

**WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT
Manitoba**

September 27, 2012

Synopsis/Overview

Due to lack of precipitation over the last three months, moderately dry conditions prevailed in the Assiniboine and Seal River Basins and in the Dauphin area. Areas near Emerson, Carman, Portage la Prairie and Norway House were severely dry. Areas around Winnipeg and Morden approached extremely dry conditions.

Due to low streamflow, the Pembina, Boyne, Souris (near Wawanesa), and Red (near St. Agathe) rivers and in the Seal River in northern Manitoba experienced moderately dry hydrological conditions. Severely dry hydrological conditions prevailed in the Whitemud River and in the Taylor River in the Nelson River watershed. Extremely dry hydrological conditions prevailed in the Roseau, Whitemouth and Icelandic River watersheds.

A number of lakes in southeastern Manitoba are experiencing low water levels including Big Whiteshell, Falcon and West Hawk lakes.

Most water supply reservoirs in southern and western Manitoba are at full or near full supply levels except for the Stephenfield and Minneswasta (Morden) reservoirs where storage is declining and the reservoirs are at 70 % and 83 % of their full storage capacity. Reservoirs have sufficient water supplies for the balance of the year.

Manitoba Agriculture, Food and Rural Initiatives reports that water levels in dugouts were lower than normal in the Southwest, Central, Interlake and Eastern regions with dugout water supplies continuing to decline. Some producers are exploring pumping water and installing pasture pipelines. Pasture productivity has been negatively affected by hot and dry conditions in most regions and pasture production is of concern.

Outlook

Environment Canada's seasonal forecast for the next three months (September, October and November 2012) for Manitoba is for above normal temperatures and normal precipitation for the entire province except below normal precipitation for much of northern Manitoba (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 (12 month), medium term (3 months) and short term (1 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 (12 month precipitation indicator), conditions are normal throughout the province with the exception of the areas near Emerson, Carman, Melita, Grand Rapids, Tadoule Lake and Norway House which have been experiencing moderately dry conditions.

Over the medium term (3 month precipitation indicator), moderately dry conditions prevailed in much of the Winnipeg River, Red River, Assiniboine River and Seal River basins and in the Dauphin area. Severely dry conditions prevailed near Emerson, Carman, Portage la Prairie, Grand Rapids and Norway House. Extremely dry conditions prevailed in the Winnipeg and Morden areas (Table 1 and Attachment 1).

Over the short term (1 month precipitation indicator), normal conditions prevailed over much of northern Manitoba. However, severely dry conditions prevailed in the Saskatchewan River basin and the Norway House area. Extremely dry conditions prevailed across all of southern Manitoba except in the Berens River area.

Stream and River Flows

The flow percentile indicator indicates moderately dry hydrological conditions in the Pembina, Boyne, Souris (near Wawanesa), and Red (near St. Agathe) rivers and in the Seal River in northern Manitoba. Severely dry hydrological conditions prevailed in the Whitemud River and in the Taylor River in the Nelson River watershed. Extremely dry hydrological conditions were observed in the Roseau, Whitemouth and Icelandic River watersheds (Table 1 and Attachment 2).

Water Availability

Lake/Reservoir Conditions

A number of lakes in southeastern Manitoba are still experiencing low water levels due to prolonged dry conditions including Big Whiteshell, Falcon and West Hawk lakes. (http://www.gov.mb.ca/mit/floodinfo/floodoutlook/lakes_information.html).

Most water supply reservoirs in southern and western Manitoba are at full or near full supply levels except for Stephenfield and Minneswasta (Morden) reservoirs where storage is 70 % and 83 % of the full storage levels (Attachment 3).

On Farm Water Supply

Manitoba Agriculture, Food and Rural Initiatives reports that water levels in dugouts were lower than normal in the Southwest, Central, Interlake and Eastern regions. Dugout water supplies continue to decline. Some producers are exploring pumping water and installing pastures pipelines. Pasture productivity has been negatively affected by hot and dry conditions in most regions with pasture production of concern in most areas in the Southwest, Central, Interlake and Eastern regions.

Aquifers

Groundwater levels in 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 shallow sand aquifers and large-diameter wells constructed into these aquifers. Many of these areas are serviced by water supply pipelines.

Forest and Grassland Fires

Due to dry conditions, fires are still a concern for the province. More detailed information on fire conditions is available on the Manitoba Conservation and Water Stewardship under the Fire Program (website <http://www.gov.mb.ca/conservation/fire/>).

Potential Impacts

Southeastern rivers and tributaries are experiencing very low flow conditions with extremely dry hydrological conditions in the Whitemouth and Roseau Rivers along with the Icelandic River in the Interlake. Flows in the Red River are declining and moderately dry conditions are prevailing near St. Agathe. With Environment Canada's outlook for normal precipitation with above normal temperatures, there are concerns that the province could see prolonged low streamflow conditions in southeastern Manitoba including in the Red River valley. There is a risk of increased shortage of livestock water and pastures in Southeastern Manitoba.

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

| Basin (in Manitoba) | Indicators | | | |
|--------------------------------------|--|---|---|---|
| | Percent of 1 month Median Precipitation September 2012 | Percent of 3 month Median Precipitation (July - September, 2012) | Percent of 12 month Median Precipitation (October 2011- September 2012) | Monthly Flow Percentile September 2012 (Lower 10 th -20 th -35 th) |
| Red River | Extremely dry | Severely to extremely dry | Moderately to severely dry except normal for Winnipeg | Moderately to extremely dry except normal for Red River at Emerson. |
| Winnipeg River | Extremely dry | Moderately dry | Normal | Extremely dry for Whitemouth River and normal for the Winnipeg River |
| Assiniboine River-Souris River | Extremely dry | Moderately dry | Normal except moderately dry for Melita | Normal except moderately dry for Souris River at Wawanesa |
| Lake Manitoba | Extremely dry | Normal near Swan River and moderately dry for Dauphin | Normal | Normal except severely dry for Whitemud River |
| Lake Winnipeg | Extremely dry except normal for Berens River | Normal | Normal | Normal except extremely dry for Icelandic River |
| Saskatchewan River | Severely dry | Normal except severely dry for Grand Rapids | Normal except moderately dry for Grand Rapids | Normal |
| Nelson River | Normal except severely dry for Norway House | Normal except severely dry for Norway House | Normal except moderately dry for Norway House | Normal except severely dry for Taylor River near Thompson |
| Hayes River | Normal | Normal | Normal | Normal |
| Churchill River | Normal | Normal | Normal | Normal except moderately dry for Cochrane River Near Brochet |
| Seal River | Normal | Moderately dry | Moderately dry | Moderately dry |

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/lakes_information.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 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.

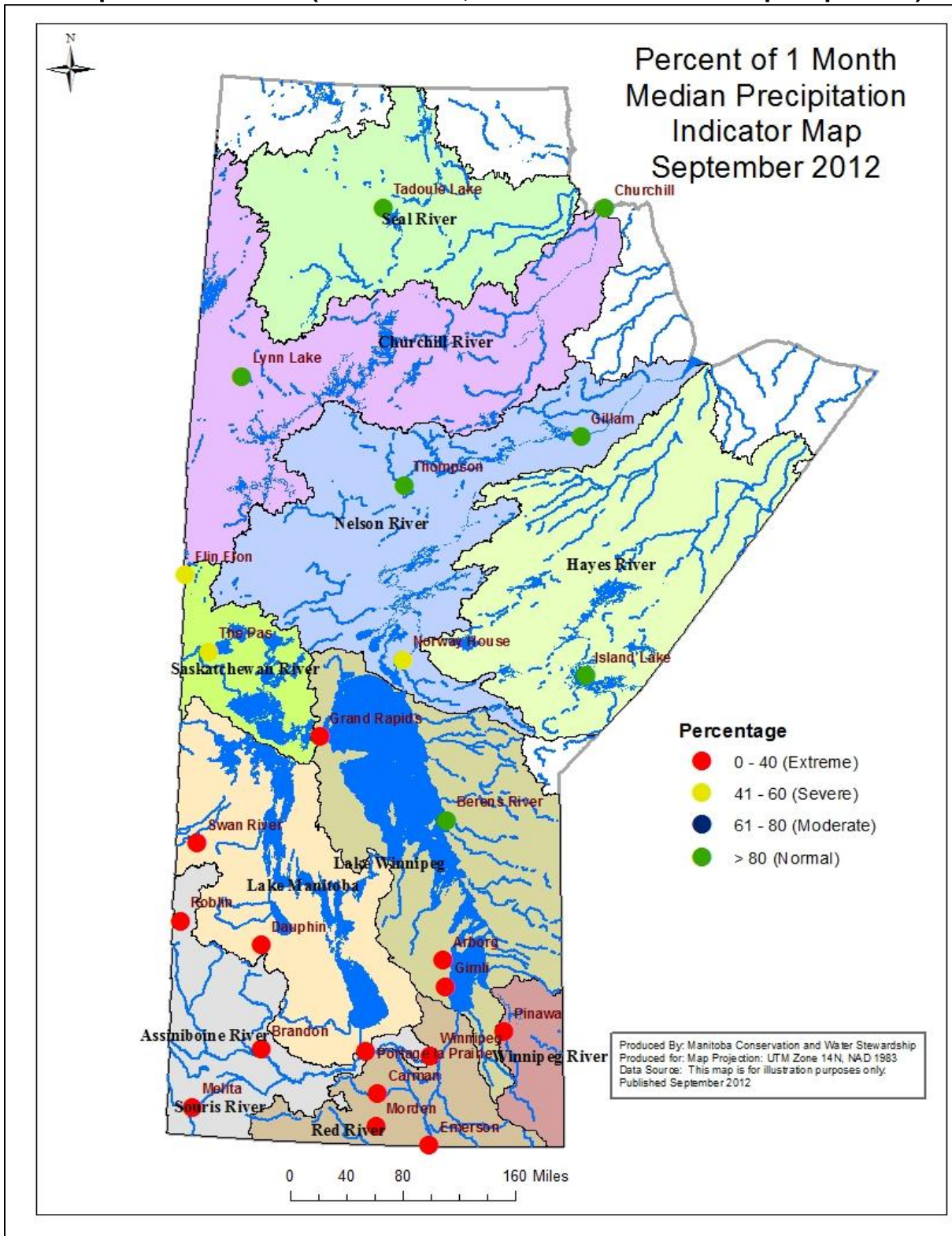
Hydrological Drought is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

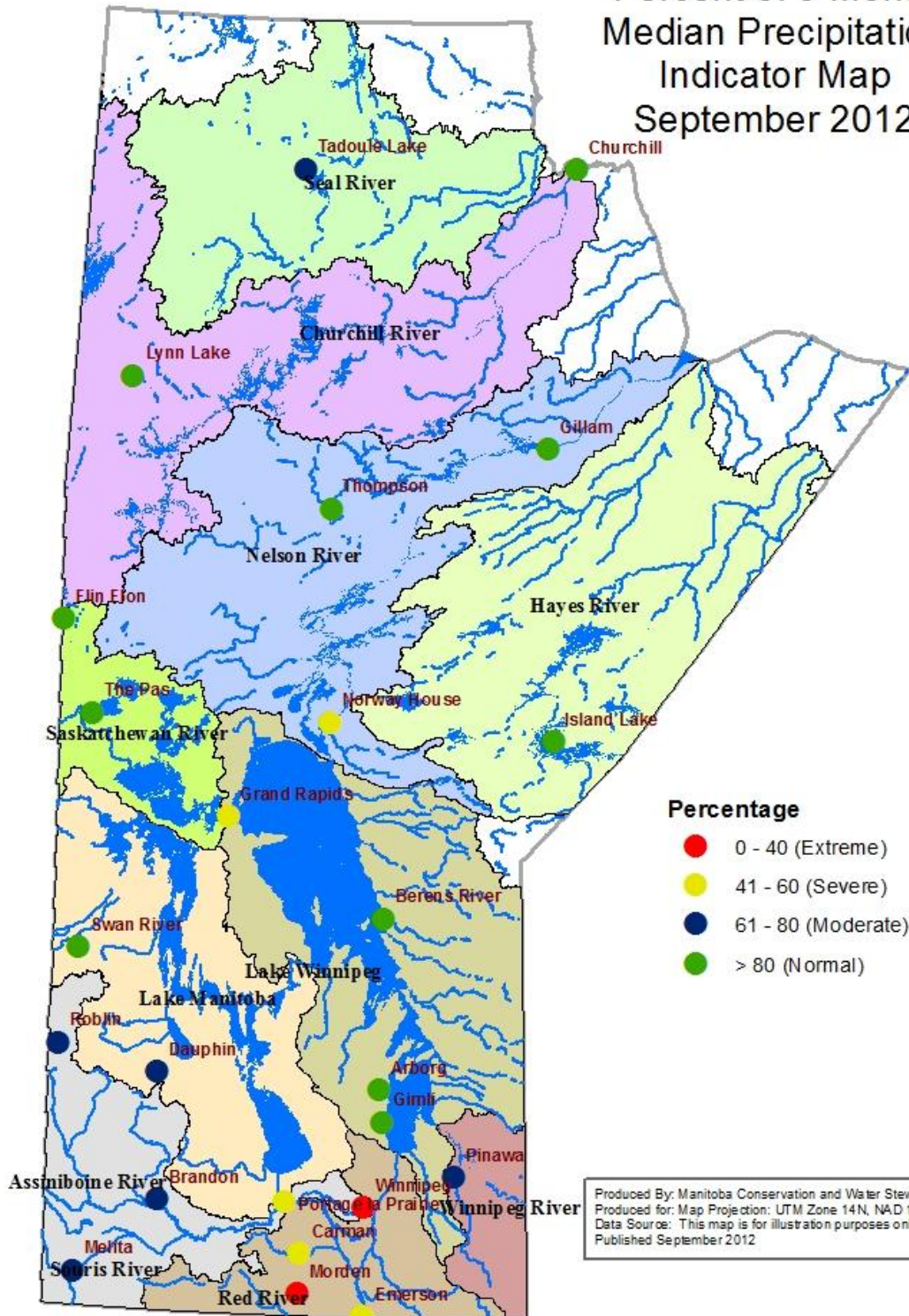
Attachments

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





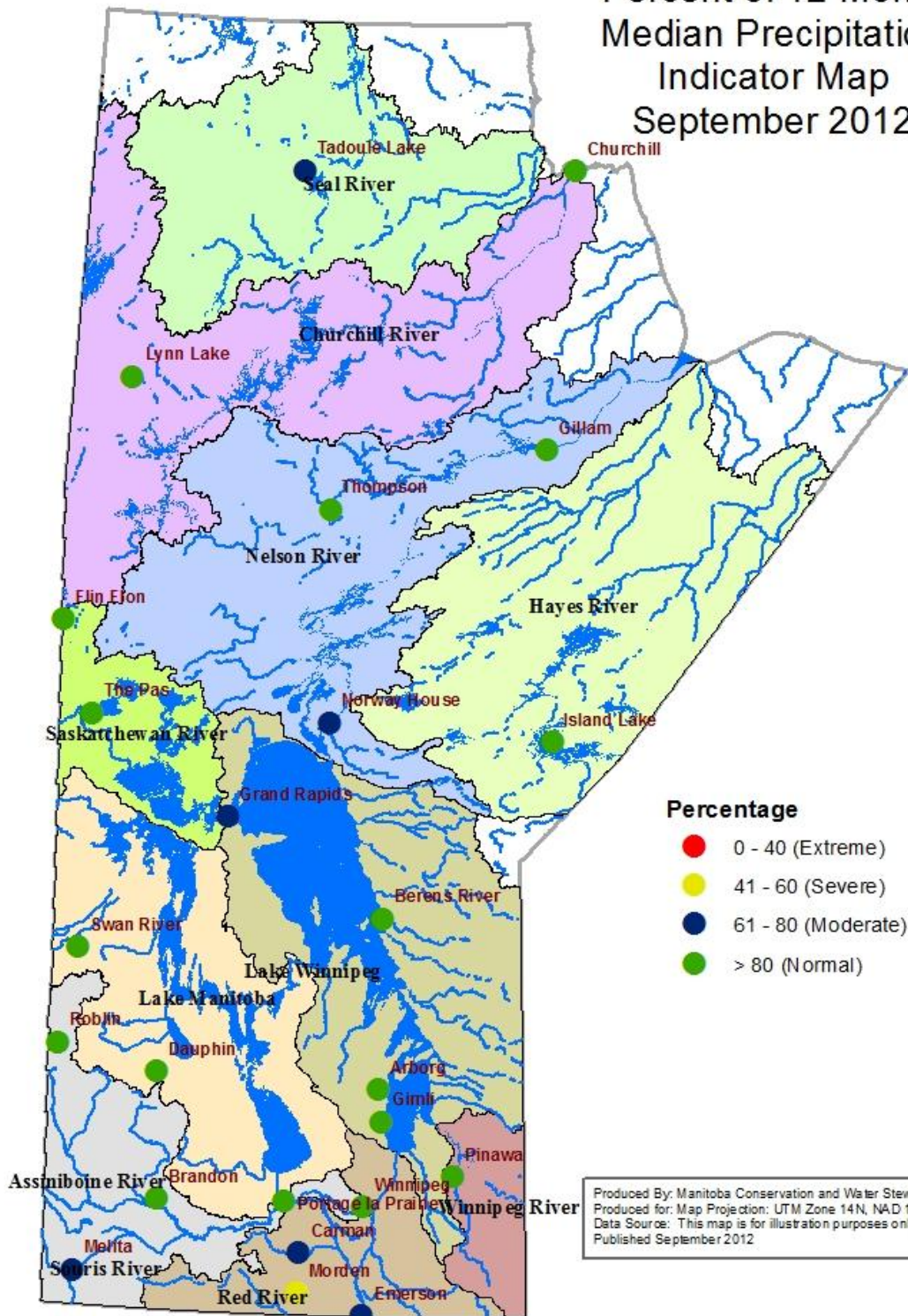
Percent of 3 Month Median Precipitation Indicator Map September 2012



0 40 80 160 Miles

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 September 2012

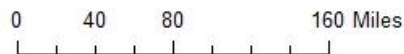
Percent of 12 Month Median Precipitation Indicator Map September 2012



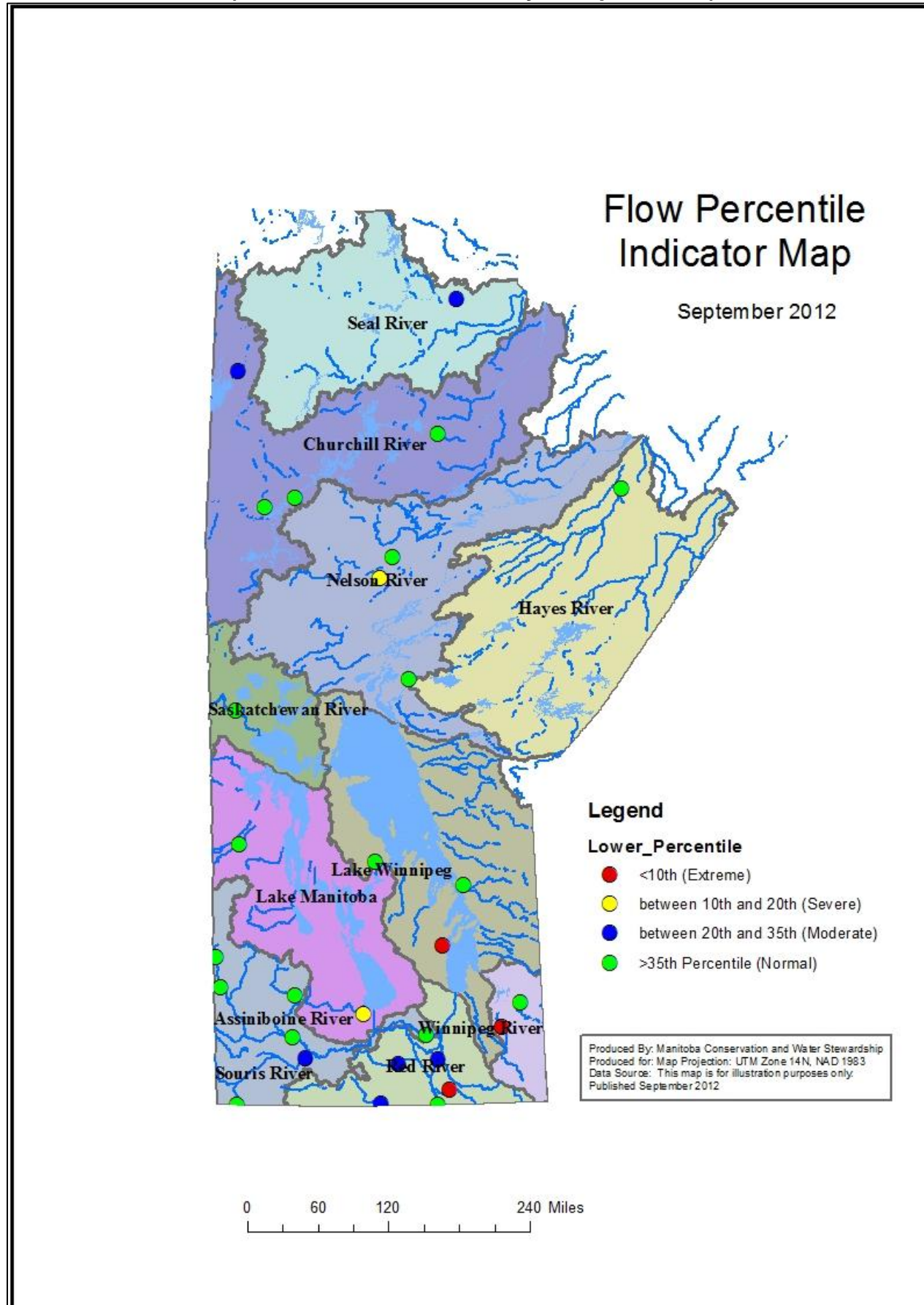
Percentage

- 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 September 2012



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

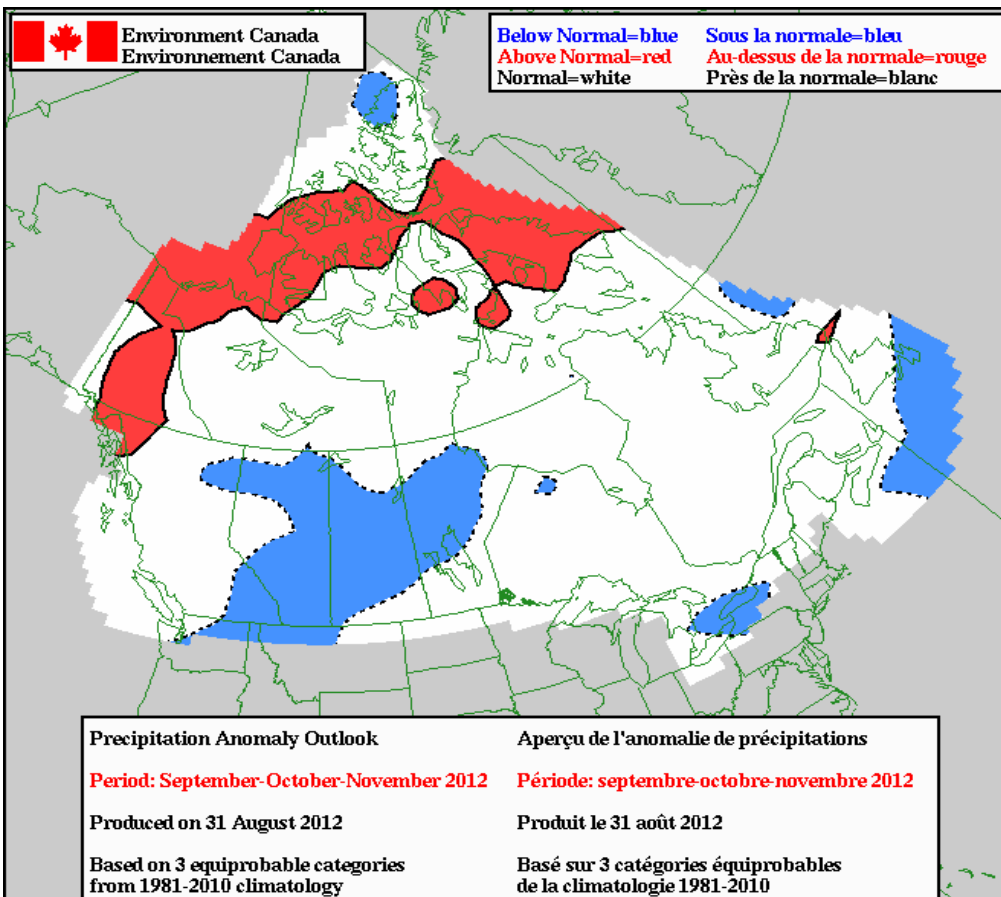
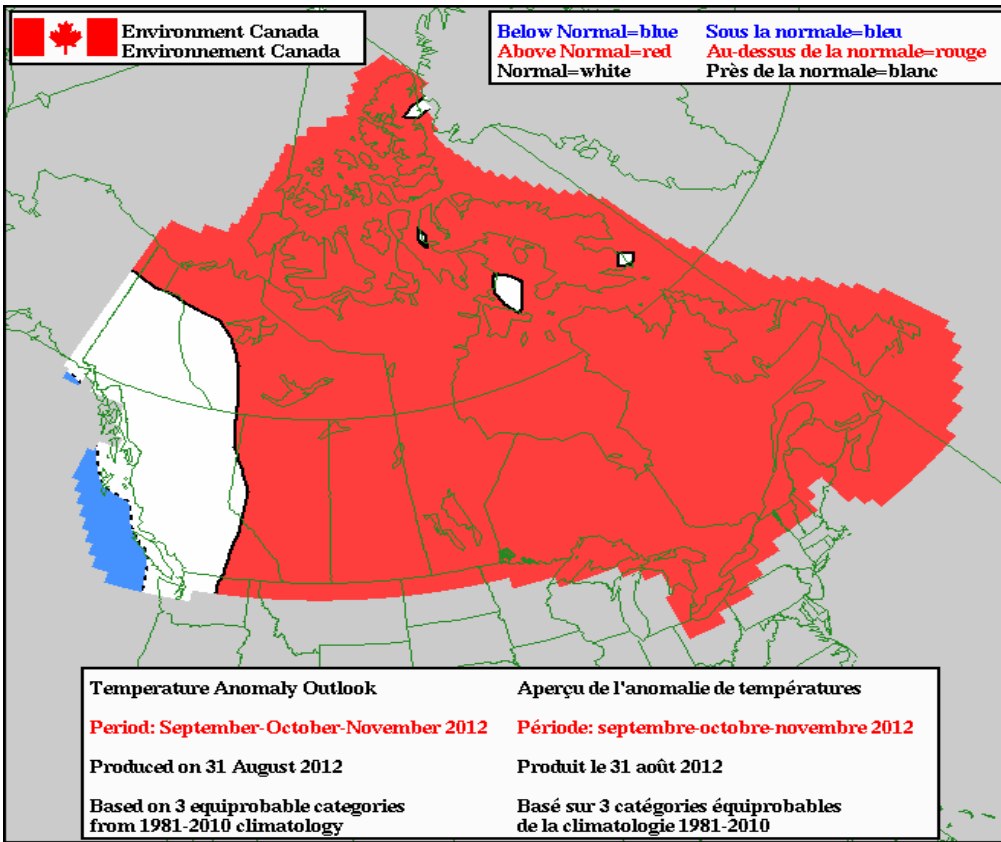


3. Water Supply Reservoir Status (Southern and Western)

| Water Supply Reservoir Levels and Storages | | | | | | | | |
|--|------------------|---------------------|------------------------------|--------------------|--|-------------------------------------|---------------------------------------|---|
| September 24, 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 | 1531.64 | July 18, 2012 | -0.4 | 520 | 495 | 95% |
| Goudney (Pilot Mound) | Pilot Mound | 1482.00 | 1481.37 | September 24, 2012 | -0.6 | 450 | 406 | 90% |
| Irwin | | 1178.00 | 1177.82 | July 5, 2012 | -0.2 | 3,800 | 3,692 | 97% |
| Jackson | | 1174.00 | 1173.73 | July 5, 2012 | -0.3 | 2,870 | 2,922 | 102% |
| Kenton (Kenworth) | Kenton | 1448.00 | 1447.81 | July 19, 2012 | -0.2 | 600 | 600 | 100% |
| Lake of the Prairies (Shellmouth)* | Brandon, Portage | 1402.50 | 1404.10 | September 24, 2012 | 1.6 | 300,000 | 322,200 | 107% |
| Killarney | Killarney | 1615.00 | 1614.95 | July 30, 2012 | 0.0 | 7,360 | 7,337 | 100% |
| Manitou (Mary Jane) | Manitou | 1537.00 | 1535.93 | September 24, 2012 | -1.1 | 1,150 | 1,054 | 92% |
| Minnewasta (Morden) | Morden | 1082.00 | 1077.93 | September 24, 2012 | -4.1 | 3,040 | 2,522 | 83% |
| Rapid City | Rapid City | 1573.50 | 1573.80 | July 19, 2012 | 0.3 | 200 | 221 | 110% |
| Lake Wahtopanah (Rivers) | Rivers | 1536.00 | 1535.52 | September 24, 2012 | | 24,500 | 23,972 | 98% |
| Stephenfield | Carman | 972.00 | 969.04 | September 24, 2012 | -3.0 | 3,810 | 2,650 | 70% |
| Turtlehead (Deloraine) | Deloraine | 1772.00 | 1771.69 | July 18, 2012 | -0.3 | 1,400 | 1,385 | 99% |
| Vermilion | Dauphin | 1274.00 | 1273.90 | August 27, 2012 | -0.1 | 2,600 | 2,595 | 100% |

* Summer Target level and storage.

4. Environment Canada 3 Month Outlook



5. Major River Basin

