CLIMAtlantic

Coastal Adaptation Toolkit

Adapting to Climate Change in Coastal Communities of Atlantic Canada

Part 2 Land Use Planning Tools & Adaptation Options

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Disclaimer

The toolkit is intended for informational purposes only. The information provided is not a substitute for site-specific professional advice, nor does the information contained in the tools replace consultation with engineering, land use planning, and/or earth science professionals. The information provided does not preclude the need to engage with relevant jurisdictions in regulatory and permitting processes. The authors make no representation as to its accuracy and the claims made by the articles from which it was derived.

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PART 2 Land Use Planning Tools & Adaptation Options

Foreword

The Atlantic Provinces of Canada have established enduring patterns of land use and development at the coast. All of the region's coastal communities are vulnerable to marine coastal hazards and climate change impacts; their future relies on adapting to the impacts of climate change in the coastal zone.

The Coastal Adaptation Toolkit, Adapting to Climate Change in Coastal Communities of Atlantic Canada, Part 2 Land Use Planning Tools & Adaptation Options provides guidance on strategies and tools to manage climate change-driven sea level rise and coastal flooding and erosion. This set of three guidance documents supports the CLIMAtlantic web-based Coastal Adaptation Tool (https://climatlantic.ca/coastal-adaptation/). Combined, these resources help decision-makers define their coastal climate change adaptation needs and select the most appropriate land use planning or engineering tools for their community's coastal context and climate change impact challenges.

Part 1 Guidance for Selecting Adaptation Options*,* introduces climate change adaptation for the coastal regions of the Atlantic Provinces. It describes the five main adaptation approaches, describes climate change impacts in the Atlantic Region, characterizes the coastal environments, presents criteria for adaptation decision-making, and links adaptation tools and strategies to the coastal settings of the Atlantic Provinces.

Part 2 Land Use Planning Tools Adaptation Options, presents over 50 land use planning tools for coastal climate change adaptation. The tools and examples in this guidance document are the land use planning options of the CLIMAtlantic web-based Coastal Adaptation Tool. The document also includes overviews of the land planning and management frameworks and legislation that could support coastal climate change adaptation in each of the four Atlantic Provinces and First Nations.

Part 3 Coastal Intervention Options and Engineering Considerations*,* presents over two dozen intervention options to manage coastal flooding and erosion, describes the suitability of the tools for different coastal conditions and climate change adaptation objectives (e.g., short to long-term, low, medium or high cost), and identifies the technical and permitting requirements for the adaptation approaches. The tools and examples in this volume are the engineering options of the CLIMAtlantic web-based Coastal Adaptation Tool.

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Preface

Coastal Adaptation Toolkit, Adapting to Climate Change in Coastal Communities of Atlantic Canada, Part 2 Land Use Planning Tools & Adaptation Options, is a reference collection of land use planning tools for climate change adaptation in rural, coastal communities. The tools described in this guidance document are also the land use planning outputs for CLIMAtlantic's web-based Coastal Adaptation Tool.

Part 2 is organized in three sections:

Chapter 1. Land Use Planning Adaptation for Coastal Impacts of Climate Change describes land use planning, coastal land use planning, and land use planning tools to address climate change impacts in coastal communities.

Chapter 2. Context for Coastal Land Use Planning in the Atlantic Provinces describes land use planning and identifies legislation of relevance to coastal land planning and management in the provinces of New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador and the Indigenous lands including Nunatsiavut, Nitassinan, and Mi'kma'ki.

Chapter 3. Land Use Planning Adaptation Options for Climate Change presents land use planning tools and their use in coastal planning and management, illustrated with regional, national, and international examples. The tools include capacity building tools; policy and planning frameworks; guidance, management, strategic and functional plans; regulatory and land use change tools; and tools for site planning and design. Each tool description covers the use of the tool in coastal and climate change adaptation planning; the adaptation approach for which it is suited; the opportunities (or advantages) and constraints (or limitations) and how to get started with creating or using the tool. Examples illustrate where the tool has been used already for coastal and climate change planning or illustrate opportunities for use in coastal climate change adaptation.

Chapter 1: Land Use Planning for Adapting to Coastal Impacts of Climate Change

Land use planning is an activity of society involving government and citizens to make the best and most efficient use of land for societal benefit, according to the vision and goals set by that society. Land use planning aims to balance private and public interest and to avoid conflicts between uses that are not compatible with one another. Modern land use planning aims to use the land sustainably so that its value continues for future generations. Sustainable land use includes protecting the natural quality of the land for the value that nature contributes to society; it can also mean protecting the interests of society from the unwise use of land, such as avoiding hazards.

Because of its inherent purpose of ensuring long-term sustainable social, economic, and environmental benefits, land use planning is well-suited to addressing the emerging and long-term challenges of climate change impacts. The common time frames of land use planning, as it is practiced at the community level, are 5, 10, and 25 to 30 years, time frames that work for developing short- and medium-term responses to planning for climate change. Land use planning is also adaptive: as circumstances change, plans change to respond to the changing conditions and contexts. It is a long-term exercise because it is responsive and continuous.

One hundred years is the common long-term projection horizon for climate change scenarios; it is also a realistic length of time for very long-range land use planning because the outcomes of land use planning can be enduring. Planning and development decisions and actions of today establish the landscapes of tomorrow. We see the evidence of these historical patterns of land use all around us in the cities, towns, villages, and rural landscapes of the Atlantic Provinces.

Coasts are the boundary spaces where land and sea meet and where diverse and sometimes competing land uses concentrate. And, because coasts are dynamic environments, they are also challenging spaces for development. Land use planning for coastal environments is complex because of the many uses that occupy coastal land and the overlapping government jurisdictions in the coastal zone. The combination of high energy and environmental sensitivity of many coastlines further contributes to the planning and management complexity. Land use planning's role in coastal land management is to ensure that:

- only land uses compatible with coastal and marine environments, or reliant on them and able to withstand the energy of the coast, locate along this edge;
- land use is not or does not become hazardous;
- land uses that need the coastal space have access to it;
- coasts have room to move in response to climate through the natural processes of erosion and deposition; and
- natural coastal habitats and structures support biodiversity and buffer development from coastal processes

This role of land use planning for coasts is the same in the context of climate change, except that climate change has now made coastal land use planning a matter of coastal climate change adaptation. Coasts are the impact zone of climate change. Sea level rise and more frequent or more powerful storms with stronger winds and storm surges are challenging our usual coastal land use patterns and behaviours. There are many land use planning tools that can help communities achieve beneficial, sustainable land use at the coast, and ensure environmental security and safety in the era of a changing climate.

1.1 Land Use Planning Tools

Land use planning has an array of tools that communities can use for adapting to and managing the impacts of climate change. The tools of land use planning range from those that influence human behaviour and decisions about land use to those that influence the type and form of land use directly. Land use planning tools include techniques to educate and gently persuade people to adopt good land use practices, methods to gather and organize land information, frameworks for putting land use planning in place, rules and regulations that control the type and extent of land use, and standards that guide the design of land use and structures on the land.

This guidebook describes land use planning tools for coastal management and climate change adaptation, illustrated with examples from the Atlantic Provinces, other parts of Canada[1] and around the world. The tools are grouped into four categories: 3.1 Land use planning tools for capacity building, 3.2 Policy and planning framework tools, 3.3 Regulatory and land use change tools, and 3.4 Site design tools.

Capacity Building Tools – Capacity building tools add to a community's knowledge and understanding of the local environment and culture and increase the ability to respond effectively to change. Increasing knowledge about local environments can involve collecting information about the land and how it works. Increasing knowledge about local culture may include identifying valuable community assets and their uses or finding the people in the community who have special knowledge about local land uses or traditions. Knowledge from capacity building tools should be shared amongst decision-makers, municipal staff, residents of a community and others who can help apply the knowledge to planning. When used for coastal climate change adaptation, capacity building includes increasing knowledge about coastal environments and weather patterns, past severe weather and its impacts at the coast, changes in sea level and natural coastlines, and vulnerability and risks to coastal climate change impacts. Capacity building is important for coastal and climate change adaptation planning and using any of the tools listed in this guidebook.

Policy and Planning Framework Tools – Planning framework tools are used by governments to guide land use and related activities. They include official plans of incorporated communities that direct the affairs and development of a community. They also include other plans and strategies that manage activity in different contexts, such as watersheds or the shoreline, or manage environmental resources, or establish systems to support certain specific needs (such as emergency management plans). They also work at different scales – provincial, regional, and municipal. These plans are common to communities everywhere, but the focus of this guidebook is the coastal setting and climate change adaptation planning for coastal areas and communities.

Regulatory and Land Use Change Tools – Regulations and land use change tools include tools that control land use, subdividing of land, change in land use, or ownership of land. Only incorporated municipalities and provincial governments use some of these tools. However, non-incorporated communities can advocate for use of these tools by the land use authority of their area. Other tools in this category do not require land use planning authority and can be used in partnerships with other organizations such as a land trust.

[1] For another example of land use planning tools in the Canadian coastal context, please see Sea Level Rise Adaptation Primer – A Toolkit to Build Adaptive Capacity on Canada's South Coasts. Arlington Group Planning + Architecture, EBA a Terra Tech Company, DE Jardine Consulting and Sustainability Solutions Group. British Columbia Ministry of Environment, 2013.

Site Design Tools– Site design tools include tools used for site specific, physical planning and design – designing, modifying, and creating physical spaces and structures, both natural and man-made. A provincial government or the local government or agency with land use planning authority may regulate the use of these tools for an area. These tools overlap with engineering tools further discussed in Part 3 of this series.

1.2 Climate Change Adaptation at the Coast

Five approaches to adaptation are available to communities to manage climate change impacts: **avoid**, **retreat, accommodate, protect**[2,3,4] and **procedural** (or risk-understanding) activities. Each approach can be used alone or in combination with one or more of the other approaches.[5] The choice of approach, or approaches, depends on the type, age, density, function, and value of development, or development needs, at the coast; the amount of time a community has to respond to the change; and the tolerance for risk a community has for climate change impacts.

Avoid is a strategy for discouraging or preventing development in hazardous places or places that might become hazardous for development and land use in the future. The strategy requires identifying such areas and the risk to future development. Keeping development away from active flooding and erosion not only protects development; it also protects coastal environments from the impacts of development and ensures that natural systems along the coast, such as dunes and salt marshes, have space to move as sea level rises with climate change. Avoid thus provides benefits to both nature and development; it can also increase public access to the coast.

Retreat or managed retreat is a strategy to relocate people and infrastructure away from hazardous coastal areas to safer areas. The strategy is a long-term adaptation approach to high-risk areas. This strategy increases public safety and can be used instead of replacing expensive protection measures, such as coastal armouring, over time. There are two types of retreat, managed retreat and abandonment. When retreat is used in this document it is almost always referring to managed retreat. With managed retreat, decisions are made about what to relocate and what areas to leave to revert to natural systems or use for alternate land uses such as parks and green spaces. Abandonment does not involve pre-planned relocation. Abandonment may be necessary in emergency situations if no other options exist.

Accommodate allows for on-going occupancy and use of coastal lands but changes the type of land use or maintains the current land use through modifications to infrastructure design and site development. Changes to infrastructure may include designing to accommodate flooding with raised, or floating structures.

Protect is the most common form of adaptation in coastal areas throughout the world. It involves installing structures to hold back water or divert water and prevent erosion with the aim of maintaining current land use without change. Protection infrastructure must be maintained and upgraded over time for long-term effect, a necessity that can become expensive over the long-term.

Procedural (also referred to risk-understanding) approaches include projects and activities that educate people about climate change and how it can affect the coast and coastal communities. It also includes collecting climate information and local coastal data to guide adaptation

[2] Arlington Group Planning + Architecture, EBA, a Tetra Tech Company, and DE Jardine Consulting Sustainability Solutions Group. (2013). Sea level rise adaptation primer: A toolkit to build adaptive capacity on Canada's south coasts. British Columbia Ministry of Environment. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/resources/slr-primer.pdf
[3] NOAA. (2010). Adapting to Climate Change: A Planning Guide for State Coastal Managers. NOAA. Washington, DC Retrieved 15 June, 2022 from https://coast.noaa.gov/data/digitalcoast/pdf/adaptationguide.pdf
[4] Doberstein, B., Fitzgibbons, J., & Mitchell, C. (2019). Protect, accommodate, retreat or avoid (PARA): Canadian community options for flood disaster risk reduction and flood resilience. *Natural Hazards*, *98*(1). https://doi.org/10.1007/s11069-018-3529-z
[5] There are many descriptions of adaptation strategies and examples of how they are used. For another treatment of adaptation in the Canadian coastal context see: Sea Level Rise Adaptation Primer – A Toolkit to Build Adaptive Capacity on Canada's South Coasts. Arlington Group Planning + Architecture, EBA a Terra Tech Company, and DE Jardine Consulting. British Columbia Ministry of Environment, 2013.

decisions; organizing the information so that it is available and easy to understand, such as in maps; and using the information to develop land use policy and planning. Activities and initiatives in this category may stand alone (such as an education program), but they usually support the other strategies or provide an overarching framework for adaptation planning.

Land use planning tools work to achieve the objectives of the different adaptation approaches. Some tools are specific to one approach, but many of the tools serve two or more of the five approaches. Tools are typically used in combination, or in sequence and many tools depend on having another tool already in place. For example, education and community engagement tools (capacity building tools) inform the public about climate change and coastal issues and involve the public in developing a climate change adaptation plan (planning framework tools). Regulatory tools (regulation and land use change tools) work in connection with an official plan (planning framework tools) to control coastal development in hazardous areas. Land use planning success is more likely when using a variety of tools in the right sequence or combinations.

Table 1.1 in the **Appendix** summarizes the land use planning tools in this section, organized by category as they occur in the guidebook, and identifies 1) the adaptation approaches each tool can address; 2) the place of the tool in the planning process; and 3) the adaptation time frame. Planning tools can be used for all time frames in adaptation planning but have the greatest effect over the medium (5 to 20 years) and long term (more than 20 years). Table 1.2 in the **Appendix** builds on Table 1.1 by identifying tool combinations for effective adaptation planning.

Chapter 2: The Context for Coastal Land Use Planning in the Atlantic Provinces

Canada's four Atlantic provinces of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador are distinct from one another in their arrangements of land ownership, governance, planning, and management. The smallest province, Prince Edward Island, is almost entirely in the hands of private landowners; 12 percent of the land mass is public land. In contrast, provincial, public land accounts for 88 percent of the land area of Newfoundland and Labrador, the largest of the four provinces.

Land use planning and management happens through local government or provincial initiatives, but the distribution of authority or control over land use planning varies widely between the four provinces. Nova Scotia has the most extensive distribution of local government and authority for local land use control. The entire province (except for federal lands and First Nations communities) is organized into municipalities. The other provinces are a mix of municipalities with local land use control and unincorporated areas, or local service districts with provincial land use control.

The provinces delegate land use planning and management authority to local governments through enabling legislation – the *Municipal Government Act* in Nova Scotia, the *Local Governance Act* in New Brunswick, the *Municipal Government Act* in Prince Edward Island, and the *Municipalities Act* in Newfoundland and Labrador. Depending on the province, municipalities may either accept the authority for land use planning and development control, or it may be required of them. They develop plans and legislation to guide and regulate land use, such as land use bylaws. Land use plans and regulations may apply broadly to the entire municipality or target specific areas in a municipality through secondary or local plan areas. Municipal plans and legislation must follow the rules of provincial land use regulations.

Areas not subject to municipal land use and development controls are still subject to provincial policy and regulation. Land management at the provincial level includes resource development for forestry and mining; wildlife and habitat protection through protected areas; environmental protection for wetlands, watercourses, and shorelines; and recreation such as parks. Agricultural land use is also subject to provincial regulations. Agriculture is private land development, but it uses soil, an environmental resource. Some provinces and/or their municipalities use zoning to protect agricultural land base from development for other uses.

The Atlantic Provinces' patterns of land ownership and governance and management overlay an Indigenous geography of traditional, unceded territories and autonomous, self-governed land, including Mi'kma'ki and Nitassinan, and Nunatsiavut, respectively. Mi'kmaw, Innu, and Inuit independently govern their communities and use and manage their land and its natural resources according to their traditions and formal agreements with federal and provincial governments. Also, federal government legislation, including the *Indian Act*, the *First Nations Land Management Act*, as well as historic treaties, modern treaties (also known as comprehensive land claim agreements-- these are treaties signed after the Supreme Court of Canada recognized Aboriginal rights for the first time in 1973), or self-government agreements confer land use planning and management to First Nations.

Any of the tools used by a municipality or First Nations community, or the provinces to control land and resource activities, can be applied in the coastal context for coastal planning and management.

The following sections describe the land use planning and management context for coastal and climate change adaptation in the four Atlantic Provinces, Nunatsiavut, and in First Nations.

2.1 Indigenous

2.1.1 First Nations

There are various ways in which land use planning and management is organized in First Nations in Canada. Some First Nations are subject to the *Indian Act*, others have opted to use the *First Nations Land Management Act*, and others have historic treaties, modern treaties (also called comprehensive land claims), or self-government agreements. These various legislative tools give First Nations different levels of autonomy for land use planning. For example, under the *Indian Act*, First Nations must receive permission from the federal government for land use planning initiatives; with self-governance, First Nations control land use and land management independently.

Some First Nations have treaties that were negotiated between a First Nation and the Crown. The rights given to First Nations through these treaties have been only partially defined. Treaties in place in Atlantic Canada are the *Treaty or Articles of Peace and Friendship Renewed* 1752, and the *Treaty of Peace and Friendship* 1760.[6] In the modern era, First Nations are negotiating with the federal government to obtain self-governance agreements and modern-day treaties and comprehensive land claims. These agreements give First Nations greater autonomy over governance and land use. The following First Nations in Atlantic Canada have agreements or are in the process of negotiating agreements as of 2022:

- The Mi'kmaq of Prince Edward Island, the Province, and Canada have signed a Framework Agreement committing them to negotiations regarding Aboriginal and treaty rights, including the inherent right to self-government. This agreement is being developed for the communities of Lennox and Abegweit.[7]

- The Mi'kmaq of Nova Scotia have an agreement-in-principle for a comprehensive land claim with self-government. This agreement includes the communities of Acadia, Annapolis Valley, Bear River, Potlotek First Nation, Eskasoni, GlooscapFirst Nation, Membertou, Millbrook, Paqtnkek Mi'kmaw Nation, Pictou Landing, Wagmatcook, and Waycobah First Nation.[8]

- The Labrador Innu Nation has a land claim and self-government agreement-in-principle. Negotiations towards a final land claim and self-government agreement are ongoing. This agreement includes the communities of Sheshatshiu Innu First Nation and Mashuau Innu First Nation.[9]

- The Miawpukek First Nation of Conne River have signed a Self-Government Agreement-in-Principle.[10]

[6] Crown-Indigenous Relations and Northern Affairs Canada. (2015). *Peace and Friendship Treaties.* Retrieved from https://www.rcaanc-cirnac.gc.ca/eng/1100100028589/1539608999656
[7] Crown-Indigenous Relations and Northern Affairs Canada. (2019). *Mi'kmaq, Prince Edward Island, and Canada Framework Agreement*. Retrieved from https://www.rcaanc-cirnac.gc.ca/eng/1548858268881/1548858560122?wbdisable=true
[8] Crown-Indigenous Relations and Northern Affairs Canada. (2019). *Negotiations in Atlantic Canada*. Retrieved from https://www.rcaanc-cirnac.gc.ca/eng/1100100028583/1529409875394
[9] Government of Newfoundland and Labrador Office of Indigenous Affairs and Reconciliation. (n.d.). *Innu Nation of Labrador*. Retrieved from https://www.gov.nl.ca/exec/iar/overview/land-claims/innu-nation-of-labrador/
[10] Government of Newfoundland and Labrador. (2013). Miawpukek First Nation Self-Government Agreement-in-Principle. Retrieved from https://publications.gc.ca/collections/collection_2016/aanc-inac/R32-283-2013-eng.pdf

- The Mi'kmaq and Maliseet of New Brunswick have signed an Umbrella Agreement towards a conclusion of a Framework Agreement on Aboriginal treaty rights and self-government. This agreement includes the communities of Buctouche, Burnt Church No. 14, Eel Ground, Eel River Bar First Nation, Fort Folly, Indian Island, Kingsclear, Metepenagiag Mi'kmaq Nation, Oromocto, Pabineau, and Tobique.[11]

The Government of Canada is reviewing laws and policies respecting their relationship with Indigenous peoples. The reviewing is guided by the United Nations Declaration on the Rights of Indigenous Peoples and informed by the *Report of the Royal Commission on Aboriginal Peoples and the Truth and Reconciliation Commission's Call to Action*. The Canadian Government recognizes that Indigenous nations are self-determining, self-governing, and aspire to no longer be marginalized, regulated, and administered under the *Indian Act*.[12]

There are many First Nations organizations that are increasingly responsible for land and resource stewardship in their territories. They are non-colonial organizations that employ traditional knowledge, often combined with western science. For instance, in Nova Scotia, the Confederacy of Mainland Mi'kmaq is a not-for-profit organization with a mission to "proactively promote and assist Mi'kmaq communities' initiatives toward self-determination and enhancement of community." The governing body is made up of the Chiefs of the eight member communities.[13] The organization administers the Mi'kmaw Conservation Group which promotes the concept of Netukulimk in the Bay of Fundy Watershed. Netukulimk is a way of life practiced by Mi'kmaq where it is considered an honor to receive gifts from Mother earth so only what is needed is taken, and nothing is wasted.[14] The conservation group is currently working on many projects, including one that measures communities' water utilities and their ability to adapt to climate change.[15] In Unama'ki/Cape Breton, the Unama'ki Institute of Natural Resources (UINR) represents five Mi'kmaq communities on natural resource and environmental issues. UINR works with First Nations and government organizations towards equal participation in natural resource management.[16]

The Mi'kmaq Confederacy of PEI is a Tribal Council and Provincial Territorial Organization that provides advisory services to member First Nation Councils and delivers shared programs and services to Indigenous communities on PEI. It has an Integrated Resource Management division that is responsible for providing advice for environmental and resource management issues.[17]

The Wolastoqey Nation in New Brunswick advises and supports Wolastoqey Communities to ensure that their constitutional duty to consult is being met and Treaty and Aboriginal Rights are being recognized and implemented. The organization provides advice on projects relating to fishing rights, crown lands, land and resource use, and environmental assessments.[18] Mawiw Council Inc. works with Elsipogtog, Neqotkuk, and Esgenoopetitj, the three largest rural First

[11] Crown-Indigenous Relations and Northern Affairs Canada. (2016). *General Briefing Note on Canada's Self-government and Comprehensive Land Claims Policies and the Status of Negotiations*. Retrieved from https://www.rcaanc-cirnac.gc.ca/eng/1373385502190/1542727338550
[12] Department of Justice Canada. (2018). *Principles Respecting the Government of Canada's Relationship with Indigenous Peoples*. Retrieved from https://www.justice.gc.ca/eng/csj-sjc/principles.pdf
[13] The Confederacy of Mainland Mi'kmaq. (2014). About CMM. Retrieved from http://cmmns.com/about-cmm/
[14] Mi'kmaq Conservation Group. (2022). Mission & Netukulimk. Retrieved from https://mikmawconservation.ca/mission-netukulimk/
[15] The Confederacy of Mainland Mi'kmaq. (n.d.). Climate Change Adaptation Program. Retrieved from http://cmmns.com/program/climate-change-adaptation-program/
[16] Unama'ki Institute of Natural Resources. (2020). About UNIR. Retrieved from https://www.uinr.ca/about/
[17] Mi'kmaq Confederacy of PEI. (2022). Retrieved from https://mcpei.ca/
[18] Wolastoquey Nation in New Brunswick. (2022). Retrieved from https://wnnb.wolastoqey.ca/

Nations in the province, by amplifying their voices and getting government attention on important issues while maintaining their cultural traditions.[19]

Table 2.1 First Nations Band (Community) subject to the *Indian Act*

Decision-Makers	Historically, each First Nation community had their own traditional governance structures, often with Hereditary Chiefs as decision-makers, many following a matriarchal line. Bands were established under the *Indian Act* with the aim to assimilate First Nations into colonial society by imposing a more municipal-style governance structure and disrupting traditional forms of governance. Many First Nations continue to recognize Hereditary Chiefs, and in some cases have someone acting as both the Elected and Hereditary Chief, or the two may work together.[20] First Nation communities with self-government agreements create a constitution that includes a leadership selection process. Communities without self-government agreements may use a custom election code that exempts the community from the election provisions of the *Indian Act*.21 Under the *Indian Act*, a band council comprises councillors and a chief. Councillors are elected by the majority votes of band members. The chief is elected either by the majority of votes of band members or by the elected councillors. A band must have one councillor for every one hundred members of the band; however, the number of councillors cannot be less than two or more than twelve. Whenever the Minister deems it advisable, an election can be called to select a chief and councillors (Section 74, *Indian Act*).
Plans and Subdivisions	The Minister may authorize the preparation of plans and reports for reserves. The Minister may also divide the whole, or a portion of, a reserve into lots (Section 19, *Indian Act*).
Regulations	The Governor in Council may make regulation for land use purposes including: Preserving and protecting fur-bearing animals, fish, and game. Providing inspection of premises and the destruction, alteration, or renovation of a premise. Constructing and maintaining boundary fences (Section 73, *Indian Act*). Written permission from the Minister is required for any person to remove resources from a reserve including minerals, stone, gravel, clay, soil, trees, saplings, shrubs, underbrush, timber, cordwood, or hay (Section 93, *Indian Act*).
By-laws	The council of a band may make by-laws for land use purposes including: Constructing and maintaining watercourses, roads, bridges, ditches, fences, and other local works. Dividing reserve land into zones with restrictions on the construction or maintenance of buildings and land uses. Regulating the construction, repair, and use of buildings owned by the band or individuals. Allotting reserve lands among members of the band and establishing Certificates of Possession.

[19] Mawiw Council Inc. (n.d.). Who are we? Retrieved from https://www.mawiwcouncilinc.com/who-are-we/
[20] Indigenous Corporate Training. (2021). Hereditary Chiefs vs. Elected Chiefs: What's the difference (and why it's important). Retrieved from https://www.ictinc.ca/blog/the-difference-between-hereditary-chiefs-and-elected-chiefs
[21] Centre for First Nations Governance. (n.d.) Custom leadership selection codes for First Nations. Retrieved from https://fngovernance.org/wp-content/uploads/2020/06/CustomElectionCode_Leadership_Selection.pdf

	Constructing and regulating the use of wells, cisterns, reservoirs and waste supplies. Preserving, protecting, and managing fur-bearing animals, fish, and game. The by-laws must be consistent with the *Indian Act* and any other regulation made by the Governor in Council or the Minister (Section 81[1*], Indian Act*). Each by-law must be approved by the Minister who may withhold approval.

Table 2.2 First Nations subject to the First Nations Land Management Act

Decision-Makers	The power to manage land is exercised by a council of a First Nation or by a person or group that the council delegates power to (Section 18[3], *First Nations Land Management Act*). A proposed land code can be approved if the majority of eligible voters participate in the voting process and the majority of voters approve the land code (Section 12[1], *First Nations Land Management Act*). Eligible voters are any First Nations member the age of eighteen or older (Section 10[2], *First Nations Land Management Act*).
Land Code	A First Nation land code gives a First Nation the interests and rights over land within the land code boundary. No interest or right may be acquired over this land except if in accordance with the land code (Section 16, *First Nations Land Management Act*). A land code gives a First Nation the authority to manage land as an owner of the land. It may be used to grant licenses for land use, manage natural resources, and receive and use money acquired by the First Nation (Section 18, *First Nations Land Management Act*). First Nations that wish to manage reserve land must adopt a land code that applies to all land in a reserve. The land code must include: Rules and procedures for the use and occupancy of First Nation land. Rules and procedures respecting revenues from natural resources. Rules and procedures for councils' authority to manage land. The procedures that apply to approve an exchange of First Nation land (Section 6[1], *First Nations Land Management Act*). If more than one reserve has been established for a First Nation, the First Nation can manage land on any or all of the reserves (Section 6[2], *First Nations Land Management Act*). First Nations are given the authority to acquire and hold property, enter into contracts, borrow money, expand and invest money, and be party to legal proceedings (Section 18[2], *First Nations Land Management Act*).
Land Expropriation	A First Nation can expropriate First Nation land that is necessary for community works and purposes (Section 28[1], *First Nations Land Management Act*). The First Nation must pay a fair compensation for expropriated land (Section 28[5], *First Nations Land Management Act*). First Nation land can be expropriated by the Governor in Council of the Federal Government; land can be expropriated for the use of a federal department for uses that serve national interest (Section 29 [1 and 2], *First Nations Land Management Act*).
Environmental Impact Assessments	A First Nation that establishes land use planning must enter into an agreement with the Minister describing the environmental assessment process that will be used for projects (Section 6[3], *First Nations Land Management Act*).

By-laws	Council of a First Nation has the authority to enact laws respecting licensing in relation to the land, development, conservation, protection, management, use, and possession of land (Section 20[1], *First Nations Land Management Act*). Laws may also respect the regulation, control, and prohibition of land use and development through zoning and subdivision by-laws; environmental assessments and protection; and the provision of local services (Section 20[2], *First Nations Land Management Act*). A land code must include an environmental protection system and environmental assessment system for First Nation land (Section 21[1 &3], *First Nations Land Management Act*)

Table 2.3 Relevant legislation

Indian Act	The *Indian Act* gives some authority to many of Canada's First Nations for land use planning and management. First Nations under this Act must, however, have land use management authorized and agreed upon by the federal government. Under this Act, reserve land is held by the federal government for the use and benefit of First Nations. The Governor in Council may determine appropriate uses for, and apply regulations to reserve land for the benefit of a band (Section 18).[22]
First Nations Land Management Act	The *First Nations Land Management Act* was passed in 1999. This Act gives First Nations the option of replacing 34 land-related sections of the *Indian Act* to develop their own land use planning regulations, called land codes. There are 153 First Nations in Canada that have opted to use the *First Nations Land Management Act* in place of the land-related sections of the *Indian Act*. These First Nations have, or are developing, their own land use plans to manage land, the environment, and most resources. The *First Nations Land Management Act* also protects First Nations land from expropriation by Canadian governments by over-riding the *Expropriation Act.* It also over-rides the *Canadian Environmental Assessment Act* and allows First Nations to apply their own laws to deal with environmental assessments.[23]
Indian Act Amendment and Replacement Act	In 2014 the *Indian Act Amendment and Replacement Act* was passed. It recognizes that the *Indian Act* is an outdated colonial statute that results in First Nations being subjected to differential treatment and is not adequate for the development of prosperous First Nations' communities. Every year the Minister of Indigenous Services must report on the work undertaken by their department in collaboration with First Nations to develop legislation to replace the *Indian Act*.[24]
Section 35 of the *Constitution Act*, 1982	Section 35 of the *Constitution Act*, 1982 explicitly recognizes and affirms the existing Aboriginal and treaty rights of the First Nation, Inuit, and Métis peoples in Canada.[25]

[22] Indian Act. Government of Canada (1985, c. I-5). Retrieved from the Government of Canada Justice Laws Website https://laws-lois.justice.gc.ca/eng/acts/i-5/
[23] First Nations Lands Management Act. Government of Canada (1999, c. 24). Retrieved from the Government of Canada Justice Laws Website https://laws-lois.justice.gc.ca/eng/acts/F-11.8/
[24] Indian Act Amendment and Replacement Act. Government of Canada. (2014, C-38). Retrieved from Government of Canada Justice Laws Website: https://laws-lois.justice.gc.ca/eng/acts/I-5.3/page-1.html
[25] Government of Canada. (2021). Section 35 of the Constitution Act 1982 – Background – Jan 21, 2021. Retrieved from https://www.canada.ca/en/immigration-refugees-citizenship/corporate/transparency/committees/inan-jan-28-2021/inan-section-35-consitution-Act-1982-background-jan-28-2021.html

2.1.2 Nunatsiavut

The traditional territory of the Labrador Inuit is called Nunatsiavut. In 1977, the Labrador Inuit Association filed a claim with the Government of Canada for the rights to land and sea in Northern Labrador. In 1997 the land claim was settled and provided the Labrador Inuit with self-governance, title to ~15,800km^2 of land, and rights over ~72,520km^2 of land.[26] In 2005, when their constitution was adopted, Nunatsiavut became the first Inuit region in Canada to achieve self-governance. There are five Inuit Community Governments in Nunatsiavut: Hopedale, Makkovik, Nain, Postville, and Rigolet. They were granted powers similar to municipalities in the rest of the province under the Labrador Inuit Land Claims Agreement. The agreement is a modern-day treaty between the Labrador Inuit, the Province of Newfoundland and Labrador, and Canada and is Constitutionally protected under the *Constitution Act, 1982.* the *Indian Act, 1985* does not apply to Inuit.[27]

Table 2.4 Nunatsiavut government

Decision-Makers	The President of Nunatsiavut is the head of the Government and Executive Council (Section 3.1, *Labrador Inuit Constitution*). The Nunatsiavut Assembly consists of no fewer than 16 members who are elected to represent Labrador Inuit and make laws (Section 4.1.3, *Labrador Inuit Constitution*). The Nunatsiavut Executive Council can implement laws except where the Labrador Inuit Constitution or an Inuit law provides otherwise (Section 5.2.3 *Labrador Inuit Constitution*).
Staff	The members of staff of the Nunatsiavut Government are known as the Nunatsiavut Civil Service (5.8.2*, Labrador Inuit Constitution*).
Committees	The Nunatsiavut Assembly may provide for the appointment of committees and may include provisions for committees to appoint subcommittees (Section 4.14.8, *Labrador Inuit Constitution*). Regard must be had to the balance of political parties represented and the balance of men and women (Section 4.14.9, *Labrador Inuit Constitution*).
Powers	The Nunatsiavut Assembly may make laws, referred to as Inuit Laws (4.18.1, *Labrador Inuit Constitution*). The power of the Nunatsiavut Government to make laws in relation to matters such as regulation of buildings, noise control, licensing of businesses, municipal public works, is as extensive as the jurisdiction of municipalities under the *Municipalities Act* (Section 17.9.6, *Labrador Inuit Land Claims Agreement*). The Nunatsiavut Government may make laws outside Inuit Communities in relation to the protection of water supplies, prevention and remediation of erosion, storm water drainage, and the management and removal of core ice and ice built-up areas (Section 17.9.3, *Labrador Inuit Land Claims Agreement*). The Nunatsiavut Government may make laws in relation to the protection of the Environment in Labrador Inuit Lands and Inuit Communities (Section 17.11, *Labrador Inuit Land Claims Agreement*).
Planning and Development	Nunatsiavut is a single regional planning area for all purposes related to land use planning (Section 10.2, *Labrador Inuit Land Claims Agreement*). Land use policies and development regulations established by the Province do not apply to Labrador Inuit Lands but do apply in accordance with terms to Water Use (Section 10.2.3, *Labrador Inuit Land Claims Agreement*). A Land Use Plan must be prepared in accordance with the procedures set out for the

[26] Crown-Indigenous Relations and Northern Affairs Canada. Inuit. (2021). Retrieved from https://www.rcaanc-cirnac.gc.ca/eng/1100100014187/1534785248701
[27] Crown-Indigenous Relations and Northern Affairs Canada. Inuit Nunangat Policy. (2022). Retrieved from https://www.rcaanc-cirnac.gc.ca/eng/1650556354784/1650556491509

	preparation of a regional plan under the *Urban and Rural Planning Act* (Section 10.2.7, *Labrador Inuit Land Claims Agreement*). The Land Use Plan must provide for the management of land, water, and resource use in the Labrador Inuit Settlement Area and take into account considerations respecting the management of estuarine, coastal, and marine ecosystems, the rights of Inuit, cultural factors and priorities, protected areas, parks, marine conservation areas, environmental considerations, economic needs, the health and quality of life of residents, and the natural resources of the Labrador Inuit Settlement Area (Section 10.4.3, *Labrador Inuit Land Claims Agreement*).

Table 2.5 Inuit Community Government

Decision Makers	The AngajukKât represent the Inuit Community Governments (Section 4.1.4, *Labrador Inuit Constitution)*. They participate as full members of the Nunatsiavut Assembly (Section 4.1.6 *Labrador Inuit Constitution*).
Staff	An Inuit Community Council may employ the people necessary for the effective performance of its functions (Section 10.3.3, *Labrador Inuit Constitution*).
Committees	Inuit Community Governments may prescribe rules and orders for the establishment, composition, procedures, powers, and functions of its committees (Section 10.3.1, *Labrador Inuit Constitution*). Inuit Community Council may elect an executive committee and other committees (Section 10.3.3, *Labrador Inuit Constitution*).
Powers	The legislative authority of an Inuit Community Government is vested in its Inuit Community Council (Section 10.1.3, *Labrador Inuit Constitution*). An Inuit Community Government has the right to govern the local government affairs of its community (Section 10.1.4, *Labrador Inuit Constitution*). Inuit Community Governments have the power to make laws within their boundaries respecting the establishment of a system of administration, parks, recreation, community economic development, public works, public places, and matters of local nature as agreed by the Nunatsiavut Government and the province (Section 17.41, *Labrador Inuit Land Claims Agreement*). They also have the power to create laws respecting prevention of pollution, prevention of remediation of erosion, zoning, and provision of services (Section 17.41.3, *Labrador Inuit Land Claims Agreement*).
By-laws	An Inuit Community Council may make bylaws respecting Internal Arrangements (Section 10.3.11 *Labrador Inuit Constitution*). Bylaws made by an Inuit Community Government apply only within the boundaries of that Inuit Community (17.38.4, *Labrador Inuit Land Claims Agreement*).

Nunatsiavut Government Department of Lands and Natural Resources

The Department of Lands and Natural Resources is responsible for the protection, use, and development of resources in Nunatsiavut. The department has four divisions: Lands, Renewable Resources, Non-Renewable Resources, and Environment. Responsibilities of the department include ocean management, Inuit water rights, land use planning, environmental assessments, and fisheries.[28]

[28] Nunatsiavut Department of Lands and Natural Resources. Department Overview. (2022). Retrieved from https://nunatsiavut.com/department/lands-natural-resources/department-overview-5/

Table 2.6 Relevant legislation: Department of Lands and Natural Resources

Land Use Planning	The *Labrador Inuit Land Claims Agreement* requires that a Regional Land Use Plan be developed. A Land Use Plan was submitted to the provincial government in March 2011 but has not yet been accepted.[29]
Nunatsiavut Environmental Protection Act	The *Nunatsiavut Environmental Protection Act* enables the Nunatsiavut Government to protect and manage the environment in accordance with Inuit knowledge, culture, and values, preserve ecosystems, maintain an environment that is capable of sustaining the health of the Inuit, foster Inuit cultural heritage, and prevent pollution of the environment in Labrador Inuit Lands and Inuit Communities. The Act contains regulations regarding the protection of water and environmental reviews. [30]
Labrador Inuit Lands Act	The *Labrador Inuit Lands Act* was enacted in 2005 to guide the administration, control, and management of the Labrador Inuit Lands. It includes regulations regarding traditional tenures, private interests, land use plans, protected areas, transfer of administration and control to the crown, abandoned interests, mineral exploration and development, monitoring, enforcement, and penalties. [31]

[29] Nunatsiavut Department of Lands and Natural Resources. Land Use Planning. (2022). Retrieved from https://nunatsiavut.com/department/lands-natural-resources/land-use-planning/
[30] Nunatsiavut Environmental Protection Act, 2012. Nunatsiavut Government Department of Lands and Natural Resources. Retrieved from https://nunatsiavut.com/wp-content/uploads/2021/06/CIL-31-12-2012-N-5-Nunatsiavut-Environmental-Protection-Act.pdf
[31] Labrador Inuit Lands Act, 2005. Nunatsiavut Government Department of Lands and Natural Resources. Retrieved from https://www.nunatsiavut.com/wp-content/uploads/2019/03/CIL-L-1-24-01-2019-Labrador-Inuit-Lands-Act.pdf

2.2 New Brunswick

Under the province's *Local Governance Act*, entities in New Brunswick may incorporate as a city, town, village, regional municipality or rural community. Incorporated entities can provide local services and have their own land use plans. Rural Districts receive their local planning and development services from a regional service commission. There are 16 First Nations communities in what is now known as New Brunswick.

As of January 1, 2023, there will be 77 local governments and 12 rural districts in New Brunswick. The provincial government will continue to be responsible for delivering services to rural districts, however residents will now be represented by elected officials, known as rural district councillors.[32]

All communities (77 plus 12 rural districts) will be required to have local land use plans in place for 2028, prepared and certified by Registered Professional Planners (RPPs). It is anticipated that the provincial government will adopt create statements of public interest (SPIs), on topics such as climate change adaptation in 2023. Local governments and rural districts will have five years to bring their land use plans into compliance with SPIs.[33]

2.2.1 Overview of land use planning decision-making authority and relevant legislation in New Brunswick

Table 2.7 New Brunswick Regional Service Commissions (RSC)

Decision-Makers	A RSC board of directors comprising the mayors of each local government and representatives from Rural Districts (Section 9[1, and 2], *Regional Service Delivery Act*) does not make any decisions about local land use planning. The RSC Board does appoint a planning review and adjustment committee (PRAC). The PRAC provides advice to the Minister about rural plans for rural districts and provides advice to local government councils about plans, plan amendments, zoning by-laws and zoning amendments. The PRAC has decision-making authority for some variances to zoning provisions. Decisions of the PRAC may be appealed to the NB Assessment and Planning Appeal Board.
Staff	The Chief Executive Officer may employ or contract a planning director to ensure that the services, powers, and duties of the commission are carried out (Section 14, *Regional Service Delivery Act*). All RSCs must have a Registered Professional Planner as a Planning Director.
Regional Land Use Plans, local land use plans, zoning By-law	It is proposed that a regional land use plan is adopted by the Minister of Local Government and Local Governance Reform, as a Ministerial regulation. A regional land use plan may be prepared by the Minister, a local government, and RSC or a combination of any of them, for one or more regions or parts of regions (Section 18-20, *Community Planning Act*). Regional land use plans must be consistent with the statements of public interests (Section 15[1], *Community Planning Act*). If there is an inconsistency between a regional land use plan, municipal plan, or rural plan, the regional land use plan prevails (Section 20], *Community Planning Act*). There are currently no regional land use plans in New Brunswick.

[32] New Brunswick Department of Environment and Local Government. (2021). Working together for vibrant and sustainable communities: White Paper. Retrieved from https://www2.gnb.ca/content/dam/gnb/Corporate/Promo/localgovreform/docs/WhitePaper-EN-Web.pdf
[33] Ibid.

	The regional service commissions (RSCs) provide local land use planning services to all rural districts and to those local governments that are not providing their own services (Section 25, *Regional Service Delivery Act*). Where an RSC is providing services to a local government, it is that local government's council that adopts the land use plan, zoning by-law, etc. (i.e., the RSC Board has no role in adopting land use plans or zoning by-laws). Administration of the zoning by-law including the issuance of development permits and variances may be done by RSC staff and the PRAC, or by local government staff and a local Planning Advisory Committee (PAC), depending on the details of the contractual arrangements made between an RSC and the local government. A rural plan for a rural district or for a village or rural community contains zoning provisions and a zoning map within it, rather than having a separate zoning by-law.

Table 2.8 New Brunswick local governments (City, Town, Village, Rural Community and Regional Municipality)

Decision-Maker	Local Government councils are comprised of a mayor, a deputy mayor and councillors. Local government council is the final decision-maker on municipal plans, rural plans, zoning by-laws and amendments and other land use planning by-laws. All land use plans and some by-laws require approval of the Minister to ensure they are consistent with the *Community Planning Act.* Regarding subdivisions, local government council must accept a location of any new public street, otherwise the decision maker on subdivisions applications is the development officer*. Variances are decided by development officer or the PAC depending on the type of variance. If the local government receives all of its planning services from the RSC, then it would be the RSC's development officer and the PRAC making those variance decisions and subdivision approval (*although the local government council would still be required to make decisions on accepting land for public purposes, accepting a proposed new public street in some cases, would be the local government council but in other cases would be the NB Dept of Transportation and Infrastructure, depending on who will own the new road)
Staff	Unless it is receiving its planning services from an RSC, a local government must engage a planning director (as an employee or contractor). The planning director is the development officer, but may also delegate development officer responsibilities to other staff (employees or contractors). A local government delivering its own planning services usually has a planning director, planner(s), development officer(s) and building inspector(s), and often a Geographic Information Services (GIS) specialist. The planners research, develop and often administer the land use plan and zoning by-laws. The development officers also administer the zoning by-law, variances and subdivision review/approval processes. A building inspector is responsible for administration of the building by-law and the National Building Code and construction activities (*Building Code Administration Act*).
Committees	Unless the local government receives all its planning services from an RSC, the local government council must establish a planning advisory committee (PAC) with five to fifteen members for a city or town and three to six members for a village or rural community (>Section 5[1], *Community Planning Act*). The PAC provides advice to the local government council regarding land use plans, zoning by-laws and amendments, and makes decisions regarding certain types of variances.

Land Use Plans for incorporated areas	All areas of NB must have a local land use plan in place by 2028. The land use plans adopted by local government council's must also be approved by the Minister. City, town, and regional municipalities have municipal plan by-law, and a separate zoning by-law. Villages and rural communities have a rural plan by-law, that include zoning provisions and a zoning map (rather than having a separate zoning by-law).
Zoning By-law	On the adoption of a municipal plan, cities, town and regional municipalities must enact a zoning by-law to carry out the intent of the municipal plan (Section 53[1], *Community Planning Act*). A zoning by-law must divide the municipality into zones and prescribe purposes, structures, and uses for the zones including restrictions on other purposes, structures and uses (Section 53[2] *Community Planning Act*). Villages and rural communities have a rural plan by-law, that include zoning provisions and a zoning map (rather than having a separate zoning by-law) that implements the policies included in the rural plan. Administration of the zoning by-law including the issuance of development permits and variances may be done by RSC staff and the PRAC, or by local government staff and a local Planning Advisory Committee (PAC), depending on the details of the contractual arrangements made between an RSC and the local government.
Subdivision By-law	Council may enact a subdivision by-law regulating the subdivision of land within the local government; the by-law must be consistent with any applicable regional land use plan, municipal plan, or rural plan (Section 74 *Community Planning Act*). Where no subdivision by-law exists, the Provincial Subdivision Regulation is in force and effect to regulate the subdivision of land. In either case, the development officer reviews and makes approval decisions on all applications to subdivide land. Variances related to subdivisions may be done by RSC staff and the PRAC, or by local government staff and a local Planning Advisory Committee (PAC), depending on the details of the contractual arrangements made between an RSC and the local government.
Building By-law	A council may prescribe building standards for demolishing, altering, repairing, or the location of a building (Section 5[1], *Building Code Administration Act*). The Lieutenant-Governor in Council may also make regulations respecting the demolishing, altering, repairing, or location of buildings (Section 125[1], *Community Planning Act*).
Flood Risk Area By-law	Local governments can request that the Minister designate any area within the local government as a flood risk area. A flood risk by-law can be enacted for these areas to maintain floodways, conserve flood-water storage capacities, and protect new development from the risk of flood damage (71 and 72, *Community Planning Act*).

2.2.2 New Brunswick Department of Environment and Local Government

The Department of Environment and Local Government has a mandate to integrate stewardship into land use planning, zoning, and management. The department also ensures the enforcement of environmental legislation, and has the mandate to provide financial support, assistance, and advice for municipal activities.[34]

[34] New Brunswick Department of Environment and Local Government. (2015). Environment and Local Government. Retrieved from http://www2.gnb.ca/content/gnb/en/contacts/dept_renderer.139.html#mandates

Table 2.9 Relevant legislation: Department of Environment and Local Government

Community Planning Act and the *Regional Service Delivery Act*	The *Community Planning Act* provides the authority and context to conduct land use planning in New Brunswick. The *Regional Service Delivery Act* provides the authority for Regional Service Commissions to provide land use planning services in New Brunswick. There are twelve Regional Service Commissions in New Brunswick with the mandate to provide local land use planning and inspection services to unincorporated areas (called rural districts) and to any local governments that request them and enter into contractual agreements for the service. Under the *Community Planning Act*, cities, towns and regional municipalities must create a municipal plan or in the case of smaller local governments (i.e., villages and rural communities), they must create a rural plan. There are several land use planning tools available under the *Community Planning Act* that communities can use to manage climate change risks: - municipal plans and zoning by-laws; - rural plans; - a provincial subdivision regulation; However, the Act allows local government councils to create their own subdivision by-law; development schemes/secondary plans (also known as neighbourhood plans); and a flood risk area by-law. Among other things pertaining to planning and development, the province is able to make regulations relating to flood plains and planning for coastal zones.[35] In 2023, Statements of Public Interest (SPIs) are anticipated to be released under the *Community Planning Act*.
Clean Environment Act	The *Clean Environment Act* deals with water quality and environmental impact assessments within the province. The Act defines the environment as the air, water and soil. The definition of coastal areas is "the air, water, and land between the lower low water large tide and one kilometre landward of the higher high-water large tide or one kilometre landward of any coastal feature" (Section 1). Coastal features include beaches, marshes, rock platforms, dunes, and dyked lands. The Act also defines wetlands as "land that periodically or permanently, has a water table at, near or above the land's surface or that is saturated with water and sustains aquatic processes" (Section 1). The province can regulate activities that may impact coastal waters within the province's jurisdiction, groundwater, and surface water (Section 1).[36]
Clean Water Act	The *Clean Water Act* contains regulations for the alteration of a watercourse, wetland, and for the management of watershed protected areas. Watershed protected areas are covered by Regulation 2001–83 under the *Clean Water Act*. This regulation protects the watersheds that are used as a source of potable water for public water supplies. Thirty watershed areas are protected under this regulation.[37]
Watercourse and Wetland Alteration Regulation, under the *Clean Water Act*	The Department of Environment and Local Government administers the *Watercourse and Wetland Alteration Permit Program*. A Permit is required when carrying out and alteration in or within 30 metres of a watercourse or wetland. An alteration is defined as a permanent or temporary change and includes, but is not limited to: constructing or repairing structures, operating

[35] Community Planning Act. New Brunswick Department of Environment and Local Government. (2017, c.19). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/showfulldoc/cs/2017-c.19//20220616
[36] Clean Environment Act. New Brunswick Department of Environment and Local Government. (1973, c. C-6). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/ShowPdf/cs/C-6.pdf
[37] Clean Water Act. New Brunswick Department of Environment and Local Government (1989, c. C-6.1). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/ShowPdf/cs/C-6.1.pdf

	machinery, soil disturbance, removing vegetation, depositing materials, pumping water, and altering the natural flow of water.[38]
New Brunswick Watercourse and Wetland Alteration Reference Map	The Department of Environment and Local Government released the Watercourse and Wetland Alteration (WAWA) Reference Map in January 2020. This tool shows watercourse and wetland locations in the province and provides information for the WAWA permitting process. The map is a reference tool only and a WAWA permit is required for any alteration in or within 30 metres of a watercourse or wetland. There are three categories of water features: Provincially Significant Wetlands (list available on DELG website), Wetlands (marsh, aquatic bed, bog, fen, forested, and shrub), and Watercourses and Water Bodies (e.g., rivers, lakes, and streams).[39] All watercourses and wetlands on the ground (whether they are identified on the WAWA Reference Map or not) which meet the definition in the *Clean Water Act* are regulated.

2.2.3 New Brunswick Department of Natural Resources and Energy Development

The New Brunswick Department of Natural Resources and Energy Development is responsible for managing crown lands in the province. Crown lands include the foreshore, or intertidal area, of the coast. The department's mandate is "to support, manage and protect the forests, fish and wildlife of New Brunswick and to develop and manage the province's energy and mineral resources." The department has five divisions: Mineral Resources, Corporate Services, Energy, Forestry, and Lands and Resources. The Crown Lands Branch, under the Lands and Resource Division, is responsible for managing Crown lands, including coastal and submerged lands, and administering land transactions such as leasing, purchases, sales, and exchanges. The department has created documents and products that provide a background for coastal planning, including The Coast and Beaches Fact Sheet for coastal property owners, Private Land Stewardship in New Brunswick: A Guide for Landowners, and a Crown Waterfront Reserve Fact Sheet.[40]

Table 2.10 Relevant legislation and policies: Department of Natural Resources and Energy Development

Crown Lands and Forests Act	The *Crown Lands and Forests Act* enables the Minister to manage Crown lands by regulating the following on Crown lands: access and travel, harvesting and renewing timber, habitat for wildlife, forest recreation, and rehabilitation (Section 3[1]). The Minister has the authority to grant Crown lands at a public auction, to a board, commission, corporation or local government (Section 13). Grants do not include land below the high-water mark and must maintain a ten-metre right-of-way from the normal high-water mark of any river or lake for public access (Section 15). The Act does not regulate uses of coastal lands specifically, but applies to Crown lands along the coast.[41]
Quarriable Substances Act	The *Quarriable Substances Act* applies to all Crown land and any land within 300m above and below the high-water mark of a body of water including any bed, bank, beach, shore, dune, bar, flat, or mud flat (Section 1). The Act sets

[38] New Brunswick Department of Environment and Local Government (n.d.). Watercourse and Wetland Alteration Permit. Retrieved from https://www2.gnb.ca/content/gnb/en/services/services_renderer.2935.Watercourse_and_Wetland_Alteration_Permit_.html
[39] Government of New Brunswick. GEO NB: WAWA Reference Map. (2020). Retrieved from: http://www.snb.ca/geonb1/e/apps/wetlands-E.asp
[40] New Brunswick Natural Resources and Energy Development. (2021). Annual Report 2020-2021. Retrieved from: https://www.legnb.ca/content/house_business/60/1/tabled_documents/11/2020-2021-ar-nred.pdf
[41] Crown Lands and Forests Act. New Brunswick Department of Natural Resources and Energy Development. (1980, c. C-38.1). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/showfulldoc/cs/C-38.1//20220531

	requirements for leases and permits for the removal of stone, sand, gravel, peat, and peat moss from these areas.[42]

2.2.4 New Brunswick Department of Transportation and Infrastructure

The New Brunswick Department of Transportation and Infrastructure provides infrastructure that allows for the movement of people and goods in the province. Highway management, ferry services, supply chain management, and bridge maintenance are all responsibilities of the department.[43]

Table 2.11 Relevant legislation: Department of Transportation and Infrastructure

Marshland Infrastructure Maintenance Act	The *Marshland Infrastructure Maintenance Act* enables the minister to construct, reconstruct, relocate, recondition, repair, maintain, operate, or decommission marshland infrastructure, defined as "includ[ing] dykes, aboiteaux, dams and dam control buildings, breakwaters, canals, ditches drains, roads, culverts, bridges, fencing, crossings and other structures, excavations and facilities for the improvement, development, maintenance or protection of marshland that are owned, controlled or managed by the Department of Transportation and Infrastructure" (Section 1).[44]

2.2.5 New Brunswick Department of Justice and Public Safety

The New Brunswick Department of Justice and Public Safety is responsible for the courts in the province as well as overseeing public safety including crime prevention, corrections, firearms, 911, and the Emergency Measures Organization.[45]

Table 2.12 Relevant Legislation: Department of Justice and Public Safety

Emergency Measures Act	The *Emergency Measures Act* requires that municipalities establish emergency measures organizations and prepare emergency measures plans (Section 9). It also allows municipalities to declare a state of local emergency (Section 10[2]).[46] New Brunswick has an Emergency Measures Organization that helps municipalities if emergencies exceed their ability to manage.

2.2.6 New Brunswick Department of Agriculture, Aquaculture, and Fisheries

The New Brunswick Department of Agriculture, Aquaculture, and Fisheries is responsible for the development of food production and value-added products of the food sector and related industries. The Livestock Sector Development Unit is responsible for the maintenance of the marshland protection systems. The department also oversees fish health, research activities, dyke and marshland development, erosion control, and aquaculture and processing sectors, as

[42] Quarriable Substances Act. New Brunswick Department of Natural Resources and Energy Development. (1991, c. Q-1.1). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/showfulldoc/cs/Q-1.1//20220616
[43] New Brunswick Department of Transportation and Infrastructure. (n.d.). Transportation and Infrastructure: Mandates. Retrieved from https://www2.gnb.ca/content/gnb/en/departments/dti/contacts/dept_renderer.149.html#mandates
[44] Marshland Infrastructure Maintenance Act. New Brunswick Department of Transportation and Infrastructure. (2013, c.35). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/showfulldoc/cs/2013-c.35//20220820
[45] New Brunswick Department of Justice and Public Safety. (n.d.) Justice and Public Safety. Retrieved from https://www2.gnb.ca/content/gnb/en/departments/public-safety/publicsafety.html
[46] Emergency Measures Act. New Brunswick Department of Justice and Public Safety. (2011, c.147). Retrieved from the New Brunswick Attorney General website: https://laws.gnb.ca/en/showfulldoc/cs/2011-c.147//20220922

well as being involved with the review of the Watercourse and Wetland Alteration Permit applications for agricultural projects.[47]

Table 2.13 Relevant Legislation: Department of Agriculture, Aquaculture, and Fisheries

Aquaculture Act	The *Aquaculture Act* regulates licensing for aquaculture facilities in the province and requires that all aquaculture activities be carried out under an aquaculture license (Section 48[1]). The Minister can develop aquaculture leases, designate aquaculture land, and impose regulations that the Minister considers appropriate. The Minister may also designate areas of land for aquaculture (Section 8[1]).[48]

[47] New Brunswick Department of Agriculture, Aquaculture and Fisheries. (n.d.) Agriculture, Aquaculture and Fisheries: Mandates. Retrieved from https://www2.gnb.ca/content/gnb/en/departments/10/contacts/dept_renderer.137.html#mandates
[48] Aquaculture Act. New Brunswick Department of Agriculture, Aquaculture, and Fisheries. (2019, c.40). Retrieved from https://laws.gnb.ca/en/showfulldoc/cs/2019-c.40//20220821

2.3 Prince Edward Island

Prince Edward Island is distinct among the Atlantic Provinces, and in Canada generally, because of the high proportion of private land ownership. Almost 90 percent of the land area of the province is privately owned. Thirty percent of the Island's land area has been incorporated into municipalities, including the two cities of Charlottetown and Summerside, 10 towns, and 47 rural municipalities.

Under the Prince Edward Island *Planning Act*, municipalities must take responsibility for land use planning, while the province holds planning authority for unincorporated areas and retains authority for municipalities that do not yet have official plans. To date, 29 municipalities have developed official plans and land use by-laws; their planning covers approximately 10% of the provincial land area. The province is responsible for planning and development control in the remaining 90% of the provincial land area. All municipalities are expected to provide land use planning services by 2023, as per the *Municipal Government Act*.[49] There are two First Nations in the part of Mi'kmaki that is known as Prince Edward Island.

2.3.1 Overview of local land use planning decision-making authority and relevant legislation in Prince Edward Island

Table 2.14 Prince Edward Island municipalities (City, Town and Rural Municipality)

Decision-Makers	Every municipality must have a council comprising members who have been elected or appointed in accordance with the *Municipal Government Act* (Section 74). Towns and rural municipalities must have either 6 elected members and a mayor or, where council has authorized, 8 councillors and a mayor (Section 78[1], *Municipal Government Act*). City councils must have a mayor and 8 councillors or, where council has authorized, a mayor and 10 councillors. The mayor must appoint a deputy mayor from among council members (Section 91[1], *Municipal Government Act*).
Staff	Council must appoint a chief administrative officer who is not a member of council (Section 86, *Municipal Government Act*). Council must appoint an auditor to audit the finances of the municipality (Section 172, *Municipal Government Act*). Council may appoint by-law enforcement officers to report to the administrator of the Municipality.
Committees	The Lieutenant Governor in Council may make regulations respecting the criteria related to the establishment of council committees and the authority to appoint the members to those committees (Section 261, *Municipal Government Act*). A Council must establish rules and regulations for the establishment of committees and council, their terms of reference, and the appointment of people to those committees (Section 86[2], *Municipal Government Act*). A resolution of a council committee is not binding unless it is passed by the council (Section 88[4], *Municipal Government Act*). A planning board may be appointed to review and make recommendations to council on a proposed plan or amendments to a plan (Section 9[2 and 3], *Planning Act*). A planning board is made up of a chairperson, who is a member

[49] Prince Edward Island Department of Fisheries and Communities. Municipal Land Use Planning. (2021). Retrieved from https://www.princeedwardisland.ca/en/information/fisheries-and-communities/municipal-land-use-planning

	of council, and at least two other members who may be councillors (Section 9[4], *Planning Act*).
Expropriation	Council of a municipality can expropriate land to provide municipal services
Official Plans	Council may appoint a planning board to review and recommend to council a proposed plan or amendment to a plan (Section 9[2 and 3], *Planning Act*). An official plan must be approved by council and the Minister (Section 15, *Planning Act*). All by-laws and regulations for the area must conform to the official plan (Section 15, *Planning Act*).
By-Laws	Council can make by-laws respecting the safety, health and welfare of people and property in the municipality, the provision of municipal services, and any other matter within the jurisdiction of the municipality (Section 180, *Municipal Government Act*). Council may make by-laws respecting the services it is authorized to provide, parks and recreational land, municipally owned land, building standards, tree preservation and protection, and protection of the natural environment (Section 180, *Municipal Government Act*). By-laws are subject to the approval of the Minister (Section 17, *Planning Act*). A planning board can make recommendations to council for by-laws that will support the official plan (Section 9[3], *Planning Act*).

Table 2.15 Prince Edward Island areas under provincial authority for land use planning (unincorporated areas, Special Planning Areas, municipalities without official plans)

Decision-Makers	The Lieutenant-Governor in Council may adopt provincial land use development policies and make regulations respecting public health and safety, environmental protection, and landscape features (Section 7[1], *Planning Act*).
Powers	The Lieutenant-Governor in Council may adopt planning regulations that apply to any area except within a municipality that has an official plan and by-laws (Section 8[1], *Planning Act*).
Land use Regulation	The Lieutenant-Governor in Council has the authority to implement regulations with respect to establishing land use zones and prescribing uses and structures within any area except a municipality with an official plan and by-law (Section 8[1], *Planning Act*). The Lieutenant-Governor in Council has the authority to establish and regulate areas for conservation and environmentally sensitive areas outside of municipal boundaries (Section 8[1], *Planning Act*).
Subdivision Regulation	The Lieutenant-Governor in Council has the authority to implement regulations with respect to the subdivision of land including restriction, governing, and prohibiting land subdivision in areas not covered by municipal official plans (Section 8[1], *Planning Act*).

2.3.2 Prince Edward Island Department of Agriculture and Land

The Department of Agriculture and Land is responsible for Prince Edward Island's food development, production, and sales. Their mandate is to grow and sustain agriculture, protect the environment, and develop products for the province's food production and innovation. The Provincial Planning Branch guides land use and development decisions in the province. [50]

[50] Prince Edward Island Department of Agriculture and Land. About: Agriculture and Land. (2022). Retrieved from https://www.princeedwardisland.ca/en/department/agriculture-and-land/about

The Land Matters Advisory Committee

In July 2021 the Land Matters Advisory Committee, appointed by the Department of Agriculture and Land, submitted its final report of recommendations on land use policy for Prince Edward Island titled "Now is the Time". The role of the Advisory Committee has been to provide advice and guidance on land-related legislation and policy in the province. The Committee was tasked with engaging the public in reviewing and updating the *Lands Protection Act* and the *Planning Act*. The report includes recommendations on topics such as: renaming and revising the *Lands Protection Act*, reviewing land holding limits every five years, expanding the Island Regulatory and Appeals Commissions' authority, adopting a province-wide land use planning framework, updating the *Planning Act*, reintegrating the Municipal Affairs Division of the Department of Fisheries and Communities and the land use planning functions of the Department of Agriculture and Land, and a more substantive role for the Mi'kmaq of Epekwitk,in developing and shaping and policies and land management, as they are rights holder.[51]

Table 2.16 Relevant legislation: Department of Agriculture and Land

Lands Protection Act	The *Lands Protection Act* regulates property rights on Prince Edward Island to address the challenges of absentee landowners, the province's small land area and relatively high population density, and protection of the natural environment, ecology, and lands on the Island (Section 1.1). No persons shall hold more than 1,000 acres of land, and no corporation shall own more than 3,000 acres (Section 2). Non-residents shall own a maximum of 5 acres and no more than 165 feet of shore frontage (Section 4). Permits for larger land holdings can be provided by the Lieutenant-Governor in Council; conditions can be placed on these permits including that the land may be designated as "non-development use" or it may not be subdivided except for uses such as agriculture, conservation, or parks (Section 9). Land that has been designated as "non-development use" cannot be used for commercial or industrial uses or subdivided without an amendment or cancellation of the identification. Under Section 17 the Lieutenant- Governor in Council is given the authority to establish a land identification program. Any land conveyed to the Crown is presumed to be identified for "nondevelopment use" unless specified otherwise (Section 21).[52]
Planning Act	Under the *Planning Act* the council of a municipality with an official plan is responsible for administering the official plan and implementing by-laws and regulations that meet the requirements of the municipality's official plan (*Planning Act*, Part III Municipal Planning, Sections 9 to 22). The official plan and land use by-laws must be consistent with provincial land use and development regulations (Section 9.1). The municipality may appoint a planning board that recommends planning policy to the council (Section 9[2 and 3]). Two or more municipalities can establish a joint planning board (Section 22 [1]). The *Planning Act* gives the Lieutenant-Governor in Council the authority to adopt provincial land use policies and to make regulations that establish province-wide minimum development standards for public health and safety and environmental protection (Section 7). Municipalities with official plans and by-laws must ensure that their requirements are not less stringent than any province-wide regulation (Section 7). The Lieutenant Governor in Council may make provincial land use

[51] Land Matters Advisory Committee. (2021). Now is the Time: Final Report of the Land Matters Advisory Committee. Retrieved from: https://www.landmatterspei.ca/sites/www.landmatterspei.ca/files/LandMatters/af_Land%20Matters_What%20We%20Heard_Final%20Report.pdf

[52] Prince Edward Island Lands Protection Act. Prince Edward Island Department of Agriculture and Land. (1988, L-5). Retrieved from the Government of Prince Edward Island Legislative Council Office website: https://www.princeedwardisland.ca/en/legislation/lands-protection-Act-pei

	planning regulations in any area not regulated through a municipal official plan. Regulations may address planning and land use, subdividing land, development, and building standards. Regulations for planning and land use may include defining the areas to be regulated and establishing zones, permitting, and restricting uses and structures within zones, establishing conservation zones, establishing environmentally sensitive areas, and establishing special planning areas. Regulations for subdivision of land include governing and restricting the subdivision of land. Subdivision regulations may require subdividers of land to convey up to 10% of the subdivided land as open space to the Crown. Regulations for developing land and providing services include governing the service of streets, sidewalks, and piped services, as well as including standards for fire prevention and establishing and prescribing architectural control standards. The Lieutenant-Governor in Council may also regulate development and subdivision permits, identify and prevent certain uses or subdivision of lands through a land identification program, and is responsible for respecting environmental protection as laid out in the *Environmental Protection Act* 1988 (Section 8).[53]
Chapter P-8 *Planning Act: Subdivision and Development Regulations*	The regulations in this chapter of the *Planning Act* apply to all areas of the province except municipalities with an official plan (Section 2). The province administers the Subdivision and Development Regulations, including subdivision and development control. Within this Act "coastal areas" are defined as being any area within 500 metres inland and seaward of the high-water mark of all tidal waters. This Act requires that any proposed subdivision in a coastal area, and adjacent to a beach, includes a buffer of at least 18.3 m (60 ft) or 60 times the annual erosion rate, measured from the top of the bank adjacent to the beach. Any proposed subdivision adjacent to a sand dune must have a buffer of 60 feet from the inland boundary of the dune (Section 16). The subdivision of land on offshore islands is prohibited in this Act (Section 64).[54]

2.3.3 Prince Edward Island Department of Environment, Energy, and Climate Action

The Department of Environment, Energy, and Climate Action works to protect the environment, land, and water resources on Prince Edward Island. The department is responsible for climate change and environmental programs, energy and mineral resource development, and forest, fish, and wildlife management. The Environmental Land Management section oversees environmental impact assessments, watercourse and wetland alteration approvals, pollution prevention, contaminated site management, environmental record reviews, and the approval of excavation pits.[55]

[53] Planning Act. Prince Edward Island Department of Agriculture and Land. (1998, c-P-8). Retrieved from the Government of Prince Edward Island Legislative Council Office website: https://www.princeedwardisland.ca/en/legislation/planning-Act
[54] Planning Act. Subdivision and Development Regulations. Prince Edward Island Department of Agriculture and Land (1988-c,P-8). Retrieved from the Government of Prince Edward Island Legislative Council Office website: https://www.princeedwardisland.ca/sites/default/files/legislation/p08-3-planning_Act_subdivision_and_development_regulations_1.pdf
[55] Prince Edward Island Department of Environment, Energy, and Climate Action. (2022). About: Environment, Energy, and Climate Action. Retrieved from https://www.princeedwardisland.ca/en/department/environment-energy-and-climate-action/about

Table 2.17 Relevant legislation: Department of Environment, Energy, and Climate Action

Environmental Protection Act	The *Environmental Protection Act* regulates the activities that affect the environment including discharges into the air, water, or land. It regulates the environmental impact assessment process for the province and requires that a developer planning a project must receive approval from the Minister before proceeding (Section 9). The *Watercourse and Wetland Protection Regulations* regulate activities that may alter a watercourse or wetland and establishes a watercourse buffer zone of 15 m (Section 25). Watercourses are defined as any stream, river, lake, bay, estuary, or coastal body including any sediment bed that may or may not contain water. At the coast, activities on sand dunes and beaches are regulated to protect the natural supply and movement of sand and maintain stabilizing vegetation (Section 22).[56]
Natural Areas Protection Act	The intent of the *Natural Areas Protection Act* is to preserve natural areas in the province. Through this Act the Minister can designate areas for natural protection on Crown land and landowners can enter into a restrictive covenant to protect natural areas on their land (Section 3). Natural areas targeted for protection include sand dunes, marshes, rivers, ponds, bogs, forests, offshore islands, cliffs, and marine areas.[57]

2.3.4 Prince Edward Island Department of Justice and Public Safety

The Department of Justice and Public Safety works to strengthen criminal and civil justice systems in the province and provide security to citizens. The Emergency Measures Organization, part of the Public Safety Division, provides the province with “an emergency management system for the protection of persons, property, and the environment in response to all emergencies and disasters.”[58]

Table 2.18 Relevant Legislation: Department of Justice and Public Safety

Emergency Measures Act	Under the *Emergency Measures Act*, municipalities have the option to establish emergency measures organizations and create emergency measures plans (Section 8). Local authorities may declare a state of local emergency (Section 9[2]).[59]

2.3.5 Prince Edward Island Department of Fisheries and Communities

The Department of Fisheries and Communities works with municipalities and rural communities to support local priorities and works to grow and sustain aquaculture and fisheries. The Municipal Affairs Division supports municipal formation, amalgamation, boundary changes,

[56] Environmental Protection Act. Prince Edward Island Department of Environment, Energy, and Climate Action.(1988, C.E-9). Retrieved from the Government of Prince Edward Island Legislative Council Office website: https://www.princeedwardisland.ca/en/legislation/environmental-protection-Act
[57] Natural Areas Protection Act. Prince Edward Island Department of Environment, Energy, and Climate Action. (1988, c.N-2). Retrieved from the Government of Prince Edward Island Legislative Council Official website: https://www.princeedwardisland.ca/en/legislation/natural-areas-protection-Act
[58] Prince Edward Island Department of Justice and Public Safety. (n.d.) About: Justice and Public Safety. Retrieved from https://www.princeedwardisland.ca/en/department/justice-and-public-safety/about
[59] Emergency Measures Act. Prince Edward Island Department of Justice and Public Safety. (1990, c.E-6.1). Retrieved from the Government of Prince Edward Island Legislative Council Official website: https://www.princeedwardisland.ca/en/legislation/emergency-measures-Act

elections, governance, financial management, administration, and official plans and land use and subdivision by-laws.[60]

Table 2.19 Relevant Legislation: Department of Fisheries and Communities

Municipal Government Act	The *Municipal Government Act* came into effect in December 2017 and repealed and replaced the *Municipalities Act*, the *Charlottetown Area Municipalities Act,* and the *City of Summerside Act.* The purpose of the Act is to provide a legal framework for the continuation, establishment, restructuring and dissolution of municipalities. It also provides council with the authority to fulfill their purposes, respond to their municipalities needs, and remain accountable. This Act applies to all councils and municipalities (Section 2).[61]

[60] Prince Edward Island Department of Fisheries and Communities. About: Fisheries and Communities. (2022). Retrieved from https://www.princeedwardisland.ca/en/department/fisheries-and-communities/about
[61] Municipal Government Act. Prince Edward Island Department of Fisheries and Communities. (2017, M-12.1). Retrieved from the Government of Prince Edward Island Legislative Council Office website: https://www.princeedwardisland.ca/sites/default/files/legislation/m-12.1-municipal_government_Act.pdf

2.4 Nova Scotia

Almost 70 percent of the land area of Nova Scotia is privately owned. The remaining land is federal, provincial, or municipal public land and First Nations communities. With the exception of First Nations communities, all other land in the province is organized into municipalities; however, while municipalities can include federal and provincial land in their land use planning, they do not or regulate the land. There are 49 municipalities in Nova Scotia. Municipalities can incorporate as regional municipalities (four), towns (25), and rural municipalities that include district (11) or county (9) municipalities. Villages are unincorporated communities that exist within rural municipalities. Villages have limited powers of governance and taxation that allow them control over infrastructure such as sewer and water and how their communities develop. There are 13 First Nation communities in the part of Mi'kma'ki also known as Nova Scotia.

Most municipalities have land use planning authority through the Nova Scotia *Municipal Government Act*, except Halifax Regional Municipality, which has the *Halifax Regional Municipality Charter*. The charter is very similar to the *Municipal Government Act* in all respects, unless cited in the Table below. A Bill has also been introduced to provide Cape Breton Regional Municipality with their own charter. Municipalities execute their authority for planning and development within their jurisdiction through the adoption of municipal planning strategies and land use by-laws. Although many rural areas of Nova Scotia do not have land use plannings, an amendment to the *Municipal Government Act* in December 2019, now requires municipalities to develop and adopt land use planning throughout the entire municipality and fulfil minimum planning requirements.[62] Development control on Crown lands falls under the jurisdiction of the Nova Scotia Department of Natural Resources and Renewables.

2.4.1 Overview of land use planning decision-making authority and relevant legislation in Nova Scotia

Table 2.20 Nova Scotia municipalities (Regional, Town, County and District)

Decision-Makers	Councils consist of at least three members. In regional municipalities and towns, decision-makers are a mayor, deputy mayor, and councillor(s). Mayors are elected at large; councillors are elected for polling districts (Sections 10(2)(3) and 11(1)], *Municipal Government Act*).
	In county, and district municipalities, decision-makers are a warden, deputy warden, and councillors. The Warden is chosen by the councillors from among themselves (Section 12[1], *Municipal Government Act*). Councillors are elected for each polling district within the municipality. (Section 10[2], *Municipal Government Act*).
Staff	Council must appoint the following positions: a municipal auditor to report to council on accounts and funds (Section 42, *Municipal Government Act*); and a development officer to administer its land use by-law and subdivision by-law (Section 243, *Municipal Government Act*). Council can appoint a chief administrative officer (Section 28, *Municipal Government Act*) or fulfil the responsibility of the chief administrative officer (Section 29, *Municipal Government Act*). In Halifax, council must employ a chief administrative officer (Section 33, *Halifax Regional Municipality Charter*). The chief administrative officer appoints the following positions:

[62] Minimum Planning Requirements Regulations made under Section 214(4) of the *Municipal Government Act*. Nova Scotia Department of Municipal Affairs and Housing. (2019). Retrieved from the Nova Scotia Office of the Legislative Council website: https://novascotia.ca/just/regulations/regs/mgaminimum.htm

	a clerk to keep records of council meetings, by-laws and policies (Section 33, *Municipal Government Act*); a treasurer to manage all moneys of the municipality (Section 37 and 38, *Municipal Government Act*); an administrator to enforce the dangerous and unsightly premises provisions (Section 41, *Municipal Government Act*); and, an engineer (Section 39, *Municipal Government Act*). Council may allow the chief administrator to Act as the clerk, treasurer, administrator, and engineer (Section 31[4], *Municipal Government Act*).
Committees	A council may establish standing, specialty, and advisory committees (Section 24[1], *Municipal Government Act*). Councils may establish citizen advisory committees (Section 26, *Municipal Government Act*) such as a community committee for a defined area within the municipality to make recommendations to council and monitor the provision of services in the area (Section 27, *Municipal Government Act*). A council may establish a planning advisory committee for the municipality, an area within the municipality, or jointly between two or more municipalities. The planning advisory committee advises council on planning matters and amendments to planning documents (Section 200, *Municipal Government Act*).
By-Laws	A council may make by-laws for municipal purposes, including regulating land use and development (land-use by-law), or industry, and business activity (Section 172 [2b], *Municipal Government Act*). Other areas of land use relevance would be tree and vegetation retention by-laws (Section 172B[2], *Municipal Government Act*).
Planning and Development	Municipalities have primary authority for land use planning within their jurisdiction. Municipalities must adopt planning strategies and land use by-laws that are consistent with Statements of Provincial Interest (Section 190, *Municipal Government Act*). Planning documents are subject to review by the Director of Municipal Affairs with the Province (Section 208, *Municipal Government Act*).
Strategic Plans	A municipality shall enact a Municipal Planning Strategy for all, or part, of the municipality. Municipal planning strategies "provide statements of policy consistent with the minimum planning requirements to guide the development and management of the municipality" (Section 213, *Municipal Government Act*). Planning strategies must include goals and objectives for the physical, economic, and social environment of the municipality (Section 214[1], *Municipal Government Act*). Secondary planning strategies can be adopted for specific areas within a municipality that are not adequately addressed in the municipal planning strategy (Section 216, *Municipal Government Act*). Two or more municipalities may adopt an inter-municipal planning strategy (Sections 212, 215, *Municipal Government Act*).
Land Use By-Law	Council must adopt land use by-laws that carry out the intent of the municipal planning strategy (Section 219, Municipal Government Act). A land use by-law divides the planning area into zones and outlines the restricted, prohibited, and permitted uses within each zone (Section 220[1 and 2], *Municipal Government Act*). A land use by-law may also regulate or prohibit development within zones, including a specified distance from a watercourse (Section 220[3], *Municipal Government Act*).
Subdivision By-Law	A municipality that does not have a subdivision by-law is deemed to have adopted the provincial subdivision regulations (Section 270[5], *Municipal Government Act*). A subdivision by-law applies to the whole municipality but may contain different requirements for different parts of the municipality (Section 271, *Municipal Government Act*).

Table 2.21 Nova Scotia Villages

Decision-Makers	A village is governed by a commission consisting of three to five commissioners (Section 405, *Municipal Government Act*). The commissioners elect a chair and vice-chair for the commission (Section 408, *Municipal Government Act*).
Staff	The commission must appoint a clerk and treasurer for the village (Section 420[1], *Municipal Government Act*). The village may employ persons necessary for the purposes of the village (Section 422, Municipal Government Act).
Communities	An area advisory committee can be established to advise municipal council on matters affecting all or part of a village (Section 201, *Municipal Government Act*). The village commission may establish standing, special, and advisory committees (Section 408A[1], *Municipal Government* Act).
Power to Make By-Laws	Village commissions have the authority to put in place by-laws for the management and security of public properties owned by the Village and to regulate and protect drains, sewers and watercourses (Section 426[c, e], *Municipal Government Act*).

2.4.2 Nova Scotia Department of Municipal Affairs and Housing

The Department of Municipal Affairs and Housing acts as the liaison between the province and Nova Scotia's municipalities and maintains the legislative framework for municipal operations. The department provides advice, assistance, and support to municipalities in the development of strategies, policies, programs, initiatives, and funding opportunities. The department also makes available programs, funding, and grants to community groups.

The Department of Municipal Affairs and Housing administered the development of the *Integrated Community Sustainability Plans* and *Municipal Climate Change Action Plans* for Nova Scotia municipalities and the Nova Scotia Flood Line Mapping program (including coastal flooding), with provincial-federal joint funding.[63] The Emergency Management Office is part of the Department of Municipal Affairs and Housing, and administers the Disaster Financial Assistance Arrangement.[64]

Table 2.22 Relevant legislation: Department of Municipal Affairs and Housing

Municipal Government Act and *Halifax Regional Municipality Charter*	The *Municipal Government Act* regulates all aspects of land use planning and development and includes the Provincial Subdivision Regulations (described below). Through this Act, municipalities are given primary authority for land use planning within their jurisdiction and are required to adopt planning strategies and land use by-laws. These policies must be consistent with the interests and regulations of the province. Land use planning policies can contain statements regarding stormwater (Section 343), erosion control, re-grading of the land, vegetation prevention, subdivision of land (Sections 268–271), development agreements (Section 225), comprehensive development districts, and site plan approval areas (Section 231 and 232). The *Municipal Government Act* also provides a framework for inter-municipal planning strategies created jointly between two municipalities, as well as secondary planning strategies that apply to a certain area within a municipality.

[63] Nova Scotia Department of Municipal Affairs and Housing. (2022). Department of Municipal Affairs and Housing: About us. Retrieved from https://beta.novascotia.ca/government/municipal-affairs-and-housing/about
[64] Nova Scotia Department of Municipal Affairs and Housing. (2019). The Municipal Flood Line Mapping Project. Retrieved from https://nsfmconference.ca/8-flood-line-mapping-program/file.html

	The *Municipal Government Act* defines the governance, organizational structure, and authority of villages within the province. Villages are located within municipalities and must follow the municipal by-laws. Although they are not independent governing units, villages do have the authority to make by-laws for the lands, management, and security of public properties owned by the village. Villages can also finance preventing or decreasing flooding, lands and buildings required for any purpose of the village, trails, bicycle paths, recreational facilities, public grounds, squares, halls, parks, tourist information centres, community centres, water systems, wharves and public landings. Under Section 355 "[a]ll docks, quays, wharves, slips, breakwaters and other structures connected with the shore are within the boundaries of the municipality." (Section 355) On undeveloped coastlines, the municipal boundary reaches to the high-water mark along the coast.[65] The *Halifax Regional Municipality Charter* regulates land use planning and development within Halifax Regional Municipality. The Charter is very similar to the *Municipal Government Act* in all cases relevant to this document.
Schedule B: Statements of Provincial Interest	The *Statements of Provincial Interest* are included as regulations under Schedule B of the *Municipal Government Act*. The statements provide an outline of the province's interests in protecting land and water resources and address issues related to the growth of Nova Scotian communities. Five statements of interest address drinking water, flood risk areas, agricultural land, infrastructure, housing. With respect to drinking water, the goal is to protect municipal drinking water supply watersheds. The goal regarding flood risk areas is "to protect public safety and property and to reduce the requirement for flood control works and flood damage restoration in floodplains." (*Municipal Government Act*, pg. 296). Provisions under this section state that planning documents must identify flood risk areas and restrict development in these regions.[66]
Minimum Planning Requirements Regulations	In December 2019 *Minimum Planning Requirements Regulations* were made under Section214(4) of the *Municipal Government Act*. It requires that municipalities create a municipal planning strategy and land use by-law for their community. The Regulations include mandatory content for municipal planning strategies such as a map that depicts the intended future uses of lands, statements of policy with respect to lands in relation to different uses (e.g., residential, commercial, industrial etc.). It also includes discretionary content that may be included in municipal planning strategies such as site-plan approval areas, studies to be carried out before undertaking developments, non-conforming uses and structures, and policy relating to climate change mitigation and adaption, protecting the coast, protecting water supplies, stormwater management and erosion control, excavating or filling of land, protecting lands subject to flooding, steep slopes, and wetlands.[67]
Provincial Subdivision Regulations	The Provincial Subdivision Regulations outline the requirements and procedure for submitting a subdivision application within the province. Subdivisions on island lots are permitted; if there is not a road on the island, then each lot must have six metres of water frontage (Section 6[2]). Applications are sent to the Department of the Environment, which regulates onsite sewage disposal and well water. Subdivision applications must contain the location of a "watercourse, wetland,

[65] Municipal Government Act. Nova Scotia Department of Municipal Affairs (1998, c.18). Retrieved from the Nova Scotia Office of the Legislative Council website: http://nslegislature.ca/legc/statutes/municipal%20government.pdf
[66] Municipal Government Act. Nova Scotia Department of Municipal Affairs (1998, c.18). Schedule B: statements of provincial interest, 293-301. Retrieved from the Nova Scotia Office of the Legislative Council website: http://nslegislature.ca/legc/statutes/municipal%20government.pdf
[67] Minimum Planning Requirements Regulations made under Section 214(4) of the *Municipal Government Act*. Nova Scotia Department of Municipal Affairs and Housing. (2019). Retrieved from the Nova Scotia Office of the Legislative Council website: https://novascotia.ca/just/regulations/regs/mgaminimum.htm

	marine water body and other features that may influence the design of the on-site sewage disposal system, including any ditch, road, driveway or easement" (Section 49[4]).[68]
Emergency Management Act	The *Emergency Management Act* provides regulations regarding emergency planning. Emergency is defined as "a present or imminent event in respect of which the Minister or a municipality, as the case may be, believes prompt co-ordination of action or regulation of persons or property must be undertaken to protect property or the health, safety or welfare of people in the Province" (Section 2[b]). The Act requires that municipalities establish emergency by-law, maintain emergency management organizations, and prepare emergency management plans (Section 10). It also requires that municipalities inform the Department of Municipal Affairs of any real or anticipated emergency (Section 10A).[69] The Emergency Management Office is a division of the Department of Municipal Affairs and Housing and works with municipalities to plan for emergencies and coordinate emergency responses. The Office is working on a Municipal Floodline Mapping Project to help municipalities avoid development in areas at risk of flooding.

2.4.3 Nova Scotia Department of Environment and Climate Change

Nova Scotia Environment and Climate Change is responsible for the management and protection of the environment including air quality, drinking water, and climate change. The department monitors and inspects activities that affect the environment. Divisions within the department include Sustainability and Applied Science; Inspection, Compliance, and Enforcement; Policy; and Climate Change.[70]

Table 2.23 Relevant Legislation: Department of Environment and Climate Change

Environment Act	The *Environment Act* is the primary legislation that regulates the impacts that human activities have on the natural environment and gives the Minister of the Environment and Climate Change the authority over wetland management. This Act has many associated regulations that have relevance to coastal planning and water resources: Activities Designation Regulations; Environmental Assessment Regulations; On-site Sewage Disposal Regulations; Water and Wastewater Facility Regulations; and Protected Areas (Water Areas) – Designations and Regulations. Activities Designation Regulations control watercourse alteration, pesticide application, sewage and storm drainage, and industrial effluent. Environmental assessment regulations require that assessments are carried out for any undertaking that disturbs a total of two hectares or more of wetland. Regulations under the on-site sewage disposal include minimum lot sizes and clearance distances for on-site services. Regulations under the water and wastewater facilities include the classifications of water treatment, wastewater treatment, water distribution, and wastewater collection facilities. The protected areas section gives authority to the Minister to designate a region as a protected area for a water supply source. Municipalities and operators can apply to have a region designated as protected.[71]

[68] Provincial Subdivision Regulations. Nova Scotia Department of Municipal Affairs (2008, N.S Reg 440/2008). Retrieved from the Nova Scotia Department of Justice website: http://www.novascotia.ca/just/regulations/regs/mgsubdiv.htm
[69] Emergency Management Act. Nova Scotia Department of Municipal Affairs (1990, c.8). Retrieved from the Nova Scotia Department of Justice website: https://nslegislature.ca/sites/default/files/legc/statutes/emergency%20management.pdf
[70] Nova Scotia Department of-Environment and Climate Change. (2015). Nova Scotia Environment and Climate Change. Retrieved from http://www.novascotia.ca/nse/dept/
[71] Environment Act. Nova Scotia Department of Environment and Climate Change (1994-95, c.1). Retrieved from the Nova Scotia Office of the Legislative Council website: http://nslegislature.ca/legc/statutes/environment.pdf

Environmental Goals and Climate Change Reduction Act	The *Environmental Goals and Climate Change Reduction Act* was passed in 2021 and repeals both the *Environmental Goals and Sustainable Prosperity Act* and the *Sustainable Development Goals Act*. The Act is based on the principles that to achieve sustainable prosperity in the province it must include Netukulimk (defined by the Mi'kmaq as "the use of the natural bounty provided by the Creator for the self-support and well-being of the individual and the community by achieving adequate standards of community nutrition and economic well-being without jeopardizing the integrity, diversity, or productivity of the environment" (Section 2), sustainable development, a circular economy, and equity (Section 4). The Act recognizes climate change as a global emergency requiring urgent action and has a goal to build climate change adaptive capacity and resilience by requiring climate adaptation planning across every Government department as well as many goals regarding reduction of greenhouse gas emissions (Section 7). The Act also includes goals regarding active transportation, land protection, water and air protection, environmental assessments, aquaculture, and diversity, equity, and inclusion.[72]
Nova Scotia Wetland Conservation Policy	The *Nova Scotia Wetland Conservation Policy* gives direction and a framework for wetland conservation. The primary goal of the Policy is to prevent the net loss of wetlands in Nova Scotia. It supplements existing policies, regulations, and legislation that are designed to manage wetlands in the province. The Nova Scotia Wetland Conservation Policy clarifies the role of the government and the public in protecting wetlands and provides information on wetlands and wetland conservation. The Policy applies to all wetlands over 100 square metres in total area, and those listed as Wetlands of Special Significance (WSS). WSS include all salt marshes.[73]
Coastal Protection Act	The Nova Scotia *Coastal Protection Act* was passed in 2019 to protect natural ecosystems and ensure new construction is built where it will be safer from sea level rise, coastal flooding, and coastal erosion. The Act will come into effect once regulations are approved.[74] The regulations will establish a Coastal Protection Zone that will extend around the entire coast of Nova Scotia. The regulations will set out vertical setbacks within the zone, based on projected sea level rise, storm surge and local tidal amplitudes. Horizontal setbacks will be determined by designated professionals on a site-specific basis, based on the erosion factors present on the property. Other provisions restrict shoreline armouring to cases where it is needed to protect an existing structure, and prescribe general design requirements for wharves and similar structures to minimize unnecessary interference with the dynamic nature of the coast.[75]

2.4.4 Nova Scotia Department of Natural Resources and Renewables

The Department of Natural Resources and Renewables (NSDNR&R) manages activities on Crown lands in Nova Scotia. Crown lands cover around 29% of the province's land and includes most of the land between the mean high-water mark and low water mark with the exception of federally and privately (pre-confederation water lots) owned coastline. The province holds other

[72] Environmental Goals and Climate Change Reduction Act. Nova Scotia Department of Environment and Climate Change. (2021, c.20). Retrieved from the Nova Scotia Office of the Legislative Council website: https://nslegislature.ca/sites/default/files/legc/statutes/environmental%20goals%20and%20climate%20change%20reduction.pdf
[73] Nova Scotia Department of Environment and Climate Change. (2019). Nova Scotia Wetland Conservation Policy. Retrieved from https://www.novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf
[74] Coastal Protection Act. Nova Scotia Department of Environment and Climate Change. (2019). Retrieved from the Nova Scotia Office of the Legislative Council website: https://nslegislature.ca/legc/bills/63rd_2nd/3rd_read/b106.htm
[75] Nova Scotia Department of Environment and Climate Change. (2021). Part 2: A Detailed Guide to Proposed Coastal Protection Act Regulations. Retrieved from https://novascotia.ca/coast/docs/part-2-detailed-guide-to-proposed-Coastal-Protection-Act-Regulations.pdf

property that is not Crown Land (not managed by the Department of Natural Resources and Renewable), including wilderness areas, protected areas, roads, highways, and provincial buildings. The department's priorities also include developing and supporting renewable energy and green infrastructure programs, promoting mineral, petroleum, and energy exploration, and managing risks to forests.[76]

The department is developing an ecosystem-based management planning system to guide government decisions on Crown land use. Ecosystem based management uses a habitat-based approach to conserve biodiversity by maintaining natural conditions and processes.[77]

Table 2.24 Relevant Legislation: Department of Natural Resources and Renewables

Crown Lands Act	The *Crown Lands Act* gives the Minister of Natural Resources and Renewables the authority to give permission for activities on Crown land. Activities covered in this Act relevant to coastal interests include the building of structures on submerged land, such as wharves. The Minister has the authority to set the terms and conditions for approval of activities on Crown land.[78]
Beaches Act	The purpose of the *Beaches Act* is to protect beaches and dune systems in the province for the benefit and education of current and future generations. In the Act "beaches" are defined as "any area of land on the coast lying seaward of the mean high-water mark and the area of land immediately adjacent thereto to the distance determined by the Governor in Council, and includes any lakeshore area declared by the Governor in Council to be a beach" (Section 3[a]). Habitats landward of the high-water mark are only protected if they are designated within this Act. Section 8(1) of the *Beaches Act* lists activities that are prohibited on designated beaches; including, that no person shall cause disturbance, be intoxicated, endanger other beachgoers, litter, or destroy property or natural resources. The Governor in Council is given the authority to make regulations for designated beaches including granting leases, licenses, and permits for the removal of sand and other material from beaches, to preserve the flora and fauna of the beach, to restrict vehicular and pedestrian traffic, and to manage adjacent crown lands (Section 13).[79]
Wetland Inventory	In 2004, the Nova Scotia Department of Natural Resources and Renewables (NSDNR&R) developed a province-wide wetland inventory. According to this inventory approximately 6.5% of Nova Scotia's landmass is freshwater wetlands and salt marshes. The wetlands are grouped into the following classes: Open Water, Marsh, Swamp, Bog or Fen, Fen. This inventory is available on the Nova Scotia Department of Natural Resources and Renewables website.[80]
Wildlife Habitat and Watercourses Protection Regulations	The Wildlife Habitat and Watercourse Protection Regulations were made under Section 40 of the *Forests Act* and pertain to habitat and watercourse protection for forestry operations. The regulations require that "special management zones" be established next to watercourses to protect the watercourse and adjacent habitat from forestry activities. A watercourse is defined as "the bed and shore of a river,

[76] Nova Scotia Department of Natural Resources and Renewables. (2022). Department of Natural Resources and Renewables: About Us. Retrieved from https://beta.novascotia.ca/government/natural-resources-and-renewables/about
[77] Nova Scotia Department of Natural Resources and Renewables. (2021). Ecosystem Management. Retrieved from https://novascotia.ca/natr/forestry/programs/ecosystem-management.asp
[78] Crown Lands Act. Nova Scotia Department of Natural Resources and Renewables (2021, c.9). Retrieved from the Nova Scotia Office of the Legislative Council website: https://nslegislature.ca/sites/default/files/legc/statutes/crown%20lands.pdf
[79] Beaches Act. Nova Scotia Department of Natural Resources and Renewables (1993, c. 9, s. 9). Retrieved from the Nova Scotia Office of the Legislative Council website: http://nslegislature.ca/legc/statutes/beaches.htm
[80] Nova Scotia Department of Natural Resources and Renewables. (2004). Wetlands Inventory. Retrieved from https://novascotia.ca/natr/wildlife/habitats/wetlands.asp

	stream, lake, creek, pond, marsh, estuary, or salt-water body that contains water for at least part of each year." (Section 2[i]).[81]
Wildlife Act	The *Wildlife Act* gives the NSDNR&R authority to designate wildlife management areas and regulations for each area. Wildlife management areas can include areas of coastal habitat and islands.[82]

2.4.5 Nova Scotia Department of Fisheries and Aquaculture

The Department of Fisheries and Aquaculture is responsible for managing, promoting, supporting and developing fisheries, aquaculture, and seafood processing in Nova Scotia. The department's Aquaculture Division regulates and manages aquaculture by leasing aquaculture sites, licensing aquaculture activities, environmental management, and conducting public outreach activities. The department's Marine and Coastal Services Division provides coastal zone management services for commercial fisheries and rockweed harvesting; the division oversees the monitoring and enforcement of the department's acts and regulations.

Table 2.25 Relevant legislation: Department of Fisheries and Aquaculture

Fisheries and Coastal Resources Act	The purposes of the *Fisheries and Coastal Resources Act* include consolidating the fisheries laws, assisting with and increasing productivity of the aquaculture industry, expanding recreational sport-fishing and ecotourism, and involving communities in managing coastal resources. In this Act fishery resources are described as "all vertebrate and invertebrate animals and all plants which spend all or part of their life in the aquatic and marine environment" (Section 3[e]).[83]

2.4.6 Nova Scotia Department of Agriculture

The mandate of the Department of Agriculture is to support the development of the agriculture and agri-food industries in Nova Scotia. The Department is responsible for overseeing the province's agriculture legislation, providing financing and credit counselling, providing programs and services, and supporting the economic growth and sustainability of agriculture.[84] The Resource Sustainability Division of the Department is responsible for 241 km of dykes primarily along the Bay of Fund coast and waterways.[85] In 2018 the Department completed a Dyke Risk Assessment for the province, results showing that ~70% of dykes examined in the project are at high vulnerability to coastal erosion and overtopping by 2050.[86]

Table 2.26 Relevant legislation: Department of Agriculture

Agricultural Marshlands Conservation Act	Under the *Agricultural Marshland Conservation Act* the Minister has the authority to designate the boundaries of marshland sections in the province. Each marshland section has individual land use regulations for conservation, protection, management, and/or development within the designated boundaries. The owners of a marshland may request that they be incorporated as a marsh

[81] Wildlife Habitat and Watercourses Protection Regulations. Department of Natural Resources and Renewables (1989, c.179). Retrieved from the Nova Scotia Department of Justice website: http://www.novascotia.ca/just/regulations/regs/fowhwp.htm
[82] Wildlife Act. Department of Natural Resources (R.S., c .504). Retrieved from the Nova Scotia Office of the Legislative Council website: http://nslegislature.ca/legc/statutes/wildlife.pdf
[83] Fisheries and Coastal Resources Act. Nova Scotia Department of Fisheries and Aquaculture. (1996, c.25). Retrieved from the Nova Scotia Department of Justice website: https://nslegislature.ca/sites/default/files/legc/statutes/fisheries%20and%20coastal%20resources.pdf
[84] Nova Scotia Department of Agriculture. (2022). Department of Agriculture: About Us. Retrieved from https://beta.novascotia.ca/government/agriculture/about
[85] van Proosdij, D., Ross, C., & Matheson, G., (2018). Risk Proofing Nova Scotia Agriculture: Nova Scotia Dyke Vulnerability Assessment. Retrieved from https://nsfa-fane.ca/wp-content/uploads/2018/08/Nova-Scotia-Dyke-Vulnerability-Assessment.pdf
[86] Ibid.

	body for that marshland section. A marsh body may, among other things, acquire, use, sell, and lease real and personal property, construct, reconstruct, recondition, repair, maintain, conduct, and operate works, make by-laws not inconsistent with this Act for the regulation of its business, and make rules respecting land within or affecting the marshland section (Section 14). This Act also gives authority to the Minister to construct a dyke, aboiteau, breakwater, canal, ditch, drain, road or other structure to develop marshland for agriculture and for the improvement of agricultural purposes.[87]

[87] Agriculture Marshland Conservation Act. Nova Scotia Department of Agriculture. (2000, c.22). Retrieved from the Nova Scotia Office of the Legislative Council website: https://nslegislature.ca/sites/default/files/legc/statutes/agricmar.htm

2.5 Newfoundland and Labrador

The Province of Newfoundland and Labrador has 276 municipalities with land use planning authority. Municipalities in Newfoundland and Labrador are cities and towns; there are three cities, St. John's, Mount Pearl, and Corner Brook. Half of these municipalities, including the cities, have municipal plans. Towns are incorporated under the *Municipalities Act*. Cities are established under their respective statutes. Additionally, there are 174 local service districts which have no legislative planning or development control authority. Less than 10% of the population resides in unincorporated areas with no service delivery. There are two First Nations and three reserves in what is now known as Newfoundland and Labrador.

The province has explored forms of regionalization over the years including the development and administration of services that can be shared between or across municipalities, local service districts, and unincorporated areas in a defined area, like transportation, water supply, waste management, fire and emergency services, among others. A regional approach can also guide land use planning. Municipalities already cooperate in some aspects of service delivery and the St John's Urban Region Regional Plan guides land use planning and regional infrastructure for the municipalities of the northeast Avalon peninsula. Municipal plans developed by municipalities within the region must conform with the regional plan. There are two other regional plan areas in the province, the Humber Valley Regional Planning Area, and the Labrador Inuit Settlement Area, but regional plans have not been completed. The province may establish regions and regional planning under the *Municipalities Act* and the *Urban and Rural Planning Act*, respectively.

In April 2022, the province released its final report on a renewed exploration of a regional governance model for the province. The Joint Working Group on Regionalization recommends regions comprising municipalities, local service areas, and unincorporated areas of 5,000 to 50,000 people, outside of most communities in Labrador, Indigenous communities, and more populated municipalities like St. John's and Corner Brook. Regional boundaries would be determined with stakeholder input and consideration of local geography. Municipalities would retain their autonomy and provide local governance and services. Regional bodies would provide regional services, including land use planning.[88]

2.5.1 Overview of land use planning decision-making authority and relevant legislation in Newfoundland and Labrador

Table 2.27 Newfoundland and Labrador (City and Town)

Decision-Makers	Council consists of five to nine councillors as decided by the Minister (Section 13, *Municipalities Act*). In St. John's the council must consist of a mayor, deputy mayor and nine councillors, but the council may vote to decrease the number of councillors to seven (Section 5*, City of St. John's Act*). In Corner Brook and Mount Pearl, the council must consist of a mayor and no fewer than six councillors (*Section 13, City of Corner Brook Act &* Section 13*, City of Mount Pearl Act*). Mayors are elected at large or by council following an election (Section 18, *Municipalities Act, Section 13, City of Corner Brook Act &* Section 13*, City of Mount Pearl Act*).
Staff	A town council may establish a position of town manager and appoint a person to the position (Section 53[1], *Municipalities Act*). The manager is the chief

[88] Joint Working Group Report and Recommendations on Regionalization; Retrieved from: https://www.gov.nl.ca/mpa/files/Regionalization-Report-and-Recommendations.pdf

	executive and administrative officer of the council (Section 54, *Municipalities Act*). A manager may also be appointed as the clerk (Section 53[3], *Municipalities Act*). A city council may appoint a city manager (Section 55, *City of Mount Pearl Act*, Section 55, *City of Corner Brook Act*, Section 328, *City of St. John's Act*) Council must establish the position of clerk and appoint a person to that position (Section 59, *Municipalities Act*, Section 68, *City of Mount Pearl Act*, Section 68, *City of Corner Brook Act*). A council may establish departments and department heads as well as employee positions for the administration of the region (Sections 63 and 65, *Municipalities Act,* Section 74 and 86, *City of Mount Pearl Act*, Section 74 and 86, *City of Corner Brook Act*). Council may appoint a municipal enforcement officer to enforce regulations made under the Municipalities Act within the municipality (Section 179, *Municipalities* Act Section 221, *City of Mount Pearl Act*, Section 221, *City of Corner Brook Act*). Town council may appoint a youth representative to sit with council and participate in discussions; the youth representative is a non-voting member of council (Section 13.1, *Municipalities Act,* Section 5.01*, City of St. John's Act,* Section 13.1, *City of Mount Pearl Act*, Section 13.1, *City of Corner Brook Act*).
Committees	Council can appoint standing or special committees to make recommendations to council on matters referred by council (Section 25[1], *Municipalities Act,* Section 42, *City of Mount Pearl Act*, Section 42, *City of Corner Brook Act*). The mayor or council appoint committee members (Section 25[2], *Municipalities Act*).
Powers	Council may acquire and establish parks and recreational facilities within the municipality (Section 174, *Municipalities Act,* Section 60, *City of St. John's Act,* Section 204, *City of Mount Pearl Act*, Section 204, *City of Corner Brook Act*). Council can, with the approval of the minister, expropriate land (Section 50[1], *Urban and Rural Planning Act*).
Planning and Development	Council may prepare a municipal plan (section 10, *Urban and Rural Planning Act*). A plan must include objectives, policies to be carried out under the plan, land use classes, proposals for land use zoning regulations, proposals for implementing the plan, and plan for a 10-year period (section 13[2], *Urban and Rural Planning Act*). A plan can also include established areas for comprehensive development, provide for the protection of environmentally sensitive land, stormwater and erosion control, the use of natural resources, and the non-removal of trees and vegetation (Section 13[3], *Urban and Rural Planning Act*). Council must make regulations to control sewer systems, septic tanks, water supplies and source of water, the design and construction of buildings, minimum lot sizes, occupancy of buildings and classes of buildings (Section 414, *Municipalities Act,* Section 187, 236 and 242 *City of Mount Pearl Act*, Section 187, 236 and 242, *City of Corner Brook Act*).
Subdivision By-law	A council may make regulations requiring that, upon subdivision, up to 10% of land undergoing subdivision be dedicated to the municipality for park land or public use (Section 37[1], *Urban and Rural Planning Act*).
Development Schemes	Where a plan and development regulations have been established, a council or regional authority may adopt a development scheme to increase the details of the proposal (Section 29[1], *Urban and Rural Planning Act*). The scheme may reserve land for future acquisition for a park or open space; specify how land can be used, subdivided, or developed; and make land available for agriculture, residential, commercial, industrial, or other uses (Section 29[2], *Urban and Rural Planning Act*).

Table 2.28 Newfoundland and Labrador Regional Planning Areas

Decision-Makers	Established by the Lieutenant-Governor in Council on recommendation from the Minister (Section 26, *Municipalities Act*). The Minister can appoint a regional authority or Act as the regional authority (Section 7, *Urban and Rural Planning Act*). The Minister may designate a council or the provincial government to implement the regional plan (Section 8[2], *Urban and Rural Planning Act*). The Lieutenant-Governor in Council designates powers to the regional council for the entire region or part of the region (Section 34[1], *Municipalities Act*). Council is elected at large or appointed, and the chairperson and deputy chairperson of the council are elected by council (Section 45, *Municipalities Act*).
Staff	Regional council must establish a position of regional manager and appoint a person to that position (Section 53[2], *Municipalities Act*). A manager may also be appointed as the clerk (Section 53[3], *Municipalities Act*). Council must establish the position of clerk and appoint a person to that position (Section 59, *Municipalities Act*). A council may establish departments and department heads as well as employee positions for the administration of the region (Sections 63 and 65, Municipalities Act). Council may appoint a municipal enforcement officer to enforce regulations made under the Municipalities Act within the municipality (Section 179, *Municipalities Act*).
Committees	The regional council may provide for an elected advisory committee where a local service area has been established; the advisory committee may make recommendations on local planning and development control for the local service area (Section 38, *Municipalities Act*). Regional council may establish standing or special committees for matters that it deems desirable; the committee makes recommendations to council on designated matters (Section 52, *Municipalities Act*).
Powers	Potential powers that may be designated include the provision of water supplies, sewer disposal, storm drainage systems, solid waste disposal; police, ambulance, and fire service; and regional and local area planning and development control (Section 35, *Municipalities Act*). Regional council can establish local service areas within the regional planning area (Section 37, *Municipalities Act*). A regional authority can, with the approval of the minister, expropriate land (Section 50[1], *Urban and Rural Planning Act*).
Strategic Plans	A regional plan must be established for a regional planning area by the regional authority (Section 8[1], *Urban and Rural Planning Act*).
Land Use By-law	Council may establish minimum lot sizes for the municipality (Section 193, *Municipalities Act*).
Subdivision By-law	A regional authority may make regulations requiring that an applicant for a subdivision dedicate up to 10% of the land to be subdivided to the municipality for park land or public use (Section 37[1], *Urban and Rural Planning Act*).

Table 2.29 Newfoundland and Labrador Local Service Districts

Decision-Makers	The Minister may establish an unincorporated area of the Province as a local service district (Section 387, *Municipalities Act*). The minister may establish a local service district committee to control and manage the district and determine the number of people elected to a committee (Section 390, *Municipalities Act*)
Staff	The committee may appoint officers, clerks, and employees that may be necessary to conduct the business of the local service district (Section 403.4[5], *Municipalities Act*).
Committees	A committee established for local service districts and the members of the committee are elected (Section 390, *Municipalities Act*). There must be at least five committee members (Section 403.4, *Municipalities Act*).

2.5.2 Newfoundland and Labrador Department of Municipal and Provincial Affairs

The mandate of the Department of Municipal and Provincial Affairs is to advance the economic, social, and environmental sustainability of municipalities, communities, regions and the province through the delivery of programs, services and supports. Pertaining to effective governance, the department develops land use policy and regional approaches to service delivery, provides municipal training to elected officials, advises local officials, administers grants and subsidies to local infrastructure projects, provides operational support, and supports regional cooperation initiatives. The department also guides infrastructure investments by assessing needs for and giving advice on municipal infrastructure investments, providing financial support, monitoring infrastructure projects, and advocating to the federal government to secure ongoing funding. The Municipal Finance Division is also responsible for the administration of Integrated Community Sustainability Plans.[89]

Table 2.30 Relevant legislation: Department of Municipal and Provincial Affairs

Municipalities Act	The *Municipalities Act* gives authority to councils to provide local governance by establishing policies and providing services. It regulates the structure of municipal governance including the establishment of council and committees. The Act outlines the requirements for municipal elections. For regions, the Act gives authority to the province to establish, amalgamate, and disestablish regional planning areas (Section 26). A regional council may establish local service areas under this Act (Section 37).[90]
Urban and Rural Planning Act	The *Urban and Rural Planning Act* regulates land use planning in Newfoundland and Labrador. It gives authority to the province to develop land use policy for the province, and areas of the province, or for a certain land use (Section 3). It also enables municipal planning areas to be developed and empowers municipal councils to control development within those areas. The Act requires that council prepare municipal plans and land use policies to guide future development (Section 10). The Act states what must, and can, be included in a plan and development regulations (Section 13): planning objectives, land use classes, zoning regulations, and plan implementation must be included (Section 13[2]). A plan can also include protection for environmentally sensitive land and natural resources, stormwater and

[89] Newfoundland and Labrador Department of Municipal and Provincial Affairs. (2022). About the department. Retrieved from https://www.gov.nl.ca/mpa/department/
[90] Municipalities Act, 1999. Newfoundland and Labrador Department of Municipal and Provincial Affairs (1999, c. M-24). Retrieved from the Newfoundland and Labrador House of Assembly website: http://www.assembly.nl.ca/Legislation/sr/statutes/m24.htm

	erosion controls, requirements for environmental studies prior to development, and prohibit the removal of vegetation (Section 13[3]). The *Urban and Rural Planning Act* also deals with regional planning and authorizes the Minister to create a regional planning area governed by a regional authority. The regional authority must develop a regional plan which has the same requirements as a municipal plan (Section 6). The Act also includes the procedures for making amendments to municipal and regional plans and requires that plans be reviewed every five years (Section 28).[91]
Regional Service Board Act	The *Regional Service Board Act* allows for the creation of Regional Service Boards by the province. These boards are enabled to provide regional services including waste disposal, water systems, and sewage disposal. Board members are appointed by the Minister and represent municipal authorities within the region. The Act regulates how the budget for services is managed and the borrowing and expenditure powers for providing services.[92]
Evacuated Communities Act	The *Evacuated Communities Act* enables the Minister to declare a community as a vacated community (Section 3). Under this Act, construction or occupancy of any building is prohibited in a vacated community without a permit from the Minister.[93]

2.5.3 Newfoundland and Labrador Department of Environment and Climate Change

The Department of Environment and Climate Change deals with matters of environmental protection and enhancement and climate change. The department consists of two branches: the Environment and Labour branch, responsible for water resource management, pollution prevention, environmental assessments, labour relations, and labour standards, and the Climate Change branch, which is responsible for climate change and energy efficiency, policy and strategic planning, and natural areas.[94]

Table 2.31 Relevant legislation: Department of Environment and Climate Change

Environmental Protection Act and Environmental Assessment Regulations	The *Environmental Protection Act* regulates the release of substances into the environment, waste disposal and litter, waste management, air quality management, contaminated sites, dangerous goods, and pesticides in the Province. The Act gives authority to the Minister to compile information and contribute to, or sponsor, environmental research for environmental education (Section 5).[95] The *Environmental Assessment Regulations* provide guidance on the review processes for projects under provincial jurisdiction. The regulations include information regarding assessment committees, guidelines, public hearings, and environmental impact statements.

[91] Urban and Rural Planning Act, 2000. Newfoundland and Labrador Department of Municipal and Provincial Affairs (2000, c. U-8). Retrieved from the Newfoundland and Labrador House of Assembly website: http://www.assembly.nl.ca/Legislation/sr/statutes/u08.htm
[92] Regional Service Board Act, 2012. Newfoundland and Labrador Department of Municipal and-Provincial Affairs (2012, c. R-8.1). Retrieved from the Newfoundland and Labrador House of Assembly website: https://www.assembly.nl.ca/legislation/sr/statutes/r08-1.htm
[93] Evacuated Communities Act. Newfoundland and Labrador Department of Municipal and Provincial Affairs (1990, c. E-15). Retrieved from the Newfoundland and Labrador House of Assembly website: https://www.assembly.nl.ca/Legislation/sr/statutes/e15-1.htm
[94] Newfoundland and Labrador Department of the Environment and Climate Change (2022). About the department. Retrieved from https://www.gov.nl.ca/ecc/department/
[95] Environmental Protection Act. Newfoundland and Labrador Department of the Environment and Conservation (2002, c. E14.2). Retrieved from the Newfoundland and Labrador House of Assembly website: https://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm

Wilderness and Ecological Reserves Act	The *Wilderness and Ecological Reserves Act* enables the province to designate areas as wilderness or ecological reserves. Little to no human activity is permitted in wilderness reserves. Wilderness reserves can be designated to preserve areas for a particular species or areas with extraordinary characteristics. Some recreational activities may take place in a wilderness reserve including hunting, fishing, and travel (Section 4). Ecological reserves can be set aside by the province in areas with unique ecosystems or natural phenomena. These reserves are established to provide for scientific research and education, to protect a certain habitat, to provide development standards, and to preserve natural landscape characteristics (Section 5). The Lieutenant- Governor in Council has the authority to establish and discontinue reserves in the province (Section 18). A Wilderness and Ecological Reserves Advisory Council advises the Lieutenant-Governor in Council on matters relating to wilderness and ecological reserves including the boundary description, management plan, and regulations (Section 17). The Act lists prohibited activities in reserve areas including altering the flow of water, use of motorized vehicles, road or path construction, logging, or mining (Section 24).[96]
Water Resources Act	The *Water Resources Act* allows the minister to create an inventory and mapping of wetlands, flood plains, shorelines, and coastal waters. The minister may also control the use of wetlands including drainage, infilling, permanent flooding, and modifications that could impact its natural functions. The minister may also designate flood risk areas, regulate land development in flood risk areas, establish a flood forecast centre, and require the construction of flood control measures to protect properties.[97]

2.5.4 Newfoundland and Labrador Department of Justice and Public Safety

The Department of Justice and Public Safety oversees the administration of justice and the protection of the people of Newfoundland and Labrador. The Emergency Services Division is responsible for emergency preparedness, response, and recovery measures. The division coordinates the Disaster Financial Assistance Program, on-call emergency services, emergency management planning, as well as other initiatives.[98]

Table 2.32 Relevant legislation: Department of Justice and Public Safety

Emergency Services Act	The *Emergency Services Act* requires that every municipality adopts an emergency management plan (Section 5). It also gives power to municipalities to declare an emergency, thus activating their emergency management plans (Section 6).[99]

[96] Wilderness and Ecological Reserves Act. Newfoundland Department of the Environment and Conservation (1990, c. W-9). Retrieved from the Newfoundland and Labrador House of Assembly website: http://www.assembly.nl.ca/legislation/sr/statutes/w09.htm
[97] Water Resources Act. Newfoundland and Labrador Department of Environment and Climate Change. (2002, cW-4.01) Retrieved from https://www.assembly.nl.ca/legislation/sr/statutes/w04-01.htm#33
[98] Newfoundland and Labrador Department of Justice and Public Safety. (n.d.) Emergency Services. Retrieved from https://www.gov.nl.ca/jps/fes/emo/
[99] Emergency Services Act. Newfoundland and Labrador Department of Justice and Public Safety. (2008, c.E-9.1). Retrieved from the Newfoundland and Labrador House of Assembly website: https://www.assembly.nl.ca/Legislation/sr/statutes/e09-1.htm

2.5.5 Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture

The Department of Fisheries, Forestry, and Agriculture is responsible for supporting the fisheries, aquaculture, forestry, agriculture, and agri-food industries. The Department's mandate includes administration of Crown lands, conservation and protection of the provinces land resources, forestry, wildlife habitat, wildlife, and inland fish, and development and growth of renewable resource areas for sustainable economic and ecological benefit.[100]

Table 2.33 Relevant legislation: Department of Fisheries, Forestry, and Agriculture

Lands Act	The *Lands Act* regulates the leasing, granting, and easements of Crown lands in the province. Crown lands are defined as all lands within the province, except lands that have been lawfully separated or alienated from the Crown, and lands that, before the enactment of the *Lands Act* have been lawfully set apart or appropriated for public purpose, and lands that may be in use or occupation of a provincial department (Section 2). The Act permits Crown lands to be transferred to other provincial departments or to the federal government (Sections 53 and 54). The shoreline of Crown lands is protected through Section 7 of this Act. Fifteen metres of land adjacent to a lake, pond, seashore, foreshore, or river is not included in grants, leases, and licenses of Crown land. Exceptions to this are lands used for an industrial undertaking that would not cause undue injury to the rights of others, aquaculture, residences erected before the coming into force of this section, construction of boathouses, wharves, shipways, airplane hangers, recreational trails, and other recreational structures. Under Section 57 of this Act, the Minister can designate an area of land as a special management area. These areas can have land use restrictions placed on them, including for leasing or licensing, constructing a building or structure, or using the land for agriculture, commercial, industrial, recreational, or residential purposes (Section 59). Regulations for each special management area are laid out under the *Lands Act*.[101]

[100] Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. Fisheries, Forestry, and Agriculture. (2022). Retrieved from https://www.gov.nl.ca/ffa/
[101] Lands Act. Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. (1991, c.36). Retrieved from the Newfoundland and Labrador House of Assembly website: https://www.assembly.nl.ca/legislation/sr/statutes/l3691.htm

Chapter 3: Land Use Planning Adaptation Options for Climate Change

This section presents a diverse selection of land use planning tools for use in coastal climate change adaptation. The tools are organized according to categories: **Capacity Building Tools, Policy and Planning Framework Tools, Regulation and Land Use Change Tools,** and **Site Design Tools.**

Each tool description begins with a chart matching the tool with one or more of the climate change adaptation strategic approaches: **Avoid, Retreat, Accommodate, Protect** and **Procedural** followed by keyword summary that covers the time frame for tool implementation, planning context and process (provincial, municipal, professional, formal, community, informal, etc.), and considerations for implementing the tool for adaptation. A short definition follows the summary. The description also summarizes the opportunities and constraints of the tool and suggests some ways to get started with developing and using the tool. Examples of each tool follow the description and include regional adaptation planning practices and national and international examples relevant to the coastal environments of the Atlantic Provinces and climate change impacts. The examples come from local and regional professional knowledge of climate change adaptation practice, other guidebooks, and websites of governments and organizations leading development in coastal climate change adaptation planning. The examples help the reader visualize the tool and understand its application for climate change adaptation.

The land use planning tools in this collection are well researched and representative, but the authors could not always verify the content through the original source. The examples illustrate the tools and hopefully inspire ideas for local application, but the authors do not make representation of accuracy or endorse the claims made in the source documents and websites.

3.1 Land Use Planning Tools for Capacity Building

3.1.1 Provincial policy statements

Adaptive response	Procedural approach
Influence time frame	medium- to long-term
Implementation time-frame	medium-term
Planning level	provincial
Planning process and plan type	formal; professional; policy planning; adaptive; may be a policy amendment or may require a new initiative
Adapting to climate change	update with new climate change information during the plan review

Provincial policy statements provide policy direction at the provincial level. Provincial policy statements can guide both provincial and local land use planning. Policies may include direction on local land use management, environmental protection, and resource use. For example, each province in Atlantic Canada has provincial wetland protection policies that include land use restrictions in and around wetlands (See the Legislative Context section of this document for information on wetland policies for each of the Atlantic Provinces.) Provincial policy can guide local land use policy and plans. Local policies may place greater restrictions on development than required by provincial policy, but they cannot contain weaker restrictions.

Provincial policy statements can be powerful tools for addressing climate change impacts through land planning and management and can be directed to the coastal environment.

OPPORTUNITIES	CONSTRAINTS
• Covers the entire landmass of the province. • Supports local jurisdictions on land use regulations.	• Communities do not have decision-making authority over what is included in the statements.

Getting started and first steps – Provincial policy statements are developed and put into action at the provincial level but local governments have a role in advocating for provincial policies. When provincial policies are in place, communities have baseline guidance for land use planning and management, and provincial support for local regulatory tools such as setbacks and zoning. Advocating for provincial coastal policies and including climate change impact management is a proactive way of gaining provincial support for coastal and climate change adaptation planning. Here are some first steps towards advocating for a provincial policy statement:

- Contact the provincial department responsible for environment and/or municipal affairs. The roles of provincial departments are described in the legislative section of this guidebook.
- For a community with planning authority, identify opportunity in the official plan and by-laws to represent and implement the intent of coastal and climate change statements of interest.

Provincial Policy Statements example (regional)

Profile: Province of Prince Edward Island	
Coast	Atlantic
Region	Gulf of St. Lawrence and Northumberland Strait
Impact Concerns	Coastal erosion and flooding
Population	154,331 (2021 Census)
Community Type	Province
Area	5,685km^2
Year	2013-Present
Funding	Province of Prince Edward Island

Summary – The province of Prince Edward Island doesn't have a specific land use policy, but it does have two substantive documents on the topic.

Recommended policies from the *Report of the Task Force on Land Use Policy,* 2014*,* aim to improve the quality of life for Islanders by improving the environment, society, and economy in Prince Edward Island. The recommendations are notable for the attention given to climate change impacts and the need to plan and manage land use at the coast for these impacts and other coastal development concerns. One of the goals recommended by the Task Force is Goal 4: "Develop a coastal zone management policy for the entire island", and includes the following policy recommendations:

> 4.1 Prohibit or regulate development in areas potentially at risk from flooding, storm surges and the adverse effects of climate change; identify non-development areas, required setbacks, and buffer zones.
>
> 4.2 Regulate development in the coastal area in order to minimize incompatible land uses, minimize effects on marine life and industry, and protect heritage resources.
>
> 4.3 Prohibit development that has the potential to increase shoreline erosion, including erosion on adjacent properties, and continue to regulate the fortification of eroding shorelines by artificial means; consider the need to protect public infrastructure.
>
> 4.4 Preserve, enhance and where appropriate, expand public and recreational access to the shore.[102]

Now is the Time (2021) includes recommendations on land use policy for Prince Edward Island. The report acknowledges that climate adaptation policy is needed in the province. It also notes that the *Planning Act* does not adequately address coastal erosion and development in flood-risk areas. One of the main recommendations within the report is to adopt a province-wide land use planning framework.[103]

[102] Government of Prince Edward Island. (2014). Report of the task force on land use policy: January 2014. Retrieved from http://www.gov.pe.ca/photos/original/fema_TFreport14.pdf
[103] Land Matters Advisory Committee. (2021). Now is the Time: Final Report of the Land Matters Advisory Committee. Retrieved from: https://www.landmatterspei.ca/sites/www.landmatterspei.ca/files/LandMatters/af_Land%20Matters_What%20We%20Heard_Final%20Report.pdf

3.1.2 Partnerships

Adaptive response	Procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal, community
Planning process and plan type	formal and informal, professional to volunteer, capacity building, community planning
Adapting to climate change	review periodically to ensure arrangements and expertise match changing needs for adaptation

Forming partnerships and building relationships can open doors to information, resources, and expertise. Partnerships can be formal or informal. Formal partnerships involve an official signed agreement and agreed-upon responsibilities for each partner.

Informal partnerships are non-binding. In both cases partners work together and support each other in achieving a common goal.

A community can form partnerships with organizations and individuals, including citizens, local community groups, other municipalities, non-government organizations, nature trusts, universities and colleges, consulting companies, and provincial and federal government departments. Partnerships benefit each party involved by drawing on each other's strengths and resources. Partnerships can help a community to complete projects or join forces on services and policies.[104]

Climate change impacts affect communities widely and adapting to climate change will more often than not require a collective effort from governments and organizations. If a community does not have expertise in present and future climate change impacts, they can form partnerships with other organizations to undertake initiatives that contribute to climate change adaptation.

OPPORTUNITIES	CONSTRAINTS
• Maximizes a community's resources and expertise. • Builds relationships throughout the local community, and beyond.	• Can be difficult to coordinate with multiple partners.

Getting started and first steps – Partnerships are an important first step for communities that need help from outside resources. Partnerships can build a community's adaptive capacity. There are many things that a community needs to consider or do when starting a partnership:

- Determine if a partnership is the best way for the community to complete a project, solve a problem, or take advantage of an opportunity.
- Consider the experience of past partnerships that the community has had, including positive aspects of past partnerships and how partnerships could have been improved.
- Compile an inventory of what the community has to offer potential partners.

[104] "Handbook for inter-municipal partnership and co-operation for municipal government." (n.d.) Retrieved from https://sarm.ca/wp-content/uploads/2022/03/handbook-on-intermunicipal-cooperation.pdf

- Look at similar partnerships elsewhere. A community can learn from the experience of others in similar situations.[2]

Partnership example (regional)

Profile: Province of Prince Edward Island	
Coast	Atlantic
Region	Gulf of St. Lawrence and Northumberland Strait
Impact Concerns	Flooding and erosion
Population	154,331 (2021 Census)
Community Type	Province
Year	2021-2022
Funding	Environment and Climate Change Canada's Climate Action and Awareness Fund

Summary – PEI Watershed Alliance is an association of 25 constituent watershed management groups on Prince Edward Island. The goal of the Alliance is to improve and protect the environmental quality of watersheds in PEI, empower watershed groups to achieve their goals, and provide a united voice on watershed management issues.[105]

Through the Climate Action and Awareness Fund, the Alliance has completed living shoreline projects that have helped build relationships with many partners in the region. An oyster reef demonstration site in Lennox Island is one project that brought together the expertise of the Mi'kmaq Confederacy of PEI, the Lennox Island Development Corporation, and the TransCoastal Adaptations Centre for Nature-Based Solutions to build a shoreline adaptation project that can guide future coastal adaptation. A community art project led by Indigenous artists featuring Mi'kmaq song, dance, and story promoted the work.

Figure 2.1 Members of PEI Watershed Alliance and partner organizations work on construction of living shoreline demonstration site (Stewart McLean)

[105] PEI Watershed Alliance. (2019). About Us: About the PEI Watershed Alliance. Retrieved from https://peiwatershedalliance.org/about-us/

Partnership example (regional)

Profile: Chignecto Isthmus, New Brunswick and Nova Scotia	
Coast	Atlantic
Region	Bay of Fundy
Impact Concerns	Sea level rise, salt marsh restoration
Year	2013-Present
Funding	The New Brunswick Environmental Trust Fund, Municipality of the County of Cumberland, New Brunswick Environmental Trust Fund, Natural Resources Canada

Summary – The Chignecto Climate Change Collaborative formed in 2013 to bring together communities of the Chignecto Isthmus in Nova Scotia and New Brunswick to address climate change adaptation. The Collaborative created a regional adaptation plan that is updated every five years and holds annual workshops to examine adaptation concerns including sea level rise, emergency measures, salt marsh restoration, and dykeland vulnerability. A working group of members from both provincial governments, municipalities in the region, universities, and environmental organizations meet regularly to work towards climate adaptation goals. [106]

Recommended resources

Government of Nova Scotia's Handbook for Inter- Municipal Partnership and Co-operation for Municipal Government: https://sarm.ca/wp-content/uploads/2022/03/handbook-on-intermunicipal-cooperation.pdf

Alliance of Regional Collaboratives for Climate Adaptation (California)- Regional Adaptation Collaborative Toolkit https://arccacalifornia.org/toolkit/

[106] EOS Eco-Energy. (2022). Chignecto Climate Change Collaborative: About the CCC [image]. Retrieved from https://eosecoenergy.com/en/projects/climate-change-adaptation/tantramar-climate-change-adaptation-collaborative/

3.1.3 Education programs

Adaptive response	Procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short-to medium-term
Planning level	regional, municipal, community
Planning process and plan type	formal and informal; professional to volunteer; capacity building; community planning and community-based planning
Adapting to climate change	review periodically to ensure arrangements and expertise match changing needs for adaptation

Education increases the adaptive capacity of communities by raising awareness of issues facing a community. Education also supports communication between community members and unites communities. Education helps to motivate community adaptation. Short- and long-term communication strategies are useful for educating the public and promoting climate change adaptation planning.[107] Even when residents are aware of the threat of sea level rise and storm surge they are not necessarily aware of the risks locally to them, their property, and their community.[108] Good communication with the public helps to gain support for adaptation plans and to maintain plans over time.

Figure 2.2 The Chignecto Climate Change Collaborative created four educational sea level rise signs and placed them across the Chignecto Isthmus. Each sign shows both the historical flood level and the level a storm of the same intensity would reach in 2100 (EOS Eco-Energy)

OPPORTUNITIES	CONSTRAINTS
• Gains public support for adaptation plans when the public is aware of the risks associated with coastal issues. • Can motivate community members to take action on their own once they are aware of coastal issues.	• Not a direct or comprehensive action to protect a community from community-wide coastal issues.

[107] CBCL. (2005). *A guide for incorporating adaptation to climate change into land-use planning.* Retrieved from https://www.academia.edu/36804378/A_Guide_for_Incorporating_Adaptation_to_Climate_Change_into_Landuse_Planning
[108] Lieske, D.J. (2012). *Visualizations and their role in communicating the risk of coastal flooding: a Tantramar case study.* Geospatial Modelling Lab, Mount Allison University. Retrieved from https://atlanticadaptation.ca/en/islandora/object/acasa%3A720

Getting started and first steps – Education comes from a wide variety of sources including community groups, non-governmental organizations, universities, schools, federal and provincial government departments, and municipalities. Working in **partnership** with others to provide education to the public will deliver a rounded education on coastal issues and climate change.

Education about sea level rise and climate change can be delivered through many approaches: community mapping exercises, workshops, school presentations, visualization tools, focus groups, environmental monitoring, facts sheets, traditional media, and social media. Information presented to residents should be specific to the local context and target audience, and use local examples and images.[109] These are some first steps to set up an education program:

- Contact experts for help developing material and understanding the local context. Experts may be staff with the provincial government, CLIMAtlantic, or environmental non-governmental organizations, or academics at a college or university.
- Define the target audience.
- Choose an approach that will reach that target audience.

Education programs example (regional)

Profile: Atlantic Canada and British Columbia	
Coast	Atlantic
Region	Atlantic Canada
Impact Concerns	Sea-level rise
Year	2017
Funding	Ecology Action Centre, Fisheries and Oceans Canada

Summary – The Educating Coastal Communities about Sea-level Rise Project was co-led by the Ecology Action Centre and Fisheries and Oceans Canada with the goal to inform coastal communities in Atlantic Canada and British Columbia about the need for planning for sea-level rise impacts. The education tool is a website through which communities learn about sea-level rise, provides tools and activities developed with current climate change information (e.g., assessing sea level rise impacts, identifying support capacity, and making a plan), and features an interactive map illustrating where sea-level rise impacts are happening.[110]

The project promotes community engagement, communication strategies, community-friendly adaptation tools, and collaboration as ways to improve sea-level rise communication in Canada. The website includes a guidance document that presents best practices for communication, resources to guide and enhance community conversation, and lessons learned from the work with coastal communities so far. The document includes advice and insights from specialists, noting the importance of including Indigenous voices in discussions, hosting interactive activities, providing simple actions for adaptation, not using fear, and considering the target audience. [111]

[109] Lieske, D.J. (2012). *Visualizations and their role in communicating the risk of coastal flooding: a Tantramar case study.* Geospatial Modelling Lab, Mount Allison University. Retrieved from https://atlanticadaptation.ca/en/islandora/object/acasa%3A720
[110] ECoAS Project. (2017). Educating Coastal Communities About Sea-level Rise. Retrieved from www.sealevelrise.ca
[111] ECoAS Project. (2017). Guidance Document. Retrieved from http://www.sealevelrise.ca/guidance-document.html

Figure 2.3 An interactive sea-level rise map allows coastal stakeholders across Canada to add locations and share their stories about sea water inundation, erosion, flooding and storm surge, saltwater intrusion, or work being done in their community related to sea-level rise (Ecology Action Centre[112])

Recommended resources

Educating Coastal Communities about Sea-level Rise Project: Resources to start sea level rise conversations in your community: http://www.sealevelrise.ca/toolkit.html

Sea-Level Rise Guidance Document: http://www.sealevelrise.ca/guidance-document.html

[112] ECoAS Project. (2018). Connect: Interactive Sea-level rise Impact Map [image]. Retrieved from http://www.sealevelrise.ca/map.html

3.1.4 Local committees

Adaptive response	Procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short-term
Planning level	municipal, community
Planning process and plan type	formal and informal; professional to volunteer; capacity building; community planning
Adapting to climate change	review periodically to ensure arrangements and expertise match changing needs for adaptation

Local committees can advise community municipal councils on matters related to climate change, coastal issues, and adaptation planning. There are two types of committees: a standing advisory committee and a specialty advisory committee. A standing advisory committee is a long-term committee, such as a planning advisory committee, that provides advice to council as part of regular council decision-making. A specialty advisory committee is an ad-hoc committee that provides advice to council on a particular topic.

Committees typically comprise citizens, usually as volunteers, staff, and often a member of council. Including a councillor on a committee improves communication between the committee and council and keeps council informed. Other committee members include experts on the topic covered by the committee. Local committees are a powerful tool for guiding decision-making in a community and therefore a powerful tool for climate change adaptation. Committees gather valuable information for decision-makers and support policies, plans and strategies for the community.

OPPORTUNITIES	CONSTRAINTS
• Informs decision-makers on the local context of issues such as climate change and coastal planning. • Incorporates local expertise into planning decisions.	• May be difficult to find local experts and volunteers. • Small communities have limited or no staff to support committees.

Getting started and first steps – In incorporated communities, such as municipalities, councils typically determine the need for a committee and establish one through municipal process. For incorporated communities, the process for forming committees is legislated by the provinces (see Legislative Context). Council can establish a committee for the set purpose of providing guidance on matters related to coastal planning and climate change impacts. Citizens and organizations can also form committees on their own to advance work in a community. The committees can advocate for coastal climate change adaptation, for example, and provide expertise to local and provincial decision-makers. Here are some first steps toward forming a committee:

- Identify a councillor or a community champion to advocate for the idea to council and/or within the community.
- For communities with a statutory community plan, amend the plan to include a strategy for forming a committee.

Local committee example (regional)

Profile: County of Colchester, town of Truro, and Millbrook First Nation	
Coast	Atlantic
Region	Bay of Fundy
Impact Concerns	Flooding
Community Type	First Nation, Town, and Municipality
Year	2012-present
Funding	Nova Scotia Flood Assessment Fund (Nova Scotia Environment and Climate Change Group), Town of Truro, County of Colchester

Summary – The County of Colchester, Town of Truro, and Millbrook First Nation formed a Joint Flood Advisory Committee to create a regional approach to flooding issues. The Town of Truro has experienced floods almost yearly since records began, and flooding has increased in frequency in recent years. The town has significant infrastructure in the floodplain, including schools, commercial development, long-term care residences, and private housing.

The Joint Flood Advisory Committee recognized the potential for even greater flood risk because of climate change and hired an engineering firm to complete a Flood Risk Study. The study identified potential projects, maintenance plans for flood management and mitigation, including changes to municipal policies and by-laws such as restricting development in the floodplain and enforcing flow control measures.[113] The Committee has also contributed funding for river stabilization and streambed deepening projects throughout the area.[114]

The Committee received financial support from the Flood Risk Infrastructure Investment Program provided by Nova Scotia Environment and Climate Change, which covered 50 percent of the cost for the Flood Risk study. The remaining budget was split between the Town of Truro and the County of Colchester.[115]

[113] CBCL Limited. (2017). *Flood Risk Study: Joint Flood Advisory Committee County of Colchester, Town of Truro, and Millbrook First Nation.* Retrieved from https://www.colchester.ca/public-works/1960-flood-risk-study-jfac/file
[114] Municipality of Colchester. (n.d.). *Flooding*. Retrieved from https://www.colchester.ca/flooding
[115] CBCL Limited. (2017). *Flood Risk Study: Joint Flood Advisory Committee County of Colchester, Town of Truro, and Millbrook First Nation.* Retrieved from https://www.colchester.ca/public-works/1960-flood-risk-study-jfac/file

3.1.5 Community engagement

Adaptive response	Procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short-term
Planning level	municipal, community
Planning process and plan type	formal and informal; professional to volunteer; capacity building; community and community-based planning
Adapting to climate change	renew visualizations as new climate change information and new technology become available; incorporate into plan reviews as part of community engagement

Engaging with community members is important for identifying community priorities, building partnerships and capacity, sharing knowledge, and gaining support for adaptation planning. Community engagement can be informal, providing an opportunity for community members to meet, share their concerns, and exchange information. It can also be directed and more structured, as part of formal planning processes and incorporating expert-led surveys, discussion groups, and workshops such as scenario-based planning exercises, design charrettes, and role-playing activities. Engagement that seeks diverse perspectives, using varied techniques and is widely accessible has become standard, best practice in community planning.

Figure 2.4 Community engagement session with community elders in Glenburnie-Birchy Head- Shoal Brook, Newfoundland and Labrador. The group discussed past weather events and changing weather patterns in the community (Manuel & Herring[1])

Indigenous engagement is important to gather unique Indigenous knowledge and perspectives. Without Indigenous perspectives being included into engagement processes, knowledge of how project impacts will result in impacts to activities, interests, and rights of Indigenous peoples may not be fully known. To have meaningful engagement it is important for Indigenous peoples to be a part of initial engagement processes instead of an afterthought to help to guide us to a better future, together.

OPPORTUNITIES	CONSTRAINTS
• Leads to more equitable planning outcomes. • Allows for knowledge sharing between experts, decision-makers, and community members.	• Can cause conflict within the community during engagement sessions. • Can be difficult to attract participants to engagement sessions.

• Empowers citizens by including them in making community decisions. • Can result in greater public support for adaptation planning.	

Getting started and first steps – Any level of government, group, or organization can set up community engagement. Here are some important first steps:

- Define the target audience and determine its level of understanding of climate change and coastal issues.
- Define engagement objectives and collect the coastal information that will be shared with participants.
- Establish an engagement strategy which corresponds with the audience and the project objectives.
- Consider follow-up sessions and ongoing communication strategies to maintain positive momentum.

Community engagement example (regional)

Profile: Halifax, Nova Scotia	
Coast	Atlantic
Region	Atlantic Ocean
Impact Concerns	Climate Change
Population	969,383 (2021 Census)
Community Type	Municipality
Year	2020
Funding	Halifax Regional Municipality

Summary – HalifACT 2050: Acting on Change Together is Halifax Regional Municipality's long-term action plan for climate adaptation and GHG emissions reduction. The project team led an in-person and online engagement strategy, involving hundreds of community members. The objectives were to raise awareness about climate change, have discussions about strategies, tools, and barriers to adaptation and mitigation, and build and strengthen networks and partnerships. The team hosted five large workshops and over 35 pop up sessions, presented at conferences, universities, and stakeholder organizations, and conducted online engagement through a social media campaign, an interactive map, and surveys.

The pop-up sessions were informal opportunities to raise awareness and gain insights into public opinion on community-level climate hazards and impacts. Staff displayed posters and banners and distributed postcards to residents with details about where residents could obtain information about the HalifACT project. Staff set up the sessions across the region in public spaces including libraries, parks, ferry terminals, community centres, and markets, and at community events.

A common theme across the pop-up sessions was a lack of understanding about climate change and the municipality's plan to address it. There was general support for action but some scepticism about the proposed timeframe for the plan. Community members had ideas for

climate change mitigation, e.g., transportation solutions and renewable energy generation, but had little to say about adaptation.

The project team also met with Joint Emergency Management Teams in three regions across the municipality as well as community members to identify and map hazards, vulnerabilities, and exposures to climate risks and describe their experiences during extreme weather events. Participants discussed vulnerable infrastructure, isolation and evacuation during an emergency, and the need for effective communication during emergencies. The community engagement showed there is a need for more education about climate adaptation. The extensive input shared by engagement participants influenced and strengthened the HalifACT 2050.[116]

Recommended resources

HalifACT 2050: https://www.halifax.ca/sites/default/files/documents/about-the-city/energy-environment/HRM_HaliFACT_vNew%20Logo_.pdf

HalifACT 2050 Community Engagement Report: https://cdn.halifax.ca/sites/default/files/documents/about-the-city/energy-environment/Community%20Engagement%20Report_0.pdf

[116] Halifax Regional Municipality. (2020). HalifACT 2050: Acting on Climate Together: Community Engagement Report. Retrieved from: https://cdn.halifax.ca/sites/default/files/documents/about-the-city/energy-environment/Community%20Engagement%20Report_0.pdf

3.1.6 Community asset mapping

Adaptive response	Procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short-term
Planning level	municipal, community
Planning process and plan type	formal and informal; professional to volunteer; capacity building; community planning and community–based planning
Adapting to climate change	renew mapping as community values change; incorporate into plan reviews as part of community engagement

Community asset mapping is a positive approach to adaptation planning. The tool helps communities understand their resources and assets rather than focusing on their shortfalls. Assets can take many forms: the knowledge and skills in the community; civic, social, and business organizations; government services; valued buildings, structures, and spaces; and natural resources. Community asset mapping identifies the existing assets a community has for dealing with issues or challenges such as climate change adaptation. Asset mapping can also be scaled down to focus on a certain type, or types, of assets.

Community members list and map the assets of the community. The process of listing and mapping assets increases communication between people, which further strengthens a community's adaptive capacity.[117] The information collected through community asset mapping can be used to guide climate change adaptation planning. Mapping will also highlight which assets are at risk due to coastal hazards.

OPPORTUNITIES	CONSTRAINTS
• Informs a community of its potential to Act on an issue and its assets available to do so. • Uncovers ways that a community can adapt without the need for outside resources. • Shows which assets are located in potentially hazardous areas. • Informs decision-makers about the desires of the community.	• Does not involve direct action to protect a community from its coastal hazards.

Getting started and first steps – Any community can carry out community asset mapping. Mapping can be a collective exercise of many people coming together, individuals can take on the task to compile and map information on behalf of the community, or people can participate individually and remotely through web-based technology. Here are first steps for community asset mapping:

- Use community engagement tools including surveys, interviews, workshops, and telephone calls to collect information about assets. Phone directories, bulletin boards, businesses, community groups, and organizations are all sources of information about community assets.

[117] Heaven, C. (2013). Developing a plan for assessing local needs and resources. Retrieved from https://ctb.ku.edu/en/table-of-contents/assessment/assessing-community-needs-and-resources/develop-a-plan/main

- Map assets using paper maps or computer mapping software and on-line mapping.
- Make maps publicly available to provide knowledge to community members and decision-makers about assets they may not have been aware of, and about the relationship between valued assets and coastal processes.[118]

Community asset mapping example (regional)

Profile: Municipality of the District of Lunenburg, Nova Scotia	
Coast	Atlantic
Region	South Shore
Impact Concerns	Assets at risk of coastal flooding
Population	25,545 (2021 Census)
Community Type	District Municipality
Project Area	Over 600 km of coastline
Year	2012
Funding	Atlantic Climate Adaptation Solutions

Summary – Residents of the Municipality of the District of Lunenburg, Nova Scotia, participated in community asset mapping to identify valued assets at risk of climate change impacts. The mapping supports proactive adaptation planning: the community can prioritize actions and resources for managing assets at risk. The project focused on identifying assets that are important for community life and enjoyment: social assets. Residents participated in mapping workshops or stopped by public engagement booths set up at key locations in the Municipality. They identified 284 social assets including structures, beaches, trails, parks, boating and fishing areas, and the coastline itself. Mapping of sea level rise and storm surge scenarios along the municipal coastline showed that 148 of the identified assets could be vulnerable to flooding by 2100. This database and mapping of at-risk social assets will inform climate change adaptation planning for the Municipality.[119]

Partners – The project was a partnership of Dalhousie University, the Municipality of the District of Lunenburg, and residents of Lunenburg, funded by the Nova Scotia Department of the Environment through the Atlantic Climate Adaptation Solutions Association.[120]

[118] Dorfman, D. (1998). Strengthening community education: the basis for sustainable renewal - Mapping community assets workbook. Retrieved from https://eric.ed.gov/?id=ED426499
[119] Cochran, M., Wollenburg, Z., Rapaport, E., Manuel, P. (2012). Municipality of the District of Lunenburg: a case study in climate change adaptation. Part 2 – Section 3: social asset identification and climate change impact risk mapping in the District of Lunenburg, Nova Scotia. Atlantic Climate Adaptation Solutions Association and Dalhousie University. Retrieved from https://atlanticadaptation.ca/en/islandora/object/acasa%3A546
[120] Ibid.

Figure 2.5 Social assets identified around the areas of petite riviere, green bay, and broad cove in the district of Lunenburg. Social assets are orange, dark green indicates the current water level, and light green along the coast indicates a 2025 sea level.

Recommended resources

Community asset mapping website: Describes steps to be taken for community asset mapping: https://ctb.ku.edu/en/Table-of-contents/assessment/assessing-community-needs-and-resources/develop-a-plan/main

Community asset mapping workbook: Walk through of community asset workshop exercises: https://eric.ed.gov/?id=ED426499

3.1.7 Visualization

Adaptive response	Procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short-term
Planning level	municipal, community
Planning process and plan type	formal and informal; professional; capacity building; community planning
Adapting to climate change	renew visualizations as new climate change information and new technology become available; incorporate into plan reviews as part of community engagement

Images help to communicate information about climate change and coastal impacts to a broad audience. The complexity of climate change and its effects on coastal areas can be challenging to communicate. The impacts are also often in the future and not immediately noticeable. The combination of complexity and time makes it difficult for decision-makers and community members to understand the climate change impacts that their coastal community faces. Visualization is a powerful communication tool for supporting successful adaptation planning in coastal areas.

There are many ways to show climate change impacts and adaptation, including flooding and erosion maps, photographs from past climate events, computer simulation models, videos, signage, and creative art. This visual information can be communicated through community engagement workshops and presentations.

Computer simulation models have become an influential means through which climate change scenarios are made more concrete in the minds of community members and decision-makers.[121] Better understanding of climate change impacts and their implications supports adaptation planning. *Coastal Impacts Visualization Environment (CLIVE)* is a visualization tool developed through the University of Prince Edward Island Climate Lab and the Spatial Interface Lab at Simon Fraser University. CLIVE uses computer game technology to show future sea level rise and erosion for Prince Edward Island coastlines. It communicates what land uses and infrastructure are at risk. The team has used the tool to teach elementary school students about climate change, help farmers with drainage issues, make decisions about where to replenish beach sand in Los Angeles, and measure changing levels in the Great Lakes.[122]

[121] Knapp, D. (2011). Climate communication for local governments: five guidelines to help city and county staff and elected officials message climate solutions, science, and local impacts. *ICLEI-Local Governments for Sustainability USA*. Retrieved from https://climateaccess.org/system/files/ICLEI_Climate%20Communication%20for%20Local%20Governments.pdf

[122] Danielle, K. (2021). UPEI Climate Lab tracks growing effects of eroding PEI shoreline using a fleet of drones, and they'll give you control of CLIVE to see for yourself Retrieved from https://blogs.unb.ca/afrc-research-highlights/2021/08/upei-climate-lab-profile.php

Figure 2.6 Maintaining a photographic record of the impacts of storm surge and flooding events is an effective way to communicate the need for coastal adaptation (Don Jardine, University of Prince Edward Island)

OPPORTUNITIES	CONSTRAINTS
• Informs community members of the local impacts of climate change and promotes the need to adapt in coastal areas. This can lead to community supported planning outcomes. • Accessible and realistic due to advances in computer technology.	• Focuses on the negative repercussions of climate change and coastal impacts which can leave community members feeling powerless. • Requires a high level of technology and technical skill to develop.

Getting started and first steps – Visualizing climate change and coastal adaptation planning is usually carried out by people with particular skills and/or access to technology, including academics, multi-media consultants, people working in community organizations, or people in government agencies. Visual artists also produce climate change visualizations. Here are some first steps toward using visualization:

Partner with colleges and universities to develop visualizations of local climate change scenarios. Some non-governmental organizations also work with visualization and can be partners for completing visioning projects.

- Develop a community engagement strategy for sharing visualizations of climate change and its impacts. A strategy ensures that people understand the context of the images and, for future scenarios, the time frame. The strategy should be an opportunity to discuss the future and talk about how to manage impacts through adaptation planning.

Figure2.7 Image from CLIVE showing expected erosion on Lennox Island (UPEI Climate Lab)

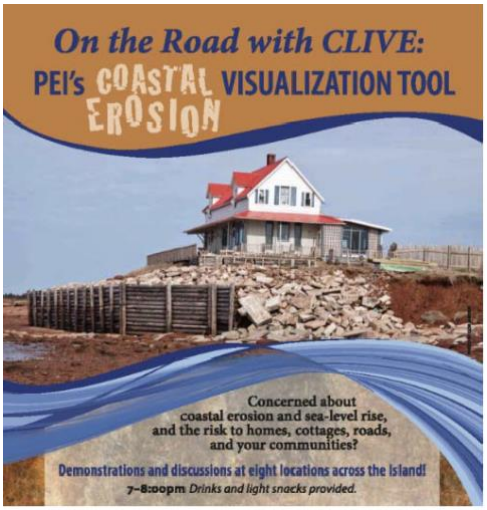

Figure 2.8 Poster advertising a Community Engagement Tour of UPEI Climate Lab's Coastal Impacts Visualization Environment (Clive) Tool.[123]

Visualization example (regional)

Profile: Mahone Bay, Nova Scotia	
Coast	Atlantic
Region	South Shore
Impact Concerns	Flooding and erosion
Population	1,064 (2021 Census)
Community Type	Town
Year	2021
Funding	Not sure

Summary – 3D Wave Design is a Mi'kmaq-owned animation and communication company that has developed 3D modelling and mapping service in collaboration with Nova Scotia Community College's Centre for Geographic Sciences to communicate the impacts of climate change.[124] The company created a 3D interactive map of the Town of Mahone Bay's waterfront to show the risks of flooding. The model allows users to input different factors, such as storm surge and tide height, to simulate the distance water could rise. It also gives the option to add a living shoreline so users can see how it would help to protect the coast. The tool is designed to "eliminate the technology and scientific language barrier associated with raw data and research reports"[125] and can be used when communicating with the public, planners, or decision makers. The goal for

[123] University of Prince Edward Island Climate Lab. (2014). *On the road with CLIVE: PEI's coastal erosion visualization tool* [image]. Retrieved from https://projects.upei.ca/climate/2014/06/23/on-the-road-with-clive-peis-coastal-erosion-visualization-tool/
[124] 3D Wave Design. (n.d.) *About: What we do*. Retrieved from https://3dwavedesign.com/about/
[125] 3D Wave Design. (n.d). *Interactive 3D Mapping: Observe. Plan. Adapt.* Retrieved from: https://3dwavedesign.com/3d-mapping/

the project is to not only help communicate ideas to the public, but also generate interest in nature-based solutions at the coast.[126]

The 3D Wave Design modelling is one component of the Living Shorelines Project in Mahone Bay. The project partners are the Town, Coastal Action, CBCL Engineering and Environmental Design and Consulting Services, TransCoastal Adaptations: Centre for Nature-Based Solutions, Saint Mary's University, and CB Wetlands & Environmental Specialists. The living shoreline was completed in the summer of 2022 with the help of volunteers and community members. Research measuring the impacts of the vegetated bank and tidal marsh is ongoing.[127]

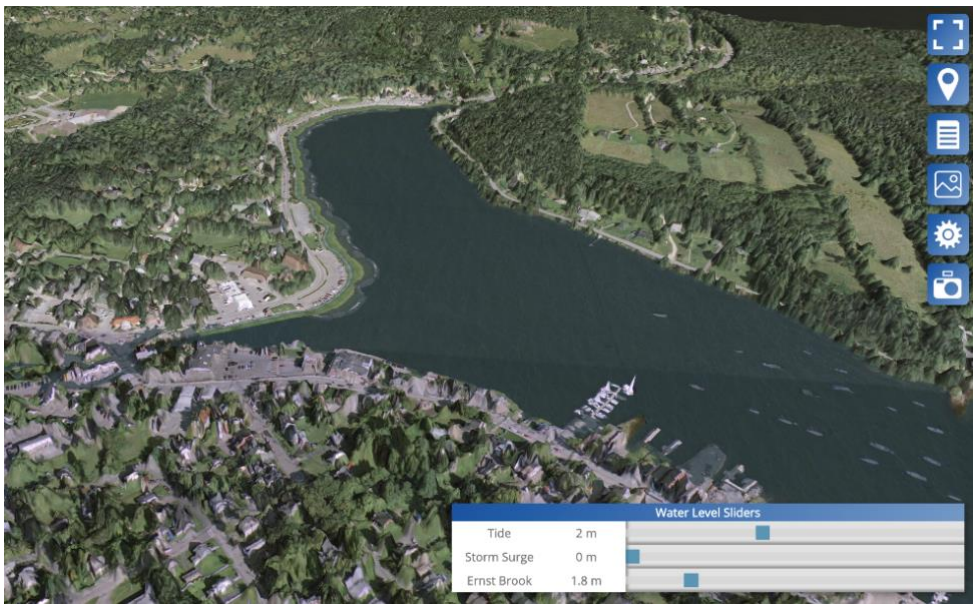

Figure 2.9 Interactive Flood Map, Mahone Bay 3D Wave Design (3D Wave Design[128])

Recommended resources

Climate Communication for Local Governments: https://icleicanada.org/resources/#

Coastal Impacts Visualization Environment (CLIVE description and video): https://projects.upei.ca/climate/2014/10/31/meet-clive/

Mahone Bay Interactive Flood Map: https://www.mahonebaylivingshoreline.com/

[126] Smith, E. (2021). This company Is imagining the future of flooding in Mahone Bay. CBC News. Retrieved from: https://www.cbc.ca/news/canada/nova-scotia/3d-wave-design-barry-and-noah-stevens-mahone-bay-climate-change-risk-1.6013397
[127] Coastal Action. (2022). Project Update. Retrieved from https://www.mahonebaylivingshoreline.com/updates
[128] 3D Wave Design. (n.d.). Mahone Bay Living Shoreline [image]. Retrieved from https://www.mahonebaylivingshoreline.com/

3.1.8 Scenario planning

Adaptive response	Procedural approach
Influence time frame	medium- to long-term
Implementation time-frame	short-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal; professional; capacity building; scenario and strategic planning
Adapting to climate change	renew scenarios as new climate change information becomes available

Scenario planning is a strategic planning tool that accounts for multiple, plausible scenarios for the future of a community. It involves identifying known drivers, or causes, of change. In the context of coastal climate change adaptation planning, drivers could include sea level rise and demographic changes in a community. Scenario planning involves acknowledging uncertainties about future projections beyond a community's control. Uncertainties may include how rainfall will change, the elevation of sea level rise, the timing of storms, or changes in society or technology. After identifying drivers (or causes) and uncertainties, a range of plausible scenarios are developed. The range of scenarios guide planners and decision-makers in choosing adaptation options.[129]

Scenario planning requires data collection and mapping of potential climate change scenarios and demographic projections of a community. It requires a discussion to understand drivers and uncertainty, which can include community members through education programs and community engagement.

OPPORTUNITIES	CONSTRAINTS
• Takes multiple drivers and uncertainties about the future of a community into account. • Brings groups together to discuss potential future scenarios for the community. • Engages community members in the planning process.	• Can be difficult to identify all uncertainties and some may be missed in the scenario planning process. • Can be difficult to develop scenarios that are more complex than best and worst-case scenarios.[130]

Getting started and first steps – Community groups and citizens can use scenario planning as a brainstorming activity. **Community engagement** will help to identify drivers and uncertainties of climate change. A **local committee** can also carry out a scenario planning process or

[129] Scenarios to Strategy Inc. (n.d.). The scenario planning process. Retrieved from http://scenarios2strategy.com/docs/planning.html
[130] Moore, S., Seavy, N.E., & Gerhart, M. (2013). Scenario planning for climate change adaptation: A guidance document for resource managers. Retrieved from https://pointblue.org/wp-content/uploads/2018/06/CCScenarioPlanning_12263_Moore2013.pdf

organize community engagement sessions. **Partnerships** with academics and government staff can also help to strengthen scenario planning as they can provide expertise and access to information on climate change scenarios. Here are some first steps for organizing a scenario planning event:

- Invite key decision makers, experts, and engaged community members to the session.
- Identify an issue or question to address.
- Develop four different, possible future scenarios to explore during discussions.

Scenario planning example (national)

Profile: Delta, British Columbia	
Coast	Pacific
Region	Strait of Georgia
Impact Concerns	Sea-level rise and storm surge
Population	108,455 (2021 Census)
Community Type	District Municipality
Project Area	180.20km^2
Year	2009-2012
Funding	Natural Resources Canada

Summary – The Delta-RAC Sea Level Rise Adaptation Visioning Study was a partnership between the Collaborative for Advanced Landscape Planning (CALP) of the University of British Columbia, the Corporation of Delta, and the BC Ministry of Environment. The project was part of the British Columbia Regional Adaptation Collaborative (RAC) project to address climate change adaptation across the province. Delta is a low-lying municipality in the Fraser River delta that is extensively protected by dykes and sea walls and is highly vulnerable to sea level rise. The goal of the project was to create a range of adaptation scenarios to inform future climate change planning in the municipality of Delta using a process developed by CALP called the Local Climate Change Visioning (LCCV) Process. This process is adaptable for any local government working on climate change visioning.

The project developers built the Delta Scenarios using an evaluation framework, a literature review, internal discussions, and workshops with staff. The project team selected criteria that were relevant to Delta communities and created adaptation scenarios. The scenarios reflect different approaches to protecting against sea-level rise, including enhancing or reducing existing protection infrastructure, like seawalls and dykes, introducing new armouring, or using softer intervention approaches. The scenarios explore risks, planning options, and possible outcomes while accounting for factors such as uncertainty, surprise, and cultural values, and are based on quantitative and qualitative data. Scenarios do not express probability and precision, but instead show extreme cases (e.g., do nothing, or do everything) so that the benefits and weaknesses of each approach are obvious. Policy and planning would likely include elements from several scenarios.

The four Adaptation Scenarios explored in the Delta-RAC study were Hold the Line, Reinforce and Reclaim, Managed Retreat, and Build Up.

- Hold the Line proposes to upgrade Delta's dyke and seawall infrastructure,
- Reinforce and Reclaim proposes to create barrier islands as well as strengthen and raise the dyke infrastructure,
- Managed Retreat leaves existing infrastructure as is, unless to protect heavily populated areas, and land uses and infrastructure in unprotected areas would be gradually relocated to higher- ground, and
- Build Up leaves existing seawall and dyke infrastructure as it is and instead focuses on raising buildings so that they are able to accommodate occasional inundation.

Each Scenario includes detailed visualizations, environmental, social, and economic implications, and precedents. The final policy report presents overarching recommendations for advancing adaptation in Delta.[131]

Figure 2.10 Four adaptation scenarios used in Delta[131]

[131] Barron, S., Flanders, D., Pond, E., Tatebe, K., Canete, G., Sheppard, S., Carmichael, J., Owen, S. M. (2012). Delta-RAC Sea Level Rise Adaptation Visioning Study: Policy Report. Collaborative for Advanced Landscape Planning. Retrieved from https://www.fraserbasin.bc.ca/_Library/CCAQ_BCRAC/bcrac_delta_visioning-policy_4d.pdf

3.1.9 Data gathering and mapping and vulnerability assessments

Adaptive response	Procedural approach
Influence time frame	short to long-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal and semi-informal; professional to volunteer; capacity building; community planning; environmental planning
Adapting to climate change	renew mapping as new climate change information becomes available and as coastal environment and land uses change

Gathering and mapping data and information on coastal issues is an important first step for coastal climate change adaptation. Coastal information, especially in map form, is critical for the planning process. Mapped information is also valuable as an education tool for decision-makers and citizens. There are several types of important information that communities can gather: locations of potential hazards; floodplains and flood zones; and land use and type classifications. Gathering these types of data and mapping them shows what a community must consider when identifying appropriate adaptation measures.

Hazard and Risk Mapping – For flooding, important hazard information includes areas that have flooded in the past and that may flood in the future. For erosion, important hazard information includes areas at risk of erosion and erosion rates along the community's coast over time. Information on local sea level rise projections will help a community understand future risks of flooding and erosion.

Floodplain Mapping – Floodplain and flood hazard maps are essential tools for land use planning in flood prone areas, including low-lying coastal areas that are now experiencing sea level rise caused by climate change. Flood mapping is also an important tool for community and decision-maker education. From 1975 to 1996 Environment Canada ran the Flood Damage Reduction Program in collaboration with the provincial and territorial governments. This Program produced thousands of kilometres of flood hazard mapping across the country. In 2017, Public Safety Canada introduced the National Floodplain Management Framework building on the previous flood hazard mapping program, updating the flood hazard maps, and setting national standards for managing flood hazards.[132] This Framework is part of the Federal Flood Mapping Guideline Series that also includes LiDAR Data Acquisition guidelines, case studies, geomatics guidelines, and flood damage estimation guidelines for infrastructure.[133] Provincial governments across the region have undertaken flood mapping. Newfoundland and Labrador created flood risk maps based on flood events associated with the 1:20 and 1:100 annual exceedance probability and have updated their mapping to incorporate climate change projections.[134] Nova Scotia created data layers such as coastal flood vulnerability, and seawater intrusion vulnerability to assist municipalities with the preparation of their Municipal Climate

[132] MMM Group Limited. (2014). National floodplain mapping assessment – final report. Retrieved from https://www.slideshare.net/glennmcgillivray/national-floodplain-mapping-assessment
[133] Public Safety Canada. (2022). Federal Flood Mapping Guidelines Series. Retrieved from https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/ndmp/fldpln-mppng-en.aspx
[134] Newfoundland and Labrador. (n.d.) Flood Risk Mapping in Newfoundland & Labrador. Retrieved from https://www.gov.nl.ca/ecc/files/waterres-flooding-frms-brochure.pdf

Change Action Plans.[135] New Brunswick's Flood Hazard Maps allow users to view possible climate change impacts up to the year 2100.[136] Prince Edward Island launched an online mapping tool in 2021 that shows the province's floodplains for 2020, 2050, and 2100.[137]

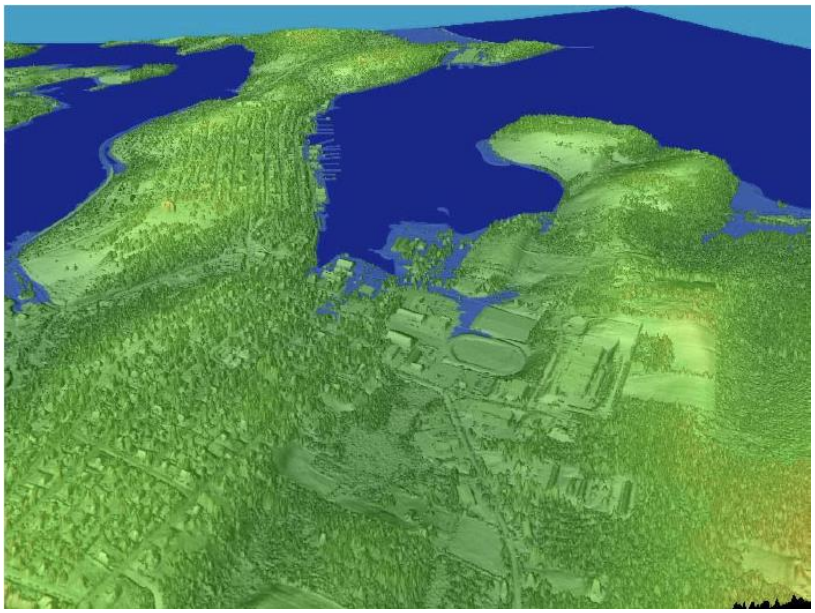

Figure 2.11 Sea level rise mapping for the town of Lunenburg. The light blue shows the area at risk of sea level rise inundation by 2100. Flood risk mapping was done as a part of an Atlantic Climate Adaptation Solutions Association project in 2011 (Webster, T. et. al)

Vulnerability Assessment – Vulnerability assessments are one way to interpret hazards and risks within a community and the land uses, activities and infrastructure that could be impacted. Hazard, vulnerability, and risk assessment allows a community to set priorities for reducing risks. One model, the *Hazard Risk Vulnerability Assessment*, uses a table to organize the interpretation of hazards (see image below) based on likeliness of occurrence and the severity of the hazard. The combination of occurrence and severity results in a hazard rating of low, medium, or high. Hazards rated as high and medium receive priority for action. This approach was used by Nova Scotia municipalities in developing their *Municipal Climate Change Action Plans*.

[135] Nova Scotia Department of Natural Resources and Renewables. (n.d.) Municipal Climate Change Action Plans - Data Sources. Retrieved from https://novascotia.ca/natr/meb/environmental/mccap.asp
[136] GeoNB (n.d.). New Brunswick Flood Hazard Maps. Retrieved from https://geonb.snb.ca/flood_hazard_maps/index.html
[137] Prince Edward Island. (2021). Government launches new online coastal flood maps to help Islanders adapt to climate change. Retrieved from https://www.princeedwardisland.ca/en/news/government-launches-new-online-coastal-flood-maps-to-help-islanders-adapt-to-climate-change

		Severity of Hazard				
		Negligible	Slight	Moderate	High	Very High
Likelihood of Occurrence	Very unlikely	Low	Low	Low	Low	Medium
	Unlikely	Low	Low	Low	Medium	Medium
	Possible	Low	Low	Medium	Medium	High
	Likely	Low	Medium	Medium	High	High
	Very likely	Low	Medium	High	High	High

Figure 2.12 One model for ranking risks involves using a table to compare the severity of a hazard and the likeliness of that hazard occurring. Hazards are rated as low, medium, or high.

Land Classification Mapping – Coastal land classification involves evaluating and defining coastal features and grouping them according to common characteristics. Coastal classification can inform zoning and determine acceptable land uses according to coastal features. Coastal classification can help to target coastal climate change adaptation by tailoring it according to coastal characteristics. Land classification simplifies land use planning at the local level, while also serving as an educational tool for understanding coastal processes. Land classification can also be used for resource protection and conservation, managing hazards, and environmental education.[138]

The *Best Practices Manual for Coastal Louisiana* was developed in 2013. The Manual is a tool to aid local planning authorities and developers in establishing sustainable land use practices, including climate change adaptation, by paying attention to the characteristics of different parts of the coast.

Land classification and mapping is usually an activity of higher levels of government. Nevertheless, municipalities and local stakeholders can contribute to the process by providing valuable first-hand insights and assisting with data collection.

OPPORTUNITIES	CONSTRAINTS
• Informs other land use planning tools. • Identifies coastal land-forms and conditions that could become hazardous if development occurs in these areas. • Simplifies decision-making in coastal areas. • Educates citizens and decision-makers about the coastal landscape, which in turn supports informed decision-making.	• Can be costly to access scientific information and risk analysis. • Does not directly reduce coastal hazards. • Data requirements are extensive. • Requires expertise to gather and integrate information used in land classification.

[138] Appenbrick, N., Bolen, G., Manning-Broome, C., Deshotels, M., DUbinin, J., Fregonese, J., Gabbe, C.J., Koole, S., Logiudice, S., Malbrough, O., Meffert, D., Milazzo, J., Pacello, T., & Tharp, J. (2013). Best practices manual for development in coastal Louisiana. Centre for Planning Excellence. Retrieved from https://www.cpex.org/best-practices-manual-coastal

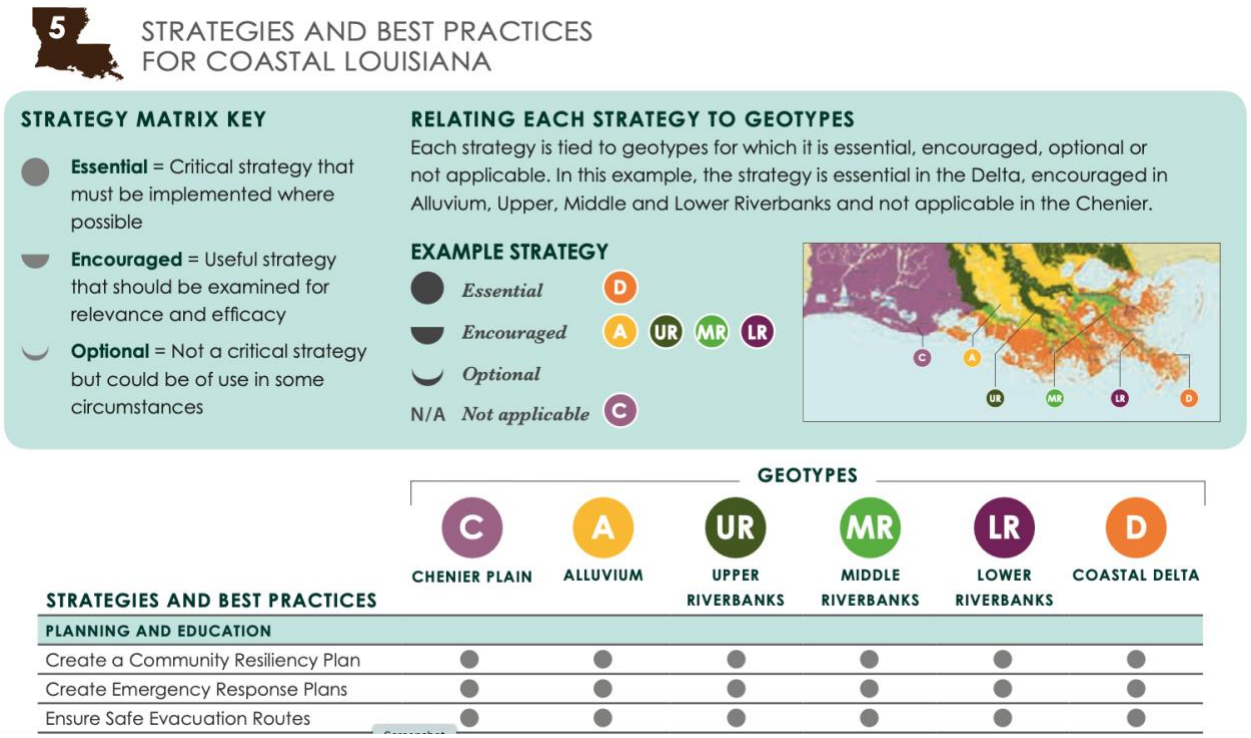

Figure 2.13 Coastal geotypes have been mapped in Louisiana along with adaptation strategies for each geotype (Centre for Planning Excellence[139])

Getting started and first steps – Gathering information is an important first step towards climate change adaptation. Non-governmental organizations, municipalities, federal and provincial government departments, universities and colleges, and community groups and individuals are all sources of information. Funding is available through a wide variety of programs to support information gathering, and partnerships can unlock funding from some programs and make data available between partners. Information specific to a local area may be more difficult to obtain through outside sources and collecting site-specific information can require special data collection projects.

Historic information on climate events, flooding, and erosion informs how these issues are likely to affect an area in the future. For example, areas that suffered damage in a previous storm event are likely to suffer damage in future storm events. Mapping the information visualizes areas at risk of coastal hazards.

Local community members are a valuable source of information. They hold a wealth of knowledge about coastal processes and past events. Gathering their knowledge through community engagement workshops, mapping exercises, and citizen science initiatives provides insight about local coastal issues. Engaging community members with information gathering involves them in adaptation planning and the decision-making process.

Other sources of information are compiled through scientific techniques including LiDAR mapping and, Geographic Information Systems mapping and analysis. These types of information illustrate, through maps and diagrams, where problems are likely to occur in the future due to climate change and sea level rise.

[139] Ibid.

Many sources gather and fund information including community groups, municipalities, federal and provincial government departments, and universities and colleges. Information specific to a local area may be more difficult to obtain through outside sources and collecting site-specific information can require special data collection projects.

Data gathering and mapping and vulnerability assessments (regional)

Profile: Sainte-Marie-Saint-Raphaël, New Brunswick	
Coast	Atlantic
Region	Gulf of St. Lawrence
Impact Concerns	Flooding and Erosion
Population	820 (2021 Census)
Community Type	Village
Project Area	15.90km^2
Year	2012-2019
Funding	N/A

Summary – Projet Adaptation PA (Peninsule Acadienne) is an initiative coordinated by Valores (formerly the Coastal Zones Research Institute Inc.) under a cooperation agreement with the Acadian Peninsula Forum of Mayors.[140] Projet Adaptation PA identifies and implements measures to reduce current and future coastal erosion and flooding impacts in communities along the Acadian Peninsula in New Brunswick. Communities go through a rigorous process that provides background for setting up local adaptation plans. The process includes the development of scenarios and risks (damage risks, risks to human health), maps and zoning (delineate areas at risk), priorities and potential strategies (identify and prioritize elements at stake within risk areas), followed by evaluation and strategy selection (further studies for adaptation measures under consideration).[141]

The Village of Sainte-Marie-Saint-Raphaël is a small fishing community located on an island in north-east New Brunswick that is experiencing significant coastal erosion. The Village developed an adaptation plan in 2019 following this process of data gathering, mapping, and analysis. University, industry, and provincial government department partners worked with the community and completed erosion and flood risk analysis. An internal committee of the town council completed a cost-benefit analysis of adaptation strategies, an evaluation of relocation as an adaptation strategy, and a planning exercise for preliminary strategy selection. Preliminary adaptation strategies included amending the municipal development plan to include a retreat zone where no construction would be permitted, regulating the use of protective structures, creating a registry of locations that owners at immediate risk of erosion can move to, and educating people in the community about flood and erosion risks and measures to limit dangers. The final plan includes action items regarding amendments to the municipal development plan to include a setback zone, prohibiting new construction, and regulating the use of protective structures, as well as details about implementation.[142]

[140] Project Adaptation PA. (n.d.). Valores – Project coordinator. Retrieved from https://adaptationpa.ca/en/adaptation-pa/valores-project-coordinator
[141] Project Adaptation PA. (n.d.). Climate Change is Affecting our Lives: We must adapt now. Retrieved from https://adaptationpa.ca/en/
[142] Project Adaptation PA. (2019). Sainte-Marie-Saint-Raphaël. Retrieved from https://adaptationpa.ca/en/secteur-lameque-miscou/ste-marie-st-raphael

Recommended resources

Federal Flood Mapping Guidelines Series: https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/ndmp/fldpln-mppng-en.aspx

Downloadable hazard risk vulnerability assessment toolkit from Emergency Management British Columbia: https://www2.gov.bc.ca/gov/content/safety/emergency-management/local-emergency-programs/assessment-analysis/hrva-guides-resources

Best practices manual for development in coastal Louisiana: https://www.cpex.org/best-practices-manual-coastal

3.2 Policy and Planning Framework Tools

3.2.1 Emergency preparedness and/or management plan

Adaptive response	Procedural approach
Influence time frame	short to medium-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal; professional; emergency planning
Adapting to climate change	update with new climate change information and environment and land use changes during mandatory plan reviews and plan renewal

Communities develop emergency preparedness and management plans to prepare for and respond to emergencies and disasters. In coastal areas emergency preparedness and management involves identifying risky coastal conditions and vulnerable places and communicating this information to citizens. It involves using this information for evacuation planning and coordinating response to emergency events. Emergency preparedness uses planning strategies and regulations designed to lessen impacts on communities. Emergency management plans set out the steps to reduce damage from disasters and steps for response after a disaster occurs.[143]

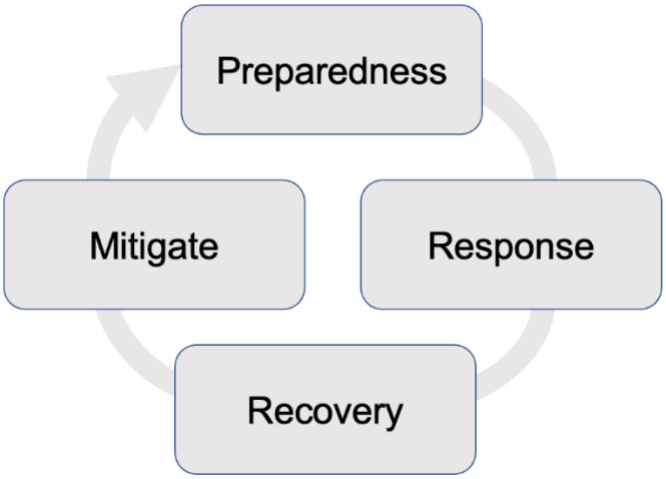

Figure 2.14 Four steps for emergency management (image created from steps outlined by Environment and Climate Change Canada[144])

[143] Tampa Bay Regional Planning Council. (2022). *Tampa Bay Disaster Planning Guide: Disaster preparedness tips and recovery resources.* Retrieved from https://www.tbrpc.org/dpg-storymap/
[144] Environment Canada. (2013). Emergency management basics. Retrieved from https://www.ec.gc.ca/ouragans-hurricanes/default.asp?lang=En&n=31DADDF5-1

OPPORTUNITIES	CONSTRAINTS
• Increases public safety during emergency events and disasters. • Prevents damage and saves on the coast of post-disaster response. • Improves coordination between public agencies.	• Requires an effective communication strategy in order to function. • Needs to be reviewed and re-communicated to the public often to remain current.

Getting started and first steps – Every community in Atlantic Canada has emergency management measures in place for their area. Emergency management plans at the federal and provincial level cover land in all local communities. Municipalities are also enabled, or required, by provinces to develop local or regional emergency management plans. Neighbouring communities can coordinate to develop regional emergency management plans. For example, the six municipalities in Pictou County, Nova Scotia, worked together to develop a regional Inter-municipal Emergency Services Agreement, and created a Regional Emergency Measures Organization in 2003. Each municipality revised their emergency measures by-laws to support the new agreement and then developed one Emergency Response Plan for the six municipalities.[145]

Here are some first steps toward using this tool for climate change adaptation at the coast:

- Become familiar with emergency plans in place for the area.
- Update existing plans to include measures to deal with coastal risks, especially as they are increasing with climate change.
- For communities without a local or regional emergency management plan, look to other plans in the area as potential models for a new plan.
- Work with the local and provincial emergency management organization. Each of the Atlantic Provinces has developed guides to assist municipalities in creating an emergency management plan. See the links below under “Recommended resources”.

Emergency preparedness and/or management plan example (regional)

Profile: Colchester County, Nova Scotia	
Coast	Atlantic
Region	Northumberland Strait, Bay of Fundy
Impact Concerns	Storm events and flooding
Population	51,476 (2021 Census)
Community Type	County
Project Area	3628km^2
Year	2021
Funding	Part of the planning process

[145] Town of New Glasgow. (2014). Emergency measures. Retrieved from https://www.newglasgow.ca/index.php/departments/emergency-measures

Summary – The municipalities in Colchester County, Nova Scotia, including the Municipality of Colchester, Town of Truro, and Town of Stewiacke use a coordinated, regional approach for their disaster and emergency responses to share essential information with stakeholders, the community, and the media. The Regional Emergency Management Plan includes regional hazard analysis for hurricanes, blizzards, ice storms, power failures, floods, and highway closures. The Plan presents information for evacuation alerting and sheltering, the evacuation process, and potential evacuation routes.[146]

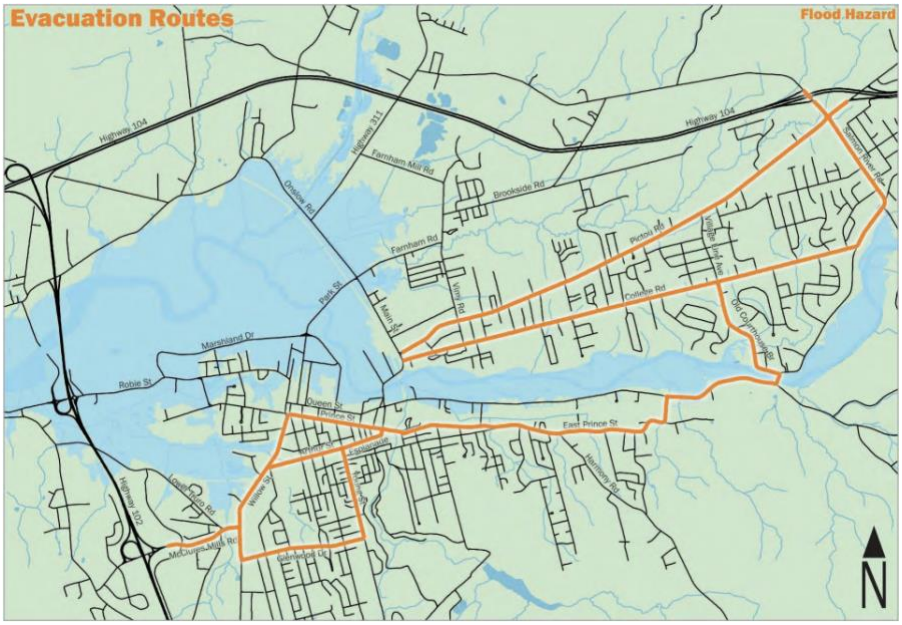

Figure 2.15 Potential evacuation routes – Central Colchester flood risk areas (Colchester County[147])

Recommended resources

Tampa Bay Regional Planning Council Disaster Planning Guide: https://www.tbrpc.org/disaster-planning-guide/

Municipal Emergency Management Program Guide from the Prince Edward Island Office of Public Safety: http://www.gov.pe.ca/photos/original/EMO_MUN_EMG.pdf

Community Event Emergency Response Planning guide from the Emergency Management Office Nova Scotia: https://beta.novascotia.ca/sites/default/files/documents/1-1417/community-event-emergency-response-planning-en.pdf

Municipal Emergency Response Plan guide from the New Brunswick Emergency Measures Organization: https://www2.gnb.ca/content/dam/gnb/Departments/ps-sp/pdf/emo/Municipal-e.pdf

Newfoundland and Labrador Emergency Management Plan Template: https://www.gov.nl.ca/jps/files/MEMP-template-Version-1.1-November-2020.pdf

[146] Colchester County. (2021). Regional Emergency Management Plan. Retrieved from https://www.colchester.ca/municipal-services/1777-colchester-regional-emergency-management-plan-feb-2017/file
[147] Ibid.

3.2.2 Statutory community plan (municipal planning strategy, municipal plan, official plan, rural plan, regional plan)

Adaptive response	Avoid, retreat, accommodate, protect, procedural
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	Regional, municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes during mandatory plan reviews and plan renewal

A statutory community plan is a legislative tool that presents a vision for the future of a community and strategies for achieving that vision and dealing with challenges. Official community planning is enabled through provincial legislation. The plan guides other planning documents and related by-laws developed by a municipality: it is the tool to put land use planning into action. A statutory community plan guides land use planning and can include a generalized future land use map, a land use zoning by-law, and a strategy for establishing setbacks from hazardous or environmentally sensitive areas through the municipality's land use by-law. Statutory community plans must abide by policies and regulations of the provincial government. A statutory community plan is a powerful tool for climate change adaptation planning.

OPPORTUNITIES	CONSTRAINTS
• Informs other municipal plans. • Can be used to plan and manage land use in a municipality. • Can be used to present the objectives of a municipality for dealing with coastal and climate change adaptation. • Can be amended to incorporate coastal adaptation policies and strategies during a regular review. • Reviewed periodically as part of the planning process.	• Subject to political controversy and compromise during plan development or amendments.

Getting started and first steps – The first step is for council and citizens to acknowledge the need for a plan to better manage the affairs of a municipality, including land use planning. Here are steps toward building a community plan:

- Begin citizen engagement immediately and be inclusive of all interests. An inclusive community engagement strategy is crucial to ensure citizen participation in developing the plan and eventual acceptance of the plan.
- Gather and map data and organize education programs for the public. Education supports other stages of engagement, not only to gain public support but for informed public input to the development and implementation of a plan or amendments to an existing plan. Plan reviews are opportunities to include objectives for climate change adaptation into an existing plan.

Statutory community plan example (regional)

Profile: Beaubassin-Est, New Brunswick	
Coast	Atlantic
Region	Northumberland Strait
Impact Concerns	Flooding & Erosion
Population	6,718 (2021 Census)
Community Type	Rural Community
Project Area	291km^2
Year	2022
Funding	Part of the planning process

Summary – Beaubassin-est is a Rural Community in Westmorland County, New Brunswick. The community updated their Rural Plan in July 2022. It sets out objectives and policies for adaptation in coastal areas.

The Plan includes a Sea Level Rise Zone, which is intended to promote sustainable development based on the precautionary principle, prevent coastal deterioration, prevent damage to properties, citizens, and the environment, and only allow development that can demonstrate adaptation to the effects of sea level rise and storm surges in flood risk areas. No buildings in the Sea Level Rise Zone will be approved unless they meet minimum elevation requirements and drainage plans.

The Plan also gives powers to the Planning Commission to refuse building development that would normally be permitted, if they believe the site is marshy, subject to flooding, too steep, or otherwise unsuitable because of the soil or topography.

One proposal in the Plan suggests that all wetland environments be designated for environmental preservation. Another proposes informing landowners of flood risk by advising coastal landowners who apply for a building permit of the location of their properties in relation to flood risk zones.[148]

Recommended resources

Beaubassin-est Rural Community Rural Plan: https://plan360.ca/media-planning/library/BE-RP-09%28fr%29consolidated-2022-07-27%282%29.pdf

[148] Beaubassin-est. (2022). Plan Rural Communauté rurale de Beaubassin-est. Retrieved from https://plan360.ca/media-planning/library/BE-RP-09%28fr%29consolidated-2022-07-27%282%29.pdf

3.2.3 Secondary plan or area plan

Adaptive response	Avoid, retreat, accommodate, protect, procedural
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes during mandatory plan reviews and plan renewal

A secondary plan, or area plan, is a legislative tool to manage a specific area within a municipality. Secondary plans are developed in the context of statutory community plans. Secondary plans include policies to control future land uses in the designated area. For example, a secondary plan may be developed for a settlement or community or local plan area within a regional municipality. Adaptation solutions within the community may differ from adaptation solutions in less populated areas. Communities with land use planning authority can use this tool to address issues that affect smaller areas within the community.

A secondary plan includes a vision for the future of the area and strategies for achieving that vision and dealing with challenges; it guides land use by-laws and zoning for the area. Like the municipal or community plan, these plans must follow land use policies set out by the provincial government.

OPPORTUNITIES	CONSTRAINTS
• States the objectives for a local area in a municipality for planning and managing land use, including coastal land. • Must be considered for future developments in the area. • Must be reviewed as a part of the planning process. • Can be amended to incorporate coastal and climate change adaptation policies and strategies during a regular review.	• Subject to political controversy and compromise during plan development or amendments.

Getting started and first steps – The first step is for council and citizens to acknowledge the need for a plan to better manage an area of the municipality. Here are some next steps:

- Begin citizen engagement immediately and be inclusive of all interests: an inclusive **community engagement** strategy is crucial to ensure citizen participation in developing the plan and eventual acceptance of the plan.
- **Gather and map data** and develop **education programs** for the public. Education supports other stages of engagement, not only to gain public support but for informed public input to the development and implementation of a plan or amendments to an existing plan. Plan reviews are opportunities to include objectives for climate change adaptation into an existing plan.

Secondary plan example (regional)

Profile: Halifax, Nova Scotia	
Coast	Atlantic
Region	Atlantic Ocean
Impact Concerns	Flooding, erosion, and storm surge
Population	439,819 (2021 Census)
Community Type	Regional Municipality
Project Area	33km^2
Year	2021
Funding	Part of the planning process

Summary – The Regional Centre Secondary Municipal Planning Strategy, also referred to as the Centre Plan, is a Secondary Plan for Halifax Regional Municipality covering the urban core which includes the Halifax Harbour waterfront of Halifax Peninsula and downtown Dartmouth. The Plan includes site-specific Development Agreement Requirements for future growth nodes (large sites that can accommodate significant growth and require neighbourhood plans to determine future land use). One of the objectives of Future Growth Node Designation is to mitigate overland and coastal flooding. Some of the Plan's policies include:

- designing new buildings to meet storm surge/sea level rise elevation requirements established in the Plan,
- designing roads, parks, and public infrastructure to comply with engineering standards to minimize risks of damage caused by future sea level rise,
- council consideration of a land suitability assessment that identifies vulnerable landforms and climate hazards, including any wetlands, flood prone areas, and steep slopes when adopting or amending Development Agreement Requirements for future growth nodes
- council consideration of the steepness of grades, soil and geological conditions, locations of watercourses and wetlands, and susceptibility to flooding when considering proposals to amend by-laws and zoning boundaries.
- extension of the minimum coastal elevation requirements for residential use within the Regional Plan to commercial and institutional uses.[149]

[149] Halifax Regional Municipality. (2021). Regional Centre Secondary Municipal Planning Strategy. Retrieved from https://cdn.halifax.ca/sites/default/files/documents/about-the-city/regional-community-planning/RegionalCentreSMPS-Eff-21Nov27.pdf

3.2.4 Open space/conservation/protected areas plan

Adaptive response	Avoid, retreat, procedural
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	Provincial, municipal
Planning process and plan type	Formal; professional to semi-professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes during mandatory plan reviews and plan renewal

Open space, conservation and protected area plans guide the development, maintenance, and management of natural, cultural, historic, or recreational spaces in a community. Many municipalities are attempting to build interconnected open space systems, including parks, linked by trails or other corridors. For example, Halifax Regional Municipality's Green Network Plan highlights ecosystem functions and benefits, and outlines strategies to manage open space. The plan is a framework for amending the Regional Plan and Secondary Planning Strategies for natural area protection and park development.[150]

The planning process should engage stakeholders early to identify the present and future needs of the community for parks and natural area protection. Engagement should include conversations and education about climate change impacts and the role of open space and nature conservation in climate adaptation.[151] It can be challenging to balance actions that reserve natural spaces and create more climate-resilient parks while also meeting public expectations for popular park spaces and infrastructure. For example, creating a living shoreline, instead of building a seawall to control flooding or erosion requires understanding the effectiveness and benefits of a natural approach, as does, replacing manicured lawns with natural meadow ecosystems.[152]

OPPORTUNITIES	CONSTRAINTS
• Establishes the objectives of a municipality for planning and managing land use within an open space framework, including coastal land. • Combines open space and natural area protection with climate change adaptation	• Subject to political controversy and compromise during plan development or amendments. • Public expectations for active park space may compete with the need for natural area protection

Getting started and first steps – An open space plan can be a guidance document or adopted into a statutory community plan.

- Form a **committee** to oversee the creation of the plan.
- Set up **community engagement** to help identify community issues and create a vision statement.

[150] Halifax Regional Municipality. (2018). Halifax Green Network Plan. Retrieved from https://www.halifax.ca/about-halifax/regional-community-planning/regional-plan/halifax-green-network-plan
[151] University of Delaware. (n.d.). Parks and Recreation Master Planning. Retrieved from https://www.completecommunitiesde.org/planning/inclusive-and-active/parks-rec-master-planning/
[152] Park People. (2021). Changing Climate, Changing Parks. Retrieved from https://ccpr.parkpeople.ca/2021/sections/nature/stories/changing-climate-changing-parks

- Review existing conditions and create an inventory. Obtain information on environmental conditions, wetlands, floodplains, current park facilities, recreation programs, accessibility etc.

Open space/conservation/protected area plan example (regional)

Profile: Municipality of the District of West Hants, Nova Scotia	
Coast	Atlantic
Region	Bay of Fundy (Minas Basin)
Impact Concerns	Flooding and erosion
Population	19,509 (2021 Census)
Community Type	District Municipality
Project Area	157 hectares (current plan area)
Year	2016-2026
Funding	Part of the planning process

Summary – The Municipality of the District of West Hants' Parks and Open Space Plan is a 10-year comprehensive plan to direct the operations, maintenance, acquisition, divestment, funding, and programming, currently of 157 hectares of Municipally-owned land. Planning involved an inventory and review of municipally owned park and open spaces public consultation to identify what municipal residents value about the parks and open space network and what the future should look like. One of the guiding principles for the plan is "green infrastructure to adapt to climate change" for stormwater capture, flood mitigation, and shoreline stabilization.[153]

The Plan includes a Decision-Making Toolkit and Suitability Framework that municipal staff can use to evaluate and prioritize lands for acquisition based on usability, suitability, budget, and urgency. "Plan green infrastructure to adapt to climate change" is one of the suitability sections and includes criteria such as "potential to buffer against negative effects of climate change in vulnerable areas," and "potential to intercept stormwater." If the land meets these criteria, along with others in the Toolkit, the municipality may consider it for acquisition.[154]

[153] Municipality of the District of West Hants. (2016). Parks and Open Space Plan. Retrieved from https://www.westhants.ca/recreatoin/482-parks-and-open-space-plan-main-body-1/file.html
[154] Municipality of the District of West Hants. (2016). Parks and Open Spaces Plan: Appendices. Retrieved from https://www.westhants.ca/recreatoin/484-parks-and-open-space-plan-appendices-1-3-6-1/file.html

Figure 2.16 Cheverie Salt Marsh Restoration Trail, West Hants, Nova Scotia

Recommended resources

Adapting to Climate Change: Guidance for protected area managers and planners:
https://portals.iucn.org/library/sites/library/files/documents/PAG-024.pdf

University of Delaware Parks and Recreation Master Planning:
https://www.completecommunitiesde.org/planning/inclusive-and-active/parks-rec-master-planning/

Municipality of the District of West Hants – Decision-Making Toolkit:
https://www.westhants.ca/recreatoin/484-parks-and-open-space-plan-appendices-1-3-6-1/file.html

3.2.5 Regional plan (non-statutory) or land use policy

Adaptive response	Avoid, retreat, accommodate, protect, procedural
Influence time frame	medium- to long-term
Implementation time-frame	medium-term
Planning level	Regional
Planning process and plan type	formal; professional; regional planning and policy planning
Adapting to climate change	update with new climate change information and environment and land use changes during plan reviews and plan renewal; may require a new initiative

A regional plan involves municipalities planning together for the future of a region. A regional plan can address matters of shared land use planning interests, or have a narrower planning and management theme, one that can benefit from a regional approach, such as transportation, waste management, or emergency events. A regional approach allows local governments to share resources and to cover a broader area. It is a tool that requires cooperation and coordination between communities. It may or may not be a statutory plan.[155] Similarly, provinces can develop province-wide land use policy comprehensively or on specific topics like agriculture to guide municipal land use planning. For example, Prince Edward Island has a land policy initiative that has resulted in several tools being created at the provincial level regarding land use policy. The documents suggest things like developing coastal zone management as well as more adequately address coastal erosion and development in flood-risk areas.[156,157]

OPPORTUNITIES	CONSTRAINTS
• Involves sharing resources between communities. • Effective approach to issues that span across municipal boundaries.	• Communities have different planning objectives.

Getting started and first steps – A regional approach to planning requires partnerships with other local jurisdictions, organizations, and the province. Here are first steps towards developing a regional plan:

- Frame the theme of the regional plan (the issue or issues the plan will address).
- Establish which communities will be partners in the plan, or in regional planning.
- Determine what each community has to offer in a **partnership**.

[155] New Brunswick Department of Environment and Local Government. (2014). Action plan for a new local governance system. Retrieved from https://www2.gnb.ca/content/gnb/en/departments/elg/local_government/content/promos/action_plan_local_governance.html
[156] Government of Prince Edward Island. (2014). Report of the task force on land use policy: January 2014. Retrieved from http://www.gov.pe.ca/photos/original/fema_TFreport14.pdf
[157] Land Matters Advisory Committee. (2021). Now is the Time: Final Report of the Land Matters Advisory Committee. Retrieved from: https://www.landmatterspei.ca/sites/www.landmatterspei.ca/files/LandMatters/af_Land%20Matters_What%20We%20Heard_Final%20Report.pdf

Regional plan (non-statutory) or land use policy example (regional)

Profile: Kings County, Nova Scotia	
Coast	Atlantic
Region	Bay of Fundy
Impact Concerns	Sea level rise, erosion, wetlands, storm surge
Population	62,914 (2021 Census)
Community Type	Town, District, County
Project Area	2,120.31km^2
Year	2013
Funding	Federal Gas Tax Extension Agreement

Summary – Every municipality in Nova Scotia developed a Municipal Climate Change Action Plan (MCCAP) by the end of 2013. The MCCAPs address both climate change adaptation and mitigation. The municipalities of Kings County decided to approach the MCCAP regionally. The region encompasses the Municipality of the County of Kings, which includes 7 villages, and three towns, Kentville, Wolfville, and Berwick.

Kings 2050 is a partnership intended to guide the long-term sustainable development of the county. The four municipal units each conduct their own planning but there are many issues, such as climate change, transportation, and economic development, that are more effective when addressed collectively. The municipalities used Kings 2050 as a model for the completion of the MCCAP. Shared geography and infrastructure, as well as the opportunity to share resources to better address issues led them to choose the regional approach. Any issue that is specific to a particular community is addressed by the individual community while considering regional impacts.

The report outlines priorities for adaptation, including risk factors, potential impacts, and adaptation actions for infrastructure such as sewage treatment plants, lift stations, municipal buildings, road networks, as well as vulnerable communities.[158]

[158] Kings County. (2013). Kings 2050: Municipal Climate Change Action Plan Kings County, N.S. Retrieved from https://www.countyofkings.ca/upload/All_Uploads/Living/services/planning/Kings2050/Reports/Regional%20Planning/Report%20Municipal%20Climate%20Change%20Action%20Plan/Kings%20Regional%20MCCAP%20Final%20Report%20Nov.%20%202013.pdf

3.2.6 Guidance, action, and management plans

A guidance, action, or management plan is a document that sets goals and objectives for a specific topic within a community. In a municipality with land use planning authority a plan can guide or regulate development in a way that addresses a local topic or issue. Community groups or organizations can also develop plans. These plans are not legal tools: they are guidelines and strategies and can also serve as educational tools for certain topics or issues. Plans may cover the entire community or a certain area within the community.

There are a variety of guidance, action, and management plans that communities and organizations can use to address coastal climate change issues:

1. integrated community sustainability plans (ICSPs),
2. climate change action/adaptation plans (CCAPs),
3. shoreline/coastal management plans,
4. watershed management plans,
5. stormwater management plans, and
6. strategic land acquisition.

In addition, Enhanced Ecosystem Management Plans are tools which are used by some Indigenous communities as an approach where impacts on the environment are managed using Indigenous concepts (for example using the Mi'kmaq concept Netukulimk) to support healing of the environment and lessen future impacts for the next seven generations.

OPPORTUNITIES	CONSTRAINTS
• Address a certain topic or issue in detail. • Guide communities to address or manage an issue or topic. • Tailored to the needs of the community.	• Not enforceable by law.

3.2.6.1 Guidance, action, and management plans – integrated community sustainability plan

Adaptive response	Avoid, retreat, accommodate, protect, procedural
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	municipal, community
Planning process and plan type	formal; professional to semi-professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes during plan reviews

Integrated Community Sustainability Plans (ICSPs) are management plans that present a vision for a liveable, healthy, and safe community into the future. Communities across Atlantic Canada prepared ICSPs throughout the early 2000s aided by funding support from the provincial and federal governments. Provincial-Federal agreements enabled access to funding from the Federal Gas Tax Fund. The funds are specifically directed towards environmentally sustainable municipal infrastructure projects, and municipalities needed to prepare ICSPs to receive funding. Plan preparation was also eligible for funding. Although subsequent funding is infrastructure-oriented, communities decide their sustainability goals within the pillars of economy, society, and the environment and the plans are broadly encompassing of sustainability principles and goals address economic diversity, environmental protection, social equity and inclusion, community stewardship, and participatory processes. Coastal themes are common in ICSPs of coastal communities, which can also lead to climate change themes. ICSPs can outline short and long-term action plans for land use planning and can guide a municipality in prioritizing actions to align with sustainability principles.[159] ICSPs can be stand-alone guidance documents, or a community with land use planning authority can integrate sustainability planning into its **statutory community plan**. An ICSP can also be the foundation for a new or revised statutory community plan, such as the Town of Norris Point Municipal Sustainable Development Plan 2009-2019, Norris Point, NL.[160]

While ICSP refers to the plans that emerged from the Gas Tax Fund program, sustainability plans are not limited to this program. The principles applied in developing ICSPs are principles for sustainability plan-making, generally.

OPPORTUNITIES	CONSTRAINTS
• Can be used to address coastal issues, including climate change impacts. • Atlantic Canada communities are likely to support a plan that addresses coastal issues.	• Cannot be used to directly regulate development if not adopted as legislation by a community with land use planning authority.

Getting started and first steps – ICSPs are usually developed by communities with land use planning authority but the principles of an ICSP can be developed into a plan by any community.

[159] Newfoundland and Labrador Department of Municipal Affairs. (2009). ICSP Development Toolkit. Retrieved from gov.nl.ca/mpa/files/publications-icsp-icsp-toolkit-.pdf
[160] Town of Norris Point. (2009). Town of Norris Point Municipal Sustainable Development Plan 2009 – 2019. Retrieved from http://www.norrispoint.ca/wp-content/uploads/2015/01/083070_norris-point-plan_complete.pdf

Communities can prepare sustainability plans themselves or hire a consultant to assist them in developing a plan and seek assistance from community groups and organizations.

Guidebooks or toolkits are available to help in creating an ICSP.[161] Getting started on a sustainability plan generally involves the following:

- Form a **committee** to oversee development of the plan.
- Set up **community engagement** to help identify community issues and create a vision statement.
- Outline goals and plans for action and identifying benefits that will result from the plan.
- Identify **partners** that a community can work with to achieve the goals it sets out in its integrated community sustainability plan.[162]

Integrated community sustainability plan example (regional)

Profile: Mahone Bay, Nova Scotia	
Coast	Atlantic
Region	South Shore
Impact Concerns	Flooding and erosion
Population	1,064 (2021 Census)
Community Type	Town
Project Area	3 km^2
Year	2010
Funding	Federal Gas Tax Rebate

Summary – The town of Mahone Bay addresses coastal conditions and sea level rise in its Integrated Community Sustainability Plan. Like many coastal towns, the waterfront is a valuable economic and cultural asset. The Plan includes a vision for waterfront development to preserve and enhance the waterfront and harbour with a focus on public access and environmental stewardship.

The Plan outlines what the Town needs to address to achieve the waterfront vision, including problems of sewage overflows, sea level rise, and shoreline erosion. The Plan presents actions to deal with challenges, including intercepting stormwater that causes sewage overflows, purchasing coastal land, and using protective engineered structures. The Plan also lists the resources and people needed, as well as potential partnerships to help achieve the waterfront vision. It also identifies opportunities and challenges for the future of the waterfront.

When developing the Plan, the Town engaged with the public through a conference and design workshop. Participants contributed their ideas for a desirable future for Mahone Bay which were included in the Plan. Small action groups formed during these workshops to continue working on the sustainability actions. The Town also engaged with the School of Planning at Dalhousie University and developed a class project to help gather background material about the Town.

[161] The Natural Step. (n.d.). Integrated Community Sustainability Planning (ICSP): The Process. Retrieved from https://www.naturalstep.ca/integrated-community-sustainability-planning
[162] Ibid.

Information collected by the students was integrated into the Plan and their reports are included in the Plan as an appendix.[163]

Recommended resources

Integrated Community Sustainability Planning (ICSP): The Process | The Natural Step Canada: https://www.naturalstep.ca/integrated-community-sustainability-planning

Newfoundland and Labrador integrated community sustainability development toolkit: gov.nl.ca/mpa/files/publications-icsp-icsp-toolkit-.pdf

[163] Town of Mahone Bay. (2010). Integrated community sustainability plan: Mahone Bay searches its future. Retrieved from https://www.townofmahonebay.ca/uploads/1/3/0/6/130665195/integrated_community_sustainability_plan.pdf

3.2.6.2 Guidance, action, and management plans – climate change action/adaptation plans

Adaptive response	Avoid, retreat, accommodate, protect, procedural
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal, community
Planning process and plan type	formal; professional to semi-professional; environmental planning and community planning
Adapting to climate change	update with new climate change information and environment and land use changes during plan reviews

Climate change action and adaptation plans identify the priorities for action to deal with climate change in a community. Creating a plan that specifically addresses the impacts expected at the local scale will help a community adapt to these changes. Gaining knowledge about local effects informs how a community will plan for the future. Developing a plan involves data gathering and mapping to identify impacts and affected areas. It also requires a community to consider the economic, environmental, and social impacts. Plans may include a hazard risk vulnerability assessment to help prioritize actions. An incorporated community can amend its statutory community plan to contain the climate change plan or to implement specific actions, such as coastal setbacks to avoid coastal flooding and erosion impacts, through by-laws. Adaptation planning is a cyclical process and the plan should be revisited and updated over time.

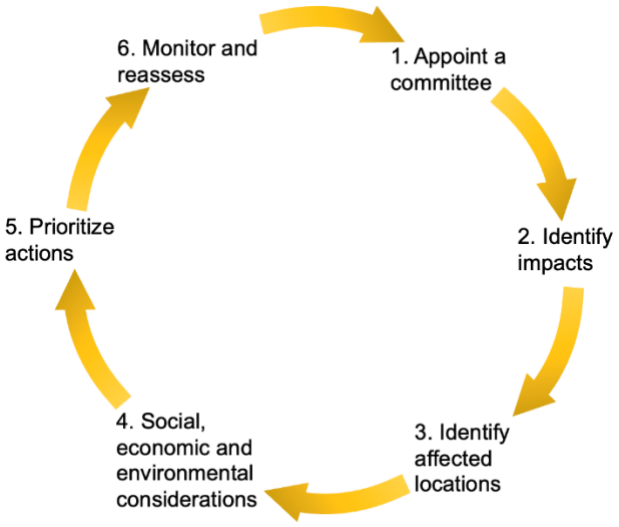

Figure 2.17 Adaptation planning cycle

OPPORTUNITIES	CONSTRAINTS
• Informs future planning decisions. • Reduces and/or manages future risks from climate change. • Can be used as an educational tool for local government and the public on climate change in the local context.	• Cannot be used to directly regulate development if not adopted as legislation by a community with land use planning authority.

Getting started and first steps – A climate change action or adaptation plan can be a guidance document or adopted into an integrated community sustainability plan or statutory community plan. A community should account for the directives of its climate change action or

adaptation plan in all future planning and actions. Here are some first steps toward creating a climate change plan:

- Appoint a climate change committee.
- Set up community engagement to find out about past events and impacts already occurring in the community and to work with community members to identify strategies that are best suited to address the community's climate change vulnerabilities and risks.
- Seek outside expertise and partnerships where needed for help with climate change data collection and analysis and building scenarios.

Climate change action plans example (regional)

Profile: Municipal Climate Change Action Plans, Nova Scotia	
Coast	Atlantic
Region	Nova Scotia
Impact Concerns	Climate Change
Community Type	Regional, District, County, and Town Municipalities
Year	2013
Funding	Federal Gas Tax Extension Agreement

Summary – Every municipality in Nova Scotia developed a Municipal Climate Change Action Plan (MCCAP) by the end of 2013 as a condition of receiving Federal Gas Tax funding. The MCCAPs are an amendment to the municipalities' Integrated Community Sustainability Plans and focus on climate change adaptation and mitigation. The plans also present the steps that a municipality will take for adaptation. Most municipalities used a hazard risk vulnerability assessment to establish adaptation priorities. Each community approached its analysis differently depending on its community context and climate change impact issues. Each municipality was dealing with concerns unique to its area. Communities differed in their level of expertise and available information.

The Nova Scotia Department of Municipal Affairs put together a guide book to lead municipalities through the plan-making process. The guidebook gives guidance without using a prescriptive approach. The guidebook describes six steps that municipalities can follow for creating their action plan:

- build a team,
- identify impacts and hazards,
- identify affected locations,
- identify affected facilities and infrastructure,
- identify social, economic, and environmental considerations, and
- identify priorities for adaptive actions.[164]

Almost all of the province's municipalities have completed an action plan and many examples can be drawn from these plans for ideas on how to follow each of the steps listed above.

[164] Nova Scotia Department of Municipal Affairs. (2012). Municipal climate change action plan guidebook. *Canada – Nova Scotia Infrastructure Secretariat.* Retrieved from https://beta.novascotia.ca/sites/default/files/documents/1-1396/municipal-climate-change-action-plan-guidebook-en.pdf

Climate change adaptation plan (regional)

Profile: Glenburnie-Birchy Head-Shoal Brook, Newfoundland and Labrador	
Coast	Atlantic
Region	Gulf of St. Lawrence
Impact Concerns	Coastal flooding, erosion, landslides
Population	241 (2021 Census)
Community Type	Town
Project Area	6.5 km of shoreline
Year	2009 - 2010
Funding	Canadian Institute of Planners

Summary – The Canadian Institute of Planners and the Atlantic Planners Institute helped the town of Glenburnie–Birchy Head-Shoal Brook (GBS), Newfoundland and Labrador, develop a *Climate Change Adaptation Plan*. The goal was to create a plan to minimize negative impacts and maximize potential benefits from climate change. Community engagement meetings and workshops helped to identify and prioritize issues facing the community and to identify solutions.

The project team determined the main concerns facing GBS. They did this by collecting local stories of changes and events that had already occurred, including coastal flooding, erosion, landslides, and avalanches. People also identified concerns about potential social and economic impacts from climate change including groundwater quality, road safety, changing community traditions, and infrastructure damage.[165]

Overlay mapping combined information about environmental features and processes, including projected coastal flood zones, to identify areas at risk of climate change impacts and therefore not suitable for future development. The project team identified priority areas for adaptation, including infrastructure, environment, economic development, culture and traditions, governance, and capacity building and proposed strategies for implementation. In 2012, GBS council formally adopted the Climate Change Adaptation Plan, and in 2013 the Plan provided foundation information for re-framing the community plan through the plan review process.[166] In 2016 the Town Council adopted a new Town Plan that incorporated content from the Climate Change Adaptation Plan into policies, land use by-law and development regulations.[167]

Partners – This project was initiated by the Canadian institute of Planners through the Atlantic Planners Institute (API) and received funding from Natural Resources Canada. The project was completed by a team of two volunteer planners from API, working collaboratively with the climate change coordinator for GBS and a community liaison committee, and with assistance from climate change researchers, environmental specialists from universities and provincial government agencies and Parks Canada (Gros Morne National Park). Many citizens participated in the project: including community elders, school children, educators,

[165] Manuel, P., & Herring, S. (n.d.). Mainstreaming climate change tools for the professional community. Climate change adaptation plan for Glenburnie-Birchy-Head-Shoal Brook, Newfoundland and Labrador. Volume 1: Background Report. Retrieved from https://www.cip-icu.ca/Files/Resources/GBS_CCAP_VOL1_E
[166] Jensen, J,. personal communication.
[167] Town of Glenburnie-Birchy Head-Shoal Brook. (2016). Town of Glenburnie-Birchy Head-Shoal Brook Municipal Plan 2014-2024. Retrieved from https://www.gov.nl.ca/mpa/files/registry-community-glenburnie-birchy-head-shoal-brook-files-glenburnie-birchy-head-shoal-brook-mp.pdf

representatives from local culture and environment groups, the local fire department, and town council.[168]

Figure 2.18 Glenburnie-Birchy Head-Shoal Brook climate change adaptation plan working group.

Recommended resources

Nova Scotia Municipal Climate Change Action Plan Guidebook: https://beta.novascotia.ca/sites/default/files/documents/1-1396/municipal-climate-change-action-plan-guidebook-en.pdf

Canadian Institute of Planners Topics in Planning - Climate Change website provides many resources to communities for climate change adaptation planning: https://www.cip-icu.ca/ClimateChange

Climate change adaptation planning: a handbook for small Canadian communities: https://www.cip-icu.ca/Files/Resources/RURAL-HANDBOOK-FINAL-COPY

[168] Manuel, P., & Herring, S. (n.d.). Mainstreaming climate change tools for the professional community. Climate change adaptation plan for Glenburnie-Birchy-Head-Shoal Brook, Newfoundland and Labrador. Volume 1: Background Report. Retrieved from https://www.cip-icu.ca/Files/Resources/GBS_CCAP_VOL1_E

3.2.6.3 Guidance, action, and management plans – shoreline/coastal management plan

Adaptive response	Avoid, retreat, accommodate, procedural
Influence time frame	medium - to long-term
Implementation time-frame	medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal, semi-formal; professional to semi-professional And informed amateur; environmental planning
Adapting to climate change	update with new climate change information and environment and land use changes and best-practice standards during plan reviews

A shoreline or coastal management plan is a tool for managing land use or development at the coast. Consequently, a shoreline or coastal management plan can be a powerful tool for community adaptation to climate change impacts along its coastline. A plan must be tailored to a community's culture and the local coastal environment. A plan might aim to provide community education about coastal issues and to protect the natural environment. A plan can include strategies for more and better public access to the coast. These management plans often address coastal issues such as coastal hazards. Shoreline and coastal management plans include a variety of ways to manage the coast. Although they can include using engineering techniques like armour rock or sea walls, they usually focus on preventing damage to the coastal environment or keeping development back from the coast. Examples of these measures can include coastal wetland restoration, managed retreat strategies, setbacks, and development guidelines.[169]

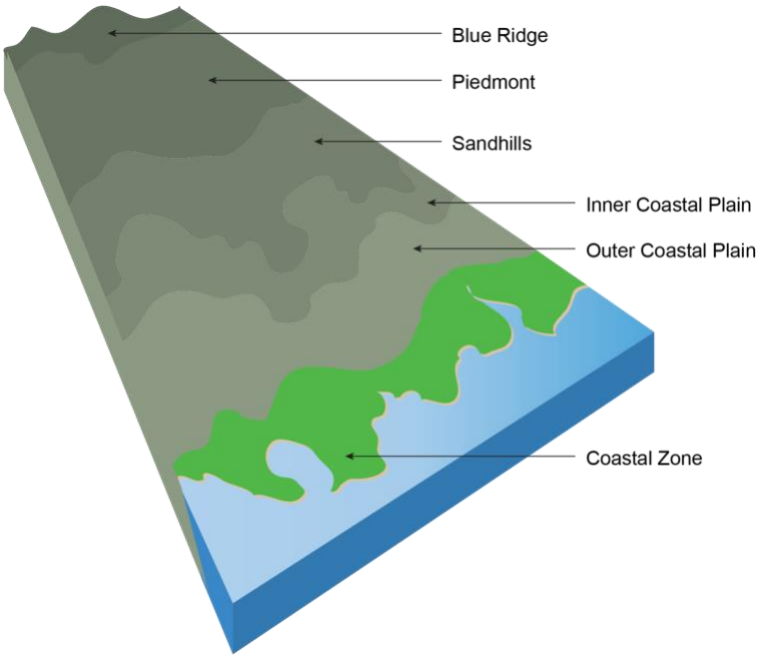

Figure 2.19 Example of defining a coastal zone including inland classifications (modified after Hall[170])

[169] State of Washington Department of Ecology. (n.d.). *Shoreline Masters Program*. Retrieved from https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-Master-Programs
[170] Hall. (n.d). Geographical regions of South Carolina coastal zone [image]. Retrieved from http://scregions.weebly.com/

OPPORTUNITIES	CONSTRAINTS
• Recognizes the shoreline area as part of larger natural and land use systems. • Supports an integrated approach to shoreline and coastal management. • Can integrate with watershed management for a whole systems approach. • May be used to prevent development in hazardous areas. • Benefits a community financially by addressing issues before damaging events happen. • Can be updated through the normal planning process with new information over time. • Can reduce conflict between coastal neighbours if controversial coastal activities are restricted.	• Usually does not require people to move away from hazardous areas where development already exists. • May require outside, hired, expertise to develop a plan. • May be complicated by jurisdictional issues if dealing with areas seaward of the high-water mark. • May become outdated if not amended within a normal planning timeframe. • Can come into conflict with property and development rights.

Getting started and first steps – Community groups, local committees, or municipal staff (or a consultant) can help with the development of a shoreline or coastal management plan. Usually, these groups work together to develop a plan. A community can adopt a plan as municipal policy. Plans that include changes to the inter-tidal zone need approval from the province and will also usually involve partnerships with the province. Neighbouring communities that share a coastline can collaborate in a partnership to develop a plan.

Shoreline and coastal management plans require knowledge of local coastal issues and the aspirations of a community for using its coastal land and resources. Information for the plan can come from a variety of sources including community members, and scientific research. Community members will have first-hand knowledge of coastal issues and past events. Their input is also essential for understanding cultural values and local land use practices and interests. Scientific or other professional input ensures accurate information about coastal environments and processes and can provide insight to future conditions.

The following are the first steps in developing a shoreline or coastal management plan:

- Identify and map the coastal zone or shoreline boundary of the community.
- Organize a shoreline management local committee.
- Develop a strategy for community engagement.
- Gather and map data, which may include completing an inventory of assets in the coastal zone.
- Develop management goals and objectives that match what was heard through community engagement and that are appropriate for the type of coast.

Shoreline/coastal management plan example (national)

Profile: West Vancouver, British Columbia	
Coast	Pacific
Region	Strait of Georgia
Impact Concerns	Flooding and erosion
Population	44,122 (2021 Census)
Community Type	District Municipality
Project Area	87.26km2
Year	2022
Funding	Part of the planning process

Summary – The District of West Vancouver created the Coastal Marine Management Plan to provide a policy framework to guide their council and staff in the management of coastal areas. The plan was informed by the West Vancouver Coastal Planning Study and the North Shore Sea Level Rise Strategy. The plan covers three key policy areas: Coastal Dynamics and Ecosystems, Built Infrastructure and Parks, and Public-Private Interface. Each policy area includes short, medium, and long-term recommended actions for the District to adopt over the next 10 to 20 years. It also includes funding, communication, and progress monitoring approaches.

West Vancouver's coastline is vulnerable to sea level rise and the District has a history of coastal flooding. The Plan presents climate adaptation objectives including prioritizing "soft", nature-based adaptation approaches, undertaking monitoring programs for past and future coastal projects, partnerships with neighbouring jurisdictions, restricting private development within flood hazard areas that does not include best practices, at owners' cost, and acquiring private lands to accommodate risk (e.g., wetlands). The Plan concludes with immediate next steps and suggests a plan review by District staff every five years.[171]

Recommended resources

NOAA Office for Coastal Management | *The National Coastal Zone Management Program*: https://coast.noaa.gov/czm/

State of Washington Shoreline Planners Toolbox, online material: http://www.ecy.wa.gov/programs/sea/shorelines/smp/toolbox.html

[171] West Vancouver. (2022). Coastal Marine Management Plan: final draft report. Retrieved from https://westvancouver.ca/sites/default/files/dwv/assets/gov/docs/strategies-and-plans/CMMP%20Final%20Draft.pdf

3.2.6.4 Guidance, action, and management plans – watershed management plan

Adaptive response	Avoid, procedural
Influence time frame	medium- to long-term
Implementation time-frame	medium-term
Planning level	provincial, regional
Planning process and plan type	formal, semi-formal; professional to semi-professional and informed amateur; environmental planning
Adapting to climate change	update with new climate change information and environment and land use changes and best-practice standards during plan reviews

A watershed management plan is a natural resource and land planning and management tool that protects water resources. A watershed is the land area from which water drains to a common body of water. Bays and estuaries are ultimately where drainage water ends up.

Watershed management plans are strategies designed to address existing and future water resource issues within a defined watershed area.[172] They do this by managing development activities on the land. Watershed management plans focus on preventing pollution, protecting natural habitats, and controlling stormwater runoff within a watershed area. While the focus is on the upland area beyond shore, managing development and protecting habitat in a watershed protects the water quality of the coastal marine environment at the outflow of the watershed. Developing a watershed management plan involves a regional approach that often includes multiple communities and organizations working in a partnership.

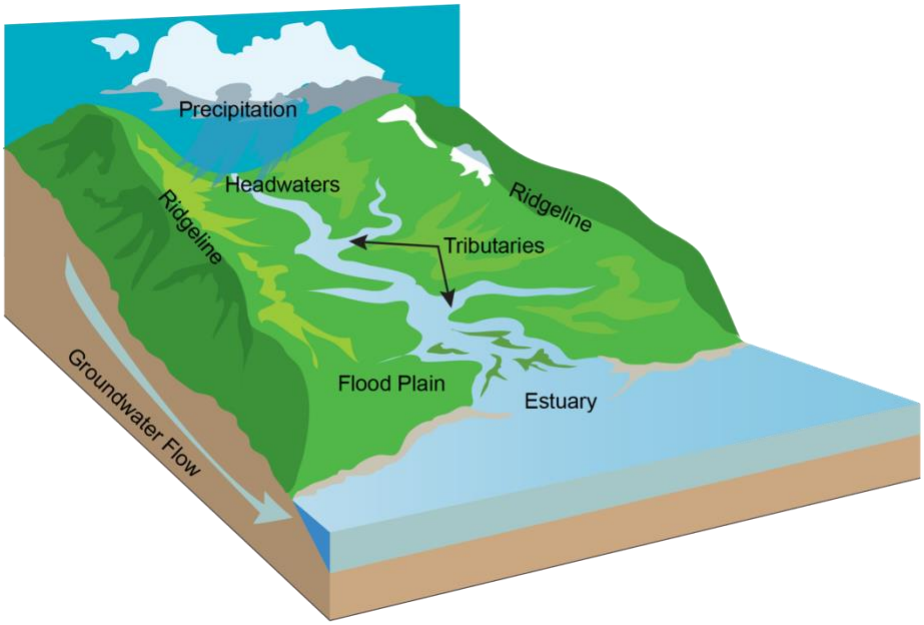

Figure 2.20 Profile of a watershed area that can be used as a boundary for land use management (modified from a drawing by Emma Poirier)

[172] United States Environmental Protection Agency. (2013). Handbook for developing watershed plans to restore and protect our waters. Retrieved from https://www.epa.gov/sites/default/files/2015-09/documents/2008_04_18_nps_watershed_handbook_handbook-2.pdf

OPPORTUNITIES	CONSTRAINTS
• Can protect drinking water and other natural resources. • Safeguards natural habitats. • Can protect marine environmental quality by identifying and managing point and non-point land-based pollution sources. • Can integrate with shoreline and coastal management for a whole systems approach • Can reduce demand for engineered stormwater infrastructure by protecting wetlands and preserving forest cover.	• Management can be complicated because watersheds usually cover large areas with multiple communities and governments. • Can require the collection of large amounts of diverse data. • Can be contentious because of conflicting land and water management interests.

Getting started and first steps – Communities with and without land use planning authority can develop and carry out watershed management plans. Community groups often initiate watershed management, typically organizing as local watershed groups. They do the preparation to make a plan possible. Developing a watershed management plan requires a solid understanding of how water flows in a watershed, and how the natural and built environments within the watershed work. Here are some first steps towards creating a watershed management plan:

- Create a watershed **committee** to oversee the development and management of a plan.
- Define the watershed area and **map** its component features, including which communities fall within the watershed area.
- Identify and make connections with organizations and management **partners**.
- Identify issues affecting the watershed that will become the focus of a plan.

Watershed management plan example (regional)

Profile: Shediac Bay Watershed, New Brunswick	
Coast	Atlantic
Region	Shediac Bay
Year	2021-2031
Funding	Part of the planning process

Summary – The Shediac Bay Integrated Watershed Management Plan was developed to help address water quality issues in the watershed in order to protect and improve water quality at Parlee Beach, located in Pointe-du-Chêne, New Brunswick. The Plan establishes seven goals and a list of 26 actions to achieve those goals. There are 10 long-term monitoring sampling sites in the watershed and the CCME Water Quality Index was applied to the water quality data over a three-year period, from 2018-2020. In addition to the long-term water quality monitoring, there were numerous scientific studies that were conducted in the Shediac Bay Watershed to better understand the factors influencing water quality in the area. A Technical Working Group

developed the plan based on the information gathered during three rounds of engagement between November 2019 and July 2021 with First Nations, the public, and stakeholders.[173]

The Plan discusses the impact climate change is having on the watershed, including flooding, and recommends enhancement of riparian zones and buffer zones as well as wetland preservation. It also recommends applying actions strategies from the climate change adaptation plans for the communities in the area.

The Plan uses a partnership-based approach for its implementation strategy by encouraging local ownership and participation. A variety of partners expressed interest in taking part in the implementation of the Plan including First Nations, federal and provincial government departments, municipalities, non-governmental organizations, and universities.[174]

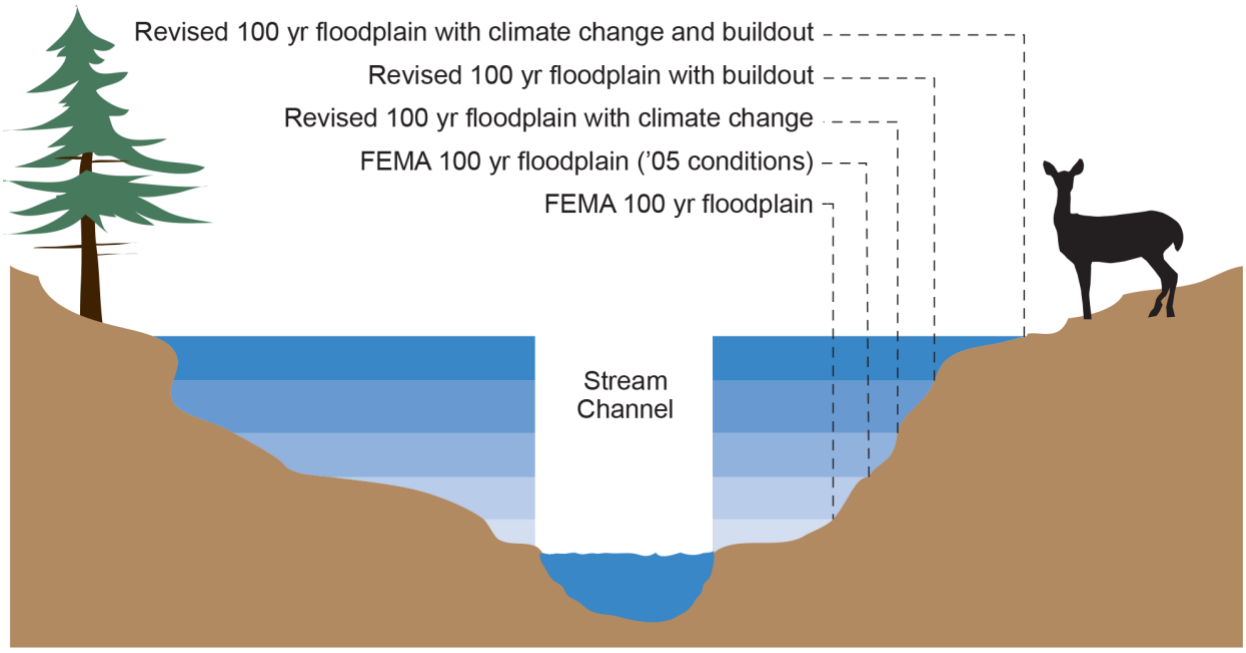

Figure 2.21 Changes to the 1-in-100-year floodplain level in the Lamprey River watershed under various scenarios. Build-out is projected rates of development based on development rates over the last four decades[5] (modified after UNH[175])

Recommended resources

Shediac Bay Watershed Management Plan:
https://www2.gnb.ca/content/dam/gnb/Departments/eco-bce/Promo/Parlee_Beach/pdfs/shediac-bay-watershed-management-plan.pdf

[173] New Brunswick Department of Environment and Local Government. (2021). Integrated Watershed Management Plan for the Shediac Bay Watershed (2021-2031). Retrieved from https://www2.gnb.ca/content/gnb/en/corporate/promo/ParleeBeach/shediacbay_watershed_management_plan.html#:~:text=The%20main%20purpose%20of%20the,is%20not%20regulatory%20in%20nature.

[174] New Brunswick Department of Environment and Local Government. (2021). Integrated Watershed Management Plan Shediac Bay Watershed 2021-2031. Retrieved from https://www2.gnb.ca/content/dam/gnb/Departments/eco-bce/Promo/Parlee_Beach/pdfs/shediac-bay-watershed-management-plan.pdf

[175] University of New Hampshire, Great Bay National Estuarine Research Reserve, UNH Stormwater Centre, Antioch University New England, UNH Cooperative Extension, & Vermont Law School. (2012). Past, present, and potential future 100-year floods in the Lamprey River Watershed [image]. Retrieved from http://100yearfloods.org/resources/pdf/120601_Wake_100yr_floods_v2.pdf

3.2.6.5 Guidance, action, and management plans – stormwater management plan

Adaptive response	Avoid, accommodate
Influence time frame	medium- to long-term
Implementation time-frame	short- to medium-term
Planning level	municipal
Planning process and plan type	formal; professional to semi-professional; environmental planning and physical planning
Adapting to climate change	update with new climate change information and environment and land use changes and best-practice standards during plan reviews

Stormwater is rainwater and snow meltwater that is either absorbed into the ground and flows through it or flows over the land and into drainage systems. The drainage systems are natural watercourses and waterbodies and retention ponds, drainage pipes, ditches, canals, and other man-made drainage control structures. Stormwater is crucial for maintaining healthy stream and lake levels, but too much stormwater flowing into waterbodies too quickly can lead to flooding. In coastal areas, river flooding can combine with a storm surge to make coastal flooding worse. Climate change affects the water cycle as well as the strength of storms that impact the coast. Stormwater management is a very important tool for addressing impacts of climate change everywhere in the system from the headwaters to the coast.

Stormwater management is a proactive planning and design tool used to manage the amount and speed of runoff entering natural and built drainage systems. The aim of modern stormwater management is to manage it as close to natural conditions as possible. When stormwater can soak into the ground and move slowly through soil or land vegetation or ponds and wetlands, the water does not rush into rivers and to the coast, so flooding is reduced, and it is cleaned of sediment and other pollutants.

OPPORTUNITIES	CONSTRAINTS
• Prevents flooding from overland run-off • Improves the aesthetics of a place through green stormwater infrastructure such as vegetated watercourses and land areas. • Can make small improvements over time rather than requiring one large project. • Encourages property owners to participate by catching rainwater on their properties and slowing down its flow.	• Only deals with inland flooding sources rather than ocean flooding. • May be difficult to implement in highly developed areas if there is little to no open space.

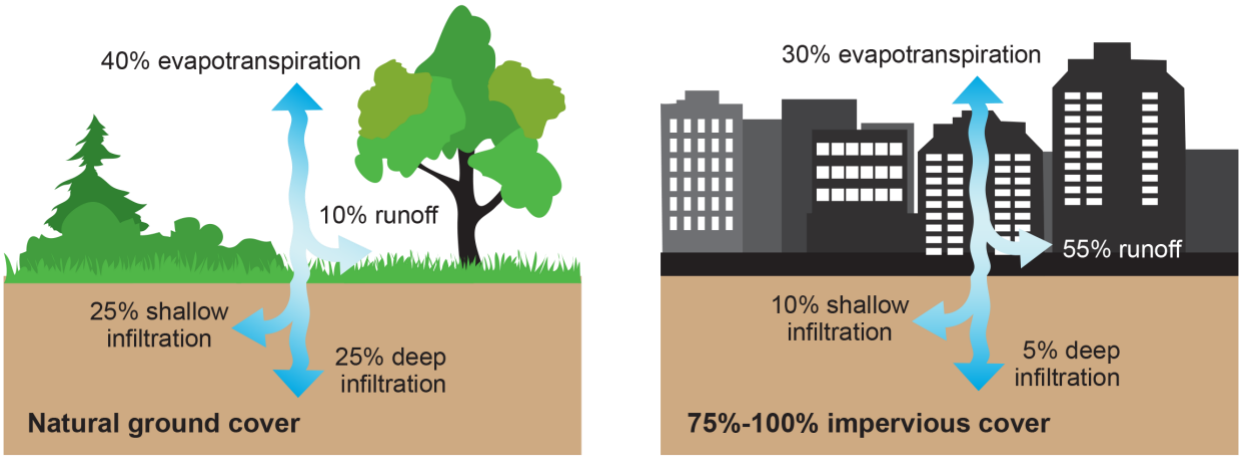

Figure 2.22 Water moves very differently over natural ground cover compared to developed surfaces. Natural cover allows more water to seep into the ground. Some water will flow deep to replenish groundwater. Most water falling on hard surfaces in built-up areas flows directly in surface drainage systems (modified after Federal Interagency Stream Restoration Working Group[176])

Getting started and first steps – Communities can use a stormwater management plan to introduce design guidelines for new developments and to retrofit existing development. Communities can also set up a grant and education program to help promote building rain gardens on private properties. A community with land use planning authority can use this plan to develop by-laws that prohibit developments from adding additional stormwater into municipal systems. Here are some first steps toward developing a stormwater management plan:

- For communities with a statutory community plan, amend the plan to include strategies for dealing with stormwater.
- Establish a committee to help develop a grant, education program, design guidelines, or by-law.
- Partner with an expert or hire a consultant on stormwater design.

Stormwater management example (national)

Profile: Gibsons, British Columbia	
Coast	Pacific
Region	Shoal Channel
Impact Concerns	Stormwater Management
Population	4,758 (2021 Census)
Community Type	Town
Project Area	4.29km^2
Year	2018
Funding	Part of the planning process

[176] Federal Interagency Stream Restoration Working Group. (n.d.). In stream corridor restoration: principles, processes, and practices [image]. Retrieved from http://www.nrcs.usda.gov/Internet/FSE_MEDIA/nrcs143_024824.jpg

Summary – The town of Gibsons, British Columbia first created an Integrated Stormwater Management Plan in 2010 and updated it in 2018 to include managing for changing hydrology due to climate change and additional data not previously available to the past study. The updated plan also includes implementation of some of the strategies proposed in the original document. The plan includes a study that examines the links between drainage servicing, land use planning, and environmental protection. The plan also includes climate change projections and proposes improvements that are necessary to prevent flooding during a 10 to 100-year storm event, depending on the location. Sea level rise is not addressed in the study because the Town decided to address the issue with a separate dedicated study.[177]

[177] Urban Systems. (2018). Final Report Revised Town of Gibsons: 2018 Integrated Stormwater (Rainwater) Management Plan Update. Retrieved from https://gibsons.civicweb.net/document/62665/

3.2.6.6 Guidance, action, and management plans – strategic land acquisition and land bank

Adaptive response	Avoid, retreat, procedural approach
Influence time frame	medium- to long-term
Implementation time-frame	medium- to long term
Planning level	regional, municipal
Planning process and plan type	formal; professional; strategic planning
Adapting to climate change	update with new climate change information and environment and land use changes when reassessing strategic land acquisition needs

Strategic land acquisition or land banking is a plan or strategy to proactively obtain land for public purposes. A plan outlines how to acquire lands and gives a framework for council decision-making about acquisition opportunities. Councils of coastal communities can use land acquisition and banking to identify and acquire coastal property to increase public safety, prevent future damage to structures, or preserve or restore natural habitats. The plan can also meet a number of community goals along the coast such as increasing coastal access, preserving natural heritage, and enhancing natural assets. For example, at risk areas can be identified for possible acquisition to prevent future development or to remove vulnerable structures.[178]

OPPORTUNITIES	CONSTRAINTS
• Enables a community to proactively acquire lands that have been identified as valuable to the community or which are at risk of coastal hazards, thereby increasing public safety during emergency events. • Identifies the means available for acquiring land. • Can encourage land donation. • Provides a framework for decision makers to make quick decisions when properties are offered up for acquisition. • Outlines funding sources for acquisition.	• Can be costly to acquire land. • External funding may be required to purchase land.

Getting started and first steps – Land trust, communities, or provincial and federal governments can develop a strategic land acquisition plan. Here are some first steps:

- Develop a **partnership** with land trusts, community groups, and residents to draft land acquisition strategies.
- Form a **committee** to guide the development of an acquisition plan.
- **Gather and map data** to target areas where acquisition would be desirable and identify what lands would be appropriate for the strategies outlined in an acquisition plan.

[178] Arlington Group Planning + Architecture, EBA a Terra Tech Company, DE Jardine Consulting and Sustainability Solutions Group. (2013). Sea level rise adaptation primer: A toolkit to build adaptive capacity on Canada's south coasts. British Columbia Ministry of Environment. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/resources/slr-primer.pdf

- Amend existing guidance documents, such as an **open space plan**, **integrated community sustainability plan**, municipal **climate change action plan**, **shoreline or coastal management plan, watershed management plan**, or **stormwater management plan**, to include strategic land acquisition objectives.

Strategic land acquisition example (national)

Profile: Capital Regional District, British Columbia	
Coast	Pacific
Region	Salish Sea
Population	415,451 (2021 Census)
Community Type	Region
Project Area	2,340.49km^2
Year	2020-2021
Funding	Regional Parks Land Acquisition Fund

Summary – The Capital Regional District (CRD) Regional Parks Land Acquisition Strategy provides the Regional Parks Committee and the CRD Board with a roadmap for acquiring land for regional parks and trails. In 2000 the CRD established the Regional Parks Land Acquisition Fund. Money for this fund is collected through municipal property taxes. The current rate is $20 per average household assessed value, generating approximately $3.6 million in 2019. The CRD uses the fund money for land purchase and associated costs such as environmental assessments, appraisals, surveys, and legal fees.[179] The regional parks system has grown by almost 4,800 hectares through multiple land acquisitions valued at $62.6 million, with 27% of the overall cost of purchases coming from CRD partners.

The purpose of the regional parks and trail system is to protect, connect, and restore the region's significant natural areas. The system of parks and trails proposed in the Regional Parks Strategic Plan is guided by principles of sustaining ecological health and the health of residents, maintaining a network of natural areas to maintain ecosystem services like flood and erosion control, and establishing interconnected natural areas as a key component of climate change adaptation.

The criteria for land acquisition includes requirements that the area must play a role in the broader ecosystem, for example, flood control and stormwater prevention, and contribute to climate change mitigation and adaptation.[180]

[179] Capital Region District. (2019). Land Acquisition Fund. Retrieved from https://www.crd.bc.ca/parks-recreation-culture/parks-trails/crd-regional-parks/land-acquisition-fund
[180] Capital Region District. (2020). CRD Regional Parks Land Acquisition Strategy 2020 to 2021. Retrieved from https://www.crd.bc.ca/docs/default-source/parks-pdf/land-acquisition-strategy-2020-21.pdf?sfvrsn=bc6530cc_0

3.2.7 Incentives

Adaptive response	Avoid, retreat, accommodate, procedural approach
Influence time frame	short to long-term
Implementation time-frame	short to long-term
Planning level	municipal
Planning process and plan type	formal; professional; community planning; development planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews and renewal

A range of incentives are available to encourage coastal climate change adaptation action including tax incentives, density bonusing, development incentives and compensation for land retirement. These incentives go hand in hand with other tools in this guidebook as described below.

Tax incentives are a tool to entice development into certain areas (see below) or to reward the donation of land to a land trust or setting up conservation easements as alternatives to land development. Any community can promote incentives through a land trust and this could be part of a strategic land acquisition strategy.

Density bonusing allows developers to increase the occupancy (number of units) permitted in a development area in exchange for assigning a larger amount of the developable property to land uses such as parks, open space, or to affordable housing. In coastal areas density bonusing could be used to gain coastal lands and move new development inland.

Development incentives are a form of tax incentive for new developments and can be granted for areas identified for the purpose of a municipality. The requirements to obtain the incentive are set by the municipality, such as providing amenities for the public or using particular building and design standards. Incentives can also be used in exchange for the cost of a building permit. These incentives can help boost commercial activity.

An example of an incentive program is the compensation for the retirement of agricultural land to encourage return to a natural landscape and the benefits of erosion control, flood mitigation, restoring of wetlands, or expanding riparian buffer zones. These programs are often implemented through partnerships between local farmers, community stakeholders, and other NGOs.[181]

[181] ALUS. (2022). Environmental Stewardship through Ecosystem Services: What We Do. Retrieved from https://alus.ca/what-we-do/

OPPORTUNITIES	CONSTRAINTS
• Can encourage development in areas away from the coast. • Can promote development within a given area. • Can promote the use of climate change resilient building and design standards.	• Can cost a municipality in tax revenue. • May not be affordable for some municipalities.

Getting started and first steps – Communities with land use planning authority can set up incentive programs. A municipality must clearly establish the purpose of the program, identify the areas eligible for the program and amenities the program will generate. For example, coastal communities could prioritize coastal land acquisition or protection through density bonusing when coastal developments are approved. Here are some first steps:

- Form a committee to determine the structure of an incentives program. This committee can also operate as a selection committee once the program is in place. The selection committee decides which developments qualify for the incentive.
- Determine the type of incentive that will be most effective in the community.

Incentives example (regional)

Profile: Prince Edward Island	
Coast	Atlantic
Region	Prince Edward Island
Impact Concerns	Erosion, siltation of wetlands, water quality, wildlife habitat, climate change
Population	154,331 (2021 Census)
Community Type	Province
Project Area	44.27km^2
Year	2008-present
Funding	ALUS Canada (corporate sponsorship, donations)

Summary – Alternative Land Use Services (ALUS) Program PEI provides financial incentives to agricultural landowners for the removal of environmentally sensitive land from agricultural production and/or for implementing beneficial management practices on agricultural land. The program is delivered through the Province of PEI under the guidance of an advisory group that includes members from industry, conservation and watershed groups, and the University of PEI.

Eligible activities include expanding buffer zones beyond the regulated 15 metres, which can include coastlines, retiring high-sloped land, maintaining livestock fencing next to watercourses and wetlands, and delayed hay cutting on long-term forage fields. Payments range from $62/hectare/year to $250/hectare/year depending on the activity. Areas eligible for payment may be prioritized by the Department of Agriculture and Land.[182]

The program's four main goals are to:

[182] Prince Edward Island Department of Agriculture and Land. (2019). Alternative Land Use Services Program Guidelines. Retrieved from https://www.princeedwardisland.ca/sites/default/files/publications/af_alus_guide.pdf

1. Reduce soil erosion and siltation of watercourses and wetlands
2. Improve water quality
3. Improve and increase wildlife habitat
4. Reduce the impacts of climate change[183]

Recommended resources

ALUS Canada website https://alus.ca/

Green Bylaws Toolkit for Protecting and Enhancing the Natural Environment and Green Infrastructure https://stewardshipcentrebc.ca/green-bylaws-toolkit/

[183] ALUS. (2019). ALUS Prince Edward Island: Where Agriculture and Nature Meet. Retrieved from https://alus.ca/alus_community/alus-prince-edward-island/

3.2.8 Wetland policy, plan, and guidelines

Adaptive response	Avoid, retreat, procedural approach
Influence time frame	medium to long-term
Implementation time-frame	medium-term
Planning level	municipal
Planning process and plan type	formal; professional; policy planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews and renewal

Wetland policies guide decision makers on development practices with respect to wetlands. Policies aim to protect wetland habitat but are not legislated through law. Legal requirements are met through regulations to implement the policies. In some cases, wetland retention policies also incorporate strategies designed to rehabilitate or even construct new wetlands.[184]

Wetlands are areas of land that are saturated with water either permanently or seasonally.[185] They form in upland and coastal environments. Coastal wetlands are salt marshes (in the mid and high latitudes) and mangroves (in the tropics and subtropics). They form in the tidal zone in protected bays and estuaries and behind barriers such as spits and bars. They also form behind dunes when there is a tidal channel connecting the low area behind the dune to the sea. Wetlands are valuable environments of the natural coastal landscape: they Act as a natural barrier between the coastline and development. They reduce the risk of flooding because they can take on extra water during flooding events;[186] they filter and clean water flowing from the upland to the estuary or the bay; and they absorb wave energy to protect the land from erosion. Wetland retention policies aim to protect these valuable environments and their functions by providing the framework for regulations that prevent or control development in and around wetland areas.

[184] US Environmental Protection Agency. (2022). Wetlands Restoration Definitions and Distinctions. Retrieved from https://www.epa.gov/wetlands/wetlands-restoration-definitions-and-distinctions
[185] Government of Canada. (n.d.). Water Sources: Wetlands. https://www.canada.ca/en/environment-climate-change/services/water-overview/sources/wetlands.html
[186] State of Washington Department of Ecology. (n.d). Wetlands and Climate Change. Retrieved from https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Wetlands-climate-change

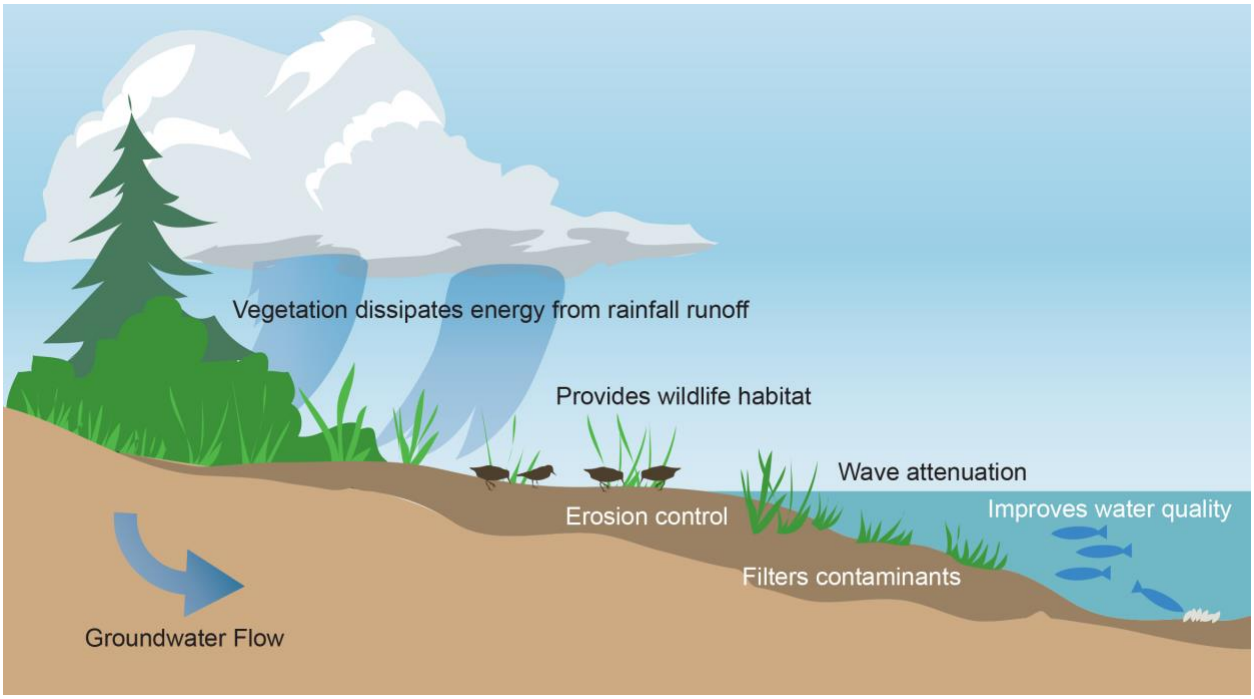

Figure 2.23 Illustration of valued wetland functions (modified after a drawing by Emma Poirier)

OPPORTUNITIES	CONSTRAINTS
• Protecting and restoring wetlands provide important services such as flood protection and erosion control, filtering pollutants from inland water runoff, improving landscape aesthetics and increasing coastal biodiversity. • Natural wetland services can replace more costly built infrastructure.	• Insects can become a health risk because wetlands are insect habitat; maintaining healthy surrounding upland habitat and good water circulation controls insect populations. • Building and restoring wetlands requires maintenance until the wetland is established.

Getting started and first steps – Wetland policies already exist at the provincial level for each of the four Atlantic Provinces (described in the Legislative Section of this document). Local communities must comply with the provincial policies and can also adopt local or regional policies. Local and regional policies can be tailored to the local context. Here are first steps toward using wetland policies:

- Become familiar with provincial level policies.
- For communities with land use planning authority, adapt **provincial policies** into local land use planning.
- Promote the stewardship of wetlands through **education** and **community engagement**. Effective stewardship of wetlands requires that community members take an active role in their management.

Wetland policy, plan and guideline example (regional)

Profile: Nova Scotia	
Coast	Atlantic
Region	Nova Scotia
Impact Concerns	Wetlands
Population	969,383 (2021 Census)
Community Type	Province
Project Area	52,942.27km^2
Year	2011, Revised 2019
Funding	Part of the planning process

Summary – The *Nova Scotia Wetland Conservation Policy*'s goal is to prevent a net loss of wetlands in the province. The Policy was written in 2011 and revised in 2019. It includes four policy objectives regarding managing human activity, promoting protection and stewardship, long-term net gain of wetlands, and encouraging buffers. The policy outlines the steps the government will take to achieve these objectives. The Policy also clarifies the roles of different government departments and the public as well as identifying the legislation, regulations, and policies relevant to wetland conservation.

Under the *Wetland Conservation Policy*, all salt marshes are considered Wetlands of Special Significance, meaning they are protected. The Policy also requires that the government must compensate for the disturbing of wetlands with new or restored wetlands. The dyke realignment project at Onslow-North River is an example of wetland creation as a result of the compensation requirements for permitted destruction or alteration of wetlands.[187]

The Policy was shaped through consultation with industry, academic, nongovernmental organization stakeholders, First Nations, Nova Scotians, and federal, provincial, and municipal government staff.[188]

Recommended resources

Government of Newfoundland and Labrador – *Policy for Development in Wetlands*: https://www.gov.nl.ca/ecc/waterres/regulations/policies/wetlands/#:~:text=The%20objective%20of%20the%20policy,aquatic%20habitats%20of%20the%20wetlands.

Government of Nova Scotia – *Wetland Conservation Policy*: http://www.novascotia.ca/nse/wetland/conservation.policy.asp

Government of Prince Edward Island – *A Wetland Conservation Policy for Prince Edward Island:*

[187] Manuel, P., Rapaport, E., Ewashen, N., Kowal, C., Warren, K. (2021). Onslow-North River Managed Dyke Realignment and Tidal Wetland Restoration Project: A Case Study of Nature-based Coastal Adaptation in Nova Scotia. Retrieved from https://static1.squarespace.com/static/5c83d5c63560c33561cc74de/t/61aeca277f2d475782d005e9/1638844969432/MRfM_Onslow_Case_Study_Final_Dec05_21_updated.pdf

[188] Government of Nova Scotia Department of Environment and Climate Change. (2019). Nova Scotia Wetland Conservation Policy. Retrieved from https://novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf

https://www.princeedwardisland.ca/sites/default/files/publications/pei_wetland_policy_2007_0.pdf

Government of New Brunswick – *Wetlands Conservation Policy*: https://www2.gnb.ca/content/dam/gnb/Departments/nr-rn/pdf/Wetlands-TerresHumides.pdf

3.3 Regulatory and Land Use Change Tools

3.3.1 Wetland regulations

Adaptive response	Avoid, retreat, procedural approach
Influence time frame	short- to long-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal; professional; regulatory; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews and renewal

Wetland regulations are a legislative tool enacted through law. They restrict and control development in and around wetlands. Restrictions involve prohibiting activities that damage or destroy a wetland, such as dredging, draining, in-filling, or removing vegetation, and development within a prescribed distance of a wetland boundary. Regulations can set development setbacks from wetlands of a certain size. In some cases, regulations also include strategies to restore or construct new wetlands, typically to make up for destroying a wetland when damaging or destroying a wetland cannot be avoided.[189]

Wetlands are areas of land that are saturated with water either permanently or seasonally.[190] They form in upland and coastal environments. Coastal wetlands are salt marshes (in the mid and high latitudes) and mangroves (in the tropics and subtropics). They form in the tidal zone in protected bays and estuaries and behind barriers such as spits and bars. They also form behind dunes when there is a channel connecting the low area behind the dune to the sea. Wetlands are valuable elements of the natural coastal landscape: they Act as a natural barrier between the coastline and development. They reduce the risk of flooding because they can take on extra water during flooding events;[191] they filter and clean water flowing from the upland to the estuary or the bay; and they absorb wave energy to protect the land from erosion. Wetland regulations protect these valuable environments and their services by preventing or controlling development in and around wetlands.

OPPORTUNITIES	CONSTRAINTS
• Enforced through law. • Protecting and restoring wetlands can provide important services such as flood protection and erosion control, filtering pollutants from inland water runoff, improving landscape aesthetics and increasing coastal biodiversity. • Natural wetland services can replace most costly built infrastructure.	• Insects can become a health risk because wetlands are insect habitat; maintaining healthy surrounding upland habitat and good water circulation controls insect populations. • Building and restoring wetlands requires maintenance until the wetland is established.

[189] US Environmental Protection Agency. (2022). Wetlands Restoration Definitions and Distinctions. Retrieved from https://www.epa.gov/wetlands/wetlands-restoration-definitions-and-distinctions
[190] US Environmental Protection Agency. (2022). What is a wetland? Retrieved from https://www.epa.gov/wetlands/what-wetland
[191] State of Washington Department of Ecology. (n.d). Wetlands and Climate Change. Retrieved from https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Wetlands-climate-change

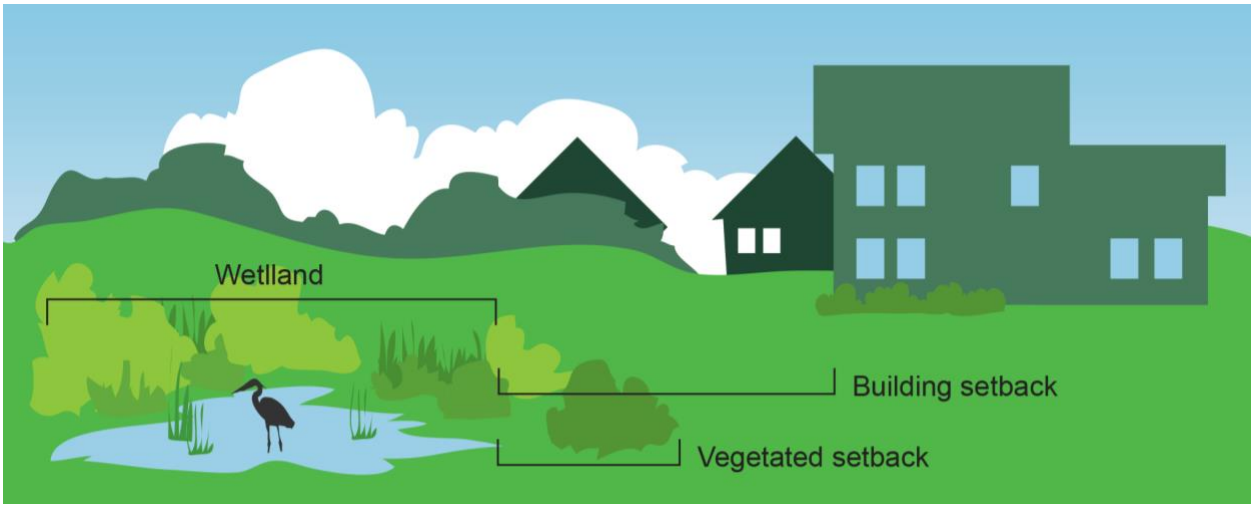

Figure 2.24 Setbacks that can protect wetlands from adjacent development (modified after Yvonne Reeves, Dalhousie University)

Getting started and first steps – All Atlantic provinces have wetland regulations. For instance, requiring wetlands to be shown on subdivision plans, or requiring the separation of forestry operations from wetlands. The Province of Prince Edward Island has a 15m buffer zone where no soil or ground may be disturbed or altered (Section 3[3], *Environmental Protection Act Watercourse and Wetland Protection Regulations*). These regulations apply to all lands within the Province. Local communities can have policies and by-laws regulating wetlands, but they cannot require less than the provincial policy regulates. They can also advocate to the province to strengthen existing regulations or to develop regulations from existing provincial policies.

Here are some first steps toward using, and advocating for, wetland regulations:

- Become familiar with provincial wetland regulations, or policies.
- Ensure that local land use by-laws comply with provincial regulations.
- For communities with land use planning authority, enact a by-law, or amend an existing by-law to place more stringent restrictions on development than the existing provincial regulations.
- For communities without land use planning authority, advocate to the province for developing and enforcing wetland regulations.
- Report any wetland regulation violations to the provincial department responsible for the regulation (see legislative section for the responsibilities of provincial departments).

Wetland regulations example (international)

Profile: Massachusetts, United States	
Coast	Atlantic
Region	Northeastern United States
Impact Concerns	Flooding
Population	6.873 million (2020 Census)
Community Type	State
Year	2014

Summary – The State of Massachusetts has a *Wetland Protection Act* that describes regulations for the protection of coastal and inland wetlands. The Act protects the following interests:

- Public and private water supplies,
- Groundwater supplies,
- Flood control and storm damage protection,
- Pollution prevention,
- Protection of wildlife and fisheries, and
- Protection of land containing marine shellfish.

This statute applies to the protection of freshwater wetlands, coastal wetlands, beaches, dunes, marshes, swamps, and banks that border on the ocean, estuaries, creeks, rivers, streams, ponds or lakes, land that is under a water body, land at risk to

tidal action, and land at risk of flooding. Activities and uses within 100 feet from these areas are also regulated. Minor activities such as planting native species, building fences, and constructing accessory buildings on lawn areas are permitted within the 100 foot buffer zone. Septic systems are permitted but must be set back 50 feet from any coastal bank, beach, dune, or salt marsh. Any proposed activities that will "remove, fill, dredge, or alter that area" require a permit through a Conservation Commission.

Conservation Commissions are local environmental agencies responsible for protecting wetlands and waterways by administering the *Wetland Protection Act* in their local jurisdictions. A commission decides after public hearings whether or not to permit a proposed activity in areas designated under the Act. A commission can permit an activity with conditions that will protect the interests listed in the Act. Commissions also have the authority to create open space and recreation plans in their jurisdictions. They have the authority to place further restrictions on wetland conservation areas in addition to the restrictions described in the *Wetland Protection Act*. Additional restrictions are enforceable by law.[192]

Recommended resources

Government of Prince Edward Island – *Watercourse and Wetland Protection Regulations*: https://www.princeedwardisland.ca/sites/default/files/legislation/e09-16-environmental_protection_Act_watercourse_and_wetland_protection_regulations.pdf

Government of New Brunswick – *Watercourse and Wetland Alteration Regulations*: https://laws.gnb.ca/en/showfulldoc/cr/90-80//20220912

Government of Nova Scotia – *Wetland Alteration Approval Process*: https://novascotia.ca/nse/wetland/docs/Short_Guide__Wetland_Alteration_Application_Approval_Process_1.0.pdf

[192] Massachusetts Association of Conservation Commissions. (n.d.). Conservation Commissions in Massachusetts. Retrieved from https://www.maccweb.org/page/AboutConCommMA

3.3.2 Land use by-law and zoning

Adaptive response	Avoid, retreat, accommodate
Influence time frame	Short- to long-term
Implementation time-frame	short- to medium-term
Planning level	regional, municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews and renewal

Communities with land use planning authority can control land use and development through land use zoning and by-laws. Land use by-laws are used to achieve the goals and objectives of a statutory community plan for land use and development. Only communities that have a statutory community plan can use by-laws. Within a land use by-law, zoning organizes land uses and development. Land use zones are mapped and typically include categories of residential, commercial, industrial, institutional, parks and open space, resource, mixed use, and general use. Specialty zones address specific land uses or areas such as coastlines. The land use by-law describes the details of permitted land uses and developments in each zone and enforces the zones.

Land use controls can be very effective tools for managing climate change adaptation in coastal areas. By-laws enacted for a coastal zone can ensure the area is used for the public good and for environmental protection. A number of by-laws can be used in a coastal zone that manage the risks to a community while supporting suitable development.

There are different types of or approaches to zoning that can support climate change adaptation in coastal areas.

Land use zoning – This type of zoning regulates the type of land use and development that is permitted within the zone. For example, land use in coastal areas could be restricted to low intensity uses such as recreation. The land would be zoned ‘recreation’ or parks and open space, and the by-law would describe the details of what can happen in this zone. This type of land use designation restricts development, permitting only those structures needed to support low intensity use, like trials; reduces risks to public safety; and limits future damage to structures. An added benefit of restricting development is that there is increased public access to the coast and open space. Normally, only public land is zoned for such low intensity uses.

Overlay zoning – This type of zoning does not change the existing, permitted, land uses but imposes additional by-laws upon them. In other words, the additional requirements form a zone or by-law laid over top of zones are already in place. Additional by-laws in coastal areas can be used to protect people and structures. Overlay zones often include by-laws that require setbacks, include building regulations, or restrict hazardous materials.

Hazard zoning – This type of zoning identifies where environmental hazards exist and specifically addresses those hazards. The zone can be in the form of a land use zone (see above) or an overlay zone (see above).

Performance or prescriptive zoning – This type of zoning is an alternative to land use zoning. It permits any development that achieves a specified performance criterion. For coastal planning, performance criteria are based on technical information that determine standards. In the context of coastal planning, standards could respond to erosion potential and flood risks. The developer must collect the necessary information and decision-makers determine if the development proposal meets the zoning criteria and standards.[193]

Conservation or protection zoning – These zones are used to protect natural habitats, such as beaches and wetlands. Land uses are often restricted in these zones to recreational activities or habitat restoration. Using these zones to protect natural coastal habitats also stops development in the zone. Removing vegetation is also often prohibited in these zones. Protecting coastal habitat maintains a protective buffer between human development and coastal hazards. The protection also provides room for natural habitats to move landward with rising sea level.

Temporal zoning – This type of zone is typically used to protect species that breed in certain coastal areas by restricting certain activities for specific times of the year.

Downzoning – This type of zoning is used to reduce the current density or intensity of use in a developed coastal area. Future density from development can be reduced through subdivision by-laws. Downzoning can also be used to prevent rebuilding structures that are damaged after storm events. Downzoning may also require that structures are rebuilt to meet new building standards that accommodate for sea level rise. Downzoning can be used as an overlay zone or land use zone (see above).

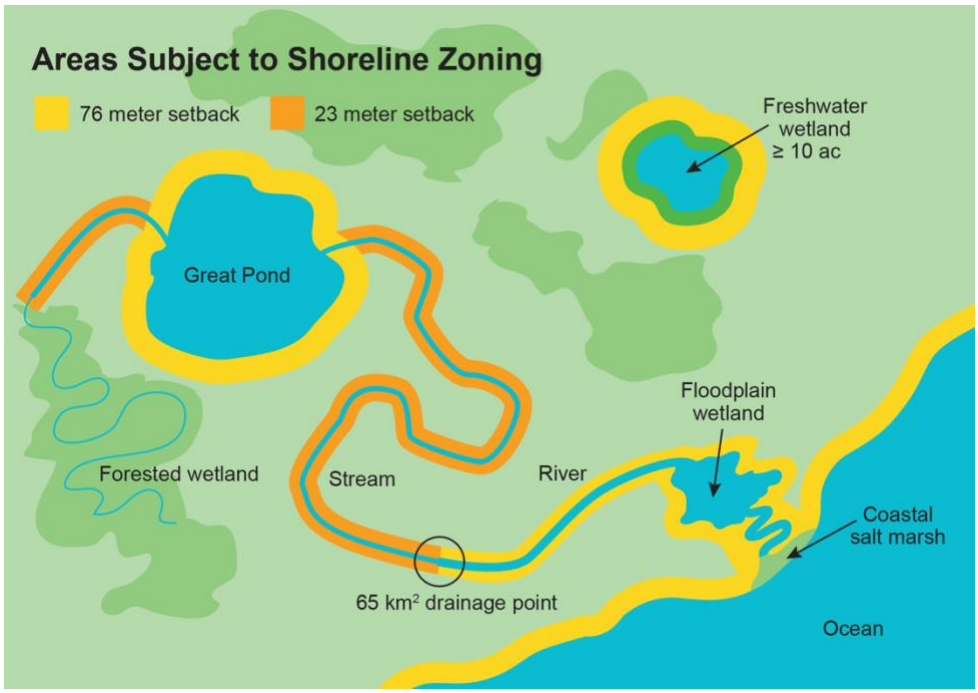

Figure 2.25 Demonstration of defining a coastal zone using best practices. The coastal zone includes wetlands and areas surrounding the freshwater systems that drain into the ocean (modified from Maine Sea Grant[1])

[193] MacDonald, S.M. (2013). Exploring the potential for performance zoning within the practice of marine spatial planning. Master of Marine Management Thesis. Dalhousie University, Halifax, NS. pdf. Retrieved from http://dalspace.library.dal.ca/bitstream/handle/10222/37031/Macdonald,%20S%20-%20Graduate_Project2013.pdf?sequence=1

OPPORTUNITIES	CONSTRAINTS
• Can protect coastal ecosystems by restricting development and other damaging activities. • Can protect development and activities from coastal hazards. • Can tailor permissions and restrictions to a specific coastal environment, anticipate changes in coastal conditions, and the circumstances of the community.	• May have limited effectiveness in developed areas where non-conforming uses will be grandfathered forward. • Zoning (or rezoning) can be controversial and requires transparency and community engagement. • Can affect property values or prevent building on small lots that do not have space for restrictions such as siting structures, or setbacks.

Getting started and first steps – Any community with land use planning authority can establish a zone to deal with coastal issues. Communities without land use planning authority can advocate to provincial authorities to establish provincial coastal zoning. In New Brunswick, the Coastal Areas Protection Policy has established zones of different levels of development restrictions at and moving back from the coast. Implementation of the *Coastal Protection Act* in Nova Scotia will be through a Coastal Protection Zone regulation that will incorporate setbacks and development permitting to meet zone requirements. Here are some first steps toward establishing a zone and by-law for adaptation to climate change at the coast:

- **Gather and map** data of coastal features, expected sea level rise and areas at risk of flooding and/or erosion to identify a zone for coastal protection. The information will also support selecting the type of zoning and by-laws necessary for adaptation that will protect the public and the environment.
- **Engage** stakeholders widely. Zoning is controversial because it restricts development and land uses. Environmental protection is vulnerable to pressures for less stringent development controls than might be necessary to protect sensitive coastal ecosystems.
- With expert and public input delineate a zone.
- Place restrictions within the zone, such as setbacks, that will protect public safety and environmental and cultural features. Restrictions in a by-law must comply with the strategies in a community's **statutory community plan** and should not contradict **guidance, action, and management plans**. Zoning can be set up through an amendment to an existing land-use by-law, or by developing a new by-law.

Land use by-law and zoning example (international)

Profile: Town of Scarborough, Maine	
Coast	Atlantic
Region	Gulf of Maine
Impact Concerns	Storm events, flooding, receding beaches
Population	22,135 (2020 Census)
Community Type	Town
Year	2006
Funding	Included in normal planning process

Summary – The town of Scarborough, Maine is located on gently sloping land. Elevations in the town range from sea level to 215 feet. The Town's shoreline includes sand beaches, bedrock outcrops, working harbours, and a large coastal wetland estuary system.

Coastal structures in the Town, including homes and cottages, are at risk of climate change impacts such as storm surge and sea level rise; storms have caused significant damage in the past. The Town uses a sea level rise scenario of 2 feet for adaptation planning. Two feet of sea level rise could potentially impact 1,100 existing buildings by 2100.

The town of Scarborough introduced a cluster subdivision design (or conservation subdivision design) by-law into three existing land use zones in its comprehensive plan. The by-law applies in these zones when any of the following conditions exist:

- the land to be subdivided contains one acre of wetland,
- 20% of the land to be subdivided is wetland,
- 20% of the land to be subdivided is within the shoreland zone, and
- a subdivision would alter 4,300 square feet or more of wetland if developed in a conventional layout.[194]

These by-laws are used to set back coastal developments and preserve natural wetland habitats. The Town has used development agreements to obtain beach lots in the community of Pine Point. The lots were exchanged for higher density allowances for a development set back from the shoreline. This was used as an incentive for developers.[195]

Figure 2.26 The town of Scarborough included regulations requiring that conservation subdivision design methods are used for new developments in areas with wetlands (Town of Scarborough, Maine[196])

[194] Town of Scarborough. (2021). Chapter 405 Zoning Ordinance Town of Scarborough. Retrieved from https://resources.finalsite.net/images/v1652281476/scarboroughmaineorg/x9utseaizhr7apudbx4c/405_Zoning_Ordinance_web.pdf
[195] Schechtman, J.D. & Brady, M. (2013). Cost efficient climate change adaptation in the North Atlantic Retrieved from https://www.researchgate.net/publication/278328711_Cost-efficient_climate_change_adaptation_in_the_North_Atlantic
[196] Town of Scarborough Maine. (2021) Town of Scarborough Maine Comprehensive Plan. Retrieved from https://resources.finalsite.net/images/v1641929250/scarboroughmaineorg/s7anzrszmc6tytnm7dve/2021ComprehensivePlan.pdf

Zoning example (regional)

Profile: Nova Scotia	
Coast	Atlantic
Region	Nova Scotia
Impact Concerns	Flooding, storm surge, erosion
Population	969,383 (2021 Census)
Community Type	Province
Year	2019
Funding	Included in normal planning process

Summary – In 2019, the government of Nova Scotia approved the *Coastal Protection Act*.[197] The purpose of the Act is to protect the coast by preventing development and activity in places that damage the environment or put residents and buildings at risk from sea-level rise, coastal flooding, storm surge, and coastal erosion.[198] After receiving feedback from the public, the Province is now developing the associated regulations. Environment and Climate Change Nova Scotia will work with municipalities, the Association of Nova Scotia Land Surveyors, Engineers Nova Scotia, Geoscientists Nova Scotia and the Mi'kmaq as it finalizes the regulations, with a goal to have them take effect in 2023.[199]

The Regulations will identify the Coastal Protection Zone (the area where the Act and Regulations will apply). It will include land on either side of the ordinary high-water mark along the province's coast, including islands, major tidal rivers, and other estuaries directly connected to coastal waters. The "upland" area will likely fall between 80-100m. It will include public and private lands. The Regulations will add new requirements for building permits, development permits, and development agreements within the zone. Municipalities will be responsible for ensuring permits comply with the Act. There will be two types of setbacks included in the regulations: vertical setbacks, called minimum building elevations and site-specific horizontal setbacks.[200] Both setbacks will incorporate climate change impact considerations, including sea level rise and projected rates of erosion.

[197] Coastal Protection Act. Nova Scotia Department of Environment and Climate Change. (2019). Retrieved from the Nova Scotia Office of the Legislative Council website: https://nslegislature.ca/legc/bills/63rd_2nd/3rd_read/b106.htm
[198] Ibid.
[199] Nova Scotia Department of Environment and Climate Change. (2022). Input on Coastal Protection Released. Retrieved from https://novascotia.ca/news/release/?id=20220318001
[200] Nova Scotia Department of Environment and Climate Change. (2021). A Detailed Guide to Proposed Coastal Protection Act Regulations. Retrieved from https://novascotia.ca/coast/docs/part-2-detailed-guide-to-proposed-Coastal-Protection-Act-Regulations.pdf

Prescriptive (performance) zoning example (regional)

Profile: Village of Le Goulet, New Brunswick	
Coast	Atlantic
Region	Gulf of St. Lawrence
Impact Concerns	Flooding, erosion, storm surge
Population	749 (2021 Census)
Community Type	Village
Year	2004-ongoing
Funding	Atlantic Climate Adaptation Solutions Association

Summary – The village of Le Goulet is working towards prescriptive zoning in coastal areas. The town has created draft regulations that consider climate adaptation for new construction. The Town is dealing with multiple coastal issues. Reduced sea ice has increased the erosion of local sand dunes from a maximum height of two metres above sea level to only a half a metre above sea level. Storm surge and extreme weather events have damaged homes, caused saltwater intrusion into wells, overfilled septic tanks, and blocked roadway access. Residents are dealing with ongoing issues of well contamination and mould from these events. Le Goulet participated in a capacity building initiative under the NRCan Regional Development Collaboratives (RAC) program, which was Atlantic Climate Adaptations Solutions Association in Atlantic Canada. The partnerships through that participation supported the development of planning and decision-support tools to help deal with issues of coastal flooding and erosion more effectively. Prescriptive zoning was chosen to ensure the use of appropriate measures to accommodate risk, rather than prohibiting all development in flood areas.[201]

The draft rezoning by-law introduces ACC zones (accommodation zone – climate change) which requires that development or construction meets the following conditions:

- new construction or additions of more than 50% of the ground floor must be located at a height greater than 2.7m,
- new construction must demonstrate the safety of its water, electricity, and mechanical systems if they are not above 2.7m
- permit applications must be accompanied by a completed plan by a licenced New Brunswick land surveyor
- new construction cannot be assigned for the purposes of a hospital, elderly care homes, fire station, or schools
- it is forbidden to install, build, modify, or repair any erosion protection work unless a permit of development has been issued and many conditions identified in the by-law are followed.

The draft rezoning by-law has not yet been adopted and still needs to be approved by the Minister and registered with the province to be effective.[202]

Partners – Coastal specialists at the University of Moncton worked with citizen-based working groups to identify areas at risk and develop an adaptation plan to address the risks. Le Goulet

[201] Department of Natural Resources Canada. (2010). Adapting to climate change. Chapter 3: Le Goulet's climate change adaptation plan. Retrieved from https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/mun/pdf/legoulet_e.pdf
[202] Kocyla, B., personal communication, July 15th, 2022.

participated in the Atlantic Climate Adaptation Solutions Association initiative to develop planning tools to deal with coastal issues, including detailed maps of the effects of climate change on the coast. The working group suggested implementing two risk-based zones based on sea level rise projections for 2055, a 1-in-50 year storm surge, and erosion projections for 2100. The Town is working with the New Brunswick Department of the Environment to develop criteria for new developments in the zone.[203]

[203] Atlantic Climate Adaptation Solutions Association. (2012). Adapting to climate change: coastal flooding, Le Goulet. Government of New Brunswick, Department of Natural Resources Canada. Retrieved from https://atlanticadaptation.ca/en/islandora/object/acasa%253A329

3.3.3 Setbacks

Adaptive response	Avoid, retreat, accommodate
Influence time frame	Short- to long-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews and renewal

Setbacks prevent damage from flooding and erosion and protect coastal habitats and green space. Coastal setbacks enforce mandatory distances between the water and built structures. They minimize the vulnerability of infrastructure to coastal hazards, protect public health and safety, and limit environmental damage.[204] There are a variety of setback types that account for horizontal distances, elevations, are a fixed and uniform distance from a boundary (such as a coastline or high-water mark), that move or retreat when the boundary itself moves (such as an eroding coastline), or are varying widths that are appropriate for changing conditions along a boundary.

Horizontal setbacks (or lateral setbacks) require that structures or activities are kept a certain distance away from a boundary, such as the high-water mark or the edge of a steep embankment. Horizontal setbacks protect human activity from hazardous coastal conditions and protect coastal process and structures from human impacts.

Vertical setbacks (or elevation setbacks) require that structures, or the uses within a structure, are located at a certain elevation above the high-water mark. Vertical setbacks protect activities and structures from flooding. Less vulnerable uses can occupy lower elevations, and more vulnerable uses, such as living spaces (residential) must be located above the elevation setback.

Fixed setbacks maintain a fixed horizontal distance or elevation over time. They do not account for coastal changes such as sea level rise or erosion. They can, however, be adjusted (with an amendment to a by-law) to account for changing conditions.

Retreating setbacks account for changing conditions and migrate landwards with changes to the boundary, such as a changing coastline.

Buffers prohibit removing vegetation within a certain distance from the coast. Vegetation preserves habitat, filters stormwater, and reduces erosion. Buffers are commonly used along banks and shores of streams, lakes, sometimes wetlands, and the coast.

[204] New Brunswick Department of Environment and Local Government. (2019). A coastal areas protection policy for New Brunswick. Retrieved from https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/CoastalAreasProtectionPolicy.pdf

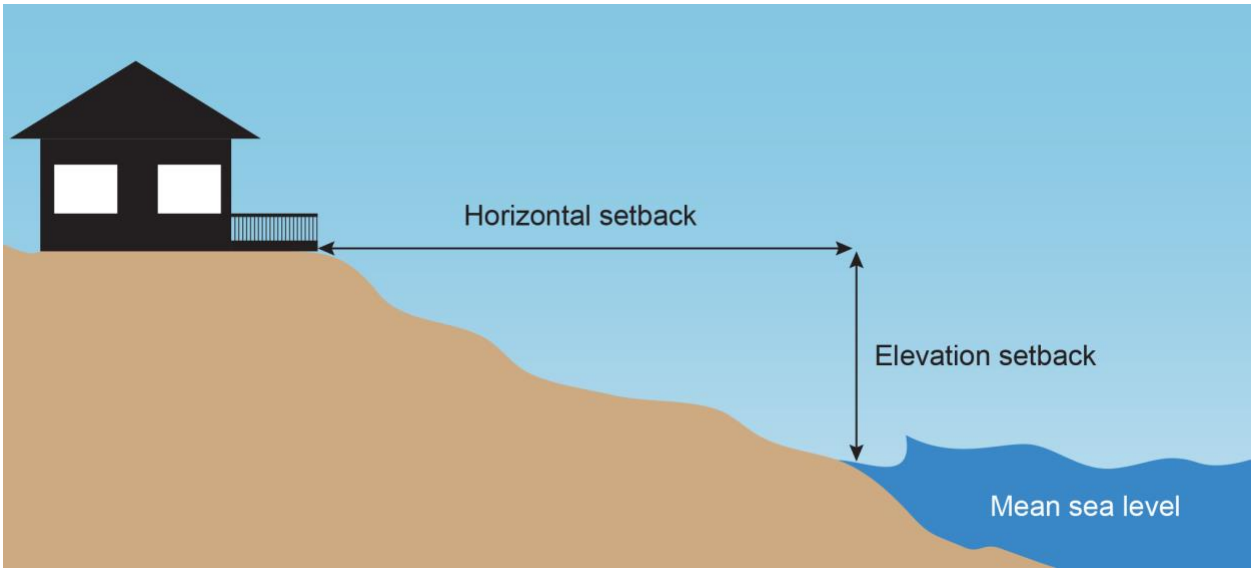

Figure 2.27 Elevation setbacks (or vertical setbacks) require that structures, or the uses within a structure, are located at a certain elevation above the high-water mark. Horizontal (or lateral) setbacks are typically measured from the high-water mark. They may also be established by other landscape features (created by Yvonne Reeves, Dalhousie University)

OPPORTUNITIES	CONSTRAINTS
• Increases public safety during severe weather events. • Prevents damage to structures and infrastructure. • Conserves coastal habitats and open space. • Increases public access to the coast. • Can protect property values over time.	• Requires scientific data on coastal processes, such as erosion, and sea level rise to support legislation. • Can cause conflict with developers and property owners. • Requires monitoring to be effective.

Getting started and first steps – The Provinces of New Brunswick and Prince Edward Island have adopted standardized coastal setback requirements for all localities under their authority. All four provinces have setbacks for watercourses (see Legislative Context section). Municipalities must comply with provincial legislation for setbacks.

Communities with land use planning authority can apply stricter setbacks and buffers in their area. Buffer regulations are already used for streams, lakes, and wetlands. Communities implement setback or buffer requirements through land use by-laws.[205]

Here are first steps toward implementing setbacks:

- Form a committee to research and make recommendations on setbacks.
- Review applicable provincial legislation to determine the criteria for setbacks or buffers.
- Gather data and map areas at risk of flooding and/or erosion, important coastal habitats, and other coastal areas that are valued by the community.

[205] Stewart, P.L., Rutherford, R.J., Levy, H.A., & Jackson, J.M. (2003). A guide to land use planning in coastal areas of the Maritime Provinces. Fisheries and Oceans Canada: Oceans and Environment Branch. Retrieved from https://waves-vagues.dfo-mpo.gc.ca/Library/316491.pdf

- Gather data and map projected sea level rise and erosion to back up setback or buffer requirements that take these issues into account.
- Establish a community engagement strategy highlighting the principles and justifications for introducing setbacks.

Setbacks example (regional)

Profile: Town of Stephenville, Newfoundland and Labrador	
Coast	Atlantic
Region	Gulf of St. Lawrence
Impact Concerns	Flooding
Population	6,540 (2021 Census)
Community Type	Town
Area	14.68km^2
Year	2014
Funding	Part of the regular planning process

Summary – The town of Stephenville's Development Regulations include a vertical setback requirement (Section 45) where development is not permitted at or below the 4-metre elevation unless the use requires direct water access or is a temporary or minor structure, or the proponent can show that "the risk is low and/or that the development can withstand the damage incurred by a flood or storm event." The Town may refuse to issue permits for development "that could be affected by a storm event based upon previous events, local knowledge, and/or research carried out in respect of climate change."

Stephenville's Development Regulations have benefited from work that the provincial government undertook to support local area environmental policy making and related development controls. The provincial government has undertaken flood plain mapping under the Canada-Newfoundland Flood Damage Reduction Program in 37 communities around the province, leading the Town to integrate the flood plain management policy into its regulation. Section 77 states that development within the 15-metre buffer of waterways and wetlands is subject to the Development Regulation as well as all relevant provincial and federal policies and statutes, including the Policy for Infilling Bodies of Water, Policy for Flood Plain Management, Development in Shorewater Zones, Development in Wetlands. Where there is conflict between any policy directives, the more restrictive standards apply.[206]

[206] Town of Stephenville. (2014). Development Regulations 2014. Retrieved from https://static1.squarespace.com/static/5c49d2d775f9eed8698ac1a9/t/5c5ae70b71c10ba34711ce97/1549461263117/Stephenville-Development-Regulations-2014-Registered-.pdf

3.3.4 Subdivision by-law or regulation

Adaptive response	Avoid
Influence time frame	Short- to long-term
Implementation time-frame	short- to medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal; professional; community planning; regulatory
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews

Subdivision by-laws can be used to regulate development in coastal areas. Sub-division by-laws control the size and configuration of lots (and therefore the number of lots for any given property, thus controlling density). A subdivision by-law may require a developer to provide a report from a qualified professional that shows where flooding or erosion will occur. The developer must also show how the land subdivision will avoid development in areas at risk or in environmentally sensitive areas. A subdivision by-law may also require that the developer convey a minimum percentage of the land to the municipality for public use. This provision may enable a community to acquire land along the coast. Within a subdivision agreement, the approving officer can also require that the developer will follow certain development standards and sign a waiver of liability where circumstances require. Subdivision by-laws can also include provisions for setbacks or enable conservation subdivision design.

OPPORTUNITIES	CONSTRAINTS
• Can amend an existing subdivision by-law to include regulations that account for coastal conditions and climate change. • Can tailor a by-law to each community's issues or objectives. • Can educate developers on coastal and climate change issues and adaptation.	• Cannot implement a local by-law without land use planning authority. • Can be contentious with landowners and developers with increasing restrictions or requirements in a by-law.

Getting started and first steps – Any municipality with land use planning authority can implement a local subdivision by-law. Local subdivision by-laws must comply with provincial subdivision legislation. Each province has legislation regarding subdivision by-laws (see Legislative Section). Here are first steps toward implementing a local subdivision by-law:

- Determine the local climate change issues and appropriate subdivision restrictions for dealing with those issues. Municipal planners, hired expertise, or a **committee** can carry out research into issues and appropriate subdivision restrictions for climate change at the coast.
- For communities with land use planning authority, develop a local subdivision by-law, or amend an existing one, to include subdivision restrictions deemed appropriate for the community in dealing with climate change.
- For communities that do not have land use planning authority, advocate to the province to develop subdivision regulations that address coastal protection and climate change

adaptation. The province of Prince Edward Island already has regulations within its subdivision by-law that address coastal issues.

Subdivision bylaw example (regional)

Profile: Souris, Prince Edward Island	
Coast	Atlantic
Region	Northumberland Strait
Impact Concerns	Erosion
Population	1,079 (2021 Census)
Community Type	Town
Area	3.8km^2
Year	2002
Funding	Part of the normal planning process

Summary – The town of Souris has provisions in its Zoning and *Subdivision Control Bylaw* that regulate subdivision of land that contains dunes and beaches. The Town's geography includes long sandy beaches, rolling hills, soft bedrock, and prominent cliffs. The land is gently sloping and the highest elevation is 38 metres above sea level. Port facilities in the town support fishing and agriculture.[207]

The Town's subdivision by-law requires that any subdivision of land needs a permit that must be approved by council. The subdivision of land that includes primary or secondary sand dunes, or bay mouth barrier sand dunes, is limited to no more than five lots with a minimum of 2 acres per lot. Lot configuration must be such that no building or structure in the subdivision can be built on any sand dune and must be at least 100 feet from primary and secondary sand dunes.[208]

Figure 2.28 The town of Souris is located in north-eastern Prince Edward Island on the Northumberland Strait-Gulf of St. Lawrence coast. The town is low-lying and has a soft, erodible coastline (Don Jardine, University of Prince Edward Island)

Recommended Resources

Town of Souris Zoning and Subdivision Control Bylaw: https://sourispei.com/wp-content/uploads/2017/05/Zoning-and-Subdivision-Development-Bylaws.pdf

[207] Town of Souris. (n.d.). *Souris official plan*. Retrieved from https://sourispei.com/town-hall/official-plan/
[208] Town of Souris. (n.d.). *Town of Souris: zoning & subdivision control (development) bylaw*. Retrieved from https://sourispei.com/wp-content/uploads/2017/05/Zoning-and-Subdivision-Development-Bylaws.pdf

3.3.5 Development standards

Adaptive response	Avoid, accommodate
Influence time frame	Short- to long-term
Implementation time-frame	short- to medium-term
Planning level	municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during plan review

Communities can use development standards to regulate the design of buildings, neighbourhoods, and infrastructure. Standards describe the requirements for subdivision, design, and construction. Local governments can develop, implement, monitor, and enforce standards within their jurisdiction. Standards can apply to the entire jurisdiction or a specific area. Development standards can direct development away from (avoid) or accommodate risks of climate change impacts including flooding and erosion.

Development standards for buildings are applied through land use by-laws and zoning, urban design standards, and building codes. Setback requirements can be used to avoid risks. Structural requirements, such as floodwalls, wet flood proofing buildings, raised infrastructure, and floating buildings are development standards to accommodate risks.

Development standards for neighbourhoods can be applied through subdivision by-laws and urban design standards. The configuration of subdivisions can require that there is room for coastal setbacks.

Development standards for infrastructure can be applied through technical guidelines. Guidelines can be used to implement stormwater management through drainage ditches, detainment ponds, and rain gardens and constructed wetlands. These standards help to reduce inland flooding. Standards for infrastructure can also require that water and sewer pipes, roads, and sewage treatment facilities are set back from areas at risk of flooding and erosion.

Figure 2.29 Raised infrastructure is an accommodation adaptation technique. Raised infrastructure can be required through development standards (Vincent Leys, CBCL Limited)

OPPORTUNITIES	CONSTRAINTS
• Are enforced through law.	• New, updated standards do not apply to existing structures.

• Can be used for new developments and reconstruction.	

Getting started and first steps – Any community with land use planning authority and a statutory community plan can use development standards. Here are first steps toward implementing development standards:

- Gather data about anticipated local hazards and risks due to climate change.
- Determine what standards are appropriate for dealing with climate change risks.
- Amend the statutory community plan to include development standards. Standards can apply to the entire area of the municipality or a part of the municipality where there is zoning.
- Include development standards in a land use bylaw or subdivision by-law.
- For communities without land use planning authority, advocate to the province to include climate change adaptation into provincial development standards.

Development standards example

Profile: Charlottetown, Prince Edward Island	
Coast	Atlantic
Region	Northumberland Strait
Impact Concerns	Flooding and erosion
Population	38,809 (2021 Census)
Community Type	City
Area	44.27 km^2
Year	2018
Funding	Part of the normal planning process

Summary – The City of Charlottetown Zoning and Development By-Law has specific development standards for its Waterfront Zone (WF). The by-law outlines permitted uses within the zone as well as giving specific regulations for buildings including lot frontage, height, setbacks, stepbacks, and ground floor elevation. A minimum of 60% of the ground floor of buildings in the Waterfront Zone on designated “Walkable Streets” must be restaurants, retail, cultural establishments, or tourism related.

There are also specific regulations regarding development adjacent to watercourses and wetlands. Permission may be granted for lesser setbacks if applicants can prove that the construction will not cause undue erosion or surface runoff, and there will be no immediate danger to inhabitants of the proposed building. Additionally, the City may ask for a watershed management plan when a development is proposed adjacent to a watercourse or wetland.

The Zoning and Development By-Law also has regulations for Water Lots with specific development standards for floating structures.[209]

[209] City of Charlottetown. (2018). City of Charlottetown Zoning and Development By-Law. Retrieved from https://www.charlottetown.ca/common/pages/DisplayFile.aspx?itemId=14140205

3.3.6 Development agreements

Adaptive response	Avoid
Influence time frame	Short- to long-term
Implementation time-frame	short-term
Planning level	municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during plan review

Communities can use development agreements to direct development away from environmentally sensitive environments and areas at risk of environmental hazards. The agreement is between a landowner and the land use planning authority. A development agreement specifies the standards and conditions that will be in place when the property is developed.

A development agreement is required for any development where a developer wants to develop in a form that is different from what the existing by-law stipulates (is not 'as-of-right' or according to the regulations), or, for development in areas where flexibility is possible and each development is considered individually (although certain criteria still apply such as land use mix, maximum densities, minimum lot sizes, protected areas, amenities, etc.). The local jurisdiction can place restrictions on the development to ensure that the community benefits from the project and that the development does not negatively impact adjacent neighbourhoods or the community. A community can also use this tool as an opportunity to allow for innovative developments, or as a bargaining tool to gain public amenities such as open or recreational space.[210] The developer will benefit usually from gaining more density.

OPPORTUNITIES	CONSTRAINTS
• Can use these agreements to allow development innovations that are not included in by-laws but that will be beneficial to the community. • Can include a positive trade-off for both the landowner and the community. • Can approve an agreement with site-specific information.	• Cannot implement this tool without land use planning authority. • Can be contentious with the public if community members do not agree with the terms set out by a development agreement.

Getting started and first steps – Any community with land use planning authority can enter into a development agreement with a landowner or developer in each of the four Atlantic Provinces.

- Develop strategies for development agreements in a statutory community plan or guidance, action, and management plans. This simplifies decision-making when development agreements are brought forward by developers and prevents poor development decisions when approving developments that deviate from the bylaw.

[210] Municipal Research and Service Centre. (2013). Development agreements in plain English. Retrieved from https://mrsc.org/Home/Explore-Topics/Planning/Land-Use-Administration/Development-Agreements.aspx

Development agreement example (regional)

Profile: Town of Bridgewater, Nova Scotia	
Coast	Atlantic
Region	South Shore
Impact Concerns	Flooding and erosion
Population	8,790 (2021 Census)
Community Type	Town
Year	2014
Funding	Part of the normal planning process

Summary – The town of Bridgewater has included a section in its Municipal Planning Strategy to address development along the estuary of the LaHave River using development agreements. The section describes the current conditions along the estuary and requirements for development in the area. Bridgewater partnered with the Applied Research Geomatics Group in 2012 to carry out a flood and erosion risk assessment based on climate change scenarios. The Town designated a LaHave River Development Agreement Area using information gathered from this research. The area is also included in the Town's Land Use By-law and zoning map.[211]

According to the land use by-law, development must comply with all other existing requirements for land use zones as well as requirements for the LaHave River Development Agreement Area.[212] The zoning map for the Town shows where the zone overlays other zones. Council can only permit new developments in this area through a development agreement and must consider the flood and erosion risk assessment in all development agreement applications for the area.

Council must consider a set of 15 criteria contained in the *Municipal Planning Strategy* for development in the zone. One criterion is that no development can be permitted in areas where people and property are at risk of flooding. Another criterion is that the development cannot include institutional buildings such as hospitals, nursing homes, and care facilities (they are prohibited). Any excavation or infilling that is associated with development in the zone must not increase the risk of ice jamming or alter the flow of water in a way that will increase or create flooding issues along the river.[213]

The *Municipal Planning Strategy* also includes a policy that council must consider acquiring land in the Lahave River Development Agreement Area for public purposes.

[211] Town of Bridgewater. (2014). Municipal planning strategy. Retrieved from https://www.bridgewater.ca/town-services/engineering/234-town-services/planning/land-use-planning/2360-municipal-planning-strategy
[212] Town of Bridgewater. (2014). Land use by-law. Retrieved from https://www.bridgewater.ca/town-services/planning/land-use-planning
[213] Town of Bridgewater. (2014). Municipal planning strategy. Retrieved from https://www.bridgewater.ca/town-services/engineering/234-town-services/planning/land-use-planning/2360-municipal-planning-strategy

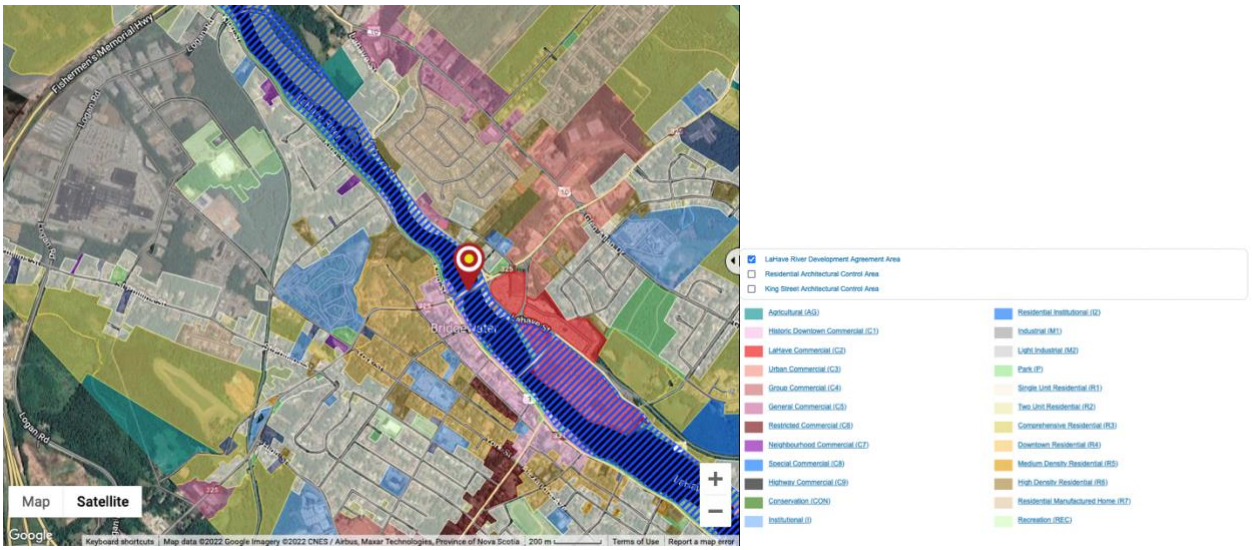

Figure 2.30 A section of the town of Bridgewater's zoning map showing the Lahave river development agreement area in hatching. The zone overlays other land use zones (Town of Bridgewater[214])

Recommended resources

Town of Bridgewater Land Use By-law:https://www.bridgewater.ca/document-library/planning/planning-documents/2232-land-use-by-law/file#page=5

[214] Town of Bridgewater. Retrieved from https://www.bridgewater.ca/zoning

3.3.7 Transfer of development credits

Adaptive response	Avoid
Influence time frame	Short- to long-term
Implementation time-frame	short-term
Planning level	municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during plan review

Transfer of development credits is a tool used during the development of new subdivisions. It can be used to preserve coastal open space and recreational opportunities, avoid hazards, and protect habitats, all desirable actions for climate change adaptation. Transferable development credits are market incentives designed to move development away from areas not suited for development, such as hazardous or environmentally sensitive areas, referred to as sending areas, to areas suitable for development, referred to as receiving areas. The development potential of the sending area is calculated and sold to developers with interests in receiving areas. Receiving areas are then developed with increased density, height, or floor area allowances.[215] The tool is more commonly used in the United States but it has also been used in Canadian municipalities.[216]

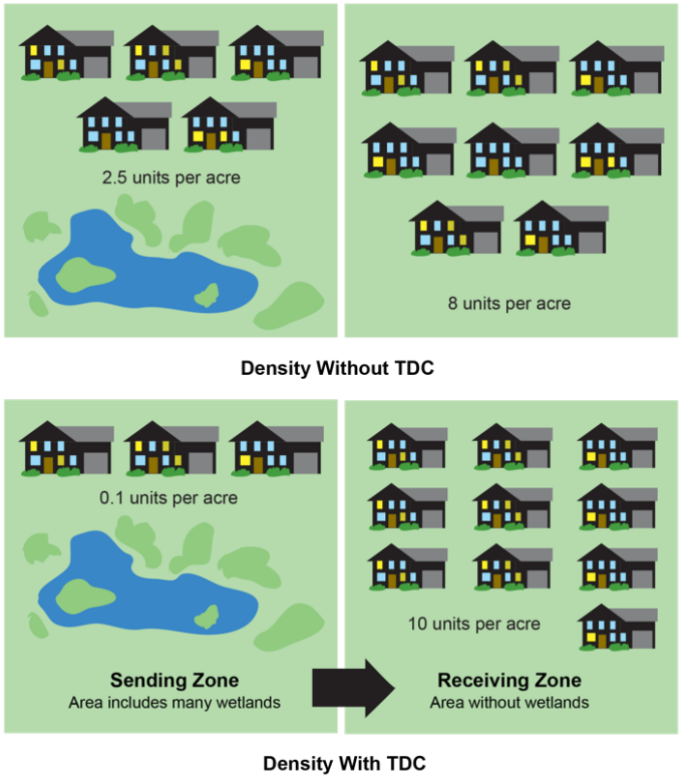

Figure 2.31 Example of how transfer of development credits (transfer development rights in the USA) work and can be used to increase density (after Huron River Watershed Council[217])

[215] Grannis, J. (2011). Adaptation toolkit: sea level rise and coastal land use. How governments can use land-use practices to adapt to sea-level rise. Georgetown Climate Centre. Retrieved from https://www.georgetownclimate.org/files/report/Adaptation_Tool_Kit_SLR.pdf

[216] Greenaway, G. & Good, K. (2008). Canadian experience with transfer of development credits and their potential application to agri-environmental policy. Retrieved from http://www.rockies.ca/downloads/Cdn_experience_with_TDC.pdf

[217] Huron River Watershed Council. (2007). Potential Impacts of Transfer of Development Rights for Michigan Communities: The Huron River Watershed Scenarios [image]. Retrieved from https://www.hrwc.org/wp-content/uploads/HRWC_TDR_FinalReport.pdf

OPPORTUNITIES	CONSTRAINTS
• Protects public safety by preventing development in hazardous areas. • Promotes sustainable development by increasing density in designated areas. • Compensates coastal property owners and reduces legal conflicts.	• Can be difficult to implement and administer. • "Down-zoning" of sending and "up-zoning" of receiving areas can result in conflict. Building and restoring wetlands requires maintenance until the wetland is established.

Getting started and first steps – A system of transfer of development credits is usually set up through **zoning** and **by-laws**. Once the development potential of a sending area is sold, **conservation easements** are typically established on the property in order to ensure that no future development takes place.

Here are some first steps:

- **Gather data and map** areas desirable as sending areas: places that support important natural processes and serve as natural protective barriers, or areas of natural hazards such as those prone to flooding and erosion.
- Establish a **community engagement** strategy to promote the program.
- Develop a land use **zone and by-law** for sending area properties.

Transfer of development credits example (international)

Profile: City Of Malibu, California	
Coast	Pacific
Region	California
Impact Concerns	Flooding and landslides
Population	12,280 (2020 Census)
Community Type	City
Year	2002
Funding	Part of the normal planning process

Summary – The City of Malibu is located within the jurisdiction of Los Angeles County. Malibu extends along 34 km of California's southern coast. Most of the city's residents live within several hundred metres of the coastal beaches and bluffs.

The community was built long before there were subdivision regulations. As a result, many properties are in areas that are now considered unsuitable for development due to a high potential for floods, wildfires, and landslides. One such location is the Santa Monica Mountain Coastal Zone, an area characterized by steep clay cliffs. The Zone has been designated as a "sending area" under Malibu's zoning by-law. Under this by-law, new subdivision development within the City, except for affordable housing units, is possible only with the purchase of development rights from donor lots within the Santa Monica Coastal Zone. Once they are "retired", properties within the sending area are protected through permanent open space

easements. This redirection of development through transfer provides the City with recreation space and a natural buffer against coastal hazards.[218]

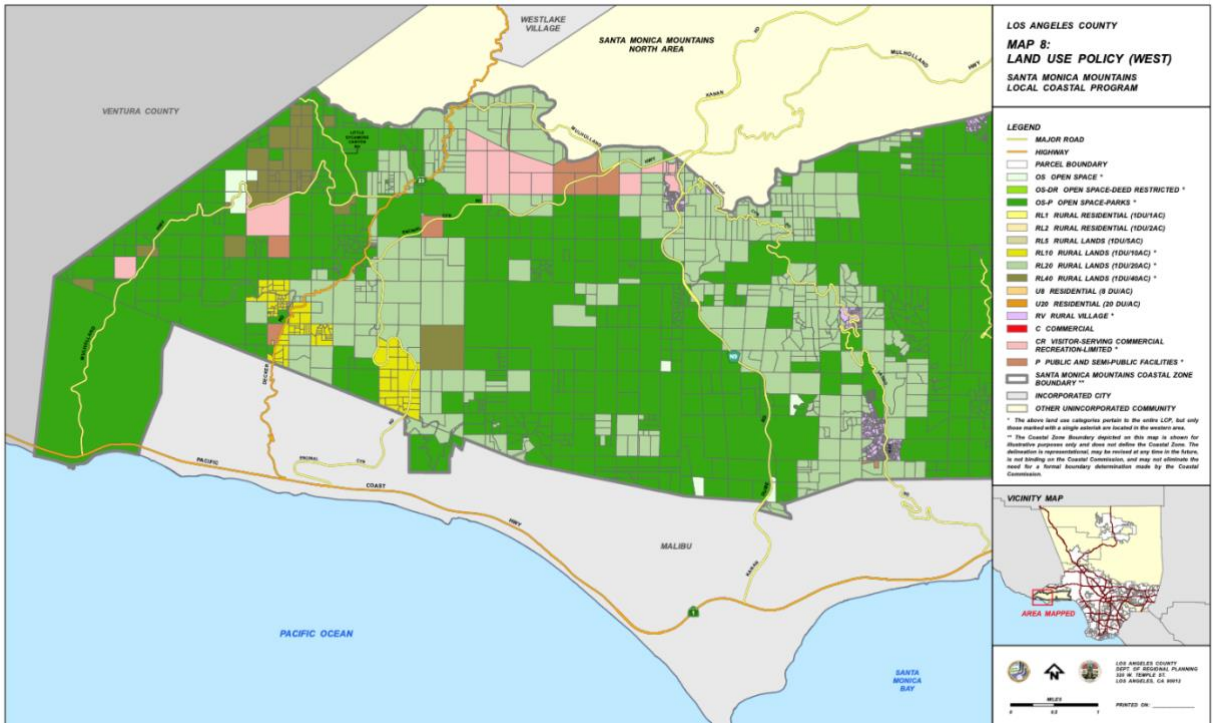

Figure 2.32 The Santa Monica Mountain Coastal Zone (indicated in grey) has been designated a "sending" area (LA County Department of Regional Planning[219])

Recommended resources

Canadian experience with transfer of development credits report: http://www.rockies.ca/downloads/Cdn_experience_with_TDC.pdf

City of Malibu Local Coastal Program: Local Implementation Plan (Chapter 7: Transfer of Development Credits): https://www.malibucity.org/DocumentCenter/View/4421/Malibu-Local-Implementation-Plan-LIP-?bidId=

Adaptation tool kit: How governments can use land use practices to adapt to sea-level rise: http://www.georgetownclimate.org/sites/default/files/Adaptation_Tool_Kit_SLR.pdf

[218] City of Malibu. (2002). City of Malibu Local Coastal Program: local implementation plan. Retrieved from https://www.malibucity.org/DocumentCenter/View/4421/Malibu-Local-Implementation-Plan-LIP-?bidId=
[219] Los Angeles County. (2013). Zoning (west) map [image]. Retrieved from https://planning.lacounty.gov/gis/maps

3.3.8 Land swap

Adaptive response	Avoid, retreat, procedural
Influence time frame	medium- to long-term
Implementation time-frame	medium- to long-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal and semi-formal; professional; community planning
Adapting to climate change	identify public lands, or build an inventory of lands, for coastal land exchange. Prioritize locations based on climate change assessments

A land swap is an exchange of land between governing bodies or between a governing body and a landowner. The exchange of property rights for the land parcels must be beneficial to both parties. This tool can be used to achieve the goals and objectives set out in a community's statutory community plan or guidance, action, and management plans.

In the context of coastal planning and climate change adaptation planning, communities could agree to a land swap with landowners of coastal properties for another parcel of land, inland from the coast. The local jurisdiction could use the coastal property for the public good. Properties that are at risk of coastal hazards or that contain valued coastal habitats or features can be targeted by a community to prevent development of these areas.

The land swap tool can also be used to reduce jurisdictional conflicts where infrastructure owned by one level of government is located on land owned by another level of government. The land can be swapped to the government that owns the infrastructure to simplify infrastructure adaptation.

Figure 2.33 Example of lands swapped between the City of Victoria, BC and the province of British Columbia (Times Colonist[220])

OPPORTUNITIES	CONSTRAINTS
• Can be used to remove people and structures from at-risk areas. • Can increase public access to the coast. • Can simplify infrastructure management.	• Requires the agreement of a second party (landowner or other governing body).

[220] Times Colonist. (2014). Land swap gives Victoria ownership of Crystal Garden [image]. Retrieved from https://www.timescolonist.com/local-news/land-swap-gives-victoria-ownership-of-crystal-garden-4605959

Getting started and first steps – Any interested party can initiate a land swap. A community could use land swap as a strategy within a **land acquisition strategy, statutory community plan**, or **guidance, action, and management plan**. Here are first steps toward using this tool for climate change adaptation:

- Identify public lands that could be offered up in a swap and private coastal lands that would benefit the community and that could further climate change adaptation objectives.
- Develop a community engagement strategy for approaching landowners or other governing bodies about land swaps.

Land swap example

Profile: Basin Head, Kings County, Prince Edward Island	
Coast	Atlantic
Region	Northumberland Strait
Impact Concerns	Loss of beach and environmentally sensitive land
Community Type	Province
Year	2007
Funding	The Nature Conservancy of Canada and the Government of Prince Edward Island

Summary – A partial land swap between the province of Prince Edward Island and the Waterworth family allowed the Province to acquire 142 acres of land at Basin Head in Kings County. The Province exchanged 28 acres of land and cash to acquire the land. The Nature Trust of Canada also contributed money towards the land exchange. Partnership with the Nature Trust and the work of dedicated provincial staff made this deal possible.

Now that the land is held by the Province, it is protected as a provincial park and its biodiversity will be preserved for future generations. The Provincial Wildlife Federation has developed a Basin Head Watershed Management Plan for the area.[221]

Figure 2.34 Basin Head coastline is a popular beach destination. Prince Edward Island obtained the land behind the beach through a land swap with a landowner (John Sylvester, PEI Government)

[221] Government of Prince Edward Island. (2007). Province acquires deed to Basin Head Beach news release. Retrieved from http://www.gov.pe.ca/webarchive/index.php?number=news&dept=&newsnumber=5442&lang=E

Recommended resources

Provincial news release on the Basin Head land exchange:
http://www.gov.pe.ca/webarchive/index.php?number=news&dept=&newsnumber=5442&lang=E

3.3.9 Land use conversion and redevelopment

Adaptive response	Avoid, retreat
Influence time frame	medium- to long-term
Implementation time-frame	medium- to long-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal and semi-formal; professional to semi-professional
Adapting to climate change	identify potential land for conversion using climate change impact assessments; update land use zoning with new climate change and environment and land use change information during plan reviews

Land use conversion and redevelopment can be used to remove unsuitable land uses and structures from coastal areas. Land use conversion is usually a strategy for publicly owned land but private landowners can change land uses as well (within the constraints of the land-use by-law). Land uses can be changed through land use planning and zoning, through land acquisition or land swaps, and by redeveloping public land by, for example, converting developed land into a park or agricultural lands back to their natural wetland habitat. Land use conversion can be used in conjunction with land acquisition and land swaps. Converting land to less intensive uses is a powerful tool for coastal climate change adaptation. It removes uses at risk of damage from coastal hazards but can still keep the land available for lower risk productive use (like agriculture or aquaculture). It can also encourage re-generation of coastal habitat or make more land available for public uses.

Figure 2.35 The Veta la Palma estate in Spain converted agricultural land into a marshland habitat that supports a natural aquaculture system. The land is still used for food production but has been restored to its natural habitat (Mark Walton et al.[222]).

[222] Walton, M., Vilas, C.,& Canavate, J. P., (2015). Policy Guidelines for Sustainable Wetlands Aquaculture [image]. Retrieved from https://www.researchgate.net/figure/Map-of-Veta-la-Palma-with-inserts-showing-its-location-within-Europe-and-adjacent-to-the_fig4_286936424

OPPORTUNITIES	CONSTRAINTS
• Can remove at risk structures or uses away from the coast. • Can be used to increase public access to the coast. • Can re-establish coastal habitats.	• May be costly to redevelop land. • May be controversial if implemented through legislation.

Getting started and first steps – Any incorporated community has the authority to redevelop its community owned public lands or to acquire land for redevelopment. Communities with land use planning authority can amend their **land use by-laws and zoning** to change the land uses permitted in a coastal area:

- Establish a **committee** to make recommendations on land use changes and redevelopment.
- Identify lands that require a land use change through **data gathering and mapping**.
- Acquire suitable land if it is privately owned.
- Develop a strategy for conversion or redevelopment.

Land use conversion and redevelopment example (regional)

Profile: Sackville, New Brunswick	
Coast	Atlantic
Region	Bay of Fundy
Impact Concerns	Flooding
Population	6,099 (2021 Census)
Community Type	Town
Year	2019
Funding	Clean Water and Wastewater Fund

Summary – The land along and including Lorne Street, in Sackville New Brunswick, is in a floodplain, and has experienced many major flooding events in recent years. The town hired an engineering firm to complete a study of the area and it was found that without any improvements made to their inadequate stormwater infrastructure to manage the runoff that is increasing due to more frequent storms and sea level rise, the problem will get worse. There would also be considerable risk of future floods reaching nearby CN Rail tracks. One of the solutions proposed included a retention pond.[223]

The town of Sackville decided to implement the Lorne Street Naturalized Stormwater Management Pond as a partial solution to the flooding problem. The project was funded by the Federal Clean Water and Wastewater Fund and construction was completed in 2019. The naturalized stormwater retention pond provides 40,000 cubic metres of storage which is then slowly released through existing stormwater infrastructure into the Tantramar River. The pond is located on land that was largely undeveloped apart from one building that was removed and replaced at another location as part of a land purchasing agreement with the Town. In addition

[223] Crandall Engineering Ltd. (2017). Lorne Street Reconstruction and Stormwater Mitigation – Phase 2 EIA Registration Document. Retrieved from https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/Registrations-Engegistrements/documents/EIARegistration1476/EIARegistration1476.pdf

to retaining and slowing stormwater flow, the pond provides and enhances other ecosystem services, including recreation space and habitat. Interpretive panels around the pond explain the reason for building it, how it works, and the benefits it provides.[224]

Figure 2.36 Interpretive panel next to Lorne Street naturalized stormwater management pond (Bruce Wark – Warktimes[225])

[224] Sackville New Brunswick. (2019). Lorne Street Stormwater Mitigation Project Phase II Update. Retrieved from https://sackville.com/2019/07/lorne-street-stormwater-mitigation-project-update/

[225] Bruce Wark. Sackville gets funding to finish Lorne St. flood control project. *The New Wark Times*. [image]. Retrieved from https://warktimes.com/2022/04/08/sackville-gets-funding-to-finish-lorne-st-flood-control-project/comment-page-1/

3.3.10 Variances

Adaptive response	Accommodate
Influence time frame	short- to long-term
Implementation time-frame	short-term
Planning level	regional, municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan review

Variances allow for flexibility with land use restriction tools such as setbacks in a land use by-law. A variance allows developers to build in a way that does not comply with the development parameters of the by-law, providing they can prove that a development is suitable for a site, will not contradict the by-law intent (such as protecting against damage to a structure, or to the environment) and is in line with the objectives of the community. The variance can allow for leniency in areas of complex coastlines, such as where some areas might be prone to flooding or erosion while other areas are not. A variance allows for adjustments at the site level. Development that uses a variance must be approved through a development agreement.

OPPORTUNITIES	CONSTRAINTS
• Allows for flexibility within by-laws. • Allows for innovative developments even if they do not comply with certain restrictions. • Allows for adjusting to variable conditions along complicated coasts.	• Can result in poor development decisions in coastal areas if information is inadequate or if over-used or misused.

Getting started and first steps – Any community with land use planning authority can use variances within an existing land use by-law:

- Develop strategies for variances in a **statutory community plan** or **guidance, action, and management plans**. This simplifies decision-making when variances are brought forward by developers and prevents poor development decisions when approving a variance for development that deviates from the by-law.

Variances example (national)

Profile: Bowen Island, British Columbia	
Coast	Pacific
Region	Howe Sound
Impact Concerns	Erosion and flooding
Population	4,256 (2021 Census)
Community Type	Municipality
Area	50.14km^2
Year	2002
Funding	Part of normal planning process

Summary – Bowen Island, British Columbia, is an island off the coast of West Vancouver. Its coast is mainly high, rocky slopes, but sea level rise is still a significant concern for residents.[226] The municipality has put in place regulations for setbacks of thirty (30) metres from the natural boundary of the sea for any building or structure. The Bylaw allows for variances to this section where the setback may be reduced. One variance is that the setback may be reduced to a minimum of 7.5 metres where the natural boundary of the sea is protected from erosion by natural bedrock. This must be determined by a Professional Engineer. The property could also be protected from erosion through works designed by a Professional Engineer, subject to a report with recommendations from an environmental consultant confirming that any environmental concerns can be adequately addressed.[227]

[226] De Villiers, M. (2019). Bowen's beaches, docks and cliffs made of sediment susceptible to rising seas. Retrieved from https://www.bowenislandundercurrent.com/local-news/bowens-beaches-docks-and-cliffs-made-of-sediment-susceptible-to-rising-seas-3098369
[227] Bowen Island Municipality. (2002). Bowen Island Municipality Land Use Bylaw N.57, 2002. Retrieved from https://bowenisland.civicweb.net/document/190971/

3.3.11 Waiver

Adaptive response	Accommodate
Influence time frame	short -term
Implementation time-frame	short-term
Planning level	municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan review

A waiver aims to limit a municipality's liability for structures built in at-risk areas by having the developer acknowledge and take responsibility for risks to their development. A municipality can require a developer to sign a waiver as part of the application process. A waiver can be a useful education tool in that it can inform developers and landowners who may not be aware of the risks involved with their proposed development. Waivers can be used as a short-term measure to accommodate coastal developments for climate change while a community develops long-term adaptation strategies. A community should not rely on waivers for a long-term adaptation approach. Waivers should only be used as a bridge to new regulations once a community decides to restrict or more tightly regulate development in at-risk areas. It is during this time that existing regulations are still in effect.

OPPORTUNITIES	CONSTRAINTS
• Can be implemented in a short timeframe. • Educates developers and landowners of risks involved with coastal developments.	• Does not restrict inappropriate development in coastal areas.

Getting started and first steps – Waivers can only be used by communities with land use planning authority because they are part of the development approval process:

- Use waivers as a short-term approach to dealing with coastal development while working towards long-term solutions.
- Include requirements for a waiver in a land use zone.
- Establish a waiver that can be used with individual developments, as a condition on a variance or through a development agreement.
- Seek legal expertise for developing a waiver.

Waiver example (regional)

Profile: Municipality of the County of Kings, Nova Scotia	
Coast	Atlantic
Region	Bay of Fundy
Impact Concerns	Storm Surge
Population	62,914 (2021 Census)
Community Type	County
Year	2014
Funding	Part of the normal planning process

Summary – The County of Kings Land Use Bylaw includes two overlay zones to deal with coastal flooding: the Urban Floodplain Zone and the Urban Floodplain Warning Zone. Within the Urban Floodplain Zone, new buildings and additions must be flood-proofed to withstand a storm surge of 28.2 feet (8.6m) above mean sea level.[228]

Within both floodplain zones, developers and landowners must sign a waiver. The Bylaw states that "Prior to any development taking place, regardless of the scale, the property owner shall provide written acknowledgement indicating that the development is located within an area identified as being vulnerable to the predicted worst case storm surge and sea level rise scenario of 34 feet (10.4m) above mean sea level, representing the estimated extent of the 1869 Saxby Gale plus an estimated sea level rise of 25 inches (64cm)." [229](Section 12.7.2 and 12.8.2)

Recommended resources

County of Kings Municipality Land Use Bylaw:
https://www.countyofkings.ca/upload/All_Uploads/Living/services/planning/lub/bylaw/By-law%20106%20Land%20Use%20By-law.pdf

[228] County of Kings. (2014). County of Kings Land Use Bylaw. Retrieved from https://www.countyofkings.ca/upload/All_Uploads/Living/services/planning/lub/bylaw/By-law%20106%20Land%20Use%20By-law.pdf
[229] Ibid.

3.3.12 Land trust

Adaptive response	Avoid
Influence time frame	medium- to long-term
Implementation time-frame	medium- to long-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal and semi-formal; professional to semi-professional; community planning; natural areas planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards when assessing land acquisition programs

A land trust is a non-profit organization that acquires and manages land and negotiates easements for nondevelopment purposes such as conservation of significant habitats. Land trusts acquire land through purchase, donation, easements, and covenants. They are usually able to offer incentives such as tax deduction charitable receipts for the donation of land and money. Nature Conservancy of Canada is a land trust that holds land in all four Atlantic Provinces. The Trust has 42 nature reserves in New Brunswick,[230] 11 in Newfoundland and Labrador,[231] 10 in Prince Edward Island,[232] and 42 in Nova Scotia.[233] The projects add up to more than 35,000 hectares of conservation land in Atlantic Canada.[234] There are regional offices for the Nature Conservancy in each of the four provinces. There are also provincial land trust organizations:

- Island Nature Trust, Prince Edward Island[235]
- Nova Scotia Nature Trust[236]
- Nature Trust of New Brunswick[237]

Indigenous communities are engaged in implementing Indigenous Protected and Conserved Areas (IPCAs) (https://www.canada.ca/en/environment-climate-change/services/nature-legacy/indigenous-led-area-based-conservation.html).

OPPORTUNITIES	CONSTRAINTS
• Financing and management of land is covered by the land trust. • Can increase public access to the coast. • Can partner with a land trust to identify areas of land that are appropriate for coastal habitat protection.	• Acquiring land can be costly. • Relies on property owners deciding to donate land or enter into an easement. • Can only accept land that has enough area to provide a large habitat reserve.

[230] Brooks, D., personal communication, July 26th, 2022.
[231] Ibid.
[232] Ibid.
[233] Ibid.
[234] Nova Scotia Nature Trust. (2022). 50 years of action for East Coast Nature. Retrieved from https://www.natureconservancy.ca/en/where-we-work/nova-scotia/our-work/50-years-for-nature.html
[235] Island Nature Trust. (2022). Retrieved from https://islandnaturetrust.ca/
[236] Nova Scotia Nature Trust. (2022). Retrieved from https://nsnt.ca/
[237] Nature Trust of New Brunswick. (2022). Retrieved from https://www.naturetrust.nb.ca/

Getting started and first steps – Any community can develop a partnership with a land trust to enable land acquisition and conservation easements in a community for environmental protection. Here are some first steps toward partnering with a land trust:

- Identify land trusts active in the local area.
- Promote land trusts to residents through **community engagement**. Engagement educates landowners about land trusts and can encourage the donation of coastal lands or create **conservation easements** on private land.

Land trust example (regional)

Profile: Sand Beach, Liverpool, Nova Scotia	
Coast	Atlantic
Region	Nova Scotia South Shore
Impact Concerns	Sea level rise, conservation
Year	2021-2022
Funding	Canada Nature Fund, the Nature Smart Climate Solutions Fund Crown Share Land Legacy Trust and donations from the public.

Summary – Nova Scotia Nature Trust has a Coastal Conservation Campaign with goals to protect undeveloped coastline, build knowledge among landowners of the importance of coastal conservation and the role they can play, provide resources for landowners wishing to steward their coastal land, and engage local people in the stewardship of coastal properties.[238]

In 2021 and 2022 the Trust added three new coastal properties to its protected areas, with contributions totaling $1 million. One area is a 154-acre property, south of Liverpool, Nova Scotia on the province's Atlantic coast. Sand Beach has over 700m of coastline with upland forests, coastal dunes, coastal wetlands, freshwater wetlands, and beaches.[239] Funding for the land was provided by the Federal government of Canada through the Canada Nature Fund and the Nature Smart Climate Solutions Fund, as well as contributions from Nova Scotia's Crown Share Land Legacy Trust and donations from the public.

Currently over 85% of the coastline in Nova Scotia is privately owned, and less than 5% is protected.[240] Land trusts play a crucial role in securing coastal space and protecting ecosystems, not only for biodiversity but also for the protection that natural systems can provide against coastal flooding and erosion.[241] Protecting the natural coast is very important for coastal climate resilience.

[238] Nova Scotia Nature Trust. (2022). Preserving our Coastal Treasure. Retrieved from https://nsnt.ca/our-work/focus-areas/preserving-our-coastal-treasures/
[239] Nova Scotia Nature Trust. (2021). Sand Beach, A Coastal Treasure. Retrieved from https://nsnt.ca/blog/sand-beach-a-coastal-treasure-protected-forever/
[240] Nova Scotia Nature Trust. (2022). Nova Scotia Nature Trust announces success in campaign to save 3 rare coastal gems. Retrieved from https://nsnt.ca/blog/nova-scotia-nature-trust-announces-success-in-campaign-to-save-3-rare-coastal-gems/
[241] van Proosdij, D; Manuel, P.; Sherren, K.; Rapaport, E; McFadden, C.; Rahman, T.; & Reeves, Y. (2021). Making room for movement: A framework for implementing nature-based coastal adaptation strategies in Nova Scotia. TransCoastal Adaptations Centre for Nature-based Solutions, Saint Mary's University. Prepared for Natural Resources Canada https://static1.squarespace.com/static/5c83d5c63560c33561cc74de/t/61af943a0624555b127356c0/1638896708462/MakingRoomforMovement_Framework.pdf

Figure 2.37 Aerial photo of Sand Beach, Nova Scotia (A for Adventure[242])

Land trust example (international)

Profile: Worchester County, Maryland	
Coast	Atlantic
Region	East
Impact Concerns	Sea level rise
Population	52,460 (2020 Census)
Community Type	County
Year	1997
Funding	State of Maryland

Summary – Worcester County, Maryland, created a plan which established a Worcester County Coastal Bays Rural Legacy Area. The County sought to protect their highly valued waterbody, Chincoteague Bay. The County was concerned about the loss of wetlands and agricultural land due to increased development. The County was also worried that coastal armouring and development would restrict wetlands from migrating inland with sea level rise.[243]

Historical records show that the average sea level rise for the County has been 3-4 mm/year since 1920. Using IPCC projections, the County is planning for a worst-case scenario of a 1.47 metre sea level rise by 2100. The County has an extensive coastline that includes numerous bays, sand beaches, and salt marshes. The land is at low elevation with a gradual slope. Projections of future inundation show that many large rural properties and hundreds to thousands of developed parcels will be lost by 2100.[244]

The County worked with a local land trust to educate landowners, and as a result many landowners were interested in the program. Over $7.25 million was contributed to securing land through the Maryland Rural Legacy Program, a state-run program, and $400,000 was contributed by Worcester County.

[242] Nova Scotia Nature Trust. (2022). Nova Scotia Nature Trust announces success in campaign to save 3 rare coastal gems. Retrieved from https://nsnt.ca/blog/nova-scotia-nature-trust-announces-success-in-campaign-to-save-3-rare-coastal-gems/
[243] Maryland Department of Natural Resources Watershed Services. (2005). Characterization of the Chincoteague Bay Watershed in Worchester County, Maryland. Retrieved from https://dnr.maryland.gov/waters/Documents/WRAS/chincotg_char.pdf
[244] Ibid.

Through this program 6,000 acres of land and eight miles of coastline have been secured around the bay. The County continues to reach out to landowners that are not involved with the program offering information about programs for protection.[245]

Worcester County is also served by the Lower Shore Land Trust, which is a non-profit organization partnered with the Maryland Environmental Trust. The two Trusts hold over 1,900 acres of donated permanent conservation easements in rural areas of Worcester County.[246]

[245] Eco Health Report Cards. (2014). Chincoteague Bay. Retrieved from https://ecoreportcard.org/report-cards/maryland-coastal-bays/regions/chincoteague-bay/
[246] Worcester County Department of Recreation and Parks. (2022). 2022 Worcester County Land Preservation, Parks and Recreation Plan DRAFT. Retrieved from http://www.co.worcester.md.us/newworcester/sites/default/files/LPPRP_2022_DRAFT%20April%202022.pdf

3.3.13 Rolling easements

Adaptive response	Avoid, retreat
Influence time frame	medium- to long-term
Implementation time-frame	medium-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal; professional; community, environmental and site planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during program reviews

Rolling easements are easements that 'roll' inland keeping up with natural coastline retreat caused by sea level change and erosion. Landowners are permitted to develop anywhere on their property provided they do not impede public coastal access and they do not armour the shore. Without prohibiting coastal armouring, shorelines cannot retreat and rolling easements would have no effect. While their intent is to preserve public coastal access, they also preserve the natural coastal zone below the high-water mark.

Establishing and implementing a rolling easement requires a clear definition of the coastal boundary and the boundary between public and private land. The boundary is determined by the natural state of the land and may be indicated by the line of vegetation or the mean high tide. The boundary moves with changing coastal conditions. Coastal roads can be moved inland with rolling easements to ensure that access to private properties is not cut off. Roads can be rebuilt over private properties if properties become damaged from coastal flooding and erosion. Structures that become vulnerable to flooding or erosion, become unsafe for human use, or end up on public land because of the shift in the private-public boundary must eventually be relocated. If the structure is still habitable but is located on public land, the government authority could potentially choose to charge rent for the use of the structure on what is now public land until it is no longer safe to use. Rolling easements encourage coastal landowners to build smaller, moveable structures when developing along the shore.[247] Rolling easements are, in effect, an approach to managed retreat. Challenges to rolling easements by landowners affected by the changing boundary are common.[248]

[247] Titus, J.G. (2011). Rolling easements: a primer for coastal managers. Environmental Protection Agency. Retrieved from http://papers.risingsea.net/rolling-easement-primer-low-res.pdf
[248] McLaughlin, R. J. (2011). Rolling easements as a response to sea level rise in coastal Texas: Current status of the law after "severance v. Patterson." Journal of Land Use & Environmental Law, 26(2), 365–394. http://www.jstor.org/stable/42842969

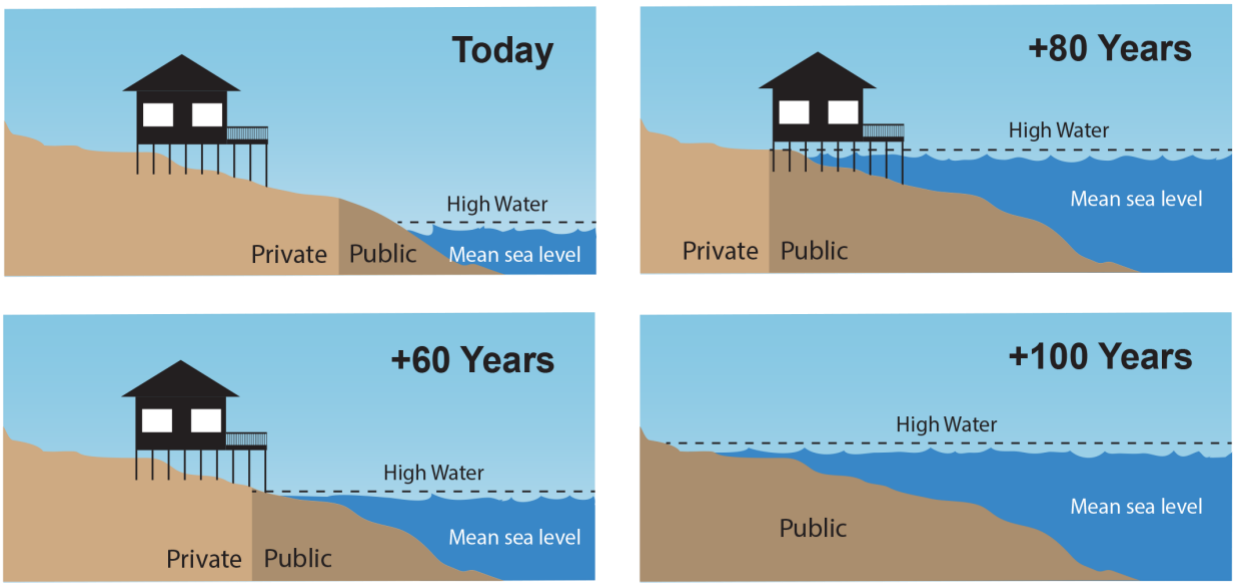

Figure 2.38 Example of rolling easement (modified from image by J.G. Titus[249])

OPPORTUNITIES	CONSTRAINTS
• Promotes the development of smaller, moveable structures. • Preserves public access along the shore. • Does not require a line to be drawn on a map; ownership is based on vegetation, dunes, or roads on the ground. • Can be used to allow landward relocation of public infrastructure. • Allows wetlands to migrate inland.	• Can be unpopular with residents if it is imposed rather than voluntary. • Can be costly to obtain ownership of and manage acquired land and structures over time. • Subject to litigation when landowners don't agree with or comply with the terms of the regulations and acquisition of land.

Getting started and first steps – Rolling easements have been enforced at the state level in the United States. No examples of this tool have been identified in Canada but it could be implemented at the provincial level: there is already familiarity with the principle in the Atlantic region. The high tide line is the boundary between private and public land in Canada and this line will move landward (or seaward) with changing sea level. Rolling easements reflect coastal boundary changes with other landscape markers such as coastal vegetation. Here are some first steps towards implementing this tool:

- Advocate to the province for rolling easements. See the Legislative Section of this document to determine the provincial department responsible for Crown lands.
- For communities with land use planning authority, identify opportunities for coastal protection measures using rolling easements on land subject to the local land use planning authority.

[249] Titus, J.G. (2011). Rolling easements: a primer for coastal managers. Rolling easements diagram [image]. Environmental Protection Agency. Retrieved from http://papers.risingsea.net/rolling-easement-primer-low-res.pdf

Rolling easements example (international)

Profile: State of Texas, United States of America	
Coast	Gulf of Mexico
Region	Texas
Impact Concerns	Loss of public access and beach loss
Population	28.64 million (2020 Census)
Community Type	State
Funding	State of Texas

Summary – Texas has rolling easements incorporated into its *Open Beaches Act*.[250] This Act requires that any home or structure that is located on a public beach must be removed. A public beach is defined as the area between the low water mark and the line of vegetation. The *Open Beaches Act* defines the line of vegetation as "the extreme seaward boundary of natural vegetation which spreads continuously inland" (61.001[5]). The State has had to defend this regulation in court many times.[251]

Surfside is a small village located on a sand barrier on the Texas Gulf of Mexico coast. In September 2008 Hurricane Ike changed the community's boundaries. Coastal erosion from the storm pushed the vegetation line back in the Village. Homes that had been built in the 1960s and were on the land side of the vegetation line at that time ended up on the water side of the vegetation line. The easement boundary had moved and the houses were now on the wrong side of the line. The State denied permits to repair homes and shut off the water supply. When property owners filed a lawsuit to maintain their homes the State responded by threatening to remove the homes. The State won the court case because it was deemed that the land was historically dedicated for public use and the purpose of the *Open Beaches Act* is to protect the public's access and use of public beaches.[252]

[250] State of Texas. (1959, c.61) Use and Maintenance of Public Beaches. Retrieved from https://statutes.capitol.texas.gov/Docs/NR/htm/NR.61.htm
[251] McCauley, M. (2010). Texas Court upholds "rolling easements" on beachfront property. University of Mississippi, School of Law. Retrieved from https://issuu.com/seagrant/docs/30.1
[252] McCauley, M. (2010). Texas Court upholds "rolling easements" on beachfront property. University of Mississippi, School of Law. Retrieved from https://issuu.com/seagrant/docs/30.1

Figure 2.39 Coastal homes in the village of surfside where damaged and destroyed by hurricane Ike (homes are the orange features in the top image). The image shows the extent of erosion along a portion of Surfside's coast. Coastal erosion from one storm event moved the vegetation line landward resulting in homes becoming located on public land. Public land is defined in Texas as the area between the low water mark and the line of vegetation (USGS[253])

Recommended resources

Rolling easements – A Primer for Coastal Managers: http://papers.risingsea.net/rolling-easement-primer-low-res.pdf

Wetlands Watch – Rolling Easement: https://wetlandswatch.org/rolling-easement

Evaluation of the court case between the state and property owners in Surfside: https://issuu.com/seagrant/docs/30.1

FEMA Article about Hurricane Ike's impact in Surfside: https://www.fema.gov/pdf/hazard/hurricane/2008/ike/surfside.pdf

[253] U.S. Geological Survey St. Petersburg Coastal and Marine Science Center. (2014). Coastal Change Hazards: Hurricanes and Extreme Storms: Hurricane Ike [image]. http://coastal.er.usgs.gov/hurricanes/ike/photocomparisons/surfside.html

3.3.14 Conservation easements

Adaptive response	Avoid, retreat
Influence time frame	medium- to long-term
Implementation time-frame	medium- to long-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal and semi-formal; professional to semi-professional; community planning, natural areas planning
Adapting to climate change	set targets for coastal land conservation; identify coastal land with high conservation value; update targets with new climate change information and environment and land use changes and best practice standards when assessing land acquisition programs

A conservation easement is a written agreement and partnership, with flexible arrangements between a government or organization and a landowner, to conserve land without changing ownership of the land. A private landowner enters into a written agreement that protects areas of land that are sensitive to human activity. Easements are registered to the deed of the land and land use restrictions are agreed upon by both parties. Restrictions can range from very restrictive, such as prohibiting any new land use activity, including passive recreation, to less restrictive, such as prohibiting the removal of riparian vegetation, disturbing the soil, or prohibiting subdivision of the land.[254] Governments can prioritize acquiring easements in coastal areas that are vulnerable to erosion and flooding. Easements are already used to protect coastal areas in Atlantic Canada. One example is an agreement in 2014 to protect a group of islands on the Eastern Shore of Nova Scotia referred to by the Nova Scotia Nature Trust as the 100 Wild Islands area. The Nova Scotia Nature Trust has been engaging with private land owners and partnering with the Province of Nova Scotia to conserve this island wilderness. In 2015, the Province designated all Crown lands in the area as Wilderness Area.[255] Together the NS Nature Trust and Province have protected 85% of the eastern shore's Wild Islands area.[256]

Figure 2.40 Conservation easement sign identifying easement property (Ducks Unlimited[1])

[254] Good, K. & Michalsky, S. (2008). Summary of Canadian experience with conservation easements and their potential application to agri-environmental policy. Agriculture and Agri-Food Canada. Retrieved from https://publications.gc.ca/collections/collection_2011/agr/A125-17-2011-eng.pdf
[255] Nova Scotia Nature Trust. (2015). The 100 Wild Islands campaign takes major step forward. Retrieved from https://www.100wildislands.ca/news/2015/6/19/the-100-wild-islands
[256] Nova Scotia Nature Trust. (2017). Nature Trust Celebrates new Protected Lands in the 100 Wild Islands. Retrieved from https://www.100wildislands.ca/news

OPPORTUNITIES	CONSTRAINTS
• Incentives, such as tax benefits, are in place for landowners who enter into an agreement. • Land ownership does not change. • Can make agreements in perpetuity and to carry forward with new landowners. • Can tailor agreements to the landowner's requests and desired level of land protection. • Can be affordable for a community with limited resources to purchase land.	• Landowners are often unaware of, or misinformed about, conservation easements. • Can be difficult to recruit landowners. • Can reduce the value of a property. • Can be difficult to implement in development areas.

Getting started and first steps – All levels of government and recognized organizations can use this tool. New Brunswick, Nova Scotia and Prince Edward Island have enabling legislation through the *Conservation Easements Act* (NS and NB) and the *Wildlife Conservation Act* (PE). Newfoundland and Labrador does not have enabling legislation for conservation easements. Communities in Newfoundland and Labrador must partner with a land trust to use this tool.

Conservation easements are initiated by either of the two parties involved; landowners can contact a governmental agency or vice versa. An agreement applies to a specific area of land. An agreement begins with a negotiation between **partners** and may require a survey and/or environmental audit of the land. Regular communication and monitoring of the land is required over the course of an agreement to ensure compliance.[257] Here are some first steps towards establishing conservation easements:

- Identify land trusts that are active in the local area.
- Promote conservation easements to residents through **community engagement**. Engagement educates landowners about conservation easements and can encourage the donation of coastal lands or of conservation easements on private land.
- Place conservation easements on land at risk of climate change impacts.

Conservation easements example (regional)

Profile: Charlotte County, New Brunswick	
Coast	Atlantic
Region	Bay of Fundy
Impact Concerns	Habitat loss
Population	26,016 (2021 Census)
Community Type	County
Year	
Funding	Multiple sources

[257] Good, K. & Michalsky, S. (2008). Summary of Canadian experience with conservation easements and their potential application to agri-environmental policy. Agriculture and Agri-Food Canada. Retrieved from https://publications.gc.ca/collections/collection_2011/agr/A125-17-2011-eng.pdf

Summary – The Nature Trust of New Brunswick completed a Campaign for Coastal Land in 2012. The Trust set goals for fundraising and conservation in 2007 to protect coastal land in Charlotte County. Overall, 379 acres of coastal habitat and three kilometres of coastline have been preserved through purchase and donation of land, conservation easements, and voluntary stewardship agreements. Through this project, the Nature Trust of New Brunswick established the Navy Island Nature Preserve in St. Andrews and expanded the Caughey-Taylor Nature Preserve in Bocabec.

The fundraising goal for the Campaign was $950,000. Sponsorship came from 18 government agencies, private industries, organizations, and individuals including the Nature Conservancy of Canada. Donated lands and easements from landowners totalled 64 acres of land at a value of $450,000. The Trust also received funding for related projects: printing a newspaper flier, producing a video, and writing a book about the architecture of St. Andrews.

The project also generated additional coastal land protection, above the Trust's conservation goals, in Charlotte County. Additional land was donated by the Connors Bros. Clover Leaf Seafood Company. South Wolf Island Nature Preserve and Connors Bros. Nature Preserve have also been established for protection in the County.[258]

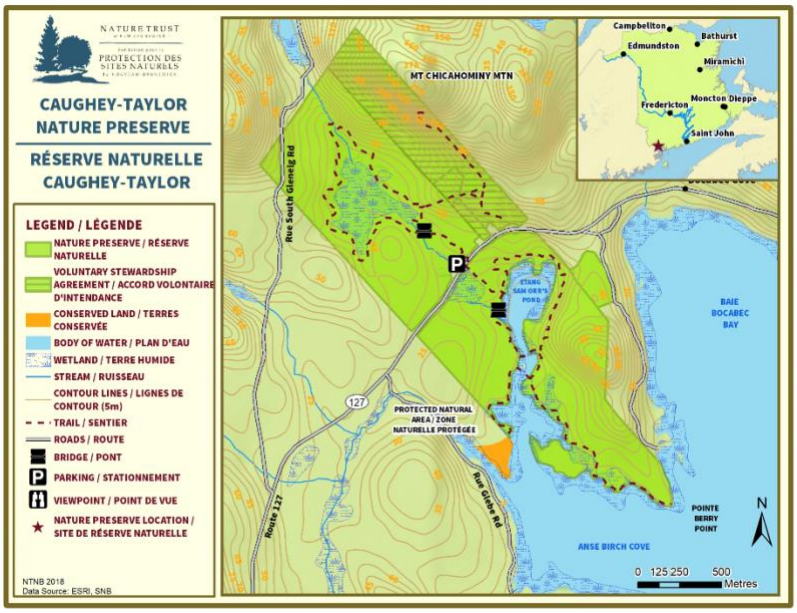

Figure 2.41 Map of the Caughey-Taylor nature preserve in Bocabec. The image shows land acquired by the nature trust of New Brunswick through a voluntary conservation easement from a landowner (NTNB[1])

Recommended resources

The Ecological Gifts Program in Atlantic Canada: https://publications.gc.ca/collections/collection_2015/ec/CW66-523-2015-eng.pdf

Conservation Easements Guide for Municipalities: https://www.communityconserve.ca/wp-content/uploads/2017/05/Cons-Easement-Guide-for-Municipalities-_Oct-2017_Final.pdf

Wetlands Watch – Conservation Easements: https://wetlandswatch.org/conservation-easements

Also see Land Trusts

[258] Nature Trust of New Brunswick. (2018). Our History. Retrieved from https://www.naturetrust.nb.ca/en/our-history

3.3.15 Managed retreat

Adaptive response	Retreat
Influence time frame	long-term
Implementation time-frame	medium- to long-term
Planning level	provincial, municipal
Planning process and plan type	formal and semi-formal; professional to semi-professional; community planning and environmental planning
Adapting to climate change	identify locations at high risk or uses becoming obsolete; plan to obtain land or shift land use with regulation; update with land planning for abandoned lands during program and mandatory plan reviews

Managed retreat involves moving back from the coast or land use conversion and redevelopment. This tool provides a long-term solution for high-risk areas along the coast. Moving back from the coast restores coastal habitats, makes room for natural coastal processes, prevents damage to buildings, roads and other infrastructure, and increases public safety for the long-term.

Managed retreat is an effective tool for addressing coastal hazards that are increasing with climate change impacts, such as erosion where protection measures will be too costly over time and flooding where structures are increasingly at risk of inundation or storm surges. The strategy has been used to relocate a few at-risk homes and businesses, up to entire towns. The image below shows a managed retreat project to restore a portion of a beach in California (by removing a seawall). On a larger scale, the town of Newtok, Alaska has a plan for relocation and is in the process of moving the entire Town away from its current location, where melting permafrost, erosion, and flooding are major hazards.[259]

Figure 2.42 Managed retreat at Surfer's Point California. A damaged bike path and parking lot were removed to restore the Beach (P. Jenkin[260])

[259] Feifel, K. & Gregg, R.M. (2021). Relocating the Village of Newtok, Alaska due to coastal erosion. Climate Adaptation Knowledge Exchange. Retrieved from https://www.cakex.org/case-studies/relocating-village-newtok-alaska-due-coastal-erosion
[260] Jenkin, P. (2010). Managed retreat process at Surfer's Point California, pictures [image]. Retrieved from https://www.venturariver.org/2010/11/managed-retreat-process-at-surfers.html

OPPORTUNITIES	CONSTRAINTS
• Long-term solution in high-risk areas. • Increases public safety by removing people and structures from high-risk areas. • Restores natural habitats and provides room for them to migrate inland as the coastline recedes.	• Can be difficult to implement in heavily developed areas or areas of high cultural significance and economic value. • Social, psychological, and equity impacts of retreat require careful assessment and management may depreciate property values in coastal areas.

Getting started and first steps – Communities can implement managed retreat. Significant **community engagement** is necessary; in some cases, public concern has initiated managed retreat. **Partnerships** with organizations and provincial governments help in providing resources and funds for managed retreat. Developing a **shoreline plan** will identify areas at high risk where managed retreat may be the best option for adaptation. Communicating these risks to the community and maintaining transparency about the process is vital for a successful retreat plan. Retreat can be achieved using land acquisitions, regulating the types of allowable structures, and using relocation assistance for property owners.[261]

Managed retreat example (national)

Profile: Tuktoyaktuk, Northwest Territories	
Coast	Arctic
Region	Beaufort Sea
Impact Concerns	Sea-ice thickness and distribution, permafrost degradation, wind patterns, storm frequency, coastal erosion, sea-level rise
Population	937 (2021 Census)
Community Type	Hamlet
Funding	Crown-Indigenous Relation and Northern Affairs' Climate Change Preparedness in the North Program

Summary – Tuktoyaktuk is an Inuvialuit community, located on the Arctic Ocean, at the tip of the Northwest Territories. The Hamlet is experiencing coastal erosion and permafrost degradation that is threatening infrastructure, municipal services, the local economy, and the health and wellbeing of the population. In 2003 researchers projected that coastal erosion would cause the tip of the peninsula to disappear within 10 years. Shoreline protection measures have slowed erosion rates; however, they remain an ongoing concern for the community.

Over the years the Hamlet has been relocating and removing infrastructure. Some residents have also relocated further inland or to areas less threatened by erosion, as this was the most inexpensive option identified. Limited financial resources are a significant roadblock to climate adaptation in the region. Although Tuktoyaktuk has received federal funding, it is not enough to cover the substantial costs needed to implement adaptation measures. In 2019 the Northwest Territories Government received federal funding to develop a coastal erosion mitigation plan. The report was completed by an engineering firm with the involvement of the territorial

[261] PennState. (n.d.) Coastal Processes, Hazards and Society: What is Managed Retreat? Retrieved from https://www.e-education.psu.edu/earth107/node/701#:~:text=Managed%20retreat%20or%20managed%20realignment%20is%20a%20coastal%20management%20strategy,a%20new%20line%20of%20defense.

government, Indigenous government, local authorities, and the public. The report authors pointed to a need for the inclusion of planned retreat in the Hamlet's adaptation plan.

In 2020 Tuktoyaktuk received funding to support the relocation of four homes at greatest risk. However, there were challenges with identifying suitable destinations for relocation, especially for elderly people who could not be moved far away from community services. The Hamlet is now proceeding with their next adaptation phase, one where the local community has been involved from the beginning and the process has been owned by the community leaders, in adherence with the Inuvialuit Final Agreement and the United Nations Declaration on the Rights of Indigenous Peoples. Despite some progress being made in Tuktoyaktuk, funding availability, relocation destination planning, and lack of technical expertise have been identified as significant issues. The history of forced relocation of Indigenous groups in Canada can make this adaptation method especially painful.[262] Planned retreat in Indigenous communities must consider the risk of irreplaceable cultural loss, and cultural sites and social networks should be preserved as much as possible.[263]

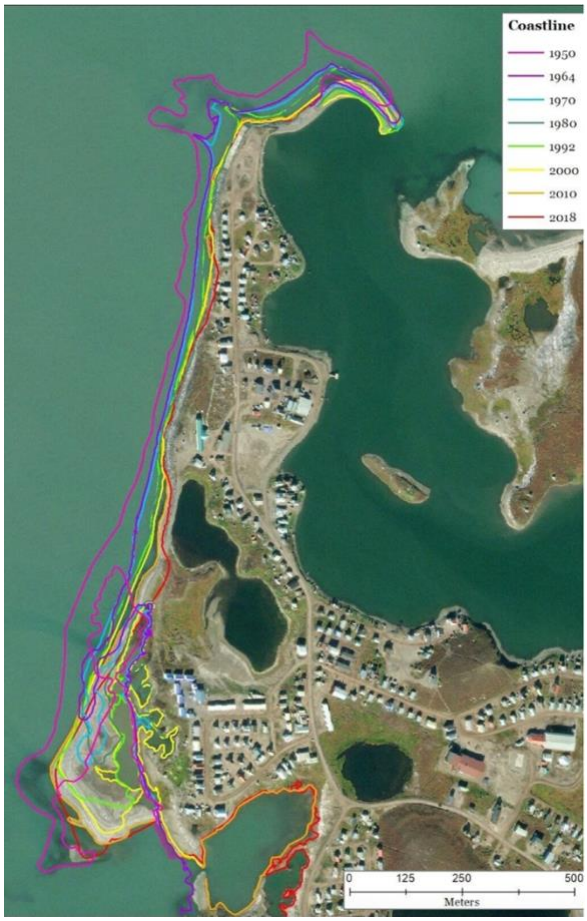

Figure 2.43 Aerial image of Tuktoyaktuk in 2010 showing the receding coastline between 1950 and 2018 (Future Tuktoyaktuk, images provided by NRCan[264])

Recommended resources

Planned Retreat Approaches to Support Resilience to Climate Change in Canada- Natural Resources Canada:
https://ftp.maps.canada.ca/pub/nrcan_rncan/publications/STPublications_PublicationsST/328/328323/gid_328323.pdf

[262] Saunders-Hastings, P., Barnard, M., and Doberstein, B. (2020). Planned Retreat Approaches to Support Resilience to Climate Change in Canada. Natural Resources Canada. Retrieved from https://ftp.maps.canada.ca/pub/nrcan_rncan/publications/STPublications_PublicationsST/328/328323/gid_328323.pdf
[263] Pearce, T., Ford, J., Duerden, F., Smit, B., Andrachuk, M., Berrang-Ford, L., Smith, T. (2010). Advancing adaptation planning for climate change in the Inuvialuit Settlement Region (ISR): A review and critique. Regional Environmental Change, 11:1–17.
[264] Future Tuktoyaktuk. (2018). Coastal Erosion. [image]. Retrieved from https://futuretuktoyaktuk.org/coastal-erosion

3.3.16 Abandonment

Adaptive response	Retreat
Influence time frame	long-term
Implementation time-frame	medium- to long-term
Planning level	provincial, municipal
Planning process and plan type	informal; non-professional; adaptive
Adapting to climate change	identify locations where abandonment is occurring or could occur; monitor abandonment; implement controls on abandoned lands and plan for opportunities to secure abandoned land during mandatory plan

Abandonment is a type of coastal retreat that may be managed and planned or may result from irreparable storm damage in a place that is prone to such impacts. Managed abandonment of seawalls and coastal structures may be a part of a coastal retreat plan. The use may also become obsolete. Abandonment may occur with no planning at all. Properties or structures are simply left to the sea, or sand, to cover or destroy.

Figure 2.44 Abandoned coast guard station on Pea Island, North Carolina (Abandoned but Not Forgotten[265])

OPPORTUNITIES	CONSTRAINTS
• Abandoning areas can allow for natural processes to re-establish coastal ecosystems.	• Abandoned structures could pose a danger to the public.

Implementation and First Steps – Abandonment can be carried out as a part of a managed retreat plan or it may happen as a reaction to damage caused by storms. Here are some first steps toward planned abandonment of structures at risk of climate change impacts:

- Identify through data gathering and mapping, structures and properties that might be best suited for abandonment.
- If a structure is slated for abandonment, ensure that the structure will not pose a risk to public safety. Structures may need to be physically removed from the coast.
- Focus on public land at risk first.
- Encourage private landowners to use a managed abandonment approach by entering into easement agreements with a municipality or land trust.

[265] Abandoned but Not Forgotten. (n.d.). Abandoned coast guard station in NC [image]. Retrieved from http://abnf.co/NC-coast_guard_station_nc.htm

Abandonment example (regional)

Profile: Daniel's Harbour, Newfoundland	
Coast	Gulf of St. Lawrence
Region	West Coast of Newfoundland
Impact Concerns	Landslides
Population	220 (2021 Census)
Community Type	Town
Year	2006-2008
Funding	Province of Newfoundland and Labrador

Summary – Daniel's Harbour is a small town on the Gulf of St. Lawrence on Newfoundland's Great Northern Peninsula. The clay-based coastal cliffs of the area become unstable when saturated with water. The Town had a small landslide in 2006 that raised concern in the community. Then, in the following year, a large landslide swept away one home, and several other buildings. Fortunately, no one was injured.

After the 2007 landslide, Fire and Emergency Services – Newfoundland and Labrador consulted with an engineer and other government departments about immediate risks to the area; the government decided to evacuate seven homes and a business.[266] The landslide also threatened Highway 403 that passed through the Town and which connected communities along the Great Northern Peninsula. A temporary road was constructed inland while a long-term plan was developed.

Figure 2.45 The Town of Daniel's Harbour after the landslide in 2007. The landslide area can be seen in the top left of the photo. The road was abandoned and houses to the left of the road were removed. The construction of a new road can be seen to the right of the houses (Government of Newfoundland and Labrador)

A group formed to decide next steps following initial abandonment of the affected area. The group included representatives from Fire and Emergency Services, the Department of Municipal and Intergovernmental Affairs, the Department of Natural Resources, the engineering consultant, local decision makers, and community members. They determined that storm events and excess moisture in the ground were triggering the landslides, thereby posing future risk to

[266] Lynch, R. (2007). Landslide on The Rock: Newfoundland community on edge as town crumbles away. Canadian Firefighter. Retrieved from https://www.firefightingincanada.com/july-2007-cff-1568/

some of the homes and the highway. Rather than continuing the geotechnical assessment of the area, the provincial government decided to compensate property owners based on property replacement cost, establish a hazard zone, and move residents out of the area. The people who left were educated about the risks to their property before a final decision was made. Because of this communication, property owners who were bought out accepted the decision. Residents had 8 to 12 months from the time the properties were condemned as unsafe to move to a new location. A subdivision was built in a safe area of the Town. The evacuated homes were removed, and the highway was reconstructed inland. The former highway and the area adjacent to the landslide were fenced off. More landslides occurred in the abandoned area in 2013; the slides also reached the former highway. The mayor of Daniel's Harbour stated that an estimated 30% of the town's land mass was lost to coastal landslides between 2006 and 2013.[267] No lives or property were at risk because the area had been abandoned, although a water line had to be relocated as a result.[268]

[267] Elliot, J. (2013). Daniel's Harbour demolition. The Western Star. https://www.pressreader.com/canada/the-westernstar/20131001/281496453992388
[268] Batterson, M., personal communication, September 18, 2015.

3.3.17 Foreshore lease

Adaptive response	Accommodate, protect, procedural approach
Influence time frame	medium- to long-term
Implementation time-frame	medium-term
Planning level	provincial, municipal
Planning process and plan type	formal; professional; community planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews and lease review

A foreshore lease is the lease of the land between the high and low water marks from the province to a municipality. Provinces own the land between the high and low water marks: coastal communities do not have authority over that land. Communities usually require approval from the province to implement tools that involve alterations to that area of land. A foreshore lease allows a community to make changes to that land without approval from the province, which can be beneficial if a community needs to maintain coastal infrastructure on that land. A foreshore lease is typically signed for 10–30 years and requires a survey of the boundaries of land to be leased. In the Atlantic Provinces the following acts allow for the granting of a foreshore lease:

- New Brunswick: *Common Law Act* (for oyster fishing),
- Newfoundland and Labrador: *Lands Act*,
- Prince Edward Island: *Fisheries Act*, and
- Nova Scotia: *Beaches Act.*

Lease agreements are often obtained for the construction of wharves and marinas. They could also be used for engineering adaptation measures which involve alterations to provincially owned land along the shoreline.[269]

OPPORTUNITIES	CONSTRAINTS
• Enables management of coastal areas as a complete system by one governing body. • Enables soft protection measures such as planting vegetation in the foreshore. • Enables a local government to explore a range of engagement and engineering tools. Natural wetland services can replace more costly built infrastructure.	• Leasing the foreshore involves ongoing costs that add to the costs of implementing protection measures on the shoreline.

Getting started and first steps – Foreshore leases are worth pursuing if control over the foreshore is important for establishing and maintaining a protection measure. Here are some first steps towards obtaining a foreshore lease:

[269] Arlington Group Planning + Architecture, EBA, a Tetra Tech Company, and DE Jardine Consulting Sustainability Solutions Group. (2013). Sea level rise adaptation primer: A toolkit to build adaptive capacity on Canada's south coasts. British Columbia Ministry of Environment. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/resources/slr-primer.pdf

- Identify if the area and protection method require having control over the foreshore.
- Approach the province regarding a foreshore lease.
- If the province agrees to a lease, the lease will require a land survey.[270]

[270] Ibid.

3.4 Site Design Tools

3.4.1 Urban design standards and guidelines

Adaptive response	Avoid, accommodate
Influence time frame	medium- to long-term
Implementation time-frame	short-term
Planning level	municipal, neighbourhood, site
Planning process and plan type	formal; professional; community planning and urban planning and design
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews

Municipalities use urban design standards for a variety of purposes including preserving the character of an area, ensuring that certain building standards are met, regulating street design, and promoting environmental protection. Design standards include both guidelines and mandatory standards for development. In coastal municipalities this tool could be used to encourage, or require, setbacks and to prevent out-of-place developments at the coast. Waterfront development or redevelopment commonly use urban design standards.

Figure 2.46 The cover of the City of Nanaimo's urban design plan (D'Ambrosio Architecture + Urbanism[271])

OPPORTUNITIES	CONSTRAINTS
• Uses a positive approach to coastal planning that also preserves the character of a place.	• May be controversial with developers and residents if they disagree with design standards.

Getting started and first steps – Any community with land use planning authority can develop design standards and guidelines for all or for a part of the municipality. Council must approve the standards and guidelines. Here are some first steps toward using design guidelines for climate change adaptation:

[271] D'Ambrosio architecture + Urbanism, Citizen Plan, City of Nanaimo. (2008). Downtown Urban Design and Guidelines [image].Retrieved from https://www.nanaimo.ca/docs/property-development/development-applications/downtown-urban-design-plan-and-guidelines.pdf

- Establish a committee. A **local committee** typically has the responsibility to develop design guidelines and to engage with the public for local input.
- Identify areas at risk of climate change through **data gathering and mapping**.
- Determine appropriate **setbacks** and other building restrictions that can be included in the guidelines for adaptation.
- Engage with the community while developing the guidelines. **Community engagement** will help gain public support for the guidelines when they come to council for approval.

Urban design standards example (international)

Profile: New South Wales, Australia	
Coast	Tasman Sea
Region	Eastern Australia
Impact Concerns	Sea level rise and increased development
Population	8.166 million (2020 Census)
Community Type	State
Area	809,444km^2
Year	2003
Funding	Part of the normal planning process

Summary – The state of New South Wales developed a Coastal Design Guidelines manual to ensure harmonization of future coastal developments with the natural environment and established urban places. Local councils are required to keep planning documents, including local environmental plans, consistent with the guidelines set out in the *Coastal Design Guidelines*. An advisory committee on coastal planning and management produced this document.

The Guidelines include a map of the coastal zone, including the landward and seaward extent. The landward extent is defined as lands affected by coastal processes. The Guidelines are based on the principles of ecologically sustainable development. Guidelines are tailored to the different communities within the State, including coastal cities, towns, villages, hamlets, new settlements, and isolated dwellings. Aspects of design in the Guidelines include open spaces, natural edges, street patterns, and appropriate building design.

The State developed the Guidelines to ensure protection of the cultural, ecological, and visual characteristics of coastal communities. The Guidelines also limit coastal sprawl and integrate new development with the surrounding land uses and current transportation infrastructure. The Guidelines establish greenbelts between settlements and encourage appropriately located settlements, which includes creating neighbourhoods serviced by existing infrastructure. The Guidelines also provide a hierarchy of coastal settlements that ranges from cities to hamlets and offers a framework for future planning for every settlement type. This same range of coastal settlements exists in Atlantic Canada and so the document presents relevant issues and opportunities for communities in Canada.[272]

[272] State of New South Wales. (2003). Coastal design guidelines for New South Wales. Retrieved from https://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/coastal-design-guidelines-for-nsw-2003-02.ashx

3.4.2 Conservation subdivision design

Adaptive response	Avoid
Influence time frame	medium- to long-term
Implementation time-frame	short- to medium-term
Planning level	municipal, neighbourhood, site
Planning process and plan type	formal; professional; community planning, physical, environmental and site planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during mandatory plan reviews

Conservation subdivision design (CSD) is a residential development model that accounts for the ability of the land to support development and the need to retain rural or natural landscapes. CSD clusters development to ensure that a large percentage of a subdivision area is kept as open space, typically 40% or more of the property. This is a subdivision design tool that avoids risks from flooding and erosion and protects green space and natural processes by retaining many natural landscape features and providing natural buffers. This type of subdivision design also reduces the need for infrastructure and manages stormwater by working with the natural flow of water through an area. Conservation subdivision design can help to manage the impacts of climate change, where it is used for land subdivision.

Conservation subdivision design requires less infrastructure, resulting in reduced costs for developers. By locating development clusters in upland areas and maintaining open space buffers along shorelines, CSD can be a useful tool in the context of climate change adaptation planning for coastal areas. Regional examples of CSD include Le Village en haut du Ruisseau in Dieppe, New Brunswick[273] and the Villages of Seven Lakes in Halifax, Nova Scotia.[274]

Figure 2.47 Example of site design differences between traditional subdivision design and conservation subdivision design (Daniel Savard, New Brunswick)

[273] Clean50. (2015). *Sustainable Community Design at 'Le Village en haut de Ruisseau' subdivision*. Retrieved from https://clean50.com/projects/province-of-new-brunswick-sustainable-community-design-for-subdivisions-2015/
[274] Villages of Seven Lakes – The Penney Group Inc. (2014). Seven Lakes. Retrieved from https://sevenlakescommunity.com/

OPPORTUNITIES	CONSTRAINTS
• Costs of infrastructure can be less than half that of conventional subdivisions. • Protects natural and cultural features. • Avoids development in hazardous areas and provides natural protective buffers between structures and the coast. • Increases recreational areas for residents.	• Relatively uncommon in Canadian communities and unfamiliar to developers.

Getting started and first steps – Communities with land use planning authority can require conservation subdivision design through **land use bylaws and zoning, subdivision by-laws, development standards, development agreements, variances,** and **urban design standards**. Communities without land use planning authority can use **education** and **community engagement** to encourage developers to use this design method for new developments. Here are some first steps towards using this tool for climate change adaptation:

- Determine through **data gathering and mapping** where conservation subdivision design would be suitable for new developments
- Encourage the provincial government to develop provincial CSD policies and by-laws.

Conservation subdivision design example (regional)

Profile: Seven Lakes Development, Halifax, Nova Scotia	
Coast	Atlantic
Region	Eastern Shore
Impact Concerns	Quantity and quality of water resources
Population	634 units
Community Type	Subdivision development
Project Area	256 hectares
Year	2014

Summary – The Villages of Seven Lakes is located on Nova Scotia's Eastern Shore in Planning Districts 8 and 9 of Halifax Regional Municipality. This rural area close to urban Halifax has a growing population. Seven Lakes is being developed according to the conservation subdivision design approach approved through a development agreement between Seven Lakes Developments (a division of The Penney Group Incorporated) and the Municipality. When complete there will be 634 homes in the subdivision.

The development of The Villages of Seven Lakes is enabled by Sections 15 and 16 of the *Halifax Regional Municipal Planning Strategy*. These sections state that the Municipality may enter into a development agreement for Lower Density Classic Conservation Design and Hybrid Conservation Design developments in specified areas of the Municipality.[275]

[275] Halifax. (2014). Regional municipal planning strategy. Policies S-15 and S-16. Retrieved from https://www.halifax.ca/sites/default/files/documents/about-the-city/regional-community-planning/RegionalMunicipalPlanningStrategy.pdf

The subdivision design works with the hydrology of the property and surrounding area. Homes and structures are grouped, or clustered, together. Clustering has the following benefits: it maintains the natural flow of water through the area; conserves the natural features of the land; provides recreational space; and encourages social interactions. Environmental protection measures for the design include a site disturbance plan, erosion and sedimentation control plan, stormwater management plan, nutrient management plan, and a water-quality monitoring program.[276]

Figure 2.48 Villages of Seven Lakes site plan through a development agreement with Halifax Regional Municipality (Villages of Seven Lakes Development[277])

Recommended resources

Conservation Design Development – Halifax Nova Scotia:
https://www.halifax.ca/business/planning-development/conservation-design-development

[276] Villages of Seven Lakes – The Penney Group Inc. (2014). Seven Lakes. Retrieved from https://sevenlakescommunity.com/
[277] Villages of Seven Lakes - The Penney Group Inc. (2014). Seven Lakes: site map [image]. Retrieved from https://sevenlakescommunity.com/site-map

3.4.3 Coastal development rating system

Adaptive response	Accommodate, procedural approach
Influence time frame	medium- to long-term
Implementation time-frame	short-term
Planning level	provincial, regional, municipal
Planning process and plan type	formal and semi-formal; professional; site planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during program reviews

The Stewardship Centre for British Columbia (SCBC) developed a coastal development rating system and assessment tool through a Green Shores program. The rating tool is based on green building rating models such as LEED. Properties are rated Bronze, Silver, or Gold based on a set of design criteria, and landowners receive a certificate of the rating for a property.

The aim of the coastal development rating system is to promote sustainable use of coastal areas through planning and design. The design ratings discourage the use of rip-rap, seawalls and other shoreline engineering measures. The principles of *Green Shores* are to preserve coastal processes, maintain habitat functions, minimize pollutants, and reduce cumulative coastal impacts.[278] The province of BC has partnered with SCBC to develop an Expedited Permit Guide and a Nature-based Shoreline Projects Checklist for residents of the province. Eligible nature-based shoreline projects are provided an expedited process compared to the authorization process for hard armour projects such as seawalls and rip rap.[279] In 2021 Green Shores launched a new chapter in Atlantic Canada, coordinated by TransCoastal Adaptations: Centre for Nature-Based Solutions.[280]

Figure 2.49 (Stewardship Centre for BC[1])

OPPORTUNTIES	CONSTRAINTS
• Promotes sustainable shoreline management by landowners. • Can raise the value of highly rated properties. • Recognizes cost effective solutions to coastal issues for landowners. • Is voluntary, non-regulatory tool.	• May be difficult to obtain voluntary participation. • Tool must be recognized and well known within a community to benefit coastal property owners who participate.

[278] Stewardship Centre for British Columbia. (n.d.). About Green Shores. Stewardship Centre for British Columbia. Retrieved from https://stewardshipcentrebc.ca/green-shores-home/gs-about/
[279] Stewardship Centre for British Columbia. (n.d.). Green Shores | Resources. Retrieved from https://stewardshipcentrebc.ca/green-shores-home/gs-resources/expedited-permit-bc/
[280] Stewardship Centre for British Columbia. (2021). New Green Shores chapter is launched in Nova Scotia. Retrieved from https://stewardshipcentrebc.ca/new-green-shores-chapter-in-the-maritimes/

Getting started and first steps – Green Shores offers programs for homeowners, commercial developers, and local governments. Any government, organization, or private landowner can use this tool.

- Visit TransCoastal Adaptations: Centre for Nature-Based Solutions website to find out more about the Green Shores program in Atlantic Canada. www.transcoastaladaptations/green-shores.com

Coastal development rating system example (regional)

Profile: Charlottetown, Prince Edward Island	
Coast	Atlantic
Region	Northumberland Strait
Impact Concerns	Flooding
Population	38,809 (2021 Census)
Community Type	City
Year	2021-22

Summary – Green Shores offers three programs that help users implement practices that prevent erosion, restore ecosystems, and reduce water pollution:

1. Green Shores for Shoreline Development is a tool for shoreline property owners, developers, and managers. The program applies to subdivisions and multi-family residential projects, commercial waterfront projects, waterfront infrastructure, parks and recreational areas, and shore design.
2. Green Shores for Homes is a tool for waterfront homeowners and their contractors that applies to marine and lake environments. It applies to all shoreline types from rock cliffs to coastal bluffs.
3. Green Shores for Local Government helps government officials and staff build capacity for shoreline planning and protection (e.g., research, community education and engagement, local action planning, evaluation).

Green Shores also offers three levels of training courses for those interested in learning more about the program. Elected officials, landowners, municipal staff, conservation organizations, real estate agents, or anyone who has an interest in shoreline ecosystem protection may participate. After finishing the first level of training, participants may advance to the next levels to gain a more in-depth knowledge about the credit and rating systems, and finally to become an approved Green Shores professional.[281]

There are multiple projects underway in Nova Scotia and Prince Edward Island that are going through the Green Shores rating system, including The Queen Elizabeth Hospital, in Charlottetown. The hospital is situated on the coast and is separated from the high-water line by a road and a walking path for patients and the public. A living shoreline was designed and constructed in collaboration with PEIWA, Province, CBWES and TransCoastal Adaptations in 2021 and is undergoing the certification process. Additions to the project include deploying reef balls as a natural breakwater to dissipate energy from the Northumberland waves.[282]

[281] TransCoastal Adaptations: Centre for Nature-Based Solutions. (n.d.). Green Shores. Retrieved from https://www.transcoastaladaptations.com/green-shores
[282] Umlah, K., personal communication.

Recommended resources

TransCoastal Adaptations: Centre for Nature-Based Solutions - Green Shores Nova Scotia
https://www.transcoastaladaptations.com/green-shores

3.4.4 Site monitoring

Adaptive response	Procedural approach
Influence time frame	medium- to long-term
Implementation time-frame	short-term
Planning level	provincial; regional; community
Planning process and plan type	formal to semi-formal; professional to informed volunteer; site, physical and environmental planning
Adapting to climate change	update with new climate change information and environment and land use changes and best practice standards during program reviews

Site monitoring of the shoreline can be an important step in understanding risks of coastal flooding and erosion, coastal habitat health, and how the coast is changing through natural processes. Monitoring an area before and after making changes along the coast can inform a community of how their actions are affecting the coast for better or for worse, knowledge that is important for making decisions about future coastal adaptation.

Figure 2.50 Example of how monitoring with images can inform decision-makers on coastal changes such as erosion. The above Image was taken in Shishmaref, Alaska where melting permafrost has increased coastal erosion (T. Weyiouanna[283])

OPPORTUNITIES	CONSTRAINTS
• Informs future decision-making. • Establishes a baseline of the current coastal conditions. • Informs how adaptation measures are working so far.	• Does not directly address coastal issues.

Getting started and first steps – Any community can establish a monitoring program. Monitoring is a good opportunity to build partnerships with educational institutions and volunteer organizations. Local residents can become involved and contribute and build new knowledge and skills. Adaptation can become a community effort. Here are some first steps toward using this tool:

- Establish a **partnership** with experts. Scientific and technical expertise may be needed to set up the monitoring program for shoreline erosion, sedimentation processes, and ecosystem health.

[283] Weyiouanna, T. (2014). Alaska Climate Mitigation Program [image]. The State of Alaska. Retrieved from https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/ACCIMP/CommunityPlanningGrants/ShishmarefCPG.aspx

- **Engage** with citizens about climate change issues at the coast. Citizen science can be used to monitor erosion and flooding. For example, photographs of the shoreline are often useful for understanding changes. Residents and others can provide this information which also enhances the participatory approach to monitoring.

Site monitoring example (regional)

Profile: Nunatukavut, Labrador	
Coast	Atlantic
Region	Labrador Sea
Impact Concerns	Ice and snow melt, water quality
Population	6,000
Community Type	Community Council
Year	2018-present
Funding	Government of Canada Indigenous Community-Based Climate Monitoring

Summary – The NunatuKavut Community Council (NCC) is the representing governing body for approximately 6000 Inuit of south and central Labrador.[284] Their vision is to govern themselves, provide and care for their families and communities, while nurturing their relationship with their land, ice, and waters.[285]

NCC started a Community-Based Climate Monitoring Project that engages youth, elders, and adults in NunatuKavut communities who spend time hunting, fishing, or harvesting berries and plants. The project focuses on seven climate indicators including sea ice, invasive species, and seasonal timing of plants. Knowledge and data are collected through youth who are monitoring ice and water conditions, elder climate knowledge, and “out on the land” observations from active adults. The program provides youth with skills and climate knowledge as they are responsible for collecting ice, snow and water data, as well as being involved as observers and assistants in other data collection. The monitoring project also increases opportunities for intergenerational knowledge transfer.[286]

The project involves the communities of Cartwright, Charlottetown, Happy Valley – Goose Bay, Mary’s Harbour, and Port Hope Simpson[287] and will be expanded to other communities when possible.

Figure 2.51 NunatuKavut Youth Climate Monitoring

[284] NunatuKavut. (2022). *Who we are.* Retrieved from https://nunatukavut.ca/about/who-we-are/
[285] NunatuKavut. (2022). Our Vision. Retrieved from https://nunatukavut.ca/about/community-objectives/
[286] NunatuKavut. (2020). *Environment and Natural Resources*. Retrieved from https://nunatukavut.ca/departments/natural-resources-environment/
[287] NunatuKavut. (2020). Expression of Interest: Community-Based Climate Monitoring Interns. Retrieved from https://nunatukavut.ca/article/expression-of-interest-community-based-climate-monitoring-interns/

Site monitoring example (international)

Profile: Wetlands Monitoring and Assessment Kit, National Wetland Trust of New Zealand	
Coast	South Pacific
Region	New Zealand
Impact Concerns	Wetland loss
Community Type	Organization
Year	2013
Funding	Donations

Summary – The National Wetland Trust of New Zealand is a non-profit organization that aims to increase the appreciation of wetlands in New Zealand. The Trust provides a range of material to support conservation activities and research, including land management guides and monitoring toolkits.

The Trust developed a free, on-line Wetland Monitoring and Assessment Kit for community groups working on restoration projects throughout the country. Resources in the kit include blank datasheets and report templates for recording observation of wetland health in the field. The modules cover topics of skills and equipment needs, creating a wetland management map, photographing changes, broad indicators of wetland health, mapping vegetation, weed surveying, vegetation plotting, and pest monitoring. The Trust also has a "wetland monitoring hub" online where users can find support and information on monitoring their restoration project.[288]

Figure 2.52 Wetmak wetlands monitoring and assessment kit (NZ Landcare Trust's Wetmak[289])

Recommended resources

Government of Canada Citizen Science Portal:
https://www.ic.gc.ca/eic/site/063.nsf/eng/h_97169.html

Wetlands monitoring and assessment toolkit:
https://www.landcare.org.nz/file/file5cf5a70b9a992/open

[288] New Zealand Landcare Trust. (2014). WETMAK-Wetlands Monitoring and Assessment Kit. Retrieved from https://www.landcare.org.nz/file/file5cf5a70b9a992/open
[289] Ibid.

Appendix: Tables

Table 1.1 Land use planning adaptation tools – continued

Land Use Planning Tools Applicable for Coastal Climate Change Adaptation **P –** Protect, **Pr** – Procedural, **A** – Accommodate, **R** – Retreat, **Av** – Avoid				Can be part of the planning process	May require a new initiative	Strategies to account for climate change	
						Short-term adaptation (10 years)	Medium to long-term adaptation (20 + years)
Capacity Building Tools	**Pr**	Provincial policy statements or statements of interest			x	x	**x**
	Pr	Partnerships		x	x	x	x
	Pr	Education programs		x	x	x	x
	Pr	Local committees		x	x	x	x
	Pr	Community engagement		x	x	x	x
	Pr	Community asset mapping			x	x	x
	Pr	Visualization			x	x	x
	Pr	Scenario planning			x	x	x
	Pr	Data gathering & mapping	Hazard and risk mapping	x	x	x	x
	Pr		Vulnerability assessment	x	x	x	x
	Pr		Floodplain mapping	x	x	x	x
	Pr		Land classification mapping	x	x	x	x

Table 1.1 Land use planning adaptation tools – continued

Land Use Planning Tools Applicable for Coastal Climate Change Adaptation P – Protect, Pr – Procedural, A – Accommodate, R – Retreat, Av – Avoid				Can be part of the planning process	May require a new initiative	Strategies to account for climate change	
						Short-term adaptation (10 years)	Medium to long-term adaptation (20 + years)
Policy and Planning Framework Tools	Pr	Emergency preparedness and/or management plan				x	x
	P, Pr, A, Av, R	Statutory community plan (municipal planning strategy, municipal plan, official plan, regional plan)		x		x	x
	P, Pr, A, Av, R	Secondary plan or area plan		x		x	x
	P, Pr, A, Av, R	Regional plan (non-statutory), land use policy, land use plan		x		x	x
	P, Pr, A, Av, R	Guidance, action, and management plans	Integrated community sustainability plan	x	x	x	x
	P, Pr, A, Av, R		Climate change action/adaptation plan	x	x	x	x
	Pr, A, Av, R		Shoreline/coastal management plan	x	x	x	x
			Open space/conservation/protected areas plan	x	x	x	x
	Pr, Av, R		Watershed management plan	x	x	x	x
	Pr, Av		Stormwater management plan	x	x	x	x
	Pr, Av, R		Strategic land acquisition (land bank)	x	x	x	x
	Pr, A, Av	Incentive	Tax incentive	x	x	x	x
	Pr, A, Av		Density Bonusing	x	x	x	x
	Pr, A, Av		Development incentive	x	x	x	x
	Pr, Av, R	Wetland policy		x		x	x

Table 1.1 Land use planning adaptation tools - continued

Land Use Planning Tools Applicable for Coastal Climate Change Adaptation P – Protect, Pr – Procedural, A – Accommodate, R – Retreat, Av – Avoid				Can be part of the planning process	May require a new initiative	Strategies to account for climate change	
						Short-term adaptation (10 years)	Short-term adaptation (10 years)
Regulations and Land Use Change mechanisms	Pr, Av, R	Wetland regulations		x	x	x	x
	A, Av, R	Zoning	Land use zoning	x		x	x
	A, Av, R		Overlay zoning	x		x	x
	A, Av, R		Hazard zoning	x		x	x
	A, Av		Performance zoning (PUD)	x		x	x
	A, Av		Conservation/protection zoning	x		x	x
	A, Av		Temporal zoning	x		x	x
	A, Av, R		Down zoning	x		x	x
	Av, R	Setbacks	Retreating/migrating setbacks	x		x	x
	Av		Fixed setbacks	x		x	x
	Av		Horizontal (lateral)	x		x	x
	Av		Elevation (vertical)	x		x	x
	Av		Buffers	x		x	x
	Av		Land use type setbacks	x		x	x
	Av	Subdivision by-law or regulations		x		x	x
	A	Development standards		x		x	x
	Av	Development agreements		x		x	x

Table 1.1 Land use planning adaptation tools - continued

	Land Use Planning Tools Applicable for Coastal Climate Change Adaptation **P –** Protect, **Pr** – Procedural, **A** – Accommodate, **R** – Retreat, **Av** – Avoid		Can be part of the planning process	May require a new initiative	Strategies to account for climate change	
					Short-term adaptation (10 years)	Short-term adaptation (10 years)
Regulations… continued…	**Av**	Transfer of development credits		x	x	x
	R, Av	Land swap		x	x	x
	R, Av	Land use conversion & re-development	x	x	x	x
	A	Variances	x		x	x
	A	Waiver	x		x	
	R, Av	Land trust		x	x	x
	R, Av	Rolling easements		x	x	x
	R, Av	Conservation easements		x	x	x
	R	Managed retreat and managed abandonment	x	x	x	x
	R	Abandonment	x	x	x	x
	Pr	Foreshore lease		x	x	x

Table 1.1 Land use planning adaptation tools - continued

Land Use Planning Tools Applicable for Coastal Climate Change Adaptation **P –** Protect, **Pr** – Procedural, **A** – Accommodate, **R** – Retreat, **Av** – Avoid			Can be part of the planning process	May require a new initiative	Strategies to account for climate change	
					Short-term adaptation (10 years)	Short-term adaptation (10 years)
Site Planning and Design Tools	**A, Av**	Urban design standards	x	x	x	x
	Av	Conservation subdivision design	x	x	x	x
	Pr, A	Coastal Development Rating System		x	x	x
	Pr	Site Monitoring	x	x	x	x

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation

Land Use Planning Tools			Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Capacity Building Tools	Provincial policy statements or statements of interest			
	Partnerships			
	Education programs			Community engagement, visioning, scenario planning, data gathering and mapping
	Local committees			Partnerships
	Community engagement			Education programs, visioning, scenario planning, data gathering and mapping
	Community asset mapping		Community engagement	Data gathering and mapping
	Visualization		Data gathering and mapping	Partnerships, education programs, community engagement
	Scenario planning		Data gathering and mapping	Partnerships, community engagement
	Data gathering & mapping	Hazard and risk mapping	Data gathering and mapping	Partnerships, local committees
		Vulnerability assessment		Partnerships, local committees
		Floodplain mapping		
		Land classification mapping	Partnerships, data gathering and mapping	

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools		Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Policy and Planning Framework Tools	Emergency preparedness and/or management plan	Data gathering & mapping, partnerships, education programs, community engagement	Provincial policy statements, local committee, scenario planning, managed retreat, site monitoring
	Statutory community plan (municipal planning strategy, municipal plan, official plan, regional plan)	Data gathering & mapping, community engagement, local committees	Education programs, visioning, community asset mapping, scenario planning, regional plan, provincial policy statements or statements of interest, regional plan, integrated community sustainability plan, coastal climate adaptation/action plan, shoreline/coastal management plan, watershed management plan, open space/conservation/protected area plan, secondary community or local area plan, zoning/land use by-law, setbacks, subdivision by-law, development standards, development agreements, urban design standards, conservation subdivision design
	Secondary plan or local area plan	Statutory community plan, data gathering & mapping, community engagement, local committees	Education programs, visioning, community asset mapping, scenario planning, development agreement-setbacks
	Regional plan (non-statutory), land use policy, land use plan	Partnerships, data gathering & mapping, local committees	Land use policies, provincial policy statements, integrated community sustainability plan, climate change adaptation/action plan, shoreline/coastal management plan, watershed management plan, open space/conservation/protection plan, statutory community plan, education programs, community engagement, visioning, scenario planning

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools			Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Policy and Planning Framework Tools	Guidance, action, and management plans	Integrated community sustainability plan	Data gathering & mapping, local committees, partnerships	Education programs, community engagement, visioning, community asset mapping, scenario planning, regional plan/land use policy, climate change adaptation/action plan, statutory community plan
		Climate change action/adaptation plan	Data gathering & mapping, local committees, partnerships	Education programs, community engagement, visioning, community asset mapping, scenario planning, emergency preparedness, regional plan, Integrated sustainability plan, shoreline/coastal management plan, watershed management plan, open space/conservation/protection plan, statutory community plan, land use conversion and redevelopment
		Shoreline/coastal management plan	Data gathering & mapping, community engagement, local committees, partnerships	Education programs, visioning, community asset mapping, scenario planning, emergency preparedness, regional plan, climate change adaptation/action plan, open space/conservation/protected area plan, wetland policy, wetland regulation, statutory community plan, tax or development incentives, land-use by laws and zoning, setbacks, subdivision bylaw(s) or regulations, transfer of development credits, land swap, development standards, development agreements, Land conversion and redevelopment, Land trust, rolling easements, conservation easements, managed retreat, foreshore lease, urban design standards, conservation subdivision design, coastal development rating system, site monitoring

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools			Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Policy and Planning Framework Tools	Guidance, action, and management plans	Open space/conservation/ protected areas plan	Data gathering & mapping, community engagement, local committees, partnerships	Regional plan/land use policy, statutory community plan, coastal/shoreline management plan, watershed management plan, open space, conservation and protected area plan, strategic land acquisition, wetland regulation, wetland policy/plan, transfer of development credits, land swap, land conversion and redevelopment, land trust, conservation easements, managed retreat, conservation subdivision design
		Watershed management plan	Data gathering & mapping, local committees, partnerships	Community engagement, education programs, visioning, community asset mapping, scenario planning, regional plan, land use policies, provincial policy statements or statements of interest, wetland policy/plan, wetland regulation, setbacks, subdivision bylaw(s) or regulations, transfer of development credits, development standards, development agreements, land conversion and redevelopment, managed retreat, stormwater management plan, conservation subdivision design
		Stormwater management plan	Partnerships, data gathering & mapping	Education programs, community engagement, visioning, scenario planning, statutory community plan, secondary community plan, guidance, action, or management plans, watershed management plan, wetland policy, wetland regulations, setbacks, development standards, urban design standards, site monitoring
		Strategic land acquisition (land bank)	Data gathering & mapping, local committees, partnerships	Community engagement, education programs, visioning, community asset mapping, open space/conservation/protection plan, statutory community plan, subdivision by-law, tax or development incentives, subdivision bylaw(s) or regulations, transfer of development credits, land swap, subdivision bylaw(s) or regulations, transfer of development credits, land swap, land conversion and redevelopment, land trust, conservation easements, managed retreat

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools			Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Policy and Planning Framework Tools	Incentive	Tax incentive	Statutory community plan or secondary community plan, land use zoning and bylaws, subdivision by-law or regulations	Data gathering and mapping, partnerships, local committees, community engagement, education programs, strategic land acquisition plan or strategy, statutory community plan, subdivision bylaw(s) or regulations, development agreements, transfer development credits, land use conversion & redevelopment, land trust, conservation easements, managed retreat and managed abandonment, conservation subdivision design, coastal development rating system
		Density Bonusing		
		Development incentive		
	Wetland policy		Data gathering & mapping, community engagement, local committees, partnerships, education programs	Regional plan, provincial policy statements or statements of interest, shoreline/coastal management plan, coastal/shoreline management plan, watershed management plan, open space, conservation and protected area plan, wetland regulation, statutory community plan, setbacks, transfer of development credits, land conversion and redevelopment, conservation easements, managed retreat, stormwater management plan, conservation subdivision design, site monitoring,

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools			Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Regulations and Land Use Change mechanisms	Wetland regulations		Data gathering & mapping, local committees, partnerships, statutory community plan	Education programs, community engagement, wetland policy, statutory community plan, setback, land use conversion and redevelopment
	Zoning	Land use zoning	Statutory community plan (for land use zoning), data gathering and mapping, local committee	Education programs, scenario planning, regional plan/land use policy, shoreline/coastal management plan, watershed management plan, open space/conservation/protection plan, secondary community plan
		Overlay zoning		
		Hazard zoning		
		Performance zoning (PUD)		
		Conservation/protection zoning		
		Temporal zoning		
		Down zoning		
	Setbacks	Retreating/migrating setbacks	Statutory community plan, zoning and/or subdivision by-law or regulations	Education programs, scenario planning, wetland policy, wetland regulations, secondary community plan, development agreements, site monitoring
		Fixed setbacks		
		Horizontal (lateral)		
		Elevation (vertical)		
		Buffers		
		Land use type setbacks		
	Subdivision by-law or regulations		Statutory community plan	Education programs, scenario planning, strategic land acquisition, statutory community plan, development agreements, transfer of development credits, land swap, variances, waiver, urban design standards, conservation subdivision design

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools		Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Regulations and Land Use Change mechanisms	Development standards	Statutory community plan, data gathering and mapping	Secondary community plan or local area plan, setbacks, zoning, transfer development credits, development agreements, stormwater management plan, urban design, conservation subdivision design, coastal development rating system
	Development agreements	Statutory community plan, zoning (for land use zoning), community engagement,	Data gathering and mapping, open space/conservation/protected area plan, strategic land acquisition, secondary community plan or local area plan, tax or development incentives, setbacks, subdivision by-law or regulations, transfer of development credits, land swap, urban design standards, conservation subdivision design
	Transfer of development credits	Statutory community plan	Data gathering & mapping, shoreline/coastal management plan, watershed management plan, open space/conservation/protected area management plan, strategic land acquisition, tax or development incentives, development standards, development agreements, subdivision by-law or regulations, land swap, land trust, conservation easements
	Land swap	Partnerships, education programs, data gathering & mapping	Shoreline/coastal management plan, open space/conservation/protection plan, strategic land acquisition, land trust, development agreements, land use conversion and redevelopment, conservation easement, managed retreat and managed abandonment
	Land use conversion & re-development	Statutory community plan, data gathering and mapping, zoning (for land use)	Emergency preparedness, regional plan/land use policy, climate change action/adaptation plan, watershed management plan, shoreline/coastal management plan, open space/conservation/protection plan, strategic land acquisition, wetland policy, wetland regulations, zoning (land use by-law), tax or development incentives, land swap, land trust, conservation easements, managed retreat and managed abandonment, site monitoring

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools		Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Regulations and Land Use Change mechanisms	Variances	Statutory community plan, data gathering and mapping	Education programs, community engagement, emergency preparedness, watershed management plan, shoreline/coastal management plan plans, climate change action/adaptation plan, zoning (land use by-law), development standards, development agreements, urban design standards
	Waiver	Statutory community plan, data gathering and mapping, or secondary community plan	Education programs, emergency preparedness, watershed management plan, shoreline/coastal management plan, climate change action/adaptation plan, zoning, subdivision by-law or regulations, development standards, development agreements, urban design standards
	Land trust	Partnerships	Education programs, community engagement, data gathering and mapping, open space/conservation/protection plan, shoreline/coastal management plan, strategic land acquisition, tax incentives, transfer of development credits, land use conversion and redevelopment, conservation easements

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools		Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Regulations and Land Use Change mechanisms	Rolling easements	Partnerships, provincial legislation	Education programs, community engagement, shoreline/coastal management plan
	Conservation easements	Partnerships	Education programs, community engagement, data gathering and mapping, shoreline/coastal management plan, open space/conservation/management plan, strategic land acquisition, land trust, tax incentives, transfer of development credits, land use conversion and redevelopment
	Managed retreat and managed abandonment	Data gathering & mapping, education programs, community engagement	Partnerships, statutory community plan, secondary community plan, emergency preparedness, regional plan, climate change action/adaptation plan, watershed management plan, shoreline/coastal management plan, open space/conservation, protection plan, strategic land acquisition, wetland policy, statutory community plan, tax incentives, zoning (land use by-law), setbacks, transfer of development credits, land swap, land use conversion and redevelopment, land trust, rolling easements, conservation easements, site monitoring
	Abandonment	N/A	Site monitoring
	Foreshore lease	Partnerships	Data gathering & mapping, shoreline/coastal management plan

Table 1.2 Prerequisites for land use planning tools applicable for climate change adaptation - continued

Land Use Planning Tools		Other tools that are required before implementing	Other tools that are beneficial for supporting implementation
Site Planning and Design Tools	Urban design standards	Community engagement, statutory community plan	Visioning, data gathering and mapping, secondary community plan or local area plan, zoning (land use by-law), setbacks, development standards, development agreement, stormwater management, conservation subdivision design, coastal development rating system
	Conservation subdivision design	Partnerships, data gathering & mapping	Education programs, visioning, scenario planning, statutory community plan, secondary community plan or local area plan, climate change adaptation/action plan, shoreline/coastal management plan, watershed management plan, open space/conservation/protection plan, tax incentives, wetland policy, wetland regulations, zoning land use by-law), setbacks, subdivision by-law or regulations, development standards, development agreements, urban design standards
	Coastal Development Rating System	Partnerships	Education programs, community engagement, visioning, data gathering & mapping, climate change adaptation plan, shoreline/coastal management plan, tax incentives, development standards, urban design standards, site monitoring
	Site Monitoring	Data gathering & mapping	Partnerships, education programs, community engagement, scenario planning, emergency preparedness, climate change adaptation/action plan, watershed management plan, shoreline/coastal management plan, stormwater management