

WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT

June 6, 2014

Synopsis/Overview

This Water Availability and Drought Conditions Report provides an update on meteorological and hydrologic drought conditions for Manitoba as of the end of May 2014.

Precipitation indicators show moderately to extremely dry conditions prevailed for areas surrounding The Pas, and moderately to severely dry conditions for areas surrounding Churchill, Flin Flon and Lynn Lake and southwestern part of the Nelson River Basin including Norway House. Moderately dry conditions prevailed for the areas surrounding, Morden, Portage la Prairie and the lower Nelson River Basin including Gillam. Normal conditions prevailed throughout the rest of the province.

Monthly stream flow indicators for May indicate flows are normal or above normal for almost all rivers across the province. The Hayes River and the Seal River River experienced severely dry hydrological conditions.

Manitoba Agriculture, Food and Rural Development reported that all dugouts across agri-Manitoba are full or close to full due to the spring freshet.

Water supply reservoirs in southern and western Manitoba are at or above full supply levels following the spring freshet.

Outlook

Environment Canada's seasonal forecast for the next three months (June-July-August 2014) is for normal temperatures for the entire province except below normal for a portion of southeast Manitoba near the borders. Normal precipitation is forecast for the entire province except above normal for southeast and southcentral Manitoba (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 or above normal throughout the province with the exception of the areas near Morden, Gimli, Norway House northeast of Lake Winnipeg and Churchill where moderately dry conditions prevailed.

Over the medium term (three months), moderately to extremely dry conditions prevailed for areas surrounding The Pas, and moderately to severely dry conditions for areas surrounding Churchill, Flin Flon and Lyn Lake and southwestern part of the Nelson basin including Norway House. Moderately dry conditions prevailed for the areas surrounding, Morden, Portage La Prairie and the lower Nelson basin including Gillam. Normal or above normal conditions prevailed throughout the rest of the province.

Over the short term (one month), moderately to extremely dry conditions prevailed in areas surrounding The Pas. Moderately to severely dry conditions prevailed in area surrounding Morden, and in the southern part of the Nelson and Hayes River basins. Moderately dry conditions prevailed in areas between Carman and Arborg. Normal or above normal conditions prevailed throughout the rest of the province.

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 flows were normal or above normal for almost all rivers across the province. The Hayes River and the Seal River River experienced severely dry hydrological conditions.

Water Availability

Reservoir Conditions

Water supply reservoirs in southern and western Manitoba are at full or above full supply level (Attachment 3).

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.

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 warm temperatures and strong winds continue to increase the fire danger levels throughout the province. 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

With Environment Canada's outlook for the next three months for normal temperature and normal precipitation dry conditions may be alleviated in existing dry areas, particularly in the Saskatchewan, Hayes River and the Seal River Basins.

Water supply reservoirs are at full or above full supply levels and should have sufficient water supplies for the balance of the year unless prolonged dry conditions occur.

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) May 2014 | Monthly Precipitation Indicator (Percent of 3 month Median) (March - May 2014) | Monthly Precipitation Indicator (Percent of 12 month Median) (June 2013- May 2014) | Monthly Flow Indicator May 2014 |
| Red River | Normal conditions east of Red River, moderately to severely dry for most areas west of the Red River | Normal conditions except moderately dry for areas surrounding Morden and west of Carman | Normal conditions except moderately dry for areas near Morden and Emerson | Normal conditions |
| Winnipeg River | Normal conditions | Normal conditions | Normal conditions | Normal conditions |
| Assiniboine River-Souris River | Normal conditions except moderately dry for areas surrounding Portage la Prairie | Normal conditions except moderately dry for areas surrounding Portage la Prairie | Normal conditions | Normal conditions |
| Lake Manitoba | Normal conditions except moderately dry for areas southeast of Lake Manitoba | Normal conditions except moderately dry conditions for the upper northwest part of the basin and areas south of Lake Manitoba | Normal conditions | Normal conditions |
| Lake Winnipeg | Normal conditions except moderately dry for areas between Gimli and Arborg | Normal conditions | Normal conditions except moderately dry conditions for the area surrounding Gimli and the northeastern part of the basin | Normal conditions |
| Saskatchewan River | Moderately to extremely dry for areas surrounding The Pas and | Moderately to extremely dry conditions in areas surrounding The | Normal conditions | Normal conditions |

| | normal near Grand Rapids | Pas, normal near Grand Rapids | | |
|-----------------|---|--|---|---------------------------------------|
| Nelson River | Moderately to severely dry conditions for the southern part of the basin including Norway House | Moderately to severely dry for the southwestern part of the Nelson basin including Norway House and moderately dry for the lower Nelson basin including Gillam | Normal conditions except moderately dry for areas surrounding Norway House. | Normal conditions |
| Hayes River | Moderately dry conditions for the southern part of the basin | Moderately dry conditions for northern and southwestern parts of the basin. | Normal except moderately dry conditions for the southern part of the basin. | Extremely dry hydrological conditions |
| Churchill River | Normal conditions except moderately dry for areas near Flin Flon | Moderately to severely dry conditions in the upper and lower parts of the basin | Normal conditions except moderately dry for areas around Churchill | Normal conditions |
| Seal River | Normal conditions | Normal conditions except moderately dry for the eastern part of the basin | Normal conditions | Extremely dry hydrological 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
- 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: Abul Kashem/Mark Lee, Surface Water Management Section, Manitoba Conservation and Water Stewardship, 204-803-9431/204-945-5606.

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.

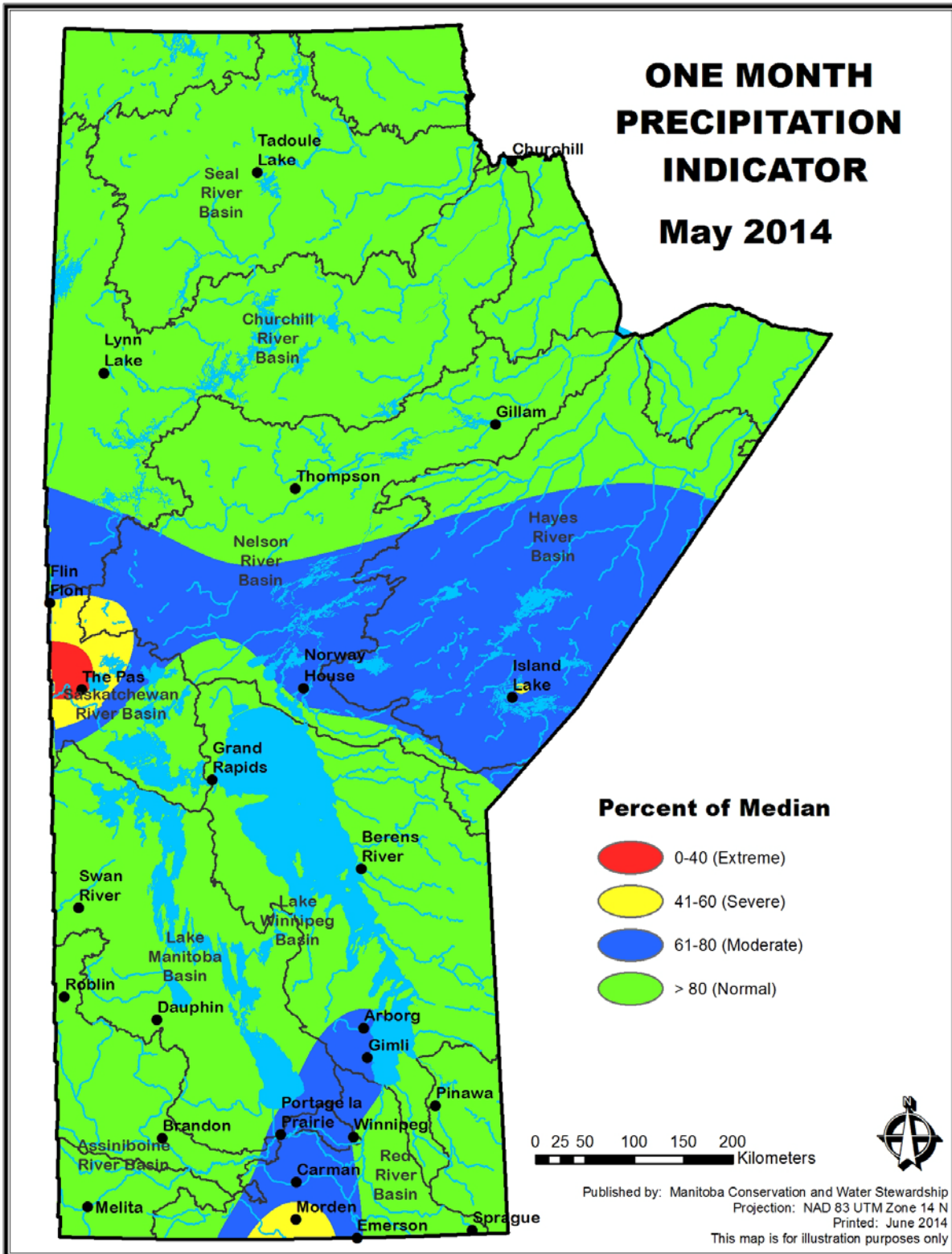
Hydrological Drought is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes, and aquifers. Hydrological droughts are usually noticed some time after meteorological droughts. First, precipitation decreases and after some time, water levels in rivers and lakes drop.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

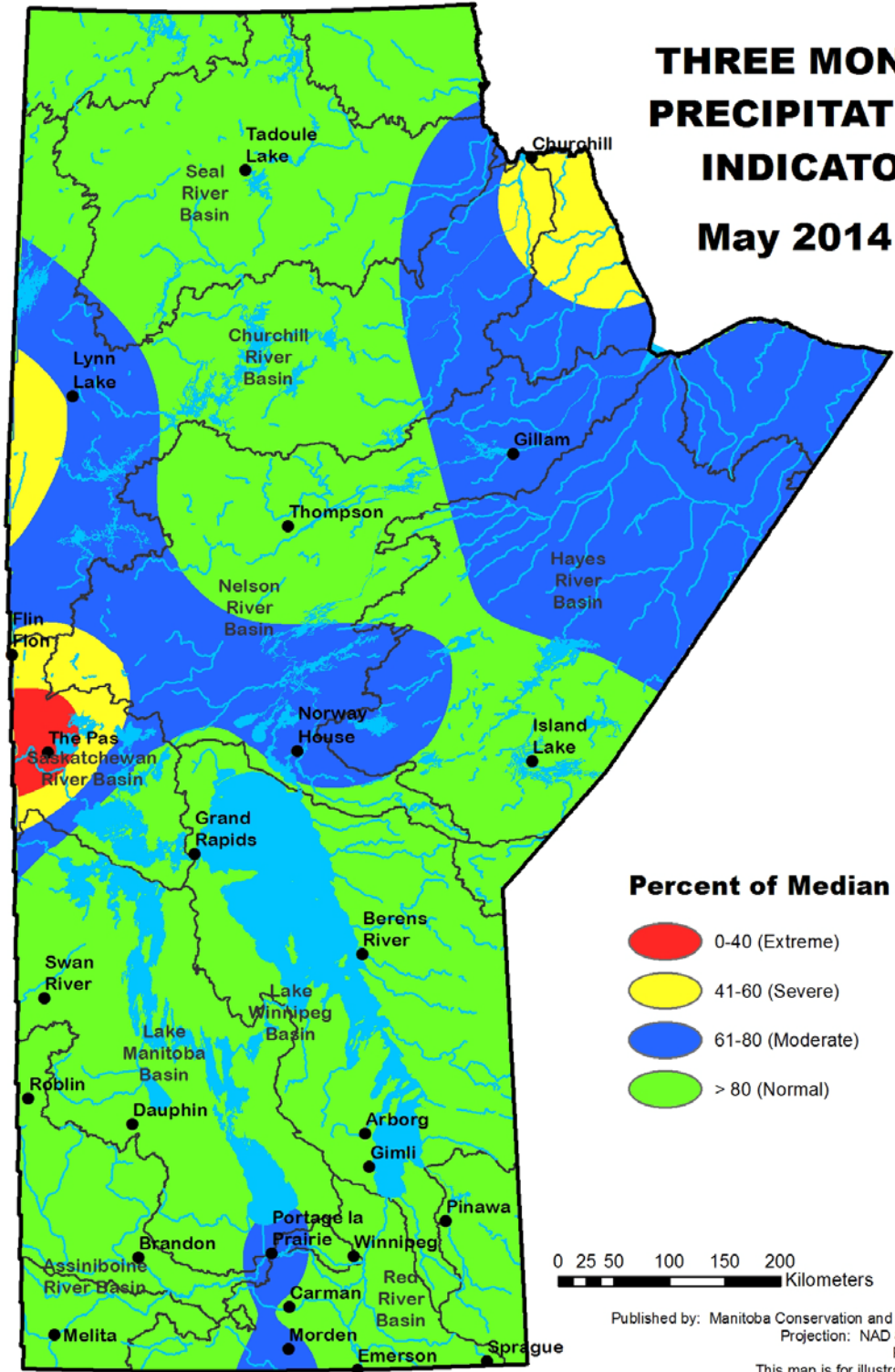
Socioeconomic Drought occurs when the supply fails to meet the demand for an economic good(s) such as domestic water supplies, hay/forage, food grains, fish, and hydroelectric power, due to weather related water supply shortages from one or both of natural or managed water systems. At any time during 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 May 2014

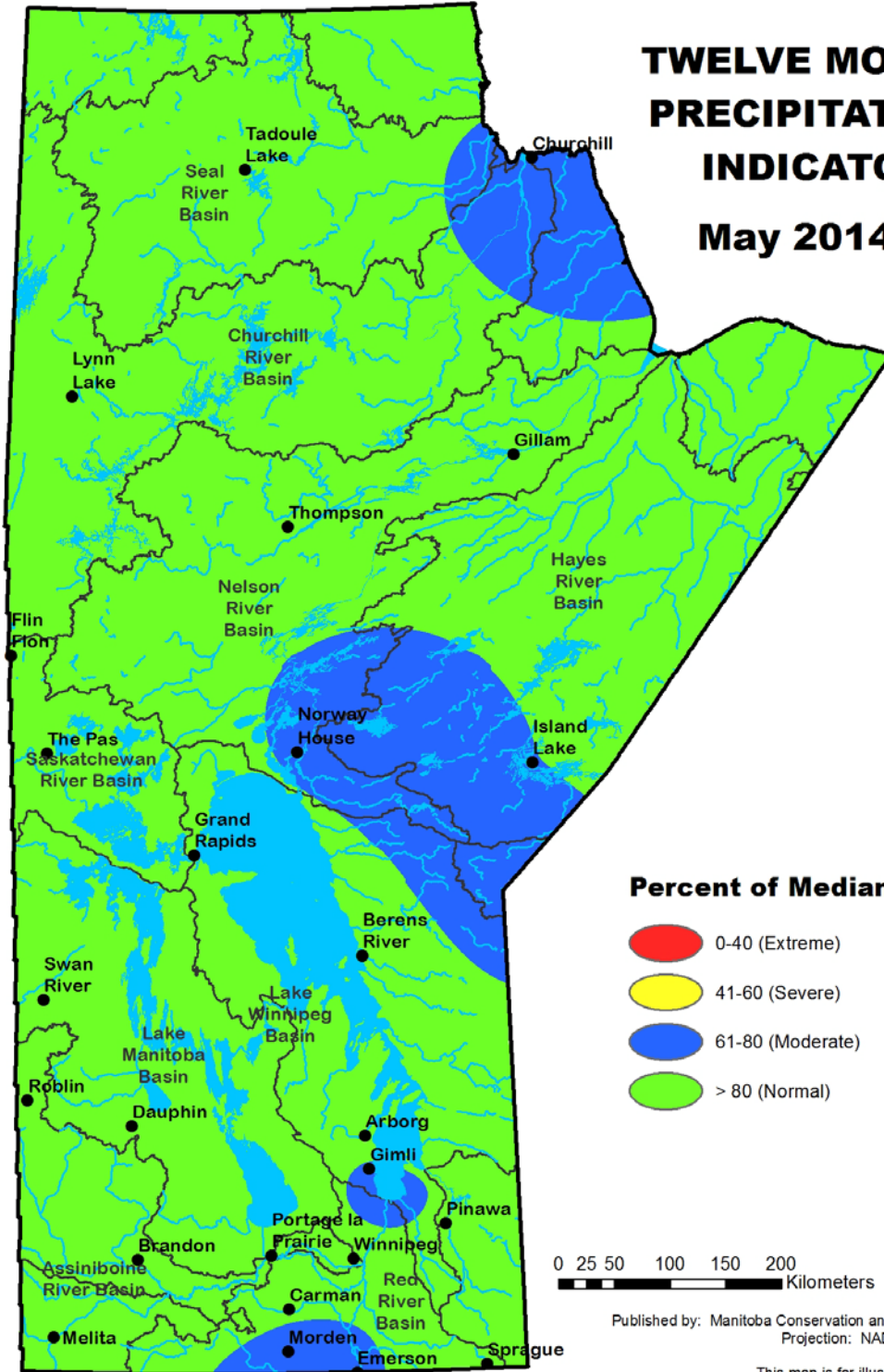


0 25 50 100 150 200
Kilometers



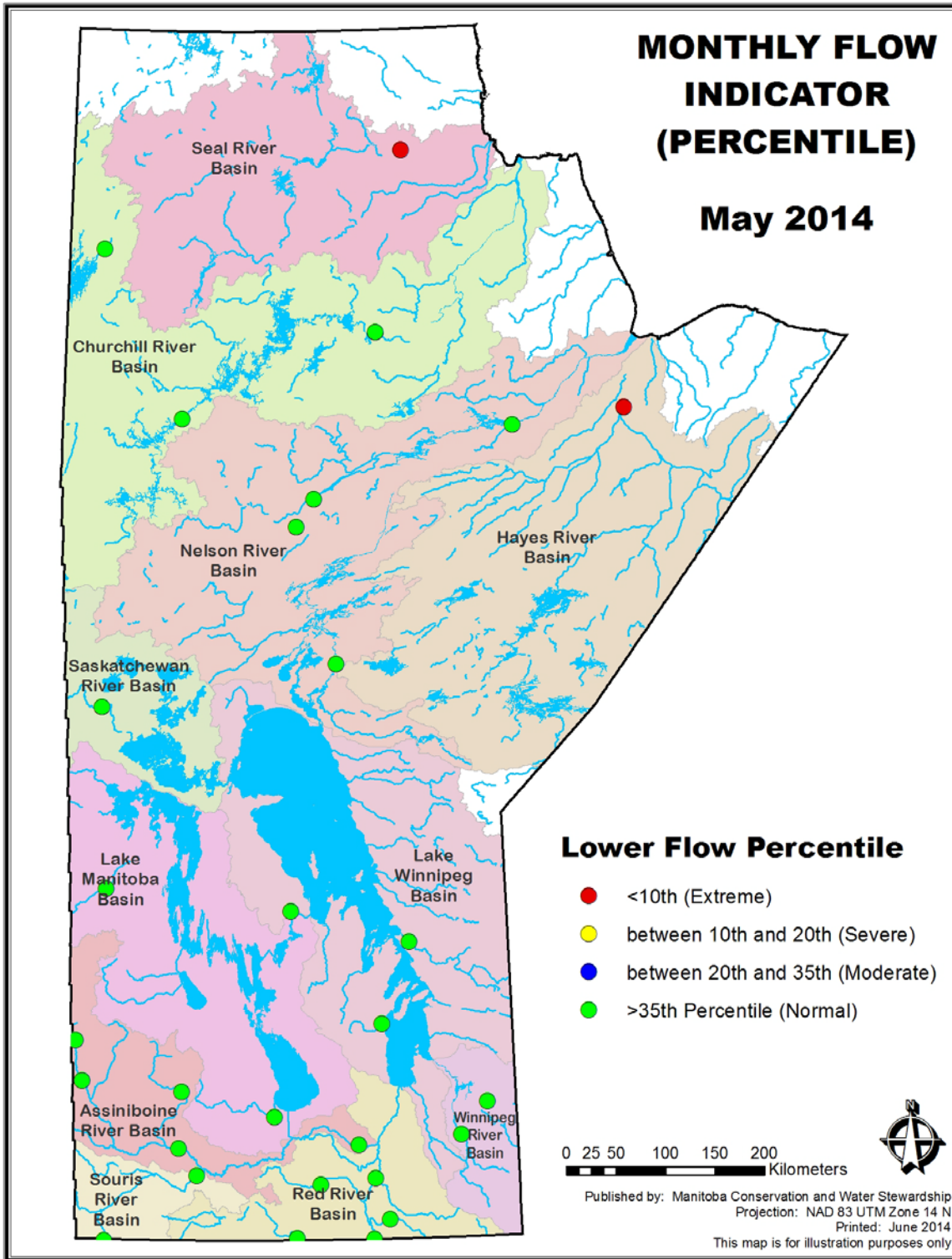
Published by: Manitoba Conservation and Water Stewardship
 Projection: NAD 83 UTM Zone 14 N
 Printed: June 2014
 This map is for illustration purposes only

TWELVE MONTH PRECIPITATION INDICATOR May 2014



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 Projection: NAD 83 UTM Zone 14 N
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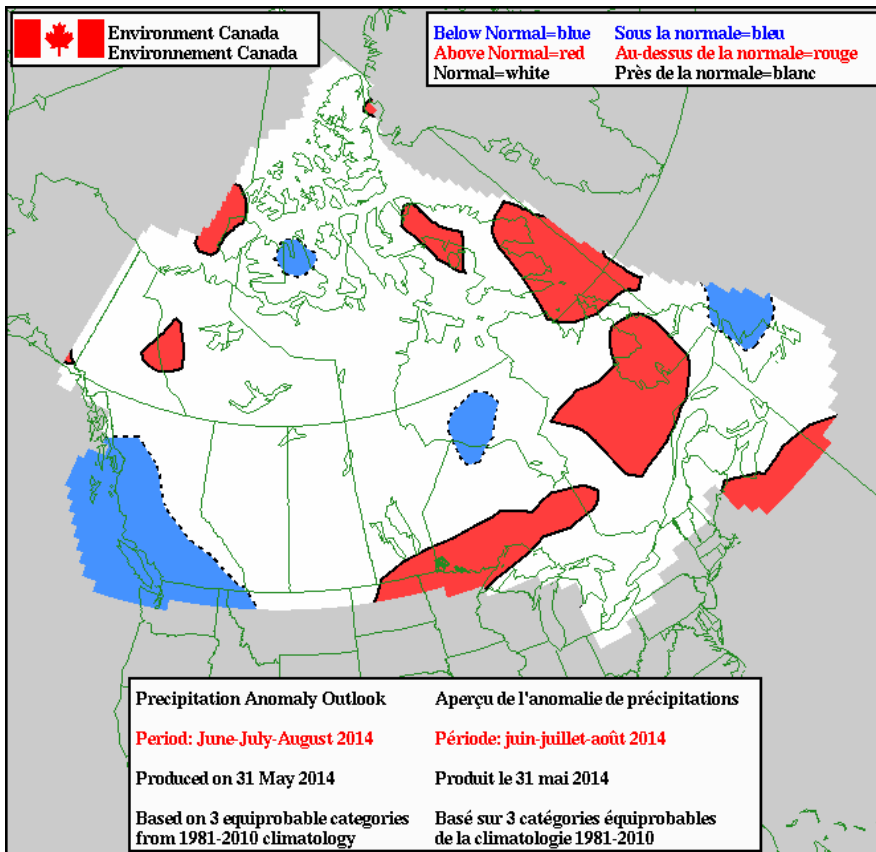
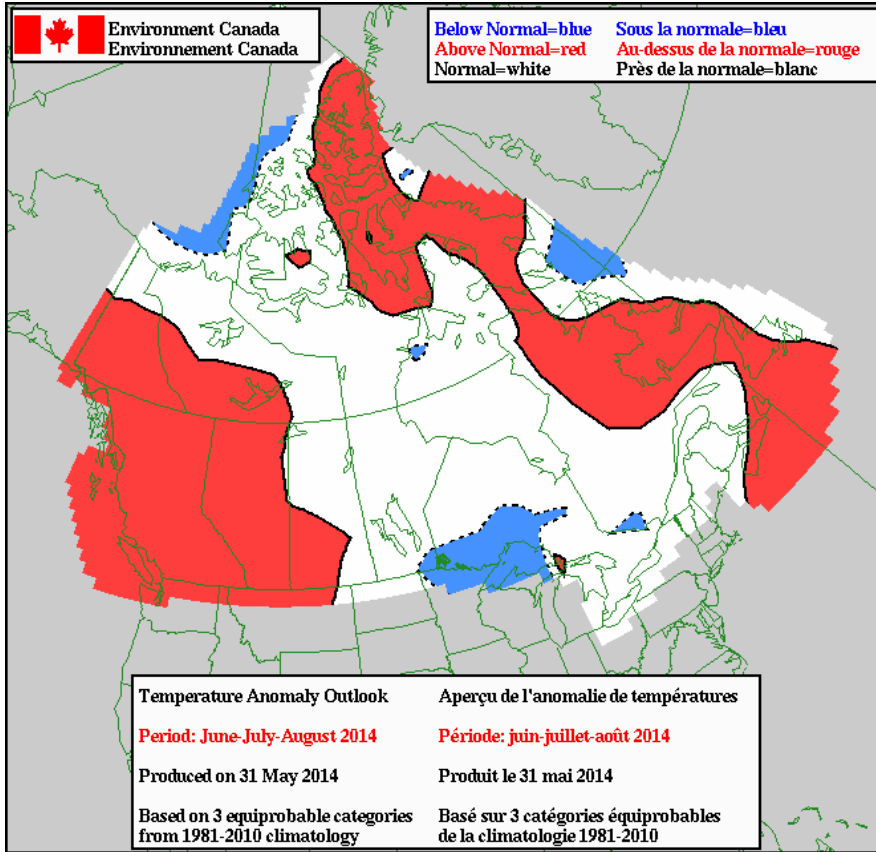
2. Monthly Flow Indicator (lower 10th-20th-35th monthly flow percentile)



3. Water Supply Reservoir Status (Southern and Western)

| Water Supply Reservoir Levels and Storages | | | | | | | | |
|--|------------------|---------------------|------------------------------|----------------|--|-------------------------------------|---------------------------------------|--|
| June 2, 2014 | | | | | | | | |
| 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 | 1,532.04 | March 24, 2014 | 0.04 | 520 | 523 | 101% |
| Goudney (Pilot Mound) | Pilot Mound | 1482.00 | 1,482.27 | June 2, 2014 | 0.27 | 450 | 463 | 103% |
| Lake of the Prairies (Shellmouth)* | Brandon, Portage | 1402.50 | 1,407.46 | June 2, 2014 | 4.96 | 300,000 | 371,684 | 124% |
| Manitou (Mary Jane) | Manitou | 1537.00 | 1,537.07 | June 2, 2014 | 0.07 | 1,150 | 1,152 | 100% |
| Minnewasta (Morden) | Morden | 1082.00 | 1,081.86 | June 2, 2014 | -0.14 | 3,040 | 3,125 | 103% |
| Rapid City | Rapid City | 1573.50 | 1,573.73 | May 2, 2014 | 0.23 | 200 | 216 | 108% |
| Lake Wahtopanah (Rivers) | Rivers | 1536.00 | 1,538.13 | June 2, 2014 | 2.13 | 24,500 | 29,228 | 119% |
| Stephenfield | Carman | 972.00 | 972.43 | June 2, 2014 | 0.43 | 3,810 | 4,012 | 105% |
| Turtlehead (Deloraine) | Deloraine | 1772.00 | 1,772.38 | June 2, 2014 | 0.38 | 1,400 | 1,442 | 103% |
| Vermilion | Dauphin | 1274.00 | 1,274.80 | June 1, 2014 | 0.80 | 2,600 | 2,650 | 102% |
| * Summer Target level and storage. | | | | | | | | |

4. Environment Canada 3 Month Outlook



5. Major River Basin

