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Pennsylvania Fish & Boat Commission

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July 28, 2014

Shawn Garvin
U.S. Environmental Protection Agency, Region 3
1650 Arch Street
Mail Code 3RA00
Philadelphia, PA 19103-2029

Dear Mr. Garvin:

I have written to you several times in the past requesting the U.S. Environmental Protection Agency's (EPA) assistance with, what we believe, is an impaired river. We certainly support the EPA's recent decision to increase oversight of pollutants from the agricultural sector in Pennsylvania's portion of the Chesapeake Bay. While large strides have been made in other sectors, the agricultural sector has been more complicated to understand and subsequently account for in regulatory improvements. Further investigation into the agricultural contribution will be challenging but one that is much needed and long overdue. I am optimistic that increased focus in this area, if properly directed, will benefit not only the Chesapeake Bay, but also the Susquehanna River as well.

Our agency investigations into factors associated with mortality of young-of-year Smallmouth Bass in the Susquehanna River have identified evidence of increased primary productivity. I have attached two Pennsylvania Fish and Boat Commission (PFBC) internal staff reports which show both smallmouth bass young-of-year and adult population trends based upon catch-per-unit-effort (CPUE) estimates that are typically used to monitor the health of our fisheries. You will see that we continue to find poor recruitment rates although we are now seeing some improvement in adult catch rates. We are hopeful that the latter positive trend is in direct response to the protection we have afforded to the adult fish by restricting harvest through catch and release regulations in addition to prohibiting anglers from targeting bass on redds during the spawning season. Annual monitoring of physiochemical water quality data continue to demonstrate biologically stressful high pH values exceeding the Commonwealth's aquatic life water quality protection criteria of 9.0 S.U. (Figure 1) resulting from excessive algal photosynthetic activity. This productivity is thought to be fueled by the dissolved components of phosphorus that have become more pervasive as agricultural practices have changed and soils have become more saturated with phosphorus.

A recent article by Rona Kobell published in the *Bay Journal* on July 15, 2014 titled "Not enough done to curb phosphorus in water, reports say," explains the severity of the problem in simple terms. It references several new reports that discuss the need for action to reduce phosphorus pollution because of over-saturated soils in about half of the farm fields in Maryland. I do not know of similar datasets for the farm fields in Pennsylvania.

A review of data produced by the U.S. Department of Agriculture's National Agriculture Statistics Service shows that the acres of cropland and pastureland treated with manure has increased 1.5% from

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2007 through 2012, despite the fact that there are over 1,000 less farms spreading manure. Over 13% (3.9 M acres) of Pennsylvania's land surface (28.6 M acres) was treated with manure and/or commercial fertilizer in 2012. Figures 2 and 3 show the national and Pennsylvania trends, and it is easy to see that the concentration of these applications is greatest in the Susquehanna River Basin. I have been advised that the United States Department of Agriculture (USDA) is working on a watershed-based map which will certainly show that this is the case.

Although recent monitoring by the Susquehanna River Basin Commission (Technical Publication 291) seem to show short-term (2004-2012) decreasing trends for dissolved phosphorus and dissolved orthophosphorus, episodic nuisance algal blooms persist. The continued occurrence of the algal blooms, despite apparent decreasing loads of dissolved phosphorus and dissolved orthophosphorus, are indicative of the complexity of this relationship. The Pennsylvania Department of Environmental Protection's (DEP) 2012-13 Susquehanna River Sampling and Assessment report states that "benthic algal sampling from 2012 has documented relationships between nutrient levels, primary productivity, and the DO and pH conditions observed at various Juniata River and Susquehanna River sites. The Juniata River at Newport had the lowest recorded DO (4.72 mg/l), the greatest diel DO fluctuation (8.92 mg/l), and some of the highest nutrient (nitrogen and phosphorus) values, relative to the other 2012 sites. This site also had elevated daytime pH levels that exceeded criteria 0.7 percent of the time during June and August 2012. The extreme DO and pH conditions observed at the site in 2012 were coupled with the highest benthic algal biovolume value (77.77 cm³/m²) recorded at any of the 2012 sites, and most of the biovolume (92.3 percent) was in the form of green algae." However, DEP's report documents low mean total phosphorus in the Juniata River at Newport. The report further states that it is "suspected that because of the large benthic algal biovolume recorded at this site the available phosphorus may be tied up in the algal plant tissue and not be seen in water column samples (luxury consumption)." DEP's 2012 data shows that total benthic algal biovolume was at least an order of magnitude higher at their sites on the Susquehanna River compared to the levels seen in the Juniata River at Newport (Figure 4). We would note that in the past we have documented bank to bank filamentous algae growth in the Susquehanna River upstream of Harrisburg.

While target parameters such as total nitrogen and total phosphorus are important in estuarine management, I strongly recommend that EPA's upcoming focus include targets specifically for the Susquehanna River, a riverine environment that's the bay's largest tributary. These would include the dissolved components of phosphorus which are fueling algal blooms and increased productivity in the Susquehanna River and its tributaries creating the primary stressor that cause young bass immune systems to be stressed, the fish to become weakened, then become infected with bacteria and die. Understanding that the nutrient dynamics of the Susquehanna River could have large potential ramifications on Bay-wide improvements. Frankly, the dissolved phosphorus dilemma plaguing the water quality of the Susquehanna River and Chesapeake Bay is a national problem identified by the EPA in your National Rivers and Streams Assessment Report, 2008-2009 (EPA/841/D-13/001) published in February 2013. A key finding of EPA's own report is that "Forty percent of the nation's river and stream length has high levels of phosphorus ..." The report concludes that "Our rivers and streams are under significant stress and more than half exhibit poor biological condition." We actually mined the dataset used in the national report and found data from four sites sampled on the Susquehanna which rated poor for total phosphorus and fish metrics.

A recent report (*A Balanced Diet for Lake Erie*, IJC, February 2014) published by the International Joint Commission (IJC), in response to toxic algae blooms in Lake Erie, similarly concluded that "phosphorus is the key nutrient limiting the amount of phytoplankton and affected algae in Lake Erie

...” Over the longer term, phosphorus loading together with future climatic conditions could alter Lake Erie’s rich and diverse fish community.” The report further recommends that “the governments of the United States and Canada should adopt new targets for maximum acceptable phosphorus loadings in Lake Erie and immediately expand the focus of existing and planned incentive-based agri-environmental programs beyond particulate phosphorus to include an emphasis on Best Management Practices (BMP) that are most likely to reduce dissolved reactive phosphorus.”

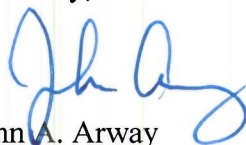
I submit that if we can produce a plan for a Great Lake like Erie, we should certainly be able to use the same science to produce a similar plan of action for a Great River like the Susquehanna. However, we need EPA’s help to get it done!

Specific recommendations from the IJC report for Pennsylvania actions that would have far reaching impacts to improve the Susquehanna if enacted statewide include:

1. Apply a public trust framework consisting of a set of important common law legal principles as an added measure of protection. This framework should be applied as an added decision-making tool in policies and after proceedings.
2. Future phosphorus management efforts should focus on:
 - a. Avoiding agricultural applications of phosphorus in the autumn.
 - b. Reducing the phosphorus load delivered during the spring period (March 1 to June 30).
3. Increase the scale and intensity of agricultural Best Management Practices (BMP) programs that have been shown to reduce phosphorus runoff.
4. Strengthen and increase the use of regulatory mechanisms of conservation farm planning to reduce nutrient loadings.
5. Accelerate 4Rs (Right source, Right rate, Right time and Right place) outreach/extension programs and phase in mandatory certification standards for agrology advisors, retailers and applicators to ensure fertilizer is applied based on the 4Rs.
6. Ban the application of manure, biosolids and commercial fertilizers containing phosphorus from agricultural operations on frozen ground or ground covered by snow.
7. Work with local governments to promote and accelerate use of green infrastructure (such as filter strips, rain gardens, bio-swales and engineered wetlands).
8. Prohibit the sale and use of phosphorus fertilizers for lawn care.

I look forward to the outcome of EPA’s upcoming focus on agriculture in the Chesapeake Basin. I hope that our agencies, along with our partners at the Pennsylvania Department of Environmental Protection, the Susquehanna River Basin Commission, and the U.S. Geological Survey can work together to identify the important factors causing these impaired conditions in both the river and bay. More importantly, as recommended for Lake Erie, we need to begin implementing measures to improve the health of the Susquehanna River and the Chesapeake Bay now before it becomes too late to repair the damage.

Sincerely,



John A. Arway
Executive Director

Enclosures

cc: Gina McCarthy, Administrator, U.S. Department of Environmental Protection Agency
Sally Jewell, Secretary, U.S. Department of the Interior
Daniel M. Ashe, Director, U.S. Fish and Wildlife Service
Wendi Weber, Northeast Regional Director, U.S. Fish and Wildlife Service
Thom Dammrich, President, Sport Fishing and Boating Partnership Council - National
Marine Manufacturers Association
William C. Baker, President, Chesapeake Bay Foundation
Christopher Abruzzo, Secretary, Pennsylvania Department of Environmental Services
Andrew D. DeHoff, Executive Director, Susquehanna River Basin Commission
U.S. Congressional Members in the Susquehanna River Basin –
Scott Perry, U.S. House of Representatives
Glenn W. Thompson, U.S. House of Representatives
Jim Gerlach, U.S. House of Representatives
Patrick Meehan, U.S. House of Representatives
Bill Shuster, U.S. House of Representatives
Thomas Marino, U.S. House of Representatives
Lou Barletta, U.S. House of Representatives
Keith Rothfus, U.S. House of Representatives
Charles Dent, U.S. House of Representatives
Joseph Pitts, U.S. House of Representatives
Matthew Cartwright, U.S. House of Representatives
Pennsylvania Senate Game and Fisheries Committee Chairs –
Richard Alloway II, Chair
Richard Kasunic, Minority Chair
Charles McIlhinney Jr., Majority Vice-Chair
Pennsylvania House Game and Fisheries Committee Chairs –
Martin T. Causer, Chair
Gary Haluska, Democratic Chair
Todd Rock, Majority Vice-Chair
John T. Galloway, Minority Vice-Chair

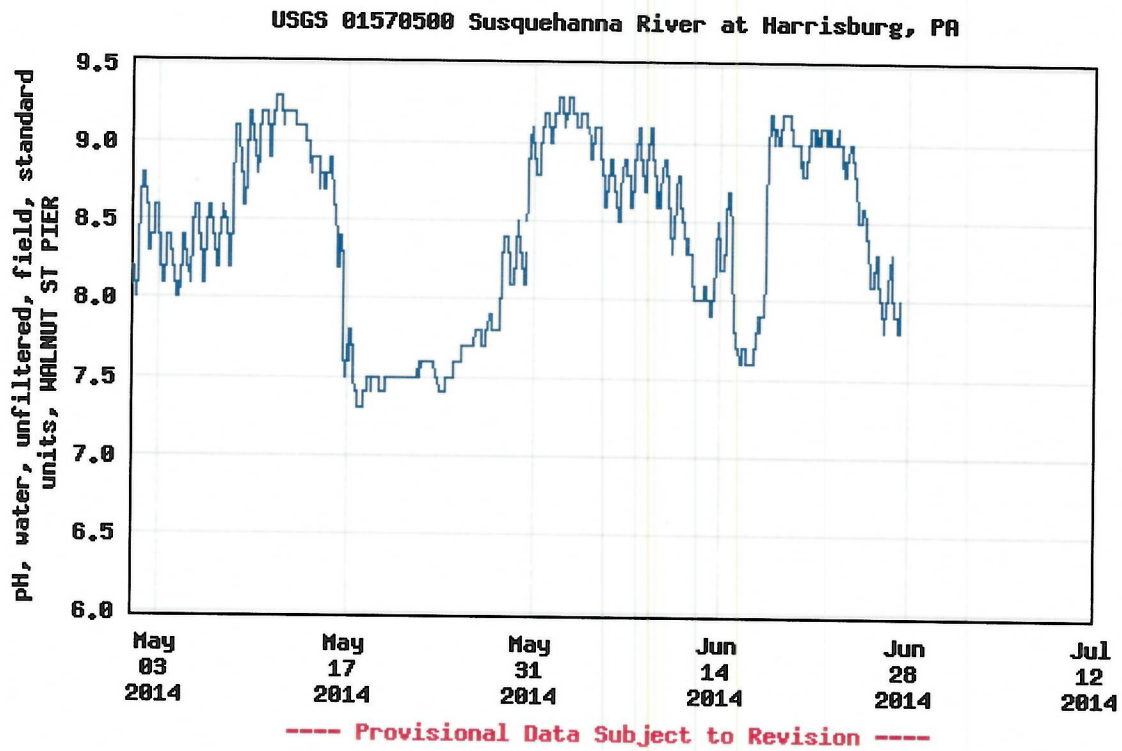
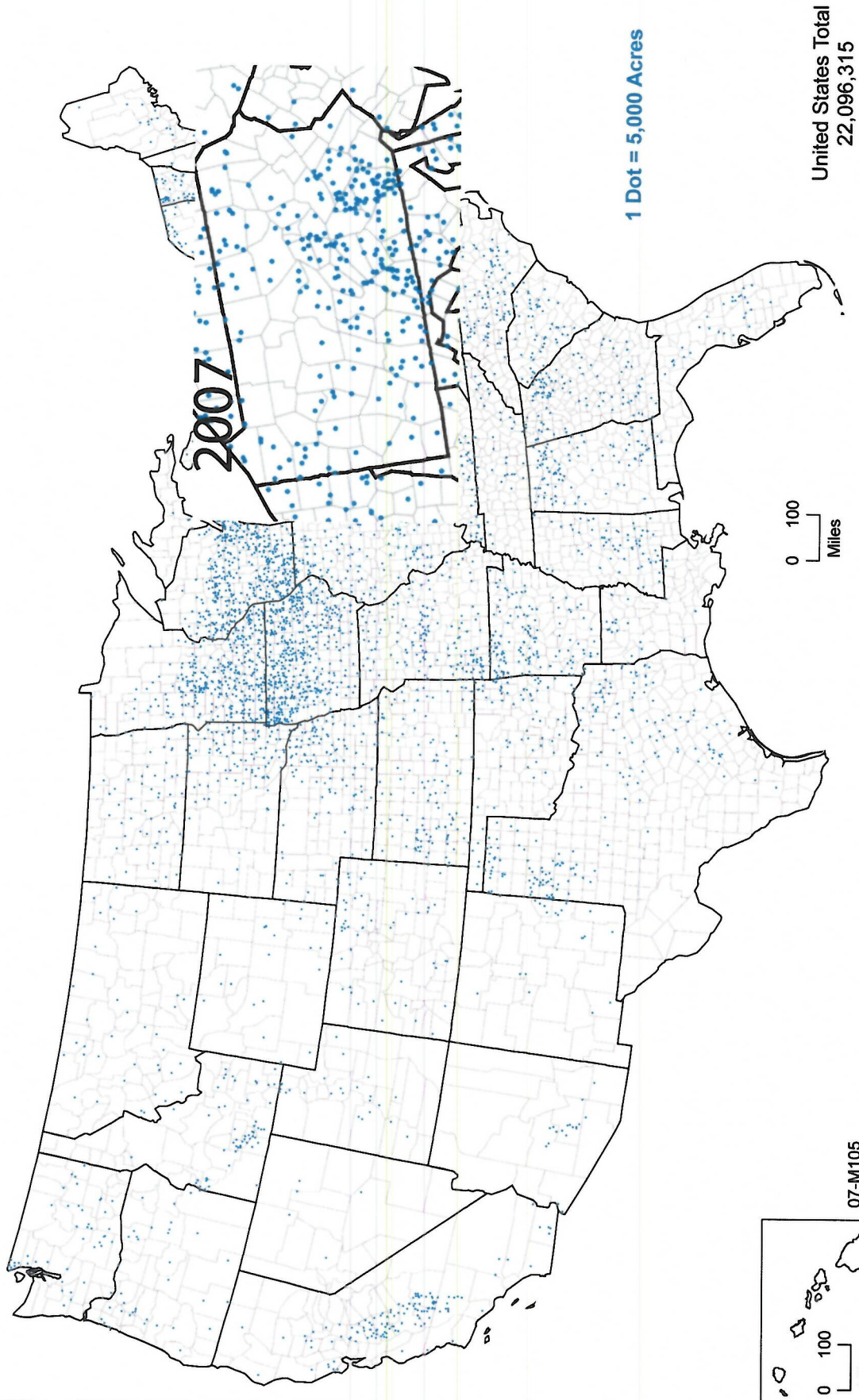


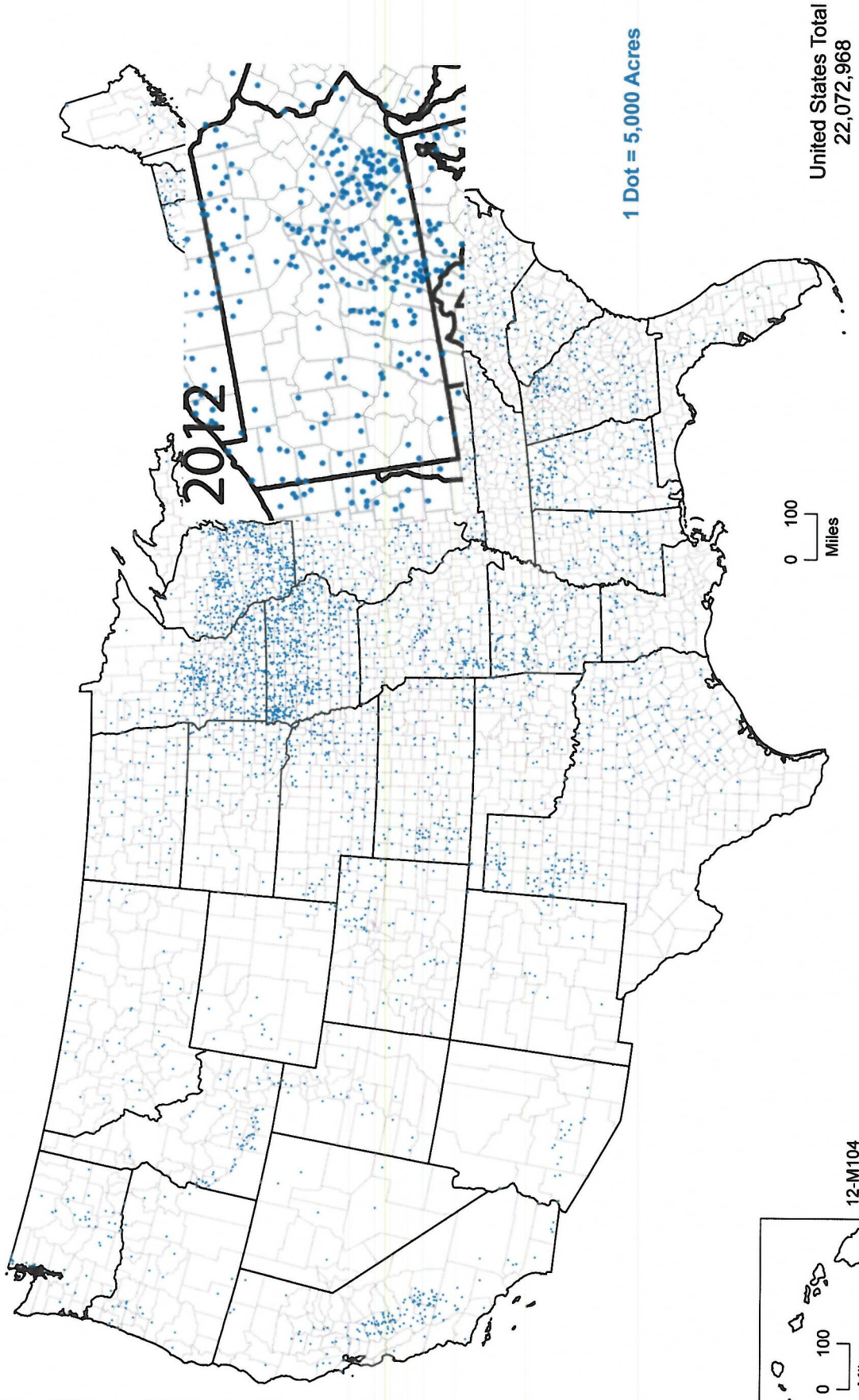
Figure 1. pH, water, unfiltered, field, standard units, Walnut St. Pier, May 3-June 27, 2014.
 (Source: USGS)

Figure 2. Acres of Cropland and Pastureland Treated with Manure: 2007



07-M105
U.S. Department of Agriculture, National Agricultural Statistics Service

Figure 3. Acres of Cropland and Pastureland Treated with Manure: 2012



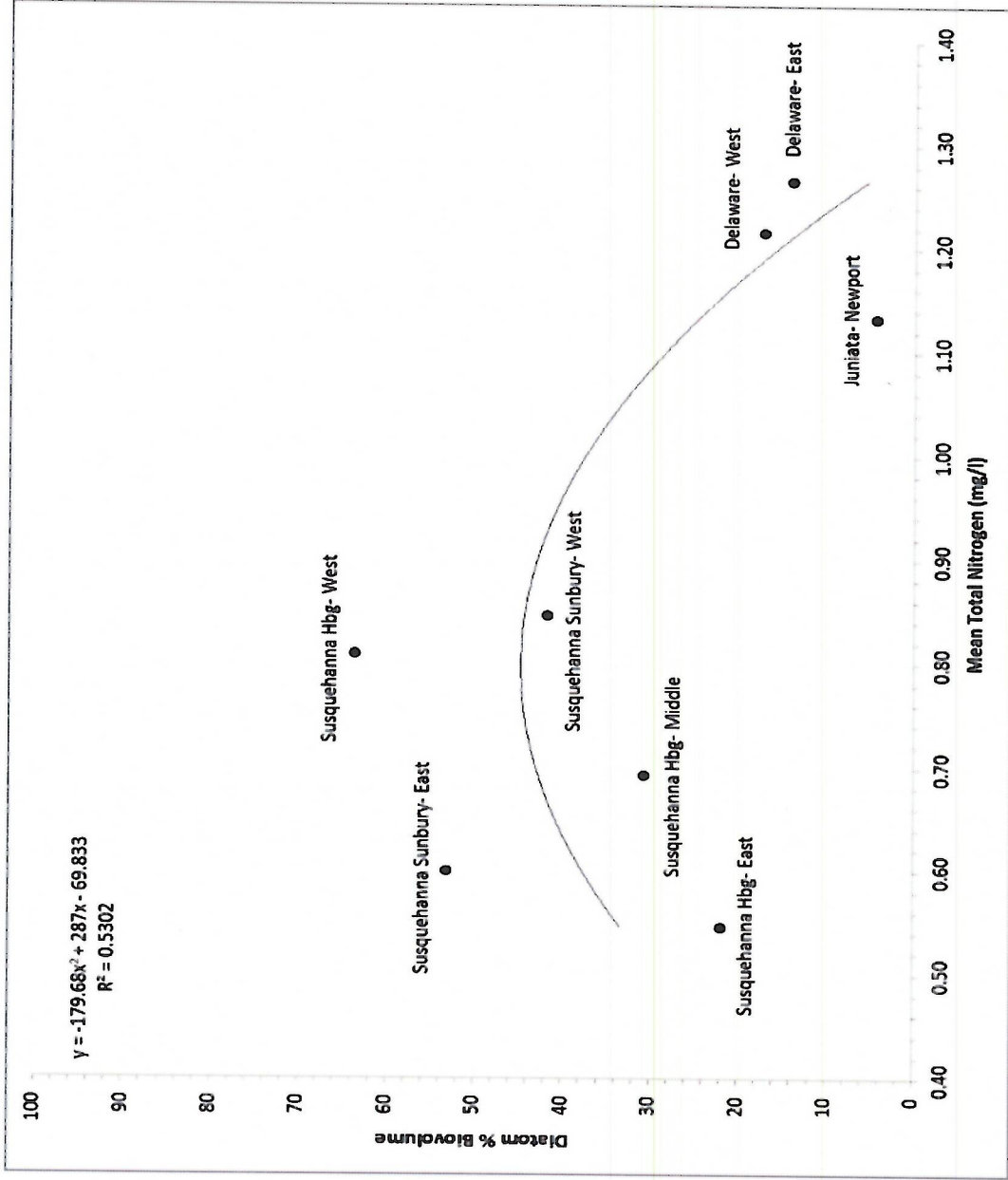


Figure 4: Relationship between diatom % biovolume and mean total nitrogen values at 2012 sites (Source: Pennsylvania DEP 2012-13 Sampling and Assessment Report

http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Regulation/WaterQualityPortalFiles/Water%20Quality%20Standards/Susquehanna_Report_2013_FinalDraft.pdf)

West Branch Susquehanna River and Susquehanna River

2013 Young-of-year black bass survey

Young-of-year (YOY) or recently spawned black bass (*Micropterus* species) are surveyed annually by Division of Fisheries Management staff at major rivers statewide as an index of reproductive success. Since 2005, this index has also been used to determine the prevalence of a recently emerging disease that has been affecting YOY Smallmouth Bass *Micropterus dolomieu* in the Susquehanna River system as well as for detection in areas that have not seen this condition historically.

Division of Fisheries Management staff from Areas 3, 4, 6, and 7 surveyed YOY black bass (primarily Smallmouth Bass) in the West Branch Susquehanna River, upper Susquehanna (North Branch), lower Susquehanna, and middle Susquehanna River, respectively. Surveys are conducted using backpack electrofishing gear targeting near-shore, gravel and cobble habitats favored by YOY Smallmouth Bass at early stages of their development.



Division of Fisheries Management staff conducting a YOY black bass survey at the middle Susquehanna River

Survey results varied by reach during 2013. The high stream flows in late-June and early-July negatively affected YOY Smallmouth Bass densities, which is common among riverine Smallmouth Bass populations. The West Branch Susquehanna River and all reaches of the Susquehanna River had catch rates below long-term medians. The upper Susquehanna River (North Branch), West Branch Susquehanna River, and middle Susquehanna River yielded YOY catch rates far below the long term medians (Figures 1-3, respectively). The lower Susquehanna River had catch rates only slightly below the historic median (Figure 4).

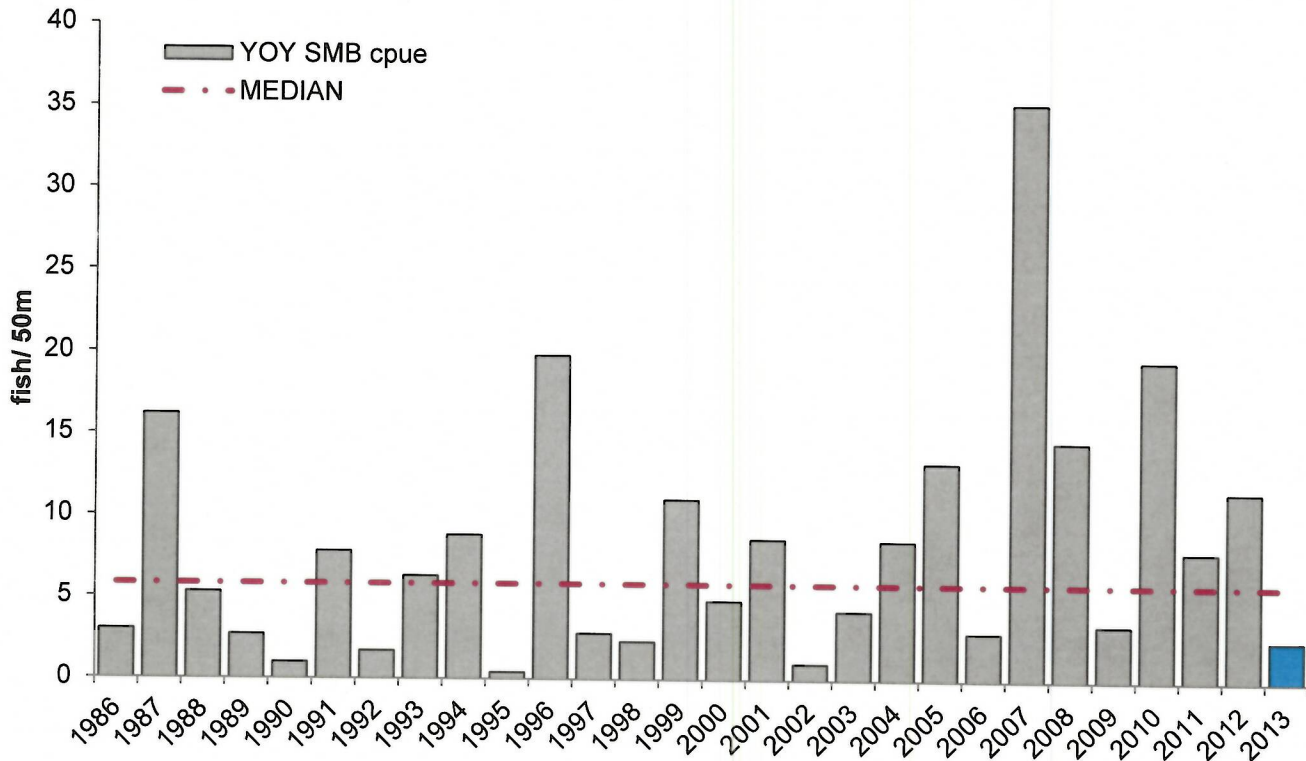


Figure 1: Catch rate of young-of-year Smallmouth Bass at the upper Susquehanna River (North Branch).

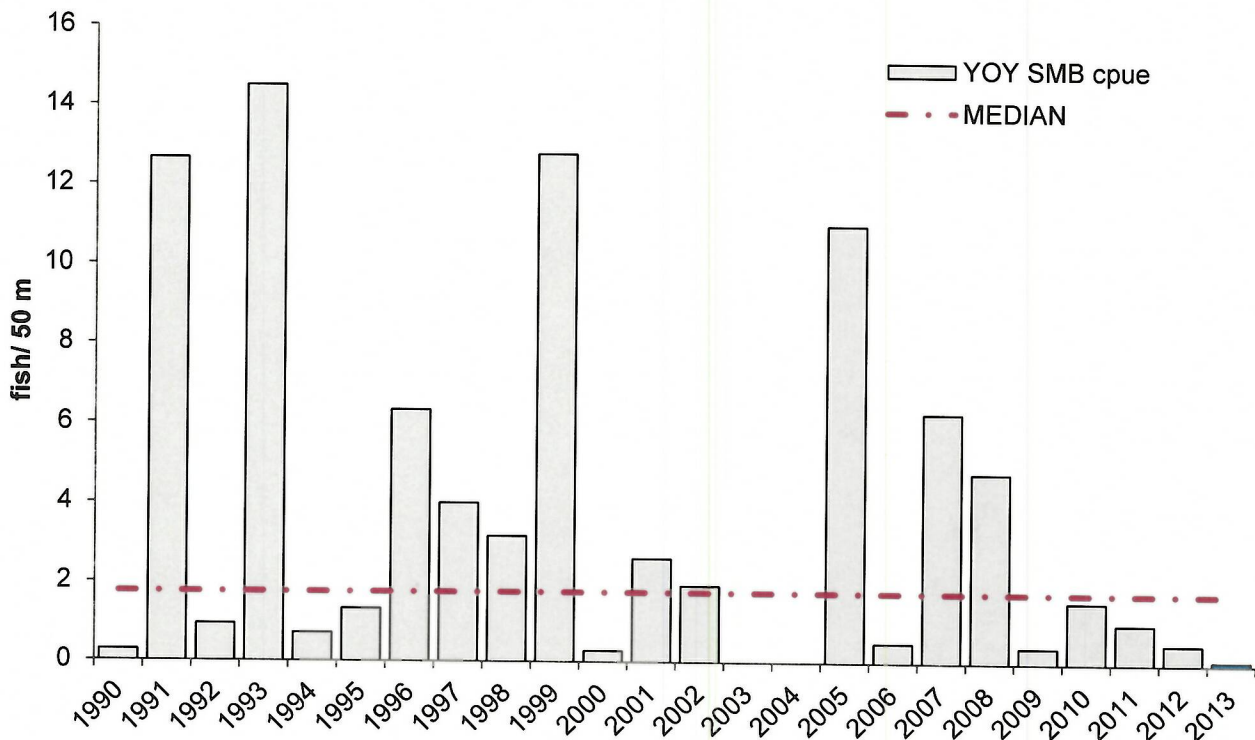


Figure 2: Catch rate of young-of-year Smallmouth Bass at the West Branch Susquehanna River. Blank values indicate years when surveys were not conducted not zero values. Note difference in scale among graphics.

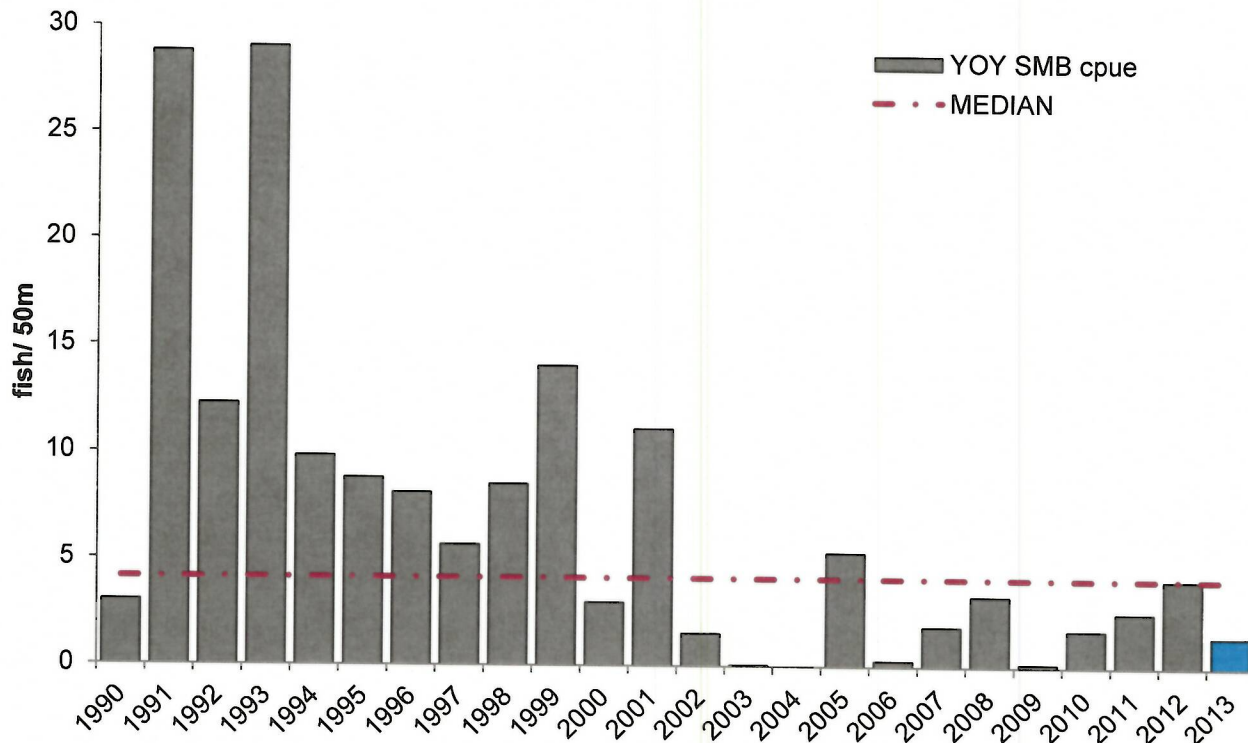


Figure 3: Catch rate of young-of-year Smallmouth Bass at the middle Susquehanna River (Sunbury to York Haven Dam). Blank values indicate years when surveys were not conducted not zero values. Note differences in scale among graphics.

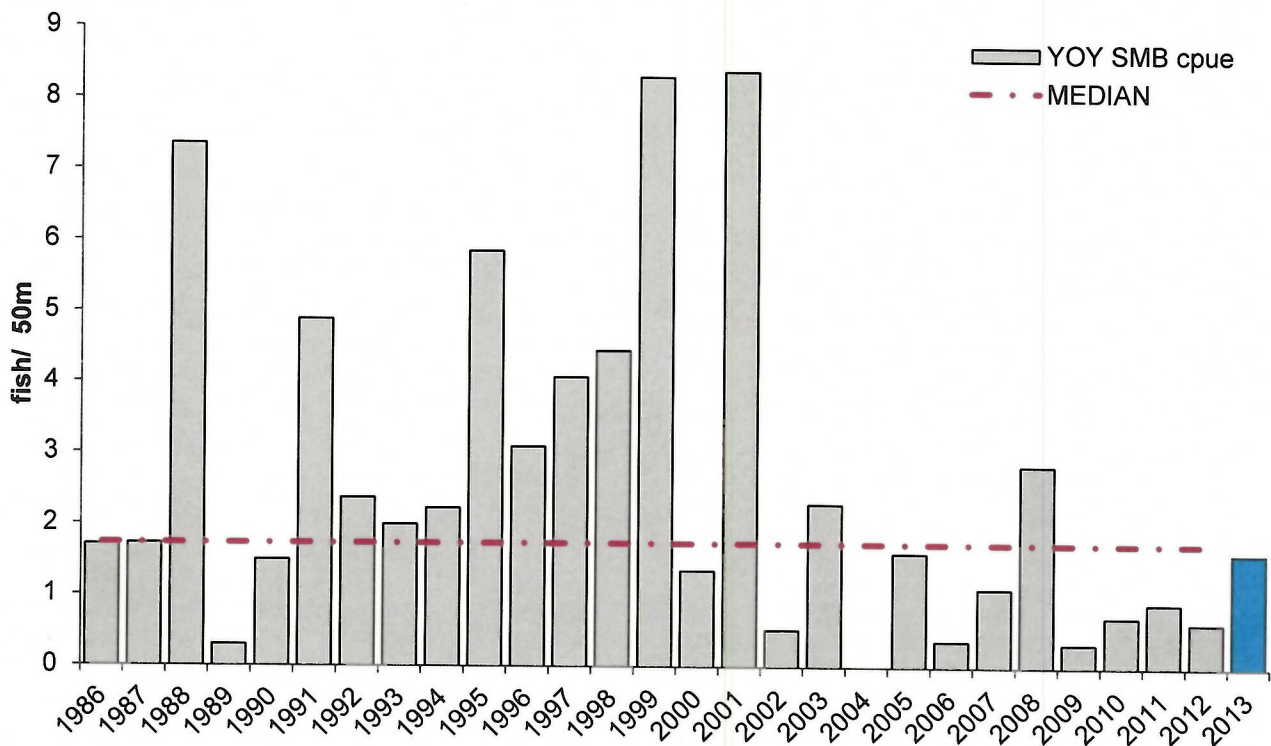


Figure 4: Catch rate of young-of-year Smallmouth Bass at the lower Susquehanna River (York Haven Dam to Holtwood Dam). Blank values indicate years when surveys were not conducted not zero values. Note differences in scale among graphics.

Prevalence of disease among YOY Smallmouth Bass sampled in 2013 was highest in the lower Susquehanna River. The year 2013 marked the highest prevalence of disease observed (47%) in the lower Susquehanna River since outbreaks were first observed in 2005 (Figure 5). At the time of the initial surveys, there were no reported incidence of disease in the West Branch Susquehanna River or upper Susquehanna River; however, modest disease outbreaks (16%) occurred in the middle Susquehanna River (Figure 5).

Future boat electrofishing surveys targeting adult Smallmouth Bass will provide further insight into the survival and contribution level of the 2013 year class to the catchable bass population in the West Branch Susquehanna River and various reaches of the main-stem Susquehanna River.

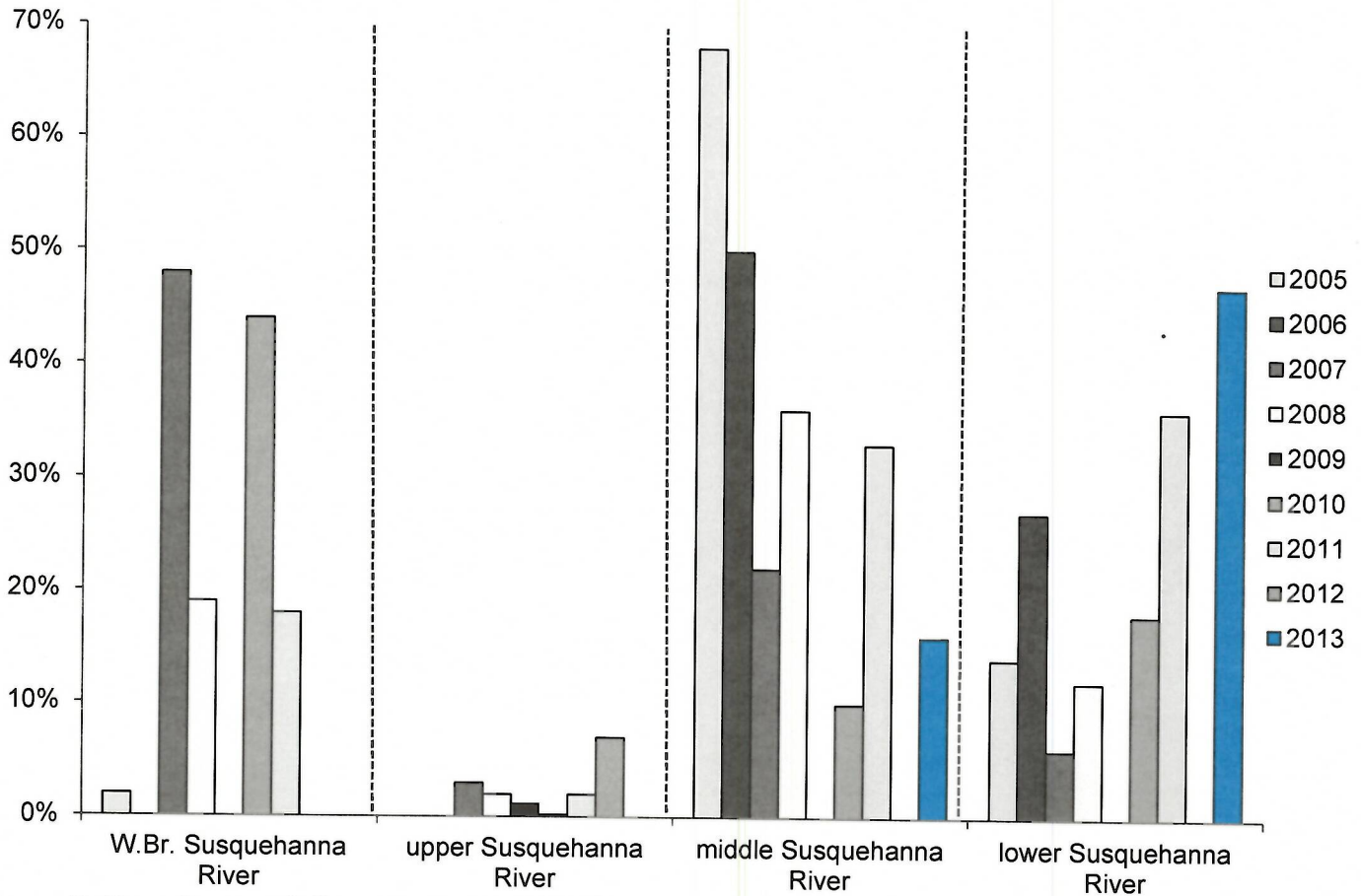


Figure 5: Prevalence of disease among YOY Smallmouth Bass since discovery in 2005 at the West Branch Susquehanna River and different reaches of the Susquehanna River.

Susquehanna River (middle)

2013 adult black bass survey

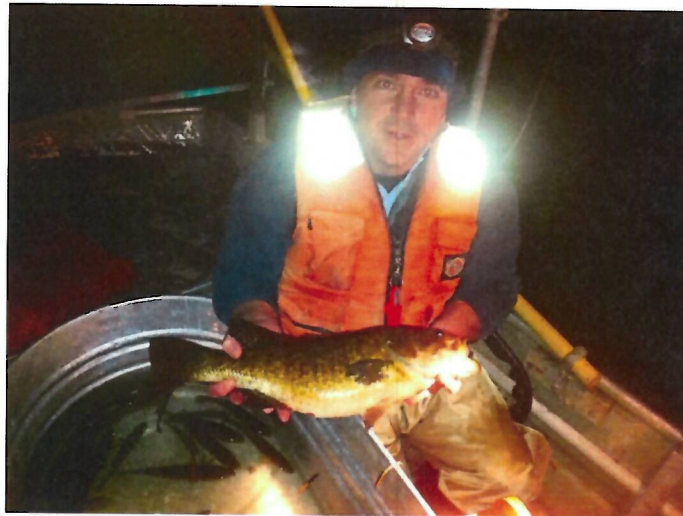


Figure 1. Fisheries Biologist John Frederick with a representative, adult Smallmouth Bass captured at the Susquehanna River near the PA Turnpike Bridge during 2013 adult Smallmouth Bass surveys. (Photo: A. Simpson – PFBC)

Fisheries Management Division biologist routinely assess the status of the Smallmouth Bass fishery residing in Susquehanna River to determine current population levels, size structure, age and growth attributes, among other parameters. During September 16 - 19, 2013 Fisheries Management Area 7 biologists conducted nighttime electrofishing surveys targeting adult Smallmouth Bass at four historic sampling sites located within the middle portion of the Susquehanna River between the inflatable dam near Sunbury and the York Haven Dam. Sites surveyed were located in the vicinity of Clemsons Island, Rockville, Dock Street Dam, and the Pennsylvania Turnpike Bridge.

During 2013, length distribution (Table 1) and catch rates of age-1 and older Smallmouth Bass varied among sites with a reach-wide catch rate of 50.94 fish/ hour (Figure 2). This is the highest catch rate since 2001; however, it is lower than the historic median catch rate (1990 – present) of 67.99 fish/ hour (Figure 2). The reach-wide catch rate of larger and older individuals, those longer than 15 inches in total length, was 7.77 fish/ hour (Figure 3). This catch rate is slightly above the historic median for this reach of 7.24 fish/ hour (Figure 3).

Table 1: Length classes (inches) of Smallmouth Bass captured at the middle Susquehanna River during nighttime electrofishing surveys, September 16-19, 2013.

Length (inches)	Clemson Island	Rockville	Dock St. Dam	Turnpike
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	2	0
4	7	7	7	18
5	7	2	2	8
6	0	2	2	4
7	3	25	24	7
8	21	8	24	10
9	10	8	4	2
10	7	1	1	4
11	6	0	0	1
12	4	2	1	2
13	5	0	2	3
14	3	0	1	3
15	6	2	0	2
16	2	0	2	0
17	5	4	2	3
18	0	1	1	1
19	2	0	1	2
20	0	0	0	0
	88	62	76	70

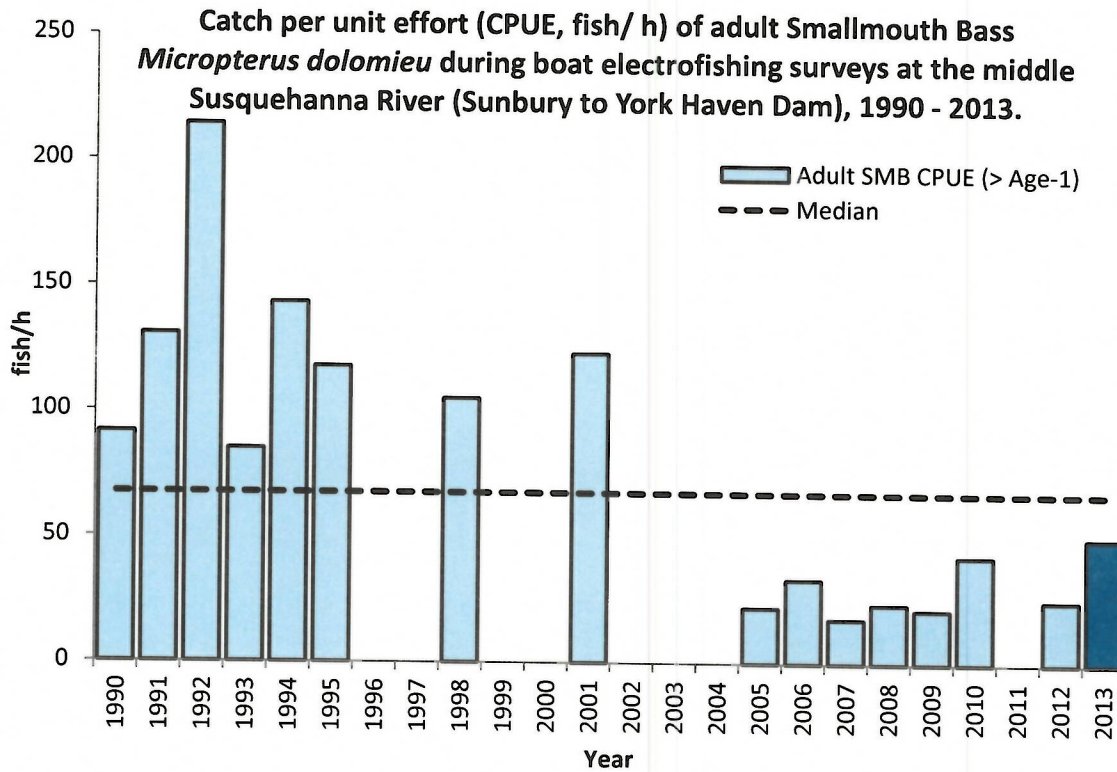


Figure 2: Catch per unit effort (CPUE, fish/ h) of Smallmouth Bass age-1 and older captured during nighttime electrofishing surveys conducted during the period of 1990 to present at four historic sites at the middle Susquehanna River. Blank values are years for which no surveys were conducted or age data does not exist

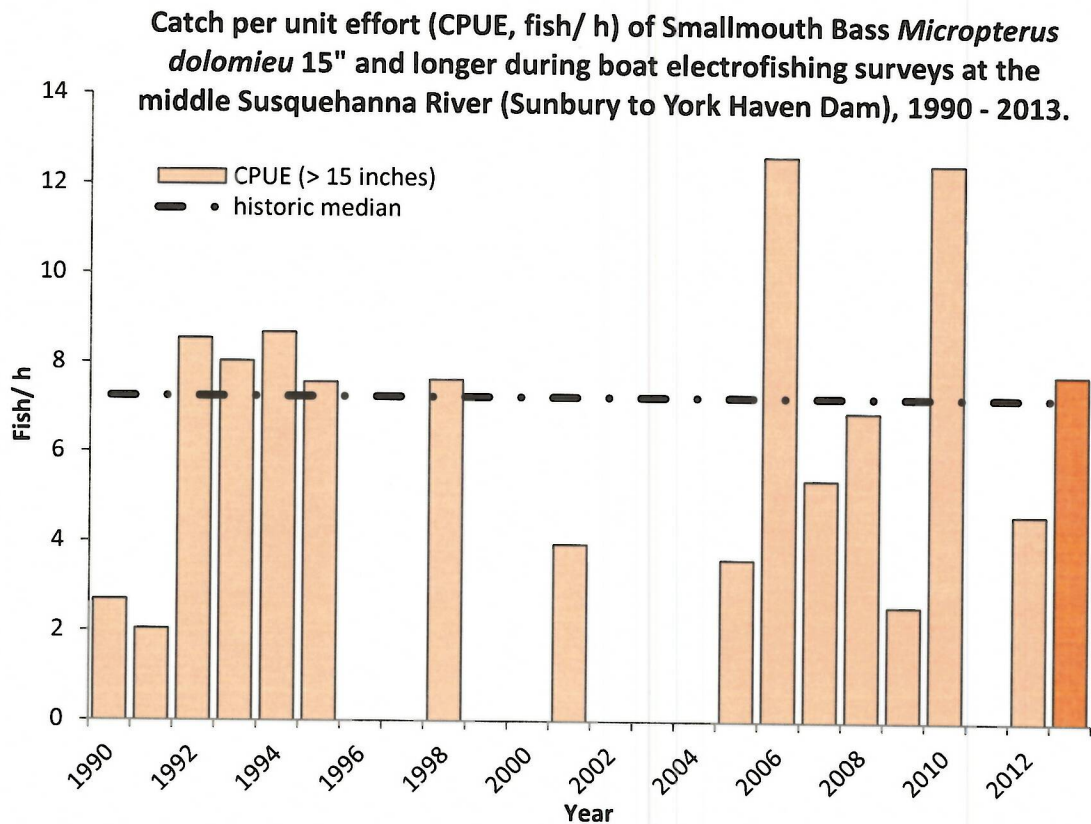


Figure 3: Catch per unit effort (CPUE, fish/ h) of Smallmouth Bass 15 inches and longer captured during nighttime electrofishing surveys conducted during the period of 1990 to present at four historic sites at the middle Susquehanna River. Blank values are years when surveys were not conducted.

During 2013 surveys, the proportion of the catch between 6 and 12 inches was higher than during recent years. We have also received similar reports from anglers who fished this reach during 2013. This provides evidence that at least two modest year-classes recruited to the population despite possible limited survival attributable to disease outbreaks affecting young-of-year Smallmouth Bass since 2005 in this portion of the Susquehanna River. Anglers targeting Smallmouth Bass at the middle Susquehanna River could potentially expect slightly better catch rates in coming years as those smaller individuals (2011 and 2012 year classes) appear to have recruited to the fishery and should be available to comprise a larger proportion of the angler catch in the near term. [Catch and Immediate Release Bass Regulations](#) apply to this portion of the Susquehanna River.

Geoffrey Smith
Susquehanna River Biologist