

Water Availability and Drought Conditions Report

May 2015

Executive Summary

- The Water Availability and Drought Conditions Report provides an update on drought conditions for Manitoba for May 2015.
- Most of Manitoba has experienced normal or above normal precipitation over the short and long term. Almost all of Manitoba has experienced normal or above normal precipitation over the last twelve months. Areas around Brandon, Swan River and Churchill have experienced moderate to severely dry conditions over the last three months. Over the last month, an area stretching from Roblin/Dauphin north to The Pas and west to Norway House experienced moderate to severely dry conditions.
- May stream flow was normal or above normal for most major rivers across the province. The Churchill River (below Fidler Lake) is experiencing extremely low flows and the Winnipeg River at Slave Falls is experiencing severely low flows for the month of May.
- There are currently no concerns over water supply as supplies are good across the province. Water supply reservoirs in southern and western Manitoba are close to, or above, full supply levels. Manitoba Agriculture, Food and Rural Development reported that dugout conditions are generally adequate or good across Agri-Manitoba. May precipitation allowed filling of irrigation reservoirs in those areas where the spring freshet was not adequate.
- Environment Canada's seasonal temperature forecast for June, July and August is projected to be above normal across Manitoba. The seasonal precipitation forecast for June, July and August is projected to be normal Manitoba. Normal precipitation over the next month will provide adequate moisture for crops and continue to reduce the risk of wildfires in the areas in which it remains high.
- For more information on drought in Manitoba please visit Conservation and Water Stewardship's website: <http://www.gov.mb.ca/drought>

Drought Indicators

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

Precipitation Indicators

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). Precipitation indicators are summarized by basin in Table 1 and in Figures 1, 2 and 3. 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.

Over the short term (one month), most of Manitoba experienced normal conditions. An area stretching from the Roblin/Dauphin area, north to The Pas and west to Norway House had moderate to severely dry conditions. The northwest corner of the province also experienced moderate to severely dry conditions.

Over the medium term (three months), most of Manitoba experienced normal conditions. Moderately to severely dry conditions existed for an area surrounding Churchill. An area surrounding Swan River, Lake Manitoba, and south around Brandon also experienced moderately to severely dry conditions.

Over the long term (twelve months), conditions were normal throughout the province with the exception of moderately dry conditions in isolated areas around Carberry, Norway House and an area to the north of Island Lake.

Stream Flow Indicators

The stream flow indicators are based on average monthly flows and are used to determine the severity of hydrological dryness in a watershed. Stream flow indicators are summarized by basin in Table 1 and in Figure 4.

The monthly stream flow indicators show that flows are normal or above normal for most major rivers across the province for the month of May. The Churchill River (below Fidler Lake) is experiencing extremely dry conditions. The Winnipeg River at Slave Falls is experiencing severely dry conditions.

Table 1: Drought Indicators by Major River Basin

Basin (in Manitoba)	Drought Indicators			
	Precipitation Indicators			Monthly Flow Indicators May 2015
	Percent of 1 Month Median May 2015	Percent of 3 Month Median March - May 2015	Percent of 12 Month Median June 2014 – May 2015	
Red River	Normal	Normal	Normal	Normal
Winnipeg River	Normal	Normal	Normal	Severely low flows
Assiniboine River-Souris River	Normal except moderately dry conditions in the north	Normal to severely dry	Normal except moderately dry conditions around Carberry	Normal
Lake Manitoba	Normal in the southeast, moderate to severely dry conditions in the north	Normal to severely dry	Normal	Normal
Lake Winnipeg	Normal except for moderate to severely dry conditions in the north	Normal except for moderately dry in the northwest	Normal	Normal
Saskatchewan River	Normal to severely dry	Normal to moderately dry	Normal	Normal
Nelson River	Normal except for moderately dry conditions around Thompson and southern part of basin	Normal	Normal except moderately dry conditions around Norway House	Normal
Hayes River	Normal except for moderately dry conditions near Norway House	Normal	Normal except for an isolated area of moderately dry conditions	Data Not Available
Churchill River	Normal except for moderately to severely dry conditions northwest of Lynn Lake	Normal except for moderately to severely dry around Churchill	Normal	Normal except extremely dry for the Churchill River below Fidler Lake
Seal River	Normal except for moderately dry in the west	Normal except for moderately dry near Churchill	Normal	Data Not Available

Water Availability

Reservoir Conditions

Reservoirs in southern and western Manitoba, including those used for water supply, are close to or at full supply level (Table 3).

On Farm Water Supply

Manitoba Agriculture, Food and Rural Development reports on dugout conditions across Agri-Manitoba in their weekly Crop Report. General dugout conditions from Crop Report: Issue 4 (May 25, 2015) are summarized in Table 2.

Table 2: On Farm Water Supply (Dugout) Conditions

Region	General Dugout Conditions
Eastern	Dugouts are full
Interlake	Ample water supply
Southwest	90 % to over capacity
Central	Rain has replenished dugouts
Northwest	Good to excellent

Many irrigators completed filling their off channel reservoirs in April. In the Red River Basin the spring freshet was not adequate to fill all reservoirs. However, the rain in May generated enough runoff to complete reservoir filling.

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'.

Forest and Grassland Fires

The Provincial Wildfire Program reported (May 27th) that warm and dry conditions persist throughout Manitoba. The wildfire danger levels remain high. Burning permits remain cancelled in the northwest region of Manitoba including areas north of Flin Flon and Sherridon, south to Grand Rapids, west to the Saskatchewan border and east to P.T.H. 6. Burning permits will not be issued until conditions improve the wildfire danger in these areas. Some municipalities still have burning bans in place.

As of May 27th, 118 fires have been reported, 16 of which are still active in the northeast, northwest, and western regions. Up to date wildfire conditions, including burning bans, are available at the Wildfire Program's website (<http://www.gov.mb.ca/wildfire>).

Drought Impacts

Observed Impacts

The high wildfire risk that developed from warm temperatures, high winds and little rainfall in the spring has persisted into the month of May. Many fires have been reported and some are still active. Fires near Cormorant and Sheridan in northern Manitoba are noteworthy. The fire near Cormorant approached roads and the railway. The fire near Sherridon damaged a power transmission line causing a temporary power outage for the community.

In early May, backcountry travel and burning permit restrictions were lifted in southeast, central and western Manitoba. Most municipal burning bans have been lifted. However, some municipalities still have burning bans in place.

May rainfall reduced agricultural drought impacts that were developing from dry conditions in spring. Adequate moisture was reported across agri-Manitoba. Frost in late May was the biggest concern to crop health.

Drought conditions in North Dakota and Minnesota have also significantly improved in May.

Future Potential Impacts

Environment Canada's seasonal forecast for the next three months (June-July-August 2015) projects temperatures to be above normal across Manitoba (Figure 5). Precipitation is projected to be normal across Manitoba (Figure 6). Normal precipitation over the next month should provide adequate moisture for crops and continue to reduce the risk of wildfires in the areas in which it remains high.

Water supply reservoirs are close to or at full supply level. There are currently no concerns about reservoir water supplies at this time.

Table 3: Reservoir Status (Southern and Western)

Reservoir Levels and Storages								
Lake or Reservoir	Community Water Supply	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	1,532.00	1,532.00	May 26, 2015	0.00	520	520	100%
Goudney (Pilot Mound)	Pilot Mound	1,482.00	1,481.97	May 29, 2015	-0.03	450	448	100%
Lake Irwin	n/a	1,178.00	1,178.47	May 21, 2015	0.47	3,800	4,106	108%
Jackson Lake	n/a	1,174.00	1,174.11	May 21, 2015	0.11	2,870	3,024	105%
Kenworth Dam	n/a	1,448.00	1,448.06	May 27, 2015	0.06	600	602	100%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,405.63	May 27, 2015	3.13	300,000	344,707	115%
Killarney Lake	n/a	1,615.00	1,615.18	May 5, 2015	0.18	7,360	7,443	101%
Manitou (Mary Jane)	Manitou	1,537.00	1,536.84	May 29, 2015	-0.16	1,150	1,135	99%
Minnewasta (Morden)	Morden	1,082.00	1,081.45	May 29, 2015	-0.55	3,150	3,058	97%
Rapid City	n/a	1,573.50	1,573.91	May 27, 2015	0.41	200	229	114%
Lake Wahtopanah (Rivers)	Rivers	1,536.00	1,536.86	May 29, 2015	0.86	24,500	26,442	108%
Stephenfield	Carman	972.00	972.50	May 29, 2015	0.50	3,810	4,045	106%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,771.93	May 29, 2015	-0.07	1,400	1,397	100%
Vermilion	Dauphin	1,274.00	1,274.85	May 24, 2015	0.85	2,600	2650	102%
* Summer target level and storage.								

Drought Definitions

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.

Acknowledgements

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

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

For further information, please contact:

Mark Lee, M.Sc., P.Eng.
Manager, Surface Water Management Section
Water Science and Management Branch
Conservation and Water Stewardship
Box 14, 200 Saulteaux Crescent
Winnipeg, Manitoba R3J 3W3

Ph. (204) 945-5606, Fax (204) 945-7419

E-mail mark.Lee@gov.mb.ca

Past reports are available at:

www.gov.mb.ca/drought

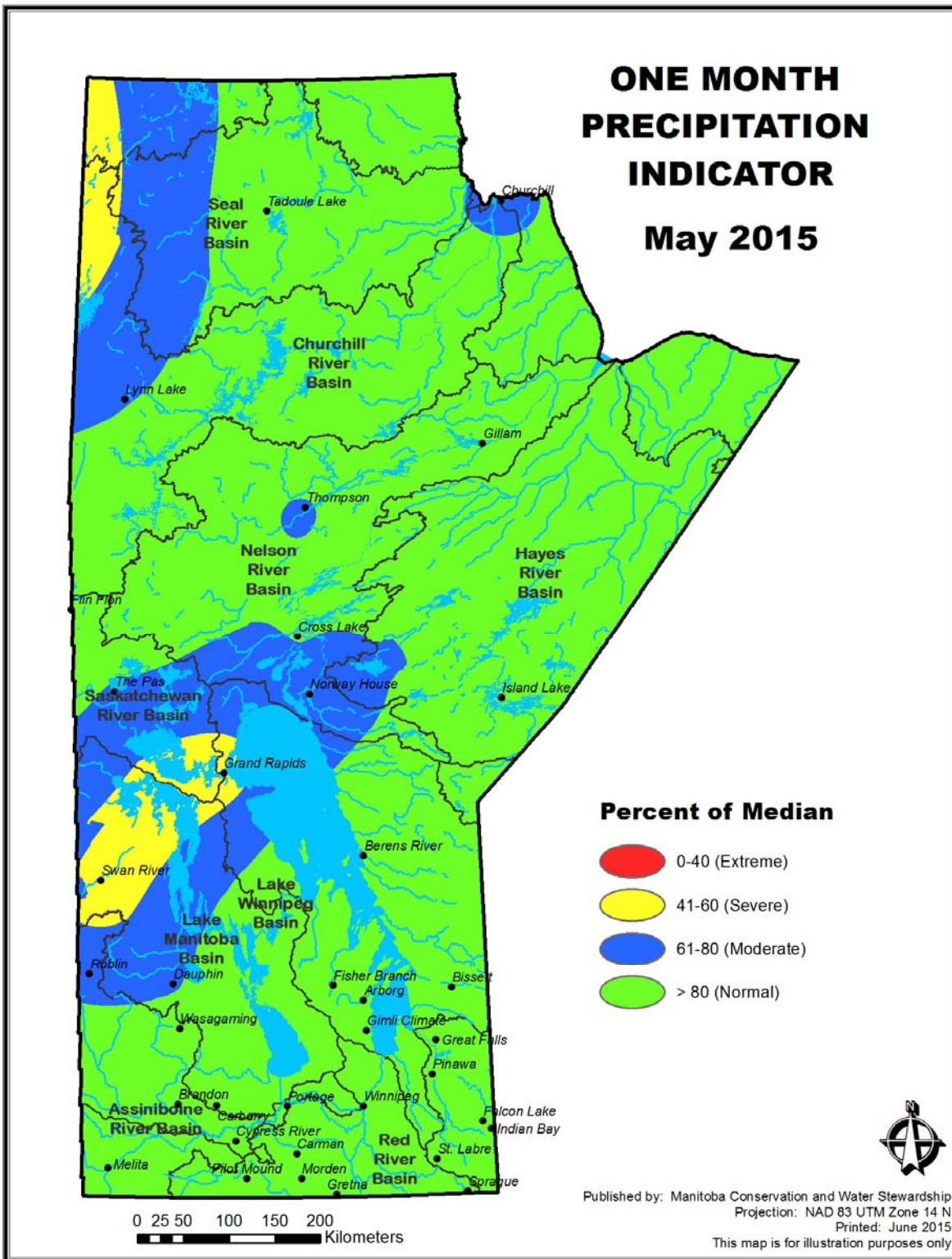


Figure 1: Precipitation Indicator (Percent of One Month Median Precipitation)

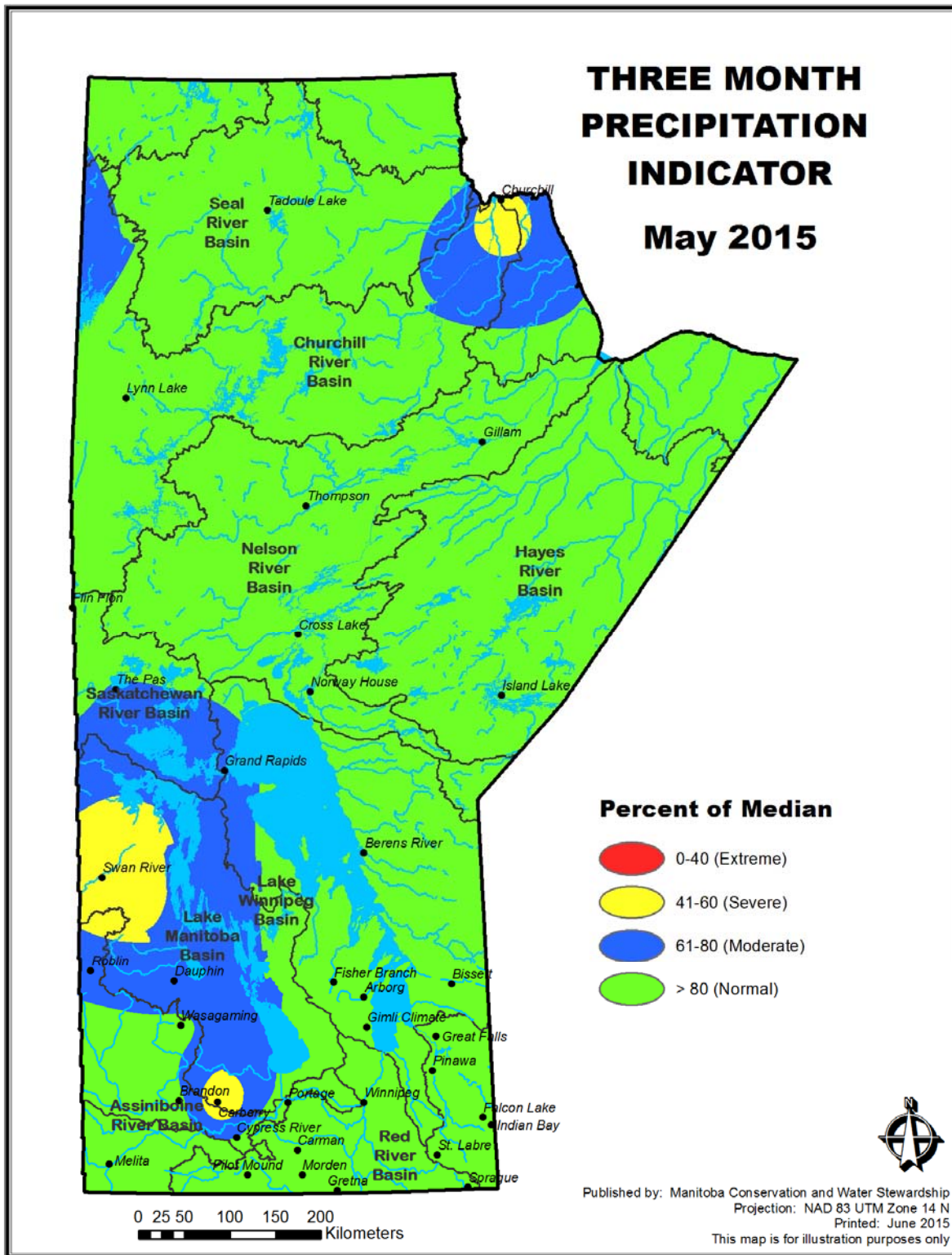


Figure 2: Precipitation Indicator (Percent of Three Month Median Precipitation)

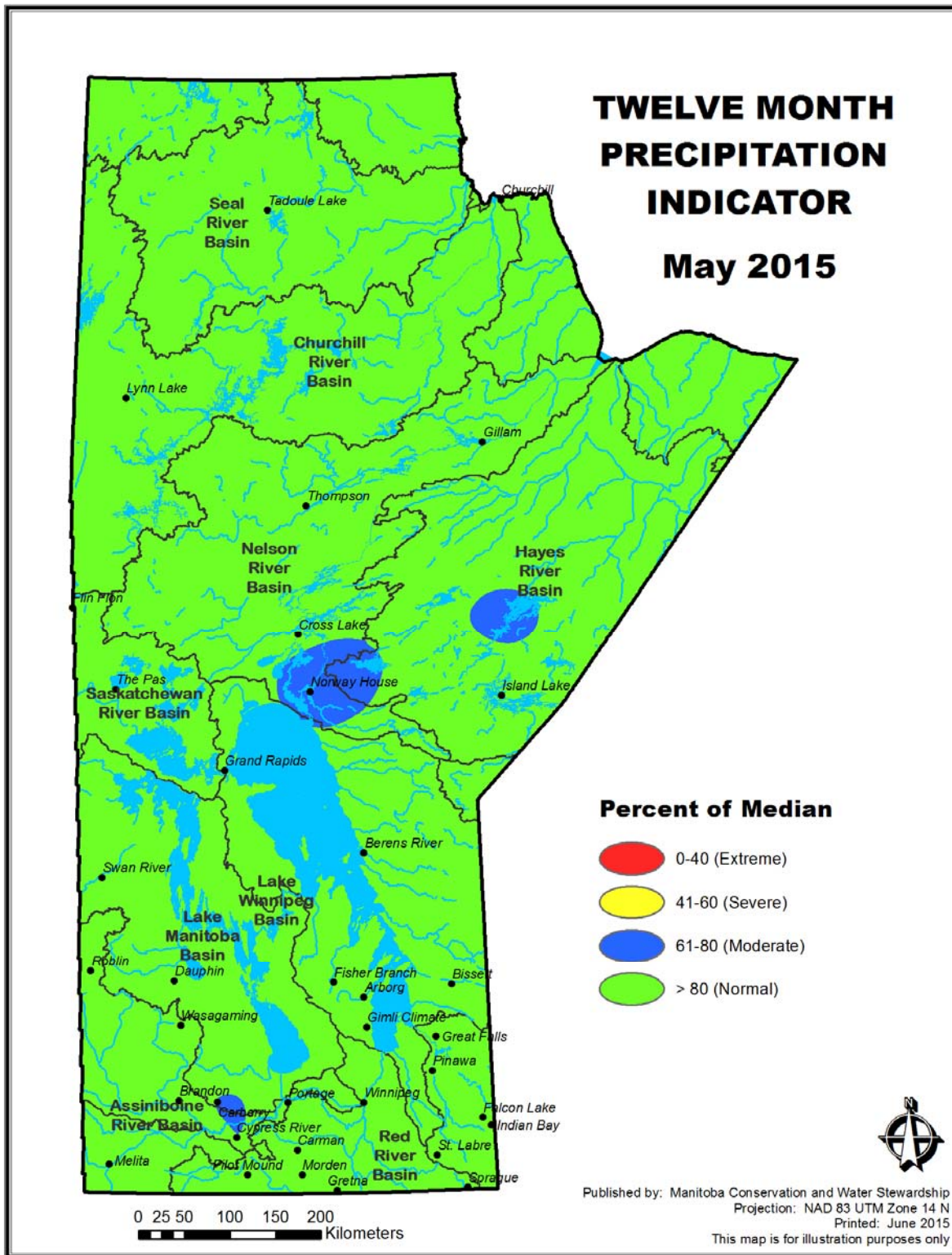


Figure 3: Precipitation Indicator (Percent of Twelve Month Median Precipitation)

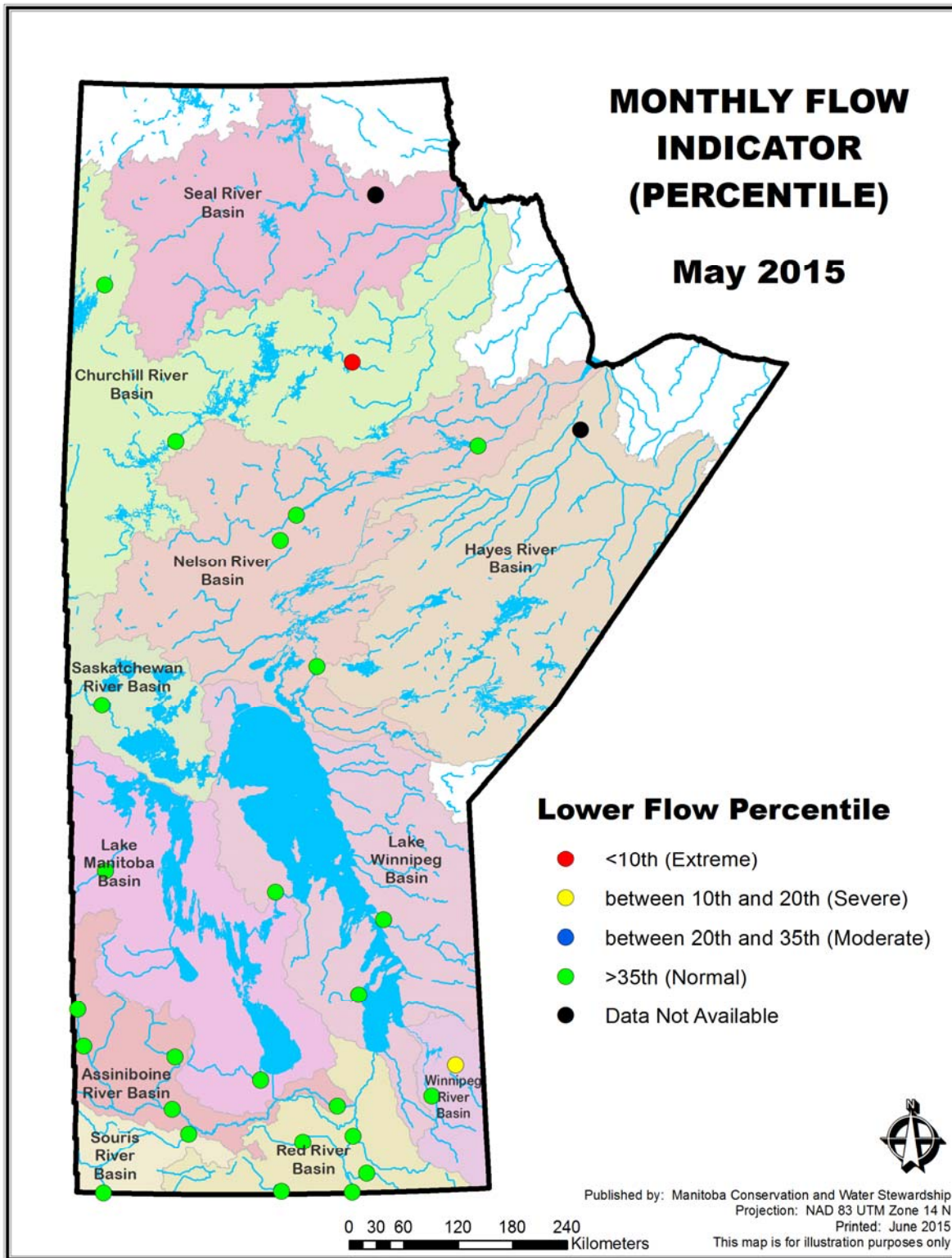


Figure 4: Monthly Flow Indicator (lower 10th, 20th and 35th monthly flow percentile)

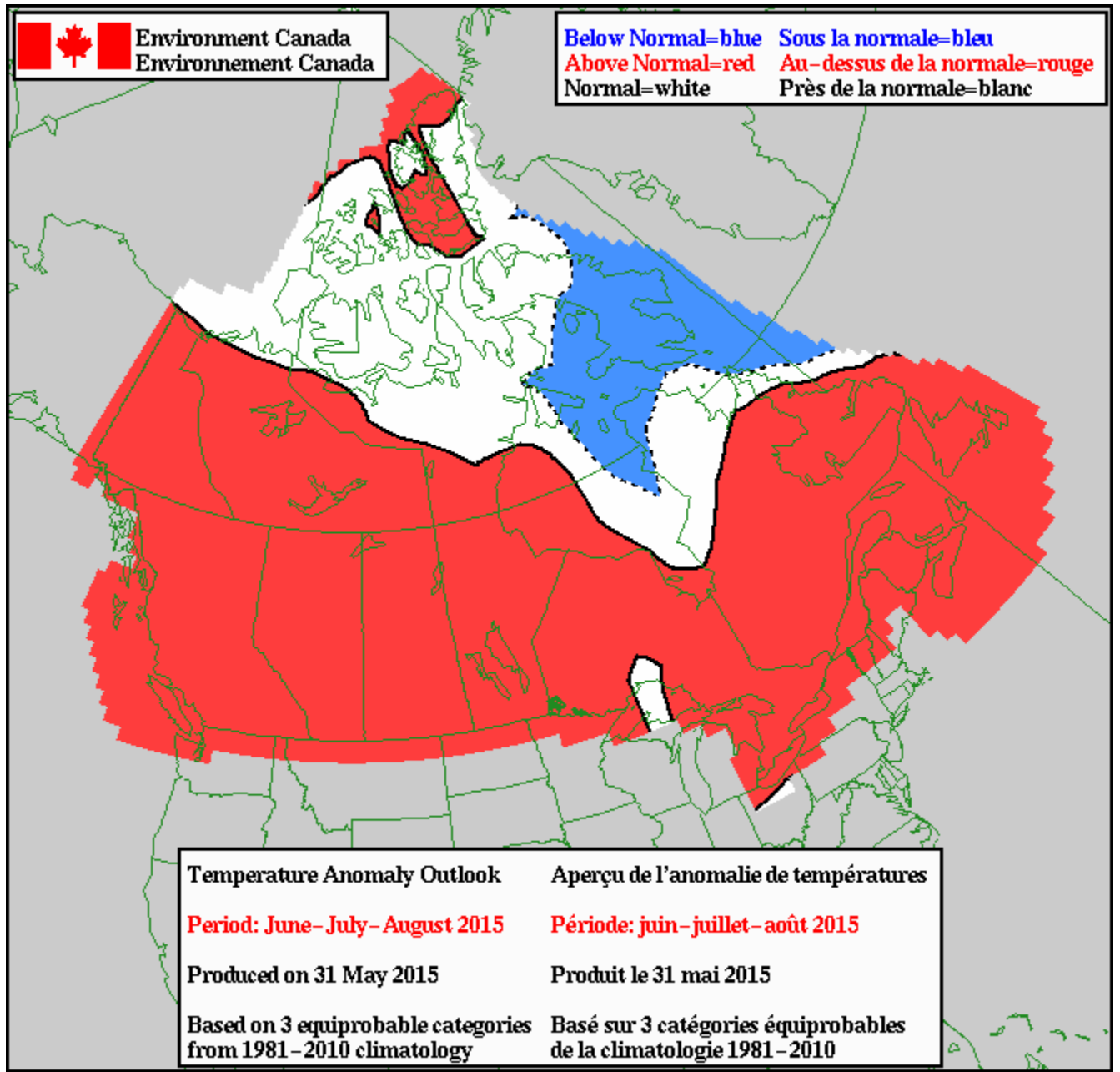


Figure 5: Environment Canada Seasonal (3 month) Temperature Outlook

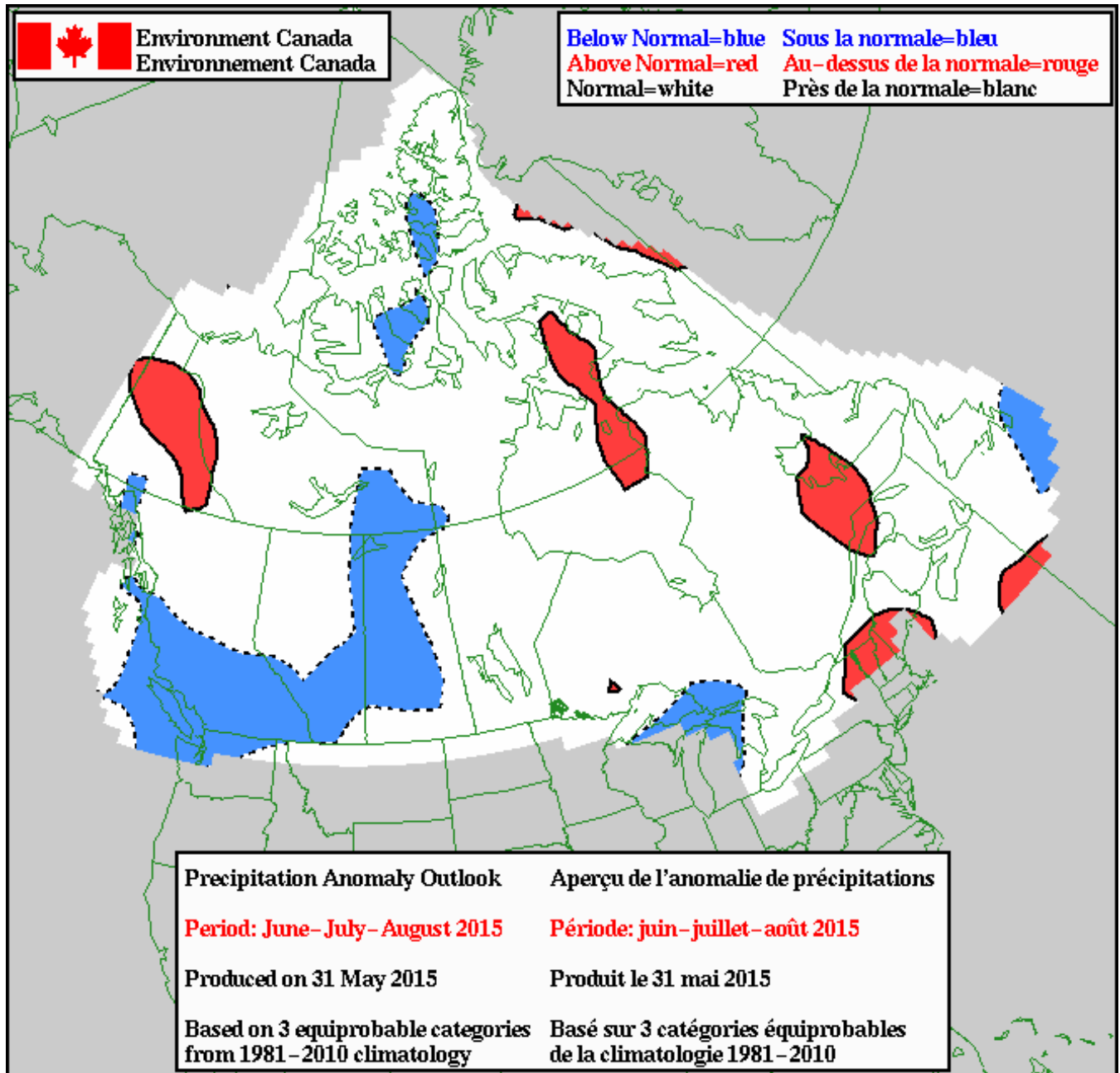


Figure 6: Environment Canada Seasonal (3 month) Precipitation Outlook

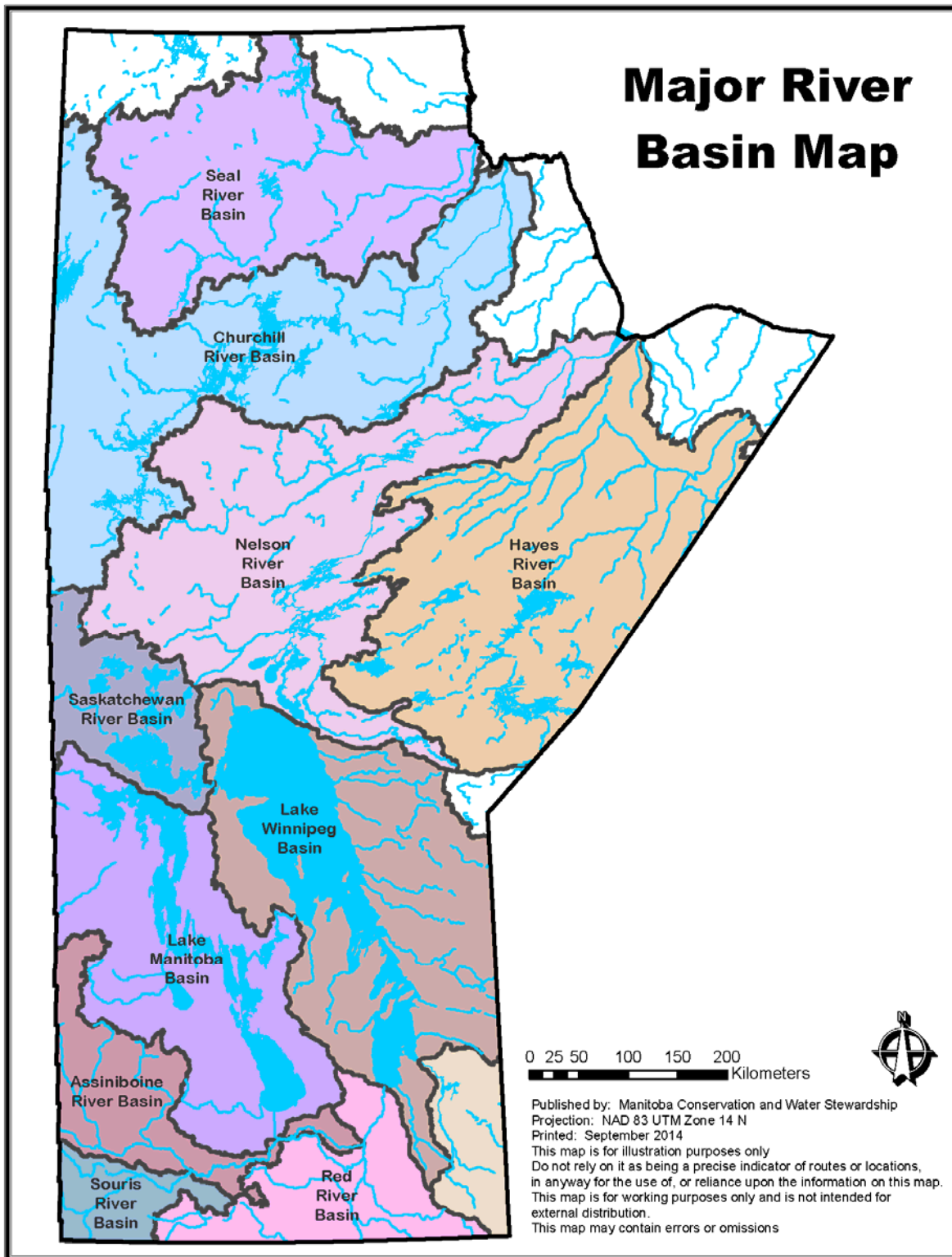


Figure 7: Major River Basins