

# SAINT JOHN

## NEW BRUNSWICK



## Adapting to Floods and Storm Surges

*"We have a three-pronged approach to climate adaptation: our climate change adaptation plan, ongoing climate vulnerability assessments of municipal infrastructure, and resiliency studies of the city's energy infrastructure. All of these are integrated". Samir Yammine, Asset and Energy Management, City of Saint John*

### Introduction to the Local Government

Saint John, with just under 71,000 inhabitants, lies on the Bay of Fundy in the Kennebecasis Valley at the mouth of the Saint John River in New Brunswick. Due to its geographic location and topography, Saint John is particularly susceptible to the impacts of climate change, such as sea level rise and riverine flooding. The combination of high tides and storm surges, which are expected to increase, result in significant climate-related hazards.

### Significant climate-related events and impacts

Saint John experienced historic spring freshet flooding in 2018 and 2019 resulting in evacuations, damage to nearly 150 homes and approximately \$1M in flood claims submitted over both events. City infrastructure, including wastewater pumping stations, storm sewer systems and roads were significantly impacted by the two floods.

Moreover, significant storm surges, often the result of hurricanes traveling up the east coast, have caused extensive coastal erosion within the municipality, an issue that has been ongoing since the 1990s. While relocation is often the best

option in affected areas, very few homeowners have chosen to move elsewhere, opting instead to adapt to the risks.

Overland flooding in winter months is also on the increase as snow events are increasingly replaced with freezing rain and ice storms, as winter air temperatures rise.



Rendering of the future Paradise Row Substation in Saint John, NB.

### Developing a Climate Adaptation Plan

*"We have been conducting risk assessments for some time already, but we were able to formalize our efforts once such assessments became a priority for the provincial government and resources were committed." Mike Carr, Saint John Deputy Fire Chief and Emergency Management Operations, City of Saint John*

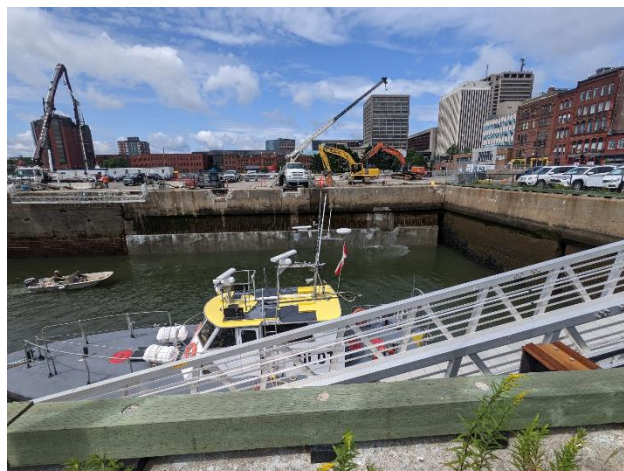
Many potential climate change hazards have been identified, yet the municipality wanted to be proactive by incorporating climate risk into development projects and by establishing an adaptation plan. To accomplish this, in 2018, the city partnered with Atlantic Coastal Action Program – Saint John (ACAP) to develop an adaptation plan. The timing was ideal since the provincial government was promoting climate adaptation plans for coastal communities. The Climate Change Adaptation Plan for Saint John (the Plan) was approved by council in 2020.

**“We used the ICLEI Building Adaptive and Resilient Communities (BARC) program to frame Saint John’s adaptation plan and to identify hazards by sector. It’s an excellent program to help municipalities respond to climate change.”** Bailey Brogan, Climate Change Coordinator, ACAP-Saint John

Once climate change hazards were identified, ACAP held public information sessions to solicit citizen input on areas at risk and provide feedback on hazards, via an online mapping tool, [Maptionnaire](#). Moreover, a steering committee comprised of municipal departments, community organizations and citizens was established to provide ongoing feedback on the Plan.

The recommended adaptation actions were derived from ACAP’s vulnerability and risk assessments for different municipal sectors and climate events. The vulnerability assessment was conducted by combining sensitivity and adaptive capacity ratings in a matrix. Risk ratings were calculated as a product of the climate event probability and the event consequence. High to medium risk ratings were determined for land and habitat loss due to sea level rise, for higher spring freshet flooding and for community isolation due to increased precipitation.

For the concurrent risk assessment for municipal infrastructure, the [PIEVC](#) engineering protocol was applied to different asset groups to determine risk mitigation and adaptation strategies. The protocol reviews historical climate information and predicts future climate changes and events. A similar methodology will be developed in-house to assess individual assets.



*Refacing of part of the seawall in Saint John, NB*

### **Climate data utilized**

Provincial climate and sea level rise data were used, and climate and meteorological expertise was provided by external scientists. This information was fed into a Geographic Information System (GIS) system in addition to data from the [Atlantic Climate Adaptation Solutions Association](#) (ACASA), the [Climate Atlas of Canada](#) and the [National Oceanic and Atmospheric Administration](#) (NOAA). The provincial government has been developing flood hazard maps for coastal areas and has started this process for inland regions as well. ACAP Saint John also helped to identify areas at risk from flooding, using wet areas mapping (LiDAR-DEM based Surface Water Scenario Evaluations).

### **Key objectives identified in the Plan**

The *Climate Change Adaptation Plan for Saint John* identifies eight key objectives for action:

1. Integrate climate change impacts into community planning
2. Reduce shoreline erosion and promote natural infrastructure
3. Protect natural spaces, local habitats and migration routes
4. Provide public education on how to deal with climate change impacts
5. Reduce the impact of climate change on human health
6. Support vulnerable groups to increase adaptive capacity
7. Increase resilience to flooding and sea level rise
8. Increase resilience to extreme weather

### **Adaptation actions implemented to date and ongoing**

- The seawall by the waterfront is currently being refurbished and raised by two metres.
- Numerous waterfront development changes have been implemented.
- Work is underway to raise and retrofit over 10 water pumping stations along the Saint John River.
- An electric substation has been relocated further inland.
- Planning is underway to upgrade the municipal plan to incorporate the recommendations from the climate change adaptation plan.
- New developments and infrastructure must now consider climate change risks
- Work is underway to conduct a climate change vulnerability assessment on city infrastructure.

The City of Saint John faced the following challenges in developing its Plan.

- Isolated communities need more consideration given the likelihood that they could be cut off in a flood event.
- Adaptation for the most vulnerable, the poor and the elderly, needs to be addressed.
- Public engagement is always a challenge and requires a host of different channels.

*“As long as we are on the climate change bandwagon, funding is easy; however, this could change quickly and then the momentum for mitigation and adaptation will be lost.” Mike Carr*

### **Opportunities and challenges in developing a Climate Change Adaptation**

The City of Saint John faced a number of opportunities in developing its *Climate Change Adaptation Plan*.

The development of the *Plan* allowed for significant collaboration between municipal departments, community organizations and citizens, which led to increased climate change and energy awareness, as well as more community capacity. As a result, the Plan included a range of perspectives from different stakeholders. The collaboration has allowed for further projects such as a coastal erosion survey.

*“The adaptation plan has led to the establishment of an emergency management committee, which is using a community level approach for developments, land use planning and future hazards.” Mike Carr*



### Looking for more great resources?

Check out [ChangingClimate.ca](https://www.changingclimate.ca), your one-stop-shop for examples of climate change impacts and examples of adaptation actions from across Canada.

### Need climate data to support your adaptation actions?

Visit [ClimateData.ca](https://www.climate-data.ca) to access historical and future climate data, custom analysis tools, training materials, and much more.

