Applied Polymer Systems, Inc.
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www.siltstop.com

Sedimentation Control using Polymer Enhanced Best Management Practices (PEBMP)

Steven R. Iwinski,

Environmental Scientist

Senior Associate

Cobb County Soil & Water Conservation District

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Ineffective BMPs and Soil Stabilization Techniques

(What not to do)

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University of Central Florida

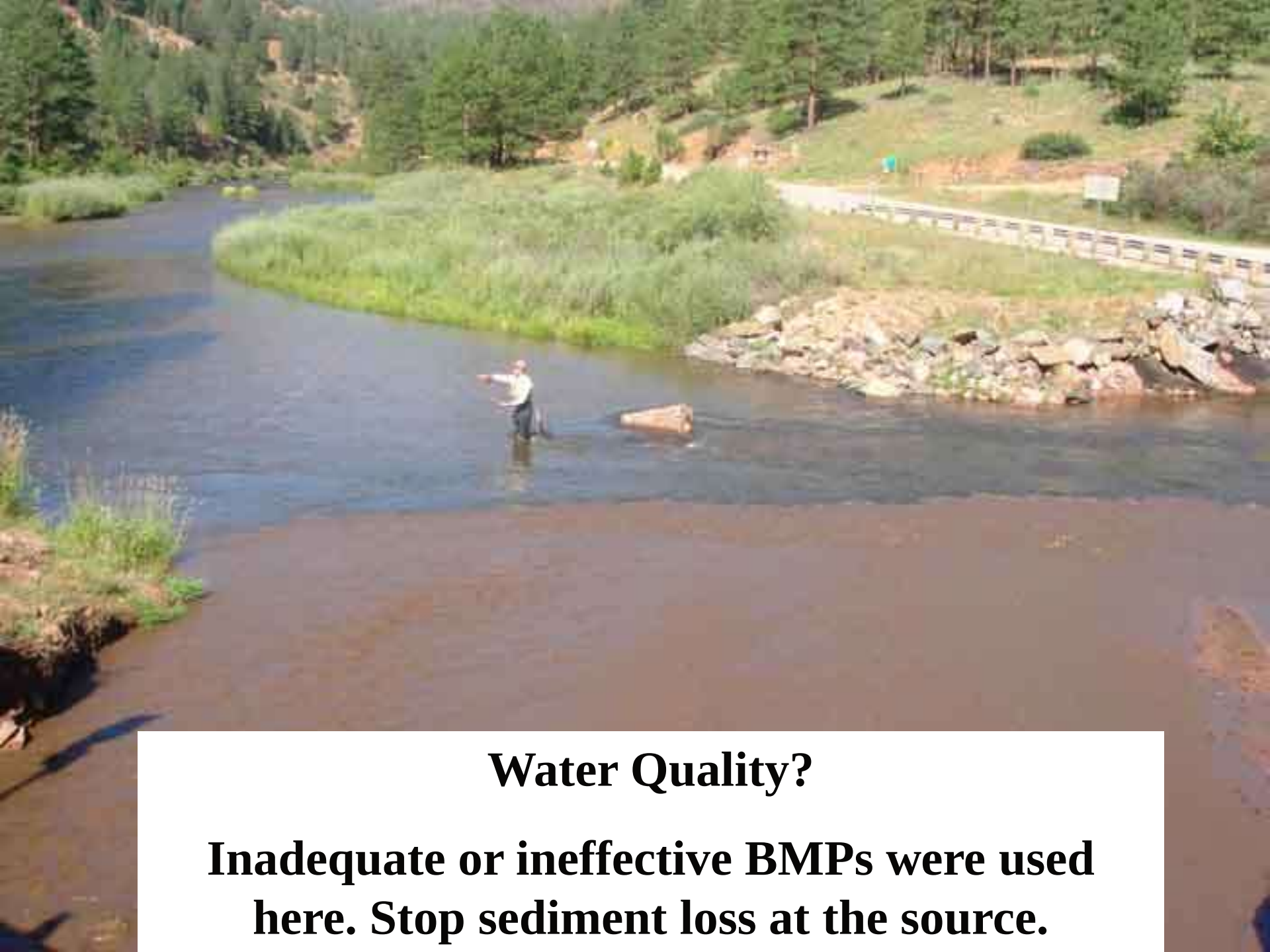
Senior Associate

H2O4U

Silt Fence?

Silt fence alone cannot prevent fine sediment loss


Ponds and Basins?
Result of NO BMPs!!

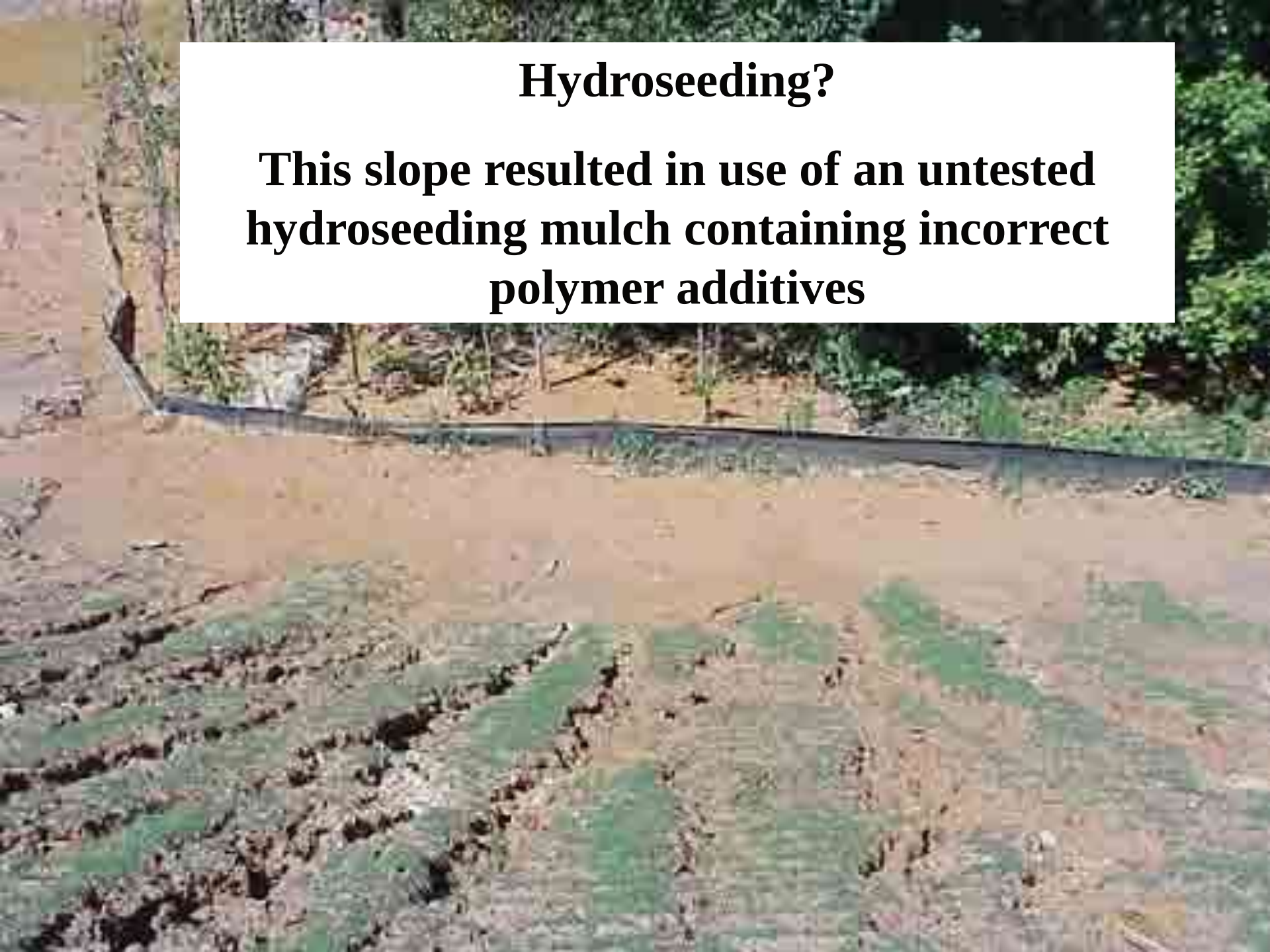


Water Quality?

Inadequate or ineffective BMPs were used here. Stop sediment loss at the source.

Site Erosion and Stream Impairment?

Erosion repair and clean up is more costly than prevention



Hydroseeding?

This slope resulted in use of an untested hydroseeding mulch containing incorrect polymer additives


Slope Protection?
Straw matting alone will not prevent erosion

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How Polymer Enhancement Works

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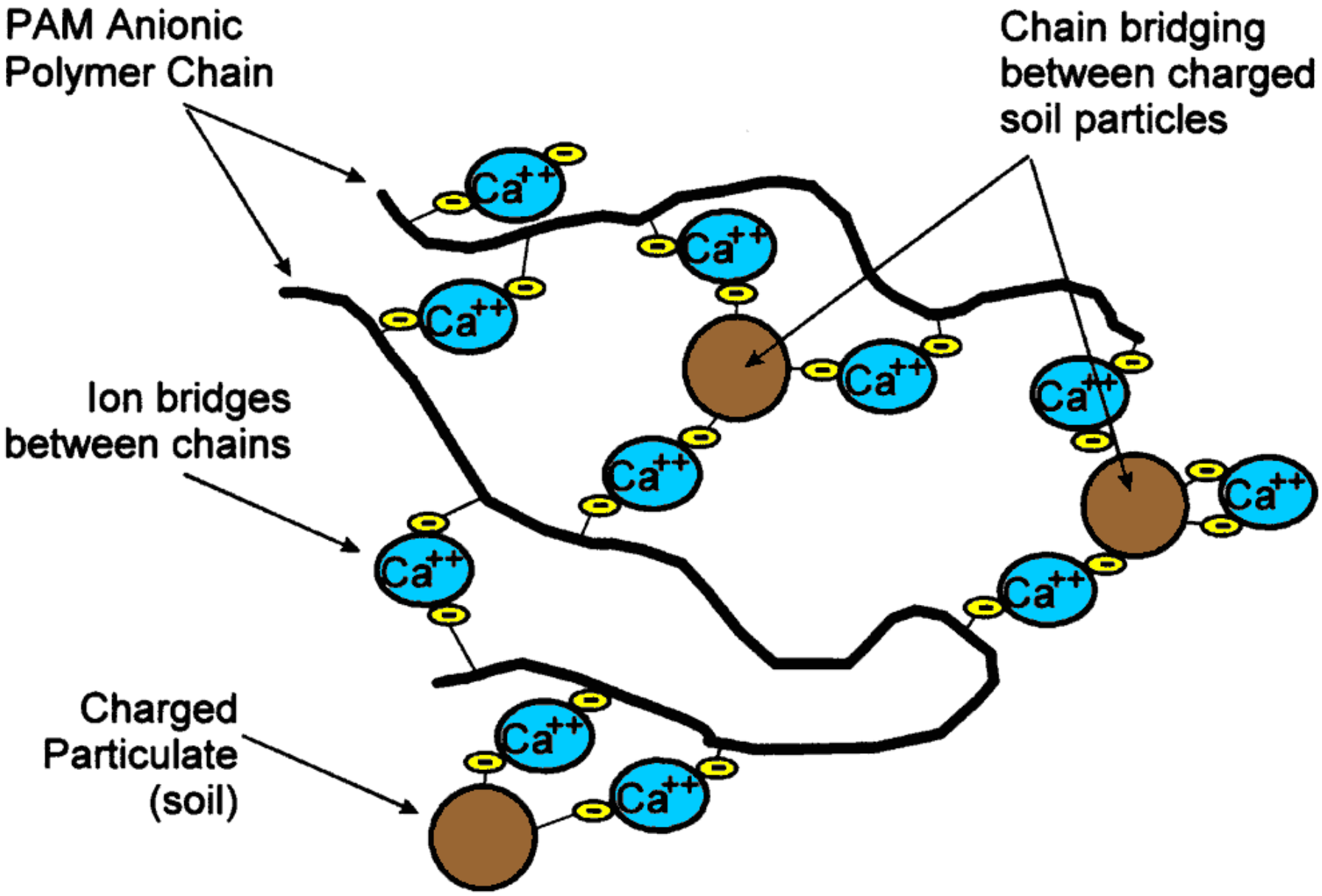
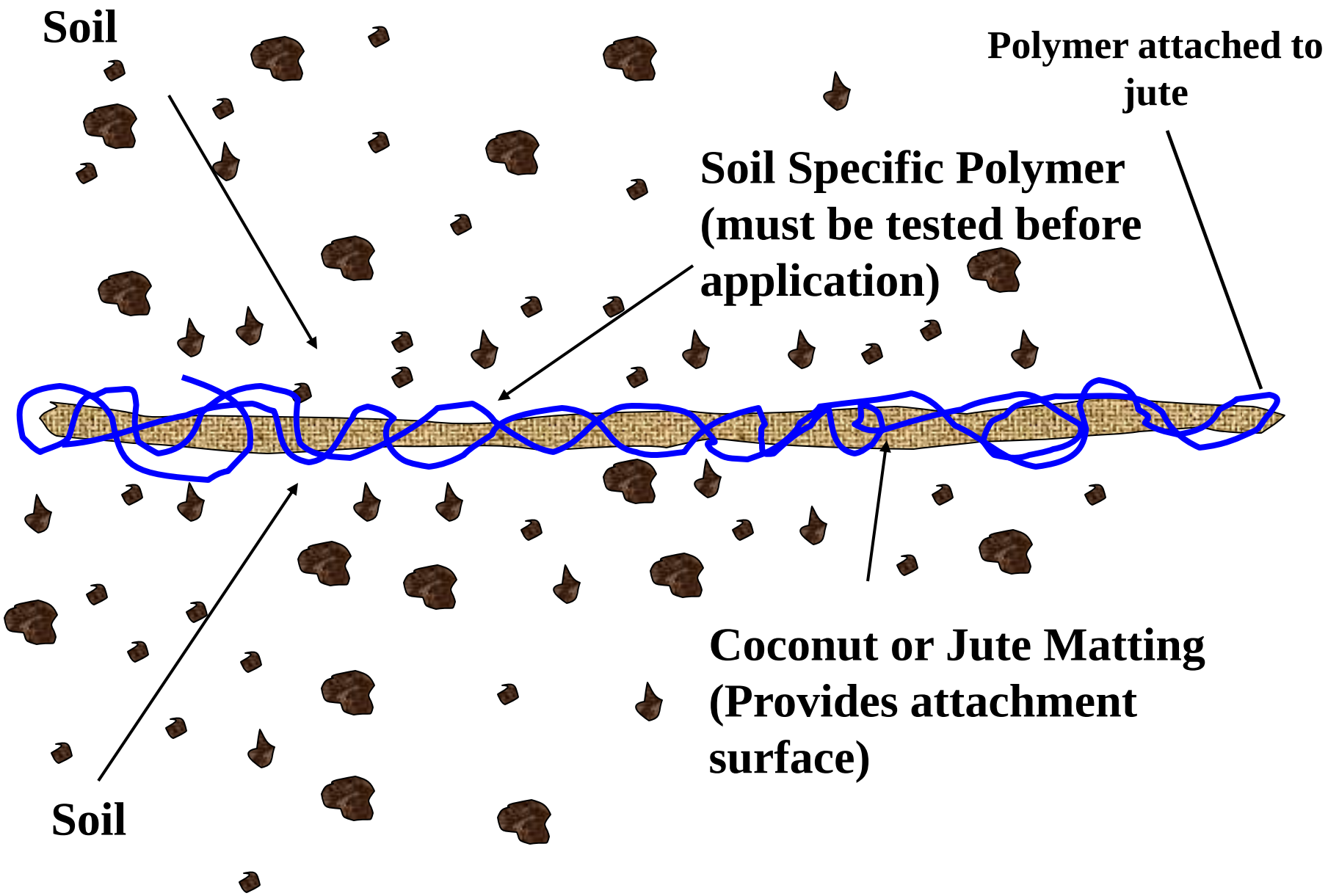
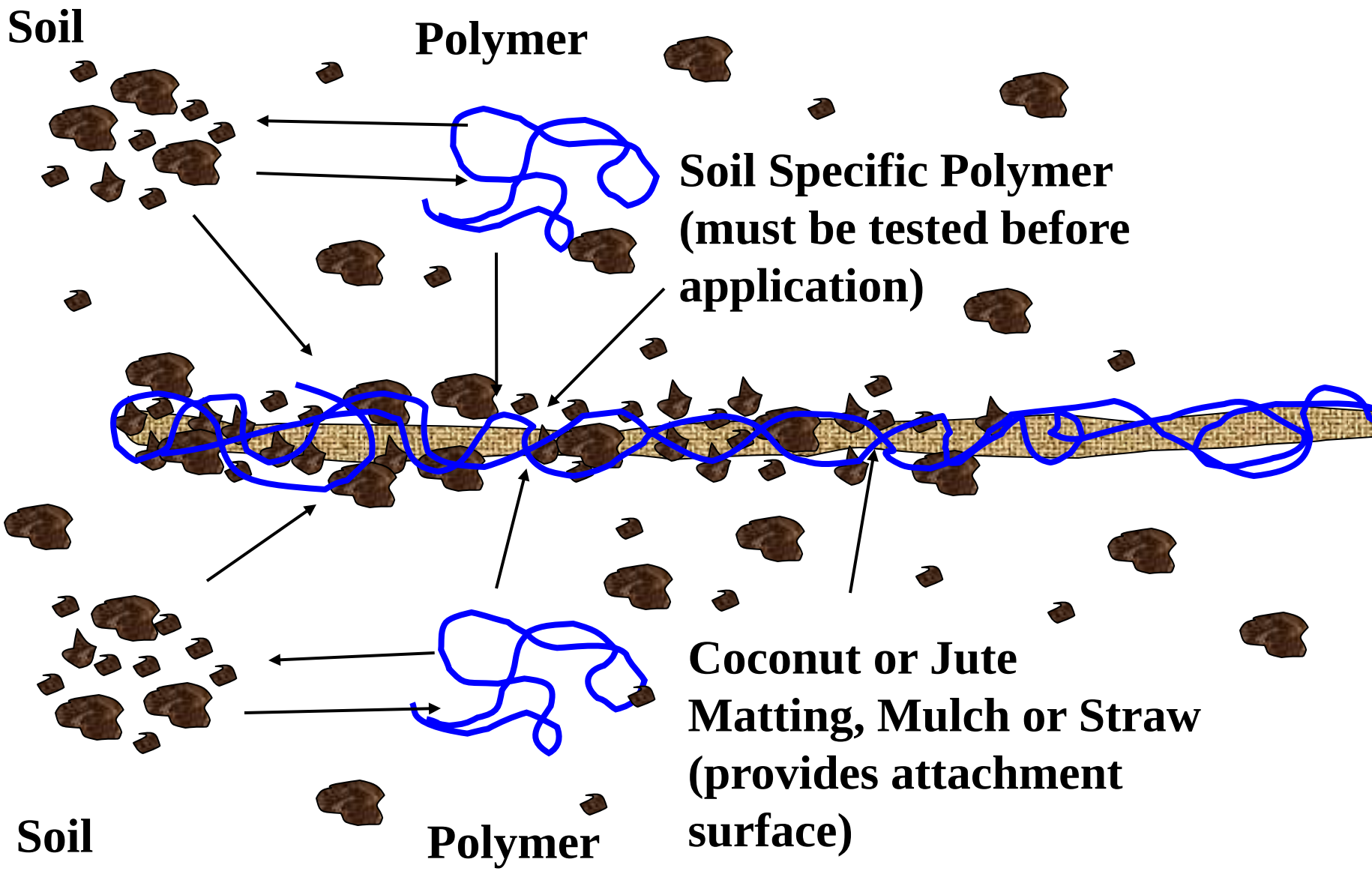
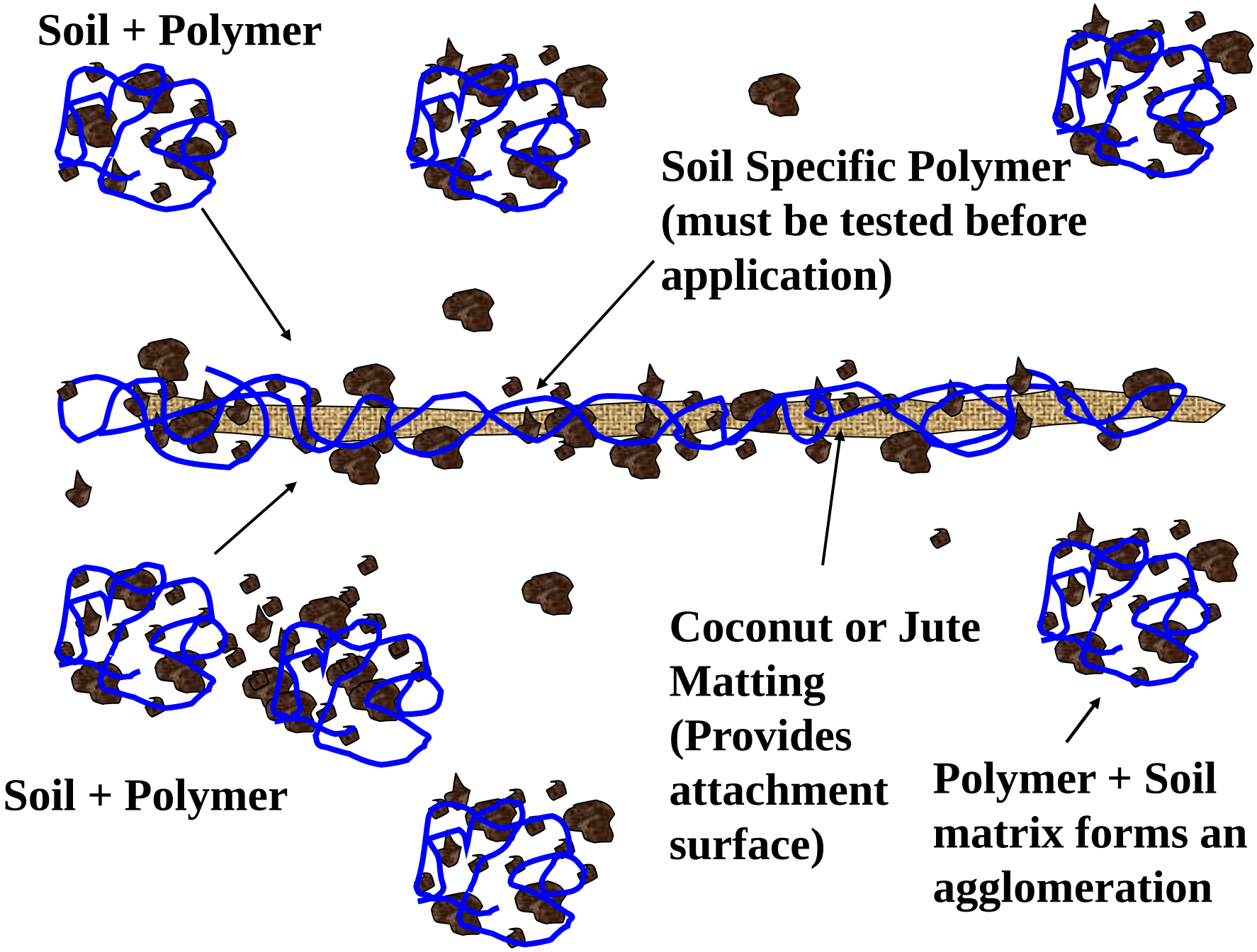
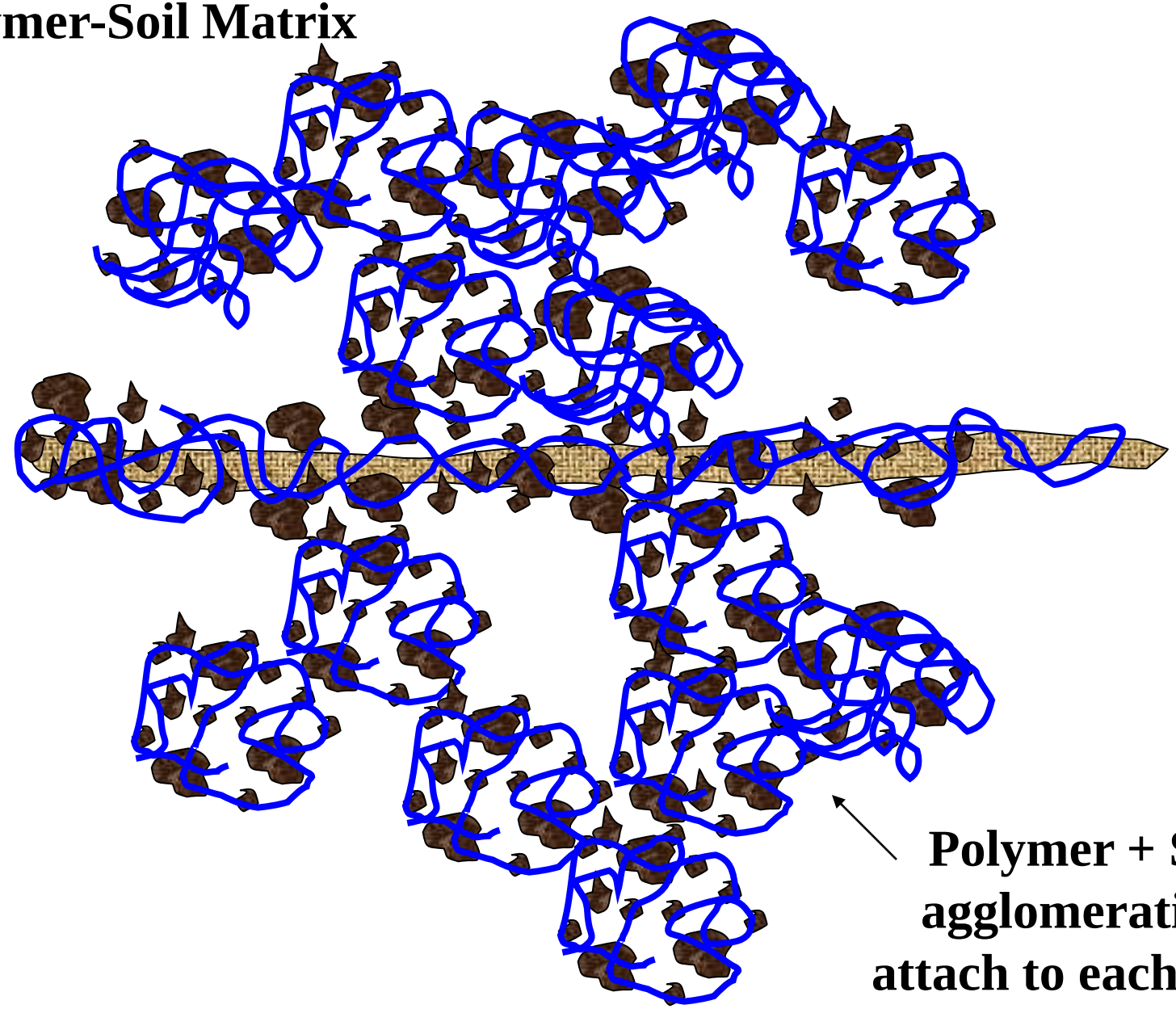

PAM Anionic
Polymer Chain
Chain bridging
between charged
soil particles
Ion bridges
between chains
Charged
Particulate
(soil)
Ca++

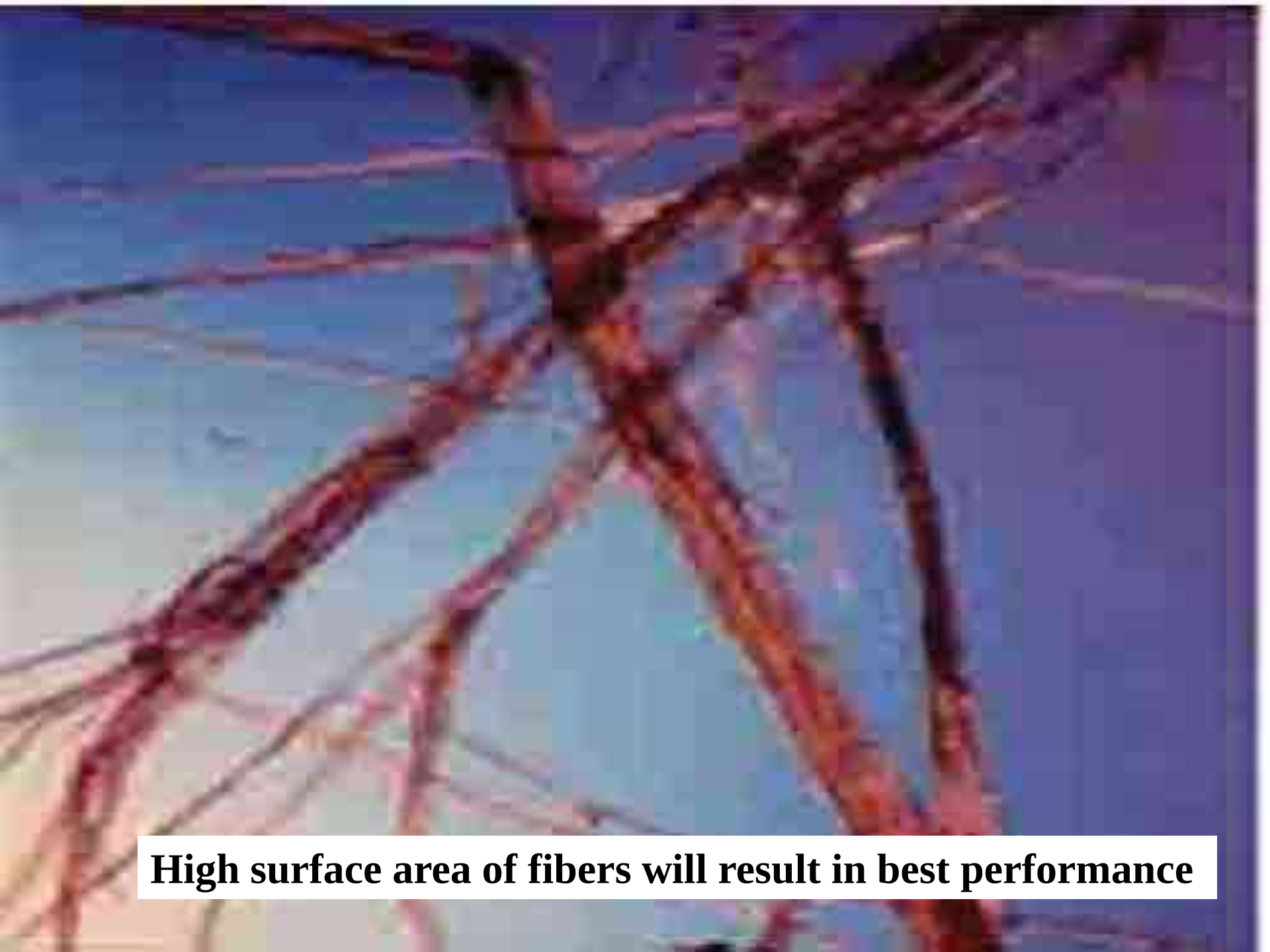

Soil
Polymer attached to jute
Soil Specific Polymer (must be tested before application)
Coconut or Jute Matting (Provides attachment surface)
Soil


Soil
Polymer
Soil Specific Polymer (must be tested before application)
Coconut or Jute Matting, Mulch or Straw (provides attachment surface)
Soil
Polymer

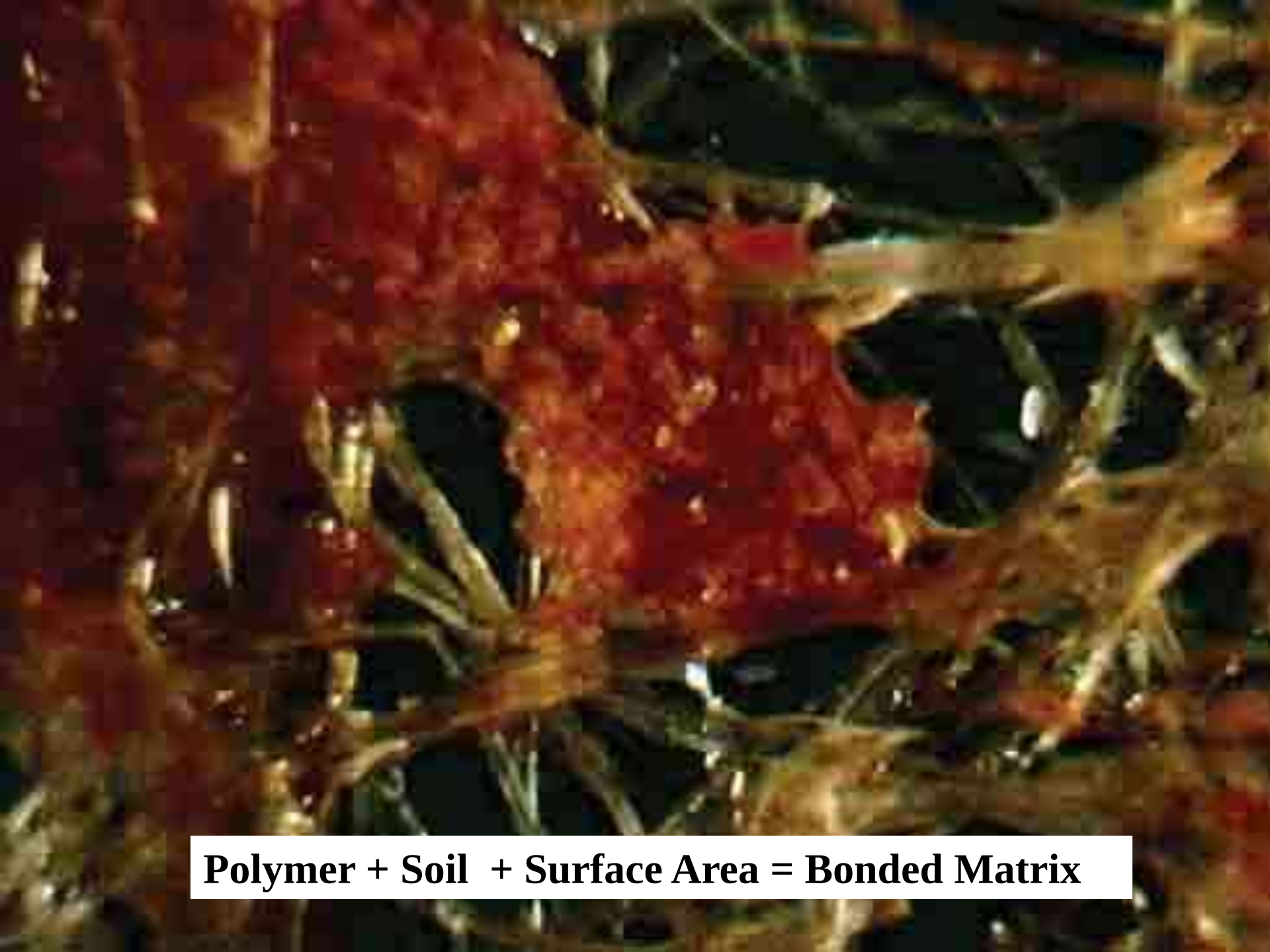

Soil + Polymer
Soil Specific Polymer (must be tested before application)
Coconut or Jute Matting (Provides attachment surface)
Polymer + Soil matrix forms an agglomeration
Soil + Polymer

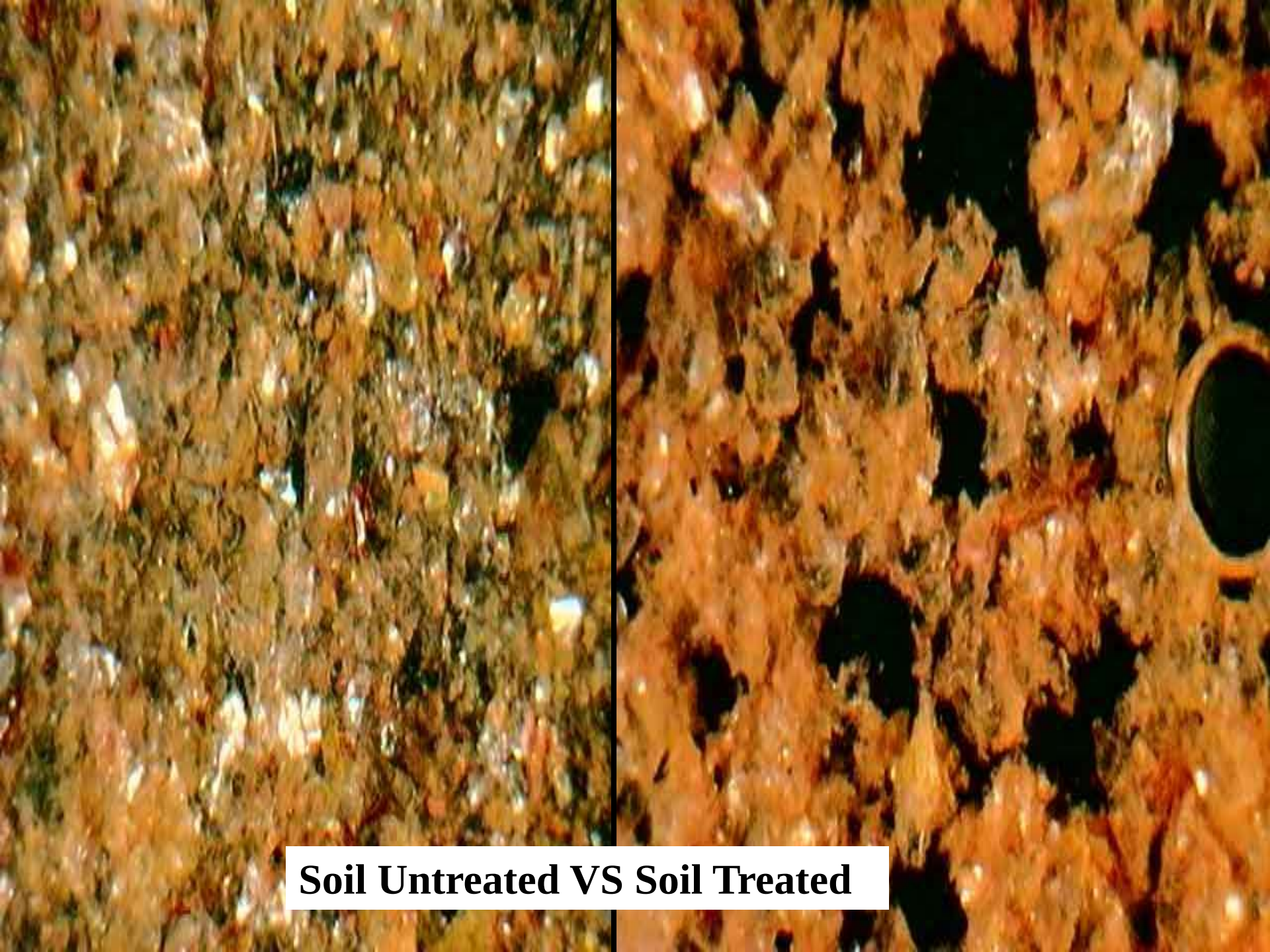
Polymer-Soil Matrix

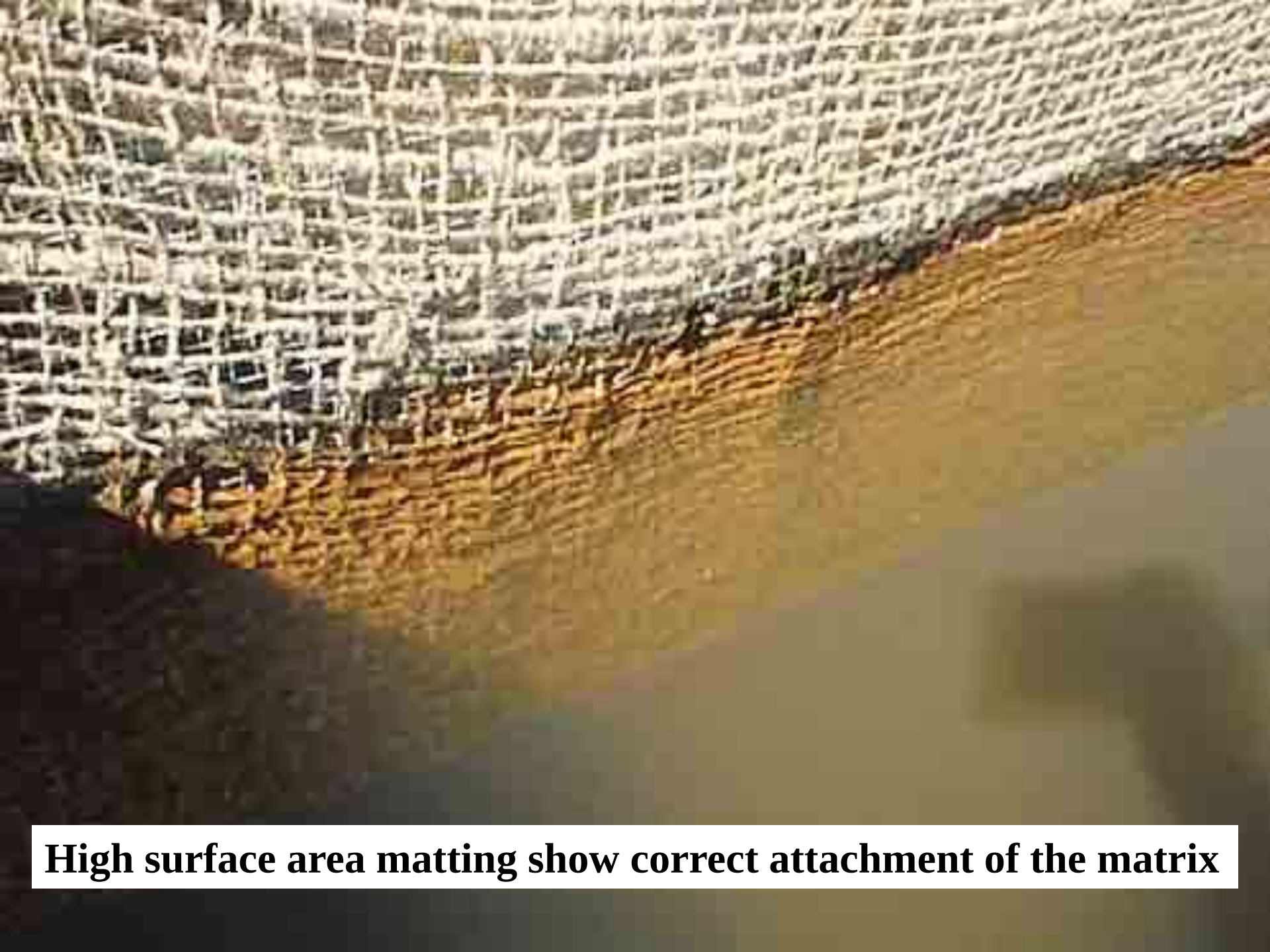




High surface area of fibers will result in best performance


Polymer + Soil + Surface Area = Bonded Matrix


Soil Untreated VS Soil Treated



High surface area matting show correct attachment of the matrix

Aquatic Toxicity Testing

and

Site Specific Testing Report

Senior Associate

Alabama Samples

(Silt Stop and Floc Log applications)

Sample	Location	Description	APS Application	Results and Special Instructions
	1/17/07 Analysis by: LBS	**Soil Type / Sample #**	**Floc Log Type**	**Reaction Time / NTU Reading**
	Auburn University	DOT Project	706b (alone)	35 sec / 16.0 NTU
	Department of Civil Engineering	Soil Sample (fill material)	703d#3 + 706b (duplex)	15 sec + 15 sec / 15.0 NTU
	238 harbert Engineering Center			
	Auburn, AL 36849	pHi- 6.90	**Stabilization Type**	
	Justin McDonald	NTUi- 600		
	334-559-3159	Hardness- 0 ppm CaCO3	705 Silt Stop powder	Dry or spray application (binder / tackifier)
	mcdonjs@auburn.edu	(very soft)	605 emulsion	Hydroseeding additive only
			712 Silt Stop powder	Dry application (stormwater clarifier)

Note: **Mixing / reaction times will be very important when using the Floc Log listed above.** All logs should be placed in a series (one after the other). The dosage rate should be **40-50 GPM flow / Floc Log** placed in a series or row. **The mixing must be continuous for the time stated to obtain the reported results.** Particulate formed may be captured by filtering through silt fence, mulch, straw, particle curtains or jute fabric after the mixing reaction has been completed. **Colder temperatures will increase reaction and mixing times using the Floc Logs stated above.**

The duplex systems require the 703d#3 Floc Log to be placed first in the system followed by the 706b Floc Log. The mixing must be continuous for the time stated to obtain the reported results. **Both logs must be used together to be effective.**

Stabilization of the soil at the source may be obtained by spreading 35-45 # pounds / acre of the 705 Silt Stop powder onto the soil surface, (can be mixed with other additives such as seed, fertilizer, etc.). The 605 emulsion may be used although the powder form of this polymer type will work better on this soil. Once the polymer is applied we suggest covering the soil with straw, mulch or matting especially in areas where water will channel. If hydroseeding, the 705 powder or 605 emulsion may be added as a final additive to the normal mix. This will perform as a stabilizer for reducing clay movement into the runoff water and as a tackifier to hold the soil/organic matrix in place.

We suggest using both methods to assure best stormwater quality discharges. Areas where high water velocity may occur (ditch lines, swales, etc.) should be "soft armored" by placing "jute" matting flush to the ground surface then spreading the 712 powder (dry) over the jute. This will greatly reduce erosion in these areas. Any areas where water clarity is important can be stabilized using the 712 Silt Stop powder and jute matting or straw.

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Metal and Nutrient Removal using

Floc Logs®

University of Central Florida Stormwater Management Academy
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University of Central Florida

Senior Associate

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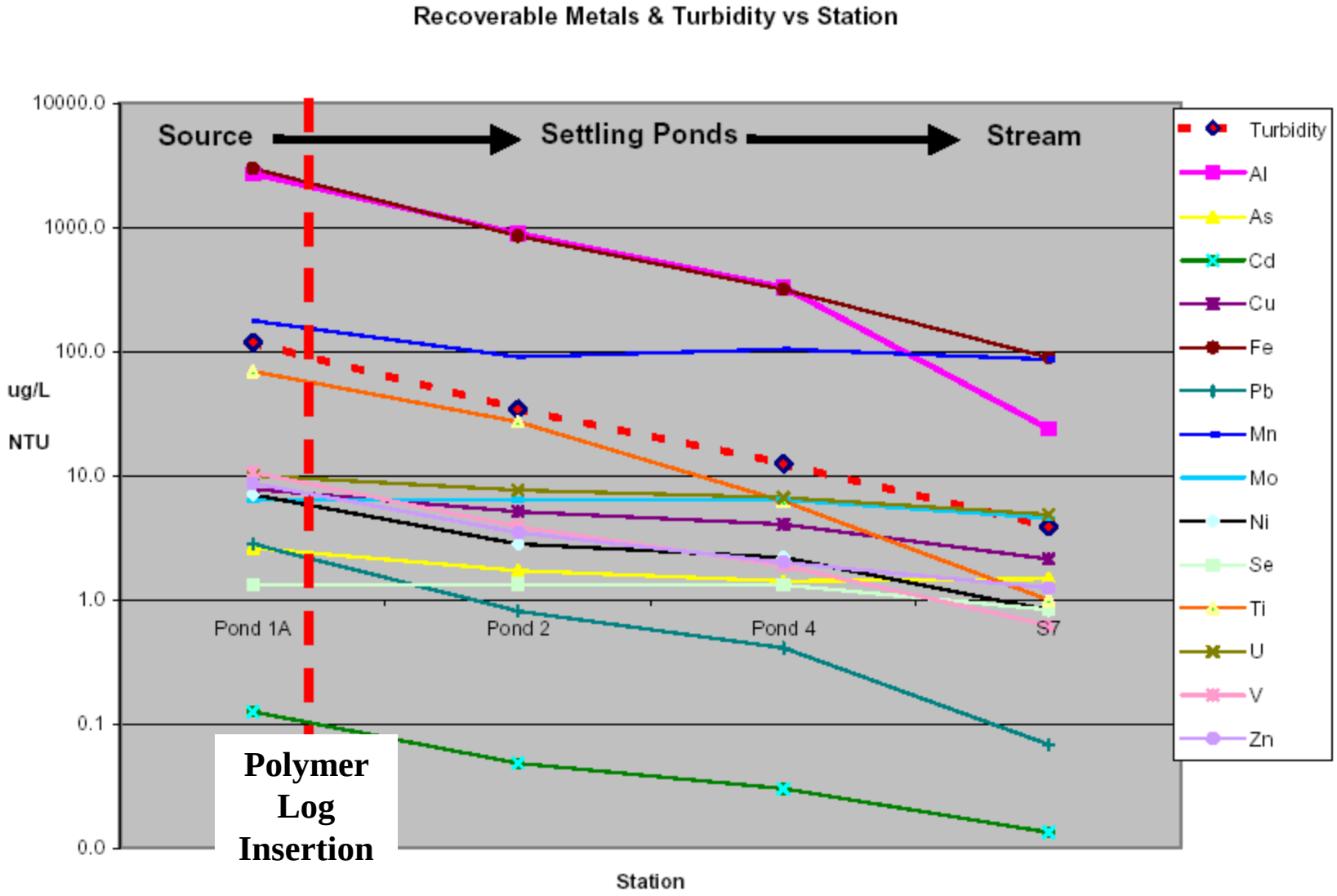
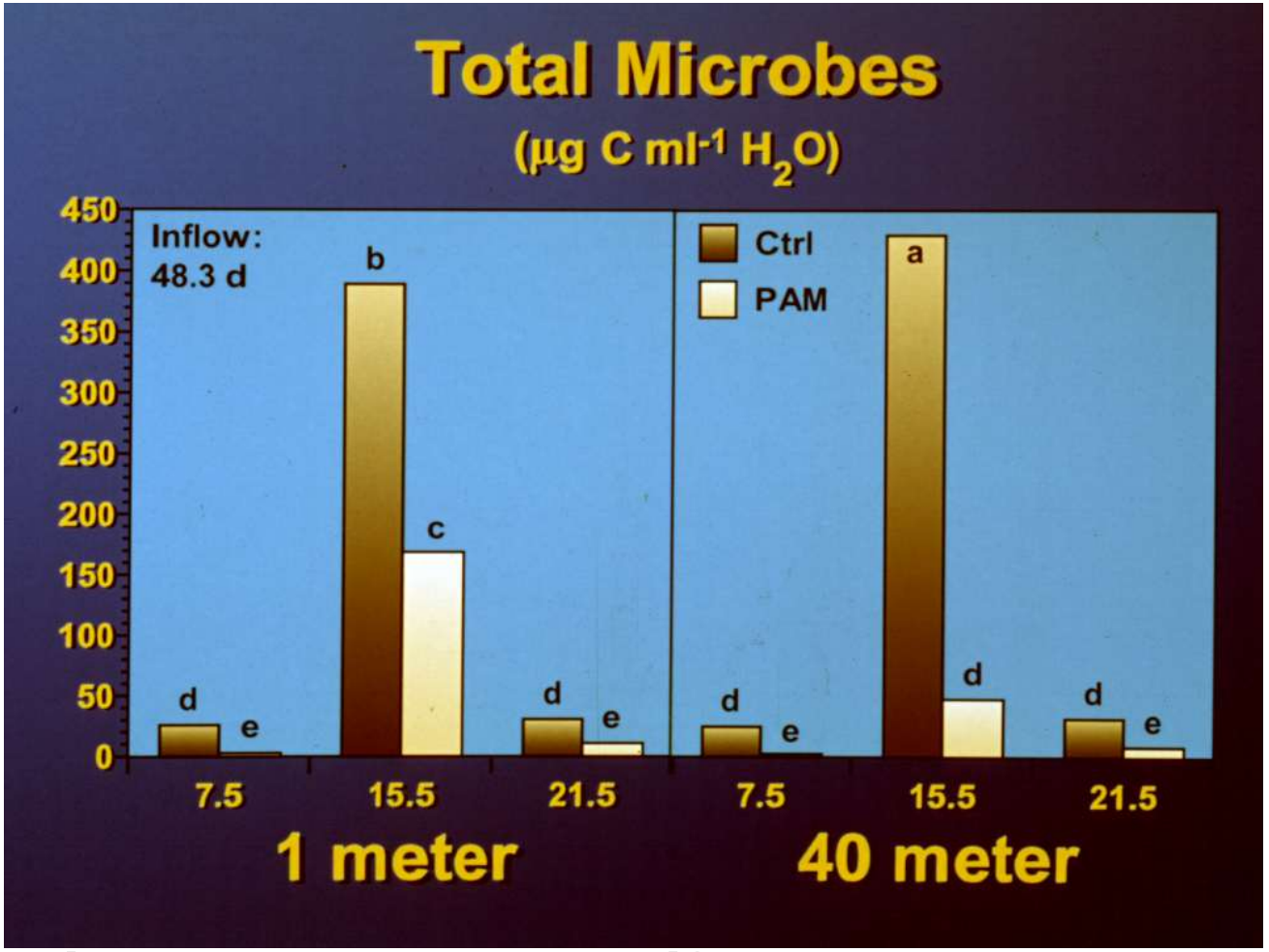


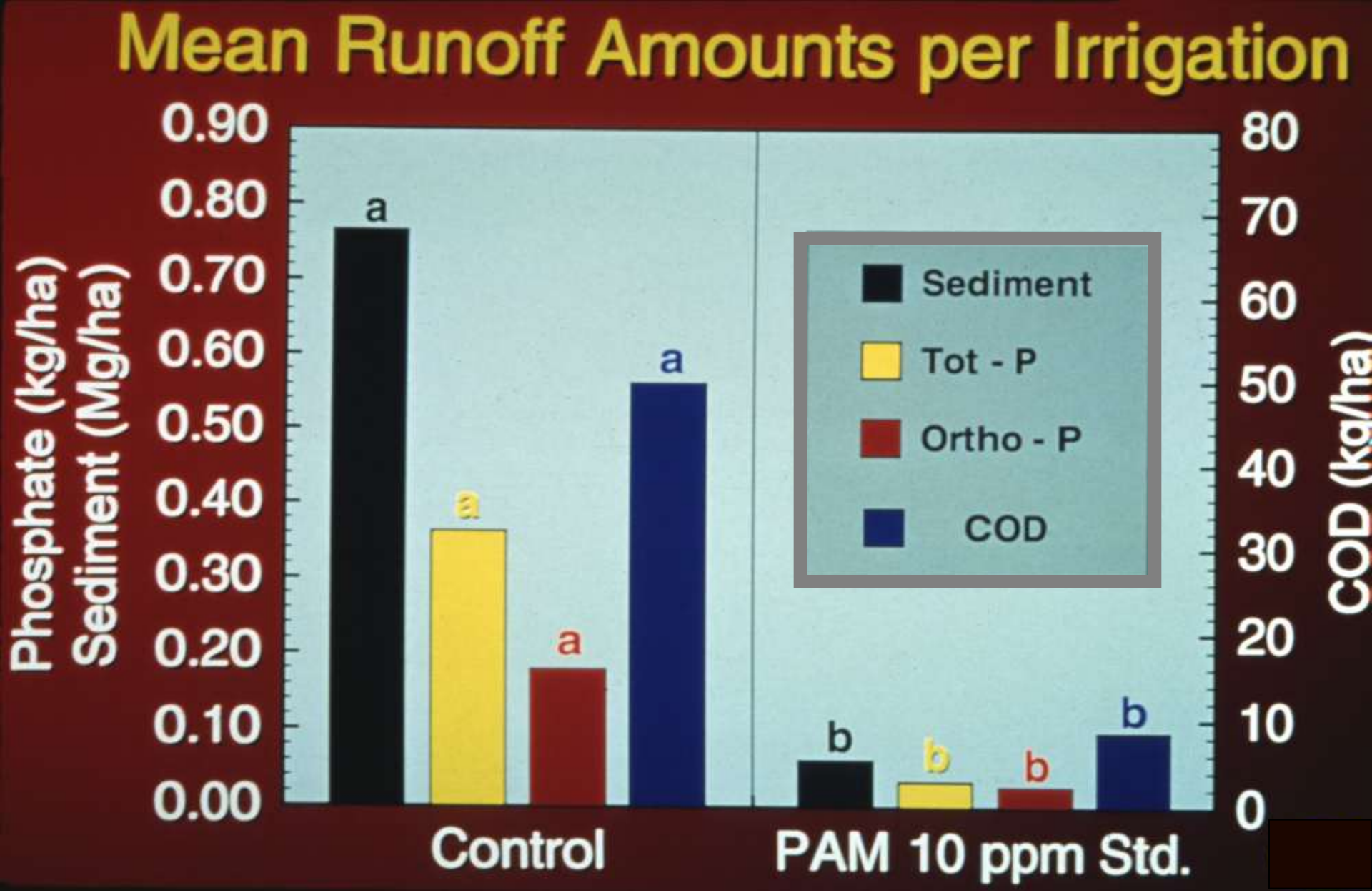
Floc Log was able to reduce all 14 metals measured

Implications of Microbe Removal from Runoff

- **Soil-borne plant disease epidemiology**
  - **Less disease spread in your field**
  - **Less spread downstream in return flows**
  - **Potentially less need for pesticides**



- **Manuring less prone to coliform losses**
  - **-- Reduced hygiene threat to public waters**
  - **-- Potentially reduced water treatment need**



California & Idaho Research Also Show Reduced Pesticide in Runoff

USDA

NWISRL
Kimberly, ID

ars

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Polymer Enhanced Soil Stabilization

(Including Polymer Enhanced Soft Armoring technique)

University of Central Florida Stormwater Management Academy
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University of Central Florida

Senior Associate

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Simply rake or grade the soil.

Apply the jute matting and soil staple into place

Apply the correct soil specific polymer to the matting

Inlet protection can be enhanced by use of polymer enhanced soft armor applications

Apply jute matting with the correct soil specific polymer to reduce soil movement at the BMP


PREMIE
770-992-8

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HWY 98 Floriada

DOT Project

University of Central Florida

Senior Associate

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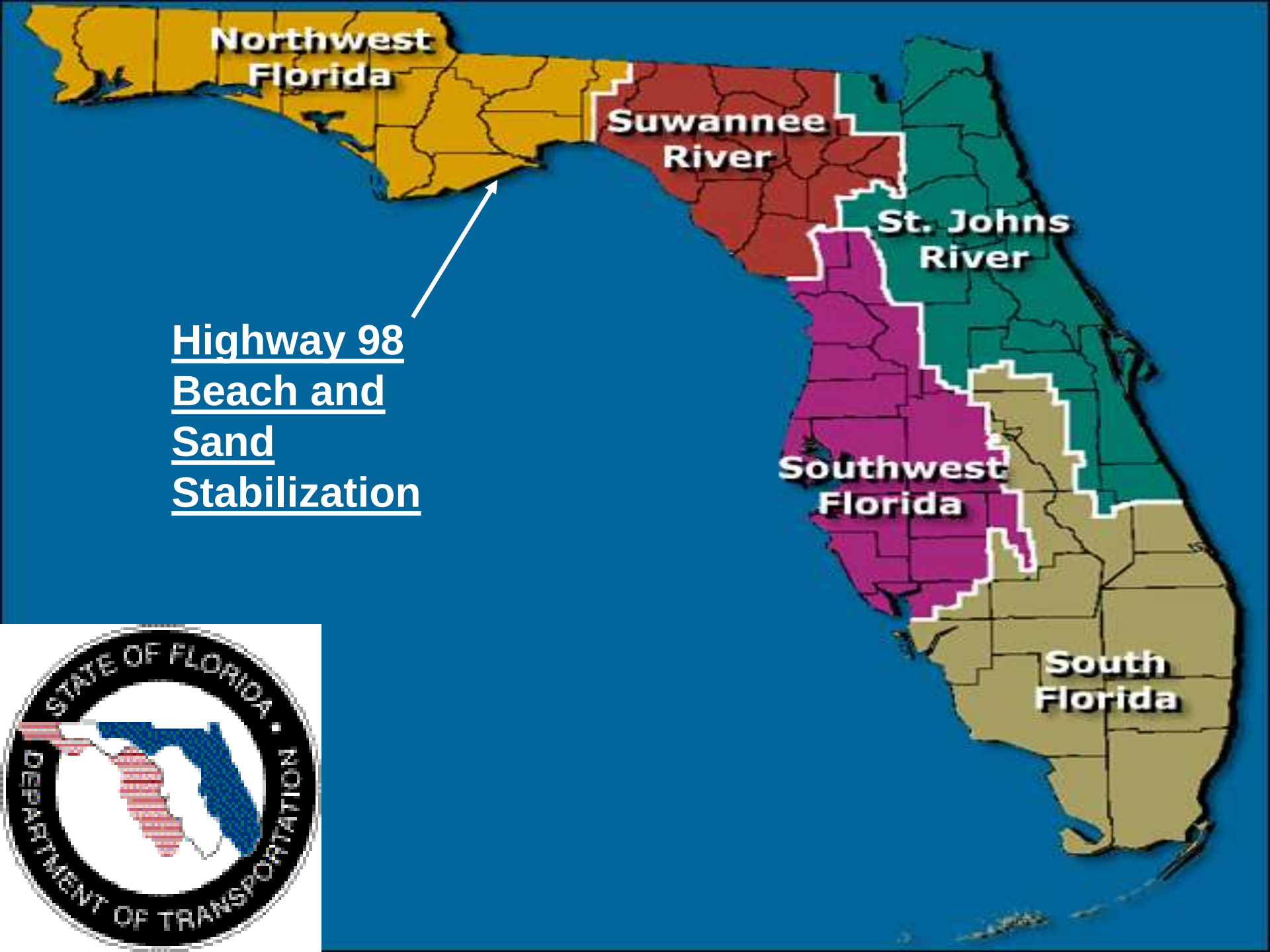
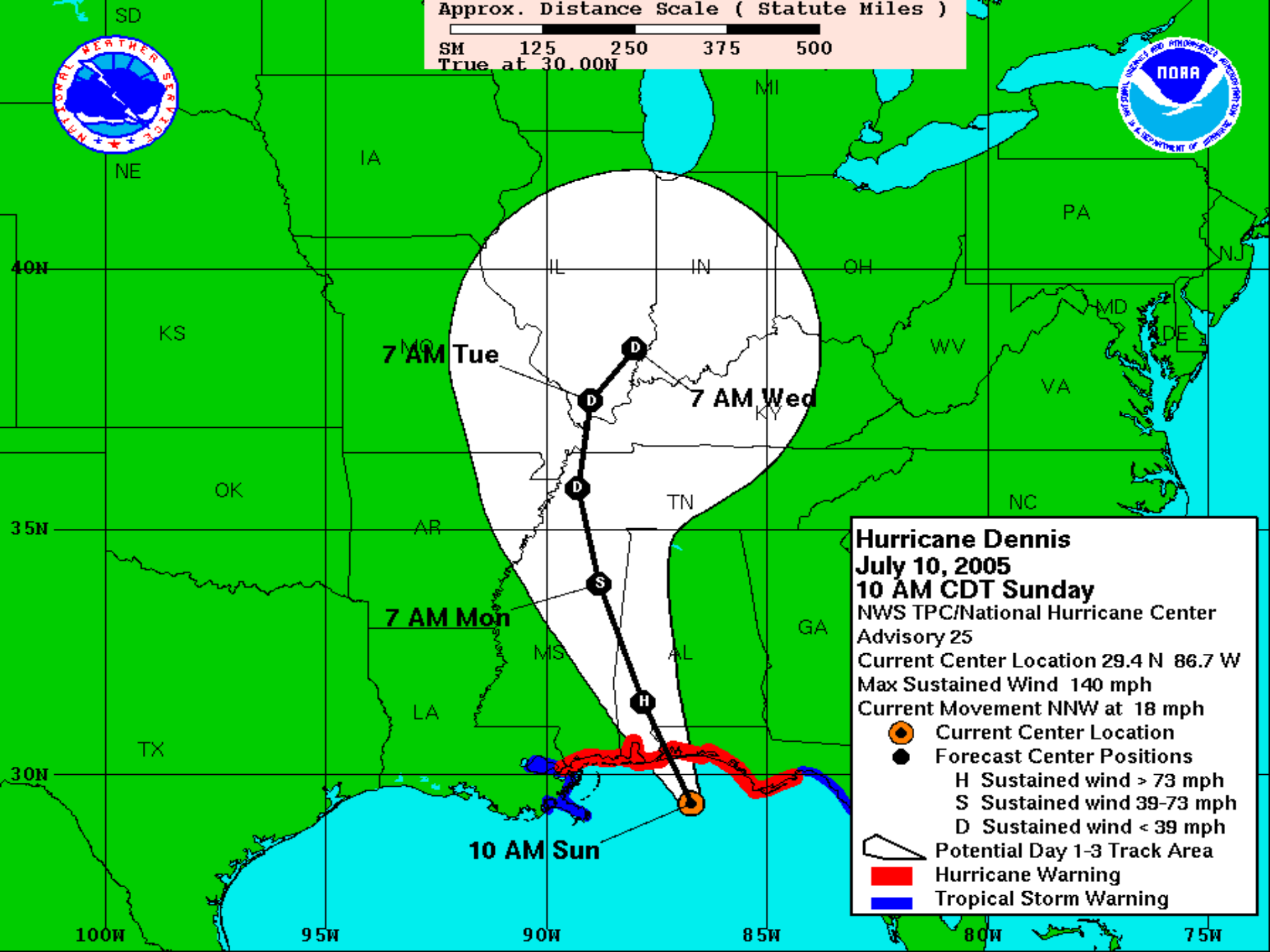

Northwest Florida
Suwannee River
St. Johns River
Southwest Florida
South Florida
Highway 98 Beach and Sand Stabilization
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

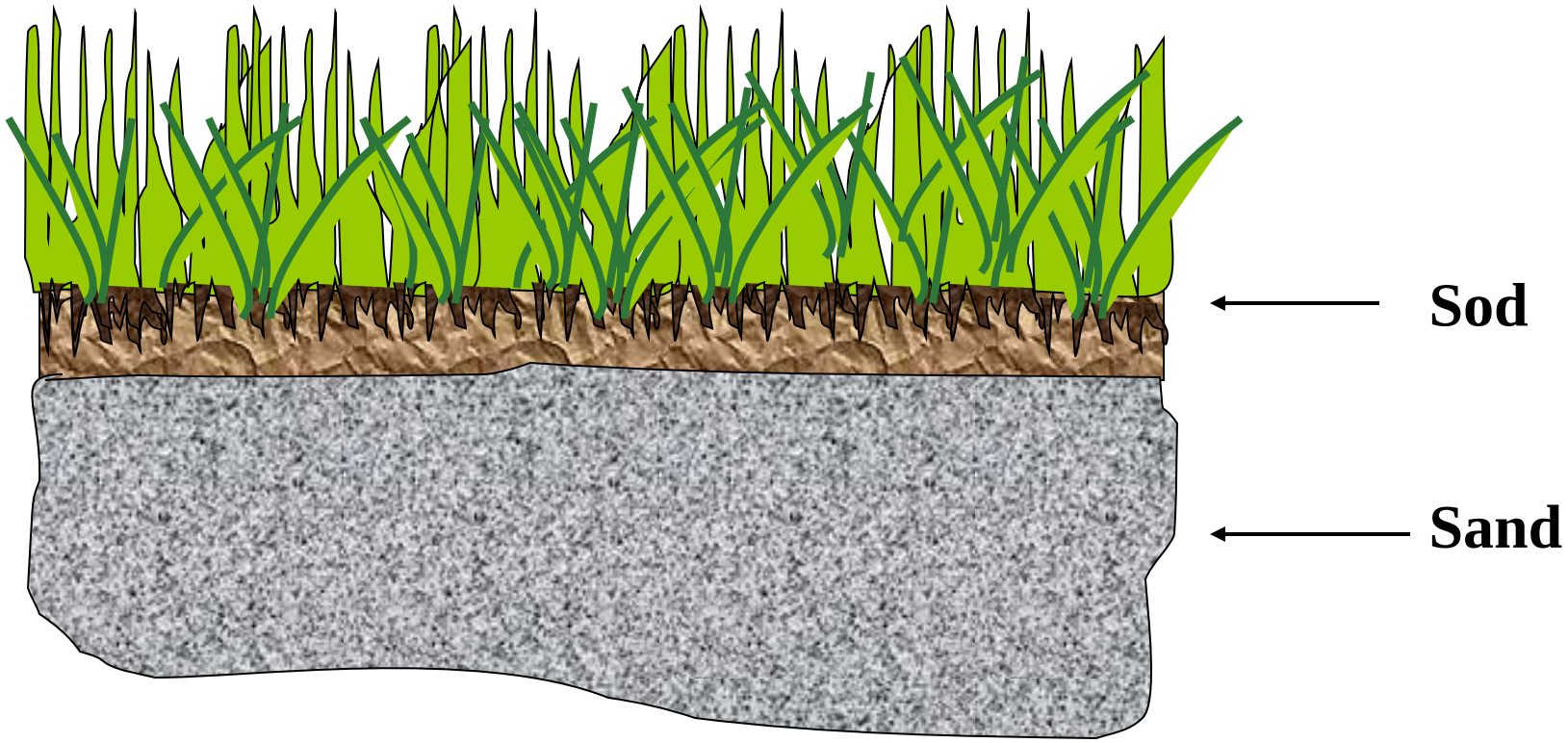

Approx. Distance Scale (Statute Miles)
SM 125 250 375 500
True at 30.00N
SD
NE
IA
MI
PA
NJ
40N
IL
IN
OH
MD
DE
KS
MO
WV
VA
KY
OK
TN
NC
35N
AR
GA
MS
AL
LA
TX
30N
7 AM Tue
7 AM Wed
7 AM Mon
10 AM Sun
100W
95W
90W
85W
80W
75W
Hurricane Dennis
July 10, 2005
10 AM CDT Sunday
NWS TPC/National Hurricane Center
Advisory 25
Current Center Location 29.4 N 86.7 W
Max Sustained Wind 140 mph
Current Movement NNW at 18 mph
Current Center Location
Forecast Center Positions
H Sustained wind > 73 mph
S Sustained wind 39-73 mph
D Sustained wind < 39 mph
Potential Day 1-3 Track Area
Hurricane Warning
Tropical Storm Warning

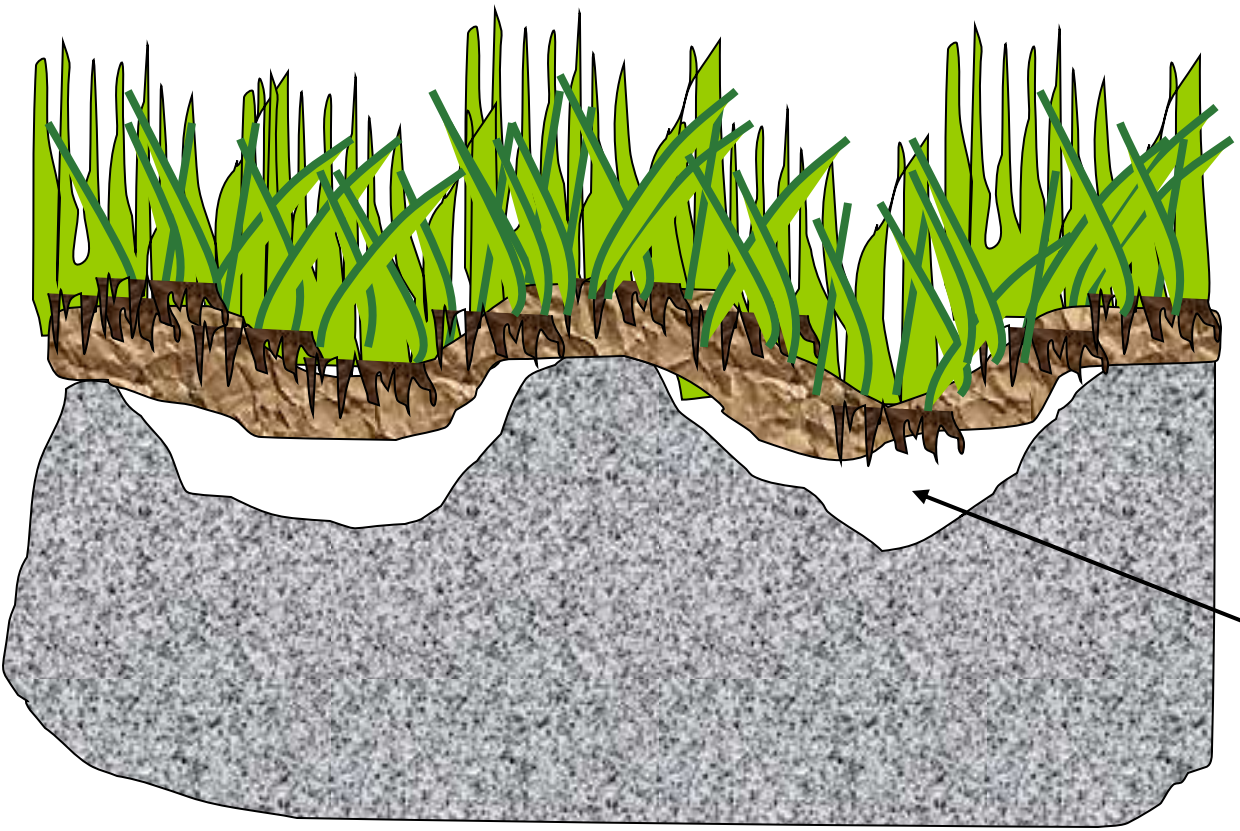
Highway 98 Damage by Hurricane Dennis

July 2005 (Carabelle to Eastpoint)

Highway 98 Repair - Carabelle to Eastpoint

Erosion after initial repair required an industrial BMP that would work on beach sands


Sod
Sand



Sod

Sand

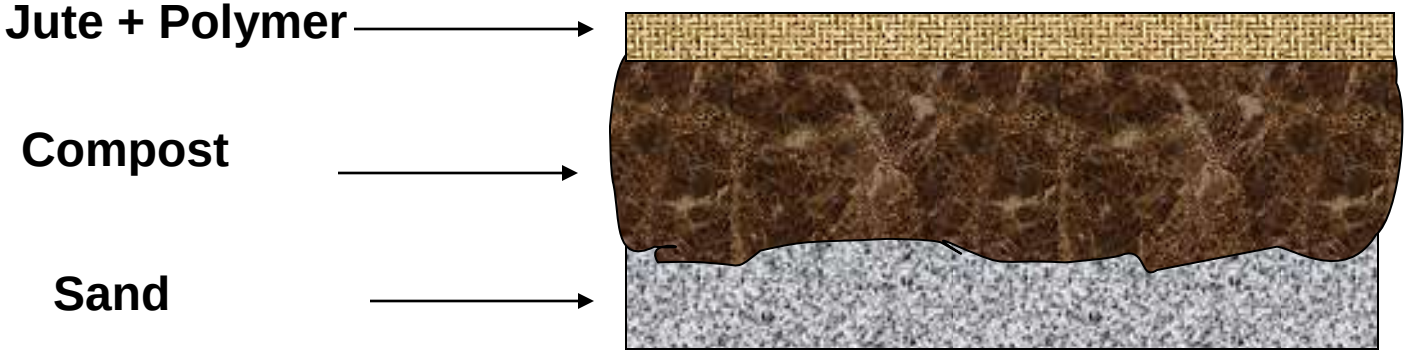
Sand Erosion, Sod Failure

Polymer Enhanced Soft Armor Systems was chosen. After grading, compost was placed as an organic layer

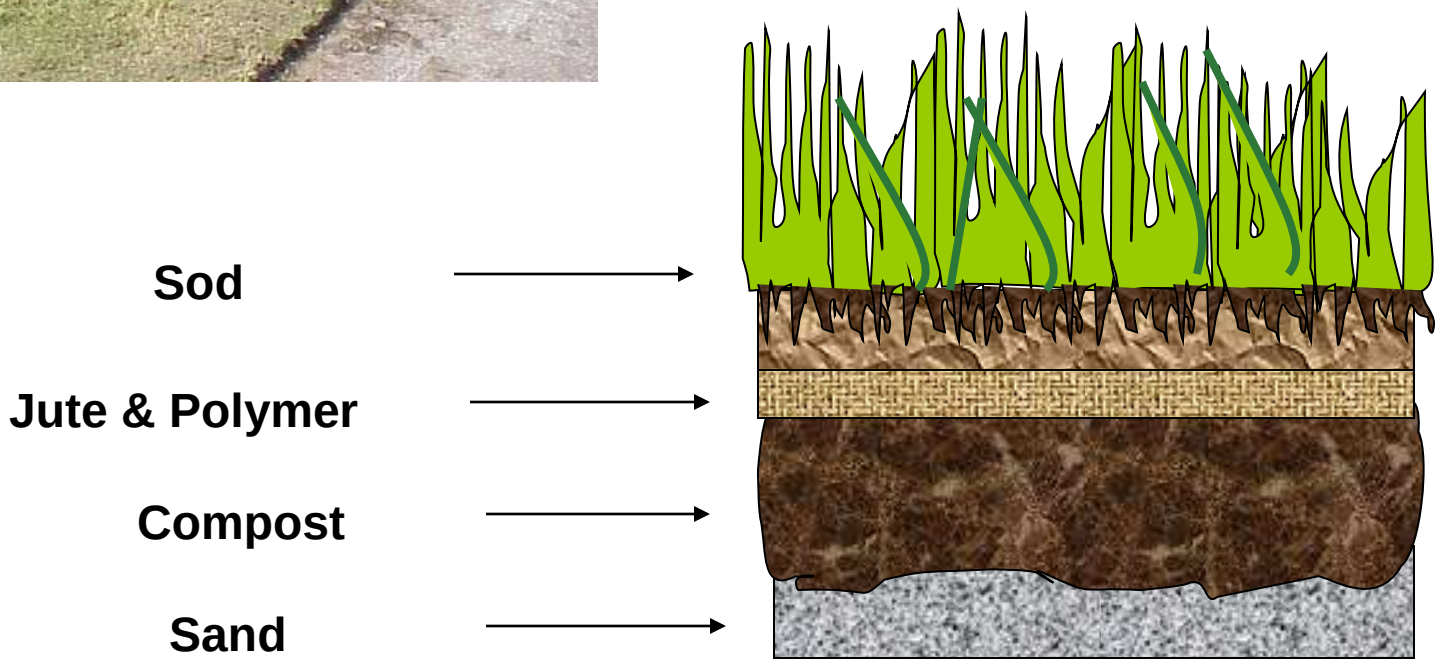
Jute matting was placed over the organic layer as a binding media for attachment of the polymer, sand and soil

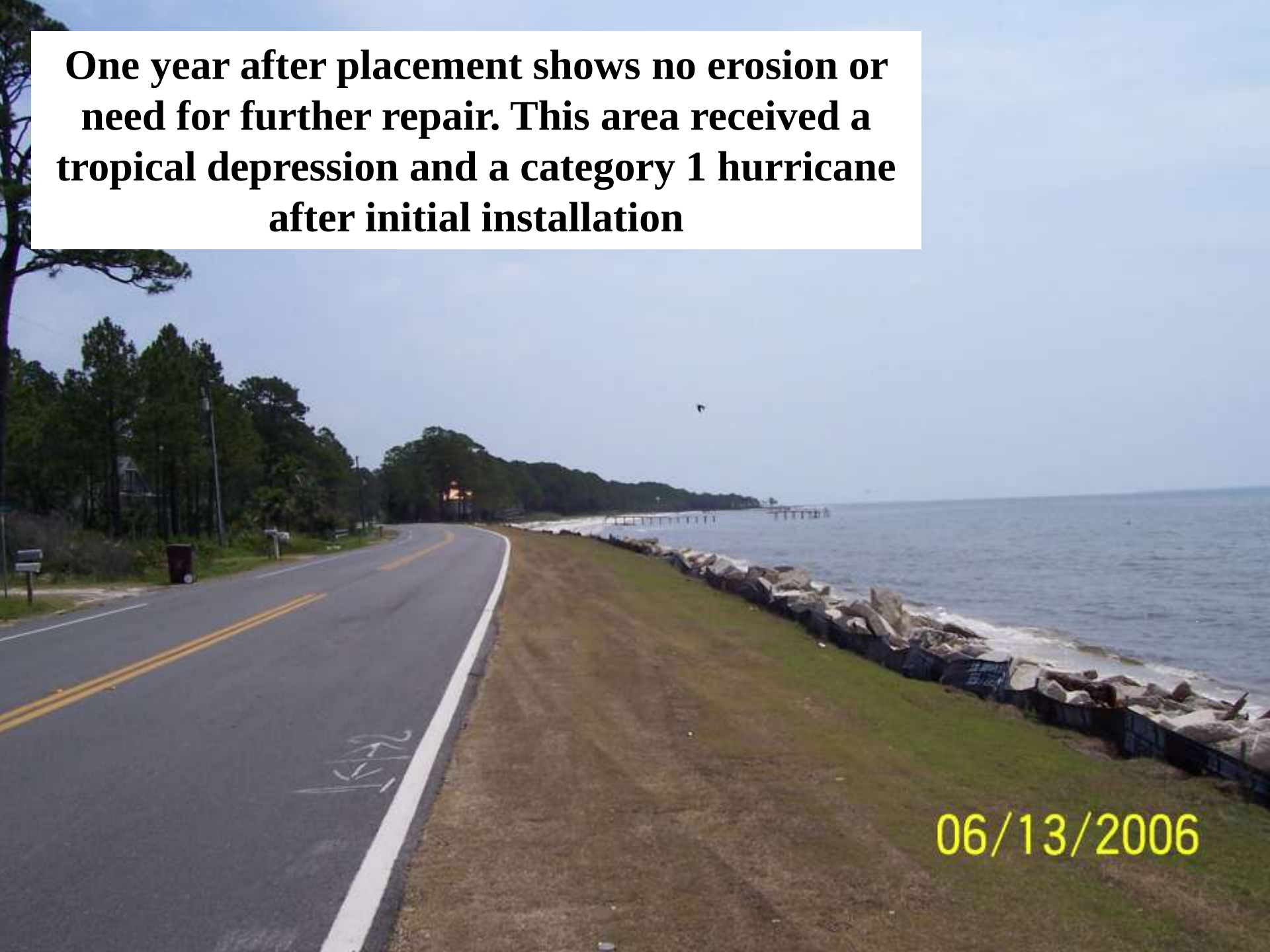
Open weave soft matting works best

Jute matting was placed over the 14 miles of repair area as a binding agent. 50 pounds / acre polymer application rate was used

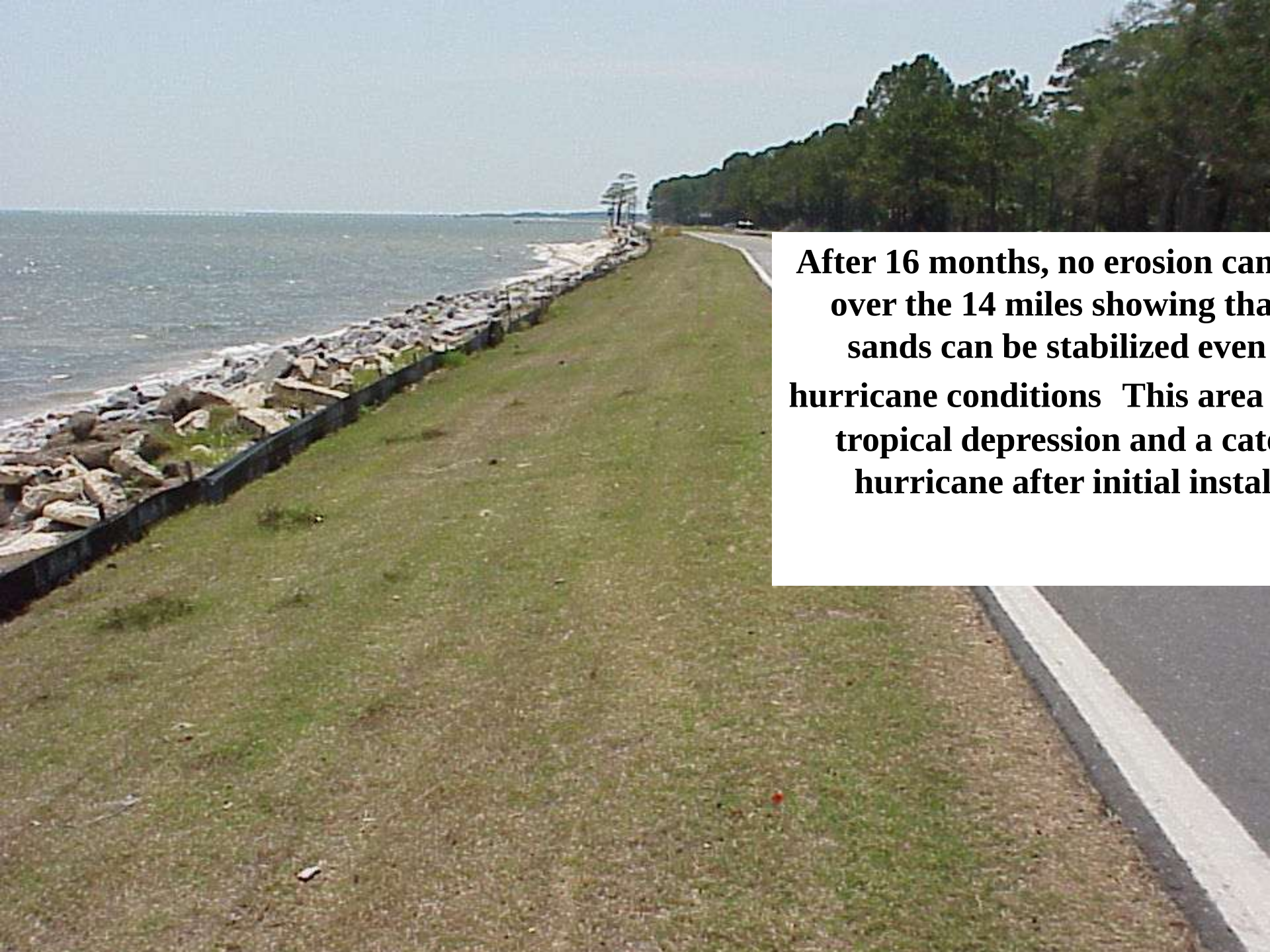


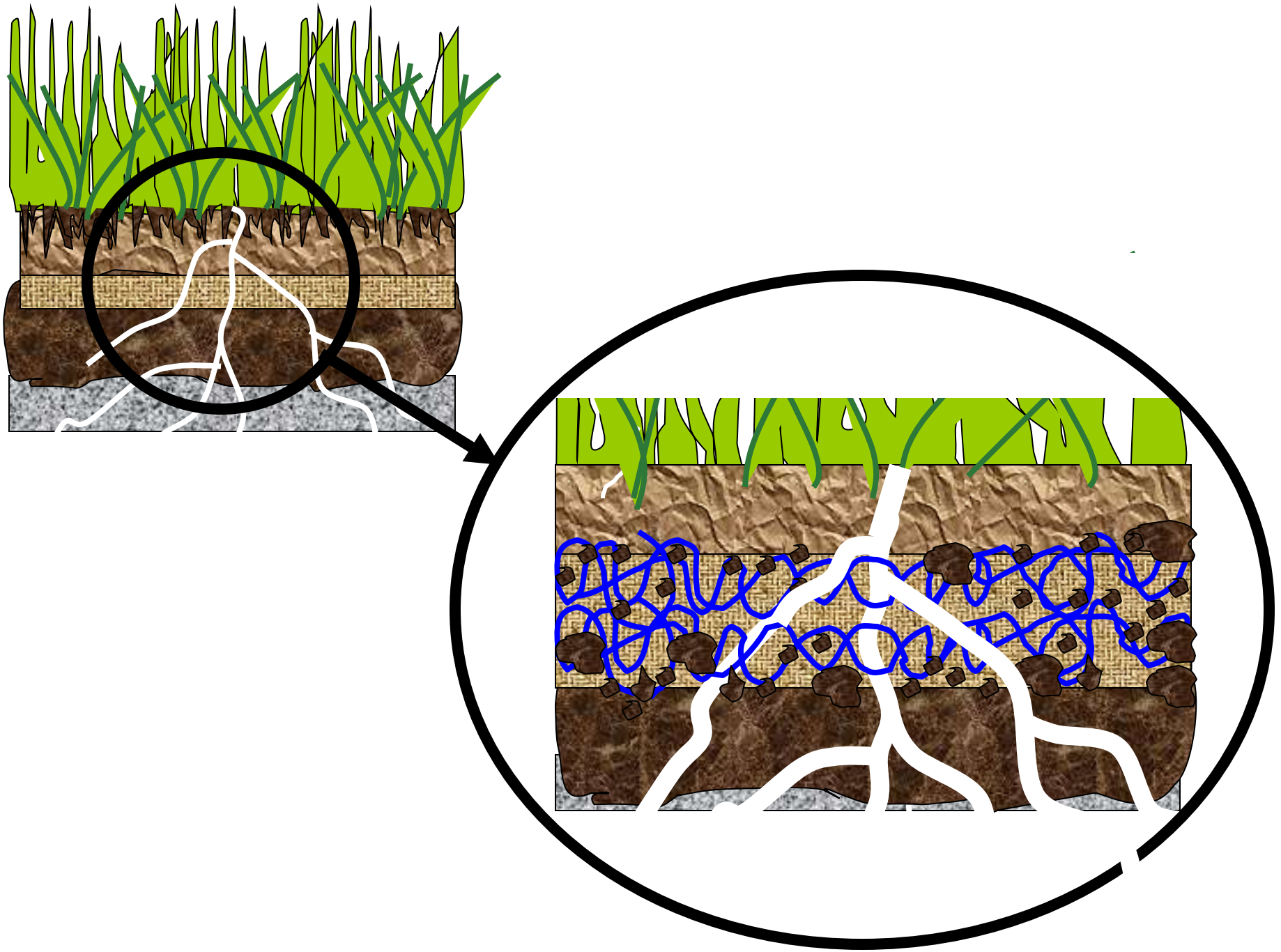
Sod was placed over the polymer enhanced BMP

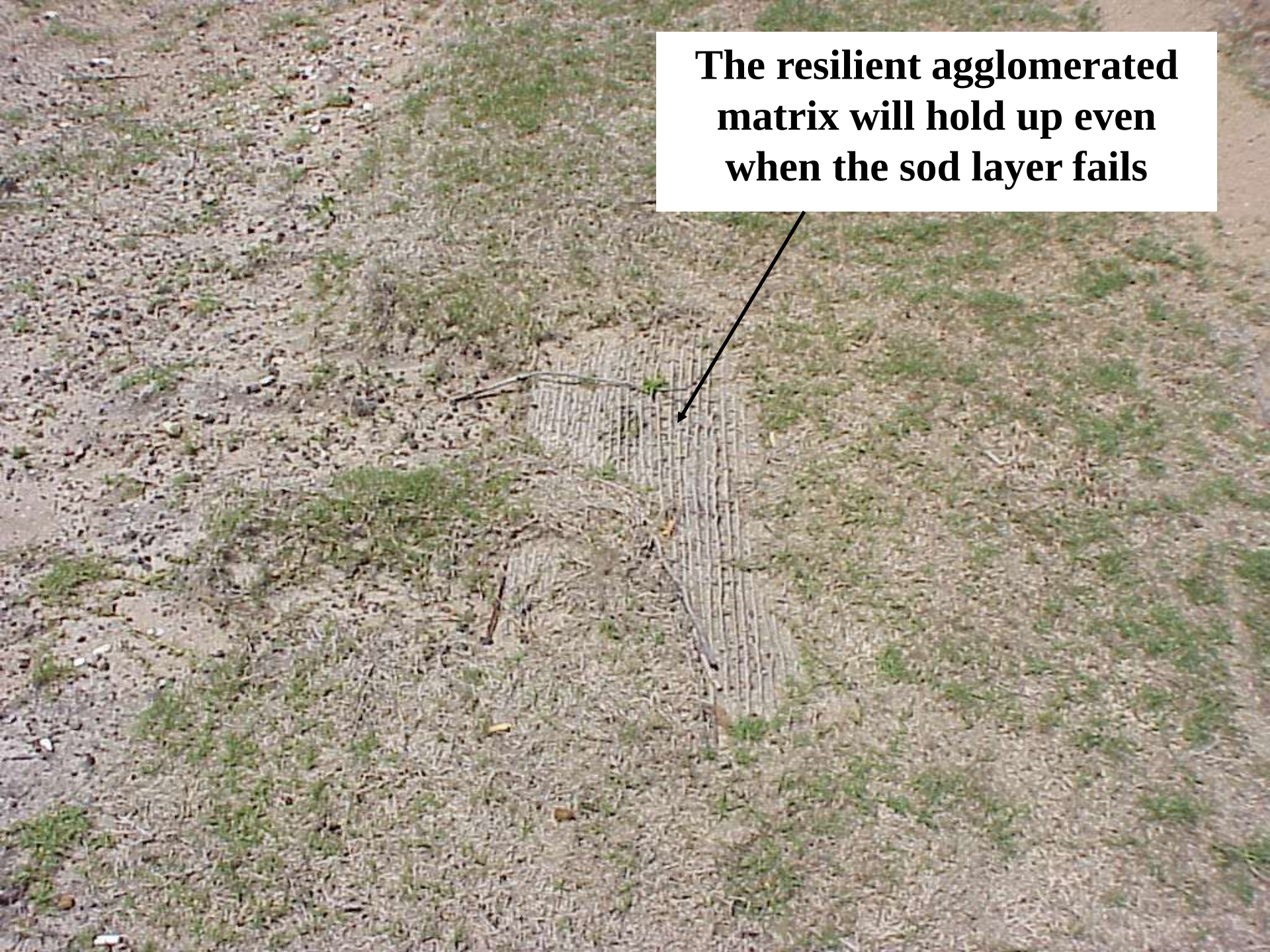




One year after placement shows no erosion or need for further repair. This area received a tropical depression and a category 1 hurricane after initial installation


After 16 months, no erosion can
over the 14 miles showing tha
sands can be stabilized even
hurricane conditions This area
tropical depression and a cat
hurricane after initial instal




The resilient agglomerated matrix will hold up even when the sod layer fails

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Polymer Enhanced Hydroseeding

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Senior Associate

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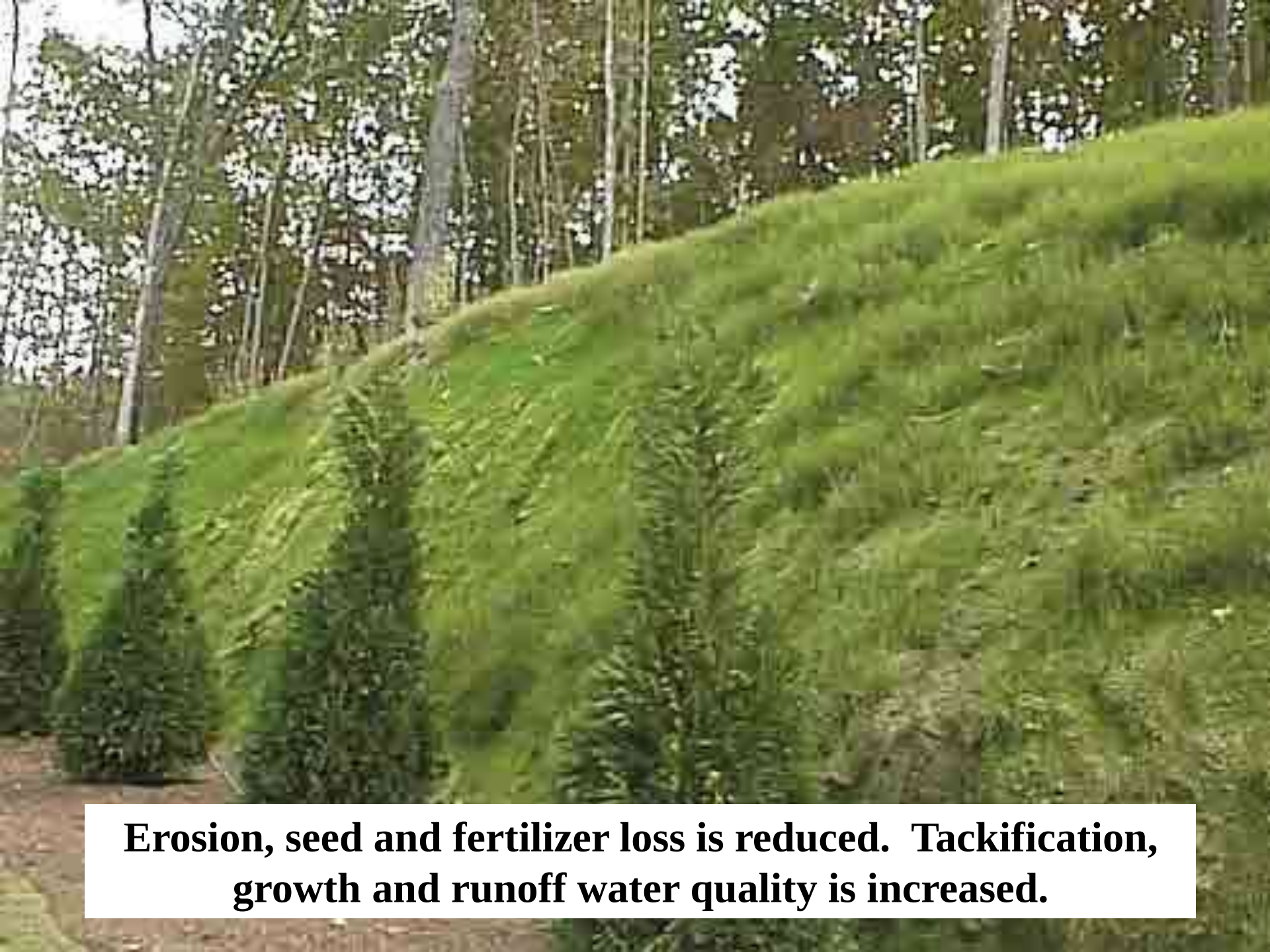
Simply apply the “correct soil tested” polymer to any hydroseeding mix

Apply the hydroseeding mix containing the soil specific polymer to the application



Erosion, seed and fertilizer loss is reduced. Tackification, growth and runoff water quality is increased.

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Polymer Enhanced Rock Check Dams

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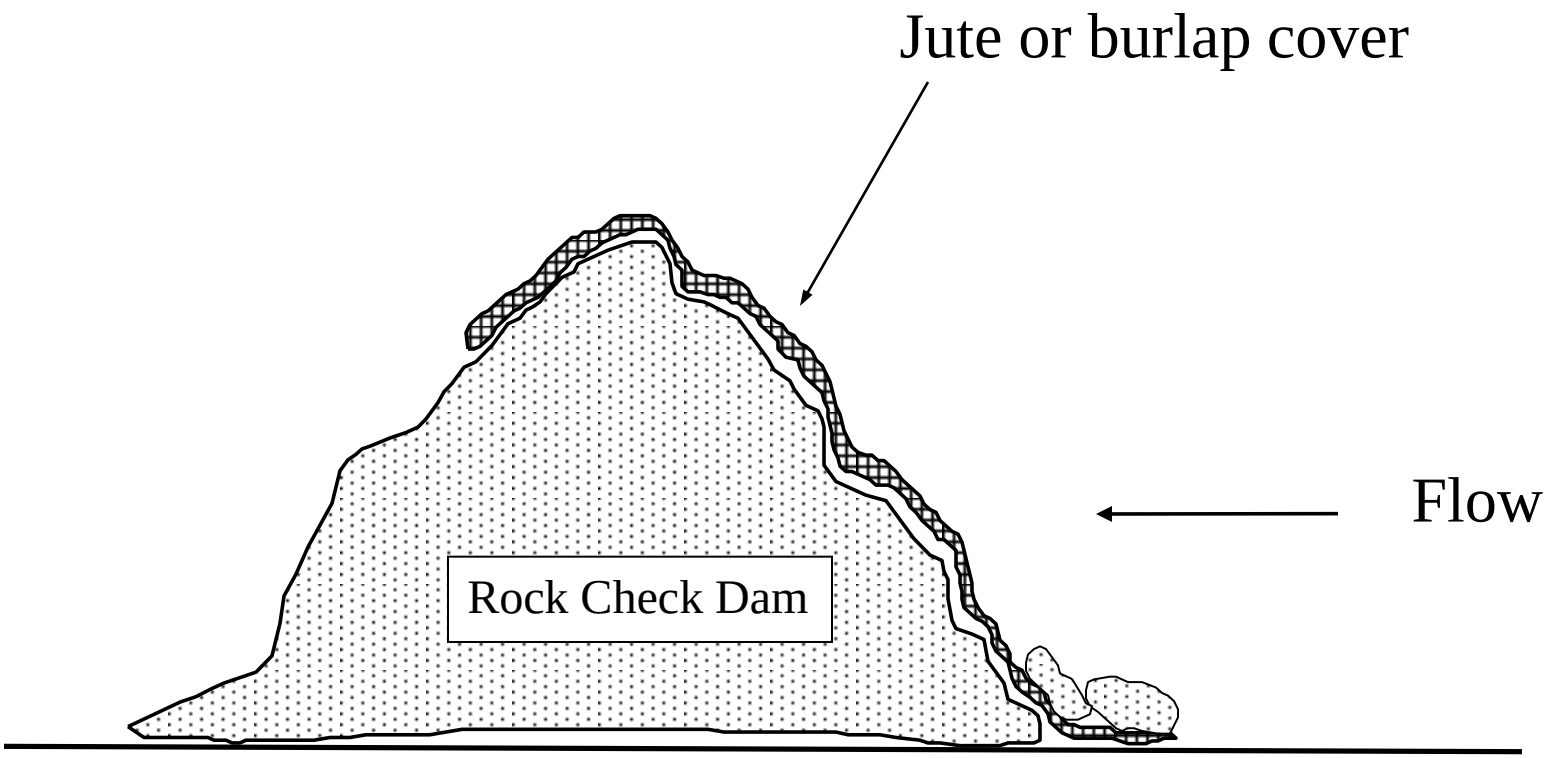
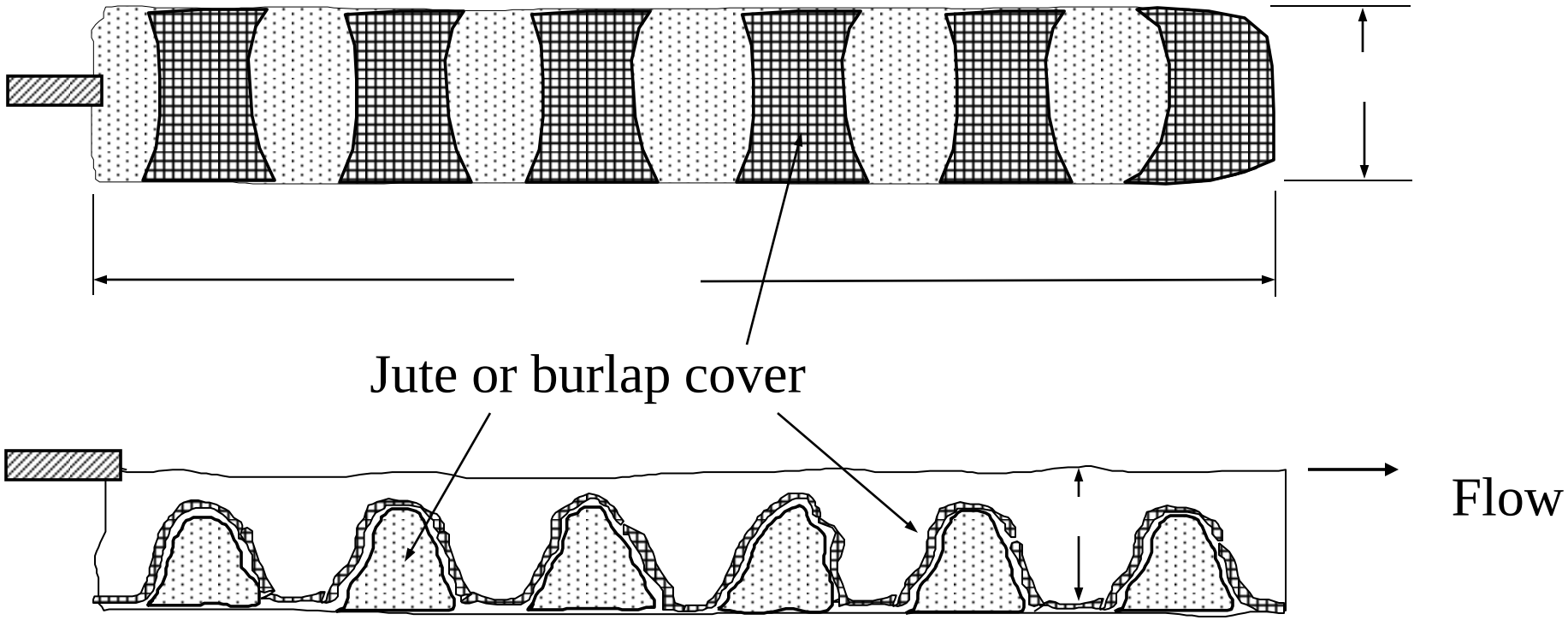
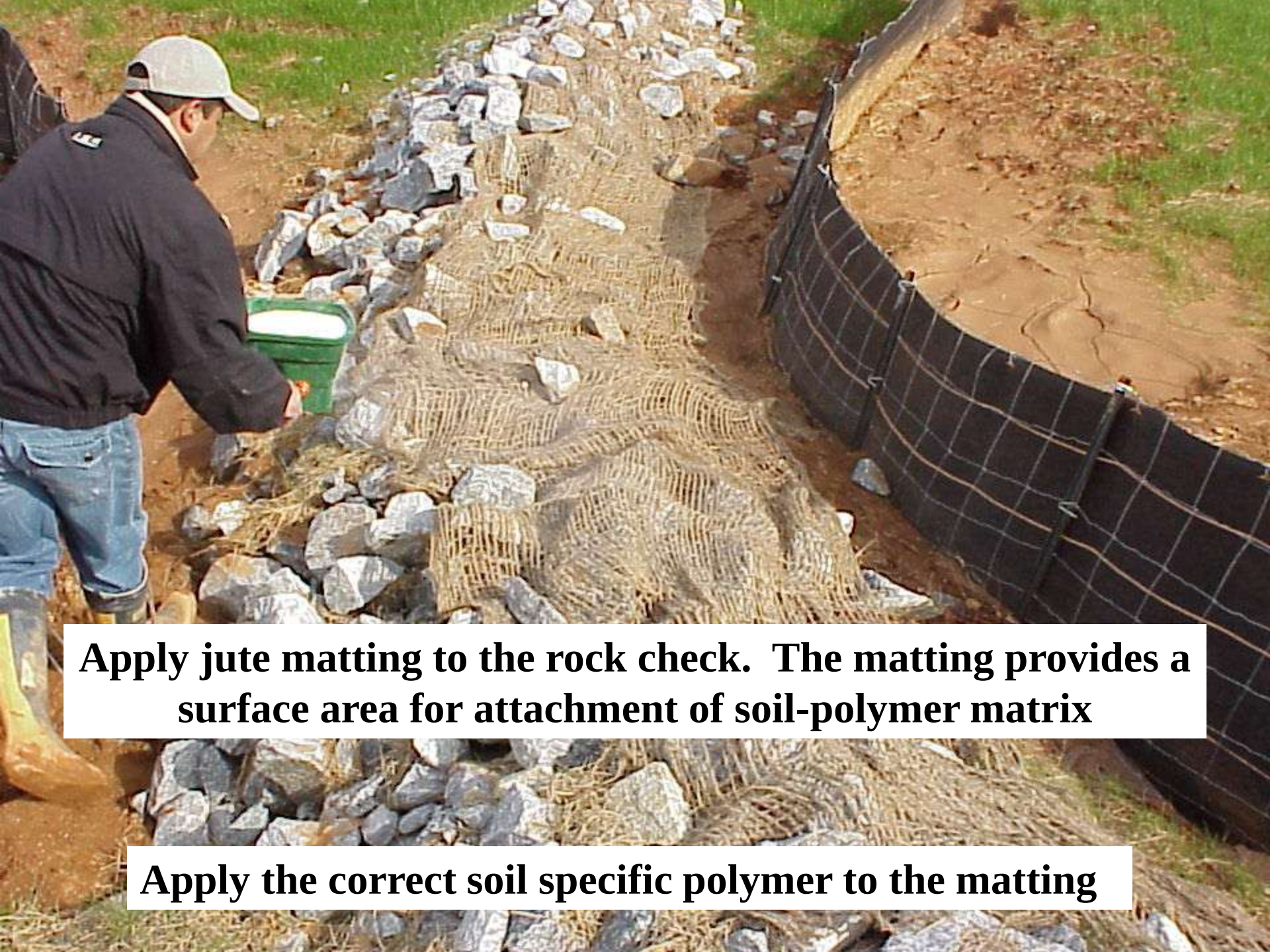


Apply the correct soil specific polymer to the matting



The greater the systems in series the greater the performance and cleaner the water quality

Fine sediment and silts move through these BMPs and enter the water ponds or streams



Apply jute matting to the rock check. The matting provides a surface area for attachment of soil-polymer matrix

Apply the correct soil specific polymer to the matting

Notice how the fine sediments become attached to the matting reducing the impact at the ponds and streams

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Silt fence Retention Barrier (SRB)

Sedimentation Control and Water Clarification

(how to enhance Silt Fence to allow it to trap fine particulate as well as heavier sediment)

University of Central Florida

University of Central Florida
Stormwater Management Academy
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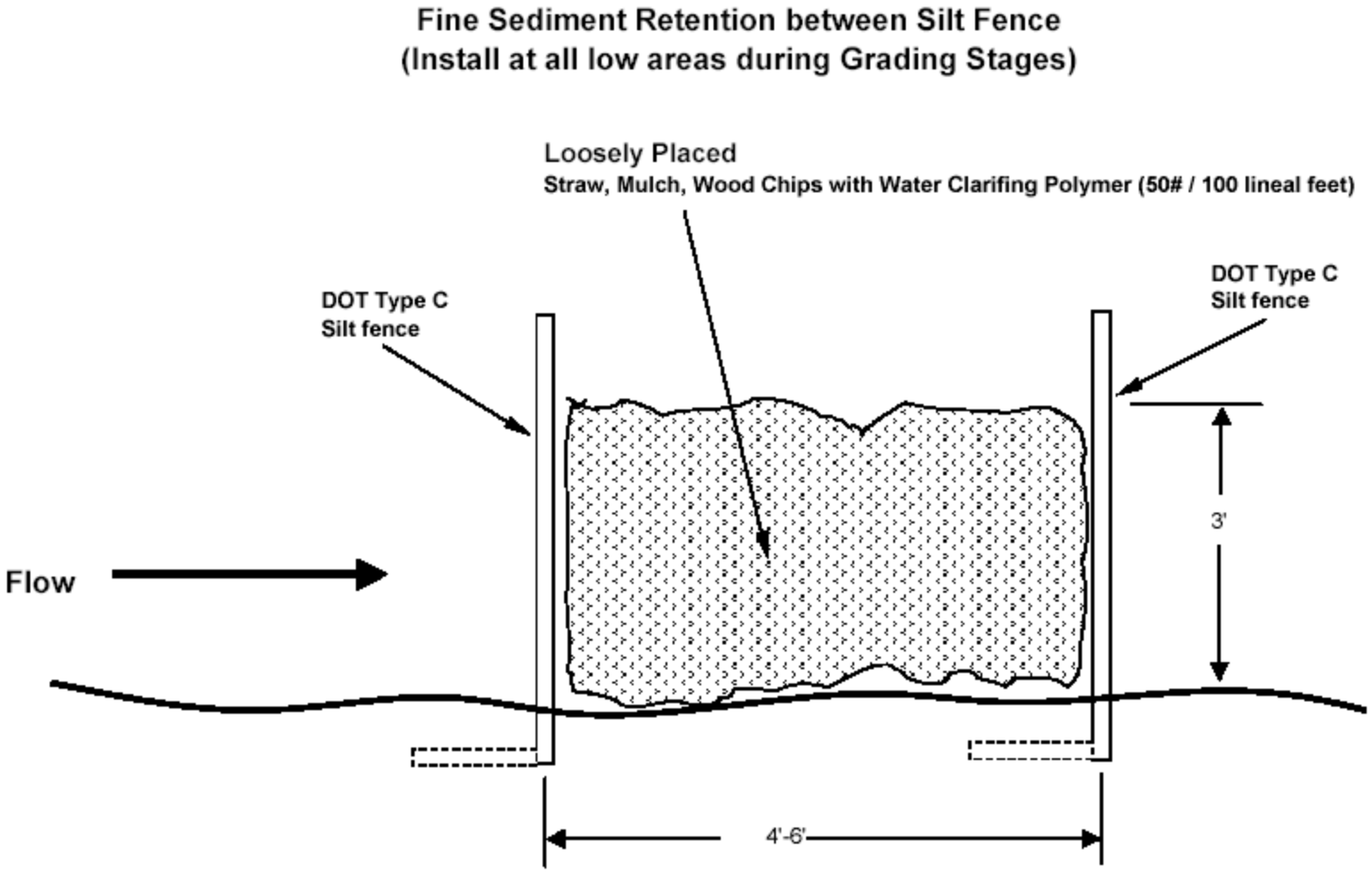
Senior Associate

H2O4U

Silt Fence can easily be used as a water quality device



See SRB applications on the APS web site

Silt fence alone cannot prevent fine sediment loss


05.15.2007


05 15 2007

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Anna River Culvert Replacement Project 2010

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H2O4U


BURIED
CABLE


Plutchak


TAL, L.L.C.
906-864-4650


CATERPILLAR

Rules of Polymer Use

1) Polymer must be non-toxic to aquatic organisms having EPA certified toxicity reports (whole product WET tests using ASTM guidelines)

2) Each site application must demonstrate 95% or better NTU reduction test reports

3) Each polymer can be unique for each application. One polymer does not work on all soils

Senior Associate

Polymer References

www.stormwater.ucf.edu

www.siltstop.com

Go to:

(Polymer Enhanced BMP Application Guide)

Senior Associate