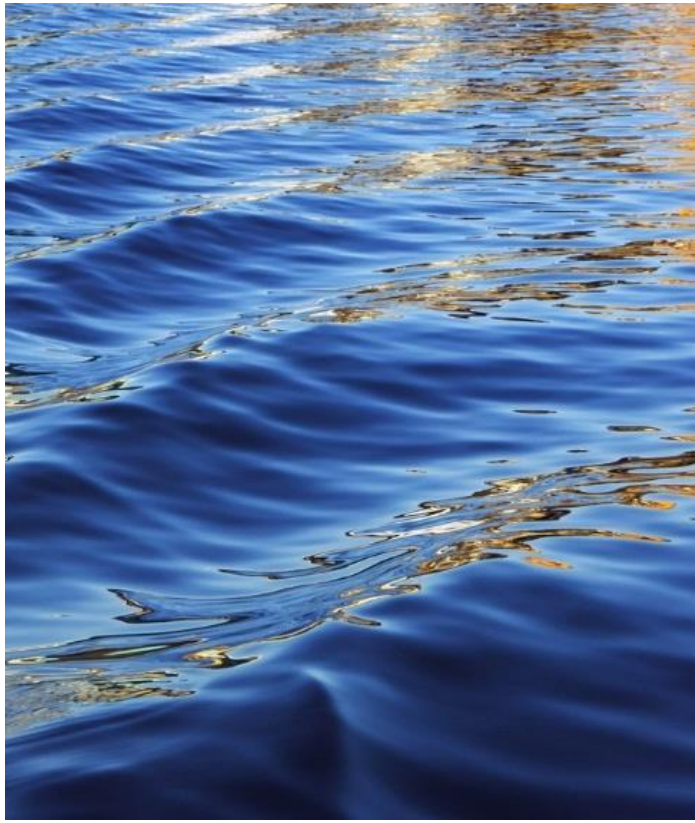
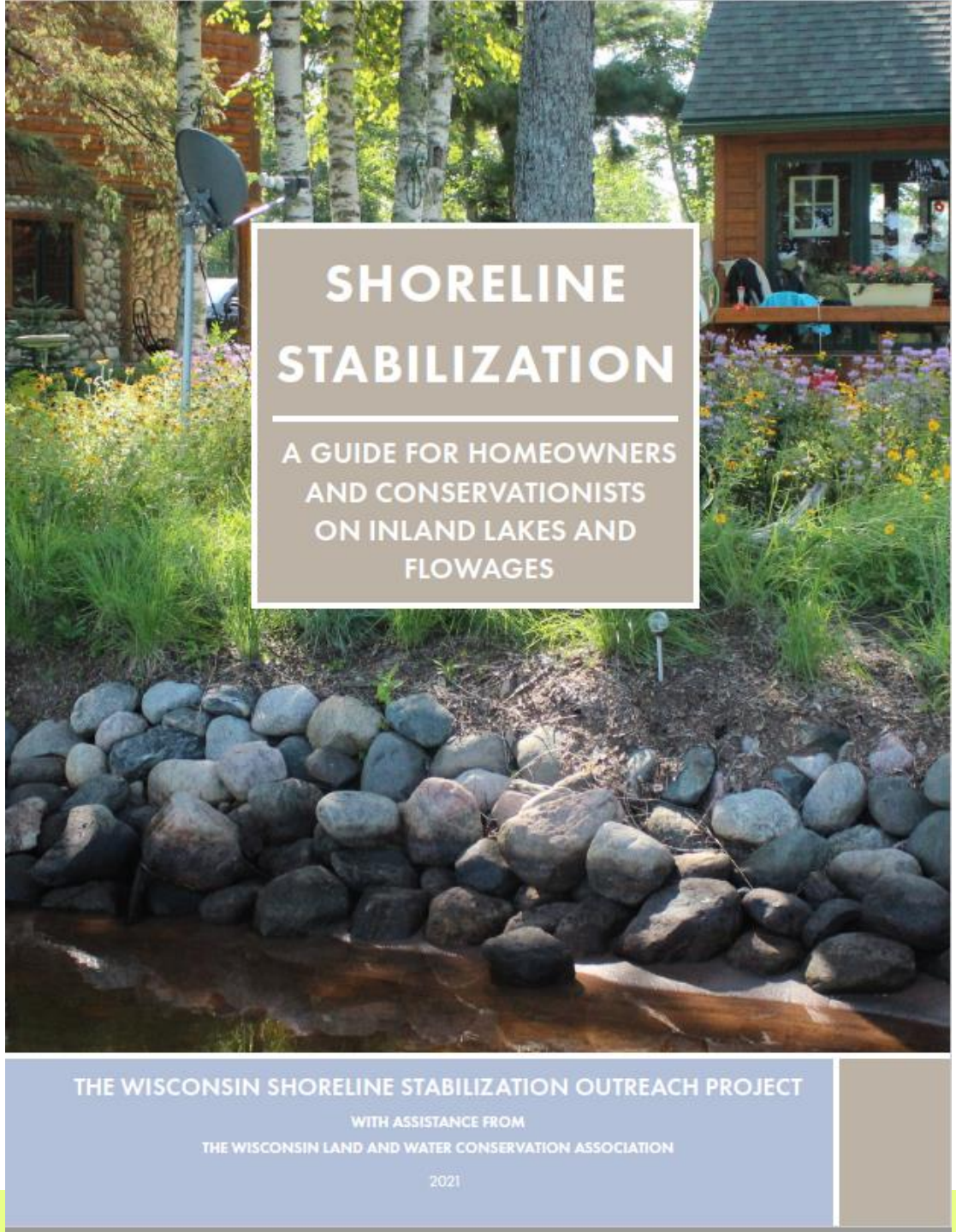
Review of the various shoreline improvement methods per Sauk County Lake Cost Share Funding Program

Mitch McCarthy





https://www.co.sauk.wi.us/sites/default/files/fileattachments/land_conservation/page/120767/shoreline_stabilization_guide_for_homeowners_web_6.25.pdf

ACKNOWLEDGEMENT & INTENDED USE Of "*SHORELINE STABILIZATION: A GUIDE FOR HOMEOWNERS AND CONSERVATIONISTS ON INLAND LAKES AND FLOWAGES*"

Shoreline Stabilization: A Guide for Homeowners and Conservationists is result of the collective effort by the Wisconsin Shoreline Stabilization Outreach Project (SSOP). The members of the group are conservationists, technicians, and outreach specialists from 11 county conservation departments across Wisconsin, with assistance from Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP).

This guide is an educational tool for both homeowners and conservationists that explains the basic principles of shoreline management on residential properties. The information within is based on Wisconsin topography, soils, and shoreline dynamics.

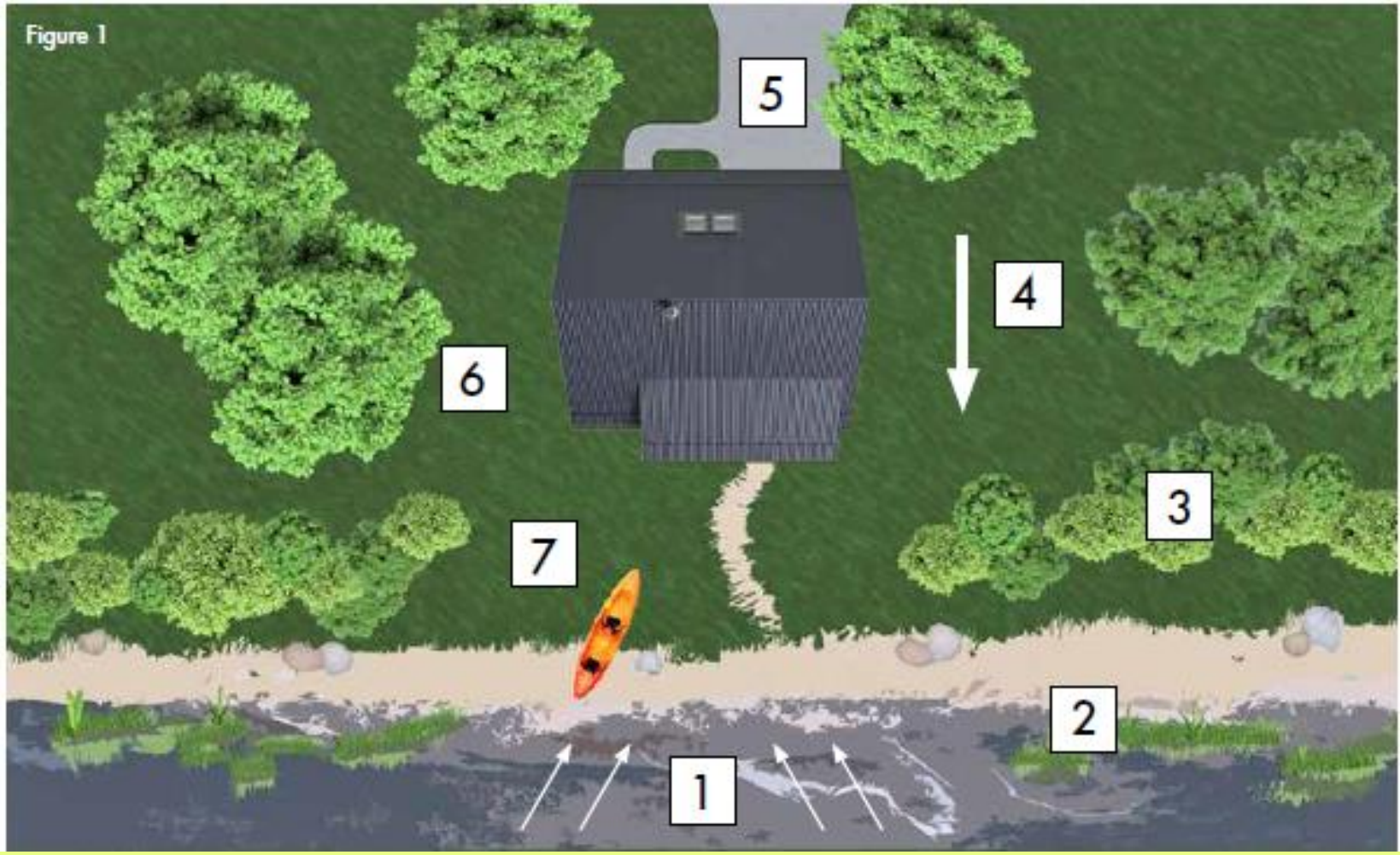
The guide is intended only as an educational document. As a homeowner, please do more research and seek professional guidance before installing any of these practices.

Before starting any alteration of your shoreline, make sure you have any required permits from the appropriate local municipalities, county government, tribal government, Wisconsin Department of Natural Resources (DNR), and the U.S. Army Corps of Engineers, as needed.

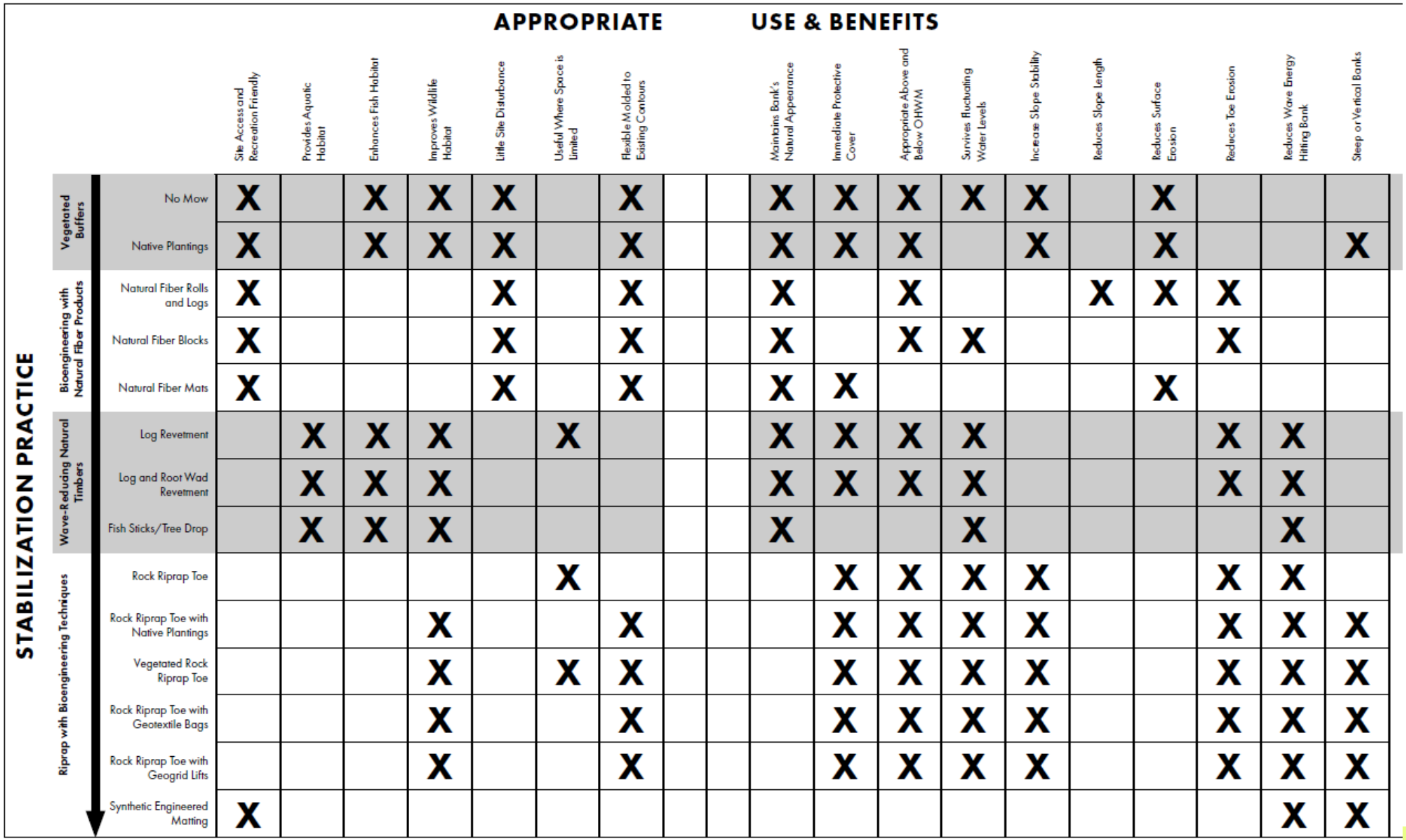
Special thanks to Karen Engelbretson of KJE Design, LLC and Elliot Meyer of WI Land+Water for their contributions to the guide.

Assessing Your Shoreline

1. Wave Energy
2. Aquatic Vegetation
3. Shoreline Vegetation
4. Slope
5. Impervious Surfaces
6. Soil Type
7. Recreational Use



Decision Table For Types Of Practices



STABILIZATION PRACTICE		APPROPRIATE USE & BENEFITS																		
		Site Access and Recreation Friendly	Provides Aquatic Habitat	Enhances Fish Habitat	Improves Wildlife Habitat	Little Site Disturbance	Useful Where Space is Limited	Flexible Molded to Existing Contours			Maintains Bank's Natural Appearance	Immediate Protective Cover	Appropriate Above and Below OHWM	Survives Fluctuating Water Levels	Increase Slope Stability	Reduces Slope Length	Reduces Surface Erosion	Reduces Toe Erosion	Reduces Wave Energy Hitting Bank	Steep or Vertical Banks
Vegetated Buffers	No Mow	X		X	X	X		X			X	X	X	X	X		X			
	Native Plantings	X		X	X	X		X			X	X	X		X		X			X
Bioengineering with Natural Fiber Products	Natural Fiber Rolls and Logs	X				X		X			X		X			X	X	X		
	Natural Fiber Blocks	X				X		X			X		X	X				X		
	Natural Fiber Mats	X				X		X			X	X					X			
Wave-Reducing Natural Timbers	Log Revetment		X	X	X		X				X	X	X	X				X	X	
	Log and Root Wad Revetment		X	X	X						X	X	X	X				X	X	
	Fish Sticks/Tree Drop		X	X	X						X			X					X	
Riprap with Bioengineering Techniques	Rock Riprap Toe						X					X	X	X	X			X	X	
	Rock Riprap Toe with Native Plantings				X			X				X	X	X	X			X	X	X
	Vegetated Rock Riprap Toe				X		X	X				X	X	X	X			X	X	X
	Rock Riprap Toe with Geotextile Bags				X			X				X	X	X	X			X	X	X
	Rock Riprap Toe with Geogrid Lifts				X			X				X	X	X	X			X	X	X
	Synthetic Engineered Matting	X																	X	X

Vegetated Buffer

Vegetated Buffer-Example

NATIVE PLANTINGS

Appropriate Uses & Benefits

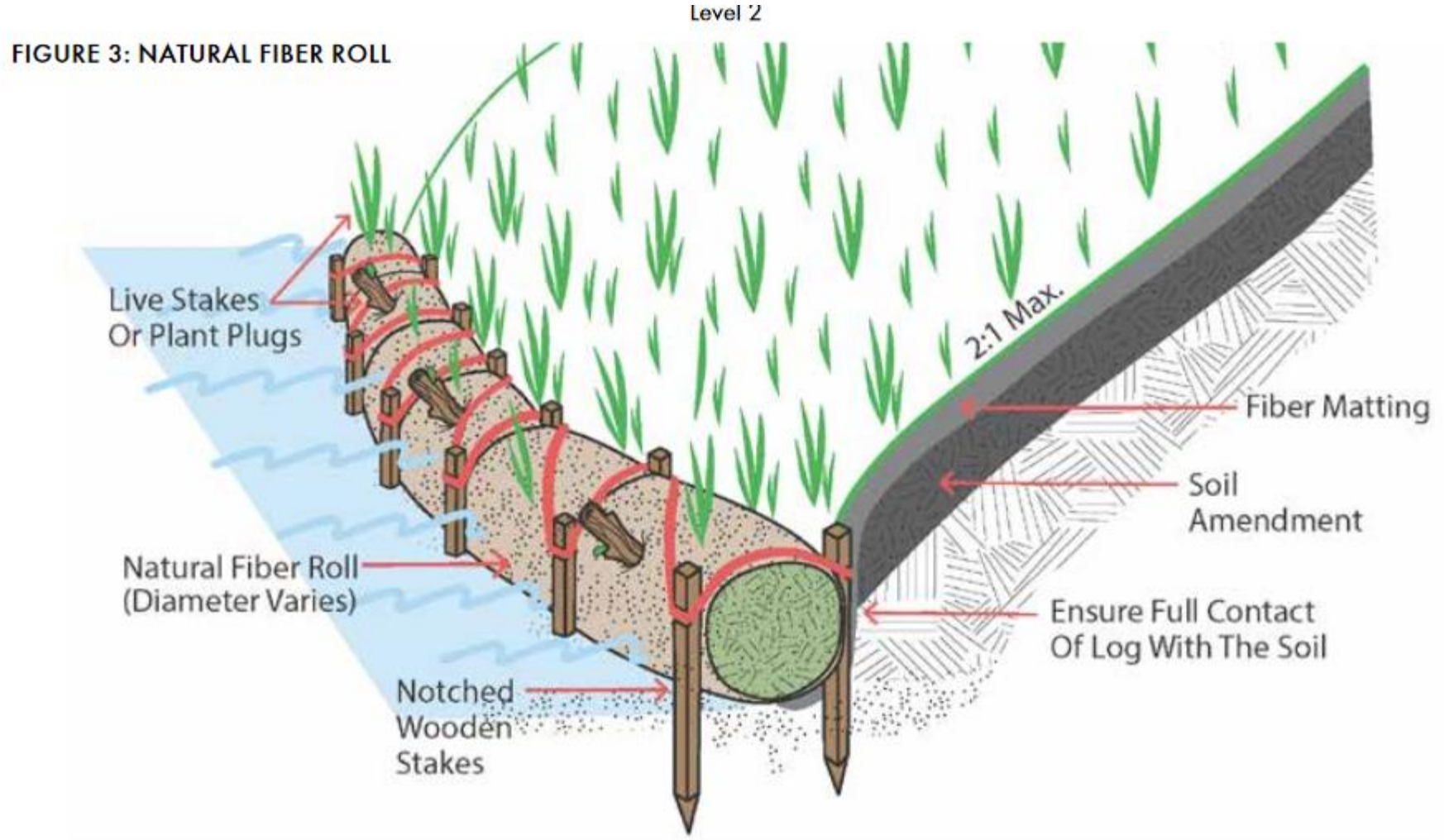
- Most sites are appropriate
- Areas with little or no traffic are best
- Areas with little or no wave action

Limitations

- Cost
- Maintenance is required (e.g. fencing, watering, and weeding)
- Deer browse may be an issue
- Not for use on sites with active erosion issues
- May need additional practices to address erosion

Turtle Flambeau Flowage, Iron County WI

Bioengineering with Natural Fiber Products



Bioengineering with Natural Fiber Products-Example

NATURAL FIBER ROLLS

Appropriate Uses & Benefits

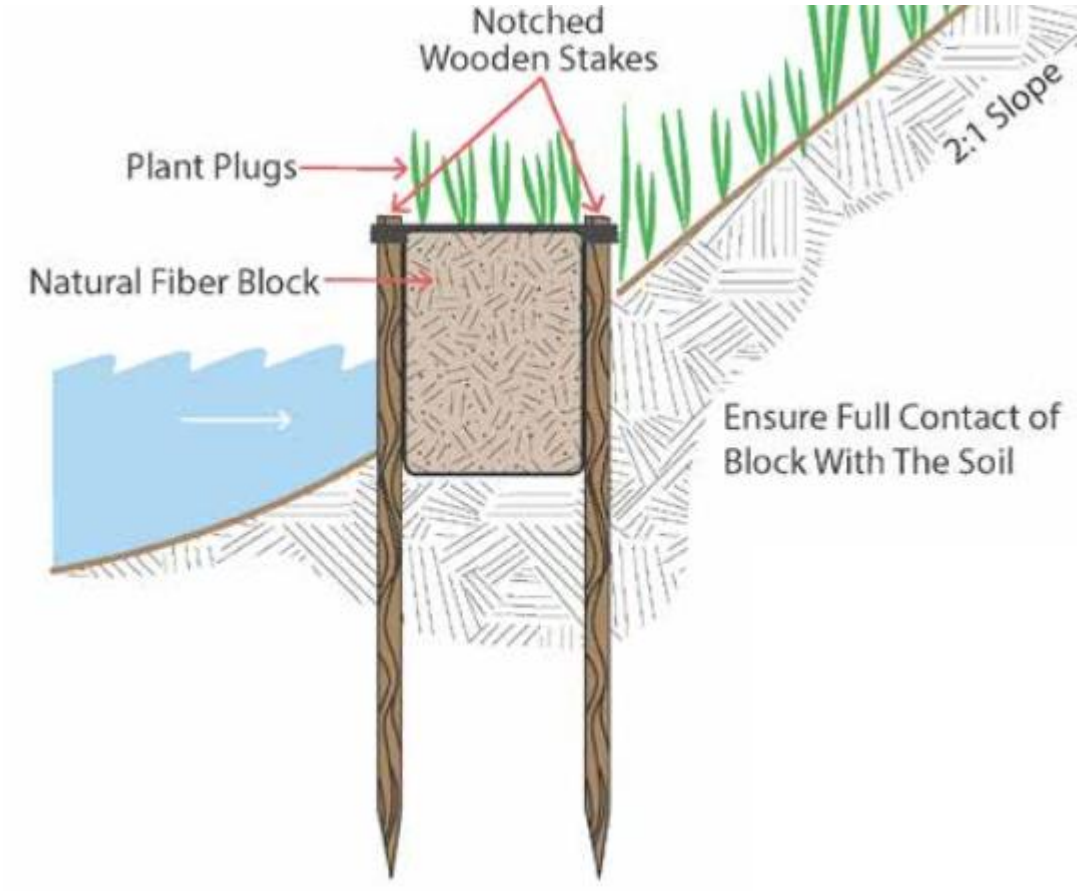
- Lightweight (when not saturated with water)
- Easy to install
- Little site disturbance
- Builds to existing contours
- Provides nutrients to plants as it biodegrades

Limitations

- Works best in low energy locations
- Can be damaged by ice or move if not staked
- Water level fluctuation affects plants
- Small surface area contact with bank
- Fiber may be non-native

Found Lake, Vilas County

Natural Fiber Blocks



Natural Fiber Block-Example

NATURAL FIBER BLOCKS

Appropriate Uses & Benefits

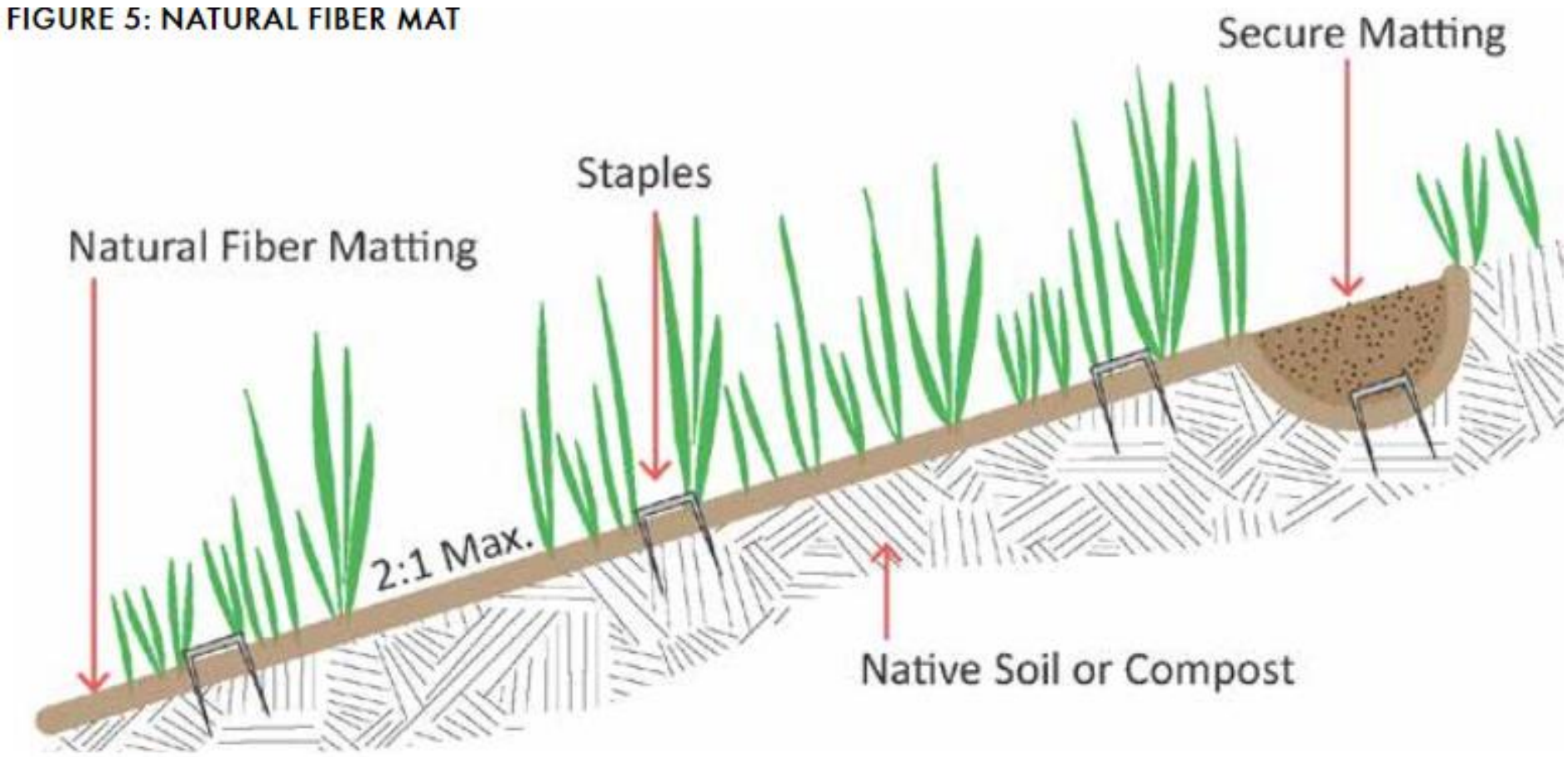
- Lightweight (when not saturated with water)
- More surface area contact with bank than a fiber roll
- Plant growth covers most of the structure
- Good in low and medium wave energy sites
- Can be made from regional fiber, specifically Great Lakes aspen

Limitations

- Works best in low energy locations
- Can be damaged by ice or move if not staked
- Water level fluctuation affects plants
- Fiber may be non-native

Boulder Lake, Vilas County

Natural Fiber Mat



Natural Fiber Mat -Example

NATURAL FIBER MATS

Appropriate Uses & Benefits

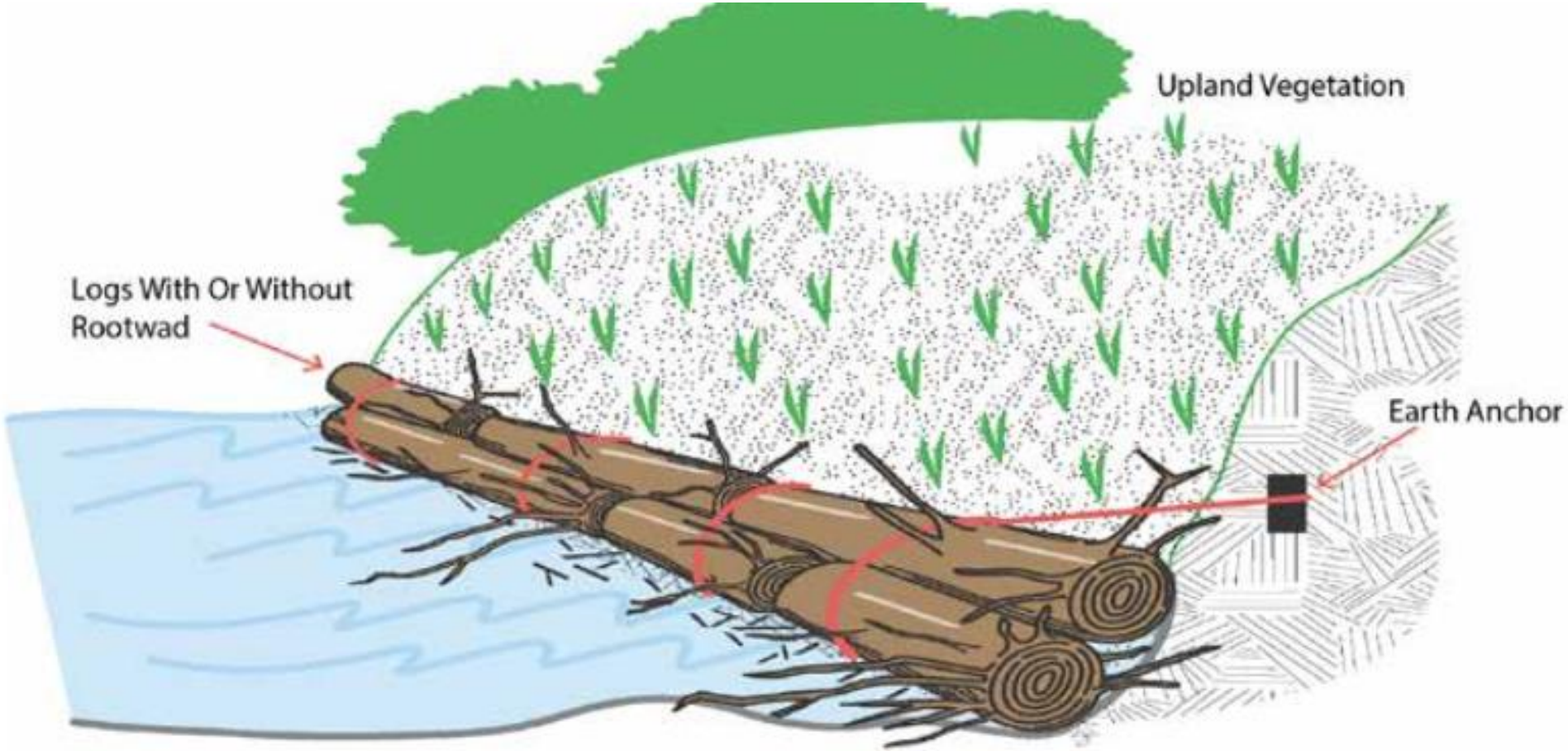
- Quick installation
- Can be used on either flat or sloped ground
- Reduces runoff and erosion of bare soil
- Plants are easily sown throughout mat
- Seed sown underneath mat will grow through
- Feeds nutrients to the plants as it biodegrades
- Retains moisture for plant growth

Limitations

- Can be dislodged by wind or water
- Must be properly stapled to the ground
- Can be expensive for large areas
- Not appropriate for steep slopes
- Potential for wildlife entanglement

Bearskin Lake, Oneida County

Wave Reducing Natural Timbers



Wave Reducing Natural Timbers- Example

LOG AND ROOT WAD REVETMENT

Appropriate Uses & Benefits

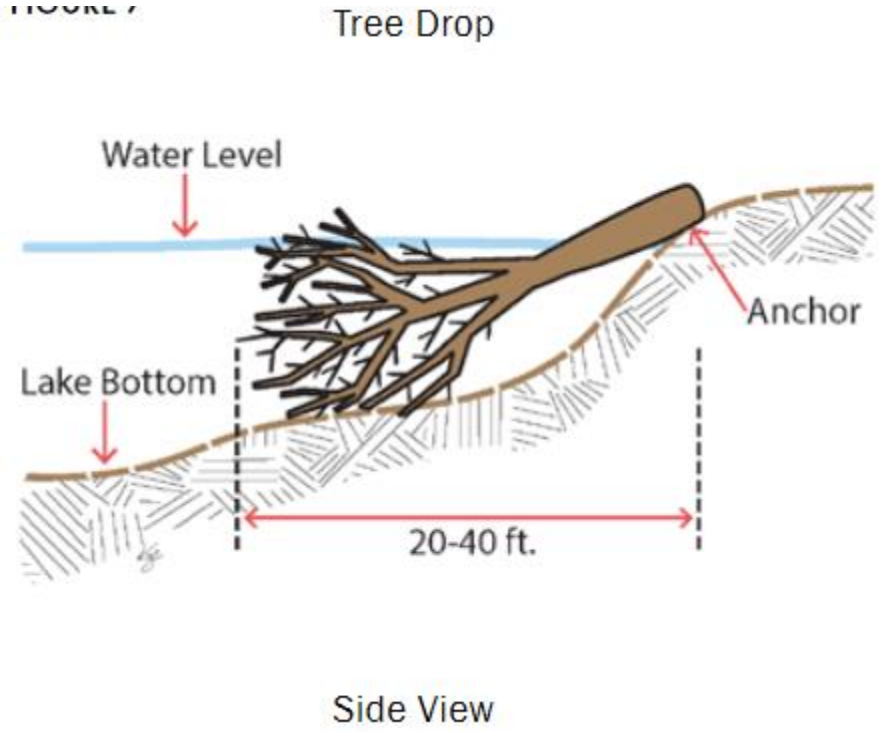
- Both high and low energy sites
- Improves spawning habitat
- Economical

Limitations

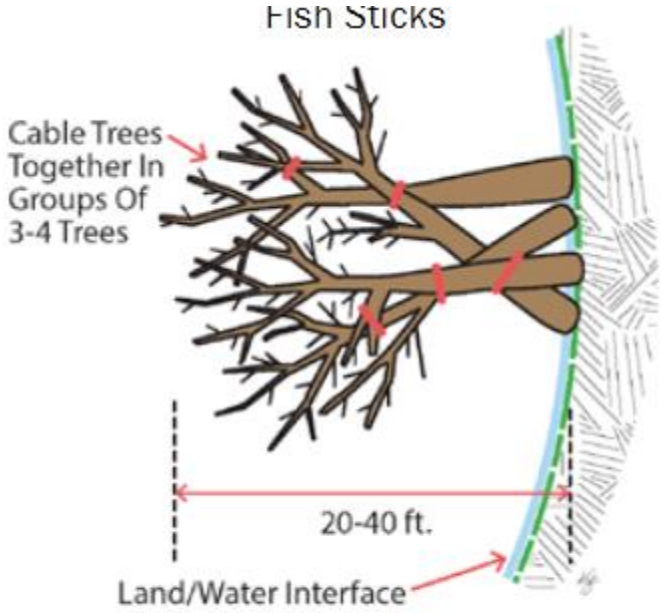
- Limits shoreline access
- Creates shoreline disturbance
- May need to be replaced eventually
- Transporting and access to trees

Project on Dutch Hollow Lake, Sauk County WI

Fish Sticks and Tree Drops



Side View



Top View

Fish Sticks and Tree Drops-Example

FISH STICKS AND TREE DROPS

Appropriate Uses & Benefits

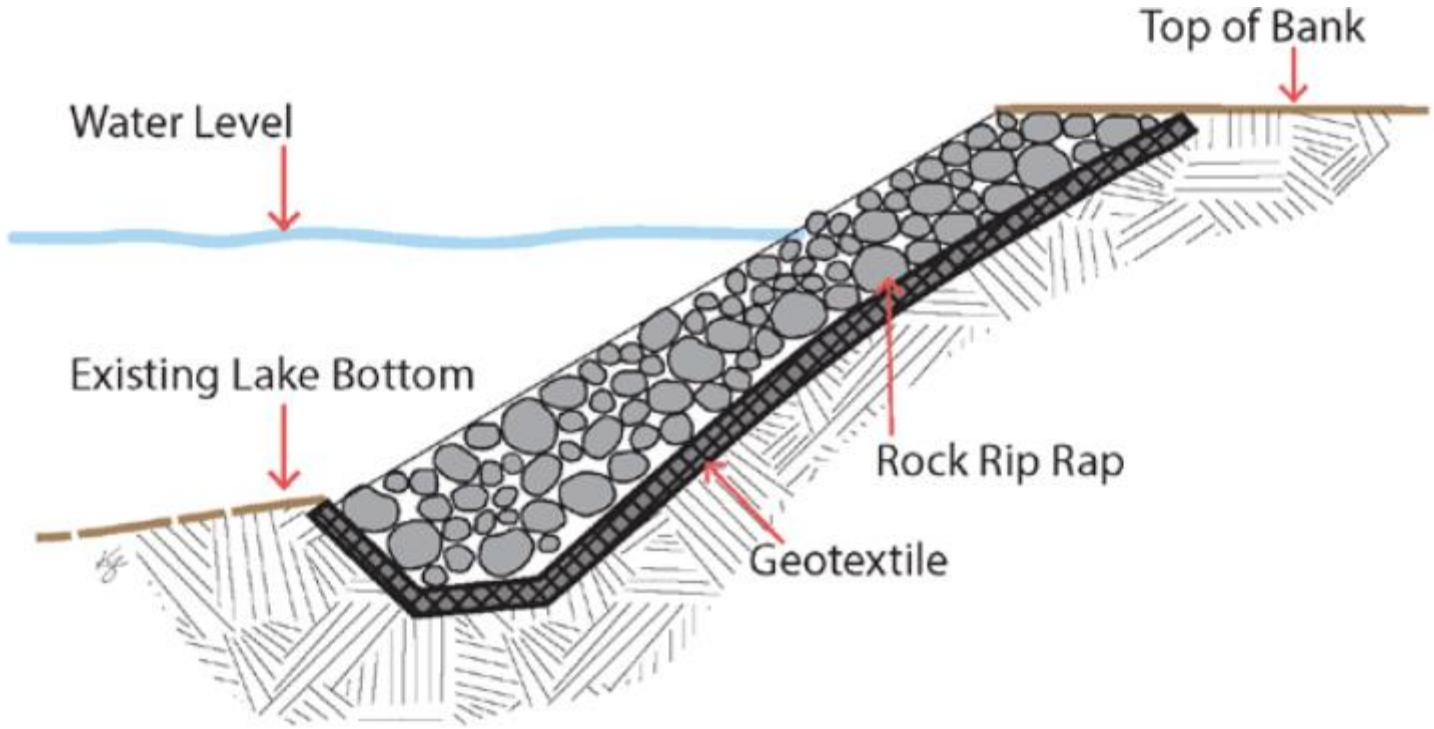
- Reduces wave energy and limits bank erosion
- Provides habitat for a variety of species
- Provides an environment for establishing aquatic plants
- Restores natural structure to lakes

Limitations

- Accessing and transporting trees
- Not suitable for high energy sites
- Not suitable near heavy boat traffic
- Avoid walleye spawning areas
- Icy conditions can delay installation

Project on Dutch Hollow Lake, Sauk County WI

Riprap With Bioengineering Techniques



Riprap Bioengineering Techniques-Example

ROCK RIPRAP TOE WHERE NATIVE VEGETATION CANNOT BE ESTABLISHED

Appropriate Uses & Benefits

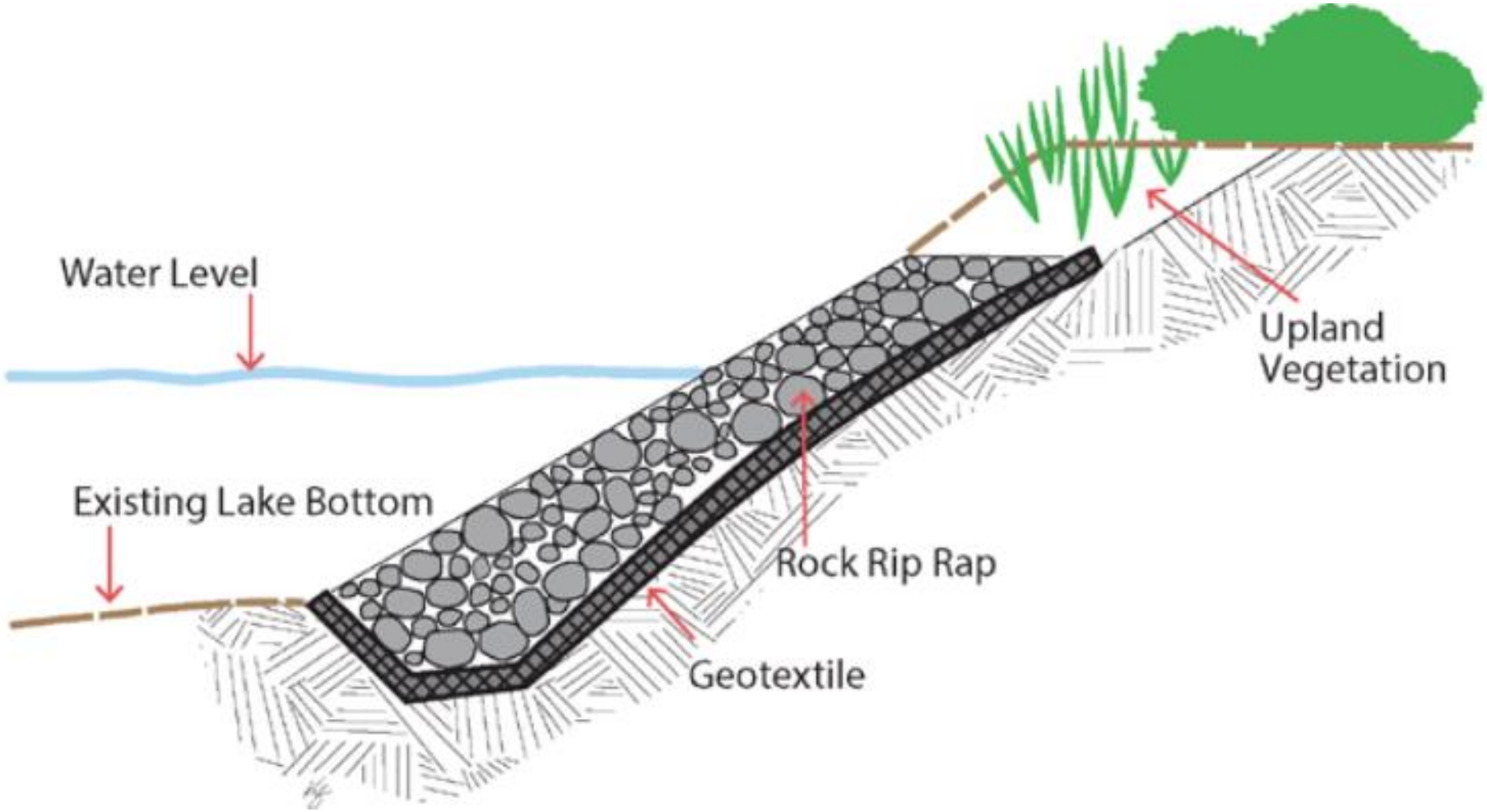
- Severe erosion
- Bank undercutting
- High wave energy
- Unstable soils

Limitations

- Cost and labor intensive
- Loss of habitat and ecosystem benefits
- Ice shoves
- Requires engineering
- Accessibility issues
- Side or flank erosion concerns

Bearskin Lake, Oneida County

Riprap Toe With Native Plantings



Riprap Toe With Native Plantings-Example

ROCK RIPRAP TOE WITH NATIVE PLANTINGS

Appropriate Uses & Benefits

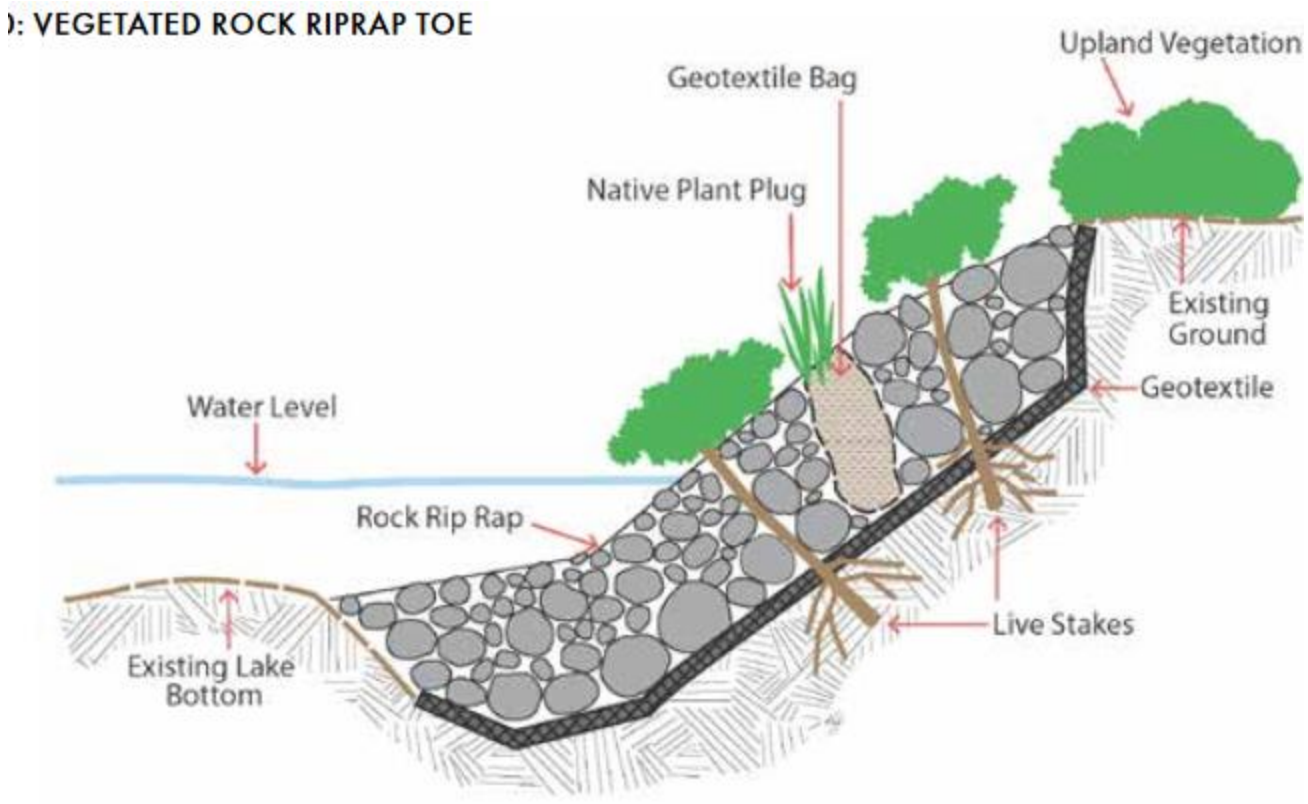
- Severe erosion
- Bank undercutting
- High wave energy
- Oversplash of waves on low bank

Limitations

- Cost
- Labor intensive
- Requires engineering
- Plant knowledge and maintenance

and after 4 years, Soo Lake, Price County

Vegetated Rock Riprap Toe



Vegetated Rock Riprap Toe-Example

VEGETATED ROCK RIPRAP TOE

Appropriate Uses & Benefits

- Wildlife habitat
- Adds strength and durability to landscape
- Immediately camouflages rocks to look more natural with the shoreline
- Fills voids within rock to reduce entrapment of critters
- Instead of covering rock with soil and seeding it

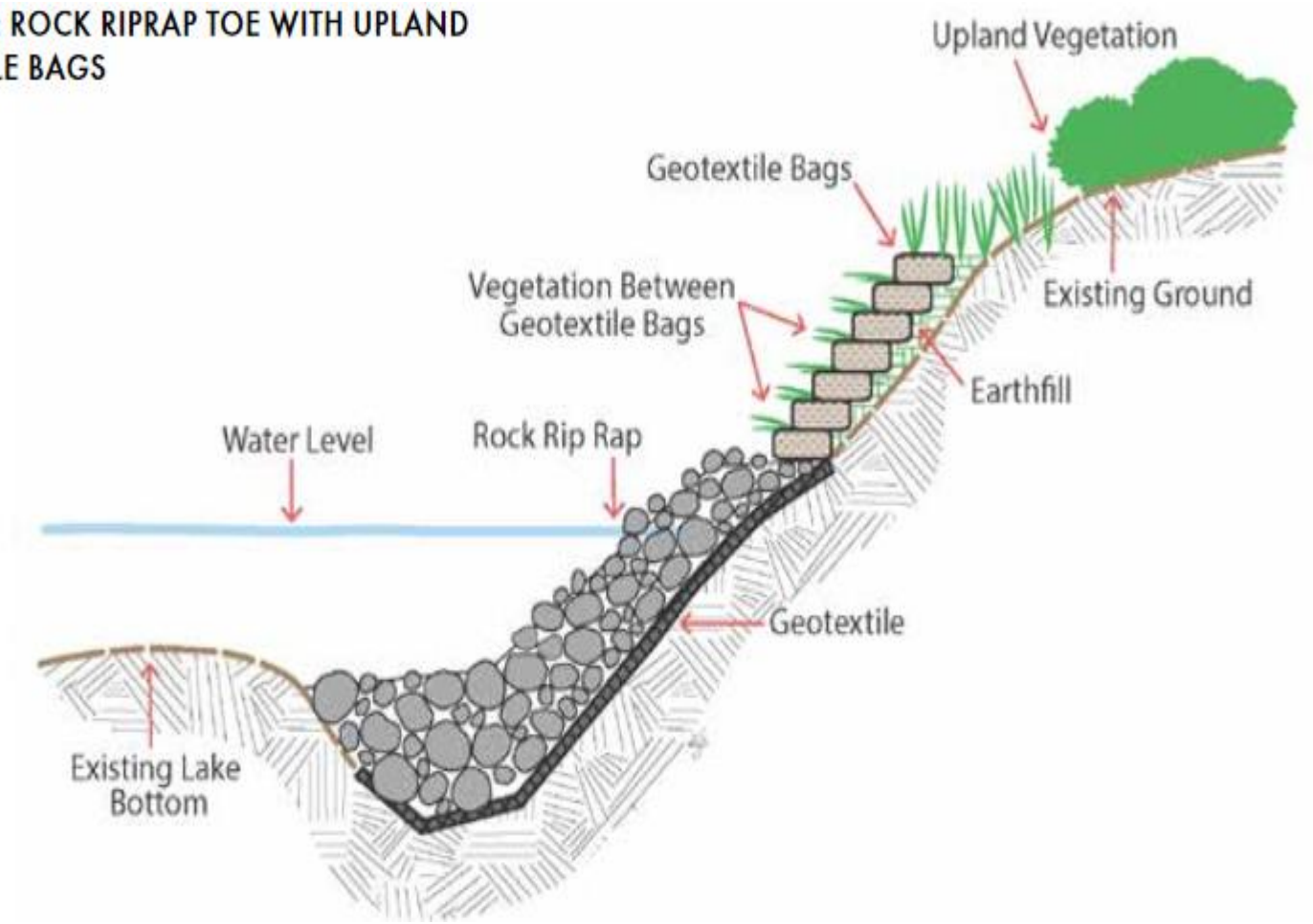
Limitations

- Ice shoves
- Deer browse
- Labor intensive
- Requires engineering and accessibility
- Time for plants to establish
- Damage and maintenance

Turtle Flambeau Flowage, Iron County WI

Rock Riprap Toe With Upland Geotextile Bags

FIGURE 11: ROCK RIPRAP TOE WITH UPLAND GEOTEXTILE BAGS



Rock Riprap Toe With Upland Geotextile Bags-Example

ROCK RIPRAP TOE WITH UPLAND GEOTEXTILE BAGS

Appropriate Uses & Benefits

- Steeper slopes
- Quickly establish riparian vegetation
- Effectiveness increases with time
- Smaller areas of unvegetated banks between trees and shrubs
- Best for areas of limited access with existing vegetation
- Environmentally friendly alternative to hardscape retaining walls

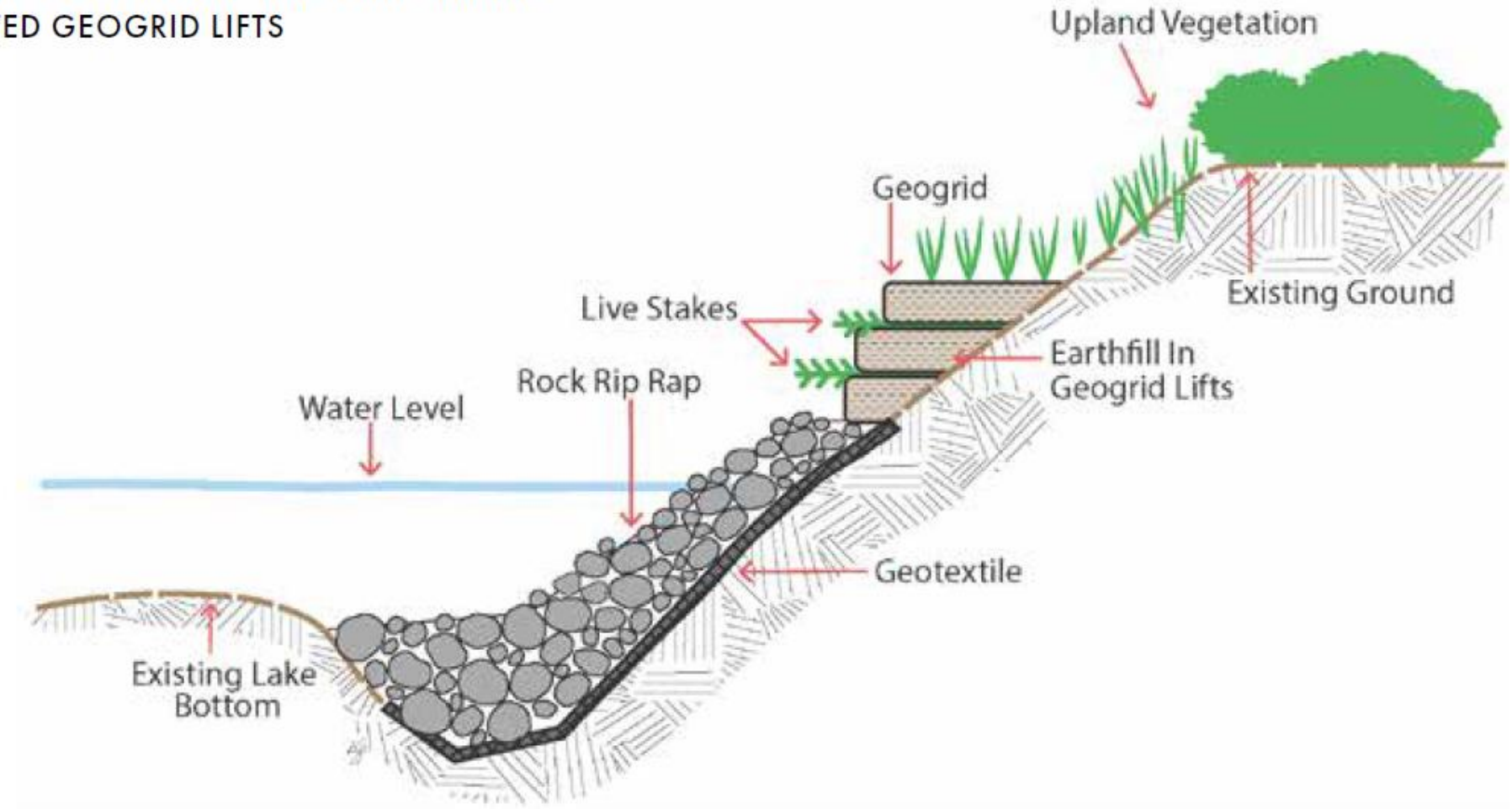
Limitations

- Expensive
- Labor intensive
- Requires engineering
- Soil-filled bags require site to be accessible

Project on Lake Redstone, Sauk County WI

Rock Riprap Toe With Upland Vegetated Geogrid Lifts

FIGURE 12: ROCK RIPRAP TOE WITH UPLAND VEGETATED GEOGRID LIFTS



Rock Riprap Toe With Upland Vegetated Geogrid Lifts- Example

ROCK RIPRAP TOE WITH UPLAND VEGETATED GEOGRID LIFTS

Appropriate Uses & Benefits

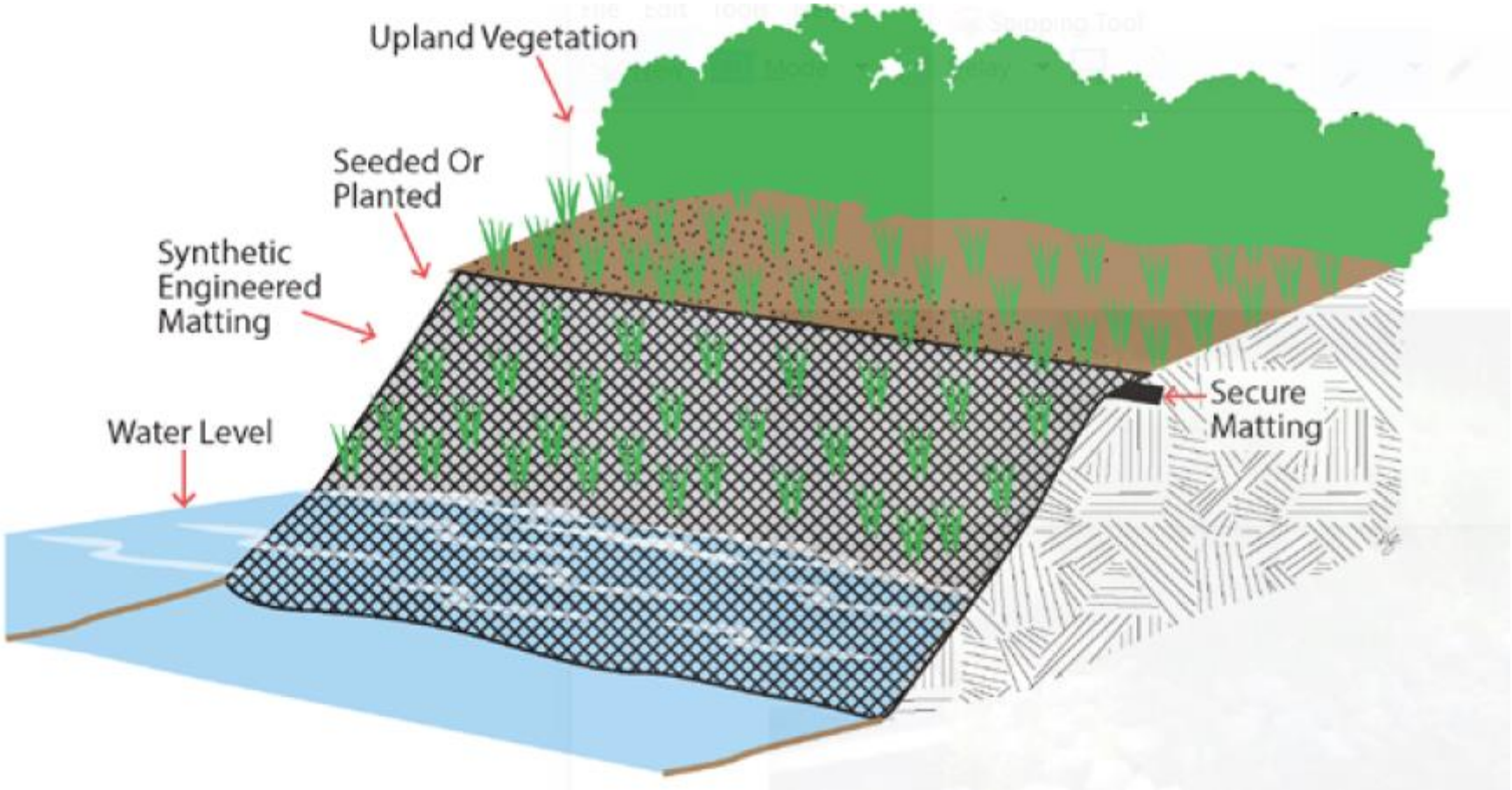
- Steeper slopes
- Quickly establish riparian vegetation
- Effectiveness increases with time
- Best for large, unvegetated areas
- Environmentally friendly alternative to hardscape retaining walls

Limitations

- Cost
- Labor intensive
- Deer browsing issues
- Requires engineering
- Accessibility for fill and materials

Before, during construction, and after one growing season. Plum Lake, Vilas County

Synthetic Engineered Matting



Synthetic Engineered Matting-Example

SYNTHETIC ENGINEERED MATTING

Appropriate Uses & Benefits

- High traffic areas
- Low to medium slopes
- Small non-motorized watercraft walk in access

Limitations

- Suggested to combine with other erosion control products
- Potential for wildlife entanglement

Rubber matting, Spirit Flowage, Lincoln County

Thick plastic mesh web, Catfish Lake, Vilas County

Sauk County Regulations for Shoreline Work

Before starting any alteration of your shoreline, make sure you have any required permits from the appropriate local municipalities, county government, tribal government, Wisconsin Department of Natural Resources (DNR), and the U.S. Army Corps of Engineers, as needed.

Sauk County Zoning	608-355-3245
WDNR	608-267-3125
U.S. Army Corps of Engineers	715-345-7911

Sauk County Cost Share Funding Program

Lake Shore Assistance Program

- Applicant must be shoreland landowner in Sauk County.
- Apply at: https://www.co.sauk.wi.us/sites/default/files/fileattachments/land_conservation/page/1934/costshareapplicationfillable.pdf
- Deadline for 2023 is November 4th.
- Cost share funding is limited to 50% of the project cost up to $2,500 per applicant. Applicants will be ranked verses other applicants
- LRE staff will contact the applicant to set up a site visit and determine project eligibility
- Awarded projects will receive a complementary design, and construction supervision.
- When projects are completed, landowners will be reimbursed.

QUESTIONS?

Mitch McCarthy

Watershed Coordinator

Sauk County Land Resources & Environment

mitchell.mccarthy@saukcountywi.gov.

608-355-4836