

## WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT

November 4, 2013

### **Synopsis/Overview**

This Water Availability and Drought Conditions Report provides an update on meteorological and hydrologic conditions for Manitoba as of October 2013.

Precipitation indicators show conditions are moderately to severely dry in parts of eastern and central Manitoba. Otherwise, precipitation over the last three to twelve months has been normal or above normal for other regions of the province.

Overall, monthly stream flow indicators for October indicated flows were normal or above normal for most rivers across the province. Moderately dry hydrological conditions prevailed in the Boyne River near Carman, the Hayes River near Gods River and the Cochrane River near Brochet. Extremely dry hydrological conditions prevailed in the Bloodvein River above Bloodvein Bay.

Manitoba Agriculture, Food and Rural Development reports that water levels in dugouts were full or close to full in most regions of agri-Manitoba. In the southwest region, water levels in dugouts are below normal for this time of the year.

Water supply reservoirs in southern and western Manitoba are at, or close to, full supply levels except the Goudney (Pilot Mound) Reservoir which is about 84 % full and the Stephenfield Reservoir which is about 86 % full.

### **Outlook**

Environment Canada's seasonal forecast for the next three months (November, December 2013 and January 2014) is for normal temperatures for the entire province. Normal precipitation is forecast for the province except for areas between Swan River, Flin Flon, Norway House and Thompson where above normal precipitation is expected (Attachment 4).

## **Indicators**

Two types of 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 or above normal throughout the province with the exception of the areas near Pinawa, Gimli and Churchill which experienced moderately dry conditions and the area near Norway House which experienced severely dry conditions.

Over the medium term (three months), moderately dry conditions prevailed in the areas around Gimli, Arborg, Berens River and Norway House. Severely dry conditions prevailed in the areas around Morden, Winnipeg, Pinawa, and Island Lake.

Over the short term (one month), moderately dry conditions prevailed in the areas around Lynn Lake and Tadoule Lake. Severely dry conditions prevailed in the areas around Churchill, Emerson, Carman, Sprague, and Gimli. Extremely dry conditions prevailed in the areas around Winnipeg, Pinawa, Arborg, and Flin Flon.

## **Stream Flows**

Stream flow indicators are summarized by basin in Table 1 and on a map in Attachment 2. The monthly flow indicator indicates flows for September were normal or above normal for most rivers across the province. Moderately dry hydrological conditions prevailed in the Boyne River near Carman, the Hayes River near Gods River and the Cochrane River near Brochet. Extremely dry hydrological conditions prevailed in the Bloodvein River above Bloodvein Bay.

## **Water Availability**

### **Reservoir Conditions**

Water supply reservoirs in southern and western Manitoba are full or close to full supply level (Attachment 3). The Goudney Reservoir near Pilot Mound is at 84 % of the full supply level and the Stephenfield Reservoir near Carman is at 86 % of the full supply level.

### **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. In the southwest region, water levels in dugouts are below normal for this time of the year.

### **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 reported that above normal temperatures and the death and drying of fine fuels including grasses, vegetation and leaves and their subsequent susceptibility to fire are increasing the fire risk in eastern Manitoba. This drying trend will continue to raise fire danger levels until precipitation occurs. 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**

Eastern Manitoba has been experiencing dry conditions. With Environment Canada's outlook for the next three months for normal temperature and normal precipitation for eastern and central Manitoba, dry conditions may persist or worsen.

Provincial water supply reservoirs 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			
	Monthly Precipitation Indicator (Percent of 1 month Median) October 2013	Monthly Precipitation Indicator (Percent of 3 month Median) (August - October 2013)	Monthly Precipitation Indicator (Percent of 12 month Median) (November 2012- October 2013)	Monthly Flow Percentile October 2013 (Lowest 10 <sup>th</sup> -20 <sup>th</sup> - 35 <sup>th</sup> )
Red River	Severely to extremely dry except normal conditions for Morden	Normal conditions except severely dry for Winnipeg and Morden	Normal conditions	Normal conditions except moderately dry for the Boyne river near Carman
Winnipeg River	Extremely dry	Severely dry	Moderately dry	Normal conditions
Assiniboine River-Souris River	Normal conditions	Normal conditions	Normal conditions	Normal conditions
Lake Manitoba	Normal conditions	Normal conditions	Normal conditions	Normal conditions
Lake Winnipeg	Severely to extremely dry except normal conditions for Berens river	Moderately dry	Normal conditions except moderately dry for Gimli	Normal conditions except extremely dry for the Bloodvein River above Bloodvein
Saskatchewan River	Normal conditions except extremely dry for Flin Flon	Normal conditions	Normal conditions	Normal conditions
Nelson River	Normal conditions	Normal conditions except moderately dry for Norway House	Normal conditions except severely dry for Norway House	Normal conditions
Hayes River	Normal conditions	Severely dry	Normal conditions	Moderately dry
Churchill River	Moderately to severely dry	Normal conditions	Normal conditions except moderately dry for Churchill	Normal conditions except moderately dry for the Cochrane River near Brochet
Seal River	Moderately dry	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](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:** Abul Kashem, Surface Water Management Section, Manitoba Conservation and Water Stewardship, 204-945-6397/204-803-9431.

## 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.

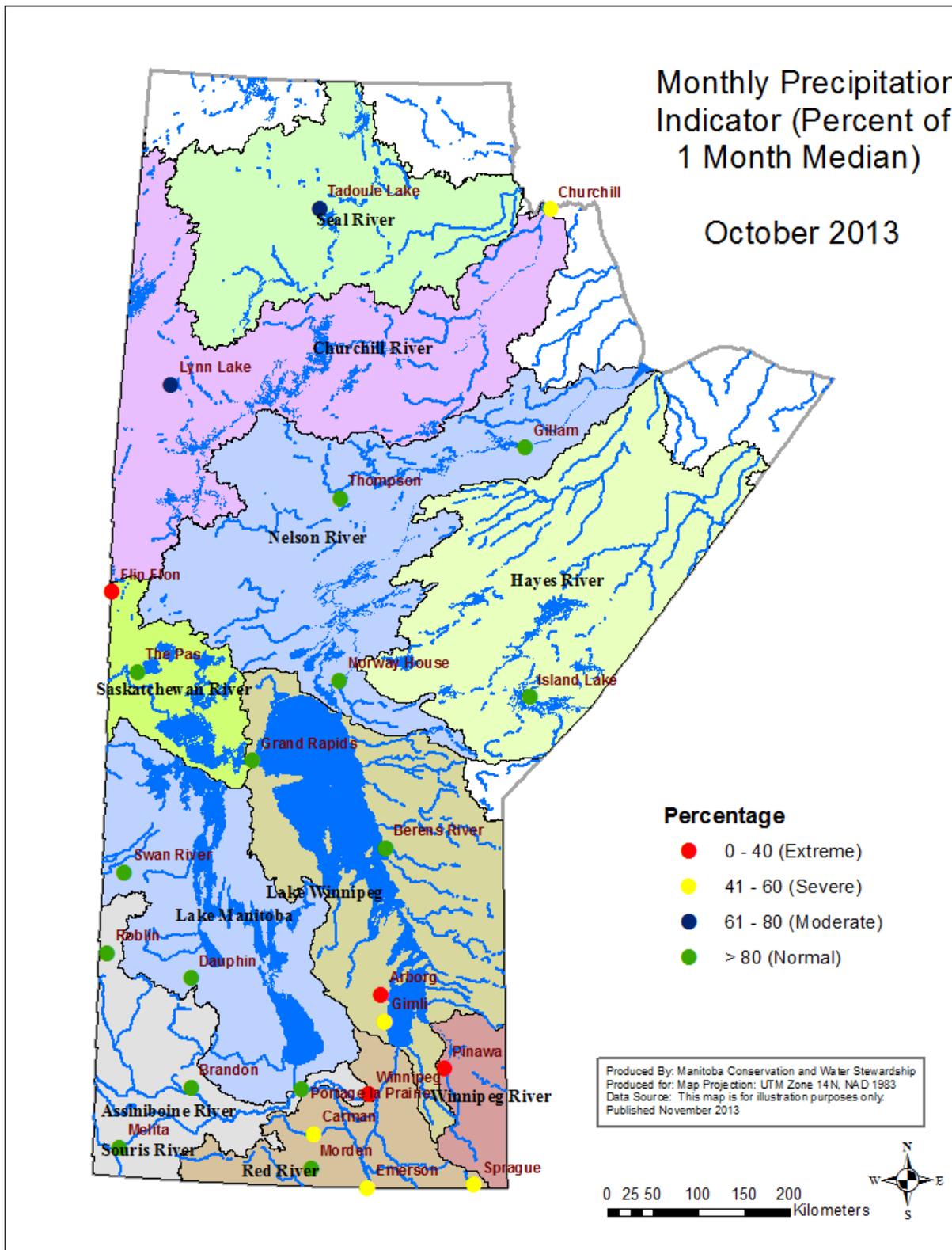
**Hydrological Drought** is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

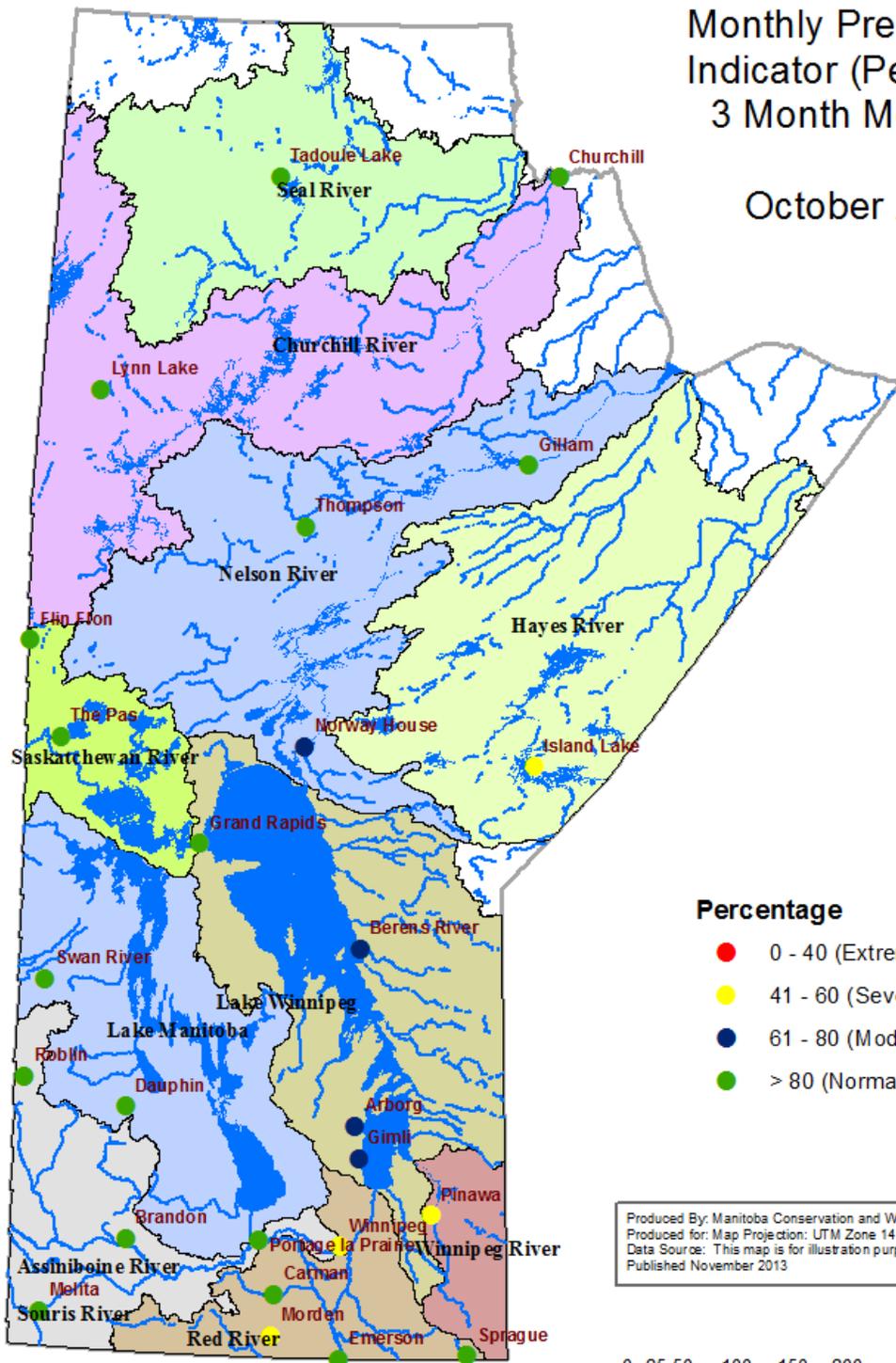
# Attachments

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



# Monthly Precipitation Indicator (Percent of 3 Month Median)

October 2013



### Percentage

- 0 - 40 (Extreme)
- 41 - 60 (Severe)
- 61 - 80 (Moderate)
- > 80 (Normal)

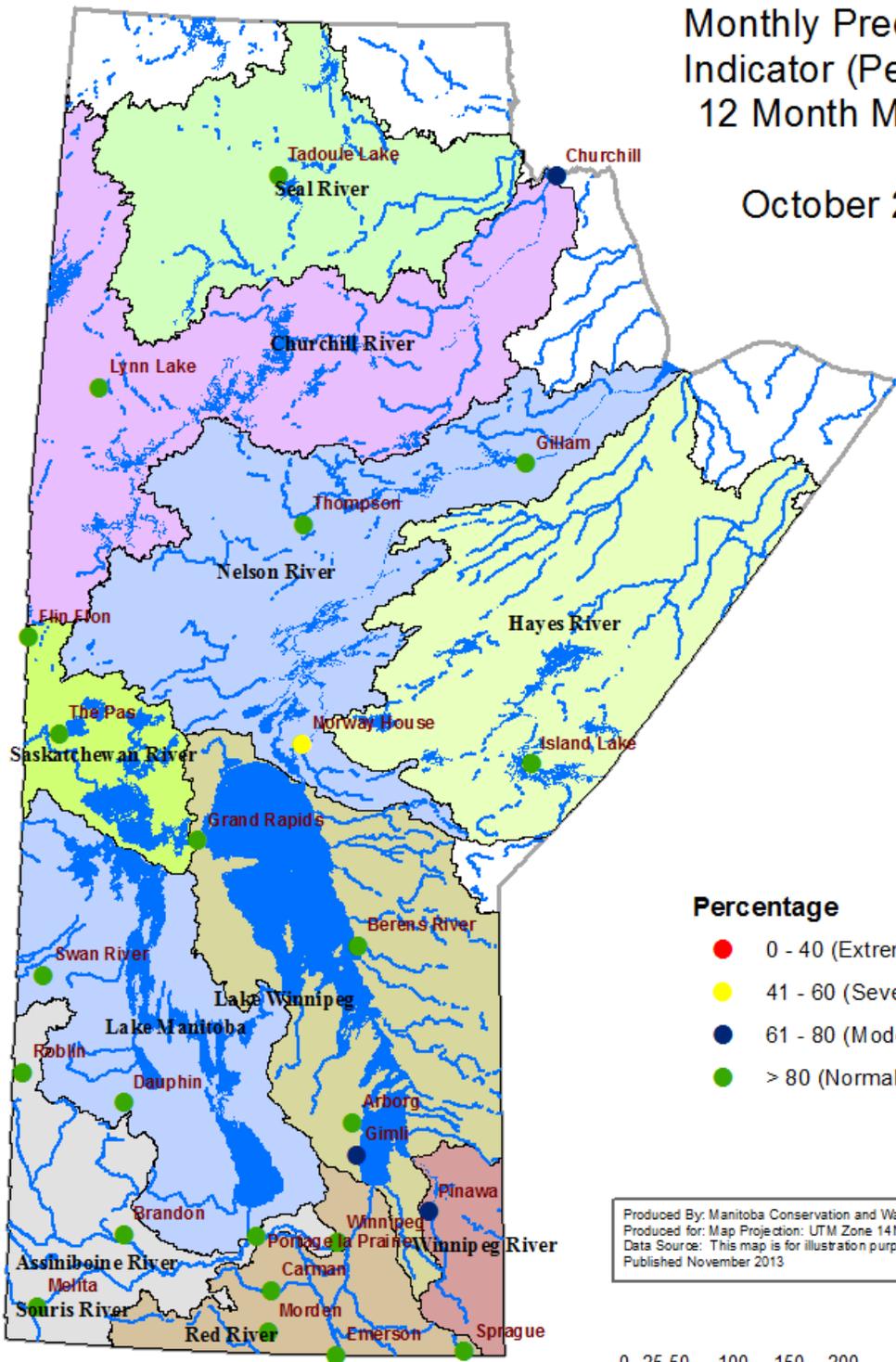
Produced By: Manitoba Conservation and Water Stewardship  
 Produced for: Map Projection: UTM Zone 14N, NAD 1983  
 Data Source: This map is for illustration purposes only.  
 Published November 2013

0 25 50 100 150 200 Kilometers



# Monthly Precipitation Indicator (Percent of 12 Month Median)

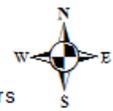
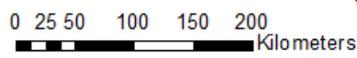
October 2013



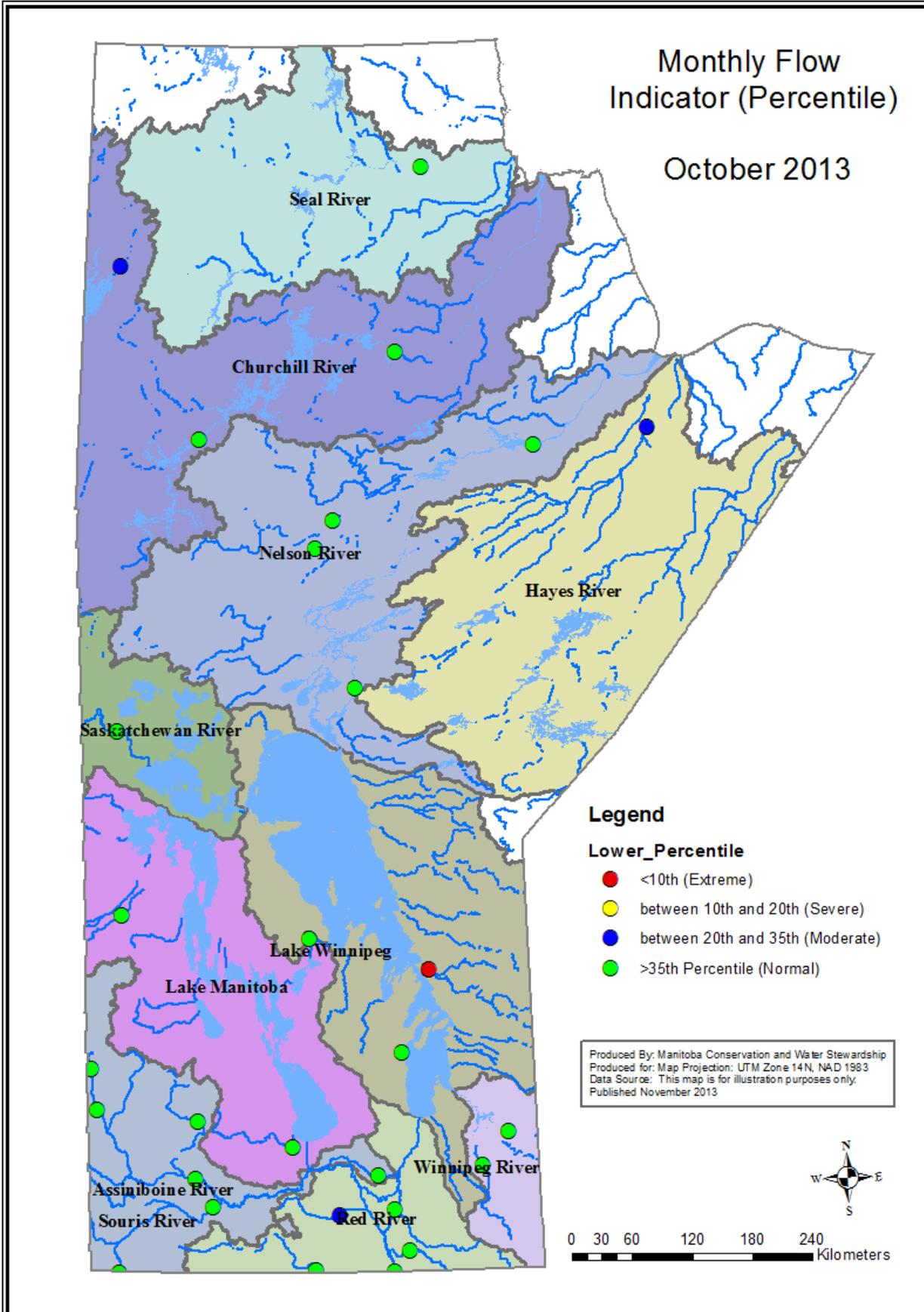
### Percentage

- 0 - 40 (Extreme)
- 41 - 60 (Severe)
- 61 - 80 (Moderate)
- > 80 (Normal)

Produced By: Manitoba Conservation and Water Stewardship  
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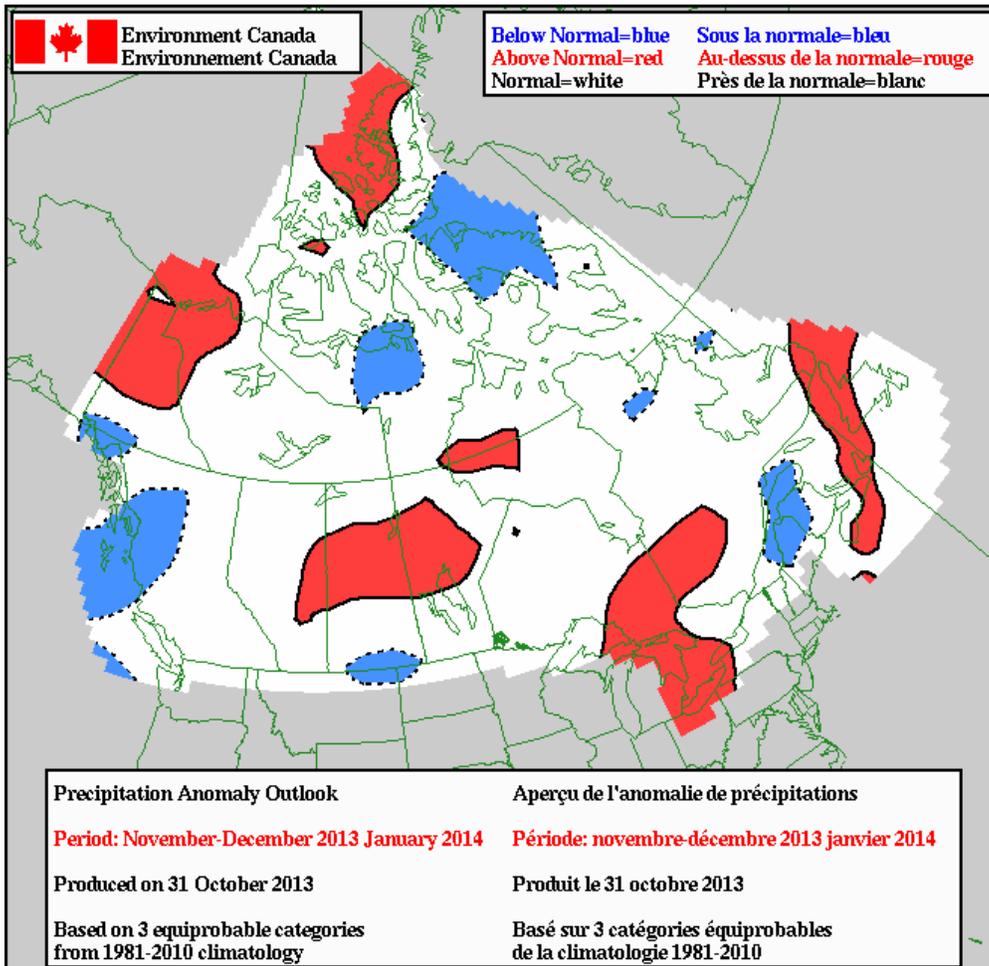
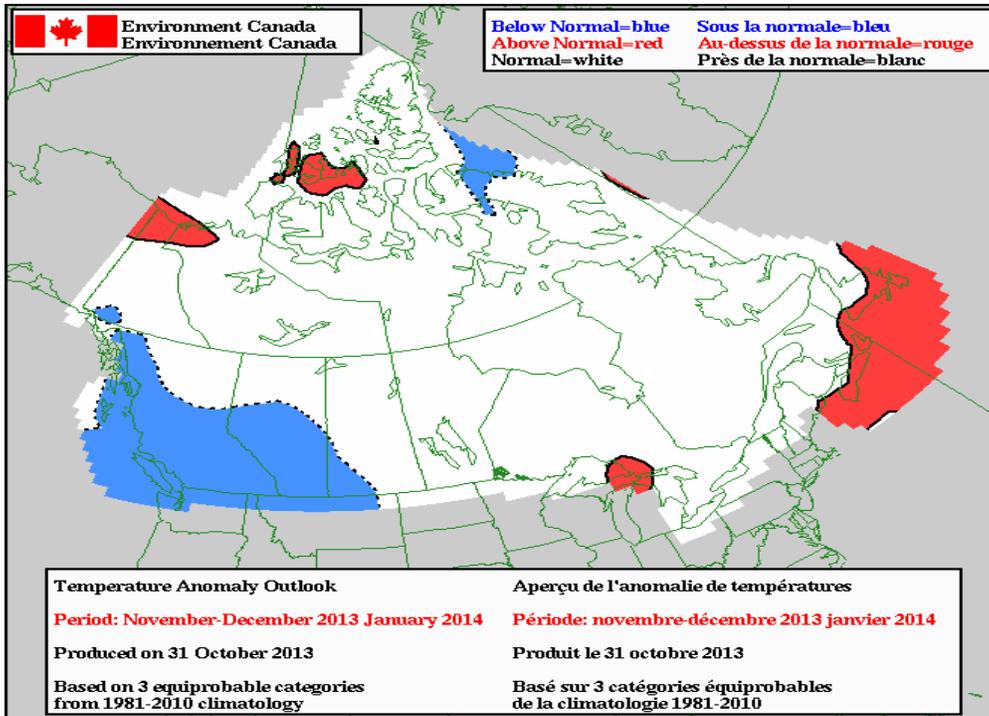
2. Monthly Flow Indicator (lower 10<sup>th</sup>-20<sup>th</sup>-35<sup>th</sup> monthly flow percentile)



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

Water Supply Reservoir Levels and Storages								
November 4, 2013								
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	1532.00	1531.54	October 7, 2013	-0.46	520	488	94%
Goudney (Pilot Mound)	Pilot Mound	1482.00	1480.90	November 4, 2013	-1.10	450	377	84%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1402.50	1400.82	November 4, 2013	-1.68	300,000	279,323	93%
Manitou (Mary Jane)	Manitou	1537.00	1535.98	November 4, 2013	-1.02	1,150	1,058	92%
Minnewasta (Morden)	Morden	1082.00	1080.54	November 4, 2013	-1.46	3,040	2,909	96%
Rapid City	Rapid City	1573.50	1573.94	October 8, 2013	0.44	200	231	115%
Lake Wahtopannah (Rivers)	Rivers	1536.00	1536.32	November 4, 2013	0.32	24,500	25,220	103%
Stephenfield	Carman	972.00	970.88	November 4, 2013	-1.12	3,810	3,289	86%
Turtlehead (Deloraine)	Deloraine	1772.00	1772.05	November 4, 2013	0.05	1,400	1,405	100%
Vermilion	Dauphin	1274.00	1274.53	November 4, 2013	0.53	2,600	2,615	101%
* Summer Target level and storage.								

## 4. Environment Canada 3 Month Outlook



## 5. Major River Basin

