

Water Availability and Drought Conditions Report

September 2015

Executive Summary

- The Water Availability and Drought Conditions Report provides an update on drought conditions in Manitoba for September 2015.
- Precipitation over the short and long term has been normal or above normal for most of Manitoba. The exceptions were an area surrounding Lake Manitoba experiencing moderately to extremely dry conditions, an area around Pinawa that experienced moderately to severely dry conditions, and a couple areas along the southern border that experienced moderately dry conditions. Over the last three to 12 months, most of Manitoba experienced normal conditions with isolated areas experiencing moderately dry conditions.
- September streamflow was normal or above normal for most major rivers across the province with the exception of the Churchill River Basin which is experiencing moderately to severely dry conditions.
- There are currently no concerns over water supply as supplies are good across the province. Most water supply reservoirs in southern and western Manitoba are close to 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 October, November and December is projected to be above normal across Manitoba. The seasonal precipitation forecast for October, November and December is projected to be normal for most of Manitoba, but above normal for the southwestern tip of Manitoba. Normal precipitation over the next month should prevent any drought impacts from developing.
- 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 streamflow. 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. The exceptions were an area surrounding Lake Manitoba experiencing moderately to extremely dry conditions, an area around Pinawa that experienced moderately to severely dry conditions, and a few isolated areas along the Canada-U.S. border that experienced moderately dry conditions

Over the medium term (three months), most of Manitoba experienced normal conditions with three isolated areas experiencing moderately dry conditions.

Over the long term (twelve months), most of Manitoba experienced normal conditions. Areas close to Dauphin, Brandon/Carberry, and Gods Lake experienced moderately dry conditions.

Streamflow Indicators

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

The monthly streamflow indicators show that flows are normal or above normal for most major rivers across the province. The Churchill River Basin is experiencing moderately to severely dry conditions.

Table 1: Drought Indicators by Major River Basin

Basin (in Manitoba)	Drought Indicators			
	Precipitation Indicators			Monthly Flow Indicators September 2015
	Percent of 1 Month Median September 2015	Percent of 3 Month Median July - September 2015	Percent of 12 Month Median August 2014 – September 2015	
Red River	Normal except for isolated areas of moderately dry conditions in south portion of the basin	Normal except for an isolated area south of Pilot Mound experiencing moderately dry conditions	Normal	Normal
Winnipeg River	Normal except for an area around Pinawa with moderately to severely dry conditions	Normal	Normal	Normal
Assiniboine River-Souris River	Normal except for areas towards the Canada-US border with moderately dry conditions	Normal	Normal except moderately dry conditions in the Brandon-Carberry area	Normal
Lake Manitoba	Normal in the north, severely to extremely dry in the south	Normal	Normal to moderately dry	Normal
Lake Winnipeg	Normal except for an area around Fisher Branch with moderately to severely dry conditions, and an area west of Pinawa experiencing moderately dry conditions	Normal except for an isolated area of moderately dry conditions northwest of Fisher Branch	Normal except for moderately dry conditions west of Fisher Branch	Normal
Saskatchewan River	Normal	Normal	Normal	Normal
Nelson River	Normal	Normal	Normal	Normal
Hayes River	Normal	Normal	Normal except for moderately dry conditions around Gods Lake	Normal
Churchill River	Normal	Normal except for moderately dry conditions along the Manitoba-Saskatchewan border west of Lynn Lake	Normal	Moderately low flows for Churchill River locations and severely low flows for Cochrane River
Seal River	Normal	Normal	Normal	Normal

Water Availability

Reservoir Conditions

Water supply reservoirs are close to or at full supply level, with the exception of the Minnewasta and Stephenfield Reservoirs, which are at 87 % and 85 % of summer target levels, respectively. There are no concerns over current water supplies for this time of year.

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 22 (September 28th, 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 85 % 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 (October 6th) that there are currently no active fires.

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, there have been minimal drought impacts during the month of September.

Moisture conditions are generally favourable for harvest in agri-Manitoba. In some areas of excess moisture, dry weather would be welcomed to finish the harvest.

A few municipalities continue to have burning bans in place.

Future Potential Impacts

Environment Canada's seasonal forecast for the next three months (October-November-December 2015) projects temperatures to be above normal across Manitoba (Figure 5). Precipitation is projected to be normal for most of Manitoba and above normal for the southwestern tip of Manitoba (Figure 6). Normal precipitation over the next month should prevent any drought impacts from developing.

Water supply reservoirs are close to or at full supply level, with the exception of the Minnewasta and Stephenfield Reservoirs. Both reservoirs are above the recommended levels for this time of year, and therefore 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	1,531.48	August 25, 2015	-0.52	520	484	93%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,401.48	September 28, 2015	-1.02	300,000	287,390	96%
Lake Wahtopannah (Rivers)	Rivers	1,536.00	1,536.47	September 28, 2015	0.47	24,500	25,547	104%
Manitou (Mary Jane)	Manitou	1,537.00	1,536.17	September 28, 2015	-0.83	1,150	1,076	94%
Minnewasta (Morden)	Morden	1,082.00	1,079.40	September 28, 2015	-2.60	3,150	2,734	87%
Stephenfield	Carman	972.00	970.75	September 28, 2015	-1.25	3,810	3,231	85%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,770.72	September 28, 2015	-1.28	1,400	1,333	95%
Vermilion	Dauphin	1,274.00	1,273.43	September 28, 2015	-0.57	2,600	2,450	94%
Goudney (Pilot Mound)		1,482.00	1,481.81	September 28, 2015	-0.19	450	437	97%
Jackson Lake		1,174.00	1,172.80	September 28, 2015	-1.20	2,870	2,689	94%
Kenworth Dam		1,448.00	1,447.89	July 29, 2015	-0.11	600	591	99%
Killarney Lake		1,615.00	1,615.30	July 22, 2015	0.30	7,360	7,498	102%
Lake Irwin		1,178.00	1,178.00	August 28, 2015	0.00	3,800	3,801	100%
Rapid City		1,573.50	1,574.21	July 29, 2015	0.71	200	250	125%
St. Malo		840.00	840.72	July 15, 2015	0.72	1,770	1,888	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

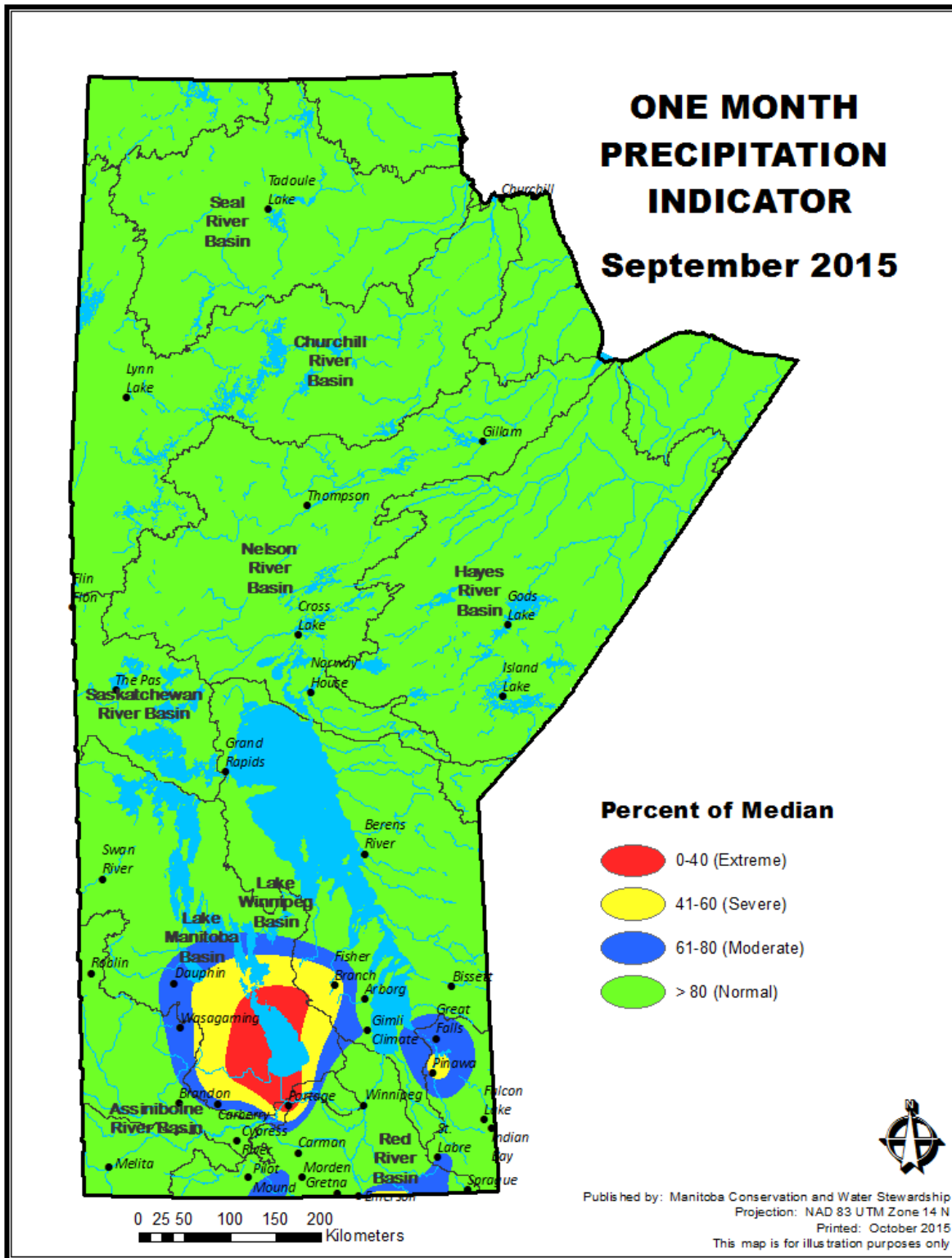


Figure 1: Precipitation Indicator (Percent of One Month Median Precipitation)

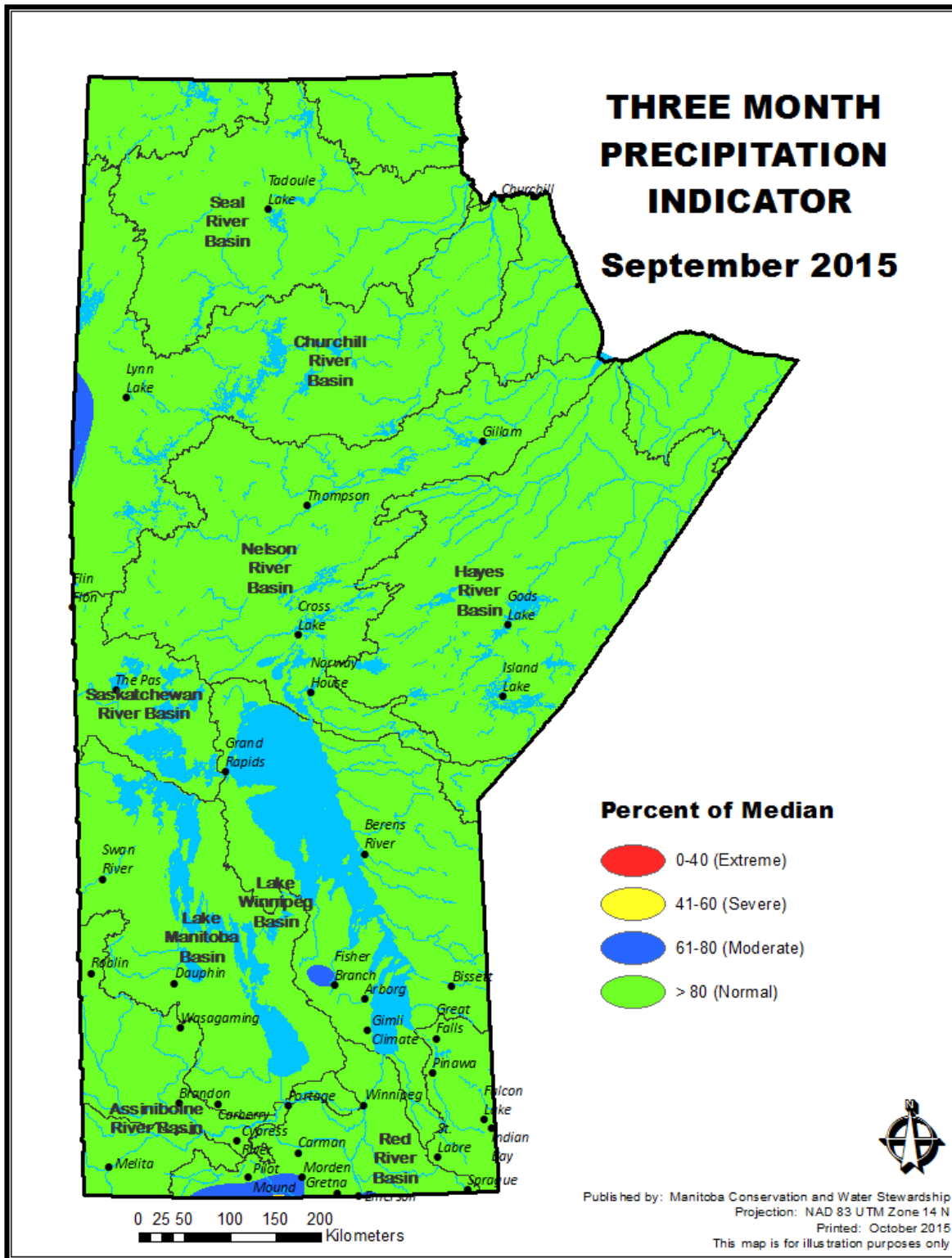


Figure 2: Precipitation Indicator (Percent of Three Month Median Precipitation)

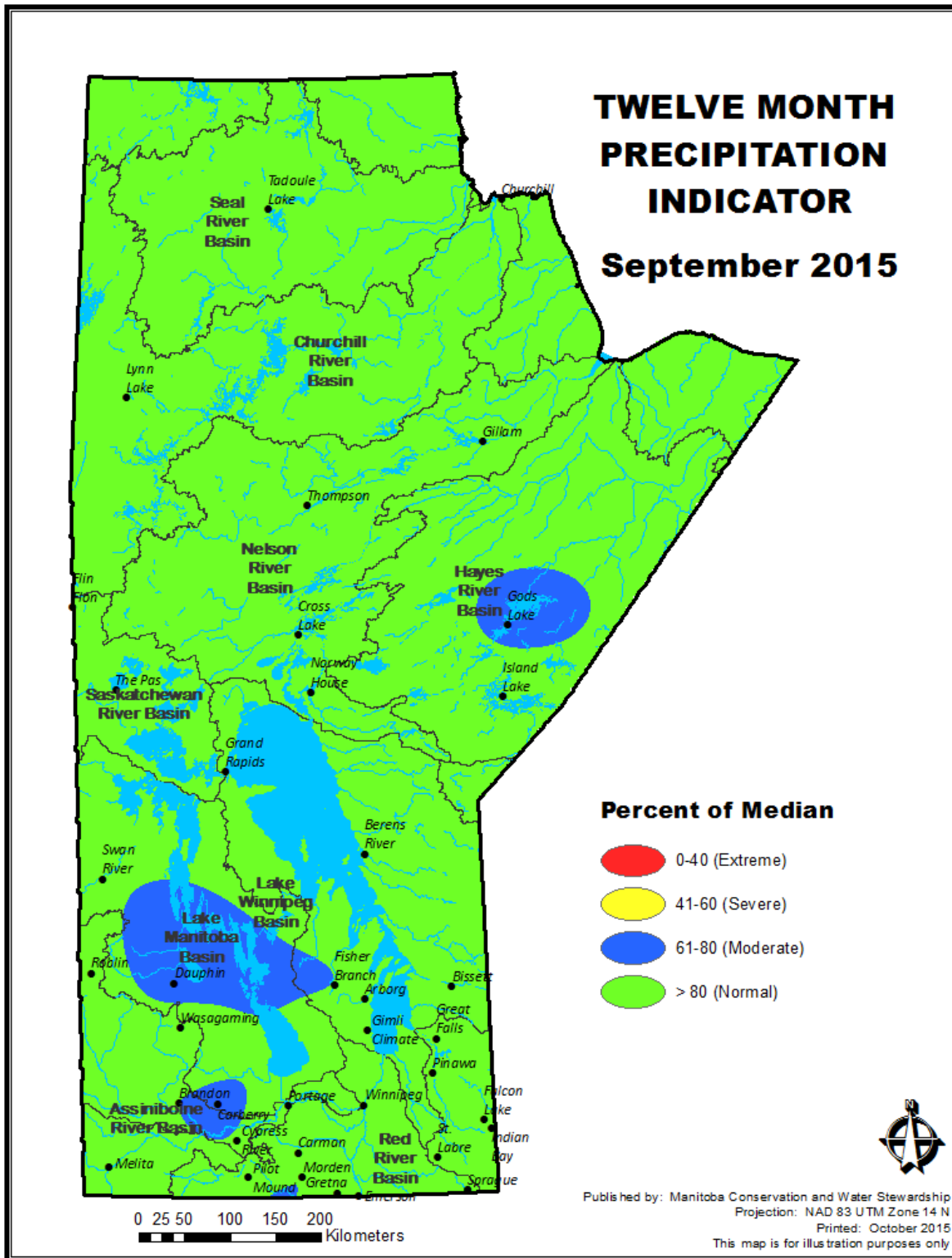


Figure 3: Precipitation Indicator (Percent of Twelve Month Median Precipitation)

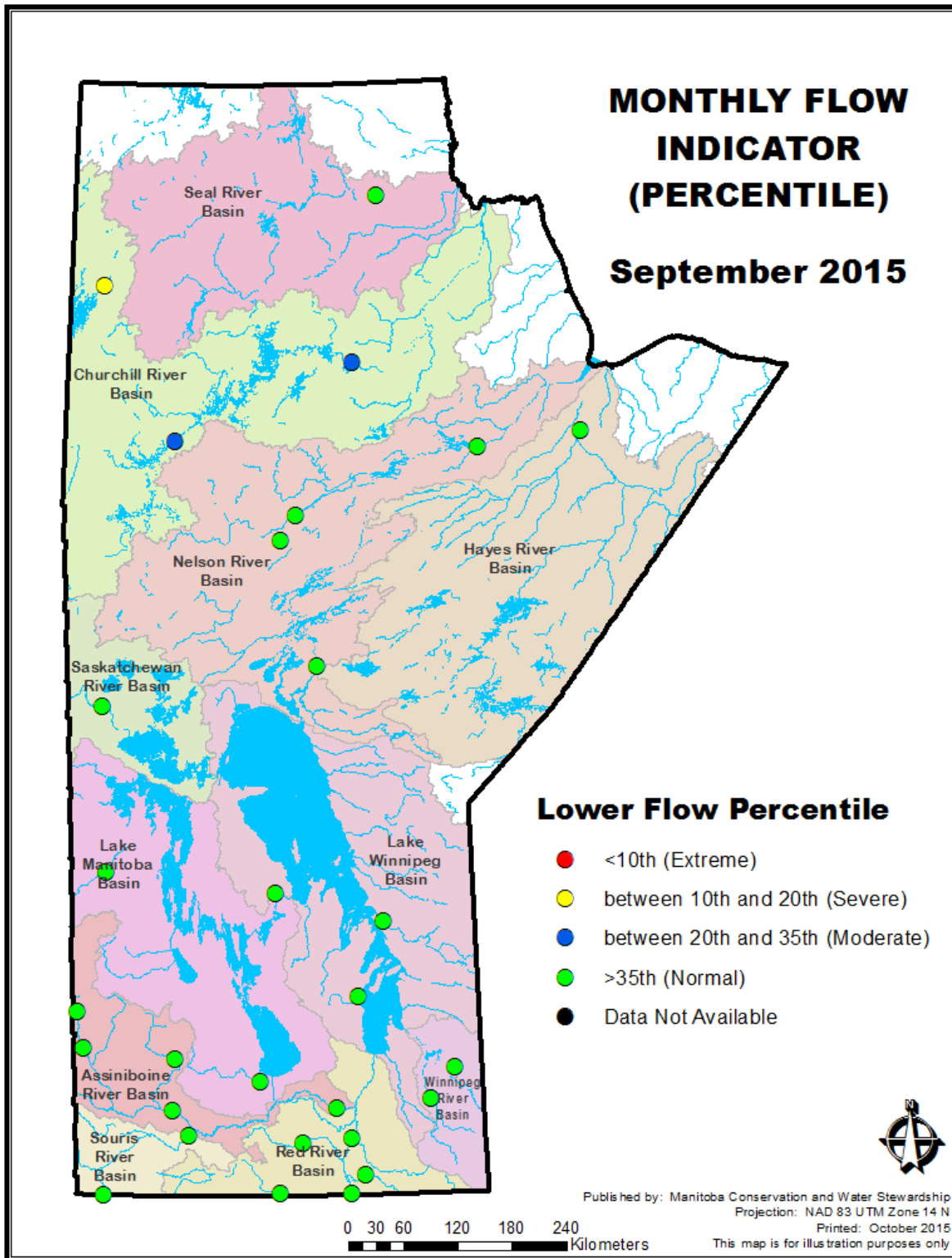


Figure 4: Monthly Flow Indicator (lower 10th, 20th and 35th monthly flow percentile)

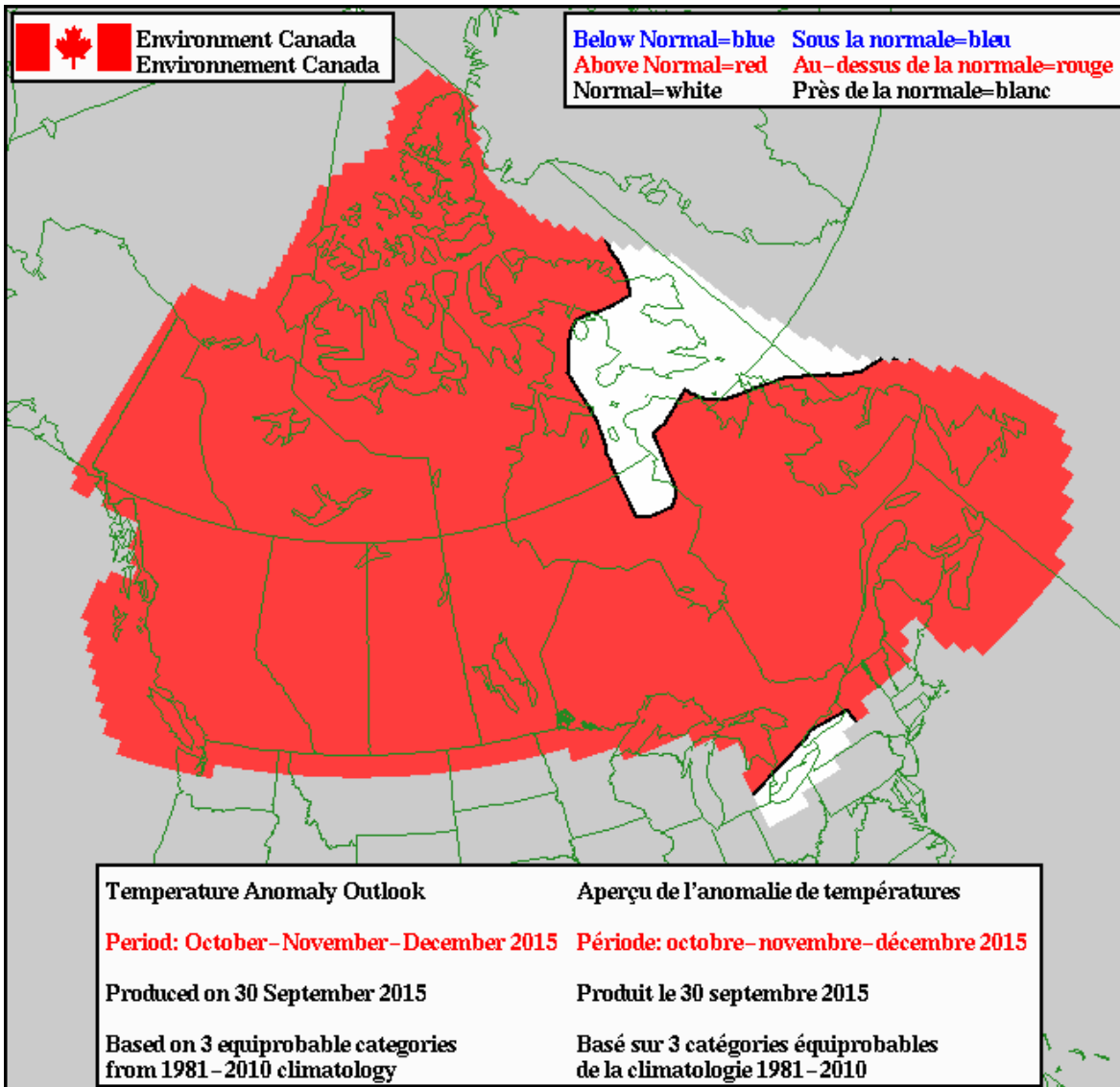


Figure 5: Environment Canada Seasonal (3 month) Temperature Outlook

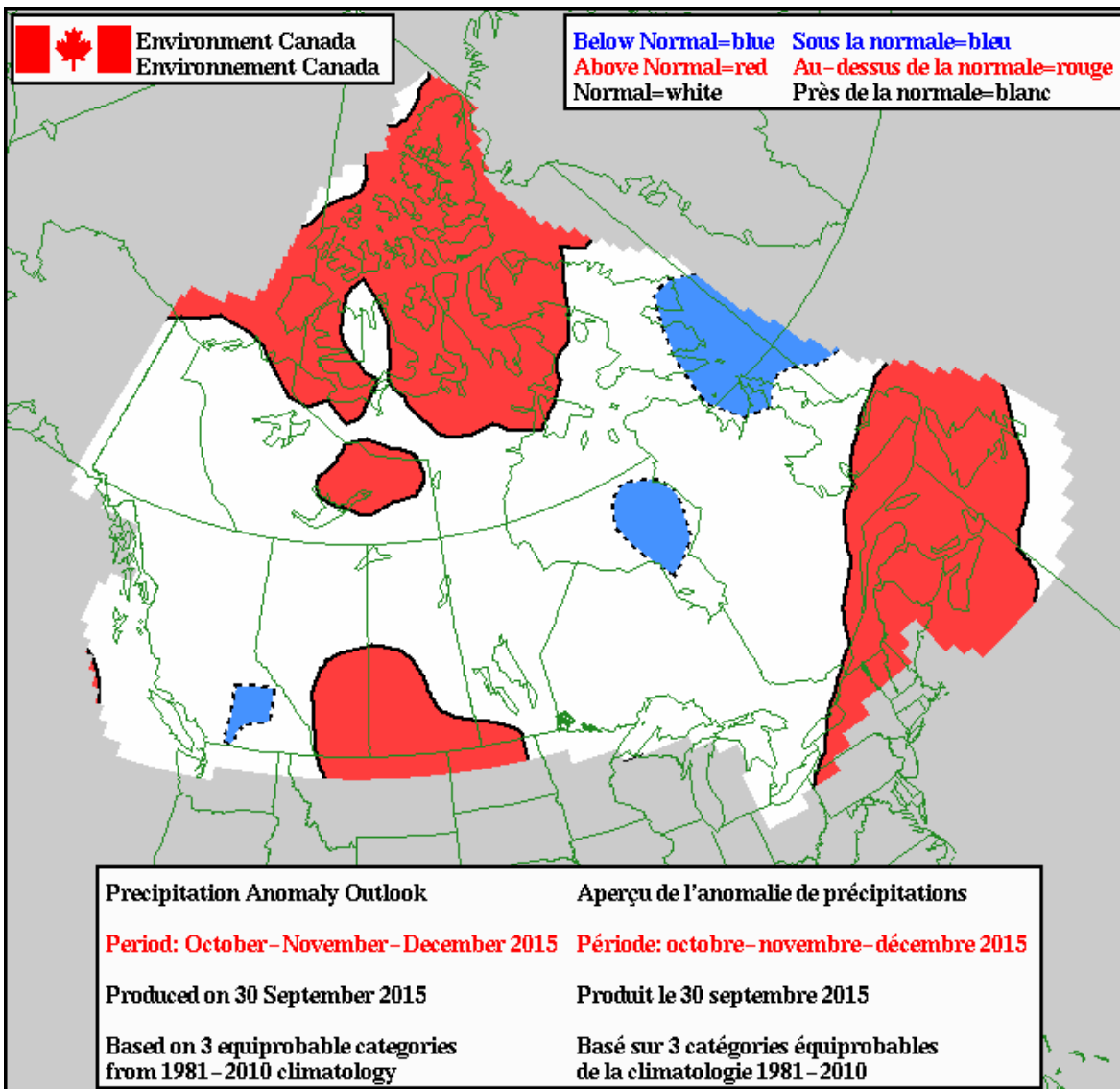


Figure 6: Environment Canada Seasonal (3 month) Precipitation Outlook

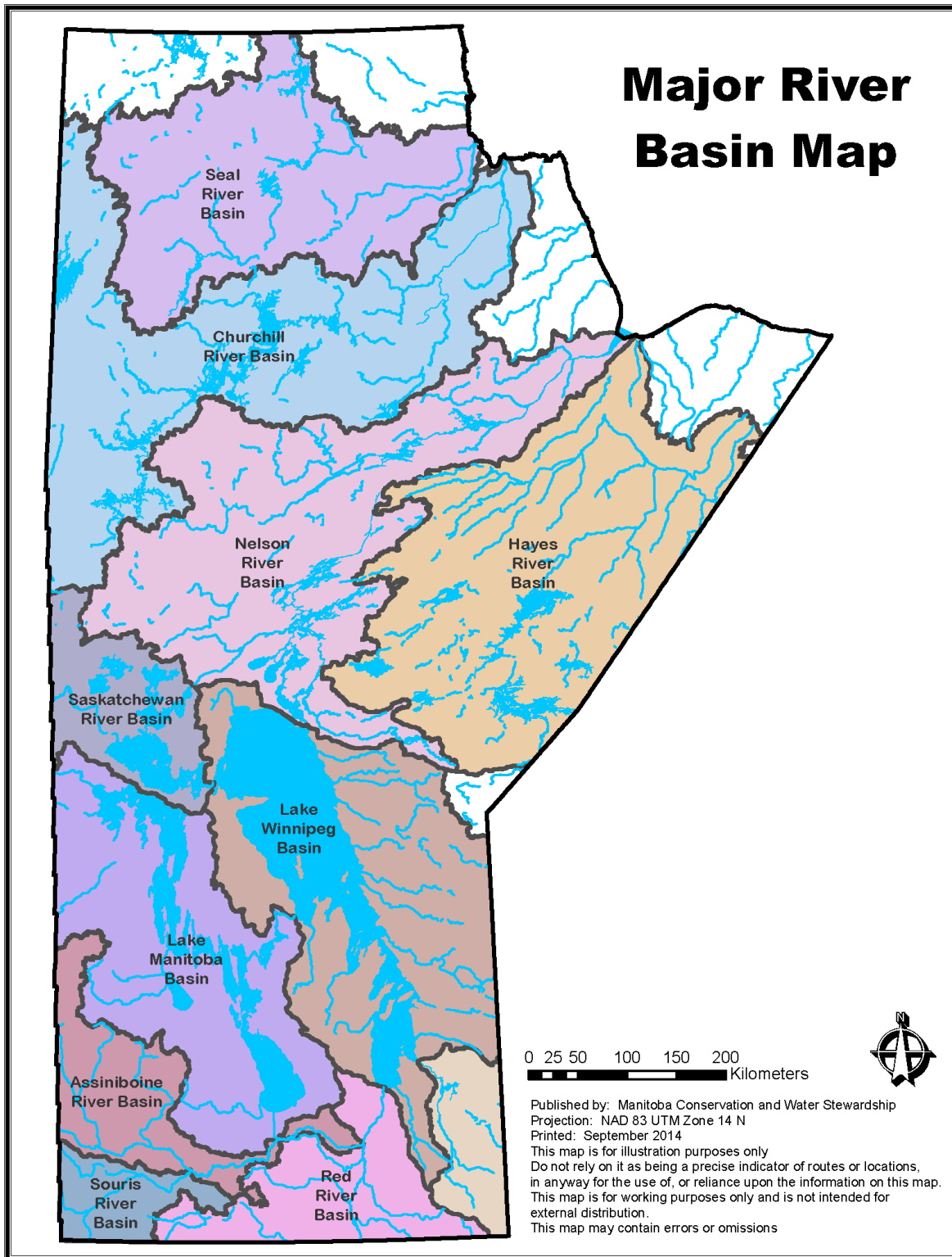


Figure 7: Major River Basins