

Water Availability and Drought Conditions Report

June 2015

Executive Summary

- The Water Availability and Drought Conditions Report provides an update on drought conditions for Manitoba for June 2015.
- Most of Manitoba has experienced normal or above normal precipitation over the short and long term. Over the last month, the northern and southern portions of Manitoba experienced normal or above normal precipitation while an area stretching across Lakes Manitoba and Winnipeg experienced moderately dry conditions. An area from Swan River to Grand Rapids experienced severely dry conditions. Over the last three months, an area stretching from Wasagaming/Dauphin north to The Pas and west to Lake Winnipeg experienced moderately dry conditions with the rest of Manitoba experiencing normal or above normal precipitation. Over the last 12 months, most of Manitoba experienced normal or above normal precipitation with some localized areas experiencing moderately dry conditions.
- June stream flow was normal or above normal for most major rivers across the province. In the Churchill River Basin, the Cochrane River near Brochet is experiencing severely low flows for the month of June.
- 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.
- Environment Canada's seasonal temperature forecast for July, August and September is projected to be above normal across Manitoba. The seasonal precipitation forecast for July, August and September is projected to be below normal for southern Manitoba and normal for northern Manitoba. If hot, dry conditions are experienced the risk of wildfires will continue to be high and agricultural impacts should be expected in those areas that currently require precipitation.
- 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 across Lakes Manitoba and Winnipeg experienced moderately dry conditions with the area from Swan River to Grand Rapids experiencing severely dry conditions.

Over the medium term (three months), most of Manitoba experienced normal conditions with the exception of moderately dry conditions experienced over an area stretching from Wasagaming/Dauphin north to The Pas and west to Lake Winnipeg.

Over the long term (twelve months), conditions were generally normal throughout the province with some localized areas around Cross Lake/Norway House, Swan River/Dauphin, Carberry, and north of Island Lake experiencing moderately 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 June. The only exception was in the Churchill River Basin where the Cochrane River near Brochet experienced severely low flows for the month of June.

Table 1: Drought Indicators by Major River Basin

Basin (in Manitoba)	Drought Indicators			
	Precipitation Indicators			Monthly Flow Indicators June 2015
	Percent of 1 Month Median June 2015	Percent of 3 Month Median April - June 2015	Percent of 12 Month Median July 2014 – June 2015	
Red River	Normal	Normal	Normal	Normal
Winnipeg River	Normal	Normal	Normal	Normal
Assiniboine River-Souris River	Normal except for moderately dry conditions in the north	Normal except for moderately dry conditions in the north	Normal except moderately dry conditions around Carberry and north of Roblin	Normal
Lake Manitoba	Normal in the south, moderate to severely dry conditions in the north	Normal in the south, moderately dry conditions in the north	Normal to moderately dry	Normal
Lake Winnipeg	Normal in the south, moderately to severely dry conditions in the north	Normal except for moderately dry areas in the north	Normal	Normal
Saskatchewan River	Moderately to severely dry	Normal to moderately dry	Normal	Normal
Nelson River	Normal except for moderately dry conditions in the south	Normal	Normal with moderately dry conditions around Norway House and Cross Lake	Normal
Hayes River	Normal in the north, moderately dry in the southern half of the basin	Normal	Normal except for isolated areas of moderately dry conditions	Normal
Churchill River	Normal except for moderately dry conditions in the very southern portion of the basin	Normal	Normal	Normal except severely dry for Cochrane River near Brochet
Seal River	Normal	Normal	Normal	Normal

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 9 (June 29, 2015) are summarized in Table 2.

Table 2: On Farm Water Supply (Dugout) Conditions

Region	General Dugout Conditions
Eastern	adequate
Interlake	ample water supply
Southwest	at 80 % 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 (June 30th) that lightning with light scattered precipitation continues to start new wildfires throughout the province. The fire near the community of Red Sucker Lake is under control. Red Sucker Lake residents were evacuated for three nights and returned home on July 1st. Crews, heavy equipment and water bombers continue work to protect timber values from a large wildfire in the Davidson Lake area. Suppression efforts also continue on a large wildfire south of Kelsey Lake, approximately 36 kilometers south of The Pas. Crews, water bombers and heavy equipment also continue working another large wildfire 42 kilometers southwest of Grand Rapids. Suppression efforts also continue on wildfires in the Lynn Lake, Setting Lake, Little Grand Rapids and Atikaki areas. Lightning is expected to spark new fires throughout the forested areas of Manitoba. As of June 30th, 264

fires have been reported, 84 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 (<http://www.gov.mb.ca/wildfire>).

On June 30th, due to the dry conditions and high forest fire danger level in northwestern Manitoba, Conservation and Water Stewardship announced it cancelled all burning permits and implemented a fire ban for all fires, including campfires in provincial parks, and will not issue fireworks in this region.

Some municipalities have burning bans in place. Burning bans are currently in effect for municipalities of Killarney-Turtle Mountain, Macdonald, Mossey River, Armstrong, St. Andrews, and the LGD of Pinawa.

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 June. A large number of fires were reported in June and many are still active. Fires near Davidson and Kelsey Lakes in northern Manitoba are noteworthy.

Drought conditions are developing in the western Prairie Provinces. Due to low flow conditions, water shortage procedures and more active monitoring have begun for the South Saskatchewan River Basin in Alberta. Large forest fires are currently burning in Saskatchewan and the Northwest Territories. During the last week of June and continuing into July, smoke from these fires has been blown southwest into Manitoba. Air quality advisories have been issued for all of Saskatchewan and much of Manitoba during the last few days in June. Areas closest to the Saskatchewan border are most affected by reduced visibilities and poor air quality values. Air quality is expected to improve in Manitoba when the wind direction changes.

Most areas in Agri-Manitoba have received adequate precipitation. Some areas of the province would benefit from additional precipitation, primarily in the areas surrounding Roblin and Swan River as conditions are dry for crops, hayland and pastures.

Future Potential Impacts

The short term forecast shows most of Manitoba is expected to receive precipitation in early July. Environment Canada's seasonal forecast for the next three months (July-August-September 2015) projects temperatures to be above normal across Manitoba (Figure 5). Precipitation is projected to be below normal for southern Manitoba and normal for northern Manitoba (Figure 6). If hot, dry conditions are experienced the risk of wildfires will continue to be high and agricultural impacts should be expected in those areas that currently require precipitation.

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	1,532.25	May 26, 2015	0.25	520	537	103%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,403.34	June 29, 2015	0.84	300,000	311,040	104%
Lake Wahtopannah (Rivers)	Rivers	1,536.00	1,536.84	June 28, 2015	0.84	24,500	26,388	108%
Manitou (Mary Jane)	Manitou	1,537.00	1,537.13	June 28, 2015	0.13	1,150	1,154	100%
Minnewasta (Morden)	Morden	1,082.00	1,081.82	June 28, 2015	-0.18	3,150	3,119	99%
Stephenfield	Carman	972.00	972.41	June 28, 2015	0.41	3,810	4,000	105%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,772.01	June 28, 2015	0.01	1,400	1,401	100%
Vermilion	Dauphin	1,274.00	1,274.31	June 28, 2015	0.31	2,600	2,650	102%
Goudney (Pilot Mound)		1,482.00	1,482.28	June 28, 2015	0.28	450	464	103%
Jackson Lake		1,174.00	1,174.11	May 21, 2015	0.11	2,870	3,025	105%
Kenworth Dam		1,448.00	1,448.06	May 27, 2015	0.06	600	602	100%
Killarney Lake		1,615.00	1,616.60	June 22, 2015	1.60	7,360	8,094	110%
Lake Irwin		1,178.00	1,178.47	May 21, 2015	0.47	3,800	4,108	108%
Rapid City		1,573.50	1,573.91	May 27, 2015	0.41	200	229	114%
St. Malo		2755.90	2,757.64	May 4, 2015	1.73	1,770	1,785	101%
* Summer target level and storage.								
Reservoir Levels and Storages								

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

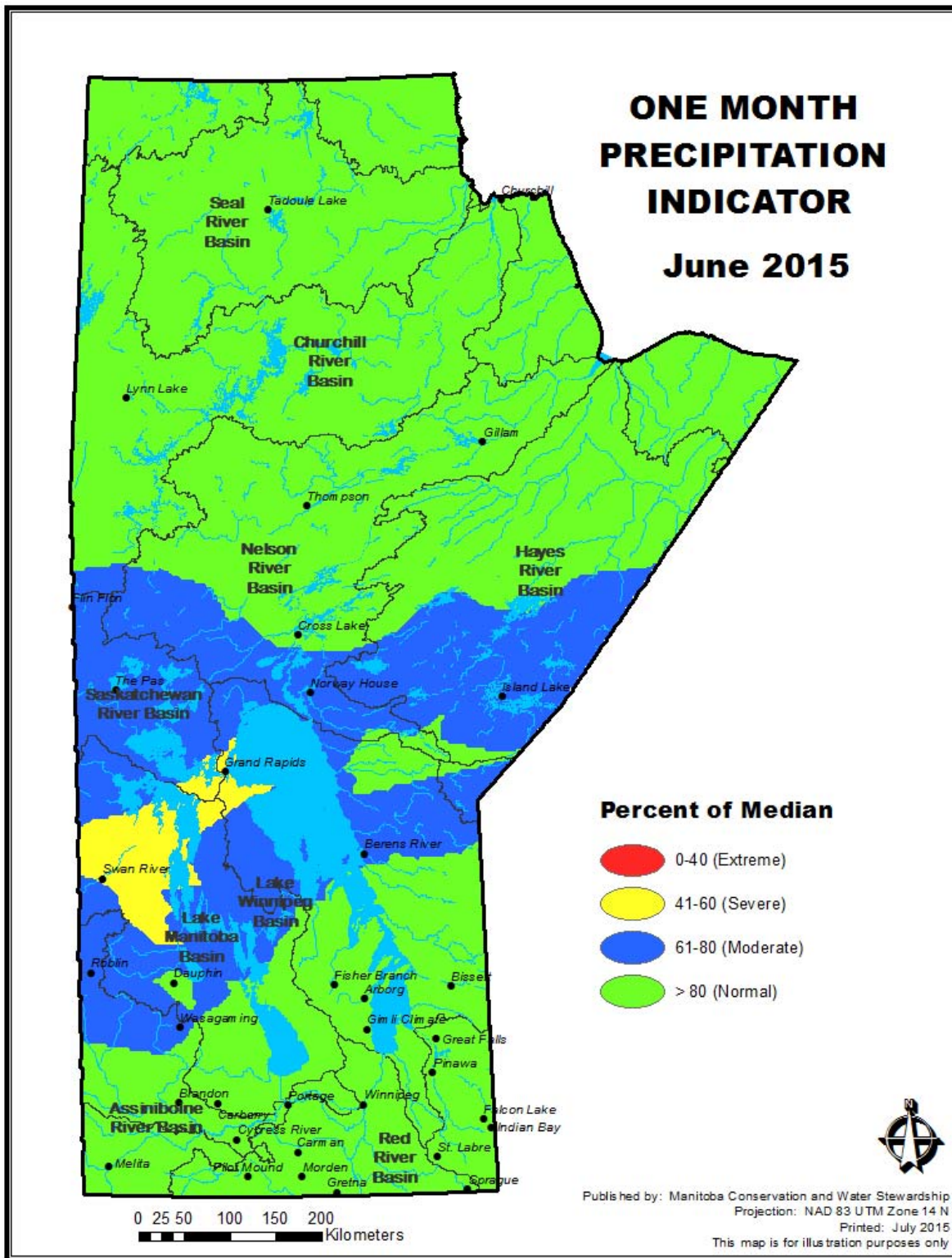


Figure 1: Precipitation Indicator (Percent of One Month Median Precipitation)

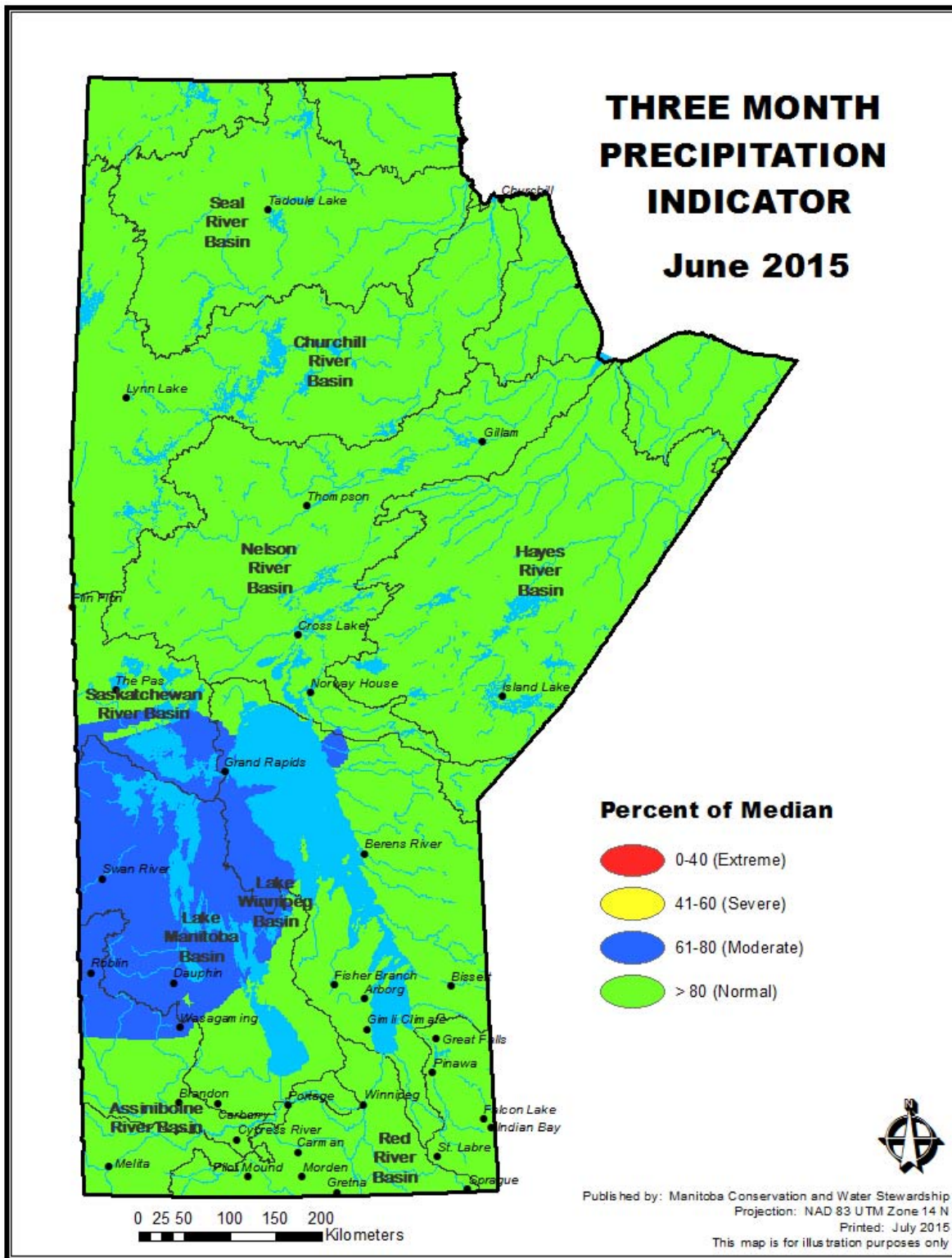


Figure 2: Precipitation Indicator (Percent of Three Month Median Precipitation)

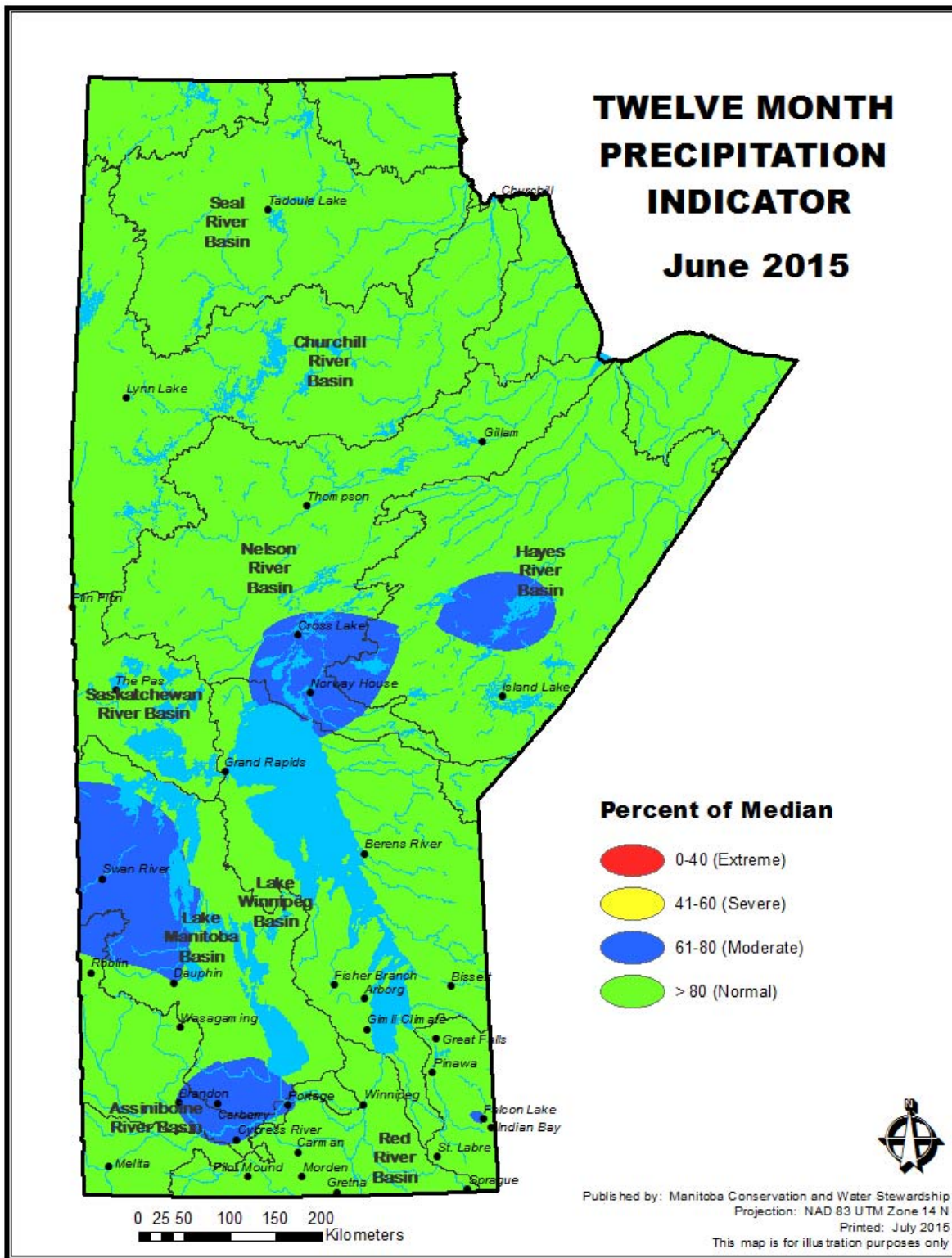


Figure 3: Precipitation Indicator (Percent of Twelve Month Median Precipitation)

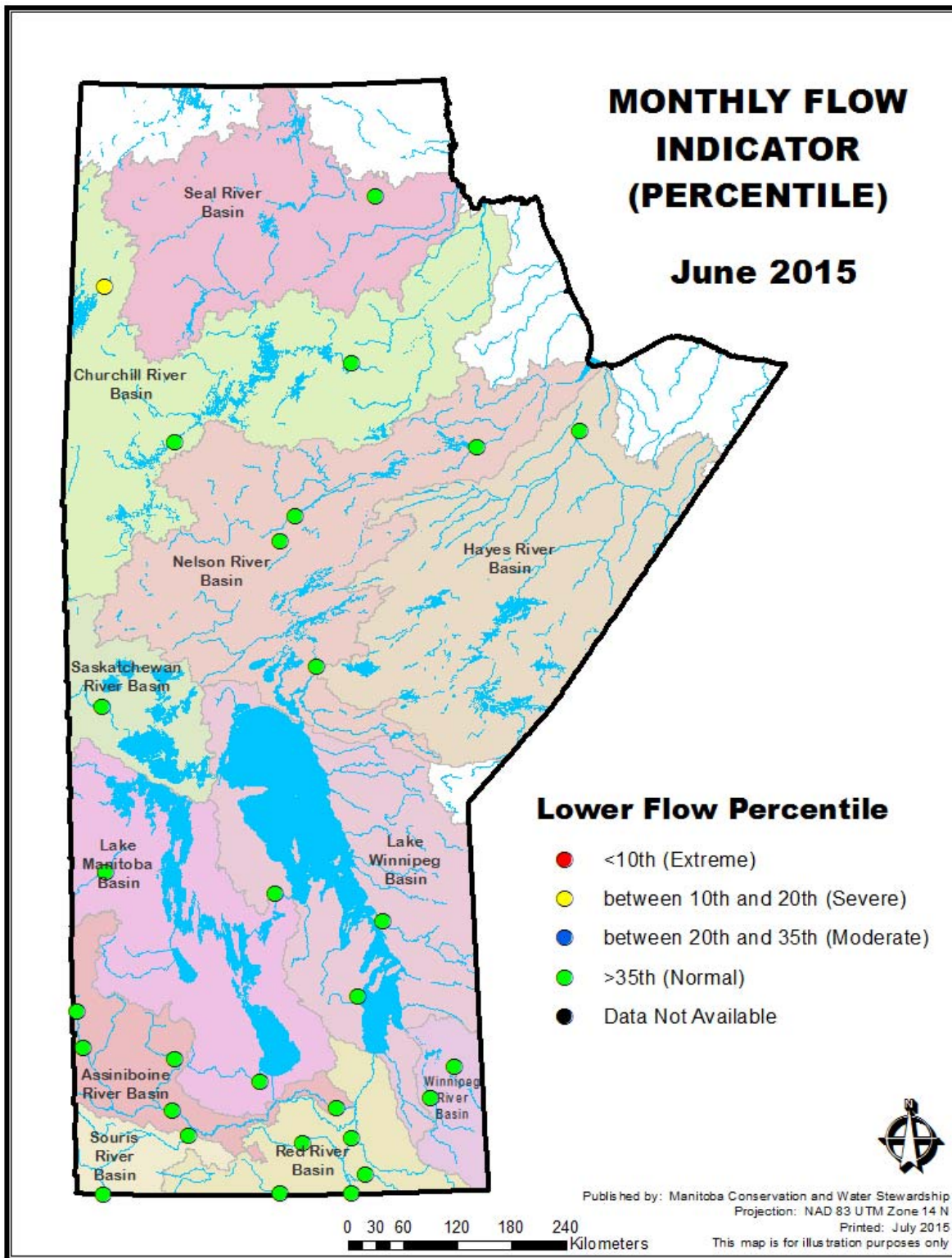


Figure 4: Monthly Flow Indicator (lower 10th, 20th and 35th monthly flow percentile)

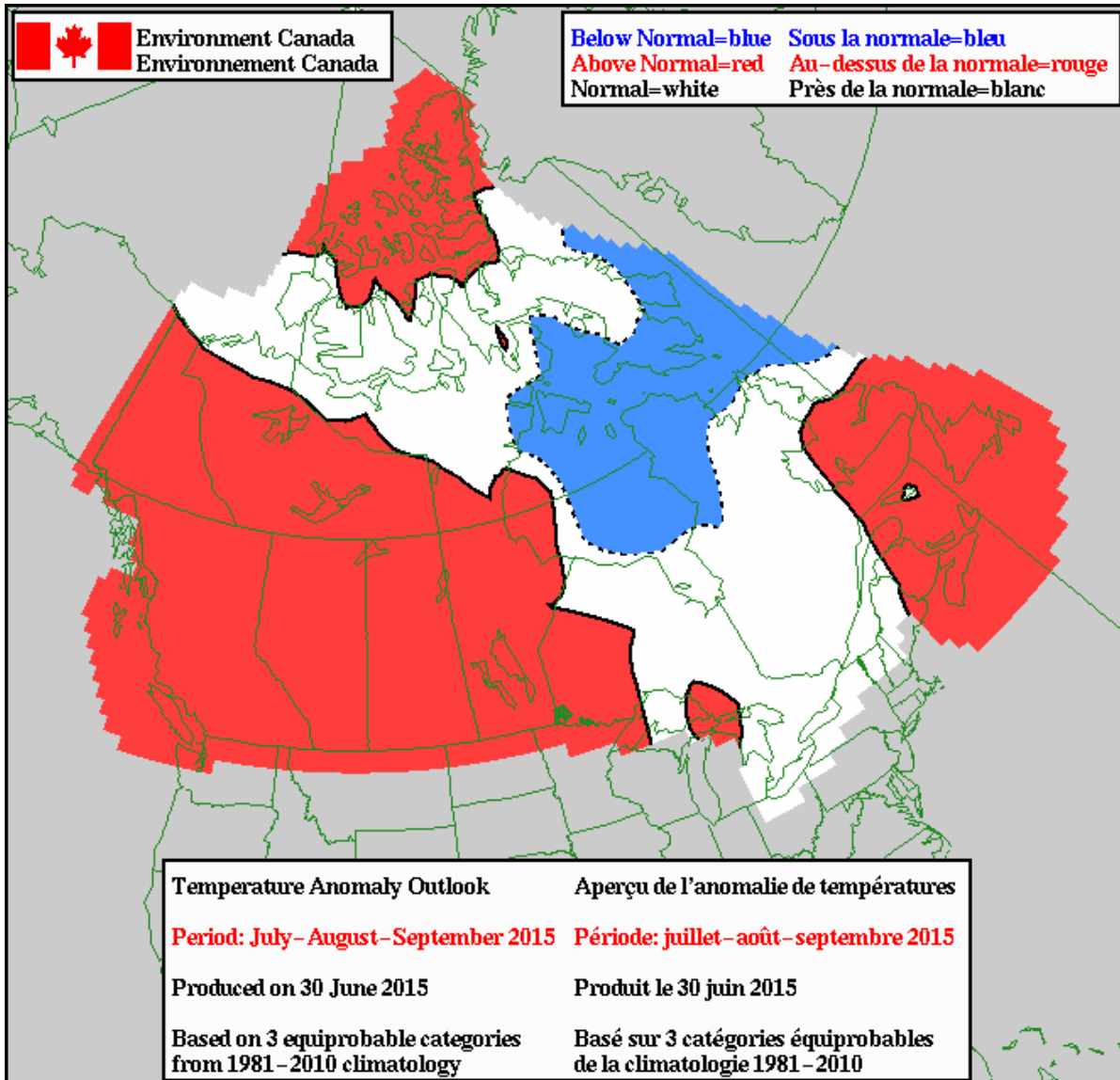


Figure 5: Environment Canada Seasonal (3 month) Temperature Outlook

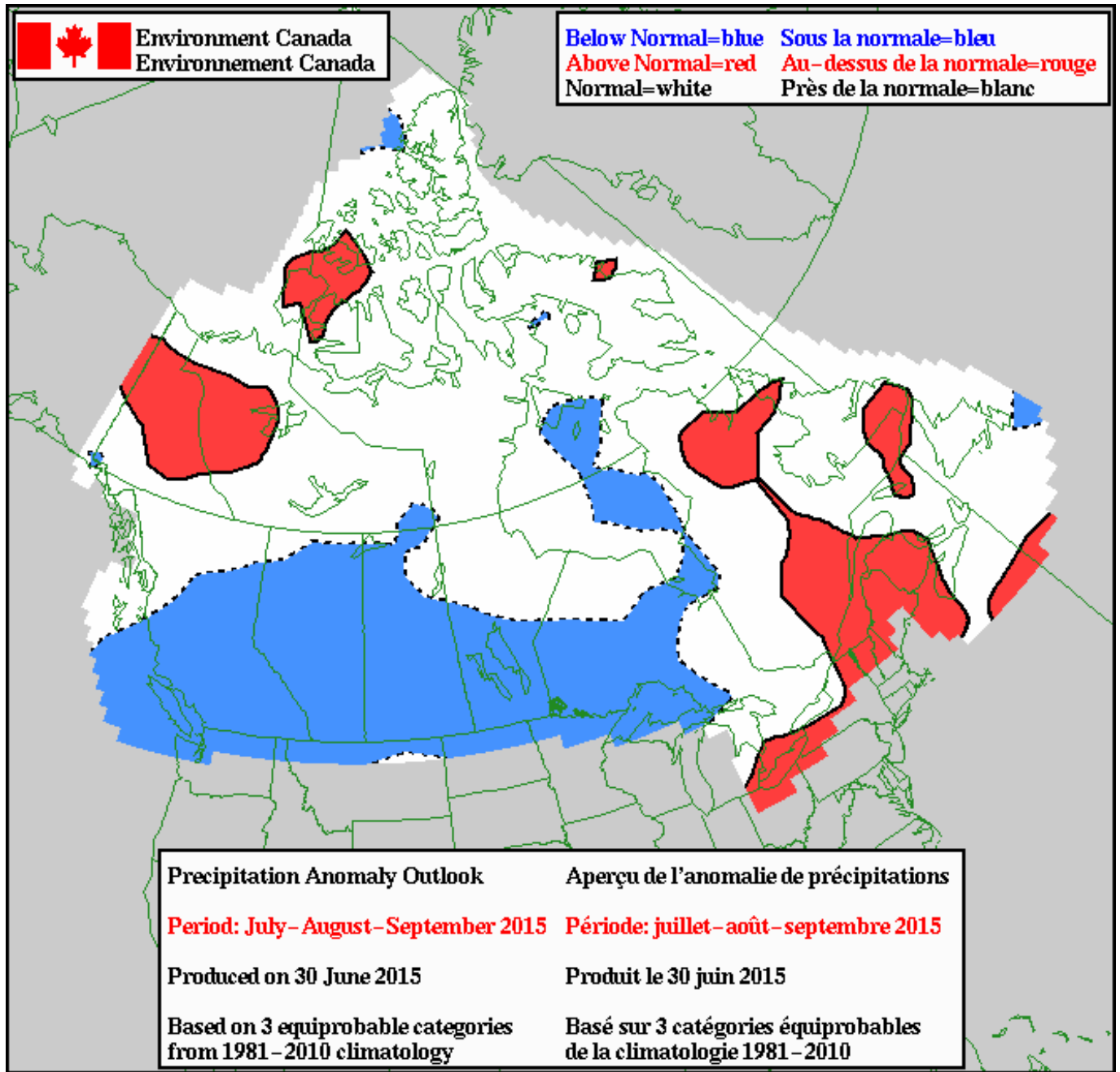


Figure 6: Environment Canada Seasonal (3 month) Precipitation Outlook

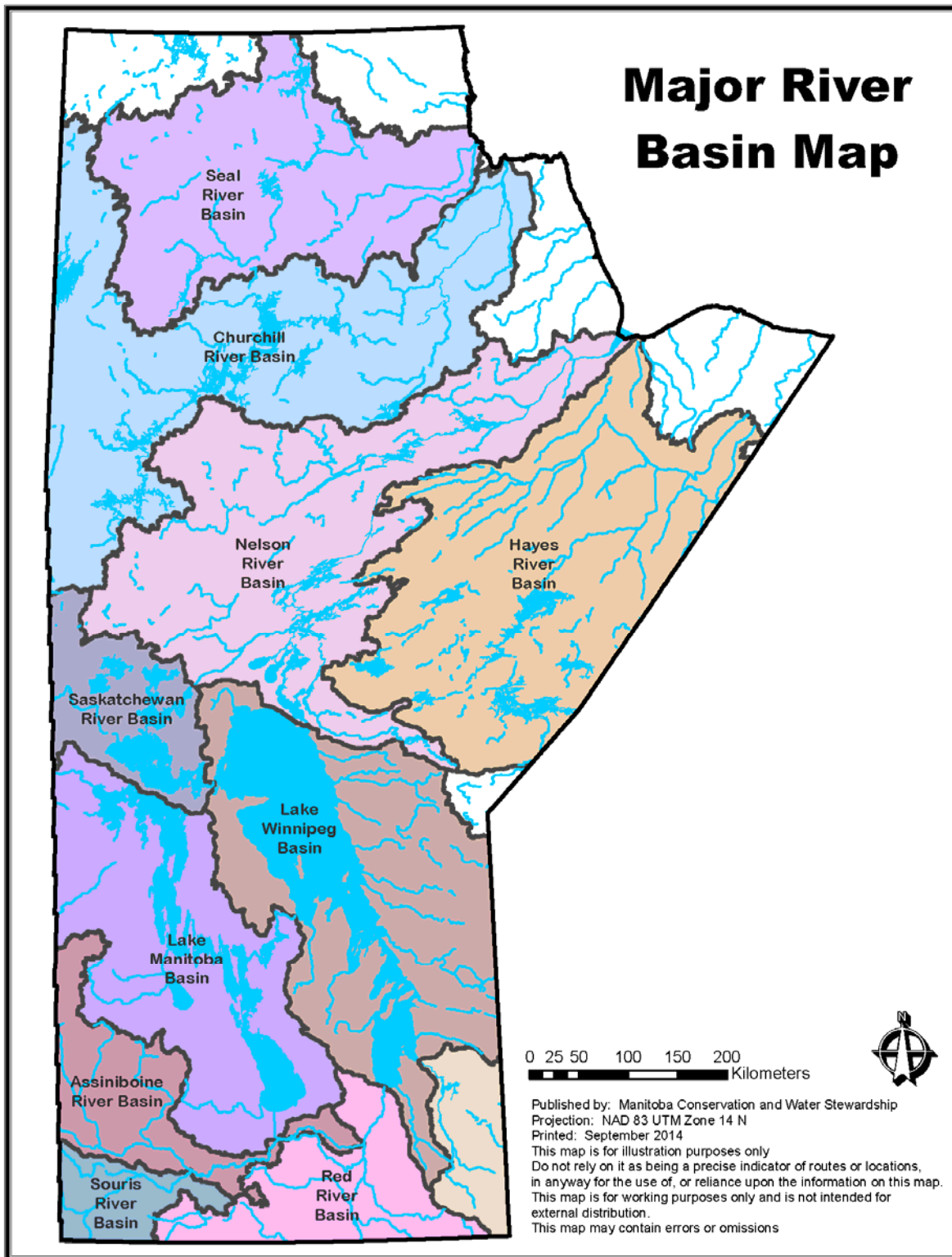


Figure 7: Major River Basins