



2008 Keystone Coldwater Conference February 23, 2008

Session Descriptions

- A. Protection
- B. Management
- C. Research I
- D. Research II

A. Protection

LEGAL PROTECTIONS FOR HEADWATER STREAMS

This session will discuss existing legal and regulatory protections for headwater streams and wetlands in Pennsylvania. Proposed revisions to erosion and sediment control, wetlands and stream encroachment regulations will also be discussed. The session will describe potential threats to legal protections for headwaters, including designated use downgrades, and will provide suggestions to attendees for becoming involved in maintaining and improving protections for their local streams.

**Matt Royer, Pennsylvania Staff Attorney
Chesapeake Bay Foundation**

**Bob Wendelgass, Deputy Director
Clean Water Action & Campaign for Clean Water**

A PRIMER FOR BROOK TROUT CONSERVATION, PROTECTION, AND RESTORATION IN THE WEST BRANCH SUSQUEHANNA WATERSHED USING THE CONSERVATION SUCCESS INDEX (CSI)

Brook trout (*Salvelinus fontinalis*) historically inhabited nearly every coldwater stream and river in Pennsylvania. Despite their historical range, scientists estimate that only 1% of Pennsylvania's subwatersheds that once contained this important fish remain intact. Trout Unlimited, as part of its West Branch Susquehanna Restoration Initiative, is utilizing the Conservation Success Index (CSI) to determine priority areas for conservation, protection, and restoration of brook trout populations in the West Branch Susquehanna watershed. The CSI integrates state and federal fish population data with publicly available spatial data to provide a quantitative framework for assessing the status and threats to brook trout populations. Applied at the sub-watershed scale, the CSI provides accessible information at various geographic scales that can help identify data gaps, analyze threats to population and habitat, and prioritize conservation actions for stakeholders.

**Rebecca Dunlap, W. Branch Susquehanna Project Manager
Trout Unlimited**

B. Management

PROJECT HEADWATERS: A STRATEGIC / COORDINATED APPROACH TO STORM WATER MANAGEMENT AND STREAM RESTORATION IN A WATERSHED

Project Headwaters is a strategic / coordinated approach to stormwater management and stream restoration in a watershed. We will explore one chapter's journey from site specific stream restoration work to a watershed wide management plan. Learn how we partnered with various groups to develop a watershed based plan, and steps we've taken to implement that plan. Since this project is focused on implementation, we will discuss projects that have already been implemented, as well as projects slated for implementation in 2008. We will also discuss how the projects are linked and support one another.

We will review the guiding principles of Project Headwaters, and how you can apply them to your specific needs. We will discuss where to find scientific information to help you in the planning and site selection process. We will outline the educational and community outreach components, as well as funding sources both public and private. In addition, we will discuss our timeframes for completion, and expected outcomes.

**Mike Wilson, Project Coordinator
SE Montgomery Trout Unlimited**

**Shandor Szalay, Senior Project Manager
AKRF, Inc.**

WILD TROUT MANAGEMENT THROUGH THE USE OF HABITAT MANIPULATIONS AND ANGLING REGULATIONS

Habitat manipulations and angling regulations are two management tools commonly implemented by fisheries managers in an attempt to enhance or sustain wild trout populations to meet both biological and social objectives. From a biological standpoint, the goals of both programs typically include aiming to increase the abundance and/or improve or maintain the size structure of a wild trout population. From a social perspective, both programs aim to increase recreational angling opportunities, improve angler satisfaction, and meet other societal goals. The environmental conditions present within a stream play a vital role in biotic production and have a direct effect on population dynamics and the ability of a wild trout population to respond to improved conditions resulting from either enhanced habitat or changes in angling regulations. The presentation will provide an overview of the factors that commonly influence wild trout populations, discuss the techniques used by the PFBC to address physical habitat limitations in trout streams, and provide the results of some recent fishery surveys that were conducted to evaluate the response of wild trout to habitat enhancement projects. Additionally, the presentation will discuss the use of angling regulations as a management tool, the conditions in which special angling regulations may be more likely to improve a wild trout population, and results of some recent evaluations of special angling regulations on wild trout populations.

**Jason Detar, Habitat Biologist
Pennsylvania Fish and Boat Commission**

C. Research I

SEEING THE FOREST FOR THE STREAM: LARGE WOODY DEBRIS AND INTEGRATED FOREST-STREAM MANAGEMENT

Large woody debris (LWD) is an important structural and functional component of headwater streams in forested landscapes. LWD plays an important role in providing in-stream habitat, modifying stream channels, influencing stream flows, and providing energy sources to stream organisms. This session will also focus on how headwater stream management can be incorporated into forest management plans to benefit aquatic and terrestrial resources.

**Chuck Williams, Upper Allegheny Watershed Manager
Western Pennsylvania Conservancy**

GENETIC STRUCTURE OF BROOK TROUT HEADWATER POPULATIONS IN THE WEST BRANCH SUSQUEHANNA RIVER

Current population surveys have identified a number of headwater streams in the West Branch of the Susquehanna River that support native fish species, but these populations are most likely small and potentially isolated due to the reduced quality of connecting habitat to other tributaries and river main-stems. Demographic consequences of population isolation include increased potential for localized extinction. Genetic consequences for population isolation, or populations that have experienced periods of very small size (genetic bottlenecks), include increasing susceptibility to inbreeding, or the expression of negative fitness traits. Low genetic variability and decreased fitness may increase the risk of localized extinction.

There is substantial interest in restoring degraded headwater or connecting habitats, especially those that historically harbored wild brook trout populations. Limited resources for restoration activities require prioritization of projects or additional data that can aid identification of restoration sites that could enhance the greatest number of populations.

Other management activities, such as stocking, can serve as a method to re-establish locally extirpated fish communities. However, stocking over existing fish communities, particularly small populations, could reduce the genetic diversity by negatively disrupting locally adapted gene complexes, or lead to competition between native and hatchery fish for limited resources and further negatively impact native populations.

To understand the degree of habitat isolation among headwater brook trout populations, we used molecular markers to genetically characterize nine native brook trout populations distributed throughout the headwaters of the West Branch of the Susquehanna River. Habitat information was obtained from available GIS data for the West Branch Susquehanna River. Results regarding population genetic characteristics, in combination with the assessment of potential barriers to gene flow due to degraded connecting habitat can be used to identify or prioritize areas for habitat restoration. Identification of native brook trout populations could also provide sources of wild trout for restoration efforts of neighboring extirpated habitat.

**Meredith Bartron, Geneticist
US Fish and Wildlife Service
Co Presenters: Shannon Julian and John Sweka**

D. Research II

AN ECOLOGICAL ASSESSMENT OF A CHRONICALLY ACIDIFIED STREAM REMEDIATED BY INSTREAM LIMESTONE SAND (ILS) ADDITION

In July 1998, an Instream Limestone Sand (ILS) mitigation project was implemented on a chronically acidified headwater stream in Southwestern PA. The goal was to re-establish a wild brook trout population, which had been extirpated from the watershed. Migration barriers prevented recolonization despite improved water quality following the initial ILS addition. Mean water chemistry parameters cumulatively improved following each treatment. Re-stocking with wild and hatchery-raised brook trout in August 2000 yielded successful reproduction later that year. Fish and invertebrate productivity and diversity increased year-over-year. Invertebrate recolonization occurred slowly due to poor recolonization potential, but acid-sensitive Ephemeroptera showed modest recovery by 2002 and decreases in acid-tolerant macroinvertebrates were noted downstream of ILS at the least stressed sites. The near doubling of brook trout biomass and 2.6 time higher macroinvertebrate densities in an adjacent circumneutral stream suggests a trophic cascade feedback into that system. ILS is an effective, economical method to mitigate watershed acidification and can increase whole-watershed productivity.

**Robert M. Ryder, Water Pollution Biologist
PA Department of Environmental Protection**

THERMAL POLLUTION OF SINKING CREEK AND ITS IMPLICATIONS FOR HATCHERY AND WILD TROUT

Small impoundments are important sources of thermal pollution in cold water streams which present limitations to trout and other cold water fishes. We investigated several impoundments in the Sinking Creek Watershed to determine their influence on summertime maximum water temperatures and the distribution of hatchery and wild trout. Results indicate significant warming as a consequence of these impoundments and concomitant adjustments in trout distribution in the watershed. Impoundments that increase maximum daily summertime water temperatures on cold water streams should be mitigated. Retrofitting these impoundments for cold water release or removing the impoundments altogether should receive greater attention from organizations and agencies in Pennsylvania.

**William E. Sharpe, Professor Emeritus of Forest Hydrology
Pennsylvania State University**