

*Adaptation Platform Webinar
(9th June 2020):*



**Helping Canadians do the right
thing: Green Shores for
Shoreline Development (2020)**

Canada's Climate Change Adaptation Platform Coastal Management Working Group (CMWG)



- CMWG consists of representatives from federal, provincial and territorial governments, academia as well as professional and other organisations working to advance adaptation and increase resilience to climate change along Canada's coasts
- The CMWG is Co-chaired by: Natural Resources Canada and the Government of Prince Edward Island
- August 2017 Adaptation Platform call for proposals. Coastal Management: Alternative and Innovative Options to Hard Protection Infrastructure Solutions

Webinar Presenter

Presenters: DG Blair and Jim
Johannessen:

DG Blair, M.Sc.
Executive Director
Stewardship Centre for B.C.



Jim Johannessen, Licensed
Eng. Geologist, MS
Principal, Engineering Geologist
Coastal Geologic Services, Inc.





Helping Canadians do the right thing: Green Shores for Shoreline Development (2020)

Presented by:
DG Blair, M.Sc. Executive Director
Stewardship Centre for BC

Jim Johannessen, Licensed Eng. Geologist, MS
Coastal Geologic Services, Inc.

June 9 , 2020



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What will we cover today?



- Introduction Green Shores program, including:
 - ✓ Rationale
 - ✓ Components
- Project Objectives: update Green Shores guidance
 - Green Shores for Coastal Development (2010)*
 -  *Green Shores for Shoreline Development (2020)*
 - ✓ Key Updates
 - ✓ Case Studies
- Next Steps/ Q & A

Shoreline Challenges



*Functioning lake and marine shorelines are vital to our most iconic species
BUT
there are challenges!*



What is Green Shores?



It is a rigorous standard to:

- ✓ Preserve or **restore shoreline physical processes**
- ✓ Maintain or **enhance habitat function** and diversity along the shoreline
- ✓ **Prevent or reduce pollutants** entering the aquatic environment
- ✓ Avoid or reduce **cumulative impacts**

How is GS Delivered?



1 Green Shores for Shoreline Development

2 Green Shores for Homes (Residential)

3 Green Shores for Local Government

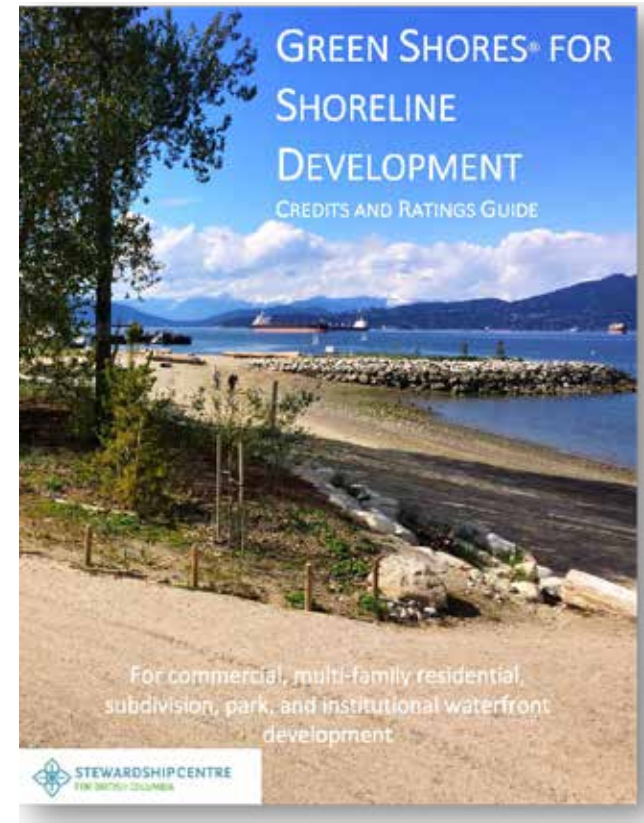




Credits and Ratings Guide created as a tool to develop properties in a “shore friendly” way

- ✓ Parks
- ✓ Mixed-use residential/commercial
- ✓ Institutional shoreline properties
- ✓ Marine & lake shorelines

Ratings: Bronze, Silver, Gold



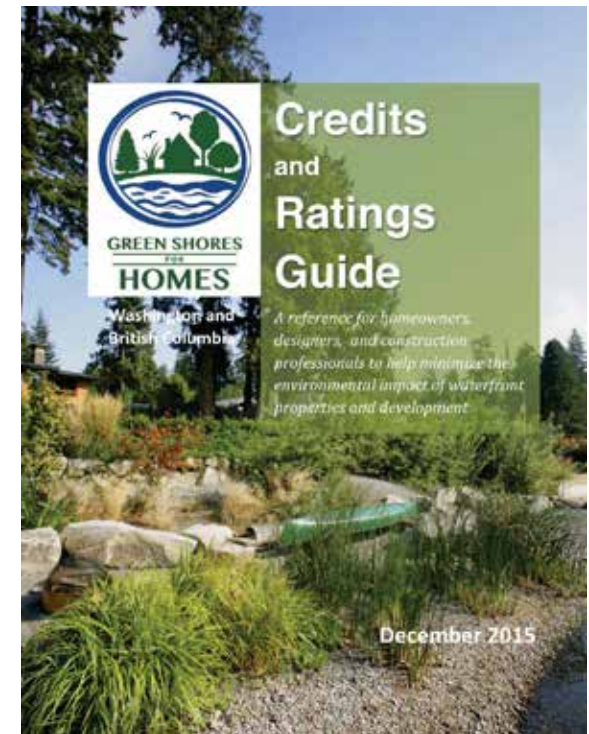
Based on Green Shores Guiding Principles



Credits and Ratings Guide created as a tool to develop properties in a “shore friendly” way

- ✓ Residential properties
- ✓ Freshwater (lake) and marine shorelines
- ✓ Intended to encourage incremental improvements

Ratings: GSH Chinook (1), GSH Orca (2)



Based on Green Shores Guiding Principles

3 Green Shores for Local Government



- Workshops (L1,L2) delivered locally
- Monthly peer to peer learning opportunities
- Support for GS demonstration projects





- ✓ 3 Levels of training (L1,L2,L3)
- ✓ Delivered in collaboration with post secondary institutions
 - ✓ University of Victoria, BCIT
 - ✓ SMU & UPEI LoAs (under development)
 - ✓ Target L1 and L2 delivery in NS and PEI & BC

(COVID pending)





Using the Green Shores Certification Process

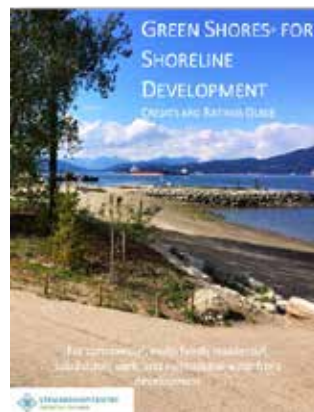
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Stage One
Enroll and Initiate

Stage Two
Project Design and
Construction

Stage Three
Verify and receive
Award



GSCD example – New Brighton Park

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Before



After

Registry of Accredited Professionals



Completion of suite of GS training L1-L3
leads to AP listing on Green Shores web
pages





Times Colonist, Victoria, BC 2012

Project Objective:

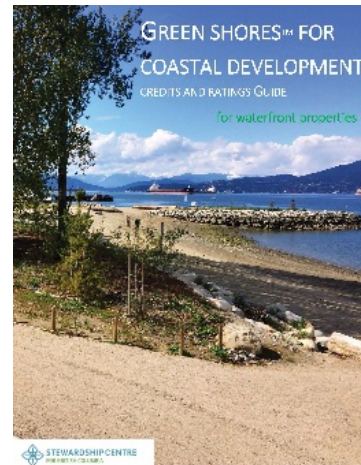
Update guidance to increase application of GSCD especially for sea level rise (SLR) and climate change adaptation (CCA)

- ✓ Pacific Coast
- ✓ Maritimes
- ✓ Lakes
- ✓ Case Studies

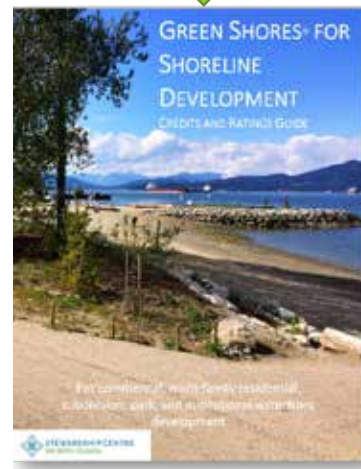


Reviewers

Province of BC
British Columbia Institute of Technology
Northwest Hydraulic Consultants Ltd.
Murdoch de Greeff Inc
Lees & Associates
West Coast Environmental Law
Archipelago Marine Research
Washington Sea Grant
Aster Group
Saint Mary's University
Ecology Action Centre
Coastal Action
Aqua-Tex Scientific Consulting Ltd
Natural Resources Canada
Comox Valley Regional District
Town of Qualicum Beach



2010



- Technical Advisory Committees on Pacific and Atlantic regions
- CBCL (Atlantic) & CGS (Pacific) contractors
- Review and input from multiple partner organizations & technical specialists on both coasts



Green Shores for Shoreline Development: Key Updates and Case Studies

Jim Johannessen

Licensed Engineering Geologist, MS

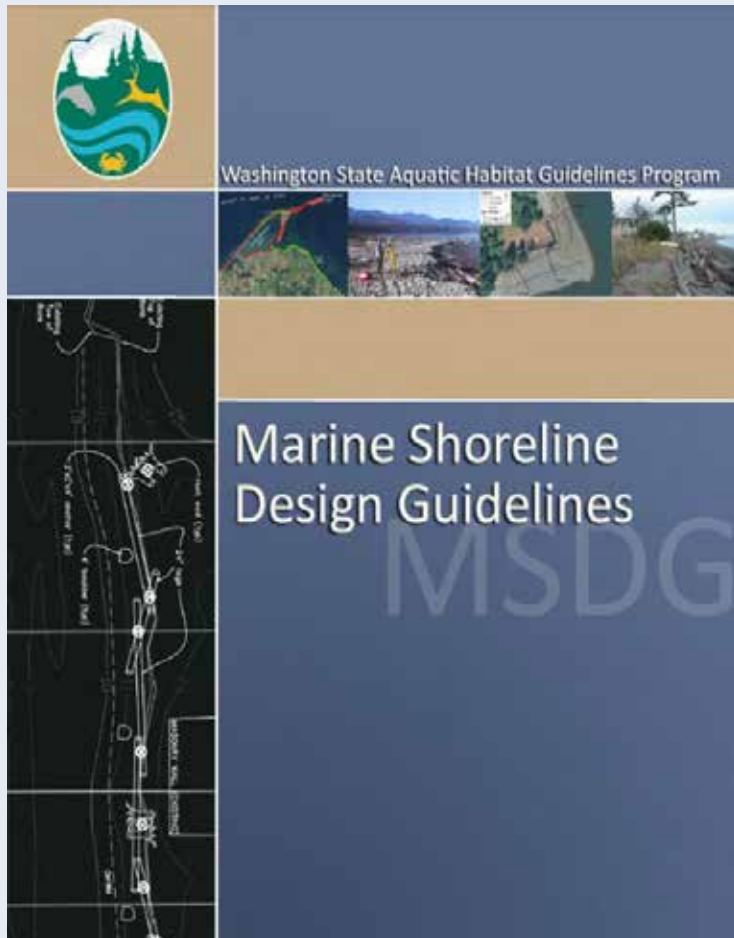
Coastal Geologic Services, Inc

Bellingham, WA

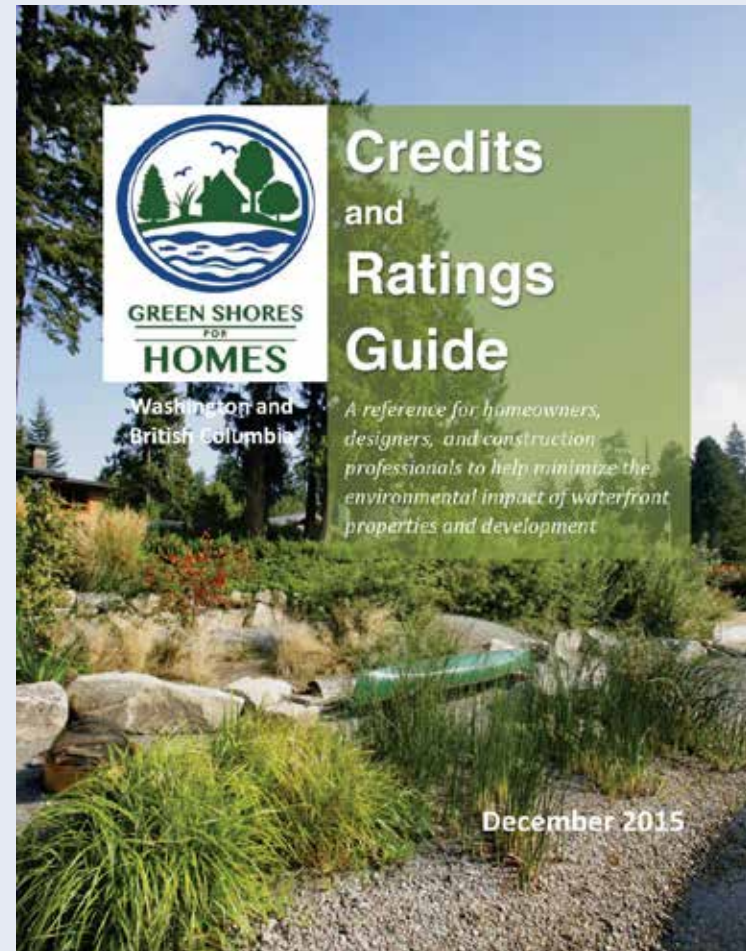
coastalgeo.com



Key Previous Documents



For: Washington Dept. of Fish and Wildlife; 2014



Similar to LEED™ rating system:

- must meet all **prerequisites** & minimum optional **credits**

The prerequisites reflect:

- current regulations in most Provinces
- generally accepted environmental best management practices
- principles of coastal/shoreline geomorphology and ecology

To prohibit new significant impacts to key processes and habitats

Prerequisites	
Prerequisite 1	Siting of Permanent Structures
Prerequisite 2	Conservation of Shoreline Sediment Processes
Prerequisite 3	Conservation of Critical or Sensitive Habitats
Prerequisite 4	Riparian Zone Protection
Prerequisite 5	Construction Environmental Management Plan



Prerequisite 1 - Siting of Permanent Structures

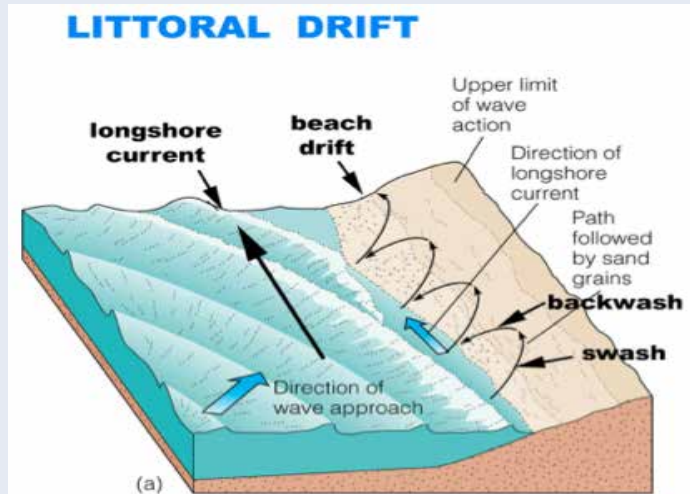
Siting - Building Setbacks



Figure 2. Examples of shore under Option A requirements (more easily eroded shores, left; Point Gray, Vancouver) or Option B requirements (non-eroding shores, right, Gulf Islands) (Coastal Geologic Services Inc.).

Option A is expected to cover most projects. Option A uses a set of standard minimum setback distances based on shore types and bank height.

Shoreline Processes...



and Habitats



Credits		
Credit 1	Site Design with Conservation of Shore Zone	1 to 3 points
Credit 2	Shore-Friendly Access	1 to 3 points
Credit 3	Re-Development of Contaminated Sites	2 points
 Credit 4	Restoration/Enhancement of Shoreline Sediment and Tidal Flow Processes	2 to 9 points
 Credit 5	Restoration/Enhancement of Aquatic Habitats	1 to 8 points
Credit 6	Enhanced Riparian Zone Protection	1 to 9 points
 Credit 7	Integrated Stormwater Planning and Design	2 to 5 points
 Credit 8	Climate Change Adaptation Plan	2 to 5 points
Credit 9	Exceptional Performance and Innovation	1 to 2 points
Credit 10	Outreach and Public Education	3 to 5 points

Featured below; credit greatly expanded/ re-written

Credit 4: Restoration/Enhancement of Shoreline Sediment and Tidal Flow Processes

Restoration of Processes - Action

- Sediment source bluff restoration - armour (bulkhead) removal at the toe of sediment source ("feeder") bluffs
- Remove or modify groynes or other longshore transport barriers
- Removal of tidal flow barriers (e.g., fill or tide gates)



Shoreline Processes - Case Study Example

Credit 4 Case Study: Restoration/Enhancement of Shoreline Sediment and Tidal Flow Processes – Jericho Beach, BC

Design Schematic



Year Completed: 2017

Project Team and Affiliated Organizations:

Vancouver Parks Board
Moffatt & Nichol
Raincoast Applied Ecology
Sharp & Diamond Landscape Architecture, Inc.
Sumas Remediation
Vancouver Pile Driving
City of Vancouver

Project Overview

The project site is located at Jericho Beach, near Point Gray and west of Kitsilano, in Vancouver, B.C. Located between two rock groynes, the site has very little sediment input from and transport to adjacent beaches. The objective of the project was to demolish the Jericho Marginal Wharf to improve sediment supply and public safety, to restore the natural beach and foreshore, and to remove creosote piles and concrete debris from the intertidal zone. The project was intended to enhance forage fish spawning substrate, support aquatic species recolonization, and restore the marine riparian ecotone from dune strand to forest vegetation communities. The park encompasses approximately 1 hectare and spans 175 metres in length. Enhancements were applied along approximately 86% of the shoreline.

Site History

The Jericho Marginal Wharf was built in the 1930s to serve the needs of the Royal Canadian Air Forces amphibious aircraft operations. Jericho and neighbouring La Corno beaches are some of the most popular recreational beaches in the City of Vancouver. The site offers numerous public recreational activities including jogging, sailing, beachcombing, and picnicking.



Implementation

Due to its location within a popular Vancouver park, a rigorous public engagement process with multiple stakeholders was used to build support for wharf removal and shoreline restoration. The site design promoted ecological restoration in an urban waterfront context.

The presence of toxic creosote from the wharf and pilings that supported the structure necessitated extensive sedimentation and pollution control measures in the project's Environmental Protection Plan. As many piles as possible were removed during low tide to minimize mobilization of toxins and contaminated sediment; small debris was captured with tarps, booms and hand removal; absorbent booms and pads were used to capture hydrocarbons.

Credit 4 Case Study: Restoration/Enhancement of Shoreline Sediment and Tidal Flow Processes – Jericho Beach, BC

How the Project Addresses Credit 4 Requirements

Habitat Components

- Enhancement of foreshore habitats and beach elevations through beach nourishment.
- Habitat restoration plan including substrate enhancement for forage fish spawning, vegetation planting, and construction methodology (habitat restoration applies to greater than 25% of the site).
- Extensive planting plan designed by a registered professional biologist with extensive experience in coastal riparian systems. The planting plan was applied along 30 meters of the project site and included the conservation of healthy riparian areas and extensive new plantings.
- Concrete debris removed from intertidal to uncover beach substrate and habitat.

Restoration of Coastal Sediment Processes

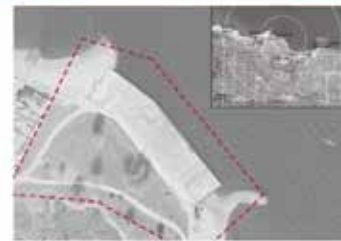
- Removal of pre-existing wharf with bulkhead and fill landward of wharf.
- Some rock was used to stabilize the soft shore protection, so the site is not entirely free of armour.
- Removal of piles may restore the natural wave regime at the site; it was not determined if the groynes could be breached during storms to resume (eastward) sediment transport from the site.
- Multi-year monitoring plan was submitted to assess the functionality of the restored habitats.
- Potentially restored sediment transport rates from removal of dense creosote piles.

Ecological Services Provided

- Creation of additional intertidal and riparian habitat with an additional 150 meters of shore length.
- Bulkhead removed to restore marsh habitat.
- Restored buried surf smelt and sand lance spawning habitat and enhanced adjacent habitats.
- Marine riparian vegetation enhancement provided additional shade and refuge for migrating juvenile salmonids and other smaller fish, water pollution abatement, and increased resilience to sea level rise.

Other Notes

- Project scored well for Restoration/Enhancement of Shoreline Habitats (Credit 5) and for Climate Change Adaptation (Credit 8) as structures were moved landward of the projected future location of the natural boundary, soft shore protection was used to mitigate erosion, and marine riparian buffers were sited at higher beach elevations.



Before



After

Shoreline Processes – Lake Case Study

Sudden Valley Marina, Lake Whatcom

Failing vinyl sheet pile wall was a barrier to sediment transport and connectivity prior to removal. Bulkhead was removed and gravel beach installed. Upland uses were maintained.



Before and After



Shoreline Processes – Lake Case Study

How the Project Addresses Credit Requirements

Materials

- Fill and old hard armor removed, including failing vinyl sheet pile wall, dilapidated wood cap and piling.

Shoreline Sediment Restoration Components

- Removal of fill and bulkhead in two areas to restore transfer of nutrients between uplands, enhanced beach, and lakebed.
- Shore and lawn edge were pulled landward.
- 1,193 metric tons of gravel beach nourishment in one primary and a small area.

Design and Construction Notes

- A comprehensive design plan explaining habitat benefits through multiple project alternatives.
- Construction was performed in the winter when (controlled) lake water levels were the lowest, to prevent certain sediment from entering the lake water.

Ecological Services Provided

- Removal of cracking vinyl material, treated wood and large rubber tires from the lake shore and shallow lakebed eliminated source of debris.
- Increase overall ecological function for fish, macroinvertebrates, and smaller lake organisms.
- Removal of wall allows for greater connectivity with increased transfer of nutrients between the uplands and the aquatic environment.

Other Notes

- This project also scored well for Restoration/Enhancement of Shoreline Habitats (Credit 5) through creation of a more natural gravel beach and Shore-Friendly Access (Credit 1) through the removal of a steep, high wall allowing for a walkable beach.
- Riparian planting areas were initially included but were substantially reduced for budget reasons.

Credit 8: Climate Change Adaptation Plan

Intent

To encourage planning and design that can support natural resilience of the shoreline to climate change impacts and may reduce risk to waterfront development from sea level rise and other related climate impacts.

Context

The natural response of a shoreline to sea level rise varies based on the type of coastal landform found on the property (see Figure).

Climate Change and Program Limitations

Although Green Shores approaches can be used to address SLR, the GSSD guide and rating system does not attempt to address the more complex coastal engineering needed to fully deal with SLR effects.

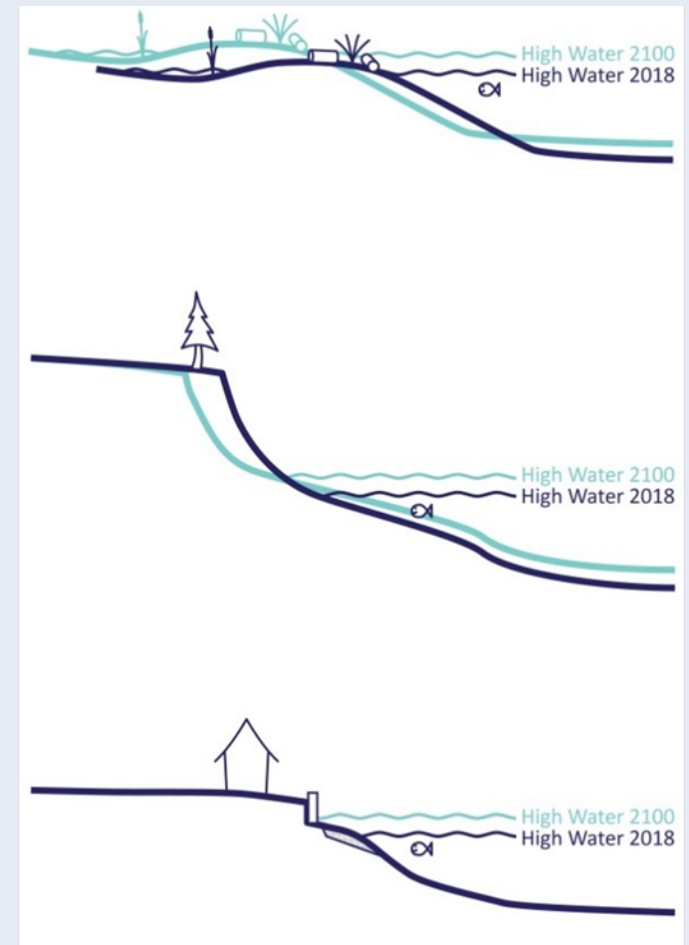


Figure 13. Shoreline response to sea level rise (Coastal Geologic Services Inc., 2018).

Credit 8: Climate Change Adaptation Plan

Applies to

All permanent structures (new and existing), shore protection works and other development amenities situated within the shore area of the development property.

Requirements

1. Documentation of projected change in the location of the 1 in 100-year extreme WL at the site due to climate change to the year 2100 or the life of the project, whichever is greatest. *AND*
2. Documented measures that accomplish one or more of the following approaches to adapting to the above-projected change in the NB/OHWM as a result of climate change – see Strategies and Technologies for example measures for each approach:
 - Avoid
 - Retreat
 - Accommodate
 - Protect

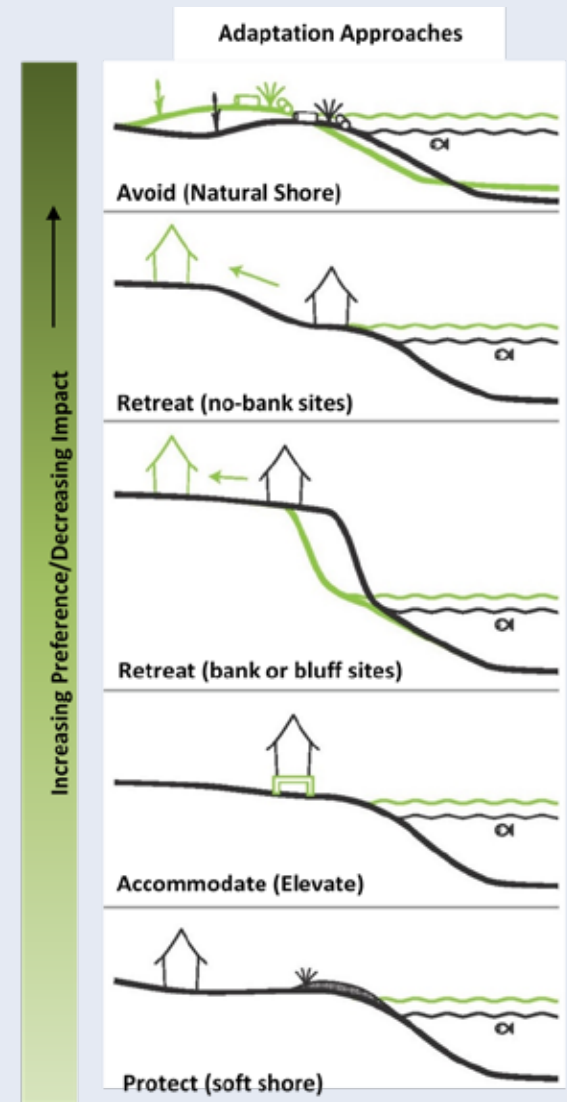


Figure 14. Adaptation approaches at barrier beaches and shoreline banks (Coastal Geologic Services, 2015).

Credit 8: Climate Change Adaptation Plan

Submittals

The applicable **Letter Template** signed by a Qualified Coastal Professional.

A **report describing the basis of the projection of the NB/OHWM** through the end of the project life or 2100, whichever is greater. This should include:

- The **projected relative sea level rise used for the site, planning horizons, with additional evaluation of wave run-up and storm surges**/high water events where available. Local sea level rise projections should be referenced when possible.
- Consideration of **background geomorphic trends** should also be considered, as different shore types will respond differently to the rise in sea level and at different rates. For example, coastal erosion is anticipated to accelerate along coastal bluffs in association with sea level rise.
- If relevant, the report should also address the **expected effects of increased precipitation** as rain and associated surface runoff or groundwater flow and the expected effects on sediment supply in the shore reach in which the site is located.
- For **lakes and reservoirs, if data are available, the report should include projected changes to water levels, anticipated high water events and changes to precipitation patterns** that may lead to flooding and erosion.

A **site plan** indicating the projected NB/OHWM location, related setbacks (relevant to the projected NB/OHWM), structure locations and designs to meet one or more of the four approaches described above. **Please specify which approach(es) will be used.**

Credit 8: Climate Change Adaptation Plan

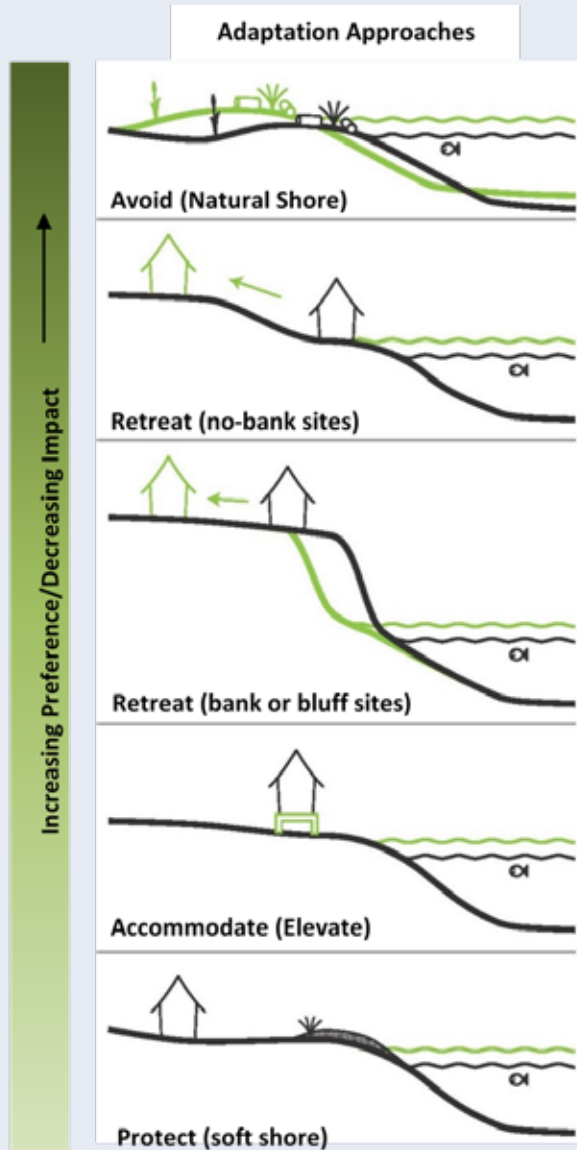


Figure 14. Adaptation approaches at barrier beaches and shoreline banks (Coastal Geologic Services, 2015).

Points

	Climate Change Adaption Plan Requirements and Strategies	Points
	Documented change of NB/OHWM, AND	1
Primary Approach *	Avoid	4
	Retreat	3
	Accommodate	2
	Protect	1

* **Note:** These strategies are not mutually exclusive and can be combined across multiple areas of the project site depending on what is most appropriate for each reach of shore...

...the Avoid and Retreat approaches are preferred over the Protect and Accommodate approaches. **If multiple actions are taken on the property, the applicant will receive points for the highest-scoring strategy option.**

Credit 8 Case Study: Climate Change Adaptation Plan – Towns of Kentville, New Minas and Port Williams, NS

Project Overview

The Belcher St. Marsh is located on the north side of the Cornwallis River, east of Kentville, NS.

The site was a mix of active and fallow agriculture protected by dykes on both banks of the main river channel, eliminating the natural floodplain.

The intention of the restoration project was to:

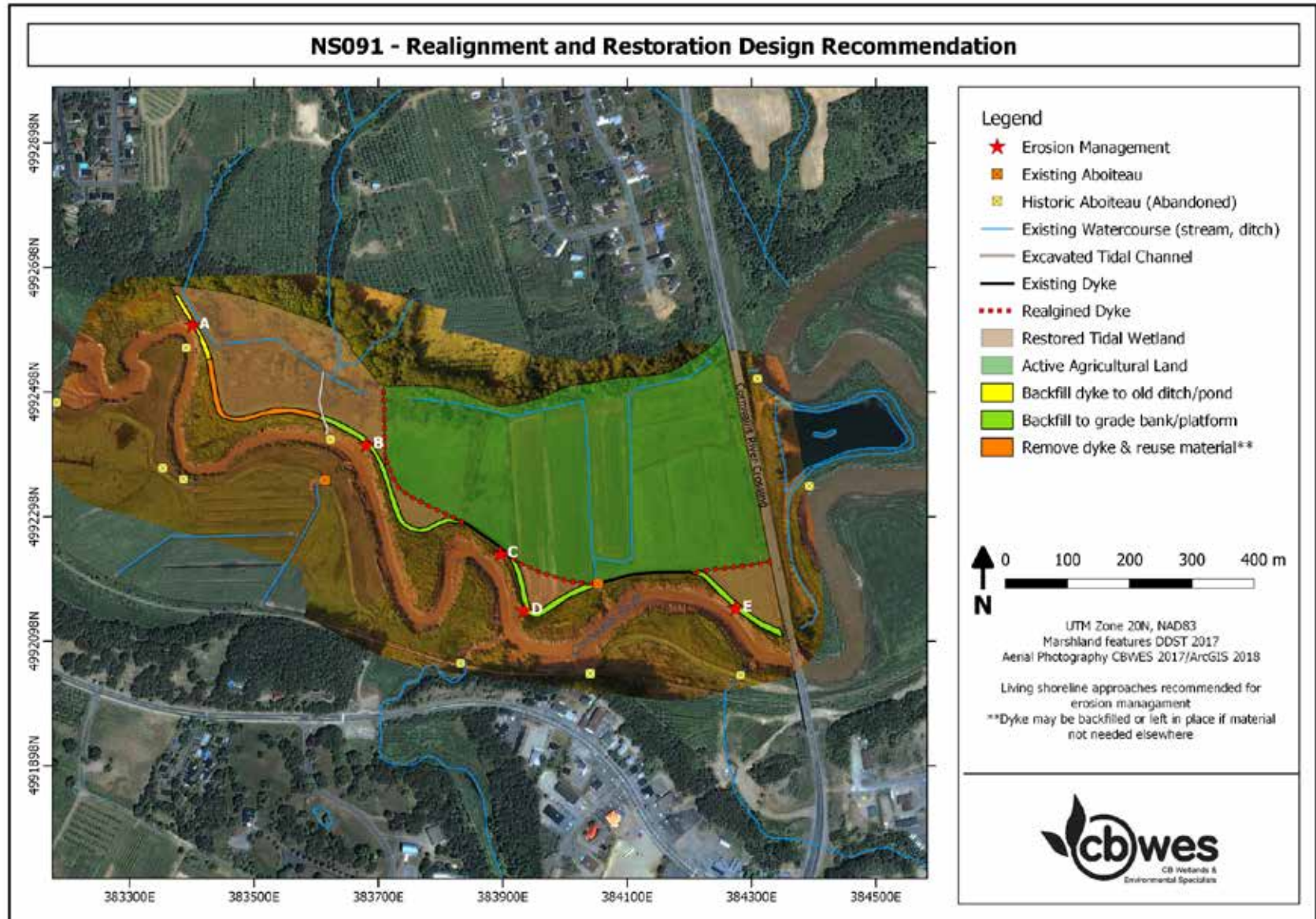
- reduce the amount of dyke infrastructure, restore 9.7 hectares (ha) of wetland habitat (6.5 ha former agricultural land, and 3.2 ha of foreshore marsh)
- contribute to efforts to increase the resiliency of the Cornwallis River system
- reduce the flood risk to the towns of Kentville, New Minas, and Port Williams.

Such an approach is referred to as 'Managed Realignment' of dykes.



Aerial view of restored areas

Credit 8 Case Study: Climate Change Adaptation Plan – Towns of Kentville, New Minas and Port Williams, NS



Climate Change Adaptation – Urban Example – Before Bellingham, Washington State



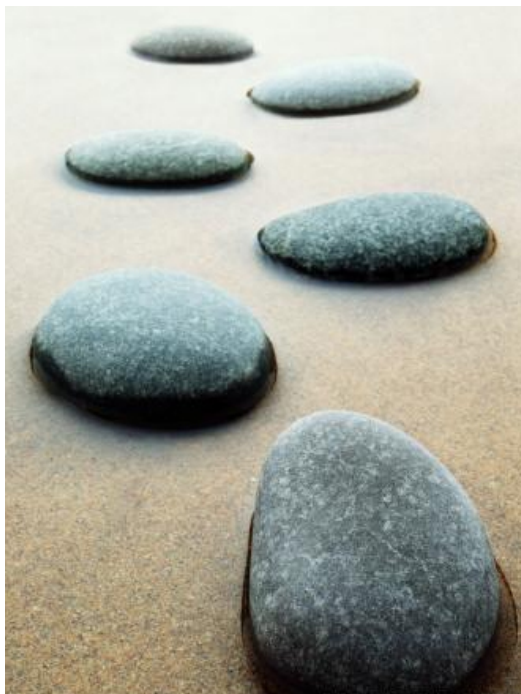
Climate Change Adaptation – Urban Example – During



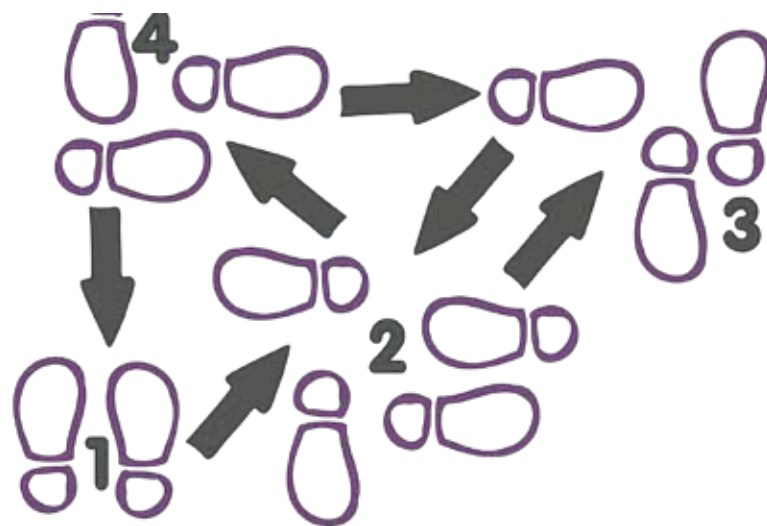
Climate Change Adaptation – Urban Example – After



Next Steps for Green Shores

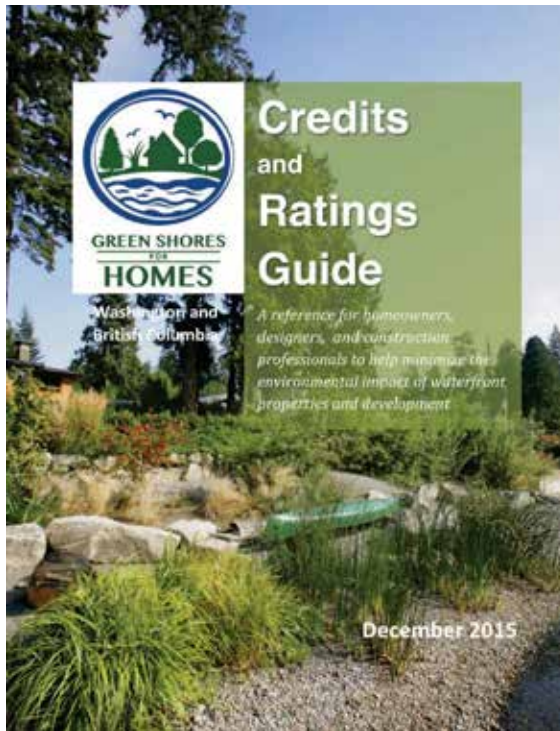


OR?



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1) Update GSH Credits & Ratings guide



Update Green Shores for
Homes credits and ratings
guide (2015) for application in
BC AND the Maritimes (coastal
and lake shores)

Building on partnerships to
update with 2023 target

2) Road Map for Green Shores



"Atlantic stakeholders are enthusiastic about the prospect of extending ... Green Shores to the region."

1. Ground Truth the Theory of Change for Green Shores
2. Develop Capacity of SCBC and Maritime Organization(s)
3. Put in Place Enablers for Green Shores Deployment and Adoption, e.g. need to increase Green Shores:
 - ✓ awareness/education
 - ✓ demonstration projects
 - ✓ training for professionals, and
 - ✓ address regulatory barriers

3) Get Involved ...



- Take Green Shores training (online or at UVic/BCIT/SMU/UPEI)
- Get in touch if your organization is interested in learning more/participating in next steps
- Check out the website for lots of great resources to learn more!

<https://stewardshipcentrebc.ca/green-shores-home/>

- Registration links to training and webinars
- Links to guidance documents & other resources

Upcoming Webinar

stewardshipcentrebc.ca



June 24, 2020 11:00 AM (Pacific)

*Green Shores for Shoreline Development 2020:
an update for shoreline practitioners*

Register: <https://stewardshipcentrebc.ca/green-shores-home/green-shores-training/green-shores-webinars/>



Thank you!

Q & A

stewardshipcentrebc.ca



DG Blair, Executive Director
Stewardship Centre for BC
dg@stewardshipcentrebc.ca
604.230.9734

Jim Johannessen, Principal

Coastal Geologic Services, Inc.
jim@coastalgeo.com
360.647.1845

**Thanks to all our partners
on both coasts who provide
in-kind support for Green
Shores!**

Canada 

This project was undertaken with the financial support
of the Government of Canada.

Ce projet a été réalisé avec l'appui financier
du gouvernement du Canada.

Access Canada's Climate Change Adaptation Platform web pages for information on Platform, Working Groups and Products at,

adaptation.nrcan.gc.ca

adaptation.nrcan.gc.ca

For questions on the Adaptation Platform,
Working Groups or Products, please email:

nrcan.adaptation.nrcan@Canada.ca

For information on upcoming and past recorded webinars, please visit
Canada's Climate Change Adaptation Platform Webinars page at:

<https://climateriskinstitute.ca/platform-webinars/>