Water Availability and Drought Conditions Report

April 2015

Executive Summary

- The Water Availability and Drought Conditions Report provides an update on drought conditions for Manitoba for April 2015.
- Most of Manitoba has experienced normal to moderately dry conditions over the last twelve months. Parts of southern Manitoba have experienced moderately to severely dry conditions over the last three months and extremely dry conditions in April.
- April stream flow was normal or above normal for most major rivers across the province. The Churchill River (below Fidler Lake) is experiencing severely low flows for the month of April.
- Manitoba Agriculture, Food and Rural Development reported that dugout conditions are generally adequate or good across Agri-Manitoba. Precipitation will be needed to maintain levels in the central region.
- Water supply reservoirs are close to or at full supply level. There are currently no concerns about reservoir water supplies at this time.
- Environment Canada's seasonal temperature forecast for May, June and July is projected to be above normal across Manitoba. The seasonal precipitation forecast for May, June and July is projected to be normal across most of Manitoba except for a small area in the southwest corner of the province along the Manitoba-Saskatchewan border. Normal precipitation would be beneficial in southern Manitoba to prevent agricultural drought impacts and reduce the risk of wildfires. The short term weather forecast anticipates 20 to 40 mm or rain over southern Manitoba in the coming days.
- For more information on drought in Manitoba please visit Conservation and Water Stewardship's website: http://www.gov.mb.ca/waterstewardship/water_info/hydrology/drought.html

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 long term (twelve months), conditions were normal throughout the province with the exception of moderately dry conditions in an isolated area near Norway House.

Over the medium term (three months), moderately to severely dry conditions existed for an area from Churchill to Gillam. The area east of Swan River, surrounding Lake Manitoba, and south around Carman and Morden also experienced moderately to severely dry conditions. Normal conditions prevailed in other areas of the province.

Over the short term (one month), much of southern Manitoba experienced severely to extremely dry conditions with the exceptions of the areas surrounding and between Winnipeg and Falcon Lake which had normal conditions. Central and northern Manitoba experienced normal conditions with the exception of moderately to severely dry conditions in the Churchill area.

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 March. The Churchill River (below Fidler Lake) is experiencing extremely dry conditions.

Table 1: Drought Indicators by Major River Basin

Basin (in Manitoba)	Drought Indicators			
	Precipitation Indicators			Monthly Flow Indicators April 2015
	Percent of 1 Month Median April 2015	Percent of 3 Month Median February - April 2015	Percent of 12 Month Median May 2014 – April 2015	
Red River	Normal to severely dry	Normal to moderately dry	Normal	Normal
Winnipeg River	Normal to extremely dry conditions	Normal to moderately dry	Normal	Normal
Assiniboine River-Souris River	Extremely dry conditions	Normal to severely dry	Normal	Normal
Lake Manitoba	Severely to extremely dry conditions except for normal in the north	Normal to severely dry	Normal	Normal
Lake Winnipeg	Severely to extremely dry conditions except for normal in the north	Normal to severely dry	Normal	Normal
Saskatchewan River	Normal	Normal	Normal	Normal
Nelson River	Normal	Normal to moderately dry	Normal except moderately dry conditions around Norway House	Normal
Hayes River	Normal	Normal to moderately dry	Normal	Normal
Churchill River	Normal except for moderately to severely dry conditions surrounding Churchill	Normal except for moderately to severely dry around Churchill	Normal	Normal except severely dry for the Churchill River below Fidler Lake
Seal River	Normal	Normal to moderately dry	Normal	Data Not Available

Water Availability

Reservoir Conditions

Water supply reservoirs in southern and western Manitoba 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 the weekly Crop Report. General dugout conditions from Crop Report: Issue 1 (March 4, 2015) are summarized in Table 2.

Table 2: On Farm Water Supply (Dugout) Conditions

Region	General Dugout Conditions
Eastern	Adequate
Interlake	Good
Southwest	80 % to 100 % full
Central	Adequate; but some pumping to fill dugouts. Precipitation is needed to maintain levels.
Northwest	100 % full

Many irrigators have completed filling their off channel reservoirs. However, in the Red River Basin, the spring freshet was not adequate to fill all reservoirs. Enough precipitation to regenerate stream flow would be required 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 reports warm temperatures, high winds and little rainfall have resulted in the cancelation of all burning permits in the central and eastern regions of Manitoba. New permits will not be issued for these areas until the fire danger improves. This includes the areas of Gypsumville and Berens River north, south to the U.S.A. border and east to the Ontario border. Due to these high fire danger levels, backcountry travel restrictions are in place for southeast Manitoba and Spruce Woods areas (restrictions were temporarily lifted April 25 to May 1). Several municipalities have imposed

burning bans. As of May 1, 49 fires have been reported, 11 of which are still active in the central and eastern 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

Warm temperatures, high winds and little rainfall resulted in high wildfire risk for the month of April. Fires were reported and some are still active. Burning bans and travel backcountry travel restrictions have been exercised.

Drought impacts have been observed in the U.S.A. portion of the Red River Basin. In mid-April smoke from multiple grass fires in North Dakota caused reduced visibility and led to the closure of I29 from Grand Forks to the Canadian border. Governor Jack Dalrymple declared a fire emergency on April 1st and a statewide burn ban is in effect. The state of emergency is to remain until May 8th.

The Wildlife and Fisheries Branch reported that for the most part low spring flows did not cause any observable negative impacts on fish spawning. However, low flow at San Creek (near Lundar) had a noticeable effect on walleye spawning conditions.

Future Potential Impacts

The short term weather forecast anticipates that much of southern Manitoba will receive rain showers that could bring accumulations of 20 to 40 mm by May 9th. Environment Canada's seasonal forecast for the next three months (May-June-July 2015) projects temperatures to be above normal across Manitoba (Figure 5). Precipitation is projected to be normal across most of Manitoba except for a portion that is projected to be above normal in the south-west corner of the province (Figure 6). Normal precipitation over the next month would be beneficial in southern Manitoba to prevent agricultural drought impacts and reduce the risk of wildfires.

The warm temperatures and dry conditions in March and April have allowed an early start to the growing season and seeding is underway in many parts of Manitoba. However, Manitoba Agriculture, Food and Rural Development's Crop report (Issue 1, Mar 4, 2015) stated that for the majority of areas in Manitoba, rainfall is needed to assist in crop emergence and growth. Rainfall would also help to stimulate pasture growth.

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	1,531.69	March 5, 2015	-0.31	520	498	96%
Goudney (Pilot Mound)	Pilot Mound	1,482.00	1,481.92	April 30, 2015	-0.08	450	445	99%
Lake Irwin	n/a	1,178.00	1,178.00	January 15, 2015	0.00	3,800	3,800	100%
Jackson Lake	n/a	1,174.00	1,173.91	January 15, 2015	-0.09	2,870	2,967	103%
Kenworth Dam	n/a	1,448.00	1,447.89	March 5, 2015	-0.11	600	592	99%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,401.06	April 30, 2015	-1.44	300,000	282,302	94%
Killarney Lake	n/a	1,615.00	1,615.04	March 16, 2015	0.04	7,360	7,378	100%
Manitou (Mary Jane)	Manitou	1,537.00	1,536.74	April 30, 2015	-0.26	1,150	1,126	98%
Minnewasta (Morden)	Morden	1,082.00	1,081.31	April 30, 2015	-0.69	3,150	3,035	96%
Rapid City	n/a	1,573.50	1,573.28	March 5, 2015	-0.22	200	184	92%
Lake Wahtopanah (Rivers)	Rivers	1,536.00	1,536.75	April 30, 2015	0.75	24,500	26,176	107%
Stephenfield	Carman	972.00	972.26	April 30, 2015	0.26	3,810	3,933	103%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,771.81	April 30, 2015	-0.19	1,400	1,391	99%
Vermilion	Dauphin	1,274.00	1,274.39	April 26, 2015	0.39	2,600	2,750	106%
* 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

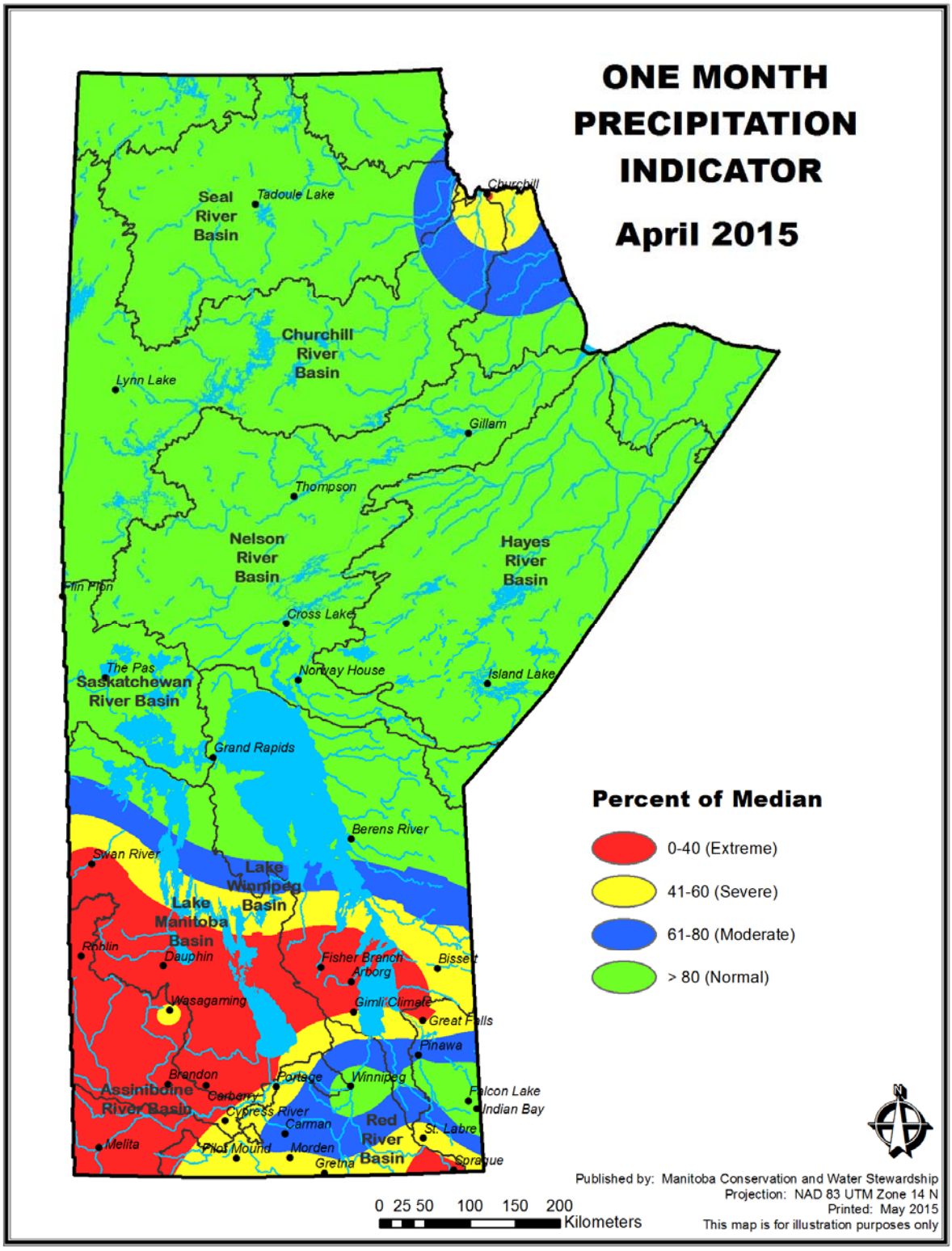

Figure 1: Precipitation Indicator (Percent of One Month Median Precipitation)

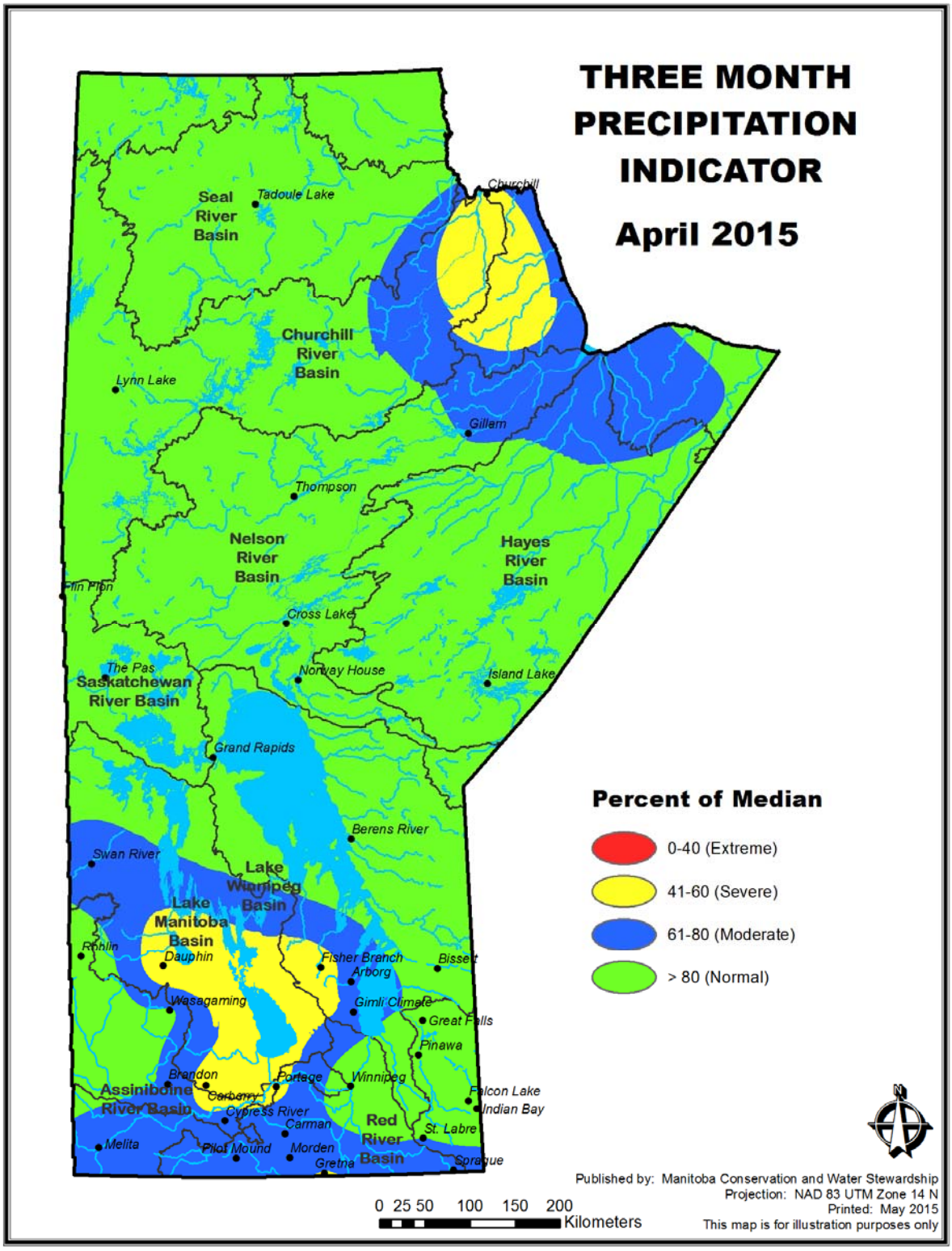

Figure 2: Precipitation Indicator (Percent of Three Month Median Precipitation)

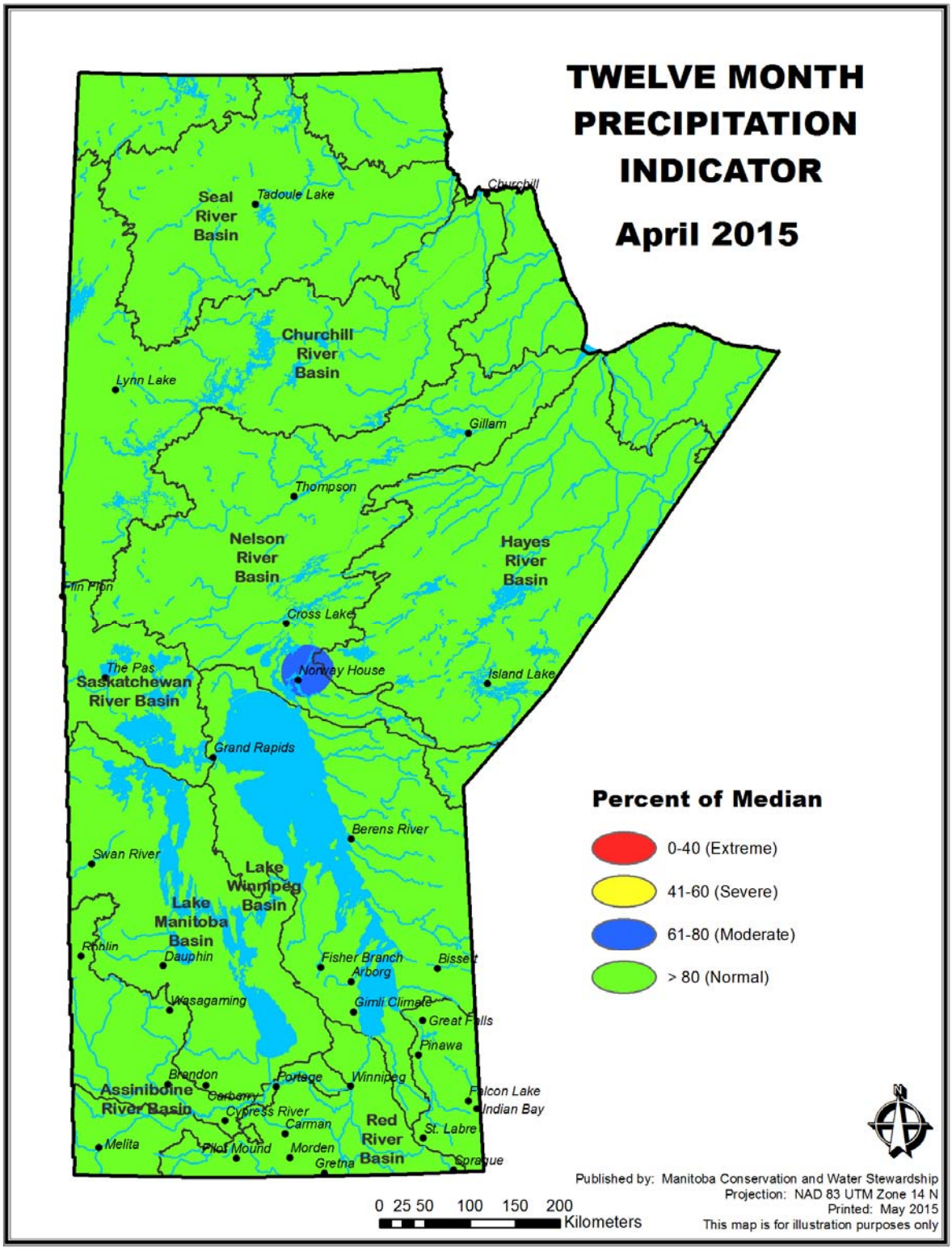

Figure 3: Precipitation Indicator (Percent of Twelve Month Median Precipitation)

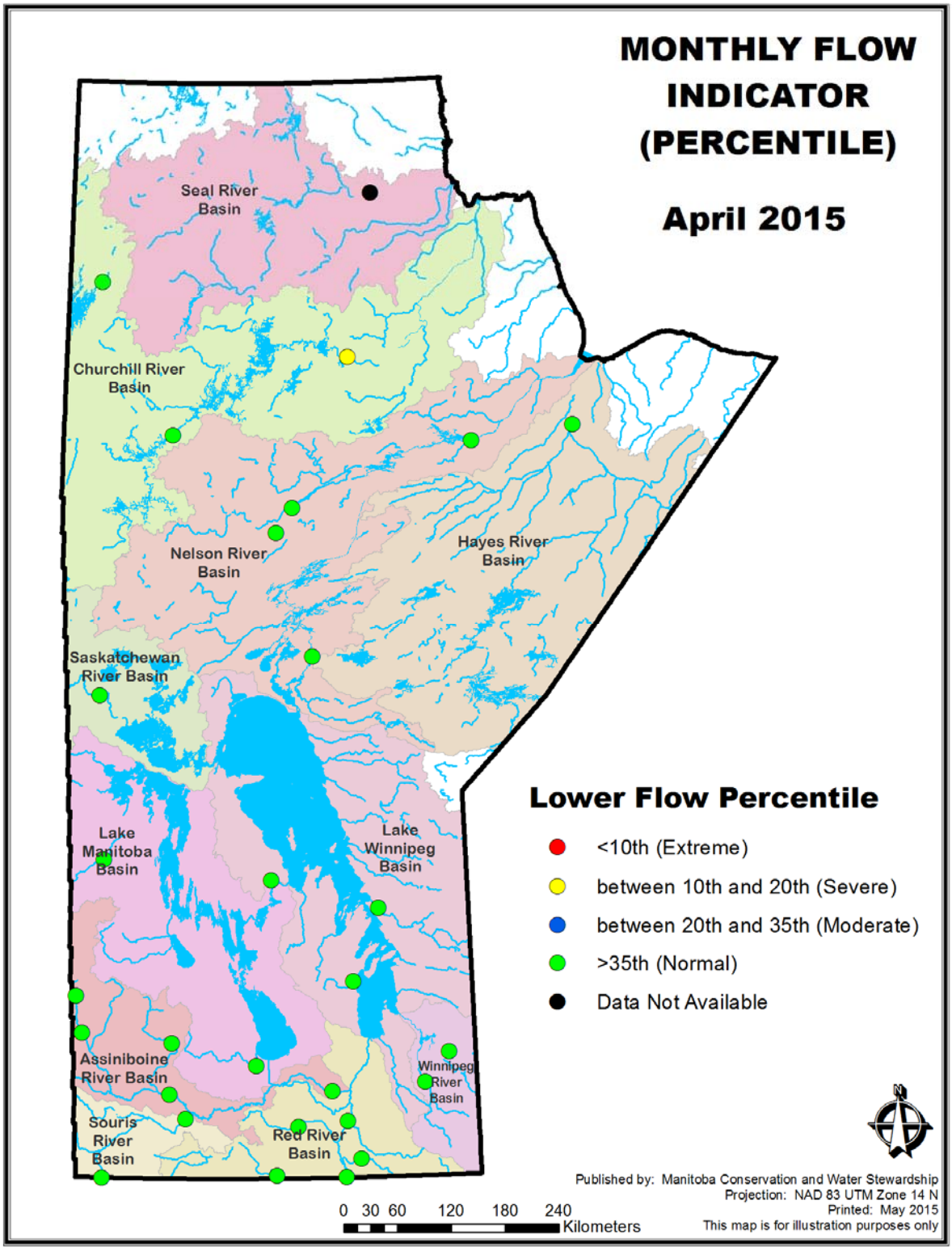

Figure 4: Monthly Flow Indicator (lower 10th, 20th and 35th monthly flow percentile)

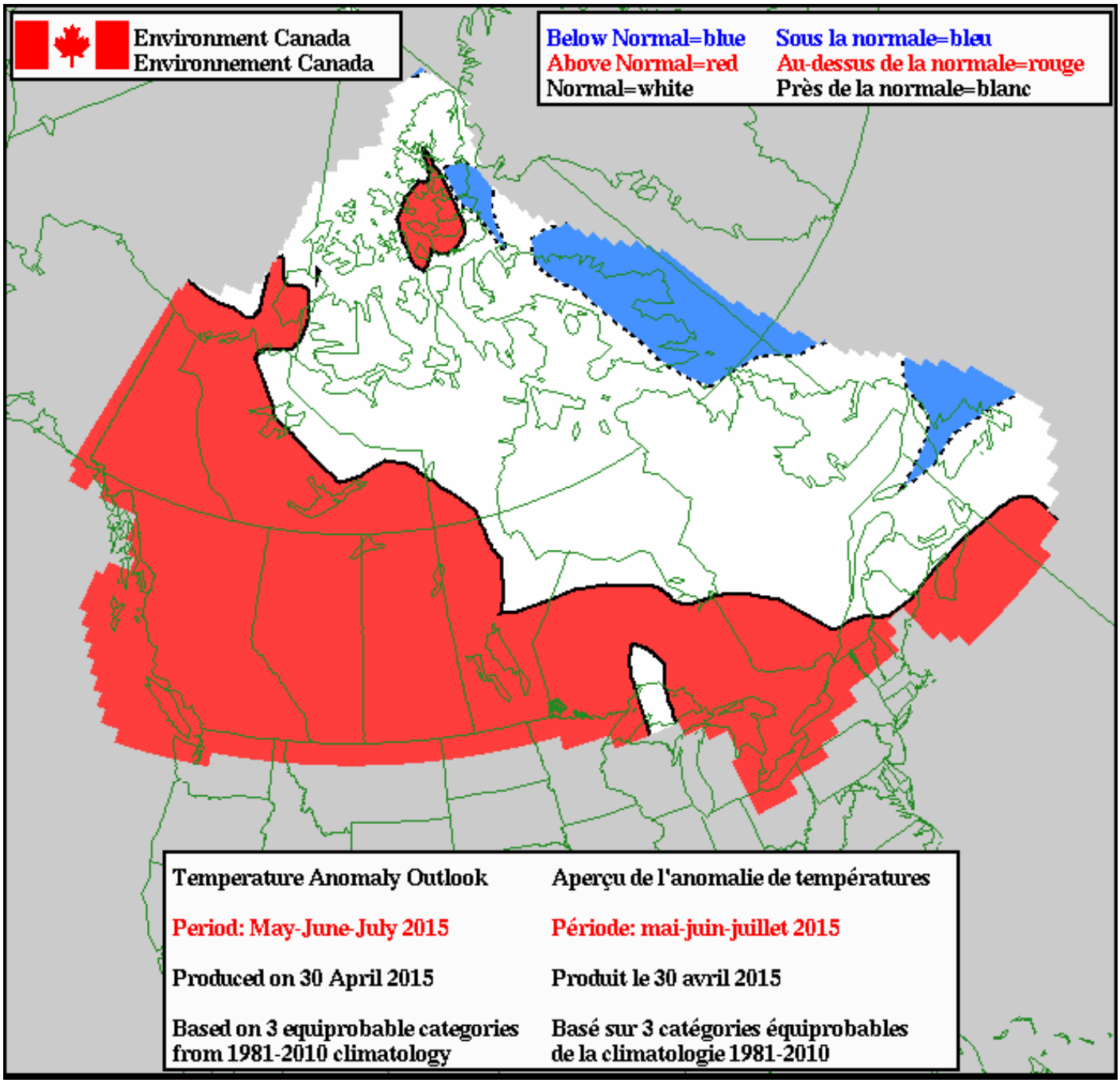

Figure 5: Environment Canada Seasonal (3 month) Temperature Outlook

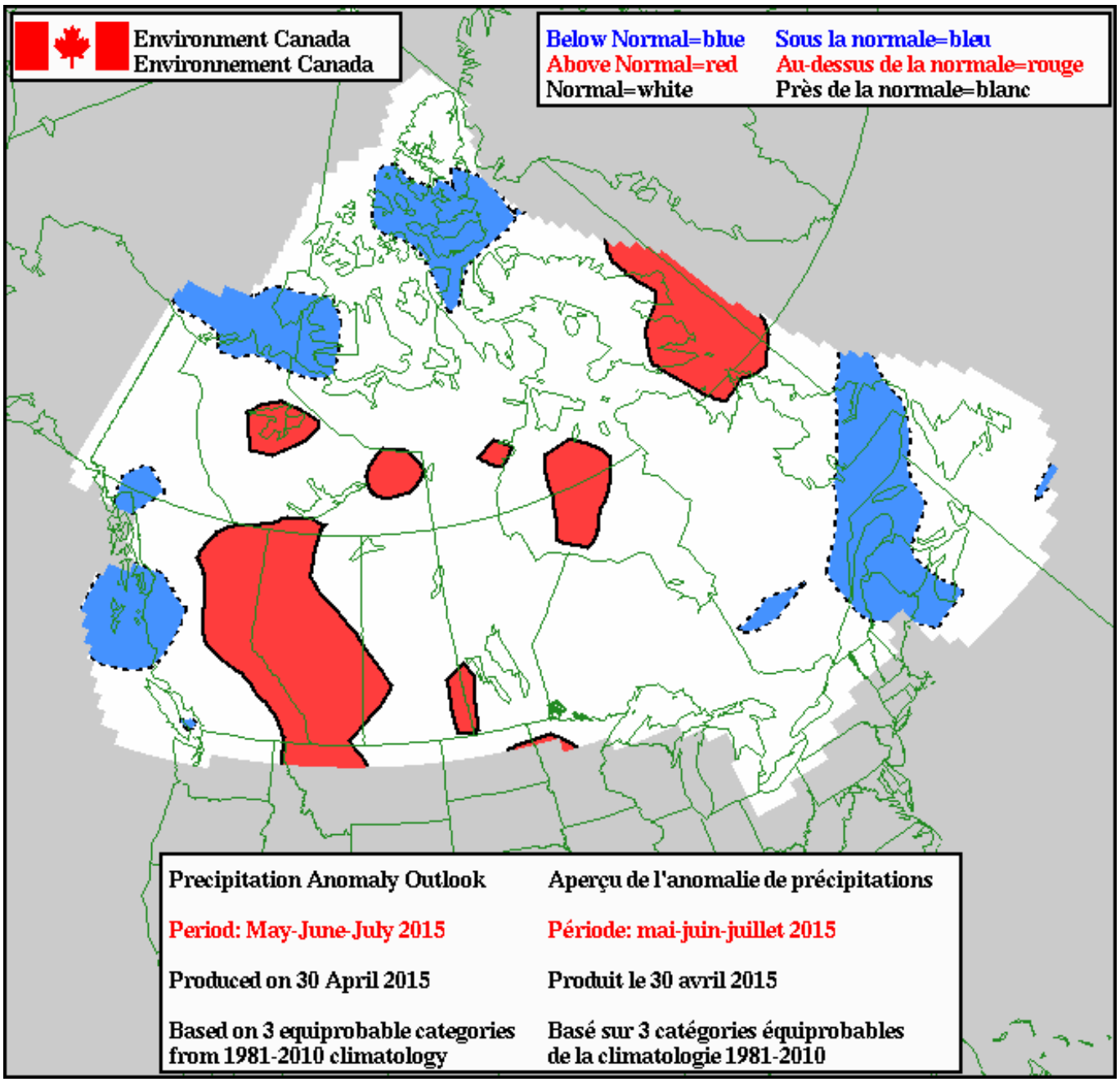

Figure 6: Environment Canada Seasonal (3 month) Precipitation Outlook

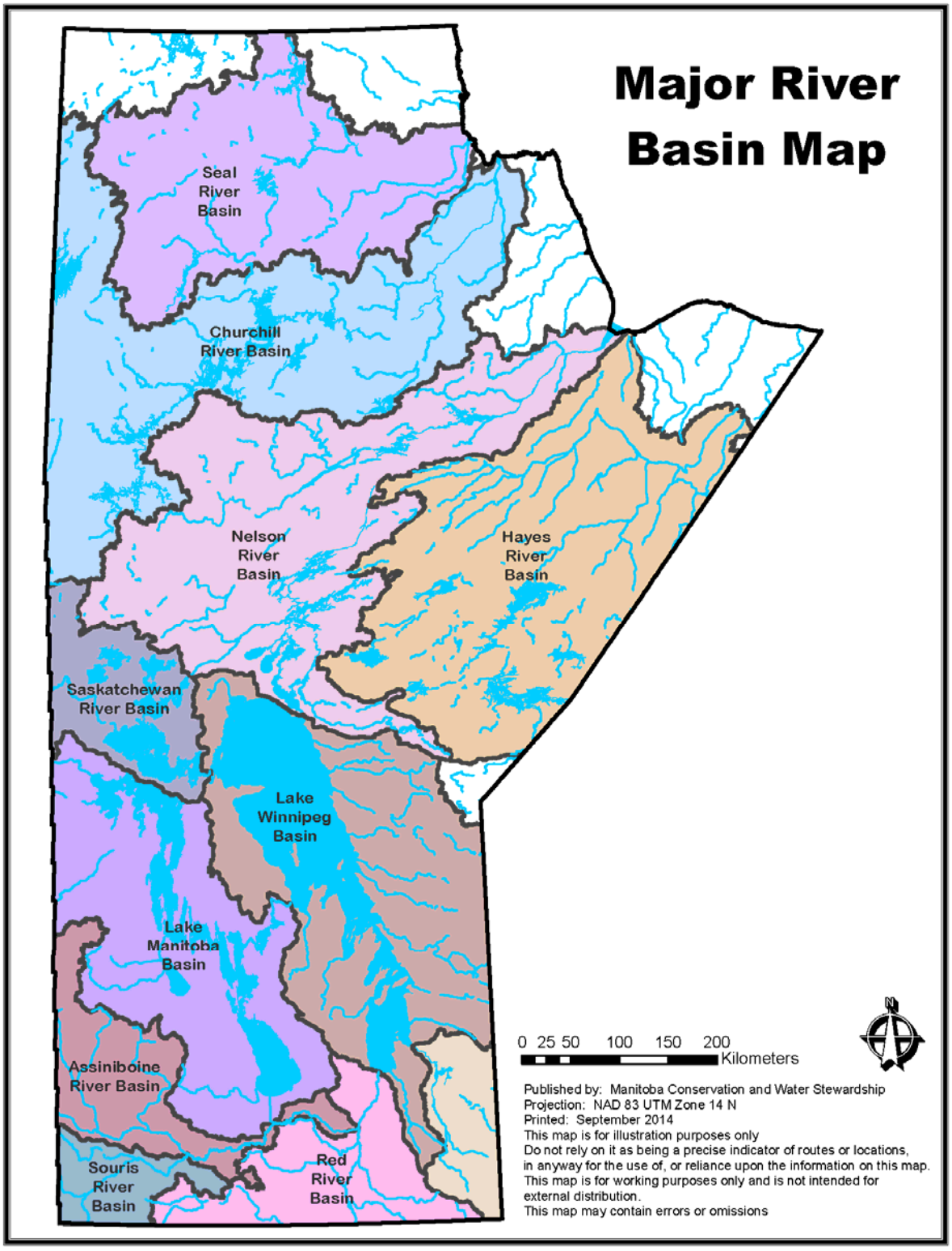

Figure 7: Major River Basins