



**MONTHLY AIR QUALITY REPORT FOR
MAY 2012**

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 May 2012*

*Preliminary data

SAMPLE POLLUTANT REPORTING BOX

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

SUN			MON			TUES			WED			THU			FRI			SAT		
						1	61	05	2	48	06	3	61	06	4	67	07	5	77	07
							32	30		36	26		33	27		37	27		37	30
6	90	06	7	87	06	8	100	08	9	74	07	10	111	06	11	93	05	12	101	07
	40	33		52	30		48	32		90	40		51	43		53	43		42	38
13	106	11	14	140	07	15	100	08	16	84	03	17	71	05	18	84	05	19	104	08
	44	40		59	82		64	59		37	32		45	41		57	45		48	44
20	116	14	21	109	11	22	109	07	23	64	05	24	58	05	25	67	02	26	67	02
	52	55		52	52		54	45		59	44		83	60		93	47		62	36
27	84	05	28	116	08	29	109	10	30	97	07	31	114	06						
	40	29		35	43		45	42		48	35		58	43						

Calendar of High Pollution Advisories and Health Watches issued during May 2012

SUN			MON			TUE			WED			THU			FRI			SAT		
					1			2			3			4			5			
6		7			8			F			F			F			C			C
13		14			E F			E F												F
20		C			21			F									A			
27		28			F			F			F									

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 May 2012

SUN			MON			TUE			WED			THU			FRI			SAT								
					1						2						3			4			5			
6		7			E			E			E			E												
13		14			E			E			A B			D E			E			E						
20		21			E F			E F									E			D						
27		28									D			D E			D			D			E			
					29			E																		

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 MAY 2012-

Total= 0 Date Max AQI Pollutant Site/s

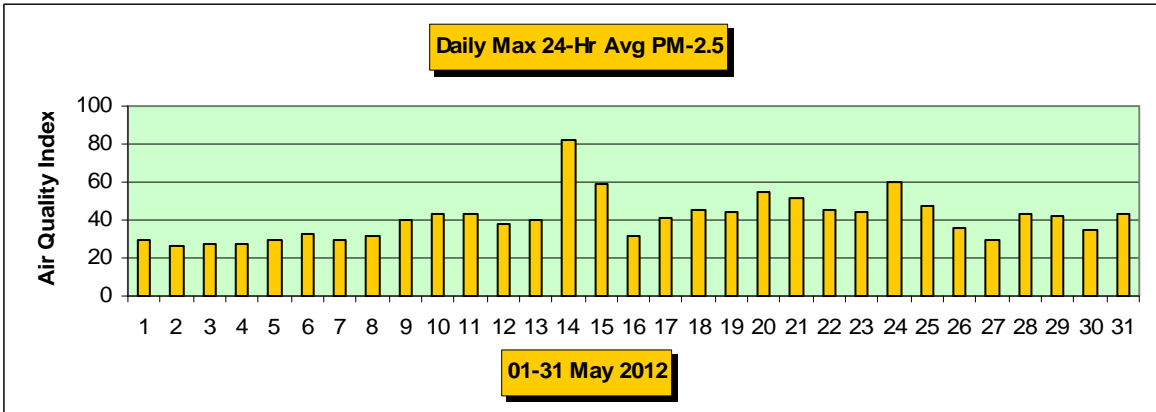
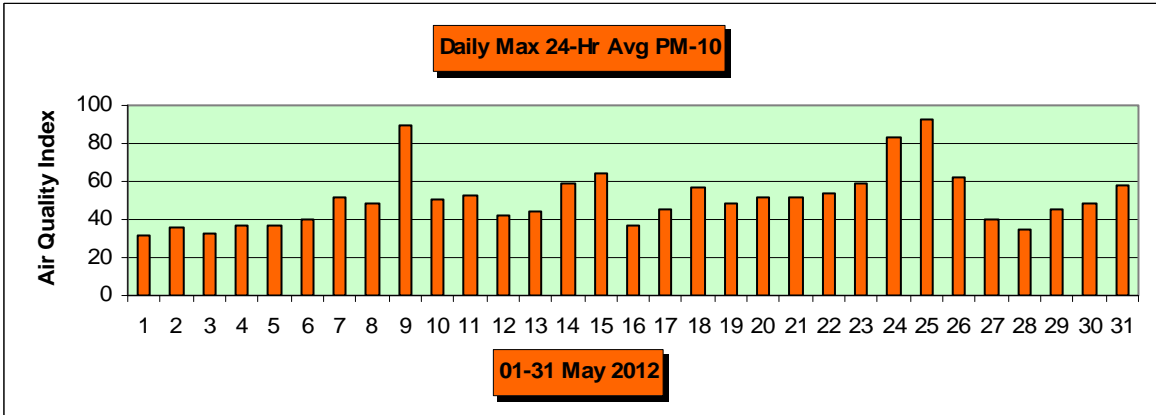
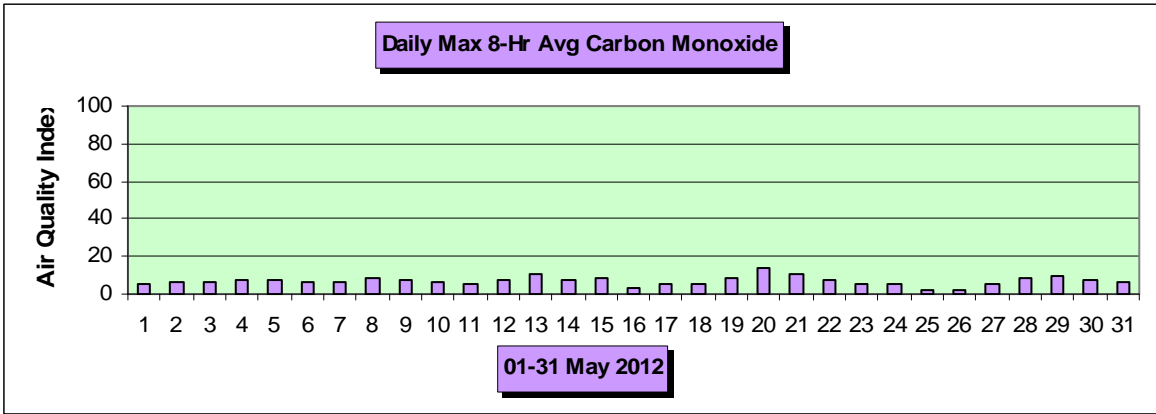
Non-Ozone Health Watches issued during MAY 2012-

Total= 2 Date Max AQI Pollutant Site/s
5/14 82 PM-2.5 Durango
5/15 59 PM-2.5 West Phoenix

Non-Ozone High Pollution Advisories issued during MAY 2012-

Total= 1 Date Max AQI Pollutant Site/s
5/25 93 PM-10 Buckeye

Concentration Recap: Days in the **Good** category: 1
Days in the **Moderate** category: 19
Days in the **Unhealthy for Sensitive Groups** category: 11
Days in the **Unhealthy** category: 0
Days in the **Very Unhealthy** category: 0
Days in the **Hazardous** category: 0
Total Forecast Days: 31



Narrative: Although there were no days in the Phoenix metro area with unhealthy levels of PM-10 (coarse particles) or PM-2.5 (fine particles) during the month of May 2012 there were a number of close calls. As it was the mid-latitude storm track was unusually active and of high-amplitude for so late in the season and a major short wave trough – whose axis had been positioned to the west of Arizona from the 1st thru the 6th – formed a closed low height center over northwest Arizona on the 7th. This feature then migrated south and ingested enough moisture to produce a few nearby thunderstorms on the 8th followed by showers and thunderstorms over the Valley floor on the 9th that were accompanied by outflow wind gusts of up to 55 mph. These winds generated a significant volume of blowing dust (PM-10) with visibilities as low as 1/4 mile. **Figures 1 & 2** are photographic images from the local VISNET camera array and show to good effect the scope of the dust problem during the afternoon of the 9th.

Figure 1



Figure 2



Fortunately, the highest local PM-10 concentration during this episode only reached the upper-moderate range of the Air Quality Index.

Much of Arizona has been in severe to extreme drought for many months and the next particle pollution event was contributed to by this situation. As can be seen by the map in [Figure 3](#), several wildfires were in progress to the north of the Phoenix Metro area by the 14th of the month and details on these fires are contained in [Figure 4](#). It just so happened that on the 14th low-level winds channeled nearly the entire smoke plume from the Sunflower Fire directly over the Valley with serious consequences for ozone levels (see detailed information beginning on page 14) along with significant impacts on fine particle (PM-2.5) pollution levels. The images in [Figures 5 thru 9](#) show the visual impact of the smoke during the afternoon hours on the 14th and [Figures 10 & 11](#) show that widespread suspended smoke remained over the area on the 15th. Highest PM-2.5 AQI levels reached the upper-moderate range on the 14th then decreased to the low-moderate range on the 15th.

[Figure 3](#)

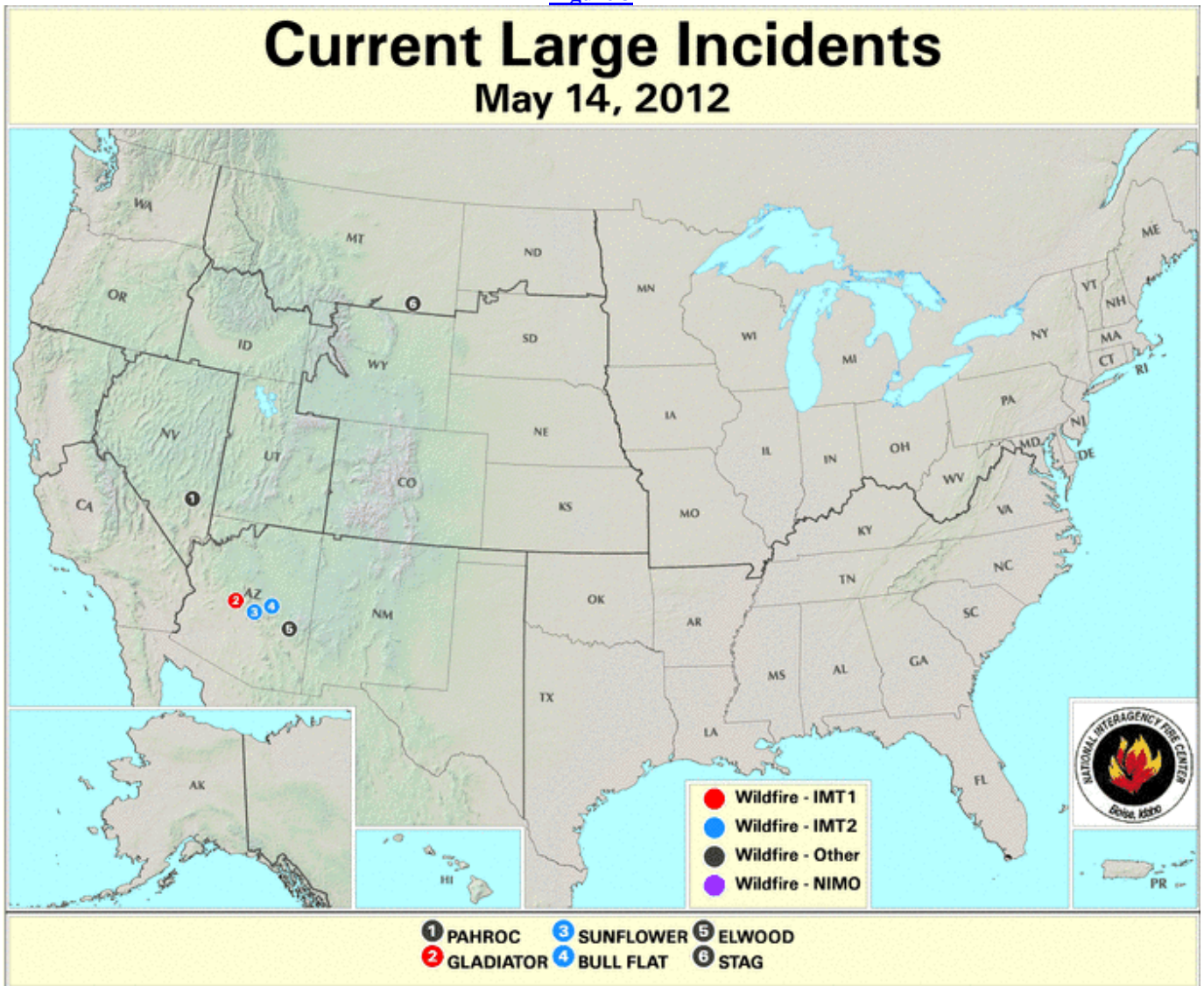


Figure 4

Southwest Area (PL 3)

New fires: 8
 New large fires: 3
 Uncontained large fires: 4
 Type 1 IMTs committed: 1
 Type 2 IMTs committed: 2

* **Gladiator**, Prescott NF. IMT 1 (Reinarz). Started on state land one mile east of Crown King, AZ. Timber and chaparral. Active fire behavior. Numerous residences threatened. Community of Crown King evacuated.

* **Sunflower**, Tonto NF. IMT 2 (Templin). Thirty miles north of Mesa, AZ. Brush, pinyon pine, juniper and grass. Moderate fire activity. Structures threatened.

Bull Flat, Fort Apache Agency, BIA. IMT 2 (Philbin). Twenty miles northwest of Cibecue, AZ. Brush and grass. Commercial property threatened. No further information received.

* **Elwood**, San Carlos Agency, BIA. Thirty-six miles northeast of San Carlos, AZ. Timber. Active fire behavior.

Incident Name	St	Unit	Size	Size Chge 24 Hrs	% Ctn	Est Ctn	Totl Pers	Pers Chge 24 Hrs	Crw	Eng	Heli	Strc Lost	\$\$ CTD	Origin Own
* Gladiator	AZ	PNF	600	---	0	5/20	87	---	3	5	1	3	250K	ST
* Sunflower	AZ	TNF	3,100	---	0	UNK	183	---	9	8	4	0	500K	FS
Bull Flat	AZ	FTA	500	0	35	UNK	28	-64	1	2	0	0	NR	BIA
* Elwood	AZ	SCA	1,137	---	5	UNK	142	---	5	5	1	0	171K	BIA

Figure 5



[Figure 6](#)



[Figure 7](#)



[Figure 8](#)



[Figure 9](#)



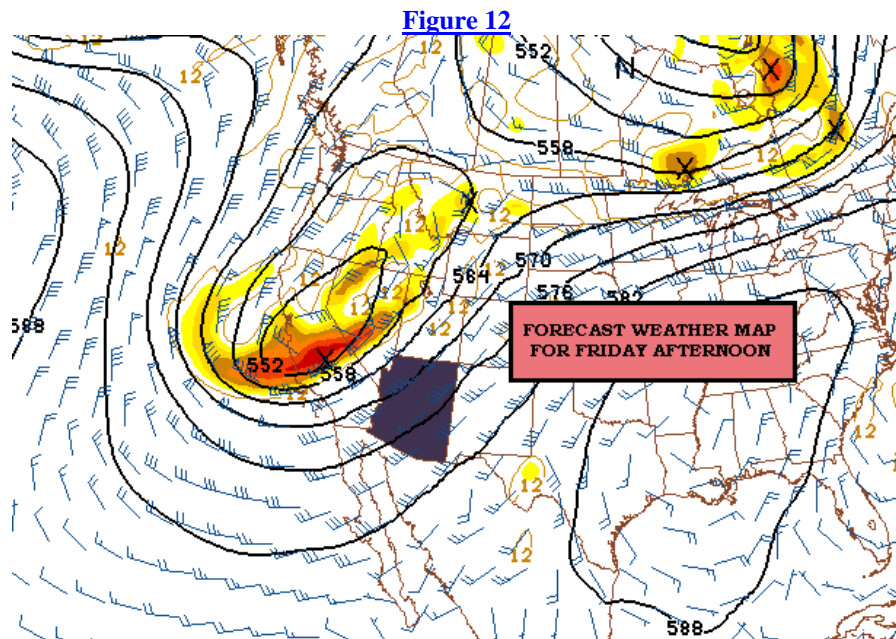
[Figure 10](#)



[Figure 11](#)



The third and final high-impact particle pollution event of the month occurred mainly on the 25th of the month and was the result of an unusually strong but dry upper level trough and surface cold front that approached the Valley from the northwest (Figure 12). Due to the antecedent dry conditions and forecast wind speeds a PM-10 High Pollution Advisory was issued for that day. Dust and blowing dust were observed between 9:00 a.m. and 9:00 p.m. with wind gusts as high as 40 mph and visibilities as low as five miles. Despite these adverse conditions highest coarse particles concentrations reached no higher than the upper-moderate range of the Air Quality Index and the Valley was spared yet another PM-10 exceedance event. On the following day (May 26) lots of suspended dust remained over the metro area with visibilities as low as four miles at times. Figures 13 & 14 are images from the local VISNET camera array showing the dusty conditions on May 25 and Figures 15-17 reveal a similar situation on May 26. -Reith



[Figure 14](#)



[Figure 15](#)



[Figure 16](#)



[Figure 17](#)



DETAILED OZONE SECTION

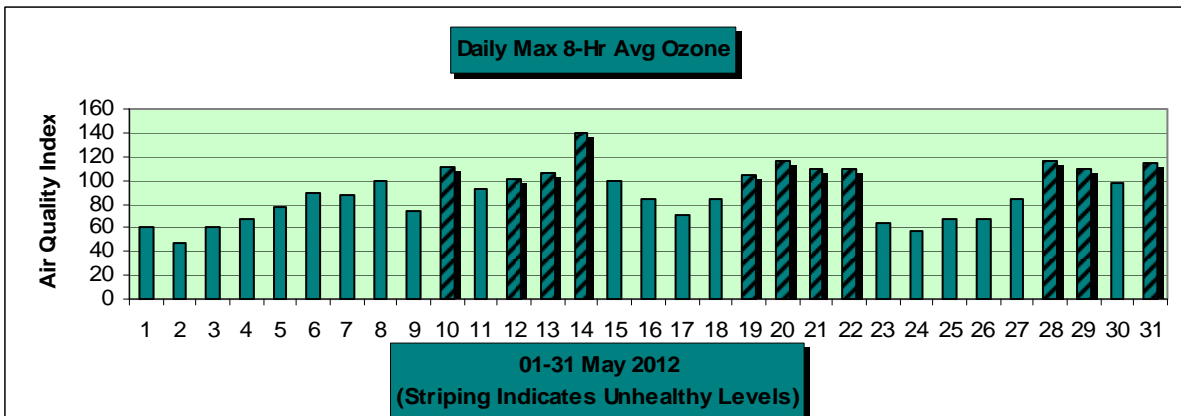
(Based on the 2008 EPA Revised 8-Hour Ozone Standard)

GOOD 0-50	MODERATE 51-100	UNHEALTHY FOR SENSITIVE GROUPS 101-150	UNHEALTHY 151-200
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SUMMARY OF MAXIMUM 8-HR OZONE AQI VALUES FOR MAY 2012*

*Preliminary data

SUN		MON		TUES		WED		THU		FRI		SAT	
				1	61	2	48	3	61	4	67	5	77
6	90	7	87	8	100	9	74	10	111	11	93	12	101
13	106	14	140	15	100	16	84	17	71	18	84	19	104
20	116	21	109	22	109	23	64	24	58	25	67	26	67
27	84	28	116	29	109	30	97	31	114				



<u>8-hr Ozone exceedance days in MAY:</u>	Total= 11	<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
		5/10	80/111	Tonto Nat'l Mon
			77/104	Blue Point
			77/104	Queen Valley
		5/12	76/101	North Phoenix
		5/13	78/106	Tonto Nat'l Mon
			77/104	North Phoenix
			76/101	Blue Point
			76/101	Cave Creek
			76/101	Queen Valley
		5/14	91/140	North Phoenix
			88/132	Glendale
			87/129	South Phoenix
			87/129	West Phoenix
			84/122	Central Phoenix
			84/122	Humboldt Mtn.
			83/119	Fountain Hills
			83/119	Phx Supersite
			81/114	South Scottsdale
			80/111	Cave Creek
			79/109	Dysart
			79/109	West Chandler
			78/106	Buckeye
			76/101	Blue Point
		5/19	77/104	Queen Valley
		5/20	82/116	North Phoenix
			80/111	South Scottsdale
			79/109	Humboldt Mtn.
			78/106	Cave Creek
			78/106	South Phoenix
			77/104	Central Phoenix
			77/104	Fountain Hills
			76/101	Blue Point
			76/101	Phx Supersite
			76/101	West Phoenix
		5/21	79/109	Fountain Hills
			78/106	Cave Creek
			77/104	North Phoenix
			76/101	Blue Point
			76/101	Humboldt Mtn.
			76/101	Tonto Nat'l Mon
		5/22	79/109	Tonto Nat'l Mon
			78/106	Humboldt Mtn.
			77/104	Blue Point
			76/101	Queen Valley
		5/28	82/116	Humboldt Mtn.
			77/104	Cave Creek
		5/29	79/109	Blue Point
			78/106	Tonto Nat'l Mon
			76/101	Fountain Hills
		5/31	81/114	Fountain Hills
			80/111	Queen Valley
			79/109	Tonto Nat'l Mon

78/106 Blue Point
 77/104 Apache Junction
 76/101 Cave Creek
 76/101 North Phoenix

Total number of exceedance days since APR 01: 14
Total number of exceedance sites since APR 01: 59

Ozone Health Watches in MAY: Total= 10
 (Forecast max value 72-75 ppb)

<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
5/08	75/100	Cave Creek
		North Phoenix
5/09	67/74	West Phoenix
5/10	80/111	Tonto Nat'l Mon
5/14	91/140	North Phoenix
5/15	75/100	Glendale
5/19	77/104	Queen Valley
5/21	79/109	Fountain Hills
5/28	82/116	Humboldt Mtn.
5/29	79/109	Blue Point
5/30	74/97	Tonto Nat'l Mon

Ozone Health Watches since APR 01: Total= 14

High Pollution Advisories in MAY: Total= 3
 (Forecast max value 76+ppb)

<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
5/11	73/93	Blue Point
		Cave Creek
		Humboldt Mtn.
		Tonto Nat'l Mon
5/12	76/101	North Phoenix
5/20	82/116	North Phoenix

High Pollution Advisories since APR 01: Total= 3

Concentration Recap: Days in the **Good** category: 1
 Days in the **Moderate** category: 19
 Days in the **Unhealthy for Sensitive Groups** category: 11
 Days in the **Unhealthy** category: 0
 Total Forecast Days: 31

Maximum 8-Hr value: Date Hour Site ppb/AQI DOW
 5/14 1200 North Phoenix 91/140 Mon

Maximum 1-Hr value: Date Hour Site ppb/AQI DOW
 5/14 1700 North Phoenix 104/87 Mon

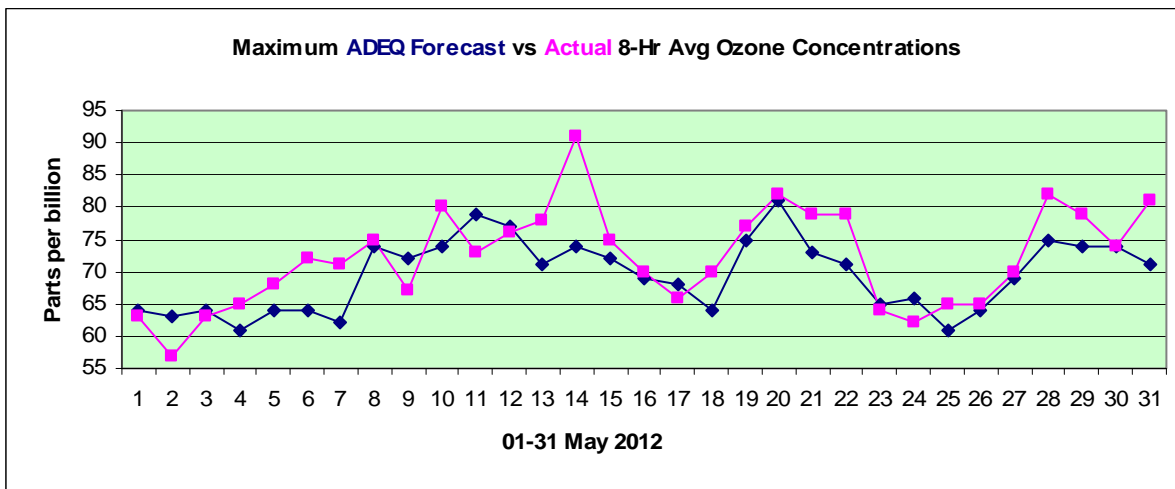
Average daily max 8-Hr concentration (ppb): 72.2
 Deviation from the 1996-2011 average (ppb): **+1.6**

MAY Climatology:
(Period 1996-2007
using 1997 85ppb
standard & 2008-
2011 using 76ppb
standard)

Average number of 8-Hr exceedance days:	2.9
Maximum number of 8-Hr exceedance days:	10 in 1996
Minimum number of 8-Hr exceedance days:	0 in 1997, 2001, 04, 07
Average daily max 8-Hr concentration (ppb):	70.6
Record high max 8-Hr concentration (ppb):	105 on the 21st, 1996
Record low max 8-Hr concentration (ppb):	46 on the 20th, 1997

Forecast Verification:

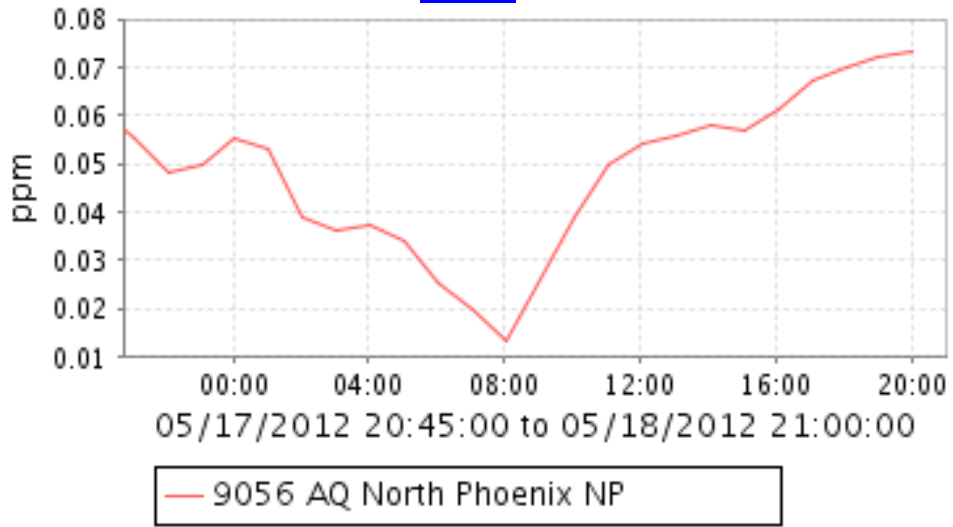
# of days maximum concentrations were over-forecast:	9
# of days maximum concentrations were under-forecast:	21
# of days maximum concentrations were correctly forecast:	1
May average forecast accuracy (ppb):	+/-4.5
May average forecast bias (ppb):	-2.7



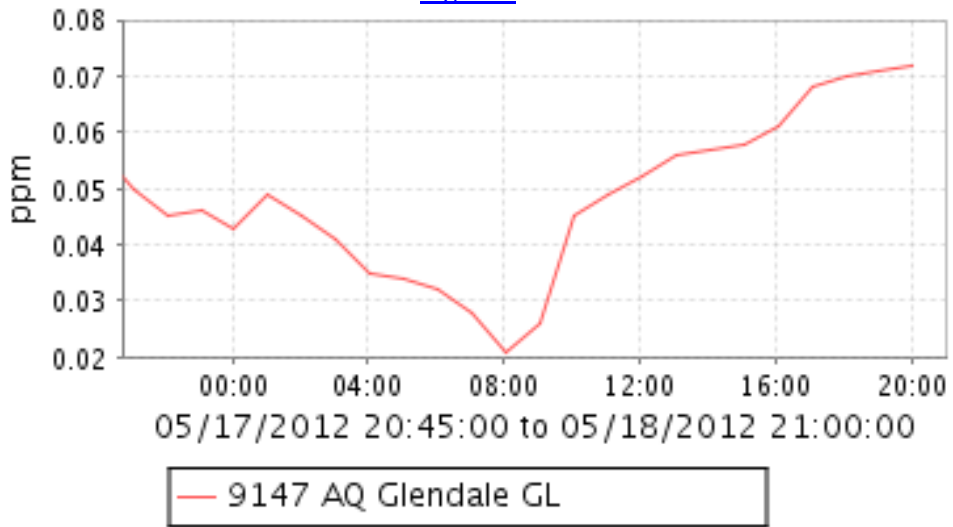
Narrative: For the second consecutive month 8-hour ozone levels were significantly higher than average (using 1996-2011 data) within the ADEQ forecast domain which includes the Phoenix metropolitan area as well as areas to the northeast and east. The number of exceedance days (11) as well as the total of monitoring site-days with unhealthy levels of ozone during the month (56) was well above normal for the month of May. It appears that a combination of factors contributed to this situation: little if any significant cloud cover, varying volumes of smoke within the mixing layer from numerous wildfires, and a series of days during which winds within the 5-10K' layer were conducive to the transport of additional ozone and/or its precursors from the west. As was described in section one of this report, on April 14 the Valley was fumigated with dense smoke from the Sunflower Fire and it does not seem to be a coincidence that one of the highest local 8-hour ozone concentrations over the past few years (91 parts per billion) as well as a very high 1-hour concentration (104ppb) was measured during that day. Using weather forecast model streamline analyses, it was determined that there were eight days during which the wind-flow within the 5-10K'' layer was capable of delivering supplemental ozone and/or its precursors from source areas to the west of Arizona. One day with exceptionally configured such winds was on the 18th and the ozone time series graphs from local monitors represented in [Figures 1-5](#) show strong evidence of such transport since local ozone levels on their own do not normally increase during the nighttime hours. Although there were no exceedances on the 18th there were exceedances on each of the subsequent four days. [Figure 6](#) on the final page of this report shows the daily highest ozone, PM-10, and PM-2.5 levels during May 2012.

-Reith

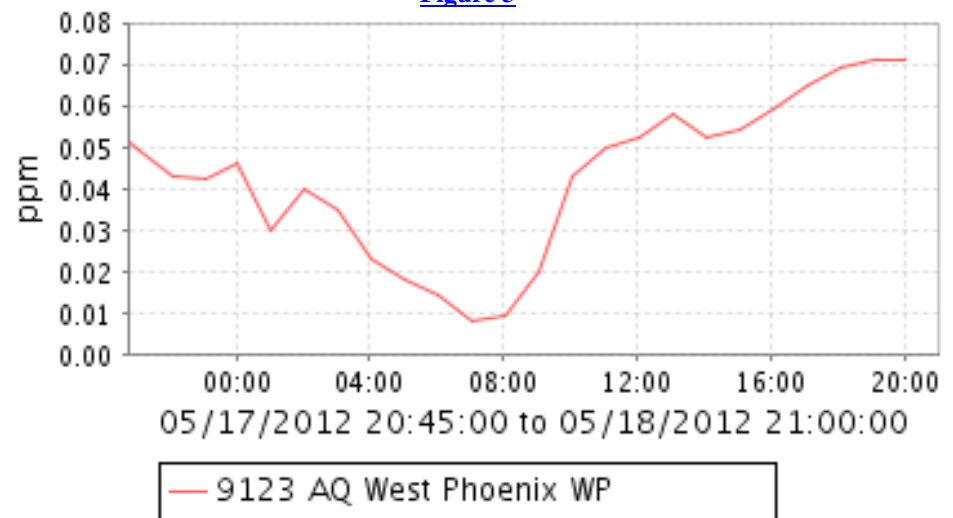
[Figure 1](#)



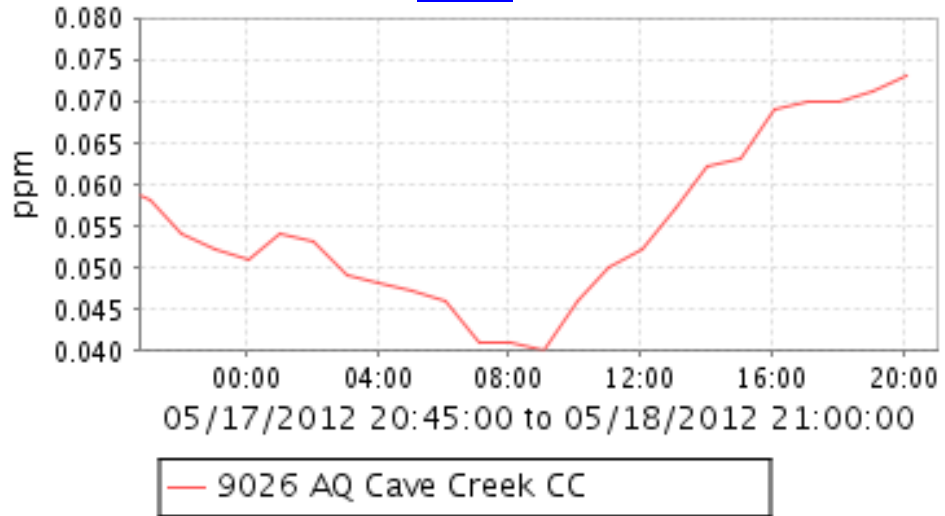
[Figure 2](#)



[Figure 3](#)



[Figure 4](#)



[Figure 5](#)

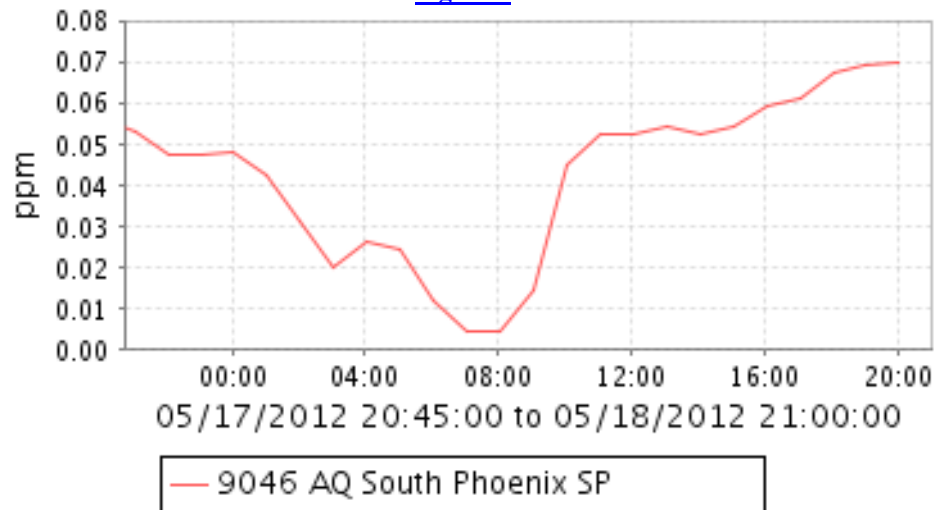


Figure 6

