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

Appalachian Stream Mitigation Workshop
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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

![During](attachment:stream-mitigation-plans-during.jpg)

![Before](attachment:stream-mitigation-plans-before.jpg)

![After](attachment:stream-mitigation-plans-after.jpg)
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

April 2006

June 2006

October 2006

April 2009
Riparian Corridor Establishment
## Restoration Monitoring

<table>
<thead>
<tr>
<th>Monitoring Event</th>
<th>Walk &amp; Photograph</th>
<th>As-Built Survey</th>
<th>Fluvial Geomorphic Survey</th>
<th>Benthos</th>
<th>Fish</th>
<th>Riparian Zone Success</th>
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</thead>
<tbody>
<tr>
<td>Immediately After Construction</td>
<td>X</td>
<td>X</td>
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</table>
## Monitoring Results

### Chaney Creek

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