TOWN OF SAINT ANDREWS
W. C. O'NEILL ARENA COMPLEX VIC
SPECIAL COUNCIL MEETING
March 25, 2019 at 7:00 PM
MINUTES

RECORDING OF ATTENDANCE
A Special Meeting of the Town of Saint Andrews Council was held on March 25, 2019, at 6:30 PM at the W. C. O'Neill Arena Complex in the Visitor Information Centre. The following members were present: Mayor Doug Naish, Chair, Deputy Mayor Brad Henderson, Councillors Kate Akagi and Kurt Gumushel. Staff also present, Chris Spear, Acting Clerk, and Terry Acton, Acting Deputy Clerk, and Alexander Henderson, Planning Director, Xander Gopen, Assistant Planner from Southwest NB Service Commission.

Absent: Councillors Edie Bishop and Andrew Harrison
Arrived Late (6:34PM): Councillor Guy Groulx

APPROVAL OF AGENDA

Motion 70 – 03/19
It was moved by Deputy Mayor Henderson, seconded by Councillor Akagi and carried that the Agenda be approved as presented. **Carried**

DISCLOSURE OF CONFLICT OF INTEREST
None

PRESENTATIONS
Briana Cowie, Climate Change Program Coordinator, Eastern Charlotte Waterways Inc. presented an update of the Saint Andrews Adaptation Plan -Community Based Climate Adaptation Plan.

COMMUNICATIONS

INTRODUCTION, CONSIDERATION AND PASSING OF BY-LAWS AND MOTIONS

Public Safety – Councillor Groulx

PS190201 Saint Andrews Adaptation Plan – Community Based Climate

Motion 71– 03/19
It was moved by Councillor Groulx, seconded by Councillor Akagi that Council accepts the "*2019 Saint Andrews Adaptation Plan- Community Based Climate Adaptation Plan*".

Attached as *Schedule "A"* **Carried**

QUESTION PERIOD

REVIEW OF COUNCIL REGISTERS

ADJOURNMENT

Motion 72 – 03/19
At 7:05 PM, it was moved by Councillor Akagi, seconded by Deputy Mayor Henderson and carried that the meeting be adjourned. **Carried**

Doug Naish, Mayor **Chris Spear, Acting-Clerk**

Schedule "A"

THE TOWN OF SAINT ANDREWS 2019+

Saint Andrews Adaptation Plan

Community Based Climate Adaptation Plan

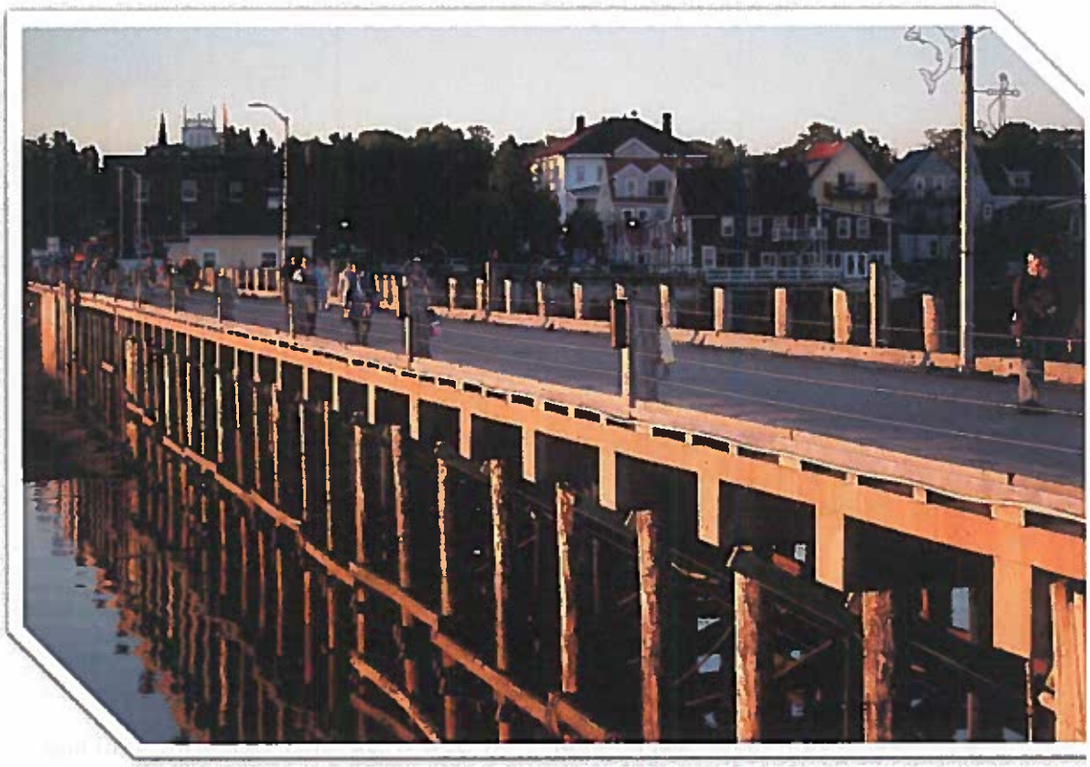


Photo Credit: Chamber of Commerce, Saint Andrews

Disclaimer: The following document is a climate change adaptation plan for the Town of Saint Andrews. It is important to note the contents of this document are for informational purposes only. This plan was prepared for the use of the Town of Saint Andrews, NB municipality to adapt against climate change. The Town is not to be held liable for any loss, direct or indirect, that may arise or occur as a result of the use of this plan in any other ways.

Prepared by:
Eastern Charlotte Waterways Inc.
881 Main Street,
Blacks Harbour, NB E5H 1E5
Tel: (506) 456-6001
Email: info@ecwinc.org

Eastern Charlotte WATERWAYS

New Nouveau Brunswick

Your Environmental Trust Fund at Work

This project was prepared with the support of the New Brunswick Environmental Trust Fund.

Executive Summary

The Town of Saint Andrews, New Brunswick is considered one of the most vulnerable areas to climate change impacts due to its location as a coastal community positioned on the Passamoquoddy Bay and at the tip of the St. Croix River. The area and community is exposed to rising sea-levels, the increase in intensity and frequency of severe storm surge events and flooding. Recognizing these vulnerabilities and risks, the Town of Saint Andrews has proactively taken a series of actions to begin to prepare and adapt against these climate risks. Using strategic planning, internal and external knowledge sources and experts as well as active community engagement, the Town of Saint Andrews works hard to build a resilient community to climate change.

Previous work includes a vulnerability and risk assessment to identify vulnerable infrastructure and assets, an emergency response plan and presently, an asset management plan in addition to ongoing updates to the municipal plan that accounts for climate change and climate adaptation actions. The Town continues to integrate climate scenario considerations into all policy, planning and project guidelines and decision-making processes.

The next phase of this integration requires a comprehensive, informed climate adaptation plan that understands climate risks, climate change impacts, drivers and constraints and necessary steps to adapt against climate change. Navigating the realities of climate change impacts requires municipalities to understand the unique interconnected nature of both their community and the changing climate. As such, the following plan works to include social, economic, environmental and institutional considerations into climate change adaptation planning and guidelines. In addition to proposing specific adaptation projects, policy recommendations are used to help inform municipal government decision making processes. Understanding that municipal governemnts are oftentimes constrained in resources, financial and otherwise, this plan also aims to provide possible implementation tools and mechanisms to overcome adaptation barriers and constraints and to encourage positive political decision making and rigorous public engagment and consultation.

This plan was informed by a multitude of different actors, stakeholders and members of the community. In addition to a Climate Change Technical Advisory Committee, comprised of town staff members, regional service commission planners and well-informed community members, other expertise was sought to inform the project proposals. For instance, we networked with other municipalities and regional service commissions to understand what approaches are currently working, which need modifications and which ones are applauded by both municipal government and community members. At times, this required collaboration with other municipal governments and experts in the field outside of New Brunswick.

The essence of this plan depends upon the active community engagement to ensure that the concerns and desires of the residents of Saint Andrews are properly represented to the municipality.

Table of Contents

Glossary

Adaptation: adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderate harm or exploit beneficial opportunities. Several types of adaptation can be distinguished, including anticipatory (before an event) and institutional (after an event) adaptation.

Adaptive Capacity: The whole of capabilities, resources and institutions of a country, region, community or group to implement effective adaptation measures.

Baseline: the baseline (or reference) is the state against which the change is measured. It might be a 'current baseline' in which case it represents present-day conditions. IT might also be a 'future baseline' which is a projected future set of conditions excluding the driving factor of interest. (Canadian Institute of Planners)

Climate Change: United Nations Framework Convention on Climate Change (UNFCCC) 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." The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes. (NRCAN)

Climate Scenario: A plausible and often simplified representation of the future climate, based on an internally consistent set of climatological relationships and assumptions of radiative forcing, typically constructed for explicit use as input to climate change impact models. A 'climate change scenario' is the difference between a climate scenario and the current climate. (NRCAN)

Community Based Adaptation: Community-based adaption focuses attention on empowering and promoting the adaptive capacity of communities. It is a proactive problem living and forward-looking approach that takes contexts, culture, knowledge, agency, preferences, and particularities of communities and their members as strengths. (Canadian Institute of Planners)

Constructed Wetlands: restored or manmade wetlands.

Emergency Preparedness: The management of emergencies concerning all hazards (natural and human-induced), including all activities and risk management measures related to prevention and mitigation, preparedness, response and recovery. Mitigation in this context refers to sustained actions taken to eliminate or reduce risks and impacts posed by hazards well before an emergency or disaster occurs, and is generally synonymous with 'adaptation' in a climate change context. (Natural Resources Canada)

Flood Scenarios: are based on projected sea levels and storm events that may impact a given area. They are generally outlined in "likelihood" of the event occurring. For example, a 1 in 10-year storm event is likely to happen once every 10 years, or each year there is a 10% chance of it happening. (NRCAN)

Green/living shorelines: use vegetation and natural materials to reduce negative impacts on nearshore habitat for plants, fish, and wildlife while protecting property. (NRCAN)

Green Space: 'any vegetated areas of land or water within or adjoining an urban area.' (Forest Research Centre)

Higher high-water large tide (HHWLT): The average of the highest high tide waters, one from each of the 19 years of predictions.

Impacts: The term "impacts" is used primarily to refer to the effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health status, ecosystems, economic, social, and cultural assets, services (including environmental), and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period, and the vulnerability of an exposed society or system. Impacts are also referred to as consequences and outcomes. The impacts of climate change on geophysical systems, including floods, droughts, and sea level rise, are a subset of impacts called physical impacts. (Canadian Institute of Planners)

Impact assessments: (for climate change) The practice of identifying and evaluating, in monetary and/or non-monetary terms, the effects of climate change on natural and human systems.

Managed Retreat: Refers to the relocation of important infrastructure or assets in flood prone zones to areas that are not directly impacted by in-land flooding or sea level rise.

Mitigation: The longer-term cousin of climate adaptation. Mitigation is a type of intervention used to reduce the anthropogenic forces of the climate system; it includes strategies and measures to reduce greenhouse gas sources and emissions including the use of 'sinks', which are natural features that absorb carbon such as forests. Planners address mitigation through intensification, active transportation, promoting public transit, encouraging the use of renewable energy, and reducing fossil fuel use with vehicle traffic. (CIP)

Municipal Plan: a planning document that accounts for a municipality strategic vision in areas relating to economic, social, environment, etc. growth and vibrancy.

Natural Asset Management: The value of natural assets increased considerably due to their resiliency and adaptability under climate change and intensified development scenarios. (MNAI)

Natural grade: the elevation of the land prior to any development occurring

Rain Gardens: a garden of native shrubs, perennials, and flowers planted in a small depression, which is generally formed on a natural slope.

Resilience Building: The ability of a social or ecological system, community, or society exposed to hazards to resist, absorb, accommodate, and recover from the effects of a hazard and/or disturbance in a timely and efficient manner, while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change, including through the preservation and restoration of its essential basic structures and functions. (CIP)

Sea-level rise: An increase in the mean level of the ocean. Eustatic sea-level rise is a change in global average sea level brought about by an increase in the volume of the world ocean. Relative sea-level rise occurs where there is a local increase in the level of the ocean relative to the land, which might be due to ocean rise and/or land-level subsidence. In areas subject to rapid land-level uplift, relative sea level can fall. (NRCAN)

Storm Surge: A storm surge is an abnormal rise of water generated by a storm.

Storm water management: provides a drainage system that carries rain and other sources of water away from municipal infrastructure and private property. The service involves inspection, preventive maintenance and repair of drainage systems.

Mayor and Council Commitments (MARCH 4th, 2019)

Acknowledgements

Eastern Charlotte Waterways Inc. would like to thank the New Brunswick Environmental Trust Fund (ETF) and the Town of Saint Andrews, who help to fund this climate change adaptation plan. We are also grateful for the contributions made by Mr. Réal Daigle (sea-level rise maps), the Southwest New Brunswick Service Commission (SNBSC), the Town of Saint Andrews municipal staff and members as well as the Climate Change Technical Advisory committee and members of the public who assisted and contributed to this community-based adaptation plan.

Background Information: The Town of Saint Andrews

Saint Andrews is located adjacent to the estuary, at the mouth of the St. Croix River on the tip of a peninsula that projects into Passamaquoddy Bay and includes Navy Island (Province of New Brunswick, 2015). Saint Andrews was founded by United Empire loyalists in 1783 and is well-preserved with many of the original buildings still standing. In 1998, Saint Andrews was designated as a National Historic Site (Town of Saint Andrews, 2010). The town was incorporated in 1903 and served as a seaport, port of entry, and the terminus of the Canadian Pacific Railway (Province of New Brunswick, 2015). Saint Andrews hosts three long-term operations that influence the local socioeconomic system. The Saint Andrews Biological Station (SABS) was permanently established in 1908. The biological station scientists have gained national and international recognition for their pioneering research and industry participation. The Huntsman Marine Science Centre (HMSC) was established by a consortium of 20 universities and several government departments in 1969. The HMSC was developed to become a 'cooperative venture in learning' and still thrives within the community. The Algonquin Hotel, currently with 233 guest rooms, was built in 1889, and has a long-standing history as a top coastal resort. New institutions such as a whale watching industry, Ministers Island as a tourist destination, and the Kingsbrae Gardens, one of the top 10 horticultural attractions in Canada, are also vital parts of the community (Town of Saint Andrews, 2010). In 2016, Statistics Canada reported a population size of approximately 1,500 residents (Statistics Canada, 2016).

The Town of Saint Andrews has been impacted by heavy rainfall and storm surge events in recent years. On February 8th, 2008, a storm surge event was accompanied by approximately 150 mm of rain in a four-hour time period and caused localized flooding and coastal inundation. On November 5th, 2010 strong winds, an extreme high tide, and 45 mm of rain caused a storm surge which inundated the coastal homes on Patrick Street. Coastal roads were temporarily closed due to the debris and the storm surged damaged the seawall and the town's wharf. The December 2010 and July 2013 heavy rainfall events flooded basements in the Town of Saint Andrews, but roads were not heavily impacted (Signer et al, 2014).

Over the last five years, the Town of Saint Andrews has made some steps toward adapting to the changing climate. Examples include the creation of a storm water management plan, storm water infrastructure upgrades throughout town, town meetings, information and newsletters and an incorporation of climate change into asset management and future municipal plans. The following plan is informed by a number of important municipal and provincial planning documents including comparative case studies of other adaptation plans, the Saint Andrews 2020 Municipal Plan, the General Operating Budget for 2019, the Five-Year Capital Budget and the New Brunswick provincial policies surrounding

climate change adaptation planning in New Brunswick. This plan was also informed by the expertise of the Climate Change Technical Advisory Committee as well as a large number of community members through several on the ground and online public engagement events.

Climate Adaptation Planning Process:

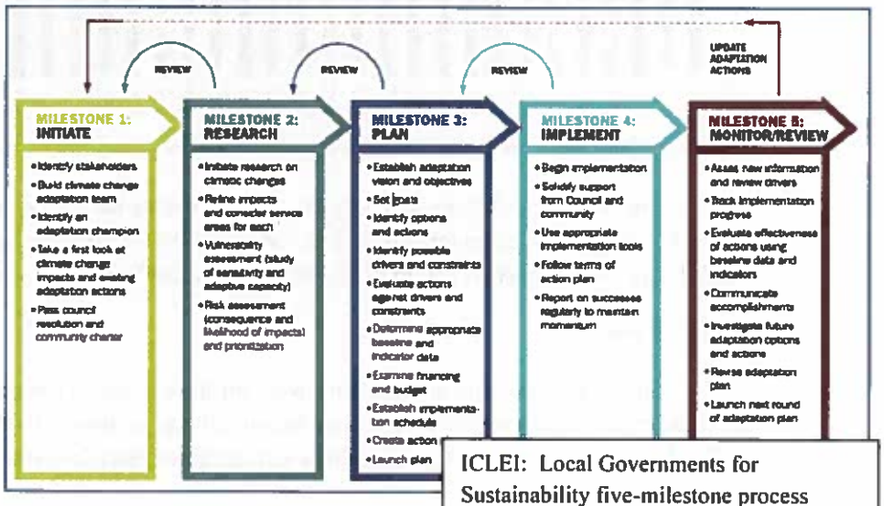
Climate change adaptation planning is a multi-step process that requires ample stakeholder engagement, identification of climate risks and prioritization of adaptive actions. Following the ICLEI: Local Governments for Sustainability five-step milestone process, this plan is a product of milestone three.

> 'An adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderate harm or exploit beneficial opportunities. Several types of adaptation can be distinguished, including anticipatory (before an event) and institutional (after an event) adaptation."
>
> - IPCC definition of climate change adaptation

Several key steps occurred prior to the creation of an adaptation plan. In 2014/2015, a risk and vulnerability assessment were conducted as a foundational base to the planning process. This produced a number of critical pieces of information including community areas of concern, vulnerable infrastructure and assets, relevant stakeholders, relevant climate risks and subsequent impacts as well as obtaining council ratification and community support.

From this information, the third milestone in the process results in a primary output of a finalized Local Adaptation Plan. The Local Adaptation Plan is comprised of a local municipal and community vision, setting adaptation goals and objectives and identifying adaptation options. These options are identified by the Climate Change Technical Advisory Committee prior to being refined and prioritized. Once the adaptation actions are prioritized, the results are presented to the public for community feedback and engagement. An examination of possible constraints and drivers to these various actions will be included in the plan.

The final adaptation plan provides the municipality with a guideline to implementation and monitoring including policy recommendations, project proposals and adaptive action items. These action items were informed by meaningful public engagement and subsequently presented to Council to be ratified prior to implementation.



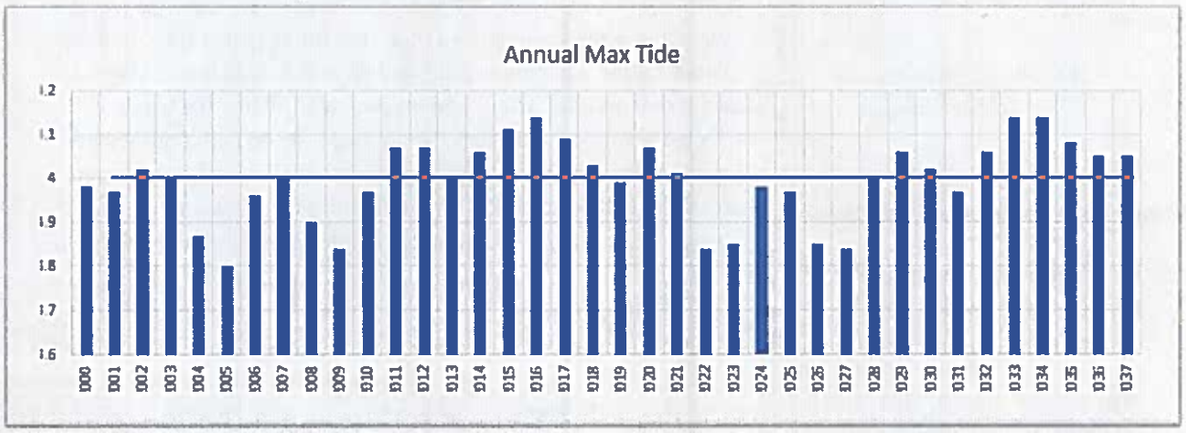
ICLEI: Local Governments for Sustainability five-milestone process

Climate Risks and Impacts: A Local Context

The adaptation plan provides six impact maps to be used as guiding documents for any future development, by-laws and planning initiatives undertaken in the Town of Saint Andrews. These maps must be updated alongside future climate science, provincial releases of LiDAR data (2020) and other research relevant to the area of understanding.

Using International Panel on Climate Change (IPCC) AR5 data, LiDAR elevation variations (2014 LiDAR data) and projected climate events, these maps depict the future, potential water rise in Saint Andrews coastal zones. Over a typical 19-year tide cycle, which was calculated using the J-Tides program (https://arachnoid.com/JTides/) the average Higher High Water Level Tide (HHWLT) was computed to be a 4m sea level baseline (using CGVD28 geodetic data). Using that data, in addition to projected sea-level rise from the IPCC reports and an additional 65 cm accounting for the externality of the Antarctic ice shelf melting at a rapid pace, the maps produced show typical sea-level rise at a HHWLT in addition to possible storm surges that accompany a HHWLT. The maps also demonstrate water depth at certain points in town as the water encroaches on the land space. These numbers will help to understand the exact water levels, both vertical and in depth, for future planning in areas relating to future land development and flood proofing regulations.

Annual Maximum Tide for Saint Andrews:



This chart depicts two complete 19-year tide cycles for the Town of Saint Andrews from 2000 to 2037. The baseline average for HHWLT is 4 m (in CGVD28 geodetic data). This translates to an average HHWLT of 7.85 m in chart datum (CD), data used by Environment Canada.

Sea-level rise

Sea levels are rising in New Brunswick for three reasons: melting terrestrial ice caps, ice sheets and glaciers are increasing water levels in oceans, a large portion of the Maritimes are sinking due to falling land levels and sea water expands as temperatures rise (Government of New Brunswick, 2015).

Reports released by Daigle (2017) contain updated sea level rise projections for coastal communities in Charlotte County, including the Town of Saint Andrews. In general, sea level in these areas are expected to rise by one metre between 2018 and 2100, resulting in frequent coastal flooding that encroaches upon waterfront land and infrastructures. These changes will re-shape the social, economic and structural circumstances of Saint Andrews.

Anticipated Changes in Relative Sea-Level (M)

Location	Global sea-level rise (2100)	Vertical motion (2100)	Total change (2025)	Total change (2055)	Total change (2085)	Total change (2100)
Saint Andrews	0.88 +/- 0.24	0.00+/-0.05	0.13+/-0.03	0.35+/-0.11	0.65+/-0.21	0.88+/-0.29

Changing ocean waters

In recent years, the Bay of Fundy has been one of the fastest-warming marine environments in the world and climate change models project average sea surface temperatures in this area to increase by an additional 3 degrees Celsius by 2065 (Perishing et al., 2015). This warming may lead to substantial changes in coastal ecosystems, affecting species of vital social, economic and environmental value, that inhabit these areas. Warming coastal waters can cause temperature-sensitive species such as lobster to shift and move northward. Invasive species, such as the green crab, that require warmer waters to survive, may now be in a position to move into local waters and compete with native species.

One of the more severe impacts of climate change relates to ocean acidification. An increase in warmer waters and rainfall events lead to greater possibilities of severely acidic water. A more acidic ocean would adversely affect the health of marine species sensitive to lower pH levels such as shellfish.

Increase in intensity and frequency of storm events

Warming temperatures, especially those in the ocean water temperatures, result in stronger and more frequent storm events such as hurricanes and tropical storms. These stronger storm events can increase the likelihood of damages to waterfront property and infrastructure, negatively impact coastal ecosystems and impact the energy grid by resulting in greater power outages.

Storm Surge Event on Patrick Street
Photo credit to: Chamber of Commerce

On November 5th, 2010, the Town of Saint Andrews experienced strong winds accompanied by an extreme high tide and 45 mm of rainfall. This caused a storm surge which inundated coastal homes on Patrick Street (Signer et al., 2014). Several roads were temporarily closed as debris was left behind

when the waves encroached the armoured stone. The storm also caused damages to the seawall and the town's wharf.

Flooding:

Increased precipitation and/or large amounts of snowfall melting at rapid paces can create major in-land flooding incidents in New Brunswick. Coastal flooding is a reality of coastal communities like Saint Andrews which can be caused by unusually high tides or storm surges. The areas and land close to river inlets and saltwater basins can be at particular risk of flooding due to marine tides, storm surges and high river flows which can act independently or simultaneously in extreme weather events.

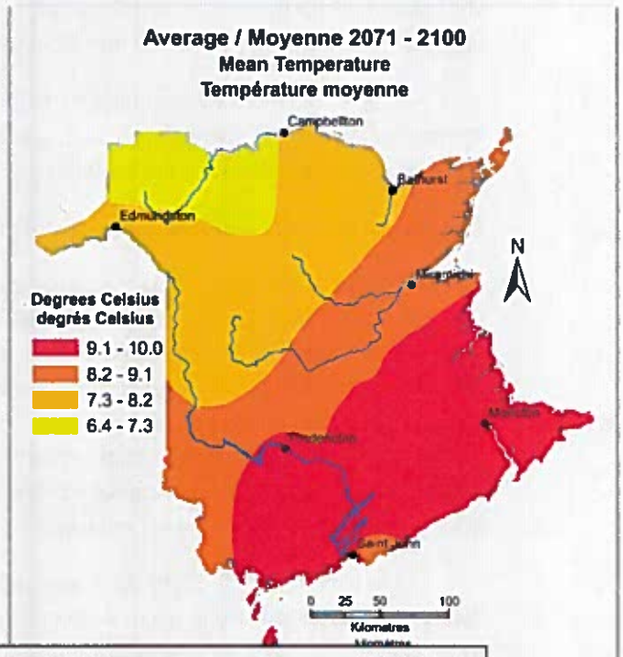
Increased precipitation:

Many New Brunswick communities are already experiencing more extreme rainfall events, defined as 50 mm or more of rain over a 24-hour period. These events are predominantly large rainfall events during the summer to early winter.

The increase in the number of these events are consistent with climate model predictions. Models predict that New Brunswick will experience less frequent but more intense precipitation events, increasing the annual total precipitation throughout the province (ACASA, 2013). This expected increase in precipitation will cause road wash-outs, more frequent flooding in low-lying areas, increased soil erosion and water contamination due to events such as overflowing of municipal waste treatment systems. It is important to note that although overall precipitation is projected to increase, variability of such events can also lead to extended dry periods and even droughts.

Temperature rise

Average annual temperatures in New Brunswick have already increased by 1.5 degrees Celsius over the last one hundred years, with most of this warming, 1.1 degrees Celsius taking place over the next thirty years. (Government of New Brunswick, 2015). In New Brunswick, climate models predict that by the end of the century New Brunswick's average temperatures will increase by 3 to 3.5 degrees Celsius (ACASA, 2013). This temperature increase will continue in all parts of the province which will result in longer and warmer summers and a shorter winter season. As the temperatures continue to increase, Saint Andrews will experience an increase in frequency of days above 30 degrees Celsius.



ACASA Map (2013) depicts temperature rise from 2071-2100 in New Brunswick

Projected Climate Impacts to the Town of Saint Andrews

The following are some examples of possible future impacted areas to climate risks in the Town of Saint Andrews. In order to properly prepare and adapt to future climate change impacts, it is vital that the Town considers the interconnections between socioeconomic impacts, infrastructure impacts, environmental impacts and climate change risks.

Social

- Recreational values and ties to community gathering points
- Culturally significant areas
- Importance of social cohesion
- Social fabric of community markets, festivals and community events
- Music festivals such as Paddle fest
- Community demographics and an aging population (vulnerable community members)
- Public health and accessibility of services
- Disruption to schools, NBCC and educational services

Economic

- Tourism industry – Water Street, Eco-tourism such as whale-watching, sea-kayaking, etc.
- Infrastructure costs and maintenance (projected capital costs on 5-year budget)
- Employment industry and job sector
- Disruption costs associated to major storm events and the ability to perform town services and provide to community members
- Disruption costs associated to the tourism industry in the event of major storms due to inaccessible roads, flooding, etc.
- Costs associated to potential saltwater or otherwise contamination of water sources
- Maintenance and repair costs to residential property owners (damages from flooding, insurance costs, etc.)
- Economic value of property ownership along the coastline (resale value)
- Town of Saint Andrews reputation as a tourism resort destination

Environmental

- Biodiversity loss and habitat degradation
- Invasive plants and invasive species
- Increase in the number of ticks and the potential for Lyme disease
- Changes to the ocean acidity
- Changes to lake, watershed water levels (i.e.: Chamcook)
- Changes to the scenic, aesthetic beauty of the land

Institutional:

- Disruption to the ability to perform town services
- Disjointed decision making due to level of risk

Vulnerability and Risk Assessment(s):

Areas of concern

In the Charlotte Country Vulnerability Assessment, several key areas of concern were highlighted. In the case of Saint Andrews, a series of public meetings helped to identify critical pieces of infrastructure, town assets and community areas at risk to climate change. These areas included Market Square and the Wharf, Indian Point and Patrick Street as vulnerable infrastructure.

Concerns over the drinking water quality and the economic dependency on the tourism industry were also expressed.

Public Engagement and Consultation:

The Saint Andrews Climate Adaptation Plan had a comprehensive public and community engagement strategy. Using a multi-pronged approach, we worked to ensure that community members were included in the adaptation planning process. The feedback on adaptive action items were collected at various public engagement events as well as online through a questionnaire that outlined climate risks, vulnerable assets, areas of concerns and associated adaptive action recommendations. The main objective was to obtain meaningful data collection from the public to present to municipal council and inform future government policy and decision making processes. Meaningful, accessible and inclusive public engagement is a critical step in effective adaptation planning.

Saint Andrews Farmers Market – September to October 2018

We attended three Saint Andrews Farmers Market events in September and October of 2018. These events served as a preliminary public forum to interact with community members concerning climate change impacts to the Town of Saint Andrews. Using wet-area flood maps, sea-level rise maps and storm surge maps to depict the potential climate change impacts for the town in the next 100 years, we interacted with community members to demonstrate the realities of climate change in the coastal community.

Saint Andrews Climate Change Steering Committee – November 15th, November 26th, 2018 and February 12th, 2019

The Climate Change Steering Committee was formed in fall of 2018 through a collaboration between the Town of Saint Andrews and Eastern Charlotte Waterways Inc. The Steering Committee is comprised of individuals from varying disciplines and backgrounds to ensure that the process remained inclusive yet diverse in the level of expertise and contribution. The Climate Change Steering Committee consisted of six members and met for a total of two times in November of 2018. Members included representatives from the Town of Saint Andrews, the New Brunswick Southwestern Regional Service Commission and active community members. The Climate Change Steering Committee serves several uniquely significant purposes for climate change adaptation and planning in the area.

The steering committee initially had several core functions including:

1. Identify the community's vision, mission statement, goals and objectives
2. Identify the community priority and need
3. Assess the quantity of resources available and recruit potential partners
4. Prepare a draft list of potential short, medium and long-term actions.
5. Upon completion of the local adaptation plan, the steering committee will also be responsible for providing oversight and further direction on the implementation of the adaptation plan

Climate Change Technical Advisory Committee 2018/2019
Chief Administrative Office, Town Staff
Asset Manager, Town Staff
Planner, Southwestern Regional Service Commission
Community Member
Community Member
Climate Change Program Manager, ECW

The initial steering committee meeting on November 15th, 2018 introduced the climate change adaptation planning process in the context of Saint Andrews. The steering committee terms of reference and participants were confirmed and climate risks, including events and vulnerable infrastructure, were introduced. The initial conversations revolved around areas of main concern in town including infrastructure at Indian Point, Market Square and the Wharf and the Town's drinking water supply. The first meeting also helped to define the community vision and strategic foresight for the plan.

The second steering committee produced a refined list of climate risks, areas of concern and potential adaptive action items. The five selected climate topics informed the public engagement events by selecting three vulnerable infrastructure assets, Indian Point, Patrick Street and Market Square and the Wharf. The drinking water source through Chamcook and the importance of community planning were also highlighted as key climate topics. At the second steering committee, potential adaptive action items as they relate to vulnerable infrastructure, drinking water and community preparedness in regards to emergency response, communication strategies and community participation in the climate adaptation planning process. This steering committee meeting also included a presentation from the Municipal Natural Asset Initiative (MNAI), a national group dedicated to enhancing natural, green infrastructure, to introduce the importance of maintaining and promoting natural infrastructure as a potential adaptation item to climate change.

The meeting agendas and meeting minutes are attached as appendixes to this plan.

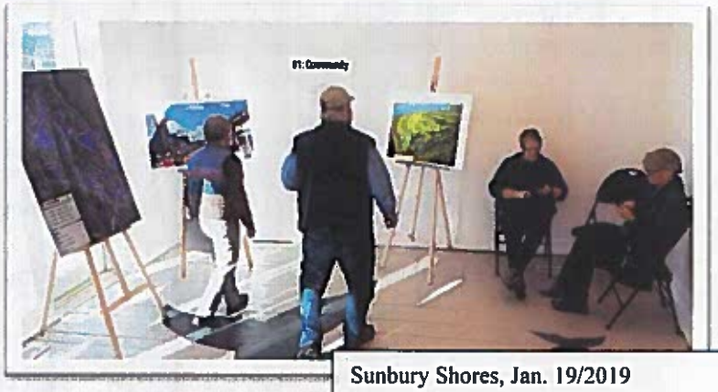
The final steering committee meeting occurred on February 12th as an opportunity to receive committee feedback on the community-based adaptation plan. The feedback from that meeting is included in the final copy of the plan.

Municipal Plan 2020 World Café – November 24th, 2018

Working in partnership with the Southwest Regional Service Commission, Eastern Charlotte Waterways Inc. attended the World Café for the Saint Andrews 2020 Municipal Plan to represent the portion of the plan involving the environment and climate change adaptation. The Climate Adaptation Plan will help to inform the pending Municipal Plan therefore it was a relevant connection. Approximately 40 community members attended the event and the table relating to the environment and climate change was well attended with various discussions surrounding possible adaptation action items for the town.

Public Engagement on Saint Andrews Climate Adaptation Plan – January 19th and January 24th, 2019

In-person community public engagement took place during January and February 2019 in the Town of Saint Andrews. Two events were scheduled, one on January 19th and one on January 24th, at Sunbury Shores Art and Nature Centre to set up a presentation, exhibit some climate topics and garner public attention and subsequent feedback on potential climate adaptation actions. The event was well attended with approximately 65 residents between the two sessions. At each session there was a brief presentation outlining the climate change adaptation planning process, the selected climate risks and their associated potential adaptive action items. The methodology of the public engagement session was also explained. These events provided a unique opportunity to interact and collect data using a different approach.



Sunbury Shores, Jan. 19/2019

Photo Credit: Florence Small

"Our Asset Manager, working with the Town's Consulting Engineers, has developed a very sophisticated Asset Management Plan. Now we need to integrate this with the Climate Change Adaptation plan to determine what's possible and at what cost. Saint Andrews has been identified as one of the most vulnerable locations in the province to climate change. In conjunction with Eastern Charlotte Waterways Inc., this is a vital next step."

- Mayor Doug Naish

The space at Sunbury Shores acted as an art gallery exhibit opening with five stations that illustrated five climate topics, vulnerable areas and relevant climate risks. The questions from the adaptation questionnaire revolved around these topic areas: Indian Point, Patrick Street, Market Square and the Wharf, Drinking Water and Community Planning as they were the five main areas discussed during the climate steering committee meetings. The questionnaire helped to determine several key aspects of community feedback including the level of value placed on certain town assets and areas, the community stance on adaptive actions to adapt against sea-level rise and the preferred method of communication between community members and municipal officials.

The questionnaire is attached as an appendix and the online version can be found at: www.ecw.ngo/sta.

Sir James Dunn High School – February 4th, 2019

The climate change adaptation questionnaire was presented at Sir James Dunn High School for the Environmental Sciences 110 class. It was important to engage students and the younger demographic to include them in the adaptive planning process. This presentation helped to familiarize the students with climate change impacts to Saint Andrews as well as adaptive and government solutions to these risks. The students were then able to contribute their voice and participate in the online questionnaire which helps to inform the overall adaptation plan.

Online Consultation – January 29th to February 25th, 2019

The Saint Andrews Climate Adaptation questionnaire was made publicly available online through the Eastern Charlotte Waterways website on January 29th, 2019 to continue to collect meaningful public feedback on the potential adaptive actions. This was made possible through a strategic social media campaign and additional advertising and support from the Town of Saint Andrews, the Charlotte County Television (CHCO), the St. Croix Courier and multiple other community organizations and word of mouth with local, small businesses.

Sunbury Shores, Jan. 24th, 2019
Photo Credit: Donald Killorn

Goals and Objectives of Climate Change Adaptation

Municipal Objectives:

1. Ensure strategic spending in areas that are deemed at high risk to climate change and of high value and significance to community members and the Town of Saint Andrews reputation
2. Protect vital pieces of infrastructure that contribute to the economic and social sustainability and welfare of Saint Andrews

Community Objectives:

1. Protect the economic vitality of the Saint Andrews tourism industry
2. Protect the natural environment and scenic beauty of Saint Andrews
3. Protect the social cohesion and value of the close-knit community of Saint Andrews

Possible Drivers and Constraints

It is important to identify possible drivers and constraints in the climate adaptation planning process to understand the opportunities and limitations of adaptive actions from a municipal and community standpoint. The following are some adaptation drivers and constraints in Saint Andrews.

Saint Andrews Adaptation Drivers	
1. Social Drivers	▪ Positive stakeholder engagement ▪ Aware and engaged community ▪ Well-informed community base ▪ Development of social capital ▪ Exposure to capacity building through multiple education and awareness campaigns by community and municipal members ▪ Access to in-house knowledge with the Biological Station, Huntsman, non-profit organizations in the area (scientific knowledge) ▪ Access to in-house knowledge with the Passamaquoddy peoples in the area (traditional ecological knowledge) ▪ Community involvement in activities related to climate change awareness, prevention and adaptation ▪ Continued narrative around climate change in the community ▪ Cultural value around coastal areas ▪ Recreational value on coastal areas ▪ Effective communication strategies to highlight areas of environmental, physical, economic and social impact to climate change.
2. Economic Drivers	▪ Community value on the tourism industry ▪ Municipal value on the tourism industry ▪ Economic value of eco-tourism (i.e.: whale watching, sea kayaking, etc.). ▪ Economic reliance on bay for jobs and employment (i.e.: fishermen, DFO, tourism, etc.) ▪ Commercial businesses located near the coast
3. Environmental Drivers	▪ Preserve the natural beauty and landscape of Saint Andrews as a coastal community ▪ Access to coastal areas
4. Institutional Drivers	▪ Municipal commitment to adapting against climate change ▪ Asset management capabilities ▪ Relationships with engineering companies ▪ Access to good, innovative technologies such as AR5 data to determine sea level rise and storm surge events

	▪ Quality wet-area mapping to depict flood prone areas ▪ Sound science and data research to intricately understand the unique climate risks to Saint Andrews

Saint Andrews Adaptation Constraints	
1. Social Constraints	▪ Community willingness to participate (over a long period of time) ▪ Variances in opinions to strategies and approaches ▪ Lack of knowledge around adaptation policies and strategies ▪ Lack of in-house knowledge to deal with certain risks ▪ Demographic ▪ Permanent vs. temporary residents (summer stays) ▪ Public health risks and concerns ▪ Varying societal and cultural values
2. Economic Constraints	▪ Financial resources ▪ Staff resources ▪ Funding resources ▪ Infrastructure expenditure costs ▪ Technological constraints to build infrastructure, technologies or other means necessary to adapt against climate change ▪ Long-term vs. short term priorities ▪ The risk of "double exposure" (i.e.: economic setbacks and damages due to climate change occurring simultaneously) ▪ High level of vulnerability to Saint Andrews job sector with fisheries and eco-tourism ▪ Insurance liability risks
3. Environmental Constraints	▪ Lack of available green space within municipal boundaries ▪ Large number of residential properties on small land space ▪ Coastal community ▪ Lack of natural water sources
4. Institutional Constraints	▪ Maintaining political will due to short term vs. long term priorities and commitments and large turnover at municipal level ▪ Adequate government attention and commitment ▪ Lack of consensus building on how to approach climate risks

	▪ Lack of knowledge and expertise on climate adaptation at a municipal, regional and provincial level ▪ Climate Adaptation Planning is a new area of expertise ▪ Legitimacy of knowledge and information sources ▪ Regional and municipal regulatory and legal responsibilities (vertical integration)

Overcoming Adaptation Constraints: (Tools to Implementation)

Social

1. Collaborate with local knowledge sources
2. Think strategically about the best knowledge base: involved community members
3. Adopt policies that build on pre-established community values and ties
4. Develop a comprehensive, inclusive and integrated communication strategy so that government and community can work cohesively to adapt against climate change
5. Create and collaborate with a Climate Change Adaptation Working Committee to liaise community members with government officials

Economic

1. Pursue federal and provincial funding for adaptive action items
2. Strategic financing of projects includes an assessment of the life-cost cycle and return on investment of each project pursued by the municipality

Environmental

1. Work alongside nature, not against it
2. Work to protect and conserve the environmental integrity of the land, air and water
3. Explore natural infrastructure and green solutions to climate change impacts

Institutional

1. Recognizing spatial and temporal limitations to municipal governance, work with local groups and the provincial government to establish strategic, sound policy making
2. Recognize the nature of a 'living' document and the flexibility and discretionary measures accompanying it
3. Ample public consultation can be a good measure on informed decision making especially for projects large in scale that adversely impact the economic, social or environmental welfare of the town and town members
4. Recognize the need for incremental change and engage in policy and planning measures that continue to integrate climate change scenario considerations alongside regional, provincial and federal policy making and scientific research

Climate Adaptation Actions:

Environmental, Infrastructure, Social and Institutional

1. Land-Use Planning

1.1.1. Objectives

(1) To ensure that development, both commercial and residential, complies with good planning principles, including adaptive measures for climate change impacts where appropriate. This refers to preparation for major climate risks including sea-level rise, increase in intensity and frequency of storm events and in-land flooding.

(2) To maintain and preserve municipally owned green space and natural infrastructure as potential barriers to climate change impacts.

(3) To understand that effective land-use planning that accounts for strategic foresight and severe climate impacts will equip the municipality with adequate natural land and space to explore natural infrastructure solutions to climate change impacts.

1.2.1. Policies

(1) The zoning by-law shall delineate a sea-level rise overly zone based on the HHWLT 5.8 m projection depicted in the attached appendices (impact maps)

(2) The zoning by-law shall limit and set conditions for development to account for a HHWLT sea-level rise overlay zone as depicted by the 5.8 m projections in the attached appendices (impact maps)

(3) As new areas of the Town are developed, Town Staff and Council shall require that the design of parks, trails and open spaces incorporate linkages with other neighbourhoods to bolster the use of trails.

1.3.1. Proposals

(1) It is proposed that the Town develop a long-term plan for municipally owned undeveloped land areas, including green space, with the goals of providing the option to have natural infrastructure solutions to climate change impacts. (attached appendices)

(2) It is proposed that Council works with landowners and new developers to minimize their impact to the land.

(3) It is proposed that Council continue to develop a system of multi-use trails and sidewalks to further promote and accommodate the use of active transportation travel modes throughout the Town.

(4) *Council shall explore options to increase the total amount of green space under municipal ownership.*

1.4.1. Project(s)

Priority Area	Land-Use Planning and Development
Risk Level	
Action	Green Space Planning: Using Natural Ecosystem Services to Combat Climate Change
Objectives	▪ Explore natural infrastructure solutions to climate change ▪ Maintain and conserve existing green space in municipality ▪ Explore the acquisition of more greenspace ▪ Understand how natural ecosystem services can provide for town services.
Timeline	Medium to Long Term (2020-2022)
Roles and Responsibilities	1. Asset Manager 2. Municipal Natural Assets Initiative
Cost Associated	$50,000 - $60,000 Municipal Staff
Funding Sources	▪ Environmental Trust Fund ▪ Federation of Canadian Municipalities ▪ Municipal Climate Innovation Program
Indicators of Progress/Success	▪ Scoping and defining natural assets and/or services of interest in the Town of Saint Andrews ▪ Preliminary inventory of assets of interest, including risk identification and prioritization

2. Water Infrastructure and Drinking Water

2.1.1. Objectives

(1) *To ensure that the municipality continues to supply good quality water that adheres to regulatory standards to the town members*

2.2.1. Policies

(1) It shall be a policy of Council to partner with external stakeholders and members to work collaboratively in order to protect the town's water supply.

(2) It shall be a policy of Council to partner with external stakeholders and partners to preserve the water quality at Chamcook Lake to ensure that the town water supply remains uncompromised

(3) It shall be a policy of Council to ensure new developments are approved only in so much as it does not compromise or exceed the current capacity of the water supply

(4) It shall be the policy of Council to require new developers to contribute to the cost of upgrading water systems that serve their developments at the expense of the town water supply

(5) It shall be the policy of Council to ensure there are contingency plans in place for an emergency water supply and to identify alternate drinking water sources

2.3.1. Proposals

(1) It is proposed that Council pursue efforts to secure long-term protection of the Town water supply (the Chamcook Lake watershed) and work conjointly with the Province, involved property owners, other identified stakeholders and communities within the local service district boundaries to implement water quality assurance measures

(2) It is proposed that Council explore the potential of adopting "green" technologies for water assurance purposes in the Chamcook watershed

(3) It is proposed that Council takes action to safeguard the Town's safe drinking water supply including steps that provide equitable allocation of water from Chamcook Lake, actions that reduce the risk associated to contamination and toxins in the water and actions which consolidate the governance of the water supply

(4) It is proposed that the town investigate alternate water sources for the Town drinking water supply

(5) It is proposed that the Town investigate new water treatment technologies.

(6) It is proposed that Council create an emergency water supply plan.

(7) It is proposed that the Town explore the option of creating a watershed committee devoted to maintaining the water quality of Chamcook watershed

(8) It is proposed that Council work in conjunction with the Department of Environment and Local Government and the affiliated provincial departments to ensure that the water quality at Chamcook is maintained.

(9) It is proposed that Council work in conjunction with the Chamcook and Bayside Local Service Districts to jointly collaborate with these residents and organizations in a manner that emphasizes the importance of maintaining the water quality of Chamcook for all involved parties.

(10) It is proposed that the town seek an alternate water supply for fire protection services to minimize the use of good quality drinking water for other purposes.

(11) It is proposed that Council works to encourage residential property owners to explore alternate water sources for non-drinking water uses

(12) It is proposed that Council works collaboratively to implement water metering in corporate buildings to encourage water conservation within municipalities

(13) It is proposed that Council work with the Department of Environment and Local Government to conduct a risk assessment of Chamcook Lake and watershed.

2.4.1. Project(s)

Priority Area	Drinking Water Source
Risk Level	
Action	▪ Conduct an assessment of Chamcook Lake looking at the resiliency to deluge rain events, water quality and possible solutions to blue-green algae blooms ▪ Maintain natural assets and ecosystem services
Objectives	▪ Monitor the lake for bacteria, nitrogen, phosphorous and chlorophyll following various different rain fall events including dry conditions, rainfalls of 0-12.5 mm, 12.5-25 mm, 25-50 mm and > 50 + mm ▪ Explore alternate technological solutions to blue green algae blooms
Timeline	Ongoing (Long-Term) – 2019 and beyond
Roles and Responsibilities	▪ Asset Manager ▪ Treasurer ▪ Chamcook Watershed Landowners Association ▪ Modelling and Hydrology Services
Cost Associated	$25,000 - $30,000 (ongoing)
Funding Sources	▪ Environmental Trust Fund (Provincial) ▪ Eco-Action Fund (Federal) ▪ World Wildlife Foundation (WWF) ▪ Clean Water Fund (Alternate)

Indicators of Progress/Success	▪ Feasibility study conducted into the possibility of finding an alternate water source for Chamcook Lake ▪ Maintaining the water quality of Chamcook Lake and ensuring that blue-green algae blooms are prevented

3. Flooding

3.1.1. Objectives

(1) Equip the municipality with the realities of inland flooding by educating and promoting good flood proof management practices

(2) Equip residential property owners with the realities of inland flooding by educating and promoting good flood proof management practices

3.2.1. Policies

(1) *Set minimum elevation level, development guidelines, zoning regulations and building bylaws to ensure flood proofing occurs at measurable heights in areas delineated by the attached maps showing sea-level rise overlay zones based on the 5.8 m projections*

(2) *Encourage current residential property owners in flood prone areas to install back-up valves and sump pumps in order to mitigate against property flooding*

(3) *Council shall favour the planting of native plants in municipally owned green space in recognition of environmental benefits such as water retention*

(4) *The Town shall investigate the possibility of natural, green infrastructure such as retention ponds in flood prone areas that are municipally owned undeveloped land*

(5) *In areas of possible contamination of water or soil quality due to flooding events, the proponent and/or owner(s) of the infrastructure at risk of contamination are responsible for relocating the assets*

(6) *Council shall consider the importance of flood prone areas in the by-law planning for future municipal plans and future development.*

3.3.1. Proposals

(1) *It shall be proposed by Council that a Flood Management Plan be created to demonstrate to the municipality the realities of in-land flooding and flood zones*

(2) *It is proposed that Council work collaboratively with the Chamber of Commerce to help equip private and commercial business owners with proper flood proofing techniques*

4. Wildlife and Habitat Degradation

4.1.1. Objectives

(1) To protect and preserve the natural environment, biodiversity and wildlife habitat in the municipal boundaries of Saint Andrews.

(2) To promote good environmental practices to community members, visitors and local businesses.

4.2.1. Policies

(1) Council shall work closely with local bee keepers to ensure that the bee population is protected despite the risk of climate change impacts

(2) Council shall support and encourage the continuation of the Marine Debris program partnership with local businesses

(3) Council shall work to preserve municipally owned wooded areas

(4) Council shall only plant locally, native plants in municipally owned green space and gardens

5. Infrastructure Adaptation Actions: Market Square and the Wharf

5.1.1. Objectives

(1) To ensure the economic, social and environmental vibrancy of the wharf and Market Square as it contributes to the Town of Saint Andrews

(2) To investigate smart, strategic and sound solutions to maintaining the infrastructure as it becomes increasingly vulnerable to climate risks

(3) To seek public feedback on adaptive measures and large projects pertaining to the maintenance of the wharf and Market Square

(4) To continue to recognize the community and municipal value of the wharf and Market Square

5.2.1. Policies

(1) Council shall consult with the community thoroughly before advancing on any large projects pertaining to the maintenance of the wharf and Market Square

(2) Council shall prepare Market Square and the Wharf for sea-level rise at the 5.8 m projection as delineated by the impact maps (appendix 5 and 6)

(3) Council shall work closely with the provincial and federal government to emphasize the importance of Market Square and the wharf as the social and economic centre of the Town

(4) Council shall go forth in investigating the potential of a seawall as supported by the majority opinion on public engagement in so long as they continue to properly inform and consult the public and relevant stakeholders

(6) It is proposed that Council work with relevant stakeholders to determine the feasibility and costs of such projects

(7) It is proposed that Council continues to engage the public on matters relating to Market Square and the Wharf

5.3.1. Proposals

(1) It is proposed that Council begin to investigate federal and provincial funding that will help to support an adaptive engineered solution to concerns relating to sea-level rise and increase in severity and frequency of storm events

(2) It is proposed that Council shall enter into discussions with local businesses, residents and other properties in and around Market Square and the wharf to encourage the installation of proper flood proofing of buildings at a minimum of a 1 m height elevation

5.4.1. Project(s)

Priority area	Market Square and the Wharf
Risk Level	
Action	Explore engineered solutions such as a sea-wall
Objectives	▪ Prevent long-term and serious damages to Market Square and the Wharf as economic centres of the town
Timeline	Medium to Long Term (2020-2025+)
Roles and Responsibilities	▪ Asset Manager ▪ Engineering Company (CBCL)

	▪ Southwestern Regional Service Commission ▪ Town Wharfinger
Cost Associated (Monetary and otherwise)	$3 million +
Funding Sources	▪ Federation of Canadian Municipalities ▪ Municipal Climate Innovation Program ▪ Infrastructure Canada – Disaster Mitigation and Asset Fund
Indicators of Progress/Success	▪ Sound public engagement and consultation ▪ Preparation for a 2055: 1-in-100-year storm

6. Infrastructure Adaptive Actions: Indian Point

6.1.1. Objectives

(1) To understand the community and social value of Indian Point

(2) To understand the economic value and realities attributed to Indian Point

(3) To respect and understand the cultural significance of Indian Point

6.2.1. Policies

(1) Council is to investigate the possibility of relocating the main sewer line located at Indian Point away from the climate projections at a 5.8 m projection delineated by the impact map (appendix 3 and 4)

(2) Council is to investigate the possibility of relocating major pieces of infrastructure located at Indian Point to areas located outside the 5.8 m projection delineated by the impact map (appendix 3 and 4)

(3) Council is to investigate the possibility of installing more soft-shoreline protection through dunes and native plants to help divert water

(5) Council is to confer with the public to determine the response around managed retreat of infrastructure and assets found within a 20m proximity to the coastline

(6) *It is proposed that Council investigate the economic and social value of Indian Point to the community prior to advancing adaptive measures.*

7. Infrastructure Adaptive Actions: Patrick Street

7.1.1. Objectives

(1) *To assist in protecting residential and municipal properties impacted by potential sea-level rise and storm surge events*

(2) *To educate residential homeowners on the climate risks in this area*

(3) *To encourage residential homeowners to be proactive in flood proofing their properties*

7.2.1. Policies

(1) *The Town shall assist residential property owners in flood prone areas to perform necessary preparations in the event of a flood*

(2) *The Town shall encourage the flood proofing of residential homes for a 2m water elevation*

7.3.1. Proposals

(1) *The Town shall encourage property owners to move all mechanical and electrical system fittings, sentimental items and at-risk item above the flood mark in so that minimal damages are incurred.*

8. Social Adaptation Actions: Public Health and Safety

8.1.1. Objectives

(1) *The Town of Saint Andrews shall be committed to ensuring the health, wellbeing and safety of its residents relating to climate risks and impacts*

(2) *The Town shall be conscientious in its preparation to help the community to adjust to changes related to increase in temperature, rainfall events, intensity and frequency of storm events and flooding as predicted in climate scenario data*

8.2.1. Policies

(1) *The Town shall be aware of residents who are deemed a 'vulnerable' population to climate change impacts due to issues relating to mobility, accessibility and financial means to prepare against climate events*

(2) *The Town shall work in conjunction with health services in Saint Andrews and the surrounding area to ensure that in the event of an emergency there is adequate level of preparedness at a community and residential level*

8.3.1. Proposals

(1) It is proposed that the Town liaise with community members deemed to be 'at-risk' or 'vulnerable' in the event of an emergency

(2) It is proposed that the Town work closely with the Emergency Measures Organization and the Red Cross to address health and safety needs of residents and community members in the event of a natural weather emergency

9. Social Adaptation Actions: Community Planning and Engagement

9.1.1. Objectives

(1) The Town will work to include the community into the climate adaptation planning process

(2) The Town will establish an effective communication strategy to engage the community

9.2.1. Policies

(1) The Town shall communicate climate change adaptation planning projects to the community through social media and, if the project is deemed of substantial economic cost (above $100,000), with a town hall meeting

9.3.1. Proposals

(1) It is proposed that the Town investigate the possibility of a 'Climate Change Week' inviting experts on climate change risks to have a public panel discussion on what individuals can do to mitigate and adapt against climate change

10. Institutional Adaptation Actions: Emergency Response Planning

10.1.1. Objectives

(1) Build a resilient, well-informed community in preparation of climate change impacts

10.2.1. Policies

(1) *The Town shall work with the Emergency Measures Organization (EMO) to create a robust emergency response plan*

(2) The Town shall ensure municipal staff and deemed trusted agents are properly trained (annually) in the protocols set forth by the Emergency Measures Organization (EMO)

(3) The Town shall work with community members to communicate effective emergency response measures

(4) The Town shall communicate to community members where key emergency centres exist in the event of an emergency

(5) The Town shall identify trees deemed to be at risk to energy infrastructure and take proper precautionary measures to eliminating these risks

10.3.1. Proposals

(1) It is proposed that the Town municipal trusted agent attend regional emergency response planning meetings presented by the EMO

(2) It is proposed that the Town encourage community members to purchase 72-hour emergency response kits

(3) It is proposed that the Town investigate alternate emergency stations in the event that the primary location(s) becomes unavailable

(4) It is proposed that the Town investigate options to communicate via the Sentinel program and/or direct text message sent to community members in the event of an emergency

(5) It is proposed that the Town liaise with at-risk or vulnerable population members to ensure adequate preparation for the event of an emergency

9.4.1. Project(s)

Priority Area	Emergency Response Planning
Risk Level	

Action	▪ Prepare the Town of Saint Andrews for Operation Bravo (New Brunswick Regional Emergency Response Initiative) ▪ Ensure that the municipal officials, town staff and council are equipped in emergency response ▪ Increase and support communication measures in place for response ▪ Table top exercises for the public engagement
Objectives	▪ Back-up power sources ▪ 72-hour emergency response kits ▪ Practice mock events ▪ Collaborate with the EMO ▪ Provide alternative solutions for service sites
Timeline	Short Term
Roles and Responsibilities	▪ Emergency Measures Organization ▪ (Regional Emergency Management Coordinator) ▪ Asset Manager ▪ Fire Chief ▪ Eastern Charlotte Waterways Inc. ▪ Municipal Staff ▪ Community Members
Cost Associated (Monetary and otherwise)	No cost (Volunteer Time Secured with EMO)
Funding Sources	Emergency Measures Organization (EMO)
Indicators of Progress/Success	▪ The number of table top exercises for municipal staff and for the public ▪ Number of scenario mapping ▪ Public availability of the information especially in regards to the emergency response plan ▪ Number of households aware of the emergency response plan ▪ Number of households equipped with 72 hour prepared kits ▪ Number of back-up sources, generators with the municipality ▪ Number of individuals signed up for communication services

11. Institutional Adaptation Actions: Staff Development

11.1.1. Objectives

(1) The Town Council will ensure appropriate municipal staff officials are properly trained and equipped to the realities of climate change adaptation in coastal communities.

11.2.1. Policies

(1) It is proposed that Town Council will ensure that the municipal staff and council members are knowledgeable around potential climate change impacts, risks, vulnerabilities and adaptation projects in Saint Andrews.

(2) Council shall form a Climate Change Technical Advisory Committee to assist with the implementation and monitoring of recommendations relating to climate adaptation planning in the town.

11.3.1. Proposals

(1) It is proposed that Town Council investigates the possibility of hiring a part-time (or full-time) Climate Change Coordinator position to oversee the implementation and monitoring of adaptive action projects and the Climate Change Technical Advisory Committee

(2) The Town Council will register to become a member of the Municipal Natural Infrastructure Collaborative

(3) The Town Council will register to receive Federation of Canadian Municipalities training on climate change adaptation planning.

(4) The Town will register with the Climate Change Adaptation Community of Practice, a federal program.

11.4.1. Project(s)

Priority Area	Staff Development
Risk Level	
Action	▪ Provide training to municipal staff and council on climate change adaptation in coastal areas ▪ Become a member of the Municipal Natural Infrastructure Collaborative (MNIC)
Objectives	▪ Ensure that municipal staff and council are knowledgeable around the potential climate change impacts, risks, vulnerabilities and adaptive action items/projects relevant to the Town of Saint Andrews
Timeline	Medium to Long Term (Ongoing)
Roles and Responsibilities	Staff , Town of Saint Andrews
Cost Associated (Monetary and otherwise)	Support staff training, workshops provided through the Federation of Canadian Municipalities

Funding Sources	▪ Transitions 2050 Fund (Federal Government) ▪ Municipal Asset Management Network ▪ Municipal Climate Innovative Programme
Indicators of Progress/Success	▪ Survey the level of knowledge regarding the relevant climate change impacts, risks and potential adaptive action items/projects of each municipal staff member, council member and other stakeholders as it relates to the Town of Saint Andrews ▪ Number of individuals signed up for communication services

Implementation and Monitoring:

The Town of Saint Andrews council and staff will be responsible for implementing the municipal adaptation plan and meeting their goals according to the timelines in the plan. Progress will be monitored frequently and communicated to the public in the communication methods requested including: social media, community meetings and town halls.

Members of the implementation working group may include:

1. The Chief Administrative Officer
2. The Asset Manager
3. Town Engineer
4. Representative from the Southwestern Regional Service Commission
5. Identified community champion
6. Representative from Eastern Charlotte Waterways Inc.

We recommend that the Town of Saint Andrews encourages public engagement and consultation throughout the implementation of the climate change adaptation actions. We recommend that the Council supports the activation of the Climate Technical Advisory Committee to oversee, advise and help guide Council through the implementation of adaptive actions.

Amending the Plan

The Town of Saint Andrews is committed to viewing this document as a 'living' document with the possibility for modifications and changes to account for the changes in climate risks, resource and economic realities of the town and community feedback.

Implementation Tracker:

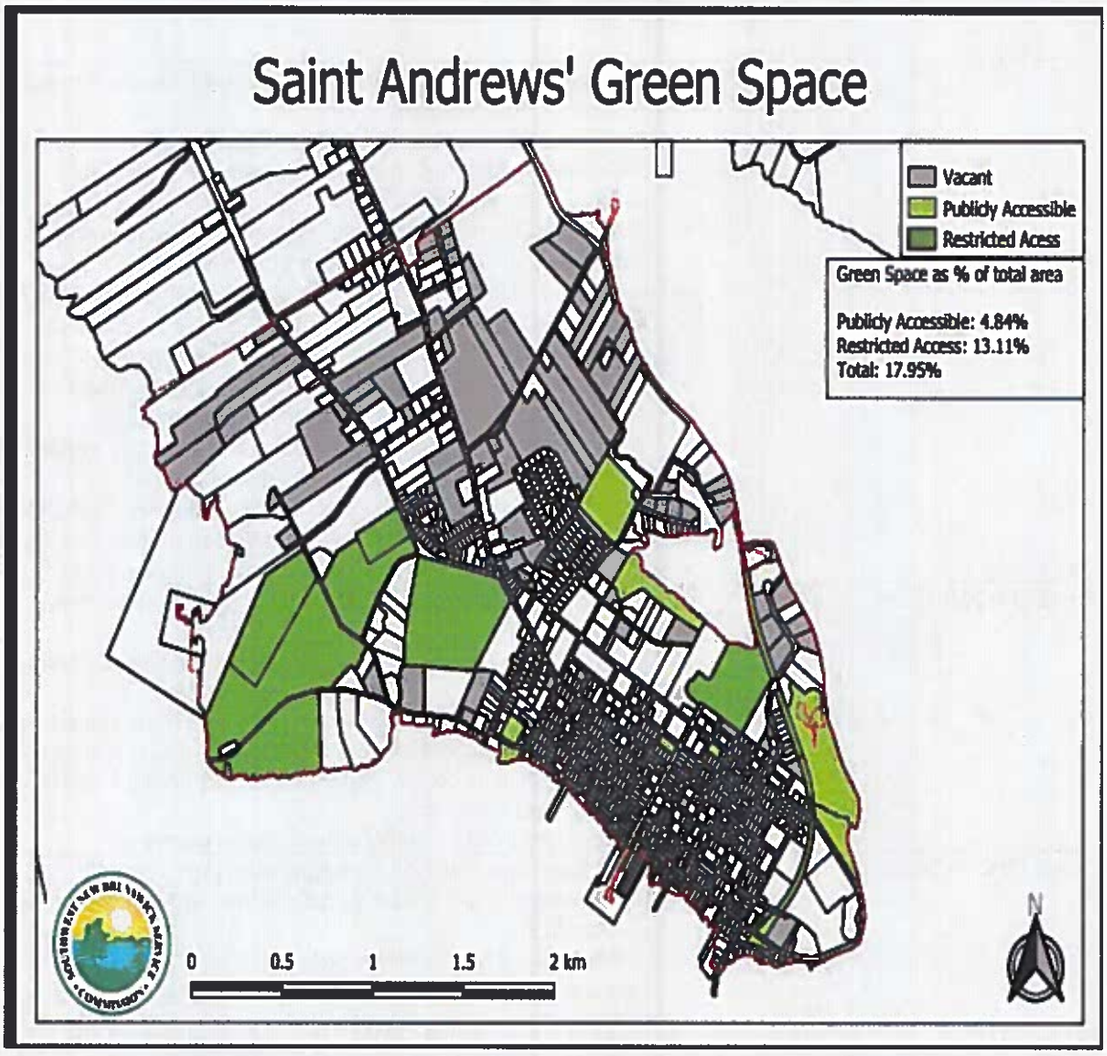
Implementation: Adaptive Action	Lead	Short-term (2019-2020)	Medium-term (2020-2022)	Long-term (2022+ beyond)
Activate the Climate Adaptation Technical Advisory Committee to advise and oversee the implementation of the adaptation plan	Acting CAO Council Member Technical Advisory Committee	X	X	X
Conduct a risk assessment on the resilience of the Chamcook watershed to climate change	Department of Environment and Local Government Hydrologists Asset Manager Chamcook Landowners Association Council		X	
Implement an Education and Awareness campaign	Eastern Charlotte Waterways Inc.	X		
Conduct emergency response planning with the EMO and the Red Cross	Fire Chief EMO Regional Director Red Cross Regional Director Town Staff	X		
Staff Development on Climate Adaptation	Acting CAO Town Staff	X		
Market Square and the Wharf: find an engineered solution	Town Engineer Asset Manager Acting CAO Council Relevant stakeholders		X	X
Flood proofing: residential property home owners and local commercial businesses	Asset Manager Eastern Charlotte Waterways Inc. Chamber of Commerce, Saint Andrews	X		

Summary of Recommended Actions

Timeline (2019 +)	Adaptive Action(s)
Ongoing	• Integrate climate change impacts and considerations into Saint Andrews Municipal Plan 2020 • Participate in New Brunswick EMO Operation Bravo 2019 and contribute community emergency response injects to the provincial government • Develop effective communication strategy to include community members in the adaptation planning process • Investigate engineered solutions to Market Square the Wharf • Investigate federal and provincial funding opportunities to approach Market Square and the Wharf engineered solutions • Identify "at risk" and "vulnerable" community members who require special attention in the event of a storm surge • Work with the community members and community organizations to design an effective communication strategy • Investigate solutions to maintaining Chamcook water quality • Investigate budgetary solutions to finding alternate water supply • Consult with public about the importance of Indian Point
Short-Term (2019-2020)	▪ Staff development on how climate change may affect town services ▪ Explore phase one of increasing armour stone around Market Square ▪ Account for updated by-laws and building permits around land, recreational and commercial developments in flood prone areas including those in coastal zones that are within the 1-in-100-year storm (1.9m) increase. ▪ Liaise with EMO for emergency response planning
Medium Term (2020 – 2022)	▪ Investigate possibility of increasing green space that is municipally owned to have as natural infrastructure solutions to climate change ▪ Create a Flood Management Strategy ▪ Create a Green Space Plan ▪ Continue to build on solutions for Market Square and the Wharf
Long-Term (2022 and beyond)	▪ Sea-wall for Market Square and the Wharf that prepares for a 2055:1-in-100-year storm event ▪ Pass a by-law making it mandatory for all residential property owners to properly flood proof their homes

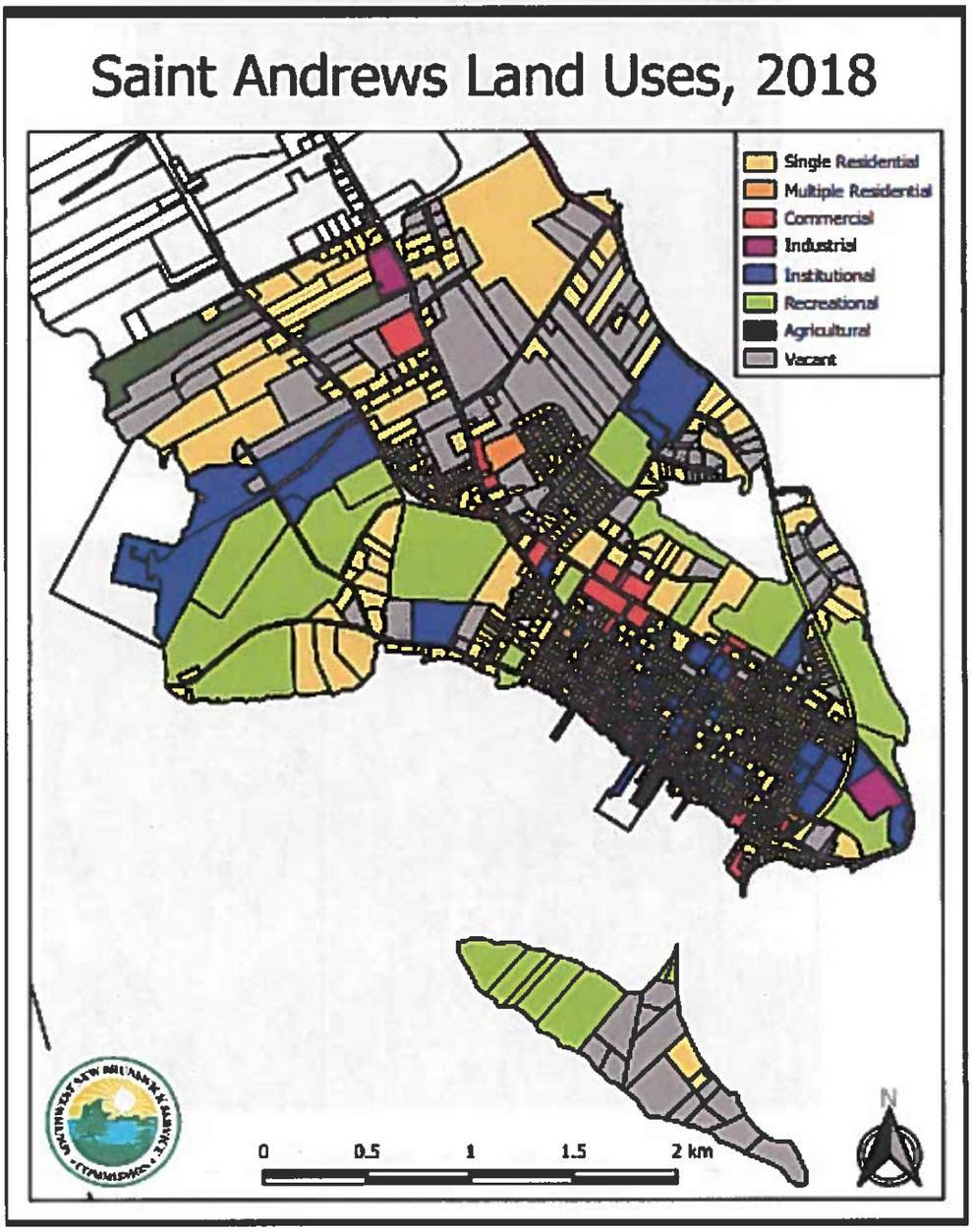
Appendix 1:

Green Space Map (2018) – Xander Gopen, SNBSC



Appendix 2:

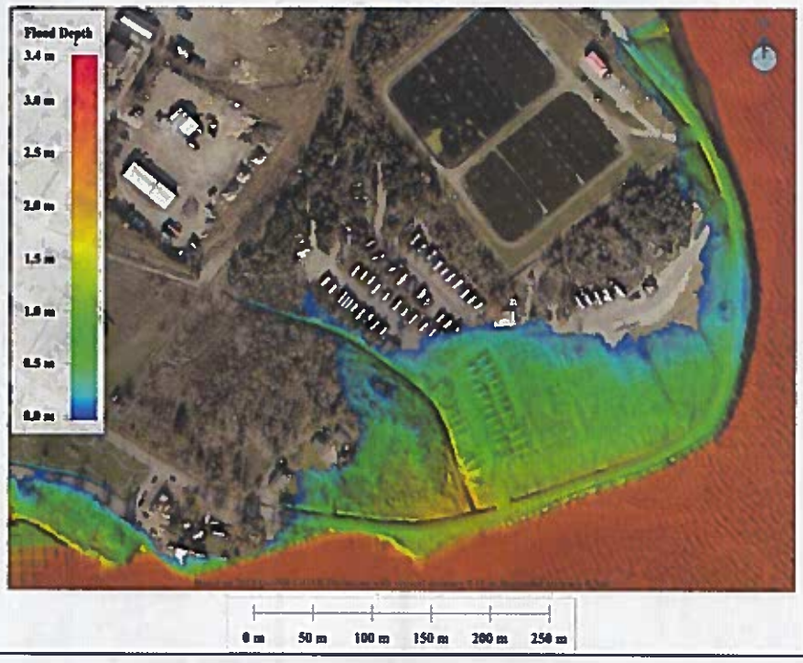
Land Use Development Map (2018) – Xander Gopen, SNBSC



Appendix 3:

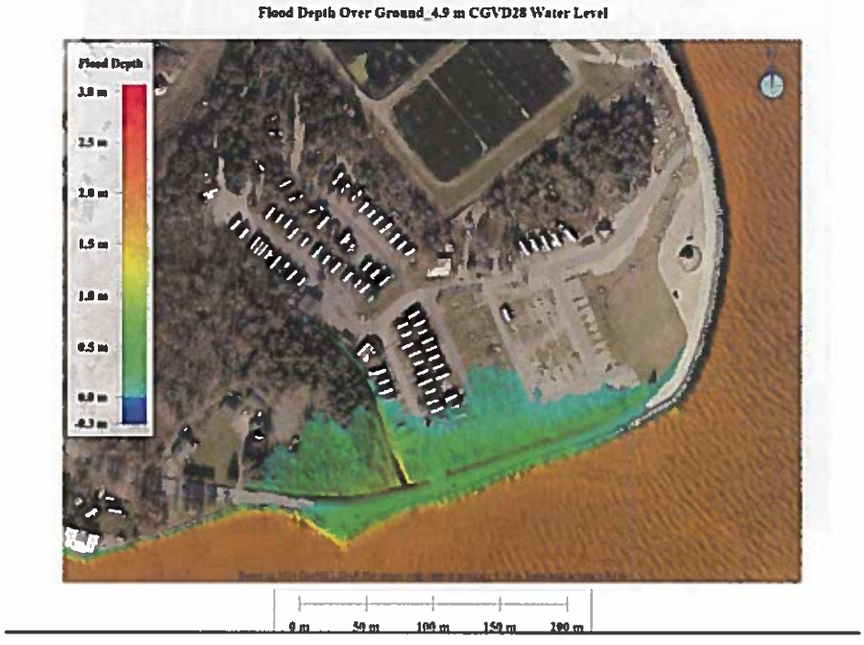
Climate Impact Map: HHWLT + Storm Surge for Indian Point at 5.8 m – Réal Daigle, R. J. Daigle Enviro

Flood Depth Over Ground_5.8 m CGVD28 Water Level



Appendix 4:

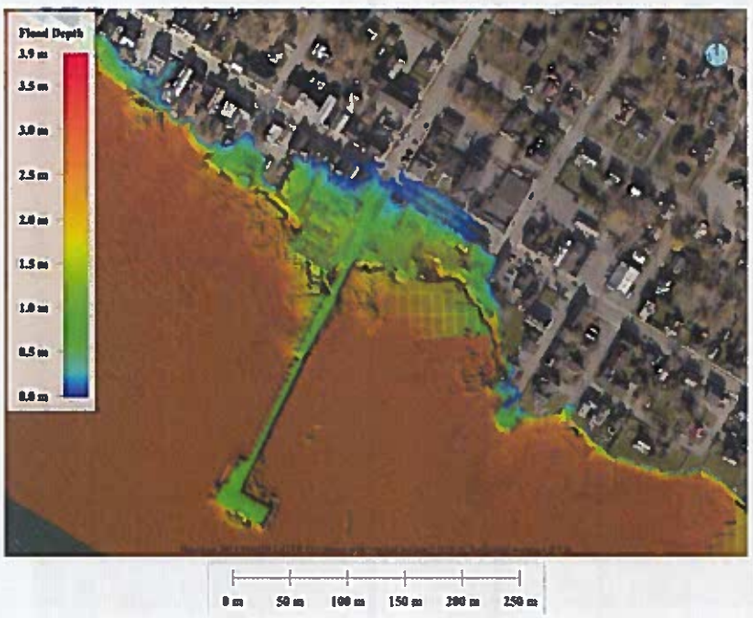
Climate Impact Map: HHTWL for Indian Point at 4.9 m – R. J. Daigle Enviro



Appendix 5:

Climate Impact Map: HHWLT + Storm Surge for King Street at 5.8 m– Réal Daigle, R. J. Daigle Enviro

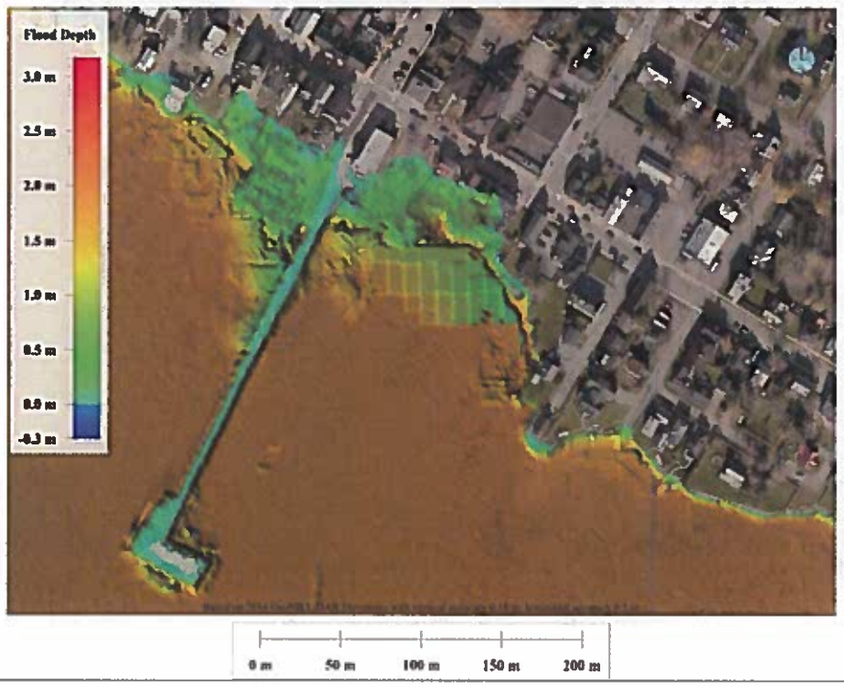
Flood Depth Over Ground_5.8 m CGVD28 Water Level



Appendix 6:

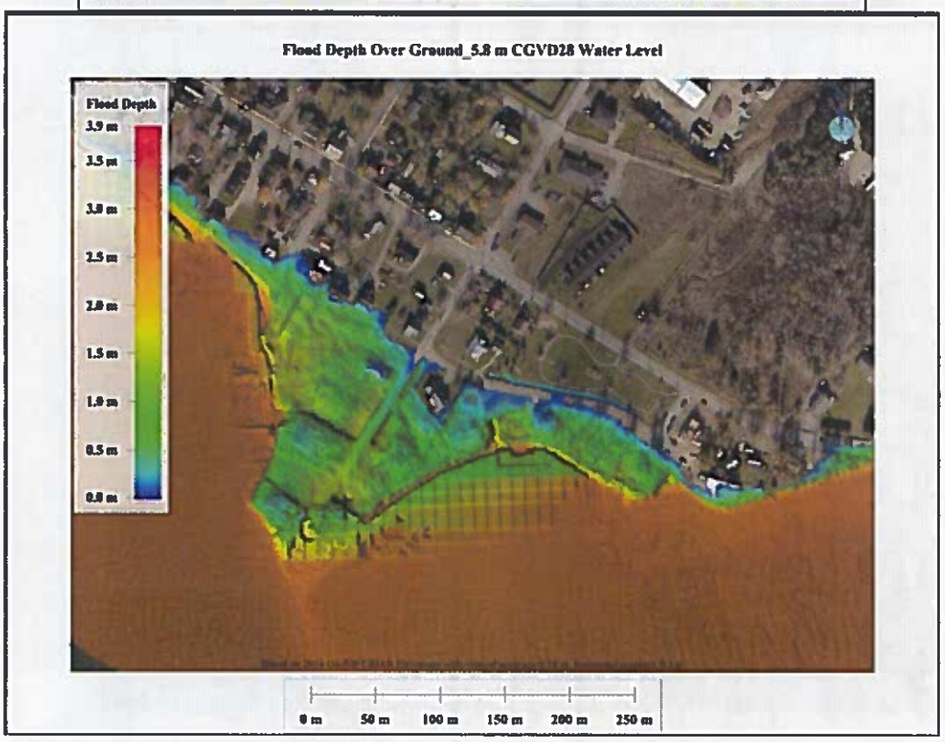
Climate Impact Map: HHWLT for King Street at 4.9 m– Réal Daigle, R. J. Daigle Enviro

Flood Depth Over Ground_4.9 m CGVD28 Water Level



Appendix 7:

Climate Impact Map: HHWLT + Storm Surge for Patrick Street at 5.8 m – R. J. Daigle Enviro



Appendix 8:

Climate Impact Map: HHWLT for Patrick Street at 4.9 m – R. J. Daigle Enviro

Flood Depth Over Ground_4.9 m CGVD28 Water Level

Appendix 9:

Climate Change Steering Committee Terms of Reference

Eastern Charlotte WATERWAYS

Saint Andrews Climate Change Steering Committee Terms of Reference:

Project Description:

In 2013, the Town of Saint Andrews partnered with two local non-profit organizations, the St. Croix Estuary Project and Eastern Charlotte Waterways Inc., to begin the climate change adaptation process. Following the ICLEI – Local Governments for Sustainability five milestone framework for adaptation planning, climate change impacts were scoped for the region, and community vulnerability and risk assessments were conducted.

A number of recommended adaptive actions were identified through the community vulnerability and risk assessment processes, and the Town of Saint Andrews has started to implement some of the actions through upgrades to storm water infrastructure.

With the support of the Environmental Trust Fund, the Town of Saint Andrews will continue the climate change adaptation process by developing a climate change local adaptation plan. The goal of this adaptation plan will be to increase the Town's resilience to climate change by reducing the impact of climate risks through the effective planning of adaptive actions.

To complete the climate change adaptation plan, a climate change steering committee will be formed to provide project guidance and ensure community priorities are reflected throughout the planning process. The steering committee will be made up of representatives from the Town of Saint Andrews, Southwest New Brunswick Regional Service Commission (SNBSC), local industry actors, non-governmental organizations and community members at large. This steering committee will continue beyond the planning phase to oversee the successful implementation of the plan.

Responsibilities of the Saint Andrews Climate Change Steering Committee:

The steering committee's function will be to:

1. Identify the community's vision, mission statement, goals and objectives
2. Identify the community priorities and needs
3. Assess the quantity of resources available and recruit potential partners
4. Prepare a draft list of potential short, medium and long-term actions
5. Upon completion of the local adaptation plan, the steering committee will also be responsible for providing oversight and further direction on the implementation of the adaptation plan

Responsibilities of the Saint Andrews Climate Change Steering Committee Chair:

The steering committee chair function will be to:

1. Ensure that meetings are scheduled accordingly and time and location information is provided to members
2. Ensure that locations for meetings are properly booked and confirmed
3. Sets the agenda for each meeting and provides meeting materials to each member of the committee at minimum 2-3 days prior to the meeting
4. Clearly explains the purpose of each meeting and the agenda plan at the beginning
5. Keeps the meeting on a schedule by placing time limits on the agenda items and ensuring they are adhered to by the members
6. Encourages participation from all members in discussion
7. Concludes the meeting with a summary of discussion points, decisions made, roles and assigned materials for next meeting
8. Maintains meetings notes to be compiled and disseminated in the days following the meeting

Meeting Materials:

1. A local action adaptation plan template will be provided by Eastern Charlotte Waterways to receive feedback and suggestions from the steering committee
2. Eastern Charlotte Waterways representative will supply a table addressing adaptive actions for the short, medium and long-term possibilities for the Town of Saint Andrews
3. Steering Committee members will provide comment and suggestions for improvement or change of actions
4. Steering Committee members will provide further suggestions for potential adaptive actions
5. Designed meeting agendas will be provided to each member of the steering committee to ensure optimal participation

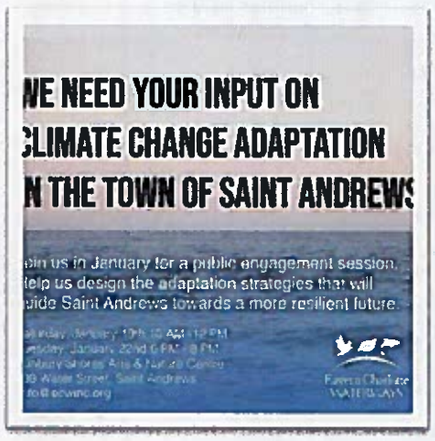
Meeting Frequency:

Initially, the Climate Change Steering Committee will assemble a maximum of 3 times prior to the submission of the climate change local adaptation plan due at the end of March 2019. Once these adaptive actions are approved and ratified through Council, the Steering Committee will reconvene in March 2019 to discuss the subsequent implementation and monitoring phases of the prioritized adaptive actions. The frequency of meetings after March 2019 remains contingent on the selected project proposals, available funding avenues and staff resources capable of committing to these projects.

Appendix 10:

Public Engagement Communication Strategy:

Two public engagement sessions were held in January 2019 at Sunbury Shores to gain public feedback on potential adaptive action items in the Town of Saint Andrews climate adaptation plan. Advertising for the event was shared with the Town of Saint Andrews social media and website, the Southwestern Regional Service Commission, multiple community communication channels, press release to CBC, Global News and advertised in the St. Croix Courier. Posters were put around town in local businesses, community gathering spots and other advertising locations. A social media campaign was performed by Eastern Charlotte Waterways introducing the climate topics discussed at the public engagement event and encouraging individuals to attend and contribute their voice to the planning process.



1. **Sunbury Shores Public Engagement Event:** January 19th and January 24th, 2019

Advertised through: social media, online, local news sources and word of mouth/in person engagement.

Total participation number: +65 community members.

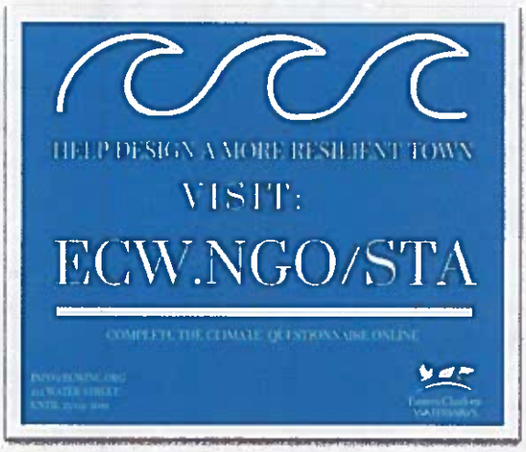
Engagement method: Art gallery exhibiting climate risks, impacts and possible adaptive actions.

2. **Online Platform:** Climate Adaptation Questionnaire

Advertised through: social media, online, local news sources and in person engagement.

Total participation number: TBD

Engagement method: online questionnaire with voiceover powerpoints to walk participants through possible climate risks, vulnerable assets and adaptive actions.



Appendix 11:

Climate Adaptation Questionnaire:

Town of Saint Andrews Climate Adaptation: Public Engagement Event

Thank you for participating in this Climate Change Adaptation Plan engagement session! Please select what station of the public engagement event you are currently at to begin the short survey.

Community:

1. Please enter your postal code:

2. How long have you lived in the Saint Andrews Community?

    a. Less than a year
    b. 1-4 years
    c. 5-9 years
    d. 10-19 years
    e. 20-29 years
    f. 30-39 years
    g. 40+ years

3. What is your age?
    a. 0-18
    b. 18-36
    c. 36-54
    d. 54-72
    e. 72-90
    f. 90+ years

4. How familiar are you with climate change adaptation planning in the Town of Saint Andrews?

Not at all (1) Very (5)

5. Which method would you prefer to receive climate change adaptation planning information? (Select all that apply)

a. Online and social media posts like Twitter, Instagram, Facebook and Town of Saint Andrews website
b. Pamphlets and posters put around town
c. Weekly column in the newspaper and/or online blog posts
d. Town halls and open sessions
e. None of the above

6. Should the municipality hire a full-time Climate Change Coordinator staff position to oversee climate change adaptation work? (This includes implementation and monitoring) YES or NO

7. When looking to implement a 'Climate Change Week,' what sorts of events should be included? (Select all that apply)

a. Community meals
b. Nature tours/hikes
c. Speaker series with experts discussing climate change
d. Climate change trivia night at a local pub
e. Film screening
f. Community 'how-to' workshops
g. Clean-up Saint Andrews event

8. How do you want to receive your information in the event of an emergency? (Choose one option)

a. Online and social media
b. Text message warning
c. Advisory on local radio stations

9. What kind of information would you like the municipality to make available for community emergency planning online? (Select all that apply)

a. Location of emergency services (warming stations, muster stations, etc.)
b. A list of top five things to do in event of an emergency
c. Municipal updates regarding participation in regional Emergency Response Operations (EMO) regional planning
d. Scheduled emergency response simulations available to the public

10. Do you have a 72-hour emergency response kit? YES or NO

11. Do you have a backup generator available in case of a power outage? YES or NO

12. Do you feel prepared in the event of an emergency? YES or NO

Market Square and the Wharf:

1.How significant is this area to you?

b. Not significant at all
c. Somewhat insignificant
d. Indifferent
e. Somewhat significant
f. Very significant

2. What climate change scenario do you think it is best to plan for?

a. 2055: 1-year storm event
b. 2055: 100-year storm event
c. 2100: 1-year storm event
d. 2100: 100-year storm event

3. Of the following adaptation strategies, which do you support?

a. Engineered solutions including raising the wharf, sea walls, dykes or hard rock barriers
b. Increase the height of Market Square by 1m
c. Promote flood proofing businesses and residential homes against possible impacts
d. I do not support any of the mentioned adaptation strategies

Indian Point:

1. How significant is this area to you?

a. Not significant at all
b. Somewhat insignificant
c. Indifferent
d. Somewhat significant
e. Very significant

2.What climate change scenario do you think it is best to plan for?

f. 2055: 1-year storm event
g. 2055: 100-year storm event
h. 2100: 1-year storm event
i. 2100: 100-year storm event

3. Of the following adaptation strategies, which are you most supportive of?

a. Soft shore protection including dunes, etc.
b. Hard rock protection including structured walls, etc.
c. Managed retreat – including relocation of important infrastructure
d. I don't support any of the mentioned adaptation strategies

4. Are you aware of the concerns surrounding infrastructure at Indian Point? YES or NO

5. Which adaptive action items do you think should be implemented to address the concern around the infrastructure at Indian Point?

a. Conduct a feasibility study looking at the possible impact scenarios
b. Build more soft shore protection
c. Relocate the sewer line so that it is not affected by sea-level rise and storm surge events
d. Implement by-laws and building regulations so that buildings in the area are equipped to deal with possible sewage and storm water management issues
e. I don't support any of the mentioned adaptation strategies

Patrick Street:

1. How significant is this area to you?

a. Not significant at all
b. Somewhat insignificant
c. Indifferent
d. Somewhat significant
e. Very significant

2. What climate change scenario do you think it is best to plan for?

a. 2055: 1-year storm event
b. 2055: 100-year storm event
c. 2100: 1-year storm event
d. 2100: 100-year storm event

3. What adaptive action items do you think should be implemented in regards to the Patrick Street vulnerable asset? (Select any that apply)

a. Encourage installation of back-up valves and sump pumps in residential homes possibly affected by flooding
b. Explore options of retention ponds to divert water away from affected home

c. Build temporary flood barriers around property and residential homes
d. Promote raising flood levels, electrical fittings, other equipment and sentimental items above the flood mark
e. Encourage water resistant construction materials
f. I don't support any of the mentioned adaptation strategies

Drinking Water:

1. How significant is this area to you?

    a. Not significant at all
    b. Somewhat insignificant
    c. Indifferent
    d. Somewhat significant
    e. Very significant

2. What adaptive actions do you think should be implemented to address this vulnerable asset?

    a. Monitor the lake ecosystem and explore technological solutions to blue-green algae blooms
    b. Explore engineered solutions
    c. Explore the potential to import water if required
    d. Look at alternate means of storing water
    e. I don't support any of the mentioned adaptation strategies