Encouraging Living Shoreline Design & Construction Through the Maine NPS Grant Program

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How we got here

- Overuse – Often Unnecessary

BEFORE:

AFTER:

How we got here

- Incorrect installation

Mason After Photos

How we got here

- Meaningful Buffer Rarely Added

BEFORE:

AFTER:

How we got here

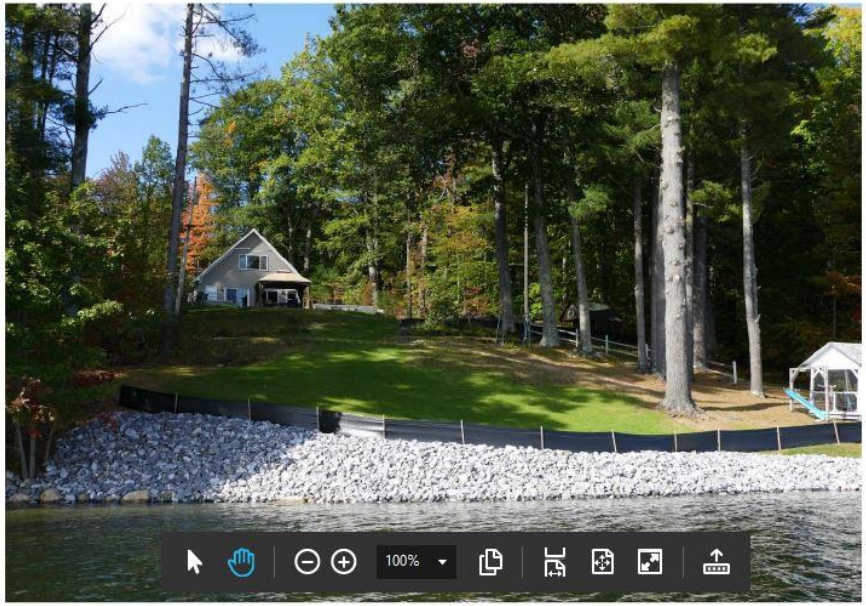
- Relatively Low Source of Phosphorus

How we got here

- Environmental Impacts
  - Habitat Damage
  - Deflects Energy to Adjacent Land
  - Thermal Impacts

How we got here

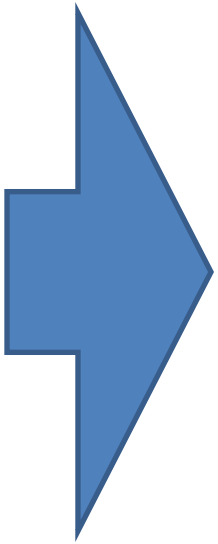
- Social Impacts
  - Highly Visible
  - Creates Unnecessary Demand & Complacency



Evolution of thought

Original Version

- Prescriptive
- Drew heavily from Vt. Bioengineering Manual



Revised Version

- More flexible
- Provides “tool box” and allows for BPJ
- Stresses use of multiple techniques

Proposed Preamble

Riprap is a material that has been used extensively throughout the state for shoreline protection. In fact, its use has become so widespread that the term “riprap” has become synonymous with the practice of exclusively using of angular rock to stabilize an entire eroding shoreline. Our evolving understanding of lake and stream ecosystem stressors requires a reexamination of riprap as a practice within the Maine DEPs 319 Grants Program.

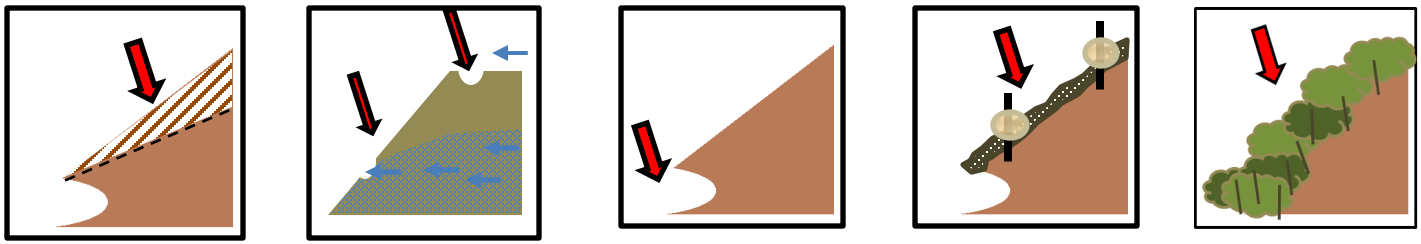
Proposed Policy Statement

The goal of this policy is to discourage the practice of riprap shoreline stabilization and encourage the practice of “living shoreline” stabilization.

Maine DEP 319 Grants Program monies will only fund projects that adhere to the following design principals:

Proposed Policy Statement

1. Apply appropriate slope preparation techniques
2. Eliminate or reduce overland drainage or provide subsurface drainage stabilization
3. Ensure appropriate toe protection is provided
4. Apply appropriate erosion control
5. Apply appropriate vegetation methods



Important Reminder

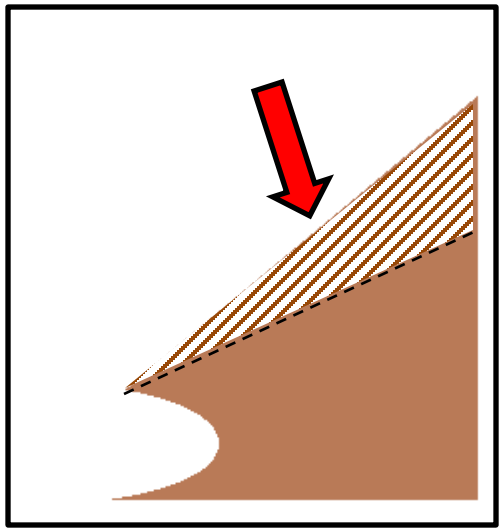
Sites should be individually assessed. Not all design goals may be incorporated, and many elements within the design goals might be. The intent is to provide options to achieve the outcomes of living shoreline stabilization.

Design Principals

Apply appropriate slope preparation techniques

Goal: “natural” stable slope

- retain natural soil conditions & structure
- behavior modification
- improving landward drainage practices
- contour swales, terracing (e.g. grading, not walls)
- establishing pit/mound topography
- cutting back slope to more stable angle
- surface roughening/reversion/tracking

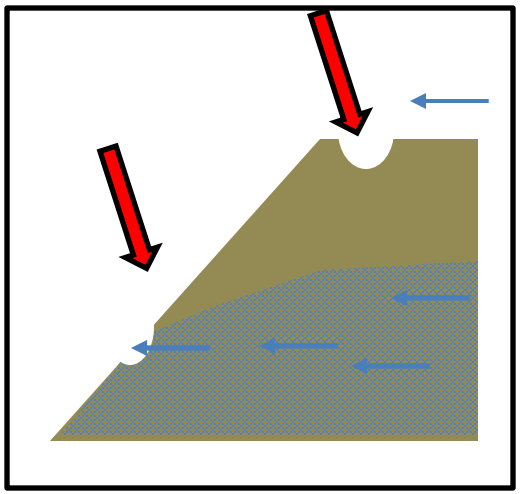


Design Principals

Eliminate or reduce overland drainage or provide subsurface drainage stabilization

Goal: Get water off the slope

- upslope treatments such as waterbars, water diversion into stable buffer, level spreaders, infiltration, buffer installation/enhancement or other improvements to minimize surface runoff;
- groundwater interception, seep stabilization, french drains, stabilized downspout, culverts/drainage tile, “Rock sandwich”, live pole drains

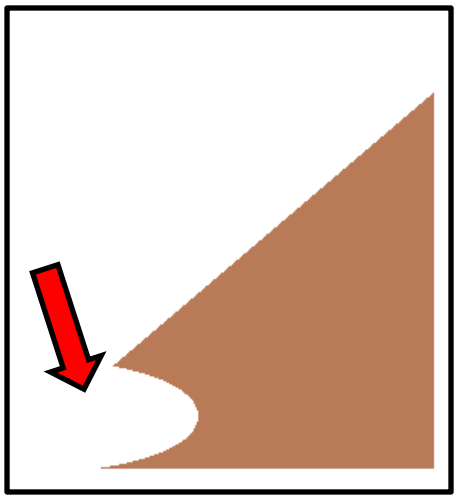


Design Principals

Ensure appropriate toe protection is provided

Goal: Minimize use of riprap

- dense toe livestaking or other vegetated solution
- encapsulated coir lifts/tubes with cobbles, ECM, other natural non-erodible material, alone or with livestake plantings or seed
- rootwad deflectors and other woody deposit practices
- riprap or stones for toe protection (or packed in scoured area only or along toe), with or without a backing filter layer (gravel or geotextile); slope vegetated or undisturbed

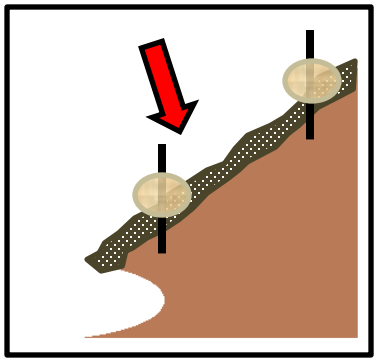


Design Principals

Apply appropriate erosion control

Goal: Prevent erosion

- Erosion Control Mix mulch “ECM” (min 4 inches)
- Slope interruption techniques (staked coir logs, wattles, etc.)
- Biodegradable blankets (coir preferred due to several year lifespan, but slope preparation is necessary)

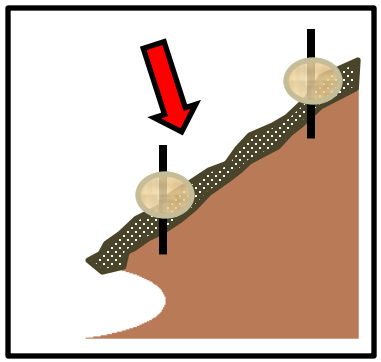


Design Principals

Apply appropriate erosion control

Goal: Prevent erosion

- Other mulches (may not work as well as ECM, slope limitations)
- Engineered designs that demonstrate the need to include:
  - Minimal use of riprap with extensive planting pockets
  - *Geocells, TRMs, other synthetic & proprietary products*

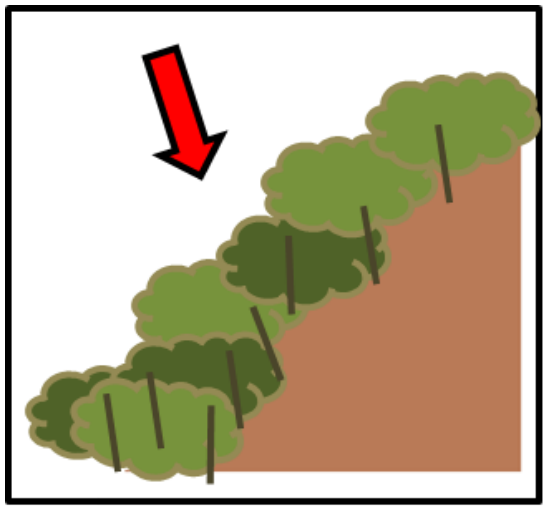


Design Principals

Apply appropriate vegetation methods

Goal: Develop living stabilization

- Dormant live staking (various methods)
- Fascines, wattles, living drains, living silt fences/checkdams, contour planting, etc.
- Bioengineering (living wattle fences, live stake wattles, etc.)
- Nursery/rootstock planting

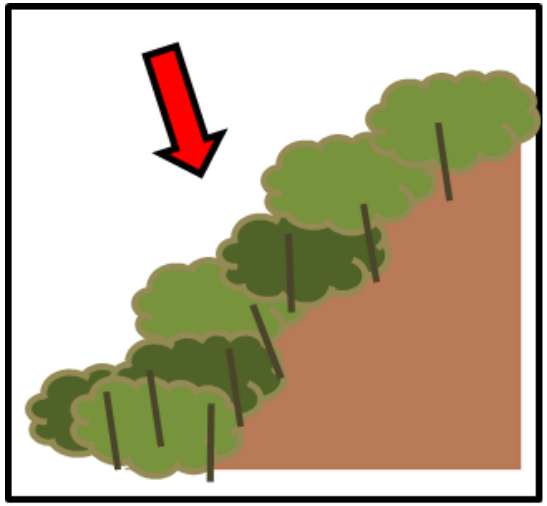


Design Principals

Apply appropriate vegetation methods

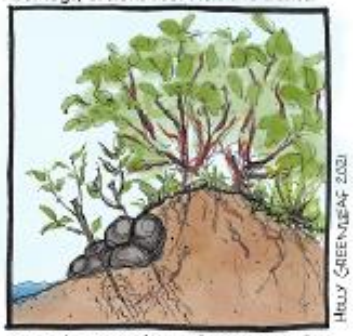
Goal: Develop living stabilization

- Nursery/rootstock planting
- Permanent seeding with appropriate native seed mixes (under blankets or mulched, hydroseeded
- “layering” propagation in place

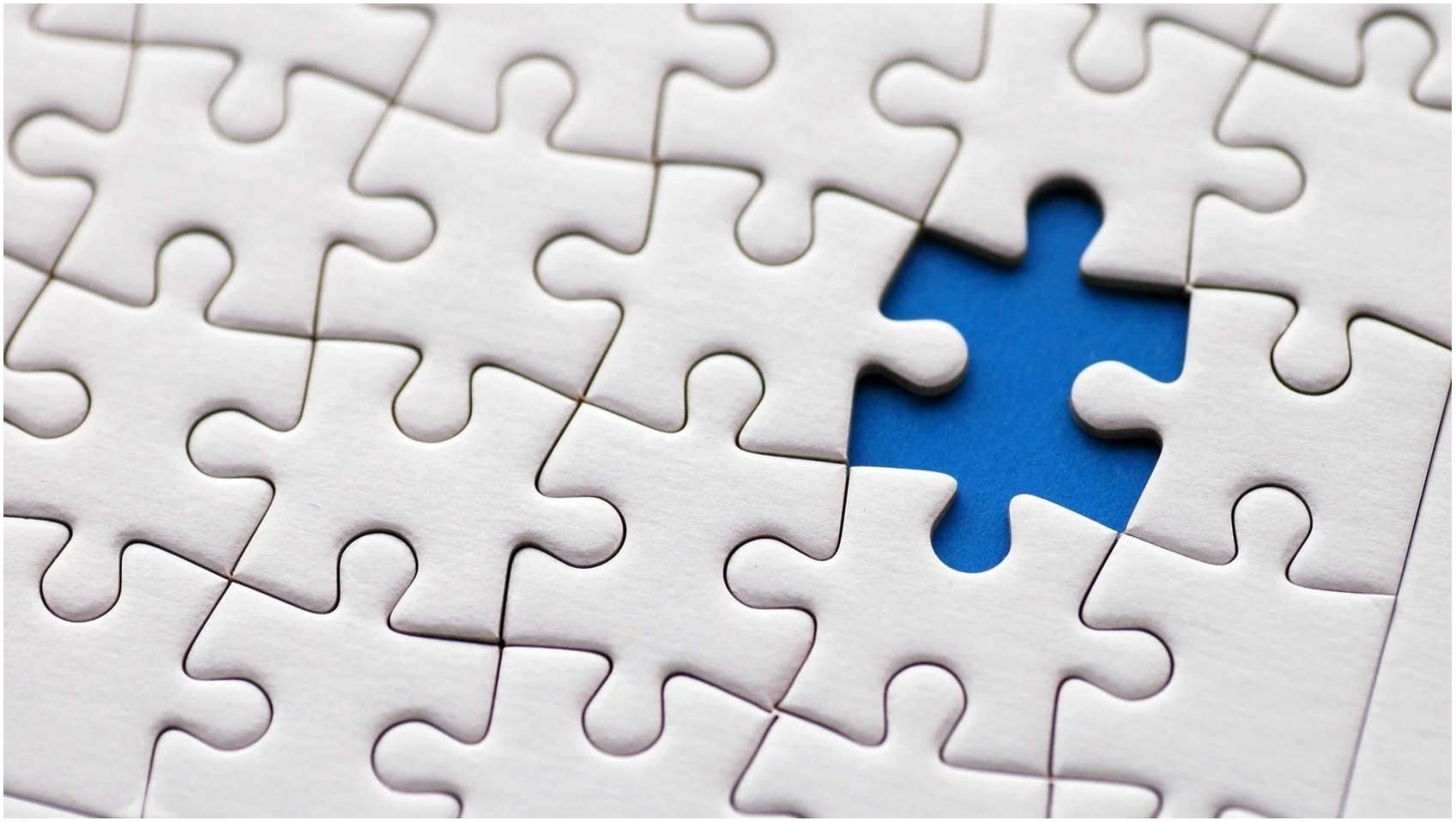


Encapsulated soil lifts can be installed in constrained areas to stabilize shorelines such as this area in Wilmington, VT where the road was built very close to Lake Raponda and was actively eroding.

Before (left) and after (right) regrading and installation of a stone toe to protect this bank.

Photo Example	Existing Conditions	Solution 1	Solution 2	Solution 3
	 Retaining wall failure	 Remove wall or repurpose for rock toe, slope bank back, install fiber log, plant.	 Remove top half of wall, regrade and slope back, backfill with gravel, plant.	 Leave and stabilize wall, backfill with gravel, plant robust native buffer.
	 Steep, eroding, undercut bank	 Regrade and slope back, install erosion control blanket, fiber log, & rock toe.	 Build encapsulated soil lifts over rock base & toe, plant native woody species.	 Leave & patch with erosion control blankets, fiber logs, & stone toe. Plant live stakes.
	 Ice push & berming	 Regrade, slope berm back, stabilize bank & rock toe. Seed & plant woody species.	 Leave berm, fill with encapsulated soil lifts over rock base. Seed and plant densely.	 Leave berm, anchor with stone toe, plant live stakes and woody vegetation on berm.

Almost there….



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Evolution of policy

Hopeful timeline

- Late Summer/Early Fall revised third draft available for review
- Late Fall finalize policy

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