



Climate Change Workshop
December 9, 2003
Seymourville, Manitoba

In Attendance

<u>Name</u>	<u>From</u>
Allison, Ken	Seymourville
Barker, Melvin	Hollow Water
Barker, Rene	Hollow Water
Bouchay, Neil	Hollow Water
Hanuta, Irene	Mb. Energy, Science & Technology, Climate Change
Hardisty, Norbert	Hollow Water
Harry, Gerald	Black River First Nation
Kaczanowski, Stan	Manitoba Conservation, Lac Du Bonnet
Moneyas Sr., Henry	Hollow Water
Ramsey, Orton	Black River First Nation
Saber, Ivon	Manigotagan
Seymour, Elmer	Seymourville
Seymour, Ted	Seymourville
Smith, Carl	Brokenhead Ojibway Nation
Smith, Lawrence	Scanterbury
Williams, Flora	Hollow Water
Williams, Gladys	Hollow Water
Yatkowsky, Bob	Pine Falls

A number of youth from the Wanipigow School - Grade 11 Biology Class and the Black River Alternative Education class also attended and showed an interest in what is happening to our environment:

Sala, Maurice	Wanipigow School (Teacher)
Boulette, Danielle	Wanipigow School - Grade 11 Biology Class
Crawford, Robert	Wanipigow School - Grade 11 Biology Class
Ducharme, Taira	Wanipigow School - Grade 11 Biology Class
Hardisty, Nikita	Wanipigow School - Grade 11 Biology Class
Johnston, Sheena	Wanipigow School - Grade 11 Biology Class
McPherson, Laura	Wanipigow School - Grade 11 Biology Class
McPherson, Scott	Wanipigow School - Grade 11 Biology Class
Meade, Farrah	Wanipigow School - Grade 11 Biology Class
Moneyas, Candita	Wanipigow School - Grade 11 Biology Class
Moneyas, Samantha	Wanipigow School - Grade 11 Biology Class
Payjack, Matthew	Wanipigow School - Grade 11 Biology Class
Bird, Kevin	Black River Alternative Education (Teacher)
Johnson, Jack	Black River Alternative Education (Instructor)
Kent, Celeste	Black River Alternative Education
Thickfoot Jr., Brian	Black River Alternative Education

After the opening prayer by Elder Lawrence Smith, Ken Allison representing Seymourville welcomed everyone to the workshop.

In his opening remarks, Ken spoke a bit about the workshop and he made reference to a recent news item that talked about a recent visit Lloyd Axworthy had made to Churchill, Manitoba. The article discussed benefits that the Port of Churchill was enjoying as a result of longer shipping seasons in recent years.

“Although the warmer climate has allowed good things like the longer shipping season to occur, it has also caused problems in other areas”, Ken explained. He continued saying “there are major concerns with the winter roads that are used to service the more remote northern regions. They are opening up later in the season and are not as reliable as they had been years ago”. With that Ken wished everyone a good workshop and thought the young people in attendance would find it particularly interesting. He also invited everyone to walk around during breaks and check out the facility.

Stan Kaczanowski of Manitoba Model Forest chaired the workshop and after Ken’s opening remarks, Stan also welcomed everyone and thanked them for their attendance. Everyone at the workshop introduced themselves and settled in to spend the day learning and sharing information and observations on Climate Change. It was interesting to note that those present ranged from a distinguished group of Elders to a fairly large contingent of students from the Wanipagow High School and Black River Alternative Education program.

Elders



Wanipigow School - Grade 11 Biology Class



Stan invited Gladys Williams who was instrumental in organizing the workshop, to say a few words and after explaining that this was her first workshop and she was there to learn as well, Gladys introduced and welcomed Irene Hanuta to the workshop. Irene is from the Climate Change Branch, Energy, Science and Technology and will be doing a presentation on Global Climate Change: What is Happening and What Can We Expect?

Carl Smith, President of Manitoba Model Forest, was then introduced by Stan. Carl welcomed everyone and expressed his hopes the younger people (students) will understand the importance of what they will hear today. He said “Listen to the Elders and hear about the change that has happened over the years.”

Stan Kaczanowski then went over the planned agenda for the day. Irene Hanuta is scheduled first to do a presentation and will field questions from the audience regarding the information presented and Climate Change in general. After lunch Stan said he would like to ask the Elders to speak and tell us about their experiences as they see Global Warming or Climate Change occurring. Stan then introduced Irene to do her presentation.

Irene explained in her opening remarks that the information in her presentation has been gathered from various sources from all over the world. She would still like to hear from the local people regarding Climate Change and hear their views on the problems/benefits associated with Climate Change.

“The science behind climate change is a lot more involved than just the change in temperature. It is very complex and brings together a lot of different components. It is not only the scientists doing the research, it is important that we have interaction from First Nations, Elders, Community members, governments, industries and others.

The climate is sort of based on long-term averages. This particular area, Manitoba, has multiple seasons, with widely varying temperatures (summer, winter, etc.)”, Irene said.

She continued with “Different components have affected the climate over the years. Human actions have had the greatest effect. Scientists have found that the earth is getting warmer. The 1980’s and 1990’s have been the warmest decades on record. The current times are following that same trend.”

Irene Hanuta - Global Climate Change: What is Happening and What Can We Expect?



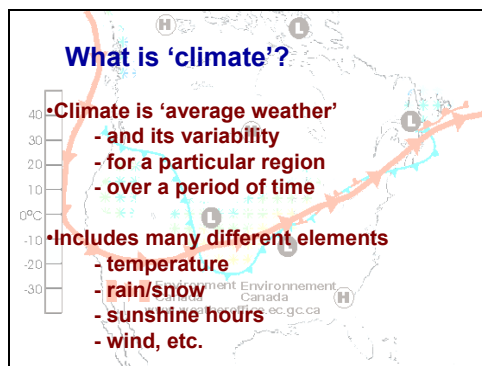
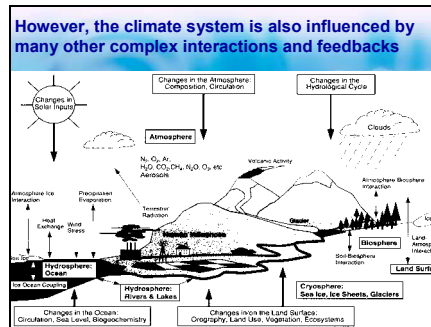


Unlike many other environmental issues, the science behind climate change involves the earth's entire life support system – its oceans and fresh water, its soils and vegetation, and most importantly, its atmosphere. As a result, climate change science is complex science. While much is known about how the climate system works, there are also many uncertainties still remaining.

The challenge of understanding what is happening to the climate system, and what we can expect to happen in the future, therefore, requires the collaboration of many scientists from many disciplines, each contributing his or her piece in putting the complex puzzle together.

It is important to first address the confusion that often exists with respect to the difference between weather and climate.

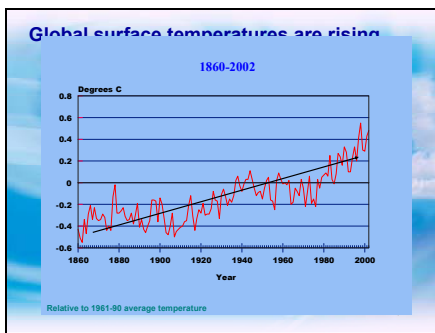
Climate values are usually based on analysis of a minimum of 30 years of observational weather data.



The climate system includes the atmosphere, the oceans, the cryosphere (snow and ice), the biosphere and the lithosphere (soils). Interactions and feedback processes include complex and non-linear flows of energy, moisture and other substances between different components.

Changes in factors external to the climate system, such as solar intensity, dust and aerosols from volcanic eruptions and human activities, can induce these processes and interactions to change, causing global and regional climate change.

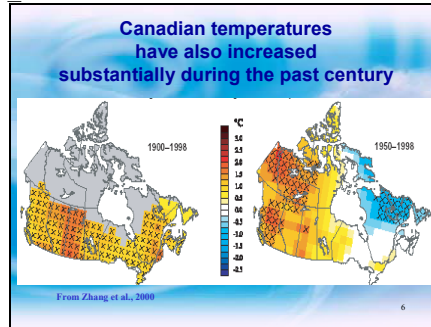
Reference: IPCC 2001. Climate Change 2001: The Scientific Basis Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T. et al. (eds.)]. Cambridge University Press, Cambridge, UK. Fig 1.1.



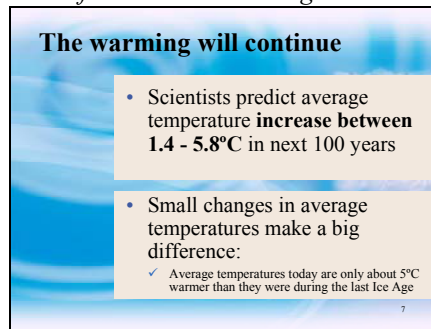
Large global temperature data sets have been assimilated from thousands of land and ocean data records that have been adjusted for known artifacts and errors such as urbanization heat island effect and changes in observing methods. These data are compiled into average global temperature departures using statistical weighting techniques.

Results indicate that, while the trend has been noisy (particularly at the annual to decadal time scale), there appears to have been an overall warming during the past century of 0.6°C.

Source: Data is from NOAA website at ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual_land.and.ocean.ts



Most of Canada is becoming less cold!



All indications are that the warming we have been experiencing is going to continue. The Intergovernmental Panel on Climate Change, which brings together scientists from around the world, including Canadian scientists, issued its Third Assessment Report in January 2001. They concluded that average global temperatures could increase by anywhere from 1.4 to 5.8 degrees over the next century.

To give a sense of what that means, during the last Ice Age, average temperatures were only about 5 degrees cooler than they are now. The five degrees of warming that ended the Ice Age was enough to melt the vast ice sheets that covered North America.

Temperature changes will vary

- Temperature changes in Canada **won't be uniform**
- Polar regions will **warm more** than mid-latitude regions
- The Atlantic will **cool slightly**

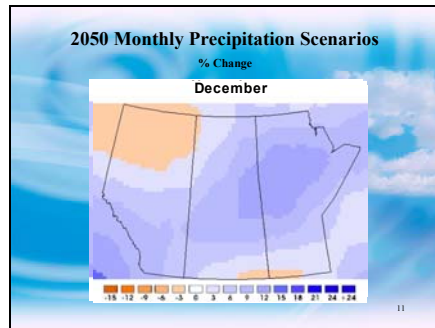
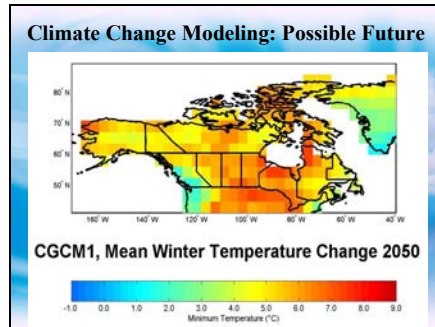
Rising temperatures won't affect everyone equally. The further north you are, the more extreme the temperature changes will be. As well, the Atlantic region is expected to actually cool slightly.

How do we know this is happening?

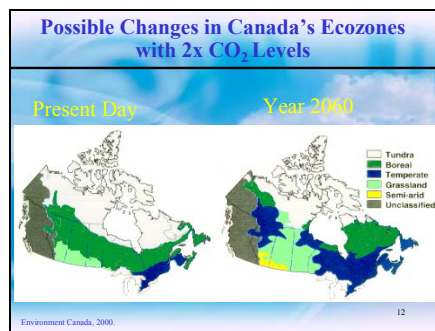
- Instrumental records - to 1860
- Ice cores, sediment cores, tree rings, historical records, traditional knowledge - evidence dating back several thousand years
- Satellite mapping & computer modelling for future predictions: Canadian model one of the best

How do we know what has happened in the past, and how do we predict the future? Scientists use a variety of tools. Reliable global temperature records only exist back to 1860. However, ice cores, tree rings, and coral reefs all release evidence of temperature change going back many millennia. They tell us that climate is variable, and that we have always experienced changes in our climate. The

difference today is in the speed of the change and its magnitude. Today, we use sophisticated computer models to determine future projections such as the ones we just saw. Canadian models are considered among the best in the world.



Most noticeable precipitation decrease in summer (critical for agriculture)



Climate is a major control on where certain plant species will grow and flourish.

Hence, as climate changes, ecosystems, with time, will change their location.

A climate under typical 2xCO₂ conditions would significantly reduce the extent of boreal forests in Canada, while increasing the area of grasslands and temperate forests.

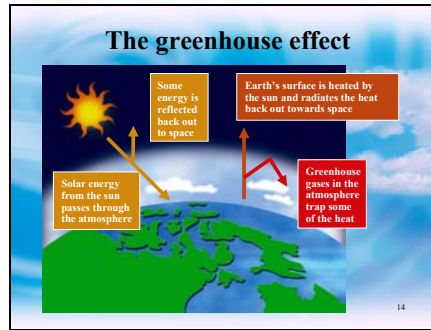
Since forests migrate very slowly, the transition of these ecosystems to new climatic zones would be out of step with changes in climate.

This is likely to cause dieback and loss to insects, diseases and fire in those ecosystem regions where climate change imposes greatest stress.

Changes in ecosystems can in turn significantly affect regional climates.

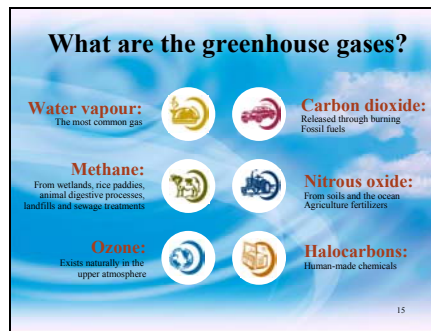


So scientists have told us that temperatures have increased in the past and will likely continue to increase. But our climate has always changed. Climate variability is a natural phenomenon. But why are temperatures increasing so much? What is it about these changes that make them different from other periods of changing temperatures in the Earth's history?



To understand what is happening, we need to understand something called the greenhouse effect. Solar energy from the sun passes through our atmosphere. The Earth's surface is heated by the sun, and radiates heat back out toward space. Gases in our atmosphere act like a greenhouse to keep that heat in, preventing it from dissipating out into space.

Without this natural insulation, average temperatures on Earth would be -18 degrees Celsius – too cold to support the diversity of life that now exists on Earth.



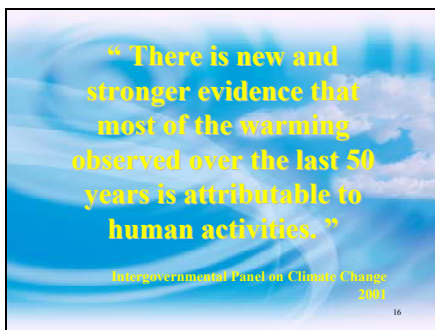
There are several greenhouse gases. Water vapour is the most common. Ozone and halocarbons are also greenhouse gases. But the three gases that are of most importance to climate change are carbon dioxide, methane, and nitrous oxide.

Carbon dioxide is released into the atmosphere through human activities, primarily the burning of fossil fuels and other materials. It is the main contributor to climate change.

Photosynthesis, the process by which plants take in carbon dioxide, removes carbon dioxide from the atmosphere. Methane is not as abundant as carbon dioxide, but it is more effective at trapping heat, making it a powerful greenhouse gas. It is created when vegetation is burned, digested, or rotted in an oxygen-free environment. Wetlands, rice paddies, animal digestive processes, and decaying garbage are the greatest sources of methane in our atmosphere.

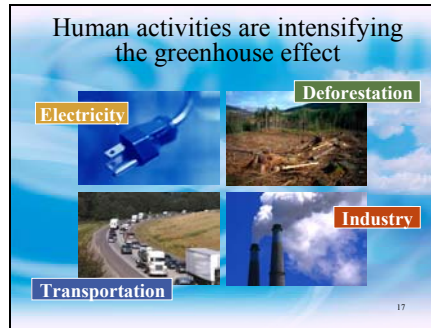
Nitrous oxide occurs naturally in the environment, but human activities are increasing the quantities. Nitrous oxide is released when chemical fertilizers and manure are used in agriculture.

Once in our atmosphere, these gases tend to stay – carbon dioxide for anywhere from five to 200 years, methane for 12 years, and nitrous oxide for a full 114 years.



In January, 2001, after carefully considering the scientific evidence, the IPCC made its strongest statement to date about the role of human activities in our

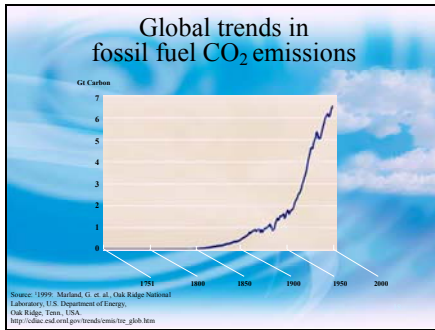
changing climate. It concluded that “there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.”



Since the Industrial Revolution, developed countries have produced large quantities of greenhouse gases, primarily by burning fossil fuels such as coal, oil, and natural gas to drive our vehicles, power our industries, and heat and cool our homes. Other human activities, such as the clearing of land for agriculture and urban development, and land filling and other waste disposal methods, are adding to the concentration of greenhouse gases in our atmosphere.

Since 1895, concentrations of carbon dioxide in the atmosphere have increased by 31 per cent, while methane and nitrous oxide have increased by 151 and 17 per cent respectively.

This increased concentration of the greenhouse gases are enhancing the natural greenhouse effect, causing the Earth to become warmer.



Over the past 250 years, carbon dioxide emissions solely from the burning of fossil fuels have risen sharply. In the late 1700s and early 1800s, emissions equaled less than one-tenth of a gigatonne of carbon.

By 1900, carbon dioxide emissions were just under one gigatonne. In 1996, global emissions of carbon dioxide were equal to 6.5 gigatonnes of carbon. Much of this carbon dioxide has remained in the atmosphere, causing a sharp increase in the concentration of this particular greenhouse gas.



Warmer temperatures have a way of sounding awfully good – particularly in the winter. But scientists tell us that the consequences are not going to be all positive – and, indeed, we may be seeing some of them already.
(nb: go to next slide for summary, or skip next slide to go on to detailed discussion of impacts)

Potential benefits to Canadians include:

- Lower snow removal costs
- Less ice cover on Great Lakes, along east coast, and Arctic
- Longer, warmer growing seasons
- Lower heating costs

In countries like Canada that have seasons with cold or cool climates, opportunities and benefits resulting from warmer climates include:

- lower costs for winter snow removal and clearing
- less hazardous shipping in ice congested waters
- lower winter space heating costs and
- longer, warmer growing seasons.

However, most of these benefits are associated with changes in average temperatures, not extremes.

Photo Source :
Snow removal : *MacLean's Magazine January 1999*
Ice congested waters: *Environment Canada*
Prairies : *Environment Canada*

Potential impacts of climate change on Canada

Some impacts of climate change can be negative, while others will be positive. In either case, adjustments can help to minimize the negative and to augment the positive.

On a national scale things may balance out but there will be sectoral, regional and local disparities.

The above collage covers some of the potential impacts identified by researchers and by provincial representatives as serious concerns in regional meetings.

In Atlantic Canada there is concern over coastal erosion and potential loss of fisheries such as cod. In Quebec and Ontario there is concern over extreme events such as flooding and droughts causing an increase in forest fires and declining lake levels:

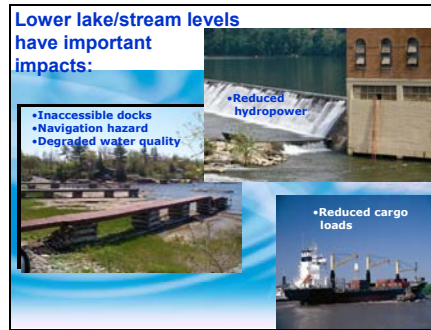
It is also recognized that there may be significant energy savings from warmer winters. This may help with air quality in large cities. Here as elsewhere it is recognized that the growing season may be extended offering benefit to many farmers.

In the prairies there is concern over extreme droughts and floods both of which ironically may occur. In BC there are concerns over forests and fish stocks, particularly salmon and the potential impacts of warmer waters on aquaculture.

The northern part of our country is likely to experience the most pronounced warming. Its people are very dependent on renewable resources. As well there are particular problems with infrastructure, pipelines, roads, buildings associated with frozen ground.

All areas of the country will be affected, but some more than others.

Source: Natural Resources Canada, Climate Change and Adaptation Directorate.

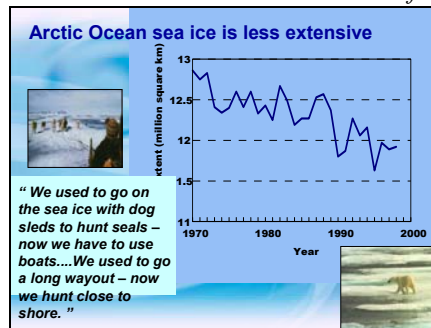


Various studies project much lower water resources and lake levels in interior parts of southern Canada, particularly in the Great Lakes and St. Lawrence Basin. This would have major adverse economic implications for hydro-electrical production, for cargo shipping within the Seaway system, and for recreational boating.

Low water levels in recent years caused reductions in cargo loading in ships within the Seaway. Lower flows could also lead to increased conflict in the Great Lakes between hydropower generation and shipping.

The combined effect of lower water levels, lack of freshening and warmer temperatures can be degraded water quality.

Photo sources: Environment Canada files

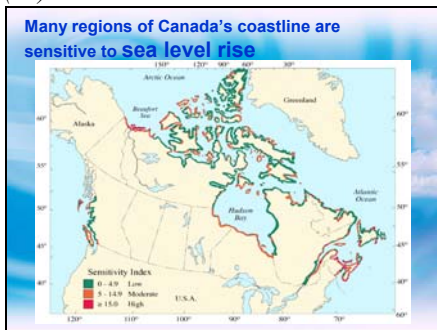


The above diagram shows changes in average annual sea ice cover as observed

by satellite. Late summer sea ice cover over the Arctic region has decreased by more than 15% since 1950.

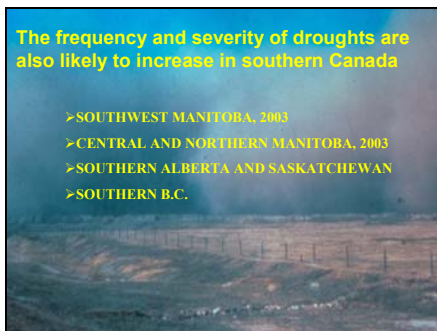
These changes are almost impossible to explain on the basis of natural variability alone. Within the Canadian Arctic, there is no significant trend in ice conditions, although recent years have been light.

Sources: Vinnikov et al 1999, *Science* 286:1934; IPCC 2001, WGI p125; Comiso, 2002, *GRL* 29 (20): 17-1 to 17-4.



This map depicts the sensitivity of Canadian coastlines to a rise in sea level rise. The sensitive regions include: much of the coasts of Nova Scotia, Prince Edward Island, New Brunswick; the urbanized Fraser Delta; and the coast of the Beaufort Sea in the Yukon and the Northwest Territories.

Source: Shaw, J., R.B. Taylor, D.L. Forbes, M.-H. Ruz and S. Solomon. 1998. *Sensitivity of the Coasts of Canada to Sea-Level Rise. Geological Survey of Canada, Bulletin 505. 79 pp + map.*

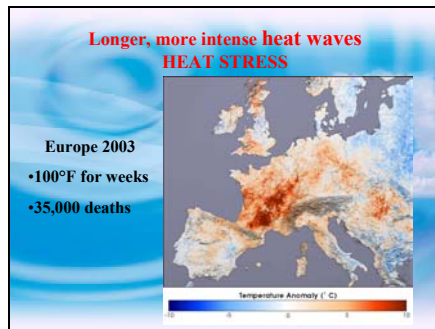


In much of central North America, the number of rain days are expected to decrease under 2XCO₂ scenarios. Therefore, there is an associated risk of an increase in the frequency of long, dry spells.

Results from the UK Hadley Centre Had CM2 coupled climate model, for example, suggest that by 2070 the return period of long dry spells over central North America could be about one-third that of today.

Although the timing is uncertain, several other studies show that, during dry times, it will be drier than today.

Source: Adapted from Gregory, J.M., J.F.B. Mitchell, A.J. Brady. 1997. *Summer drought in northern mid-latitudes in a time dependent CO₂ experiment. Journal of Climate* 10(4): 662-686.



In recent years, disease viruses such as those for malaria, Lyme disease and west Nile virus have appeared (or re-appeared) in southern Canada.

Studies suggest that risks of such diseases spreading into Canada are likely to increase as the climate warms.

Source: IPCC 2001. Climate Change 2001: Impacts, Adaptations and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change [McCarthy, J.J. et al. (eds.)]. Cambridge University Press, Cambridge, UK. p762-763.

Photos: Environment Canada files

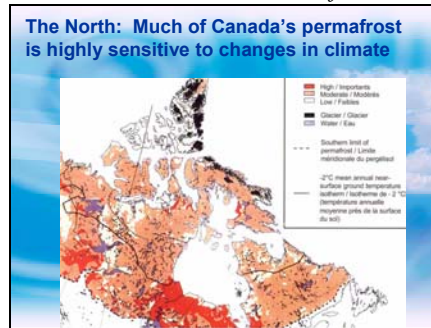


In recent years, disease viruses such as those for malaria, lyme disease and west Nile virus have appeared (or re-appeared) in southern Canada.

Studies suggest that risks of such diseases spreading into Canada are likely to increase as the climate warms.

Source: IPCC 2001. Climate Change 2001: Impacts, Adaptations and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change [McCarthy, J.J. et al. (eds.)]. Cambridge University Press, Cambridge, UK. p762-763.

Photos: Environment Canada files



Over time, the boundary between discontinuous and continuous permafrost may move hundreds of km northward as the Arctic climate warms.

Such changes will increase land instability and cause problems for built infrastructure in the north. They will also change the surface hydrology and stream flow in areas of complete permafrost decay.

Source: Natural Resources Canada 2000. Sensitivities to Climate Change: Permafrost, pp 6-7. Available online at: http://adaptation.nrcan.gc.ca/resource_e.asp.



The impacts of permafrost thaw will be highest in regions of ice-rich permafrost. Increased thaw settlement may occur beneath buildings, utility systems, roads, railways, pipelines, etc. Remedial action may be required.

The impacts of climate warming on permafrost will need to be considered in the design of future structures to prevent damage.

Photo Sources:

Background : Environment Canada

Other: Natural Resources Canada

Manitoba Impacts

- Millions \$ in costs already due to unreliability of **winter ice roads** for northern community access
- Millions \$ more in costs now to develop land based winter road system with river crossings

31

Manitoba Impacts

- Increased risk of **forest fires** (1148 fires in 2003 and largest area burned in Canada)

Area Burned
(As of September 17, 2003)

Province / Territory	2003 (Hectares)	10-yr avg (Hectares)
ATL	10	10
BC	10	10
MB	10	10
NS	10	10
NT	10	10
ON	10	10
PE	10	10
QC	10	10
SK	10	10
YK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB	10	10
SA	10	10
NT	10	10
YT	10	10
NU	10	10
PE	10	10
QC	10	10
SK	10	10
AB		

Protocol, with binding targets for emissions reductions.

Canada agreed to reduce its emissions to 6% below 1990 levels by the period between 2008 and 2012. Other countries agreed to similar targets.

Over the second half of 2001, in two meetings at Bonn and Marrakesh, the “rules” for implementing the Kyoto Protocol were agreed to. This puts Canada in a position to consider during 2002 whether to ratify the accord.

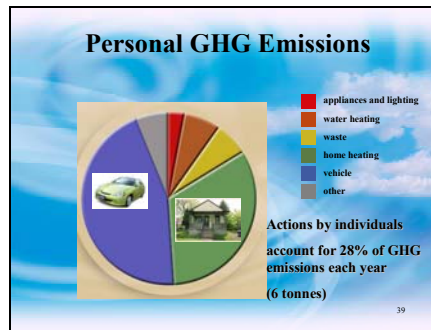


If Canada ratifies the Kyoto Protocol, we are committed to reducing our emissions to six per cent below 1990 levels by the period between 2008 and 2012. To know what that will mean, we need to know where we stand.

As we can see from this slide, Canada isn't a big emitter overall – but that's mostly because our population is small. On a per person basis, we're among the largest emitters in the world, and our emissions are going up.

In part, this is because we're a large country with a dispersed population and a cold climate. Our rising emissions are also due to a growing population and a growing economy.

However, importantly, we've managed in Canada to slow down the rate of growth in our emissions, and decouple emissions growth from economic growth. So, between 1997 and 1998, for example, our economy grew by 3% -- but our emissions only grew by 1%.



As you can see, most of the emissions from individuals come from two sources – driving our cars and heating our homes.

These are pretty much givens for most people – we're not going to stop driving, and we're certainly not going to turn off the heat! Not in our winters, anyway!

But there are things we can do. We can stop idling our cars – idling for more than 10 seconds uses more gas than stopping and restarting the engine. We can make sure our cars are well-tuned, and our tires inflated properly, both actions that will make our cars drive more efficiently, emitting fewer pollutants – and saving us money on gas at the same time.

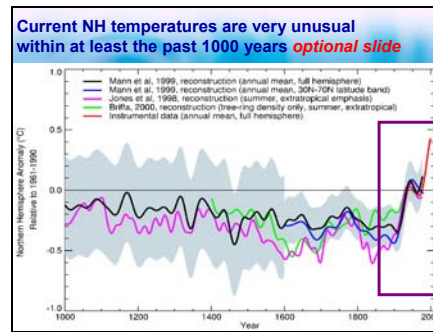
When we're buying a car, whether new or used, we can use fuel efficiency as one of our criteria.

It's the same thing with our homes. For instance, all of the cracks and gaps in the average house add up to a 1.5 square foot hole. If we caulk and weather strip all the leaks around doors and windows where heat escapes, we can save up to 20 per cent on our heating bills. If we insulate when we renovate, that small up-front cost will pay for itself awfully quickly.



In fact, there are all sorts of actions that we can all take that cost little, take even less effort, and have an enormous payback – for ourselves, and for our environment.

One of the most potent actions we, as individuals, can take, is to become involved in organizations in our community who are working for change. Whether it's joining a walking school bus, participating in community composting, or lobbying for better bike paths, your voice needs to be heard.



Several studies have used a variety of proxy indicators, based on ice core, tree ring and coral data, to reconstruct Northern Hemisphere surface air and sea surface temperatures.

The shaded area indicates the range of uncertainty in the proxy data reconstructions. The studies show agreement on the presence of a Little Ice Age, which peaked ~1600-1900, but little evidence for a hemispheric-scale Medieval Warm Period. When compared with recent instrumental data, all studies indicate that the 20th century was likely the warmest century, and the 1990s the warmest decade, of the past millennium.

Source: IPCC 2001. Climate Change 2001: The Scientific Basis Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T. et al. (eds.)]. Cambridge University Press, Cambridge, UK., p 134.



We all have to eat and the lunch was fantastic!



Discussions continued even through lunch!





Elders listening to the presentation!



Grade 11 Biology students busy taking notes!



A full house listens intently!



Some of the Wanipagow youth!



Carl Smith presenting Irene Hanuta with a gift of appreciation for her presentation.



Wanipagow Grade 11 Biology class!



The Elders held everyone's attention as they expressed their concerns.

"I put out forty traps, left them for a week and I caught nothing!"

"It is us humans that are changing the climate!"

"Companies don't have as much effect on the land as we do!"

"No one lives by the old ways any more!"

"The pulp industry is cleaning out our trees and the fur bearing animals!"

"The hunters and fishermen see the changes. Humans are involved!"

"We need the trees to grow faster!"

"We need to recycle more, save the trees and the animals!"

"Trapping in the area is affected by climate change. The harvesting of trees by humans is diminishing animal populations. Once something is disturbed, it will never be the same. Trees take a long time to grow and we don't always have time to wait for things to fix themselves. We have to watch what and how we harvest trees!"