

The Effects of Disease-Related Mortality of Young-of-Year Smallmouth Bass on Population Characteristics in the Susquehanna River Basin, Pennsylvania and Potential Implications to Conservation of Black Bass Diversity

GEOFFREY D. SMITH*

*Pennsylvania Fish and Boat Commission, Division of Fisheries Management
1601 Elmerton Avenue, Harrisburg, Pennsylvania 17106, USA*

VICKI S. BLAZER

*U.S. Geological Survey, Leetown Science Center, National Fish Health Research Laboratory
11649 Leetown Road, Kearneysville, West Virginia 25430, USA*

HEATHER L. WALSH

*West Virginia University Research Corporation
866 Chestnut Ridge Road, Morgantown, West Virginia 26506, USA*

LUKE R. IWANOWICZ AND CLIFFORD STARLIPER

*U.S. Geological Survey, Leetown Science Center, National Fish Health Research Laboratory
11649 Leetown Road, Kearneysville, West Virginia 25430, USA*

ADAM J. SPERRY

*West Virginia University Research Corporation
866 Chestnut Ridge Road, Morgantown, West Virginia 26506, USA*

Abstract.—In recent years, wide-scale mortality of young-of-year (YOY) Smallmouth Bass *Micropterus dolomieu* has affected recruitment in the Susquehanna River and a number of its tributaries. Investigations have determined that these mortality events are associated with changes in various components of water quality in the presence of multiple pathogens. Outbreaks have been characterized by lesions colonized by several species of bacteria, including motile *Aeromonas* spp., *Flavobacterium columnaris*, and *Pseudomonas aeruginosa*. Further, the myxozoan parasite *Myxobolus inornatus* and trematode metacercariae have been documented in affected fish. Many of the specimens submitted for analysis have also been infected by Largemouth Bass virus. However, the relationship between any particular pathogen and the mortalities remains unclear. Histological analysis of adult bass has demonstrated frequent and severe cases of intersex (i.e., testicular oocytes) and measurable plasma concentrations of vitellogenin in male Smallmouth Bass, suggesting the presence of endocrine-disrupting compounds in the system. It is uncertain what compounds are present or how these compounds may contribute to immunosuppression of YOY Smallmouth Bass, allowing for bacterial and parasite colonization. A complex relationship of several, sublethal stressors are contributing to repeated occurrence of disease outbreaks. Although the Smallmouth Bass is not native to the Susquehanna system, it could be used as a case study as to how changes in water quality and multiple pathogens could pose a threat to conservation of populations of black bass species with low densities and limited distribution.

* Corresponding author: geofsmith@pa.gov