Nothing Compares
NORTH CAROLINA

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

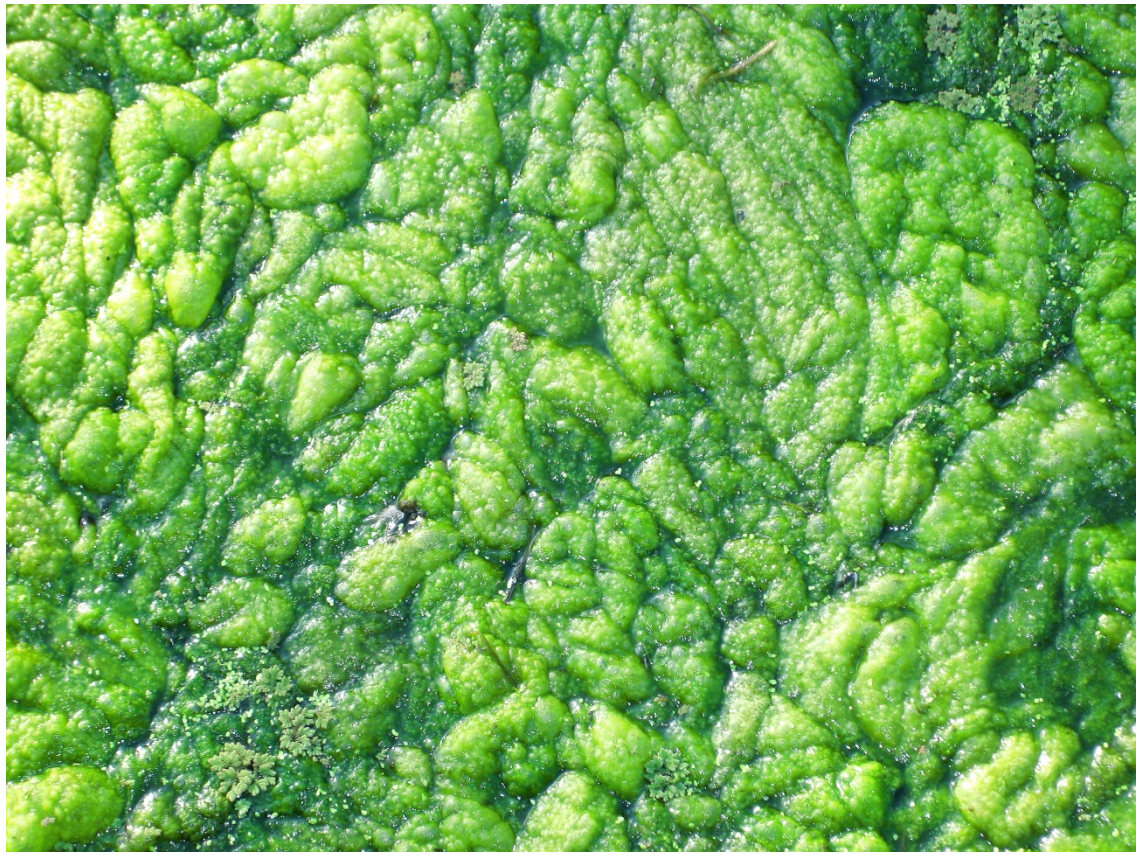
Source

Fecal Coliform

Impairment

Source

Chlorophyll-a



Problem

Nutrients

Impairment

Source

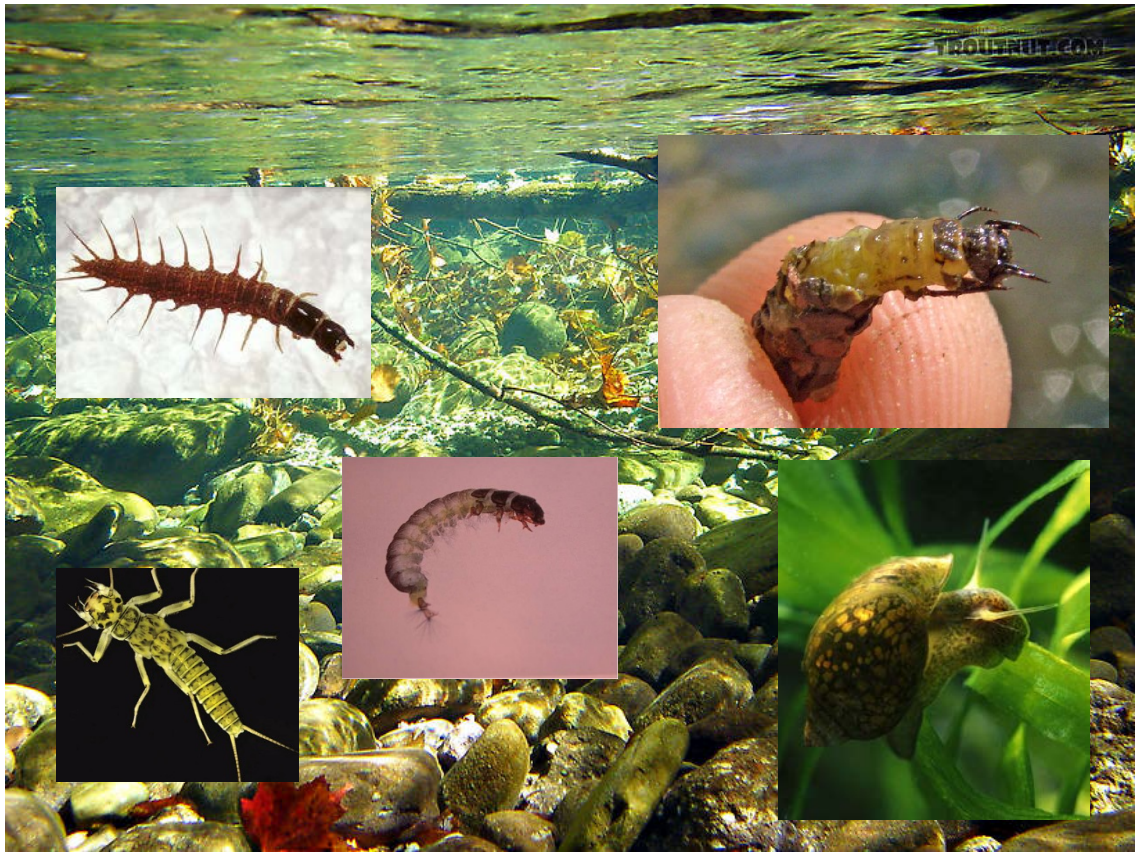
Turbidity

Impairment

What is it?

Benthos

“Benthic Community”



Impairment

Fish Community

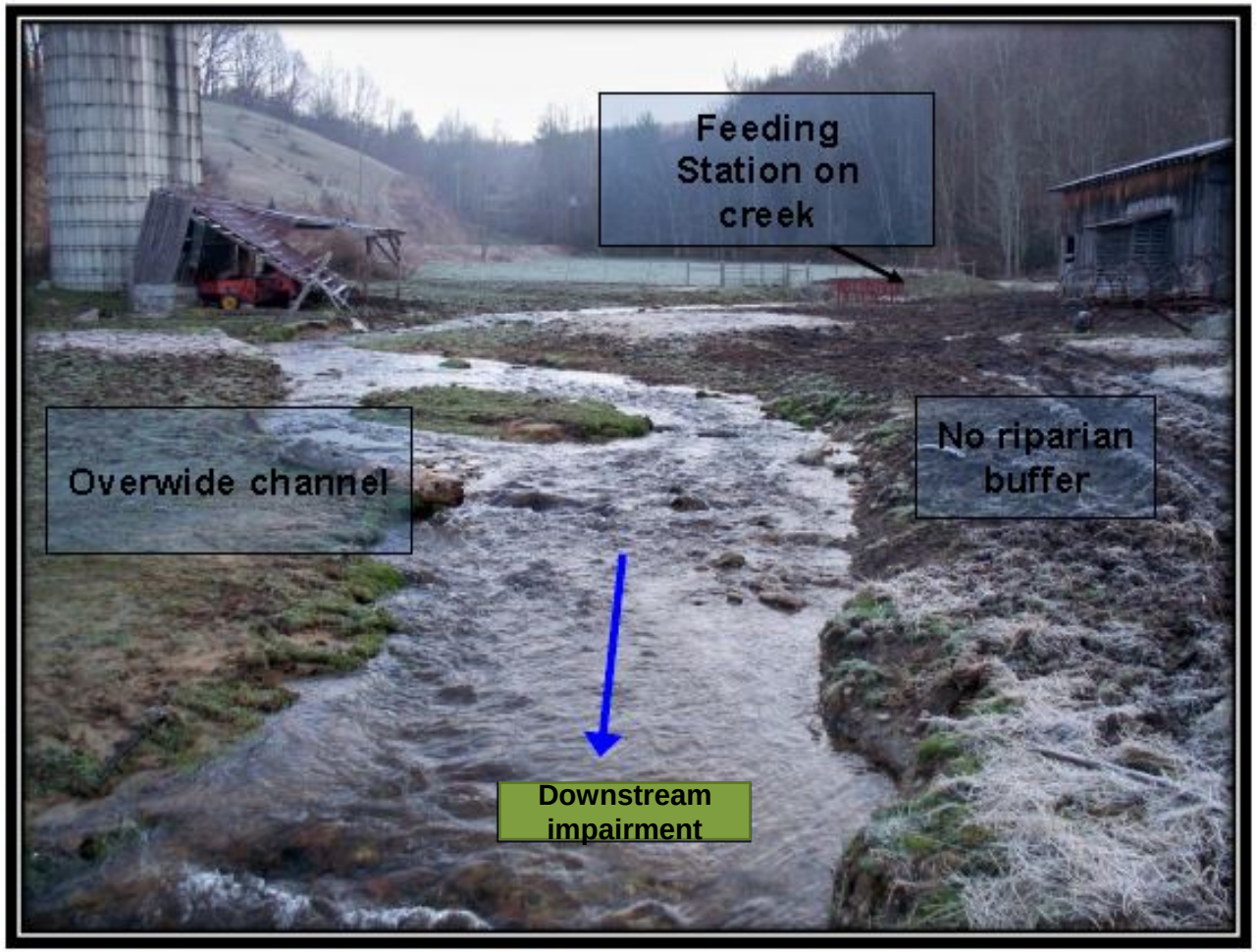
What is it?

Source?

Everything.

Why Work at the Watershed Scale?

Everything on the land ends up in the water:



Credit: Beaverdam Creek Watershed Management Plan

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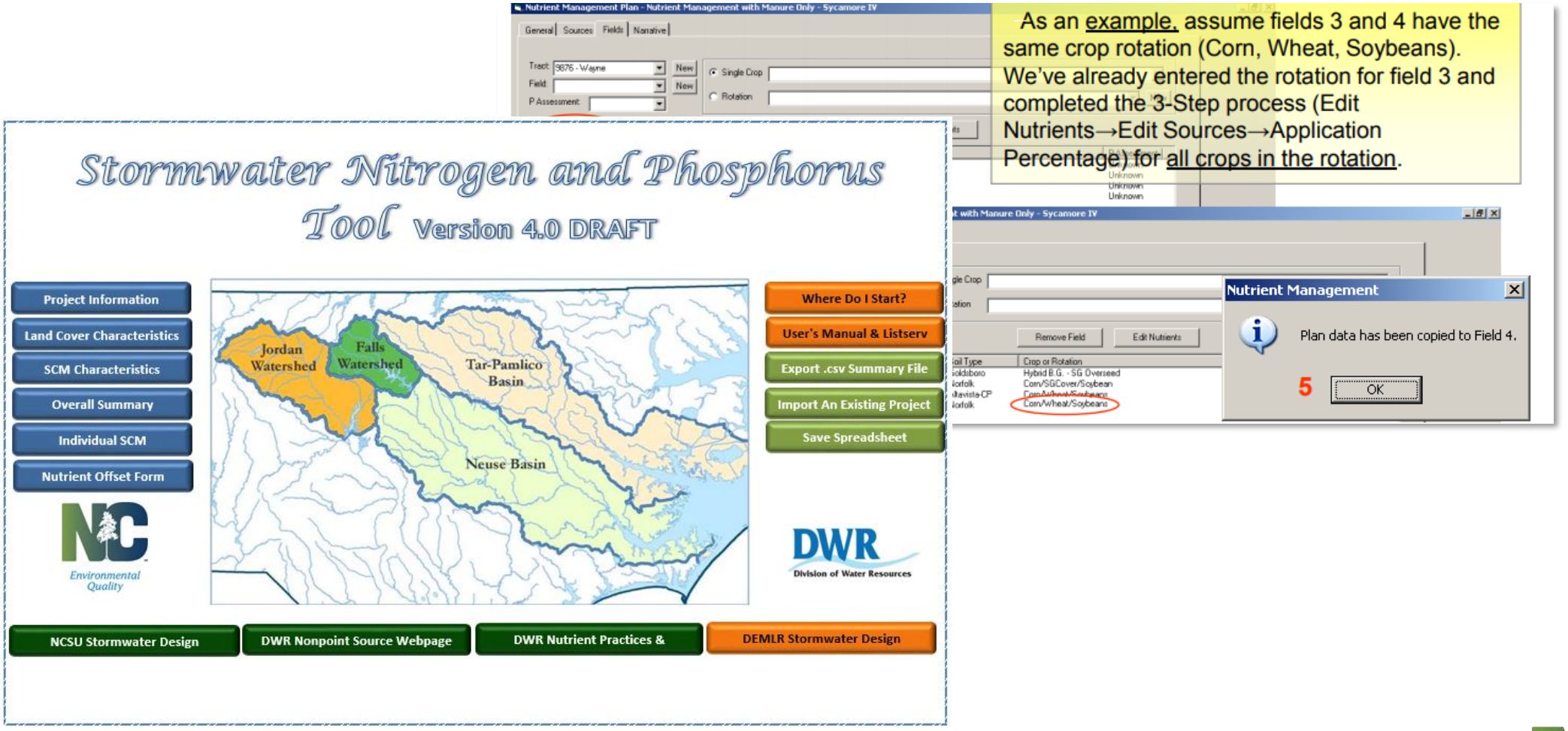
Possible Tools to Estimate Load Reductions



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

Source	Grant Due Date	Website
Duke Energy Foundation Water Resources Fund	May, November	https://www.duke-energy.com/community/duke-energy-foundation/water-resources-fund
DWR 319 Program	May	www.deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/319-grant-program
Ecosystem Enhancement Program	Ongoing	www.deq.nc.gov/about/divisions/mitigation-services
Fund for Haywood County	September	www.nccommunityfoundation.org/section/haywood
National Fish & Wildlife Foundation, Five Star and Urban Waters Restoration Grant Program	February	www.nfwf.org/Pages/default.aspx
NC Agricultural Cost-Share Programs	Variable	www.ncagr.gov/SWC/costshareprograms/ACSP/index.html
NC Clean Water Management Trust Fund	February	www.cwmtf.net/
NC Dept. of Justice Environmental Grants	August	www.ncdoj.gov/EEG.aspx
NRCS Financial Assistance Programs	Variable	www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/
Pigeon River Fund	March, September	www.cfwnc.org/Nonprofits/PigeonRiverFund.aspx
TVA Ag & Forestry Fund	January	wnccommunities.org/index.php/2015/tva-ag-forestry-fund-2015/
TVA Community Relations Grant	Ongoing	www.tva.com/About-TVA/Community-Relations
Z Smith Reynolds Foundation	February, August	www.zsr.org/

Credit: Fines Creek Watershed Action Plan

What Makes a Good 9-Element Watershed Plan?

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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

Site Number	Location Description and Subwatershed	Ownership	Implementation Time Period (years)		
			1-3	4-7	8-10
1	Urban Branch	Public		X	
2	Suburban Branch	Public		X	
3	Rural Branch/ Friendly Neighbors Road	Private			X
4	Urban Branch	Public		X	

Milestones are measures of what needs to be accomplished over time to fully implement the watershed management plan.

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Criteria to Determine Impact of Management Practices

Pollutant Issue	Management Action	Target Criteria
Streambank erosion	Stream improvements: • Streambank enhancement • Stream channel restoration • Riparian area revegetation	• Linear feet of stream channel improved o Feet of bank reshaping o Feet of channel restoration • Acres of riparian area revegetated o Number of native plants installed o 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

Streambank stabilization accomplished with a native riparian buffer.

Credit: Middle Fork South Fork New River plan

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

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?