Water Availability and Drought Conditions Report

JUNE 2023

Executive Summary

- This Water Availability and Drought Conditions Report provides an update on conditions throughout Manitoba for June 2023.
- Precipitation conditions over the past month, three month, and twelve month periods are as follows:
  - During June 2023, Manitoba experienced highly variable precipitation conditions. In agri-Manitoba, the central and eastern regions and along the Saskatchewan border were moderately dry (60 – 85 % of median) to extremely dry (<40 %), while portions of the southwest, northwest and Interlake regions observed normal (85 – 115 %) to above normal (>115 %) conditions. In northern Manitoba conditions generally ranged from moderately dry to extremely dry in the south, with normal to above normal conditions in the north.
  - Over the past three months (April, May, June), agri-Manitoba experienced mostly moderately to severely (40 – 60 %) dry conditions except for a few pockets of normal or above normal conditions. Precipitation conditions in northern Manitoba ranged from moderately to extremely dry, except for a region of normal to above normal conditions in the northwest.
  - Over the past 12 months, agri-Manitoba observed moderately dry to normal precipitation conditions with a few pockets of severely dry conditions. In northern Manitoba conditions ranged from moderately to severely dry in the south giving way to more normal conditions in the north.
- As of June 30, 2023, many rivers and lakes remained in the normal range (25^{th} – 75^{th} percentile), while others dropped into the below normal (10^{th} – 25^{th} percentile) or much below normal (<10^{th} percentile) categories.
- As of June 23, 2023, most monitored aquifer levels were in the normal range (25^{th} – 75^{th} percentile), except for the sand and gravel aquifers in south-eastern Manitoba which were either below normal (10^{th} – 25^{th} percentile) or much below normal (<10^{th} percentile) categories.
- The June 30, 2023 Canadian Drought Monitor assessment showed an increase in the extent of abnormally dry (D0) and moderate drought (D1) conditions across Manitoba, and the development of a region of D2 (severe drought) in south-central agri-Manitoba. Most of Manitoba is now classified as D0, with large regions of D1 throughout agri-Manitoba and into northern Manitoba.
- As of June 30, 2023, provincial water supply reservoirs were close to or above full supply levels and there are currently no concerns over reservoir water supplies at this time.
- On July 4, 2023, on-farm water supplies were reported as highly variable; all dugout levels were declining, and some were dry. Water quality is a concern in low dugouts and anecdotal observations suggest that water tables are low for this time of year.
- As of July 7, 2023, a total of 61,846 hectares have been burned during the 2023 wildfire season, primarily in the western and northern regions. At the time this report was published, no provincial burning or travel restrictions were in place due to wildfire activity; however, six communities or municipalities had burning restrictions in place.

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.

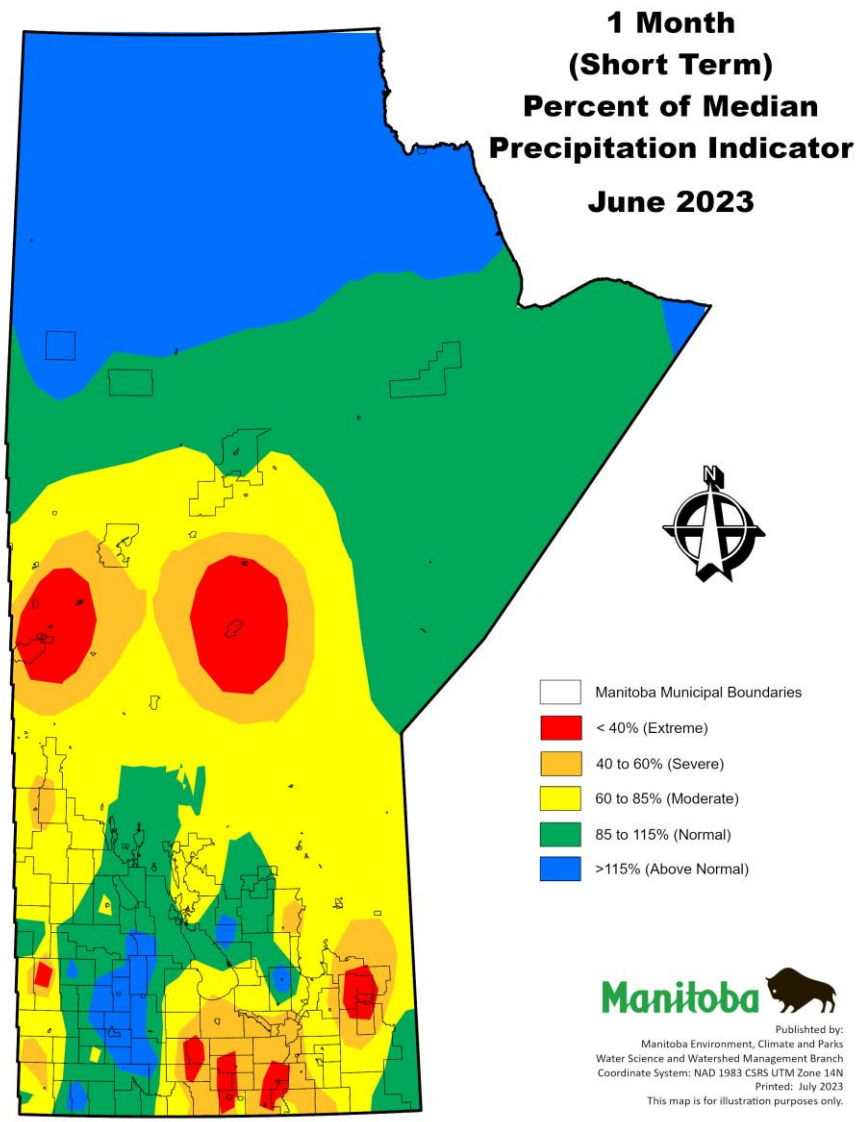

Figure 1: One month (short term) per cent of median precipitation indicator.

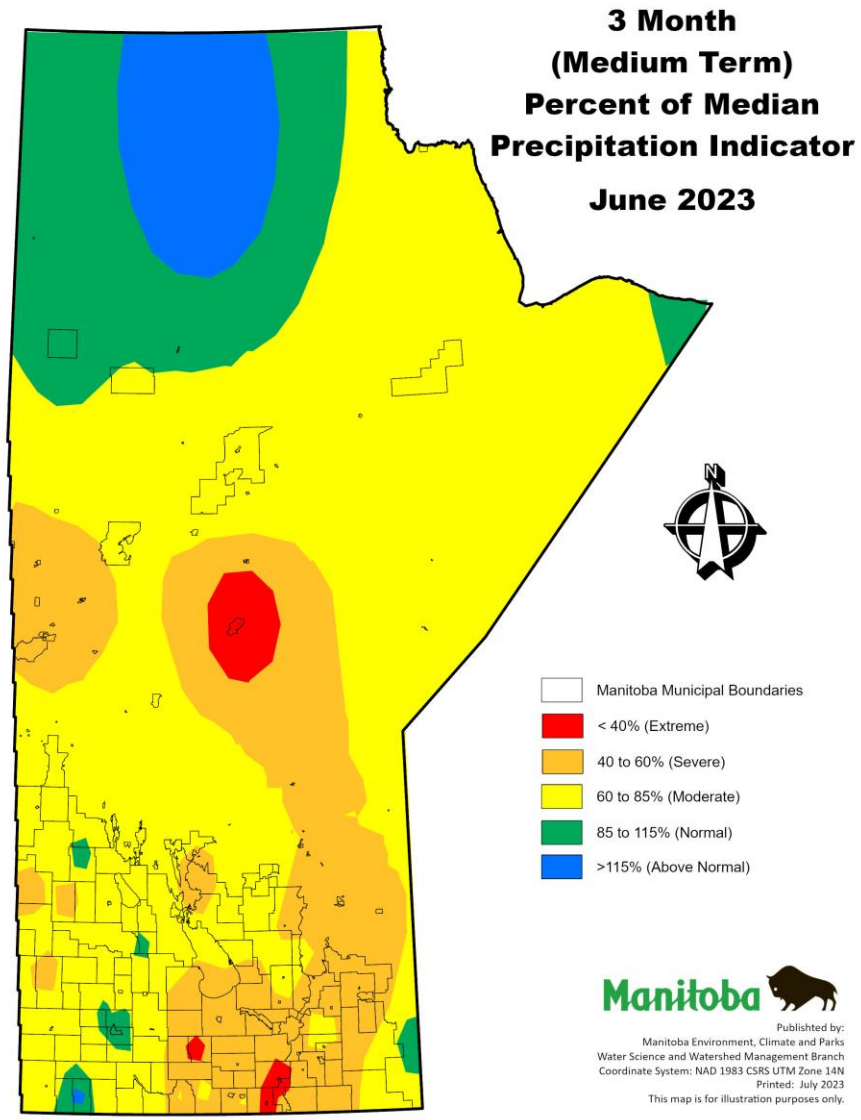

Figure 2: Three month (medium term) per cent of median precipitation indicator.

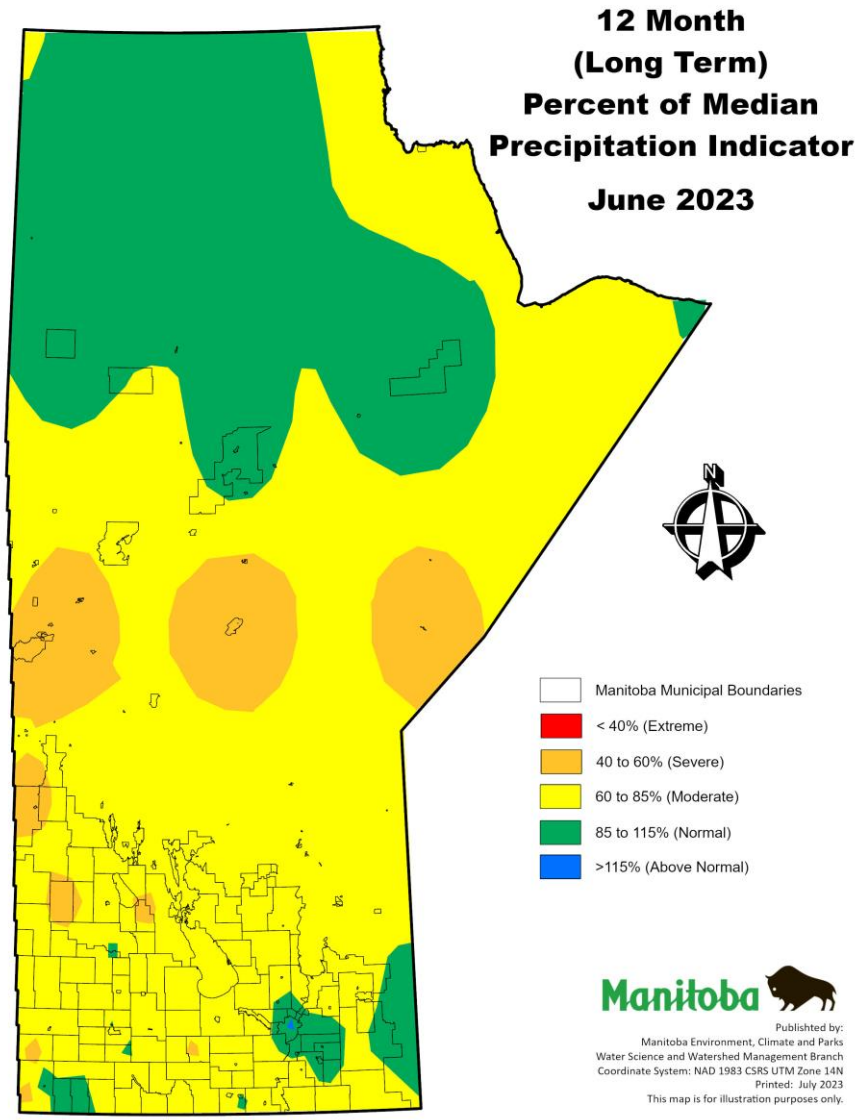

Figure 3: Twelve month (long term) per cent of median precipitation indicator.

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 June 30, 2023.

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.

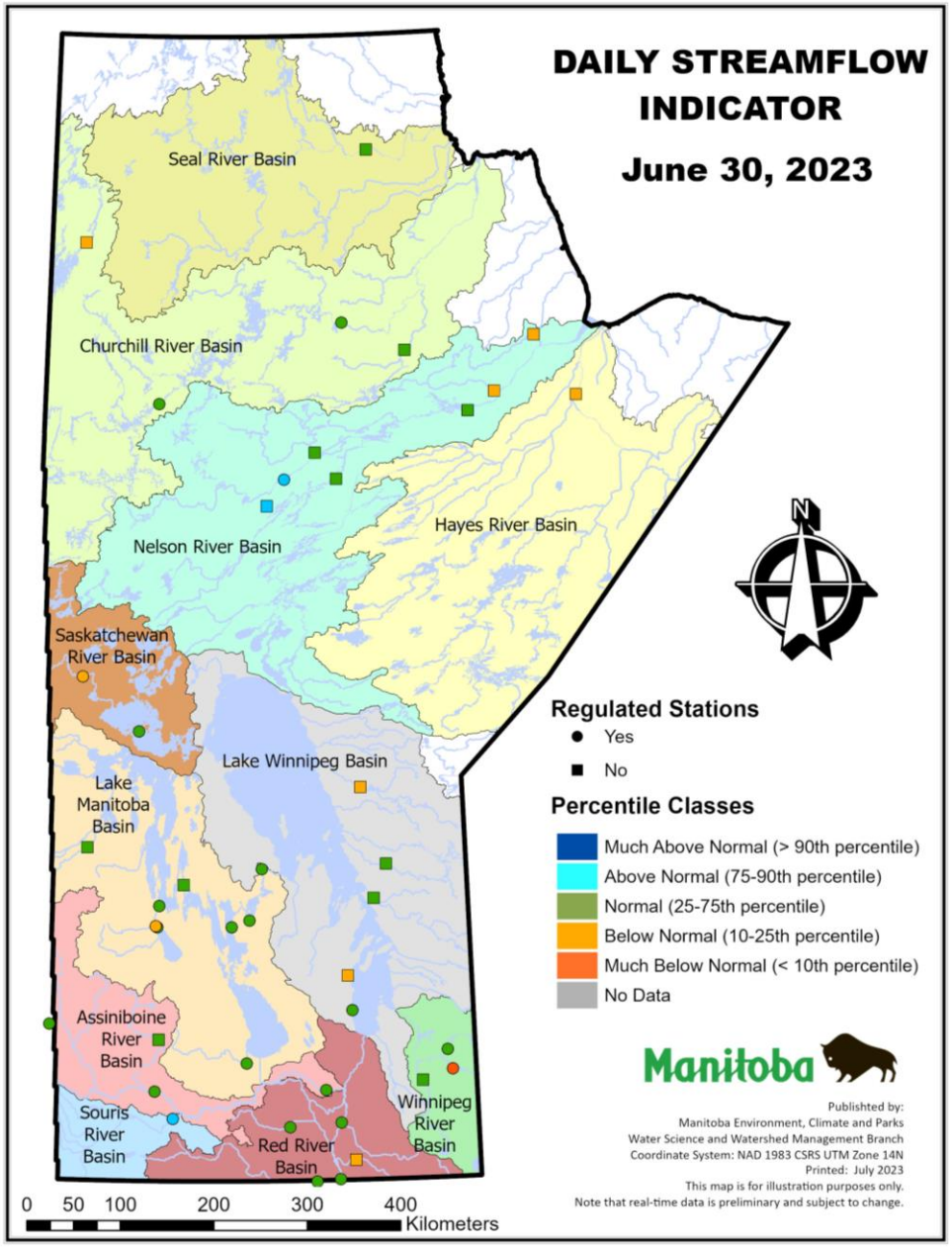

Figure 4: Daily streamflow and lake level indicator for June 30, 2023.

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. Even at low levels, most aquifers store large amounts of water and can continue to provide water during extended periods of dry weather. However, local conditions may vary from monitoring and in shallow aquifers with limited extent, may experience water levels declining below the pump and reported as dry or intermittently dry during pumping cycles. 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'.

Figure 5: Groundwater indicator on June 28, 2023 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).

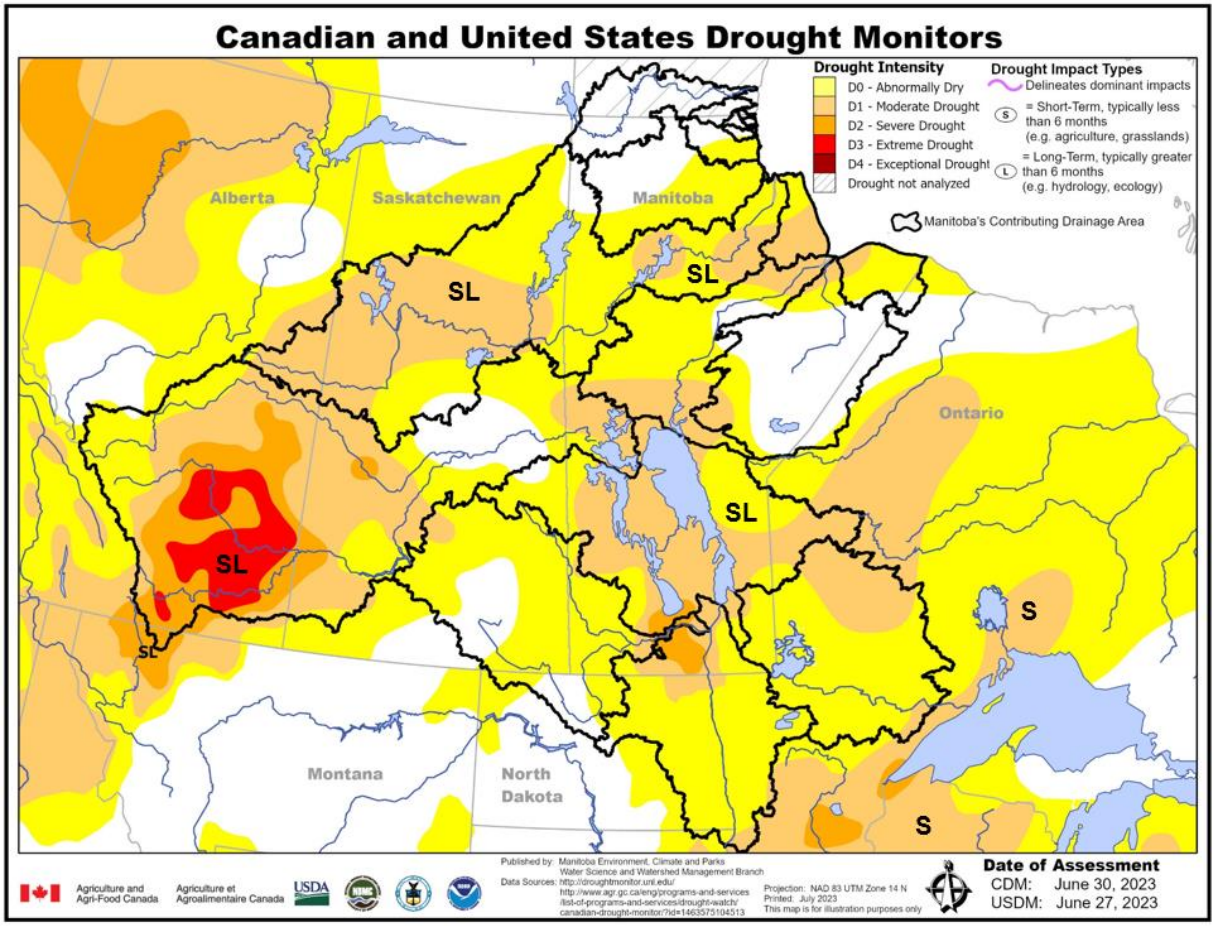

Figure 6: Canadian and United States Drought Monitors' classification of short-term (S) and long-term (L) drought conditions assessed as of June 30, 2023.

Water Availability

Reservoir Conditions

Table 1: Water Supply Reservoir Levels and Storages – June 30, 2023 (Southern and Western Manitoba).

Water Supply Reservoir Levels and Storages - June 30, 2023								
Lake or Reservoir	**Community 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	1402.43	June 30, 2023	-0.07	300,000	299,170	100%
Lake Wahtopanah (Rivers)*	Rivers	1,536	1536.68	June 30, 2023	+0.68	24,500	26,033	106%
Minnewasta (Morden)*	Morden	1,082	1081.78	June 30, 2023	-0.22	3,150	3,113	99%
Stephenfield*	Carman, Pembina Valley Water Co-op	972	971.59	June 30, 2023	-0.41	3,810	3,617	95%
Vermilion*	Dauphin	1,274	1274.37	June 30, 2023	+0.37	2,600	2,687	103%
Goudney (Pilot Mound)*		1,482	1482.56	June 30, 2023	+0.56	450	478	106%
Jackson Lake*		1,174	1172.31	June 30, 2023	-1.69	2,990	2,567	86%
Manitou (Mary Jane)*		1,537	1536.79	June 30, 2023	-0.21	1,150	1,131	98%
Turtlehead (Deloraine)*	Deloraine	1,772	1772.26	June 30, 2023	+0.26	1,400	1,428	102%
Lake Irwin*		1,178	1178.05	June 30, 2023	+0.05	3,800	3,835	101%
Minnedosa*		1,682	1682.40	June 30, 2023	+0.40	1,688	1,795	106%
Boissevain*	Boissevain	1,697	1698.52	June 30, 2023	+1.52	505	633	125%
Elgin*		1,532	1531.79	June 30, 2023	-0.21	520	506	97%
St. Malo*		840	840.20	June 30, 2023	+0.20	1,770	1,804	102%
Kenton Reservoir		1,448	1447.97	May 11, 2023	-0.03	600	598	100%
Killarney Lake		1,615	1616.10	May 12, 2023	+1.10	7,360	7,868	107%

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

On Farm Water Supply

Manitoba Agriculture's Crop Report Issue 8 (July 4, 2023) summarized on farm water supply availability as follows:

- Dugout levels are reported as highly variable; all are declining, some are dry.
- Some regions provided estimates of average dugout supply status. Dugouts are approximately 30% full in the Eastern region and ~70 % full in the Western region.
- Water quality is a concern in low dugouts.
- Anecdotal observations suggest that water tables are surprisingly low for this time of year.

Soil Moisture

A regional representation of soil moisture conditions for the top 120 cm relative to the field capacity is shown on Figure 7 for July 3, 2023.

The colours on the map represent measured soil moisture values from automated instruments at sites across Manitoba. Qualitative range (very dry to very wet) is based on the amount of current soil moisture relative to field capacity. Field Capacity is defined as the maximum amount of moisture the soil can hold when drainage due to gravity stops.

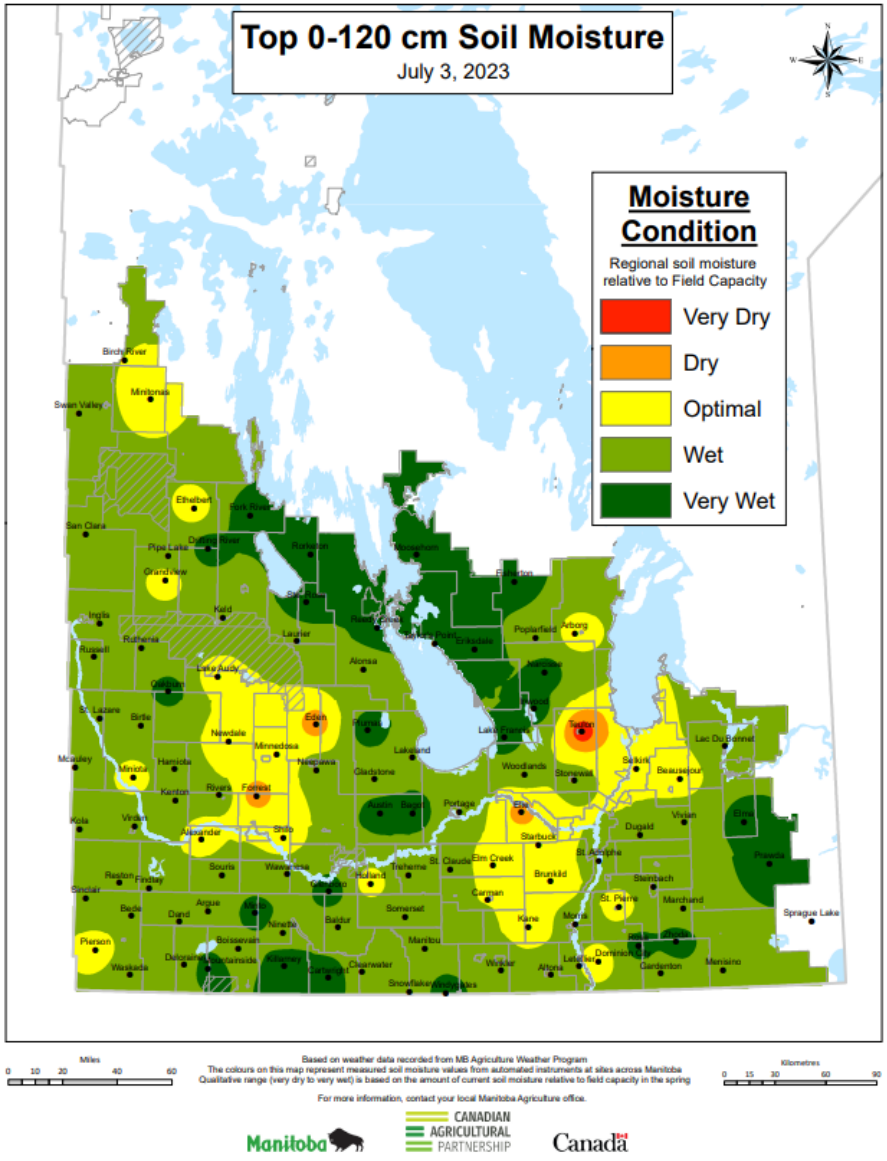

Figure 7: Manitoba Agriculture's July 3, 2023 mapping of soil moisture conditions in the top 0 – 120 cm.

Wildland Fires

As of July 7, 2023, 192 fires burned a total of 61,846 hectares, primarily in the western and northern regions. Wildfire danger was moderate to low across Manitoba (Figure 8).

As of July 7, 2023, there were no provincial fire or travel restrictions in place. Six communities or municipalities had burning restrictions implemented.

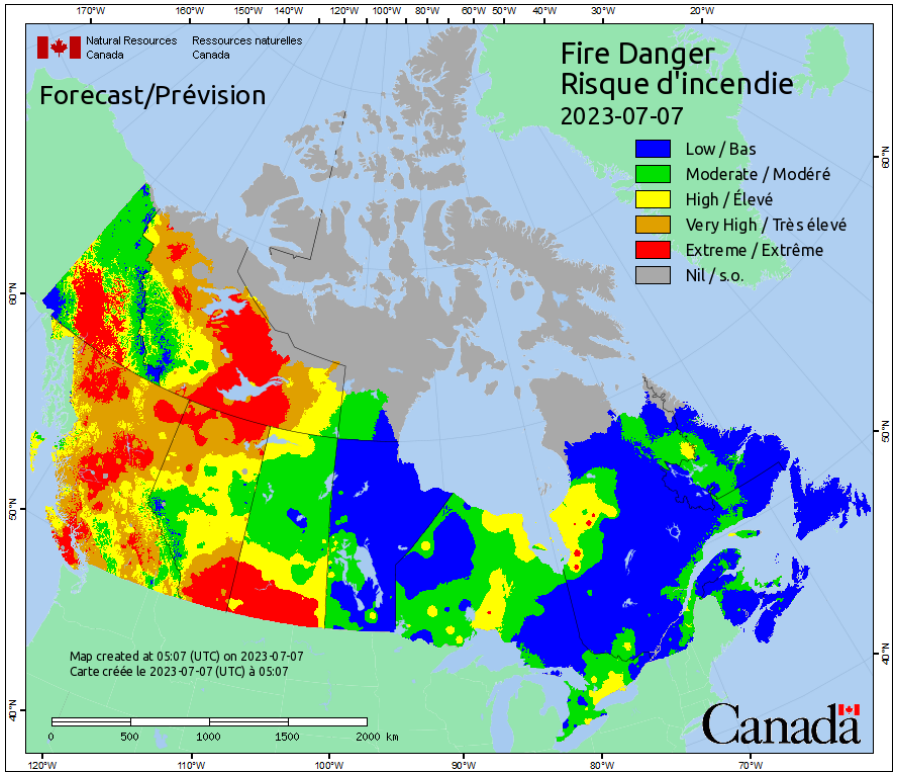

Figure 8: Fire Danger mapping by Natural Resources Canada.

Impacts due to Dry Conditions

Towards the end of June, a wildfire over 20,000 hectares in size located approximately eight kilometres east of the Town of Leaf Rapids resulted in the decision to evacuate. The mandatory evacuation order was rescinded on July 4, 2023, and repatriation of evacuees from the Town of Leaf Rapids began on July 5, 2023.

Crop development has been rapid and crops remain in good condition except later planted fields with uneven and thin stands due to dry topsoil. The biggest concern amongst crop producers in June remains the lack of significant rainfall. Rainfall amounts have been highly variable throughout agri-Manitoba during the 2023 growing season.

Hay yields are also highly variable due to the patchy rainfall experienced to date. The recent moisture received in some regions is vital for regrowth on hayfields that have already been cut. Second cut will be minimal without any further rain. Hay yields are down this year, with many producers reporting one third of what they did last year. Early forage growth is adequate for grazing, but regrowth will be reduced unless producers receive more rainfall. Pastures that were grazed early are in poor condition but recent rain has helped some of the better managed pastures.

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

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

Manitoba Wildfire Service:
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

Environment and Climate Change Canada:
Flow and lake level information:
http://www.wateroffice.ec.gc.ca/index_e.html

Agriculture and Agri-Food Canada:
Canadian Drought Monitor:
https://agriculture.canada.ca/en/agriculture-and-environment/drought-watch-and-agroclimate/canadian-drought-monitor

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