

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).

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

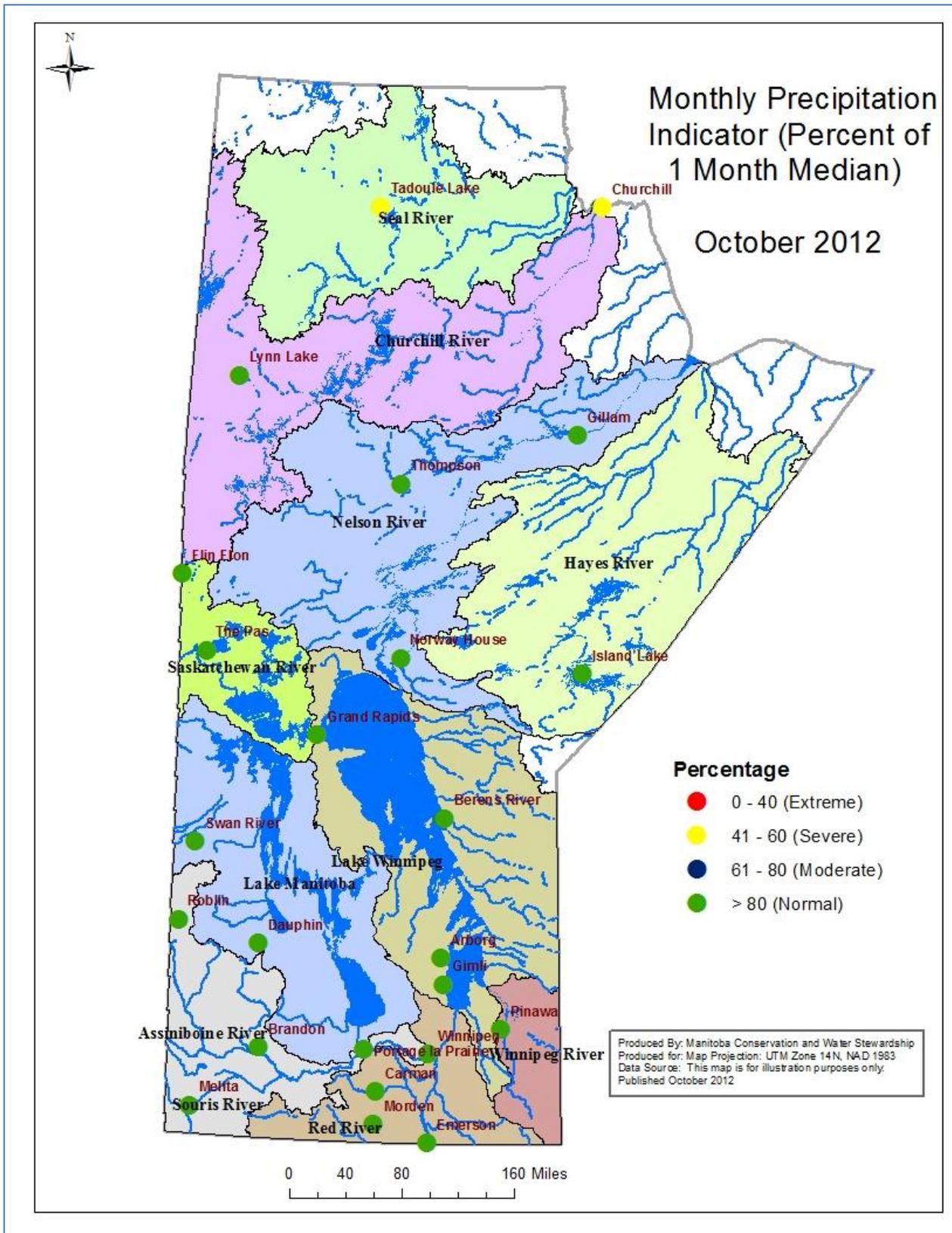
Hydrological Drought is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

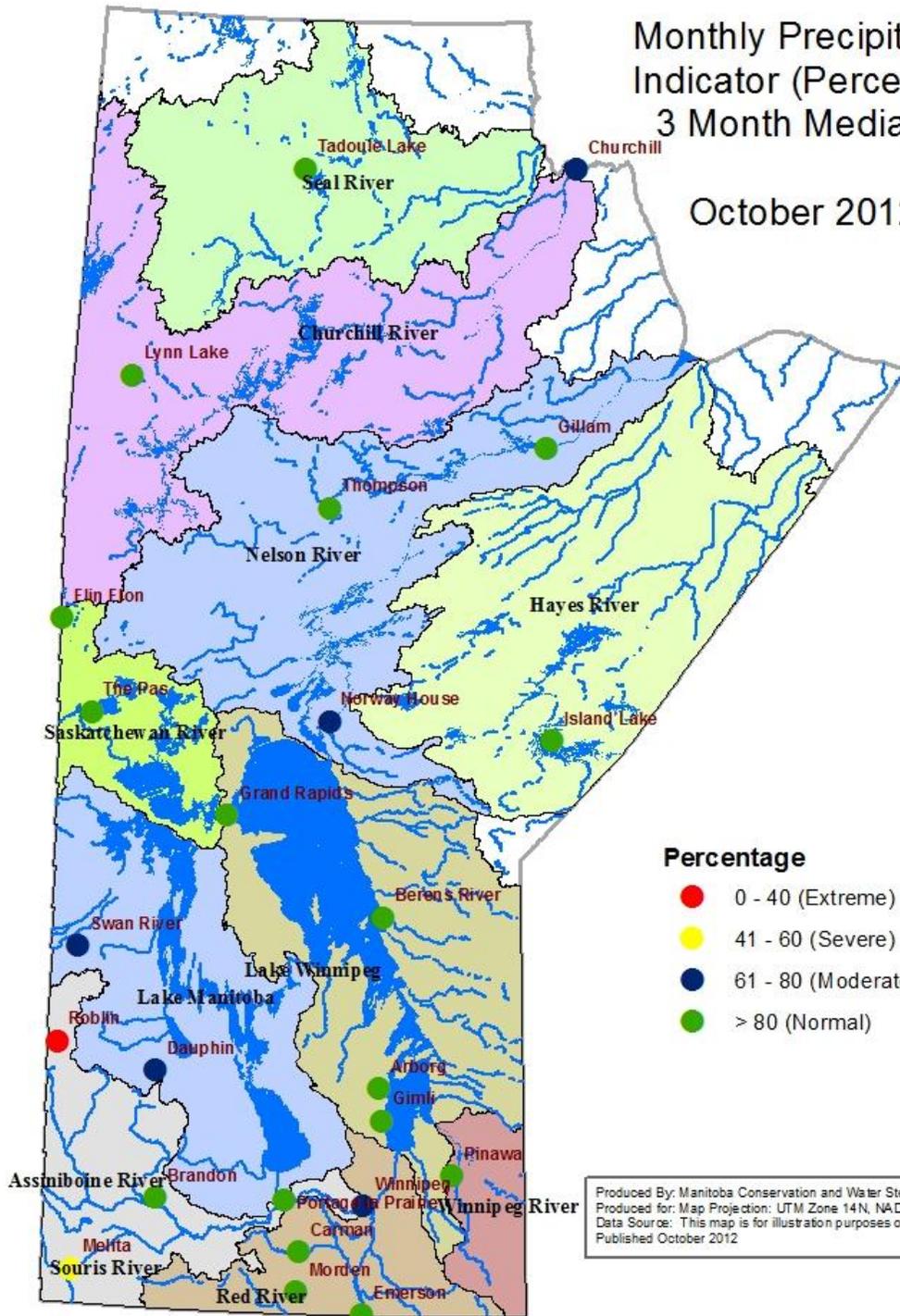
1. Precipitation Indicator (Percent of 1, 3 and 12 month median precipitation)





Monthly Precipitation Indicator (Percent of 3 Month Median)

October 2012

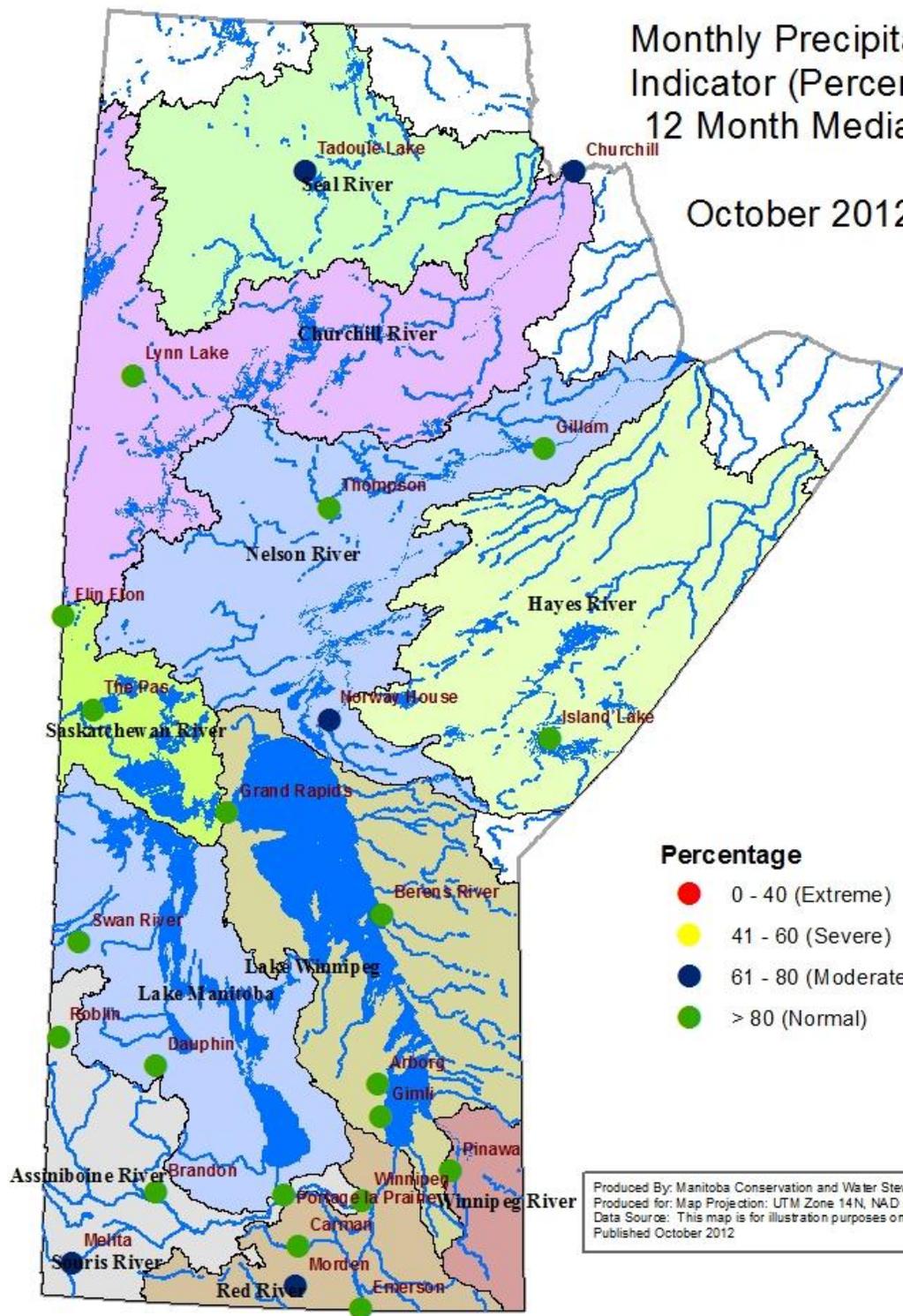


0 40 80 160 Miles



Monthly Precipitation Indicator (Percent of 12 Month Median)

October 2012



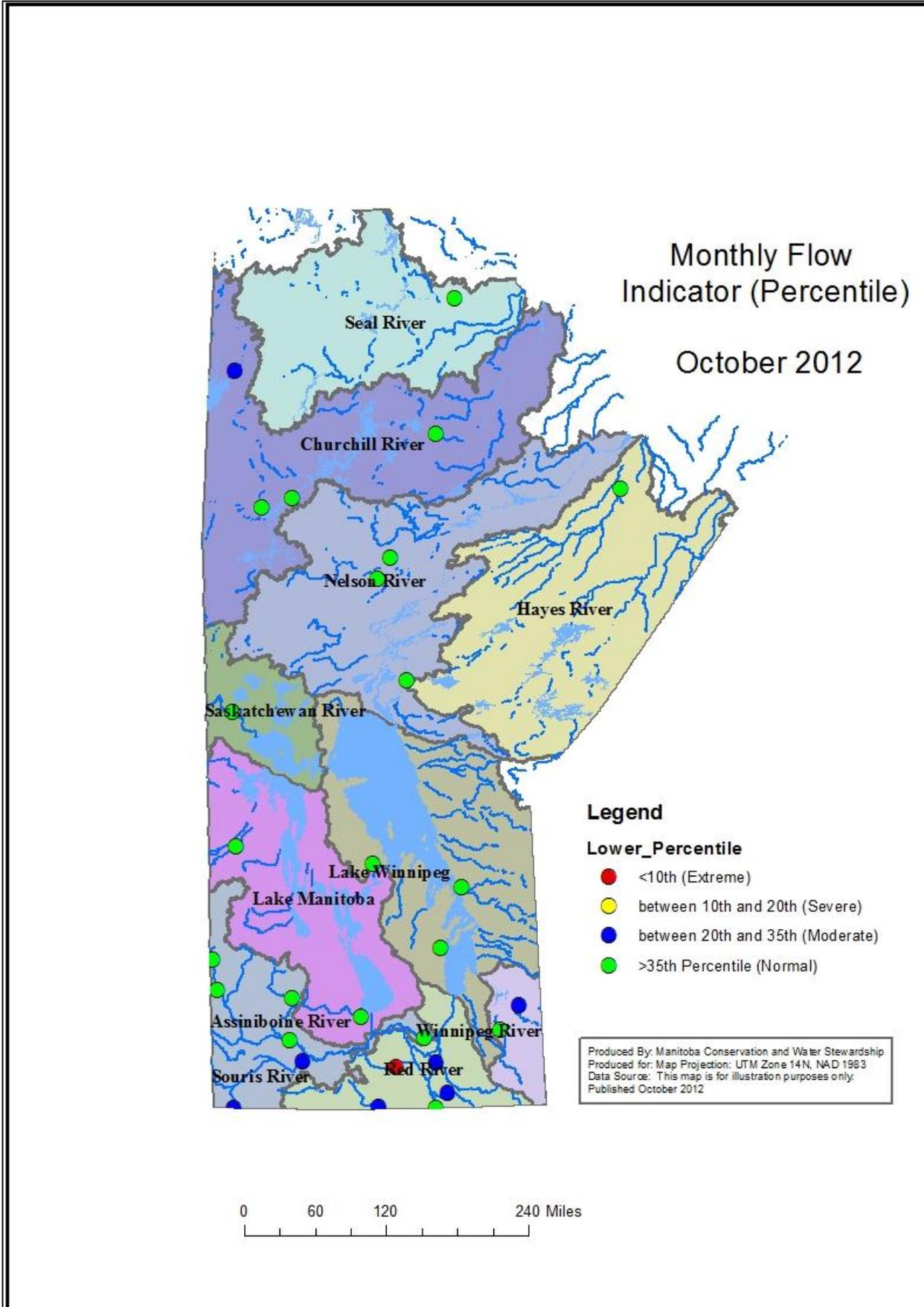
Percentage

- 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

0 40 80 160 Miles

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

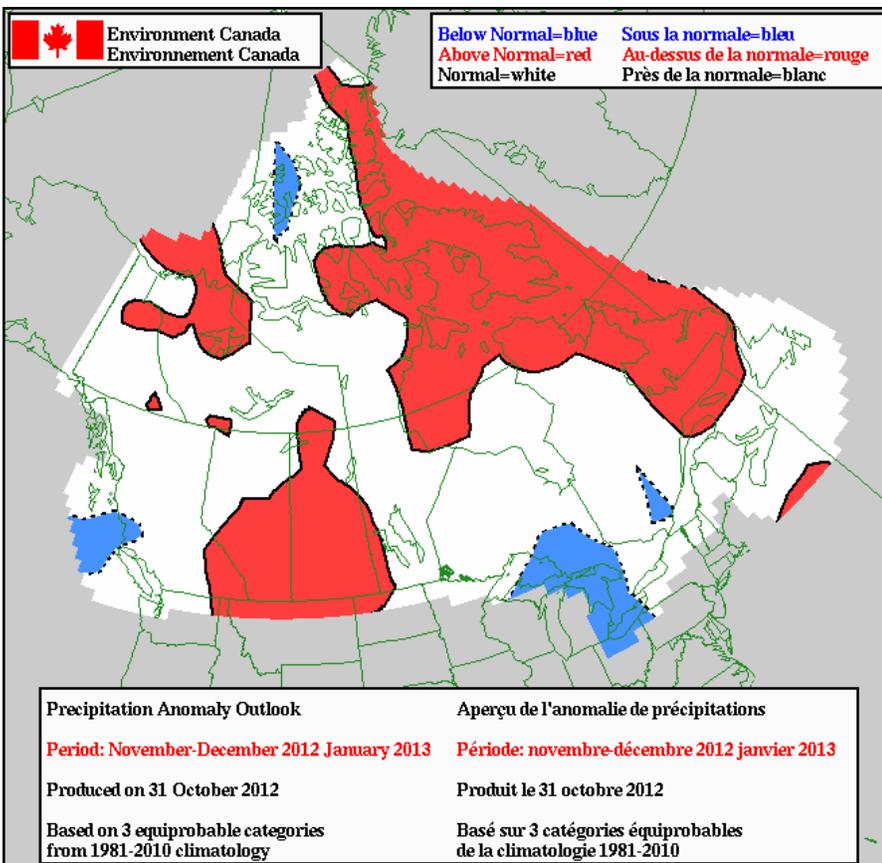
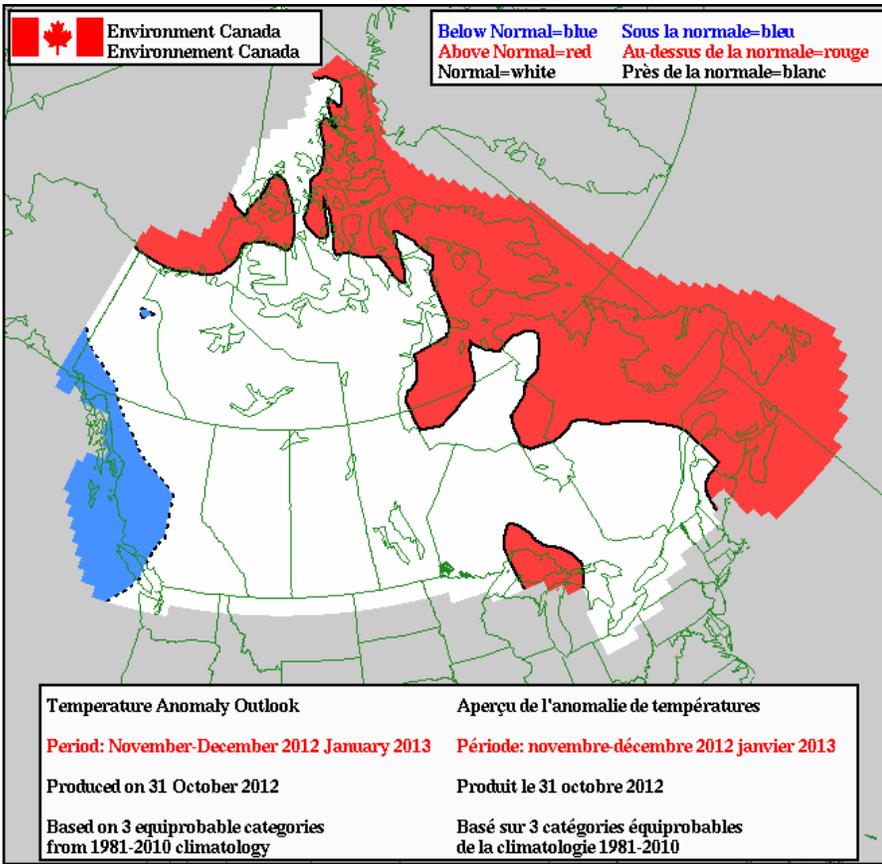


3. Water Supply Reservoir Status (Southern and Western)

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

