

**The Hydro Province:**  
**Manitoba's Hydroelectric Complex**

*January 2005*

*Manitoba Wildlands*

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# **The Hydro Province:**

## **Manitoba's Hydroelectric Complex**

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**“We can have our cake, we can eat it and we can  
make a bigger cake and sell part of that.”**

Premier Duff Roblin addressing the Manitoba Legislature on the prospects  
of northern hydro development and export potential, February 15, 1966

**“Alberta was the energy producer for the last 50 years; Manitoba can be the energy  
producer for the next 50 years... It’s our ace in the hole.”**

Premier Gary Doer, Winnipeg Free Press, May 6, 2001

Hydroelectric development has played a prominent, controversial and often dramatic role  
in the last 100 years of Manitoba history. Now it has again burst onto the province’s  
political, social and economic center stage with mega-dreams of \$10 billion worth of  
expansion to the existing hydro system.

### **The Northern Hydro System**

Manitoba Hydro's massive industrial complex in the north is designed to function as a  
single integrated whole. This single system consists of four major components: Churchill  
River Diversion, Lake Winnipeg Regulation, the major generation stations, and the  
transmission infrastructure.

#### **Churchill River Diversion**

Manitoba's two largest rivers drain northeastward  
into Hudson's Bay (see Appendix A). The Nelson  
River flows from Lake Winnipeg to the Bay. The  
Churchill River enters the province from  
Saskatchewan and empties into Hudson's Bay.  
These rivers drain an area spanning parts of seven  
provinces and states (see Figure 1). Instead of  
building dams on these roughly parallel rivers,  
Manitoba Hydro chose to divert one river into the other, allowing them to them to  
essentially harness two rivers with dams on only one.

The diversion of the  
Churchill River into the  
Nelson is basic to the  
entire future concept for  
Manitoba.

K. Kristjanson  
Manitoba Hydro Official  
1969

Since 1976 the Missi Falls dam at the eastern outlet  
of Southern Indian Lake has blocked about 85% of the flow of the Churchill River thus  
raising the lake by about three metres (10 feet).<sup>1</sup> The man-made South Bay Channel  
allows the flooded lake to spill over into the Rat-Burntwood River system eventually  
emptying into the Nelson River. The diverted water augments Nelson River flows by  
about 40%. Southern Indian Lake was turned into a holding tank, the Rat-Burntwood  
River system became a diversion route and the Nelson River was converted into a power  
corridor.

<sup>1</sup> Sources: Federal Ecological Monitoring Program, Final Report, Vol. 1, Environment Canada /  
Department of Fisheries and Oceans, April 1992, pp. 2-4 to 2-5; and Manitoba Hydro  
[http://www.hydro.mb.ca/issues/churchill\\_river\\_diversion.shtml](http://www.hydro.mb.ca/issues/churchill_river_diversion.shtml).

Churchill River Diversion (CRD) results in ongoing flooding of 837 square kilometers (323 square miles) at Southern Indian Lake and along the diversion route.<sup>2</sup> Average annual flows on the diversion route are roughly nine times greater than what they would be in a state of nature.<sup>3</sup>

### **Lake Winnipeg Regulation**

One dilemma for engineers designing Manitoba's northern hydro complex was that natural cycles do not match energy demand cycles. Mother Nature supplies more water in spring and summer but energy demand is highest in winter. While it is impossible to store large amounts of electricity from one season to the next it is not impossible to store large amounts (of water).

The engineering solution to Mother Nature's inconvenient timing was the Jenpeg Dam (see Appendix A). It serves to regulate flows out of Lake Winnipeg into the Nelson power corridor. Water is held back in the Lake Winnipeg holding tank in spring and summer, to be released into the Nelson in winter when energy demand is high. Lake Winnipeg—the 11<sup>th</sup> largest freshwater lake in the world—is thus manipulated to function as a 'battery' for Manitoba Hydro. And Jenpeg is, in essence, the 'on-off' switch.

Three channels were dug near the vicinity of where Lake Winnipeg empties into the Nelson. They serve to bypass narrow and shallow sections of the waterway, increasing the potential outflow from the lake into the river system by 40-50%.<sup>4</sup>

The seasonal control of outflows from Lake Winnipeg into the Nelson power corridor by use of the channels and Jenpeg is known as Lake Winnipeg Regulation (LWR). It went into operation in 1976.

### **Dams**

“The economic future of this province hinges on efficient development of the Nelson at least for the next twenty years.” L.A. Bateman, Manitoba Hydro Chairman, correspondence dated January 18, 1973]

Three major dams on the lower Nelson—Limestone, Kettle and Long Spruce—are the points the system turns water flow into kilowatts (see Appendix A). These three dams are like the drive train with CRD and LWR acting as the engine.

While Limestone, Kettle and Long Spruce account for as much as 70% of Manitoba Hydro's total production (depending on the year), the Jenpeg and Kelsey dams also

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<sup>2</sup> Federal Ecological Monitoring Program, Final Report, Vol. 1, Environment Canada / Department of Fisheries and Oceans, April 1992, p. 2-7.

<sup>3</sup> Federal Ecological Monitoring Program, Final Report, Vol. 1, Environment Canada / Department of Fisheries and Oceans, April 1992, p. 2-8.

<sup>4</sup> Decision of the Northern Flood Agreement Arbitrator, Claim 183, p.9.

generate smaller amounts of electricity along the Nelson.<sup>5</sup> The Grand Rapids Dam, located where the Saskatchewan River empties into Lake Winnipeg from the west (via Cedar Lake), is another significant northern source of power, though it is not technically part of the CRD/LWR system.

Two small dams on the Laurie River (tributary to the Churchill River) generate a combined 10 MW. Four remote northern Aboriginal communities are serviced by diesel powered generators as they are not connected to the transmission and distribution grid. The four diesel generators in Brochet, Lac Brochet, Shamattawa and Tadoule Lake account for about 9 MW of capacity. (See “Southern Operations” below for the remaining sources of Manitoba Hydro generation.)

<b>Manitoba Hydro’s Northern Dams</b>				
<u>Dam</u>	<u>Capacity</u>	<u>River</u>	<u>Waterfall drop (head)</u>	<u>Construction period*</u>
Grand Rapids	479 MW	Saskatchewan	36.6 m	1960-68
Jenpeg	132 MW	Nelson	7.3 m	1972-79
Kelsey	223 MW	Nelson	17.1 m	1957-61
Kettle	1220 MW	Nelson	30.0 m	1966-74
Long Spruce	1010 MW	Nelson	27.6 m	1971-79
<u>Limestone</u>	<u>1340 MW</u>	<u>Nelson</u>	<u>26.0 m</u>	<u>1985-90</u>
Nelson River totals:	3925 MW		108.0 m	

\* From start of construction to installation of final generating unit(s).

Source: Manitoba Hydro [http://www.hydro.mb.ca/our\\_facilities/generating\\_stations.shtml](http://www.hydro.mb.ca/our_facilities/generating_stations.shtml).

The elevation drop from Lake Winnipeg to Hudson’s Bay is about 217.3 metres (713 feet) depending on the level of Lake Winnipeg. The task of hydro system engineers is to utilize as much of that drop as possible. Currently dams on the Nelson power corridor utilize 108 meters (354 ft) of the total drop (i.e. 108 m is the combined waterfall drop/head of all dams on the Nelson).

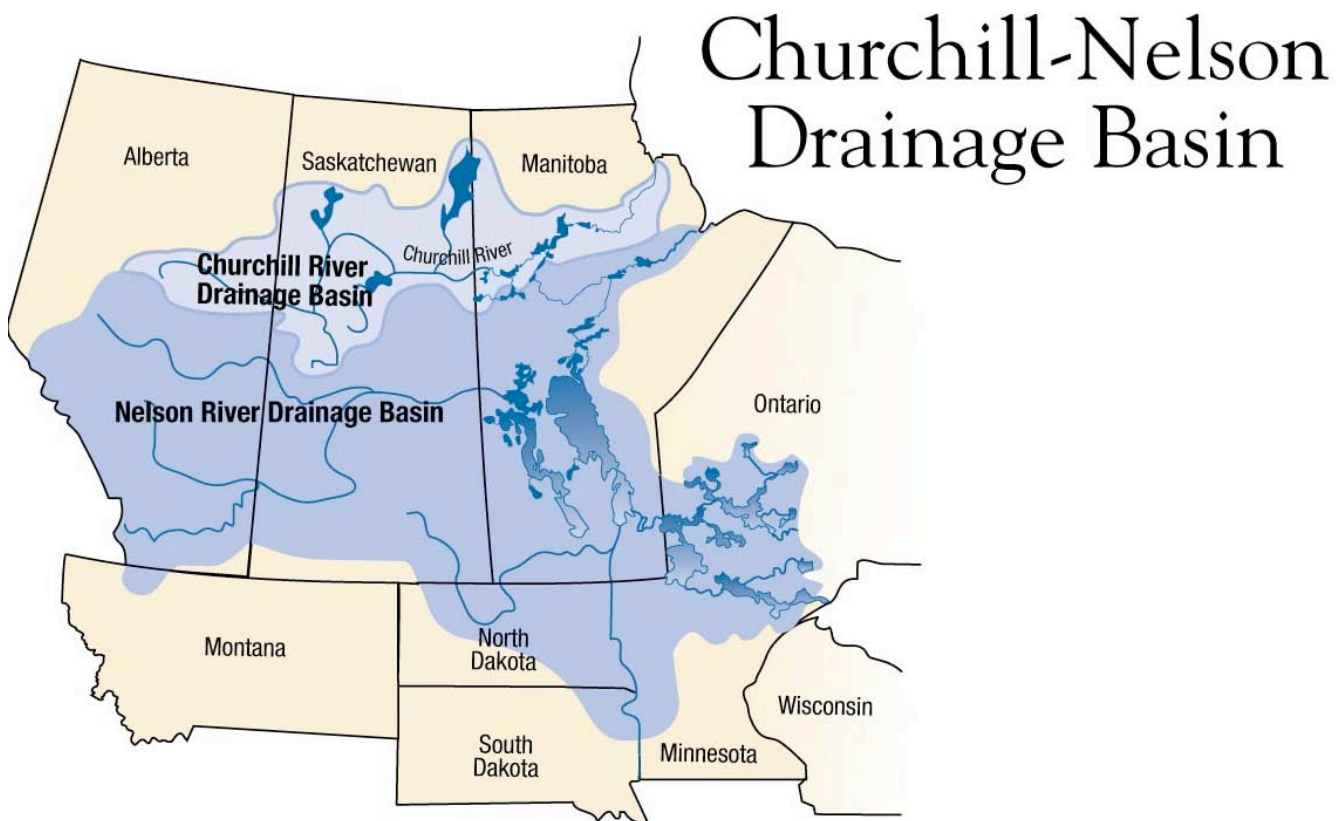
<sup>5</sup> Manitoba Hydro Annual Reports for 2000-2001 <[http://www.hydro.mb.ca/about\\_us/ar\\_2000\\_maps.pdf](http://www.hydro.mb.ca/about_us/ar_2000_maps.pdf)>; 2001-2002 (p. 67); and 2002-2003 (p. 99). Available at [http://www.hydro.mb.ca/about\\_us/annual\\_report.shtml](http://www.hydro.mb.ca/about_us/annual_report.shtml).

## Transmission

A pair of parallel transmission lines carries the bulk of Nelson River electricity to southern markets (see Appendix B). The two high voltage direct current lines—Bipole I (450 kV) and Bipole II (500 kV)—span the roughly 900 km (560 miles) from the main northern dams to the Dorsey Converter Station just northwest of Winnipeg. The corridor is 137 meters (450 feet) wide occupying a total of 10,800 hectares (26,700 acres) of land.<sup>6</sup> These two lines transmit about 70% of Manitoba Hydro’s annual electricity production.<sup>7</sup>

See “Exports” and “Project Expansion” below for information on transmission interconnections between Manitoba and other provinces and states, and for information on possible new transmission infrastructure.

Figure 1



<sup>6</sup> Manitoba Hydro <[http://www.hydro.mb.ca/our\\_facilities/ts\\_nelson.shtml](http://www.hydro.mb.ca/our_facilities/ts_nelson.shtml)>.

<sup>7</sup> Wuskwatim Generation and Transmission Projects, Report on Public Hearings, Manitoba Clean Environment Commission, September 2004, p. 18.

- Manitoba Hydro produces roughly 8% of the hydropower generated in Canada (depending on the year) and has 7.2% of the national hydropower capacity.
- Over 97% of electricity generated in Manitoba is from hydroelectric sources (except in years when water flows are exceptionally low and more thermal generation is needed).

Sources: Canadian Hydropower Association

<[http://www.canhydropower.org/hydro\\_e/pdf/Quick\\_Facts\\_2004.pdf](http://www.canhydropower.org/hydro_e/pdf/Quick_Facts_2004.pdf)>; and Manitoba Hydro annual reports <[http://www.hydro.mb.ca/about\\_us/annual\\_report.shtml](http://www.hydro.mb.ca/about_us/annual_report.shtml)>

## Exports

Ever since Duff Roblin’s “have our cake, eat it and make more cake” remarks to the Manitoba Legislature, electricity exports to other provinces and especially the US have been a major emphasis of Manitoba Hydro.

Year <sup>8</sup>	Revenue from exports to US <sup>9</sup>	Revenue from Cdn exports <sup>10</sup>	Total export revenue** <sup>11</sup>	Total exports as % of total energy sales <sup>12</sup>
2003-4	\$224 million*	\$127 million	\$351 million	18.5%
2002-3	\$392 million	\$71 million	\$463 million	33.3%
2001-2	\$507 million	\$81 million	\$588 million	41.6%
2000-1	\$469 million	\$11 million	\$480 million	41.9%
1999-2000	\$362 million	\$14 million	\$376 million	40.7%
Total	\$1,954 million	\$304 million	\$2,258 million	

\*All figures in Canadian dollars.

\*\*These figures represent gross as opposed to net export revenue. Every year Manitoba Hydro imports electricity from other jurisdictions. These imports have not been subtracted from the exports.

Of Manitoba Hydro’s revenue from extra provincial exports, 86.5% comes from exports to the US, with the remainder from sales to other provinces.

<sup>8</sup> As Manitoba Hydro’s fiscal year end is March 31, the period listed as “2003-4” is equivalent to April 1, 2003 to March 31, 2004. All hyphenated years correspond with this April 1 to March 31 period.

<sup>9</sup> Source: National Energy Board <[http://www.neb-one.gc.ca/Statistics/ElectricityExportsImports/index\\_e.htm#Year2003](http://www.neb-one.gc.ca/Statistics/ElectricityExportsImports/index_e.htm#Year2003)>. The annual figures cover the period April 1 to March 31 of the following year so as to coincide with Manitoba Hydro’s fiscal year.

<sup>10</sup> These figures are simply total export revenue minus US export revenue.

<sup>11</sup> Source: Manitoba Hydro Annual Report, 2003-4, p. 88; accessible at <[http://www.hydro.mb.ca/about\\_us/ar\\_2003/ar\\_2003\\_complete.pdf](http://www.hydro.mb.ca/about_us/ar_2003/ar_2003_complete.pdf)>.

<sup>12</sup> Export percentages derived from data in Manitoba Hydro Annual Report, 2003-4, p.89; <[http://www.hydro.mb.ca/about\\_us/ar\\_2003/ar\\_2003\\_complete.pdf](http://www.hydro.mb.ca/about_us/ar_2003/ar_2003_complete.pdf)>.

## Manitoba's portion of total Canadian electricity exports to the US<sup>13</sup>

	By revenue	By amount of energy
2003*	13.8%	16.2%
2002	21.1%	20.8%
2001	12.7%	24.3%
2000	10.9%	18.7%
1999	17.9%	17.7%

\*Calendar year.

Current plans for expansion of Manitoba Hydro's northern system are driven largely by the prospect of increased exports, both to the US and to kilowatt-hungry Ontario (see "Project Expansion" below).

### Generating Dollars and Debt

Manitoba Hydro revenue from sale of electricity<sup>14</sup>

2003-4	\$1.29 billion
2002-3	\$1.35 billion
2001-2	\$1.39 billion
2000-1	\$1.27 billion
1999-2000	\$1.12 billion

Manitoba Hydro profits<sup>15</sup>

2003-4	(\$436 million) loss
2002-3	\$71 million
2001-2	\$214 million
2000-1	\$270 million
1999-2000	\$152 million

The culture of the white man is economics.

"Statement of General Policies: A Focus on the North," A Document of the Manitoba Schreyer Government, 1975

<sup>13</sup> National Energy Board of Canada <[https://www.neb-one.gc.ca/Statistics/ElectricityExportsImports/index\\_e.htm](https://www.neb-one.gc.ca/Statistics/ElectricityExportsImports/index_e.htm)>.

<sup>14</sup> These revenues do not include Manitoba Hydro's natural gas operations. The time periods listed (e.g. 2003-4) refer to Manitoba Hydro's fiscal year which ends on March 31. Source: Manitoba Hydro Annual Report, 2003-4, p.88; <[http://www.hydro.mb.ca/about\\_us/ar\\_2003/ar\\_2003\\_complete.pdf](http://www.hydro.mb.ca/about_us/ar_2003/ar_2003_complete.pdf)>.

<sup>15</sup> These revenues include Manitoba Hydro's natural gas operations. The time periods listed (e.g. 2003-4) refer to Manitoba Hydro's fiscal year which ends on March 31. Source: Manitoba Hydro Annual Report, 2003-4, p.88; <[http://www.hydro.mb.ca/about\\_us/ar\\_2003/ar\\_2003\\_complete.pdf](http://www.hydro.mb.ca/about_us/ar_2003/ar_2003_complete.pdf)>.



Manitoba Hydro's long-term debt as of March 31, 2004: \$7.1 billion<sup>16</sup>

In the current era of hydro development in Manitoba—since Lake Winnipeg Regulation and Churchill River Diversion went into operation—Manitoba Hydro has taken in \$27.4 billion in gross revenue (2003 dollars), paid \$1.2 billion to the provincial government in water rental payments (2003 dollars) and spent a reported \$540 million on compensation and mitigation initiatives in northern Manitoba. For a table showing Manitoba Hydro revenues, profits/losses and water rental payments from 1977 to 2004 see Appendix E.

### **Project Expansion: Doer's Dams**

Manitoba Hydro is, to a considerable degree, the nucleus around which the Manitoba Government of Premier Doer intends to drive the Manitoba economy.

Manitoba Hydro and Manitoba Government officials boast the province could expand the existing system to pump out an additional 5,000 MW of hydro capacity. The most recent talk is of providing Ontario—which may face energy shortfalls in coming years—with 1500 MW of power from northern Manitoba. This would require construction of the proposed Conawapa dam, a major new transmission line from northern Manitoba, connecting Manitoba with southern Ontario.

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<sup>16</sup> Manitoba Hydro Annual Report, 2003-4, p. 88 <  
[http://www.hydro.mb.ca/about\\_us/ar\\_2003/ar\\_2003\\_report.shtml](http://www.hydro.mb.ca/about_us/ar_2003/ar_2003_report.shtml)>.

## Proposed system expansions

	Capacity	Projected Cost	Location*	Status
Wuskwatim Dam	200 MW	\$0.9 billion	Burntwood diversion route	Public hearing complete, federal assessment pending, earliest in service date 2011
Gull/Keeyask Dam	620 MW	\$2.5 billion	Nelson Power Corridor	Technical studies underway, possible in service date 2012
Conawapa	1380 MW	\$6 billion	Nelson Power Corridor	Technical studies underway, possible in service date 2017
Gillam Island	1000 MW	N/A	Nelson Power Corridor	Manitoba Hydro has indicated it may follow the 3 above
Notigi	100 MW	\$500 million	Rat River diversion route	Technical studies undertaken, currently not being pursued
First Rapids	210 MW	N/A	Burntwood	Listed on Manitoba Government web site <sup>17</sup>
Manasan	265 MW	N/A	Burntwood	“
Early Morning	70 MW	N/A	Burntwood	“
Red Rock	340 MW	N/A	Nelson	“
Whitemud	310 MW	N/A	Nelson	“
Kelsey extension	200 MW	N/A	Nelson	“
Bonald	120 MW	N/A	Churchill	“
Granville	125 MW	N/A	Churchill	“

\*Transmission infrastructure included with Dam costs. Additional Bi-pole costs not included.

\*See Appendix A

<sup>17</sup> Source: Manitoba Government; <http://www.gov.mb.ca/est/energy/power/generating.html>.

We have 5,000 megawatts of power still to develop, and we are going to be developing hydrogen fuel using our abundant supplies of water and hydro-electric power in about ten years from now. At that point, I predict, we are going to take over from Alberta as the energy re-source centre in Canada.

Premier Gary Doer  
Queens University, April 28, 2000

### **Bipole III or World Heritage Site**

Any northern dams beyond the 200 MW Wuskwatim project would require major new north-south transmission infrastructure. The corporate preference would include additional high voltage direct current lines (commonly referred to as Bipoles) running east of Lake Winnipeg. This possible route is highly controversial.

Such a route would bisect one of the largest intact areas of boreal forest in the world. Aboriginal nations in the area are part of a nomination of 4.3 million ha for designation as a UNESCO World Heritage Site.

Additional Bipole routes could parallel the existing Bipole corridor west of Lake Winnipeg.

Additional lines could also be routed west of Cedar Lake and Lake Manitoba but this route is considerably longer, depending where the energy would be destined for export. The estimated cost of Bipole III is \$2.5 billion, though this would depend on which route were to be chosen.

Bi pole planning by Manitoba Hydro is currently underway independent of new generation station construction.

If Manitoba Hydro were to proceed with all its northern expansion plans as many as 10 new transmission lines in as many as six new corridors could be required.<sup>18</sup>

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<sup>18</sup> Manitoba Hydro Interoffice Memorandum from W. N. Zurba to C. V. Thio, June 27, 2000. Obtained by Manitoba Wildlands from Parks Canada under the Access to Information Act.

## Manitoba-Ontario Energy Transfer

Construction of the 1380 MW Conawapa dam would be contingent on a contract to sell energy to Ontario, and such a sale would in turn depend on construction of major transmission infrastructure from Manitoba to the Sudbury, ON area.

In a June 2003 Memorandum of Understanding, the premiers of Manitoba and Ontario set out a concerted plan for steps that could lead to a sale of energy from Manitoba to Ontario and the required transmission line for such a sale.<sup>19</sup>

A \$2 million September 2004 joint feasibility study into the transfer of 1500 MW from Manitoba to Ontario found that the transfer could lead to “significant” benefits, that there are “no insurmountable obstacles” and that the project should “move into its next stage.”<sup>20</sup> To coincide with the release of the report, Premier Doer presented a speech at the Empire Club in Toronto in which he set out the case for federal funding of the Manitoba-Ontario transmission infrastructure.<sup>21</sup>

### Southern Operations

In addition to the northern hydro system, Manitoba Hydro operates six relatively small and older dams on the Winnipeg River and two thermal generating stations (see Appendix C).

#### **Winnipeg River Generating Stations<sup>22</sup>**

See Appendix D for a map showing Winnipeg River dams.

	Capacity	Waterfall drop (head)	Date the dam went into service
Point du Bois	78 MW	14 m	1911
Slave Falls	67 MW	9.75 m	1931
Seven Sisters	165 MW	18.6 m	1931
McArthur Falls	55 MW	7 m	1954
Great Falls	131 MW	17.7m	1923
Pine Falls	88 MW	11.3 m	1951
<i>(Pinawa</i>	<i>22 MW</i>	<i>14 m</i>	<i>1906, decommissioned in 1951)</i>
Totals*	584 MW	78.35 m	

\*Not including Pinawa.

<sup>19</sup> The 2003 MOU can be accessed at <[http://manitobawildlands.org/docs/Ont\\_MB\\_Hydro\\_MOU.doc](http://manitobawildlands.org/docs/Ont_MB_Hydro_MOU.doc)>.

<sup>20</sup> The Sept. 2004 study can be accessed at <[http://www.gov.mb.ca/est/energy/pdf/clean\\_energy\\_transfer.pdf](http://www.gov.mb.ca/est/energy/pdf/clean_energy_transfer.pdf)>.

<sup>21</sup> Premier Doer’s October 2, 2004 speech at the Empire Club can be accessed at <[http://manitobawildlands.org/docs/Doer\\_at\\_Empire2Oct2004.doc](http://manitobawildlands.org/docs/Doer_at_Empire2Oct2004.doc)> (see final three pages of speech).

<sup>22</sup> Source: Manitoba Hydro <[http://www.hydro.mb.ca/our\\_facilities/generating\\_stations.shtml](http://www.hydro.mb.ca/our_facilities/generating_stations.shtml)>.

## Thermal Generating Stations

**Brandon:** The Brandon Generating Station in western Manitoba is a combined coal and natural gas powered facility with a total capacity of 347 MW. It originally went into service in 1958 as a coal facility with 95 MW capacity.<sup>23</sup> In 2002 two natural gas units with an additional combined capacity of 252 MW were added. The Brandon Station is used on a somewhat limited basis to firm-up and maximize export sales, and as a backup to the northern system.<sup>24</sup>

**Selkirk:** The Selkirk Generating Station is 126 MW natural gas powered facility located just north of Winnipeg. It was first built as a coal powered facility in 1960. Following a period of considerable environmental controversy related to the Selkirk Station, the plant was converted from coal to natural gas in 2002.<sup>25</sup> Its primary role is as a backup source of energy, though it has also been operated to capitalize on lucrative export opportunities.

Manitoba Hydro's total generating capability is 5,481 MW (4,998 MW of which is hydro). See Appendix E for a table showing all Manitoba Hydro generation facilities.

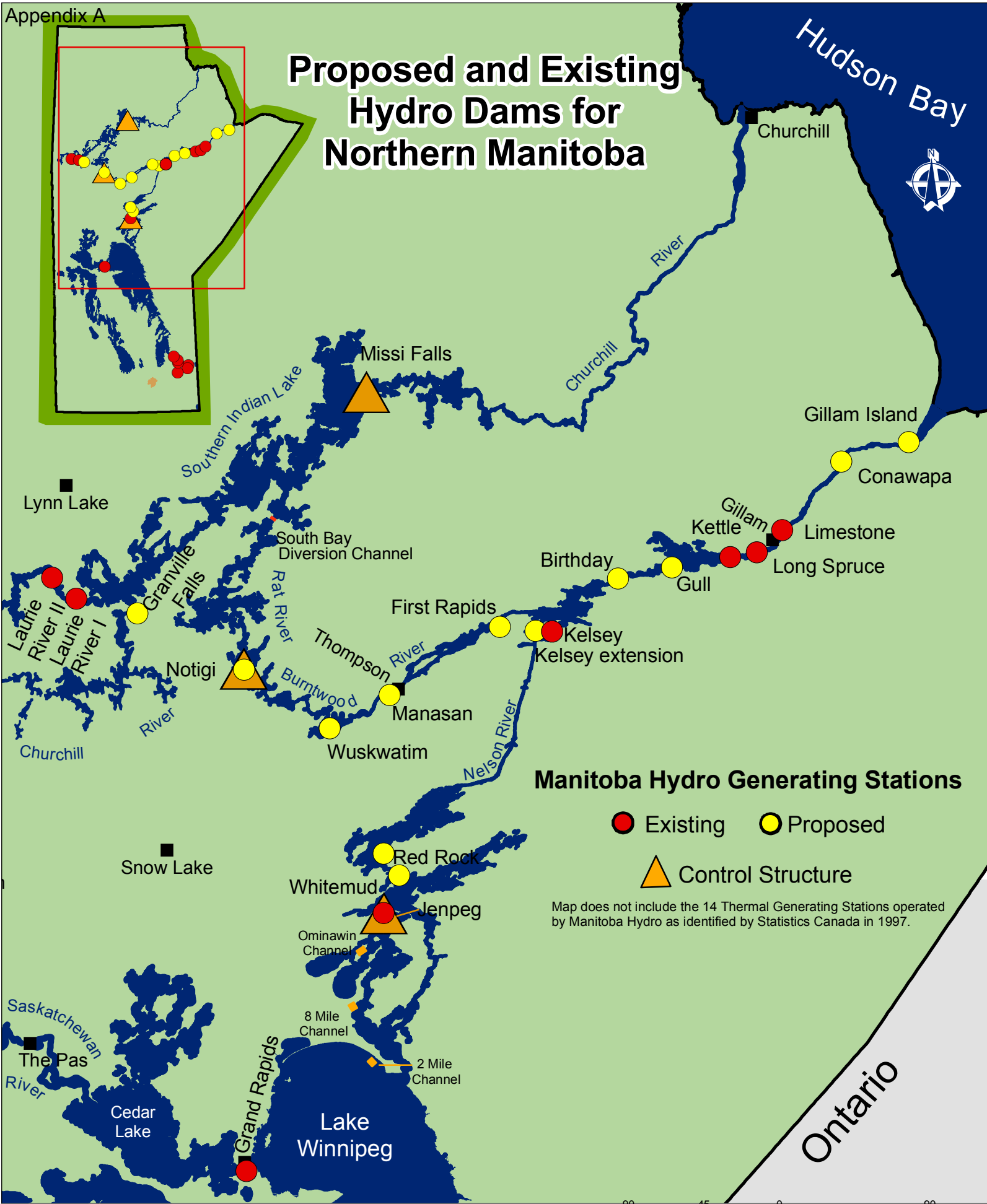
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<sup>23</sup> Source: Manitoba Hydro <[http://www.hydro.mb.ca/our\\_facilities/g\\_s\\_brandon.shtml](http://www.hydro.mb.ca/our_facilities/g_s_brandon.shtml)>.

<sup>24</sup> Source: Manitoba Hydro brochure accessible at <[http://www.hydro.mb.ca/our\\_facilities/g\\_s\\_brandon.pdf](http://www.hydro.mb.ca/our_facilities/g_s_brandon.pdf)>.

<sup>25</sup> Sources: Manitoba Hydro <[http://www.hydro.mb.ca/our\\_facilities/g\\_s\\_selkirk.shtml](http://www.hydro.mb.ca/our_facilities/g_s_selkirk.shtml)>; and Manitoba Hydro brochure accessible at <[http://www.hydro.mb.ca/our\\_facilities/g\\_s\\_selkirk.pdf](http://www.hydro.mb.ca/our_facilities/g_s_selkirk.pdf)>.

# Proposed and Existing Hydro Dams for Northern Manitoba



## Manitoba Hydro Generating Stations

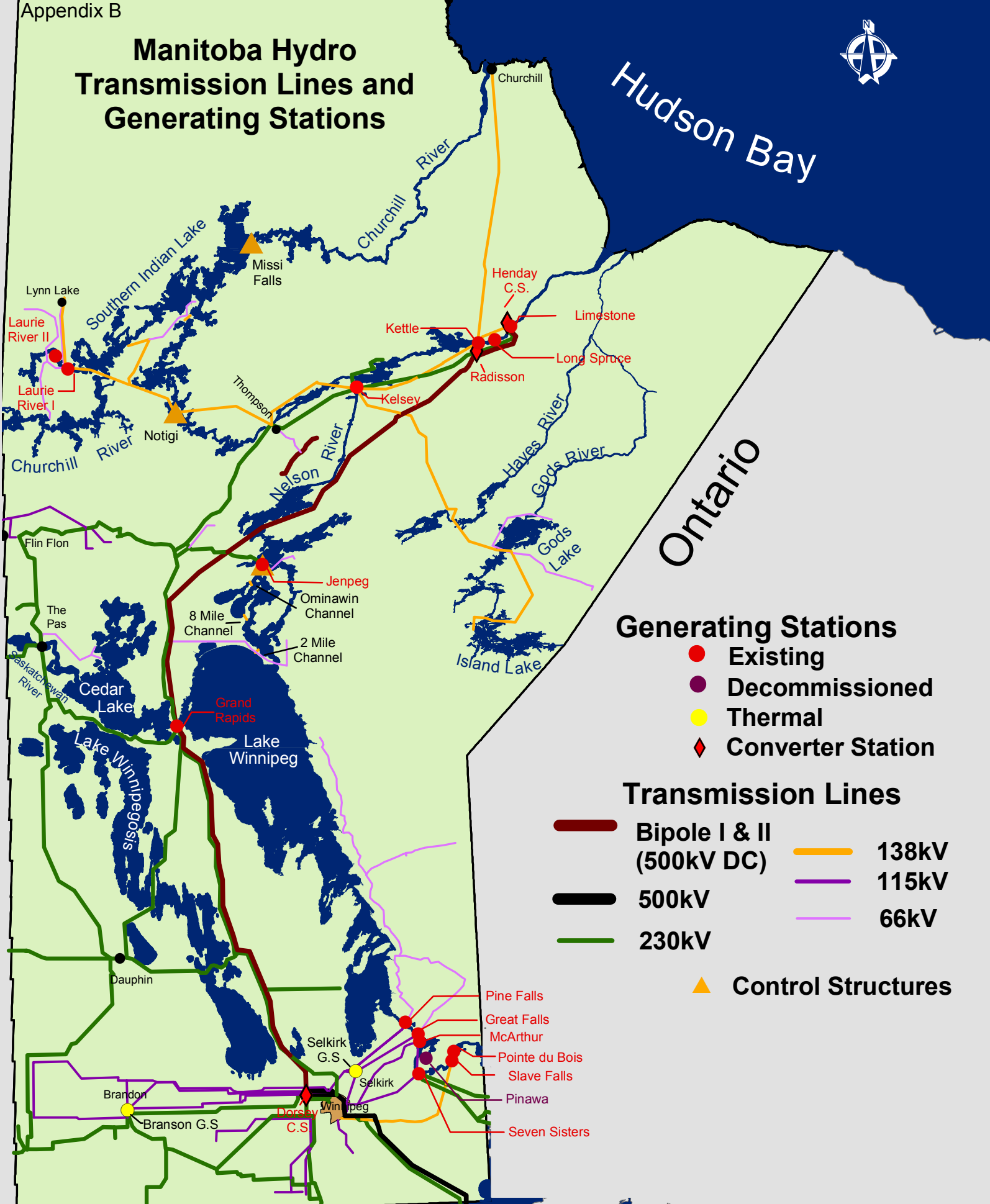
- Existing
- Proposed
- ▲ Control Structure

Map does not include the 14 Thermal Generating Stations operated by Manitoba Hydro as identified by Statistics Canada in 1997.

Sources: Manitoba Land Initiative - 1:500,000 Base Map  
Northern Manitoba - Northwestern Ontario First Nations Meeting on Energy Related Issues Thunder Bay, Ontario, September 9th 2003.

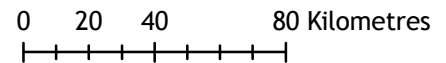
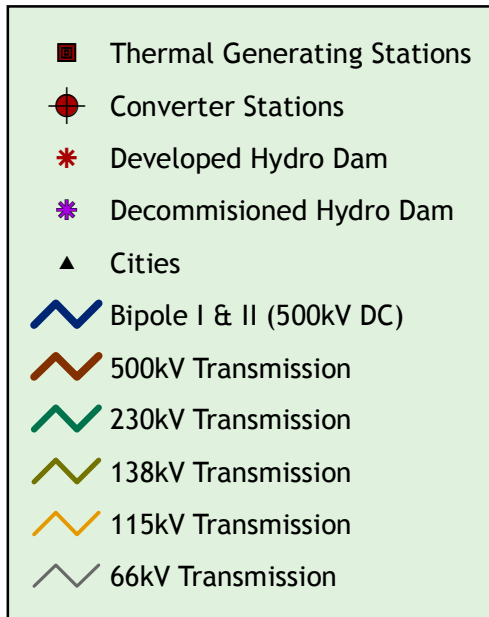
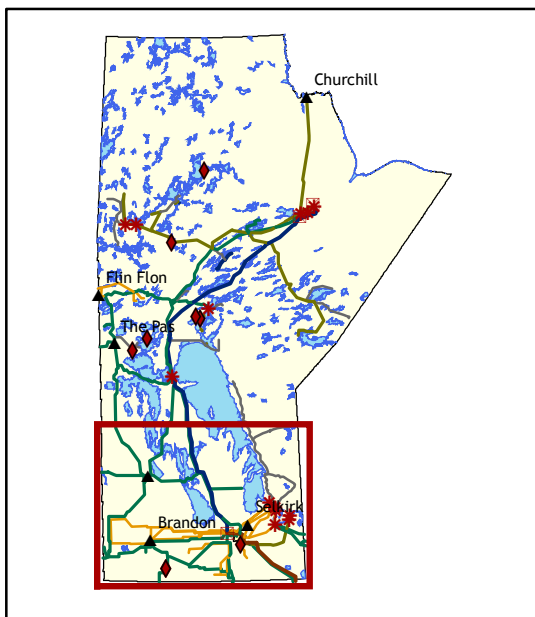
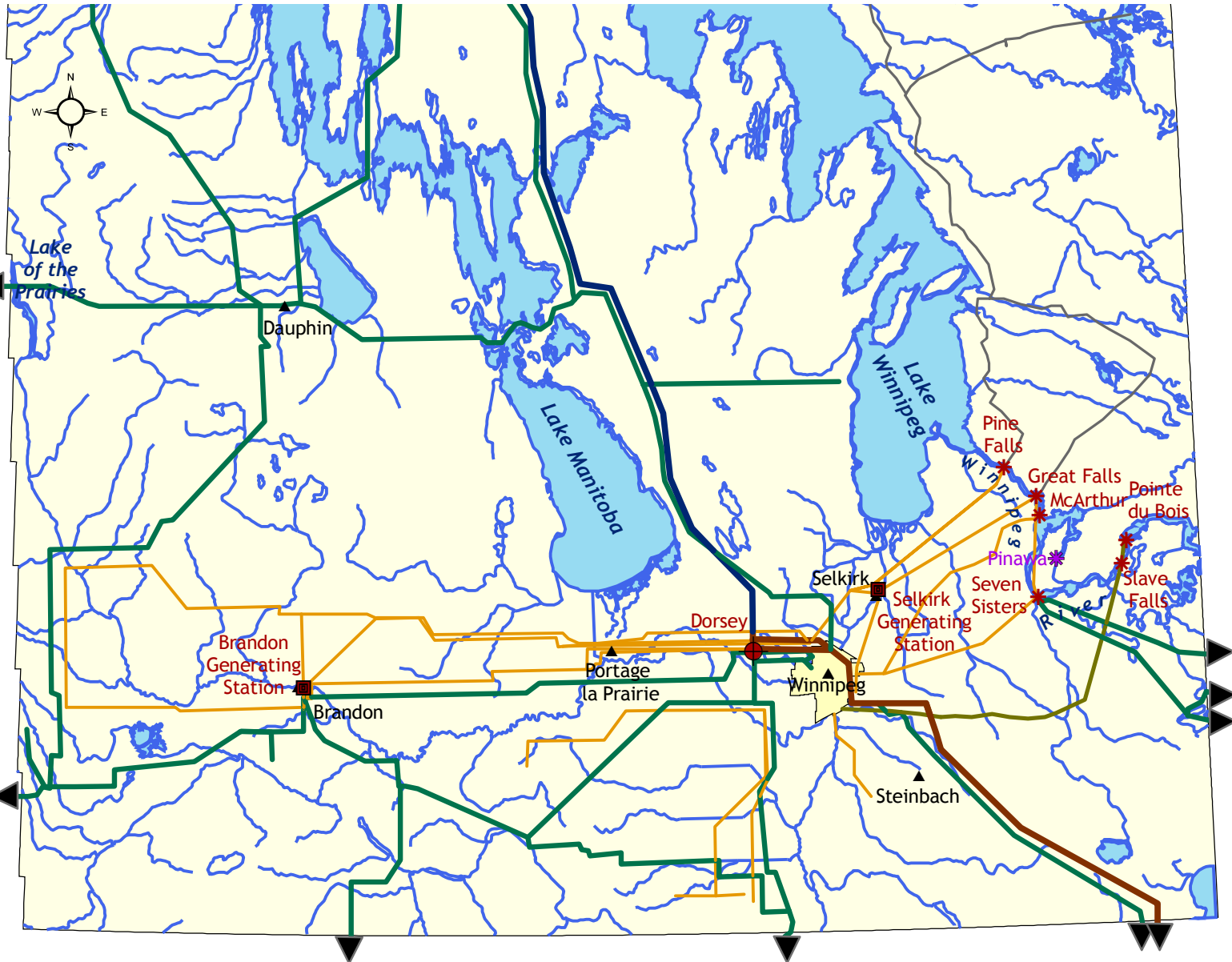


# Manitoba Hydro Transmission Lines and Generating Stations



Sources: Manitoba Land Initiative - 1:500,000 Base Map  
 Northern Manitoba - Northwestern Ontario First Nations Meeting on  
 Energy Related Issues Thunder Bay, Ontario, September 9th 2003.  
 JustEnergy: <http://www.justenergy.org/maps/hydrosystems.jpg>  
 Wuskwatim Transmission Project EIS Fig 1.6

# Manitoba Hydro Southern Operations

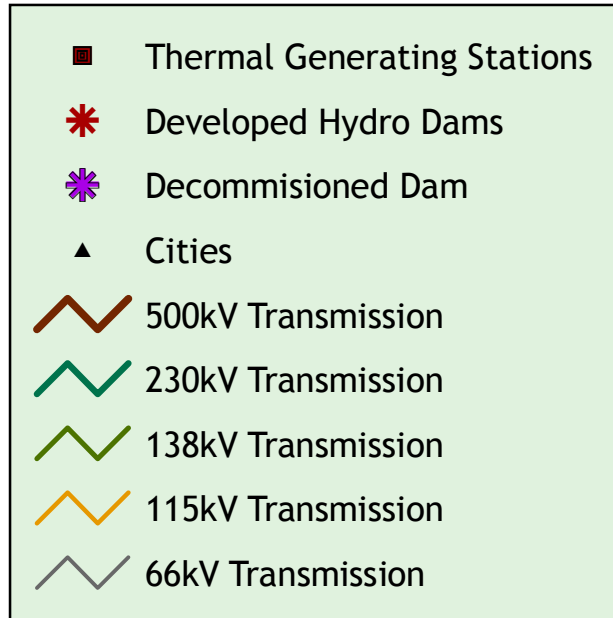
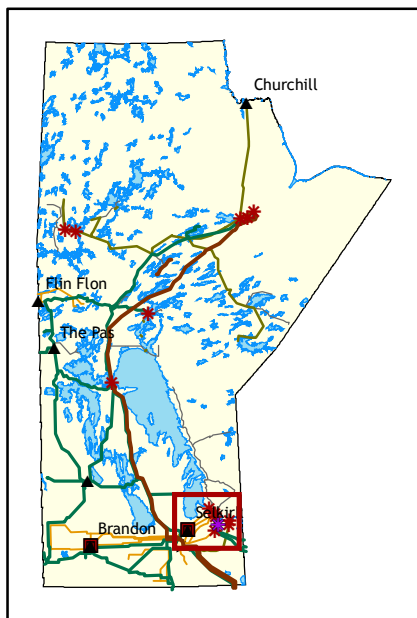
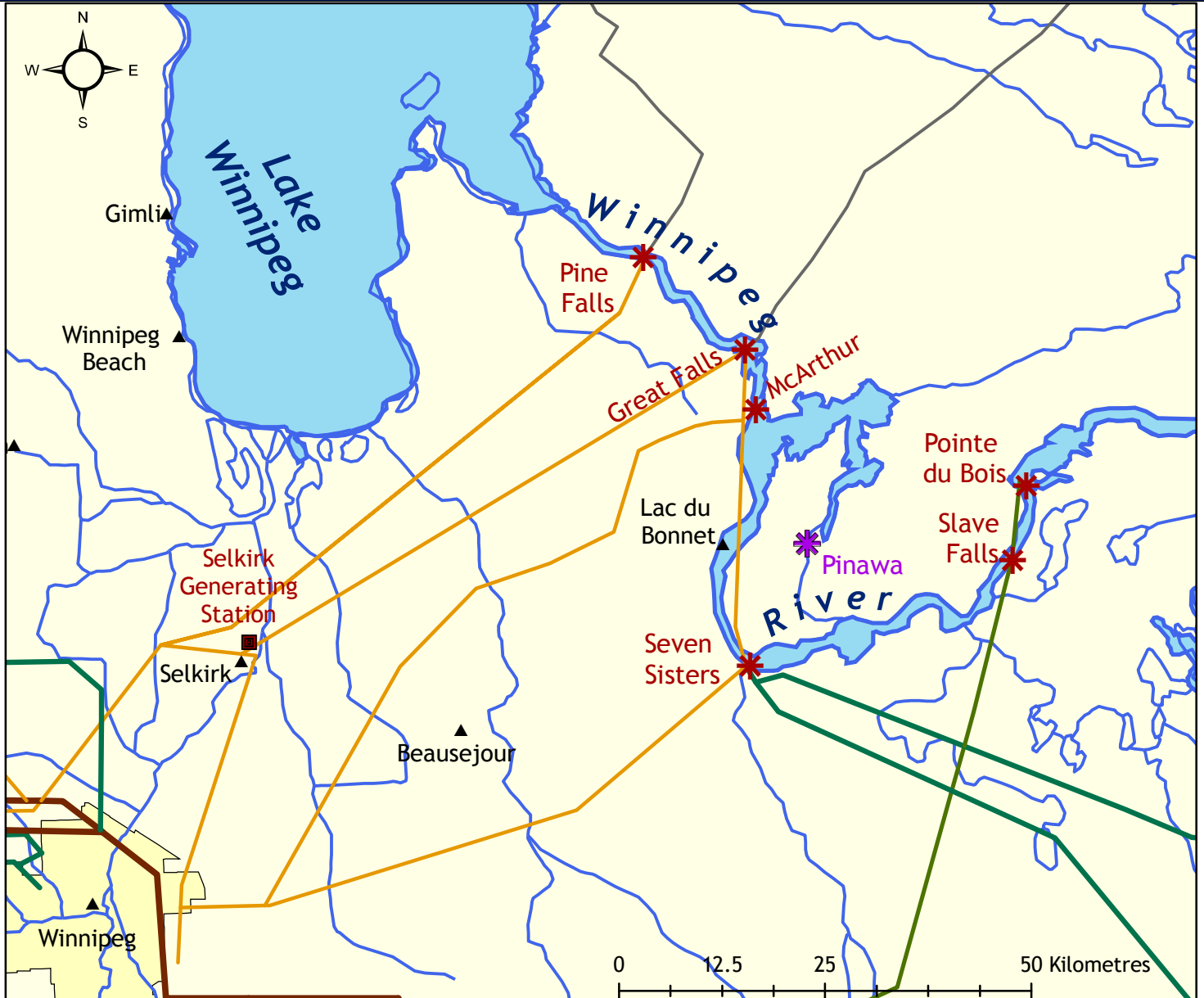


Produced By: Manitoba Wildlands  
 Date: January 28, 2005  
 Projection:  
 UTM, NAD 83, Zone 14N  
 Scale: 1:2,300,000

Data acquired from:  
 Manitoba Eco-Network GIS Centre  
<http://www.mbeconetwork.org/>  
 Manitoba Land Initiatives website  
<http://mli.gov.mb.ca>  
 Manitoba Hydro  
<http://www.hydro.mb.ca/>



# Manitoba Hydro Winnipeg River Operations



Produced By: Manitoba Wildlands  
 Date: January 28, 2005  
 Projection:  
 UTM, NAD 83, Zone 14N  
 Scale: 1:750,000

Data acquired from:  
 Manitoba Eco-Network GIS Centre  
<http://www.mbeconetwork.org/>  
 Manitoba Land Initiatives website  
<http://mli.gov.mb.ca>  
 Manitoba Hydro  
<http://www.hydro.mb.ca/>

*Map for illustrative purposes only.*

## Appendix D: Manitoba Hydro revenues, and profits, 1977-2004

In the current era of hydro development in Manitoba—since Lake Winnipeg Regulation and Churchill River Diversion went into operation—Manitoba Hydro has taken in \$27.4 billion in gross revenue (2003 dollars). The chart below shows total and net revenue from overall Manitoba Hydro operations (northern and southern) by year. It also shows “water rental” payments the utility is required to make to the provincial government (this is the main form of direct “taxation” on the utility and is common practice in Canada).

All figures in thousands of dollars, Canadian funds.  
Source: Manitoba Hydro annual reports.

Year	Gross Revenues	Net Revenues/ Profits (Losses)	Water Rental Payments to Manitoba
1977*	\$192,827	(\$4,091)	N/A
1978	242,995	(1,263)	N/A
1979	328,531	45,663	\$ 3,937
1980	374,345	45,603	4,765
1981	361,843	(16,268)	8,956
1982	387,603	(24,192)	9,342
1983	414,695	(19,129)	11,575
1984	461,497	(3,674)	11,760
1985	506,414	11,134	11,287
1986	552,603	30,265	17,850
1987	569,688	13,448	37,582
1988	580,302	(18,493)	26,220
1989	609,500	(26,400)	22,900
1990	664,100	24,200	28,900
1991	702,500	48,600	32,800
1992	756,700	17,700	38,300
1993	823,000	(24,000)	45,700
1994	924,800	69,500	44,100
1995	944,000	55,900	45,200
1996	988,100	70,100	47,100
1997	1,025,100	101,000	51,300
1998	1,041,100	110,500	54,600
1999	1,080,000	100,000	50,000
2000	1,122,000**	152,000**	51,000
2001	1,269,000**	270,000**	56,000
2002	1,385,000**	214,000**	113,000
2003	1,354,000**	71,000**	103,000
2004	1,287,000**	(436,000)**	71,000
<b>Totals:</b>	<b>\$20,949,243</b>	<b>\$877,103</b>	<b>\$998,174</b>

\*Manitoba Hydro fiscal years, ending on March 31 of the given year.

\*\*By 2000 Manitoba Hydro had acquired Centra Gas and was selling natural gas in addition to electricity. Gross revenue numbers for 2000 to 2004 are revenue from electricity sales only (not including gas). However net revenue numbers are for overall Manitoba Hydro operations (electricity and gas).

**When all figures are converted to 2003 dollars the tallies for the period 1977 to 2004 are as follows.<sup>26</sup>**

<b>Gross revenue:</b>	<b>\$27,358,059,000</b>
<b>Net revenue:</b>	<b>\$1,078,411,000</b>
<b>Water rental payments:</b>	<b>\$1,189,535,000</b>

As of March 31, 2004 Manitoba Hydro reports expenditures of \$540 million for “remedial works, compensation and/or mitigation initiatives in northern Manitoba.”<sup>27</sup> (Presumably these numbers are not calculated to current year dollars.)

The Government has already indicated that it is committed to doing everything possible to ensure that people in northern Manitoba have at least comparable options available to them after the regulation program as they had before... It is, of course, hoped that conditions will be such that it will be unnecessary to pay compensation to anyone.

Letter from Premier Schreyer to Cross Lake informing them of predicted impacts of the hydro project, which by then, was well underway, Jan. 31, 1975.

<sup>26</sup> Calculation of 2003 dollars done for each year using the Statistics Canada Consumer Price Index historical summary found at <<http://www.statcan.ca/english/Pgdb/econ46.htm>>.

<sup>27</sup> Manitoba Hydro Annual Report, 2003-4, p. 43; <[http://www.hydro.mb.ca/about\\_us/ar\\_2003/ar\\_2003\\_complete.pdf](http://www.hydro.mb.ca/about_us/ar_2003/ar_2003_complete.pdf)>.

## Appendix E: All Manitoba Hydro generating facilities

Dam/Station	Capacity	River	Waterfall Drop (head)	Construction Period
Jenpeg	132 MW	Nelson	7.3 m	1972-79
Kelsey	223 MW	Nelson	17.1 m	1957-61
Kettle	1220 MW	Nelson	30.0 m	1966-74
Long Spruce	1010 MW	Nelson	27.6 m	1971-79
Limestone	1340 MW	Nelson	26.0 m	1985-90
Grand Rapids	479 MW	Saskatchewan	36.6 m	1960-68
Laurie River (2)	10 MW	Laurie	N/A	N/A
Pointe du Bois	78 MW	Winnipeg	14 m	1911*
Slave Falls	67 MW	Winnipeg	9.75 m	1931*
Seven Sisters	165 MW	Winnipeg	8.6 m	1931*
McArthur Falls	55 MW	Winnipeg	7 m	1954*
Great Falls	131 MW	Winnipeg	17.7 m	1923*
Pine Falls	88 MW	Winnipeg	11.3 m	1951*
<i>Pinawa**</i>	<i>(22 MW)</i>	<i>Winnipeg</i>	<i>14 m</i>	<i>1906*</i>
Brandon Thermal	347 MW			
Selkirk Thermal	126 MW			
Brochet Diesel	3 MW			
Lac Brochet Diesel	2 MW			
Shamattawa Diesel	3 MW			
Tadoule Lake Diesel	1 MW			
<b>Total</b>	<b>5480 MW</b>			

\*In-service date

\*\*Decommissioned in 1951