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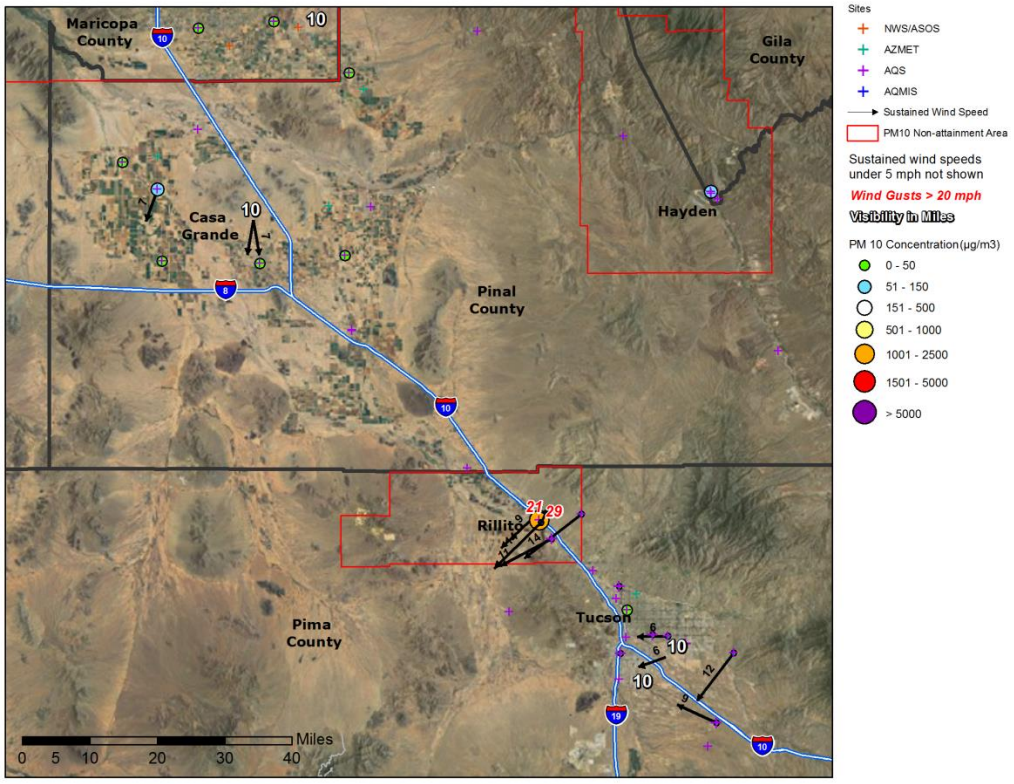
Air Quality Research and Innovative Solutions

State of Arizona Exceptional Event Documentation for the Event of May 2, 2011, for the Rillito PM_{10} Nonattainment Area



Final Report Prepared for

Arizona Department of Environmental Quality
Phoenix, AZ

December 2013

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State of Arizona Exceptional Event Documentation for the Event of May 2, 2011, for the Rillito PM_{10} Nonattainment Area

Final Report
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Cover graphic illustrates hourly wind speeds, visibilities, and PM_{10} concentrations in the Rillito, Arizona, area during the May 2, 2011, event. See Section 3 for more information.

Acknowledgments

The authors would like to acknowledge the Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency, Region 9, for helpful discussion and feedback during the preparation of this document.

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1. Introduction

On May 2, 2011, the Rillito monitor recorded a 24-hr average PM_{10} (particulate matter less than 10 microns in diameter) concentration of 210 µg/m^3. This value exceeds the National Ambient Air Quality Standard (NAAQS) of 150 µg/m^3 for 24-hr PM_{10}. This report demonstrates that this exceedance was caused by naturally occurring windblown dust, was not reasonably controllable or preventable, was historically unusual, and would not have occurred "but for" the windblown dust and, therefore, the event is an exceptional event as defined by the U.S. Environmental Protection Agency's (EPA) Exceptional Events Rule (EER).

1.1 Report Contents

Section 2 of this assessment contains a conceptual model of the windblown dust event that occurred on May 2, 2011, providing a background narrative of the exceptional event and an overall explanation of how the event affected air quality. Section 2 also provides evidence that the event was a natural event.

Section 3 of this assessment establishes a clear causal connection between the natural event on May 2, 2011, and the exceedance of the 24-hr PM_{10} standard at the monitoring station. The evidence in this section also confirms that the event in question both affected air quality and was the result of natural events.

Section 4 of this assessment contains data summaries and time-series graphs which help illustrate that the event of May 2, 2011, produced PM_{10} concentrations in excess of normal historical fluctuations.

Section 5 of this assessment details the existing dust control measures and demonstrates that despite the presence and enforcement of these controls, the event of May 2, 2011, was not reasonably controllable or preventable.

Section 6 of this assessment builds upon the demonstration, showing a clear causal connection between the natural event and the exceedance, and concludes that the exceedance of the 24-hr PM_{10} standard on May 2, 2011, would not have occurred but for the event.

Appendix A contains time-series graphs and data tables to supplement Section 3. **Appendix B** contains air quality forecasts issued by the Arizona Department of Environmental Quality (ADEQ) and weather statements and warnings issued by the National Weather Service (NWS). **Appendix C** contains a copy of the affidavit of public notice concerning this assessment report.

1.2 Exceptional Event Rule Requirements

In addition to the technical requirements contained in the EER, procedural requirements must also be met for the EPA to concur that the flagged air quality monitoring data is due to an exceptional event. This section of the report contains the requirements of the EER and associated guidance, and discusses how ADEQ has addressed those requirements.

1.2.1 Public Notification That the Event Was Occurring (40 CFR 50.14(c)(1)(i))

ADEQ issued Air Quality Forecasts indicating that east-northeasterly winds could generate some pockets of blowing dust. More information on ADEQ's forecasting program can be found in Section 5.2 of this report. The forecasts and advisories that were issued for May 2, 2011, are included in Appendix B.

1.2.2 Place Informal Flag on Data in AQS (40 CFR 50.14(c)(2)(ii))

ADEQ and other operating air quality agencies in Arizona submit data into the EPA's Air Quality System (AQS), the official repository of ambient air quality data. This data submittal to AQS includes PM data from filter-based and continuous monitors operated in Arizona.

When ADEQ and/or another agency operating monitors in Arizona suspects that data may be influenced by an exceptional event, ADEQ and/or the other operating agency expedites analysis of the filters collected from the potentially affected filter-based air monitoring instruments, quality-assures the results, and submits the data into AQS. ADEQ and/or other operating agencies also submit data from continuous monitors into AQS after quality assurance is complete.

If ADEQ and/or other operating air quality agencies determine that the potential exists for a monitor's reading(s) to be influenced by an exceptional event, a preliminary flag is submitted for the measurement in AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1 following the calendar year in which the data were collected (40 CFR 58.15(a)(2)). The presence of the flag can be confirmed in AQS.

1.2.3 Notify EPA of Intent to Flag Through Submission of Initial Event Description by July 1 of Calendar Year Following Event (40 CFR 50.14(c)(2)(iii))

ADEQ submitted a letter to EPA on September 11, 2013, listing all days for calendar years 2011–2013 that ADEQ intends to analyze under the EER. The PM_{10} exceedance that occurred at the Rillito monitor on May 2, 2011, in the Rillito PM_{10} Nonattainment Area (RNA) was included on this list. This assessment report demonstrates support for the flagging of these data.

1.2.4 Document That the Public Comment Process Was Followed for Event Documentation (40 CFR 50.14(c)(3)(iv))

ADEQ posted this assessment report on the ADEQ webpage and placed a hard copy of the report in the ADEQ Records Management Center for public review. ADEQ opened a 30-day public comment period on February 7, 2014. A copy of the public notice certification, along with any comments received, will be submitted to EPA, consistent with the requirements of 40 CFR 50.14(c)(3)(iv). See Appendix C for a copy of the affidavit of public notice.

1.2.5 Submit Demonstration Supporting Exceptional Event Flag (40 CFR 50.14(a)(1-2))

At the close of the public comment period, and after ADEQ has had the opportunity to consider any comments submitted on this document, ADEQ will submit this document, the comments received, and ADEQ's responses to those comments to EPA Region 9 headquarters in San Francisco, California. The deadline for the submittal of this package is June 30, 2014.

1.2.6 Documentation Requirements (40 CFR 50.14(c)(3)(iii))

The EER states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

1.3 Guide to New Material in This Report

Naturally occurring dust events occur several times per year in Arizona, with each event requiring the preparation of exceptional events documentation. Some text in this documentation is required by the EER and is common to all the demonstrations. The text, figures, and tables unique to this event are outlined in **Table 1-1**.

Table 1-1. Summary of information unique to the Rillito May 2, 2011, event.

Section	Unique Material
Throughout the report	Event date(s) updated
Section 2.4	Event day summary
Chapter 3	Clear causal relationship
Chapter 4	Historical norm
Section 5.1.6 through Section 5.4	Source-permitted inspections and public complaints, forecasts and warnings, and wind observations
Chapters 6 and 7	But-for analysis and conclusion
Appendices A and B	Additional data and forecasts

2. Conceptual Model

This section provides a narrative background and summarizes the meteorological and air quality conditions in Rillito on May 2, 2011. This section includes

- A description and map of the geographic setting of the air quality and meteorological monitors.
- A description of Rillito's regional climate.
- An overall description of meteorological and air quality conditions on the event day.

2.1 Geographic Setting and Monitor Locations

Rillito is an unincorporated community in Pima County in southern Arizona, approximately 88 miles southeast of Phoenix and 20 miles northwest of Tucson (**Figure 2-1**). Rillito is bordered on all sides by the incorporated town of Marana. The region, along with much of southern Arizona, is in the Sonoran Desert. Rillito and Marana are flanked by the foothills of the Tortolita Mountains to the east, the Tucson Mountains to the south, and the Silver Bell Mountains to the west. Rillito and Marana lie at an elevation of approximately 1,900 feet above sea level, while peaks in each of the surrounding mountain ranges exceed 4,500 feet above sea level.

The RNA encompasses 324 square miles and nine townships. Much of the RNA comprises undeveloped land, and approximately 30% of the RNA consists of land cleared for agricultural purposes. Interstate 10 traverses the northeastern corner of the RNA, and the Silver Bell copper mine is in the southwestern corner of the RNA. Saguaro National Park is south of the RNA.

Over the past 20 years, the RNA has undergone a transformation from a predominantly rural, agricultural area to an area of substantial population growth. The town of Marana has annexed large sections of the RNA and has grown from an estimated population of just over 2,000 in 1990 to over 30,000 in 2010. The population of Rillito has also grown during this period, but because of its very small geographic area, Rillito's population was only 97 as of 2010.

The air quality and meteorological monitors used in this analysis are shown in **Figure 2-1**. AQS monitors measure air quality and meteorological data; Arizona Meteorological Network (AZMET) and NWS monitors measure meteorological data only. The PM_{10} exceedance on May 2, 2011, was recorded at the Rillito monitor, which has been operational since 1985 (**Figure 2-2**). In 2005, the monitor was moved to a new location less than 1,000 feet from its original location. The site is close to residential and industrial areas (chiefly, the CalPortland Cement plant). Collocated wind data are available from the Rillito monitor. One AZMET monitor was in operation near the Rillito monitor during the May 2, 2011, dust event. There are no official NWS monitors in the immediate vicinity of Rillito. However, data from two NWS monitors in Tucson (about 15 to 20 miles away) and Casa Grande (about 50 miles away) are used in this report to illustrate regional weather conditions.

Recent analyses have determined that the I-10 corridor between Marana/Rillito and Casa Grande is particularly susceptible to dust storms and fatal traffic accidents due to the associated low visibilities.[1] These analyses identify this region as particularly susceptible to dust storms because much of the land was originally used for agricultural purposes. That land has since been largely abandoned and allowed to revert to open desert. Desert soil that has been farmed and then abandoned in this manner takes a long time to recover. As a result, there is a dearth of vegetation to hold down or catch blowing dust. Most of this land is located from Rillito northward into Pinal County.

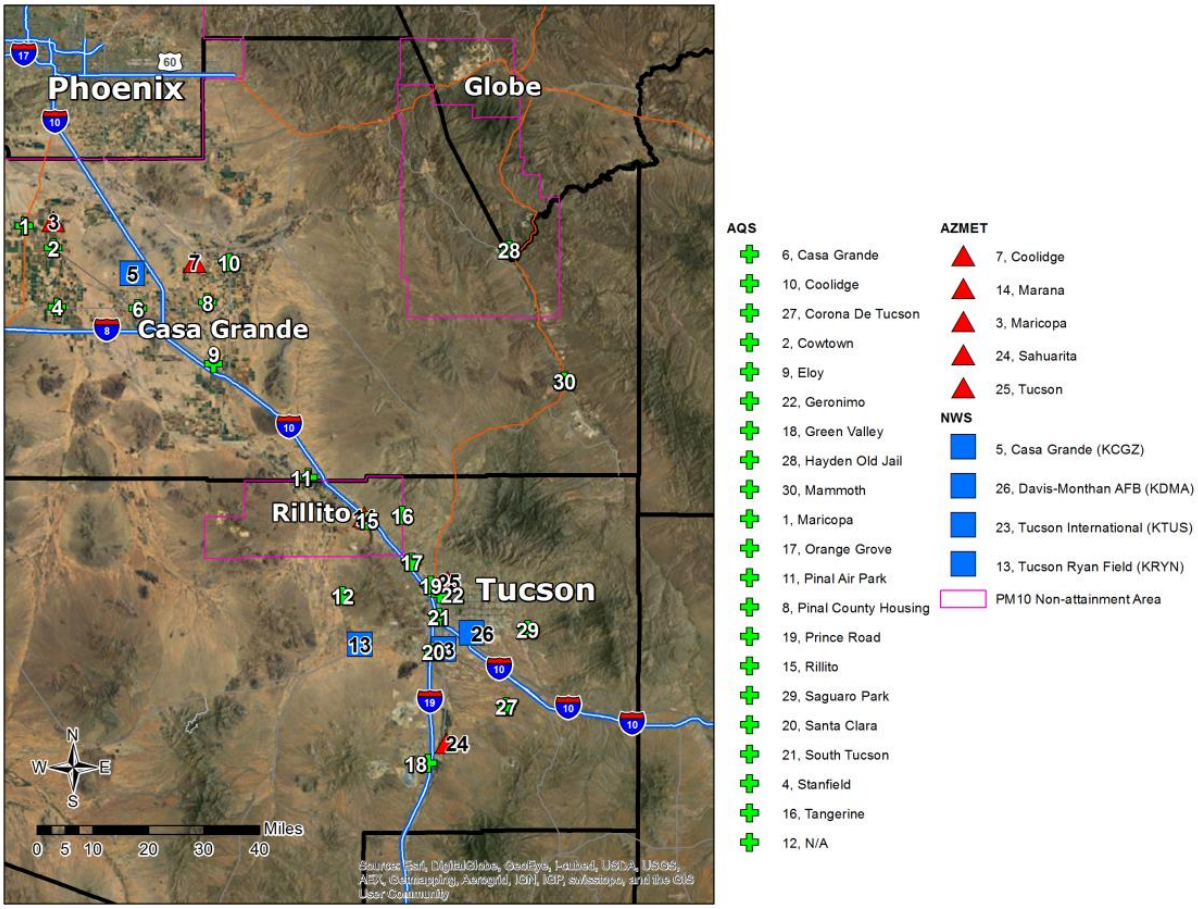


Figure 2-1. Air quality and meteorological monitors in Pima and Pinal counties.

[1] Several media outlets reported on the I-10 corridor dust storm analyses, including http://bit.ly/1gClpJq.

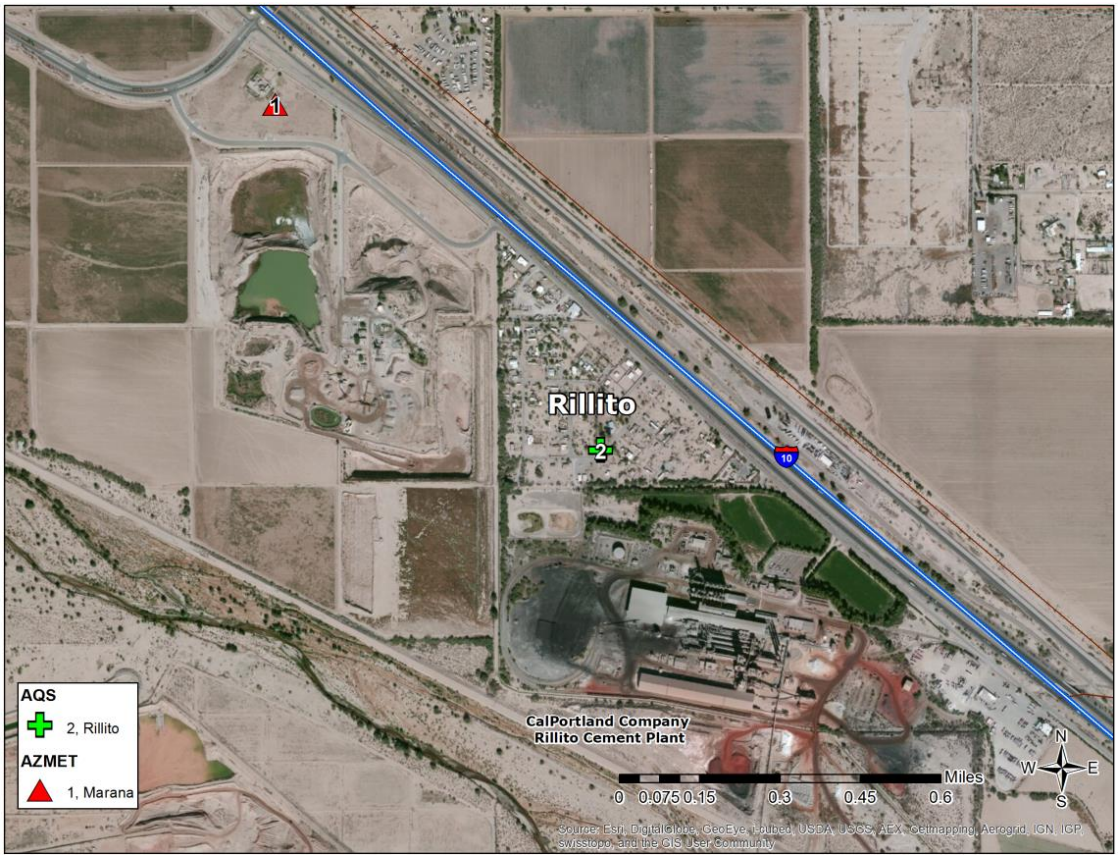


Figure 2-2. Air quality and meteorological monitors in the immediate Rillito region.

2.2 History of PM_{10} Attainment Status for Rillito

ADEQ began monitoring PM in what is now the RNA in 1971. The original measurement standard for PM, known as total suspended particulate matter (TSP), included a size range of particles collected by high-volume samplers (generally particles up to 40 microns in diameter). PM_{10} monitoring began in the RNA in 1985 on a sampling schedule of once every six days. Daily PM_{10} monitoring in the RNA began on April 1, 2010. On July 1, 1987, EPA revised PM standards to include only PM_{10} (52 FR 24634). As part of the implementation policy for the new standards, where insufficient observational PM_{10} data were available, EPA categorized areas of the country according to their probability of violating the standards: (1) Group I areas have a high probability of violating the standards, (2) Group II areas have a moderate probability of violating the standards, and (3) Group III areas are unlikely to violate the standards.

EPA listed Rillito as a Group I area. As a result, the state of Arizona was required to submit a State Implementation Plan (SIP) within nine months of the promulgation of the NAAQS (52 FR 24672, July 1, 1987, and 52 FR 29383, August 7, 1987).

Prior to the state of Arizona's submission of a SIP, EPA updated its initial geographic descriptions for the Group I and Group II areas. Consistent with EPA's PM_{10} grouping scheme, the Rillito Group I Area was designated and classified as a moderate PM_{10} nonattainment area

upon enactment of the 1990 Clean Air Act (CAA) amendments, effective November 15, 1990. This action included requirements for submittal of an attainment demonstration and reasonably available control measures (RACM) implementation provisions by November 15, 1991.

ADEQ submitted a PM_{10} moderate nonattainment area attainment demonstration for the RNA on November 14, 1991. In a letter dated May 14, 1992, EPA found this plan to be incomplete because it lacked an emissions inventory. On April 22, 1994, ADEQ submitted a revised PM_{10} attainment plan for Rillito. In a letter dated August 18, 1994, EPA found the revised plan to be incomplete because of a lack of RACM. EPA has not taken further action on the 1994 PM_{10} plan.

No exceedances of the 24-hr PM_{10} NAAQS occurred in the RNA from 1990 through 2006. As a result, EPA determined that the RNA had met the PM_{10} NAAQS and issued a "clean data" finding for the area in 2006. Subsequently, ADEQ submitted to EPA a PM_{10} Limited Maintenance Plan (LMP) and a request for redesignation of the area to attainment. The LMP is a streamlined alternative to the reporting required under a regular Maintenance Plan.

2.3 Climate

Rillito's climate is typical of the desert region of the southwestern United States. The warmest months of the year are June through August, when average daily maximum temperatures are near 100°F (**Figure 2-3**). Average annual rainfall in Rillito is nearly 12 inches. The bulk of this rain usually falls during July through September, with a secondary maximum during December through February. During December through February, winter storms originating from the Pacific Ocean can produce significant rains in southern Arizona. During July through September, monsoonal moisture originating from the Gulf of California and Gulf of Mexico, as well as large thunderstorm complexes over the Sierra Madre Occidental Mountains in Mexico, move northward into Arizona. Prevailing winds in the Tucson/Rillito area are from the southeast.

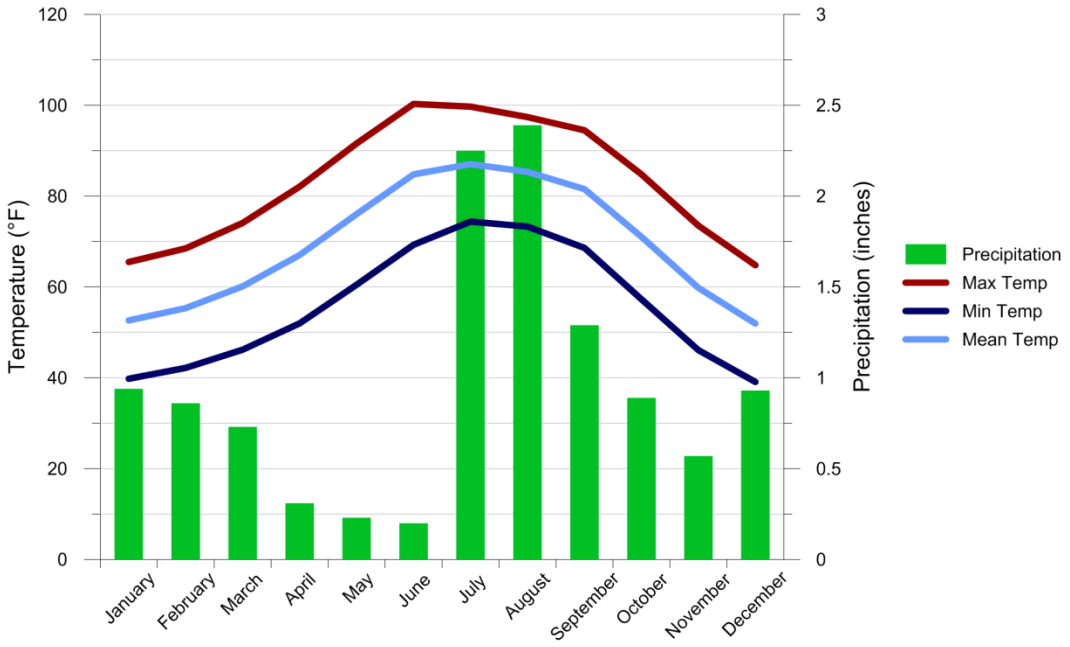


Figure 2-3. Average monthly temperatures and precipitation for Tucson, 1981–2010. Rillito does not have an official NWS climate site. The nearest NWS climate site is in Tucson, approximately 20 miles southeast of Rillito.

While windblown dust events in Arizona during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California and Arizona. These winds are the result of strong surface pressure gradients between the approaching low-pressure system (or cold front) and higher pressure ahead of it. As the low-pressure system (or cold front) approaches and passes, gusty southwesterly winds typically shift to northwesterly. Gusty easterly winds can also develop in the Tucson/Rillito area when strong surface high pressure builds southward along the Rocky Mountains, resulting in a strong pressure gradient over Arizona. The strong winds can loft dust into the air and transport it over long distances, especially if soils in the region are dry.

2.4 Event Day Summary

On May 2, 2011, gusty east-northeasterly winds due to a departing upper-level trough of low pressure and a surface high-pressure system north of Arizona lofted and transported dust into Rillito (**Figure 2-4**). The windblown dust resulted in a 24-hr average PM_{10} concentration of 210 µg/m^3 at the Rillito monitor (**Table 2-1**); this value is in exceedance of the NAAQS. The hourly and 24-hr average PM_{10} concentrations measured at the Rillito monitor were in excess of normal historical fluctuations. The dust was naturally occurring and likely originated over open desert lands northeast of Rillito outside the RNA. Wind gusts of up to 29 mph overwhelmed reasonable dust control measures. Winds were likely locally enhanced in the Rillito area due to terrain channeling effects; as a result, PM_{10} concentrations were lower at other monitors in Pima and Pinal counties where winds were lighter.

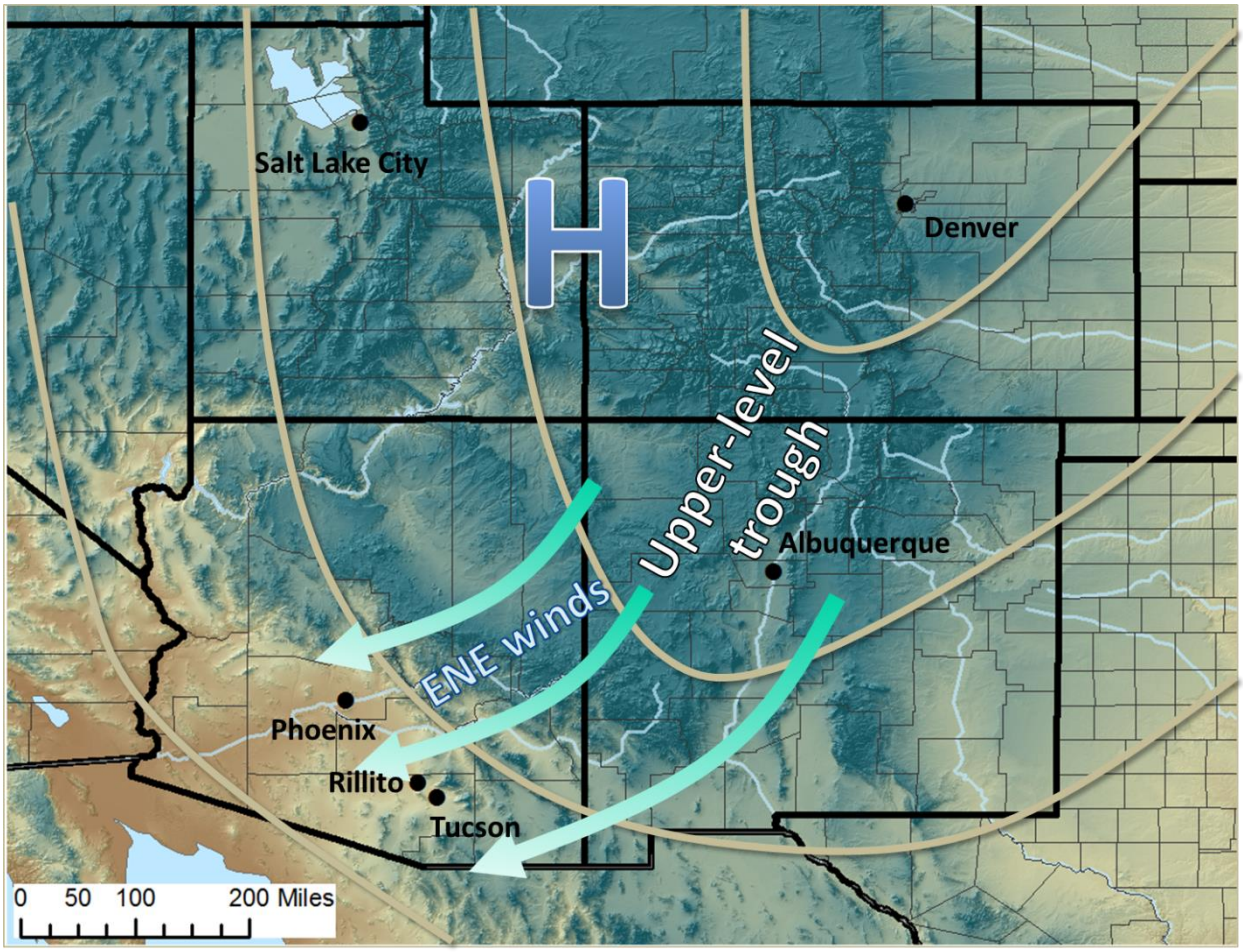


Figure 2-4. Early on May 2, 2011, a departing upper-level trough of low pressure over Colorado and New Mexico, combined with surface high pressure north of Arizona (blue "H"), produced locally gusty east-northeasterly winds across southern Arizona. Brown lines indicate 500 mb geopotential height contours, outlining the upper-level trough.

Table 2-1. PM_{10} measurements collected in Arizona on May 2, 2011. Data from the Rillito monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Apache County							
N/A	TEOM	WMAT	04-001-1003-81102-1	14	37	0500	
Coconino County							
N/A	TEOM	NNIR	04-005-1237-81102-1	20	72	1900	
Gila County							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	29	83	2300	
Maricopa County							
West Phoenix	BAM	MCAQD	04-013-0019-81102-1	22	48	2000	
Glendale	TEOM	MCAQD	04-013-2001-81102-1	18	61	0600	
Central Phoenix	TEOM	MCAQD	04-013-3002-81102-4	18	36	2000	
Greenwood	TEOM	MCAQD	04-013-3010-81102-1	26	45	1900	
South Phoenix	TEOM	MCAQD	04-013-4003-81102-1	30	69	2000	
West Chandler	TEOM	MCAQD	04-013-4004-81102-1	15	33	1900	
Higley	TEOM	MCAQD	04-013-4006-81102-1	18	49	0600	
West 43rd Ave	TEOM	MCAQD	04-013-4009-81102-1	30	69	0700	
Dysart	TEOM	MCAQD	04-013-4010-81102-1	13	25	2000	
Buckeye	TEOM	MCAQD	04-013-4011-81102-1	31	98	0600	
Zuni Hills	TEOM	MCAQD	04-013-4016-81102-1	14	33	2100	
Durango Complex	TEOM	MCAQD	04-013-9812-81102-1	27	96	0700	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	13	28	2100	
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	14	33	2100	
Navajo County							
N/A	TEOM	WMAT	04-017-1002-81102-1	19	32	0800	
Pima County							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	22	89	0900	
Orange Grove	GRAV	PCDEQ	04-019-0011-81102-2	16	N/A	N/A	
Rillito	**TEOM**	**ADEQ**	**04-019-0020-81102-3**	**210**	**1387**	**0300**	**RJ**
South Tucson	GRAV	PCDEQ	04-019-1001-81102-1	21	N/A	N/A	
Green Valley	TEOM	PCDEQ	04-019-1030-81102-1	15	27	0500	
Geronimo	TEOM	PCDEQ	04-019-1113-81102-1	20	36	0600	

Table 2-1. PM_{10} measurements collected in Arizona on May 2, 2011. Data from the Rillito monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Pinal County							
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	27	N/A	N/A	
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	62	N/A	N/A	
Combs	TEOM	PCAQCD	04-021-3009-81102-3	45	N/A	N/A	
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	27	N/A	N/A	
Pinal County Housing (aka Eleven Mile Corner)	TEOM	PCAQCD	04-021-3011-81102-3	41	N/A	N/A	
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	105	N/A	N/A	
Santa Cruz County							
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	36	92	0000	
Yuma County							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	17	41	1100	

BAM: Beta Attenuation Monitor
FMIR: Fort McDowell Indian Reservation
FRM: Federal Reference Method
GRAV: Gravimetric Analysis
GRIC: Gila River Indian Community
HIR: Hualapai Indian Reservation
MCAQD: Maricopa County Air Quality Department
MST: Mountain Standard Time
NNIR: Navajo Nation
NPS: National Park Service
PCAQCD: Pinal County Air Quality Control District
PCDEQ: Pima County Department of Environmental Quality
RJ: qualifier flag for high winds
SRPMIC: Salt River Pima-Maricopa Indian Community
TEOM: Tapered Element Oscillating Microbalance
WMAT: White Mountain Apache Tribe

3. Causal Relationship

3.1 Discussion

Meteorological and air quality observations indicate that dust carried by gusty east-northeasterly winds generated by a departing upper-level trough of low pressure (**Figure 3-1**) and a strong surface pressure gradient (**Figure 3-2**) was directly responsible for the high PM_{10} concentrations observed in Rillito on May 2, 2011. In addition, PM_{10} concentrations peaked in the Rillito area between 01:00 and 04:00 Mountain Standard Time (MST), followed by a secondary, smaller peak between 08:00 and 11:00 MST (**Figure 3-3**). Gusty winds were reported in the Rillito area during both peaks in PM_{10} concentrations. The likely source region for PM_{10} during the May 2, 2011, event was the desert region east and northeast of Rillito. This region consists largely of natural, undisturbed desert and former agricultural lands that have since reverted to desert. The last time the Rillito area recorded any measurable rainfall leading up to the May 2, 2011, high-wind event was on April 9, 2011, when showers associated with a cold front produced 0.28 inches of rain at Tucson International Airport. This combination of geography and lack of rainfall preceding the event resulted in a large fetch of soils that were particularly vulnerable to particulate suspension.

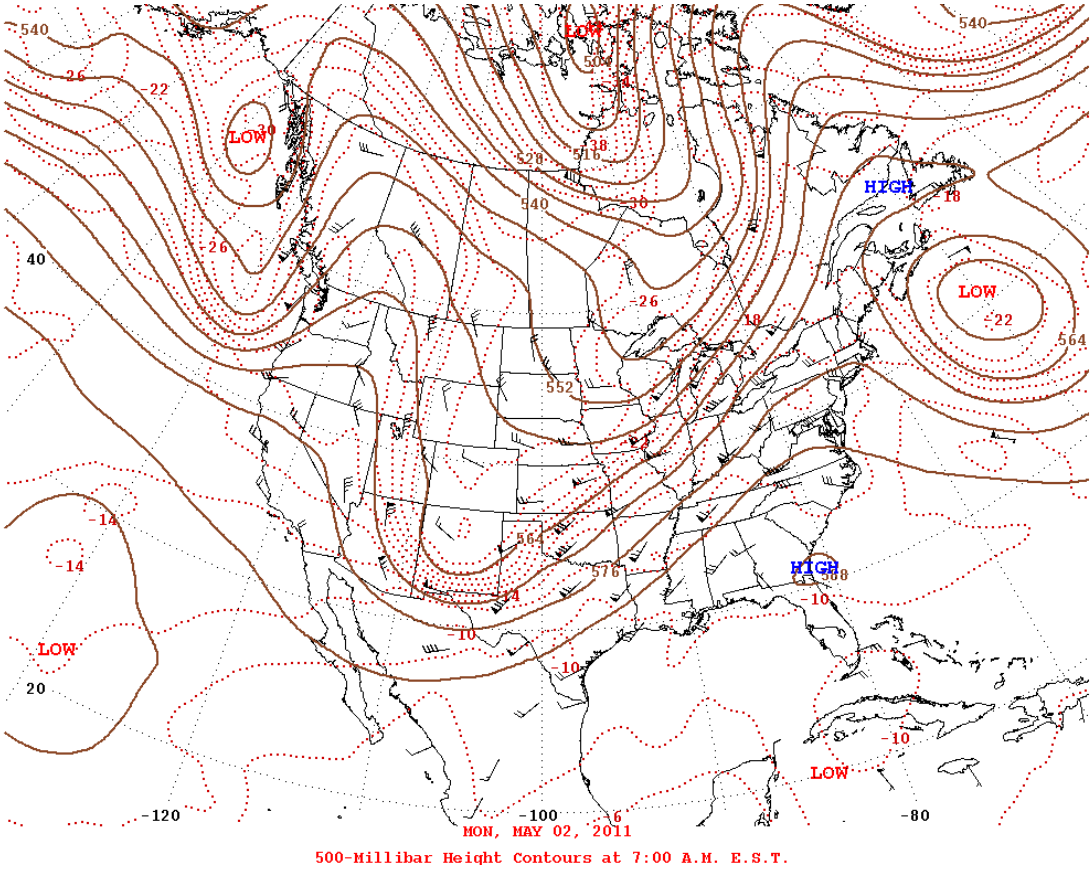


Figure 3-1. 500 mb geopotential height map from 05:00 MST on May 2, 2011. A strong upper-level trough of low pressure was located over Colorado and New Mexico.

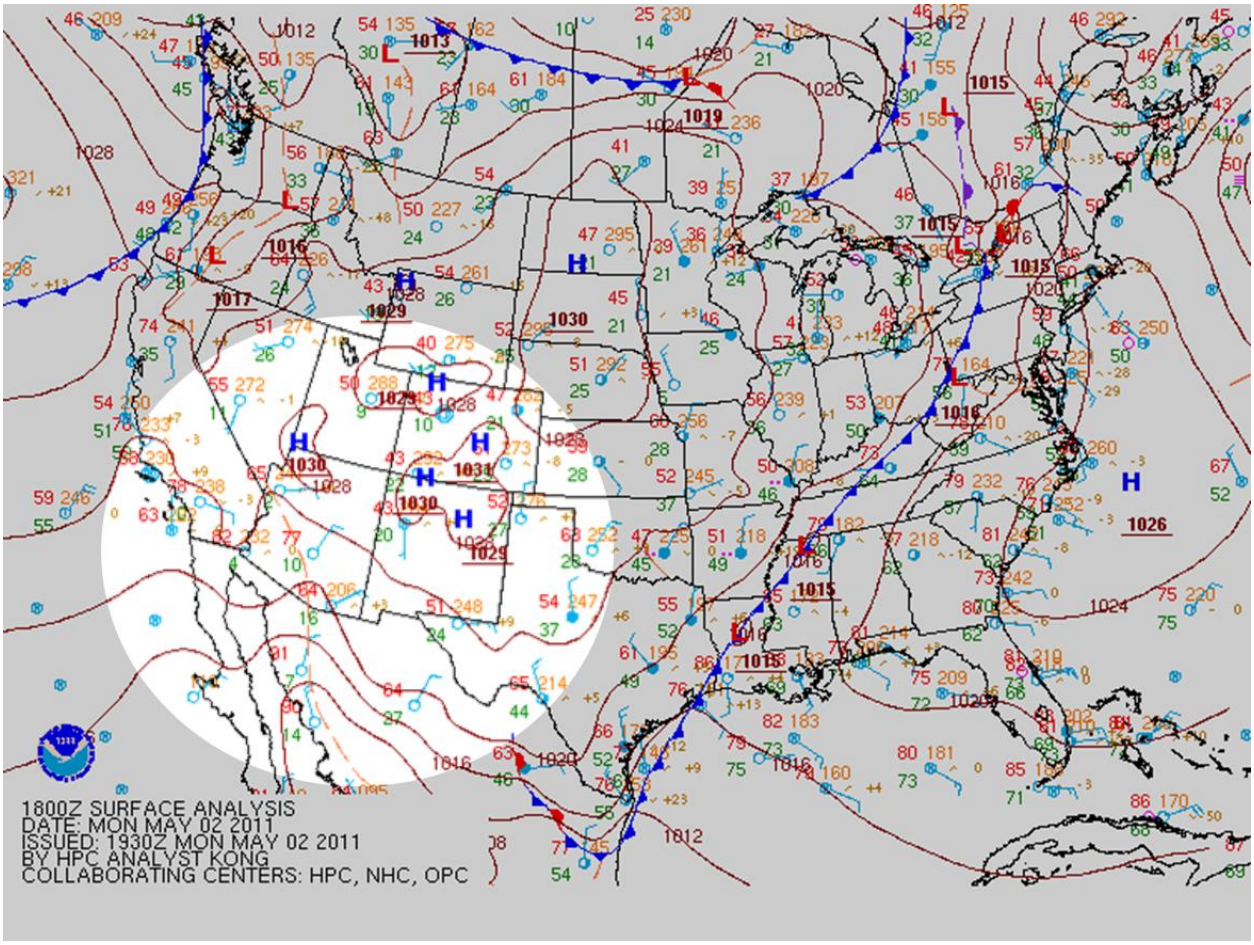


Figure 3-2. Surface pressure map from 11:00 MST on May 2, 2011. A strong pressure gradient between surface high pressure north of Arizona and lower pressure over Mexico produced locally gusty northeasterly winds across southern Arizona.

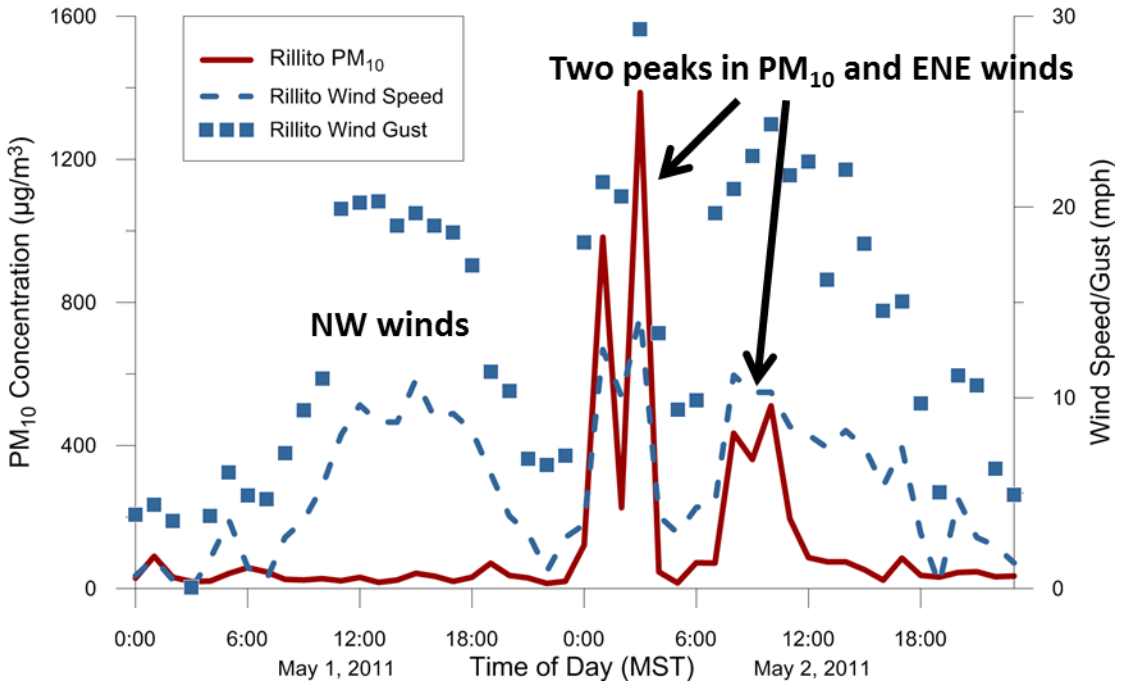


Figure 3-3. Hourly PM_{10} concentrations and wind speeds at the Rillito monitor on May 1 and 2, 2011. PM_{10} concentrations and wind speeds sharply increased after 00:00 MST on May 2, followed by a secondary increase between 07:00 and 11:00 MST on May 2, indicating the presence of windblown dust. Gusty winds were reported on May 1 while PM_{10} concentrations were low; however, winds were from a different direction (northwesterly) at that time.

Figures 3-4 through 3-13 illustrate wind, visibility, and PM_{10} data across Pima and Pinal counties before, during, and after the peak wind speeds and PM_{10} concentrations. At 22:00 MST on May 1, wind speeds throughout the region were generally light from the north and PM_{10} concentrations were low (Figure 3-4). Gusty east-northeasterly winds developed at 01:00 MST and continued through 04:00 MST on May 2, particularly in the immediate Rillito area (Figures 3-5 through 3-7). The gusty winds lofted and transported dust into the Rillito area, resulting in a 1-hour PM_{10} concentration of 1,387 µg/m^3 at 03:00 MST. This time frame corresponds to the first peak in PM_{10} concentrations noted in Figure 3-3. Winds were also notably lighter in surrounding areas of Pima and Pinal counties at this time. At 04:00 MST, winds quickly diminished and PM_{10} concentrations were much lower in the immediate vicinity of Rillito, illustrating the causal relationship between the wind speeds and PM_{10} concentrations (Figure 3-8).

Winds remained light in the Rillito area until 08:00 MST, when gusty winds were reported throughout Pima and Pinal counties (Figure 3-9). At the same time, PM_{10} concentrations increased at Rillito. Winds remained gusty and PM_{10} concentrations remained high through 12:00 MST (Figures 3-9 through 3-12); this time frame corresponds to the second peak in PM_{10} concentrations noted in Figure 3-3.

Winds quickly diminished regionwide during the afternoon hours on May 2, resulting in a corresponding drop in PM_{10} concentrations at Rillito (Figure 3-13). The gusty east-northeasterly

winds reported in Rillito during the periods of high PM_{10} concentrations were not favorable for transport of PM_{10} from anthropogenic point sources, including the CalPortland Cement factory south of the Rillito monitor. Note in Figure 3-3 that gusty winds were also reported for much of the afternoon on May 1 while PM_{10} concentrations were generally low; however, winds were from a different direction (northwesterly) at that time. A summary of area peak sustained winds and wind gusts is shown in **Table 3-1**.

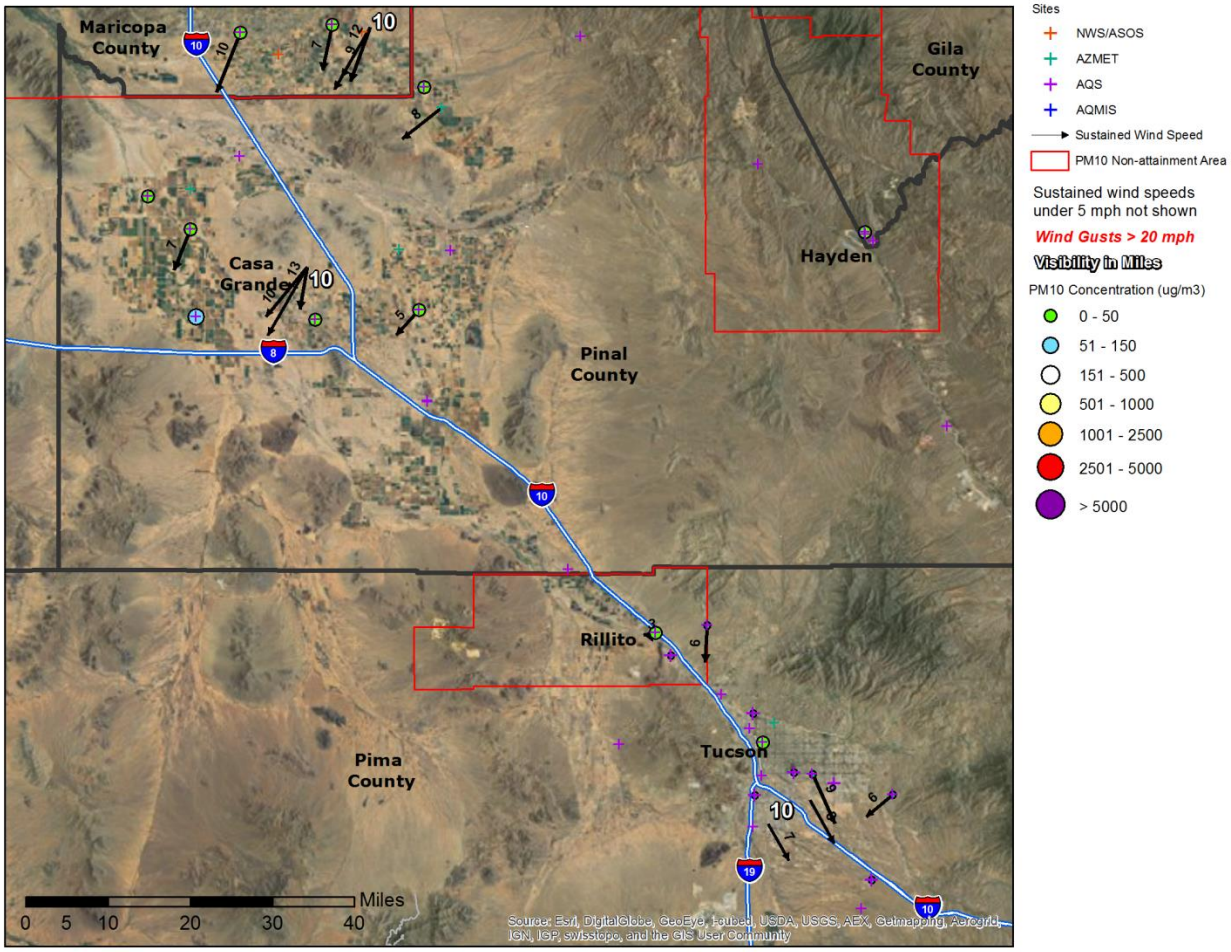


Figure 3-4. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 22:00 MST and 23:00 MST on May 1, 2011. Winds were generally light and PM_{10} concentrations were low throughout the region at this time.

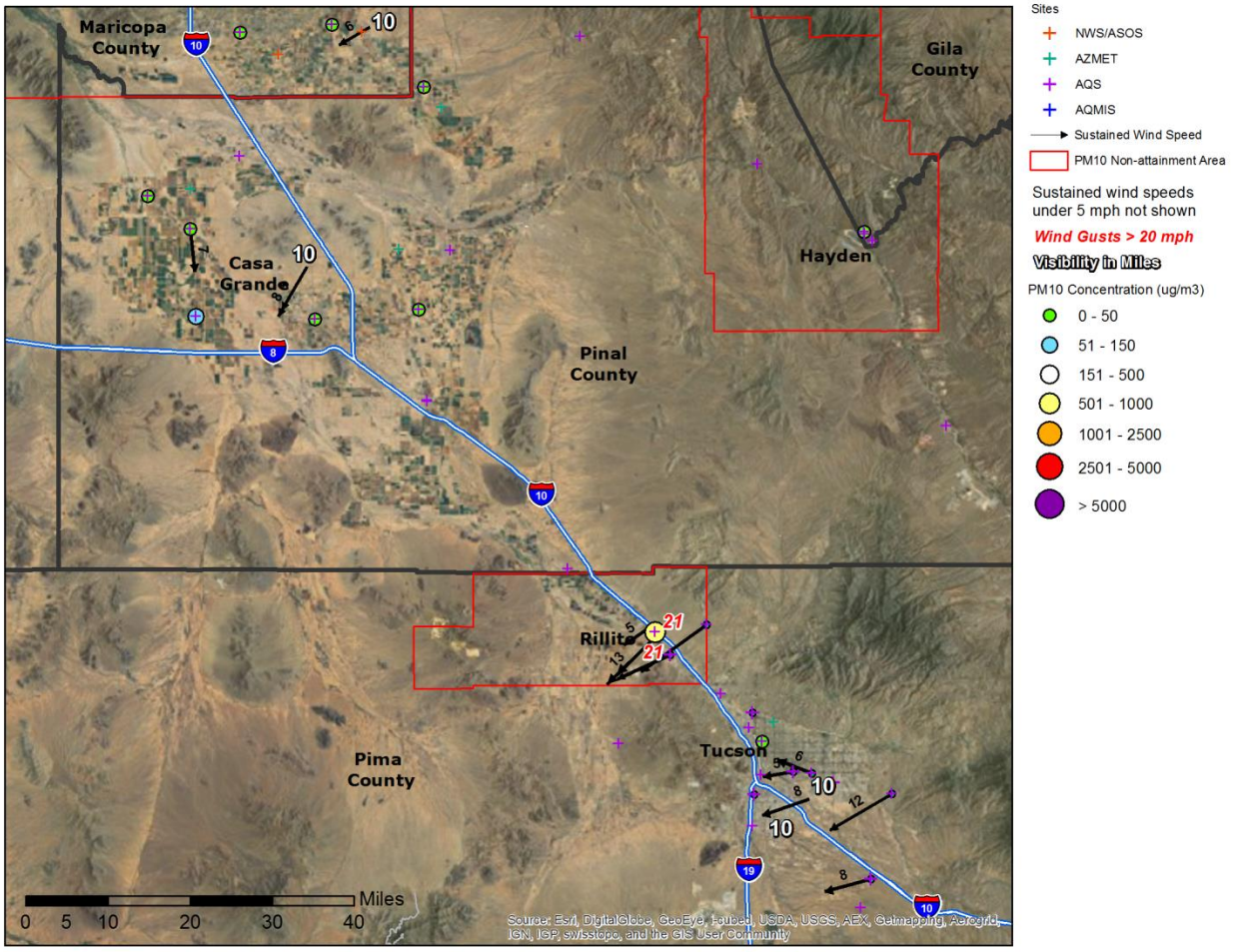


Figure 3-5. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 01:00 MST and 02:00 MST on May 2, 2011. Wind speeds, wind gusts, and PM_{10} concentrations increased in the immediate vicinity of Rillito.

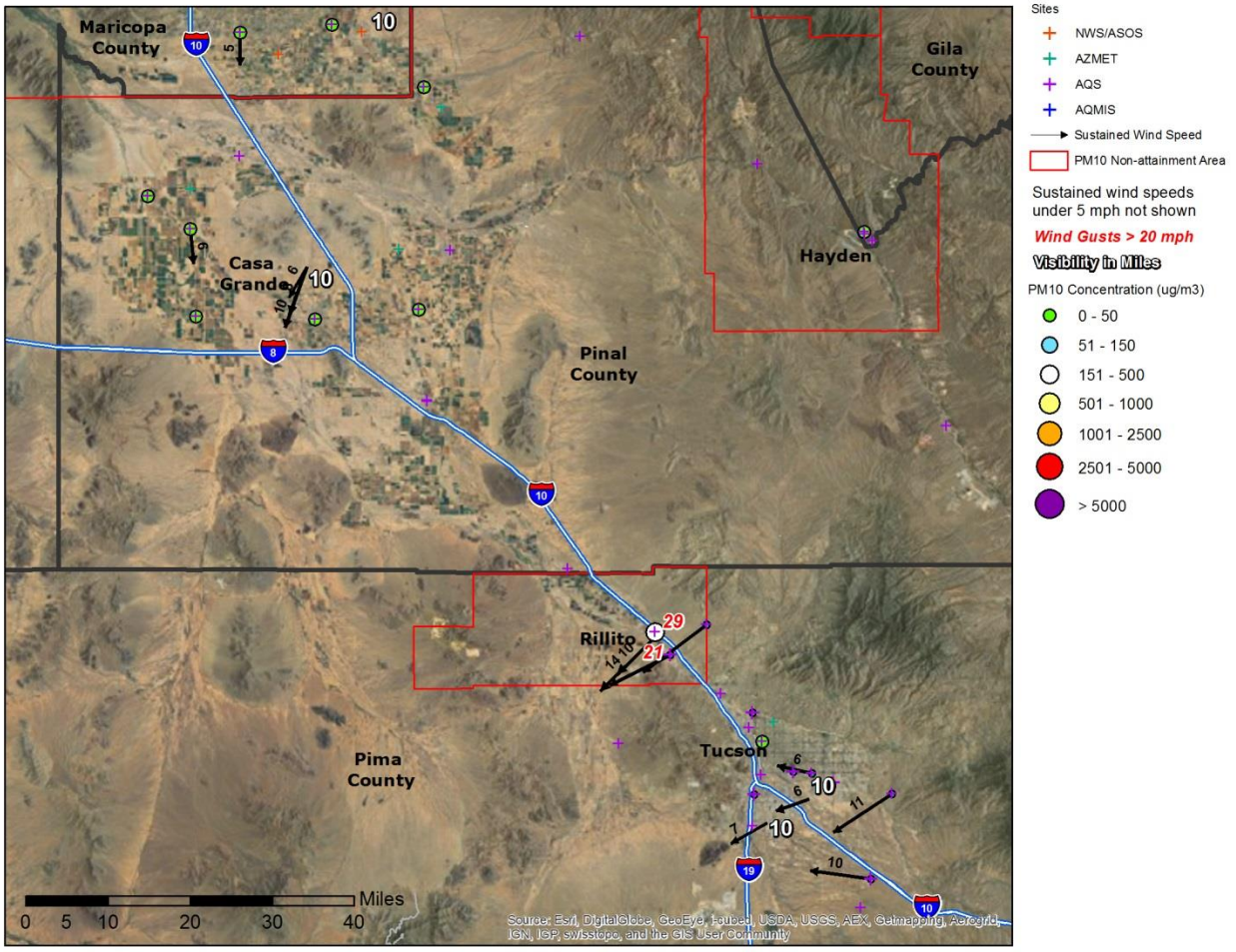


Figure 3-6. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 02:00 MST and 03:00 MST on May 2, 2011. Gusty winds and elevated PM_{10} concentrations continued in the immediate vicinity of Rillito. Other monitors in Pima and Pinal counties reported generally light winds with no wind gusts exceeding 20 mph.

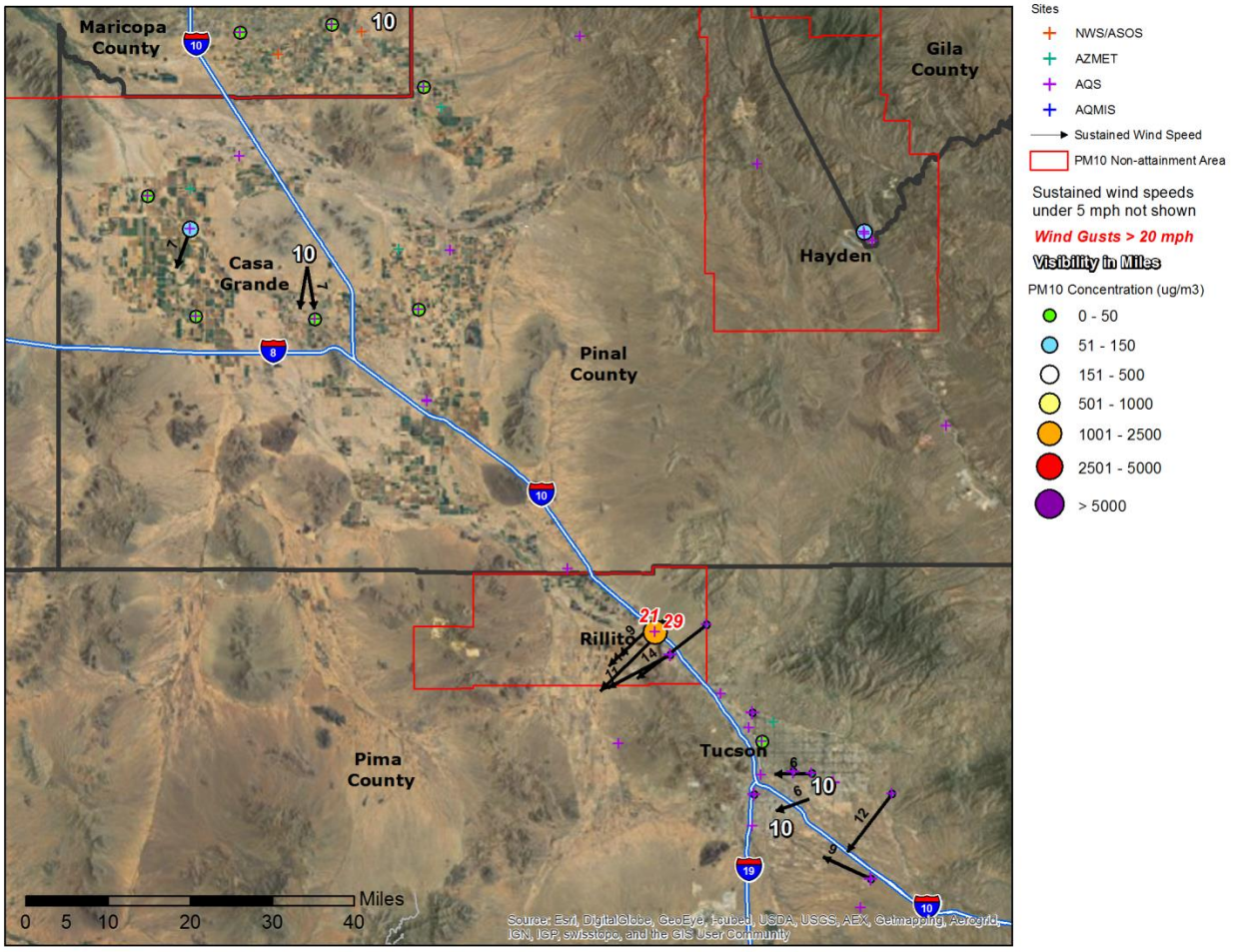


Figure 3-7. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 03:00 MST and 04:00 MST on May 2, 2011. Gusty east-northeasterly winds and high PM_{10} concentrations were reported in the immediate Rillito area, while surrounding areas of Pinal and Pima counties reported lighter winds and lower PM_{10} concentrations. PM_{10} concentrations peaked in Rillito during this hour. Winds were locally enhanced by terrain channeling effects in the Rillito area and were weaker further south in the Tucson area due to terrain blocking effects.

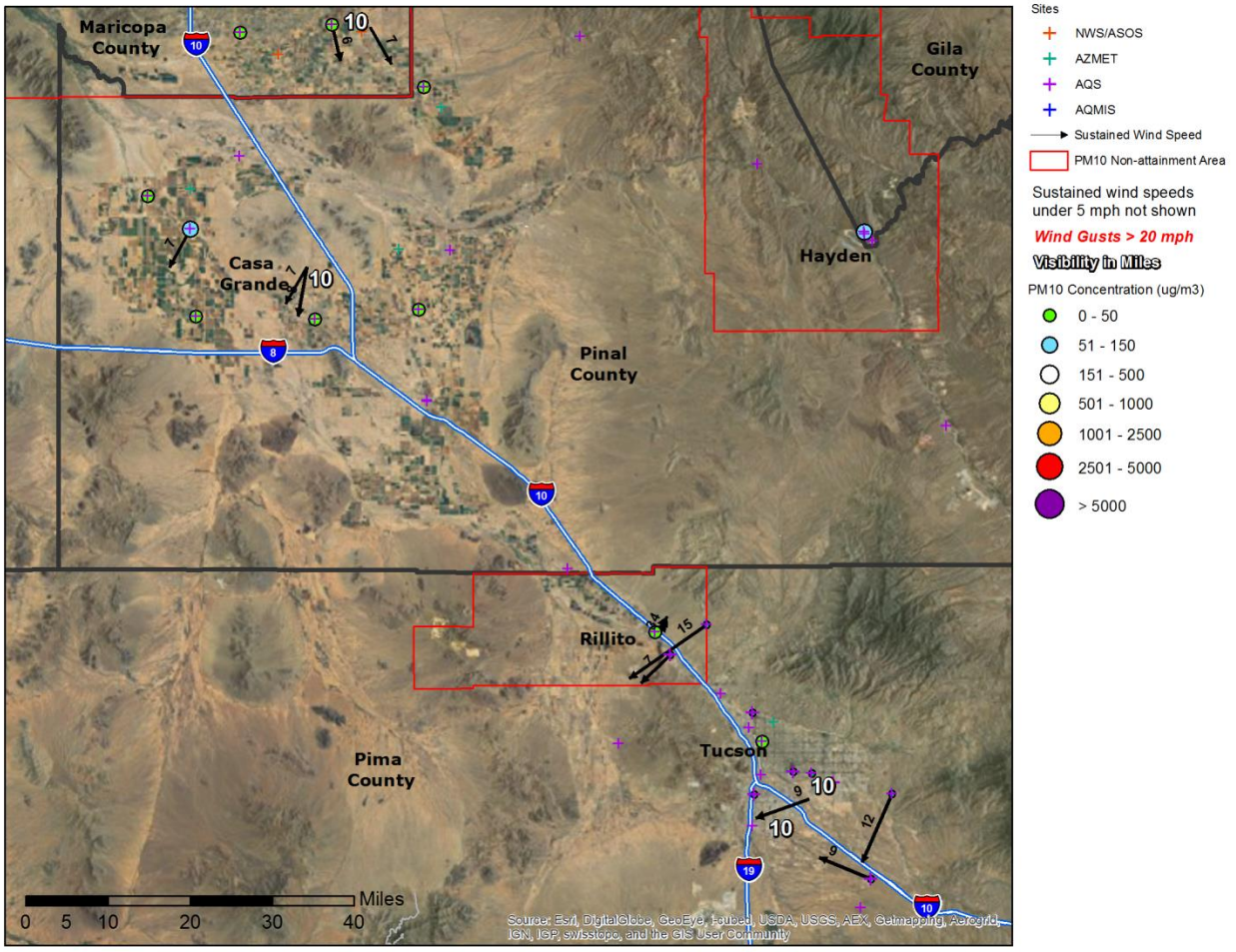


Figure 3-8. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 04:00 MST and 05:00 MST on May 2, 2011. Wind speeds and PM_{10} concentrations decreased in the Rillito area, illustrating the causal relationship between the strong winds and high PM_{10} concentrations observed in previous hours.

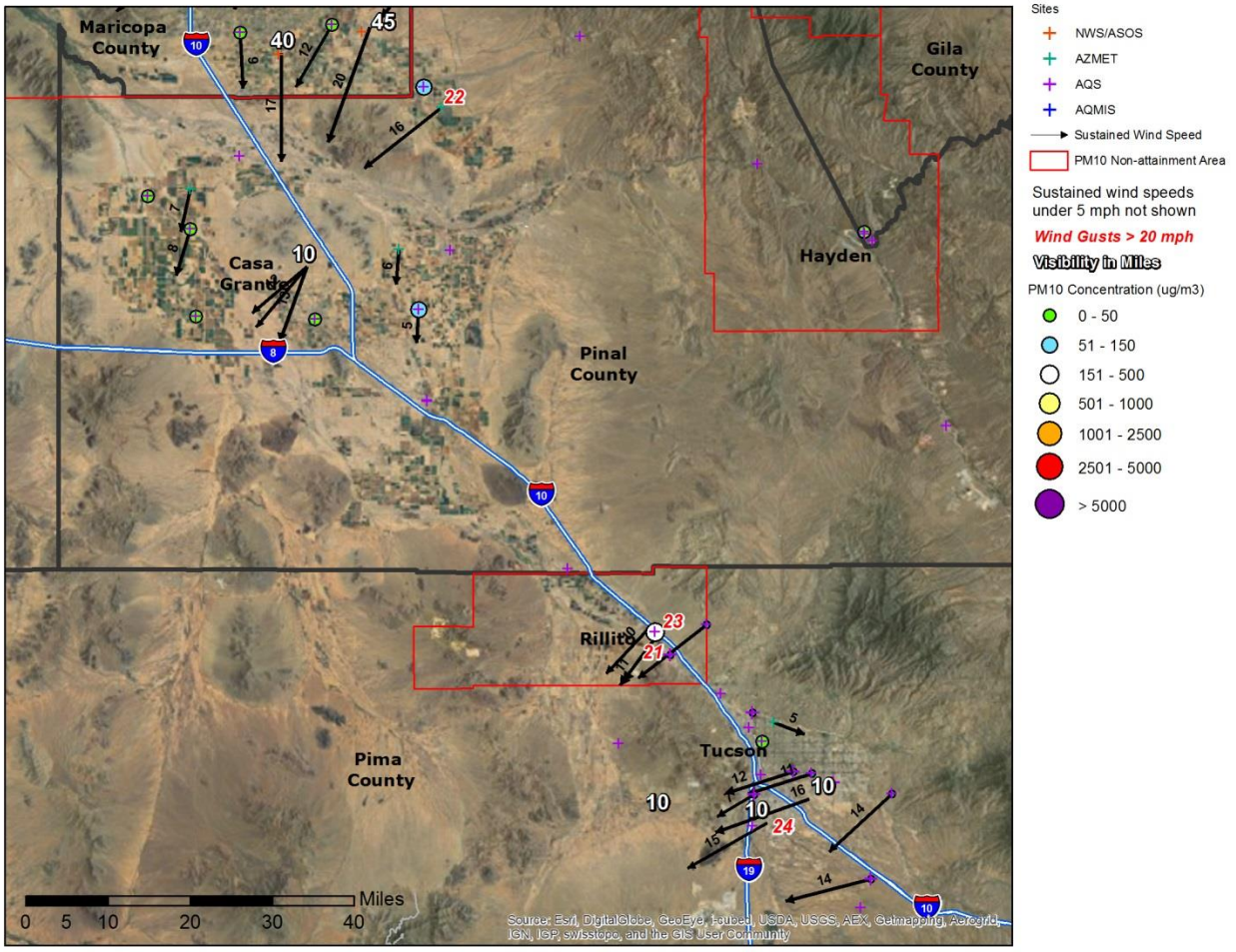


Figure 3-9. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 08:00 MST and 09:00 MST on May 2, 2011. Wind speeds increased again in Rillito, with a corresponding increase in PM_{10} concentrations. Wind speeds also increased at other monitors in the region.

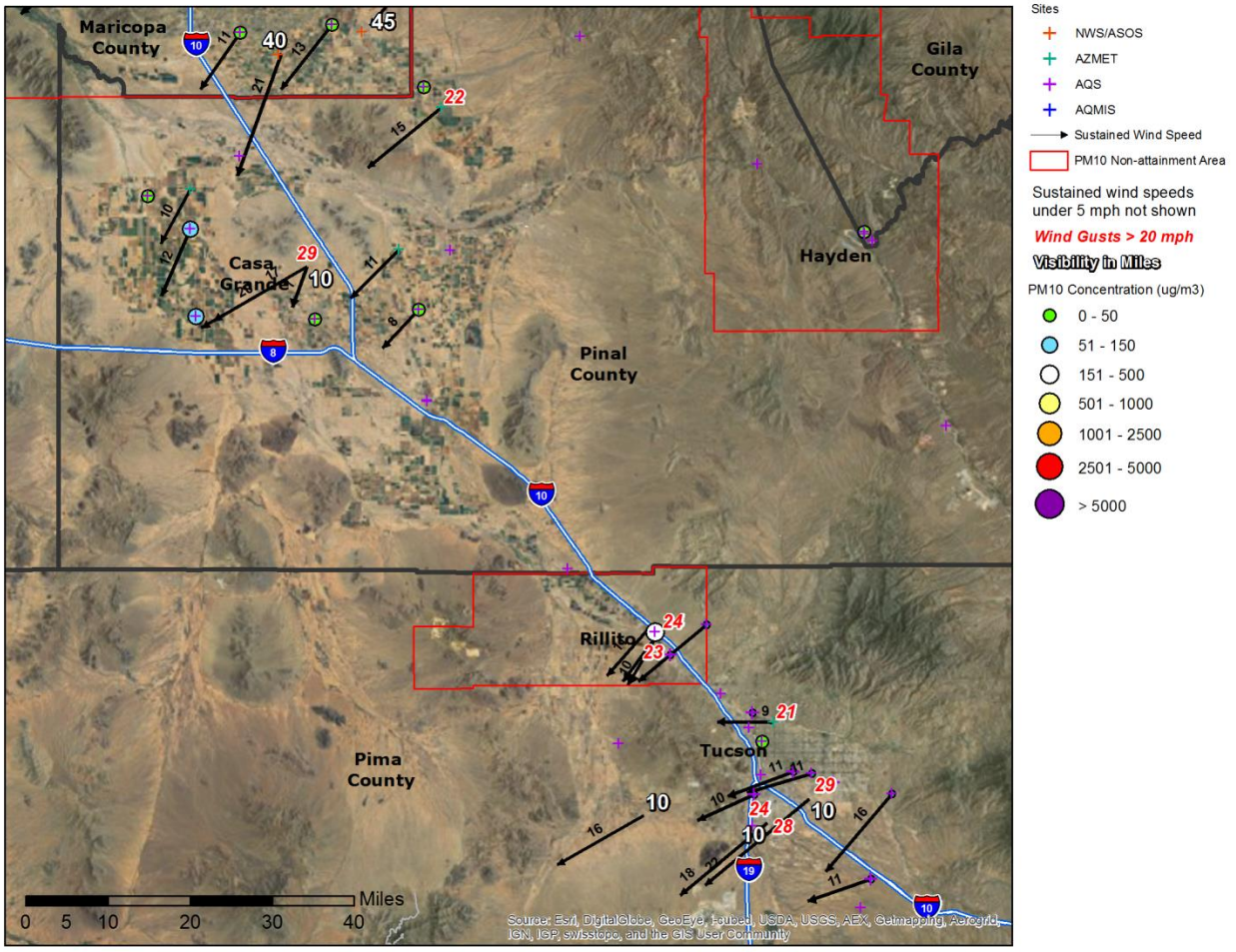


Figure 3-10. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 09:00 MST and 10:00 MST on May 2, 2011. Gusty winds and elevated PM_{10} concentrations continued in the Rillito area. Winds also remained gusty at other monitors in the region.

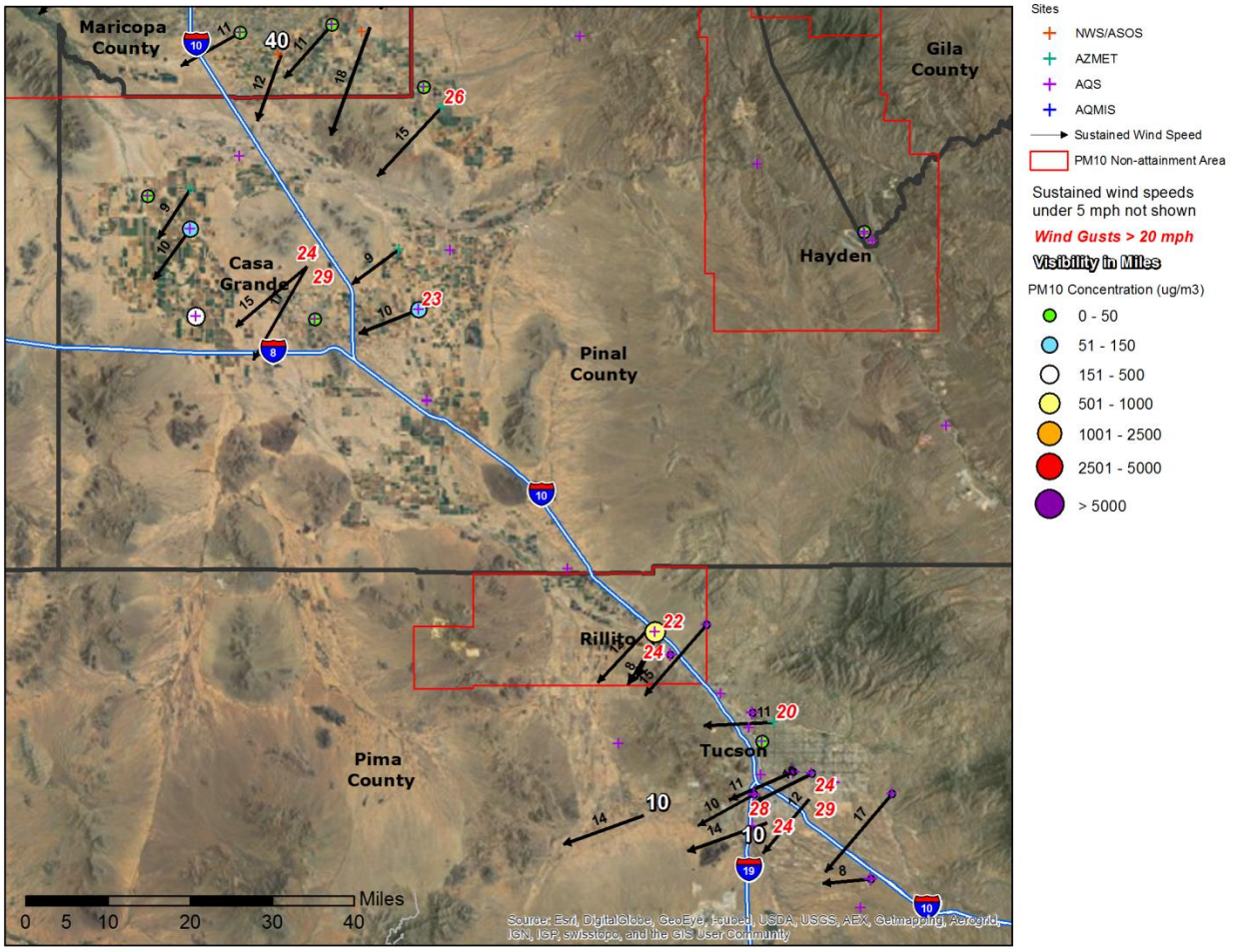


Figure 3-11. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 10:00 MST and 11:00 MST on May 2, 2011. Gusty northeasterly and east-northeasterly winds were reported regionwide coincident with high PM_{10} concentrations at the Rillito monitor.

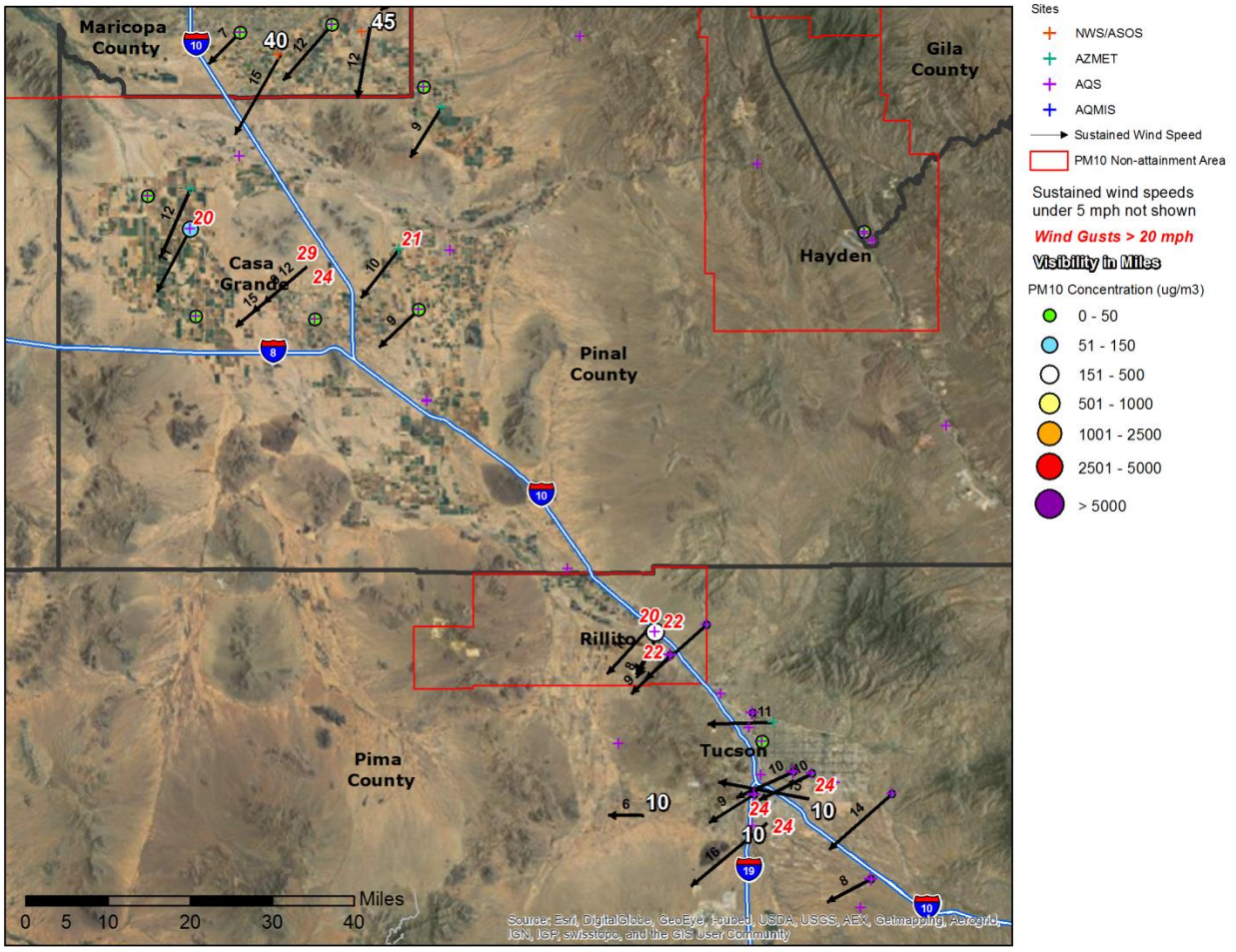


Figure 3-12. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 11:00 MST and 12:00 MST on May 2, 2011. Gusty winds and elevated PM_{10} concentrations continued in the Rillito area. Winds also remained gusty at other monitors in the region.

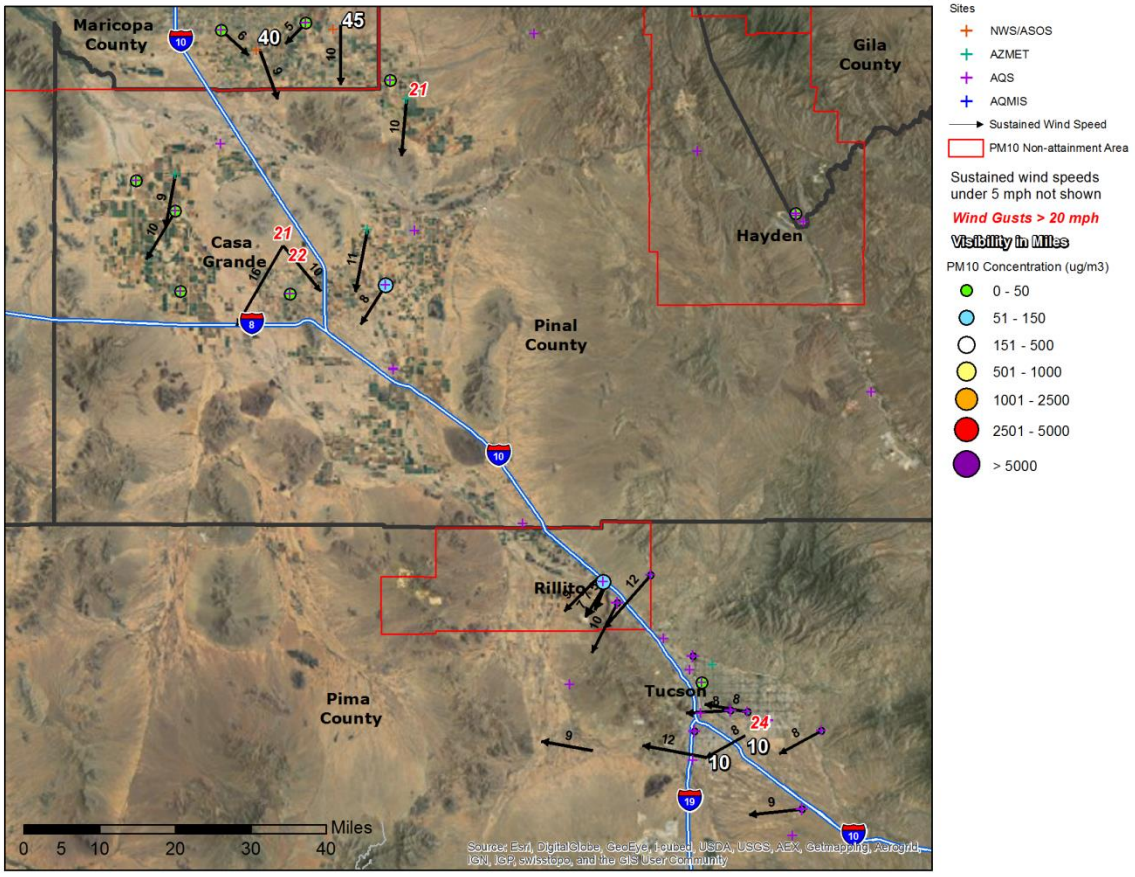


Figure 3-13. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 15:00 MST and 16:00 MST on May 2, 2011. Lighter winds and lower PM_{10} concentrations were reported in the immediate vicinity of Rillito.

Table 3-1. Peak observed wind speeds and wind gusts at Pima and Pinal county monitors on May 2, 2011. The Rillito monitor reported a 1-hr PM_{10} concentration of 1,387 µg/m^3 at 03:00 MST and a 1-hr PM_{10} concentration of 510 µg/m^3 at 10:00 MST.

Monitor	Maximum Wind Speed (mph)	Wind Direction (degrees)	Time (MST)	Maximum Wind Gust (mph)	Time (MST)
Rillito	14 10	056 041	03:00 10:00	29 24	03:00 10:00
Casa Grande	20	060	09:35	29	09:35
Tucson International Airport	18	050	09:53	28	09:53
Tucson Davis-Monthan Air Force Base	22	050	09:55	29	09:55
Marana	12	043	10:00	21	03:00

The complex spatial and temporal wind pattern in the Rillito/Tucson area observed during this windblown dust event was likely attributable to terrain effects. East-northeasterly winds can be locally enhanced in the immediate Rillito and Marana areas due to channeling effects from the nearby Santa Catalina Mountains (**Figure 3-14**). In contrast, winds in the immediate Tucson area can be notably lighter under east-northeasterly wind regimes due to blocking effects from the Santa Catalina Mountains (peak elevation of 9,157 feet). These terrain effects are typically maximized during overnight periods when temperatures in sheltered areas (e.g., Tucson, due to the nearby mountains) quickly decrease, resulting in strong temperature inversions and increased atmospheric stability compared with areas more exposed to the wind (e.g., Rillito and Marana). The local terrain helps to explain why the winds were gusty only in the immediate Rillito area during the early morning hours on May 2 (Figures 3-5 through 3-7), but were gusty regionwide later in the morning (Figures 3-9 through 3-12). The Area Forecast Discussions issued by the NWS office in Tucson noted the potential for gusty east-northeasterly winds early on May 2, and the potential for a wide variation in observed winds and temperatures (Appendix B).

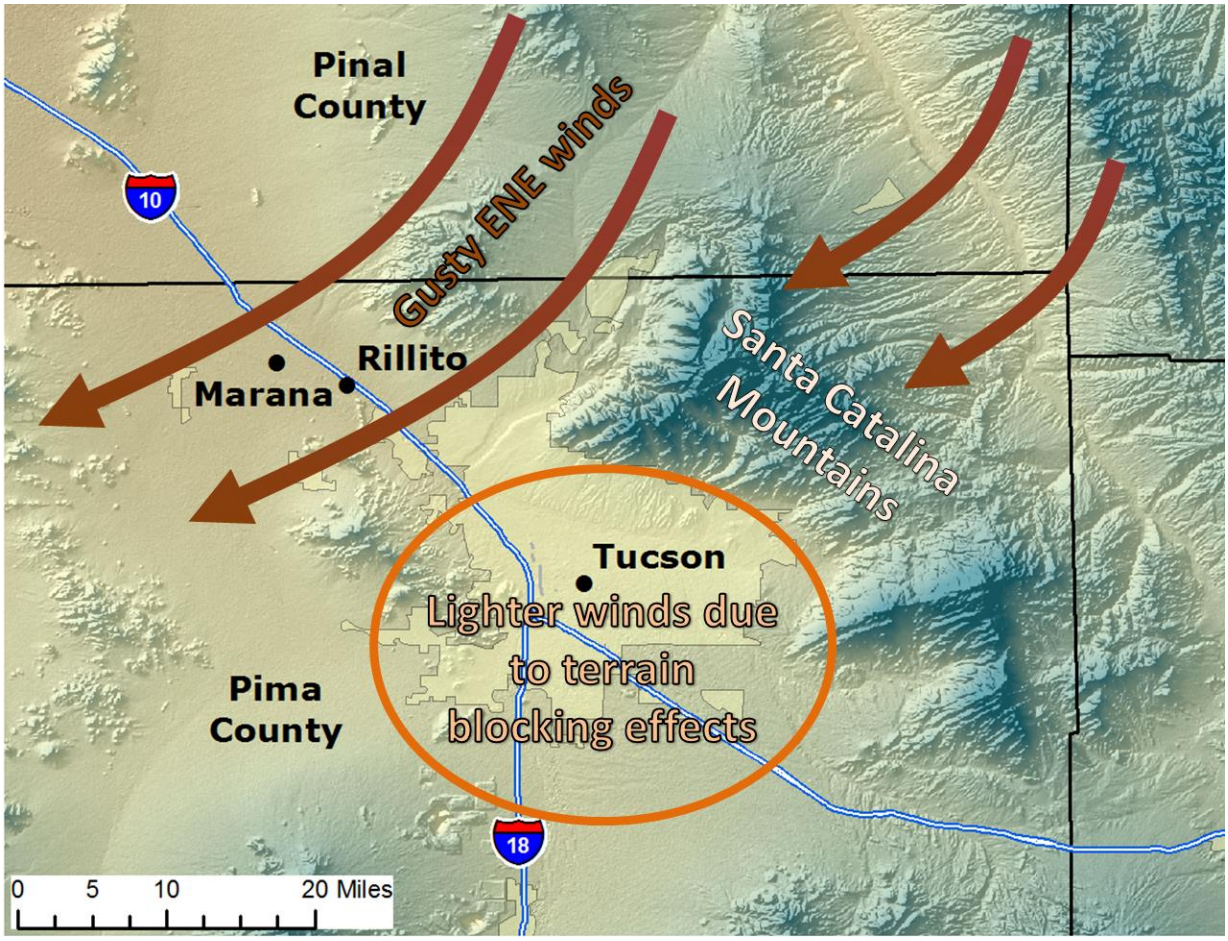


Figure 3-14. East-northeasterly winds were locally enhanced in the Rillito area due to terrain channeling effects during the early morning hours on May 2, 2011. In contrast, winds were weaker in the immediate Tucson area due to blocking effects from the Santa Catalina Mountains.

3.2 Summary

The information presented in this section demonstrates a clear causal relationship between the windblown dust and the PM_{10} exceedance measured at the Rillito monitor on May 2, 2011. The PM_{10} and wind data shown in this section illustrate the spatial and temporal representation of the windblown dust as it impacted Rillito. Locally gusty east-northeasterly winds likely lofted large amounts of dust and PM_{10} into the lower atmosphere. This dust likely originated in open desert areas east-northeast of Rillito and was transported into Rillito by the gusty east-northeasterly winds. In addition, the time-series plots of air quality and meteorological data found in this section and in Appendix A show that the sharp increase in PM_{10} concentrations coincided with the onset of gusty east-northeasterly winds. Channeling effects by nearby terrain likely locally enhanced wind speeds observed in the immediate Rillito area.

4. Historical Norm

4.1 Analysis

PM_{10} concentrations measured at the Rillito monitor on May 2, 2011, were unusual and in excess of normal historical fluctuations. Time-series plots of the 24-hr average PM_{10} concentrations for January 1, 2007, through December 31, 2011, provide a historical perspective of PM_{10} concentrations at Rillito (**Figure 4-1**). The 24-hr average PM_{10} concentration on May 2, 2011, is one of the highest daily averages measured at Rillito during this five-year period. Please note that prior to April 1, 2010, the Rillito monitor operated on a one-in-six day schedule.

Historical daily cumulative distributions of the 24-hr average PM_{10} concentrations were created for the Rillito monitor for the same five-year data set to provide additional evidence in establishing the severity of this event. **Figure 4-2** shows a histogram of 24-hr average PM_{10} concentrations at the Rillito monitor and the corresponding 95th percentile. The 24-hr average PM_{10} concentration on May 2, 2011, was more than two times higher than the 95th percentile at the Rillito monitor. Concentrations in excess of the 95th percentile are considered to be unusual.[2]

4.2 Summary

Given the recorded values and using similar methodology to the one accepted by EPA, it is clear that the PM_{10} concentrations observed at the Rillito monitor on May 2, 2011, were well above normal historical fluctuations. This analysis provides evidence that the event affected air quality on a historic scale.

[2] Excluding days on which concentrations caused by exceptional events exceed the 95th percentile threshold employs a general test of statistical significance and has the effect of ensuring that such concentrations would clearly fall beyond the range of normal expectations for air quality during a particular time of year. Source: "The treatment of Data Influenced by Exceptional Events," 71 FR 12598.

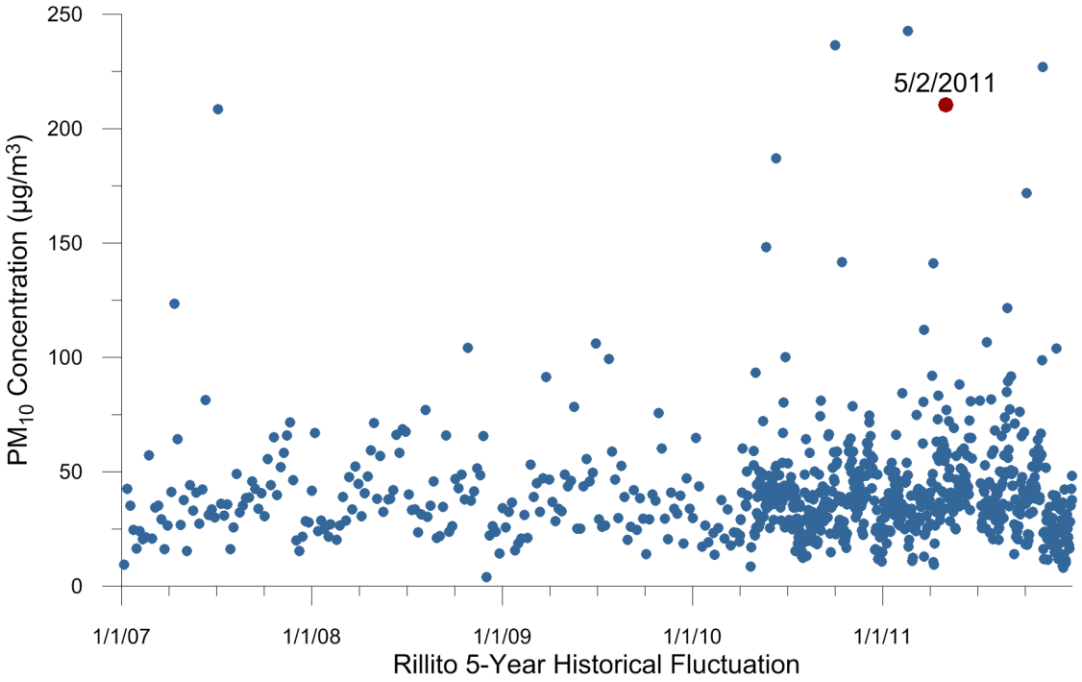


Figure 4-1. 24-hr average PM_{10} concentrations at the Rillito monitor for 2007-2011. The 24-hr average PM_{10} concentration on May 2, 2011, is highlighted in red. Prior to April 1, 2010, the Rillito monitor operated on a 1-in-6 day schedule.

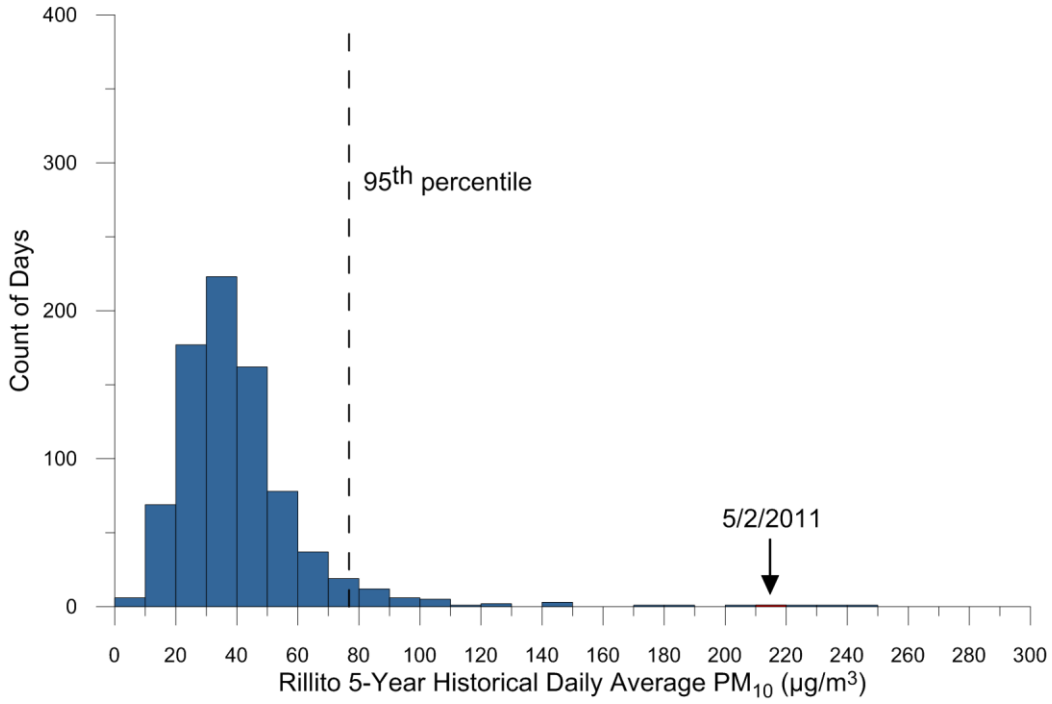


Figure 4-2. 24-hr average PM_{10} concentrations at the Rillito monitor for 2007-2011. The 24-hr average PM_{10} concentration on May 2, 2011, was in excess of the 95th percentile. The value is also above the 95th percentile when considering only the continuous data since April 1, 2010.

5. Not Reasonably Controllable or Preventable

5.1 Background

Rillito was designated as a moderate PM_{10} nonattainment area by operation of the 1990 CAA. In 2006, following several years of improved air quality, EPA determined that the RNA had met the PM_{10} NAAQS and issued a clean data finding for the RNA. EPA's Clean Data Policy relieves the state of Arizona from certain demonstrations of attainment because qualifying for a clean data finding indicates that attainment has already been achieved. This section of the exceptional events demonstration describes the RACM implemented to bring the RNA into attainment and maintain attainment status.

5.1.1 Control Measures

Details of the RACM implemented in the RNA can be found in the *2008 RNA PM_{10} LMP and Request for Redesignation to Attainment*. The 1994 SIP submitted to EPA contained a series of control measures designed to mitigate PM_{10} emissions. Since then, the RNA has become more urbanized and less agricultural. Thus, some of the control measures included in the 1994 SIP have been discontinued or were one-time actions. **Table 5-1** provides the status of these measures.

Table 5-1. Status of control measures implemented in the RNA from the 1994 Rillito PM_{10} SIP.

Control Measure	Details	Current Status
1. CalPortland cement plant and quarry operations	Comprehensive road stabilization plan to mitigate emissions.	In effect, included in the CPC operating permit issued October 7, 2003
2. Pima County Grading Ordinance, Chapter 18.81 of the Pima County Zoning Code (January 2001)	Permits for earth moving require stabilization to mitigate fugitive emissions.	In effect
3. Bank stabilization of the Santa Cruz River	One-time control measure implemented in 1988 during the development of nearby residential neighborhoods.	Complete
4. Reduced tillage program	United States Department of Agriculture (DOA) pilot program.	Discontinued by U.S. DOA
5. Dust stabilization – Rillito community	Approximately one mile total of dirt road segments within the community are now paved.	Complete
6. Avra Valley road shoulder dust stabilization	Once per year, 2.5 miles of road shoulders undergo blading and rolling, followed by application of magnesium chloride.	In effect on an as-needed basis

The implementation of these control measures helped bring the RNA into timely attainment of the 24-hr standard; thus, the measures meet the CAA requirement for RACM for moderate PM_{10} nonattainment areas. In addition to these RACM, the Arizona Department of Transportation's (ADOT) Standard Specification Section 810 mandates that state contractors use a comprehensive series of control measures designed to mitigate airborne PM_{10} emissions during road construction projects.

5.1.2 Permanent and Enforceable Control Measures

The CAA requires that all types of maintenance plans demonstrate that measures credited with bringing an area into attainment are federally enforceable and continue into the future. Measures 1, 2, and 6 in Table 5-1 meet these requirements. Measure 4 was discontinued by the U.S. DOA and was not replaced, and measures 3 and 5 are no longer necessary because the affected public roadways have since been paved.

New major emissions sources or major modifications to existing sources in nonattainment areas are subject to AAC R18-2-403 (*Permits for Sources Located in Nonattainment Areas*). After an area is redesignated, AAC R18-2-406 (*Permit Requirements for Sources Located in Attainment and Unclassifiable Areas*) will apply for any major source(s) within the maintenance area.

5.1.3 Contingency Measures

Section 175A of the CAA requires a maintenance plan's contingency provisions to be enacted should a violation of the PM_{10} standard occur following redesignation to attainment. EPA's memo, *Limited Maintenance Plan Option for Moderate PM_{10} Nonattainment Areas* (Lydia Wegman, August 9, 2001),[3] states that contingency measures do not have to be fully adopted at the time of redesignation, but that the LMP should identify measures to be implemented if necessary.

The state commits to act promptly if an exceedance of the area's design value occurs following redesignation to attainment. Specifically, the state commits to determine that an exceedance has occurred within six months of the end of the calendar year in which that exceedance occurred. The state also commits to identify and implement the appropriate control measure(s) needed to remedy the situation by the end of the same calendar year.

A redesignated area with an LMP is also required to annually recalculate the average design value for the area to determine whether the area has continued to qualify for an LMP. If, after performing the annual recalculation, the state determines that the area no longer qualifies for an LMP, the state will commit to take actions to reduce PM_{10} concentrations sufficiently to requalify for an LMP, or will prepare a Maintenance Plan.

[3] The EPA memo regarding the LMP option for Moderate PM_{10} Nonattainment Areas can be found at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final.pdf.

5.1.4 Contingency Measure Trigger

The state will consider implementing the contingency measures featured in **Table 5-2** should an exceedance of the critical design value (CDV) occur. In order to prevent an exceedance from occurring, ADEQ opted to identify a specific indicator, or trigger, if PM_{10} concentrations reach a level that signals an imminent exceedance. The trigger will be used by ADEQ to determine the need to implement contingency measures in order to prevent an exceedance.

Table 5-2. Rillito area contingency control measures.

Contingency Control Measure	Implementing Entity
1. If any PM_{10} generating source within the maintenance area is found to be contributing to monitored readings above the LMP allowable limits, ADEQ will review existing air quality permits and/or applicable rules to identify additional control measures that may be needed. If a PM_{10} source does not have a permit, ADEQ will determine whether a permit and PM_{10} controls are needed.	ADEQ
2. Review and revise dust control measures for material storage piles to determine whether additional action is needed.	ADEQ
3. Pave any new unpaved public roads, vacant lots, and unpaved parking lots located in the PM_{10} maintenance area subject to limits of statutory authority.	Pima County
4. Review and, if necessary, revise existing grading ordinances.	Pima County
5. Reduce PM by paving or stabilizing unpaved or unimproved shoulders and alleys.	Pima County and Town of Marana
6. Review and, if necessary, revise standards for installation and maintenance of landscaping and screening.	Pima County
7. Review and, if necessary, revise roadway maintenance practices following exceptional events.	Pima County

Per the LMP submitted in 2008, contingency measures will be considered if ambient concentrations reach 95% of the CDV. The current CDV for the RNA is 135 $\mu g/m^3$. The causes that activated the trigger will help the state to determine the appropriate contingency measure(s) to be implemented. ADEQ believes that identifying a trigger, although not required, will increase protection of public health and help assure that the area continues to qualify for an LMP.

5.1.5 Conformity

The Transportation Conformity Rule (40 CFR Parts 51 and 93) and General Conformity Rule (58 FR 63214; November 30, 1993) apply to nonattainment areas and maintenance areas operating under maintenance plans. Under transportation conformity rules, one way to demonstrate conformity is to indicate that expected emissions from planned actions are

consistent with the emissions budget for the area. Emissions budgets in LMP areas can be treated as essentially non-constraining for the length of the maintenance period because it is unreasonable to expect that an LMP area would experience so much growth during that period of time that a violation of the PM_{10} NAAQS would result. This does not exempt an LMP area from the need to affirm conformity, but it does allow the area to demonstrate conformity without following certain requirements. For transportation conformity purposes, EPA would most likely conclude that emissions in these areas do not require a cap for the duration of the maintenance period and, therefore, that a regional emissions analysis will not be required.

General conformity requires that non-transportation-based projects in areas that have nonattainment or maintenance plans submit a description of the project to the state. The description must show either that the project will not increase the relevant emissions for the area, or that specific control measures will be applied for the duration of the project in order to prevent increased emissions.

5.1.6 Review of Source-Permitted Inspections and Public Complaints

ADEQ's Arizona Unified Repository for Information Tracking of the Environment (AZURITE) database was queried to compile a list of inspections for the permitted sources in the Rillito area around the time of the May 2, 2011, PM_{10} exceedance. An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions.

5.2 Forecasts and Warnings

Dust forecasts produced by ADEQ indicated that gusty east-northeasterly winds could cause local areas of blowing dust (Appendix B). The gusty winds and blowing dust were not prolonged or widespread enough to warrant advisories or warnings from local NWS offices.

5.3 Wind Observations

Sustained wind speeds of up to 14 mph and wind gusts of up to 29 mph were reported at the Rillito monitor during this windblown dust event. Winds of over 25 mph are normally sufficient to overcome most PM_{10} control measures. As was noted in Section 2.1, soils in the region between Marana/Rillito and Casa Grande are particularly prone to lofting by winds; thus, while sustained winds during the May 2, 2011, event were not overly strong, the wind gusts were likely sufficient to loft dust from the nearby loose soils.

5.4 Summary

The weather forecasts and observations outlined in this section demonstrate that gusty east-northeasterly winds caused uncontrollable PM_{10} emissions. The RACM outlined in the Rillito PM_{10} Maintenance Plan were in place at the time of the event. These control measures are required for areas designated as Moderate non-attainment for PM_{10}, such as Rillito. Thus, the RACM in place at the time of the event were reasonable. In addition, surface wind

measurements in the Rillito area during the event were high enough (winds gusts of over 25 mph) that most reasonable PM_{10} control measures would have been overwhelmed.

6. But-For Analysis

6.1 Discussion

Section 50.14(c)(3)(iv)(D) in 40 CFR Part 50 requires that an exceptional event demonstration satisfies that "[t]here would have been no exceedance or violation but for the event." The prior sections of this submittal have provided detailed information that, in regard to the PM_{10} exceedance at the Rillito monitor on May 2, 2011,

- The exceedance was not reasonably controllable or preventable, and
- There was a clear causal relationship between PM_{10} transported gusty east-northeasterly winds originating in desert areas outside the Rillito Nonattainment Area and the measured PM_{10} exceedance in Rillito.

The weight of evidence in these sections demonstrates that, but for the existence of dust emissions generated by gusty east-northeasterly winds and the associated transport of PM_{10}, there would have been no exceedance of the NAAQS for 24-hr average PM_{10}.

As shown in Section 3, time-series plots of PM_{10} and wind speeds establish a clear causal relationship between the arrival of windblown dust and elevated PM_{10} concentrations at the Rillito monitor. Multiple independent measurements of wind speed and PM_{10} concentrations point to the presence of gusty east-northeasterly winds as the mechanism for transport of PM_{10} into the Rillito PM_{10} Nonattainment Area. In addition, PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event. The source regions for the PM_{10} are clearly identified as open desert northeast of the Rillito PM_{10} Nonattainment Area. The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of May 2, 2011, to any causal source except PM_{10} transported by gusty east-northeasterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

As detailed in Section 5, all reasonable control measures were in place and/or implemented on a continual basis. Air quality-related inspection and compliance data revealed no violations or complaints within three days before and after the time of the event.

6.2 Summary

The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of May 2, 2011, to any causal source except PM_{10} transported by gusty east-northeasterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

7. Conclusions

The PM_{10} exceedance that occurred on May 2, 2011, satisfies the criteria of the EER, which states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

7.1 Affects Air Quality

As stated in the preamble to the EER, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in Sections 2, 3, 4, and 5, we can reasonably conclude that the event in question affected air quality.

7.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 requires that an event must be “not reasonably controllable or preventable” in order to be defined as an exceptional event. This requirement is met by demonstrating that, despite reasonable control measures in place within the Rillito PM_{10} Nonattainment Area, high winds overwhelmed all reasonably available controls. The PM_{10} exceedance discussed in this report was caused by naturally occurring east-northeasterly winds that transported dust into Rillito from areas largely outside the Rillito PM_{10} Nonattainment Area. These facts provide strong evidence that the PM_{10} exceedance on May 2, 2011, was not reasonably controllable or preventable.

7.3 Natural Event

As discussed above, the PM_{10} exceedance in Rillito on May 2, 2011, was shown to be caused by transport of PM_{10} into Rillito by gusty east-northeasterly winds. The event therefore qualifies as a natural event.

7.4 Clear Causal Relationship

The following points demonstrate that the high PM_{10} concentrations were caused by windblown dust:

- Time-series of PM_{10} concentrations show that the timing of high concentrations of PM_{10} at the Rillito monitor was consistent with gusty winds at Rillito-area meteorological stations (Section 3).
- PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event (Section 3).
- Dry conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by high winds (Section 3).

7.5 Historical Norm

The 24-hr average PM_{10} values measured at the Rillito monitor were historically unusual compared to a multi-year data set (Section 4).

7.6 But For

On the basis of the weight of evidence described above and in Section 6, the exceedance of the federal 24-hr PM_{10} standard on May 2, 2011, at the Rillito monitor would not have occurred but for the period of gusty east-northeasterly winds that transported dust from open desert areas east-northeast of Rillito into the Rillito PM_{10} Nonattainment Area.

Appendix A:
Air Quality and Meteorological Data for the Rillito Area

This section contains time-series of air quality and meteorological data for Rillito and other regional monitors for May 1 and 2, 2011. The data illustrate the increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in the immediate Rillito area.

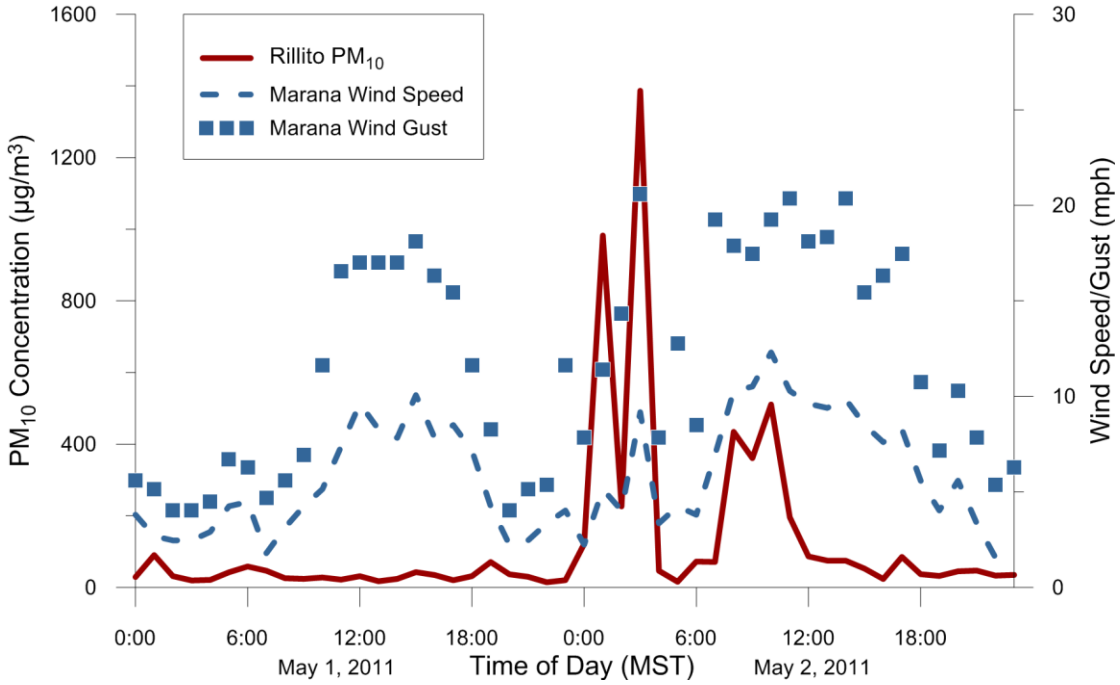


Figure A-1. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at the Marana monitor on May 1 and 2, 2011. PM_{10} concentrations and wind speeds sharply increased after 00:00 MST on May 2, followed by a secondary increase between 07:00 and 11:00 MST on May 2, indicating the presence of windblown dust. Gusty winds were also reported on May 1 while PM_{10} concentrations were low; however, winds were from a different direction (northwesterly) at that time.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
TUCSON INTERNATIONAL AIRPORT (23160)
TUCSON, AZ (05/01/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2549 ft. above sea level
Latitude: 32.131
Longitude: -110.955
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	0053	11	CLR	10.00		56	13.3	37	2.8	-1	-18.3	9	0	000		27.27			29.85	AA		29.94
01	0153	11	CLR	10.00		56	13.3	37	2.8	-0	-17.8	10	0	000		27.27			29.84	AA		29.94
01	0253	11	CLR	10.00		53	11.7	36	2.0	1	-17.2	12	5	250		27.27			29.84	AA		29.94
01	0353	11	CLR	10.00		52	11.1	35	1.8	2	-16.7	13	0	000		27.27			29.85	AA		29.94
01	0453	11	CLR	10.00		50	10.0	34	1.1	1	-17.2	13	3	170		27.28			29.86	AA		29.95
01	0553	11	CLR	10.00		48	8.9	33	0.4	-0	-17.8	13	7	200		27.29			29.88	AA		29.96
01	0653	11	CLR	10.00		51	10.6	35	1.4	1	-17.2	13	5	230		27.32			29.91	AA		29.99
01	0753	11	CLR	10.00		57	13.9	38	3.2	1	-17.2	10	6	290		27.33			29.92	AA		30.00
01	0853	11	CLR	10.00		59	15.0	39	3.7	-0	-17.8	9	0	000		27.35			29.94	AA		30.02
01	0953	11	CLR	10.00		62	16.7	40	4.7	1	-17.2	8	3	VR		27.36			29.95	AA		30.03
01	1053	11	CLR	10.00		66	18.9	43	5.8	1	-17.2	7	6	VR		27.36			29.94	AA		30.03
01	1153	11	CLR	10.00		69	20.6	44	6.4	-3	-19.4	5	18	330	28	27.36			29.94	AA		30.03
01	1253	11	CLR	10.00		71	21.7	45	7.0	-3	-19.4	5	15	340	24	27.36			29.94	AA		30.03
01	1353	11	CLR	10.00		71	21.7	44	6.9	-5	-20.6	5	10	310	24	27.35			29.93	AA		30.02
01	1453	11	CLR	10.00		72	22.2	45	7.0	-10	-23.3	3	14	330	24	27.34			29.93	AA		30.01
01	1553	11	CLR	10.00		71	21.7	45	6.9	-4	-20.0	5	15	300	21	27.33			29.92	AA		30.00
01	1653	11	CLR	10.00		71	21.7	44	6.8	-6	-21.1	4	18	350	24	27.34			29.93	AA		30.01
01	1753	11	CLR	10.00		70	21.1	44	6.6	-5	-20.6	5	8	320	16	27.34			29.93	AA		30.01
01	1853	11	CLR	10.00		68	20.0	43	6.2	-1	-18.3	6	7	320		27.36			29.95	AA		30.03
01	1953	11	CLR	10.00		66	18.9	43	5.8	1	-17.2	7	10	310		27.38			29.97	AA		30.05
01	2053	11	CLR	10.00		65	18.3	42	5.6	2	-16.7	8	8	320		27.40			30.00	AA		30.08
01	2153	11	CLR	10.00		62	16.7	41	4.7	2	-16.7	9	5	330		27.41			30.01	AA		30.09
01	2253	11	CLR	10.00		61	16.1	40	4.5	3	-16.1	10	7	330		27.43			30.02	AA		30.11
01	2353	11	CLR	10.00		60	15.6	40	4.4	5	-15.0	11	6	050		27.45			30.04	AA		30.13

Figure A-2. Quality-controlled local climatological data hourly observations table for Tucson International Airport, Tucson, AZ (05/01/2011). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
TUCSON INTERNATIONAL AIRPORT (23160)
TUCSON, AZ (05/02/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2549 ft. above sea level
Latitude: 32.131
Longitude: -110.955
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
02	0053	11	CLR	10.00		51	10.6	35	1.5	2	-16.7	13	5	190		27.45			30.06	AA		30.13
02	0153	11	CLR	10.00		52	11.1	35	1.8	2	-16.7	13	3	100		27.45			30.06	AA		30.13
02	0253	11	CLR	10.00		58	14.4	38	3.2	-5	-20.6	7	7	060		27.46			30.05	AA		30.14
02	0353	11	CLR	10.00		48	8.9	33	0.4	-0	-17.8	13	5	220		27.48			30.09	AA		30.16
02	0453	11	CLR	10.00		50	10.0	34	1.0	-1	-18.3	12	0	000		27.49			30.09	AA		30.17
02	0553	11	CLR	10.00		50	10.0	34	0.9	-2	-18.9	11	3	190		27.51			30.12	AA		30.19
02	0653	11	CLR	10.00		54	12.2	36	2.3	1	-17.2	11	0	000		27.52			30.14	AA		30.21
02	0753	11	CLR	10.00		58	14.4	38	3.5	1	-17.2	10	3	290		27.53			30.14	AA		30.22
02	0853	11	CLR	10.00		67	19.4	43	5.9	-2	-18.9	6	15	060	24	27.53			30.13	AA		30.22
02	0953	11	CLR	10.00		69	20.6	44	6.3	-6	-21.1	5	18	050	28	27.53			30.13	AA		30.22
02	1053	11	CLR	10.00		72	22.2	45	7.2	-5	-20.6	4	14	070	24	27.53			30.12	AA		30.22
02	1153	11	CLR	10.00		74	23.3	46	7.7	-7	-21.7	4	16	050	24	27.52			30.10	AA		30.20
02	1253	11	CLR	10.00		76	24.4	47	8.2	-10	-23.3	3	13	050	22	27.50			30.09	AA		30.18
02	1353	11	CLR	10.00		77	25.0	47	8.4	-11	-23.9	3	11	060		27.49			30.08	AA		30.17
02	1453	11	CLR	10.00		78	25.6	48	8.7	-12	-24.4	2	8	100		27.47			30.05	AA		30.15
02	1553	11	CLR	10.00		80	26.7	49	9.2	-10	-23.3	3	11	100	17	27.44			30.03	AA		30.12
02	1653	11	CLR	10.00		79	26.1	48	9.0	-8	-22.2	3	11	080	16	27.43			30.02	AA		30.11
02	1753	11	CLR	10.00		78	25.6	48	8.7	-7	-21.7	3	10	120		27.43			30.02	AA		30.11
02	1853	11	CLR	10.00		76	24.4	47	8.3	-4	-20.0	4	13	130		27.43			30.02	AA		30.11
02	1953	11	CLR	10.00		73	22.8	46	7.5	-3	-19.4	5	10	110		27.45			30.03	AA		30.13
02	2053	11	CLR	10.00		70	21.1	45	6.9	1	-17.2	6	8	100		27.46			30.04	AA		30.14
02	2153	11	CLR	10.00		69	20.6	44	6.7	2	-16.7	7	7	080		27.48			30.06	AA		30.16
02	2253	11	CLR	10.00		66	18.9	43	5.9	3	-16.1	8	9	110		27.49			30.07	AA		30.17
02	2353	11	CLR	10.00		67	19.4	44	6.6	8	-13.3	10	13	100		27.50			30.07	AA		30.18

Figure A-3. Quality-controlled local climatological data hourly observations table for Tucson International Airport, Tucson, AZ (05/02/2011). Gusty east-northeasterly winds were reported during the late morning hours coincident with high PM_{10} concentrations at the Rillito monitor. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE DAVIS-MONTHAN AFB AIRPORT (23109) TUCSON, AZ (05/01/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2704 ft. above sea level
Latitude: 32.166
Longitude: -110.883
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	0000	0	CLR	10.00		59	15.0	M	M	-0	-18.0	M	9	270		M			29.83	AA		29.93
01	0055	0	CLR	10.00		54	12.2	36	2.1	-1	-18.5	10	9	240		27.12			29.84	AA		29.93
01	0155	0	CLR	10.00		53	11.8	36	1.9	-0	-17.8	11	5	200		27.12			29.82	AA		29.93
01	0255	0	CLR	10.00		50	10.0	34	1.1	1	-17.0	13	3	190		27.11			29.83	AA		29.92
01	0355	0	CLR	10.00		48	9.1	33	0.6	3	-16.2	15	3	190		27.12			29.85	AA		29.93
01	0455	0	CLR	10.00		46	7.8	32	0.1	4	-15.8	17	6	210		27.12			29.86	AA		29.93
01	0555	0	CLR	10.00		44	6.8	31	-0.6	3	-16.2	18	6	210		27.14			29.88	AA		29.95
01	0655	0	CLR	10.00		51	10.6	35	1.5	3	-16.2	14	0	000		27.16			29.90	AA		29.97
01	0755	0	CLR	10.00		56	13.2	37	3.0	2	-16.6	11	3	280		27.17			29.91	AA		29.99
01	0855	0	CLR	10.00		58	14.4	38	3.5	2	-16.8	10	3	030		27.19			29.94	AA		30.01
01	0955	0	CLR	10.00		60	15.6	40	4.2	3	-15.9	10	3	VR		27.19			29.94	AA		30.01
01	1055	0	CLR	10.00		63	17.3	41	5.1	4	-15.8	9	7	330		27.19			29.93	AA		30.01
01	1155	0	CLR	10.00		67	19.3	43	6.0	1	-17.3	7	13	310	21	27.19			29.93	AA		30.01
01	1255	0	FEW200	10.00		68	20.1	43	6.2	-1	-18.2	6	20	300	25	27.18			29.94	AA		30.00
01	1355	0	CLR	10.00		69	20.7	44	6.5	-1	-18.1	6	15	310	23	27.18			29.93	AA		30.00
01	1455	0	CLR	10.00		69	20.8	43	6.3	-4	-20.2	5	18	310	25	27.17			29.92	AA		29.99
01	1555	0	CLR	10.00		70	21.2	44	6.6	-4	-19.9	5	17	280	21	27.16			29.93	AA		29.98
01	1655	0	CLR	10.00		70	20.9	44	6.8	-0	-17.9	6	17	310	21	27.17			29.94	AA		29.99
01	1755	0	CLR	10.00		69	20.7	44	6.5	-1	-18.5	6	11	310		27.17			29.94	AA		29.99
01	1855	0	CLR	10.00		67	19.3	43	6.0	1	-17.3	7	15	310		27.19			29.95	AA		30.01
01	1955	0	CLR	10.00		65	18.2	42	5.5	2	-16.5	8	14	310		27.21			29.97	AA		30.03
01	2055	0	CLR	10.00		62	16.7	41	4.8	3	-16.3	9	14	300		27.24			29.99	AA		30.06
01	2155	0	CLR	10.00		61	15.9	41	4.7	6	-14.4	11	11	320		27.26			30.01	AA		30.08
01	2255	0	CLR	10.00		60	15.8	40	4.5	6	-14.5	11	8	330		27.27			30.02	AA		30.10
01	2355	0	CLR	10.00		59	15.0	39	4.1	5	-15.2	11	5	110		27.28			30.03	AA		30.11

Figure A-4. Quality-controlled local climatological data hourly observations table for Davis-Monthan Air Force Base (AFB), Tucson, AZ (05/01/2011). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
DAVIS-MONTHAN AFB AIRPORT (23109)
TUCSON, AZ (05/02/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2704 ft. above sea level
Latitude: 32.166
Longitude: -110.883
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
02	0055	0	CLR	10.00		59	14.9	39	3.7	0	-17.7	9	8	060		27.29			30.03	AA		30.12
02	0155	0	CLR	10.00		59	15.0	38	3.4	-5	-20.6	7	8	070		27.29			30.03	AA		30.12
02	0255	0	CLR	10.00		58	14.6	38	3.1	-6	-20.9	7	6	070		27.29			30.03	AA		30.12
02	0355	0	CLR	10.00		58	14.4	38	3.3	-3	-19.5	8	6	070		27.30			30.05	AA		30.13
02	0455	0	CLR	10.00		58	14.2	38	3.3	-3	-19.6	8	9	070		27.32			30.06	AA		30.15
02	0555	0	CLR	10.00		56	13.3	37	2.8	0	-17.7	10	3	250		27.34			30.09	AA		30.17
02	0655	0	CLR	10.00		60	15.4	39	4.1	1	-17.3	9	10	050		27.36			30.11	AA		30.19
02	0755	0	CLR	10.00		63	17.2	41	4.9	1	-17.3	8	17	050		27.36			30.11	AA		30.19
02	0855	0	CLR	10.00		65	18.5	42	5.5	-0	-17.9	7	16	070		27.37			30.12	AA		30.20
02	0955	0	CLR	10.00		68	20.2	43	6.1	-3	-19.7	6	22	050	29	27.37			30.11	AA		30.20
02	1055	0	CLR	10.00		71	21.7	45	7.0	-3	-19.5	5	11	040	24	27.37			30.10	AA		30.20
02	1155	0	CLR	10.00		73	22.7	46	7.5	-2	-18.8	5	15	100		27.34			30.08	AA		30.17
02	1255	0	CLR	10.00		74	23.4	46	7.7	-6	-20.9	4	18	090	28	27.33			30.06	AA		30.16
02	1355	0	CLR	10.00		76	24.3	47	8.3	-4	-20.2	4	3	VR		27.32			30.04	AA		30.15
02	1455	0	CLR	10.00		78	25.3	48	8.8	-3	-19.5	4	18	080	24	27.29			30.02	AA		30.12
02	1555	0	CLR	10.00		78	25.7	48	8.8	-3	-19.2	4	8	060	18	27.27			29.99	AA		30.10
02	1655	0	CLR	10.00		79	25.9	48	9.1	-2	-19.1	4	8	090		27.27			29.99	AA		30.09
02	1755	0	CLR	10.00		78	25.3	48	8.8	-3	-19.5	4	8	100		27.27			29.99	AA		30.09
02	1855	0	CLR	10.00		74	23.6	46	7.8	-1	-18.1	5	13	100		27.27			29.98	AA		30.09
02	1955	0	CLR	10.00		71	21.5	45	7.1	1	-17.5	6	10	110		27.28			30.01	AA		30.11
02	2055	0	CLR	10.00		68	20.0	44	6.4	2	-16.8	7	8	080		27.30			30.03	AA		30.13
02	2155	0	CLR	10.00		67	19.6	43	6.3	4	-15.4	8	7	060		27.32			30.04	AA		30.15
02	2255	0	CLR	10.00		65	18.2	42	5.8	5	-15.1	9	8	110		27.32			30.05	AA		30.15
02	2355	0	CLR	10.00		67	19.2	44	6.9	11	-11.8	11	17	110		27.33			30.04	AA		30.16

Figure A-5. Quality-controlled local climatological data hourly observations table for Davis-Monthan AFB, Tucson, AZ (05/02/2011). Gusty east-northeasterly winds were reported during the late morning hours coincident with high PM_{10} concentrations at the Rillito monitor. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
CASA GRANDE MUNICIPAL ARPT (03914)
CASA GRANDE, AZ (05/01/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1462 ft. above sea level
Latitude: 32.95
Longitude: -111.766
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
02	0015	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	11	030		28.55			M	AA		30.11
02	0035	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	10	030		28.56			M	AA		30.12
02	0055	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	11	030		28.56			M	AA		30.12
02	0115	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	9	030		28.56			M	AA		30.12
02	0135	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	8	030		28.56			M	AA		30.12
02	0155	0	CLR	10.00		64	18.0	43	5.9	7	-14.0	10	8	030		28.57			M	AA		30.13
02	0215	0	CLR	10.00		64	18.0	43	5.9	7	-14.0	10	10	020		28.57			M	AA		30.13
02	0235	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	8	020		28.58			M	AA		30.14
02	0255	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	6	030		28.58			M	AA		30.14
02	0315	0	CLR	10.00		57	14.0	39	3.6	3	-16.0	11	7	010		28.59			M	AA		30.15
02	0335	0	CLR	10.00		55	13.0	37	2.8	1	-17.0	11	7	350		28.59			M	AA		30.15
02	0355	0	CLR	10.00		54	12.0	37	2.5	1	-17.0	11	5	340		28.61			M	AA		30.17
02	0415	0	CLR	10.00		55	13.0	37	2.9	1	-17.0	11	3	070		28.61			M	AA		30.17
02	0435	0	CLR	10.00		55	13.0	37	3.0	3	-16.0	12	7	030		28.61			M	AA		30.17
02	0455	0	CLR	10.00		52	11.0	36	1.9	1	-17.0	12	8	010		28.62			M	AA		30.18
02	0515	0	CLR	10.00		54	12.0	37	2.7	3	-16.0	12	8	350		28.62			M	AA		30.18
02	0535	0	CLR	10.00		54	12.0	37	2.9	5	-15.0	14	8	340		28.63			M	AA		30.19
02	0555	0	CLR	10.00		54	12.0	38	3.0	7	-14.0	15	7	340		28.64			M	AA		30.20
02	0615	0	CLR	10.00		54	12.0	38	3.0	7	-14.0	15	5	360		28.65			M	AA		30.21
02	0635	0	CLR	10.00		55	13.0	38	3.5	9	-13.0	16	6	010		28.66			M	AA		30.22
02	0655	0	CLR	10.00		59	15.0	41	4.7	9	-13.0	14	7	360		28.67			M	AA		30.23
02	0715	0	CLR	10.00		61	16.0	42	5.4	10	-12.0	13	6	360		28.67			M	AA		30.23
02	0735	0	CLR	10.00		64	18.0	43	6.2	10	-12.0	12	8	010		28.68			M	AA		30.24
02	0755	0	CLR	10.00		66	19.0	44	6.7	10	-12.0	11	8	360		28.68			M	AA		30.24
02	0815	0	CLR	10.00		68	20.0	45	7.3	10	-12.0	10	11	050	18	28.68			M	AA		30.24
02	0835	0	CLR	10.00		70	21.0	47	8.0	12	-11.0	10	13	020		28.68			M	AA		30.24
02	0855	0	CLR	10.00		70	21.0	47	8.0	12	-11.0	10	13	040		28.68			M	AA		30.24
02	0915	0	CLR	10.00		70	21.0	47	8.0	12	-11.0	10	7	020		28.68			M	AA		30.24
02	0935	0	CLR	10.00		72	22.0	48	8.7	14	-10.0	11	20	060	29	28.68			M	AA		30.24
02	0955	0	CLR	10.00		72	22.0	48	8.7	14	-10.0	11	17	060	22	28.68			M	AA		30.24
02	1015	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	15	050	22	28.68			M	AA		30.24

02	1035	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	15	050	24	28.68			M	AA		30.24
02	1055	0	CLR	10.00		75	24.0	50	9.7	16	-9.0	11	17	030	22	28.67			M	AA		30.23
02	1115	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	15	050	21	28.67			M	AA		30.23
02	1135	0	CLR	10.00		75	24.0	50	9.7	16	-9.0	11	9	050	22	28.66			M	AA		30.22
02	1155	0	CLR	10.00		75	24.0	50	9.7	16	-9.0	11	11	050	29	28.65			M	AA		30.21
02	1215	0	CLR	10.00		77	25.0	51	10.4	18	-8.0	11	10	040	20	28.64			M	AA		30.20
02	1235	0	CLR	10.00		79	26.0	52	10.9	18	-8.0	10	11	040	21	28.63			M	AA		30.19
02	1255	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	8	010	24	28.62			M	AA		30.18
02	1315	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	10	090	24	28.61			M	AA		30.17
02	1335	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	14	010	24	28.61			M	AA		30.17
02	1355	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	8	350		28.60			M	AA		30.16
02	1415	0	CLR	10.00		81	27.0	53	11.5	19	-7.0	10	18	040		28.59			M	AA		30.15
02	1435	0	CLR	10.00		81	27.0	53	11.5	19	-7.0	10	11	360	20	28.58			M	AA		30.14
02	1455	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	14	030	22	28.57			M	AA		30.13
02	1515	0	CLR	10.00		81	27.0	53	11.7	21	-6.0	11	10	320	17	28.56			M	AA		30.12
02	1535	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	16	030		28.55			M	AA		30.11
02	1555	0	CLR	10.00		81	27.0	53	11.7	21	-6.0	11	3	310		28.55			M	AA		30.11
02	1615	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	16	050	21	28.54			M	AA		30.10
02	1635	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	10	340	20	28.53			M	AA		30.09
02	1655	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	15	360	21	28.53			M	AA		30.09
02	1715	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	15	360		28.52			M	AA		30.08
02	1735	0	CLR	10.00		81	27.0	53	11.7	21	-6.0	11	11	340		28.52			M	AA		30.08
02	1755	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	9	330		28.51			M	AA		30.07
02	1815	0	CLR	10.00		81	27.0	53	11.4	19	-7.0	10	11	330	18	28.51			M	AA		30.07
02	1835	0	CLR	10.00		81	27.0	53	11.4	19	-7.0	10	9	350		28.51			M	AA		30.06
02	1855	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	9	330		28.51			M	AA		30.06
02	1915	0	CLR	10.00		77	25.0	51	10.4	18	-8.0	11	7	330		28.51			M	AA		30.06
02	1935	0	CLR	10.00		75	24.0	49	9.7	16	-9.0	11	8	310		28.51			M	AA		30.07
02	1955	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	7	310		28.51			M	AA		30.07
02	2015	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	9	310		28.52			M	AA		30.08
02	2035	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	8	310		28.53			M	AA		30.09
02	2055	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	10	310		28.53			M	AA		30.09
02	2115	0	CLR	10.00		72	22.0	48	8.7	14	-10.0	11	7	350		28.53			M	AA		30.09
02	2135	0	CLR	10.00		72	22.0	47	8.5	12	-11.0	10	5	330		28.54			M	AA		30.10
02	2155	0	CLR	10.00		70	21.0	46	8.0	12	-11.0	10	5	040		28.54			M	AA		30.10
02	2215	0	CLR	10.00		66	19.0	44	6.7	10	-12.0	11	5	050		28.54			M	AA		30.10
02	2235	0	CLR	10.00		66	19.0	44	6.6	9	-13.0	11	7	010		28.55			M	AA		30.11
02	2255	0	CLR	10.00		63	17.0	43	5.8	9	-13.0	12	3	020		28.55			M	AA		30.11
02	2315	0	CLR	10.00		63	17.0	43	5.8	9	-13.0	12	6	350		28.55			M	AA		30.11
02	2335	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	8	340		28.55			M	AA		30.11
02	2355	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	9	350		28.56			M	AA		30.12

Figure A-6. Quality-controlled local climatological data hourly observations table for Casa Grande Municipal Airport, Casa Grande, AZ (05/01/2011). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
CASA GRANDE MUNICIPAL ARPT (03914)
CASA GRANDE, AZ (05/02/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1462 ft. above sea level
Latitude: 32.95
Longitude: -111.766
Data Version: VER2

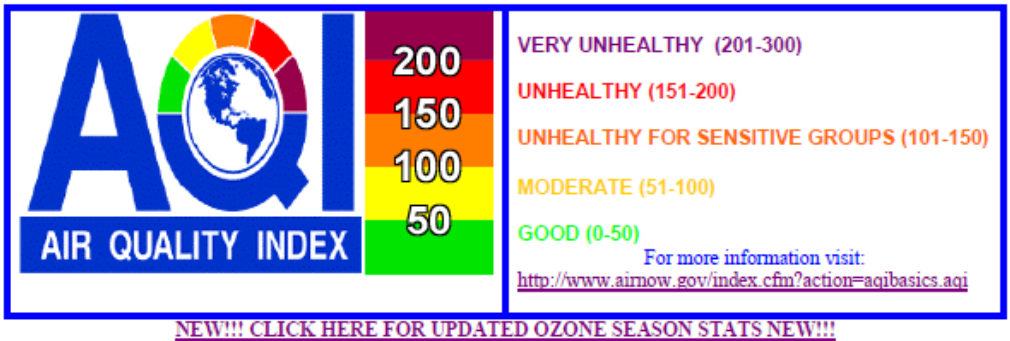
Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
02	0015	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	11	030		28.55			M	AA		30.11
02	0035	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	10	030		28.56			M	AA		30.12
02	0055	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	11	030		28.56			M	AA		30.12
02	0115	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	9	030		28.56			M	AA		30.12
02	0135	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	8	030		28.56			M	AA		30.12
02	0155	0	CLR	10.00		64	18.0	43	5.9	7	-14.0	10	8	030		28.57			M	AA		30.13
02	0215	0	CLR	10.00		64	18.0	43	5.9	7	-14.0	10	10	020		28.57			M	AA		30.13
02	0235	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	8	020		28.58			M	AA		30.14
02	0255	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	6	030		28.58			M	AA		30.14
02	0315	0	CLR	10.00		57	14.0	39	3.6	3	-16.0	11	7	010		28.59			M	AA		30.15
02	0335	0	CLR	10.00		55	13.0	37	2.8	1	-17.0	11	7	350		28.59			M	AA		30.15
02	0355	0	CLR	10.00		54	12.0	37	2.5	1	-17.0	11	5	340		28.61			M	AA		30.17
02	0415	0	CLR	10.00		55	13.0	37	2.9	1	-17.0	11	3	070		28.61			M	AA		30.17
02	0435	0	CLR	10.00		55	13.0	37	3.0	3	-16.0	12	7	030		28.61			M	AA		30.17
02	0455	0	CLR	10.00		52	11.0	36	1.9	1	-17.0	12	8	010		28.62			M	AA		30.18
02	0515	0	CLR	10.00		54	12.0	37	2.7	3	-16.0	12	8	350		28.62			M	AA		30.18
02	0535	0	CLR	10.00		54	12.0	37	2.9	5	-15.0	14	8	340		28.63			M	AA		30.19
02	0555	0	CLR	10.00		54	12.0	38	3.0	7	-14.0	15	7	340		28.64			M	AA		30.20
02	0615	0	CLR	10.00		54	12.0	38	3.0	7	-14.0	15	5	360		28.65			M	AA		30.21
02	0635	0	CLR	10.00		55	13.0	38	3.5	9	-13.0	16	6	010		28.66			M	AA		30.22
02	0655	0	CLR	10.00		59	15.0	41	4.7	9	-13.0	14	7	360		28.67			M	AA		30.23
02	0715	0	CLR	10.00		61	16.0	42	5.4	10	-12.0	13	6	360		28.67			M	AA		30.23
02	0735	0	CLR	10.00		64	18.0	43	6.2	10	-12.0	12	8	010		28.68			M	AA		30.24
02	0755	0	CLR	10.00		66	19.0	44	6.7	10	-12.0	11	8	360		28.68			M	AA		30.24
02	0815	0	CLR	10.00		68	20.0	45	7.3	10	-12.0	10	11	050	18	28.68			M	AA		30.24
02	0835	0	CLR	10.00		70	21.0	47	8.0	12	-11.0	10	13	020		28.68			M	AA		30.24
02	0855	0	CLR	10.00		70	21.0	47	8.0	12	-11.0	10	13	040		28.68			M	AA		30.24
02	0915	0	CLR	10.00		70	21.0	47	8.0	12	-11.0	10	7	020		28.68			M	AA		30.24
02	0935	0	CLR	10.00		72	22.0	48	8.7	14	-10.0	11	20	060	29	28.68			M	AA		30.24
02	0955	0	CLR	10.00		72	22.0	48	8.7	14	-10.0	11	17	060	22	28.68			M	AA		30.24
02	1015	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	15	050	22	28.68			M	AA		30.24

02	1035	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	15	050	24	28.68			M	AA		30.24
02	1055	0	CLR	10.00		75	24.0	50	9.7	16	-9.0	11	17	030	22	28.67			M	AA		30.23
02	1115	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	15	050	21	28.67			M	AA		30.23
02	1135	0	CLR	10.00		75	24.0	50	9.7	16	-9.0	11	9	050	22	28.66			M	AA		30.22
02	1155	0	CLR	10.00		75	24.0	50	9.7	16	-9.0	11	11	050	29	28.65			M	AA		30.21
02	1215	0	CLR	10.00		77	25.0	51	10.4	18	-8.0	11	10	040	20	28.64			M	AA		30.20
02	1235	0	CLR	10.00		79	26.0	52	10.9	18	-8.0	10	11	040	21	28.63			M	AA		30.19
02	1255	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	8	010	24	28.62			M	AA		30.18
02	1315	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	10	090	24	28.61			M	AA		30.17
02	1335	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	14	010	24	28.61			M	AA		30.17
02	1355	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	8	350		28.60			M	AA		30.16
02	1415	0	CLR	10.00		81	27.0	53	11.5	19	-7.0	10	18	040		28.59			M	AA		30.15
02	1435	0	CLR	10.00		81	27.0	53	11.5	19	-7.0	10	11	360	20	28.58			M	AA		30.14
02	1455	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	14	030	22	28.57			M	AA		30.13
02	1515	0	CLR	10.00		81	27.0	53	11.7	21	-6.0	11	10	320	17	28.56			M	AA		30.12
02	1535	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	16	030		28.55			M	AA		30.11
02	1555	0	CLR	10.00		81	27.0	53	11.7	21	-6.0	11	3	310		28.55			M	AA		30.11
02	1615	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	16	050	21	28.54			M	AA		30.10
02	1635	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	10	340	20	28.53			M	AA		30.09
02	1655	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	15	360	21	28.53			M	AA		30.09
02	1715	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	15	360		28.52			M	AA		30.08
02	1735	0	CLR	10.00		81	27.0	53	11.7	21	-6.0	11	11	340		28.52			M	AA		30.08
02	1755	0	CLR	10.00		82	28.0	54	11.9	21	-6.0	10	9	330		28.51			M	AA		30.07
02	1815	0	CLR	10.00		81	27.0	53	11.4	19	-7.0	10	11	330	18	28.51			M	AA		30.07
02	1835	0	CLR	10.00		81	27.0	53	11.4	19	-7.0	10	9	350		28.51			M	AA		30.06
02	1855	0	CLR	10.00		79	26.0	52	11.0	19	-7.0	10	9	330		28.51			M	AA		30.06
02	1915	0	CLR	10.00		77	25.0	51	10.4	18	-8.0	11	7	330		28.51			M	AA		30.06
02	1935	0	CLR	10.00		75	24.0	49	9.7	16	-9.0	11	8	310		28.51			M	AA		30.07
02	1955	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	7	310		28.51			M	AA		30.07
02	2015	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	9	310		28.52			M	AA		30.08
02	2035	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	8	310		28.53			M	AA		30.09
02	2055	0	CLR	10.00		73	23.0	49	9.2	16	-9.0	11	10	310		28.53			M	AA		30.09
02	2115	0	CLR	10.00		72	22.0	48	8.7	14	-10.0	11	7	350		28.53			M	AA		30.09
02	2135	0	CLR	10.00		72	22.0	47	8.5	12	-11.0	10	5	330		28.54			M	AA		30.10
02	2155	0	CLR	10.00		70	21.0	46	8.0	12	-11.0	10	5	040		28.54			M	AA		30.10
02	2215	0	CLR	10.00		66	19.0	44	6.7	10	-12.0	11	5	050		28.54			M	AA		30.10
02	2235	0	CLR	10.00		66	19.0	44	6.6	9	-13.0	11	7	010		28.55			M	AA		30.11
02	2255	0	CLR	10.00		63	17.0	43	5.8	9	-13.0	12	3	020		28.55			M	AA		30.11
02	2315	0	CLR	10.00		63	17.0	43	5.8	9	-13.0	12	6	350		28.55			M	AA		30.11
02	2335	0	CLR	10.00		63	17.0	42	5.6	7	-14.0	11	8	340		28.55			M	AA		30.11
02	2355	0	CLR	10.00		64	18.0	43	6.1	9	-13.0	11	9	350		28.56			M	AA		30.12

Figure A-7. Quality-controlled local climatological data hourly observations table for Casa Grande Municipal Airport, Casa Grande, AZ (05/02/2011). Gusty east-northeasterly winds were reported during the late morning hours coincident with high PM_{10} concentrations at the Rillito monitor. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

Appendix B:
ADEQ and NWS Forecasts and Advisories

ADEQ
Arizona Department of Environmental Quality



NEW!!! CLICK HERE FOR UPDATED OZONE SEASON STATS NEW!!!

AIR QUALITY FORECAST FOR MONDAY, MAY 02, 2011

This report is updated by 1:00 p.m. Sunday thru Friday and is valid
for areas within and bordering Maricopa County in Arizona

FORECAST DATE NOTICES (*SEE BELOW FOR DETAILS) AIR POLLUTANT	YESTERDAY SAT 04/30/2011 NONE Highest AQI Reading/Site (Preliminary data only)	TODAY SUN 05/01/2011 NONE	TOMORROW MON 05/02/2011 NONE	EXTENDED TUE 05/03/2011 NONE
O3*	77 TONTO NATIONAL MONUMENT	64 MODERATE	54 MODERATE	48 GOOD
CO*	05 GREENWOOD	07 GOOD	05 GOOD	04 GOOD
PM-10*	44 WEST FORTY THIRD	58 MODERATE	42 GOOD	49 GOOD
PM-2.5*	22 PHOENIX SUPERSITE	33 GOOD	29 GOOD	27 GOOD

* O3 = Ozone CO = Carbon Monoxide PM-10 = Particles 10 microns & smaller PM-2.5 = Particles smaller than 2.5 microns

*"Ozone Health Watch" means that the highest concentration of OZONE may approach the federal health standard.
"PM-10 or PM-2.5 Health Watch" means that the highest concentration of PM-10 or PM-2.5 may approach the federal health standard.
"High Pollution Advisory" means that the highest concentration of OZONE, PM-10, or PM-2.5 may exceed the federal health standard.
"DUST" means that short periods of high PM-10 concentrations caused by outflow from thunderstorms are possible.

Health message for Sunday, May 01: Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.

Health message for Monday, May 02: Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.

Synopsis and Discussion

OZONE: Ozone levels remained elevated on Saturday not only over the Valley but also at many locations statewide including Yuma, Tucson, Flagstaff, and Prescott where a near-exceedance occurred. With gusty winds and below-average temperatures the rule at all these locations, transport of additional ozone and its precursors from CA was a likely contributor. Winds below 10K' have now shifted to a northerly component and over the next two days will shift to northeast and then easterly and will be especially gusty during the morning hours. Under these conditions a drop in local ozone levels is expected and the current forecast for Monday and Tuesday reflects this.

PARTICLES:

In the wake of the weekend trough and frontal passage, the mid-latitude storm track will shift north of AZ as a warm but low-amplitude ridge builds overhead from the west. Strong warming aloft (21-23 deg F in the 5-10K' layer by Tuesday afternoon) will turn the Valley air mass rather stagnant, but gusty northeast to easterly gradient winds Monday and Tuesday mornings will help to lessen the impact. Some areas of blowing dust are even possible in the southeast Valley Tuesday morning, but for now 24-hour average PM-10 concentrations are forecast to remain rather low. -Reith

MONITORING SITE MAPS: STATIC MAP - http://www.azdeq.gov/environ/air/monitoring/images/map.jpg
INTERACTIVE MAPS - http://aqwww.maricopa.gov/AirMonitoring/SitePollutionMap.aspx
http://www.airnow.gov/

POLLUTION MONITOR READINGS FOR SATURDAY, APRIL 30, 2011

O3 (OZONE)

Info on current 8-hour ozone standard: http://www.epa.gov/air/ozonepollution/pdfs/2008_03_aqi_changes.pdf
For archived AQI maps go to: http://www.airnow.gov/index.cfm?action=airnow.maps

SITE NAME	MAX 8-HR VALUE (PPB)	MAX AQI	AQI COLOR CODE
Alamo Lake (La Paz County)	63	61	
Apache Junction (Pinal County)	62	58	
Blue Point	65	67	
Buckeye	60	51	
Casa Grande (Pinal County)	60	51	
Cave Creek	67	74	
Central Phoenix	64	64	
Combs School (Pinal County)	58	49	
Dysart	58	49	
Falcon Field	57	48	
Fountain Hills	65	67	
Glendale	60	51	
Humboldt Mountain	63	61	
Maricopa (Pinal County)	59	50	
North Phoenix	65	67	
Phoenix Supersite	64	64	
Pinal Air Park (Pinal County)	59	50	
Pinnacle Peak	60	51	
Queen Valley (Pinal County)	66	71	
Rio Verde	59	50	
South Phoenix	64	64	
South Scottsdale	63	61	
Tempe	59	50	
Tonto Nat'l Mon. (Gila County)	68	77	
West Chandler	63	61	
West Phoenix	64	64	
Yuma (Yuma County)	57	48	

ADEQ Arizona Department of Environmental Quality

MARICOPA COUNTY DUST CONTROL FORECAST

ISSUED SUNDAY, MAY 01, 2011

Five-day weather outlook:

In the wake of the weekend trough and frontal passage, the mid-latitude storm track will shift north of AZ as a warm but low-amplitude ridge builds overhead from the west. Strong warming aloft (21-23 deg F in the 5-10K' layer by Tuesday afternoon) will turn the Valley air mass rather stagnant, but gusty northeast to easterly gradient winds Monday and Tuesday mornings will help to lessen the impact. Even so, a few high hourly PM-10 readings are possible the next few mornings but 24-hour average concentrations will remain low. -Reith

R I S K F A C T O R S

	WINDS		STAGNATION		UNHEALTHY PM-10 RISK LEVEL
Day 1: Mon 05/02/201	Northeasterly 10-20 mph with gusts near 25 mph becoming 5-15 mph during the afternoon.	+	No significant stagnation expected.	=	LOW
Day 2: Tue 05/03/2011	Easterly 10-20 mph with gusts near 30 mph during the morning hours becoming 5-15 mph during the afternoon.	+	No significant stagnation expected.	=	LOW
Day 3: Wed 05/04/2011	Southwest to westerly 5-15 mph by the afternoon.	+	No significant stagnation expected.	=	LOW
EXTENDED OUTLOOK					
Day 4: Thu 05/05/2011	Southwest to westerly 5-15 mph with gusts of 20 mph during the afternoon.	+	No significant stagnation expected.	=	LOW
Day 5: Fri 05/06/2011	Southwest to westerly 5-15 mph with gusts of 20 mph during the afternoon.	+	No significant stagnation expected.	=	LOW

The Maricopa County Dust Control Action Forecast is issued to assist in the planning of work activities to help reduce dust pollution. A recorded message of this forecast can be accessed at 602-771-2368. To review the complete air quality forecast for the Phoenix metropolitan area, as well as the health impacts and reduction methods for different air pollutants, call 602-771-2367 for recorded forecast information or click on ADEQ's Air Quality Forecast at http://www.azdeq.gov/environ/air/ozone/ensemble.pdf.

CKR 04/28/2011

ADEQ Arizona Department of Environmental Quality

GREEN VALLEY AND VICINITY
DUST RE-ENTRAINMENT RISK WIND FORECAST

ISSUED SUNDAY, MAY 01, 2011

Three-day weather outlook:

In the wake of the weekend trough and frontal passage, the mid-latitude storm track will shift north of AZ as a warm but low-amplitude ridge builds overhead from the west. Some gusty easterly gradient winds may impact the Green Valley area on Tuesday morning – there may even be some dust transported from that direction – but no re-entrained dust is expected.

	WINDS	RE-ENTRAINMENT RISK
Day #1: Mon 05/02/2011	No significant winds expected.	LOW
Day #2: Tue 05/03/2011	Easterly 10-20 mph with gusts near 30 mph morning hours decreasing by the afternoon.	LOW
Day #3: Wed 05/04/2011	No significant winds expected.	LOW

PM-10 (COARSE PARTICLES):

Description – The term "particulate matter" (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles with diameters between 2.5 and 10 micrometers are referred to as "coarse".

Potential health impacts – PM can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis.

Exposure reduction measures – During high-wind or other events that prompt a forecasted MODERATE or HIGH risk of transported dust over the Green Valley area, sensitive persons should remain indoors and close windows and doors.

Units of measurement – Micrograms per cubic meter (ug/m3).

CKR 02/11/2010

National Weather Service Tucson Forecast Products

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE TUCSON AZ
202 AM MST MON MAY 2 2011

.SYNOPSIS...A CHILLY MORNING ACROSS MOST OF SOUTHEAST ARIZONA WITH COOLER THAN NORMAL HIGH TEMPERATURES THIS AFTERNOON. MUCH WARMER FOR THE REST OF THE WEEK AS HIGH PRESSURE BUILDS OVER THE AREA.

&&

.DISCUSSION...WATER VAPOR IMAGERY SHOWS THE TROUGH CURRENTLY EXITING THE AREA AND MOVING INTO NEW MEXICO. A LINE OF THUNDERSTORMS AHEAD OF THIS SYSTEM EXTENDS FROM SRN INDIANA/ILLINOIS THROUGH ARKANSAS AND INTO CENTRAL TEXAS.

IT WILL BE ANOTHER COOL START TO THE MORNING ACROSS SOUTHEAST ARIZONA WITH LOWS IN THE MID 40S FOR THE TUCSON AREA AND IN THE 30S FOR AREAS TO THE EAST TOWARD NEW MEXICO...WITH MOUNTAIN TOP LOCATIONS POSSIBLY DIPPING INTO THE 20S. OUT WEST TOWARDS AREAS LIKE AJO AND ORGAN PIPE CACTUS NATIONAL MONUMENT...LOWS WILL HOVER AROUND THE 50 DEGREE MARK. WITH SUCH A COOL START TO THE MORNING HIGHS WILL ALSO STRUGGLE TO REACH THE 80 DEGREE MARK FOR THE TUCSON METRO AREA WITH COOLER HIGH TEMPERATURES TO THE EAST AS WELL AS HIGH ELEVATIONS AND HIGHS OUT WEST WILL ONLY REACH THE LOWER 80S THIS AFTERNOON.

A RIDGE OF HIGH PRESSURE ALONG THE WEST COAST WILL MOVE OVERHEAD AND TEMPERATURES WILL INCREASE ABOUT 10 DEGREES WARMER THAN TODAYS HIGHS FOR TUESDAY...THEN ABOUT ANOTHER 4 TO 6 DEGREE INCREASE ON WEDNESDAY BEFORE TEMPERATURES STABILIZE AT AROUND THE MID 90S FOR THE TUCSON AREA THROUGH THE WEEKEND.

&&

.AVIATION...SKC-FEW CLOUDS AOB 25KFT. SFC WINDS LESS THAN 10 KTS THRU 11Z...THEN NELY-ELY SFC WINDS OF 10-18 KTS AND GUSTS UP TO 25 KTS BETWEEN 13Z-19Z...SLOWLY DIMINISHING AFT 19Z. AVIATION DISCUSSION NOT UPDATED FOR TAF AMENDMENTS.

&&

.FIRE WEATHER...GUSTY EASTERLY WINDS ARE EXPECTED DURING THE MORNING HOURS BOTH TODAY AND TUESDAY. WINDS WILL BE ESPECIALLY STRONG AND GUSTY TUESDAY MORNING AND INTO EARLY TUESDAY AFTERNOON BEFORE BEGINNING TO DIMINISH. WHILE ISOLATED LOCATIONS MAY MEET RED FLAG CRITERIA BETWEEN 1000 AND 1400 MST TUESDAY...CONDITIONS ARE NOT EXPECTED TO BE WIDESPREAD OR LONG LIVED. CREWS EXPECTING TO BE IN THE FIELD SHOULD USE CAUTION AND MONITOR OBSERVATIONS AND CONDITIONS. BY THE MIDDLE OF THE WEEK...LESS WIND IS ANTICIPATED BOTH DURING THE MORNING AND IN THE AFTERNOON.

IT WILL BE RELATIVELY COOL TODAY...WITH A STRONG WARMING TREND THEN EXPECTED THROUGH THE REMAINDER OF THE WORK WEEK. DRY CONDITIONS WILL PREVAIL THE NEXT SEVEN DAYS.

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE TUCSON AZ
930 AM MST MON MAY 2 2011

.SYNOPSIS...A CHILLY MORNING ACROSS MOST OF SOUTHEAST ARIZONA WITH COOLER THAN NORMAL HIGH TEMPERATURES THIS AFTERNOON. MUCH WARMER FOR THE REST OF THE WEEK AS HIGH PRESSURE BUILDS OVER THE AREA.

&&

.DISCUSSION...COOL MORNING ACROSS MOST OF SOUTHEAST ARIZONA WIDE RANGE IN OVERNIGHT LOWS...DUE TO AN AREA HAVING A BIT MORE WIND VERSUS ONES THAT ARE SHELTERED. FOR EXAMPLE...THERE WAS A 20+ DEGREE DIFFERENCE IN LOWS ACROSS COCHISE COUNTY WHILE IN TUCSON THE AIRPORT WAS 8 DEGREES COLDER THAN THE AFB...WHICH IS ABOUT 5 MILES AWAY.

HEIGHTS/THICKNESS VALUES REBOUND TODAY AS SYSTEM IN NEW MEXICO PUSHES ON EAST. MUCH WARMER TODAY VERSUS SUNDAY...WITH READINGS BELOW NORMAL. ENJOY IT FOR THE REMAINDER OF THE WEEK...DAILY HIGHS WILL BE ABOVE NORMAL.

SURFACE HIGH PRESSURE BUILDING DOWN THE FRONT RANGE WILL BRING GUSTY EASTERLY WINDS TO THE AREA...MAINLY BETWEEN 3 AM AND 2 PM.

&&

.AVIATION...CLEAR. SFC WINDS LESS THAN 10 KTS THRU 11Z...THEN NELY-ELY SFC WINDS OF 10-18 KTS AND GUSTS UP TO 25 KTS BETWEEN 13Z-19Z...SLOWLY DIMINISHING AFT 19Z. AVIATION DISCUSSION NOT UPDATED FOR TAF AMENDMENTS.

&&

.FIRE WEATHER...GUSTY EASTERLY WINDS ARE EXPECTED DURING THE MORNING HOURS BOTH TODAY AND TUESDAY. WINDS WILL BE ESPECIALLY STRONG AND GUSTY TUESDAY MORNING AND INTO EARLY TUESDAY AFTERNOON BEFORE BEGINNING TO DIMINISH. WHILE ISOLATED LOCATIONS MAY MEET RED FLAG CRITERIA BETWEEN 1000 AND 1400 MST TUESDAY...CONDITIONS ARE NOT EXPECTED TO BE WIDESPREAD OR LONG LIVED. CREWS EXPECTING TO BE IN THE FIELD SHOULD USE CAUTION AND MONITOR OBSERVATIONS AND CONDITIONS. BY THE MIDDLE OF THE WEEK...LESS WIND IS ANTICIPATED BOTH DURING THE MORNING AND IN THE AFTERNOON.

IT WILL BE RELATIVELY COOL TODAY...WITH A STRONG WARMING TREND THEN EXPECTED THROUGH THE REMAINDER OF THE WORK WEEK. DRY CONDITIONS WILL PREVAIL THE NEXT SEVEN DAYS.

Appendix C:
Affidavit of Public Notice