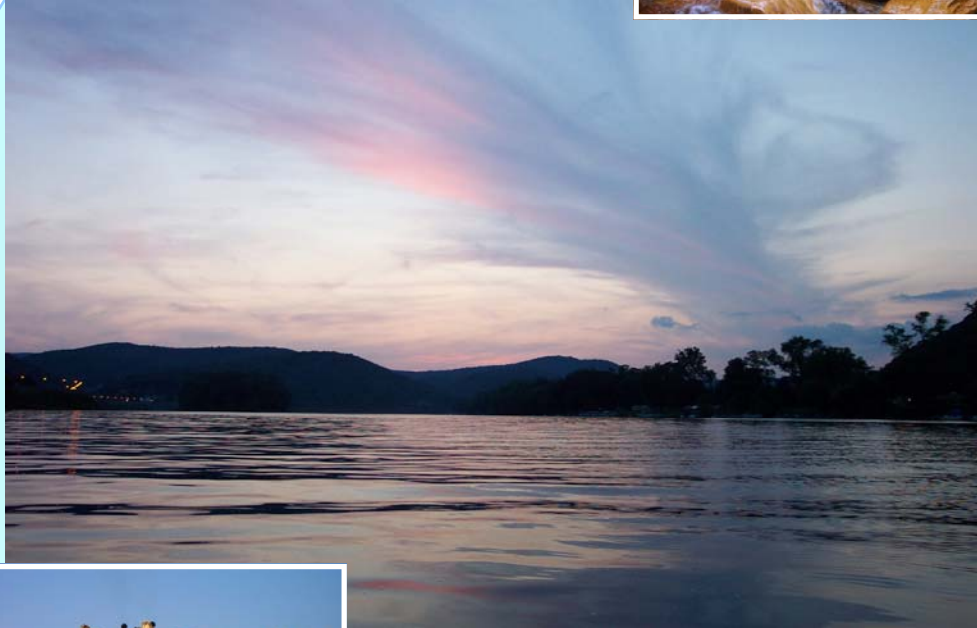
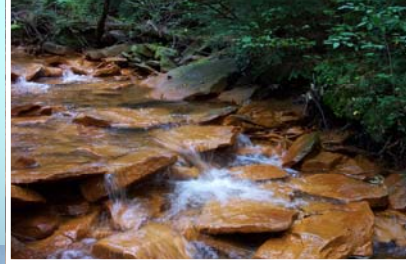


# West Branch Susquehanna Restoration Symposium II



May 12, 2006

Penn Stater Conference Center Hotel  
State College, Pennsylvania

Hosted By



**AGENDA (Morning)**

**Friday, May 6, 2005**

- 7:30 - 9:00      **Registration/Refreshments, Display Setup**
- 9:00 - 9:15      **Welcome**  
*Amy G. Wolfe*  
Trout Unlimited
- 9:15 - 9:45      **Keynote Address - What Rob Piper Taught Me that Day**  
*Paul O. Swartz*  
Susquehanna River Basin Commission
- 9:45 - 10:15     **Abandoned Mine Lands Fund, the Beginning and the Future**  
*John Dawes*  
Western PA Watershed Program
- 10:15 - 10:45    **Break with Refreshments**
- 10:45 - 11:15    **Watershed Scale Impact and Recovery of Fish Communities in Mined Watersheds**  
*Dr. Todd Petty*  
West Virginia University, Division of Forestry & Natural Resources
- 11:15 - 11:45    **Cold Stream Restoration**  
*Terry Schmidt, P.E.*  
Skelly & Loy Engineers and Consultants
- 11:45 - 12:15    **Slippery Rock Watershed: A Decade of Accomplishments and Lessons Learned**  
*Margaret Dunn, P.G., and Kyle Durrett*  
Slippery Rock Watershed Coalition
- 12:15 - 1:45     **Lunch with Special Presentation -  
The Susquehanna Greenway Call to Action: Unique Opportunities for the Restoration of the West Branch Susquehanna River**  
*Brian Auman, ASLA*  
Susquehanna Greenway Partnership

**AGENDA (Afternoon)**

**Friday, May 6, 2005**

- 1:45 - 2:15      **AMD Abatement through Alkaline Addition**  
*Michael Smith, P.G.*  
DEP Moshannon District Mining Office
- 2:15 - 2:45      **Beech Creek Watershed: The Good, the Bad, and the Ugly**  
*James R. Walker*  
Beech Creek Watershed Association
- 2:45 - 3:15      **Benthic Community Response to Remediation Activities in the  
West Branch Tributaries and Implication for Restoration of Fishes**  
*Robert M. Ross*  
USGS Northern Appalachian Research Laboratory
- 3:15 - 3:45      **Break with Refreshments**
- 3:45 - 4:15      **Vertical Flow Ponds: Function and Foibles**  
*Dr. Arthur W. Rose*  
Penn State University
- 4:15 - 4:45      **The Forgotten Systems: Passive Treatment Can Work**  
*Kimberly R. Weaver, P.E.*  
Hedin Environmental
- 5:00 - 7:30      **Social Reception in Exhibit Hall**  
Hors D'Oeuvres and Cash Bar

**Keynote Speaker**  
**What Rob Piper Taught Me that Day**

*Paul O. Swartz*

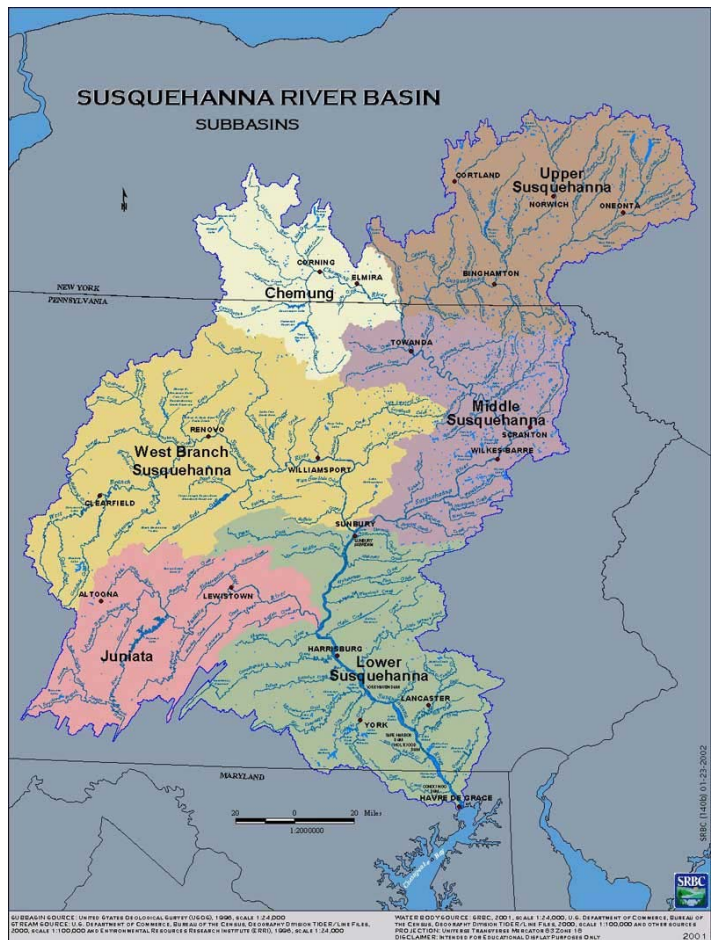
**Executive Director**  
**Susquehanna River Basin Commission**



Paul O. Swartz is the Executive Director of the Susquehanna River Basin Commission. Mr. Swartz was appointed Executive Director in 1992 and directs the Commission's activities, including its regulatory responsibilities, water supply management, flood plain management, migratory fish restoration, and water quality programs that benefit the Chesapeake Bay. Prior to joining the Commission, Mr. Swartz was the director of the Bureau of Soil and Water Conservation in the Pennsylvania Department of Environmental Resources. Mr. Swartz also served as Executive Secretary to the Pennsylvania Conservation Commission from 1982-1992.



[www.srbc.net](http://www.srbc.net)



## **Presentation Summaries & Speaker Biographies**

### **Abandoned Mine Lands Fund, the Beginning and the Future**

**John Dawes**

**Western PA Watershed Program**

The Abandoned Mine Lands Fund, an Office of Surface Mining Trust Fund, collected at 35 cents per ton on mined coal, has accumulated to \$1.8 billion in Washington D.C.. The intent of the Program is to address the dangerous impacts brought about by historic mining practices prior to regulation in 1977. The Program is operating on its third extension and is currently set to expire on June 30th of this year. A full court effort is now underway to secure reauthorization. This effort includes both Senate offices of Pennsylvania, the Governor's office and the Departments of Environmental Protection and Conservation and Natural Resources. Citizens groups are in a leadership role. Approximately 1.4 million Pennsylvania citizens live within a mile of one of the dangerous abandoned mine features across the state. With 46 counties involved and 184,000 acres impacted by this degradation, this issue is Pennsylvania's largest environmental problem. Past legislation called for the fee to be annually appropriated. Current legislative language would take the Fund off-budget, which would provide a reliable and timely source of reclamation funds to the Commonwealth.

*John Dawes is the Administrator of the Western PA Watershed Program, a small grants program funded by philanthropy. The intent of the Program is to provide support to watershed associations and environmental groups that are implementing restoration projects, using agency funding—both state and federal. He is a graduate of Penn State University, holding a Master's degree. Previously he was an alternate Commissioner on Governor Tom Ridge's 21<sup>st</sup> Century Commission on the Environment and was part of a visioning team to write the guidelines for the Heinz Endowments Environment Program. He is a cattle breeder on his Huntingdon Co. farm, implementing many agricultural BMPs. Dawes has been nominated for the 2006 Karl Mason Award from the PA Association of Environmental Professionals.*



[www.wpawp.org](http://www.wpawp.org)

### **Watershed Scale Impact and Recovery of Fish Communities in Mined Watersheds**

**Dr. Todd Petty**

**West Virginia University, Division of Forestry & Natural Resources**

Aquatic ecosystem functions in Appalachian watersheds have been impacted by mining to such an extent that it affects the quality of life of residents and limits the potential for sustained economic development. For the past six years, our lab has studied aquatic ecosystem structure in the Cheat and Tygart Valley River watersheds (WV) in an effort to: 1) Quantify both the local and regional impacts of mining on fish and benthic invertebrate communities; and 2) Develop procedures for identifying

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(—Dr. Todd Petty continued—)

restoration priorities and implementing watershed scale management of aquatic resources in mined Appalachian watersheds. We have found that extensive impairment to fish and invertebrate communities occurs in mined watersheds via three dominant pathways. Pathway 1 occurs when one or more acute stressors (e.g., dissolved aluminum) produce severe negative impacts to local communities. Pathway 2 occurs when multiple dilute stressors (e.g., dissolved trace metals) interact to produce a greater localized impact than expected. Pathway 3 occurs when regional losses of diversity and high levels of fragmentation cause impairment in streams that have not been directly impacted by mining. Our findings support the conclusion that reach-scale protection and restoration will be ineffective in managing aquatic resources in this region. However, integrated approaches that focus on recovering drainage networks have a high potential for success in restoring productive fisheries at a watershed scale.

*Dr. Petty received a bachelor's degree in Biology from the University of Virginia and a master's and PhD in Forest Resources from the University of Georgia. Todd currently is an Assistant Professor in the Division of Forestry and Natural Resources at West Virginia University where he teaches courses in Limnology, Fisheries Management, Stream Restoration, and Population Ecology. He conducts research in basic stream ecology, fish community ecology, and watershed restoration. Most recently Todd's work has focused on optimizing efforts to restore mined Appalachian watersheds for the purpose of recovering productive fisheries.*



[www.wvri.nrcce.wvu.edu](http://www.wvri.nrcce.wvu.edu)

[www.wvu.edu](http://www.wvu.edu)

**Cold Stream Restoration**

**Terry Schmidt, P.E.**

**Skelly & Loy Engineers and Consultants**

The Cold Stream watershed is located south of the Borough of Philipsburg, Pennsylvania within the Moshannon Creek watershed. The upper watershed areas of Cold Stream are classified as a high quality cold water fishery which currently supports a trout fishery with some tributaries supporting native trout populations. The lower reach of Cold Stream is impacted by acid mine drainage (AMD) and does not support any fishery. The Woodduck Chapter of Trout Unlimited (WCTU) has been working on restoration of the Cold Stream watershed for decades. Working downstream, WCTU has spearheaded an effort to remediate all of these discharges. Numerous projects have been funded and constructed including Glass City, Chiller Theater, Mine Drift, Stump, Stump Junior, Fossil Rock, and Shotgun. However, the final mile of Cold Stream still remains impaired. This presentation is intended to describe the past, present status, and future plans of Cold Stream restoration efforts. The partnering efforts and watershed restoration approach used by WCTU can serve as a model for other groups in achieving their watershed restoration goals.

*Terry Schmidt, P.E. is Vice President of Engineering for Skelly and Loy Engineers and Consultants. Starting out as a surface coal miner in Somerset County, Pennsylvania, he became interested in the*

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(—Terry Schmidt continued—)

*passive treatment of mine impacted waters. While gaining a Master of Science in Mining Engineer at Penn State, his studies continued to focus on mine drainage treatment. During his 18 years as a Skelly and Loy employee, he has directed the design of over 50 passive and active treatment systems for coal mine drainage throughout the Appalachian and Anthracite Coal Regions.*



[www.skellyloy.com](http://www.skellyloy.com)

**Slippery Rock Watershed: A Decade of Accomplishments and Lessons Learned**

**Margaret Dunn, P.G., and Kyle Durrett  
Slippery Rock Watershed Coalition**

Since 1994, over 16 passive systems have been installed that successfully treat over 750,000,000 gallons of abandoned mine drainage annually in the headwaters of the Slippery Rock Creek Watershed. These efforts have resulted in the substantial improvement in over 11 miles of stream with the return of fish in segments that have been essentially lifeless for about a century. In addition, over 150 acres of abandoned mine lands have been restored to desirable wildlife habitat or productive farmland and more than 15 acres of naturally-functioning wetlands have been created or restored. In order to sustain and expand this effort, the SRWC continues to focus on improving restoration techniques. Even though reclaimed sites have required little or no maintenance (some completed over a decade ago), upgrades have been implemented, where warranted, to increase long-term effectiveness and to decrease future maintenance. The initial design and construction and post-installation operation, maintenance, monitoring, and upgrades could not have been accomplished without initiatives that support watershed groups like the Growing Greener Program and the willingness of federal, state, and local government agencies and elected officials, landowners, mining companies, private foundations, local businesses, environmental professionals, and volunteers to work with us to achieve our goals.

*As active participants in the Slippery Rock Watershed Coalition, Margaret and Kyle apply their knowledge in geology and construction, to work with those interested in forming public-private partnership efforts to develop, improve, implement, and maintain environmentally-friendly technologies to treat abandoned mine drainage and for resource recovery in order to restore Pennsylvania's watersheds. Margaret and Kyle are also associated with Stream Restoration, Inc. which is a non-profit organization whose mission focuses on the restoration of streams impacted by abandoned coal mine drainage.*



[www.srwc.org](http://www.srwc.org)

[www.streamrestorationinc.org](http://www.streamrestorationinc.org)

**The Susquehanna Greenway Call to Action: Unique Opportunities for the Restoration of the West Branch Susquehanna River**

**Brian Auman, ASLA  
Susquehanna Greenway Partnership**

The Susquehanna Greenway is a corridor of land and water following the Susquehanna River and its West Branch along a 500-mile journey through the Commonwealth of Pennsylvania. The Pennsylvania Greenways Action Plan recognizes it as the state's largest greenway. The purpose of the Susquehanna Greenway is to protect, value, and enjoy the exceptional resources of the river, creating an interconnected network of trails and natural areas traversing urban, suburban and rural landscapes. The Susquehanna Greenway provides endless opportunities for visitors and residents to connect with the river and its bountiful heritage through land and water trails, parks, historic sites, working farms and forests, and unique river communities. Today's presentation will summarize the Susquehanna Greenway planning process and look ahead to implementing the Greenway and also examine the unique resources and opportunities for the restoration of the West Branch Susquehanna River.

*Brian, a landscape architect and principal planner with the SEDA-COG Community Resource Center, has a diverse professional background with over 20 years of experience working in planning, landscape architectural, architectural and engineering offices, as well as academia. Brian holds a BS - Landscape Architecture - Penn State and an MS - Natural Resource Management, Utah State. Brian has been involved in planning the Susquehanna Greenway for the last 3-1/2 years, currently serving as Interim Coordinator for the Susquehanna Greenway Partnership – a newly formed 501 (c)(3) non-profit corporation created to oversee the implementation of the Susquehanna Greenway.*



[www.susquehannagreenway.org](http://www.susquehannagreenway.org)

**AMD Abatement through Alkaline Addition**

**Michael Smith, P.G.  
DEP Moshannon District Mining Office**

Passive treatment works well on AMD discharges with the right water chemistry. On others it poses difficult and expensive maintenance headaches or doesn't work at all. In some cases, AMD occurs as baseflow directly into streams making it very difficult to collect and treat. Where coal reserves remain, remining with the addition of alkaline materials such as waste lime presents a good alternative approach to remediation. It can also be a much more cost-effective and maintenance-free approach. Examples from Lycoming and Clearfield Counties show how the importation of alkaline material or redistribution of naturally-occurring carbonates can overcome otherwise acidic overburden to help correct acid discharges, eliminating the need for treatment or making passive treatment more feasible. Two alkaline addition projects in the Kettle and Babb Creek watersheds are being considered as the

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(—Michael Smith continued—)

principal alternative for AMD remediation. On the Kettle Creek project, over half of the AMD seepage is under ground, precluding easy collection and treatment. Water chemistry at the Rattler Mine in Tioga County is too severe, overwhelming existing passive treatment. DEP is proposing projects to daylight the underground mine and backfill it with alkaline addition rates sufficient to produce a net-alkaline discharge.

*Michael Smith has a M.S. in hydrogeology from Penn State and is a registered professional geologist. He has 25 years experience with DEP, primarily with the mining program where he has been District Mining Manager at the Moshannon District Office for the past 15 years. He has published numerous articles on remining and alkaline addition, and their impacts on mine drainage quality.*



[www.dep.state.pa.us](http://www.dep.state.pa.us) (Keyword: District Mining Operations)

**Beech Creek Watershed: The Good, the Bad, and the Ugly**

**James R. Walker**

**Beech Creek Watershed Association**

The Beech Creek watershed has many “good”, some “bad”, and some really “ugly” characteristics. The “good” characteristics include a primarily undeveloped forested watershed with water quality that supports wild trout populations in many subwatersheds. The “bad” and “ugly” characteristics are related to AMD issues in the watershed that have killed the mainstem of Beech Creek and several subwatersheds. This presentation will hopefully characterize the watershed and demonstrate the approach taken by the Beech Creek Watershed Association to protect, preserve, and restore Beech Creek.

*James R. Walker is the president of the Beech Creek Watershed Association. Jamie and his wife Christa live in Beech Creek. Jamie has earned a B.S. in Biology and Geography with an emphasis in Environmental Science from Mansfield University. He is currently pursuing a M.S. in Ecology with a concentration in wetland ecology from Penn State University. Jamie enjoys all outdoor activities from hunting to cross country skiing. He is keenly interested in seeing fish return to the mainstem of Beech Creek.*



<http://mywebpage.netscape.com/bcwasite/>

**Benthic Community Response to Remediation Activities in West Branch Tributaries and the Implication for Restoration of Fishes**

**Robert M. (Bob) Ross  
Beech Creek Watershed Association**

With >4,000 miles of streams in Pennsylvania impaired by AMD and a \$15 billion liability, stream restoration activities in the state have increased dramatically recently. To characterize recovery of benthic habitats in AMD-treated streams and rivers, we sampled periphyton and macroinvertebrate communities in AMD-impacted (Moshannon Creek, Bennett Branch), unimpacted freestone (Young Womans, Kettle Creeks), and limestone (treatment surrogate; Antes, Bald Eagle Creeks) streams of the West Branch along with water quality. Periphyton biomass (measured as chlorophyll-a, mg/m<sup>2</sup>) was an order of magnitude lower at both AMD-impacted (22) and freestone (33) than limestone (322) sites. Macroinvertebrate densities were an order of magnitude lower in AMD-impacted (1,146/m<sup>2</sup>) than in either freestone (9,126/m<sup>2</sup>) or limestone (19,316/m<sup>2</sup>) benthic communities. In AMD streams, scrapers (herbivores) were replaced by collector (detritus-feeding) functional feeding groups and EPT species (specialist feeders) were replaced by dipterans (generalists). Multivariate analysis enabled us to identify up to 17 periphyton and 4 macroinvertebrate indicator species for each of the three stream types. Indicator taxa are currently being examined for potential identification of genetic fragments in homogenized samples. If successful, biological assessment of streams will become much more cost-effective, potentially accelerating recovery efforts in the watershed and state-wide. Restoration of benthic communities in impacted streams and rivers will greatly increase the quantity and improve the quality of the food base for native resident and migratory fishes in impacted zones of the watershed.

*Robert M. (Bob) Ross is Ecologist and Section Leader at the Northern Appalachian Research Laboratory (USGS) in Wellsboro, Pennsylvania. He holds degrees in biology (BA, Thiel College; MS, University of Guam) and zoology (PhD, University of Hawaii). Professional activities include former or current president/chairman of the PA Chapter of American Fisheries Society, Western PA Chapter of Sigma Xi, Ornithological Technical Committee of the Pennsylvania Biological Survey, and secretary of Babb Creek Watershed Association. Research interests include cormorant feeding ecology, eastern hemlock decline and effects on aquatic/terrestrial biota, restoration of Susquehanna fisheries through dam-removal prioritization, and AMD impacts on stream ecology.*



[www.lsc.usgs.gov/NARLindex.asp](http://www.lsc.usgs.gov/NARLindex.asp)

**Vertical Flow Ponds: Functions and Foibles**

**Dr. Arthur W. Rose  
Penn State University**

Vertical Flow Ponds, also known as SAPS, RAPS and vertical flow wetlands, are the major passive treatment method for net acid mine drainage. The functions of the receiving pond, compost layer, limestone layer and final pond are discussed, and problems encountered with these are illustrated. A database on about 40 VFP systems indicates that nearly half the systems are performing very well.

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**(—Dr. Arthur W. Rose continued—)**

A similar proportion are performing as well as might be expected, but not up to the intended design. Reasons for deficiencies are discussed. About 10-15% can be considered failures, most because of high-Al or high-Fe influent or poor design or construction. For most systems, the cost of acid removal is \$200-600/ton of acidity removed, which compares favorably with active treatment.

*Arthur Rose has a B.S. in Geology from Antioch College and a PhD. in Geology and Geochemistry from the California Institute of Technology. He has worked for Kennecott Copper Co., the State of Alaska, and (since 1967) Penn State University, where he is currently Professor Emeritus of Geochemistry. He has published extensively on acid mine drainage prevention and treatment. Dr. Rose is also an active member of the Clearfield Creek Watershed Association and the newly formed West Branch Susquehanna Restoration Coalition.*



[www.clearfieldcreekwatershed.org](http://www.clearfieldcreekwatershed.org)

**The Forgotten Systems: Passive Treatment Can Work**

**Kimberly R. Weaver, P.E.**

**Hedin Environmental**

The goal of this presentation is to discuss passive treatment systems that have been forgotten. While it might seem like a bad thing to “forget” these passive treatment systems, they have been forgotten because they continue to provide treatment and haven’t presented any serious problems. While much of the focus of investigations, sampling, and discussion rightly focuses on failed or failing passive treatment systems, this presentation will serve as a reminder that correctly selected and designed passive treatment systems can be a cost-effective, long-term solution for AMD problems.

*Kim Weaver has worked for Hedin Environmental since 1999. Kim first studied mine drainage with Dr. Carl Kirby. She has a BS in Civil Engineering from Bucknell University and a master’s in Environmental Engineering from Princeton. Kim is a registered professional engineer.*



**HedinEnvironmental**

[www.hedinenv.com](http://www.hedinenv.com)



# West Branch Susquehanna Restoration Symposium II

