

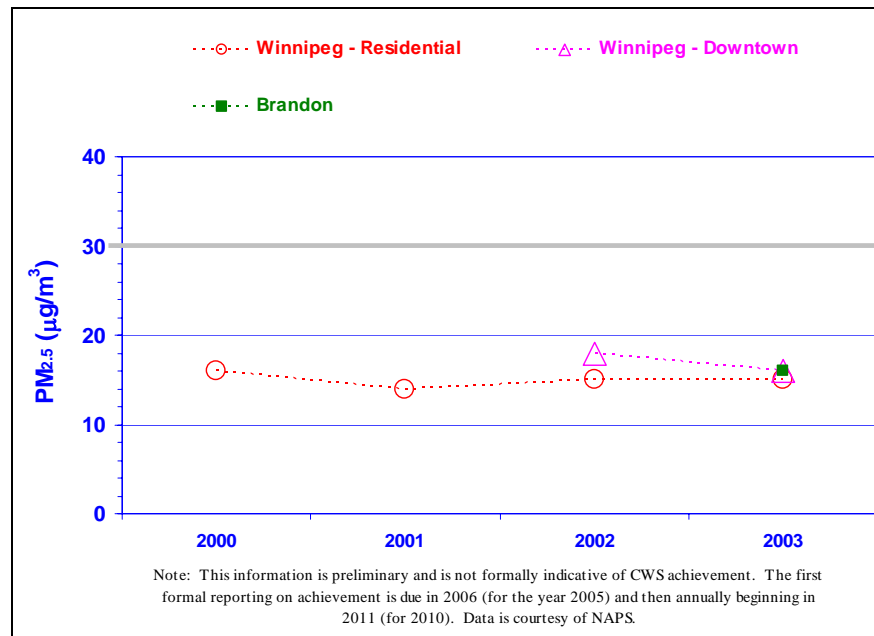
CANADA-WIDE STANDARDS FOR PM & OZONE
STATUS OF JURISDICTIONAL IMPLEMENTATION ACTIVITIES
“MANITOBA”
UPDATE - SEPTEMBER 2004

I. INTRODUCTION

- Manitoba has only one Census Metropolitan Area (CMA) (*i.e.*, Winnipeg with a population of 671,000 or about 60% of Manitoba’s population). The next largest community is Brandon with a CMA population of about 41,000 (3.6% of the total population). (Data for Brandon in this report are included for information only.)
- 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 continuous monitoring data in Winnipeg at two sites (located in a downtown area since November 2000 and in a residential area since September 1997) and long-term non-continuous sampling at the downtown site indicate that Winnipeg is currently in compliance with the future CWS. Monitoring has been undertaken in an industrial area of Brandon since 2001.

Value of the PM_{2.5} CWS metric ($\mu\text{g}/\text{m}^3$) in Manitoba from 1999 to 2002.				
<i>Indicated values are the required 3-year averages.</i>				
Year	2000	2001	2002	2003
Winnipeg - Residential	16	14	15	15
Winnipeg - Downtown			18	16
Brandon				16

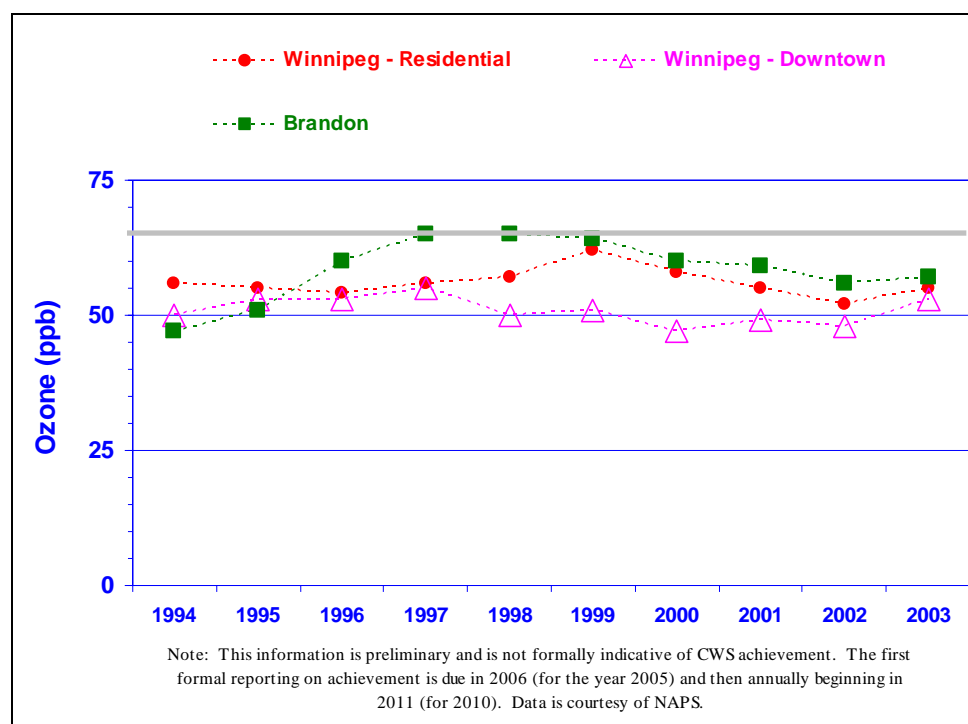
PM_{2.5} CWS: 30 $\mu\text{g}/\text{m}^3$ as 24-hour average; 98th percentile ambient measurement annually, averaged over three consecutive years



- **Ozone:** Based on long-term continuous monitoring at two urban sites in Winnipeg, the future CWS is currently being achieved. The CWS is also being achieved at the monitoring location in a smaller community (*i.e.*, Brandon).

Value of the ozone CWS metric (ppb) in Manitoba. <i>Indicated values are the required 3-year averages.</i>													
Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Winnipeg - Residential	58	55	55	56	55	54	56	57	62	58	55	52	55
Winnipeg - Downtown	51	49	49	50	53	53	55	50	51	47	49	48	53
Brandon	56	50	46	47	51	60	65	65	64	60	59	56	57

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.
- Using the Guidance Document on Achievement Determination, jurisdictions are in the process of implementing and designating their monitoring stations and reporting areas for CWS achievement determination. The information presented above is strictly preliminary and should not be construed as achievement of the CWS. The CWS for particulate matter and ozone is to be achieved by 2010. A comprehensive report will be completed for the year 2005 and for every fifth year thereafter assessing progress on all provisions of the CWSs including assessment of ambient levels and trends and identification of communities where ambient levels are exceeding or approaching the CWS levels. Annual reporting on achievement of the CWSs begin in 2011.

II. AIR QUALITY OVERVIEW

- The most recent information on the jurisdictional emissions of PM_{2.5}, SO_x, NO_x and VOC's is part of the 2000 national criteria air contaminant (CAC) inventory which is expected to be published in late 2004. 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 2000 criteria air contaminant inventory for Manitoba is included in Appendix B.
- At this time, it is not possible to compare the 2000 and 1995 CAC inventories for Manitoba because the methodology for estimating emissions were different for the two years for some of the sectors (*e.g.*, transportation).
- In the "Open Source" category, forest fires were a significant contributor to PM_{2.5}, NO_x, and VOC emissions. This sector, however, is highly variable from year to year. In 1995, the area of forest burned in Manitoba was eight times larger than in the year 2000 (*i.e.*, 8,892 km² versus 1,109 km²). Consequently, forest fires as a source of emissions were far more significant in 1995 than in 2000. However, forest fire smoke only infrequently affects air quality in the Winnipeg CMA.

2000 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	4,218
	Residential Fuelwood Combustion	2,461
	Transportation	4,788
	Other	1,449
	Open Sources	42,148
	Total (without Open Sources)	12,916
	Total (with Open Sources)	55,064
SO _x	Non-ferrous Mining and Smelting	353,000
	Transportation	2,305
	Other	6,631
	Open Sources	10
	Total (without Open Sources)	361,936
Total (with Open Sources)	361,945	
NO _x	Transportation	82,191
	Upstream Oil and Gas	8,329
	Commercial and Residential Fuel Combustion	2,868
	Electric Power Generation (Utilities)	2,136
	Other	3,433
	Open Sources	4,305
	Total (without Open Sources)	98,956
	Total (with Open Sources)	103,262
VOC's	Organic Solvents	11,540
	Residential Fuelwood Combustion	3,580
	Transportation	43,947

Pollutant	Sectoral Contribution to Total Provincial Emissions (tonnes)	
	Other	12,679
	Upstream Oil and Gas	7,367
	Fuel Marketing	3,663
	Open Sources	38,827
	Total (without Open Sources)	75,449
	Total (with Open Sources)	114,276

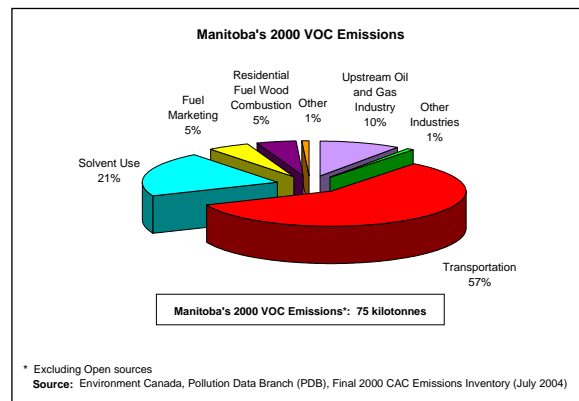
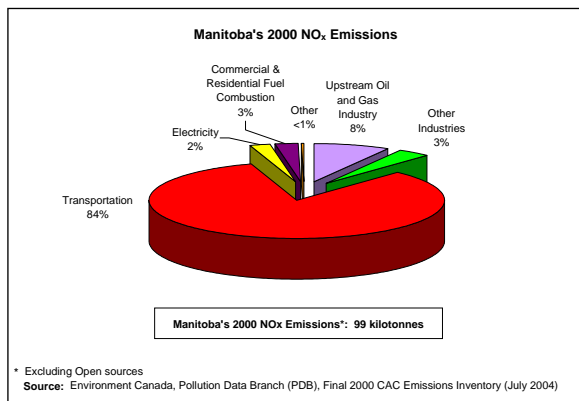
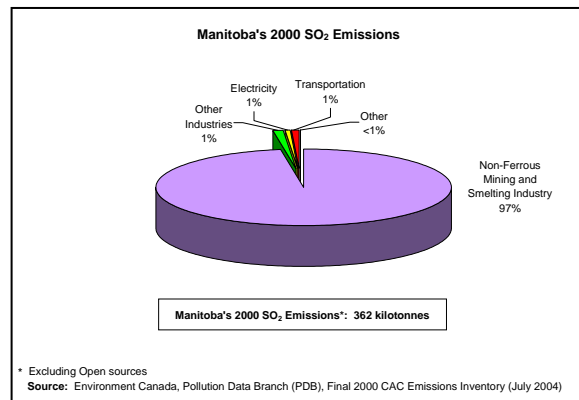
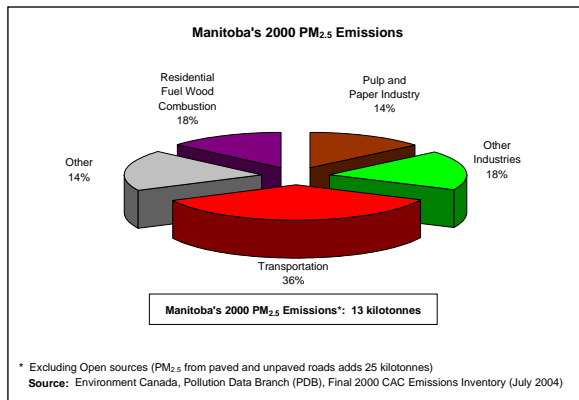
Open Sources: sources which emit air contaminants over large geographical areas, primarily in a stationary non-point source manner, and are diffuse in nature (*e.g.*, forest fires, road dust, *etc.*).

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 continuing compliance with both the PM_{2.5} and ozone CWS, the focus of Manitoba's implementation plan remains on "Keeping Clean Areas Clean".

- Since the last update in January 2003, additional examples of actions taken by Manitoba Conservation which are likely to expand our knowledge or reduce ambient PM_{2.5} and ozone concentrations include:
 - ◆ Expanding the ambient air monitoring network at urban sites in Manitoba with the addition of particulate matter monitors (PM₁₀ and PM_{2.5}) to the existing SO₂ monitoring network in Thompson.
 - ◆ Undertaking shorter-term, special air monitoring projects in select urban areas in Winnipeg to better define the spatial and temporal distribution of ambient PM_{2.5} levels.
 - ◆ Working towards reductions in emissions of particulate matter at northern Manitoba smelters.
 - ◆ As part of the environmental licensing process, working with and encouraging provincial sources to reduce emissions of all pollutants.
 - ◆ Making progress on the goal of phasing out the three beehive burners in Manitoba by 2005 (the largest one has already been replaced by an engineered incinerator).
- Many of the current and proposed programs in Manitoba's Climate Change Action Plan¹ have the potential to reduce particulate matter and VOC emissions from various sectors, in most cases by reducing the need for the combustion of fossil fuel. Examples of just a few of the programs include: the Wuskwatim Hydro Generation Project in Northern Manitoba (reducing the need for fossil fuel-fired thermal power generation); and Manitoba Hydro's Power Smart conservation programs.

IV. NEXT STEPS (Path Forward)

Manitoba is currently in compliance with the future 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 of this current update and all previous updates; and
- continued cooperation with other provincial and federal Departments in addressing the PM_{2.5} and ozone issues.

Manitoba Conservation September 16, 2004

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¹ Province of Manitoba, "Kyoto and Beyond: A plan of action to meet and exceed Manitoba's Kyoto targets", October 2002.

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 - 2000 Criteria Air Contaminant Inventory for Manitoba (tonnes)

SECTOR	PM2.5	SOx	NOx	VOC
INDUSTRIAL SOURCES	4,218	356,652	11,744	7,688
Abrasives Manufacture	0	0	0	0
Aluminum Industry	0	0	0	0
Asbestos Industry	0	0	0	0
Asphalt Paving Industry	183	10	24	14
Bakeries	0	0	0	172
Cement and Concrete Industry	43	2	2	0
Chemicals Industry	28	223	454	8
Clay Products Industry	0	0	0	0
Coal Mining Industry	13	0	0	0
Ferrous Foundries	214	7	16	8
Grain Industries	174	0	0	0
Iron and Steel Industries	18	51	126	78
Iron Ore Mining Industry	0	0	0	0
Mining and Rock Quarrying	49	7	374	1
Non-Ferrous Mining and Smelting Industry	798	353,000	1	0
Oil Sands	0	0	0	0
Other Petroleum and Coal Products Industry	0	0	0	0
Paint & Varnish Manufacturing	0	0	0	0
Petrochemical Industry	0	0	0	0
Petroleum Refining	0	0	0	0
Plastics & Synthetic Resins Fabrication	0	0	0	0
Pulp and Paper Industry	1,868	3,141	793	8
Upstream Oil and Gas Industry	0	0	8,329	7,367
Wood Industry	298	104	26	0
Other Industries	532	106	1,599	30
NON INDUSTRIAL FUEL COMBUSTION	3,054	2,977	5,003	3,794
Commercial Fuel Combustion	157	358	1,525	73
Electric Power Generation (Utilities)	309	2,563	2,136	58
Residential Fuel Combustion	127	23	1,115	83
Residential Fuel Wood Combustion	2,461	33	228	3,580
TRANSPORTATION	4,788	2,305	82,191	43,947
Air Transportation	23	103	1,641	560
Heavy-duty diesel vehicles	807	334	24,784	1,406
Heavy-duty gasoline trucks	14	23	1,177	858
Light-duty diesel trucks	41	21	356	182
Light-duty diesel vehicles	10	2	65	30
Light-duty gasoline trucks	50	207	6,720	10,330
Light-duty gasoline vehicles	32	214	9,118	12,887

SECTOR	PM _{2.5}	SO _x	NO _x	VOC
Marine Transportation	2	13	45	6
Motor cycles	0	0	16	22
Off-road use of diesel	3,248	982	28,456	3,786
Off-road use of gasoline	317	40	1,926	13,481
Rail Transportation	173	364	7,885	397
Tire wear & Brake lining	72	0	0	0
INCINERATION	38	2	18	181
Crematorium	0	0	1	0
Industrial & Commercial Incineration	0	0	0	0
Municipal Incineration	0	0	0	0
Wood Waste Incineration	38	2	16	181
Other Incineration & Utilities	0	0	0	0
MISCELLANEOUS	818	0	0	19,840
Cigarette Smoking	26	0	0	0
Dry Cleaning	0	0	0	30
Fuel Marketing	0	0	0	3,663
General Solvent Use	0	0	0	11,540
Marine Cargo Handling Industry	0	0	0	0
Meat Cooking	46	0	0	0
Pesticides and Fertilizer Application	286	0	0	0
Printing	0	0	0	1,190
Structural Fires	460	0	0	496
Surface Coatings	0	0	0	2,920
OPEN SOURCES	42,148	10	4,305	38,827
Agriculture (Animals)	2,294	0	0	20,103
Agriculture Tilling and Wind Erosion	3,235	0	0	0
Construction Operations	419	0	0	0
Dust from Paved Roads	7,943	0	0	0
Dust from Unpaved Roads	16,664	0	0	0
Forest Fires	11,488	10	4,305	18,535
Landfills Sites	4	0	0	190
Mine Tailings	101	0	0	0
Prescribed Burning	0	0	0	0
TOTAL WITH OPEN SOURCES	55,064	361,945	103,262	114,276
TOTAL WITHOUT OPEN SOURCES	12,916	361,936	98,956	75,449

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

SO_x: sulphur oxides

NO_x: nitrogen oxides

VOC: volatile organic compounds

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.).