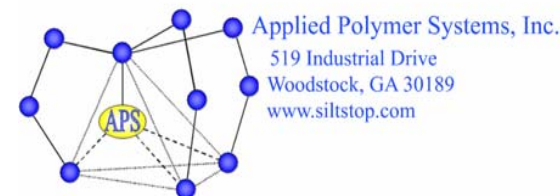


Technical Solutions for Erosion Control and Water Clarification using Polyacrylamide (PAM) and PAM Blends

William Gowdy, Jerry Hanna and
Steven R. Iwinski



Soil Erosion Factors

- Wind
- Water
- Topography
- Soil Lithology
- Vegetative Stabilization

Bare Soils will Erode Quickly



Rain Drops Dislodge Soil



Bare Slopes can be Stabilized using Site Specific PAM Blends with Matting or Sod



Controlling Turbidity From Construction Activities





Ineffective BMPs





Ineffective BMPs





Effective BMPs

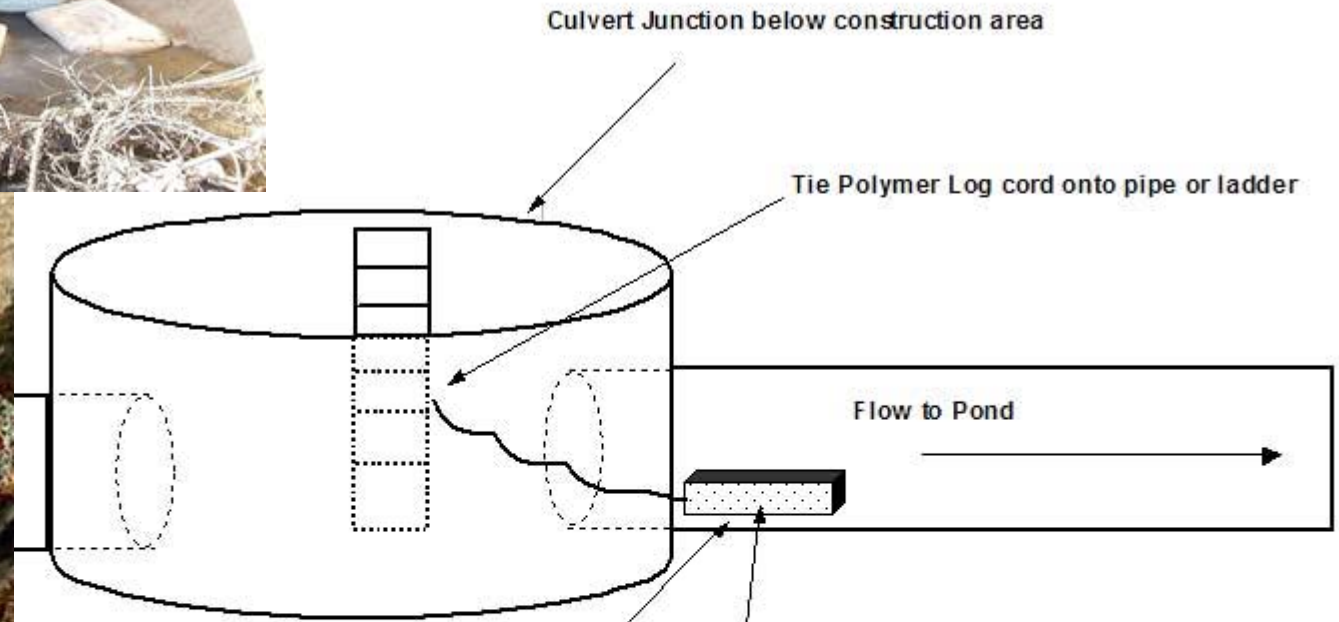




Effective Storm Drain Inlet Protection



Using Floc Logs in storm drains for turbidity control



Note: Polymer Log should sit 3" above the pipe bottom
(Iron rebar legs may be inserted into the Polymer Log)

Specific Polymer Log for Soil & Particle Chemistry

(Note: Polymer Log may be required at various mixing points on the way to the main pond
(based on the water volume that will flow through the system))



**Temporary Stabilization:
Seeding/Mulching/Silt Stop**



**Permanent Stabilization:
Sodding with Silt Stop**

EFFECTIVE STABILIZATION BMPS



Riprap



Gabions

Using hand
spreaders to
apply site
specific Silt Stop
polymer to BMP





Berms/Diversions



Blankets

EFFECTIVE STABILIZATION BMPS



**Cellular Confinement
Systems (GeoWeb)**



Plastic



Baffle grid with polymer, used to reduce turbidity of discharged water



Soft Armoring with polymer over blown mulch using jute woven mat



Jute woven mat has most effective adhesive properties for the flocculant



Soft Armoring with polymer along a slope to prevent further erosion

Polyacrylamide (PAM)

Hundreds of Different Types

Effective on All Soil Types

Fast Results (Seconds to Minutes)

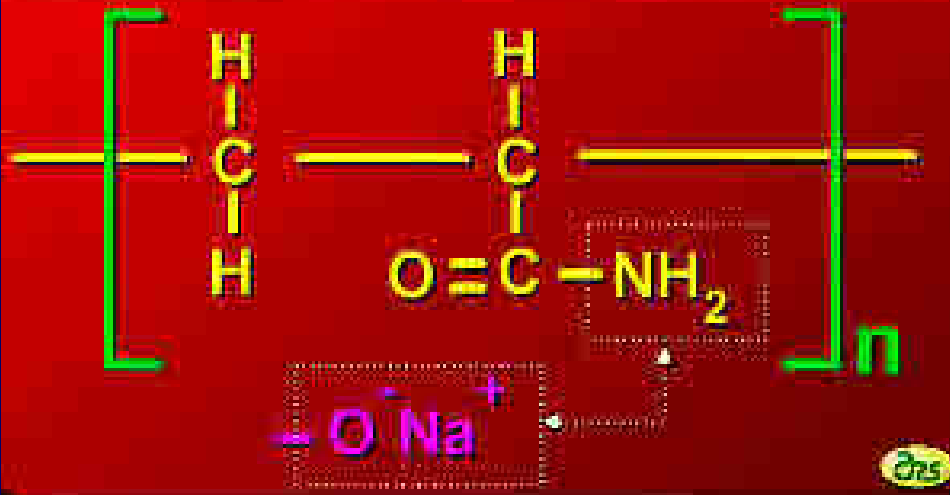
Soil Specific (Best)/Non-Specific (Ag)

Non-Toxic (Test Data Available)

Passive Flow & Mechanical Application



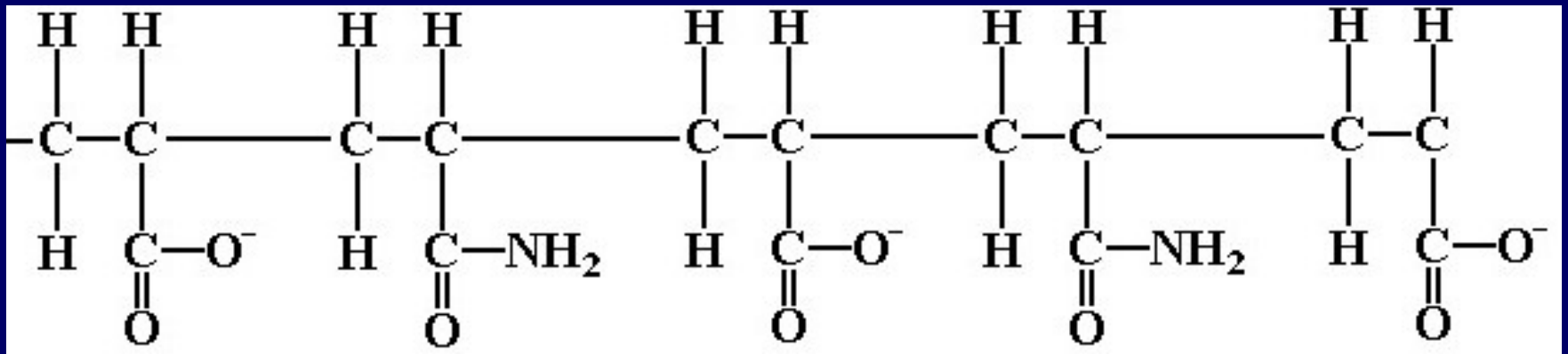
Polyacrylamide (PAM)



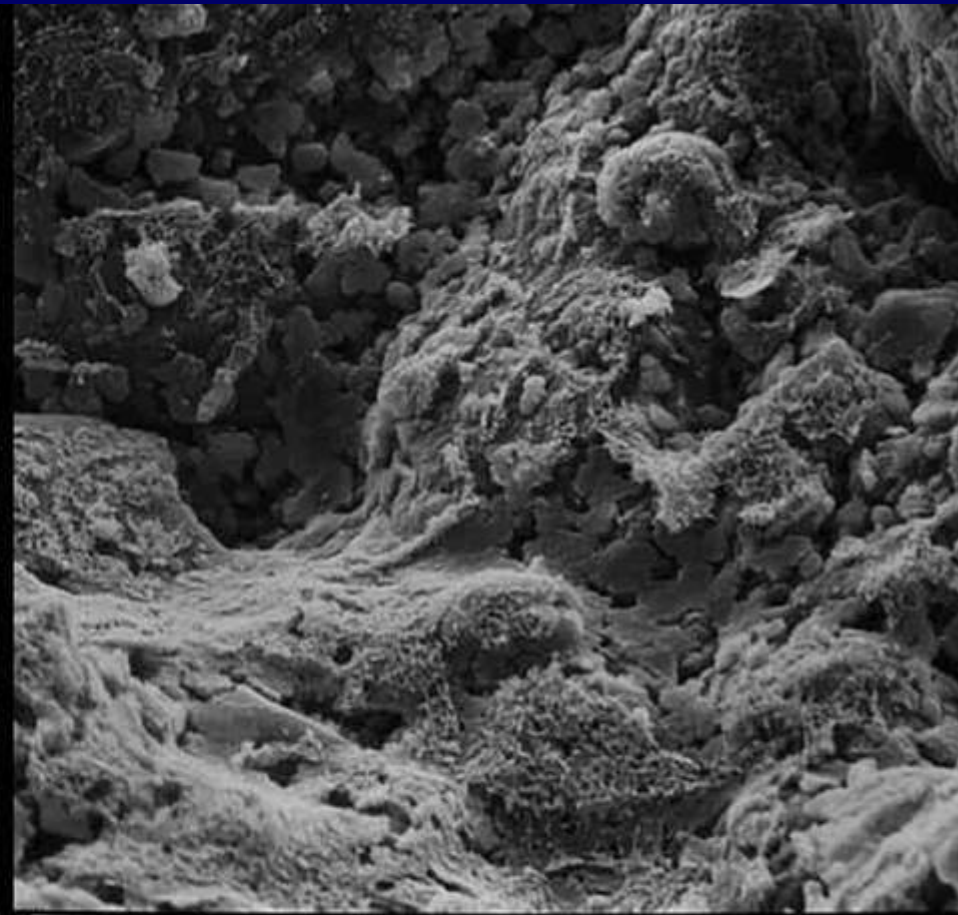
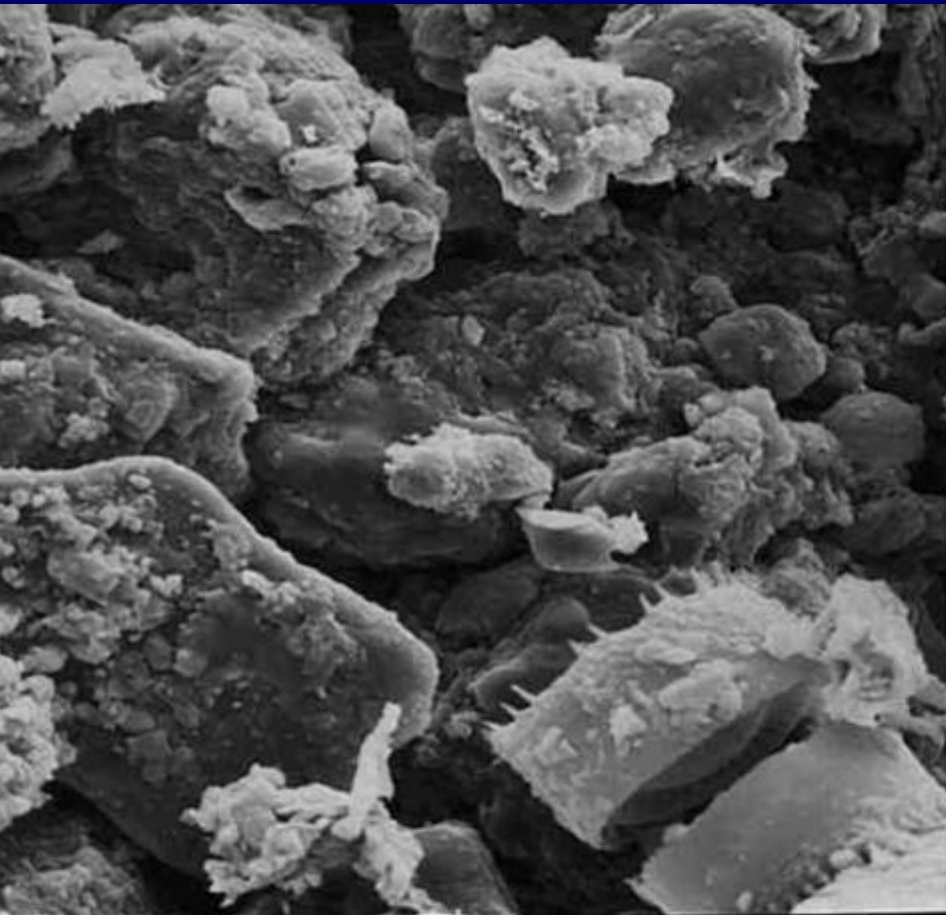
PAM molecule is 100,000 to 150,000 monomer units in size (HUGE) with multiple attachment points capable of ion exchange

This gives the PAM molecule a tremendous ability to grab charged particles.

PAM binds the sediment together, allowing it to drop out of suspension quickly, and prevents re-suspension.



The Difference of PAM



10μm

Control

10μm

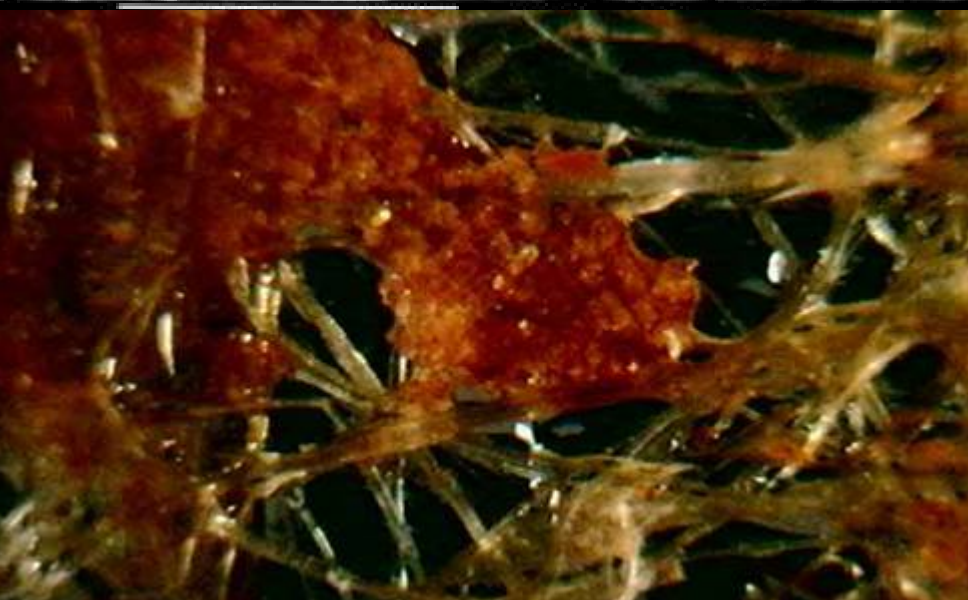
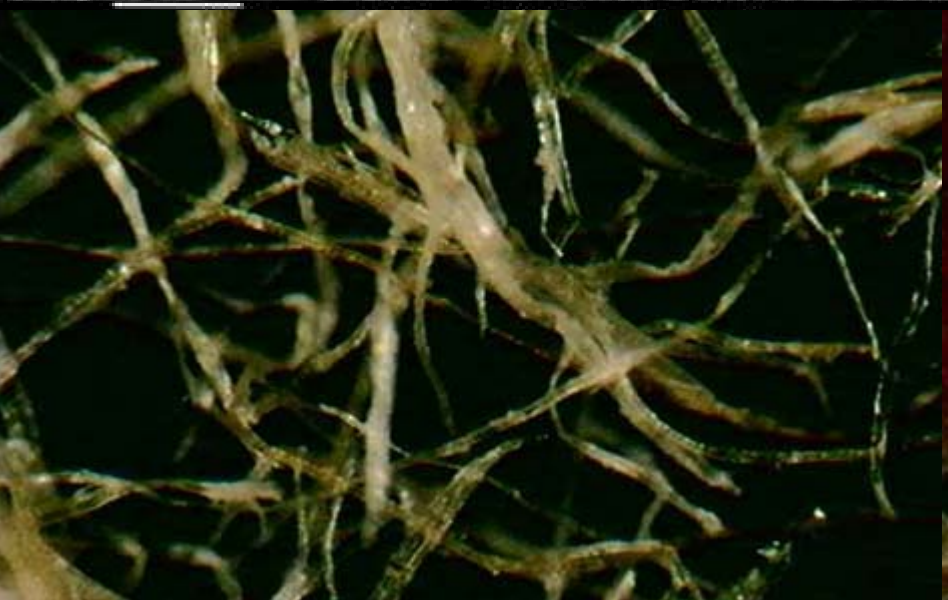
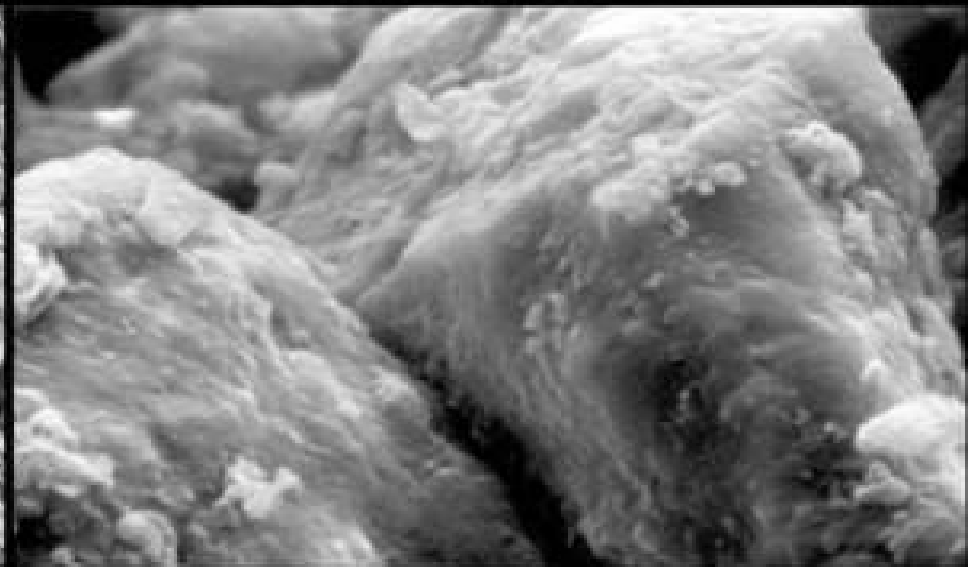
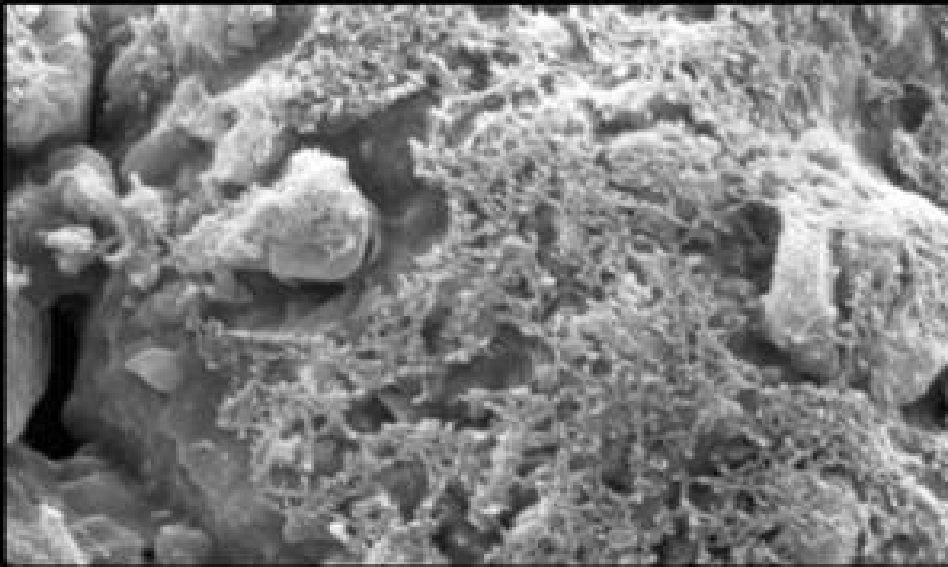
PAM

3000x

Untreated Soil

Treated Soil

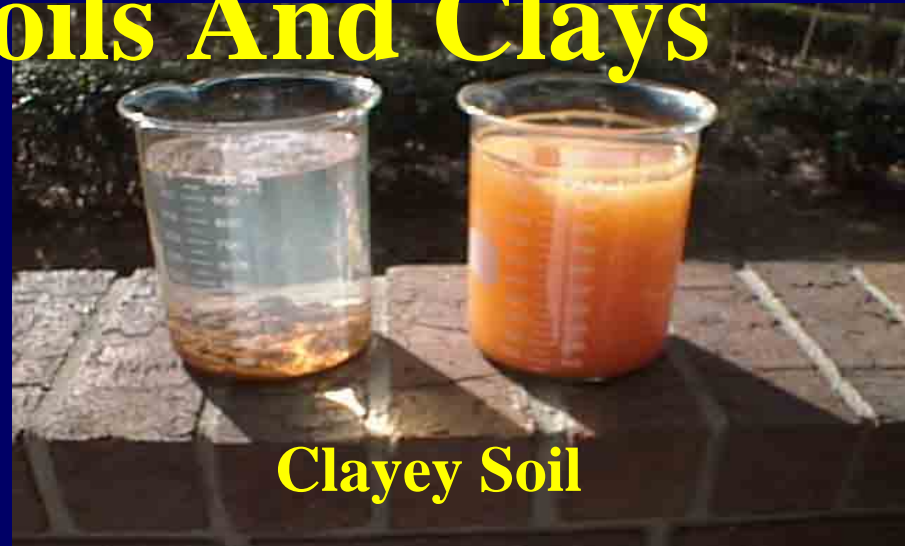
How PAM Attaches



Different Blended PAMs Are Used On Different Soils And Clays



Loamy Soil



Clayey Soil



Phosphate Soil



Organic Dredge Soil



Applied Polymer Systems, Inc.
519 Industrial Drive
Woodstock, GA 30189
www.siltstop.com

Site Specific Soil Samples Are Taken In The Field



Samples Are Analyzed In The Lab



Samples are taken from entire site to match Silt Stop polymer to the soil type

Types of Polyacrylamides Blends

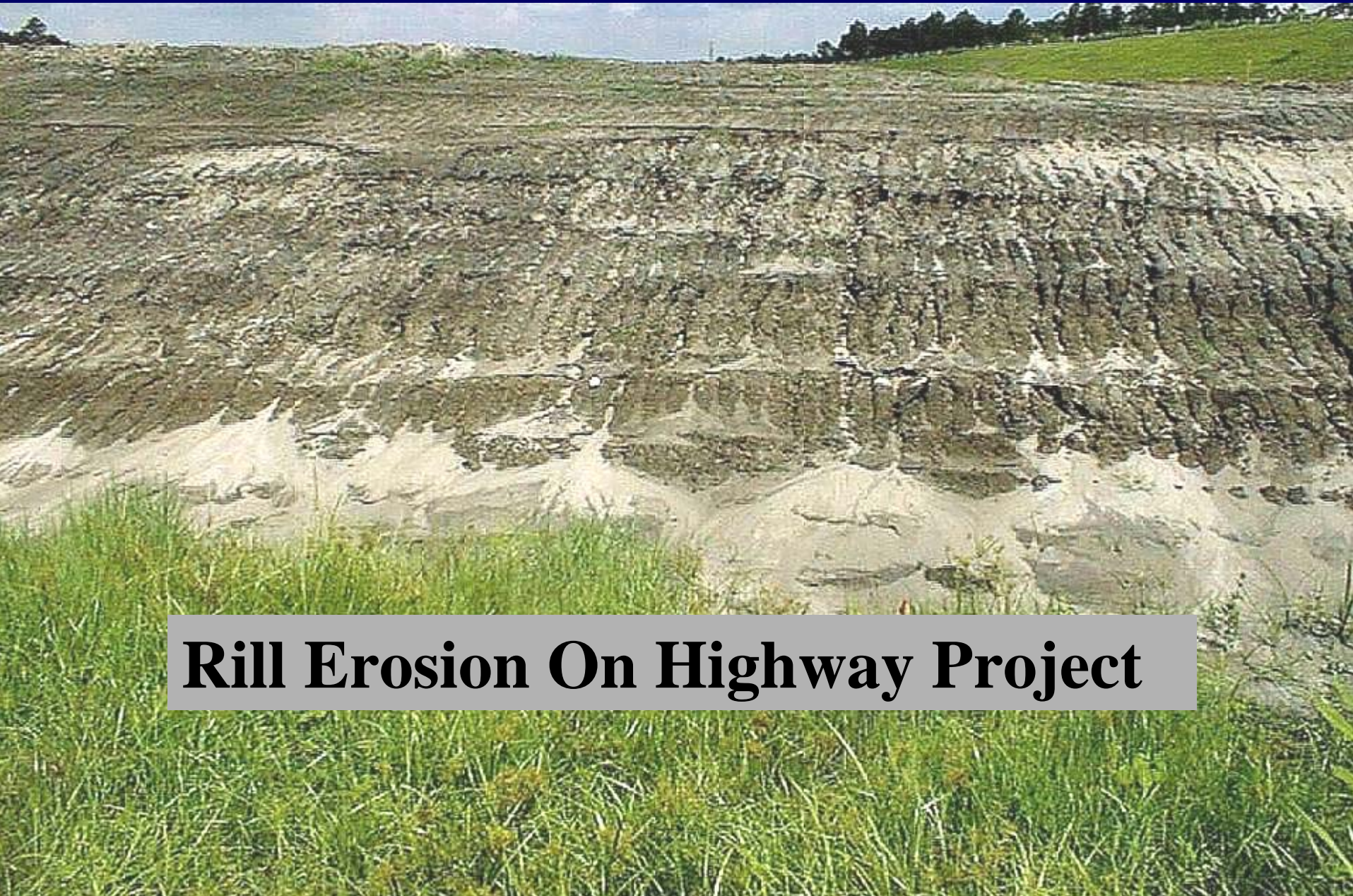
- Emulsions
- Granular
- Floc Log®



Various Site Specific PAM Blend Applications:

- Slope Stabilization
(Erosion Control)
- Turbidity Control
(Water Clarification)
- Dust Suppression
- Wet Soil Solidification
(Demucking projects)
- Nutrient Control
- Dissolved Metal Control

Raw Slope Stabilization



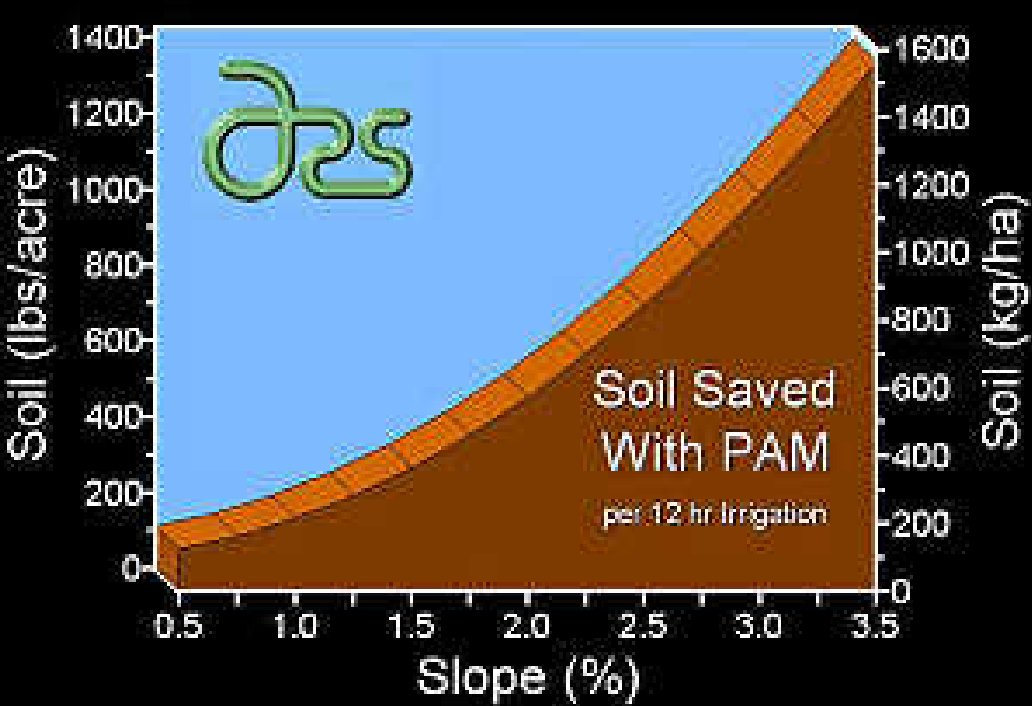
Rill Erosion On Highway Project

A high-pressure water spray is being directed at a gravelly slope. The spray is bright white and creates a large cloud of mist. The nozzle is visible on the right side of the frame. The background shows a line of trees and a body of water.

Emulsion Applied
to Raw Slope

Air Spraying to Forest Fire Areas





Hydroseeding over soft armor

Using soil-specific high chelating
anionic Silt Stop blend




Jute Matting Installation



**Hydro Mulch Application with
APS Blended PAM and Grass Seed**



Excellent Slope Stabilization

A photograph showing a temporary erosion control channel. The channel is constructed from jute matting, which is laid out in a series of overlapping sections to form a narrow, winding path. Water is flowing through the channel, creating a small waterfall effect as it drops from one section to the next. The surrounding area is dry, brown soil with some sparse green vegetation and bare tree branches in the background. The text is overlaid on the right side of the image in a yellow font on a dark blue background.

**Temporary Polymer
Enhanced Flow
Channel Using Jute
Matting & APS Silt
Stop Blend**

The image shows a cross-section of a water channel. The channel is filled with murky, brownish water. The walls of the channel are lined with a dense, woven mesh of light-colored, fibrous material, likely coir or straw. The mesh is laid out in a way that it follows the curve of the channel, creating a continuous lining. On the right side, the mesh extends up a slight embankment where some dry, brown grass and a few small green plants are growing. The overall appearance is that of a well-maintained, erosion-resistant waterway.

**Channel Easily Handles
Over 1,000 GPM Flow
With No Erosion**



Water Treatment Ditches using Floc Logs

Water Clarification using Baffle Grid and Mixing Trough





Excavation for Baffle Grid



Charging the Grid with APS Silt Stop polymer

Water Clarification using Baffle Grid System



Effluent water discharged for the Baffle Grid



**Polymer Baffle Mixing And Treatment Systems
APS Advanced Turbidity Treatment**

Sediment Trap/ Basin Stabilization



A photograph of a dirt road or haul road, likely at a landfill, with a white container visible in the distance. The road is flanked by dense green trees and vegetation. The text is overlaid on the lower half of the image.

Dust Suppression Using Site Specific Silt Stop blends

Landfill Haul Road Dust Suppressed With
7 Water Wagon Treatments Per Day

50 lbs Polymer Powder Applied With
Fertilizer Spreader



1 Water Wagon Application Applied



PAM Treatment Extends 4-6" In To Soil



Dust Controlled With 1 Daily Water
Wagon Application For 45 Days

Blended PAM for Demucking



Silt Stop Powder Applied
With Leaf Blower



Silt Stop Powder
Mixed With
Equipment Until
Muck Thickens

Blended Silt Stop PAM for Demucking

PAM Blends
increases the ease of
handling wet soil
without liquid spills
or dripping





Blended PAM turns a problem soil into a resource as a topsoil amendment



6.29.2000



7.13.2000

Polymer Case Studies

1. Floc Log[®] – Water Discharge Quality
2. Silt Stop – Erosion Control

Case Study 1

Floc Logs[®]

Aggregate Washing Operation

Initial Status of Operation

- Pit run is washed to remove finer particles to upgrade aggregate quality for various uses
- By-product is water laden with fine particulate
- Water is passed through a series of settling ponds ultimately discharging to a stream
- Wanted to improve water discharge quality

Floc Log ® Design Considerations

- Lithology – Appropriate Polymer Selection
- Flow Rates Determined
- Polymer Used in Conjunction with other Best Management Practices (BMPs)

Polymer Formulated for Soil Type



No Polymer

Non-Optimized
Polymer

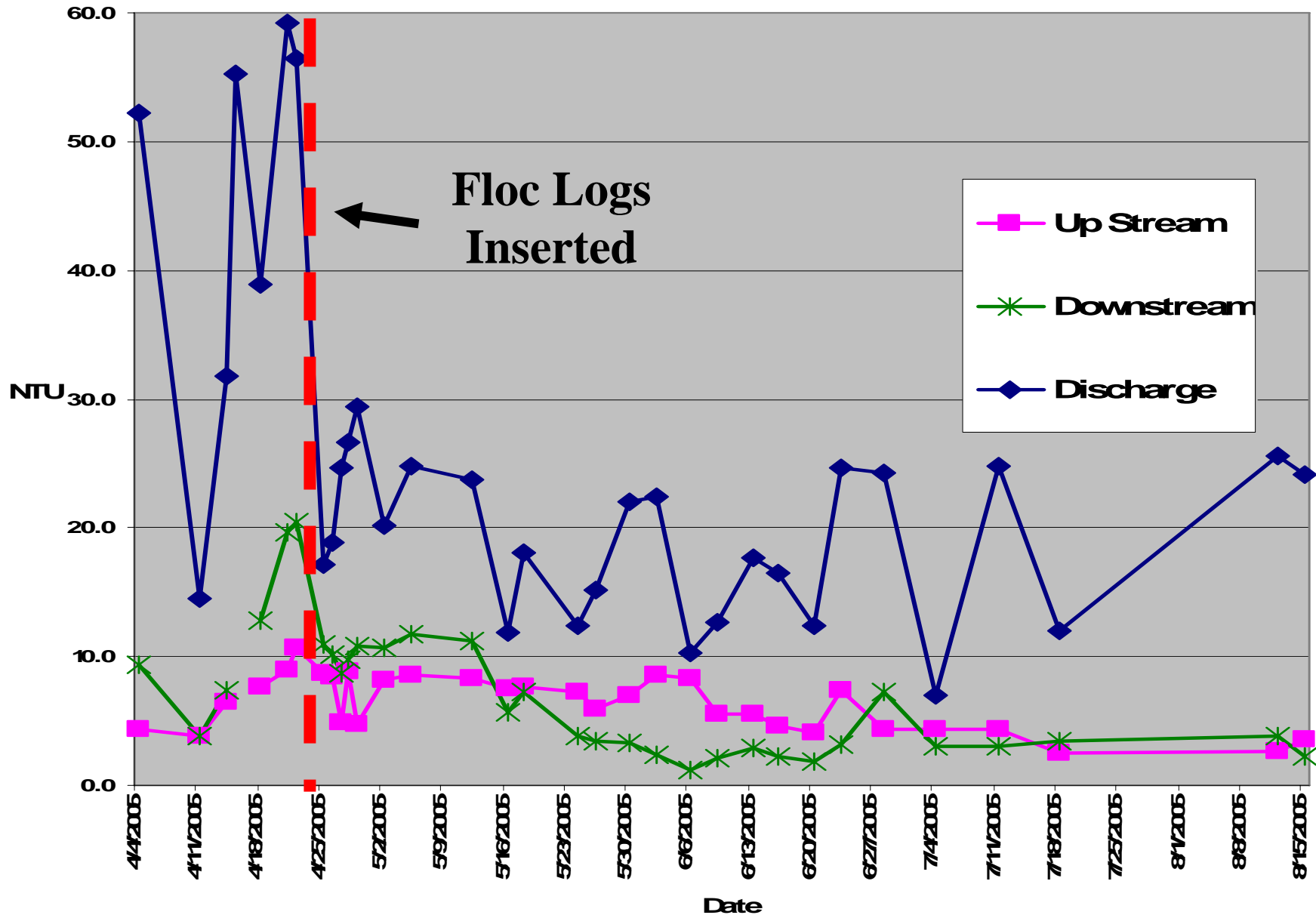
Optimum
Polymer

Floc Log[®] Mixing Configuration

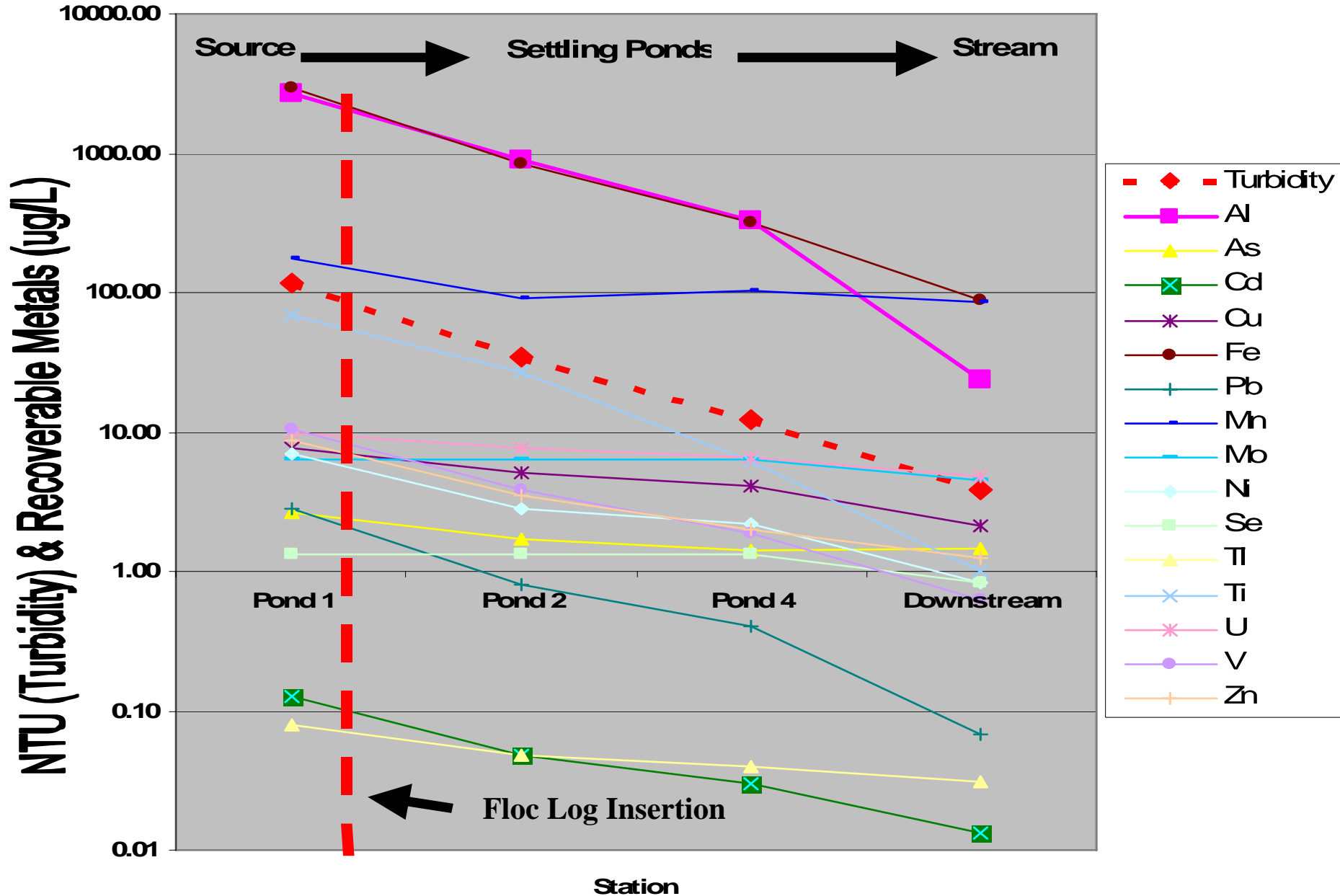


Mixing Grid with Floc Logs[®]

Floc Log[®] Effect on Turbidity



Turbidity vs Recoverable Metals



Case Study 2

Siltstop – Erosion Control

**Siltstop Powder
Applied to Surface
To Prevent Surface
Erosion**



**Siltstop Emulsion
Added to Hydroseed
Mix Before Application
to Surface To Prevent
Surface Erosion**



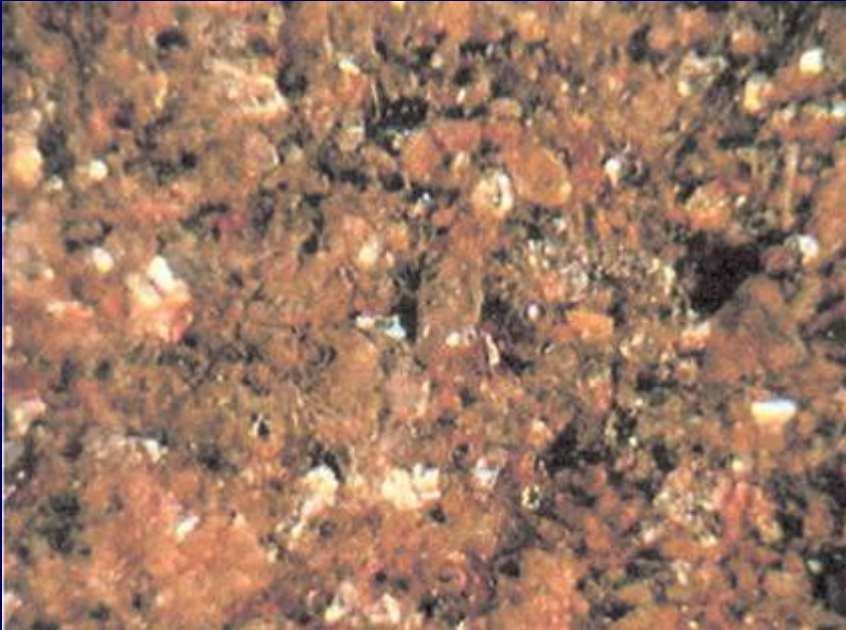
Improved Growth Characteristics



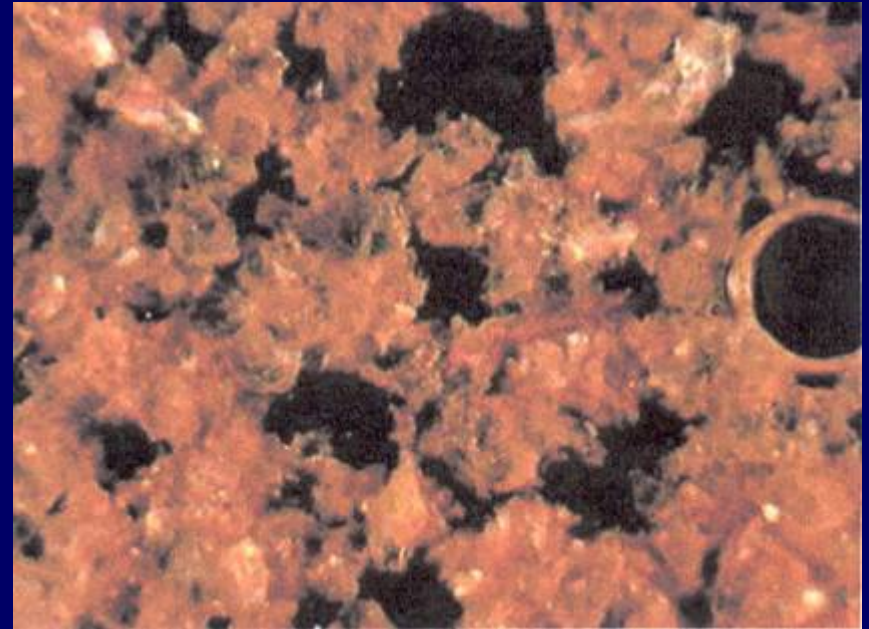
**Siltstop Retains
Nutrients, Improved
Porosity &
Permiability**



Improved Porosity/Permiability



**Without Siltstop – Soil
Pores Become Blocked**



**Without Siltstop – Soil
Pores Remain Open,
Improved
Permiability**

Thank You



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