

WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT

August 8, 2014

Synopsis/Overview

The Water Availability and Drought Conditions Report provides an update on meteorological and hydrologic drought conditions for Manitoba as of the end of July 2014.

Short term indicators show agri-Manitoba experienced dry conditions in July. Medium term (3 month) precipitation indicators show moderately dry conditions prevailed for areas surrounding Flin Flon, parts of the Nelson River basin including Norway House and Gillam, and the Hay River basin. Long term indicators (12 month) show normal conditions prevailed throughout most of the province.

Monthly stream flow indicators for July indicate flows are normal or above normal for rivers across the province.

Manitoba Agriculture, Food and Rural Development reported that dugouts across agri-Manitoba are at or near capacity.

Water supply reservoirs in southern and western Manitoba are at or above full supply levels.

Outlook

Environment Canada's seasonal forecast for the next three months (August-September-October, 2014) project above normal temperatures and normal precipitation for the entire province (Attachment 4).

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 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). 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.

The stream flow indicator is used to determine the severity of hydrological dryness in a watershed.

Precipitation

Precipitation indicators are summarized by basin in Table 1 and on maps in Attachment 1.

Over the long term (twelve months), conditions were normal throughout the province with the exception of the areas near Norway House, Churchill, and Flin Flon where moderately dry conditions prevailed.

Over the medium term (three months), moderately to severely dry conditions existed for areas surrounding Flin Flon and Norway House. Moderately dry conditions prevailed for the local area surrounding Carman, most of the Hayes River basin, and the lower Nelson basin including Gillam. Normal conditions prevailed throughout the rest of the province.

Over the short term (one month), moderately to extremely dry meteorological conditions prevailed throughout agri-Manitoba. Moderately to severely dry conditions prevailed in the southern part of the Nelson River basin, the area around Flin Flon, and the northern part of the Hayes River basin. Normal conditions prevailed in northern Manitoba.

Stream Flows

Stream flow indicators are summarized by basin in Table 1 and on a map in Attachment 2.

The monthly stream flow indicators show that flows are normal or above normal for major rivers across the province.

Water Availability

Reservoir Conditions

Water supply reservoirs in southern and western Manitoba are at full or above full supply level (Attachment 3).

On Farm Water Supply

Manitoba Agriculture, Food and Rural Initiatives reports that water levels in dugouts were full, or close to full, in most regions of agri-Manitoba.

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 Fire Program reports that some large fires are active in northern Manitoba. More detailed information on fire conditions is available on the Manitoba Conservation and Water Stewardship website under the Fire Program (website <http://www.gov.mb.ca/conservation/fire/>).

Potential Impacts

With Environment Canada's outlook for the next three months for above normal temperature and normal precipitation southern Manitoba may continue to dry out after the heavy rains early in summer.

Water supply reservoirs are at full or above full supply levels and should have sufficient water supplies for the balance of the year.

Table 1: Drought Indicators by Major River Basin (Attachments: 1, 2 and 5)

Basin (in Manitoba)	Drought Indicators			
	Precipitation Indicator			Monthly Flow Indicator July 2014
	Percent of 1 month Median July 2014	Percent of 3 month Median May - July 2014	Percent of 12 month Median August 2013- July 2014	
Red River	Moderately to severely dry conditions	Normal conditions except for moderately dry near Carman	Normal conditions	Normal conditions
Winnipeg River	Moderately to severely dry conditions	Normal conditions	Normal conditions	Normal conditions
Assiniboine River-Souris River	Moderately to extremely dry conditions	Normal conditions	Normal conditions	Normal conditions
Lake Manitoba	Moderately to severely dry conditions	Normal conditions	Normal conditions	Normal conditions
Lake Winnipeg	Moderately to severely dry conditions except northeastern part of the basin	Normal conditions.	Normal conditions	Normal conditions
Saskatchewan River	Normal conditions	Normal conditions	Normal conditions	Normal conditions
Nelson River	Moderately to severely dry conditions except normal conditions surrounding Thompson	Moderately to severely dry for the southeastern part of the basin and near Gillam	Normal conditions except moderately dry for areas surrounding Norway House.	Normal conditions
Hayes River	Moderately dry conditions for northern part of the basin	Moderately dry conditions for most parts of the basin except the Island Lake area	Normal conditions except moderately dry in western part of the basin	Normal conditions
Churchill River	Normal conditions except for the southwestern portion with moderately to severely dry conditions	Normal conditions except for the southwestern portion with moderately to severely dry conditions	Normal conditions except moderately dry for areas around Churchill	Normal conditions
Seal River	Normal conditions	Normal conditions	Normal conditions	Normal conditions

Acknowledgements

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

- Manitoba Infrastructure and Transportation: Flow information:
http://www.gov.mb.ca/mit/floodinfo/floodoutlook/river_conditions.html
- Environment Canada: Flow and Lake information
http://www.wateroffice.ec.gc.ca/index_e.html
- Fire Hazard: <http://www.gov.mb.ca/conservation/fire/>
- Environment Canada 3 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>
- Manitoba Conservation and Water Stewardship Fire Program

For further information, please contact: /Mark Lee, Surface Water Management Section, Manitoba Conservation and Water Stewardship, /204-945-5606.

Definition of drought

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.

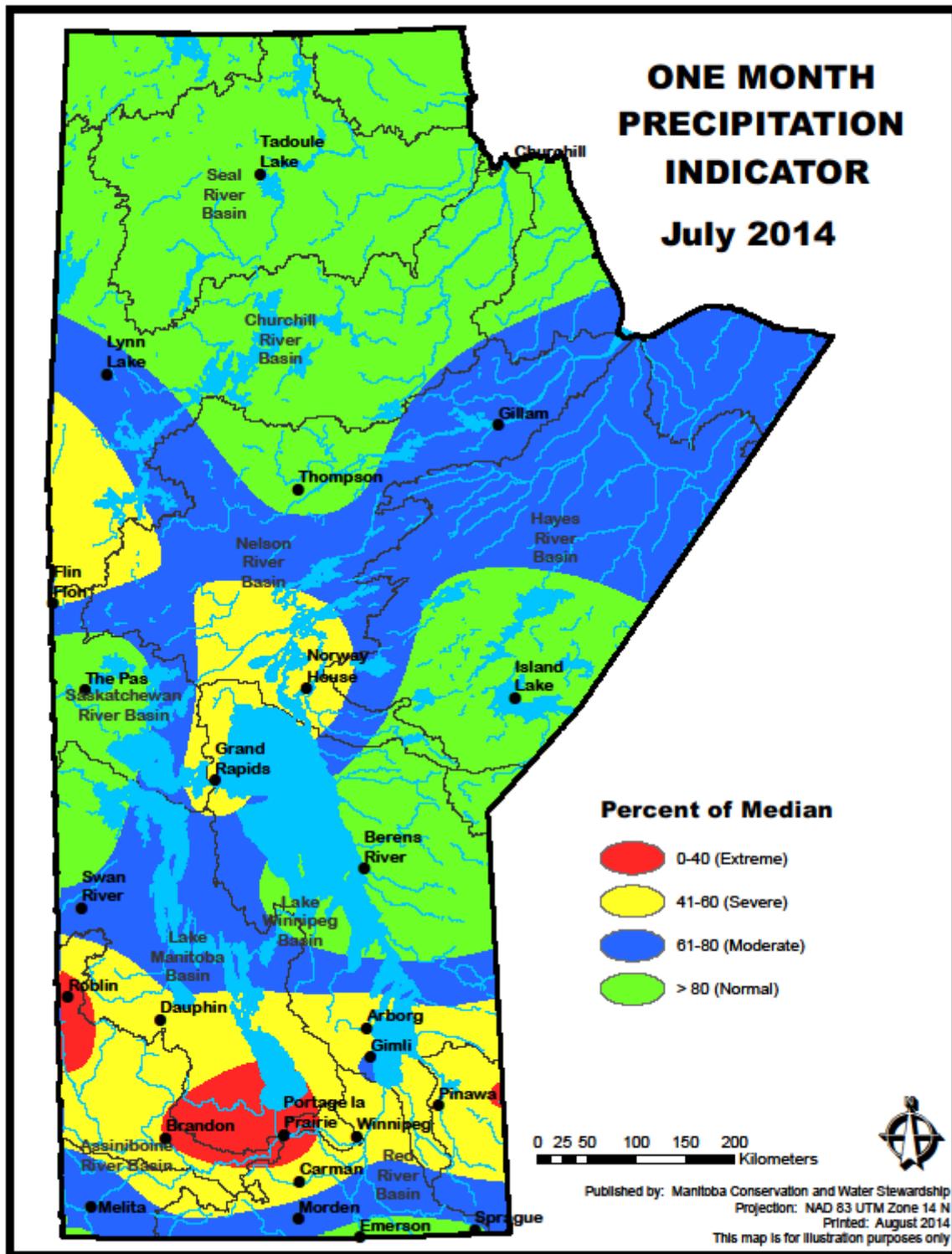
Hydrological Drought is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop. 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.

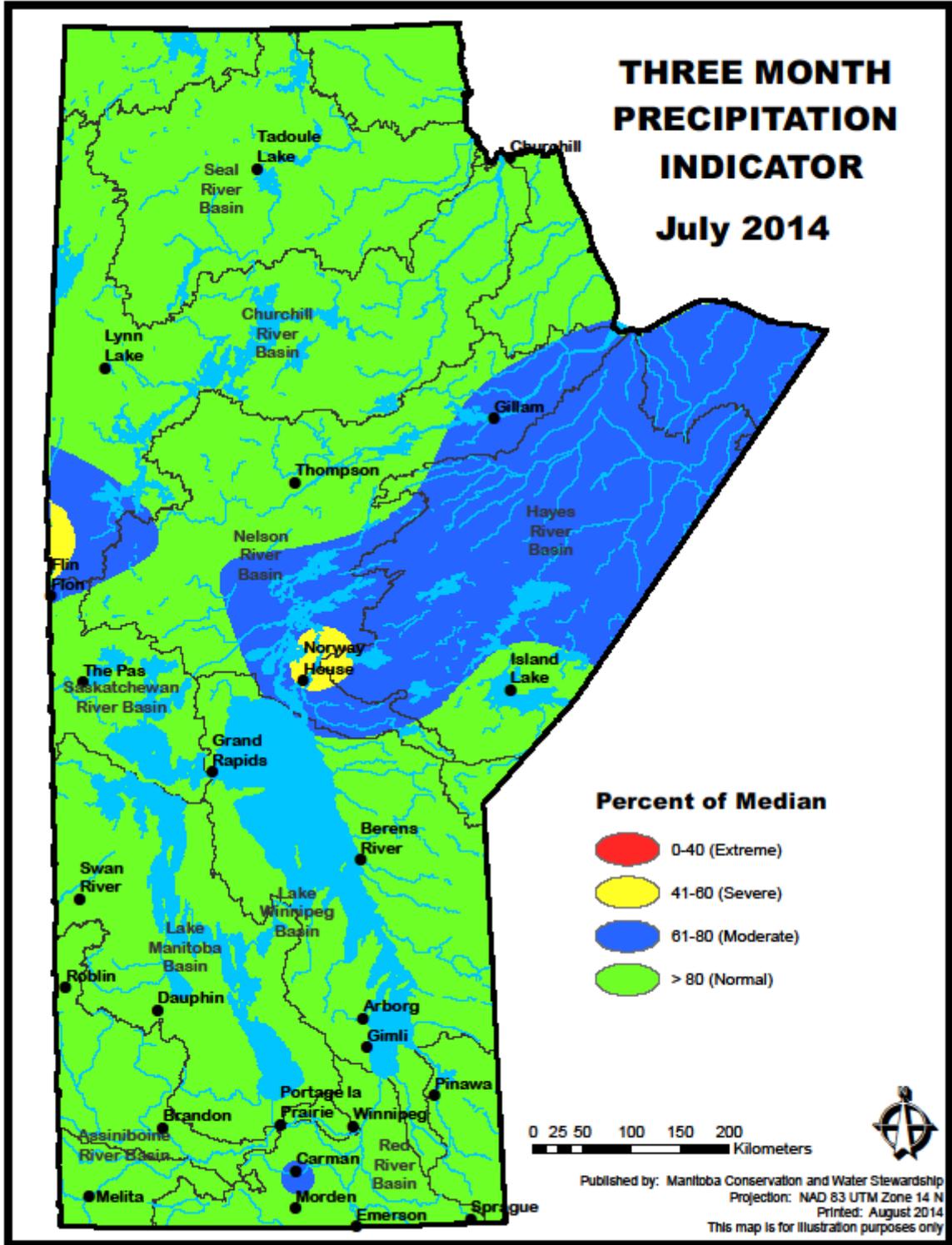
Socioeconomic Drought occurs when the supply fails to meet the demand for an economic good(s) such as domestic water supplies, hay/forage, food grains, fish, and hydroelectric power, due to weather related water supply shortages from one or both of natural or managed water systems. At any time during meteorological, hydrological, or agricultural droughts, a socioeconomic drought can occur.

Attachments

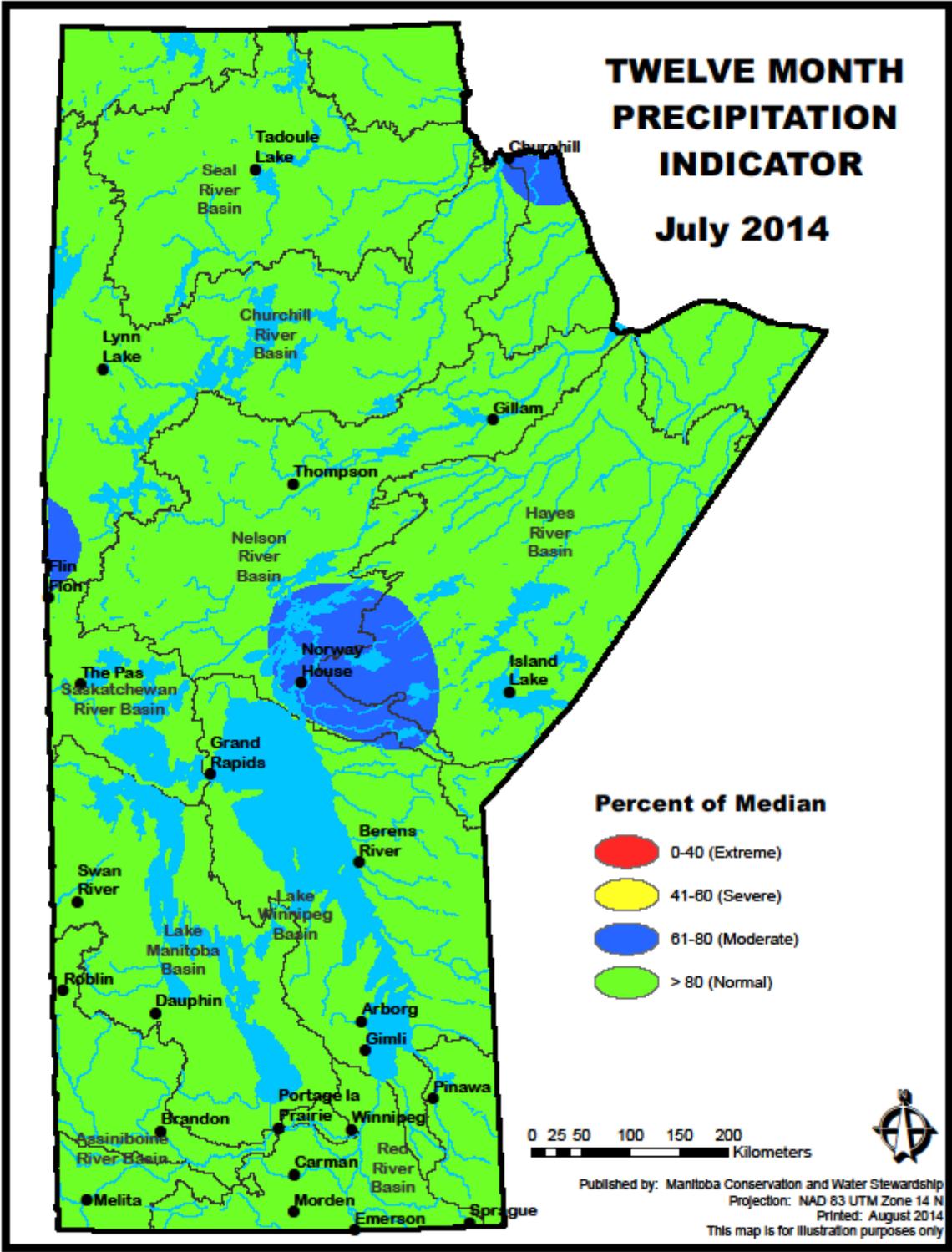
1. Precipitation Indicator (Percent of 1, 3 and 12 month median precipitation)



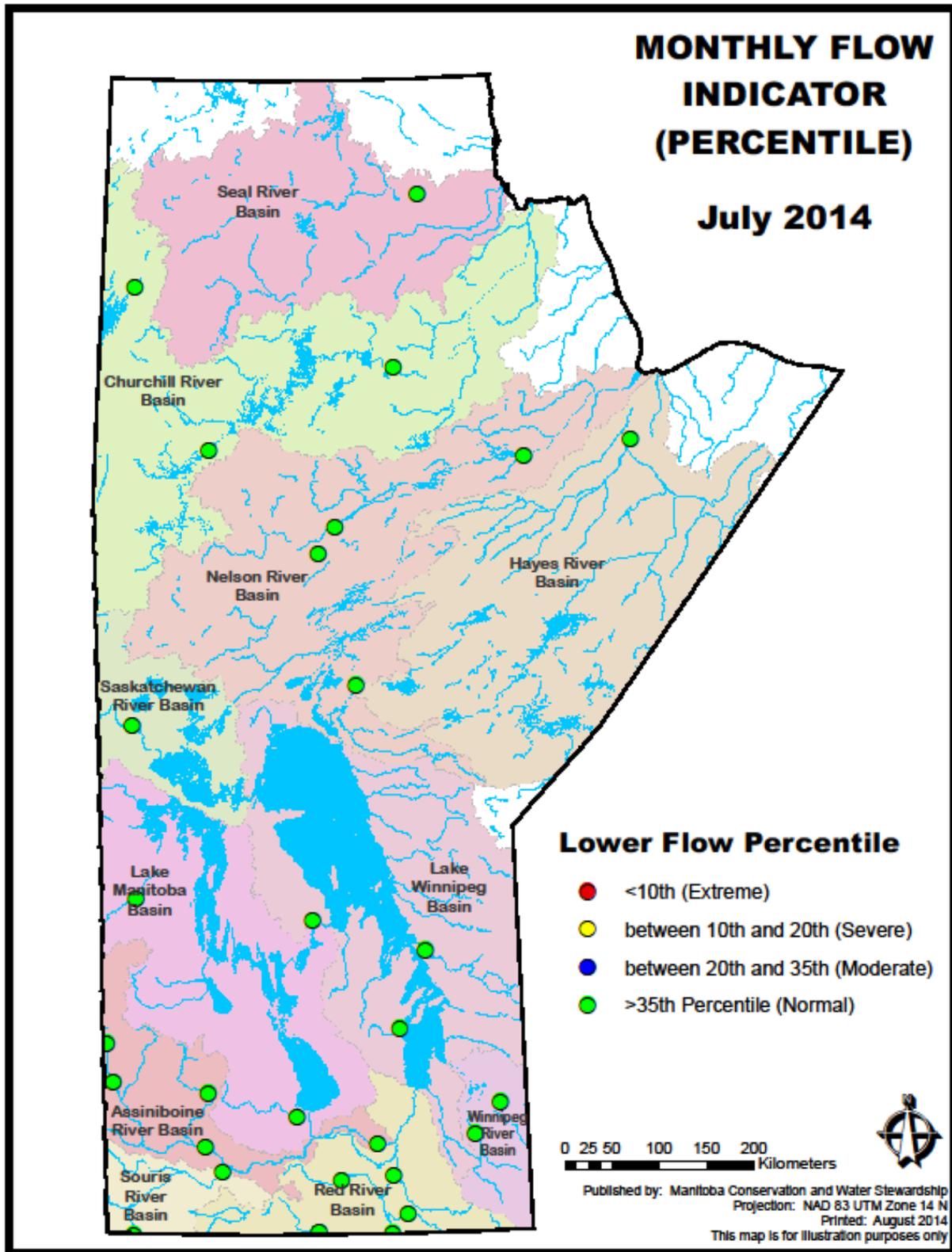
THREE MONTH PRECIPITATION INDICATOR July 2014



TWELVE MONTH PRECIPITATION INDICATOR July 2014



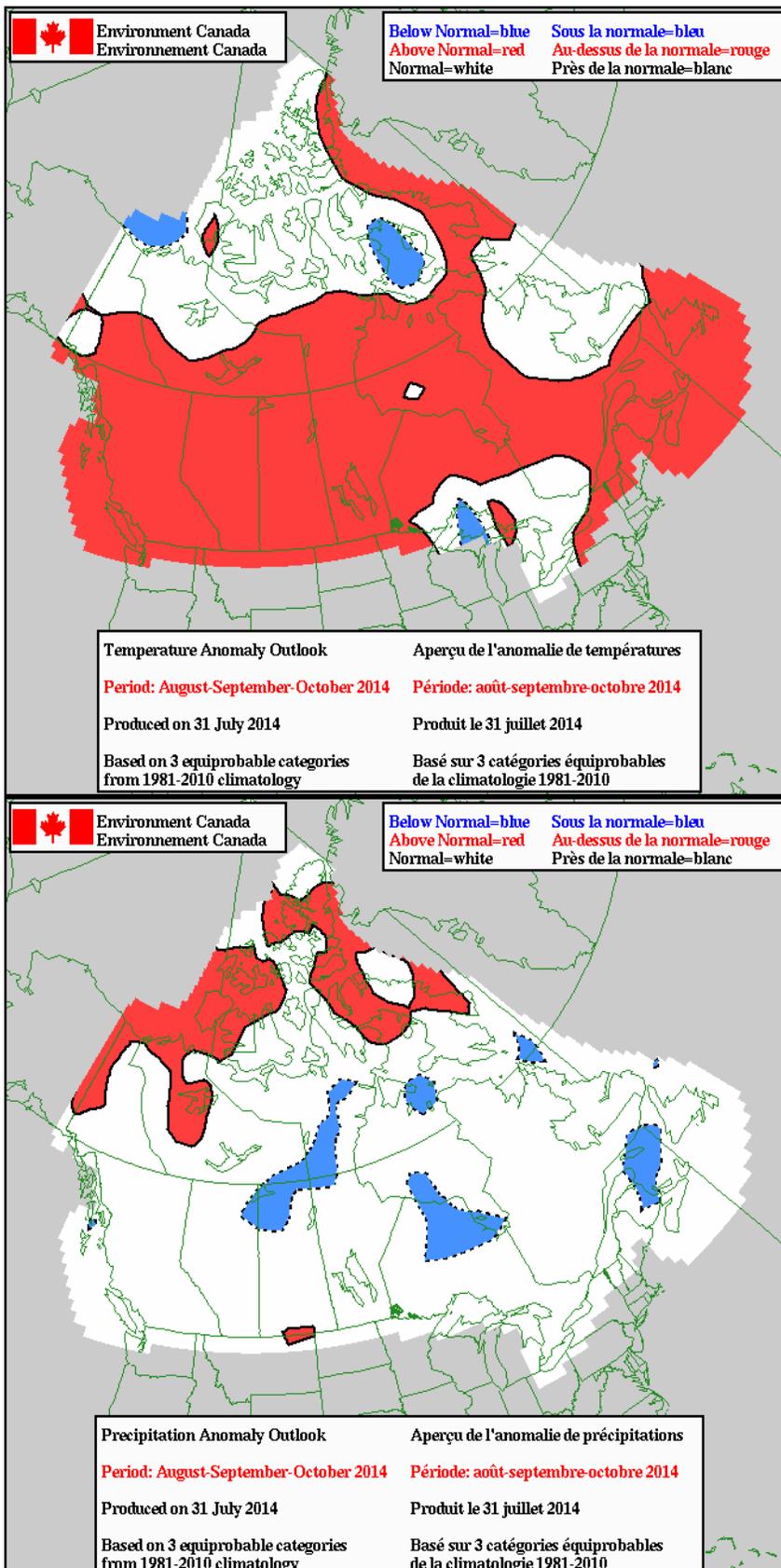
2. Monthly Flow Indicator (lower 10th-20th-35th monthly flow percentile)



3. Water Supply Reservoir Status (Southern and Western)

Water Supply Reservoir Levels and Storages								
August 1, 2014								
Lake or Reservoir	Community	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	1,532.04	March 24, 2014	0.04	520	523	101%
Goudney (Pilot Mound)	Pilot Mound	1,482.00	1,482.31	July 31, 2014	0.31	450	465	103%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,419.13	July 11, 2014	16.63	300,000	579,579	193%
Manitou (Mary Jane)	Manitou	1,537.00	1,536.87	July 31, 2014	-0.13	1,150	1,138	99%
Minnewasta (Morden)	Morden	1,082.00	1,081.33	July 31, 2014	-0.67	3,150	3,038	96%
Rapid City	Rapid City	1,573.50	1,573.73	May 2, 2014	0.23	200	216	108%
Lake Wahtopanah (Rivers)	Rivers	1,536.00	1,538.57	July 16, 2014	2.57	24,500	29,994	122%
Stephenfield	Carman	972.00	972.24	July 31, 2014	0.24	3,810	3,923	103%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,772.21	July 27, 2014	0.21	1,400	1,423	102%
Vermilion	Dauphin	1,274.00	1,274.28	July 27, 2014	0.28	2,600	2,605	100%
* Summer target level and storage.								

4. Environment Canada Seasonal (3 months) Outlook



5. Major River Basin

