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for Climate Change
and Adaptation

Prince Edward Island Interim Coastal Policy Recommendations Report

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Figure 1. New residential construction on a low lying coastline surrounded by saltmarsh. Tignish Shore, PE. (D. Jardine, 2023)

Introduction

Prince Edward Island's (PEI) unique coastline, which spans over 3,000 km in length, is under threat from both natural and societal stressors. Effectively managing the coast requires an understanding of the often-conflicting demands and their implications on the future of the Island's coast, including:

- A high demand for new waterfront homes, cottages, and tourist establishments.
- The draw of visitors and tourists for seasonal recreation.
- A fisheries sector reliant on coastal infrastructure and healthy waterways.
- Coastal habitats and species at risk vulnerable to human activities and development.
- Coastal hazards which have intensified in recent years due to extreme weather events and climate change.

In other jurisdictions land use planning is used to establish which areas of the coast will be protected, developed, and/or restored. But 82% of PEI lacks comprehensive land use planning policies and development regulations to guide coastal zone management. In the absence of planning, the current approach is limited to environmental protection policies and regulations which only address the range of issues from a single perspective: what is best for the environment. These measures fall short from protecting the dynamic

natural processes and have been insufficient in reducing vulnerability to coastal hazards, including erosion and storm surge flooding.

Where infrastructure and land uses that serve people have not yet been developed, natural processes do not constitute hazards. Coastal hazards occur where the built environment encroaches upon the coastline and the coastal processes threaten to cause damage. Despite knowledge of these threats, new coastal subdivisions continue to be approved in hazard-prone areas, and properties continue to be developed in older, existing subdivisions which do not meet current minimum standards. These development trends increase the province's vulnerability and drive reactive adaptation strategies.

In the absence of proactive adaptation, shoreline armouring (i.e., the construction of structures or use of materials to prevent and/or reduce impacts of coastal erosion), has emerged as the most prevalent coastal adaptation method used on the Island. It has become such a common practice that it is found on coastlines in low-hazard areas, along the full length of farm fields, and on many vacant properties.

While often called "coastal protection", armouring does not protect the coast, and does not protect low-lying areas from coastal flood risks. The act of armouring or hardening the coast is intended to mitigate the natural process of erosion to protect

Shoreline armouring already covers over 237 km of PEI’s coastline and has been installed at a rate of about 7.2 km per year since 2018. Over the past 5 years, 98% of the new installations were on private property.

(Parnham et al., 2023)

coastal infrastructure. However, studies have shown that armouring can lead to accelerated loss of the sandy beach, coastal habitat loss and degradation, and accelerated erosion on adjacent properties. Additionally, many armouring installations, both those that are professionally designed and those commonly found on private property, have failed repeatedly during extreme weather events. It is becoming clear that armouring should always be considered a temporary strategy.

While armouring may be necessary for critical coastal infrastructure such as wharfs and bridge embankments due to their inherent coastal function, other types of infrastructure would not require armouring if not for their existing proximity to the coast. Climate change will continue to increase coastal vulnerabilities, even for those areas once considered safe. With more than 1000 km of coastline already developed (based on coastal properties with a civic number) and as many lots approved for future development, there is significant risk exposure to current and future coastal hazards.

As long as development continues in high hazard areas, the Island’s coastal vulnerability will continue to increase, risking further coastline degradation and escalating disaster recovery related costs.

The status quo is unsustainable.

Unless the root cause is addressed, the province faces an uphill battle against coastal hazards. The situation’s urgency demands a robust, systematic approach, that addresses not just immediate infrastructure risks but which also protects the remaining natural coastline and supports the growth of resilient coastal communities challenged by ongoing and future climate change threats. It is time to set the Island’s long-term priorities for coastal zone management.



Figure 2. (left) Remnants of a failed gabion basket coastline installation. Victoria, PEI. (D. Jardine, 2015)

Figure 3. (right) Repeated attempts at shoreline armouring has resulted in a shoreline characterized by the debris of various materials. Souris, PE. (D. Jardine, 2014)

Interim Coastal Policy Recommendations Report

The Government of Prince Edward Island, Department of Environment, Energy and Climate Action (DEECA) commissioned the *Interim Coastal Policy Recommendations Report* (ICPRR) to identify actions that can be taken by the DEECA's adaptation practitioners, planners, policy advisers, and decision-makers. While the intent was to identify actions that fall within the DEECA's mandate and current scope of responsibilities, a holistic coastal zone management plan necessitates a whole-of-government response. As such, the report's recommendations will also be relevant for decision-makers across government departments and in PEI's coastal municipalities, especially for those involved with land use planning, emergency planning and response, and asset management.

This report draws from the findings presented in the *PEI State of the Coast Report 2023*, a detailed background document which describes PEI's natural coastal processes, projected impacts of climate change, and the current extent of coastal development, including critical infrastructure located in high-hazard coastal areas. The proposed Coastal Policy Decision Framework and 16 specific policy recommendations presented in this report are based on innovative strategies and best practices assessed from over 41 provinces, states, and countries. Details of the jurisdictional scan are presented in a stand-alone report (Jardine, et al. 2023)

The proposed Coastal Policy Decision Framework moves beyond describing the range of adaptation options as "either/or" alternatives. Instead, it establishes a system in which options for coastal zone management and adaptation strategies are ranked according to priorities. The framework emphasizes proactive and preventative measures to prevent further actions that increase the province's coastal vulnerability. The framework also addresses current challenges while promoting sustainable new development opportunities and bolstering coastal ecosystem resilience.

The interim policy recommendations describe actionable steps for Government including new policies, regulations, strategic plans, and programs. While some of the recommendations will require further inter-departmental collaboration, public consultation, or legislative changes, others can be swiftly implemented through decisive action. The recommendations proposed serve as a temporary measure, however offering pathways

towards provincial coastal zone management while emphasizing no-regrets strategies in the interim.

The next phase of this work should involve the development of detailed shoreline management plans (SMPs). SMPs offer a framework for decision-making related to coastal development and adaptation. They reflect the unique natural conditions of each coastal littoral cell as well as the long-term social, environment, and economic objectives of existing coastal communities and anticipated growth areas. In addition to SMPs, further research, monitoring, and post-policy implementation evaluations such as those presented in the *State of the Coast Report* (Parnham, et al., 2023) will also be essential to achieving long-term coastal zone management objectives.

The PEI Government has recently committed to the development of the province's first strategic Land Use Plan. Such a plan will guide sustainable development and resource protection on the Island, balancing environmental conservation, economic growth, social well-being, and agricultural needs. While the interim measures proposed here constitute a critical first step, long-term coastal sustainability and resilience for PEI will depend upon the development of a provincial Land Use Plan.

Without a clear vision for how and where coastal development will be permitted in the future, planning for the impacts of coastal hazards, and safeguarding the Island's beaches for future generations will not be possible.

The development of the Land Use Plan will involve public engagement, an equally important component to the creation of the SMPs. Public consultation was excluded from this interim project's scope due to time constraints.

Given the ongoing work still to be completed, the University of Prince Edward's School of Climate Change and Adaptation welcomes the opportunity to continue to support the Government of Prince Edward Island in the creation of its 25-year Coastal Management Plan.

Coastal Zone Management Today

The multiple jurisdictional authorities that oversee and regulate activities in the coastal zone have overlapping geographic boundaries, often blurring the lines of responsibility for coastal zone management. The following section provides a summary of jurisdictional responsibilities and highlights current legislation and processes. This is not an exhaustive review of all coast-related legislation, but rather is intended to provide context for the challenges to be addressed.

Overarching to this context is the fact that Epekwitk (PEI) is situated on Mi'kma'ki, the unceded lands of the Mi'kmaq people. The *Constitution Act*, 1982 affirms Aboriginal rights, and the Peace and Friendship Treaties recognize the authority of the Mi'kmaq First Nations over all lands and waters in Epekwitk.

The following descriptions of jurisdictional responsibilities are not intended to supersede the rights of the Mi'kmaq. Any further work on the development and/or adoption of coastal zone management policies should be pursued in collaboration with L'nuey, the governments and communities of the Lennox Island First Nation and the Abegweit First Nation, and the Mi'kmaq Confederacy of Prince Edward Island.



Figure 4. Buried revetment, sand renourishment and dune restoration. Dalvay, PEI National Park (D. Jardine, 2023)

Federal Jurisdiction

Canada's federal government oversees coastal waters from the ordinary low-water mark seaward to 200 nautical miles. Its jurisdiction encompasses activities such as navigation, shipping, and inland fisheries in the Gulf of St. Lawrence and Northumberland Strait. It also manages Crown land, including small craft harbours, National Parks, and land designated under the *Indian Act*. Typically, the federal government only intervenes in coastal zone matters in PEI if a project impacts its property, fish habitat, the aquatic or marine environments, is a federally funded project, or involves harbour or wharf infrastructure.

Federal environmental legislation, including the *Species at Risk Act* (SARA) and *Migratory Birds Convention Act* (MBCA) identify vulnerable species that are found on PEI's coast. The federal government has designated five species at risk that have habitat within or adjacent to the coast in PEI, including the Bank Swallow (bird, threatened), Piping Plover (bird, endangered), Little Brown Myotis (mammal, endangered), Northern Myotis (mammal, endangered), and Gulf of St. Lawrence Aster (plant, threatened).

The federal government has identified critical habitat that covers almost 39% of the total length of PEI's coastline (Parnham, et al., 2023). While enforcement of the SARA is currently limited to federal lands within the province, the regulations of the MBCA, which is applicable to Bank Swallow and Piping Plover habitat, are enforceable everywhere.



Figure 5. Graham's Pond Small Craft Harbour with shoreline armouring and offshore breakwater/reef (D. Jardine, 2023)

Provincial Jurisdiction

The provincial government is responsible for all coastal land above the ordinary low-water mark and the area within the intertidal zone is deemed provincial land and is publicly accessible.

All beaches are public beaches.

Currently, PEI does not have specific legislation to protect or manage public access to the coast or beaches other than in a *Coastal Area Policy* (1992) (CAP/92) which states that traditional beach accesses are to be respected and maintained in new subdivision designs.

DEPARTMENT OF ENVIRONMENT, ENERGY AND CLIMATE ACTION (DEECA)

The Environment Regulation Division of the DEECA is responsible for the Environmental Protection Act Watercourse and Wetland Protection Regulations. The regulations identify a 15m protected space adjacent to all watercourses and wetlands including the exposed coastline. This protected area is commonly referred to as the buffer zone. These regulations were originally adopted to reduce the impacts of runoff from agricultural land and safeguard riparian areas and water quality. Activities within the buffer zone are regulated, including farming, construction, landscaping, and conservation activities. A Watercourse, Wetland and Buffer Zone Activity Permit is required for undertakings including excavations, changes to the grade, removal of vegetation, operation of heavy equipment, and various types of development (e.g., construction of boardwalks, steps, docks, bridges, culverts, and shoreline armouring).

The Contractor Licensing Program is in place to provide local businesses with a 2-day training session on the rules and best practices for working in the buffer zone, and landowners are advised to use a licensed contractor for their buffer zone projects. Current regulations do not require construction design drawings to be submitted with Buffer Zone Activity Permit applications, nor is a qualified professional (i.e., coastal engineer, landscape architect, etc.) required to oversee the design, construction, or inspection of the completed work. The design of built projects is primarily based on the experience of the licensed contractor, or as requested by the landowner.

Enforcement of buffer zone regulations is limited due to the current capacity of the DEECA and is most often driven by complaints. In late 2022, due

to the increasing number of violations, the Minister announced that the fines for damaging the buffer zone would be raised from \$3,000 to \$50,000. Shortly afterwards, a moratorium was placed on new coastal developments and associated erosion control activities within the buffer zone. Since that time, only certain activities associated with critical infrastructure and repairs following Post-tropical Storm Fiona have been permitted.

The Forest, Fish and Wildlife Division is responsible for land and wildlife conservation efforts under the *Natural Areas Protection Act* and the *Wildlife Conservation Act* and their applicable regulations. Designated natural areas which are protected from future development include both public and private lands. Less than 5% of PEI's land area is currently protected under legislation. The *Wildlife Conservation Act* is intended to provide protection for species at risk and their habitats, however those species designated under federal legislation have yet to be identified in the provincial regulations.

The Sustainability Division oversees the development of resources for climate adaptation and coastal hazards. Coastal Hazard Assessments (CHA) are provided for coastal properties on request. In the past 2 years, the division has completed more than 650 CHAs per year. Each CHA includes a summary of the average rate of erosion and flood hazard associated with a specific coastal property. The CHA is intended to provide guidance for current and prospective property owners who want to be aware of the potential impacts of coastal hazards as they buy, sell, develop, and/or maintain a given property.

In 2016, the *PEI Coastal Property Guide* was published to answer frequently asked questions about living on and developing property on the coast. In 2021, a Coastal Hazards website was launched dedicated to sharing information and resources, including the Coastal Hazard Information Platform (CHIP), an online application form for requesting a CHA, technical information for design professionals, and a free online course available to anyone interested in learning more about coastal hazards and adaptation options.

In 2021 and 2022, over 35 presentations were held to launch the Coastal Hazards website, informing government departments and agencies, municipalities, professional associations and other relevant stakeholders about new coastal hazard data and resources available.

DEPARTMENT OF HOUSING, LAND AND COMMUNITIES (DHLC)

The Lands Division of the DHLC oversees land use and development through the administration of the *Planning Act* and its regulations for 82% of the land area in PEI, which includes approximately 78% of the coastline. The *Planning Act* identifies “the protection, conservation, and management of coastal areas” as a matter of provincial interest and broadly defines coastal areas as “all lands and waters within 500m of the mean high-water mark”.

The importance of the role of the DHLC in PEI’s coastal zone management cannot be overstated. Its responsibilities include processing applications for changes in land use, new subdivisions, and development of coastal properties. This department also oversees the administration of the *Planning Act* for coastal municipalities that do not provide planning service.

The DHLC’s *Coastal Area Policy* (1992) (CAP/92) covers a range of issues including maintaining traditional beach accesses and the need for enhanced servicing requirements for new coastal subdivisions. The CAP/92 also recognizes that existing undersized coastal lots (i.e., non-conforming) that cannot meet safe environmental standards should be redesigned or the approval of these lots should be revoked. The *Planning Act* Coastal Area Regulations (No. EC159/92) which were used to enforce the CAP/92 were revoked in 2000 and since that time the policies have generally not

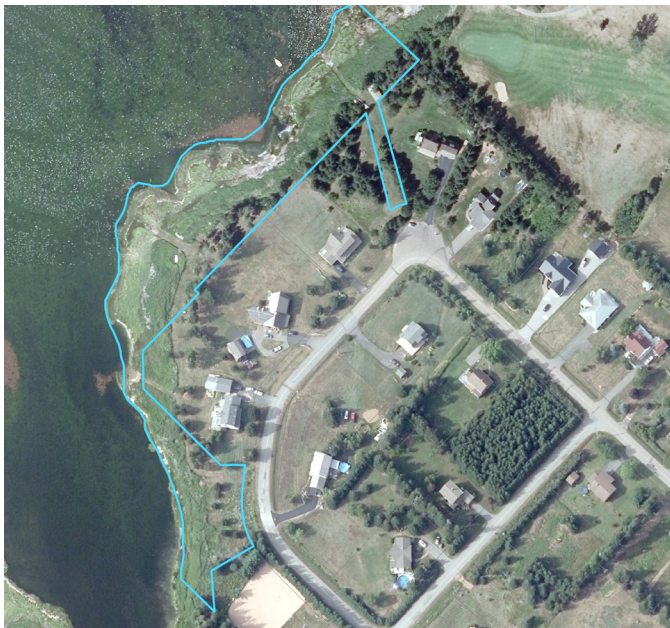


Figure 6. A subdivision buffer lot. Stanhope, PEI.

been referenced in planning decisions. However, the policies in the CAP/92 have never been revoked (*pers. comm.*, DHLC, 2023) which presents an opportunity for coastal zone management to be integrated into land use planning decisions until such time the new provincial land use plan is developed.

The following sections of the *Planning Act* Subdivision and Development Regulations are applicable to new applications in coastal areas within provincial jurisdiction.

- New **coastal subdivisions** must include a subdivision buffer that is 18.3m (60 ft) or 60 times the annual rate of erosion. The subdivision buffer can be integrated into individual lots by increasing the depth of each waterfront property, or it can be subdivided as a separate property that is held in common ownership by the neighborhood association of the new subdivision. While registering a neighbourhood association is no longer a popular option with developers, subdivision buffer lots can still be found in older coastal neighbourhoods.
- New development on the coast is required to have a building setback of 22.9 m (75 ft) or 60 times the annual rate of erosion, whichever is greater. The setback is measured from the top of the bank or the inland boundary of a dune, wetland, or watercourse to the foundation or wall of the proposed structure. This setback does not apply to accessory structures or in-ground services.
- Existing non-conforming coastal properties, approved prior to June 1993, may still be developed even if they do not have sufficient lot area, frontage, or road access, as long as the application receives approval for a sewerage disposal system from the DEECA.
- Existing non-conforming buildings, such as a building which does not meet current setback regulations, may also continue to be used and renovations or additions are permitted, as long as the addition does not increase the level of non-compliance of the existing building.

The DEECA provides a Coastal Hazard Assessment for new coastal subdivisions and development applications on request for DHLC.



Figure 7. Artificial reefs for wave attenuation and sediment capture. West Point, Cedar Dunes Prov. Park, PE. (D. Jardine, 2023)

DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE (DTI)

The DTI is responsible for government owned buildings and properties, public roads, and coastal infrastructure (bridges, causeways, etc.). The DTI is regularly involved in the maintenance, restoration, and reconstruction of infrastructure vulnerable to coastal hazards. Traditional coastal adaptation projects have included raising bridges, reinforcement of bridge embankments and installing shoreline armoring adjacent to shore-parallel roadways and public properties.

In recent years, the DTI has been instrumental in supporting new innovative approaches to coastal adaptation projects. Buried revetments and offshore artificial reefs have been used to achieve goals of coastal infrastructure protection through nature-based or hybrid adaptation strategies. For these projects, the DTI has engaged professional coastal engineer(s) and other qualified professionals. The projects include an analysis of the site-specific coastal conditions, shore types, geomorphology, and local sediment transport processes. The proposed designs are reviewed under the DTI's environmental impact guidelines and policies. Additionally, the reef projects required federal approval for installation within the water which is federal jurisdiction. To date, these strategies have proven to be effective in improving resilience of public beaches adjacent to provincially owned properties.

DEPARTMENT OF FISHERIES, TOURISM, SPORT, AND CULTURE (DFTSC)

The DFTSC does not have direct responsibility for the maintenance of properties but does oversee the activities and use of many provincial coastal properties and infrastructure. The Aquaculture Division, in close collaboration with the PEI Shellfish Association, the PEI Aquaculture Alliance, Harbour Authorities and the Federal Department of Fisheries and Oceans, is involved in issues relating to fisheries and aquaculture infrastructure, including small craft harbours, access points, aquaculture operations and processing facilities. The Tourism and Culture divisions are similarly involved in overseeing activities on provincial parks, campgrounds, and heritage sites.



Figure 8. Coastal armoring installation at the provincially owned Links at Crowbush Cove golf course (D. Jardine, 2023)

ISLAND REGULATORY AND APPEALS COMMISSION (IRAC)

The IRAC is mandated to administer the *Lands Protection Act*. The IRAC makes recommendations to Executive Council on applications for land purchases governed by the Act and monitors the land holdings of large landowners. The IRAC also acts as an arbitrator when an individual or business appeals the decision of a provincial or municipal planning authority regarding developments in the coastal zone.

The *Lands Protection Act* includes regulations that limit non-residents (people who do not have a primary residence in PEI) and corporations from purchasing or holding more than 5 acres or having shore frontage of more than 165 ft, unless permission is first received from the Executive Council, on behalf of the Lieutenant Governor in Council. To purchase a property that exceeds these regulations, an interested party must apply to the IRAC and the final decision on an application is made by Executive Council based on IRAC’s recommendation.

Municipal Jurisdiction

The *Municipal Government Act* (MGA) requires that all PEI municipalities provide fire protection, land use planning and emergency management planning services, with the requirement for planning services extended to 2025. Municipalities are not explicitly required to address coastal areas, watercourses, environmental protection, or climate adaptation in the services that they provide. However, if a municipality has adopted an Official Plan and planning related bylaws, then the provincial statements of interest identified in the *Planning Act*, including “the protection, conservation, and management of coastal areas”, should also be addressed in the municipality’s Official Plan.

Only 29 municipalities currently provide planning services which covers approximately 22% of the length of the Island’s coastline. These municipalities are responsible for land use designations, subdivisions, and development of coastal properties. While a municipality’s bylaw cannot conflict with provincial legislation, such as the buffer zone requirements of the Environmental Protection Act, the Planning Act Subdivision and Development Regulations do not apply to these coastal areas. To date, only a few municipalities have addressed coastal areas in their official plan and/or bylaw regulations. However, recognition of the provincial environmental buffer zone and the

Littoral Cell Name	Coastal Properties (#)	Non-Resident Owner (%)
Bedeque	1,926	17%
Boughton	758	29%
Brackley	1,746	27%
Cardigan	2,292	18%
Cavendish	1,508	23%
Egmont	1,199	24%
Hillsborough	5,567	9%
Malpeque	5,174	20%
Murray Harbour	1,209	17%
Naufrage	832	36%
Northeast	1,353	21%
Southeast	1,157	23%
St. Peter's	1,472	33%
Tignish	710	23%
Tracadie	865	24%
Tryon	2,328	26%
West	1,030	24%
Total	31,126	20%

Table 1. The proportion of non-resident owned properties for each of the PEI littoral cells. In 5 littoral cells characterized by rural landscapes, over 1/4 of all coastal properties are owned by Non-residents. See page 23 for a map of the littoral cells.

coastal floodplain has become more common in Municipal plans and bylaws adopted in recent years. The *Planning Act* requires that an official plan and its bylaws be updated every 5 years, which provides an opportunity for more coastal municipalities to adopt similar policies.

City of Charlottetown Waterfront Zone Development Regulations

In the City of Charlottetown’s Zoning and Development By-law, in the Waterfront Zone all buildings shall be setback a minimum of 8m (26.2ft) from the ordinary highwater mark and the ground floor finished floor elevation (FFE) must be set at a minimum of 3.76 m (CGVD28). These regulations were based on the based available data in 2012, after Hurricane Sandy threatened Atlantic Canada before making landfall in New York City.

Existing Challenges

Coastal Development Trends in Rural PEI

While PEI faces many of the same coastal hazards (coastal erosion, storm surge and sea level rise) as other regions, its unique demographics, municipal governance structure and lack of land use planning contributes to additional challenges in the adoption of coastal zone management and adaptation strategies.

PEI boasts the highest population density of any province or territory at 27.2 people/km² yet has the lowest percentages of publicly owned land (approximately 12%) and protected lands for conservation (less than 5%). Only 32% of land area is within incorporated municipalities but only 18% is within municipalities that currently provide land use planning. As such the municipal governance framework leaves a substantial gap in local representation and public engagement opportunities for decisions relating to coastal land uses, development, and environmental protection priorities.

The unincorporated lands (outside municipalities) which is under provincial jurisdiction are not subject to municipal property tax. This lower cost encourages development outside municipal boundaries leaving PEI's attractive coastline disproportionately vulnerable to unplanned, unserviced, and often seasonal developments.

Despite the increased knowledge, data and lived experiences, rural coastal development in coastal hazard areas continues, increasing the coastal vulnerability across the Island. And, since the provincial government is responsible for planning and development regulations in unincorporated areas and municipalities with no planning services, provincially led adaptation efforts are spread thin between the rural coastal developments, and that of the urban centres and coastal communities that have higher population densities and a greater concentration of critical infrastructure.

Prioritizing the Status Quo, One Property at a Time

To date, provincial government-led coastal adaptation projects have focused on specific public properties and infrastructure sites, such as the undertakings at West Point, Souris Causeway, Basin Head, and the Links at Crowbush Cove. Additionally, Transport Canada has conducted risk assessments on the Ferry Terminals at Wood Islands and Souris, and various Harbour Authorities have prepared management plans in conjunction with the Small Craft Harbours Branch of DFO for their own infrastructure. For the most part, the goal of these projects has been to maintain the status quo and existing uses of the site in question despite hazards and known risks.

The site analysis for these projects rarely incorporates a community's long-term social, environmental, or economic objectives, land use goals, or regional scale coastal processes. The potential impacts of the proposed adaptation measures on nearby properties and environmental features are not explored. When the goal of the project is to protect the existing conditions and human-centered activities, it is inevitable that the adaptation strategy utilized will be a form of infrastructure protection, in other words adaptation resistance, such as shoreline armoring.

Unfortunately, this approach has resulted in multiple attempts to reinforce the shoreline on the same site multiple times after repeated storm events. Alternatively, a long-term strategy to accommodate the hazard, such as relocating the infrastructure, may have addressed the problem permanently from the onset.

Similarly, private property owners are limited to adaptation options that fit within the limits of their own property and the adjacent shoreline. Actions by private property owners are rarely coordinated to ensure that adjacent properties or the adjacent beach is not negatively impacted by the shoreline alteration.

Coastal hazards don't recognize property boundaries and long-term strategies for coastal zone management should not either.

Alternatively, best practice in coastal zone management is a designed solution that addresses the system-wide hazard and development area.

Regulations vs. Existing Nonconforming Conditions

Based on the regulations described in the previous section, a new waterfront property in a new subdivision (in provincial planning jurisdiction) should have a 15m environmental buffer zone from the top of the bank. Because there are limited activities permitted in the buffer zone this space “should” look like a thick row of trees or shrubbery, tall grasses, or a natural transition zone at the edge of a saltmarsh. In addition to the buffer zone, there “should be” at least 7.9m (25 ft) of rear yard. This is the space permitted for a mowed lawn, gardens, an accessory building, and in-ground services (i.e., sewerage system).

In reality however, buffer zones adjacent to most residential coastal properties do not look like this because there is a keen desire to obtain an unobstructed view of the coast. Where the buffer zone has been previously cleared, there is no obvious way for residents to know where the rear yard ends and the buffer zone begins unless they are familiar with the regulations. Where a buffer zone has been cleared in the past, residents are permitted to continue to manage this space as a lawn. As a result, despite regulations, most residential coastal properties are non-conforming with a lawn right to the edge and little to no resistant vegetation present to stabilize the bank.



Figure 9. Waterfront residential properties with large mowed lawn and a cleared non-conforming coastal buffer zone. St-Nicholas, PE. (D. Jardine, 2023)

Where present, subdivision buffer lots offer an opportunity to address this problem because a neighbourhood association could collectively work together to reinstate the buffer zone vegetation. However, challenges have arisen with these lots because the residents of adjacent properties frequently assume ownership for that portion of the subdivision buffer lot that is between their property

and the coast. Some people have even erected fences excluding their neighbours from accessing the shared property and have invested in shoreline armoring on the segment they believe to be part of their own property. Furthermore, if the subdivision buffer lot does not already have an established vegetated buffer zone, residents who may be interested in restoring the space may be unclear who has authority to do this work. In this case the space is more likely being maintained as a lawn because of the shared ownership arrangement.



Figure 10. Non-conforming residential properties with no buffer zone or setback to the top of the bank. Cape Bear, PE (D. Jardine, 2023)

Current regulations treat coastal non-conforming lots (undersized) and non-conforming buildings (built with a reduced setback or within the buffer zone), the same as all other non-conforming properties and permit them to remain in place and to continue to be used and renovated. However coastal properties are unique because the lot area and building setbacks change over time. What was once a lot that met minimum standards for development and environmental protection, may have gradually become nonconforming. And it may no longer be considered safe for environmental purposes such as on-site sewerage, or for public safety due to the proximity of the building to the edge of a cliff. There are currently no processes in place to address properties that have become unsafe or that could cause a threat to environmental contamination.

Currently there is no legislation to prevent a non-conforming building from being rebuilt following significant damage or loss.

Lack of Transparency and Disclosure

Since Post-tropical storm Fiona impacted PEI's shorelines, many damaged coastal properties have been listed for sale, but disclosure of the damage incurred, known hazards, or financial assistance conditions are rarely included in the property listing or Property Condition Disclosure Statement (PCDS) in PEI. When a property is listed "as is where is" this disclosure is not required; let the buyer beware.

Unfortunately, prospective buyers are often uninformed about potential coastal hazards. Despite Coastal Hazard Assessments being offered by the Province for free, they have still not been adopted as a standard practice for all coastal property transactions. The demand to process a sale quickly in a very competitive market can cause additional pressure on potential buyers to make decisions without having all the information made available to them.

The lack of transparency can be worsened when people assume that the property is developable and that they can get a development permit, or that they can get property insurance for flood risks, or that the provincial/federal government financial

assistance programs will cover their losses following a natural disaster.

Property owners flooded by the storm surge caused by Post-tropical Storm Fiona (or previous events) soon discovered that at the time there was only one local insurance company which provided coverage for flooding caused by overland storm surge. This coverage is not included in the standard package but may be available to those that request it.

Many property owners without insurance were also unaware that they may not qualify for provincial or federal Disaster Financial Assistance Arrangements (DFAA) which is sometimes made available to provide financial aid to property owners that have experienced damage due to an extreme event.

Under current guidelines, the following types of properties are excluded:

- secondary properties, and
- primary dwellings built since 2021 that are located in the coastal floodplain and have not been designed appropriately to accommodate the projected level of floodwater.

The Impact-Rebuild-Repeat Cycle

Facing uncertainty on when the next extreme weather event will occur, cottage owners continue to struggle to maintain their cottage properties over the years.

In one PEI coastal subdivision built in the 1970s, property owners have shared a variety of stories about the impacts of coastal hazards, various attempts at adaptation, and the frustration of seeing their efforts being washed away by the next big storm. Examples of the stories from this community include:

- Several lots have raised the elevation of their lots by infilling, at least one resident reported infilling the property at least 3 times.
- One lot was raised about 1 m after minor flooding during Hurricane Dorian (2019) but when Fiona struck 3 years later their cottage floated away and was a total loss.
- Owners of a lot purchased in September 2021 reported that when Fiona struck flood water reached a depth of about 0.5 m inside the cottage. This year the cottage is being raised over 1 m with over 140 loads of fill imported at a cost of approximately \$50,000.
- Owners in the subdivision were unhappy they could not obtain DFAA financial relief but have recently been able to secure storm surge (tidal) coverage for \$4,100/yr from a local insurance broker.
- Another cottage owner installed shoreline armouring to 1.8 m in height along their coastline in 2005. The armouring was overtopped in December 2010. In 2011, an additional of armour rock was installed to the top of the cliff. This was overtopped by Fiona in September 2022. In August 2023, an additional 1 m of armour rock was installed. The stone now sits approximately 60 cm over the top of the cliff.

(Jardine, 2023)

Coastal Policy Decision Framework

Adaptation strategies that address coastal hazards typically fall into four broad categories: avoid, retreat, accommodate, or resist (also referred to as “protect”). While each of these strategies reduce risk and enhance benefits to humans, they differ based on the specific benefit they prioritize. When the strategies are presented as mutually exclusive options, decision-makers lack the guidance to discern which strategy is most suitable for specific circumstances. Consequently, the most common choice is a resistance strategy implemented on a project-by-project basis, which prioritizes the status quo by altering the surrounding environment to safeguard existing infrastructure. These actions are narrow in scope, and exclude options for transformative change, long-term planning, and multi-stakeholder collaboration. Alternatively, the strategies that adapt by modifying human activities are more sustainable, offer long-term effectiveness, and are the least disruptive to natural processes.

New development and investments in infrastructure should not result in increased vulnerability. Preventative and proactive adaptation strategies, including avoidance, retreat, and accommodation, offer sustainable, future-oriented alternatives. Embracing these strategies demands a departure from past practices and a commitment to forward-thinking by establishing principles and long-term objectives to guide decision-making.

The Coastal Policy Decision Framework proposed here emphasizes the need for informed decision-making and prioritizes preventive actions which will enhance the protection of natural areas and support avoidance of hazards in areas not yet developed. For coastlines with existing at-risk infrastructure, preferred options include retreat and restoration of the coastline to eliminate and/or reduce risk through temporary measures. Resistance strategies that alter the state of the coastline, including hybrid or hard infrastructure solutions, should be considered a last resort. These strategies may be necessary for situations where human lives, critical public infrastructure, and economic activities face imminent threats and alternatives are cost prohibitive in the immediate future. However, these strategies should still be considered temporary and a plan for a long-term alternative and restoration should be included in the long-term asset management plan.

Shifting priorities from quick-fix, short-term solutions to long-term sustainable strategies will not be without its challenges, especially in defining critical infrastructure and activities. Future development, shoreline armouring, and coastline alteration have long-term implications that necessitate community and rightsholder engagement and these types of decisions are most appropriately made through a public process that incorporates the environmental, social, and economic goals of coastal communities and addresses coastal issues at a regional scale.

Informed Decision-Making

To date, efforts by the DEECA have been successful in making climate change and coastal hazard information available to communities and the public, but it is not known to what degree this information is used in decision-making. Following extreme weather events people continue to report that they wish that they had known more about their risks sooner, or that they wish they had accessed hazard information prior to making important decisions relating to their property or investments.

Public education programs and resources such as websites, reports and guidance documents, visualization tools and community meetings are passive strategies. While valuable information has been made available, whether someone accesses or uses the information in decision-making is voluntary. These strategies generally only benefit those people who are already informed enough to seek out the information, or who have the interest and availability to make it a priority. These strategies often fail to reach a broader audience including vulnerable populations, commercial tenants and renters, new residents to PEI, and tourists who are not familiar with local issues.

Important decisions, such as whether to purchase a property or to shelter-in-place ahead of an incoming storm, should be supported by ensuring that the necessary information is made available directly to those who need access to it. Active strategies could include direct notifications and disclosure policies. Information communicated should include past events and records of previous impacts, projected hazards, policies relating to coastal zone management, and any known conditions on eligibility for provincial or federal DFAA.

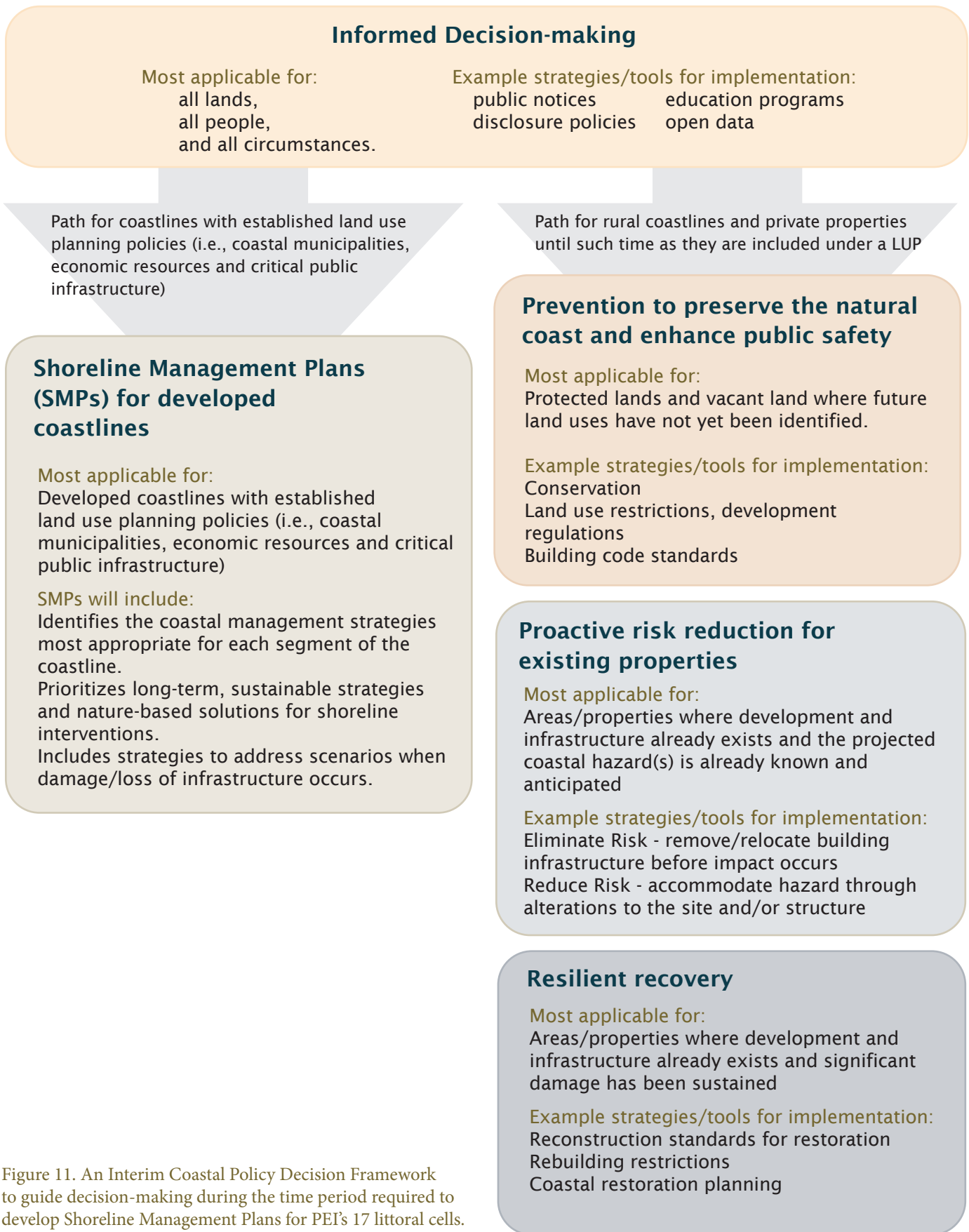


Figure 11. An Interim Coastal Policy Decision Framework to guide decision-making during the time period required to develop Shoreline Management Plans for PEI's 17 littoral cells.

Recognizing PEI's current gap between areas with and without land use planning policies, the framework suggests two distinct *interim* and *concurrent* adaptation pathways.

1. For the coastlines that already have land use planning in place, Shoreline Management Plans (SMPs). SMPs are regional studies (littoral cell) that incorporate natural features and processes, and existing and future social, environmental, and economic objectives, to identify the most appropriate strategies for coastal adaptation. Municipalities with a land use plan have already identified the preferred land uses for coastal areas within their boundary and as such, these municipalities are better positioned to engage in discussions about long-term coastal zone management. Municipalities are expected to review

their planning policies and regulations every 5 years. Coastal municipalities should be encouraged to incorporate the SMPs into that process.

2. As the province progresses in developing the provincial Land Use Plan, allowing development to continue in hazard areas on the coastline in unincorporated areas and in municipalities that do not yet provide land use planning will continue to degrade environmentally sensitive habitat and increase the province's coastal vulnerability. Until such time as a land use plan can be developed, no-regrets coastal zone management strategies should be used. These strategies include prevention, proactive risk reduction and resilient recoveries. This approach will ensure that the province continues to progress towards enhanced sustainability and resilience.

Pathway 1. Shoreline Management Plans (SMP) for developed coastlines with established land use planning policies

Shoreline management plans (SMP) are a standard practice internationally in many other jurisdictions. An SMP outlines a long-term strategy for managing the risks associated with coastal erosion and flooding and provides guidance on how to manage the coastline in a sustainable manner. The development of an SMP requires an assessment of local coastal processes, and existing features, land uses and vulnerabilities along a specific length of the coast.

Stakeholder and rights holder involvement is an important component of the process to ensure transparency and accountability in decision-making. This also provides an opportunity for community residents to weigh in on decisions relating to long-term priorities – critical infrastructure, economic sectors, heritage sites, cultural amenities, recreational sites, natural shorelines, vulnerable species and habitat, and private properties, residential and otherwise, are all included within the scope of a regional SMP. Decisions will be made as to what adaptation strategies will be used in which sections of the coastline.

The SMP outlines a realistic and affordable action plan for implementing strategies for each shoreline segment based on technical, environmental, social, and economic factors. The most appropriate

solutions will depend on local conditions, while prioritizing working with natural processes and emphasizing the importance of protecting and restoring existing natural defenses.

SMP action plans for PEI would likely identify:

- Existing natural areas and critical habitat that should be protected from future development.
- At-risk buildings and infrastructure that should be removed or relocated over time so that the natural processes of the shoreline can be restored.
- High hazard areas that should be avoided, and areas suitable for accommodation in design to address future hazards.
- Critical infrastructure and sites suitable for protection by nature-based solutions or hard infrastructure (such as seawalls or armouring) as a temporary measure, until such time as the lifespan of the infrastructure warrants replacement and an alternative strategy can be implemented.

Long-term planning for decommissioning and shoreline restoration will support informed reactions if damage is sustained by the coastal hazard(s) earlier than anticipated.

Once approved, the SMPs should be made publicly accessible so that property owners, residents and potential buyers have access to information about the long-term strategy for the coastal segment that their property is within. Municipalities should be encouraged to incorporate the relevant sections into their municipal planning policies and development regulations.

All coastal management projects (such as those activities that currently require a Watercourse, Wetland and Buffer Zone Activity Permit) must align with the approved SMP. A process for considering future amendments to the plan should also be developed. In some jurisdictions, a third-party commission of qualified coastal professionals is

established to oversee the process, review, and approval of the SMP.

Work is currently underway on the development of national guidelines to support regional strategies for coastal adaptation. PEI has an opportunity to be a leader in Canada as an early adopter of a province-wide sustainable coastal management strategy.

Shoreline Management Plans in the UK

In the United Kingdom, SMPs have been used to manage the shorelines since 1993. The SMPs identify the most successful and sustainable techniques to implement for 11 littoral cells and a series of subcells.

SMPs aim to reduce the threat of flooding and erosion to people and property, and benefit the environment, society, and the economy, by providing the basis for sustainable coastal adaptation policies within a coastal cell. They identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the: short-term (0 to 20 years), medium term (20 to 50 years), and long term (50 to 100 years).

SMPs developed under UK guidelines must:

- Identify the most appropriate option to manage risks from flooding and/or erosion for the next 100 years.
- Remove risks by avoiding or moving inappropriate development.
- Reduce the likelihood of damaging events through strategies that prevent damage, restore beaches, cliffs, dunes, saltmarshes, and/or uses back-up and secondary defense systems.
- Reduce the risks of potentially damaging events through defense schemes or altering buildings.

Read more about the UK's Environment Agency SMP policies to manage the threat of coastal change [here](#).

(DEFRA, 2006)

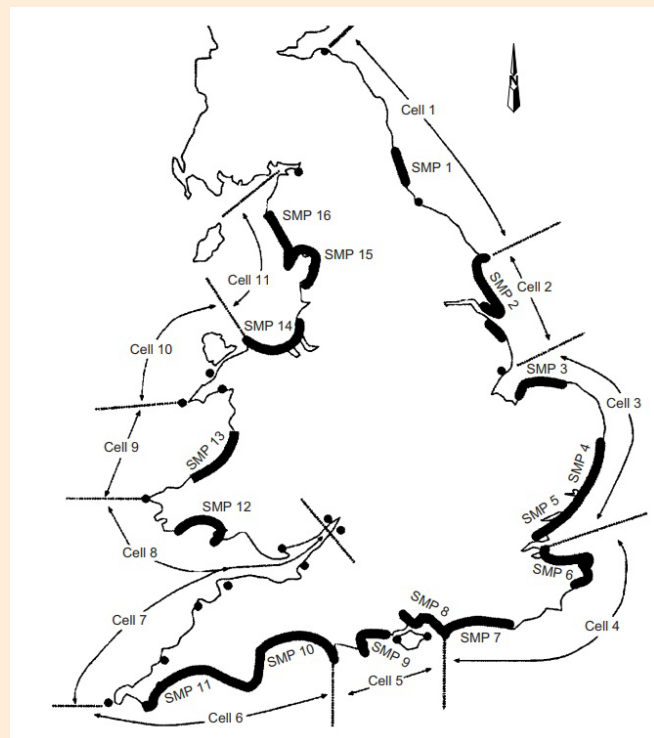


Figure 11. Coastal (littoral) sediment transport cells as defined for the English coast. (J. Dronkers, 2019)

Pathway 2. Strategies for rural and unincorporated coastlines

Prevention to preserve the natural coast and enhance public safety

Prevention is the most proactive adaptation strategy the province can adopt.

Prevention strategies can be implemented at little to no cost and are effective for the long term. While it may not seem like a priority to develop policies for locations where people and infrastructure are currently not at risk, prevention of future risk is the first step in reducing coastal vulnerability and is the most economical, long-term adaptation strategy. Implementing preventative actions also sets the tone for the policy priorities for other areas.

Preventative actions can serve two purposes:

1. To preserve environmentally sensitive areas; and
2. To prevent development in hazardous areas and areas expected to become hazardous in the future.

A study on the United States' coastline found that the number of vulnerable people and the total value of residential properties exposed to hazards could be reduced by half if existing coastal habitats remained fully intact (Arkema, 2013).

In PEI, coastal and floodplain habitats including wetlands, saltmarshes, eelgrass beds, reefs, sand

dunes, barrier islands, spits, and sandy beaches enhance the Island's resilience, and the protection of these environments under the *Natural Areas Protection Act* should be prioritized.

Prevention strategies can be implemented through conservation and environmental protection regulations, as well as land use planning. All coastal areas that fall within specific land cover types and/or within critical habitat zones which have already been designated by the federal government, should be identified as conservation areas. Violations for activities that adversely impact these coastlines should not only include a fine but also a requirement for ecological restoration.

Avoidance of hazard areas is a matter of land use planning and development control. These strategies require creative solutions and compromise. Until the province has adopted a provincial land use plan, the best strategy for avoiding further development in high hazard areas, is to adopt an interim planning policy on coastal development. A similar recommendation was also made by the Land Matters PEI Advisory Committee in 2021. Municipalities that provide planning services can also implement policies that identify hazard zones and require accommodations through changes in land use, or site and building designs that reduce vulnerability.



Figure 12. Hog Island (Pitaweikek) is a 14.5 km long barrier island. The Island has a unique and vulnerable sand dune ecosystem, is culturally significant to the Mi'kmaq, and provides natural adaptative capacity by buffering the inner estuary including Lennox Island First Nation from the direct forces of the open oceans during extreme events. (D. Jardine, 2023)

Proactive risk reduction for existing properties

Proactive risk reduction strategies should be implemented when hazards and risks have been identified for an existing property or infrastructure.

Proactive strategies can be actions that offer a long-term solution, such as relocation or managed retreat. When retreat is imposed on a community, these strategies can be complex, controversial, and politically unappealing, but this usually only occurs following a major event and after properties have been significantly damaged. In contrast, proactive relocation is already happening quite regularly in PEI by individual property owners. Based on provincial records, 19 permits have been issued for homes or other structures to be moved within the same coastal property since 2018.

Site and/or building modifications can also provide a proactive strategy to extend the life of a property or structure, at least temporarily. However, it is important to remember that coastal hazards are unpredictable and inevitable. Sea level will continue to rise and eventually (10-20-50 years from now), nuisance floods will become safety hazards. Site and/or building modifications do not provide a guarantee of long-term resilience. The impact-rebuild-repeat cycle (see example described on page 15) can lead to frustration, anxiety, and financial burdens on individual property owners as efforts to mitigate risks have repeatedly failed.

Some properties are more vulnerable than others and many people don't realize the underlying cause of the issues that they are experiencing, such as when erosion is driven by stormwater rather than wave action.

Examples of proactive risk reduction strategies include:

For buildings - raising a building on posts, raising the ground level under a structure, raising a well casing, installing hurricane proof materials, covering window wells to prevent basement flooding, and raising the utility equipment within a building that is susceptible to flooding.

For properties - restoring the shoreline (buffer zone) vegetation with native deep-rooted species to stabilize the bank and reduce vulnerability to coastal erosion and modifying the grade of the lot to divert stormwater.



Figure 13. Cape Bear lighthouse in its new location. The structure was relocated from its original position in 2015 due to coastal erosion. Cape Bear, PE (D. Jardine, 2023)

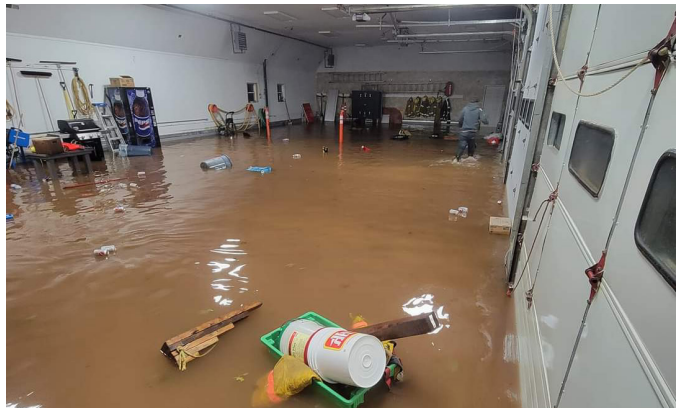


Figure 14. North Rustico Fire Hall. Critical public infrastructure in need of accommodation or relocation due to storm surge flood vulnerability. Fortunately, the fire trucks were removed ahead of Post Tropical Storm Fiona. North Rustico, PE (Photo provided with permission, 2022)



Figure 15. New construction of this summer home started with infilling the property to raise the foundation 3 m above high tide. Chelton, PE (D. Jardine, 2023)

Resilient Recovery

Disaster response and recovery are those actions taken following an event that has caused damage to a community or to a specific property.

Normally government-led disaster assistance programs involve financial support that will be provided to property owners who have experienced property loss or damage. However, these programs can increase inequities in disaster recovery by excluding individuals who do not own property, and who may be financially more vulnerable to disruptions to their housing security.

Alternatively, policies for a resilient recovery should be designed to be equitable by ensuring that the impacts on people and housing security are prioritized over the impacts on property through compensation for financial losses.

Unfortunately, disaster response programs and coastal zone management are run by different government departments which can cause conflicting messaging and can reduce the uptake of proactive strategies. Many people put off investing in proactive measures because they assume they have insurance coverage or that they will receive financial support following damage.

If insurance options are available for coastal flood damage, the property should not qualify for provincial/federal DFAA. However, overland and coastal flood insurance is relatively new in Canada and many people are not aware that they must request this additional coverage now that it is an option.

For this reason, it is very important for disaster response plans, including availability of financial supports, financial assistance caps, requirements for rebuilding in a more resilient manner, and restrictions on rebuilding be communicated in advance of the next big storm.



Figure 16. Following damage from Post Tropical Storm Fiona, this lot was raised 1.4 m and the cottage elevation raised to 3.7 m above mean sea level. As a cottage, this property was not eligible for financial assistance. MacEwen Island, PE (D. Jardine, 2023)

Flood Insurance in Canada

Insurance is meant to cover sudden and accidental loss or damage. The following events are either not covered, covered in limited circumstances and/or require optional coverages:

- Damage caused by the backing up of sewers and drains is typically not covered by a standard policy. (Optional sewer backup is offered by most insurers)
- Overland flooding, which occurs when bodies of fresh water, such as rivers or dams overflow onto dry land, is typically not covered by a standard policy. Optional residential overland flood coverage is now offered by many insurers for the majority of homes across the country and is based on risk. Commonly, this coverage is combined with sewer backup coverage, which is also optional.
- Flood damage due to storm surge or tidal waves. These risks impact the small percentage of Canadians who live in coastal areas and are typically not covered by most home insurance policies, nor by optional endorsement.

Insurance Bureau of Canada, 2023

Interim Coastal Policy Recommendations

1. DEVELOP SHORELINE MANAGEMENT PLANS FOR PEI'S 17 LITTORAL CELLS

ACTION FOR DEECA

Shoreline management plans (SMPs) provide an action plan for increasing resilience of coastal communities and public coastal infrastructure. The plan identifies the most appropriate adaptation strategy for each segment of the coastline based on the environmental, social, and economic conditions.

SMPs should be prepared by a team of qualified professionals in the fields of coastal engineering and geomorphology, land use planning and public engagement. The team will need to work with stakeholders, residents, and communities to identify common priorities and to address conflicting interests.

SMPs could be adopted as regulations under the *Environment Protection Act* and/or the future provincial Land Use Plan.

In PEI, SMPs should be conducted on a regional scale based on the boundaries of the 17-littoral cells (sediment transport cells).

While the long-term goal would be to complete SMPs for the entire coastline, priority should be given to the littoral cells (or sub-cells) with the longest stretches of coastline within coastal planning municipalities and with critical coastal public infrastructure.

Based on these criteria, the first SMPs should be developed for the Hillsborough (Charlottetown, Stratford, Cornwall, and a portion of West River municipal planning areas) and Cardigan Cells (Three Rivers), followed by the Bedeque (Summerside, Linkletter), Brackley (includes North Rustico and most of North Shore), Northeast (Souris and Eastern Kings), and Tryon (portion of West River, Victoria, and Borden-Carleton) Cells.

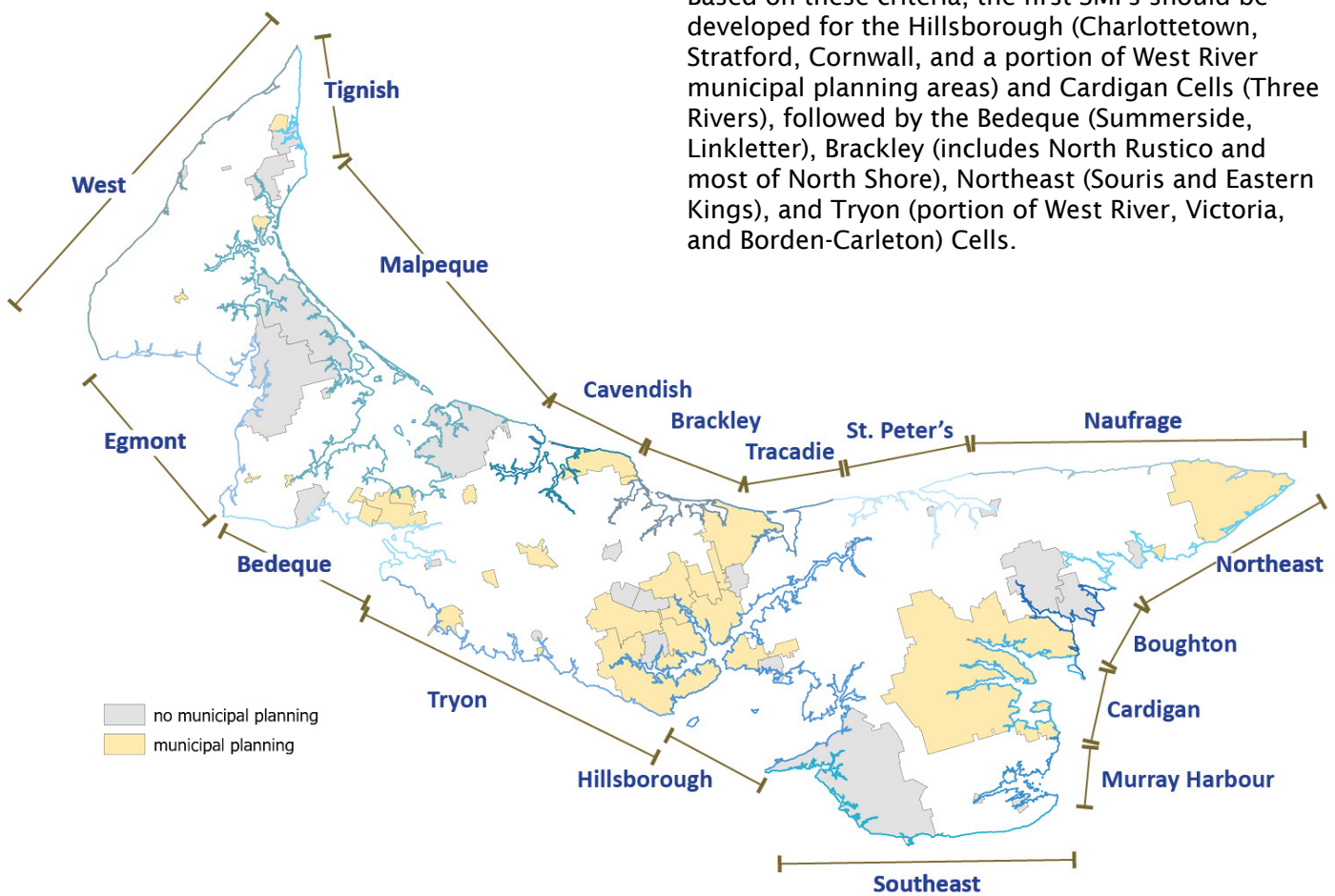


Figure 17. PEI littoral or coastal cells and planning and non-planning municipal boundaries.

Note: Natural Resources Canada (NRCan) has recently announced a call for proposals under the [Canada's Climate-Resilient Coastal Communities \(CRCC\) Program](#). The CRCC program may provide an opportunity to initiate the development of SMPs in priority areas.

2. RESTRICT NEW SHORELINE ALTERATIONS TO AREAS WITH AN APPROVED SHORELINE MANAGEMENT PLAN

ACTION FOR DEECA

New shoreline alterations, including erosion mitigation structures that extend beyond the natural boundary of a coastal property (e.g., riprap, seawalls, groins, and revetments), should only be permitted in accordance with an approved SMP.

SMPs are developed based on consideration of both environmental and socioeconomic considerations. This ensures that future shoreline alterations will only be permitted as necessary for the protection of public infrastructure and public good, and where there will be minimal impact on vulnerable environmental processes and critical habitat. Environment and Climate Change Canada (ECCC) is responsible for the enforcement of legislation related to species at risk and critical habitat. They should be engaged in the process of developing the SMPs to ensure that any shoreline alterations strategies adopted align with their species protection and recovery Action Plans.

Where shoreline alterations are permitted under the SMP, all new shoreline alterations should be designed by a qualified professional to meet minimum standards on the types of materials permitted, the design and the installation process.

The Shoreline Structure Inventory conducted in 2018 found that 39% of shoreline armoring (riprap) installations were composed primarily of concrete, much of which was sourced from demolition debris and field observations noted the frequency of finding protruding rebar mixed into the materials. When impacted by an extreme weather event, this debris can be spread out over the beach and into the waterway, creating a public safety hazard. These types of inappropriate materials should be restricted from being used on the coastline.

Permitting should also include an environmental impact assessment (EIA) if the structure encroaches on the waterway or marine intertidal zone. Note that EIAs are already standard practice for government-led shoreline alteration projects now. A qualified professional should also be required to sign off on the installation, confirming that the project was constructed as designed.

Shoreline alterations that are considered living shorelines or nature-based solutions (NBS), should require an equivalent permitting process and approval under the SMP. While NBS are preferred

Shoreline Armouring Restrictions

In the United States, due to the growing awareness of the actual, potential, and perceived impacts of coastal armoring, at least eight states have already banned or significantly restricted the use of shoreline armoring for private property, including Maine, Massachusetts, North Carolina, Oregon, Rhode Island, South Carolina, Hawaii, and Texas. In these States, armoring is only permitted in exceptional circumstances and there are rigorous permitting requirements.

Studies have shown that while armoring may temporarily preserve the property value of a waterfront property, the adjacent and inland property values decline as more and more properties rely on armoring, and have reduced the beneficial functions of the coastal resources and public accessibility to the beach (O’Connell, 2010).

strategies over that of hard infrastructure, alterations to the shoreline that involve changes to the grade can have detrimental impacts on coastal habitat such as nesting sites for bank swallows.

In the absence of an SMP, existing shoreline erosion mitigation structures, including those in coastal communities and on public infrastructure, could be permitted to be maintained and restored as long as the encroachment beyond the boundary of the subject property is not increased. Extensions to existing structures should be limited but may be appropriate for small properties located between two existing structures.

Applicants seeking approval in advance of the SMP process should be required to demonstrate that all other reasonable measures have been considered and implemented, including restoring deep-rooted vegetation in the buffer zone and other hazard accommodations to the site and/or building.

3. EXPAND LOCAL NURSERY CAPACITY AND IMPLEMENT A COASTAL BUFFER ZONE PLANTING PROGRAM

ACTION FOR DEECA

Existing regulations restrict activities within the buffer zone, including the removal of vegetation, but currently no services are provided to support restoration and enhancement of the vegetation in the Buffer Zone in coastal areas.

The existing Hedgerow/Buffer Zone Planting Program prioritizes projects in the riparian buffer zone (adjacent to freshwater streams and estuaries). The species planted through this program are not appropriate for the exposed coast, where salt tolerant, native, deep-rooted species can be used to help bind unconsolidated soils and reduce vulnerability of the bank to erosion. To develop and implement a successful coastal planting program, resources will be needed to expand the capacity of the provincial and/or local nurseries to ensure a sustainable supply of appropriate plants, including cord and marram grasses.

Coastal property owners will likely require assistance in selecting appropriate types of plants based on their shore time and in the planting process. Local watershed groups and other organizations, such as Island Nature Trust, could assist through partnership agreements for implementation of planting activities and for ongoing monitoring and maintenance.

There are many resources available to help guide in the selection of appropriate species, and in techniques for planting and maintenance under coastal conditions:

[Planting Guide for Tidal Shoreline Erosion Management in New Hampshire.](#)

[StormSmart Coasts - Coastal Landscaping in Massachusetts.](#)

Common Name	Planting Conditions
Trees	
Balsam Poplar	Shade tolerant
White Spruce	Shade tolerant
White Ash	Intermediate shade tolerance
American Mountain Ash	Intermediate shade tolerance; rocky hillsides
Paper/White Birch	Shade tolerant
Trembling Aspen	Shade tolerant
Tamarack	Shade tolerant
Shrubs	
Late lowbush blueberry	Shade tolerant
Squashberry	Shade tolerant
Coastal Sweet Pepperbush	Shade tolerant
Swedish Bunchberry	Shade tolerant
Round-Leaved Dogwood	Intermediate shade tolerance
Black elderberry	Intermediate shade tolerance

Common Name	Planting Conditions
Shrubs	
Fireberry Hawthorne	Intermediate shade tolerance; Wind tolerance
Canada Cinquefoil	Intermediate shade tolerance
Canada St. John's Wort	Intermediate shade tolerance
Perennials	
Lupin	Shade tolerant
Purple-stemmed Aster	Shade tolerant
Canada Lily	Shade tolerant
Boreal Aster	Shade tolerant; moist soils
Fringed Yellow Loosestrife	Intermediate shade tolerance
Common Evening Primrose	Intermediate shade tolerance; slopes
Canada Anemone	Intermediate shade tolerance
Spotted Joe-pye-weed	Intermediate shade tolerance
Common Yarrow	Shade tolerant

Table 2. Plant list prepared and distributed by the Ecology Action Centre. These native, salt tolerant plants that can help stabilize the shoreline. A combination of trees, shrubs and perennials is recommended.

4. EXPAND THE ENVIRONMENTAL BUFFER ZONE AND UPDATE THE REGULATIONS TO REFLECT CURRENT WORKING POLICIES

ACTION FOR DEECA

The limits of the Environmental Buffer Zone (Environmental Protection Act Wetland, Watercourse and Buffer Zone Regulations) should be expanded to include:

- i. a 15m horizontal setback measured from the edge of the watercourse or wetland [existing Buffer Zone],
- ii. the area occupied by a watercourse or wetlands, **and**
- iii. all areas below 2.0m elevation (CGVD2013)

Why include the watercourse?

Small watercourses (i.e., brooks and creeks) and wetlands are sometimes located within a property boundary. Regulations that restrict activity within the Buffer Zone should also apply to the area occupied by the watercourse and wetland.

This update is necessary to support provincial and municipal development regulations that rely on minimum lot area calculations, so that the area of the watercourse *and* buffer zone can be subtracted from the developable land area of the parcel. Development regulations require clear definitions to be enforced.

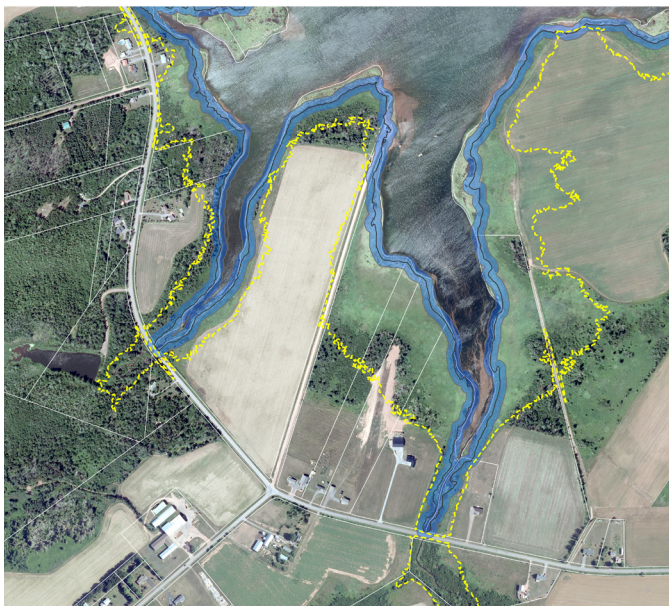


Figure 18. Comparison between a 2m vertical (yellow) buffer zone delineation and the existing 15m horizontal setback (blue). Note site visits are currently required to identify the edge of the watercourse or wetland. Rosehill, PEI.

Why 2.0m Vertical Elevation?

A minimum vertical elevation in the Buffer Zone will provide additional protection for vulnerable coastal saltmarshes against the impacts of coastal squeeze as sea level rises and will allow the saltmarsh habitat to migrate inland over time. By restricting certain activities including the installation of on-site sewerage services, in these exceptionally low-lying areas, the Buffer Zone will also protect against potential contamination of the watercourse or groundwater resources during flood events.

Projections for flood water elevations are different for different areas of the coastline. The 2.0m elevation (CGVD2013) was selected because for some areas it is the elevation of a coastal flood event with a 10% annual exceedance probability (10% AEP), and by 2050 as sea level continues to rise, it will be the average elevation of a flood event with a 10% AEP. This area has a 92% chance of flooding within a 25-year period. Over time, the elevation for the Buffer Zone may need to be changed to reflect changes in sea level and the occurrences of extreme flood events.

Note that 2.0m elevation is not the same as the coastal floodplain (1% AEP). Recent extreme storm surge events have flooded land areas at a higher elevation than 2.0m.

The Environmental Protection Act, Wetland, Watercourse and Buffer Zone Regulations currently lacks clarity on the criteria under which an Enforcement Officer is authorized to waive the requirements of the Regulations, such as in urban areas where the waterfront has been reclaimed and constructed with infill held by a seawall, or areas surrounding small craft harbours and other coastal infrastructure. Existing working policies that have allowed Enforcement Officers to waive the regulations without issuing summary offence tickets should be disclosed in public policy or should no longer be permitted.

Furthermore, the provincial wetland conservation policy is currently not supported by legislation. Bringing the policy into regulation would increase its effectiveness in protecting coastal wetlands.

5. DEVELOP A COASTAL SUBDIVISION BUFFER LOT BUYOUT PROGRAM

ACTION FOR DEECA

The existing Buffer Zone Acquisition Program should be expanded to include coastal buffer zones and more specifically, Subdivision Buffer Lots. While not commonly found in new subdivisions, older coastal subdivision buffer lots are common and present a unique opportunity for buffer zone restoration projects adjacent to residential coastal developments.

The current program works with individual land owners to acquire the buffer area on their land. The process requires surveying and buffer zone delineation and generally excludes small parcels from the process. In contrast, the existing Subdivision Buffer Lots are held in common ownership by neighborhood associations or in some cases by developers who are no longer interested in maintenance responsibilities of the shared spaces within a subdivision. The Buffer Lots extend along the coastline fronting multiple residential lots within the subdivision.

These lots already exist as separate and distinct parcels and are generally wider than the Environment Buffer Zone as regulated under the *Environmental Protection Act*. The province could target acquisition of the Subdivision Buffer Lots with the intent to plant appropriate species to restore the buffer zone, enhancing resilience of the coastline and increasing provincial conservation lands.

The purchase of this property benefits the neighbourhood association or developer who holds ownership title by providing much needed financing for upgrades and ongoing maintenance of the shared spaces and services of the subdivision, including private road maintenance.



Figure 19. A coastal subdivision with a Subdivision Buffer Lot, owned by the neighbourhood association. Naufrage, PEI.

6. DEVELOP A TARGETED OUTREACH CAMPAIGN TO DISTRIBUTE CRITICAL INFORMATION ON COASTAL PROPERTIES

ACTION FOR DEECA

It is time to provide coastal hazard and coastal zone management policy information directly to those most impacted, in contrast to the passive strategies for education and information dissemination that government has previously undertaken.

The information in the letter or brochure should include: the hazard classification of the property in question (or directions on how to access this information), eligibility conditions that may apply to the property relating to provincial or federal DFAA, links to additional resources, and contact information should they have any further questions.

The letter also provides an opportunity to distribute information on proposed changes to coastal zone

management policies and to solicit feedback.

Note that the proposed content of this letter is already publicly accessible information, but to date has only been accessed by those with the means and knowledge to do so. All efforts should be made to make this information available to residents and tenants, as well as property owners.

The University of Maine sent mail outs to 7000 coastal property owners to inform and survey residents on climate variability and climate change as part of the development and testing of a national model of state-based outreach campaign. (White et al., 2010)

7. DEVELOP A HOME AND COTTAGE RELOCATION PROGRAM

ACTION FOR DEECA

Property owners should be encouraged to be proactive to save their home or cottage prior to sustaining damage in high-hazard areas. Proactive adaptation saves both the owner, community and government from the public safety risks and costs associated with disaster response and recovery.

Many people do not realize that for small homes and cottages the cost to move a structure proactively can be significantly less than the cost to armour the shoreline or to rebuild following disaster. This is especially true for seasonal cottages built on posts rather than a permanent foundation. And, where relocation can provide a permanent solution, resistance strategies can result in an impact-rebuild-repeat cycle of investment, with no long-term solution.

The New Zealand federal government's Climate Adaptation Plan (August, 2022) includes a proposed action to pass legislation to support managed retreat to enable relocation of assets from high-risk areas. By the end of 2023, the government is expecting to introduce the Climate Adaptation Bill, setting out the managed retreat framework.

(New Zealand Ministry for the Environment, 2022)

It is recognized that the capacity to undertake such adaptation actions is not the same for all home/cottage owners. To qualify for this financial assistance program, applicants should be required to demonstrate a financial need for assistance and must demonstrate that the proposed new location will substantially reduce risk by moving the structure to higher ground and further back from the coastal edge. The program should prioritize high-hazard structures and primary dwellings.

The intent of the proposed subsidy program would not be to fully fund structure relocation, but rather to incentivize the option of proactive relocation over temporary measures and taking chances with known risks.



Figure 20. A house recently relocated and elevated. North Lake, PEI. (D. Jardine, 2023)

8. INCLUDE RESTORATION REQUIREMENTS IN EPA PENALTIES AND BUILD CAPACITY TO ENFORCE REGULATIONS

ACTION FOR DEECA

While the DEECA has already announced an increase to fines for damage to the Environmental Buffer Zone, penalties for violations under the *Environmental Protection Act* (EPA) should also include requirements for environmental restoration and the removal of unlawful structures and/or materials from the coast. Restoration requirements should be at the expense of the property owner and the province should be empowered to undertake the work in cases where the owner fails to implement restoration requirements.

Enforcement of EPA Regulations are currently driven by complaints due to the lack of capacity of the DEECA to monitor coastal activities across the Island.

The enforcement capacity could be enhanced by the following strategies:

- i. Hire more enforcement staff.
- ii. Promote the existing online system established for the public to use to report suspected unlawful activities and possible violations.
- iii. Maintain a database of records, permits and non-conforming conditions to support enforcement staff in verifying unlawful (non-permitted) alterations.
- iv. Conduct an annual aerial survey of the coastline and compare observed changes from one year to the next to identify unlawful alterations.

9. DEVELOP A PUBLIC BEACHES ACCESS POLICY AND/OR LEGISLATION

ACTION FOR DEECA

Other than in a few unique situations (to be confirmed on a property's deed) the boundary for coastal properties is generally the top of the bank or the ordinary high-water mark. This means that the land area that gets wet under a high tide, including PEI's beaches and intertidal flats are public spaces and other people have the right to use this area of the beach adjacent to your coastal property.

As the backshore of the coast erodes and the natural boundary of the coastline recedes, the high tide water line will reach further inland. The area that was once part of the adjacent property becomes part of the foreshore, and consequently becomes public land. This is true for coastal properties across the country. This legislation is not new in Canada or in PEI.

Current provincial policies and legislation are silent on how the province intends to protect public access to the shore and the public's right of unimpeded access along the length of the natural shoreline under the conditions of a changing climate and sea level rise.

Such a policy and/or legislation could include provisions for the enforcement of the removal of structures (buildings and/or armourstone) that over time have become non-conforming and impede public access to and along the beach.

In Nova Scotia, the *Beaches Act* designates 92 beaches along the coast to provide protection of beaches and associated dune systems as significant and sensitive environmental and recreational resources.

In Texas, a rolling easement for public access is recognized by the *Texas Open Beaches Act* (OBA). Where the shoreline is critically eroding and houses were gradually entering the easement over time, a structure removal initiative was created to support property owners with the costs (up to \$50,000 US) to move their homes from the beach to a more suitable location. At least 18 homes were relocated under this program improving public access to the beach and reducing risk to people and property during storms.

10. REQUIRE COASTAL RESILIENCE ACTION AS A CONDITION TO QUALIFY FOR FUNDING ACROSS GOVERNMENT PROGRAMS

ACTION FOR ALL OF GOVERNMENT

The PEI government offers a wide range of programs that support individuals, homeowners, communities, and local businesses to thrive and develop. However further investment in high-hazard areas without adequate consideration for proactive coastal management risk reduction should be avoided. The intent is not to punish those in high-hazard areas, but rather to ensure that adaptation actions are equally prioritized in decisions relating to new development and investment of public funds.

Eligibility for funding programs, such as the new Housing Challenge Fund, already includes a requirement that new development must be net zero ready. These applications should also be required to submit a Coastal Hazard Assessment (where applicable) and where coastal hazards are identified the proponent should submit a plan to mitigate risks in alignment with the area's approved SMP.

Furthermore, a Coastal Hazard Assessment should also be completed for all internal budget considerations relating to coastal properties and infrastructure projects. Publicly funded and government led projects should demonstrate compliance with approved SMPs.

Canada's National Adaptation Strategy

As part of the commitments made under the National Adaptation Strategy (NAS) the federal government will require that new investments in infrastructure apply resilience criteria and adopt climate change guidelines, standards, and future design data to maximize the long-term benefits of infrastructure outcomes.

11. ADOPT AN INTERIM PLANNING POLICY FOR COASTAL DEVELOPMENT

ACTION FOR DHLC

Land use planning plays a significant role in coastal zone management. It is promising that the current government has committed to developing a provincial-wide strategic Land Use Plan, but continued coastal development in the interim will continue to harm the natural environment in coastal areas and will increase the province's vulnerability to coastal hazards, increasing risks to public safety and new infrastructure.

An Interim Planning Policy should, at the very least, include the following:

- i. Prohibit new subdivisions where the proposed lots and/or access road is located within the coastal floodplain.
- ii. Require a Subdivision Buffer Lot for new coastal subdivisions, and rather than the lot being owned by a neighbourhood association, the lot should be conveyed to the province as an Environmental Reserve as lands for public purposes. Environmental Reserves are a coming planning tool used in other provinces.
- ii. Prohibit new development requiring an excavation for construction (i.e., no foundations or in-ground services) on high-hazard, non-conforming (undersized) coastal properties.

iii. Prohibit rebuilding on non-conforming (undersized) high-hazard properties following substantial damage or complete loss.

iv. Prohibit new development in areas at highest risk until enhanced building standards can be adopted, or unless a qualified professional can verify the design of the proposed development addresses the known hazard without the need for future shoreline erosion mitigation (i.e., armouring).

Building Standards for Coastal Hazards

In the United States, FEMA (Federal Emergency Management Agency) has created coastal flood hazard zones which are identified on a series of national maps, referred to as the FIRM (Flood Insurance Rate Maps). Depending on the zone a property is located in, new development is subject to stricter building requirements because of the elevated risk of flooding.

For example, new residential buildings within the high-hazard areas are required to be elevated and ground-level enclosures must have breakaway walls to collapse under flood loads to protect the foundation and elevated building above.

(FEMA, 2008)

12. SUPPORT MUNICIPALITIES TO ADDRESS COASTAL HAZARDS AND ENVIRONMENTAL PROTECTION

ACTION FOR DHLC AND MUNICIPALITIES

Municipalities play an important role in coastal zone management in a wide range of services that they provide, including planning, emergency management and asset management.

Municipal planning authorities have a responsibility to address statements of provincial interest including the protection, conservation, and management of coastal areas. Municipalities can adopt applicable policies and regulations within existing land use and planning policy documents by including applicable goals, objectives and policies in their Official Plan, Land Use Bylaws, and/or with zoning designations.

Municipalities can also identify coastal hazard areas in emergency management plans and establish

evacuation plans for those areas where road access may be affected during a storm surge event.

Finally, municipalities play an important role in local communications to address the safety, health and welfare of people, and the protection of persons and property.

The Province can further support municipalities by:

- enable and encourage municipalities to adopt coastal management plans and applicable bylaw regulations based on the provincial SMPs.
- provide financial incentives or prioritize financial partnerships to implement proactive adaptation strategies.

13. DEVELOP ASSET MANAGEMENT RELOCATION AND DECOMMISSIONING PLANS FOR COASTAL PUBLIC PROPERTY AND INFRASTRUCTURE

ACTION FOR DTI

The current mandate of the DTI is to maintain public properties and infrastructure. But without a requirement to prioritize long-term sustainable adaptation strategies, their mandate drives actions that prioritize the status-quo. Government needs to lead by example by relocating buildings, infrastructure and land uses on government properties in high-risk coastal areas.

Asset management plans for public infrastructure should identify the strategies that will be used to extend the functional life of existing at-risk infrastructure but should also include a plan and timeline for decommissioning. Should significant damage be incurred prior to the end-of-service timeframe, decommissioning and shoreline restoration should commence.

A coastline restoration plan is necessary to ensure debris and remnants of old infrastructure are not left to weather on the beach as some shoreline structures have done in the past.



Figure 21. Brae Harbour road and wharf were abandoned rather than decommissioned. The beach at Brae Harbour road and is littered with the debris of the old structure. Brae Harbour, PEI. (H. Parnham, 2023)

14. ESTABLISH A CAP ON FINANCIAL DISASTER ASSISTANCE FOR PROPERTY DAMAGE AND LOSS FOR REPEATED EVENTS

ACTION FOR DJPS

As extreme weather events continue to be more common, the costs to provide support to people who are impacted by the events will continue to escalate. To encourage uptake of preventative and proactive risk reduction strategies, people need a better understanding of their eligibility for provincial and/or federal government financial support in the event of a disaster, especially as it relates to known high-hazard areas.

Other provinces that have experienced repetitive disaster-rebuild cycles have established a cap on a property's eligibility if repeatedly damaged by the same hazard. By publicly announcing the cap, in advance of the next disaster property owners can plan accordingly and weigh their adaptation options from a financial perspective.

PEI should similarly establish a cap or limit on funding for damage caused by coastal flooding. Properties that have not taken reasonable measures to reduce risks, such as by participating in the buffer zone planting program, should be ineligible.

Cap on Repeat DFAA payouts

Other provinces, including New Brunswick and Nova Scotia, have announced a \$200,000 cap on disaster financial assistance arrangements for properties eligible for the program.

New Brunswick has gone one step further by stating that when a property is no longer eligible, it will be registered on the deed of the property to ensure adequate disclosure to the next property owner.

15. POST SIGNAGE TO ALERT THE PUBLIC TO POTENTIAL COASTAL HAZARDS

JOINT ACTION FOR DEECA, DTI AND DJPS

Signage should be installed on roads, causeways, and bridges prone to overwash due to storm surge, where emergency vehicle access may be restricted during an extreme event, and where previous evacuations have been necessary. This action prioritizes public safety for all.

Public signage of potential hazards serves multiple purposes:

- i. Signage is accessible to everyone, whether they are a property owner, resident/tenant, employee or visitor.
- ii. Signage made visible on a day-to-day basis provides a continuous reminder of the potential hazards in an area.
- iii. The placement of the signs can be used as landmarks to advise people on the seaward side to consider voluntary evacuations when there is a forecasted storm surge event for the area.

In addition to addressing public safety concerns, many people are not aware that exposure to salt water is particularly harmful to a vehicle and that cars should not be left parked in an area subject to flooding.

During Post Tropical Storm Fiona, many vehicles were ruined due to storm surge flood damage. While it is fortunate vehicle insurance can currently cover these losses, a substantial increase in claims could lead to an increase in costs or a change to insurance availability over time.

Standard coastal hazard signage should be made available to anyone who would like to erect a sign on their private road or within a parking lot. The Texas Transportation Institute developed guidelines for flood-prone sections of roadways which can be accessed [here](#) (Balke et al. 2011).



Figure 22. Road Subject to Flooding signage. Davis Bay, BC. (Photo shared with permission, 2023)



Figure 23. A local city council installs 50 ‘smart’ flood warning signs in high risk areas. Run on low-cost solar power, the signs are activated automatically and simultaneously update flood information on the city’s website. Logan City, AU. (Jimboomba Times, 2017)

Road subject to flooding signs from around the world

In the Caribbean Islands, storm surge warning signage is used to direct people to evacuation centers.

In the United States and Australia, flood warning signage also includes indicators of potential depth based on real-time or previous high-water marks.

In British Columbia, signs are erected on the coast in Davis Bay to warn of tsunami dangers.

In Truro, NS, when Park Street floods, they close the road with a swinging gate that reads “Road closed due to flooding”.

16. MAKE COASTAL HAZARD DISCLOSURE MANDATORY FOR PROPERTY SALES, RENTAL LEASES, AND TOURISM ESTABLISHMENTS

ACTION FOR DJPS, DEPARTMENT OF FINANCE, AND DFTSC

Coastal hazard disclosure policies are needed to inform decisions relating to the sale of property to ensure that a property owner, developer, property assessor, mortgage lender, insurer and future property owners are all aware of the known hazards, and the implications those hazards may have on future development opportunities, insurance coverage options, and eligibility for financial assistance in the event of a disaster.

The following quote is from a current public real estate listing for a PEI property: “... a half acre waterfront lot in beautiful... This is the perfect location to enjoy the views, nearby beaches, and local seasonal amenities along PEI’s north shore. This lot has electricity, well, and septic on site and is conveniently located in...”. The cottage that was previously on this property was lost in the storm surge of Post Tropical Storm Fiona, 2022.

Risk disclosure policies should not be limited to point-of-sale transactions. Rental leases also contribute to a lack of informed decision-making. Renters are currently ineligible for financial assistance if their home is damaged or lost, making them disproportionately vulnerable to coastal risks. Landlords should be required to inform tenants of prior flood history and known coastal hazards associated with a property.

The following information should be included in a coastal hazard disclosure statement:

- i. The location of a property, its buildings and utility infrastructure (e.g., on-site well, drainage ditches, storm water drains, and sewerage systems) in relation to the current and future coastal floodplains.
- ii. The historic rate of erosion according to the most current data available.
- iii. Previous impacts due to coastal hazards.
- iv. Eligibility conditions and/or restrictions on provincial/federal DFAA.

Operators of PEI tourism establishments (motels, cottages, campgrounds, etc.) should also be required to disclose coastal flood hazards to guests/tenants when a potential storm surge is forecasted to ensure visitors seek appropriate shelter during an extreme weather event.



Figure 24. (left) For sale sign on a coastal property following damage from Post Tropical Storm Fiona. MacEwen’s Island, PEI. (D. Jardine, 2023)

Disclosure in the US

In the United States, 29 states have varying types of flood disclosure requirements.

States with the best flood risk disclosure requirements include Texas, New Jersey, South Carolina, Louisiana, and Mississippi. Rankings according to the Natural Resources Defence Council can be found on their [Flood Risk Disclosure Laws Scoreboard](#) (online map).

In Texas, disclosure laws require the seller to disclose whether there has been any previous water damage due to a natural flood event, any flooding due to flooding from a reservoir or controlled release of water, **if the property is located in a flood zone**, if the seller has claimed flood insurance for damage to the property, if flood insurance covers the property and if the seller has ever received assistance from FEMA, or US Small Business Administration for flood damage to the property.

Final Remarks

Recent events, including Post-tropical Storms Dorian in 2019 and Fiona in 2022, have reminded Island residents that our provincial coastline is vulnerable to impacts that had previously not been experienced for some time (recall the record-breaking storm surge of 2001, Hurricane Juan in 2003, and White Juan in 2004). But scientists have been steadfast in their projection that these types of storms will become more frequent and will occur with a higher intensity in the future. Islanders can no longer deny the inevitability of coastal vulnerability, now and for the future.

The proposed Coastal Policy Framework provides a system in which options for coastal zone management and adaptation strategies are ranked according to public priorities. The framework underscores the importance of shifting from reactive to proactive adaptation through preventative actions that reduce coastal vulnerability, including the protection of natural areas, avoidance of hazard zones, and utilizing relocation and restoration strategies where necessary. Resistance strategies, though essential in certain circumstances, should be used in areas of substantive public priority to prolong the usefulness of critical infrastructure, and otherwise should be considered a last resort or a temporary measure.

The interim policy recommendations highlight the need for better informed decision-making. For the

developed coastlines where municipalities have established land use planning, the next task will involve the development of Shoreline Management Plans that address both current risks and future environmental, social, and economic objectives. As the Province works towards the development of a comprehensive provincial Land Use Plan, interim adaptation strategies are proposed for rural areas under provincial jurisdiction.

The future of PEI's coastal zones hinges on a proactive, informed approach to coastal zone management. For the successful development of a 25-year Coastal Management Plan, a whole-of-government approach will be necessary, and long-term policies and programs should be developed based on meaningful engagement with communities and rightsholders.

By acknowledging past errors and prioritizing sustainable, long-term solutions, PEI can ensure the safety and prosperity of its coastal communities, infrastructure, and natural landscapes. We have an opportunity now to prevent coastal vulnerability from getting any worse than it is today, and to maintain the natural resilience of the coast.

PEI is fortunate to still have lengths of unaltered coastline that can be protected. Will PEI be up for the challenge?



Figure 25. Tracadie and Blooming Point beaches meet at a relatively new opening in the sandspit which formed on December 21, 2010 following a storm surge event that breached the previous barrier island and altered this dynamic landscape once again. (D. Jardine, 2023)

References

- Arkema, K., Guannel, G., Verutes, G. et al. Coastal habitats shield people and property from sea-level rise and storms. *Nature Clim Change* 3, 913–918 (2013). <https://doi.org/10.1038/nclimate1944>
- Balke K., Higgins, L., Chrysler S., Pesti G., Chaudhary N., and R. Brydia (2011) Signing strategies for low-water and flood-prone highway crossings. Report No. FHWA/TX-12/0-6262-1. Developed by the Texas Transportation Institute for the Texas Department of Transportation. Accessed at: <https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6262-1.pdf>
- DEFRA (2006) Shoreline management plan guidance Volume 1: Aims and requirements. Published by the Department for Environment, Food and Rural Affairs. March 2006 Accessed at: www.defra.gov.uk
- Dronkers, J. (2019) Shoreline Management Plans, UK. Accessed at: https://www.coastalwiki.org/wiki/Shoreline_Management_Plans,_UK
- DV8 Consulting (2016) PEI Coastal Property Guide. Prepared for the PEI Department of Communities, Land and Environment, Government of Prince Edward Island. Accessed at: www.princeedwardisland.ca/sites/default/files/publications/prince_edward_island_coastal_property_guide.pdf
- EF | Design and Planting, LLC. Planting Guide for Tidal Shoreline Erosion Management in New Hampshire. Prepared for the N.H. Department of Environmental Services Coastal Program. Accessed at: www.des.nh.gov/sites/g/files/ehbemt341/files/documents/tidal-erosion-planting-guide.pdf
- Environmental Protection Act, R.S.P.E.I. 1988, Cap. E-9. current to August 1, 2023. Retrieved from the Statutes and Regulations website: <https://www.princeedwardisland.ca/en/legislation/all/all/e>
- Environmental Protection Act Watercourse and Wetland Protection Regulations. current to September 4, 2021. Retrieved from the Statutes and Regulations website: <https://www.princeedwardisland.ca/en/legislation/all/all/e>
- FEMA (2008) Design and Construction Guidance for Breakaway Walls Below Elevated Buildings Located in Coastal High Hazard Areas in accordance with the National Flood Insurance Program. Department of Homeland Security. Technical Bulletin 9 / August 2008
- Government of Nova Scotia (2000) Beaches Act. R.S., c. 32, s. 1. Accessed at: <https://nslegislature.ca/sites/default/files/legc/statutes/beaches.htm>
- Insurance Bureau of Canada (2023) Prevent water damage: Know what's covered and what's not covered. Accessed at: <https://www.IBC.ca/stay-protected/severe-weather-safety/flood-and-water>
- Jardine, D.E. (2023) Post Tropical Storm Fiona Highwater Mark and Shoreline Erosion Field Notes with Photos. Prepared for the Government of Prince Edward Island by DE Jardine Consulting.
- Jardine, D.E., Parnham, H., Kennedy, C., Keefe, G., Pang, T., Kinay, P., Wang, X. and A. Farooque (2023) Jurisdictional Scan: Coastal Zone Management Policies, Programs and Resources. Canadian Centre for Climate Change and Adaptation, St. Peter Bay, Canada.
- Land Matters Advisory Committee. (2021). Now is the Time: Final Report of the Land Matters Advisory Committee. Available at: <https://www.landmatterspei.ca/>
- Massachusetts Department of Environmental Protection (2014) 310 CMR: Wetlands Protection Act, Massachusetts General Laws (MGL) Chapter 131, Section 40.
- Massachusetts Office of Coastal Zone Management (2023) StormSmart Coasts - Coastal Landscaping in Massachusetts. Accessed at: www.mass.gov/info-details/stormsmart-coasts-coastal-landscaping-in-massachusetts
- Migratory Birds Convention Act (S.C. 1994, c. 22) Act current to 2023-08-21. Retrieved from the Justice Laws website: <https://laws-lois.justice.gc.ca/eng/acts/M-7.01/index.html>
- Ministry for the Environment. 2022. Aotearoa New Zealand's first national adaptation plan. Wellington. Ministry for the Environment.
- NRDC (2023) How States Stack Up on Flood Disclosure. August 31, 2023. Development by the Natural Resources Defense Council. Accessed at: www.nrdc.org/resources/how-states-stack-flood-disclosure
- O'Connell, J.F. (2010) Shoreline armoring impacts and management along the shores of Massachusetts and Kauai, Hawaii, in Shipman, H., Dethier, M.N., Gelfenbaum, G., Fresh, K.L., and Dinicola, R.S., eds., 2010, Puget Sound Shorelines and the Impacts of Armoring—Proceedings of a State of the Science Workshop, May 2009: U.S. Geological Survey Scientific Investigations Report 2010-5254, p. 65-76.
- Parnham, H. (2023) [managed] retreat: the elephant in the adaptation framework. Prepared for CLIMAtlantic by DV8 Consulting.
- Parnham, H., Jardine, D., Kennedy, C., Weatherbie, C., Keefe, G., Pang, T., Kinay, P., Wang, X. and A. Farooque (2023) Prince Edward Island State of the Coast Report 2023. Canadian Centre for Climate Change and Adaptation, St. Peter Bay, Canada. Report submitted to the Department of Environment, Energy and Climate Action, Government of Province Edward Island
- Planning Act Coastal Area Regulations (No. EC159/92) March 1992. Revoked December 2, 2000. EC2000-693.
- Prince Edward Island Coastal Area Policy (CAP/92) Department of Community and Cultural Affairs.
- Species at Risk Act (S.C. 2002, c. 29) Act current to 2023-08-21. Retrieved from the Justice Laws website: <https://laws-lois.justice.gc.ca/eng/acts/s-15.3/>
- Starkey, L. (2017) Logan Council installs new flood signs. Jimboomba Times. Australian Community Media. First published, Feb. 9 2017. Accessed at: <https://www.jimboombatimes.com.au/story/4458671/state-council-flood-logan-with-warning-signs/>
- Webster, T. K. McGuigan and C. Webster (2011) Survey Grade GPS Storm Surge High Water Mapping. Prepared by the Applied Geomatics Research Group, Nova Scotia Community College.
- White, S., Grant, K., Leyden K., and E. Stancioff (2010) Building a Resilient Coast. Climate Variability and Coastal Community Resilience: Developing and Testing a National Model of State-based Outreach. The University of Maine. Maine Sea Grant Publications. 104. Accessed at: https://digitalcommons.library.umaine.edu/seagrant_pub/104

