Quick Assessment & Selection Checklist
Nature-based Solutions to Shoreline Erosion

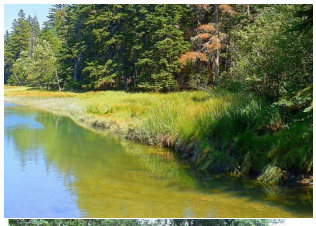
This tool is intended for use by homeowners, contractors, municipal officials, and others involved in the assessment, selection, or construction of shoreline stabilization projects. Use this resource for selecting appropriate tools and practices to stabilize shorelines using the least amount of intervention to become more resilient to erosion, and function as natural systems, protecting the shoreline, water quality, and habitat for fish and wildlife in the long term.

Design Goals & Objectives — O U R

Observe and blend project with any unaltered shore near site

Use native, natural, living, and biodegradable materials

Reach conditions that function as a naturalized shore over time



Assess Sources of Instability & Erosion — S H O R

Source & Severity of Erosion

Assess the contributions of instability by source such as Surface water Flows, Groundwater, wave action/ toe erosion, and Ice.

Height & Slope Risk

Assess contributions of height, slope, and soil conditions to instability risk

Overland Water and Land Use

Assess how use of the site may affect stability

Re-vegetate/Re-connect Shoreline Buffer

Assess the existing shoreline vegetation and the contribution to stability, water quality, & shoreline habitat connectivity.

Implement — E

Erosion Control Selection Based on Site

Select stabilization practices after assessing the causes of instability to create a stabilization plan based on the needs of the specific site conditions, while meeting the “O-U-R” deign objectives.

"OUR SHORE" QUICK ASSESSMENT

Using the S H O R portion of the Quick Assessment, select the level of instability risk within each criteria outlined. See potential stabilization practices using the corresponding results in Section E on the next page to select stabilization practices that can be combined to meet your sites needs. Select and combine practices from each category, or combine practices within a category to increase stabilization ability where needed. Permitting of certain projects may require additional review and consultation --additional guidance on permitting is available on Page 4 of this Assessment. Consult an engineer or other experts to fully assess any site where safety and property are at risk. Use this tool with the **Maine DEP *Shoreline Stabilization Guide*** for more detailed information on permitting and each practice.

Lower ← Instability Risk → Higher

S — Source & Severity of Erosion – Assess the locations & sources of of instability

Overland Erosion/Flows	☐ No recent bank erosion or loss from overland flows	☐ Bank is eroding with observable change and loss from overland flows	☐ Bank erosion is occurring with measurable change from overland flows
Groundwater	☐ No evidence of groundwater seepage	☐ Evidence of limited or seasonal groundwater seepage or impacts to slope	☐ Groundwater is severely impacting the stability of the slope
Toe Erosion (Wave or Ice)	☐ Toe erosion in limited areas or none	☐ Moderate toe erosion, beginning to	☐ Bank is slumping from completely
	☐ Site is mostly sheltered from severe wave action	☐ Site receives some wave action, but only large storms cause erosion. Only toe is affected.	☐ Site is receives heavy wave or ice action. Increased impacts seen from severe storms.

H — Height & Slope Risk – Assess contributions of height, slope, and soil to instability risk

Bank Height	☐ Low Bank (less than 3 feet)	☐ Moderate Bank (3-6 feet)	☐ High Bank/Bluff (over 6 feet)
Slope Severity	☐ Low Slope (less than 3L:1V)	☐ Moderate Slope (between 3L:1H—1L:1H)	☐ High Slope (> 1L:1V)
Current Slope	☐ Surface Protection = 80 - 100% intact vegetation and duff layer	☐ More than half of surface has vegetation and duff layer	☐ Less than half of surface has vegetation and duff layer
Soils	☐ Soils contain mix of sediments and stone; fairly stable soil condition	☐ Unstable soil condition or moderate erosion rate	☐ High rate of erosion and very unstable soils of solely sand or fine sediments

O — Overland Water from Land Use – Assess how property use affects stability through overland flow and groundwater

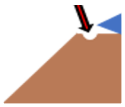
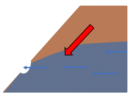
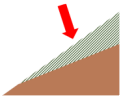
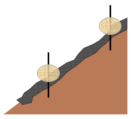
Surface water flow to the bank	☐ No concentrated or channelized flow from adjacent land use	☐ Some concentrated or channelized flow is directed toward the eroding bank resulting in minimal sheet or rill erosion.	☐ Concentrated or channelized flow is directed down the embankment with rills and gully erosion. No protection is in place.
Lawn or bare ground near	☐ No lawns or bare ground are within 100 feet of the shoreline	☐ No lawns or bare ground are within 25 feet of the shoreline	☐ Lawn area or bare ground are located within 25 feet of the shoreline
Distance to impervious surfaces	☐ No roads, driveways, houses, or other impervious surfaces are within 100 feet of the shoreline	☐ No roads, driveways, houses, or other impervious surfaces are within 25 feet of shoreline	☐ Roads, driveways, houses, or other impervious surfaces are within 25 feet of the shoreline
Overall impact of surface flows	☐ Very limited impacts from surface flows, surface flows properly managed	☐ Moderate Overland Impact from surface water	☐ Overland flow of water is a significant contributor to instability

R — Revegetate/reconnect shoreline buffer* – Assess levels of buffer vegetation for stability and habitat connec-

Vegetation within 250	☐ Dense mix of shrubs and trees (70%+ Coverage)	☐ Average vegetation (20-70% coverage)	☐ Low/sparse vegetation (less than 20%)
Vegetation with 25 Feet?	☐ Dense mix of shrubs and trees (70%+ Coverage)	☐ Average vegetation (20-70% coverage)	☐ Low/sparse vegetation (less than 20%)
How natural is the shoreline habitat?	☐ Bank and vegetation are not altered. No riprap or hardened structures installed.	☐ Bank impaired by riprap/hardened structures but vegetation is present or is pruned, mowed, or otherwise altered	☐ Bank is hardened and/or no vegetation present

E Erosion Control Selection Based on Site Conditions

Select practices that would effectively address the factors of instability from the previous page. Practices can be combined from multiple risk levels to increase function. See Permitting Guidance on Page 4 for more information. 👍= No permit required

Overland Erosion 	☐ None – no overland erosion to instability 👍 ☐ Increase buffer vegetation & duff layer ☐ Land Use Best Practices	☐ Multiple "Lower Risk" Treatments ☐ Upslope treatments (e.g. Waterbars, upslope water diversion, rubber razors, etc.) ☐ Direct runoff from impervious surfaces to stable areas, infiltration areas ☐ Direct flow as sheet into stable buffer area ☐ Slope interruption practices (e.g. coir logs, wattles, contour swales, contour planting) ☐ Use of Vegetation Practices or other Slope Protection Practices	☐ Multiple "Moderate Risk" Treatments ☐ Use of additional Slope Preparation or Slope Protection, Land Use practices ☐ Stabilize overland concentrated flows ☐ Culverts/drainage tile collection with stable outfall ☐ Stabilized vegetated swale/buffer between outfall and resource ☐ Rain gardens, Level spreaders, Plunge pools, & other Energy Dissipation
Groundwater 	☐ None – no groundwater or subsurface drainage issue corrections 👍 ☐ Land Use Best Practices	☐ Multiple "Lower Risk" Treatments ☐ Groundwater interception/conveyance: subsurface drains; rock sandwich, French drains; living drains (buried bundled live stakes) ☐ Examine & correct land use contributions – septic systems, irrigation systems, dry wells, impervious drainage, infiltration & other groundwater affects 👍	☐ Multiple "Moderate Risk" Treatments ☐ Groundwater interception/conveyance: culverts/drainage tile (with stable outfall) ☐ Drainage layer (e.g. well draining filter gravel, nonwoven geotextiles, or other filter fabric) if installing riprap for slope soil protection) to protect soil fines ☐ Limited stabilization; stone/drainage in seeps
Toe Erosion 	☐ None – Toe erosion is not present or minimal, rate is very slow; Retain natural conditions 👍 ☐ Land Use Best Practices	☐ Dense Toe Live Staking ☐ Root wad toe protection* ☐ Coir Logs & coarse natural media-filled socks* ☐ Encapsulated cobble/media/oyster shells (with coir or other biodegradable material)* ☐ Anchored woody deposit practices* ☐ Live stake fascine (bundle) toe protection	☐ Multiple "Moderate Risk" Treatments ☐ Riprap stone-packed undercut ☐ Riprap stones in excavated toe trench ☐ Vegetated Timber Crib* ☐ Vegetated Gabion* ☐ In-Water Practices *(see page 4)**
Slope Severity 	☐ None – Slope is low or moderate and stable 👍 ☐ Land Use Best Practices ☐ Increase buffer vegetation & duff layer	☐ Multiple "Lower Risk" Treatments ☐ Use of Vegetation Practices or other Slope Protection Practices ☐ Slope interruption practices (coir logs, wattles, contour swales, contour planting) ☐ Regrading: Surface Roughening/reversion (light grading) and vegetation ☐ Regrading: *Installing rough topography* and vegetation	☐ Regrading: cut back slope angle when greater than 1:1; smooth graded ☐ Regrading: Encapsulated soil lifts planted with vegetation (PBR above normal high water) ☐ Vegetated Timber Crib* ☐ Vegetated Gabion* ☐ In-Water Practices *(see Page 4)**
Slope Protection 	☐ Natural conditions retained or augmented with vegetation, and landward practices 👍 ☐ Land Use Best Practices ☐ Increase buffer vegetation & duff layer 👍	☐ Multiple "Lower Risk" Treatments ☐ Install/enhance native Vegetation (may require additional mulch/duff) ☐ Erosion Control Mix mulch ☐ Hydraulic mulches & hydroseed ☐ Other appropriate mulches ☐ Natural Fiber blankets (e.g. heavy coir) & Vegetation **Note:** *Requires smooth slope grading, does not work with roughened soil surfaces* ☐ Slope interruption practices	☐ Riprap stone mixed with soil/engineered core/naturalized riprap with vegetation ☐ Riprap armor stone with defined planting pockets (drainage layer required) ☐ In-Water Practices *(see Page 4)** ☐ Turf Reinforcement Mats/Geocells with grading & vegetation (NOTE: contains plastic)
Land Use Best Practices 	**Vegetated buffers** ☐ Refrain from raking or removing organic duff and vegetation 👍 ☐ Refrain from dumping brush or lawn clippings over bank (blocks vegetation and increases risk from overland erosion) 👍 ☐ Plant only native vegetation	**Pathways/resource access** ☐ Define & stabilize pathways 👍 ☐ Make pathways meander through the buffer to prevent concentrated flows 👍 ☐ Limit access points to more stable bank areas 👍 ☐ Cover pathways with mulch 👍 ☐ Don't store docks on the shoreline or bank 👍 **Lawns & Gardens** ☐ Minimize lawns/maintained areas near the bank 👍 ☐ Reduce and minimize lawn or other impervious surfaces draining to bank 👍 ☐ Limit mowing, allow revegetation of buffer, or set mower height higher 👍	**Houses & Roof Runoff** ☐ Discharge any outfalls (Drains, sump pump discharge, gutters) to dissipate energy and spread out water (plunge pool, level spreader) 👍 ☐ Use rain gardens, dripline trenches for roof Runoff **Driveways, Parking, & Road Runoff** ☐ Prevent/divert flows driveways & roads using water bars, infiltration steps, or mulch covering ☐ Minimize runoff from impervious surfaces to the bank ☐ Identify any high energy or concentrated water flows – slow it down, spread it out 👍

VEGETATION PRACTICES

Shoreline stability and a healthy vegetated buffer are closely linked. Increasing the amount and variety of vegetation, as well as installing multiple layers of vegetation (such as groundcover, shrubs, and trees), can improve overall slope stability and create habitat connectivity. Combining these practices yields the best results.

Natural Growth - Increase growth indirectly by limiting mowing, pruning, raking of duff, and thoughtful land use.

Live Stakes - Live stakes are cuttings of hardwood shrubs/trees like willows, dogwoods, and elders. They are put in the soil and grow into new plants, identical to their parent. This simple and cost-effective tool can be used in many ways, such as contour planting, living fences and wattles, living check dams, fascines, brush mattresses, pole drains and other bioengineering techniques, making it an important resource in stabilization projects.

Planting Nursery and root stock - Incorporating native trees and shrubs, with their deeper and wider root systems, can enhance stability. Additional mulch stabilization may be needed.

Seeding - Enhancing shoreline resilience and habitat can be achieve by seeding disturbed areas with a native seed mix composed of species adapted to the site's conditions. However, the seeds will require time and attention for establish. To protect the soil and seeds from erosion, temporary mulches or natural fiber blankets should be used.

In-Water Tools and Techniques

Although addressing the shoreline factors causing erosion and selecting tools to protect against it is effective in most situations, there are additional methods that have been utilized in Maine that indirectly assist in stabilizing shorelines. Most of these methods work by attenuating energy within the resources by mimicking naturally occurring protections such as fallen trees, marshes, wave breaks,/reefs, and restoring natural sediment movement. These practices will typically require higher level of permit review and professional assessment of the site.

Rivers & Streams	Lakes, Ponds, Wetlands	Coastal Wetlands & Shores	Coastal Sand Dunes & Beaches
☐ Root Wad Flow Deflectors ☐ Bendway weirs, other flow deflectors ☐ Rock weirs & rock ramps ☐ Targeted Chop & Drop/woody material ☐ Gravel/sand bar live staking	☐ Anchored Pole/log Ice Ramp ☐ Wave attenuation devices and techniques -Root wad attenuation -Engineered Log Jams/ anchored piles	☐ Wave attenuation devices/techniques ☐ Living Breakwater ☐ Marsh Creation /Enhancement with Toe Protection ☐ Natural Marsh Creation/Enhancement ☐ Encapsulated Oyster shells (e.g. burlap bags, cages) ☐ Anchored Pole/log Ice Ramp	☐ Dune with Engineered Core ☐ Sediment deposition via wave & wind attenuation ☐ *Beach nourishment*+ ☐ *Dune- Natural construction*+ ☐ *Enhance Dune Vegetation*+

Maine Geological Survey Decision Support Tool (Coastal) :
https://www.maine.gov/dacf/mgs/explore/marine/living-shorelines/project_living_shoreline_dst_summary_slides.pdf
New England Living Shoreline State of the Practice Report:
https://www.conservationgateway.org/ConservationPractices/Marine/Pages/new-england-living-shorelines.aspx

Permitting of Nature-based Stabilization Solutions

Permitting of the tools listed in Part E will depend on the location of the activity, and other factors, including the need & purpose of the project, considerations of alternatives and minimization of impacts to natural resources and adjacent areas. Most practices, except those marked with a "*" would be permitted under Permit By Rule Section 8. Shoreline stabilization projects using riprap in coastal waters, Shoreland Zone Rivers, or in mapped sand dune systems require a higher level of review under the Natural Resources Protection Act and do not qualify for Permit By Rule. Stabilization projects may also require a permit from the Army Corps of Engineers and local municipality under Shoreland Zoning.

Contact your Maine DEP regional office for specific guidance on permitting the methods selected through the "OUR SHORE" assessment. https://www11.maine.gov/dep/land/contacts/index.html

For more information on Assessing Shoreline erosion, selecting appropriate nature-based solutions, installation and permitting guidance, see DEP's Nature-based Shoreline Stabilization Guide

Sketch the site conditions and potential solutions