

## Mid-Atlantic Volunteer Monitoring Conference Abstracts

Friday Sessions

### Data Communication

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### Conceptualization - A tool for effective science communication

If you want to influence decisions and policymaking, you need to learn the art of storytelling; to capture the key messages from scientific research and make the data compelling. The most successful scientists are skilled at communicating their ideas. This session will teach the principles and practice of effective science communication, with emphasis on visual science communication tools. These skills are readily applied to communicating at various levels, from the general public to resource managers to local and state politicians. The ability to capture main messages and concepts is the basis of effective communication. A tool that helps clarify messages is the production of conceptual diagrams. These diagrams can be used on scales of the ecosystem down to detailed processes of nutrient dynamics. Workshop participants will learn how to design and produce a conceptual diagram using our freely available online tools and symbol libraries. At the end of the workshop, participants will have been introduced to the principles of effective science communication and the elements of conceptual diagrams, and have used a hands-on activity, Conceptionary, to further enforce their understanding of how to use conceptual diagrams to express scientific ideas.

The Mountain Institute

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### Watershed Monitoring With Youth During School Time and Free Time

For the past nine years The Mountain Institute has partnered with the WV DEP to provide Appalachian Watershed and Stream Monitors (AWSM). This program has engaged thousands of students in critical thought and active stewardship related to streams and land use in their watershed. An overview of the AWSM program will be presented with a focus on communicating with teachers and schools to get students engaged. Through its services for youth The Mountain Institute has also been an active supporter of Friends of Deckers Creek's Youth Advisory Board (YAB), facilitating YAB leadership programs for the past four years. The Mountain Institute and Friends of Deckers Creek are currently looking at ways to provide youth across WV a greater voice through online interactive mapping. This conversation style presentation will appeal to anyone interested in expanding their youth based volunteer monitoring efforts. Plenty of time will be provided to answer your questions about youth engagement practices.

## Tools for re-engaging your watershed organization

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Alliance for Aquatic Resource Monitoring

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### Tools for re-engaging your watershed organization

Do you work with watershed volunteers or are you a watershed volunteer? If so, what do you notice about your group's dynamics? Have you experienced the same leadership for a while? Has the momentum of the group faded? Are you wishing that someone else would step up and share the burden of leadership activities? If you answered yes, then this session is for you. In the larger watershed community it is common for the energy and number of volunteers to ebb and flow. All too often groups form in response to an issue and don't develop a strategic plan from the get-go. That is okay, strategic planning is a tool that can be implemented at any time. The Alliance for Aquatic Resource Monitoring (ALLARM) has found that when volunteer watershed groups go through a strategic planning process it can help solidify a group's mission and help with volunteer recruitment. This 90 minute session will expose participants to tools that aid watershed groups in starting a strategic planning process as well as key elements to recruiting and engaging new volunteers. Through hands-on activities, participants will create the initial building blocks to re-engage their community.

## Understanding and Implementing TMDLs and WIPs

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USEPA, Chesapeake Bay Program Office

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### Supporting of the Chesapeake Bay TMDL using traditional assessment programs and non-traditional partner efforts

The U.S. Environmental Protection Agency has established the Chesapeake Bay Total Maximum Daily Load (TMDL), a historic and comprehensive "pollution diet" with rigorous accountability measures to initiate sweeping actions to restore clean water in the Chesapeake Bay and the region's streams, creeks and rivers. The TMDL identifies the necessary pollution reductions of nitrogen, phosphorus and sediment across Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and the District of Columbia, and sets pollution limits necessary to meet application water quality standards (i.e. dissolved oxygen, water clarity, underwater Bay grasses and chlorophyll-a, an indicator of algae levels) in the Bay, its tidal rivers and embayments. Watershed Implementation Plans detail how and when the six States and District of Columbia will meet pollution reduction allocations. The Chesapeake Bay Partnership (CBP) tidal and nontidal monitoring networks collect physical, chemical and biological data annually that is used to evaluate Bay water quality against water quality impairment standards, track changes in response to management actions, and target areas for further management actions. This presentation will further discuss the evolution of the CBP monitoring programs including the use of Nontraditional partner data in regulatory assessments, informing the status of waterways, supporting management action targeting tools and in the development of health and restoration indicators.

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#### Effective Ag BMPs for Shenandoah River Chesapeake Bay TMDL Effort

The hydrology and geology of the Shenandoah River Valley (SRV) are major factors controlling the nitrogen and phosphorus yield of the River. The mountains surrounding the SRV are not karst. The mountain streams yield high storm runoff, very low base flow and little nitrogen or phosphorus as documented by Friends of the Shenandoah River (FOSR) data. The karst carbonate rocks that cove most the Valley between the mountains have limited periods of overland runoff, low storm peaks, high base flow that supports the low flow of the Shenandoah River and yield 2+ mg/L of dissolved nitrate as N. Because most the base flow of the Shenandoah River is from the karst rocks one would expect that the main stem of the River would contain about 2 mg/L of dissolved nitrate and the concentrations would decrease with increasing flow. USGS data collected from the North Fork at Strasburg VA and the South Fork at Front Royal VA show that the dissolved and total nitrogen increase with flow up to about 1 cfs per square mile. The apparent loss of nitrogen may be as much as 400 tons per year for the SRV. If photosynthetic up take is the cause of the loss are the plants measured in samples collected at high flow? Could denitrification be the cause? Because most the nonpoint source nitrogen comes from ground water in the karst areas the most effective Ag BMPs are those that limit nitrogen application to the land. Because 2/3 the phosphorus is transported during the 5% of the time when there is overland flow from the karst areas the most effective Ag BMPs are those that maintain soil on the land.

Note: Also speaking in this session is Jim George, MD Dept. of the Environment

#### **Stream Restoration**

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#### Natural Stream Restoration

Learn about methods used to restore a stream back to a more natural setting. This session will focus on the techniques used to monitor these projects after their implementation. Examples include a simple string-line cross-section, pebble counts, visual clues etc. Homework may be required...

#### **Data Visualization**

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### Storytelling with Your Data

Maps have been telling stories for centuries. In the past few decades, however, maps have been integrated with data analysis and supercharged with digital technologies, including geographic information systems, the Web, mobile communications, and the cloud. Thanks to these technologies, maps can be used and interacted with in a myriad of ways unlocking the meaning behind data. The presentation will provide share some best practices in how to cost effectively build story maps for your own organization.

West Virginia Water Research Institute

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### Three Rivers QUEST Data Management & Visualization

The Three River QUEST (3RQ) is a water quality monitoring and reporting program of the West Virginia Water Research Institute (WVWRI) at West Virginia University. The QUEST program includes a regimented bi-weekly sampling effort by environmental scientists and a volunteer monitoring component that serves to inform state and federal agencies, industry and the public on water quality in the Upper Ohio Region. The 3RQ program was initiated in July 2009 after concerns arose over high concentrations of Total Dissolved Solids (TDS) in the Monongahela River that exceeded the U.S. Environmental Protection Agency's secondary drinking water standard. Since then, WVWRI staff has conducted sampling and monitoring at 17 locations throughout the Monongahela River Basin every two weeks. WVWRI received funding from the Colcom Foundation, in part, to develop a platform for the collection of data throughout the Upper Ohio River Basin. The 3 Rivers QUEST program, administered and managed by WVWRI, now includes regional research partners at Duquesne University (Southern Allegheny River Region), Wheeling Jesuit University (Upper Ohio River Region), and the Iron Furnace Chapter of Trout Unlimited (Northern Allegheny River Region). In each of these regions, volunteer organizations are also encouraged to participate in the program. Understanding that citizen-based groups are collecting similar information throughout the 3RQ area, WVWRI has been working to find the "commonality" of data being collected. With the West Virginia University Research Office of Information Technology (WVU ROIT), WVWRI has developed the QUEST Data Management Tool which provides a secure data entry portal for QUEST participants. The data is managed by a secure database and housed on WVU servers. Quality control measures are performed when volunteers enter data, preventing mis-entry of data. Visualization of data is provided by an Arc-GIS based data map on the program's website, [www.3RiversQUEST.org](http://www.3RiversQUEST.org). This format provides public accessibility to data in a safe and secure manner. Coordinates for volunteer site locations are not shared. Reporting features such as graphs for site locations are provided through the Arc GIS platform.

USEPA, Office of Wetlands, Oceans and Watersheds

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### New EPA Tools to Aid in Water Decision Making

This presentation will discuss new tools that are available to watershed managers and watershed groups to aid in decision making. First, the presentation will cover a high level view of water data availability through the EPA and USGS co-hosted Water Quality Portal. The presentation will then explain how water data is made available through the Portal using a common water data structure, EPA Water Quality Exchange. Next, the presentation will discuss geospatial

analysis tools in the National Hydrography Data Set Plus. Finally, the presentation will discuss a tool which pulls multiple EPA water program data into one location enabling someone to view conditions at a specific point of interest called My Waterway Mobile App. Together, these tools help increase the value of data to address issues more holistically and aid in decision making.

### **Making QAPPs work for you**

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#### Quality Assurance Project Plans (QAPP)

It may QAPP like a duck but it is not a duck. Learn how QAPPs are a necessary component in many monitoring programs. Learn how QAPPs can get your data recognized, and save countless hours and expense in preventing a flawed monitoring project from occurring. This session will cover the essentials in developing a QAPP as well as essential quality assurance procedures.

South River Federation

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#### Quality Data and Small Watershed Organizations- You Too Can Do This!

The South River Federations' water quality monitoring program is being accepted into the Chesapeake Bay Program and into the State of Maryland for the 2014 integrated report. Capt. Diana Muller will discuss the QAPP and SOP implementation and development in order to obtain the high quality data, both the pros and cons.

### **MS4s – What are they and making them work**

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#### MS4s and YOU

Larger communities are regulated through Municipal Separate Storm Sewer System (MS4) permits. These permits spell out a number of requirements and activities that the local government must comply with. This includes six minimum

control measures: 1. Public Education and Outreach; 2. Public Participation/Involvement; 3. Illicit Discharge Detection and Elimination; 4. Construction Site Runoff Control; 5. Post-Construction Runoff Control; and 6. Pollution Prevention/Good Housekeeping. Tight budgets and limited staff make it difficult for our local MS4s to maximize the benefits of these requirements. This session identifies opportunities that allow watershed organizations and volunteers to actively contribute to the health of our communities while working in concert with your local government.

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#### Initiating Your MS4 Outreach Requirements

Municipal Separate Storm Sewer System (MS4) permit holders are required to implement an education and outreach program for the area served by the MS4. The outreach program shall be designed to achieve measurable improvements in the target audience's understanding of stormwater pollution and steps they can take to reduce their impacts. This session introduces rain barrel workshops and Project Water Education for Teachers (Project WET) as an economical avenue to outreach many audiences on various subject areas of stormwater pollution.

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#### City perspectives of MS4s

The presentation will discuss the cities perspective and will include why stormwater is important; how does it affect the Chesapeake Bay; explain what an MS4 community is; explain BMPs; and explain Martinsburg's approach for stormwater management

#### **Citizen Watch-Dogging Gas Pipeline Projects**

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#### Citizen Watch-Dogging Gas Pipeline Projects

Delaware Riverkeeper Network will review a new visual assessment for volunteer monitors who are concerned with gas drilling impacts related to large pipeline projects to carry marcellus shale gas to various markets. During this session participants will learn the types of impacts that are violations and what to look for and how to report potential problems and violations to the proper agencies and how to ensure a record of the observations are compiled via the FERC website. Basic pipeline construction techniques and processes, types of wet crossings implemented, pipeline environmental impacts, and types of pipelines associated with natural gas development will also be covered. DRN will also share on the ground experiences with its own Pipeline Watch Program that has mobilized about 30 volunteer monitors to document

pipeline impacts for a pipeline cutting through Exceptional Value and High Quality streams of the Delaware River Watershed. Field photos of one specific intra-state pipeline currently under construction from Bradford County PA eastward and across the Delaware River into New Jersey will be shared to show on the ground construction. How to share your observations with the public will also be shared based on ways to get the data out to the local press outlets.

## Saturday's Sessions

### Using Social Media

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#### Chickahominy Swamp Rats

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The Chickahominy Swamp Rats located near Richmond, VA is a small volunteer group monitoring water quality in the Chickahominy River. Having a very limited budget and a small core group of volunteers, it was not feasible to build a webpage to inform the public on monitoring activities. Instead, the 'Swamp Rats' use Facebook to relay information and communicate with their volunteers and public. By using Facebook, the group is able to post meeting information, videos using you tube, monitoring data using Google Maps, and other information for free and with minimal technical skill. This is extremely important for a small group that has very little funding or volunteer time to update a traditional webpage. The group plans to continue to use Facebook for the foreseeable future.

#### James River Association

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#### James River Watch

To ensure safe and responsible river recreation, the James River Association (JRA) launched the James River Watch website in late 2012 to offer river users information on current swimming, boating and fishing conditions. James River Watch features an interactive map that gives up-to-the -hour information such as river height, water temperature, turbidity, and e. coli bacteria concentrations. Color-coded dots on the map provide local condition information. Data for the James River Watch is collected in large part by volunteers monitoring e. coli, turbidity, and air/water temperature weekly from May to September. Volunteers upload the data directly into the James River Watch website, and this information is collected at high public use locations across the James River Watershed including; Williamsburg, Hopewell, Petersburg, Richmond, Maidens, Scottsville, Lynchburg and Buchanan. In addition to showcasing this web application and the work of JRA's volunteer water monitors, this presentation will cover some of the challenges, successes, and future goals of the project.

The James River Watch website is available at [www.jamesriverassociation.org/jrw](http://www.jamesriverassociation.org/jrw).

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SkyTruth's mission is to motivate and empower new constituencies for environmental protection. We use scientifically credible satellite images and other visual technologies to create compelling pictures that vividly illustrate environmental impacts and provide these pictures and supporting data to environmental advocates, the media, and the public. SkyTruth promotes environmental awareness and protection with remote sensing and digital mapping technology. We provide stunning images backed by scientifically robust information about our changing environment to stimulate changes in habitat protection, biodiversity conservation, and sustainable resource management. We design and conduct our projects in close partnership with environmental groups, local planners and resource managers to complement their work on a broad spectrum of environmental issues.

### **Volunteer Monitoring Lessons Learned**

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### Training Managers by Ear and Volunteers by Sight

Monitoring programs need to create opportunities for volunteer feedback, input, and program ownership. Strong relationships, transparent operations, and good listening and observational skills are a must for a successful program that will generate buy-in from both new and veteran volunteers.

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### 24 Years of Successful Collaboration Working Together to Preserve and Protect a Treasured Resource

Since 1989 the Friends of the Shenandoah River (FOSR) has been successfully calibrating with state, federal and local government as well as citizens in their endeavor to protect and restore the aquatic environment of one of Virginia's greatest natural resources, the Shenandoah River. In 1994, the FOSR entered into a mutually beneficial partnership with Shenandoah University. SU graciously offered space for the FOSR to house and operate their lab. FOSR and SU also works collaboratively to provide students with internship opportunities and an additional resource for students working on research projects or those wishing to explore opportunities within both the laboratory and environmental career areas. Many of the FOSR lab interns have been successful in finding jobs in large part because of the experience they



gained through their internship with FOSR. In addition environmental organizations are aware of the quality of work the FOSR lab produces and the strict protocols FOSR follows. The most important and successful collaboration the FOSR has had is the dedication of the citizen volunteer water-quality monitors from the seven counties in the Shenandoah River basin. Many of the volunteers represent other like organizations such as Friends of the North Fork of the Shenandoah River, Friends of the Middle River, and Page Valley Citizen Group. Collectively they form the Friends of the Shenandoah River Cooperative Volunteer Water Monitoring Program. Recently the FOSR's monitoring program has expanded into Jefferson County West Virginia. One of the landmark achievements of the FOSR's Cooperative Volunteer Water Quality Monitoring Program is the inclusion of the water quality data in the VA DEQ 305(b)/ 303(d) Reports submitted to the US EPA as required by the Clean Water Act and related federal regulations. Through collaboration and partnership an entire watershed's long-term water quality is being documented by a volunteer-based non-profit organization, Friends of the Shenandoah River.

## **Shale Gas Monitoring**

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Alliance for Aquatic Resource Monitoring

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### Shale Gas Monitoring

In 2010, the Alliance for Aquatic Resource Monitoring (ALLARM) developed a volunteer based protocol with the goal of monitoring streams and their watersheds for early detection of the impacts from Marcellus and Utica Shale gas extraction in Pennsylvania. To date, ALLARM has conducted 50 shale gas monitoring workshops in Pennsylvania, New York, and West Virginia, with over 1,000 volunteers in attendance. Many lessons have been learned over the course of the past three years, particularly concerning the importance of Quality Assurance/Quality Control (QA/QC) and strategies for data management. Learn about the ways in which different states can tailor this protocol to their needs for shale gas monitoring. Also hear about various obstacles ALLARM encountered, and the ways in which they were overcome with case studies from Pennsylvania communities.

## **Social Marketing: Changing Behavior for Improved Water Quality**

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Virginia Tech-Biological System Engineering

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### Social Marketing: Changing Behavior for Improved Water Quality

If we are to succeed in improving water quality degraded by human-induced sources of pollution, we must understand what makes people tick and what it will take for them change their behavior (think native landscaping instead of fertilized turf, for example). Community Based Social Marketing is the use of marketing principles and techniques to influence a target audience to accept, reject, modify, or abandon a behavior for the benefit of society as a whole. This session will provide a description of this approach, a method for identifying barriers to adopting a behavior, tools that can be used to encourage behavior change, and methods for evaluating impact. We will talk about case studies related

to practices that benefit water quality, and work in small groups to figure out how best to apply these techniques in our volunteer work.

## **Partnership Efforts**

Elks Run Watershed Group

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### Walking for the Water

For centuries indigenous people have cared for the water relating to it as a sacred gift central to life. A dozen years ago grandmothers of the Anishinaabe people, witnessing the accelerated degradation of the Great Lakes, began to walk for the water. To date they have walked around each of the Great Lakes, from the four directions (two years ago they carried water from the East, West and Southern Coasts and northern Canada to the Great Lakes), and the length of the Mississippi (1,752 miles). The story I offer in this session is that of the most recent walk from the headwaters of the Mississippi in Northern Minnesota, through Louisiana's "Cancer Alley," to the Gulf of Mexico. It is a story of inclusion, cross-cultural partnership, cultivating local leadership, impacting policy, and deep commitment to the health of our water for generations. Everyone has a story of connecting with water. This session offers an opportunity to explore those stories, thinking outside the box about what partnerships and water monitoring can look like.

Friends of the Cheat

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### Lessons learned from a collaborative approach to watershed restoration

Friends of the Cheat (FOC) is a nonprofit watershed association working to restore, preserve, and promote the outstanding natural qualities of the Cheat watershed in northern West Virginia. While FOC's primary focus has been the implementation of acid mine drainage treatment projects in collaboration with its regional partners, FOC staff and volunteers also work on rails to trails projects, brownfields site revitalization, water trail development, and citizen science and outreach programs. Years of implementing projects and programs with private, academic, and government partners have provided many challenges and learning opportunities. Challenges relating to communication, roles and responsibilities, and strategic planning will be reviewed using two case studies. The first is FOC's recently completed EPA Targeted Watershed Grant representing over \$1.5 million of restoration efforts in Muddy Creek spanning over seven years. The second is FOC's most recent partnership with the 3 Rivers Quest water quality monitoring and reporting program.

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### Partners for Protection

The White Clay Creek became the first entire watershed (rather than just a section of a river) designated into the National Wild and Scenic River system. Long-term partnerships between the National Park Service, local, regional, and state stakeholders have resulted in highly successful collaborative management and programs. This presentation highlights the role of volunteers and how volunteer monitoring partnerships are developing and growing to monitor chemistry, bacteria, mussels, and macroinvertebrates.

### **Macroinvertebrate Identification**

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### Benthic Macroinvertebrate Identification

This session will start with an overview presentation on the morphology, diversity and taxonomy of freshwater benthic macroinvertebrates. Participants will then practice their taxonomic skills by identifying preserved specimens to order or family taxonomic level. Stereo scopes will be available as well as references and keys to common fauna. Taxonomic experts will be on hand to answer questions throughout the session.

### **Bacteria monitoring and data use**

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### Bacteria monitoring and data use

This session will cover everything anyone needs to know about monitoring for fecal bacteria in water. Learn why it is important to monitor for this bacteria as well as the multiple methods volunteer groups have successfully incorporated it into their program. The session will also include a short educational comedy film.

## Program Evaluation

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River Network

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### The Value of Organizational Assessment

How does an organization realize its needs before there is a threat to its programs and its organizational sustainability? One way is to assess its internal operation and programmatic metrics on a regular basis. By assessing the “present” an organization will be prepared to plan for its “future” and will be in a position to react and offset a pending crisis. Using an online assessment tool, participants will learn the importance and efficiencies of tracking metrics to determine your organization’s successes and needs. This workshop will introduce participants to River Network’s new FREE diagnostic tool that assesses their organization’s operational structures as well as its progress with on-the-grounds projects. We will look at the questions asked by the survey and discuss the value of taking the time to keep track of metrics that address funding sources, Board performance, planning mechanisms. We will also cover the programmatic metrics that determine the importance and efficiency of an organization’s specific programs such as water monitoring, community organizing, restoration projects, education and outreach programs, etc. There will be time to also explore other assessment tools. Groups will be encouraged to take the online assessment and learn what is important to track for their organization.

### **Plenary Speaker – Nathaniel (Than) Hitt**

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### Forecasting brook trout stream responses to climate change

Forecasting effects of climate change for brook trout requires an understanding of how stream temperatures respond to air temperatures (i.e., thermal sensitivity). We measured air-water temperature relationships within Shenandoah National Park streams and assessed variation in thermal sensitivity within and among watersheds. Stream temperatures in the study area were generally less sensitive to air temperature than previously assumed and we attribute this to the moderating effect of groundwater discharge at many sites. As a result, our predictions of future habitat loss were less pessimistic than those derived from prior research. However, our analysis also revealed spatial variation in thermal sensitivity that will forecast fragmentation of currently suitable habitat. Habitat fragmentation from thermal barriers should therefore be considered in research and monitoring designs for brook trout.