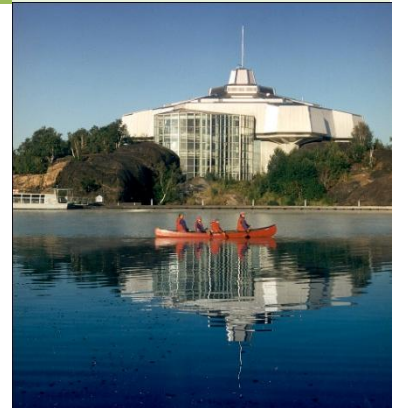
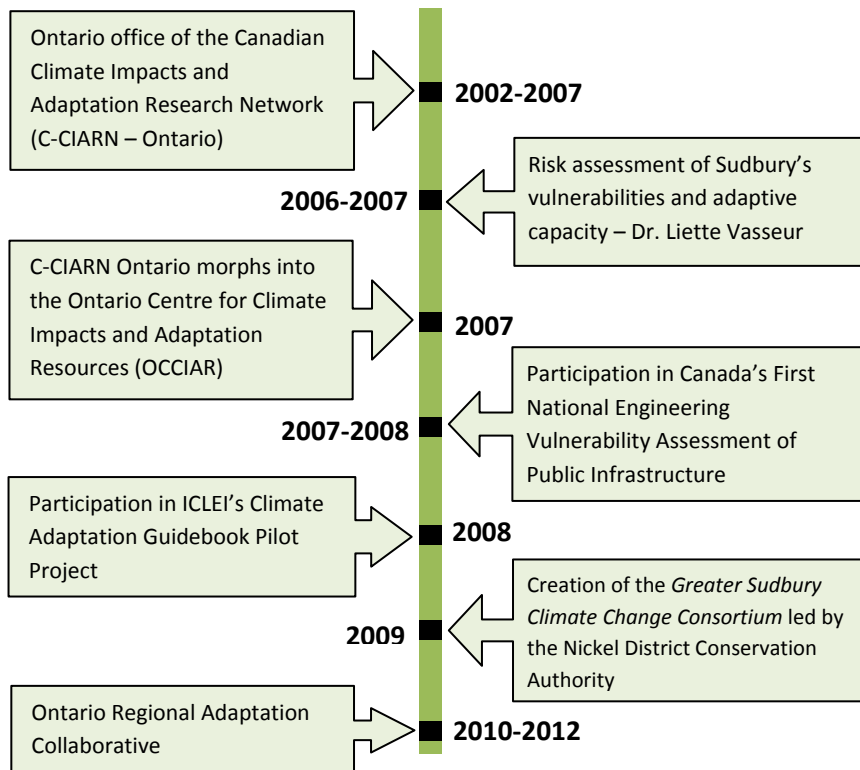


Climate Change Adaptation in the City of Greater Sudbury

The City of Greater Sudbury (CGS) is a bilingual, multicultural, and geographically varied community of 165,000 people located on the Canadian Shield approximately 400 km north of Toronto. The total area of the CGS is 3,627 km² (the largest city by land area in the province). The City’s economy has diversified markedly over the past few decades, from being a resource-based (mining) economy to also having strong commerce, science and technology research, public administration, health, education, and tourism sectors.¹

The CGS has been engaged in the topic of adaptation to climate change for the past decade. This case study highlights the major initiatives and projects that have occurred over this timeframe. It also provides information about some of the projected impacts that Sudbury will face. All of these pieces contribute to the knowledge and capacity for the City to successfully adapt to climate change.

Timeline of Sudbury’s Engagement – Major Initiatives



OCCAR
 Ontario Centre for Climate Impacts
 and Adaptation Resources
www.climateontario.ca

Climate change mitigation: Reducing the amount of greenhouse gas emissions entering/ currently in the atmosphere.

Climate change adaptation: Reducing the negative impacts of climate change and making the best of positive effects.

As a result of historic and current greenhouse gas emissions, it is necessary for communities to adapt to climate variability and change. A great deal of information about the impacts of climate change is available, in Natural Resources Canada’s 2007 assessment *From Impacts to Adaptation: Canada in a Changing Climate*.²

Projected Climate-Related Changes and Vulnerabilities for Sudbury

A science-based risk assessment is an important early step to developing and implementing adaptation actions. A 2006-2007 Natural Resources Canada (NRCAN) funded research project, led by Dr. Liette Vasseur of Laurentian University, identified the vulnerabilities and adaptive capacity of the CGS.³ These included:

- Temperatures could increase by as much as 2 °C in summer and 1 °C in winter for the period 2010-2039
- Shorter winter and longer summer seasons with close to twice as many hot days (>25 °C), and 4-6 times as many days above 30 °C compared to 1960-1990
- A slight (1%) increase in annual precipitation by 2020, with variable changes in seasonal distribution with more falling as rain and less as snow. Precipitation could increase by up to 10-15% by 2050
- Evapotranspiration rates will increase, particularly in the summer
- Water levels in Sudbury lakes may fluctuate thus impacting hydroelectricity, recreational activities, drinking water supply, the environment (e.g. wetlands, shorelines) and water quality.
- Extreme events (e.g. heat waves, tornadoes, windstorms, freezing rain) will become more frequent and intense
- Vulnerable areas include water quality and quantity, municipal infrastructure, human health especially for vulnerable populations, tourism, mining and forestry, culture (e.g. shifting range of plants such as blueberries and others traditionally used by First Nations people and other Northern Ontarians).



Flooding in Pointe au Baril, January 2008

First National Engineering Vulnerability Assessment

In 2007 and 2008, the City of Greater Sudbury was a key participant in a NRCAN and Engineers Canada study entitled “*Adapting to Climate Change – Canada’s First National Engineering Vulnerability Assessment*” (2008). The City contracted a consultant to prepare a detailed report outlining the application of the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Engineering Protocol for Climate Change Infrastructure Assessment to Greater Sudbury’s road conditions.

As part of the vulnerability assessment, a meeting was held in December 2007 in Sudbury with City staff. The participants selected key interactions to be analyzed (drainage and rainfall, road surfaces and high temps, road surfaces and snow, road surfaces (gravel) and rain, embankments/cuts and rainfall. The study concluded that Sudbury’s roads and associated structures are generally robust and there are no major vulnerabilities to climate change with the exception of some drainage infrastructure and major rainfall events.

ICLEI Climate Adaptation Guidebook

In 2008, the City of Greater Sudbury was chosen as one of three Canadian communities to participate in a pilot climate change adaptation planning process supported by ICLEI- (International Council for Local Environmental Initiatives) Canada. Along with Delta, BC and St. John’s Nfld, Sudbury’s efforts helped inform the development of a climate change adaptation guidebook for Canadian municipalities. Since this pilot, the resource has been released and is titled *‘Municipal Climate Adaptation Guide and Workbook for Canadian Municipalities.’*⁴



Adaptation-Related Actions in Sudbury

It is useful to keep in mind that communities routinely work to adapt to the current climate, although they may not think of this work as climate change adaptation per se.

“Emergency preparedness plans, sound land-use and transportation planning decisions, wildfire prevention measures, water supply diversification, and robust infrastructure design all represent efforts that bolster climate resilience. Cities, in other words, possess much of the necessary expertise, mechanisms, and tools to deal with climate change.”⁵

This is the case in Sudbury as a number of actions taken to date that will help the City manage the effects of climate change are not directly attributable to adaptation planning, but were meant to meet other goals. For example:

- The CGS adopted a policy of installing all utilities services (cable, phone, electricity) via underground wiring in new subdivisions and new roads. The cables are buried deep enough to avoid freeze-thaw cycle damage, and they are more resilient to ice or wind storms.⁶
- Through the Clean Water Act, the Nickel District Conservation Authority (NDCA) was mandated to develop a source water protection plan for the city’s municipal drinking water supply. The NDCA is developing a GIS database to locate and examine the status of groundwater resources, which could aid with future adaptation planning.⁷
- CGS Emergency Services is mapping infrastructure within the Sudbury watershed which will help identify potentially vulnerable, and critical, major infrastructure. The GIS layers will include demographic data so that it is possible to map out vulnerable populations across the City, which will also aid with emergency response planning. Emergency Services will bring forward a policy document to Council based on the information obtained by this mapping exercise regarding the protection of public infrastructure and property.

Greater Sudbury Climate Change Consortium

The Greater Sudbury Climate Change Consortium, led by the Nickel District Conservation Authority, was established and officially endorsed by the municipal council in November 2009, and subsequently by the City of Greater Sudbury's Healthy Community Cabinet. The Consortium brings together organizations in the city that have a stake in ensuring that the City of Greater Sudbury is able to adapt to climate change impacts. The Consortium will facilitate the continued assessment of the potential impacts of climate change on industry, people, municipal infrastructure, and water resources, and will determine what adaptation strategies will be needed to address these impacts in the City of Greater Sudbury and its watersheds.

The specific objectives of the Consortium include:

- Work with key stakeholders to identify the threats and risks associated with existing and anticipated changes to the local climate;
- Recommend adaptation measures to stakeholders, including municipal departments, to alleviate these risks;
- Develop an integrated climate change risk management plan for the Greater Sudbury community;
- Guide the development and distribution of a GIS-based map of local climate change vulnerabilities;
- Provide technical support to enhance adaptation projects currently underway;
- Improve communication about the local effects of climate change among stakeholders and the community at large.

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