

November 30

Meeting Summary

# Tar-Pamlico

## Local Watersheds Planning Team

*Watershed Education for Communities and Local Officials*

[www.ces.ncsu.edu/depts/agecon/WECO/tar\\_pamlico.htm](http://www.ces.ncsu.edu/depts/agecon/WECO/tar_pamlico.htm)

### NEXT MEETING

**February 14,  
2005**

**1:00-3:00 p.m.**

**Pitt County  
Agricultural Center  
Auditorium**

**403 Govt. Circle  
Greenville, NC**

#### Directions:

264 east to Greenville.  
Turn left on 264 By-pass and continue north to Exit 80. Take Exit 80 onto Hwy. 11/13 south and travel ¼ mile to Belvoir Rd/Hwy. 33. Turn left onto Belvoir Road/Hwy. 33. Continue straight, crossing Greene St., until you come to Old Creek Road. Turn left onto Old Creek Road and then left into the Pitt County Office Complex. [The Pitt County Agricultural Center is located at the far right of the circle.](#)

#### Next meeting

- Update on watershed assessment
- Hear group's feedback about work so far

## Watershed Team Looks to Future Watershed

The Tar-Pamlico Local Watersheds Team met on November 30 at the Braswell Center in Tarboro to discuss ideas for a vision of the watershed, and to hear an update on the watershed assessment. This Newsletter contains summaries of the presentations and the results of the group's discussion.

As usual, all Powerpoint presentations are

posted in Adobe PDF format on the WECO website listed above. There is also a new comment form on the website for you to post anonymous suggestions or comments.

If you have any questions about the planning process, feel free to call Christy Perrin at 919-515-4542 or email her at [Christy\\_perrin@ncsu.edu](mailto:Christy_perrin@ncsu.edu)

## How Should Our Watersheds Function?

Watersheds perform a number of functions, such as cycling nutrients and storing storm water. The assessment aims to evaluate the watersheds' abilities to perform a number of functions.

The group was involved in an exercise to discuss how the watersheds *should* function, and what types of services should be provided from those functions. This information can help the project team to determine potential goals for the planning process. It is also useful to know what the group's priorities are for the watersheds.

The group broke into subgroups based on the rural and urban watersheds. The initial results are posted here.

### Urban Watersheds

#### *Provide Water Supply*

- Public Water Supply
- Aquifer Recharge

#### *Protect Wildlife Habitat & Biodiversity*

- There should be a plethora of diversity.

- To provide aquatic and riparian habitat within an urban landscape that represents the least altered condition from an urban reference standard.
- To be the best (optimal) functioning riparian ecosystem possible in an urban landscape (holistic) Wildlife Habitat
- Birds -Provide habitat for a variety of songbirds for birdwatchers.

#### *Providing Recreational & Educational Opportunities*

- Educational
- Provide areas for class field trips, K-12.
- Green Space Recreation
- Natural Recreation Activities
- Greenways

#### *Flood Control*

- To provide hydrologic stream functions that are the least-disturbed (altered) from an urban reference standard system.

## How Should our Watersheds Function continued...

- Provide stormwater retention at appropriate locations.
- Find balance between providing stormwater quantity and quality.
- Control flood into rural storms.
- Flood Control (4 comments)

### *Protecting Water Quality*

- Sediment Control
- Improvement of stream bank stabilization (aquatic Habitat function)
- Clean water, which meets its intended uses.
- Provide storm water treatment, i.e. removal of NPS pollutants
- Minimal pollution
- Nutrient removal
- Clean up run-off before it gets to the sounds

### **Rural Watersheds**

#### *Water Quality*

- Storm water Management treatment
- Control storm water run-off (2)
- Improve water quality (2)
- Natural filter system
- Clean water
- Control nutrients leaving agricultural and individual homesites
- Retention ponds for existing subdivisions and trailer parks
- Filter out pollutants
- Buffer zone

#### *Recreation*

- Recreation Greenways
- Open Space & Greenways
- Recreation

#### *Sustainable Agriculture*

- Enhance Agricultural Opportunities
- Access for Irrigation
- Sustain agriculture

#### *Flood Control*

- Flood control
- Flood prevention
- Preserve Floodplain

- Improved Drainage
- Reduce Flooding
- Retain (slow) water from run off to decrease likelihood of downstream flooding (2 comments)

#### *Human Habitat*

- Land for housing

#### *Wildlife Habitat*

- Wildlife Corridors
- Recreational Fishing
- Provide habitat for a diverse array of wildlife.
- Rare Species Habitat
- Wildlife Habitat (2)
- Wildlife

#### *Land Preservation*

- Conservation Easements
- Forestry
- Open Space
- Farmland preservation
- Preserve Agriculture

#### *Discussion:*

The group discussed the merits of ranking the various issues as a tool to help prioritize potential projects in the watershed and to clarify the group's vision for these watersheds. A ranked list of prioritized issues would be useful for the watershed assessment team. Several participants pointed out that the issues identified through the exercise include a mix of *watershed functions* and *watershed uses, products or services*, so ranking the issues as identified would be like ranking apples and oranges.

The project team decided to determine how to organize the information after the meeting and will look into developing a survey for group members to complete at a later date.

## Overview of a Coastal Plain Landscape from a Restoration Perspective

East Carolina University (ECU) has been working with EEP and Blue Land Water Infrastructure (BLWI) to develop a stream assessment methodology that is appropriate for the coastal plain. Dr. Mark Brinson, of ECU, provided the framework for understanding the stream assessment methodology as it pertains to the coastal plain. His presentation is summarized below - for his complete powerpoint presentation check out our website.

The goals of the assessment development and pilot studies are to:

- Determine the condition of streams/riparian ecosystems at the reach scale (~100 yard)
- Estimate the condition of streams/riparian ecosystems at the sub-watershed scale (5-25 sq. mi.)

A stream, or watershed's, functions are what the ecosystem actually does, regardless of how people benefit from it. Three functions of forest buffers on streams relate to:

- Hydrology
  - Reduce surface runoff
  - Stabilize channels with roots and buried wood
- Nutrients and sediment
  - Plants take up nutrients and store them
  - Organic matter production drives denitrification
- Habitat
  - Often the main forest habitat in the landscape
  - Types of biodiversity that is absent in other places

### Length of Headwaters Streams

Headwater streams include the first and second order streams (the smallest streams that feed into a watershed system). Between 70-80% of stream length in a watershed consists of headwater streams. These

provide a major connection between land and water, and should be an important focus for restoration. Table 1 shows how much of the streams in the focus watersheds are first and second order streams

### Landuse and impacts on water quality

Mark described 3 different areas that make up the watersheds:

Interstream divides: upland areas that are relatively closed hydrologically are not large sources of nutrient-rich water. Not much opportunity here for restoring water quality or hydrology.

Agricultural areas: These areas provide potential for forested buffers, although their establishment is complicated by complex land ownership patterns

Bottomland floodplain swamps: consist of hardwood forests, and channelized streams mostly without agriculture. Natural channels support productive hardwood forests.

### Roadside ditches

Represents a fairly strong source of sediment (which carries phosphorus), and is directly connected to streams. Highways have caused a large expansion of the drainage network.

### Urban impervious surfaces

10-15% impervious surface in a watershed is the threshold for degrading streams. Mark showed a slide that illustrated a developed area with 27% impervious surface development.

### Beaver Impoundments

These may be providing some mitigation of water quality problems, such as nitrogen loading. Beaver ponds directly interfere with maintaining forests for timber production.

**Table 1: Length of Headwater Streams**

watershed name	watershed area, mile <sup>2</sup>	stream length by stream order, miles				1st & 2nd % of total
		1st	2nd	3rd	4th	
Cow Swamp	17.2	16.3	5.1	4.7	3.3	73%
Crisp Creek	17.7	14.5	4.0	3.9	3.2	72%
Hendricks Creek	8.8	12.5	5.9	3.4	1.0	81%
Green Mill Run	13.3	10.0	6.9	1.8	5.0	71%

## Stream Assessment Method

Kevin Miller, of EEP, presented the stream assessment methods that the project team is using to evaluate the watersheds.

The *objective* of the assessment is to characterize individual stream reaches AND the watershed as a whole.

Kevin re-iterated the riparian ecosystem functions, providing specific examples:

- Hydrology
  - Surface water storage and transport
  - Groundwater discharge/recharge
- Biogeochemistry (nutrient, sediment processes)
  - Carbon production and storage
  - Nutrient cycling
- Habitat
  - Aquatic habitat for fishes, amphibians, invertebrates, etc.
  - Terrestrial habitat for mammals, birds, reptiles, etc.

The team will be measuring *indicators* that are intended to evaluate condition of riparian systems. The indicators can provide evidence of the condition, which relates to how the systems are functioning. These indicators include:

- Riparian zone condition (~100 ft. wide)
- Near stream condition (0-10 ft.)
- Instream woody structure
- Sediment regime
- Channel riparian zone connection
- Off/onsite factors affecting stream channel
- On/off site factors affecting riparian zone
- Composition and structure of vegetation in riparian zone
- Bank stability (high order only)

**Biomass** is a mega-indicator of condition, relating to all of the functions. Biomass refers to all the living organic matter (trees, shrubs, above ground living organic matter). One can relate the amount of biomass to various **land use cover types**. The team can look at the cover types in reference reaches (a reach that is intended to be indicative of what is repeated in the landscape), to predict biomass. Basically, the more biomass you see, the better the condition of the riparian system. You would expect the most biomass in forests, and no biomass in impervious surfaces (the more intensely developed, the less amount of biomass).

Kevin discussed how each of the indicators can be interpreted for the riparian ecosystem functions that they reveal. We are providing an example for one of the indicators, *channel - riparian zone connections*. For discussion about the remaining indicators, you can view his presentation on our website.

**Channel Riparian Zone Connection:** this indicator relates to the ability of high streams flows to overflow the banks into a floodplain (which is a natural occurrence). This ability affects ALL FUNCTIONS in both the stream channel and riparian zone

- The connection between the stream channel and riparian zone is fundamental to riparian ecosystem functioning
- This is determined by the degree of incision and evidence of overbank flow

The channel riparian zone connection, when altered, interferes with the functions in the following ways:

- Hydrology
  - The greater the channel capacity, the higher flow necessary to reach overbank
  - Higher flow velocity means more rapid transport of water, nutrients, and sediment during high flows
  - Whole-system storage volume is reduced and thus transports water more quickly downstream
- Biogeochemistry or nutrient cycling
  - Lower water table reduces contact between groundwater and organic soils, reduces denitrification, increases soil aeration, and inhibits anaerobic processes
  - Greater oxidation reduces accumulation of organic matter

## Stream Assessment Method continued...

- Habitat
  - Terrestrial habitat becomes dryer without overflow, and fewer hydrophytes (water dependent species) are supported
  - Aquatic habitat becomes degraded with more sediment

### Selection of Sampling Reaches

A random sampling approach was used to select the stream reaches for investigation in each of the watersheds. The team used various methods of identifying streams to ensure that headwater streams were included in the list of stream reaches from which the random sampling was taken. BLWI staff assessed those reaches based on the indicators chosen.

### Assessment Update

Amber Coleman, BLWI, provided an update on the watershed assessment and watershed modeling that will occur. Check out her interesting Powerpoint presentation, including stream photos, on the project website.

Regarding the Coastal Plain Stream Assessment:

- Field assessment completed July-September 2004
- 23-46 points sampled per watershed by a 2 person crew
- Assessed sample locations for the indicator functions discussed by Kevin

Amber showed the average scores calculated for the indicators in each of the four watersheds (see Table 2). She then showed examples of each of the indicator functions and how the stream systems looked based on the degree of degradation. The project team’s next step is to analyze the data collected through the field assessment. These results will be presented to the group for their review and feedback at a future meeting.

Amber briefly introduced MUSIC, a model that will be used in this watershed assessment. MUSIC (Model for Urban Stormwater Improvement Conceptualisation) was developed in Australia and is currently used by Brisbane and Melbourne city governments. MUSIC is a planning level model that simulates the performance of a “treatment train” of stormwater improvement projects and their effect on water quality. More information about MUSIC can be found at: <http://toolkit.net.au/music>.

**Table 2: Average Scores for indicators in Each Watershed**

Indicator	Hendricks Creek	Cow Swamp	Crisp Creek	Green Mill Run
Instream Woody Structure	2	3	3	2
Sediment Regime	2	3	3	3
Channel-Riparian Zone Connection	2	3	4	3
Factors Affecting Stream Channel	2	3	3	3
Factors Affecting Riparian Zone	2	3	4	3
Vegetation	Left: 3, Right: 2	3	Left: 3, Right: 4	Left: 3, Right: 4
Streambank Stability	3	3	3	3

\* Scores are average scores across each subwatershed; 1 = Relatively Unaltered to 4 = Severely Altered



Watershed  
Education for  
Communities and  
Officials

NC State University  
Campus Box 8109  
Raleigh, NC 27695

PHONE:  
(919) 515-4542

E-MAIL:  
Christy\_perrin@ncsu.edu  
Patrick\_beggs@ncsu.edu

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We're on the Web!

*See us at:*

**[www.ces.ncsu.edu/](http://www.ces.ncsu.edu/)**  
**WECO**

## Meeting Participants

Nancy Baldwin, Edgecombe Co. Planning  
Patrick Beggs, WECO; NCSU  
Art Bradley, Edgecombe Cooperative Ext.  
Mark Brinson, ECU  
David Brown, City of Greenville  
David L. Cashwell, Town of Tarboro  
Robert Cheshire, City of Greenville  
Amber Coleman, BLWI  
Bonnie Duncan, EEP-DENR  
Bob Holman, NCDOT  
Dwane Jones, NC Cooperative Extension  
Natalie Jones, DSWC  
Alice Keene, Pitt Co.  
Margaret Knight, Edgecombe SWCD  
Amy Lamson, EEP-DENR  
Troy Lewis, Town of Tarboro  
Chiquita McDowell, Edgecombe Co. SWCD  
Kevin Miller, EEP-DENR, ECU  
Sam Noble, Town of Tarboro

Christy Perrin, WECO; NCSU  
Lee Perry, Town of Tarboro Parks & Rec.  
Connell Purvis  
Marc Recktenwald, EEP-DENR  
Rick Rheinhardt, ECU  
James Rhodes, Pitt Co. Planning Dept.  
Melissa Ruiz, BLWI  
Dallas Shackelford, Edgecombe Co. SWCD  
Stephen Smith, Pitt Co. Planning Dept.  
Lisa Smith, City of Greenville  
C. Leroy Smith, Clean Water Mgt. Trust  
Sue Stuart, Daily Southerner  
Charles R. Vandiford, SE Drainage District

May you and yours enjoy a peaceful holiday season

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Watershed Education for Communities and Officials  
Dept. Agricultural & Resource Economics  
Campus Box 8109  
Raleigh, NC 27695-8109