



# Palliser Airshed Society

## Ambient Air Monitoring Network Summary

**July 2006**

Prepared By:



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August 3, 2006

Environmental Service Response Centre  
Alberta Environment  
#111 Twin Atria Building  
4999-98 Ave  
Edmonton Alberta T6B 2X3

**Attention: Director of Monitoring and Evaluation**

**RE: Palliser Airshed Society (PAS) Ambient Air Monitoring Report – July 2006**

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Enclosed is the PAS Ambient Monitoring Report for the month of **July 2006**.

Please note that this report has been prepared in partial fulfillment of the City of Medicine Hat's air monitoring requirement as well as all members of the Palliser Airshed Society.

**Continuous Monitoring – Crescent Heights**

Included in this report are; monthly sampling table, detailed hourly average reports and multipoint calibration reports of all instruments. The measured ambient air quality was within the Provincial and Federal guidelines with no exceedences recorded. Operational time of all instruments was greater than 95% uptime for the month of July. There were no significant events leading to emergency response for the month of June.

The following is a summary of the monthly averages recorded during sampling:

- Monthly average concentrations of NO<sub>2</sub> was 7.0 ppb
- Monthly average concentrations for O<sub>3</sub> was 34.9 ppb
- Monthly average concentrations for CO was 0.15 ppm
- Monthly average concentrations for THC was 1.95 ppm
- Monthly average concentrations for PM<sub>2.5</sub> was 5.4 µg/m<sup>3</sup>

**Passive Monitoring – Six Sites throughout the PAS zone:**

The following are the ranges for July 2006 recorded by the six passive stations located throughout the PAS zone.

- Monthly average concentrations for SO<sub>2</sub> passives were all <0.4 ppb.
- Monthly average concentrations for NO<sub>2</sub> passives ranged from 3.7 ppb to 5.1 ppb
- Monthly average concentrations for O<sub>3</sub> passives ranged from 30.9 ppb to 38.5 ppb

If you have any questions, please contact the Focus office at 1-888-466-6555 or 1-888-869-2252.

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AQM Data Specialist

Kevin McCullum, Ph.D., P.Eng.  
AQM Environmental Specialist



# Continuous Monitoring

## Ambient Air Monitoring Network

### Crescent Heights Station

#### General Station Issues

Calibrations were performed on July 25<sup>th</sup> and 26<sup>th</sup> on all the pollutant analyzers. The coils in the air conditioner unit began to freeze up on July 27<sup>th</sup> to the 31<sup>st</sup> of July; this caused an increase in the station temperature which affected the daily zero and spans of the analyzers. A technician was on call to help ensure the air conditioner unit continued to operate well.

Parameter	Make	Model	Units	Notes
Ozone	Teledyne - API	400E	ppb	No operational issues observed.
Nitrogen Dioxide	Teledyne - API	200E	ppb	No operational issues observed.
Total Hydrocarbons	Bendix	400A	ppm	No operational issues observed.
Carbon Monoxide	TEI	49C	ppm	No operational issues observed.
PM 2.5	R&P TEOM	1400ab	µg/m <sup>3</sup>	There were twenty-eight (28) hours of excessive baseline drift flagged. No other operational issues were observed.
Wind Speed	Met One	010C	kph	There were two (2) hours of calm noted. No other operational issues were observed.
Wind Direction	Met One	020C	Deg	No operational issues observed.
Ambient Temperature	Met One	083D	DegC	No operational issues observed.
Relative Humidity	Met One	083D	%	No operational issues observed.
Solar Radiation	Met One	096-1	W/m <sup>2</sup>	No operational issues observed.
Data Acquisition System	Titan Logix	AP1000		No operational issues observed.



## July 2006 Monthly Overall Summary Report

### Ambient Air Quality Data

Jul-2006		Palliser Airshed Society					Maximum Recorded Values							
							1-hr		24-hr / 8-hr					
Pollutant (units)	Objectives		Station	Monthly Average	Exceedence	1-hr	24-hr	Conc	Day	WSPD (km/hr)	WDIR (Sector)	Conc	Day	Operational Time (%)
NO (ppb)			Crescent Heights	1.6	-	-	17.8	Jul-22 08:00	1.5	ESE	3.3	Jul-22	100.0%	
NO <sub>2</sub> (ppb)	212	106	Crescent Heights	7.0	0	0	33.9	Jul-29 20:00	5.5	SE	10.7	Jul-29	100.0%	
NO <sub>x</sub> (ppb)			Crescent Heights	8.4	-	-	39.1	Jul-22 08:00	1.5	ESE	12.9	Jul-29	100.0%	
O <sub>3</sub> (ppb)	82		Crescent Heights	34.9	0	-	64.4	Jul-28 13:00	8.2	SW	46.2	Jul-05	100.0%	
O <sub>3</sub> (ppb) - 8-hr	65		Crescent Heights		0							59.1	Jul-27	
CO (ppm)	13		Crescent Heights	0.15	0	-	0.5	Jul-21 22:00	2.8	S	0.2	Jul-24	100.0%	
CO (ppm) - 8-hr	5		Crescent Heights		0							0.3	Jul-22	
THC (ppm)			Crescent Heights	1.95	-	-	2.8	Jul-22 03:00	5.0	S	2.1	Jul-23	100.0%	
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	30 <sup>a</sup>		Crescent Heights	5.4		0	27.5	Jul-07 10:00	17.4	W	9.5	Jul-30	96.2%	
RH (%)			Crescent Heights	47.8	-	-	-	-	-	-	-	-	100.0%	
SR (W/m <sup>2</sup> )			Crescent Heights	302.3	-	-	-	-	-	-	-	-	100.0%	
Temp (°C)			Crescent Heights	23.7	-	-	-	-	-	-	-	-	100.0%	
WSPD v (km/hr)			Crescent Heights	2.7	-	-	28.0	Jul-30 19:00	28.0	W	14.1	Jul-13	100.0%	
WSPD s (km/hr)			Crescent Heights	8.8	-	-	28.1	Jul-30 19:00	28.1	W	14.9	Jul-30	100.0%	
WDIR (Deg)			Crescent Heights	WSW	-	-	-	-	-	-	-	-	100.0%	

Note: <sup>a</sup> the draft 24-hr Alberta Ambient Air Quality Objectives  
 \* Wind Direction is the predominate direction for the Month



# **PAS - Crescent Heights**

## **Monthly Summary Tables, Graphs, and Roses**





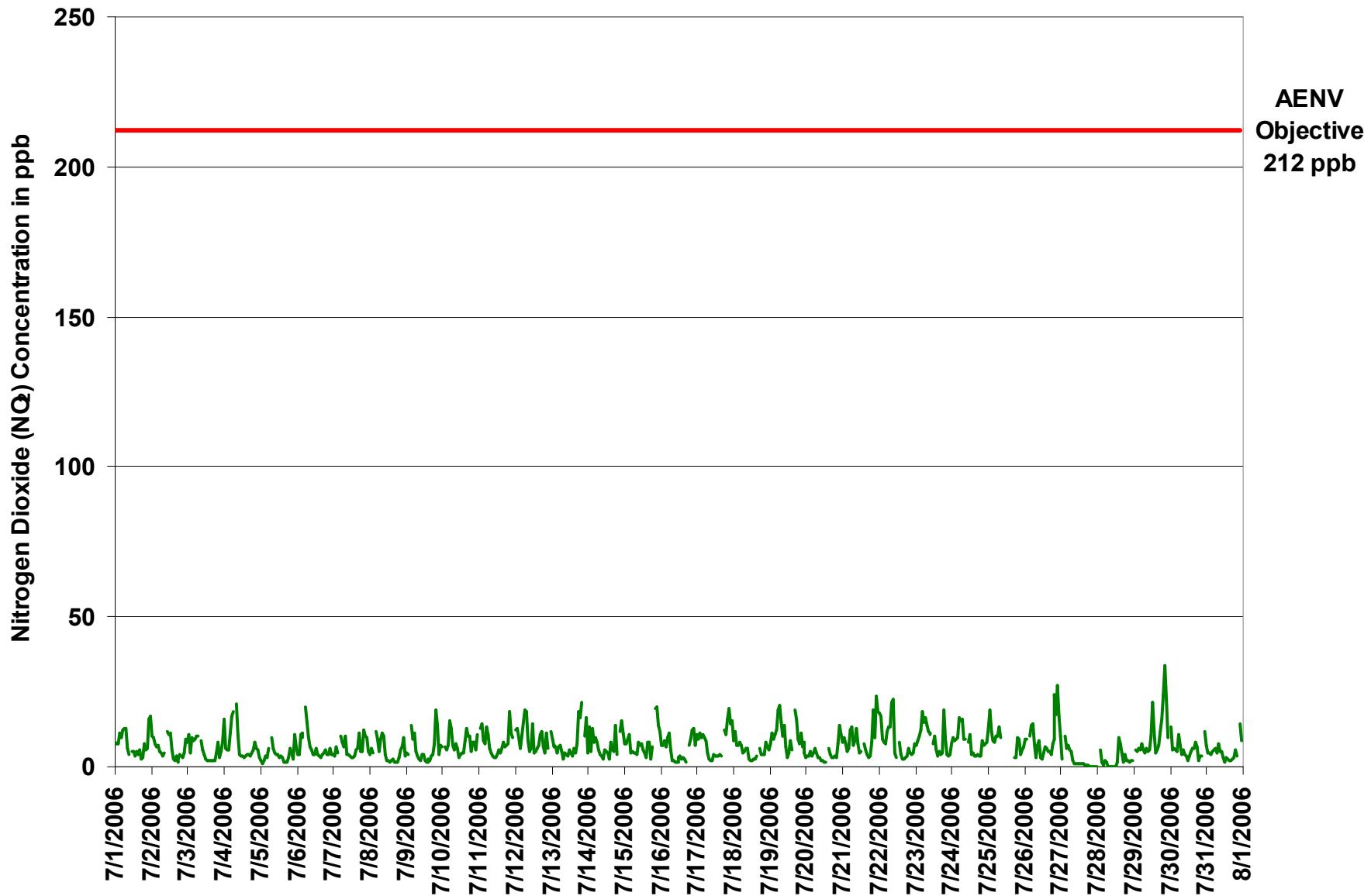


Figure 1. PAS - Crescent Heights Nitrogen Dioxide 1-hr Average Monthly Trend



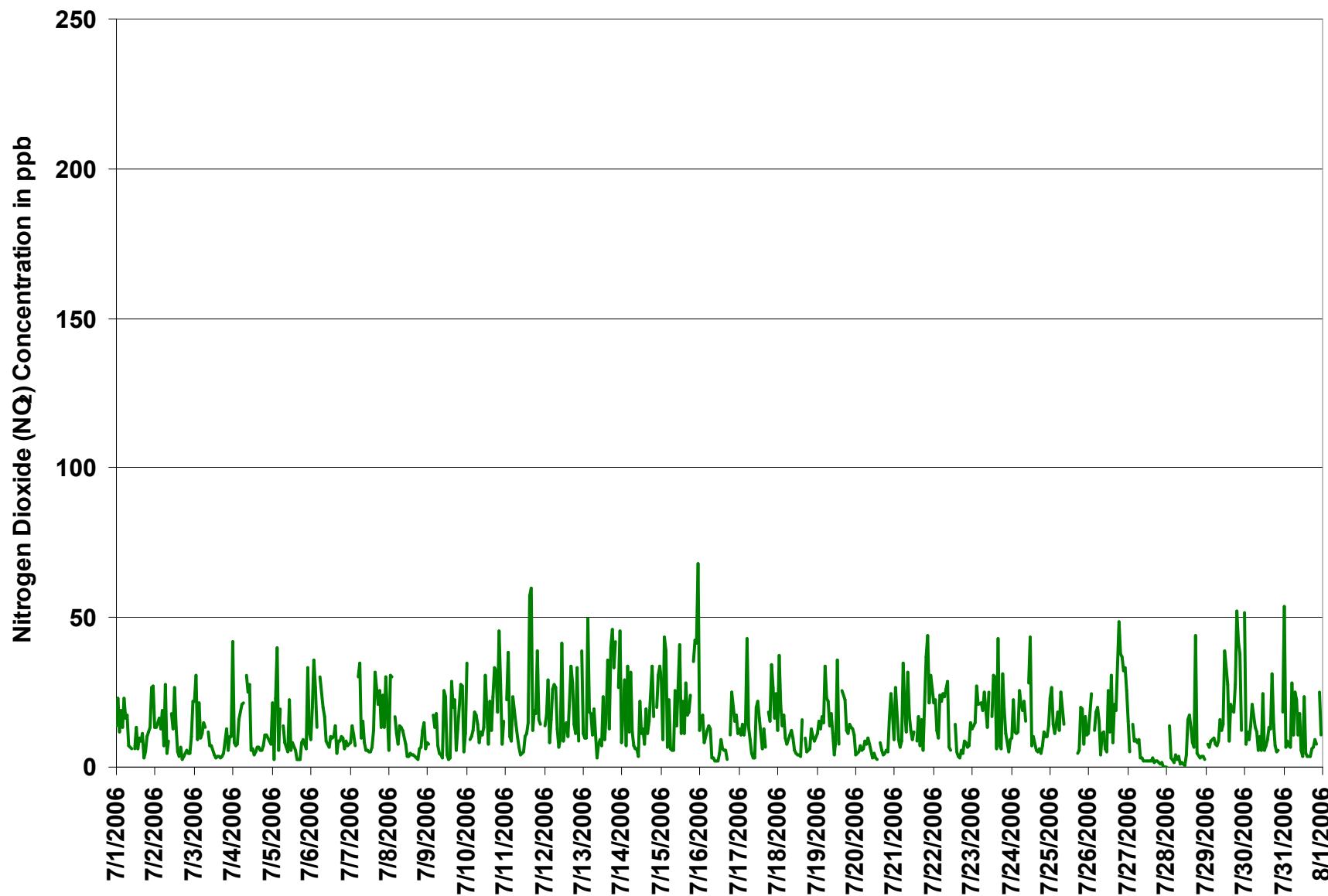
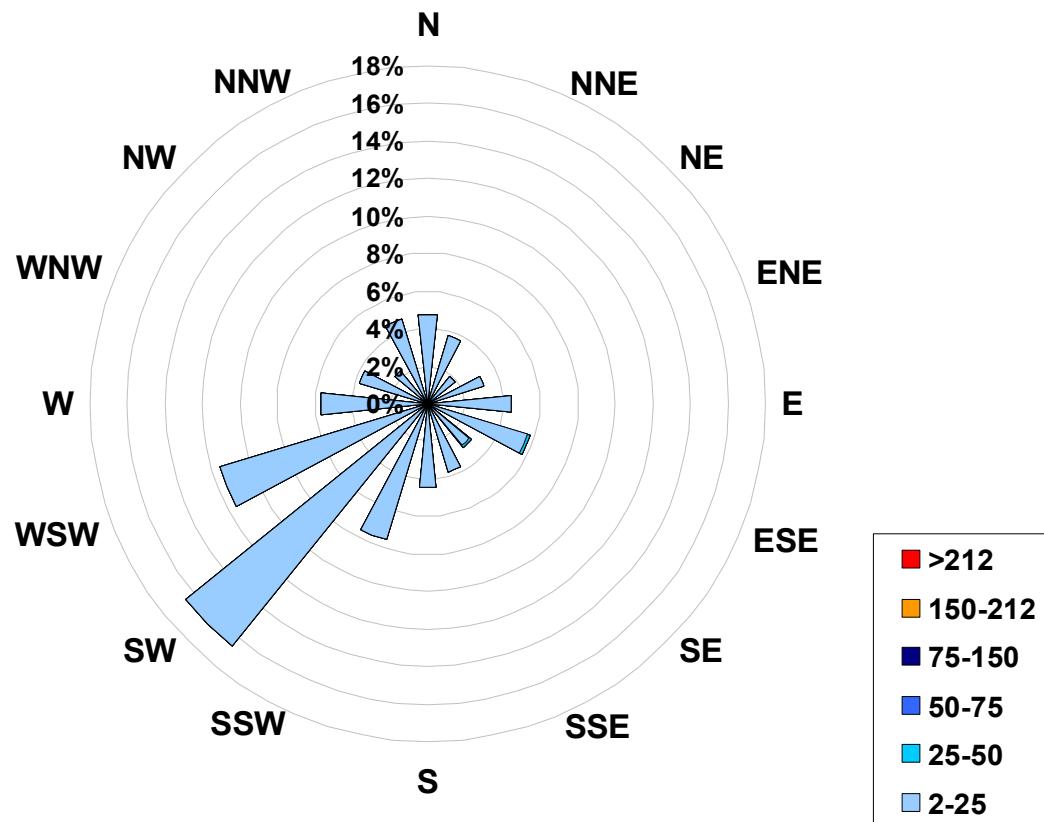


Figure 2. PAS - Crescent Heights Nitrogen Dioxide Instantaneous (30 Second) Maximum Value Monthly Trend



1-hr Average Concentration Rose for Nitrogen Dioxide (in ppb) Located at  
the Crescent Heights Site for July 2006



Calms:		Frequency Distribution of NO <sub>2</sub> in ppb	
		Range	Frequency (hrs)
2.0	<	25	705
25	to	50	0
50	to	75	0
75	to	150	0
150	to	212	0
		> 212	0
Total Non-Zero Values			705







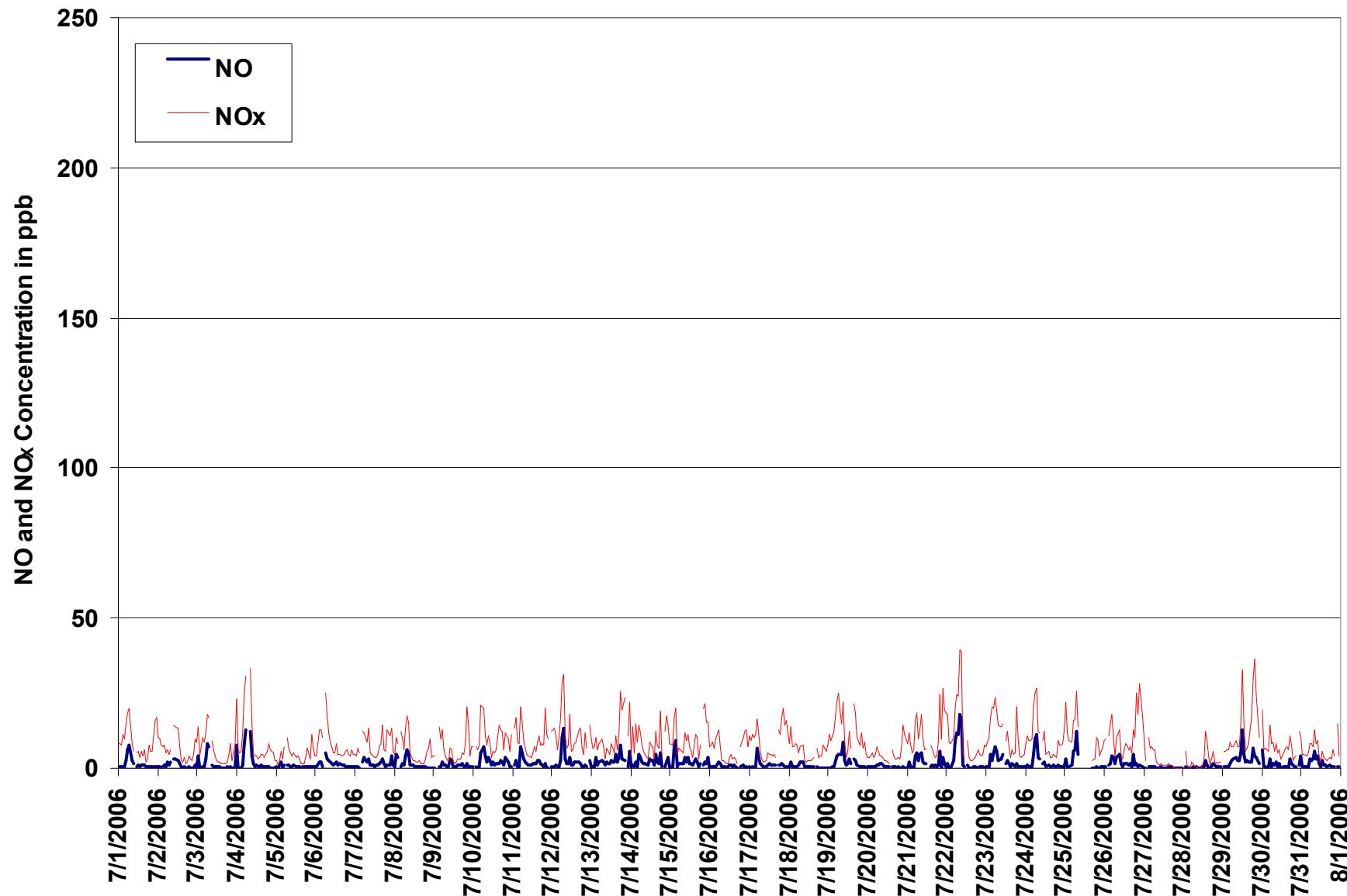


Figure 3. PAS - Crescent Heights Oxides of Nitrogen 1-hr Average Monthly Trend



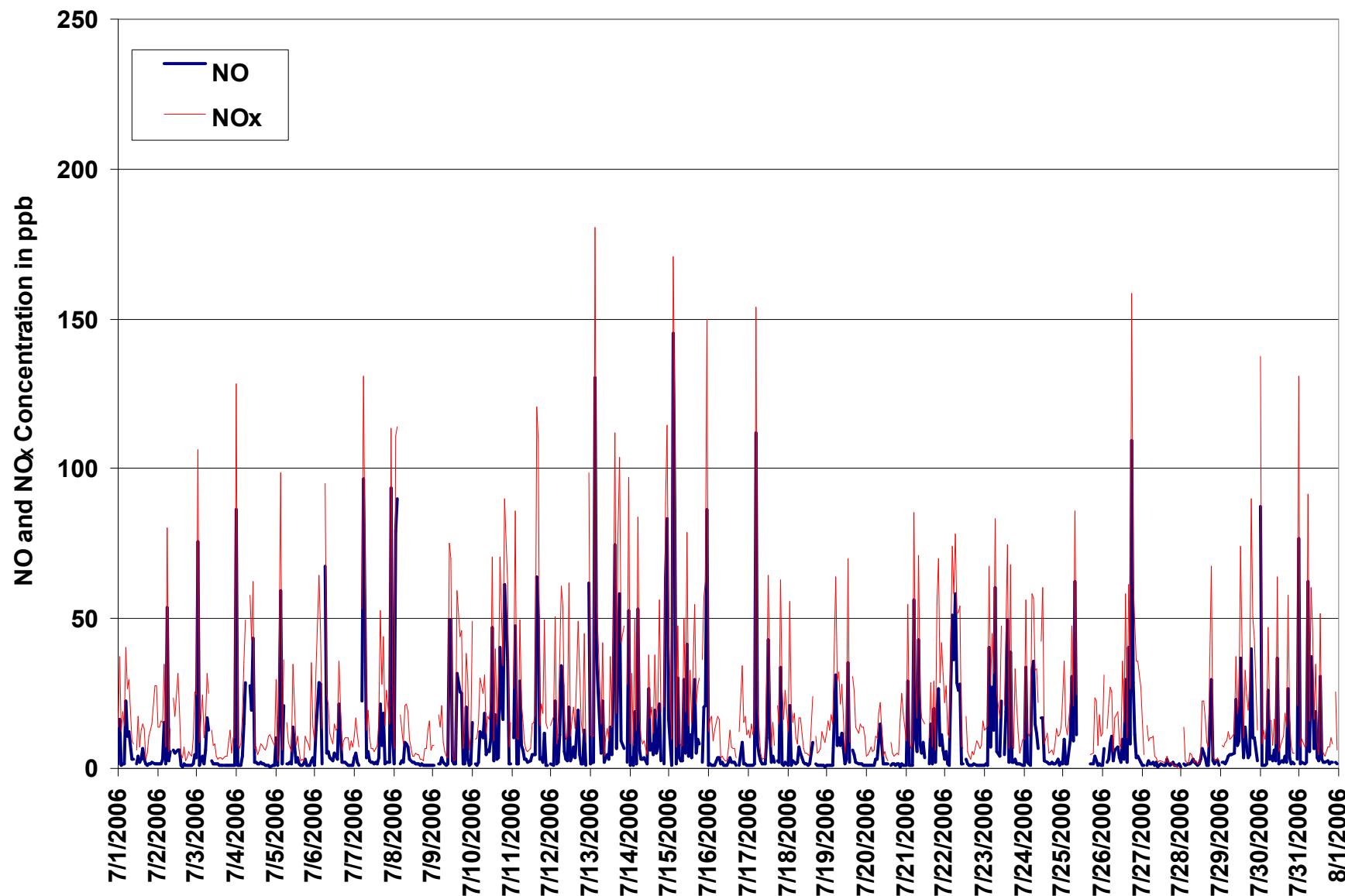


Figure 4. PAS - Crescent Heights Oxides of Nitrogen Instantaneous (30 Second) Maximum Value Monthly Trend



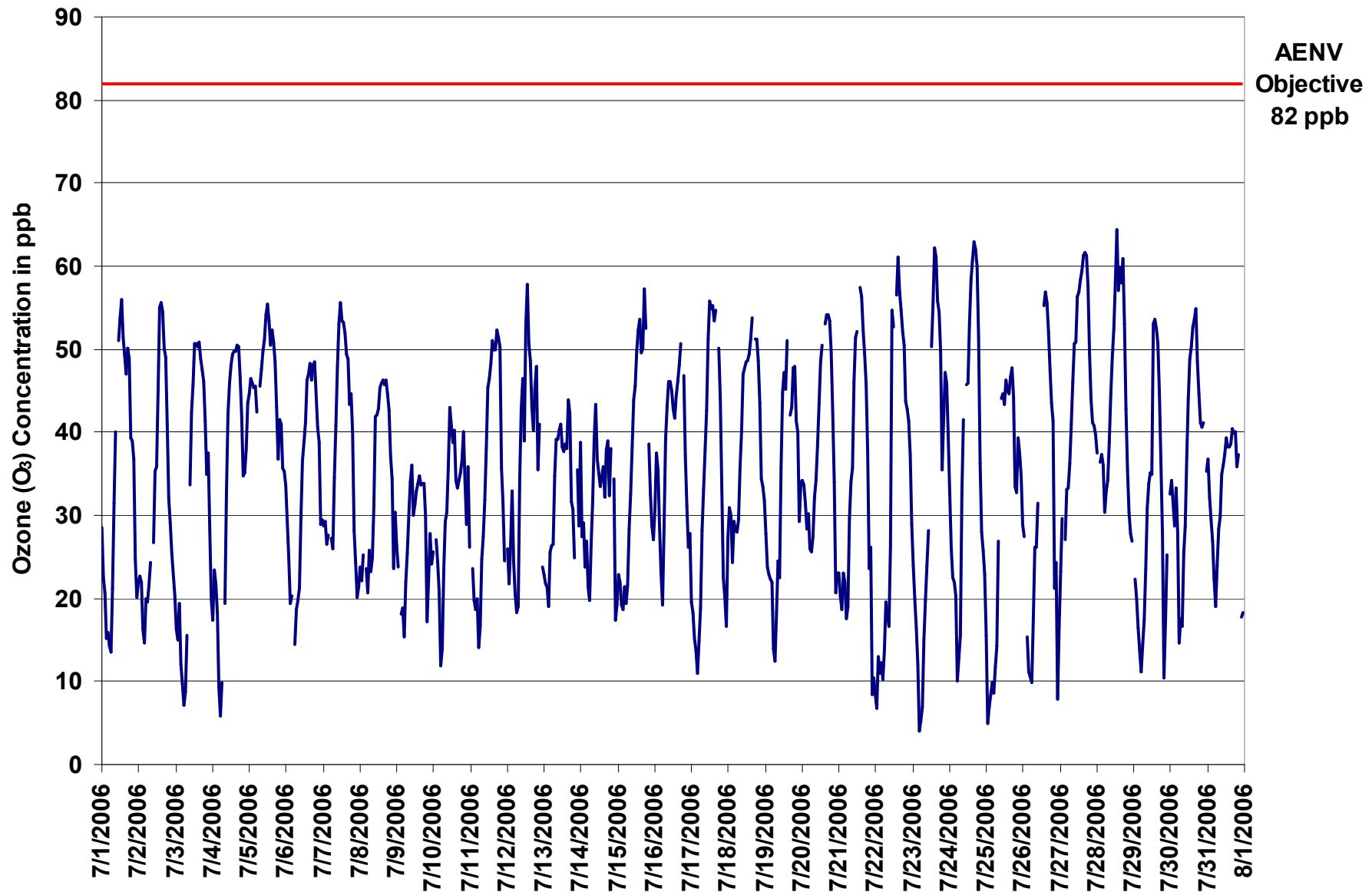


Figure 5. PAS - Crescent Heights Ozone 1-hr Average Monthly Trend



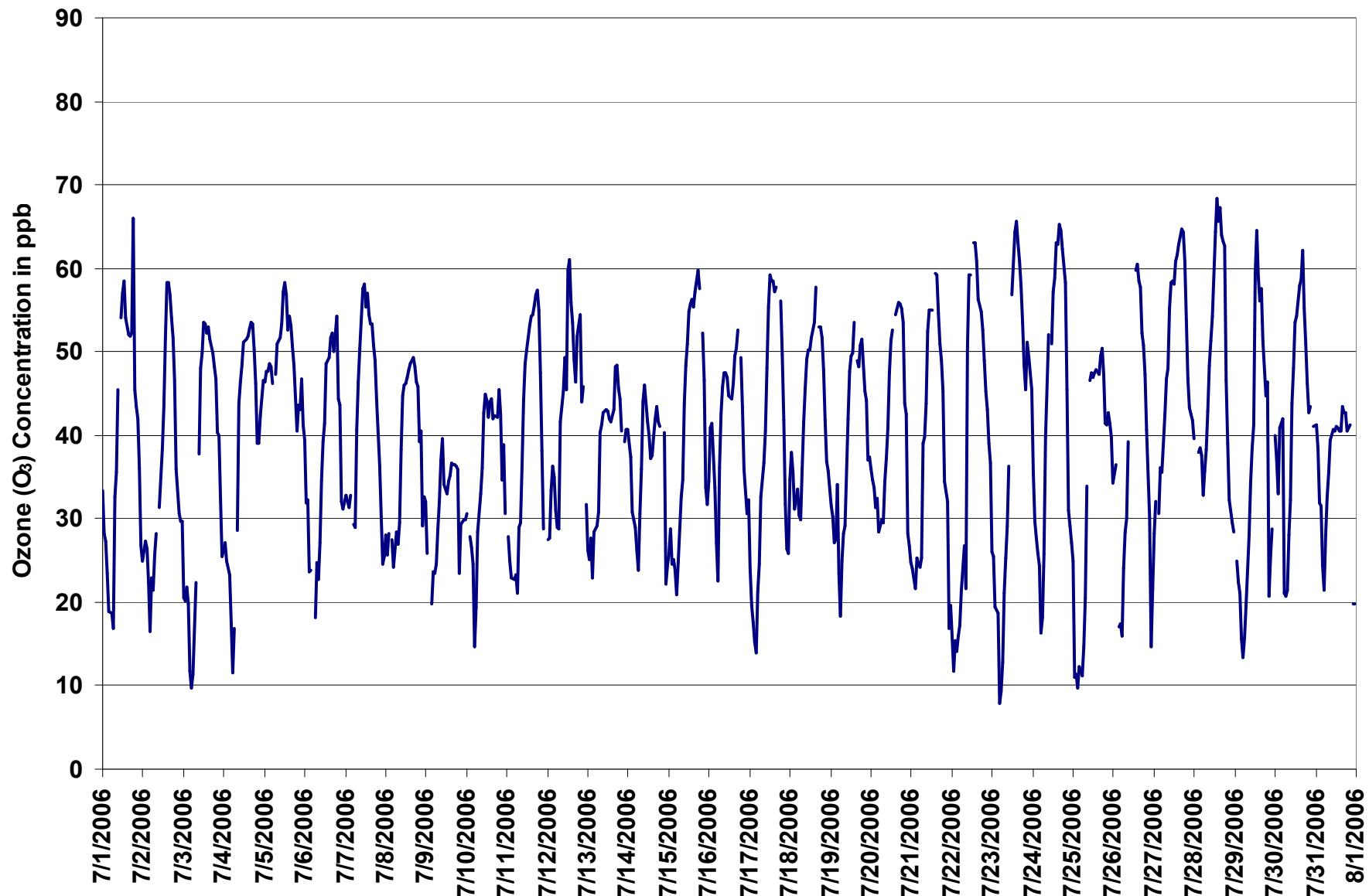
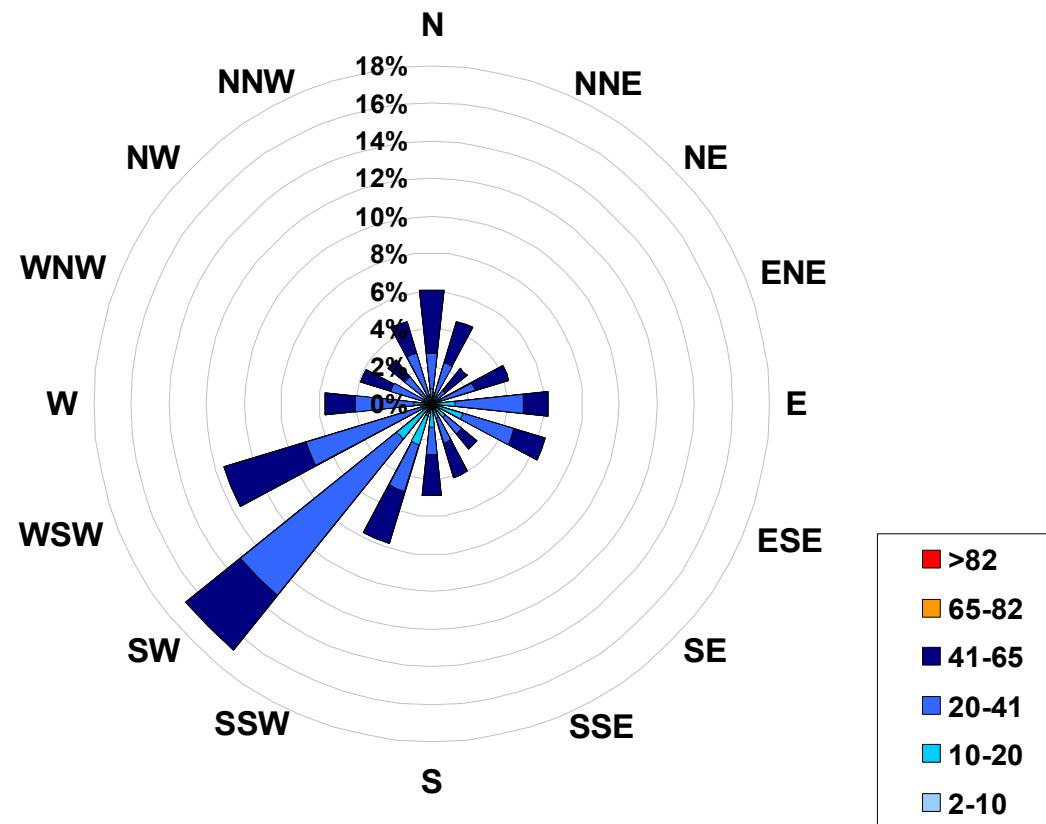


Figure 6. PAS - Crescent Heights Ozone Instantaneous (30 Second) Maximum Value Monthly Trend



1-hr Average Concentration Rose for Ozone (in ppb) Located at the  
Crescent Heights Site for July 2006



Calms: 0%

Frequency Distribution of O <sub>3</sub> in ppb			
Range		Frequency (hrs)	
2.0	<	10	20
10	to	20	92
20	to	41	339
41	to	65	257
65	to	82	0
	>	82	0
Total Non-Zero Values		708	





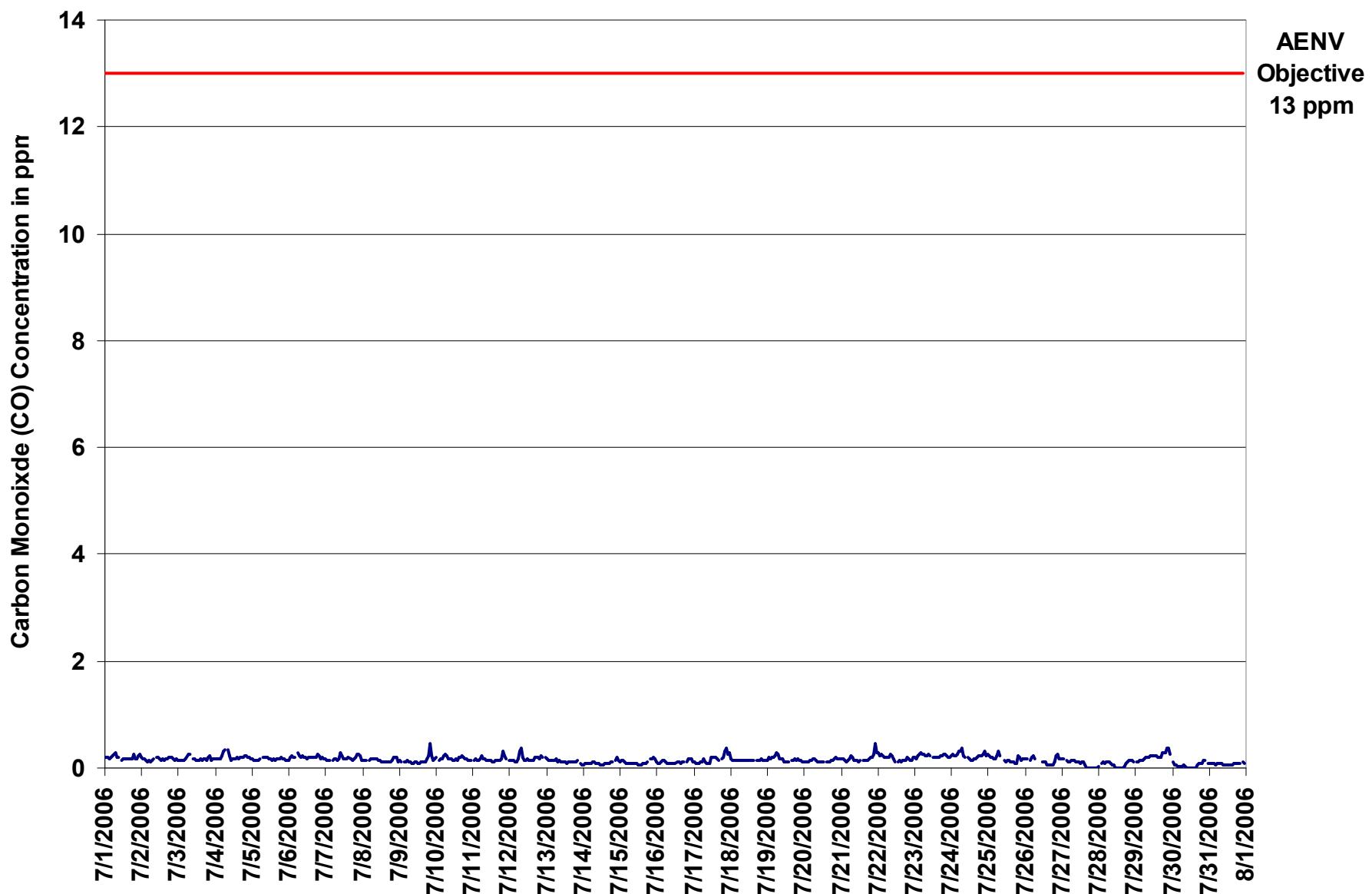


Figure 7. PAS - Crescent Heights Carbon Monoxide 1-hr Average Monthly Trend



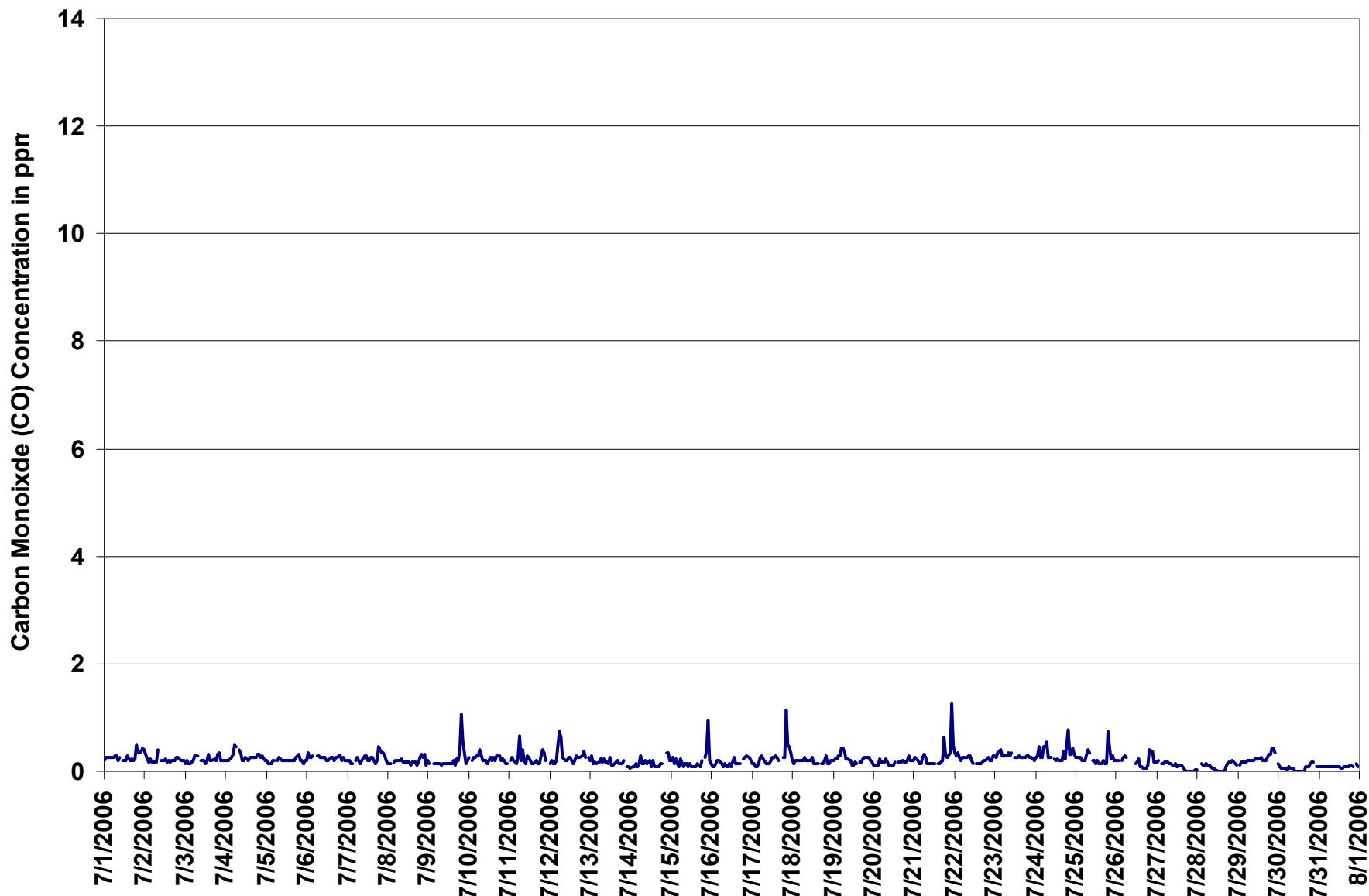
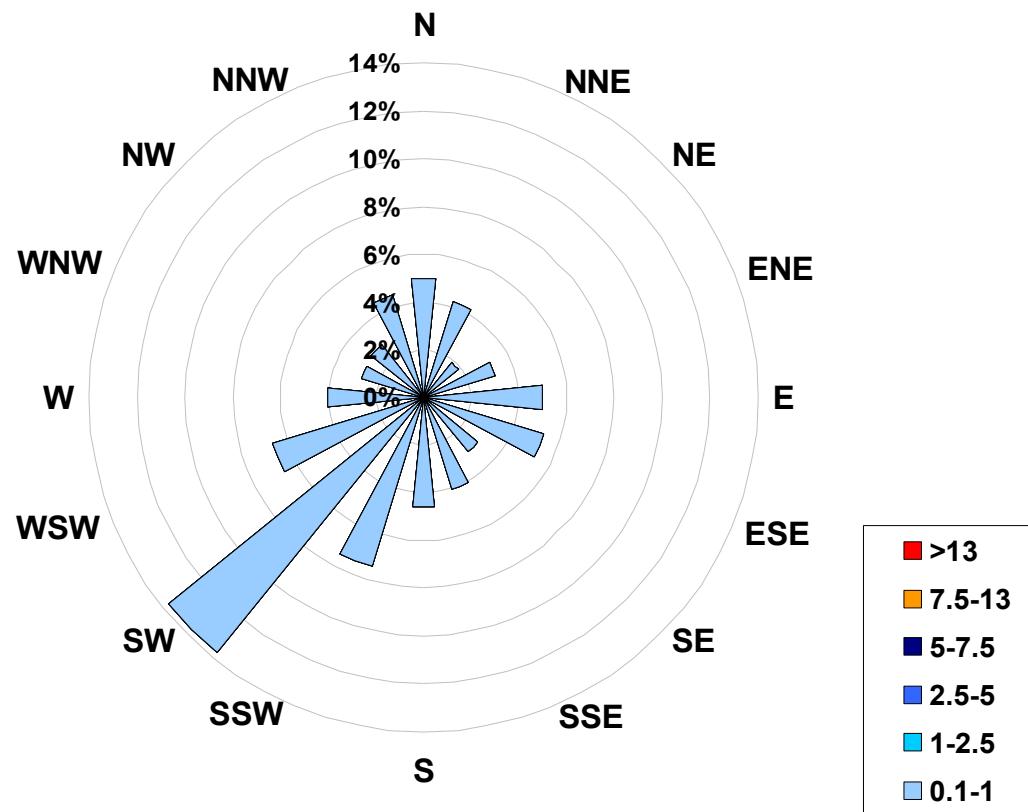


Figure 8. PAS - Crescent Heights Carbon Monoxide Instantaneous (30 Second) Maximum Value Monthly Trend

1-hr Average Concentration Rose for Carbon Monoxide (in ppm) Located  
at the Crescent Heights Site for July 2006



Calms:	0%
--------	----

Frequency Distribution of CO in ppm			Frequency (hrs)
Range			
0.1	<	1	707
1	to	2.5	0
2.5	to	5	0
5	to	7.5	0
7.5	to	13	0
>	13		0
Total Non-Zero Values			707





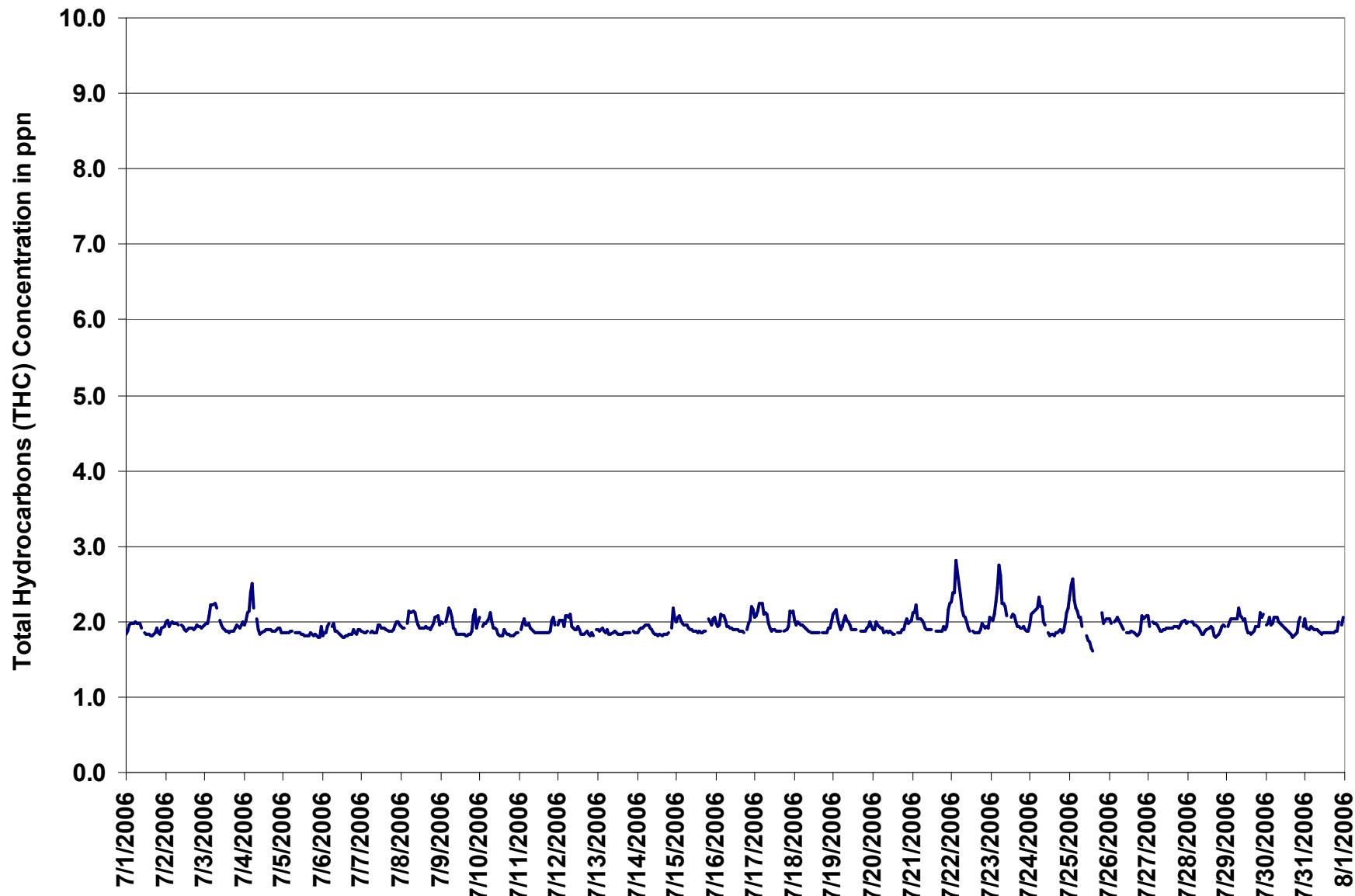


Figure 9. PAS - Crescent Heights Total Hydrocarbons 1-hr Average Monthly Trend



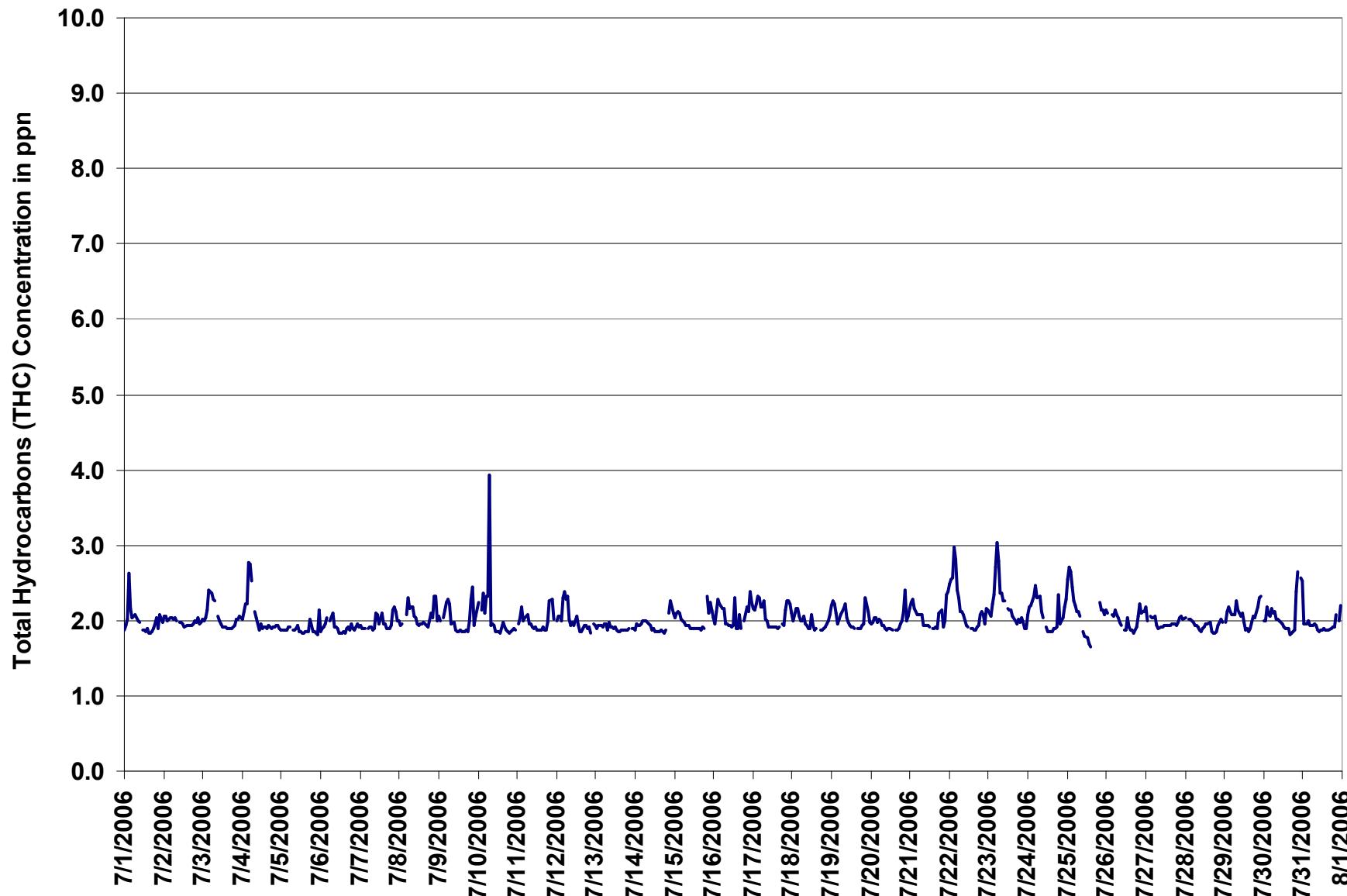
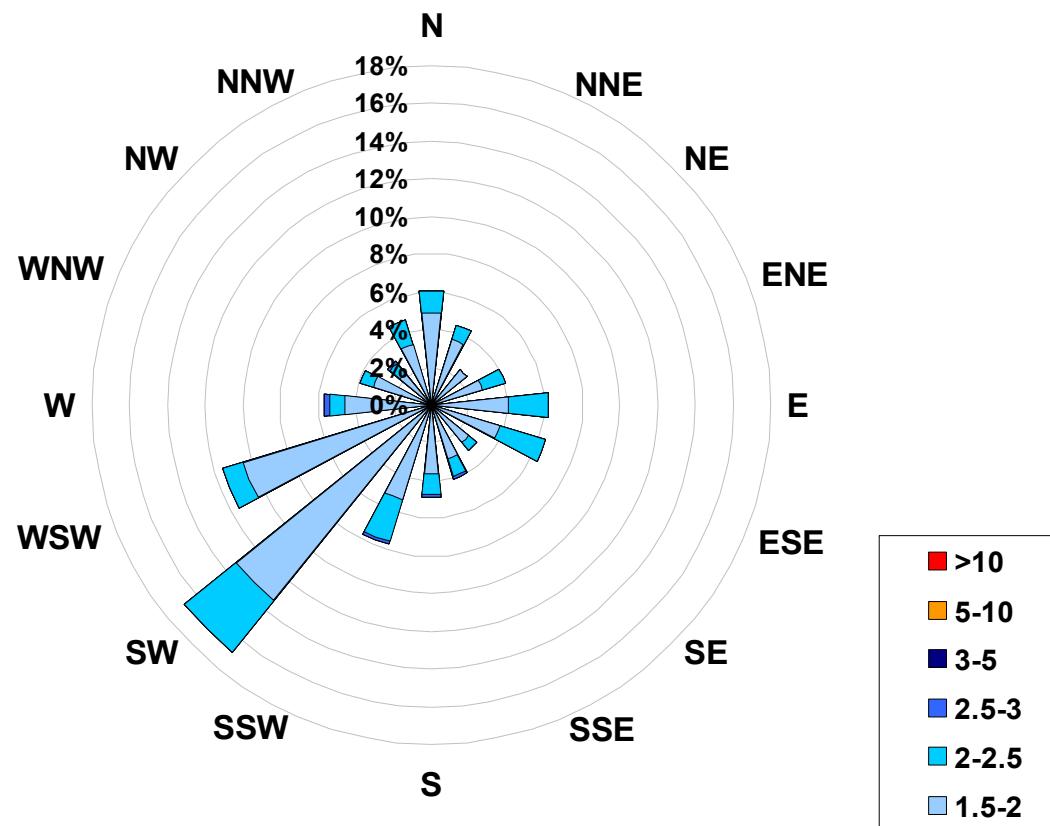


Figure 10. PAS - Crescent Heights Total Hydrocarbons Instantaneous (30 Second) Maximum Value Monthly Trend

1-hr Average Concentration Rose for Total Hydrocarbons (in ppm)  
Located at the Crescent Heights Site for July 2006



Calms: 0%

Frequency Distribution of THC in ppm			
Range			Frequency (hrs)
1.5	<	2	542
2	to	2.5	157
2.5	to	3	6
3	to	5	0
5	to	10	0
	>	10	0
Total Non-Zero Values			705



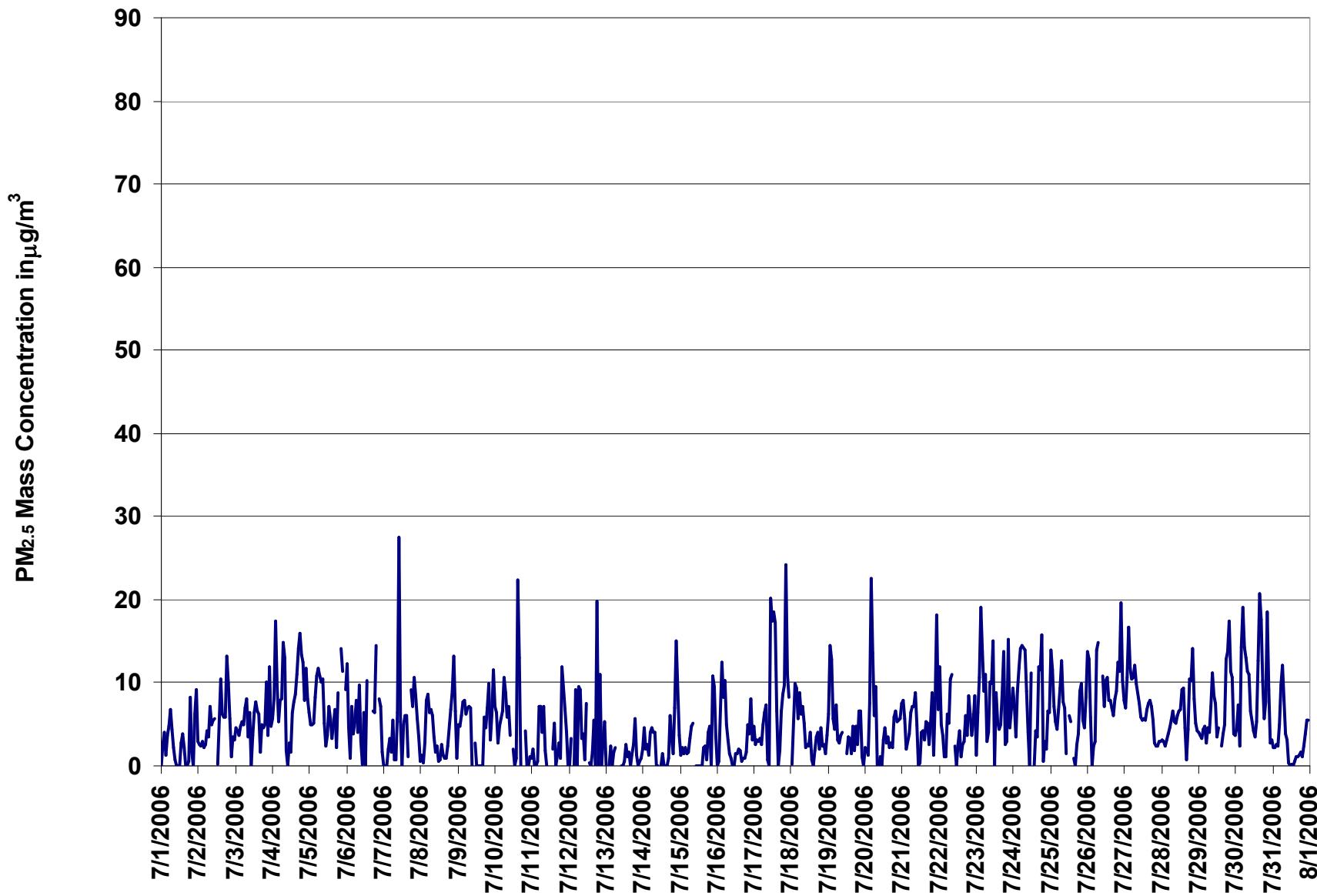


Figure 11. PAS - Crescent Heights Particulate Matter (less than 2.5 microns) 1-hr Average Monthly Trend



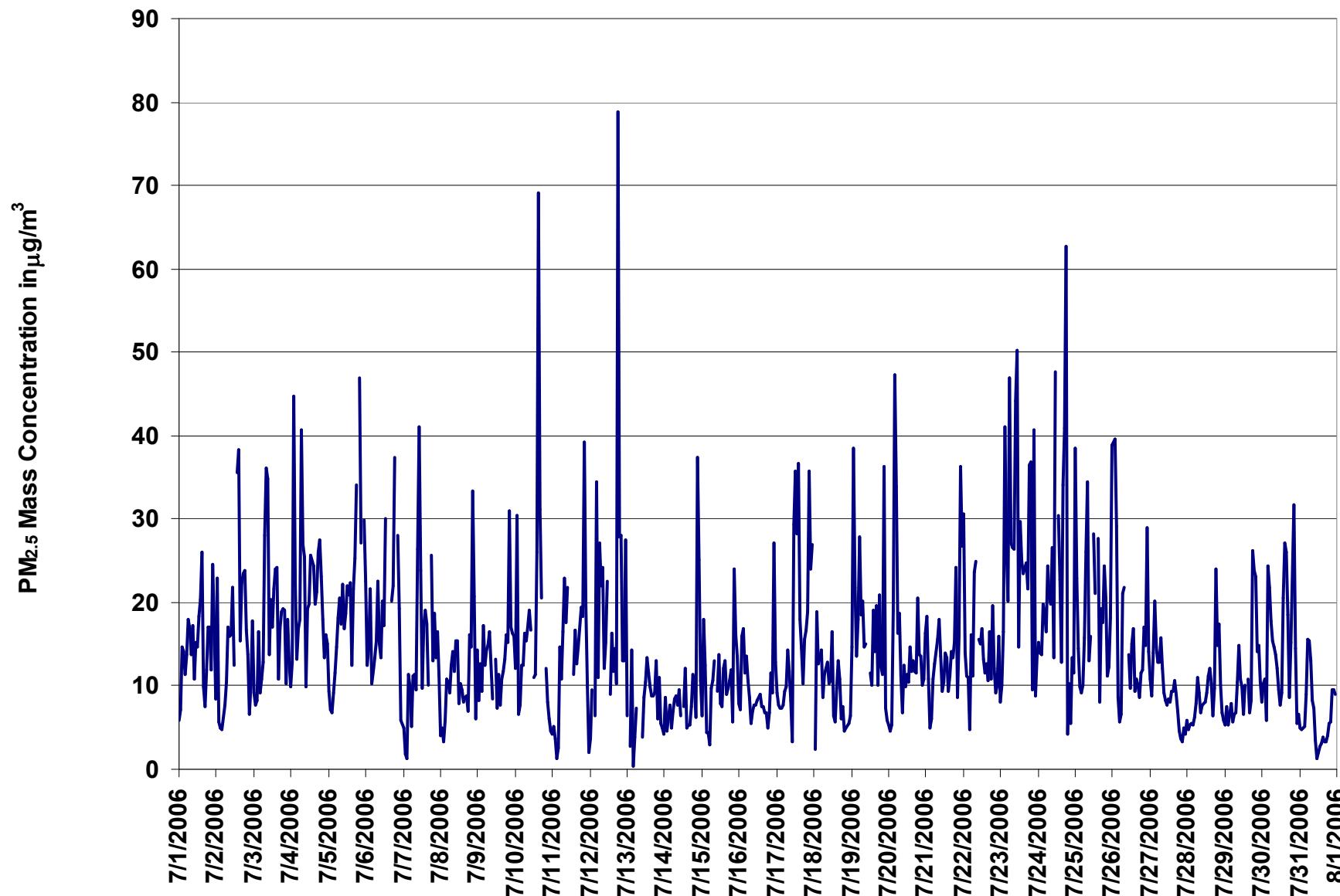
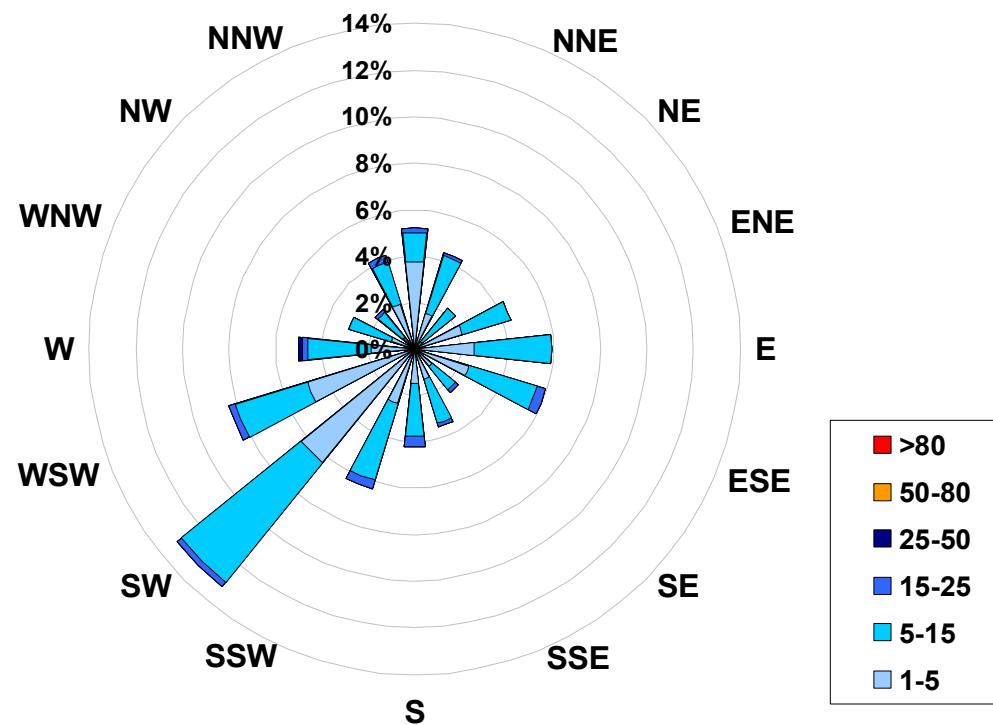


Figure 12. PAS - Crescent Heights Particulate Matter (less than 2.5 microns) Instantaneous (30 Second) Maximum Value Monthly Trend



1-hr Average Concentration Rose for Particulate Matter (less than 2.5 microns) (in micrograms per cubic meter) Located at the Crescent Heights  
Site for July 2006



Calms:	0%
--------	----

Frequency Distribution of PM <sub>2.5</sub> in µg/m <sup>3</sup>		
Range		Frequency (hrs)
1.0	< 5	383
5	to 15	307
15	to 25	23
25	to 50	1
50	to 80	0
> 80		0
Total Non-Zero Values		714



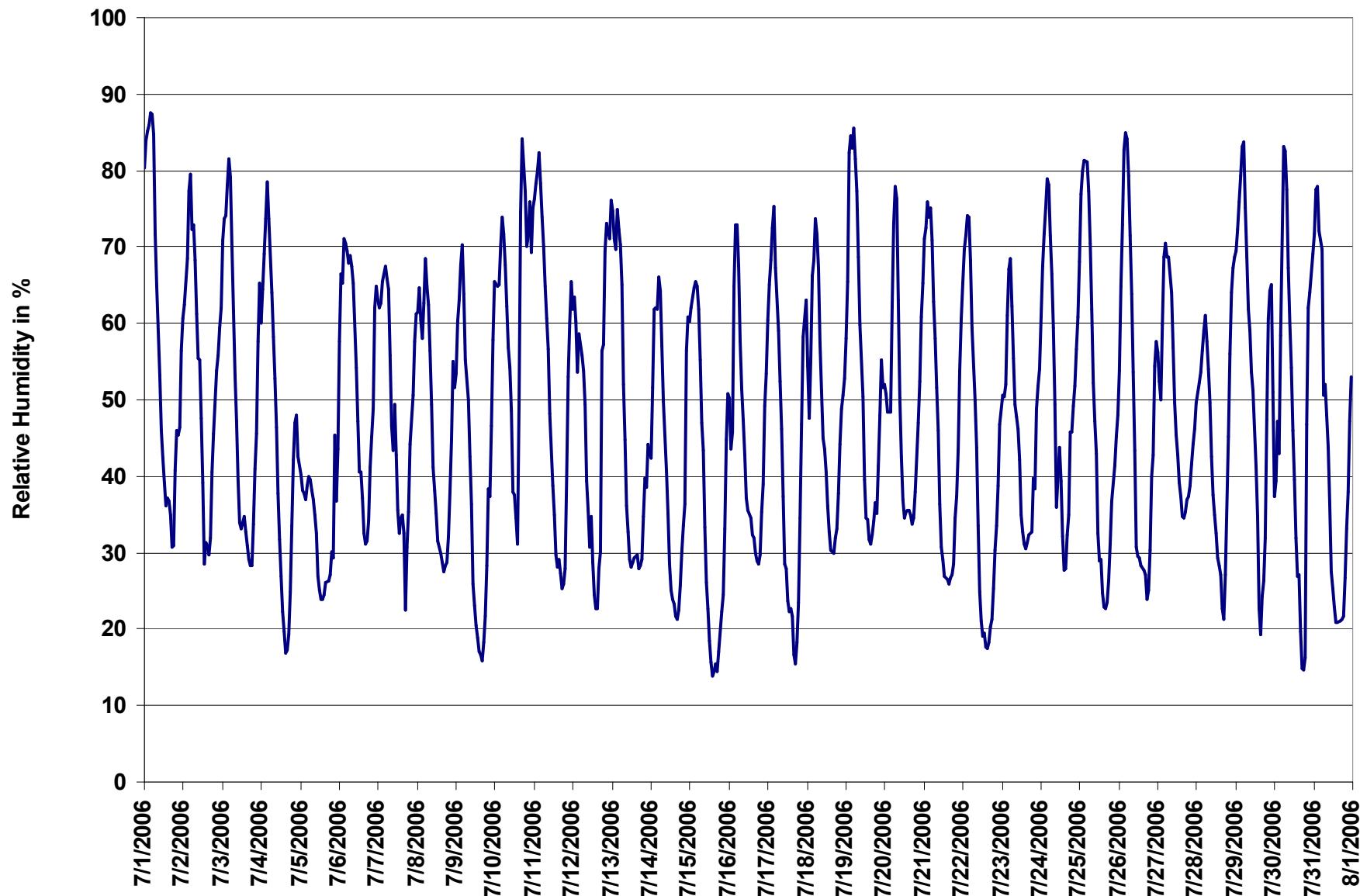


Figure 13. PAS - Crescent Heights Relative Humidity 1-hr Average Monthly Trend



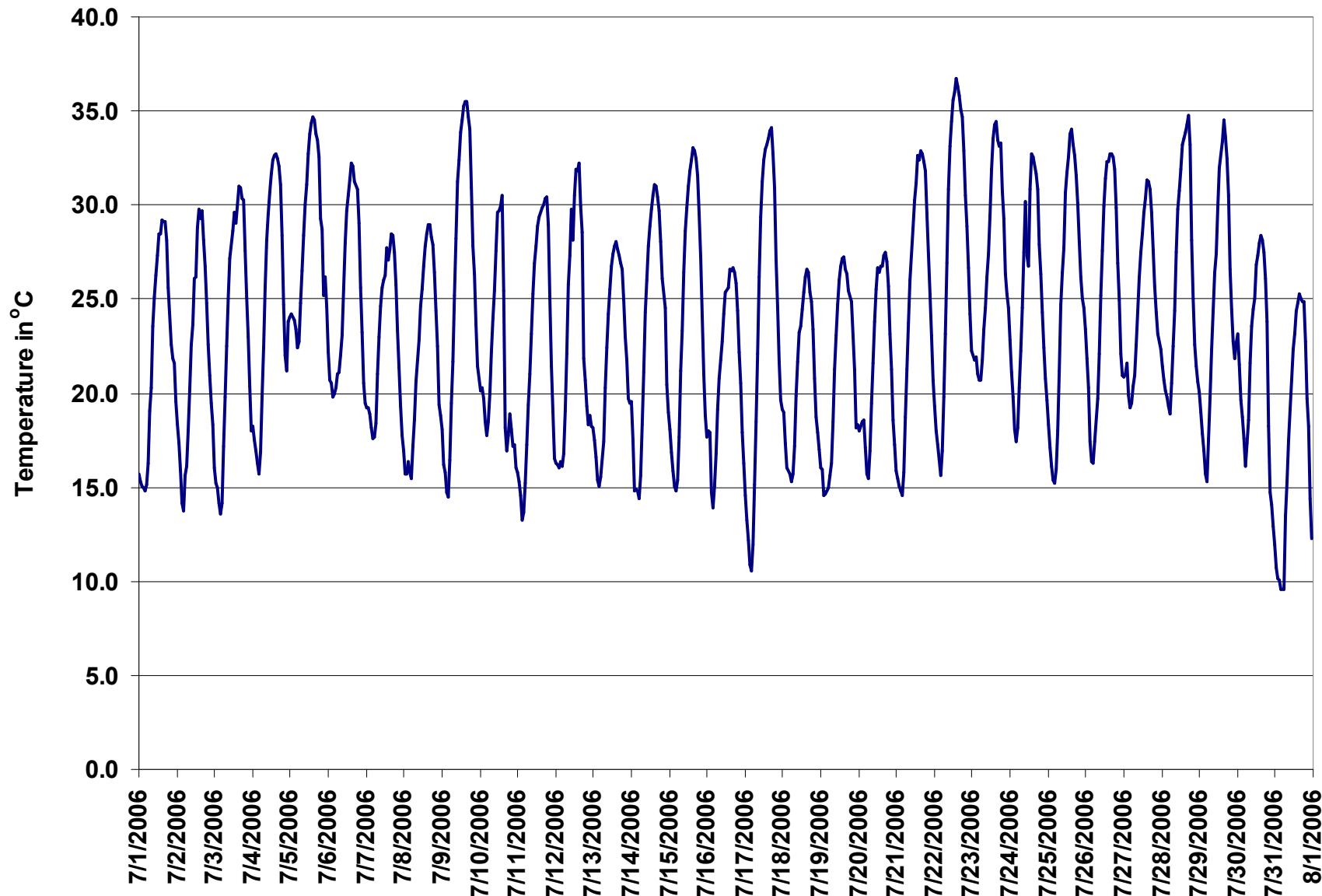


Figure 14. PAS - Crescent Heights Temperature 1-hr Average Monthly Trend



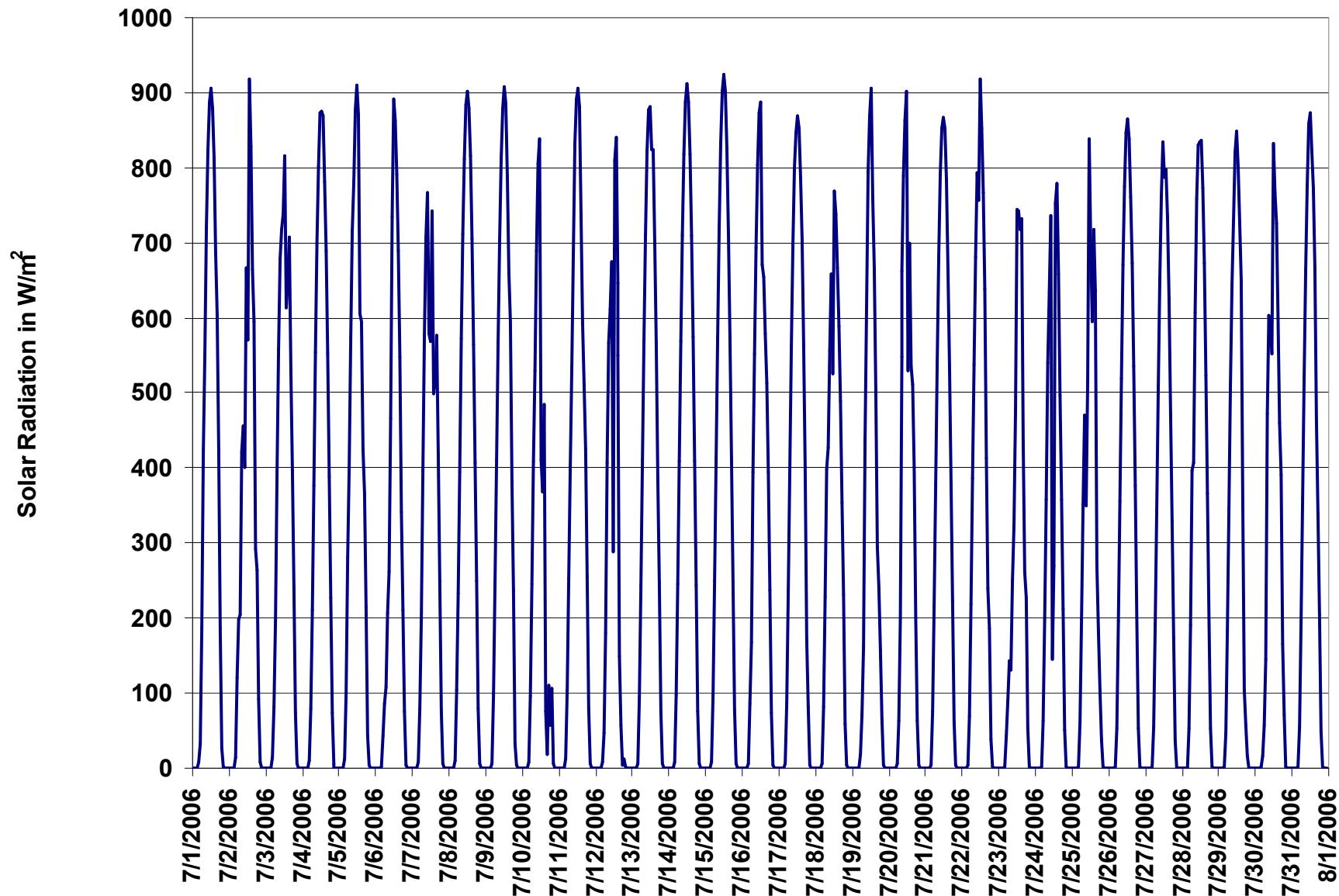


Figure 15. PAS - Crescent Heights Solar Radiation 1-hr Average Monthly Trend



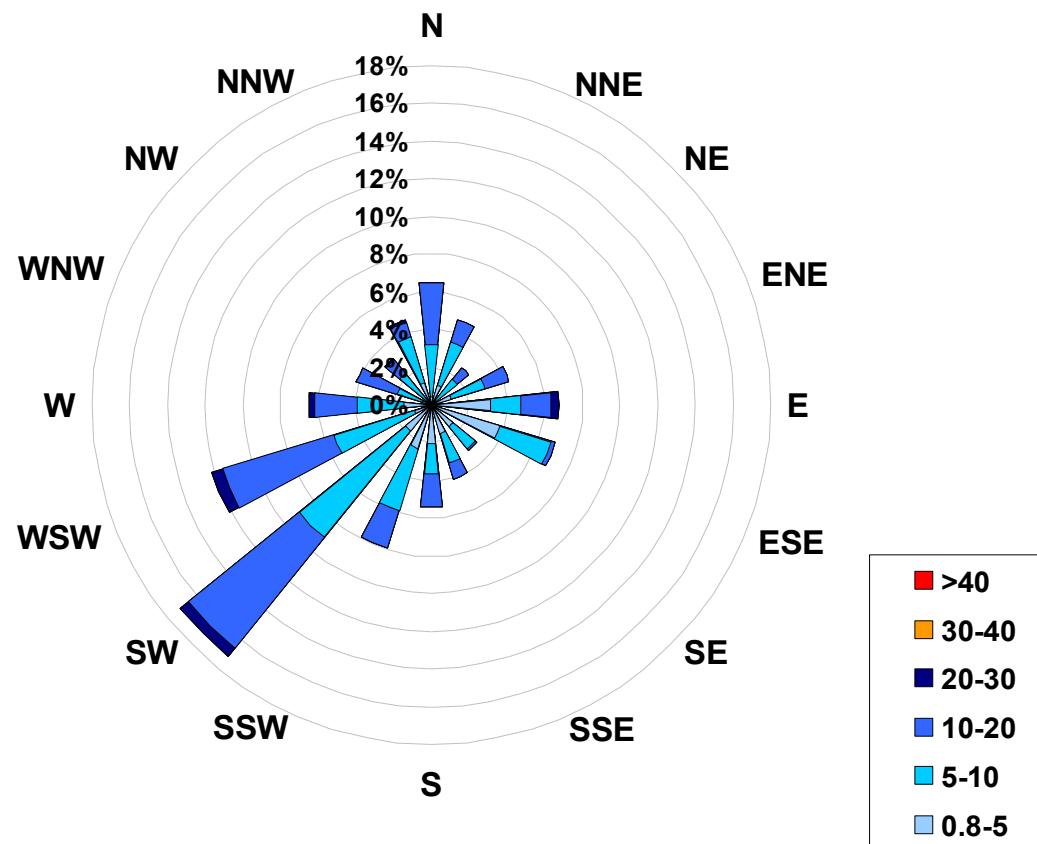








**1-hr Average Wind Rose (in km/hr) Located at the Crescent Heights Site  
for July 2006**



Calms: 0%

Frequency Distribution of Wind in km/hr			Frequency (hrs)
Range			
0.8	<	5	173
5	to	10	306
10	to	20	248
20	to	30	15
30	to	40	0
	>	40	0
Total Non-Zero Values			742



# Passive Monitoring – July 2006

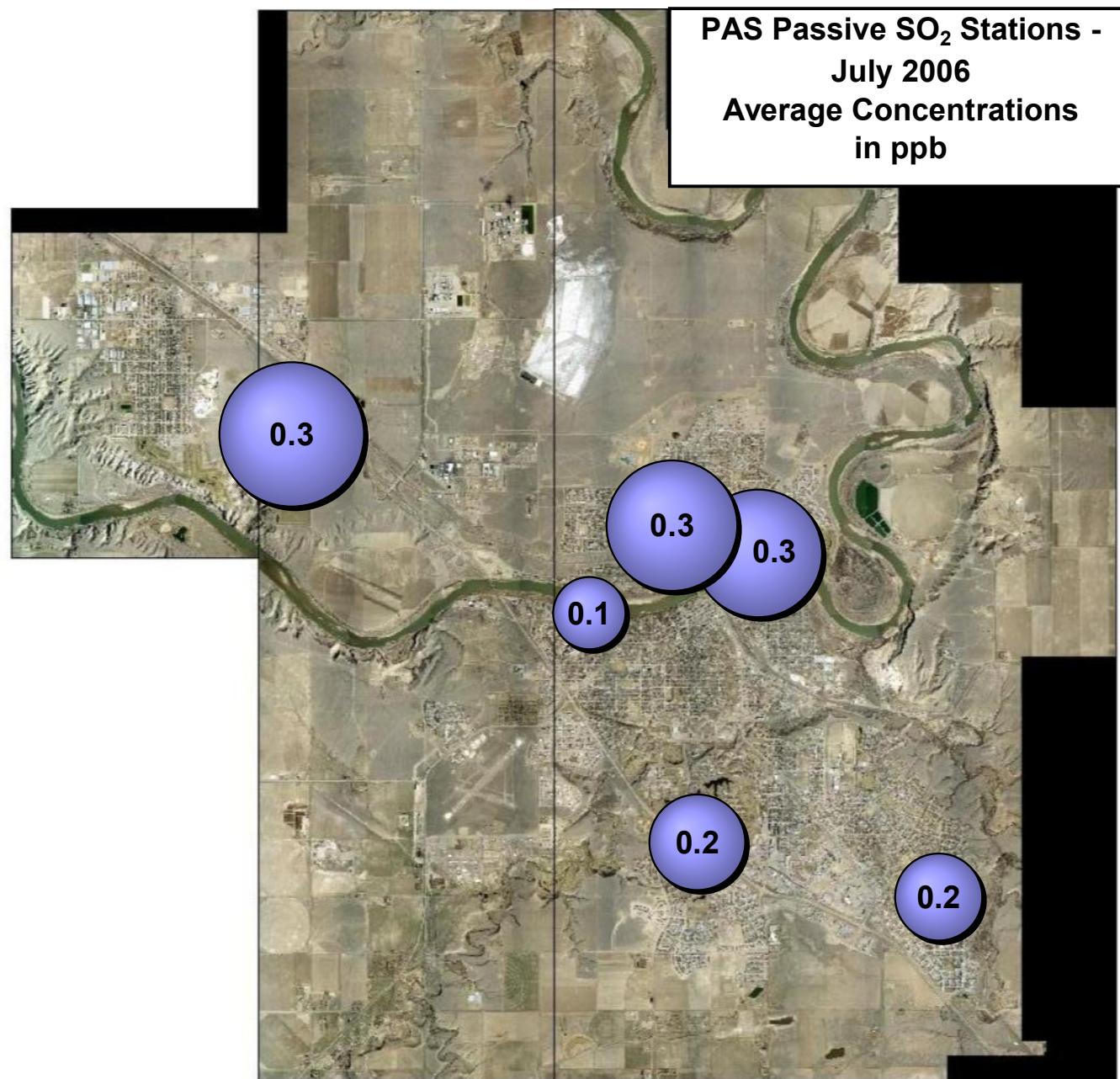
Ambient Air Compliance Network

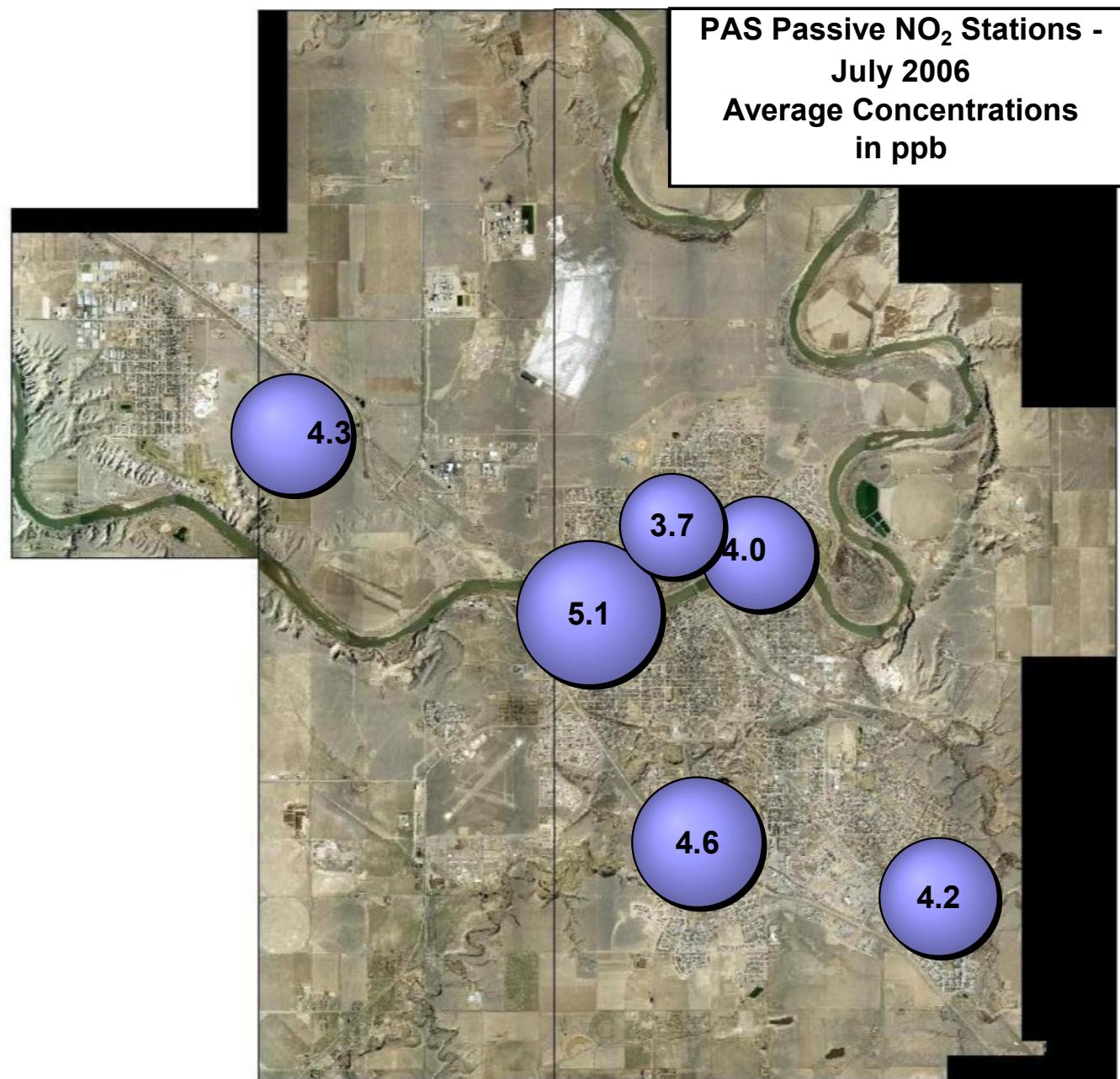
## Palliser Airshed Society - PAS Passive Stations for July 2006

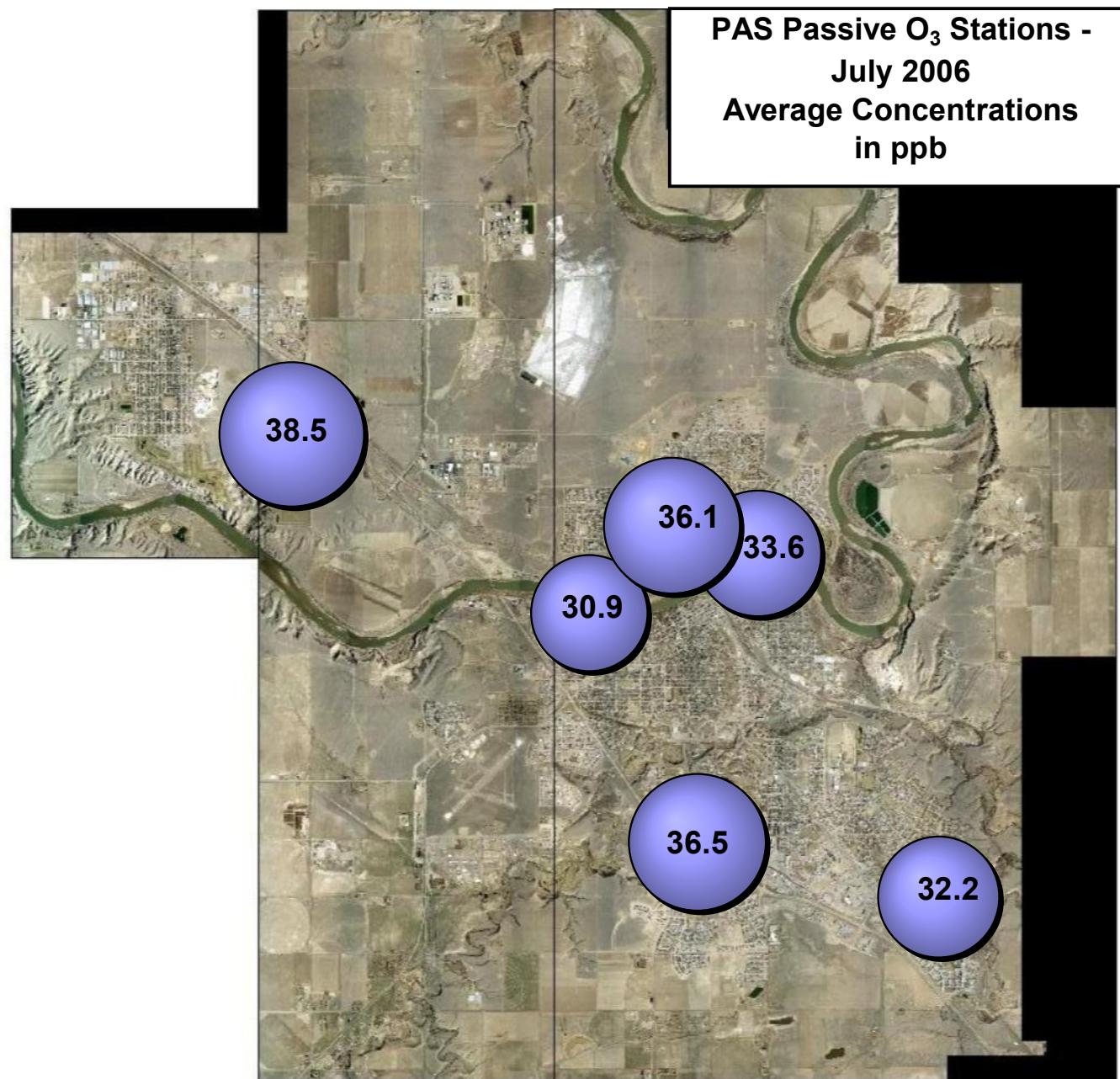
Station Number	Station Name	SO <sub>2</sub> ppb	O <sub>3</sub> ppb	NO <sub>2</sub> ppb	Location		
					Easting	Northing	Elevation
<b>Duplicates</b>							
3a	Monitoring Station	0.3	37.1	4.1			
3b		0.2	35.2	3.2			
1	Hospital	0.1	30.9	5.1	521648	5542721	698
2	Ball Park	0.3	33.6	4.0	524019	5543686	660
3	Monitoring Station	0.3	36.1	3.7	522812	5544133	714
4	Redcliff	0.3	38.5	4.3	517448	5545608	725
5	Southridge	0.2	36.5	4.6	523172	5539016	721
6	Christian School Park	0.2	32.2	4.2	526577	5538133	709

Stats:

Mean	0.2	34.6	4.3		
Standard Deviation	0.1	2.9	0.5		
Minimum	0.1			1	Hospital
Maximum	0.3			4	Monitoring Station
Minimum		30.9		1	Hospital
Maximum		38.5		4	Monitoring Station
Minimum			3.7	3	Monitoring Station
Maximum			5.1	1	Hospital







# PAS

## **July 2006 - Calibration Reports**

**Crescent Heights Station: O<sub>3</sub>, NO<sub>x</sub>, NO, NO<sub>2</sub>, THC, CO and PM<sub>2.5</sub>**

## Calibration Report

Parameter

O3

Air Monitoring Network

Palliser Airshed

### Station Information

Calibration Date	July 26, 2006	Previous Calibration	June 15, 2006
Station Number	101	Station Location	Crescent Heights
Reason:	Routine	Calibration	Removal
			Other:
Start Time (MST)	10:17	End Time (MST)	11:12
Barometric Pressure	27.3 inches Hg	Station Temperature	19.7 Deg C
Calibrator	Environics 6100	Serial Number	3474
Cal Gas Concentration	NA	Cal Gas Expiry Date	NA
DACS make	Focus AP1000	DACS serial No.	45270
DACS voltage range	0 - 1 volt	DACS channel #	5
	Before		After
Calculated slope	0.997785	Calculated slope	1.026545
Calculated intercept	3.495678	Calculated intercept	-1.693290
Analyzer make	API Model 400E	Analyzer serial #	331
Concentration range Offset Slope Lamp measure Lamp Reference Pressure Sample Flow Sample temp	before	after	
	0 - 500	ppb	0 - 500 ppb
	-6.3	ppb	-6.5 ppb
	1.067		1.117
	4892.7	mV	4832.5 mV
	4792.5	mV	4834.2 mV
	25.0	inches Hg	25.8 inches Hg
	708	ccm	668 ccm
	38	Deg C	42 Deg C

### Calibration Data

Dilution air flow rate (cc/min)	Ozone Set Point	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
4992	0.0	0.0	-1.5	N/A
4992	300.0	298.3	289.4	1.0307
4992	200.0	199.8	198.2	1.0079
4992	100.0	101.7	104.8	0.9708
4992	0.0	0.0	-1.5	0.0000
4992	300.0	298.3	268.0	1.1132
Average Correction Factor				1.0031

Calculated value of As Found Response:

272.4 ppm

Percent Change of As Found: -8.7%

Auto zero Auto span	before calibration		after calibration	
	-5.0	ppb	-4.7	ppb
	356.8	ppb	344.1	ppb

Notes:

Calibration Performed By: LF, TM

## Calibration Summary

Parameter O3

Air Monitoring Network

**Palliser Airshed**



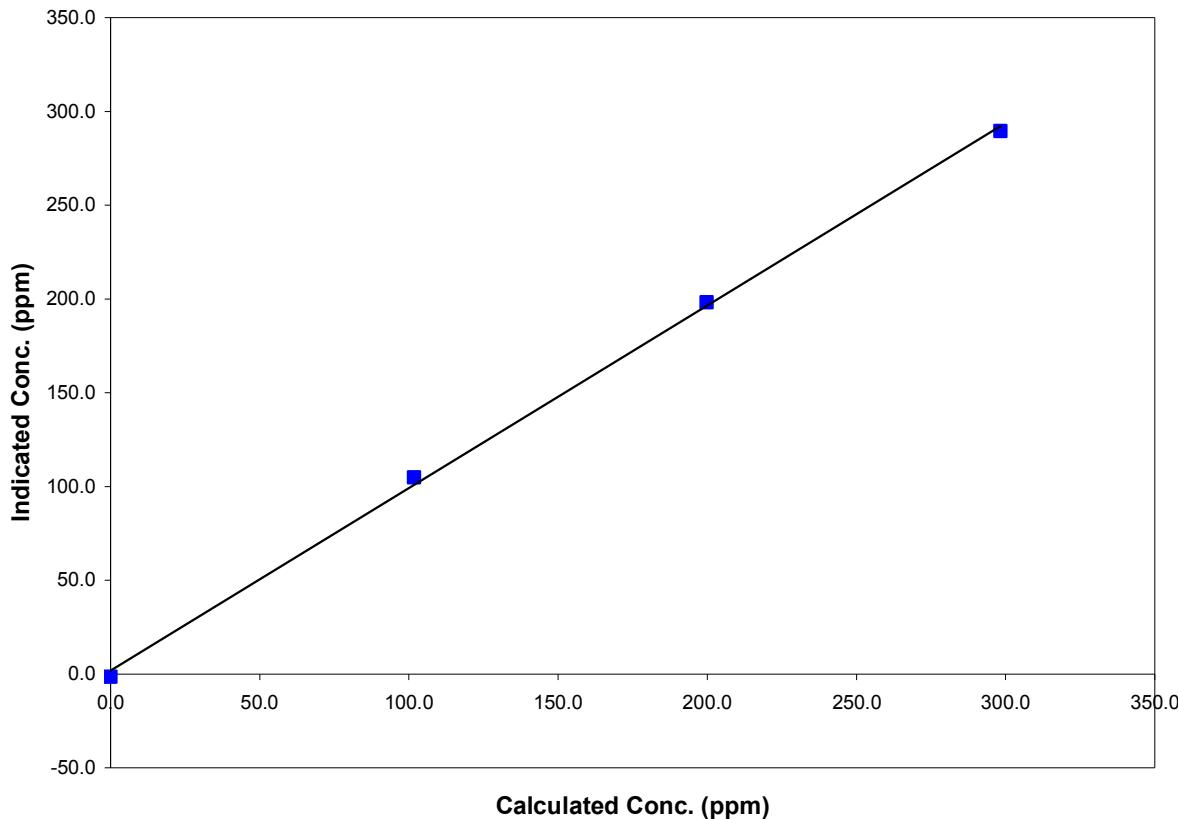
### Station Information

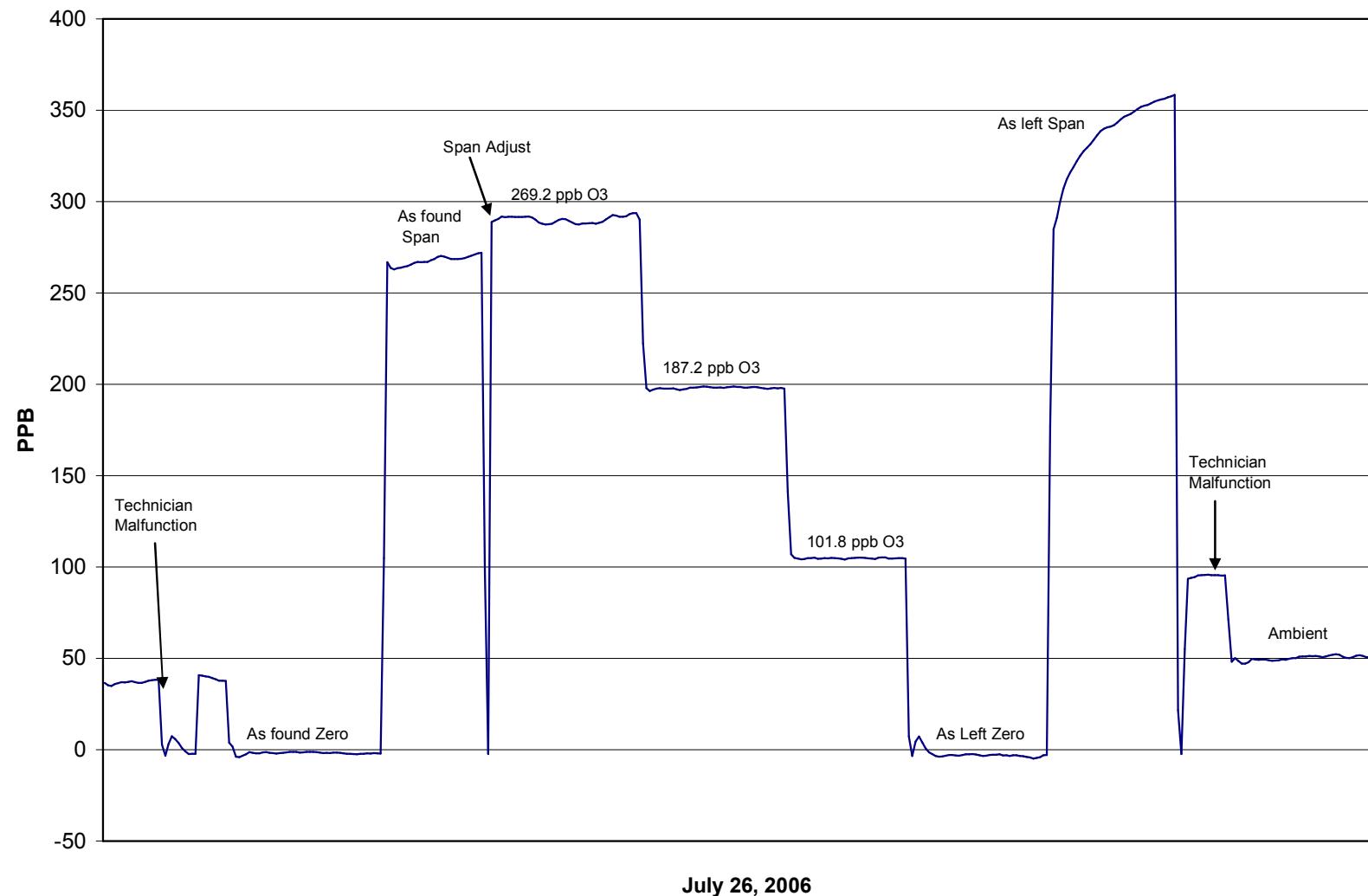
Calibration Date	July 26, 2006	Previous Calibration	June 15, 2006
Station Number	101	Station Location	Crescent Heights
Start Time (MST)	10:17	End Time (MST)	11:12
Analyzer make/model	API Model 400E	Analyzer serial #	331

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
298.3	289.4	1.0307		
199.8	198.2	1.0079	Correlation Coefficient	0.999187
101.7	104.8	0.9708	Slope	1.026545
0.0	-1.5	N/A	Intercept	-1.693290

### O3 Calibration Curve



**O3 Calibration**

# Calibration Report

Parameter NOx-NO-NO<sub>2</sub>  
 Air Monitoring Network Palliser Airshed



## Station Information

Calibration Date	July 25, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Reason:			
Start Time (MST)	11:09	End Time (MST)	14:33
Barometric Pressure	27.3	inches Hg	20.3
Calibrator	Environics 6100	Serial Number	3474
NO Cal Gas Conc	50.5	ppm	Cal Gas Expiry Date
NOx Cal Gas Conc	50.5	ppm	22-Nov-06
			Cal Gas Serial #
			BAL786

## DACS Information

DACS make FOCUS AP1000      DACS serial No. 45270

Parameter	NO2	NOx	NO
Before	Data Slope	1.014194	1.011883
	Data Offset	0.509312	-0.347709
After	Data Slope	1.020337	1.017192
	Data Offset	-0.176913	-1.080539
Channel #	8	6	7
Voltage Range	0 - 1 VDC	0 - 1 VDC	0 - 1 VDC

## Analyzer Information

Analyzer make/model API Model 200E      Analyzer serial # 219

Test Point	before		after	
Concentration range	0 - 500	ppb	0 - 500	ppb
NO background	-0.2	mV	-0.2	mV
NOx background	1.1	mV	1.1	mV
NO coefficient	1.085		1.159	
NOx coefficient	1.101		1.173	
Chamber Temp	49.9	Deg C	49.9	Deg C
Cooler Temp	7.0	Deg C	7.0	Deg C
Azero	36.5		39.6	
Perm Temp	40.2	Deg C	40.4	Deg C
Pressure	4.6	inches Hg	4.6	inches Hg
Sample Flow	449.0	ccm	446.0	ccm

Notes: \_\_\_\_\_

## Calibration Report

Parameter **NOx-NO-NO<sub>2</sub>**  
 Air Monitoring Network **Palliser Airshed**



### Station Information

Calibration Date: July 25, 2006 Station Location: Crescent Heights

### Calibration Data

	Dilution flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO <sub>2</sub> conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO <sub>2</sub> conc (ppb)	NOx Correction factor	NO Correction factor
zero	4992	0.00	0.0	0.0	0.0	0.9	-2.4	0.9	N/A	N/A
1	4992	39.88	400.2	400.2	0.0	394.4	393.6	-1.3	1.0147	1.0168
2	4992	19.93	200.9	200.9	0.0	198.7	197.8	-1.4	1.0110	1.0153
3	4992	9.96	100.5	100.5	0.0	100.0	97.8	-0.5	1.0052	1.0284
AFZ	4992	0.00	0.0	0.0	0.0	0.9	-2.4	0.9	0.0000	0.0000
AFS	4992	39.88	400.2	400.2	0.0	379.4	383.2	-5.9	1.0547	1.0444
								Average Correction Factor	1.0103	1.0202

As Found Concentrations NO<sub>x</sub>= 378.2 NO= 386.4 As Found Percent Change NO<sub>x</sub>= -5.5% NO= -3.4%

### GPT Calibration Data

Dilution Flow 4992 ccm Source Gas Flow 39.88 ccm

O <sub>3</sub> Setpoint (ppb)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO <sub>2</sub> conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO <sub>2</sub> conc (ppb)	NOx Correction factor	NO Correction factor	NO <sub>2</sub> Correction factor	Converter Efficiency
0	401.6	399.4	2.2	395.8	393.3	0.9	N/A	N/A	N/A	N/A
300	401.8	300.1	101.7	396.1	295.0	98.9	1.0145	1.0170	1.0285	97.2%
200	403.2	203.4	199.8	397.4	199.4	195.7	1.0145	1.0200	1.0207	98.0%
100	403.3	105.0	298.3	397.5	102.1	293.0	1.0145	1.0287	1.0180	98.2%
				Average Correction Factor	1.0145	1.0219	1.0224	97.8%		

### AIC Data

Parameter	Previous calibration				Current calibration			
	NOx	NO <sub>2</sub>	NO	ppb	NOx	NO <sub>2</sub>	NO	ppb
Auto zero	2.1	-0.7	2.1	ppb	-1.4	-1.1	-0.1	ppb
Auto span	413.7	404.2	8.6	ppb	378.0	374.8	5.1	ppb

Calibration Performed By: Lenin Flores

## Calibration Summary

Parameter **NO<sub>2</sub>**  
 Air Monitoring Network **Palliser Airshed**



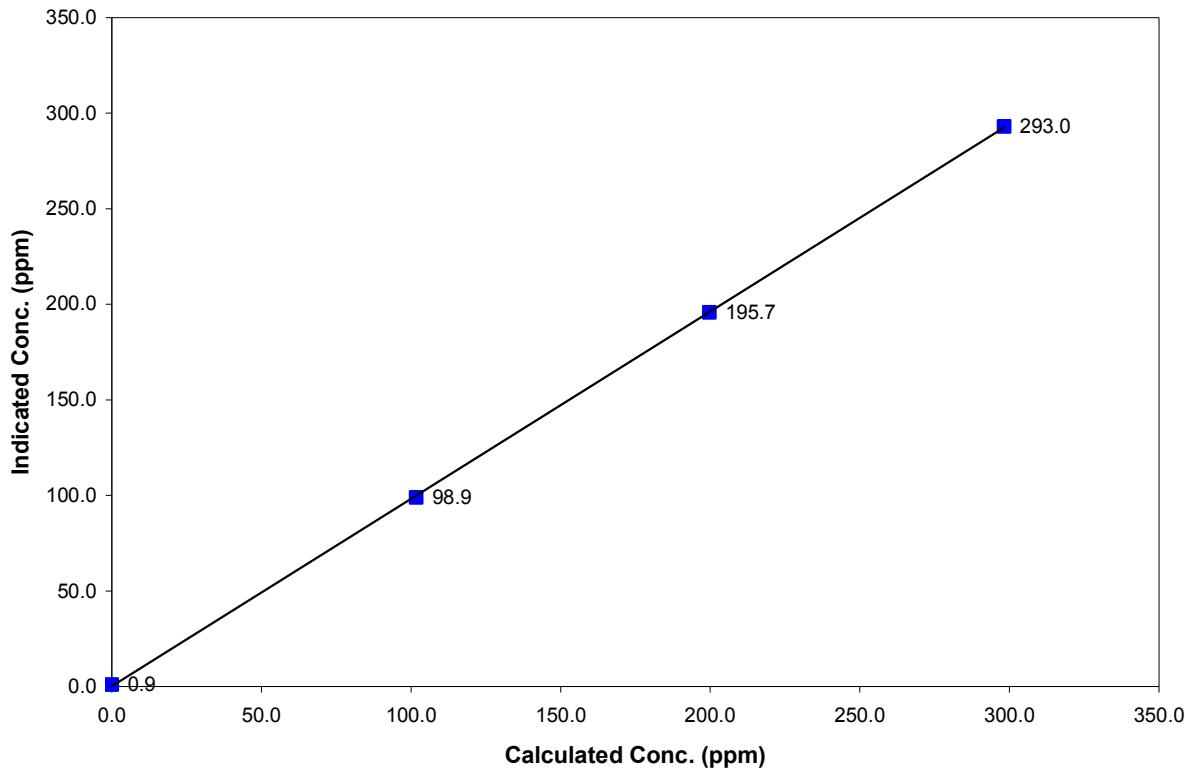
### Station Information

Calibration Date	July 25, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Start Time (MST)	11:09	End Time (MST)	14:33
Analyzer make	API Model 200E	Analyzer serial #	219

### Calibration Data

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	0.0000		
101.7	98.9	1.0285	Correlation Coefficient	0.999963
199.8	195.7	1.0207	Slope	1.020337
298.3	293.0	1.0180	Intercept	-0.176913

### NO<sub>2</sub> Calibration Curve



## Calibration Summary

Parameter **NO<sub>x</sub>**  
 Air Monitoring Network Palliser Airshed



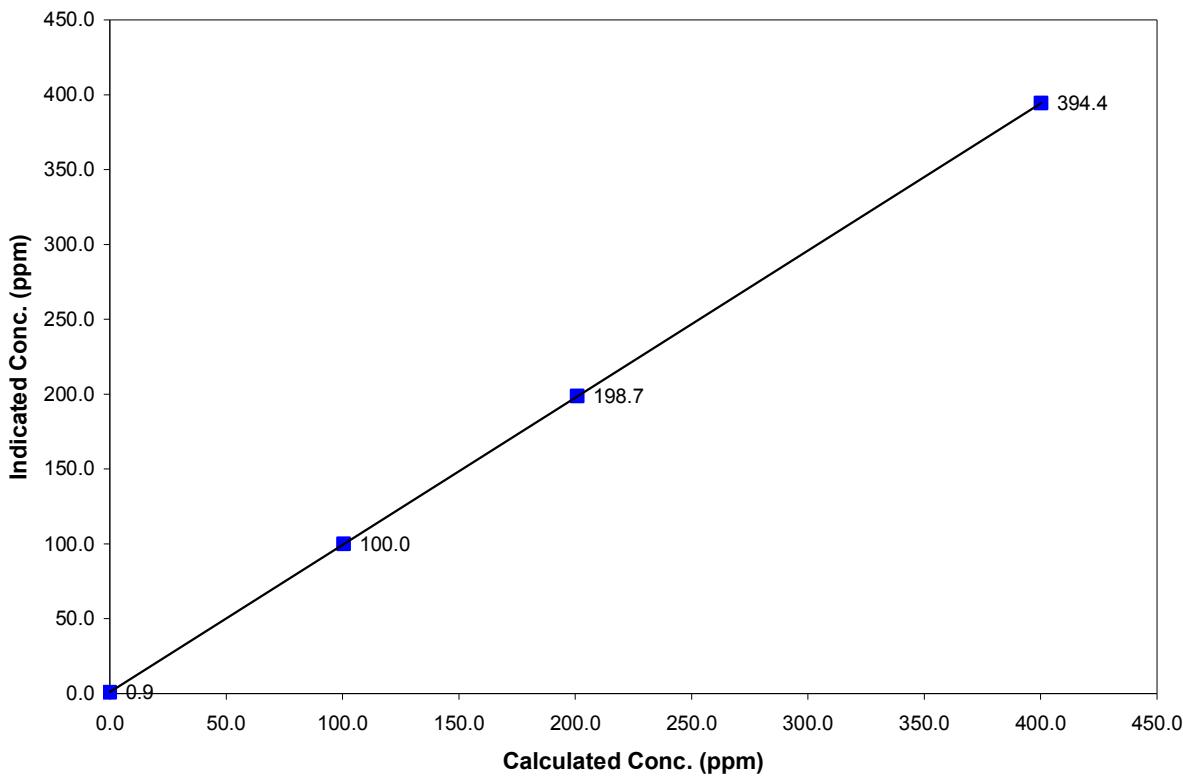
### Station Information

Calibration Date	July 25, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Start Time (MST)	11:09	End Time (MST)	14:33
Analyzer make	API Model 200E	Analyzer serial #	219

### Calibration Data

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	0.0000	Correlation Coefficient	0.999999
400.2	394.4	1.0147		
200.9	198.7	1.0110		
100.5	100.0	1.0052		
			Slope	1.017192
			Intercept	-1.080539

### NOx Calibration Curve



**Calibration Summary**

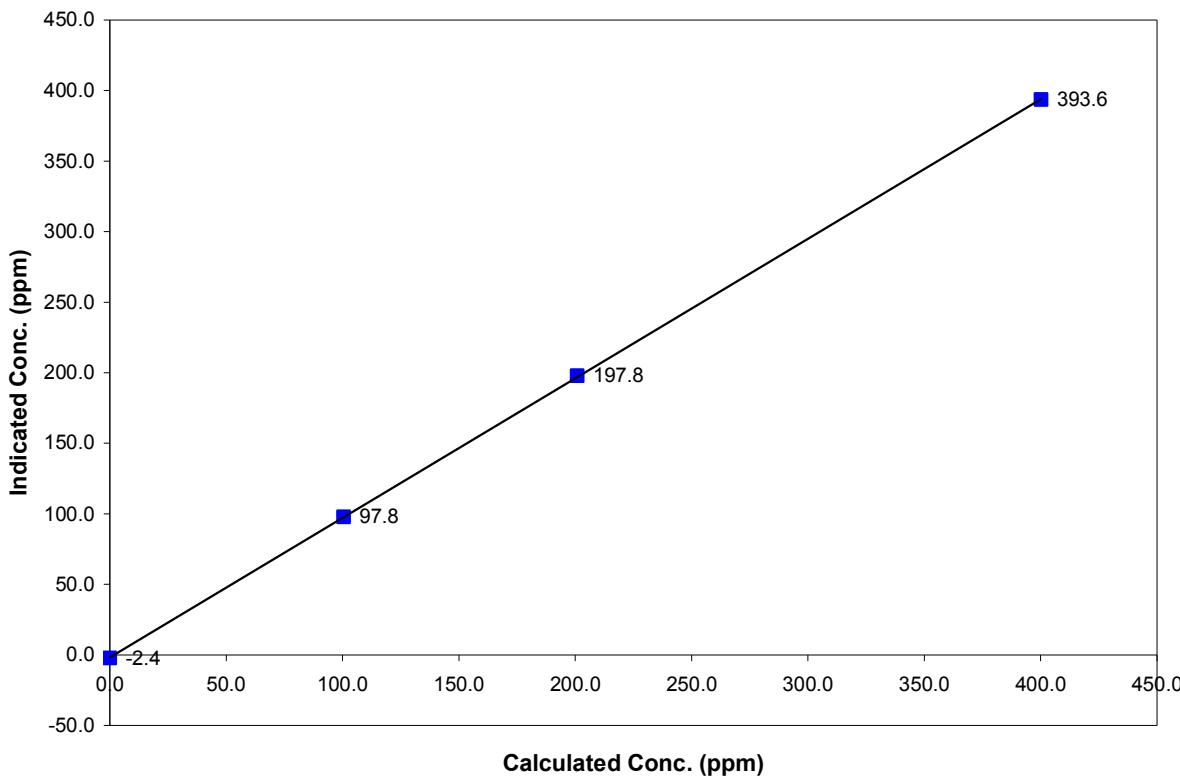
Parameter **NO**  
 Air Monitoring Network **Palliser Airshed**

**Station Information**

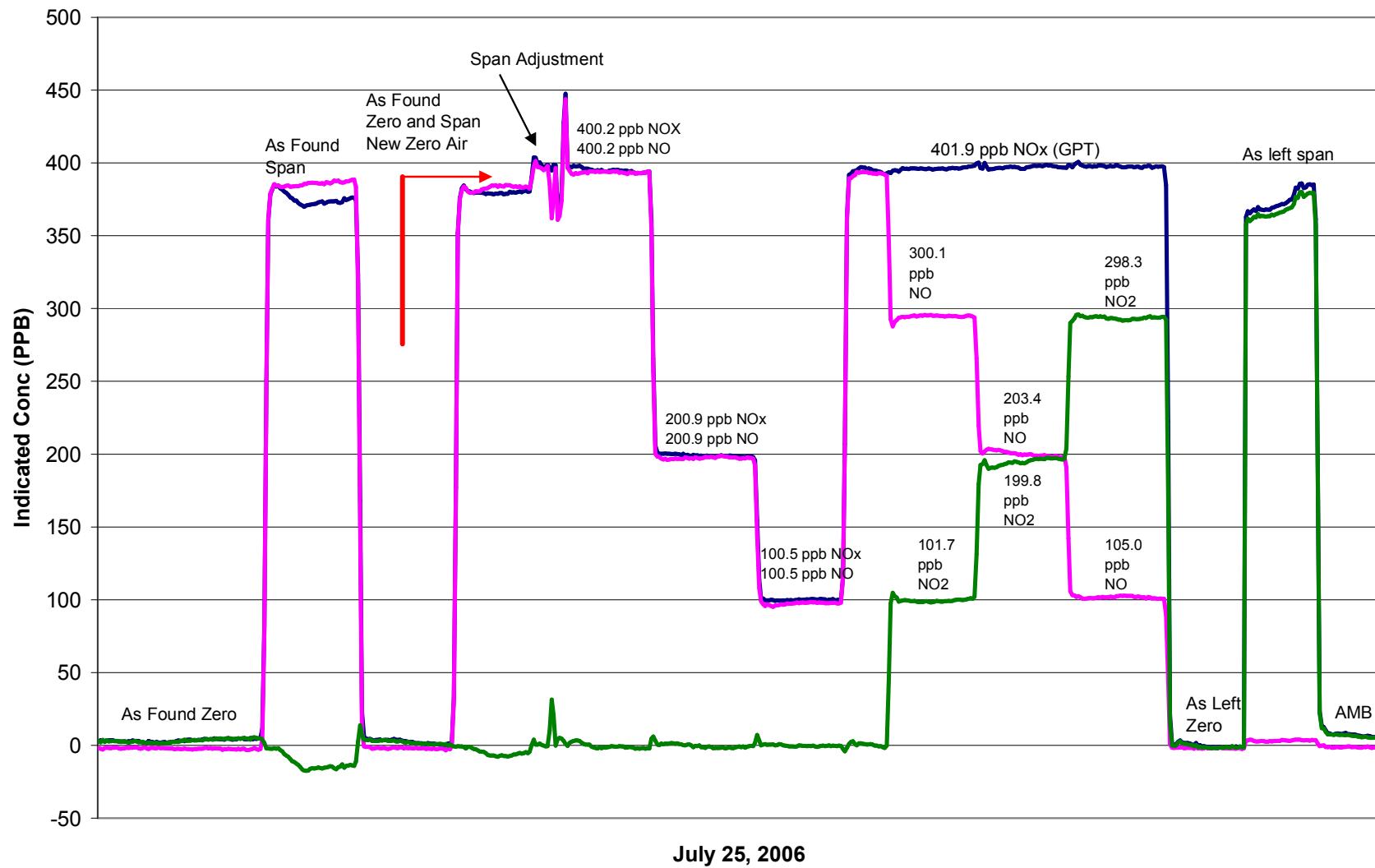
Calibration Date	July 25, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Start Time (MST)	11:09	End Time (MST)	14:33
Analyzer make	API Model 200E	Analyzer serial #	219

**Calibration Data**

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-2.4	N/A	Correlation Coefficient	0.999983
400.2	393.6	1.0168		
200.9	197.8	1.0153		
100.5	97.8	1.0284		
			Slope	1.010860
			Intercept	1.825379

**NO Calibration Curve**

## NOx Calibration



## Calibration Report

Parameter THC  
 Air Monitoring Network Palliser Airshed



### Station Information

Calibration Date	July 25, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Reason:	Routine	Install	Removal
			Other:
Start Time (MST)	15:45	End Time (MST)	20:00
Barometric Pressure	27.3 inches Hg	Station Temperature	20.2 Deg C
Calibrator	Environics 6100	Serial Number	3747
Cal Gas Concentration	700 ppm CH <sub>4</sub> / 301 ppm C <sub>3</sub> H <sub>8</sub>	Cal Gas Expiry Date	8/28/2005
Cal Gas CH4 equiv	1527.75 ppm	Cal Gas Cylinder #	ALM030358
DACS make	Focus AP1000	DACS serial No.	45270
DACS voltage range	0 - 10 volt	DACS channel #	9
	Before		After
Calculated slope	1.007221	Calculated slope	0.998768
Calculated intercept	0.101549	Calculated intercept	0.062009
Analyzer make	TEI model 51C-LT	Analyzer serial #	407505596
	before		after
Concentration range	0 - 50	ppm	0 - 50
THC sample pressure	5.75	PSI	5.77
THC span counts	12620	raw	12605
THC zero counts	1557	raw	1370

### Calibration Data

Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
4992	0.00	0.00	-0.03	N/A
4992	79.78	24.03	24.03	1.0000
4992	39.85	12.10	11.99	1.0093
4992	9.96	3.04	2.98	1.0199
zero	0.00	0.00	-0.38	As Found Zero
4992	79.78	24.03	23.66	As Found Span
	Average Correction Factor			1.0097

Calculated value of As Found Response: 24.315 ppm Percent Change of As Found: -1.2%

Auto zero Auto span	before calibration		after calibration	
	0.06	ppm	0.03	ppm
	23.35	ppm	10.97	ppm

Notes: Performed Zero and Span Adjustments

Calibration Performed By: Lenin Flores, Travis Mehrer

**Calibration Summary**

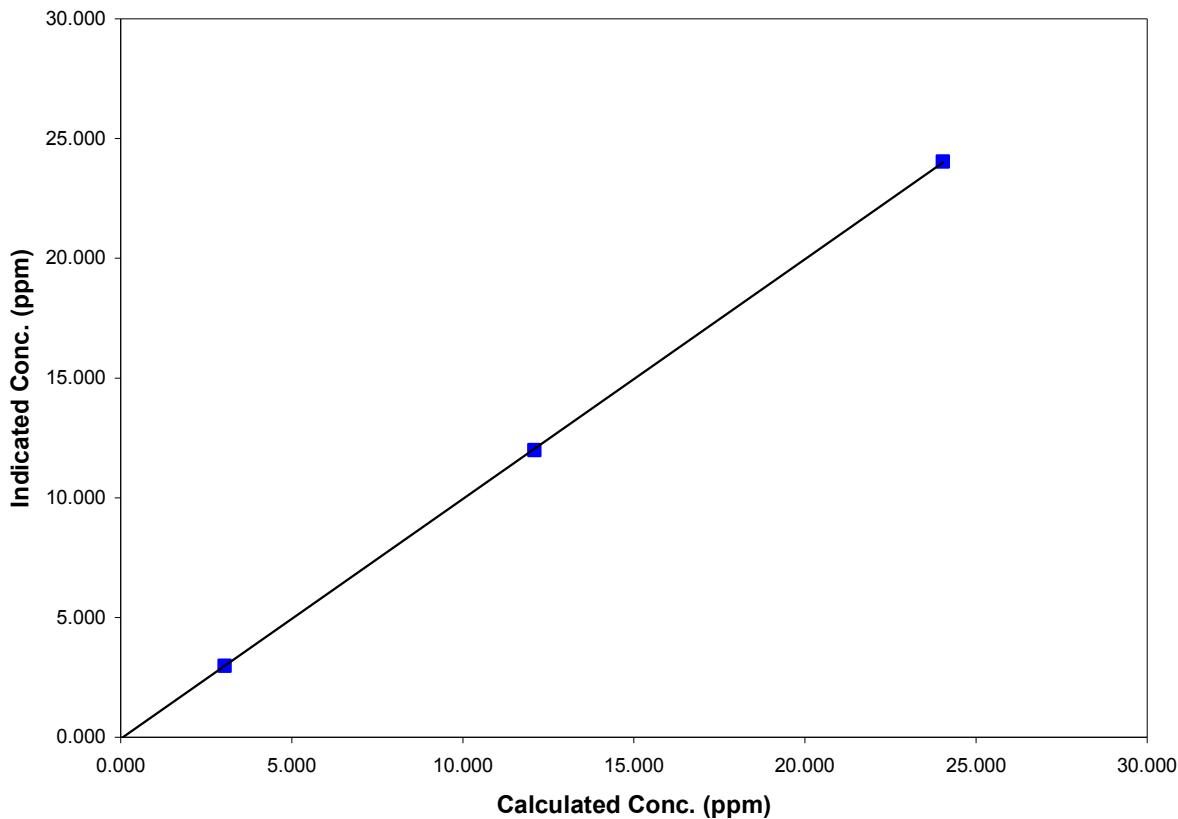
Parameter THC  
 Air Monitoring Network Palliser Airshed

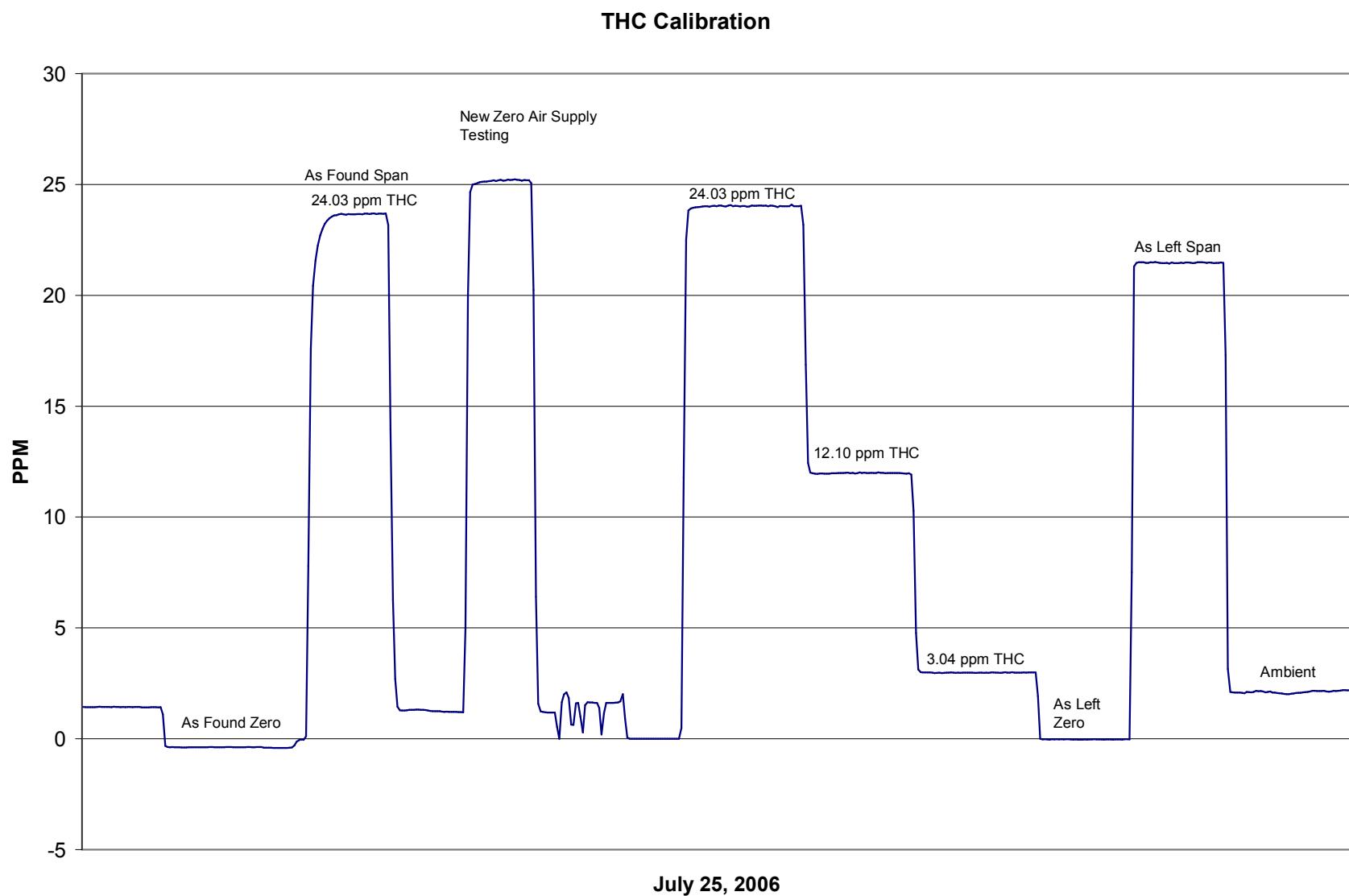
**Station Information**

Calibration Date	July 25, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Start Time (MST)	15:45	End Time (MST)	20:00
Analyzer make/model	TEI model 51C-LT	Analyzer serial #	407505596

**Calibration Data**

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.000	-0.029	N/A		
24.031	24.031	1.0000	Correlation Coefficient	0.999982
12.098	11.986	1.0093	Slope	0.998768
3.041	2.982	1.0199	Intercept	0.062009

**THC Calibration Curve**



## Calibration Report



Parameter CO  
Air Monitoring Network Palliser

### Station Information

Calibration Date	July 26, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Reason:	Routine	Install	Removal
			Other:
Start Time (MST)	7:22	End Time (MST)	11:09
Barometric Pressure	27.3 in Hg	Station Temperature	20.6 Deg C
Calibrator	Environics 6100	Serial Number	3474
Cal Gas Conc	2998 ppm	Cal Gas Expiry Date	3/14/2008
DACS make	Focus AP1000	DACS serial No.	45270
DACS voltage range	0 - 1 volt	DACS channel #	11
	Before		After
Calculated slope	0.989096	Calculated slope	0.998287
Calculated intercept	-0.086934	Calculated intercept	-0.149556
Analyzer make	TEI Model 48C	Analyzer serial #	436609887
Concentration range	before	after	
CO coefficient	0 - 50 ppm	0 - 50 ppm	
CO bkg setting	1.060	1.064	
Lamp ratio	9.568	9.920	
Lamp intensity	1.1490 Hz	1.1484 Hz	
Sample Flow	199976 LPM	199354 LPM	
	0.994	1.011	LPM

### Calibration Data

Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
4992	0.00	0.00	-0.01	N/A
4992	49.85	29.64	29.83	0.9936
4992	19.91	11.91	11.93	0.9981
4992	9.96	5.97	6.44	0.9267
4992	0.00	0.00	0.50	0.0000
4992	49.85	29.64	30.91	0.9588
		Average Correction Factor	0.9728	

Calculated value of As Found Response: 29.996 ppm Percent Change of As Found: -1.2%

Auto zero	before calibration		after calibration	
	0.30	ppm	-0.10	ppm
	20.77	ppm	19.59	ppm

Notes: Performed Zero and Span Adjustments

Calibration Performed By: LeninF,Travis Mehrer

## Calibration Summary

Parameter co  
Air Monitoring Network Palliser



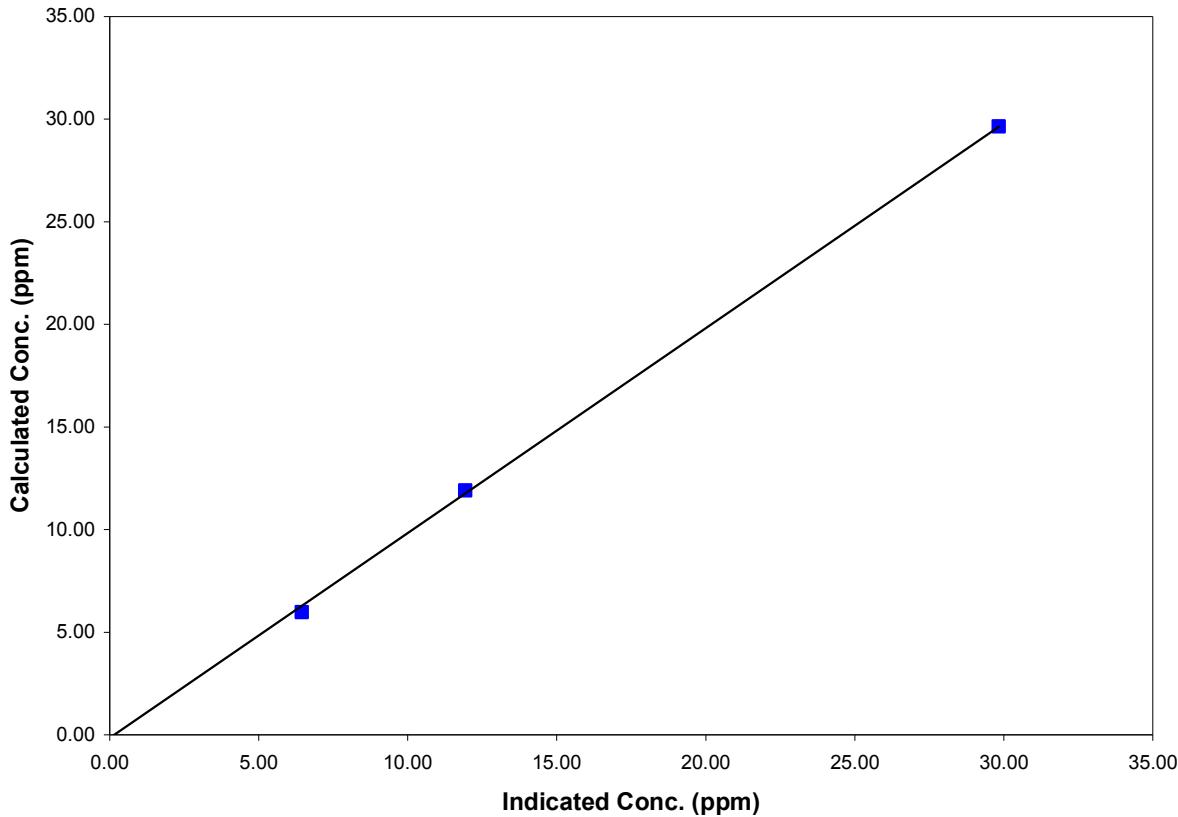
### Station Information

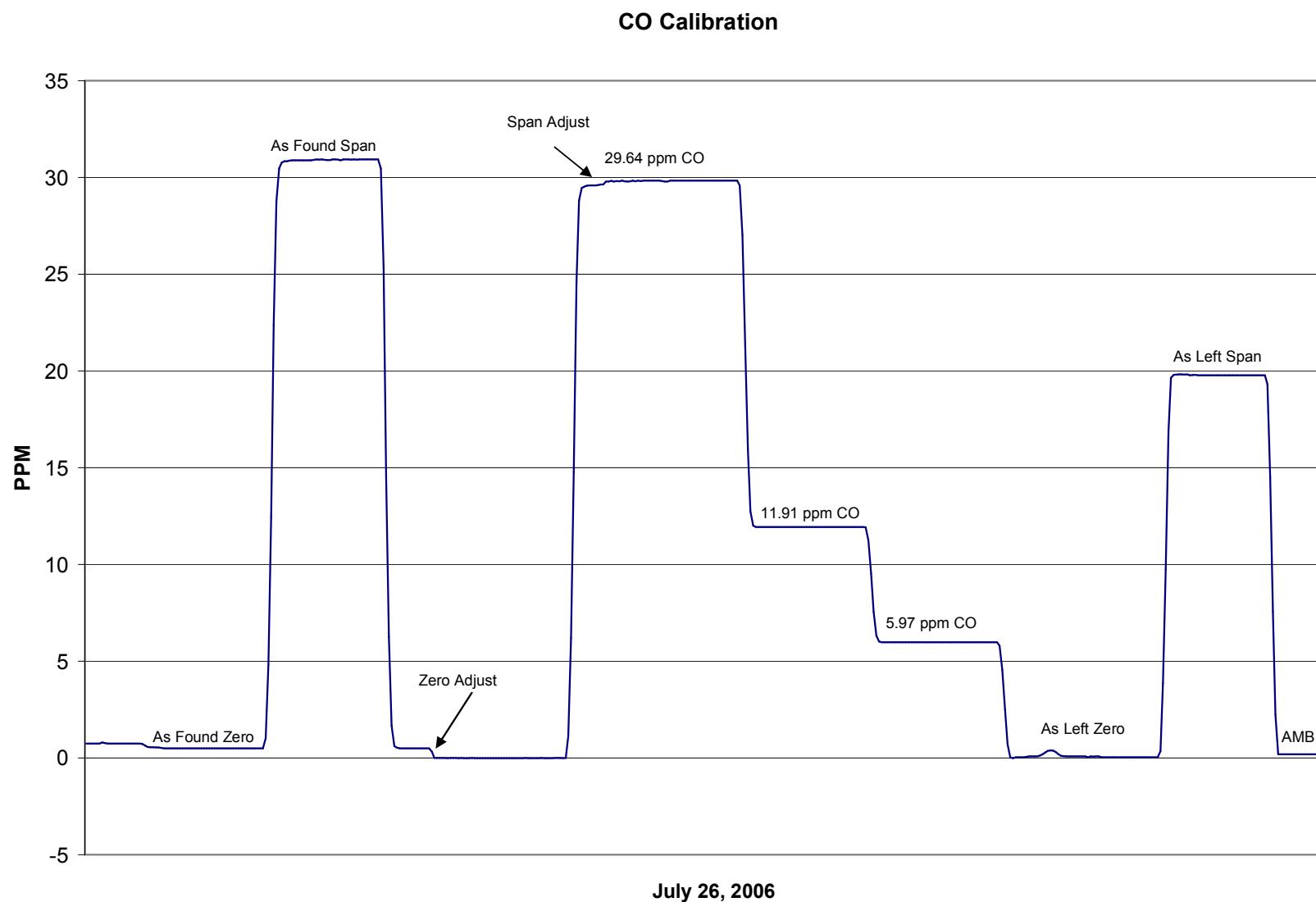
Calibration Date	July 26, 2006	Previous Calibration	June 14, 2006
Station Number	101	Station Location	Crescent Heights
Start Time (MST)	7:22	End Time (MST)	11:09
Analyzer make/model	TEI Model 48C	Analyzer serial #	436609887

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A		
29.64	29.83	0.9936	Correlation Coefficient	0.999709
11.91	11.93	0.9981	Slope	0.998287
5.97	6.44	0.9267	Intercept	-0.149556

### CO Calibration Curve





## Calibration Report



Parameter **PM2.5**  
Air Monitoring Network **Palliser Airshed**

### Station Information

Calibration Date	July 26, 2006	Previous Calibration	May 18, 2006
Station Number	1	Station Location	Crescent Heights
Reason:	Routine	Install	Removal
			Other:
Start Time (MST)	8:12	End Time (MST)	11:00
Barometric Pressure	0.712 ATM	Station Temperature	20.0 Deg C
Flow Calibrator	BIOS Drycal DCL-MH	Serial Number	101780
DACS make	AP 1000	DACS serial No.	45269
DACS voltage range	0 - 1 V	DACS channel #	15
	Before		After
DACS Scale High	450	DACS slope	450
DACS Scale Low	-50	DACS intercept	-50

### Analyzer Information

Analyzer make	R&P	Control Unit serial #	140AB237960110
Analyzer model	TEOM 1400AB	Sensor Unit serial #	140AB237960110

	before		after
Main Flow Set Point	3.000	SLPM	2.990
Aux Flow Set Point	16.67	SLPM	16.65
Filter Load	46	%	13%
Ko Factor	12758		NA
Temperature	14.1	Deg C	30.0
Pressure	0.907	ATM	0.907

### Calibration Data

Parameter	Set Point	TEOM Reading (as found)	Tolerance	TEOM Reading (after adjustments)
zero flow - main	0.0	0.02	0.00	0.01
zero flow - auxillary	0.0	0.02	0.01	0.00
flow recovery - main	45 - 60 Seconds	25.0	45 - 60 Seconds	25.0
flow recovery - aux	46 - 60 Seconds	30.0	46 - 60 Seconds	30.0
Temperature	measured	31.0	+/- 1.0 Deg C	31.0
Pressure	measured		+/- 1.5% ΔATM	
Total Flow	16.67 SLPM	16.55		16.65
Auxiliary flow	13.67 SLPM	13.78	+/- 1.0 SLPM	13.64
Main flow	3.0 SLPM	2.991	+/- 0.2 SLPM	3.010
Leak Check - main	0.0	0.02	<0.15 SLPM	0.01
Leak Check - aux	0.0	0.02	<0.15 SLPM	0.02
Ko Factor (w/o filter)	measured	NA	filter weight (g)	NA
Ko Factor (w/ filter)	measured	NA	% Ko difference	N/A

Notes: Main and Auxiliary flows were low... Adjusted all flows...

Calibration Performed By: LF, TM