

# Climate Change Impacts and Adaptation in the Prairie Provinces



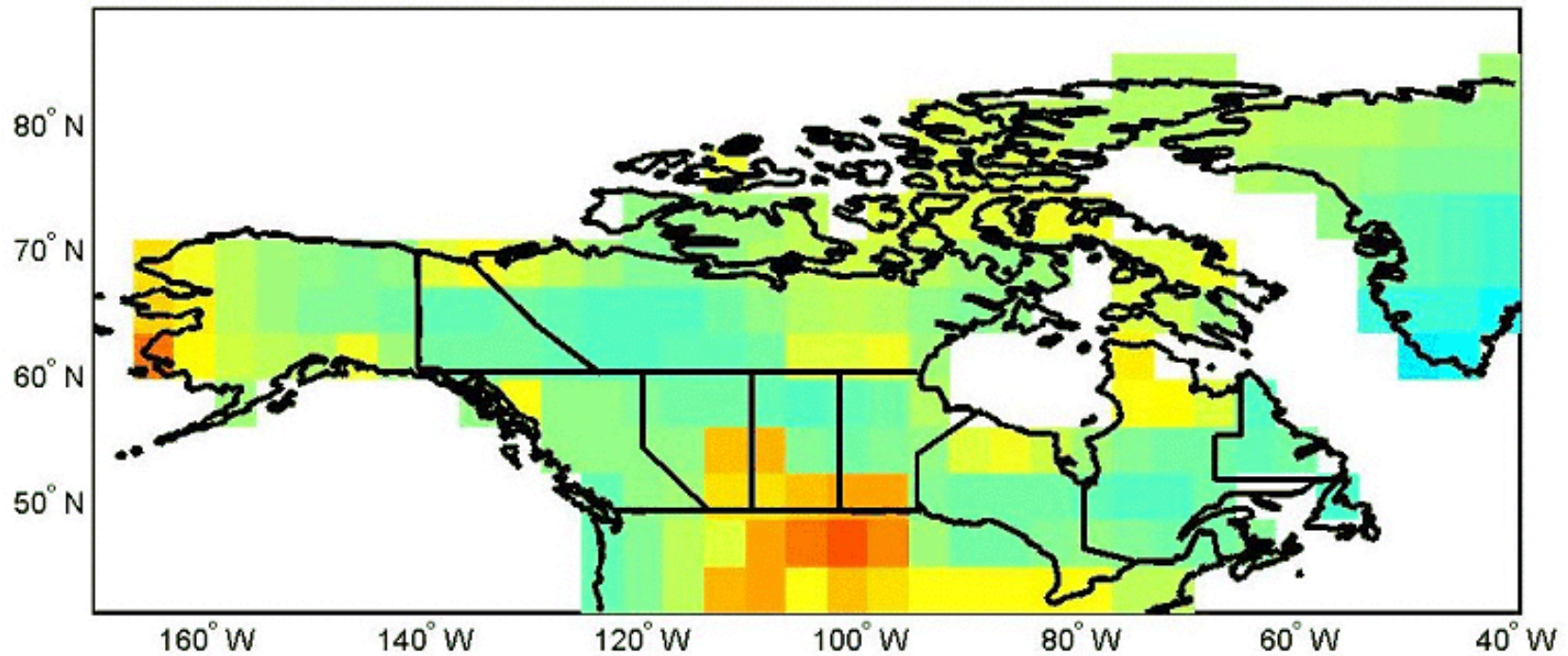
Dave Sauchyn, Ph.D., P.Geo.

**C-ClARN Prairies**

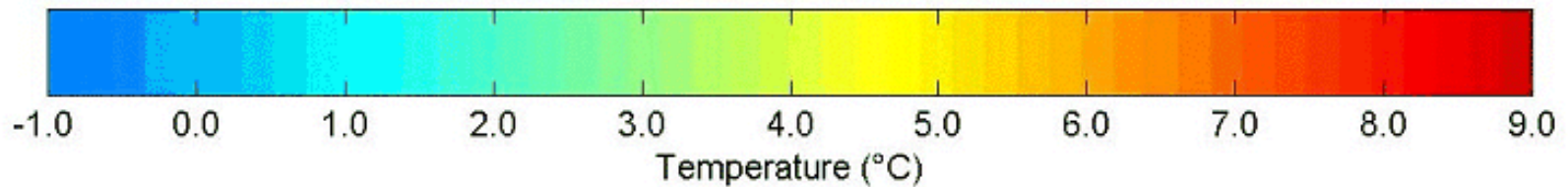
Prairie Adaptation Research Collaborative

Senate Committee on Agriculture and Forestry

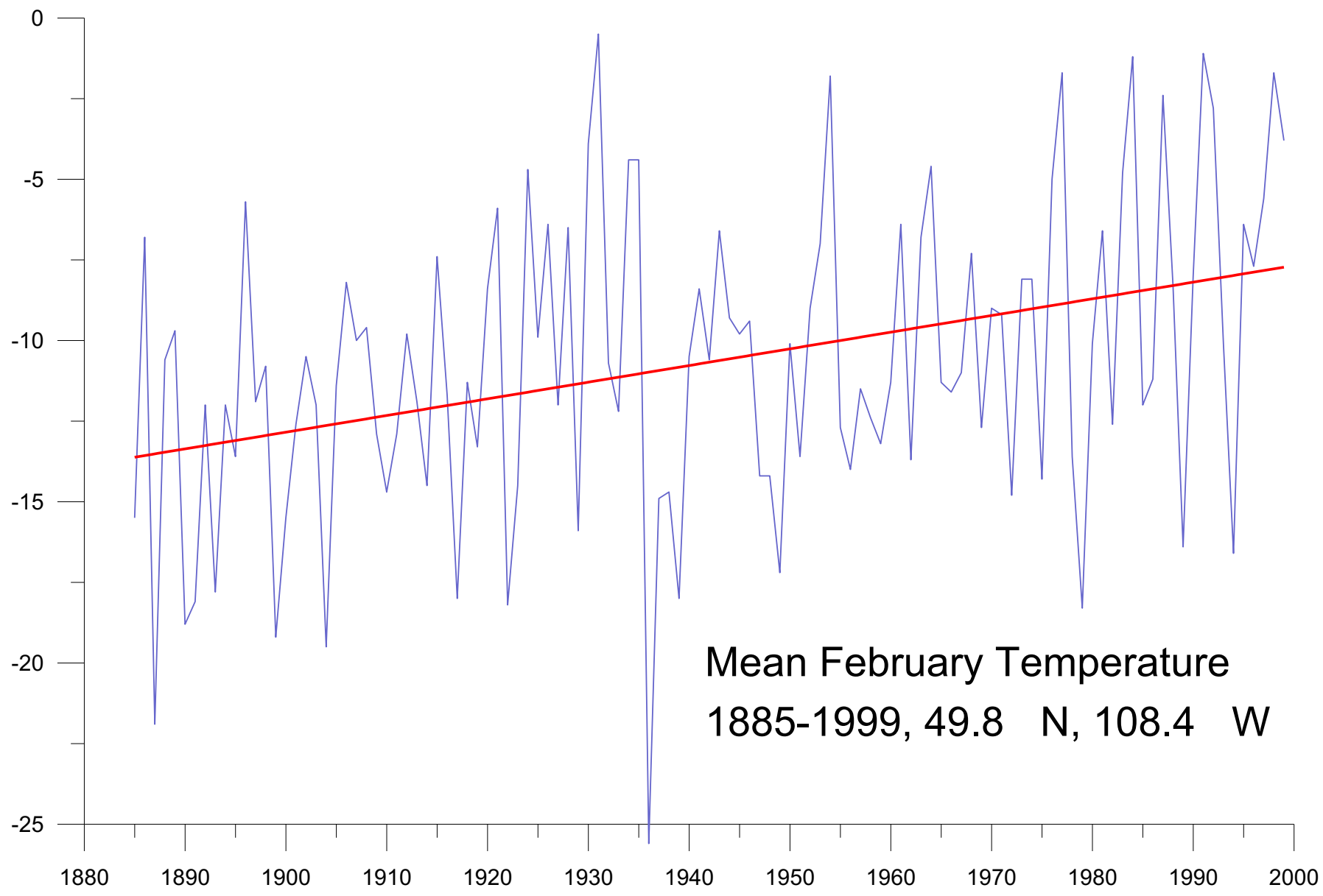
Ottawa, December, 2002



## CGCM1, Mean Spring Temperature Change 2050



<http://www.cics.uvic.ca/scenarios/index.cgi>



# **Projections** (broad generalizations) **for the future climate of the Prairie Provinces**

**Temperature:** increasing, greater in winter than summer, greater at night than during day

**Precipitation:** great uncertainty, annually small increase to significant decrease

**Evaporation:** increased

**Soil moisture:** decreased

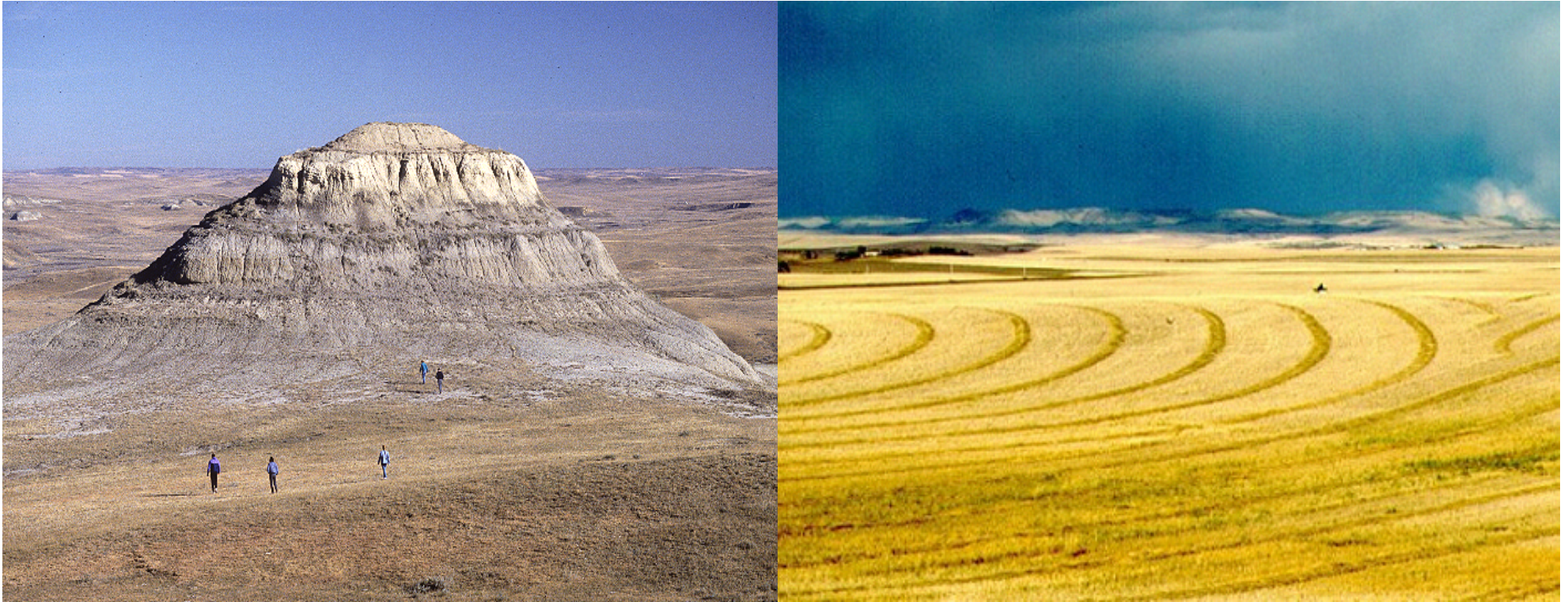
**Growing season:** increased

**Atmospheric CO<sub>2</sub>:** increased

**Extreme events:** increased frequency and magnitude

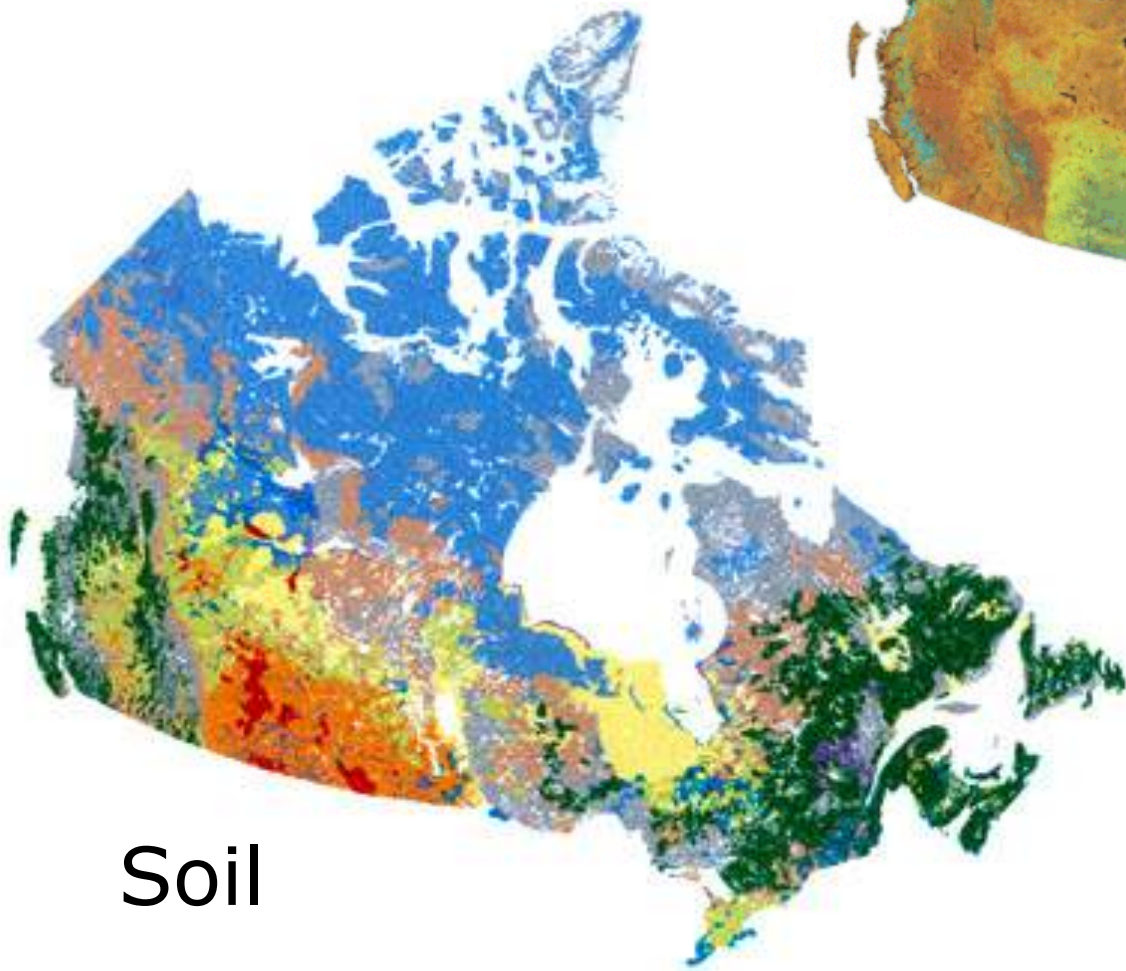
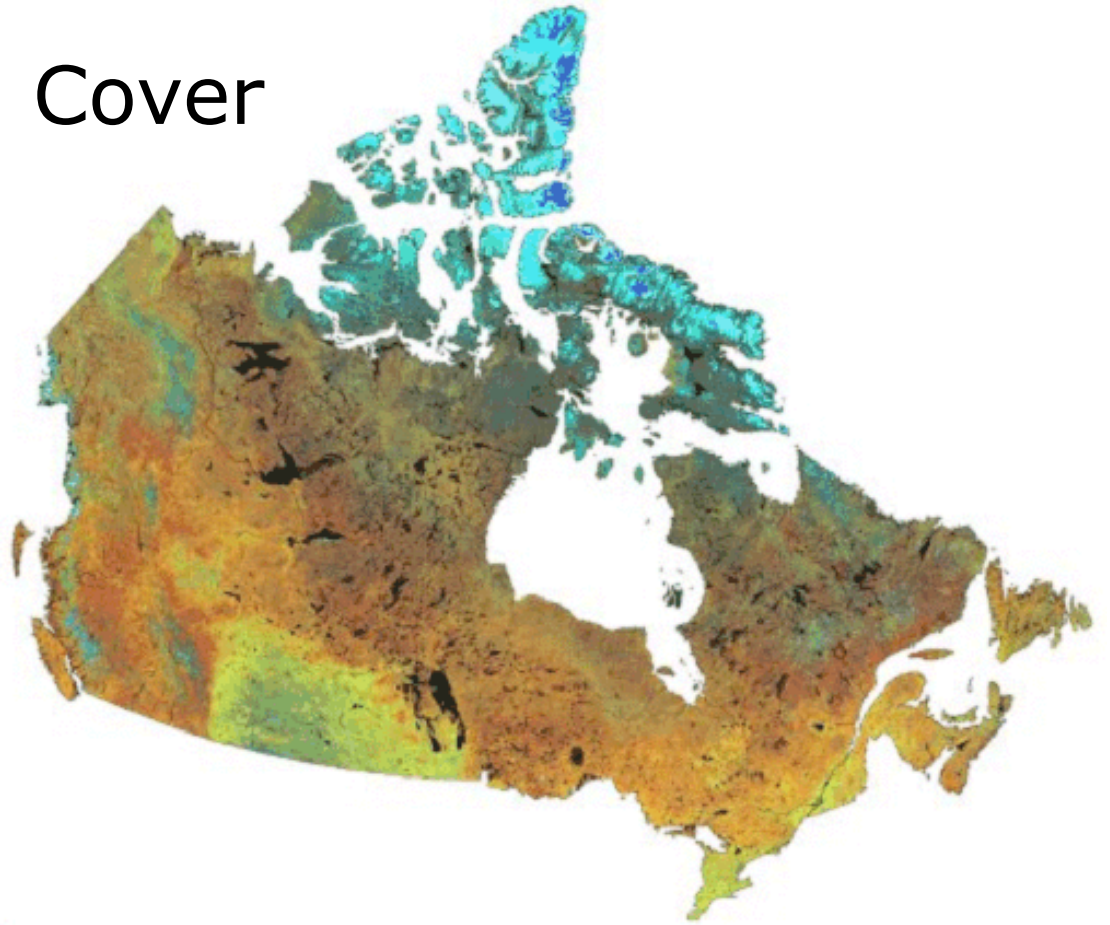
**Hydrology:** increased variability, earlier peak flows

# The Canadian Plains



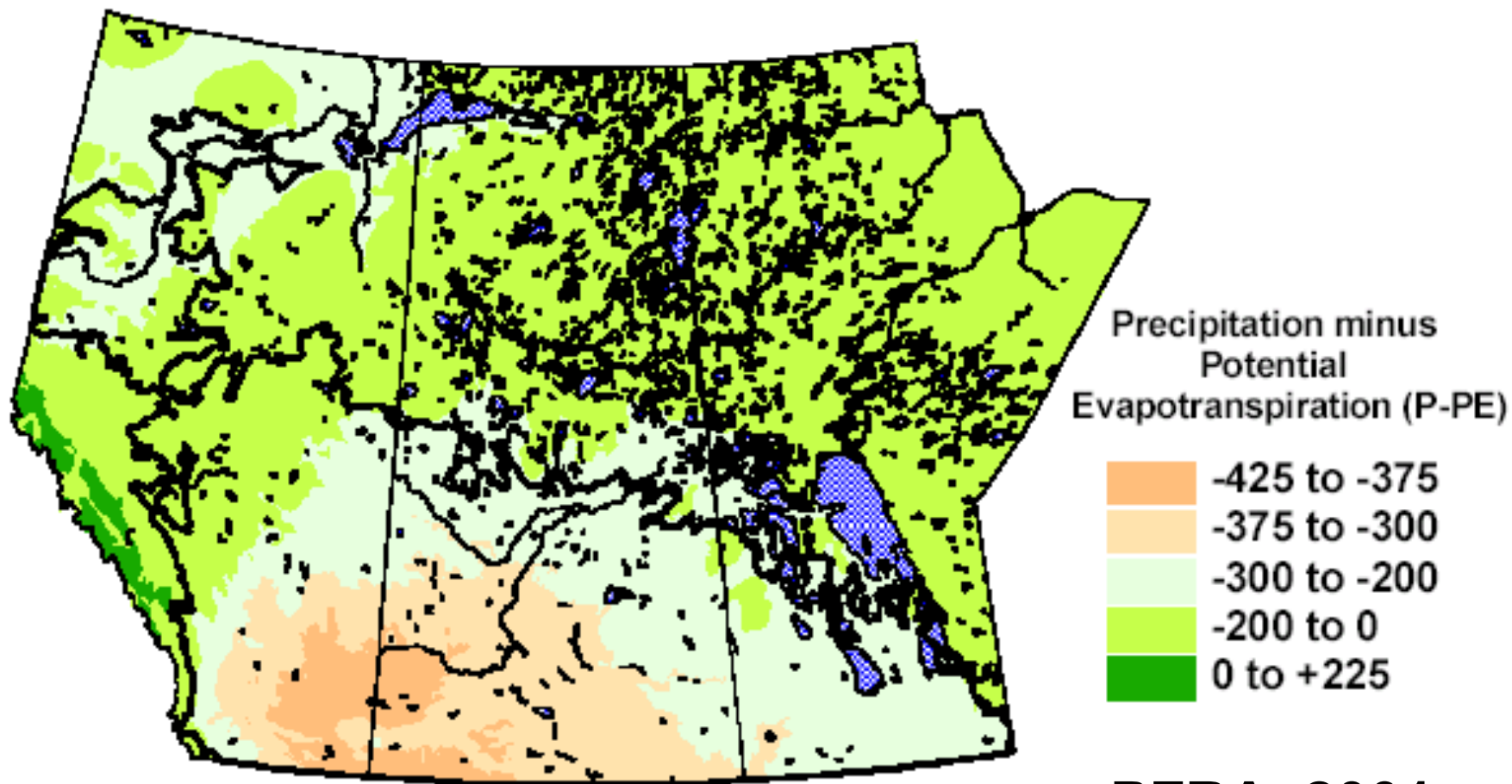
Natural and socio-economic systems are sensitive to climatic variability, climatic change and extreme hydroclimatic events

Land Cover



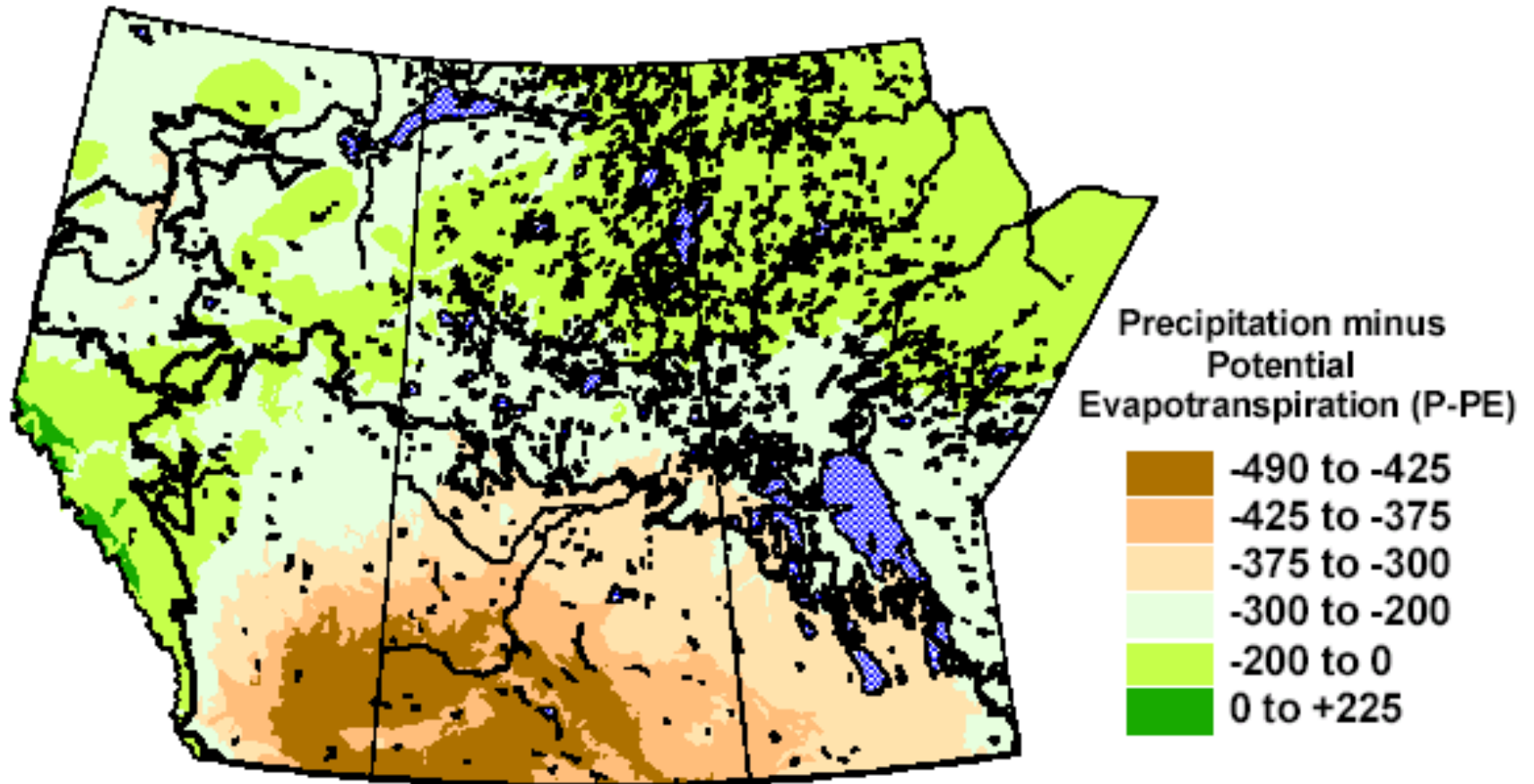
Soil

# Moisture Deficit (P-PE) (1961-90)



**PFRA, 2001**

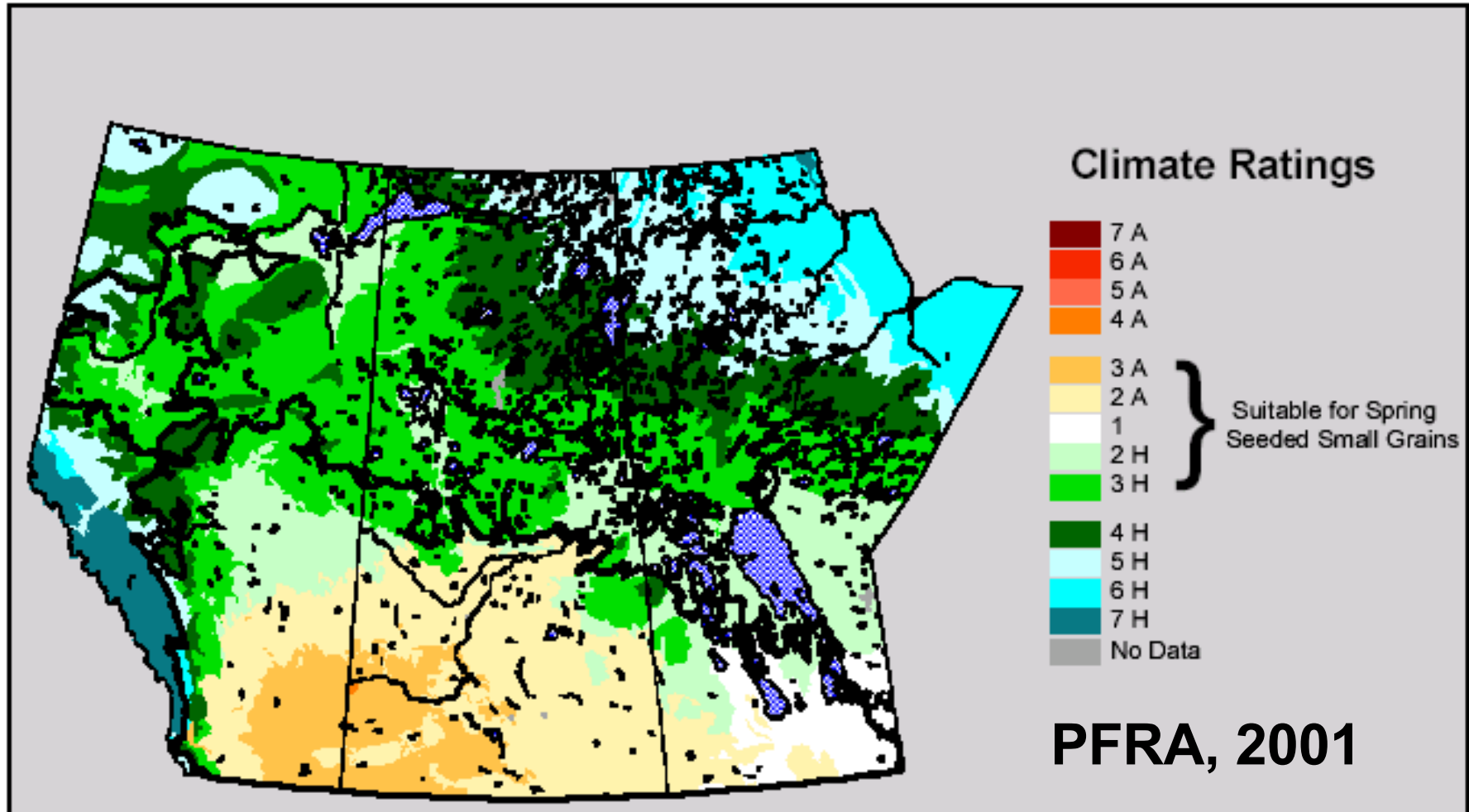
# Moisture Deficit (P-PE) (2040-69)



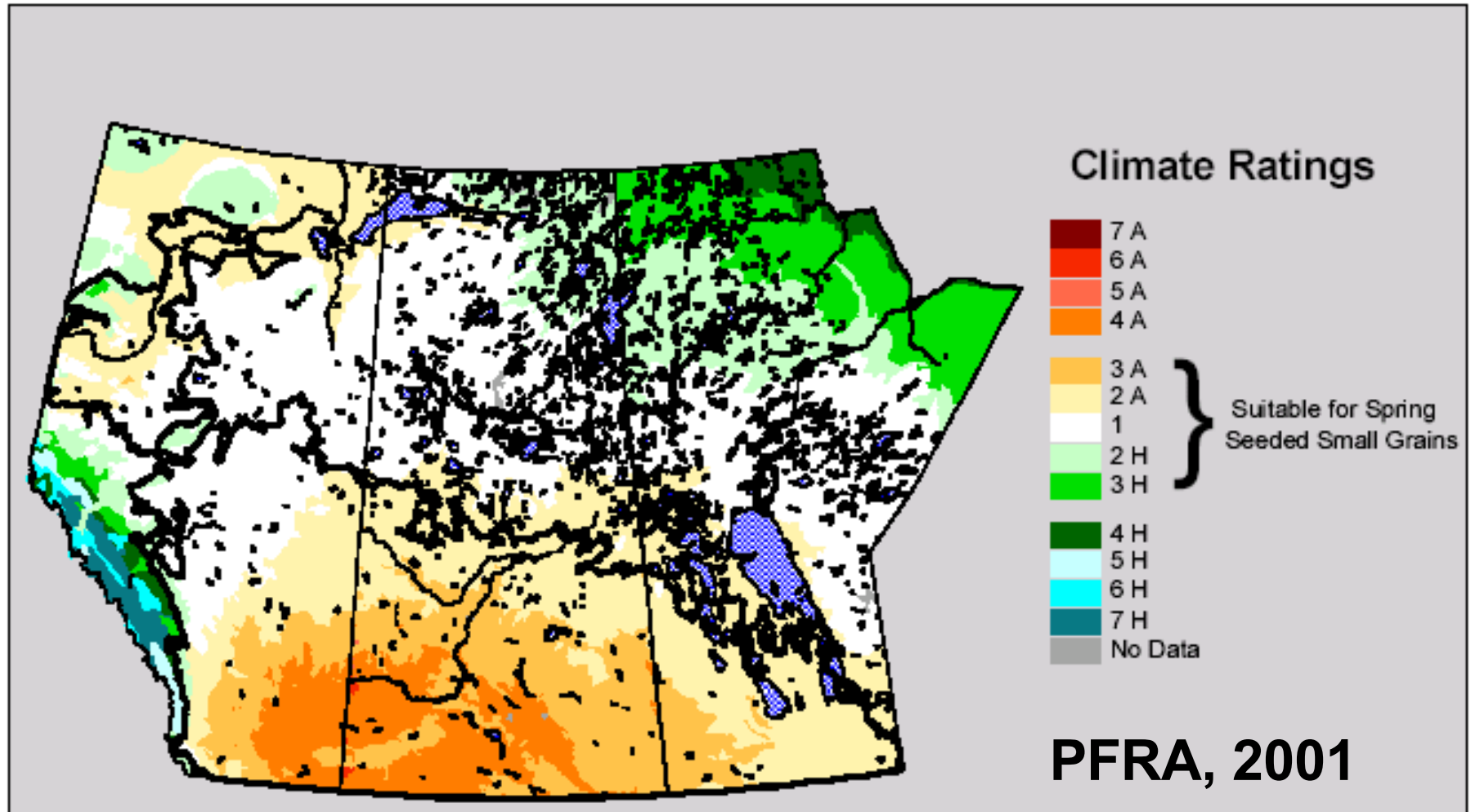
**PFRA, 2001**



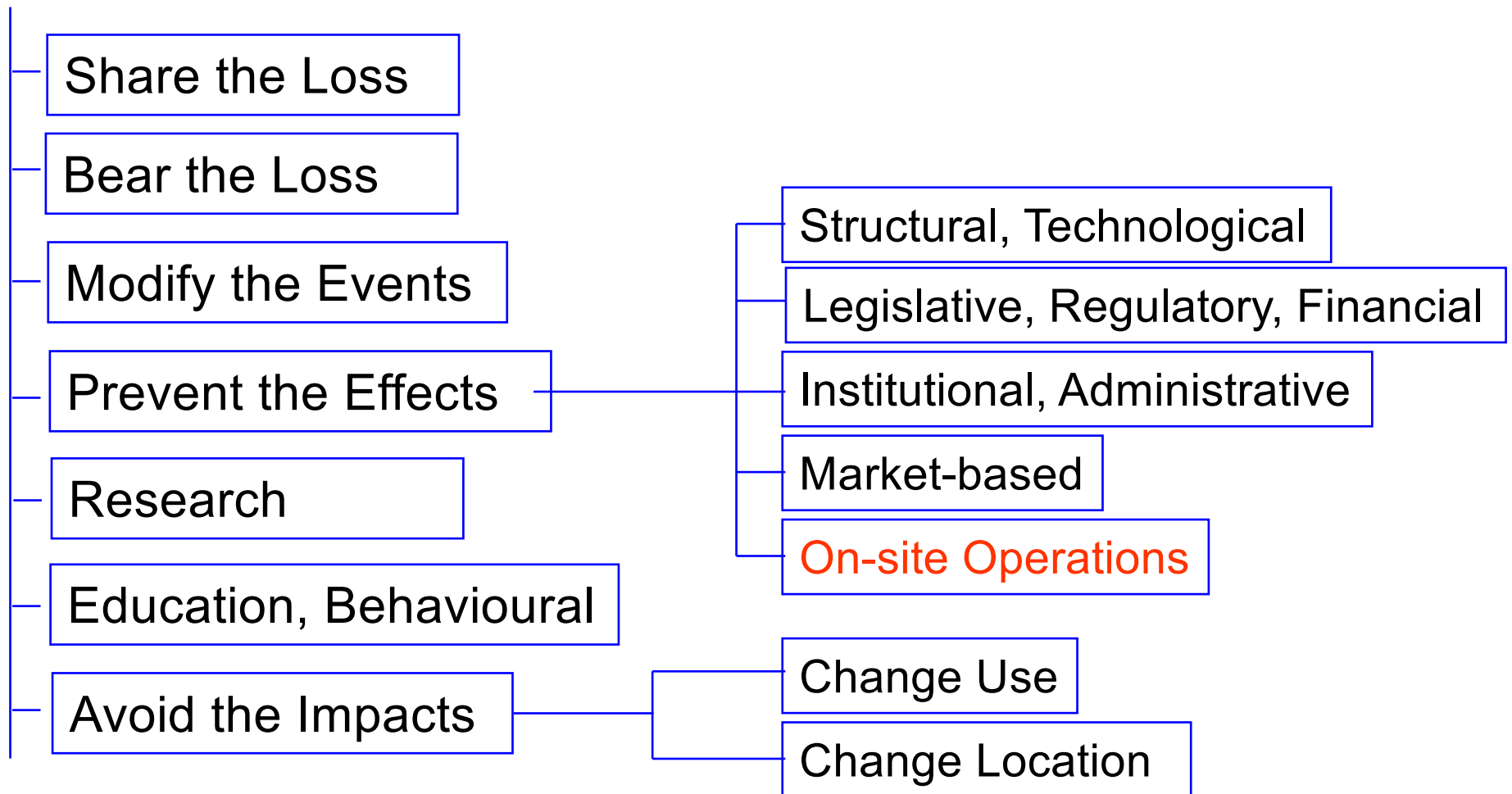
# Land Suitability Rating System (LSRS) Climate Classification (1961-90)



# Land Suitability Rating System (LSRS) Climate Classification (2040-69)



# Adaptation Options



## Prairie Agricultural Landscapes (PFRA 2000: 32-33)

Severe and widespread erosion could still occur during extreme climatic events and especially during a period of years with **back-to-back droughts**.

Soil eroded from the conventional and minimum till plots in 1990 [two events] was 70% and 73%, respectively, of the total soil eroded during the operation of the plots from 1986 to 1993.

Very severe wind and water erosion is dominated by infrequent occurrences of when highly erosive events impact exposed soil. Such events may only happen **once during the farming lifetime** of an individual farmer, making it difficult to justify the expense and inconvenience of many soil conservation practices.

# Adaptation to Climatic Variability

A projected **increase in climate variability**, including more frequent drought and major hydroclimatic events, **is the most ominous climate change scenario**. It is a more formidable and complex challenge than the adaptation of practices, processes and infrastructure to long-term climate trends. More extreme **climate anomalies** are more likely to exceed natural and engineering thresholds beyond which the impacts of climate are much more severe.

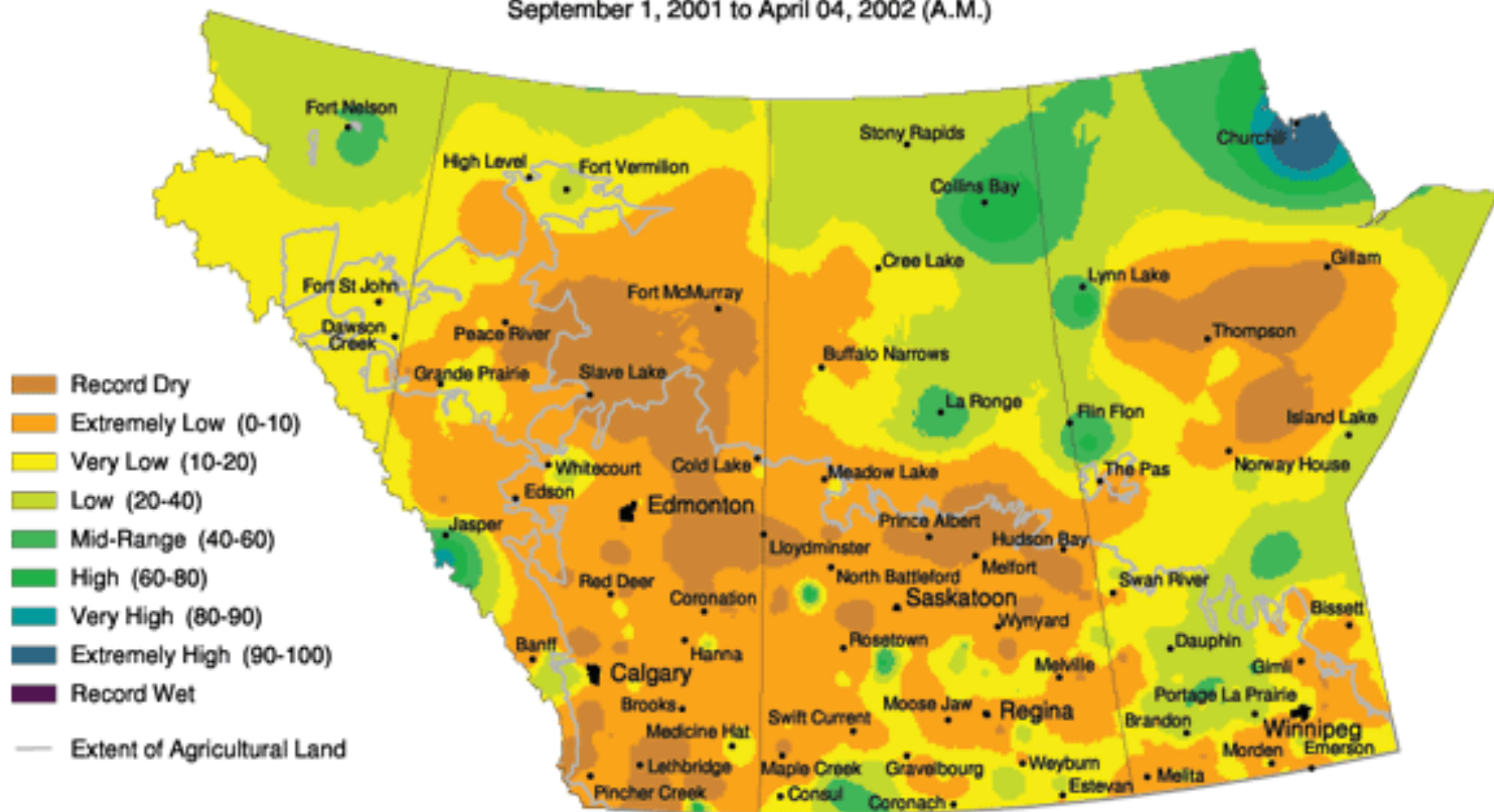


# Drought Watch

on the Prairies

## Precipitation Percentiles

September 1, 2001 to April 04, 2002 (A.M.)



Prepared by PFRA (Prairie Farm Rehabilitation Administration) using data from the Timely Monitoring Network and the many federal and provincial agencies and volunteers that support it.

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## Medicine Hat (1884-2001)

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<u>Single Years</u>		<u>Three-year droughts</u>	
<b>2001</b>	<b>147.3</b>	<b>1999-2001</b>	<b>662.6</b>
1907	173.1	1907-09	681.6
1943	182.2	1918-20	716.4
1928	194.1	1905-07	721.5
1919	195.6	1928-30	724.9
1997	197.3		
1929	207.0		
1924	207.6		
1961	207.7		
<b>2000</b>	<b>214.3</b>		

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Near Outlook, Saskatchewan, May 2, 2002





# Soil drifting near Oyen, Alberta, May 5, 2002



Dust, Regina, May 22, 2002





**Agriculture  
Drought Risk Management Plan  
for Alberta**

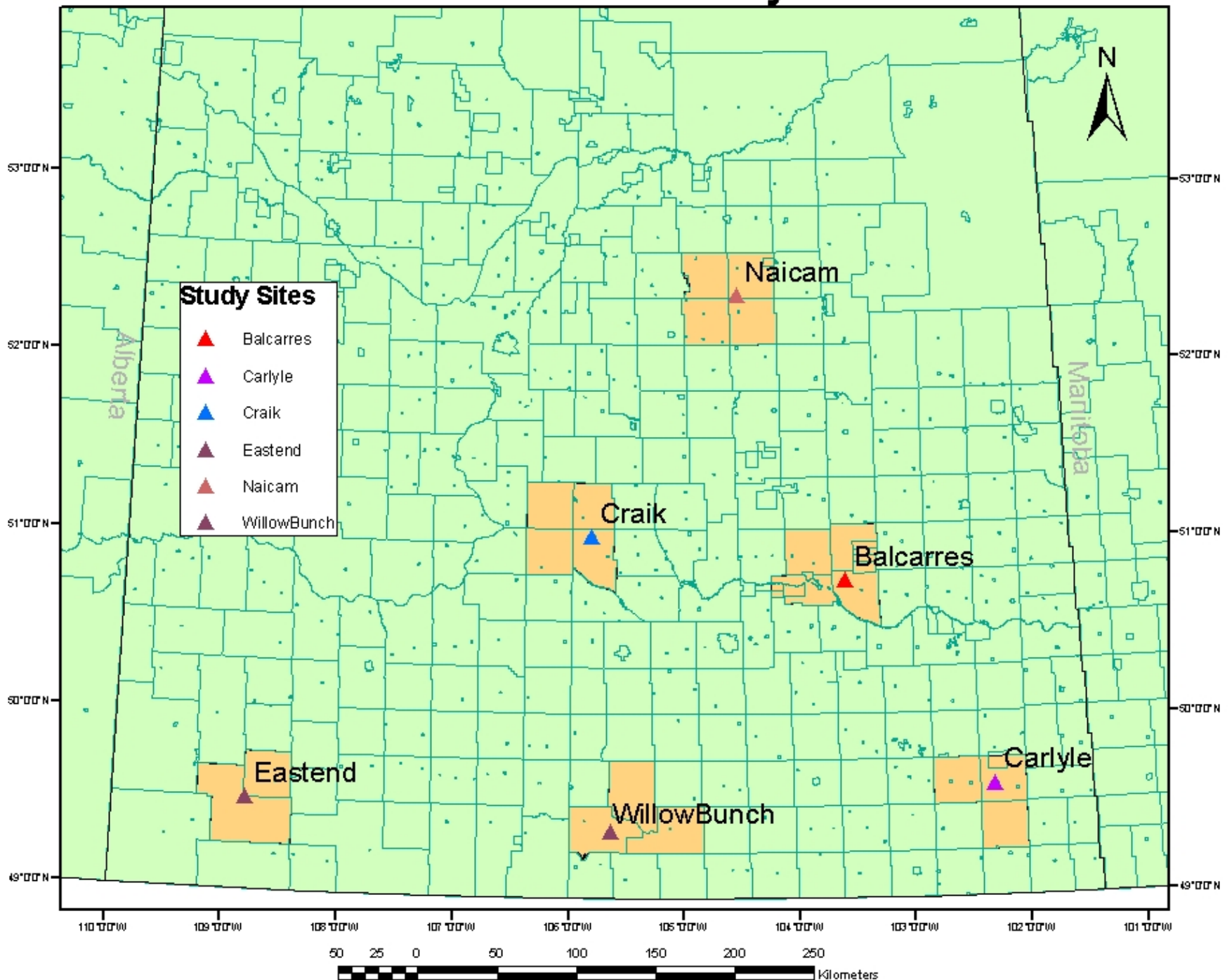


STRATEGIC PLAN

## Agriculture Drought Risk Management Plan for Alberta

Ad hoc responses to an existing drought crisis may lead to untimely and costly short-term solutions. In contrast, a **risk management** approach to drought allows an immediate, effective response during a drought crisis, and also reduces drought impacts over the long term through **planning and preparedness**.

# Social Cohesion Project RMs



## Social Cohesion Survey

### How Seriousness is Climate Change?

Very Serious	45%
Somewhat Serious	44%
Not at all	11%

**B2 Doing Anything to Adjust to Climate Change? Own Farm and/or Business?  
Crosstabulation**

			D3 Own Farm and/or Business?				Total
			1 Yes, Own a Farm	2 Yes, Own a Business	3 Yes, Own a Farm & Business	4 No	
B2 Doing Anything to Adjust to Climate Change?	Doing Nothing About it Yet	Count % within D3 Own Farm and/or Business?	68  39.5%	35  62.5%	17  34.7%	101  50.2%	221  46.2%
	Following Climate Change Issues	Count % within D3 Own Farm and/or Business?	54  31.4%	14  25.0%	18  36.7%	75  37.3%	161  33.7%
	Doing Something More Active	Count % within D3 Own Farm and/or Business?	50  29.1%	7  12.5%	14  28.6%	25  12.4%	96  20.1%
Total	Count % within D3 Own Farm and/or Business?	172  100.0%	56  100.0%	49  100.0%	201  100.0%	478  100.0%	