NWQEP NOTES

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NC STATE UNIVERSITY

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PROJECT SPOTLIGHT

Stone Mountain State Park Stream Restoration Project on the East Prong Roaring River

Dani Wise-Frederick
North Carolina Stream Restoration Institute

Laura Lombardo
NCSU Water Quality Group

Introduction

The East Prong Roaring River stream restoration project is located within the boundaries of Stone Mountain State Park in Wilkes and Allegany Counties in western North Carolina. The drainage area for the section of river being restored is approximately 22 square miles. Nearly 2 miles of restoration work was completed, making this one of the largest projects of its kind in the State. Total cost is approximately $1 million.

The project is a collaborative effort between the North Carolina Wetlands Restoration Program, North Carolina Division of Parks and Recreation, and the North Carolina Stream Restoration Institute (NC SRI).

Due to the location of the project, it offered a rare opportunity for a "true restoration," allowing the river to be restored to its pre-disturbed condition. As nearly all the land in the watershed lies within the park boundaries, restoration efforts were not constrained by utilities, roads and residences.

Design of the restoration work began in January 2000, with permit applications submitted in early May 2000 and construction running from July to October 2000. Floodplain and stream bank planting will continue through the winter until February 2001.

Historical Land Use

Stone Mountain State Park was purchased by the State of North Carolina in the early 1960s. Prior to this purchase, all of the streams in the alluvial valley portion of the park were modified to improve agricultural production. Field observations suggest that tributary streams were straightened. Much of the downstream portion of the restoration site was used for gravel mining, and as part of this operation, the East Prong was channelized, impounded, and moved several times, resulting in destabilization of the channel. Figure 1 shows riprapped banks. Spoil piles generated from the mining operation created overly high banks, which eroded away during high flows (see Figure 2). Aerial photos (1999) and the 1968 USGS Glade Valley Quadrangle indicate locations of the historic channels.

Figure 1: Pre-restoration riprap in Reach 2

Fig 2: Pre-restoration bank erosion in Reach 4

EDITOR'S NOTE

Over the past century, our rivers and streams have taken quite a beating. They have been moved and straightened to make way for agriculture and mining, channelized and widened for flood control, and piped and paved over for urbanization. Signs of unhealthy, unstable streams are everywhere, from eroded banks and lack of diverse aquatic life to filled-in channels that require dredging. Fortunately, attitudes about rivers and streams are changing. People are recognizing their numerous values, such as aesthetics, aquatic habitat and flood control when they are left in, or returned to, their natural state.

Stabilizing and restoring rivers using natural channel design is gaining wide spread recognition among scientists and engineers as a preferred alternative to traditional engineering approaches. This issue of *NWQEP NOTES* features a stream restoration project using natural channel design to reduce bank erosion and improve aquatic life. This project is one of the largest of its kind in North Carolina and will be used as a demonstration site to educate professionals and the public on how to restore a stream to a healthy, naturally stable state.

As always, please feel free to contact me regarding your ideas, suggestions, and possible contributions to this newsletter.

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Restoration Goals

As a result of the modification of the river for agricultural and mining purposes, banks were unstable and eroded at an accelerated rate, transporting sediment into the river, which degraded water quality and aquatic habitat (see Figure 3). The purpose of the project is to reestablish the historic channel of the river and restore it to a healthy, naturally stable and self-maintaining system over the long term.

The goals of the project are as follows:

- Improve water quality degraded by sedimentation by returning the river to a stable dimension, pattern and profile;
- Restore the aquatic and terrestrial habitat of the stream corridor;
- Restore floodplain and wetland functionality; and
- Improve the natural aesthetics of the river corridor.

These goals will be met by applying *natural channel design* principles and techniques. The stream segment to be restored was divided into 4 reaches, based upon changes in valley types moving downstream.

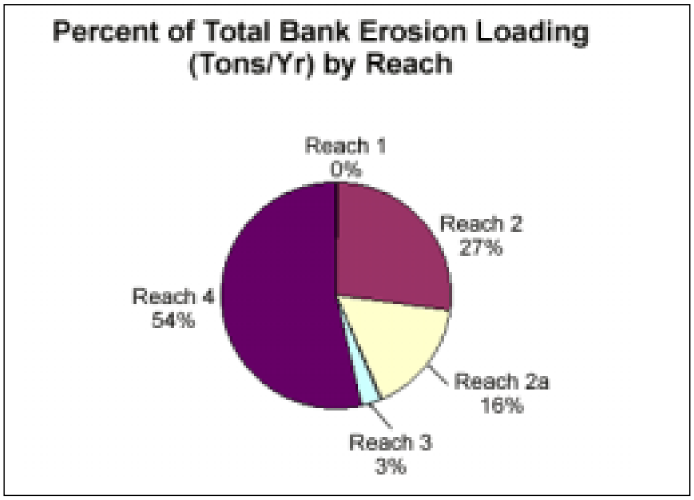

Fig. 3

Natural Channel Design

Natural channel design techniques and procedures for stream restoration and stabilization were first employed about a decade ago. Dave Rosgen, a professional hydrologist in Colorado, pioneered this work, developing a river classification system and restoration design methodologies. This type of restoration differs from the traditional engineering approach of armoring unstable stream banks with riprap or simply patching a problem area using bioengineering. One major difference in approaches is that with natural channel design, the *morphology* (size and shape) of the stream is taken into account. The *dimension* (cross-sectional area), *pattern* (view as seen from above) and *profile* (longitudinal slope) of the stream are quantified, classified, and examined to assess the evolutionary stage of the particular channel. The Rosgen stream classification system is useful for this morphological assessment and provides a standard "language" or frame of reference for professionals, such as engineers, hydrologists and biologists, to use in communicating stream morphology and condition information. Knowing a stream's "type" says a lot about the characteristics of the existing channel as well as the channel's potential future condition. Information on the Rosgen Classification System in North Carolina can be found in the NC SRI River Course Factsheet #2.

Another major difference between restoration approaches is the initial *watershed assessment* conducted as part of natural channel design. The purpose of the assessment is to see what is happening in both the watershed and the area immediately surrounding the stream to determine the cause(s) of stream instability and also how that instability might be addressed.

The goal of natural channel design is to design a stable morphology for the disturbed stream, in which the channel *maintains its dimension, pattern and profile over time without degrading or aggrading*. "Tools" such as *regional curves* and *reference reaches* are required. The regional curve is a bankfull hydraulic geometry relationship that is developed for a particular hydrophysiographic region, such as the piedmont of North Carolina. Regional curves look at the relationship between channel cross-sectional area, discharge, depth, width, all at the *bankfull stage*, and drainage area. The *bankfull stage*, during bankfull flow, is the point at which flooding occurs on the floodplain. *Bankfull discharge* is the flow that transports the majority of a stream's sediment load over time, thereby forming the channel. It occurs, on average, approximately every 1.5 years. As bankfull discharge is the most important stream process in defining channel form, its identification is a key component of natural channel design. Bankfull stage is first identified in the field by visual indicators, such as a bench, top of the bank, or the highest scour line. Regional curves can then be used as tools to verify bankfull stage in ungaged watersheds.

In order to examine bankfull hydraulic geometry relationships and develop a regional curve for a particular hydrophysiographic region, gaged sites within the region of interest are surveyed. These sites must have similar land use, as urban sites typically will have different relationships than rural sites. More information on bankfull indicators and regional curves in North Carolina can be found in the NC SRI River Course Factsheet #3.

The survey of a *reference reach* is another necessary tool to aid in the design of a stable channel. A reference reach is a stream that has been identified to act as a "reference" for the design of the new stable channel. The reference reach must be of the same "type" that the unstable stream is being restored to. It must have a similar drainage area as the unstable stream, similar land use in its watershed, and it must be stable. The detailed survey of the reference reach provides information that is used in the natural channel design procedures.

Methodology

The following steps were taken in the restoration effort. As stated earlier, the portion of the stream to be restored was divided into four sections or reaches.

Step 1: Assess the watershed to determine possible reasons for instability in Reaches 2 and 4.

Step 2: Form a steering committee to include NC Wetlands Restoration Program, NC Division of Parks and Rec. – Stone Mt State Park, and other agency personnel.

Step 3: Map the topography of the stream and floodplain. Survey with a total station the channel longitudinal profile and cross sections of the 4 reaches.

Step 4: Create a conceptual design for the project to present to the steering committee.

Step 5: Upon approval of the conceptual design, follow natural channel design procedures: survey the reference reach (Basin Creek), use regional curves to verify bankfull stage, calculate hydraulic geometry dimensionless ratios for design purposes.

Step 6: Complete design and send out for permitting.

Step 7: Once permitting has been approved, begin construction, to be periodically inspected by permitting agencies. Follow design specifications and construct new channel.

Step 8: Conduct an as-built survey of post-restoration channel at the completion of construction.

Step 9: Plant vegetation this winter.

Step 10: Monitor for five years.

More information on the work performed for each of the four stream reaches is presented below.

Reach 1

Reach 1 pre- and post-restoration length was 936 linear feet. The stream type is a B4c. The valley for Reach 1 is confined and the stream banks are well vegetated with a mature riparian buffer. The restoration design was to provide for more diversity in channel bed form. The stream type was not changed during construction. Large woody debris was re-introduced in the form of structures such as log vanes. These structures provide cover for fish and help stabilize banks by directing the flow of the river towards the center of the channel. Boulder clusters were also used to improve aquatic habitat by creating scour holes downstream of the clusters, which provide holding areas for fish.

Reach 2

Reach 2 pre-restoration length was 2,238 linear feet. The valley for Reach 2 is wider than in Reach 1. The pre-construction stream type for this section was a C4 moving towards a D4, meaning the stream was getting wider as it flowed downstream. In Reach 2, mid-channel bars had formed in the river, adding more stress to the already eroding banks during high flows. A chute cut-off had formed, causing bank erosion and threatening the stability of the park road.

The restoration efforts in Reach 2 were more aggressive than in Reach 1 due to the unstable condition of the river in this reach and the wider floodplain, which provided more flexibility with the design. Restoration of Reach 2 involved re-meandering the river through the floodplain by excavating a new channel with the proper dimension, pattern, and profile. The resulting stream type was a more stable C4. As a result of the design, the slope and the bank height ratio were decreased. The soil that was excavated to form the new channel was used to fill in the abandoned channel. Where possible, wetland and pond areas were created in the floodplain and enhanced to balance the cut-fill ratios. Several types of in-stream structures were used to stabilize the new channel, to enhance fish habitat, and provide grade control at critical locations. These structures included log vanes, rock vanes, cross vanes (see Figure 4), rootwads, and boulder clusters. Vegetation transplants generated by clearing the path for the new channel were placed throughout the newly excavated channel at the top of the banks. The post restoration stream length of Reach 2 is 3496 linear feet, an increase of 1258 feet.

Fig 4: Looking upstream in Reach 2, two log and rock cross vanes in the new channel

Reach 3

The restoration of Reach 3 was very similar to that of Reach 1. The pre- and post- restoration stream type was a B4c. The pre- and post-restoration stream lengths remained at 1640 linear feet. Structures were placed in this reach to provide for more variability in channel bed profile to enhance fish habitat. The pools created by downstream scour from the log vanes provide deeper holding areas with cooler water for the different fish species, including trout. The banks along Reach 3 were also well vegetated and the valley was confined.

Reach 4

As with Reach 2, the stream in Reach 4 was widening. The stream classification was moving from a C4 to a D4. At Reach 4, the valley widened out again and the restoration effort re-meandered the stream through the floodplain. The resulting stream type was a more stable C4. In this section of the restoration, there were stable areas of a historic channel that closely matched the design dimensions. Hence, the river was returned to this historic channel with minimal disturbance to the mature riparian buffer. The stream entered into the floodplain at four separate locations in this reach. The new channel was designed for a stable dimension, pattern, and profile. In-stream structures were used throughout to maintain grade, ensure stability of the new

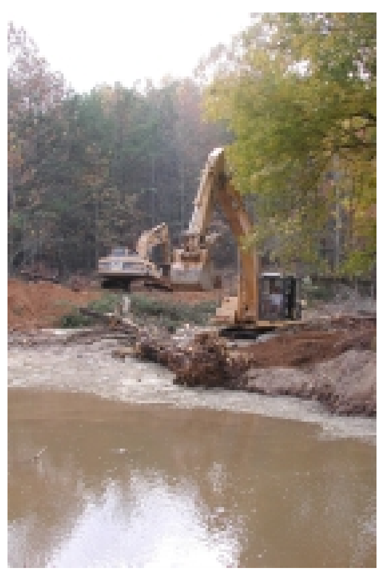

Fig 5: Building a pond in Reach 4

stream banks, and create scour holes for fish. Wetland and pond areas were also created to balance the cut-fill amounts (see Figure 5). The stream length in Reach 4 was increased between pre- and post-restoration by approximately 1028 linear feet, from 3,522 feet to 4,550 feet.

Vegetation

Vegetation plays a major role in the success of a stream restoration project. As plants grow and their roots take hold into the stream banks, adding stability, the reliance on in-stream structures, such as rootwads, decreases. This project includes an aggressive plan for revegetating the floodplain areas, including the wetland and pond fringe. The trees that will be planted are in the form of bare-root seedling and live staking. Also, permanent seeding will be conducted from December 2000 through January 2001.

Monitoring and Evaluation

As each of the four reaches was completed, an as-built survey was conducted to characterize the cross sectional dimensions and the longitudinal profile. Permanent cross-sections were installed and will be surveyed over time to monitor the structures and general dimension of the newly excavated channel. Pebble counts were performed to determine the composition of the channel bed substrate. All of these physical monitoring practices will be repeated throughout the five-year monitoring period for the project.

Other monitoring being performed at the restoration site includes: photo reference sites, temperature of the water in each reach, shading of the riparian areas, ground water levels in the floodplain, vegetation sampling and bank erosion estimates. Also, a gage station will be installed at the point farthest downstream of the restoration, and a stage-discharge relationship will be developed for the gage site. This gage will be used to relate the stream stability and sediment transport data for various discharges.

Permitting

Various permits were required before the construction phase of the restoration project could begin. The permitting agencies included U.S. Army Corps of Engineers and NC Department of Environment and Natural Resources - Division of Water Quality and Division of Land Resources. The NC Wildlife Resources Commission and the U.S. Fish and Wildlife Service provided comments on the permits. As the East Prong Roaring River is designated as trout waters, special considerations were placed on the permit limiting the time period for construction to April 15 - October 15 to prevent disturbance in the stream during critical periods. In addition, the trout waters designation required separate permission from the NC Division of Land Quality, beyond the construction permit, to enter the 25-foot riparian buffer area.

Education

With the location of the stream restoration effort in Stone Mountain State Park, more opportunities now exist for the public of North Carolina to see this type of work. The NC Stream Restoration Institute has already held three workshops at the site, free of charge, to present construction techniques for natural channel design. In attendance were State agency personnel, regulators, private consultants and university professors and students. Two workshops will be held in January 2001 on vegetation and two more in February 2001 on monitoring and evaluation. The NC Division of Parks and Recreation has produced a brochure and a display that resides at the visitor's center to inform park visitors of all the changes that are happening to the East Prong Roaring River.

For More Information

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The NC Stream Restoration Institute's River Course Factsheets #1-3 can be viewed and downloaded from the NC SRI website below. Factsheet 4, *Using Root Wads and Rock Vanes for Streambank Stabilization,* is currently available in hardcopy only but will soon be placed at the site. **http://www5.bae.ncsu.edu/programs/extension/wqg/sri/** ■

INFORMATION

Report Highlights "Restorative Redevelopment" Approach to Wet Weather Management

A new report by Rocky Mountain Institute makes a case for alternative solutions to chronic sewer overflows and stormwater problems. *Re-Evaluating Stormwater: The Nine Mile Run Model for Restorative Redevelopment* shows how low-cost stormwatermanagement measures, incorporated into retrofit programs and redevelopment projects, can economically reduce runoff and sewer overflows while also providing other benefits.

A panel of design and policy experts devised a "restorative redevelopment" model for Pittsburgh's densely developed Nine Mile Run watershed. This report outlines the model's overall logic and strategy, offers a menu of techniques, discusses the technical and economic feasibility of implementing them on a variety of sites in already built-up urban areas, and proposes policies for implementing restorative redevelopment.

The approach of restorative redevelopment is to manage precipitation as close to where it falls as is physically and economically feasible, using freely available natural processes to do the work of stormwater storage treatment.

The Pittsburgh panel integrated many such techniques into sample designs for four sites in the Nime Mile Run watershed. The techniques included:

- capturing roof runoff in tanks or cisterns for irrigation or indoor graywater use;
- disconnecting pavement and roof drainage from sewer lines and directing it to adjacent vegetated soil or to infiltration basins;
- engineering infiltration basins to collect runoff and percolate it into the soil;
- planting trees to intercept a portion of rain water;
- reconfiguring driveways, parking lots, and streets to turn more of a site over to pervious, vegetated soil;
- replacing impervious pavements with porous ones; and
- routing runoff through swales to slow its velocity, remove pollutants, and infiltrate it into the soil.

The panel's designs handle runoff at costs comparable to those of conventional projects in the area ($2 per gallon of hydraulic capacity). They also provide other community and environmental benefits, such as watershed restoration, community and economic revitalization, educational opportunities, and neighborhood street and park enhancement. The costs of these measures can then be shared across multiple agencies and budgets, and absorbed into the incremental retrofitting and redevelopment of urban areas.

The report concludes with a section on policy objectives and action plans to support restorative redevelopment through institutional coordination, infrastructure management, watershed restoration, and community economic development.

Re-Evaluating Stormwater: The Nine Mile Run Model for Restorative Redevelopment may be ordered directly from Rocky Mountain Institute (1-800-333-5903; www.rmi.org). It costs $24.95 plus shipping and handling ($5.50 for one copy).

New Video Explains Riparian Functions

Life on the Edge: Improving Riparian Function, a new 12-minute video from the Oregon State University Extension Service, shows viewers:

- How the transition zone between water's edge and the uplands provides food and cover for fish and wildlife, controls erosion, filters runoff, and produces the ingredient for fish habitat and stream channel stability.
- What land-use practices can impact riparian areas.
- The techniques landowners, volunteers, and professional resource managers are using to improve and protect riparian function.

Life on the Edge: Improving Riparian Function (VTP 033) costs $19.95 (including shipping) per copy. Order by e-mailing puborders@orst.edu or send your request and check or money order payable to Oregon State University: Publication Orders, Extension & Station Communications, Oregon State University, 422 Kerr Administration Building, Corvallis, OR 97331-2119.

Nutrient Criteria Technical Guidance for Rivers and Streams

EPA has announced the availability of the Nutrient Criteria Technical Guidance Manual for Rivers and Streams. A copy of the guidance is available at **http://www.EPA.gov/OST/standards/nutrient.html**

New EPA Guidance for Controlling Nonpoint Source Pollution from Agriculture

EPA has developed and is requesting comments on draft technical guidance for managing agricultural sources of nonpoint pollution. This guidance is intended to provide technical assistance to State program managers and others on the best available, economically achievable means of reducing nonpoint source pollution of surface and ground water from agriculture. The guidance provides background information about agricultural nonpoint source pollution, where it comes from and how it enters the Nation's waters, discusses the broad concepts of assessing and addressing water quality problems on a watershed level, and presents up-to-date technical information about how to reduce agricultural nonpoint source pollution.

Reviewers should note that the draft technical guidance is entirely consistent with the Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, which EPA published in January 1993 under section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). The draft document does not supplant or replace the requirements of the 1993 document. It enhances the technical information contained in the 1993 coastal guidance to include inland as well as coastal context and to provide updated technical information based on current understanding and implementation of best management practices. It does not set new or additional standards for either CZARA section 6217 or Clean Water Act section 319 programs.

Written comments must be postmarked no later than January 16, 2001. Comments may be addressed to Sharon Buck, Assessment and Watershed Protection Division (4503-F), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; or electronically mailed to buck.sharon@epa.gov.

Persons requesting additional information or a complete draft of the document should contact Sharon Buck at (202) 260-0306; buck.sharon@epa.gov; or U.S. Environmental Protection Agency (4503-F), 1200 Pennsylvania Avenue, NW., Washington, DC 20460. The complete text of the draft guidance is also available on EPA's Internet site on the Nonpoint Source Control Branch homepage **http://www.epa.gov/owow/nps/new.html**.

EPA Releases Onsite System Management Guidelines

Onsite wastewater treatment systems treat and release about 4 billion gallons of effluent per day from nearly a fourth of all U.S. homes. Although these systems work well when designed, installed, operated, and maintained properly, they are regulated under a patchwork of state and local laws that focus primarily on permitting and installation. Operation and long-term maintenance are often left to untrained and uninformed homeowners.

In response to recurring onsite system failures and associated public health and water resource risks, the U.S. Environmental Protection Agency (EPA) with input from stakeholders from the public and private sectors, has developed a set of voluntary management guidelines that can be adapted for local conditions. The guidelines describe a series of five progressive management tiers and key program elements for each tier. The tiers range from programs that maintain simple system inventories and provide basic information on maintenance to programs that own, operate, and manage systems in a manner similar to centralized sewage treatment plants. Local communities can use the guidelines to develop a program tailored to local conditions—adjusting for water resource sensitivities, the types of systems in use, system densities, and the availability of operation/maintenance services.

The guidelines can be an important tool for local agencies or private developments facing pathogen contamination of ground water and recreational waters, nutrient overloads to lakes and coastal areas, sewage pooling on the ground surface, or other problems related to failed onsite systems.

The draft *Guidelines for Management of Onsite/Decentralized Wastewater Systems*, which were published by EPA in the *Federal Register* on October 6, are posted on the Internet at **www.epa.gov/owm/smallc/guidelines.htm**. Links are available at that site for online commenting on the draft guidelines and for other information. ■

WEB RESOURCES

On-Line Access to Water Quality Data

A new online data warehouse of 6.5 million records enables water resource managers, scientists, and the public to find data about the quality of the water at 2,800 stream sites and 5,000 wells in 46 states.

The data were collected by the USGS National Water-Quality Assessment (NAWQA) Program beginning in 1991 in 36 basins around the country, which are the basic study units of the NAWQA effort. Data from 15 additional study units, which began in 1997, will be incorporated later. Data in the warehouse are from surface and ground water sources, not from finished tap water.

The data include about 15,000 pesticide and VOC (volatile organic compound) samples and about 26,000 nutrient samples collected from the water column, as well as about 1,200 samples from bed sediment and aquatic animal tissue, which were analyzed for trace elements and organic compounds that do not dissolve in water easily.

Most pesticide, sediment and tissue samples were analyzed for over 40 different compounds at the USGS National Water Quality Laboratory in Denver, Colorado.

Types of information include:

- Site, well and network (groups of sites with similar characteristics or sampling regime) information and descriptive variables like land use.
- Daily streamflow and temperature information for repeated sampling sites.
- Chemical concentrations in water, sediment and aquatic organisms.

Data can be compiled and summarized for geographic areas, such as for one or multiple states, counties, basins, or NAWQA study units. Examples of summaries include:

- Concentrations for groups of chemicals, like pesticides, detected in streams, streambed sediment/aquatic tissue and/or wells.
- Samples where the concentration of a specific chemical of your interest exceeds some value like a water quality standard.
- Counts of samples for one of the above examples.

The data can be easily exported in several formats to Excel or delimited ascii files.

Links are provided to other data from the NAWQA program, other water data from the USGS, as well as to the USGS home page. USGS Water Quality Data Warehouse: **http://water.usgs.gov/nawqa/data**

Contact Mr. Sandy Williamson, USGS, 1201 Pacific Ave., Tacoma, WA 98402, ph: 253-428-3600, x2683, fax: 253-428-3614, email: akwill@usgs.gov ■

CONFERENCE REPORT

8th National Nonpoint Source Monitoring Workshop

The 8th National Nonpoing Source Monitoring Workshop was held September 11-14, 2000, in Hartford, Connecticut. Over 150 people attended, representing Federal, State and local government agencies, non-profit groups, academia, consulting firms and private companies.

The goal of this annual conference is to bring together land managers and water quality specialists to share information on monitoring and evaluating the effectiveness of Best Management Practices (BMPs) in improving water and habitat quality. Workshops typically focus on progress made and lessons learned from Section 319 National Monitoring Program (NMP) projects, but other nonpoint source control watershed projects are also represented.

This year's conference theme was monitoring and modeling nonpoint source pollution in the rural-urban interface. The conference brought in six plenary speakers and included breakout sessions on detecting change in habitat and water quality from BMP implementation, modeling applications of nonpoint source pollution, application of NMP project data in TMDLs, volunteer monitoring in Section 319 projects, and urban nonpoint source pollution and BMPs. A half-day workshop was given on statistical analysis of water quality data. A full-day field tour included: two demonstration sites of stormwater treatment systems installed in parking lots; constructed wetlands and turf research plots at the University of Connecticut; the Jordan Cove NMP project, which is evaluating construction BMPs and low-impact design subdivisions in terms of runoff; and a visit with the Town of Waterford's planner, to hear about community efforts to manage development while protecting water resources.

Other conference activities included: a full-day excursion to Block Island to see and learn about an innovative on-site wastewater treatment system and to partake in some great biking and sight seeing; a delicious lobster/clam bake at Mystic Seaport; and a boat ride on the Connecticut River.

The workshop was hosted by Connecticut Department of Environmental Protection, Connecticut Institute of Water Resources, Jordan Cove Urban Watershed National Monitoring Project, Lombardi Inside/Out L.L.C., New England Interstate Water Pollution Control Commission, Northeast Section Soil & Water Conservation Society, North Carolina State University, Riverfront Recapture, Inc., Town of Waterford, CT, University of Connecticut, USDA Natural Resources Conservation Service, and US Environmental Protection Agency.

A big thanks to Jack Clausen of the University of Connecticut, Department of Natural Resources Management and Engineering and Chair of the conference steering committee, and to the rest of the local and national steering committee members, workshop hosts and sponsors, for putting together such a great program, which was informative, fun and provided excellent networking opportunities.

Next year's Nonpoint Source Monitoring Workshop will be held in Indianapolis, Indiana on August 27-30, 2001 and will focus on monitoring and modeling nonpoint source pollution in the agricultural landscape. ■

ANNOUNCEMENTS

NCSU Water Quality Group Staff Changes

Will Harman

We would like to extend a fond farewell to Will Harman, who has worked as an Extension Specialist and hydrologist with the NCSU Water Quality Group since 1996. Will left in October 2000 to form a new consulting firm, Buck Engineering, specializing in stream restoration.

Will has made significant contributions to the efforts of the NCSU Water Quality Group, particularly in the field of stream restoration and the application of natural channel design to degraded streams in North Carolina. Will was instrumental in forming the Stream Restoration Institute at NC State University, providing training courses in stream classification, morphological assessment, and natural channel design and construction. Prior to Will's departure, he co-lead our team in completing a 2-mile stream restoration project at Stone Mountain State Park in western North Carolina, where a new channel was created at an elevation reconnecting it to the floodplain, at its original location. This project, which is the largest stream restoration project completed in the State to date, will serve as a demonstration site. Will has been extremely effective at advancing the science of stream restoration in North Carolina and we wish him the very best with his new company.

Kevin Tweedy

We also extend our farewell to Kevin Tweedy, who has worked as a Water Quality Extension Specialist with the NCSU Water Quality Group since March 1998. Effective October 2000, Kevin has accepted a position as water resources engineer with Will Harman's new company, Buck Engineering. Kevin will be working primarily on stream restoration projects.

Kevin also made significant contributions to the efforts of the Group, primarily in the areas of wetland restoration, constructed wetland design to treat stormwater, and stream restoration. Kevin also provided technical support to Section 319 National Monitoring Program nonpoint source watershed projects nationwide with BMP implementation and water quality monitoring and evaluation. We wish Kevin much luck with his new job. ■

MEETINGS

Call For Papers

2001 ASAE Annual International Mtg: Jul 29-Aug 1, 2001, Sacramento, CA. Submit abstracts by **Dec 1, 2000**. Web site: http://asae.org/meetings/am2001/form.html.

WEFTEC 2001. Water Environment Federation 74th Annual Conference & Exposition: Oct 13-17, 2001, Atlanta, GA. Submit abstracts by **Dec 4, 2000**. To receive WEFTEC 2001 materials, call 1-800-666-0206**.** If outside the US and Canada, call 1-703-684-2471 or send an email to confinfo@wef.org. Web site: www.wef.org.

Meeting Announcements — 2001

JANUARY

Intl Symposium on Integrated Decision-Making for Watershed Mgmt: Jan 7-9, Chevy Chase, MD. Contact Dr. Darrell Bosch at Tel: 540-231-5265, email: bosch@vt.edu, web site: http//www.conted.vt.edu/watershed.htm

International Soil Erosion Symposium: Jan 15-18, Hawaii. Contact American Society of Agricultural Engineers at Tel: 616-429-0300; Fax: 616-429-3852; email: mcknight@asae.org

MARCH

Agriculture and the Environment: State & Federal Water Initiatives: Mar 5-7, Iowa State Univ, Ames, IA. Web site: http://extension.agron.iastate.edu/aged/water_quality/MainWQ/wqm.htm

9th National Symposium on Individual and Small Community Sewerage Systems: Mar 12-14, Fort Worth, TX. Contact American Society of Agricultural Engineers at Tel: 616-429-0300; Fax: 616-429-3852; email: mcknight@asae.org

APRIL

14th Annual National Conf, Enhancing the States' Lake Management Programs: Integrating Nonpoint Source Watershed Mgmt with Lake Mgmt & Protection: Apr 17-20, Chicago, IL. Contact Bob Kirschner, Conf. Coordinator, Chicago Botanic Garden, 1000 Lake Cook Rd., Glencoe, IL 60022. Tel: 847-835-637, Fax: 847-835-1635, email: bkirschn@chicagobotanic.org

4th National Mitigation Banking Conf: April 18-20, Ft. Lauderdale, Florida. Web site: http://www.terrene.org, Tel: 800-726-5253.

MAY

2nd National Conf, Nonpoint Source Pollution Information & Education Programs: May 15-17, Glencoe, IL. Contact Bob Kirschner, Conf Coordinator, Chicago Botanic Garden, 1000 Lake Cook Rd., Glencoe, IL 60022. Tel: 847-835-6837, Fax: 847-835-1635, e-mail: bkirschn@chicagobotanic.org

9th National Nonpoint Source Monitoring Workshop

August 27-30, 2001
Hyatt Regency, Indianapolis, IN
http://www.ctic.purdue.edu/CTIC/NPSCall.html

About the Conference: This workshop will bring together land managers and water quality specialists to share information on the effectiveness of best management practices in improving water quality, effective monitoring techniques, and statistical analysis of watershed data. The workshop will focus on the successes of Section 319 National Monitoring Program projects and other innovative projects from throughout the U.S. The agenda will include three days of workshop sessions/presentations and a one-day field trip. Two half-day workshops will focus on monitoring program evaluation and GIS. Presentations will be 20 minutes, followed by 10 minutes for discussion. Poster presentations are also encouraged. Presenters will submit a paper due the date of the conference for publication by US EPA-ORD.

Instructions for Submission of Abstracts: Deadline for submission of abstracts is March 1, 2001.

Session Topics: Presentations should focus on one of the following session topics:

- Detecting change in water quality from agricultural BMP implementation
- Modeling application of NPS pollution
- Agricultural nonpoint source pollution TMDLs
- Volunteer monitoring in 319 projects
- Innovative monitoring in agricultural landscape
- Programs and approaches for animal operations and nutrient management

Format: Abstracts are limited to 1 page, single spaced (or 300 words). Submission of abstracts via e-mail or website is encouraged. Preferred format is MS Word or Text file.

Review & Notification: Authors will be notified of receipt of their abstract. The workshop program committee will review abstracts. Accepted abstracts will be published in the workshop program. Authors will be notified by April 16, 2001 regarding the status of their abstract. Publication specifications will then be sent to authors presenting papers.

Submit Abstract to: Email: ctic@ctic.purdue.edu; Mail disk: Nonpoint Source Workshop, 1220 Potter Drive, Suite 170, West Lafayette, IN 47906; Phone (765) 494-9555; Fax (765) 494-5969

If you have questions, contact Tammy Taylor at taylor@ctic.purdue.edu. Indicate your affiliation, session topic selected, and whether presentation will be oral or poster. Include phone, fax, and email with your mailing address.

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