

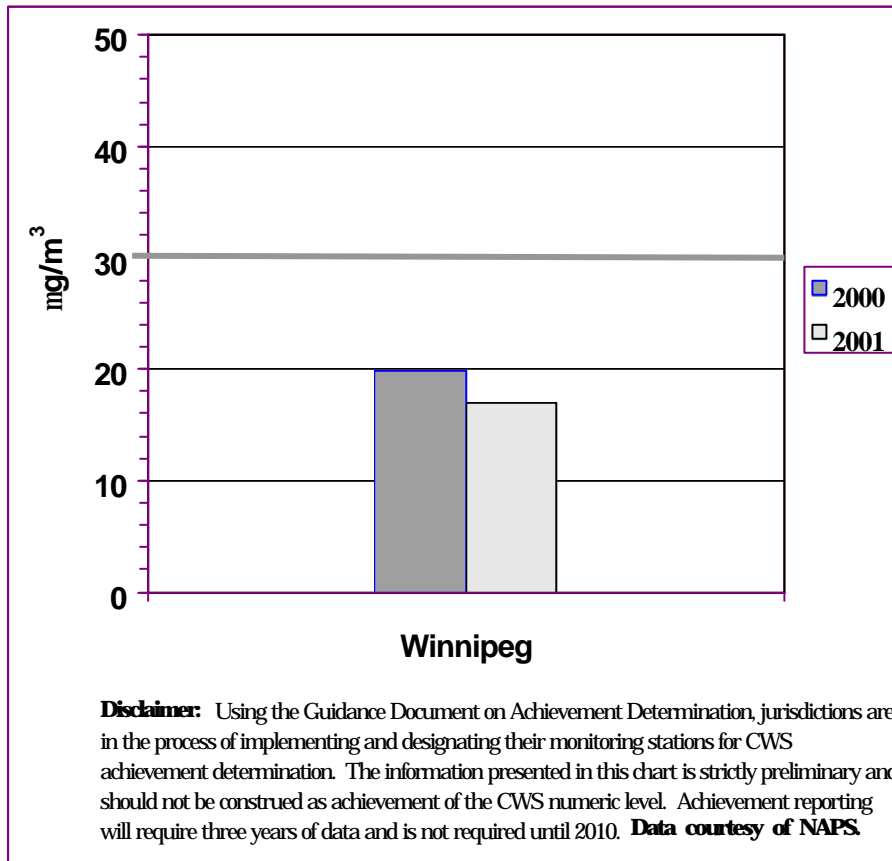
CANADA-WIDE STANDARDS FOR PM & OZONE STATUS OF JURISDICTIONAL IMPLEMENTATION ACTIVITIES “MANITOBA”

I. INTRODUCTION

- Manitoba has only one Census Metropolitan Area (CMA) (*i.e.*, Winnipeg with 60% of Manitoba’s population).
- The provincial monitoring network has been expanded in recent years, but the available ambient data for PM_{2.5} are still limited to a few locations and a relatively limited time period; for ozone, data are available for Winnipeg since 1976.
- PM_{2.5}: limited data from continuous monitoring in Winnipeg at two sites (located in a downtown area since November 2000 and a residential area since September 1997) and from long-term non-continuous sampling at the downtown site indicate that Winnipeg is currently in compliance with the CWS.

Value of the PM_{2.5} CWS metric (mg/m³) at Winnipeg in 2000 and 2001.		
<i>Indicated values are the required 3-year averages.</i>		
Winnipeg (Residential)	2000	2001
	20	17

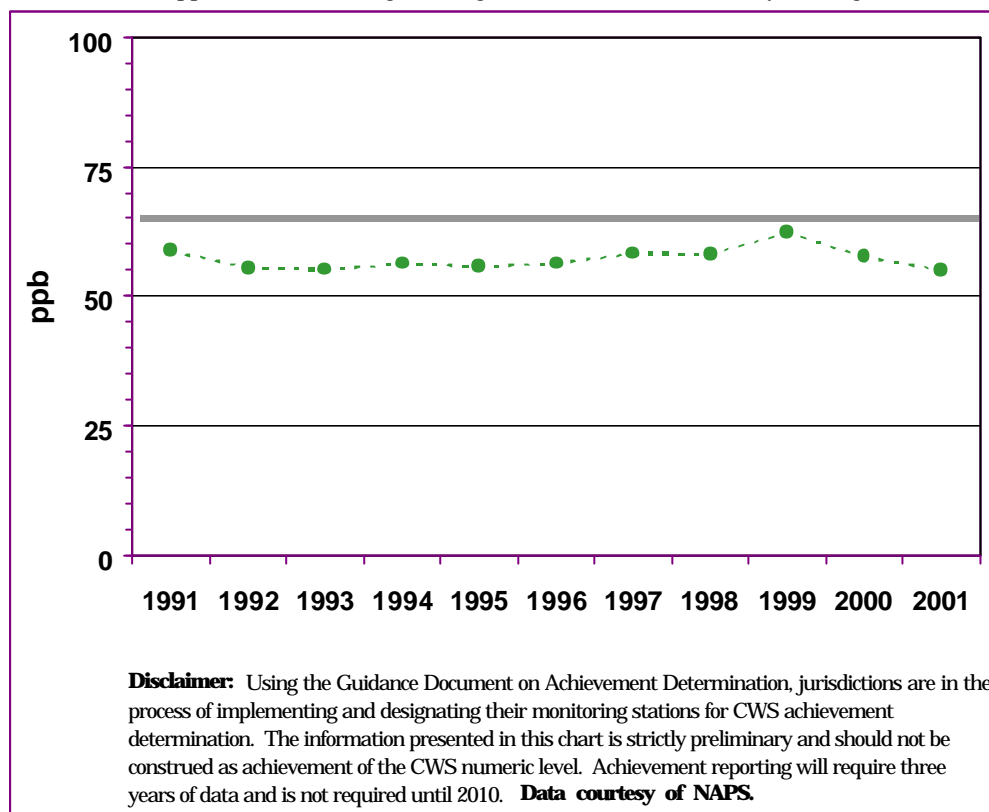
PM_{2.5} CWS: 30 µg/m³ as 24-hour average; 98th percentile ambient measurement annually, averaged over three consecutive years



- Ozone: based on long-term continuous monitoring at two urban sites in Winnipeg and at one location in a smaller community, the CWS is currently being achieved.

Value of the ozone CWS metric (ppb) at Winnipeg. <i>Indicated values are the required 3-year averages.</i>											
Winnipeg	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	59	55	55	56	56	56	58	58	62	58	55

Ozone CWS: 65 ppb as 8-hour average; 4th highest measurement annually, averaged over three consecutive years



- Transboundary pollution and urban smog issues have historically not been of concern in Manitoba.
- Additional air monitoring data are provided in Appendix C.

II. AIR QUALITY OVERVIEW

- The most recent published information on the jurisdictional emissions of PM_{2.5}, SO_x, NO_x and VOC's is part of the 1995 national criteria air contaminant inventory. This inventory, however, only provides information on the total provincial emissions rather than on emissions specifically within or in the vicinity of the Winnipeg CMA.
- The complete 1995 criteria air contaminant inventory for Manitoba is included in Appendix D.

1995 Manitoba Emissions of PM_{2.5} and Precursors of PM_{2.5} and Ozone

Pollutant	Sectoral Contribution to Total Provincial Emissions (tonnes)	
PM _{2.5}	Industrial	3,894
	Residential Fuelwood Combustion	2,100
	Transportation	3,120
	Other	1,417
	Open Sources	119,824
	Total (without Open Sources)	10,531
	Total (with Open Sources)	130,355
SO _x	Non-ferrous Mining and Smelting	357,762
	Transportation	2,568
	Other	5,027
	Open Sources	80
	Total (without Open Sources)	365,357
	Total (with Open Sources)	365,436
NO _x	Transportation	59,184
	Upstream Oil and Gas	7,868
	Commercial and Residential Fuel Combustion	2,572
	Other	3,820
	Open Sources	48,342
	Total (without Open Sources)	73,444
	Total (with Open Sources)	121,786
VOC's	Organic Solvents	17,411
	Residential Fuelwood Combustion	3,055
	Transportation	42,144
	Other	1,228
	Upstream Oil and Gas	7,592
	Fuel Marketing	4,247
	Open Sources	1,157,838
	Total (without Open Sources)	75,676
	Total (with Open Sources)	1,233,514

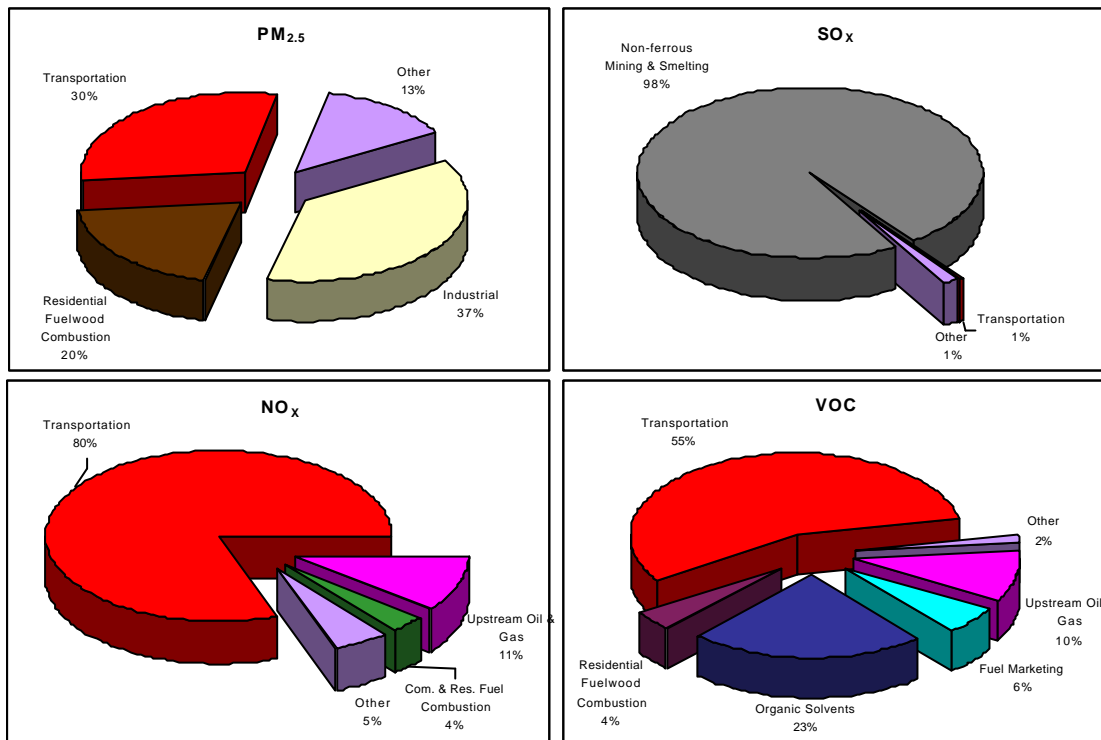
Open Sources: sources which emit air contaminants over large geographical areas, primarily in a stationary non-point source manner, and are diffuse in nature (*e.g.*, forest fires, road dust, *etc.*).

PM_{2.5}: particulate matter less than 2.5 µm in diameter

SO_x: sulphur oxides

NO_x: nitrogen oxides

VOC: volatile organic compounds



III. STATUS OF ACTIVITIES RELATED TO PM & OZONE IMPLEMENTATION

- Given the current compliance with both the PM_{2.5} and ozone CWS, the focus of Manitoba's implementation plan will be on "Keeping Clean Areas Clean".
- Examples of actions taken by Manitoba Conservation which are likely to expand our knowledge or reduce ambient PM_{2.5} and ozone concentrations include:
 - Upgrading the provincial air quality monitoring network, including the recent installation of a PM_{2.5} sampler in Flin Flon;
 - Assisting in the development of a provincial climate change strategy and providing funding (Manitoba Climate Change Action Fund) to support actions that respond to this issue;
 - Addressing various air quality policy issues (*e.g.*, expanded recycling and reduction of permitted burning at landfills, *etc.*); and
 - As part of the environmental licensing process, working with and encouraging significant provincial sources to reduce emissions of all pollutants. Examples of these projects include: Hudson Bay Mining and Smelting spill gas collection program (Flin Flon) (particulate reduction ~ 700 tonnes/year); Tembec conversion to a thermomechanical pulping facility (Pine Falls) (reductions: SO_x: up to 780 tonnes/year; particulates: up to 300 tonnes/year; NO_x: up to 140 tonnes/year; and hydrocarbons: up to 3 tonnes/year); Manitoba Hydro conversion of generating

station from coal- to natural gas-fired (Selkirk) (reductions: PM: up to 2,800 tonnes/year; SO_x: up to 1,800 tonnes/year; NO_x: up to 840 tonnes/year).

- Manitoba Conservation will be reviewing the recommendations from the MERS process for the various sectors. Those recommendations that are appropriate to Manitoba will be reviewed and, where feasible, incorporated into additional provincial actions.
- Recent actions undertaken by other Manitoba government departments which will likely have an effect on PM_{2.5} or ozone levels in Manitoba include: Manitoba Highways and Government Services' "Community Main Access Gravel Road Stabilization Program" (\$4M over 2 years); Manitoba Health/Manitoba Conservation's development of an implementation plan to deal with the province's biomedical waste incinerators; and Manitoba Agriculture and Food's promotion of methods to reduce soil loss.

IV. NEXT STEPS (Path Forward)

Manitoba is currently in compliance with the CWS for both PM_{2.5} and ozone. Consequently, Manitoba Conservation is focussing on "Keeping Clean Areas Clean" through:

- continuation of the initiatives and activities noted in Section III;
- development of new initiatives, where applicable, as information from the MERS becomes available; and
- continued cooperation with other provincial and federal Departments in addressing the PM_{2.5} and ozone issues.

Manitoba Conservation
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Appendix A - The Canada-wide Standards Numeric Targets and Statistical Forms

The Canada-wide Standards (CWS) provisions include numeric targets for PM_{2.5} and ozone, and their associated statistical forms. The numeric targets are:

PM_{2.5}: 30 µg/m³, 24-hour (midnight to midnight) averaging time

Ozone: 65 ppb, 8-hour averaging time

The statistical forms of the numeric targets are:

PM_{2.5}: 98th percentile ambient measurement annually,
averaged over three consecutive years

Ozone: 4th highest measurement annually,
averaged over 3 consecutive years

To facilitate the communication and data presentation in relation to the statistical forms, the above statistical forms are referred to as the *PM_{2.5} CWS metric* and the *ozone CWS metric* respectively. Table A-1 below provides an outline of the computation procedure of the CWS metrics for a single site.

Jurisdictions are in the process of implementing and designating their monitoring stations for CWS achievement determination using the Guidance Document on Achievement Determination. As such, it should be noted that the ambient data presented in this Update is strictly preliminary and should not be construed as achievement of the CWS numeric level. Achievement reporting will require three years of data and is not required until 2010.

Table A-1: Sample calculations for the CWS metric.

Annual 98 th percentile of the daily PM _{2.5} levels (µg/m ³)			Value of the PM _{2.5} CWS metric for the year 2000 (µg/m ³)
1998	1999	2000	
35	25	40	33

Annual 4 th highest of the daily maximum 8-hour ozone levels (ppb)			Value of the ozone CWS metric for the year 2000 (ppb)
1998	1999	2000	
65	70	50	62

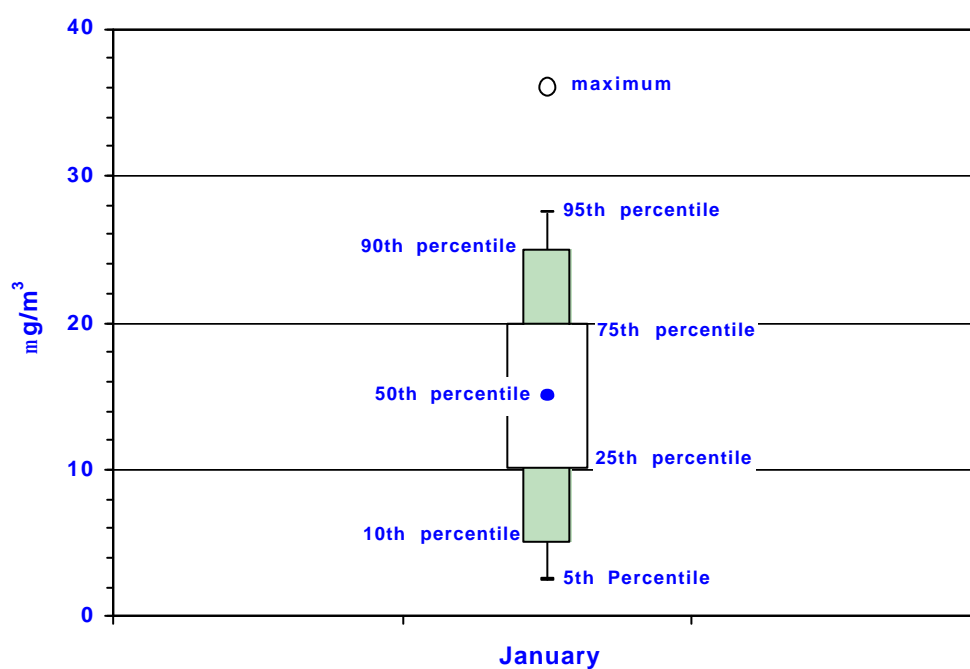
Appendix B - Percentiles

Percentiles indicate the percentage of measured levels that are less than or equal to (i.e. do not exceed) an *associated level*, and this associated level is dependent on the underlying measurements. For example, if the 75th percentile of the daily PM_{2.5} levels for the month of January is 15 µg/m³ (the *associated level*), it means that 75% of all measured levels in January did not exceed 15 µg/m³.

For this Update, the 5th, 10th, 25th, 50th, 75th, 90th, 95th and 100th percentiles are displayed in the format of Figure B-1. These percentiles are presented by month of the year as combined over a number of years depending on data availability. The maximum measured level is the 100th percentile. Visually, the longer are the white and shaded rectangles, the greater is the range of the measured levels.

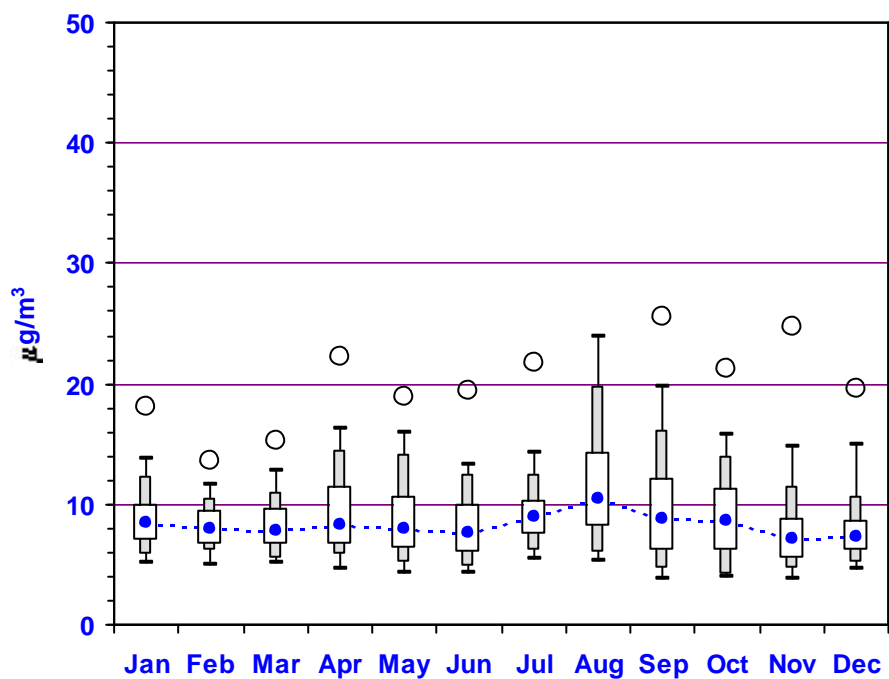
Percentiles provide not only information on the magnitude of the measured levels, but also information on how frequent these levels were experienced. For example, if the 75th and 100th percentiles of the daily PM_{2.5} levels were 55 and 15 µg/m³ in March, and 40 and 25 µg/m³ in July, it indicates that although the maximum level was higher in March, *most* levels may have been instead higher in July.

Figure B-1: Sample percentile plot.



Appendix C - Additional Ambient Air Quality Monitoring Data for Winnipeg

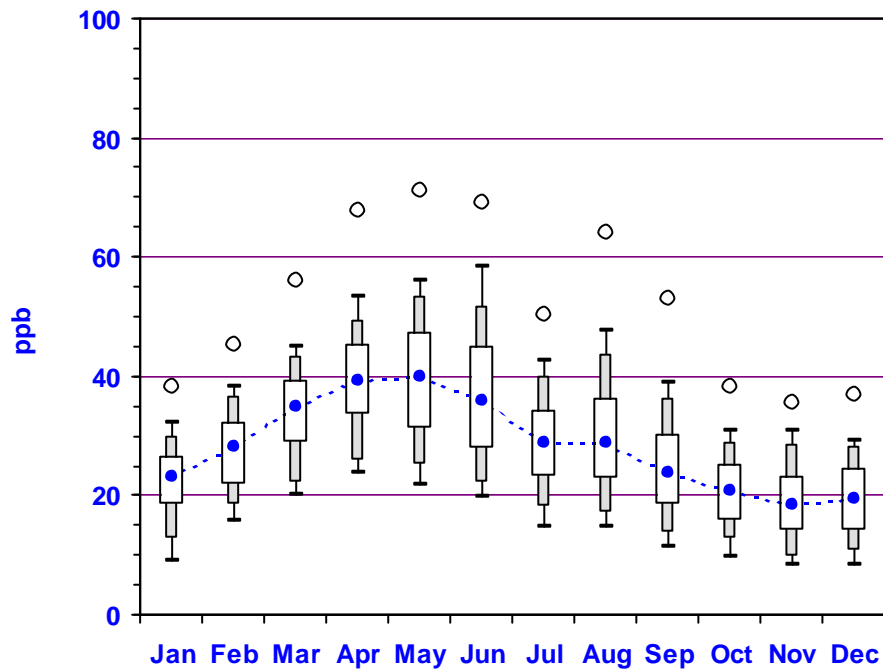
Monthly percentiles of the daily PM _{2.5} levels (mg/m ³) at Winnipeg - Jefferson & Scotia, combined over 1997 to 2000.												
Percentiles	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	5	5	5	5	4	4	5	5	4	4	4	5
10	6	6	6	6	5	5	6	6	5	4	5	5
25	7	7	7	7	6	6	7	8	6	6	6	6
50	8	8	8	8	8	8	9	10	9	9	7	7
75	10	10	10	12	11	10	10	14	12	11	9	9
90	12	11	11	15	14	12	12	20	16	14	11	11
95	14	12	13	16	16	13	14	24	20	16	15	15
Max	18	14	15	22	19	19	22	67	26	21	25	20
N	93	83	93	89	90	90	88	93	115	123	120	124



** For an interpretation of percentile plots please see Appendix B.

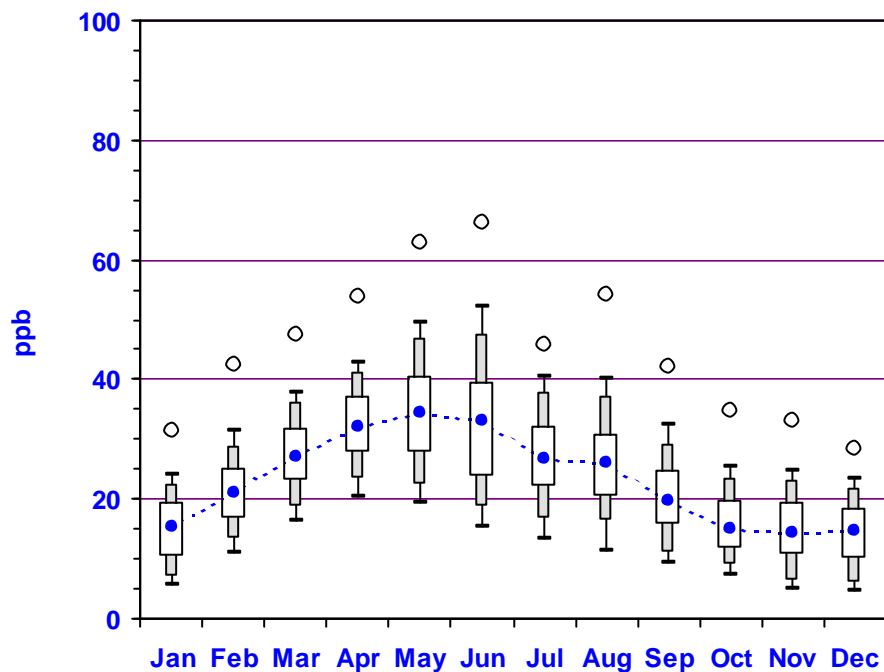
Data courtesy of NAPS.

Monthly percentiles of the daily maximum 8-hour ozone levels (ppb) at Winnipeg - Jefferson & Scotia, combined over 1990 to 2000.												
Percentiles	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	9	16	20	24	22	20	15	15	12	10	8	8
10	13	19	22	26	25	22	18	17	14	13	10	11
25	18	22	29	33	31	28	23	23	19	16	14	14
50	23	28	35	39	40	36	29	29	24	21	19	19
75	27	32	39	45	47	45	34	36	30	25	23	25
90	30	37	43	49	53	52	40	44	36	29	29	28
95	32	38	45	54	56	58	43	48	39	31	31	29
Max	38	45	56	68	71	69	50	64	53	38	36	37
N	279	227	305	300	309	300	279	310	300	310	300	308



For an interpretation of these percentile plots, please see Appendix B.
 Data courtesy of NAPS.

Monthly percentiles of the daily maximum 8-hour ozone levels (ppb) at Winnipeg - Ellen Street, combined over 1990 to 2000.												
Percentiles	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	6	11	16	20	20	15	13	12	9	7	5	5
10	7	13	19	24	23	19	17	16	11	9	6	6
25	10	17	23	28	28	24	22	20	16	12	11	10
50	15	21	27	32	35	33	27	26	20	15	15	15
75	19	25	32	37	41	40	32	31	25	20	20	19
90	23	29	36	41	47	48	38	37	29	24	23	22
95	24	31	38	43	49	52	41	40	32	25	25	24
Max	32	42	47	54	63	66	46	54	42	35	33	28
N	288	264	309	291	295	265	277	279	285	310	300	304



For an interpretation of these percentile plots, please see Appendix B.
 Data courtesy of NAPS.

Appendix D - 1995 Criteria Air Contaminant Inventory for Manitoba (tonnes)

Sector	PM _{2.5}	SO _x	NO _x	VOC	NH ₃
Industrial	3,894	361,257	10,574	7,913	6,578
Chemical Industry	76	34	128	3	6,415
Non-ferrous Mining and Smelting	599	357,762	2	0	0
Upstream Oil and Gas Industry	0	0	7,868	7,592	0
Other Industrial	3,219	3,461	2,576	319	163
Non-Industrial Fuel Combustion	2,596	1,530	3,673	3,233	38
Electric Power Generation	210	1,361	907	20	3
Residential Fuelwood Combustion	2,100	28	195	3,055	18
Com. & Res. Fuel Combustion	286	141	2,572	157	17
Transportation	3,120	2,568	59,184	42,144	726
On-road Gasoline	237	414	19,137	28,297	672
On-road Diesel	1,142	572	14,784	2,053	4
Off-road Use of Gasoline	202	83	2,582	7,318	18
Off-road Use of Diesel	1,194	807	10,818	1,570	30
Other Transportation	345	691	11,863	2,906	1
Miscellaneous & Incineration	921	1	12	22,387	29,429
Fuel Marketing	0	0	0	4,247	0
Organic Solvents	0	0	0	17,411	0
Pesticides And Fertilizer Application	264	0	0	0	29,136
Other Misc. & Incin.	656	1	12	729	293
Open Sources	119,824	80	48,342	1,157,838	31,627
Total without Open Sources	10,531	365,357	73,444	75,676	36,770
Total with Open Sources	130,355	365,436	121,786	1,233,514	68,397

PM_{2.5}: particulate matter less than 2.5 µm in diameter

SO_x: sulphur oxides

NO_x: nitrogen oxides

VOC: volatile organic compounds

NH₃: ammonia

Open Sources: sources which emit air contaminants over large geographical areas, primarily in a stationary non-point source manner, and are diffuse in nature (*e.g.*, forest fires, road dust, *etc.*).