Introduction to the 9 Elements of a Watershed Restoration Plan

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What is a Watershed Restoration Plan?
EPA’s 9 Elements

1. ID causes and sources of pollution
2. Estimate load reductions from practices
3. Mgmt. practices needed to achieve load reductions
4. Estimate technical and financial resources needed
5. Info/ed component - public awareness/participation
6. Implementation schedule
7. Interim milestones
8. Criteria: determining load reductions/progress
9. Monitoring: evaluate effectiveness
Water Quality

- Where do I find out if there’s a problem?
  - 303(d) List
- What exactly is wrong?
  - Chlorophyll-a
  - Fecal Coliform
  - Turbidity
  - Benthos
  - Fish Community
  - pH
  - Dissolved Oxygen
  - Metals (Zinc, Copper, Nickel, Arsenic)
- How do I figure out the sources of this problem?
  - Basinwide Plans
  - Local Watershed Plans
Impairment Source

Fecal Coliform
Impairment

Chlorophyll-a
Problem

Nutrients
Impairment

Turbidity

Source
Impairment

What is it?

Benthos

“Benthic Community”
Impairment

Fish Community

Source?

What is it?

Everything.
Why Work at the Watershed Scale?

Everything on the land ends up in the water:

Credit: Beaverdam Creek Watershed Management Plan
EPA’s 9 Elements of a Watershed Restoration Plan

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Possible Tools to Estimate Load Reductions

Also: EPA STEPL, Phosphorus Loss Assessment Tool, RUSLE-2
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Element 3: Management Practices to Improve Water Quality

• Riparian buffer (grass, forb, or trees; preferably fenced)
Element 3: Management Practices to Improve Water Quality

• Livestock Management
  • Alternative water sources
  • Fencing livestock out of the creek
  • Rotational grazing
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## Element 4: Estimate Technical/Financial Resources Needed

<table>
<thead>
<tr>
<th>Source</th>
<th>Grant Due Date</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWR 319 Program</td>
<td>May</td>
<td><a href="www.deq.nc.gov/about/divisions/water-resources/Planning/nonpoint-source-management/319-grant-program">www.deq.nc.gov/about/divisions/water-resources/Planning/nonpoint-source-management/319-grant-program</a></td>
</tr>
<tr>
<td>Ecosystem Enhancement Program</td>
<td>Ongoing</td>
<td><a href="www.deq.nc.gov/about/divisions/mitigation-services">www.deq.nc.gov/about/divisions/mitigation-services</a></td>
</tr>
<tr>
<td>Fund for Haywood County</td>
<td>September</td>
<td><a href="www.nccommunityfoundation.org/section/haywood">www.nccommunityfoundation.org/section/haywood</a></td>
</tr>
<tr>
<td>National Fish &amp; Wildlife Foundation, Five Star and Urban Waters Restoration Grant Program</td>
<td>February</td>
<td><a href="www.nfwf.org/Pages/default.aspx">www.nfwf.org/Pages/default.aspx</a></td>
</tr>
<tr>
<td>NC Clean Water Management Trust Fund</td>
<td>February</td>
<td><a href="www.cwmtf.net/">www.cwmtf.net/</a></td>
</tr>
<tr>
<td>NC Dept. of Justice Environmental Grants</td>
<td>August</td>
<td><a href="www.ncdoj.gov/EEG.aspx">www.ncdoj.gov/EEG.aspx</a></td>
</tr>
<tr>
<td>Pigeon River Fund</td>
<td>March, September</td>
<td><a href="www.cfwnc.org/Nonprofits/PigeonRiverFund.aspx">www.cfwnc.org/Nonprofits/PigeonRiverFund.aspx</a></td>
</tr>
<tr>
<td>TVA Community Relations Grant</td>
<td>Ongoing</td>
<td><a href="www.tva.com/About-TVA/Community-Relations">www.tva.com/About-TVA/Community-Relations</a></td>
</tr>
<tr>
<td>Z Smith Reynolds Foundation</td>
<td>February, August</td>
<td><a href="www.zsr.org/">www.zsr.org/</a></td>
</tr>
</tbody>
</table>

Credit: Fines Creek Watershed Action Plan
What Makes a Good 9-Element Watershed Plan?

1. ID causes and sources of pollution
2. Estimate load reductions from practices
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What Makes a Good 9-Element Watershed Plan?

1. ID causes and sources of pollution
2. Estimate load reductions from practices
3. ID mgmt. practices needed to achieve pollutant load reductions
4. Estimate technical and financial resources needed
5. Info/ed component - public awareness/participation
6. Implementation schedule
7. Milestones (progress towards mgmt. measures)
8. Criteria to measure water quality improvement over time
9. Monitoring to evaluate effectiveness of practices
## Implementation Schedule

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Location Description and Subwatershed</th>
<th>Ownership</th>
<th>Implementation Time Period (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-3</td>
</tr>
<tr>
<td>1</td>
<td>Urban Branch</td>
<td>Public</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Suburban Branch</td>
<td>Public</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rural Branch/ Friendly Neighbors Road</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Urban Branch</td>
<td>Public</td>
<td></td>
</tr>
</tbody>
</table>

Milestones are measures of what needs to be accomplished over time to fully implement the watershed management plan.
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<table>
<thead>
<tr>
<th>Pollutant Issue</th>
<th>Management Action</th>
<th>Target Criteria</th>
</tr>
</thead>
</table>
| Streambank erosion | Stream improvements:  
  • Streambank enhancement  
  • Stream channel restoration  
  • Riparian area revegetation | • Linear feet of stream channel improved  
  ○ Feet of bank reshaping  
  ○ Feet of channel restoration  
  • Acres of riparian area revegetated  
  ○ Number of native plants installed  
  ○ Survival of plants |

Ideally, measure or photo-document impact on water quality outcomes

Credit: Upper Swannanoa Watershed Management Plan
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Monitoring to Evaluate Project Effectiveness

- Before and after photos
- Existing DWR monitoring stations
- Citizen science monitoring
- QAPPs for use support or other monitoring

Streambank stabilization accomplished with a native riparian buffer.

Credit: Middle Fork South Fork New River plan
Parting Thoughts

Developing a Watershed Restoration Plan is a team effort. Some questions to ask at the beginning of the process:

• Where will the money come from?
• Who can administer the funds?
• Who can schedule and run meetings?
• Who can perform watershed monitoring?
• Who can run educational outreach?
• Who can provide technical or engineering support?