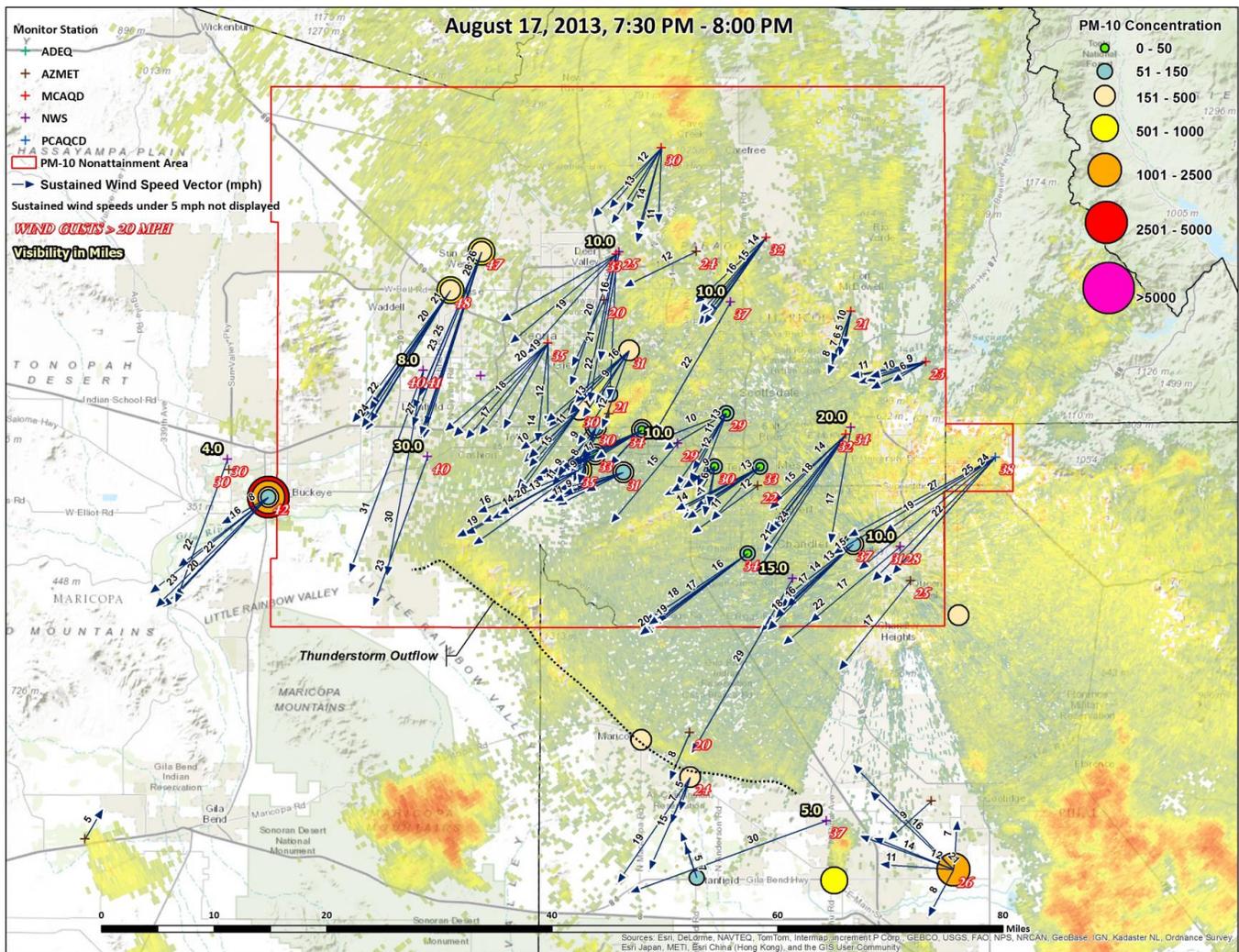


# State of Arizona Exceptional Event Documentation for August 17, 2013, for the Buckeye Monitor

Produced by:

Arizona Department of Environmental Quality  
Maricopa County Air Quality Department  
Maricopa Association of Governments

FINAL Report  
December, 2013



# Table of Contents

I. EXCEPTIONAL EVENT RULE (EER) REQUIREMENTS .....	1
Procedural Requirements .....	1
Public notification that event was occurring (40 CFR 50.14(c)(1(i)) .....	1
Place informational flag on data in AQS (40 CFR 50.14(c)(2)(ii)) .....	1
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)).....	1
Document that the public comment process was followed for event documentation (40 CFR 50.14(c)(3)(iv)).....	2
Submit demonstration supporting exceptional event flag (40 CFR 50.14(a)(1-2)) .....	2
Documentation Requirements .....	3
II. CONCEPTUAL MODEL .....	4
Geographic Setting and Climate.....	4
Geographic Setting.....	4
Climate .....	7
Monsoon Season Thunderstorm Outflow Dust Storm Event Summary .....	8
III. HISTORICAL FLUCTUATIONS.....	14
IV. NOT REASONABLY CONTROLLABLE OR PREVENTABLE.....	15
Regulatory Measures and Control Programs.....	15
PM10 Rule Effectiveness .....	18
Compliance and Enforcement Activities.....	19
Conclusions .....	20
V. CLEAR CAUSAL RELATIONSHIP .....	22
Introduction .....	22
Time Series Maps and Visibility Photos. ....	22
Map Description.....	22
Visibility Photos.....	36
Conclusion.....	36
VI. “BUT FOR” ANALYSIS .....	37
VII. CONCLUSIONS .....	39

## List of Figures

Figure 2-1. Phoenix Geographic Setting and PM10 Monitor Locations (source: EPA AQS DataMart, NASA MODIS Satellite, Google Earth). PM10 monitor locations are indicated by white markers.....	5
Figure 2-2. Drainage System of Phoenix, Arizona. ....	6
Figure 2-3 Phoenix Monthly Precipitation (top) and Maximum Temperature (bottom) Climatology (source: National Weather Service). ....	7
Figure 2-4. Cross-section of a thunderstorm creating an outflow boundary and haboob (Source: Desert Meteorology. Thomas T. Warner. 2004.) ....	8
Figure 2-5. U.S. Drought Monitor analysis of Arizona released around the time period of the exceedance described in this report. ....	10
Figure 2-6. Timeline of PM10 concentrations at monitors in Maricopa County on August 17, 2013. ....	11
Figure 3-1. Plot of 24-hour average PM10 concentrations (2008 – September 2013) at the Buckeye monitor. ....	14
Figure 4-1. Timeline of Maricopa County fugitive dust rules and ordinances. ....	19
Figure 5-1. August 17, 2013, 5:30 PM – 6:00 PM.....	25
Figure 5-2. August 17, 2013, 6:00 PM – 6:30 PM.....	26
Figure 5-3. August 17, 2013, 6:30 PM – 7:00 PM.....	27
Figure 5-4. August 17, 2013, 7:00 PM – 7:30 PM.....	28
Figure 5-5. August 17, 2013, 7:30 PM – 8:00 PM.....	29
Figure 5-6. August 17, 2013, 8:00 PM – 8:30 PM.....	30
Figure 5-7. August 17, 2013, 8:30 PM – 9:00 PM.....	31
Figure 5-8. August 17, 2013, 9:00 PM – 9:30 PM.....	32
Figure 5-9. August 17, 2013, 9:30 PM – 10:00 PM.....	33
Figure 5-10. August 17, 2013, 10:00 PM – 10:30 PM.....	34
Figure 5-11. August 17, 2013, 10:30 PM – 11:00 PM.....	35
Figure 6-1. Hourly PM10 concentration, wind gust, and average wind speed as recorded at the Buckeye monitor. ....	37

## **List of Tables**

Table 2-1. Summary of Statewide PM10 Measurements for August 17, 2013. ....	12
Table 4-1. Rules and Ordinances Regulating Particulate Matter Emissions in Maricopa County. ....	16
Table 4-2. Pinal County Rules Regulating Existing and New Non-point Sources in Pinal County.....	17
Table 4-3. Pinal County Rules Regulating Fugitive Dust in Pinal County Portion of MC PM10 NAA....	17
Table 5-1. Data Sets Used in the Creation of Time Series GIS Maps. ....	22

## **List of Appendices**

Appendix A – ADEQ Forecast Products for Maricopa County

Appendix B – National Weather Service Meteorological Observations and Storm Reports

Appendix C – Notice of Public Comment Period

## **I. EXCEPTIONAL EVENT RULE (EER) REQUIREMENTS**

In addition to the technical requirements that are contained within the EER, procedural requirements must also be met in order for EPA to concur with the flagged air quality monitoring data. This section of the report lays out the requirements of the EER and associated guidance, and discusses how the Arizona Department of Environmental Quality (ADEQ) addressed those requirements.

### **Procedural Requirements**

This section presents a review of the procedural requirements of the EER as required by 40 CFR 50.14 (Treatment of Air Quality Monitoring Data Influenced by Exceptional Events) and explains how ADEQ fulfills them. The Federal EER requirements include public notification that an event was occurring, the placement of informational flags on data in EPA's Air Quality System (AQS), the notification of EPA of the intent to flag through submission of initial event description, the documentation that the public comment process was followed, and the submittal of a demonstration supporting the exceptional events flag. ADEQ has addressed all of these procedural and documentation requirements.

#### ***Public notification that event was occurring (40 CFR 50.14(c)(1)(i))***

ADEQ issued Dust Control Action Forecasts and Ensemble Forecasts for the Greater Phoenix area advising citizens of the potential for high wind / dust events on August 17, 2013. More information on ADEQ's forecasting program can be found in Section IV. The forecast products that were issued for August 17, 2013 are included in Appendix A.

#### ***Place informational flag on data in AQS (40 CFR 50.14(c)(2)(ii))***

ADEQ and other operating agencies in Arizona submit data into EPA's AQS. Data from both filter-based and continuous monitors operated in Arizona are submitted to AQS.

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 the operating agency have determined a potential exists that the monitor reading has been influenced by an exceptional event, a preliminary flag is submitted for the measurement in the AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1st of the year 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.

#### ***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 Region 9 Air Division Director, Deborah Jordan, on September 11, 2013, notifying EPA of ADEQ's intent to flag data in AQS and submit documentation to EPA by February 2014 for multiple exceptional events. EPA was later notified with subsequent communication

via email that the August 17, 2013, exceptional event would be added to the other exceptional events specified in the September 11, 2013, letter. This assessment report serves as the demonstration supporting the flagging of these data. One Maricopa County monitor has been flagged as exceeding the 24-hour PM10 standard as a result of the high wind exceptional event:

Buckeye (04-013-4011-81102-1).

***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 hardcopy of the report in the ADEQ Records Management Center for public review. ADEQ opened a 30-day public comment period on 01/13/2014. 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.

***Submit demonstration supporting exceptional event flag (40 CFR 50.14(a)(1-2))***

At the close of the 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 IX headquarters in San Francisco, California. The deadline for the submittal of this demonstration package is September 30, 2016.

## **Documentation Requirements**

Section 50.14(c)(3)(iii) of the EER states that in order to justify excluding air quality monitoring data, evidence must be provided for the following elements:

- a. The event satisfies the criteria set forth in 40 CFR 501(j) that:
  - (1) The event affected air quality,
  - (2) The event was not reasonably controllable or preventable, and
  - (3) The event was caused by human activity unlikely to recur in a particular location or was a natural event;
- b. There is a clear causal relationship between the measurement under consideration and the event;
- c. The event is associated with a measured concentration in excess of normal historical fluctuations; and
- d. There would have been no exceedance or violation but for the event.

Section II of this assessment introduces the conceptual model of a thunderstorm outflow wind event that transpired on August 17, 2013, providing a background narrative of the exceptional event and an overall explanation that ‘the event affected air quality’. Further evidence that ‘the event affected air quality’ is provided in Section V.

Section IV of this assessment details the existing area control measures and demonstrates that despite the presence and enforcement of these controls, the event on August 17, 2013, was not reasonably controllable or preventable.

Section V of this assessment establishes a clear causal connection between the natural event on August 17, 2013, and the exceedances of the 24-hour PM10 standard. The evidence in this section (and the previous section on historical fluctuations) also confirms that the event in question both affected air quality and was the result of a natural event.

Section III of this assessment provides data summaries and time series graphs which help illustrate that the event on August 17, 2013, produced PM10 concentrations in excess of normal historical fluctuations.

Section VI of this assessment builds upon the demonstration showing a clear causal connection between the natural event and the exceedance and concludes there would have been no exceedance on August 17, 2013, but for the presence of the natural event.

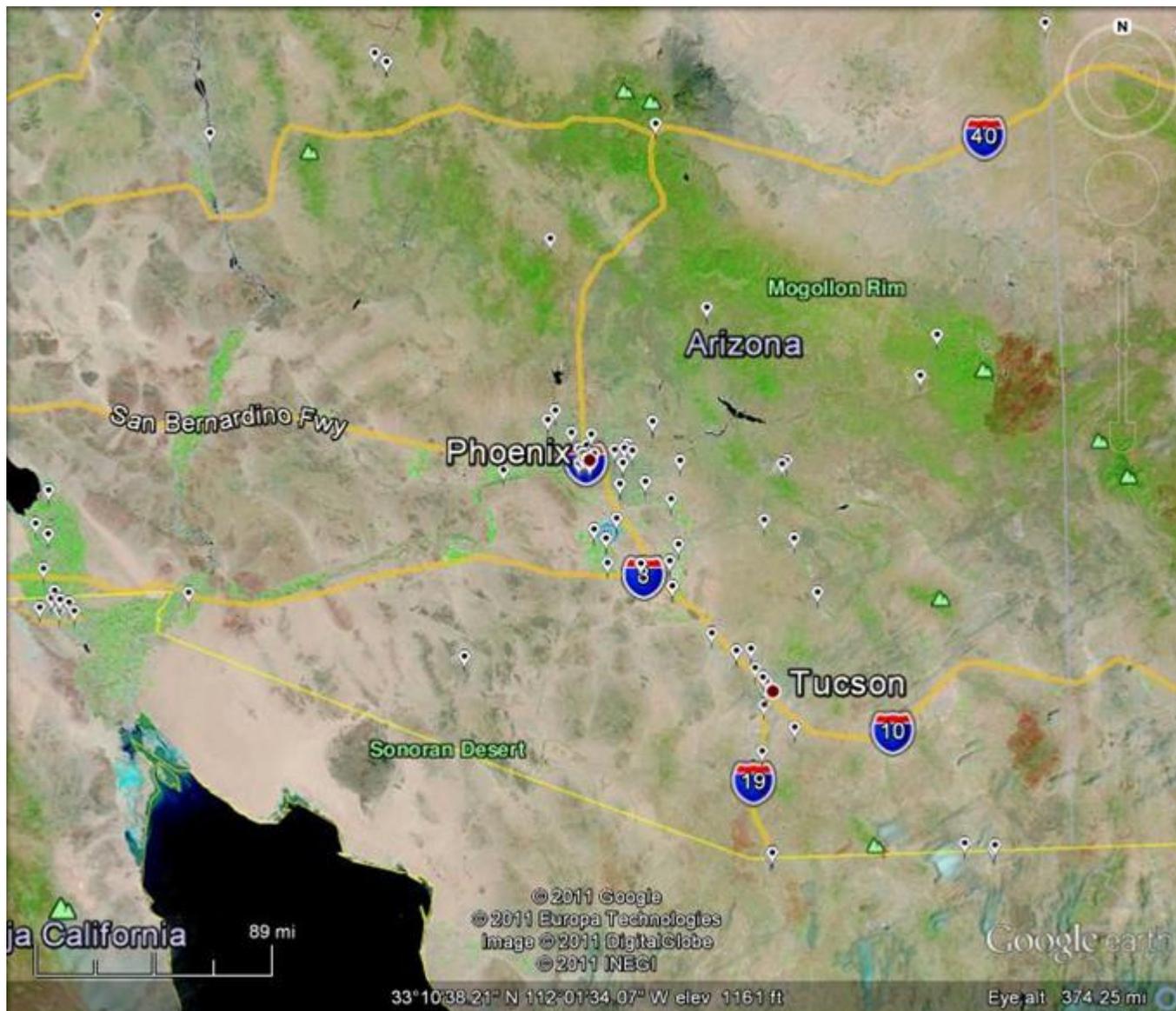
## II. CONCEPTUAL MODEL

### Geographic Setting and Climate

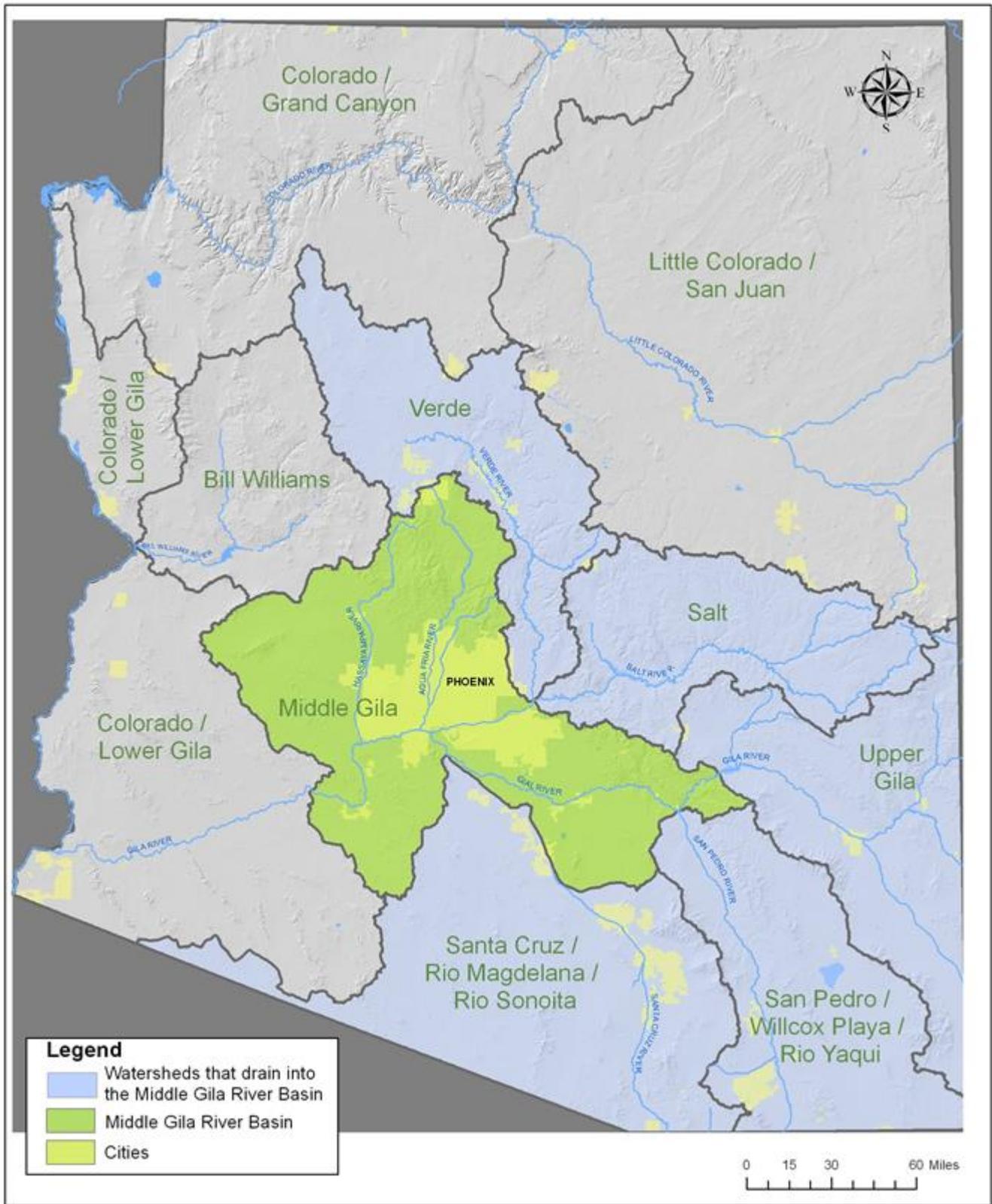
#### *Geographic Setting*

Phoenix is located in the Salt River Valley in south-central Arizona. It lies at a mean elevation of 1,090 feet above mean sea level (msl) in the northeastern part of the Sonoran Desert. Other than the mountains in and around the city, the topography of Phoenix is generally flat. The Phoenix area is surrounded by the McDowell Mountains (~4,200 ft msl) to the northeast, the foothills of the Bradshaw (~7,900 ft msl) and Mazatzal (~7,900 ft msl) ranges to the north, the White Tank Mountains (~4,500 ft msl) to the west, the Sierra Estrella (~4,450 ft msl) to the southwest, and the Superstition Mountains (~5,000 ft msl) far to the east. Within the City are the Phoenix Mountains (~2,600 ft msl) and South Mountain (~2,600 ft msl). Current development is pushing north, west, and south into Pinal County. The Phoenix metropolitan area contains a fairly dense network of PM10 monitors throughout the area, with a much less dense network of monitors located throughout the rest of the state. Figure 2–1 shows the general geographic setting of Phoenix, as well as the locations of PM10 monitors throughout the state. It should be noted that some of the monitors shown in Figure 2-1 are filter-based monitors; therefore, monitoring data from all locations may only be available for select days (i.e. 1-in-6 run days).

Figure 2–2 depicts the drainage systems or watersheds for the State of Arizona. Many of the rivers that form Arizona's drainage system are dry for most of the year and, consequently, are sources of silt and fine soils that become suspended and add to regional PM10 loadings during high wind events. Much of this alluvial matter and fine soil is deposited in the low lying areas of central and southern Arizona, with larger depositional areas focused in and around the confluences of dry river channels.



**Figure 2-1.** Phoenix Geographic Setting and PM10 Monitor Locations (source: EPA AQS DataMart, NASA MODIS Satellite, and Google Earth). PM10 monitor locations are indicated by white markers.

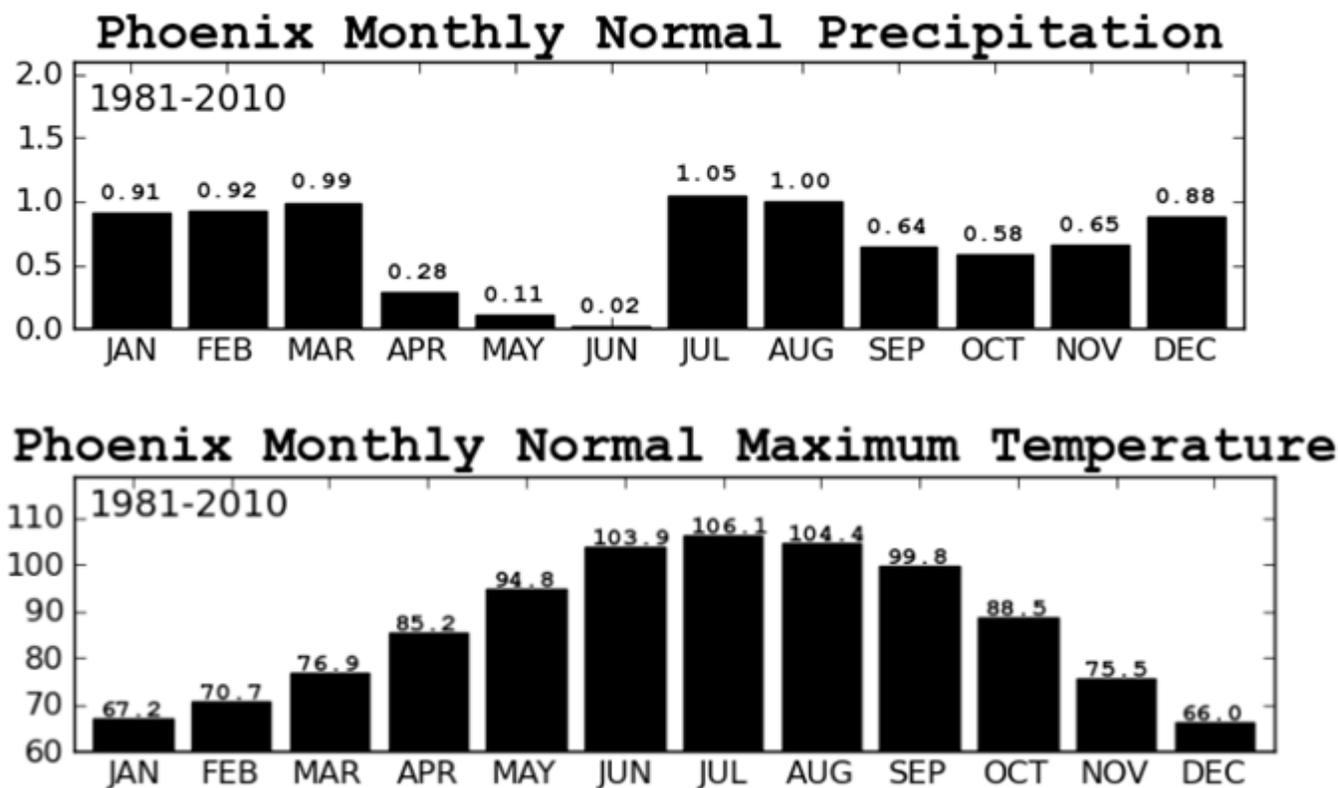


**Figure 2-2.** Drainage System of Phoenix, Arizona.

### *Climate*

Phoenix has an arid climate, with very hot summers and temperate winters. The average summer high temperature is among the hottest of any populated area in the United States. The temperature reaches or exceeds 100°F an average of 110 days during the year and highs top 110°F an average of 18 days during the year. Phoenix receives an average of 7.66 inches of rain per year.

Precipitation is sparse during the first part of the summer, but the influx of monsoonal moisture, which generally begins in early July and lasts until mid-September, raises humidity levels and can cause heavy localized precipitation and flooding. Although thunderstorms are possible at any time of the year, they are most common during the monsoon season from July to mid-September as humid air is advected from the Gulf of California, Gulf of Mexico, and large thunderstorm complexes from the Sierra Madre Occidental Mountains in Mexico. This influx in moisture, combined with intense solar heating, often creates a very unstable environment that is ripe for thunderstorm development. These thunderstorms can bring strong winds and blowing dust, large hail, and heavy rain. Dust storms associated with these thunderstorms typically occur in the early part of the monsoon season (July) before soaking rains help keep soil particles bound to one another. However, depending on the amount of precipitation received during the monsoon season, extremely hot temperatures act to dry out the surface quickly, and dust storms can occur at any time. During the December through March period, winter storms moving inland from the Pacific Ocean can bring strong winds, blowing dust and significant rains throughout Arizona. This December – March time period, and July – August time period are typically the wettest parts of the year. Meanwhile, a distinct dry season occurs during the period April through June for Phoenix and the rest of Arizona. While these weather patterns describe the general climatology for the Phoenix area over a long period of time, Phoenix and the entire state of Arizona is also prone to a high degree of variability in these weather patterns from year to year.

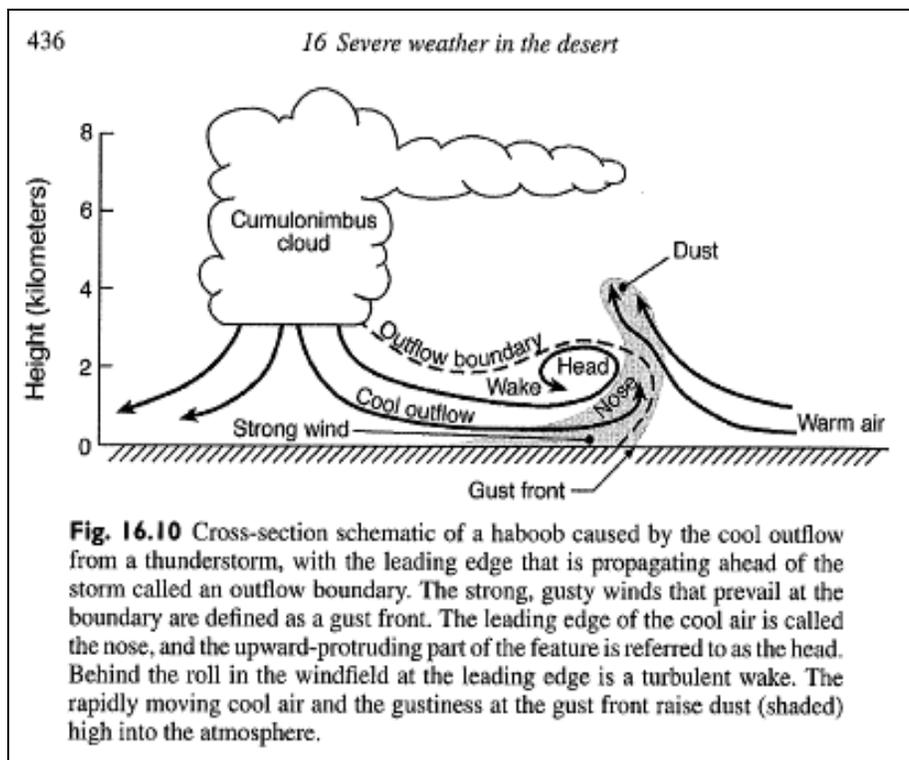


**Figure 2-3** Phoenix Monthly Precipitation (top) and Maximum Temperature (bottom) Climatology (source: National Weather Service).

## Monsoon Season Thunderstorm Outflow Dust Storm Event Summary

The North American Monsoon is a shift in wind patterns in the summer which occurs as Mexico and the southwest U.S. warm under intense solar heating. As this happens, low level moisture is transported primarily from the Gulf of California and eastern Pacific Ocean into the southwestern U.S. Mid and upper level moisture is also transported into the region, mainly from the Gulf of Mexico by easterly winds aloft. This combination causes a distinct rainy season over large portions of western North America, which develops rather quickly and sometimes dramatically. There are usually distinct “burst” periods of heavy rain during the monsoon, and “break” periods with little or no rain. Even during active monsoon periods, some areas can go without receiving any significant precipitation while other nearby areas experience heavy rains and flooding.

In addition to bringing precipitation, active thunderstorms can produce downbursts, or sometimes more concentrated and severe microbursts, which are rapidly descending bursts of air spreading away from the thunderstorm clouds. These downward bursts of air hit the ground and then disperse away from the storms as areas of outflow. These outflow boundaries from the thunderstorms can generate large walls of dust, sometimes called haboobs, and transport that dust for long distances from the initiating thunderstorms (see Figure 2–4).



**Figure 2-4.** Cross-section of a thunderstorm creating an outflow boundary and haboob (Source: Desert Meteorology. Thomas T. Warner. 2004.)

On the evening of August 17, 2013, thunderstorm outflows north of Maricopa County produced very strong outflow winds that generated a significant dust storm. Beginning at approximately 5:30 pm, the thunderstorm outflow is clearly visible on National Weather Service (NWS) base reflectivity radar near the border of Maricopa and Yavapai counties. The outflow progressed south-southwest across Maricopa County, generating wind gusts up to 52 mph and sustained winds as high as 40 mph. Visibilities were reduced to two and three miles at multiple airports in the western portions of Maricopa County as a result of the dust storm passing through. Some scattered precipitation from the thunderstorm outflow was recorded (between 0.01–0.06 inches) beginning at approximately 9:15 pm. However, the precipitation occurred after the monitors had been subject to over one and a half hours of windblown dust emissions. The precipitation likely helped to speed the return of PM10 concentrations to normal levels, but did not occur early enough or frequently enough to prevent an exceedance of the PM10 standard.

Outflow winds from the thunderstorm produced wind speeds that easily overwhelmed controls designed to reduce PM10 from high winds. Five-minute average PM10 concentrations during the high wind dust storm event reached  $3,605 \mu\text{g}/\text{m}^3$  in response to gusty winds from the outflow event. The Maricopa County monitors most impacted by the event were located on the western and northern edges of the urbanized boundary. As such, wind speeds were greatest at these monitors and there was more open and natural desert areas available upwind of these monitors, allowing for greater generation of windblown dust emissions compared to monitors located within the urbanized core. The PM10 from the dust storms ultimately caused the western-most Maricopa County monitor (Buckeye) to exceed the 24-hour PM10 standard on August 17, 2013, and caused the northern-most Maricopa County monitor (Zuni Hills) to record a 24-hour concentration within  $7 \mu\text{g}/\text{m}^3$  of exceeding the standard.

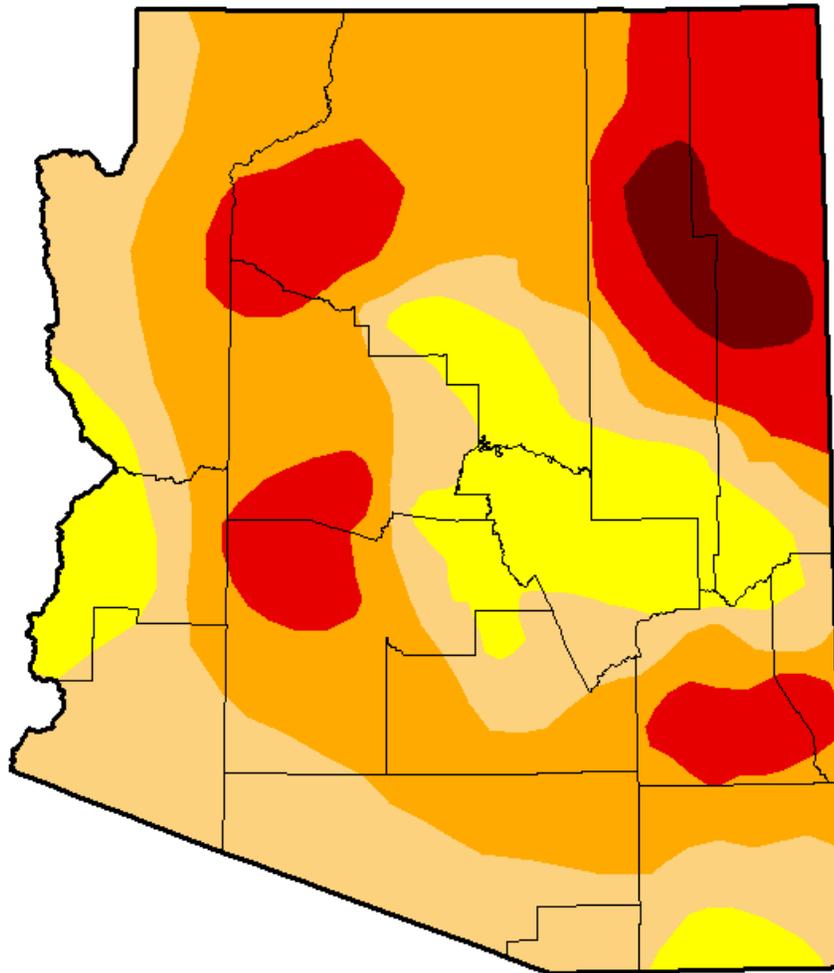
A contributing factor that led to this dust storm was the on-going drought across the region. The U.S. Drought Monitor as of August 13, 2013, categorized the source area of the thunderstorm winds as either D1 (Moderate), D2 (Severe) or D3 (Extreme) drought level. This level of drought helps to show how the natural desert areas of Maricopa County are vulnerable to dust storms generated by thunderstorm outflow winds.

A more detailed explanation and time series visualization of the thunderstorm outflow dust storm event is available in Section V, describing the clear causal connection between the approaching outflow and the exceeding PM10 concentrations recorded in Maricopa County.

As a summary of the event, Figure 2–6 displays an hourly graph of the PM10 concentrations throughout Maricopa County. Table 2–1 contains PM10 concentration data from all recorded monitors throughout the State of Arizona.

# U.S. Drought Monitor Arizona

**August 13, 2013**  
(Released Thursday, Aug. 15, 2013)  
Valid 7 a.m. EST



*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	0.00	100.00	85.78	56.39	20.86	3.04
<b>Last Week</b> 8/6/2013	0.00	100.00	85.78	56.39	20.86	3.04
<b>3 Months Ago</b> 5/14/2013	0.00	100.00	86.66	69.64	18.95	0.00
<b>Start of Calendar Year</b> 1/1/2013	0.00	100.00	97.91	37.78	8.68	0.00
<b>Start of Water Year</b> 9/25/2012	0.00	100.00	100.00	31.93	5.67	0.00
<b>One Year Ago</b> 8/14/2012	0.00	100.00	100.00	93.97	24.95	0.00

*Intensity:*

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

**Author:**  
Michael Brewer  
NCDC/NOAA



<http://droughtmonitor.unl.edu/>

**Figure 2-5.** U.S. Drought Monitor analysis of Arizona released around the time period of the exceedance described in this report.

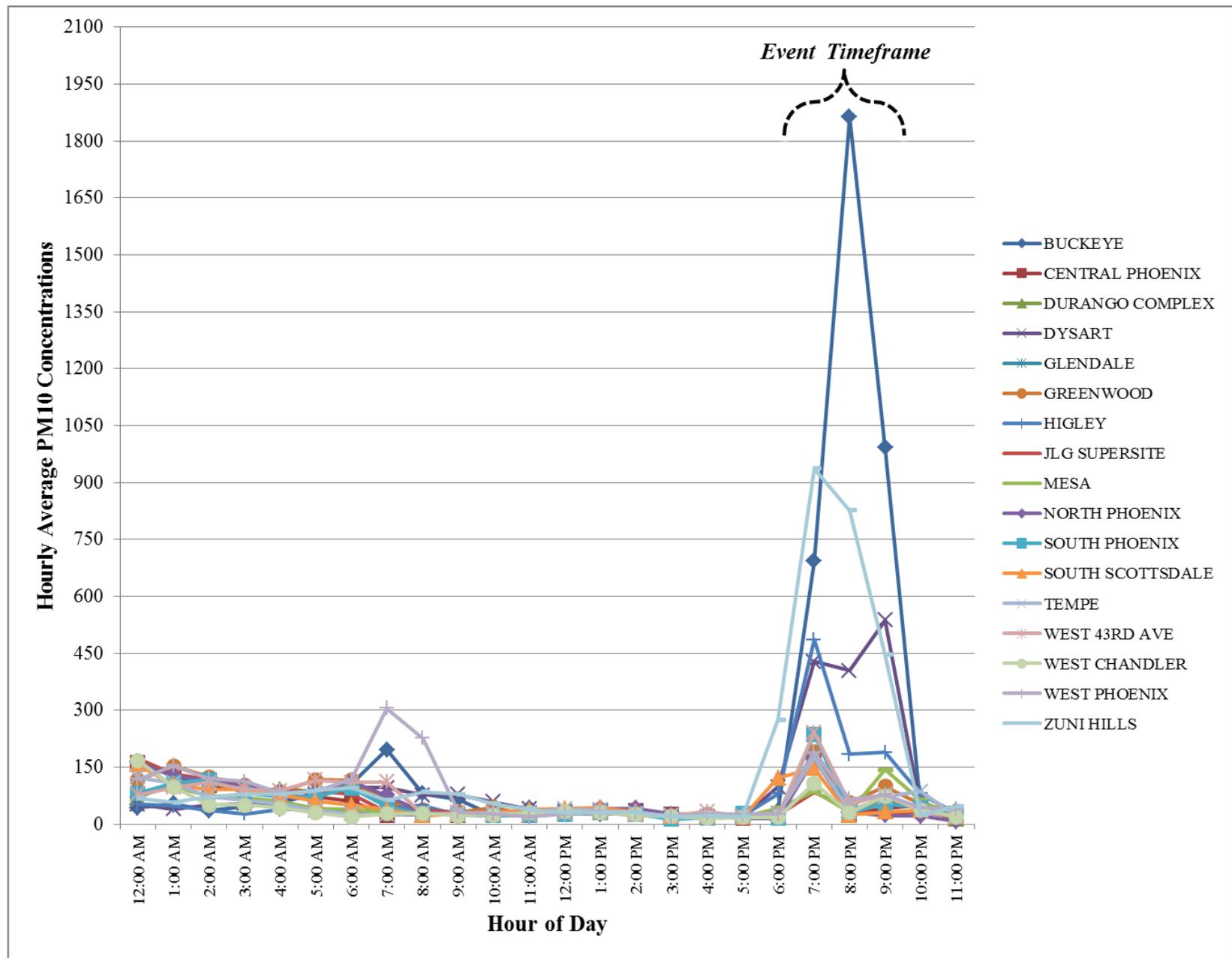


Figure 2-6. Timeline of PM10 concentrations at monitors in Maricopa County on August 17, 2013.

**Table 2-1. Summary of Statewide PM10 Measurements for August 17, 2013.**

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 (µg/m <sup>3</sup> )	1-hr Max PM10 (µg/m <sup>3</sup> )	Max Time	AQS Qualifier Flag
<b>Apache County<sup>1</sup></b>							
N/A	N/A	WMAT	04-001-1003-81102-1	8	30	2200	
<b>Coconino County</b>							
N/A	N/A	ADEQ	04-005-1237-81102-1	N/A	N/A	N/A	
<b>Gila County<sup>2</sup></b>							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	52	354	1800	
<b>Maricopa County<sup>1</sup></b>							
<b>Buckeye</b>	<b>TEOM</b>	<b>MC</b>	<b>04-013-4011-81102-1</b>	<b>193</b>	<b>1,863</b>	<b>2000</b>	<b>RJ</b>
Central Phoenix	TEOM	MC	04-013-3002-81102-4	54	185	1900	
Durango Complex	TEOM	MC	04-013-9812-81102-1	54	175	1900	
Dysart	TEOM	MC	04-013-4010-81102-1	103	537	2100	
Fort McDowell/ Yuma Frank	TEOM	FMR	04-013-5100-81102-3	N/A	N/A	N/A	
Glendale	TEOM	MC	04-013-2001-81102-1	N/A	N/A	N/A	
Greenwood	TEOM	MC	04-013-3010-81102-1	67	191	1900	
Higley	TEOM	MC	04-013-4006-81102-1	67	485	1900	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	55	173	0000	
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	N/A	N/A	N/A	
Lehi Air Monitoring Station	N/A	SRP-MIC	04-013-7022-81102-1	N/A	N/A	N/A	
Mesa	TEOM	MC	04-013-1003-81102-1	52	168	0000	
North Phoenix	BAM	MC	04-013-1004-81102-1	58	172	1900	
Senior Center Air Monitoring Station	N/A	SRP-MIC	04-013-7020-81102-1	N/A	N/A	N/A	
Senior Center Air Monitoring Station	N/A	SRP-MIC	04-013-7020-81102-2	N/A	N/A	N/A	
South Phoenix	TEOM	MC	04-013-4003-81102-1	54	236	1900	
South Scottsdale	TEOM	MC	04-013-3003-81102-1	55	157	0000	
Tempe	TEOM	MC	04-013-4005-81102-1	49	174	1900	
West Chandler	TEOM	MC	04-013-4004-81102-1	42	167	0000	
West Forty Third	TEOM	MC	04-013-4009-81102-1	62	241	1900	
West Phoenix	TEOM	MC	04-013-0019-81102-1	83	304	0700	
Zuni Hills	TEOM	MC	04-013-4016-81102-1	148	936	1900	
<b>Navajo County<sup>1</sup></b>							
N/A	N/A	WMAT	04-017-1002-81102-1	12	25	0600	
<b>Pima County<sup>2</sup></b>							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	21	70	2300	
Orange Grove	FRM	PCDEQ	04-019-0011-81102-2	N/A	N/A	N/A	
Prince Road	FRM	PCDEQ	04-019-1009-81102-1	N/A	N/A	N/A	
Rillito	TEOM	ADEQ	04-019-0020-81102-3	19	52	0300	
Santa Clara	FRM	PCDEQ	04-019-1026-81102-1	N/A	N/A	N/A	
Tangerine	FRM	PCDEQ	04-019-1018-81102-1	N/A	N/A	N/A	
<b>Pinal County<sup>3</sup></b>							
Apache Junction Fire Station	FRM	PCAQCD	04-021-3002-81102-1	N/A	N/A	N/A	
Bapchule	FRM	GRIC	04-021-7004-81102-1	N/A	N/A	N/A	
Bapchule	FRM	GRIC	04-021-7004-81102-2	N/A	N/A	N/A	
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	114	1,522	2000	
Combs School	TEOM	PCAQCD	04-021-3009-81102-3	55	325	2000	
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	96	680	2000	
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	75	476	2000	
Pinal Air Park	TEOM	PCAQCD	04-021-3007-81102-1	28	240	1800	
Pinal County Housing	TEOM	PCAQCD	04-021-3011-81102-3	95	1,367	1900	
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	111	1,235	2000	
<b>Santa Cruz County<sup>2</sup></b>							

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 (µg/m <sup>3</sup> )	1-hr Max PM10 (µg/m <sup>3</sup> )	Max Time	AQS Qualifier Flag
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	34	109	2300	
<b>Yuma County<sup>2</sup></b>							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	20	60	2000	

SOURCE: <sup>1</sup>EPA's Air Quality System (AQS) database. <sup>2</sup>ADEQ's AZURITE database. <sup>3</sup>Pinal County Air Quality Control District (PCAQCD). AZURITE and PCAQCD data are preliminary and should not be considered final until entered into AQS.

TEOM: Tapered Element Oscillating Microbalance monitor

FRM: Federal Reference Method

WMAT: White Mountain Apache Tribe of Fort Apache Reservation, AZ

SRP-MIC: Salt River Pima-Maricopa Indian Community of Salt River Reservation, AZ

PCDEQ: Pima County Department of Environmental Quality

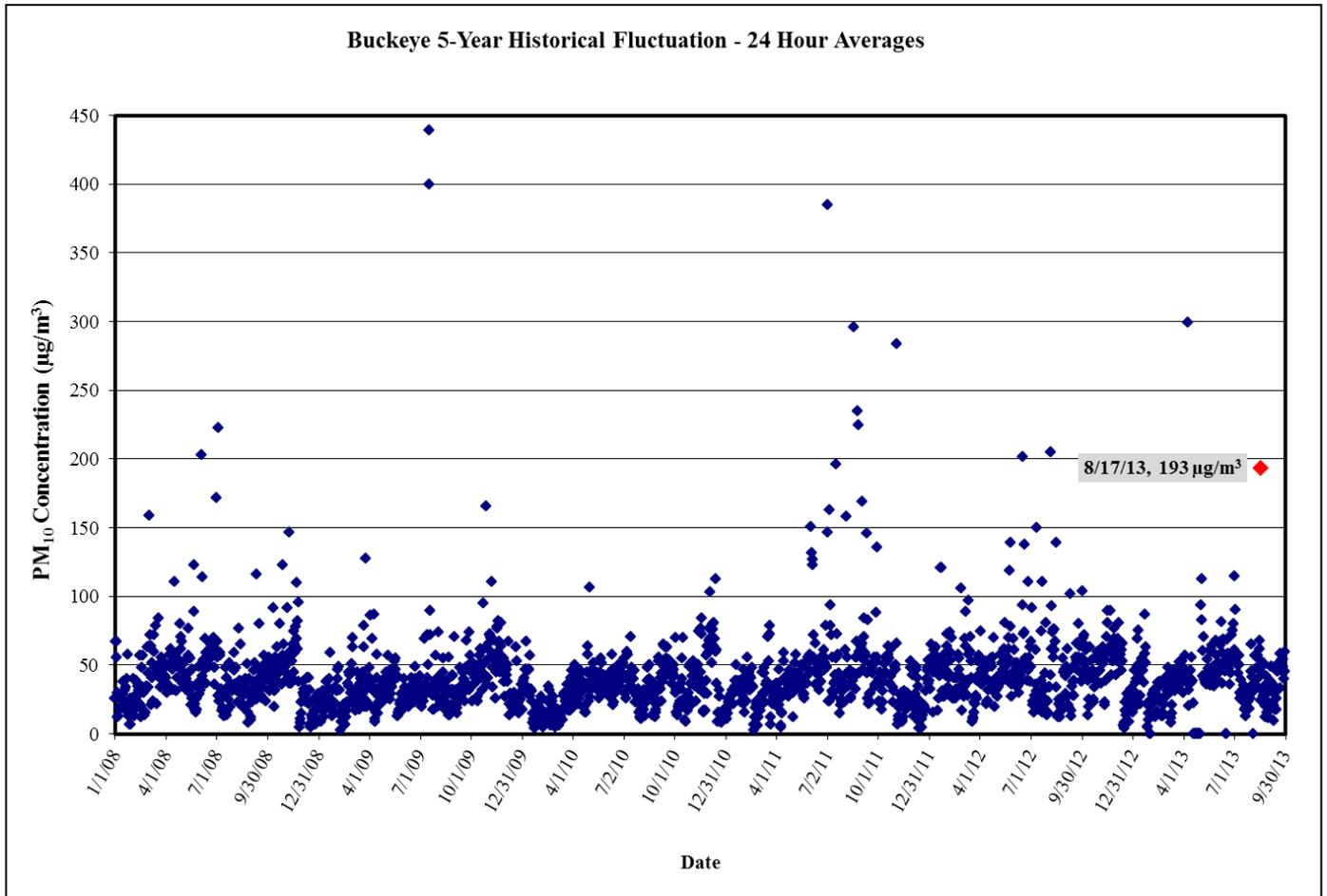
PCAQCD: Pinal County Air Quality Control District

GRIC: Gila River Indian Community

RJ: qualifier flag for high winds

### III. HISTORICAL FLUCTUATIONS

PM10 concentrations measured at the Buckeye monitor on August 17, 2013, were unusual and in excess of normal historical fluctuations. Figure 3-1 displays a time series plot of the 24-hour PM10 concentrations for the period of January 1, 2008, through September 30, 2013, for the Buckeye monitor. The figure indicates that the PM10 concentrations seen at the Buckeye monitor on August 17, 2013, were in excess of normal historical fluctuations.



**Figure 3-1.** Plot of 24-hour average PM10 concentrations (2008 – September 2013) at the Buckeye monitor.

## **IV. NOT REASONABLY CONTROLLABLE OR PREVENTABLE**

Section 50.1(j) of Title 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 Maricopa County, high wind conditions overwhelmed all reasonably available controls. The event occurring on August 17, 2013, was directly related to strong and gusty winds generated by thunderstorm outflows. The gusty outflow winds overwhelmed all reasonably available controls within Maricopa County. As shown in section V, the open and natural desert areas of Maricopa County were source regions for the dust created by the thunderstorm outflow wind event that occurred on August 17, 2013. Strict controls on local sources of fugitive dust were in place and enforced during the event on August 17, 2013, but were not capable of controlling dust and PM10 generated by the gusty and turbulent thunderstorm outflow winds on this date.

The following sections describe the BACM- and MSM-level PM10 control measures in place on August 17, 2013, and the robustness of the programs designed to enforce these measures. Inspections of local sources performed before, during, and after August 17, 2013, confirmed that no unusual anthropogenic PM10-producing activities contributed to the exceedance on August 17, 2013.

### **Regulatory Measures and Control Programs**

The Arizona Department of Environmental Quality (ADEQ) and the Maricopa County Air Quality Department (MCAQD) are responsible for implementing regulatory measures to control emissions from agricultural sources, stationary sources, fugitive dust sources, and open burning within Maricopa County<sup>1</sup>. Three major programs provide or contribute to air pollution control measures for the Greater Phoenix area. These programs include:

- 1.) ADEQ’s Agricultural Best Management Program (AgBMP)
- 2.) Maricopa County’s Inspection and Compliance Program
- 3.) ADEQ’s Air Quality Forecasting Program

Specifically, ADEQ is responsible for compliance assistance and enforcement of Agricultural Best Management Practices developed by the Governor’s Agricultural Best Management Practices Committee, while MCAQD is responsible for compliance assurance for all other significant sources of PM10 emissions. In addition to routine inspections and inspections driven by complaints, inspections are often increased when 1.) ADEQ forecasters issue a High Risk for the Maricopa County Dust Control Forecast, 2.) ADEQ forecasters issue a High Pollution Advisory, or 3.) near real-time monitoring data indicate unique activity via high PM concentrations. The forecasting program and inspection / compliance programs work together so that resources can be best utilized during days that are of greatest risk for elevated PM emissions.

---

<sup>1</sup> The exceedance on August 17, 2013, occurred at the Buckeye monitor which is located just west (approximately 0.75 miles) of the Maricopa County PM10 nonattainment area boundary. Fugitive dust rules issued by MCAQD are not just applicable to the nonattainment area, but have county-wide applicability and enforceability. Some fugitive dust ordinances are limited to “Area A”, but the Buckeye monitor is within Area A and subject to those ordinances. Additionally, the ADEQ AgBMP program applies to Area A.

On July 25, 2002, EPA took initial action to finalize approval of the Best Available Control Measure (BACM) and the Most Stringent Measure (MSM) demonstrations in the Serious Area PM10 plan for the Maricopa County portion of the metropolitan Phoenix PM10 nonattainment area (67 FR 48718). These BACM and MSM demonstrations were again approved by EPA on July 14, 2006 (71 FR 43979). The Agricultural Best Management Practices General Permit rule and related definitions have been approved into the Arizona Administrative Code as R18-2-610 and R18-2-611 pursuant to Arizona Revised Statutes § 49-457<sup>2</sup>. Maricopa County regulations of PM10 emissions are listed in Table 4-1.

**Table 4-1.** Rules and Ordinances Regulating Particulate Matter Emissions in Maricopa County.

<b>Rule/Ordinance Number &amp; Title</b>	<b>Description</b>
<b>Rule 300:</b> Visible Emissions	Establishes standards for visible emissions and opacity.
<b>Rule 310:</b> Fugitive Dust from Dust-Generating Operations	Establishes limits for the emissions of particulate matter into the ambient air from any property, operations, or activity that may serve as a fugitive dust source.
<b>Rule 310.01:</b> Fugitive Dust from Non-Traditional Sources of Fugitive Dust	Establishes limits for the emissions of particulate matter into the ambient air from open areas, vacant lots, unpaved parking lots, and unpaved roadways which are not regulated by Rule 310 and which are not required to have either a permit or a dust control plan.
<b>Rule 311:</b> Particulate Matter from Process Industries	Establishes emission rates based on process weight applicable to any affected operations not subject to Rule 316.
<b>Rule 312:</b> Abrasive Blasting	Establishes limits for particulate emissions from abrasive blasting operations.
<b>Rule 314:</b> Open Outdoor Fires and Indoor Fireplaces at Commercial and Institutional Establishments	Establishes limits for the emissions of air contaminants produced from open burning.
<b>Rule 316:</b> Nonmetallic Mineral Processing	Establishes limits for the emissions of particulate matter into the ambient air from any nonmetallic mining operation or rock product processing plant.
<b>Rule 317:</b> Hospital/Medical/ Infectious Waste Incinerators	Establishes limits for the emissions of air pollutants from medical waste incinerators.
<b>Rule 322:</b> Power Plant Operations	Establishes limits for the emissions of nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter from existing power plants and cogeneration plants.
<b>Rule 323:</b> Fuel Burning Equipment from Industrial/Commercial/ Institutional (ICI) Sources	Establishes limits for the emissions of nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter from ICI sources.
<b>Rule 324:</b> Stationary Internal Combustion (IC) Engines	Establishes limits for the emissions of carbon monoxide, nitrogen oxides, sulfur oxides, volatile organic compounds, and particulate matter from stationary internal combustion engines, including stationary IC engines used in cogeneration.

<sup>2</sup> Updates to the AgBMP program in December, 2011, clarified BMPs for crop and added BMPs for animal operations. Effective 12/29/2011, R18-2-611 was renumbered to R18-2-610.0,1 **Agricultural PM10 General Permit for Crop Operations** and R18-2-611.01, **Animal Operations PM10 General Permit** was added. Definitions for Crop Operations were revised at R18-2-610 and new definitions for Animal Operations were added at R18-2-611.

<b>Rule/Ordinance Number &amp; Title</b>	<b>Description</b>
<b>Rule 325:</b> Brick and Structural Clay Products (BSCP) Manufacturing	Establishes limits for particulate matter emissions from the use of tunnel kilns for curing in the brick and structural clay product (BSCP) manufacturing processes.
<b>Ordinance P-25:</b> Leaf Blower Restriction	Establishes restrictions for leaf blowers in incorporated and unincorporated sections of Area A in Maricopa County.
<b>Ordinance P-26:</b> Residential Woodburning Restriction	Establishes restrictions for residential woodburning.
<b>Ordinance P-27:</b> Vehicle Parking and Use on Unstabilized Vacant Lots	Establishes restrictions for vehicle parking and use on unstabilized vacant lots in unincorporated sections of Area A in Maricopa County.
<b>Ordinance P-28:</b> Off-Road Vehicle Use in Unincorporated Areas of Maricopa County	Establishes restrictions for operating vehicles on unpaved property in unincorporated areas of Maricopa County.
<b>Arizona Administrative Code R18-2-611 &amp; 610:</b> Agricultural PM10 General permit	Establishes a requirement for commercial farmers to implement best management practices and maintain a record demonstrating compliance

In addition to the rules and regulations listed in the above table, other PM10 reducing control measures (e.g., paving of unpaved roads, PM10 certified street sweepers, controlling unpaved parking lots, etc.) have been committed to, and implemented by, local jurisdictions throughout the PM10 nonattainment area, and incorporated into the Arizona SIP through PM10 plans such as the Revised MAG 1999 Serious Area Particulate Plan for PM10 for the Maricopa County Nonattainment Area. The Pinal County Air Quality Control District (PCAQCD) also implements regulatory control measures on emissions from existing and new non-point sources within Pinal County (see Table 4-2). Additionally, the PCAQCD implements specific nonattainment rules for that part of the Phoenix PM10 nonattainment area that resides in Pinal County (see Table 4-3).

**Table 4-2.** Pinal County Rules Regulating Existing and New Non-point Sources in Pinal County.

<b>Article Number &amp; Title</b>	<b>Description</b>
<b>Article 2:</b> Fugitive Dust	Provides a mechanism to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere
<b>Article 3:</b> Construction Sites – Fugitive Dust	Improves the control of excessive fugitive dust emissions that have been traditionally associated with construction, earthwork, and land development, and thereby minimize nuisance impacts

**Table 4-3.** Pinal County Rules Regulating Fugitive Dust in Pinal County Portion of MC PM10 NAA.

<b>Article Number &amp; Title</b>	<b>Description</b>
<b>Article 4:</b> Nonattainment Area Rules; Dustproofing for Commercial Parking, Drives and Yards	Establishes rules to avoid violations of the prevailing PM10 standard and additionally minimize nuisance impacts by improving control of excessive fugitive dust emissions from unpaved parking lots
<b>Article 5:</b> Nonattainment Area Rules; Stabilization for Residential Parking and Drives	Establishes rules for stabilizing residential properties
<b>Article 6:</b> Restrictions on Vehicle Parking and Use on Vacant Lots	Establishes rules for unpaved or unstabilized vacant lots

Article Number & Title	Description
<b>Article 7:</b> Construction Sites in Nonattainment Areas – Fugitive Dust	Establishes rules to avoid violations of the prevailing PM10 standard and additionally minimize nuisance impacts by improving control of excessive fugitive dust emissions from activities associated with construction, earthwork, or land development.
<b>Article 8:</b> Nonattainment Area Rules, Requirement for Stabilization of Disturbed Areas at Vacant Lots	Establishes rules for stabilizing disturbed areas at vacant lots

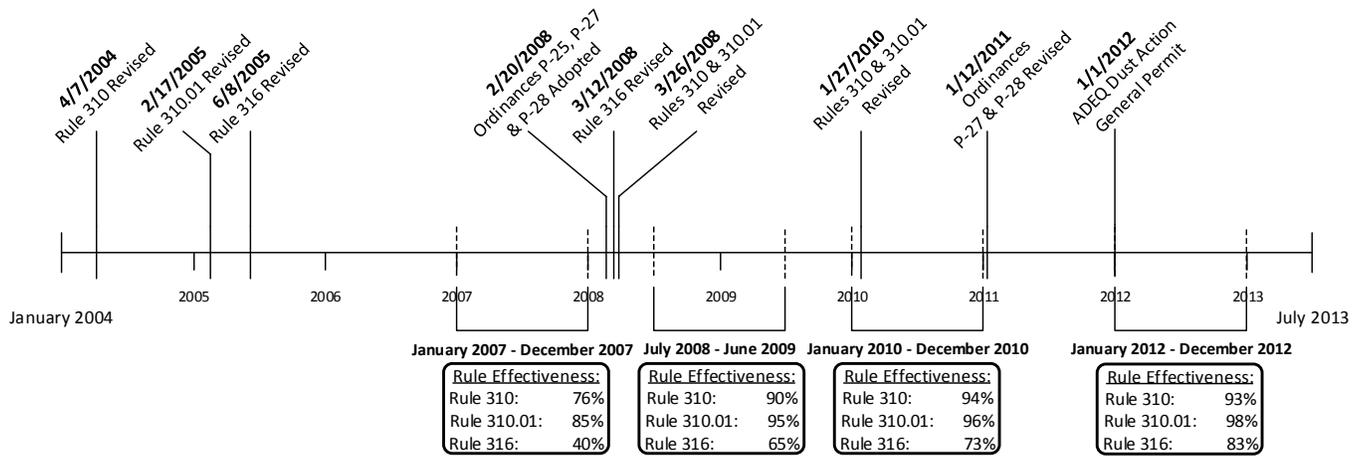
### **PM10 Rule Effectiveness**

MCAQD analyzed the effectiveness of its fugitive dust rules (Rules 310, 310.01 and 316) in terms of source compliance rates. The rule effectiveness study was designed to assess how many sources regulated by MCAQD during the subject time period received no PM10 emissions-related violations. As a basis for comparison, the percentage of sources that did not receive a PM10 emissions-related violation during calendar year 2007 was 76% for sources subject to Rule 310, 85% for sources subject to Rule 310.01, and 40% for sources subject to Rule 316. In early 2008, Rules 310, 310.01, and 316 were strengthened and new ordinances (covering additional source categories such as leaf blowers, vacant lots, and off-road vehicles) were adopted. These enhancements resulted from MCAQD’s obligations under such agreements as the 2005 Revised PM10 State Implementation Plan for the Salt River Area and the Maricopa Association of Governments (MAG) 2007 Five Percent Plan for PM10 for the Maricopa County Nonattainment Area. Three major areas that contributed to increased compliance were an increase in departmental staffing (especially inspectors), a robust training program, and regulatory changes that broadened and strengthened control measures under Rules 310, 310.01, and 316.

Rule effectiveness rates were re-assessed for FY 2009 (July 2008–June 2009), a period that allowed time for the new and revised regulations to take effect. The results showed significant increases in compliance compared with the earlier period: to 90% (from 76%) for Rule 310 sources, to 95% (from 85%) for Rule 310.01 sources, and to 65% (from 40%) for Rule 316 sources. These improvements continued into calendar year 2010 with rule effectiveness rates of 94% for Rule 310 sources, 96% for Rule 310.01, and 73% for Rule 316 sources.

Additional rule effectiveness increases were observed for Rule 310.01 and Rule 316 in calendar year 2012. The increase in rule effectiveness for Rule 310.01 was attributed to ADEQ’s Dust Action General Permit, which was a new dust measure contained in the 2012 Five Percent Plan for PM10 for the Maricopa County Nonattainment Area. The rule effectiveness for Rule 310.01 was 98%, an increase of 2% in 2012. The rule effectiveness for Rule 316 had a considerable increase to 83%, which is an increase of 10% compared to 2010.

The timeline below illustrates the improvements in rule effectiveness over the last several years, and also points out significant revisions to previous rules, as well as newly adopted rules, ordinances and measures. Since the first study of 2007, the rule effectiveness has increased for Rule 310, Rule 310.01, and Rule 316 by 17%, 13%, and 43%, respectively.



**Figure 4-1.** Timeline of Maricopa County fugitive dust rules and ordinances.

### **Compliance and Enforcement Activities**

MCAQD is prepared to proactively respond to high wind events and protect human health and well-being. MCAQD’s approach consists of two primary components: routine proactive inspections, as well as surveillance inspections, conducted both during and after significant events. MCAQD routinely inspects dust control-permitted sites and increases the frequency of inspections for permits covering areas of ten acres or more. Non-metallic surface mining sources under Rule 316 are also regularly inspected multiple times every year. Maricopa County also responds to the majority of air quality complaints within 24 hours.

Maricopa County monitors the ADEQ Five-Day Dust Control Forecast to identify the potential for elevated PM10 pollution levels due to high winds or stagnant conditions. When a High Pollution Advisory (HPA) is issued for Maricopa County, MCAQD conducts additional increased surveillance before, during, and after the forecast event(s). MCAQD also conducts event surveillance and post-event activities after an exceptional event that had not been forecast (i.e., those instances in which an HPA had not been issued).

Pre-event surveillance consists of surveying high-risk areas for any dust-generating activities, educating sources of the impending HPA event, and issuing violations for failure to comply with local, state, or federal regulations. During the event, MCAQD inspectors survey high-risk areas to confirm that control measures are in place, document any violations, and contact other regulatory agencies if necessary. Post-event activities include continued surveys of high-risk areas, re-inspecting sources within two business days of receiving a violation, and an internal MCAQD debriefing of event activities.

Currently, a total of 16 MCAQD air monitoring sites were upgraded with new equipment to allow the monitoring sites to automatically report monitored readings at five-minute intervals. Previously, hourly readings were only available. The real-time data reporting system includes a mechanism to alert MCAQD inspectors when PM10 concentrations are elevated. The system allows MCAQD inspectors to review concentrations at the monitor and to consult the National Weather Service website to check for weather event activity. This capability allows the MCAQD responder to identify regional events and monitor specific issues. If necessary, the MCAQD responders can inform nearby stakeholders and local governments of the elevated PM10 concentrations.

For August 17, 2013, a Maricopa County Dust Control Forecast was issued indicating a low risk level for unhealthy PM<sub>10</sub>. The Dust Control Forecast indicated southwest winds of 5 mph.

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM<sub>10</sub> emissions. During the time period of August 14 through August 20, 2013, MCAQD inspectors conducted a total of 320 inspections of permitted facilities, of which 206 were at fugitive dust sources. Additionally, MCAQD conducted 104 inspections on vacant lots and unpaved parking lots during this period.

During this seven-day period, a total of 67 violations were issued county-wide for PM<sub>10</sub> and non-PM<sub>10</sub>-related violations. No violation was issued for PM<sub>10</sub> emissions within a four-mile radius of the Buckeye monitor.

MCAQD was prepared for any complaints received due to the high wind event. During the seven-day period from August 14 through August 20, 2013, MCAQD received ten complaints, of which one was windblown dust or PM<sub>10</sub> related. Each complaint was assigned to and investigated by a MCAQD inspector. A review of all pertinent records from this period indicates that MCAQD inspectors observed no PM<sub>10</sub> violations of local, state, or federal regulations resulting from complaints within a four-mile radius of the exceeding monitor.

In addition to MCAQD's efforts in pre-event surveillance and proactive inspections, ADEQ's Agricultural Best Management Practice Program (Ag BMP) inspector also monitors the ADEQ Five-Day Dust Control Forecast and the MCAQD air monitoring sites that include real-time data. The ADEQ Ag BMP inspector uses specific knowledge of seasonal activities and associations with the local growers and dairymen to communicate the importance of limiting dust-generating activities, especially during high-wind events. Additional outreach is conducted with facility representatives prior to forecasted high-wind alert days. Should the PM<sub>10</sub> readings at a MCAQD air monitoring site show notable increases, the ADEQ Ag BMP inspector is dispatched to contact the owners and operators of agriculture fields in the area to discern if their activities are causing negative impacts. The Ag BMP inspector is prepared to respond to most agriculture complaints within 24 hours.

Based on a review of the inspection reports and site visit documentation, there is no evidence to suggest that agricultural activities produced unusual or significant PM<sub>10</sub> emissions. From August 14 through August 20, 2013, the ADEQ Ag BMP inspector received no complaints. One site inspection occurred on August 14, 2013, in response to a hay fire in Mesa, Arizona. Emissions from this fire would not have impacted the high wind dust exceptional event that occurred on August 17, 2013.

## **Conclusions**

The thunderstorm outflow event on August 17, 2013, produced strong gusts and turbulent wakes that generated dust and PM<sub>10</sub> in Maricopa County. The source region of the outflow winds that caused the exceedance were the open and natural desert areas of Maricopa County. BACM-approved control measures on significant anthropogenic sources were in place and enforced during the events, and proactive tracking and response to the events by regulatory agencies and local governments confirmed the uncontrollable nature of the dust emissions; therefore, these pre-existing/prior approved required controls are adequate for meeting the requirements of an exceptional event and should be considered "reasonable" for these purposes.

Despite the deployment of comprehensive control measures and sophisticated response programs, high wind conditions associated with thunderstorms and thunderstorm outflow winds overwhelmed controls

within Maricopa County. Strong thunderstorm outflows with gusts up to 52 mph, and sustained winds up to 40 mph, were more than enough to overwhelm all available efforts to limit PM10 concentrations from the event. The fact that this was a natural event involving strong thunderstorm outflow winds that generated PM10 emissions within Maricopa County provides strong evidence that the event and exceedance of August 17, 2013, recorded at the Buckeye monitor, was not reasonably controllable or preventable.

## V. CLEAR CAUSAL RELATIONSHIP

### Introduction

A demonstration of the clear causal connection between windblown dust generated by thunderstorm outflow winds and the exceedance at the Buckeye monitor on August 17, 2013, is provided in this section. The high wind event dust storm produced wind gusts as high as 52 mph and sustained winds as high as 40 mph, and reduced visibilities to two to three miles at multiple locations in western Maricopa County. The Buckeye monitor exceeded the 24-hour PM10 standard as a result of the PM10 generated by the thunderstorm outflow winds, with one other Maricopa County monitor (Zuni Hills) recording 24-hour average PM10 concentrations within  $7 \mu\text{g}/\text{m}^3$  of the standard. Drought conditions in Maricopa County likely exacerbated the amount of the dust the thunderstorm outflow was able to entrain.

A detailed description of the meteorology that caused the natural windblown dust exceedance event at the Buckeye monitor is described below in a series of time-stamped maps. Time series videos of visibility photos on the day of the high wind dust event provide additional evidence of the dust storm impacts on Maricopa County monitors. The weight of evidence presented in this section provides the clear causal connection between the windblown dust generated by thunderstorm outflow winds and the exceedance at the Buckeye monitor on August 17, 2013.

### Time Series Maps and Visibility Photos

Figures 5–1 through 5–11 provide a time series GIS-based visualization of the meteorology and PM10 concentrations associated with the thunderstorm outflows. The data displayed in the following maps were gathered from five data sources. All available meteorological and air quality data was used in order to present the most complete story of the event. Table 5–1 displays the types of data used from each agency in creating the maps. Figure

**Table 5-1.** Data Sets Used in the Creation of Time Series GIS Maps.

<b>Agency</b>	<b>Data Sets</b>
Arizona Department of Environmental Quality (ADEQ)	Hourly PM10 Concentrations, Wind Speed, Wind Direction and Wind Gusts
Arizona Meteorological Network (AZMET)	Hourly Wind Speed, Wind Direction and Wind Gusts
Maricopa County Air Quality Department (MCAQD)	5-Minute PM10 Concentrations, Wind Speed, Wind Direction, and Wind Gusts (hourly data used when 5-minute was unavailable)
Pinal County Air Quality Control District (PCAQCD)	Hourly PM10 Concentrations, 5-Minute and Hourly Wind Speed, Wind Direction and Wind Gusts
National Weather Service (NWS)	Point in Time Wind Speed, Wind Direction, Wind Gusts, Visibility and Base Reflectivity Radar

### *Map Description*

A description of each time series map is provided to highlight important data in each map and explain the progression of the meteorology and PM10 concentrations through time. Taken as a whole, the maps and associated explanatory text describe the clear causal connection between the windblown dust generated by the thunderstorm outflow winds and the PM10 exceedance at the Buckeye monitor.

August 17, 5:30 PM – 6:00 PM

Base reflectivity radar reveals the approach of a thunderstorm outflow from the border of Maricopa and Yavapai counties. PM10 concentrations, wind speeds and visibilities are currently normal throughout Maricopa County.

August 17, 6:00 PM – 6:30 PM

As the thunderstorm outflow progresses south-southwest across Maricopa County, wind speeds are elevated in the northern portions of the county. Gusts as high as 38 mph and sustained winds as high as 20 mph are recorded. While not completely visible on base reflectivity radar as this point, the extent of the thunderstorm outflow is wide, elevating wind speeds across Maricopa County. The northern-most PM10 monitor (Zuni Hills) begins recording elevated PM10 concentrations in response to the approaching dust storm generated by the thunderstorm outflow winds.

August 17, 6:30 PM – 7:00 PM

Winds from the over 100-mile wide thunderstorm outflow continue to increase as they progress south-southwest across Maricopa County. Gusts as high as 41 mph and sustained wind speeds as high as 26 mph are recorded. The densest PM10 concentrations are recorded in the northwest portion of Maricopa County, due to the larger availability of open and natural desert areas upwind of the northwest monitors. However, sporadic pockets of high PM10 concentrations are recorded throughout Maricopa County, as evidenced by reduced visibility (3.0 miles) at the Scottsdale Airport and PM10 concentrations over 500  $\mu\text{g}/\text{m}^3$  at the South Scottsdale and Higley monitors.

August 17, 7:00 PM – 7:30 PM

Wind speeds continue to increase as the thunderstorm outflow is now centrally located over Maricopa County. Gusts as high as 47 mph and sustained winds as high as 31 mph are generated during this period. PM10 concentrations over 1,800  $\mu\text{g}/\text{m}^3$  are recorded at the Zuni Hills monitor. Visibility has been reduced to 2.5 miles at Luke Air Force Base. All monitors throughout Maricopa County except the western-most Buckeye monitor show elevated PM10 concentrations in response to the dust storm generated by the thunderstorm outflow.

August 17, 7:30 PM – 8:00 PM

The thunderstorm outflow first reaches the exceeding Buckeye monitor during this period. Winds from the outflow have not decreased and are still generating gusts as high as 48 mph and sustained wind speeds as high as 31 mph. The Zuni Hills and Dysart monitors still record PM10 concentrations over 500  $\mu\text{g}/\text{m}^3$ , despite the fact that it has been over an hour since dust from the thunderstorm outflow first impacted the monitors. This indicates that the dust storm behind the thunderstorm outflow front is large and continues to generate PM10 under very gusty and turbulent winds. Visibility at the Buckeye Airport has been reduced to 4.0 miles in response to the arrival of the dust storm, and the Buckeye monitor records PM10 concentrations over 2,500  $\mu\text{g}/\text{m}^3$ .

August 17, 8:00 PM – 8:30 PM

Despite the thunderstorm outflow front nearly exiting Maricopa County, strong and gusty winds behind the front continue to generate dust and PM10. Gusts as high 52 mph are recorded (51 mph at the

exceeding Buckeye monitor) along with sustained winds as high as 37 mph. Visibilities are reduced in the western portion of Maricopa County, pointing to widespread windblown dust in those areas. PM10 concentrations at the Buckeye monitor are still very high, with concentrations over  $2,500 \mu\text{g}/\text{m}^3$ . The central and eastern portions of Maricopa County have largely returned to normal PM10 concentrations. This is due to reduced wind speeds as compared to the western portion of Maricopa County and also due to a lack of open and natural desert areas upwind of these urbanized monitors.

#### August 17, 8:30 PM – 9:00 PM

The thunderstorm outflow has left Maricopa County, but turbulent winds still persist in the county creating fresh PM10 emissions. Gusts remain as high as 52 mph with sustained winds as high as 33 mph. Visibilities remain poor throughout the western portion of Maricopa County, with Luke Air Force Base reporting 2.5 miles, Phoenix Goodyear Airport reporting 3.0 miles, and the Buckeye Airport reporting 6.0 miles. PM10 concentrations remain high at the Buckeye, Dysart and Zuni Hills monitors, with both Buckeye and Zuni Hills recording concentrations above  $1,000 \mu\text{g}/\text{m}^3$ . In addition to the dominant south-southwest wind direction, fresh winds blowing to the west in the eastern portions of Maricopa County have occurred. These winds will help push suspended PM10 out of Maricopa County to the west in the next few hours and help return PM10 concentrations to normal levels throughout Maricopa County before 11:00 pm.

#### August 17, 9:00 PM – 9:30 PM

The first signs of precipitation from the turbulent monsoon thunderstorm activity are recorded at Luke Air Force Base and the Buckeye Airport. The precipitation is light and scattered, and it is unknown whether any precipitation fell in the areas immediately around the western PM10 monitors. Winds remain very strong with gusts as high as 49 mph and sustained wind speeds as high as 29 mph. The Zuni Hills and Buckeye monitors continue to record PM10 concentrations above  $1,000 \mu\text{g}/\text{m}^3$ , suggesting that it is unlikely any precipitation fell near those monitors at this time.

#### August 17, 9:30 PM – 10:00 PM

Easterly winds have become more prominent and have begun to push some of the suspended PM10 out of Maricopa County to the west. PM10 concentrations remain high at the Buckeye monitor under gusts up to 51 mph and sustained winds as high as 40 mph. Precipitation continues to be recorded at the Buckeye Airport and Luke Air Force Base, though light in quantity.

#### August 17, 10:00 PM – 10:30 PM

The strongest winds have finally diminished and almost all of the Maricopa County monitors are recording concentrations under  $150 \mu\text{g}/\text{m}^3$ . Winds remain turbulent near the Buckeye monitor, with gusts as high as 40 mph and sustained winds as high as 29 mph. PM10 concentrations have dropped significantly at the Buckeye monitor and are now under  $500 \mu\text{g}/\text{m}^3$ . Light rain continues to fall at the Buckeye Airport, but has ceased at Luke Air Force Base.

#### August 17, 10:30 PM – 11:00 PM

Breezy conditions continue throughout Maricopa County, which continues to help blow out any remaining PM10 suspended by the thunderstorm outflow dust storm. All Maricopa County monitors record PM10 concentrations below  $150 \mu\text{g}/\text{m}^3$ , with the exceeding Buckeye monitor now recording concentrations less than  $50 \mu\text{g}/\text{m}^3$ .

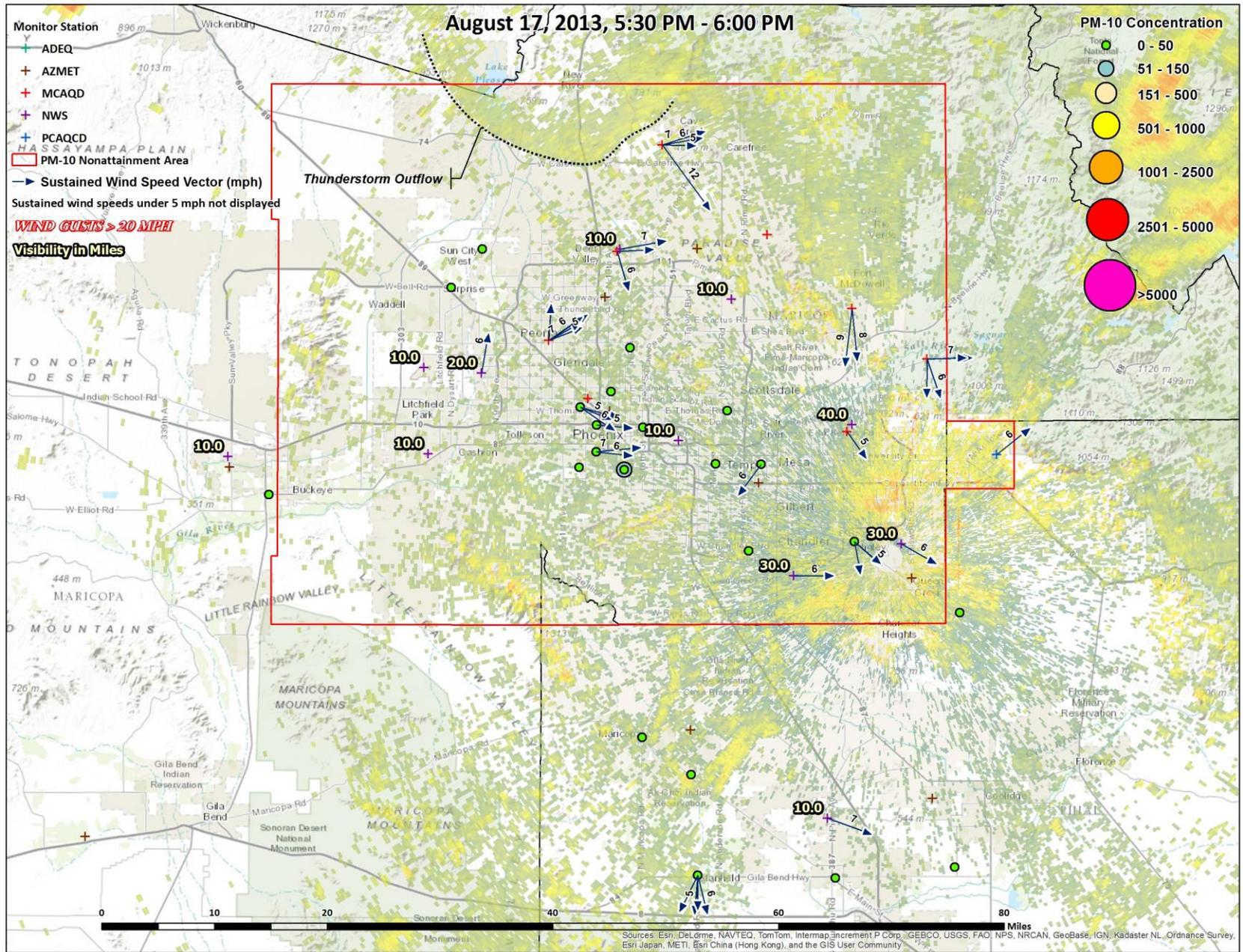


Figure 5-1. August 17, 2013, 5:30 PM – 6:00 PM.

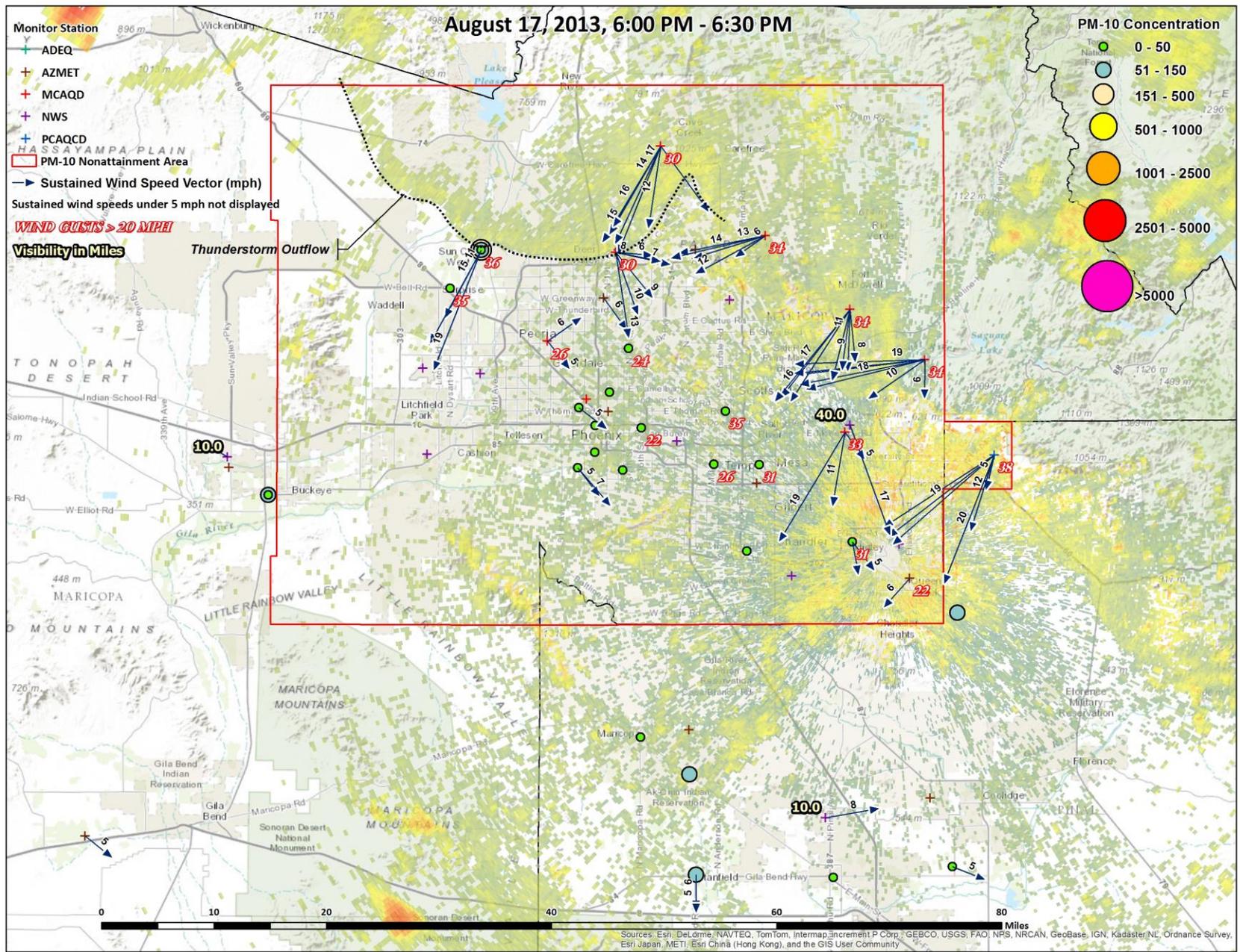


Figure 5-2. August 17, 2013, 6:00 PM – 6:30 PM.

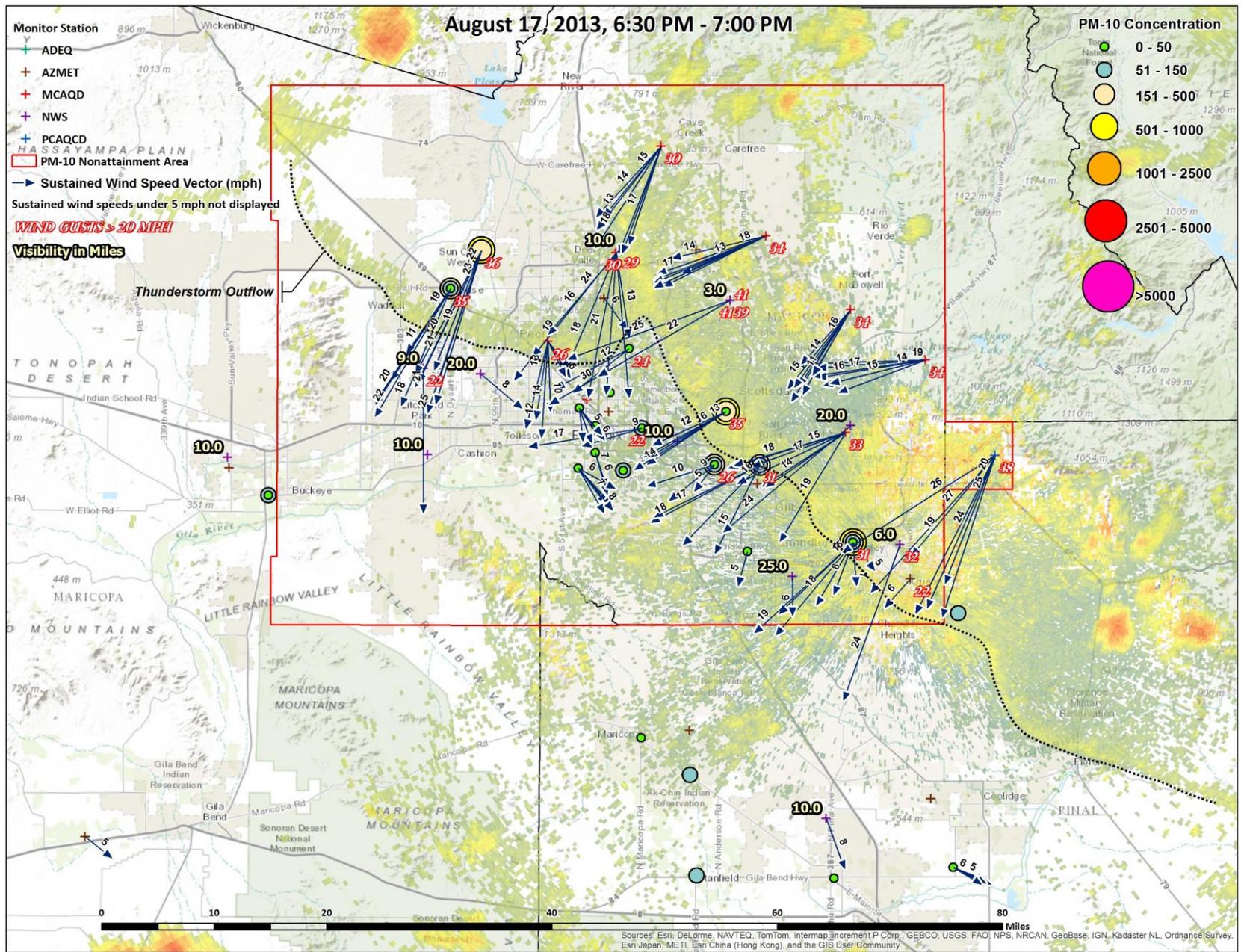


Figure 5-3. August 17, 2013, 6:30 PM – 7:00 PM.

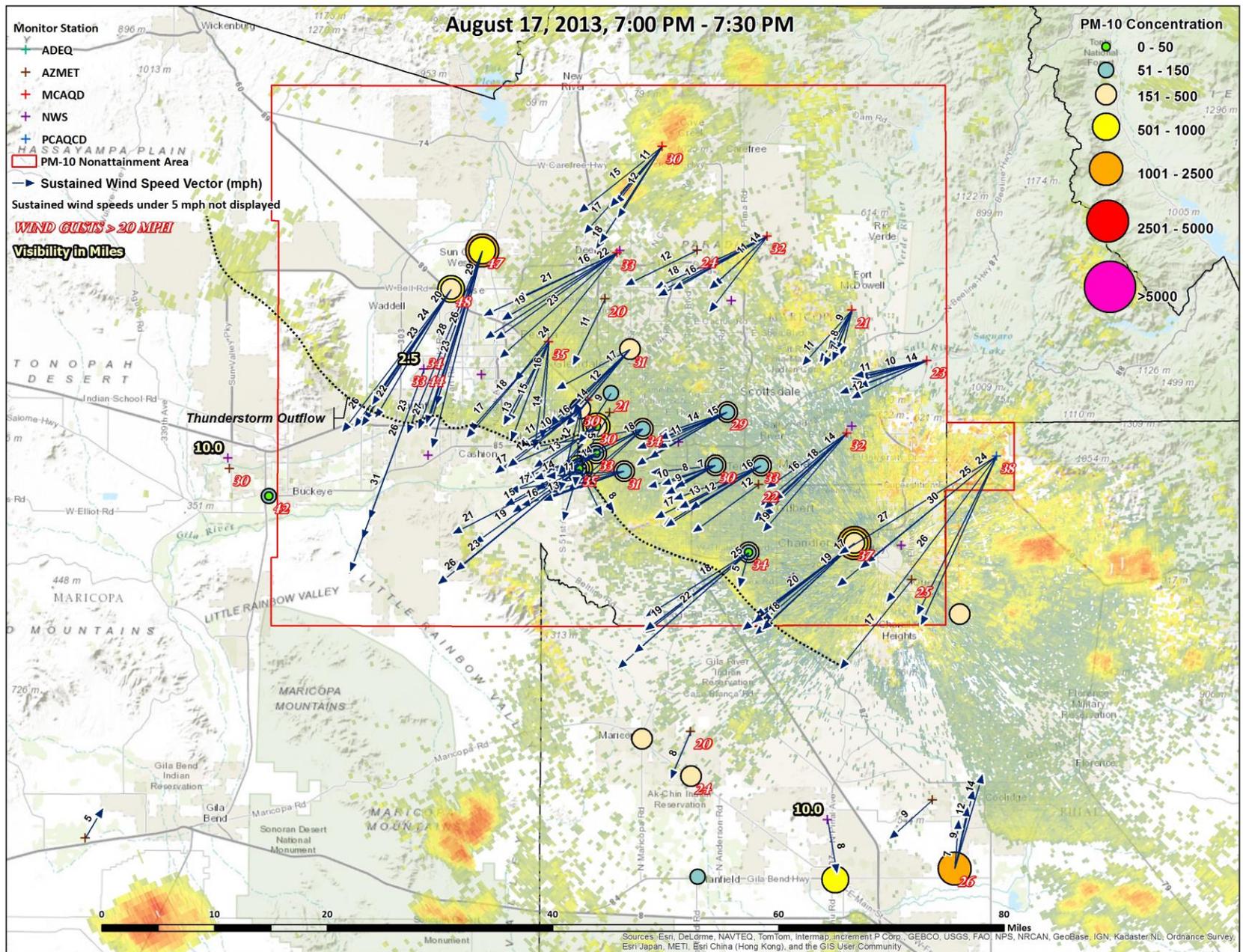


Figure 5-4. August 17, 2013, 7:00 PM – 7:30 PM.

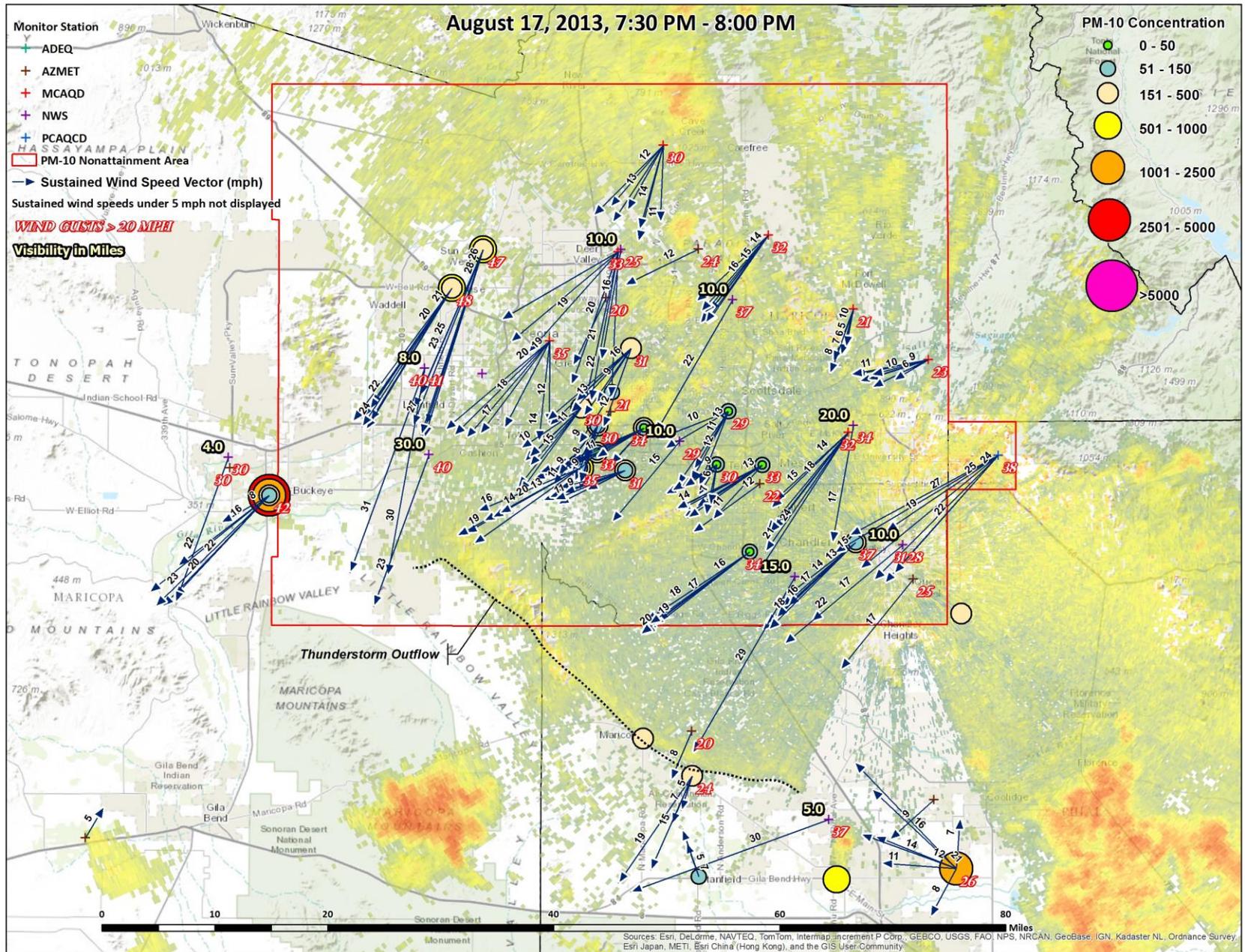


Figure 5-5. August 17, 2013, 7:30 PM – 8:00 PM.

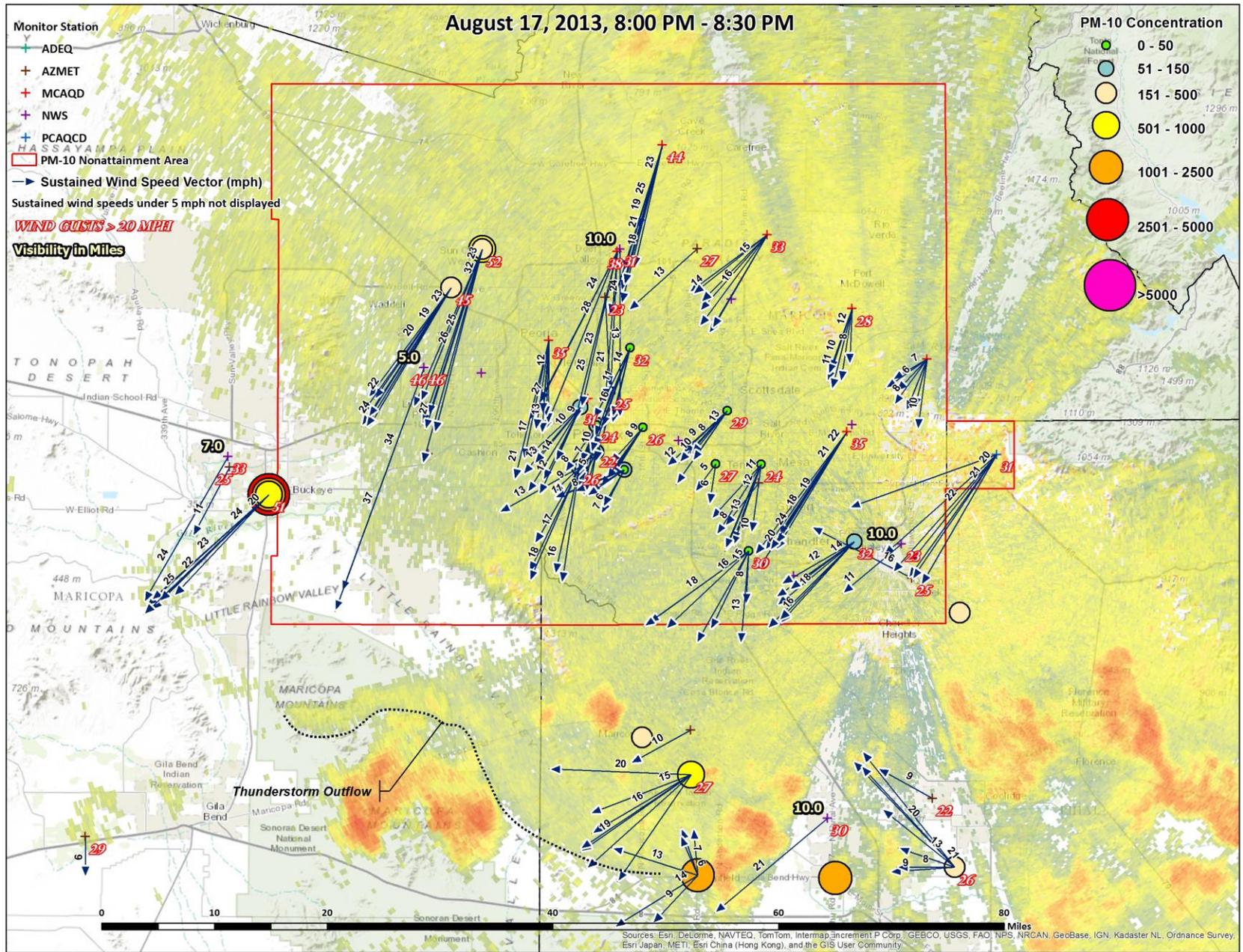


Figure 5-6. August 17, 2013, 8:00 PM – 8:30 PM.

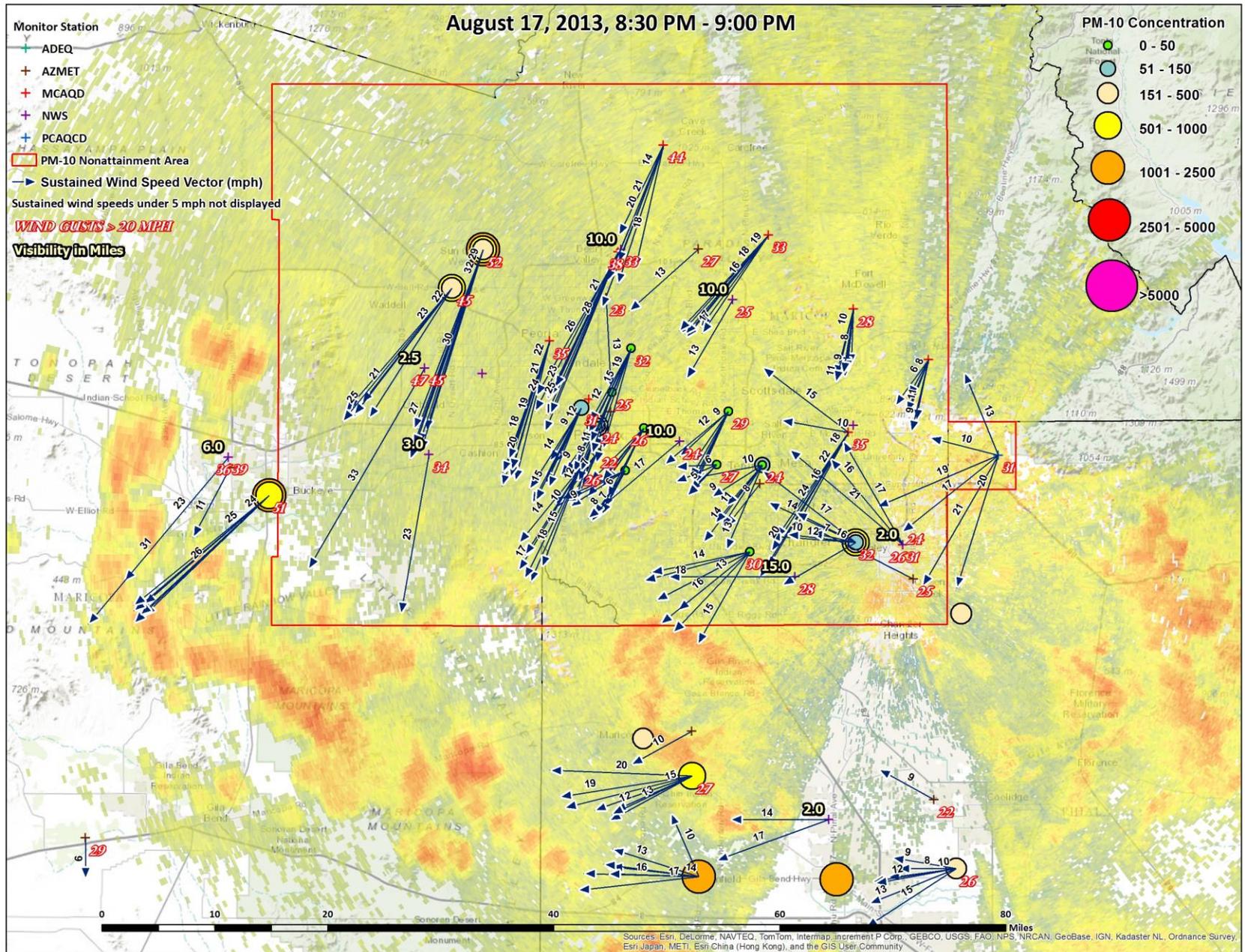
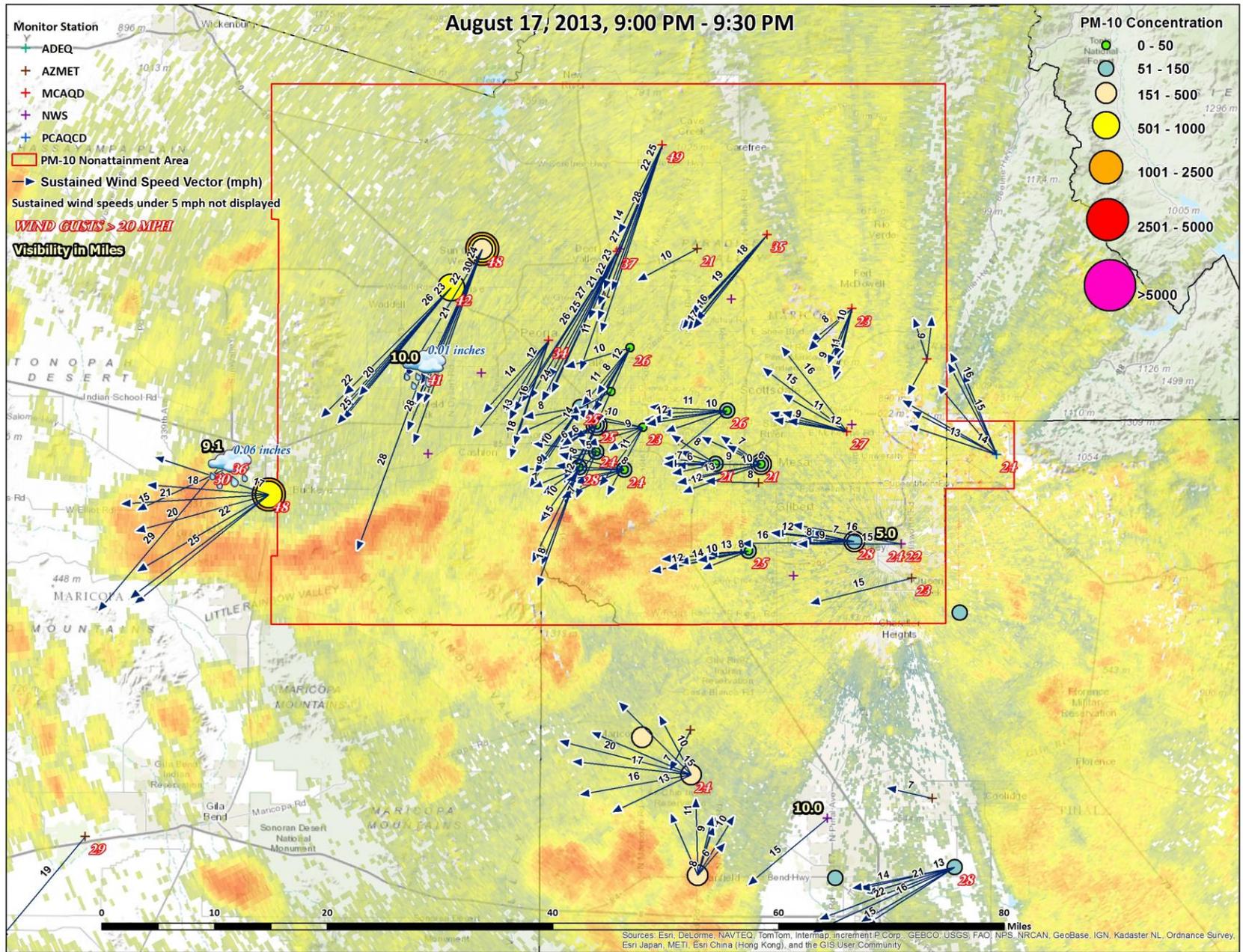


Figure 5-7. August 17, 2013, 8:30 PM – 9:00 PM.



**Figure 5-8.** August 17, 2013, 9:00 PM – 9:30 PM.

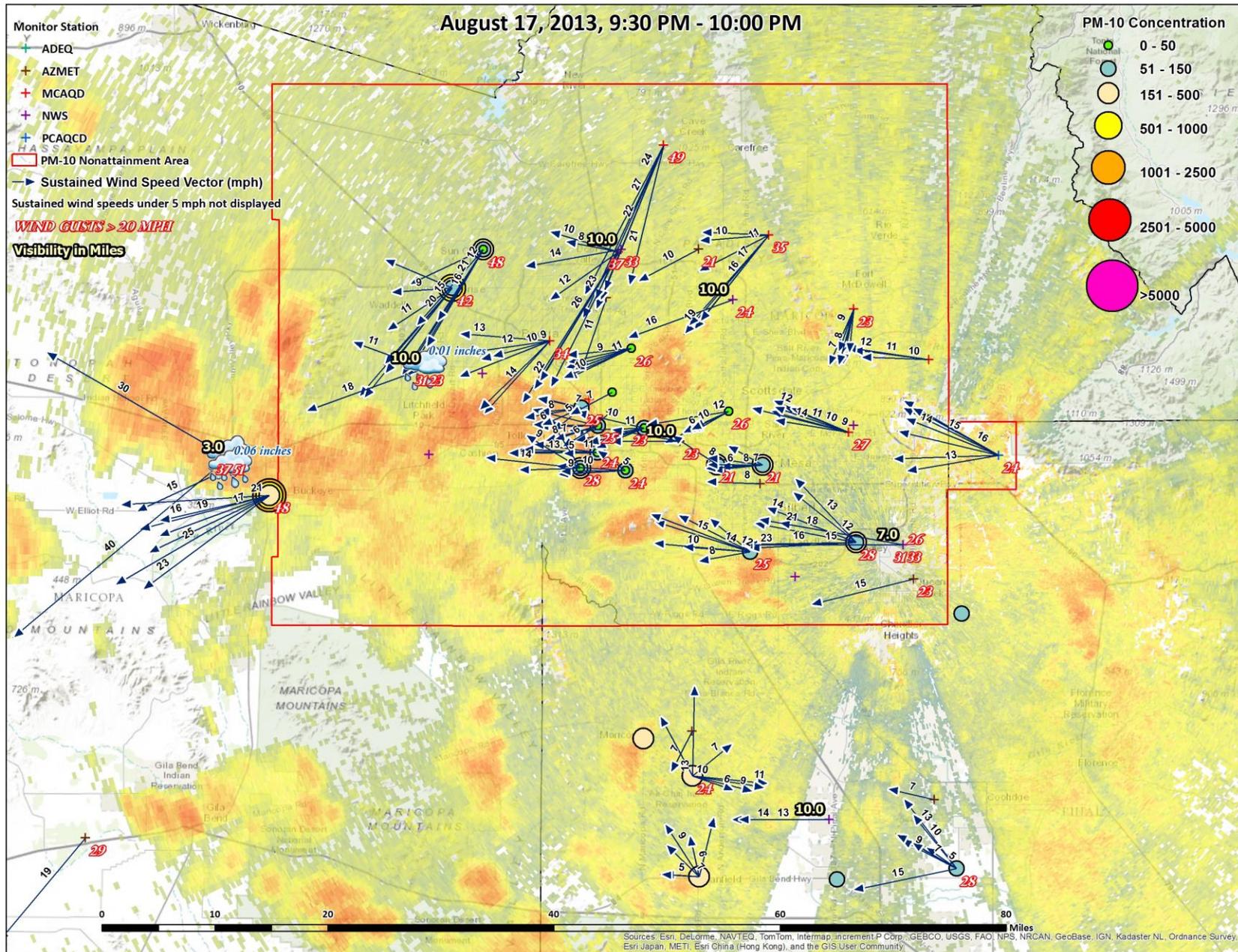


Figure 5-9. August 17, 2013, 9:30 PM – 10:00 PM.

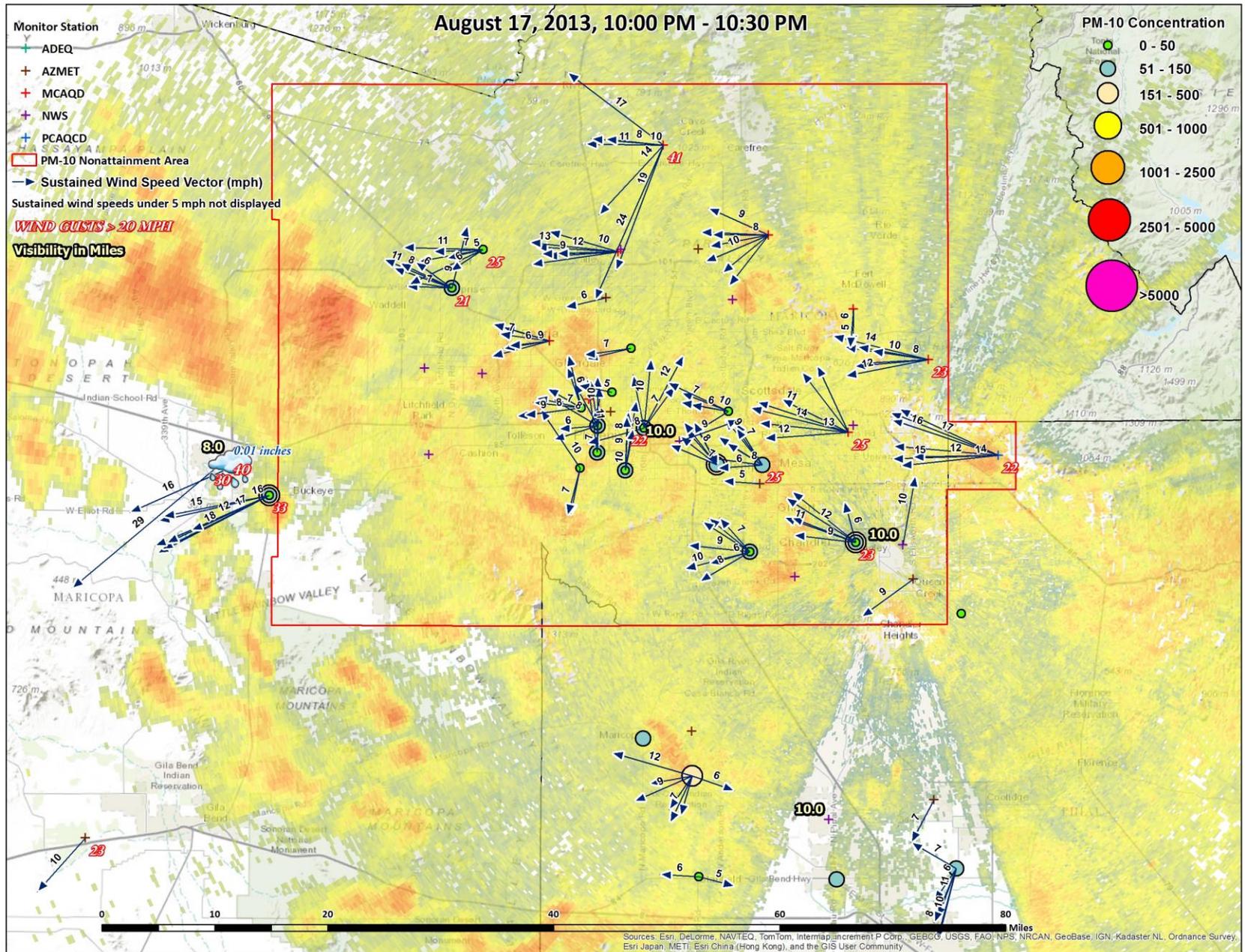


Figure 5-10. August 17, 2013, 10:00 PM – 10:30 PM.

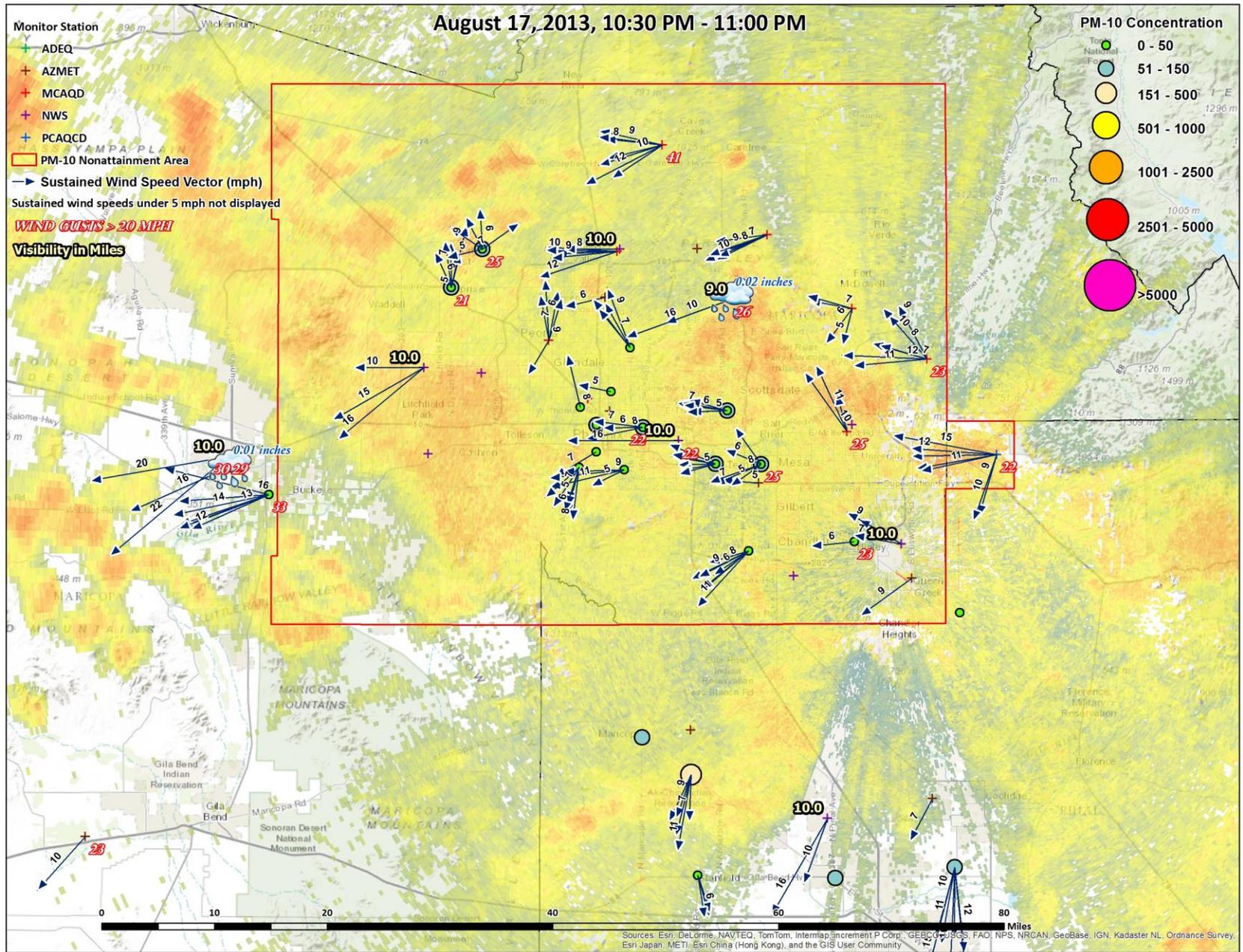


Figure 5-11. August 17, 2013, 10:30 PM – 11:00 PM.

### ***Visibility Photos***

While the event occurred mainly after dark on August 17, 2013, time series videos of visibility photos taken on the day of the event facing the White Tank Mountains (link #1) do show the approach of the thunderstorm outflow and decreased visibility due to the dust storm associated with the thunderstorm outflow. Locations for visibility cameras positioned in the Phoenix area are shown in link #2.

1.) [http://www.phoenixvis.net/tlapse\\_camera.aspx?site=WHTM1](http://www.phoenixvis.net/tlapse_camera.aspx?site=WHTM1)

2.) <http://www.phoenixvis.net/>

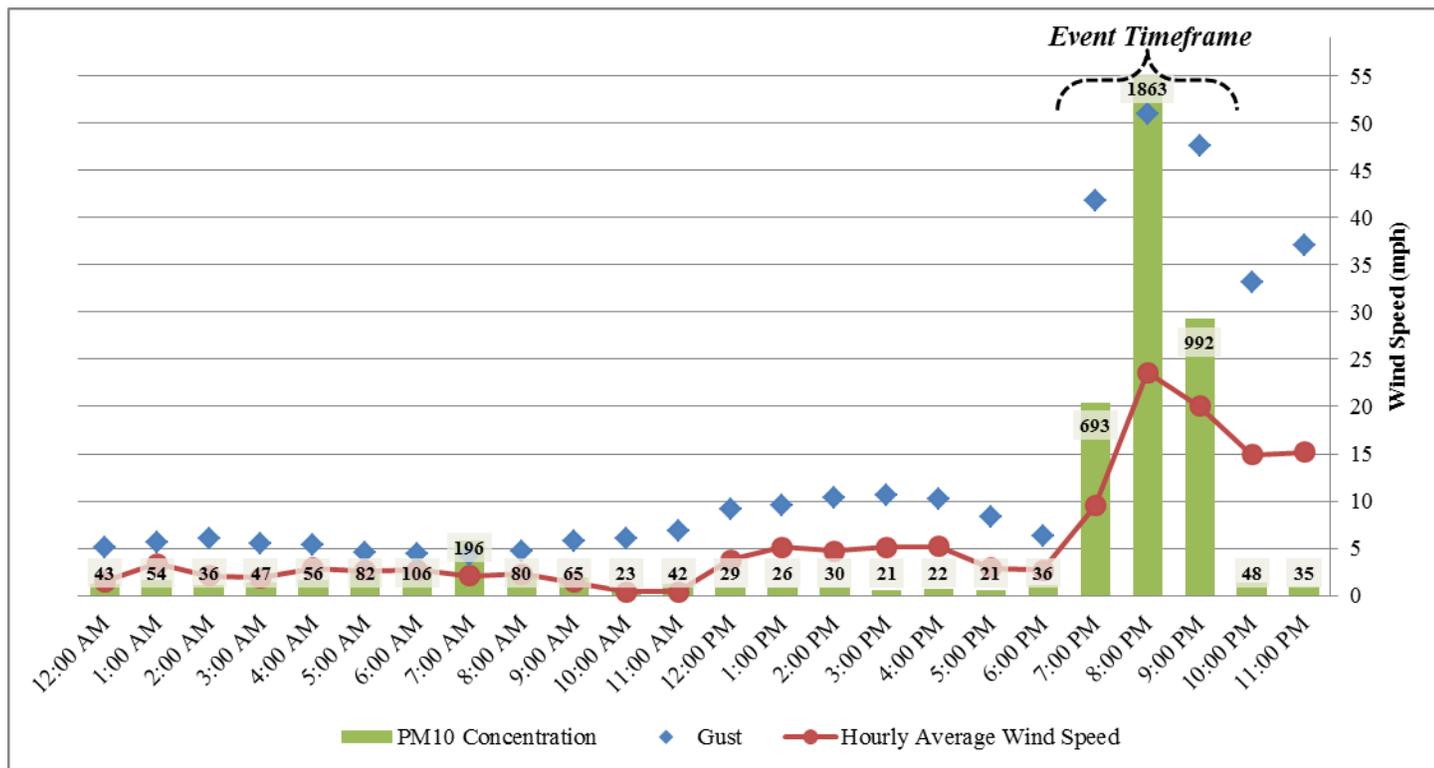
### **Conclusion**

The information presented within this section has adequately demonstrated a clear causal relationship between the emissions generated by uncontrollable natural events and the exceedance measured at the Buckeye monitor. The maps provided in this section contain an illustration of the event as it unfolded. The series of maps for the event show a spatial and temporal representation of the thunderstorm outflow winds and associated windblown dust as they move throughout Maricopa County. These maps show a clear causal connection between the windblown dust generated by the thunderstorm outflow winds and the exceedance at the Buckeye monitor. Visibility photos help show the approach of the thunderstorm outflow and the reduced visibilities associated with the dust storm generated by the outflow. It is clear from these data that thunderstorm outflow winds generated uncontrollable windblown PM10 emissions at the Buckeye monitor, demonstrating a clear causal connection between the event and the exceedance.

## VI. “BUT FOR” ANALYSIS

Section 50.14(c)(3)(iv)(D) in 40 CFR part 50 requires that an exceptional event demonstration must satisfy 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 the exceedance on August 17, 2013, was not reasonably controllable or preventable and that there is a clear causal relationship between the windblown dust generated by thunderstorm outflow winds and the exceedance at the Buckeye monitor. The weight of evidence in these sections demonstrates that but for the existence of windblown dust emissions generated by thunderstorm outflow winds, there would have been no exceedance of the 24-hour PM10 standard.

As detailed in Section IV, all reasonable control measures were in place and actively enforced before, during, and after the exceedances on August 17, 2013. Inspection and compliance data of local fugitive dust sources during this time period revealed that PM10 from anthropogenic activities was well controlled and constant. Real-time surveillance of PM10 monitoring stations during the event established a clear link between rapidly rising PM10 concentrations and the arrival of the thunderstorm outflow winds. Figure 6–1 shows that PM10 concentrations in the hours before the event at the exceeding Buckeye monitor were at normal levels, indicating no significant anthropogenic activities. PM10 concentrations in the hours after the event show a quick return to low levels once generated dust from the thunderstorm outflows passed the monitoring station.



**Figure 6-1.** Hourly PM10 concentration, wind gust, and average wind speed as recorded at the Buckeye monitor.

As shown in Section V, detailed, time series maps establish a clear causal relationship between the arrival of windblown dust generated by thunderstorm outflow winds and elevated PM10 concentrations at the Buckeye monitor. The body of evidence presented in this submittal confirms that the exceedance on August 17, 2013 was a natural event and that there would have been no exceedance but for the presence of the uncontrollable windblown dust from the thunderstorm outflow winds.

## **VII. CONCLUSIONS**

The exceedance that occurred on August 17, 2013, satisfy the criteria of 40 CFR 50.1(j) and meet the definition of an exceptional event. These criteria are:

- The event affects air quality.
- The event is not reasonably controllable or preventable.
- The event is unlikely to reoccur at a particular location or [is] a natural event.

### **A. Affects Air Quality**

As stated in the preamble to the Exceptional Events Rule, 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 measured concentrations in excess of normal historical fluctuations. Given the information presented in Sections II, III, IV and V, it is reasonable to conclude that the event in question affected air quality.

### **B. Not Reasonably Controllable or Preventable**

Section 50.1(j) of Title 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 Maricopa County, high wind conditions overwhelmed all reasonably available controls. Despite the deployment of comprehensive control measures and sophisticated response programs, high wind conditions associated with thunderstorms and thunderstorm outflows generated high concentrations of PM10 emissions in Maricopa County. The event discussed in this document that caused the exceedances in this request (see Sections II and V) was caused by thunderstorm driven outflow winds that generated dust in Maricopa County from open and natural desert areas. The fact that this was a natural event involving strong thunderstorm outflow winds that generated PM10 emissions in Maricopa County provides strong evidence that the event and exceedance of August 17, 2013, recorded at the Buckeye monitor was not reasonably controllable or preventable.

### **C. Natural Event**

As discussed above, the event shown to cause the exceedance was emissions of PM10 generated by high winds caused by thunderstorm activity and related outflow boundaries on August 17, 2013. The event therefore qualifies as a natural event.

In summary, the exceedance of the federal 24-hour PM10 standard on August 17, 2013, would not have occurred but for the monsoonal thunderstorm driven high winds and windblown dust generated in Maricopa County, based on the following weight of evidence:

- Historical Fluctuation data in Section III showing five years of 24-hour average data for the exceeding Buckeye monitor demonstrates that the value on August 17, 2013, was atypical and in excess of normal historical fluctuations.
- Section IV discusses rules that are in place in Maricopa County as well as inspections that were conducted in the area to verify compliance with those rules in order to show that the event was not reasonably controllable or preventable. Visibility camera imagery displayed in Section V indicates the widespread nature of the windblown dust caused by the low pressure system winds and provides evidence that high PM10 concentrations are linked to natural sources as opposed to specific anthropogenic sources of dust.
- The exceedance of the PM10 standard recorded on August 17, 2013, was tied to thunderstorm activity and thunderstorm generated outflow winds, as can be seen in radar imagery analyses in Section V.
- Figures in Section V show that the timing of thunderstorm generated outflow boundary passage and increases in wind speeds at monitoring locations and National Weather Service stations during the event are consistent with the timing of elevated PM10 concentrations recorded at the monitoring locations in Maricopa County.
- Wind directions, thunderstorm generated outflow boundary propagation, and concentration patterns showing elevated levels of PM10 in Maricopa County help to show that the monitors that recorded the highest PM10 concentrations were downwind of large, open and natural desert areas.
- Visibility camera imagery displayed in Section V indicates the widespread nature of the windblown dust transported by thunderstorm outflow winds and provides evidence that high PM10 concentrations are linked to natural sources as opposed to specific anthropogenic sources of dust.

**APPENDIX A**

**ADEQ FORECAST PRODUCTS FOR MARICOPA COUNTY**



## MARICOPA COUNTY DUST CONTROL FORECAST

**ISSUED Friday, August 16, 2013**

Three-day weather outlook:

Phoenix will see daytime highs around 106-110°F through the middle of next week under partly cloudy skies. The monsoon pattern has returned to much of Arizona with high pressure centered over the Arizona-New Mexico border. Surface winds are forecast to be fairly light during the day, gusting near outflow from nearby thunderstorms. For now, the risk of exceeding the 24-hr PM10 health standard in Phoenix is forecast to be Low through at least Wednesday of next week.

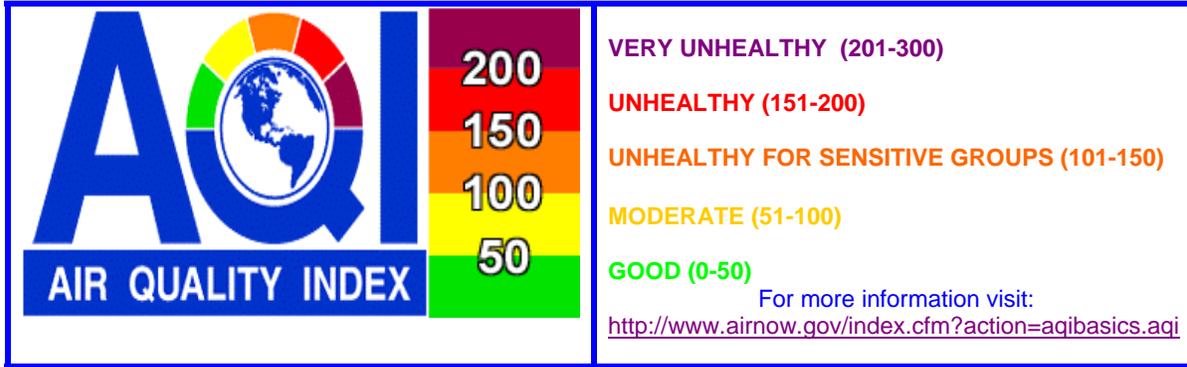
### R I S K F A C T O R S

	<u>WINDS</u>	<u>STAGNATION</u>	<u>UNHEALTHY PM-10 RISK LEVEL</u>
<b>Day 1: Sat. 8/17/2013</b>	Southwest winds around 5 mph are expected (20% chance of showers).	+ Stagnant conditions are expected, improving if precipitation occurs.	= <b>LOW</b>
<b>Day 2: Sun. 8/18/2013</b>	Southwest winds around 5 mph are expected (20% chance of showers).	+ Stagnant conditions are expected, improving if precipitation occurs.	= <b>LOW</b>
<b>Day 3: Mon. 8/19/2013</b>	West-northwest winds around 5 mph are expected (10% chance of showers).	+ Stagnant conditions are expected, improving if precipitation occurs.	= <b>LOW</b>

### EXTENDED OUTLOOK

<b>Day 4: Tue. 8/20/2013</b>	West winds around 5 mph are expected.	+ Stagnant conditions are expected.	= <b>LOW</b>
<b>Day 5: Wed. 8/21/2013</b>	Southwest winds between 5 and 10 mph are expected.	+ Stagnant conditions are expected.	= <b>LOW</b>

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](tel: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](tel: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>.



[\\*LINK TO 2012 AIR POLLUTION EXCEEDANCE GRAPH\\*](#)

**AIR QUALITY FORECAST FOR Saturday, August 17, 2013**

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	YESTERDAY <a href="#">Thu 08/15/2013</a>	TODAY <a href="#">Fri 08/16/2013</a>	TOMORROW <a href="#">Sat 08/17/2013</a>	EXTENDED <a href="#">Sun 08/18/2013</a>
<b>NOTICES</b> (*SEE BELOW FOR DETAILS)	Dust	Ozone Health Watch Dust	Dust	
AIR POLLUTANT	Highest AQI Reading/Site (*Preliminary data only*)			
<b>O3*</b>	111 Phoenix Supersite	93 Moderate	87 Moderate	77 Moderate
<b>CO*</b>	3 Greenwood & Phoenix Supersite	7 Good	5 Good	6 Good
<b>PM-10*</b>	54 Buckeye	70 Moderate	65 Moderate	50 Good
<b>PM-2.5*</b>	35 West Phoenix	45 Good	45 Good	30 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 Statements	
Friday, 08/16/2013	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
Saturday, 08/17/2013	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.

### SYNOPSIS AND DISCUSSION

#### ...AN OZONE HEALTH WATCH REMAINS IN EFFECT FOR TODAY, FRIDAY, AUGUST 16, 2013...

Phoenix will see daytime highs around 106-110°F through the middle of next week under partly cloudy skies. The monsoon pattern has returned to much of Arizona with high pressure centered over the Arizona-New Mexico border. Surface winds are forecast to be fairly light during the day, gusting near outflow from nearby thunderstorms. Thus, PM10 levels are forecast to reach the low to middle Moderate range through Saturday as a result.

Ozone levels made another last-gasp push into the Unhealthy for Sensitive Groups category on Thursday at the Phoenix Supersite and North Phoenix monitors, right on cue with the return of high pressure close the Four Corners area. The trapping of accumulating ozone concentrations will ease somewhat over the weekend, allowing maximum 8-hr levels to improve into the low to middle Moderate range. Lingering morning cloud cover from nighttime monsoon storms this weekend may also help to block ozone-forming sunlight during this period. Thus, we are allowing Friday's Ozone Health Watch to expire this evening with no further extension or escalation.

Check back on Sunday for a look ahead at next week's weather and air quality. Until then, have a great weekend! -J.Paul

MONITORING SITE MAPS	
STATIC MAP	<a href="http://azdeg.gov/environ/air/assessment/images/map.jpg">http://azdeg.gov/environ/air/assessment/images/map.jpg</a>
INTERACTIVE MAPS	<a href="http://alert.fcd.maricopa.gov/alert/Google/v3/air.html">http://alert.fcd.maricopa.gov/alert/Google/v3/air.html</a> <a href="http://www.airnow.gov/">http://www.airnow.gov/</a>

### POLLUTION MONITOR READINGS FOR Thursday, August 15, 2013

#### O3 (OZONE)

Info on current 8-hour ozone standard: [http://www.epa.gov/air/ozonepollution/pdfs/2008\\_03\\_aqi\\_changes.pdf](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	50	42	Green
Apache Junction	53	45	Green
Blue Point	65	67	Yellow
Buckeye	47	40	Green
Casa Grande	55	47	Green
Cave Creek	68	77	Yellow
Central Phoenix	69	80	Yellow
Dysart	70	84	Yellow
Falcon Field	66	71	Yellow
Fountain Hills	60	51	Yellow
Glendale	70	84	Yellow
Humboldt Mountain	61	54	Yellow
Phoenix Supersite	80	111	Orange
Mesa	67	74	Yellow
North Phoenix	78	106	Orange
Pinal Air Park	57	48	Green

Pinnacle Peak	68	77	
Queen Valley	58	49	
Rio Verde	52	44	
South Phoenix	63	61	
South Scottsdale	70	84	
Tempe	62	58	
Tonto Nat'l Mon.	53	45	
West Chandler	60	51	
West Phoenix	73	93	
Yuma	42	36	

### CO (CARBON MONOXIDE)

SITE NAME	MAX 8-HR VALUE (PPM)	MAX AQI	AQI COLOR CODE
Central Phoenix	0.2	2	
Greenwood	0.3	3	
Phoenix Supersite	0.3	3	
West Phoenix	0.1	1	

### PM-10 (PARTICLES)

SITE NAME	MAX 24-HR VALUE (µg/m3)	MAX AQI	AQI COLOR CODE
Buckeye	61.6	54	
Central Phoenix	29.0	26	
Combs School (Pinal County)	51.9	47	
Durango	36.4	33	
Dysart	38.5	35	
Glendale	31.0	28	
Greenwood	43.8	40	
Higley	35.4	32	
Maricopa (Pinal County)	40.4	37	
Phoenix Supersite	27.6	25	
Mesa	18.6	17	
North Phoenix	22.5	20	
South Phoenix	36.8	34	
South Scottsdale	28.9	26	
Tempe	25.3	23	
West Chandler	27.7	25	
West Forty Third	35.9	33	
West Phoenix	36.8	34	
Zuni Hills	32.8	30	

### PM-2.5 (PARTICLES)

(Some data derived from light-scattering equipment)

For maps go to: <http://www.airnow.gov/>

SITE NAME	MAX 24-HR VALUE (µg/m3)	MAX AQI	AQI COLOR CODE
Durango	5.4	18	
Glendale	6.7	22	
Phoenix Supersite	6.5	21	
Mesa	4.8	16	
North Phoenix	8.5	28	
South Phoenix	6.8	22	
Tempe	5.1	17	
West Phoenix	10.7	35	

## DESCRIPTION OF LOCAL AIR POLLUTANTS IN DETAIL



### **O3 (OZONE):**

#### Description –

This is a secondary pollutant that is formed by the reaction of other primary pollutants (precursors) such as VOCs (volatile organic compounds) and NO<sub>x</sub> (Nitrogen Oxides) in the presence of heat and sunlight.

Sources – VOCs are emitted from motor vehicles, chemical plants, refineries, factories, and other industrial sources. NO<sub>x</sub> is emitted from motor vehicles, power plants, and other sources of combustion.

Potential health impacts – Exposure to ozone can make people more susceptible to respiratory infection, result in lung inflammation, and aggravate pre-existing respiratory diseases such as asthma. Other effects include decrease in lung function, chest pain, and cough.

Unit of measurement – Parts per billion (ppb).

Averaging interval – Highest eight-hour period within a 24-hour period (midnight to midnight)

Reduction tips – Curtail daytime driving, refuel cars and use gasoline-powered equipment as late in the day as possible.

### **CO (CARBON MONOXIDE):**

Description – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely.

Sources – In cities, as much as 95 percent of all CO emissions emanate from automobile exhaust. Other sources include industrial processes, non-transportation fuel combustion, and natural sources such as wildfires. Peak concentrations occur in colder winter months.

Potential health impacts – Reduces oxygen delivery to the body's organs and tissues. The health threat is most serious for those who suffer from cardiovascular disease.

Unit of measurement – Parts per million (ppm).

Averaging interval – Highest eight-hour period within a 24-hour period (midnight to midnight)

Reduction tips – Keep motor vehicle tuned properly and minimize nighttime driving.

### **PM-10 & PM-2.5 (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 less than 2.5 micrometers in diameter are referred to as “fine” particles and are responsible for many visibility degradations such as the “Valley Brown Cloud” (see <http://www.phoenixvis.net/>). Particles with diameters between 2.5 and 10 micrometers are referred to as “coarse”.

Sources – Fine = All types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Coarse = crushing or grinding operations and dust from paved or unpaved roads.

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

Units of measurement – Micrograms per cubic meter (ug/m<sup>3</sup>)

Averaging interval – 24 hours (midnight to midnight).

Reduction tips – Stabilize loose soils, slow down on dirt roads, carpool, and use public transit.

{Updated 12/19/2011}

## **APPENDIX B**

### **NATIONAL WEATHER SERVICE METEOROLOGICAL OBSERVATIONS AND STORM REPORTS**

AWS ID	WBAN ID	Name	Country	State	Latitude	Longitude	Elevation																						
720644	99999	BUCKEYE MUNI	UNITED STATES	ARIZONA	+33.417	-112.683	+0311.0 (meters)																						
USAF	WBAN	YR--MODAHRMN	DIR	SPD	GUS	CLG	SKC	L	M	H	VSB	MW	MW	MW	MW	AW	AW	AW	AW	W	TEMP	DEWP	SLP	ALT	STP	MAX	MIN	PCP01	PC
		GMT		MPH	MPH						Miles										F	F	mb	inches	mb	F	F	inches	in
720644	99999	201308170715	020	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	91	55	*****	29.87	*****	***	***	*****	**
720644	99999	201308170735	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	91	54	*****	29.87	*****	***	***	*****	**
720644	99999	201308170755	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	91	54	*****	29.86	*****	***	***	*****	**
720644	99999	201308170815	***	0	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	91	54	*****	29.86	*****	***	***	*****	**
720644	99999	201308170835	020	3	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	54	*****	29.86	*****	***	***	*****	**
720644	99999	201308170855	020	5	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	52	*****	29.86	*****	***	***	*****	**
720644	99999	201308170915	020	5	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	52	*****	29.86	*****	***	***	*****	**
720644	99999	201308170935	040	3	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	52	*****	29.86	*****	***	***	*****	**
720644	99999	201308170955	360	3	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	88	52	*****	29.86	*****	***	***	*****	**
720644	99999	201308171015	***	0	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	52	*****	29.86	*****	***	***	*****	**
720644	99999	201308171035	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	52	*****	29.87	*****	***	***	*****	**
720644	99999	201308171055	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	50	*****	29.87	*****	***	***	*****	**
720644	99999	201308171115	***	0	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	50	*****	29.87	*****	***	***	*****	**
720644	99999	201308171135	080	5	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	86	54	*****	29.87	*****	***	***	*****	**
720644	99999	201308171155	060	3	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	86	54	*****	29.87	*****	***	***	*****	**
720644	99999	201308171215	080	3	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	86	52	*****	29.88	*****	***	***	*****	**
720644	99999	201308171235	050	5	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	86	52	*****	29.88	*****	***	***	*****	**
720644	99999	201308171255	060	3	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	86	52	*****	29.89	*****	***	***	*****	**
720644	99999	201308171315	100	3	***	120	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	88	54	*****	29.90	*****	***	***	*****	**
720644	99999	201308171335	070	5	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	54	*****	29.90	*****	***	***	*****	**
720644	99999	201308171355	080	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	54	*****	29.91	*****	***	***	*****	**
720644	99999	201308171415	070	3	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	90	55	*****	29.91	*****	***	***	*****	**
720644	99999	201308171435	100	3	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	91	55	*****	29.91	*****	***	***	*****	**
720644	99999	201308171455	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	91	55	*****	29.92	*****	***	***	*****	**
720644	99999	201308171515	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	93	55	*****	29.92	*****	***	***	*****	**
720644	99999	201308171535	***	0	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	93	54	*****	29.92	*****	***	***	*****	**
720644	99999	201308171555	140	3	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	95	54	*****	29.93	*****	***	***	*****	**
720644	99999	201308171615	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	97	52	*****	29.92	*****	***	***	*****	**
720644	99999	201308171635	150	6	***	***	***	*	*	*	10.0	*	*	*	*	*	*	*	*	*	97	50	*****	29.92	*****	***	***	*****	**
720644	99999	201308171655	170	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	97	54	*****	29.92	*****	***	***	*****	**
720644	99999	201308171715	100	6	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	99	54	*****	29.92	*****	***	***	*****	**
720644	99999	201308171735	120	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	99	52	*****	29.91	*****	***	***	*****	**
720644	99999	201308171755	170	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	100	52	*****	29.90	*****	***	***	*****	**
720644	99999	201308171815	150	6	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	100	52	*****	29.89	*****	***	***	*****	**
720644	99999	201308171835	150	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	102	50	*****	29.88	*****	***	***	*****	**
720644	99999	201308171855	160	7	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	102	54	*****	29.87	*****	***	***	*****	**
720644	99999	201308171915	150	8	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	102	52	*****	29.86	*****	***	***	*****	**
720644	99999	201308171935	210	6	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	102	54	*****	29.84	*****	***	***	*****	**
720644	99999	201308171955	200	3	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	102	54	*****	29.83	*****	***	***	*****	**
720644	99999	201308172015	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	104	54	*****	29.82	*****	***	***	*****	**
720644	99999	201308172035	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	104	54	*****	29.81	*****	***	***	*****	**
720644	99999	201308172055	150	7	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	104	54	*****	29.80	*****	***	***	*****	**
720644	99999	201308172115	180	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	106	52	*****	29.79	*****	***	***	*****	**
720644	99999	201308172135	160	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	106	54	*****	29.78	*****	***	***	*****	**
720644	99999	201308172155	130	6	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	108	52	*****	29.77	*****	***	***	*****	**
720644	99999	201308172215	160	6	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	52	*****	29.76	*****	***	***	*****	**
720644	99999	201308172235	170	7	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	50	*****	29.75	*****	***	***	*****	**
720644	99999	201308172255	170	7	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	50	*****	29.74	*****	***	***	*****	**
720644	99999	201308172315	200	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	50	*****	29.74	*****	***	***	*****	**
720644	99999	201308172335	160	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	50	*****	29.73	*****	***	***	*****	**
720644	99999	201308172355	140	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	50	*****	29.72	*****	***	***	*****	**
720644	99999	201308180015	120	3	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	50	*****	29.72	*****	***	***	*****	**
720644	99999	201308180035	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	48	*****	29.72	*****	***	***	*****	**
720644	99999	201308180055	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	48	*****	29.72	*****	***	***	*****	**
720644	99999	201308180115	120	5	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	48	*****	29.72	*****	***	***	*****	**
720644	99999	201308180135	100	3	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	109	48	*****	29.72	*****	***	***	*****	**
720644	99999	201308180155	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	108	50	*****	29.73	*****	***	***	*****	**
720644	99999	201308180215	***	0	***	722	CLR	*	*	*	10.0	*	*	*	*	*	*	*	*	*	106	48	*****	29.73	*****	***	***	*****	**

720644	99999	201308180235	***	0	***	722	CLR	*	*	10.0	**	**	**	**	**	**	**	**	**	104	48	*****	29.74	*****	***	***	*****	**
720644	99999	201308180255	020	22	30	120	***	*	*	4.0	**	**	**	**	**	**	**	**	**	102	52	*****	29.77	*****	***	***	*****	**
720644	99999	201308180315	030	24	33	120	***	*	*	7.0	**	**	**	**	**	**	**	**	**	100	52	*****	29.77	*****	***	***	*****	**
720644	99999	201308180335	040	23	36	120	***	*	*	5.0	**	**	**	**	**	**	**	**	**	99	52	*****	29.77	*****	***	***	*****	**
720644	99999	201308180355	040	31	39	120	***	*	*	6.0	**	**	**	**	**	**	**	**	**	99	52	*****	29.79	*****	***	***	*****	**
720644	99999	201308180415	040	29	36	120	***	*	*	9.1	**	**	**	**	**	**	**	**	**	99	52	*****	29.81	*****	***	***	*****	**
720644	99999	201308180435	120	30	37	75	***	*	*	5.0	**	**	**	**	**	**	**	**	**	97	54	*****	29.89	*****	***	***	*****	**
720644	99999	201308180455	050	40	51	36	***	*	*	3.0	**	**	**	**	**	**	**	**	**	82	64	*****	29.85	*****	***	***	0.02	**
720644	99999	201308180515	050	29	40	120	***	*	*	8.0	**	**	**	**	**	**	**	**	**	82	64	*****	29.84	*****	***	***	*****	**
720644	99999	201308180535	050	22	30	120	***	*	*	10.0	**	**	**	**	**	**	**	**	**	88	61	*****	29.87	*****	***	***	*****	**
720644	99999	201308180555	080	20	29	120	***	*	*	10.0	**	**	**	**	**	**	**	**	**	88	63	*****	29.89	*****	***	***	*****	**
720644	99999	201308180615	070	29	41	***	***	*	*	8.0	**	**	**	**	**	**	**	**	**	88	59	*****	29.88	*****	***	***	*****	**
720644	99999	201308180635	070	30	38	120	***	*	*	7.0	**	**	**	**	**	**	**	**	**	90	59	*****	29.88	*****	***	***	*****	**
720644	99999	201308180655	090	18	36	120	***	*	*	10.0	**	**	**	**	**	**	**	**	**	88	59	*****	29.89	*****	***	***	*****	**
720644	99999	201308180715	090	18	25	120	***	*	*	10.0	**	**	**	**	**	**	**	**	**	86	63	*****	29.89	*****	***	***	*****	**
720644	99999	201308180735	100	20	32	120	***	*	*	10.0	**	**	**	**	**	**	**	**	**	86	63	*****	29.88	*****	***	***	*****	**
720644	99999	201308180755	090	16	21	120	***	*	*	10.0	**	**	**	**	**	**	**	**	**	84	63	*****	29.88	*****	***	***	*****	**

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**LUKE AFB AIRPORT (23111)**  
**GLENDALE, AZ**  
(08/2013)

Elevation: 1085 ft. above sea level  
Latitude: 33.55  
Longitude: -112.366  
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
17	0058	0	CLR	10.00		96	35.3	71	21.4	57	13.9	27	0	000		28.71			29.80	AA		29.86
17	0158	0	CLR	10.00		95	35.0	70	21.3	57	14.0	28	3	130		28.71			29.80	AA		29.86
17	0258	0	SCT170	10.00		94	34.4	71	21.6	59	14.8	31	2	100		28.70			29.80	AA		29.85
17	0358	0	FEW190	10.00		91	32.5	70	21.2	59	14.8	34	0	000		28.71			29.81	AA		29.86
17	0458	0	FEW190	10.00		88	30.9	70	21.2	61	15.9	40	3	340		28.71			29.82	AA		29.87
17	0558	0	BKN210	10.00		87	30.8	71	21.4	62	16.7	43	3	060		28.74			29.84	AA		29.89
17	0658	0	CLR	10.00		88	31.3	70	21.3	61	16.1	40	5	310		28.74			29.85	AA		29.90
17	0758	0	CLR	10.00		91	32.8	71	21.5	60	15.7	35	3	070		28.76			29.87	AA		29.92
17	0858	0	CLR	10.00		94	34.5	72	21.9	60	15.4	32	3	020		28.76			29.87	AA		29.92
17	0958	0	CLR	10.00		97	36.3	72	22.4	60	15.4	29	0	000		28.76			29.87	AA		29.92
17	1058	0	CLR	10.00		101	38.1	73	22.5	58	14.7	24	1	VR		28.74			29.85	AA		29.90
17	1158	0	CLR	10.00		103	39.7	73	22.7	58	14.3	23	5	120		28.71			29.81	AA		29.86
17	1258	0	CLR	10.00		106	40.9	74	23.2	58	14.2	21	6	VR		28.67			29.77	AA		29.82
17	1358	0	CLR	10.00		107	41.6	74	23.1	57	14.0	19	5	280		28.64			29.74	AA		29.79
17	1458	0	CLR	10.00		109	42.7	74	23.1	56	13.4	18	13	210		28.61			29.70	AA		29.76
17	1558	0	CLR	10.00		110	43.2	73	22.6	53	11.8	15	8	260		28.58			29.68	AA		29.73
17	1658	0	CLR	10.00		110	43.4	72	22.3	52	11.3	15	5	250		28.57			29.67	AA		29.72
17	1758	0	CLR	10.00		109	43.0	72	22.2	52	11.2	15	2	VR		28.57			29.67	AA		29.72
17	1858	0	CLR	9.00		108	42.3	72	22.0	52	11.0	16	21	360	22	28.59			29.69	AA		29.74
17	1908	0	CLR	4.00	HZ	102	39.0	72	22.3	57	14.0	23	26	020	34	28.59			M	AA	T	29.74
17	1918	0	FEW200	7.00		100	38.0	72	22.0	57	14.0	24	23	020	33	28.60			M	AA	T	29.75
17	1928	0	SCT200	2.50	-DZ	99	37.0	72	22.4	59	15.0	27	31	020	44	28.61			M	AA	T	29.76
17	1948	0	FEW200	5.00	HZ	99	37.0	72	22.4	59	15.0	27	31	020	40	28.61			M	AA	T	29.76
17	1958	0	CLR	8.00		98	36.6	71	21.7	57	13.9	26	30	010	41	28.63			29.73	AA	T	29.78
17	2008	0	FEW140 SCT170	4.00	HZ	99	37.0	71	21.9	57	14.0	25	34	020	46	28.62			M	AA		29.77
17	2028	0	FEW140 BKN190	5.00	HZ	97	36.0	71	21.6	57	14.0	26	37	020	46	28.64			M	AA		29.79
17	2048	0	FEW190	4.00	HZ	95	35.0	71	21.8	59	15.0	30	33	030	47	28.65			M	AA		29.80
17	2058	0	CLR	2.50	-DZ	95	35.0	70	21.3	57	14.0	28	33	030	45	28.66			29.76	AA		29.81
17	2118	0	FEW190	10.00		93	34.0	70	20.9	57	14.0	30	28	020	41	28.68			M	AA	0.01	29.83
17	2145	0	SCT130 BKN180	10.00		93	34.0	71	21.5	59	15.0	32	18	070	31	28.74			M	AA	0.01	29.89
17	2158	0	BKN120 OVC180	10.00		95	35.0	70	21.3	57	14.0	28	11	110	23	28.76			29.87	AA	0.01	29.92
17	2233	0	SCT140 BKN160	10.00	-TSRA	91	33.0	71	21.7	61	16.0	37	10	090		28.78			M	AA	T	29.94
17	2256	0	SCT120	10.00	-DZ	93	34.0	71	21.5	59	15.0	32	16	050		28.78			M	AA	T	29.94
17	2258	0	SCT120	10.00	-DZ	93	34.0	71	21.5	59	15.0	32	15	060		28.78			29.89	AA	T	29.94
17	2348	0	BKN025	10.00	-RA	86	30.0	74	23.1	68	20.0	55	8	070		28.78			M	AA	0.01	29.94
17	2358	0	BKN034	10.00	-RA	86	30.0	75	23.8	70	20.9	59	16	070		28.78			29.89	AA	0.01	29.94

Dynamically generated Tue Nov 05 16:24:45 EST 2013 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**  
**PHOENIX GOODYEAR AIRPORT (03186)**  
**GOODYEAR, AZ**  
(08/2013)

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

Elevation: 968 ft. above sea level  
Latitude: 33.416  
Longitude: -112.383  
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
17	0547	0	BKN180 BKN250	10.00		90	32.0	72	22.2	63	17.0	41	6	120		28.87			M	AA		29.90
17	0647	0	BKN180 BKN250	10.00		91	33.0	72	22.3	63	17.0	39	0	000		28.89			M	AA		29.92
17	0747	0	BKN200 BKN250	10.00		91	33.0	73	22.6	64	18.0	41	5	VR		28.90			M	AA		29.93
17	0847	0	BKN200	10.00		93	34.0	74	23.6	66	19.0	41	6	VR		28.91			M	AA		29.94
17	0947	0	SCT200	10.00		97	36.0	74	23.2	63	17.0	33	5	140		28.91			M	AA		29.94
17	1047	0	BKN200	10.00		100	38.0	75	23.7	63	17.0	30	3	VR		28.89			M	AA		29.92
17	1147	0	FEW180 SCT250	10.00		104	40.0	76	24.2	63	17.0	26	5	VR		28.85			M	AA		29.88
17	1247	0	SCT080	10.00		108	42.0	77	25.0	64	18.0	24	6	VR		28.81			M	AA		29.84
17	1347	0	FEW090	10.00		109	43.0	78	25.7	66	19.0	25	6	VR		28.78			M	AA		29.81
17	1447	0	FEW090	10.00		109	43.0	78	25.7	66	19.0	25	7	VR		28.75			M	AA		29.78
17	1547	0	SCT090	10.00		109	43.0	78	25.7	66	19.0	25	7	VR		28.72			M	AA		29.75
17	1647	0	SCT090 SCT200	10.00		111	44.0	78	25.4	64	18.0	22	9	280		28.70			M	AA		29.73
17	1747	0	SCT090 SCT200	10.00		109	43.0	77	25.1	64	18.0	23	7	VR		28.70			M	AA		29.73
17	1847	0	SCT090 SCT200	10.00		109	43.0	77	25.1	64	18.0	23	6	VR		28.71			M	AA		29.74
17	1947	0	SCT090 BKN200	30.00s	BLDU	100	38.0	76	24.5	66	19.0	33	23	020	40	28.74			M	AA		29.77
17	2047	0	SCT090 BKN200	3.00	BLDU	99	37.0	75	23.8	64	18.0	32	23	010	34	28.77			M	AA		29.80

Dynamically generated Tue Nov 05 16:25:57 EST 2013 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  
GLENDALE MUNICIPAL AIRPORT (53126)  
GLENDALE, AZ  
(08/2013)**

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

Elevation: 1066 ft. above sea level  
Latitude: 33.527  
Longitude: -112.295  
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
17	0647	0	SCT150 BKN200	20.00		91	33.0	69	20.6	57	14.0	32	5	100		28.78		M	AA		29.92	
17	0750	0	SCT150 BKN200	20.00		93	34.0	71	21.5	59	15.0	32	3	VR		28.79		M	AA		29.93	
17	0847	0	SCT150 BKN200	20.00		97	36.0	73	22.7	61	16.0	30	5	VR		28.79		M	AA		29.93	
17	0947	0	SCT150 BKN200	20.00		99	37.0	72	21.9	57	14.0	25	3	VR		28.80		M	AA		29.94	
17	1047	0	SCT150 SCT200	20.00		102	39.0	72	22.4	57	14.0	23	5	130		28.78		M	AA		29.92	
17	1147	0	FEW120 SCT150 SCT200	20.00		104	40.0	73	22.6	57	14.0	21	3	150		28.74		M	AA		29.88	
17	1255	0	FEW150	20.00		106	41.0	73	22.9	57	14.0	20	5	VR		28.71		M	AA		29.84	
17	1347	0	FEW080 FEW150	20.00		108	42.0	74	23.2	57	14.0	19	6	130		28.67		M	AA		29.80	
17	1447	0	FEW080 FEW150	20.00		109	43.0	73	22.6	54	12.0	16	7	150		28.65		M	AA		29.78	
17	1547	0	FEW080 FEW150	20.00		111	44.0	73	22.9	54	12.0	15	5	140		28.62		M	AA		29.75	
17	1647	0	FEW080 FEW150	20.00		111	44.0	73	22.5	52	11.0	14	6	240		28.61		M	AA		29.74	
17	1747	0	FEW080 SCT150	20.00		111	44.0	73	22.5	52	11.0	14	6	190		28.60		M	AA		29.73	
17	1847	0	SCT080 BKN150 BKN250	20.00		109	43.0	71	21.8	50	10.0	14	8	310		28.61		M	AA		29.74	

Dynamically generated Tue Nov 05 13:42:04 EST 2013 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**PHOENIX SKY HARBOR INTL AIRPORT (23183)**  
**PHOENIX, AZ**  
**(08/2013)**

Elevation: 1107 ft. above sea level  
Latitude: 33.427  
Longitude: -112.003  
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
17	0051	11	FEW120 SCT250	10.00		95	35.0	70	21.3	57	13.9	28	10	090		28.69		29.79	AA		29.86	
17	0151	11	FEW120 SCT250	10.00		94	34.4	71	21.6	59	15.0	31	7	090		28.69		29.79	AA		29.86	
17	0251	11	SCT120 SCT250	10.00		93	33.9	71	21.8	60	15.6	33	5	120		28.68		29.78	AA		29.85	
17	0351	11	SCT120 SCT250	10.00		94	34.4	71	21.6	59	15.0	31	5	180		28.69		29.79	AA		29.86	
17	0451	11	SCT120 SCT250	10.00		94	34.4	71	21.4	58	14.4	30	3	180		28.69		29.80	AA		29.87	
17	0551	11	BKN210	10.00		93	33.9	70	20.9	57	13.9	30	0	000		28.70		29.81	AA		29.88	
17	0651	11	SCT120 BKN170 BKN220	10.00		91	32.8	71	21.5	60	15.6	35	9	140		28.72		29.83	AA		29.90	
17	0751	11	FEW120 BKN170 BKN220	10.00		92	33.3	71	21.6	60	15.6	34	10	130		28.74		29.85	AA		29.92	
17	0851	11	FEW120 SCT180 SCT250	10.00		94	34.4	72	21.9	60	15.6	32	8	090		28.74		29.85	AA		29.92	
17	0951	11	FEW120 FEW180 SCT250	10.00		99	37.2	73	22.7	60	15.6	28	7	110		28.74		29.85	AA		29.92	
17	1051	11	FEW120 FEW180 SCT250	10.00		102	38.9	72	22.3	57	13.9	23	3	060		28.71		29.82	AA		29.89	
17	1151	11	FEW120 FEW180 SCT250	10.00		104	40.0	72	22.2	55	12.8	20	6	230		28.69		29.79	AA		29.86	
17	1251	11	FEW120 FEW250	10.00		107	41.7	73	22.6	55	12.8	18	5	VR		28.65		29.75	AA		29.82	
17	1351	11	FEW120 FEW250	10.00		108	42.2	73	22.5	54	12.2	17	5	290		28.62		29.72	AA		29.79	
17	1451	11	FEW090 FEW120 SCT250	10.00		112	44.4	73	22.6	52	11.1	14	6	170		28.58		29.68	AA		29.75	
17	1551	11	FEW090 FEW120 SCT250	10.00		112	44.4	72	22.2	50	10.0	13	7	VR		28.56		29.65	AA		29.73	
17	1651	11	FEW100 FEW120 SCT250	10.00		112	44.4	72	22.2	50	10.0	13	5	VR		28.54		29.64	AA		29.71	
17	1751	11	FEW100 FEW120 SCT250	10.00		110	43.3	71	21.5	48	8.9	13	3	VR		28.54		29.64	AA		29.71	
17	1851	11	FEW110 SCT190 SCT250	10.00		110	43.3	70	21.3	47	8.3	12	3	080		28.56		29.66	AA		29.73	
17	1951	11	FEW090 SCT120 SCT150	10.00		100	37.8	70	21.3	54	12.2	21	15	040	29	28.60		29.70	AA	T	29.77	
17	2051	11	SCT120 SCT150 SCT190	10.00		100	37.8	70	21.1	53	11.7	21	17	050	24	28.63		29.74	AA		29.80	
17	2147	11	BKN120CB BKN150 BKN250	10.00	TS	97	36.0	70	21.1	55	13.0	24	10	100	23	28.71		M	SP		29.89	
17	2151	11	BKN120CB BKN150 BKN250	10.00	-TSRA	96	35.6	72	22.0	59	15.0	29	10	090		28.72		29.83	AA	T	29.90	
17	2227	11	BKN120 BKN150 BKN250	10.00		89	31.7	73	22.9	66	18.9	47	9	250		28.75		M	SP		29.93	
17	2251	11	BKN120 BKN150 OVC250	10.00	-RA	93	33.9	71	21.5	59	15.0	32	16	090	22	28.77		29.88	AA	T	29.95	
17	2306	11	BKN120 BKN150 OVC250	10.00	-RA	91	32.8	72	22.3	63	17.2	39	18	070		28.76		M	SP		29.94	
17	2351	11	BKN120 BKN150 OVC250	10.00		88	31.1	71	21.5	62	16.7	42	13	030		28.76		29.88	AA	T	29.94	

Dynamically generated Tue Nov 05 16:29:48 EST 2013 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  
SCOTTSDALE AIRPORT (03192)  
SCOTTSDALE, AZ  
(08/2013)**

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

Elevation: 1473 ft. above sea level  
Latitude: 33.622  
Longitude: -111.910  
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
17	0053	12	CLR	10.00		93	33.9	70	21.2	58	14.4	31	3	070		28.32		29.82	AA		29.92	
17	0153	12	CLR	10.00		93	33.9	70	21.2	58	14.4	31	0	000		28.31		29.81	AA		29.91	
17	0253	12	CLR	10.00		92	33.3	70	21.3	59	15.0	33	0	000		28.30		29.80	AA		29.90	
17	0353	12	CLR	10.00		92	33.3	70	21.0	58	14.4	32	0	000		28.30		29.80	AA		29.90	
17	0453	12	CLR	10.00		90	32.2	70	21.2	60	15.6	37	3	210		28.31		29.82	AA		29.91	
17	0553	12	CLR	10.00		89	31.7	70	20.8	59	15.0	36	3	090		28.33		29.84	AA		29.93	
17	0653	12	CLR	10.00		89	31.7	70	21.1	60	15.6	38	3	110		28.35		29.85	AA		29.95	
17	0753	12	CLR	10.00		91	32.8	71	21.4	60	15.6	35	3	170		28.36		29.87	AA		29.96	
17	0853	12	CLR	10.00		93	33.9	71	21.4	59	15.0	32	5	170		28.36		29.87	AA		29.96	
17	0953	12	CLR	10.00		96	35.6	72	21.9	59	15.0	29	0	000		28.36		29.87	AA		29.96	
17	1053	12	CLR	10.00		100	37.8	72	22.0	57	13.9	24	5	310		28.34		29.84	AA		29.94	
17	1153	12	CLR	10.00		102	38.9	72	22.3	57	13.9	23	3	320		28.31		29.81	AA		29.91	
17	1253	12	CLR	10.00		104	40.0	73	22.6	57	13.9	21	6	VR		28.27		29.77	AA		29.86	
17	1353	12	CLR	10.00		106	41.1	72	22.4	55	12.8	19	6	200		28.24		29.73	AA		29.83	
17	1453	12	CLR	10.00		107	41.7	72	22.0	53	11.7	17	0	000		28.22		29.71	AA		29.81	
17	1553	12	CLR	10.00		108	42.2	72	22.0	52	11.1	16	7	VR		28.19		29.68	AA		29.78	
17	1653	12	CLR	10.00		108	42.2	72	22.0	52	11.1	16	0	000		28.18		29.67	AA		29.77	
17	1753	12	CLR	10.00		108	42.2	71	21.8	51	10.6	15	0	000		28.18		29.67	AA		29.77	
17	1845	12	CLR	1.75	HZ	102	39.0	71	21.8	55	13.0	21	30s	060	41	28.21		M	SP		29.80	
17	1851	12	CLR	2.00	HZ	102	39.0	71	21.8	55	13.0	21	22	060	41	28.21		M	SP		29.80	
17	1853	12	CLR	3.00	HZ	102	38.9	71	21.8	55	12.8	21	25	070	39	28.21		29.71	AA		29.80	
17	1953	12	CLR	10.00		97	36.1	70	21.0	55	12.8	24	22	030	37	28.23		29.72	AA		29.82	
17	2053	12	CLR	10.00		96	35.6	69	20.6	54	12.2	24	13	030	25	28.26		29.76	AA		29.85	
17	2153	12	BKN110	10.00		94	34.4	69	20.3	54	12.2	26	16	070	24	28.34		29.85	AA		29.94	
17	2243	12	SCT100 OVC120	9.00	TSRA	86	30.0	71	21.8	64	18.0	48	10	070		28.39		M	SP		29.99	
17	2253	12	SCT060 SCT095 OVC120	9.00	-TSRA	86	30.0	71	21.5	63	17.2	46	16	070	26	28.40		29.91	AA	0.02	30.00	
17	2303	12	SCT055 BKN070 OVC120	10.00	-RA	84	29.0	71	21.5	64	18.0	51	6	170	20	28.40		M	SP		30.00	
17	2353	12	CLR	10.00		84	28.9	72	22.1	66	18.9	55	3	180		28.40		29.91	AA	T	30.00	

Dynamically generated Tue Nov 05 16:31:27 EST 2013 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
PHOENIX DEER VALLEY ARPT (03184)  
PHOENIX, AZ  
(08/2013)**

Elevation: 1455 ft. above sea level  
Latitude: 33.688  
Longitude: -112.081  
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
17	0053	12	CLR	10.00		94	34.4	70	21.1	57	13.9	29	6	080		28.33			29.80	AA		29.89
17	0153	12	CLR	10.00		92	33.3	70	21.0	58	14.4	32	3	100		28.33			29.79	AA		29.89
17	0253	12	CLR	10.00		91	32.8	70	20.8	58	14.4	33	6	050		28.32			29.79	AA		29.88
17	0353	12	CLR	10.00		91	32.8	70	20.8	58	14.4	33	7	060		28.32			29.79	AA		29.88
17	0453	12	CLR	10.00		89	31.7	69	20.5	58	14.4	35	0	000		28.34			29.80	AA		29.90
17	0553	12	CLR	10.00		89	31.7	69	20.5	58	14.4	35	0	000		28.35			29.82	AA		29.91
17	0653	12	CLR	10.00		90	32.2	69	20.7	58	14.4	34	3	070		28.37			29.83	AA		29.93
17	0753	12	CLR	10.00		92	33.3	70	21.3	59	15.0	33	6	100		28.38			29.85	AA		29.94
17	0853	12	CLR	10.00		94	34.4	70	21.3	58	14.4	30	6	090		28.38			29.86	AA		29.95
17	0953	12	CLR	10.00		97	36.1	71	21.8	58	14.4	27	5	190		28.38			29.85	AA		29.94
17	1053	12	CLR	10.00		99	37.2	71	21.3	55	12.8	23	0	000		28.36			29.83	AA		29.92
17	1153	12	CLR	10.00		101	38.3	71	21.6	55	12.8	22	5	VR		28.33			29.80	AA		29.89
17	1253	12	CLR	10.00		105	40.6	73	22.5	56	13.3	20	8	140		28.28			29.75	AA		29.84
17	1353	12	CLR	10.00		105	40.6	73	22.5	56	13.3	20	5	VR		28.25			29.72	AA		29.81
17	1453	12	CLR	10.00		107	41.7	72	22.1	53	11.7	17	8	210		28.23			29.69	AA		29.79
17	1553	12	CLR	10.00		107	41.7	72	22.0	53	11.7	17	7	240	17	28.20			29.67	AA		29.76
17	1653	12	CLR	10.00		108	42.2	72	22.0	52	11.1	16	7	190		28.20			29.66	AA		29.75
17	1753	12	CLR	10.00		107	41.7	71	21.8	52	11.1	16	7	260		28.20			29.66	AA		29.75
17	1853	12	FEW120	10.00		103	39.4	71	21.5	53	11.7	19	16	040	29	28.23			29.70	AA		29.79
17	1953	12	FEW120	10.00		97	36.1	70	21.3	56	13.3	25	16	010	25	28.26			29.72	AA	T	29.82
17	2006	12	FEW120	10.00		97	36.0	70	21.0	55	13.0	24	24	360	31	28.26			M	SP		29.82
17	2053	12	CLR	10.00		94	34.4	69	20.5	55	12.8	27	24	030	33	28.29			29.76	AA		29.85
17	2153	12	CLR	10.00		92	33.3	68	20.0	54	12.2	28	14	080	33	28.36			29.83	AA		29.92
17	2253	12	FEW120	10.00		93	33.9	68	20.1	54	12.2	27	8	090		28.40			29.87	AA		29.96
17	2353	12	SCT120	10.00		88	31.1	69	20.4	58	14.4	36	11	130		28.40			29.88	AA		29.97

Dynamically generated Tue Nov 05 16:28:06 EST 2013 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**WILLIAMS GATEWAY AIRPORT (23104)**  
**PHOENIX, AZ**  
**(08/2013)**

Elevation: 1382 ft. above sea level  
Latitude: 33.3  
Longitude: -111.666  
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
17	0015	0	CLR	10.00		90	32.0	68	19.9	55	13.0	31	5	060		28.46		M	AA		29.92	
17	0035	0	CLR	10.00		90	32.0	68	19.9	55	13.0	31	5	060		28.45		M	AA		29.91	
17	0055	0	CLR	10.00		90	32.0	68	19.9	55	13.0	31	5	050		28.45		M	AA		29.91	
17	0115	0	CLR	10.00		90	32.0	68	19.9	55	13.0	31	10	190		28.45		M	AA		29.91	
17	0135	0	CLR	10.00		88	31.0	67	19.6	55	13.0	33	0	000		28.45		M	AA		29.91	
17	0155	0	CLR	10.00		88	31.0	67	19.6	55	13.0	33	0	000		28.45		M	AA		29.91	
17	0215	0	CLR	10.00		88	31.0	67	19.6	55	13.0	33	3	150		28.44		M	AA		29.90	
17	0235	0	CLR	10.00		88	31.0	67	19.6	55	13.0	33	0	000		28.44		M	AA		29.90	
17	0255	0	CLR	10.00		86	30.0	68	19.7	57	14.0	37	6	160		28.44		M	AA		29.90	
17	0315	0	CLR	10.00		86	30.0	68	19.7	57	14.0	37	6	170		28.44		M	AA		29.90	
17	0335	0	CLR	10.00		86	30.0	68	19.7	57	14.0	37	6	170		28.44		M	AA		29.90	
17	0355	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	7	170		28.45		M	AA		29.91	
17	0415	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	7	150		28.45		M	AA		29.91	
17	0435	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	5	180		28.45		M	AA		29.91	
17	0447	0	CLR150 CLR250	20.00		88	31.0	M	M	57	14.0	M	7	120		M		M	AA		29.92	
17	0455	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	6	160		28.46		M	AA		29.92	
17	0515	0	CLR	10.00		86	30.0	68	19.7	57	14.0	37	5	120		28.46		M	AA		29.93	
17	0535	0	CLR	10.00		86	30.0	68	19.7	57	14.0	37	6	090		28.46		M	AA		29.93	
17	0547	0	SCT150 BKN250	20.00		84	29.0	67	19.4	57	14.0	40	6	090		28.46		M	AA		29.93	
17	0647	0	BKN200	35.00		88	31.0	68	20.1	57	14.0	35	9	090		28.49		M	AA		29.96	
17	0750	0	BKN200	35.00		91	33.0	71	21.7	61	16.0	37	7	120		28.50		M	AA		29.97	
17	0847	0	BKN200	35.00		93	34.0	70	20.9	57	14.0	30	7	110		28.50		M	AA		29.97	
17	0947	0	SCT200	35.00		99	37.0	71	21.9	57	14.0	25	5	VR		28.50		M	AA		29.97	
17	1047	0	SCT200	30.00		99	37.0	70	21.1	54	12.0	22	3	VR		28.48		M	AA		29.94	
17	1147	0	SCT200	30.00		100	38.0	70	21.3	54	12.0	21	8	140		28.45		M	AA		29.91	
17	1247	0	FEW120 SCT200	30.00		104	40.0	71	21.4	52	11.0	18	6	180		28.41		M	AA		29.87	
17	1347	0	FEW120 SCT200	30.00		106	41.0	70	20.9	48	9.0	14	9	280		28.38		M	AA		29.84	
17	1447	0	FEW120 SCT200	30.00		108	42.0	71	21.6	50	10.0	14	9	270		28.35		M	AA		29.81	
17	1547	0	FEW120 SCT200	30.00		108	42.0	71	21.6	50	10.0	14	6	310		28.32		M	AA		29.78	
17	1647	0	FEW120 SCT200	30.00		108	42.0	70	21.2	48	9.0	13	6	290		28.31		M	AA		29.77	
17	1750	0	SCT080 BKN200	30.00		108	42.0	69	20.8	46	8.0	12	6	300		28.30		M	AA		29.76	
17	1847	0	SCT080 BKN200	6.00	BLDU	106	41.0	70	20.8	48	9.0	14	24	020	32	28.32		M	AA		29.78	
17	1947	0	CLR080 CLR200	20.00		99	37.0	M	M	52	11.0	M	17	050	31	M		M	AA		29.80	
17	1955	0	CLR	10.00		99	37.0	68	20.2	50	10.0	19	22	050	28	28.33		M	AA		29.79	
17	2015	0	CLR	10.00		99	37.0	68	20.2	50	10.0	19	11	050	23	28.34		M	AA		29.80	
17	2035	0	CLR	7.00		99	37.0	69	20.6	52	11.0	21	17	150	24	28.41		M	AA		29.87	
17	2047	0	CLR007	2.00		99	37.0	M	M	54	12.0	M	21	130	26	M		M	AA		29.87	
17	2055	0	CLR	2.00	-RA	91	33.0	70	21.1	59	15.0	34	16	140	31	28.43		M	AA		29.89	
17	2105	0	SCT080 BKN200	5.00		91	33.0	70	21.1	59	15.0	34	16	100	24	28.44		M	AA		29.90	
17	2115	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	15	090	22	28.44		M	AA		29.90	
17	2135	0	CLR	10.00		93	34.0	71	21.5	59	15.0	32	18	100	26	28.45		M	AA		29.91	
17	2147	0	CLR080 CLR200	3.00		93	34.0	M	M	57	14.0	M	23	090	31	M		M	AA		29.91	
17	2155	0	CLR	7.00		90	32.0	70	21.0	59	15.0	35	21	100	33	28.46		M	AA		29.92	
17	2215	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	10	190	16	28.49		M	AA		29.96	
17	2235	0	CLR	10.00	-RA	88	31.0	68	20.1	57	14.0	35	7	100		28.51		M	AA		29.98	
17	2247	0	CLR080 CLR200	20.00		88	31.0	M	M	57	14.0	M	7	120		M		M	AA		29.99	
17	2255	0	CLR	10.00		90	32.0	68	19.9	55	13.0	31	9	120		28.53		M	AA		30.00	
17	2315	0	CLR	10.00	-RA	88	31.0	67	19.6	55	13.0	33	0	000		28.53		M	AA		30.00	
17	2335	0	CLR	10.00	-RA	86	30.0	70	20.9	61	16.0	43	11	040		28.51		M	AA		29.98	
17	2347	0	CLR080 CLR200	20.00		88	31.0	M	M	61	16.0	M	14	030	18	M		M	AA		29.98	
17	2355	0	CLR	10.00	-RA	84	29.0	69	20.6	61	16.0	46	18	020		28.50		M	AA		29.97	

Dynamically generated Tue Nov 05 16:28:56 EST 2013 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
CHANDLER MUNICIPAL AIRPORT (53128)  
CHANDLER, AZ  
(08/2013)**

Elevation: 1243 ft. above sea level  
Latitude: 33.268  
Longitude: -111.812  
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
17	0547	0	SCT180 BKN250	40.00		88	31.0	69	20.7	59	15.0	38	7	180		28.59			M	AA		29.91
17	0647	0	BKN180	40.00		90	32.0	71	21.6	61	16.0	38	0	000		28.61			M	AA		29.93
17	0747	0	BKN180	40.00		90	32.0	72	22.2	63	17.0	41	7	080		28.62			M	AA		29.94
17	0847	0	BKN180	40.00		93	34.0	72	22.0	61	16.0	34	5	040		28.62			M	AA		29.94
17	0947	0	SCT180	40.00		97	36.0	72	22.1	59	15.0	28	5	VR		28.62			M	AA		29.94
17	1047	0	FEW180	40.00		100	38.0	73	22.5	59	15.0	26	3	VR		28.60			M	AA		29.92
17	1147	0	FEW180	40.00		104	40.0	73	22.6	57	14.0	21	5	VR		28.57			M	AA		29.89
17	1247	0	SCT150	40.00		104	40.0	72	22.1	55	13.0	20	7	160		28.53			M	AA		29.85
17	1350	0	FEW150	40.00		106	41.0	72	22.4	55	13.0	19	9	240		28.49			M	AA		29.81
17	1447	0	FEW120 SCT250	40.00		108	42.0	73	22.7	55	13.0	17	10	230		28.46			M	AA		29.78
17	1547	0	FEW120 SCT250	35.00		109	43.0	73	22.6	54	12.0	16	8	240		28.43			M	AA		29.75
17	1650	0	FEW120 FEW200	30.00		109	43.0	72	22.2	52	11.0	15	6	VR		28.43			M	AA		29.74
17	1747	0	FEW120 SCT200	30.00		109	43.0	71	21.7	50	10.0	14	6	270		28.42			M	AA		29.73
17	1850	0	SCT100 BKN200	25.00		108	42.0	71	21.6	50	10.0	14	6	360		28.43			M	AA		29.75
17	1947	0	SCT100 BKN200	15.00		97	36.0	M	M	M	M	M	29	030		28.46			M	AA		29.77
17	2050	0	SCT120 BKN200	15.00		95	35.0	71	21.8	59	15.0	30	18	090	28	28.55			M	AA		29.87

Dynamically generated Tue Nov 05 13:40:18 EST 2013 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  
FALCON FIELD AIRPORT (03185)  
MESA, AZ  
(08/2013)**

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

Elevation: 1380 ft. above sea level  
Latitude: 33.466  
Longitude: -111.733  
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
17	0755	0	BKN250	40.00		93	34.0	70	20.9	57	14.0	30	6	090		28.46			M	AA		29.94
17	0948	0	SCT250	40.00		99	37.0	71	21.9	57	14.0	25	7	220		28.46			M	AA		29.94
17	1047	0	SCT250	40.00		102	39.0	72	22.3	57	14.0	23	7	170		28.44			M	AA		29.92
17	1347	0	CLRs	40.00		109	43.0	73	22.6	54	12.0	16	8	220		28.34			M	AA		29.81
17	1447	0	CLRs	40.00		108	42.0	72	22.4	54	12.0	17	11	220		28.32			M	AA		29.79
17	1653	0	SCT160	40.00		111	44.0	72	22.0	50	10.0	13	11	230		28.28			M	AA		29.75
17	1747	0	SCT170	40.00		109	43.0	71	21.7	50	10.0	14	5	VR		28.28			M	AA		29.75
17	1828	0	BKN200	40.00		108	42.0	72	22.4	54	12.0	17	17	340		28.29			M	AA		29.76
17	1847	0	BKN200	20.00		100	38.0	70	21.2	54	12.0	21	24	050		28.30			M	AA		29.77
17	1950	0	BKN200	20.00		99	37.0	70	21.1	54	12.0	22	17	010	34	28.30			M	AA		29.77

Dynamically generated Tue Nov 05 16:27:14 EST 2013 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

NWS Storm Reports

WWUS85 KPSR 180202

AWWPHX

AZZ023-180415-

AIRPORT WEATHER WARNING FOR SKY HARBOR AIRPORT

NATIONAL WEATHER SERVICE PHOENIX AZ

702 PM MST SAT AUG 17 2013

... AIRPORT WEATHER WARNING FOR SKY HARBOR AIRPORT IN EFFECT UNTIL

800 PM MST...

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED AN AIRPORT WEATHER WARNING FOR SKY HARBOR AIRPORT FOR STRONG GUSTY WINDS.

NORTHEAST WINDS GUSTING TO 35 KNOTS WILL CONTINUE THROUGH 8 PM BEFORE WEAKENING.

\$\$

WWUS75 KPSR 180203

NPWPSR

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE PHOENIX AZ

703 PM MST SAT AUG 17 2013

AZZ023-028-180415-

/O. NEW. KPSR. DU. Y. 0018. 130818T0203Z-130818T0400Z/

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF... BUCKEYE... MESA... PHOENIX...

APACHE JUNCTION... CASA GRANDE... FLORENCE

703 PM MST SAT AUG 17 2013

... BLOWING DUST ADVISORY IN EFFECT UNTIL 9 PM MST THIS EVENING...

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A BLOWING DUST

ADVISORY... WHICH IS IN EFFECT UNTIL 9 PM MST THIS EVENING. AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST SUNDAY.

\* AFFECTED AREA... PHOENIX METRO AREA... NORTHWEST PINAL COUNTY

\* TIMING... UNTIL 9 PM

\* WINDS... 30-40 MPH

\* VISIBILITY... AROUND 1 MILE... POSSIBLY AROUND A HALF MILE WITHIN THE STRONGEST WINDS.

\* IMPACTS... SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT APPROACHING... PULL OFF

THE ROAD AS FAR AS POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE

LIGHTS ALL THE WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.

REMEMBER... PULL ASIDE... STAY ALIVE.

&&

\$\$

WWUS75 KPSR 180212

NPWPSR

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE PHOENIX AZ

712 PM MST SAT AUG 17 2013

AZZ022-027-180515-

/O. EXB. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

NORTHWEST MARICOPA COUNTY-SOUTHWEST MARICOPA COUNTY-

INCLUDING THE CITIES OF... BUCKEYE... NEW RIVER... WICKENBURG...

GILA BEND

712 PM MST SAT AUG 17 2013

... BLOWING DUST ADVISORY IN EFFECT UNTIL 10 PM MST THIS EVENING...

NWS Storm Reports

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A BLOWING DUST ADVISORY...WHICH IS IN EFFECT UNTIL 10 PM MST THIS EVENING. AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST SUNDAY.

- \* AFFECTED AREA...WESTERN MARICOPA COUNTY...INCLUDING WICKENBURG...BUCKEYE...GILA BEND...AND INTERSTATES 8 AND 10.
- \* TIMING...UNTIL 10 PM
- \* WINDS...30-40 MPH
- \* VISIBILITY...AROUND 1 MILE...POSSIBLY AROUND A HALF MILE WITHIN THE STRONGEST WINDS.
- \* IMPACTS...SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.

REMEMBER...PULL ASIDE...STAY ALIVE.

&&

\$\$

AZZ023-028-180515-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0400Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-INCLUDING THE CITIES OF...BUCKEYE...MESA...PHOENIX...

APACHE JUNCTION...CASA GRANDE...FLORENCE

712 PM MST SAT AUG 17 2013

...BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 9 PM MST THIS EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 9 PM MST THIS EVENING.

- \* AFFECTED AREA...PHOENIX METRO AREA...NORTHWEST PINAL COUNTY
- \* TIMING...UNTIL 9 PM
- \* WINDS...30-40 MPH
- \* VISIBILITY...AROUND 1 MILE...POSSIBLY AROUND A HALF MILE WITHIN THE STRONGEST WINDS.
- \* IMPACTS...SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.

REMEMBER...PULL ASIDE...STAY ALIVE.

&&

\$\$

WWUS75 KPSR 180236

NPWPSR

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE PHOENIX AZ

736 PM MST SAT AUG 17 2013

AZZ022-027-180515-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

NORTHWEST MARICOPA COUNTY-SOUTHWEST MARICOPA COUNTY-

NWS Storm Reports

INCLUDING THE CITIES OF...BUCKEYE...NEW RIVER...WICKENBURG...  
GILA BEND

736 PM MST SAT AUG 17 2013

...BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST THIS  
EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST

SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST  
THIS EVENING.

\* AFFECTED AREA...WESTERN MARICOPA COUNTY...INCLUDING  
WICKENBURG...BUCKEYE...GILA BEND...AND INTERSTATES 8 AND 10.

\* TIMING...UNTIL 10 PM

\* WINDS...30-40 MPH

\* VISIBILITY...AROUND 1 MILE...POSSIBLY AROUND A HALF MILE  
WITHIN THE STRONGEST WINDS.

\* IMPACTS...SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER

BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT

APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR

VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.

REMEMBER...PULL ASIDE...STAY ALIVE.

&&

\$\$

AZZ023-028-180515-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0400Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF...BUCKEYE...MESA...PHOENIX...

APACHE JUNCTION...CASA GRANDE...FLORENCE

736 PM MST SAT AUG 17 2013

...BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 9 PM MST THIS  
EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST

SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 9 PM MST  
THIS EVENING.

\* AFFECTED AREA...PHOENIX METRO AREA...NORTHWEST PINAL COUNTY

\* TIMING...UNTIL 9 PM

\* WINDS...30-40 MPH

\* VISIBILITY...AROUND 1 MILE...POSSIBLY AROUND A HALF MILE WITHIN THE  
STRONGEST WINDS. AT 730 PM...HIGHWAY PATROL AND TRAINED SPOTTERS  
HAVE INDICATED VERY LOW VISIBILITIES JUST SOUTH OF CASA GRANDE.

\* IMPACTS...SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER

BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT

APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR

VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.

REMEMBER...PULL ASIDE...STAY ALIVE.

&&

\$\$

WWUS75 KPSR 180240

NPWPSR

URGENT - WEATHER MESSAGE

NWS Storm Reports

NATIONAL WEATHER SERVICE PHOENIX AZ

740 PM MST SAT AUG 17 2013

AZZ022-027-180615-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

NORTHWEST MARI COPA COUNTY-SOUTHWEST MARI COPA COUNTY-  
INCLUDING THE CITIES OF... BUCKEYE... NEW RIVER... WICKENBURG...

GILA BEND

740 PM MST SAT AUG 17 2013

... BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST THIS  
EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST

SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST  
THIS EVENING.

\* AFFECTED AREA... WESTERN MARI COPA COUNTY... INCLUDING  
WICKENBURG... BUCKEYE... GILA BEND... AND INTERSTATES 8 AND 10.

\* TIMING... UNTIL 10 PM

\* WINDS... 30-40 MPH

\* VISIBILITY... AROUND 1 MILE... POSSIBLY AROUND A QUARTER MILE  
WITHIN THE STRONGEST WINDS.

\* IMPACTS... SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER

BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT  
APPROACHING... PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR  
VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.

REMEMBER... PULL ASIDE... STAY ALIVE.

&&

\$\$

AZZ023-028-180615-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0400Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF... BUCKEYE... MESA... PHOENIX...

APACHE JUNCTION... CASA GRANDE... FLORENCE

740 PM MST SAT AUG 17 2013

... BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 9 PM MST THIS  
EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST

SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 9 PM MST  
THIS EVENING.

\* AFFECTED AREA... PHOENIX METRO AREA... NORTHWEST PINAL COUNTY

\* TIMING... UNTIL 9 PM

\* WINDS... 30-40 MPH

\* VISIBILITY... AROUND 1 MILE... POSSIBLY AROUND A QUARTER MILE  
WITHIN THE STRONGEST WINDS. AT 730 PM... HIGHWAY PATROL AND  
TRAINED SPOTTERS HAVE INDICATED VERY LOW VISIBILITIES JUST  
SOUTH OF CASA GRANDE.

\* IMPACTS... SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER

BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT  
APPROACHING... PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR  
VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.

REMEMBER... PULL ASIDE... STAY ALIVE.

NWS Storm Reports

&&  
\$\$

WWUS75 KPSR 180345

NPWPSR

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE PHOENIX AZ

845 PM MST SAT AUG 17 2013

AZZ022-027-180615-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

NORTHWEST MARI COPA COUNTY-SOUTHWEST MARI COPA COUNTY-  
INCLUDING THE CITIES OF... BUCKEYE... NEW RIVER... WICKENBURG...

GILA BEND

845 PM MST SAT AUG 17 2013

... BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST THIS  
EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST  
SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST  
THIS EVENING.

\* AFFECTED AREA... WESTERN MARI COPA COUNTY... INCLUDING  
WICKENBURG... BUCKEYE... GILA BEND... AND INTERSTATES 8 AND 10.

\* TIMING... UNTIL 10 PM

\* WINDS... 30-40 MPH

\* VISIBILITY... AROUND 1 MILE... POSSIBLY AROUND A QUARTER MILE  
WITHIN THE STRONGEST WINDS.

\* IMPACTS... SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER  
BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT  
APPROACHING... PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR  
VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.

REMEMBER... PULL ASIDE... STAY ALIVE.

&&  
\$\$

AZZ023-028-180615-

/O. EXT. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF... BUCKEYE... MESA... PHOENIX...

APACHE JUNCTION... CASA GRANDE... FLORENCE

845 PM MST SAT AUG 17 2013

... BLOWING DUST ADVISORY NOW IN EFFECT UNTIL 10 PM MST THIS  
EVENING...

THE BLOWING DUST ADVISORY IS NOW IN EFFECT UNTIL 10 PM MST THIS  
EVENING. AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM  
MST SUNDAY.

\* AFFECTED AREA... PHOENIX METRO AREA... NORTHWEST PINAL COUNTY

\* TIMING... UNTIL 9 PM

\* WINDS... 30-40 MPH

\* VISIBILITY... AROUND 1 MILE... POSSIBLY AROUND A QUARTER MILE WITHIN  
THE STRONGEST WINDS. A SECONDARY AREA OF BLOWING DUST IS MAKING ITS  
WAY INTO THE AREA FROM THE SOUTHEAST AND IS ENTERING THE EAST  
VALLEY AS OF 845 PM.

\* IMPACTS... SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

NWS Storm Reports

PRECAUTIONARY/PREPAREDNESS ACTIONS...  
BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER  
BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT  
APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR  
VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.  
REMEMBER...PULL ASIDE...STAY ALIVE.  
&&  
\$\$

WWUS75 KPSR 180347

NPWPSR

URGENT - WEATHER MESSAGE...CORRECTED

NATIONAL WEATHER SERVICE PHOENIX AZ

846 PM MST SAT AUG 17 2013

AZZ022-027-180630-

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

/O. CON. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

NORTHWEST MARI COPA COUNTY-SOUTHWEST MARI COPA COUNTY-

INCLUDING THE CITIES OF...BUCKEYE...NEW RIVER...WICKENBURG...

GILA BEND

846 PM MST SAT AUG 17 2013

...BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST THIS  
EVENING...

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST  
SUNDAY. A BLOWING DUST ADVISORY REMAINS IN EFFECT UNTIL 10 PM MST  
THIS EVENING.

\* AFFECTED AREA...WESTERN MARI COPA COUNTY...INCLUDING  
WICKENBURG...BUCKEYE...GILA BEND...AND INTERSTATES 8 AND 10.

\* TIMING...UNTIL 10 PM

\* WINDS...30-40 MPH

\* VISIBILITY...AROUND 1 MILE...POSSIBLY AROUND A QUARTER MILE  
WITHIN THE STRONGEST WINDS.

\* IMPACTS...SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL  
CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE  
MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER  
BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT  
APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR  
VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR  
FOOT OFF THE BRAKE PEDAL.

REMEMBER...PULL ASIDE...STAY ALIVE.

&&

\$\$

AZZ023-028-180630-

/O. COR. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

/O. COR. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF...BUCKEYE...MESA...PHOENIX...

APACHE JUNCTION...CASA GRANDE...FLORENCE

846 PM MST SAT AUG 17 2013

...BLOWING DUST ADVISORY NOW IN EFFECT UNTIL 10 PM MST THIS  
EVENING...

THE BLOWING DUST ADVISORY IS NOW IN EFFECT UNTIL 10 PM MST THIS  
EVENING. AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM  
MST SUNDAY.

\* AFFECTED AREA...PHOENIX METRO AREA...NORTHWEST PINAL COUNTY

\* TIMING...UNTIL 10 PM

\* WINDS...30-40 MPH

NWS Storm Reports

\* VISIBILITY...AROUND 1 MILE...POSSIBLY AROUND A QUARTER MILE WITHIN THE STRONGEST WINDS. A SECONDARY AREA OF BLOWING DUST IS MAKING ITS WAY INTO THE AREA FROM THE SOUTHEAST AND IS ENTERING THE EAST VALLEY AS OF 845 PM.

\* IMPACTS...SUDDENLY REDUCED VISIBILITIES ON ROADWAYS WILL CREATE DANGEROUS DRIVING CONDITIONS. MULTI-CAR PILEUPS ARE MORE LIKELY DURING DUST STORMS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...  
BE READY FOR A SUDDEN DROP IN VISIBILITY. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.  
REMEMBER...PULL ASIDE...STAY ALIVE.

&&  
\$\$

WWUS85 KPSR 180436

AWWPHX

AZZ023-180645-

AIRPORT WEATHER WARNING FOR SKY HARBOR AIRPORT

NATIONAL WEATHER SERVICE PHOENIX AZ

936 PM MST SAT AUG 17 2013

...AIRPORT WEATHER WARNING FOR SKY HARBOR AIRPORT IN EFFECT UNTIL 1030 PM MST...

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED AN AIRPORT WEATHER WARNING FOR SKY HARBOR AIRPORT DUE TO OBSERVED LIGHTNING WITHIN 10 MILES OF THE AIRPORT.

THE POTENTIAL FOR LIGHTNING WITHIN 10 MILES WILL CONTINUE THROUGH 1030 PM BEFORE DISSIPATING.

\$\$

WWUS75 KPSR 180451

NPWPSR

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE PHOENIX AZ

951 PM MST SAT AUG 17 2013

AZZ022-027-180615-

/O. EXP. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

NORTHWEST MARI COPA COUNTY-SOUTHWEST MARI COPA COUNTY-

INCLUDING THE CITIES OF...BUCKEYE...NEW RIVER...WICKENBURG...

GILA BEND

951 PM MST SAT AUG 17 2013

...EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST SUNDAY...

...BLOWING DUST ADVISORY WILL EXPIRE AT 10 PM MST THIS EVENING...

THE BLOWING DUST ADVISORY WILL EXPIRE AT 10 PM MST THIS EVENING.

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST SUNDAY.

\* AFFECTED AREA...LOWER DESERTS OF SOUTHWEST AND SOUTH CENTRAL ARIZONA...AS WELL AS SOUTHEAST CALIFORNIA.

\* TEMPERATURE...WARM OVERNIGHT LOWS 85-90.

\* IMPACTS...HOT AFTERNOON TEMPERATURES COMBINED WITH VERY LITTLE RELIEF AT NIGHT COULD LEAD TO HEAT RELATED ILLNESS FOR THOSE WHO WORK OUTDOORS...DO NOT HAVE PROPER AIR CONDITIONING...ARE HOMELESS...AND THOSE TAKING CERTAIN TYPES OF MEDICATION.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

TAKE EXTRA PRECAUTIONS IF YOU WORK OR SPEND TIME OUTSIDE.

WHEN POSSIBLE...RESCHEDULE STRENUOUS ACTIVITIES TO EARLY

MORNING OR EVENING. KNOW THE SIGNS AND SYMPTOMS OF HEAT

EXHAUSTION AND HEAT STROKE. WEAR LIGHT WEIGHT AND LOOSE

NWS Storm Reports

FITTING CLOTHING WHEN POSSIBLE AND DRINK PLENTY OF WATER.  
IF YOU WEAR A WIDE-BRIMMED HAT... YOUR HEAD AND BODY WILL BE  
MUCH COOLER.

TO REDUCE RISK DURING OUTDOOR WORK... THE OCCUPATIONAL SAFETY  
AND HEALTH ADMINISTRATION RECOMMENDS SCHEDULING FREQUENT  
REST BREAKS IN SHADED OR AIR CONDITIONED ENVIRONMENTS.

ANYONE OVERCOME BY HEAT SHOULD BE MOVED TO A COOL AND  
SHADED LOCATION. HEAT STROKE IS AN EMERGENCY... CALL 9 1 1.

&&

\$\$

AZZ023-028-180615-

/O. EXP. KPSR. DU. Y. 0018. 000000T0000Z-130818T0500Z/

/O. CON. KPSR. EH. W. 0006. 000000T0000Z-130818T1200Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF... BUCKEYE... MESA... PHOENIX...

APACHE JUNCTION... CASA GRANDE... FLORENCE

951 PM MST SAT AUG 17 2013

... EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST  
SUNDAY...

... BLOWING DUST ADVISORY WILL EXPIRE AT 10 PM MST THIS EVENING...

THE BLOWING DUST ADVISORY WILL EXPIRE AT 10 PM MST THIS EVENING.

AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 5 AM MST  
SUNDAY.

\* AFFECTED AREA... LOWER DESERTS OF SOUTHWEST AND SOUTH CENTRAL  
ARIZONA INCLUDING THE GREATER PHOENIX METROPOLITAN AREA.

\* TEMPERATURE... WARM OVERNIGHT LOWS 85-90.

\* IMPACTS... HOT AFTERNOON TEMPERATURES COMBINED WITH VERY LITTLE  
RELIEF AT NIGHT COULD LEAD TO HEAT RELATED ILLNESS FOR THOSE  
WHO WORK OUTDOORS... DO NOT HAVE PROPER AIR CONDITIONING... ARE  
HOMELESS... AND THOSE TAKING CERTAIN TYPES OF MEDICATION.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

TAKE EXTRA PRECAUTIONS IF YOU WORK OR SPEND TIME OUTSIDE.

WHEN POSSIBLE... RESCHEDULE STRENUOUS ACTIVITIES TO EARLY

MORNING OR EVENING. KNOW THE SIGNS AND SYMPTOMS OF HEAT

EXHAUSTION AND HEAT STROKE. WEAR LIGHT WEIGHT AND LOOSE

FITTING CLOTHING WHEN POSSIBLE AND DRINK PLENTY OF WATER.

IF YOU WEAR A WIDE-BRIMMED HAT... YOUR HEAD AND BODY WILL BE  
MUCH COOLER.

TO REDUCE RISK DURING OUTDOOR WORK... THE OCCUPATIONAL SAFETY  
AND HEALTH ADMINISTRATION RECOMMENDS SCHEDULING FREQUENT  
REST BREAKS IN SHADED OR AIR CONDITIONED ENVIRONMENTS.

ANYONE OVERCOME BY HEAT SHOULD BE MOVED TO A COOL AND  
SHADED LOCATION. HEAT STROKE IS AN EMERGENCY... CALL 9 1 1.

&&

\$\$

**APPENDIX C**

**NOTICE OF PUBLIC COMMENT PERIOD**

## **Request for Public Comments on Exceptional Events in the Greater Phoenix Area**

In 2005, Congress identified a need to account for events that result in exceedances of the National Ambient Air Quality Standards (NAAQS) that are exceptional in nature (e.g., not expected to reoccur or caused by acts of nature beyond man-made controls.) In response, EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560). On May 10, 2013, EPA released interim guidance documents to State, tribal and local air agencies for review. These guidance documents clarify key provisions of the 2007 EER in response to questions and issues that have arisen since the rule was promulgated. The EER allows for states and tribes to “flag” air quality monitoring data as an exceptional event. If flagged, these data can be excluded from consideration in air quality planning if EPA concurs with the demonstration submitted by the flagging agency documenting that all procedural and technical requirements have been met.

Pursuant to 40 CFR 50.14(c)(3)(i), the Arizona Department of Environmental Quality (ADEQ) is soliciting comments on its final demonstrations of events that have caused elevated concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> in the Greater Phoenix Area on June 30, and elevated concentrations of PM<sub>10</sub> on July 2, August 17, August 26, and October 9, 2013. ADEQ has decided to flag these episodes based on these analyses. Copies of the demonstrations are available for review beginning Monday, January 13, 2014 on the ADEQ website at [www.azdeq.gov/environ/air/plan/nee.html](http://www.azdeq.gov/environ/air/plan/nee.html). Interested parties can submit written comments throughout the comment period which will end at 5:00 p.m. on Tuesday, February 11, 2014. Any comments received will be responded to and forwarded to EPA with the final demonstrations.

Written comments should be addressed, faxed, or e-mailed to:

Andra Juniel, Air Assessment Section, Arizona Department of Environmental Quality, 1110 W. Washington Street, 3415-A, Phoenix, AZ 85007, PHONE: (602) 771-4417; FAX: (602) 771-2366, E-mail: [juniel.andra@azdeq.gov](mailto:juniel.andra@azdeq.gov).

In addition to being available on-line, copies of the analyses are available for review, Monday through Friday, 8:30 a.m. to 4:30 p.m., at the ADEQ Records Management Center, 1110 W. Washington St., Phoenix, AZ, 85007, Attn: Records Center, (602) 771-4380, email: [recordscenter@azdeq.gov](mailto:recordscenter@azdeq.gov).

Persons with a disability may request reasonable accommodation, such as a sign language interpreter, by contacting Alicia Pollard at (602) 771-4791 or at [pollard.alicia@azdeq.gov](mailto:pollard.alicia@azdeq.gov). The TDD line for hearing impaired individuals is (602) 771-4829. Requests should be made as early as possible to allow time to arrange for the accommodation.