

Water Availability and Drought Conditions Report

August 2015

Executive Summary

- The Water Availability and Drought Conditions Report provides an update on drought conditions in Manitoba for August 2015.
- Precipitation over the short and long term has been normal or above normal for most of Manitoba. Over the last month, most of Manitoba experienced normal or above normal precipitation. Two areas experienced severe to extremely dry conditions over the last month, one stretching from Lynn Lake, through Gillam to Churchill and the other near Pilot Mound and Gretna. Over the last three months to twelve months most of Manitoba experienced normal or above normal precipitation with a few areas from Dauphin to Swan River, Cypress River to Carberry, and around Morden and Gods Lake experiencing moderately dry conditions.
- August stream flow was normal or above normal for most major rivers across the province. The Churchill River basin experienced some moderately to extremely low flow conditions. The Saskatchewan River continues to have moderately low flow conditions due to the dry conditions experienced over the spring and summer in Alberta and Saskatchewan.
- There are currently no concerns over water supply as supplies are good across the province. Water supply reservoirs have declined slightly but remain 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.
- Environment Canada's seasonal temperature forecast for September, October and November is projected to be above normal across Manitoba. The seasonal precipitation forecast for September, October and November is projected to be normal for northern Manitoba and above normal for southern Manitoba. Normal precipitation over the next month will likely prevent significant drought conditions from forming.
- 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. Two areas experienced severe to extremely dry conditions. The first stretched from Lynn Lake, through Gillam to Churchill in northern Manitoba and the other was a smaller area near Pilot Mound and Gretna.

Over the medium term (three months), most of Manitoba experienced normal conditions. Areas close to Lynn Lake, Gods Lake, Fisher Branch, Dauphin, and Brandon experienced moderately dry conditions.

Over the long term (twelve months), conditions were generally normal throughout the province. Areas from Dauphin to Swan River, Cypress River to Carberry, and a small area near Morden experienced moderately dry conditions. An area around Gods Lake experienced moderately to severely dry conditions.

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 August. In the Churchill River Basin, Churchill River (below Fidler Lake) had moderately low flow conditions and Cochrane River (near Brochet) had extremely low flow conditions. Saskatchewan River flows were moderately low in August but have increased after reaching near record low flows for parts of July.

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 August 2015	Percent of 3 Month Median June - August 2015	Percent of 12 Month Median September 2014 – August 2015	
Red River	Normal except for the Pembina River area experienced moderate to extremely dry conditions	Normal	Normal except for a small moderately dry area south of Morden	Normal
Winnipeg River	Normal	Normal	Normal	Normal
Assiniboine River-Souris River	Normal to severely dry	Normal except for a small moderately dry area near Brandon	Normal except moderately dry conditions in the Brandon-Carberry area	Normal
Lake Manitoba	Normal except for moderately dry conditions between Dauphin and Roblin	Normal in the south, moderately dry conditions northwest of Dauphin	Normal to moderately dry conditions	Normal
Lake Winnipeg	Normal	Normal except for moderately dry conditions west of the north basin	Normal	Normal
Saskatchewan River	Normal	Normal	Normal	Moderately dry
Nelson River	Normal in the southern part of basin, moderate to severely dry in the northern part of basin	Normal	Normal	Normal
Hayes River	Normal in the southern part of basin, moderate to severely dry in the northern part of basin	Normal except for moderately dry conditions around Gods Lake	Normal except for moderately dry conditions surrounding Gods Lake Narrows	Normal
Churchill River	Moderate to severely dry with areas close to Lynn Lake and Churchill experiencing severely dry conditions	Normal except for moderately dry conditions west of Lynn Lake	Normal	Moderately dry below Fidler Lake and extremely dry for the Cochrane River (near Brochet)
Seal River	Normal except for the southern portion with moderate to severely dry conditions	Normal	Normal	Normal

Water Availability

Reservoir Conditions

Reservoirs in southern and western Manitoba, including those used for water supply, have declined in August but remain 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 17 (August 24, 2015) are summarized in Table 2.

Table 2: On Farm Water Supply (Dugout) Conditions

Region	General Dugout Conditions
Eastern	adequate
Interlake	adequate
Southwest	75 to 90 % capacity
Central	adequate
Northwest	adequate

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 (August 27th) that higher temperatures are being experienced in many areas of the province this week. This is increasing the wildfire danger levels in some of the forested areas. As of August 27th, 450 fires have been reported this year, 7 of which are still active across Manitoba.

Up to date wildfire conditions and restrictions, including burning bans, are available at the Wildfire Program's website (www.gov.mb.ca/wildfire).

Drought Impacts

Observed Impacts

Overall drought impacts have decreased through August.

Generally, there are no moisture shortages in agri-Manitoba. Rain and excess moisture have caused delays in harvesting of crops and hay in some agricultural areas.

The number of active wildfires has decreased throughout August. There continues to be a few active wildfires. Some municipalities have burning restrictions in place.

Future Potential Impacts

Environment Canada's seasonal forecast for the next three months (September-October-November 2015) projects temperatures to be above normal across Manitoba (Figure 5). Precipitation is projected to be normal for northern Manitoba and above normal for southern Manitoba (Figure 6). Normal precipitation over the next month would likely prevent significant drought conditions from forming.

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 Supplied	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	1,531.49	August 25, 2015	-0.51	520	484	93%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,402.42	August 31, 2015	-0.08	300,000	299,060	100%
Lake Wahtopanah (Rivers)	Rivers	1,536.00	1,536.71	August 31, 2015	0.71	24,500	26,093	107%
Manitou (Mary Jane)	Manitou	1,537.00	1,536.45	August 31, 2015	-0.55	1,150	1,100	96%
Minnewasta (Morden)	Morden	1,082.00	1,079.98	August 31, 2015	-2.02	3,150	2,818	89%
Stephenfield	Carman	972.00	971.62	August 31, 2015	-0.38	3,810	3,632	95%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,771.09	August 31, 2015	-0.91	1,400	1,355	97%
Vermilion	Dauphin	1,274.00	1,272.47	August 30, 2015	-1.53	2,600	2,600	100%
Goudney (Pilot Mound)		1,482.00	1,481.92	August 31, 2015	-0.08	450	444	99%
Jackson Lake		1,174.00	1,172.67	August 20, 2015	-1.33	2,870	2,655	93%
Kenworth Dam		1,448.00	1,447.90	July 29, 2015	-0.10	600	592	99%
Killarney Lake		1,615.00	1,615.32	July 22, 2015	0.32	7,360	7,506	102%
Lake Irwin		1,178.00	1,178.01	August 20, 2015	0.01	3,800	3,810	100%
Rapid City		1,573.50	1,574.21	July 29, 2015	0.71	200	250	125%
St. Malo		840.00	840.71	July 15, 2015	0.71	1,770	1,889	107%

* 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>

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Past reports are available at:

www.gov.mb.ca/drought

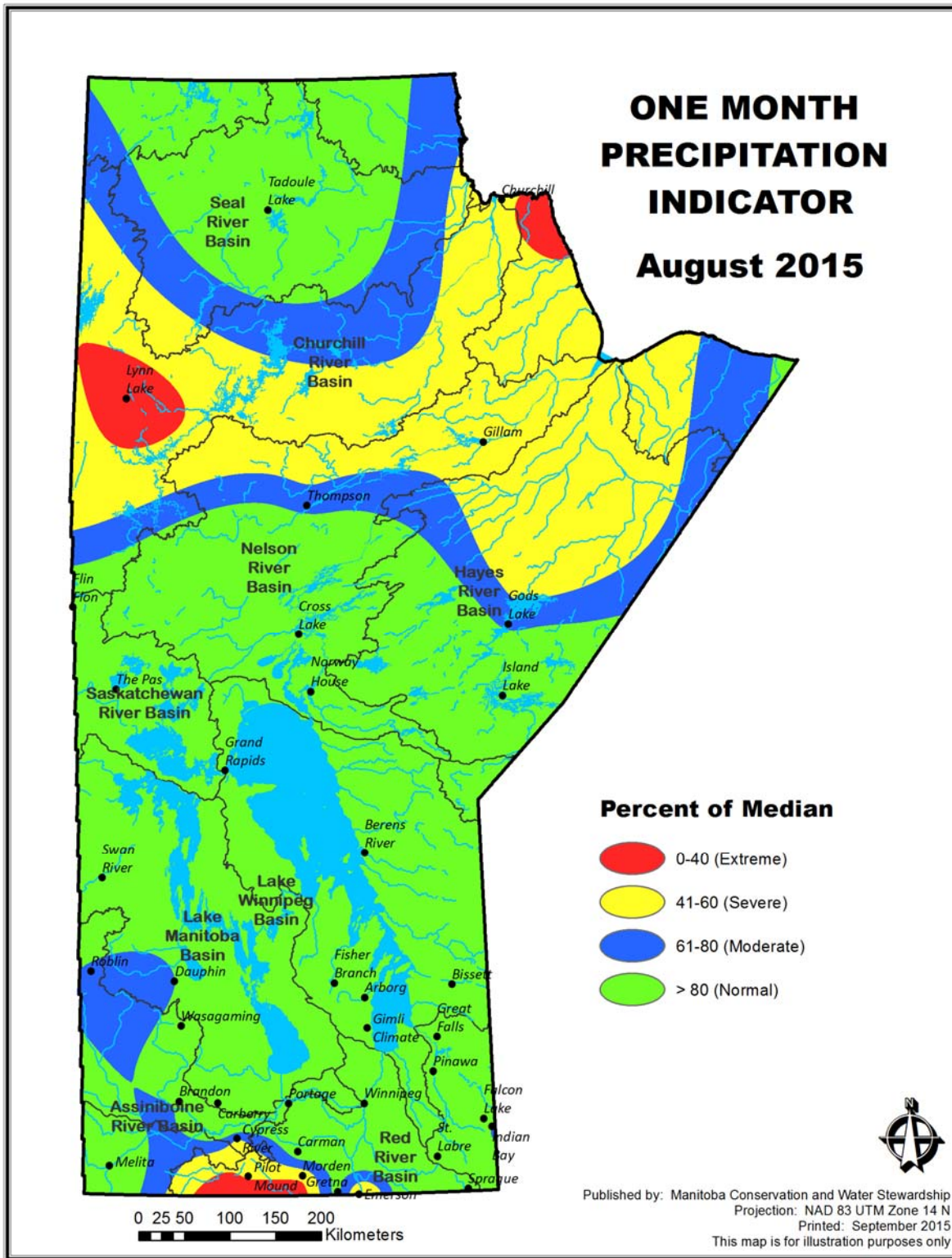


Figure 1: Precipitation Indicator (Percent of One Month Median Precipitation)

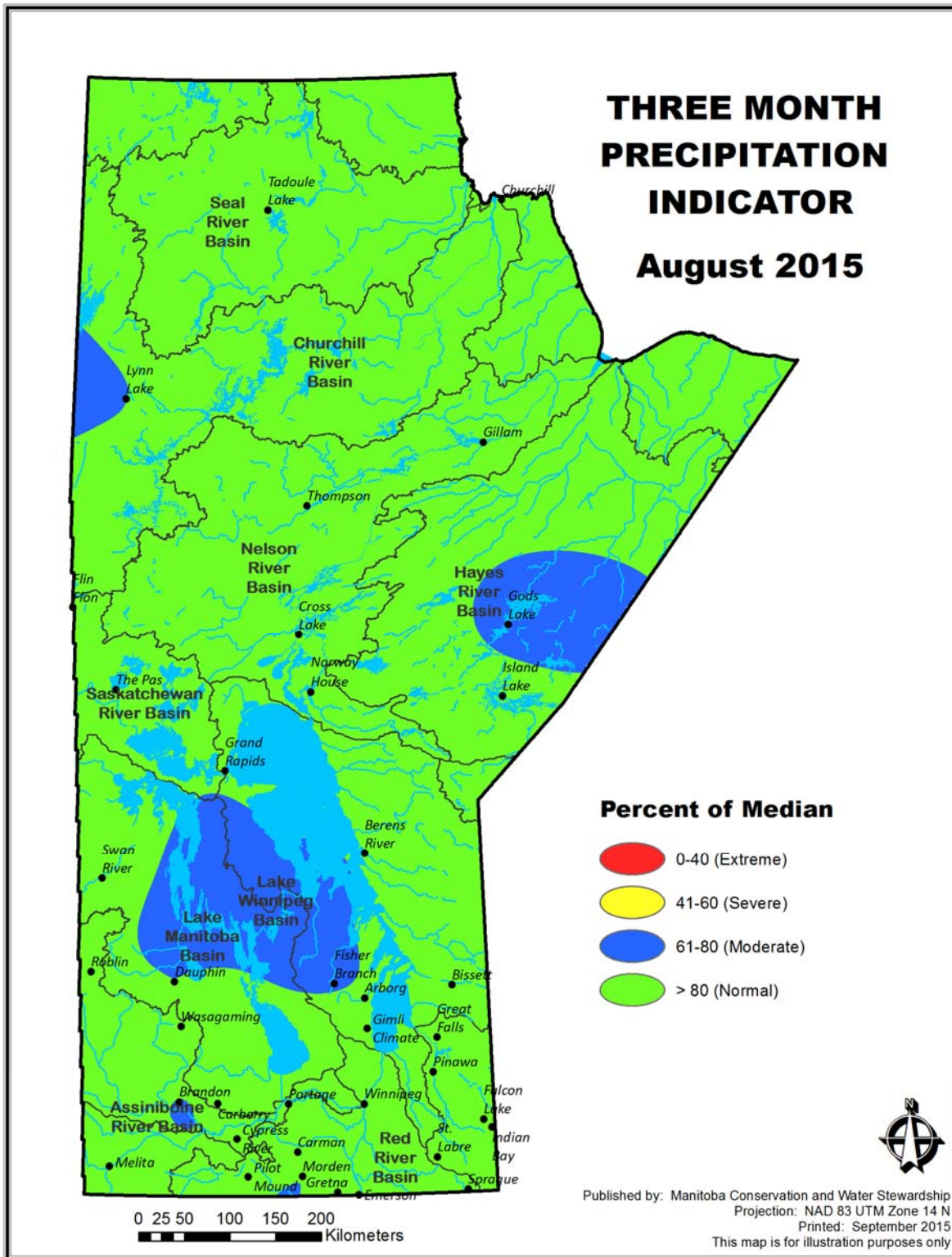


Figure 2: Precipitation Indicator (Percent of Three Month Median Precipitation)

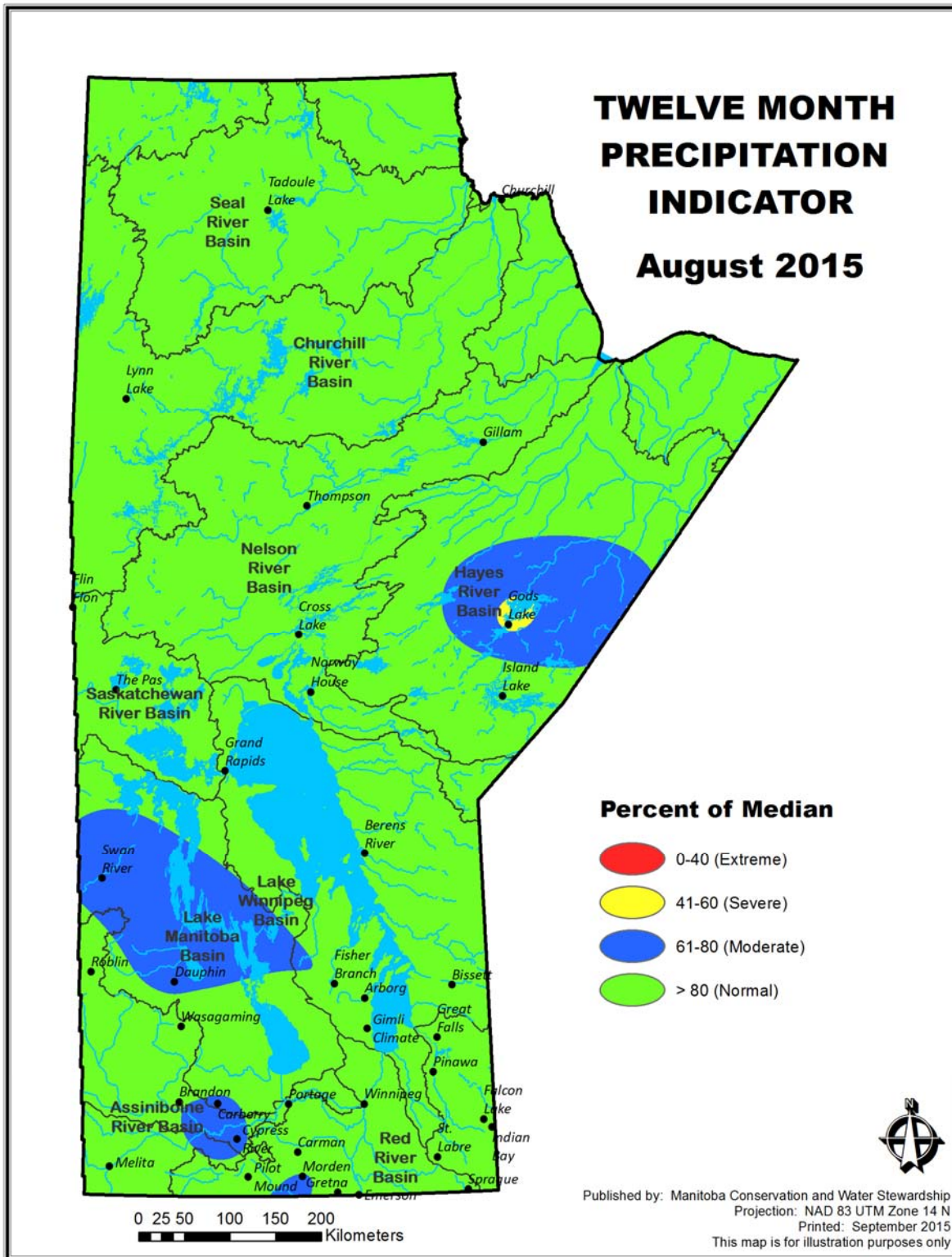


Figure 3: Precipitation Indicator (Percent of Twelve Month Median Precipitation)

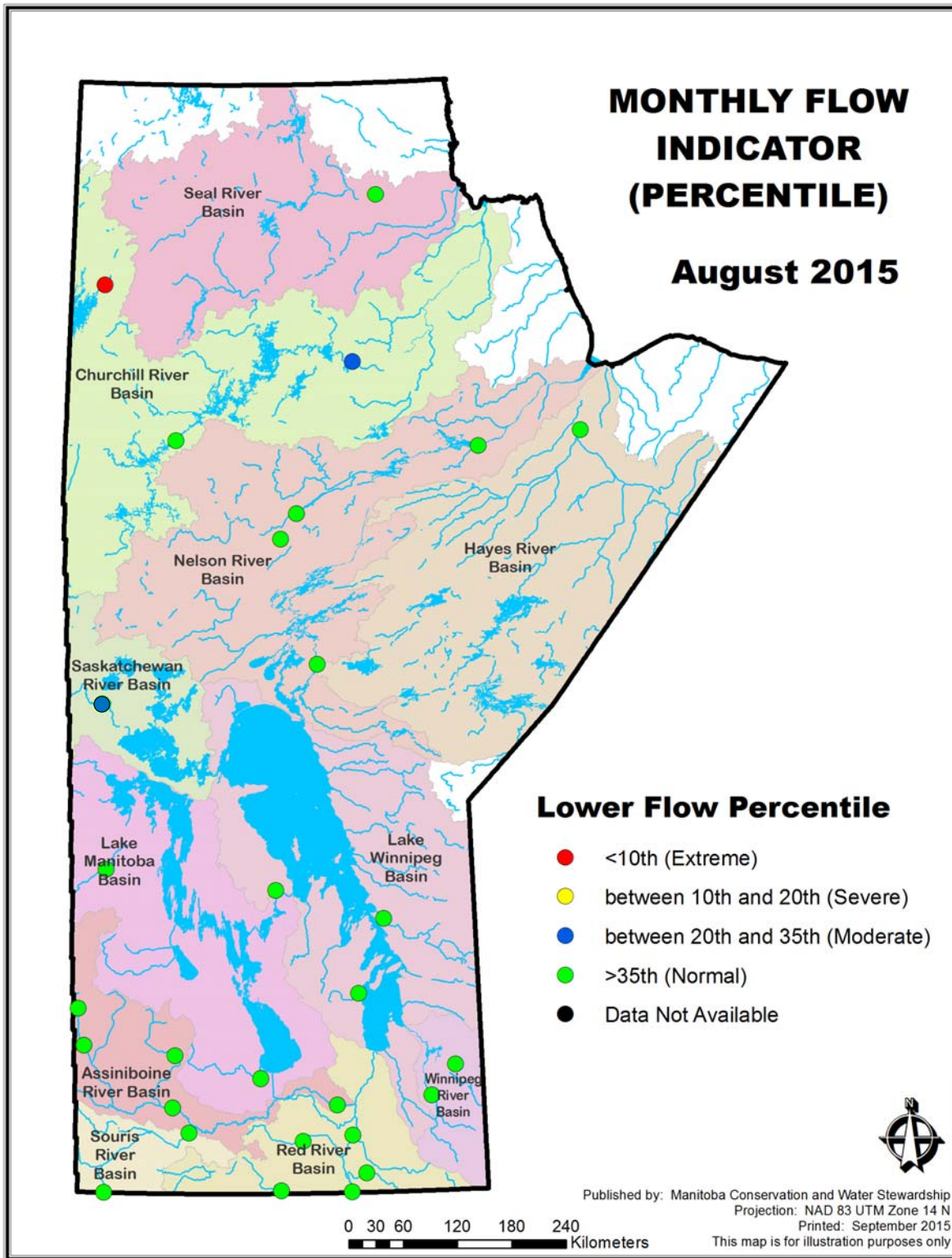


Figure 4: Monthly Flow Indicator (lower 10th, 20th and 35th monthly flow percentile)

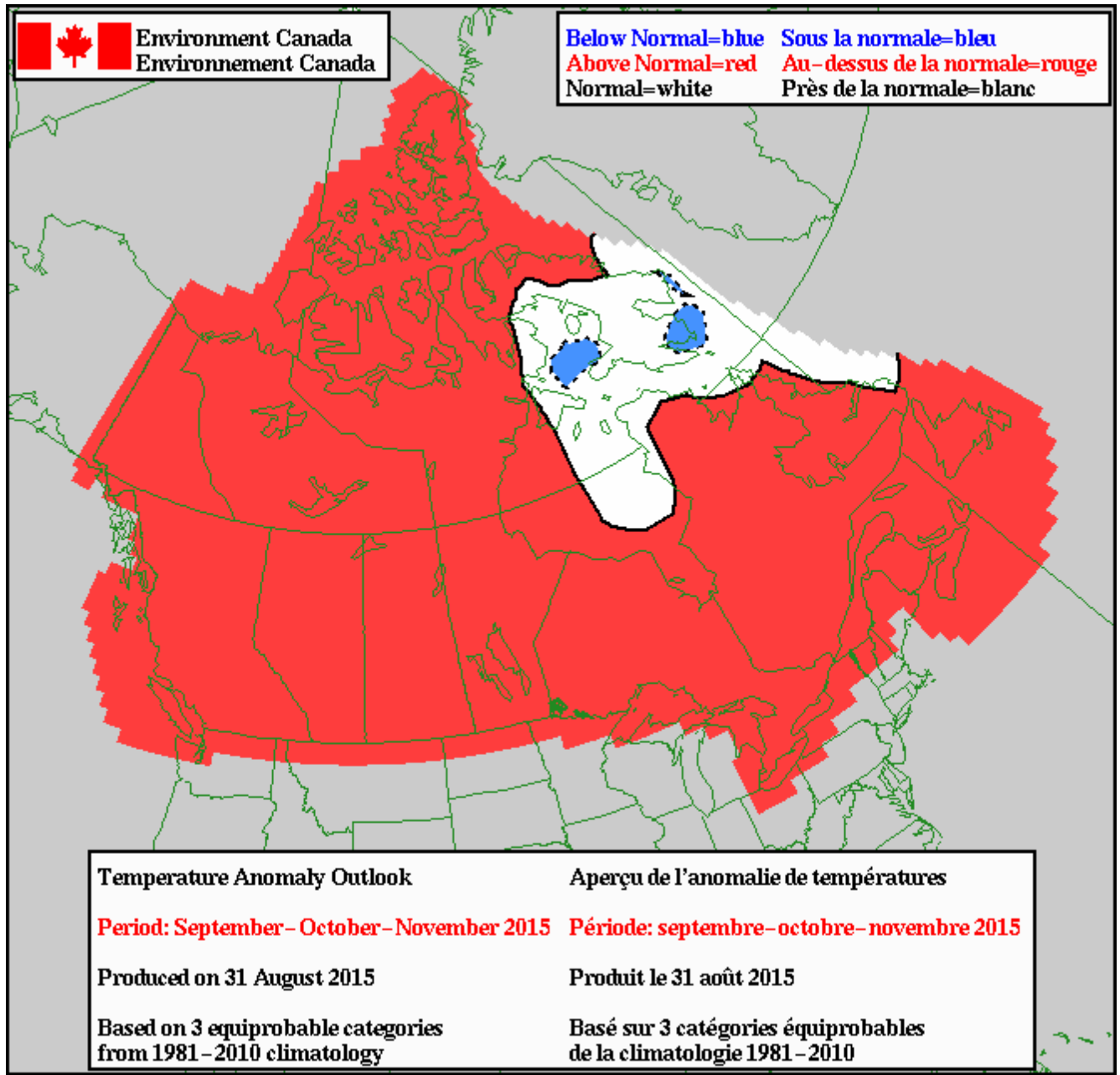


Figure 5: Environment Canada Seasonal (3 month) Temperature Outlook

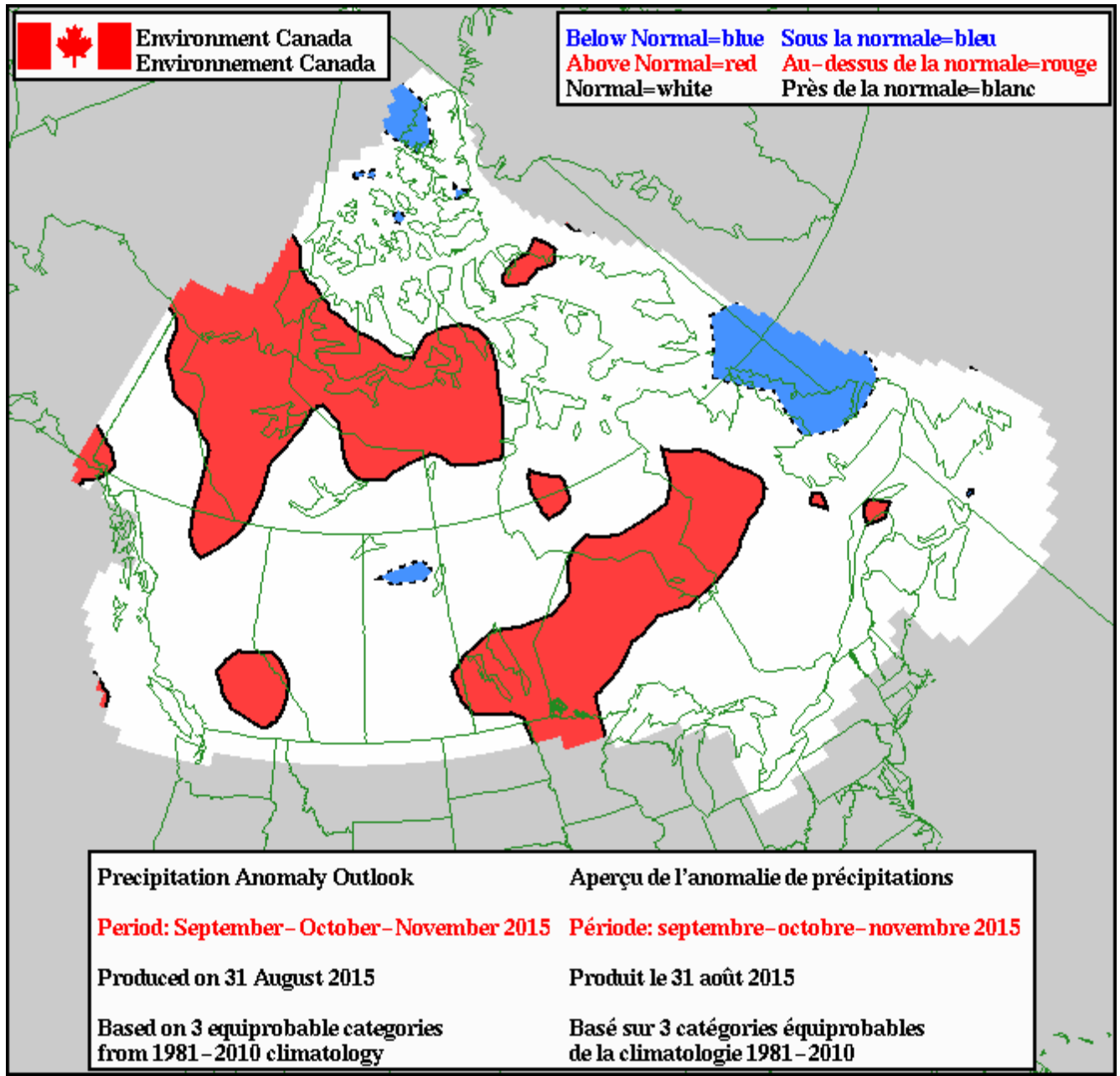


Figure 6: Environment Canada Seasonal (3 month) Precipitation Outlook

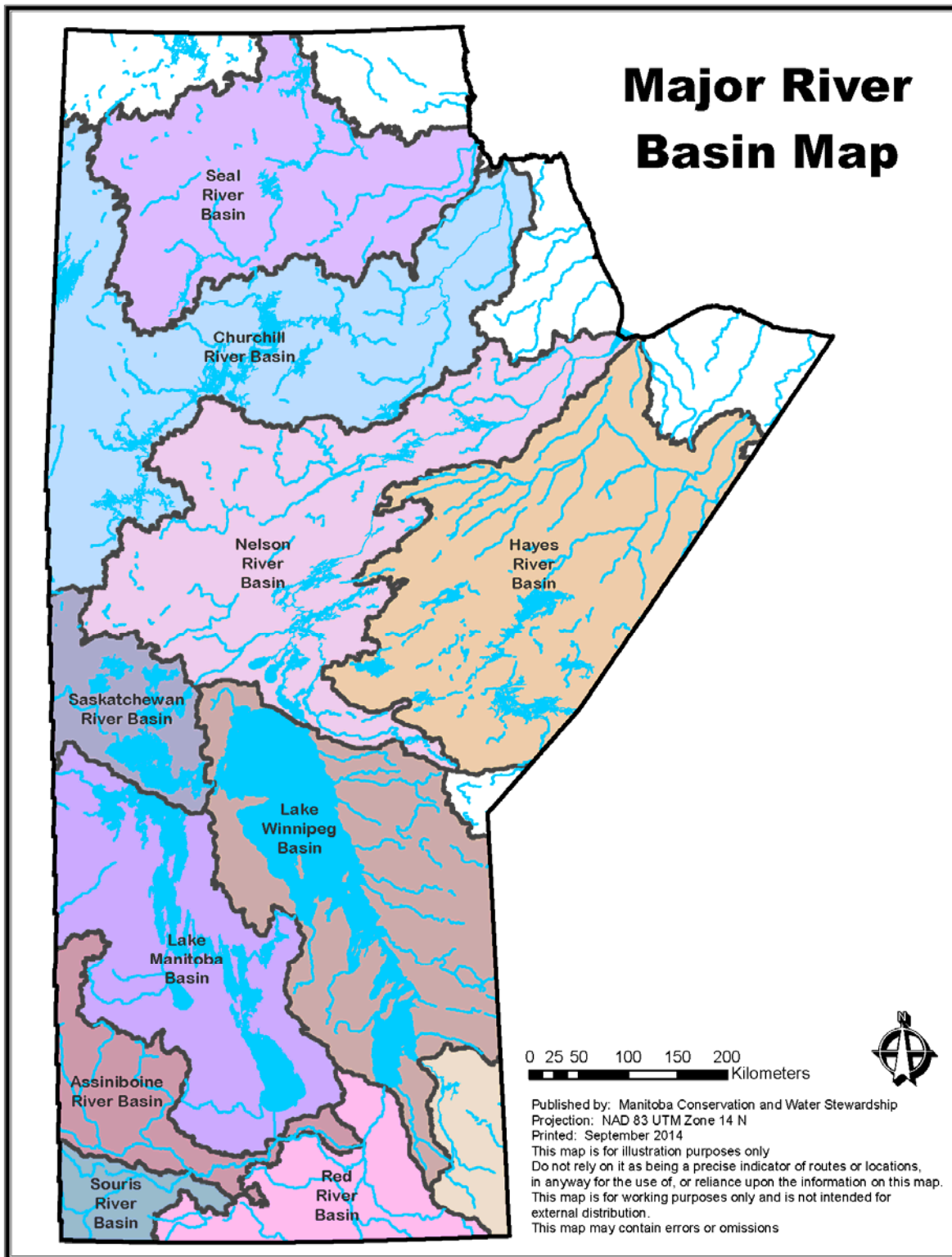


Figure 7: Major River Basins