

## **WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT Manitoba**

October 31, 2012

### **Synopsis/Overview**

This Water Availability and Drought Conditions Report provides information on current meteorological and hydrologic conditions for Manitoba.

Due to a shortage of precipitation over the last three months, moderately dry conditions prevailed in the Winnipeg, Dauphin, Swan River, Norway House and Churchill areas. The area around Melita is severely dry. The Roblin area is also extremely dry.

Above normal precipitation in October helped to increase the moisture levels in southern Manitoba. However, no significant runoff was generated from this precipitation.

Over the month of October, due to low streamflow, moderately dry hydrological conditions prevailed in the Souris, Pembina, Roseau, Red (near St. Agathe) and Winnipeg rivers in southern Manitoba and in the Cochrane River in northern Manitoba. Extremely dry hydrological conditions prevailed in the Boyne River near Carman.

A number of lakes in southern and eastern Manitoba are experiencing low water levels.

A number of water supply reservoirs in southern and western Manitoba are below full supply levels. Stephenfield and Minnewasta (Morden) reservoirs are 73 % and 81 % of the full storage levels. Reservoirs have sufficient water supplies for the winter.

Manitoba Agriculture, Food and Rural Initiatives reports that because surface soil moisture was at a deficit, precipitation over the month of October soaked into the soil profile and with a few exceptions has not caused any surface runoff. As a result, water levels have not changed in most wetlands and dugouts. Water levels in dugouts and wetlands are lower than normal in the Southwest, Central, north Interlake and Eastern regions. Most dugout supplies are inadequate in the Southwest, Central, north Interlake and Eastern regions.

### **Outlook**

Environment Canada's seasonal forecast for the next three months (November, December 2012 and January 2013) for Manitoba is for normal temperatures and normal precipitation for the entire province except above normal precipitation for southwestern Manitoba along the Manitoba and Saskatchewan border (Attachment 4).

## **Indicators**

Two indicators are assessed across Manitoba - precipitation and flow. The indicators describe the severity of dryness in a watershed.

Precipitation is assessed to determine the severity of meteorological dryness in a watershed 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 flow indicator is used to determine the severity of hydrological dryness in a watershed.

### **Precipitation**

Over the long term (twelve month precipitation indicator), conditions were normal throughout the province with the exception of the areas near Morden, Melita, Norway House, Tadoule Lake and Churchill which have experienced moderately dry conditions (Table 1 and Attachment 1).

Over the medium term (three month precipitation indicator), conditions were moderately dry in the Winnipeg, Dauphin, Swan River, Norway House and Churchill areas. Severely dry conditions prevailed near Melita. Extremely dry conditions prevailed near Roblin

Over the short term (one month precipitation indicator), conditions were normal over much of Manitoba. However, severely dry conditions prevailed in the Seal River basin and in the Churchill area in northern Manitoba.

### **Stream and River Flows**

Over the month of October, the flow percentile indicator indicates moderately dry hydrological conditions prevailed in the Souris, Pembina, Roseau, Red (near St. Agathe) and Winnipeg rivers in southern Manitoba and in the Cochrane River in northern Manitoba. Severely dry hydrological conditions prevailed in the Boyne River near Carman in the Red River basin (Table 1 and Attachment 2).

## **Water Availability**

### **Lake/Reservoir Conditions**

A number of lakes in southeastern Manitoba are experiencing low water levels ([http://www.gov.mb.ca/mit/floodinfo/floodoutlook/lakes\\_information.html](http://www.gov.mb.ca/mit/floodinfo/floodoutlook/lakes_information.html)).

A number of water supply reservoirs in southern and western Manitoba are below full supply levels. Stephenfield and Minnewasta (Morden) reservoirs are 73 % and 81 % of the full storage levels (Attachment 3).

### **On Farm Water Supply**

Manitoba Agriculture, Food and Rural Initiatives reports that because surface soil moisture was at a deficit, precipitation over the month of October soaked into the soil profile and with a few exceptions has not caused any surface runoff. As a result, water levels have not changed in most wetlands and dugouts. Water levels in dugouts and wetlands are lower than normal in the Southwest, Central, north Interlake and Eastern regions. Most dugout supplies are inadequate in the Southwest, Central, north Interlake and Eastern regions.

### **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 into near surface sand aquifers. As the water table drops there is less available drawdown in shallow wells and some wells may 'go dry'. This was experienced at the beginning of October in the southeast prior to heavy snowfall. Deeper wells were not similarly affected by the dry conditions.

### **Potential Impacts**

A number of rivers and tributaries in southern Manitoba are experiencing very low flow conditions with extremely dry hydrological conditions in the Boyne River near Carman in the Red River basin. Moderately hydrological dry conditions are prevailing in the Souris, Pembina, Roseau, Red (near St. Agathe) and Winnipeg rivers. While Environment Canada's outlook for the next three months is for normal precipitation with normal temperatures, there are concerns that the province could see prolonged low streamflow conditions in southern Manitoba including in the Red River Valley. There is a risk of increased shortages of livestock water in Southwest, Central, north Interlake and Eastern regions and impacts to areas served by shallow sand wells.

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

| Basin<br>(in Manitoba)               | Drought Indicators                                                                      |                                                                                                       |                                                                                                              |                                                                                                             |
|--------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|                                      | Monthly<br>Precipitation<br>Indicator<br>(Percent of 1 month<br>Median)<br>October 2012 | Monthly<br>Precipitation<br>Indicator<br>(Percent of 3<br>month Median)<br>(August -<br>October 2012) | Monthly<br>Precipitation<br>Indicator<br>(Percent of 12<br>month Median)<br>(November 2011-<br>October 2012) | Monthly Flow<br>Percentile<br>October 2012<br>(Lower 10 <sup>th</sup> -20 <sup>th</sup> -35 <sup>th</sup> ) |
| Red River                            | Normal                                                                                  | Normal except<br>moderately dry<br>for Winnipeg                                                       | Normal except<br>moderately dry for<br>Morden                                                                | Moderately to<br>extremely dry except<br>normal for Red River<br>at Emerson.                                |
| Winnipeg<br>River                    | Normal                                                                                  | Normal                                                                                                | Normal                                                                                                       | Normal for Whitemouth<br>River and moderately<br>dry for Winnipeg River                                     |
| Assiniboine<br>River-Souris<br>River | Normal                                                                                  | Normal except<br>severely dry for<br>Melita and<br>extremely dry<br>for Roblin                        | Normal except<br>moderately dry for<br>Melita                                                                | Normal except<br>moderately dry for<br>Souris River                                                         |
| Lake Manitoba                        | Normal                                                                                  | Moderately dry                                                                                        | Normal                                                                                                       | Normal                                                                                                      |
| Lake Winnipeg                        | Normal                                                                                  | Normal                                                                                                | Normal                                                                                                       | Normal                                                                                                      |
| Saskatchewan<br>River                | Normal                                                                                  | Normal                                                                                                | Normal                                                                                                       | Normal                                                                                                      |
| Nelson River                         | Normal                                                                                  | Normal except<br>moderately dry<br>for Norway<br>House                                                | Normal except<br>moderately dry for<br>Norway House                                                          | Normal                                                                                                      |
| Hayes River                          | Normal                                                                                  | Normal                                                                                                | Normal                                                                                                       | Normal                                                                                                      |
| Churchill River                      | Normal except<br>severely dry for<br>Churchill                                          | Normal except<br>moderately dry<br>for Churchill                                                      | Normal except<br>moderately dry for<br>Churchill                                                             | Normal except<br>moderately dry for<br>Cochrane River Near<br>Brochet                                       |
| Seal River                           | Severely dry                                                                            | Normal                                                                                                | Moderately dry                                                                                               | Normal                                                                                                      |

## Acknowledgements

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

- Manitoba Infrastructure and Transportation: Flow and Lake information:  
[http://www.gov.mb.ca/mit/floodinfo/floodoutlook/river\\_conditions.html](http://www.gov.mb.ca/mit/floodinfo/floodoutlook/river_conditions.html)  
[http://www.gov.mb.ca/mit/floodinfo/floodoutlook/lakes\\_information.html](http://www.gov.mb.ca/mit/floodinfo/floodoutlook/lakes_information.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 Initiatives:  
<http://www.gov.mb.ca/agriculture/crops/cropreports/pdf/cr.pdf>
- Manitoba Conservation and Water Stewardship Fire Program

**For further information, please contact:** Abul Kashem, Surface Water Management Section, Manitoba Conservation and Water Stewardship, 945-6397

## 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.

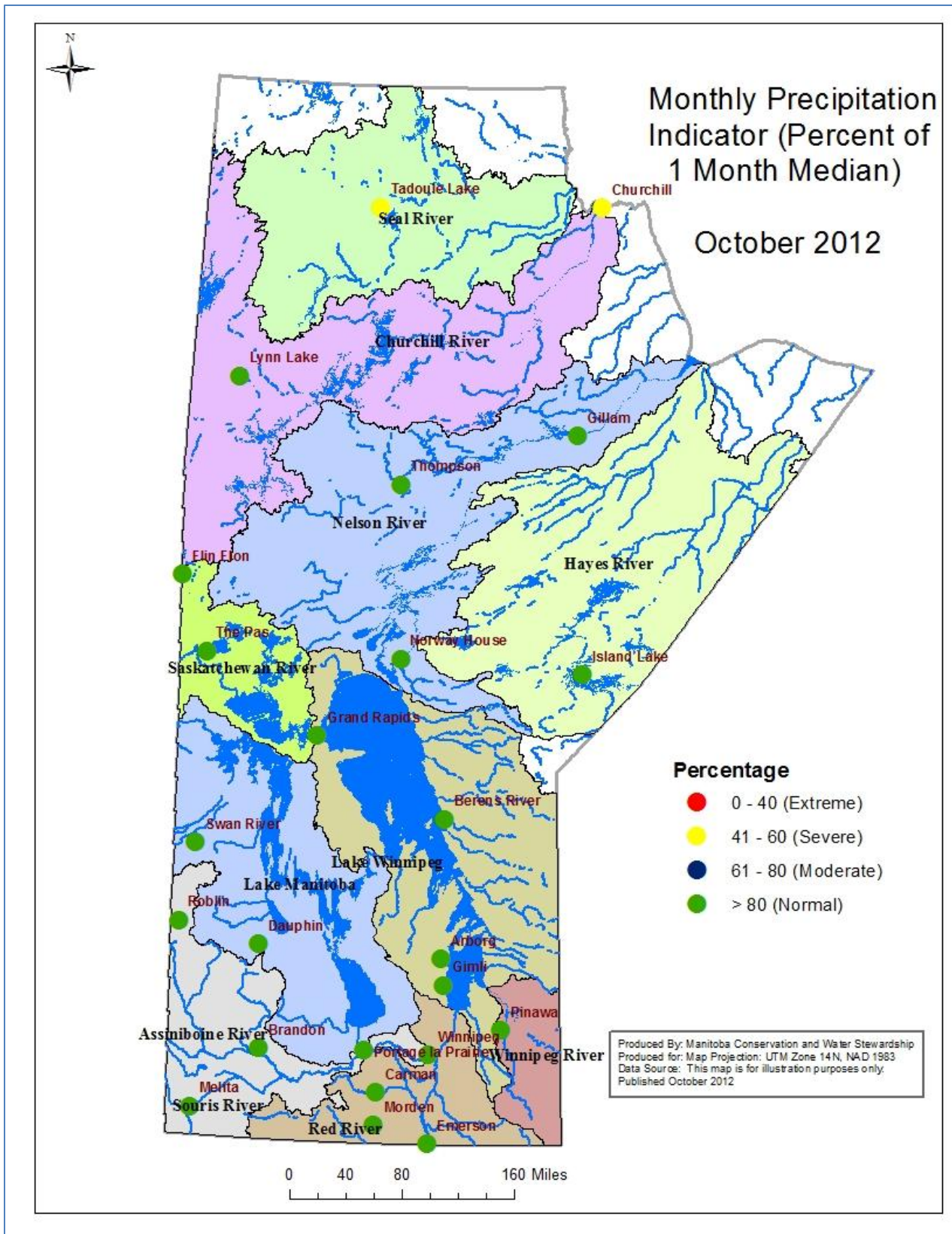
**Hydrological Drought** is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

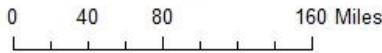
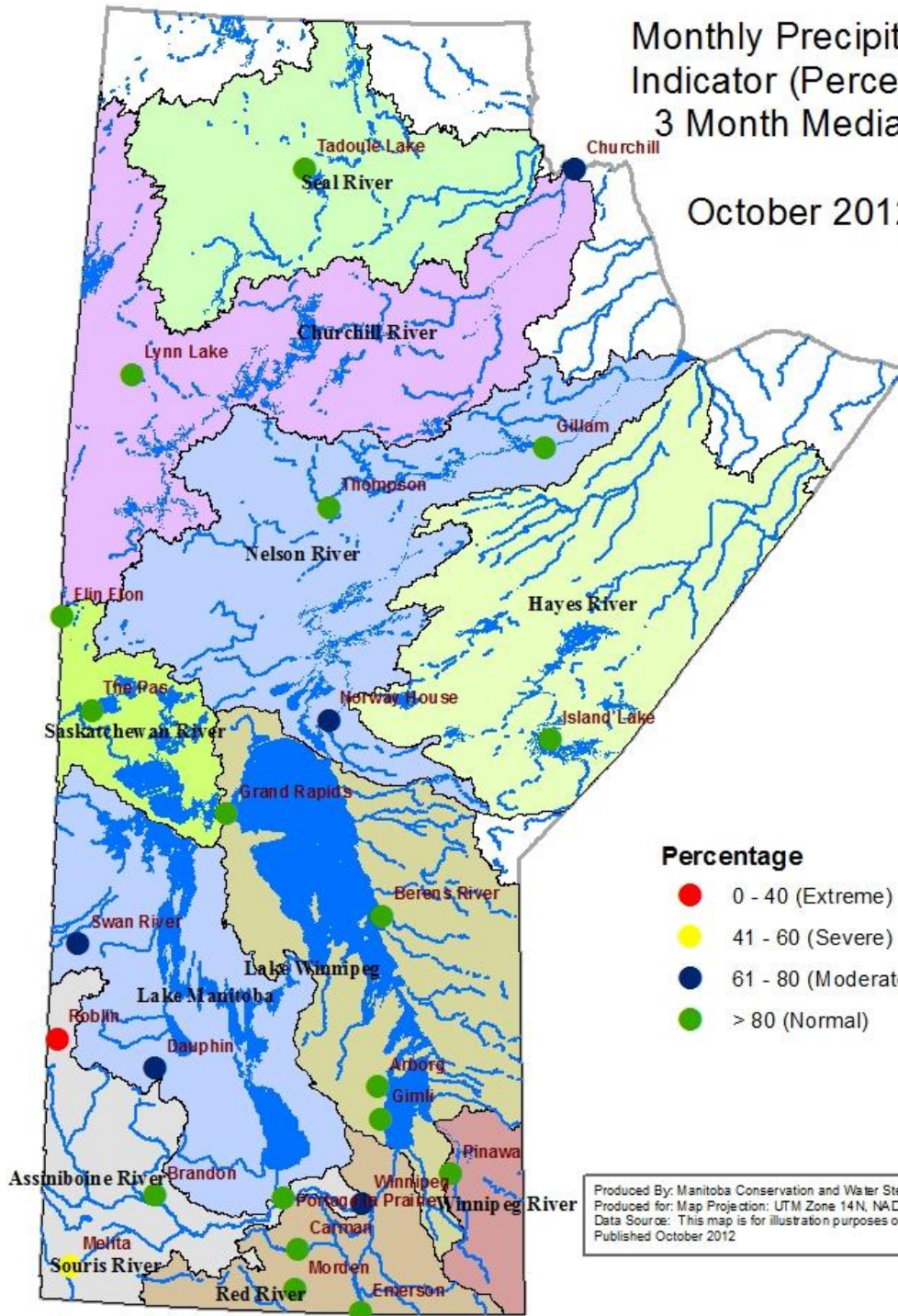
## 1. Precipitation Indicator (Percent of 1, 3 and 12 month median precipitation)





# Monthly Precipitation Indicator (Percent of 3 Month Median)

October 2012

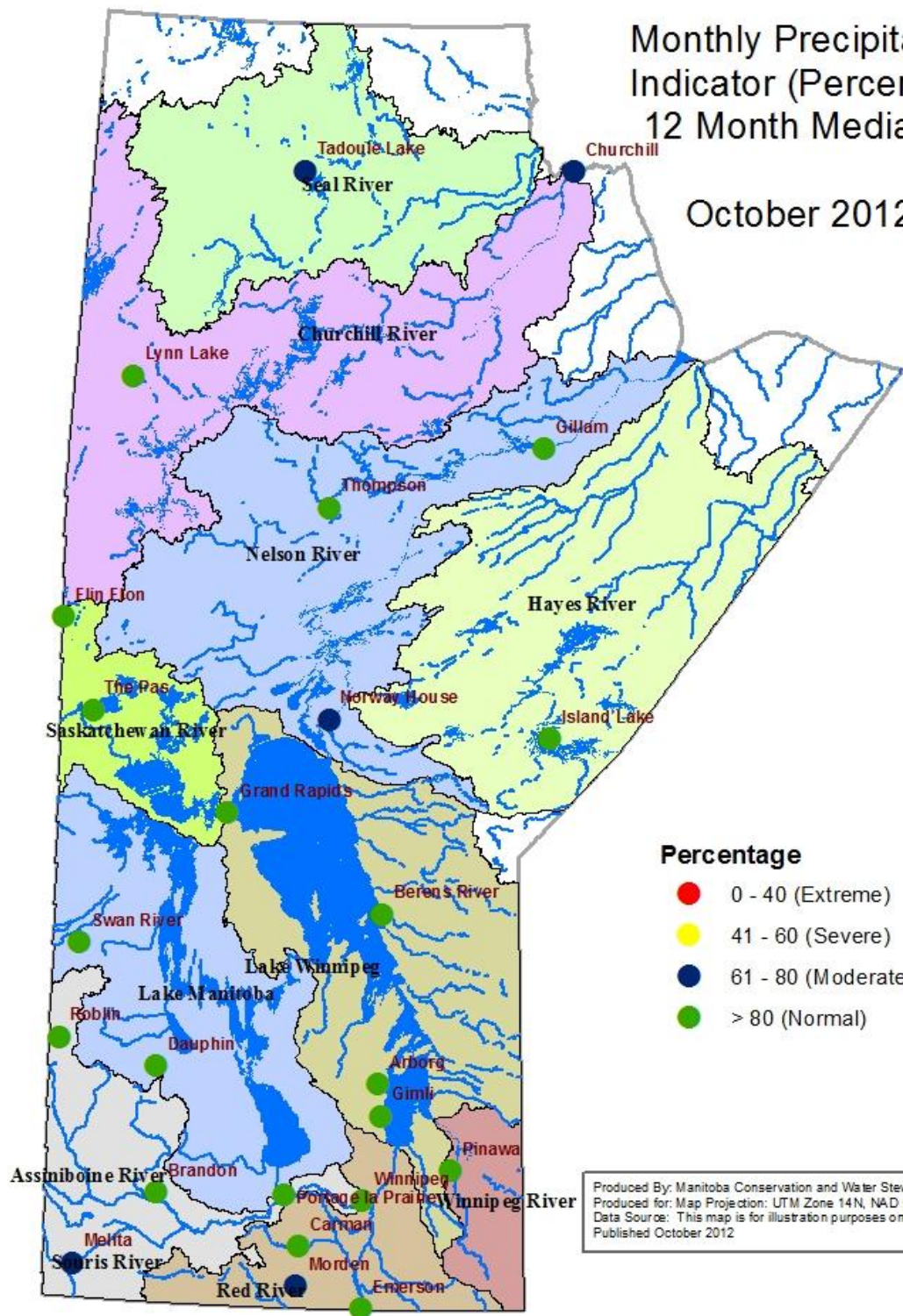


Produced By: Manitoba Conservation and Water Stewardship  
Produced for: Map Projection: UTM Zone 14N, NAD 1983  
Data Source: This map is for illustration purposes only.  
Published October 2012



# Monthly Precipitation Indicator (Percent of 12 Month Median)

October 2012

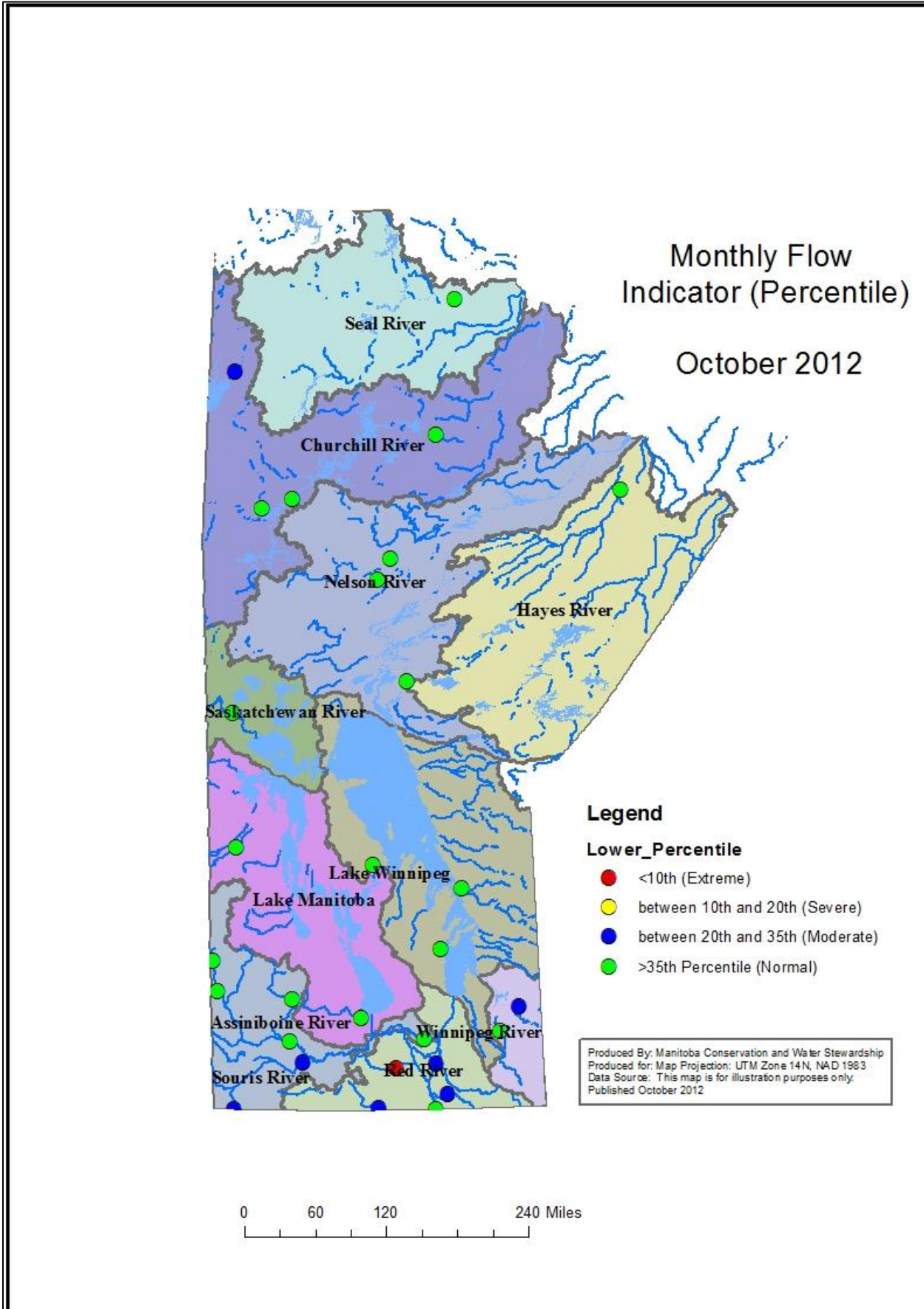


- Percentage**
- 0 - 40 (Extreme)
  - 41 - 60 (Severe)
  - 61 - 80 (Moderate)
  - > 80 (Normal)

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 October 2012



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

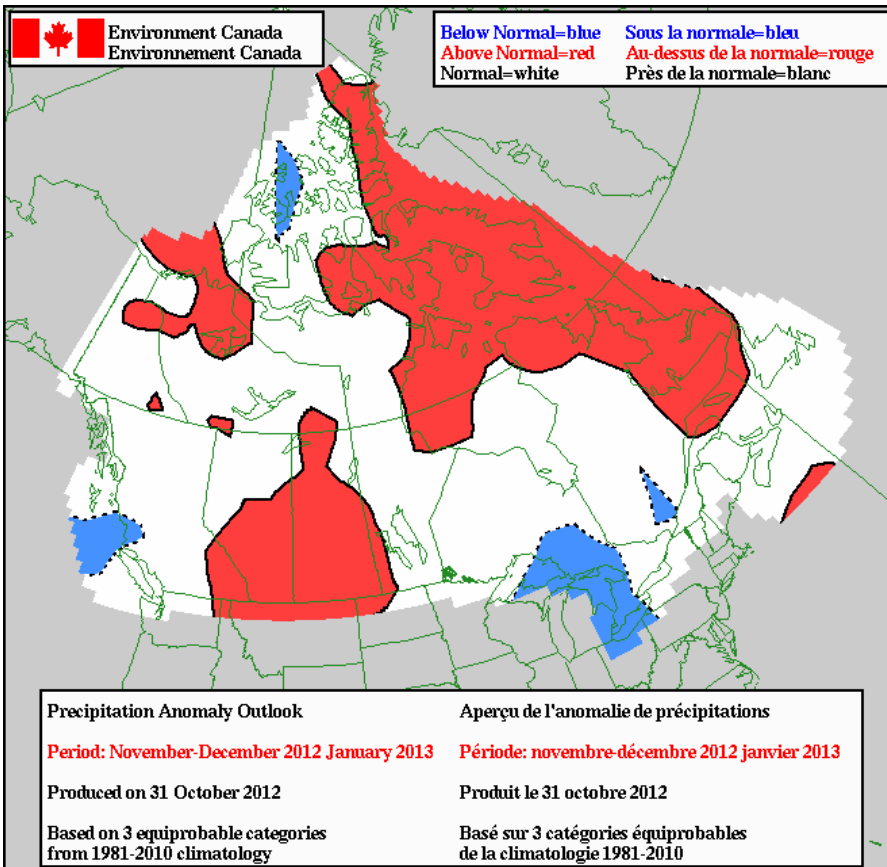
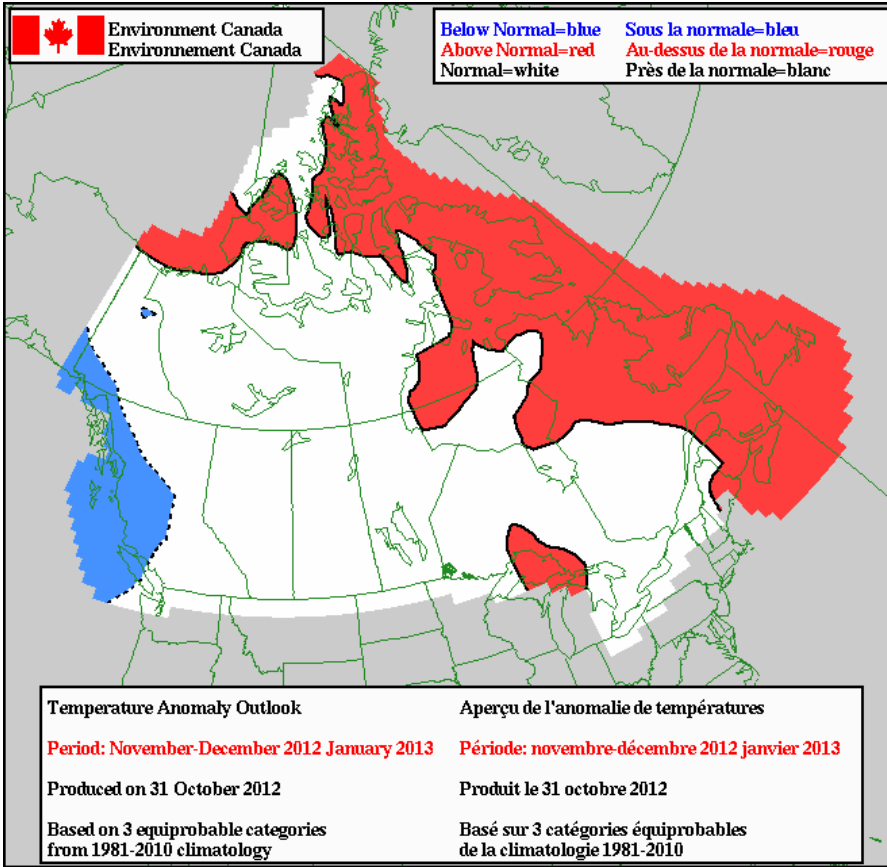


### 3. Water Supply Reservoir Status (Southern and Western)

| Water Supply Reservoir Levels and Storages |                  |                     |                              |                  |                                        |                                     |                                       |                                                     |
|--------------------------------------------|------------------|---------------------|------------------------------|------------------|----------------------------------------|-------------------------------------|---------------------------------------|-----------------------------------------------------|
| October 29, 2012                           |                  |                     |                              |                  |                                        |                                     |                                       |                                                     |
| 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             | 1530.45                      | October 1, 2012  | -1.5                                   | 520                                 | 414                                   | 80%                                                 |
| Goudney (Pilot Mound)                      | Pilot Mound      | 1482.00             | 1480.94                      | October 25, 2012 | -1.1                                   | 450                                 | 378                                   | 84%                                                 |
| Irwin                                      |                  | 1178.00             | 1175.81                      | October 15, 2012 | -2.2                                   | 3,800                               | 2,733                                 | 72%                                                 |
| Jackson                                    |                  | 1174.00             | 1171.28                      | October 15, 2012 | -2.7                                   | 2,870                               | 2,318                                 | 81%                                                 |
| Kenton (Kenworth)                          |                  | 1448.00             | 1446.79                      | October 2, 2012  | -1.2                                   | 600                                 | 600                                   | 100%                                                |
| Lake of the Prairies (Shellmouth)*         | Brandon, Portage | 1402.50             | 1397.28                      | October 29, 2012 | -5.2                                   | 300,000                             | 235,754                               | 79%                                                 |
| Killarney                                  | Killarney        | 1615.00             | 1614.02                      | October 16, 2012 | -1.0                                   | 7,360                               | 6,909                                 | 94%                                                 |
| Manitou (Mary Jane)                        | Manitou          | 1537.00             | 1535.76                      | October 17, 2012 | -1.2                                   | 1,150                               | 1,041                                 | 91%                                                 |
| Minnewasta (Morden)                        | Morden           | 1082.00             | 1077.49                      | October 29, 2012 | -4.5                                   | 3,040                               | 2,459                                 | 81%                                                 |
| Rapid City                                 | Rapid City       | 1573.50             | 1573.64                      | October 2, 2012  | 0.1                                    | 200                                 | 210                                   | 105%                                                |
| Lake Wahtopanah (Rivers)                   | Rivers           | 1536.00             | 1534.21                      | October 29, 2012 |                                        | 24,500                              | 22,531                                | 92%                                                 |
| Stephenfield                               | Carman           | 972.00              | 969.55                       | October 29, 2012 | -2.5                                   | 3,810                               | 2,772                                 | 73%                                                 |
| Turtlehead (Deloraine)                     | Deloraine        | 1772.00             | 1769.72                      | October 29, 2012 | -2.3                                   | 1,400                               | 1,262                                 | 90%                                                 |
| Vermilion                                  | Dauphin          | 1274.00             | 1274.21                      | October 29, 2012 | 0.2                                    | 2,600                               | 2,610                                 | 100%                                                |

\* Summer Target level and storage.

#### 4. Environment Canada 3 Month Outlook



## 5. Major River Basin

