



Climate Change Action Plan

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Partnerships and Approaches: Muskoka's Climate Change Action Plan

November 21, 2019

About this Presentation

- Partnerships
- A different approach

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Climate Change and the District

- My roll at the District
- Our current program and partnerships
- The Muskoka Watershed Council



Muskoka
WATERSHED COUNCIL

Partnerships

1. Muskoka Watershed Council
2. Simcoe Muskoka District Health Unit
3. Northern Climate Change Network
4. G.N.O.M.E.S
5. Climate Risk Institute
6. Federation of Canadian Municipalities
7. Other Municipalities
8. Universities

The District is working with a number of different groups to further our corporate climate change action plan



Muskoka Watershed Council

Mission: to champion watershed health

Goal: to enhance air quality and sustain the water and terrestrial ecosystems of the watersheds of Muskoka for the environmental, health, economic, spiritual and intrinsic values they provide.



Muskoka Watershed Report Card



Summary
Infographic



Background
Report



Story
Maps



Watershed
Infographics



Blog
Postings

Community

Collaboration

Government

Muskoka Watershed Council

District of Muskoka supports the Muskoka Watershed Council through:

- Provision of staff & other resources
 - Director of Environmental and Watershed Programs
 - Watershed Planning Technician

Muskoka Watershed Council Executive Committee

- 4 District Councilors
- 4 representatives from the community
- Provides governance, program direction and financial oversight

Muskoka Watershed Council

Created by the District of Muskoka in 2001 to:

- Promote environmental sustainability;
- Increase volunteer participation; and
- Engage and partner with stakeholders across Muskoka.



MWC Key Activities



**YOUR WATERSHED:
CONNECTING THE DROPS**
WWW.MUSKOKAWATERSHED.ORG

APRIL 26, 2019
9 AM - 4:30 PM

ACTIVE LIVING
CENTRE
HUNTSVILLE

TICKETS:
PUBLIC:
\$60 (UNTIL APR 15)
\$75 (AFTER APR 15)
STUDENT: \$45

BROUGHT TO YOU BY:
 Muskoka
WATERSHED COUNCIL
THE DISTRICT OF MUSKOKA

**2019 MUSKOKA
STEWARDSHIP
CONFERENCE**

A vertical poster for the 2019 Muskoka Stewardship Conference. It features a green background with a white line connecting several small circular images of nature scenes. The text is arranged in a clean, modern layout.

Muskoka Summit
ON THE ENVIRONMENT

RESTORE
YOUR MUSKOKA SHORE

A photograph of a waterfall with white water cascading over rocks into a pool of blue water.

*Planning for Climate
Change in Muskoka*

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www.muskokawatershed.org
January 2016

A close-up photograph of a vibrant green fern frond.

Forest Health
Fast on Feet

Muskoka
WATERSHED COUNCIL

January 2015

Living in
COTTAGE COUNTRY
What You Need To Know

A photograph of a lakeside cottage with a red roof, surrounded by trees and reflected in the water.

Healthy Buffers
Sewage Treatment
Native Plants
SEPTIC SYSTEMS
Docks & Pathways

Wildlife
Pests & Ambowags
& more

Muskoka
WATERSHED COUNCIL

Muskoka Watershed Report Card

2018

The Muskoka Watershed Report Card is a science-based evaluation of the health of Muskoka's watersheds. It is produced by Muskoka Watershed Council every four years, with 2018 being the fifth Report Card.

The Report Card provides a snapshot of watershed health by evaluating 8 indicators, 4 of which measure the health of the watershed, and 4 that consider potential threats.

Health Indicators

- Total Phosphorus
- Calcium
- Benthic Macroinvertebrates
- Interior Forest

Threat Indicators

- Climate Change
- Species at Risk
- Invasive Species
- Fragmentation

Quaternary Watersheds of Muskoka



A watershed is an area of land that drains to a river, lake or stream. The Muskoka Watershed refers to all watersheds lying totally or partially within the District Municipality of Muskoka and includes areas in Algonquin Park, the Township of Seguin and the Township of Algonquin Highlands. All water in the Muskoka Watershed eventually flows into Georgian Bay.

The map above shows the nineteen subwatersheds within the Muskoka Watershed. A healthy watershed not only benefits our lakes, forests, and wildlife, but also supports our health, our communities, and the economy.



Muskoka Watershed Council (MWC) is a volunteer-based non-profit organization with the mandate to champion watershed health. MWC is comprised of representatives from a wide range of stakeholders and has been providing a coordinated and science-based voice on issues affecting the environmental quality of our watersheds since 2001.

Dive deeper into the story map at www.muskokawatershed.org/reportcard-story-map

Phosphorus Concentrations in Lakes

Trophic Status of Sampled Lakes (2001-2017)



Phosphorus is a nutrient in limited supply in most Precambrian Shield lakes & generally controls the growth of algae. In general, lakes in Muskoka have had stabilized phosphorus levels in recent years.

Calcium Concentrations in Lakes



Calcium is the **5th** most abundant natural element

Not Stressed
Vulnerable
Stressed
Insufficient Data

Did You Know?
187 lakes across Muskoka were assessed for the calcium indicator.



56% of lakes sampled for the Report Card, have calcium concentrations below the threshold of 2.5 milligrams of calcium per litre, the amount when Daphnia become stressed. Daphnia are keystone herbivores in lake food webs.

Benthic Macroinvertebrates

Did You Know?
These creatures are small but large enough to see with the naked eye (macro), have no backbone (invertebrate) and live on the bottom of lakes & rivers (benthic).

The District Municipality of Muskoka has continuously sampled

45

lakes across the watershed to monitor benthos through the Biological Monitoring Program with lake associations.



Typical
Atypical
Extremely Atypical
Insufficient Data



Benthos are used as a biological indicator of water quality & habitat condition. Healthy lakes support high species richness & abundance.

Dive deeper into the story map at www.muskokawatershed.org/reportcard-story-map

Interior Forest

Interior forest is habitat
DEEP
in the forest which is secluded
from development and open areas.

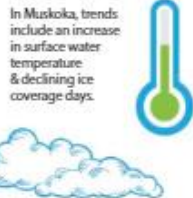
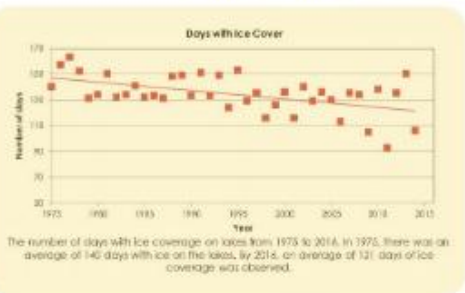
Not Stressed
Vulnerable
Stressed
Insufficient Data



Did You Know?
40% of the Muskoka
Watershed is interior
forest.

Interior forest is important for the filtering and absorption of water, sequestration of carbon dioxide, and provides essential habitat to wildlife.

Climate Change in Muskoka



In Muskoka, trends include an increase in surface water temperature & declining ice coverage days.

The typical year by mid-century is likely to be 3-4°C warmer and 10% wetter than present.

Species at Risk in Muskoka

There are
46 species at risk in the watershed



Did You Know?

Species at risk are classified as special concern, threatened, endangered or extirpated

Being at the southern edge of the Canadian Shield in Ontario, Muskoka is the northern limit for many southern species, and the southern limit for many northern species. This has resulted in biologically diverse ecosystems that support many species that are at risk.

Dive deeper into the story map at www.muskokawatershed.org/reportcard-story-map

Invasive Species

Main characteristics of invasive species

Few Natural Predators
Thrive In Disturbed Ecosystems
Outcompete For Food & Habitat
Adaptable
Reproduce Quickly



Not Stressed
Vulnerable
Stressed
Insufficient Data



The Ministry of Natural Resources and Forestry (MNRF) has identified
24 Invasive Species of concern in Ontario
7 of which are found in Muskoka

Fragmentation

Did You Know?

82% of the Muskoka Watershed is natural area. This includes lakes, wetlands, forests, rock barrens, and other natural ecological communities.



Development such as roads, urban areas, and railways disrupt large natural areas like interior forest and contribute to habitat loss, decreased biodiversity, and a fragmented landscape.

It's Your Turn! Top 5 Actions You Can Take

1. Get involved in citizen science programs! Key ones include:
 - Lake Partner Program (calcium and phosphorus)
 - EDDMap5 (invasive species)
 - iNaturalist (Species at Risk reporting)
2. Prevent the spread of invasive species
3. Reduce your carbon footprint
4. Volunteer for your local lake association or environmental organization
5. Support your municipality's green initiatives such as decreasing energy consumption and greenhouse gas emissions



Dive deeper into the story map at www.muskokawatershed.org/reportcard-story-map

3. Muskoka at Mid-Century 1: Climate

Creating future scenarios

The Earth's climate system is inherently complex and dynamic. We cannot know precisely what our climate will be like in several decades' time. That depends on many factors, including the degree to which countries act to reduce emissions of greenhouse gases. However, climate scientists now have considerable understanding of what determines climate, and major effort over the past two decades has improved the overall accuracy of global climate models (GCM), and their ability to project climate for particular geographic regions (such as central Ontario). As explained in **Box A**, we have made use of the output from a suite of GCMs for climate at a location in Muskoka as an appropriate projection of our likely mid-century climate. Two alternative projections of this climate which make different assumptions about future human policy on GHG emissions are displayed in Table 1. These projections are discussed on pages 15-16; they describe the mid-century climate that we use in the remainder of this report.

IPCC has created a set of emissions scenarios which describe possible changes in human behavior with respect to GHG emissions during this century. In evaluating Muskoka's likely future climate, we have assumed

CLIMATE VARIABLE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average Daily Maximum Temp												
Historical	-5.7	-4.0	1.7	9.7	17.2	22.4	25.5	24.7	19.4	12.0	3.7	-2.6
rcp4.5	-3.8	-1.6	4.7	12.9	19.4	25.1	28.3	27.6	22.5	14.4	6.5	0.2
rcp8.5	-2.0	-0.2	5.9	13.6	20.3	25.9	29.4	28.5	23.4	15.5	7.2	1.1
Average Daily Mean Temp												
Historical	-6.4	-4.2	-2.4	5.3	12.3	17.5	20.6	19.9	15.3	8.4	1.0	-5.7
rcp4.5	-4.3	-2.1	0.7	8.1	14.4	20.8	23.2	22.5	18.0	10.7	3.4	-1.4
rcp8.5	-2.5	-0.8	1.9	8.9	15.2	20.8	24.3	23.5	18.8	11.7	4.4	-1.4
Average Daily Minimum Temp												
Historical	-13.5	-12.4	-4.4	0.8	7.3	14.5	15.7	15.0	10.9	4.8	-1.4	-8.8
rcp4.5	-9.6	-8.4	-3.3	3.4	9.9	14.8	18.2	17.5	13.4	7.0	0.8	-5.1
rcp8.5	-8.3	-7.4	-2.0	4.2	10.1	15.7	19.2	18.5	14.2	8.0	1.7	-4.0
Average Total Monthly Precipitation												
Historical	64.3	64.1	74.8	83.9	89.8	108.0	106.3	95.5	86.8	66.8	54.2	74.9
rcp4.5	73.4	73.7	82.6	94.1	104.0	113.0	107.2	94.0	81.1	63.4	56.9	81.4
rcp8.5	76.3	79.5	86.9	99.2	106.7	115.9	103.3	86.3	71.8	59.5	55.5	86.2

Table 1. Projections of four components of the climate for Muskoka at mid-century, based on the IPCC CMIP5 data set. The average daily maximum temperature, average daily temperature, and average nightly minimum temperature are listed (all in degrees Celsius), together with the total precipitation (in mm of rain or melted snow) received for each month of the year. Current climatic values for these components are shown (historical), and compared with values derived for mid-century under two different emissions scenarios (named RCP4.5 and RCP8.5). Details in Box A.

that the world will follow IPCC's RCP8.5 scenario, a pattern of fuel use that requires fewer, less substantial alterations to past policy. This is the scenario we have been tracking most closely over the past decade. By taking this approach, Muskoka Watershed Council is not suggesting that continuing current policies is a sufficient response to the global threat that is climate change. It is our opinion that Canada and other countries should all work to achieve the deepest and most rapid cuts in GHG emissions possible, but we also

recognize that this is NOT what is happening at present. A precautionary approach requires that we focus on the most likely rather than on a preferred policy scenario. We will briefly note differences in the anticipated Muskoka climate if a more aggressive scenario of CO₂ emissions reductions is adopted (e.g. RCP4.5), keeping average global temperature to a maximum 2°C increase by 2100. (Note that under conditions achieving an average global increase of 2°, the increase in Muskoka will still be greater than 2°C.)

Planning for Climate Change in Muskoka

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January 2016

Simcoe Muskoka District Health Unit



Changing Temperatures

Mean Annual Temperatures

The annual average temperature in our region will continue to increase due to climate change. Temperatures are expected to increase by approximately 1°C by 2020, 3.5°C by 2050 and 5.7°C by 2080. This means that our climate will become similar to Ohio in 2020, Kentucky in 2050 and Mississippi in 2080. While all seasons are expected to become warmer, there will be variations in temperature increase across each season.

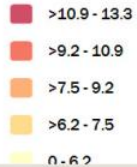
Swipe Map: This is an interactive swipe map. You can drag the vertical bar left and right to compare mean annual temperature projections between baseline (left) and projected future temperatures (right). The left panel presents a legend for these maps, with the projection data broken down by quintiles, and gives you the option to switch between swipe maps of baseline vs. 2020s, 2050s or 2080s. You can scroll and zoom in this map, and click the home button to re-center to the default map view.

Mean Annual Temperature Projections

Baseline (left) and future (right) mean annual temperature projections.

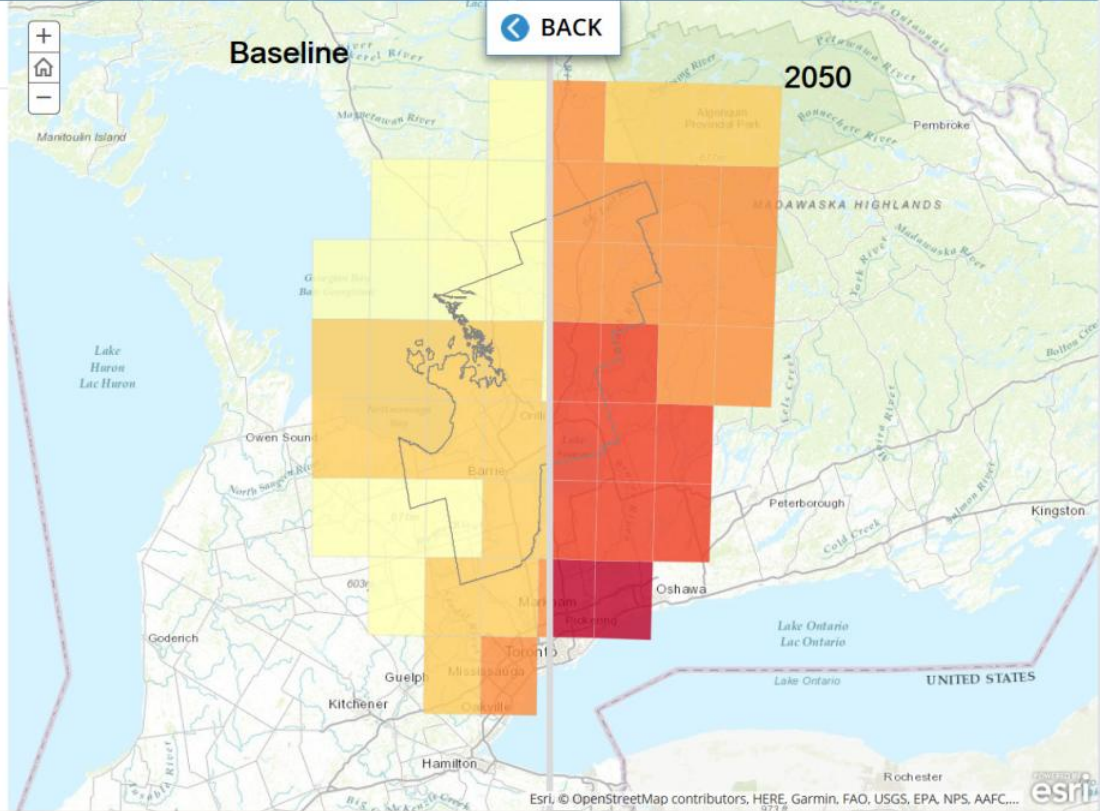
Legend

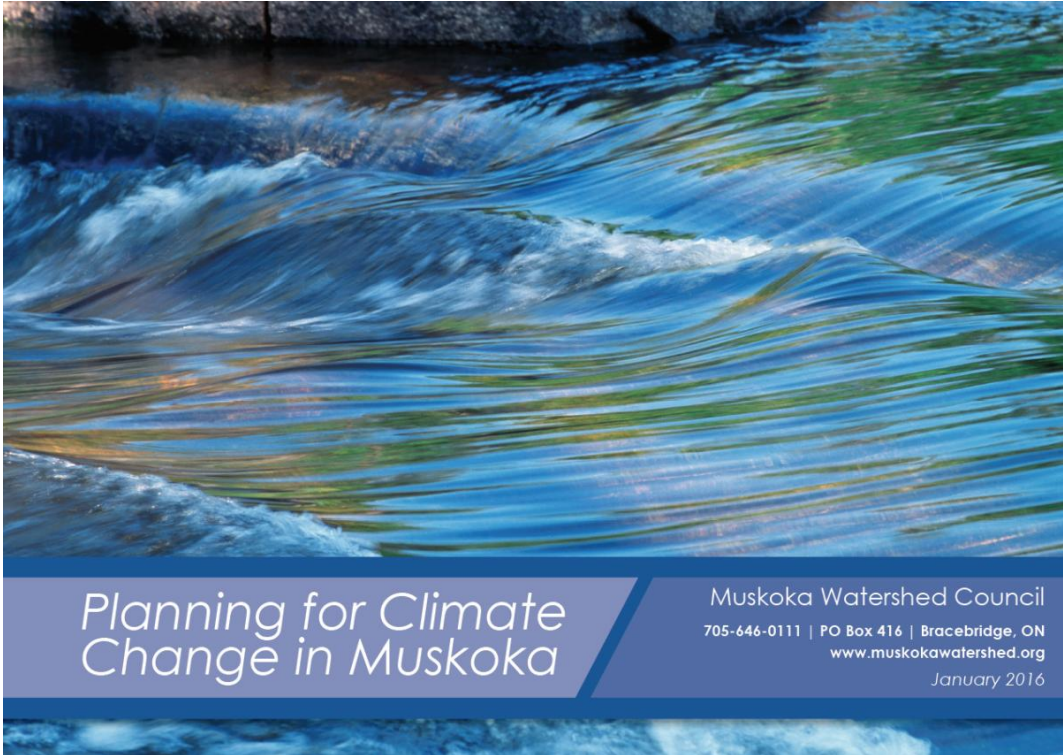
Mean Annual Temperature (°C)



Future Projections

- 2020
- 2050
- 2080





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Change in Muskoka*

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January 2016

- Actions to improve understanding of the ecological functioning of the Muskoka environment
- Actions to address anticipated impacts of climate change on the Muskoka environment
- Actions to prepare our built infrastructure and its management for the climate of mid-century
- Action to facilitate the effective implementation of these recommendations

What The District is Doing

A Corporate Climate Change Action Plan

Adaptation

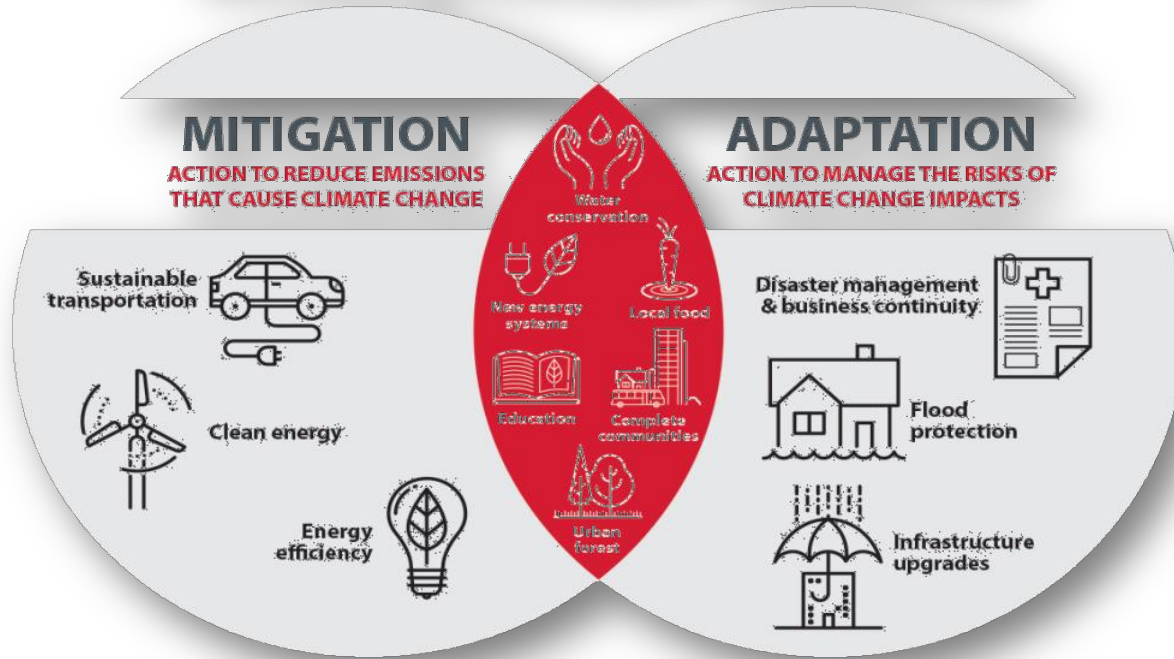


Mitigation



A Different Approach

Building Climate Resilience



Mitigation – Actions to reduce emissions that contribute to climate change and increase sustainability

Adaptation – Actions that minimize or prevent the negative impacts of climate change



[HOME](#) > [PROGRAMS](#) > [PARTNERS FOR CLIMATE PROTECTION](#)

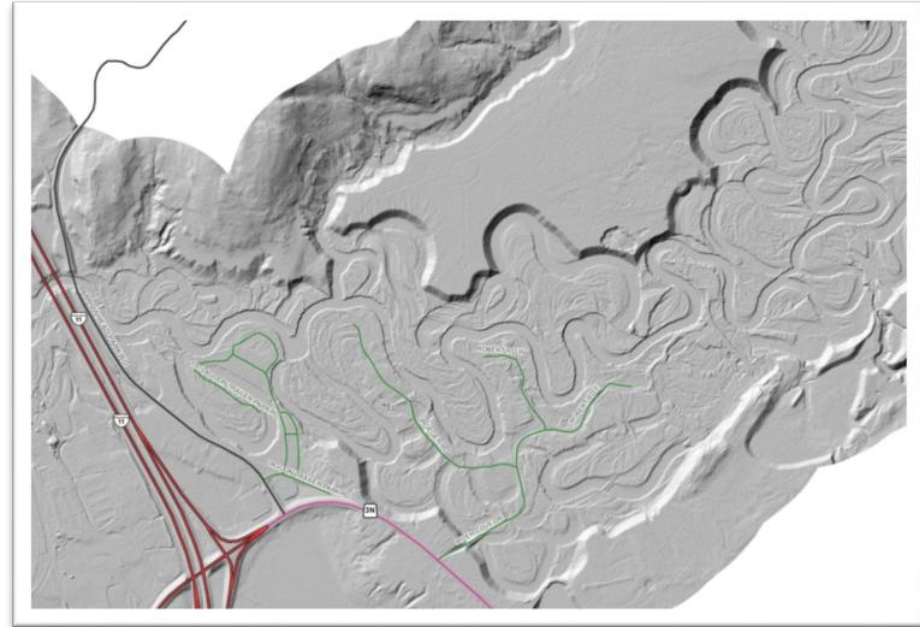
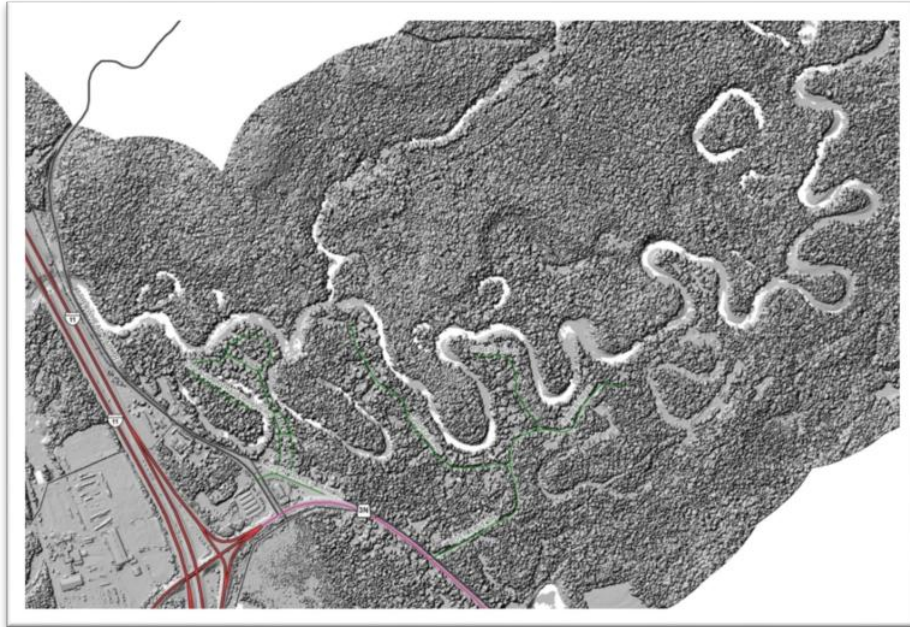
Partners for Climate Protection

Join this national network of 350+ municipalities and learn how to reduce greenhouse gas emissions and act on climate change.

Municipal governments like yours influence or control half the sources of Canada's greenhouse gas (GHG) emissions. You're also on the front lines of responding to severe weather events and other impacts of climate change. By taking action, you have the opportunity to save money in municipal operations, lower energy costs for residents and businesses and increase investment in the local economy.

The Partners for Climate Protection (PCP) program, from ICLEI — Local Governments for Sustainability

Flood Plain Mapping

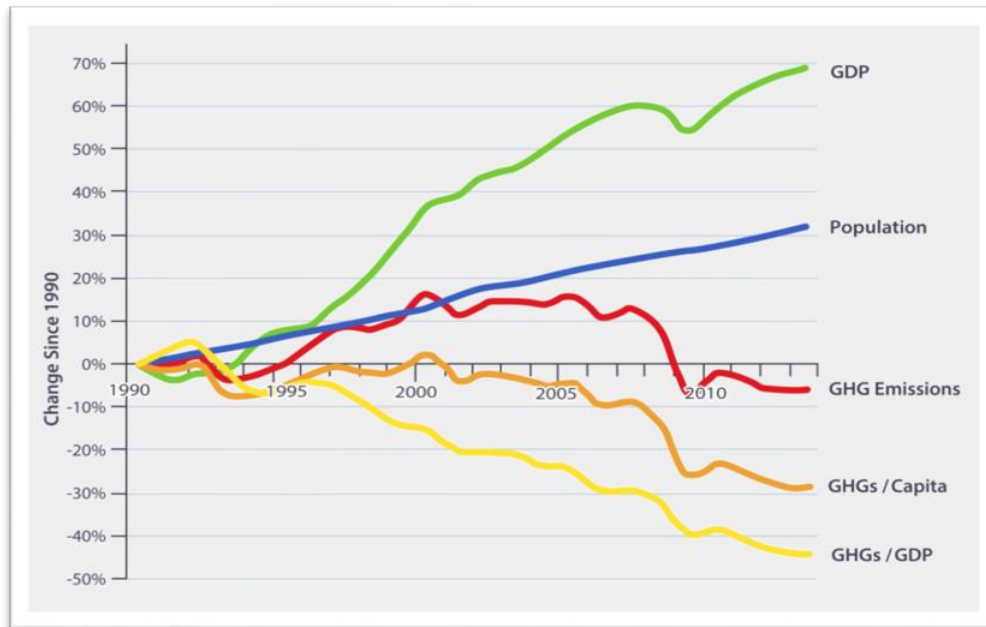


Other Partnerships

- Climate Change 'Magpie'
- Universities
- Other Municipalities

Looking to expand our networks and partnerships

Progress Doesn't Mean Sacrificing the Economy



Thank You!!

Questions?

