# Water Availability and Drought Conditions Report

## SEPTEMBER 2019

## Executive Summary

- This Water Availability and Drought Conditions Report provides an update on conditions throughout Manitoba for September 2019.
- Precipitation conditions over the past month, three month, and twelve month periods are as follows:
  - In September, conditions were above normal (> 115 % of median) across agro-Manitoba. Significant rainfall in some areas has resulted in saturated soils and well above normal runoff, particularly in the Red River Basin. Northern Manitoba experienced moderately (60 to 85 %) to severely (40 to 60 %) dry conditions, with a pocket of extremely dry conditions (< 40 %) centered over Thompson.
  - Over the past three months (July, August, September), conditions were normal to above normal across agro-Manitoba, with moderately dry conditions centered over Swan River. Across northern Manitoba, conditions were normal to above normal with a region of moderately dry conditions surrounding Island Lake.
  - Over the past 12 months, the southern portion of agro-Manitoba observed normal conditions, while the northern portion of agro-Manitoba observed moderately dry conditions. The region surrounding Swan River was severely dry. In northern Manitoba, conditions ranged from normal to moderately dry.
- Streamflows and lake levels increased during September due to above average rainfall. As of October 1, 2019, much below normal (< $10^{th}$ percentile) conditions were observed on Mossy River, Dauphin Lake, and Lake Manitoba.
- By the end of September, groundwater levels in monitoring wells completed into sand and gravel aquifers and shallow carbonate aquifers were starting to show a response from recent rains. However, water levels in monitoring wells in both the Steinbach area and the Carbonate aquifer near Poplarfield remained in the below normal ($10^{th}$ – $25^{th}$ percentile) to much below normal range (< $10^{th}$ percentile).
- The September 30, 2019 Canadian Drought Monitor assessment showed improvements in some areas since August 31. However, regions of abnormally dry conditions (D0) remained within portions of the Interlake and northwest regions of agro-Manitoba, east of Lake Winnipeg and north of Cedar Lake. Regions of moderate drought (D1) conditions developed over Swan River and Arborg.
- There are currently no concerns over reservoir water supplies.
- September precipitation helped improve pasture conditions and on-farm water supplies. Although recent rainfall extended the grazing season, forage availability continues to be a concern.
- Government funding for water source development projects became available. Producers can inquire about the Water Source Development Program through Ag Action Manitoba – Assurance: Beneficial Management Practices.
- Wildland fires burned 101,144 hectares as of October 4, 2019. The total number of acres burned during the 2019 fire season was 50 % of average.

# 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.

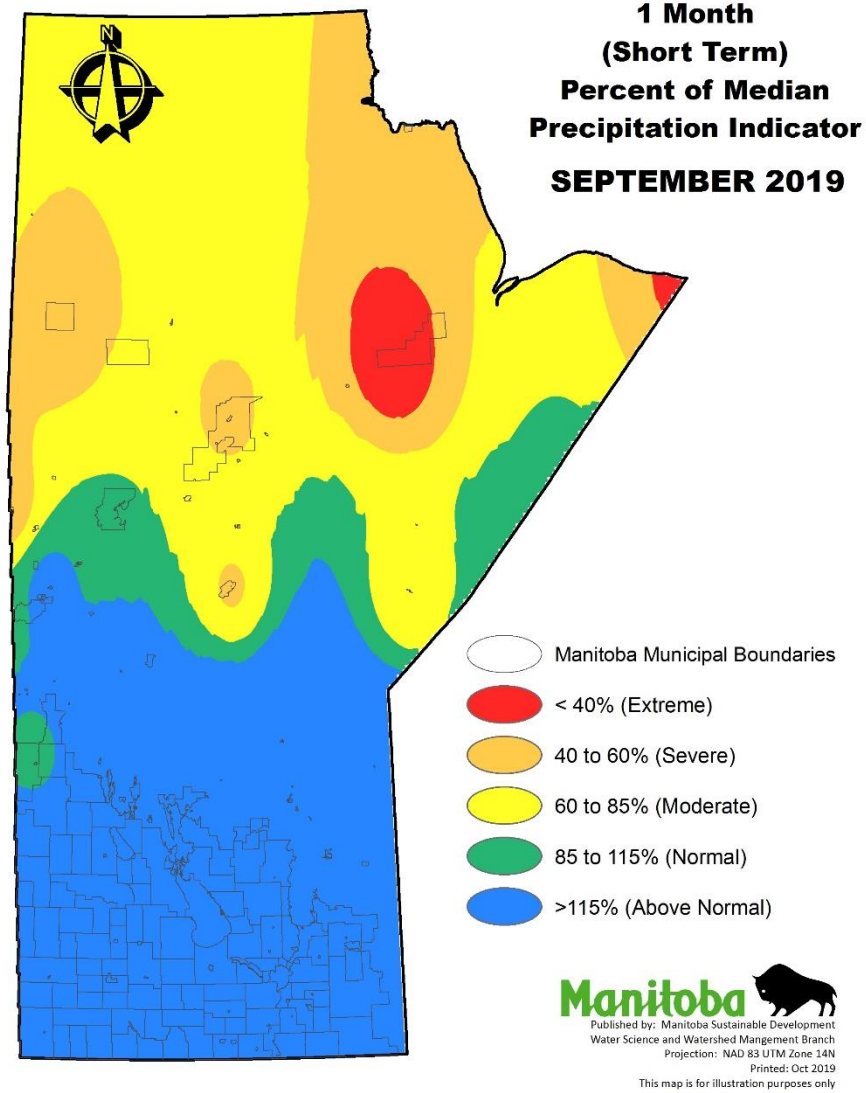


Figure 1: One month (short term) per cent of median precipitation indicator.

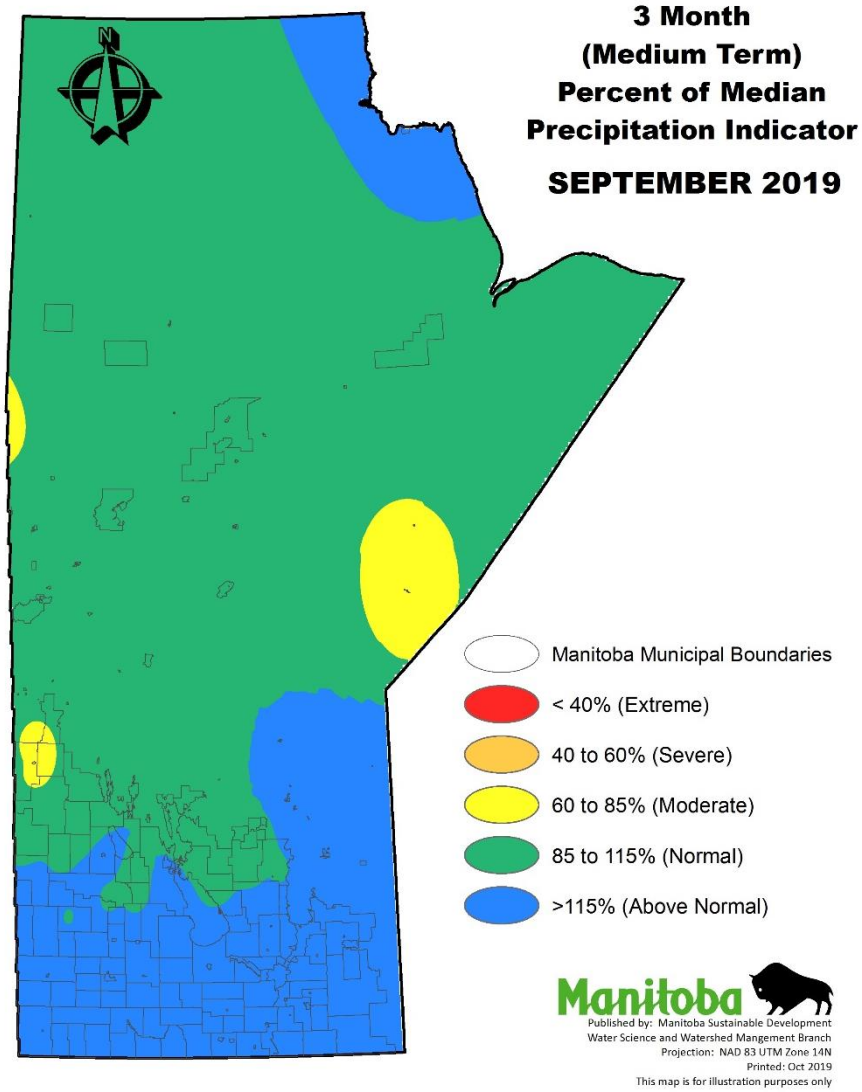


Figure 2: Three month (medium term) per cent of median precipitation indicator.

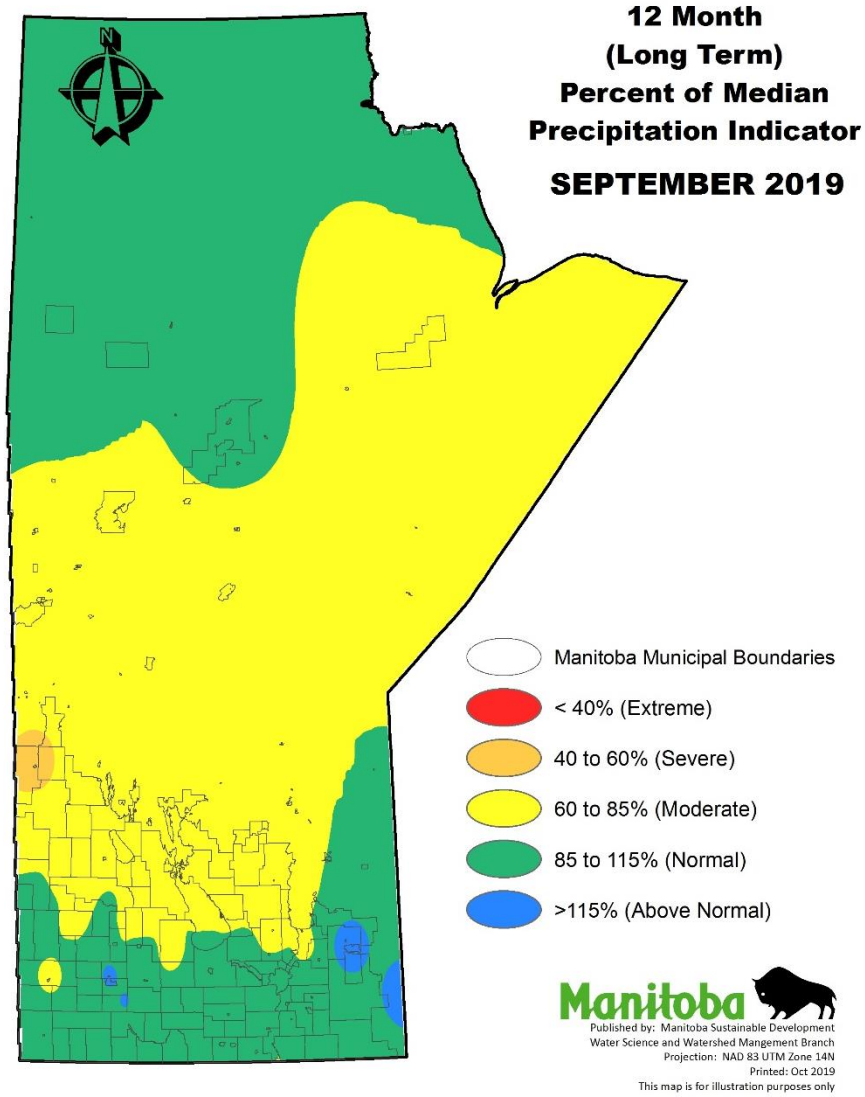


Figure 3: Twelve month (long term) per cent of median precipitation indicator.

### *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 October 1, 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.

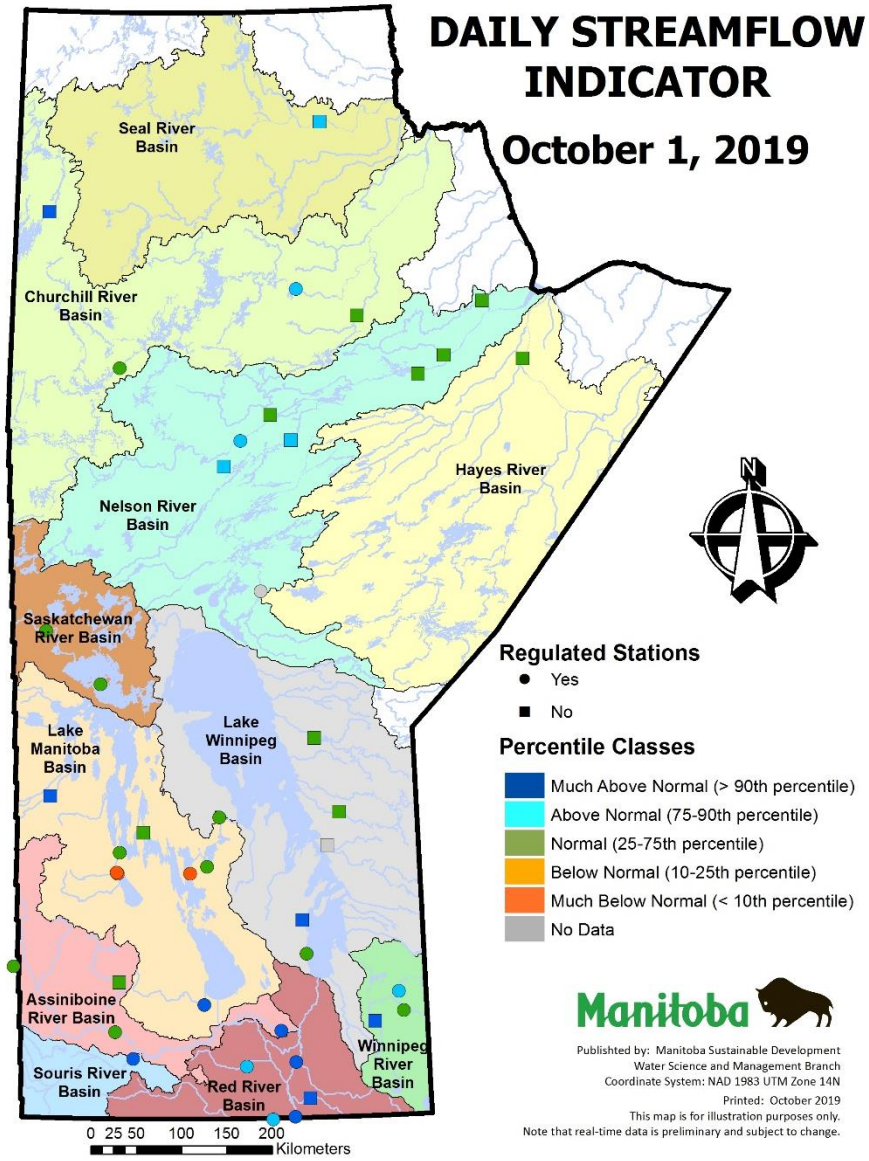


Figure 4: Daily streamflow and lake level indicator for October 1, 2019

## 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.

By the end of September water levels in monitoring wells completed into sand and gravel aquifers and shallow carbonate aquifers were starting to show a response from recent rains. The water level in the sand and gravel aquifer near Sprague increased from the normal to the much above normal category. The water level in the sand and gravel near Steinbach moved up one category into the below normal range. In the Carberry area, the water level is in the above normal range. Other monitoring wells remain in the same category as the August 30, 2019 assessment (Figure 5).

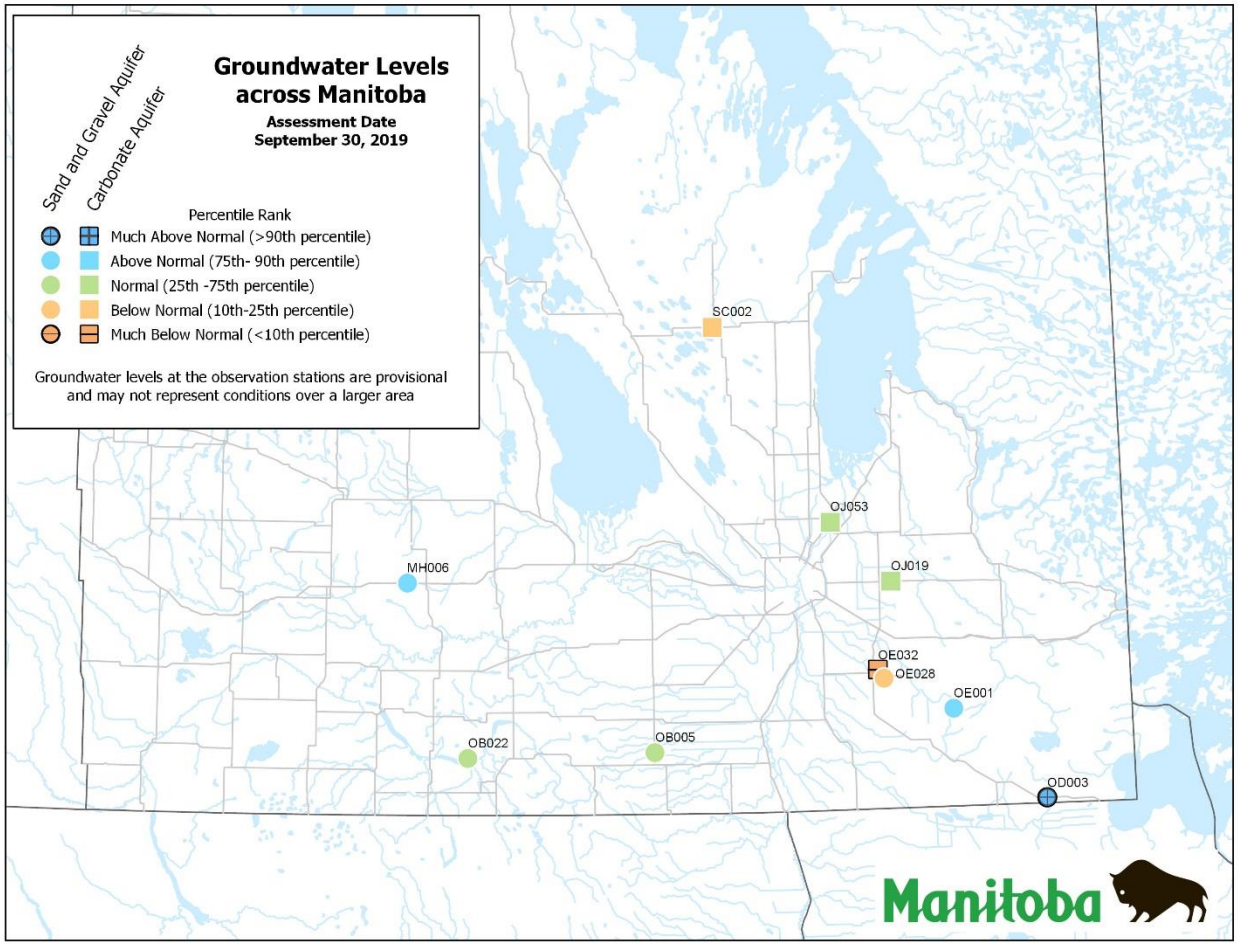


Figure 5: Groundwater indicator on September 30, 2019 for select groundwater monitoring sites.

## 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).

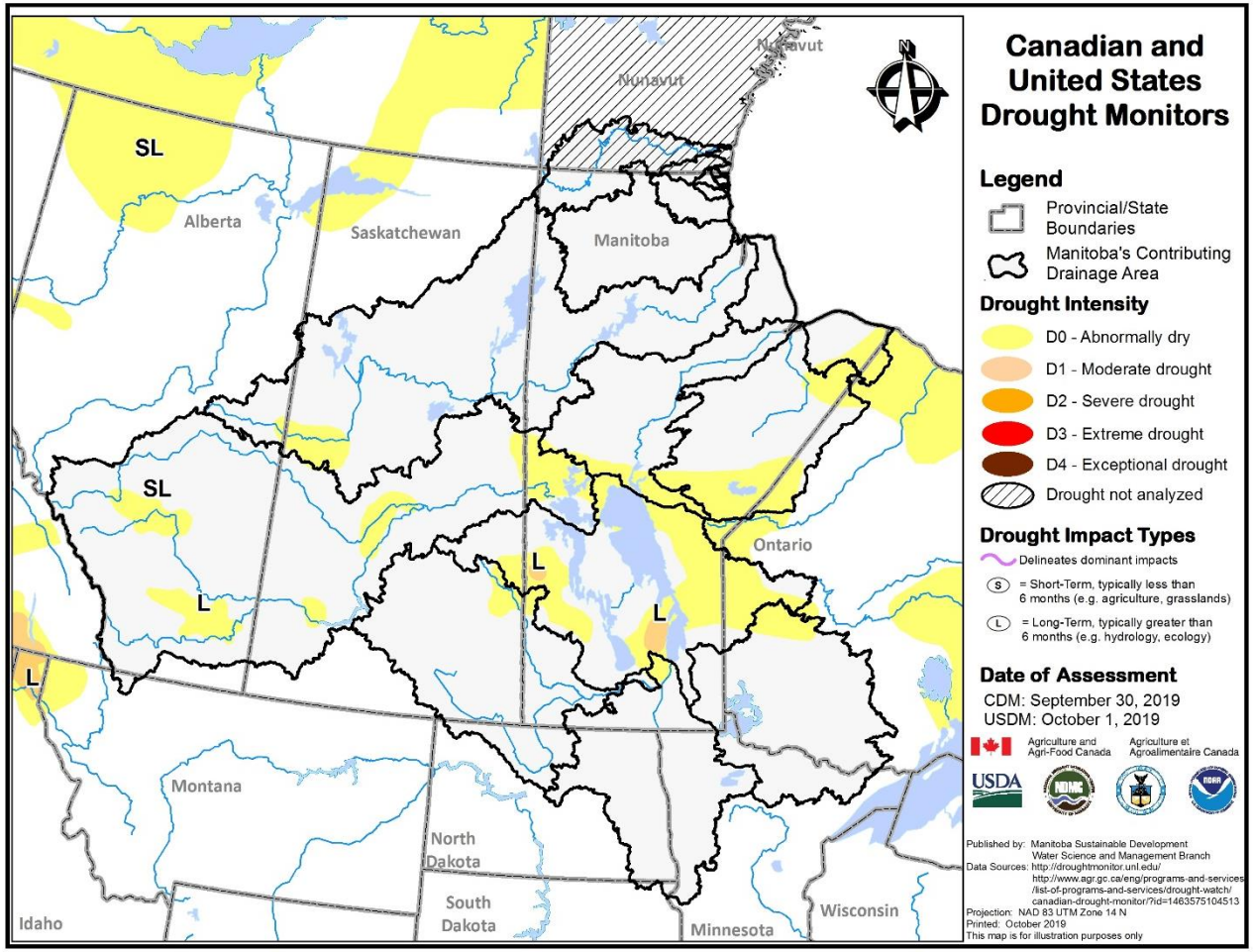


Figure 6: Canadian and United States Drought Monitors' classification of short-term (S) and long-term (L) drought conditions assessed as of September 30, 2019.

# Water Availability

## *Reservoir Conditions*

Most reservoirs are at or near full supply level (Table 1) and there are no concerns over reservoir water supplies at this time.

Table 1: Water Supply Reservoir Levels and Storages – October 1, 2019 (Southern and Western Manitoba).

| 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] | 1401.82 | October 2, 2019 | -0.68 | 300,000 | 291,631 | 97% |
| **Lake Wahtopanah (Rivers)*** | Rivers | 1,536 | 1534.39 | September 30, 2019 | -1.61 | 24,500 | 22,734 | 93% |
| **Minnewasta (Morden)*** | Morden | 1,082 | 1079.77 | October 1, 2019 | -2.23 | 3,150 | 2,787 | 88% |
| **Stephenfield*** | Carman, Pembina Valley Water Co-op | 972 | 972.43 | October 1, 2019 | 0.43 | 3,810 | 4,014 | 105% |
| **Vermilion*** | Dauphin | 1,274 | 1269.59 | September 30, 2019 | -4.41 | 2,600 | 1,511 | 58% |
| **Goudney (Pilot Mound)*** | | 1,482 | 1482.38 | October 1, 2019 | 0.38 | 450 | 469 | 104% |
| **Jackson Lake*** | | 1,174 | 1173.39 | October 1, 2019 | -0.61 | 2,990 | 2,836 | 95% |
| **Manitou (Mary Jane)*** | | 1,537 | 1537.02 | October 1, 2019 | 0.02 | 1,150 | 1,151 | 100% |
| **Turtlehead (Deloraine)*** | Deloraine | 1,772 | 1772.15 | October 1, 2019 | 0.15 | 1,400 | 1,416 | 101% |
| **Rapid City*** | | 1,573.5 | 1574.16 | September 30, 2019 | 0.66 | 200 | 246 | 123% |
| **Kenton Reservoir** | | 1,448 | 1447.39 | **August 7, 2019** | -0.61 | 600 | 554 | 92% |
| **Killarney Lake** | | 1,615 | 1615.06 | **July 11, 2019** | 0.06 | 7,360 | 7,388 | 100% |
| **Lake Irwin** | | 1,178 | 1178.29 | October 1, 2019 | 0.29 | 3,800 | 3,989 | 105% |
| **Elgin** | | 1,532 | 1531.99 | **August 6, 2019** | -0.01 | 520 | 520 | 100% |
| **St. Malo** | | 840 | 840.78 | **July 15, 2019** | 0.78 | 1,770 | 1,898 | 107% |
| **Minnedosa** | | 1,682 | 1682.15 | **August 7, 2019** | 0.15 | 1,688 | 1,728 | 102% |
| **Boissevain** | Boissevain | 1,697 | 1697.89 | **June 24, 2019** | 0.89 | 505 | 585 | 116% |

[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 23 (published on October 1, 2019) are provided in Table 2.

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

| Region | General Dugout Condition |
|---|---|
| Eastern | Availability of livestock water was rated as 100 % adequate. |
| Interlake | Dugout levels have declined, some are dry. Water supply is rated as 40 % adequate. Both supply and quality remain a concern. (September 24, 2019). |
| Southwest | Sloughs and dugouts are recharging and many areas that have been dry all summer now have standing water. |
| Central | Livestock water supplies have improved with the recent rains but dugouts are still low and will need runoff in the spring to fill (September 24, 2019). |
| Northwest | Rain has helped dugouts but levels remain low. (September 24, 2019). |

### *Soil Moisture*

Manitoba Agriculture's mapping of sub-surface soil (0 – 120 cm) conditions for September 30, 2019 (Figure 7) shows the impact of September precipitation on re-charging the sub-surface soil moisture. Wet to very wet surface soil moisture conditions were observed across a large portion of agro-Manitoba. The Interlake and Northwest regions were at optimal levels at most locations except at Pipe Lake, Moosehorn and Eriksdale where conditions were dry. Pierson (southwest) and Menisino (southeast) also observed dry soil moisture conditions.

Soil moisture levels are rated as follows: < 20 % Very Dry, 20 – 40 % Dry; 40 – 70 % Optimal; 70 – 90 % Wet and >90 % Very Wet in relation to the soil saturation level (maximum recorded at that station).

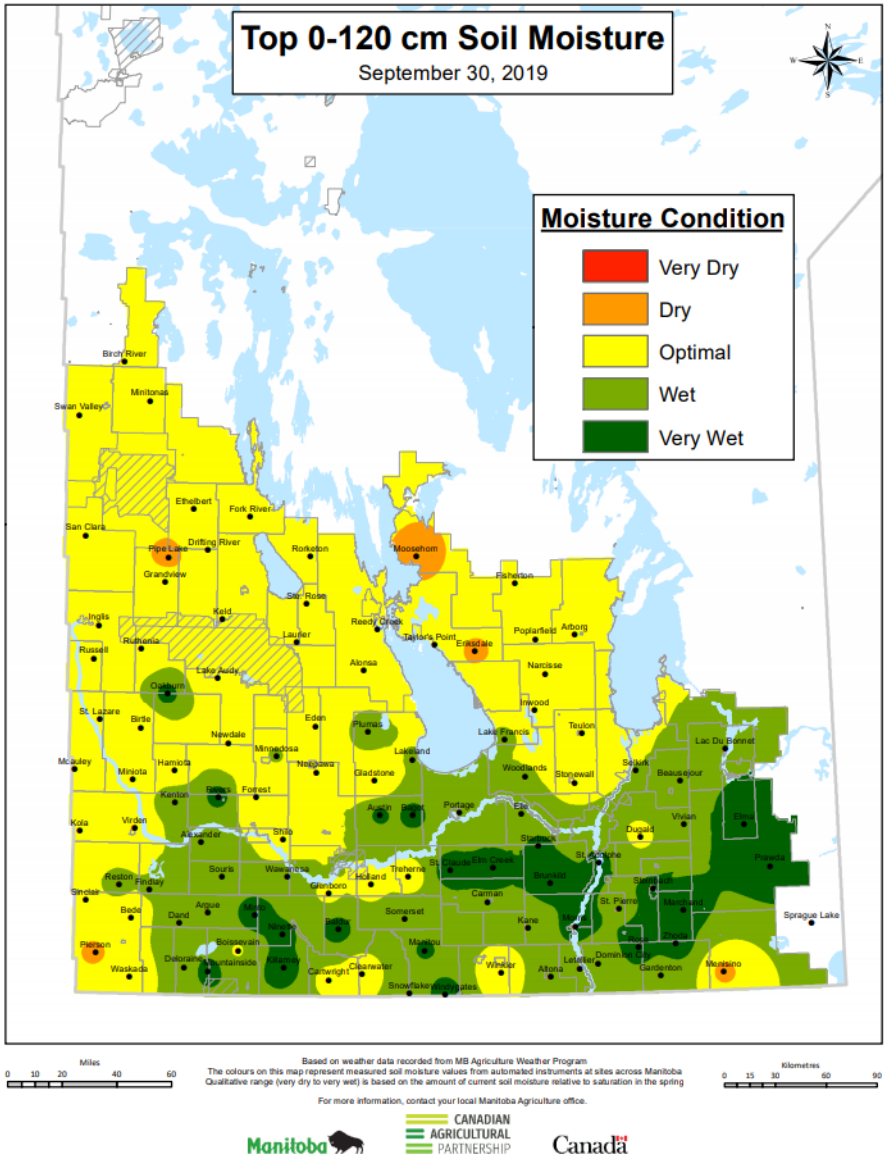


Figure 7: Manitoba Agriculture's September 30, 2019 mapping of soil moisture conditions in the top 0 – 120 cm.



Manitoba
Sustainable Development

## Wildland Fires

As of October 4, 2019, the Manitoba Sustainable Development Wildfire Program reported 277 wildfires occurred during the 2019 fire season, burning a total area of 101,144 hectares. Based on data from 1914 – 2019, this burned area is about 50 % of average for the season.

Drought Code (DC) values as of October 7, 2019 ranged from nil to moderate, with a few small pockets of high.

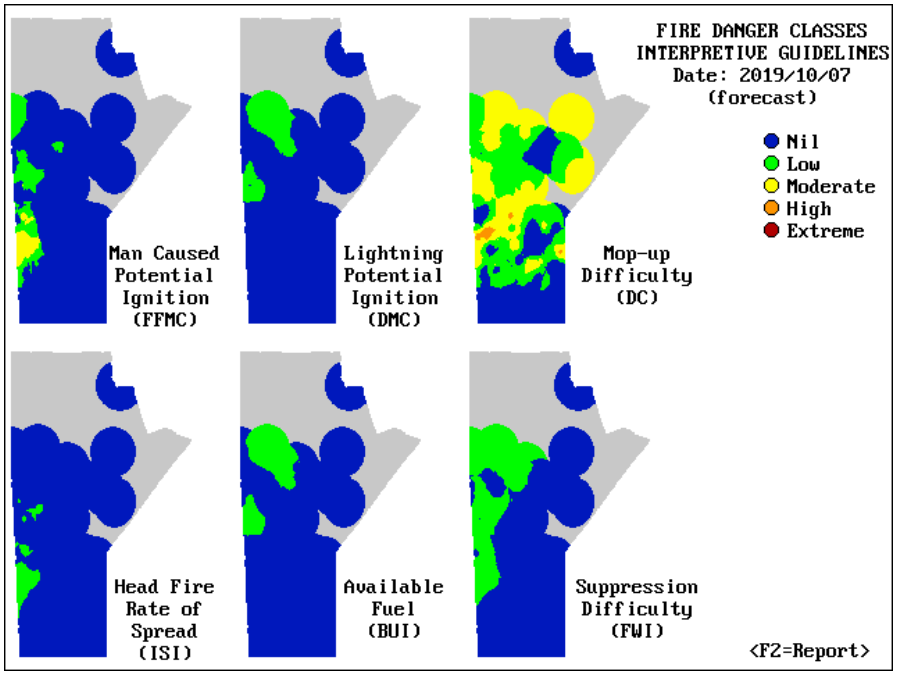


Figure 8: Fire danger mapping by the Manitoba Sustainable Development Wildfire Program.

## Impacts due to Dry Conditions

Manitoba Agriculture's Crop Report Issue 23 indicated that harvest has been slowed by widespread rainfall and is estimated at 67 % complete as of October 1, 2019. Information on 2019 yields is available in Manitoba Agriculture's weekly crop reports.

Although September rainfall extended the grazing season, forage availability continues to be a concern. There are reports of more animals going to market than normal due to lack of available feed and many producers are looking at alternative feed sources for winter feed supply. Hay sampling and testing are underway, with results indicating the presence of nitrates in some feeds affected by dry growing conditions. Producers that are feeding a variety of feed sources this year should feed test and have their rations balanced to meet livestock requirements.

Manitoba Agriculture's website has information and resources for producers on how to manage crop and livestock production during dry conditions. Producers looking for hay should see the Manitoba Hay Listing Service. For fall and winter planning, see resources on Managing Low Forage Supplies and Feed Plan Feed Ingredient Cost Calculator.

On September 12, 2019, government funding for water source development projects became available. Producers can inquire about the Water Source Development Program through Ag Action Manitoba – Assurance: Beneficial Management Practices.

**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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## Acknowledgements

This report was prepared with information from the following sources which are gratefully acknowledged:

**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*