



# National Drought Model



The dry, cracked ground shown above represents severe drought conditions which have devastating potential for Canada's agricultural industry.

Agriculture and Agri-Food Canada (AAFC) uses the National Drought Model (NDM) to monitor drought occurrence and severity across Canada. Monitoring the spatial extent and severity of weather conditions is the only way to determine drought impacts on the agricultural sector. The NDM is based on decades of research in climate and soil science, and is used to create and distribute monthly maps of drought conditions in Canada.

The NDM tracks drought using the Palmer Drought Index and Versatile

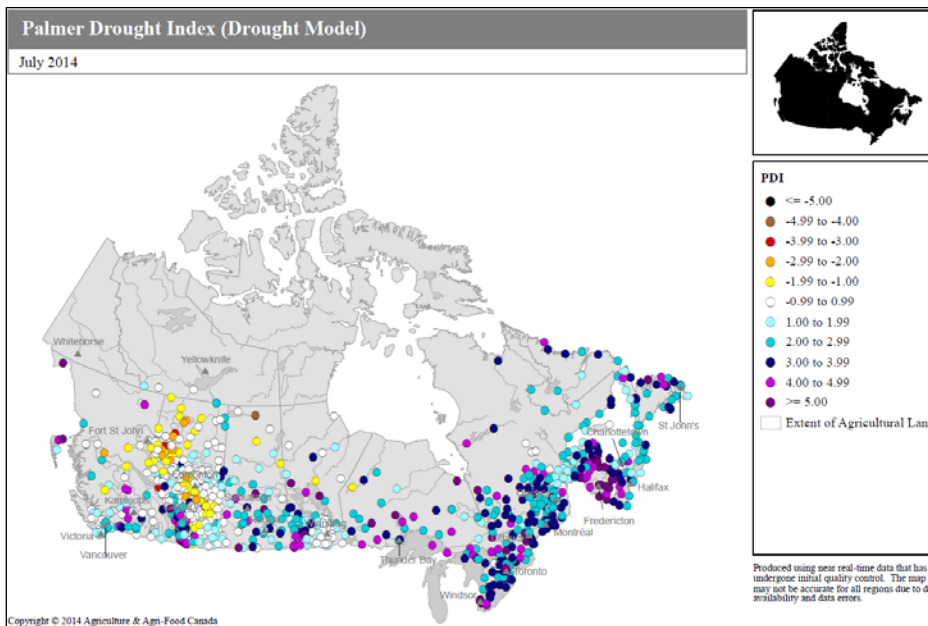
Soil Moisture Budget, which accounts for Canadian sub-zero temperatures and snow in soil moisture estimates. The NDM is also used to calculate root zone soil moisture, evapotranspiration, solar radiation, growing degree-days and soil temperature. Much of this information can be accessed in maps on the Drought Watch website ([www.agr.gc.ca/drought](http://www.agr.gc.ca/drought)) in near real-time.

The Palmer Drought Index (PDI) estimates the difference of current moisture supply from average conditions. The index is standardized so comparisons can be made between locations and time periods. The PDI value represents moisture deficiency or surplus, with negative values indicating a shortage of water while positive numbers suggest surplus water.

The Moisture Anomaly Index, also known as MAI or the Z index, is an intermediate step of the PDI and estimates the moisture difference from normal. It compares conditions for the current month against a long-term average of 30 years.

The PDI for a particular month consists of two components:

- 1) the moisture state of the current month, which contributes about 10 per cent to the index; and
- 2) the moisture state of previous months, which contributes about 90 per cent to the index.



Since the PDI is heavily weighted to previous months, the index is said to have a “memory”. This is important as drought often spans multiple years and is difficult to fully understand without a historical context. For this reason, the PDI, although often referred to as a meteorological

index, is more appropriately considered as a measure of long-term drought or moisture surplus.

NDM monthly outputs are used by academia, research initiatives, drought monitoring initiatives, Environment Canada and commodity brokers. The maps, including those on the Drought Watch website, have application in a wide range of activities such as current drought monitoring in agricultural areas, water quality studies, potential evapotranspiration studies, climate change research and historical drought research.

Ongoing operation of the NDM is led by AAFC’s National Agroclimate Information Service (NAIS) of the Agro-Climatic, Geomatics and Earth Observations (ACGEO) Division of the Science and Technology Branch. AAFC’s partner in this project is Environment Canada, which supplies the input data in accordance with an agreement for the North American Drought Monitor which uses NDM outputs in decision support for its products.

**For more information** please contact AAFC’s **National Agroclimate Information Service** at [nais-snia@agr.gc.ca](mailto:nais-snia@agr.gc.ca) or visit AAFC’s **Drought Watch** website at [www.agr.gc.ca/drought](http://www.agr.gc.ca/drought).

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