

## WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT

September 10, 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 August 2014.

Precipitation indicators show most of Manitoba has experienced normal or above normal precipitation over the last three to twelve months. In the shorter term, the northwest corner of the province experienced moderate to severely dry conditions and an area centered on Norway House experienced extremely dry conditions in August. Other parts of the province including Agri-Manitoba experienced normal conditions in August.

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

Water supply reservoirs in Manitoba are close to or above full supply levels. Manitoba Agriculture, Food and Rural Development reports that dugouts across agri-Manitoba are at or near capacity.

### **Outlook**

Environment Canada's seasonal forecast for the next three months (September-October-November 2014) projects temperatures to be above normal in northern Manitoba and normal in southern Manitoba. Precipitation is projected to be normal 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 and Churchill 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. Normal conditions prevailed throughout the rest of the province.

Over the short term (one month), normal conditions prevailed throughout most of Manitoba. Moderately to severely dry conditions prevailed around Flin Flon and in the northwest corner of the province. Extremely dry conditions prevailed in the Norway House area. Moderately dry conditions existed near the U.S. border around Sprague and Emerson.

### **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 close to 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 fires are active in northeast and eastern 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**

Environment Canada's outlook for the next three months is for normal precipitation for all of Manitoba, normal temperatures for southern Manitoba and above normal temperatures for northern Manitoba. Dry conditions may develop in northwest Manitoba while southern Manitoba rivers and lakes should continue to decline to, or remain at, normal seasonal levels.

Water supply reservoirs are at full or above full supply levels. There are no concerns about reservoir water supplies at this time.

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

| Basin<br>(in Manitoba)         | Drought Indicators   |   |  |  |
|--------------------------------|--|---|--|--|
|                                | Precipitation Indicator  |   |  | Monthly Flow<br>Indicator<br>July 2014 |
|                                | Percent of 1<br>month Median<br>August 2014                                      | Percent of 3<br>month Median<br>June - August<br>2014                         | Percent of 12<br>month Median<br>July 2013- August<br>2014         |  |
| Red River                      | Normal to moderately dry conditions  | Normal  | Normal   | Normal                                 |
| Winnipeg River                 | Normal   | Normal  | Normal   | Normal                                 |
| Assiniboine River-Souris River | Normal   | Normal  | Normal   | Normal                                 |
| Lake Manitoba                  | Normal   | Normal  | Normal   | Normal                                 |
| Lake Winnipeg                  | Normal   | Normal  | Normal   | Normal                                 |
| Saskatchewan River             | Normal   | Normal  | Normal   | Normal                                 |
| Nelson River                   | Normal except for extremely dry conditions surrounding Norway House              | Moderately to severely dry for the area surrounding Norway House              | Normal except moderately dry for areas surrounding Norway House    | Normal                                 |
| Hayes River                    | Normal except for moderate to severe conditions in the southwest corner          | Normal conditions for most parts of the basin except for the southwest corner | Normal except moderately dry in the southwest portion of the basin | Normal                                 |
| Churchill River                | Normal except for the northwest portion with moderate to severely dry conditions | Normal  | Normal except moderately dry for areas around Churchill            | Normal                                 |
| Seal River                     | Moderate to severely dry conditions for the area surrounding Tadoule Lake        | Normal  | Normal   | Normal                                 |

## 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](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](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](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.

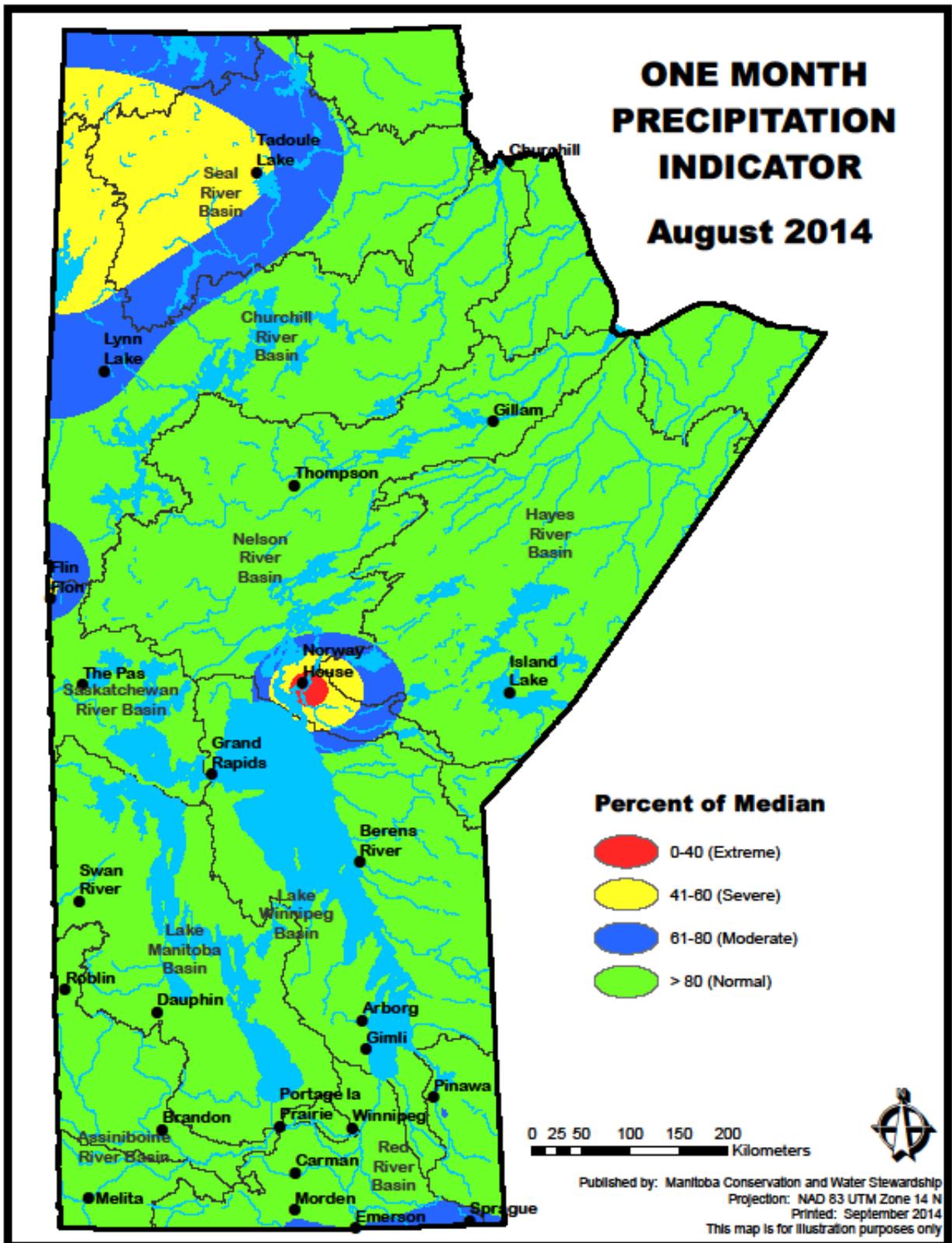
**Hydrological Drought** is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

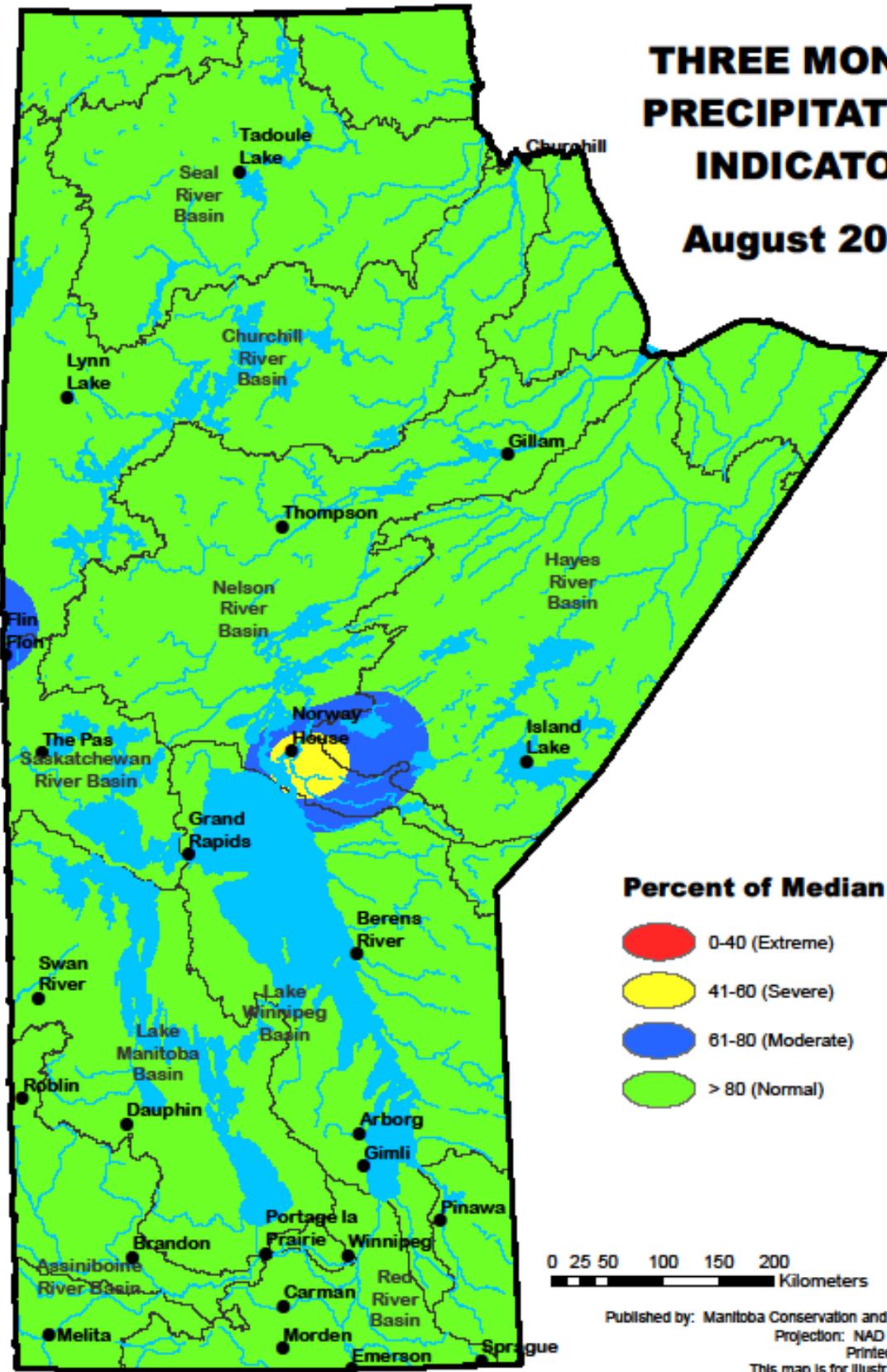
Attachments

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



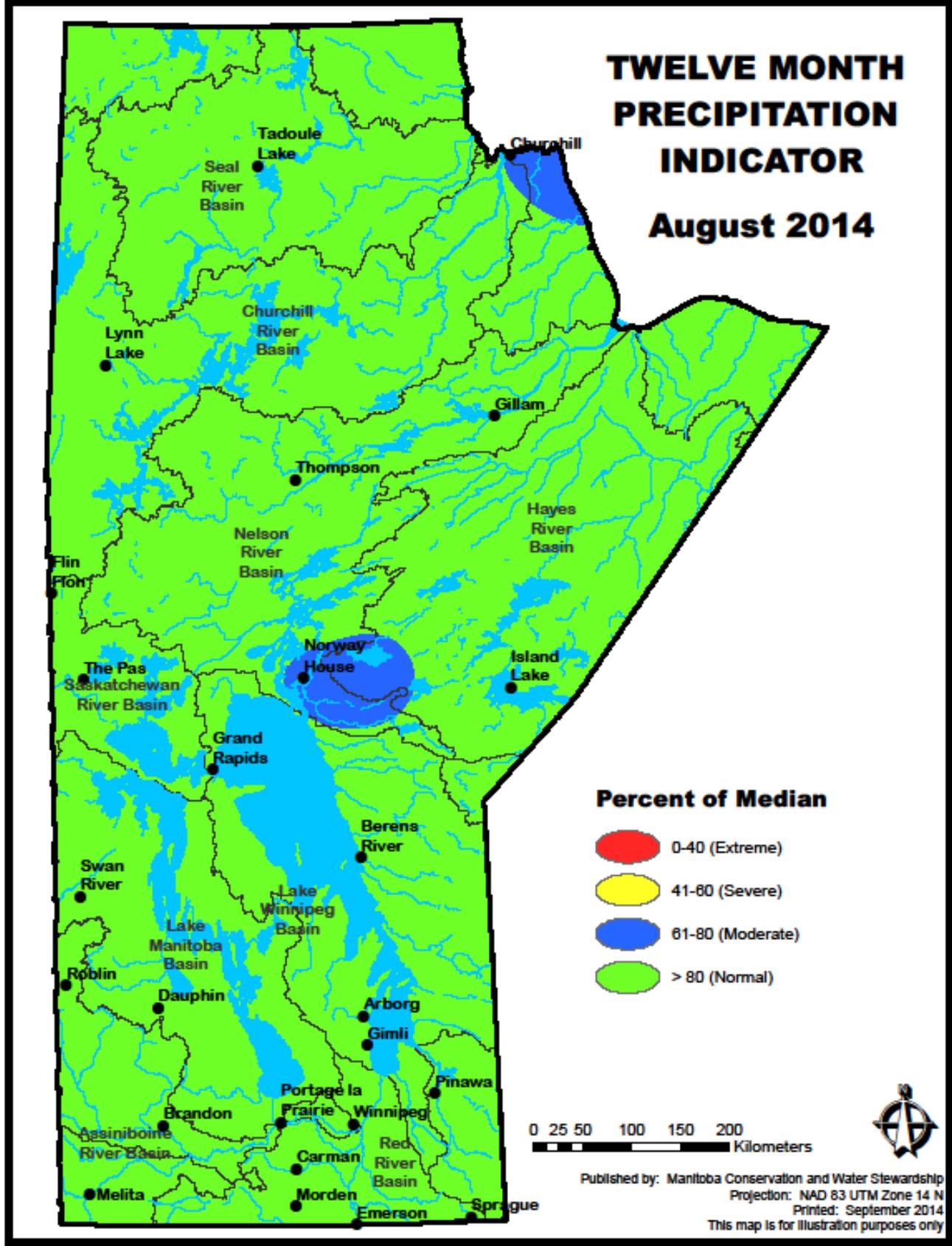
# THREE MONTH PRECIPITATION INDICATOR

## August 2014

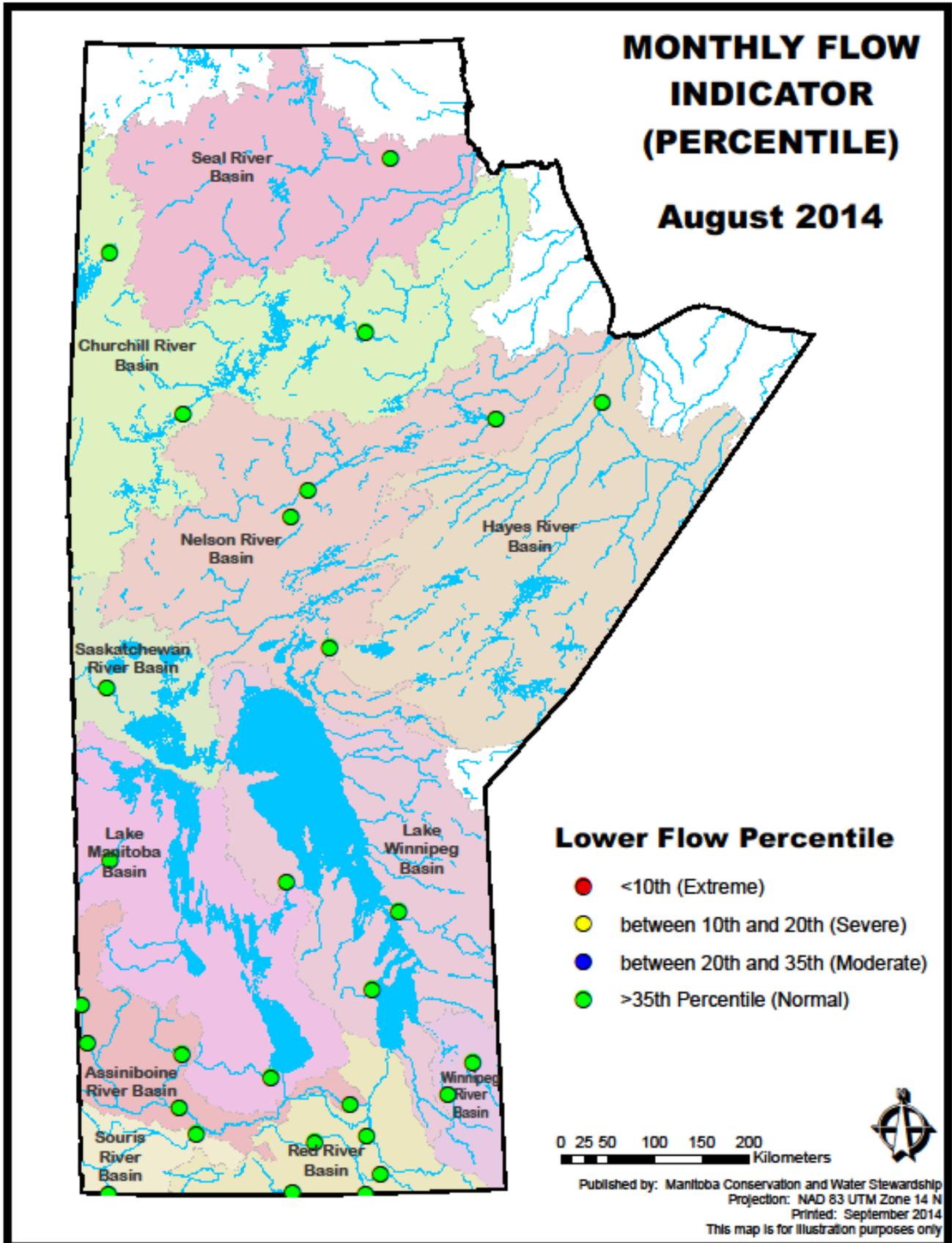


Published by: Manitoba Conservation and Water Stewardship  
 Projection: NAD 83 UTM Zone 14 N  
 Printed: September 2014  
 This map is for illustration purposes only

# TWELVE MONTH PRECIPITATION INDICATOR August 2014



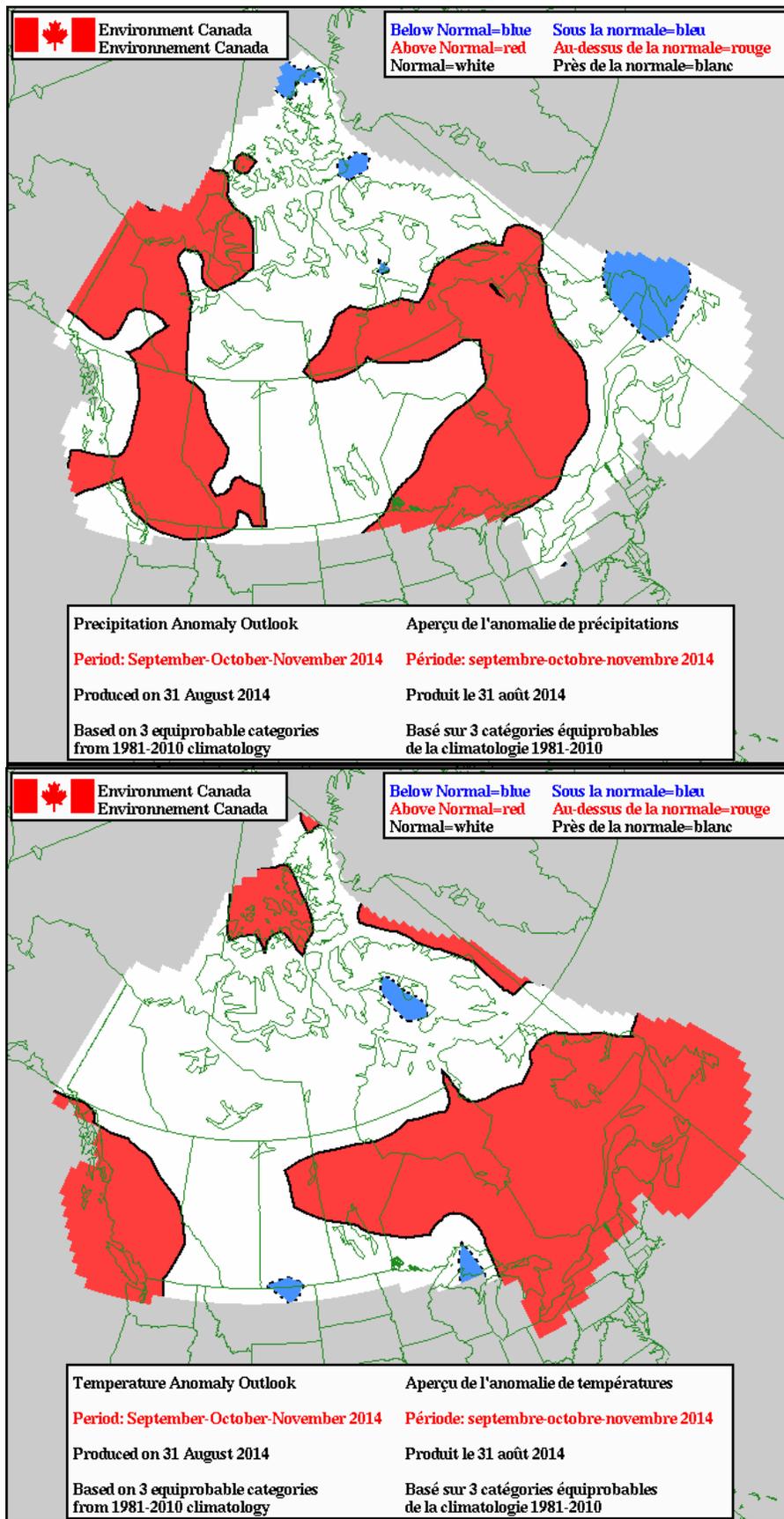
2. Monthly Flow Indicator (lower 10<sup>th</sup>-20<sup>th</sup>-35<sup>th</sup> monthly flow percentile)



### 3. Water Supply Reservoir Status (Southern and Western)

| Water Supply Reservoir Levels and Storages      |                  |                     |                              |                 |  |                                      |                                       |   |
|---|------------------|---------------------|------------------------------|-----------------|--|--------------------------------------|---------------------------------------|---|
| September 2, 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            | 1,532.59                     | August 25, 2014 | 0.59                                   | 520                                  | 561                                   | 108%  |
| Goudney (Pilot Mound)                           | Pilot Mound      | 1,482.00            | 1,482.26                     | August 27, 2014 | 0.26                                   | 450                                  | 463                                   | 103%  |
| Lake of the Prairies (Shellmouth)*              | Brandon, Portage | 1,402.50            | 1,407.71                     | August 31, 2014 | 5.21                                   | 300,000                              | 375,432                               | 125%  |
| Manitou (Mary Jane)                             | Manitou          | 1,537.00            | 1,536.33                     | August 28, 2014 | -0.67                                  | 1,150                                | 1,090                                 | 95%   |
| Minnewasta (Morden)                             | Morden           | 1,082.00            | 1,081.78                     | July 31, 2014   | -0.22                                  | 3,150                                | 3,112                                 | 99%   |
| Rapid City                                      | Rapid City       | 1,573.50            | 1,573.10                     | August 26, 2014 | -0.40                                  | 200                                  | 172                                   | 86%   |
| Lake Wahtopanah (Rivers)                        | Rivers           | 1,536.00            | 1,537.14                     | August 31, 2014 | 1.14                                   | 24,500                               | 27,055                                | 110%  |
| Stephenfield                                    | Carman           | 972.00              | 971.71                       | August 28, 2014 | -0.29                                  | 3,810                                | 3,675                                 | 96%   |
| Turtlehead (Deloraine)                          | Deloraine        | 1,772.00            | 1,771.77                     | August 28, 2014 | -0.23                                  | 1,400                                | 1,389                                 | 99%   |
| Vermilion                                       | Dauphin          | 1,274.00            | 1,272.73                     | August 31, 2014 | -1.27                                  | 2,600                                | 2,500                                 | 96%   |
| * Summer Target level and storage. ** Corrected |                  |                     |                              |                 |  |                                      |                                       |   |

#### 4. Environment Canada Seasonal (3 months) Outlook



## 5. Major River Basin

