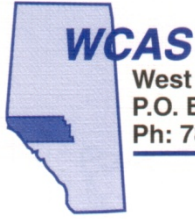




**TransAlta Utilities Corporation  
Continuous Ambient Air Quality  
Monitoring Program  
Annual Summary for 2016**

**Prepared by:**

**West Central Airshed Society  
Drayton Valley, Alberta**



West Central Airshed Society  
P.O. Box 7421, Drayton Valley, Alberta T7A 1S6  
Ph: 780-514-3533 • Fax: 780-514-3563 • www.wcas.ca

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February 21<sup>st</sup>, 2017

Attention: Mr. Ken Woollard  
GBS Building  
RR#1, Site 4, Box #2  
Duffield Alberta  
T0E 0N0

Dear Sir:

**Re: Annual Ambient Air Quality Monitoring Report January – December 2016.  
For TransAlta Utilities Corporation**

The West Central Airshed Society (WCAS) presents the 2016 Annual Report containing ambient air quality and meteorological information from the following sites:

Network Stations are	AMS 907	Power
Identified as:	AMS 908	Meadows
	AMS 959	Wagner2

The following is a list of the reported ambient air and meteorological parameters measured at each site location:

**AMS 907 (Power)**

SO<sub>2</sub>, NO/ NO<sub>2</sub>/ NO<sub>x</sub>, Particulate Matter (2.5 microns), Wind Speed and Direction, Relative Humidity, and External Temperature.

**AMS 908 (Meadows)**

SO<sub>2</sub>, NO/ NO<sub>2</sub>/ NO<sub>x</sub>, Wind Speed and Direction, Relative Humidity, and External Temperature.

**AMS 959 (Wagner2)**

SO<sub>2</sub>, NO/ NO<sub>2</sub>/ NO<sub>x</sub>, Wind Speed and Direction, Relative Humidity, and External Temperature.

If additional information is required please contact Patrick Andersen at (780) 514-3533.

Sincerely,



Patrick Andersen  
Interim Executive Director



Greg Swain  
Senior Technologist



Jeff McClintock  
Intermediate Technologist

**Summary Report**

Continuous air quality/meteorological monitoring measurements

**West Central Airshed Society**

TransAlta / Powers Station 907														
January to December 2016														
Parameter	Calibration Hours	Number of Data	Percent Uptime	Mean	Min	Max	-----Percentile-----					Exceedences		24 Hour Average Me (ppm)
							P10	Q1	Median	Q3	P90	1-hour	24-hour	
SO <sub>2</sub> (ppb)	419	8363	100.0	0.6	0.0	84.0	0.0	0.0	0.1	0.4	1.1	0	0	0.020
NO (ppb)	443	8311	99.7	0.4	0.0	96.1	0.0	0.0	0.0	0.1	0.9	-	-	-
NO <sub>2</sub> (ppb)	443	8311	99.7	2.9	0.0	39.4	0.2	0.8	1.7	3.5	6.7	0	0	0.020
NO <sub>x</sub> (ppb)	443	8311	99.7	3.0	0.0	132.0	0.0	0.4	1.5	3.5	7.2	-	-	-
Particulate Matter 2.5 microns (µ/m <sup>3</sup> )	13	8682	99.0	4.4	0.0	201.0	0.0	1.1	3.0	5.7	9.4	12	1	30.78 ug/m <sup>3</sup>
Wind Speed (kph)	0	8779	99.9	10.9	0.0	44.0	3.9	6.5	10.0	14.2	19.0	-	-	-
Temperature (°C)	0	8779	99.9	5.6	-25.7	29.9	-7.7	-1.4	5.9	13.8	19.0	-	-	-
Relative Humidity (%)	0	8726	99.3	69.5	12.4	103.4	38.0	52.9	72.7	88.2	96.0	-	-	-
Std Dev Wind Direction (deg)	0	8780	100.0	18.8	2.5	100.7	8.7	10.8	14.0	20.8	34.8	-	-	-
Std Dev Wind Speed (kph)	0	8780	100.0	2.7	0.0	13.0	1.3	1.7	2.4	3.4	4.7	-	-	-

**Summary Report**

*Continuous air quality/meteorological monitoring measurements*

**West Central Airshed Society**

TransAlta / Meadows Station 908														
January to December 2016														
Parameter	Calibration Hours	Number of Data	Percent Uptime	Mean	Min	Max	-----Percentile-----					Exceedences		24 Hour Average Me (ppm)
							P10	Q1	Median	Q3	P90	1-hour	24-hour	
SO <sub>2</sub> (ppb)	417	8312	99.4	0.8	0.0	53.6	0.0	0.0	0.1	0.4	1.4	0	0	0.014
NO (ppb)	432	8296	99.4	3.7	0.0	154.2	0.0	0.0	0.3	2.2	10.4	-	-	-
NO <sub>2</sub> (ppb)	432	8296	99.4	6.6	0.0	37.7	0.6	1.4	4.2	9.6	17.0	0	0	0.023
NO <sub>x</sub> (ppb)	432	8296	99.4	10.0	0.0	183.2	0.0	1.0	4.4	12.3	26.9	-	-	-
Wind Speed (kph)	0	8714	99.2	10.0	0.0	47.2	2.8	5.4	8.8	13.5	18.9	-	-	-
Temperature (°C)	0	8729	99.4	5.5	-27.2	29.1	-8.5	-1.5	5.7	14.0	19.4	-	-	-
Relative Humidity (%)	0	8729	99.4	70.3	11.9	99.5	40.7	56.2	74.4	87.0	93.7	-	-	-
Std Dev Wind Direction (deg)	0	8714	99.2	21.9	2.4	106.5	7.4	10.0	14.7	25.0	49.1	-	-	-
Std Dev Wind Speed (kph)	0	8714	99.2	2.6	0.0	13.5	1.2	1.6	2.3	3.2	4.4	-	-	-

**Summary Report**

Continuous air quality/meteorological monitoring measurements

**West Central Airshed Society**

TransAlta / Wagner2 Station 959													January to December 2016		
Parameter	Calibration Hours	Number of Data	Percent Uptime	Mean	Min	Max	Percentile					Exceedences		24 Hour Average Maximum (ppm)	
							P10	Q1	Median	Q3	P90	1-hour	24-hour		
SO <sub>2</sub> (ppb)	419	8356	99.9	1.1	0.0	66.5	0.0	0.0	0.0	0.4	3.1	0	0	0.012	
NO (ppb)	434	8346	100.0	1.2	0.0	96.5	0.0	0.0	0.1	0.8	3.4	-	-	-	
NO <sub>2</sub> (ppb)	434	8346	100.0	4.5	0.0	40.6	0.9	1.6	3.3	6.1	9.7	0	0	0.019	
NO <sub>x</sub> (ppb)	434	8346	100.0	5.6	0.0	123.6	0.6	1.5	3.5	7.1	12.5	-	-	-	
Wind Speed (kph)	0	8768	99.8	4.2	0.0	23.7	0.4	0.9	2.8	6.3	10.5	-	-	-	
Temperature (°C)	0	8761	99.7	5.9	-27.9	31.6	-9.1	-1.4	5.9	14.6	20.5	-	-	-	
Relative Humidity (%)	0	8779	99.9	70.8	11.4	100.4	37.8	55.6	77.0	88.2	93.6	-	-	-	
Std Dev Wind Direction (deg)	0	8768	99.8	46.7	6.2	111.8	18.0	26.3	39.3	67.9	85.6	-	-	-	
Std Dev Wind Speed (kph)	0	8768	99.8	2.3	0.1	11.3	0.7	1.1	1.9	3.1	4.4	-	-	-	

**TransAlta Utilities Corporation  
Frequency Distribution Charts  
SO<sub>2</sub> Monthly Averages  
Year 2016**

West Central Airshed Society - Power (AMS 907)  
 Annual Summary for 2016  
 SO2 (ppb)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operational Time (%)	Number 24-Hour Violations	Number 1-Hour Violations	Percent of Data in each Concentration Range					
								<=0.02	>0.02-0.06	>0.06-0.11	>0.11-0.17	>0.17-0.34	>0.34
January	709	1.2	20.2	84.0	100.0	0	0	98.45	1.41	0.14	0.00	0.00	0.00
February	663	0.5	2.1	11.8	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	709	0.9	7.2	31.8	100.0	0	0	99.44	0.56	0.00	0.00	0.00	0.00
April	685	0.5	2.9	18.3	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
May	707	0.5	4.2	33.7	99.7	0	0	99.72	0.28	0.00	0.00	0.00	0.00
June	686	0.4	1.9	12.4	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
July	709	0.5	3.2	17.5	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	704	0.4	2.4	18.4	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
September	686	0.5	2.6	15.9	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	709	0.5	2.6	9.6	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
November	687	0.7	4.8	12.1	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	709	0.3	1.4	8.8	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8363	0.6	20.2	84.0	100.0	0	0	99.80	0.19	0.01	0.00	0.00	0.00



West Central Airshed Society - Meadows (AMS 908)  
 Annual Summary for 2016  
 SO2 (ppb)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operational Time (%)	Number 24-Hour Violations	Number 1-Hour Violations	Percent of Data in each Concentration Range					
								<=0.02	>0.02-0.06	>0.06-0.11	>0.11-0.17	>0.17-0.34	>0.34
January	708	0.9	14.1	53.6	100.0	0	0	99.01	0.99	0.00	0.00	0.00	0.00
February	664	0.5	9.3	30.6	100.0	0	0	99.40	0.60	0.00	0.00	0.00	0.00
March	706	1.1	5.8	32.1	99.7	0	0	98.87	1.13	0.00	0.00	0.00	0.00
April	683	0.9	8.5	25.1	99.6	0	0	99.71	0.29	0.00	0.00	0.00	0.00
May	668	0.6	2.7	15.6	94.2	0	0	100.00	0.00	0.00	0.00	0.00	0.00
June	686	0.7	3.0	24.7	100.0	0	0	99.85	0.15	0.00	0.00	0.00	0.00
July	707	0.6	3.1	13.8	99.7	0	0	100.00	0.00	0.00	0.00	0.00	0.00
August	700	0.9	7.2	23.9	99.3	0	0	99.57	0.43	0.00	0.00	0.00	0.00
September	686	0.5	3.1	17.1	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
October	709	1.2	6.5	28.9	100.0	0	0	99.29	0.71	0.00	0.00	0.00	0.00
November	686	0.9	4.5	19.3	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
December	709	0.5	4.7	22.1	100.0	0	0	99.86	0.14	0.00	0.00	0.00	0.00
Annual	8312	0.8	14.1	53.6	99.4	0	0	99.63	0.37	0.00	0.00	0.00	0.00

West Central Airshed Society - Wagner2 (AMS 959)  
 Annual Summary for 2016  
 SO2 (ppb)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operation Time (%)	Number 24-Hour Violations	Number 1-Hour Violation	Percent of Data in each Concentration Range					
								<=0.02	>0.02-0.06	>0.06-0.11	>0.11-0.17	>0.17-0.34	>0.34
January	709	0.8	12.2	43.2	100.0	0	0	98.87	1.13	0.00	0.00	0.00	0.00
February	663	0.4	3.4	15.0	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
March	705	1.4	8.1	26.1	99.5	0	0	99.29	0.71	0.00	0.00	0.00	0.00
April	686	1.6	8.4	45.5	100.0	0	0	99.42	0.58	0.00	0.00	0.00	0.00
May	710	1.4	7.9	66.5	100.0	0	0	99.44	0.42	0.14	0.00	0.00	0.00
June	682	1.9	5.8	50.4	99.6	0	0	98.97	1.03	0.00	0.00	0.00	0.00
July	708	0.9	3.0	22.2	100.0	0	0	99.86	0.14	0.00	0.00	0.00	0.00
August	706	1.3	5.8	33.4	100.0	0	0	99.29	0.71	0.00	0.00	0.00	0.00
September	684	1.1	4.5	22.4	99.7	0	0	99.71	0.29	0.00	0.00	0.00	0.00
October	709	0.5	2.2	29.6	100.0	0	0	99.86	0.14	0.00	0.00	0.00	0.00
November	686	0.5	3.4	24.0	100.0	0	0	99.71	0.29	0.00	0.00	0.00	0.00
December	708	1.1	6.7	19.1	100.0	0	0	100.00	0.00	0.00	0.00	0.00	0.00
Annual	8356	1.1	12.2	66.5	99.9	0	0	99.53	0.46	0.01	0.00	0.00	0.00

**TransAlta Utilities Corporation  
Frequency Distribution Charts  
NO<sub>2</sub> Monthly Averages  
Year 2016**

West Central Airshed Society - Power (AMS 907)  
 Annual Summary for 2016  
 NO2 (ppb)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operational Time (%)	Number 24-Hour Violations	Number 1-Hour Violations	Percent of Data in each Concentration Range			
								<=0.05	>0.05-0.11	>0.11-0.21	>0.21
January	707	6.9	20.4	36.6	100.0	0	0	100.00	0	0	0
February	662	3.4	14.0	39.4	100.0	0	0	100.00	0	0	0
March	707	3.4	14.0	27.4	100.0	0	0	100.00	0	0	0
April	684	1.8	4.2	14.9	100.0	0	0	100.00	0	0	0
May	675	1.8	6.1	30.6	96.0	0	0	100.00	0	0	0
June	684	2.2	5.5	17.7	100.0	0	0	100.00	0	0	0
July	707	1.9	5.3	23.8	100.0	0	0	100.00	0	0	0
August	700	1.5	4.0	14.8	100.0	0	0	100.00	0	0	0
September	685	1.6	5.1	13.9	100.0	0	0	100.00	0	0	0
October	708	2.5	6.1	16.0	100.0	0	0	100.00	0	0	0
November	684	4.2	9.5	26.6	100.0	0	0	100.00	0	0	0
December	708	3.2	8.8	26.8	100.0	0	0	100.00	0	0	0
Annual	8311	2.9	20.4	39.4	99.7	0	0	100.00	0	0	0

West Central Airshed Society - Meadows (AMS 908)  
 Annual Summary for 2016  
 NO2 (ppb)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operational Time (%)	Number 24-Hour Violations	Number 1-Hour Violations	Percent of Data in each Concentration Range			
								<=0.05	>0.05-0.11	>0.11-0.21	>0.21
January	707	13.5	23.3	36.7	100.0	0	0	100.00	0	0	0
February	663	7.6	19.1	37.7	100.0	0	0	100.00	0	0	0
March	704	6.5	12.0	32.5	99.7	0	0	100.00	0	0	0
April	681	4.3	9.9	33.9	99.6	0	0	100.00	0	0	0
May	667	5.7	12.5	33.4	94.2	0	0	100.00	0	0	0
June	685	5.5	12.8	29.5	100.0	0	0	100.00	0	0	0
July	703	3.9	8.1	23.8	99.6	0	0	100.00	0	0	0
August	699	4.3	8.4	19.5	99.3	0	0	100.00	0	0	0
September	685	4.7	9.8	25.2	100.0	0	0	100.00	0	0	0
October	708	5.2	10.4	26.9	100.0	0	0	100.00	0	0	0
November	686	9.7	18.7	31.9	100.0	0	0	100.00	0	0	0
December	708	8.7	20.4	36.0	100.0	0	0	100.00	0	0	0
Annual	8296	6.6	23.3	37.7	99.4	0	0	100.00	0	0	0

West Central Airshed Society - Wagner2 (AMS 959)  
 Annual Summary for 2016  
 NO2 (ppb)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operational Time (%)	Number 24-Hour Violations	Number 1-Hour Violations	Percent of Data in each Concentration Range			
								<=0.05	>0.05-0.11	>0.11-0.21	>0.21
January	707	8.9	18.7	34.0	100.0	0	0	100.00	0	0	0
February	662	5.3	12.7	29.8	100.0	0	0	100.00	0	0	0
March	703	5.0	12.2	28.1	99.5	0	0	100.00	0	0	0
April	685	3.6	7.6	30.0	100.0	0	0	100.00	0	0	0
May	709	3.9	7.9	27.0	100.0	0	0	100.00	0	0	0
June	684	5.8	11.9	32.8	100.0	0	0	100.00	0	0	0
July	707	3.6	6.0	17.7	100.0	0	0	100.00	0	0	0
August	705	2.6	5.5	20.2	100.0	0	0	100.00	0	0	0
September	684	2.6	4.5	16.3	100.0	0	0	100.00	0	0	0
October	708	3.0	8.4	40.6	100.0	0	0	100.00	0	0	0
November	685	4.7	8.8	18.7	100.0	0	0	100.00	0	0	0
December	707	5.0	10.8	26.4	100.0	0	0	100.00	0	0	0
Annual	8346	4.5	18.7	40.6	100.0	0	0	100.00	0	0	0

**TransAlta Utilities Corporation  
Frequency Distribution Charts  
PM Monthly Averages  
Year 2016**

West Central Airshed Society - Power (AMS 907)  
 Annual Summary for 2016  
 PM<sub>2.5</sub> (µg/m<sup>3</sup>)

Month	Number of Data	Mean	Maximum 24-Hour Value	Maximum 1-Hour Value	Operational Time (%)	Number 24-Hour Violations	Number 1-Hour Violations
January	744	5.4	18.5	38.2	100.0	0	0
February	696	2.1	5.8	18.5	100.0	0	0
March	744	2.8	9.4	17.8	100.0	0	0
April	700	3.9	21.7	83.9	97.2	0	1
May	740	8.7	30.8	201.0	99.5	1	10
June	719	3.7	12.9	37.1	99.9	0	0
July	744	3.5	7.7	31.8	100.0	0	0
August	722	2.9	12.3	60.5	98.8	0	0
September	720	4.5	11.6	88.0	100.0	0	1
October	721	4.7	12.1	25.0	96.9	0	0
November	716	5.8	19.2	56.2	99.4	0	0
December	716	5.0	8.4	27.6	96.2	0	0
Annual	8682	4.4	30.8	201.0	99.0	1	12



**TransAlta Utilities Corporation  
Frequency Distribution Charts  
Wind Speed and Direction  
Year 2016**

West Central Airshed Society - Power (AMS 907)  
 Annual Summary for 2016  
 Percentage Frequency Distribution of Wind

Speed (kph)							
Direction	>1 to 5	>5 to 11	>11 to 19	>19 to 28	>28 to 38	>38	Totals
N	0.96	1.94	1.07	0.31	0.08	0.01	4.37
NNE	1.10	1.69	0.93	0.05	0.00	0.00	3.77
NE	1.38	1.75	0.32	0.00	0.00	0.00	3.45
ENE	1.17	1.61	0.48	0.02	0.00	0.00	3.29
E	1.09	1.45	0.53	0.12	0.00	0.00	3.19
ESE	0.71	1.82	1.43	0.09	0.00	0.00	4.05
SE	0.71	2.44	4.02	1.12	0.07	0.00	8.35
SSE	0.81	3.14	3.45	0.87	0.07	0.00	8.34
S	0.92	3.15	1.21	0.05	0.00	0.00	5.33
SSW	1.40	2.43	1.09	0.14	0.00	0.00	5.06
SW	1.38	3.28	2.11	0.21	0.00	0.00	6.97
WSW	1.44	4.03	2.45	0.06	0.02	0.00	8.00
W	1.54	4.64	3.23	0.47	0.05	0.00	9.93
WNW	1.14	4.07	3.26	1.19	0.22	0.01	9.88
NW	1.21	3.03	3.28	2.22	0.77	0.10	10.61
NNW	0.79	1.89	1.78	0.86	0.07	0.00	5.40
Totals	17.77	42.35	30.64	7.77	1.35	0.13	100.00

Number of Data Values		8691
Hours in Time Period		8784

West Central Airshed Society - Meadows (AMS 908)  
 Annual Summary for 2016  
 Percentage Frequency Distribution of Wind

Speed (kph)							
Direction	>1 to 5	>5 to 11	>11 to 19	>19 to 28	>28 to 38	>38	Totals
N	1.00	1.93	0.75	0.05	0.02	0.00	3.75
NNE	0.84	1.72	0.46	0.01	0.00	0.00	3.03
NE	1.02	1.82	0.49	0.01	0.00	0.00	3.34
ENE	1.51	2.00	1.05	0.09	0.00	0.00	4.66
E	2.01	3.35	2.41	0.16	0.00	0.00	7.94
ESE	2.19	2.73	2.76	1.08	0.05	0.00	8.81
SE	1.44	1.83	2.44	0.76	0.00	0.00	6.46
SSE	0.70	1.44	1.25	0.26	0.06	0.00	3.71
S	0.82	0.74	0.77	0.19	0.07	0.00	2.59
SSW	1.12	0.91	0.49	0.05	0.01	0.00	2.59
SW	1.52	1.29	0.73	0.32	0.04	0.00	3.89
WSW	3.08	3.92	0.87	0.19	0.00	0.00	8.06
W	3.30	6.68	2.51	0.36	0.07	0.05	12.96
WNW	1.96	5.49	3.48	1.79	0.23	0.09	13.05
NW	0.98	3.08	3.13	1.70	0.27	0.01	9.17
NNW	1.00	2.01	2.00	0.78	0.20	0.00	6.00
Totals	24.50	40.94	25.59	7.80	1.02	0.15	100.00

Number of Data Values		8539
Hours in Time Period		8784

West Central Airshed Society - Wagner2 (AMS 959)  
 Annual Summary for 2016  
 Percentage Frequency Distribution of Wind

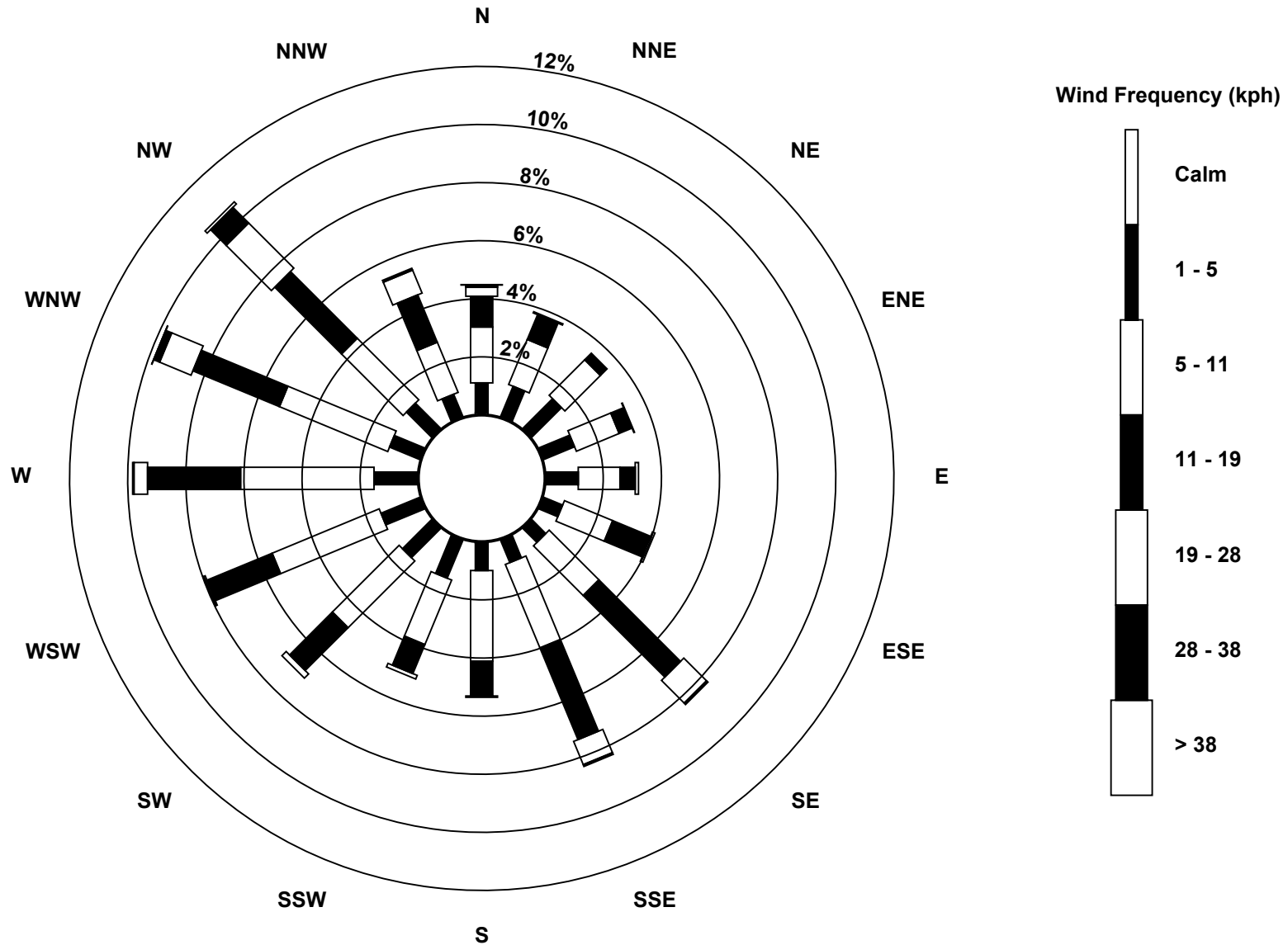
Speed (kph)							
Direction	>1 to 5	>5 to 11	>11 to 19	>19 to 28	>28 to 38	>38	Totals
N	3.45	0.25	0.00	0.00	0.00	0.00	3.70
NNE	2.76	0.16	0.00	0.00	0.00	0.00	2.92
NE	2.28	0.11	0.00	0.00	0.00	0.00	2.39
ENE	2.33	0.22	0.00	0.00	0.00	0.00	2.55
E	4.18	2.81	0.57	0.00	0.00	0.00	7.56
ESE	4.63	4.86	3.85	0.05	0.00	0.00	13.38
SE	3.74	2.86	1.24	0.05	0.00	0.00	7.89
SSE	2.39	1.26	0.70	0.12	0.00	0.00	4.47
S	2.62	0.85	0.20	0.00	0.00	0.00	3.68
SSW	1.26	0.20	0.00	0.00	0.00	0.00	1.46
SW	1.40	0.06	0.00	0.00	0.00	0.00	1.46
WSW	2.17	0.37	0.00	0.00	0.00	0.00	2.55
W	4.18	1.27	0.02	0.00	0.00	0.00	5.46
WNW	5.84	5.22	1.44	0.16	0.00	0.00	12.65
NW	7.90	6.78	2.11	0.03	0.00	0.00	16.83
NNW	8.55	2.41	0.09	0.00	0.00	0.00	11.05
Totals	59.68	29.68	10.23	0.40	0.00	0.00	100.00

Number of Data Values		6441
Hours in Time Period		8784

WCAS - Power  
Wind Speed Rose



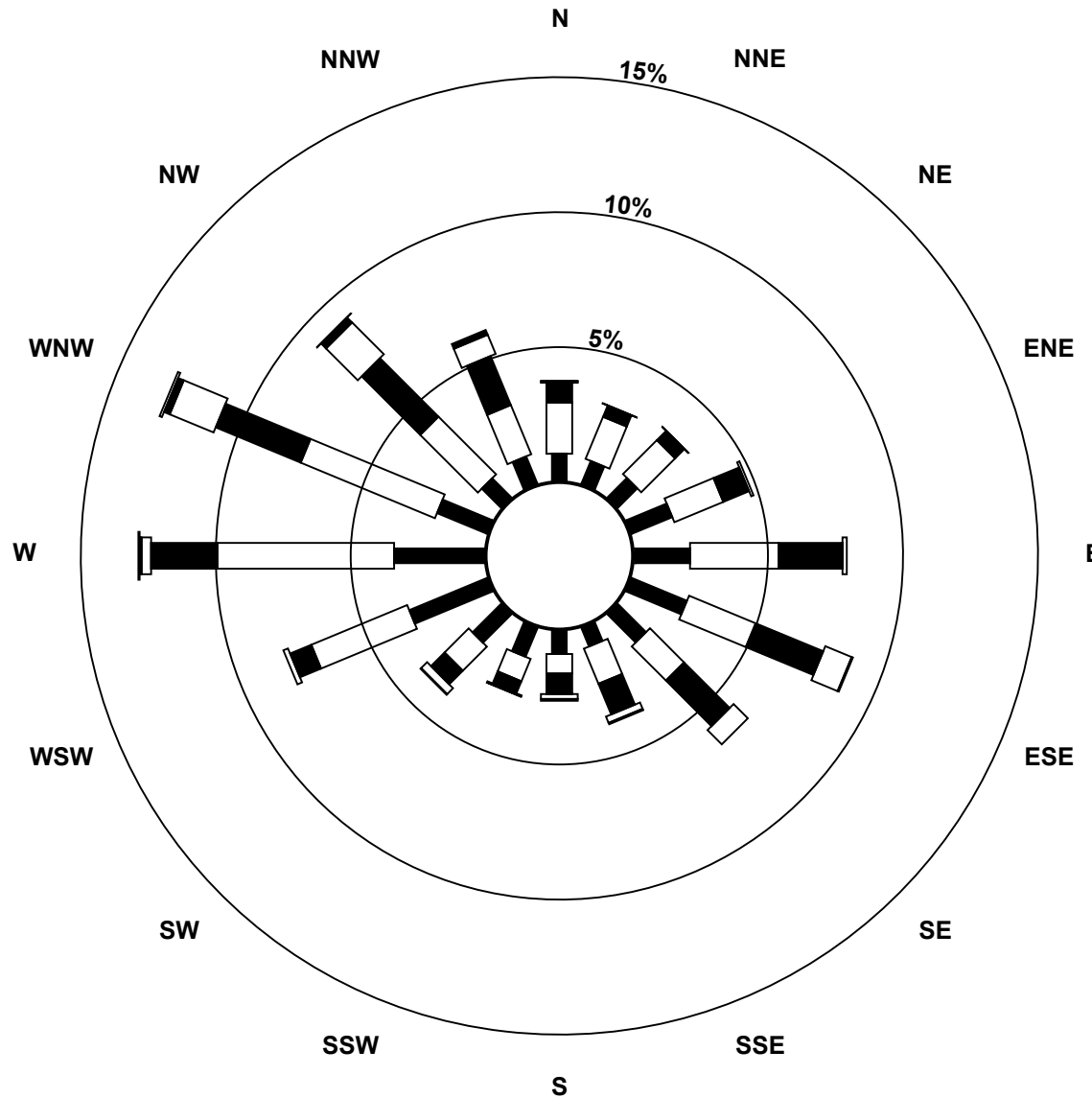
Wind Speed (WS) - kph  
2016



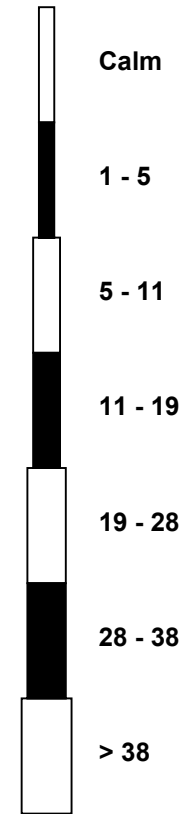
**WCAS - Meadows  
Wind Speed Rose**



**Wind Speed (WS) - kph  
2016**



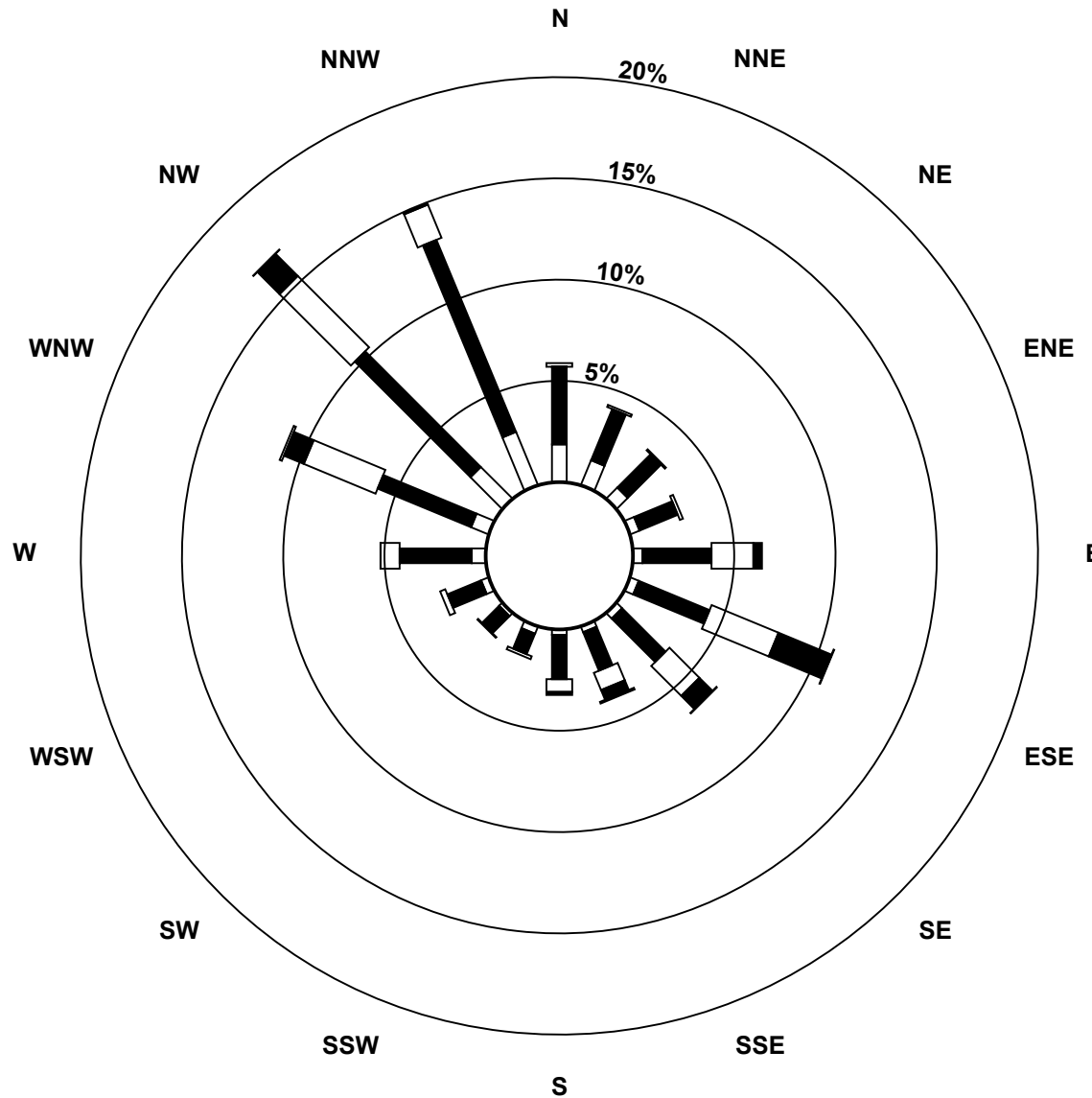
**Wind Frequency (kph)**



WCAS - Wagner2  
Wind Speed Rose



Wind Speed (WS) - kph  
2016



Wind Frequency (kph)

