

From the Branches to the Confluence: The Upper Susquehanna River Basin and its Communities

Bucknell University

September 23, 2006

PANEL DISCUSSION PRESENTATION ABSTRACTS

9:15AM - ENVIRONMENTAL SCIENCE ON THE RIVER

North Branch - Fishes and Other Environmental Indicators

Brian Mangan, Biology Professor at Kings College and the Director of the Susquehanna River Institute

Extensive ecological monitoring of the north branch of the Susquehanna River for the past 30 years has indicated a number of significant trends in water quality, benthic macroinvertebrates, and fishes. Fortunately, many of these trends are positive indicators of improved river conditions. Some of the trends are not so positive and raise serious questions related to the ecology of the river. However, all of the trends indicate that the Susquehanna is a dynamic, changing ecosystem, and if it is to be managed well, must be consistently and comprehensively monitored.

West Branch - Implications of Key Pieces of Data from Monitoring Projects

Mel Zimmerman, Lowry Professorship in Biology at Lycoming College and Chair of Lycoming's Clean Water Institute (www.lycoming.edu/biologydept/cwi)

The West Branch Susquehanna watershed drains an area of approximately 4,466 million acres ranging from Carroltown in Cambria County to its confluence with North Branch in Northumberland County. In the last 10 years, three DCNR sponsored river conservation plans have been written, the SRBC (Susquehanna River Basin Commission) has published a sub-basin survey (2003) and most recently (2005) a "State of the Watershed Report" has been summarized by the West Branch Susquehanna River Task Force. In addition, numerous watershed groups, conservancies and college/university partners have contributed data and insight into the river. Bottom line is that 57% of the West Branch Watershed is Acid Mine Drainage impaired (over 1,000 miles, especially in the upper 2/3 of watershed), 24% shows non-point source impact by Agriculture and the remaining 19% impairment is from point source, habitat alteration or other categories. As of August 2006 the Lycoming College Clean Water Institute with partners from SRHCES (Susquehanna River Heartland for Environmental Studies) has collected and entered 6,464 data points (including nitrogen, phosphorous and coliform bacteria) for 16 watersheds in the lower West Branch. A discussion of these data and role of combined sewer overflows (especially in the lower West Branch between Lock Haven and Sunbury) on the water quality of the river and influence on the Chesapeake Bay will be given.

Emerging Data on Link between Acid Mine Drainage and Nutrient Processing

Steven T. Rier, Professor of Biology at Bloomsburg University

Stream ecosystems provide a myriad of important services to humans. Examples include providing clean drinking water for municipalities, detoxifying pesticides, and offering recreational fishing opportunities. One often overlooked "ecosystem service", however, is the processing and retention of excess phosphorus and nitrogen from sewage and agricultural runoff. The ability of small streams to process and retain nitrogen and phosphorus has important implications for the greater Susquehanna River watershed and ultimately

the health of Chesapeake Bay. In healthy streams, bottom-dwelling microorganisms actively remove nitrogen and phosphorous from the water and transfer it up the food chain before recycling it back into the water where it is displaced downstream. This process slows the downstream progression of nitrogen and phosphorous and consequently decreases nutrient loading rates to large bodies of water, such as Chesapeake Bay. However, impairments such as acid mine drainage (AMD) might interfere with a stream's ability to retain these nutrients. Our current research focuses on how AMD in the upper Susquehanna River basin might impair normal stream functions, such as nutrient retention, and how this might contribute to the nutrient loading problem to Chesapeake Bay. Furthermore, we are investigating the effectiveness of AMD remediation efforts in restoring this vital ecosystem service. Preliminary results suggest that the microbial communities involved in stream nutrient dynamics and nitrogen retention are seriously impaired by AMD. However, much more work needs to be completed before we fully understand the effects of AMD on nutrient retention in streams and the ultimate implications for nutrient loading to Chesapeake Bay.

11:00AM - ENVIRONMENTAL PROTECTION AND RESTORATION

Geomorphic Problems with Natural Design Methods Applied to Stream Channel Restoration: Examples from a Comprehensive Survey of Projects in North Carolina and Implications for the Susquehanna Watershed - R. Craig Kochel, Professor of Geology, Bucknell University

Federal, state, local, and private funds are increasingly being committed to stream restoration projects in the United States, to stabilize stream channels, reduce bank erosion, and improve aquatic habitat. The majority of these projects utilize a method known as Natural Channel Design, which relies on the classification of channels into Rosgen type stream reaches and assigns a prescriptive restorative treatment. Hallmarks of this strategy employ in-channel rock structures such as cross-vanes, J-hooks, and rock weirs as well as bank treatments such as rootwads, revetments, and live stakings. Little information exists about the performance of these projects. We are finishing a comprehensive 3-year survey of 400 restoration projects for the state of North Carolina completed within the past 8 years. The evaluation of these widely-used techniques can provide insights into the physical performance of restoration designs. The data are intended to provide guidelines for the design of restoration projects, and can be applied to similar projects in the Susquehanna watershed.

Field surveys show that at about a third of examined sites, more than 70% of in-stream structures have sustained significant damage so that structures no longer perform their intended function; numerous others exhibit less severe damage. Some structures were rendered non-functional after the first overbank flood. In some cases, structures were installed, damaged, and repaired, only to be damaged again. Damages vary, but a common problem was the erosion around the landward side of J-hooks and cross-vanes during overbank flows, accelerating bank erosion locally and stranding the rock structures as ineffective mid-channel islands. Approximately 30 % of the damaged structures were affected by either burial or bar development, which led to channel migration and flanking of the structure along newly eroded banks. Channels with high failure rates are associated with easily erodible bed and bank materials (in comparison to stream power) and/or streams with high rates of bedload transport. A preliminary review of design documents shows that analyses of the past or current geomorphic conditions were rarely undertaken, and analyses of sediment transport continuity through the restored reach were virtually non-existent. In-stream structures are designed to handle bankfull or lower flows. During overbank flows (which occur on-the-average every 1-2 years), the structures become mere roughness elements. In some cases they may even

accelerate bank erosion and channel migration. Moreover, many projects fail to consider changes in sediment and water yield that have occurred, or are occurring, due to historical land use changes and/or major flood events in upstream portions of the drainage basins. In these cases, streams may be in a protracted phase of morphologic adjustment, rendering restorative structures virtually useless

A similar evaluation of restoration projects is needed in the Susquehanna watershed. The large number of sites in North Carolina exhibiting damaged structures within a few years of construction strongly suggests that more rigorous geomorphic and hydrological analyses are required to improve the performance of restoration projects. Even though this will initially require more time, money, and trained personnel, improvements in the success of stream restoration projects are possible by integrating geomorphic knowledge of river channel behavior with the planning and designing of restoration projects.

State Government Regulations and Work with Watershed Groups

Joan Sattler, Watershed Manager, Pennsylvania Department of Environmental Protection

I will give a whirlwind tour of Pennsylvania's environmental history - from Native Americans to present. The focus will be how humans have impacted the environment and how laws and programs evolved to address those impacts. I will explain the regulatory focus of the Pennsylvania Department of Environmental Protection for point source pollution and how that focus has recently been modified to address non-point source pollution. I will also describe the Watershed Initiative and its place in environmental protection.

Stormwater Management on a Watershed Basis – the Paxton Creek Initiative

David W. Heicher, Chief of the Susquehanna River Basin Commission's Division of Watershed Assessment and Protection

The Susquehanna River Basin Commission (SRBC) and Paxton Creek Watershed and Education Association (PCWEA) are developing a program to address stormwater impacts on a watershed basis, within several Pennsylvania municipalities in the Harrisburg area. SRBC and PCWEA will work closely with the watershed municipalities to explore innovative and cost-effective ways to establish a stormwater management structure for Paxton Creek Watershed, use demonstration projects to improve water quality, and test sustainable funding mechanisms using public/private partnerships. In addition, SRBC and PCWEA will conduct a public outreach and education campaign to promote stormwater management on a watershed basis.

The project will produce output in two categories: management and demonstration projects.

- The management portion of the study will test various multi-jurisdictional stormwater management structures and demonstrate how these structures may interact with public agencies, commercial entities, and residential/citizen groups to control and reduce stormwater runoff. Special emphasis will be placed on developing economic incentives for reducing stormwater runoff, as well as an educational program to reduce the concentrations of nutrients and other contaminants in runoff (i.e., lawn fertilizers). Upon completion of the study, a stormwater management structure appropriate for the Paxton Creek Watershed will be established and made available for use in other suitable watersheds, both statewide and possibly nationwide.
- Five demonstration projects will test various management scenarios for public, residential, and commercially controlled lands. Stormwater runoff from over 30 acres of developed land will be channeled through stormwater Best Management Practices (BMPs) ranging from infiltration/filtration practices to wetland complexes. In addition, approximately 4,000 feet of adjacent urban/suburban stream corridor will be rehabilitated and stabilized. A relatively small amount of nutrients and

sediments will be removed by the demonstration projects, but the successful implementation of these projects will lead to significant reductions when implemented on a watershed basis using a successful, innovative management model. Other benefits include reducing flooding, and human health threats from combined sewer overflows.

Western Pennsylvania Watershed Program (WPWP)—Funding the Projects That Make a Difference

R John Dawes, WPWP Administrator

There is a need for private funds to match agency dollars. New requirements for Growing Greener are forcing watershed organizations to provide cash match for grant requests. For years, philanthropy has been serving this match-funding role. This presentation will overview WPWP Program Areas, how to create a winning proposal, what is appealing to funders and introduce you to our services.

Due to the magnitude of federal funding provided through the Abandoned Mine Lands Fund in Washington D.C. for reclamation of Pennsylvania's 184,000 acres of degraded lands, a short presentation will be provided on the state of the re-authorization legislation.

2:00PM - CONNECTIONS BETWEEN THE RIVER AND COMMUNITY VIBRANCY – FORUM

Acknowledging the River in Town Revitalization Plans: the Case of Selinsgrove

Caru Bowns, Assistant Professor, Department of Landscape Architecture, Pennsylvania State University

My remarks for the Susquehanna River Symposium will focus on the role of the place of the Susquehanna River in the master plan and site design work a Pennsylvania State University landscape architecture class produced for SPI (Selinsgrove Projects Inc.) last spring semester.

The talk will address:

- Historical and current potentials of the river considered in the design process.
- Civic Input and Community Perceptions of the Susquehanna River.
- Conceptual design that connects the River to downtown Selinsgrove.

Essential Commitments and Prerequisites to River Community Vibrancy

Jerry Walls, Planning Director, Lycoming County and Chair, Susquehanna Greenways Partnership

This talk will address the community partners that are needed and methods that can be employed to achieve buy-in. Successful projects that tie in rivers and communities include:

- Williamsport Riverwalk
- Pine Creek Rail Trail
- Sunbury Riverwalk

Big picture large landscape initiatives and opportunities for vibrancy include:

- Susquehanna Greenway Partnership
- Pennsylvania WILDS

Historical Geography of Rivertown Economics
Ben Marsh, Professor of Geography, Bucknell University

I will give a brief historical geography of rivertown economics:

- The reasons why towns located on the river.
- The impact of that location on form and function.
- The evolving significance of river location with changes in transportation, water quality, and perception.

I will conclude with a projection into a future of continual deindustrialization, income disparity, economic centralization, and sprawl.

The River and the Long Term Perspective on Community Vibrancy
Brian Auman, Planner, SEDA-COG

The River physically unites and defines our regional identity. This presentation will address:

- A comparison of traditional patterns of development with the current trend towards decentralization.
- Building on our Strengths, making the case for asset-based development.
- Reaching towards a sustainable regional economy - beyond the assumption of cheap and easily accessible energy.

3:45PM - ENVIRONMENTAL HUMANITIES IN THE RIVER BASIN – FORUM

The History of Tourist Interest in Centralia, PA
Ed Slavishak, History Professor at Susquehanna University

I will talk about the research that's been done in the Susquehanna University history department to examine tourist interest in Centralia since the mid-1990s. To quote from an abstract: "The town site marks the virtual disappearance of an entire community and serves as a point of political and commercial tension. Although represented frequently by the media as a pilgrimage site, Centralia is officially off-limits to visitors. Although depicted often as a ghost town, Centralia retains 18 residents who refuse to be relocated. Although narrated as evidence of the emptiness of modern technology, Centralia's career as a tourist site depends largely on cyberspace and digital imagery."

So far we've found that visitors do not fit into the target audience of governmental efforts at promoting cultural tourism. In contrast to heritage tourism, the appeal of Centralia for its most avid visitors derives from its gothic landscape, its aura of economic and environmental failure, and its status as a bizarre, potentially dangerous modern ruin.

Europeans and the Susquehanna: A Vision of Nature

Katherine Faull, Chair, Department of Foreign Language Programs and Professor of German at Bucknell

In his 1808 occasional poem on the Susquehanna, Johann Wolfgang von Goethe ironically juxtaposes the broad sweep of this American river, imaginatively bordered on each side by barren wastes, Indian corn, and missionaries, with the urban landscape of ornate bridges and inns that define the Bohemian resort of Carlsbad. This brief overview will look at how the Susquehanna entered into the European imaginary through the travel accounts and mission diaries of the Moravians who settled in Shamokin (present-day

Sunbury) and also traversed the West and North Branches of the river. The paper will also attempt to account for the persistent perception of the confluence as a place of magic and turmoil.

The Susquehanna's Role in the Underground Railroad

Scott Duncan, Project Leader, The Forum for Pennsylvania's Heartland

In January of 2006, the Susquehanna Heartland Humanities Council initiated a collaboration to develop a self-guided driving tour of Underground Railroad period history from Union County to Lycoming County, PA. The effort involved representatives from three colleges and universities, three historical societies, two regional tourism offices, and was funded by the Commonwealth of Pennsylvania's Department of Community and Economic Development, Office of Heritage Tourism. The tour, *Riots, Rumors, and Stories: The Underground Railroad Period in Pennsylvania's Heartland*, features 11 stops that describe local history in Lewisburg, Muncy, Pennsdale, South Williamsport, and Williamsport. The tour also discusses the importance of the Susquehanna River Watershed in shaping 19th century Pennsylvania history. This presentation highlights the people, places, and stories that make the Pennsylvania Heartland region's role unique in Underground Railroad period history.

Planned Humanities Journal on the Susquehanna

Jerry Wemple, Associate Professor of English, Bloomsburg University of Pennsylvania

Jerry Wemple will discuss the plans for an annual interdisciplinary journal focused on the Susquehanna River region. The journal will seek to illustrate the varied culture, literature, and environment of the twin-branched river that flows through three states, including much of Pennsylvania.