Water Availability and Drought Conditions Report

MAY 2019

Executive Summary

- This Water Availability and Drought Conditions Report provides an update on conditions throughout Manitoba for May 2019.
- Precipitation conditions over the past month, three month, and twelve month periods are as follows:
  - In April, most of southern Manitoba observed severely (40 to 60 % of median) to extremely (< 40 % of median) dry precipitation conditions, with some regions of moderately dry conditions (60 – 85 % of normal) in central and eastern agro-Manitoba. Northern Manitoba saw a range of conditions with normal precipitation amounts in the west and moderate to extremely dry conditions in the east.
  - Over the past three months, most of southern Manitoba observed severely to extremely dry precipitation conditions. Conditions in northern Manitoba were generally moderately to severely dry, with a pocket of normal conditions surrounding Thompson.
  - Over the past 12 months, most of southern Manitoba and the region surrounding Churchill observed moderately dry conditions, with pockets of severely dry conditions. The remainder of the province experienced normal or above normal conditions.
- As of June 5, 2019, below normal (10^{th} - 25^{th} percentile) or much below normal (< 10^{th} percentile) streamflows were observed on many rivers and streams across Manitoba. Flows are receding faster than normal due to dry conditions. Below normal water levels were observed on Lake Manitoba and Round Lake in eastern Manitoba.
- Many aquifers had little to no recharge during the spring of 2018 resulting in lower water levels over the previous year and into 2019. Spring recharge is starting to be measured in monitoring wells. Currently, aquifers in the Steinbach area are in the much below normal range, the carbonate aquifer in the Anola and Poplarfield areas is slightly below the normal range, whereas other aquifer water levels are in the normal to above normal range.
- In their May 31, 2019 assessment, the Canadian Drought Monitor classified conditions in agro-Manitoba as abnormally dry (D0) to moderate drought (D1), with regions of severe drought (D2) centered over Virden/Minnedosa and Swan River/Winnipegosis.
- There are currently no major concerns over reservoir water supplies. Most reservoirs reached their full supply level during the spring melt. Shellmouth Reservoir is near the lower end of the summer target range and outflow from the dam is at the minimum target outflow as defined in the Shellmouth Operating Guidelines. Conditions in the upper Assiniboine River basin have been dry and the Shellmouth Reservoir and the Assiniboine River are being closely monitored.
- Although livestock water supply is generally considered to be adequate, dugout levels are classified as low or below normal and in some cases, are almost dry. Precipitation is needed to recharge water supplies to last the grazing season and to stimulate pasture growth.
- Wildfires burned 8,696 hectares as of June 5, 2019, almost exclusively in the central region. Municipal burning restrictions are in place for 25 municipalities across southern Manitoba due to the dry conditions.
- Environment and Climate Change Canada's seasonal forecast for June-July-August predicts temperatures will be above normal across most of Manitoba. Precipitation is forecasted to be normal.

Drought Indicators

Precipitation Indicator

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 short term (one month; Figure 1), medium term (three months, Figure 2) and long term (12 months; Figure 3) conditions. The indicators compare current monthly precipitation totals to historical data to calculate the per cent of median precipitation that occurred over the past one, three or twelve months. Historical medians are computed from 45 years of data (1971 – 2015).

Due to large distances between meteorological stations in northern Manitoba, the interpolated contours in this region are based on limited observations and should be interpreted with caution.

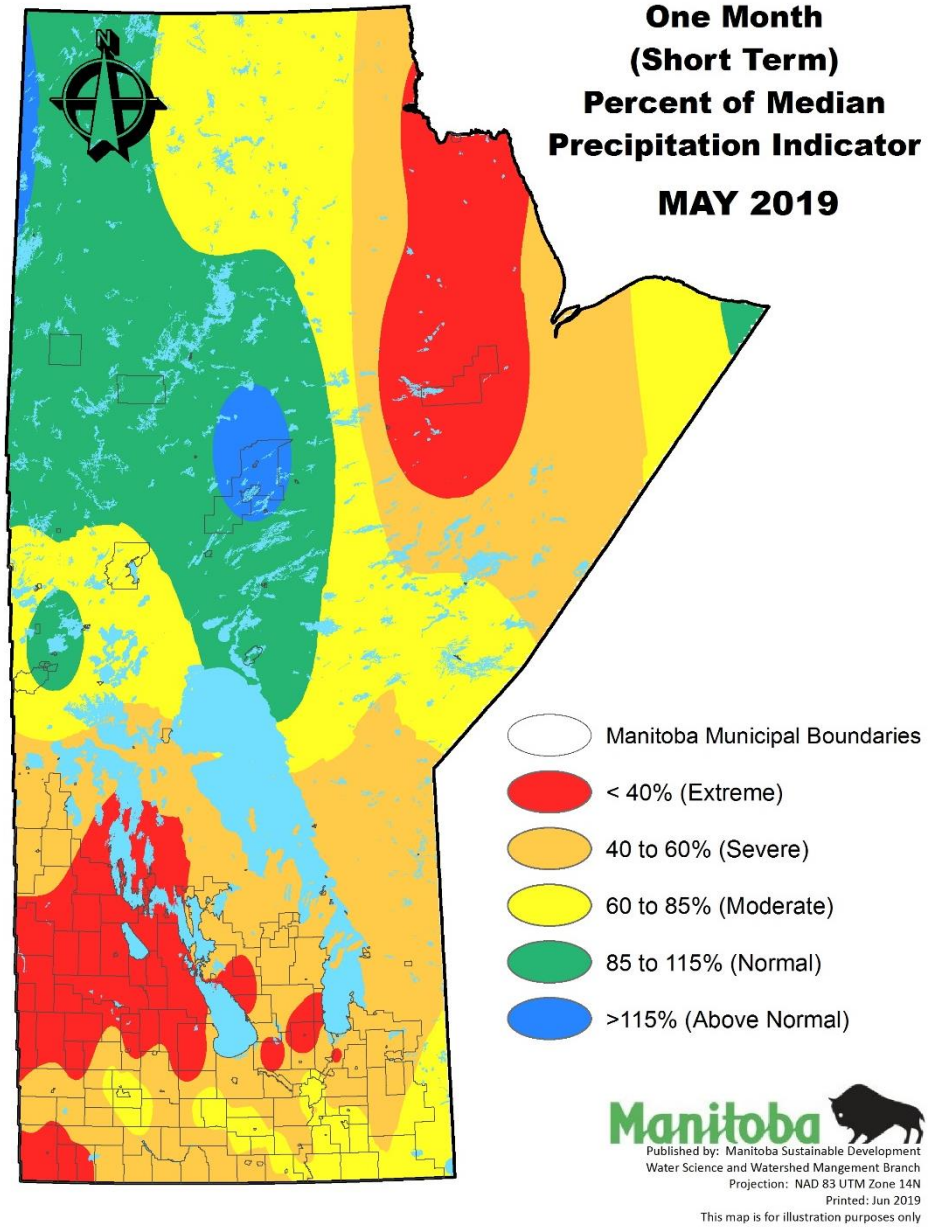

Figure 1: Short term (one month) per cent of median precipitation indicator.

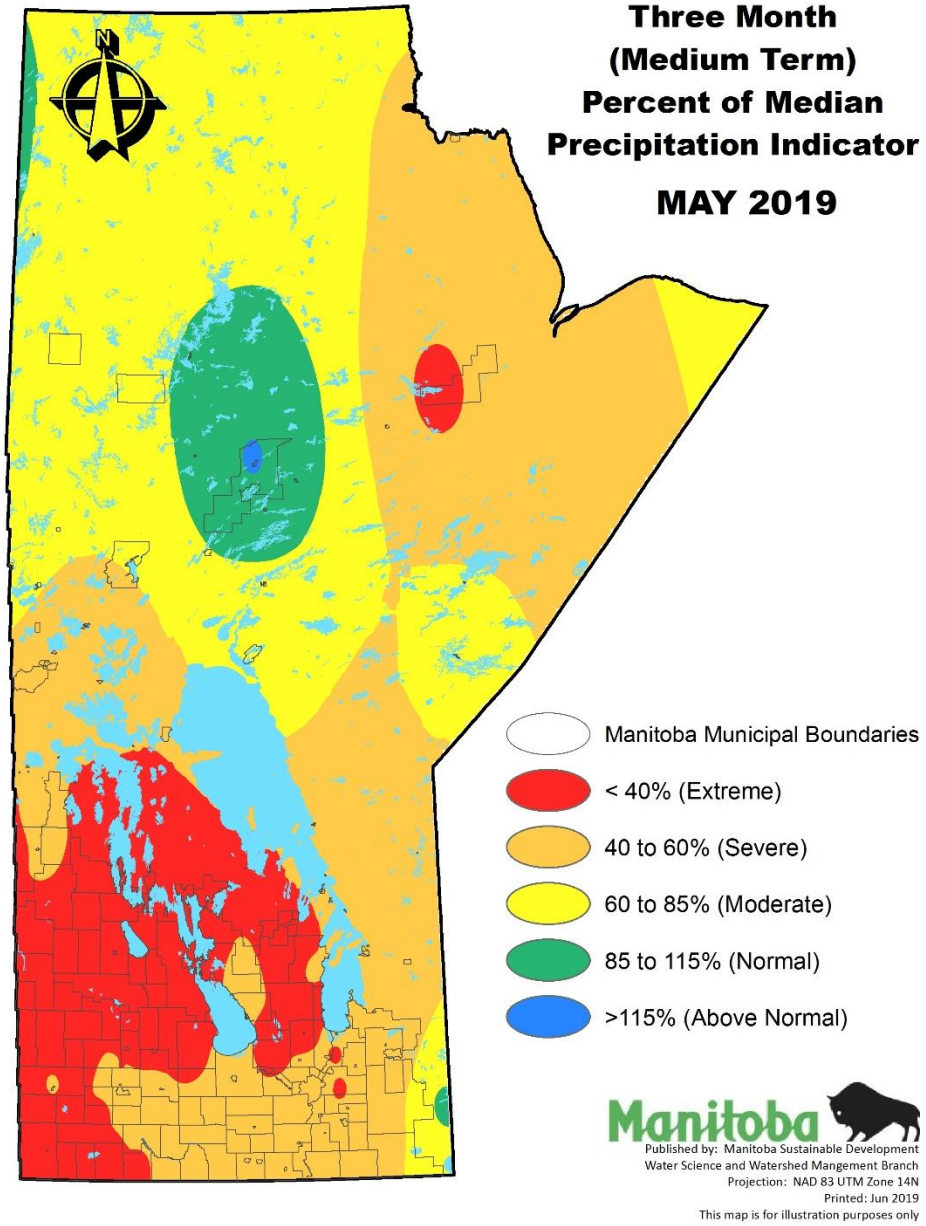

Figure 2: Medium term (three month) per cent of median precipitation indicator.

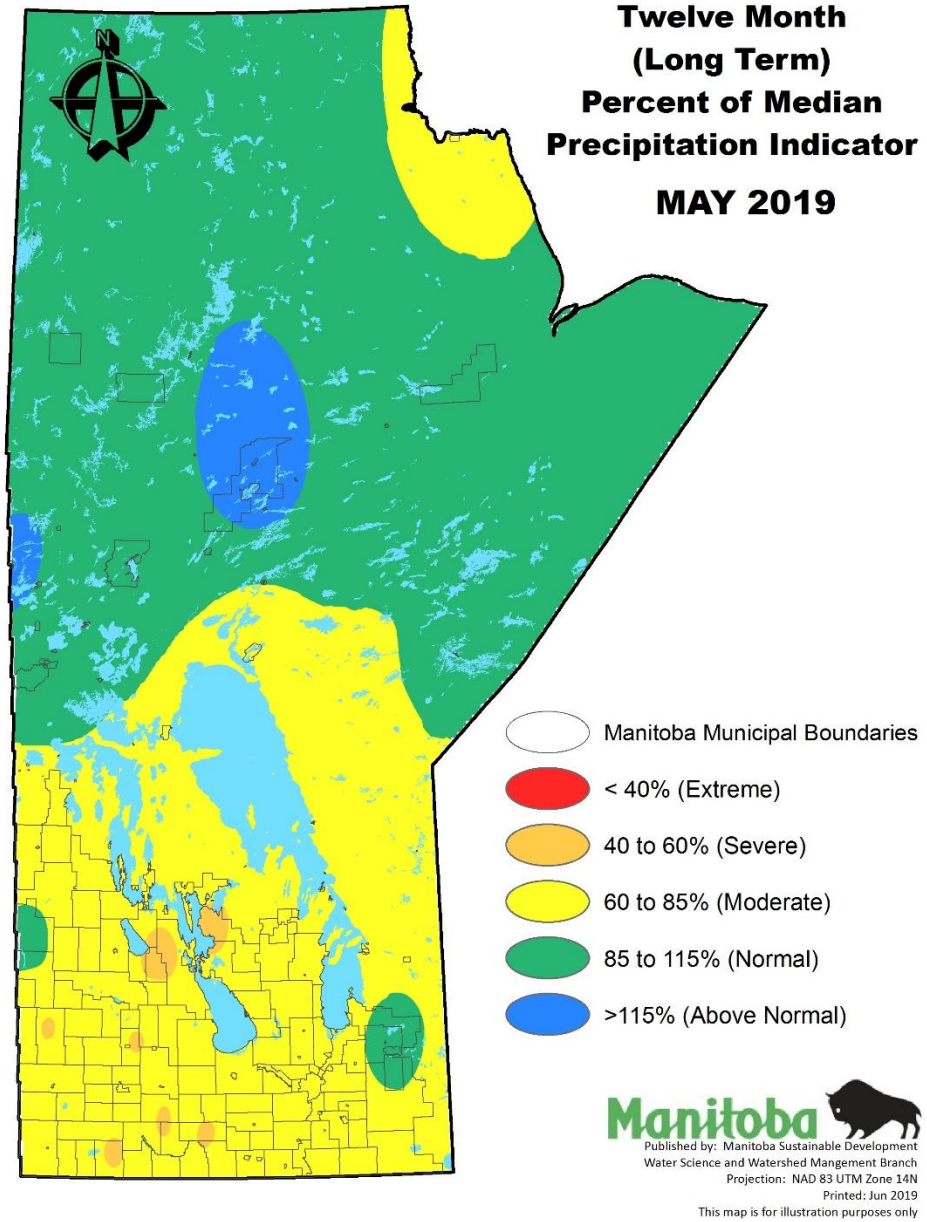

Figure 3: Long term (12 month) per cent of median precipitation indicator.

Streamflow & Lake Level Indicator

The streamflow and lake level indicator is based on average daily flows and levels compared to historical values for that particular day.

This indicator is used to determine the severity of hydrological dryness in a watershed and is summarized on Figure 4, representing hydrological conditions for June 5, 2019.

Streamflow and lake level percentile plots for all of the rivers and lakes included on Figure 4 are available on the Manitoba Drought Monitor website under the *Drought Indicator Map* tab.

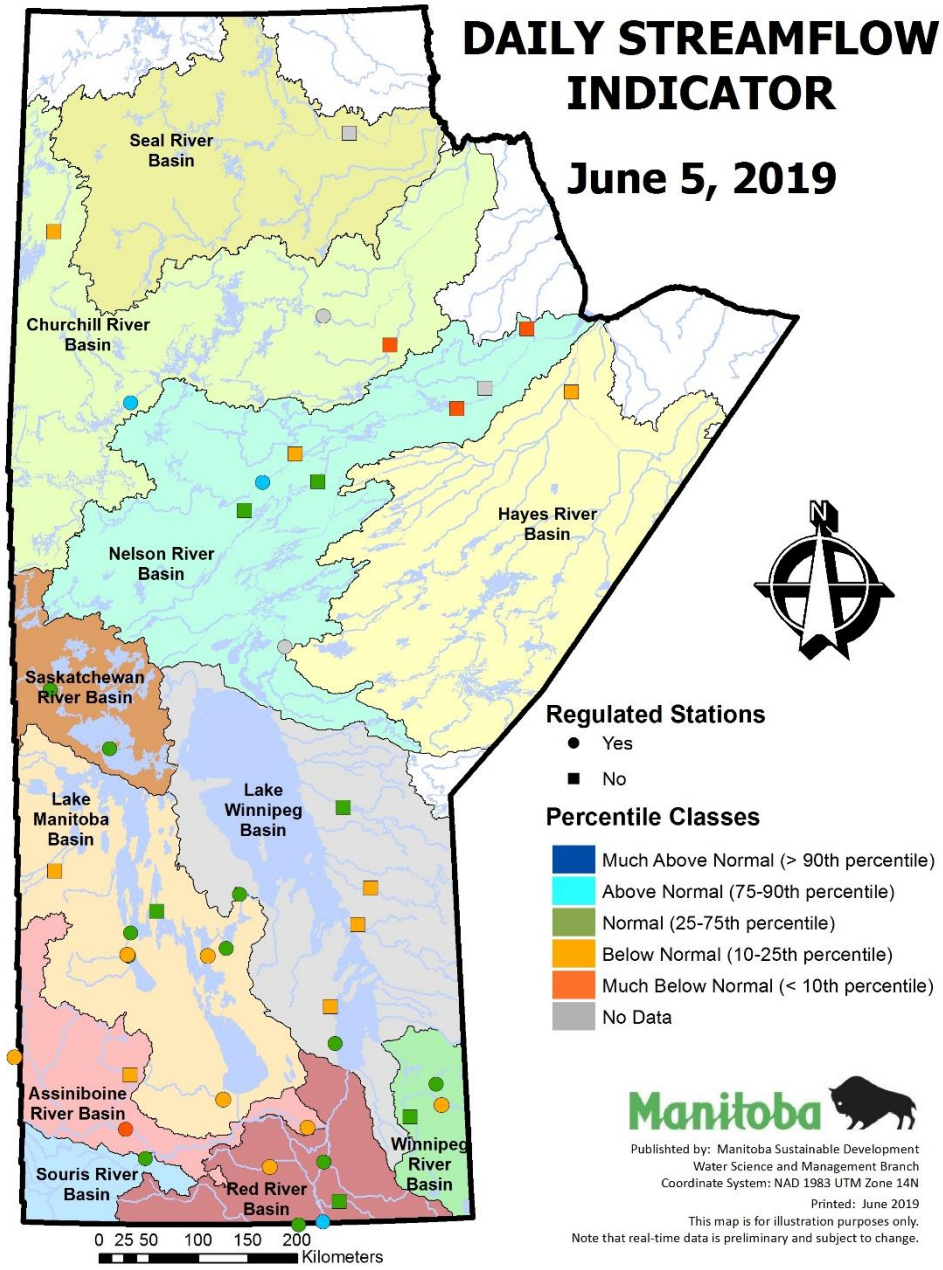

Figure 4: Daily streamflow and lake level indicator for June 5, 2019.

Groundwater Indicator

Water level responses to 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. As the water table drops, there is less available drawdown in shallow wells and some wells may 'go dry', even in short-term drought conditions.

Many aquifers had little to no recharge during the spring of 2018 resulting in lower water levels over the previous year and into 2019. Spring recharge is starting to be measured in monitoring wells. Currently, aquifers in the Steinbach area (OE032 & OE028; Figure 5) are in the much below normal range and are currently setting new record low levels. The carbonate aquifer in the Anola (OJ019) and Poplarfield (SC002) areas is slightly below the normal range, whereas other aquifer water levels are in the normal to above normal range.

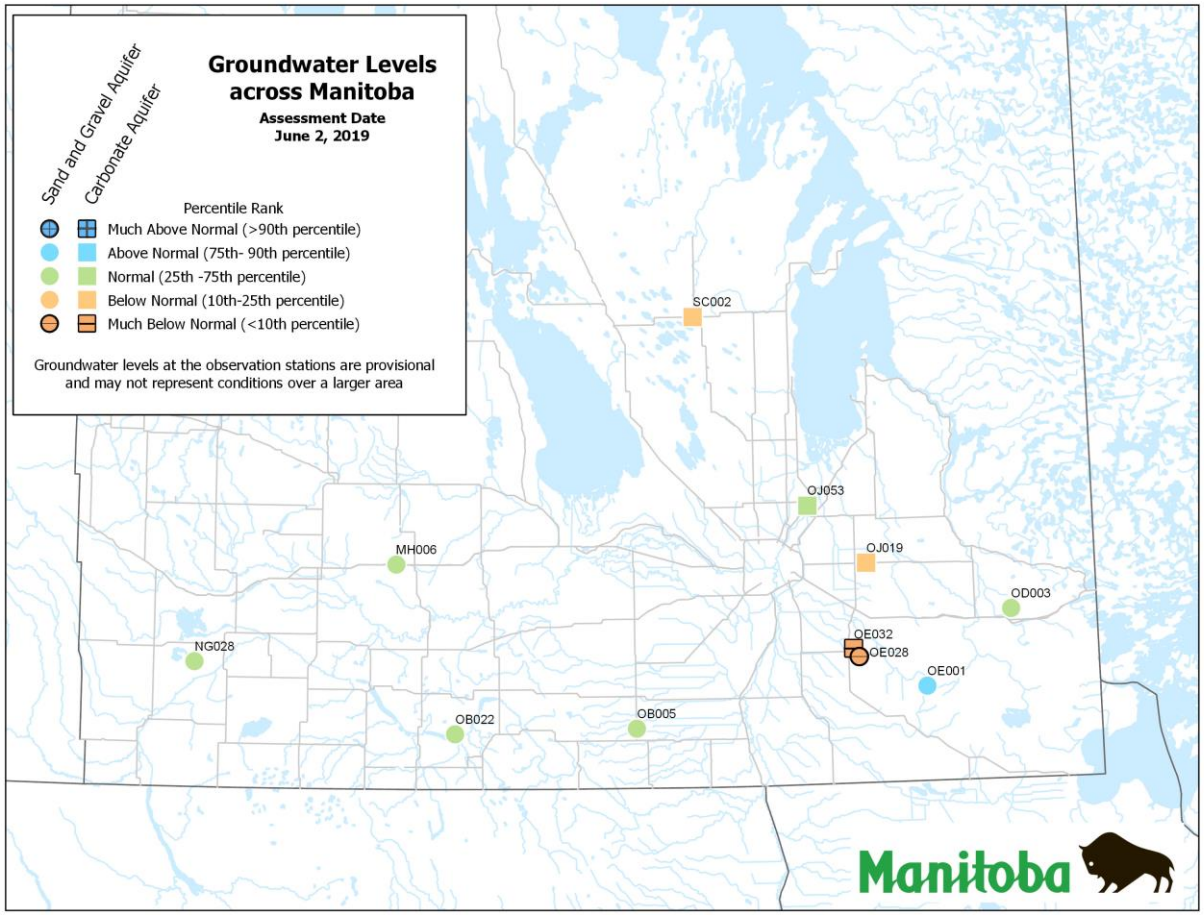

Figure 5: Groundwater indicator on June 2, 2019 for select groundwater monitoring sites.

Canada and United States Drought Monitors

The Canadian Drought Monitor and the United States Drought Monitor map the extent and intensity of drought conditions across Canada and the continental U.S.A.

Drought Monitor assessments are based on a suite of drought indicators, impacts data and local reports as interpreted by federal, provincial/state and academic scientists.

The Canadian and United States Drought Monitor maps use the following classification system:

- D0 (Abnormally Dry) – represents an event that occurs every 3 to 5 years;
- D1 (Moderate Drought) – 5 to 10 year event;
- D2 (Severe Drought) – 10 to 20 year event;
- D3 (Extreme Drought) – 20 to 50 year event; and
- D4 (Exceptional Drought) – 50+ year event.

Additionally, the map indicates the duration of drought as either short-term (S; less than 6 months) or long-term (L; more than 6 months) (Figure 6).

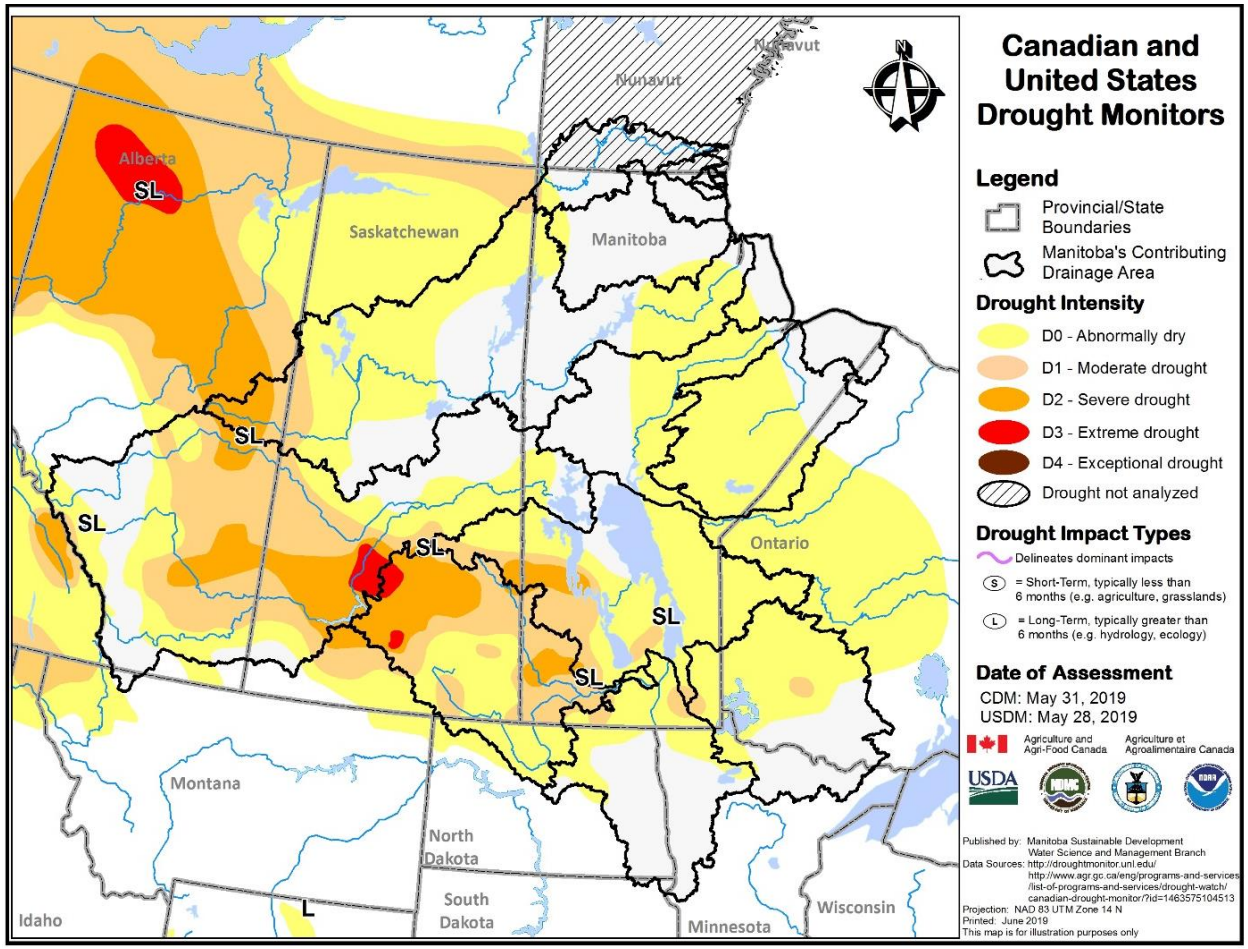

Figure 6: Canadian and United States Drought Monitors' classification of short-term (S) and long-term (L) drought conditions assessed as of May 31, 2019.

Water Availability

Reservoir Conditions

Most reservoirs reached their full supply level during the 2019 spring melt (Table 1) and there are no major concerns over reservoir water supplies at this time. Due to dry conditions in the Saskatchewan portion of the Assiniboine River Basin, Shellmouth Reservoir is near the lower end of the summer target range (1400 to 1404 feet) and outflow from the dam is at the minimum target outflow of 50 cfs, as defined in the Shellmouth Operating Guidelines. Shellmouth Reservoir and downstream flows along the Assiniboine River are being closely monitored, and any concerns from water users are being discussed through the Shellmouth Dam Liaison Committee.

Table 1: Reservoir Status (Southern and Western Manitoba).

Water Supply Reservoir Levels and Storages – June 4, 2019.								
Lake or Reservoir	**Community or Co-ops Supplied**	**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) (%)**
Lake of the Prairies (Shellmouth)[1]*	Brandon, Portage, Cartier Regional Water Co-op	1,402.5[1]	1400.39	June 4, 2019	-2.11	300,000	274,031	91 %
Lake Wahtopanah (Rivers)*	Rivers	1,536	1536.28	June 4, 2019	0.28	24,500	25,126	103 %
Minnewasta (Morden)*	Morden	1,082	1081.55	June 4, 2019	-0.45	3,150	3,074	98 %
Stephenfield*	Carman, Pembina Valley Water Co-op	972	972.32	June 4, 2019	0.32	3,810	3,959	104 %
Vermilion*	Dauphin	1,274	1273.54	June 4, 2019	-0.46	2,600	2,478	95 %
Goudney (Pilot Mound)*		1,482	1482.28	June 4, 2019	0.28	450	464	103 %
Jackson Lake*		1,174	1172.64	June 4, 2019	-1.36	2,990	2,649	89 %
Manitou (Mary Jane)*		1,537	1536.86	June 4, 2019	-0.14	1,150	1,137	99 %
Turtlehead (Deloraine)*	Deloraine	1,772	1771.88	June 4, 2019	-0.12	1,400	1,394	100 %
Rapid City*		1,573.5	1573.46	June 4, 2019	-0.04	200	197	99 %
Kenton Reservoir		1,448	1447.64	June 5, 2019	-0.36	600	573	95%
Killarney Lake		1,615	1614.70	May 9, 2019	-0.30	7,360	7,220	98%
Lake Irwin		1,178	1177.91	June 5, 2019	-0.09	3,800	3,748	99%
Elgin		1,532	1531.14	**February 19, 2019**	-0.86	520	460	88%
St. Malo		840	840.50	**April 11, 2019**	0.50	1,770	1,852	105%
Minnedosa	Minnedosa	1,682	1682.18	June 5, 2019	0.18	1,688	1,735	103%
Boissevain	Boissevain	1,697	1696.24	**October 15, 2018**	-0.76	505	450	89%

[1] Summer target level and storage; * Real-time water level gauge.

On Farm Water Supply

Farm water supply updates from Manitoba Agriculture's Crop Report Issue 6 (published on June 4, 2019) are provided in Table 2.

Table 2: On Farm Water Supply (Dugout) Conditions.

Region	General Dugout Condition
Eastern	Reports have been received that some dugouts are almost dry. Some producers have enquired about funding for water pumping and the maintenance of adequate livestock water supply is a major producer concern. Availability of livestock water rated as 90 % adequate and 10 % inadequate.
Interlake	Dugout levels are below normal, and sometimes dry. Water supply is rated as 90 to 95 % adequate, but rain is needed.
Southwest	Currently adequate but will need recharging to last the grazing season.
Central	Livestock water supplies are adequate at this time but water levels in sloughs and dugouts are dropping due to the low water table level.
Northwest	50 to 75 % full

Soil Moisture

Manitoba Agriculture's mapping of topsoil (0 – 30 cm) conditions for June 3, 2019 shows that most areas are either at optimal or dry soil moisture condition. The Interlake region, southeast as well as southwest corners of the province also showed dry condition in the top 30 cm (Figure 7). However, the deeper soil moisture map (0 – 120 cm) shows that soil moisture is mostly at optimal level across agro-Manitoba.

Note that reported soil moisture conditions are relative to the soil saturation level (maximum recorded at that station).

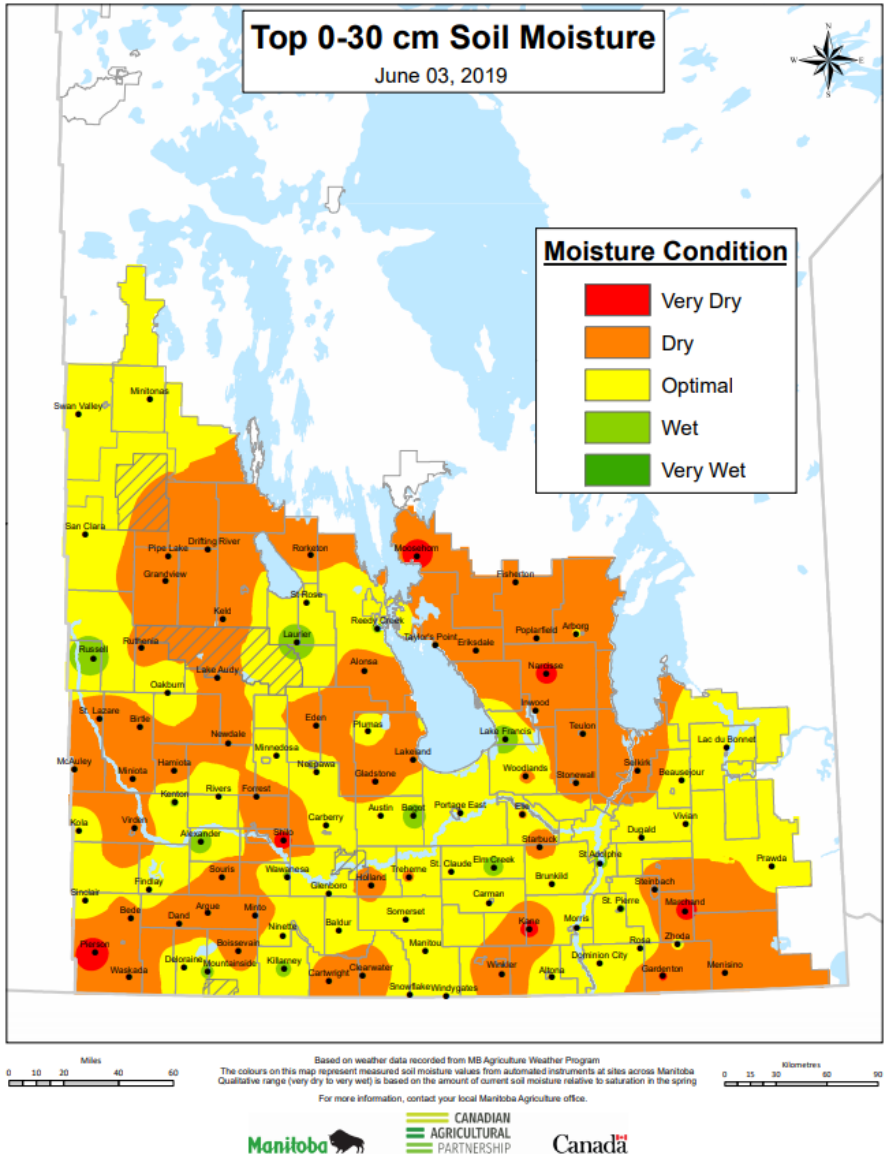

Figure 7: Manitoba Agriculture's June 3, 2019 mapping of soil moisture conditions in the top 0 – 30 cm.

Manitoba
Sustainable Development

Wildland Fires

As of June 5, 2019 the Provincial Wildfire Program reported 106 wildfires have occurred during the 2019 fire season, burning a total of 8,698 hectares. Approximately 97 % of the burned area is located within the central region.

As of June 5, 2019, fire danger (Figure 8) is low in northern Manitoba but moderate to high throughout much of southern Manitoba.

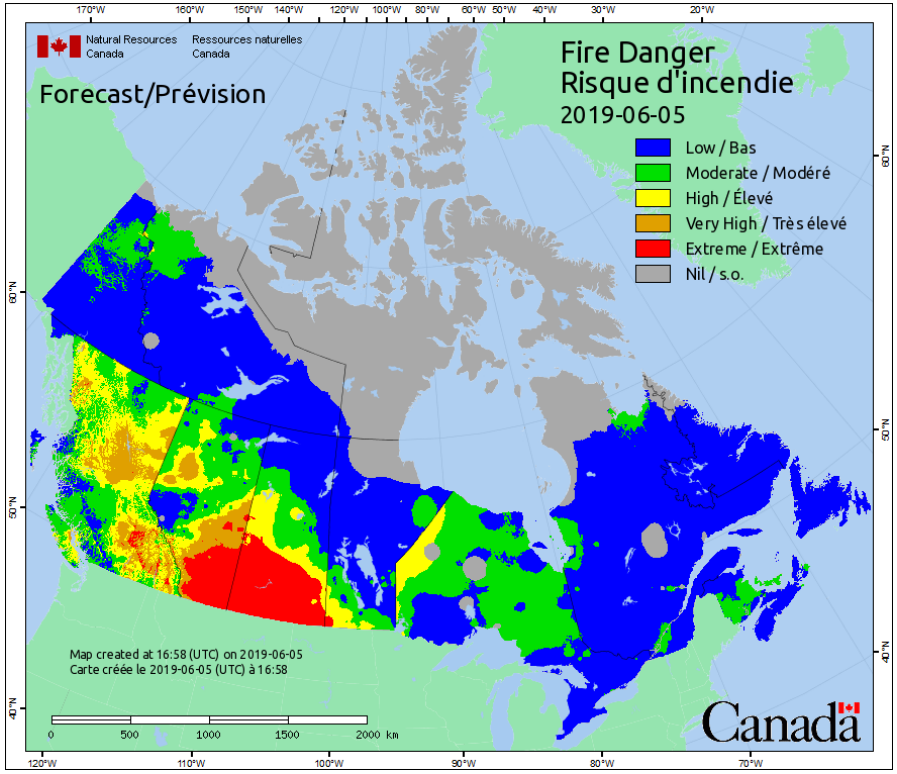

Figure 8: Fire danger mapping by Natural Resources Canada.

Impacts due to Dry Conditions

Suppression efforts continue on a number of active fires across the province, and resources are in place to meet preparedness levels for new fire starts. All fires have been successfully contained to date. Crews continue to make good progress on the fire near the community of Paungassi First Nation, located on the east side of Lake Winnipeg. This fire grew to 44 hectares before being contained by Provincial fire crews from the Eastern Region. Due to the dry conditions in the southern and central regions, human fires continue to be the main concern. As of June 5, 2019, municipal burning restrictions were in place for 25 municipalities across southern Manitoba due to the dry conditions.

Manitoba Agriculture's June 4 Crop Report reported that seeding is almost complete, with some uneven emergence and slow development due to dry conditions. Flea beetles are active in all areas. Fields experiencing flea beetle pressure plus dry conditions and frost are being re-seeded back to canola or cereals. Pastures are slow to re-grow due to overgrazing damage from last year and dry conditions this spring. Rainfall and warmer temperatures are needed for regrowth.

Future Weather

Environment and Climate Change Canada's seasonal forecast for the next three months (June-July-August) predicts temperatures will be above normal across most of Manitoba. Precipitation over the next three months is forecasted to be normal across the province.

The National Oceanic and Atmospheric Administration indicated that El Niño conditions are currently present. There is a 70 % chance that El Niño will continue through the Northern Hemisphere summer 2019 and into the fall (55 – 60 % chance).

Past reports, drought mapping and other information and resources are available on the Manitoba Drought Monitor website.

For further information, please contact:

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Manitoba Infrastructure - Reservoir level information:
https://www.gov.mb.ca/mit/floodinfo/index.html

Environment and Climate Change Canada:
Flow and lake level information:
http://www.wateroffice.ec.gc.ca/index_e.html
Three month climatic outlook:
http://weatheroffice.gc.ca/saisons/index_e.html

Manitoba Sustainable Development's Fire Program:
https://www.gov.mb.ca/sd/fire/

Manitoba Agriculture:
Crop Reports:
http://www.gov.mb.ca/agriculture/crops/seasonal-reports/crop-report-archive/index.html
Topsoil moisture conditions:
https://www.gov.mb.ca/agriculture/weather/weather-conditions-and-reports.html

Canadian Drought Monitor: *http://www.agr.gc.ca/drought*

United States Drought Monitor: *https://droughtmonitor.unl.edu/*

National Oceanic and Atmospheric Administration: ENSO Status Update:
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf