

Saving lives and protecting assets and services in the face of a changing climate

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NOFNEC
6 Oct 2016







10 Dec 2009



Xavier Sagutch, Eabametoong FN













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Google Earth



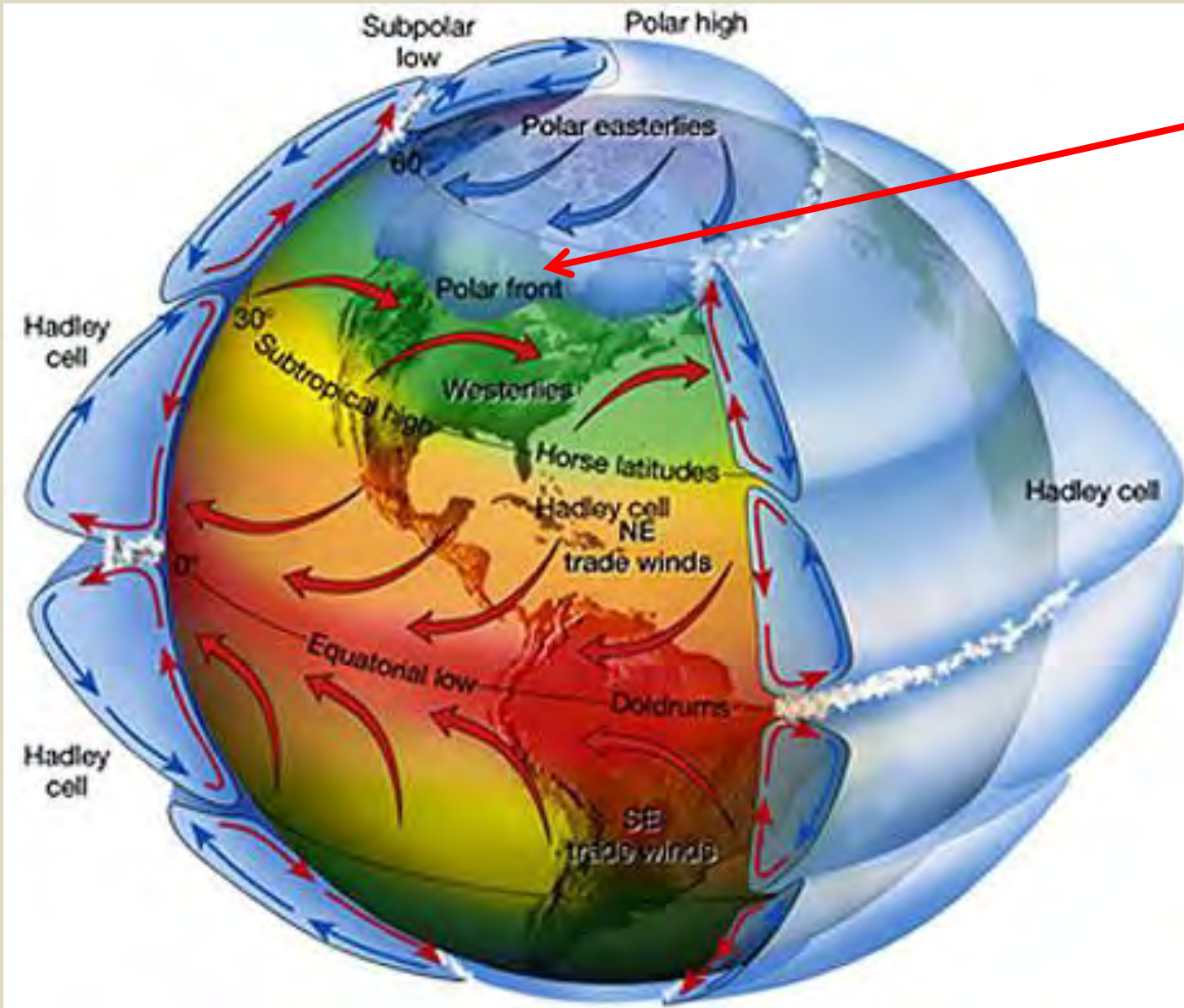
+ 8°C and rain in Fort Severn, 21 March, 2012











Far North
Ontario

Flooding of the community in 1959



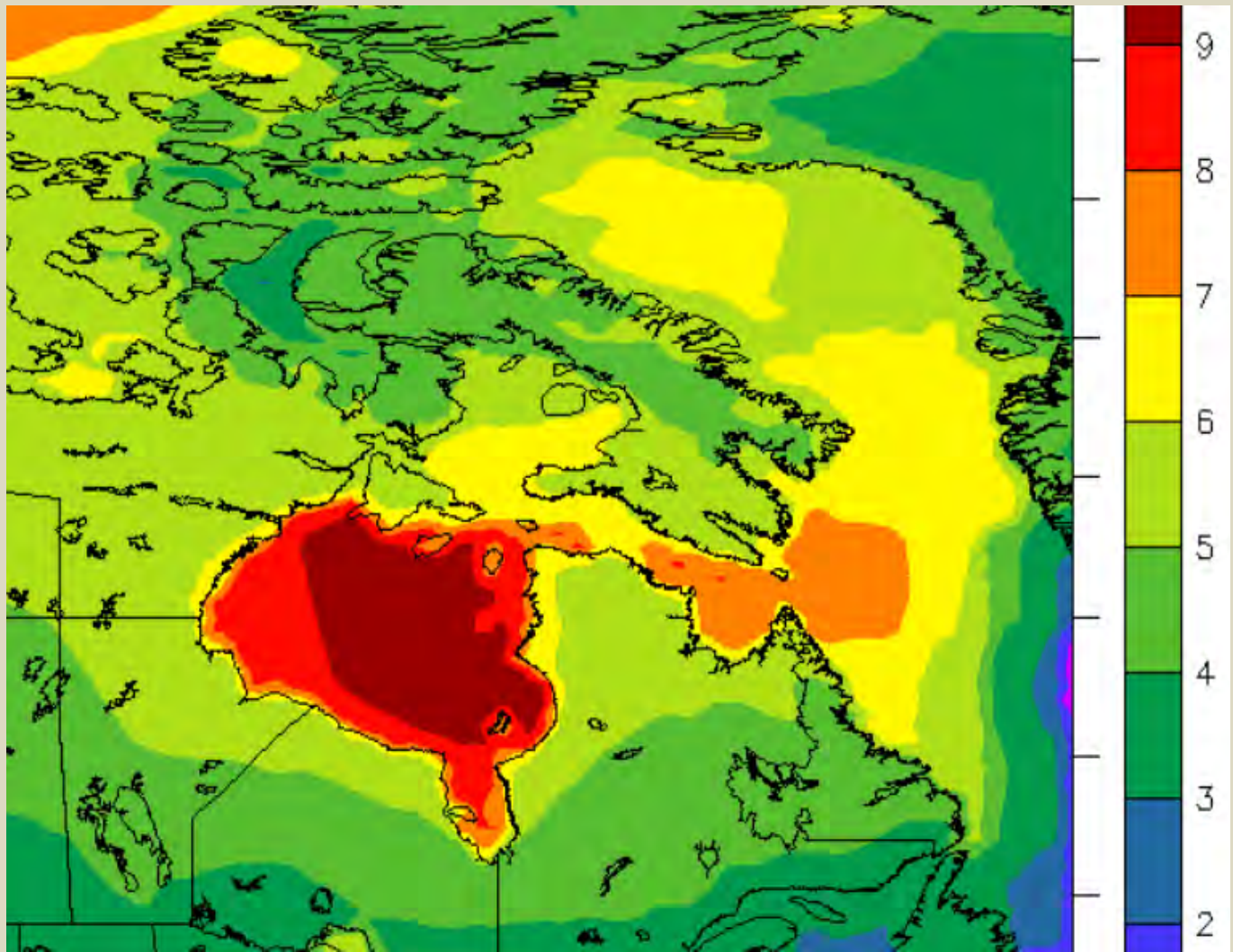
Drawn by Xavier Sagutch, 2012



Wataynikaneyap Transmission Project

A grand
project with
1800 km of
lines. How to
prepare for
wildfires and
ice-storms ?





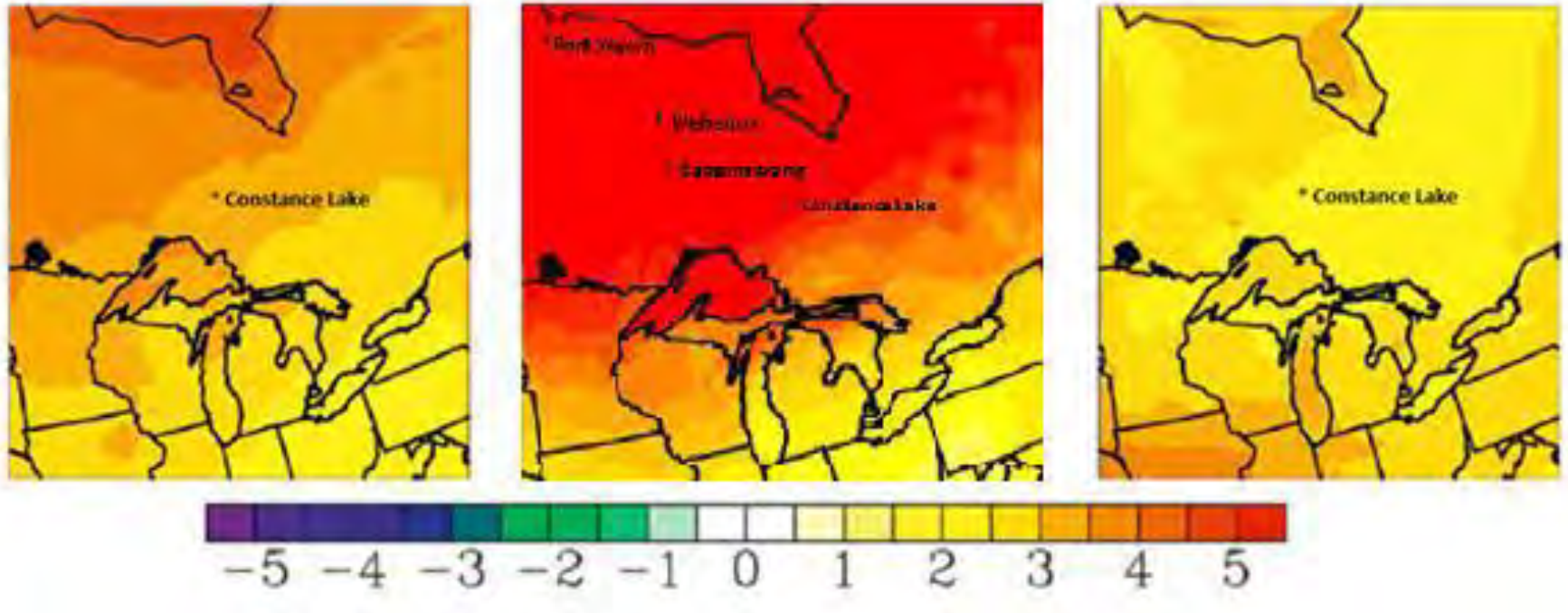
Projected change in average mean winter temperature in the 2050s compared with 1961 – 1990 over northern Canada combining two versions of the Canadian Regional Climate Model (CRCM 4.2.0 and 4.2.3). CCCSN Ouranos Consortium.
<http://www.cccsn.ec.gc.ca/images/ensemblescenarios/ontario-winter-2050s-crcm.png>

Annual average

Winter (DJF)

Summer (JJA)

WRF (10km)



decrease (°C)

increase (°C)

Projected changes in Annual, Winter, and Summer temperatures in the 2050s compared with 1979-2001 at 10 km resolution (Gula and Peltier (2011))

**Preparing for the weather of the future in the north. What is happening and why?
Are there opportunities for communities? Transferring knowledge and building a team.**

(3 Oct. 2016)

What will the weather be like when today's young people become Elders? What will changes in climate mean for First Nations in the north ... for communities, for wildlife and plants ... for travelling on the land? How can First Nations prepare? How might Northern First Nations include knowledge of climate change in planning their future? Will there be economic opportunities as Ontario acts to limit climate change?

These are some of the questions scientists in the School of the Environment at Laurentian University in Sudbury are hoping to work with First Nations in the north to answer. Our vision is to build a climate change team with First Nations across the north. We have already teamed up with the Ontario FN Technical Services Corporation to assist communities identify opportunities as Ontario reduces pollution from using energy.

What could be done through teamwork and collaboration?

- 1) Increase people's understanding of why and how weather is changing in the north and around the world
- 2) Study how changes in climate have affected the north in the past and what could happen in the future
- 3) Recommend how at least eight communities in the north could prepare for future weather
- 4) Promote energy planning, especially in communities where it isn't already happening
- 5) Assist in identifying economic opportunities for First Nations in Ontario's proposals for cutting climate-warming gasses with a "cap and trade" program.

Why is the weather changing ?



Weather is changing because of invisible gas pollution in the atmosphere. Carbon dioxide gas is released when coal, oil, diesel or gasoline is burned to generate electrical energy or to power vehicles. This causes the "Greenhouse Effect".

Energy from the Sun warms the Earth which stays cool by radiating heat into space. Carbon dioxide and other "greenhouse gases" trap some of that heat like the glass of a greenhouse. With more carbon dioxide in the atmosphere, more heat is trapped.

Warming increases evaporation from oceans and lakes, adding more water vapour to the atmosphere. Water vapour is also a greenhouse gas, so evaporation increases warming.

Preparing for the weather of the future: A checklist of the possible effects of changing climate in the homelands of Far North Ontario First Nations.

David Pearson, Laurentian University (dpearson@laurentian.ca)

(NOFNEC Oct 2016)

Scientific records and the knowledge of Elders tell us that weather in the north has been changing since about 1980. Lives are being lost in some places because late winter ice is not as thick as it used to be. Summer boat travel on traditional routes is often more difficult now because of lower water. Those are just two consequences of changing climate. More and greater changes can be expected in the future. Being prepared and adapting to those changes will save lives and prevent damage.

These are possible effects of changing weather patterns that should be considered in planning for the future:

- flooding of ditches, roads and buildings during late winter and early spring because of heavy rain falling on hard frozen ground – may be accompanied by rapid snow melt
- flooding over the banks of rivers caused by ice jams during break-up. Most likely when the difference between the temperature in the south and the north causes rapid snow melt and run-off that breaks ice from the banks in the south while the river is still frozen in the north.
- sudden flooding in summer because of very severe rain storms in places with poor drainage
- flooding of stretches of coastal winter roads by more frequent storm surges from James Bay (OURANOS research; MOECC study)
- dangers in winter travel because of thinner ice on traditional travel routes on rivers, creeks and lakes and by poor near-shore ice conditions in James Bay and Hudson Bay
- shorter winter road season, especially for loaded trailers

Questions for interviewing First Nation Elders and community members

1. How has the land changed during your life?

Follow-up questions to add missing information or to bring out details.

Changes in the “bush” ... trees and plants

- Any changes in plants or trees such as areas of dead or dying trees or bushes ... any kinds that have disappeared or any new ones?
- Have any of the changes made a difference to harvesting activities by members of your community, such as finding healing plants or harvesting berries?
- Have any of the changes on the land been good or bad for people in your community?

Changes in lakes and rivers

- Any changes in lakes, rivers and creeks, such as unusual water levels or colour, or how warm the water is, or when it freezes and thaws?
- Any changes in the water plants in lakes and creeks? Have you see new ones? Have any disappeared? Are there more or less of any of them?
- Have you noticed unusual growth of green scum (algae) on any lakes or creeks?
- Do you think any of the changes in lakes and rivers have been good for people in the community

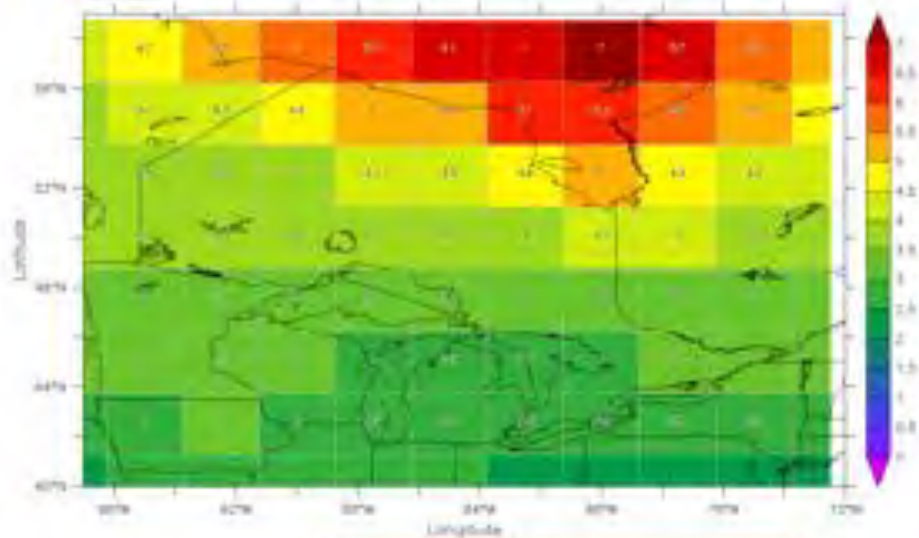
Changes in swamps and wet areas

- Have you noticed swamps and wet areas changing in size or looking different in any way?



Common Grid - Composite of Models

Mean change from (1961-1990) to (2041-2070 or '2050s')
Winter - Medium - Change in Air Temperature at 2m (°C)

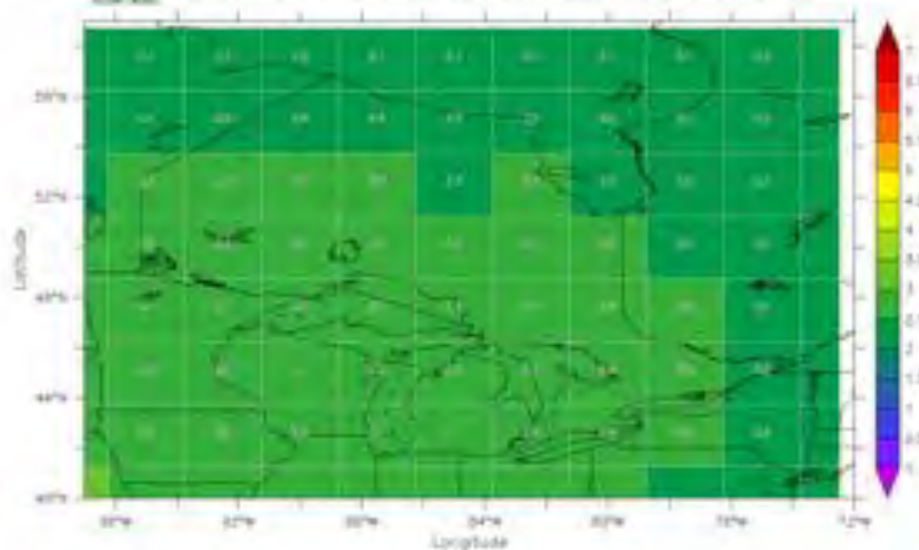


<http://climate.geog.udel.edu/wiki/wiki/wiki/2050s>



Common Grid - Composite of Models

Mean change from (1961-1990) to (2041-2070 or '2050s')
Summer - Medium - Change in Air Temperature at 2m (°C)



Vulnerability Indicators – ecosystem services and infrastructure			Climate Projections to 2050		Risks	
TEK and Community Observations	Community Weather Incidents	Technical Information	Temperature & Precipitation climate scenarios	Weather Event modelling	Risk = Consequence x Likelihood High - Med – Low	A F
Severe flooding in the 1950s from rise in Albany River	Flooding not in recent memory but Elders speak of severe event in the 1950s. Implies water level of 20 feet higher	See Lake of the Woods water release records for 1959 – may be related to incident. Need to understand			Need to determine if cause was related to control of flow in Albany by hydro dams. What weather event?	
Spring flooding from rapid local snow melt and rain in March	See locations on oblique aerial photo. Relates to surface drainage.		Winter average +4- 5 ⁰ C in 2050 shorter winter = late winter rain on frozen surface drains fast		Med - High Risk likely rising from late winter rain on frozen ground	
Late freeze up (Nov) and thin ice at time when good winter travel conditions expected.	Dangerous ice breakthrough incidents				High	M H



Being prepared Being resilient

- Designate a community member as a “climate change information gatherer”
- Coordinate with other First Nations in developing a statement of needs for preparing or adapting to a changing climate
- Collaborate in identifying past severe weather events and vulnerabilities in the future
- Think regionally as well as locally; think and plan strategically for long term resilience

(D.P. NOFNEC 2015)