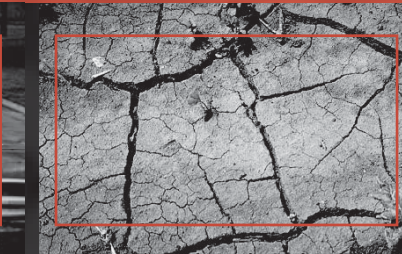




Climate Change in York Region:

Adapting to a Different Reality

draft discussion paper



January
2008

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1. Introduction: Climate Change and Sustainability

The Region's **Sustainability Strategy** is a broad based strategy with a number of actions aimed at making smarter decisions about our communities, our economy and our natural heritage. This Climate Change Discussion paper focuses on the impacts of climate change on municipal service provision as well as adaptation and resiliency strategies. Feedback from the Climate Change Workshop will also help identify adaptation strategies so that we might become a more resilient Region.

What does Sustainability mean? York Region's Sustainability Strategy has defined sustainability as:



Sustainability means leaving our communities, our Region, our World in a healthy state for our children and grandchildren.

Sustainability means evaluating the community, environmental and economic effects of our actions.

Sustainability means thinking differently, being more innovative and collaborative.\

Sustainability means making smarter decisions about our lifestyle, community design, infrastructure and financial decisions.

Sustainability means practicing prevention and adaptation so that our communities become more resilient to long term social, economic and climate change.

York Region's Sustainability Strategy which was adopted by Regional Council on November 15, 2007, was developed to provide a framework for making smarter decisions about growth management and all municipal responsibilities that better integrate the economy, environment and community.

One of the key action areas of the Sustainability Strategy is hosting a Climate Change Workshop in York Region to promote awareness implications as well as explore adaptation and response strategies.

The Climate Change Symposium will involve working with staff from each Regional Department, area municipalities, school boards, hospitals, emergency responders, conservation authorities, utilities and interest groups. This paper has been prepared to provide information to generate discussion.

The paper discusses what we know so far about Climate Change, what risks our services and communities face, and offers some ideas around what adaptation and response strategies to deal with these risks.

The United Nations Framework Convention on Climate Change defines Climate Change as:

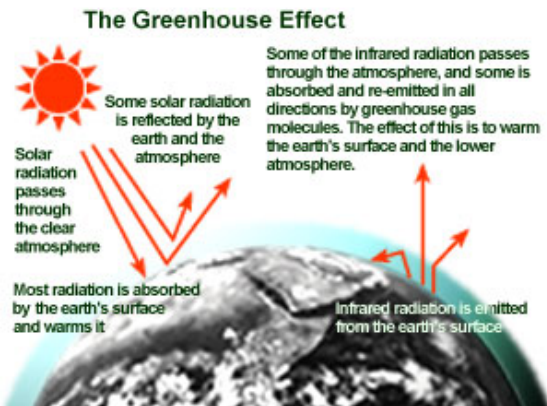
“A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods”. In other words...changes that are brought about by human activities.”

What is Climate Change?

By now, we've all heard about Climate Change and have a fairly good idea of what it is. We know that some of the changes happening to the earth's climate are normal. But we also know that more dramatic changes occurring in the past 25 years are a direct result of human activities and the use of

fossil fuels for transportation, manufacturing, heating, cooling and generation of electricity. This use alone is responsible for 70 – 90% of greenhouse gasses, with the rest coming from land uses such as agriculture and forestry.¹

Burning fossil fuels like coal, oil and natural gas has resulted in accumulation of these gasses in the atmosphere, where, because of their long life, they stay for anywhere from decades to centuries. Since the Industrial Revolution concentrations of carbon dioxide have increased by 30 per cent, methane by 145 per cent, and nitrous oxide by 15 per cent above “normal” levels.



“Climate naturally varies over time, so any change we're seeing now is just part of a natural cycle.”

Climate does naturally change. By studying tree rings, lake sediments, ice cores, and other natural features that provide a record of past climates, scientists know that changes in climate, including abrupt changes, have occurred throughout history. But these changes all took place with natural variations in carbon dioxide levels that were smaller than the ones we are now causing. Cores taken from deep in the ice of Antarctica show that carbon dioxide levels are higher now than they have been at any time in the last 650,000 years, which means we are outside the realm of natural climate variation.

Al Gore. An Inconvenient Truth. 2006.

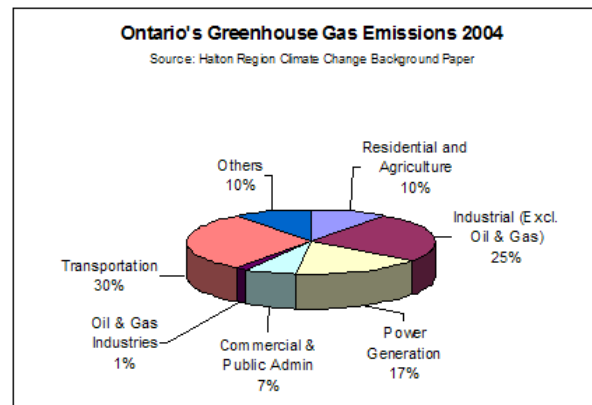
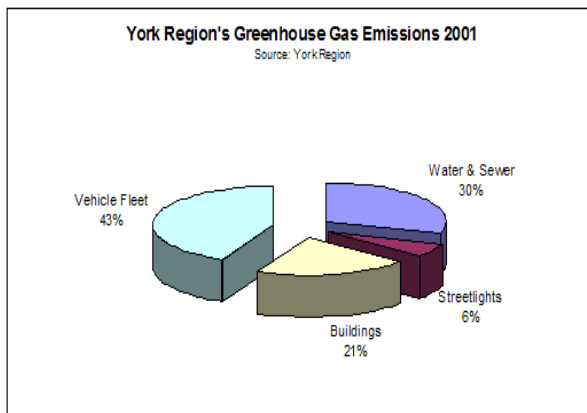
Table 1: Examples of Greenhouse Gas Lifetimes

Gas	Lifetime
Carbon Dioxide(CO ₂)	5 to 200 years
Methane (CH ₄)	12 years
Nitrous Oxide (N ₂ O)	114 years
Sulphur Hexafluoride (SF ₆)	3,200 years
Carbon Tetrafluoride (CF ₄)	50,000 years

Source: Centre for Science in the Earth System and ICLEI. Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments. 2007.

In the past 100 years, we have cleared more land for human use than in all of prior human history. This has resulted in the loss of forests and wetlands, which absorb and store greenhouse gases and naturally regulate the atmosphere.² It is estimated that worldwide, emissions from deforestation, which the United Nations Framework Convention on Climate Change defines as the direct human-induced conversion of forested land to non-forested land, accounts for 18% of global emissions, which is greater than the amount produced by the transportation sector.³

As municipalities we are also a resource user and contributor to Climate Change in our own communities as a provider of water and waste water services, street and traffic lighting, road construction, public transit, etc.



Ten Years of “Meteorological Mayhem” in Canada

Across Canada, the last 10 years have been described as “meteorological mayhem” by Environment Canada’s David Phillips. Beginning in 1996, the Saguenay flood was Canada’s first billion dollar disaster. The 1998 ice storm was the most destructive and disruptive in Canadian history at a total cost of \$3 billion.⁴

Nova Scotia experienced three “50 year” storms in less than 12 months in 2003-04 with Halifax taking a direct hit from Hurricane Juan. Canada’s west experienced wind storms, avalanches, fire, drought and record rains and floods. Peterborough experienced 2 significant floods within 2 years (2004-05). Closer to home along the Toronto/York Region border, August 19, 2005 brought 180mm of rain in 90 minutes, hail, strong winds and flash floods, with damages exceeding \$500 million. Add to this several higher intensity tornados and damaging downbursts in recent years.⁵

In the recent past, across Ontario, heavy rain events of very short duration (minutes to hours) have caused street flooding, sewer overflows, erosion, and flash floods, contamination of water supplies and landslides. Although little change in precipitation is anticipated in the future, shorter duration heavy rainfalls have already increased by 6 – 18% and are forecasted to continue increasing.⁶

Canadian models suggest that as CO2 rises, heavy one-day rainfalls will become *twice* as common as they are today, and are also likely to become 50% more intense.⁷

Number of Canadian Natural Disasters by Decade 1950-1999				
1950s	1960s	1970s	1980s	1990s
36	61	97	121	155

Source: Institute for Catastrophic Loss Reduction. 2005



Woodbine Avenue

York Region's Climate is Already Changing

Growing evidence suggests that the climate of Ontario and closer to home, the Great Lakes Region which York Region is a part of, is already changing:

- Winters are getting shorter
- Annual average temperatures are growing warmer
- The duration of lake ice cover is decreasing as air and water temperatures rise
- Heavy rainstorms are becoming more common.”⁸

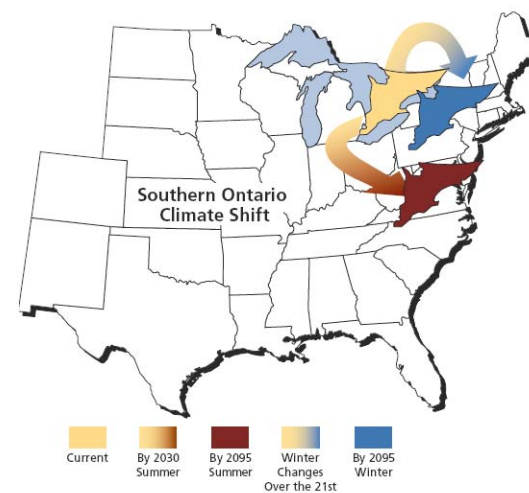
In Ontario, it is expected that average temperatures could rise by three to eight degrees Celsius over the next 100 years. This increase in temperature changes has the potential to result in:

- An increased frequency in severe weather events like intense localized storms, heavy rains, ice storms, tornadoes, floods, droughts and heat waves which could impact human lives and property.



Drought and irrigation impact on the Maskinonge River

- Longer and more intense heat waves making air pollution in larger urban areas worse, leading to increased illness and deaths from asthma and respiratory disease.
- Growing seasons may lengthen, but crop yields may be impacted by increased and longer droughts.
- Warmer winters could result in an increase in non-native pests and diseases, and long drier summers increase the risk of forest fires.
- Drier conditions could affect the quality and quantity of our water resources and Great Lakes water levels.⁹



Source: Union of Concerned Scientists', Confronting Climate Change in the Great Lakes Region – Impacts on Ontario Communities and Ecosystems, 2003

Did You Know?

A 50% to 60% reduction in present global emissions of carbon dioxide would be required to stabilize atmospheric CO₂ concentrations at current levels. Under the Kyoto Protocol, participating countries set an average emission reduction target of 5.2% below 1990 levels by approximately 2010. Canada's target is 6%.

Natural Resources Canada

2. Why Municipalities Need to Consider Climate Change

Municipal governments and our partners have an important role to play in addressing Climate Change.

We are responsible, either solely, or in partnership, for providing and managing the systems our communities depend on. **Built systems** like roads, bridges, power, water and waste management. Municipalities are also partially responsible for **Human systems** like medical and social welfare services. And finally, we are responsible for managing and protecting our **natural systems** like groundwater, streams, forests and other natural heritage features. These are all essential and, at the same time, vulnerable systems we depend on for quality of life and economic prosperity.

As our climate continues to change, and our urban populations and areas grow, more people, property and infrastructure systems will be at risk, including the services the municipalities provide such as:

- Water and Wastewater Systems
- Transportation Systems
- Energy Systems
- Health Care Systems
- Emergency Response Capabilities.



1998 Ice Storm



Water shortages due to drought



Peterborough 2005 Flood

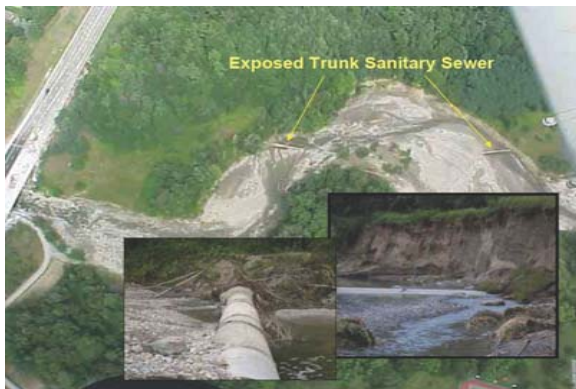
Impacts on Built Systems

Our built systems are constructed to specific standards, we invest billions of dollars in them, and they are expected to last for decades. Until now, we have had few reasons to consider these systems as vulnerable. Given the Climate Changes expected over the next century, infrastructure design standards, based on historic conditions, may no longer provide accurate guidance for building or maintenance.

Built infrastructure systems are more exposed to extreme events that will result in an increased need for maintenance and upgrades. Energy transmission networks are vulnerable as their towers can be damaged by severe windstorms and ice build up as we witnessed in the 1998 ice storm.

Water and sewage networks may need to accommodate both more intense and frequent rainfall events as well as droughts such as the one experienced in the summer of 2007.

The August 19, 2005 storm, classified as one that exceeded the 1 in 100 year storm, lasted 2 to 3 hours but resulted in a recorded 180 mm of rainfall concentrated in isolated areas of north Toronto. The event resulted in erosion in ravines and waterways, collapse of Finch Avenue at Black Creek, collapse of the Highland Creek Trunk sanitary sewer, widespread basement flooding, watermain breaks and wastewater treatment plant flooding.¹⁰ According to the Insurance Bureau of Canada, this storm represented the highest insured loss in Ontario's history, exceeding \$500 million¹¹, mostly in claims for sewer backups.



Highland Creek Trunk Sanitary Sewer Collapse



Finch Avenue Collapse

Impacts on Natural Systems



Ground level ozone damage to leaf

While natural systems are expected to adapt to shorter winters and earlier springs in the long term, these changes will alter ecosystems and species' lifecycles. A warmer climate is likely to result in changing habitat ranges bringing an increased risk of pests and diseases as well as issues around competition from non-native species.¹² Rising urban temperatures and heat waves frequently cause smog and diminished air quality, both of which affect the health of plant and animal species.¹³

Strong winds during storms, such as downbursts are becoming more intense in the Great Lakes Region and can affect large areas of land. Heavy winds can also cause large-scale forest destruction through blowdown¹⁴ or microbursts.

Water resources will also be under considerable stress, both for environmental and human use. Projected changes to rainfall, evaporation and groundwater recharge rates in Ontario will impact all water users, specifically:

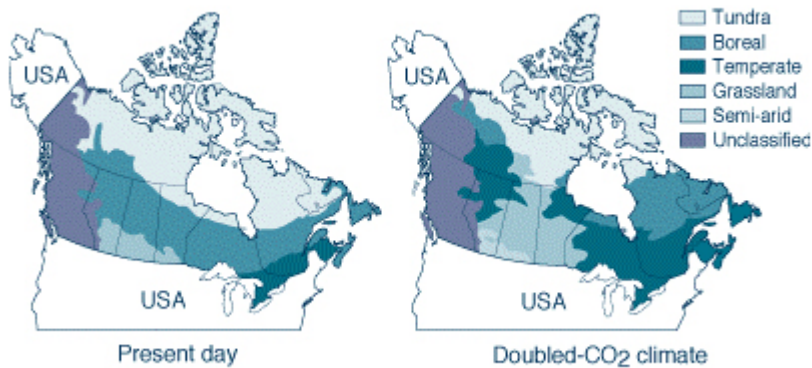
- Warmer temperatures may lead to declines in lake levels in both the Great and inland lakes with more evaporation, less spring runoff, and less ice cover.
- Increased demand for water takings from the Great Lakes, which is already a contentious area of debate.
- Reduced summer water levels due to reduced rainfall and increased evaporation will decrease groundwater recharge, dry up small streams, and reduce wetland areas, resulting in poorer water quality and less wildlife habitat.
- Increase in impervious surfaces as a result of urbanization and Climate Change together may lead to decreased flood-absorbing capacities of wetlands and floodplains, resulting in increased erosion, flooding and runoff polluted with nutrients, pesticides and other toxins.¹⁵



Microburst Damage to Regional Forest

The Hurricane Hazel storm in 1954, representing the worst flooding in Ontario in a 200 year period, has been used as the “design storm” for flooding in southern Ontario.¹⁶ In the past 5 years, Ontario has experienced several storms that have exceeded the 1 in 100 year design storm. What implications does this increased frequency have on the design criteria for our built infrastructure?

Changes in Forest and Grasslands Boundaries



SOURCE: Rizzo 1990.

Observations of species out of their normal range are leading forestry experts to conduct further research into the northern movement of tree species due to climate change. Examples of butternut and pear trees being able to grow in Sault Ste. Marie demonstrate that enough warming has occurred to support these trees, however, scientists will also look at whether native soils can support the theoretical northern movement of non-native tree species.

Impacts on Human Systems



Emergency Shelter for Seniors

Human systems like medical systems, public health and social services may experience increased need to respond to emergency management of vulnerable populations like seniors and the homeless during more frequent extreme heat days and the need to house larger populations after events like floods. For example, within a few hours of the July 15, 2004 flood that struck the City of Peterborough, emergency shelter was needed for 200 people including 134 residents of a nursing home¹⁷. During that event, 245 mm of rain fell in a 12 hour period beginning in the early hours of the morning, overwhelming storm sewers and backing up sanitary sewers into homes, businesses and submerging the downtown core. The total cost to the City for recovery was \$100 million.

Climate Change will have significant impacts on human health. Health Canada has identified eight significant health concerns related to Climate Change. They include health effects from increased smog episodes, illnesses and deaths caused by heat and cold waves, water- and food-borne contamination, diseases transmitted by insects, health effects of stratospheric ozone depletion, and extreme weather events.

Those that will be subject to greater health risks include children, the elderly, the poor, disabled people, immigrant populations and Aboriginal people.¹⁸

Health systems will need to be capable of responding to an increase in pollution and heat based health issues, including respiratory diseases.

In 2005, York Region experienced 14 smog advisories affected a total of 48 days, in 2006 there were 5 smog advisories covering 11 days, and in 2007 York Region experienced 11 Smog Advisories covering 29 days. Climate change can be expected to result in more poor air quality days in the future.

What does this mean? The Ontario Ministry of the Environment warns that poor air quality may have some short-term adverse effects on the human or animal populations, or may cause significant damage to vegetation and property, and that moderate air quality may lead to some adverse effects on very sensitive people.¹⁹



Poor air quality creates health risks to children



Air Pollution affects human health and the economy

The Ontario Medical Association has stated that "...exposure to air pollution will result in almost 5,800 premature deaths and cost the province almost a billion dollars this year (2005) alone. If nothing is done to further improve the quality of air in Ontario, the number of premature deaths is estimated to hit 10,000 lives by the year 2026. The combined healthcare and lost productivity costs are expected to reach well over a billion dollars."²⁰

Shorter winters and warmer overall temperatures might mean that disease carrying insects will be able to survive in broader ranges and further north than before. Diseases of concern, aside from the increase in West Nile, include Lyme disease,

malaria and encephalitis, which will present resource issues for our health care system.

Climate and extreme weather events may significantly impact the health of our communities. Adaptation and preparation to reduce the impacts associated with climate change and the resulting extreme weather events will be necessary in order to protect those most at risk. Natural disasters due to Climate Change are expected to lead to an increase in demand for emergency response measures, shelter availability as well as hospital and medical systems.



Canada's Health Impacts from Climate Change and Variability

Health Issues	Examples of Health Vulnerabilities
Temperature-related morbidity and mortality	Cold and heat related illnesses, mental health, respiratory and cardiovascular stress, occupational health stress
Health effects of extreme weather events	Social and mental health stress due to disasters , injuries, preparedness and population displacements, damaged public health infrastructure, occupational health hazards
Air pollution related health effects	Respiratory diseases, cardiovascular diseases, cancer, allergens and asthma, changed exposure to outdoor and indoor air pollutants and allergens
Water and food borne contamination	Enteric diseases
Vector-borne infections and diseases	Changed patterns of diseases caused by bacteria, viruses and other pathogens carried by mosquitoes, ticks and other vectors
Health effects of stratospheric ozone depletion	Cancer, cataracts, immune suppression
Population vulnerabilities in cities and communities	Rural and Urban health, seniors, children, homeless and low income, traditional cultures, disabled, immigrant populations
Health and socio-economic impacts	Loss of income and productivity, Social disruption, Diminished quality of life, Increased costs to health care

Adapted from <http://www.hc-sc.gc.ca>

3. Toward a Sustainable Region

“Climate change is already making an impact on the environment of the Great Lakes region. Waiting to begin reducing emissions or to plan for managing the effects of climate change only increases the eventual expense and the potential for irreversible losses. Fortunately, many of the actions that can be taken now to prevent the most damaging impacts of climate change can also provide immediate collateral benefits such as cost savings, cleaner air and water, improved habitat and recreational opportunities, and enhanced quality of life in communities...”

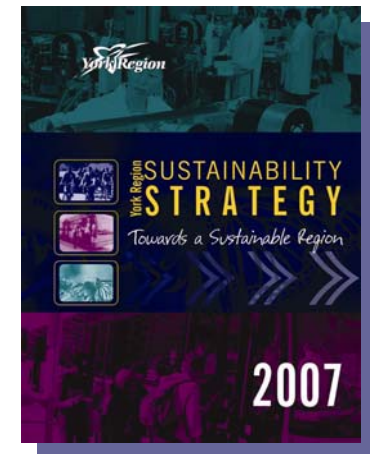
Union of Concerned Scientists and the Ecological Society of America. *Confronting Climate Change in the Great Lakes Region*.

York Region’s Sustainability Strategy

York Region has built a strong foundation for sustainability over the past 13 years with its two strategic documents, *Vision 2026* and the *Regional Official Plan*. The Region has had a number of successes such as the Greening Strategy, the Human Services Planning Coalition, Viva Rapid Transit, and more recently, the Tom Taylor Place, an energy efficient and affordable housing project.

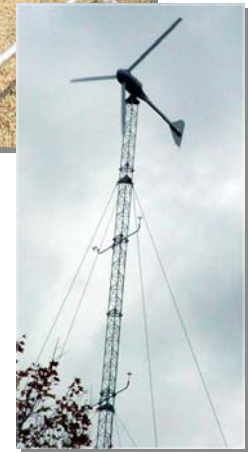
The Region’s Sustainability Strategy, approved by Regional Council in November of 2007, is meant to further inform and improve policies, programs and operations around the three sustainability pillars of economy, environment and community.

The Strategy includes over 100 short-term actions and is based on increased awareness and partnerships to make more sustainable decisions, including reducing greenhouse gas emissions.



The Region has made efforts towards addressing sustainability and Climate Change with initiatives that include:

- Coordinated approach to the Regional Official Plan and Infrastructure Master Plans Update
- The Greening Strategy and Land Securement Initiatives
- The State of the Environment Report 2005
- Energy and Environmental Management Systems (EEMS)
- Water for Tomorrow Program
- Energy Efficient Affordable Housing Project: Tom Taylor Place
- Public Transit and Rapid Transit Initiatives (YRT/VIVA)
- Minimum LEED Silver Standard for Regional Facilities
- Development of a Regional Air Quality Strategy through the Corporate Clean Air Task Force
- A variety of purchasing and operation decisions (i.e. LED traffic lights, new carpet procurement etc.)
- Employee Trip Reduction Program (Smart Commute York Region)
- Green Fleets Plan
- OPTimize Works
- Regional Emergency Operations Centre
- Pedestrian and Cycling Master Plan
- Stouffville Zone 2 Pumping Station Photovoltaic system
- Wind Energy Feasibility Study in progress at Sutton Water Pollution Control Plant
- Solar domestic hot water installation at Newmarket Health Centre
- Member of the Partners for Climate Protection Program
- Member of the GTA Clean Air Council



York Region also has a comprehensive Emergency Plan in place to protect and preserve life and property during times of crisis by providing efficient, co-ordinated response capabilities and decision-making. The Region takes part in annual exercises to test the effectiveness of its Plan and ensure that all agencies are familiar with their respective roles in the event of an actual emergency.

Through their participation in simulated emergencies, participating agencies are able to identify strengths and areas needing improvement in their plans, policies and procedures prior to an actual emergency.

The simulated emergency drills have included epidemic and natural disaster preparedness and have included; Operation Rising Waters simulated flooding in the region, the evacuation of residents, and the opening of reception centres, Exercise "Whiteout" simulated severe weather conditions due to a major snow storm in the region.

As mentioned earlier, this paper has been prepared to provide participants of the upcoming Climate Change Workshop with information to generate discussion.

This paper discusses what we know so far about Climate Change, what risks our services and communities face, and offers some ideas around mitigation and adaptation approaches to dealing with the risks and impacts of Climate Change might mean.



York Region's 1st LEED® Gold Certified Facility

What Does Mitigation, Adaptation and Resiliency Mean?

Literature on Climate Change often talks about the need to assess municipal **vulnerability** and preparedness for Climate Change, which involves identifying how to **mitigating** for, or **adapting** to Climate Change and some literature is beginning to talk about **resiliency**. There are no standard definitions around Climate Change thus far. However, there seems to be some common themes around the terminology.

Mitigation usually refers to changing behaviours, actions and decisions in order to reduce our production of greenhouse gasses, but not how we need to prepare for the effects of Climate Change. Examples of mitigation include reducing our use of single occupancy vehicles in favour of transit, reducing energy and electricity use in buildings through building retrofits and energy conservation programs, or increasing the Region's forest cover.



An example of mitigation is carbon “sequestering”. Forests play an important role in the global carbon cycle, exchanging carbon with the atmosphere through photosynthesis and respiration, and storing a large amount of carbon in vegetation and soil. Forests (and how they are managed) could help Canada achieve a greenhouse gas emissions reduction target by increasing the removal of carbon dioxide from the atmosphere and storing it in both vegetation and soil.

Adaptation refers to changing our behaviour, planning or building techniques in order to better cope with the impacts of Climate Change. For example, increasing the size of our storm sewer pipes to adapt to more intense storms with higher precipitation or preparing community disaster management plans are ways to adapt to Climate Change.

Using alternative technologies is another. A recent study by Ryerson University found that using green roof technology for 8% of Toronto's roofs reduced the city's heat island effect by up to two degrees Celsius. The study also found that green roofs could slow runoff of rainfall at peak times, reducing the risk of sewer overflows.²¹



Resiliency refers to the ability of a community, nature, and the built environment to not only cope with Climate Change through mitigation and adaptation measures, but also to continue thriving under any number of circumstances.

While York Region faces increasing growth pressures, expanding urban areas and populations, this growth also presents an opportunity to build more sustainably and to protect and preferably enhance existing natural systems.

Protecting our natural areas and systems through the Region's work and partnerships on projects like the Natural Heritage Strategy and watershed plans will help us to build communities that better mimic pre-development conditions and protect the environment with technologies like green roofs, water re-use, alternative energy use, transit supportive community design guidelines.

For example, increasing natural cover along the Humber River and its tributaries by 32% to 40% would result in reduced flooding during most types of storm events and may decrease concentrations of suspended solids by 10% to 30% immediately downstream.²² Increasing natural cover also gives growing human populations an opportunity for more nature-based recreation and increased quality of life in communities.

We can also increase environmental resiliency and protect property and human life by increasing the soil area permeability in our communities so that we provide natural pathways for intense rainfall through the soil rather than relying solely on stormwater management infrastructure.



Climate Change Raises Concerns for Municipal Services

Over the next 25 years, York Region will experience continued rapid population and employment growth. The Ontario Government forecasts that by 2031, the Region will:

Add 570,000 people, to bring our population to 1.5 million people

Add 345,000 jobs, to bring our employment to 800,000

To adequately plan for these increases, York Region faces a number of issues, including:

- Addressing the increasing burden of illness, both as a result of climate change (e.g. poor air quality, extreme weather events) and the vulnerability of our aging population
- Protecting our natural heritage and maintaining our high quality of life
- Accommodating significant population and employment growth
- Addressing traffic congestion and ensuring that there is appropriate infrastructure investment to support growth rates
- Ensuring that human services keep pace with growth
- Maintaining a vibrant economy and attracting employment.

As our climate continues to change, and our urban populations and areas grow, more people, property and infrastructure systems will be at risk, including the services the municipalities provide such as:

- Water and Wastewater Systems
- Transportation Systems
- Energy Systems
- Public Health and Health Care Systems
- Emergency Response Capabilities.

Climate Change also has implications for how we plan our communities and we deliver our services. For example, we need to look at how land use planning could minimize the risks of increased hazards from Climate Change.

Working With Our Partners

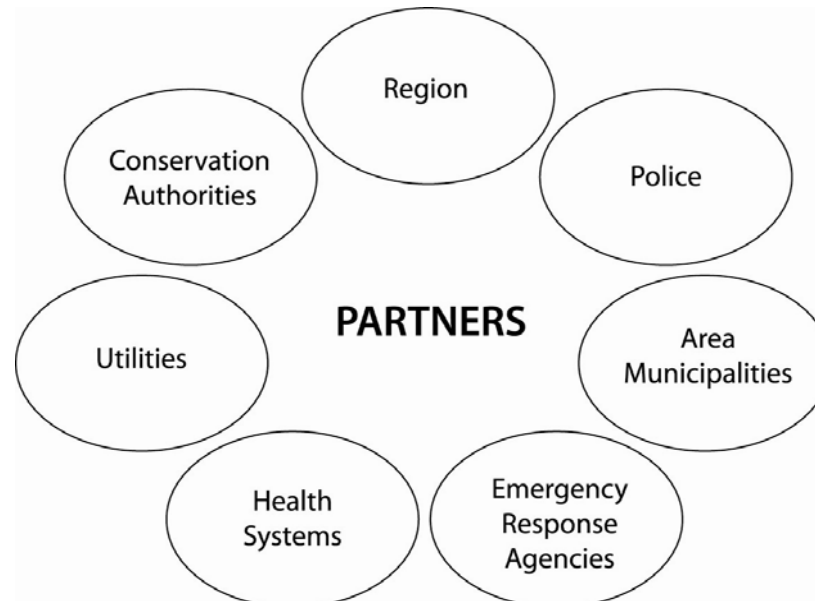
“Preparing for climate change is not a “one size fits all” process. Just as the impacts of climate change will vary from place to place, the combination of institutions and legal and political tools available to public decision-makers are unique from region to region...It is...necessary that local, regional and state government decision-makers take an active role in preparing for climate change, because it is in their jurisdictions that climate change impacts are felt and understood most clearly.”

Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments.

The Climate Impacts Group and ICLEI. 2007

York Region, along with its partner area municipalities and Conservation Authorities are involved in number initiatives that will assist in addressing our response to Climate Change.

Municipalities and Conservation Authorities in York Region currently deal with environment and climate in daily planning and management activities, including such things as flood protection, water supply and stormwater management, invasive species and disease control, such as West Nile.



Managing Risk

One way of better understanding Climate Change impacts and managing risk is to undertake a vulnerability assessment.

Vulnerability Assessment, or risk assessment, is one approach to preparing for the impacts of Climate Change by assessing the vulnerability of our built, natural and human systems. A vulnerability assessment can help us to ensure that we, along with our partners and the public, are taking the steps necessary to minimize risk and prepare people and built systems for Climate Change impacts, for example, a weather disaster. A vulnerability assessment is undertaken by gathering input from community stakeholders, historical data and experience, as well as future social, demographic, and economic conditions, as well as climate scenarios.

Vulnerability Assessment

Step 1: Engage Affected Parties

Engage and retain decision-makers and those affected by future climate change

Step 2: Assess Current Vulnerability

Use experience to assess impact and potential damage. Gather information to understand adaptive capacity, critical thresholds and coping ranges.

Step 3: Estimate Future Conditions

Use climate, environmental and socio-economic scenarios to determine future policy.

Step 4: Estimate Future Vulnerability and Identify Adaptation Strategies

Use the two previous steps (current vulnerability and future conditions) to identify future vulnerability and adaptive strategies.

Step 5: Decisions and Implement

Incorporate results into risk-management strategies and follow through with these.

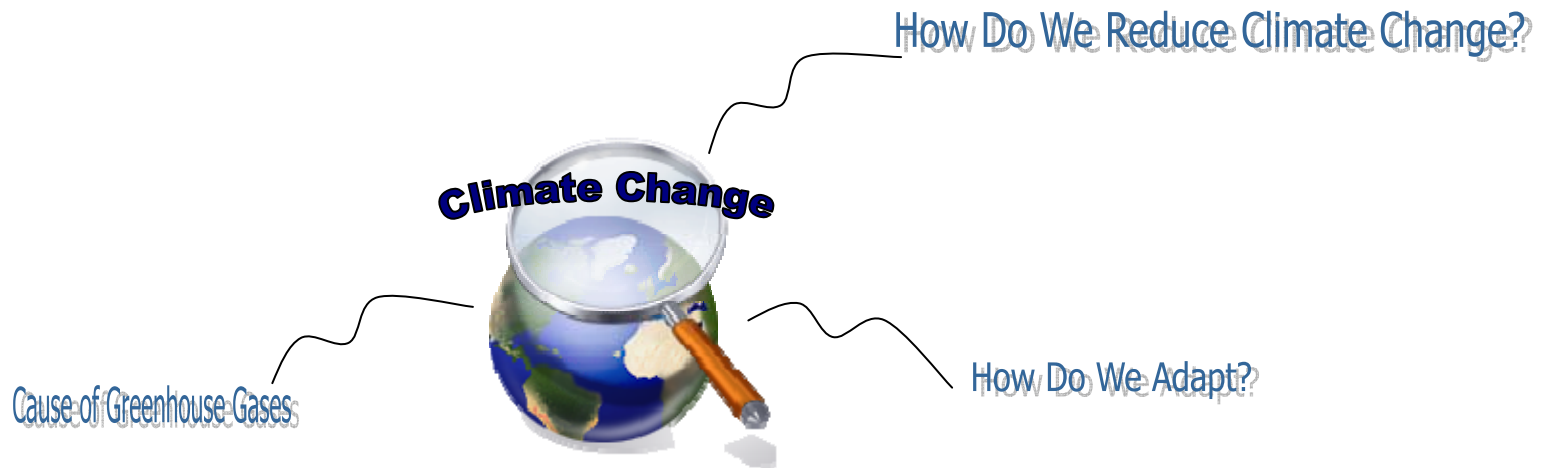
Source: Natural Resources Canada

Is the Region Doing Enough to Plan for and Adapt to Climate Change?

While the Region is doing a great deal to respond to Climate Change through mitigation, are we taking steps to adapt to and prepare ourselves for Climate Change?

How can we encourage infrastructure and community design that is more resilient to Climate Change? Using planning tools like policy, site plan control and the building permit system can help us implement new technologies and approaches for more adaptive community design. For example, these tools can be used to ensure lot level storm water infiltration.²³

Could our infrastructure handle the events that Toronto and Peterborough have experienced? What is the Region's level of vulnerability or risk to examples of Climate Change we have already seen?



Conclusion

Evidence suggests that Climate Change is a fact. Over the last 5 to 10 years storms have become more frequent and intense, summer heat waves have lasted longer, smog days have increased, and periods of drought have affected water tables and lake levels.

The effects of these storms, droughts and heat waves have affected us in a variety of ways. Many Ontario communities (including Newmarket, Peterborough and Toronto) have experienced significant physical damage, economic loss and disruption as a result of violent storms.

Climate Change will have significant impacts on human health. These include health effects from increased smog episodes, illnesses and deaths caused by heat and cold waves, water- and food-borne contamination, diseases transmitted by insects, health effects of stratospheric ozone depletion, and extreme weather events.

York Region has put a progressive and comprehensive Sustainability Strategy in place to reduce our contribution to the production of Greenhouse Gasses and pollutants. The Strategy contains over 100 actions to reduce our Ecological Footprint. The Strategy calls for a Climate Change Workshop to better understand the impacts of Climate Change on York Region and how we can adapt. In other words, how can York Region become more resilient to Climate Change?

The Workshop will explore potential impacts of Climate Change on our:

- Water and Wastewater Systems
- Transportation Systems
- Energy Systems
- Health Care Systems
- Emergency Response Capabilities.

It is hoped that discussion by our partners including our area municipalities, utilities, conservation authorities, emergency responders and regional staff will raise awareness of Climate Change Impacts.

Feedback will also help identify adaptation strategies so that we might become a more resilient Region.

Photo Credits

Cover: York Region Emergency Management.

Page 4: The Greenhouse Effect: United States Environmental Protection Agency at <http://www.epa.gov/climatechange/science/index.html>.

Page 6: York Region Emergency Management.

Page 7: Maskinonge River: YorkRegion.Com news.

Page 8: 1998 Ice Storm and Peterborough 2005 Flood photos, York Region Emergency Management. Drought: Environment Canada at <http://www.nwri.ca/threats2full/ch3-1-e.html>.

Page 9: Highland Creek Trunk Sanitary Sewer Collapse and Finch Avenue Collapse: City of Toronto at http://www.toronto.ca/involved/projects/east_highland_creek/pdf/flood_presentation.pdf.

Page 10: Ground Level ozone damage to leaf: Environment Canada at http://www.ec.gc.ca/envirozine/english/issues/39/any_questions_e.cfm. Microburst Damage to Regional Forest: York Region Emergency Management.

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