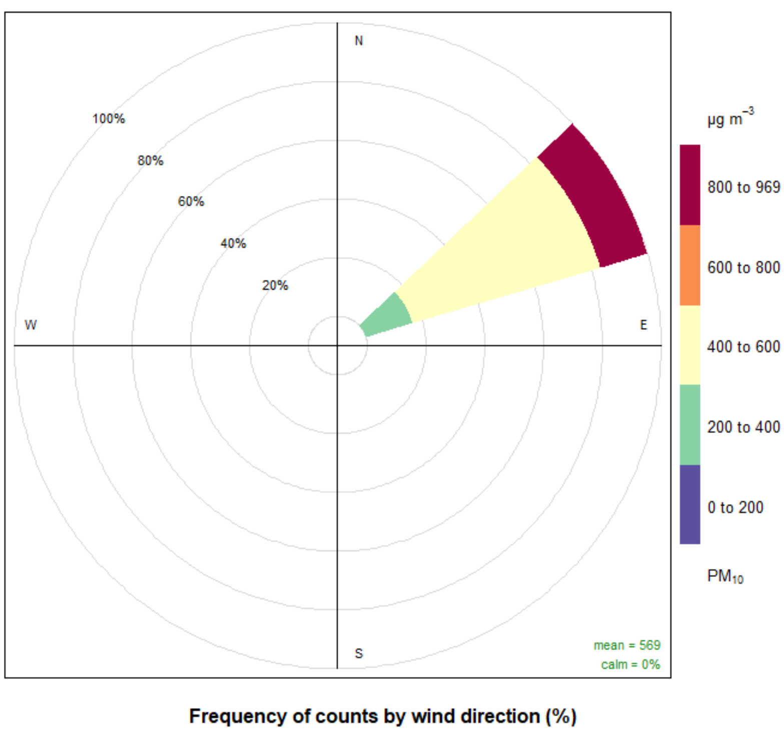


Figure 16-7. Pollution rose for the Anthony monitoring site

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west-southwesterly winds beginning at the 0340 hour and lasting through the 0650 hour. During this time, peak hourly PM_{10} concentrations ranged from 141 to 969 µg/m^3 at the Chaparral and Anthony monitoring sites, respectively (Figure 16-7). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained average wind speeds of 5.4 to 12.4 m/s were recorded at the Chaparral and Holman monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 16-8 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

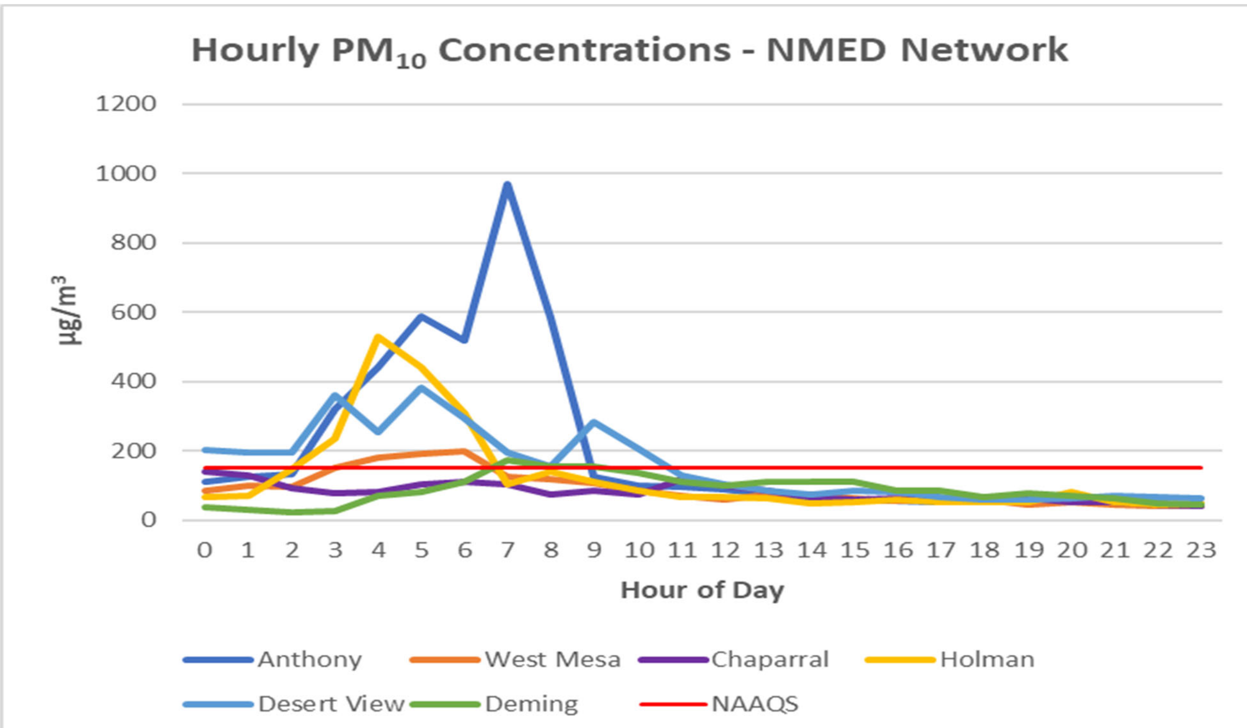


Figure 16-8. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

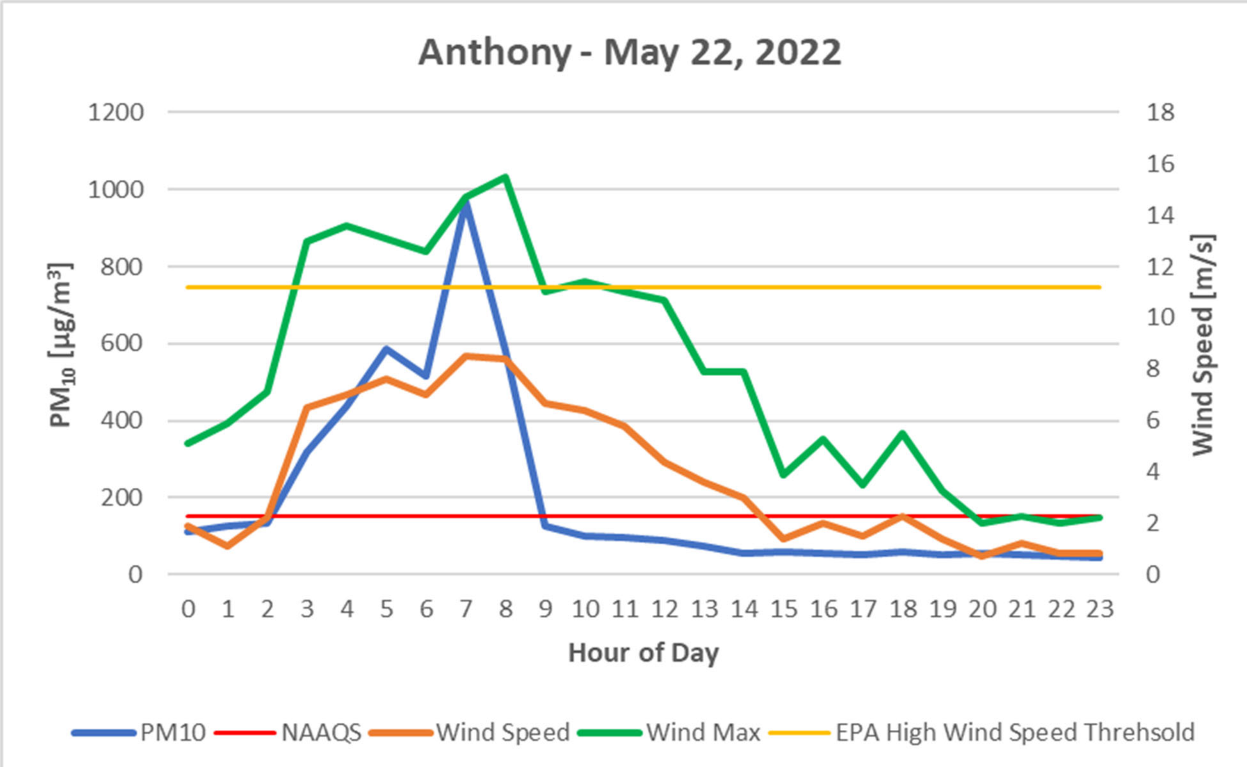


Figure 16-9. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Anthony monitoring site recorded 22 exceedances of the PM_{10} NAAQS (Figure 22-1 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 541 µg/m^3, recorded in 2021. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 16-9, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 115 µg/m^3, except for the previous May 20, 2022 event date, demonstrating the influence high winds have on PM_{10} concentrations in the area.

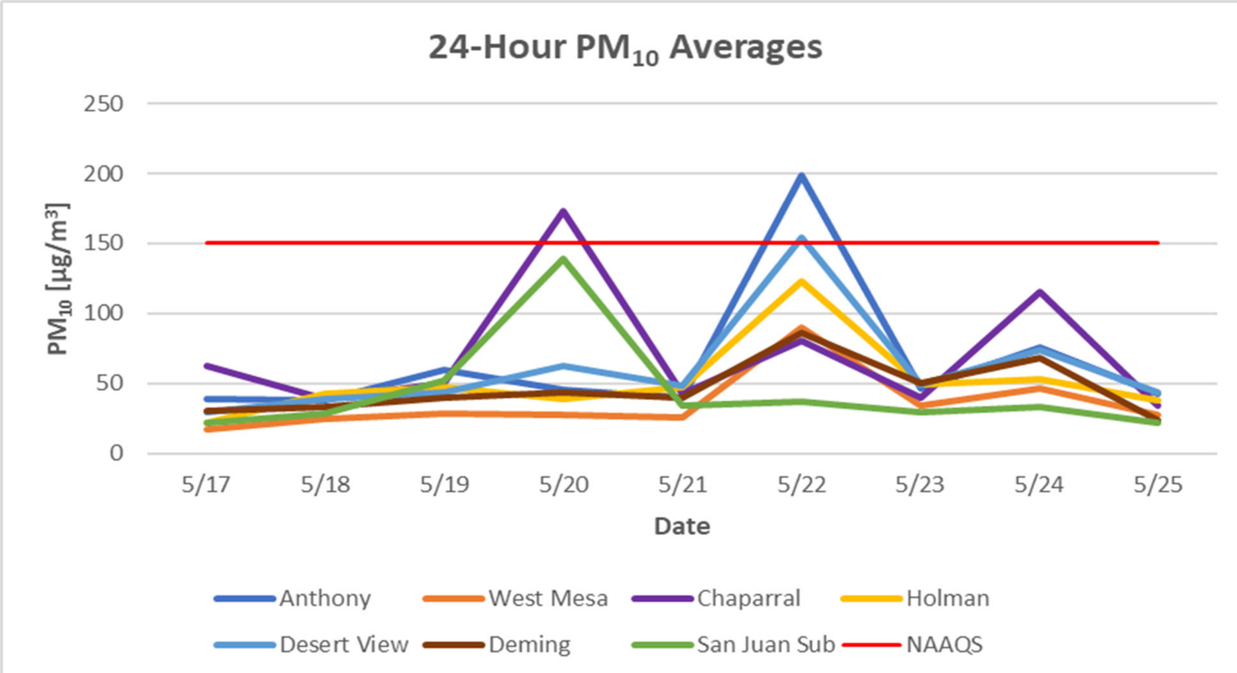


Figure 16-10. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking
Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at the Anthony monitoring site, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (199 µg/m^3) is sitting right above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the Anthony monitoring site. The monitored PM_{10} 24-hour average (199 µg/m^3) is above the 99th percentiles of data monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

17. HIGH WIND EXCEPTIONAL EVENT: May 29, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in San Juan County resulting in an exceedance of the PM_{10} NAAQS at the San Juan Substation monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 17-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-045-1005	1H San Juan Sub	246 µg/m^3	13.5 m/s	26 m/s

Table 17-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Strong winds this afternoon will be created by a weak upper-level disturbance along with a surface cold front crossing New Mexico this even. At the 1800 hour, the surface cold front is progressing southeast through northern New Mexico from the Four Corners and the Baja of California (Figure 17-1). Aloft, the trailing trough hovered over the Great Basin. As the day progressed this low-pressure aloft traveled east and aligned itself with New Mexico and the surface wind direction (Figure 17-2). Trough dynamics plus the surface cold front coupled with increased moisture, created increasingly unstable conditions for the surface wind velocities while providing the turbulence required for vertical mixing and entrainment of dust into the air.

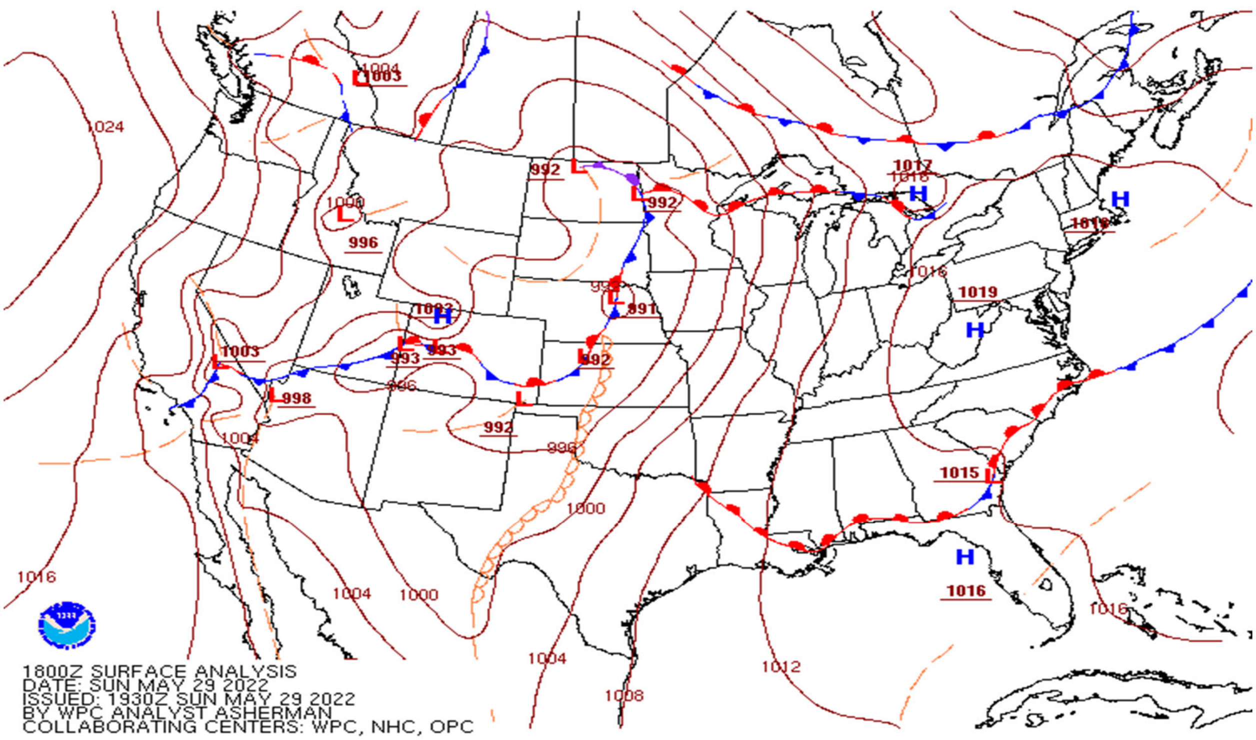


Figure 17-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

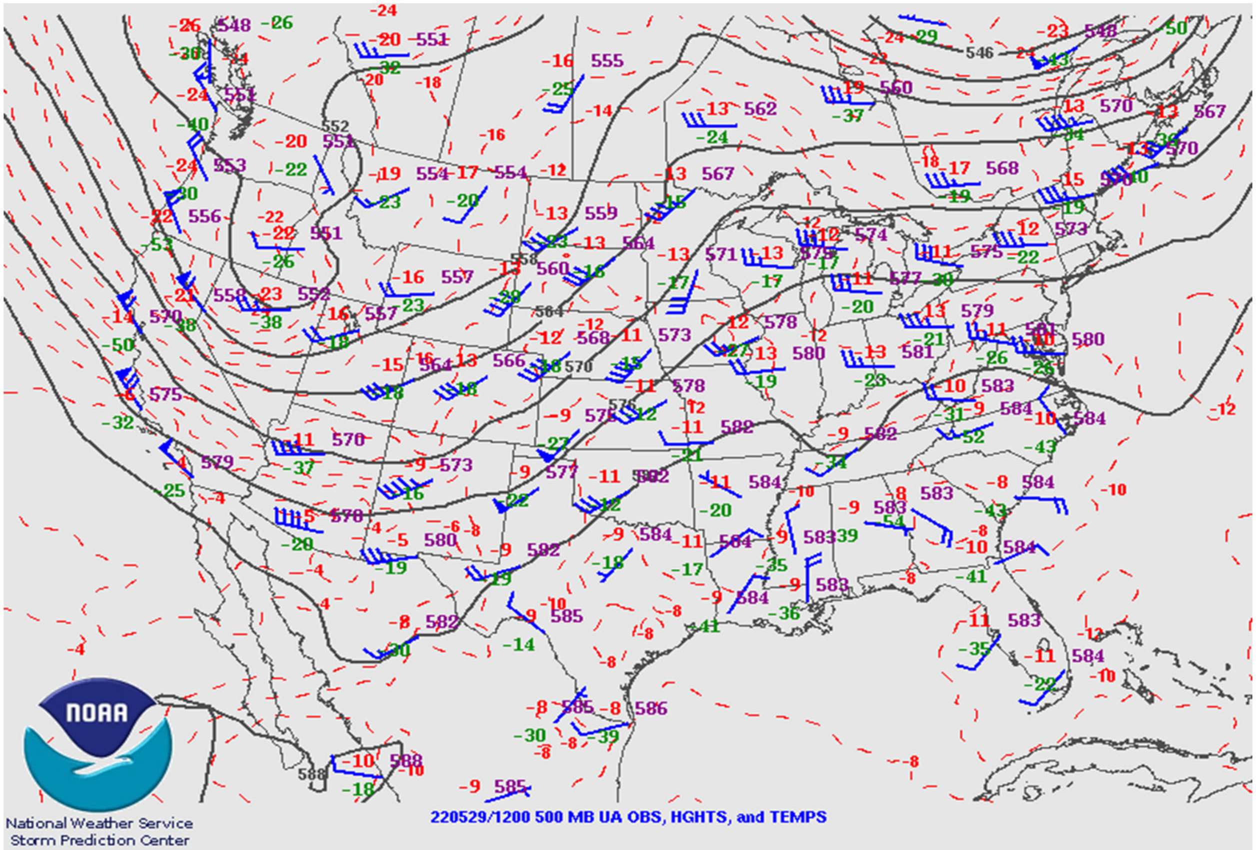


Figure 17-2. Upper air weather map for May 29, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the west-southwest throughout the Four Corners region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Anthony, Chaparral, Holman, West Mesa, Santa Teresa, La Union, and Deming monitoring sites beginning at the 0800 hour and lasted through the 2000 hour. PM_{10} concentrations began to exceed the NAAQS at the Desert View, Chaparral, Holman, West Mesa, Deming, and San Juan monitoring sites beginning at the 0800 hour. Hourly concentrations remained elevated through the 2000 hour. Table 5-2 below summarizes hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Desert View			Deming			San Juan Substation		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
1300	439	8	15.2	134	10.4	18.7	83	8.7	16.8
1400	351	9.3	15.9	188	10.6	18	219	12.5	18.4
1500	315	9.2	16.8	251	10.8	16.9	407	13.5	20
1600	197	8.1	15.3	161	10.5	15.4	2393	13.1	26
1700	219	7.9	13.1	437	10.4	15.5	486	11.5	25.9
1800	134	5.7	10.2	534	10.2	15.7	163	7.8	16.4
1900	61	4.7	9	112	7.1	11.3	1211	13.4	20.1
2000	53	3.6	7.4	34	5.2	9.5	434	9.8	17.4

Table 17-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this Memorial Day, beginning with a low-pressure system in the afternoon with an abnormally hot and dry start coupled with some upper air moisture. Aloft an upper trough moved across New Mexico and at the same time the Pacific cold front peaked into the region in the afternoon and diminished shortly after sunset. The system's movement across the area timed well with afternoon heating and mixing generating a deep trough to the west as stronger winds aloft moved into the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area, especially in the lowland desert areas of New Mexico.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The West Mesa and Holman monitoring sites recorded wind speeds above this threshold for 5 cumulative hours from the 1400 to the 1700 hour, then briefly again for the 1900 hour (Figure 17-3). The wind speeds at the southern Doña Ana County West Mesa monitoring site also reached the high wind threshold.

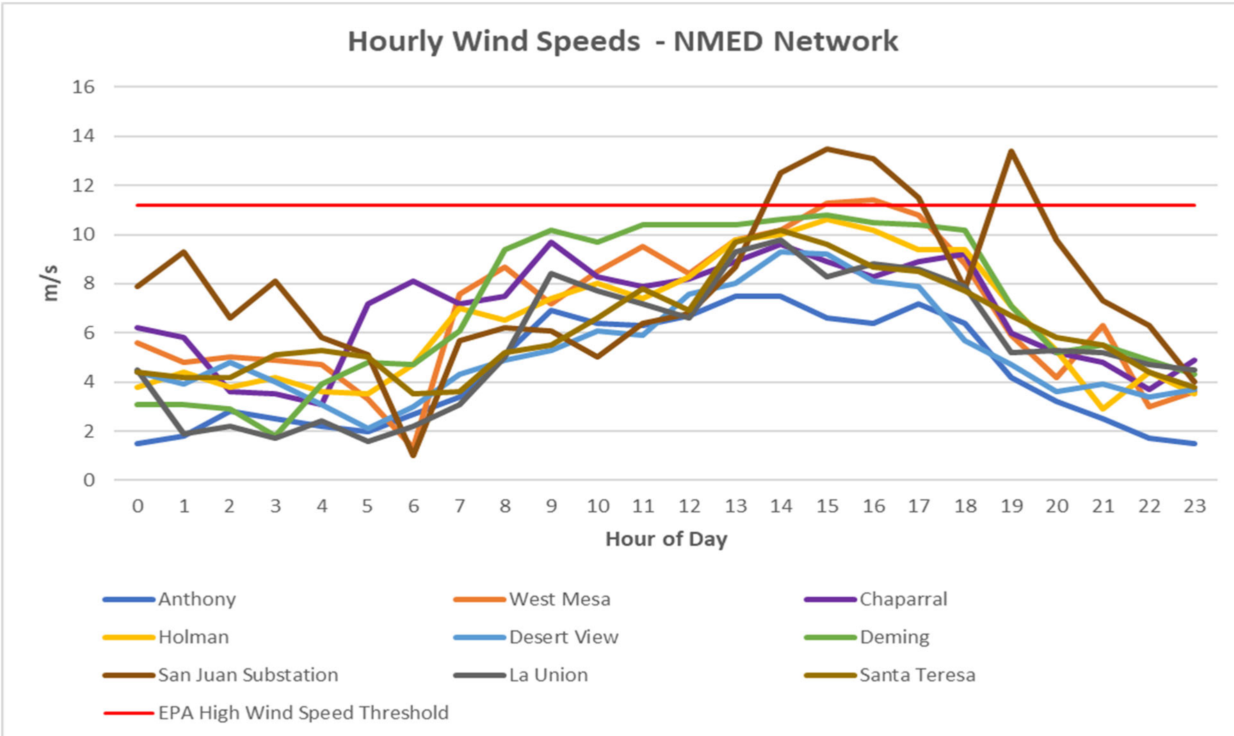


Figure 17-3. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana and Luna

Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in San Juan and McKinley Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Utah likely contributed to the exceedance on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate sources.

The documentation and analysis presented in this section demonstrates that all identified sources that may have caused or contributed to the exceedance were reasonably controlled, implemented and enforced at the time of the event, therefore emissions associated with the high wind dust event were not reasonably controllable or preventable.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on the Sentinel 5P TROPOMI satellite Aerosol Index product imagery with dust plumes originating upwind of NMED's monitoring site northeast of Flagstaff, Arizona. which are represented as warm colors with the intensity increasing with denser concentrations in the air. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern New Mexico (Figure 17-4). The dust plumes of interest appear to be limited to northern New Mexico and Arizona, at the time of the satellite pass (1401 - 1620 MDT) that created the aerosol index product.

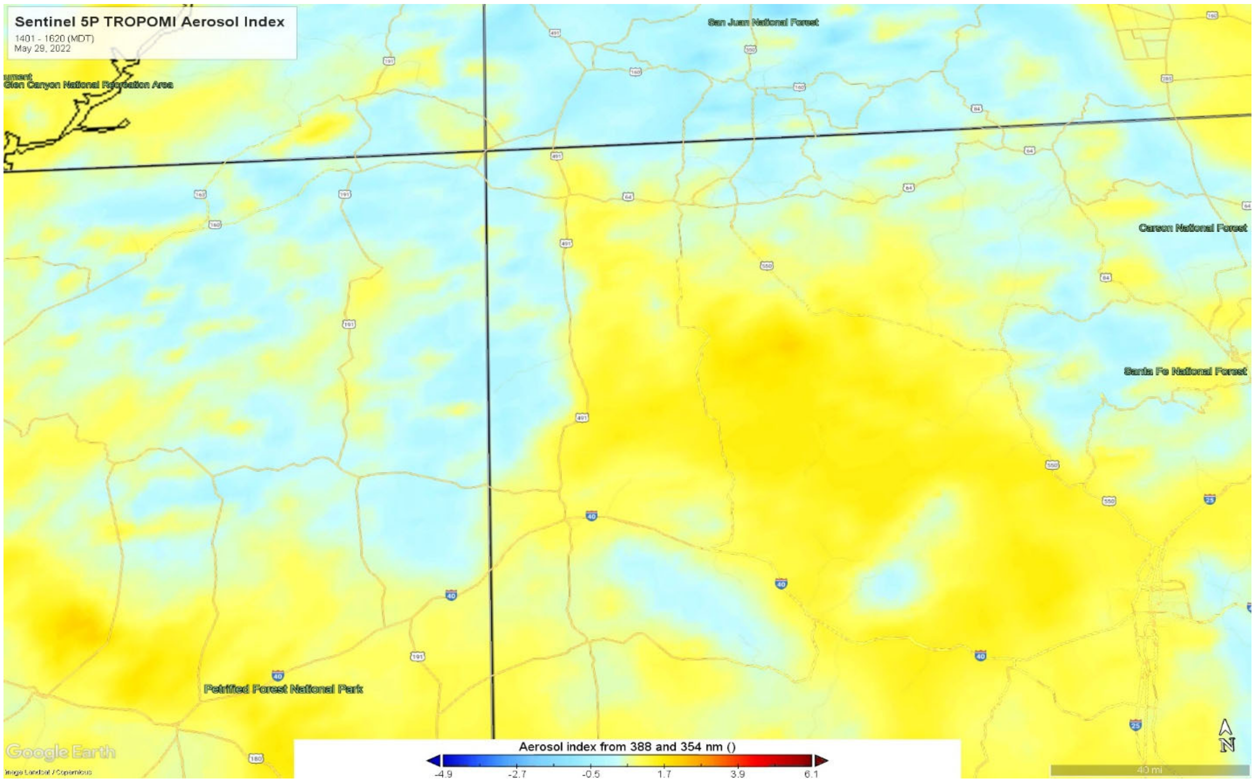


Figure 17-4. Sentinel 5P TROPOMI Aerosol Optical Index product satellite imagery. Courtesy of NOAA Earthdata.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Wind Advisory for this date. A Wind Advisory is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. This was in place for San Juan and McKinley Counties to warn the public of the high wind event. An excerpt from the NWS Wind Advisory can be found below:

"...Wind Advisory from 11 AM this morning to 9 PM MDT this evening…Strong southwest winds… will be the most dominant weather feature…"

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from north-northeastern Arizona to the Four Corners area and on to the NMED monitoring site. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 17-5). This analysis supports the hypothesis that dust plumes originated in Arizona and northern New Mexico before being transported to the downwind monitoring site.

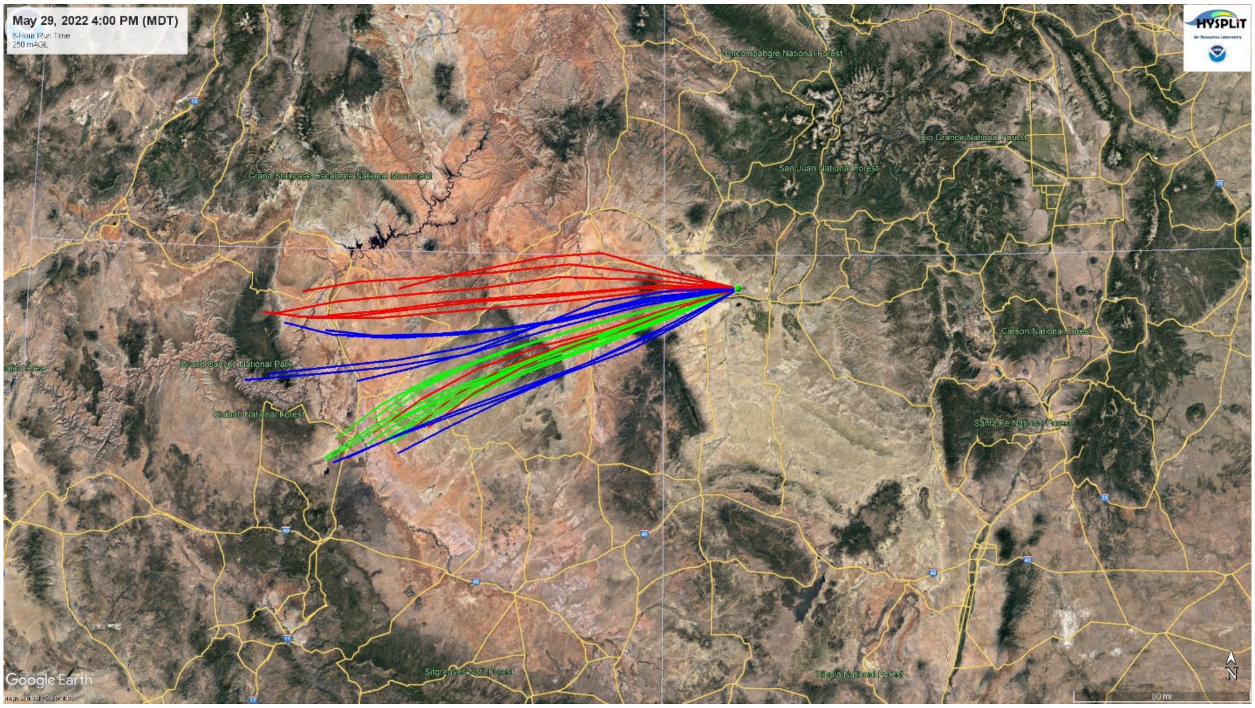


Figure 17-5. HYSPLiT back-trajectory analyses using the Ensemble mode for the San Juan Substation Monitoring site

Wind Direction and Elevated PM_{10} Concentrations

A pollution rose (Figure 17-6) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0800 -2000 hour). During the event, winds blew from the west-northwest directions 100% of the time coinciding with peak PM_{10} concentrations.

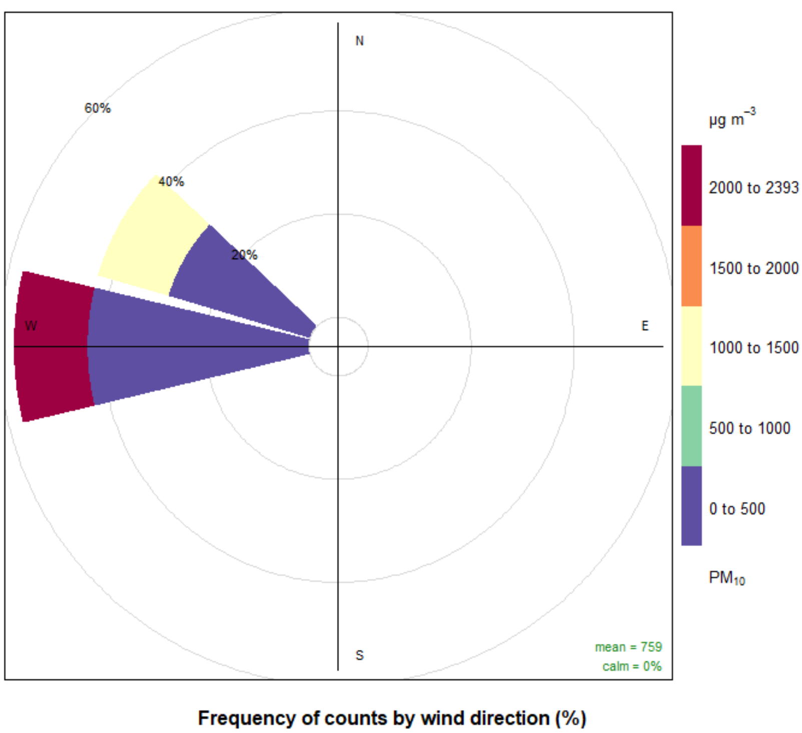


Figure 17-6. Pollution rose for the San Juan Substation monitoring site

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong west-southwesterly winds beginning at the 0800 hour and lasting through the 2000 hour. During this time, peak hourly PM_{10} concentrations ranged from 151 to 2393 µg/m^3 were recorded at the West Mesa and San Juan Substation monitoring sites, respectively (Figure 17-7). As the San Juan monitoring site recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds of 7.5 to 13.5 m/s were recorded at the Anthony and San Juan monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 17-8 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

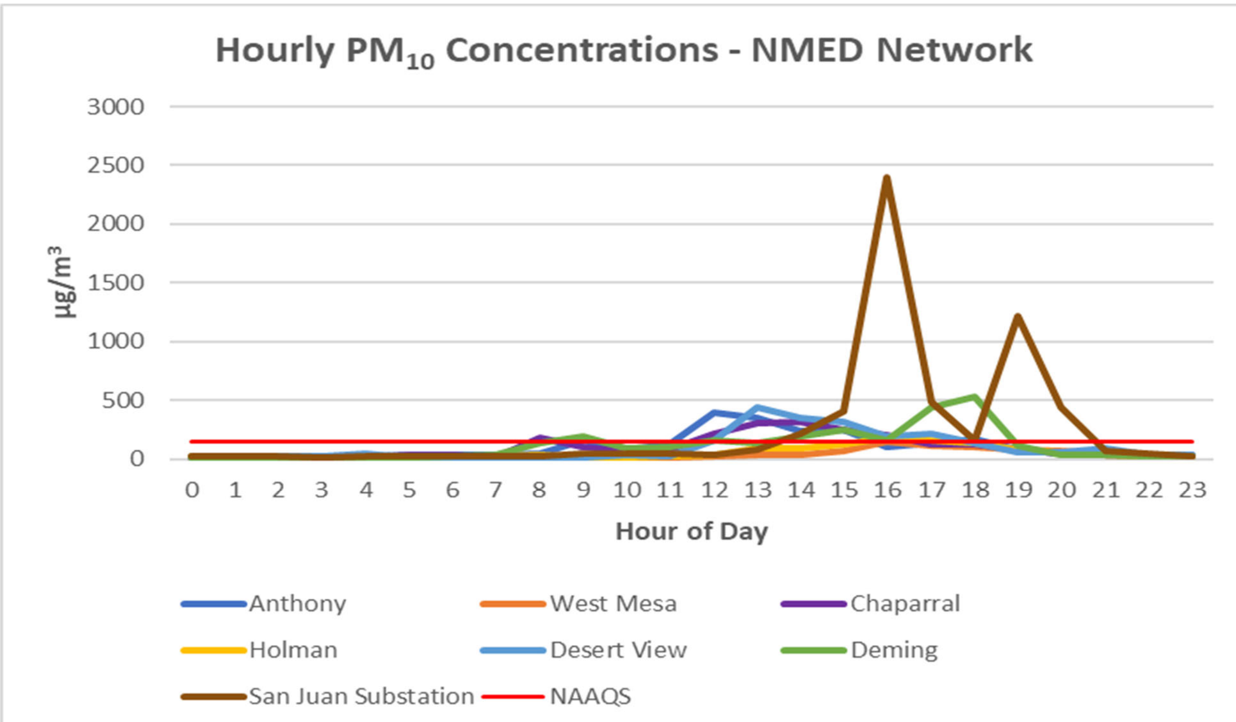


Figure 17-7. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

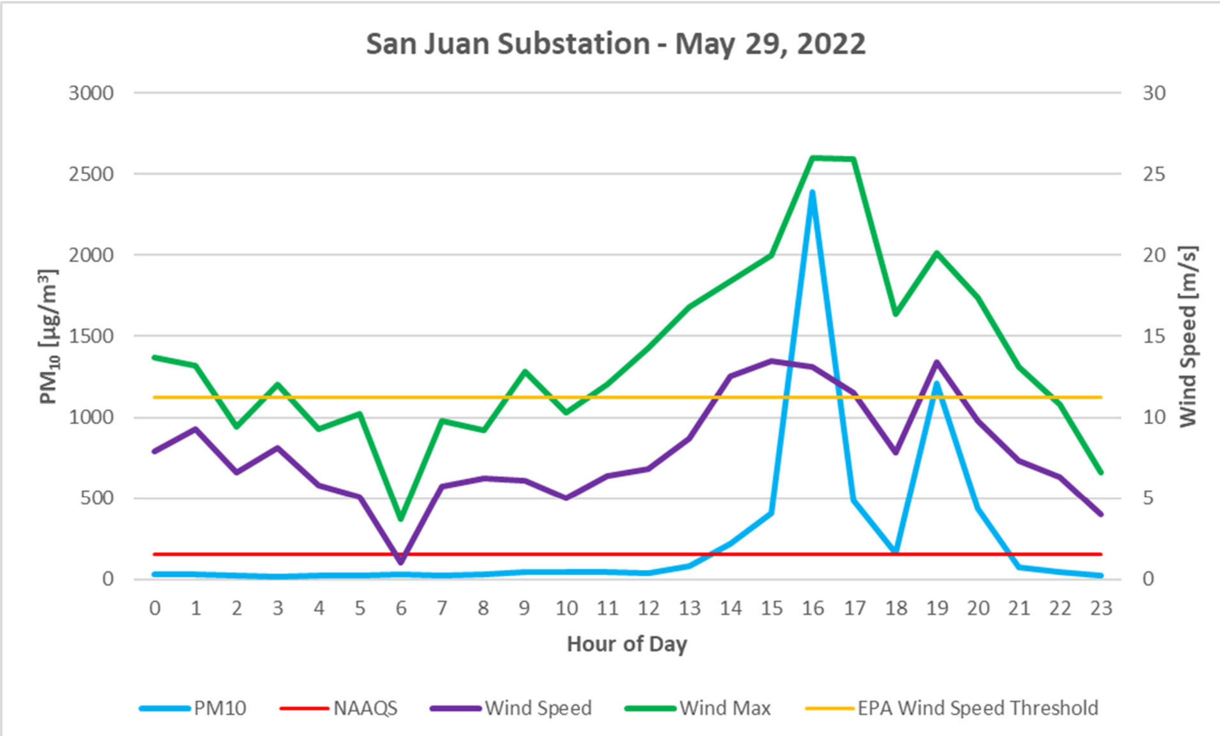


Figure 17-8. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2018-2021, the San Juan substation monitoring site recorded only 1 exceedance of the PM_{10} NAAQS (Figure 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 171 µg/m^3, recorded in 2020. High wind blowing dust events in New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 17-9, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 53 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

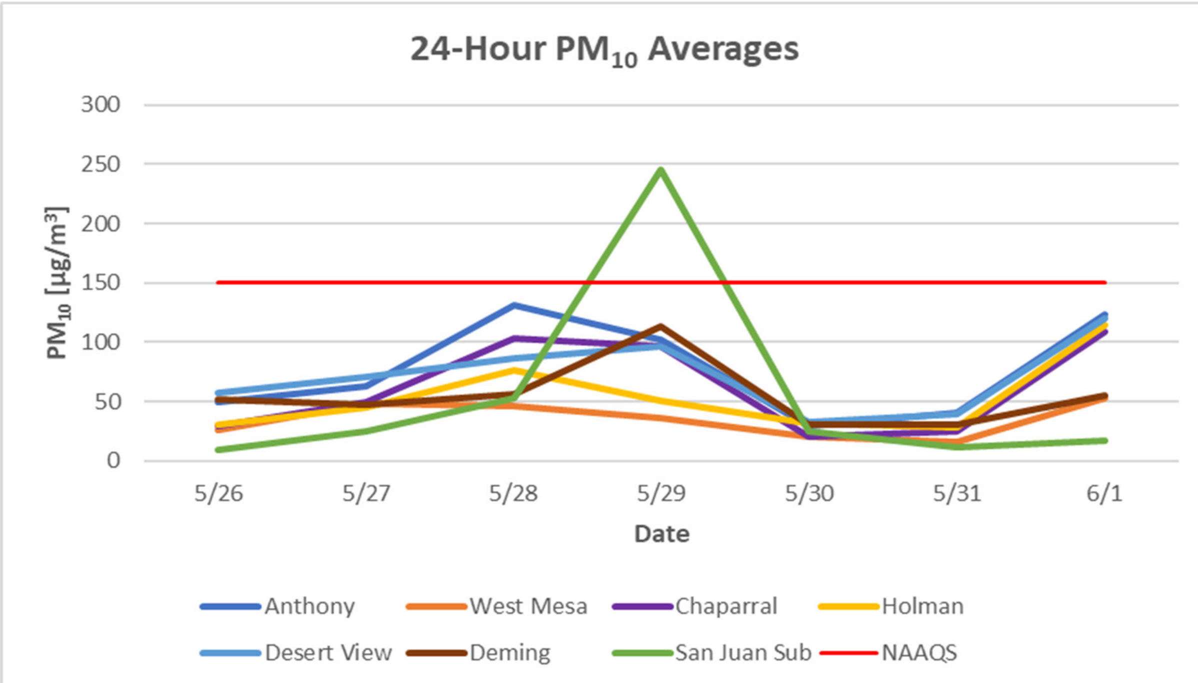


Figure 17-9. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at the San Juan Substation monitoring site, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2018-2021. The recorded value for this day (246 µg/m^3) is above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the San Juan Substation monitoring site. The monitored PM_{10} 24-hour average (246 µg/m^3) is above the 99th percentile of data monitored over the previous four years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedance on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedance associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

18. HIGH WIND EXCEPTIONAL EVENT: June 8, 2022

Conceptual Model

Thunderstorm outflow created from a backdoor cold front caused high winds and blowing dust in Doña Ana County resulting in an exceedance of the PM_{10} NAAQS at the Desert View and Holman monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 18-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	484 µg/m^3	10.1 m/s	17.1 m/s
RJ	35-013-0019	6ZL Holman	285 µg/m^3	14.5 m/s	23.1 m/s

Table 18-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Beginning the day with high pressure and a hot day to be followed by a strong late season backdoor cold front moving through southern New Mexico will begin later in the afternoon with strong cold winds and increased moisture. As the storm system moves through the state, an easterly pressure gradient will start forming over southwestern Texas, southern New Mexico and eastern Arizona. At the 1800 hour, the area of low-pressure extends into the Four Corners (Figure 18-1). Aloft, the deep trough axis of the storm system hovered over the Great Lakes. As the day progressed this low-pressure aloft traveled west and aligned itself with New Mexico and tapped into the surface wind direction while sustaining wind speeds (Figure 18-2). Trough dynamics coupled with the backdoor cold front and increased upper level moisture created unstable conditions which allowed winds aloft to mix down creating enough convective energy to increase surface wind velocities providing the turbulence required for vertical mixing and entrainment of dust, especially for west facing slopes.

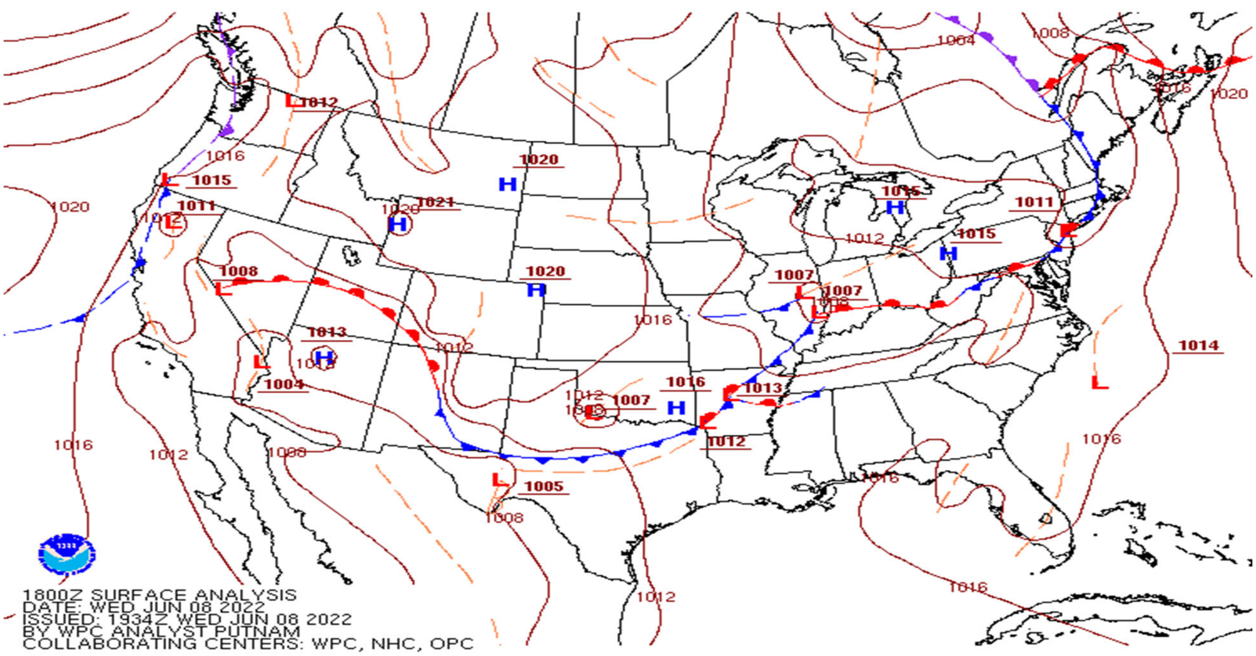


Figure 18-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

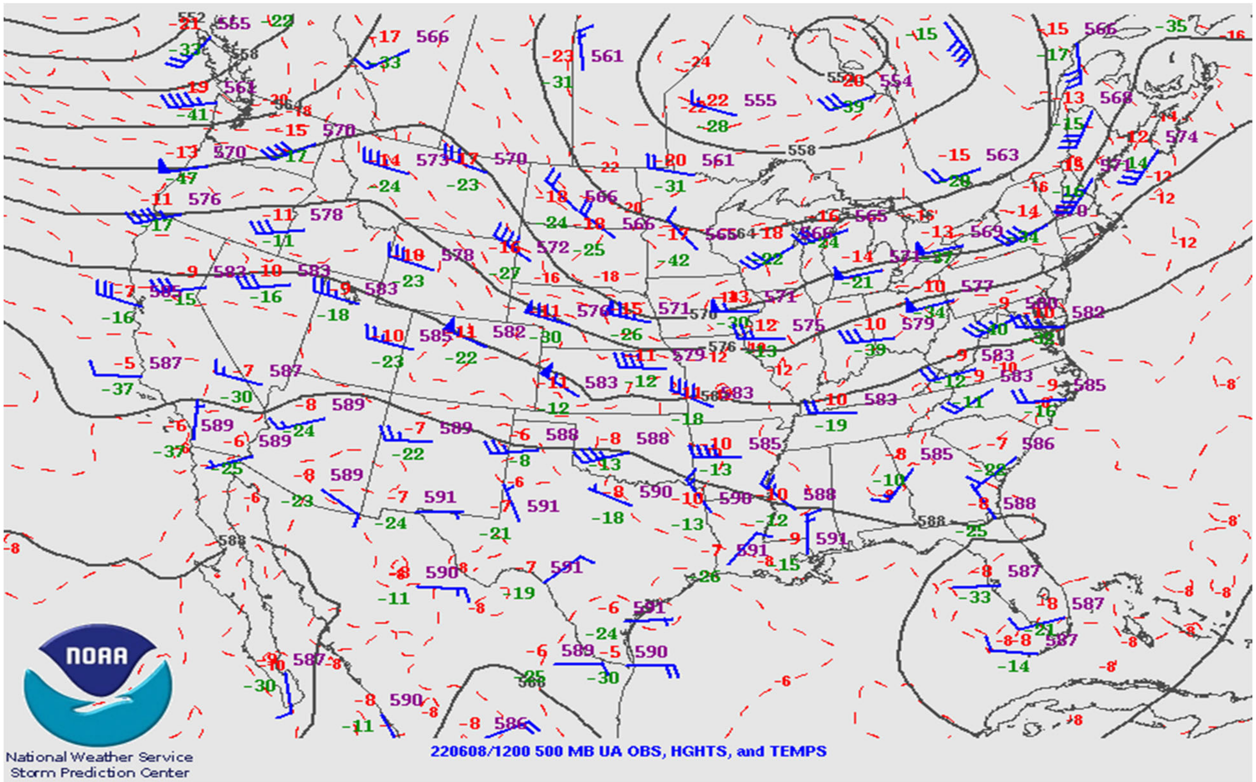


Figure 18-2. Upper air weather map for April 17, 2021, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the east-northeast throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Anthony, Desert View, West Mesa, Holman, and Santa Teresa monitoring sites beginning at the 1700 hour and lasted through the 2100 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa and Deming monitoring sites beginning at the 1600 hour. Hourly concentrations remained elevated through the 2200 hour. Table 18-2 below summarizes peak hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Anthony			Holman			Desert View		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
1500	75	3.4	7.8	27	3.1	12.8	27	3.3	14.8
1600	1443	7.2	16	144	9	13.5	554	9.3	15.9
1700	693	7.4	16.3	4151	14.5	23.1	823	8.8	14
1800	744	6.9	12.8	1211	10.8	21.6	407	8.3	14
1900	969	6	15.6	442	9.3	18.8	293	7.4	14.5
2000	2510	9.5	16.9	193	11.3	18.8	334	4.6	9.4
2100	4444	10.1	17.1	80	10.7	17.7	361	5.3	12
2200	127	4.8	13.3	41	6.7	13.8	149	3.1	9.2
2300	46	4	7.5	80	8.6	13.6	158	2.1	6

Table 18-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from east to west moving across New Mexico in the afternoon and evening hours. The system's movement across the area timed well with daytime heating and mixing generating a deep trough from the east as strong winds continued throughout the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area, especially in the desert areas of southern New Mexico (Figure 18-3).

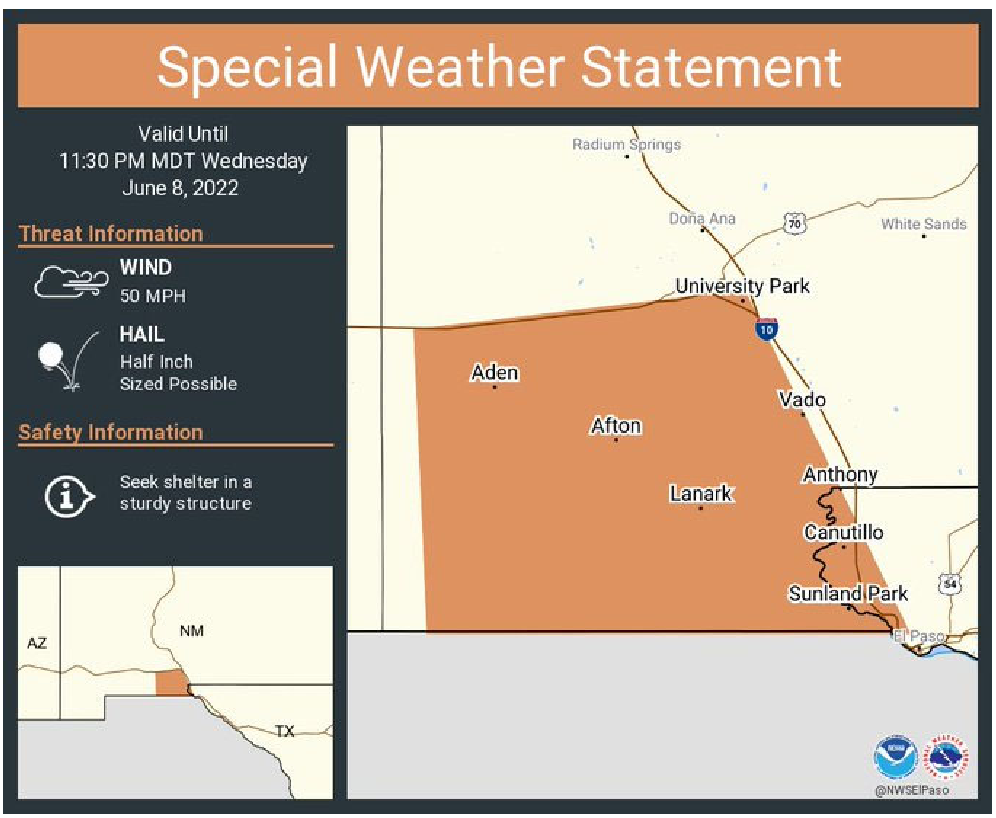


Figure 18-3. NWS Forecast Graphic for the event.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable
This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, “the State shall not be required to provide a case-specific justification for a high wind dust event.”

Not Reasonably Controllable
The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED’s monitors.

Sustained Wind Speeds
EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The Santa Teresa monitoring site recorded wind speeds above this threshold for 2 hours for the 1700 and 2000 hours (Figure 18-4).

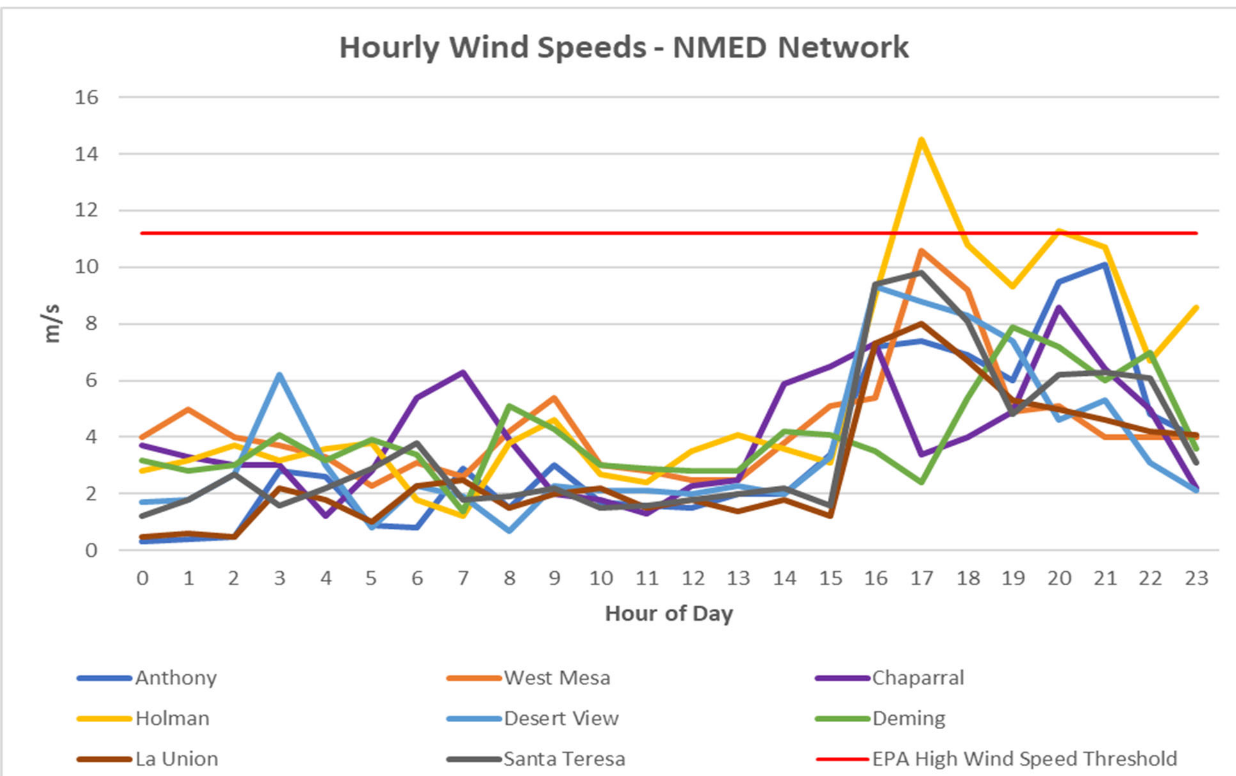


Figure 18-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis
Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

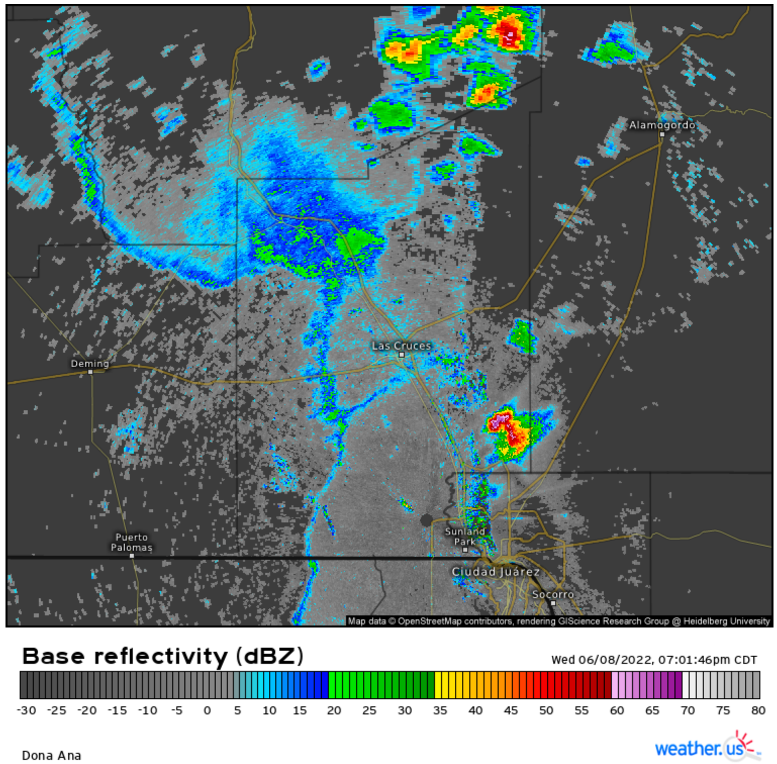
Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Otero, Eddy, Lea, and Chavez Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Texas and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Radar Imagery

The event was captured on the High-Definition Radar product imagery with the cold front originating upwind of NMED's monitoring sites in Otero and west El Paso County and ejecting through the San Augustin Pass and Anthony Pass (where the Organ Mountain Range connects to the Franklin Mountain Range) which are represented as blue and green colors as the least dense of the cold front observed with orange and red being the most dense outflow storm activity. The distinct blue line moving through Doña Ana County and approaching Luna County shows the fast-moving nature of the cold front moving west through the region. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in New Mexico, Texas, and Mexico (Figure 18-5).



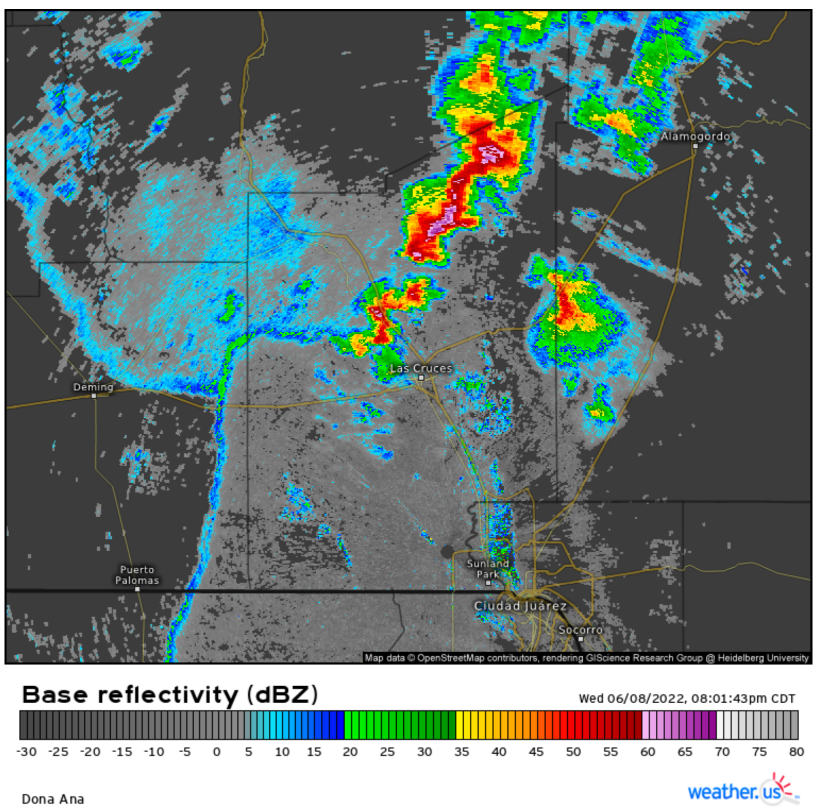


Figure 18-5.High-Definition Radar product showing southwestern New Mexico, northern Chihuahua and western Texas. Imagery obtained from weather.us.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Hazardous Weather Outlook for this date. A Hazardous Weather Outlook is a statement issued by NWS to provide information to the public about potential adverse weather events. A Hazardous Weather Outlook statement was issued for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Hazardous Weather Outlook and Area Forecast Discussion can be found below:

"…main hazard…will be strong, gusty and damaging winds…blowing dust."

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from west Texas and southern New Mexico into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 18-6). This analysis supports the hypothesis that dust plumes originated in Texas and New Mexico before being transported to downwind monitoring sites.

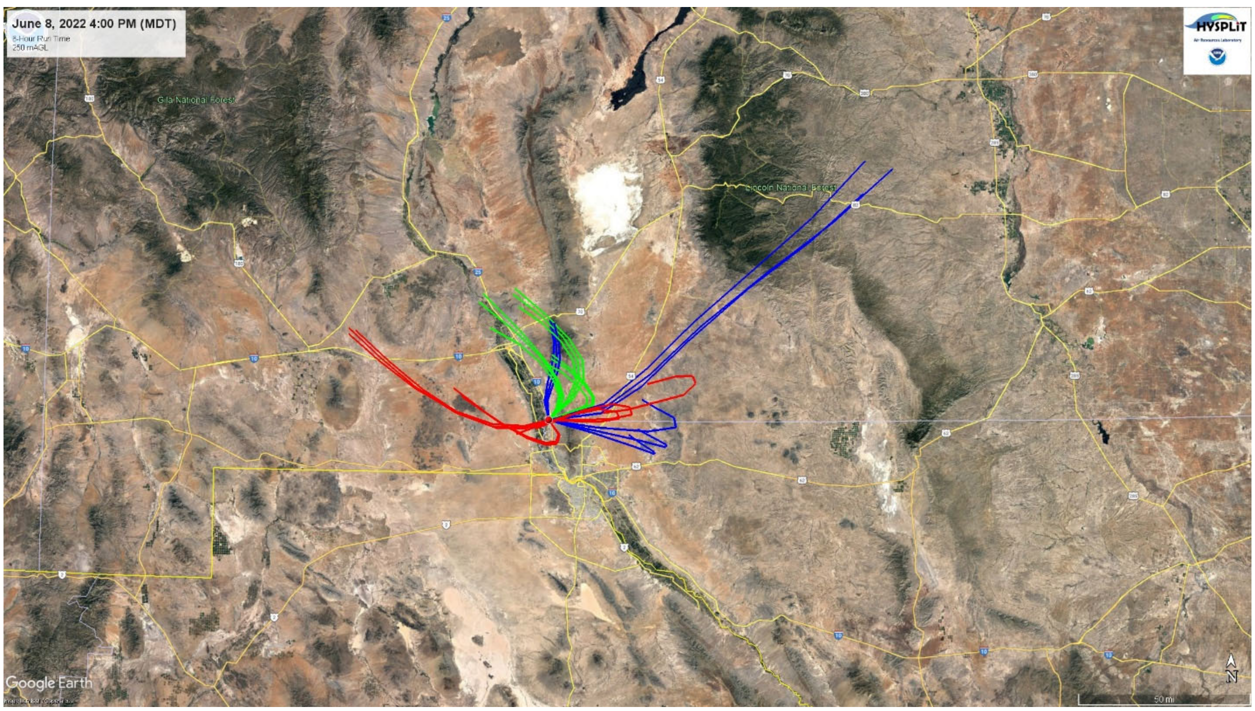


Figure 18-6. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony monitoring site.

Wind Direction and Elevated PM_{10} Concentrations

Pollution roses (Figure 18-7 and 18-8) were created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m^3 (1600-2200 hour). During the event, winds primarily blew from the east northeast approximately 100% of time coinciding with peak PM_{10} concentrations.

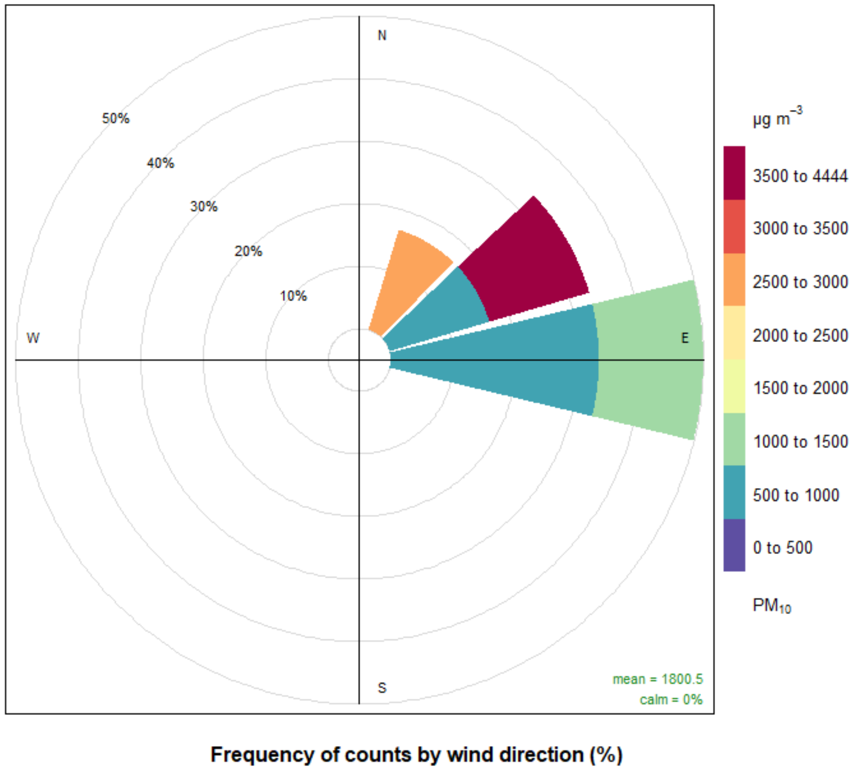


Figure 18-7. Pollution rose for the Anthony monitoring site.

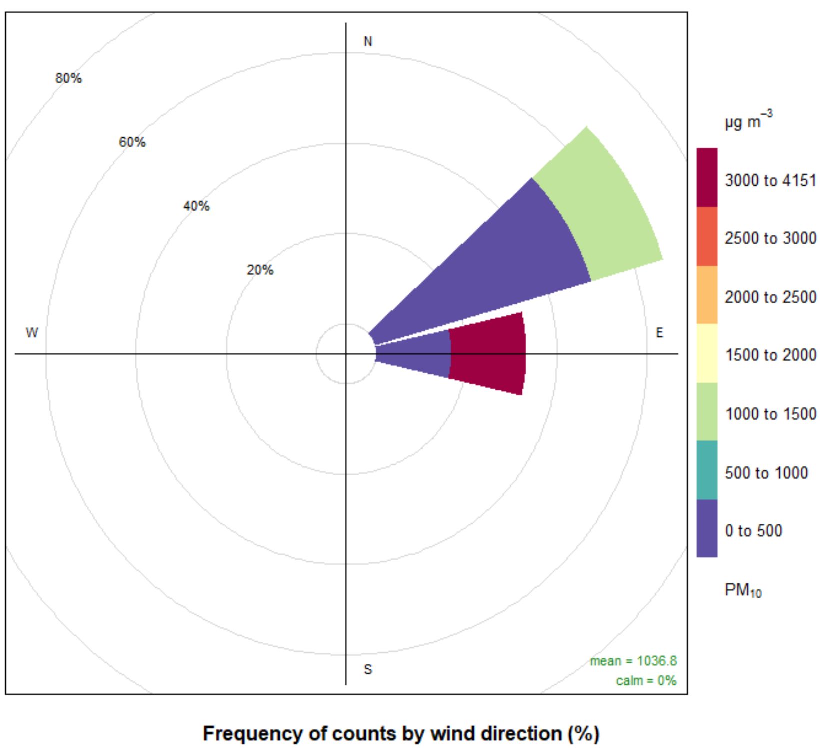


Figure 18-8. Pollution rose for the Holman monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong east-northeasterly winds beginning at the 1700 hour and lasting through the 2100 hour. During this time, peak hourly PM_{10} concentrations ranged from 385 to 4444 µg/m^3 were recorded at the Deming and Anthony monitoring sites, respectively (Figure 18-9). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 7.9 to 14.5 m/s were recorded at the Deming and Holman monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figure 18-11 and 18-12 demonstrate the correlation between elevated levels of PM_{10} and high winds for this event.

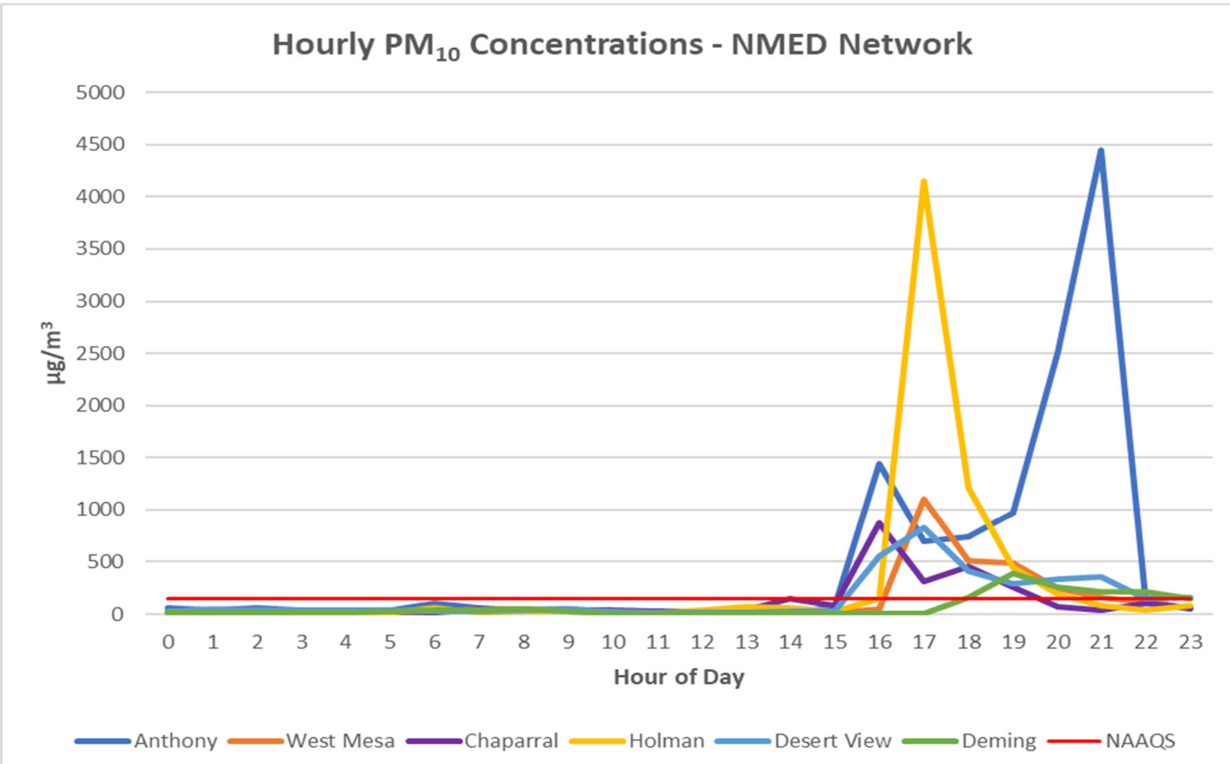


Figure 18-9. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

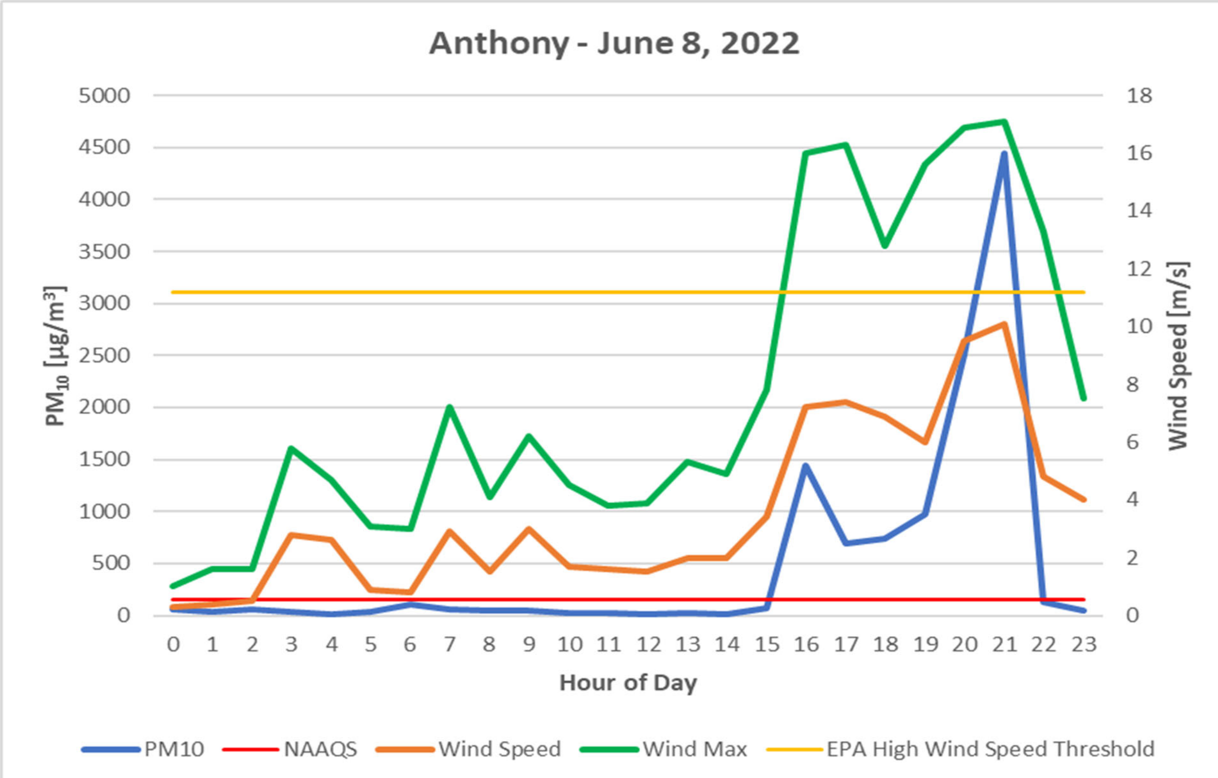


Figure 18-10. Anthony monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

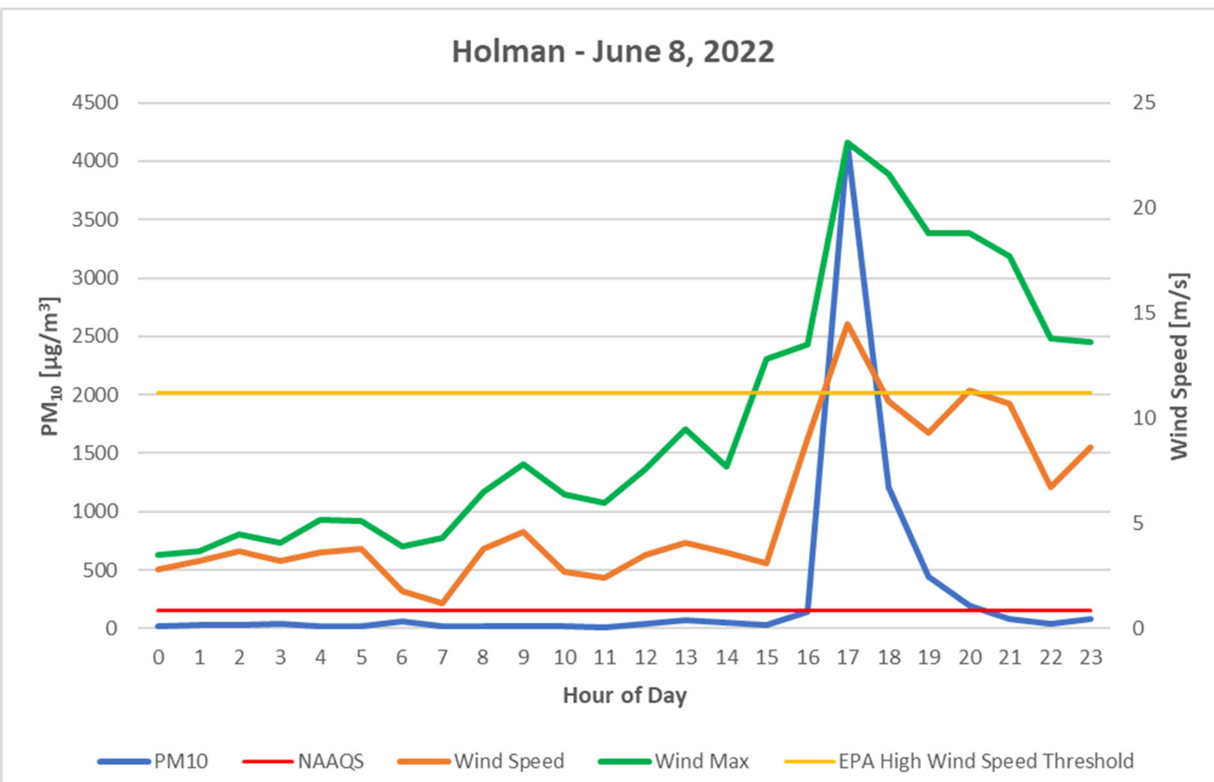


Figure 18-11. Holman monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Anthony and Holman monitoring sites recorded 22 and 12 exceedances, respectively, of the PM_{10} NAAQS (Figures 22-1 and 22-5 in Appendix B). The maximum 24-hour average PM_{10} concentration at these sites were 541 (Anthony) and 691 (Holman) µg/m^3, recorded in 2021 (Anthony) and 2019 (Holman). High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 18-12, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for three days surrounding the event did not surpass 92 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

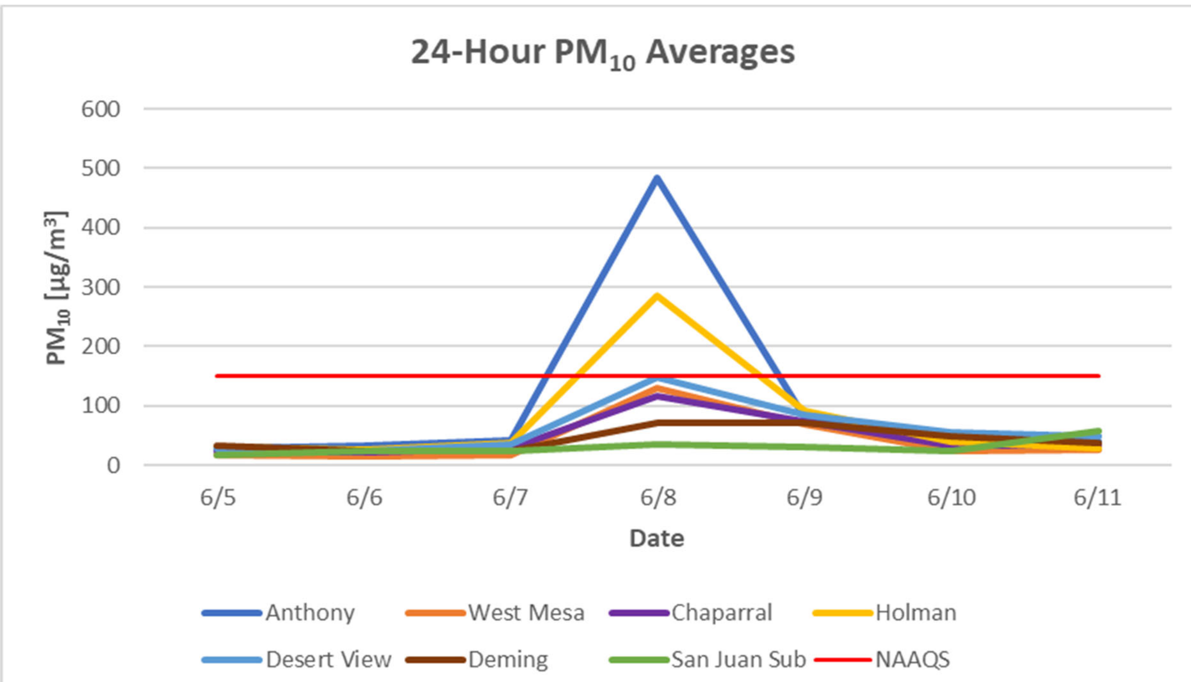


Figure 18-12. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 484 (Anthony) and 285 (Holman) µg/m^3 are both above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at the Anthony and Holman monitoring sites. The monitored PM_{10} 24-hour averages 484 (Anthony) and 285 (Holman) µg/m^3 are both above the 99th percentile monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

19. HIGH WIND EXCEPTIONAL EVENT: June 13, 2022

Conceptual Model

Thunderstorm outflow and a Pacific cold front caused high winds and blowing dust in Luna and San Juan Counties resulting in an exceedance of the PM_{10} NAAQS at the Deming and San Juan Substation monitoring sites on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 7-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-029-0003	7E Deming	212 µg/m^3	10.6 m/s	20 m/s
RJ	35-045-1005	1H San Juan Sub	213 µg/m^3	13.5 m/s	21.5 m/s

Table 19-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

The brunt of a Pacific storm system will impact northern New Mexico with a lesser impact for southern New Mexico's high-pressure system which will be more affected by thunderstorm outflows in the afternoon. As the Pacific cold front moves through the state, an easterly pressure gradient will start forming over the Four Corners along with Gulf moisture pushed towards the Borderland. At the 1800 hour, the area of low-pressure progresses towards the Four Corners (Figure 19-1). Aloft, the deep trough axis of the storm system hovered over the Great Basin with the leeside of the trough approaching the Four Corners. As the day progressed this low-pressure aloft traveled east and aligned itself with New Mexico and tapped into the surface wind direction while sustaining wind speeds (Figure 19-2). Diurnal heating of the surface at sunrise allowed winds aloft to mix down creating enough convective energy to increase surface wind velocities providing the turbulence required for vertical mixing and entrainment of dust in northern New Mexico along with afternoon outflow thunderstorm activity for southern New Mexico.

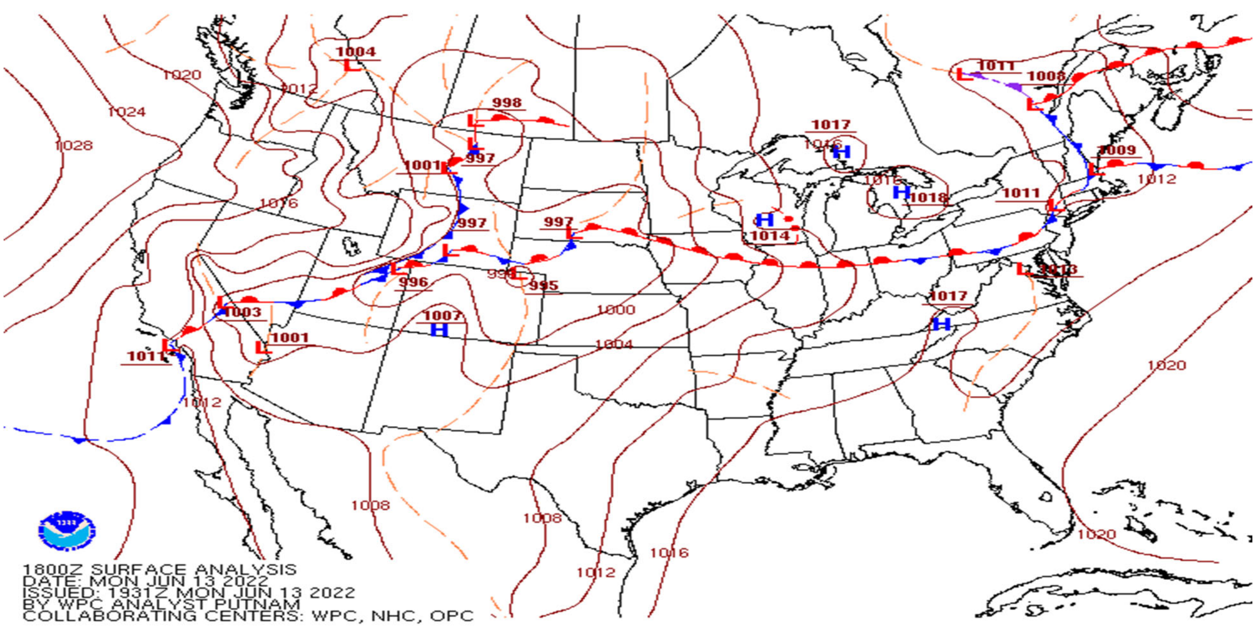


Figure 19-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

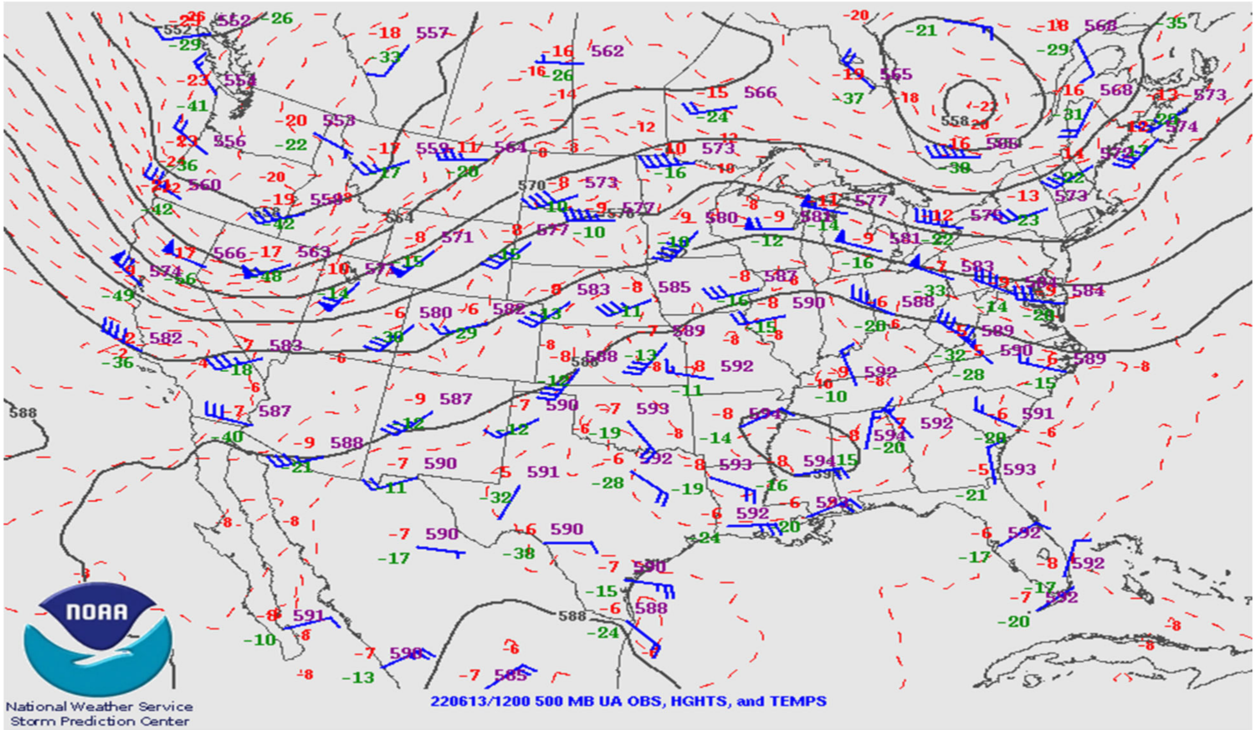


Figure 19-2. Upper air weather map for June 13, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the west southwest throughout the southern border and Four Corners region. These high velocity winds passed over large areas of desert within New Mexico, Arizona, and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Deming, Holman, West Mesa, and San Juan Substation monitoring sites beginning at the 1100 hour and lasted through the 2300 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa, Deming, and San Juan Substation monitoring sites beginning at the 1000 hour. Hourly concentrations remained elevated through the 2000 hour. Table 19-2 below summarizes peak hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	Desert View			Deming			San Juan Substation		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
1000	29	2.5	6.1	39	5.8	11.1	202	7.7	18.5
1100	29	2.2	6	39	6.8	12.4	188	11.8	18.1
1200	19	3.5	7.7	44	6.9	13.4	288	10.5	18.2
1300	19	4.6	10.2	27	7.2	12.3	600	12	21.5
1400	19	4.1	9.6	41	6	12.7	749	12.6	18.9
1500	119	5.7	14.7	454	7.2	15.3	456	13.1	20.9
1600	166	6.6	12.8	1956	10.6	20	361	13.5	18.9
1700	61	4	7.3	1846	9.2	19.9	605	12.1	17.7
1800	114	4.5	9.7	117	6.1	9.4	385	11.9	17.4
1900	559	5.5	12.5	85	6	12.8	315	12.2	17.6
2000	144	3.9	7.1	17	2.7	6.8	222	11.2	17.8
2100	85	3.5	6.2	36	2.7	3.8	129	9.8	15.9
2200	39	4	7.8	22	3.3	7.1	122	12.2	18.1
2300	39	5	8.2	22	2.9	4.8	53	11.4	16.5

Table 19-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from west to east moving across New Mexico in the late morning and afternoon hours. The systems movement across the area timed well with daytime heating and mixing generating a deep trough moving to the east as strong winds continued throughout the state of New Mexico, especially in the Four Corners area. Media outlets also forecasted a high probability of thunderstorm activity throughout the Borderland, especially in the desert areas of southern New Mexico (Figure 19-3).

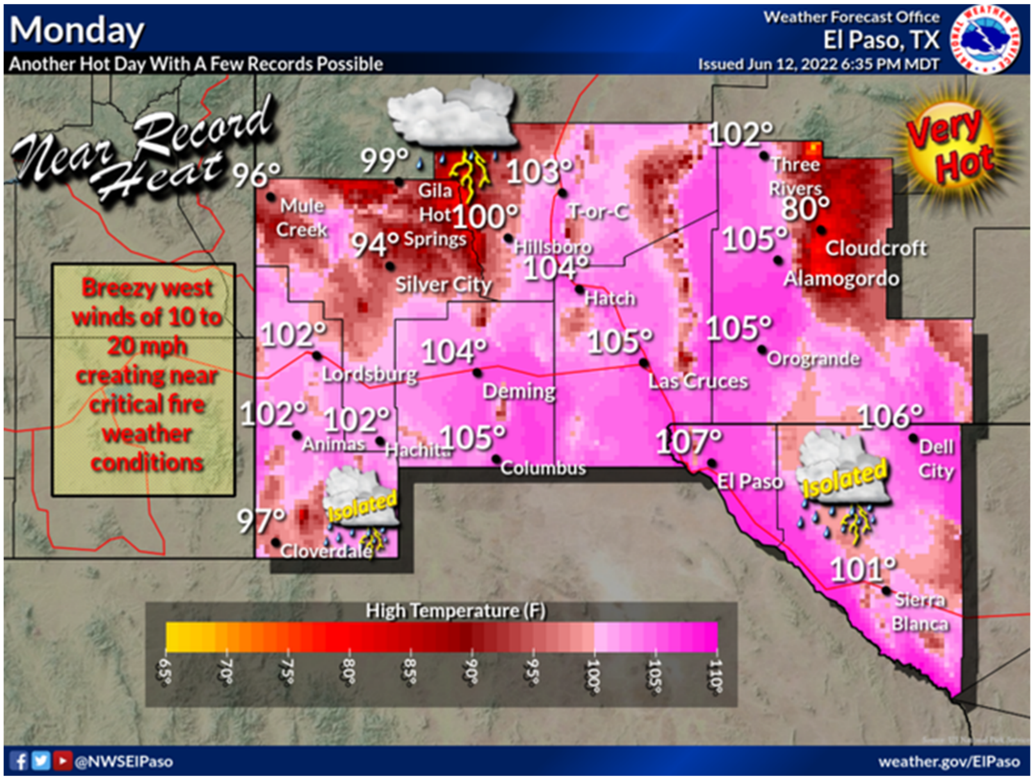


Figure 19-3. NWS Forecast Graphic for the event.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. The San Juan Substation monitoring site recorded wind speeds above this threshold for ten hours for the 1100, then at the 1300 through the 2000 hours then to resume again at the 2200 hour (Figure 19-4). The El Paso Airport documented a one-hour sustained wind speed of 25 mph at the 2051 hour (Figure 19-5). The Las Cruces Airport documented 20-minute sustained wind speeds for a cumulative of 80 minutes (25 - 30 mph) for the 1535, 1755, 1855, and 1915 hours (Figure 19-6).

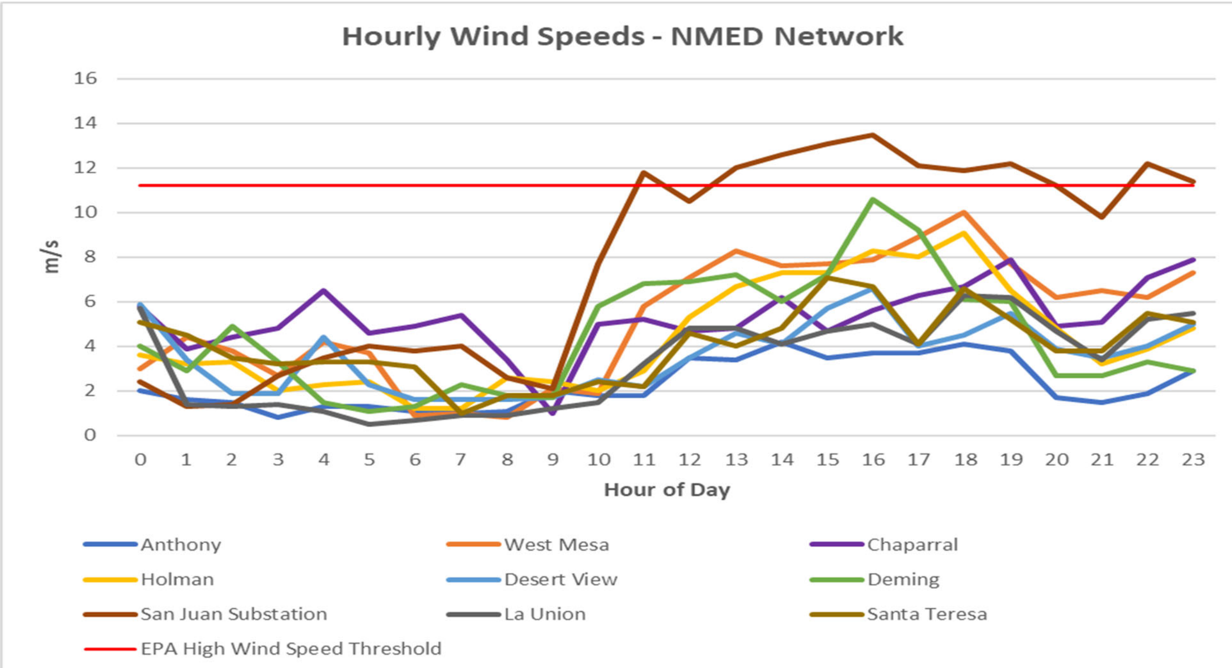


Figure 19-4. Wind speeds at NMED monitoring sites in Doña Ana, Luna, and San Juan Counties.

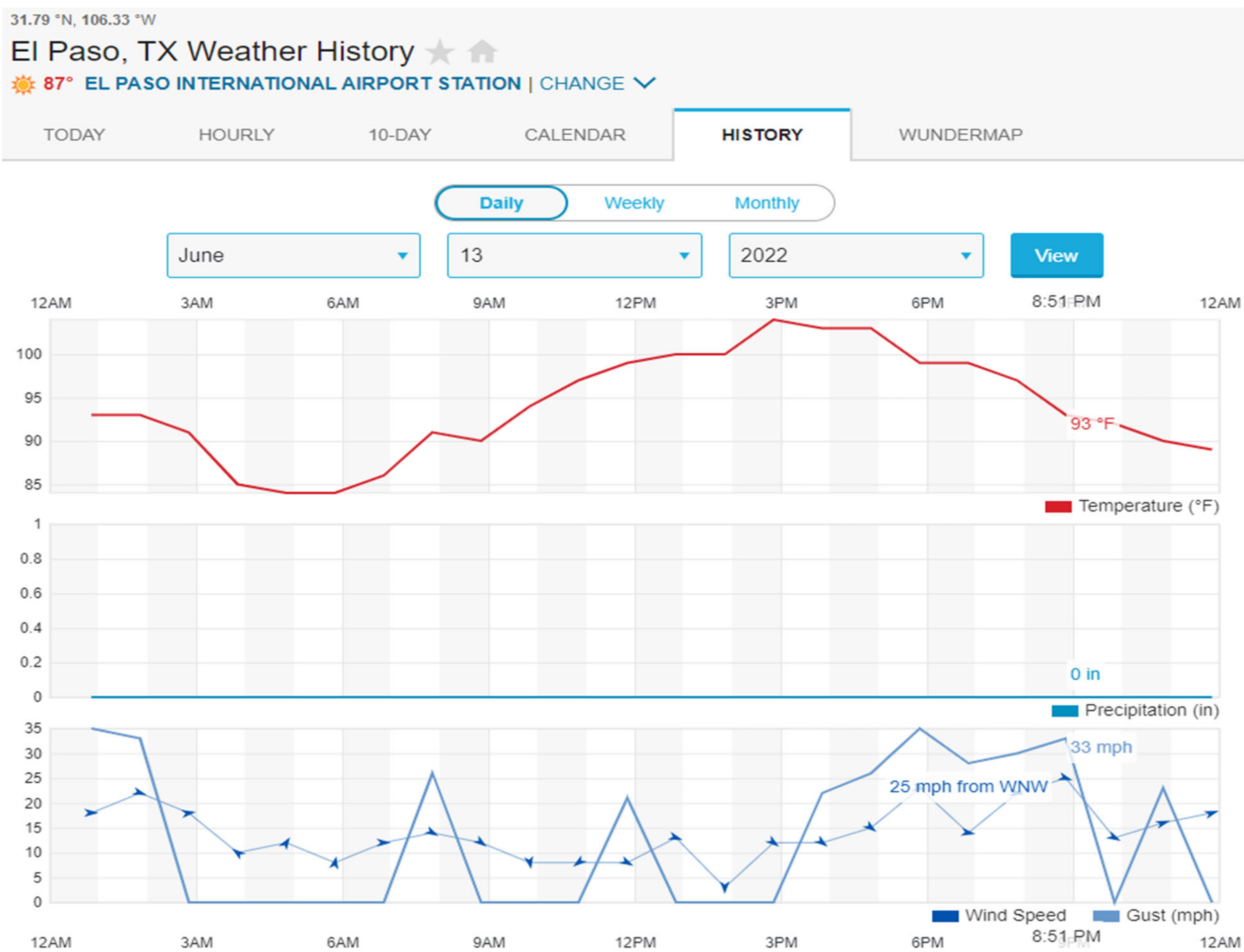


Figure 19-5. El Paso Airport historic weather data for June 13, 2022. Courtesy of weatherunderground.com

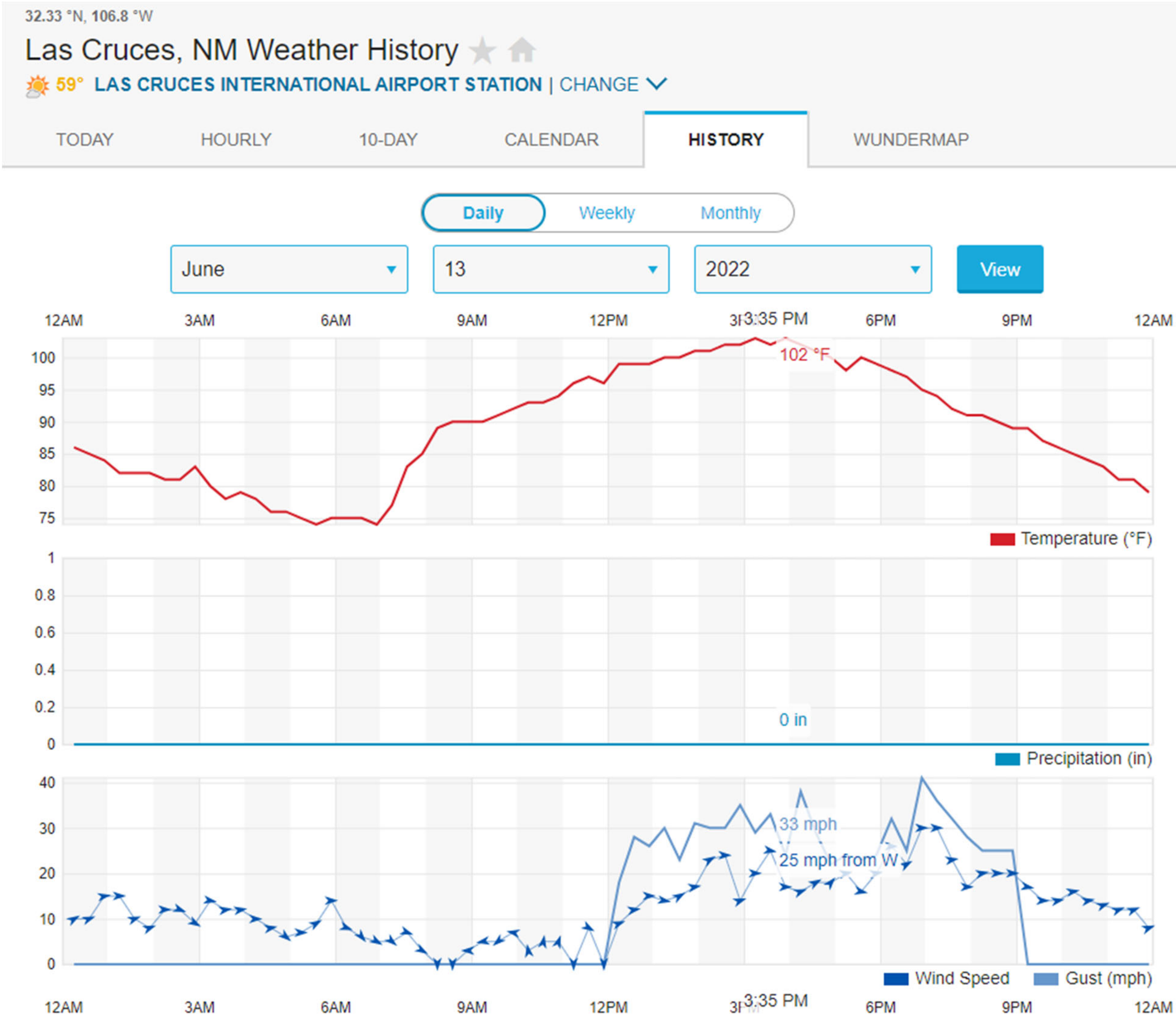


Figure 19-6. Las Cruces Airport historic weather data for June 13, 2022. Courtesy of weatherunderground.com

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Given the newly EPA designated status of the San Juan Substation monitoring site as a State and Local Air Monitoring Station (SLAMS) in 2023 from a Special Purpose Monitor and a general lack of exceedances of the PM_{10} NAAQS within the past four years of historical data the need for BACM through a Dust Mitigation Plan is currently not required for San Juan County. Bernalillo, Doña Ana, and Luna Counties are the only EPA required counties in New Mexico to implement a Dust Mitigation Plan based on historical PM_{10} NAAQS exceedances. Doña Ana, Luna, and San Juan Counties are under the jurisdiction of NMED.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in San Juan, McKinley, Doña Ana, Luna, Hidalgo, and Grant Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona, Texas and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on satellite imagery with dust plumes that are characterized as pink or magenta colors in the Suomi NPP satellite VIIRS RGB dust product originating upwind of NMED's monitoring sites in northeastern Arizona. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 19-7). The dust plumes of interest appear to be limited to Arizona, orientated in a southwest to northeast direction and traveling toward NMED's monitoring sites at the time of the satellite observation (1510 hour MDT) that captured the imagery.

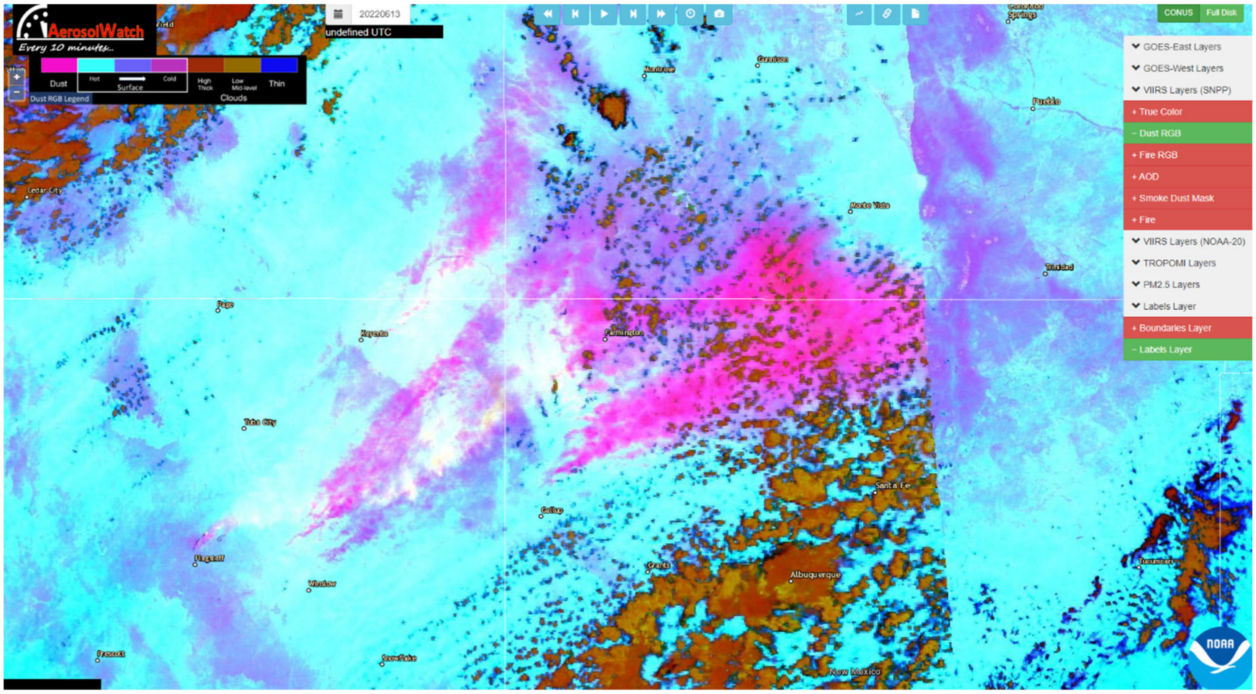


Figure 19-7. VIIRS RGB dust product imagery from the Suomi NPP satellite showing the Four Corners area. Imagery obtained from NASA's AerosolWatch website.

Radar Imagery

The event was captured on the High-Definition Radar product imagery with the cold front originating upwind of NMED's monitoring site in Luna County and moving in a southwest to northeast direction south of Deming along the Mexico international border which are represented as blue and green colors as the least dense of the cold front observed with orange and red being the densest outflow storm activity. The distinct blue line moving through Luna County and approaching Doña Ana County shows the fast-moving nature of the outflow boundary moving east through the region. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in New Mexico, Arizona, and Mexico (Figure 19-8).

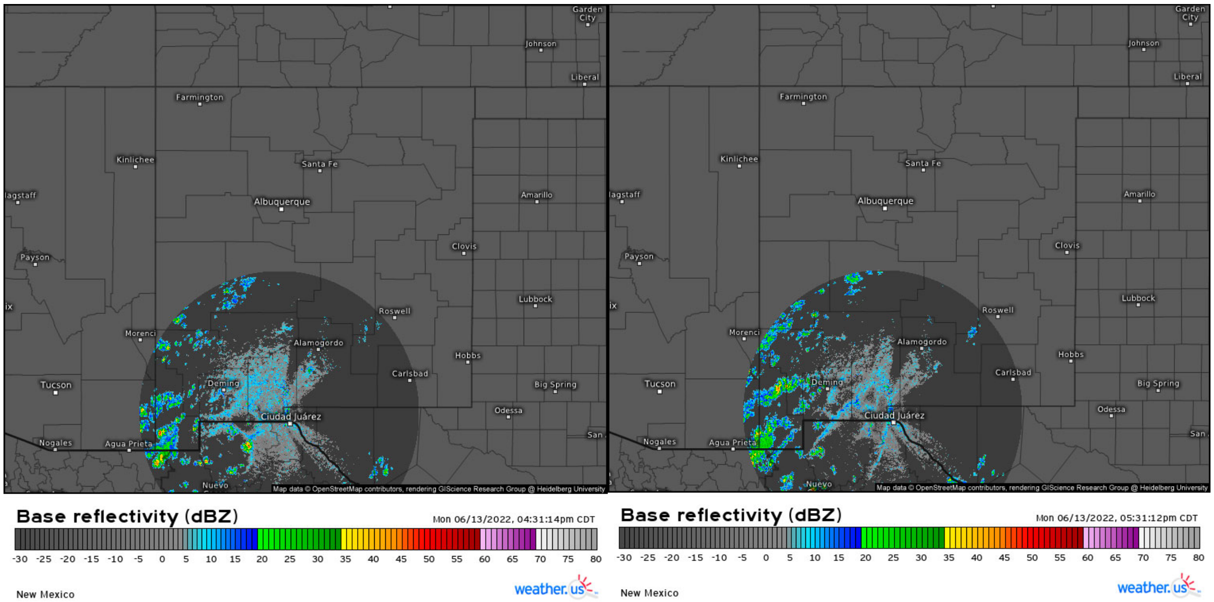


Figure 19-8. Radar imagery showing the outflow boundary approaching the Deming monitoring site from the 1531-1631 hours (MDT). Courtesy of weather.us

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Wind Advisory for this date. A Wind Advisory is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. This was in place for San Juan and McKinley Counties to warn the public of the high wind event. An excerpt from the NWS Wind Advisory can be found below:

"A Wind Advisory will be issued for areas from near Gallup to Farmington for this afternoon and early evening, where areas of blowing dust are likely…Wind Advisory from 1 PM this afternoon to 8 PM MDT this evening…"

The El Paso NWS was on the verge of issuing a wind warning but provided an excerpt describing the outflow wind conditions in the Hazardous Weather Outlook:

"…main threat will be strong and gusty outflow winds."

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from Arizona into both the Four Corners area and the southern New Mexico area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 19-9). This analysis supports the hypothesis that dust plumes originated in Arizona before being transported to downwind monitoring sites.

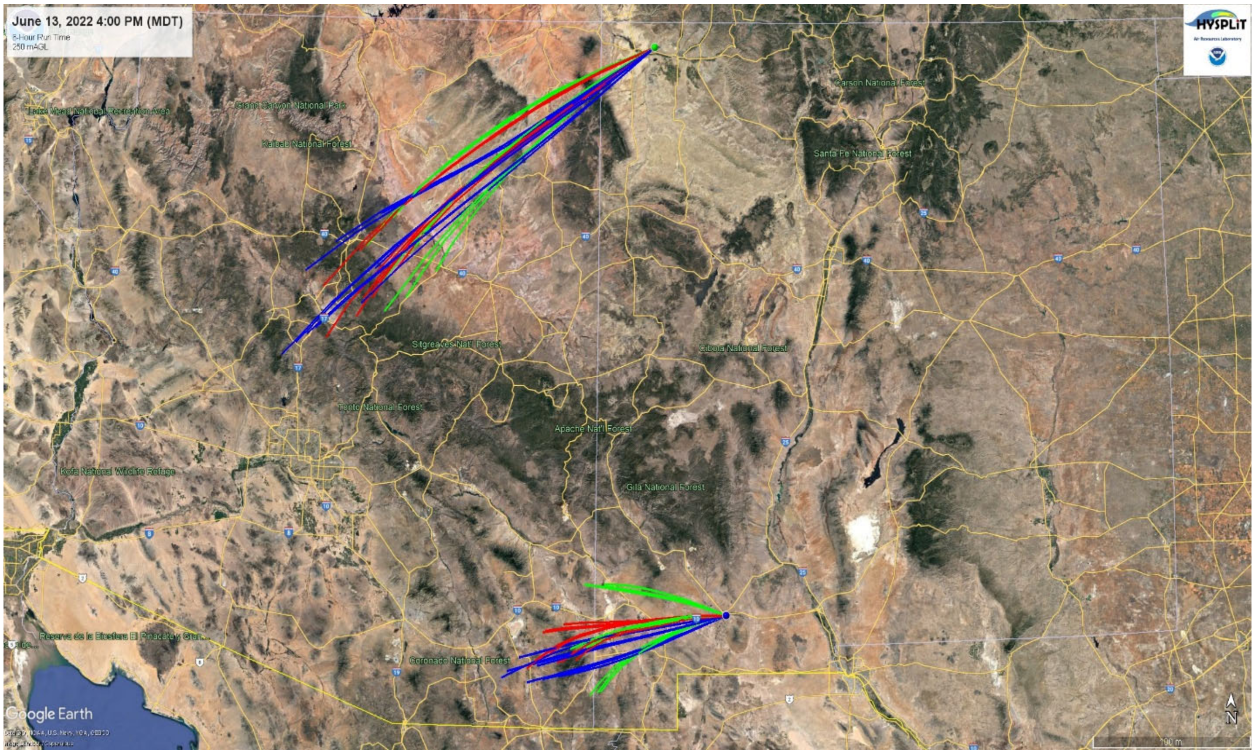


Figure 19-9. HYSPLiT back-trajectory analyses using the Ensemble mode for the Deming and San Juan Substation monitoring sites.

Wind Direction and Elevated PM_{10} Concentrations
A pollution rose (Figures 19-10 and 19-11) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (1000-2000 hour). During the event, winds primarily blew from the west approximately 100% of time coinciding with peak PM_{10} concentrations.

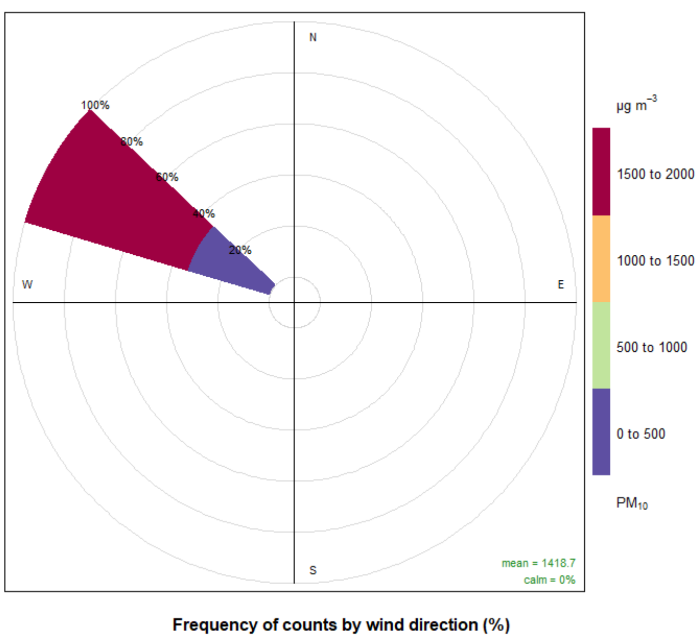


Figure 19-10. Pollution rose for the Deming monitoring site.

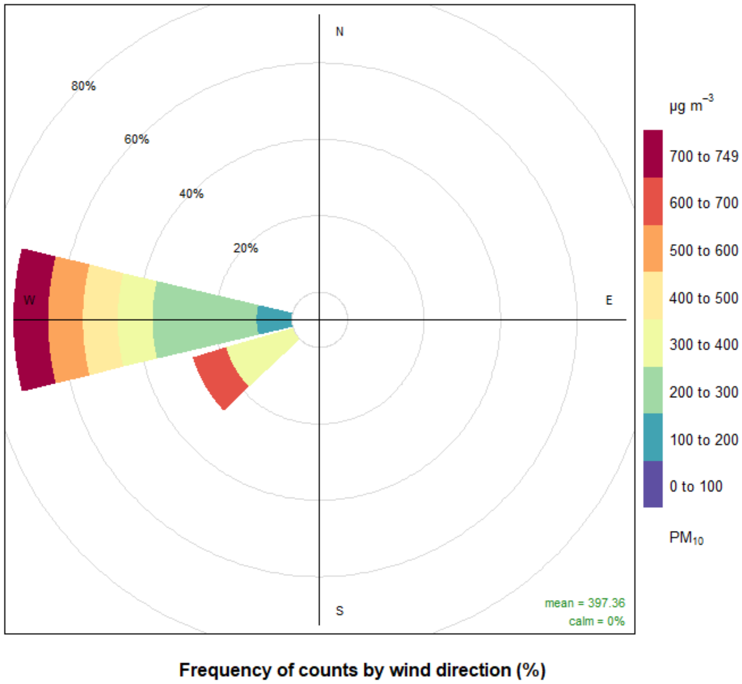


Figure 19-11. Pollution rose for the San Juan Substation monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong east-southeasterly winds beginning at the 1100 hour and lasting through the 2300 hour. During this time, peak hourly PM_{10} concentrations ranged from 237 to 1956 μg/m^3 were recorded at the Anthony and Deming monitoring sites, respectively (Figure 19-13). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 4.2 to 13.5 m/s were recorded at the Anthony and San Juan Substation monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figures 19-14 and 19-15 demonstrate the correlation between elevated levels of PM_{10} and high winds for this event.

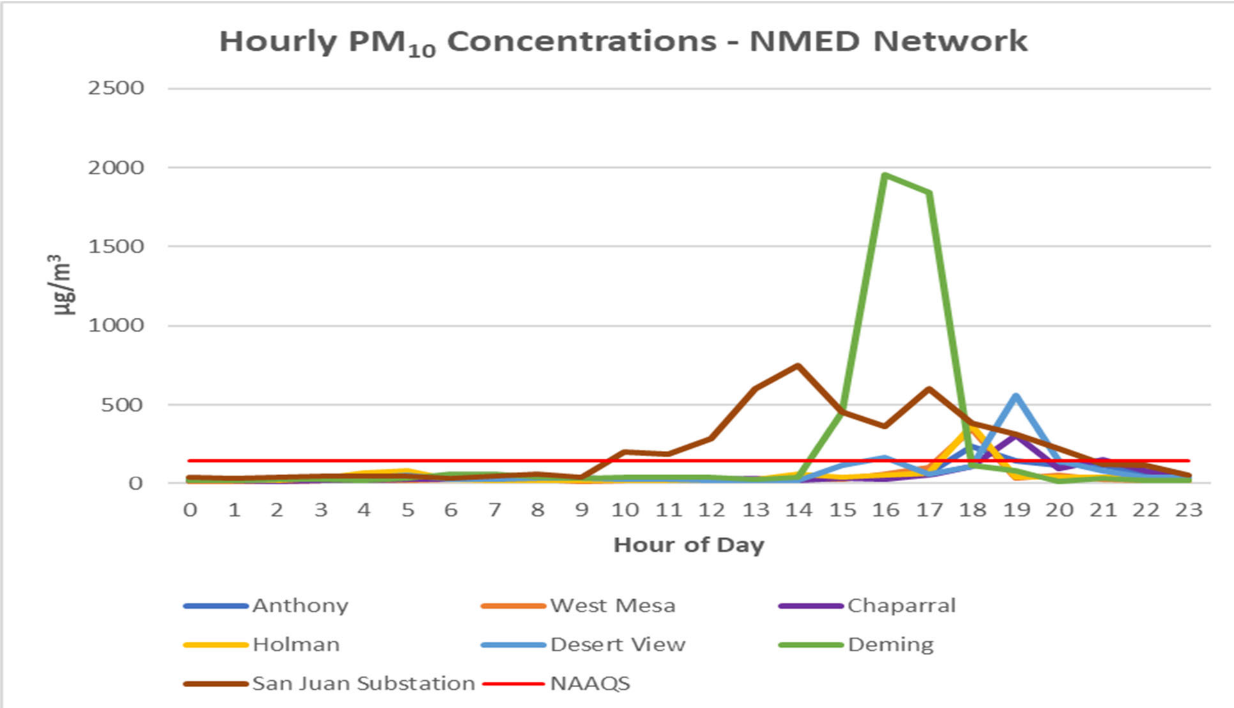


Figure 19-12. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

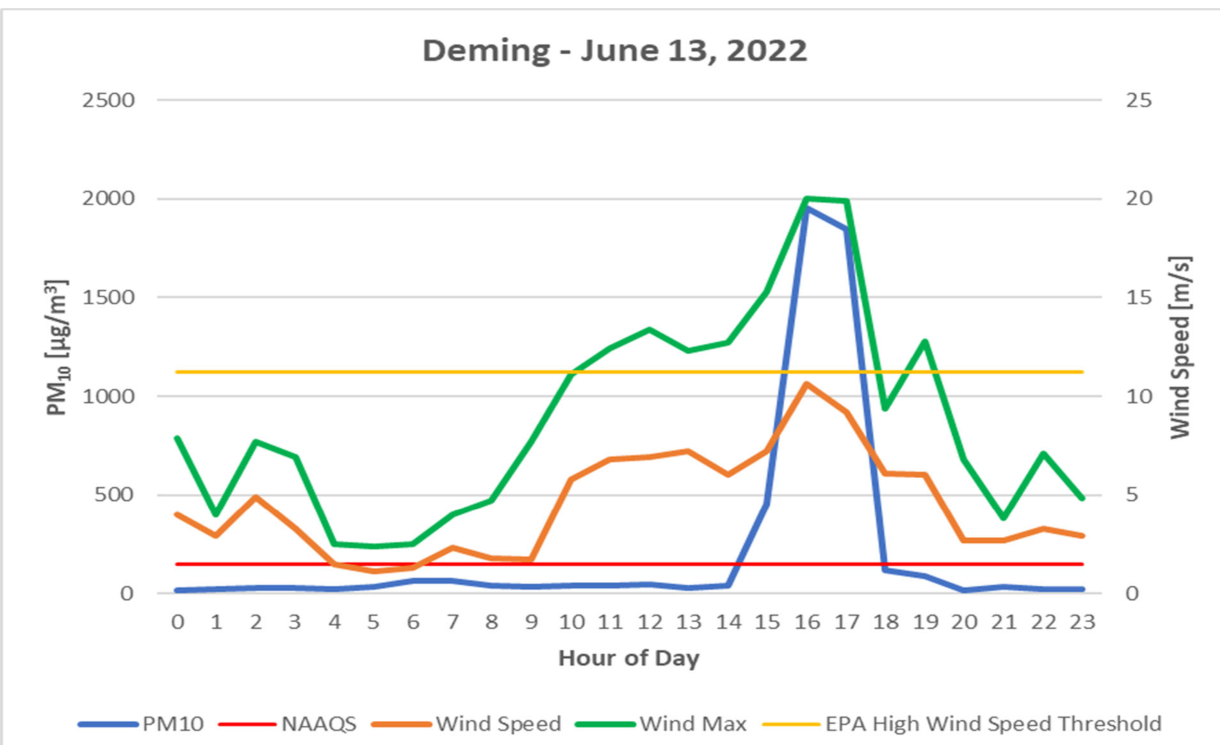


Figure 19-13. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

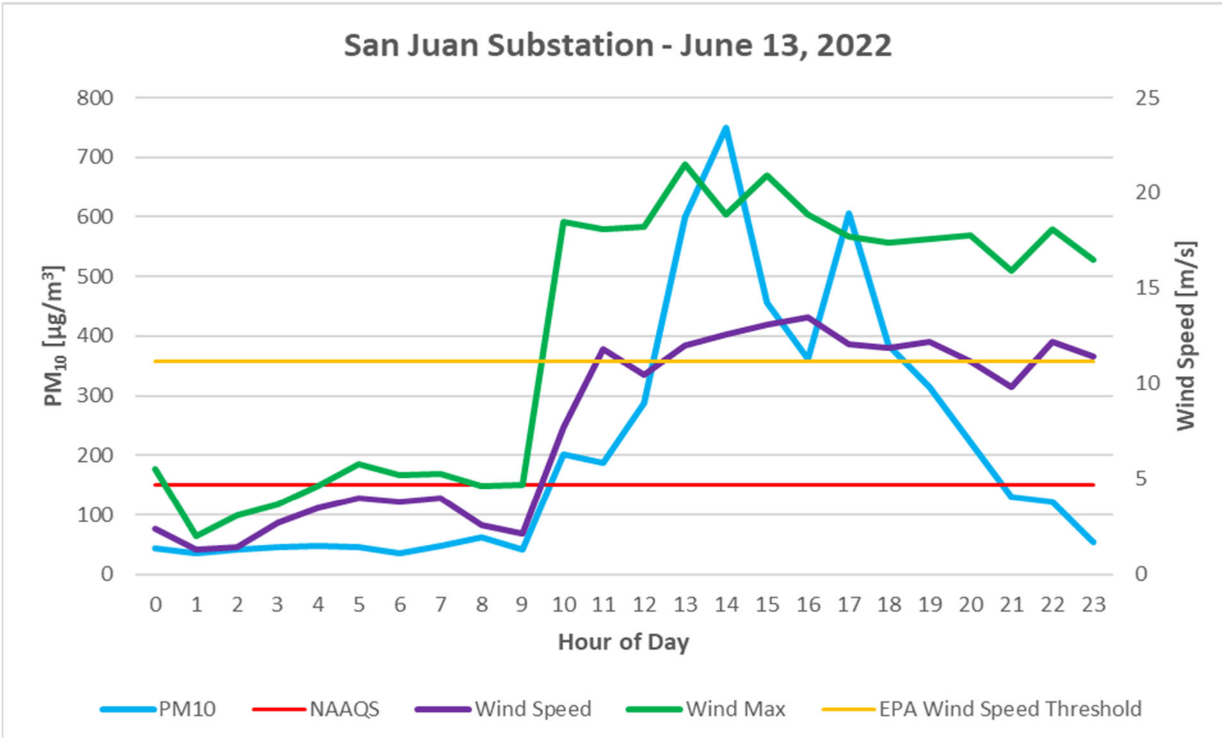


Figure 19-14. San Juan Substation monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Deming and San Juan Substation monitoring sites recorded 14 and 1 exceedance(s), respectively, of the PM_{10} NAAQS (Figures 22-6 and 22-7 in Appendix B). The maximum 24-hour average PM_{10} concentration at these sites were 721 (Deming) and 171 (San Juan Substation) µg/m^3, recorded in 2019 and 2022, respectively. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 19-16, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 139 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the state.

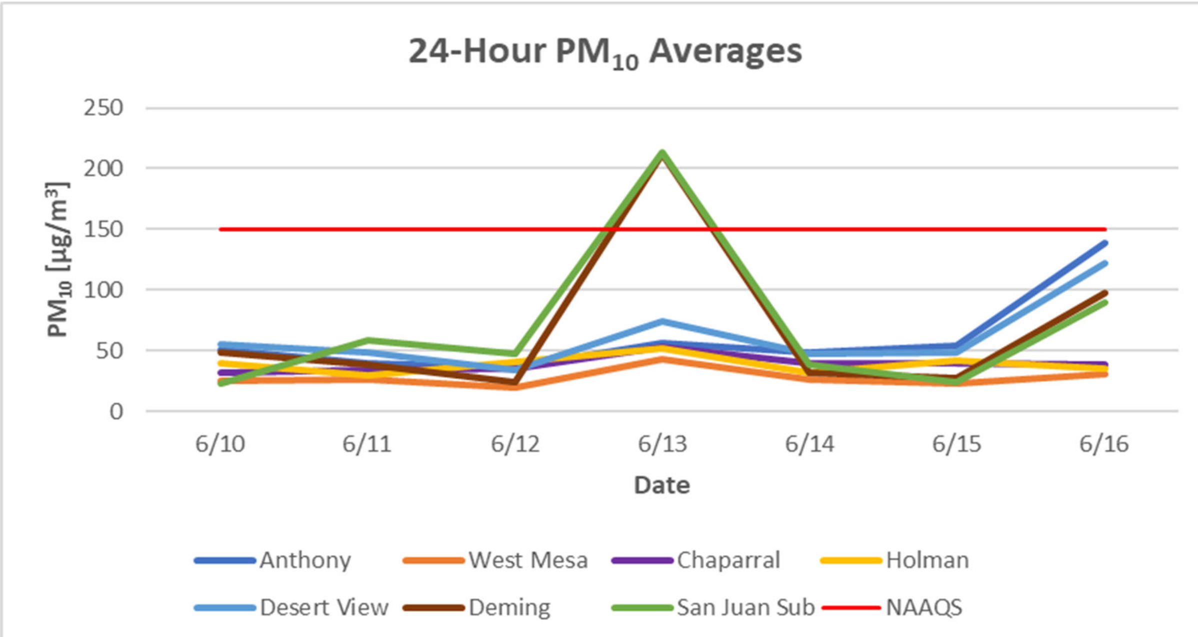


Figure 19-15. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded values for this day 212 (Deming) and 213 (San Juan Substation) µg/m^3 are both above the 99th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average 212 (Deming) and 213 (San Juan Substation) µg/m^3 are both above the 99th percentiles monitored over the previous four to five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

20. HIGH WIND EXCEPTIONAL EVENT: August 2, 2022

Conceptual Model

Thunderstorm outflow caused high winds and blowing dust in Luna County resulting in an exceedance of the PM_{10} NAAQS at the Deming monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 20-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-029-0003	7E Deming	173 µg/m^3	10.4 m/s	15.5 m/s

Table 20-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

Today begins with a high-pressure system that will bring triple digit temperatures along with upper atmosphere moisture that will increase scattered showers west of the Rio Grande in the afternoon. At the 1800 hour, the area of low-pressure and a dryline are located along the Texas/New Mexico international border (Figure 20-1). Aloft, the center of the low-pressure system is located at the Arizona/New Mexico border (Figure 20-2). Diurnal heating of the surface at sunrise allowed moisture laden winds aloft to mix down creating enough convective energy to increase surface wind velocities providing the turbulence required for vertical mixing and entrainment of dust in a short amount of time and in relatively small sporadic areas due to the unpredictable nature of convective outflow thunderstorm activity.

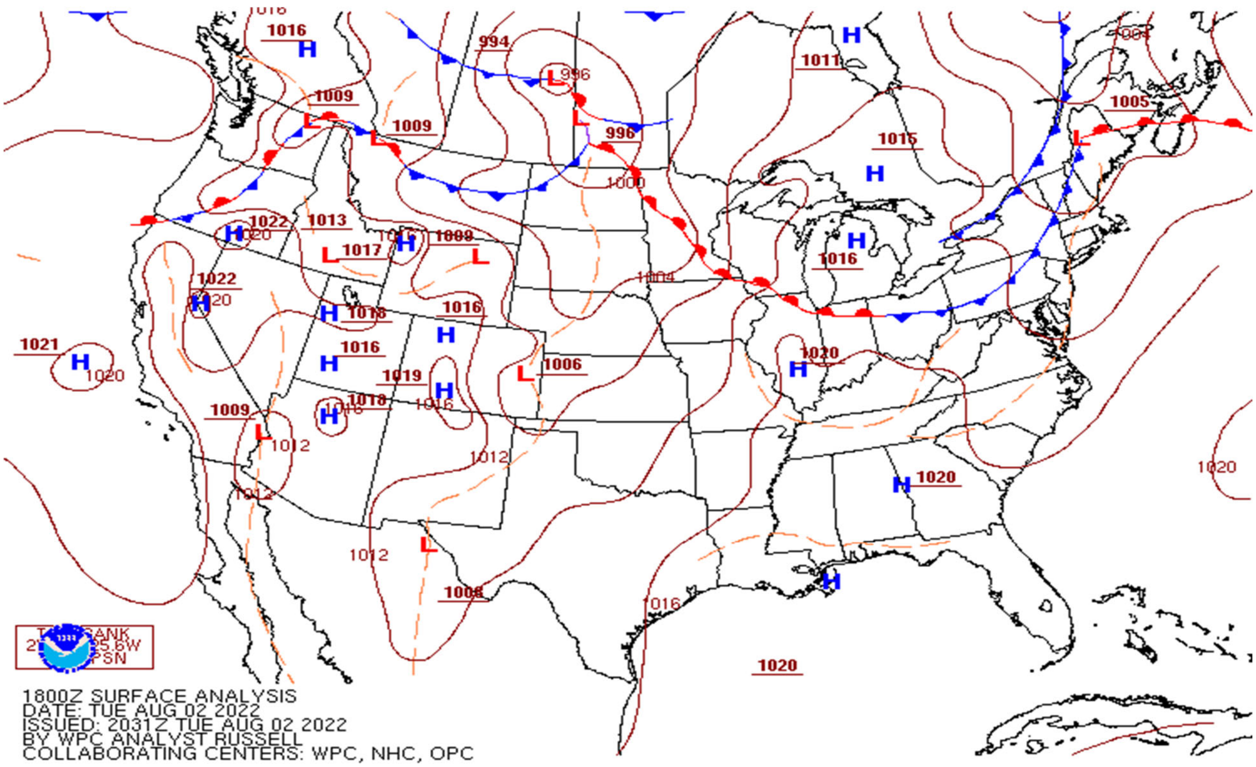


Figure 20-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

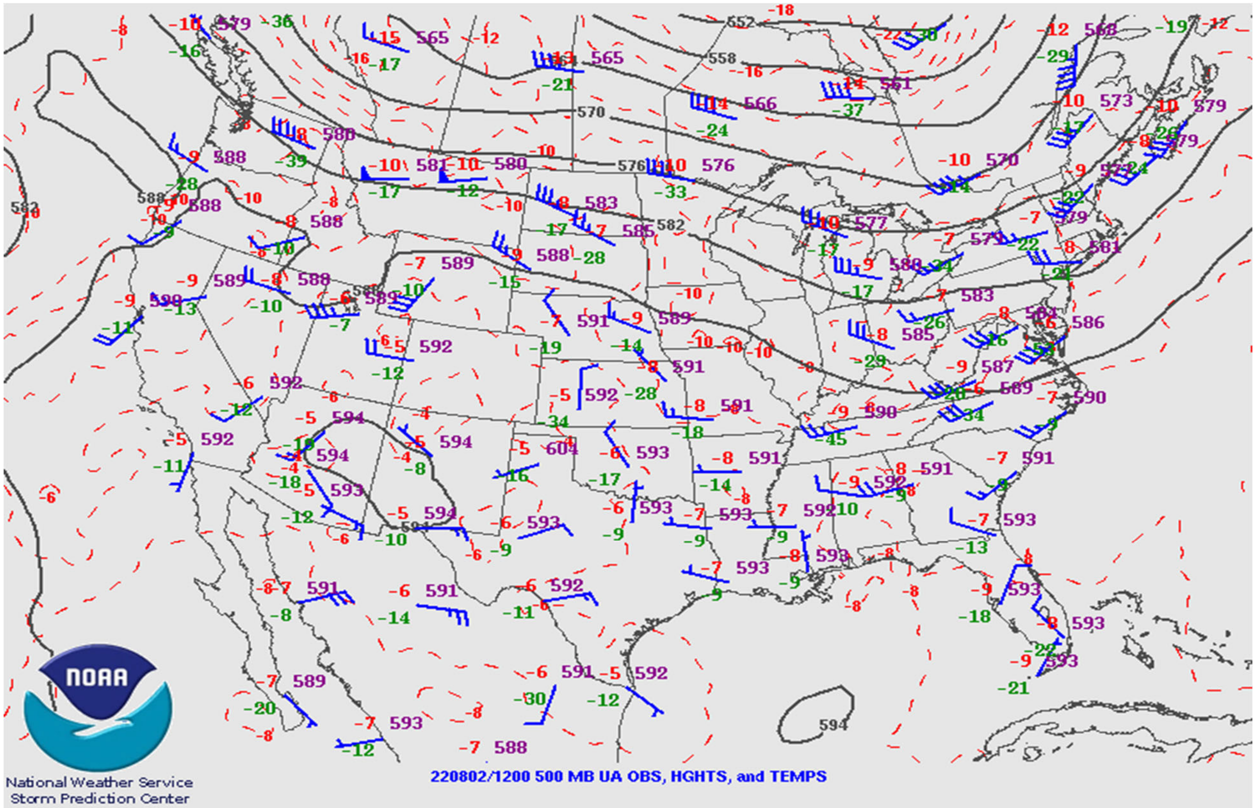


Figure 20-2. Upper air weather map for August 2, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind primarily blew from the northwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at the Deming monitoring site beginning at the 1300 hour and lasted through the 1600 hour. PM_{10} concentrations began to exceed the NAAQS at the Deming monitoring sites beginning at the 1300 hour. Hourly concentrations remained elevated through the 1500 hour. Table 7-2 below summarizes peak hourly PM_{10} concentrations, wind speeds, and wind gusts during the event. Additionally, Santa Teresa and La Union five-minute wind speed data is provided in Table 20-2.

Hour	West Mesa			Holman			Deming		
	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m³)	Wind Speed (m/s)	Wind Gust (m/s)
1200	14	4	7.8	17	3.1	5.5	100	5.2	12.9
1300	17	3.9	7.4	9	2.6	6.9	2302	9.3	15.5
1400	5	3.2	6.2	9	2.7	6.1	24	8.1	13.1
1500	5	2.4	6	7	2.2	5	1392	10.4	15.4
1600	61	8	16.7	7	2.4	7.4	117	9	14.6

Table 20-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists had difficulty forecasting the high wind blowing dust event to occur this day, as the monsoon outflow conditions are difficult to predict where the brunt of the storm will impact until shortly before conditions start to materialize. Forecasts predicted strong winds as the storm approached the area with the area of low-pressure tracking from east to west moving across the forecast area in the early afternoon hours after a high-pressure system in the morning hours. The system's movement across the area timed well with daytime heating and mixing generated sporadic outflow conditions with Luna County experiencing the brunt of the storms impact. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area once conditions began to materialize, especially in the desert areas of southern New Mexico.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. Unfortunately, NMED monitoring sites recorded sustained wind speeds less than the wind speed threshold for this date (Figure 20-3). Additional wind speed data is provided for the Lordsburg Playa (Figure 20-4) and the Chihuahua Desert Range (Figure 20-5) meteorological stations showing the difference in wind intensity northeast of Las Cruces versus near the Deming monitoring site with very gusty conditions. The Grant County Airport located in the town of Hurley north of Deming has a 20-minute sustained wind speed documented at the 1535 hour were in excess of the wind speed threshold (Figure 20-6). The vast rural area of Luna County makes obtaining meteorological data difficult to obtain due to the sparse network. NMED is relying on the assumption that wind speeds exceeded minimum threshold criteria where the sources of natural windblown dust coming from the north northwest from the Deming monitoring site were sufficient to overwhelm BACM.

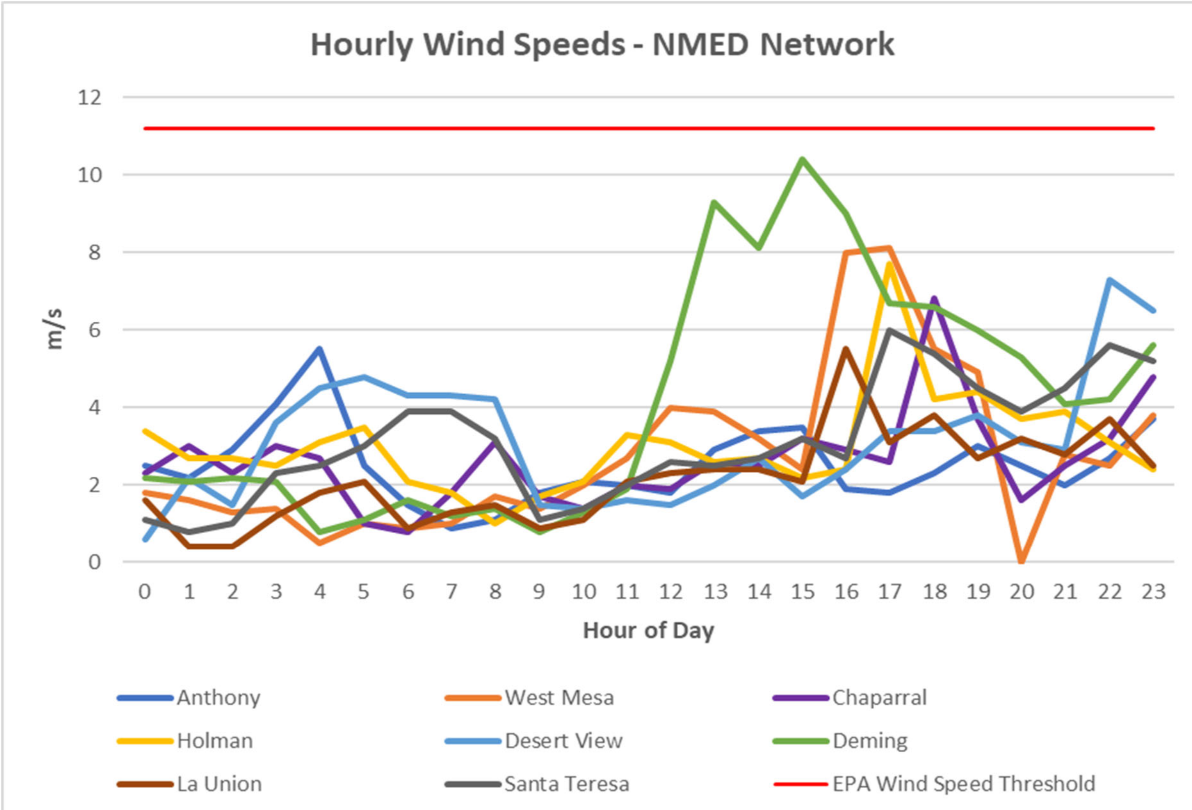


Figure 20-3. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Home ZiaMet Lordsburg Playa Request Data

Lordsburg Playa Daily Surface Weather

	Air Temperature			RH			3m Wind Speed		3m Wind Direction	Rain	Solar Radiation
	F			%			MPH		deg	in	MJ/m^2
Date	Max	Min	Mean	Max	Min	Mean	Max	Mean	Mean	Total	Total
2022-08-02	93.6	75.4	83.2	68.3	37.4	53.2	32.9	10.9	279.0	0.0	17.19

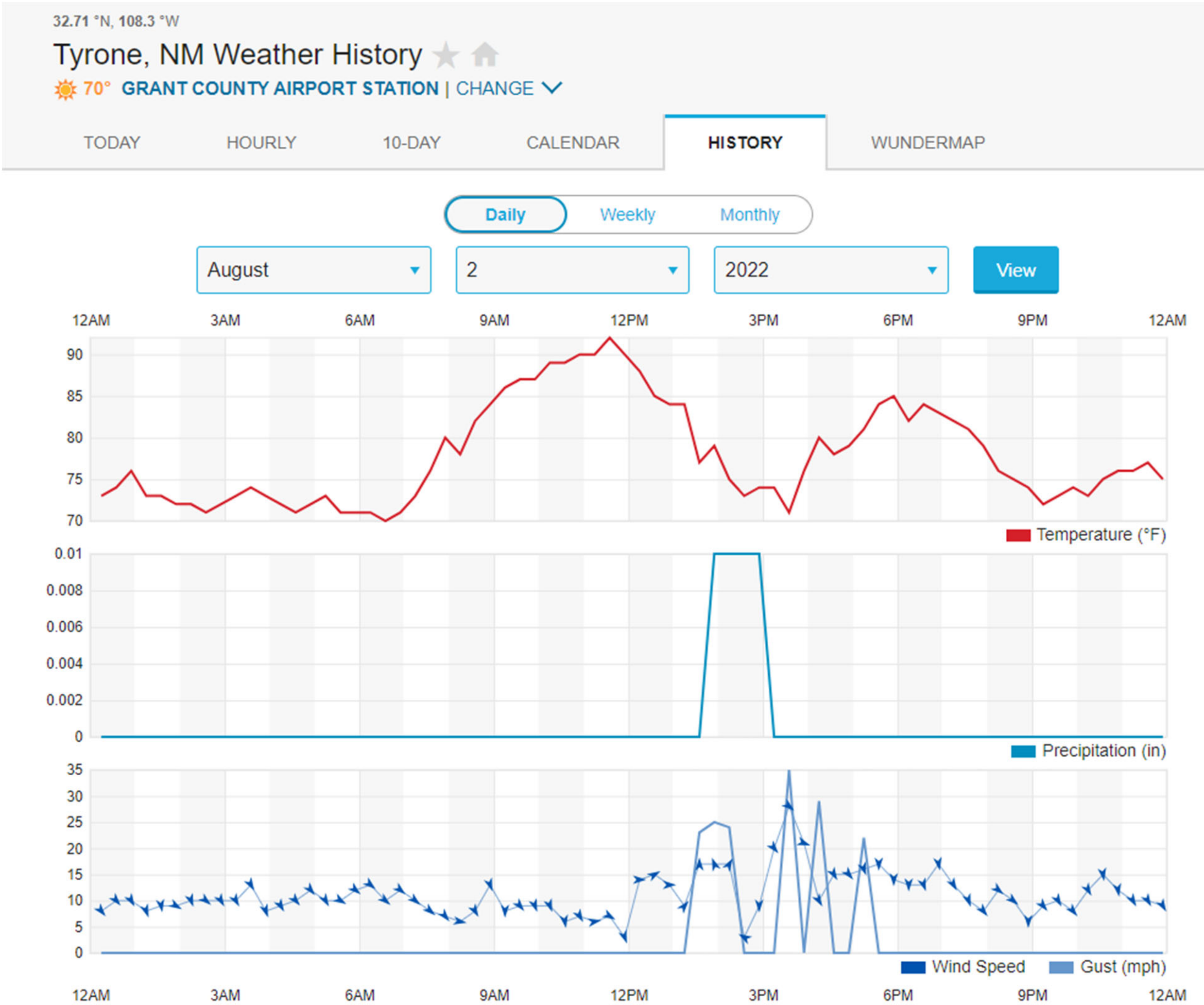
Figure 20-4. Lordsburg Playa meteorological station historic data for August 2, 2022. Courtesy of NMSU's ZiaMet.

Home ZiaMet Chihuahua Desert Range RC Request Data

Chihuahua Desert Range RC Daily Surface Weather

	Air Temperature			RH			3m Wind Speed		3m Wind Direction	Rain	Solar Radiation
	F			%			MPH		deg	in	MJ/m^2
Date	Max	Min	Mean	Max	Min	Mean	Max	Mean	Mean	Total	Total
2022-08-02	99.6	72.2	83.7	62.5	23.5	43.8	32.5	4.1	223.0	0.05	19.97

Figure 20-5. Chihuahua Desert Range meteorological station historic data for August 2, 2022. Courtesy of NMSU's ZiaMet.



Daily Observations

Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Condition
2:55 PM	74 °F	62 °F	66 %	N	9 mph	0 mph	24.72 in	0.0 in	T-Storm
3:15 PM	74 °F	63 °F	69 %	NW	20 mph	0 mph	24.72 in	0.0 in	T-Storm
3:35 PM	71 °F	61 °F	69 %	NW	28 mph	35 mph	24.72 in	0.0 in	Thunder / Windy
3:55 PM	76 °F	58 °F	54 %	WNW	21 mph	0 mph	24.70 in	0.0 in	Mostly Cloudy / Windy
4:15 PM	80 °F	56 °F	43 %	NNW	10 mph	29 mph	24.69 in	0.0 in	Partly Cloudy
4:35 PM	78 °F	57 °F	49 %	NNW	15 mph	0 mph	24.68 in	0.0 in	Thunder in the Vicinity
4:55 PM	79 °F	58 °F	49 %	NW	15 mph	0 mph	24.68 in	0.0 in	Fair
5:15 PM	81 °F	62 °F	52 %	NNW	16 mph	22 mph	24.67 in	0.0 in	Fair

Figure 20-6. Grant County Airport historic meteorological data for August 2, 2022. Courtesy of Weather Underground.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Luna, Hidalgo, Grant, McKinley, and Doña Ana Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Radar Imagery

The event was captured on the NOAA High-Definition Radar product imagery with the thunderstorm outflows originating upwind of NMED's monitoring site in northern Luna County and southern Grant County ejecting to the south towards Deming which are represented as blue and green colors as the least dense of the thunderstorm outflows observed with orange and red being the densest outflow storm activity located nearest to the Deming monitoring site. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in New Mexico, Arizona, and Mexico (Figure 20-7). U.S. Highway 180 that connects Silver City to Deming commonly experiences brown out conditions which prompts NM Department of Transportation road closures during periods of low visibility.

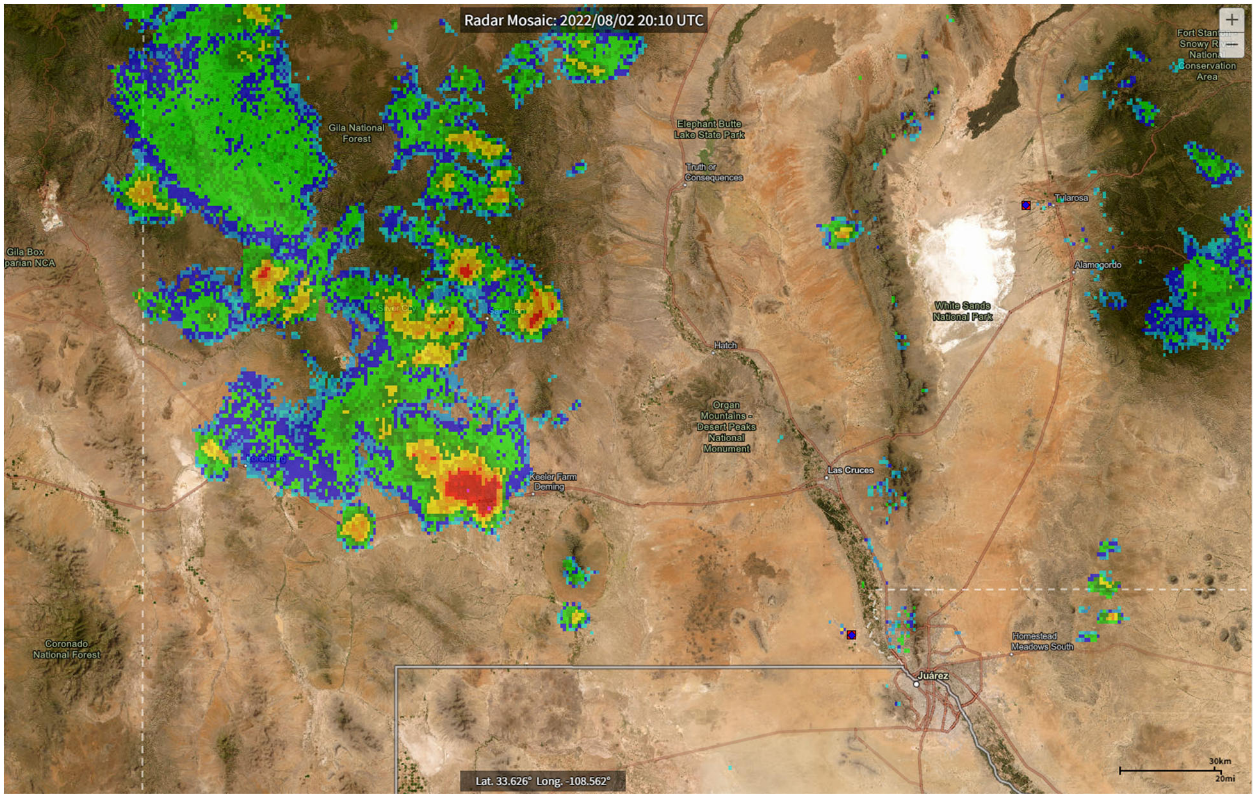


Figure 20-7. Aerosol Optical Depth (AOD) product imagery from the GOES-16 geostationary satellite showing southwestern New Mexico, northern Chihuahua and western Texas. Imagery obtained from NASA's AerosolWatch website.

Weather Statements, Advisories, News and Other Media Reports Covering the Event

The National Weather Service (NWS) issued a Hazardous Weather Outlook for this date. A Hazardous Weather Outlook is a statement issued by NWS to provide information to the public about potential adverse weather events. A Hazardous Weather Outlook statement was issued for southwestern New Mexico and west Texas to warn the public of the high wind event. An excerpt from the NWS Hazardous Weather Outlook and Area Forecast Discussion can be found below:

"Isolated late afternoon and evening thunderstorms. Peas-size hail and wind gusts 35 to 45 mph possible with these storms."

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from western New Mexico into the southern New Mexico area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 20-8). This analysis supports the hypothesis that dust plumes originated in New Mexico and Arizona before being transported to downwind monitoring sites.

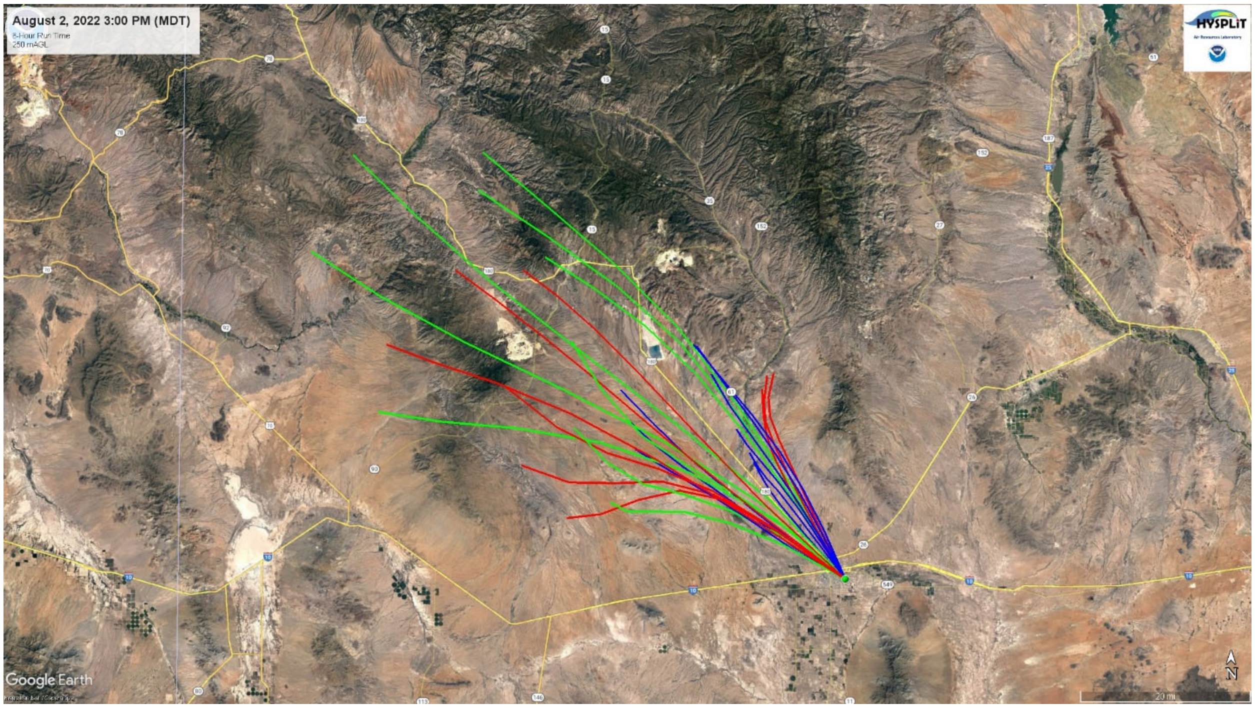


Figure 20-8. HYSPLiT back-trajectory analyses using the Ensemble mode for the Deming monitoring site.

Wind Direction and Elevated PM_{10} Concentrations

A pollution rose (Figure 20-9) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (1300-1500 hour). During the event, winds primarily blew from the north northwest approximately 60% and sporadically coming from the east and southwest the other 40% of time coinciding with peak PM_{10} concentrations.

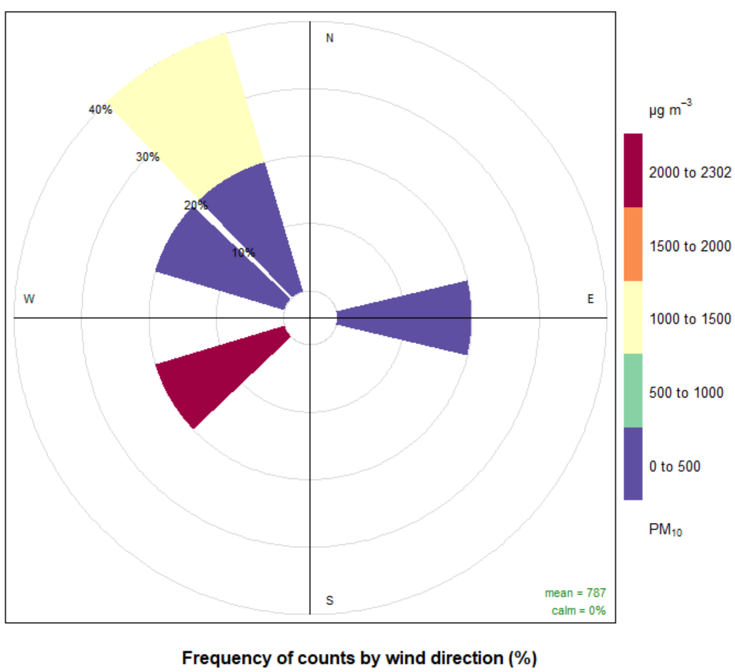


Figure 20-9. Pollution rose for the Deming monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated generally strong north-northwest winds beginning at the 1300 hour and lasting through the 1600 hour. During this time, peak hourly PM_{10} concentrations ranged from 48 to 2302 µg/m^3 were recorded at the Chaparral and Deming monitoring sites, respectively (Figure 20-10). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked only for the Deming monitoring site due to the brunt of the outflow thunderstorm activity primarily impacted the Deming area of the monitoring network. Sustained hourly average wind speeds ranged from 5.5 to 10.4 m/s were recorded at the Anthony and Deming monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plot in Figure 20-11 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

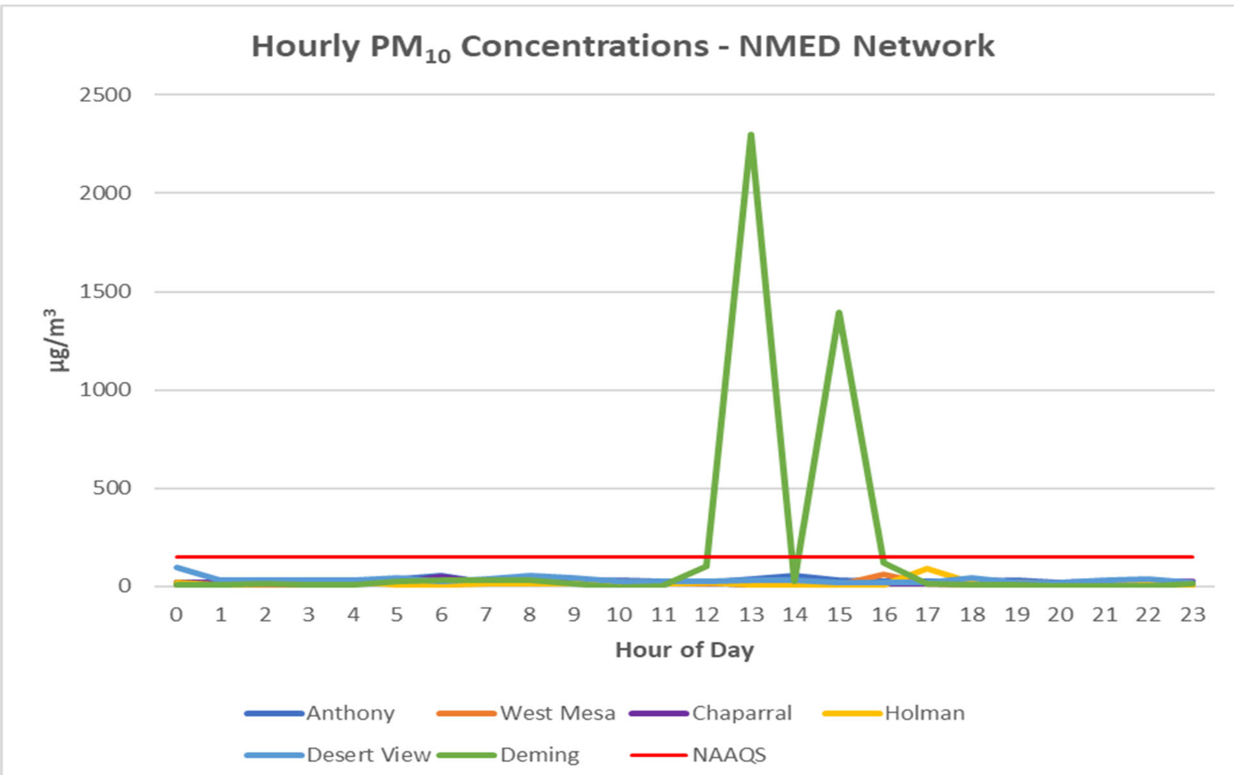


Figure 20-10. NMED monitoring network hourly PM_{10} data for the high wind blowing dust event.

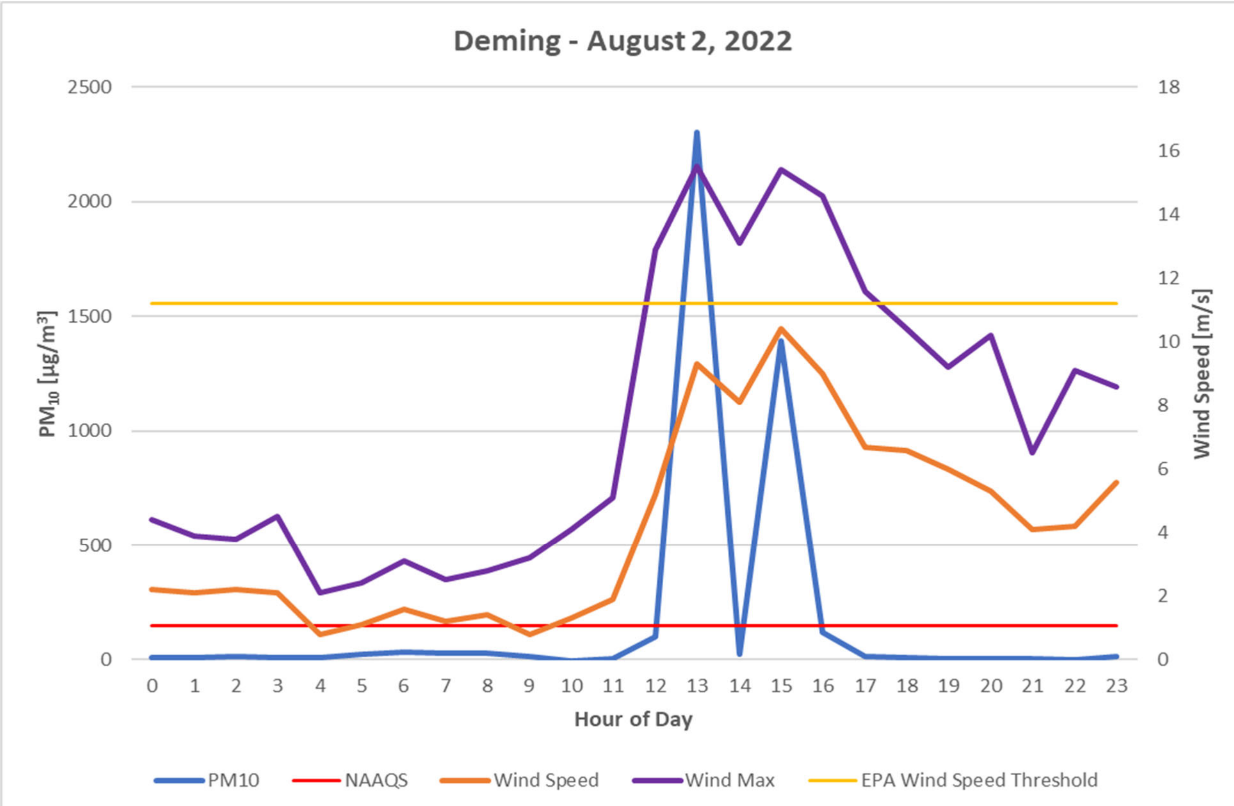


Figure 20-11. Deming monitoring site hourly PM_{10} and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Deming monitoring site recorded 14 exceedances of the PM_{10} NAAQS (Figure 22-6 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 721 µg/m^3, recorded in 2019. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 20-12, the Deming monitoring site recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 90 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

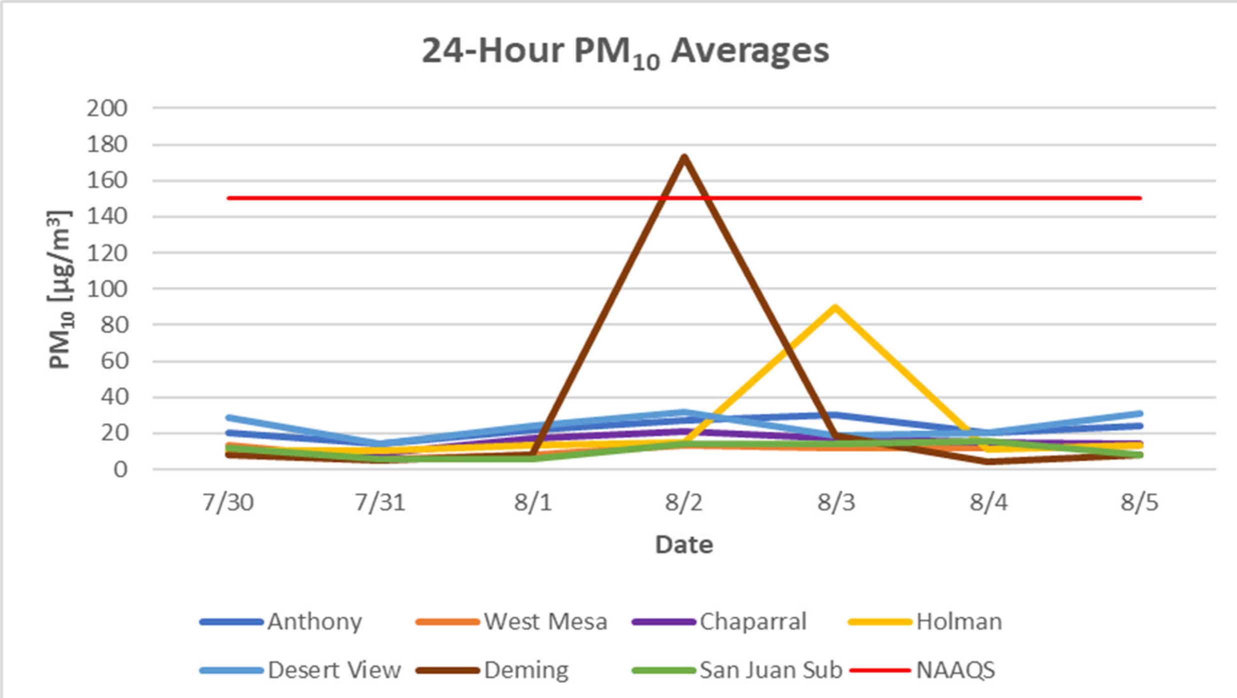


Figure 20-12. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking
Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (173 µg/m^3) is above the 99th percentile of historical data.

CCR Conclusion
On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average (173 µg/m^3) is above the 99th percentile monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

21. HIGH WIND EXCEPTIONAL EVENT: December 12, 2022

Conceptual Model

A Pacific cold front caused high winds and blowing dust in Doña Ana County resulting in an exceedance of the PM_{10} NAAQS at the Anthony monitoring site on this date. In accordance with the EER, the AQB submitted this data to EPA's AQS database and flagged it (coded as RJ) as a high wind dust event (Table 21-1).

AQS Flag	AQS ID	Site Name	24-Hour Average Concentration	Max 1-Hour Wind Speed	Max Gust
RJ	35-013-0016	6CM Anthony	158 μg/m^3	10.5 m/s	19.6 m/s

Table 21-1. 2022 PM_{10} Data flagged by NMED for exclusion pursuant to the EER.

A strong upper level low will create strong gusty winds that will create patchy blowing dust potential along with rain showers and cold temperatures as the frontal passage moves through the region. Surface wind map shows the lee side of the frontal passage at the southeastern corner of Colorado (Figure 21-1). Aloft, the deep trough axis of the storm system hovered over the Great Basin. As the day progressed this low-pressure aloft traveled west and aligned itself with New Mexico and tapped into the surface wind direction with increasing wind speeds (Figure 21-2). Diurnal heating of the surface at sunrise allowed the strong upper winds aloft to mix down creating enough convective energy to increase surface wind velocities providing the turbulence required for vertical mixing and entrainment of dust.

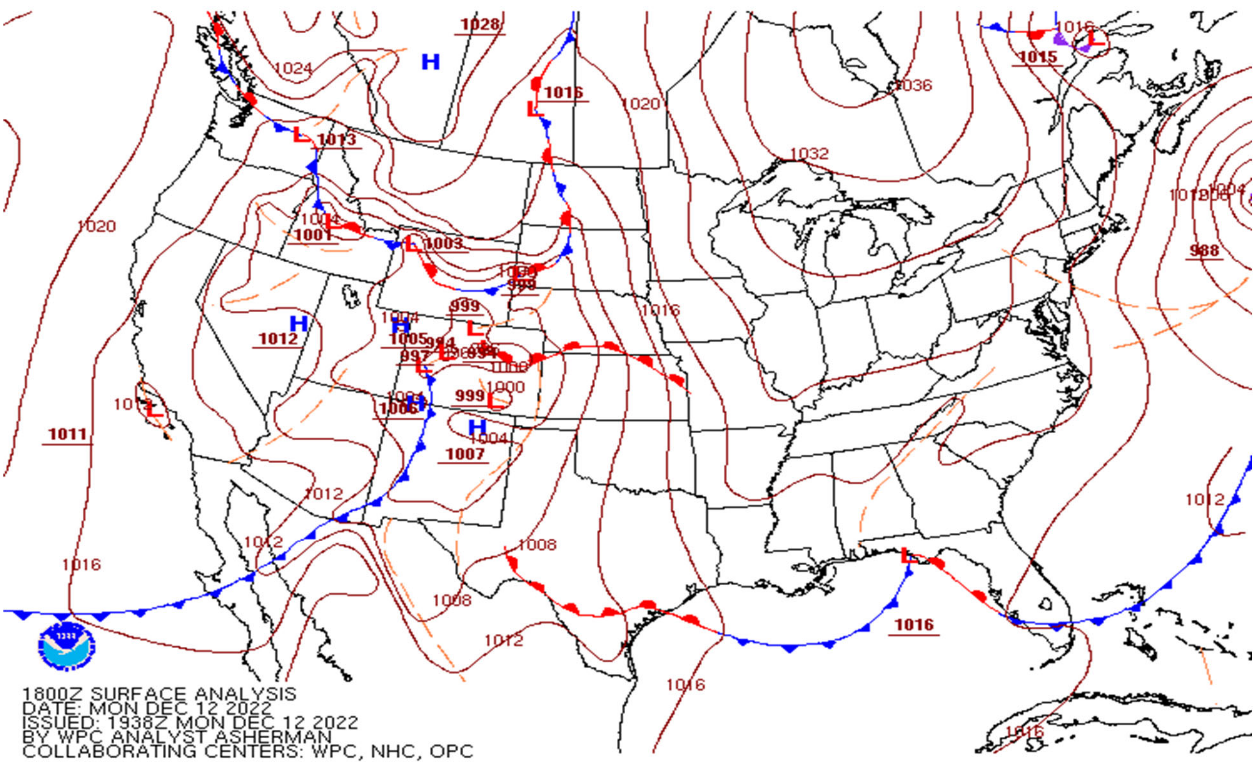


Figure 21-1. Surface weather map showing storm (surface low), cold fronts and isobars of constant pressure (red lines).

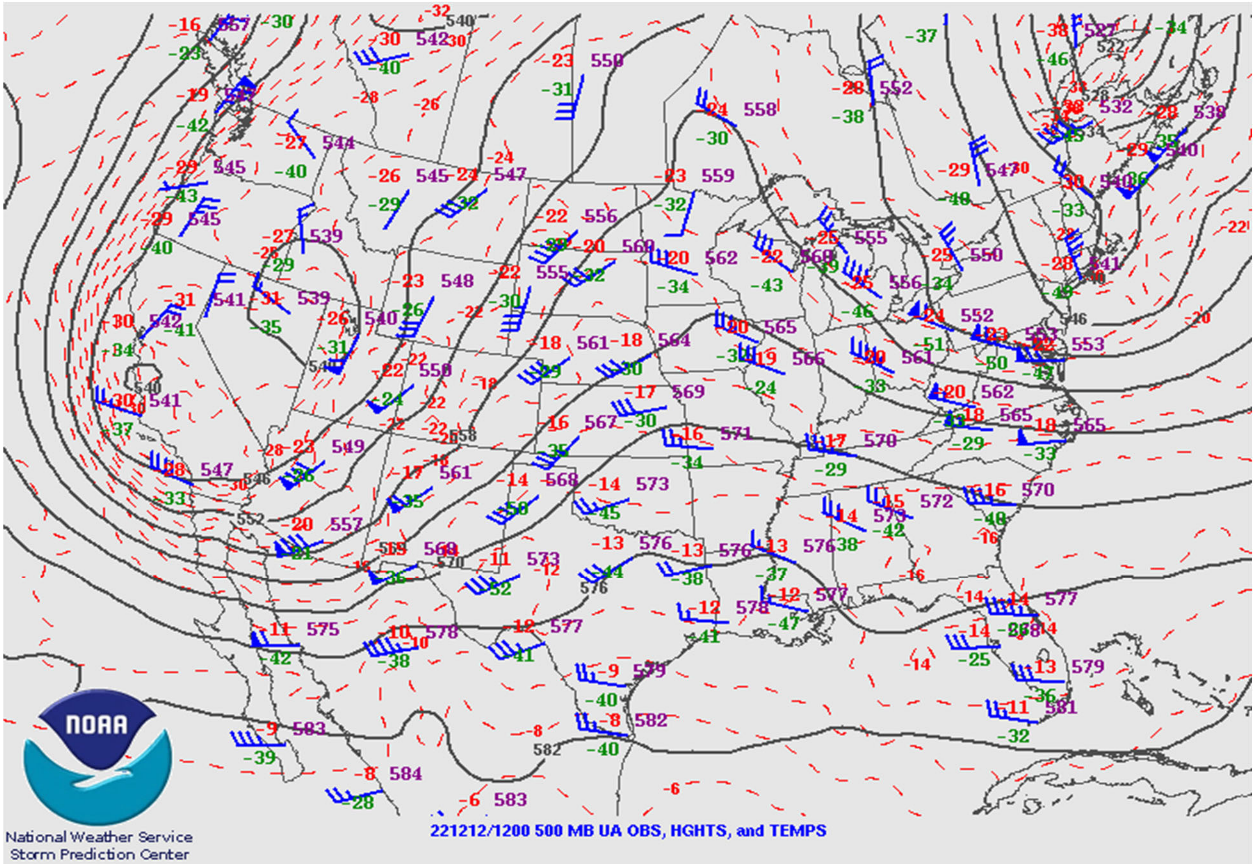


Figure 21-2. Upper air weather map for December 12, 2022, at the 1200 hour. Wind barbs depict wind speed (knots) and direction.

As the event unfolded, the wind blew from the southwest throughout the border region. These high velocity winds passed over large areas of desert within New Mexico and Mexico. Anthropogenic sources of dust near NMED's monitoring sites include: disturbed surface areas, residential properties, vacant lots, dirt roads, and storage piles.

The co-occurrence of high winds and elevated levels of blowing dust, little to no point sources in the area, and the high hourly and daily PM_{10} concentrations support the assertion that this was a natural event, specifically a high wind dust event. Sustained hourly wind speeds exceeding 9 m/s (~20 mph) were recorded at Anthony, Desert View, Chaparral, Holman, West Mesa, La Union, Santa Teresa, and Deming monitoring sites beginning at the 1100 hour and lasted through the 1900 hour. PM_{10} concentrations began to exceed the NAAQS at the Anthony, Desert View, Chaparral, Holman, West Mesa and Deming monitoring sites beginning at the 0800 hour. Hourly concentrations remained elevated through the 1500 hour. Table 21-2 below summarizes peak hourly PM_{10} concentrations, wind speeds, and wind gusts during the event.

Hour	West Mesa			Holman			Anthony		
	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)	PM_{10} (µg/m^3)	Wind Speed (m/s)	Wind Gust (m/s)
1200	12	9.3	14.1	46	10	16.9	90	6.2	11.2
1300	520	14.4	21.8	420	12	21.9	134	6.6	11.8
1400	288	14.3	22.2	495	13.5	21.4	1984	10.5	19.6
1500	46	13.6	20.5	100	11.3	17.3	490	6.4	15.2
1600	14	12.8	19.9	34	8.8	16.7	141	5.6	11.6
1700	7	11.8	18.4	7	6.3	9.7	83	5.7	11.4

Table 21-2. Hourly PM_{10}, wind speed and wind gust data during the peak hours of the event.

Meteorologists forecasted the high wind blowing dust event to occur this day, as the spring windy season begins in March for most of the southwestern United States winter dust events such as this event are common especially during periods of prolonged drought. Forecasts predicted strong winds as the upper-level storm system approached the area with the area of low-pressure tracking from west to east moving across New Mexico in the early morning hours. The system's movement across the area timed well with daytime heating and mixing generating a deep trough to the west as strong winds continued throughout the area. Many outlets also forecasted a high probability of blowing and entrained dust throughout the area, especially in the desert areas of southern New Mexico (Figure 21-3).

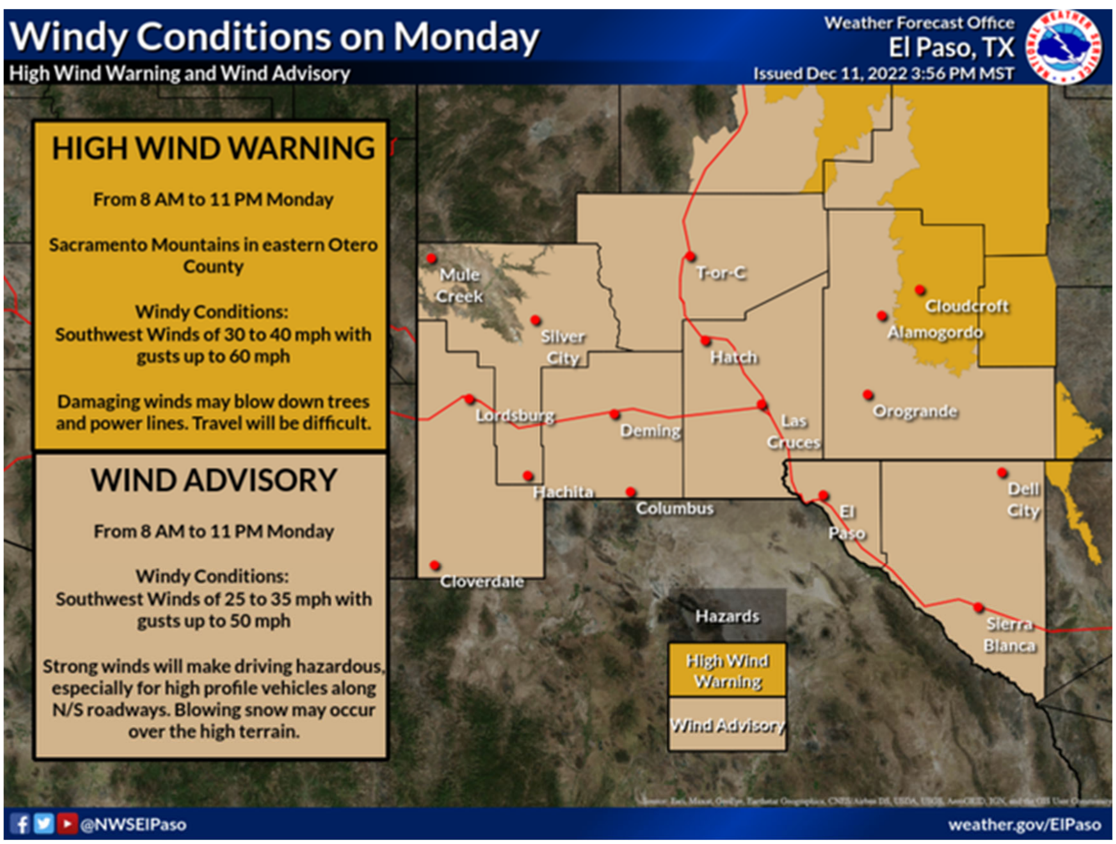


Figure 21-3. NWS Forecast Graphic for the event.

Not Reasonably Controllable or Preventable (nRCP)

Not Reasonably Preventable

This demonstration does not provide a showing of not reasonably preventable pursuant to 40 CFR 50.14(b)(5)(iv) that states, in part, "the State shall not be required to provide a case-specific justification for a high wind dust event."

Not Reasonably Controllable

The documentation provided in this section demonstrates that the wind speeds and other meteorological conditions overwhelmed the reasonable control measures in place for anthropogenic sources, causing emissions of dust that were transported to NMED's monitors.

Sustained Wind Speeds

EPA has indicated 11.2 m/s (25 mph) as the wind speed threshold at which natural or controlled anthropogenic sources will emit dust. NMED monitoring sites recorded wind speeds above this threshold for 6 hours from the 1200 through the 1700 hours (Figure 21-4).

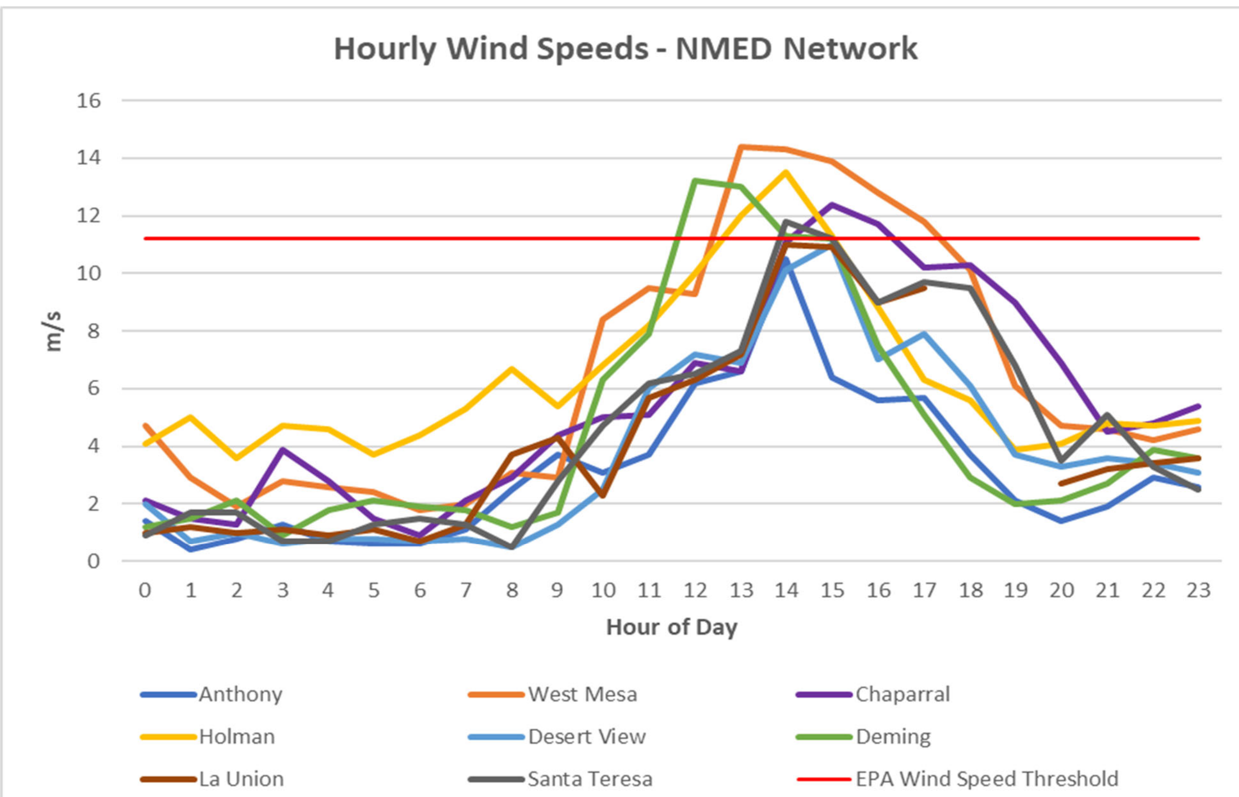


Figure 21-4. Wind speeds at NMED monitoring sites in Doña Ana and Luna Counties.

Level of Controls Analysis

Based on the sustained winds speeds monitored in the area during the event a basic controls analysis will be provided.

Basic Controls Analysis

Implementation and Enforcement of Control Measures

Reasonable controls for anthropogenic sources of dust are based on an area's attainment status for the PM_{10} NAAQS. It is not reasonable for areas designated as attainment, unclassifiable or maintenance to have the same level of controls as areas that are nonattainment for the standard. However, southern New Mexico has a long history of high wind blowing dust events with NMED developing a nonattainment SIP for the Anthony Area and NEAPs for the remaining portion of Doña Ana County and all of Luna County. As discussed in the Background section, NMED worked with local governments to help them develop and adopt dust control ordinances based on BACM. Based on the area's attainment status and SIP waiver, NMED believes these ordinances constitute reasonable controls.

The ordinances developed and adopted under the NEAPs are implemented and enforced at the local level with NMED playing a supporting role to ensure effective and enforceable implementation of control measures. Under the regulatory framework applicable to the two counties, NMED's purview does not include oversight of the extent of the effectiveness and enforcement of local ordinances. However, NMED believes that these ordinances are appropriately implemented at the local level.

Suspected Source Areas and Categories Contributing to the Event

Anthropogenic sources of dust in New Mexico include disturbed lands, construction and demolition activities, vacant parking lots and materials handling and transportation. Area sources account for a much larger portion of overall PM_{10} emissions than point sources. On the day of the event, no unusual PM_{10} producing activities occurred and anthropogenic point source emissions remained constant before, during and after the event. Natural areas of the Chihuahuan Desert in Doña Ana, Luna, Hidalgo, and Grant Counties are the most likely sources, under NMED's jurisdiction, contributing to the high wind blowing dust event. Other area sources located in Arizona and Chihuahua, MX likely contributed to the exceedances on this day. Controlling dust from the natural desert terrain is cost prohibitive and falls outside NMED's jurisdiction when it is transported from interstate and international sources.

Clear Causal Relationship (CCR)

Occurrence and Geographic Extent of the Event

Satellite Imagery

The event was captured on satellite imagery with dust plumes that are observed in the GOES-16 geostationary satellite GeoColor product imagery originating upwind of NMED's monitoring sites near Ascension and Janos, Chih. This area is largely rural with the largest area sources of PM originating from agricultural activities as well as the vast desert areas and playas in northern Mexico (Figure 21-5). The dust plumes of interest appear to be limited to Mexico, orientated in a northeast to southwest direction and traveling toward El Paso and NMED's monitoring sites at the time of the satellite observation (1631 hour MST) that captured the imagery.

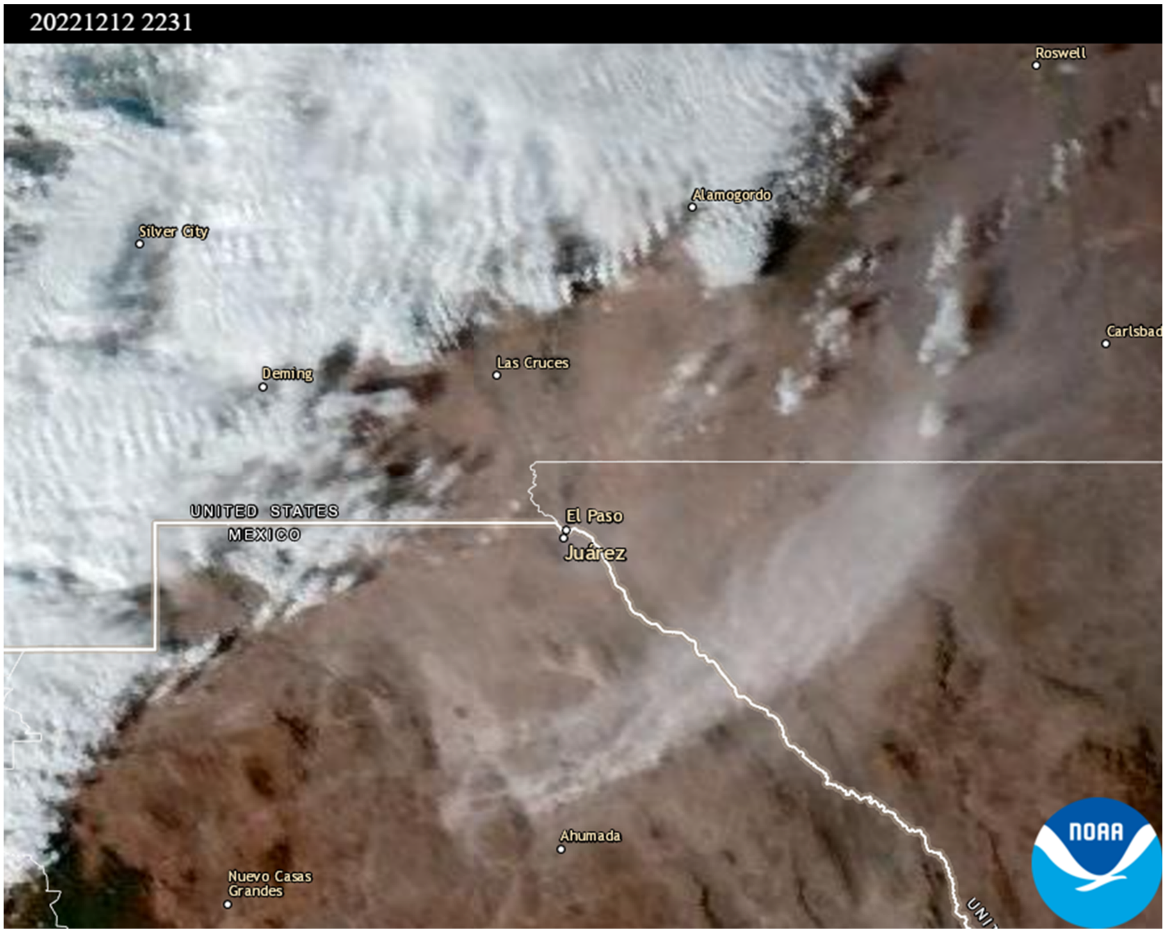


Figure 21-5.GeoColor product imagery from the GOES-16 geostationary satellite showing southwestern New Mexico, northern Chihuahua and western Texas. Imagery obtained from NASA's AerosolWatch website.

Weather Statements, Advisories, News and Other Media Reports Covering the Event
The National Weather Service (NWS) issued a Wind Advisory for this date. A Wind Advisory is issued by NWS when sustained winds of 30 to 39 mph are expected for 1 hour or longer. This was in place for southern Doña Ana and Luna Counties to warn the public of the high wind event. An excerpt from the NWS Wind Advisory can be found below:

"The strongest winds will be ahead of the front and generally from the Bootheel, the entire Rio Grande Valley…Wind advisory from 10 AM this morning to 11 PM MST this evening…A Potent storm system will affect the area today…25 to 40 MPH winds with gusts 50-60 MPH, especially for mountain areas. Areas of blowing dust are possible."

The El Paso NWS December 2022 Weather Digest provided a photo of the dust plume over El Paso, TX (Figure 21-6).

Figure 21-6. El Paso NWS December 2022 Weather Digest photo showing dust cloud over El Paso, TX.

Spatial and Transport Analysis

HYSPLiT Backtrajectory Analysis

A back-trajectory analysis using the HYSPLIT (NOAA Air Resources Laboratory HYSPLIT transport and dispersion model (Draxler et al., 2015; Rolph et al., 2017) shows that the air masses traveled from Chihuahua, MX and west Texas into the southern New Mexico and El Paso, TX area and on to the NMED monitoring sites. The model was run using GDAS meteorological data for the six hours preceding the start of elevated PM_{10} concentrations during the event (Figure 21-7). This analysis supports the hypothesis that dust plumes originated in MX before being transported to downwind monitoring sites.

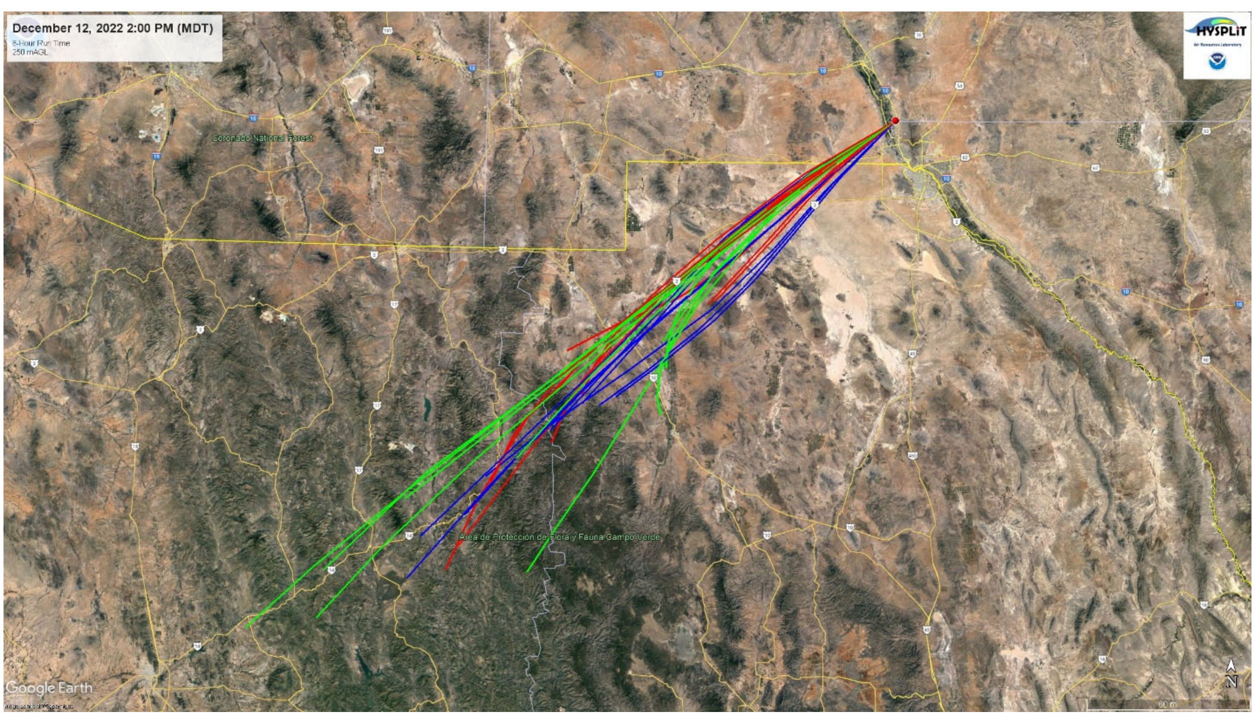


Figure 21-7. HYSPLiT back-trajectory analyses using the Ensemble mode for the Anthony monitoring site.

Wind Direction and Elevated PM_{10} Concentrations

A pollution rose (Figure 21-8) was created for the hours of the event when PM_{10} concentrations exceeded 150 µg/m³ (0800-1500 hour). During the event, winds primarily blew from the southwest approximately 100% of time coinciding with peak PM_{10} concentrations.

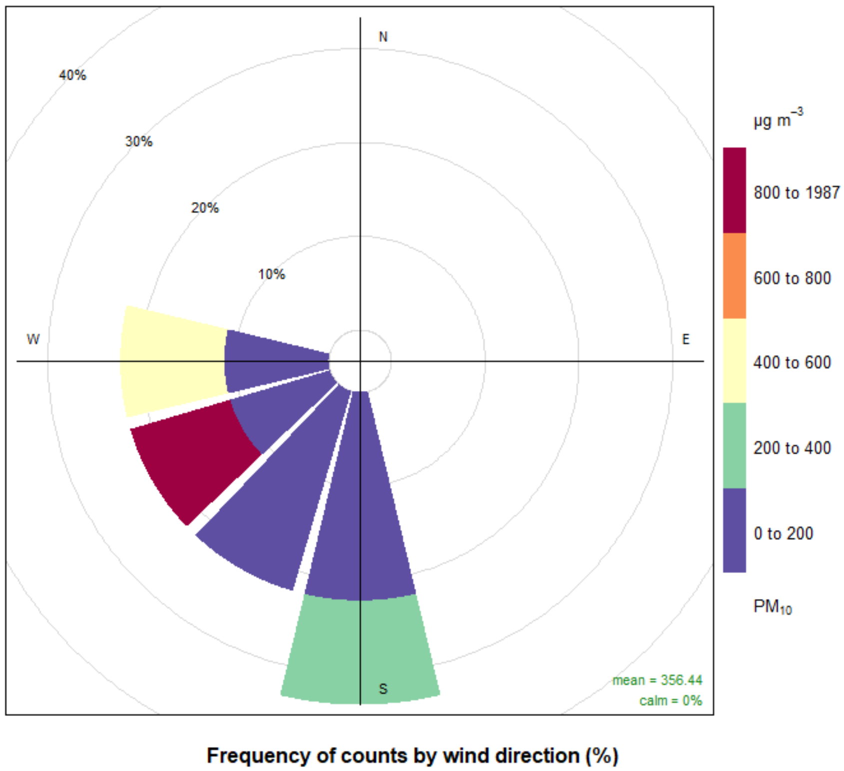


Figure 21-8. Pollution rose for the Anthony monitoring site.

Temporal Relationship of High Wind and Elevated PM_{10} Concentrations

The high wind blowing dust event generated strong east-southeasterly winds beginning at the 1100 hour and lasting through the 1900 hour. During this time, peak hourly PM_{10} concentrations ranged from 288 to 1987 µg/m³ were recorded at the Deming and Anthony monitoring sites, respectively (Figure 21-9). Although not all NMED monitoring sites recorded an exceedance of the NAAQS, hourly PM_{10} data spiked at approximately the same time throughout the network. Sustained hourly average wind speeds ranged from 10.1 to 14.4 m/s were recorded at the Desert View and West Mesa monitoring sites, respectively, during the peak PM_{10} concentrations of the event. The time series plots in Figure 21-10 demonstrates the correlation between elevated levels of PM_{10} and high winds for this event.

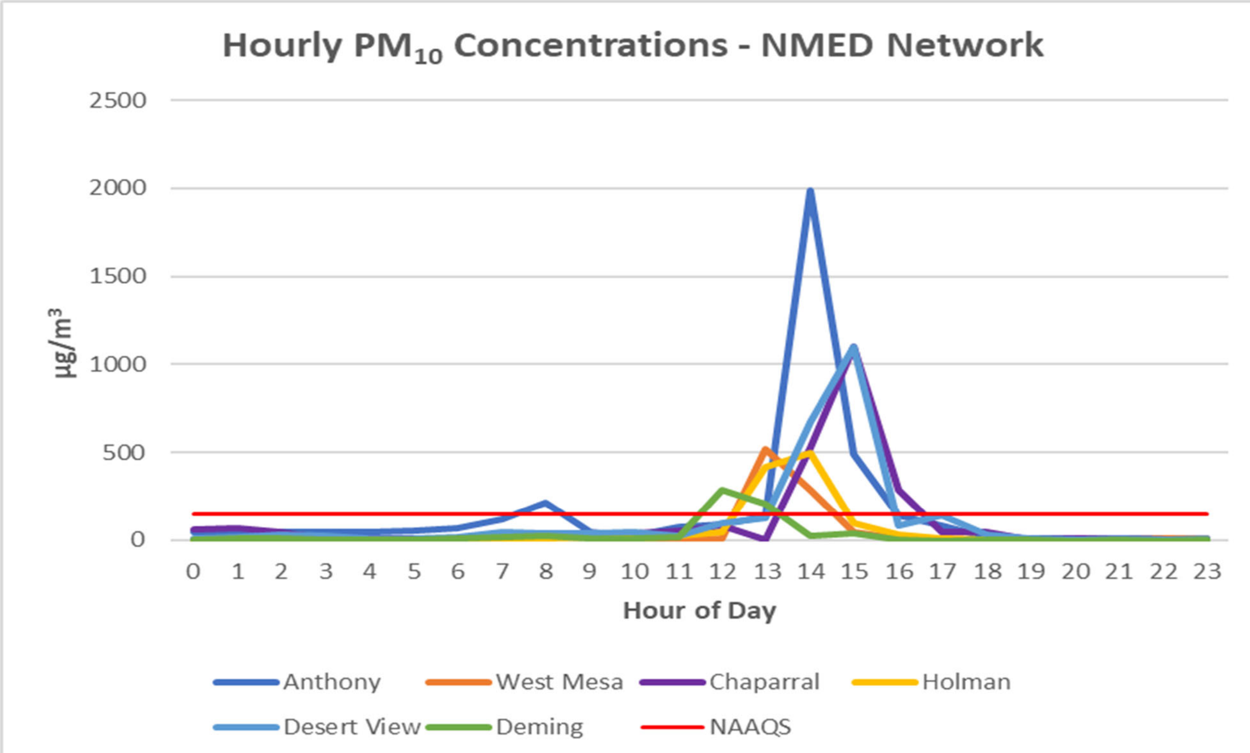


Figure 21-9. NMED monitoring network hourly PM$_{10}$ data for the high wind blowing dust event.

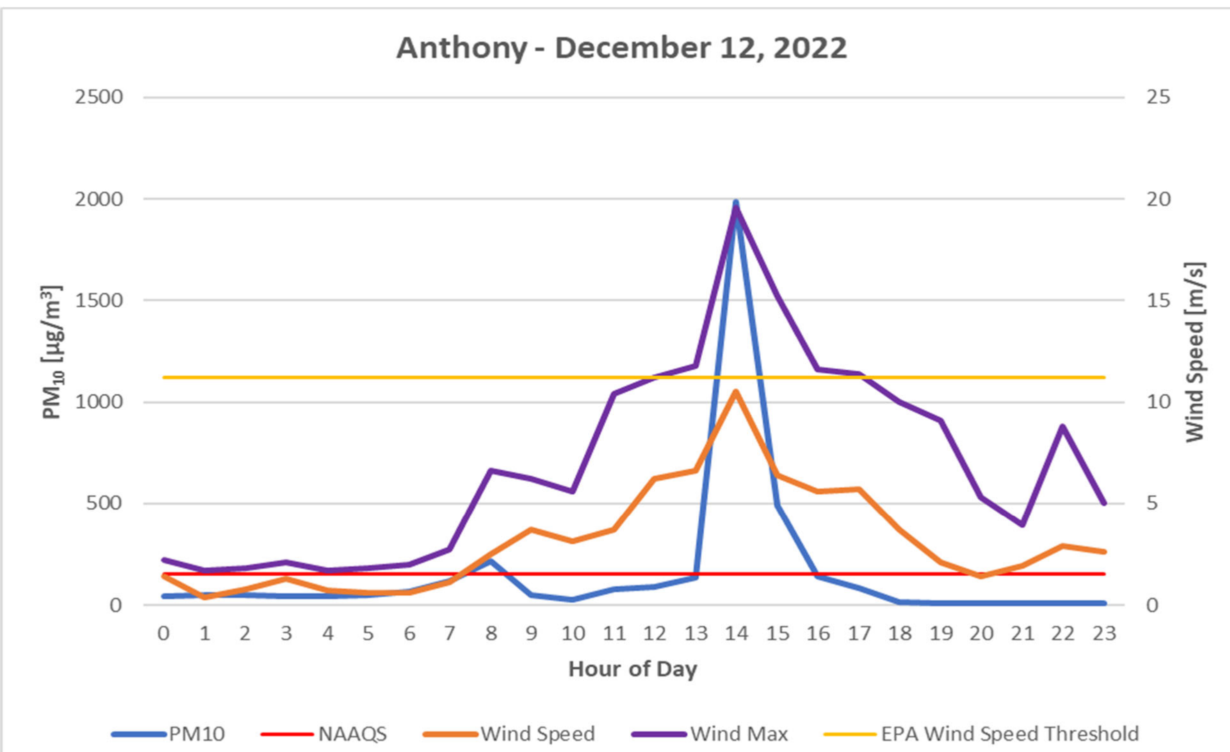


Figure 21-10. Desert View monitoring site hourly PM$_{10}$ and wind speed data for the high wind blowing dust event.

Historical Concentrations Analysis

Annual and Seasonal 24-Hour Average Fluctuations

From 2017-2021, the Anthony monitoring site recorded 22 exceedances of the PM_{10} NAAQS (Figure 22-1 in Appendix B). The maximum 24-hour average PM_{10} concentration at this site was 541 µg/m^3, recorded in 2021. High wind blowing dust events in southern New Mexico can occur at any time of the year, but the majority of these days occur during the spring windy season, from March through May. NMED has documented that all exceedances have been caused by high wind blowing dust events.

Spatial and Temporal Variability

As demonstrated in Figure 21-11, all NMED monitoring sites recorded elevated 24-hour average PM_{10} concentrations compared to the days preceding and following the event. Daily averages for the days surrounding the event did not surpass 54 µg/m^3, demonstrating the influence high winds have on PM_{10} concentrations in the area.

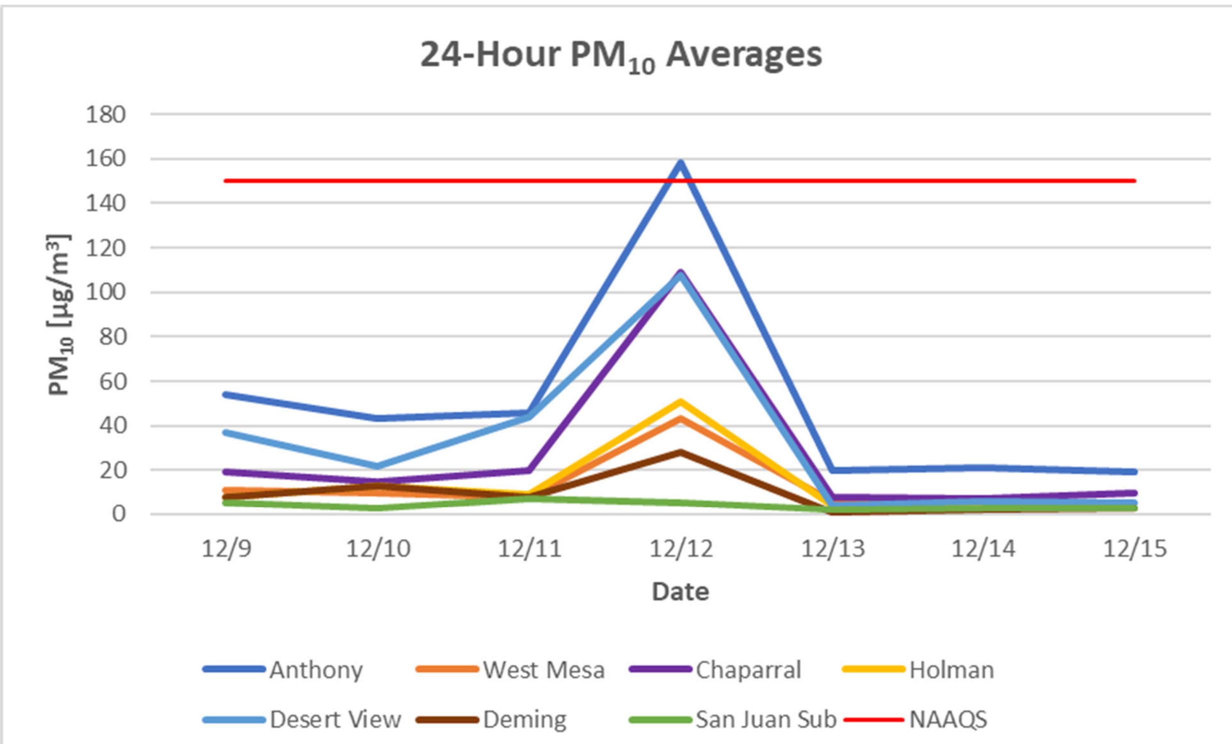


Figure 21-11. 24-Hour PM_{10} averages recorded at NMED monitoring sites for the event day and three days before and after.

Percentile Ranking

Table 22-2 in Appendix B shows the 24-hour average PM_{10} data distribution recorded at NMED monitoring sites, including high wind blowing dust events flagged with a request to exclude data in the AQS database for exceedances of the standard from 2017-2021. The recorded value for this day (158 µg/m^3) is above the 95th percentile of historical data.

CCR Conclusion

On this day a high wind blowing dust event occurred, generating PM_{10} emissions that resulted in elevated concentrations at NMED monitoring sites. The monitored PM_{10} 24-hour average (158 µg/m^3) is above the 95th percentile monitored over the previous five years. Meteorological conditions were consistent with past event days and elevated PM_{10} concentrations. The comparisons and analyses provided in the CCR section of this demonstration support NMED's position that the event affected air quality in such a way that a clear causal relationship exists between the high wind blowing dust event and the monitored exceedances on this day, satisfying the CCR criterion.

Natural Event

The CCR and nRCP analyses show that this was a natural event caused by high wind and blowing dust. Based on the documentation provided in this demonstration, the event qualifies as a natural event. The exceedances associated with the event meets the regulatory definition of a natural event at 40 CFR 50.14(b)(8). This event transported windblown dust from natural and anthropogenic sources that have been reasonably controlled and accordingly, NMED has demonstrated that the event is a natural event and may be considered for treatment as an exceptional event.

22. Appendices

Appendix A 2022 PM_{10} NAAQS Exceedances

Date	Anthony (35-013-0016)	Chaparral (35-013-0020)	Desert View (35-013-0021)	Holman (35-013-0019)	West Mesa (35-013-0024)	Deming (35-029-0003)	San Juan (35-045-1005)
February 16	259	169	434	223	98	208	37
February 21	172	142	372	48	23	69	191
February 23	162	125	222	160	157	879	22
March 4	180	119	127	108	64	189	78
March 6	55	76	45	68	47	188	4
March 29	130	70	174	122	33	112	6
April 11	57	123	63	41	22	58	155
April 12	360	377	320	123	46	313	183
April 22	177	161	117	92	52	336	270
April 25	81	51	68	59	33	167	7
May 8	65	50	92	45	24	76	368
May 9	34	26	49	31	16	24	172
May 20	45	173	62	39	27	44	139
May 22	199	80	154	123	90	86	37
May 29	102	96	96	51	36	113	246
June 8	484	117	149	285	130	72	35
June 13	59	53	74	52	43	212	213
August 2	27	21	32	15	13	173	14
December 12	158	109	108	51	43	28	5

Table 22-1. Dates, Monitoring Sites (including AQS ID), and 24-Hour Average PM_{10} Concentrations ($\mu g/m^3$) for 2022 high wind blowing dust events requested for exclusion under the EER.

Appendix B Historical Annual 24-Hour PM_{10} Concentrations

Anthony Monitoring Site

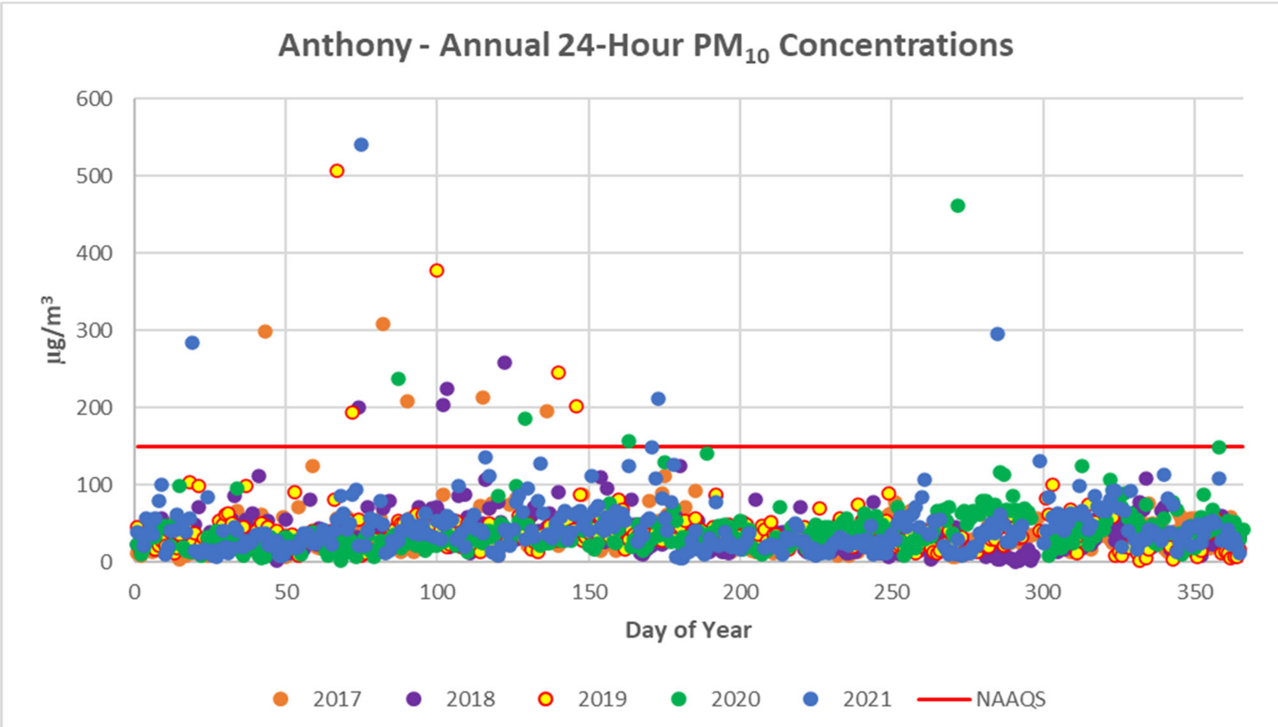


Figure 22-1. Five-year trend (2017-2021) 24-hour PM_{10} concentrations for the Anthony monitoring site.

Desert View Monitoring Site

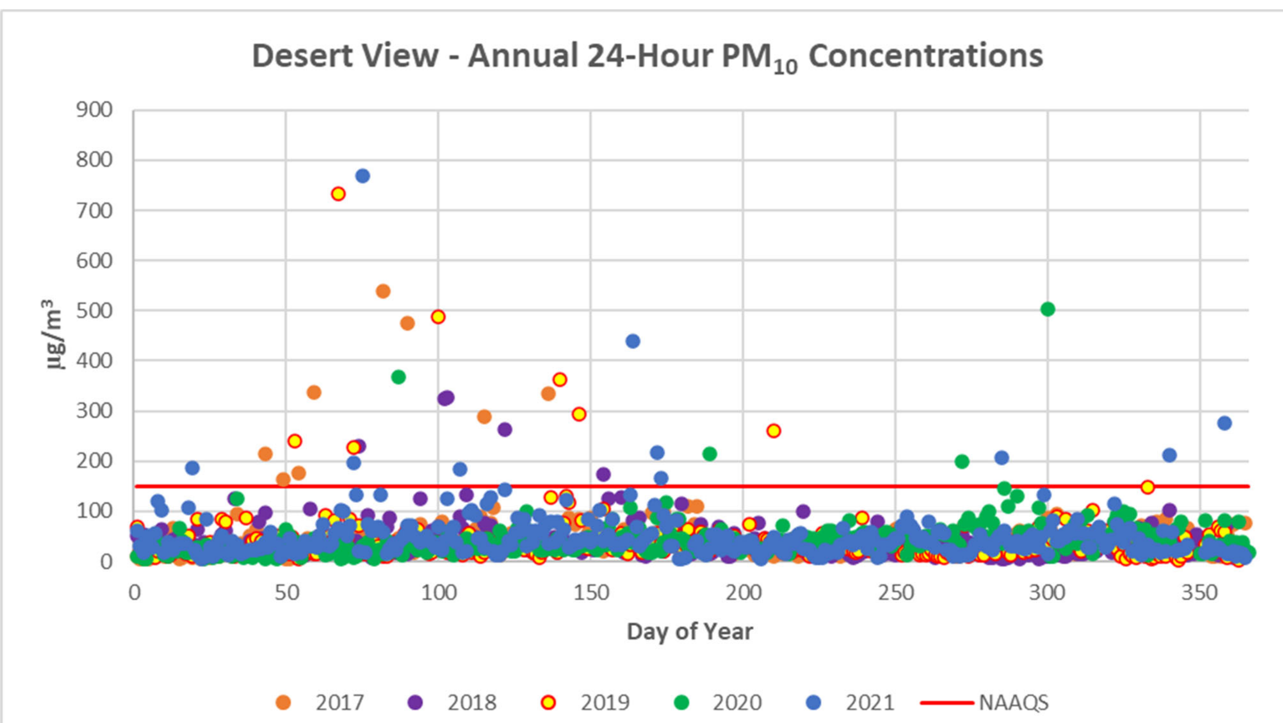


Figure 22-2. Five-year trend (2017-2021) 24-hour PM_{10} concentrations for the Desert View monitoring site.

Chaparral Monitoring Site

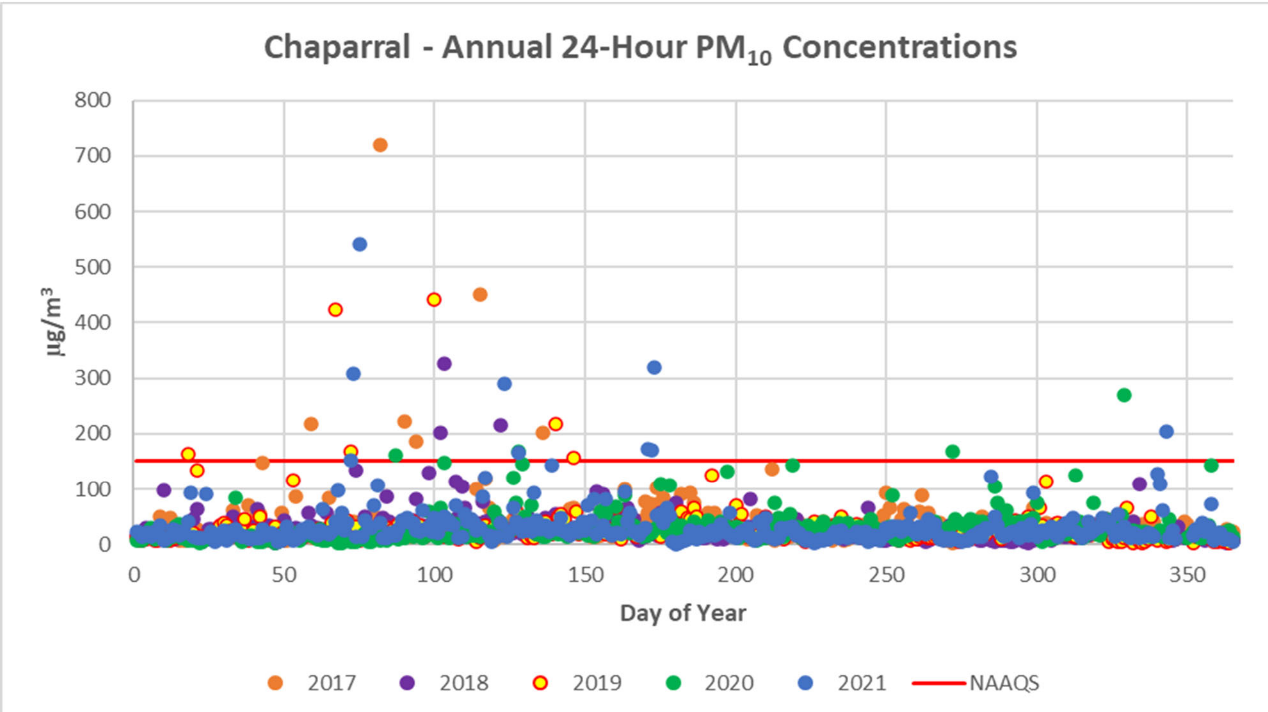


Figure 22-3. Five-year trend (2017-2021) 24-hour PM_{10} concentrations for the Chaparral monitoring site.

West Mesa Monitoring Site

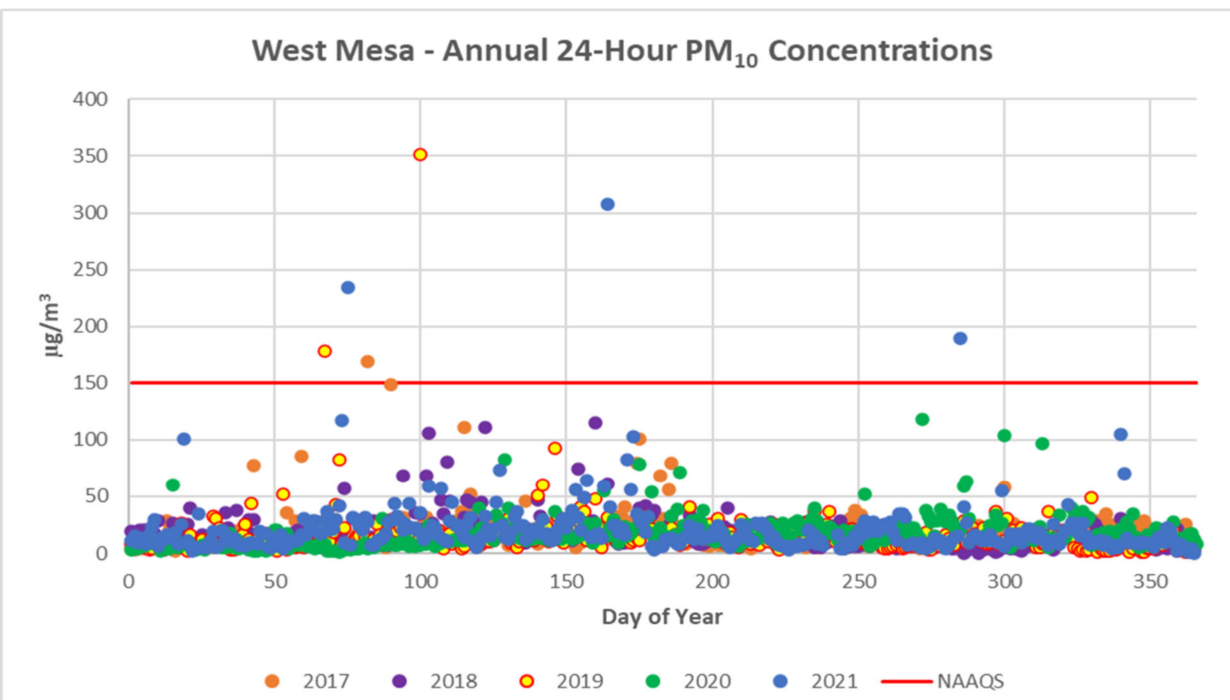


Figure 22-4. Five-year trend (2017-2021) 24-hour PM_{10} concentrations for the West Mesa monitoring site.

Holman Monitoring Site

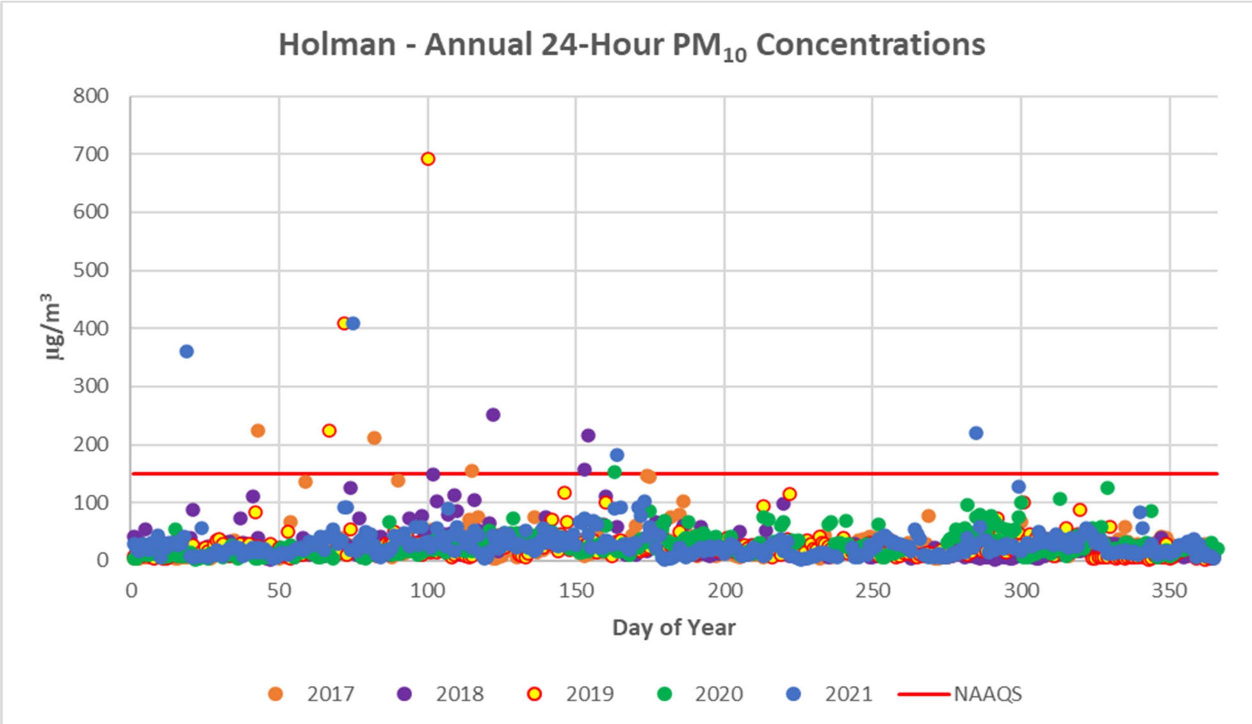


Figure 22-5. Five-year trend (2017-2021) 24-hour PM_{10} concentrations for the Holman monitoring site.

Deming Monitoring Site

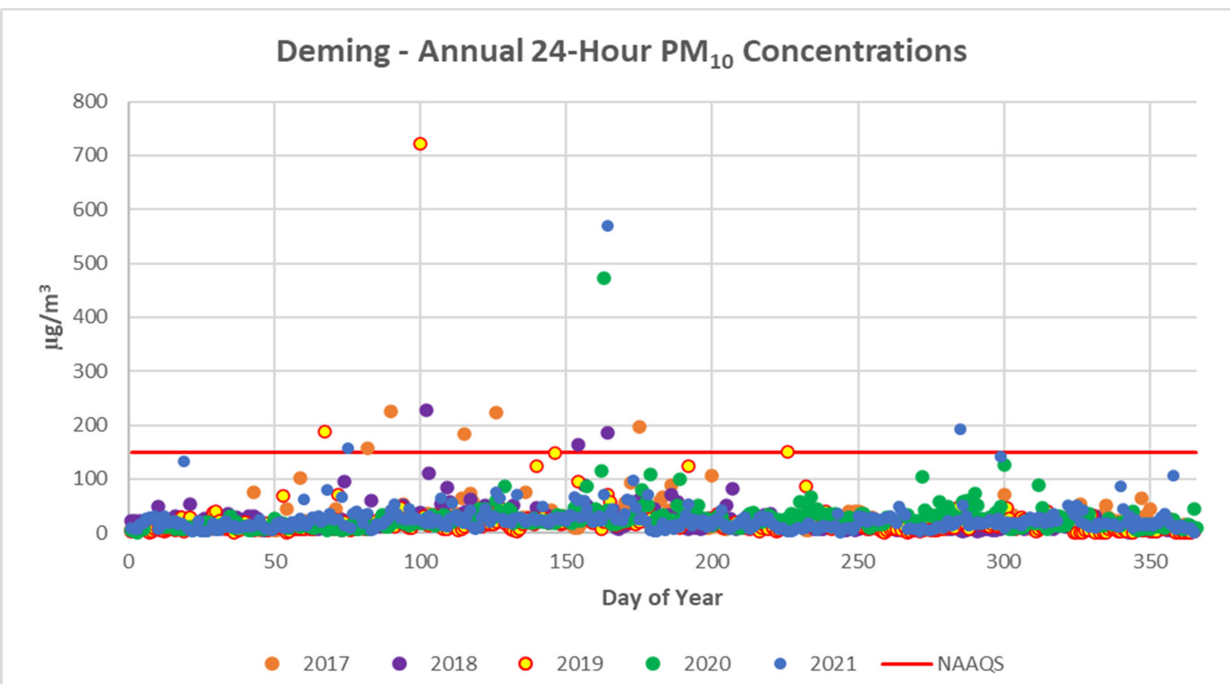


Figure 22-6. Five-year trend (2017-2021) 24-hour PM_{10} concentrations for the Deming monitoring site.

San Juan Substation Monitoring Site

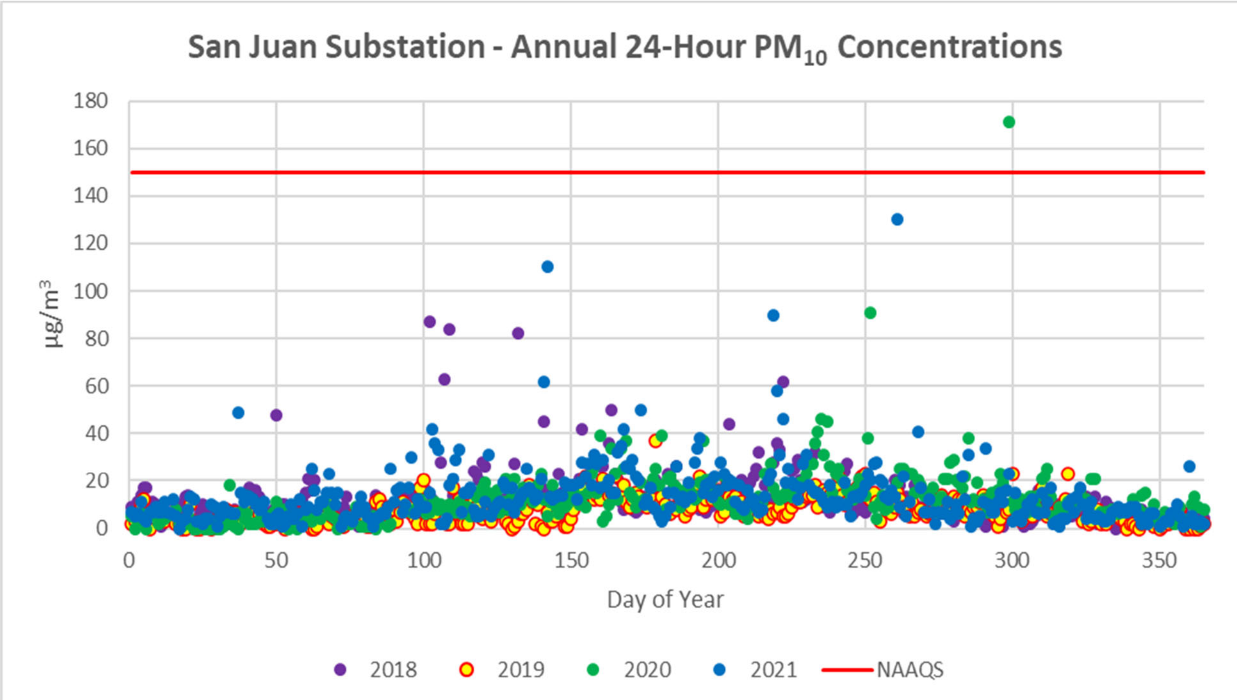


Figure 22-7. Four-year trend (2018-2021) 24-hour PM_{10} concentrations for the San Juan Substation monitoring site.

Monitoring Network Statistics

Statistic\Monitoring Site	Anthony	West Mesa	Chaparral	Holman	Desert View	Deming	San Juan
Max	541	351	721	691	769	721	171
99th Percentile	197	97	172	138	242	126	49
95th Percentile	84	39	75	66	92	54	27
75th Percentile	47	20	33	31	48	26	14
50th Percentile	33	13	22	21	33	18	9
25th Percentile	22	8	15	13	21	11	5
5th Percentile	11	4	7	5	10	4	1
Mean	40	17	30	27	42	23	11

Table 22-2. NMED monitoring sites PM_{10} 24-hour average data distribution. Includes data flagged in AQS for exclusion due to high wind blowing dust events (RJ).

Appendix C Initial Notification Letter

MICHELLE LUJAN GRISHAM
GOVERNOR

JAMES C. KENNEY
CABINET SECRETARY

July 27, 2023

Jeff Robinson
Branch Chief
U.S. EPA Region 6
1201 Elm Street, Ste. 500
Mail Code: 6ARPM
Dallas, TX 75270

Re: 2022 Exceptional Event Demonstration for PM_{10} Exceedances Caused by High Wind

Dear Mr. Robinson:

This letter serves as formal notification that the New Mexico Environment Department (NMED) will develop and submit a demonstration to exclude 2022 PM_{10} air monitoring data influenced by exceptional events pursuant to 40 CFR Parts 50 and 51. NMED proposes to submit this demonstration to EPA by December 31, 2023.

The data requested for exclusion affects the regulatory determination that Luna, Doña Ana, and San Juan Counties attain the 1987 PM_{10} National Ambient Air Quality Standard (NAAQS). In addition, affected data impacts the classification of the Anthony PM_{10} nonattainment area. Please find a list of dates and monitoring data requested for exclusion enclosed as attachment A.

If you or your staff have any questions or comments, please contact Armando Paz of my staff at (505) 629-3242 or armando.paz@env.nm.gov.

Respectfully,

Elizabeth Kuehn
Digitally signed by Elizabeth Kuehn
Date: 2023.07.14 16:36:45 -06'00'

Elizabeth Bisbey-Kuehn
Air Quality Bureau Chief
New Mexico Environment Department

Cc: Michael Baca, NMED AQB
Armando Paz, NMED AQB
Joshua Madden, EPA R6

Enc: Attachment A

SCIENCE | INNOVATION | COLLABORATION | COMPLIANCE

Air Quality Bureau | 525 Camino de los Marquez, Suite 1A, Santa Fe, New Mexico 87505-1816 | (505) 476-4300 | www.env.nm.gov

Attachment A-2022 PM_{10} Exceptional Events

Date	Type of Event	AQS Flag	AQS ID	Site Name	Exceedance Concentration
02/16/2022	High Wind	RJ	35-013-0019	6ZL Holman	223 µg/m³
	High Wind	RJ	35-013-0021	6ZM Desert View	434 µg/m³
	High Wind	RJ	35-013-0016	6CM Anthony	259 µg/m³
	High Wind	RJ	35-013-0020	6ZK Chaparral	169 µg/m³
	High Wind	RJ	35-029-0003	7E Deming	208 µg/m³
02/21/2022	High Wind	RJ	35-013-0021	6ZM Desert View	372 µg/m³
	High Wind	RJ	35-013-0016	6CM Anthony	172 µg/m³
	High Wind	RJ	35-045-1005	1H San Juan Sub	191 µg/m³
02/23/2022	High Wind	RJ	35-013-0021	6ZM Desert View	222 µg/m³
	High Wind	RJ	35-013-0016	6CM Anthony	162 µg/m³
	High Wind	RJ	35-013-0024	6WM West Mesa	157 µg/m³
	High Wind	RJ	35-013-0019	6ZL Holman	160 µg/m³
	High Wind	RJ	35-029-0003	7E Deming	879 µg/m³
03/04/2022	High Wind	RJ	35-013-0016	6CM Anthony	180 µg/m³
	High Wind	RJ	35-029-0003	7E Deming	189 µg/m³
03/06/2022	High Wind	RJ	35-029-0003	7E Deming	188 µg/m³
03/29/2022	High Wind	RJ	35-013-0021	6ZM Desert View	174 µg/m³
04/11/2022	High Wind	RJ	35-045-1005	1H San Juan Sub	155 µg/m³
04/12/2022	High Wind	RJ	35-029-0003	7E Deming	313 µg/m³
	High Wind	RJ	35-013-0021	6ZM Desert View	320 µg/m³
	High Wind	RJ	35-013-0016	6CM Anthony	360 µg/m³
	High Wind	RJ	35-013-0020	6ZK Chaparral	377 µg/m³
	High Wind	RJ	35-045-1005	1H San Juan Sub	183 µg/m³
04/22/2022	High Wind	RJ	35-013-0016	6CM Anthony	177 µg/m³
	High Wind	RJ	35-013-0020	6ZK Chaparral	161 µg/m³
	High Wind	RJ	35-029-0003	7E Deming	336 µg/m³
	High Wind	RJ	35-045-1005	1H San Juan Sub	270 µg/m³
04/25/2022	High Wind	RJ	35-029-0003	7E Deming	167 µg/m³
05/08/2022	High Wind	RJ	35-045-1005	1H San Juan Sub	368 µg/m³
05/09/2022	High Wind	RJ	35-045-1005	1H San Juan Sub	172 µg/m³
05/20/2022	High Wind	RJ	35-013-0020	6ZK Chaparral	173 µg/m³
05/22/2022	High Wind	RJ	35-013-0016	6CM Anthony	199 µg/m³
05/29/2022	High Wind	RJ	35-045-1005	1H San Juan Sub	246 µg/m³

2

06/08/2022	High Wind	RJ	35-013-0016	6CM Anthony	484 µg/m^3
	High Wind	RJ	35-013-0019	6ZL Holman	285 µg/m^3
06/13/2022	High Wind	RJ	35-029-0003	7E Deming	212 µg/m^3
	High Wind	RJ	35-045-1005	1H San Juan Sub	213 µg/m^3
08/02/2022	High Wind	RJ	35-029-0003	7E Deming	173 µg/m^3
12/12/2022	High Wind	RJ	35-013-0016	6CM Anthony	158 µg/m^3

Appendix D Public Notices

STATE ENVIRONMENT DEPARTMENT SEEKS PUBLIC COMMENT ON EXCEPTIONAL EVENTS DEMONSTRATIONS

(Santa Fe, NM) –The New Mexico Environment Department Air Quality Bureau has completed draft exceptional events demonstrations for periods exceeding federal air quality standards for particulate matter in southern (Doña Ana and Luna Counties) and northern (San Juan County) New Mexico during calendar years 2022. This document demonstrates to the U.S. Environmental Protection Agency that dust storms generated by high winds, rather than man-made sources, caused exceedances of the national standard for particulate matter in the air. Without this demonstration, certain areas of the state would be in violation of federal standards and subject to stricter air quality rules and requirements designed to meet and maintain the standard in the future. The level of the federal air standards for particulate matter is protective of public health.

The New Mexico Environment Department is seeking public comment on the draft documents through July 19, 2024. The document is available for review at the Environment Department's field offices and website at https://www.env.nm.gov/public-notices-2/ or by contacting the Department at (505) 629-3242.

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, or if you believe that you have been discriminated against with respect to a NMED program or activity, you may contact: Kate Cardenas, Non-Discrimination Coordinator, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@env.nm.gov. You may also visit our website at https://www.env.nm.gov/non-employee-discrimination-complaint-page/ to learn how and where to file a complaint of discrimination.

For more information and to submit comments, please contact Armando Paz, Environmental Analyst, NMED Air Quality Bureau at (505) 629-3242 or at armando.paz@env.nm.gov.

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EL DEPARTAMENTO DE MEDIO AMBIENTE DEL ESTADO SOLICITA COMENTARIOS DEL PÚBLICO SOBRE DEMOSTRACIONES DE EVENTOS EXCEPCIONALES

(Santa Fe, NM) -La Oficina de Calidad del Aire del Departamento de Medio Ambiente de Nuevo México ha completado el borrador de demostraciones de eventos excepcionales para periodos que exceden los estándares federales de calidad del aire para material particulado en el sur (Candados de Doña Ana y Luna) y norte (Candado de San Juan) de Nuevo México durante los años naturales 2022. Este documento demuestra a la Agencia de Protección Ambiental de los Estados Unidos que las tormentas de polvo generadas por vientos fuertes, y no por fuentes artificiales, causaron excedencias del estándar nacional de material particulado. Sin esta demostración, algunas zonas del estado estarían incumpliendo los estándares federales y estarían sujetas a normas y requisitos de calidad del aire más estrictos diseñados para cumplir y mantener el estándar en el futuro. El nivel de los estándares federales del aire para el material particulado protege la salud pública.

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Para obtener más información y presentar comentarios, póngase en contacto con Armando Paz, analista medioambiental de la Oficina de Calidad del Aire del NMED, llamando al (505) 629-3242 o escribiendo a armando.paz@env.nm.gov.

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Appendix E ANTHONY PM_{10} STATE IMPLEMENTATION PLAN

REVISION TO THE

NEW MEXICO PM10 STATE IMPLEMENTATION PLAN

FOR ANTHONY, NEW MEXICO

Prepared by the
New Mexico Environment Department
Air Quality Bureau

November 8, 1991

Roy S. Walker

Approved
Roy Walker, Chairman
Environmental Improvement Board

11/8/91
Date

I. Background

A. History

Soil in Anthony and the surrounding region tends to be sandy and friable. This, in concert with the sparse vegetation, low rainfall and gusty winds inherent to the region, can result in relatively high levels of naturally occurring rural fugitive dust. In 1987, New Mexico petitioned EPA and was granted Rural Fugitive Dust Area (RFDA) designation for Anthony. This designation was based on a list of criteria which included reviews of air sampling data, particulate emission sources, available control strategies and demographics. Under the RFDA policy, it was recognized that exceedances of the particulate matter ambient standard were primarily due to blowing dust inherent to the region and thus the development of control strategies would be pointless.

With the implementation of the 1990 Clean Air Act Amendments (CAAA), EPA discontinued the RFDA program. Under the CAAA, all areas violating the PM10 standard prior to January 1, 1989 were designated non-attainment whether or not the particulate matter could actually be controlled. PM10 is defined as particulate matter with an aerodynamic diameter less than or equal to 10 microns. EPA adopted the National Ambient Air Quality Standards (NAAQS) for PM10 in July of 1987. These standards limit the PM10 24-hour average to 150 micrograms per cubic meter (ug/m^3) and the annual arithmetic mean to 50 ug/m^3.

All non-attainment areas, including Anthony, have been initially classified as moderate. EPA may subsequently redesignate moderate areas as serious, subjecting them to stricter control requirements. This may happen if an area cannot practicably attain the PM10 standard by the moderate area deadline of December 31, 1994, or if the State fails to submit a PM10 State Implementation Plan revision by the November 15, 1991 deadline. However, the CAAA also provides for a waiver to the attainment date for areas where non-anthropogenic emissions contribute significantly to a NAAQS violation. As discussed in this plan, the Department believes a waiver is appropriate for Anthony and that further controls for serious areas are unwarranted.

The State Implementation Plan or SIP contains all federally required air quality plans and regulations developed to ensure that the provisions of the federal Clean Air Act and its amendments are satisfied. This includes the attainment and maintenance of the NAAQS. New Mexico's air quality SIP, first adopted in 1972, incorporates the control strategies and regulations found necessary to meet these standards.

The purpose of this revision to the New Mexico SIP is to address the mandatory federal requirements for PM10 non-attainment areas applicable to Anthony. In those moderate PM10 non-attainment areas where the State's control strategy cannot demonstrate attainment by the applicable date mandated in the Act, EPA requires the State to document that its control strategy represents the application of the available control measures to all source categories. Available control measures include those which are technologically and economically feasible for the area. The State has considered partial implementation of control measures where full implementation is not feasible. In addition, the State has addressed the impacts of individual source categories on ambient air levels, legal responsibility for and enforceability of chosen control measures and relevant quantitative milestones. Sources whose emissions are shown to be insignificant ("de minimis") are excluded from further consideration.

B. Anthony, NM and Surrounding Region

The community of Anthony is located in south central New Mexico, just east of where the Rio Grande first crosses the border into Texas. Las Cruces, New Mexico, with a population of 62,126 (1990 census) lies 35 kilometers (km) to the north. El Paso, Texas, with a population of 515,342 (1990 census) lies 30 km to the south. Although the community of Anthony, New Mexico, is not incorporated as a municipality, its 1990 population as a Census Designated Place (CDP) was 5160. Anthony, Texas, directly across the border to the south, is incorporated and has a population of 3,328. The County of Dona Ana (in which both Anthony and Las Cruces are situated) had a 1990 population of 135,510. Figure 1 presents a map of Dona Ana County. Figure 2 is a map of Anthony, including the designated non-attainment area (sections 35 and 36 of Township 26 south, Range 3 east).

The south (Mesilla) valley, created by the Rio Grande, is defined in this report as extending south of Las Cruces to north of El Paso (Texas). The valley is about five kilometers wide, narrowing towards El Paso and bordered by the West Mesa and, to the east, by the Franklin Mountains. Unless otherwise noted, demographic information does not include the Texan (south-eastern) portion of the valley.

Of the 21 communities in Dona Ana County, only Las Cruces, Sunland Park, Hatch and Mesilla (adjoining Las Cruces) are incorporated. The reason is financial. Most communities lack the tax base necessary to support a municipal government. As a result, the county carries the burden for roads, planning and other services. Unfortunately, the county's tax base is also weak. Approximately 86 percent of the county is non-taxable (state or federally owned) land. Much of the county's work is funded by state or federal grants. For example, 75 to 100% of road work money (depending on the project) is provided by the state.

Preliminary (1990 estimated) census figures support the common observation that the area is poor:

	Median Yearly Household Income	Per Capita Yearly Income
United States	$27,000	$13,900
New Mexico	$20,500	$9,600
Dona Ana County	$17,300	$7,400
South Valley	$14,900	$5,300

While the median yearly household income in the south valley is low, at 55% of the national average, the per capita income is even less, at only 38%. This area has a higher percentage of children, elderly and unemployed, all of which require services while not necessarily paying taxes. The 1990 census results verify that New Mexico and Dona Ana County residents are younger than the national average and live in larger households:

	Median Age	Persons per household
United States	32.9	2.63
New Mexico	31.3	2.74
Dona Ana County	27.9	2.92
Anthony CDP	NA	3.96

2

It is estimated (1980 census) that approximately 30% of the valley's population is over 16 years of age and works. The 1990 census results indicate that 40% of Anthony's population is 16 years of age or younger and that 23% of Anthony's households have one or more persons who are 60 years old or older. The County estimates that 16% of the population receives unemployment benefits in any given year, with 8% unemployed for 15 or more weeks per year. In 1980, 28% of all families were below the poverty level (compared to 22% nationally).

Anthony's population has been doubling in size each decade, with (New Mexico) populations of 1700 in '70, 3200 in '80 and 5160 in '90. This growth is not expected to slow. The population is swelling due to the birthrate and to incoming immigrants looking for work. In 1980, about one quarter of the population was foreign born, mostly from Mexico. Since then, the 1987 Amnesty law has allowed hundreds of Mexican laborers to establish legal residence in the Mesilla valley. Many have subsequently brought their families.

The opening of a new border crossing and the continuing expansion of El Paso will further stimulate growth in the area. Anthony is particularly attractive to developers as the community has municipal sewer service. Without such service, state regulations limit the minimum size of residential plots to 3/4 acre. Only three communities in the south valley (Santa Teresa, Sunland Park and Anthony) have sewage treatment plants. State funds have been allotted to double the capacity of the Anthony plant over the next 2 years.

C. Air Quality Data

The State has been monitoring PM10 in Anthony since March of 1988. Air quality data is included in Appendix A. As of the end of the second quarter of 1991, a total of twelve PM10 24-hour averages greater than the standard have been recorded. Four of these exceedances occurred within the first month of monitoring. The state measured 7, 4 and 1 exceedances in 1988, 1989 and 1990, respectively. There have been no exceedances measured in the first two quarters of 1991. This downward trend is also reflected in Figure 3, where the monthly averages tend to drop with each passing year.

Prior to 1990, the standard for the annual arithmetic mean was also exceeded. The annual arithmetic means have been calculated using the method described in 40 CFR Part 50 appendix K. These values include high wind and flagged data. The annual arithmetic mean for 1991 reflects only the first two quarters of the year.

The 24-hour and annual mean exceedances are listed in Table 1. Half of the 24-hour exceedances occurred on windy days. Two have been flagged by EPA as exceptional events, and the state has requested that the four additional high wind days also be flagged. As seen in Figure 3, PM10 concentrations and exceedances tend to be higher during the windier seasons of Spring and Fall. Exceedances which occurred on low wind days were possibly caused by atmospheric inversions trapping locally generated dust.

The filters which recorded the 1989 and 1990 exceedances have been analyzed and are discussed in Appendix B. Analysis has shown that the particulates in the air on both high and low wind days are characteristic of, and likely derived from, local soils. Meteorological data presented is from the La Union monitoring tower, 11 km southwest of Anthony.

II. Emission Sources and Control Strategies

In accordance with the April 2, 1991 EPA policy document titled PM-10 Moderate Area SIP Guidance, all listed and known area and point source categories have been analyzed for the Anthony area. The Guidance requires that anthropogenic (man-made) source categories with significant emissions be analyzed for the technical and economic feasibility of implementing control measures. For point sources, such measures are called "RACT" or "reasonably available control technology". For area sources, these measures are called "RACM" or "reasonably available control measures". The EPA guidance document described above includes a list of RACT and RACM strategies to be considered. Indications of the legal responsibility for and enforceability of chosen control measures and relevant quantitative milestones are also required.

PM10 emission sources within Dona Ana county and the Anthony non-attainment area are discussed below and in Table 2. Where particulate emissions from any specific category were determined to be de minimis or insignificant, the category was dropped from further consideration for the implementation of RACT or RACM. As shown, all source categories are being currently controlled and/or are de minimis. As such, the application of quantitative milestones or contingency plans are not relevant. The greatest source of PM10 in Dona Ana county, windblown soil from partially vegetated areas such as range lands and desert, is non-anthropogenic.

A. Point Sources

Industrial point sources of PM10 have been analyzed to determine their impacts on Anthony and the appropriateness of retrofitting reasonably available control technology or RACT. Because Anthony is located on the New Mexico-Texas border, the point source analysis included sources within Texas. An emission inventory was compiled and used as input for dispersion modeling to predict the impact on Anthony.

In the past, several cotton gins operated in this area. These gins, included in the emission inventory (Table 2) and modeling summary (Appendix C), have all been closed within the last year in order to consolidate their operations into a single, larger gin near Vado (11 km north of Anthony). Anticipated PM10 emissions from the new gin are 1.14 pounds per hour. The gin is to operate a maximum of 24 hours per day for 4 months of each year (mid-September to mid-January).

There are no other industrial point sources of any size in or adjacent to Anthony located within New Mexico. This determination is based on a search of all existing emission inventory, permitting, and registration files. The closest point sources to Anthony in New Mexico are both located in Sunland Park which is approximately 23 km away. All PM10 point sources within 50 km of Anthony were included regardless of size. Using this criterion, three sources besides the cotton gins were identified. One of the three sources, Ribble Construction, is a portable sand and gravel plant which had been located 30 km from Anthony but is currently not in Dona Ana County.

The Texas Air Control Board furnished the Department with a complete PM10 point source inventory which has been compiled for the El Paso PM10 SIP. For purposes of this analysis, the six sources closest to Anthony were included. Even though it is located 26 km from Anthony, the Asarco Smelter was included due to its high PM10 emission rate. The two point sources closest to Anthony are located across the state line in Texas. These facilities, Proler International and Border Steel, are each within 5 km of Anthony.

A summary of the point source emission inventory and modeling inputs, outputs and results are included as Appendix C to this revision. Maximum impact due to these sources was modeled using ISCST (version 90346). It was determined that the most representative meteorological data was from a station in Las Cruces. One full year of meteorological data (1990) was used. The maximum predicted 24-hour impact from all historical and current point sources was 2.86 ug/m3. The cumulative annual average was predicted to be 0.69 ug/m3.

These two values are extremely low and considered to be de minimis, especially when compared to the 24-hour and annual PM10 standards of 150 ug/m3 and 50 ug/m3 respectively. For comparison, EPA non-attainment new source review requirements in 40 CFR Part 51, Appendix S establish significance levels which define when a major source is causing or contributing to a violation of a NAAQS. Impacts below these Appendix S concentrations are deemed de minimis. The Department has used these same values in AQCR 702-Permits to define sources impacting non-attainment areas. For PM10, the significance values are 5 ug/m3 and 1 ug/m3 for the 24-hour and annual standards, respectively. Not only does each point source in the analysis have an ambient impact below these concentrations, but the cumulative impact of all sources combined is below these significance levels.

Based on the modeling analysis, the Department finds industrial point sources have no significant impact on air quality in Anthony. As allowed by the EPA SIP Guidance for PM10 Moderate Areas, it is not necessary to consider the appropriate level of RACT to be required of point sources because the current impact is de minimis. There would be no improvement in PM10 concentrations in Anthony brought about through additional controls on point sources. In addition, there is no reason to conduct any other more advanced modeling analysis regarding point sources when their impact is very clearly minimal.

Regarding future emissions from point sources, the Department recognizes that Anthony is officially designated non-attainment for PM10. As such existing requirements for new sources locating in or impacting Anthony in AQCR's 702 and 709 will be applied and followed. The Department will also strive to meet EPA guidance on non-attainment new source review issued in response to the 1990 Amendments prior to revising AQCR's 702 and 709 when this is possible.

EPA recently promulgated new test methods (201 and 201A) for PM10 and proposed test method 202 for measurement of condensible particulate emissions. Although this SIP revision contains no emission limits, any future source given PM10 emission limits will be required to use appropriate EPA approved test methods.

B. Area Sources

Available emission inventories indicate that the majority of PM10 emissions in New Mexico are from area sources. Area sources include fugitive and reentrained dust from roads, fugitive dust from sparsely vegetated surfaces, range lands and agricultural areas, motor vehicles and residential woodburning.

1. Unpaved Roads

The Dona Ana County Planning Department has estimated that almost 10 miles, or about 1/3, of the streets in Anthony are unpaved. Traffic along unpaved roads is observed to be slow, an apparent attempt to minimize dust. PM10 emissions from unpaved roads in the non-attainment area are estimated to be 36.7 tons per year (see Table 2 for calculations).

Area residents are eager to have these streets paved, or at least improved. However, County and State funds only cover 2 road projects per year in each (Road Commissioner) district. Anthony shares District 2 with 5 other communities. As a result, progress has been slow. However, some streets have been primed (sprayed with oil) or treated by double penetration (grading, oil and large aggregate, oil and small aggregate) until funds are available to pave them. Priming is expected to last about a year. Double penetration treatment should last 5 to 6 years. Last year, 4 streets were primed in Anthony. Other streets were treated (double penetration) in conjunction with the installation of new sewer lines.

In the 1986 EPA Rural Fugitive Dust Area Study in Grant County, New Mexico, researchers determined that:

"The possible control strategies for the area are limited due to the nature of the dust sources. Because agricultural tilling and wind erosion represent negligible dust sources, common controls such as conservation tilling and acreage stabilization are unwarranted. Since the greatest source of dust is generated by vehicular traffic on dirt roads, the control having the greatest effect would be paving or treating the dirt roads. This form of dust control may prove to be cost prohibitive. Grant County road officials estimated paving costs to be $80,000 per mile. This would amount to $2,000 per ton of particulates removed assuming paving would eliminate the 22,997 tons/year particulates reported in [the 1983] NEDS. The county paved a total of 3 miles in 1985."

It is not clear whether EPAs cost estimate has been annualized, or if it includes the continuing costs of maintaining and repaving these roads. However, the Division agrees that the cost to government of paving public roads as a form of dust control is prohibitive. This cost has risen since the 1986 Grant County report. The Dona Ana County Road Department estimates that one mile of (hot mix) paved road costs $4.59 per square yard, or $108,000 per mile (40 foot width). This 26% cost increase translates to an estimated control cost of $2520 per ton of particulate. Assuming that 47% of the total suspended particulate is PM10 (PM10 SIP Development Guide, EPA, June 1987), the cost of controlling PM10 by paving roads may be estimated at approximately $5360 per ton.

The County and State continue to pave and treat roads as expeditiously as funding allows. However, to pave all of the unpaved roads in Anthony (assuming a road width of 24 feet) will cost approximately $693,000 (1991 dollars). Paving as a PM10 control strategy is economically infeasible.

Recent growth in the area has raised concerns about the creation of additional unpaved residential roads. A number of low-cost housing developments have been built or proposed in the region. The recently revised Land Subdivision Regulations of Dona Ana County (December 11, 1990) require most developers to pave newly established roads. If these streets are up to (hot mix) code, the county will annex and maintain them. The New Mexico Constitution prohibits the county from paving or maintaining private roads.

2. Paved Roads

The Dona Ana County Road Department is responsible for maintaining the paved public roads in Anthony. This includes clean-up after heavy rains or winds have deposited soil onto paved roads. Climate has not necessitated the salting of roads in the winter. Due to a lack of funding, sidewalks are rare in Anthony and street sweepers are operated on a complaint basis only.

The State has estimated PM10 emissions due to re-entrained dust from paved roads to be 0.7 tons per year. These emissions are considered de minimis.

3. Haul Trucks

By policy, all Dona Ana County haul trucks are covered. Most commercial trucks are covered as well, in order to avoid material loss and complaints from broken windows. Emissions from these sources are considered de minimis.

4. Unvegetated Areas

Dona Ana County receives less than 9 inches of rain per year. This scarcity of water virtually guarantees an abundance of dry, dusty yards, vacant lots and ball fields. All of these fugitive dust sources are adjacent to (and up wind of) the monitor. The only ballfield in Anthony is about 1000 feet southwest of the monitor. This well used ballpark is devoid of plantlife, and the parking area and adjacent road are unpaved.

Nearer the monitor, the (historically) paved parking lot on which the monitors sit is now either ground to dust and gravel or simply covered with dust and gravel. A vacant lot sits across the street (south and slightly west). Although the nearest streets are paved, there are no curbs, sidewalks or lawns. A partially vegetated vacant lot sits due east of the monitors (emissions from this vacant lot are shown in Figures 21 and 22 of Appendix B).

Clearly, these sources can be significant, although during high winds dust from surrounding range land may dominate impacts on the monitor site. However, for a region in which virtually all areas not covered by pavement or buildings are sparsely vegetated and subject to wind erosion, feasible control strategies are not forthcoming. Irrigated crop lands and school lawns are notable exceptions; however, in the desert not all areas can be irrigated. In fact, water pressures in the overextended residential water system in Anthony are often feeble and erratic. Even with the planned improvements to the system, area water resources cannot sustain the kind of groundcover necessary to prevent wind erosion. It is technologically infeasible to vegetate the surrounding area with ground cover.

Earth moving activities further raise dust. An ordinance regarding the grading of land has recently been developed by the County Road Department. The new ordinance requires individuals to obtain a permit and to water while grading.

5. Trash Burning

New Mexico Air Quality Control Regulation (AQCR) 301, included as Appendix G, prohibits the burning of refuse in towns the size of Anthony. It is also illegal to burn trash in Dona Ana County (Dona Ana County Ordinance No. 79-1, Section III.E). Violators may be fined up to $300 or sentenced to up to 90 days in jail for each offense of the County regulation, and fined up to $1000 per day for violation of the State regulation. In addition, the transfer facility where residents deposit their trash will not accept the remains of burnt trash. This policy was instituted after smoldering garbage ignited and destroyed one of their bins. The county is also developing a system to provide household pick-up. These efforts reduce both blowing trash and trash burning.

PM-10 emissions due to the burning of trash are considered well controlled and de minimis.

6. Wood Burning (home heating)

The 1990 census information regarding the use of wood burning for home heating is not yet available. According to the 1980 census for Anthony, 'House heating fuel' use was 71% utility gas, 27% bottled, tank or LP gas, 2% electricity and zero wood, fuel oil, coal or other fuel. However, it is not clear how many migrants, illegals or illiterate were included in the 1980 census, or how many of these individuals winter in Anthony. The 1990 results will likely be higher, as woodstoves became more popular during the 1980's. Although fireplaces have always been common, the regional practice is to use them on Christmas Eve and not for general home heating.

Woodsmoke contributions to PM10 exceedances would be most significant on low wind days in the winter. However, the filter analyses described in Appendix B have shown that wood smoke was not a significant contributor to any of the exceedances, including the exceedance which occurred on the (low wind) Christmas Eve of 1989. Based on filter analyses and available information, emissions from these sources are considered de minimis.

7. Off-road recreational vehicles

Due to low income levels, off-road recreational vehicles are uncommon in or around Anthony. Although some of these vehicles were observed near Sunland Park, aerial photographs do not show any areas near Anthony with the distinctive patterns of off-road vehicle use.

8. Agricultural and range lands

A report describing the PM10 contributions from rural land soils in the Anthony area is included as Appendix D. As documented in that report and in Appendix F (correspondence from the Soil Conservation Service), Dona Ana County's croplands are in compliance with the Food Securities Act. The EPA <u>PM10 Moderate Area SIP Guidance: Final Staff Work Product</u> (April 1991) lists, as an available fugitive dust control measure, reliance "upon the soil conservation requirements... of the Food Security Act to reduce emissions from agriculture operations." Thus, the favored RACM for agricultural land is already in place. PM10 emissions from these areas are not considered significant.

As discussed in Appendix D, open burning (for weed control) is not commonly practiced in this area. However, New Mexico Air Quality Control Regulation (AQCR) 301 (Open Burning) is included as reference in Appendix G. AQCR 301 was most recently revised in February of 1983.

The federal Bureau of Land Management (BLM) leasing requirements are designed, in part, to minimize overgrazing. In fact, the average carrying capacity for allotments in the area is less than two animal units per (640 acre) section per year. However, the soil composition of regional rangelands are inherently susceptible to wind erosion, regardless of impacts from humans. Estimated potential PM10 emissions from rangelands, based on soil types and natural vegetation, are high, approximately 150 tons per acre per year, and apt to contribute significantly to windy day exceedances (<u>Control of Open Fugitive</u>

Dust Sources, EPA-450/3-88-008, September 1988). There are no range lands within the Anthony non-attainment area. However, approximately 86%, or 3350 square miles, of Dona Ana county are classified as range lands. This represents potential countywide emissions of 502,584 tons per year. Similar desert soils in Mexico, Arizona, Texas, California and other parts of New Mexico are also likely PM10 contributors during high wind seasons. Long range transport of PM10 is an established phenomenon. The State finds that these emissions, while significant, should not be considered anthropogenic.

C. Summary

The State finds all point and area sources of PM10 in or effecting the Anthony non-attainment area to be de minimis, with the exception of unpaved roads, unvegetated and sparsely vegetated areas, and range lands. Of these, the paving of roads is economically infeasible and enhancement of ground cover in the area or region is technologically infeasible. Emissions from range lands are considered non-anthropogenic. The State is aware of no additional reasonable or available control measures for anthropogenic sources of PM10 in the Anthony area.

III. Attainment Feasibility and Waivers

The State finds the attainment of the PM10 NAAQS in Anthony by the required deadline impracticable. Although the continuing efforts of County, State and Federal agencies have reduced dust levels within the area, the State is not confident that the implemented control strategies can prevent exceedances which are predominantly non-anthropogenic. As acknowledged by EPA in the establishment of the RFDA program and current waiver provisions, high winds, friable soils and low annual rainfall are not within regulatory control.

Under section 188(f) of the CAAA, the EPA Administrator may waive the attainment date if he or she determines that non-anthropogenic (natural) sources of PM10 contribute significantly to a violation of the PM10 NAAQS in the area. The State believes this to be the case in Anthony, as filter analyses have shown that the overwhelming contributor to PM10 violations is airborne soil. Although some of this soil may originate from unpaved roads, a significant portion arises from regional terrain which is sandy, dry and only partially vegetated.

The State understands that a waiver of the attainment date does not release it from full implementation of its moderate area SIP requirements. Despite significant economic hardship and onerous control costs, anthropogenic sources of PM10 are being controlled as rapidly as practicable.

IV. Conclusion

The State and County have been working steadily to reduce PM10 levels in Anthony. Existing roads are being paved as quickly as funding allows. Permitting regulations in both New Mexico and Texas are designed to prevent industrial source contributions to PM10 violations. Agricultural and range lands are being managed as recommended and required by Federal agencies.

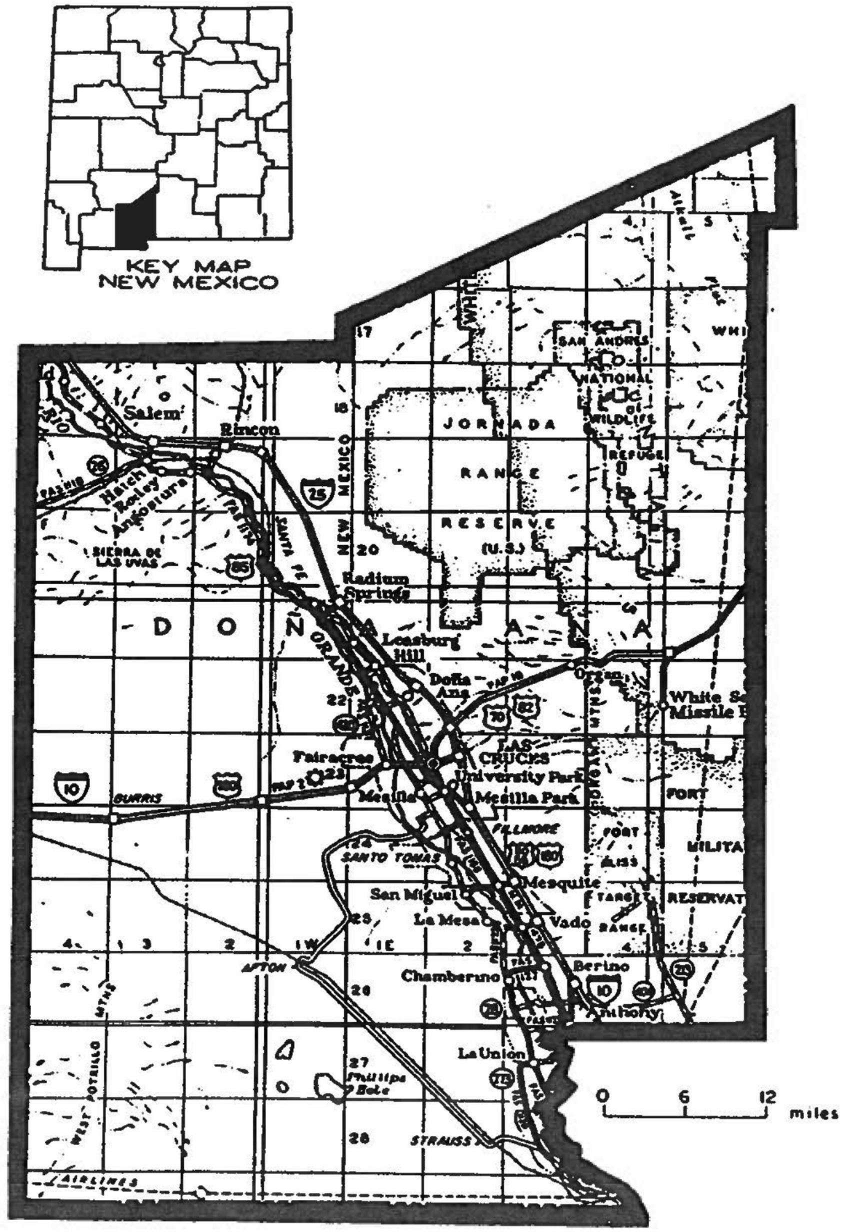
These State, County and Federal efforts have been successful. Whereas in 1988, the first year of PM10 monitoring, seven exceedances were measured, in 1989 four were measured and in 1990 only one. No exceedances have been measured to date in 1991. Likewise, the annual arithmetic mean in 1990 was significantly lower than those measured previously.

However, the region continues to be dry and sparsely vegetated. Recent improvements in air quality may be the result of fortunate climactics. Dust storms and dust devils will continue to occur, especially in the Spring. Non-anthropogenic sources persist and will, at times, prevail. This was acknowledged in EPA's acceptance of Anthony as an RFDA.

The State remains committed to the dust control measures implemented by Dona Ana County, moderate area control strategies as agreed to in this SIP submittal and to the established air quality monitoring schedule. However, the State is requesting a waiver of the moderate area attainment deadline of December 31, 1994. While efforts towards the mitigation of anthropogenic sources continue, recurring non-anthropogenic sources thwart ambitions of consistent attainment.

Appendices:

A. Air Quality Data
B. PM10 Exceedances at Anthony and Sunland Park, New Mexico
C. Air Quality Dispersion Modeling Summary for Anthony PM10 SIP
D. PM10 Contributions from Rural Land Soils and Open Burning
E. Dona Ana County Soils Information from the Soil Conservation Service
F. Soil Conservation Service Correspondence Regarding Food Security Act
G. Air Quality Control Regulation 301



DOÑA ANA COUNTY

NOTE: ALL OF THIS COUNTY IS LOCATED WITHIN THE RIO GRANDE BASIN

Figure 1

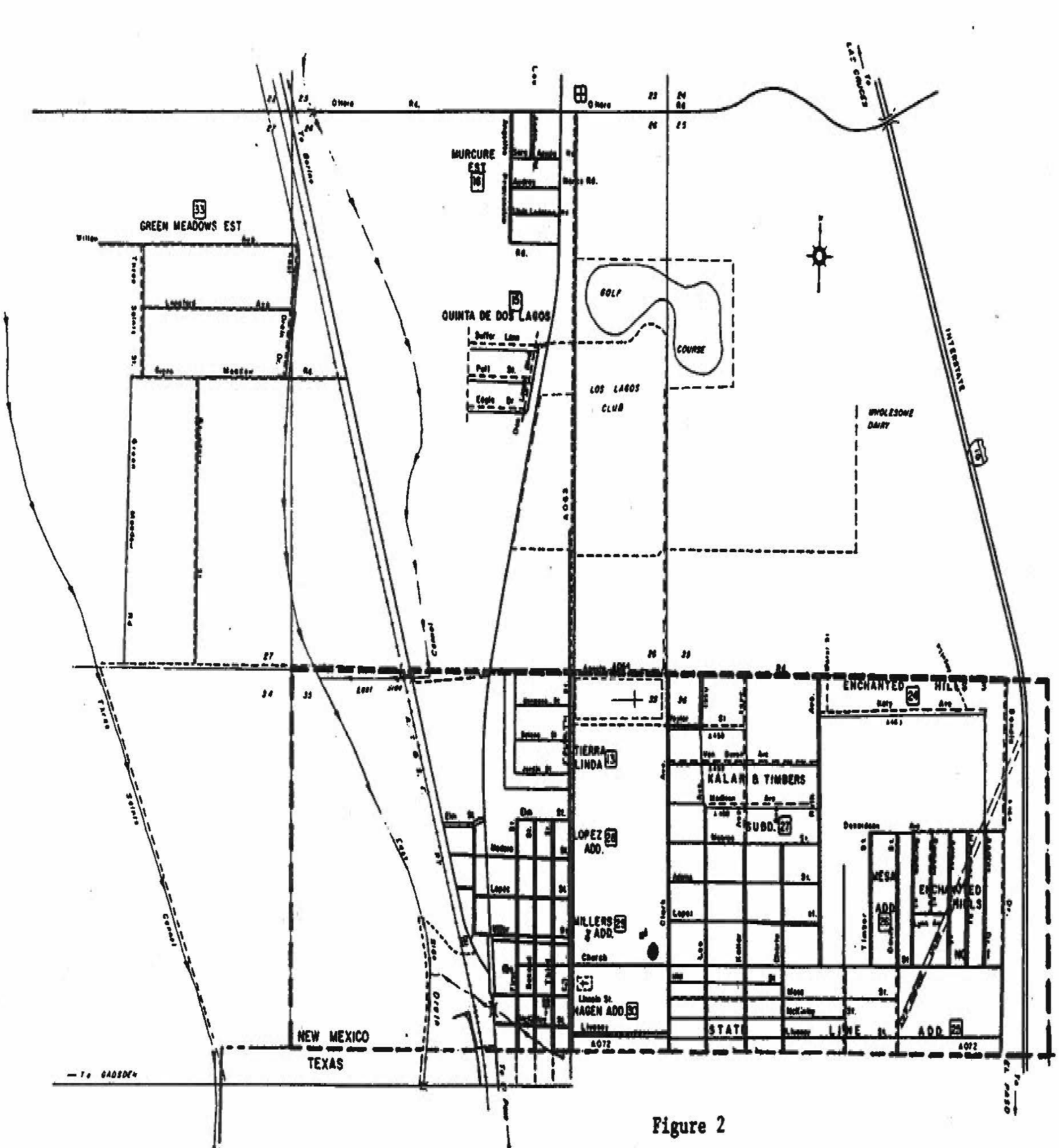


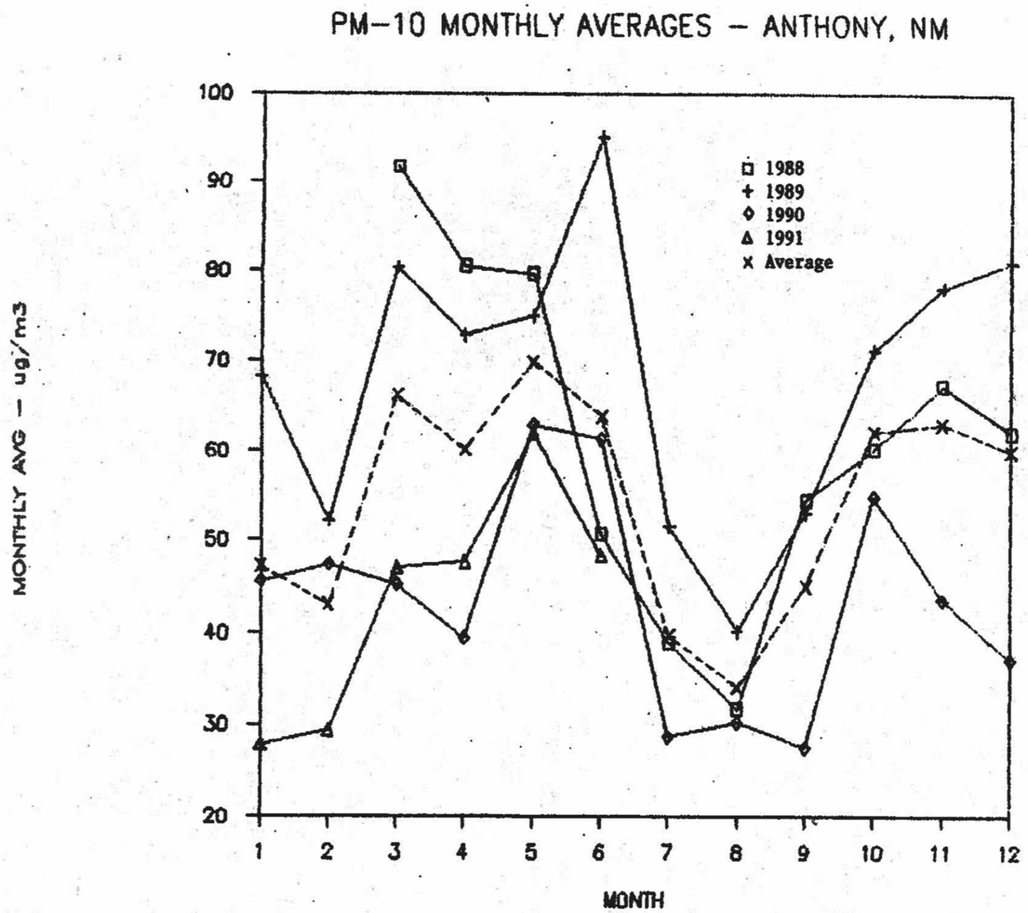
Figure 2

Anthony, New Mexico
Dona Ana County Engineering Dept.
1986

—— Paved Roads	---- Unpaved Roads
— — Non-attainment Area	● - PM10 Monitoring Site

Note: Fourth St. and Green Meadows Est have since been paved
1 inch equals 1500 feet

Figure 3



Total Number Exceedances in Each Month:	0	0	5	1	2	0	0	0	0	1	0	2

Table 1
PM10 Exceedances at Anthony, New Mexico

24-Hour Average (Standard: 150 ug/m3)

Date	Concentration (ug-PM10 /m3)	Remarks
3/10/88	170	High wind day (1)
3/19/88	151	
3/28/88	227	
3/29/88	226	
4/21/88	223	High wind day (1)
5/01/88	154	High wind day (1)
12/31/88	173	
3/03/89	297	Flagged as exceptional event
6/13/89	202	High wind day (1)
10/27/89	176	
12/24/89	176	
5/19/90	198	Flagged as exceptional event

(No exceedances recorded in first 2 quarters of 1991)

(1) Requested to be flagged as an exceptional event

Annual Arithmetic Mean (Standard: 50 ug/m3)

Year	Concentration (ug-PM10 /m3)
1988	59
1989	68
1990	44 (2)
1991	44 (3)

(2) In compliance with standard
(3) First two quarters only

Table 2
PM10 Emission Inventory
(Tons per Year)

Source	Area: Dona Ana County	Area: Anthony Non-Attainment Area	Notes
Point Sources			(1)
Joab Incin.	7.5	0	
Ribble Asphalt	13.1	0	
El Paso Electric	46.0	0	
Santo Tomas Gin	1.4	0	(2)
Santo Tomas Short	1.4	0	(2)
Chamberino Coop	1.8	0	(2)
Mesa Farmer's Coop	0.9	0	(3)
Area Sources			(4)
Unpaved Roads	N/A	36.7	(5)
Paved Roads	N/A	0.7	(6)
Rangelands/Desert	502,584	0	(7)

Notes:

(1) Emission estimates derived from permit files and AIRS data base. Only sources in New Mexico are included in this table. Sources in both New Mexico and Texas are listed and modeled in Appendix C.

(2) Closed down as of January, 1991. While in operation, these cotton gins ran a maximum of 24 hours a day, 4 months per year (September 15 - January 15). Also closed in January was the Anthony Gin in Texas, just across the state line and near the southwest corner of the Anthony non-attainment area.

(3) Opened October 1991, to replace closed gins. Permitted to operate a maximum of 24 hours a day, 4 months per year (September 15 - January 15).

(4) Specific emission estimates regarding haul trucks, trash burning, wood burning, off-road vehicles and agricultural practices are not available but are expected to be minimal (see text).

(5) Calculated to be 36.74 tons/yr using AP-42 (Section 11.2.1) and CARB (Calif. Air Resources Board) factors, County estimates and observation:
Emission Factor, EF = $k\ (5.9)\ (s/12)\ (S/30)\ (W/3)^{0.7}\ (w/4)^{0.5}\ (d/365)$ lb/VMT
Where: k (particle multiplier) = 0.49 for PM-10 (from CARB)
s (silt) = 15% (AP-42)
S (speed) = 20 mph (observation)
W (weight) = 3 tons (AP-42, observation)
w (wheels) = 4 (observation)
d (dry days per year) = 305 (AP-42)
Emissions = (EF) (VMT per day) (m) (365 days/year) / (2000 lb/ton)
Where: EF = 2.013 lb/VMT (calculated above)
VMT (vehicle miles traveled) = 10/day (CARB for equivalent areas)
m (miles of unpaved roads) = 10 (County estimate)

(6) Calculated using AP-42 (Section 11.2.5) (which recommends a PM-10 emission factor of 0.018 lb/VMT for local streets) and above assumptions for 20 miles of paved roads: (0.018)(10)(20)(365)/(2000) = 0.657 t/y

(7) Non-Anthropogenic Source

City of Anthony

820 HWY 478 / P.O. Box 2663
Anthony, New Mexico 88021
(575) 882-2983 Office / (575) 882-2978 Fax
www.cityofanthonynm.com

City of Anthony New Mexico
July 1, 2010

September 18th, 2019

Armando Paz
Environmental Analyst
New Mexico Environment Department
Air Quality Bureau – Control Strategies
2301 Entrada del Sol
Las Cruces, NM 88001

Via Email: Armando.Paz@state.nm.us

RE: Public Record Request

We are in receipt of your email dated September 12th, 2019. In request for dust ordinance or any City controls of implemented to help minimize the impact from manmade sources.

City of Anthony has not passed any environmental ordinance, we have received NMED funds that is helping us with designing South Anthony Arroyo which is underway. In 2016 we used CMAQ Funds to build walking paths from Duffer to O'hara that contribute to air quality. Streets that have been paved since we became a City are:- John Hinkley, One block of Lopez and Acosta, Putter Circle, 4th Street, Clark St, Nancy Domenici.

If you have any questions or require additional information, please contact me on 575-882-2983 or Email: emotongo@cityofanthonynm.org

Sincerely,
City of Anthony

Esther Motongo
City Clerk

Appendix F DUST CONTROL ORDINANCES

Las Cruces Dust Control Ordinance

ARTICLE V. - STANDARDS FOR EROSION CONTROL[5]

Footnotes:

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Editor's note—Ord. No. 2657, § I(exh.A), adopted July 16, 2012, repealed the former art. V., §§ 32-301, 32-302, and enacted a new art. V as set out herein and became effective Oct. 1, 2012. The former art. V pertained to similar subject matter and derived from: Ord. No. 1789, § I, adopted Apr. 3, 2000; and Ord. No. 1929, §§ I, II, adopted Aug. 5, 2002.

Sec. 32-301. - Soil erosion control.

(a) Introduction. Intense and sporadic rainfall or wind are typically the culprits of soil erosion in this region. When rain impacts the earth, water runoff transports loose soil through hydrologic actions, while soil and dust are moved by their inclusion in adjacent wind. These items compose the primary forces that cause sediment erosion of our soils. To prevent this erosion, there are different sediment control measures available to minimize and control these erosions.

(b) Purpose and intent of this section. The purpose of this section is to comply with all federal, state and local codes and regulations in order to protect upstream and downstream properties, the city's MS4 system, and all natural waterways from erosion.

(c) Erosion control. Erosion control is necessary on any location where contaminated flowing water or blowing soil/dust may threaten the health and safety of the adjacent areas and its occupants. Control measures shall be implemented and maintained to minimize and/or prevent entrainment of soil into water runoff or wind from both disturbed and undisturbed areas. Control measures for any development within the city limits shall conform to the provisions set forth in chapter 32 and chapter 34 of the Las Cruces Development Code.

(Ord. No. 2657, § I(exh. A), 7-16-12)

Sec. 32-302. - Wind erosion control.

(a) Purpose and intent of this article.

(1) The purpose of this section is to protect and maintain the natural environment and to reduce the health effects caused by the creation of fugitive dust, equal or greater than PM10, consistent with the policies of the city's comprehensive plan and the natural events action plan for Dona Ana County. In addition, the ordinance attempts to limit property damage due to blowing sand and particulate matter caused by anthropogenic (manmade) activities. This article shall accomplish the requirements of these planning documents by requiring mitigation measures for activities that create fugitive dust.

(2) The intent of this section is to minimize the contribution of manmade dust production on a regular basis. This chapter is also intended to realize that fugitive dust creation does occur due to the natural environment and natural events however when careful and effective dust control measures are implemented on those sources which by their nature are prone to dust creation, the overall impact from these natural events can be minimized.

(b) Applicability. The provisions of this article shall apply to any activity, equipment, operation and/or practice, manmade or man-caused, capable of generating fugitive dust or windblown particulate matter.

(1) Exemptions: The following activities are automatically exempted from the provisions of this article:

a. Regular agricultural operations; including home gardening, including cultivating, tilling, harvesting, growing, the raising of farm animals or fowl, excluding unpaved roads associated with such operations.

b. Governmental activities during emergencies, life threatening situations or in conjunction with any officially declared disaster or state of emergency.

c. Operations conducted by essential service utilities to provide electricity, natural gas, oil and gas transmission, cable television, telephone, water and sewage during service outages and emergency disruptions.

d. This article shall not apply to the generation of airborne particulate matter from undisturbed lands.

(c) Application for exclusions. Waiver from specific requirements of this article shall be made to the building official or designee for approval. Requests shall include a documented justification statement including full description of reasons for the waiver and the concurrence of the waiver by adjacent downwind (historic wind directions) development(s) and occupants within a reasonable affected distance. The distance shall be determined on a case by case basis dependent on the scope and scale of the project/activity seeking the waiver.

(d) Definitions. Terms and words used in this article shall have the following meanings except where any narrative portion specifically indicates otherwise:

"Activity" or "activities" means any land stripping, earthmoving, trenching, road construction and demolition or renovation of manmade facilities.

"Air contaminant" means smoke, vapor, charred paper, dust, soot, grime, carbon, fumes, gases, odors, particulate matter, windborne matter, or any other material in the outdoor atmosphere.

"Anthropogenic" means created or caused by human activity.

"Chemical/organic stabilizer" means any nontoxic chemical or organic dust suppressant other than water which meets any specifications, criteria, or tests required by any federal, state or local water agency and is not prohibited for use by the U.S. Environmental Protection Agency or any applicable law, rule or regulation.

"Construction and demolition activities" means any on-site activities preparatory to or related to building alteration, rehabilitation, removal or razing, or improvement on real property, including the placement and upkeep of mobile or manufactured homes or buildings. "Construction" also means construction of roadway systems including, arterials, expressways, interstates, tunnels, overpasses, bridges, interchanges, residential and commercial streets within a subdivision, and airport runway improvements.

"Control measures" (CM's) means techniques or methods specifically identified within the construction documents or wind erosion control plan used to prevent or reduce the emission and/or airborne transport of fugitive dust and dirt.

"Disturbed area" means any area in which the soil will be altered by grading, leveling, scraping, cut and fill activities, excavation, brush and timber clearing, grubbing, and unpaved soils on which vehicle operations and/or construction activities will occur.

"Dust" or "dust emissions" means the finest particulates within the soil that may be transported and deposited by a blowing wind initiated by a surface disturbance that could present a health or safety hazard to the adjacent area or its occupants.

"Dust generating operation" means any activity capable of generating fugitive dust, including, but not limited to, activities associated with creating a disturbed area, construction and demolition activities, and the movement of vehicles on unpaved roadways or parking areas.

"Dust suppressant" means a chemical compound or mixture of chemical compounds added with or without water to a dust source for purposes of preventing air entrainment.

"Emission" means an air contaminant, or the act of discharging an air contaminant, visible or invisible that could cause a health and safety hazard to the adjacent area and its occupants.

"Erosion" means the inclusion and transportation of the soil surface particles by wind or water.

"Fugitive dust" means particles lifted into the ambient air by manmade and natural disturbance activities such as the movement of soil, vehicles, equipment, blasting and wind.

"Grading" means the construction process consisting of stripping, excavating, filling, stockpiling or combination thereof, including the land in its excavated or filled condition.

"Haul road" means a road constructed for, or used for, the purpose of hauling construction materials, or to provide access to one or more construction sites or industrial operations.

"High wind event" means a climatological occurrence in which the average wind speed exceeds a threshold in which fugitive dust will be generated from undisturbed areas, naturally covered areas, disturbed areas, and construction sites, regardless of reasonably available control measures implementation. The average wind speed for high wind events is a sustained wind speed of 25 miles per hour or greater.

"Inactive disturbed area" means any disturbed surface area on which active operations have been suspended.

"Land stripping" or "land stripping activity" means removal of all or any portion of existing vegetation, or natural soil surfacing, from parcels of land by various means.

"Maintenance" means the checking, repairing, and replacement of various dust CM's to insure their continued workability.

"MS4 utility" municipal separate storm sewer system; is a stormwater conveyance or system or conveyances that are owned by a state, city, town, village, or other public entity that discharges into waters of the U.S.

"Natural cover" means any vegetation, or natural ground surface, which exists on the property, prior to any construction activity. This includes areas which have been previously restored to undisturbed conditions.

"Owner" or "operator" means any person or entity who owns, leases, operates, controls, or supervises an affected facility or a stationary source of which an affected facility is a part.

"Palliative" means any agent used to lessen or reduce dust emissions.

"Particulate matter" (PM), are tiny particles of solid matter suspended in the air.

"$PM_{2.5}$" means particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

"PM_{10}" means particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers (smaller than the diameter of a human hair).

"PM_{10} emissions" means finely divided solid or liquid material, with an aerodynamic diameter less than or equal to a nominal ten micrometers emitted to the ambient air.

"Sand" means small loose grains of disintegrated rock. Sand is finer than a granule and coarser than silt, with grains between 0.06 and 2.0 millimeters in diameter.

"Silt" means small loose grains of disintegrated rock, finer than sand with grains between 0.004 and 0.06 millimeters in diameter. These particles are typically easily transported by surface breezes.

"Silt fence" means a temporary sediment control device consisting of a synthetic filter fabric stretched across and attached to supporting posts and entrenched along its bottom. Typically these fences are primarily designed for water erosion control.

"SWPPP" stormwater pollution prevention plan, means a document that defines the construction activities and best practices/control measures are to being installed to retain the stormwater pollution and prevents it from leaving a construction site.

"Track-out control" means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road and prevent contamination into an adjacent MS4 city utility(s).

"Undisturbed" means land or property which is in its natural condition and has not been stripped or graded. Exception is if the property has been revegetated and the soil and vegetative groundcover is now mature.

"Unpaved road" means a road which is not paved with a formal hardened surfacing but instead has a running surface of either crushed gravel or native soil. Such roads are typically for low use and slow traffic. Their ability to produce dust from traffic is well known.

"Vacant lot" means a subdivided or unsubdivided parcel of land which contains no buildings or structures of a temporary or permanent nature, excluding perimeter walls or fences.

"Visible emissions" means any emission which contains particulate matter which are visually detectable without the aid of instruments.

"Wind erosion control plan" (WECP) means a document used to list control measures to be used for the activities being undertaken to prevent fugitive dust or windblown particulate matter and mitigate the escape of these materials beyond the property lines(s) of the originating site(s).

"Wind fence" means a fence made of small, evenly spaced wooden slats (similar to a snow fence) or fabric. They are erected to reduce wind velocity and to trap blowing sand. They may be used as perimeter controls around open construction sites to keep sediments from being blown off-site. The spaces between the fence slats allow wind and sediment to pass through but reduce the wind's speed, allowing transported soil particles to deposit along the fence.

"Wind speed" means the average wind velocity, or gusts regardless of direction, felt on the surface of a soil surface. A hand-held anemometer or an established station may be used to measure the ground surface wind speed at a specific point within a specific site.

"Wind speed test" means an on-site test of the wind speed measured at zero to two feet above the ground surface. This test is taken and certified by a City of Las Cruces construction inspector or codes enforcement officer using a portable hand-held anemometer standing at a specific approved point within the development (+/- 2 feet).

(e) Wind erosion control plan (WECP) requirements. In addition to standards established in subsequent sections of this article, any construction or demolition operation that is subject to this article, a WECP shall be required, excluding general property maintenance e.g., weed management. The WECP shall be designed by the project design engineer for subdivisions, larger scale commercial and industrial projects or infrastructure projects to specifically counter the potential of the sites' soil wind erosion. The contractor or property owner may prepare WECP in other situations. The WECP outlines the potential activities that may create dust and the mitigation steps to be taken for an existing or proposed activity. This WECP is a flexible and dynamic document which may be amended throughout the project to reflect the correct control measures used on the site or project. The initial WECP shall be submitted as a separate document along with the required construction plans for the proposed activity. The following shall constitute the minimum information required within the WECP and description for control measures as part of any activity:

(1) Name(s), addresses and phone number(s) of person(s) responsible for the preparation, submittal and implementation of the control plan and responsible for the dust generating operations.

a. Copies of the general liability insurance policy for the property owner and contractor(s) responsible for dust generating operations.

(2) A plot plan or plat of survey of the site which describes:

a. The total area of land surface to be disturbed and the total area of the entire project site, in acres or square feet, depending on scale;

b. The operation(s) and activities to be carried out on the site;

c. All actual and potential sources of fugitive dust emissions on the site;

d. Delivery, transport and storage areas for the site, including types of materials stored and size of piles.

(3) A description of control measures (CM's) or combination thereof to be applied during all periods of dust generating operations and periods of inactivity to each of the fugitive dust sources described on the plot plan or plat. For each source identified a primary and contingency control measure must be identified and at least one control measure must be implemented. The same control measure(s) may be used for more than one dust generating activity. Specific details must include:

a. Listing by the design engineer, or preparer of the wind erosion containment alternatives that could be used on the specific project;

b. Locate projected application areas on the construction site for specific erosion control treatments;

c. If dust suppressants are to be applied, then the type of suppressant, method, frequency, and intensity of application, the number and capacity of application equipment to be used, and any pertinent information on environmental impacts and/or certifications related to appropriate and safe use for ground applications;

d. The specific surface treatment(s) and/or other CM's utilized to control material track-out and sedimentation where unpaved and/or access points join paved surfaces; and

e. For each fugitive dust source at least one CM shall be designated as a contingency measure in the original control plan. Should the original CM prove ineffective, immediate and effective implementation of the contingency measure(s) shall be required. Any change in the application of a CM must be immediately, or as soon as practicable, forwarded to the building official or designee for review and approval.

(f) Wind erosion control plan review and approval. Review and approval of the WECP and proposed CM's shall be the responsibility of the building official or designee. Approval may be conditioned to require additional measures, actions, or other activities, in addition to those actions proposed within the control plan documentation.

(g) Implementation. Approval and issuance of the building and/or subdivision construction permit(s) and the approval of all outlined CM's contained within the WECP or description shall mandate the implementation of listed CM's by the developer, contractor, builder, owner, and/or agents as part of construction activities.

(h) Other violation prohibited. Implementation of CM's shall not allow the creation of other violations of these standards or other provisions of the Municipal Code.

(i) General activity standards. No person shall cause, allow, or permit diffusion of visible emissions of fugitive dust or windblown dirt/sand beyond the property boundary line within which the emissions become airborne, without taking necessary and feasible precautions to control the generation of airborne or windblown particulate matter. The operation(s) which is causing or contributing to the emissions may be required to temporarily cease the activity or operation until necessary and feasible precautions are taken.

(1) Groundcover removal is prohibited. No person shall disturb the topsoil or remove groundcover on any property within the city limits and thereafter allow the property to remain vacant or undeveloped unless listed readily available CM's have been placed to prevent generation of windblown dust or soil in accordance with this section.

(2) Soil moving activities shall cease when wind speeds exceed 25 mph. Soil moving activities may recommence when either the wind speeds decrease or as soon as effective control measures are implemented during the high wind event which contain the emissions.

(3) Vacant land—Weed management.

a. For all vacant or undeveloped lots or parcels, weed eradication is limited to the removal of weeds only by mowing or individual hand digging. Adjacent natural vegetation should not be removed.

b. Clearing of the entire property is prohibited.

c. All mature trees and major shrubs shall be protected from damage to continue their role in the prevention of soil erosion.

(4) Storage of materials and material transport. No person shall cause, allow, or permit dust producing material to be stacked, piled, or otherwise stored for a period exceeding 24 hours or permit transportation of materials likely to give rise to airborne dust without taking precautions to prevent the creation of fugitive dust. Actions shall be taken to ensure that such areas or uses shall be covered, moistened, compacted, or applied with a chemical dust suppressant, or other applicable CM's to prevent fugitive dust creation.

a. Earth or other material deposited from trucks or earth moving equipment shall be removed from paved streets by the person responsible for such deposits.

b. Stockpiling materials in paved streets, public or private, is prohibited.

(5) Parking time delay agreements. For businesses that have an approved parking time delay agreement and corresponding business license with the city, the agreement shall include submittal of a WECP and implementation of CM's during the approved delay period prior to pavement installation. All parking areas with an approved parking time delay must be surfaced in accordance with the provisions of chapter 38 of the Las Cruces Municipal Code.

(6) Continuous activity operations. For existing, on-going, and/or permanently-sited institutional, governmental, commercial and/or industrial facilities or operations which may continuously generate fugitive dust or windblown particulate matter, individual WECP's with corresponding CM's shall be submitted to the community development department for approval. Approval shall be made by the building official/community development director or designee and shall be communicated in writing to the property/business owner. Letters of approval and approved control plans shall be kept at the property subject to this provision. A new WECP shall be submitted every three years and reviewed for effectiveness. The provisions of the approved WECP shall be implemented as needed to eliminate the creation of airborne fugitive dust or particulate matter.

(j) Construction activity standards. These standards shall apply for all design and construction activities on property within the city limits including, but not limited to, subdivisions, large lot residential, office, commercial and industrial construction:

(1) No person shall cause, allow, or permit a building or its appurtenances, or a building or subdivision site to be constructed, used, altered, repaired, demolished, cleared, leveled, or the earth to be moved or excavated, without taking precautions to limit excessive amounts of particulate matter from becoming airborne. Dust or windblown soil and sand shall be kept to a minimum by the application of good practices such as approved dust suppressant or soil stabilizer, paving,

compaction, covering, landscaping, continuous wetting, controlling access and vehicle speeds, or other approved CM's.

(2) Track-out control is required to be placed at the exits onto a paved road for any development or construction site that is one acre or greater, or in which any material is being hauled on- or off-site. Track-out controls may be provided using the following:

a. Gravel pad, consisting of a layer or layers of washed gravel, rock or crushed rock at least one inch in diameter, 20 feet wide, 50 feet long (or as long as the longest haul truck).

b. Grizzly, at least 20 feet long with bars being at least three inches tall and spaced six inches apart.

c. Wheel washers or pressure sprayers.

d. Other approved method.

Track-out devices shall be routinely cleaned or replaced as necessary to maintain effectiveness. Any bulk material or dirt tracked onto a paved right-of-way, public or private, shall be cleaned up as soon as practical but in no instance longer than 24 hours to prevent it from entering a MS4 utility.

(3) Subdivision requirements.

a. For all subdivisions, a WECP shall be prepared, submitted and reviewed for approval as part of the overall construction permit application of the subdivision construction drawings through the community development department.

b. Developers of the subdivision shall be allowed to grade for the subdivision only after complete subdivision construction drawing approval and permit issuance. No separate grading permit shall be allowed nor shall any grading be allowed beyond the phase of the development that is under construction.

c. The developer shall construct and maintain a perimeter wind fence or dust barrier with a minimum height of three feet along the perimeter of the area of disturbance where the activity or construction could impact downwind developed areas. In addition, all interior yard walls that run predominantly north-south should be constructed, or replaced by maintained wind fences, during the initial project construction phase to create additional wind breaks and buffers.

(4) Grading requirements.

a. A SWPPP, erosion control plan and WECP must be submitted, reviewed and approved by the city prior to any site disturbance or construction activities that equal one acre or more of land. All site erosion control measure must correspond with the erosion control and/or the SWPPP document, and be property maintained for the duration of construction or until final site stabilization has been established.

b. Clearing, except that necessary to establish CM's, shall not begin until all required CM's have been installed and the site has been inspected.

c. Phasing shall be required on all sites disturbing greater than 30 acres, with the size of each phase to be established at plan review and as approved by the City of Las Cruces. A detailed sequence of construction of the project site, including stripping and clearing; rough grading; construction of utilities, infrastructure, and buildings; and final grading and landscaping must be submitted. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, areas of clearing, installation of temporary erosion and sediment control measures, and establishment of permanent vegetation. All areas that have been cleared of significant portions of its vegetative cover and will remain so for 30 days or longer without appreciable construction activity shall be seeded and mulched within 14 days of being disturbed. If seeding or another vegetative erosion control method is used, germination shall be evident within two weeks or the city may require the site to be reseeded or a nonvegetative option employed. Irrigation may be required to establish vegetative cover.

(5) Large lot residential, office, commercial and industrial requirements. For all large lot residential properties, in which the total area is one-half acre or greater, and for all office, commercial, industrial, institutional or governmental construction activities, a WECP shall be prepared, submitted and reviewed as part of the building permit submittal by the community development department.

a. Grading activities shall only be allowed to commence after building plan approval and permit issuance. Site improvement only development permits may be considered based on all of the following:

1. The site is three acres or less; and

2. Dust emissions on the affected lot must be permanently suppressed by providing the required landscaping and paving all required parking areas and driving aisles. All disturbed building pads must be suppressed as to prevent the creation of fugitive dust until such time as building placement occurs; and

3. The anticipated amount of time between site development and building construction is 30 days or less. If more than 30 days passes the building pad shall be re-vegetated or fenced off with a minimum three-foot high wind fence capable of controlling fugitive emissions.

(6) Cessation of operations. Once construction has commenced, stabilization measures must be immediately installed to ensure that fugitive dust and windblown particulate matter creation is suppressed during the approved construction phase, including weekends, after-hours and holidays. A permanent stabilization via re-vegetation, landscaping, paving or the application of dust suppressants or wetting shall be required for projects once the inactive period exceeds 60 days.

(7) City construction projects. Construction activities by the city shall require the provision of a WECP with the construction drawings. This applies to those projects not part of a subdivision i.e., road construction or utility replacements, or buildings not issued building permits by the city i.e., new city buildings or utility substations. Compliance with both the WECP and outlined CM's shall be the responsibility of the contractor and subject to verification by the public works department, utilities department or community development department's building/project inspectors or the city project management staff.

(k) Control measures. Control measures are methods which can be utilized to limit the creation of fugitive dust or windblown particulate matter. CM's are to be identified within the WECP and once approved need to be implemented in accordance with this article for all dust or windblown particulate matter generating activities within the city limits. CM's shall include, but not be limited to:

(1) Designing subdivisions or building sites to utilize existing, pre-development grades;

(2) Watering disturbed areas on a regular basis throughout the daily construction activities, including periods of inactivity;

(3) Applying palliatives or chemical soil suppressant/stabilizer for idle construction periods;

(4) Constructing and maintaining wind barrier fences. Such fencing should be a minimum of three feet in height with 50 percent or less porosity and be placed adjacent to roadways or property boundaries to reduce the amount of windblown material leaving a site. The barriers may also be placed within a site to create wind buffers;

(5) Re-seeding or re-vegetation of graded or disturbed areas along with associated watering until mature vegetation is established;

(6) Grading for street and utility placement only as part of subdivision construction;

(7) Building all interior and perimeter cinder block, rockwalls, and retaining walls as part of the overall construction of subdivisions and not part of the individual building permit for each lot. Walls shall serve as wind breaks and help to reduce the entrainment of dust and the spread of windblown particulate matter;

(8) Grading the building pad site only plus five feet in all directions of the pad site;

(9) Retaining natural vegetation during the construction phase of building excluding the building pad site;

(10) Utilizing existing or natural vegetation as part of the required landscaping for the site as elsewhere required within these design standards, to limit grading activities, to promote water conservation, and to reduce dust generation;

(11) Installing non-natural landscaping or vegetation in the latter part of construction to reduce the amount of disturbed area and the potential for dust generation;

(12) Implementing any other proposed dust suppressing agent or activity approved by the building official or designee, especially those that have been developed to be effective in our particular area;

(13) Combining any two or more of the above items;

(14) Inspections: The City of Las Cruces through its designated agent(s) shall make inspections as required and either shall approve that portion of the work completed or shall notify the permittee that the work fails to comply with the WECP as approved. A copy of the City of Las Cruces approved WECP shall be maintained at the site during the progress of the work. To obtain inspections, the permittee shall notify the applicable City of Las Cruces department.

(l) Corrections, effective date and enforcement.

(1) Correction of condition. If the community development department, code enforcement section of the police department, or other city personnel document that a person is in noncompliance with any of the provisions contained within the article above, he or she will notify the person, in writing, by phone or in person, of that fact and specify a period of time in which the person must achieve compliance. Failure to comply within the timeframe determined by the city constitutes grounds for a notice of violation per the city's enforcement ordinances. Correction of condition may include the amendment of plans to reflect additional or new control measures to be taken in the event that original measures prove to be insufficient or ineffective. Nothing herein shall prevent separate enforcement being taken in accordance with chapter 18 (Nuisances), LCMC.

(2) Remedial action. The city community development department, its designated agent and any other authorized city representative, after proper notice, may enter upon any real property where dust or windblown particulate matter is being generated and take such remedial and corrective action as he or she deems necessary when the owner, occupant, operator, or any tenant, lessee, or holder of any possessory interest or right in the involved land fails to do so.

(3) Costs. Any costs incurred in connection with any remedial or corrective action taken by the city, pursuant to this section, shall be assessed against the owner of the property involved. Failure to pay the full amount of such incurred costs shall result in a lien against the property. The lien shall remain in full force and effect until all costs have been fully paid, which may include costs of collection and reasonable attorney fees.

(4) Effective date. For all existing emission sources governed by this article, the activity must be completed within six months of the effective date or be brought into full compliance. For existing, on-going, and/or permanently-sited institutional, governmental, commercial and/or industrial facilities or operations, the wind erosion control provisions of this article shall be submitted in writing, approved, and implemented within six months of the effective date of this article.

(5) Liability. All persons owning, operating, or in control of any equipment or property who shall cause, permit, or participate in any violation of this article shall be individually and collectively liable to any penalty or punishment imposed by and under the Municipal Code for the city.

(6) Offenses. Any person who violates any provision of this article, including, but not limited to, any application requirement; any permit condition; any fee or filing requirement; any duty to allow or carry out inspection, or any requirements by the city is guilty of a petty misdemeanor and shall pay a fine of not more than $500.00 as levied by the municipal court. Each day of violation may constitute a separate offense.

(Ord. No. 2657, § I(exh. A), 7-16-12)

Secs. 32-303—32-399. - Reserved.

Las Cruces Recommended BACM

City of Las Cruces®
PEOPLE HELPING PEOPLE

Community Development Department
Permitting and Inspections Section
PO Box 20000, Las Cruces, New Mexico 88004
Offices located at 700 N. Main St, Las Cruces, New Mexico 88001
Phone (575) 528-3106 Fax (575) 528-3155

FUGITIVE DUST CONTROL METHODS

The following are suggested dust control methods that may be used to control the fugitive dust created or attributed to operations listed below.

The use of these controls methods **DOES NOT** assure compliance with the Las Cruces Municipal Code Section 32-302. Wind Erosion Control. The use of multiple methods may be necessary for the control of fugitive dust.

Land Clearing Activities

Control Methods	Description
A. Watering	1. Application by means of trucks and/or hoses during land clearing operations.
B. During periods of high winds	1. Apply non-toxic chemical stabilizers per manufacturer's directions, and prior to expected high wind events. 2. Apply water as necessary, and prior to expected high wind events. 3. Stop work activities temporarily.

Earthmoving Activities

Control Methods	Description
A. Watering	1. Application of water by means of trucks, hoses, and/or sprinklers at sufficient frequency and quantity prior to, during, and after earthmoving operation. 2. Pre-application of water to the depth of the proposed cuts or equipment penetration.
B. Pre-grading planning	1. For projects to be phased: time the grading to coincide with the construction phases.

	2. Grade entire project but apply non-toxic chemical stabilizers or ground cover to inactive disturbed surface areas where construction is scheduled to begin more than 60 days after earthmoving activity is complete.
C. Chemical stabilizers	1. Most effective in areas that are not subject to daily disturbances. 2. Apply per manufacturer's instructions.
D. Wind fencing	1. Three to five foot high with 50% or less porosity, adjacent to roadways and property/boundary lines. 2. Normally used in conjunction with watering or non-toxic chemical stabilizers. 3. Use trees and shrubs for long-term stabilization of site.
E. Operate on-road haul vehicles appropriately	1. Mix material with water prior to loading and/or wet surface of material after loading. 2. Do not overload vehicle. Freeboard should not be less than 3". 3. Remove spillage from body of truck after loading and unloading of truck. 4. Empty loader slowly and keep bucket close to the truck while dumping. 5. Apply water as necessary during loading operation.
F. Operate off-road haul vehicles appropriately	1. Mix material with water prior to loading and/or wet surface of material after loading. 2. Empty loader slowly and keep bucket close to the truck while dumping. 3. Apply water as necessary during loading operations.
G. Alternative haul vehicles	1. Use bottom-dumping haul vehicles.
H. During periods of high winds	1. Apply chemical stabilizers per manufacturer's directions prior to expected high wind events. 2. Apply water as necessary prior to expected high wind events. 3. Stop work activities temporarily.

Storage Piles

Control Methods	Description
A. Watering	1. Application methods include spray bars, hoses, and water trucks. 2. Frequency of application will vary with site-specific conditions and soil/gravel type.
B. Wind sheltering	1. Install three-sided barriers with no more than 50% porosity equal to material height.
C. Chemical stabilizers	1. Best for use on storage piles subject to infrequent disturbances.
D. Altering loading and unloading procedures	1. Confine loading and unloading procedures to the downwind side of storage piles. 2. May need to be used in conjunction with wind sheltering.
E. Coverings	1. Tarps, plastic, or other material can be used to as temporary covering. 2. When used – covering must be anchored to prevent wind from removing them.
F. During periods of high winds	1. Apply chemical stabilizers per manufacturer's directions prior to expected high wind events. 2. Apply water as necessary prior to expected high wind events. 3. Install temporary covers.

Disturbed Surface Areas or Inactive Construction Sites

Control Methods	Description
A. Chemical stabilizers	1. Most effective when used on areas where active operations have ceased. 2. Apply per manufacturer's directions.
B. Watering	1. Apply at sufficient frequency and quantity to develop a surface crust.
C. Wind fencing	1. Three to five foot high with 50% or less porosity, adjacent to roadways and property/boundary lines. 2. Normally used in conjunction with watering or non-toxic chemical stabilizers.

D. Vegetation	1. Establish as quickly as possible when active operations have ceased.
E. Prevent access	1. Install fencing around the perimeter of the property. 2. Install "No Trespassing" signs.
F. Site access improvements	1. Stay on established routes.
G. During periods of high winds	1. Apply chemical stabilizers per manufacturer's directions prior to expected high wind events. 2. Apply water as necessary prior to expected high wind events.

Unpaved Roads and Shoulders

Control Methods	Description
A. Paving or chip sealing	1. Requires routine maintenance by watering or dry/wet sweeping to control fugitive dust.
B. Chemical stabilization	1. Not recommended for high volume or heavy equipment traffic use. 2. Apply per manufacturer's directions.
C. Watering	1. Need sufficient quantities to keep the surface moist. 2. Required application frequency will vary according to soil type, weather conditions, and amount of vehicle traffic.
D. Reduced speed	1. May need to be used with watering or non-toxic chemical stabilizers
E. Gravel/recycled asphalt	1. Restrict access or redirect traffic to reduce vehicle trips.
F. Location	1. Locate haul roads as far from existing housing as possible.
G. Site access improvements	1. Stay on established routes.
H. During periods of high winds	1. Apply chemical stabilizers per manufacturer's directions prior to expected high wind events. 2. Apply water as necessary prior to expected high wind events. 3. Stop work and vehicle activity temporarily.

Paved Road Track-Out

Control Methods	Description
A. Wheel washers	1. Should be placed where vehicles exit unpaved areas onto paved areas. 2. May be adjusted to spray entire vehicle including bulk-stored material in haul vehicles.
B. Sweep/Clean roadways	1. Either dry or wet sweeping may be used – dependent on soil type and moisture content.
C. Cover haul vehicles	1. All vehicles shall be covered when moving.
D. Site access improvements	1. Install a gravel pad or grizzly/shaker at the access point to your site. 2. Designate a single site entrance and exit. 3. Stay on established routes.
E. During periods of high winds	1. Clean streets with water flushing.

Doña Ana County Dust Ordinance

Chapter 172. EROSION CONTROL

[HISTORY: Adopted by the Board of County Commissioners of Doña Ana County 12-15-2000 by Ord. No. 194-00. Amendments noted where applicable.]

GENERAL REFERENCES

General penalty — See Ch. 1, Art. III.
Design and construction standards — See Ch. 157.
Flood damage prevention — See Ch. 207.
Grading permits — See Ch. 217.
Land use and zoning — See Ch. 250.

Roads — See Ch. 279.
Subdivision of land — See Ch. 300.

Article I. General Provisions

§ 172-1. Authority and purpose.

The Board of Commissioners of Doña Ana County is authorized by statute, in particular NMSA § 4-37-1, to enact ordinances to protect and promote the health, safety, and general welfare of the residents of the unincorporated areas of Doña Ana County. The purpose of this chapter is to protect and maintain the natural environment and to reduce the negative health effects caused by the creation of fugitive dust, more specifically "PM10," which refers to a size of particulate matter within dust that has been identified by the scientific and medical communities and by the federal Environmental Protection Agency (EPA) as a significant health risk in high concentrations in the air. This chapter is enacted consistent with the goals and policies of the Comprehensive Plans for Doña Ana County and for the Las Cruces Extraterritorial Zone, and as a part of the New Mexico Environment Department's Natural Events Action Plan (NEAP) for Doña Ana County and the State of New Mexico. This chapter shall accomplish the requirements of these documents by preventing, limiting, or mitigating the effects of activities which create fugitive dust (which includes PM10s) or have a tendency to make land more vulnerable to natural erosion forces that create fugitive dust. The objective of this chapter is to ensure that all surface disturbance activities use erosion control measures to mitigate visible fugitive dust on an ongoing basis for the protection of health and safety of the residents of Doña Ana County. This chapter also attempts to ensure that when natural events do occur, such as fugitive dust creation through high winds, the contribution of human-generated dust is limited in its negative health and safety impacts. Emissions that are regulated by federal or state law to require filtering or similar treatment prior to release into the air are not considered "fugitive," and are not regulated by this chapter.

§ 172-2. Applicability.

Under the conditions outlined below, the provisions of this chapter shall apply to any human activity, operation and/or practices, or any condition caused by human activity, which generates dust, causes water erosion, or makes the land more vulnerable to erosion by natural erosion forces. In the development of County land for public purposes, County policies shall be consistent with the purposes of this chapter, and shall be conducted so as to minimize the creation or aggravation of erosive forces.

§ 172-3. Interpretation and conflict.

Where this chapter imposes greater restrictions than those imposed by other rules, regulations, agreements, or County ordinances or resolutions, the provisions of this chapter shall be prevailing and controlling. Where two or more provisions of this code are conflicting, the most restrictive shall apply.

§ 172-4. Appeals.

A determination that a property requires an erosion control plan (ECP) or erosion mitigation plan (EMP), or that a proposed ECP or EMP is insufficient, or both, shall be subject to administrative appeal to the County Manager, and then to the Board of County Commissioners. A property owner wishing to appeal a determination shall request an appeal in writing, directed to the County Manager.

§ 172-5. New development.

Any development that requires a permit under any County ordinance, other than for construction of a single-family dwelling unit (multiple applications within a subdivision shall not apply), shall require an erosion control plan to be submitted consistent with Article II. Grading for all construction, including single-family dwelling units, shall be limited to the building pad site, pond and driveway plus an additional five feet in all directions from these areas.

§ 172-6. Existing conditions.

The owner of any property that is determined to be in a condition vulnerable to erosion by natural forces due to human development of the property may be required to submit an erosion mitigation plan (EMP) consistent with Article II, if the condition of the property is determined to pose a significant health threat due to the nature or extent of the vulnerable condition of the property, or its location near concentrations of vulnerable populations, such as of school children, or ill or elderly persons.

§ 172-7. Exempt activities.

Although Doña Ana County encourages the use of reasonable erosion control measures in all activities, the following activities are exempt from the regulations and restrictions of this chapter:

A. Regular agricultural operations covered by the Right to Farm Act, NMSA §§ 47-9-1 through 47-9-7, including cultivating, tilling, growing, and harvesting crops, and the raising of farm animals or fowl.
B. Governmental activities during life-threatening situations or other emergencies, or in connection with any officially declared disaster or state of emergency.
C. Operations conducted by essential service utilities to provide electricity, natural gas, oil and gas transmission lines, telephone, water and sewage during or to avoid service outages and emergency disruptions.
D. Temporary use of unpaved roads and parking lots that generate fewer than 20 vehicle trips per day for fewer than three successive calendar days.

§ 172-8. Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

ACTIVE OPERATIONS
Any human activity that is capable of generating or generates visible fugitive dust, including bulk material storage, handling and processing; earth moving; construction, renovation and demolition activities; and the movement of motorized vehicles on any unpaved roadways and parking areas.

BULK MATERIAL
Sand, gravel, soil, aggregate and any other inorganic or organic solid matter capable of releasing visible fugitive dust.

CHEMICAL SOIL STABILIZATION/SUPPRESSION
A method of dust control implemented by any person to mitigate PM10 emissions by applying asphaltic emulsions, acrylics, adhesives, or any other approved materials that are not prohibited for use by the New Mexico Environment Department, the Environmental Protection Agency, or any other law, rule, or regulation.

DISTURBED AREA
Any area in which the soil will be altered by grading, leveling, scraping, cut-and-fill activities, excavation, brush and timber clearing, grubbing, and unpaved soils on which vehicle operations and/or movement will or has occurred.

DUST-GENERATING OPERATION
Any activity capable of generating fugitive dust, including, but not limited to, activities associated with creating a disturbed area, construction and demolition activities, and the movement of vehicles on unpaved roadways or parking areas.

DUST SUPPRESSANT
Water, hygroscopic materials, or nontoxic chemical stabilizers used as a treatment to reduce visible fugitive dust emissions. Dust suppressants shall be used as recommended by the manufacturer and in concentrations and application frequencies sufficient to prevent violation of this chapter.

EROSION CONTROL MEASURES (ECMs)
Techniques used to limit the emission and/or airborne transport of fugitive dust from its original site to accomplish satisfactory results for temporary and/or extended suppression of dust and PM10 emission(s).

EROSION CONTROL PLAN (ECP)
A written description of all reasonably available control measures (RACMs) to be implemented at a work site and/or in transit to and from a work site for any earth moving, construction, or potential dust-generating operation. Such written description may be incorporated into building and construction plans or a separate document submitted with said plans.

FUGITIVE DUST
Any particulate matter entrained in the ambient air that is caused from man-made and natural activities without first passing through a stack or duct designed to control flow, including, but not limited to, emissions caused by movement of soil, vehicles, equipment, and windblown dust. Excluded particulate matter includes matter emitted directly from the exhaust of motor vehicles, or from other combustion devices, portable brazing, soldering or welding equipment, and pile drivers.

HIGH WIND CONDITIONS
On-site hourly average wind speed greater than 15 miles per hour, gusts of 20 miles per hour, or an active wind
advisory issued by the National Weather Service for Doña Ana County.

NATIVE PLANTS
Plants that are indigenous to the state or have been imported from other places and have become established in
wildlands without cultivation. *Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I).*

NATURAL COVER
Any vegetation that exists on the property, prior to any construction activity or achieved through vegetation restoration back to a natural state, including the placement of sod.

PALLIATIVE
Any agent used to lessen or reduce dust emissions.

PARTICULATE MATTER
Any material emitted or entrained into the air as liquid or solid particulate, with the exception of uncombined water.

PM10

Particulate matter, both filterable and condensable, with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

REASONABLY AVAILABLE CONTROL MEASURE (RACM)
Any device, system, process modification, apparatus, technique, or control measure, or combination thereof, which results in the lowest emissions rate possible taking into consideration the RACMs' technological and economical feasibility as determined by approval of the erosion control plan.

STABILIZED or STABILIZATION
The ongoing process necessary to reduce the fugitive-dust-generating capability of a surface by paving, dust suppression, watering, compacting or revegetating the disturbed surface sufficient to prevent a violation of this chapter.

TRACK-OUT
Visible bulk material deposited upon a paved public or private roadway and capable of going airborne due to mechanical actions.

Article II. Development Standards and Process

§ 172-9. Erosion control plan (ECP) required.

Other than for a single-family dwelling unit, any grading, construction, demolition, or other development requiring a permit or other form of approval under any County ordinance shall have an approved erosion control plan (ECP) in place prior to receiving a permit. The ECP may be separate documents or incorporated as part of required building and/or construction plans.

§ 172-10. ECP documentation.

Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I). The following shall constitute the minimum information required within the ECP to be submitted as part of an application for building and/or subdivision construction to describe the erosion control measures (ECMs) proposed for the project. For all subdivisions, ECMs shall be outlined and approved as part of the overall review of the subdivision construction drawings through the Engineering and Community Development Departments.

A. Name(s), address(es) and phone number(s) of person(s) responsible for the preparation, submittal and implementation of the ECP, and for the dust-generating operations generally.

B. A site plan or plat of survey of the site that describes:

  (1) The total area of land surface to be disturbed and the total area of the entire project site, in acres or square feet, depending on scale.
  (2) The operation(s) and activities to be carried out on the site.
  (3) All anticipated sources of fugitive dust emissions on the site.
  (4) Temporary drainage and/or ponding facilities to minimize soil erosion and localized flooding of adjacent properties from water utilized on site for development or for dust control.
  (5) Delivery, transport and storage areas for the site, including types of materials to be stored, and proposed maximum sizes of stockpiles for different types of materials.

C. A description of ECMs or combination thereof to be applied during all periods of dust-generating operations to each of the fugitive dust sources described on the site plan or plat. For each source identified, at least one control measure must be implemented. The same control measure(s) may be used for more than one dustgenerating activity. Specific details must include:

(1) If dust suppressants are to be applied, the type of suppressant, method, frequency, and intensity of application, the number and capacity of application equipment to be used, and any pertinent information on environmental impacts and/or certifications related to appropriate and safe use for ground applications;
(2) The specific surface treatment(s) and/or other ECMs utilized to control material track-out and sedimentation where unpaved and/or access points join paved surfaces;
(3) For each fugitive dust source, at least one auxiliary ECM designated as a contingency measure shall be described in the original control plan. Should the original ECM in the control plan prove ineffective, immediate and effective implementation of the contingency measure shall obviate the requirement of submitting a revised control plan; and
(4) ECMs to be implemented prior to any period of inactivity of 10 days or more, due to any reason other than extended rainfall.

D. A description of ECMs or combination thereof to be used to minimize the negative effects of water usage on site during the development activities. All approved measures should be continued until final paving, wall or fence construction and landscaping is in place.

E. The person responsible for implementing the objectives of the ECP shall keep accurate records and document all activities in carrying out the ECP. These records shall be made available upon request by the County staff.

§ 172-11. ECP review and approval.

Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I). Review and approval of a proposed ECP shall be the responsibility of the County Engineering and Community Development Departments or their designees. Approval may be conditioned upon the implementation of additional measures, actions, or other activities, in addition to those included in the proposed ECP. Approval and issuance of the building and/or subdivision construction permit(s) and the approval of all outlined ECMs contained within the control plan or description shall constitute a mandate that the approved ECMs be implemented by the developer, contractor, builder, owner, and/or agents as part of construction activities.

§ 172-12. Erosion control measures (ECMs).

Erosion control measures included with an erosion control plan required by this chapter may include, but are not necessarily limited to, any one or more of the following measures:

A. General guidelines.

(1) Designing subdivisions or building sites to utilize existing, predevelopment grades;
(2) Watering disturbed areas on a regular and minimum basis throughout daily construction activities;
(3) Applying palliatives or chemical soil suppressant/stabilizer for idle construction periods;
(4) Constructing snow and/or wind fences;
(5) Reseeding or revegetation of graded or disturbed areas;
(6) Grading for street and utility placement only as part of subdivision construction;

(7) Building some or all interior and perimeter cinder block, rock walls, and retaining walls as part of the overall construction of all subdivisions and not part of the individual building permit for each lot;
(8) Retaining natural vegetation during the construction phase of buildings, excluding the building pad site;
(9) Utilizing existing or natural vegetation as part of the required landscaping for the site as elsewhere required within these design standards, to limit grading activities, to promote water conservation, and to reduce dust generation;
(10) Installing vegetation or nonnatural landscaping elements in the latter part of construction to reduce the amount of disturbed area and the potential for dust generation; or
(11) Implementing any other reasonable dust-suppressing agent or activity.

B. Active operations in construction areas and other land disturbances.

(1) Short-term control measures may include:
(a) Regularly scheduled wet suppression;
(b) Dust suppressants applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer;
(c) Upwind temporary windbreaks, including fabric fences with the bottom of the fence sufficiently anchored to the ground to prevent material from blowing underneath the fence;
(d) Starting construction upwind and stabilizing disturbed areas before disturbing additional areas; and/or
(e) Stopping active operations during high wind periods.

(2) Long-term control measures may include:
(a) Site stabilization using dust suppressants applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer;
(b) Reseeding using native grasses;
(c) Xeriscaping;
(d) Tree planting; and/or
(e) Permanent perimeter and interior fencing.

C. Specific construction guidelines. The following additional ECMs may be incorporated in a proposed ECP to mitigate the effects of the specified activities:

(1) Unpaved roadways.
(a) Paving using asphalt, recycled asphalt, asphaltic concrete, concrete, or double-penetration (consistent with subdivision or zoning requirements); *Editor's Note: See Ch. 250, Land Use and Zoning; and Ch. 300,Subdivision of Land.*
(b) Dust suppressants applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer;
(c) Regularly scheduled wet suppression; and/or
(d) The use of traffic controls, including decreased speed limits with appropriate enforcement; vehicle access restrictions and controls; road closures and barricades; and off-road vehicle access controls and closures.

(2) Trucks hauling bulk materials on public roadways.
(a) Properly secured tarps or cargo covering that covers the entire surface of the load;
(b) Dust suppressants applied in amounts and rates recommended by the manufacturer;

(c) Maintaining six inches of freeboard from the rim of the truck bed. "Freeboard" means the vertical distance from the highest portion of the load to the lowest part of the rim of the truck bed; and/or
(d) Preventing leakage from the truck bed, sideboards, tailgate or bottom dump gate.

(3) Bulk material handling.
(1) Spray bars;
(2) Wetting agents (surfactants) added to bulk material;
(3) Wet suppression through manual application;
(4) Dust suppressants added to bulk materials in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer;
(5) Stopping bulk material handling during high wind conditions;
(6) Reduced process speeds; and/or
(7) Reduced drop heights.

(4) Industrial sites.
(a) Pave roadways and parking area with asphalt, recycled asphalt, asphaltic concrete, and concrete;
(b) Regularly scheduled vacuum street cleaning;
(c) Regular wet suppression of unpaved areas;
(d) Dust suppression applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer;
(e) Wind breaks;
(f) Enclosures;
(g) Increased wet suppression applications during high wind conditions;
(h) Slowing active operations during high wind conditions; and/or
(i) Stopping active operations during high wind conditions.

(5) Demolition and renovation activities when asbestos-containing materials are not present. If asbestos containing material may be present, all demolition or renovation activity shall be performed in accordance with the federal standards referenced in 20 NMAC 11.64, Emission Standards for Hazardous Air Pollutants for Stationary Sources. In other instances, the following ECMs may be utilized:
(a) Constant wet suppression on the debris piles during demolition;
(b) Dust suppression applied on the debris piles in amounts and rates recommended by the manufacturer;
(c) Enclosures;
(d) Curtains or shrouds;
(e) Negative-pressure dust collectors; and/or
(f) Stopping demolition during high wind conditions.

(6) Milling, grinding or cutting of paved or concrete surfaces.
(a) Constant wet suppression;
(b) Ongoing clean up of milled, ground or cut material;
(c) Dust suppression applied in amounts and rates recommended by the manufacturer and maintained as recommended by the manufacturer.
(d) Enclosures;
(e) Negative-pressure dust collectors; and/or
(f) Curtains or shrouds.

(7) Pressure blasting operations.
   (a) Use of nonfriable abrasive material;
   (b) Curtains or shrouds;
   (c) Negative-pressure dust collectors;
   (d) Constant wet suppression; and/or
   (e) Ongoing clean up of abrasive material.

Article III. General Nonconstruction Activity Standards

§ 172-13. Ground cover removal prohibited.

No person shall disturb the topsoil or remove ground cover on any real property within the County unless reasonable actions are taken to prevent generation of dust caused by the disturbed condition.

§ 172-14. Weed eradication and dust suppression.

A. Weed eradication is limited to removal of specific weeds; clearing of the entire lot is prohibited.
B. Once weeds are removed or mowed, dust suppression can be achieved through watering, chemical suppressant application, or the expansion of natural vegetation areas on the site. Expansion of natural vegetation areas is encouraged.

§ 172-15. Storage of materials and material transport.

Actions shall be taken to ensure that materials storage and material transport areas or uses with the potential of becoming or generating fugitive dust and particulate matter shall be covered, moistened, compacted, or otherwise treated to prevent fugitive dust creation.

Article IV. Existing Conditions

§ 172-16. Existing human-created vulnerable conditions.

If the condition of a property is determined to pose a significant health threat, due to the nature or extent of existing development that makes the property vulnerable to natural erosion forces, or due to its location near concentrations of vulnerable populations, such as of school children, or ill or elderly persons, an erosion mitigation plan (EMP) shall be required.

§ 172-17. Determination.

Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I). The initial determination that a property is in such a condition may be made by any law enforcement or code enforcement or other County agent authorized to make such a determination, subject to review by the Community Development Director.

§ 172-18. Plan submission requirement.

Once the determination has been made in writing, the property owner shall be required to submit within 30 working days a proposed erosion mitigation plan, which may include any of the erosion control measures (ECMs) presented in this chapter, or other reasonable plans for eliminating or mitigating the vulnerable condition of the property. The plan may include a proposed timeline for implementation.

§ 172-19. Review of EMP.

Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I). Upon receipt of a proposed EMP by the County representative making the determination that a plan is required, the EMP shall be submitted for review to the County Engineering and Community Development Departments. The determination of whether the EMP is sufficient shall be made by the County Community Development Director or other authorized County staff member. If the plan is determined to be insufficient, that determination and the reasons therefor shall be provided to the applicant in writing, and the applicant shall be given 10 working days to revise the EMP to address the insufficiencies.

Article V. Enforcement

§ 172-20. Enforcement; penalty.

Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I). Any violation of the provisions of this chapter, including any failure to implement any ECM of an approved ECP or EMP, may be subject to any penalties or remedies allowed by law, including NMSA § 4-37-3 and the general penalty set forth in Chapter 1, General Provisions, Article III, General Penalty. In addition, the County may enforce the provisions of this chapter through the procedures in Chapter 146, Dangerous Buildings, or any similar ordinance subsequently enacted. The County may also pursue injunctive relief or any other remedies available under the law.

Deming Dust Ordinance

DEMING, NEW MEXICO: CITY CODE

Title 11
BUILDING REGULATIONS

Chapter 5
WIND EROSION AND DUST CONTROL

11-5-1: DEFINITIONS:
11-5-2: PURPOSE; APPLICABILITY:
11-5-3: GENERAL PROVISIONS:
11-5-4: DUST CONTROL AND SOIL EROSION PLAN:
11-5-5: REASONABLY AVAILABLE CONTROL MEASURES (RACMS):
11-5-6: GENERAL AND NONCONSTRUCTION STANDARDS:
11-5-7: CORRECTION OF VIOLATIONS:
11-5-8: CITY NOT LIABLE:
11-5-1: DEFINITIONS:

As used in this chapter, the following words and terms shall mean:

AMBIENT AIR: That portion of the atmosphere, external to buildings, to which the general public has access. Land owned or controlled by the stationary source and to which public access is precluded by a fence, physical barriers, or other effective means is exempted from the ambient air.

APPLICANT: Any person, corporation, or public or private organization proposing a development which would involve disturbance to the natural terrain.

CHEMICAL SOIL STABILIZATION/SUPPRESSIVE: A method of dust control implemented by any person to mitigate emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other approved material that are not prohibited for use by the city, the state environment department, the environmental protection agency, or any other law, rule, or regulation.

CLEARING: Any activity that removes the vegetative surface cover.

CONSTRUCTION DEMOLITION ACTIVITIES: Any on site activities preparatory to or related to building alteration, rehabilitation, removal or razing, or improvement on real property, including the placement and upkeep of mobile or manufactured homes or buildings. "Construction" also means construction of roadway systems including, arterials, expressways, interstates, tunnels, overpasses, bridges, interchanges, residential and commercial streets within a subdivision, and airport runway improvements.

DISTURBED AREA: Any area in which the soil will be altered by grading, leveling, scraping, cut and fill activities, excavation, brush and timber clearing, grubbing, and unpaved soils on which vehicle operations and/or movement will or has occurred.

DUST CONTROL AND SOIL EROSION PLAN: A written description of all reasonably available control measures (RACMs) to be implemented at a work site and/or in transit to and from a work site for any earthmoving, construction, or potential dust generating operation. Such written description may be incorporated into building and construction plans or a separate document submitted with said plans.

DUST GENERATION OPERATION: Any activity capable of generating fugitive dust, including, but not limited to, activities associated with creating a disturbed area, construction and demolition activities, and the movement of vehicles on unpaved roadways or parking areas.

EROSION AND DUST CONTROL PLAN: A set of plans indicating the specific measures and sequencing to be used to control sediment and erosion on a development site during and after construction.

EROSION CONTROL: A measure that prevents erosion.

EXCAVATE: Any act by which earth, sand, gravel, or any other similar material is dug into, cut, removed, displaced, relocated, or bulldozed, and includes the resulting conditions.

FILL: Any act by which earth, sand, gravel, or any other similar material is placed or moved to a new location aboveground. The fill is also the difference in elevation between a point of existing undisturbed ground and a designated point of higher elevation of the final grade.

FUGITIVE DUST OR DUST: Organic and inorganic particulate matter in quantities and of a duration that may with reasonable likelihood injure human or animal health or plant life, reduce safe visibility, cause property damage, or degrade visibility. Water vapor, steam, or particulate matter emissions emanating from a duct or stack of process equipment are not fugitive dust.

GRADING: Excavation or fill of material, including the resulting conditions thereof.

GRUBBING: The process of digging up and removing the roots, trunk, branches and stems of all plants in order to clear the land.

HIGH WIND EVENT: A climatological occurrence in which the average wind speed exceeds a threshold in which fugitive dust will be generated from undisturbed areas, naturally covered areas, disturbed areas, and construction sites, regardless of reasonably available control measure implementation. Notwithstanding other climatic conditions, the average wind speed for high wind events is a sustained wind speed of twenty five (25) miles per hour or greater.

LAND DISTURBING ACTIVITY: Any physical land development activity which includes such actions as clearance of vegetation, moving or filling of land, removal or excavation of soil or mineral resources or similar activities.

NATURAL COVER: Any vegetation which exists on the property, prior to any construction activity or achieved through vegetation restoration back to a natural state, including the placement of sod.

PALLIATIVE: Any agent used to lessen or reduce dust emissions.

PARTICULATE MATTER: Any material emitted or entrained into the air as liquid or solid particulate, with the exception of uncombined water.

START OF CONSTRUCTION: The first land disturbing activity associated with a development, including land preparation such as clearing, grading, and filling; installation of streets and walkways; excavation for basements, footings, piers, or foundations; erection of temporary forms; and installation of accessory buildings such as garages.

STRIPPING: Any activity that removes or significantly disturbs the vegetative surface cover, including clearing and grubbing operations.

VISIBLE DUST EMISSION: Dust of such opacity as to obscure an observer's view to a degree equal to or greater than an opacity of twenty percent (20%), for a period or periods aggregating more than three (3) minutes in any one hour.

WIND SPEED: The average wind velocity, regardless of direction, based on a sixty (60) minute average from the nearest weather report or PM10 monitoring station, or by a portable wind instrument located at the site. (Ord. 1144, 7-10-2006)

11-5-2: PURPOSE; APPLICABILITY:

A. Purpose And Intent: The purpose of this chapter is to protect and maintain the natural environment and to reduce the health effects caused by the creation of fugitive dust and wind erosion as a result of the operations and activities with new or existing construction and development. This chapter is also intended to limit the negative health and safety impacts when natural events do occur, such as fugitive dust creation through high winds. Also, the actions required within this chapter are not intended, necessarily, to cease all manmade dust generation activities when such natural events occur and the actions taken to reduce dust generation may be overcome by the natural occurrence.

B. Applicability: The provisions of this chapter are applicable to any situation involving any disturbance to the terrain, topsoil or vegetative ground cover, including grading, grubbing, stripping, cut and fill activity and similar operations, upon any property within the city of Deming as provided for in this chapter. Compliance with the requirements as described in this chapter shall not be construed to relieve the owner/applicant of any obligations to obtain necessary state or federal permits.

C. Exemptions: Any person seeking an exemption from any of the provisions of this chapter shall submit a petition to the city building official for approval. The following activities are automatically exempted from the provisions of this chapter:

1. Regular agricultural operations, including cultivating, tilling, harvesting, growing, and the raising of farm animals or fowl, excluding unpaved roads associated with such operations.

2. Governmental activities during emergencies, health or life threatening situations or in conjunction with any officially declared disaster or state of emergency.

3. Operations conducted by essential service utilities to provide electricity, natural gas, oil and gas transmission, cable television, telephone, water and sewage during service outages and emergency disruptions.

4. Temporary use of unpaved roads and parking lots which generate less than twenty (20) vehicle trips per day for less than three (3) successive calendar days.

5. Excavations for cemeteries for burial of human or animal remains.

6. Existing quarry operations actively engaged in excavating rock, sand, and/or gravel. (Ord. 1144, 7-10-2006)

11-5-3: GENERAL PROVISIONS:

A. Each person shall use reasonably available control measures (RACMs) to prevent a violation of this chapter. No person shall allow fugitive dust, track out, or transported material from any active operation, open storage pile, paved or unpaved roadway or disturbed surface area, or inactive disturbed surface area to be carried beyond the property line, right of way, easement or any other area under control of the person generating or allowing the fugitive dust. Failure to comply with this subsection shall be a violation of this chapter.

B. No person shall permit building materials or any construction waste or other materials to be blown from the site by the wind.

C. Failure to comply with a fugitive dust control term or condition shall be a violation of this chapter.

D. A person whose violation of this chapter results in fugitive dust being deposited upon land beyond the limits of the permitted area shall take all actions necessary to remedy damage caused by a violation proven with credible evidence. Such remedies may include, but are not limited to, compensation, removal of the fugitive dust and/or repair of any damage, obtaining permission from property owners or operators before doing any work on the damaged property. It shall be a separate violation of this part to fail to remove the fugitive dust and repair the damage as specified in the written schedule or any extension agreed to by the person and the damaged property owner. No violation will occur if the failure to perform the corrective actions is for any reason beyond the control of the person performing the work including, without limitation, acts of God or government preemption in connection with a national emergency or if the allegedly damaged property owner refuses to grant reasonable permission and access to conduct the remediation activities.

E. The city, in adopting this chapter, shall collect a twenty five dollar ($25.00) permit fee for review of a stand alone soil erosion and dust control plan. Otherwise, the fee will be considered as incorporated in other permit fees being collected at the time of the review. (Ord. 1144, 7-10-2006)

11-5-4: DUST CONTROL AND SOIL EROSION PLAN:

In order to obtain permit approval for any land disturbing activity involving a site of three thousand five hundred (3,500) square feet or more, and prior to the issuance of any building permit and prior to the commencement of any activity on the site, the applicant shall file with the building official a soil erosion and dust control plan and shall obtain the building official's approval of such plan. In assessing the plan, the building official may consult with any person, agency, or organization he or she deems appropriate.

The following constitutes the minimum information required in the control plan as part of any building or subdivision development:

A. Name, address and phone number of person(s) responsible for the preparation, submittal and implementation of the control plan.

B. A plot or plat of survey of the site which describes:

1. The total area of land surface to be disturbed and the total area of the entire project site, in areas or square feet, depending on scale;

2. The operation(s) and activities to be carried out on the site;

3. All actual and potential sources of fugitive dust emissions on the site.

C. A description of RACMs or combination thereof to be applied during all periods of dust generating operations to each of the fugitive dust sources described on the plot or plat. For each source identified at least one control measure must be implemented. The same control measure(s) may be used for more than one dust generating activity.

D. Approval and issuance of the building and/or subdivision construction permit(s) and the approval of all outlined RACMs contained within the control plan shall mandate the implementation of said RACMs by the developer, contractor, builder, owner, and/or agents as part of construction activities. (Ord. 1144, 7-10-2006)

11-5-5: REASONABLY AVAILABLE CONTROL MEASURES (RACMS):

Reasonably available control measures to be implemented in accordance with this chapter may include, but are not limited to, the following:

A. Using dust suppressants applied in amounts and rates recommended by the manufacturer;

B. Using wet suppression;

C. Upwind windbreaks, including fabric fences;

D. Starting construction at the location that is upwind from the prevailing wind direction and stabilizing disturbed areas before disturbing additional areas;

E. Stopping active operations during high wind;

F. Cleanup and removal of track out material;

G. Retaining natural vegetation during the construction phase of building excluding the building pad site;

H. Utilizing existing or natural vegetation as part of the required landscaping for the site;

I. Temporary seeding or revegetation for soil stabilization when grades are not ready for permanent seeding;

J. Surfacing with gravel or other mulch material of a size and density sufficient to prevent surface material from being airborne;

K. Mulching and crimping of straw or hay as specified;

L. Installing permanent perimeter and/or interior fence walls;

M. Designing subdivisions of building sites to utilize existing predevelopment grades;

N. Applying palliatives or chemical soil suppressant/stabilizer for idle construction areas;

O. Restricting access to lot by subcontractors by providing parking areas. (Ord. 1144, 7-10-2006)

11-5-6: GENERAL AND NONCONSTRUCTION STANDARDS:

A. Ground Cover Removal Prohibited: No person, no matter the size of the property, shall disturb the topsoil or remove ground cover on any real property within the city limits and thereafter allow the property to remain unoccupied, unused, vacant, or undeveloped unless reasonable actions are taken to prevent generation of dust. Such reasonable actions must be submitted to the building official in the form of a wind erosion and dust control plan and must be approved by the building official prior to any removal of ground cover by the applicant.

B. Vacant Land; Weed Eradication And Dust Suppression:

1. For all vacant or underdeveloped lots, weed eradication is limited to removal of specific weeds only through mowing or hoeing and not the removal of natural vegetation. Clearing of the entire lot is prohibited.

2. Once weeds are removed or mowed, dust suppression can be achieved through watering, chemical suppressant application, or the expansion of natural, nonweed vegetation areas on site. Natural vegetation shall consist of those plant varieties that are indigenous to New Mexico or that are determined to be native or natural plant varieties by the city building official.

C. Storage Of Materials: Actions shall be taken to ensure that such areas or uses with the potential of becoming or generating fugitive dust and particulate matter, shall be covered, moistened, compacted, or otherwise treated to prevent fugitive dust creation.

D. Existing Operations: For existing operations, ongoing, and/or permanently sited institutional, commercial and/or industrial facilities or operations which may continuously generate fugitive dust, individual control plans with the corresponding RACMs shall be submitted to the building official for approval. Approval shall be made by the building official or his or her designee and shall be communicated in writing to the property/business owner. (Ord. 1144, 7-10-2006)

11-5-7: CORRECTION OF VIOLATIONS:

A. Notification: Where a person fails to comply with control measures approved by the building official or with any provision of this chapter, the building official or his or her designee, or city code enforcement officer, shall notify the person of that fact and specify a period of time in which the person must achieve compliance. Failure to comply within a twenty four (24) hour minimum or within the time determined by the city constitutes grounds for a notice of violation. The building official may also issue a stop work order where a building permit has been issued. Correction of conditions may include the amendment of plans to reflect additional or new control measures.

B. Remedial Action: The city or its designated agent, after proper notice, may enter upon any real property where dust is being generated and take such remedial and corrective action as he or she deems necessary when the owner, occupant, operator, or any tenant, lessee, or holder of any possessory interest or right in the involved land fails to do so.

C. Costs: Any costs incurred in connection with any remedial or corrective action taken by the city, pursuant to this chapter, shall be assessed against the owner of the property involved. Failure to pay the full amount of such incurred costs shall result in a lien against the property. The lien shall remain in full force and effect until all costs have been fully paid, which may include cost of collection and reasonable attorney fees.

D. Effective Date: For all existing emission sources governed by this chapter, the activity must be completed within six (6) months of the effective date hereof or be brought into full compliance. For existing, ongoing, and/or permanently sited institutional, governmental, commercial and/or industrial facilities or operations, the dust control provisions of this chapter shall be submitted in writing, approved, and implemented within six (6) months of the effective date hereof.

E. Liability: All persons owning, operating, or in control of any equipment or property who shall cause, permit, or participate in, any violation of this chapter shall be individually and collectively liable to any penalty or punishment imposed by and under this code.

F. Offenses: Any persons who violate any provision of this chapter, including, but not limited to, any application requirement; any permit condition; any fee or filing requirement; any duty to allow or carry out inspection, or any requirement by the city is guilty of a misdemeanor and shall be punished as provided in section 1-4-1 of this code, and a separate offense shall be deemed committed on each day during or on which a violation occurs or continues. (Ord. 1144, 7-10-2006)

11-5-8: CITY NOT LIABLE:

A. Nothing contained in this chapter is intended to be construed to create or form the basis for any liability on the part of the city, or its officers, employees or agents for any injury or damage resulting from the failure of responsible parties to comply with the provisions of this chapter, or by reason or in consequence of any inspection, notice, order, certificate, building permit, permission or approval authorized or issued or done in connection with the implementation or enforcement of this chapter, or by reason of any action or inaction on the part of the city related in any manner to the enforcement of this chapter by its officers, employees or agents.

B. The building official, code enforcement officer, or other city employee charged with the enforcement of this chapter, acting in good faith and without malice on behalf of the city, shall not be personally liable for any damage that may accrue to persons or property as a result of any act required by the city, or by reason of any act or omission in the discharge of these duties. Any suit brought against the building official, code enforcement officer, or other city employee because of an act or omission performed in the enforcement of any provisions of this chapter shall be defended by the city.

C. Nothing in this chapter shall impose any liability on the city or any of its officers or employees for construction or cleanup of the erosion and sediment control measures listed herein. (Ord. 1144, 7-10-2006)

LUNA COUNTY BUILDING CODE ORDINANCE NUMBER 75

AN ORDINANCE PROVIDING FOR THE ESTABLISHMENT OF MINIMUM STANDARDS FOR CONSTRUCTION IN LUNA COUNTYAND FOR THE PROVISION OF PENALTIES, CIVIL REMEDIES, SEVERABILITY AND EFFECTIVE DATE.

Whereas, the health, safety and welfare of the residents of Luna County require the regulation of the erection, construction, maintenance, enlargement, moving, removal, conversion, occupancy, equipment, use, height, demolition, alteration, and repairs, of all buildings and/or structures within Luna County; and

Whereas, it is deemed necessary and desirable to ensure orderly and integrated development within Luna County in compliance with policies and guidelines set out in the Luna County Comprehensive Land Use Plan and all other County policies and regulations; and

Whereas, Luna County remains essentially rural in nature in which open space and the natural landscape predominate over the developed environment; rural lifestyles and rural based landowners are fostered; the conversion of undeveloped areas into sprawling low density development is reduced; and

Whereas, Section 4-37-1 NMSA 1978 provides all counties are granted the same powers as municipalities, and included in this grant of powers are those powers necessary and proper to provide for the safety, preserve the health, promote the prosperity and improve the order, comfort and convenience of Luna County and its inhabitants;

Whereas, Section 3-17-6, NMSA 1978 provides that a municipality may adopt by ordinance the conditions, provisions, limitations, and terms of a building code, plumbing code, electrical code fire prevention code, and any other code not in conflict with the laws of New Mexico;

NOW, THEREFORE BE IT ORDAINED BY THE LUNA COUNTY BOARD OF COUNTY COMMISSIONERS AS FOLLOWS:

ARTICLE 1 GENERAL PROVISIONS

1.1 Short Title: This Ordinance shall be known as the "Building Code Ordinance", and shall be referred to herein as "this Ordinance".

1.2 Purpose: This Ordinance shall provide for the regulation of all construction, whether residential or commercial or other use, including any additions, expansions, repairs, remodel, or renovation to any building or structures in Luna County; provide for the issuance of permits for such work; establish minimum standards of workmanship and materials to be used in such work; and provide for the inspection, administration, penalties and enforcement of the regulation.

1.3 Jurisdiction: This Ordinance shall provide for the regulation of construction activities within the County, but not within the boundaries of municipalities.

1.4 Interpretation and Conflict: The regulations provided herein are held to be the minimum standards necessary to carry out the purposes of this Ordinance. This Ordinance is not intended to interfere with, or abrogate or annul any other valid ordinance or statute. In the event the provisions of this Ordinance conflict with other County rules, regulations or ordinances pertaining to the subject matter herein, the provisions of this Ordinance shall prevail.

1.5 Meaning of Terms: Wherever the terms "Luna County Planning Director", "County Planning Director", or "Luna County Planner" appear in this Ordinance they shall be read and understood as including any other person or position authorized by the County Manager or the County Board of County Commissioners to administer or otherwise carryout the requirements of the Ordinance.

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1.6 Definitions:

"Agriculture": An agricultural use or activity requires a tract containing five (5) or more contiguous acres in active, current use for the production of farm crops for sale and profit, including vegetables, fruit, cotton, grain and other crops and the processing of crops to the generally recognizable minimum level of marketability and storage thereof on the premises; the open range grazing of livestock or irrigated pasture for grazing livestock; animal and poultry husbandry, dairy operations, floriculture and horticulture; and accessory uses customarily incidental to agricultural activities. Provided further that agriculture does not include commercial slaughter houses, meatpacking plants, fertilizer yards, or other similar animal related uses.

"Building": any structure used or intended for supporting or sheltering any use or occupancy.

"Building Official" shall mean the officer, or official, or inspector or other designated authority charged with the administration and enforcement of any Code, or the building official's duly authorized representative.

"Certificate of Compliance" shall mean a certificate issued to the property owner by the Luna County Code Compliance Officer or other designated County official, or a New Mexico State Building Official evidencing the fact that the requirements of this ordinance as set forth in this Ordinance, have been met.

"CID" State of New Mexico Construction Industries Division.

"Code" shall mean a standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law, any adopted uniform code pertaining to construction activities.

"Code Compliance Officer" shall mean the person designated by Luna County to enforce various County codes or ordinances.

"Community Liquid Waste System" A liquid waste system or sewerage system, publicly or privately owned and operated, including collection and treatment facilities constructed to serve one or more lots.

"Community Water System": A water system or utility, publicly or privately owned, that relies on surface and/or groundwater diversions other than wells permitted by the State Engineer under Section 72-12-1, NMSA, 1978, and that consists of common storage and/or distribution facilities operated for the delivery of water to multiple service connections. A community water supply system shall have sufficient water rights to serve all lots within the community. A community water system shall include mutual domestic water associations established in accordance with New Mexico law.

"Contiguous" refers to adjacent lots or parcels of land sharing a boundary line.

"County" shall mean Luna County, New Mexico.

"County Commission" shall mean the Board of County Commissioners of Luna County.

"Development" the use of any land; the carrying out of any building activity including construction, reconstruction, conversion or enlargement of any building or structure; the making of any material change in the use, or intensity of use, or appearance of any building, structure, or land; the establishment of a commercial parking lot or the dividing of land into lots, blocks, or parcels, including the construction of roads, the installation of water, sanitary sewer and stormwater management facilities or other utilities.

"Dwelling" any building or portion thereof, which is designed or used exclusively for residential purposes.

"Dwelling Unit, Accessory": A self contained living quarter attached to, or detached from, or under the same roof as the main or principal dwelling, located on the same site as the main or principal dwelling created by:

a) the conversion of an existing single family dwelling; or
b) the construction of an addition to an existing single family dwelling; or
c) the construction of a detached structure which is subordinate to the main of principal dwelling.

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The gross floor area of any such accessory dwelling unit shall be no larger than 50% of the gross floor area of the original main or principal dwelling.

"Dwelling, Apartment or Dwelling Multiple" a building or portion thereof that contains three (3) or more dwelling units, and for purposes of this Ordinance, includes residential condominiums. .

"Family" One (1) or more persons occupying a dwelling unit and living as a single housekeeping unit as distinguished from a group occupying a boarding house, dormitory, lodging house, or hotel, as herein defined.

"Fire Marshal" the Luna County Fire Marshall or a person discharging the duties of Fire Marshal.

"FPC" Fire Prevention Code.

"Flood Hazard Boundary Map" an official map issued by the Federal Emergency Management Agency, where the areas within special flood hazards are designated.

"Flood Prone Area" an area where a temporary condition of partial or complete inundation of normally dry land results from the unusual and rapid accumulation or runoff of surface waters.

"Footing" that portion of the foundation of a structure that spreads and transmits loads directly to the soil or piles.

"Grade Level" the lowest point of elevation of the finished surface of the ground, paving or sidewalk within the area between the building and the property line or, when the property line is more than five (5) feet from the building, between the building and a line five (5) feet from the building.

"Habitable" as applied to any form of housing, such as manufactured homes, site built homes, or mobile homes, means that there are no known defects, damage or deterioration to the home which creates a dangerous or unsafe situation or condition. All plumbing, heating and electrical systems are in safe working order and must meet all applicable codes.

"IBC" International Building Code.

"IRC" International Residential Code.

"Inspector" shall mean the Luna County Building Inspector or the Code Compliance Officer or a person duly delegated by the Luna County Building Inspector or the Code Compliance Officer, or a person instructed or requested by the Luna County Building Inspector or the Code Compliance Officer to provide a written report with respect to any matter set out in this Ordinance.

"LCBO" shall mean the Luna County Building Official; see also Inspector and Building Official.

"Lot" shall mean a parcel of land occupied or intended for occupancy by one main building together with its accessory buildings and uses customarily incidental to it.

"Lot of Record" A lot which is part of a subdivision, the map or plat of which has been recorded in the office of the County Clerk of Luna County, or a lot described by metes and bounds or by survey plat prepared by a land surveyor licensed in the state of New Mexico, which has been recorded in the office of the County Clerk of Luna County.

"Modular Home" a standardized factory fabricated transportable building module not having a chassis or wheels of its own, designed and constructed in accordance with the International Building Code and intended to be placed on a permanent foundation and requires a building permit for installation.

"NFPA" National Fire Protection Association.

"NMBC" New Mexico Building Code.

"Non-Residential Property" a building or structure or parts thereof not occupied in whole or in part for the purposes of human habitation including the land and premises appurtenant thereto.

"Occupancy" shall mean the purpose that a building, or part thereof, is used or intended to be used.

"Officer" shall mean the Code Compliance Officer of Luna County, the person designated by Luna County to administer and enforce various codes and ordinances.

"Owner" shall mean any person, agent, firm or corporation having a legal or equitable interest in the property.

"Parcel" shall mean a unit of land capable of being described by location and boundaries and not dedicated for public or common use.

"Permit" shall mean an official document or certificate issued by the building official, the County Planner, or other authorized authority, as appropriate, authorizing performance of a specified activity.

"Person" shall mean a natural person including any individual, partnership, company, corporation, firm, association, trust, estate, foundation, state and federal agency, institution, county, city, town, village, or municipality or other legal entity, however organized.

"Property" shall mean any area, plot, or parcel of land in Luna County, which is under a common ownership or is separately identified for assessment by the Luna County Assessor's Office. Property shall include land under the ownership of the United States, the State of New Mexico, or any local government or school district entity. This definition is intended to be inclusive and not limiting, and shall therefore include all land within the boundaries of Luna County, New Mexico, except that the definition of property, and therefore this Ordinance, shall exclude property within the boundaries of the City of Deming and the Village of Columbus, and any hereafter incorporated municipality.

"Property Occupant" shall mean any person who is occupying any property, whether by legal right or without legal right.

"Property Owner" shall mean the person who is the recorded owner of any property according to the records contained in the Luna County Clerk's Office.

"Repair" shall mean the reconstruction, renewal, refinishing or refurbishing of all or any part of an existing building or structure, or property for the purpose of its maintenance.

"Residential Property" any property or building that is used, designed, or intended for use as a dwelling unit, dwelling, or apartment dwelling and includes the yards, accessory buildings and vacant property belonging to such property.

"Sewage" shall mean residential liquid wastes, commercial liquid wastes, industrial liquid wastes, and any drainage, but does not include storm water.

"Sewerage System" shall mean a system for transporting sewage owned and operated by Luna County, a municipality or a private disposal system approved by the state of New Mexico Environmental Department.

"Shall" shall be construed as mandatory.

"Site Built Residences" residences constructed at the permanent building site but which may incorporate the use of some prefabricated building components.

"Smoke Detector" an approved device that senses visible or invisible particles of combustion.

"Special Flood Hazard Area" land in the flood plain subject to a one percent or greater chance of flooding in any given year.

"Standards" the provisions and measures of physical conditions and occupancy set out in this Ordinance.

"Street or Road" shall mean all property dedicated or intended for public or private access to property, or subject to public easements therefore.

"Structure" shall mean that which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner. Without limiting the generality of the foregoing, structure shall include a wall, fence, sign or billboard.

"Temporary": applies to facilities or structures that are not of permanent construction, and are not intended to be permanently erected and maintained on a site. Tents and air supported structures are considered temporary for purposes of this Ordinance.

"Terrain Management" means the control of floods, drainage, and erosion and measures required for adapting proposed development to existing soil characteristics and topography.

"UMC" Uniform Mechanical Code.

"UPC" Uniform Plumbing Code.

"Utility Service" connection to an electrical service pole or other approved receptacle, or gas and water meter installation, but does not include electrical mainline extension or gas and water mainline extension or water main tap or meter box and setter installation.

"Use" shall mean the use for which land or buildings are occupied or maintained, arranged, designed, or intended.

"Variance" Any deviation from the Regulations of this Ordinance as approved by the Board of County Commissioners, where such variance will not be contrary to the public interest; however, the allowable use of the premises is not subject to change by variance.

"Wastewater" means the liquid-or water-carried wastes removed from residential properties, businesses, institutions and other uses, including bath and toilet wastes, laundry waste, and kitchen waste but not including toxic, hazardous, or industrial waste.

Words not Defined: Any word or term not defined in this Ordinance shall have the meaning ascribed to it in the Luna County Subdivision ordinance or the Luna County Zoning ordinance or the Deming/Luna County Extra-Territorial Zoning regulations, or they shall have their ordinary accepted meaning within the context with which they are used.

ARTICLE 2 BUILDING STANDARDS-GENERAL

2.1 Adoption of International Building code and Other Codes

Each and all of the regulations, provisions, penalties, conditions, terms and all appendices of the latest editions of:

2.1.1 International Building Code
2.1.2 International Residential Code
2.1.3 New Mexico Commercial Building Code
2.1.4 New Mexico Residential Code
2.1.5 National Electric Code
2.1.7 New Mexico Non-Load Bearing Straw Construction Building Code (Phase III)
2.1.8 New Mexico Plumbing Code
2.1.9 Uniform Plumbing and Mechanical Code
2.1.10 New Mexico Mechanical Code
2.1.11 New Mexico Electrical Code
2.1.12 New Mexico Electrical Safety Code (Phase III)
2.1.13 National Fire Protection Association, Fire Prevention Code
2.1.14 NFIP Regulations, 44 CFR, Section 60.3; Flood Insurance Study, and Flood Insurance Rate Map, effective October 19, 2010

Are hereby referred to, adopted and incorporated as fully as if set out verbatim herein and any amendments thereto, including the most recent additions, updates, revisions, or editions thereof.

2.2 Copies of Codes Available for inspection

One or more copies of applicable codes adopted in Article 2.1 of this Ordinance shall be available for review and inspection during regular business hours in the Office of the LCBO.

2.3 Fee Schedule

The Fee Schedule for Building Permits shall be established by the Luna County Board of County Commissioners. No permit shall be issued nor shall an application be considered complete prior to the receipt of said fee.

2.4 Building Permits Required

Any construction, residential or commercial or other use, any additions, expansions, repairs, remodel, or renovation to any building or structure, to include site built and modular buildings or structures, shall have a building permit issued by the LCBO or a New Mexico State Building Official, and follow procedures required by the Codes adopted in this ordinance. The Building Permit must be displayed in a conspicuous place at the building site. If the LCBO, or State Building Official or the Luna County Code Compliance Officer determines that the property for which a permit has been requested is in violation, has outstanding violations, or may be in non-compliance with any part of this Ordinance, or the Luna County Subdivision Ordinance, or any other applicable county, state or federal regulation, the LCBO, State Building Official or the Luna County Code Compliance Officer may deny issuance of the permit until such time as the property has been deemed compliant.

2.5 Exceptions to Requirement for Permits

a) One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11.15 m^2).
b) Fences not over 6 feet high.
c) Retaining walls that are not laterally supported at the top and that retain in excess of 36 inches (915mm) of unbalanced fill, unless supporting a surcharge or impounding class I, II or III-A liquids.
d) Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18,927L) and the ratio of height to diameter or width does not exceed 2 to 1.
e) Sidewalks and driveways not more than 30 inches (762mm) above grade and not over any basement or story below and which are not part of an accessible route.
f) Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
g) Temporary motion picture, television and theater stage sets and scenery.
h) Prefabricated swimming pools accessory to a group R-3 occupancy, as applicable in the NMRBC, which are less than 24 inches (610mm) deep, do not exceed 5,000 gallons (19,000L) and are installed entirely above ground.
i) Shade cloth structures constructed for nursery or agricultural purposes and not including services systems.
j) Swings and other playground equipment accessory to one- and two-family dwellings.
k) Window awnings supported by an exterior wall of group R-3, as applicable in the NMRBC, and group U occupancies.
l) Movable cases, counters and partitions not over 5 feet, 9 inches (1,753mm) in height.
m) Any work not otherwise regulated by the New Mexico construction codes and the CID rules.

2.6 Alternate Materials, Alternate Design and Methods of Construction

Pursuant to the International Building Code, and the International Residential Code, as amended from time to time, where materials, design and construction methods are specified in any of the Codes or Rules and Regulations adopted in Article 2 of this ordinance, alternate materials, design and methods of construction may be allowed provided any alternate has been approved, and is authorized by the Luna County Building Official (LCBO), or other authorized official.

The LCBO, or other authorized official, may approve any such alternate provided the LCBO, or other authorized official, is satisfied the proposed design is satisfactory and complies with the provisions of those codes and rules and regulations set out in Article 2 of this ordinance, and that the material and method of work proposed is at least the equivalent of that prescribed in any of the codes and rules and regulations set out in Article 2 of this ordinance.

The LCBO, or other authorized official, shall require that sufficient evidence or proof to substantiate any claims made about alternate material, design or methods of construction. Without limiting the generality of the foregoing sentence, the LCBO may require a study and/or certificate of code compliance from a qualified engineer or architect as evidence or proof of claims made about alternate material, design, or methods of construction.

Whenever there is insufficient evidence of compliance with any of the provisions of this code or evidence that any material or construction does not conform to the requirements of this code, the LCBO, or other authorized official, may require tests by an approved agency as proof of compliance to be made at no expense to Luna County.

The details of any action by the LCBO, or other authorized official, granting approval of an alternate shall be recorded and retained in the files of the Luna County Building Official's Office or the County Planner's office.

2.7 Use of Waste Tires for Construction

2.7.1 No use of waste or scrap tires, baled or non-baled, or processed tires, or used tires for the construction of any building or structure is permitted on any site or lot in Luna County unless all of the following conditions are met to the satisfaction of Luna County:

a) such proposed use constitutes no environmental hazard and that it will not endanger the health or safety of the residents of Luna County. To this end, Luna County may require the owner or his/her authorized agent to produce and submit to the County an environmental impact assessment prepared by a qualified Environmental Consultant showing no adverse environmental impact. Prior to taking any decision, the County may consult with any state agency or it may engage its own consultant to undertake an oversight review of the environmental impact assessment prepared by the owner's or his/her authorized agent's consultant;

b) a building permit is obtained from the Construction Industries Division of the State of New Mexico;

c) written approval is obtained from the Fire Marshal, or other authorized official, which written approval shall state clearly that there is sufficient fire suppression measures in place on the lot or site; and, that in his/her opinion Luna County has the capability to effectively deal with any building or structure fire that may occur. The Fire Marshal may also prescribe specific fire prevention measures that shall be taken by the owner or his/her authorized agent;

d) the owner or his/her authorized agent shall submit design and construction plans to the County Planner and to the Construction Industries Division showing clearly the use of waste or scrap tires, or processed tires, and that such design complies with all requirements of the International Building Code. These drawings shall be stamped and signed by a professional engineer licensed in the State of New Mexico, or by an architect licensed in the State of New Mexico;

e) a financial guarantee in favor of Luna County, in the form of a bond, cashier's check, or other form satisfactory to the Luna County Attorney, and in an amount satisfactory to Luna County shall be posted with the County Clerk. The amount of the financial guarantee shall be sufficient to cover the full cost of any clean-up, disposal of materials, and the removal of all buildings and structures on the site or lot. The amount of the financial guarantee shall be in the sole discretion of Luna County. The owner, or his/her authorized agent shall keep the financial guarantee current. The County shall retain the right to request an increase in the

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financial guarantee as circumstances warrant. The financial guarantee shall be released at the time the project is completed to the satisfaction of the Building Official; and,

f) a permit for the proposed use is obtained from the Luna County Planning Department. The County shall not issue any permit unless and until it is fully satisfied that conditions set out in Article 2.6.1 a), b), c), d) and e) of this Ordinance have been fulfilled.

2.7.2 If the owner or his/her authorized agent, or any successor, fails to maintain full compliance with the conditions upon which approval of a proposed use is given, the County, after giving notice to comply, may revoke the permit. Upon revocation, all operations shall cease and site clean-up shall commence immediately.

2.8 On-Site Utility and Development Requirements

Approved on-site utilities, to include water, sewer, and electricity are prerequisite to issuance of a building permit. All housing units shall be connected to a waste disposal system permitted and approved by the New Mexico Environment Department, a domestic water well permitted by the New Mexico State Engineer, or be connected to an approved potable water utility whether private or municipal. For purposes of this section:

2.8.1 There shall be no multiple users connected to a domestic water well nor to any on-site liquid waste disposal system except for properly permitted community water systems and properly permitted cluster wastewater systems, or as otherwise provided herein.

2.8.2 All electrical, plumbing, and gas hookups shall be inspected and approved by an inspector of CID, as the case may be prior to occupancy and before a Certificate of Occupancy will be issued by the LCBO, or other authorized official.

2.8.3 Any water/well, sewer/septic, electric, or natural gas/LP utility provider that connects service to individual parcels before the land owner holds a valid building permit is in violation of this ordinance and the service shall be disconnected.

2.8.4 Any waste disposal system must be approved by the New Mexico Environment Department.

2.8.5 No building permit or other permit shall be issued until and unless the applicant for such permit can show to the satisfaction of the Luna County Planner, that the applicant has legal access to a lot or parcel of land either by means of a public road or by means of a properly recorded easement, and such access shall provide reasonable physical ingress and egress to and from the parcel of land.

2.9 Smoke Detectors

Smoke detectors shall be required in all dwelling units to include site built, and modular, occupied or installed after the effective date of this Ordinance.

2.10 Flood Hazard Installation Requirements

The Luna County Floodplain Manager is hereby appointed the Floodplain Administrator to administer and implement the Flood Hazard Installation provisions of this Ordinance and other appropriate sections of 44 CFR pertaining to floodplain management. No residential, commercial or other use or development shall be located or installed in a flood-prone area, such as a Flood Hazard Area as designated by the National Flood Insurance Rate Map for Luna County, or in, on, or over the path of an arroyo, or floodway without the prior approval of the County Floodplain Manager and the issuance of a floodplain development permit. All development and all construction related to such development shall comply with the minimum standards as adopted by, or may be amended by, the Federal Emergency Management Agency (FEMA). A new or replacement water supply system or sanitary sewage system may be required within a designated flood hazard area which shall be designed to minimize or eliminate infiltration of flood waters into the system as well as discharges from the system into flood waters, and the on-site waste disposal system must be located so as to avoid impairment of them or contamination from them during flooding.

2.11 Flood Hazard Installation Base Flood Elevation

All new construction and substantial improvements of structures designed for human occupancy being built in a special flood hazard area shall be constructed such that all electrical, heating, ventilation, plumbing and other service facilities are located so as to prevent water from entering or accumulating within the components during conditions of flooding and must meet one of the following conditions:

2.11.1 The lowest floor level elevated at least one (1) foot above the base flood elevation where base flood elevations are determined.

2.11.2 The lowest floor level, with respect to site built structures, elevated two (2) feet above the highest adjacent grade in areas where no base flood elevations are determined.

2.12 Flood Hazard Minimum Fill Requirement

Any building or structure to be constructed in "A" Zones, as designated by the National Flood Insurance Rate Map for Luna County, where no base flood elevations are determined, must have its lowest floor level constructed a minimum of two (2) feet above the highest adjacent grade. The material used to raise the lowest floor above the highest adjacent grade must be compacted to the satisfaction of the LCBO, the County Planner, or other authorized official, who may require that the landowner provide a report from a qualified geo-technical consultant that the soil is sufficiently compacted to accommodate the intended development. This section shall apply only to dwellings or structures erected or installed after the date of this ordinance as amended.

2.13 Storm Water, Grading, Drainage and Dust Control

2.13.1 No property owner shall alter the natural flow of storm water across their property in such a manner as to increase the flood hazard on other properties

2.13.2 Except for agricultural operations, no person shall clear any land of its natural vegetation without having in place and implementing a plan, approved by the Officer, to prevent soil, sand, dust, and building materials, construction waste or other materials from being blown by the wind from the said land. In the event the owner, lessee, occupant, or any agent or representative thereof having charge or control of such land fails or refuses to prevent such materials from being blown from the land by the wind, the County may take such corrective action as it deems advisable and the cost of doing so shall constitute a lien on the subject land.

2.14 Lighting

2.14.1 Lighting fixtures, lamps and their supports and connections shall be maintained in a safe and complete condition, without visible deterioration.

2.14.2 All properties that are being developed, remodeled, refurbished, or rehabilitated shall comply with the Night Sky Protection Act, NMSA 1978, § 74-12-1 through § 74-12-11.

2.15 Roofs

2.15.1 All roofs shall be kept clear of debris such as tires, concrete blocks, rocks, and other objects, materials, and structures not approved by the builder, manufacturer or installer, or for which a permit has not been issued.

2.16 Set-Back

2.16.1 All permitted structures shall have a twenty-five (25) foot set-back from the front property line, a five foot set-back from the side property line, and a five (5) foot set-back from the rear property line.

ARTICLE 3 ADMINISTRATION AND ENFORCEMENT

This Ordinance and all codes, rules, regulations and other provisions set out in said Ordinance shall be enforced by the Luna County Building Official (LCBO), who is certified by the State of New Mexico Construction Industries Division, and has such powers and duties as are enumerated in and set forth in the current provisions of the Codes adopted in Article 2 of this Ordinance, or by a Luna County Code Compliance Officer. Article 2 of this Ordinance may be enforced by an inspector employed by the State of New Mexico Construction Industries Division. The LCBO shall not enforce any code provisions pertaining to gas service installations or related matters.

3.1 Any Building Inspector of the Luna County Planning Office, and the Luna County Fire Marshall, and any Electrical Inspector of the State of New Mexico, and any Plumbing Inspector of the State of New Mexico, and any Environmentalist of the State of New Mexico Environment Department, and any Engineer or Technician or Technologist or Water Resource Specialist of the State Engineer's Office of the State of New Mexico, and any other qualified person, may be authorized by the Code Compliance Officer to help enforce the standards set out in this Ordinance, or may be requested by the Code Compliance Officer to give a written report, or other advice to aid in the administration and enforcement of this Ordinance.

3.2 Notice of Violation

3.2.1 In addition to the criminal penalties provided for in this Ordinance, any such violation, after reasonable efforts to secure voluntary compliance with this Ordinance have failed, shall be subject to abatement as follows:

a) Notice of Violation. (i) If, after inspection, or the observation of any County or State employee, the Officer is satisfied that a violation does exist, the Officer shall serve, or cause to be served by personal service, or send by prepaid registered mail to the owner of record of the property, or to the occupant or tenant of the property, or both, and to all persons shown by the records to have an interest in the property, a Notice of Violation setting out the particulars of the violation(s). The Notice shall establish that the abatement of the violation(s) by the owner, or occupant or tenant, or both, shall begin in not more than ten (10) days and shall be completed in not more than ninety (90) days after service of the Notice. The Notice shall be served at the owner's or occupant's or tenant's last known address; (ii) In the event a violation of this ordinance constitutes an immediate danger to the public health and safety, the notice provisions of this subsection shall not apply, and the violation may be prosecuted and abated immediately.

b) Placard. If the Officer is unable to achieve service under Article 3.2.1 a) he/she may place a placard containing the terms of the Notice in a conspicuous place on the property or building, and the placing of the placard shall be deemed to be sufficient service of the Notice on the Owner or other persons.

c) Extension of Time Frame for Abatement. Where the Officer is satisfied that there is good and sufficient reason to extend the time frame for abatement of the violation(s), he/she may extend the time frame set out in Article 3.2.1 a) above for a period of time not to exceed forty-five (45) days beyond the time period set out in the original Notice.

d) Failure to Correct. In the event the owner, occupant or tenant of the property where the violation exists, has failed to correct the violation(s) within the prescribed period of time, then the Officer shall issue a citation or file a complaint charging violation of this Ordinance with the Magistrate Court, or other appropriate court of jurisdiction, demanding that the owner of the property, or the occupant, or both, be held to answer to the Court for the violation.

3.3 Certificate of Occupancy/Compliance

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3.3.1 All buildings or structures, to include site built, and modular, whether titled or untitled are subject to this Ordinance and shall, prior to use, be inspected by the LCBO, or other authorized official.

3.3.2 Following the final inspection of a building or structure, the Officer will issue a Certificate of Occupancy/Compliance, when the building or structure is in compliance with the standards of this Ordinance.

3.4 Prohibition

3.4.1 The Code Compliance Officer may issue a Notice prohibiting the occupancy of any unsafe or uninhabitable building.

3.5 Citation Uniform Non-Traffic

3.5.1 The use of uniform non-traffic citation forms is authorized for use in enforcement of this Ordinance, except as otherwise provided.

3.6 Penalties and Remedies

Any person violating or failing, or refusing to comply with the provisions of this Ordinance and the Codes adopted may be prosecuted in any court of competent jurisdiction within the County, and shall be punished by a fine of not more than three hundred dollars ($300), the Board of County Commissioners may apply to the District Court for appropriate injunctive relief to compel compliance by any person whose conduct violates any provision of this Ordinance. The County shall be entitled to recover a reasonable attorney's fee if required to enforce this Ordinance through the issuance of a demand letter, or in enforcing any portion of this Ordinance in any Court of competent jurisdiction. After the effective date of this ordinance, all violations are subject to issuance of a citation.

3.7 Variance

3.7.1 It is the intention of the Board of County Commissioners that all variances be temporary in duration. The County Commission may grant a variance to the regulations set out in Article 4.2 of this Ordinance for the sole purpose of permitting one accessory dwelling unit on any property in Luna County on the following grounds only:

a) To provide living accommodation to an immediate member of the family of the owner-occupant of the principal dwelling unit which family member requires immediate and urgent care because he/she is disabled, physically or mentally infirm, has a disease which is or will become debilitating, or is incapable of being gainfully employed because of their condition. A certificate or letter signed by a physician licensed in the State of New Mexico attesting to the medical condition and the need for care of the family member who will occupy the accessory dwelling unit shall be required by the County Commission as proof of the medical condition.

3.7.2 The County Commission shall not grant any variance which will cause the County to incur or absorb any costs. In granting any variance the County Commission may impose such conditions as will:

a) Substantially secure the objectives of the standards set out in this Ordinance;

b) Not adversely affect the health safety and general welfare of the general public and the immediate property owners;

c) Impose whatever time limits may be reasonable and appropriate in the circumstances. Any variance granted shall be for a period of time not to exceed three (3) years from the date of granting such variance. If necessary, the variance may be renewed prior to the expiration of the term of the variance upon written application by the owner-occupant. Such renewal shall be for a period of time not to exceed three (3) years. All variances granted by the County Commission must be renewed prior to the expiration of either the initial time limit imposed by the County Commission or any renewal period granted by the County Commission. There shall be no limits on the number of renewals provided the reason for the initial variance remains valid;

d) Impose conditions on the type, quality and design of any proposed construction;

e) Impose height limits;

f) Require buffering in the form of fencing and/or vegetation to protect and shield adjacent land uses;

g) Ensure compatibility with other development in the adjacent area. Compatibility as used here shall include, but is not limited to the following: land use, height, scale, density, water supply and liquid waste disposal facilities; and,

h) Accomplish any other purpose and effect deemed advisable and appropriate by the County Commission.

3.7.3 Procedure. The following procedure shall apply to all requests for a variance:

a) All requests for a variance shall be in writing and submitted to the Luna County Planner. The written request shall set out the following information:

i. a description of the specific variance requested;

ii. the reasons for the request;

iii. the supporting information, such as medical certificates, for such request;

iv. the period of time for which the variance is necessary (initial variance may be for a maximum three year period, subject to renewal);

v. a description of the action the owner-occupant will take to discontinue the use of, and remove, the additional accessory dwelling when the reason for the variance no longer exists.

b) The County Planner shall review the written request for variance for completeness and shall, within ten (10) days of receipt of the request, inform the applicant either that the request is complete or the nature of any additional information that is required. Until the request is complete, no further action shall be taken by the County Planner or the County Commission.

c) The County Planner shall confer with and seek the advice of the Code Compliance Officer and the County Attorney, as appropriate, with respect to the request for variance.

d) The County Planner shall notify all property owners within five hundred (500) feet of the subject property by first class regular mail at least ten (10) days prior to the County Commission meeting at which the variance application will be heard. Such notice shall briefly describe the nature of the variance and the date, time and location of the hearing.

e) The County Planner shall submit a written report together with his/her recommendation to the County Commission five (5) days prior to the hearing date.

f) The County Board of Commissioners shall hold a public hearing on all requests for a variance, or a renewal of a variance, under this section. The public hearing shall be held at a regularly scheduled County Commission meeting. The public hearing shall be considered a quasi-judicial proceeding to be conducted in accordance with quasi-judicial procedures adopted by the County Commission.