WILLIAMS LAKE AIRSHED MANAGEMENT PLANNING
BACKGROUND AIR QUALITY REPORT
(FOR DATA COLLECTED 1990 – 2002)
TABLES AND FIGURES

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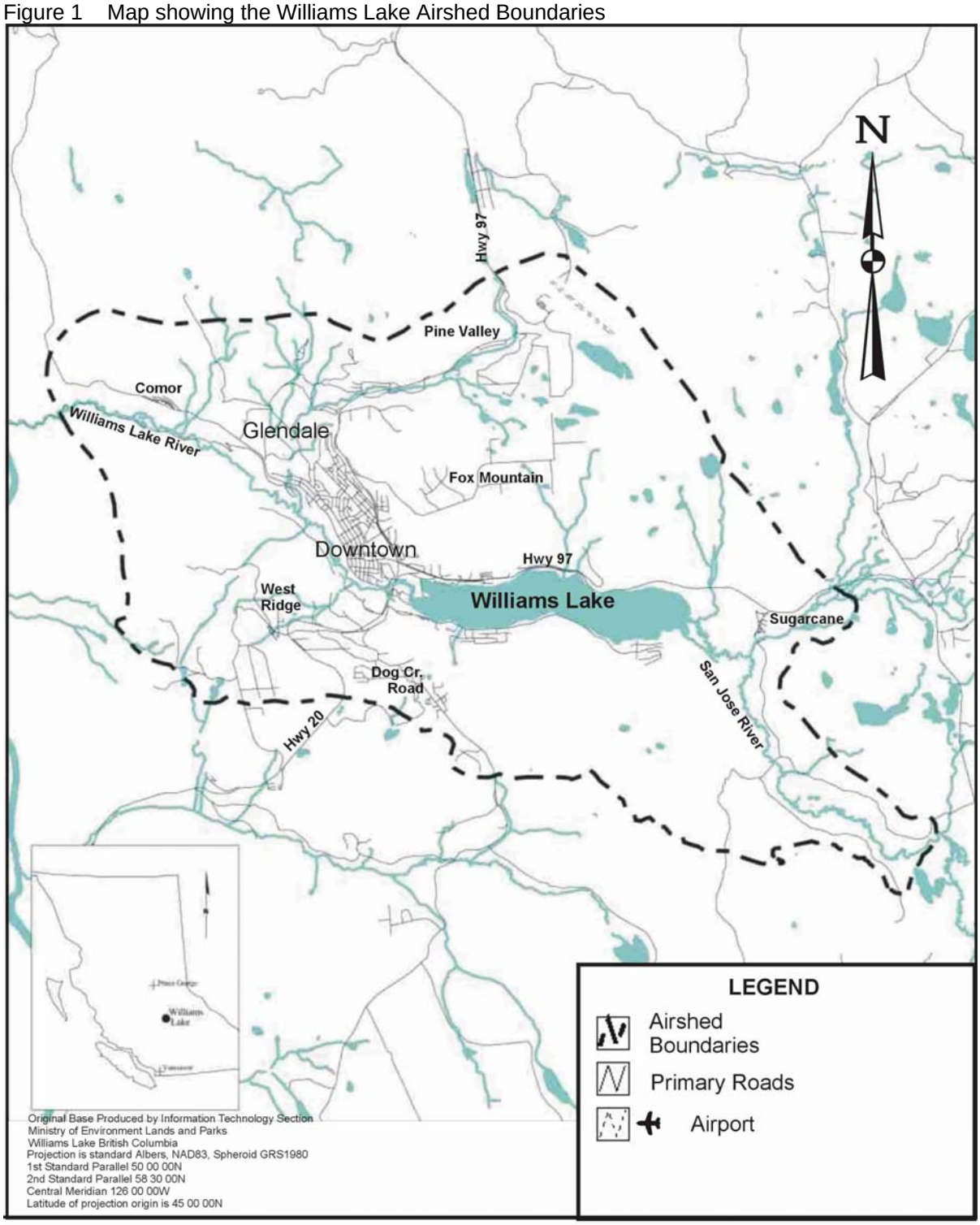

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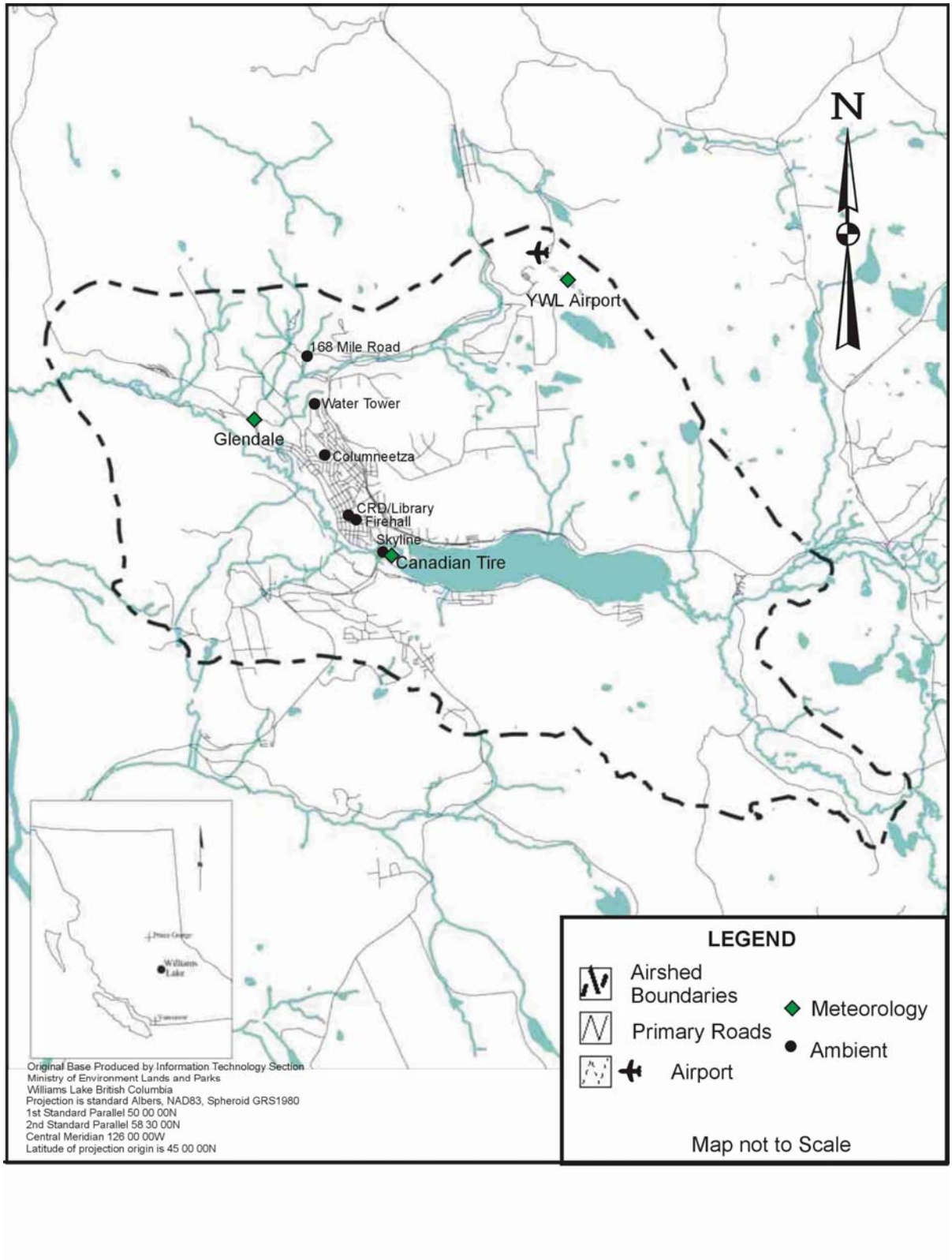
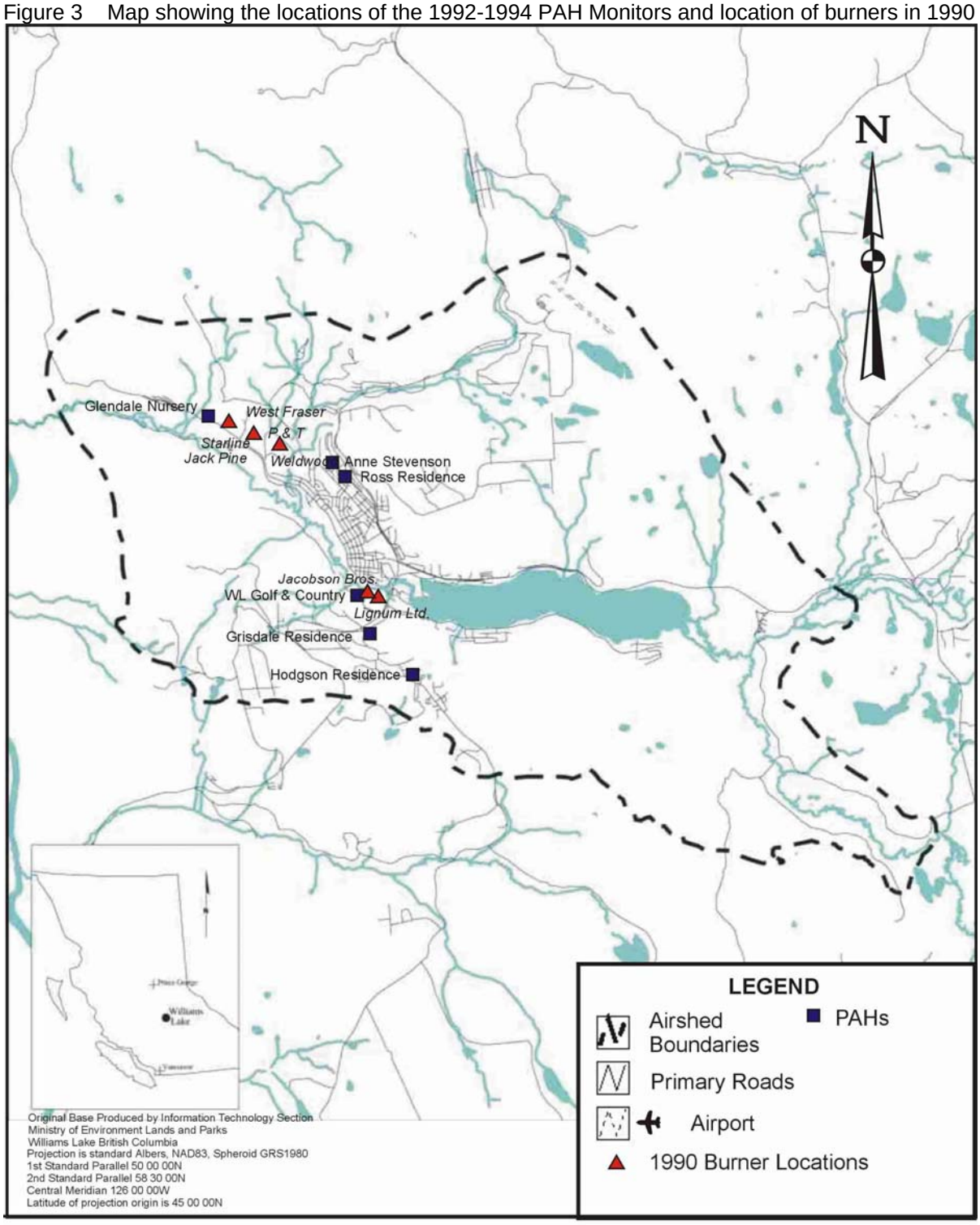


Figure 3 Map showing the locations of the 1992-1994 PAH Monitors and location of burners in 1990



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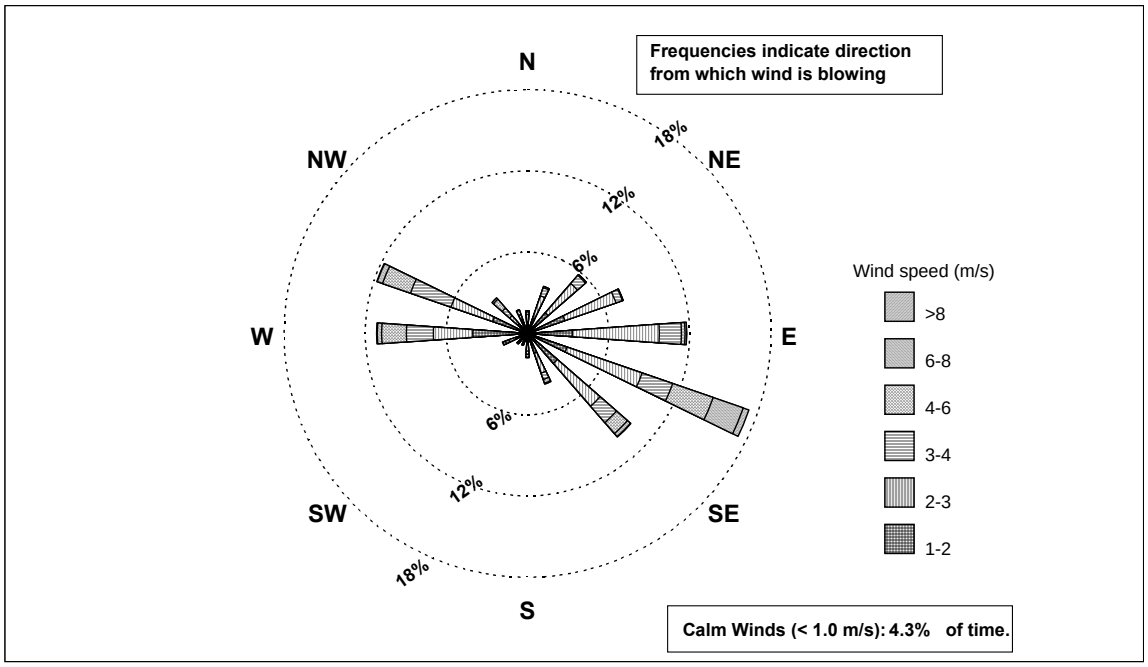

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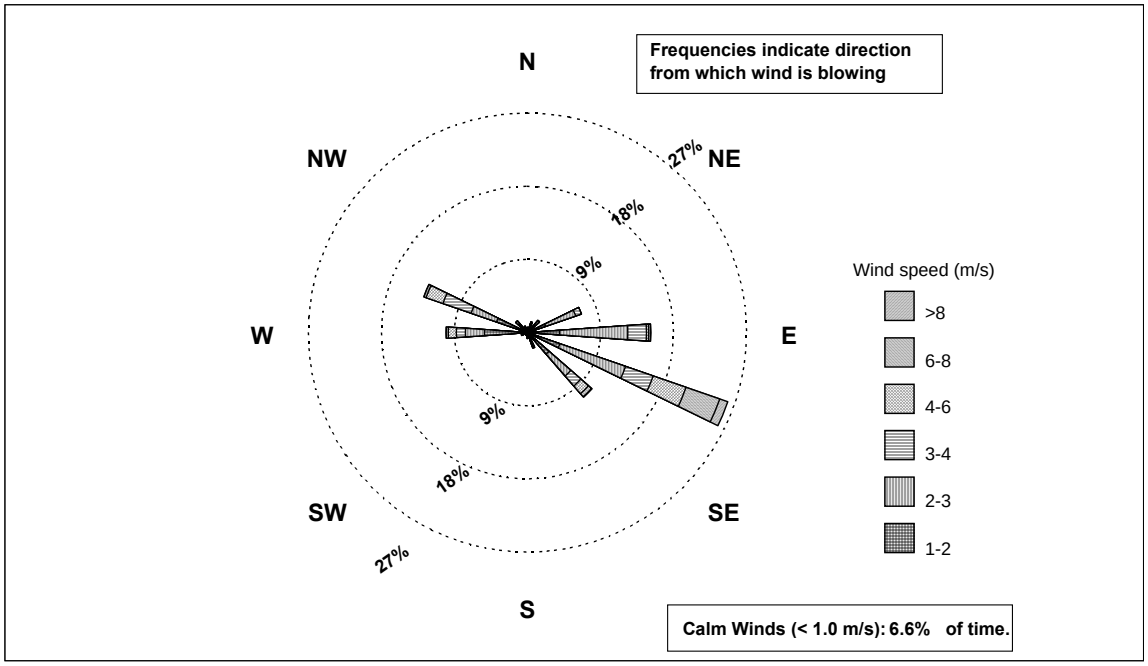

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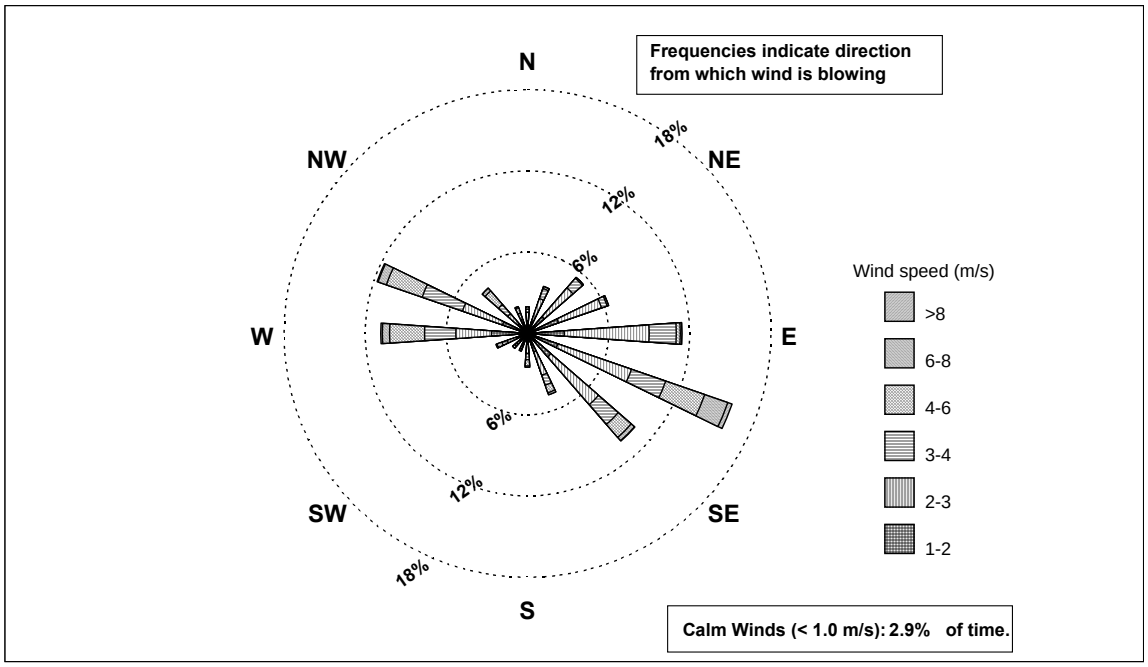

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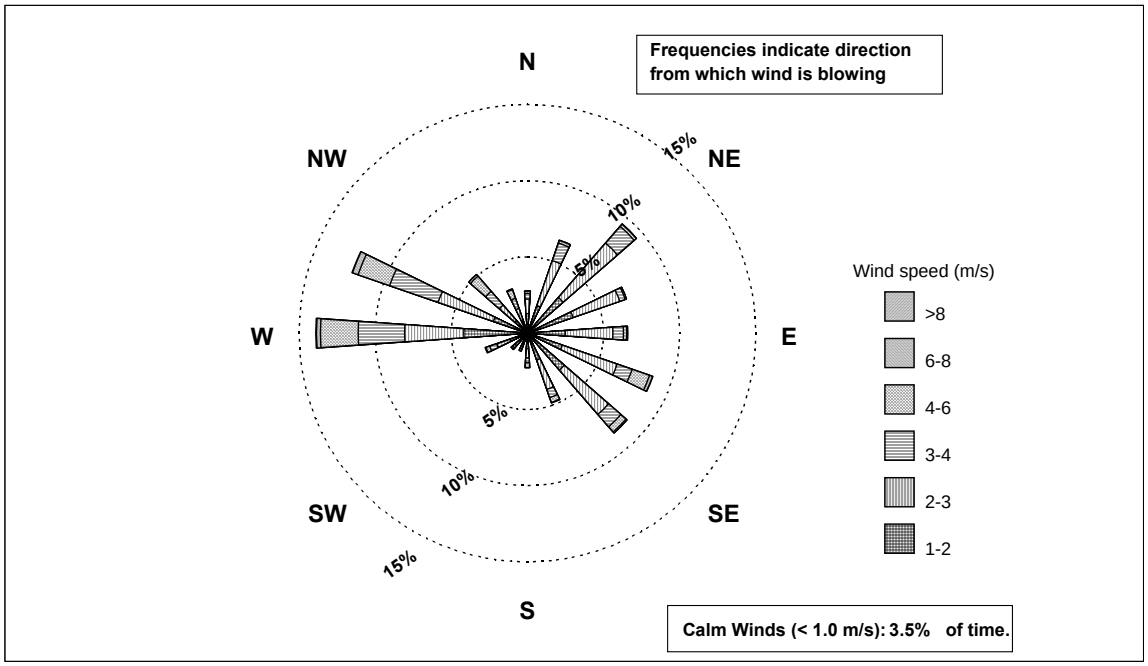

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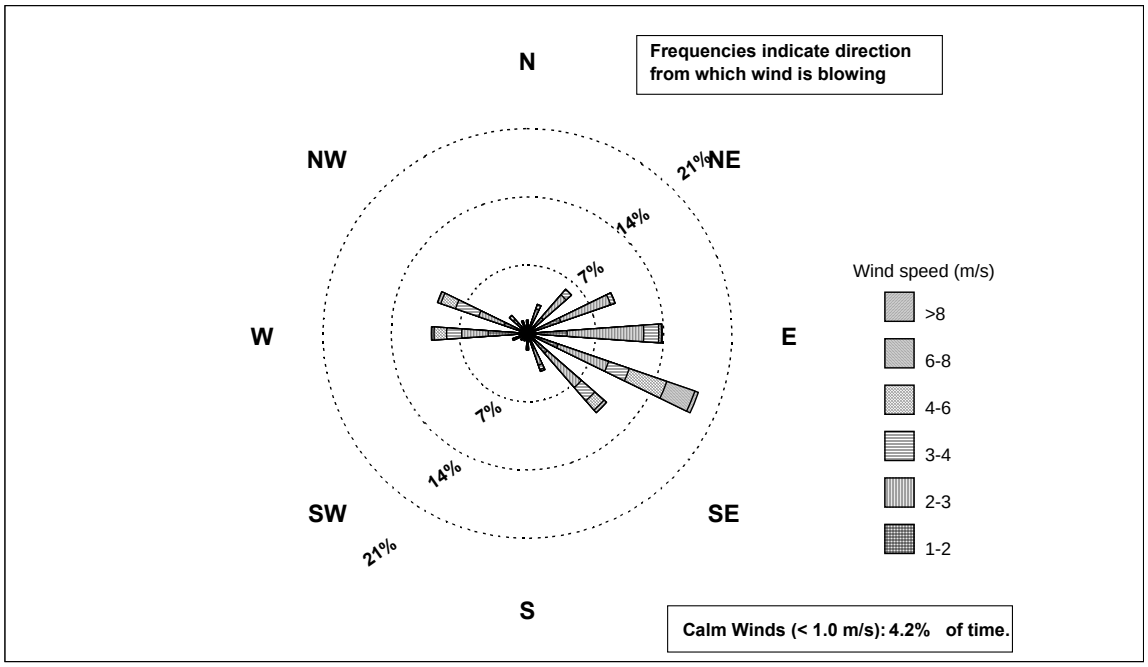

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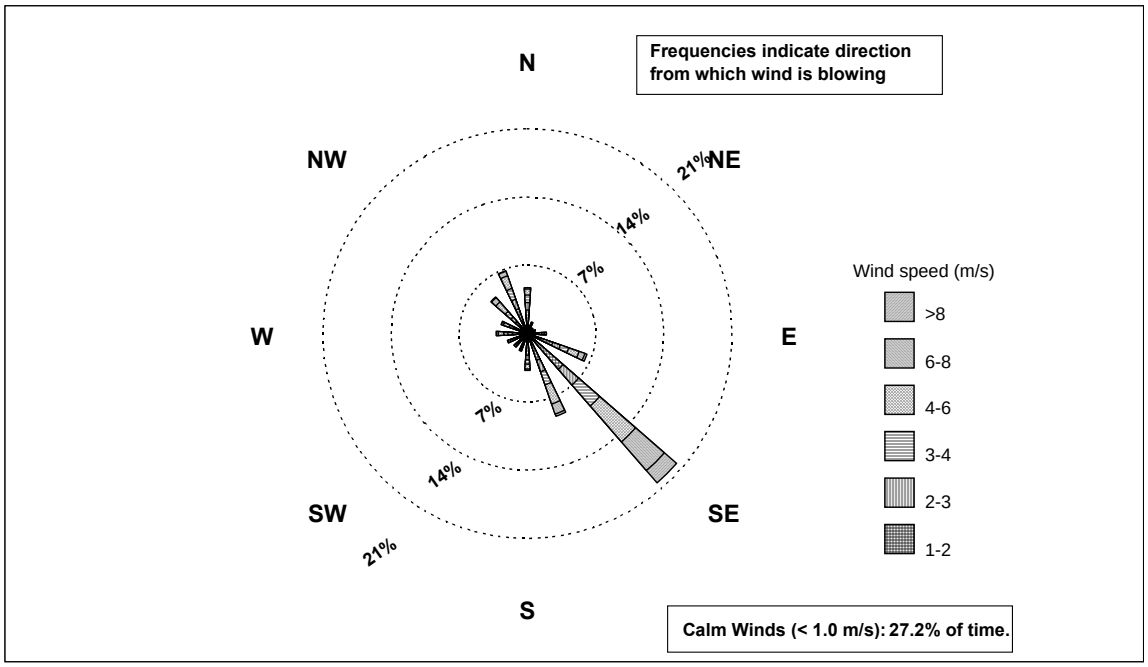

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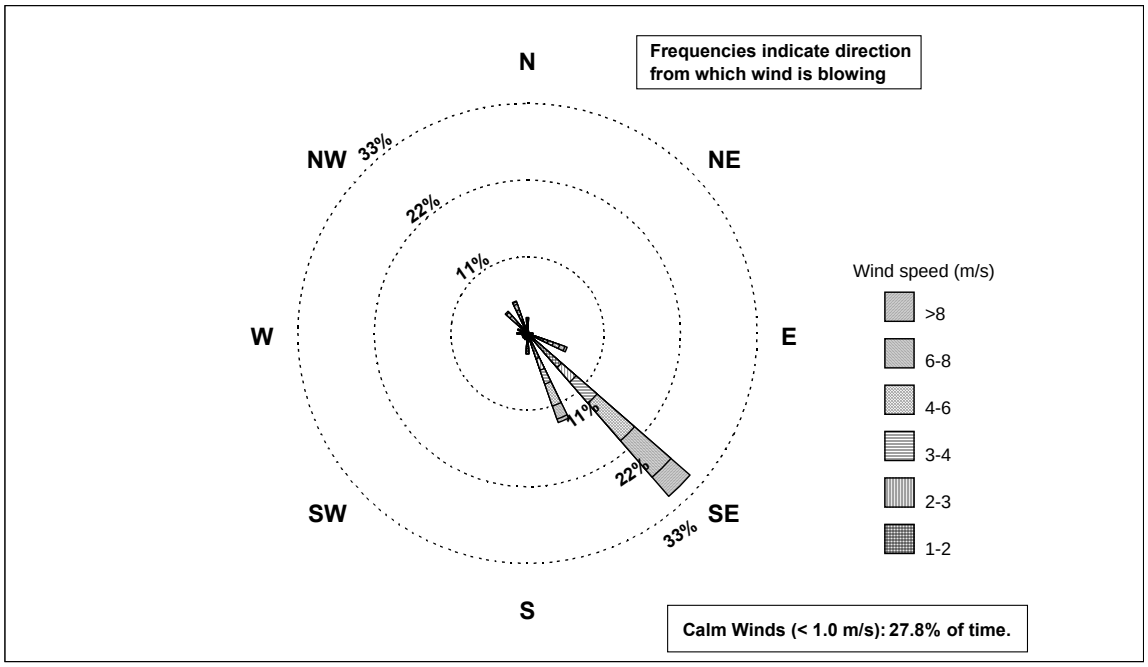

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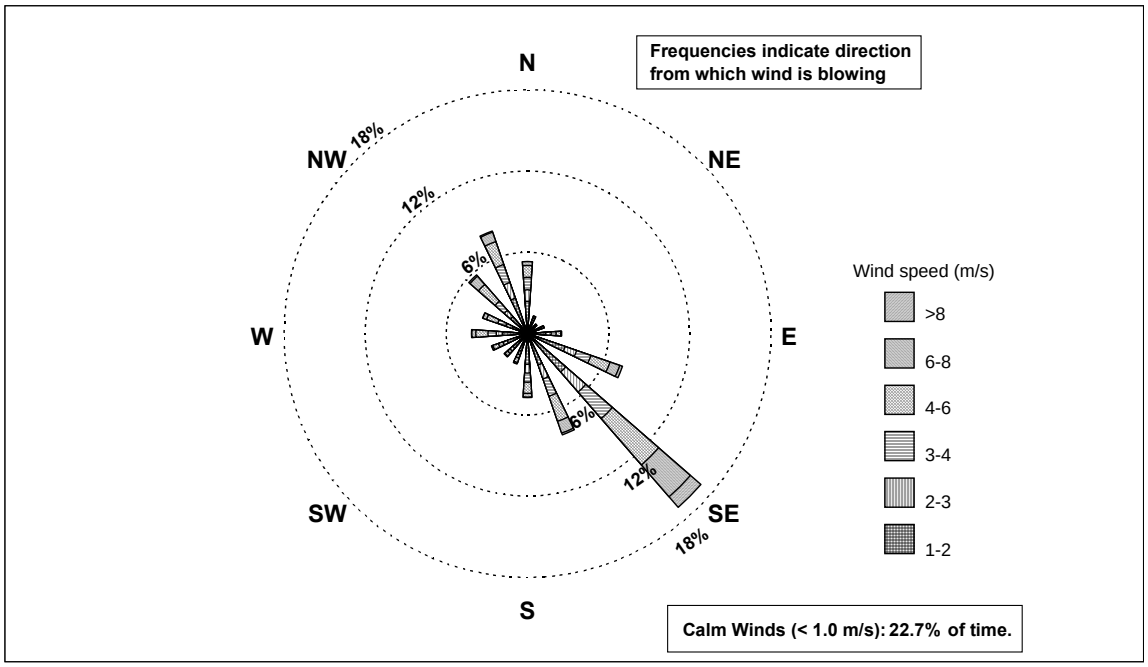

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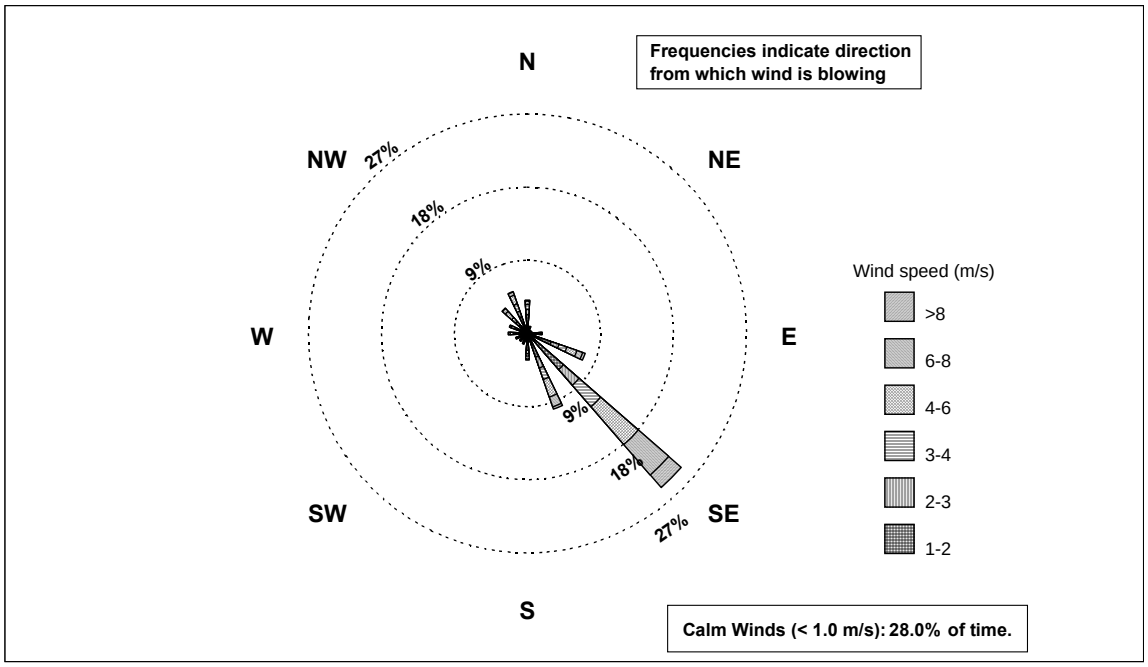

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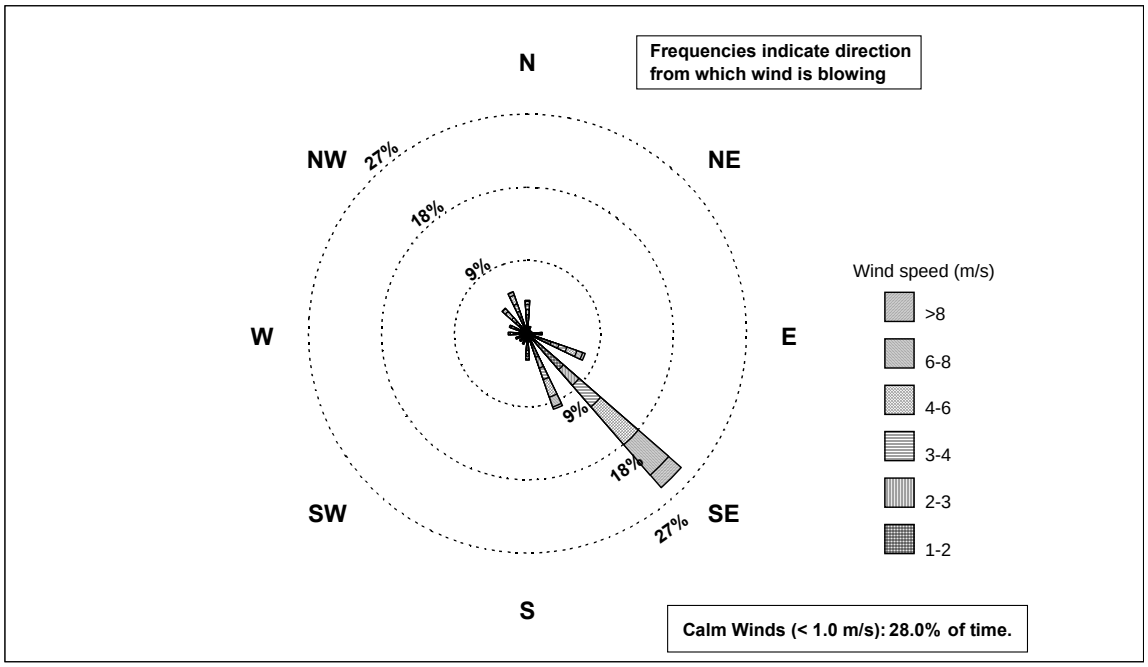

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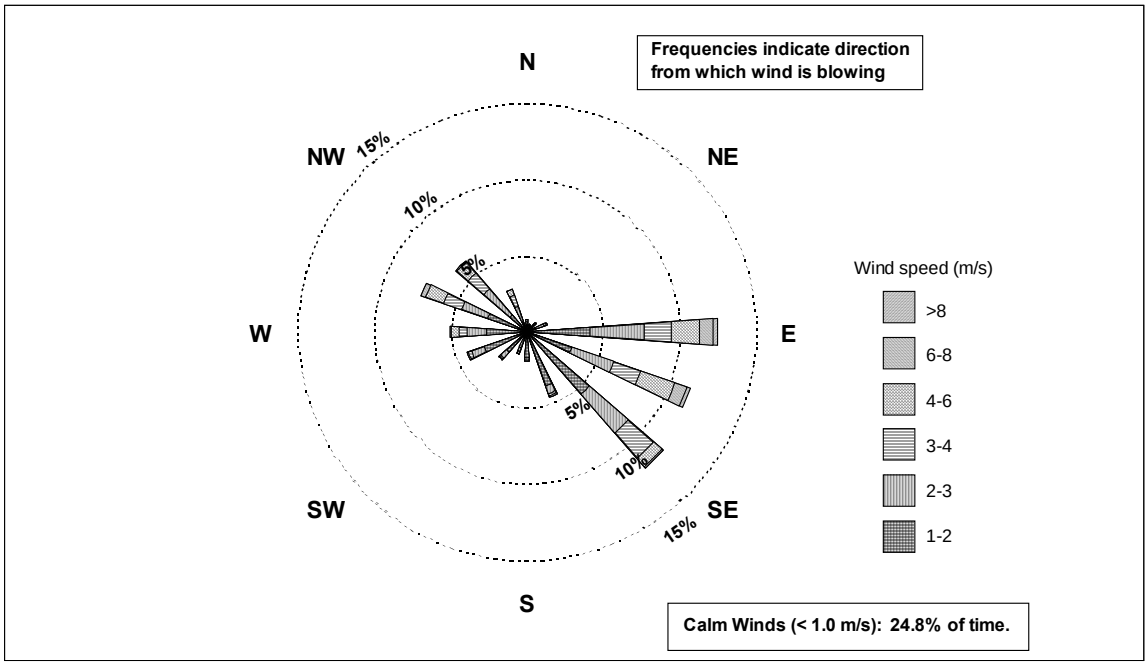

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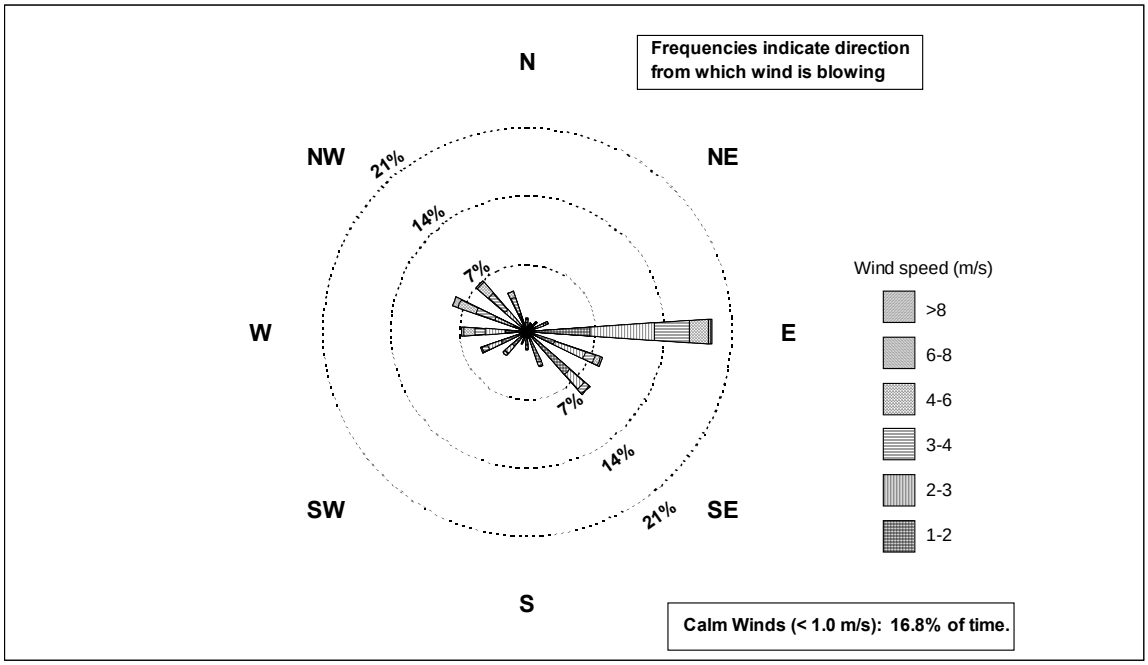

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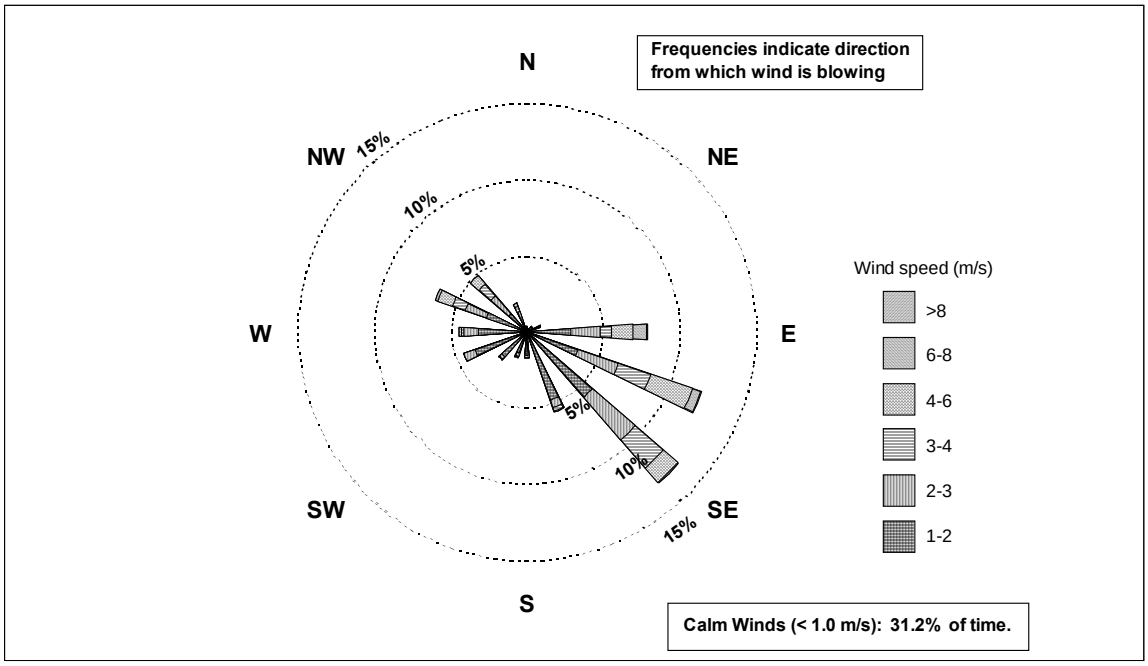

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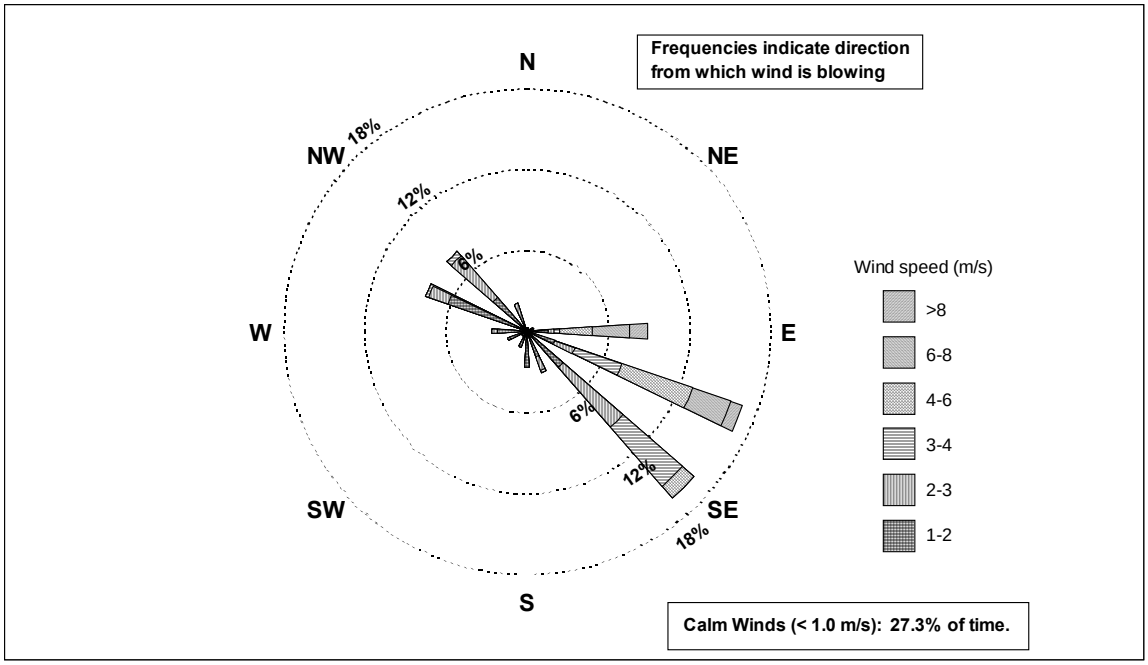

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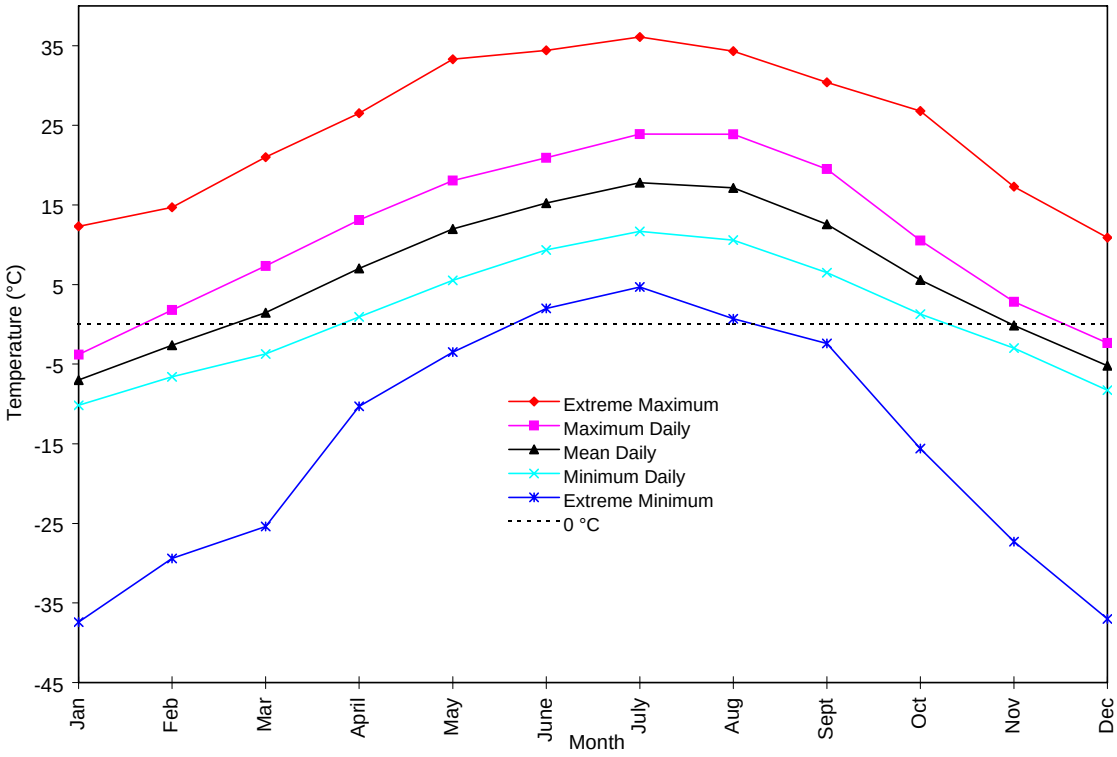

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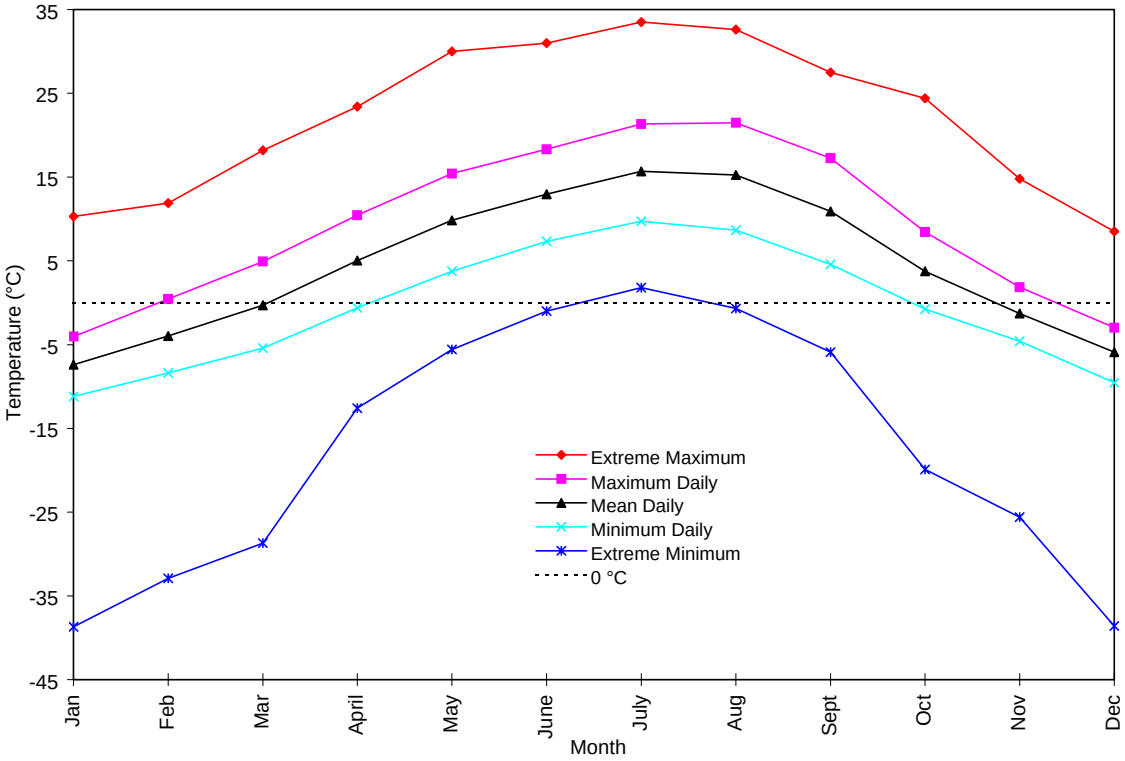


Figure 20 Williams Lake Canadian Tire Temperature Summary for 2002

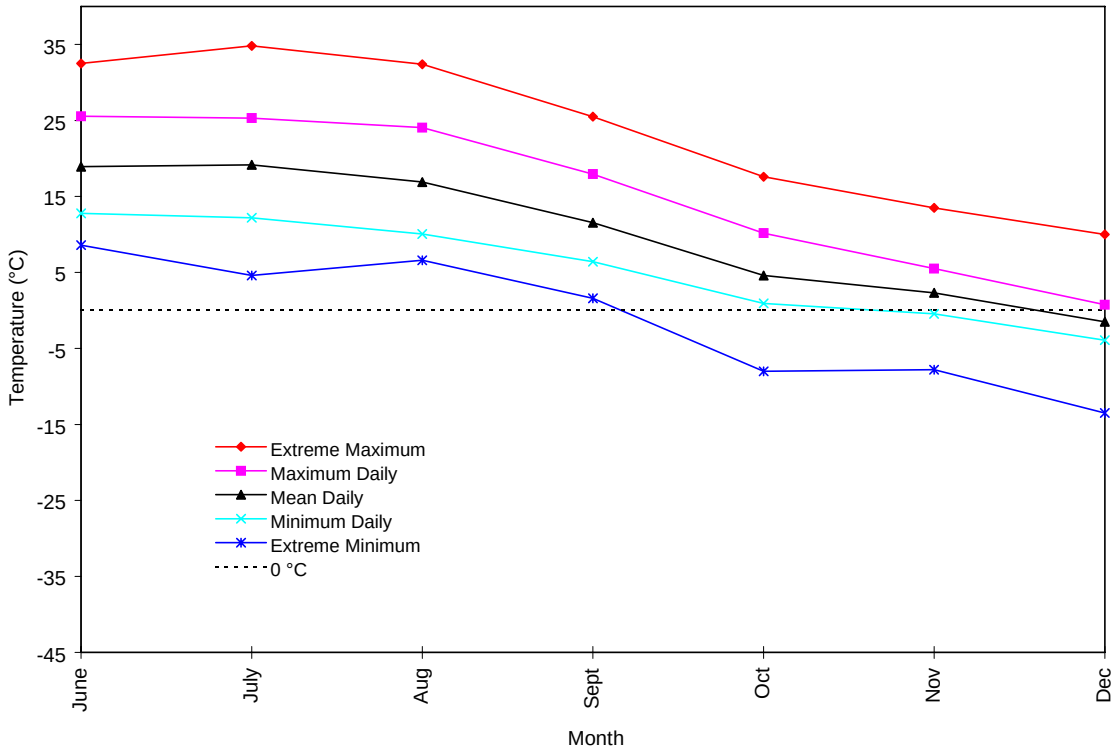


Figure 21 Average Monthly Wind Speed for Williams Lake Meteorological Stations, 1990-2002

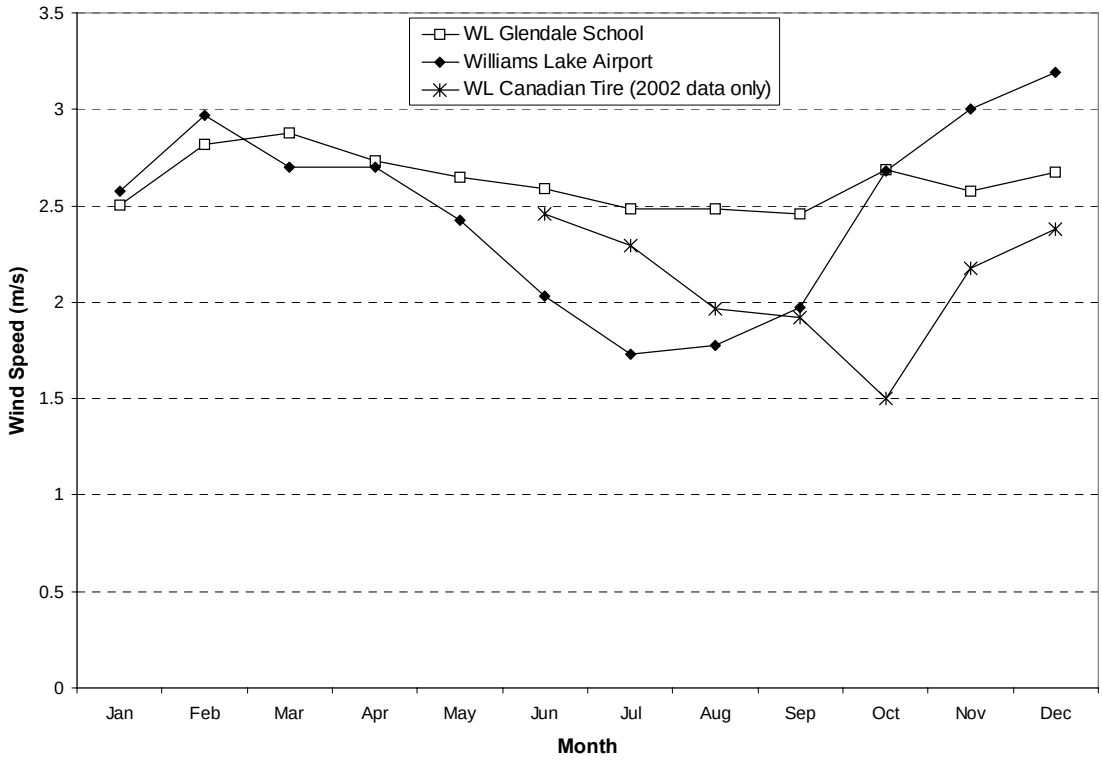
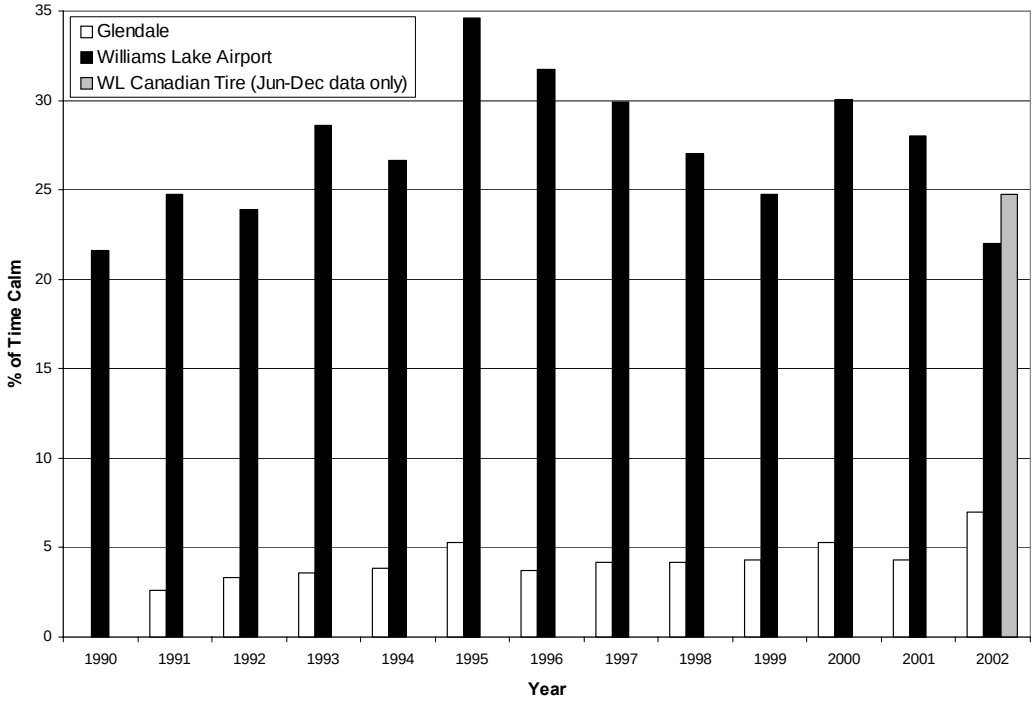


Figure 22 Annual Average Percent Calm Winds (< 1 m/s) for the Williams Lake Meteorological Stations, 1990-2002



Note: %calms for Canadian Tire – June to December data only

Figure 23 Scatterplot of Non-Continuous PM_{10} – HiVol vs. Partisol, at the Firehall Site, April – December 2001. Calculations Based on Paired HiVol PM_{10} and Partisol PM_{10} Values.

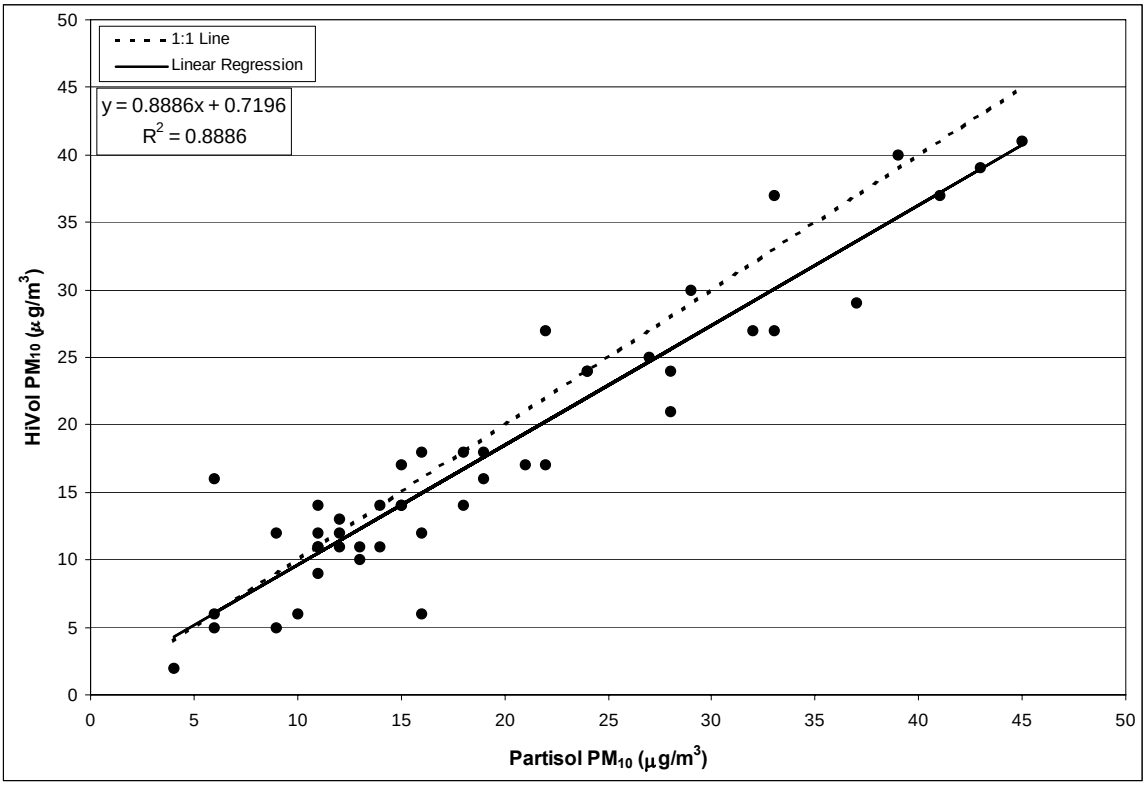


Figure 24 Annual Average Non-Continuous PM_{10} Concentrations Williams Lake Sites, 1990 – 2002.

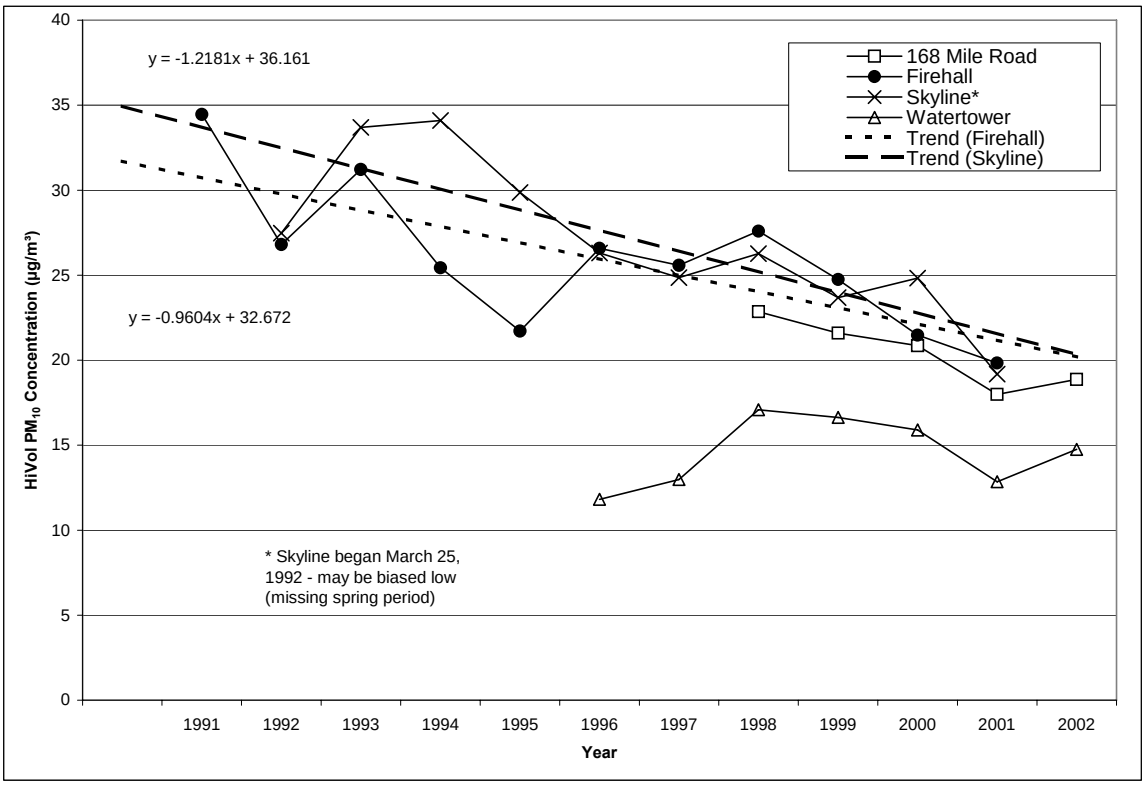


Figure 25 Monthly Average Non-Continuous Concentrations at Williams Lake, 1990 – 1996

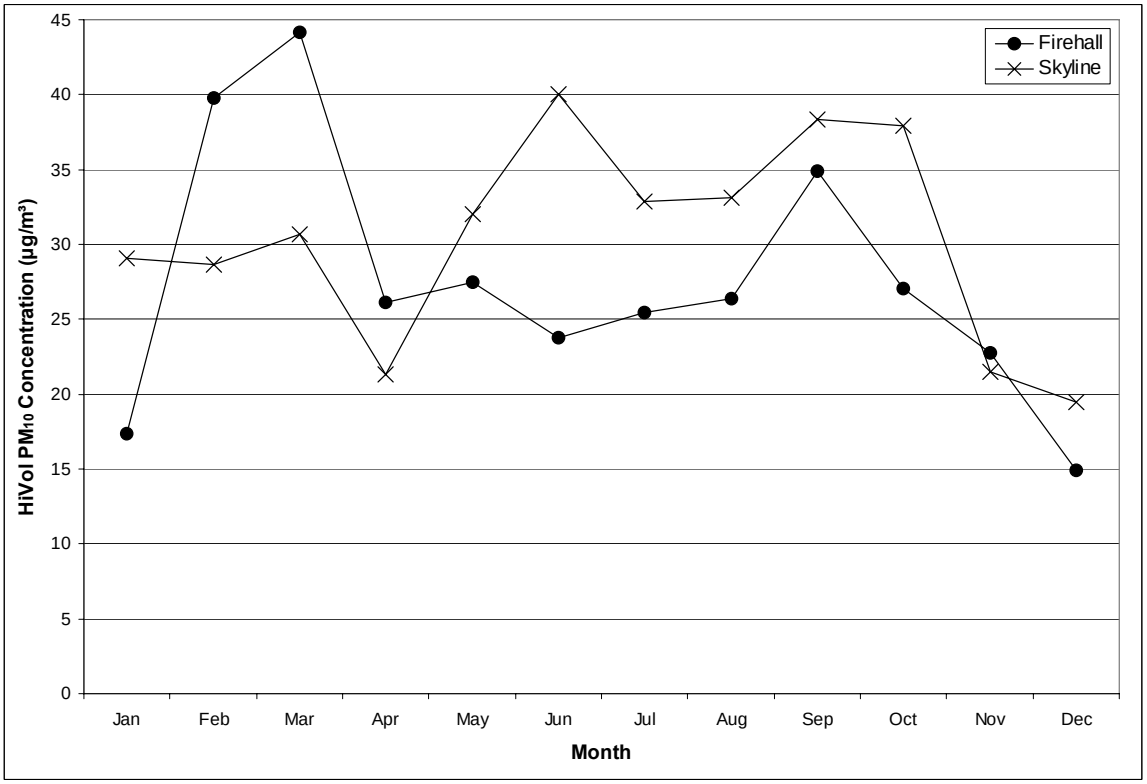


Figure 26 Monthly Average Non-Continuous PM_{10} Concentrations at Williams Lake Sites, 1997–2002.

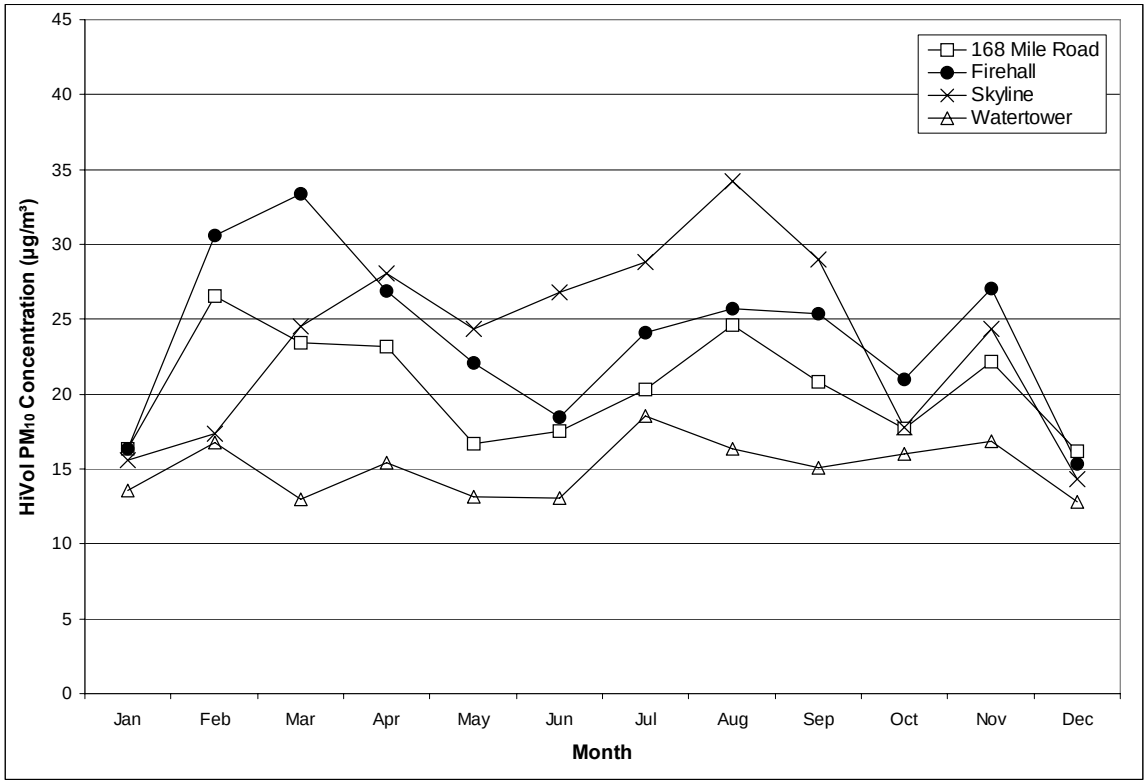


Figure 27 Percent of time the 24-hour Ambient Objective was Exceeded at PM_{10} Monitors, 1992-2002

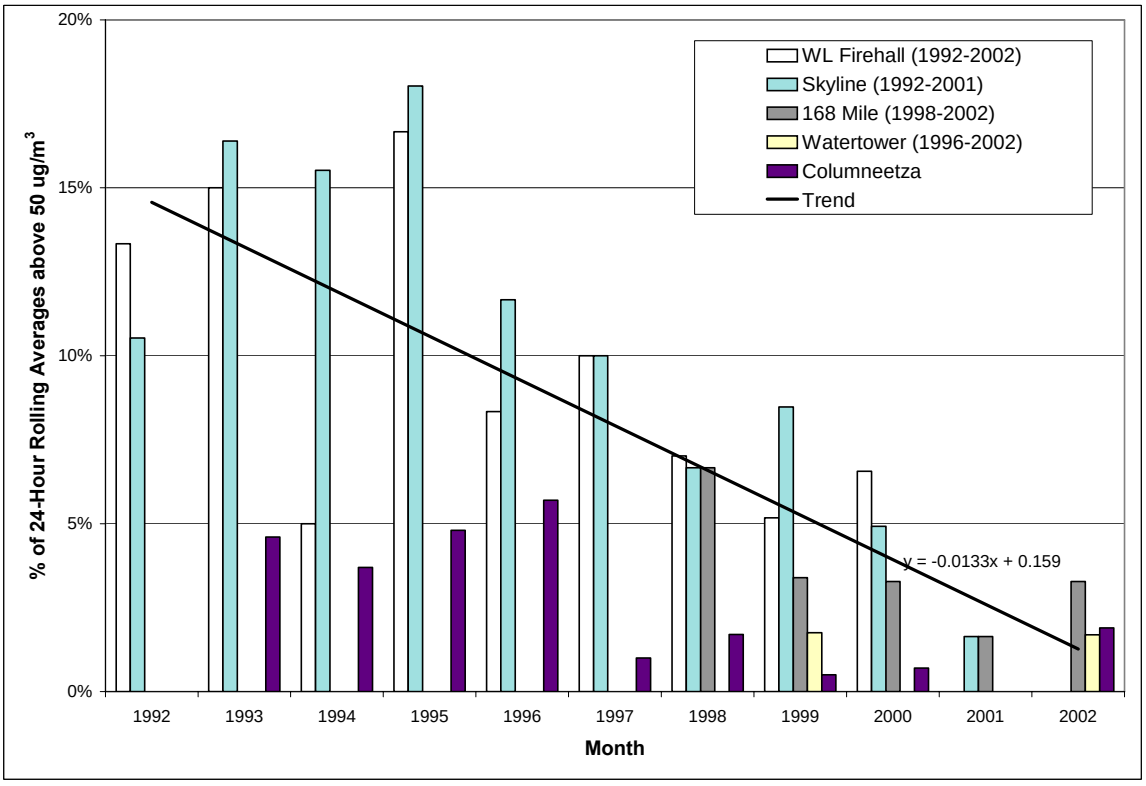


Figure 28 The Relationship Between the July – December 2002 PM_{10} Exceedances (% of time that midnight – midnight 24-hour block averages were > 50 $\mu g/m^3$) at Skyline and Total Precipitation (Airport)/Percent Calm Winds (Canadian Tire site)

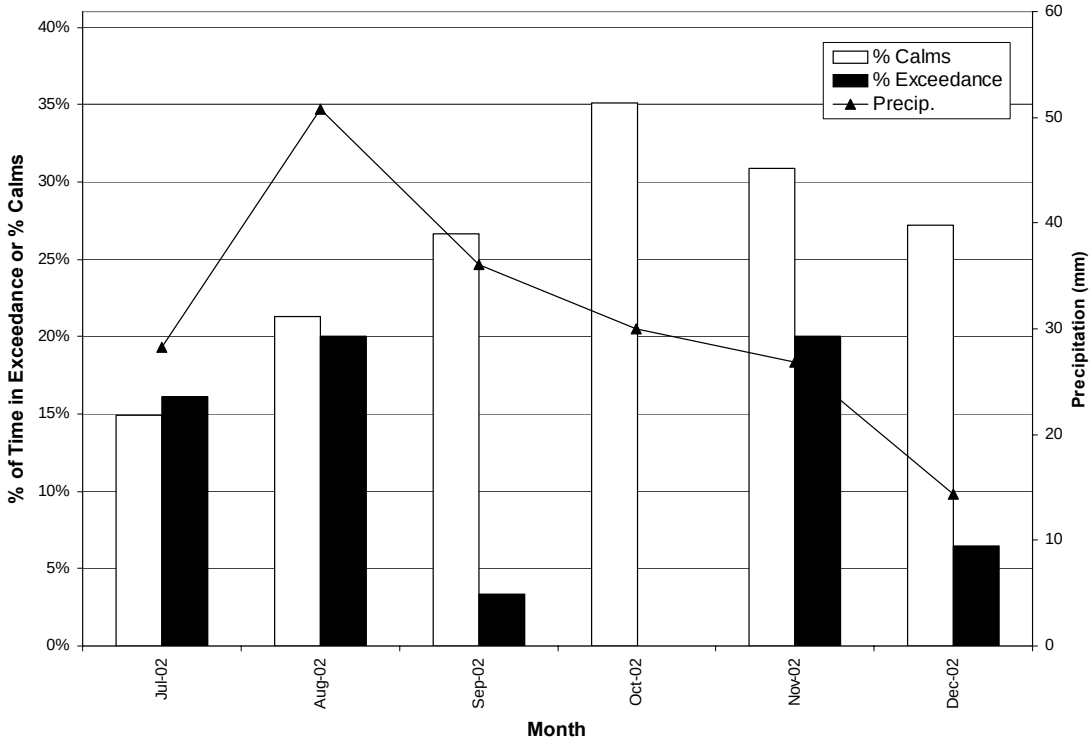


Figure 29 The Relationship Between the 1993 – 1997 PM_{10} Exceedances (% of time that midnight – midnight 24-hour block averages were > 50 $\mu g/m^3$) at Columneetza and Total Precipitation (Airport)/Percent Calm Winds (Glendale site)

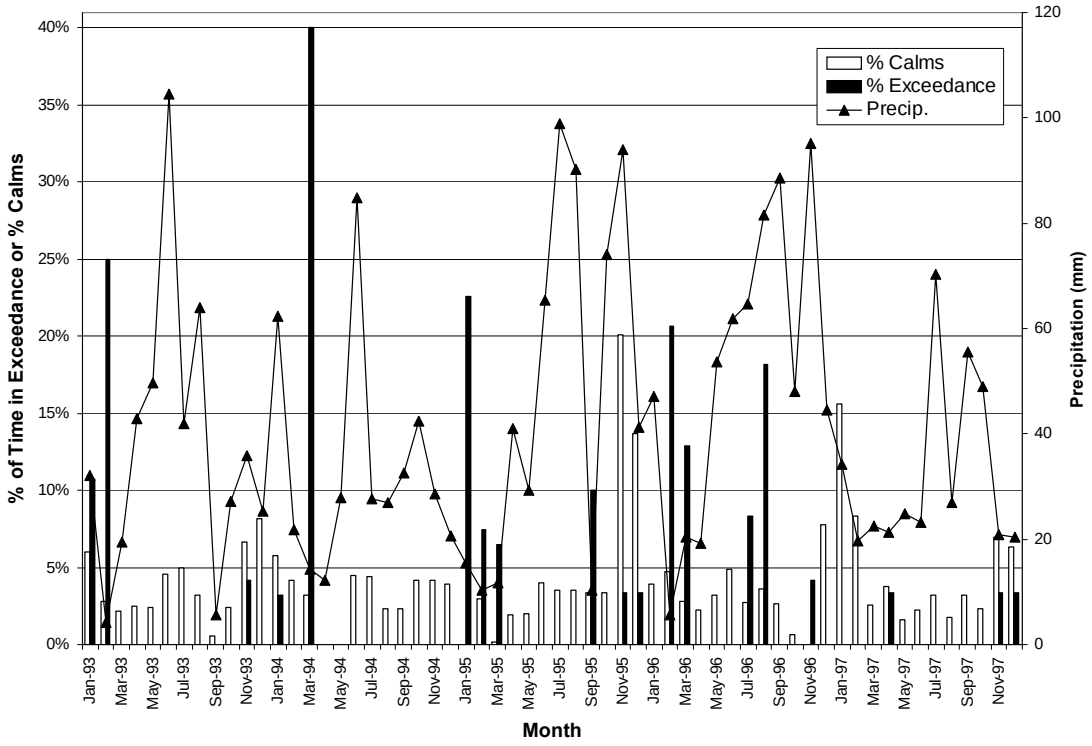


Figure 30 The Relationship Between the 1998 – 2002 PM_{10} Exceedances (% of time that midnight – midnight 24-hour block averages were > 50 $\mu g/m^3$) at Columneetza and Total Precipitation (Airport)/Percent Calm Winds (Glendale site)

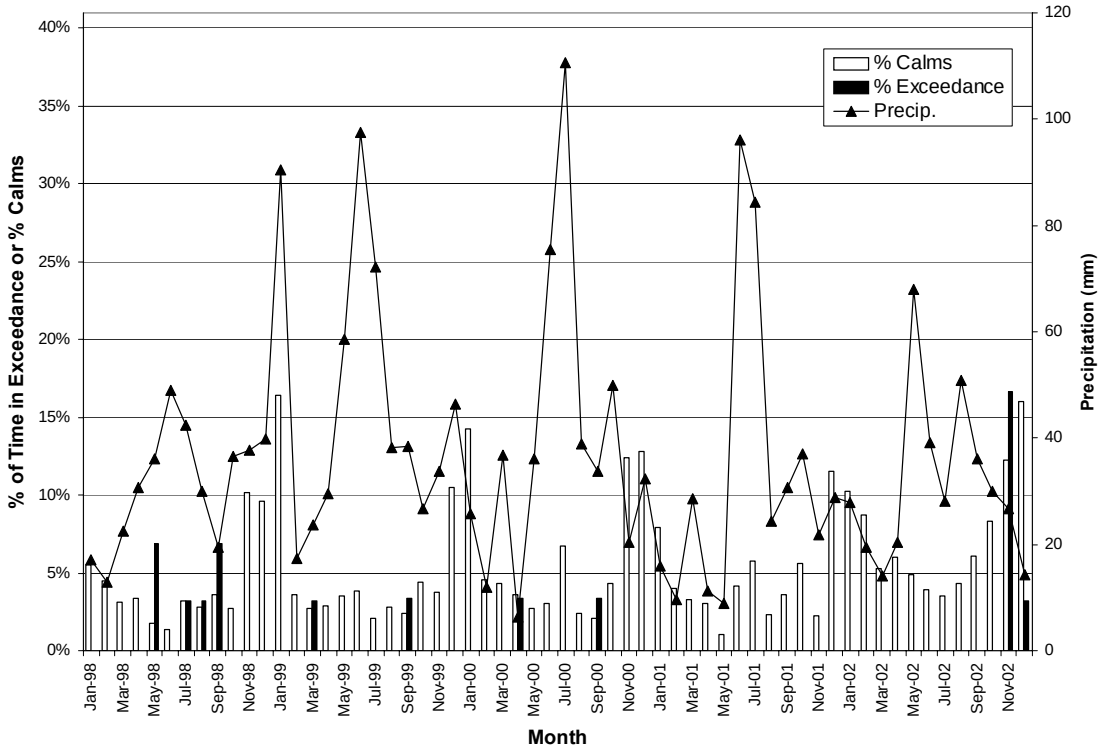


Figure 31 PM_{10} Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002

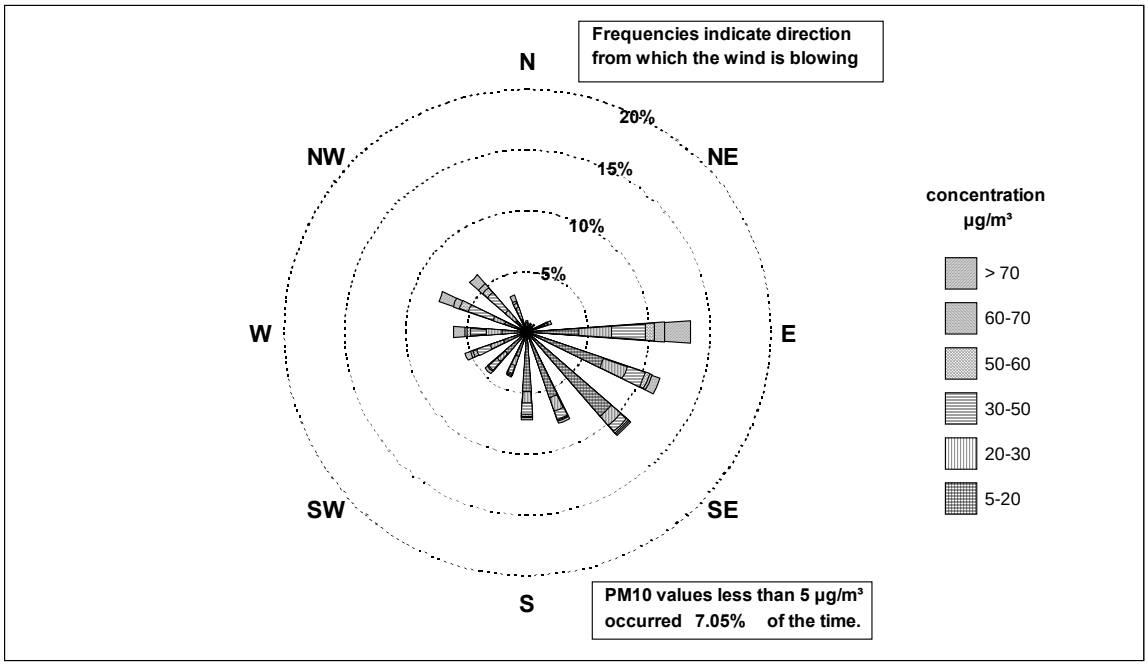


Figure 32 PM_{10} Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002, summer

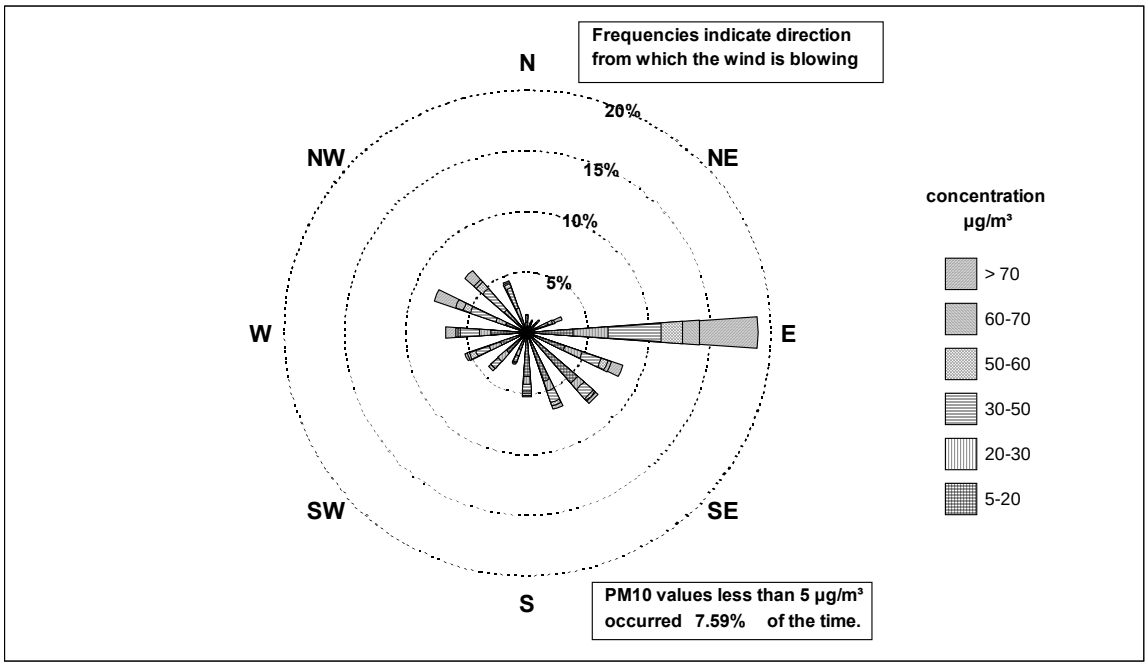


Figure 33 PM_{10} Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002, fall

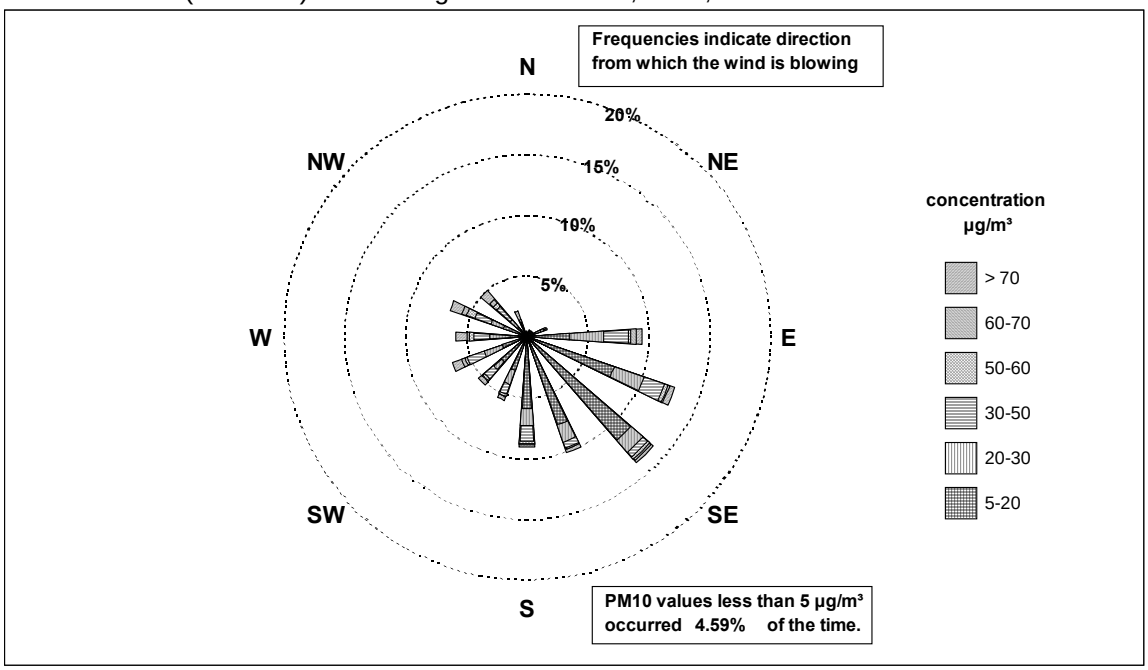


Figure 34 PM_{10} Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002, winter (November and December data only)

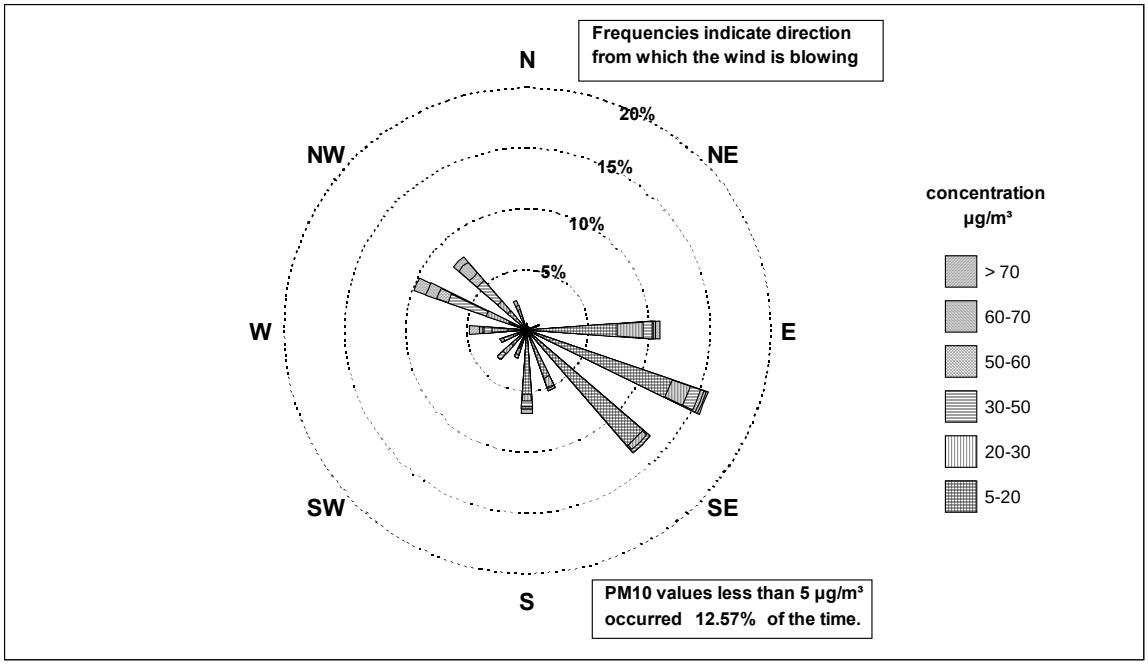


Figure 35 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1992-2002

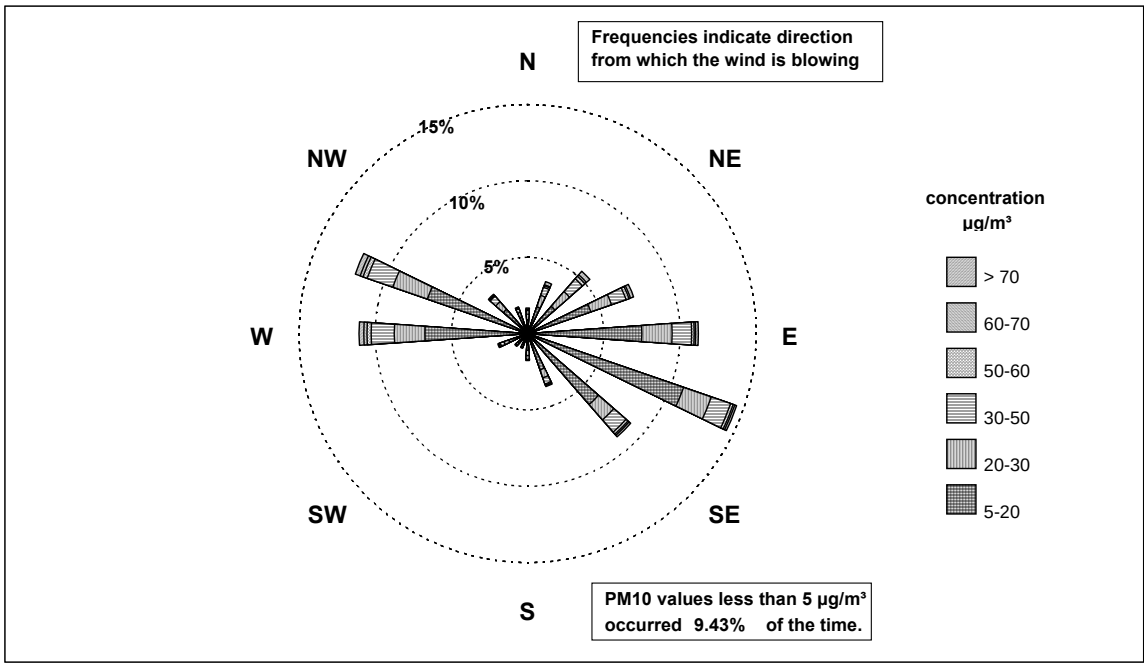


Figure 36 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1992-2002, winter

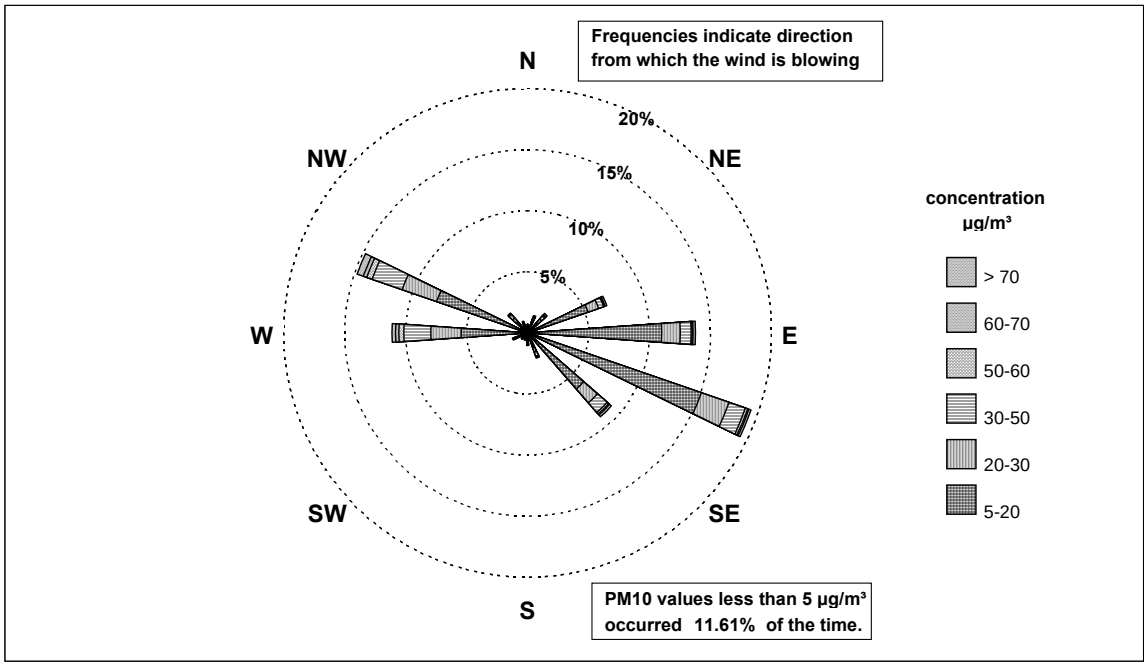


Figure 37 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1992-2002, spring

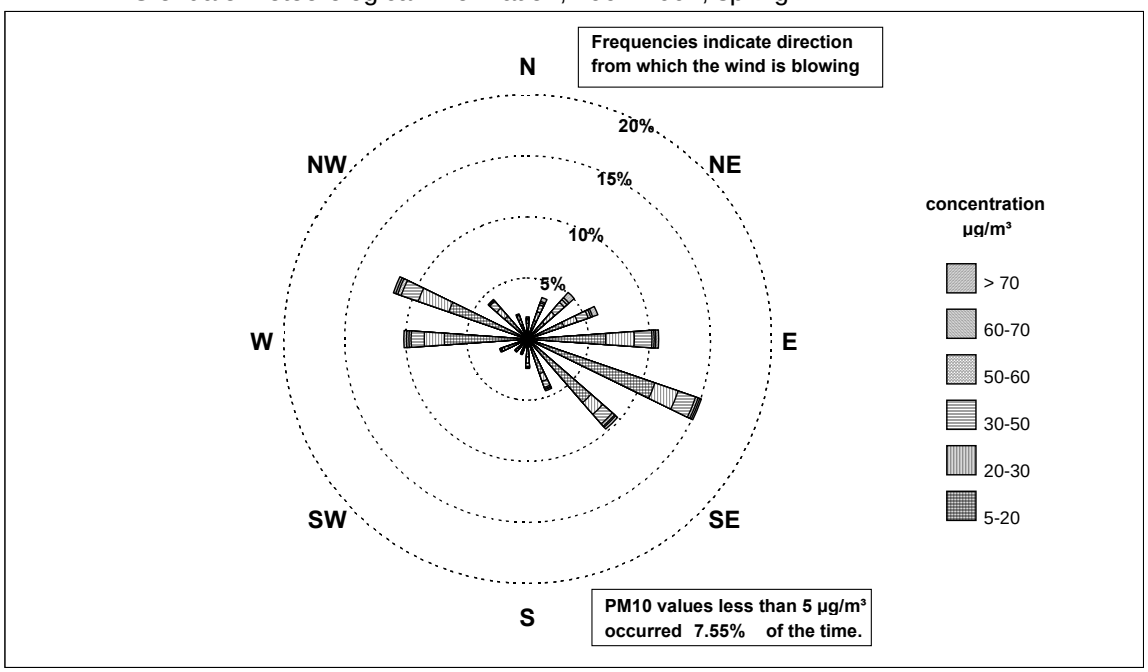


Figure 38 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1992-2002, summer

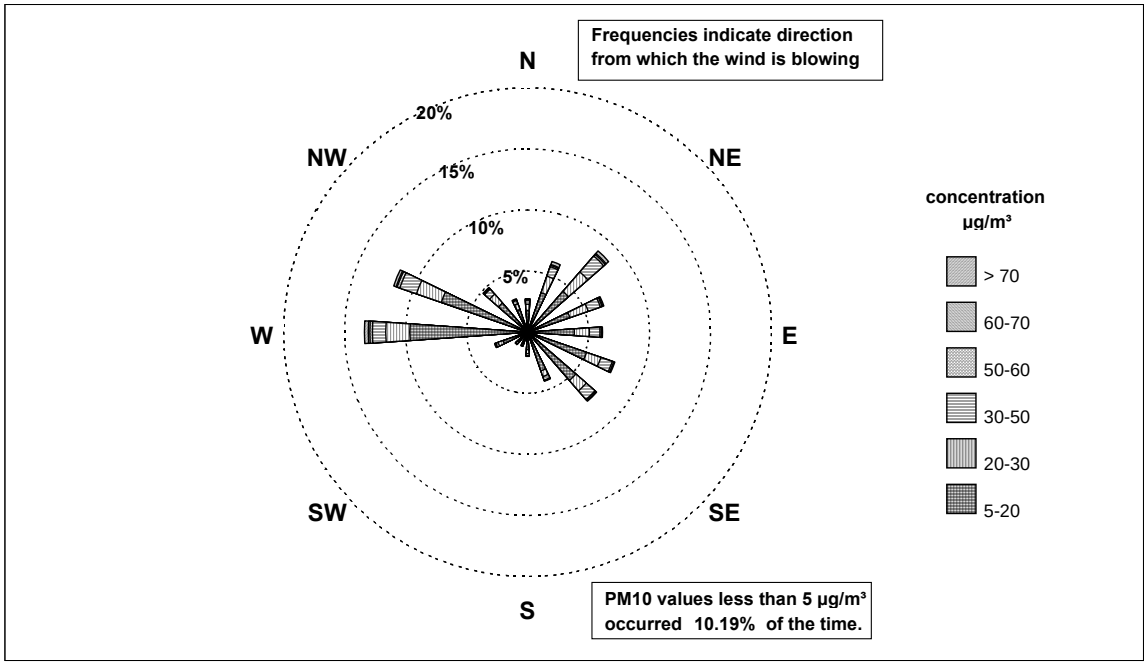


Figure 39 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1992-2002, fall

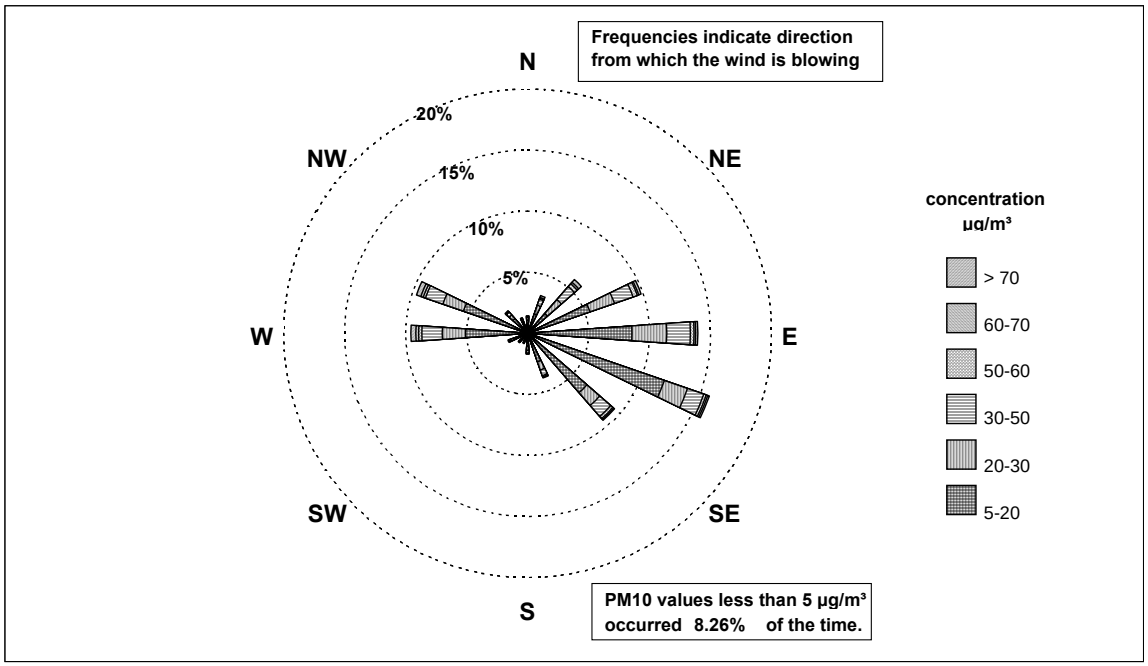


Figure 40 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1992-1995

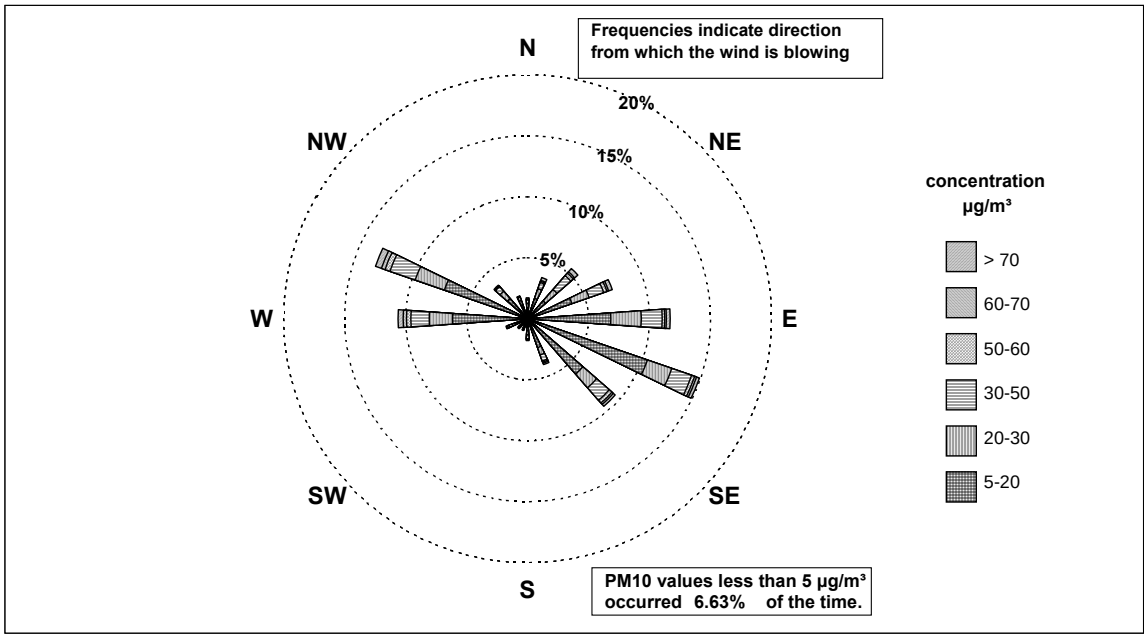


Figure 41 PM_{10} Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 1996-2002

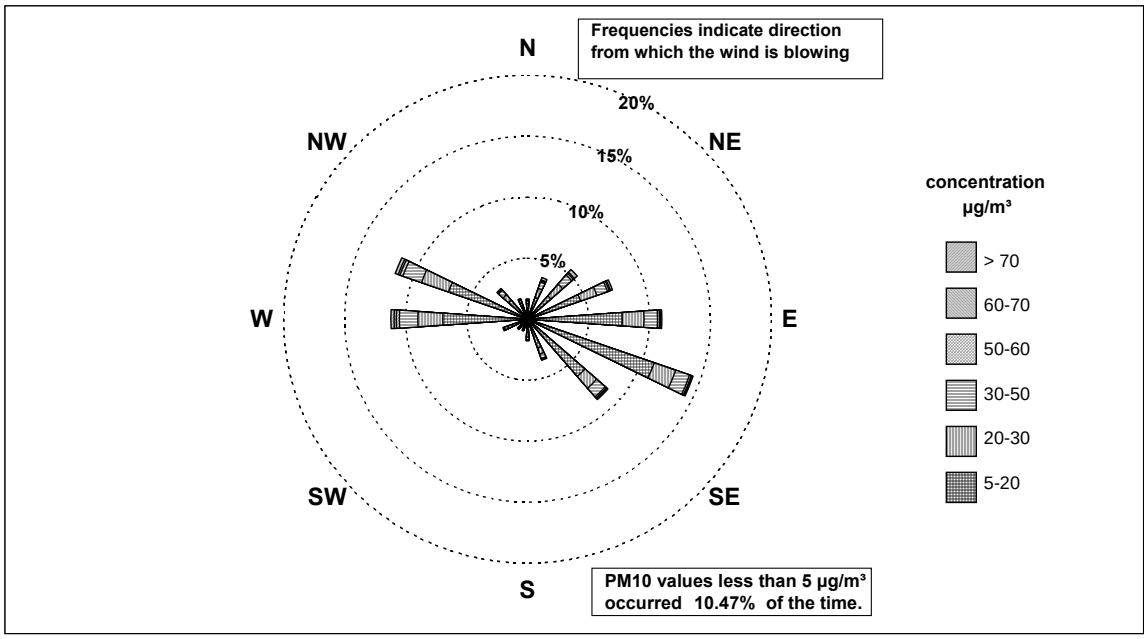


Figure 42 Annual Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Annual Mean, 24-hour Maximum, and 75th and 95th Percentile Values, 1992-2002

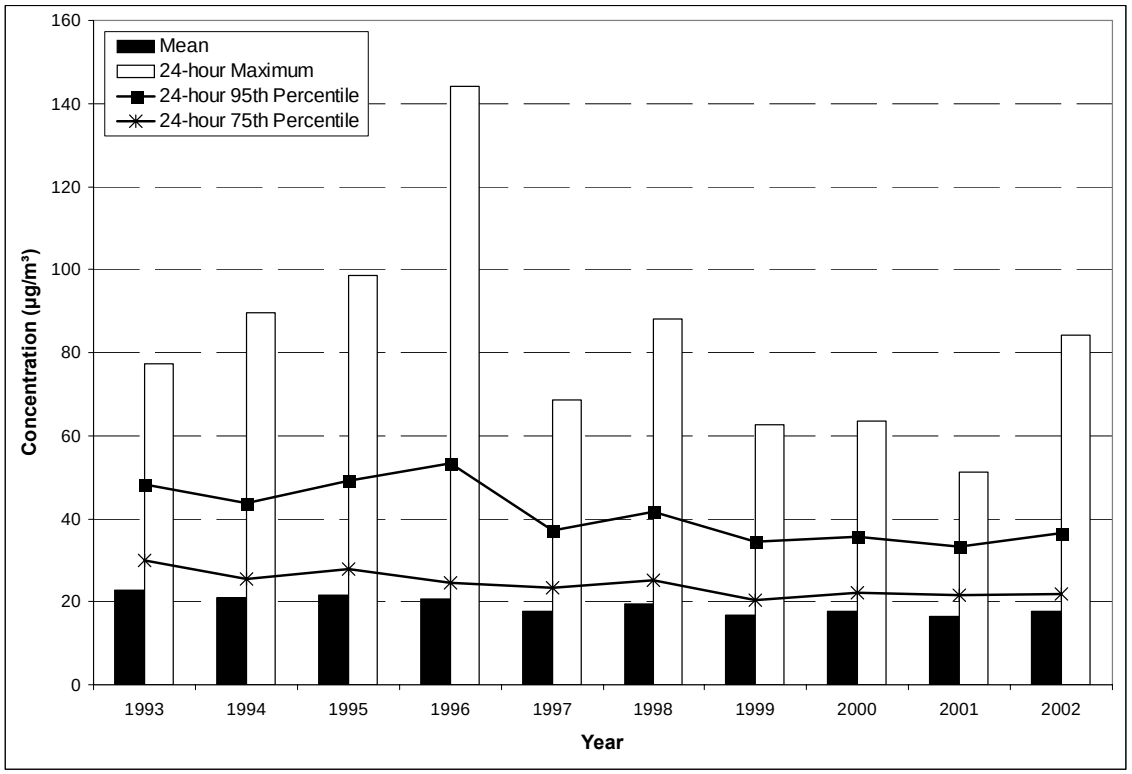


Figure 43 Monthly Variations in Williams Lake Skyline Continuous PM_{10} Measurements – Annual Mean, 24-hour Maximum, and 75th and 95th Percentile Values, 2001-2002

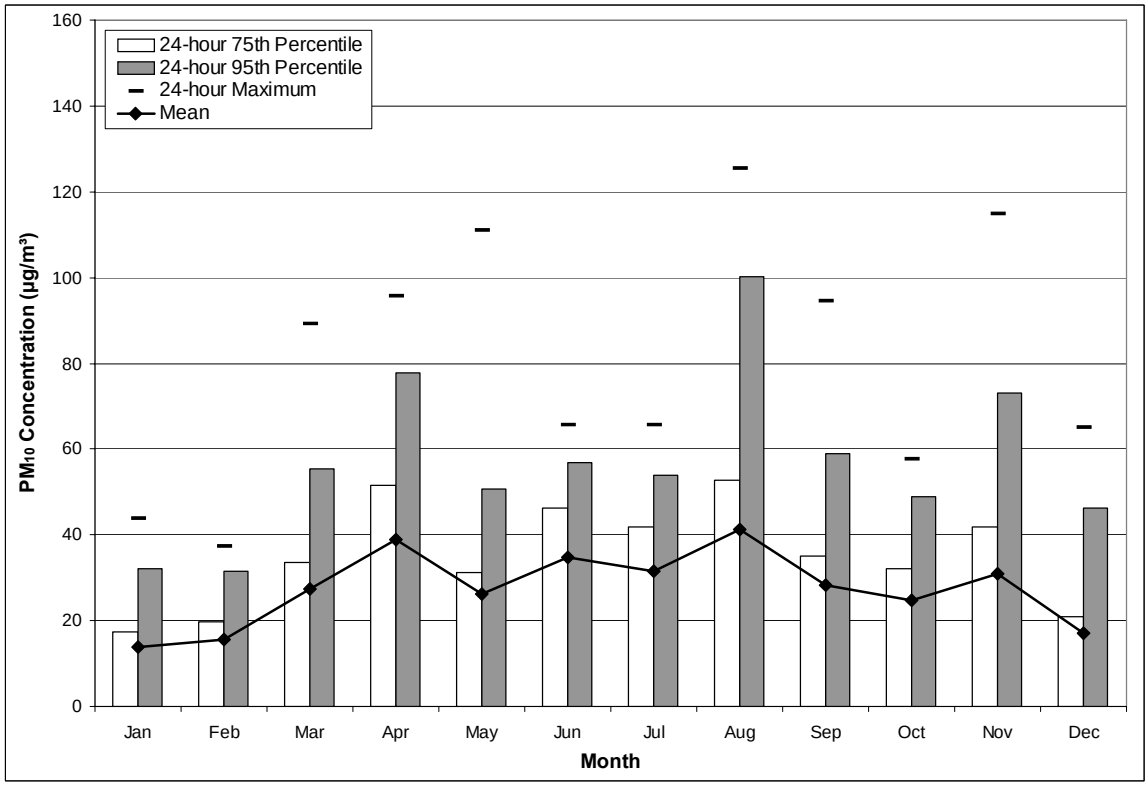


Figure 44 Monthly Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Annual Mean, 24-hour Maximum, and 75th and 95th Percentile Values, 1992-2002

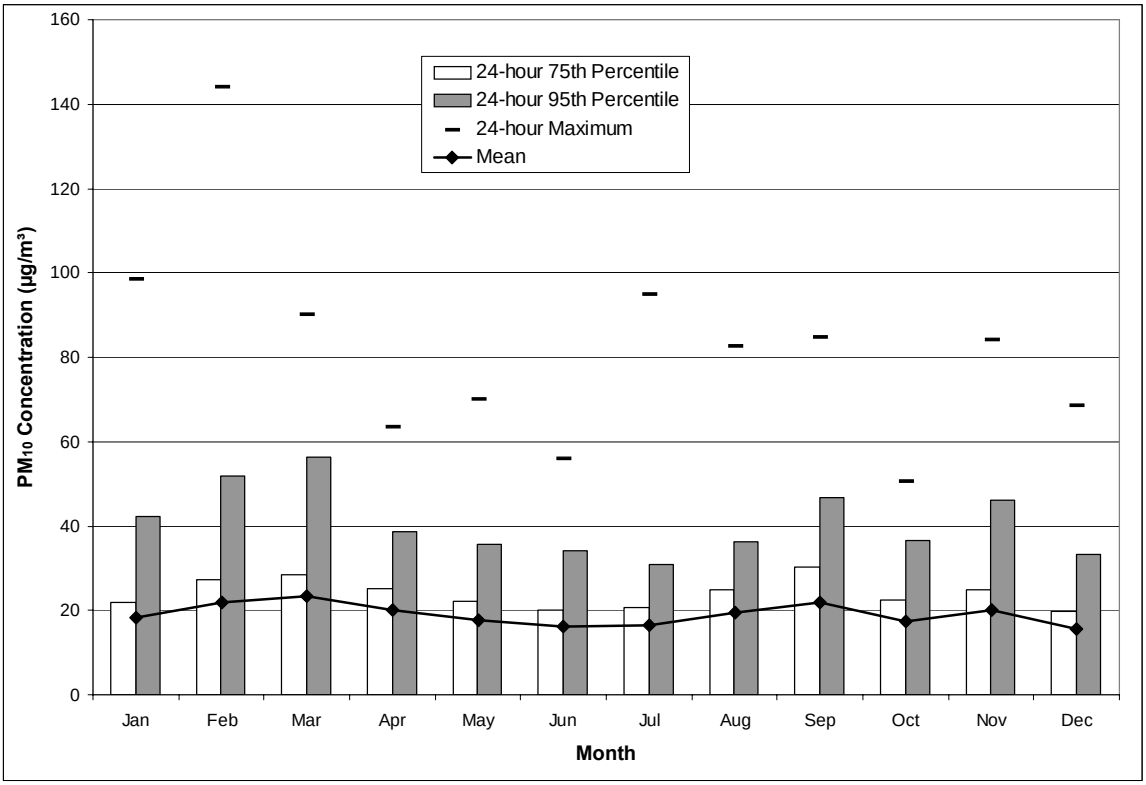


Figure 45 Monthly PM_{10} Exceedances of the 25 µg/m^3 24-Hour Ambient Objective at Williams Lake Columneetza (0550502) – Block Averages 1993-1995, 1996-2002, 1993-2002

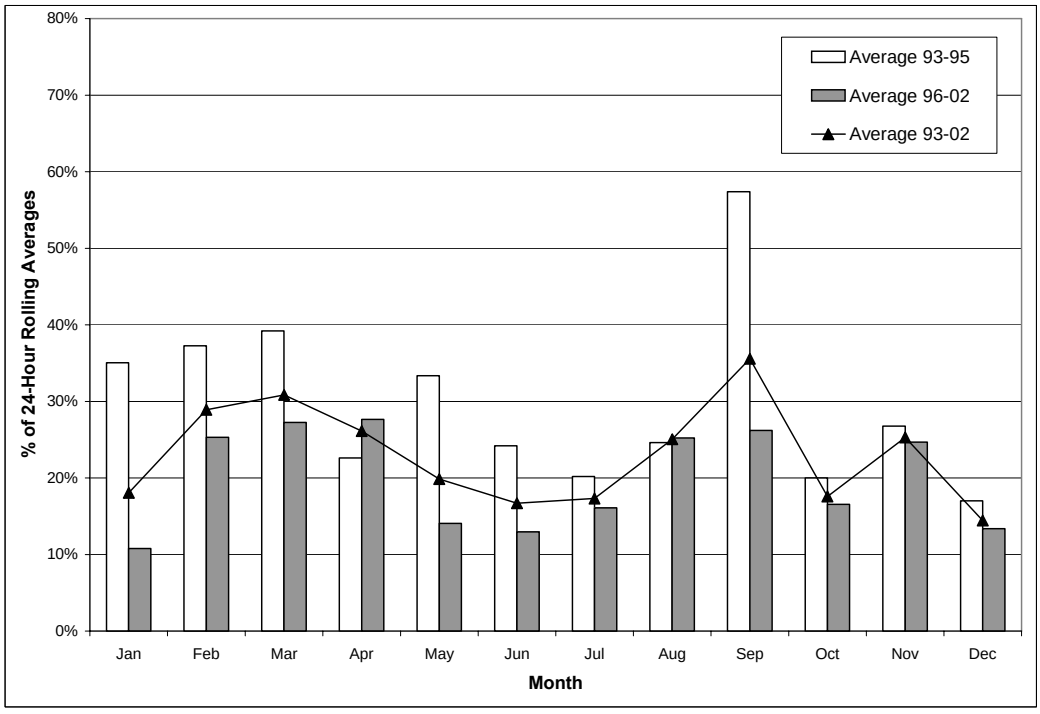


Figure 46 Monthly PM_{10} Exceedances of the 50 µg/m^3 24-Hour Ambient Objective at Williams Lake Columneetza (0550502) – Block Averages 1993-1995, 1996-2002, 1993-2002

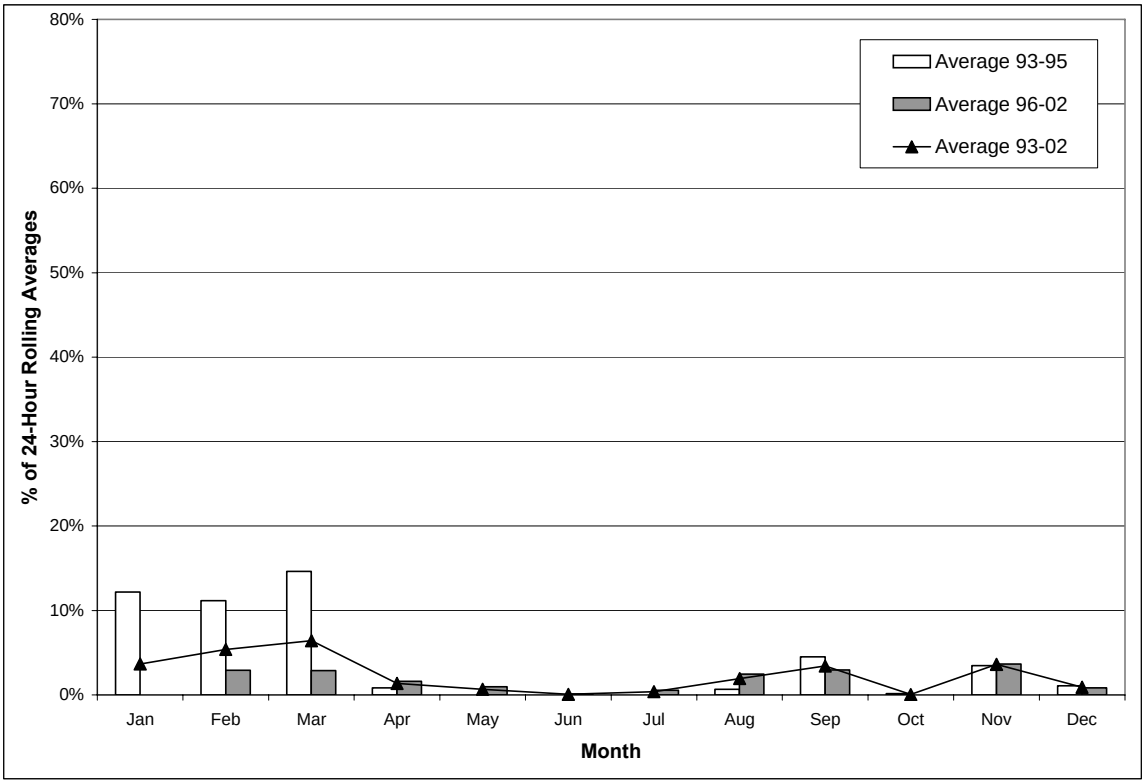


Figure 47 Monthly Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Block Averages of 1993-1995, 1996-2002, 1993-2002

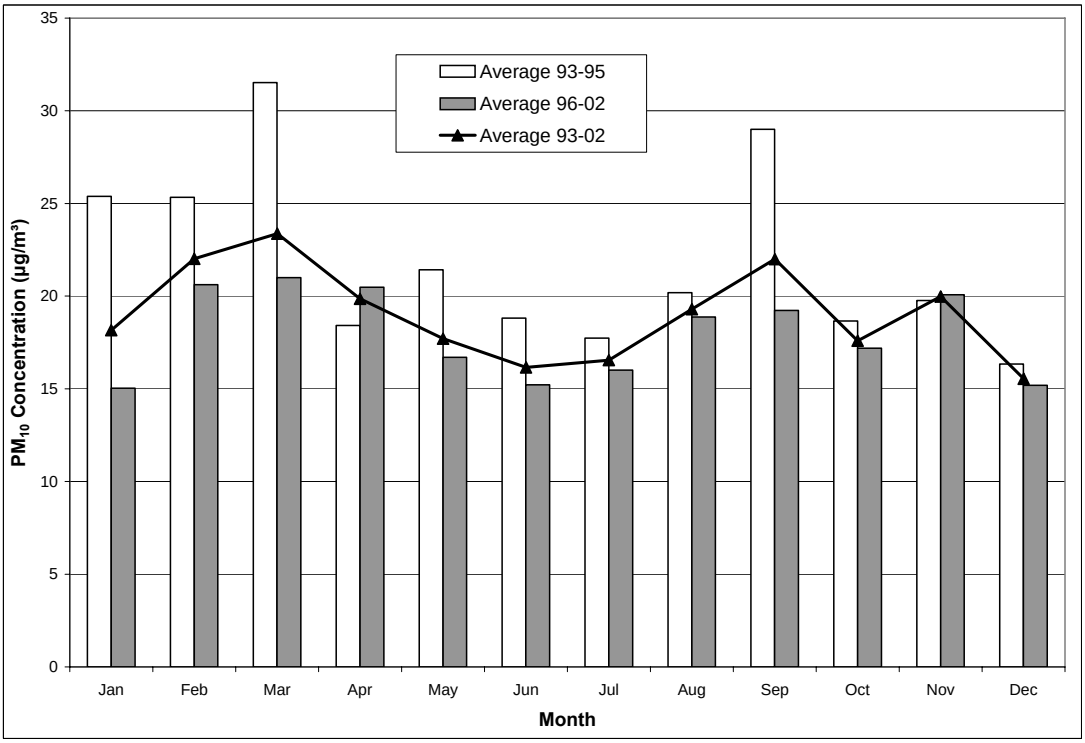


Figure 48 Diurnal Variations in Williams Lake Skyline Continuous PM_{10} Measurements – Hourly Mean and 75th, 95th, and 98th Percentile Values, 2001-2002

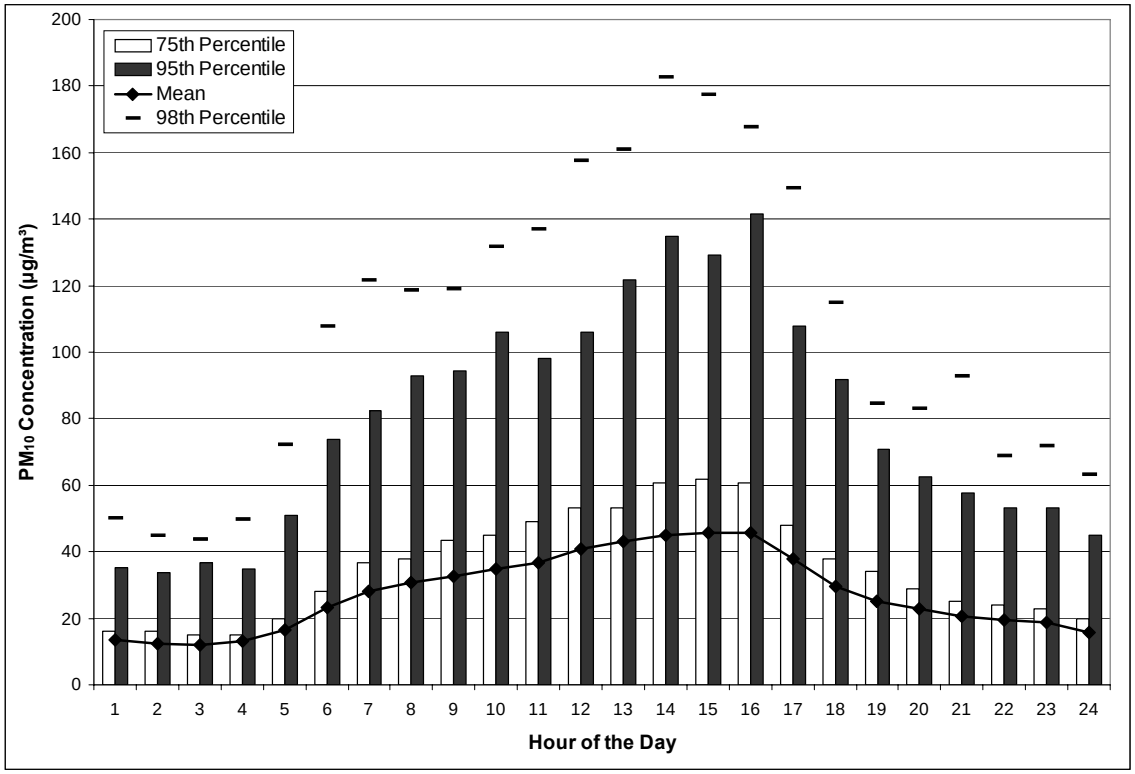


Figure 49 Diurnal Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Hourly Mean and 75th, 95th, and 98th Percentile Values, 1992-2002

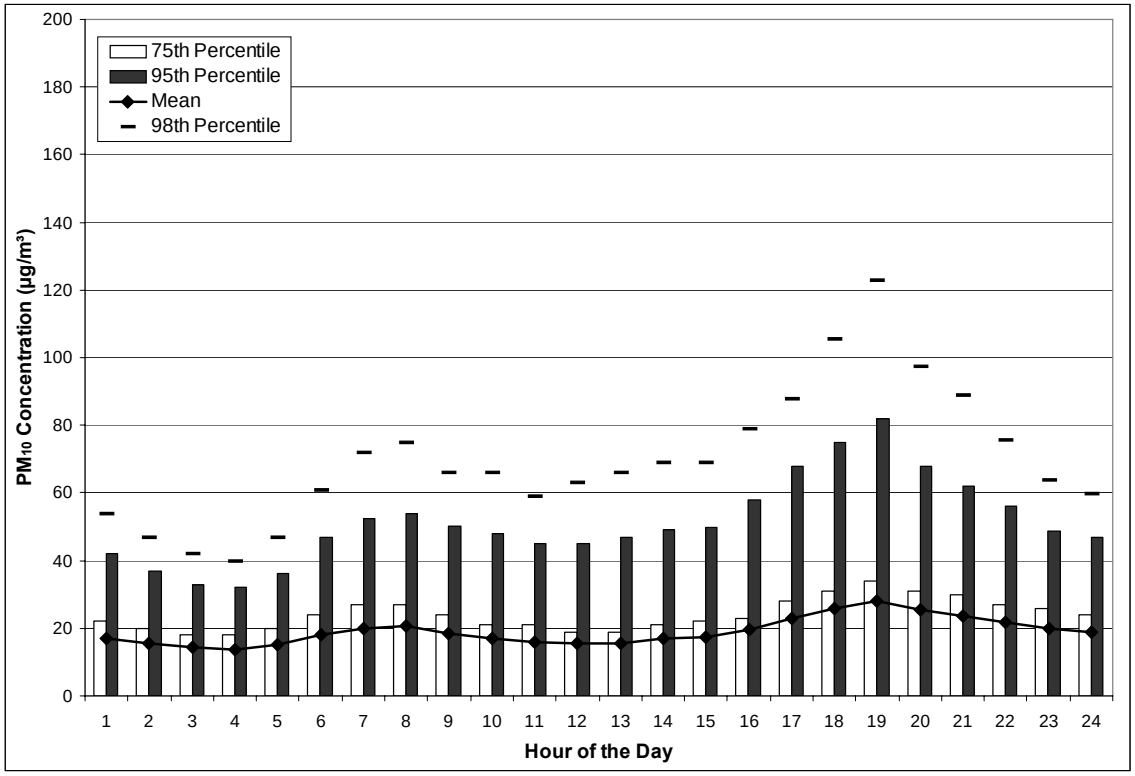


Figure 50 Diurnal Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Block Averages of 1993-1995, 1996-2002, 1993-2002

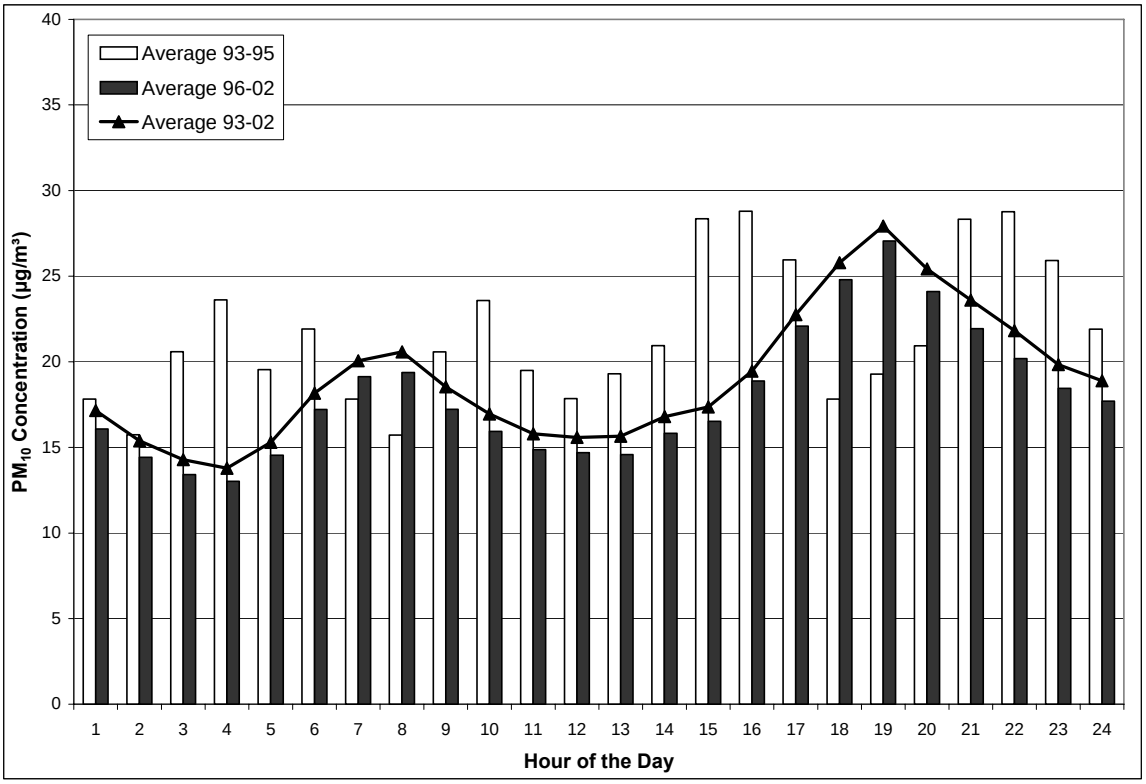


Figure 51 Seasonal Diurnal Variations in Mean Williams Lake Skyline Continuous PM_{10} Measurements, 2001-2002

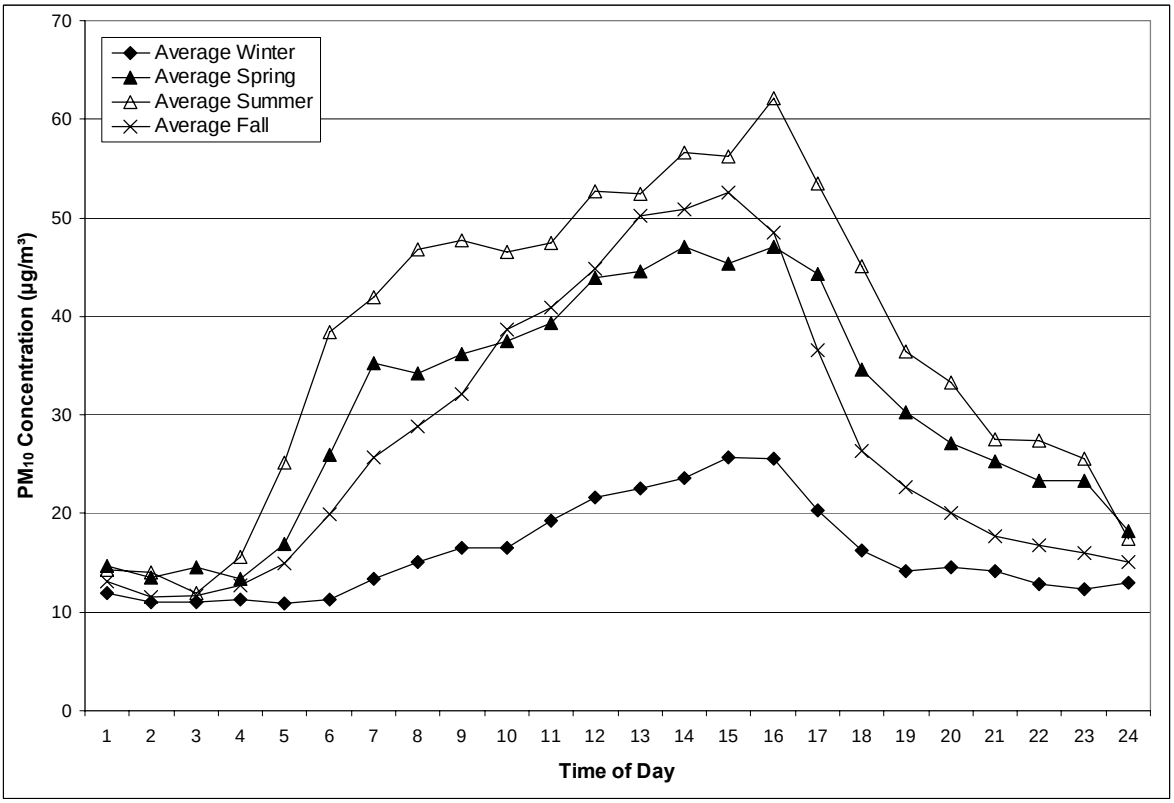


Figure 52 Seasonal Diurnal Variations in Mean Williams Lake Columneetza Continuous PM_{10} Measurements, 1992-2002

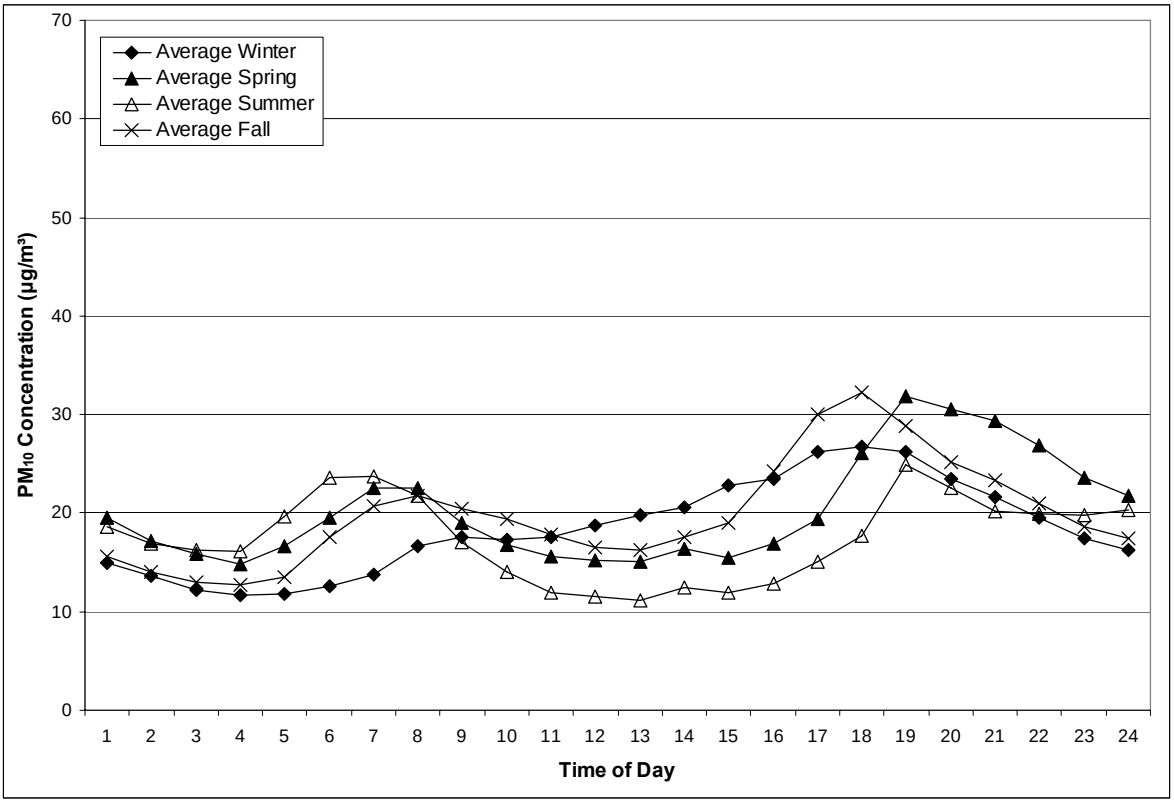


Figure 53 Day of the Week Variations in Williams Lake Skyline Continuous PM_{10} Measurements – Mean and 75th, 95th, and 98th Percentile Values, 2001-2002

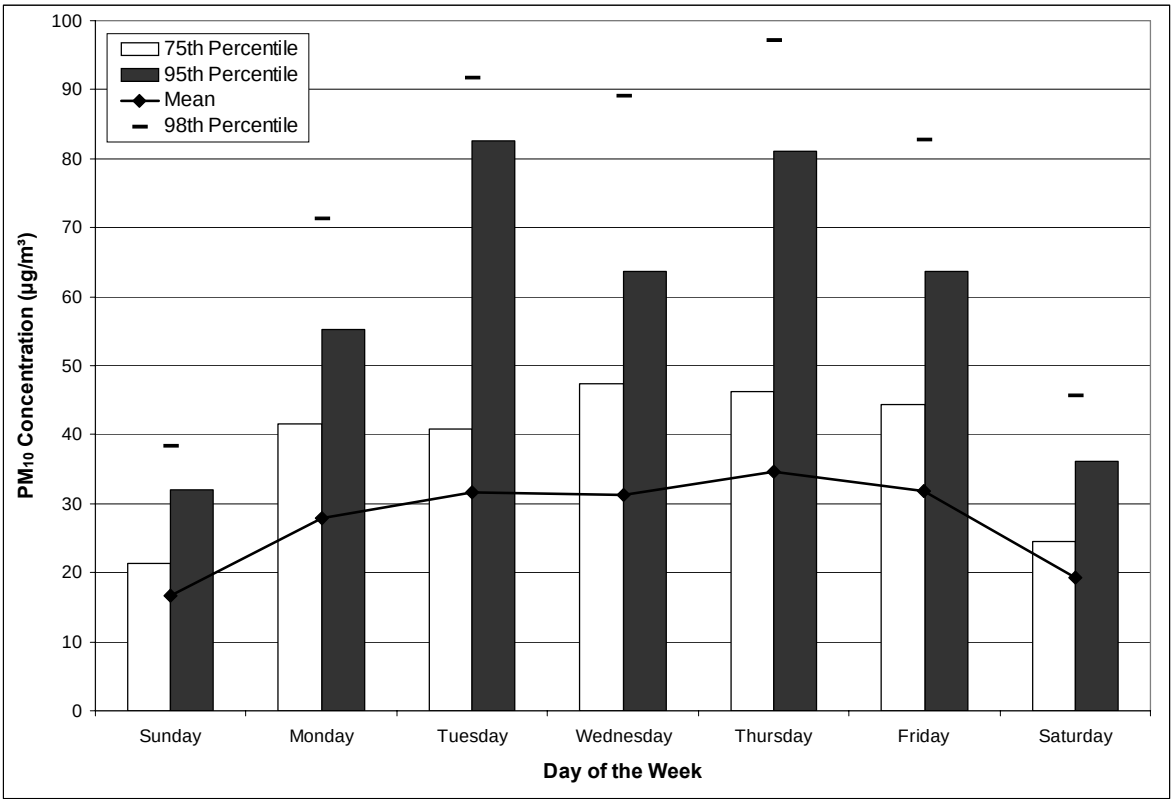


Figure 54 Day of the Week Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Mean and 75th, 95th, and 98th Percentile Values, 1992-2002

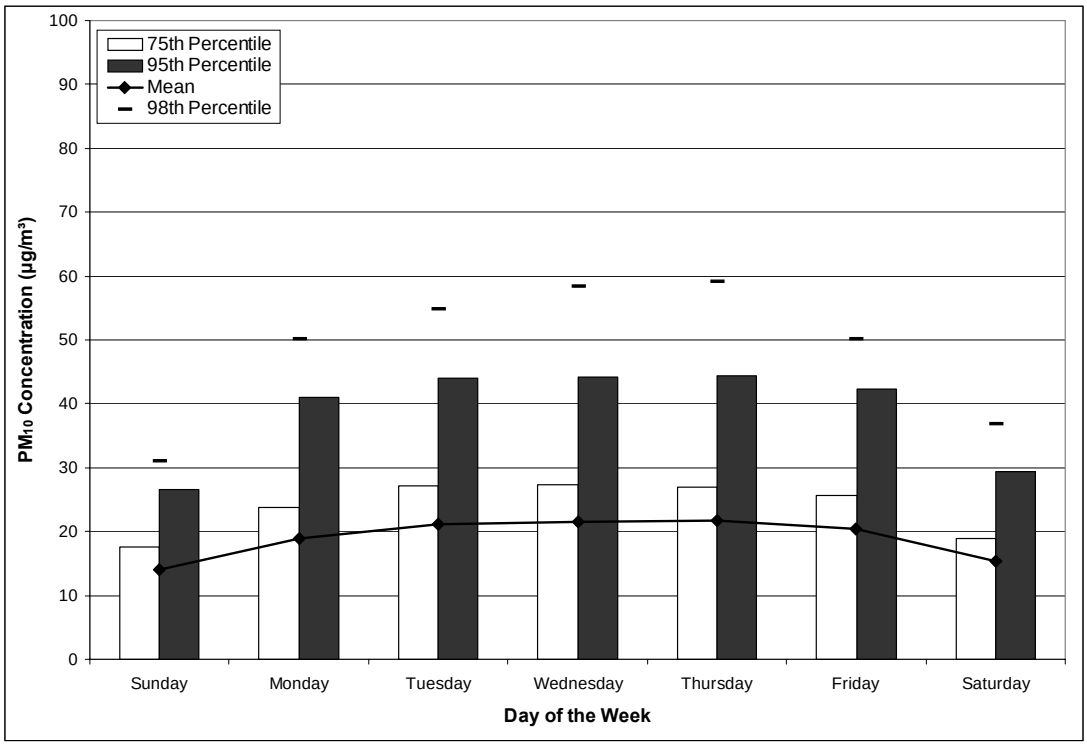


Figure 55 Day of the Week Variations in Williams Lake Columneetza Continuous PM_{10} Measurements – Block Averages of 1993-1995, 1996-2002, 1993-2002

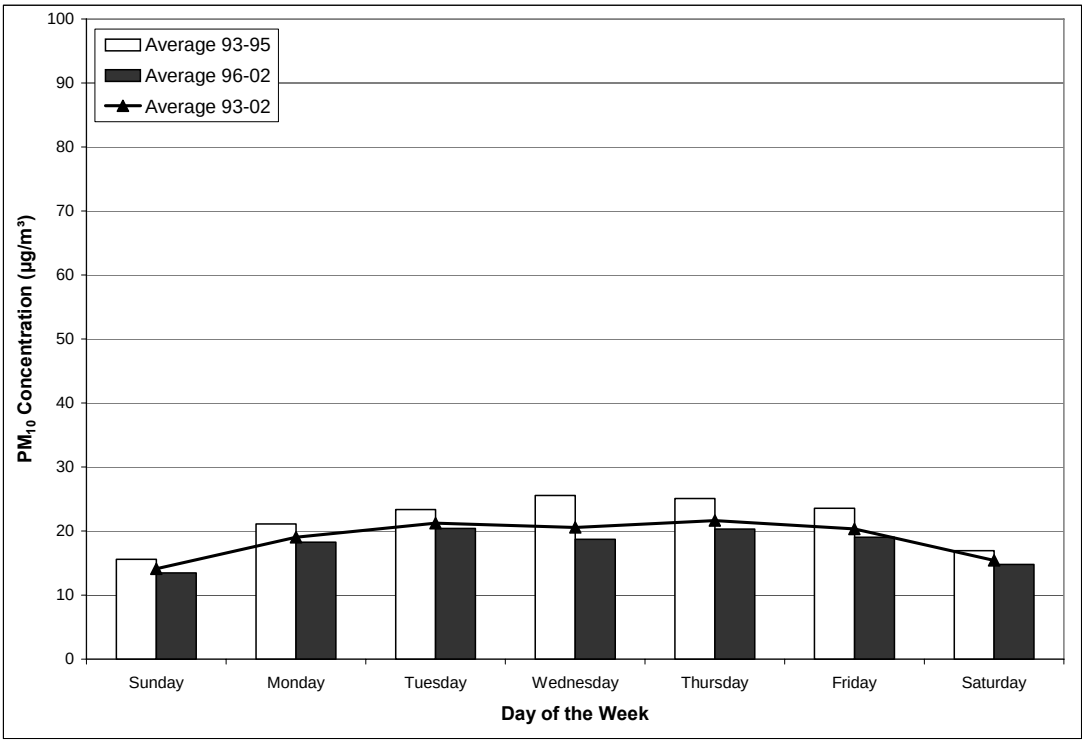


Figure 56 Seasonal Average Non-Continuous Concentrations at the Columneetza Site, 1994 – 2000. Comparisons Made Between Paired Partisol $PM_{2.5}$ and TEOM PM_{10} Values.

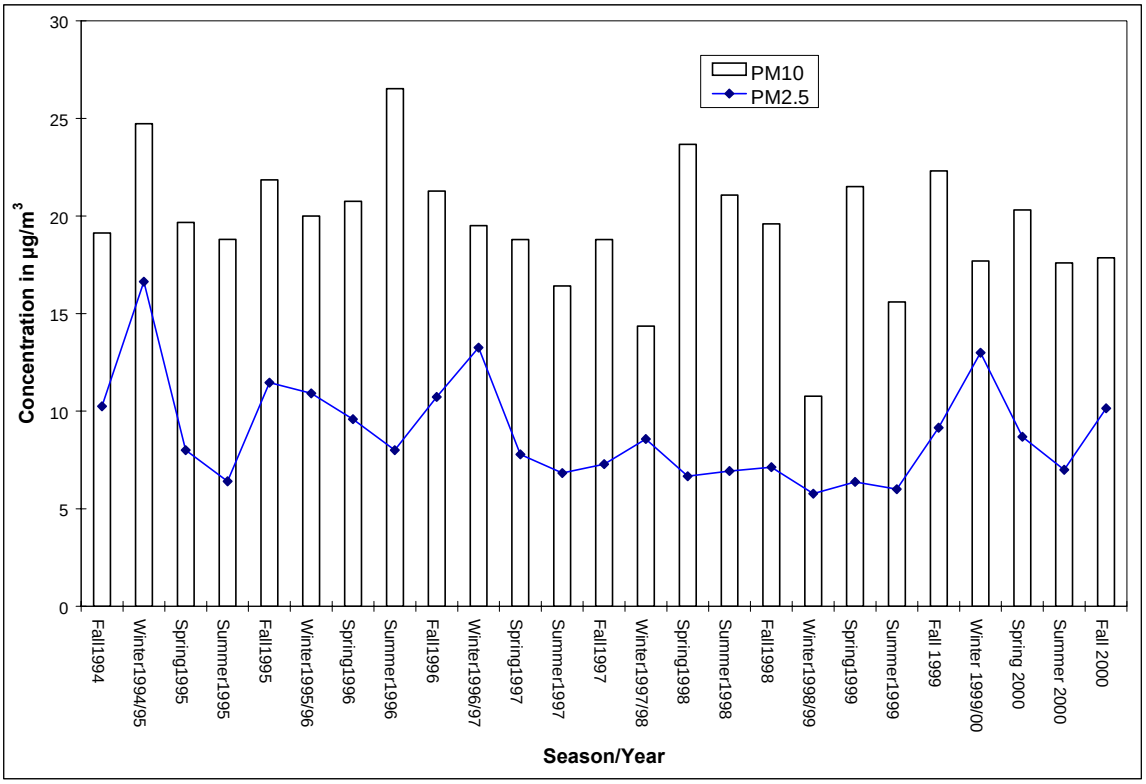


Figure 57 Percentage of Non-Continuous PM_{10} that is $PM_{2.5}$ on a Seasonal Basis at Columneetza, 1994 – 2000. Calculations Based on Paired Partisol $PM_{2.5}$ and TEOM PM_{10} Values.

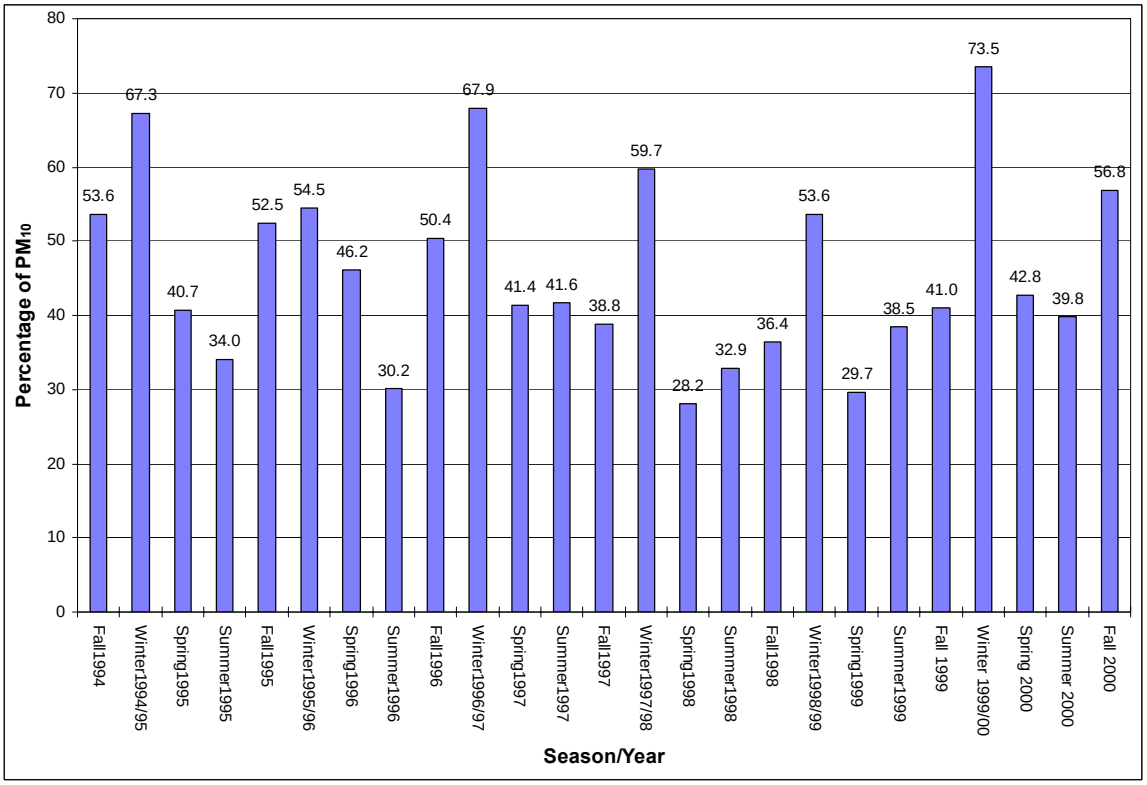


Figure 58 Seasonal Average Non-Continuous Concentrations at the Firehall Site, 2001 – 2002. Comparisons Made Between Paired Partisol $PM_{2.5}$ and Partisol PM_{10} Values.

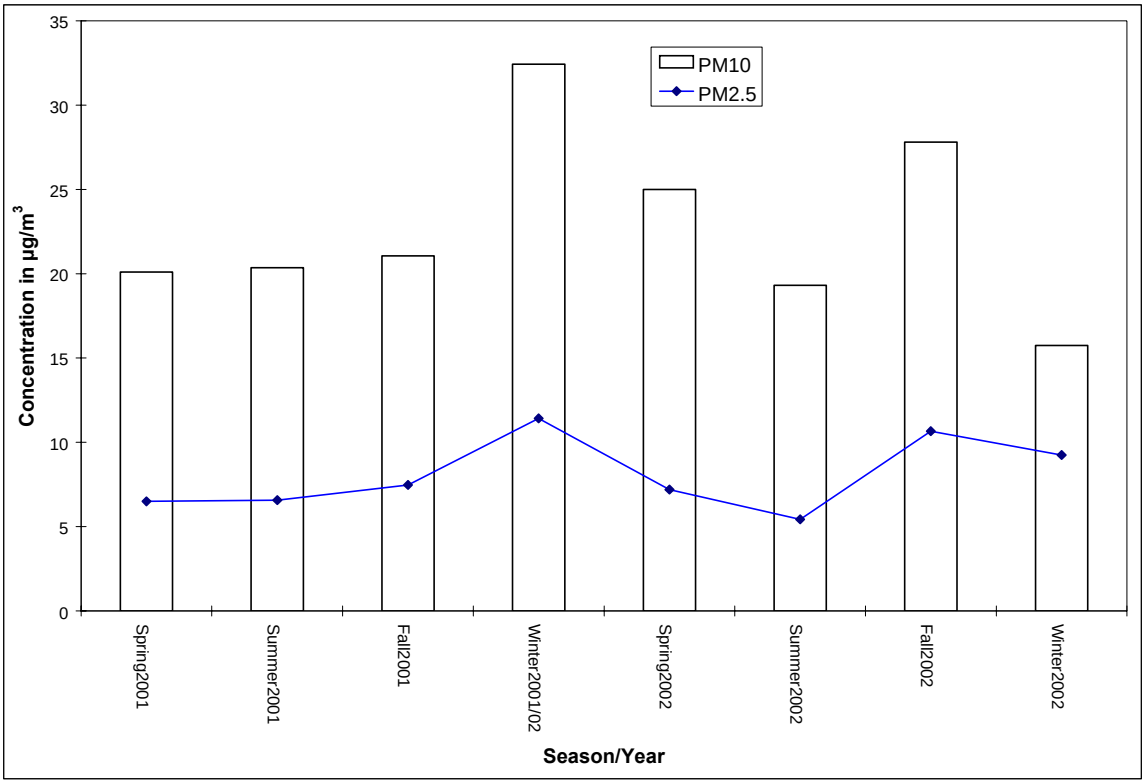


Figure 59 Percentage of Non-Continuous PM_{10} that is $PM_{2.5}$ on a Seasonal Basis at the Firehall Site, 2001 – 2002. Calculations Based on Paired Partisol $PM_{2.5}$ and Partisol PM_{10} Values.

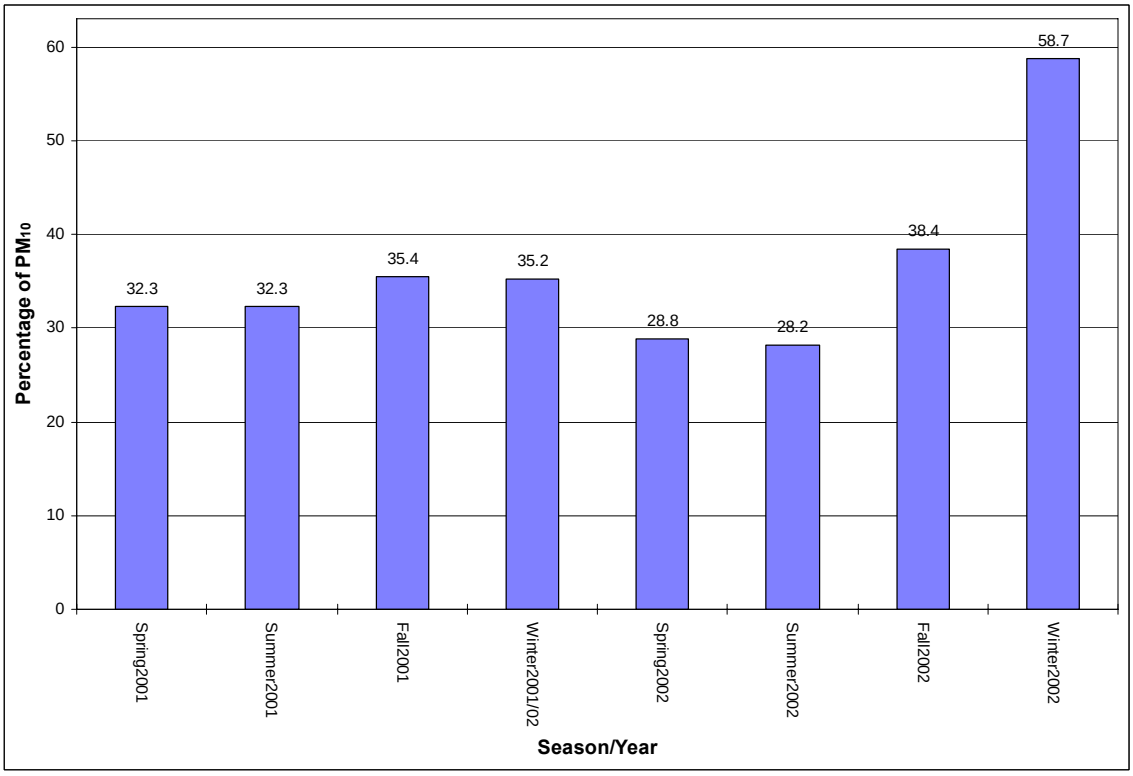


Figure 60 $PM_{2.5}$ Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 2001-2002

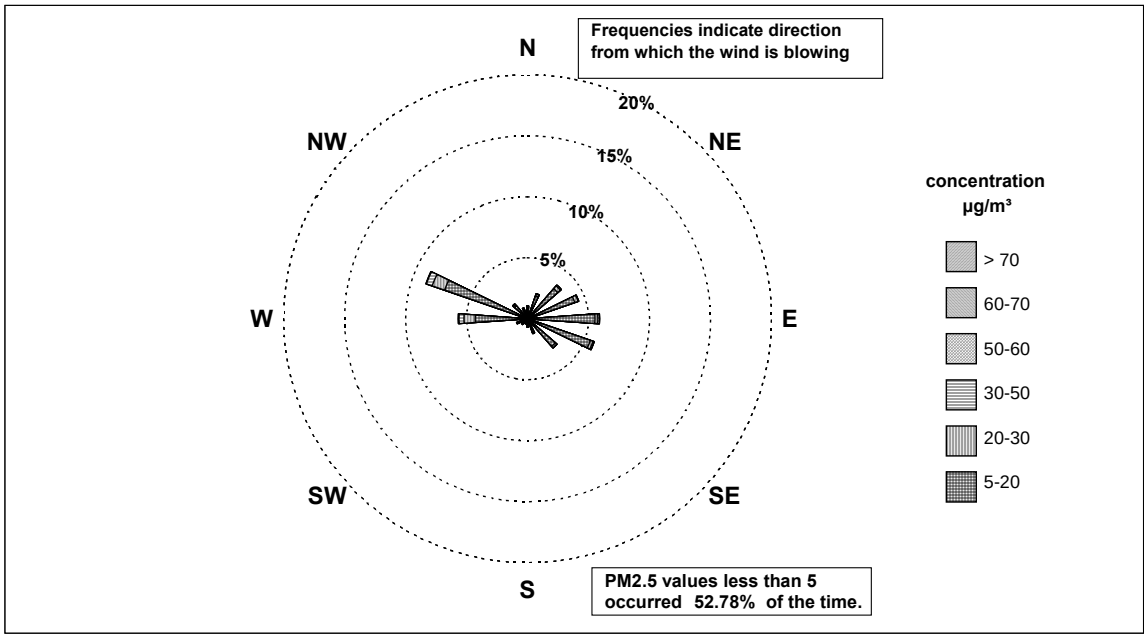


Figure 61 $PM_{2.5}$ Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 2001-2002, spring

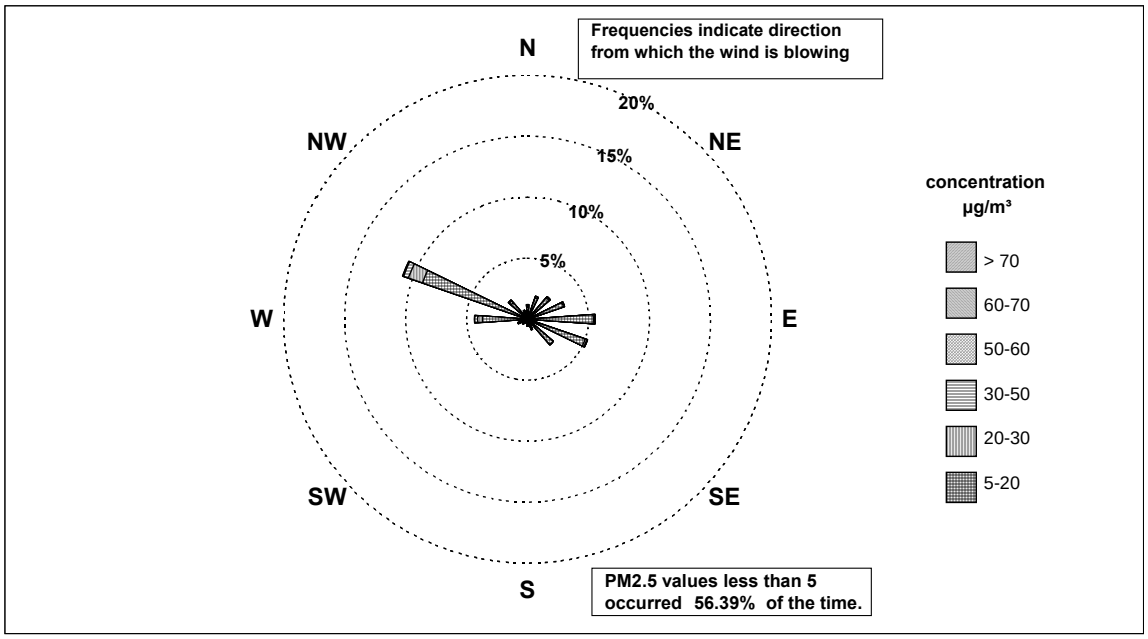


Figure 62 $PM_{2.5}$ Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 2001-2002, summer

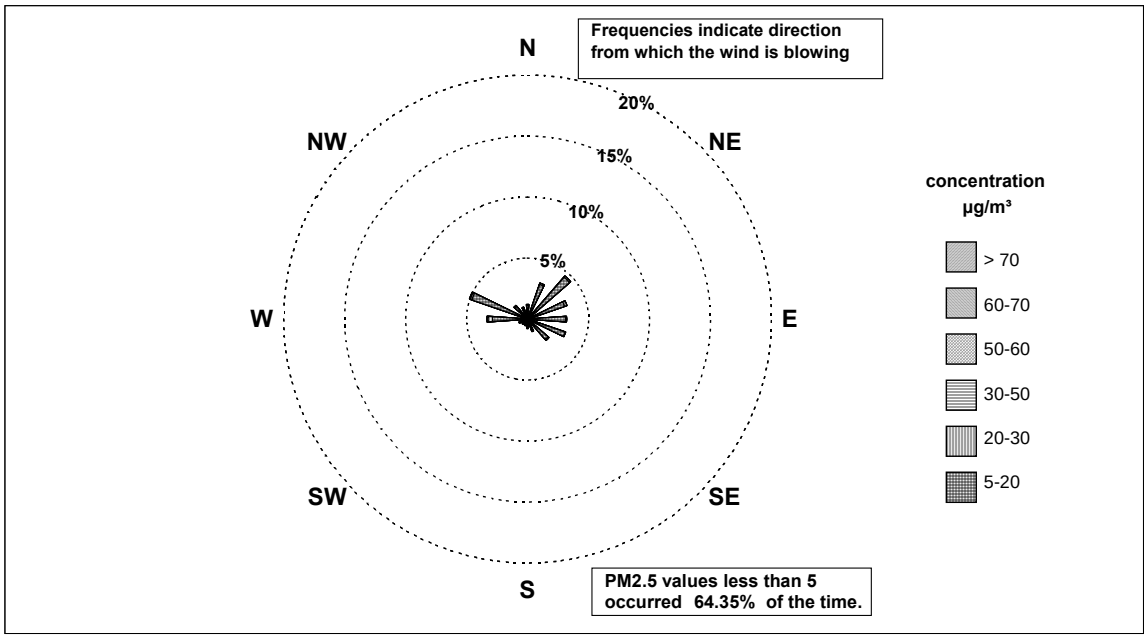


Figure 63 $PM_{2.5}$ Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 2001-2002, fall

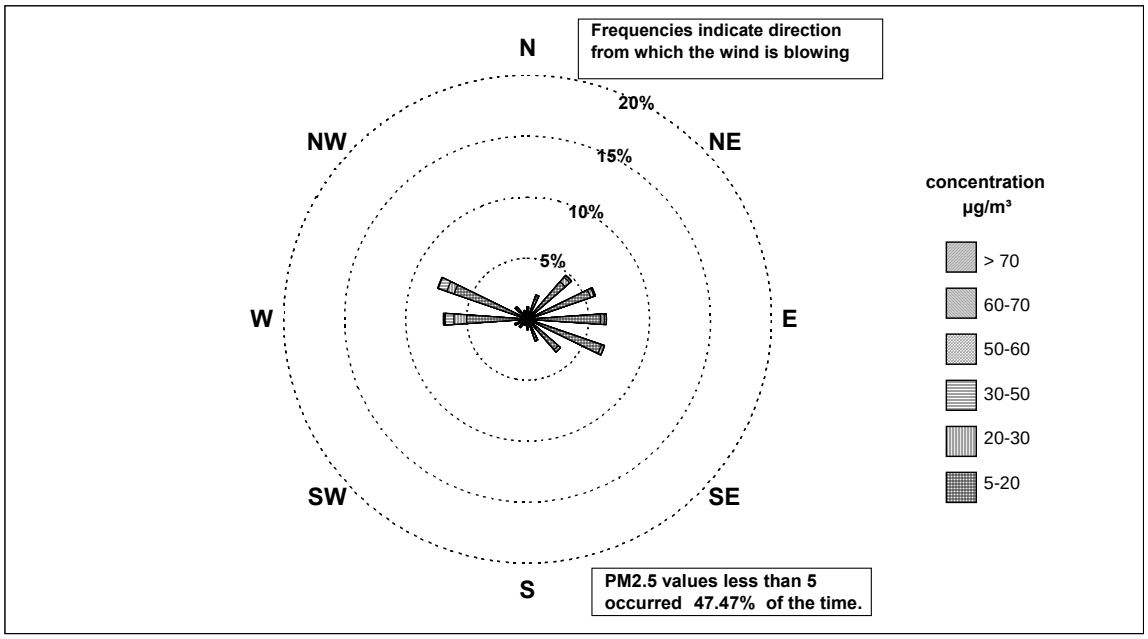


Figure 64 $PM_{2.5}$ Pollution Rose for the Columneetza (0550502) Ambient Monitoring Station using Glendale Meteorological Information, 2001-2002, winter

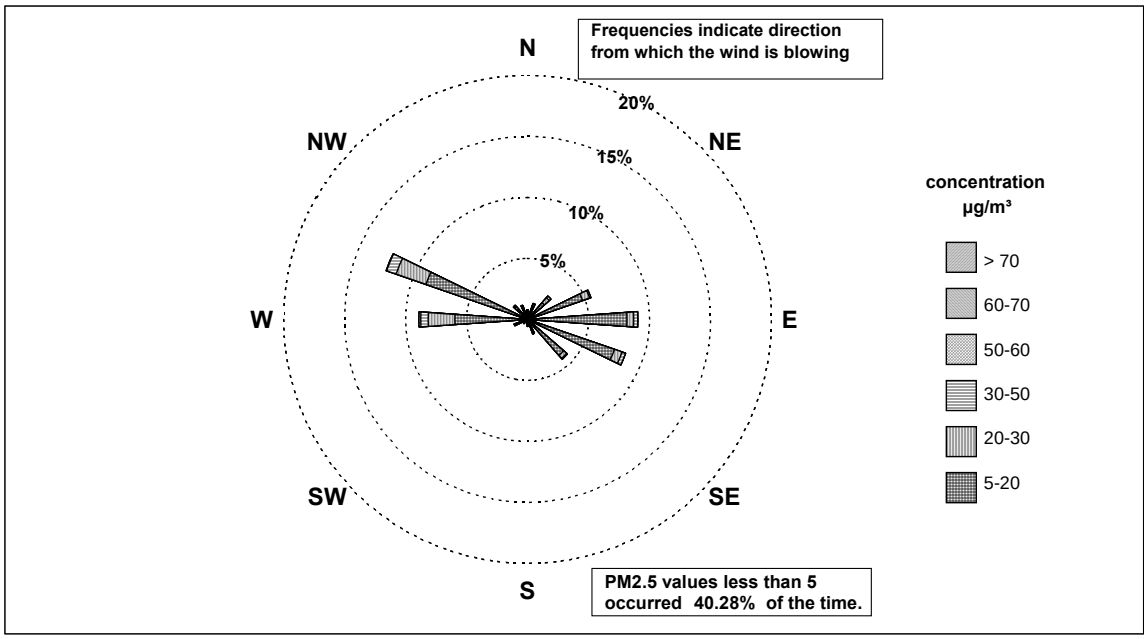


Figure 65 $PM_{2.5}$ Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002

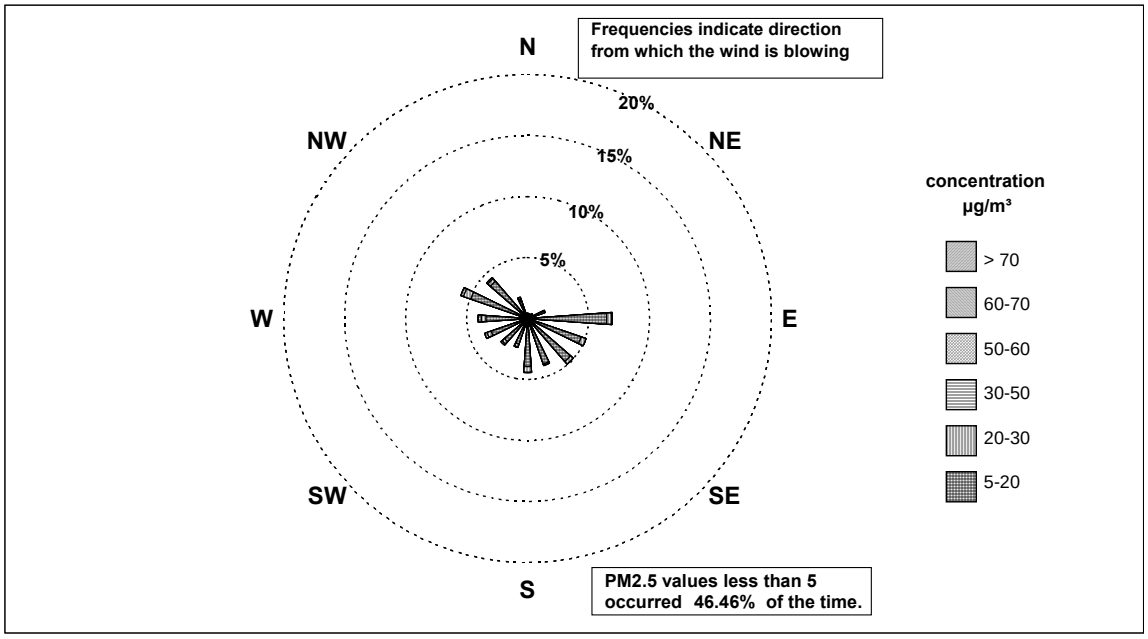


Figure 66 $PM_{2.5}$ Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002, summer

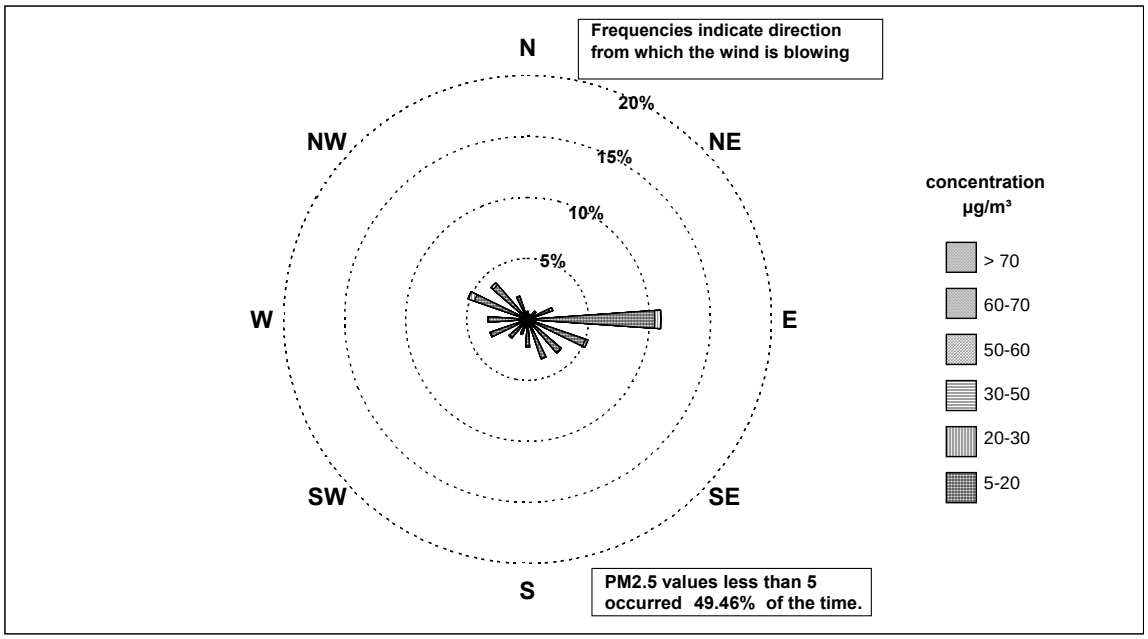


Figure 67 $PM_{2.5}$ Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002, fall

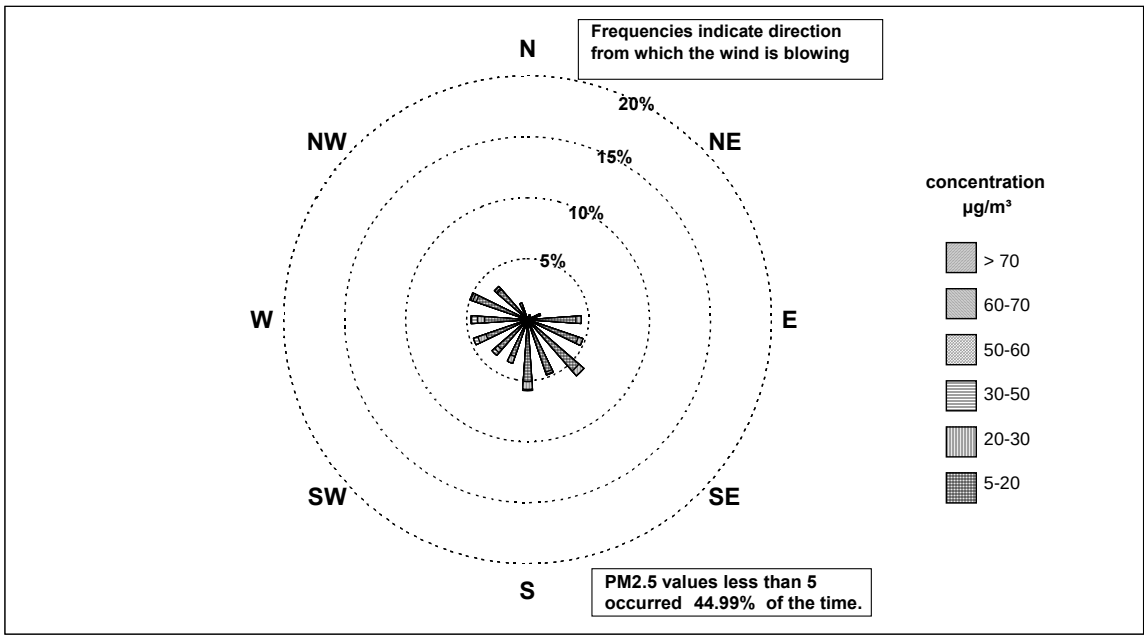


Figure 68 $PM_{2.5}$ Pollution Rose for the Skyline (0605020) Ambient Monitoring Station using Canadian Tire (E248623) Meteorological Information, 2002, winter (December)

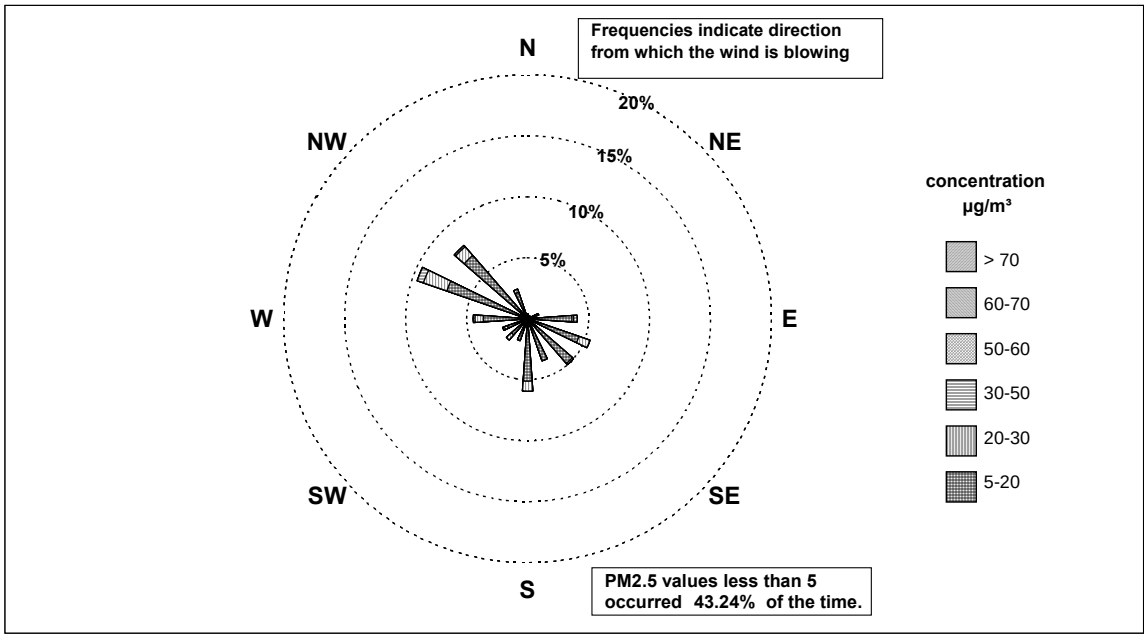


Figure 69 Monthly Variations in Williams Lake Skyline Continuous $PM_{2.5}$ Measurements Annual Mean, 24-hour Maximum, and 75th, 95th, and 99th Percentile Values, 2001-2002

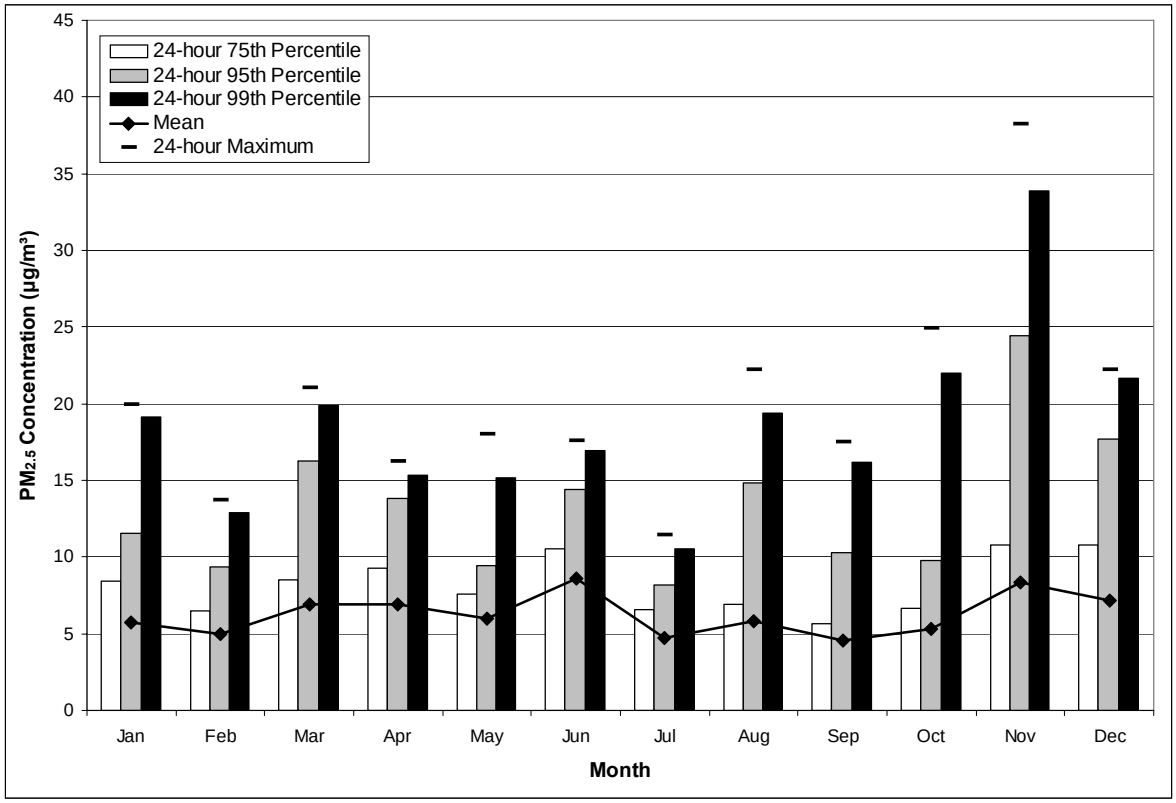


Figure 70 Monthly Variations in Williams Lake Columneetza Continuous $PM_{2.5}$ Measurements – Annual Mean, 24-hour Maximum, and 75th, 95th, and 99th Percentile Values, 2001-2002

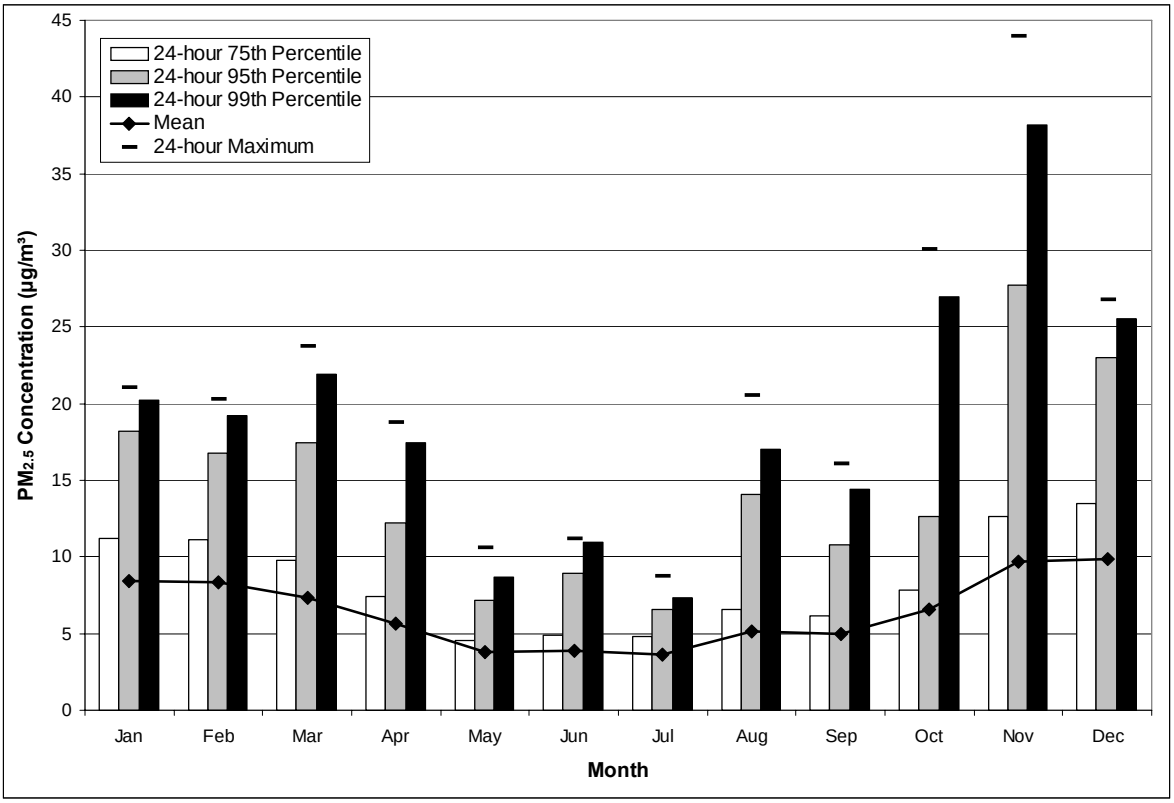


Figure 71 Diurnal Variations in Williams Lake Skyline Continuous $PM_{2.5}$ Measurements – Hourly Mean and 75th, 95th, and 99th Percentile Values, 2001-2002

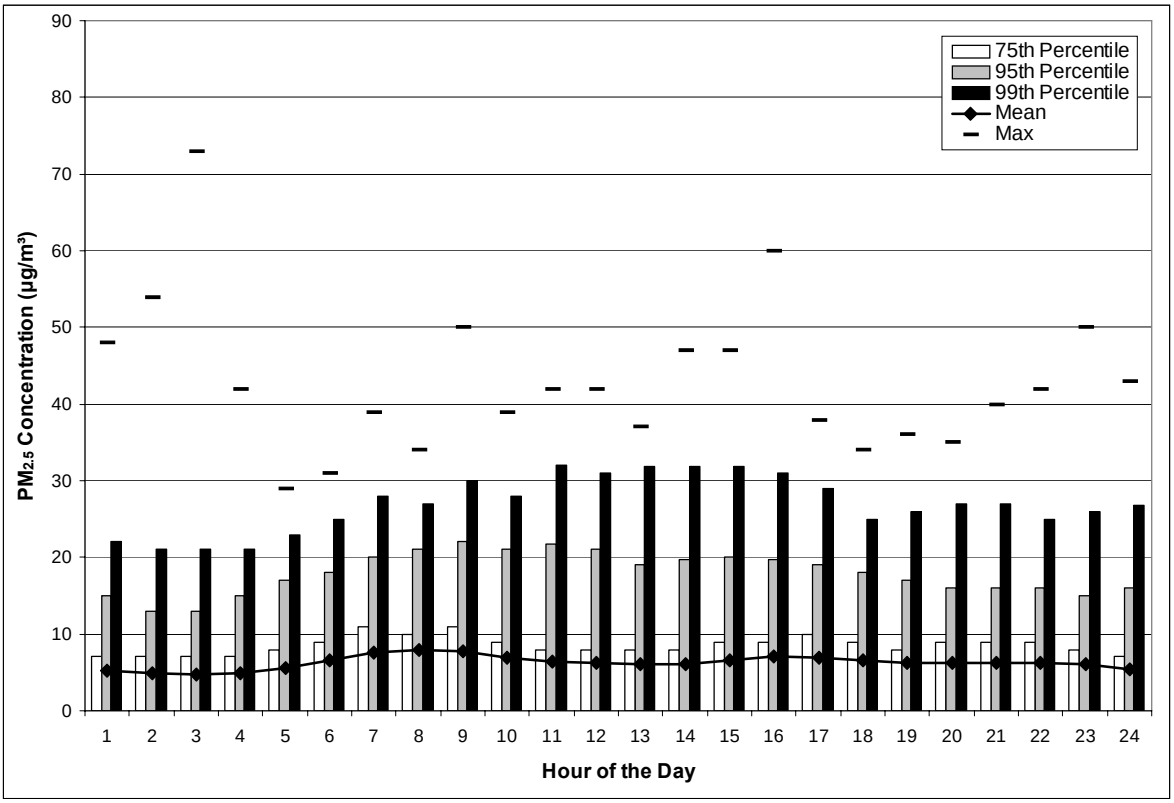


Figure 72 Diurnal Variations in Williams Lake Columneetza Continuous $PM_{2.5}$ Measurements – Hourly Mean and 75th, 95th, and 99th Percentile Values, 2001-2002

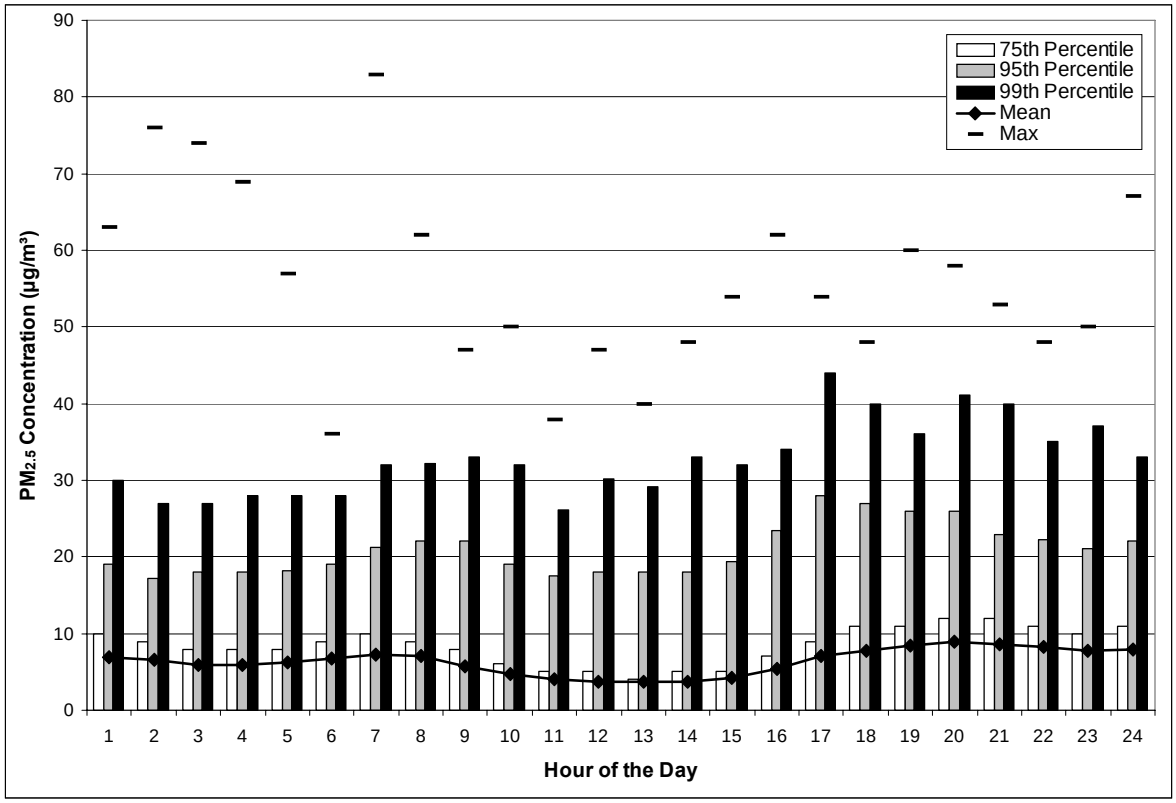


Figure 73 Seasonal Diurnal Variations in Mean Williams Lake Skyline Continuous $PM_{2.5}$ Measurements, 2001-2002

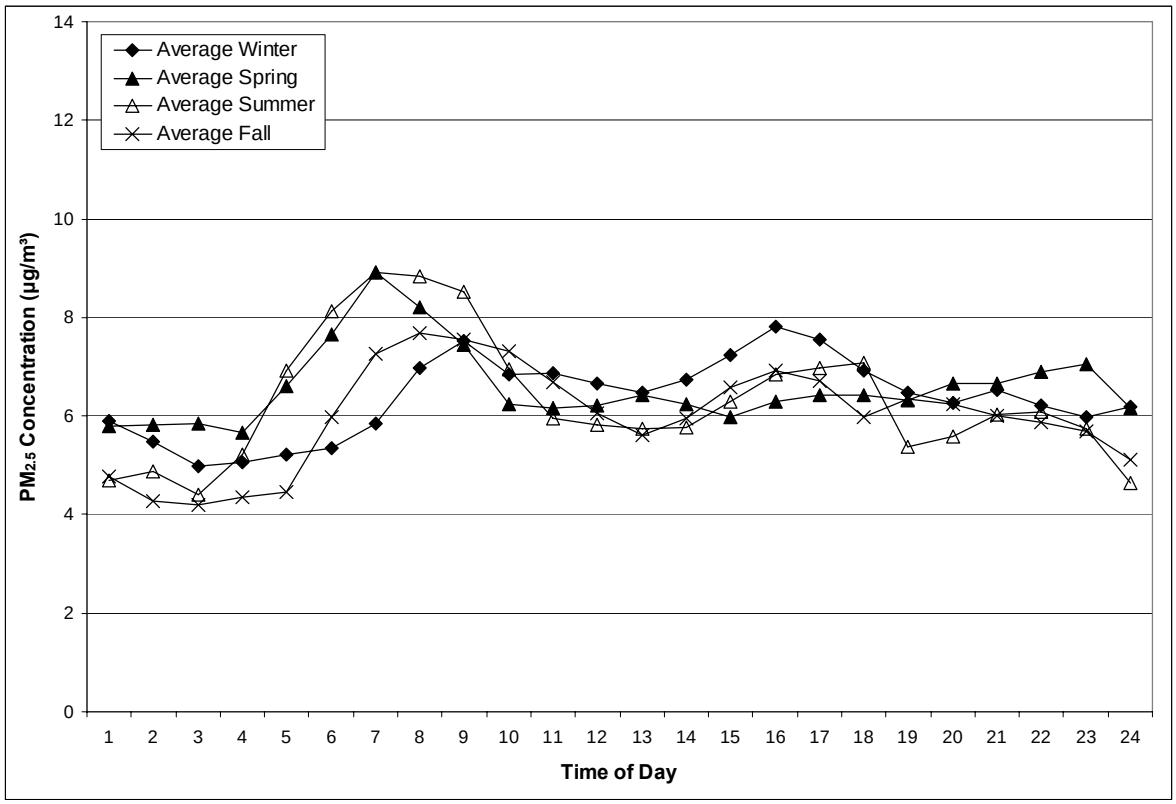


Figure 74 Seasonal Diurnal Variations in Mean Williams Lake Columneetza Continuous $PM_{2.5}$ Measurements, 2001-2002

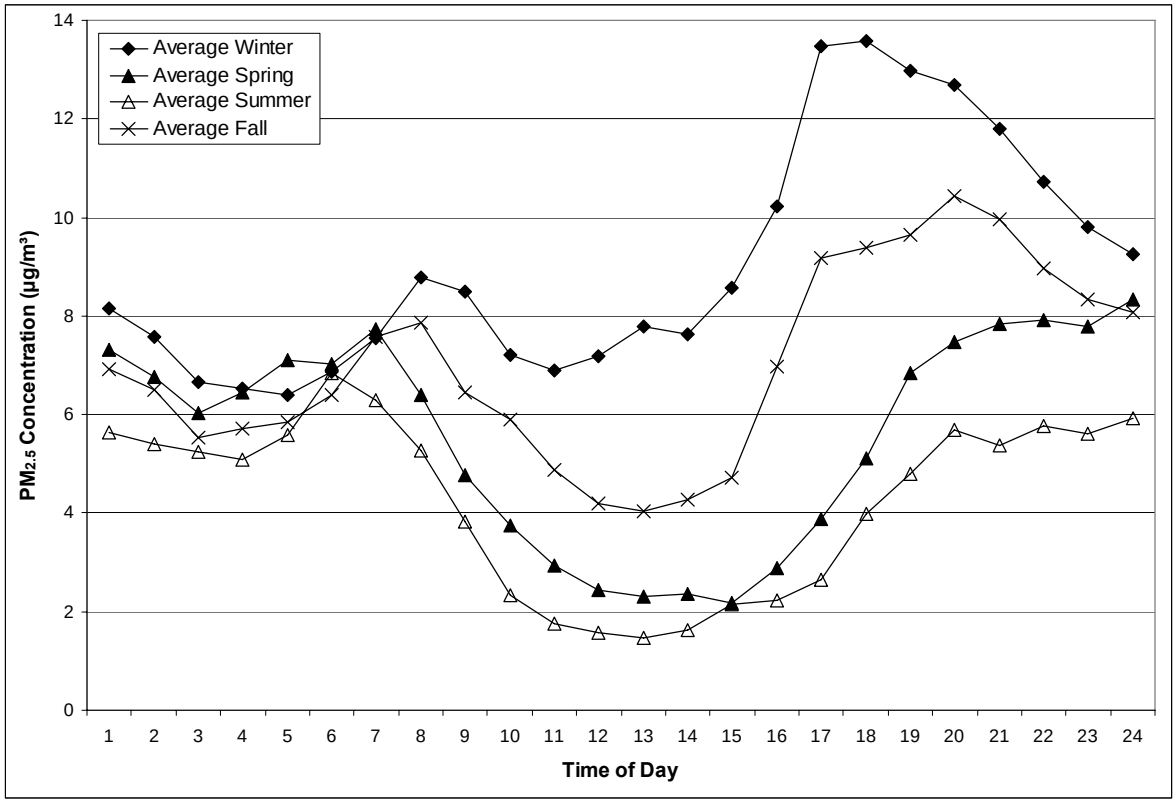


Figure 75 Day of the Week Variations in Williams Lake Skyline Continuous $PM_{2.5}$ Measurements – Mean and 75th, 95th, and 99th Percentile Values, 2001-2002

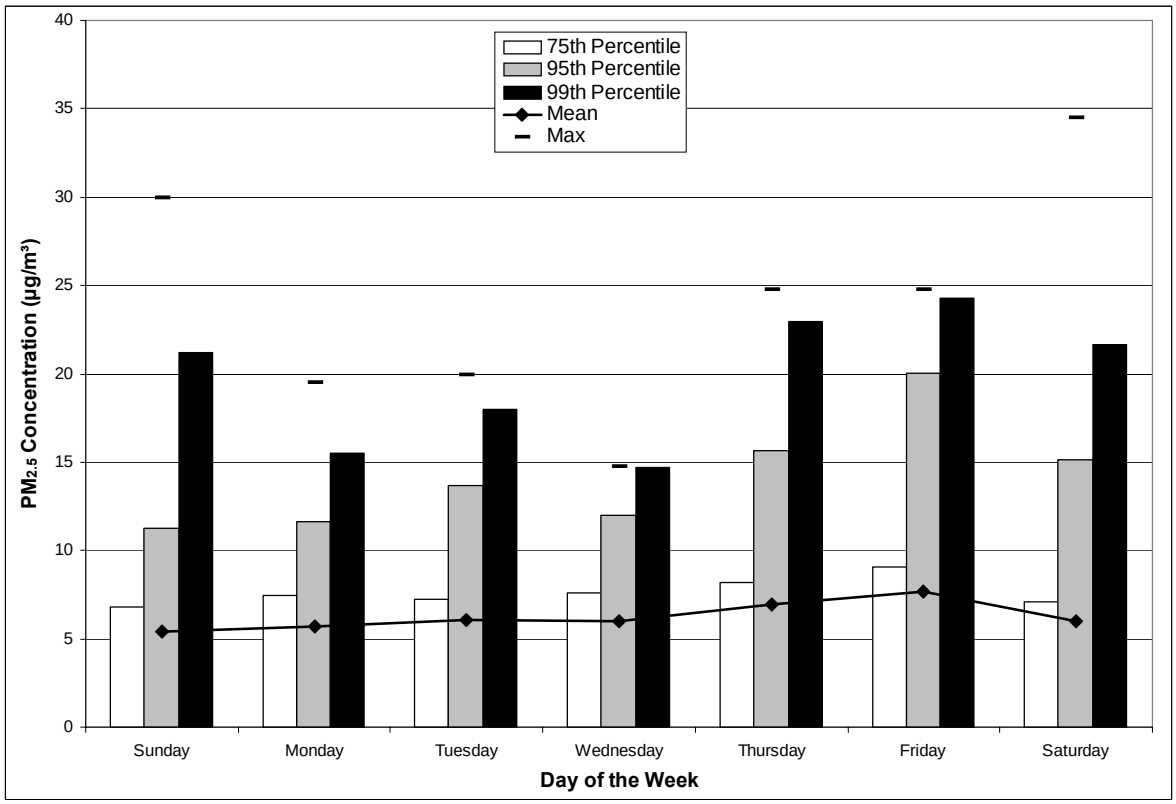


Figure 76 Day of the Week Variations in Williams Lake Columneetza Continuous $PM_{2.5}$ Measurements – Mean and 75th, 95th, and 99th Percentile Values, 2001-2002

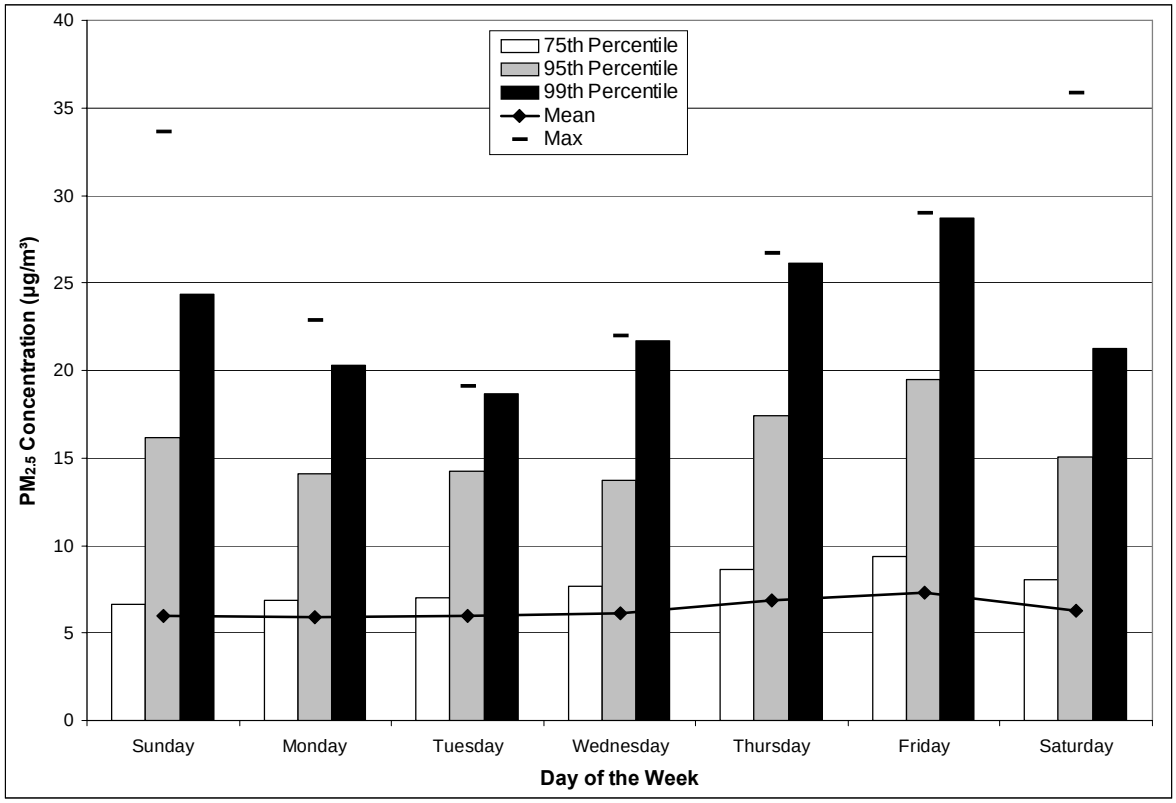


Figure 77 Percentage of PM_{10} that is $PM_{2.5}$ (continuous data) on a Monthly Basis at Williams Lake Skyline, 2001-2002

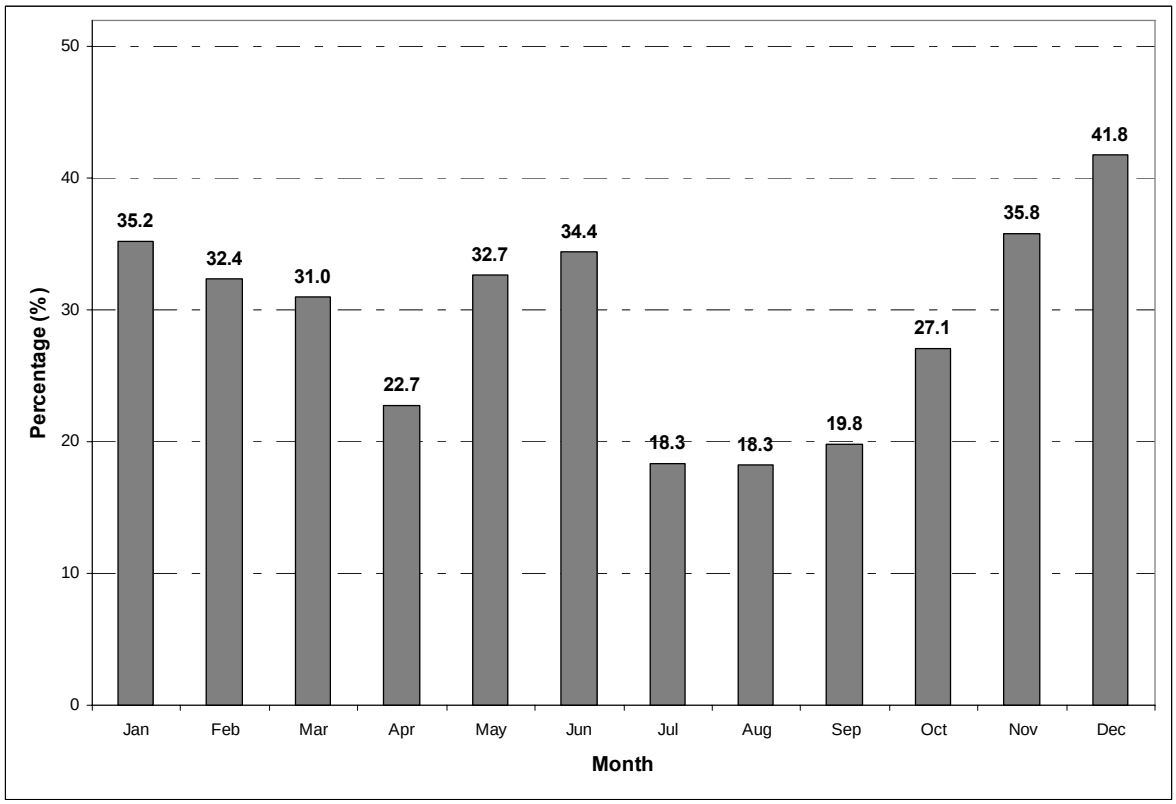


Figure 78 Percentage of PM_{10} that is $PM_{2.5}$ (continuous data) on a Monthly Basis at Williams Lake Columneetza, 2001-2002

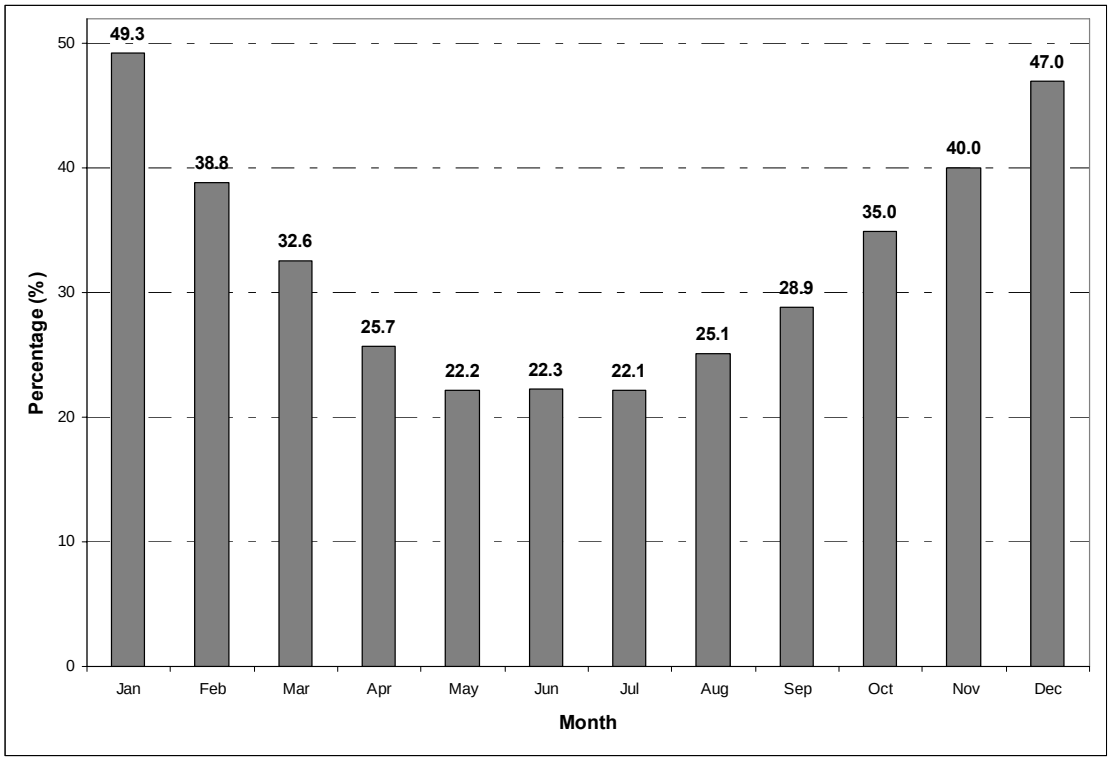


Figure 79 Annual Variations in Columneetza Continuous Ozone Measurements – Annual Mean, 8-Hour Maximum, and 75th and 95th Percentile Values, 1992-2002.

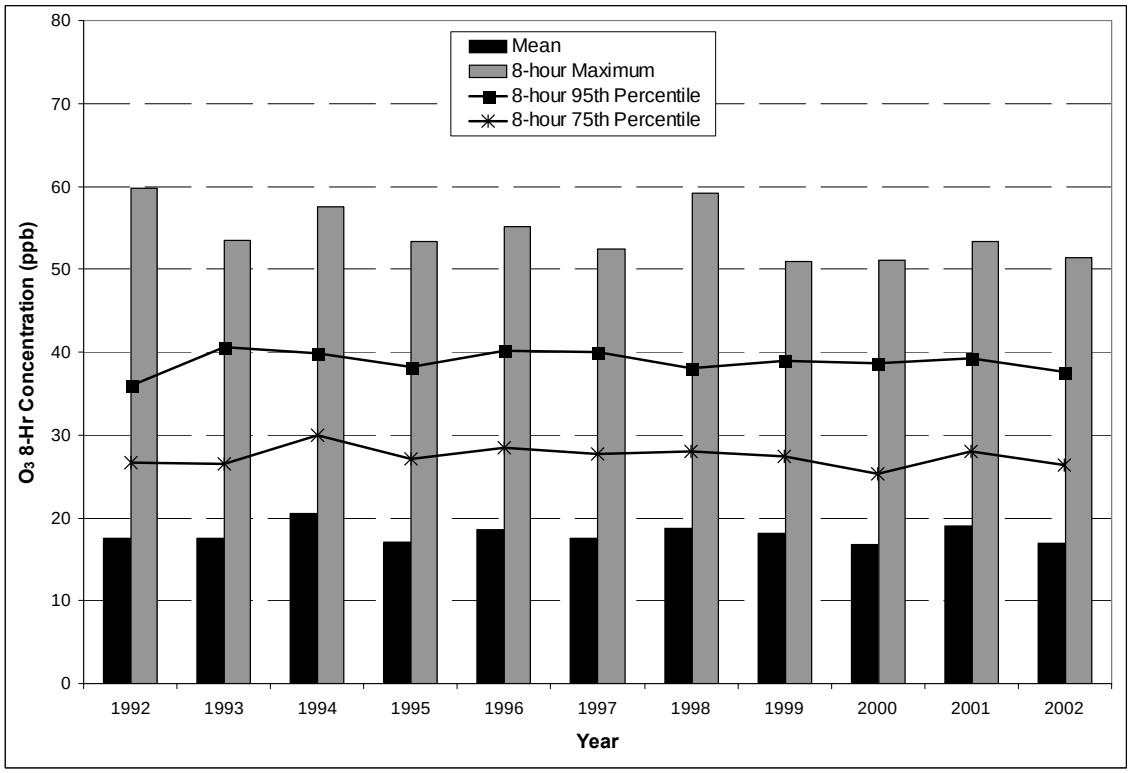


Figure 80 Hourly Variations in Columneetza Continuous Ozone Measurements – Mean and 75th , 95th, and 98th Percentile Values, 1992-2002.

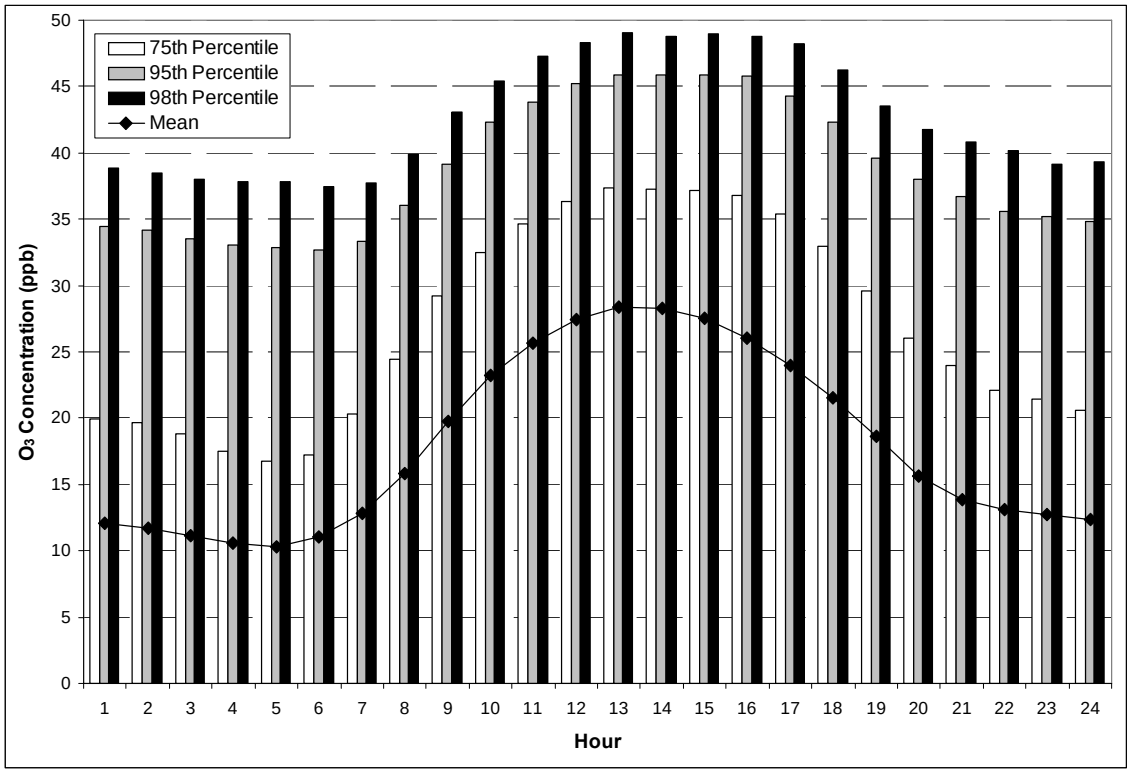


Figure 81 Seasonal Diurnal Variations in Columneetza Continuous Ozone Measurements, 1992-2002.

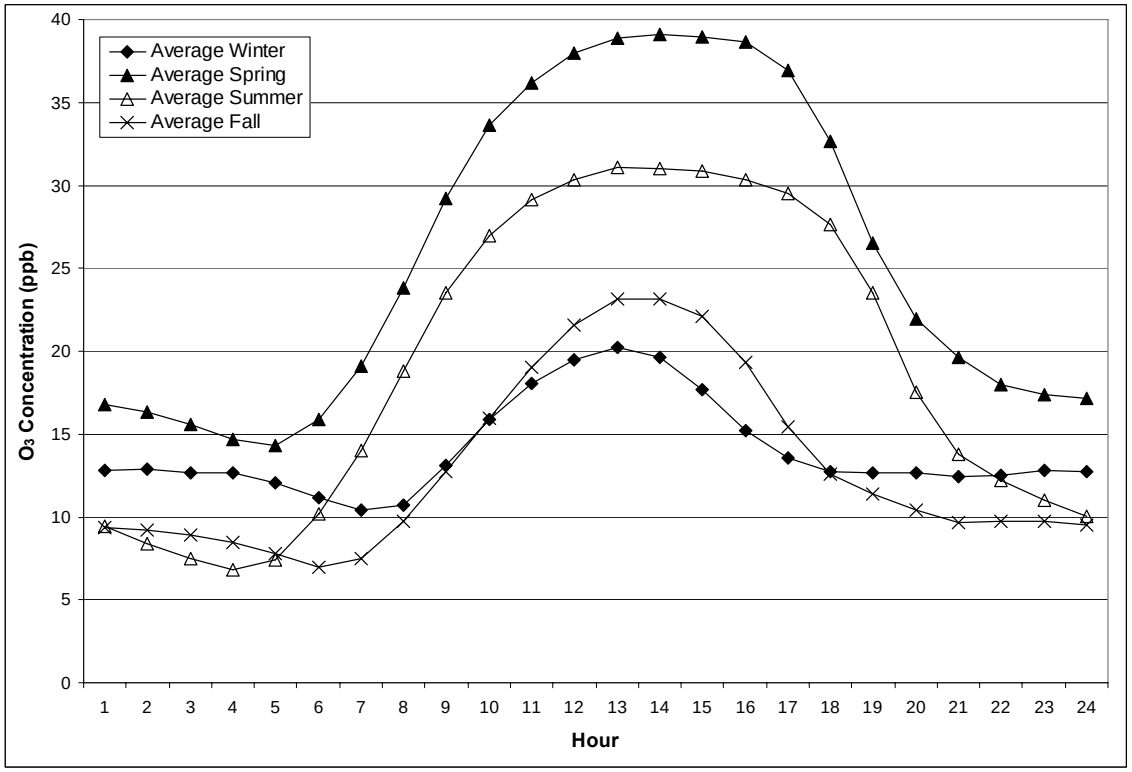


Figure 82 Hebdomadal Variations in Columneetza Continuous Hourly Ozone Measurements – Mean and 75th, 95th, and 98th Percentile Values, 1992-2002.

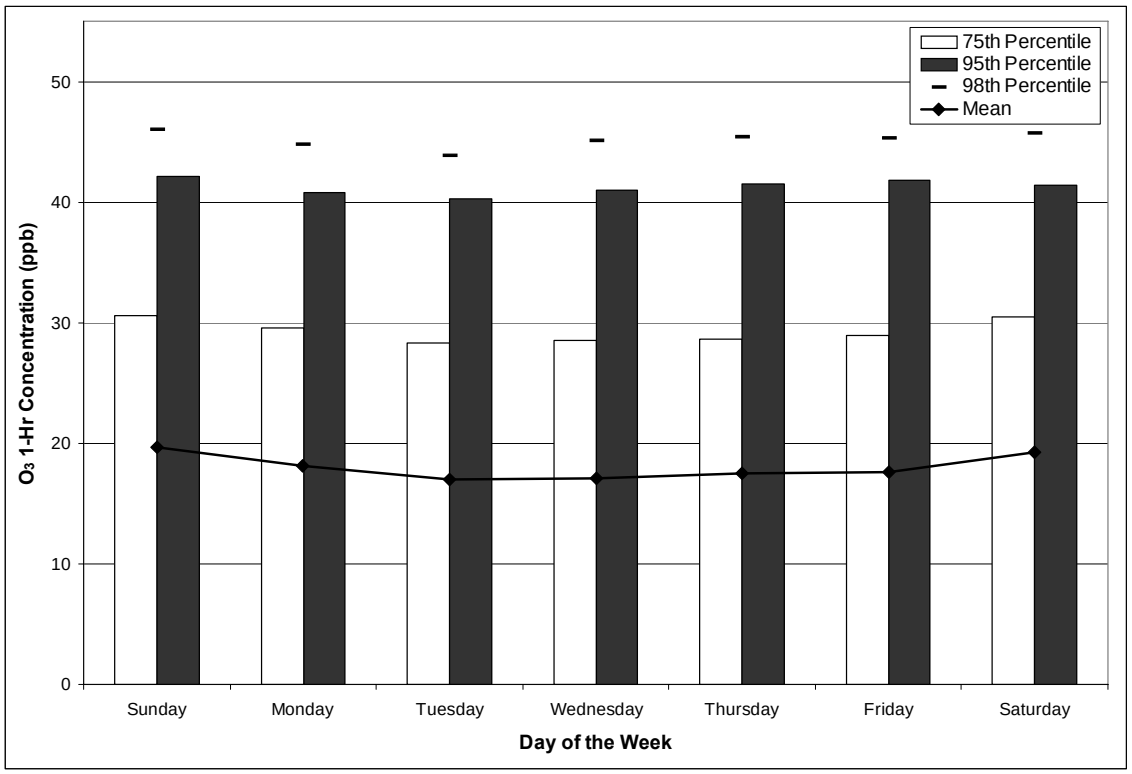


Figure 83 Day of the Week Variations in Williams Lake Columneetza Continuous Ozone Measurements – Block Averages of 1993-1995, 1996-2002, 1993-2002

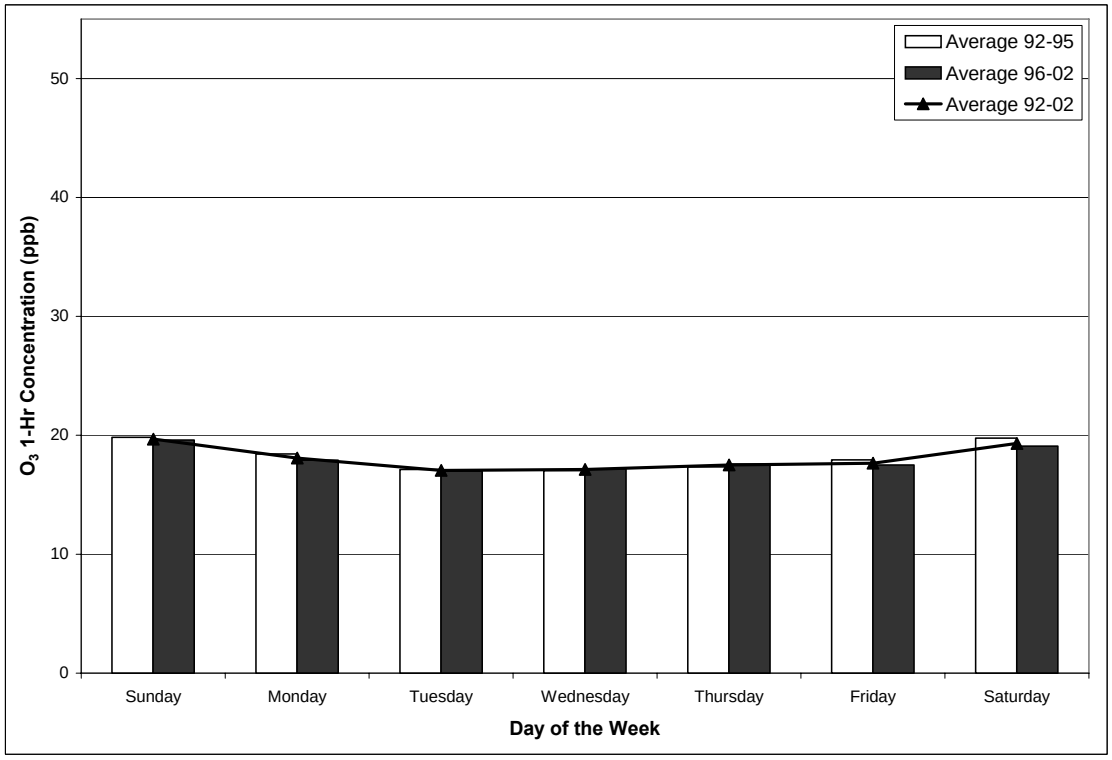


Figure 84 Monthly Variations in Columneetza Continuous NO_2 Measurements – Annual Mean and 24-Hour 75th, 95th, and 98th Percentile Values, 1992-2002. A similar pattern exists for the NOx measurements

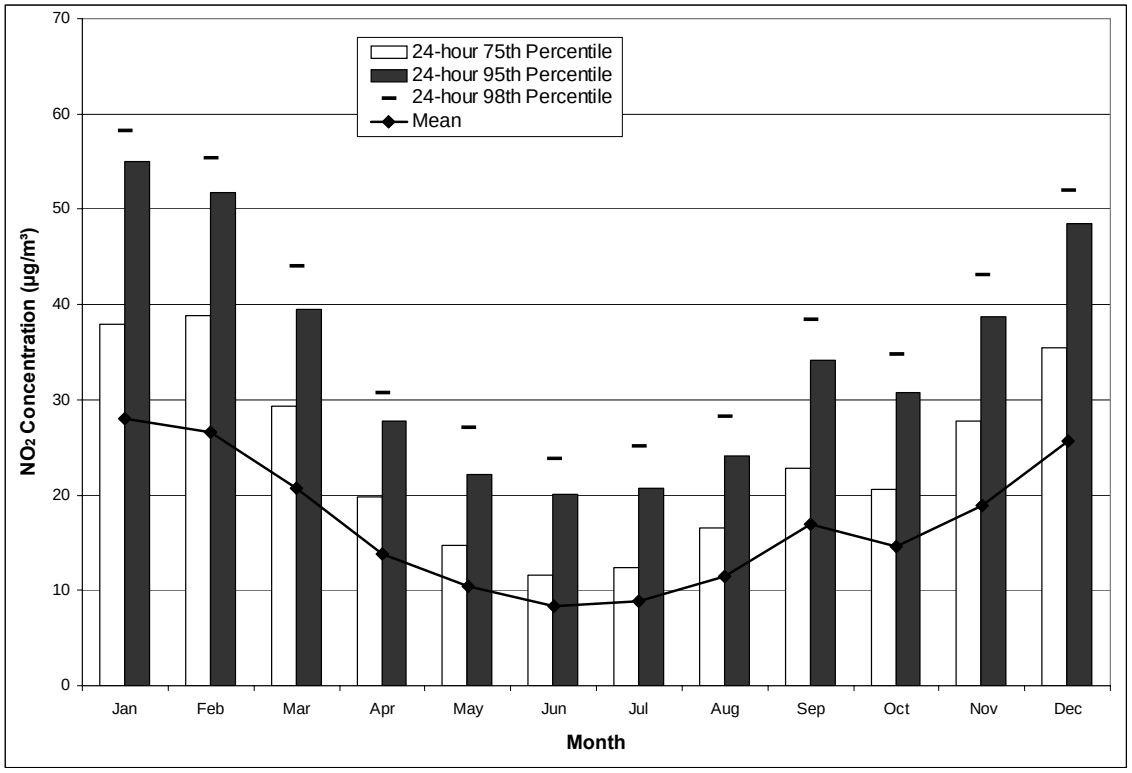


Figure 85 Hourly Variations in Columneetza Continuous NO_2 Measurements – Mean and 75th , 95th, and 98th Percentile Values, 1992-2002.

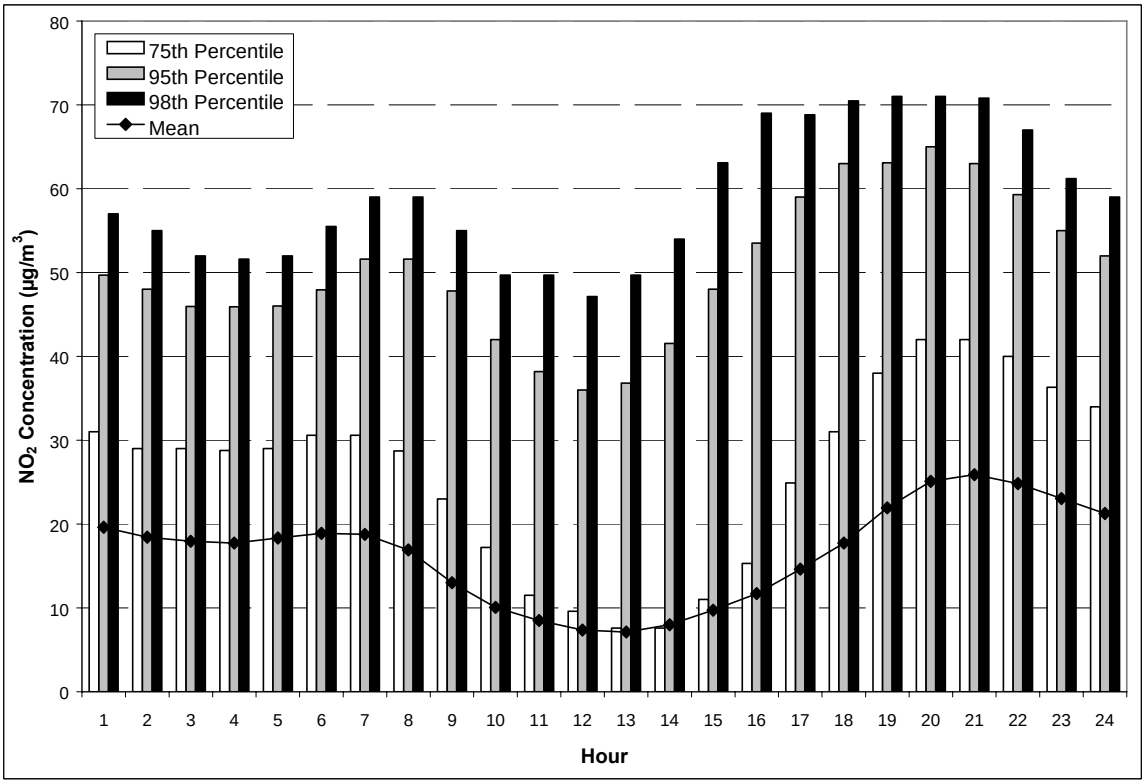


Figure 86 Hourly Variations in Columneetza Continuous NO_x Measurements – Mean and 75th , 95th, and 98th Percentile Values, 1992-2002.

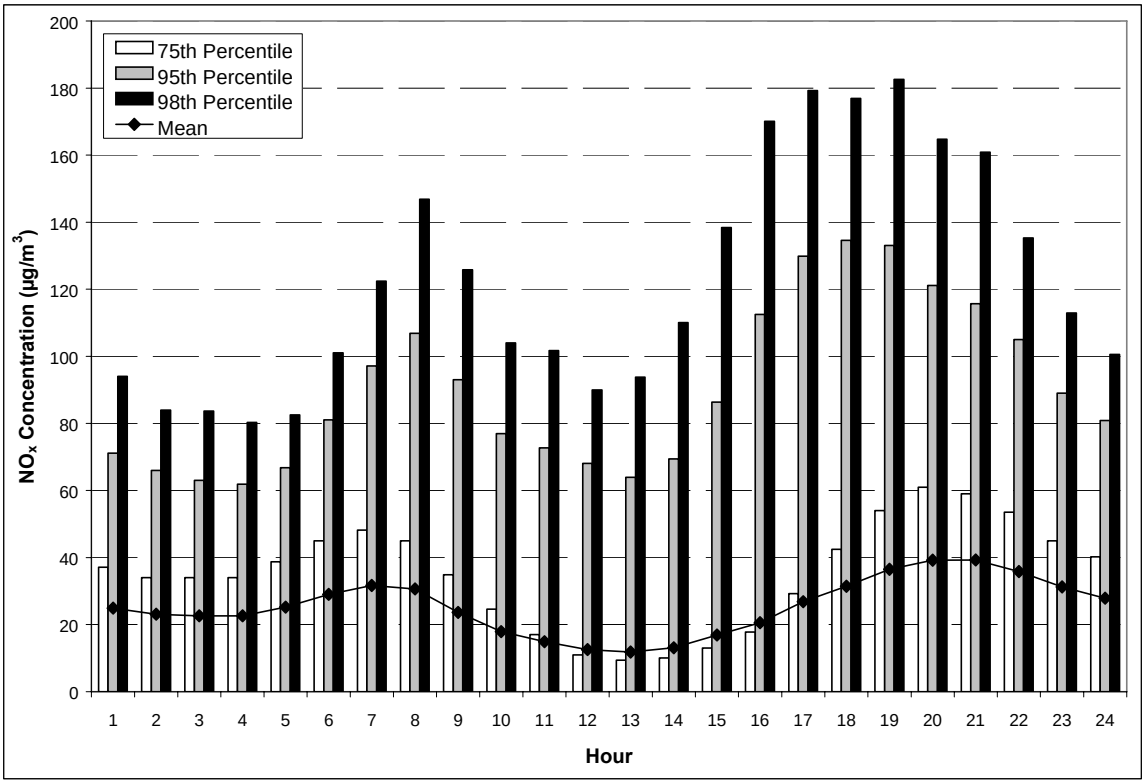


Figure 87 Hourly Variations in Williams Lake Columneetza Continuous NO_X Measurements – Block Averages of 1993-1995, 1996-2000, 1993-2000

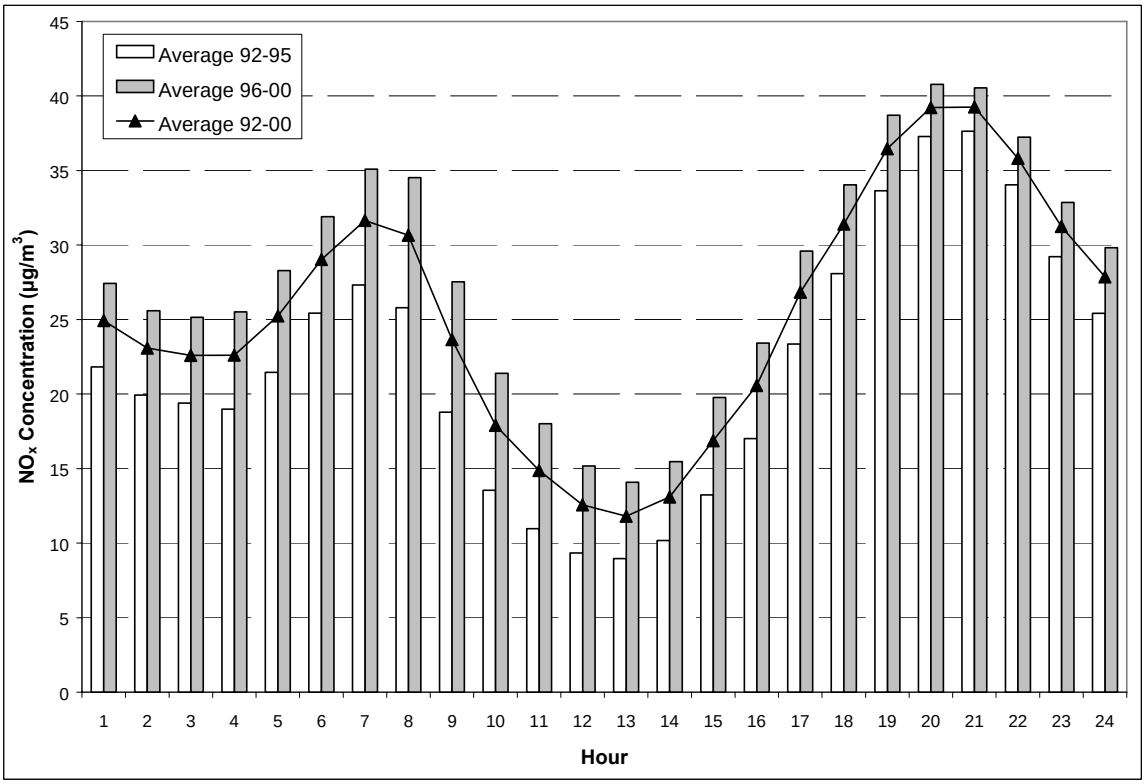


Figure 88 Seasonal Diurnal Variations in Columneetza Continuous NO_2 Measurements, 1992-2002.

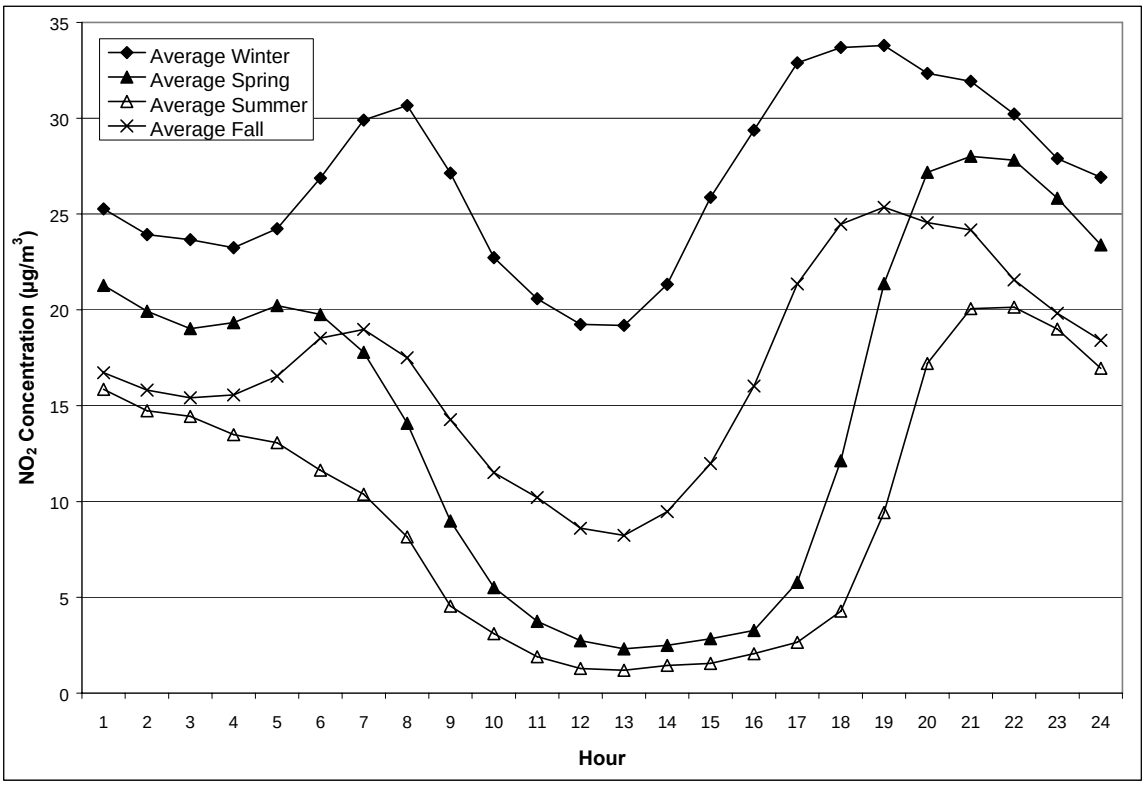


Figure 89 Seasonal Diurnal Variations in Columneetza Continuous NO_x Measurements, 1992-2002.

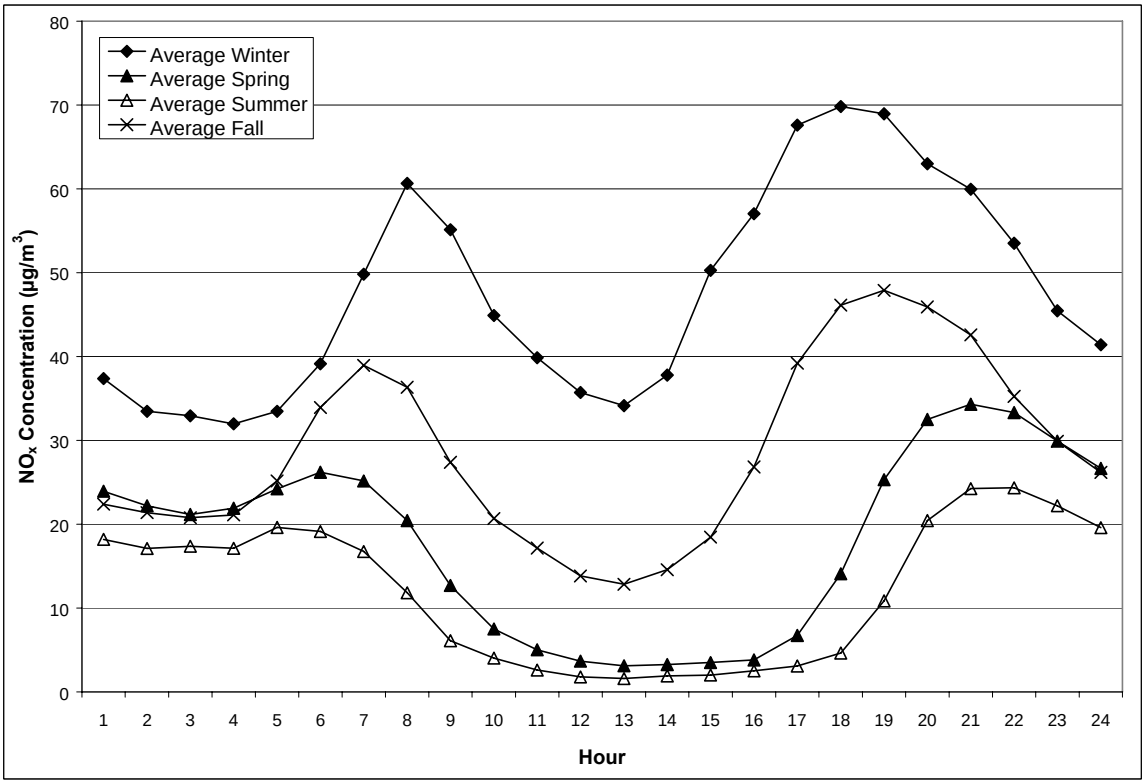


Figure 90 Monthly Variations in Williams Lake Columneetza Continuous NO_x Measurements – Block Averages of 1993-1995, 1996-2002, 1993-2002

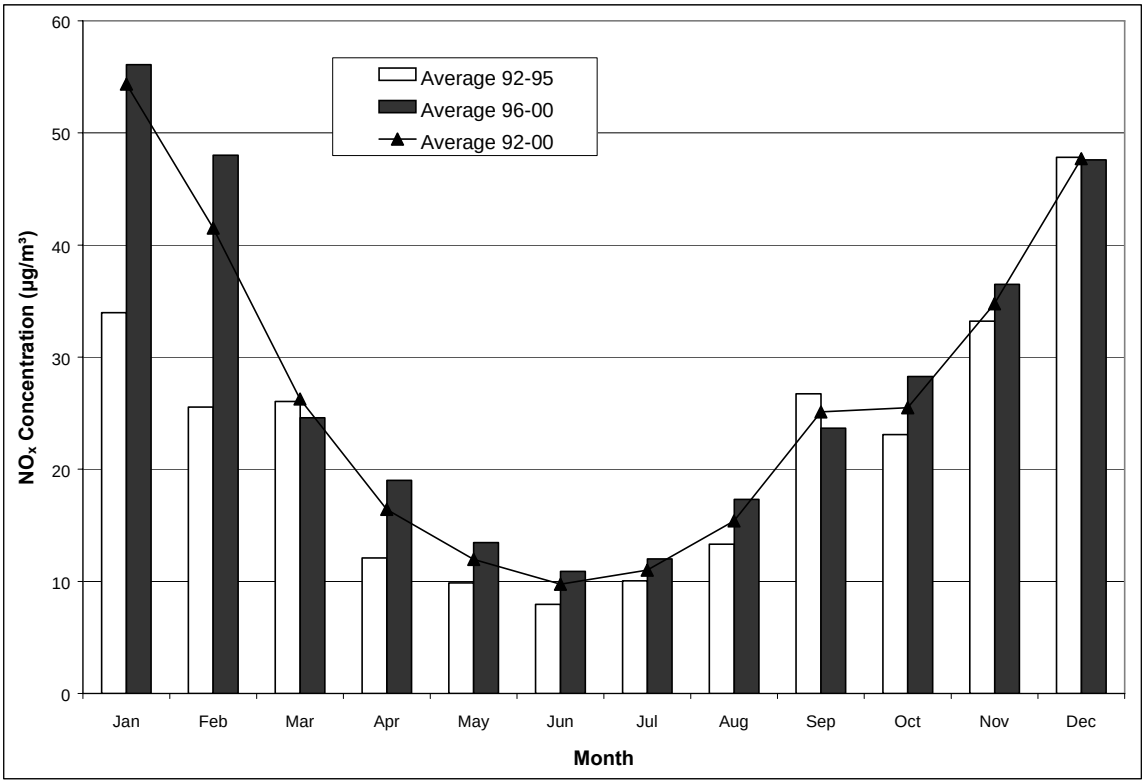


Figure 91 Hebdomadal Variations in Columneetza Midnight-Midnight Block Averaged NO_2 Measurements – Mean and 75th, 95th, and 98th Percentile Values, 1992-2002.

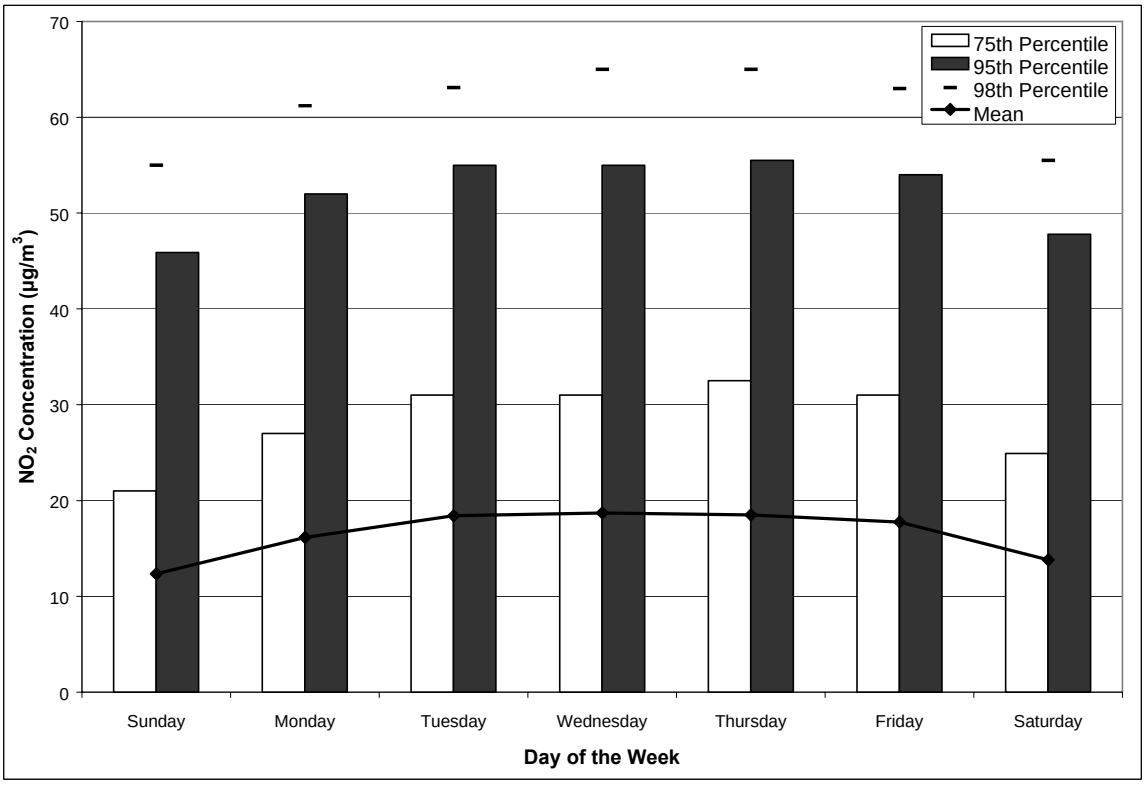


Figure 92 Hebdomadal Variations in Columneetza Midnight-Midnight Block Averaged NO_x Measurements – Mean and 75th, 95th, and 98th Percentile Values, 1992-2002.

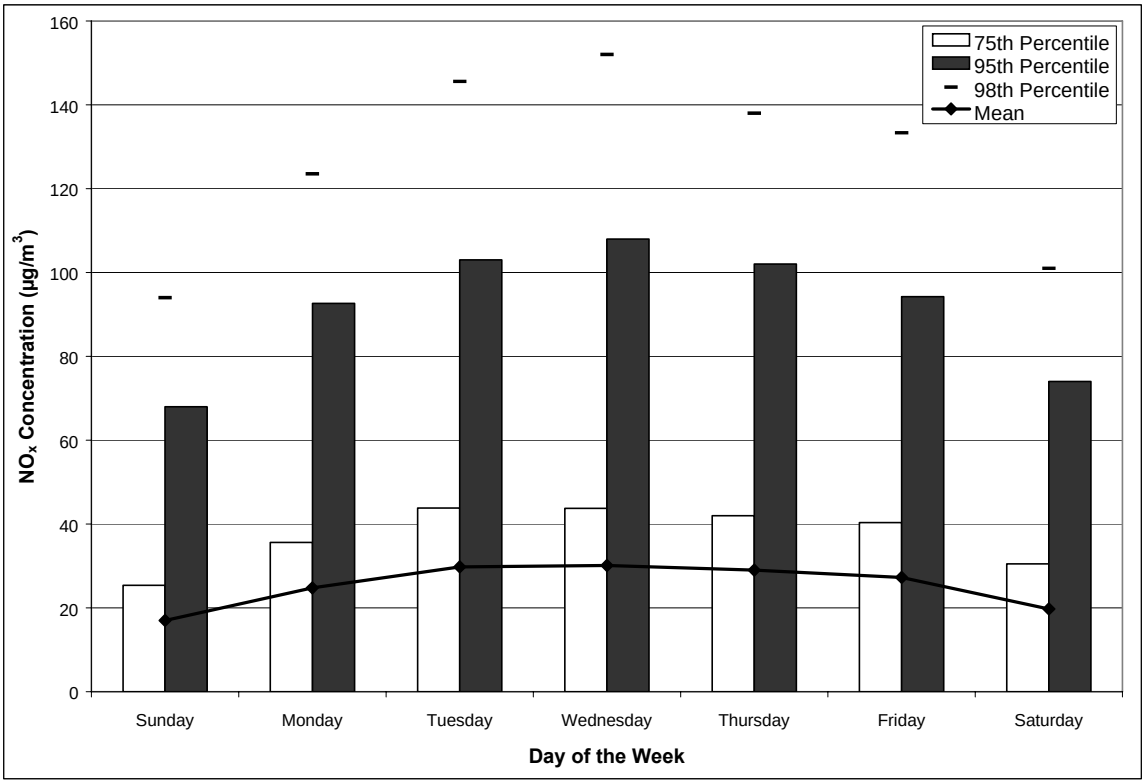


Figure 93 Day of the Week Variations in Williams Lake Columneetza Continuous NO_X Measurements – Block Averages of 1993-1995, 1996-2002, 1993-2002

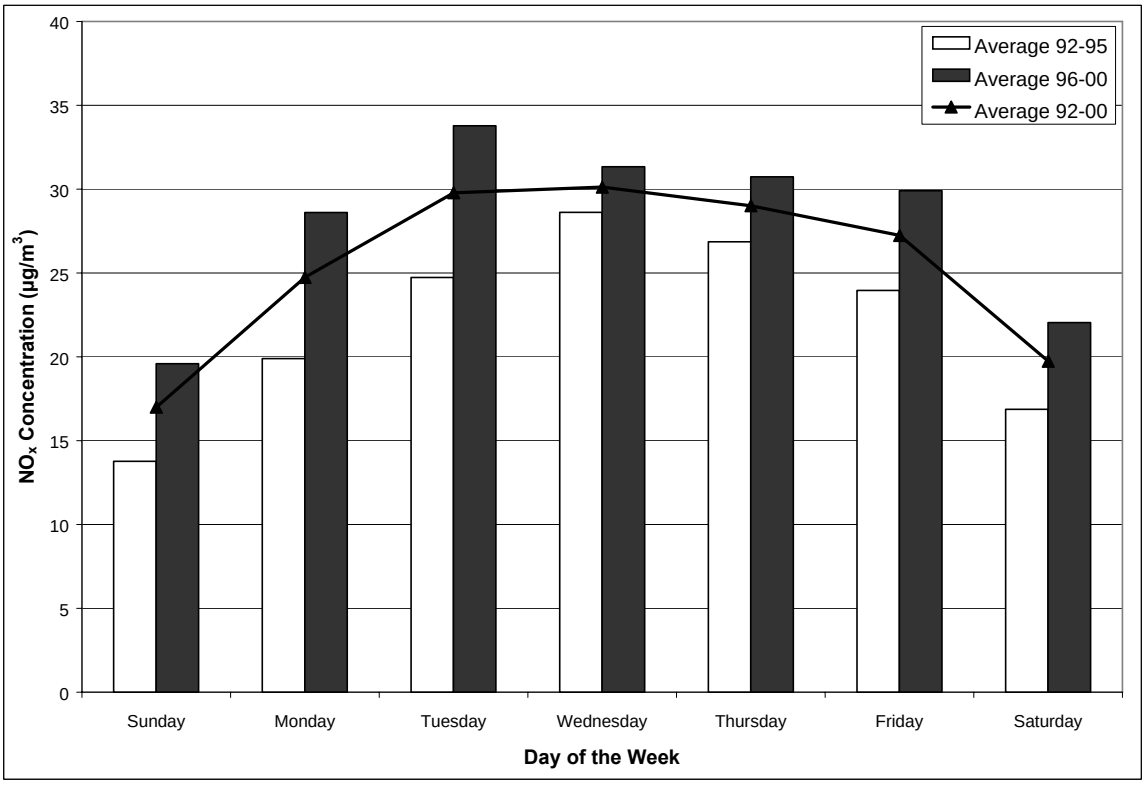


Figure 94 Monthly average Total PAHs from 1992 to 1994.

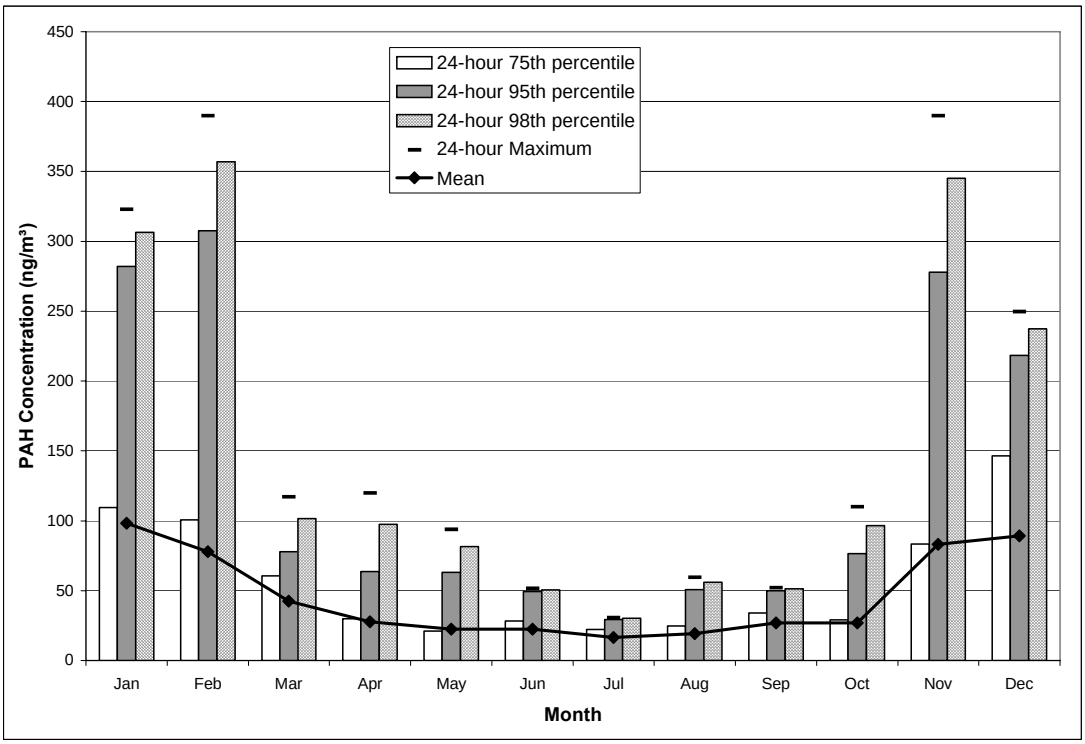


Figure 95 Time Series comparison of Total PAHs with Temperature, PM_{10}, NOx, and NO_2 data. (PAHs in ng/m^3)

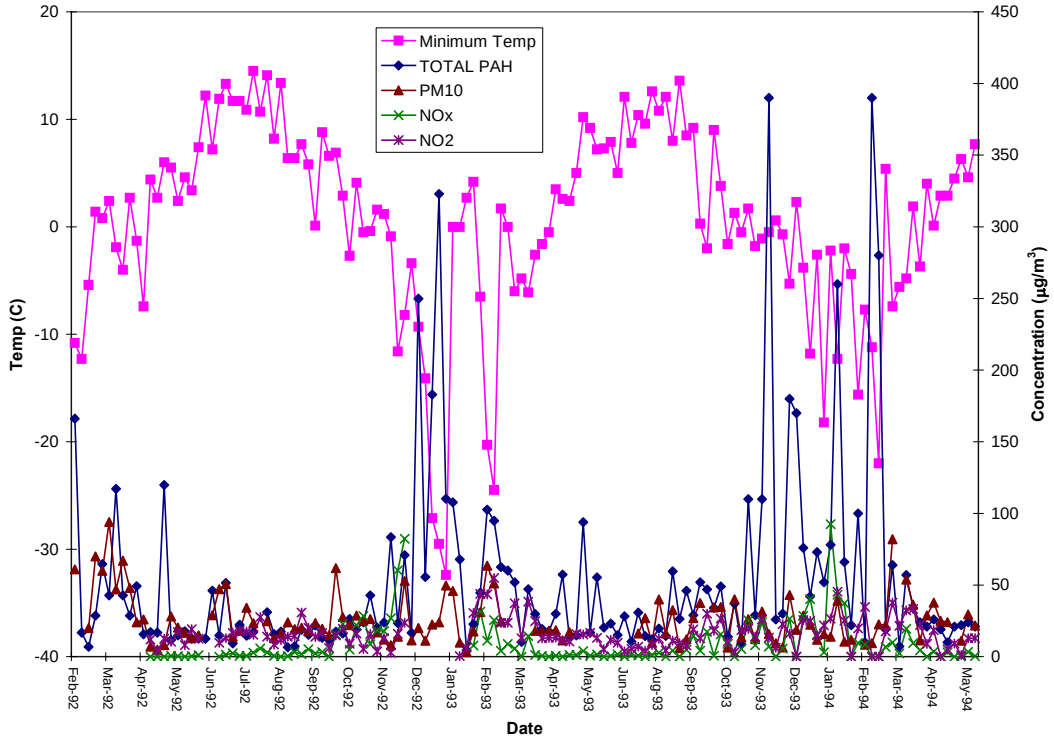


Figure 96 Seasonal comparison of Total PAHs with PM_{10}, NOx, and NO_2 data (PAHs in ng/m^3)

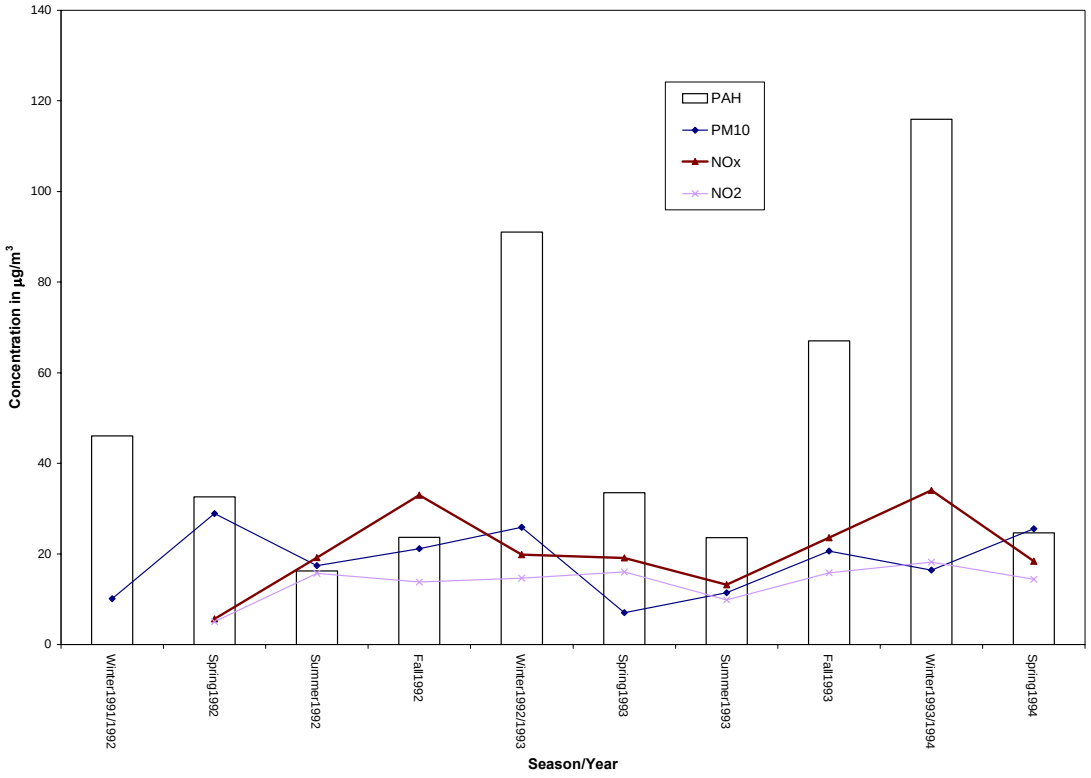


Figure 97 Seasonal comparison of selected Metals, 1996-2000 at Skyline, Firehall, and Watertower

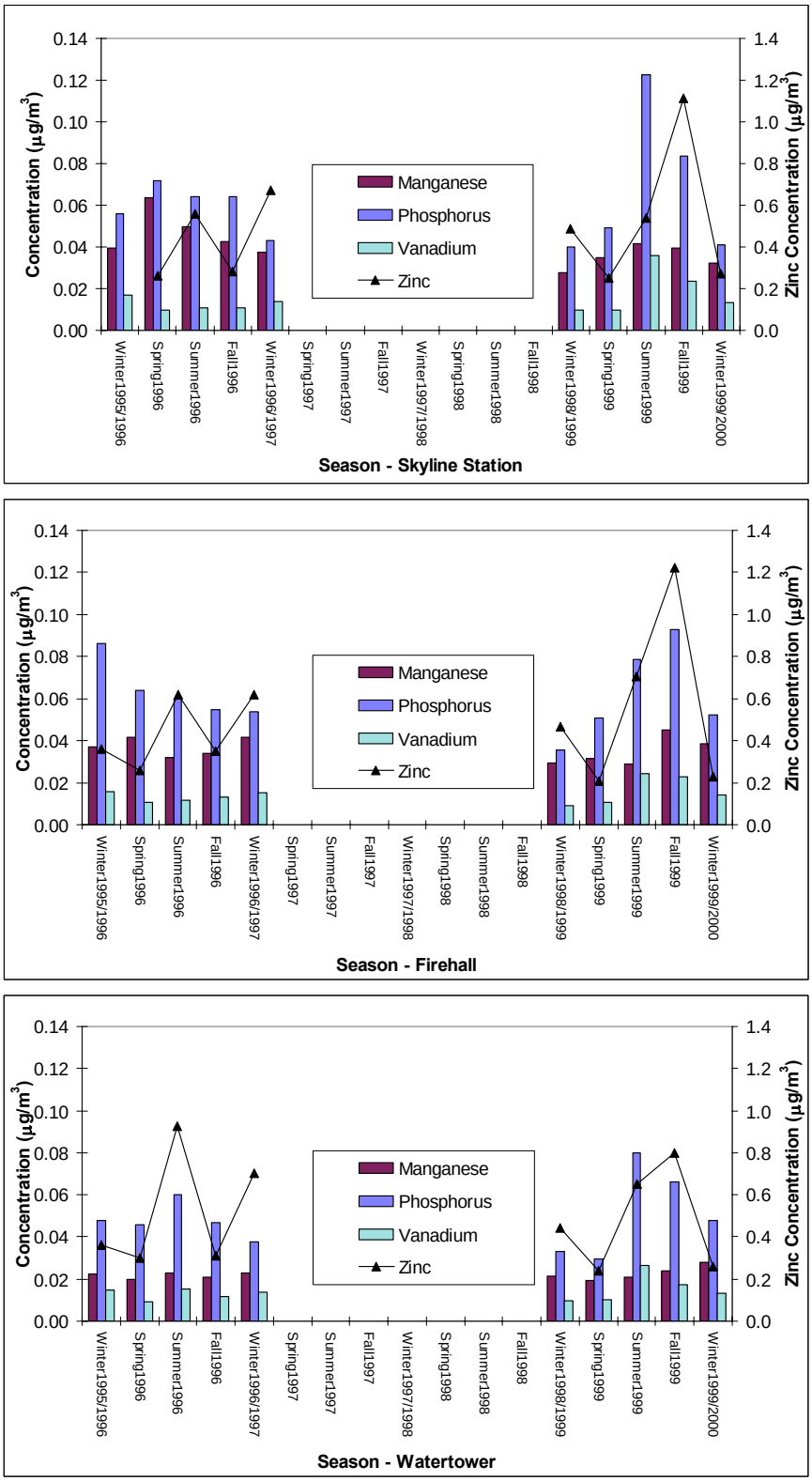
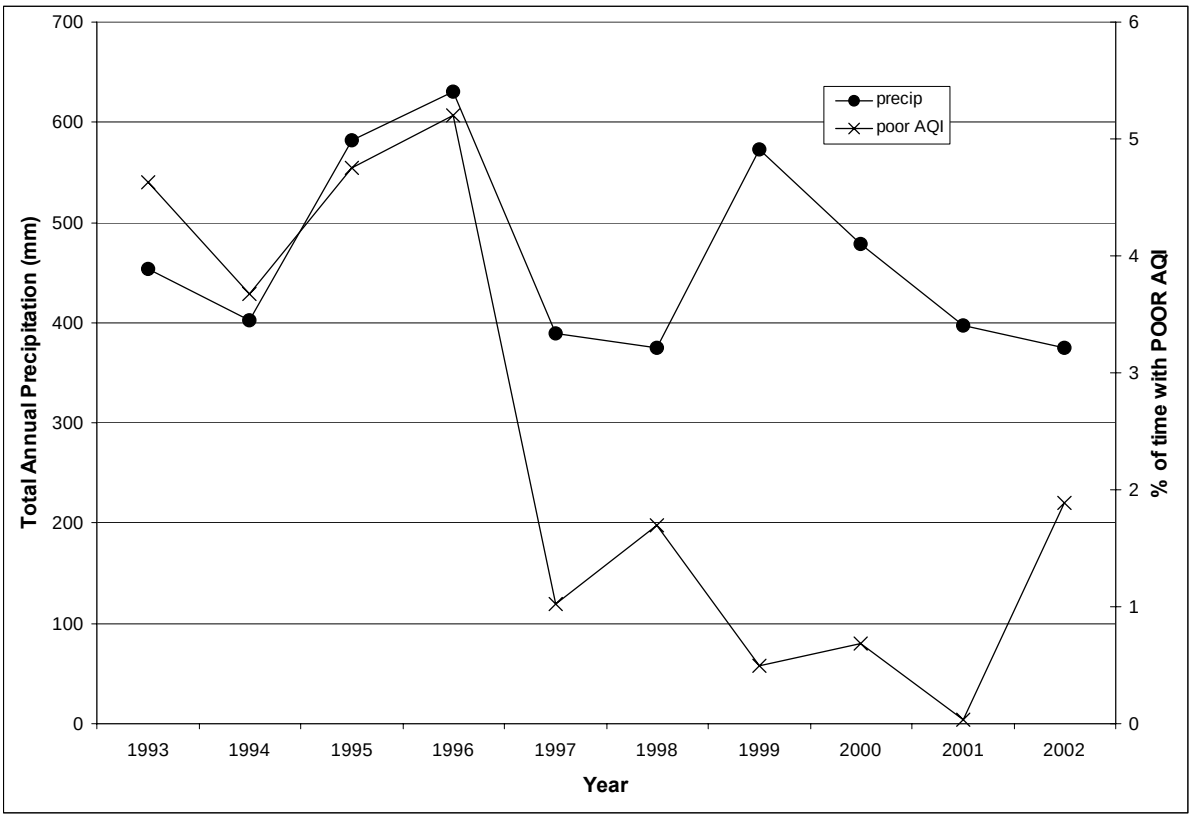


Figure 98 Total Annual Precipitation at the Williams Lake airport, and Annual AQI at Columneetza



TABLES

Table 1 Meteorological and Ambient Air Monitoring Sites in Williams Lake BC and Associated Parameters

Monitoring Location	Sampling Duration	Parameter Measured	Continuous or Bulk sampling (NAPS)	Sampler Type
WL Skyline School (Site 0605020)	Mar 1992 – Dec 2001	PM_{10}	Bulk Sampler	HiVol PM_{10} (with SSI)
WL Skyline School (Site 0605020)	Aug 2001 – Dec 2002	PM_{10} & $PM_{2.5}$	Continuous Monitors	TEOM 1400AB
WL Firehall (Site E206112)	Nov 1990 – Dec 2001	PM_{10}	Bulk Sampler	HiVol PM_{10} (with SSI)
WL Firehall (Site E206112)	Apr 2001 – Dec 2002	PM_{10} & $PM_{2.5}$	Bulk Samplers	Partisol 2000
WL Columneetza School (Site 0550502)	Apr 1992 – May 2000	NO & NO_2	Continuous	TECO 42, TECO 49
WL Columneetza School (Site 0550502)	Apr 1992 – Dec 2002	Ozone	Continuous	TECO 42, TECO 49
WL Columneetza School (Site 0550502)	Dec 1992 – Dec 2002	PM_{10}	Continuous	TEOM 1400A
WL Columneetza School (Site E221197)	Sep 1994 – Dec 2000	$PM_{2.5}$	Bulk Sampler	Partisol 2000
WL Columneetza School (Site 0550502)	Jan 2001 – Dec 2002	$PM_{2.5}$	Continuous	TEOM 1400AB
WL Watertower (Site E222242)	Nov 1995 – Dec 2002	PM_{10}	Bulk Sampler	HiVol PM_{10} (with SSI)
WL 168 Mile Road (Site E229457)	Dec 1997 – Dec 2002	PM_{10}	Bulk Sampler	HiVol PM_{10} (with SSI)
WL Glendale School (Site 111068)	Sep 1990 – Dec 2002	Wind speed, Wind direction, temperature	Continuous	Aanderaa
WL Canadian Tire (Site E248623)	June 2002 – Dec 2002	Wind speed, Wind direction, Temperature, RH	Continuous	RM Young
WL Airport MSC Meteorological Station	Sep 1990 – Dec 2002	Wind speed, Wind direction, Temperature, Precipitation,	Continuous	

PM_{10} = Suspended particulate matter less than 10 microns in size
$PM_{2.5}$ = Suspended particulate matter less than 2.5 microns in size

Table 2 Climate Normals for the Williams Lake Airport (1961-1990). Data Courtesy of Environment Canada Climatic Services

Avg. Wind Speed (km/hr.) by month													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	11	11	11	11	10	9	8	7	8	11	12	11	10
Avg. Calm	23.5	23.4	21.9	19.0	21.2	22.9	27.4	30.6	28.4	21.6	19.5	23.7	23.6
% Frequency Wind Direction													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
N	8.6	7.8	8.2	10.6	11.2	12.4	13.7	13.3	9.8	5.1	6.1	6.5	9.4
NE	0.9	1.1	1.5	2.4	3.2	4.0	4.1	3.8	2.4	1.2	0.8	0.8	2.2
E	2.7	3.3	4.3	4.6	5.2	5.2	5.3	5.2	5.1	4.6	3.6	2.8	4.3
SE	33.7	34.3	29.6	24.3	17.8	14.7	13.1	13.7	22.7	38.1	41.2	37.1	26.7
S	14.8	13.8	13.7	12.8	11.5	9.7	8.6	8.0	10.0	15.1	15.3	15.2	12.4
SW	2.2	2.7	3.9	5.7	6.9	7.0	6.7	5.5	3.9	3.1	2.2	1.9	4.3
W	3.3	3.8	5.3	7.7	9.5	9.6	8.2	7.4	5.6	4.2	3.1	3.0	5.9
NW	10.4	9.8	11.6	12.8	13.5	14.6	12.8	12.5	12.1	7.0	8.2	8.9	11.2
Total	76.6	76.6	78.1	80.9	78.8	77.2	72.5	69.4	71.6	78.4	80.5	76.2	76.4
*calms make up remainder													

Table 3 Annual Average Mean Wind Speeds (m/s) and % Valid Data for the Williams Lake Meteorological Stations, 1990-2002

Year	Mean Wind Speed (m/s) WL Glendale	% Valid Data WL Glendale	Mean Wind Speed (m/s) WL Airport	% Valid Data WL Airport	Mean Wind Speed (m/s) WL Canadian Tire	% Valid Data WL Canadian Tire
1990	2.78	26.0*	2.7	100.0		
1991	2.67	95.1	2.6	100.0		
1992	2.72	86.9	2.7	100.0		
1993	2.61	94.0	2.3	100.0		
1994	2.34	100.0	2.5	99.9		
1995	2.52	100.0	2.1	99.6		
1996	2.58	98.2	2.3	99.0		
1997	2.74	99.8	2.3	99.6		
1998	2.73	99.8	2.5	99.6		
1999	2.78	95.8	2.7	99.6		
2000	2.57	99.9	2.3	99.8		
2001	2.74	99.7	2.7	99.8		
2002	2.59	99.8	2.7	99.9	2.08**	53.8**

* Observations at Glendale began on September 26, 1990.

** Observations at Williams Lake Canadian Tire began on June 13, 2002.

Table 4 Monthly Average Mean Wind Speeds for Three Williams Lake Sites, 1990-2002 (m/s)

Williams Lake Glendale

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990									2.35	2.88	2.67	3.02
1991	2.32	3.12	2.76	2.79	2.93	2.27	2.44	2.80	2.42	2.72	3.19	3.00
1992	3.11	2.83	2.42	3.08	2.85	2.82	2.47	2.64	2.77	3.03	2.73	2.61
1993	2.63	2.94	3.06	2.85	2.67	2.57	2.58	2.50	2.74	2.44	2.58	2.39
1994	2.19	3.00	2.74	0.83	1.15	2.51	2.55	2.53	2.39	2.70	3.10	2.95
1995	1.87	2.82	3.07	2.88	2.84	2.76	2.54	2.18	2.39	2.75	2.10	2.59
1996	3.04	2.70	3.19	3.22	2.82	2.55	2.62	2.26	2.32	2.86	0.91	2.57
1997	2.39	2.14	3.34	3.19	3.00	2.79	2.54	2.71	2.45	2.64	2.60	3.01
1998	3.03	3.19	2.79	2.56	2.69	2.90	2.58	2.57	2.38	2.82	2.27	3.00
1999	2.23	3.68	3.24	2.95	2.85	2.60	2.71	2.40	2.50	2.66	3.02	2.49
2000	2.32	2.50	2.72	3.21	2.65	2.55	2.28	2.56	2.44	2.90	2.39	2.30
2001	2.76	2.53	2.77	3.11	3.08	2.59	2.27	2.55	2.67	2.76	3.43	2.34
2002	2.60	2.79	2.84	2.72	2.75	2.72	2.59	2.44	2.36	2.09	2.46	2.73
Avg.	**2.54**	**2.85**	**2.91**	**2.78**	**2.69**	**2.64**	**2.51**	**2.51**	**2.48**	**2.71**	**2.57**	**2.69**

Williams Lake Airport

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	3.15	3.13	2.21	2.53	2.64	2.72	1.99	2.06	1.55	3.68	3.47	3.60
1991	2.16	3.36	2.63	2.43	2.83	1.69	1.29	2.10	1.66	2.55	3.73	4.32
1992	3.87	3.25	1.71	3.10	2.63	2.03	1.73	2.13	2.98	3.20	2.89	2.87
1993	2.22	3.01	3.27	2.74	2.27	1.94	1.66	1.36	1.69	1.69	2.96	2.85
1994	1.93	3.14	2.58	2.64	2.44	1.79	1.71	1.63	1.96	2.53	3.73	3.57
1995	1.63	2.49	2.91	2.36	2.05	1.84	1.85	1.30	1.45	2.70	2.27	2.90
1996	2.37	2.60	2.69	3.27	2.23	1.97	1.71	1.47	1.58	2.81	1.72	2.68
1997	2.32	1.59	2.83	2.82	2.30	1.69	1.26	1.49	2.27	2.69	2.49	3.58
1998	3.08	3.69	2.37	1.88	1.96	2.14	2.01	1.74	1.89	3.11	2.58	3.50
1999	2.48	4.79	3.58	2.60	2.51	1.94	1.94	1.87	1.80	2.54	3.51	2.94
2000	1.99	2.14	2.71	2.95	2.22	2.12	1.53	1.69	2.01	2.93	2.66	2.30
2001	3.16	1.76	2.73	3.12	2.70	1.98	1.51	2.29	2.50	2.96	4.05	3.12
2002	3.07	3.68	2.87	2.68	2.72	2.55	2.28	2.00	2.32	1.45	2.94	3.36
Avg.	**2.57**	**2.97**	**2.70**	**2.70**	**2.42**	**2.03**	**1.73**	**1.78**	**1.97**	**2.68**	**3.00**	**3.20**

Williams Lake Canadian Tire

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002						2.46	2.30	1.97	1.92	1.50	2.17	2.38

Table 5 Monthly Total Precipitation Records from 1990 to 2002, Williams Lake Airport. Data Courtesy of the Meteorological Service of Canada

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1990	34.8	25.6	9.1	25.9	42.3	54.8	41.5	28.7	20.4	60.9	92.4	79.0	**515.4**
1991	34.0	6.6	26.0	11.9	20.2	71.7	56.4	38.6	24.0	52.5	44.7	21.3	**407.9**
1992	38.5	17.4	9.2	30.4	30.8	34.4	36.9	45.4	46.6	26.5	56.5	76.7	**449.3**
1993	32.2	4.2	19.5	42.8	49.8	104.5	42.0	64.0	5.6	27.3	35.9	25.2	**453.0**
1994	62.4	21.9	14.3	12.2	28.0	84.9	27.6	26.9	32.5	42.5	28.7	20.6	**402.5**
1995	15.5	10.4	11.7	41.1	29.4	65.3	98.8	90.3	10.2	74.1	94.1	41.2	**582.1**
1996	47.1	5.7	20.3	19.2	53.6	61.8	64.6	81.6	88.6	48.0	95.2	44.6	**630.3**
1997	34.2	19.6	22.4	21.4	24.8	23.2	70.4	27.0	55.6	49.0	20.8	20.4	**388.8**
1998	17.0	13.0	22.6	30.8	36.0	49.0	42.5	30.0	19.5	36.6	37.7	39.8	**374.5**
1999	90.5	17.3	23.6	29.6	58.6	97.6	72.2	38.2	38.5	26.8	33.8	46.5	**573.2**
2000	25.7	11.9	36.8	6.4	36.2	75.4	110.6	38.8	33.8	50.0	20.5	32.3	**478.4**
2001	16.0	9.6	28.6	11.2	8.8	96.1	84.4	24.3	30.8	37.0	21.9	28.8	**397.5**
2002	27.8	19.4	14.0	20.4	68.0	39.2	28.2	50.8	36.1	30.0	26.8	14.4	**375.1**
Avg.	**36.59**	**14.05**	**19.85**	**23.33**	**37.42**	**65.99**	**59.70**	**44.97**	**34.02**	**43.17**	**46.85**	**37.75**	**463.7**

Table 6 Annual Summary of Williams Lake Firehall High Volume PM_{10}

Year	No. of samples	Min. Value (µg/m^3)	Max. Value (µg/m^3)	Annual Arithmetic Mean (µg/m^3)	No. of Daily Values (# of samples and % of total samples)					
					>25 µg/m^3		>50 µg/m^3		>100µg/m^3	
					#	%	%	#	%	%
1990*	8	5	21	13.4	0	0	0	0	0	0
1991	59	3	125	34.5	31	52.5	18.6	11	18.6	0
1992	45	5	94	26.8	17	37.8	13.3	6	13.3	0
1993	60	6	90	31.2	31	51.7	15.0	9	15.0	0
1994	60	5	102	25.4	24	40.0	5.0	3	5.0	0
1995	60	3	53	21.7	22	36.7	1.7	1	1.7	0
1996	60	6	146	26.6	22	36.7	8.3	5	8.3	0
1997	60	5	116	25.6	23	38.3	10.0	6	10.0	0
1998	57	2	65	27.6	30	52.6	7.0	4	7.0	0
1999	58	4	85	24.7	21	36.2	5.2	3	5.2	0
2000	61	2	75	21.5	18	29.5	6.6	4	6.6	0
2001	61	5	47	19.8	18	29.5	0	0	0	0
2002	1	2	2	2.0	0	0	0	0	0	0

* <75% data capture, collection began Nov 19th 1990

Table 7 Annual Summary of Williams Lake Firehall Partisol PM_{10}

Year	No. of samples	Min. Value (µg/m^3)	Max. Value (µg/m^3)	Annual Arithmetic Mean (µg/m^3)	No. of Daily Values (# of samples and % of total samples)					
					>25 µg/m^3		>50 µg/m^3		>100µg/m^3	
					#	%	%	#	%	%
2001	45	6	45	19.7	0	0	0	0	0	0
2002	60	4	167	26.1	6	6	10.0	6	10.0	1.7

Table 8 Annual Summary of Williams Skyline School High Volume PM_{10}

Year	No. of samples	Min. Value (µg/m^3)	Max. Value (µg/m^3)	Annual Arithmetic Mean (µg/m^3)	No. of Daily Values (# of samples and % of total samples)					
					>25 µg/m^3		>50 µg/m^3		>100µg/m^3	
					#	%	#	%	#	%
1992*	38	5	111	27.5	14	36.8	4	10.5	1	2.6
1993	61	8	101	33.7	32	52.5	10	16.4	1	1.6
1994	58	3	162	34.1	25	43.1	9	15.5	4	6.9
1995	61	5	101	29.9	27	44.3	11	18.0	1	1.6
1996	60	2	78	26.3	23	38.3	7	11.7	0	0
1997	60	3	84	24.9	21	35.0	6	10.0	0	0
1998	60	2	87	26.3	26	43.3	4	6.7	0	0
1999	59	4	83	23.7	21	35.6	5	8.5	0	0
2000	61	3	130	24.8	26	42.6	3	4.9	1	1.6
2001	61	3	52	19.2	16	26.2	1	1.6	0	0
2002	1	2	2	2.0	0	0.0	0	0.0	0	0

* <75% data capture, collection began March 25th 1992

Table 9 Annual Summary of Williams Lake Watertower High Volume PM_{10}

Year	No. of samples	Min. Value ($\mu g/m^3$)	Max. Value ($\mu g/m^3$)	Annual Arithmetic Mean ($\mu g/m^3$)	No. of Daily Values (# of samples and % of total samples)					
					>25$\mu g/m^3$		>50 $\mu g/m^3$		>100$\mu g/m^3$	
					#	%	#	%	#	%
1995*	9	2	33	11.0	1	11.1	0	0	0	0
1996	55	2	37	11.8	2	3.6	0	0	0	0
1997	59	2	43	13.0	4	6.8	0	0	0	0
1998	59	3	48	17.1	8	13.6	0	0	0	0
1999	57	5	74	16.6	10	17.5	1	1.8	0	0
2000	57	4	47	15.9	6	10.5	0	0	0	0
2001	59	3	38	12.8	6	10.2	0	0	0	0
2002	59	2	57	15.0	6	10.2	1	1.7	0	0

* <75% data capture, collection began Nov 11th 1995

Table 10 Annual Summary of Williams Lake 168 Mile Road High Volume PM_{10}

Year	No. of samples	Min. Value ($\mu g/m^3$)	Max. Value ($\mu g/m^3$)	Annual Arithmetic Mean ($\mu g/m^3$)	No. of Daily Values (# of samples and % of total samples)					
					>25 $\mu g/m^3$		>50 $\mu g/m^3$		>100$\mu g/m^3$	
					#	%	#	%	#	%
1997*	5	4	28	14.6	0	0.0	0	0	0	0
1998	60	3	67	22.9	21	35.0	4	6.7	0	0
1999	59	6	61	21.6	17	28.8	2	3.4	0	0
2000	61	4	96	20.9	20	32.8	2	3.3	0	0
2001	61	3	67	18.0	14	23.0	1	1.6	0	0
2002	61	4	77	18.9	2	3.3	2	3.3	0	0

* <75% data capture, collection began Dec 6th 1997

Table 11 Annual Trend Summary for Continuous PM_{10} Data Collected at the Skyline School Ambient Monitoring Site, 2001-2002

Year	Hours of Data	Annual Average ($\mu g/m^3$)	Maximum Hourly Value ($\mu g/m^3$)	Maximum Rolling 24-hour Value ($\mu g/m^3$)	No. (%) of Rolling 24-hour periods > 25 $\mu g/m^3$	No. (%) of Rolling 24-hour periods > 50 $\mu g/m^3$	No. (%) of Rolling 24-hour periods > 100 $\mu g/m^3$
2001	3481	29.26	458.0	125.6	1532 (44.1%)	486 (14.0%)	88 (2.5%)
2002	8692	26.96	602.0	111.0	3864 (44.3%)	875 (10.0%)	15 (0.2%)

Table 12 2001 Summary of Continuous PM_{10} Data for the Williams Lake Skyline School Ambient Monitoring Station

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value ($\mu g/m^3$)	Minimum Rolling 24-hour Value ($\mu g/m^3$)	Monthly Mean 24-hour Value ($\mu g/m^3$)
	> 25 $\mu g/m^3$		> 50 $\mu g/m^3$		>100 $\mu g/m^3$				
	#	%	#	%	#	%			
August	400	73.5%	208	38.2%	66	12.1%	125.60	7.09	49.75
September	367	51.0%	126	17.5%	0	0.0%	94.54	9.63	31.84
October	335	45.0%	53	7.1%	0	0.0%	57.75	4.83	26.22
November	364	50.6%	99	13.8%	22	3.1%	114.80	6.36	30.48
December	66	8.9%	0	0.0%	0	0.0%	43.54	3.58	13.18
Total	1532	44.1%	486	14.0%	88	2.5%	**Annual Average: 29.26**		

Table 13 2002 Summary of Continuous PM_{10} Data for the Williams Lake Skyline School Ambient Monitoring Station

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value ($\mu g/m^3$)	Minimum Rolling 24-hour Value ($\mu g/m^3$)	Monthly Mean 24-hour Value ($\mu g/m^3$)
	> 25 $\mu g/m^3$		> 50 $\mu g/m^3$		>100 $\mu g/m^3$				
	#	%	#	%	#	%			
January	83	11.2%	0	0%	0	0%	43.88	1.54	13.71
February	113	16.8%	0	0%	0	0%	37.38	2.96	15.80
March	324	43.5%	58	7.8%	0	0%	89.17	3.50	26.79
April	467	64.9%	183	25.4%	0	0%	95.63	7.63	38.88
May	337	45.3%	61	8.2%	15	2.0%	111.00	4.08	26.50
June	524	72.8%	128	17.8%	0	0%	65.77	6.30	34.89
July	456	61.3%	82	11.0%	0	0%	65.67	9.00	31.36
August	461	64.4%	152	21.2%	0	0%	99.04	5.26	35.81
September	237	32.9%	20	2.8%	0	0%	63.32	6.54	23.65
October	334	44.9%	0	0%	0	0%	46.83	7.50	23.51
November	340	47.2%	137	19.0%	0	0%	91.46	6.63	31.40
December	188	25.3%	54	7.3%	0	0%	65.08	4.21	21.36
Total	3864	44.3%	875	10.0%	15	0.2%	**Annual Average: 26.96**		

Table 14 Annual Trend Summary for Continuous PM_{10} Data Collected at the Columneetza Ambient Monitoring Site, 1992-2002

Year	Hours of Data	Annual Average ($\mu g/m^3$)	Maximum Hourly Value ($\mu g/m^3$)	Maximum Rolling 24-hour Value ($\mu g/m^3$)	No. (%) of Rolling 24-hour periods > 25 $\mu g/m^3$	No. (%) of Rolling 24-hour periods > 50 $\mu g/m^3$	No. (%) of Rolling 24-hour periods > 100 $\mu g/m^3$
1992	366	14.36	60	28.67	9 (2.6%)	0 (0.0%)	0 (0.0%)
1993	6725	22.77	217	77.21	2328 (34.8%)	309 (4.6%)	0 (0.0%)
1994	7620	21.19	413	89.57	1975 (26.2%)	276 (3.7%)	0 (0.0%)
1995	8451	21.54	302	98.67	2545 (30.3%)	400 (4.8%)	0 (0.0%)
1996	6597	20.74	359	144.10	1472 (24.1%)	351 (5.7%)	33 (0.5%)
1997	8678	17.71	311	68.50	1885 (21.7%)	88 (1.0%)	0 (0.0%)
1998	8672	19.58	496	88.08	2174 (25.0%)	148 (1.7%)	0 (0.0%)
1999	8731	16.72	427	62.75	1253 (14.3%)	43 (0.5%)	0 (0.0%)
2000	8552	17.68	399	63.58	1543 (18.1%)	59 (0.7%)	0 (0.0%)
2001	8734	16.53	157	51.21	1448 (16.5%)	3 (0.0%)	0 (0.0%)
2002	8650	17.77	237	84.33	1493 (17.3%)	163 (1.9%)	0 (0.0%)

Table 15 1992 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value ($\mu g/m3$)	Minimum Rolling 24-hour Value ($\mu g/m3$)	Monthly Mean 24-hour Value ($\mu g/m^3$)
	> 25 $\mu g/m3$		> 50 $\mu g/m3$		>100 $\mu g/m3$				
	#	%	#	%	#	%			
December	9	2.6%	0	0.0%	0	0.0%	28.67	7.17	14.36
Total	9	2.6%	0	0.0%	0	0.0%	**Annual Average: 14.36**		

Table 16 1993 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	397	58.0%	90	13.1%	0	0.0%	77.21	0.67	29.63
February	380	56.5%	159	23.7%	0	0.0%	76.29	4.13	31.21
March	25	15.8%	0	0.0%	0	0.0%	50.00	8.75	19.89
April	14	1.9%	0	0.0%	0	0.0%	27.42	5.25	15.88
May	38	26.8%	0	0.0%	0	0.0%	33.00	8.88	19.18
June	23	21.1%	0	0.0%	0	0.0%	31.17	3.71	16.53
July	113	16.3%	0	0.0%	0	0.0%	36.13	4.96	17.07
August	203	27.3%	0	0.0%	0	0.0%	46.08	4.58	19.43
September	394	56.2%	27	3.9%	0	0.0%	55.58	8.46	28.24
October	326	43.8%	3	0.4%	0	0.0%	50.63	5.42	24.36
November	246	40.7%	30	5.0%	0	0.0%	72.04	5.13	23.85
December	169	23.9%	0	0.0%	0	0.0%	42.63	4.08	18.58
Total	2328	34.8%	309	4.6%	0	0.0%	**Annual Average: 22.77**		

Table 17 1994 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	74	9.9%	10	1.3%	0	0.0%	55.92	3.70	17.23
February	119	17.7%	4	0.6%	0	0.0%	51.46	7.42	19.13
March	406	66.3%	225	36.8%	0	0.0%	89.57	7.46	42.05
April	323	44.9%	18	2.5%	0	0.0%	70.33	5.58	23.15
May	152	21.3%	0	0.0%	0	0.0%	41.25	6.63	18.67
June	140	19.4%	0	0.0%	0	0.0%	42.75	6.88	18.10
July	216	30.9%	0	0.0%	0	0.0%	42.56	7.67	21.29
August	235	33.0%	14	2.0%	0	0.0%	69.50	7.13	23.28
September	154	41.0%	5	1.3%	0	0.0%	54.58	6.54	24.59
October	32	9.1%	0	0.0%	0	0.0%	30.83	5.67	18.04
November	63	8.8%	0	0.0%	0	0.0%	30.17	4.25	14.73
December	61	12.5%	0	0.0%	0	0.0%	34.67	3.21	15.06
Total	1975	26.2%	276	3.7%	0	0.0%	**Annual Average: 21.19**		

Table 18 1995 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	277	37.2%	165	22.2%	0	0.0%	98.67	2.63	30.03
February	245	37.6%	60	9.2%	0	0.0%	79.21	4.58	24.88
March	264	35.5%	53	7.1%	0	0.0%	76.29	5.29	25.22
April	151	21.0%	0	0.0%	0	0.0%	44.88	4.92	16.88
May	279	52.0%	0	0.0%	0	0.0%	47.50	3.38	24.41
June	213	32.1%	0	0.0%	0	0.0%	44.83	3.13	21.06
July	100	13.4%	0	0.0%	0	0.0%	38.96	4.29	15.32
August	96	13.6%	0	0.0%	0	0.0%	34.54	5.46	17.63
September	540	75.0%	60	8.3%	0	0.0%	68.92	8.67	32.11
October	53	7.1%	0	0.0%	0	0.0%	40.50	2.33	13.92
November	222	30.8%	39	5.4%	0	0.0%	59.22	3.79	21.67
December	105	14.6%	23	3.2%	0	0.0%	61.21	0.79	16.43
Total	2545	30.3%	400	4.8%	0	0.0%	**Annual Average: 21.54**		

Table 19 1996 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	24	3.2%	0	0.0%	0	0.0%	30.54	2.46	14.21
February	261	37.5%	131	18.8%	7	1.0%	144.10	2.00	31.09
March	388	52.2%	136	18.3%	21	2.8%	140.70	4.79	30.59
April	119	16.5%	0	0.0%	0	0.0%	34.38	2.25	17.43
May	19	2.9%	0	0.0%	0	0.0%	32.67	4.63	14.47
June									
July	158	60.1%	3	1.1%	0	0.0%	94.84	4.77	27.47
August	120	43.0%	43	15.4%	5	1.8%	105.30	4.92	25.51
September	86	38.4%	10	4.5%	0	0.0%	52.76	4.17	20.10
October	119	26.2%	0	0.0%	0	0.0%	45.29	5.29	19.91
November	138	23.5%	28	4.8%	0	0.0%	62.88	2.25	18.68
December	40	5.4%	0	0.0%	0	0.0%	31.96	0.21	13.39
Total	1472	24.1%	351	5.7%	33	0.5%	**Annual Average: 20.74**		

Table 20 1997 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value ($\mu g/m^3$)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	54	8.1%	0	0.0%	0	0.0%	30.75	2.96	14.79
February	231	34.4%	10	1.5%	0	0.0%	59.67	3.50	21.55
March	157	21.1%	0	0.0%	0	0.0%	44.83	3.58	17.97
April	238	33.1%	36	5.0%	0	0.0%	63.50	4.63	21.91
May	142	19.1%	0	0.0%	0	0.0%	43.30	5.33	17.24
June	63	8.8%	0	0.0%	0	0.0%	39.00	5.08	14.13
July	75	10.1%	0	0.0%	0	0.0%	30.88	5.50	14.04
August	174	23.4%	0	0.0%	0	0.0%	37.75	6.54	17.90
September	253	35.1%	5	0.7%	0	0.0%	54.00	5.50	20.87
October	136	18.3%	0	0.0%	0	0.0%	48.54	2.58	17.43
November	260	36.1%	14	1.9%	0	0.0%	55.50	3.04	20.58
December	102	13.8%	23	3.1%	0	0.0%	68.50	4.22	14.55
Total	1885	21.7%	88	1.0%	0	0.0%	**Annual Average: 17.71**		

Table 21 1998 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value ($\mu g/m^3$)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	65	8.9%	0	0.0%	0	0.0%	36.08	1.67	14.16
February	158	23.5%	1	0.1%	0	0.0%	50.88	6.13	19.59
March	157	21.1%	0	0.0%	0	0.0%	48.21	6.36	18.96
April	269	37.4%	14	1.9%	0	0.0%	61.42	4.83	22.92
May	284	39.8%	48	6.7%	0	0.0%	70.04	4.58	24.08
June	194	26.9%	5	0.7%	0	0.0%	56.13	2.83	18.89
July	160	21.5%	20	2.7%	0	0.0%	55.04	3.71	18.72
August	247	33.2%	11	1.5%	0	0.0%	56.96	5.79	21.62
September	255	36.0%	49	6.9%	0	0.0%	88.08	8.54	24.00
October	162	22.6%	0	0.0%	0	0.0%	46.92	5.42	17.98
November	132	18.3%	0	0.0%	0	0.0%	49.63	7.26	20.06
December	91	12.2%	0	0.0%	0	0.0%	49.13	3.88	14.37
Total	2174	25.0%	148	1.7%	0	0.0%	**Annual Average: 19.58**		

Table 22 1999 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	50	6.7%	0	0.0%	0	0.0%	36.63	3.58	14.72
February	28	4.2%	0	0.0%	0	0.0%	29.21	4.25	12.08
March	164	22.0%	1	0.1%	0	0.0%	50.63	6.17	20.64
April	210	29.2%	12	1.7%	0	0.0%	55.17	4.67	20.76
May	47	6.3%	0	0.0%	0	0.0%	42.88	4.54	14.56
June	79	11.0%	0	0.0%	0	0.0%	37.04	4.50	14.39
July	93	12.5%	0	0.0%	0	0.0%	36.00	5.33	16.99
August	158	21.2%	0	0.0%	0	0.0%	42.79	5.96	19.60
September	230	31.9%	30	4.2%	0	0.0%	62.75	4.04	21.76
October	50	6.7%	0	0.0%	0	0.0%	43.42	5.50	15.39
November	106	14.7%	0	0.0%	0	0.0%	49.54	5.17	18.12
December	38	5.1%	0	0.0%	0	0.0%	34.15	4.04	11.37
Total	1253	14.3%	43	0.5%	0	0.0%	**Annual Average: 16.72**		

Table 23 2000 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	161	24.7%	0	0.0%	0	0.0%	38.21	4.83	18.23
February	180	26.5%	0	0.0%	0	0.0%	45.29	6.63	19.89
March	155	20.8%	8	1.1%	0	0.0%	50.96	5.88	19.04
April	213	29.6%	19	2.6%	0	0.0%	56.67	6.83	21.22
May	73	9.8%	0	0.0%	0	0.0%	44.00	6.13	15.44
June	92	12.8%	0	0.0%	0	0.0%	43.92	2.88	15.64
July	56	7.5%	0	0.0%	0	0.0%	32.38	4.58	14.28
August	108	17.2%	0	0.0%	0	0.0%	36.17	5.50	17.03
September	133	18.5%	32	4.4%	0	0.0%	63.58	3.71	17.88
October	91	12.2%	0	0.0%	0	0.0%	36.67	4.79	16.56
November	165	23.7%	0	0.0%	0	0.0%	41.38	5.08	19.44
December	116	15.6%	0	0.0%	0	0.0%	41.42	1.04	17.75
Total	1543	18.1%	59	0.7%	0	0.0%	**Annual Average: 17.68**		

Table 24 2001 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	87	11.7%	0	0.0%	0	0.0%	48.96	3.96	14.92
February	233	34.7%	0	0.0%	0	0.0%	48.48	5.21	22.40
March	187	25.1%	0	0.0%	0	0.0%	46.75	4.88	18.98
April	110	15.3%	0	0.0%	0	0.0%	37.25	5.21	17.83
May	104	14.0%	0	0.0%	0	0.0%	37.08	5.67	17.13
June	0	0.0%	0	0.0%	0	0.0%	24.79	4.42	11.11
July	7	0.9%	0	0.0%	0	0.0%	25.63	5.08	13.36
August	215	28.9%	3	0.4%	0	0.0%	51.21	4.79	18.49
September	137	19.0%	0	0.0%	0	0.0%	48.75	3.61	16.29
October	62	8.3%	0	0.0%	0	0.0%	32.63	6.13	14.88
November	139	19.3%	0	0.0%	0	0.0%	37.58	4.54	16.44
December	167	22.4%	0	0.0%	0	0.0%	49.29	2.75	17.01
Total	1448	16.5%	3	0.0%	0	0.0%	**Annual Average: 16.53**		

Table 25 2002 Summary of Continuous PM_{10} Data for the Williams Lake Columneetza School

Month	No. of Rolling 24-hour Average Values (# of samples and % of total samples)						Maximum Rolling 24-hour Value (µg/m3)	Minimum Rolling 24-hour Value (µg/m3)	Monthly Mean 24-hour Value (µg/m^3)
	> 25 µg/m3		> 50 µg/m3		>100 µg/m3				
	#	%	#	%	#	%			
January	91	12.2%	0	0.0%	0	0.0%	41.63	0.88	14.64
February	110	16.4%	0	0.0%	0	0.0%	37.54	2.42	16.36
March	206	28.5%	5	0.7%	0	0.0%	52.67	4.38	20.69
April	233	32.4%	0	0.0%	0	0.0%	43.50	4.46	21.13
May	48	6.5%	0	0.0%	0	0.0%	46.04	3.75	14.65
June	131	18.2%	0	0.0%	0	0.0%	37.00	3.17	17.40
July	0	0.0%	0	0.0%	0	0.0%	22.75	5.58	13.12
August	72	9.7%	0	0.0%	0	0.0%	36.00	3.42	16.42
September	33	4.6%	0	0.0%	0	0.0%	37.17	4.54	14.08
October	161	21.6%	0	0.0%	0	0.0%	47.63	6.17	19.05
November	267	37.1%	137	19.0%	0	0.0%	84.33	6.09	27.31
December	141	19.0%	21	2.8%	0	0.0%	60.00	2.42	18.17
Total	1493	17.3%	163	1.9%	0	0.0%	**Annual Average: 17.77**		

Table 26 Annual Trends in PM_{10} Concentrations for 1993-2002 inclusive, at the Columneetza Continuous Monitoring Station.

	Mean	75th Percentile (24-hour value)	95th Percentile (24-hour value)	98th Percentile (24-hour value)
N (# of Years)	10	10	10	10
Slope	-.639	-0.873	-1.888	-3.141
Correlation Coefficient (r)	0.88	0.87	0.72	0.79
P-Value	0.001	0.001	0.020	0.007

Table 27 Day of the Week (Hebdomadal) Variations in Continuous PM_{10} Measurements at Williams Lake Ambient Monitoring Sites (in μg/m3). Maximum and Minimum Values are Shaded.

Skyline (2001 – 2002)								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Max/Min Diff. ($\mu g/m^3$)
Mean	16.71	27.87	31.64	31.33	34.64	31.88	19.20	17.93
75th %ile	21.36	41.63	40.79	47.29	46.29	44.38	24.50	25.93
95th %ile	32.06	55.18	82.66	63.59	81.02	63.60	36.21	50.60
98th %ile	38.40	71.33	91.81	89.07	97.15	82.70	45.68	58.75
Max	42.42	80.29	94.17	108.54	114.25	110.75	60.38	71.83
Columneetza (1992 – 2002)								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Max/Min Diff. ($\mu g/m^3$)
Mean	14.05	18.89	21.20	21.51	21.65	20.39	15.31	7.60
75th %ile	17.58	23.72	27.13	27.42	26.96	25.56	19.00	9.83
95th %ile	26.61	40.94	43.92	44.16	44.37	42.38	29.41	17.75
98th %ile	31.17	50.11	54.85	58.46	59.22	50.20	36.91	28.05
Max	62.42	67.92	92.88	94.30	139.17	88.92	63.54	76.75

Table 28 Annual Trend Summary of Non-continuous $PM_{2.5}$ Data for Columneetza

Year	**Annual Arithmetic Mean ($\mu g/m^3$)**	**Annual Geometric Mean ($\mu g/m^3$)**	**Daily Values >15 $\mu g/m^3$**		**Maximum Daily Value ($\mu g/m^3$)**	**Number of Samples**	**3 year 98th Percentile -For CWS**	**Attainment with CWS (30 $\mu g/m^3$)**
			(#)	(%)				
1994	10.3	8.6	5	29.4%	21	17*	20.4	
1995	10.7	8.9	8	13.6%	44	59	38.9	
1996	10.0	8.8	7	11.9%	27	59	26.7	28.6
1997	8.8	7.5	8	14.5%	25	55	22.8	29.5
1998	7.2	6.4	3	4.9%	19	61	17.6	22.4
1999	7.6	6.7	3	5.1%	22	59	20.4	20.3
2000	10.0	8.7	9	14.8%	26	61	24.0	20.7

* Observations began in September 1994.

Table 29 Annual Trend Summary of Non-continuous $PM_{2.5}$ Data for the Firehall Site

Year	**Annual Arithmetic Mean ($\mu g/m^3$)**	**Annual Geometric Mean ($\mu g/m^3$)**	**Daily Values >15 $\mu g/m^3$**		**Maximum Daily Value ($\mu g/m^3$)**	**Number of Samples**	**3 year 98th Percentile -For CWS**	**Attainment with CWS (30 $\mu g/m^3$)**
			(#)	**(%)**				
2001	7.9	7.1	4	8.9%	20	45*	18.2	
2002	8.3	7.2	5	8.5%	24	59	19.0	

* Observations began in April 2001.

Table 30 Annual Trend Summary for Continuous $PM_{2.5}$ Data Collected at the Skyline Ambient Monitoring Site, 2001-2002

Year	**Valid Rolling 24-hour periods**	**Annual Average ($\mu g/m^3$)**	**Max Hourly Value ($\mu g/m^3$)**	**Max Rolling 24-hour Value ($\mu g/m^3$)**	**98th Percentile -For CWS ($\mu g/m^3$)**	**Minimum Rolling 24-hour Value ($\mu g/m^3$)**	**Daily Values >15 $\mu g/m^3$**	
							(#)	**(%)**
2001*	3472	5.76	60.00	28.79		0.13	208	6.0%
2002	8723	6.46	73.00	38.29	20	0.00	393	4.5%

* Site installed in August 2001.

Table 31 Annual Trend Summary for Continuous $PM_{2.5}$ Data Collected at the Columneetza Ambient Monitoring Site, 2001-2002

Year	Valid Rolling 24-hour periods	Annual Average (µg/m^3)	Max Hourly Value (µg/m^3)	Max Rolling 24-hour Value (µg/m^3)	98th Percentile -For CWS (µg/m^3)	Minimum Rolling 24-hour Value (µg/m^3)	Daily Values >15 µg/m^3	
							(#)	(%)
2001*	8008	5.95	62.00	31.71		0.29	460	5.7%
2002	8677	6.71	83.00	43.96	23	0.00	574	6.6%

* Site installed in late January 2001.

Table 32 Summary of Continuous $PM_{2.5}$ Data Collected at the Skyline Ambient Monitoring Site, 2001

Month	Monthly Mean 24-hour Value (µg/m^3)	Valid Rolling 24-hour periods	Minimum Rolling 24-hour Value (µg/m^3)	Maximum Rolling 24-hour Value (µg/m^3)	Daily Values >15 µg/m^3	
					(#)	(%)
August	7.26	544	0.54	22.25	63	11.6%
September	5.08	720	0.50	17.54	19	2.6%
October	4.04	744	0.79	8.92	0	0.0%
November	5.90	720	0.79	23.33	22	3.1%
December	6.89	744	0.13	28.79	104	14.0%
Average	5.83		0.55	20.17	42	6.3%
Total		3472				

Table 33 Summary of Continuous $PM_{2.5}$ Data Collected at the Skyline Ambient Monitoring Site, 2002

Month	Monthly Mean 24-hour Value (µg/m^3)	Valid Rolling 24-hour periods	Minimum Rolling 24-hour Value (µg/m^3)	Maximum Rolling 24-hour Value (µg/m^3)	Daily Values >15 µg/m^3	
					(#)	(%)
January	5.73	744	0.00	20.00	23	3.1%
February	4.99	672	0.04	13.71	0	0.0%
March	6.94	744	0.63	21.08	45	6.0%
April	6.96	720	0.83	16.29	13	1.8%
May	5.87	744	0.63	18.00	9	1.2%
June	8.65	720	2.00	17.63	29	4.0%
July	4.68	708	1.08	11.48	0	0.0%
August	4.83	743	0.67	11.25	0	0.0%
September	3.97	720	0.83	7.71	0	0.0%
October	6.33	744	1.33	21.67	15	2.0%
November	10.64	720	0.38	38.29	175	24.3%
December	7.77	744	0.04	22.25	84	11.3%
Average	6.45		0.70	18.28	33	4.5%
Total		8723				

Table 34 Summary of Continuous $PM_{2.5}$ Data Collected at the Columneetza Ambient Monitoring Site, 2001

Month	Monthly Mean 24-hour Value ($\mu g/m^3$)	Valid Rolling 24-hour periods	Minimum Rolling 24-hour Value ($\mu g/m^3$)	Maximum Rolling 24-hour Value ($\mu g/m^3$)	Daily Values >15 $\mu g/m^3$	
					(#)	(%)
January	5.56	0*				
February	9.70	664	0.63	20.27	97	14.6%
March	6.21	744	0.83	18.46	31	4.2%
April	4.50	720	0.54	10.96	0	0.0%
May	4.01	744	0.71	10.58	0	0.0%
June	2.85	720	0.46	6.54	0	0.0%
July	3.70	744	1.00	8.75	0	0.0%
August	6.04	744	0.50	20.58	58	7.8%
September	5.28	720	0.67	16.13	13	1.8%
October	5.56	744	0.92	14.17	0	0.0%
November	7.27	720	0.58	27.63	62	8.6%
December	10.54	744	0.29	31.71	199	26.7%
Average	5.94		0.65	16.89	42	5.8%
Total		8008				

* Observations began on January 31, 2001.

Table 35 Summary of Continuous $PM_{2.5}$ Data Collected at the Columneetza Ambient Monitoring Site, 2002

Month	Monthly Mean 24-hour Value ($\mu g/m^3$)	Valid Rolling 24-hour periods	Minimum Rolling 24-hour Value ($\mu g/m^3$)	Maximum Rolling 24-hour Value ($\mu g/m^3$)	Daily Values >15 $\mu g/m^3$	
					(#)	(%)
January	8.57	744	0.00	21.08	93	12.5%
February	6.95	672	0.00	19.88	19	2.8%
March	8.49	744	1.25	23.79	81	10.9%
April	6.73	720	0.13	18.79	30	4.2%
May	3.46	744	0.71	7.29	0	0.0%
June	4.94	720	0.29	11.25	0	0.0%
July	3.56	661	1.08	7.33	0	0.0%
August	4.38	744	0.67	10.33	0	0.0%
September	4.53	720	1.09	11.57	0	0.0%
October	7.29	744	2.04	26.13	18	2.4%
November	12.05	720	0.92	43.96	194	26.9%
December	9.36	744	0.04	25.42	139	18.7%
Average	6.69		0.68	18.90	48	6.0%
Total		8677				

Table 36 Day of the Week Variations in Continuous $PM_{2.5}$ Concentrations (μg/m3) at the Skyline and Columneetza Monitoring Sites 2001 – 2002 inclusive. Maximum and Minimum Values are Shaded.

Skyline								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Max - Min
Mean	5.42	5.71	6.05	6.02	6.95	7.68	6.01	2.26
75th Percentile	6.79	7.44	7.27	7.62	8.17	9.08	7.08	2.29
95th Percentile	11.24	11.65	13.70	12.01	15.65	20.01	15.13	8.77
98th Percentile	21.21	15.52	17.96	14.69	22.93	24.28	21.64	9.59
Max	30.00	19.54	20.00	14.75	24.79	24.79	34.54	19.79
Columneetza								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Max - Min
Mean	5.98	5.90	5.96	6.15	6.86	7.33	6.25	1.43
75th Percentile	6.67	6.88	7.04	7.69	8.65	9.40	8.02	2.73
95th Percentile	16.17	14.12	14.26	13.76	17.45	19.50	15.07	5.74
98th Percentile	24.36	20.32	18.67	21.71	26.09	28.67	21.26	10.00
Max	33.67	22.88	19.08	22.00	26.71	29.00	35.83	16.75

Table 37 Annual Variations in Continuous Ozone Measurements at Columneetza (in ppb).

Year	Maximum 1-Hour Value (ppb)	Maximum 8-Hour Value (ppb)	98th Percentile 8-Hour Value for CWS (ppb)	Annual Average (ppb)
1992*	77.5	59.7	39.1	17.4
1993	69.1	53.4	44.9	17.5
1994	64.3	57.6	43.2	20.5
1995	57.8	53.3	41.0	17.2
1996	58.2	55.1	43.3	18.5
1997	55.8	52.4	44.0	17.6
1998	60.6	59.1	43.2	18.8
1999	59.2	50.9	41.7	18.1
2000	66.7	51.1	42.9	16.8
2001	56.0	53.4	42.8	19.0
2002	54.2	51.4	40.5	17.0

* Observations began in April, 1992.

Table 38 Monthly Variations in Continuous Ozone Measurements (in ppb) at Columneetza, 1992-2000.

Month	Maximum Hourly Value (ppb)	Maximum 8-Hour Average (ppb)	Monthly Average
January	45.1	37.9	11.8
February	49.2	48.1	17.7
March	59.2	52.4	24.7
April	69.1	51.5	26.1
May	66.7	59.1	26.5
June	77.5	59.7	22.4
July	72.9	58.7	18.5
August	56.5	52.7	16.6
September	49.0	44.7	14.5
October	59.1	47.7	12.9
November	42.8	40.9	11.9
December	41.2	40.3	12.9

Table 39 Annual Percentage of Time that Continuous Hourly Ozone Measurements at Columneetza (in ppb) Were Above the Canadian Federal Objectives of 46.7 ppb (100 $\mu g/m^3$) and 74.7 ppb (160 $\mu g/m^3$). The 8-Hour CWS of 65 ppb was never exceeded during 1992-2002.

Year	% of Time > 46.7 ppb	% of Time > 74.7 ppb
1992*	1.00%	0.04%
1993	2.44%	0.00%
1994	1.70%	0.00%
1995	0.79%	0.00%
1996	1.30%	0.00%
1997	1.69%	0.00%
1998	1.98%	0.00%
1999	0.95%	0.00%
2000	1.23%	0.00%
2001	1.10%	0.00%
2002	0.48%	0.00%

* Obervations began in April, 1992.

Table 40 Monthly Percentage of Time that Continuous Hourly Ozone Measurements at Columneetza (in ppb) were Above the Canadian Federal Objectives of 46.7 ppb (100 $\mu g/m^3$) and 74.7 ppb (160 $\mu g/m^3$). The 8-Hour CWS of 65 ppb was never exceeded during 1992-2002.

Month	% of Time > 46.7 ppb	% of Time > 74.7 ppb
January	0.00%	0.00%
February	0.20%	0.00%
March	2.27%	0.00%
April	3.22%	0.00%
May	6.28%	0.00%
June	2.41%	0.03%
July	0.63%	0.00%
August	0.66%	0.00%
September	0.09%	0.00%
October	0.08%	0.00%
November	0.00%	0.00%
December	0.00%	0.00%

Table 41 Annual Variations in Continuous NO_2 and NO_x Measurements at Columneetza (in $\mu g/m^3$).

Year	Annual Average ($\mu g/m^3$)			Maximum Hourly Value ($\mu g/m^3$)			Maximum 24-hour Value ($\mu g/m^3$)		
	NO_2	% of NO_2 objective	NO_x	NO_2	% of NO_2 objective	NO_x	NO_2	% of NO_2 objective	NO_x
1993	16.1	26.8	24.2	115.0	28.75	406.0	59.7	29.9	176.7
1994	14.9	24.8	22.4	88.0	22.0	405.0	64.1	32.1	139.9
1995	14.4	24.0	22.6	115.0	28.75	530.0	56.1	28.1	216.5
1996	15.4	25.7	22.7	92.0	23.0	470.0	65.5	32.8	186.9
1997	17.4	29.0	27.8	112.8	28.2	391.7	61.8	30.0	168.9
1998	17.9	29.8	27.8	88.0	22.0	419.3	53.8	26.9	195.1
1999	18.3	30.5	30.1	88.0	22.0	526.5	60.2	30.1	219.5

Table 42 Monthly Variations in Continuous Hourly NO_2 and NO_x Measurements at Columneetza (in $\mu g/m^3$), 1992-2000.

Month	Annual Average ($\mu g/m^3$)		Maximum Hourly Value ($\mu g/m^3$)		Maximum 24-hour Value ($\mu g/m^3$)	
	NO_2	NO_x	NO_2	NO_x	NO_2	NO_x
January	28.0	54.4	115.0	526.5	65.5	219.5
February	26.6	41.5	103.0	419.3	60.5	195.1
March	20.7	26.3	84.1	201.0	53.5	88.9
April	13.8	16.4	82.2	129.7	36.5	52.8
May	10.4	12.0	88.0	116.0	36.6	47.3
June	8.3	9.7	75.0	116.0	29.7	38.5
July	8.8	11.0	84.0	104.0	38.9	44.8
August	11.5	15.4	88.0	110.8	45.2	59.6
September	17.0	25.1	86.0	244.0	48.7	67.1
October	14.6	25.5	70.8	185.9	45.0	90.8
November	18.9	34.8	92.0	470.0	60.2	186.9
December	25.7	47.7	115.0	530.0	64.1	216.5

Table 43 Day of the Week (Hebdomadal) Variations in Continuous NO_2 and NO_x Measurements at Columneetza (in $\mu g/m^3$), 1992-2000. Maximum and Minimum Values are Shaded.

NO_2								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Max - Min
Mean	12.3	16.2	18.4	18.7	18.5	17.7	13.8	6.4
75th Percentile	21.0	27.0	31.0	31.0	32.5	31.0	24.9	11.5
95th Percentile	45.9	52.0	55.0	55.0	55.5	54.0	47.8	9.6
98th Percentile	55.0	61.2	63.1	65.0	65.0	63.0	55.5	10.0
Max	88.0	92.0	115.0	90.0	115.0	91.8	112.8	27.0
NO_x								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Max - Min
Mean	17.0	24.7	29.8	30.1	29.0	27.2	19.7	13.1
75th Percentile	25.4	35.6	43.8	43.7	42.0	40.3	30.5	18.4
95th Percentile	68.0	92.6	103.0	108.0	102.0	94.2	74.0	40.0
98th Percentile	94.0	123.5	145.6	152.0	138.0	133.3	101.0	58.0
Max	218.3	470.0	526.5	406.0	530.0	417.2	326.1	311.7

Table 44 Summary of Williams Lake Measured Total PAH at the Anne Stevenson School Site

Year	No. of samples	Min. Value (µg/m^3)	Max. Value (µg/m^3)	Annual Arithmetic Mean (µg/m^3)
1992	65	0.88	250	28.6
1993	56	1.02	390	55.3
1994	24	0.12	390	66.4

Table 45 Summary of Measured PAH Data at the Williams Lake Anne Stevenson School Site

Pollutant	Guide-line*	1992			1993			1994			Maximum % of Guideline
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
Acenaphthene	1000	0.10	8.0	2.5	0.13	37.0	3.5	0.45	7.7	2.4	3.7%
Acenaphthylene	N/A	0.31	36.0	8.3	0.48	280.0	23.3	0.49	98.0	19.5	N/A
Fluorene	2000	0.62	14.0	3.6	0.51	21.0	4.7	0.79	17.0	5.1	1.1%
Phenanene	500	1.80	60.0	13.1	1.70	68.0	17.1	3.60	110.0	26.8	22.0%
Anthracene	500	0.05	5.7	1.4	0.13	43.0	3.9	0.05	16.0	2.9	8.6%
Fluoranthene	N/A	0.31	14.0	3.5	0.47	42.0	5.1	0.55	46.0	7.8	N/A
Pyrene	500	0.25	120.0	6.8	0.38	41.0	4.9	0.49	45.0	7.1	24.0%
Benz(a)anthracene	N/A	0.05	3.9	0.7	0.05	18.0	1.5	0.05	8.9	1.6	N/A
Chrysene	500	0.05	4.3	1.0	0.07	12.0	1.3	0.15	14.0	2.3	2.8%
Benzo(b+k) pyrene	500	0.05	11.0	1.5	0.05	13.0	1.6	0.05	15.0	2.7	3.0%
Benzo(a)pyrene	30	0.05	5.6	0.9	0.05	7.3	1.1	0.05	9.2	1.4	30.7%
Dibenz(a,h) pyrene	N/A	0.06	2.3	0.3	0.10	2.1	0.2	0.10	1.7	0.3	N/A
Indeno(1,2,3-c,d) pyrene	N/A	0.10	2.7	0.5	0.10	7.6	0.7	0.10	6.6	1.0	N/A
Benzo (g,h,i)perylene	N/A	0.10	5.1	0.8	0.10	8.1	0.8	0.10	10.0	1.4	N/A
Total PAHs	**N/A**	**6.60**	**249.8**	**44.8**	**4.53**	**390.0**	**66.5**	**7.20**	**390.0**	**80.5**	**N/A**

* Lower of Ontario Point of Impingement or ESL.

Table 46 1996 to 2000 Summary of Metals data at the Williams Lake Skyline Site

Metal (Minimum Detection Limit - µg/m^3)	# of Samples	Min (µg/m^3)	Max (µg/m^3)	Mean (µg/m^3)	Short-term ESL (µg/m^3)	Max % of 1-hour ESL	Annual ESL (µg/m^3)	Mean % of Annual ESL
Antimony (MDC-0.09)	99	0.0900	0.0900	0.0900	5	1.80%	0.5	18.00%
Arsenic (MDC -0.02)	99	0.0200	0.0700	0.0213	0.1	70.00%	0.01	n/a
Beryllium (MDC-0.0002)	99	0.0002	0.0005	0.0003	0.02	2.50%	0.002	13.18%
Bismuth (MDC-0.01)	99	0.0100	0.0100	0.0100	50	0.02%	5	0.20%
Boron (MDC- 2.00)	99	2.0000	9.8100	5.1729	100	9.81%	10	51.73%
Cadmium (MDC-0.03)	99	0.0300	0.0300	0.0300	0.1	30.00%	0.01	n/a
Chromium (MDC-0.01)	99	0.0100	0.0500	0.0223	1	5.00%	0.1	22.32%
Cobalt (MDC-0.002)	99	0.0020	0.0050	0.0023	0.2	2.50%	0.02	11.26%
Copper (MDC-0.02)	99	0.4000	0.4000	0.4000	10	4.00%	1	40.00%
Lead (MDC-0.30)	99	0.0300	0.3000	0.2591	1.5	20.00%	1.5	17.27%
Manganese (MDC -0.008)	99	0.0110	0.1290	0.0394	2	6.45%	0.2	19.70%
Molybdenum (MDC-0.002)	99	0.0020	0.0030	0.0020	50	0.01%	5	0.04%
Nickel (MDC-0.01)	99	0.0100	0.0200	0.0102	0.15	13.33%	0.015	68.01%
Phosphorus (MDC-0.02)	99	0.0300	0.1800	0.0667	1	18.00%	0.1	66.67%
Selenium (MDC-0.01)	99	0.0100	0.0100	0.0100	2	0.50%	0.2	5.00%
Silicon (MDC-0.07)	99	0.0700	0.4600	0.0822	50	0.92%	5	1.64%
Silver (MDC- 0.002)	99	0.0020	0.0020	0.0020	0.1	2.00%	0.01	20.00%
Strontium (MDC-0.1)	99	0.1000	0.7000	0.3859	20	3.50%	2	19.29%
Tellurium (MDC-0.01)	99	0.0100	0.0200	0.0101	1	2.00%	0.1	10.10%
Thallium (MDC-0.02)	99	0.0200	0.0200	0.0200	1	2.00%	0.1	20.00%
Tin (MDC-0.02)	99	0.0200	0.0200	0.0200	1	2.00%	0.1	20.00%
Titanium (MDC -0.04)	99	0.0700	0.4600	0.1664	50	0.92%	5	3.33%
Vanadium (MDC-0.003)	99	0.0060	0.0430	0.0167	0.5	8.60%	0.05	33.47%
Zinc (MDC-0.1)	99	0.1000	3.4000	0.5081	50	6.80%	5	10.16%
Zirconium (MDC-0.004)	94	0.0020	10.0000	0.0050	50	20.00%	5	0.10%

Table 47 1996 to 2000 Summary of Metals data at the Williams Lake Firehall Site

Metal (Minimum Detection Limit - µg/m^3)	# of Samples	Min (µg/m^3)	Max (µg/m^3)	Mean (µg/m^3)	Short-term ESL (µg/m^3)	Max % of 1-hour ESL	Annual ESL (µg/m^3)	Mean % of Annual ESL
Antimony (MDC-0.09)	98	0.0900	0.0900	0.0900	5	1.80%	0.5	18.00%
Arsenic (MDC -0.02)	98	0.0200	0.0400	0.0213	0.1	40.00%	0.01	n/a
Beryllium (MDC-0.0002)	98	0.0002	0.0020	0.0003	0.02	10.00%	0.002	14.23%
Bismuth (MDC-0.01)	98	0.0100	0.0100	0.0100	50	0.02%	5	0.20%
Boron (MDC- 2.00)	98	2.0300	15.1000	4.9054	100	15.10%	10	49.05%
Cadmium (MDC-0.03)	98	0.0300	0.0300	0.0300	0.1	30.00%	0.01	n/a
Chromium (MDC-0.01)	98	0.0100	0.0700	0.0210	1	7.00%	0.1	21.02%
Cobalt (MDC-0.002)	98	0.0020	0.0070	0.0022	0.2	3.50%	0.02	10.82%
Copper (MDC-0.02)	98	0.4000	0.4000	0.4000	10	4.00%	1	40.00%
Lead (MDC-0.30)	98	0.0300	0.3000	0.2614	1.5	20.00%	1.5	17.43%
Manganese (MDC -0.008)	98	0.0130	0.1330	0.0369	2	6.65%	0.2	18.44%
Molybdenum (MDC-0.002)	98	0.0020	0.0030	0.0020	50	0.01%	5	0.04%
Nickel (MDC-0.01)	98	0.0100	0.0200	0.0103	0.15	13.33%	0.015	68.71%
Phosphorus (MDC-0.02)	98	0.0200	0.1700	0.0631	1	17.00%	0.1	63.06%
Selenium (MDC-0.01)	98	0.0100	0.0100	0.0100	2	0.50%	0.2	5.00%
Silicon (MDC-0.07)	98	0.0700	0.6300	0.0872	50	1.26%	5	1.74%
Silver (MDC- 0.002)	98	0.0020	0.0020	0.0020	0.1	2.00%	0.01	20.00%
Strontium (MDC-0.1)	98	0.2000	1.1000	0.3724	20	5.50%	2	18.62%
Tellurium (MDC-0.01)	98	0.0100	0.0100	0.0100	1	1.00%	0.1	10.00%
Thallium (MDC-0.02)	98	0.0200	0.0250	0.0201	1	2.50%	0.1	20.05%
Tin (MDC-0.02)	98	0.0200	0.0200	0.0200	1	2.00%	0.1	20.00%
Titanium (MDC -0.04)	98	0.0700	0.4800	0.1586	50	0.96%	5	3.17%
Vanadium (MDC-0.003)	98	0.0050	0.0370	0.0156	0.5	7.40%	0.05	31.18%
Zinc (MDC-0.1)	98	0.0040	4.2000	0.5327	50	8.40%	5	10.65%
Zirconium (MDC-0.004)	98	0.0040	0.0180	0.0050	50	0.04%	5	0.10%

Table 48 1996 to 2000 Summary of Metals data at the Williams Lake Watertower Site

Metal (Minimum Detection Limit - µg/m^3)	# of Samples	Min (µg/m^3)	Max (µg/m^3)	Mean (µg/m^3)	Short-term ESL (µg/m^3)	Max % of 1-hour ESL	Annual ESL (µg/m^3)	Mean % of Annual ESL
Antimony (MDC-0.09)	98	0.0900	0.0900	0.0900	5	1.80%	0.5	18.00%
Arsenic (MDC -0.02)	98	0.0200	0.0400	0.0213	0.1	40.00%	0.01	n/a
Beryllium (MDC-0.0002)	98	0.0002	0.0020	0.0003	0.02	10.00%	0.002	14.23%
Bismuth (MDC-0.01)	98	0.0100	0.0100	0.0100	50	0.02%	5	0.20%
Boron (MDC- 2.00)	98	2.0300	15.1000	4.9054	100	15.10%	10	49.05%
Cadmium (MDC-0.03)	98	0.0300	0.0300	0.0300	0.1	30.00%	0.01	n/a
Chromium (MDC-0.01)	98	0.0100	0.0700	0.0210	1	7.00%	0.1	21.02%
Cobalt (MDC-0.002)	98	0.0020	0.0070	0.0022	0.2	3.50%	0.02	10.82%
Copper (MDC-0.02)	98	0.4000	0.4000	0.4000	10	4.00%	1	40.00%
Lead (MDC-0.30)	98	0.0300	0.3000	0.2614	1.5	20.00%	1.5	17.43%
Manganese (MDC -0.008)	98	0.0130	0.1330	0.0369	2	6.65%	0.2	18.44%
Molybdenum (MDC-0.002)	98	0.0020	0.0030	0.0020	50	0.01%	5	0.04%
Nickel (MDC-0.01)	98	0.0100	0.0200	0.0103	0.15	13.33%	0.015	68.71%
Phosphorus (MDC-0.02)	98	0.0200	0.1700	0.0631	1	17.00%	0.1	63.06%
Selenium (MDC-0.01)	98	0.0100	0.0100	0.0100	2	0.50%	0.2	5.00%
Silicon (MDC-0.07)	98	0.0700	0.6300	0.0872	50	1.26%	5	1.74%
Silver (MDC- 0.002)	98	0.0020	0.0020	0.0020	0.1	2.00%	0.01	20.00%
Strontium (MDC-0.1)	98	0.2000	1.1000	0.3724	20	5.50%	2	18.62%
Tellurium (MDC-0.01)	98	0.0100	0.0100	0.0100	1	1.00%	0.1	10.00%
Thallium (MDC-0.02)	98	0.0200	0.0250	0.0201	1	2.50%	0.1	20.05%
Tin (MDC-0.02)	98	0.0200	0.0200	0.0200	1	2.00%	0.1	20.00%
Titanium (MDC -0.04)	98	0.0700	0.4800	0.1586	50	0.96%	5	3.17%
Vanadium (MDC-0.003)	98	0.0050	0.0370	0.0156	0.5	7.40%	0.05	31.18%
Zinc (MDC-0.1)	98	0.0040	4.2000	0.5327	50	8.40%	5	10.65%
Zirconium (MDC-0.004)	98	0.0040	0.0180	0.0050	50	0.04%	5	0.10%

Table 49 2001 Summary of Metals data at the Williams Lake Skyline Site

Metal	# of Samples	Min	Max	Mean	Short-term ESL (mg/m3)	Max % of 1-hour ESL	Annual ESL (mg/m3)	Mean % of Annual ESL
Aluminum	61	15.6000	41.5000	35.8590	50	83.00%	5	717.18%
Antimony	61	0.0003	0.0012	0.0006	5	0.02%	0.5	0.12%
Arsenic	61	0.0030	0.0050	0.0030	0.1	5.00%	0.01	30.49%
Barium	61	0.0744	0.5960	0.3041	5	11.92%	0.5	60.83%
Beryllium	61	0.0002	0.0006	0.0004	0.02	3.00%	0.002	22.38%
Bismuth	61	0.0005	0.0005	0.0005	50	0.00%	5	0.01%
Boron	61	4.9800	11.7000	9.9984	100	11.70%	10	99.98%
Cadmium	61	0.0003	0.0004	0.0003	0.1	0.40%	0.01	3.02%
Chromium	61	0.0140	0.0450	0.0320	1	4.50%	0.1	32.03%
Cobalt	61	0.0006	0.0021	0.0015	0.2	1.05%	0.02	7.63%
Copper	61	0.0070	0.0380	0.0184	10	0.38%	1	1.84%
Lead	61	0.0034	0.0270	0.0086	1.5	1.80%	1.5	0.57%
Lithium	61	0.0120	0.0350	0.0276	10	0.35%	1	2.76%
Magnesium	61	3.9700	10.9000	9.1993	50	21.80%	5	183.99%
Manganese	61	0.0119	0.0843	0.0383	2	4.22%	0.2	19.17%
Molybdenum	61	0.0010	0.0020	0.0011	50	0.00%	5	0.02%
Nickel	61	0.0030	0.0110	0.0084	0.15	7.33%	0.015	55.74%
Selenium	61	0.0050	0.0050	0.0050	2	0.25%	0.2	2.50%
Silver	61	0.0005	0.0005	0.0005	0.1	0.50%	0.01	5.00%
Strontium	61	0.2760	0.9050	0.7838	20	4.53%	2	39.19%
Thallium	61	0.0001	0.0003	0.0001	1	0.03%	0.1	0.07%
Tin	61	0.0004	0.0034	0.0017	1	0.34%	0.1	1.70%
Uranium	61	0.0005	0.0014	0.0011	0.5	0.28%	0.05	2.19%
Vanadium	61	0.0150	0.0420	0.0340	0.5	8.40%	0.05	67.93%
Zinc	61	0.0450	0.4930	0.2326	0.5	98.60%	0.05	465.11%

Table 50 2001 Summary of Metals data at the Williams Lake 168 Mile Road

Metal	# of Samples	Min	Max	Mean	Short-term ESL (mg/m3)	Max % of 1-hour ESL	Annual ESL (mg/m3)	Mean % of Annual ESL
Aluminum	60	34.3000	44.7000	38.1317	50	89.40%	5	762.63%
Antimony	60	0.0002	0.0012	0.0006	5	0.02%	0.5	0.13%
Arsenic	60	0.0030	0.0070	0.0032	0.1	7.00%	0.01	31.50%
Barium	60	0.1780	1.5300	0.4133	5	30.60%	0.5	82.66%
Beryllium	60	0.0003	0.0006	0.0005	0.02	3.00%	0.002	23.42%
Bismuth	60	0.0005	0.0005	0.0005	50	0.00%	5	0.01%
Boron	60	9.3400	11.5000	10.2960	100	11.50%	10	102.96%
Cadmium	60	0.0003	0.0019	0.0003	0.1	1.90%	0.01	3.35%
Chromium	60	0.0310	0.0470	0.0367	1	4.70%	0.1	36.73%
Cobalt	60	0.0013	0.0020	0.0015	0.2	1.00%	0.02	7.57%
Copper	60	0.5630	27.7000	1.5108	10	277.00%	1	151.08%
Lead	60	0.0071	0.0112	0.0084	1.5	0.75%	1.5	0.56%
Lithium	60	0.0260	0.0360	0.0306	10	0.36%	1	3.06%
Magnesium	60	9.4700	13.7000	12.1828	50	27.40%	5	243.66%
Manganese	60	0.0184	0.0511	0.0301	2	2.56%	0.2	15.03%
Molybdenum	60	0.0010	0.0020	0.0011	50	0.00%	5	0.02%
Nickel	60	0.0040	0.0480	0.0057	0.15	32.00%	0.015	37.89%
Selenium	60	0.0050	0.0050	0.0050	2	0.25%	0.2	2.50%
Silver	60	0.0005	0.0138	0.0010	0.1	13.80%	0.01	9.50%
Strontium	60	0.7220	1.1500	0.9363	20	5.75%	2	46.82%
Thallium	60	0.0001	0.0003	0.0001	1	0.03%	0.1	0.07%
Tin	60	0.0009	0.0044	0.0018	1	0.44%	0.1	1.84%
Uranium	60	0.0011	0.0014	0.0012	0.5	0.29%	0.05	2.46%
Vanadium	60	0.0260	0.0430	0.0330	0.5	8.60%	0.05	65.93%
Zinc	60	0.1000	1.1100	0.3092	0.5	222.00%	0.05	618.43%

Table 51 2001 Summary of Metals data at the Williams Lake Firehall Site

Metal	# of Samples	Min	Max	Mean	Short-term ESL ($\mu g/m^3$)	Max % of 1-hour ESL	Annual ESL ($\mu g/m^3$)	Mean % of Annual ESL
Aluminum	104	33.5000	107.0000	84.9173	50	214.00%	5	1698%
Antimony	104	0.0005	0.0039	0.0012	5	0.08%	0.5	0.25%
Arsenic	104	0.0030	0.0100	0.0090	0.1	10.00%	0.01	90.10%
Barium	104	0.2070	2.6000	1.1550	5	52.00%	0.5	230.99%
Beryllium	104	0.0004	0.0018	0.0012	0.02	9.00%	0.002	59.13%
Bismuth	104	0.0005	0.0020	0.0018	50	0.00%	5	0.04%
Boron	104	8.0100	32.7000	26.6061	100	32.70%	10	266.06%
Cadmium	104	0.0003	0.0051	0.0009	0.1	5.10%	0.01	9.45%
Chromium	104	0.0320	0.1100	0.0756	1	11.00%	0.1	75.59%
Cobalt	104	0.0013	0.0051	0.0037	0.2	2.55%	0.02	18.45%
Copper	104	0.0060	0.0700	0.0230	10	0.70%	1	2.30%
Lead	104	0.0070	0.0310	0.0190	1.5	2.07%	1.5	1.26%
Lithium	104	0.0230	0.1140	0.0781	10	1.14%	1	7.81%
Magnesium	104	8.6300	36.7000	29.4484	50	73.40%	5	588.97%
Manganese	104	0.0207	0.1020	0.0564	2	5.10%	0.2	28.21%
Molybdenum	104	0.0010	0.0050	0.0045	50	0.01%	5	0.09%
Nickel	104	0.0050	0.0180	0.0120	0.15	12.00%	0.015	80.32%
Selenium	104	0.0050	0.0200	0.0178	2	1.00%	0.2	8.92%
Silver	104	0.0005	0.0020	0.0018	0.1	2.00%	0.01	17.84%
Strontium	104	0.7790	2.1300	1.7679	20	10.65%	2	88.40%
Thallium	104	0.0001	0.0014	0.0003	1	0.14%	0.1	0.28%
Tin	104	0.0009	0.0090	0.0040	1	0.90%	0.1	4.01%
Uranium	104	0.0010	0.0037	0.0030	0.5	0.74%	0.05	5.99%
Vanadium	104	0.0240	0.3060	0.1388	0.5	61.20%	0.05	277.52%
Zinc	104	0.1270	1.9100	0.8282	0.5	382.00%	0.05	1695%

Table 52 2001 Summary of Metals data at the Williams Lake Water Tower Site

Metal	# of Samples	Min	Max	Mean	Short-term ESL (µg/m^3)	Max % of 1-hour ESL	Annual ESL (µg/m^3)	Mean % of Annual ESL
Aluminum	59	13.6000	49.2000	39.0000	50	98.40%	5	780.00%
Antimony	59	0.0001	0.0012	0.0006	5	0.02%	0.5	0.12%
Arsenic	59	0.0030	0.0040	0.0030	0.1	4.00%	0.01	30.17%
Barium	59	0.1100	0.8140	0.3223	5	16.28%	0.5	64.46%
Beryllium	59	0.0002	0.0006	0.0005	0.02	3.00%	0.002	24.15%
Bismuth	59	0.0005	0.0005	0.0005	50	0.00%	5	0.01%
Boron	59	4.3600	13.6000	10.6376	100	13.60%	10	106.38%
Cadmium	59	0.0003	0.0004	0.0003	0.1	0.40%	0.01	3.03%
Chromium	59	0.0110	0.0450	0.0341	1	4.50%	0.1	34.05%
Cobalt	59	0.0005	0.0019	0.0015	0.2	0.95%	0.02	7.70%
Copper	59	0.0170	4.3800	0.1864	10	43.80%	1	18.64%
Lead	59	0.0028	0.0109	0.0079	1.5	0.73%	1.5	0.53%
Lithium	59	0.0110	0.0350	0.0293	10	0.35%	1	2.93%
Magnesium	59	3.5300	12.6000	9.9931	50	25.20%	5	199.86%
Manganese	59	0.0067	0.0571	0.0265	2	2.86%	0.2	13.27%
Molybdenum	59	0.0010	0.0020	0.0010	50	0.00%	5	0.02%
Nickel	59	0.0030	0.0100	0.0085	0.15	6.67%	0.015	56.95%
Selenium	59	0.0050	0.0050	0.0050	2	0.25%	0.2	2.50%
Silver	59	0.0005	0.0022	0.0005	0.1	2.20%	0.01	5.29%
Strontium	59	0.2430	1.0900	0.8512	20	5.45%	2	42.56%
Thallium	59	0.0001	0.0003	0.0001	1	0.03%	0.1	0.08%
Tin	59	0.0008	0.0038	0.0016	1	0.38%	0.1	1.63%
Uranium	59	0.0004	0.0015	0.0012	0.5	0.29%	0.05	2.37%
Vanadium	59	0.0150	0.0440	0.0357	0.5	8.80%	0.05	71.36%
Zinc	59	0.0880	0.6660	0.2471	0.5	133.20%	0.05	494.17%

Table 53 PM_{10} Episode Analysis for the Skyline Monitoring Location

Year	Months with episodes	Number of Episodes Type 1	Type 2	Average duration (days)	Longest Episode (hours)	Total number episode days	Episode Hours per year	% of time Episodes Occur	% of total exceedances in episode days
2001	August	1	2	2.75	121	8.25	371	10.66	77.13
	September	3	0	1.42	40	4.25			
	November	2	0	1.48	47	2.96			
	total	**6**	**2**			**15.46**			
2002	March	1	0	1.54	37	1.54	589	6.78	67.31
	April	2	1	2.13	81	6.38			
	May	1	0	1.50	36	1.50			
	June	2	0	1.48	47	2.96			
	July	1	0	1.33	32	1.33			
	August	1	1	2.54	90	5.08			
	October	1	0	1.00	24	1.00			
	November	1	1	1.56	51	3.13			
	December	1	0	1.63	39	1.63			
	total	**11**	**3**			**24.54**			

Table 54 PM_{10} Episode Analysis for the Columneetza Monitoring Location

Year	Months with episodes	Number of Episodes Type 1	Type 2	Average duration (days)	Longest Episode (hours)	Total number episode days	Episode Hours per year	% of time Episodes Occur	% of total exceedances in episode days
1993	January	0	1	3.04	73	3.04	262	3.90	84.79
	February	0	2	3.31	85	6.63			
	November	1	0	1.25	30	1.25			
	total	**1**	**3**			**10.92**			
1994	March	1	3	2.45	96	9.79	235	3.08	85.14
1995	January	0	2	3.44	103	6.88	356	4.21	89.00
	February	0	2	2.06	51	4.13			
	September	2	0	1.25	36	2.50			
	November	1	0	1.33	32	1.33			
	total	**3**	**4**			**14.83**			
1996	February	2	1	2.43	125	7.29	260	3.94	74.07
	March	2	0	1.15	28	2.29			
	July	1	0	1.25	30	1.25			
	total	**5**	**1**			**10.83**			
1997	April	1	0	1.50	36	1.50	36	0.41	40.91
1998	April	1	0	1.96	47	1.96	82	0.95	55.41
	August	1	0	1.46	35	1.46			
	total	**2**	**0**			**3.42**			
1999	September	1	0	1.00	24	1.00	24	0.27	55.81
2000	September	1	0	1.04	25	1.04	25	0.29	42.37
2002	October	1	0	1.46	35	1.46	106	1.23	65.03
	November	0	1	2.96	71	2.96			
	total	**1**	**1**			**4.42**			

Table 55 Percent of Time that the 24-Hour Air Quality Index was in Each Category at Ambient Monitoring Sites in Williams Lake, BC 1994-2002

Skyline

Year	Good (0-25)	Fair (26-50)	Poor (51-100)	Very poor (100+)
2002	55.66	34.30	9.87	0.17

Columneetza

Year	Good (0-25)	Fair (26-50)	Poor (51-100)	Very poor (100+)
1993	65.15	30.22	4.63	0.00
1994	73.76	22.57	3.67	0.00
1995	69.75	25.50	4.75	0.00
1996	75.75	18.51	5.20	0.54
1997	78.34	20.64	1.02	0.00
1998	74.98	23.31	1.70	0.00
1999	85.70	13.81	0.49	0.00
2000	81.92	17.39	0.69	0.00
2001	83.47	16.50	0.03	0.00
2002	82.72	15.40	1.89	0.00