

Review of Climate Change Projections for Southern Manitoba and Potential Impacts for Agriculture

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Climate Projections for Southern Manitoba: Executive Summary

These are summaries of the overall projected trends as reported in *From Impacts to Adaptation: Canada in a Changing Climate 2007* (2008); *The New Normal: The Canadian Prairies in a Changing Climate* (2010); IPCC's *Climate Change 2007: The Physical Science Basis* (2007); and other select sources compiled by D. Blair. The confidence levels reflect the consensus views from these sources.

Temperature Projections:

Variable	Projected Change	Confidence
Annual Mean Temperature	+1 to +3°C by 2050	Very High
Winter Mean Temperature	+3 to +5°C by 2050	Very High
Spring Mean Temperature	+1 to +2°C by 2050	Very High
Summer Mean Temperature	+1 to +2°C by 2050	Very High
Fall Mean Temperature	+1 to +2°C by 2050	Very High
Maximum Temperatures	Warming slower than means	Very High
Minimum Temperatures	Warming faster than means	Very High

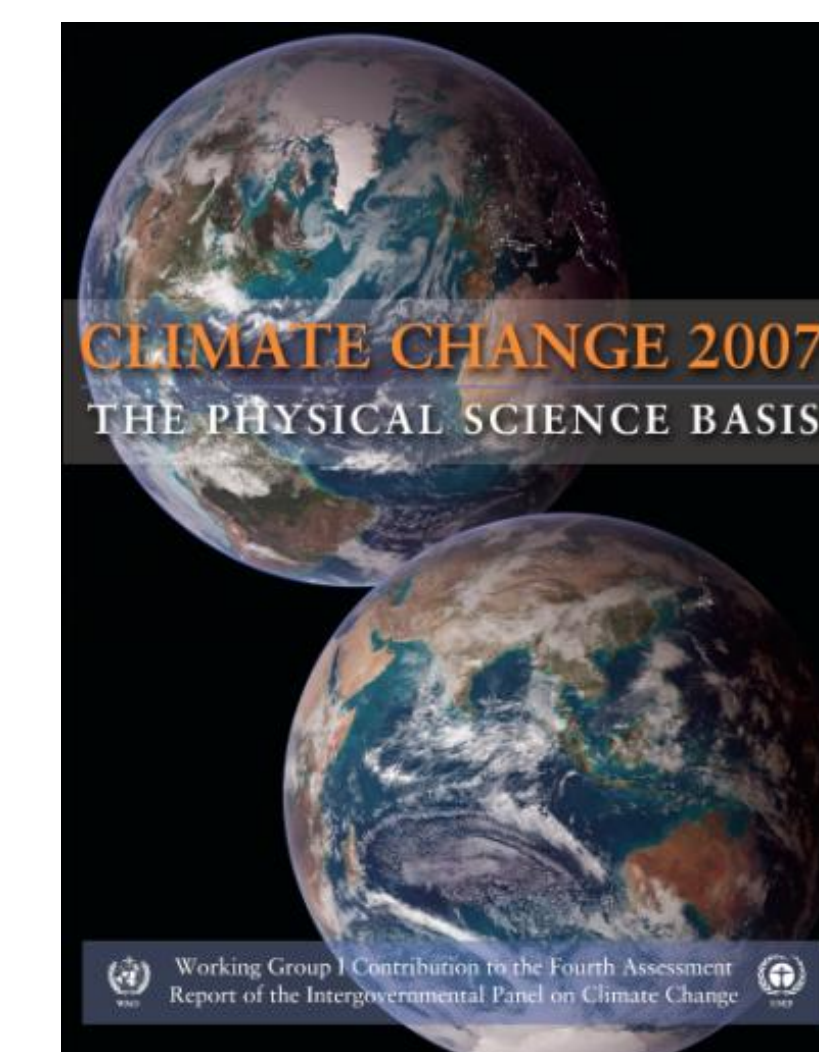
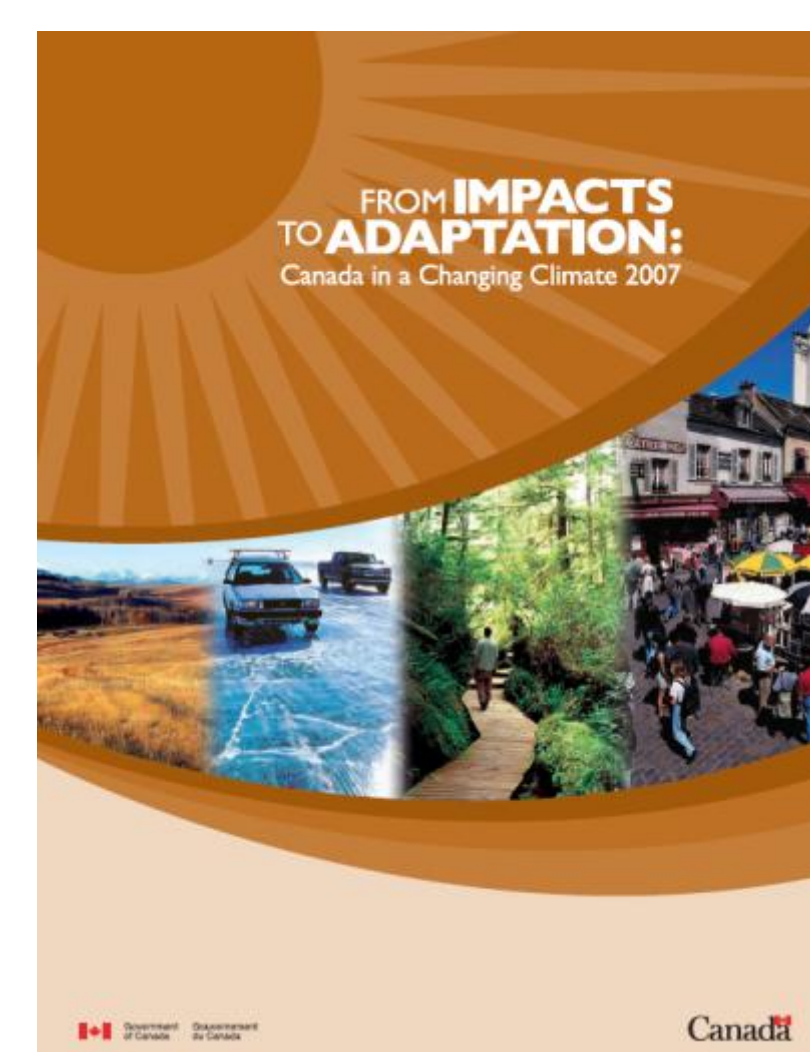
Variable	Projected Change	Confidence
Warm-season heat waves	Warmer and more frequent	Very High
Heat extremes	Warmer and more frequent	Very High
Cooling-degree days	Much higher	Very High
Heating-degree days	Much lower	Very High
Growing-degree days	Much higher	Very High
Frost-free season	Much longer	Very High
Mid-winter thaws	Warmer and more frequent	Very High
Winter-cold snaps	Shorter and less frequent	Very high
Snow cover season	Much shorter	Very high
Length of winter season	Much shorter	Very high
Winter freeze-thaw cycles	More frequent	Low
Cold nights	Warmer and fewer	Very high

Precipitation Projections:

Variable	Projected Change	Confidence
Annual precipitation	Modest increase	Medium
Winter precipitation	Substantial increase	Very High
Spring precipitation	Increase	Medium
Summer precipitation	Lower	Low
Fall precipitation	Increase	Low
Winter rain events	Many more	Very high
Snow storms	Fewer	Medium
Droughts	More and longer	High
Intense rain events	More and more intense	High
Surface water amount	Less	Medium

Potential Impacts

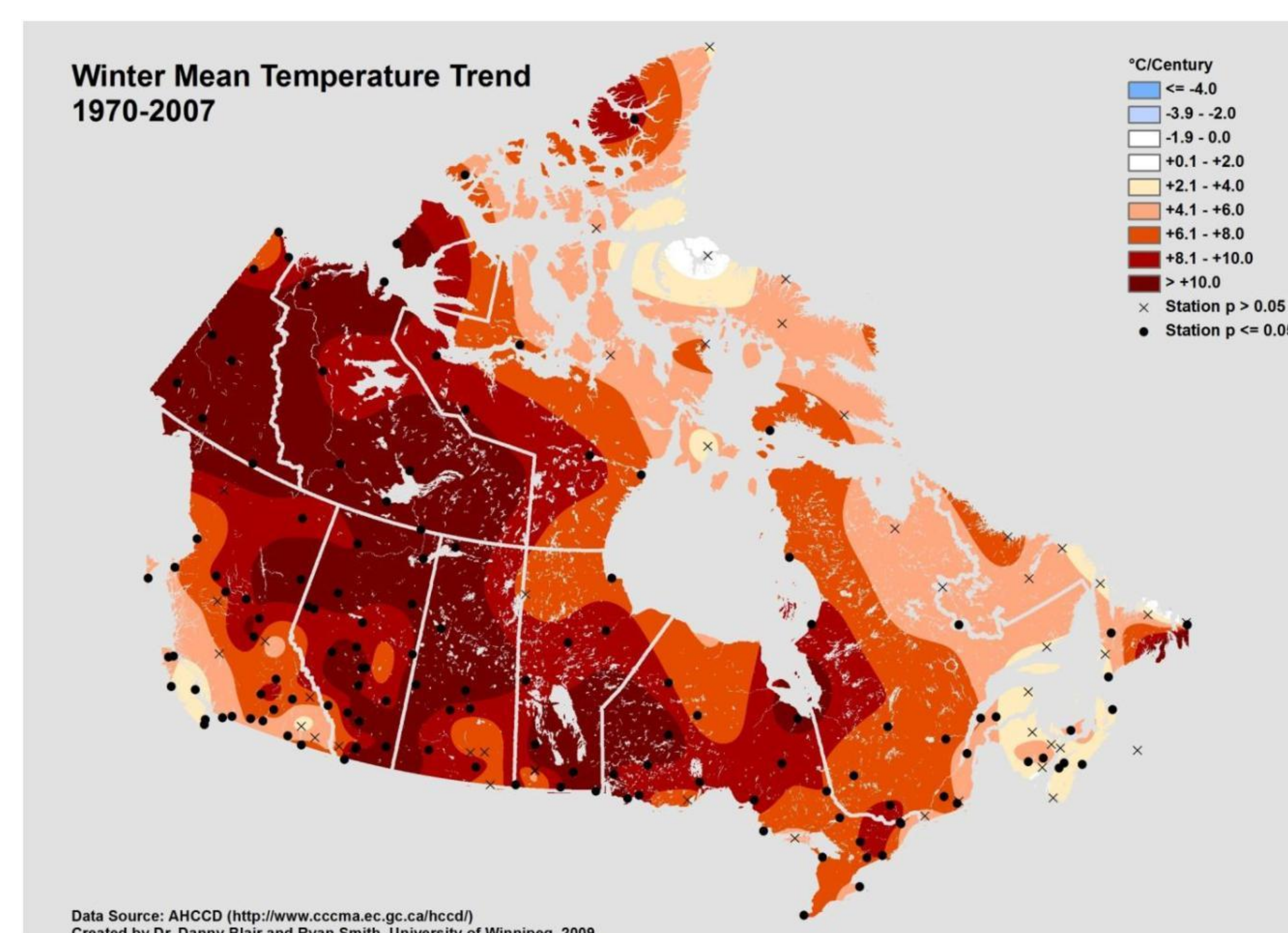
- Longer growing season:
 - Opportunity for new crops, with improved quality
 - Likely more weeds, insects and diseases
- More heat and less cold:
 - Decreased heating costs
 - Increased cooling costs
- More extreme precipitation events, less snow:
 - More flooding and erosion
 - Longer grazing season, but less water



Extreme Weather and Other Projections:

Variable	Projected Change	Confidence
Wind extremes	Higher	Medium
Wind erosion	Higher	Low
Summer severe weather	More	Medium
Lightning	More	Medium
Tornadoes	More	Medium
Surface water temperature	Higher	Very high
Carbon dioxide	Higher	Very high

Variable	Projected Change	Confidence
Year to year variability	Higher	High
Climate extremes	Higher	High
Spring flooding	More frequent	Low
Local summer flooding	More frequent	High
Very wet summers	More frequent	Low
Very dry summers	More frequent	Medium
Very hot summers	More frequent	High
Very wet winters	More frequent	High
Very cold winters	Much less frequent	Very high
Positive impacts	Some, decreasing with time	Very high
Negative impacts	Many, increasing with time	Very high



At Winnipeg the trend shows an increase from a mean winter temperature of -16°C in 1970 to -13°C in 2007, and if it continues, -9°C by 2050.

- More heat waves, fewer cold spells:
 - More heat and water stress for crops and animals
 - Less winter stress for animals
 - Increased pests and diseases
 - Increased risk of winterkill
- Drier surface, more drought events:
 - Greater risk of drought
 - Greater costs associated with droughts
- Northward shifting of Grassland/Aspen Parkland and Aspen Parkland/Boreal Forest transition zones.

