FROM SHORELINE TO HEARTLAND:

RURAL MUNICIPALITY OF NORTH SHORE'S CLIMATE ACTION PLAN

2024

RURAL MUNICIPALITY OF North Shore

stanhopecovehead.pe.ca

LAND ACKNOWLEDGEMENT

We acknowledge that we are on the traditional, taken territory of the Mi'kmaq people. For over 12,000 years, the Mi'kmaq Nation has been the keepers of this land we now call Prince Edward Island, known as Epekwitk. We express our deep gratitude and respect for the Epekwitnewaq Mi'kmaq elders, past and present, who have cared for and nurtured this land.

We recognize the enduring presence, knowledge, and contributions of the Mi'kmaq people, whose vibrant culture and rich heritage continue to shape the identity of this region. We honour their connection to the land, waters, and all living beings that inhabit these territories.

Let us reflect on the ongoing challenges faced by the Mi'kmaq people and the importance of reconciliation. May we strive for understanding, justice, and equality as we work together to build a future that respects the rights and aspirations of all Indigenous peoples.

In the spirit of reconciliation, we commit to fostering meaningful relationships with the Mi'kmaq community and engaging in ongoing dialogue, recognizing the need to listen, learn, and take meaningful action towards reconciliation.

We are all Treaty People.
Wela'lioq. Thank you.

COLLABORATION ACKNOWLEDGEMENTS

Funders and Facilitators

The *From Shoreline to Heartland: The Rural Municipality of North Shore's Climate Action Plan* (The Plan) was made possible through the Climate Challenge Fund and facilitated through the Federation of PEI Municipalities (FPEIM) and the Clean Foundation.

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Contributors: This Plan represents the efforts of many parties who offered their expertise, advice, and time. We thank the participating residents, staff, Council, and committee members of the RMNS. Notably, we thank ***Sarah Wheatley***, the Chief Administration Officer of the RMNS, for her great contributions.

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Special thanks to Lily Reaman for contributing many of the photos found throughout this document.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The From Shoreline to Heartland: Rural Municipality of North Shore's Climate Action Plan (The Plan) provides guidelines to help deal with climate change in our rural, coastal municipality. Its main focus is on making community changes to prepare against the threats posed by climate change, while at the same time taking steps to reduce greenhouse gas emissions by using renewable energy sources and becoming more energy efficiencent over time.

To put The Plan together, we carried out a thorough Needs and Risk Assessment, had residents complete a survey, and conducted extensive research, all of which helped us identify concerns, needs, priorities, and weaknesses. The Plan focuses on considering climate change in every level of community planning, in homes and buildings, energy sources and uses, transportation, weather emergency plans, all types of water usage, and the environment.

Climate Hazards, Local Climate Projections, Residents' Priorities and Concerns:

- *As a result of climate change, we are facing threats from increased risk of higher sea levels, eroding coastline, storm surge, flooding, extreme weather, and seasonal coastal ice loss.*
- *Temperatures are expected to rise year round. From between 2011 and 2040, seasons without frost could increase in length from 187 days a year to 212-236 days a year between 2071 and 2100.*
- *Extremely hot days (with temperatures above 29° C) could increase from 8 days per year (between 2011 and 2040) to 21–50 days per year (by 2071-2100).*
- *Rain/snowfall is projected to increase in all seasons. Between 2071 and 2100, there could be 2 to 4 more days per year with brief but intense rainfall.*
- *By 2100, sea levels could rise by 0.76 – 1.12m, and under certain conditions could rise by 1.51m.*
- *Residents were asked to rank their most pressing concerns, 36% of RMNS survey respondents rated coastal hazards (e.g., post tropical storms, erosion, storm surges) damaging properties and environment as their top concern. Their second highest ranking concern (by 32% of people) is damage to trees and plants due to extreme weather (e.g., heat, freezing rain and wind), while their third highest ranking concern (31% of respondents) is power outages that last more than 12 hours.*

Highlights from the Plans Goal and Action Section:

Resilient Buildings

- *Encourage Efficiency PEI's approach: First, think about behaviour changes that can save energy; second, look at how well energy is used inside specific buildings; and lastly, consider big changes to your building's energy systems, which may include adding renewable power sources.*
- *Encourage making changes to buildings and creating new buildings that better withstand climate hazards, using suggestions made through local coastal and flood zone assessments and resources, such as: Coastal Hazard Assessments (offered by The Province), Coastal Hazards Information Platform, Watershed Flood Projections Reports, Protecting PEI Homes from Flooding and Erosion course, and CLIMAtlantic's Coastal Adaptation Toolkit.*

Water Matters

- *Work towards a reliable and safe supply of drinkable water for all: Take into account well contamination by increasing natural supports around well sites, and supports for water security into the future.*
- *Increase effectiveness of stormwater and erosion management: Develop area-specific stormwater and erosion management plans, increase the ability to handle stormwater (culverts), and introduce natural, hybrid, and low-cost control habits through education and community initiatives.*

Coastal & Wetland Defence

- *Encourage solutions based in nature to maintain and improve the physical wellbeing of local coastlines and wetlands in collaboration with local watersheds and The Province. Examples: living shorelines, artificial reefs, oyster reefs, wetland and upland planting, etc.*
- *Host workshops/events or share educational materials to raise awareness of the benefits of healthy wetlands and coastlines in adjusting to climate change and for reducing its impact.*

Green Havens

- *Manage green space like parks, in ongoing cooperation with a variety of parties who will benefit from them: create a Parkland/Forest/Green Space Management Plan; create more green space; add more plants that are native to PEI; increase biking, walking, and cycling paths; and add more supports for climate health such as water fountains in green spaces.*

Conclusion

The recommendations in this plan focus on local solutions and investments that will save money and increase our community's overall quality of life. The actions we take today to prepare for climate emergencies and to strengthen supports, transportation, energy, natural defence, and municipal planning, will not only help us reduce the risks of climate emergencies and adapt to them, but they also create an environment that is welcoming and healthier to live in over the long term.

Please Note: For explanation of terms, please see the Glossary on page 35 of the document.

WELCOME TO THE RURAL MUNICIPALITY OF NORTH SHORE'S CLIMATE ACTION PLAN

Climate Action Plan (The Plan) represents our commitment to addressing the urgent challenges posed by climate change. As the RMNS works towards providing guidance for protecting our environmental future, The Plan outlines what we must do to reduce greenhouse gas emissions (from gasoline, furnace oil, etc.), adjust to a climate that is changing, and to ensure a future in which we can continue living in this community.

Climate change is both a worldwide and a local issue that affects everybody. Rising temperatures, extreme weather events, damage to the environment, and threats to our coastline are major risks to our community, economy, and natural resources. However, we believe that by taking strong action now, we can create a manageable and healthier RMNS for generations to come.

The purpose of The Plan is to outline the goals and actions that can help us to address climate change. The Plan is the result of input on local climate priorities from RMNS staff, committees and Council, residents, and non-government organisations (NGOs). Taking into account other issues that may need to be taken care of right away and may disrupt the schedule as planned, the actions in this plan will be taken as funding for each becomes available. The Plan is not set in stone and is created with the understanding that it may change over time as environmental concerns and understanding change, and as new solutions are developed.

The Plan focuses on making sure that climate change is taken into consideration in all areas and all levels of our municipal government, including community planning, building construction, energy, transportation (fuel-powered and human-powered), climate emergency readiness, water (drinkable, stormwater, and septic), and environment. By acting to reduce climate change hazards through mitigation and adaptation in each of these areas, our aim is to create a wholesome plan that considers every aspect of life in the RMNS.

LIMITATIONS

The municipality faces several challenges that also occur in many other communities on Prince Edward Island (P.E.I.). These include having too many tasks and not enough staff and time to follow through, finding enough funding, getting residents involved, sharing information about the threats climate change poses, and bringing individual groups and residents together to work in collaboration. Tackling these challenges will make it possible to overcome many other related barriers.

LOCATION & PEOPLE

The RMNS is located in Queens County, P.E.I., Canada, and borders the Rural Municipalities of York and Union Road. The RMNS is approximately 12 km north of the City of Charlottetown, P.E.I.'s capital.

The municipality was incorporated on September 28, 2018, when three existing municipalities joined together: the Rural Municipality of North Shore (RMNS), Grand Tracadie and Pleasant Grove. The municipality now covers approximately 72 km^2 of land area and encompasses the communities of West Covehead, Covehead Road, Stanhope, Grand Tracadie and Pleasant Grove (see Figure 1). Part of the Municipality includes a relatively long section of the Prince Edward Island National Park along its northern borders.

Many residents in the municipality live along the coast, with its sandy beaches, sand dunes, salt marshes, and waterways. Industry in the RMNS focuses on its land and sea resources, and its population is growing and diverse. While some neighbourhoods within the municipality are like suburbs of a city, with many residents who commute to Charlottetown or other regions for work, other areas are populated by retirement, recreational, or seasonal communities, with a mix of year-round and summer residents.

- *2021 Census (released, March 2023): RMNS had a population of 2500.*
- *2016 Census RMNS had a population 2,152.*
- *RMNS's number of private dwellings was 1358 in 2023 (a 5.6% increase from 1286 in 2016).*
- *981 of the private dwellings were occupied by usual residents (permanent residents that may leave temporarily), the rest may be considered seasonal.*[6]

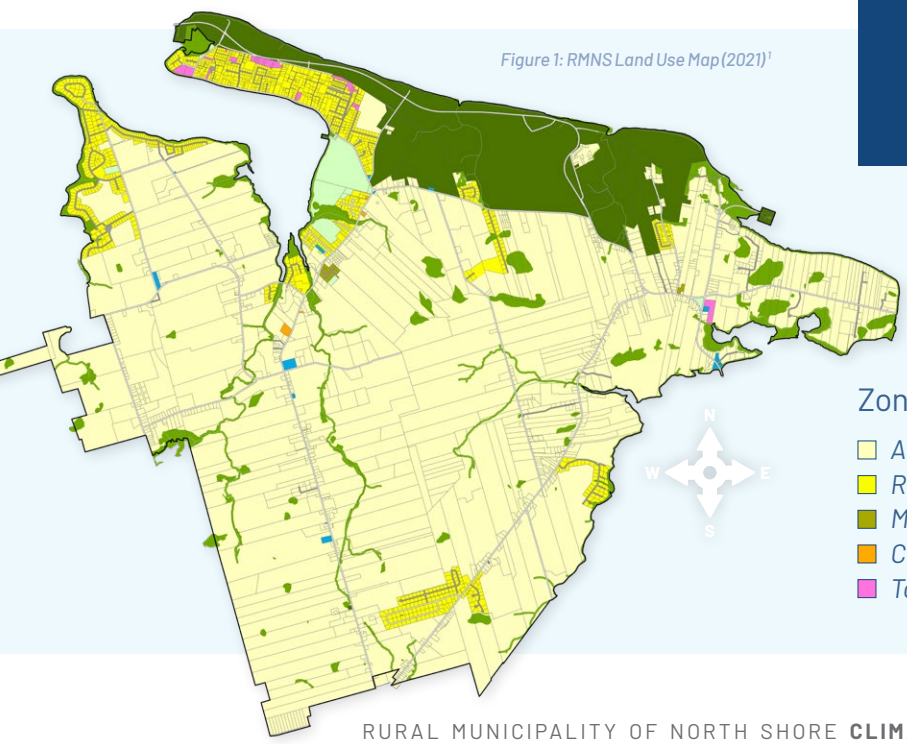

Figure 1: RMNS Land Use Map (2021)[1]

RURAL MUNICIPALITY OF NORTH SHORE

Draft Zoning Map (Jan. 2021)

Zones

- *Agriculture*
- *Residential*
- *Multi-Unit Residential*
- *Commerical*
- *Tourism Establishment*
- *Institutional*
- *Parks and Recreation*
- *Environmental Conservation*
- *Federal Jurisdiction*
- *Right of Way*

WATERSHED SYSTEMS

There are six watersheds (areas of land that water flows through on its way to a body of water such as a river or bay) that are fully or partially located within the RMNS. These watersheds from east to west are Black River, Bell's Creek, Auld Creek, Parson's Creek, Dalvay Lake, and Winter River. There are two watershed associations in the RMNS who work to keep their watersheds healthy: Friends of Covehead-Brackley Bay Watershed (FCBB) seen in Figure 2, and the Winter River-Tracadie Bay Watershed Association (WRTBWA) seen in Figure 3.

FRIENDS OF COVEHEAD-BRACKLEY BAY WATERSHED

Figure 2: Friends of Covehead-Backley Bay Watershed [2]

WINTER RIVER / TRACADIE BAY WATERSHED

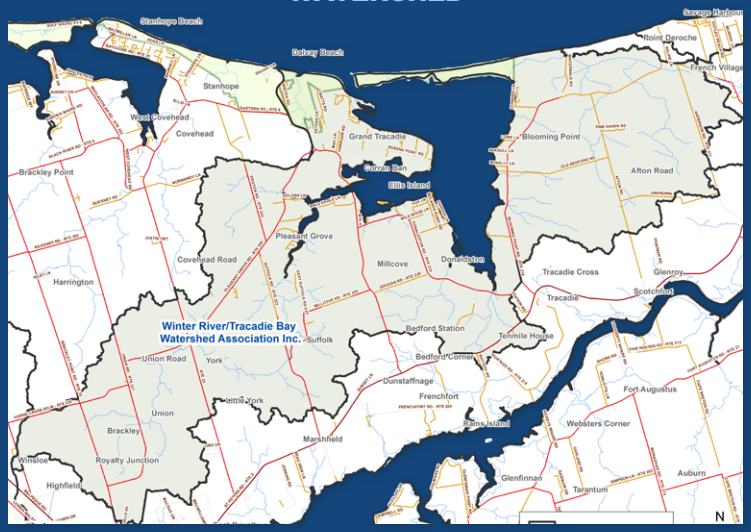

Figure 3: Tracadie Bay and Winter River Watershed [3]

FCBB (Figure 2) is a community-based volunteer organisation established in 2000, incorporated in 2001. The FCBB operates in an area of approximately 73km^2 (7,300 hectares or 18,039 acres) along the North Shore of Prince Edward Island. The Covehead-Brackley watershed area is made up of several different communities: Brackley Beach, Brackley Point, Covehead Road, Harrington, North Milton, Stanhope, West Covehead, Winsloe North, and Union Road. The five streams that make up the watershed area, from east to west, Parson's Creek (1 km long), Auld's Creek (5 km long), Bell's Creek (10 km long), Black River (combined with MacCallum's Creek 10 km long), and MacCallum's Creek. These five streams empty into the two bays, Brackley and Covehead. The bays are separated by a small channel at MacMillan's Point and eventually empty out into the Gulf of St. Lawrence at the mouth of Covehead Bay.[4]

WRTBWA (Figure 3) is found on the north coast of PEI just east of the center of the province. The Winter River-Tracadie Bay watershed encompasses a large area on PEI and includes several small communities including: Brackley, York, Union Road, Suffolk, Pleasant Grove, Mill Cove, Grand Tracadie, Donaldston, Corran Ban, Ten Mile House, Tracadie Cross and Blooming Point. The current group, WRTBWA, was established in 2008. The WRTBWA covers 14,117 hectares. The streams of all the rivers within the watershed management area have a total length of 42.75 km. Connected to these streams and rivers, are three large ponds and associated wetlands - Officer's Pond, Hardy Mill Pond, and Deroche Pond.[5]

RMNS CLIMATE PROFILE

This document identifies seven threats that our community, and the rest of the province, could be facing if the right changes are not made. These threats are coastal hazards, post-tropical storms, extreme heat events, heavy precipitation and flooding, earlier and warmer springs, severe ice storms and freezing rain, and seasonal droughts.

The following three tables show climate information for the RMNS, focussed on temperature (Table 1), precipitation (Table 2), and sea level rise (Table 3). This climate information includes past and current information, and forecasts up to the year 2100. It's important to have solid climate data in order to plan the actions we must take. Temperature and rainfall data used here are from the national climate data site, ClimateData.ca,[7] using averaged numbers. Sea level rise numbers are from Natural Resources Canada.[8] All numbers were arrived at using the most up to date methods from around the world for information collection (CMIP6). Results are comparable between scenarios until about mid-century (2041-2070). Results for the end of the century (2071-2100) are shown for both low emission (SSP2-4.5) and high emission scenarios (SSP5-8.5). All sea level rise data are for the high emissions scenario (SSP5-8.5).

The tables show past and future climate information for the area. Temperature and rainfall data represent an average year across four periods of time. Sea level rise is shown for each decade.

Table 1: Local Temperature Projections

Climate Index	1971-2000	2011-2040	2041-2070	2071-2100 [low]	2071-2100 [high]
Average temperature: Spring (°C)	2.9	4.7	6.5	6.8	8.7
Average temperature: Summer (°C)	17.1	19.0	21.1	21.1	23.8
Average temperature: Fall (°C)	8.6	10.3	12.2	12.1	14.5
Average temperature: Winter (°C)	-5.8	-3.4	-1.2	-1.1	0.9
Hottest day (°C)	29.6	31.4	33.2	33.6	36.1
Extremely hot days (> 29°C)	2 days	8 days	22 days	21 days	50 days
Coldest day (°C)	-23.8	-19.8	-15.6	-15.2	-11.6
Extremely cold days (< -15°C)	22 days	10 days	2 days	1 day	0 days
Ice days (entire day below 0°C)	71 days	53 days	37 days	36 days	20 days
Last spring frost (date)	May 7	Apr 29	Apr 15	Apr 14	Apr 1
First fall frost (date)	Oct 25	Nov 4	Nov 13	Nov 13	Nov 25
Frost free season	169 days	187 days	209 days	212 days	236 days
Growing degree days (base 5°C)	1697	2048	2477	2498	3094
Heating degree days (threshold 18°C)	4574	3980	3428	3387	2871

Temperatures are projected to increase throughout all seasons in the RMNS. Earlier and warmer springs are a hazard identified by P.E.I.'s Climate Adaptation Plan. In years 2011 through 2040, seasons without frost could increase in length from 187 days a year to 236-236 days a year between 2071 and 2100. In the years 2011-2040, the last frost date in spring is expected to move from April 29 to around April 1–April 14 from the year 2071–2100. The yearly frost-free season is projected to last longer, from 187 days from the year 2011–2040 to 212–236 days from the year 2071–2100. Temperature changes will affect farming and fisheries with an increasing number of pests, diseases, and invasive species, lobster sensitivity to water temperatures, faster erosion and coastline damage due to a reduction in protection from ice cover and more exposure to damage from waves.

Extreme heat events (temperatures above 29°C for 3 consecutive days) are a hazard identified in the P.E.I. plan and are connected to problems in agriculture, fisheries, tourism industries, and public health (including death in "vulnerable populations, such as the elderly). Extremely hot days (with temperatures above 29°C) are expected to increase from 8 days per year from 2011-2040 to 21–50 days per year from 2071-2100.

Table 2: Local Precipitation Projections

Climate Index	1971-2000	2011-2040	2041-2070	2071-2100 [low]	2071-2100 [high]
Total precipitation: Spring (mm)	244	264	276	281	289
Total precipitation: Summer (mm)	244	261	271	266	263
Total precipitation: Fall (mm)	307	314	323	319	326
Total precipitation: Winter (mm)	297	316	335	334	357
Wet days (1-19 mm)	150 days	150 days	149 days	150 days	147 days
Very wet days (> 20 mm)	9 days	11 days	13 days	13 days	15 days
Maximum one-day precipitation (mm)	46	51	55	55	58

Rainfall is projected to increase in all seasons in the RMNS. Very wet days are expected to increase - days that provide downfall in heavier bursts (too quickly to be absorbed by the ground). By 2071-2100, there could be 2 to 4 more days with short but heavy rainfall that may lead to flash flooding and heavy snowfall that interfere with transportation, damage crops, pollute waterways, block roads and traffic to communities, and reduce access to health care and emergency medical service (EMS). Changes in rainfall will affect a number of the problems outlined in P.E.I.'s Climate Adaptation Plan, including post-tropical storms, heavy rainfall and flooding, and severe ice storms and freezing rain.

Table 3: Local Sea Level Rise Projections (metres)

Year	2020	2030	2040	2050	2060	2070	2080	2090	2100
50th percentile (median)	0.11	0.19	0.23	0.32	0.40	0.48	0.59	0.69	0.76
95th percentile	0.18	0.30	0.34	0.47	0.58	0.71	0.86	1.01	1.12
Enhanced risk scenario									1.51

The 50th percentile, equal to the median, is the value at which half of the models give values that are higher and half the models give values that are under (so reasonable to assume that these results will occur); the 95th percentile represents the value at which 95% of the model results fall under (explaining a worse situation that is not as likely to happen) and it represents the models that show much higher sea levels. The enhanced scenario is the scenario that considers low-likelihood but high impact ice sheet processes (something of a worst case scenario).

By 2100, sea levels are expected to rise by 0.76–1.12m and under certain conditions could rise by 1.51m. This estimation of sea level rise would involve three of the hazards identified in P.E.I.'s Climate Adaptation Plan: coastal hazards, post-tropical storms, and heavy precipitation (rainfall) and flooding.

LESSONS FROM POST-TROPICAL STORM

FIONA

In late September of 2022, P.E.I. and Atlantic Canada experienced the destructive impact of post-tropical storm Fiona, a powerful storm that was a strong reminder of the challenges posed by climate change. Studying this event allows us to find useful lessons that can direct us in working to address a changing climate.

Post-tropical storm Fiona left a lasting impression on the Island, especially due to widespread power outages that lasted for weeks. The lengthy blackout was a difficult reminder of how easy it is to damage key parts of our communities and the services they provide (infrastructure) when extreme weather happens. It forced us to understand that we need a strong energy supply that can last through powerful storms, be repaired quickly, and cause fewer problems for "essential services" (medical staff, etc.), when it does have problems.

One of the clear results of the post-tropical storm is the major loss of dunes surrounding Prince Edward Island. Dunes are nature's way of protecting our coastlines. The major damage caused by Fiona reduced the size and strength of our dunes and pointed out how easy it is to damage the natural coastline and everything that lives among it (ecosystems), showing us how important it is to maintain and repair natural features along our protective coastline areas. It also displays how important it is to consider more natural protection methods.

The storm also did significant damage to our much loved forests; about 13% of forested areas on P.E.I. lost at least 70% of their trees.[9] Native Acadian Forest plants play an important part in maintaining a healthy climate, helping to get rid of impurities in the air, keeping our soil healthy, giving protection from water and wind, and many other important services. The damage done by Fiona brings home the need to increase resources for the planting of more trees native to P.E.I., more community engagement, and stronger support for local watershed groups and other organizations which are working for a healthy environment. The protection from our trees meant that more homes were less damaged than they would have been without the trees.

Post-tropical storm Fiona also showed us the incredible power of communities working together and rebuilding. The storm brought neighbours and strangers together to offer support, assistance, and comfort during a time of trouble. Communities came together, showing the strength and kindness that can come forward during difficult times. This community spirit pointed out the importance of encouraging strong social connections and community readiness, and of creating a way of life that is able to rebuild and change as we deal with the challenges of a changing climate.

Looking back on the way post-tropical storm Fiona affected us, we are reminded that climate change is an immediate and all-around challenge that means we must act together. It tells us that we need to build strong community support (infrastructure) that can be rebuilt if necessary, we must locate any new infrastructure with thought, protect and repair our natural ecosystems, and create a sense of community togetherness and readiness. By taking these lessons to heart, we can work towards a strong future for our community that is able to survive from climate threats.

RMNS RESIDENTS PRIORITIES AND CONCERNS WITH CLIMATE CHANGE

A total of 88 participants completed a survey regarding priorities and attitudes towards climate change, and was composed of mainly year-round residents of the municipality.

The survey asked respondents to rank a list of climate change hazards from first choice to last choice based on their level of concern. There were questions about certain climate hazards impacting the RMNS (Table 4), and ranking climate action priorities (Table 5 and Table 6). In calculating the top three issues, the first, second and third choices of each person were added together.

The number one concern to RMNS residents (36% of the tally), is coastal hazards (e.g., post tropical storms, erosion, storm surges) damaging properties and environment. The second top concern is damage to trees or plants due to extreme weather (e.g., heat, freezing rain and wind) with 32% of the tally. The third concern is power outages that last more than 12 hours (31%).

#1 CONCERN

36% RESPONDED:

COASTAL HAZARDS

#2 CONCERN

32% RESPONDED:

DAMAGE TO TREES OR PLANTS

#3 CONCERN

31% RESPONDED:

POWER OUTAGES

TABLE 4 - **HIGHEST CONCERNS:**

# 1	Coastal hazards
# 2	Damage to trees or plants
# 3	Power outages lasting more than 12 hours
# 4	Property damage from high winds
# 5	Flooding/seepage of water on property
# 6	Surface runoff into waterways
# 7	Health impacts from climate events
# 8	Property damage from freezing rain
# 9	Impacts on outdoor recreation
# 10	Increased pest migration

TABLE 5 - **HIGHEST CONCERNS:**

# 1	Energy efficiency initiatives
# 2	Renewable energy adoption
# 3	Sustainable transportation options
# 4	Advanced green building standards and incentives
# 5	Stronger development regulations

#1 CONCERN

37% RESPONDED: ENERGY EFFICIENCY INITIATIVES

We created two questions related to priority areas for climate action, one on energy/transport/buildings, and the next grouping of direct environmental issues. In the first part (Table 5) energy efficiency initiatives is the top choice (37%), second is renewable energy adoption with 35% of the tally, and the third top priority is sustainable transportation options (e.g., public transit, cycling, walking, EV chargers).

In the next question (Table 6), the top three priorities are all very close in ranking. The top priority is coastal, wetland, and watercourse conservation with 36% of the tally. The second top priority is potable water conservation and management with 33% of the tally, and coming in third is climate emergency preparedness with 32% of the tally.

TABLE 6 - **HIGHEST CONCERNS:**

# 1	Coastal, wetland and watercourse conservation
# 2	Potable water conservation and management
# 3	Climate emergency preparedness
# 4	Climate education and community outreach
# 5	Green space expansion
# 6	Stormwater management

#1 CONCERN

36% RESPONDED: COASTAL, WETLAND AND WATERCOURSE CONSERVATION

Qualitative and Quantitative input from residents is included throughout the rest of The Plan.

ACTIONS & GOALS

Community Climate Planning

As the effects of climate change become more and more obvious, it's necessary that we tie it into local community (municipal) planning.

The Plan draws attention to the importance of this, and of taking action on these plans.

Benefits of Good Planning

- *Fewer land use conflicts*
- *More efficient and cost-effective development, use and maintenance of infrastructure*
- *Predictability for landowners*
- *Protection of natural resources*
- *Clean and healthy environment*
- *Better quality of life for residents*
- *Climate resilience and preparedness*
- *Low carbon lifestyles that reduce greenhouse gas emissions*

Consequences of Not Planning

- *Conflicting land uses*
- *Urban sprawl and rural ribbon development*
- *Unpredictable development*
- *Loss of natural assets, biodiversity, and vulnerable habitat*
- *Expensive and inefficient delivery of services*
- *High cost to maintain infrastructure*
- *Increased climate vulnerability*
- *High dependence on personal vehicles (increased emissions)*[11]

Community Climate Planning Goal and Action Table

*C - Community Climate Planning goal label.

Goals	**Recommended Actions** (and Examples)	
C1 Integrate climate change considerations into all aspects of community planning.	1. Update the Official Plan, Land Use Bylaw, and other applicable plans to reflect the new CSA Group Community Water Standards and allow the standards to be updateable as the CSA Group updates them. 2. Amend the Official Plan Land Use Bylaw to increase horizontal coastal setbacks to reflect current rates of erosion and to incorporate future climate considerations into land use and building regulations. 3. Update the directions in the Waterfront Development Policy with more stringent erosion and sediment control requirements for development. 4. Increase development restrictions in high-risk coastal and flood zone areas (including no further development). 5. Educate residents about proposed policy and bylaw changes, showing data that is backed by professionals, and why they are necessary. 6. Promote well designed rural mixed-use development patterns that adapt to the changing climate (less sprawl along the coast) that protects residents, infrastructure, industry, natural assets, and increase attractiveness of the RMNS as a place to live.	• Number of individual bylaw items that were changed to consider local climate change hazards. • Number of climate change objectives integrated into the municipal planning framework.
C2 Foster collaboration and partnerships with stakeholders to implement effective climate-responsive planning initiatives.	1. Foster partnerships with local businesses, academic institutions, different levels of government, neighboring municipalities, watershed groups, and non-profit organizations to leverage expertise, resources, and funding for climate-responsive planning initiatives and co-benefits. 2. Ensure equitable access to resources and opportunities within the community through inclusive and participatory planning processes. 3. Collaborate on local climate action projects mentioned within this plan.	• Number of joint projects completed with partners that align with The Plan's actions.
C3 Resources and capacity for The Plan's success.	1. Increase staff capacity for implementing RMNS climate goals. • Search for opportunities to hire more staff or expand the roles of existing staff. 2. Showcase climate change resilience techniques and funding programs that are applicable for rural and coastal residential properties.	• Number Full Time Equivalent staffing positions created • Number of events and social media posts pertaining to climate resilience funding.

CASE STUDY: North Rustico, PE
Using Electric Buses for Emergency Warming Centres

This solution uses electric-powered school buses (Lion Electric) equipped with vehicle-to-grid (V2G) technology so that the pre-charged buses can feed power to the emergency warming centres during power outages. The North Rustico Lions Club has been selected as the site where this will be tested.

Putting V2G Technology Into Action: *Lion Electric buses have V2G technology that allows chargers to take power from the buses' batteries during emergencies. This technology allows electric buses to act as moveable power sources, giving electricity to emergency heating centres when the usual power sources aren't available.*

Covering the Cost: *Lion Electric, the company that owns the electric buses, will pay for most of the costs instead of the town or the North Rustico Lions Club. The government of P.E.I. will take care of the cost of anything that might happen during setup, such as more chargers for the electric buses.*

Future Plans: *All electric buses on P.E.I. can be fitted for V2G technology, meaning that the amount of movable power can be increased easily, and adjusted as needed between different emergency warming centres across the province.*

By using electric buses to power warming centres during disasters, the North Rustico Lions Club and province are putting environmental concerns at the top of their list, and also showing that new technology is a strong hope in responding to serious community needs. [13]

Emergency planning and readiness are top priorities for our rural coastal municipality, given the challenges and risks we face due to climate change. Rising sea levels, coastal damage, and stronger storms are potential and powerful risks, as are growing concerns about forest fires from trees downed during post-tropical storm Fiona and future extreme heat.

More than $220 million in insurance was paid out to cover damage caused by post-tropical Storm Fiona in P.E.I.,[14] and insurance payouts in Atlantic Canada reached over $800 million.[15] This does not include damage that was not covered by insurance. That damage was left to property owners, local government, and provincial government to pay for.

By being emergency ready on all levels, we can more successfully protect the lives and properties of our residents, reduce the impact of climate-related disasters, lower the financial cost of climate emergencies (as prevention makes more money sense than emergency

repairs), and strengthen our ability to deal with changing environmental conditions. This includes connecting residents to early warning systems, putting evacuation strategies in place, growing the number of people that a community centre can hold, having the needed equipment and supports in place, bringing the municipality and its partners together, and creating actions to strengthen the ability to withstand emergencies.

Being ready for a climate emergency in our area is not limited to the RMNS alone, but it also involves neighbouring municipalities. The North Shore Joint Emergency Management Organization (NSJEMO) also includes the communities of Union Road and York. These three communities have come together to pool resources and skills to manage emergency services. Because of this partnership, it's important to support these neighbouring municipalities in increasing their overall ability to handle climate emergencies.

The potential occurrence of wildfires has been brought up by RMNS residents. Fire Smart Canada[16] has resources available for residents and communities, as well as providing education sessions to communities.

Emergency Preparedness Goal and Action Table

*EM - Emergency preparedness goal label.

Goals	**Recommended Actions** (and Examples)	**KPIs** (examples)
EM1 Update Emergency Response Plan.	1. Include measures in the EMO plan for residents who bring their pets. • Explore opportunities for North Shore Community Centre (NSCC) pet services, supplies, and a directory for partnering boarding facilities, animal shelters or veterinarians that can care for residents' animals during longer emergencies. 2. Collaborate with EMO and fire department on emergency and prevention plans that consider, loss of vital road access, wildfires, extended power outages (more than 3 days), and support measures for seniors during emergencies. 3. Declare a Climate Emergency.	• Number of climate emergency preparedness measures covered in EMO plans.
EM2 Enhance community resilience and preparedness to withstand the impacts of climate change.	1. Conduct education and awareness campaigns to increase climate emergency preparedness. • Promote EMO preparedness through broadcasting on the RMNS Facebook page and newsletter. • Materials such as, 72-hour emergency kits and checklists, generator safety, Parks Canada wildfire wall, and pet emergency kits and checklists. 2. Update EMO volunteer lists bi-annually and their duties. • Provide financial incentives to volunteers, to reduce the financial barrier of their participation (all training provided for free, child-care stipends while volunteers are at NSCC, mileage reimbursement for attending meetings, etc.	• Number of climate emergency volunteers.
EM3 Increase infrastructure and equipment capacity in preparation for climate emergencies.	1. Increase emergency capacity of community buildings/lands. • Upgrade the NSCC washrooms and showers, provide cots, increase pet capacity (have some large crates and foldable bowls on hand), store more care kits, area for food supply, and incorporate renewable energy for everyday use and back-up. 2. Install backup generators on other municipal buildings, such as Stanhope Place, for some RMNS staff to operate out of part-time during climate emergency events. 3. Foster partnerships with other municipalities, regional organizations, and government agencies to leverage resources, share best practices, and collaborate on climate solutions. • Encourage nearby communities to increase their climate emergency capacity (such as York community centre getting a generator and functioning as a warming centre) to reduce the number of individuals from outside RMNS needing to travel to our community to access services.	• Number of NSCC capacity and emergency preparedness projects completed.

Powering Sustainability

Renewable energy (RE) offers sizable benefits in the fight against climate change. Unlike fossil fuels (gas, oil, etc.), they give off little to no greenhouse gas emissions which are the problem behind climate change. By using solar, wind, hydro, geothermal, and other renewable sources, we can move away from fossil fuels, with the added benefits of improving air quality and allowing us to rely less on energy we have to buy from far away. To try to use more RE locally, the RMNS has outlined a Renewable Energy Policy in the Official Plan (2021; available online) to help work towards this idea.

CASE STUDY: Summerside, PE
Green Energy Success

The City of Summerside owns an electrical service for their community, and they aim to generate 65% of their electricity from RE sources by the spring of 2023, partly through the Sunbank Project (Partnering with Samsung Renewable Energy):

$66M solar power farm *(21 MW) with Samsung Renewable Energy.*

48,000 solar panels *with 10 MW/28MWh battery storage.*

Expected to provide 20% *of Summerside Electric's energy.*

Wind provides 45% of energy *from the city wind farm and West Cape Energy, the rest is purchased from NB Power.*

Aside from improved quality of life for residents, and a safe local power supply that comes from more than one source, the economic impact is significant as "clean tech" projects put money into the community, create jobs, and make the city more attractive to residents and investors because of its "green" supports and services.

Despite challenges with renewable sources like the possibility of change in supply, Summerside is proactively planning to increase energy sources that can be stored and used as needed from wind and solar-powered "green hydrogen" (low emission).

Financially, the city uses low-interest loans, government funding, and support from the Federation of Canadian Municipalities. Even municipalities that do not have their own utilities can work with partners on local power projects, and make additional money through renewables, as Summerside's $2.5M gain from the city wind farm shows.[17]

Powering Sustainability Goals and Actions Table

*E - Powering Sustainability goal label.

Goals	Recommended Actions (and Examples)	KPIs (examples)
E1 Lobbying in community energy generation.	1. Explore renewable energy (RE) power utilization, generation, and storage. • Solar, wind, and bio energy. • Reliable RE microgrids. - *Promoting affordability and accessibility for all residents, including those without generators or a lower mobility to operate one.*	• Number of municipal RE units installed.

On the Move — Transportation

Transportation is a major source of greenhouse gas emissions, air pollution, and energy use on P.E.I. By rethinking how we move people and goods, we can reduce our carbon footprint (the measure of the amount of harmful gas that is released by doing an activity), and improve both air quality and the lives of our residents. This section of The Plan outlines goals and actions that encourage non-harmful hobbies or recreation, changes in our behaviour, and building infrastructure. Working with regional and provincial partners will speed up progress as we work towards a healthy, long term future for transportation.

On the Move Goals and Actions Table

*T - On the Move goal label.

Goals	Recommended Actions (and Examples)	KPIs (examples)
T1 Promote electric and low-emission vehicles.	1. Help provide EV accessibility through charging stations. • Install charging site(s) at community center(s) and other municipally owned locations. 2. Create a plan for routine maintenance, possibly through a defined service relationship with the professionals who installed the charger. • Include routine maintenance and support into contracts with providers, opt for double-head chargers, and create an internal budget for maintenance. 3. Host promotion events and broadcast incentives on EV's and other low-emission vehicles during holidays (e.g., Canada Day and Easter).	• Number of EV and low emission vehicle charging stations installed.
T2 Expand T3 route.	1. Encourage The Province/T3 transit to create routes to the NSCC.	• Length (in Kms) of new routes added to the RMNS.
T3 Increase active transportation infrastructure.	1. Review current active pathways and search for ways to increase active pathway connectivity to, and through, the RMNS. • E.g., connect the NSCC to the Confederation Trail by creating an active pathway on Covehead Road from York to Stanhope Promenade, which then provides a connection to the National Park entrance. 2. Enhance the Promenade using nature-based initiatives to increase resilience. 3. Encourage planting of more native species along active pathways in collaboration with The Province and/or local watershed groups.	• Total length of active pathway lanes constructed within municipal boundaries. • Number of adaptive and climate resilient active pathway projects completed.

CASE STUDY: Charlottetown, PE
Taking Action Against Flooding – Flood Risk Reduction Rebate Program

In response to the need to make changes due to climate change, the City of Charlottetown uses a method that works for the location and that looks at any flood weaknesses the City might have. This case study reviews the municipality's flood program, that takes an active role in preparing for flooding, as a role model for successfully avoiding risk:

> *In 2021, the City of Charlottetown took part in a test program (funded by PEI Climate Challenge Fund). City staff filled out risk assessments with homeowners, and offered cash-back for any upgrades and repairs that prevented water from getting into homes.*
>
> *In 2022, the program spread wider across the City, and was known as the Charlottetown Flood Risk Reduction Rebate Program (in partnership with Intact Public Entities). This program covered 75% of the cost of any device that the City approved to protect against flooding, plus the cost of labour to install them. The limit was one application per property and total cash-back up to $1,000.*
>
> *Devices that the City could approve: Sump pumps, backup battery systems for sump pumps, water alarm/detection devices, and backwater valves (which automatically shut to prevent leakage).*

The City of Charlottetown's well-planned response shows the importance of risk assessments that are made specifically for the community, offer encouragement via cash-backs, and focusing on people when planning for climate change. This case study is a useful example for municipalities that want to strengthen and take care of climate problems that are found in their community.[18]

Across the province, most buildings are major contributors to greenhouse gas emissions. Reducing greenhouse gas (GHG emissions) not only helps address climate hazards, but it also can keep more money in the pockets of our residents. Efficiency PEI suggests taking three steps to successfully work to make buildings energy efficient.

First, look at the changes in behaviour that can be made to save energy. Second, look at how well (or poorly) energy is used inside the building. Finally, look at what can be changed about energy systems that are in place to make them more energy friendly, including renewable energy sources.

It is just as important to know the risks faced by buildings (such as post tropical storms, storm surge, flooding, sea level rise and coastal erosion) that are located in the municipality, and understand the importance of making changes that increase the safety of residents.

The Province of PEI offers a free in-depth Coastal Hazard Assessments (CHA)[2] and Watershed Flood Projections Reports[3] for developers, coastal residents, and potential coastal property buyers. Intact and ClimateSense offer a free course on Protecting PEI Homes from Flooding (PPHF)[4] and CLIMAtlantic provides public and free access to their online Coastal Adaptation Toolkit[5]. Residents and community organizations can utilize the toolkit to provide a general assessment of at-risk coastal infrastructure, and provide a list of potential solutions to be examined further by a professional.

Resilient Buildings Goals and Actions Table

*B - Resilient Buildings goal label.

Goals	**Recommended Actions** (and Examples)	**KPIs** (examples)
B1 Increase energy conservation, efficiency, and utilization of energy retrofits for all buildings with the RMNS.	1. Promote Efficiency PEI steps for all buildings within the RMNS. • Upgrade insulation, seals, doors, windows, etc. • Upgrade lighting, appliances, smart building technologies, etc. • Promote changes in low-carbon heating, cooling, and air conditioning (heat pumps and HVAC systems) • Promote the benefits of incremental increases in RE integration. • Promote whole-building systems thinking.	• Number of social media and newsletter posts regarding building energy conservation, efficiency, and retrofits.
B2 Promote climate resilient and adaptive local buildings.	1. Adapt buildings for local climate hazards (e.g., storm surge, flooding, erosion, and extreme weather events). • Ensure proper ventilation and air quality for extreme weather conditions. • Install sump pumps and backflow prevention devices or if these installations already exist, ensure they are maintained and in working order. 2. Inspire residents in coastal and flood zone areas to protect their own home and properties infrastructure through utilization of free assessment and guiding tools. 3. Encourage property owners and developers to consider green building design techniques. • LEED, Net-Zero, International Living Future Institute - Zero Carbon certification, Zero Carbon Building standard (CaGBC), and Passive House certification.	• Number of events and social media platforms promoting local coastal and flood zone risk assessments and tools. • Number of green buildings developed and/or certified within the RMNS.

[2] *Province of Prince Edward Island. (2020, April 30). Coastal Hazard Assessment. www.princeedwardisland.ca. https://www.princeedwardisland.ca/en/service/coastal-hazard-assessment*

[3] *Province Of Prince Edward Island. (2021, November 24). Watershed Flood Projections Reports. www.princeedwardisland.ca. https://www.princeedwardisland.ca/en/feature/watershed-flood-projections-reports#/service/Watershed/WatershedSearch*

[4] *Intact Centre on Climate Adaptation (University of Waterloo) and ClimateSense. (n.d.). Flood Protection Training – Intact Centre on Climate Adaptation. https://www.intactcentreclimateadaptation.ca/programs/home_flood_protect/training/#4th_PEI_Flooding_Erosion*

[5] *CLIMAtlantic. (2023). Coastal Adaptation Toolkit | Climatlantic. Climatlantic.ca. https://climatlantic.ca/coastal-adaptation/*

Water Matters — Potable Water, Stormwater & Septic

RMNS faces some challenges with groundwater, wastewater, and stormwater systems, mostly in areas along our coast where many residents live. The RMNS has undertaken many studies of drinkable (potable) water; the Stanhope Peninsula Potable Water System Conceptual Design (LINK) and Study can be found on the RMNS website.

As more extreme weather events take place, there are risks of coastal damage (erosion) and of unusually large amounts of tidal water caused by storms (storm surge). There is also a serious threat, now and in the future, to the systems that deal with groundwater, wastewater and stormwater in coastal regions.

This means that the RMNS has to take climate change into account when making decisions around groundwater (which is the source of all drinkable water on P.E.I.), wastewater, and stormwater control in order to reduce the risk of these water systems failing. The RMNS has conducted water studies and the recent Stanhope Peninsula Potable Water System Conceptual Design and Study is available on the RMNS website.

Attempts to reduce the risks posed by climate change, to increase our ability to deal with any sort of climate occurrence, and to work with other people and organizations who have an interest in the community (particularly the provincial government), will give the RMNS the best chance to continue having healthy water resources in future.

Water Matters Goals and Actions Table

*W - Water Matters goal label.

Goals	**Recommended Actions** (and Examples)	**KPIs** (examples)
W1 Ensure a reliable and sustainable potable water supply for all.	1. Enhance water conservation education and outreach programs. • Encourage native planting around residential well sites to slow surface water and increase groundwater infiltration. 2. Install central water infrastructure for long term water security. • Bypass the growing concern of well system failures (contamination through chemical and saltwater intrusion). • Seek funding opportunities for central water system installations and infrastructure improvements.	• Number of contamination incidents. • Installation of central water infrastructure.
W2 Ensure effective septic management.	1. Work with The Province on improving the effectiveness of the processes which regulate residential septic systems.	• Number of septic contamination and failure events.
W3 Implement effective stormwater and erosion management.	1. Develop localized stormwater (including from storm surge) and erosion management plans. 2. Showcase natural, hybrid, and low-cost management practices through education and municipal initiatives. • See N2 for blue and green natural and hybrid solution examples. • Seek out opportunities for small-scale stormwater and natural solution bank stabilizing improvements (municipal, residential, and businesses). 3. Increase capacity of culverts and ditches to allow efficient water flow during heavy precipitation and storms. • See B2 and C1 for more information on storm and flood resilience.	• Number of properties implementing stormwater, storm surge, and erosion management projects. • Number of updated culverts.

CASE STUDY:
Protecting Prince Edward Island's Coastline: Offshore Reefs

Locations that were studied: Souris Causeway, Cape Traverse, Cedar Dunes Provincial Park and West Point lighthouse, Crowbush Golf Course, Grand Tracadie Beach, Jacques Cartier Provincial Park, Miminegash Harbour, and the Panmure Island Causeway.

UPEI is studying a number of locations across P.E.I. to find out what works and what doesn't work with methods to preserve shorelines. The study records any changes to the shoreline, looks at whether or not measures in place to protect shoreline are holding up from year to year, as well as the condition of nearby roads, bridges, etc. (infrastructure).

A drone flies over each site twice a year to gather information about any changes to the sites.

Most of the monitored sites have some form of bulkhead, seawall (hard armouring), or rock wall protection.

Two of the infrastructure sites are protected by structures in the water that combine concrete and natural materials (hybrid offshore reefs) to break up waves that could cause damage.

Two offshore reefs built at Souris causeway in 2018 using a hybrid method (including large sandstone rocks).

Six reefs were installed in 2022 along in the intertidal zone (area between high tide line and low tide line, that is sometimes wet and sometimes dry) of the shoreline in front of the West Point lighthouse and Cedar Dunes Provincial Park.

Hard armouring does not stand up to severe weather events such as Fiona, when water is forced up and over the rock walls. Even without an extreme weather event, erosion can increase, speeding up shoreline damage in nearby areas, if structures are used incorrectly. The armouring method should be considered with caution.

While hard armouring alone isn't very successful against severe weather events, the two hybrid offshore reefs at the Souris Causeway are growing in success, allowing the beach to build back up and provide wave protection. The six intertidal reefs are showing promise as well. [20]

CASE STUDY: Stratford, PE
Strong & Flexible Shorelines at Tea Hill

A green approach to protecting the Island's shorelines has shown success against one of its first tests — post-tropical storm Fiona. Led by the PEI Watershed Alliance and the Stratford Area Watershed Improvement Group (SAWIG) with federal grant funding, this project used natural elements (sand, plants, reefs, etc.) to create what is called a "living shoreline" that strengthens coastal areas, which can be very successful when facing dangerous weather conditions.

The Project

Green Approach: *The project used a natural method (soft-armouring) with hay bales, logs, brush, and plant life to create strong and flexible shorelines.*

Away from Hard-Armouring: *Unlike the standard hard-armouring methods that use large stones and may actually increase erosion, living shorelines focus on natural materials to successfully lessen the power of waves and storm surges.*

Post-Storm Assessment

Slight Damage: *PEI Watershed Alliance looked at the living shorelines one week after storm Fiona, and found only slight damage even though waves and winds were extreme. Some erosion occurred to the Harbourfront living shoreline, but the plant life higher up made it through the storm, confirming the success of the living shorelines.*

Ongoing Maintenance: *While some posts and hay bales were washed away, the project does not need to re-start from the beginning, with only repairs and strengthening of the existing protection needed.*

Stratford's living shoreline has not only shown early success against extreme weather (when Fiona hit, the living shorelines were about a year old), but has also pointed out its possibility to reduce coastal erosion. The cooperation between organizations, and the creative use of natural materials, shows that this project is a promising and long-lasting answer for protecting shorelines against future challenges.

The aftermath of storm Fiona. [21]

With the experience of extreme weather events such as post-tropical storm Fiona, our natural resources were hit hard. Parks Canada noted that all areas of the National Park saw major damage, there were different levels of coastal erosion during Fiona, which ranged from 3 to 10 metres of shoreline loss from erosion and dunes being swept away.[22] We need to use more nature-based solutions, or those that are a combination of natural and built methods, which is becoming known as the best approach for working with natural areas, as opposed to expensive construction (hard engineering also called grey solutions).

In the RMNS Official Plan (2021) and the Land Use Bylaw (2021) the RMNS has marked the approach the municipality will take in fulfilling different policy goals for wetlands and coastal areas. This includes the Environmentally Sensitive Area Policy for coastlines, water channels, wetlands, and their bordering areas, labelling these regions as Environmental Conservation Zones (ECZ). Limiting what happens in ECZ areas to those activities that help repair the environment or at least don't cause harm to these environmentally delicate areas. Along with ECZ, steps to control erosion are to be put in place during construction, unless Council believes that there will likely be no damage to nearby environmentally delicate areas.

The RMNS Official Plan also talks about meeting local goals with a Ground and Surface Water Protection Policy and an Environmental Buffer Policy (following the rules of the Environmental Protection Act, Watercourse and Wetland Protection Regulations) to protect the quality of water above and below ground (ground and surface water). This might be achieved through a permit provided by the municipality and approval though The Province.

Beneficial services wetlands provide:

- *Aesthetic, heritage, recreation, commercial value*
- *Flood and storm surge protection (wave attenuation and absorption)*
- *Groundwater recharge, discharge, purification, and storage reservoirs*
- *Shoreline and bank stabilization (erosion mitigation, soil conservation, and siltation management)*
- *Air purification, GHG recycling and sequestering (blue carbon)*
- *Human food sources (wild rice, cranberries, fish, shellfish, wildfowl) and energy material (peat, wood, charcoal)*
- *Wildlife habitat (biodiversity)*

These policies show that the RMNS understands the importance of having a Waterfront Development Policy in place in order to meet at least the lowest level of what is needed to reduce risks connected to climate change and to keep the area safe.

The top threats and risks to development near water are coastal erosion, coastal flooding and damage due to storm surge, sea level rise, and post tropical storms. With coastal areas under more threat than areas inland, if anyone wishes to build close to water they must complete a Development and Subdivision Application. A Coastal Erosion and Flood Risk Assessment carried out by The Province is needed before these builds can be approved.

Things that were looked at while making policy written about in this section can be found in C1. Wetland and coastal areas are managed by a number of legally governing bodies that must work together.

Coastal, Watercourse and Wetland Defense Goals and Actions Table

*N - Coastal, Watercourse and Wetland Defense goal label.

Goals	**Recommended Actions** (and Examples)	**KPIs** (examples)
N1 Update best practice guidelines and policies for land uses in coastal, watercourse, and wetland areas.	1. Follow best practices from governmental, local watershed groups, and industry, to preserve wetlands, watercourses, and coastal areas. 2. Collaborate on projects with other organizations that share the same goals in protecting local infrastructure, public wellbeing, fishery industry, and natural assets along coastlines, watercourses, and wetlands. • Leverage expertise and resources for joint coastal, watercourse and wetland projects. 3. Work with The Province on setting standards for appropriate water access points (notably in the bays and public areas) and infrastructure (e.g., docks and harbour infrastructure). 4. Educate residents on the pros and cons of different shore access structures/techniques.	• Number of water access points considering climate hazards (e.g., erosion, post tropical storms and storm surge).
N2 Work in partnership to promote nature-based solutions in and around coastlines, watercourses, and wetlands.	1. Promote nature-based solutions to maintain and enhance ecological integrity of local coastlines, watercourse and wetlands in collaboration with local watersheds, and The Province. Incorporate green (inland) and blue (in or periodically submerged by water) techniques. • Rain gardens, naturalized retention ponds, bioswales, community gardens, wetland planting, upland native plantings to strengthen and diversify buffer zones and stabilize soil (helps with erosion) on higher slopes and agricultural land. • Living shorelines and riparian planting, with artificial reefs (e.g., oystertecture - little reefs made of a mixture of things, such as oyster shells and live oysters) creating an in-water wave buffer. 2. Promote use of local material for nature-based solutions near water. • E.g... oyster shells and/or oysters from nearby fisheries (in partnership with industry and residents). 3. Utilize well planned hard engineering methods only when and where they are appropriate. • Dredge Cass's Pond to Improve water quality, ecosystem functionality, recreation and aesthetics, flood and erosion control, and increase water holding capacity. • Explore the option of using dredged material for agriculture purposes. 5. Look for ways to support both local watershed groups, whether it is with in-kind services (office space, meeting facilities), direct grants, participating in fundraising events, or encouraging residents to volunteer with their local group. 6. Discuss with agricultural organizations on better ways to promote beneficial change on agricultural land, notably buffer zones and ways to reduce runoff. 7. Host workshops/events or share educational materials to raise awareness of the benefits of healthy wetlands and coastlines, and actions residents can take on their own property.	• Number of nature-based projects collaborated on. • Number of outreach events and activities conducted.

CASE STUDY: Stratford, PE
Small Climate Projects Still Make Ripples

Starting to plan for climate change doesn't mean that a major "official" review or a complete look at every possible risk is needed. Municipalities can begin by working with a number of partners, including NGOs, watershed groups, property owners, residents, and school groups, to undertake small projects. This case study looks at the Town of Stratford's tree-planting program as a good example of a successful small-scale idea:

Partnerships: *The Town of Stratford worked with residents on a tree-planting program, carried out with support from the PEI Climate Challenge Fund.*

Cost-Effective Approach: *Through the program, residents applied to receive large native species trees for their yards at a quarter of the regular cost, making them easy to afford and to get.*

Smart Action: *With residents digging the holes and town staff planting the trees, this meant that the program required less staff, with about 160 trees planted from 2021-2022.*

Community Buy-In: *Having residents involved in the tree-planting initiative not only helps create a healthier environment, but it also allows residents to be more aware of the changing climate and builds wellbeing among community members.*

The Town of Stratford is an example of the success of starting small in climate change planning. The tree-planting program shows the common-sense in getting residents involved, creating awareness about the environment, and in meeting goals that people can see and experience without the need for a large investment.

This case study shows that other municipalities could put similar projects in place quickly, and the success that people working together can have in building climate-resilient communities.[23]

Green spaces are important to communities. They add to the economy, help balance the environment, and add to quality of life for residents. However, many factors need to be looked at more closely, so that we can have healthy, financially secure, and happy neighbourhoods:

- Intense weather
- Challenges in working with areas that are not part of any municipality (unincorporated areas)
- Activities on private land that cause environmental damage
- Removing many of the trees from a large forest and leaving only smaller unconnected bits of forest for wildlife (land fragmentation)
- Turning good farmland land into residential developments
- High levels of development along the coast
- Challenges with enforcing rules

Quick status on our lands provincially:

- *"Since 2001, more than 20 percent of the province's agricultural land has been lost. In addition, over the previous three censuses, from 2006 to 2016, P.E.I. showed an average loss of 3.6 percent of its farmland every five years. If the current rate continues, half of the farmland the province had in 2021 will be gone before 2050."* [24]
- *"An analysis on P.E.I.'s forests showed that the amount of forested land on P.E.I. had fallen 20% between 1990 and 2020, with most of that decline occurring between 2010 and 2020".* [25]
- *About 13% of forested areas on PEI lost at least 70% of their trees because of post tropical storm Fiona.* [26]

Knowing that growth and change will happen, we are looking at how to balance climate change, development, and community needs, through smarter planning to uphold our beautiful rural municipality.

Green Space Havens Goals and Actions Table

*G - Green Space Havens goal label.

Goals	**Recommended Actions** (and Examples)	**KPIs** (examples)
G1 Manage parkland in a sustainable and collaborative way.	1. Increase native plant coverage throughout the municipality. • Hire organizations such as watersheds to plant more native trees, shrubs, and ground cover plants to help heal from post-tropical storm Fiona. • Plant native plant species around NSCC and if the opportunity arises plant special and/or endangered native plant species if suitable for the area. • Provide a letter of support to local watersheds for the 2 Billion Trees Program. • Promote opportunities for residential plantings. 2. Hire a forestry professional to create a Parkland/Forest/Green Space Management Plan for any municipally owned properties and inquire about monitoring throughout the years.	• Number of locations where native plant species were planted. • Number of collaborative projects.
G2 Acquire and enhance current public green space areas for conservation, rehabilitation, and recreation.	1. Support efforts to convert marginally productive or high sloped farmland into parkland and rehabilitation areas. (e.g., ALUS program). 2. Update Land Use Bylaw to better protect productive agricultural land. 3. Promote and educate on the importance of sustainable agriculture and buffer zones (including smaller residential gardens). • Host seasonal celebrations for local sustainable farmers to showcase their efforts and appreciation for their harvest. 4. Investigate potential areas to acquire for green spaces. • Explore municipal records and land-use by-laws for Parkland Dedication locations (pockets of green space) and missed greenspaces to be deeded over. • Deed over any greenspaces that have been previously missed. 5. Enhance active transportation routes. Provide safe, and accessible greenways and bike lanes. • See T3 for more information. 6. Update or relocate the outdoor rink for better sun and heat protection in the winter months. • Use white liners only (to lessen the warming of the ice). 7. Incorporate FPEIM Protecting Habitat Guide into green space decision making. 8. Plant more deep rooted native tree species in appropriate locations (e.g., away from powerlines) to conserve the natural environment.	• Percentage increase in municipal parkland area, active transportation routes, and other public green space. • Number of days that rink is usable per year.
G3 Incorporate human health in green space management plans.	1. Increase tree canopy to provide cooling spaces, install water fountains to help prevent dehydration from extreme heat, and use built structures to better protect the public from climate dangers. • Explore municipal-provincial-federal relationship to shift policies, enhance fiscal responsibility, and equitable cost sharing for health services and green spaces.	• Number of green space infrastructure projects incorporated through a human health lens.

Green Space Havens Goals and Actions Table *(continued)*

*G - Green Space Havens goal label.

Goals	**Recommended Actions** (and Examples)	**KPIs** (examples)
G4 Provide educational opportunities.	1. Gauge the public interest for more public greenspace or their value of the relationship between climate change and green space. 2. Provide workshops on ways to increase local climate resilience through collaboration with agricultural organizations. • Possible topics: biodiversity, crop selection (including cover crops), optimal buffer zones, green technology, and financial savings. 3. Support local programs that enhance climate resiliency. • Native planting programs (trees, shrubs, and ground cover), invasive species removal (e.g., forest fire issue with invasives like Scotch Broom), native seed collection and dispersal, ect. 4. Invite local organizations to provide educational events that inspire residents to enhance their yard with locally compatible nature-based techniques.	• Number of educational workshops and programs conducted on green spaces.

CONCLUSION: CHARTING THE WAY

FORWARD

The "From Shoreline to Heartland: Rural Municipality of North Shore's Climate Action Plan" stands as a sturdy foundation from which to address the unique challenges posed by climate change in our coastal and rural municipality. With a key focus on adjustment, The Plan works to strengthen our community against the immediate and long-term impacts of climate change, dealing with the increased risks from hazards such as sea-level rise, coastal erosion, and extreme weather events. Other strategies aim to reduce greenhouse gas emissions, by creating small and measurable changes toward renewable energy sources and increased energy efficiency in our own municipal properties and projects, and we encourage others to join us.

In moving forward, when deciding how to best use our resources to meet the goals of The Plan, we will use a local outlook and consider how we can contribute to future cost savings and boost our community's overall quality of life. The actions outlined in The Plan (climate emergency preparedness, infrastructure resilience, sustainable transportation, energy initiatives, natural defence strategies, and all-round municipal planning), together create a more welcoming, livable, long-lasting, and healthy environment for our residents. The Plan is our commitment to building a strong and adaptive climate-aware community that is ready for the challenges of tomorrow.

LIST OF ACRONYMS

ALUS: Alternative Land Use Services

CHA: Coastal Hazards Assessment

ECZ: Environmental Conservation Zone

EMO: Emergency Measures Organization

EMS: Emergency Medical Services

EV: Electric Vehicle

FCBB: Friends of Covehead-Brackley Bay Watershed

GDD: Growing Degree Days (temperature 5 °C and warmer)

GHG: Greenhouse Gas

HDD: Heating Degree Days (temperatures 18°C and colder)

HVAC: Heating Ventilation and Air Conditioning

NGO: Non-Government Organization

NSCC: North Shore Community Centre

PEI: Province of Prince Edward Island

RMNS: Rural Municipality of North Shore

RE: Renewable Energy

WRTBWA: Winter River-Tracadie Bay Watershed Association

Acronyms for Action Tables Goal Labels

B: Buildings

C: Community Climate Planning

EM: Emergency Preparedness

E: Powering Sustainability

G: Green Space Havens

N: Coastlines and Wetland Defense

T: On the Move

W: Water Matters

GLOSSARY

Adaptation: Adjusting to the actual or expected climate and taking actions to reduce the impacts while also taking advantage of new opportunities provided under a changing climate.

Adaptive capacity: The ability of a human or natural system to adjust to climate change (including climate variability and extremes) by moderating potential damages, taking advantage of opportunities, or coping with the consequences.

Average temperature: Describes the average temperature for the 24-hour day. The average temperature is an environmental indicator with many applications in agriculture, engineering, health, energy management, recreation, and more.

Capacity: The combination of all the strengths, attributes, and resources available to an individual, community, society, or organization, which can be used to achieve established goals.

Climate Hazards: Refer to specific natural events or phenomena that have the potential to cause harm, damage, or disruption to human societies, ecosystems, or infrastructure. These hazards are often triggered or exacerbated by climate-related factors such as temperature changes, precipitation patterns, and extreme weather events.

Examples of climate hazards include hurricanes, droughts, floods, heatwaves, wildfires, and sea-level rise. These events can have immediate and direct impacts on communities and environments.

Climate resilience: Generally defined as the capacity of a system to maintain function in the face of stresses imposed by climate change and to adapt the system to be better prepared for future climate impacts.

Climate resilient infrastructure: Refers to how well something withstands, and how quickly it recovers from, natural hazards made worse by climate change. As climate change causes disasters like floods, post tropical storms, heatwaves, and wildfires to become more severe or reach new areas, much of our infrastructure will need to be redesigned and rebuilt for climate resilience. Examples such as, installing artificial reefs and living shorelines in efforts to aid in erosion and certain extreme weather buffers. Examples can also be seen in the size, location, and type of culverts to increase storm water capacity and direction. Another example is building homes in appropriate places and the design of the home considers local climate hazards.

Climate Risks: The potential for adverse effects or negative consequences resulting from exposure to climate hazards. Climate risks consider both the likelihood of a hazard occurring and the vulnerability of a system (such as a community, economy, or ecosystem) to that hazard. In other words, climate risks arise from the interaction between a hazard, the exposed elements, and their susceptibility or resilience to the hazard's impacts.

Coastline: a line that forms the boundary between the land and the ocean or a lake.

Coldest day: Describes the lowest nighttime temperature. In general, the coldest day of the year occurs during the winter months. Cold temperatures affect our health and safety, determine what plants and animals can live in the area, limit, or enable outdoor activities, define how we design our buildings and vehicles, and shape our transportation and energy use.

Ecosystems: are a community of organisms that interact within a specific environment.

Ecosystem service: Is any positive benefit that wildlife or ecosystems provide to people. The benefits can be direct or indirect—small or large, societal or economic.

Enhance Asset/green-grey assets: A hybrid between a natural asset and engineered asset.

Examples: Rain gardens, bioswales, urban trees, urban parks, biomimicry, stormwater ponds, living shorelines, oyster-tecture/oyster reefs, etc.

Engineered Assets/grey assets: Human made and engineered infrastructure.

Equity: Is the fair and respectful treatment of all people. This involves the creation of opportunities and reduction of disparities in opportunities and outcomes for diverse communities.

Extremely cold days: Describes the number of days where the lowest temperature of the day is colder than -15°C. This index gives an indication of the number of very cold days.

Extremely hot days: Describes the number of days where the daytime high temperature is warmer than 29°C. PEI's temperature threshold is when 2 or more consecutive days of daytime maximum temperatures are expected to reach 28°C or warmer and nighttime minimum temperatures are expected to fall to 18°C or warmer.

Or issued when 2 or more consecutive days of humidex values are expected to reach 36 or higher.

First fall frost: Marks the approximate end of the growing season for frost-sensitive crops and plants. When the lowest temperature of the day is colder than 0°C for one consecutive day (after July 15th) the date of the first fall frost is established.

Frost-free season: The Frost-Free Season is the approximate length of the growing season during which there are no freezing temperatures to kill or damage frost-sensitive plants. This index describes the number of days between the Last Spring Frost and the First Fall Frost.

Green Spaces: Refers to areas of land covered predominantly by vegetation, such as parks, gardens, open areas for recreation, and natural reserves. They provide recreational opportunities, support biodiversity, and offer ecosystem services like air purification and temperature regulation. Green spaces mitigate climate change impacts, improve resilience, and promote sustainable practices. They enhance the quality of life and create a healthier urban environment by fostering a harmonious relationship between humans and nature.

Growing degree days (temperatures 5°C or warmer): Growing degree days (GDD) are a measure of whether climate conditions are warm enough to support plant and insect growth. When the daily average temperature is warmer than the threshold temperature, growing degree days are accumulated. For forage crops and canola, a threshold temperature of 5°C is generally used.

Heating degree days (temperatures 18oC or colder): Heating degree days (HDDs) give an indication of the amount of space heating (e.g., from a gas boiler/furnace, baseboard electric heating or fireplace) that may be required to maintain comfortable conditions inside a building during cooler months. When the daily average temperature is colder than the threshold temperature (18oC), HDDs are accumulated. Threshold values may vary, but 17°C or 18°C are commonly used in Canada. Larger HDD values indicate a greater need for space heating.

Hottest day: Describes the warmest daytime temperature. In general, the hottest day of the year occurs during the summer months. When temperatures are very hot, people – especially the elderly – are much more likely to suffer from heat exhaustion and heat stroke. Many outdoor activities become dangerous or impossible in very high temperatures.

Ice days: Describe the number of days where the warmest temperature of the day is not above 0°C. In other words, this index indicates the number of days when temperatures have remained below freezing for the entire 24-hour period. This index is an indicator of the length and severity of the winter season.

Last spring frost: Marks the approximate beginning of the growing season for frost-sensitive crops and plants. When the lowest temperature of the day remains above 0°C for one consecutive day (before July 15th) the date of the last spring frost is established.

Maximum one-day precipitation: Describes the largest amount of precipitation that falls within a single 24-hour day. This index is commonly referred to as the wettest day of the year.

Mitigation: Actions limiting the magnitude and rate of future climate change by reducing greenhouse gas emissions and/or advancing nature-based solutions.

Natural Assets: A valuable resource provided by nature that provides ecosystem services and benefits for people.

Examples: bodies of water such as lakes, rivers, ponds, streams, creeks, watersheds, aquifers, wetlands, foreshores (part of a shore between the high-water and low-water marks), minerals, air quality, soil, biodiversity, forests, parks, soil, agricultural land (some include it while others do not), cleared land, built-up pervious, fields, etc.

Resilience: The ability of a system and its component parts to anticipate, absorb, accommodate, or recover in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.

Sea level change: The change in ocean level relative to land. Attributed to thermal expansion of water and meltwater from glaciers, ice caps, and ice sheets, along with vertical motion of the land. Projected sea level change is relative to 1986-2005 conditions.

Seasons: Seasons are divided into standard meteorological seasons: winter includes December, January, February; spring March, April, May; summer includes June, July, August; and fall includes September, October, November.

Total precipitation: Describes the total amount of precipitation (rain and snow combined) that falls. Precipitation significantly impacts water availability, agricultural practices, electricity generation and wildfire suppression.

Very wet days: Describes the number of days where at least 20 mm of precipitation falls. Short duration, high intensity rainfall events may lead to flash flooding; heavy snowfall events disrupt transportation.

Vulnerability: The sensitivity or predisposition to be adversely affected by climate change. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Watershed: An area of land that drains or "sheds" water into a specific waterbody.

Wet days: Describes the number of days where at least 1 mm of precipitation falls. This index generally captures every day when there is measurable precipitation.

Wetlands: Areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils. There are two general categories of wetlands, coastal/tidal wetlands and inland/non-tidal wetlands.

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RURAL MUNICIPALITY OF North Shore

FROM SHORELINE TO HEARTLAND:

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2024