

State Wildlife Action Plan: Identifying Threats to Pennsylvania's At-Risk Aquatic Species

photo-PFBC archives

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Holtwood Dam on the Susquehanna River

In the November/December 2012 issue of the *Pennsylvania Angler & Boater* magazine, an overview of the State Wildlife Action Plan highlighted the importance of the plan for guiding the protection, recovery and management of some of the Commonwealth's most vulnerable species and their habitats. As part of the revision process, and as required by Congress, identifying threats to species and habitats is one of the eight elements to be addressed in the State Wildlife Action Plan. Therefore, in this issue, we would like to further explore this important component of the State Wildlife Action Plan and identify some prominent threats facing species at-risk and the challenges for addressing these threats.

First, it is important to define or characterize a threat. Essentially, a threat is any factor that affects the survival of a species. A threat could be a disease, competition for food or habitat, predation, changes in environmental conditions such as hydrology or temperature, reduced quantity or quality of habitat, physical or chemical features that interrupt the life-history of a species or other factors. In this article, we briefly investigate some of these threats.

A common, prominent threat to a species is a change in habitat (i.e., loss or modification), which can impede its survival. Habitat alteration or modification is the number one threat to most species and is the primary culprit to species becoming listed as threatened or endangered. Historically, for example in the late 19th and early 20th centuries, demand for coal and forest products in Pennsylvania led to the loss of, or changes in, aquatic habitats. These changes included loss or diminished quality of water and habitats leading to incredible

burdens on the Commonwealth's aquatic life. Specifically, loss of aquatic habitats resulted from flooding wetlands, dams, deforestation, mining, urban development, and associated industrial pollution and sedimentation. Although in the intervening years, conditions have improved, and some of the Commonwealth's habitats have recovered. "Legacy" problems remain from these historical activities. Sediment in streams, acid mine drainage and dams continues to negatively impact aquatic life. Current day expansion of urban areas further stresses natural resources.

For aquatic habitat, dams continue to present a particularly important threat. Thousands of dams remain in Pennsylvania. Despite concerted efforts to remove dams and include enhancements (e.g., fish passage) on larger dams, migratory and local fish movement is still often impeded. Dams not only pose a physical threat to movement, but they can also modify water quality (e.g., temperature and dissolved oxygen) in the impounded area and disrupt the natural sediment transport functions of streams. Two Pennsylvania fishes specifically influenced by dams are the American shad and American eel. In addition to direct impacts on these species, the loss of some fishes in a river can alter other biological components of these systems. For example, the American eel is a host fish species for a freshwater mussel, the eastern elliptio (*Elliptio complanata*), found in the Susquehanna River Basin. However, dams on this river have greatly inhibited upstream movement of eels and may be contributing to the reduction of eastern elliptio populations in this river system.



American Shad

photo-Art Michaels



Eastern elliptio, found in the Susquehanna River Basin

photo-Geoff Smith

As in the late 19th and early 20th centuries, Pennsylvania has once again become a well-known source for energy. In addition to established forms (e.g., coal, hydropower) emerging sources include wind, natural gas, biomass and solar. There are many social and economic benefits from these energy sources, yet each source can contribute to habitat fragmentation, runoff of nutrients and sediments and provide pathways for invasive species, all of which pose a threat to the Pennsylvania Fish & Boat Commission's trust species. Although the source of the threat may differ from those of over a century ago, the potential impacts on aquatic resources are similar.

Aquatic Invasive Species (AIS) are an increasing threat to the biodiversity of Pennsylvania's native aquatic species and habitats. Due to the extensive number of aquatic invasive species in Pennsylvania, only a basic overview of this threat can be discussed in this article. Examples of types of AIS currently found in Pennsylvania include fishes (e.g., round goby, snakehead), aquatic vascular plants (e.g., water chestnut and *Hydrilla*), algae (*Didymosphenia geminata*, also called Didymo), reptiles (e.g., red-eared slider) and pathogens (e.g., Viral Hemorrhagic Septicemia-VHS). For a more complete list of AIS in Pennsylvania and an associated field guide, visit www.anstaskforce.gov/Documents/AIS_Field_Guide_Finalweb.pdf. As a threat to native species, AIS are particularly difficult to address. Not only the diversity of AIS, but also the mechanisms by which AIS are transported further complicate prevention and control measures. Commercial transportation (e.g., cargo ships on the Great Lakes), release of unwanted pets, and movement by anglers and boaters are among the many vectors by which AIS may be distributed across the state.

Finally, a changing climate poses a serious threat to the aquatic resources of Pennsylvania. Many of the at-risk species are characterized as such,

because they often have limited tolerances for changes in environmental conditions such as the temperature regime, thermal extremes, the hydrologic cycle (e.g., drought and flooding) and loss of important habitats. At-risk species, such as some reptiles and amphibians, may have specific habitat requirements or a limited capacity to move to more suitable conditions. Fishes with narrow thermal tolerances may be impeded from finding optimal conditions by dams and other factors. Regardless of the causes of climate change, altered meteorological patterns are likely to contribute to changes in habitats and place increased burdens directly on the survival of species.

Many of the threats discussed here are quite large. However, there are conservation actions or adaptation measures for many of them that can be implemented to assist species at-risk. In a future issue of the *Pennsylvania Angler & Boater*, we will explore conservation actions to cope with some of these threats. In a dynamic world, we must be prepared to address these challenges if we are to ensure the rich natural heritage of Pennsylvania for future generations.

Find out more about the current State Wildlife Action Plan at www.fishandboat.com, click on "Grants" and "State Wildlife Grant (SWG) Program." □



photo-Keith Edwards

The round goby, classified as an Aquatic Invasive Species (AIS), is a recognized threat to the biodiversity of Pennsylvania's native aquatic species and habitats.