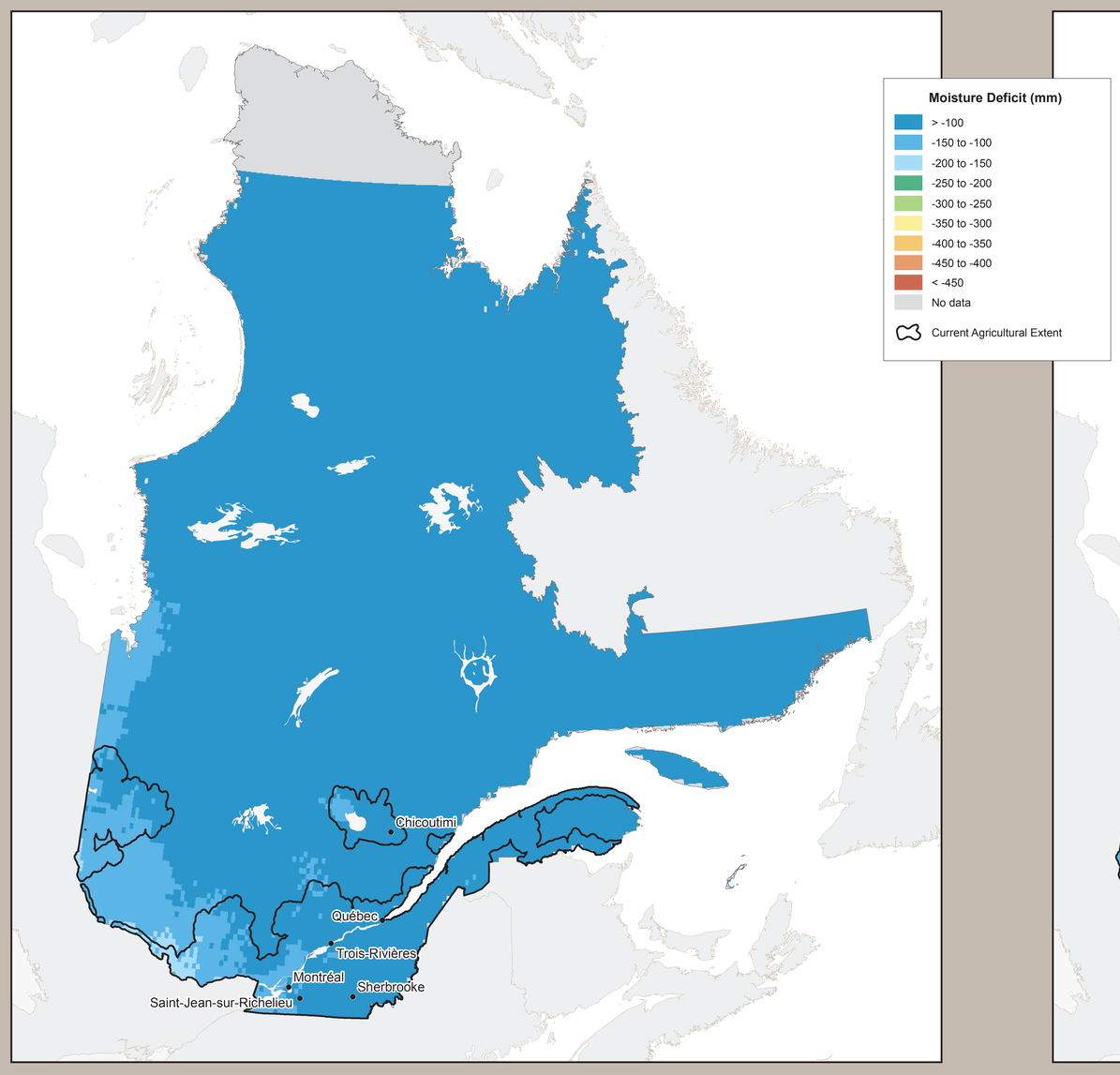
Moisture Deficits

Quebec

Moisture Deficits (P-PE):

- Moisture deficit is precipitation (P) minus potential evapotranspiration (PE).
- Moisture deficits were accumulated from seeding date, until estimated crop maturity using the Bio-Meteorological Time Scale (BMTS) for wheat.

Baseline: 1971-2000



Climate Change Scenario: 2010-2039

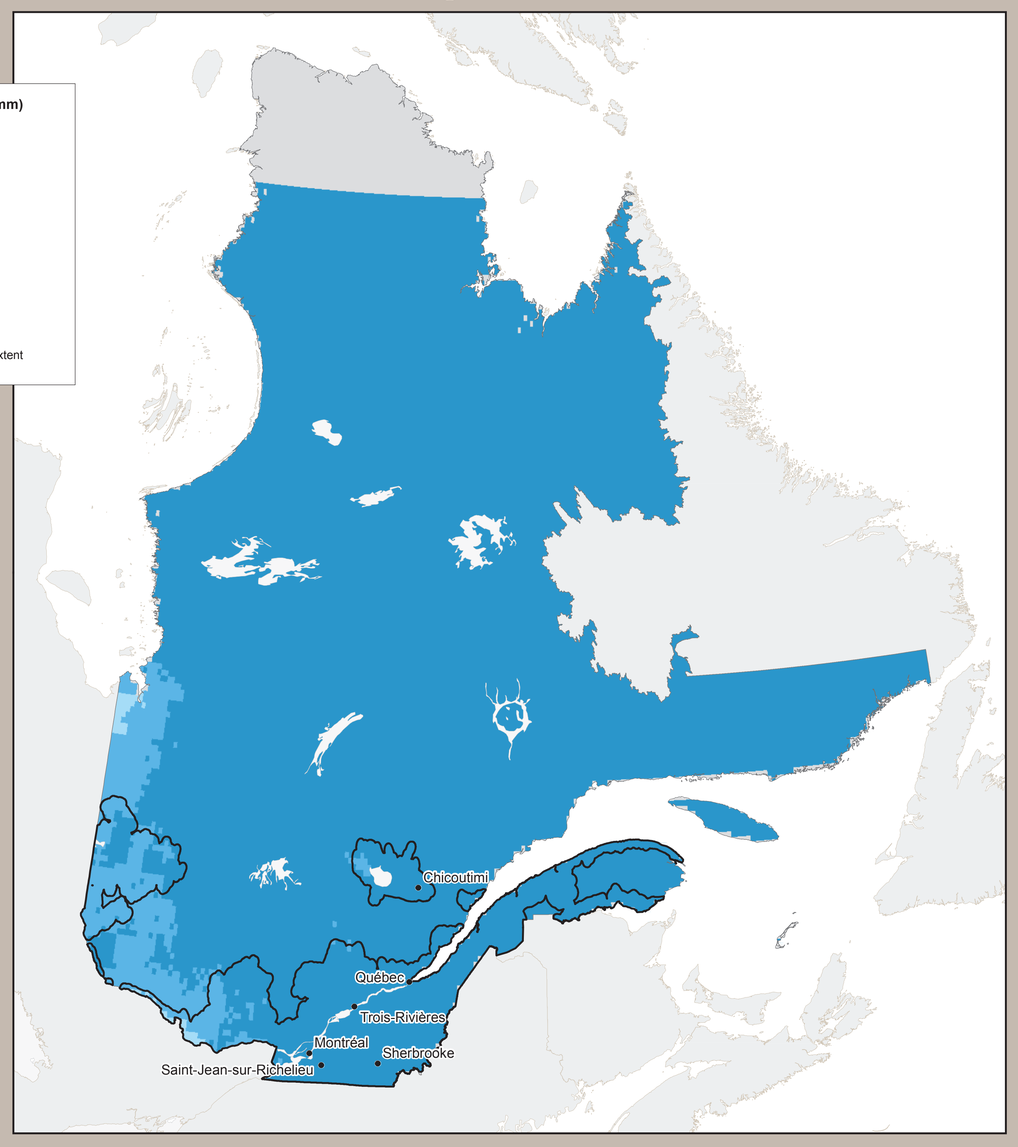


Table 1: Climate Suitability Ratings for Spring Seeded Small Grains

Moisture Deficit (mm)	Suitability Rating and Description
-150	No limitations - Class 1
-300	Slight limitations - Class 2
-400	Moderate limitations - Class 3
-500	Severe limitations - Class 4 to Class 5

Note: Class 1 to Class 3 are considered suitable for continual crop growth.

For more information on suitability ratings for spring seeded small grains:
http://sis.agr.gc.ca/cansis/publications/manuals/lsrs.pdf

Table 2: Summary of P-PE comparing 1971-2000 to projected climate change in 2010-2039

Moisture Deficit (mm)	1971 - 2000 Baseline	2010 - 2039 CGCM 3.1
	Percent of total area	
> -100	93.6	95.1
-150 to -100	6.0	4.7
-200 to -150	0.4	0.2
-250 to -200	< 0.1	0.0
-300 to -250	0.0	0.0
-350 to -300	0.0	0.0
-400 to -350	0.0	0.0
-450 to -400	0.0	0.0
< -450	0.0	0.0

- The CGCM 3.1 model predicts similar to a small increase in precipitation by 2010-2039, as well as a shift to earlier crop seeding and maturity times in Quebec.

Climate Data and Future Scenario:

- 30 year average monthly climate data (Tmax, Tmin, ppt) was used to calculate:
  - Effective Growing Degree Days,
  - Moisture Deficits (P-PE) and
  - Length of Growing Season (seeding date until fall frost).
- Baseline data (1971-2000) provided by Natural Resources Canada (Great Lakes Forestry Centre).
- Climate Change Scenario (2010-2039)
  - Global Climate Change Model (GCM) used: Canada's Coupled Global Climate Model (CGCM3.1) developed by the Canadian Centre for Climate Modelling and Analysis.
  - Climate data was spatially interpolated using ANUSPLIN software (2.5° grid interpolated to ~10km grid).

Limitations:

- Represents only a single climate change model result, using the A2 climate change scenario from the Intergovernmental Panel on Climate Change (IPCC).
- Seasonal and inter-seasonal variability in the 30 year average monthly climate data was not considered (e.g. extreme events such as drought and excess spring moisture).

Prepared by Agriculture and Agri-Food Canada's Agri-Environmental Services Branch (AESB), in partnership with Research Branch and Environment Canada's National Service Office-Agriculture

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