

State Wildlife Grants

Advancing Understanding and Conservation of Pennsylvania's Diverse Natural Heritage



Searching for Eastern Hellbenders,
Photo: Mark Lethaby



Eastern Hellbender, Tim Maret, Shippensburg University



Mussel Data Collection, Juniata River, Jeremy Deeds,
Western PA Conservancy



Mussel siphoning, Jeremy Deeds, Western PA
Conservancy

February 2009

See: [Pennsylvania's Wildlife Action Plan](#)



Approaches to Understanding Pennsylvania's Diverse Natural Heritage

Introduction

The State Wildlife Grant Program (SWG) represents an investment in the natural resources of Pennsylvania, and practical, tangible benefits of the program are new data and an increased understanding of the Commonwealth's species of greatest conservation need (SGCN) and their habitats. These data are laying the biological foundation for current and future conservation actions and will be especially important for addressing potentially deleterious factors such as climate change and urban sprawl.

The Fish and Boat Commission has taken a 3-fold approach to addressing the aquatic resource needs. First, using a landscape-scale approach we have developed a series of SWG-funded projects on major ecological systems such as the Allegheny, Susquehanna, and Delaware Rivers, to establish comprehensive baseline data that has previously been lacking. Second, we have targeted data collection and management initiatives for indicator or keystone species, guilds or communities, such as the eastern massasauga, or groups of amphibians and reptiles.



Tuscarora Creek, Jeremy Deeds, Western PA Conservancy

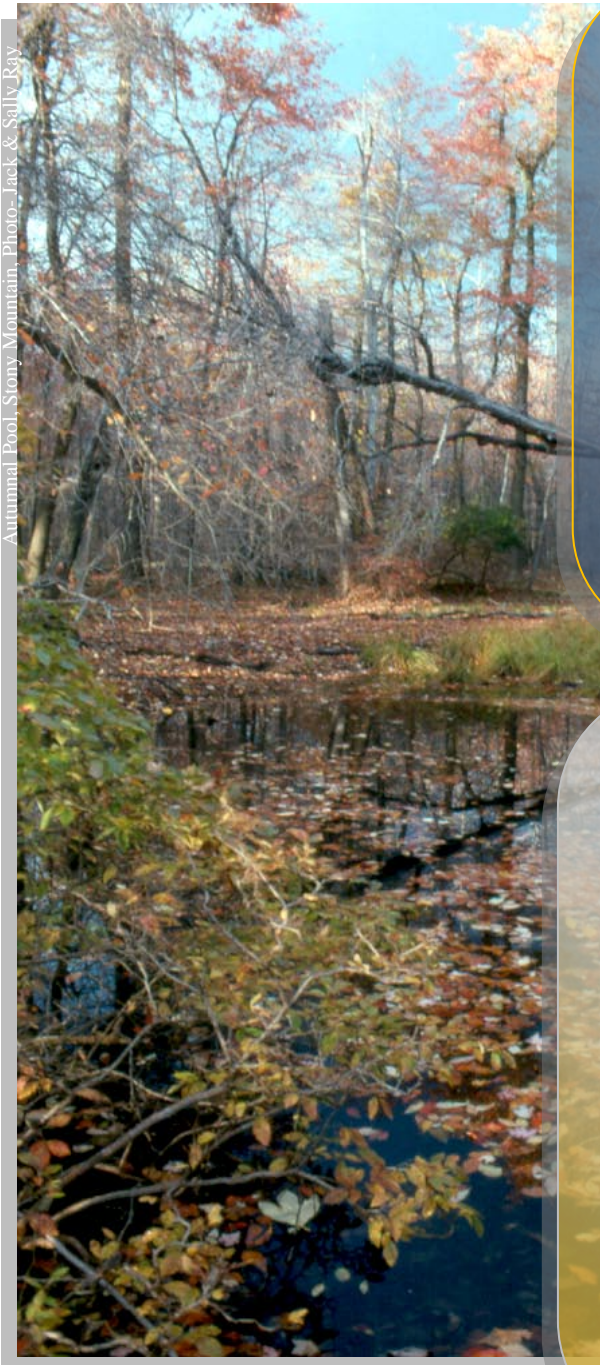
These animals are often cryptic, widely dispersed, low in abundance, or in habitats where they are difficult to locate. With SWG funds we are obtaining a better understanding of the status of many of these animals. Third, the breadth and scope of projects in Pennsylvania are allowing the collection of robust information that will greatly assist resource managers with developing conservation plans such as for the eastern massasauga. These resource management plans along with on-the-ground activities are restoring habitats.

In this report, the various projects collectively show the reliance of animals on certain habitats and

how the status of these animals is reflective of habitat conditions. Much has been learned through these and other projects, yet due to the complexity and interrelatedness of habitats and species, as well as emerging threats, there are still many knowledge gaps. Pennsylvania will continue to apply State Wildlife Grant resources to most efficiently and effectively manage and protect our species of greatest conservation need and address our Wildlife Action Plan. All of these efforts will help secure the Commonwealth's natural heritage for future generations.

Aquatic Habitats

The Commonwealth lies within parts of six major river basins: Ohio, Lake Erie, Susquehanna, Potomac, Genesee, and Delaware River drainages, and contains numerous wetlands, nearly 4,000 lakes and more than 83,000 miles of waterways, ranging from high-gradient coldwater streams to large, warmwater rivers. These waters support a high diversity of fish, freshwater mussels, amphibians, reptiles, and other aquatic life, dependent upon Pennsylvania's management and protection efforts.



Autumnal Pool, Stony Mountain, Photo: Jack & Sally Jody

THE PENNSYLVANIA WILDLIFE ACTION PLAN GUIDING PRINCIPLES

The protection and management of Pennsylvania's fish and wildlife, and their habitats, and the incorporation of human interests are the basis for the five guiding principles of the Wildlife Action Plan. These principles include:

1. **Conserve At-Risk Species.**
2. **Keep Common Species Common.**
3. **Recognize the Important Conservation Role of Pennsylvania.**
4. **Foster Voluntary Partnerships for Species, Habitats and People.**
5. **Develop a Comprehensive Strategy.**

The Ecological Setting

Pennsylvania straddles many ecological systems and exhibits a diversity of habitats supporting species from northern and southern climates, lowlands and uplands, and grasslands and forests. The Commonwealth is at an ecological crossroads and thus plays a pivotal role in conserving many species and habitats, resident and migrant, common and rare. For this reason, the strategies and priorities identified in Pennsylvania's Wildlife Action Plan incorporate the needs of Pennsylvania's "Responsibility Species" and their associated habitats. Pennsylvania's ecosystems include:

- An estuary on the Delaware River,
- Woodlots and wide agricultural valleys in the southeast,
- Deciduous forests of the central ridges,
- Extensive mixed forests of the Allegheny high plateau,
- Glaciated woodlands and wetlands, and
- Lake Erie in the northwest.

Fish Assemblages of the Lower Allegheny River

Summary: This project provides a current list of fishes inhabiting the lower Allegheny River and precisely delineates sampling sites for future surveys.

Two major sampling methods gillnetting and benthic (bottom) trawling were used to assess the composition of the fish community in the Lower Allegheny River. Gillnetting, used to capture fish in the middle and upper portions of the water column, yielded 1052 fishes representing 36 species or hybrids. Six “Species of Special Concern”, accounting for 14% of the total catch (see table).

A benthic (bottom) trawl was the primary sampling gear to assess bottom-dwelling fishes and this method resulted in collection of 603 individuals from 18 species.

Dominant species included the channel darter and logperch. Two-hundred and eighty-two individuals of “Special Concern” representing 46% of the total catch were captured -silver chub, gravel chub, bluebreast darter, Tippecanoe darter, channel darter, gilt darter, and longhead darter (see table). Dr. David Argent, California University of Pennsylvania; Dr. William Kimmel, California University of Pennsylvania. T- 40, *Biodiversity of Riverine Fish Assemblages of the Lower Allegheny River*.



Mooneye, Dr. David Argent, California University of PA

Allegheny River Fish Sampling Summary Species of Greatest Conservation Need (SGCN)		
Status	Gillnet	Bottom Trawl
State Candidate	Longnose gar, bowfin, river redhorse	
State Threatened	Smallmouth buffalo, Mooneye	Bluebreast darter, channel darter, longhead darter
State Endangered		Silver chub
Recovering	Paddlefish	

Fish Community Assessments of the Upper Ohio River Drainage

Summary: Fishes were sampled from large river habitats to determine distribution and abundance in relation to habitat, and the effects of gravel dredging.

For this study, a Missouri benthic trawl was electrified and used in 40 paired-comparisons in 2007 and 2008 to determine its efficacy relative to an



Allegheny River fish sampling, Jonathan Freedman, Penn State University

unmodified trawl. The electrified, or PSU trawl, captured more species (26 to 19) and more than twice as many fishes (988 to 448) than did the unelectrified Missouri trawl. In a total of 139 Missouri and PSU trawls in pools 2-9 of the Allegheny River in 2008, we captured 33 taxa of fish, including five species listed as threatened in Pennsylvania (bluebreast darter, Tippecanoe darter, channel darter, gilt darter, and longhead darter). In addition, during our benthic trawling of the Ohio River in 2007 and 2008 we captured a river darter,

a species previously unrecorded from Pennsylvania. Common in the Mississippi and lower Ohio rivers, we captured 35 individuals in the New Cumberland and Montgomery pools of the Ohio River and our continued sampling will help to elucidate the full distribution and conservation status of this species in Pennsylvania.

Dr. Jay Stauffer, Jr., Penn State University, T-42; *Survey of the Fishes of Deep Waters of the Ohio, Allegheny, and Monongahela Rivers—Pennsylvania.*

Freshwater Mussel Distribution and Genetic Analysis in the Susquehanna River Watershed

Summary: This project will gather distribution and relative abundance of freshwater mussels, especially the yellow lampmussel, as well as genetic information on key species, through targeted sampling on the Susquehanna River and major tributaries.

Freshwater mussels are among the most imperiled group of organisms in North America. These animals are long-lived and thus serve a valuable role in understanding water quality and other factors influencing their survival. Water quality, water quantity, pollution and other



Freshwater Mussels, Jeremy Deeds, Western PA Conservancy

disturbances are of major concern in the Susquehanna River Watershed and developing a baseline of information about these animals will be important for directing management initiatives. Two studies comprise this work and, when completed, will provide a thorough assessment of mussel communities, habitat associations and distribution of key species such as the yellow lampmussel and eastern elipitio. Additionally, genetic assessment of these primary species will greatly enhance the ability of

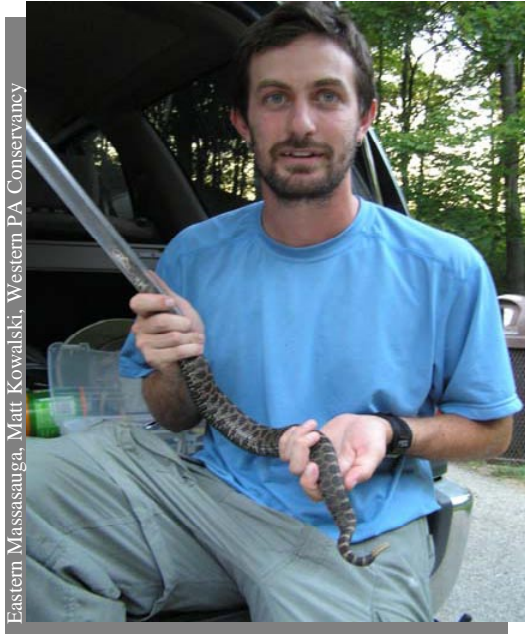
resource managers to make informed conservation decisions by revealing which tributaries have the greatest conservation need based on the ecosystem viability of the resident mussel populations.

Jeremy Deeds, Western PA Conservancy; *T-51 Distribution of Yellow Lampmussel (*Lampsilis cariosa*) in the Susquehanna River Watershed.*

Jeremy Deeds, Western PA Conservancy & Dr. Kurt Elderkin, The College of New Jersey. (New 2008 Project); *Mussel Community Assessment in the Lower Susquehanna River Basin: Conservation and Genetics Analysis.*



Mussel Vouchers, Jeremy Deeds, Western PA Conservancy



Eastern Massasauga, Matt Kowalski, Western PA Conservancy

Two projects have been directed at habitat conservation and planning for recovery of the eastern massasauga. Below are brief descriptions and findings.

Conservation and Habitat planning for Eastern Massasauga in Pennsylvania

Summary: This project is evaluating various habitat restoration techniques and will develop a preliminary conservation plan for the Eastern Massasauga.

This project will determine which habitat management techniques (e.g., mechanically removing vegetation, prescribed burning, herbicide spraying) performed during appropriate times of the year (spring, summer, fall, or winter) will work best to restore and conserve habitat for the eastern massasauga in Pennsylvania. Prescribed fire will be tested in 2009.

Matt Kowalski, Western PA Conservancy; T-39, *Conservation and Habitat planning for the Eastern Massasauga (Sistrurus catenatus catenatus) in Pennsylvania.*

Eastern Massasauga Habitat Management

- Compared to mechanical cutting, cutting woody vegetation by hand appears to create habitat that more closely resembles habitat chosen by eastern massasauga.
- Post-treatment vegetation was dominated by forbs like golden rod, with short seedlings and short stump re-growth from the treated shrubs and trees.

Eastern Massasauga Habitat Protection Plan

Summary: This recently completed project developed a plan and framework for future eastern massasauga rattlesnake habitat protection efforts in Pennsylvania.

A strategic plan for protecting the critical habitat for the four remaining populations of eastern massasauga in Pennsylvania was completed and delivered to PFBC. This plan identifies and prioritizes the most critical properties for eastern massasauga conservation efforts, providing a guide for government and conservation groups to effectively protect this species. Matt Kowalski, Western PA Conservancy; T-53, *Eastern Massasauga Rattlesnake Habitat Protection Plan.*



Eastern Massasauga, Ryan Miller, Western PA Conservancy

An Assessment of the Eastern Spadefoot Toad in Pennsylvania

Summary: This project will fill critical data gaps for the eastern spadefoot toad. Findings will support a preliminary conservation and management plan and improve the scientific basis for making conservation decisions.

The life-history of the eastern spadefoot toad contributes to a general lack of information on its distribution and abundance in Pennsylvania. This project will determine the location of eastern spadefoot toad metapopulations and breeding sites by assessing the current geographic distribution throughout Pennsylvania. The results of this project will serve the overall purpose of helping to create a successful comprehensive conservation and management plan for maintaining viable populations of the eastern spadefoot toad as well as



Eastern Spadefoot, Pennsylvania, Brandon M. Ruhe

Timber Rattlesnake Genetics in Pennsylvania

Summary: This project will compare genetic variability within the sampled populations and measure population subdivision and gene flow among these populations. These data will provide baseline information necessary for long-term monitoring and conservation efforts.

The timber rattlesnake has experienced extensive habitat loss, population fragmentation, and persecution across its range in the northeastern United States. In the PA Wildlife Action Plan this species is listed as a “responsibility species,” indicating that Pennsylvania contains a high percentage of the remaining global population of



Eastern Spadefoot Project Volunteers (from left to right) Dan Silknetter, B. Scott Fiegel, and Amy Croushore, Brandon M. Ruhe, East Stroudsburg University

for other amphibian species of greatest conservation need.

Brandon M. Ruhe, East Stroudsburg University; T-52, *Metapopulation Analysis and Range Determination of the Eastern Spadefoot (Scaphiopus holbrookii) in Pennsylvania.*



the species and therefore has responsibility for maintaining healthy populations of timber rattlesnakes statewide. Information about genetic variation and population isolation will allow for the development of appropriate conservation management plans and the prioritization of conservation efforts for timber rattlesnakes across the state.

Dr. Lauretta M. Bushar Arcadia University, Howard K. Reinert, Ph.D. The College of New Jersey; T-54-R-1, *Assessment of the Genetic Status of Timber Rattlesnake Populations in Pennsylvania.*

Planning, Coordination, and Management of the Pennsylvania Aquatic Habitat Initiatives

Summary: This project is providing critical planning, coordination and management for aquatic habitat initiatives that affect a wide array of fish, wildlife, and species of greatest conservation need.

PFBC personnel will plan, coordinate and manage habitat protection, restoration, and enhancement activities that benefit species under our trust, with an emphasis on species of greatest conservation need. Coordination, planning, and management will be conducted on wetland, stream, lake, riparian and upland habitat projects benefiting fish, amphibians, reptiles and other aquatic life. Scott Carney, PFBC; T-50, *A Collaborative, Low-Cost Approach to Stream Habitat Improvement and Watershed Stabilization*.



Survey of At-Risk Amphibians and Reptiles

Summary: The distribution status of several species is now known and information can be used to determine listing status and develop conservation plans.

Recent surveys indicate that marbled salamanders, spotted turtles, and shorthead garter snakes presently maintain viable populations in the state. Surveys for mountain earth snakes, eastern earth snakes, and Kirtland’s snakes were less successful. Mountain earth snakes were found at only ten

locations, and no eastern earth or Kirtland’s snakes were recorded. Healthy eastern hellbender populations still exist at some locations in the Commonwealth, but there has been a substantial decrease in both the abundance and distribution of this species within the last 20 years. It is imperative that steps be taken to halt this decline. Dr. Tim Maret, Shippensburg University; T-25, *Determining the Status of At-Risk Amphibians and Reptiles*.

Species	Locations Found	New County Records	Notes
Spotted turtles	57	3	
Marbled salamanders	28	5	
Shorthead garter snakes	44	--	
Mountain earth snakes	10	--	
Eastern earth snakes	0		Not found in PA for over 60 years
Kirtland’s snakes	0		Not found in PA for over 40 years
Eastern hellbender			Significant decline in recent years



Spotted Turtle, Tim Maret-Shippensburg University

Contact: [Pennsylvania Fish and Boat Commission](http://www.pennsylvaniafishandboat.com)
Dave Day
 Conservation Coordinator
 Pennsylvania Fish and Boat Commission
davday@state.pa.us
<http://www.fish.state.pa.us>