

SAFEGUARDING YOUR COASTAL PROPERTY:

A guide to protecting your property
and promoting healthy coastlines
in the face of climate change



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This guide is for informational purposes only. It is not a substitute for provincial statutes and regulations. Provincial departments, the federal government, local governments, and other agencies may have statutory and/or regulatory requirements not specified in this document. It is the responsibility of each property owner to ensure activities on a property are in accordance with all relevant statutes and regulations. This document may be reviewed and updated periodically as deemed appropriate by the Department of Environment and Climate Change.

The latest version of this document is available at novascotia.ca/coastal-climate-change



MINISTER'S MESSAGE



Buying or developing a property is one of the most important investments we make in our lives. There is a lot to consider, and it can be complex to plan your home so that it stays safe and meets your needs. If your property is by the ocean, then there are additional things you need to consider to safeguard against the hazards and risks the ocean can bring.

Living by the ocean is a dream for many. Some Nova Scotians' coastal homes and cottages have been passed down from generation to generation. Or you may be building a new place by the ocean. Whatever your situation, there are additional steps you need to take if you live, or plan to build by, our coast.

This guide gives you the information you need to live by the coast in a way that will protect your property and the people who live there, along with the special and beautiful natural environment around you.

The reality is that our coastline, like all others around the world, is on the front-lines of climate change. The ebbs and flow of tides, waves, storms and wind have shaped our beaches, coastline, dunes and bluffs since time began and have always presented coastal property owners with risks. Climate change is raising the stakes.

The facts are clear. Parts of our coast will look very different 25, 50, and 100 years from now. Climbing global temperatures mean rising sea levels and more frequent and intense storms. Sea level rise when combined with storm surge at high tide, will intensify flooding and erosion in coastal regions in every corner of the world. People, homes and our environment are at risk. This can be concerning. However, there are things each of us can—and must—do to live in a new way that considers our changing climate.



Climate change is a global issue. It requires global action. Nova Scotia is proud to be a leader in climate change action. In 2021, our Government introduced the *Environmental Goals and Climate Change Reduction Act* which lays out the legislative framework and sets 28 goals to help Nova Scotians respond to climate change. We followed that up with *Weathering What's Ahead*, a provincial climate change risk assessment that tells us how climate change may impact us if we don't take action. We also have a climate plan – *Our Climate, Our Future: Nova Scotia's Climate Change Plan* – with actions to help Nova Scotians mitigate climate change and adapt to how it is changing our province, including along the coast.

And we are taking action. We have the strongest greenhouse gas reductions in the country, we are moving to clean energy, empowering community-led action to respond to climate change through grant programs, protecting 20 per cent of our land and water including along the coast, and more. In fact, about 13.1 per cent of Nova Scotia's coastline is protected now from development – this includes coastal areas inside provincial parks, wilderness areas, nature reserves, national parks, national wildlife areas and in land owned and managed by conservation land trusts, including Mi'kmaq organizations. Government has committed to increasing this number as part of its goal to protect 20 per cent of the province's land and water by 2030.

As a coastal property owner, you have a responsibility to live, build and renovate in a way that considers, and mitigates, the impacts of climate change on your property. The decisions you make impact your neighbours, your community and everyone who lives on or visits your property. And you know your property best. That's why we are giving you the information and tools you need to make informed decisions.

Nova Scotians are a coastal people. Our coastline offers stunning views and a way of life that reminds us every day of how lucky we are to live here. However, we must rethink how and where we build and live. We have no choice.

I know you have a personal stake to get this right. And we are here to support you every step of the way.

Honourable Timothy Halman
Minister of Environment and Climate Change



HOW TO USE THIS GUIDE

If you own, or if you're interested in buying, selling, doing work on, or managing a coastal property in Nova Scotia, then this guide is for you.

If you have lived by the coast for years, then you already know that the coast is a complex and constantly changing environment. You are likely familiar with its natural rhythms, like the tides, but also the kinds of damage that big storms can bring. A changing climate means giving the coast even more space, so we can keep people, buildings, and shorelines healthy.

This guide is divided into three sections to help you make informed decisions about your coastal property. Section one provides information about our coastline and the impacts of climate change. The second section provides an overview of coast-friendly practices. And the final section offers resources that can support you as you take action to prepare and protect your investment.

Nova Scotia's coastline is diverse. Addressing coastal hazards needs to be appropriate to each unique property, community and geography. This guide provides general advice and outlines a range of options that can help to reduce impacts on coastal properties and promote healthy shorelines.

This guide is part of *The Future of Nova Scotia's Coastline: A plan to protect people, homes and nature from climate change*, a suite of steps the Government of Nova Scotia is taking as part of its commitment to tackling climate change. It is specific to the impact of climate change on our coastlines and does not cover all the effects we'll see in Nova Scotia. For more information on ways the climate is changing in our province and the impacts and risks for our region, please see *Weathering What's Ahead: Climate Change Risk and Nova Scotia's Well-being*.

For more information about how the Government of Nova Scotia is taking action to reduce greenhouse gases, increase renewables, protecting more land and water, and grow the clean economy, please see *Our Climate, Our Future: Nova Scotia's Climate Change Plan for Clean Growth*.

Section One:

Our coast and the impacts of climate change

In Nova Scotia, we're never more than 60 kilometers from the ocean. If you unraveled the 13,300 km of our coastline, it would stretch further than the distance from Halifax to Vancouver and back. Nova Scotia's coasts have been home to the Mi'kmaq for thousands of years, and today our vibrant coastal communities and natural features attract visitors from around the world. The ocean has shaped our ways of life, creating diverse histories, cultures, and livelihoods.

What is the coast?

The coast is the area where land meets the sea, and where rivers meet the ocean. Coastlines are rich in biodiversity, providing a home for many unique species of plants and animals. Nova Scotia has many types of coastal environments, each with different characteristics and features. Tides, wind, and waves are powerful forces that constantly reshape the shore. Understanding natural coastal processes and the different parts of the coast can help identify options for avoiding harm and reducing impacts from storms, sea level rise, and coastal erosion.

Natural processes

Tides

The oceans rise and fall each day with the tides. The tidal range varies around the coast. Along much of the Atlantic coast, a typical tidal range is less than 2 metres. The Bay of Fundy has some of the biggest tidal ranges in the world, rising as much as 16 metres higher than low tide – the height of a four-story building. The height of the tides varies throughout the year, too. When a storm hits at high tide, waves can reach farther inland and cause more damage than if the storm hits at low tide.





Erosion

The effects of erosion also shape the coastline, its landforms, and ecosystems. Wind and waves break down rocks and move sand and other material, especially during storms. Rivers and runoff from heavy rains can also leave material along the shoreline or wear down rocks. Together, these forces wash away material in some spots and build it up in others, giving us the coastline we enjoy today.

Different types of coastlines erode at different speeds. A sandy beach will change more quickly than a stone cliff, through runoff or erosion. Areas that are more exposed to wind and waves can change faster than areas that are protected, like a sheltered inlet.



*Loose or packed material
(sand, mud, fill)*



*Soft rock
(erodes easily - e.g., sandstone)*



*Hard rock
(resistant - e.g., granite)*



Coastal Environments

Other areas offer natural protection against the forces of the ocean. For example, coastal wetlands can help buffer the shoreline from the effects of strong winds and waves. Coastal environments include:



Developed waterfronts



Exposed bedrock or boulders



Bluff



Dune



Intertidal flat (sand or mud)



Saltmarsh



Rock cliff



Gravel/cobble



Sandy beach or barriers



Dyklands

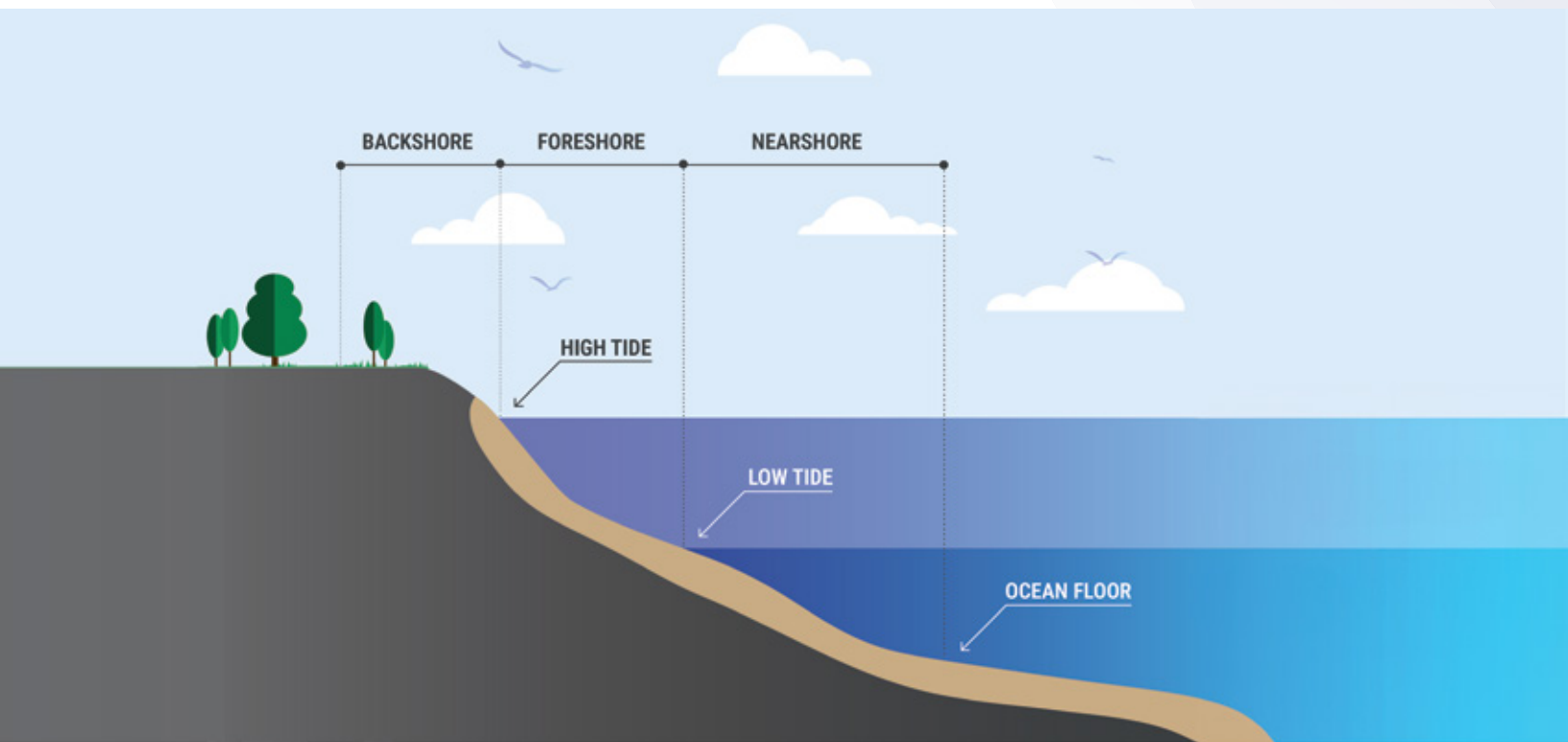
Parts of the shore

Knowing the different parts of the shore can be useful in a few ways. The shore is made up of different areas, and the ocean influences them differently, so the options to reduce the impacts from climate change will vary depending on the area of shoreline.

This information may help you to know how local government, provincial, and/or federal regulations and guidelines may apply to different parts of the shore when considering options. For example, the nearshore is often subject to federal regulation.

The shore can be divided into three sections:

- The nearshore is the area where waves become steeper and break.
- The foreshore is the area between low tide and high tide and can change through wind and wave action. The foreshore could be sandy beach, a mud flat, a salt marsh, cobble, or exposed bedrock.
- The backshore is the area where waves only reach during big storms. It can provide natural protection against flooding and erosion. The backshore may be a bank, a bluff, or a rock cliff. It may also include dykelands. Banks and cliffs can erode or collapse over time, and dunes can shift in the wind. When these natural changes are big enough, waves can reach further inland.



The impacts of climate change

Living along the coast has always involved risk of flooding and erosion. With climate change, these risks are increasing.

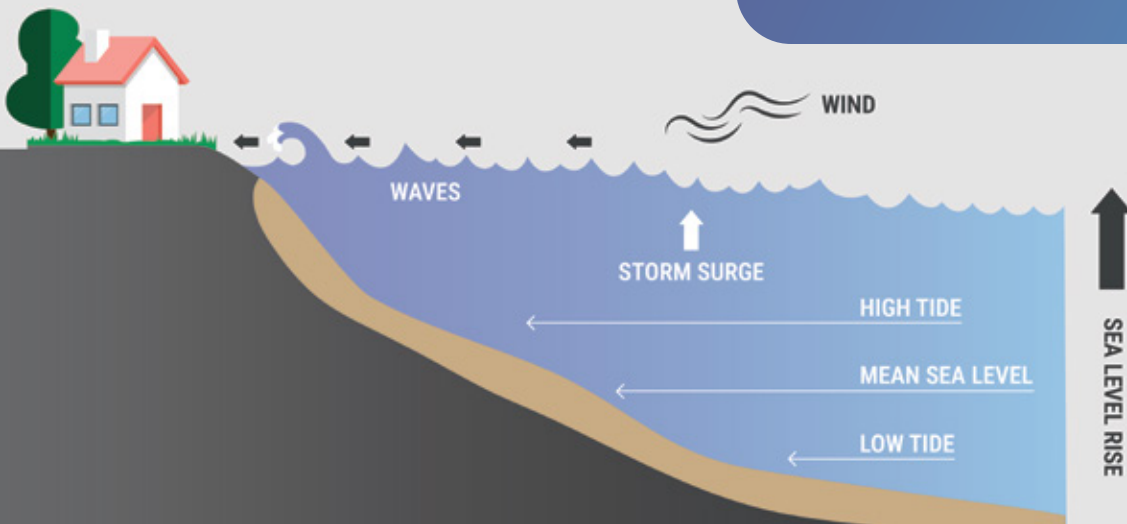
Sea level

Knowing how sea levels are changing can help people living along the coast to prepare. Sea levels have been slowly rising along Nova Scotia's coast for thousands of years and will continue to rise due to melting of continental ice sheets and ongoing sinking of the land. But, climate change is adding to this:

- Warming temperatures cause seawater to expand, taking up more space in ocean basins.
- Melting ice sheets and glaciers are increasing runoff, which increases the amount of water in the oceans.

Nova Scotia can expect sea levels to rise 30 centimetres or more by the year 2050, and around one metre by the year 2100. Over the near term, most of this sea level rise is unavoidable. Future sea level rise also depends on how successful the world is at slowing climate change.

The Mi'kmaq have been in Nova Scotia for over 12,000 years and witnessed dramatic transformations to this landscape, including from the last ice age. While this is normal, climate change has accelerated the pace and the risks – and will continue to do so.





Storms

We've always had our fair share of storms, but climate change is causing more intense tropical storms and hurricanes to reach Nova Scotia. Oceans are warming, and warmer oceans mean storms can intensify more quickly and travel further north before losing strength.

Stronger storms create larger and more powerful storm surges, more intense heavy rainfall, and higher peak wind speeds, making flooding and erosion more likely. Our recent experience with record-breaking storms like Hurricane Fiona makes it clear that Nova Scotia is already feeling the effects of climate change.

Sea ice

Sea ice, like we see in the Northumberland Strait, has protected sections of the coast from wind and waves during winter storms. With warmer winters and less sea ice cover, our shorelines will be more exposed to stronger waves and surges throughout the year. This could increase erosion in some areas.

The Government of Nova Scotia is taking action on climate change. Through the Environmental Goals and Climate Change Reduction Act and *Our Climate, Our Future: Nova Scotia's Climate Change Plan for Clean Growth*, the Government is reducing greenhouse gases, increasing renewables, protecting more land and water and growing the clean economy. *The Future of Nova Scotia's Coastline: A plan to protect people, homes and nature from climate change* is a suite of actions the Government is taking to fulfill part of its Climate Change Plan for Clean Growth.



Understanding coastal hazards

The combination of natural processes (like the tides) and changes caused by climate change (like higher sea levels and more intense storms) create the conditions for more coastal hazards. It's important to understand these hazards, and how they might impact your property.

Submersion

With sea level rise, features right along the coast, like parts of docks, lower sections of stairs, low-lying trails, and foundations of boathouses could become partially submerged.

Storms

- During a storm, water levels can be even greater than at high tide and more powerful waves can reach further inland than they do normally. This is known as “storm surge,” and it can flood low-lying areas.
- The force of the waves themselves can damage buildings and roads, and waves carry debris (like rocks and logs) that can cause damage. Salt water and sand can enter broken windows and doors and cause damage inside buildings.
- Stronger storms also bring stronger winds, which can blow debris around and damage roofs, siding and buildings.





Coastal erosion

Although erosion can be gradual, land may be lost faster during storms. If erosion reaches a building, driveway, or road, it can make the structure less stable.

Erosion can also shorten the distance between buildings and the ocean. This may make the property more likely to flood in the next storm.

Heavy rain and runoff over properties can cause erosion, particularly along banks and cliffs.



Salt water in water supplies

Near the coast, the freshwater table underground is connected to the ocean. Through sea level rise and strong storm surges, salt water can get drawn into those freshwater sources (called saltwater intrusion). This can make well water unpleasant or too salty to drink and can damage metal pipes and vegetation. The likelihood of this depends on the specific location and depth of the well, the amount of water being pumped from the well (including if several houses are sharing one well), along with other features of the property (like its slope).

Coastal Hazard Map

See what sea level rise and storm surge could look like on your property at high tide with our new online mapping tool. The Coastal Hazard Map offers information on how Nova Scotia's coastline is changing, coastal hazards and more to help you make informed decisions.



Section Two: Embracing coast-friendly practices

There's always risk when living near the coast and a chance that properties will be damaged by a storm, especially with climate change. However, there are some coast-friendly practices that can help reduce the impacts of storms, coastal flooding and erosion. This can help keep people and buildings safe, reduce costs and take care of the coast for future generations. Coast-friendly practices also support biodiversity, including habitats for species at risk.

Flood insurance typically doesn't cover damages from coastal flooding and erosion (you would need specific storm surge coverage), even after a large storm event. Homeowners are responsible for the cost of repairs. If you have already experienced damage and need to repair, this is a good opportunity to consider some of these practices to help reduce future impacts.

Know your property

As a property owner or manager, you know that maintenance is key to protecting your property. When you live along the coast, there are additional options and actions you'll need to consider to reduce the possible impact of coastal hazards. Here are a few things to consider:

- **Rules and regulations:** Municipalities set rules about what can be done on a property. Your property may also have additional rules through development agreements or covenants registered to the property. Provincial or Federal Acts (like Nova Scotia's Beaches Act, Canada's Species at Risk Act) and policies may apply. And these Acts or policies may require permits. The specific permits required will depend on the nature of the work being done. Some of these permits have a cost.

Take a fresh look at your property with our checklist. Having these answers will help you identify options and seek professional advice.

Find Your Coastal Property Checklist on page 21.

- **Know what makes your property unique:** While there are a range of options, not all of them will be right for your unique property. Choosing suitable options can depend on things like how exposed the property is to wind and waves, whether the property is high above the water line or low-lying, its slope, and what kind of material is along the shore (sand, rocks, etc.). With this information in mind, it's useful to look at your property through the lens of coastal hazards.

- **Project complexity and cost:** Often, the simplest option can be the best and most cost-effective. But it's important to consider the long-term effects of any intentional changes on the property, the shoreline, and your coastal community.
- **Working together:** Talk to your neighbours to explore shared opportunities (like nature-based solutions) and learn more about what has been successful for their property.
- **Calling in an expert:** Experienced professionals can help by assessing your property, reviewing your options with you and recommending appropriate actions.

Reducing the impact of coastal hazards

There are two main strategies for reducing the risk posed by coastal hazards and climate change: avoiding harm and reducing impacts.



Avoiding harm

The most effective long-term protection from coastal hazards is to build out of harm's way. For new or existing properties, avoiding areas that are susceptible to flooding and erosion is the best way to keep people and property safe. The coastline also needs space for its natural processes to stay healthy and resilient. Ideally, the most at-risk areas should be left as natural, open space.



The risk of being impacted by erosion or coastal flooding can be minimized by building farther inland and at a higher elevation. Structures should be located above the estimated maximum flood level for your location and far enough back from the water's edge to account for potential erosion. The estimated maximum flood level will be different for every property. Factors include high tide levels, the range of future sea level rise, the reach of waves and storm surge, and coastal features affected by erosion. For a general sense of what this could look like in your area, please visit the Coastal Hazard Map at novascotia.ca/coastal-climate-change

Building out of harm's way is easiest with new construction, but it is possible to relocate or elevate existing structures to safer areas. You might consider relocating essential systems like wells and septic systems.

You may wish to seek professional advice to get specific information to guide your decision on where to build. You'll find a list of resources in section three that could help.

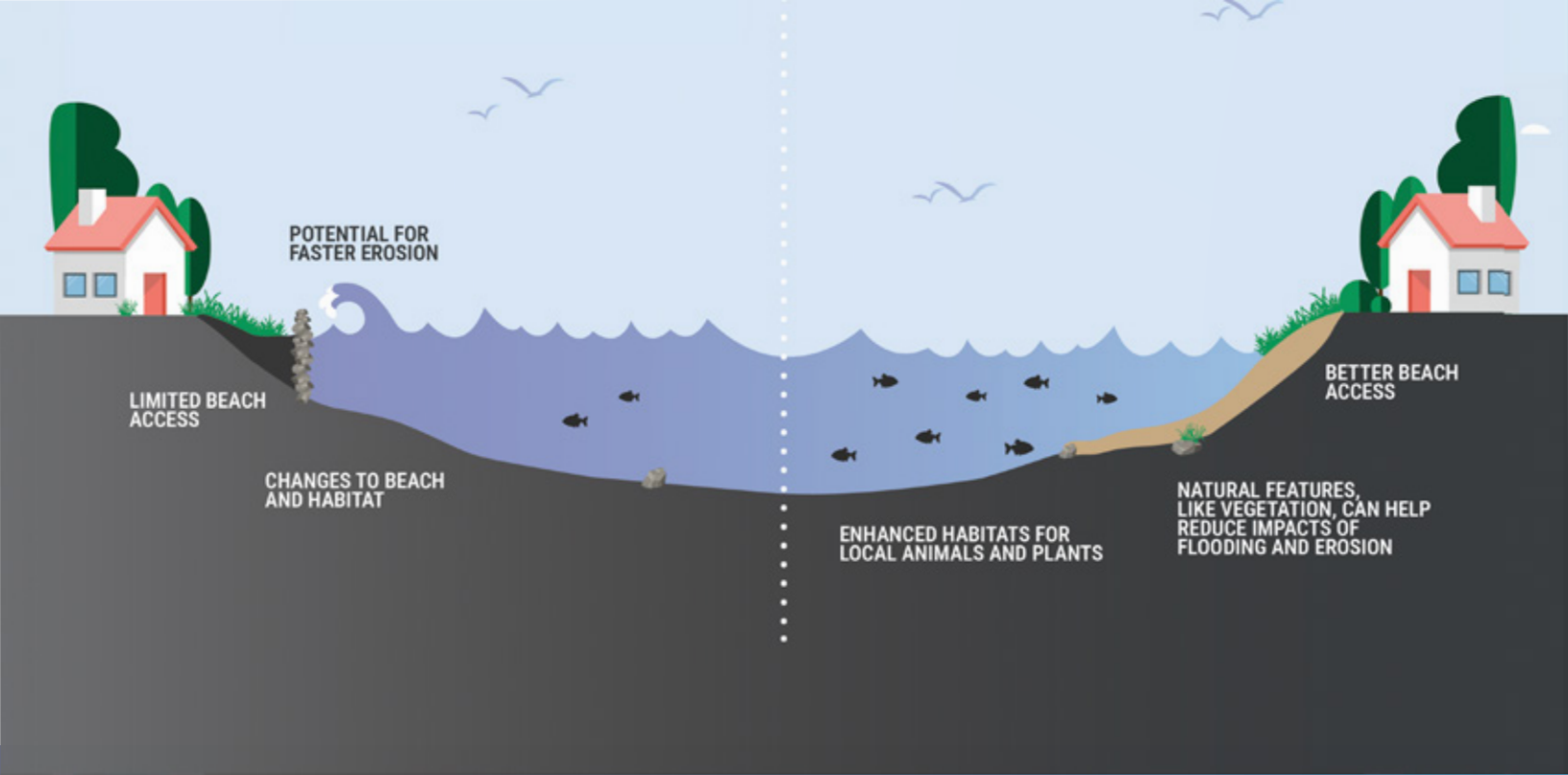
Reducing impacts

Building outside of hazard-prone areas is not always possible. Many existing homes and communities are in areas that already experience flooding or erosion or may see more as the climate continues to change. But as a property owner, you can make coast-friendly decisions, take action, and limit costs and damages.

The most effective approach is often to work with nature. A variety of options exist for different coastal environments that include natural features and work with coastal processes. And the sustainable choices you make for your waterfront can also be a good investment in your property and the health of the local environment. For example:

- Planting vegetation can help stabilize banks.
- Leaving areas in their natural state, such as by mowing less, can help to reduce erosion.
- Living shorelines (using a combination of rock, sediment, and vegetation) create natural, self-sustaining barriers against coastal flooding and erosion.
- Ecosystems like salt marshes and coastal wetlands provide natural flood protection and can be protected or re-established. These are also excellent opportunities to support wildlife and biodiversity by creating habitat for local animals and plants, including protected species.





Another way to reduce the impacts is to co-exist with coastal flooding and erosion. While no floodproofing method can completely protect a property from severe flooding, these are great options to explore if expanding, rebuilding, or repairing a property. You could consider building materials (things like shingles and roofing) that can withstand storms and strong winds. Living along the coast means adding onto regular upkeep in ways that reduce the impacts.

What about armoured shorelines?

Protecting or “hardening” the shoreline with concrete seawalls or rock armouring has been widely practiced in the past but it comes with drawbacks. By interrupting the natural movement of material along the coastline, armoured shorelines can actually cause faster erosion of beaches and along neighboring coastlines. Hardening measures also disrupt natural ecosystems, limit access to the coast, and tend to be expensive to install. Maintenance is also a consideration. One big storm can still overwhelm these kinds of structures, which become costly to repair. The drawbacks of hardening the shoreline mean it is better to first consider other ways to avoid harm and reduce impacts.

Taking action

You know your coastal property better than anyone, but you’re not alone in preparing for and protecting against climate change. There is no one-size-fits-all solution, but armed with information, tools and professional advice, we can all take action to protect our homes, our families and our communities.

Section Three: Tools and resources

Your property is unique, and your preparation and adaptation should be, too.

From self-service tools to professional services, these are some important resources that can help you make informed decisions about your property.

Coastal Hazard Map

The Coastal Hazard Map shows what extreme water levels could look like along the province's coast, where impacts will be felt more acutely. An extreme water level includes a sea level rise scenario, storm surge, and high tide. Get started at novascotia.ca/coastal-climate-change

Coastal Adaptation Toolkit

If you find that your property is in a high-risk coastal zone, you can learn more about specific tools you can use to mitigate these risks that are tailored to the site conditions of your property. CLIMAtlantic's Coastal Adaptation Toolkit helps coastal property owners identify appropriate options for addressing coastal flooding or erosion at a specific site. This online tool asks a series of questions about the site and the nature of the hazard to identify which approaches are most likely to be successful. Detailed information for each suggested option is provided. Access the toolkit at climatlantic.ca/coastal-adaptation

Your town or municipality

Before starting any work, contact your local municipality to understand any permitting, by-laws, or regulatory requirements for your property, and whether professional advice or studies are required. Through *The Future of Nova Scotia's Coastline: A plan to protect people, homes and nature from climate change* (novascotia.ca/coastal-climate-change) we are supporting municipal leadership. With the information and resources we are sharing, municipalities can address coastal hazards in a way that makes sense for them. Your municipality may also have records of past property notices, site plans or survey maps that could be available to you.

Your insurance broker or mortgage lender

You may also wish to speak with your insurance broker to see if any proposed actions could change your insurance coverage or insurance premiums. For new buildings, you may wish to speak with your mortgage lender to learn if coastal hazards might affect mortgage eligibility.

Professional advice

Professional advice can help you identify the options that are suitable for your property. For new buildings or renovations, this may be your planner, architect, landscape architect, builder, or contractor. For projects along the shore, a licensed professional engineer or similar expert can advise on ways to reduce impacts.

If you're concerned about saltwater intrusion, then a professional hydrogeologist or similar expert can provide advice on steps or practices you can take to prevent or manage it. Prevention is key, as saltwater intrusion can take many years to recover. Reducing water use is a good place to start to keep freshwater supplies healthy.

You can identify an appropriate professional through organizations such as:

- Licensed Professional Planners Association of Nova Scotia (**ppans.ca**)
- Nova Scotia Association of Architects (**nsaa.ns.ca**)
- Atlantic Provinces Association of Landscape Architects (**apala.ca**)
- Canadian Home Builders' Association Nova Scotia (**chbans.ca**)
- Consulting Engineers of Nova Scotia (**cens.org**)
- Geoscientists Nova Scotia (**geoscientistsns.ca**)

Environmental organizations

Several environmental organizations have local projects along Nova Scotia's coast that work with nature to address coastal flooding and erosion. Activities include helping to restore saltmarshes and wetlands or developing living shorelines.

You may wish to contact local groups to see if any projects are active in your area. Some municipalities are also partnering with groups working on coastal action that can help at a neighbourhood or regional level.



APPENDIX: YOUR COASTAL PROPERTY CHECKLIST

You know your property best – and you're ready to take action and adapt to coastal hazards. Taking a fresh look can help you identify opportunities to incorporate coast-friendly practices.

Having these answers in hand can also help when you speak with neighbours, your municipality or licensed professionals, or when considering the purchase of a property.

What does your property look like?

- What is the ground made of? (sand, rock that easily crumbles, gravel or cobbles, boulders, solid rock)
- How high is your property above the ocean? How steep is the slope?
- Are there any streams or rivers nearby?
- Are there dunes or other features between any structures and the shoreline?
- How exposed is your site to waves (including open areas, protected bays or inlets)?
- How does water drain off your property in a storm (ditches, for example)?
- Are there plants, trees, or shrubs growing along the shoreline, or is it mostly lawn?



What is already built on your property?

What are all the structures or features of your property. How close are they to the shore?
How high up are they?

- Houses
- Driveways
- Trails
- Stairs
- Docks/wharves/boat launches
- Boat houses
- Sheds, garages, barns,
- Gazebos, gardens, play structures, fire pits
- Wells and septic fields

How is your property changing?

- Do you notice the shoreline eroding? How quickly?
- Does material (sand, rocks, debris) tend to build up over time?
- Have there been landslides in the past?
- What happened during the last big storm? How high did debris (like seaweed or driftwood) wash up on your property?



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