



MONTHLY AIR QUALITY REPORT FOR
SEPTEMBER 2011

AOI COLOR SCALE

GOOD 0-50	MODERATE 51-100	UNHEALTHY FOR SENSITIVE GROUPS 101-150	UNHEALTHY 151-200
	VERY UNHEALTHY 201-300	HAZARDOUS 301-500	

Calendar of maximum AQI values & their corresponding color for September 2011*

*Preliminary data

SAMPLE POLLUTANT REPORTING BOX

1 (day of month)	O3	CO
	PM10	PM2.5

SUN		MON		TUES		WED		THU		FRI		SAT								
								1	119	06	2	49	05	3	71	05				
									56	35		390	129		56	37				
4	84	05	5	61	02	6	93	06	7	67	06	8	71	08	9	50	07	10	49	05
	44	30		66	31		59	38		46	45		53	35		78	41		97	80
11	49	06	12	47	06	13	46	07	14	47	07	15	49	13	16	42	07	17	54	07
	115	78		138	69		41	29		24	37		32	28		37	27		36	32
18	74	11	19	64	10	20	74	14	21	51	14	22	54	09	23	61	13	24	64	16
	43	34		50	37		76	38		59	34		57	41		52	38		64	40
25	39	07	26	39	07	27	47	07	28	49	06	29	61	08	30	48	10			
	64	24		42	27		70	46		65	37		53	36		91	42			

Calendar of High Pollution Advisories and Health Watches issued during September 2011

SUN			MON			TUE			WED			THU			FRI			SAT								
												1						2						3		
4			5			6			7			8						9						10		
11			12			13			14			15						16						17		
18			19			20			21			22						23						24		
25			26			27			28			29						30								

LEGEND

HIGH POLLUTION ADVISORIES

- A** = PM-10 High Pollution Advisory
- B** = PM-2.5 High Pollution Advisory
- C** = Ozone High Pollution Advisory

HEALTH WATCHES

- D** = PM-10 Health Watch
- E** = PM-2.5 Health Watch
- F** = Ozone Health Watch

Calendar of Meteorological Conditions observed in Metro Phoenix during September 2011

SUN			MON			TUE			WED			THU			FRI			SAT								
												1						2						3		
4			5			6			7			8						9						10		
11			12			13			14			15						16						17		
18			19			20			21			22						23						24		
25			26			27			28			29						30								

LEGEND

ELECTROMETEORS

- A** = Thunderstorm

HYDROMETEORS

- B** = Rain/Drizzle/Hail/Snow
- C** = Fog

LITHOMETEORS

- D** = Blowing Dust
- E** = Haze (vsby <10SM)
- F** = Smoke

Non-Ozone Exceedance days during SEP 2011-

Total=	<u>Date</u>	<u>Max AQI</u>	<u>Pollutant</u>	<u>Site/s</u>
3	9/02	390	PM-10	North Phoenix
		247	PM-10	West Chandler
		192	PM-10	South Phoenix
		177	PM-10	Central Phoenix
		151	PM-10	Durango
		133	PM-10	West Forty Third
		130	PM-10	Higley
		127	PM-10	Phx Supersite
		122	PM-10	Greenwood
		108	PM-10	Buckeye
		129	PM-2.5	North Phoenix
		108	PM-2.5	Phx Supersite
	9/11	115	PM-10	North Phoenix
		113	PM-10	Phx Supersite
		108	PM-10	West Phoenix
	9/12	138	PM-10	Durango
		123	PM-10	West Phoenix
		105	PM-10	West Forty Third

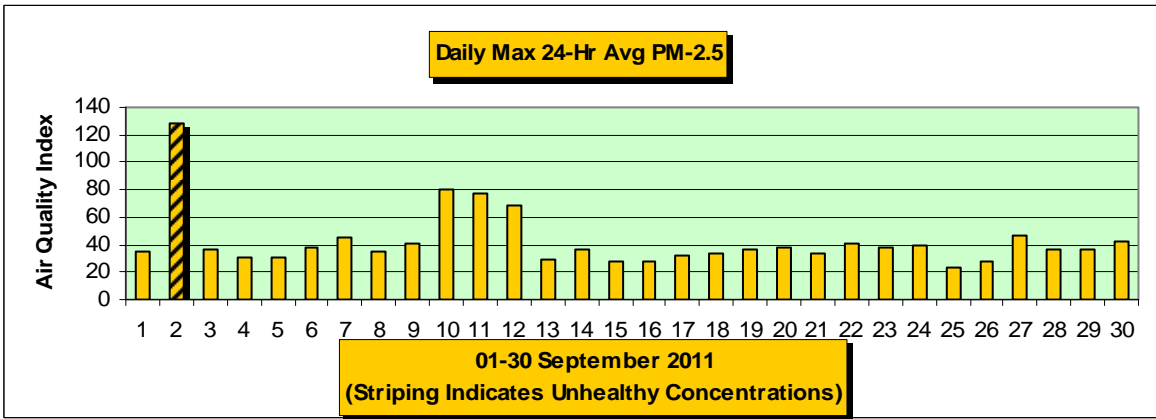
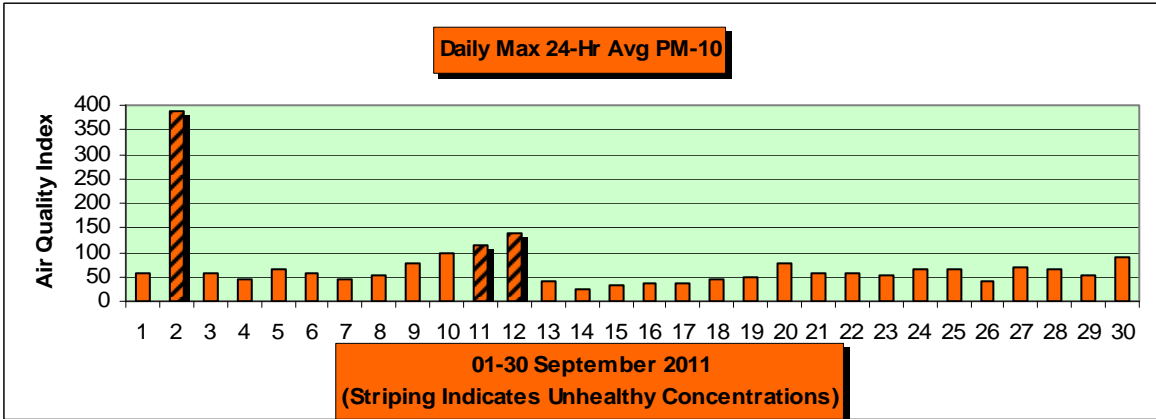
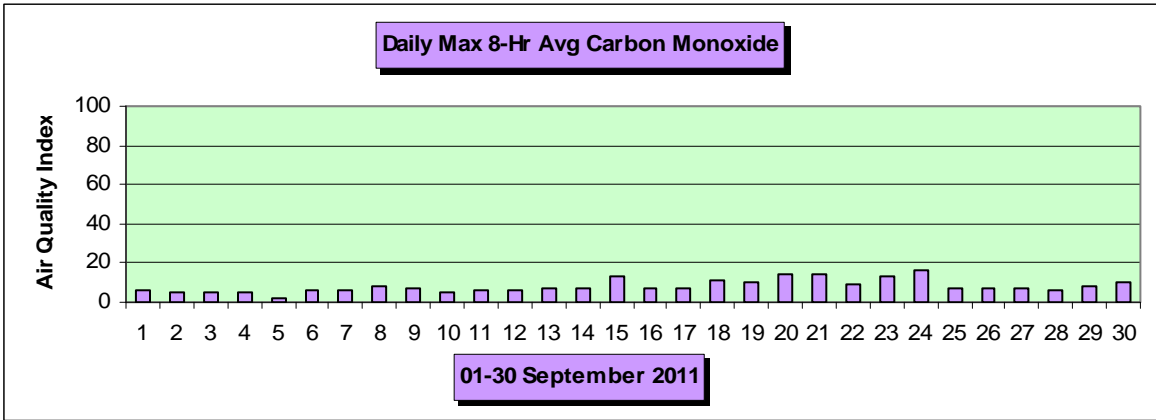
Non-Ozone Health Watches issued during SEP 2011-

Total=	<u>Date</u>	<u>Max AQI</u>	<u>Pollutant</u>	<u>Site/s</u>
0				

Non-Ozone High Pollution Advisories issued during SEP 2011-

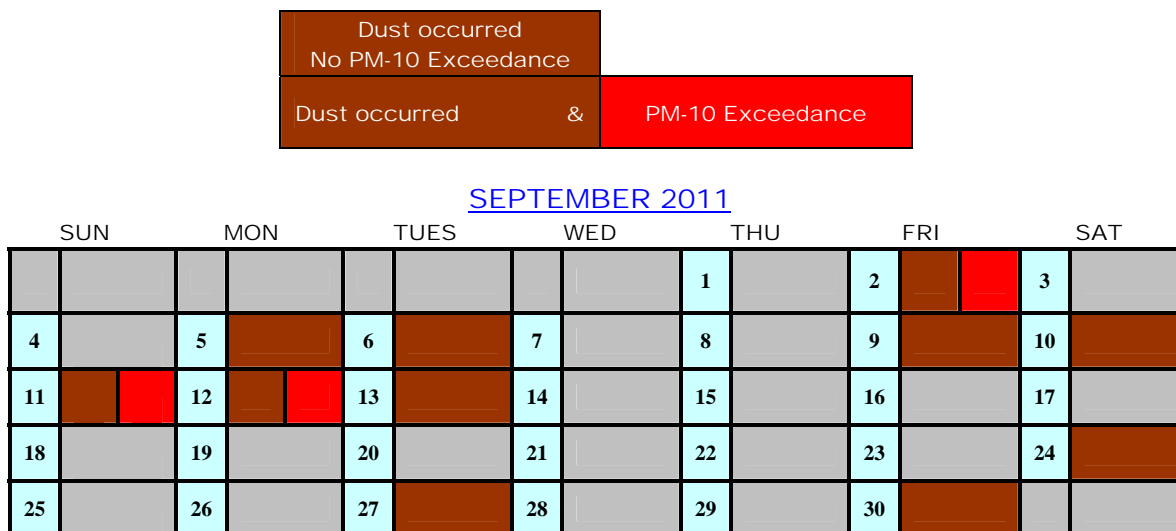
Total=	<u>Date</u>	<u>Max AQI</u>	<u>Pollutant</u>	<u>Site/s</u>
0				

<u>Concentration Recap:</u>	Days in the Good category:	5
	Days in the Moderate category:	22
	Days in the Unhealthy for Sensitive Groups category:	3
	Days in the Unhealthy category:	0
	Days in the Very Unhealthy category:	0
	Days in the Hazardous category:	1
	Total Forecast Days:	31



Narrative: July, August, and September 2011 may forever be remembered in the Phoenix metro area as the “Summer of Dust”. As [Figure 1](#) below shows, during September 2011 there were 11 days during which blowing or suspended dust was reported. On three of these days PM-10 (coarse particle) exceedances occurred and on one of those days unhealthy levels of PM-2.5 (fine particle) were also measured. The severity of these dust events can not be understated; during three days (2nd, 11th, and 12th) **18** site exceedances occurred between the two pollutants.

Figure 1



The origins of the dust episodes began with a very dry spring season with only four local rainfall events during the months of April, May and June, record heat during late June, and lots of open and disturbed desert areas and farm fields southeast and south of the Phoenix metro area. Although monsoon rainfall events did occur during the month of August and September, they were sporadic, light, and not particularly widespread. By far the worst of the blowing dust events during September occurred on the 2nd of the month. This was a very unusual incident because the thunderstorm outflow-boundary that produced the strong southeast to southwesterly straight-line winds that in turn transported enormous volumes of dust toward and over the metro area was generated during the early morning hours. Wind gusts of up to 37 mph and visibilities as low as 3/4 mile were recorded at local airfields between 2:00 and 4:00 a.m. The highest hourly concentration was an incredible 9,248.2ug/m³ at the North Phoenix monitoring site at 2:00 a.m. and the subsequent 24-hour average concentration of 495.6ug/3 placed it within the **HAZARDOUS** range of the Air Quality Index. [Figure 2](#) (page 6) shows the PM-10 time series graph for North Phoenix and [Figures 3-4](#) (page 7) are images from the local VISNET camera array showing that visibilities over the metro area were severely degraded the remainder of the day due to lingering suspended dust particles.

Figure 2

Name: NORTH PHOENIX

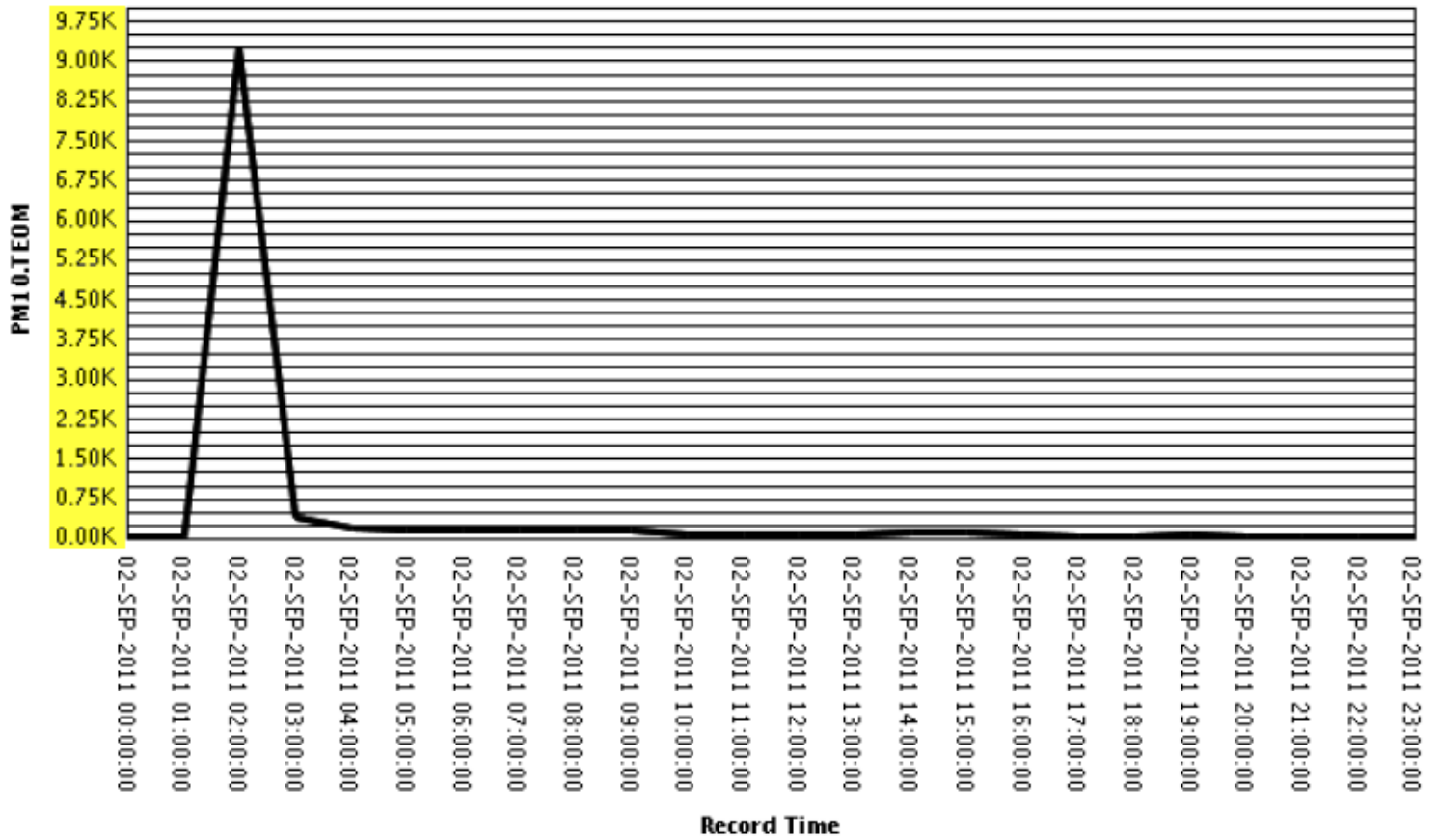


Figure 3



Figure 4



Unfortunately, monsoon thunderstorms and their outflow boundaries continued thru the first two weeks of the month. Rainfall from this activity continued to be rather spotty and light in many areas so more blowing dust events were in the offing. Back-to-back severe dust episodes occurred on September 11 and 12 and these were the final two PM-10 exceedance days of the month. [Figures 5-6](#) show the approach and arrival of a thick dust wall during the September 11 event and [Figures 7-8](#) illustrate the September 12 event.

[Figure 5](#)



Figure 6



Figure 7



Figure 8

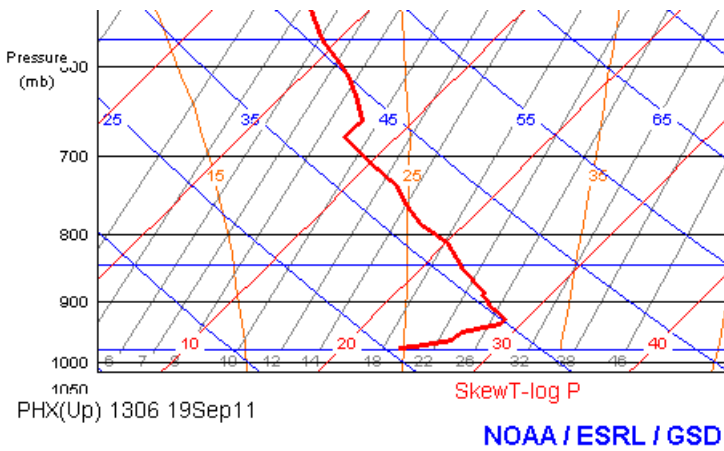


The synoptic weather pattern changed beginning on September 13 with the mid-latitude storm track sending a series of weak upper level troughs and ridges toward and over Arizona the remainder of the month. The result was a variety of weather conditions in the Phoenix metro area including some rather stagnant mornings during the ridge periods. By the 18th much drier air had arrived over the Valley with dew points in the 30's and mostly light or calm winds occurred between the 17th and the 23rd. These conditions were conducive to strong overnight surface-based radiation inversion formation (9-12 deg F) between the 19th and 21st which in turn contributed to an increase in local PM-10 levels due to stagnation of the air mass. This situation is summed up nicely using [Figures 9-11](#). Even so, particle pollution Air Quality Index levels were in the low to moderate range for the remainder of the month. -Reith

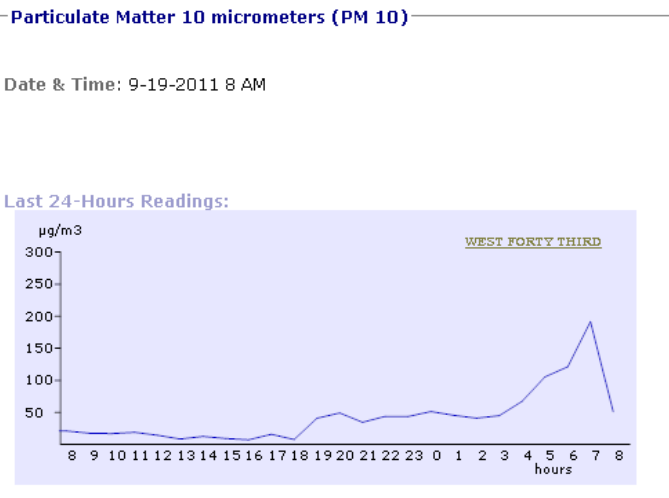
Three sure signs of fall: The Valley Brown Cloud (Figure 9), strong overnight inversion formation (Figure 10), and a.m. spikes in PM-10 (Figure 11).



[Figure 9](#)



[Figure 10](#)



[Figure 11](#)

DETAILED OZONE SECTION

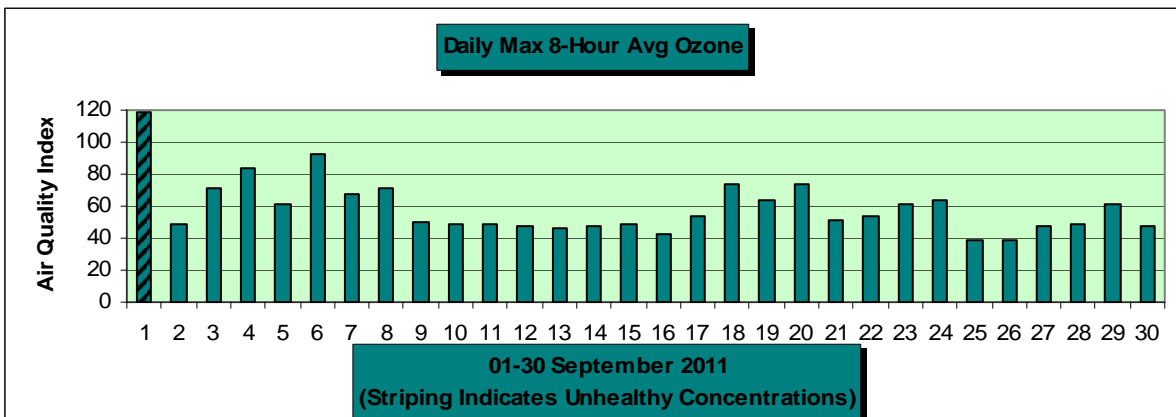
(Based on the 2008 EPA Revised 8-Hour Ozone Standard)

GOOD	MODERATE	UNHEALTHY FOR SENSITIVE GROUPS	UNHEALTHY
0-50	51-100	101-150	151-200

SUMMARY OF MAXIMUM 8-HR OZONE AQI VALUES FOR SEPTEMBER 2011*

*Preliminary data

SUN		MON		TUES		WED		THU		FRI		SAT	
								1	119	2	49	3	71
4	84	5	61	6	93	7	67	8	71	9	50	10	49
11	49	12	47	13	46	14	47	15	49	16	42	17	54
18	74	19	64	20	74	21	51	22	54	23	61	24	64
25	39	26	39	27	47	28	49	29	61	30	48		



8-hr Ozone exceedance days in SEP:	Total= 1	<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
		9/01	83/119	North Phoenix
			81/114	Phx Supersite
			78/106	West Phoenix
			76/101	Cave Creek
			76/101	Glendale

Total number of exceedance days since APR 01: 23
Total number of exceedance sites since APR 01: 90

Ozone Health Watches in SEP: (Forecast max value 72-75 ppb)	Total= 5	<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
		9/01	83/119	North Phoenix
		9/02	58/49	Queen Valley
		9/08	66/71	Phx Supersite
		9/17	61/54	Cave Creek
		9/18	67/74	Humboldt Mtn.

Ozone Health Watches since APR 01: Total= 32

High Pollution Advisories in SEP: (Forecast max value 76+ppb)	Total= 0	<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
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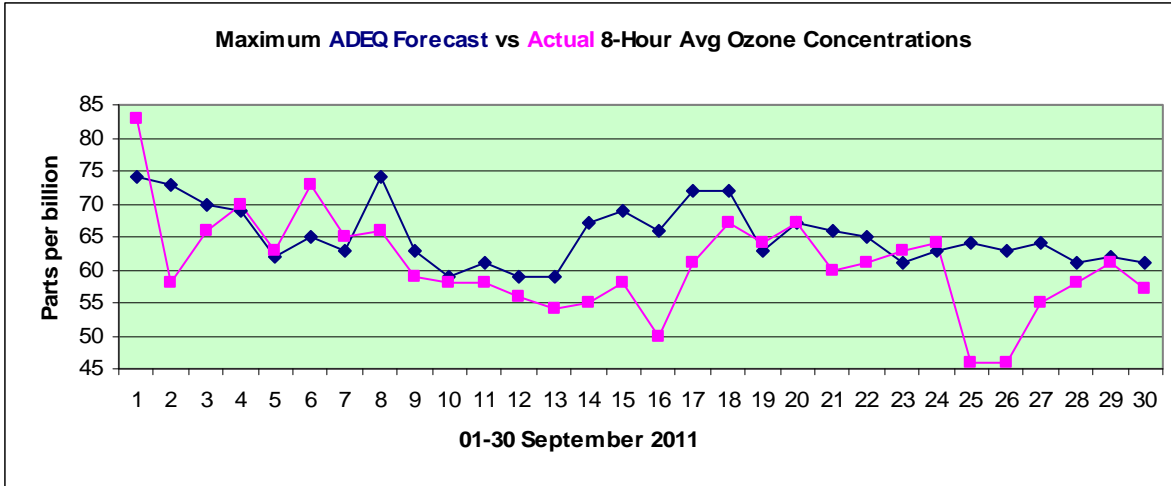
High Pollution Advisories since APR 01: Total= 11

Concentration Recap:	Days in the Good category:	14			
	Days in the Moderate category:	15			
	Days in the Unhealthy for Sensitive Groups category:	1			
	Days in the Unhealthy category:	0			
	Total Forecast Days:	30			
Maximum 8-Hr value:	<u>Date</u>	<u>Hour</u>	<u>Site</u>	<u>ppb/AQI</u>	<u>DOW</u>
	9/01	1000	North Phoenix	83/119	Thu
Maximum 1-Hr value:	<u>Date</u>	<u>Hour</u>	<u>Site</u>	<u>ppb/AQI</u>	<u>DOW</u>
	9/06	1300	South Phoenix	97/81	Tue
	Average daily max 8-Hr concentration (ppb):	60.7			
	Deviation from the 1996-2010 average (ppb):	-1.3			

SEP Climatology: (Period 1996-2007 using 1997 85ppb standard & 2008-2010 using 76ppb standard)	Average number of 8-Hr exceedance days:	0.5
	Maximum number of 8-Hr exceedance days:	3 in 2010
	Minimum number of 8-Hr exceedance days:	0 in 1996, 1998, 2000-09
	Average daily max 8-Hr concentration (ppb):	62.0
	Record high max 8-Hr concentration (ppb):	91 on the 4th, 1997
	Record low max 8-Hr concentration (ppb):	36 on the 14th, 2009

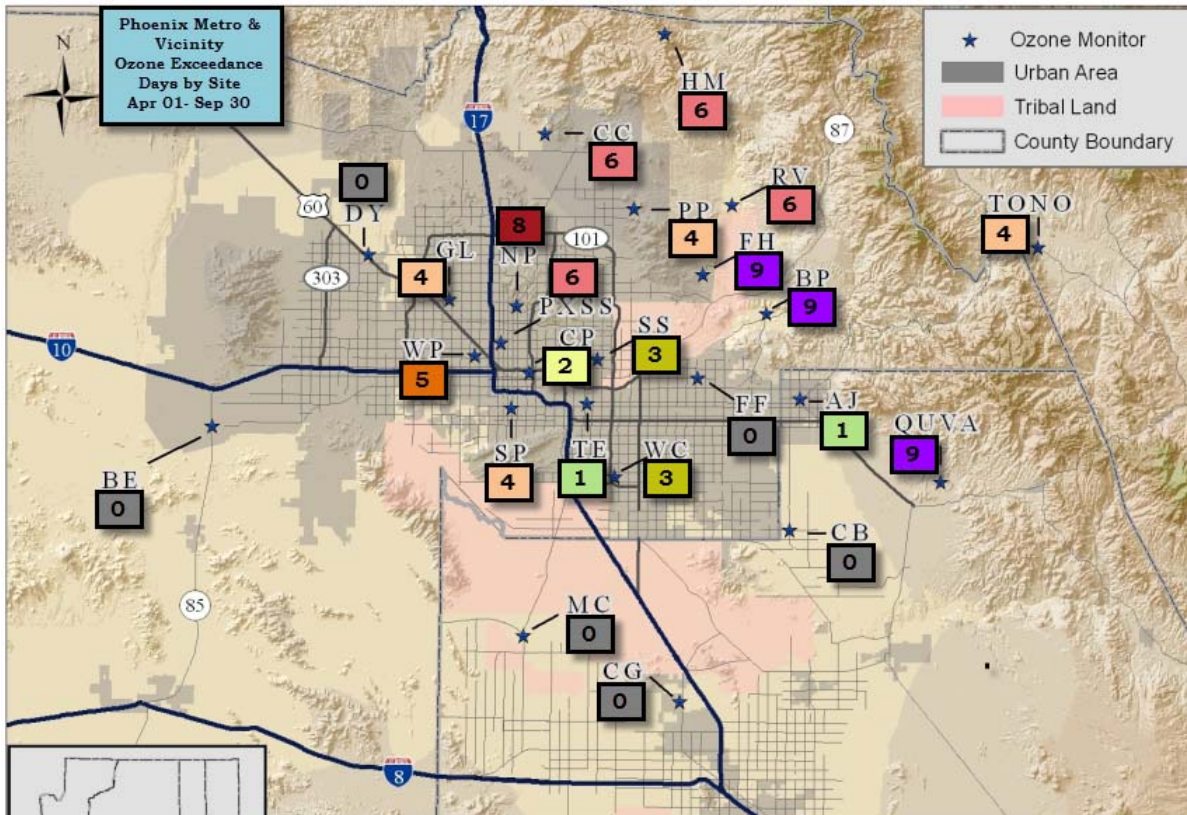
Forecast Verification:

# of days maximum concentrations were over-forecast:	16
# of days maximum concentrations were under-forecast:	14
# of days maximum concentrations were correctly forecast:	1
Sep average forecast accuracy (ppb):	+/-6.1
Sep average forecast bias (ppb):	+4.6



Narrative: The 2011 ozone season in the Phoenix metro area ended with a whimper as unhealthy concentrations were reached on only one day during the month; however, the season as a whole ended up being quite busy. The 23 exceedance days were the most since 2008 and the absolute maximum 8-hour average concentration of 92 parts per billion that occurred on June 9 was the highest since 2006. Other summary data can be seen in [Figure 12](#) and on subsequent pages. –Reith

Figure 12





2011 8-HOUR OZONE EXCEEDANCE REPORT

(Preliminary Data April 01-September 30

Using 2008 revised ozone standard)

PART I – EXCEEDANCES BY DATE

<u>DATE</u>	<u>SITE(S)</u>	<u>PPB</u>
May 06 (1)	Tonto Nat'l Mon	76
May 24 (6)	Blue Point	82
	Rio Verde	80
	Humboldt Mountain	77
	Cave Creek	76
	Fountain Hills	76
	Tonto Nat'l Mon	76
May 25 (13)	Blue Point	84
	Cave Creek	83
	Fountain Hills	83
	North Phoenix	82
	Pinnacle Peak	82
	Humboldt Mountain	81
	Rio Verde	81
	Glendale	80
	Phoenix Supersite	78
	South Phoenix	78
	West Phoenix	78
	South Scottsdale	77
	Tonto Nat'l Mon	77
June 03 (1)	Humboldt Mountain	76
June 09 (18)	Blue Point	92
	North Phoenix	90
	Fountain Hills	89
	Cave Creek	88
	Humboldt Mountain	88
	Pinnacle Peak	88
	Rio Verde	88
	West Phoenix	86
	Phoenix Supersite	84
	Glendale	83
	South Scottsdale	83
	Tonto Nat'l Mon	83
	Central Phoenix	81
	South Phoenix	81
	Apache Junction	79
	Queen Valley	78
	West Chandler	77
	Tempe	76
June 10 (11)	Humboldt Mountain	85
	Rio Verde	82
	Blue Point	81
	Cave Creek	81
	Fountain Hills	81
	North Phoenix	81
	Pinnacle Peak	80
	West Phoenix	79
	South Scottsdale	78
	South Phoenix	77
	Central Phoenix	76
June 13 (1)	Humboldt Mountain	77
June 14 (1)	Blue Point	76
June 15 (1)	Blue Point	77
June 20 (3)	Queen Valley	83

	Blue Point	80
	Fountain Hills	76
June 21 (3)	Blue Point	77
	Fountain Hills	77
	Pinnacle Peak	77
June 22 (4)	Blue Point	80
	Queen Valley	78
	Fountain Hills	77
	Rio Verde	76
July 04 (1)	Rio Verde	84
July 06 (1)	Queen Valley	80
July 07 (1)	Queen Valley	76
July 08 (3)	Fountain Hills	77
	North Phoenix	77
	Phoenix Supersite	76
August 02 (3)	Queen Valley	82
	West Chandler	79
	South Phoenix	76
August 03 (1)	Queen Valley	76
August 04 (3)	Queen Valley	81
	North Phoenix	77
	West Chandler	77
August 17 (2)	North Phoenix	77
	Phoenix Supersite	77
August 25 (6)	Phoenix Supersite	84
	Cave Creek	82
	Glendale	82
	North Phoenix	82
	West Phoenix	80
	Fountain Hills	77
August 28 (1)	Queen Valley	77
September 01 (5)	North Phoenix	83
	Phoenix Supersite	81
	West Phoenix	78
	Cave Creek	76
	Glendale	76
Totals: <u>23</u> Days	<u>18</u> Sites	<u>90</u> Exceedances

PART II – EXCEEDANCES BY SITE

(Sites with four or more exceedances in red type; sites with ten or more exceedances in violet type)

<u>SITE</u>	<u>DATE(S)</u>	<u>PPB</u>
Apache Junction	June 09	79
Blue Point (9)	May 24	82
	May 25	84
	June 09	92
	June 10	81
	June 14	76
	June 15	77
	June 20	80
	June 21	77
	June 22	80
Cave Creek (6)	May 24	76
	May 25	83
	June 09	88
	June 10	81
	August 25	82
	September 01	76
Central Phoenix (2)	June 09	81
	June 10	76
Fountain Hills (9)	May 24	76
	May 25	83
	June 09	89
	June 10	81
	June 20	76
	June 21	77
	June 22	77
	July 08	77
	August 25	77
Glendale (4)	May 25	80
	June 09	83
	August 25	82
	September 01	76
Humboldt Mountain (6)	May 24	77
	May 25	81
	June 03	76
	June 09	88
	June 10	85
	June 13	77
North Phoenix (8)	May 25	82
	June 09	90
	June 10	81
	July 08	77
	August 04	77
	August 17	77
	August 25	82
	September 01	83
Phoenix Supersite (6)	May 25	78
	June 09	84
	July 08	76
	August 17	77
	August 25	84
	September 01	81

Pinnacle Peak (4)	May 25	82
	June 09	88
	June 10	80
	June 21	77
Queen Valley (9)	June 09	78
	June 20	83
	June 22	78
	July 06	80
	July 07	76
	August 02	82
	August 03	76
	August 04	81
	August 28	77
Rio Verde (6)	May 24	80
	May 25	81
	June 09	88
	June 10	82
	June 22	76
	July 04	84
South Phoenix (4)	May 25	78
	June 09	81
	June 10	77
	August 02	76
South Scottsdale (3)	May 25	77
	June 09	83
	June 10	78
Tempe	June 09	76
Tonto Nat'l Mon (4)	May 06	76
	May 24	76
	May 25	77
	June 09	83
West Chandler (3)	June 09	77
	August 02	79
	August 04	77
West Phoenix (5)	May 25	78
	June 09	86
	June 10	79
	August 25	80
	September 01	78
Totals: <u>23</u> Days	<u>18</u> Sites	<u>90</u> Exceedances

OZONE WATCHES AND HIGH POLLUTION ADVISORIES ISSUED AND 8-HR EXCEEDANCES
OCCURRING DURING THE 2011 OZONE FORECAST SEASON*

WATCHES FOR

April 15
 April 28
 May 06
 May 11
 May 12
 May 13
 May 24
 May 25
 May 31
 June 11
 June 14
 June 20
 June 23
 June 24
 July 01
 July 06
 July 16
 July 17
 July 18
 July 25
 August 02
 August 03
 August 05
 August 20
 August 21
 August 26
 August 27
 September 01
 September 02
 September 08
 September 17
September 18

HPAS FOR

May 05
 May 26
 May 27
 June 09
 June 10
 June 15
 June 21
 June 22
 July 02
 August 04
August 25

EXCEEDANCES ON*

May 06
 May 24
 May 25
 June 03
 June 09
 June 10
 June 13
 June 14
 June 15
 June 20
 June 21
 June 22
 July 04
 July 06
 July 07
 July 08
 August 02
 August 03
 August 04
 August 17
 August 25
 August 28
September 01

TOTALS:

32

11

23

*Preliminary data