



Shoreland Restoration Techniques,  
Bio-engineered Projects & Monitoring

2013

Wisconsin Lakes Partnership Convention

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# Talking Points

Techniques

Possibilities

Materials Discussion

Project Examples - Before / After

Project Monitoring & Observations

# Various Techniques or Combinations of Techniques

- Natural Shoreline
- Native Plantings
- Biolog w/ Plantings
- Branch Box Breakwater
- Brush Mattress
- Live Fascine
- Branch Packing
- Vegetated Geogrid
- Rock Riprap
- Rock Riprap w/ Live Stakes; “vegetated riprap”
- Demo/Experimental

Techniques

# Natural Shoreline

- Left natural
- Buffer of vegetation left intact, i.e. no mow
- May have access to water, i.e. path, dock, stairway, etc.
- Removal of invasive species
- Easiest to maintain



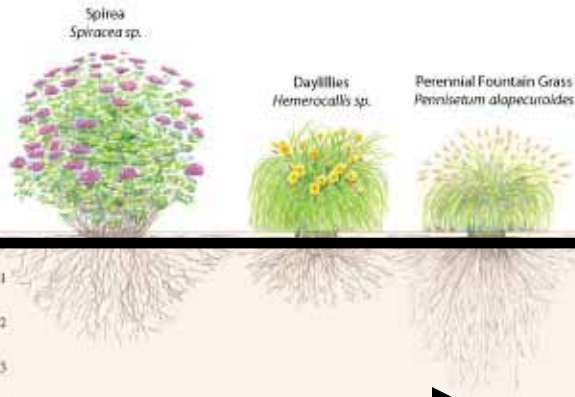
# Techniques

# Vegetation Holds Soil

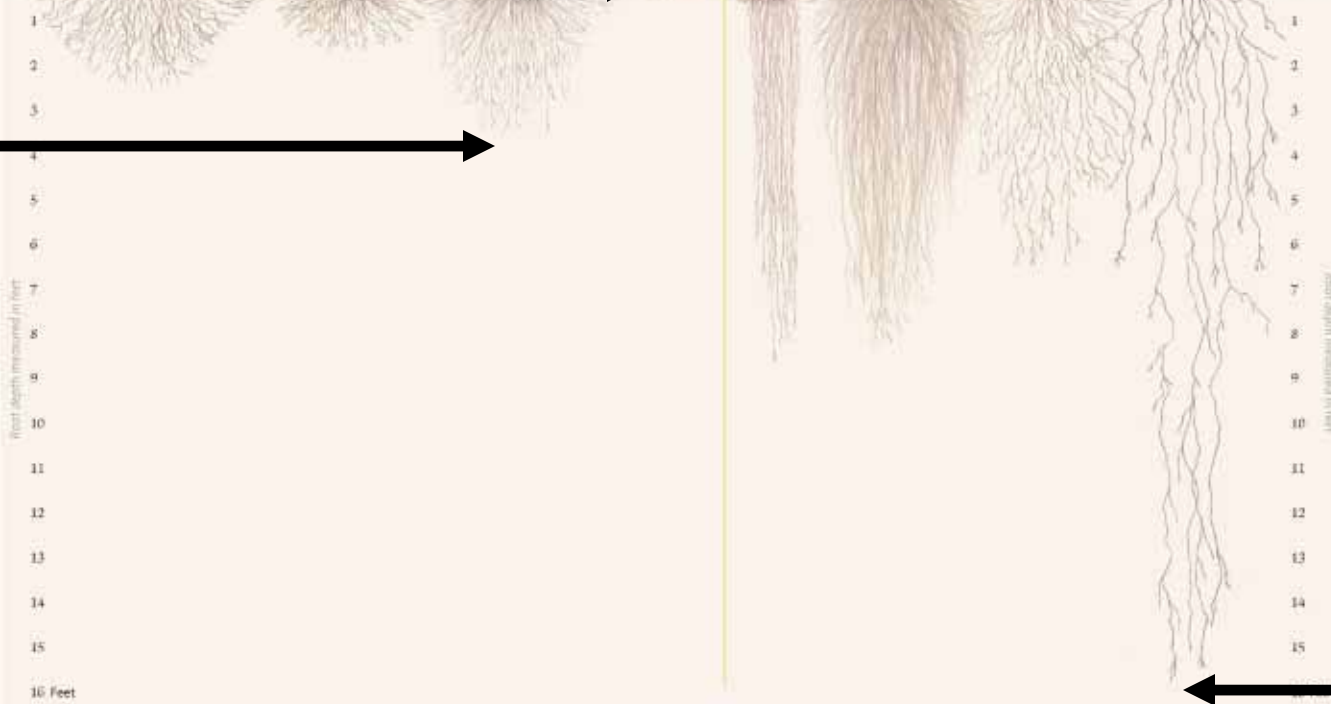
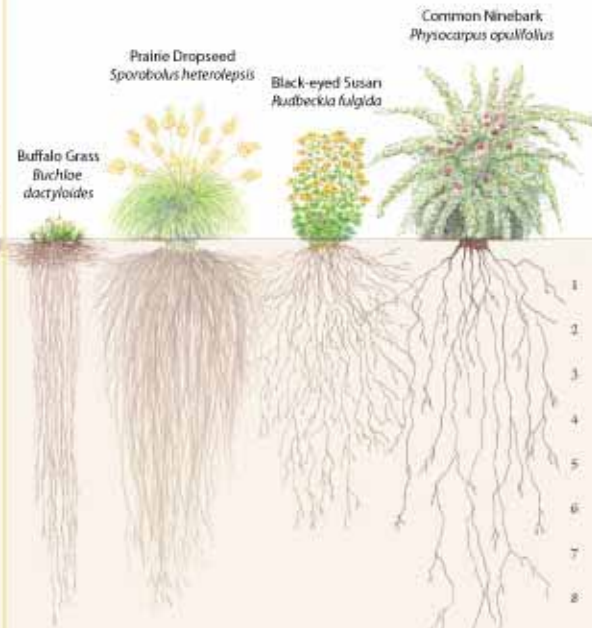
Turf  
Grass

4.0 Ft

## Non-Natives



## Natives



16 Ft

Techniques

# Shrubs & Trees



Techniques

# Biolog



3 YEAR OLD BIOLOG

Techniques

# Brush Mattress





Techniques

# Live Fascine



Techniques

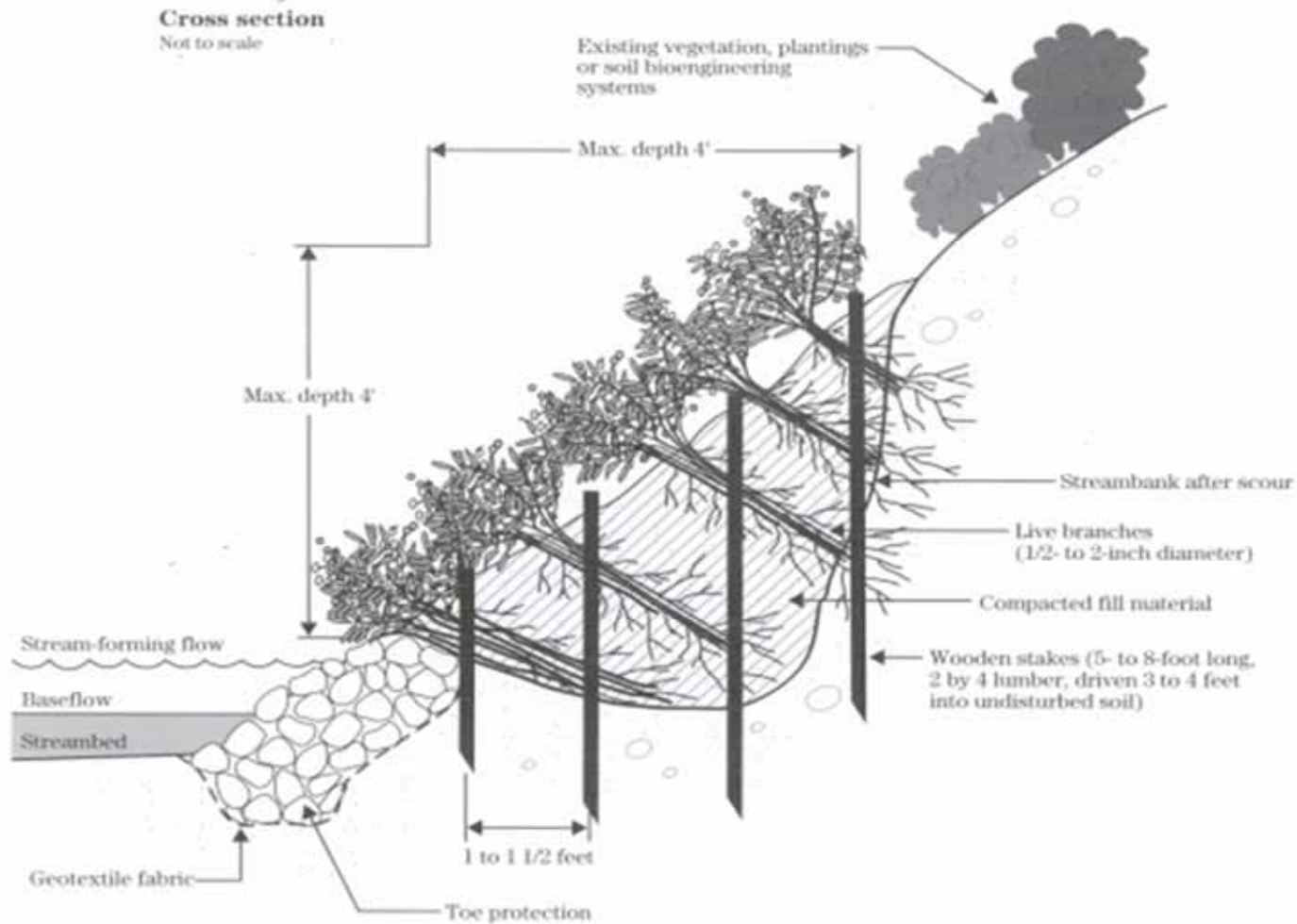
# Branchbox Breakwater



# Techniques

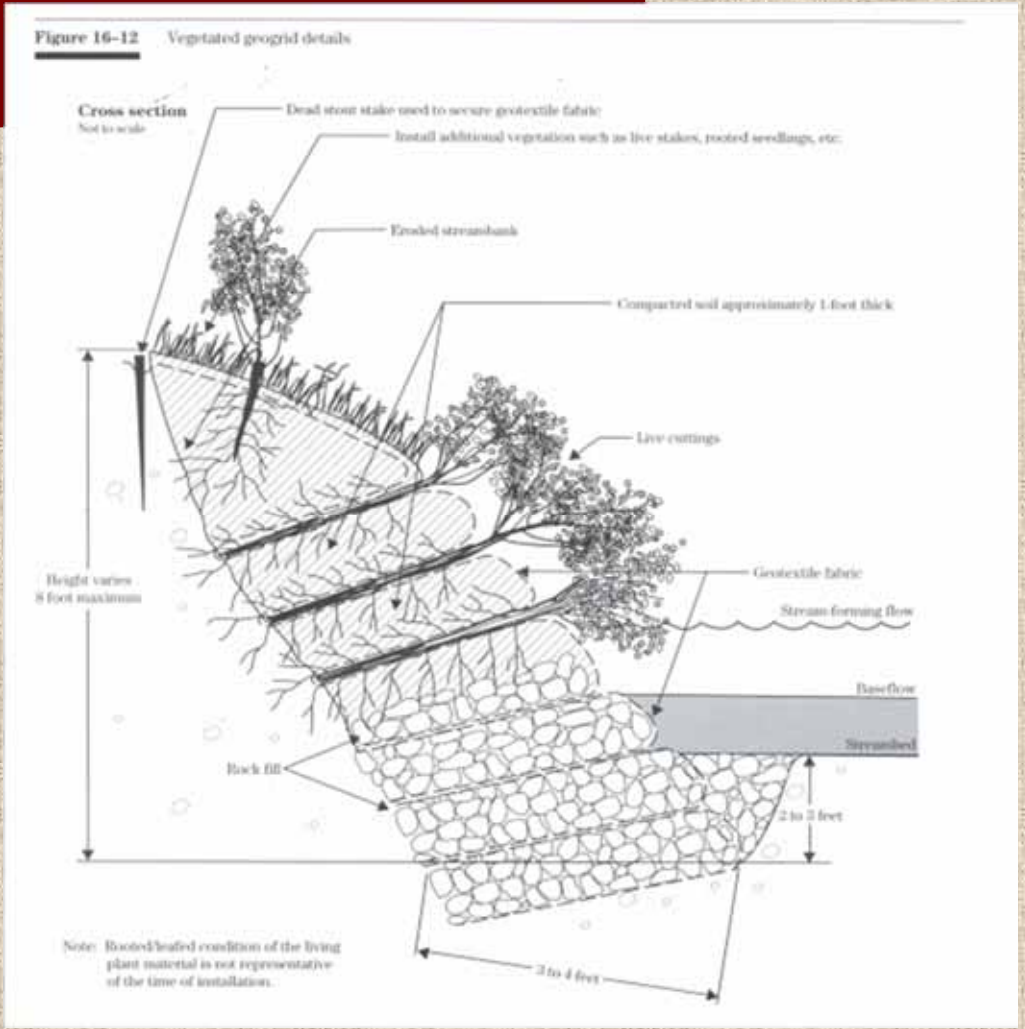
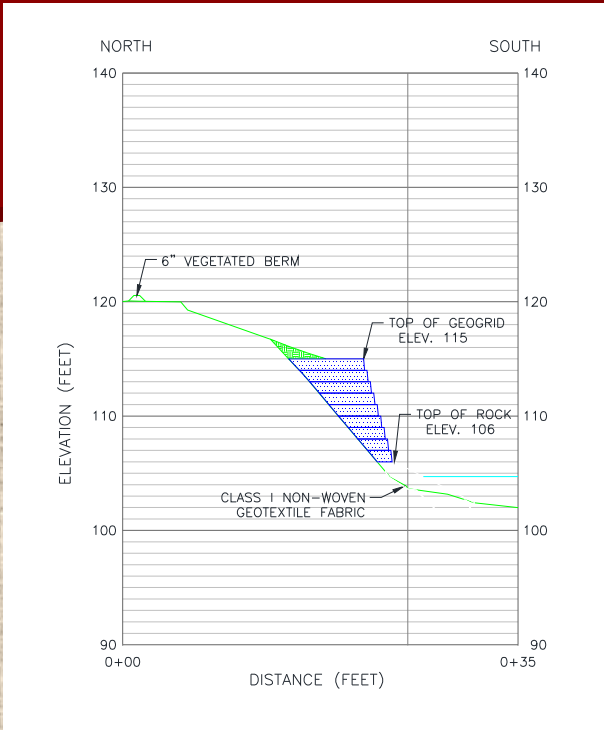
# Branch Packing

Figure 16-10 Branchpacking details

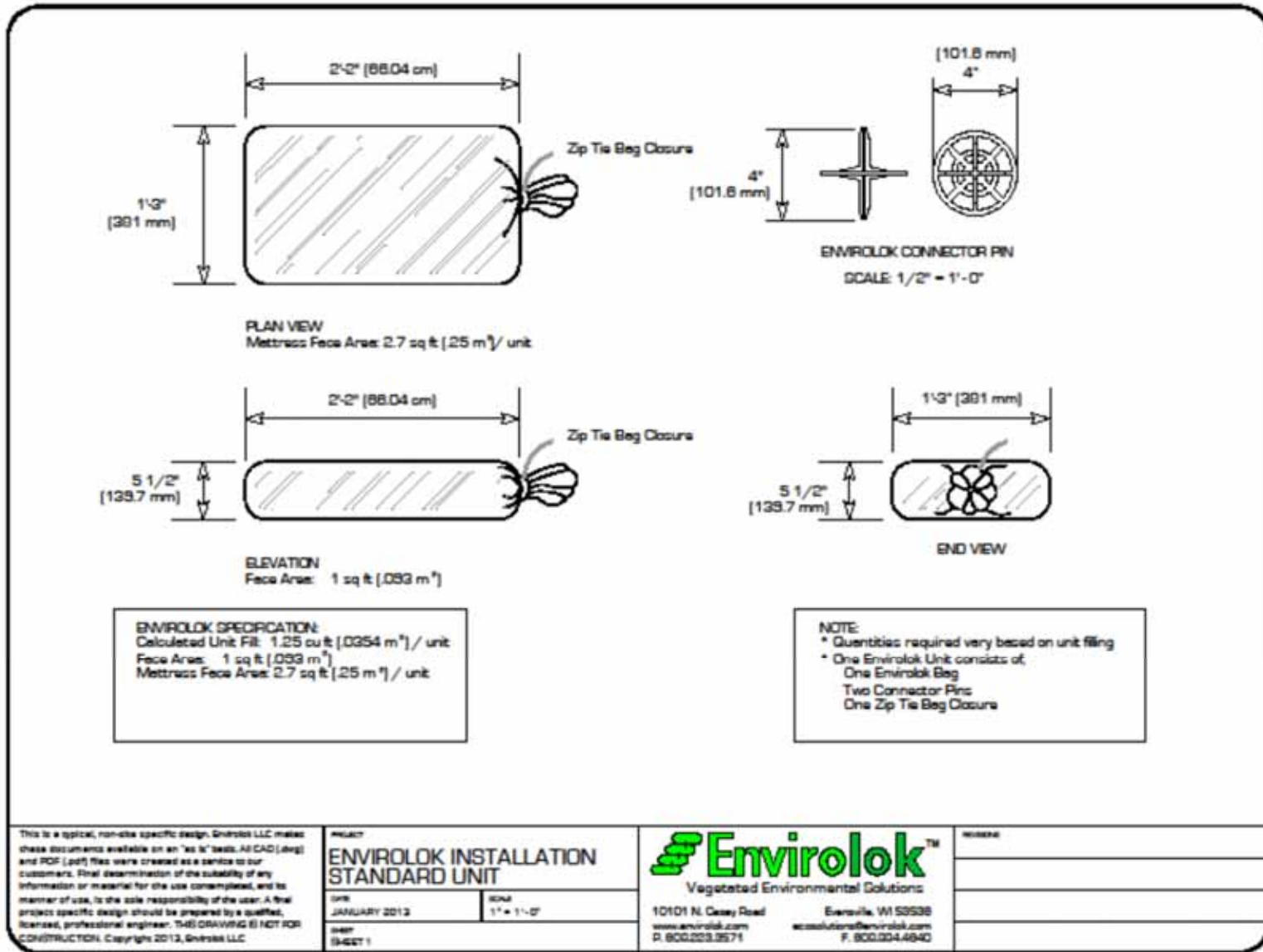


# Techniques

# Vegetated Geogrid



# Geotextile Bag Wall





Deltalok GTX Bag

The Deltalok System evolves bag work construction practices by combining an innovative and patented interlocking method with a vegetation sustainable GTX soil bag.



Deltalok Standard Connector

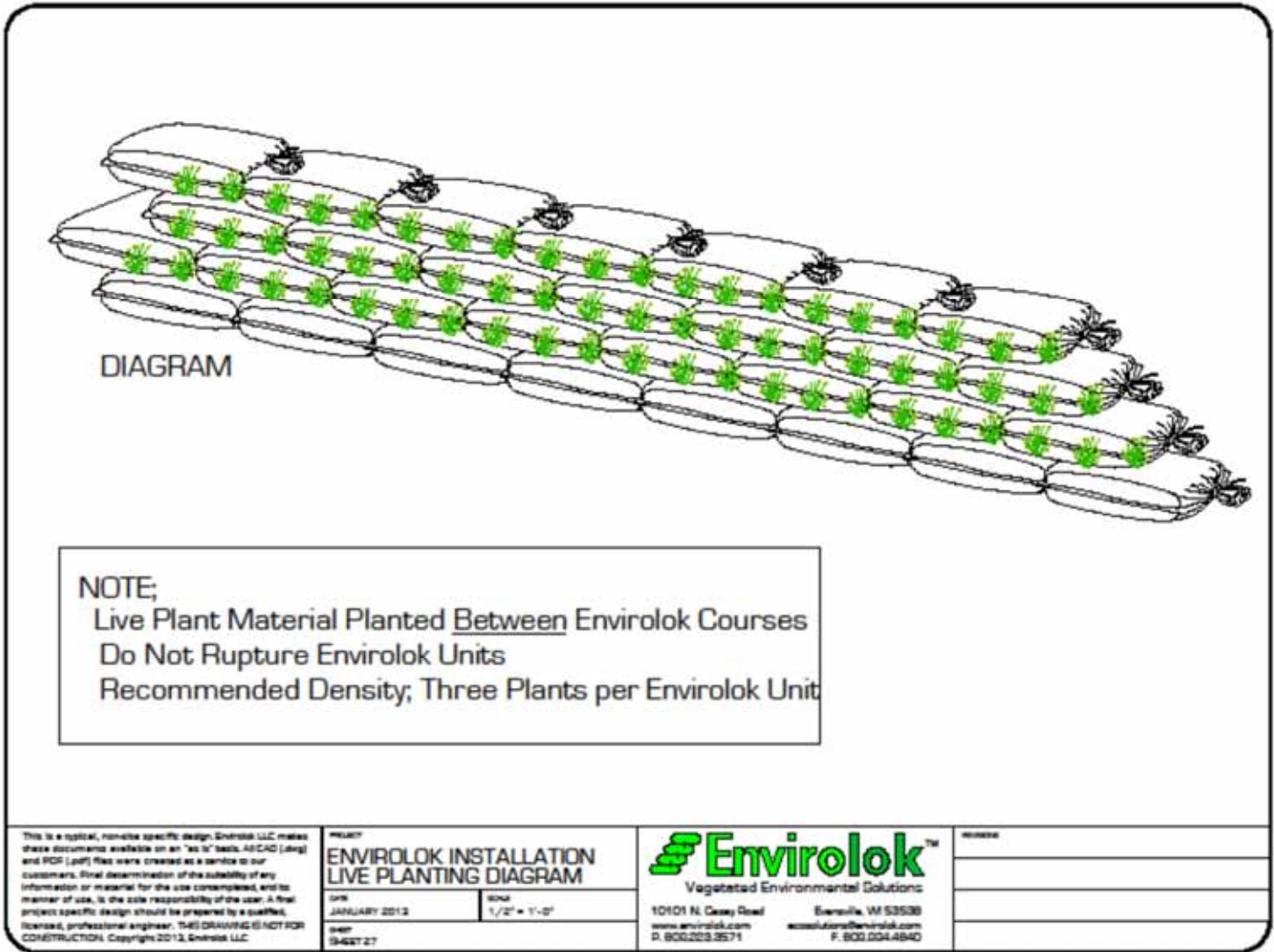
The Deltalok Connector is placed between sand/soil filled Deltalok GTX bags to dramatically increase the shear strength of the bag structure. The result is an interlocking soil mass that promotes and sustains vegetation.



Deltalok Engineered Connector

The connector also provides a positive mechanical connection to geogrid in the construction of steep slopes and retaining wall structures where needed.

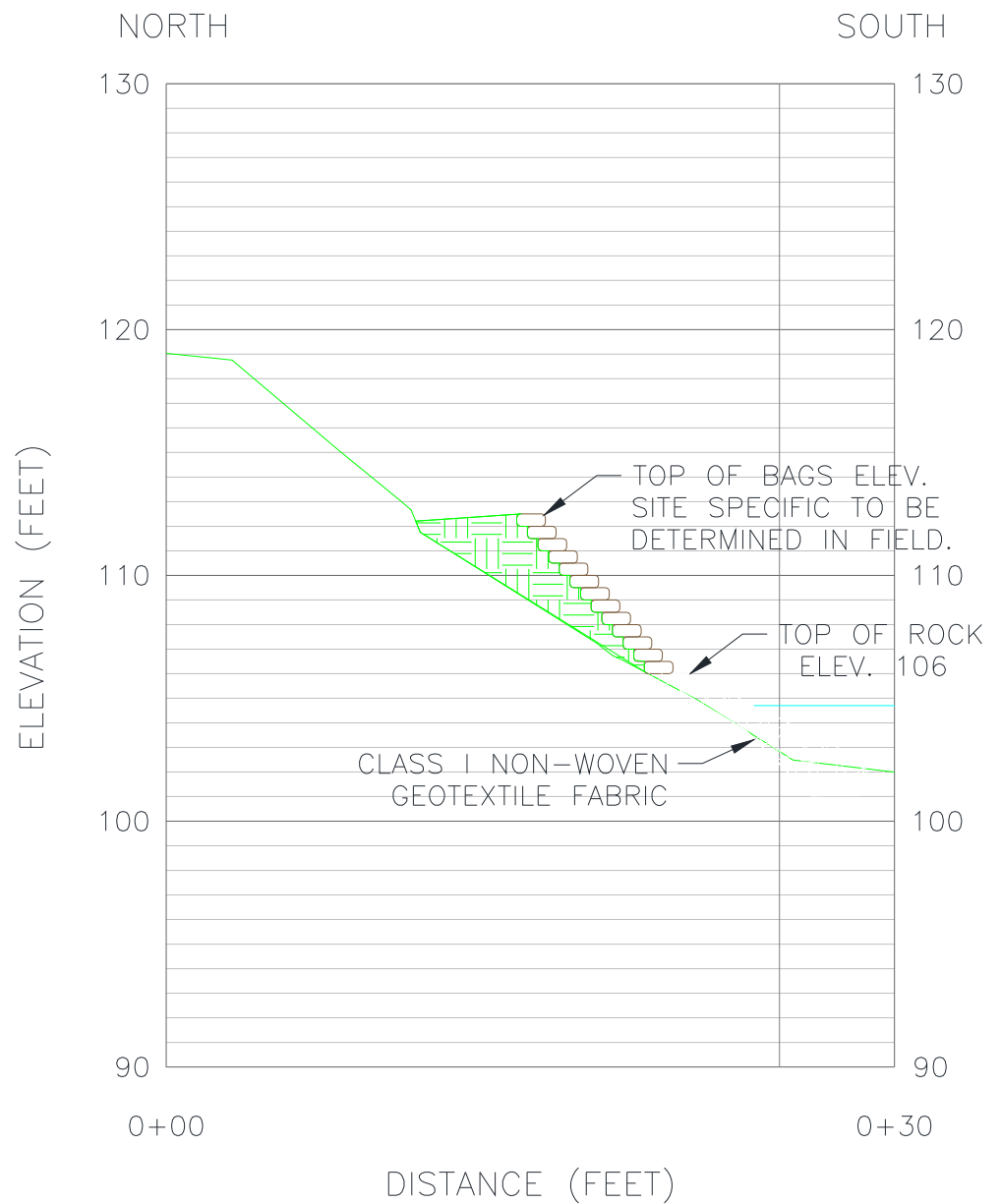
# Geotextile Bag Wall



**NOTE:**  
 Live Plant Material Planted Between Envirolok Courses  
 Do Not Rupture Envirolok Units  
 Recommended Density; Three Plants per Envirolok Unit

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                              |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| <p>This is a typical, non-site specific design. Envirolok LLC makes these documents available on an "as is" basis. AECAD (.dwg) and PDF (.pdf) files were created as a service to our customers. Final determination of the suitability of any information or material for the use contemplated, and its manner of use, is the sole responsibility of the user. A final project specific design should be prepared by a qualified, licensed, professional engineer. THIS DOCUMENT IS NOT FOR CONSTRUCTION. Copyright 2012, Envirolok LLC.</p> | <p>PROJECT<br/> <b>ENVIROLOK INSTALLATION<br/>         LIVE PLANTING DIAGRAM</b></p> <p>DATE<br/>         JANUARY 2012</p> <p>SCALE<br/>         1/2" = 1'-0"</p> <p>DRAWN<br/>         04-27-12</p> | <p><br/>         Vegetated Environmental Solutions</p> <p>10101 N. Casey Road<br/>         www.envirolok.com<br/>         P. 800.223.3571</p> <p>Emeryville, VA 53538<br/>         ec@solutions@envirolok.com<br/>         F. 900.004.6840</p> | <p>REVISIONS</p> <table border="1"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> |  |  |  |  |
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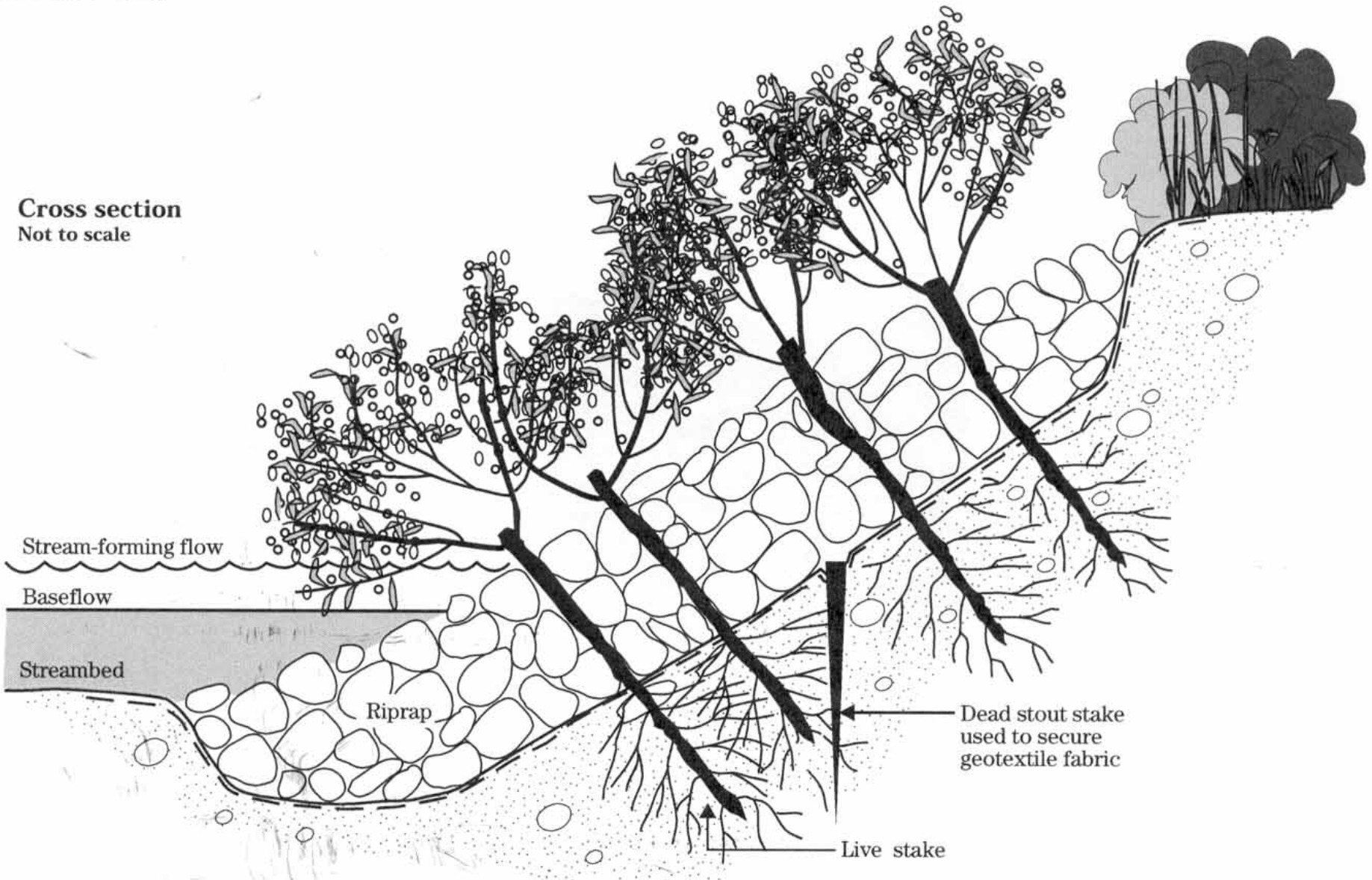
# Geotextile Bag Wall





# Techniques

# Vegetated Riprap



NOESGES PHASE II  
TYPICAL CROSS SECTION STATIONS 0+80 — 2+00

1+06

1+04

1+02

1+00

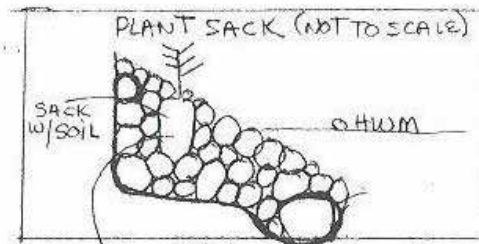
0+98

0+96

0+94

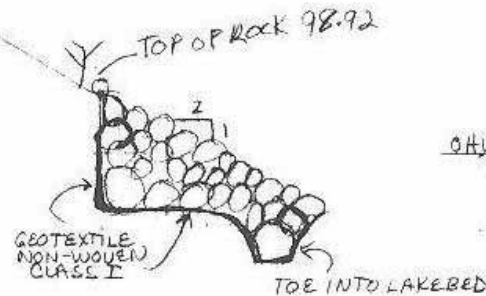
NOTES

1. TOE INTO LAKEBED 1' X 1'
2. NON-WOVEN CLASS I GEOTEXTILE PLACED UNDER ROCK
3. WRAP GEOTEXTILE ONE FOOT ON ENDS
4. ROCK - d 50 5 INCH
5. ROCK RIPRAP TO HAVE A FINISHED SLOPE OF 2:1
6. TBM - LAST PERMANENT STEP OF WOOD DECKING - NE CORNER - ELEVATION 100.00



NOTE: CHANGE EVERY OTHER SACK FROM VERTICAL TO HORIZONTAL.

| ROCK GRADATION |                    |
|----------------|--------------------|
| % PASSING      | SIZE OF STONE (IN) |
| 100            | 10-12.5            |
| 85             | 8-10               |
| 50             | 5-7.5              |
| 15             | 1.5-2.5            |



**Shrubs for sacks**

|                |                     |
|----------------|---------------------|
| Meadowsweet    | <i>Spirea alba</i>  |
| Sweet Gale     | <i>Myrica gale</i>  |
| Speckled alder | <i>Alnus incana</i> |

# Vertical Geotextile Bag Photo





# Project Examples Before / After

# AMNICON LAKE

BEFORE



AFTER





BEFORE



Seawall Re



Rock Riprap  
AFTER

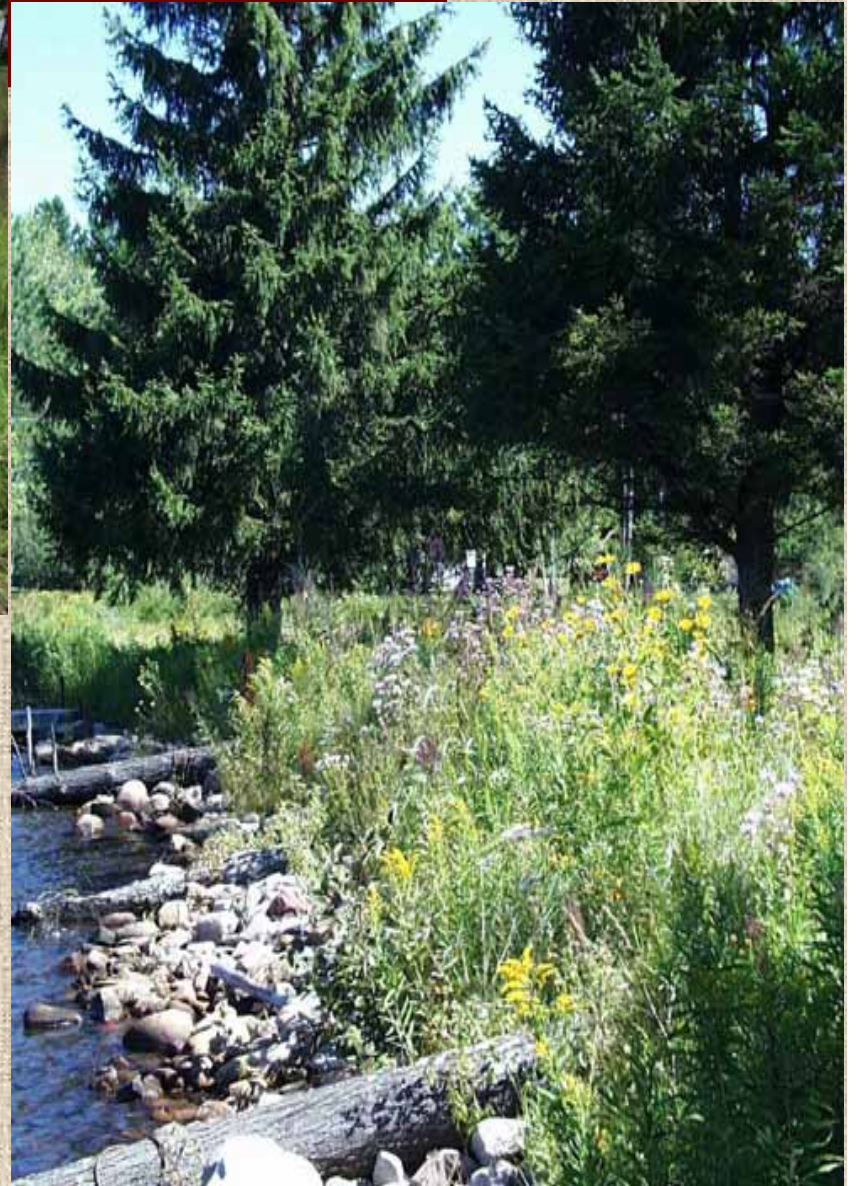


BEFORE





AFTER











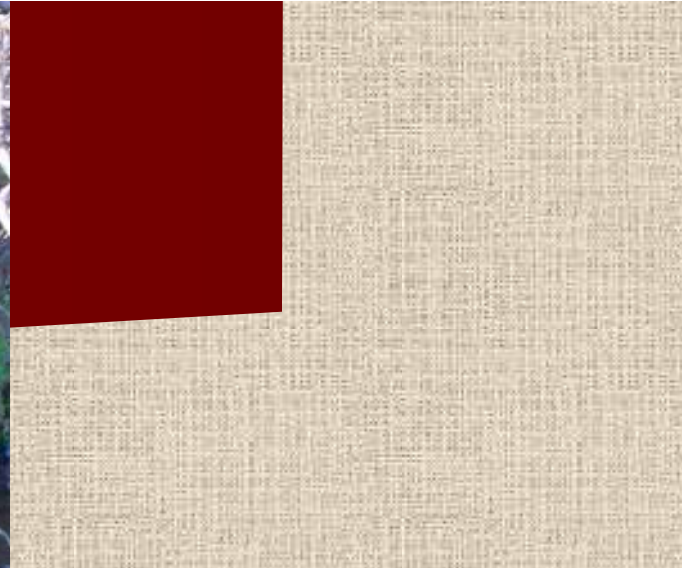












NOV 2 200









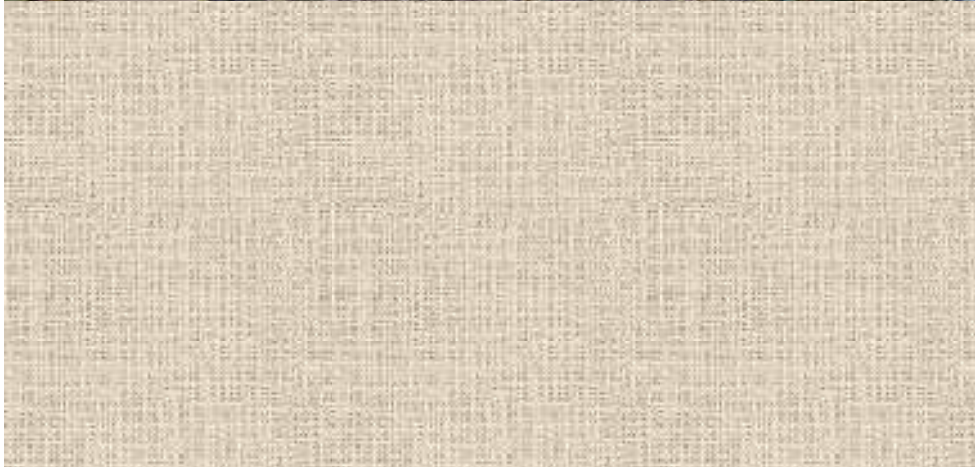
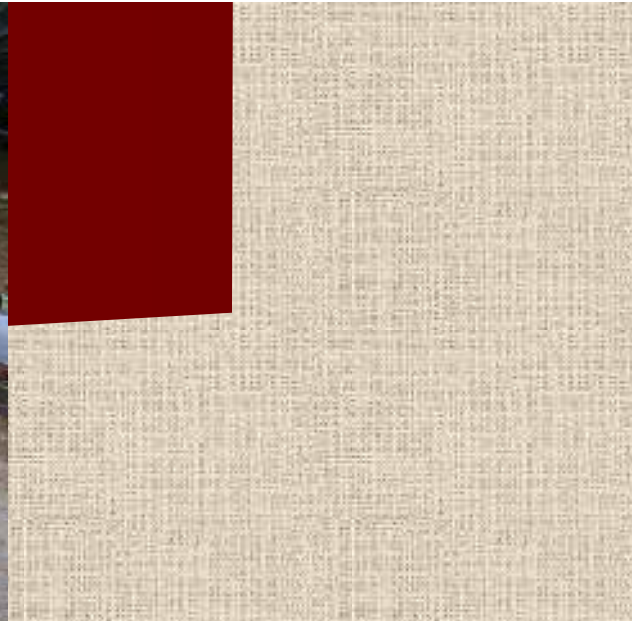
Before – Oct 2009



After - Oct 2012









After 5 months of growth (May 2010 to Oct 2010)



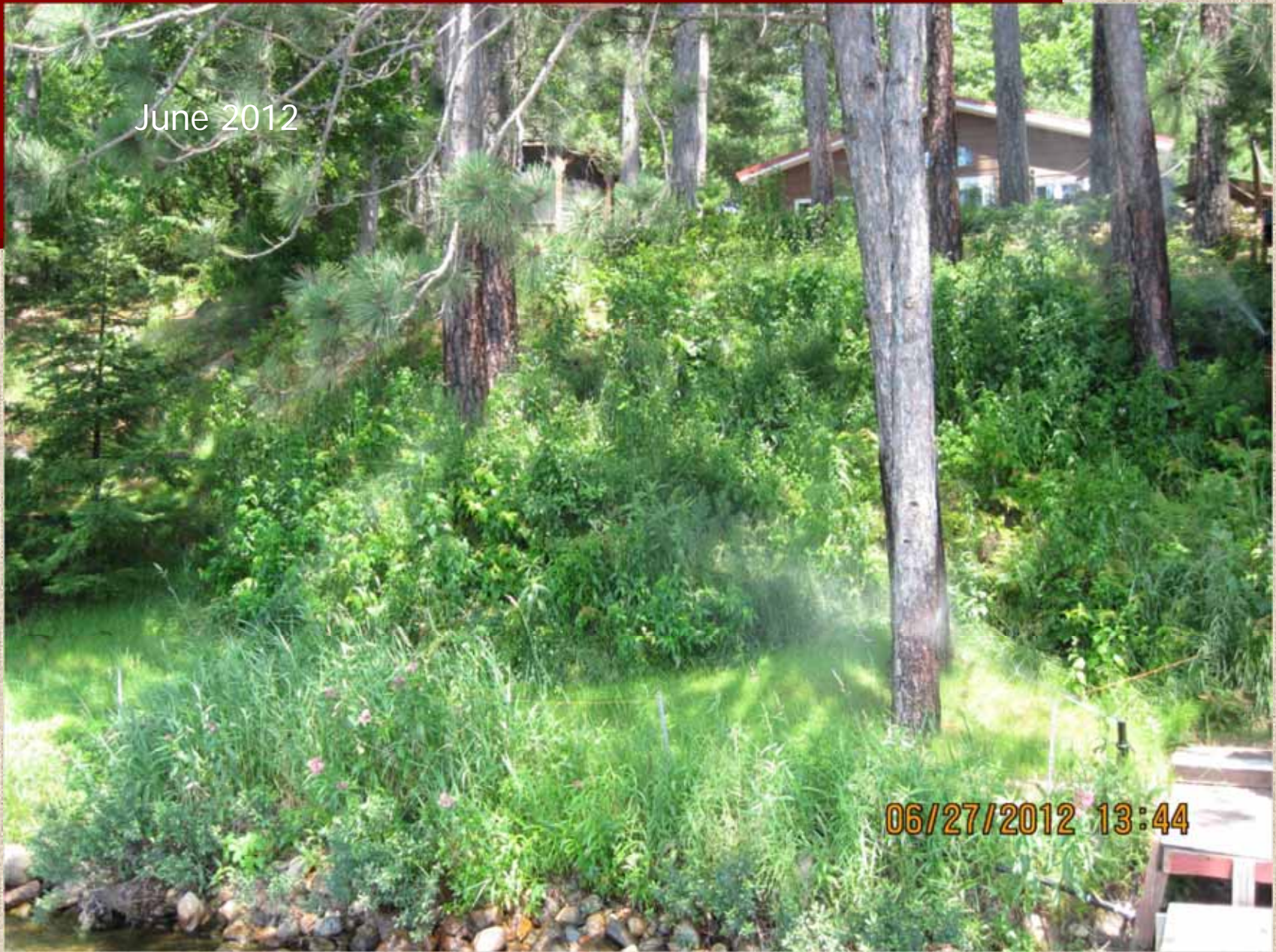
June 2010 Before



June 2011



June 2012



06/27/2012 13:44



After After





After After

# ShoreMax Product



## **ShoreMax**<sup>TM</sup>

**Soft Revetment Scour Protection Mat**

**What is ShoreMax?**

ShoreMax<sup>TM</sup> is a patent pending soft treatment scour protection that designed as mechanical protection over highly erodible areas. ShoreMax provides protection against much higher shear stresses and velocities than turf reinforcement mats (TRMs) alone. The ShoreMax system is comparable to hard armor products such as rock rip rap and articulated concrete blocks in turbulent flow and wave attack application.

ShoreMax is a unique, highly flexible 1/4" stabilized rubber mat designed with weils to allow vegetation establishment through the mat, or natural infilling of sediment. ShoreMax is a versatile product that should be used in conjunction with other erosion control products such as turf reinforcement mats above water lines and geotextiles below normal water lines.

**Typical Applications and Uses for ShoreMax**

- Shoreline protection along rivers, streams, and lakes
- Boat docking areas
- High flow channel bottoms and bends
- Stormwater pipe inlets and outlets
- Curb inlets and downspouts
- Over flow structures (RA, weirs and spillways)
- Bridge abutments
- Anywhere extra scour protection is needed!

The flexible interlock system of the ShoreMax allows for easy installation in adverse conditions. ShoreMax can be installed with different fasteners including precasted earth anchors, standard wire staples, or rebar stakes.

For more information contact North American Green or your authorized distributor today by calling (800) 772-2040, emailing [sales@na-green.com](mailto:sales@na-green.com) or visiting [www.na-green.com](http://www.na-green.com).

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**North American Green**

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After After

Not Advised!



# Questions?

Thank you for your interest in  
Shoreland Restoration and  
Bioengineering Techniques!