

## **WATER AVAILABILITY AND DROUGHT CONDITIONS REPORT Manitoba**

January 10, 2012

### **Synopsis/Overview**

Moderate drought conditions (meteorological) are prevailing in eastern Manitoba from the Bloodvein River to the international border (includes Winnipeg River watershed), in the northern portions of the Red River basin, and southern parts of the Westman and Interlake regions. Eastern Manitoba has been experiencing moderate drought conditions for the past seven months. The remaining areas in western Manitoba including the Swan River and southern Manitoba are experiencing mild dry conditions due to below precipitation over the past three months.

Flows were generally at or above median except for the Winnipeg River watershed, Bloodvein and Cochrane rivers which are below median.

Manitoba Agriculture, Food and Rural Initiatives fall soil survey in October 2011 reported that east-central Manitoba is consistently drier than other regions due to well below average soil moisture.

Manitoba Agriculture, Food and Rural Initiatives, Winter Cereal Canada, and WeatherFarm reported that the current snowpack in southern and western Manitoba is not sufficient to protect winter wheat if the cold temperatures were to quickly return to normal without significant precipitation. The current snowpack is less than 10 to 13 cm (four to five inches). About 10 to 13 cm (four to five inches) of snowpack is typically required to provide protection against harsh winter weather.

There is also a potential risk for harvested grains as insect and pest control is a potential issue as a result of the warm weather.

### **Outlook**

For the next 3 months (January, February and March 2012) Environment Canada's seasonal forecast is for above normal temperatures for southern Manitoba, and normal for central and northern Manitoba except below normal for the far north. Above normal precipitation is forecast for most of Manitoba with below normal precipitation forecast for the far north (Attachment 4).

### **Precipitation**

Over the last 30 days, below average precipitation was received in all regions of Manitoba except for the Manitoba portion of Saskatchewan River basin where precipitation was average to above average. Well below average precipitation was received in all of

## southern Manitoba

Over the last 90 days, well below average precipitation was received in all of southern Manitoba. Average to above average precipitation was received in northern Manitoba and parts of western Manitoba north of Swan River (Table 1 and Attachment 1).

### **Stream and River Flows**

Flows were generally at or above median except for the Winnipeg River watershed, the Bloodvein and the Cochrane rivers which are below median (Table 1 and Attachment 3).

### **Lake/Reservoir conditions**

For December, most lakes in eastern Manitoba were experiencing very low levels due to prevailing low moisture conditions with water levels about 0.3 to 0.6 metres (1 to 2 ft) below target levels.

[http://www.gov.mb.ca/waterstewardship/floodinfo/lakes\\_information.html#lake\\_levels](http://www.gov.mb.ca/waterstewardship/floodinfo/lakes_information.html#lake_levels).

Except for Turtlehead Creek (near Deloraine) and the Vermillion reservoir, all reservoirs operated by the province are either full or close to full at this time. The Turtlehead Creek is about one metre (3 ft) below the full supply. The Vermillion reservoir operated by the Town of Dauphin is about 1.5 metres (5 ft) below the full supply level.

### **Fall Soil Moisture Survey**

Manitoba Agriculture, Food and Rural Initiatives conducted a fall soil survey across Agro-Manitoba in October 2011 and reported that east-central Manitoba is consistently drier than other regions due to well below average soil moisture (Attachment 2).

### **Potential Impacts**

Meteorological drought can contribute to low flows in rivers and streams and to low soil moisture and low snowpack. There is a potential for forage shortages and negative impacts on the emergence of winter wheat in some areas in the Interlake, Westman and southern regions. There is generally not sufficient snowpack, less than 10 to 13 cm (four to five inches) to protect winter wheat if cold temperatures were to quickly return to normal without significant precipitation. There is also a potential risk for harvested grains as tinsect and pest control is a potential issue as a result of the warm weather.

**Table 1: Detail by Major River Basin (Attachments: 1, 3 and 7)**

Basin	Indicators			Major River Flow Conditions December 2011
	1 month Precipitation (December 4, 2011 – January 2, 2012)	3 months Precipitation (October 5, 2011 – January 2, 2012)	Standard Precipitation Index (SPI)	
Red River	Well below average	Well below average	n/a	Above median
Winnipeg River	Well below average	Well below average	n/a	Below median
Assiniboine River- Souris River	Well below average	Well below average	n/a	Above median
Lake Manitoba	Well below average	Below average and well below average for southern part	n/a	Above median
Lake Winnipeg	Well below average	Well below average for southern part and below to average for northern part of basin	n/a	Above median except below median for eastern tributaries
Saskatchewan River	Below average for most parts of basin except above average for The Pas area	Average to above average	n/a	Above median
Nelson River	Below average	Average to above average	n/a	Above median
Hayes River	Below average	Above average	n/a	Above median
Churchill River	Below average	Above average for lower Churchill and below average for upper Churchill	n/a	Above median except below median for Cochrane River near Brochet
Seal River	n/a	n/a	n/a	Above median

**Note: Median is 50<sup>th</sup> percentile.**

## Acknowledgements

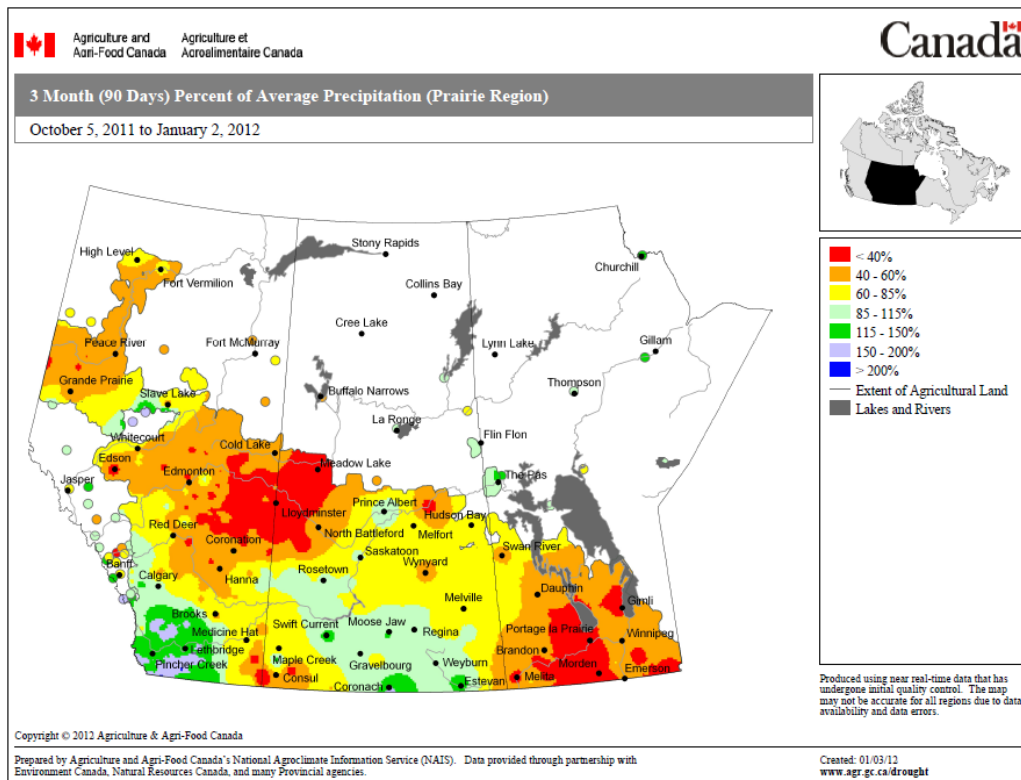
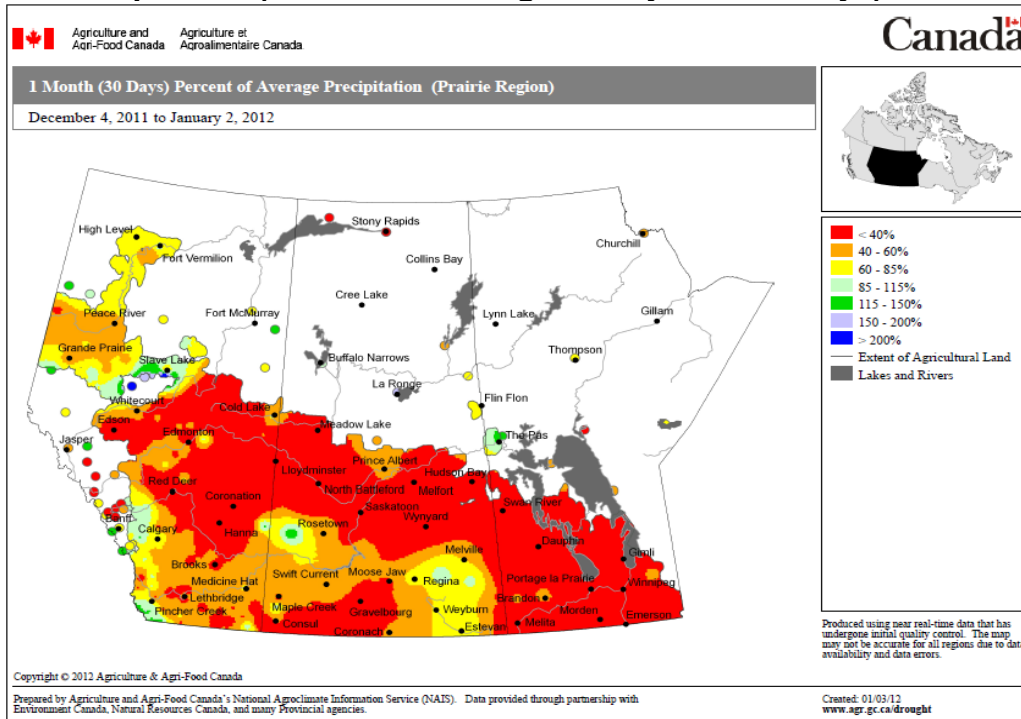
This report was prepared with information from the following sources which are gratefully acknowledged:

- Agriculture and Agri-food Canada (Drought watch); North America Drought Monitor:  
<http://www4.agr.gc.ca/DW-GS/current-actuelles.jsp?lang=eng>
  - Regional site: [30 and 90 precipitation](#)
  - National Site: [Palmer Drought](#) and [Standard Precipitation Indices](#)
- Manitoba Conservation and Water Stewardship: Flow and Lake information:  
[http://www.gov.mb.ca/waterstewardship/floodinfo/river\\_conditions.html](http://www.gov.mb.ca/waterstewardship/floodinfo/river_conditions.html)  
[http://www.gov.mb.ca/waterstewardship/floodinfo/lakes\\_information.html#lake\\_levels](http://www.gov.mb.ca/waterstewardship/floodinfo/lakes_information.html#lake_levels).
- Environment Canada: Flow and Lake information  
[http://www.wateroffice.ec.gc.ca/index\\_e.html](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](http://weatheroffice.gc.ca/saisons/index_e.html)
- Manitoba Agriculture, Food and Rural Initiatives
- Manitoba Conservation and Water Stewardship Fire Program

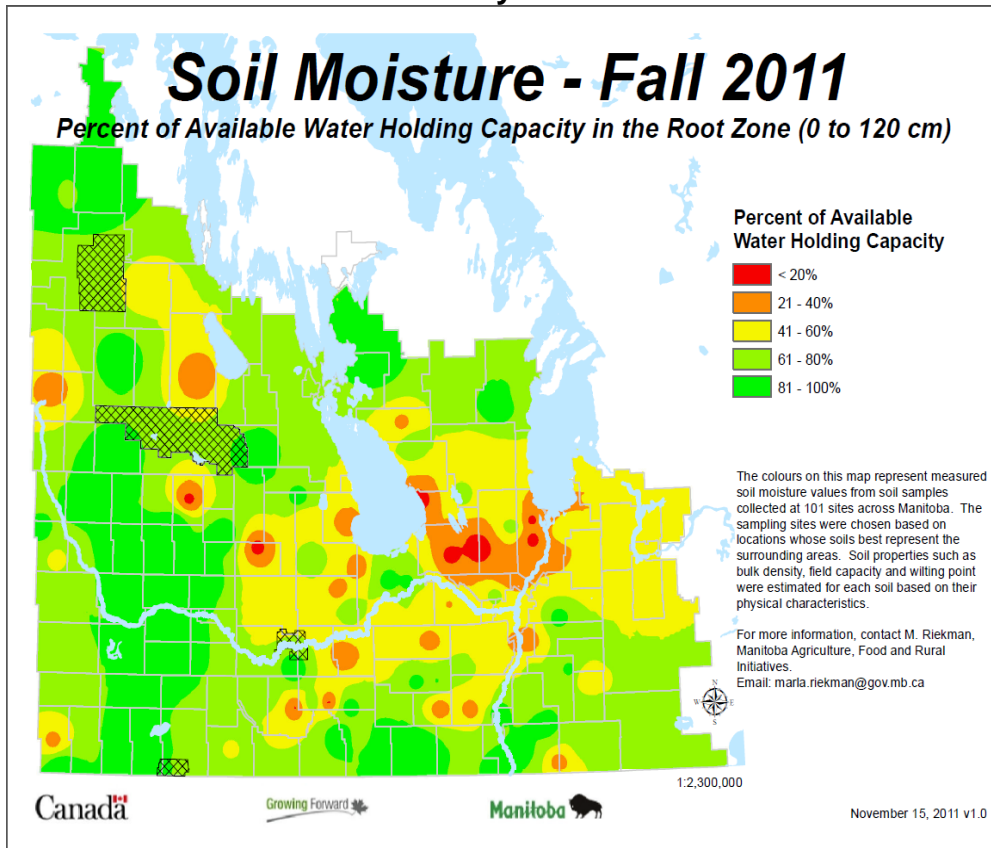
**For further information, please contact:** Abul Kashem, Surface Water Management Section, Manitoba Conservation and Water Stewardship, 945-6397

# Attachments

## 1. Precipitation (Percent of average:30 days and 90 days)



## 2. MAFRI Soil Moisture Survey - Fall 2011



### 2011 Fall Soil Moisture Survey

Marla Riekman<sup>1</sup>, Mike Wroblewski<sup>1</sup>, Andy Nadler<sup>2</sup>, John Heard<sup>1</sup>, Ian Kirby<sup>1</sup>

<sup>1</sup> Manitoba Agriculture, Food and Rural Initiatives, <sup>2</sup> Weather Innovations Incorporated

---

#### Background

During the last two weeks of October 2011, a soil moisture survey was completed across Agro-Manitoba. Knowing the fall soil moisture status can be helpful for agronomic decisions such as crop selection, determining potential yield, and estimating fertilizer requirements. The amount of moisture within the root zone just prior to freeze-up provides a good indication of what can be expected in the spring. With snow cover and freezing temperatures, soil moisture content remains relatively stable throughout the winter. This is especially true in frozen moist soils whose pores become "sealed off" from further water infiltration.

#### Method

Each sampling site was chosen based on the soil properties that best represent each area and the most common cropping system in the region. Soil samples were collected from 101 locations at five depths throughout the root zone: 0-15 cm, 15-30 cm, 30-60 cm, 60-90 cm, and 90-120 cm. Samples were placed in sealed containers and subsequently weighed, oven dried, and re-weighed to determine their gravimetric moisture content.

Soil samples were classified based on their similarities to other well characterized soils in Manitoba according to Haluschak et al (2004). This enabled us to assign a bulk density, wilting point, field capacity, and available water holding capacity value to each depth from each sample location. From there, soil moisture by weight was converted to percent moisture by volume. Then available water and soil moisture as a percent of available water holding capacity were calculated and mapped. An inverse distance weighted (IDW) interpolation technique with minimal smoothing was used to retain the spatial variability of the results. The interpolation was performed between the actual values of the sample sites without accounting for soil variability between those locations.

#### Results

**Figure 2:** Available amount of water in the root zone (0-120 cm) for the 2011 fall soil moisture survey. The amount of water in the root zone is expressed as a percentage of the total available water holding capacity of the soil. Percent of available water holding capacity can be used to assess whether the soils are dry or wet. Soil with its moisture content at field capacity would have an available water holding capacity of 100% while soil at the wilting point would have a value of zero. For most crops, moisture stress can begin as the moisture content drops below 50-60%. The amount of water held at field capacity will vary greatly depending on the soil texture. Coarse sand at field capacity would have about 75 mm of available soil moisture, sandy loam would have about 175 mm, loam would have about 250 mm, clay loam would have about 275 mm, and clay could have over 300 mm.

**Figure 3:** Locations of 101 sample points for the 2011 fall soil moisture survey. The map shows the locations of 101 sample points across Manitoba, color-coded by crop type: annual crop (red), fallow (green), and perennial (blue).

**Figure 4:** Average Available Soil Moisture by Crop Type (mm). A bar chart showing the average available soil moisture (mm) for three crop types: annual (n=75), fallow (n=11), and perennial (n=23). The annual crop has the highest average soil moisture, followed by fallow, and then perennial.

---

#### Summary

In general, east-central Manitoba is consistently drier than other areas of the province. A major impact on soil moisture is the 2011 crop (Figure 4). Note that a number of the high moisture readings (dark green and blue areas of Figure 2) coincide with sample locations where the fields were left fallow in 2011.

#### Acknowledgements

Many thanks to MAFRI staff who completed the soil sampling: Scott Chalmers, Eric Cox, Gerwin Franken, Laura Grzenda, Ainsley Little, Clay Sawka, Jim Snowdon, and Matthew Wiens.

---

#### References

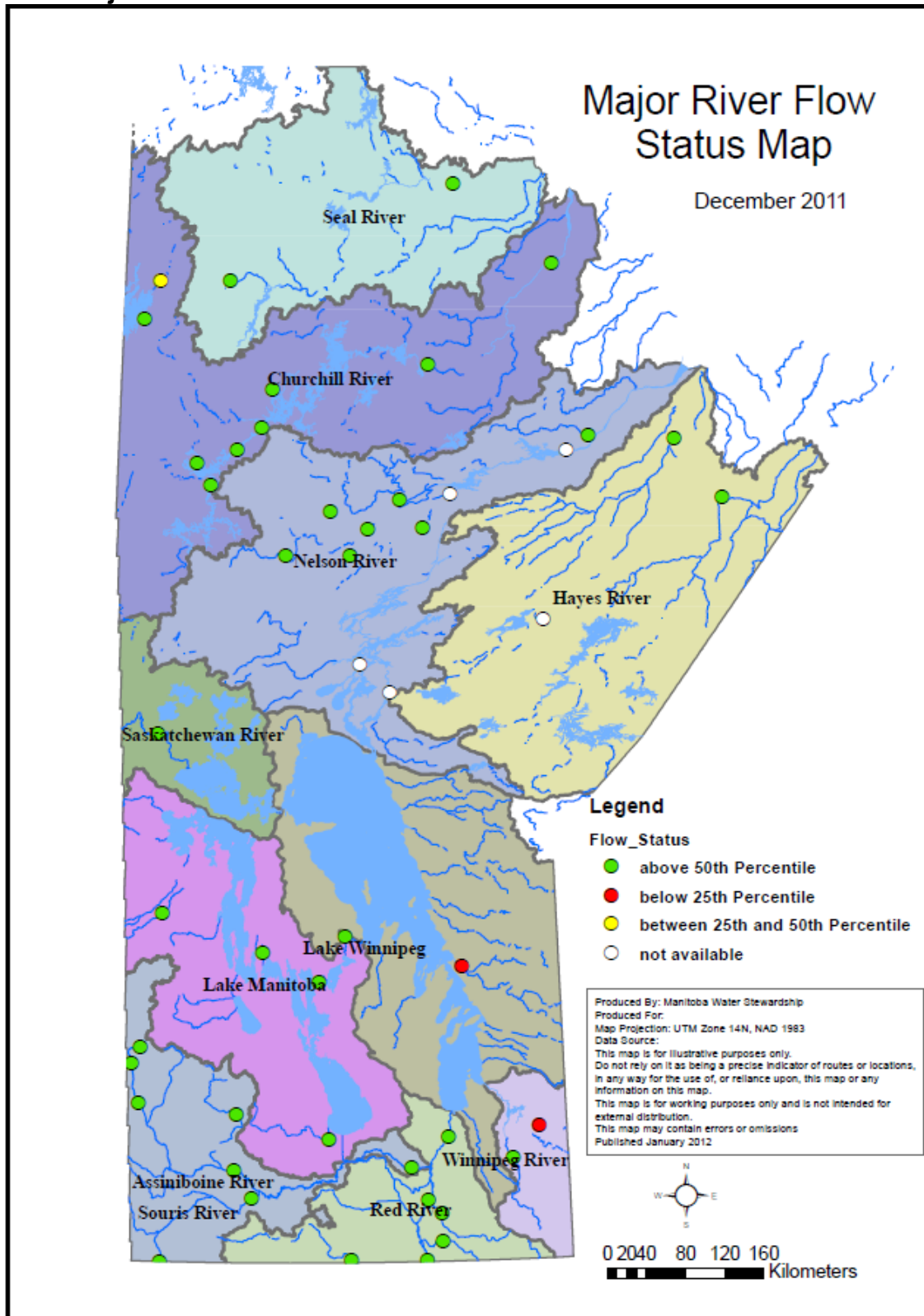
Haluschak, P., Griffiths, J. and Shaykewich, C. F. 2004. Available water holding capacities of Manitoba soil. Manitoba Soil Science Society Proceedings 2004: 224-232.

Attached to a summary of the field activity for 2011.

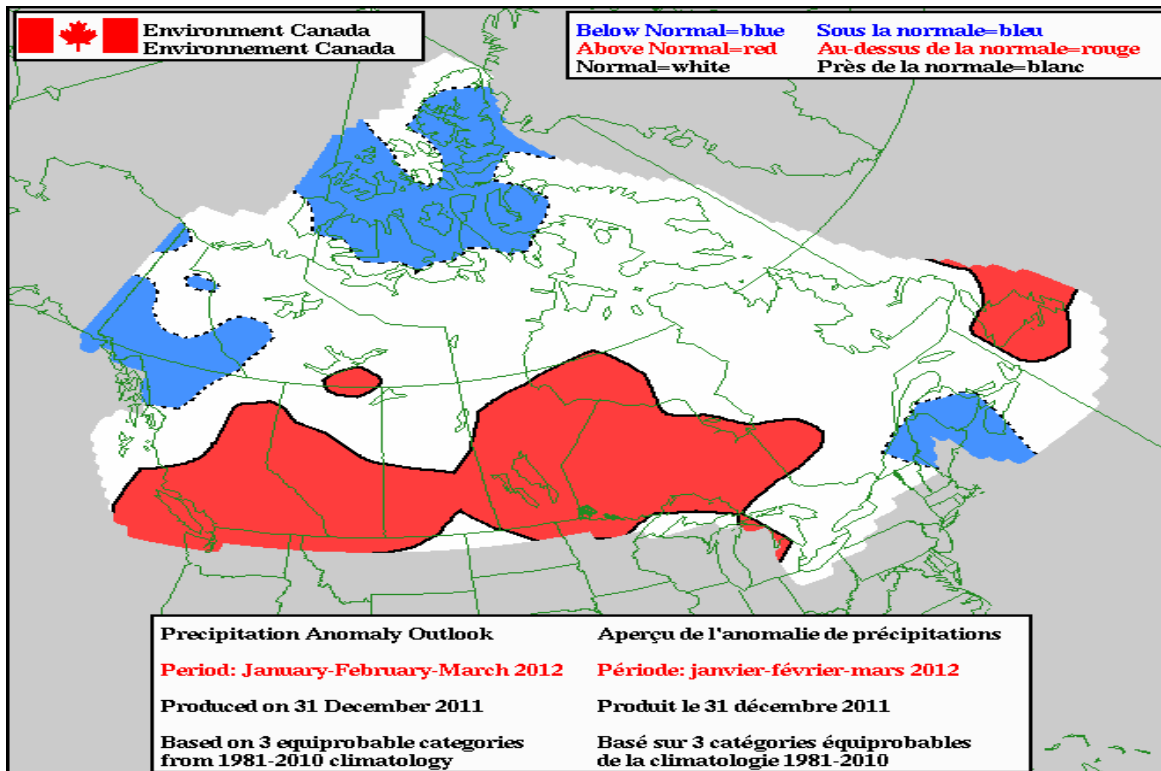
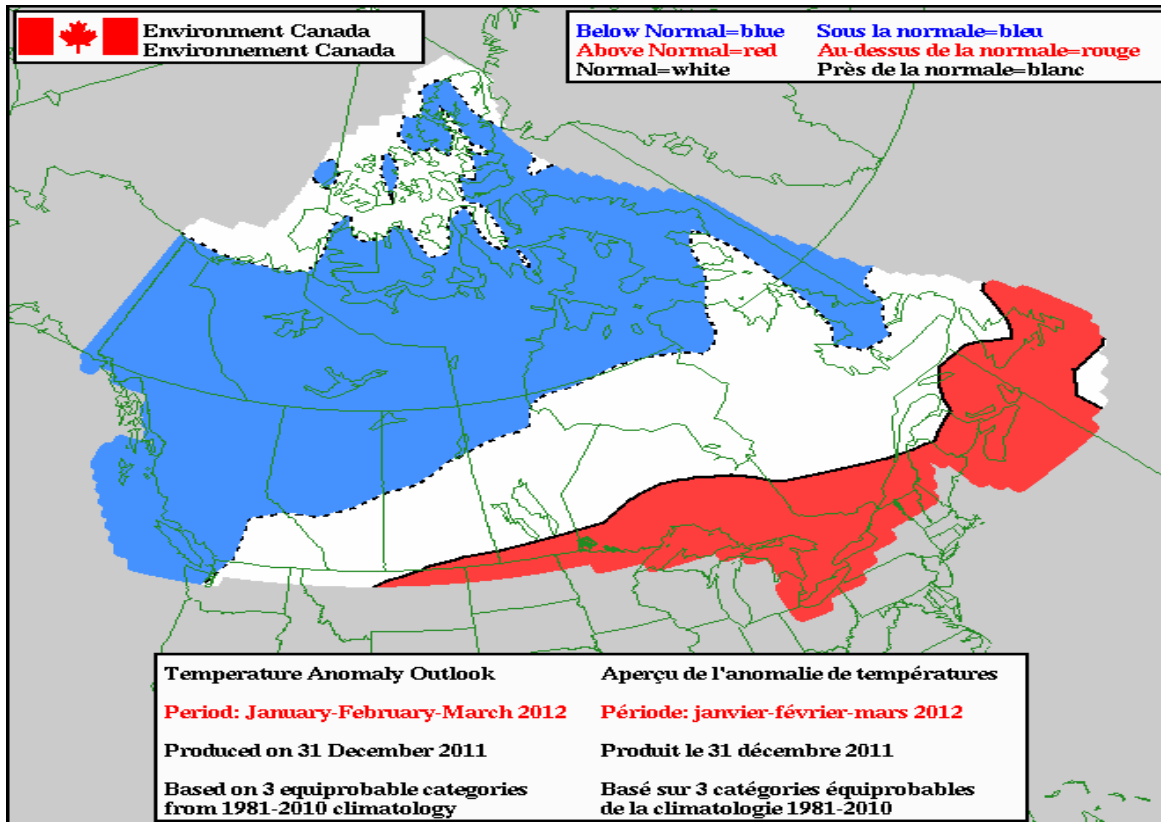
---

The Manitoba Fall Soil Moisture Survey is an initiative of the Manitoba Ag-Weather Program. For more information go to: [www.gov.mb.ca/agriculture](http://www.gov.mb.ca/agriculture)

### 3. Major River Flow Status



#### 4. Environment Canada 3 Month Outlook





## 5. Major River Basins

