

**WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT
Manitoba**

May 6, 2013

Synopsis/Overview

This Water Availability and Drought Conditions Report provides an update on meteorological and hydrologic conditions for Manitoba as of April 2013.

The three month precipitation indicator indicates moderately dry conditions prevailed in the areas around Emerson, Morden, Carman and Gillam. Severely dry conditions prevailed in the areas around Gimli, Arborg, Melita, Swan River, The Pas, Flin Flon, Thompson, Lynn Lake and Tadoule Lake. Extremely dry conditions prevailed in the areas around Dauphin, Norway House and Churchill.

Overall, flow indicators indicated flows were normal across the province this spring. Conditions will be reassessed after recession of the spring freshet to determine if any low flow conditions exist.

Manitoba Agriculture, Food and Rural Initiatives' fall soil moisture survey in 2012 reported that soil moisture was below normal to near normal in most parts of agro-Manitoba.

Manitoba Agriculture, Food and Rural Initiatives reports that water levels in most dugouts were lower than normal in the southwest. Most dugouts were full or close to full in the central region and northwest region.

A number of water supply reservoirs in southern and western Manitoba are below full supply levels but are expected to replenish to full supply levels due to spring melt.

Warming temperatures and dry conditions have increased the fire risk in some areas of the province. There have been a few fires reported in the eastern and northwest regions of the province.

Outlook

Environment Canada's seasonal forecast for the next three months (May, June and July 2013) is for normal temperatures for the entire province except above normal for a portion of south-western Manitoba. Below normal precipitation is forecast for southern and central Manitoba and normal for northern Manitoba (Attachment 5).

Indicators

Two types of indicators are assessed across Manitoba - precipitation and stream flow. The indicators describe the severity of dryness in a watershed.

Precipitation is assessed to determine the severity of meteorological dryness and is an indirect measurement of agricultural dryness. Three precipitation indicators are calculated to represent the long term (twelve months), medium term (three months) and short term (one month). Long term and medium term indicators provide the most appropriate assessment of dryness as the short-term indicator is influenced by significant rainfall events and spatial variability in rainfall, particularly during summer storms.

The stream flow indicator is used to determine the severity of hydrological dryness in a watershed.

Precipitation

Over the long term (twelve months), conditions were normal throughout the province with the exception of the areas near Morden, Melita, Norway House, Tadoule Lake and Churchill which have experienced moderately dry conditions.

Over the medium term (three months), moderately dry conditions prevailed in the areas around Emerson, Morden, Carman and Gillam. Severely dry conditions prevailed in the areas around Melita, Gimli, Arborg, Swan River, The Pas, Flin Flon, Thompson, Lynn Lake and Tadoule Lake. Extremely dry conditions prevailed in the areas around Dauphin, Norway House and Churchill.

Over the short term (one month), moderately dry conditions prevailed in the areas around Emerson, Portage La Prairie, Gimli and Arborg. Severely dry conditions prevailed in the areas around Morden, Carman, Brandon, Swan River, Norway House, The Pas and Thompson. Extremely dry conditions prevailed in the areas around Melita, Dauphin and Churchill (Table 1 and Attachment 1).

Stream Flows

Monthly flow indicator indicates flows for April were normal across the province except severely dry hydrological conditions for the Hayes river and extremely dry hydrological conditions for the Little Saskatchewan River and the Cochrane River (Table 1 and Attachment 2).

Water Availability

Fall Soil Moisture Survey

Manitoba Agriculture, Food and Rural Initiatives' fall 2012 soil survey indicates soil moisture was below normal to near normal in most parts of Agro- Manitoba (Attachment 3).

Reservoir Conditions

A number of water supply reservoirs in southern and western Manitoba are below full supply levels (Attachment 4) but are expected to replenish to full supply levels due to spring melt. Provincial water supply reservoirs should have sufficient water supplies for the balance of the year.

On Farm Water Supply

Manitoba Agriculture, Food and Rural Initiatives reports that water levels in most dugouts were lower than normal in the southwest. Most dugouts were full or close to full in the central region and northwest region.

Aquifers

Groundwater levels in major aquifers are generally good. Water level responses to seasonal or yearly precipitation fluctuations in most aquifers lag considerably behind surface water responses, so even prolonged periods of below normal precipitation may not have a significant negative effect on groundwater levels. Most aquifers also store very large quantities of groundwater and can continue to provide water during extended periods of dry weather. Consequently, the major concern regarding groundwater and dry periods relates to water levels in shallow wells constructed in near surface sand aquifers. As the water table drops, there is less available drawdown in shallow wells and some wells may 'go dry'. This was experienced last October in the southeast region of Manitoba. Deeper wells were not similarly affected by the dry conditions.

Forest and Grassland Fires

Warming temperatures and dry conditions have increased the fire risk in some areas of the province. A few fires have been reported in the eastern and northwest regions of the province. More detailed information on fire conditions is available on the Manitoba Conservation and Water Stewardship under the Fire Program (website <http://www.gov.mb.ca/conservation/fire/>).

Potential Impacts

Many rivers and their tributaries have experienced above normal runoff conditions this spring. However, flow in many tributaries has receded rapidly. Precipitation in April was also below normal in southern Manitoba. With Environment Canada's outlook for the next three months for below normal precipitation and normal to above normal temperature for southern Manitoba, low flow conditions could occur in tributaries. There is also a risk of grass fires in southern Manitoba due to dry and hot weather. Provincial water supply reservoirs should have sufficient water supplies for the balance of the year.

Table 1: Drought Indicators by Major River Basin (Attachments: 1, 2 and 6)

Basin (in Manitoba)	Drought Indicators			
	Monthly Precipitation Indicator (Percent of 1 month Median) April 2013	Monthly Precipitation Indicator (Percent of 3 month Median) (February - April 2013)	Monthly Precipitation Indicator (Percent of 12 month Median) (May 2012- April 2013)	Monthly Flow Percentile April 2013 (Lower 10 th -20 th -35 th)
Red River	Moderately to severely dry except normal for Winnipeg	Moderately dry except normal for Winnipeg	Normal except moderately dry for Morden	Normal
Winnipeg River	Normal	Normal	Normal	Normal
Assiniboine River-Souris River	Moderately to extremely dry except normal for Roblin	Normal except severely dry for Melita	Normal except moderately dry for Melita	Normal except extremely dry for Little Saskatchewan river ¹
Lake Manitoba	Severely to extremely dry	Severely to extremely dry	Normal	Normal
Lake Winnipeg	Moderately dry except normal for Berens River	Severely dry except normal for Berens River	Normal	Normal
Saskatchewan River	Severely dry except normal for Flin Flon	Severely dry	Normal	Normal
Nelson River	Severely dry except normal for Gillam	Moderately to extremely dry	Normal except moderately dry for Norway House	Normal
Hayes River	Normal	Normal	Normal	Severely dry
Churchill River	Extremely dry except normal for Lynn Lake	Severely to extremely dry	Normal except moderately dry for Churchill	Normal except extremely dry for Cochrane river ¹
Seal River	Normal	Severely dry	Moderately dry	Normal

Note 1: Low April flows due to late spring melt.

Acknowledgements

This report was prepared with information from the following sources which are gratefully acknowledged:

- Manitoba Infrastructure and Transportation: Flow and Lake information:
http://www.gov.mb.ca/mit/floodinfo/floodoutlook/river_conditions.html
http://www.gov.mb.ca/mit/floodinfo/floodoutlook/lakes_information.html
- Environment Canada: Flow and Lake information
http://www.wateroffice.ec.gc.ca/index_e.html
- Fire Hazard: <http://www.gov.mb.ca/conservation/fire/>
- Environment Canada 3 month climatic outlook:
http://weatheroffice.gc.ca/saisons/index_e.html
- Manitoba Agriculture, Food and Rural Initiatives:
<http://www.gov.mb.ca/agriculture/crops/seasonal-reports/crop-report-archive/index.html>
- Manitoba Conservation and Water Stewardship Fire Program

For further information, please contact: Abul Kashem, Surface Water Management Section, Manitoba Conservation and Water Stewardship, 945-6397

Definition of drought

Meteorological Drought is generally defined by comparing the rainfall in a particular place and at a particular time with the average rainfall for that place. Meteorological drought leads to a depletion of soil moisture and this almost always has an impact on agricultural production. Meteorological droughts only consider the reduction in rainfall amounts and do not take into account the effects of the lack of water on water reservoirs, human needs or on agriculture. A meteorological drought can occur without immediately impacting streamflow, groundwater, or human needs. If a meteorological drought continues, it will eventually begin to affect other water resources.

Agricultural Drought occurs when there is not enough water available for a particular crop to grow at a particular time. Agricultural drought depends not only on the amount of rainfall but also on the use of that water. Agricultural droughts are typically detected after meteorological drought but before a hydrological drought. If agricultural drought continues, plants will begin to protect themselves by reducing their water use, which can potentially reduce crop yields.

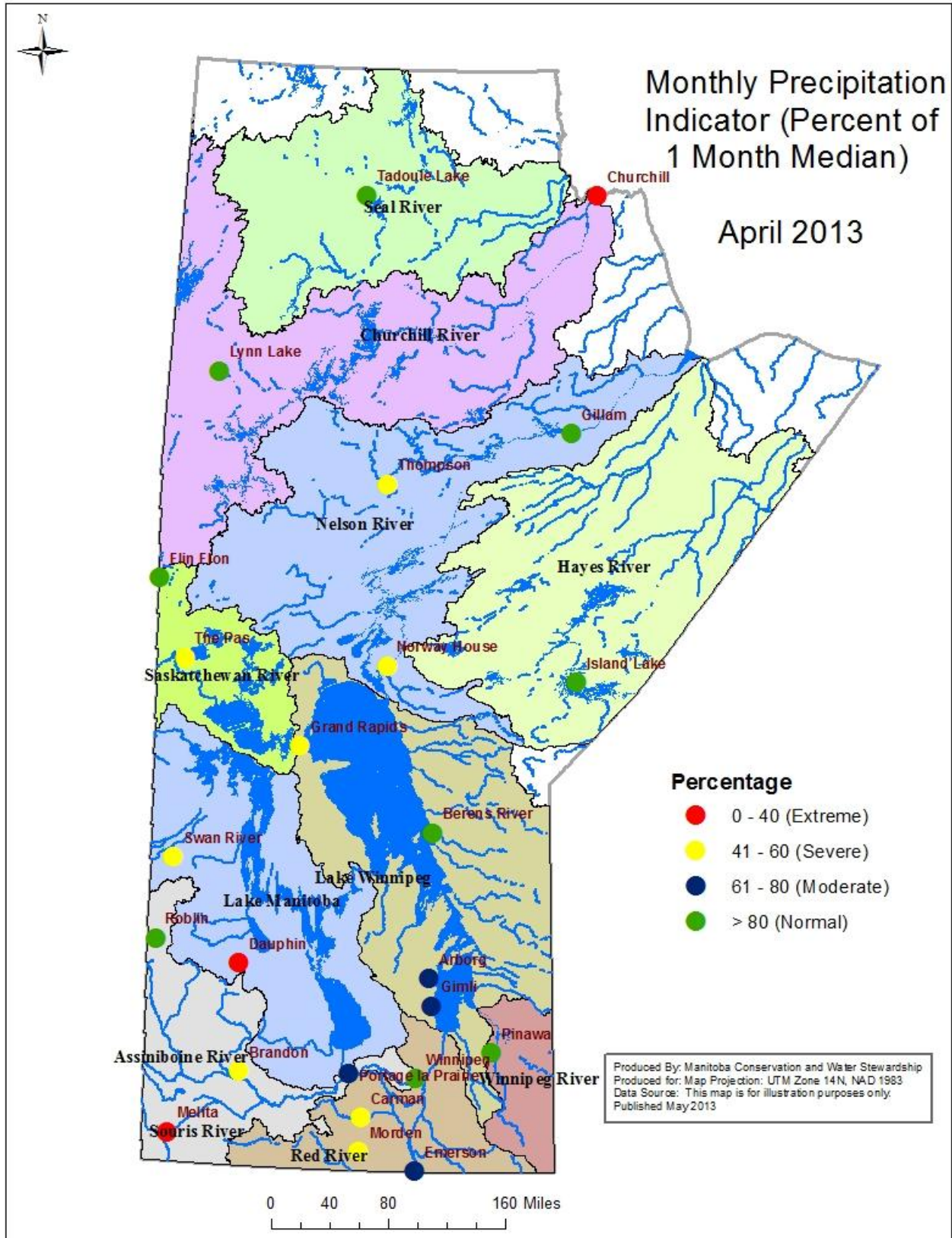
Hydrological Drought is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop. Hydrological drought affects uses that depend on water levels. Changes in water levels affect ecosystems, hydroelectric power generation, and recreational, industrial and urban water use. A minor drought may affect small streams causing low streamflows or drying. A major drought could impact surface storage, lakes, and reservoirs thereby affecting water quality and causing municipal and agricultural water supply problems.

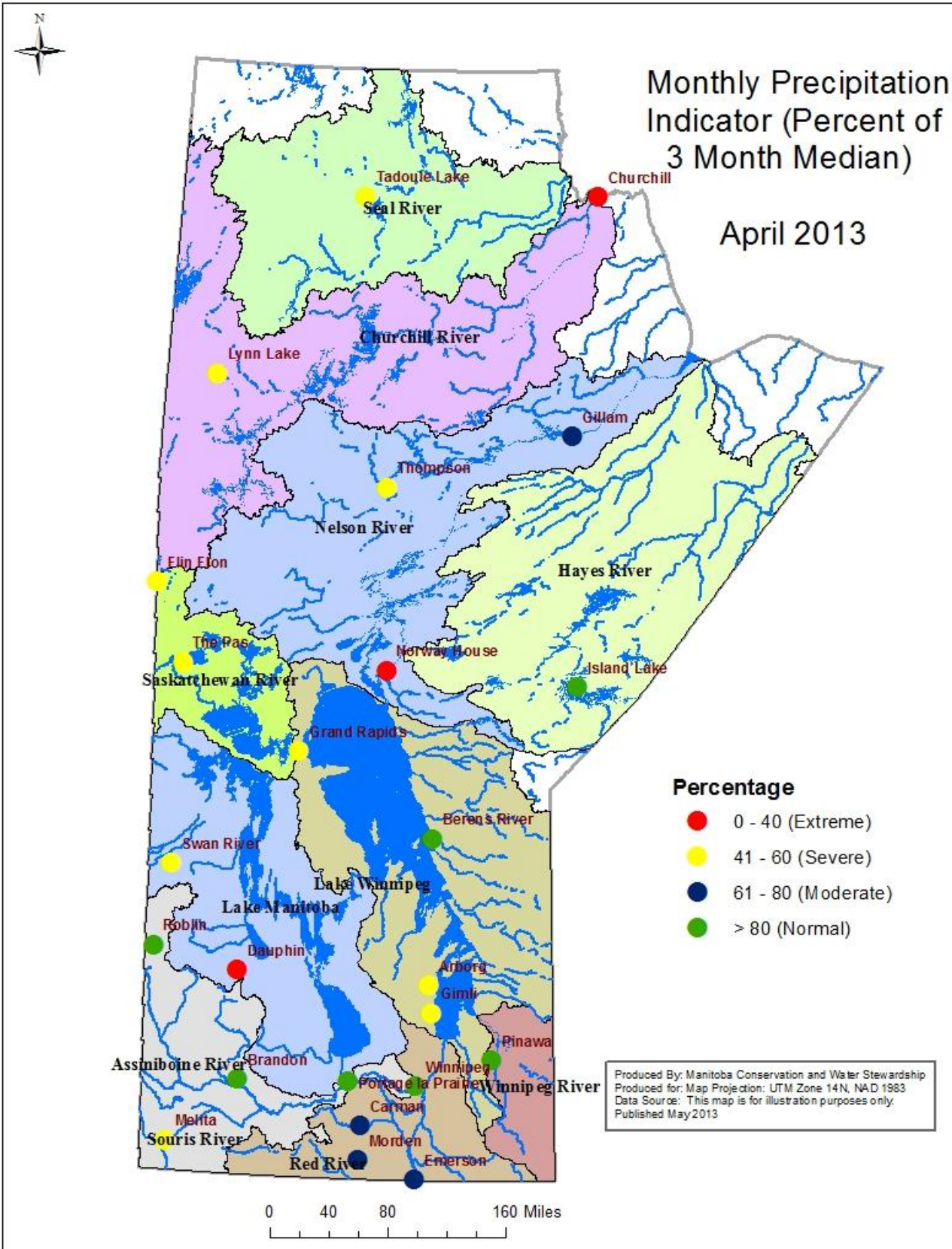
Rainfall also recharges groundwater aquifers through infiltration through the soil and run-off into streams and rivers. Once groundwater and surface waters are significantly impacted by lack of precipitation, a "hydrologic drought" occurs. Aquifer declines can range from a quick response (shallow sand) to impacts extending over multiple years. Impacts can include depletion of shallow depth wells, drying of farm dugouts, and changes to ground water quality.

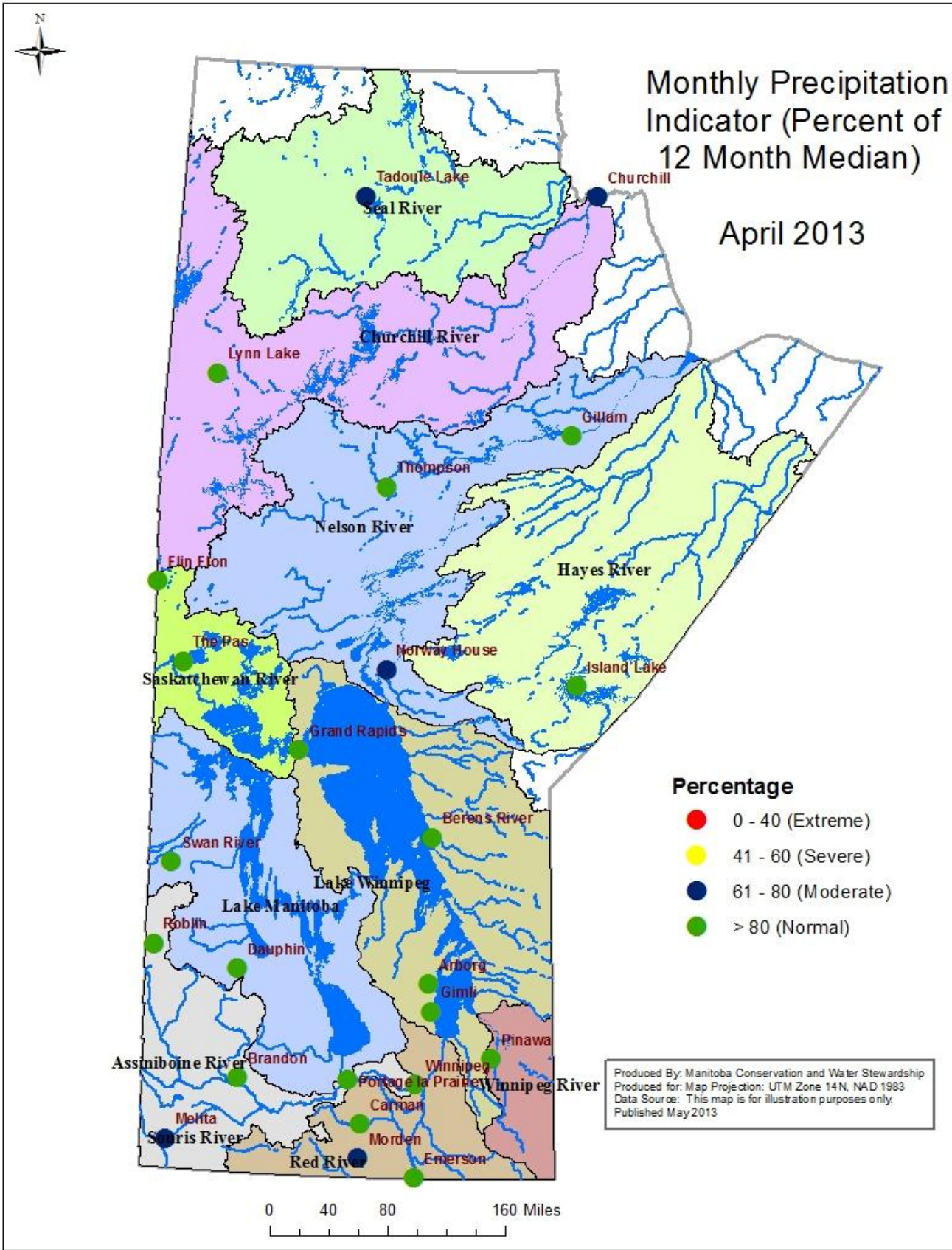
Socioeconomic Drought occurs when the supply fails to meet the demand for an economic good(s) such as domestic water supplies, hay/forage, food grains, fish, and hydroelectric power, due to weather related water supply shortages from one or both of natural or managed water systems. At any time during meteorological, hydrological, or agricultural droughts, a socioeconomic drought can occur.

Attachments

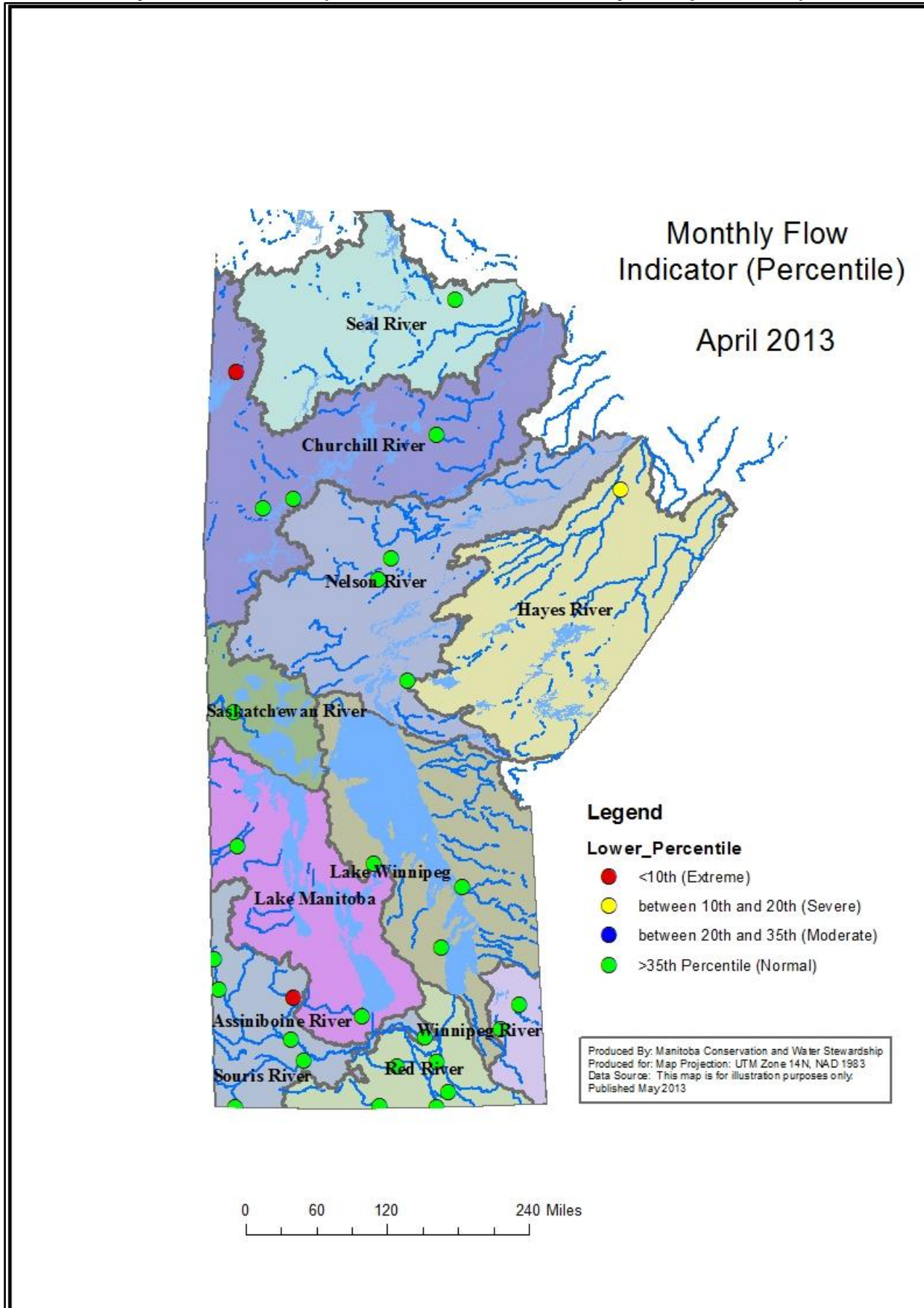
1. Precipitation Indicator (Percent of 1, 3 and 12 month median precipitation)



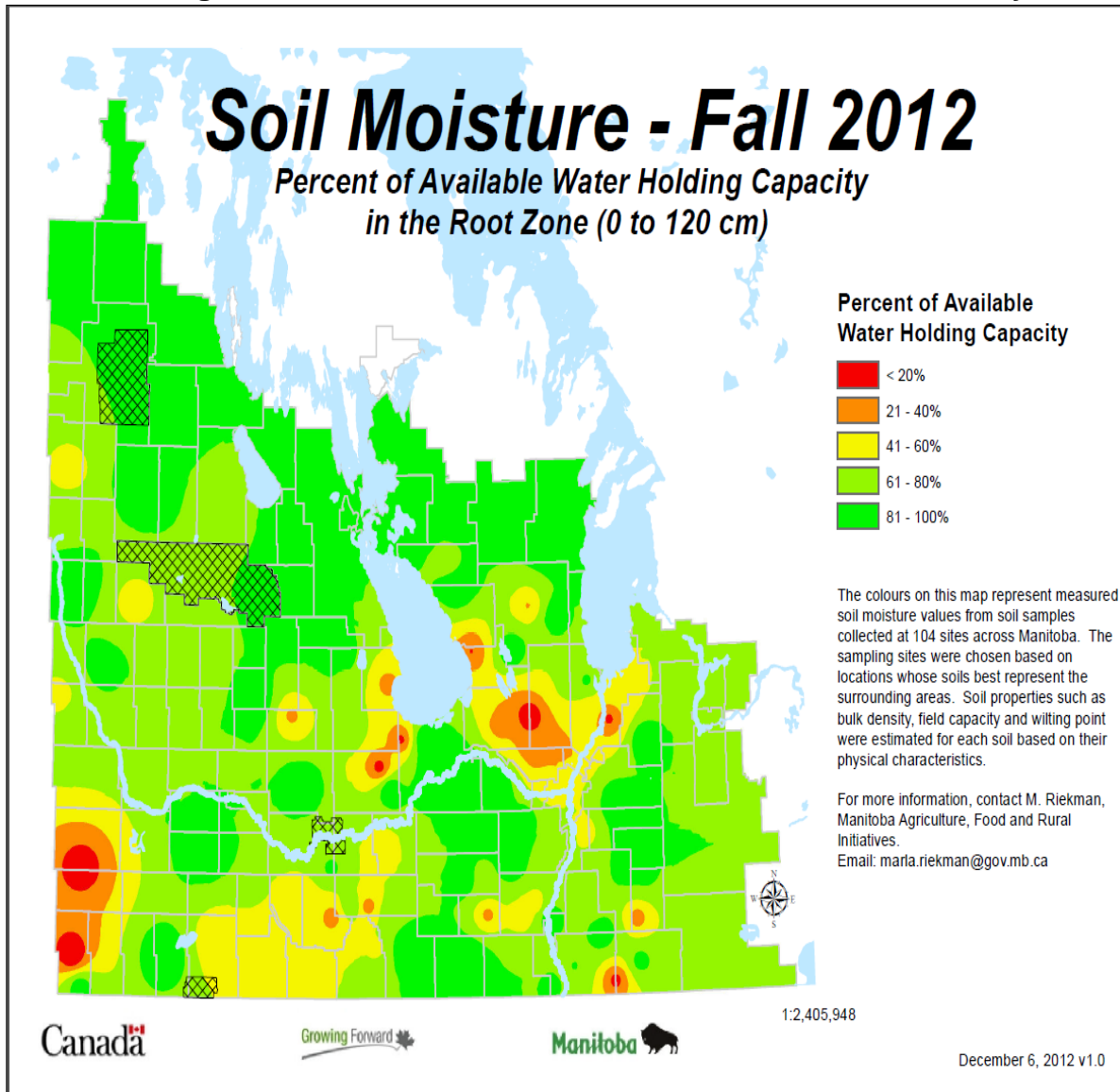




2. Monthly Flow Indicator (lower 10th-20th-35th monthly flow percentile)



3. Manitoba Agriculture, Food and Rural Initiatives Soil Moisture Survey

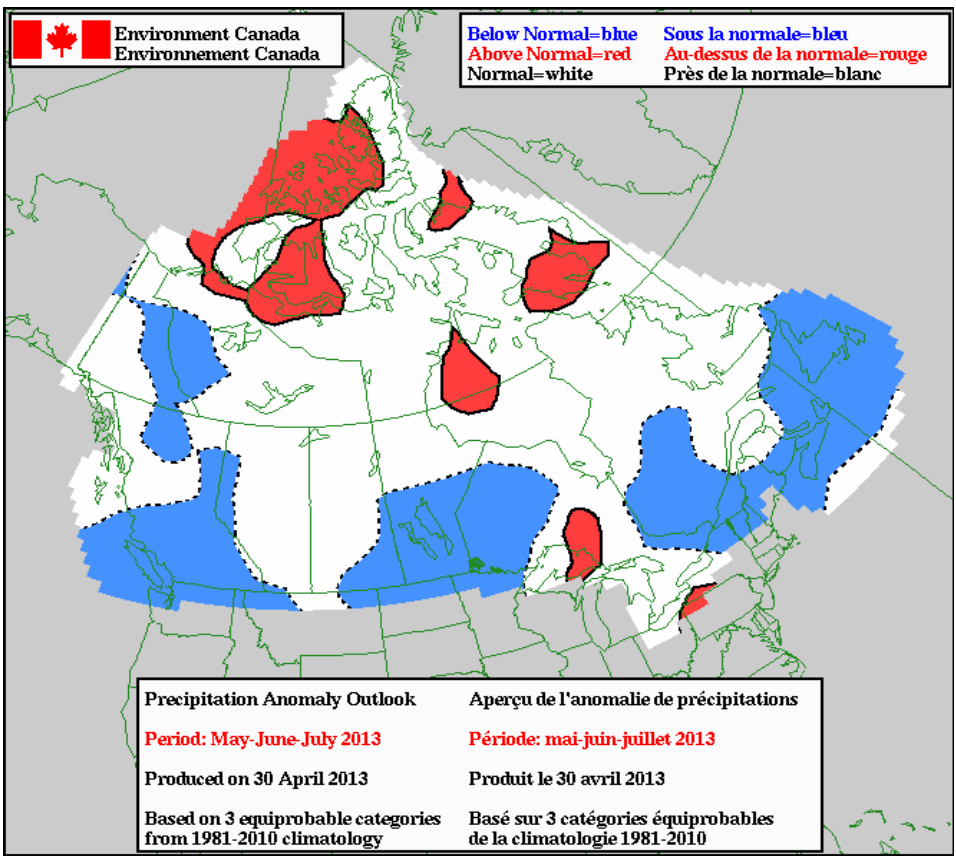
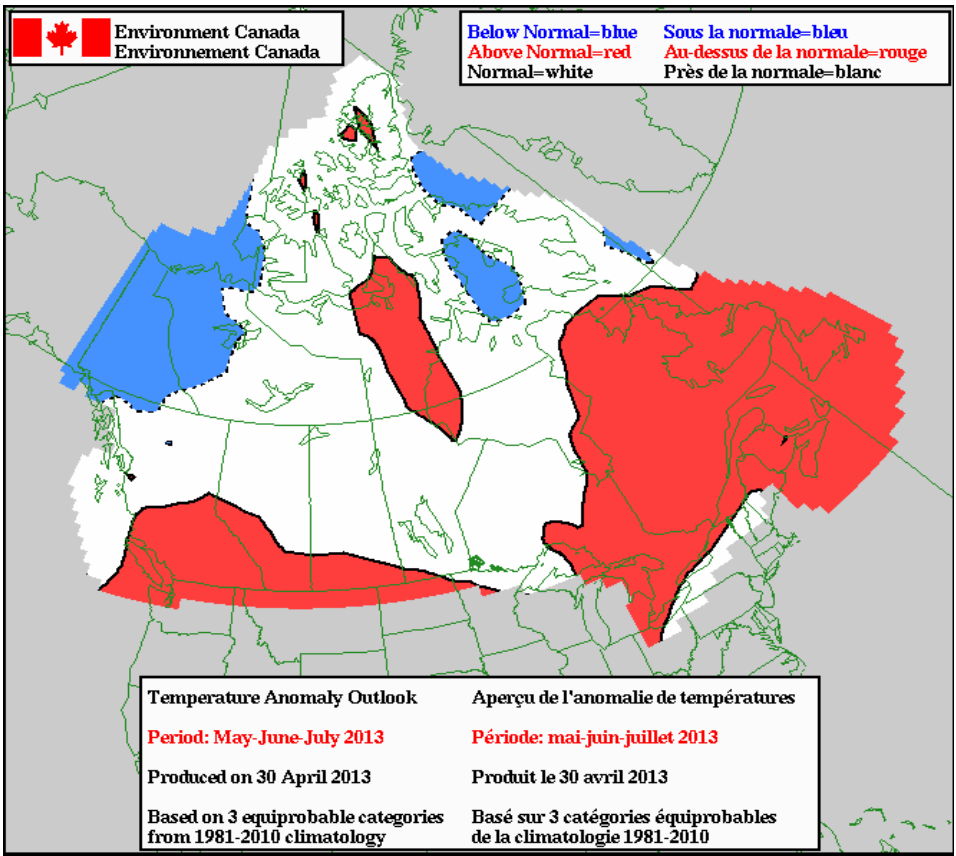


4. Water Supply Reservoir Status (Southern and Western)

Water Supply Reservoir Levels and Storages								
May 6, 2013								
Lake or Reservoir	Community	Target Level (feet)	Latest Observed Level (feet)	Observed date	Supply Status (Recent - Target) (feet)	Storage at Target Level (acre-feet)	Storage at Observed Level (acre-feet)	Supply Status (observed storage/target storage) (%)
Elgin	Elgin	1532.00	1530.45	February 26, 2013	-1.5	520	414	80%
Goudney (Pilot Mound)	Pilot Mound	1482.00	1482.11	May 3, 2013	0.1	450	455	101%
Irwin		1178.00	1178.65	January 7, 2013	0.7	3,800	4,223	111%
Jackson		1174.00	1173.04	January 7, 2013	-1.0	2,870	2,747	96%
Kenton (Kenworth)		1448.00	1446.77	February 27, 2013	-1.2	600	600	100%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1402.50	1390.80	May 6, 2013	-11.7	300,000	161,933	54%
Killarney	Killarney	1615.00	1614.10	March 13, 2013	-0.9	7,360	6,945	94%
Manitou (Mary Jane)	Manitou	1537.00	1535.59	April 28, 2013	-1.4	1,150	1,027	89%
Minnewasta (Morden)	Morden	1082.00	1075.95	February 28, 2013	-6.0	3,040	2,237	74%
Rapid City	Rapid City	1573.50	1574.02	February 27, 2013	0.5	200	236	118%
Lake Wahtopanah (Rivers)	Rivers	1536.00	1534.20	March 4, 2013		24,500	22,520	92%
Stephenfield	Carman	972.00	974.23	May 3, 2013	2.2	3,810	4,893	128%
Turtlehead (Deloraine)	Deloraine	1772.00	1772.13	May 3, 2013	0.1	1,400	1,414	101%
Vermilion	Dauphin	1274.00	1272.54	March 3, 2013	-1.5	2,600	2,350	90%

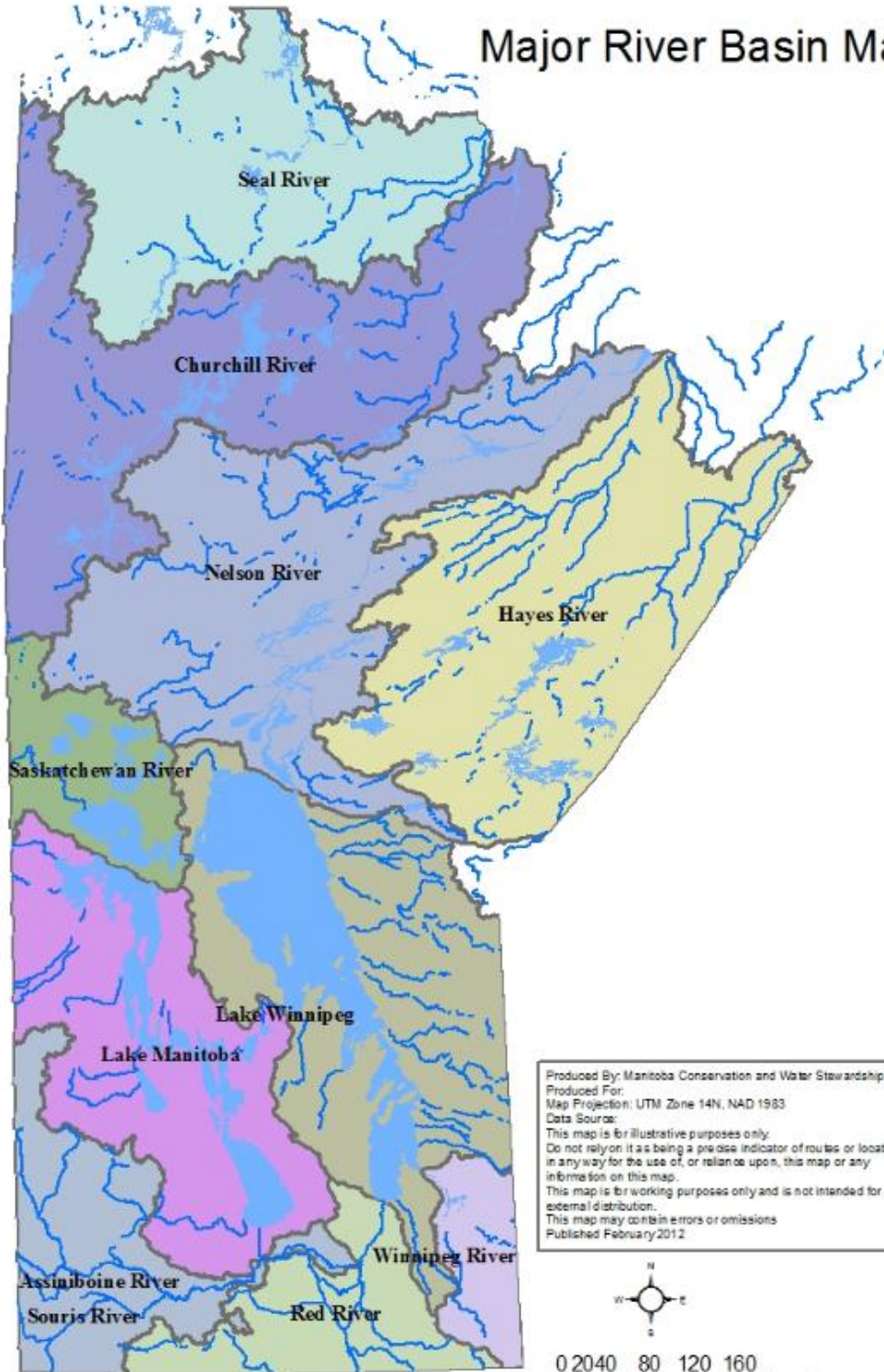
* Summer Target level and storage.

5. Environment Canada 3 Month Outlook



6. Major River Basin

Major River Basin Map



Produced By: Manitoba Conservation and Water Stewardship
Produced For:
Map Projection: UTM Zone 14N, NAD 1983
Data Source:
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Published February 2012



0 20 40 80 120 160
Kilometers