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Let's Put on a Show!

The Sturgeon Hero

Atlantic Sturgeon and Robots

Science, Stewardship, and Sturgeon

Researching *Scaphirhynchus* Sturgeon

Undergoing Sex Reversal

"It's The Habitat, Stupid!"

The Man Who Named Fish

Sick Fish, Sick River



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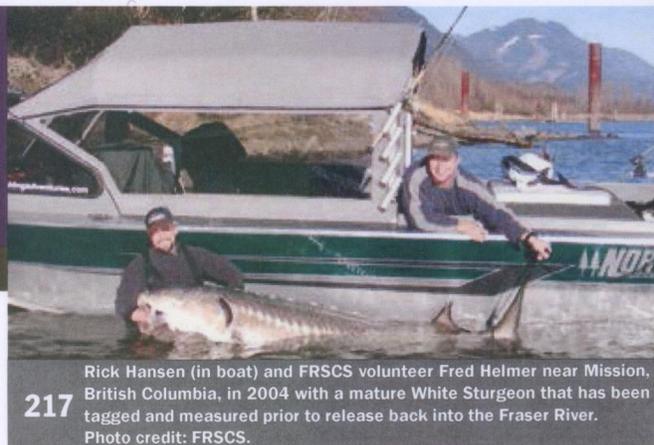
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The White Sturgeon needed rescuing. To the rescue: Rick Hansen—one of our newest AFS members. Famous for his Man In Motion World Tour—as well as one of the torchbearers who brought the flame into the stadium to light the torch in the 2010 Winter Olympics—Rick has set out to save the White Sturgeon in the lower Fraser River in British Columbia.

Cover: Carlin Fenn weighs a sturgeon to monitor growth while Lucas Nelson looks on. Photo credit: Southern Illinois University Carbondale.



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Rick Hansen (in boat) and FRSCS volunteer Fred Helmer near Mission, British Columbia, in 2004 with a mature White Sturgeon that has been tagged and measured prior to release back into the Fraser River. Photo credit: FRSCS.

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The Susquehanna River—A Fishery in Decline

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As fisheries scientists, we were all taught early on in our education that there are two primary components to a fishery. There are the fish, including the sport fish, forage fish, aquatic invertebrates, and other members of the resident biological community that we, as fisheries professionals, study, protect, manage, and conserve. The other part of the fishery definition includes the act of taking fish whether by recreational, commercial, or subsistence means. Both parts of the definition are necessary for a fishery to exist.

We have a river in Pennsylvania that once supported a world-class Smallmouth Bass *Micropterus dolomieu* fishery. The Susquehanna River drains 27,510 mi², covering half the surface area of Pennsylvania and portions of New York and Maryland. It comprises 43% of the Chesapeake Bay's drainage area with more than 49,000 miles of flowing waters (Susquehanna River Basin Commission 2006). Unfortunately, beginning in 2005, anglers fishing the river began reporting thousands of dead and dying young bass. Fortunately, our staff scientists have been monitoring young of year Smallmouth Bass for over

30 years. Declining trends in relative abundance of age-0 Smallmouth Bass have been observed in the middle reach of the river (Sunbury to York Haven) since at least 2005 (Figure 1). Poor year classes coupled with bacterial disease-related mortality have caused poor recruitment over time, resulting in substantially lower relative abundance of adult bass (Figure 2).

Anglers used to travel from all over the world to fish the Susquehanna, and even we could catch over 100 bass in an afternoon of fishing before 2005. Our boat launch parking lots were filled with trucks and boat trailers, and our river guides—including internationally known Lefty Kreh and Bob Clouser—were booked for guided trips all year long. This is no longer the case. Our agency, the Pennsylvania Fish and Boat Commission, has taken action by prohibiting harvest, implementing immediate catch-and-release regulations, and creating a closed season that prohibits anglers from targeting bass during the spawning period (May 1–June 14). However, these actions do not address the causes and sources of the problems that continue to plague the river and our fishery. They are only designed to protect the remaining adult bass while we work on a plan to fix the watershed's problems.

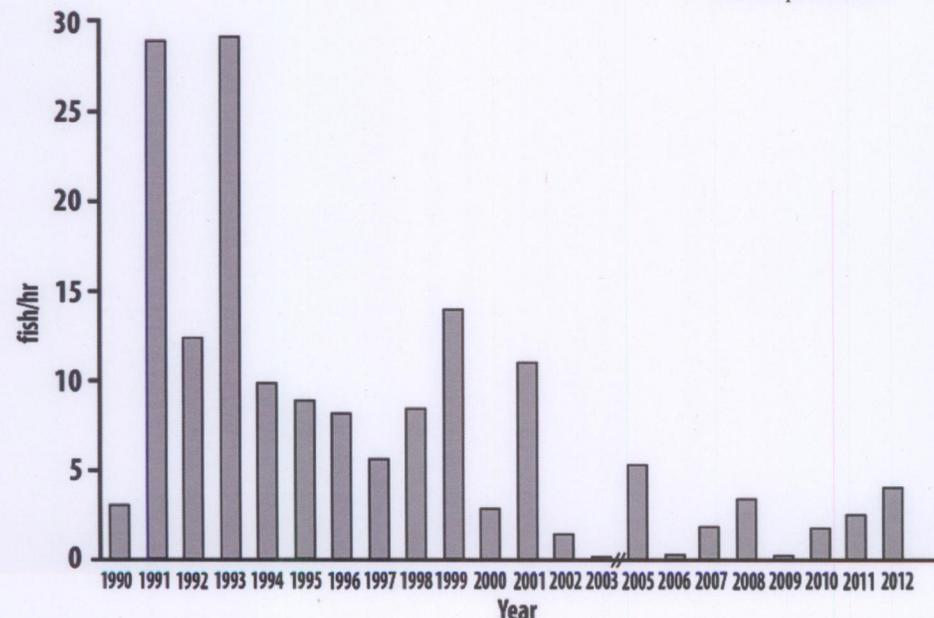


Figure 1. Relative abundance (fish/50 m) of young-of-year Smallmouth Bass *Micropterus dolomieu* during July backpack electrofishing surveys at the Susquehanna River between Sunbury and York Haven, Pennsylvania.

Coincidental with the 2005 fish kills, we began observing nuisance blooms of *Cladophora* spp.—invasive green filamentous algae that interfere with recreational fishing and lower dissolved oxygen through nighttime respiration to stressful levels for warmwater fish. Chaplin et al. (2009) and Chaplin and Crawford (2012) documented significantly lower minimum dissolved oxygen concentrations in age-0 Smallmouth Bass microhabitats compared to adjacent main channel areas. Prior research in the Great Lakes has linked *Cladophora* blooms to high dissolved phosphorus levels, mainly resulting from human activities such as fertilizing lawns, poorly maintained septic systems, inadequate sewage treatment, agricultural runoff, and detergents containing phosphorus

(Tomlinson et al. 2010). Breeuwisma and Reijerink (1992) revealed phosphate-saturated soils as a new environmental issue for Europe. However, there has been reluctance by state and federal regulators to accept the evidence that the fishery of the Susquehanna is impaired. Much like the original definition of a fishery, the Clean Water Act of 1972 requires the states to protect both the ecological and recreational uses of a river. Unless we admit that the river is impaired, there is no legal obligation to begin the process of resolving the impairment.

The Smallmouth Bass fishery of the Susquehanna River is undoubtedly compromised by a number of other stressors, including a wide variety of endocrine-disrupting chemicals causing as much as 100% of male Smallmouth Bass in some reaches of the river to have intersex (Blazer et al., in review). Recently, Brodin et al. (2013) reported that a pharmaceutical drug (oxazepam) altered the behavior and feeding rate of wild European Perch *Perca fluviatilis* at concentrations found in European surface waters. Similarly, recruitment of Yellow Perch *Perca flavescens* has been linked to compromised reproductive health in urbanized tributaries of the Chesapeake Bay (Blazer et al. 2013). Data also show that the river is warming as an effect of climate change and its pH increases above 9.0 during the day due to photosynthesis (Arway 2012).

Although it is quite apparent that the Smallmouth Bass fishery of the Susquehanna River is in decline and there is much public interest in restoring the world-class fishery the river once supported, there is currently no voluntary or mandatory action plan to identify the causes and sources of the problem and find solutions. Many of us within the fisheries ranks believe that we are responsible for producing the science that drives these decisions; however, we believe that it is equally important that we become advocates for the science we produce because it is readily apparent to us that if we do not, the fisheries that we study may no longer exist.

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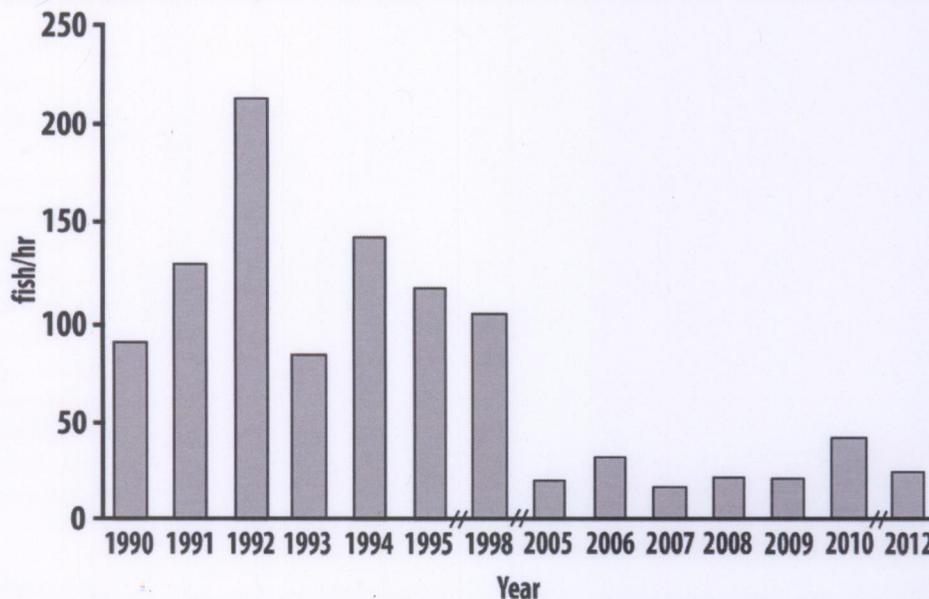


Figure 2. Relative abundance (fish/h) of adult (>age-1) Smallmouth Bass *Micropterus dolomieu* during boat electrofishing surveys at the Susquehanna River between Sunbury and York Haven, Pennsylvania.

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From the Archives

The fish commission amounts to nothing, (I do not wish the stenographer to miss that either) because it is merely a political plan from beginning to end, and you must do so and so or it don't go.

John E. Gunckel (1902): *Transactions of the American Fisheries Society*, 31:1, 17.