Manitoba
Conservation and Water Stewardship

WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT

October 20, 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 September 2014.

Precipitation indicators show most of Manitoba has experienced normal or above normal precipitation of the last three to twelve months. The area east of Lynn Lake and small areas surrounding Norway House and Pinawa experienced moderately to severely dry conditions over the last three months. In the shorter term, some areas of central and northern Manitoba experienced moderately to extremely dry conditions in September.

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

Water supply reservoirs in southern and western Manitoba are close to or above full supply levels. Manitoba Agriculture, Food and Rural Development reported that dugouts across agri-Manitoba have adequate supplies.

Outlook

Environment Canada's seasonal forecast for the next three months (October-November – December 2014) projects temperatures to be above normal across Manitoba. Precipitation in projected to be normal south of Lake Manitoba and Lake Winnipeg and above normal in the rest of the 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 isolated areas near Norway House, Lynn Lake, 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 Lynn Lake, Norway House, and a portion of the Winnipeg River basin. The area east of Swan River experienced moderately dry conditions. Normal conditions prevailed throughout the majority of the province.

Over the short term (one month), normal conditions prevailed throughout most of southern Manitoba. Moderately to severely dry conditions existed in the areas around the north basin of Lake Winnipeg and Lake Winnipegosis. In northern Manitoba, moderately to extremely dry conditions existed over most of the Churchill and Lower Nelson River Basins while normal to severely dry conditions existed in the Seal and Hayes River basins.

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 most major rivers across the province. The Cochrane River in the upper Churchill River basin experienced severely dry conditions.

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 Development reports that water levels in dugouts were adequate across 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 one fire was active in western Manitoba as of September 30th. 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 seasonal forecast for the next three months (October-November – December 2014) projects temperatures to be above normal across Manitoba. Precipitation in projected to be normal south of Lake Manitoba and Lake Winnipeg and above normal in the rest of the province (Attachment 4). Areas in northern Manitoba may become increasingly dry if precipitation does not occur and the fall is unseasonably warm.

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 (in Manitoba)	Drought Indicators			
	Precipitation Indicator			Monthly Flow Indicator July 2014
	Percent of 1 month Median August 2014	Percent of 3 month Median June - August 2014	Percent of 12 month Median July 2013- August 2014	
Red River	Normal except for severely dry conditions near Morden	Normal	Normal	Normal
Winnipeg River	Normal except for severely dry conditions near Pinawa	Normal to severely dry	Normal	Normal
Assiniboine River-Souris River	Normal except moderately dry in southwest corner	Normal	Normal	Normal
Lake Manitoba	Normal to severely dry in Lake Winnipegosis region	Normal except moderately dry west of Swan River	Normal	Normal
Lake Winnipeg	Normal to severely dry	Normal except for moderately dry in north and south ends of the watershed	Normal	Normal
Saskatchewan River	Normal to moderately dry	Normal	Normal	Normal
Nelson River	Moderately to severely dry	Normal except for moderately to severely dry near Norway House	Normal except moderately dry for areas surrounding Norway House	Normal
Hayes River	Normal to moderately dry	Normal except for moderately dry in southwest corner of basin	Normal except moderately dry areas in the southwest and middle portions of the basin	Normal
Churchill River	Normal to extremely dry towards west part of basin	Normal except for moderately to severely dry in western portion of basin	Normal except moderately dry west of Lynn Lake	Normal except moderately dry for Cochrane River
Seal River	Normal except moderately/ severely dry in west part of basin	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
- 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 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.*

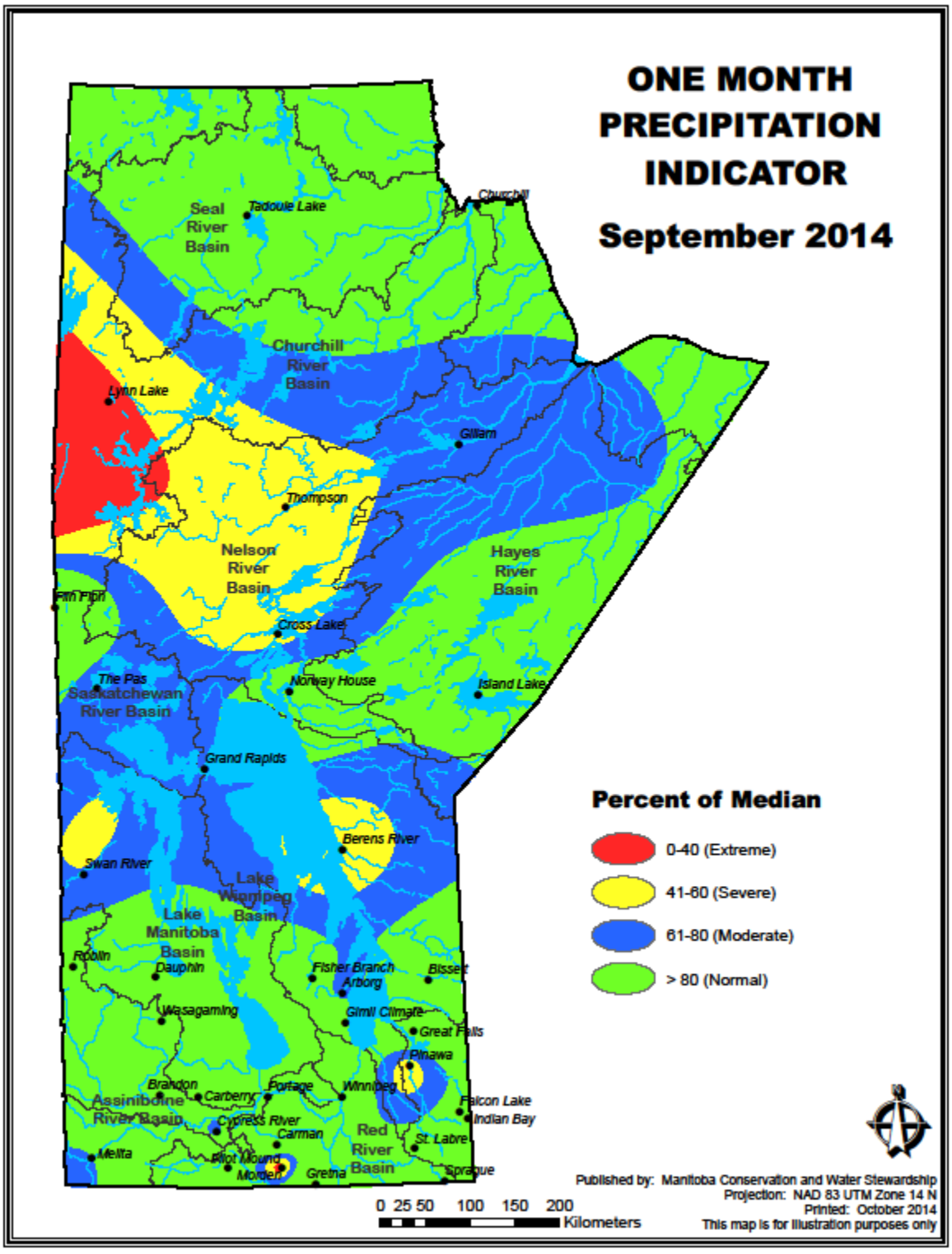
Hydrological Drought *is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

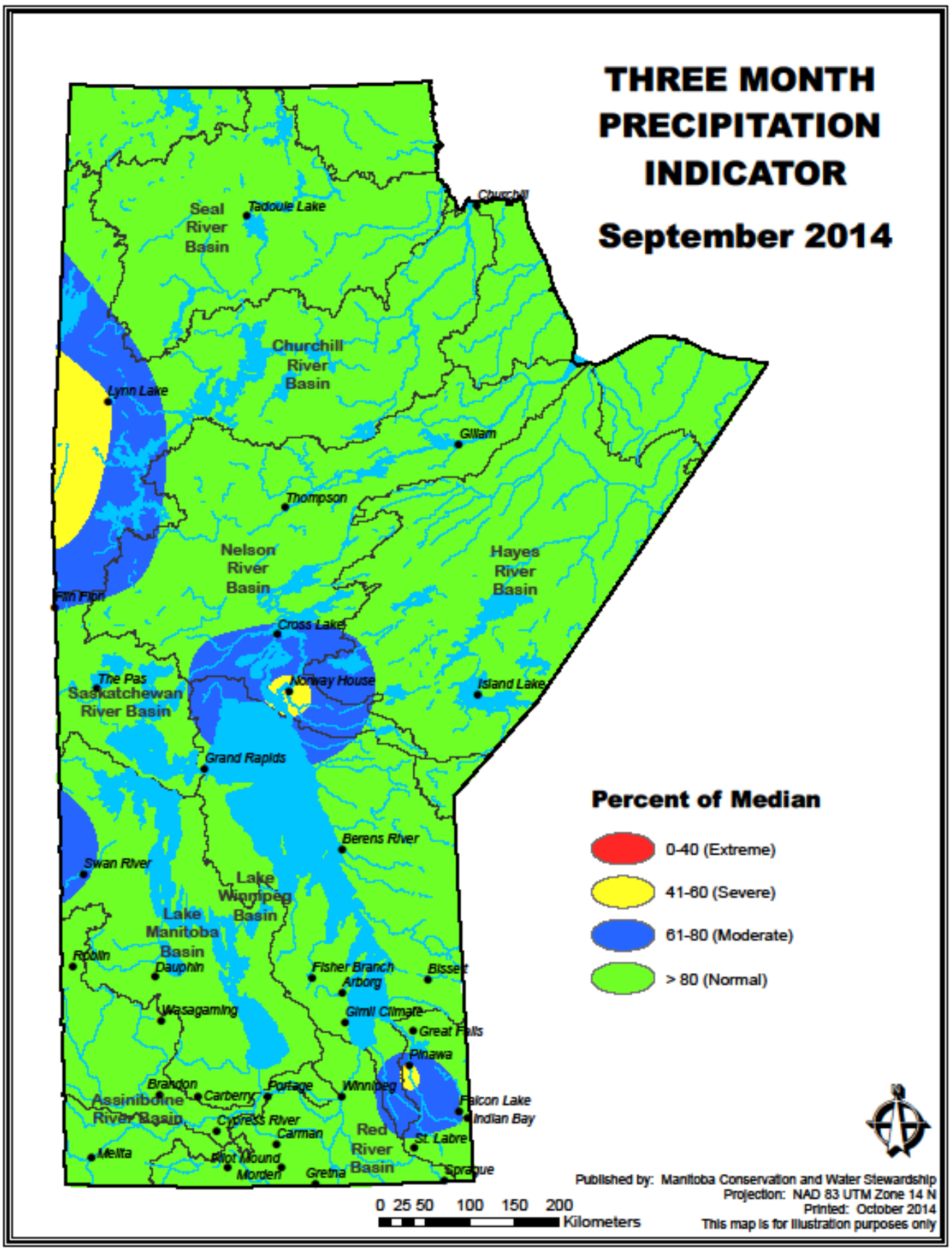
Rainfall also recharges groundwater aquifers through infiltration through the soil and run-off into streams and rivers. Once groundwater and surface waters are significantly impacted by lack of precipitation, a "hydrologic drought" occurs. Aquifer declines can range from a quick response (shallow sand) to impacts extending over multiple years. Impacts can include depletion of shallow depth wells, drying of farm dugouts, and changes to ground water quality.

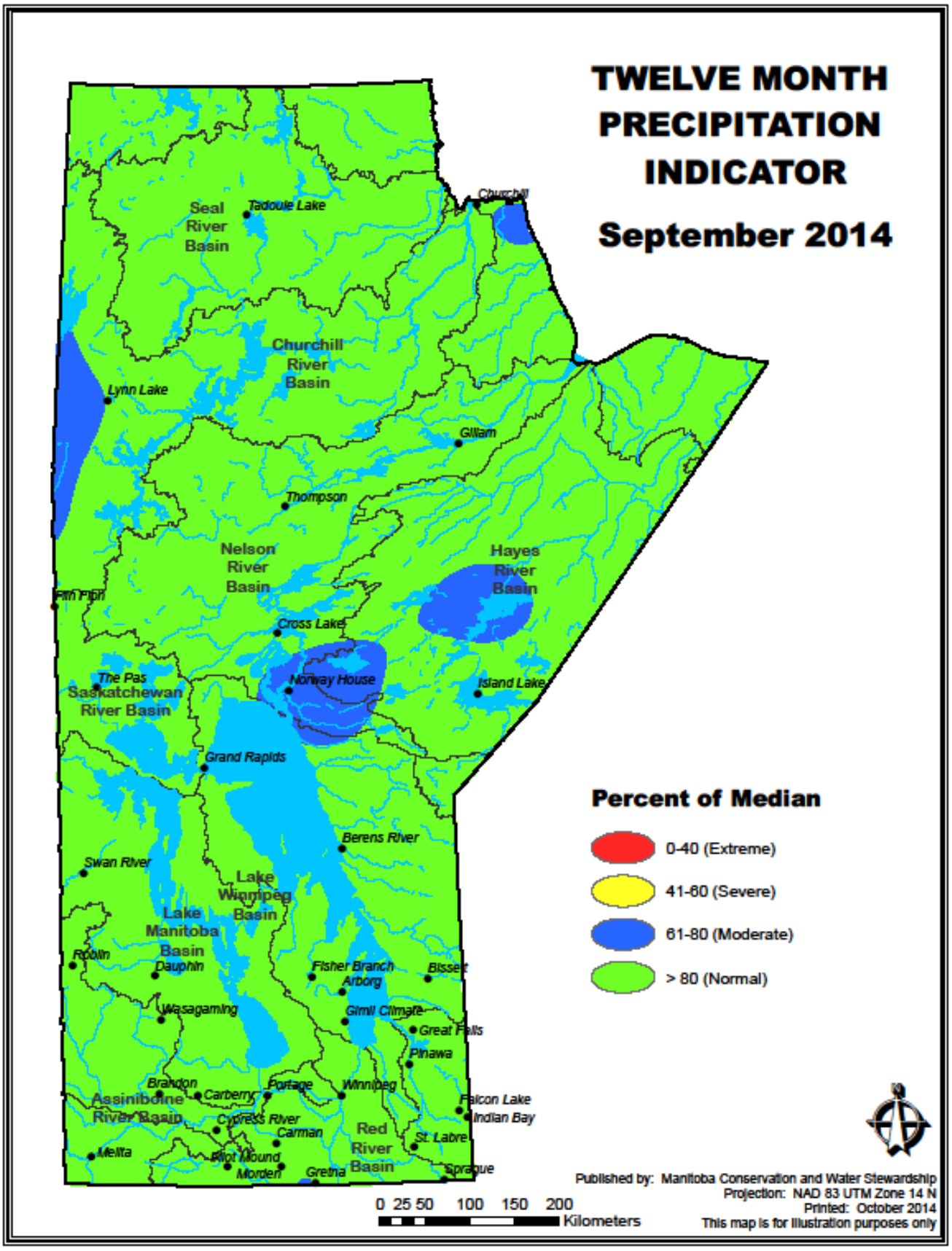
Socioeconomic Drought *occurs when the supply fails to meet the demand for an economic good(s) such as domestic water supplies, hay/forage, food grains, fish, and hydroelectric power, due to weather related water supply shortages from one or both of natural or managed water systems. At any time during 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
September 2014
Seal River Basin
Tadoule Lake
Churchill
Churchill River Basin
Lynn Lake
Gillam
Thompson
Nelson River Basin
Hayes River Basin
Flin Flon
Cross Lake
The Pas
Saskatchewan River Basin
Norway House
Island Lake
Grand Rapids
Berens River
Swan River
Lake Winnipeg Basin
Lake Manitoba Basin
Roblin
Dauphin
Fisher Branch
Arborg
Bissett
Wasagaming
Gimli Climate
Great Falls
Pinawa
Brandon
Carberry
Portage
Winnipeg
Falcon Lake
Indian Bay
Assiniboine River Basin
Cypress River
Carman
Red River Basin
St. Labre
Melita
Pilot Mound
Morden
Gretna
Sprague
Percent of Median
0-40 (Extreme)
41-60 (Severe)
61-80 (Moderate)
> 80 (Normal)
0 25 50 100 150 200
Kilometers
Published by: Manitoba Conservation and Water Stewardship
Projection: NAD 83 UTM Zone 14 N
Printed: October 2014
This map is for illustration purposes only


TWELVE MONTH
PRECIPITATION
INDICATOR
September 2014
Seal River Basin
Tadoule Lake
Churchill
Churchill River Basin
Lynn Lake
Gillam
Thompson
Nelson River Basin
Hayes River Basin
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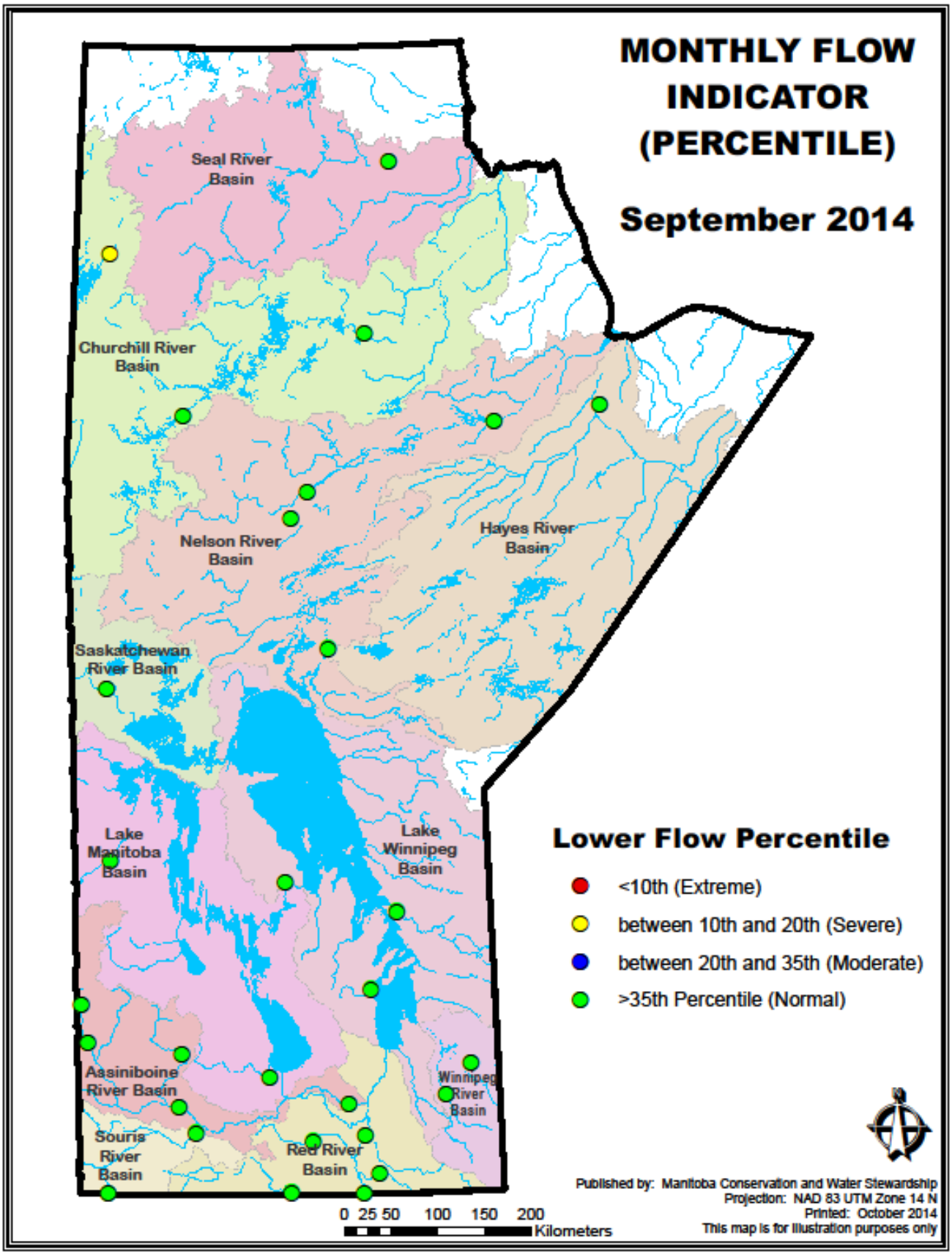
Published by: Manitoba Conservation and Water Stewardship
Projection: NAD 83 UTM Zone 14 N
Printed: October 2014
This map is for illustration purposes only

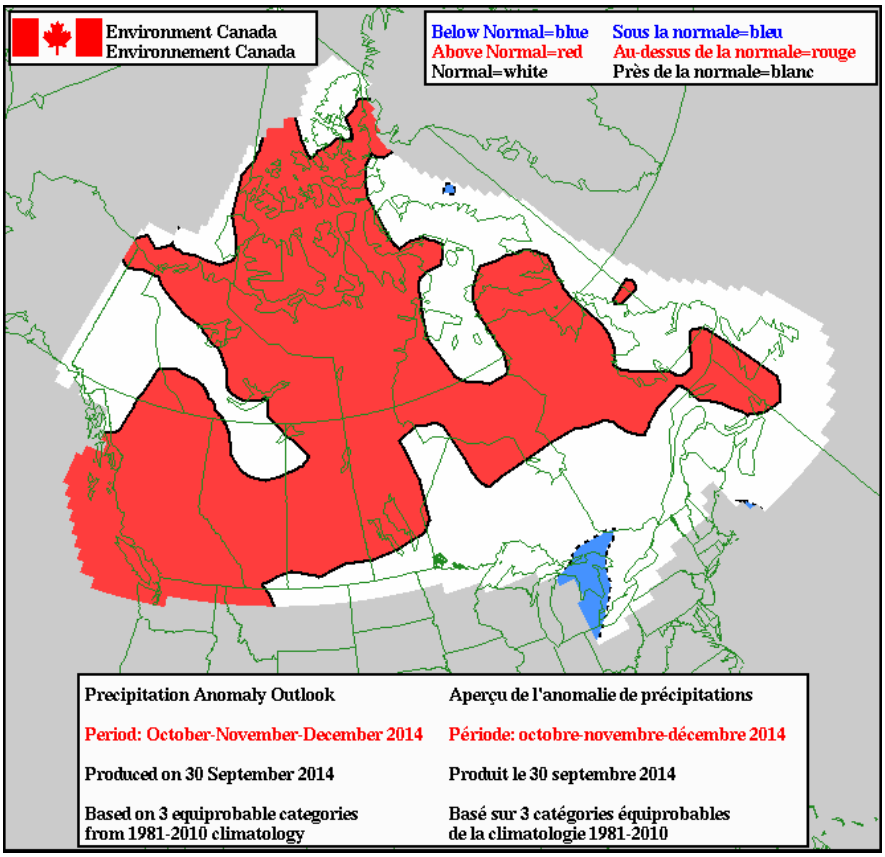
2. Monthly Flow Indicator (lower 10th-20th-35th monthly flow percentile)

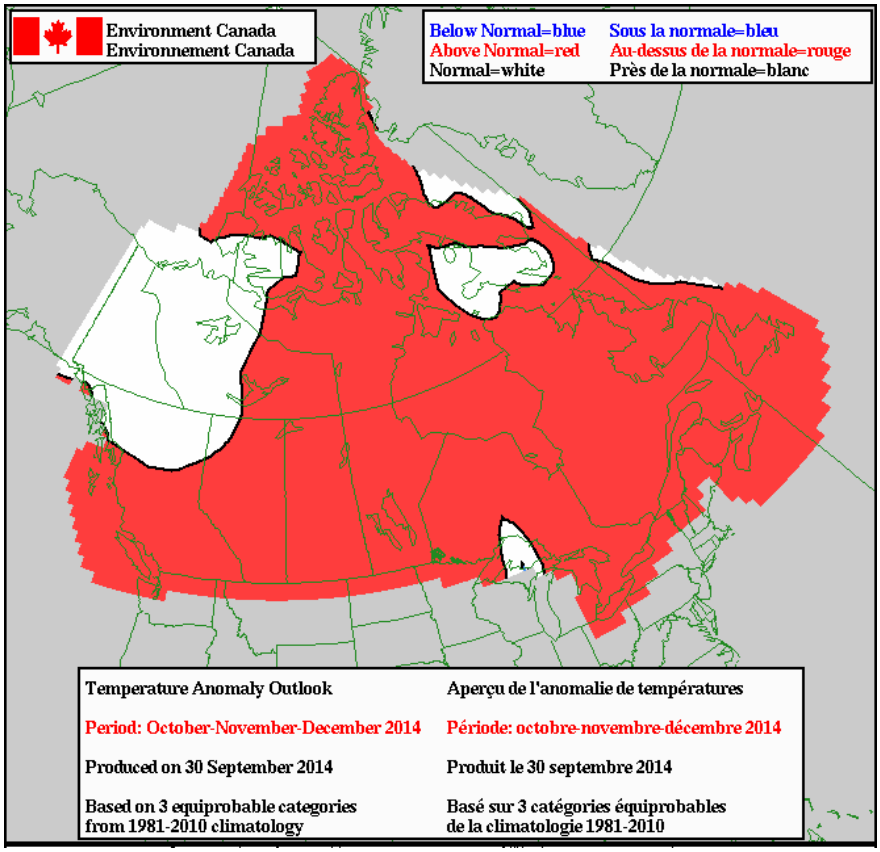


3. Water Supply Reservoir Status (Southern and Western)

Water Supply Reservoir Levels and Storages								
October 3, 2014								
Lake o October 3, 2014 r 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	1,481.93	September 30, 2014	-0.07	450	445	99%
Lake of the Prairies (Shellmouth)*	Brandon, Portage	1,402.50	1,404.76	September 15, 2014	2.26	300,000	331,856	111%
Manitou (Mary Jane)	Manitou	1,537.00	1,536.18	September 30, 2014	-0.82	1,150	1,076	94%
Minnewasta (Morden)	Morden	1,082.00	1,081.25	September 30, 2014	-0.75	3,150	3,025	96%
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	1,536.98	September 30, 2014	0.98	24,500	26,715	109%
Stephenfield	Carman	972.00	972.04	September 30, 2014	0.04	3,810	3,831	101%
Turtlehead (Deloraine)	Deloraine	1,772.00	1,771.59	September 30, 2014	-0.41	1,400	1,379	99%
Vermilion	Dauphin	1,274.00	1277.48	September 30, 2014	0.20	2,600	3,100	102%
* Summer Target level and storage. ** Corrected								

4. Environment Canada Seasonal (3 months) Outlook





5. Major River Basin