



Removal and Restoration of In-stream Sediment Ponds: Part 2 – A Case Study

**Appalachian Stream Mitigation
Workshop**

Lexington, KY

April 11-15, 2011

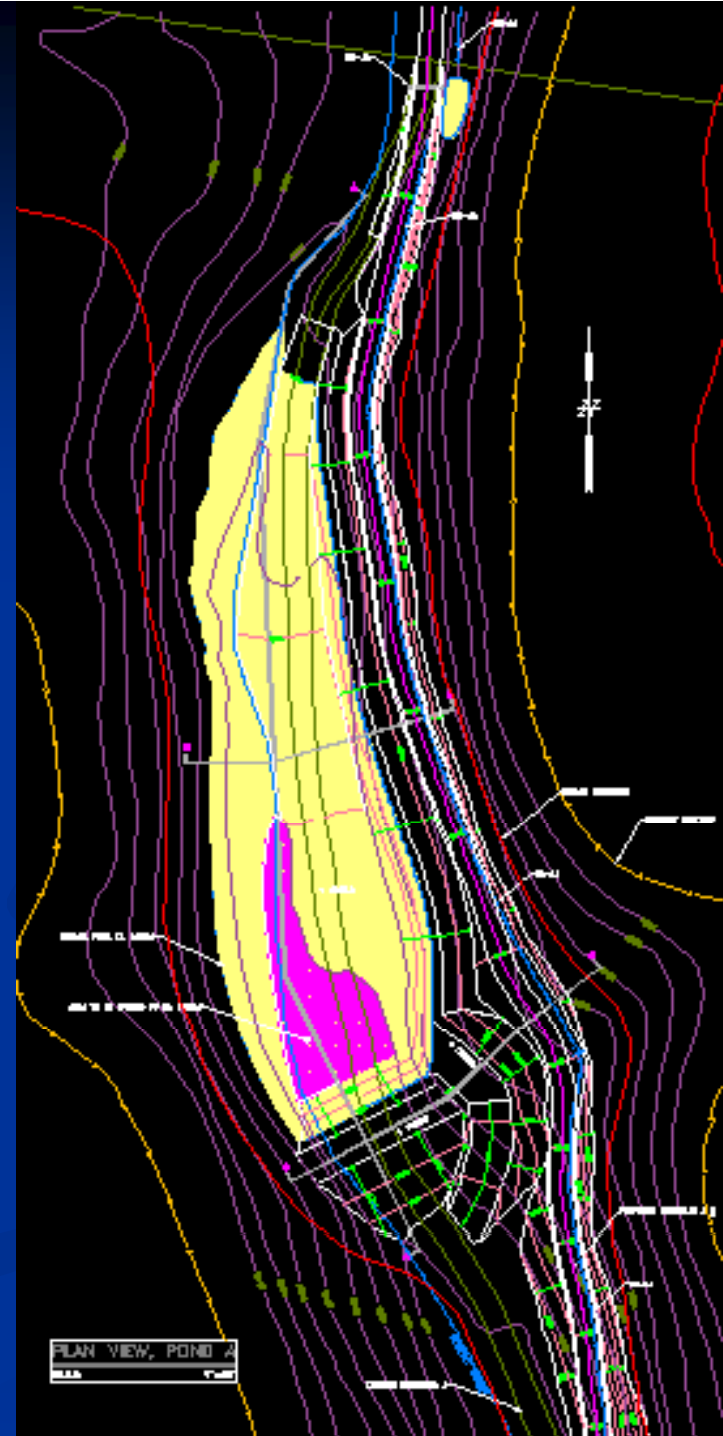
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D. R. Allen & Associates, P.C.**

Sediment Pond Removal

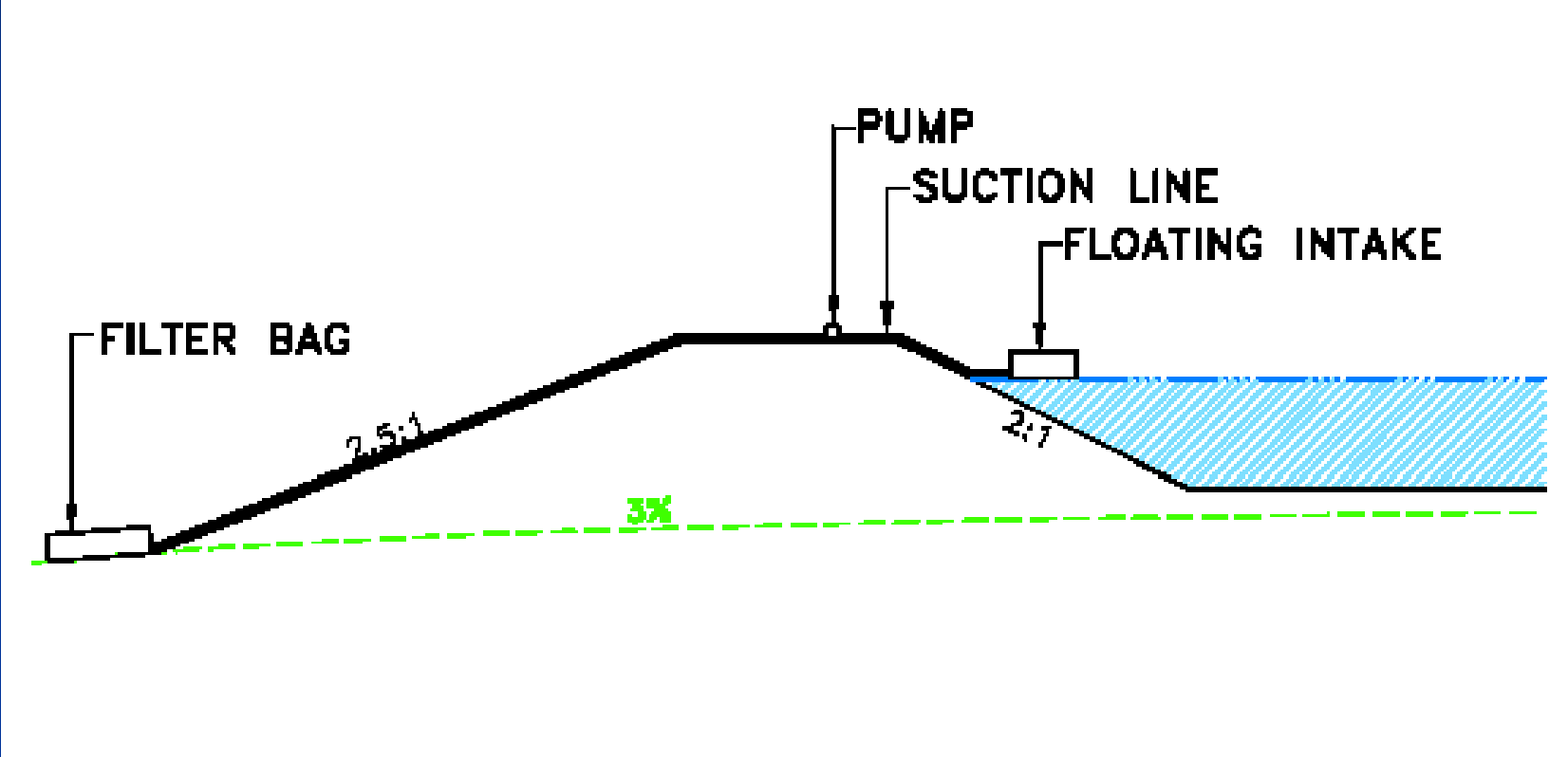
- Divert clean water
- Dewater pond pool through filter bag
- Breach embankment
- Establish rough channel or temporary diversion
- Remove remaining portion of embankment
- Use embankment material to isolate/blend sediment from pond
- Stabilize and cover sediment
- Temporary seeding
- Continue diversion and begin stream restoration
- Plant trees and herbaceous vegetation
- Monitoring

Divert Water

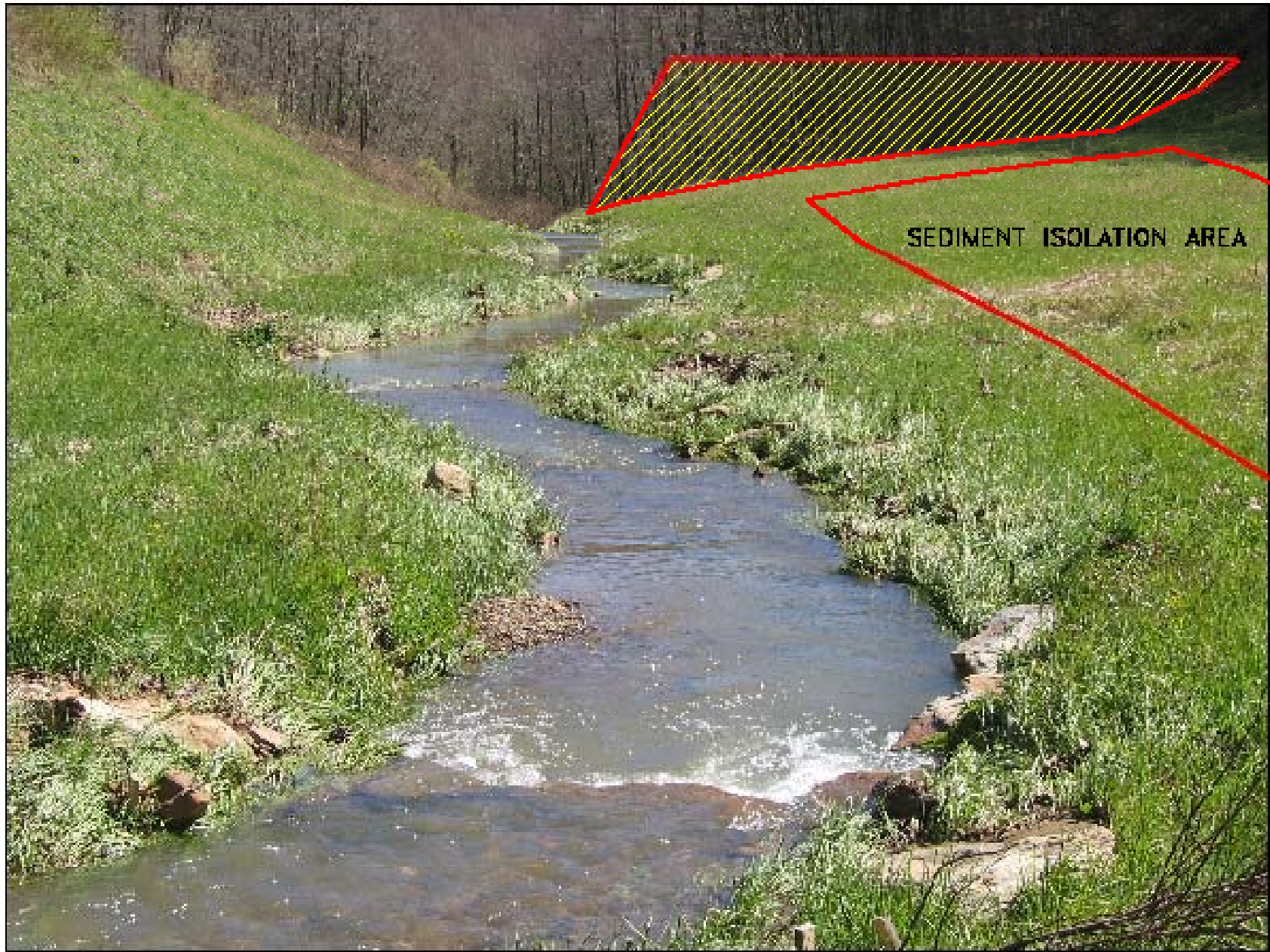
- Temporary diversion
- Pump around



Dewater Pond









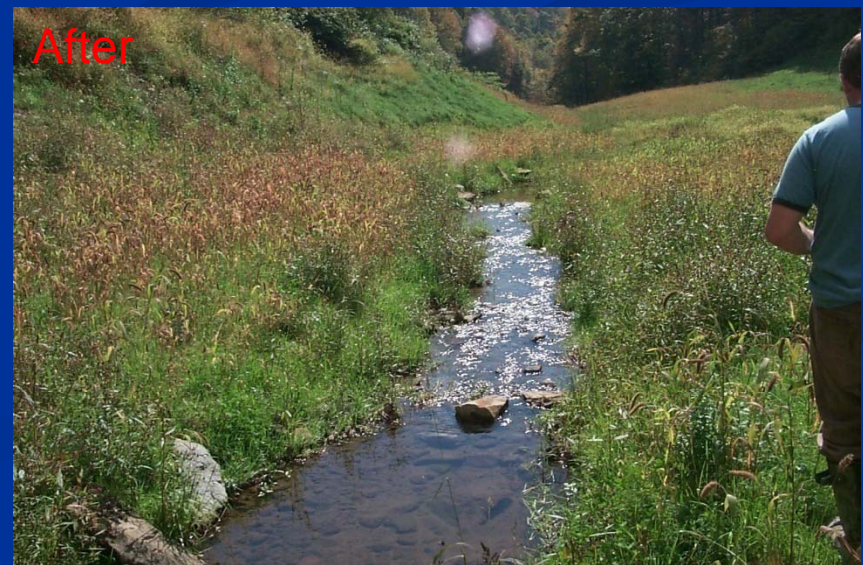




Stream Mitigation Plans

■ Goals and Objectives

- Restore impacted streams to a proper dimension, pattern, and profile
- Emphasis on restoration of stream and riparian habitats



Design Summary

- Design x-sectional area and bankfull flow based on D.R. Allen & Associates observed field data from stable streams in southwest Virginia
- Compare with VA Ridge & Valley, NC Mountain, and Eastern Regional curve data
- Design parameters based on dimensionless ratios calculated from a reference reach of the same stream type

Dimensionless Ratios

- Pool Depth/Riffle Depth
- Pool Width/Riffle Width
- Max Pool Depth/Mean Bankfull Depth
- Riffle Slope/Avg. Water Surface Slope
- Pool Slope/Avg. Water Surface Slope
- Riffle Max Depth/Mean Bankfull Depth
- Pool Length/Bankfull Width
- Pool to Pool Spacing/Bankfull Width

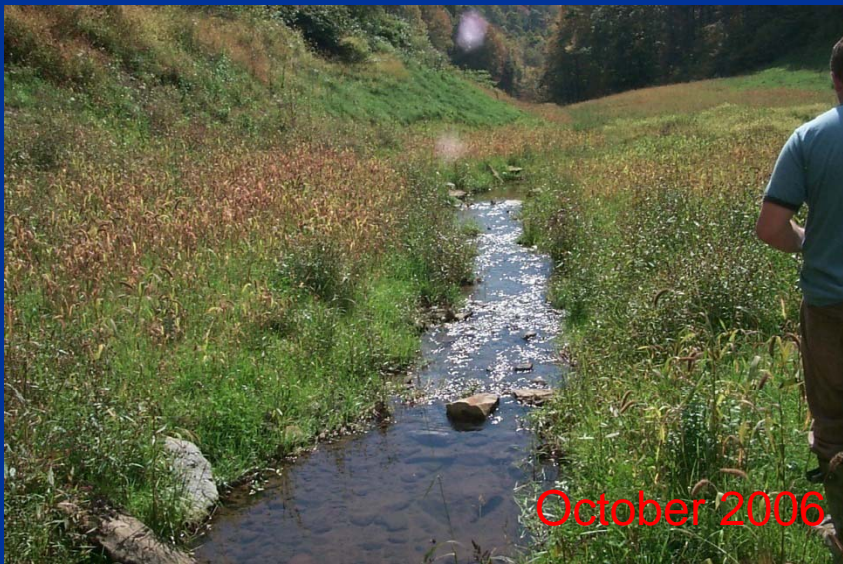
Chaney Creek

■ Design Criteria

- 1.6 sq. mi. drainage area
- Stream Type B3, B3c, B3a
- Slopes 1% - 6%
- Width/Depth Ratio 10 – 13
- Sinuosity 1.2 – 1.3
- Bankfull Width 13.3 – 15.2
- Max Pool Depth 3.0 – 3.5
- Pool Length 14.7 – 25.9
- Max Riffle Depth 1.4 – 1.7
- Pool Spacing 26.6 – 53.2



Chaney Creek



Riparian Corridor Establishment



Restoration Monitoring

Monitoring Event	Walk & Photograph	As-Built Survey	Fluvial Geomorphic Survey	Benthos	Fish	Riparian Zone Success
Immediately After Construction	X	X	-	-	-	-
Year 1	X	-	X	X	X	-
Year 2	X	-	-	X	X	-
Year 3	X	-	X	X	X	X
Year 4	X	-	-	X	X	-
Year 5	X	-	X	X	X	X



Monitoring Results



Chaney Creek						
Year	MBI	Cond.	Habitat	Fish (#species)	Trees/ acre	EKSAP
2007	0.54	622	169	156 (5)	700	0.52
2008	0.59	500	181	89 (6)	-	0.56
2009	0.66	455	183	171 (6)	-	0.62
2010	0.70	464	185	125 (5)	1230	0.63