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## Pennsylvania Fish & Boat Commission

EXECUTIVE DIRECTOR  
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April 25, 2012

Shawn Garvin  
Regional Administrator  
United States Environmental Protection Agency  
1650 Arch Street  
Philadelphia, PA 19103-2029

Dear Mr. Garvin:

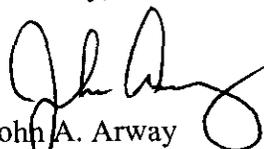
Since I wrote to you two years ago about the health of the Susquehanna River, the state of our once renowned smallmouth bass fishery has continued to deteriorate. As you may have read in recent news articles, the Pennsylvania Fish and Boat Commission submitted the attached data to the Pennsylvania Department of Environmental Protection (DEP) on August 31, 2011, supporting the inclusion of portions of the Susquehanna River on the forthcoming 303(d) list of impaired and threatened waters.

Unfortunately, the Susquehanna River was not on the impaired list when the DEP released its draft 2012 Pennsylvania Integrated Water Quality Monitoring and Assessment Report on April 6. Our agency is hopeful that the weight of scientific evidence and public outcry over the lost recreational values of the river will lead to the Susquehanna being included in the final 2012 list (DEP is accepting public comments through May 22).

We continue to be grateful for the assistance that the EPA and other federal partners have provided as we try to diagnose the sources of the river's impairment. I would welcome the chance to personally brief you on the issue and discuss a plan for collectively moving forward to help bring back a true natural treasure before it is too late. Our Executive Secretary Teresa Erdman will be contacting your office in the near future to try to set up a time for us to meet.

Thank you in advance for your attention and cooperation.

Sincerely,



John A. Arway  
Executive Director

Enclosure

Our Mission:

[www.fishandboat.com](http://www.fishandboat.com)

*To protect, conserve and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities.*

August 31, 2011

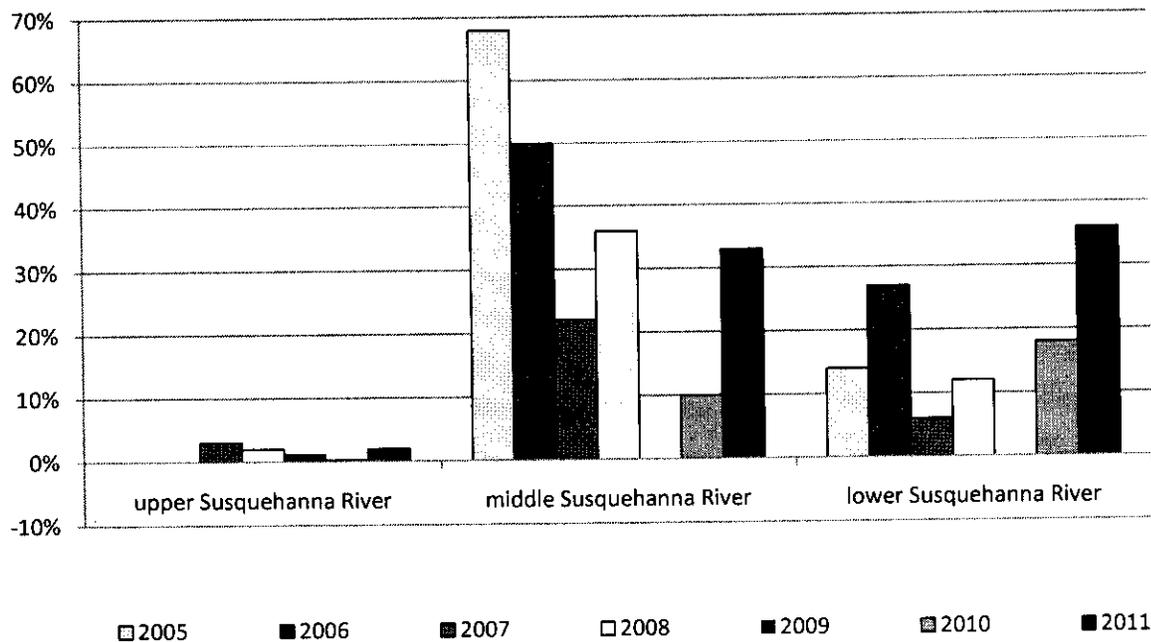
Pennsylvania Department of Environmental Protection  
Bureau of Water Standards and Facility Regulation  
Division of Water Quality Standards  
Molly Pulket  
P.O. Box 8467  
Harrisburg, PA 17105-8467

RE: Data submission for consideration in the year 2012 for the 303(d) listing process

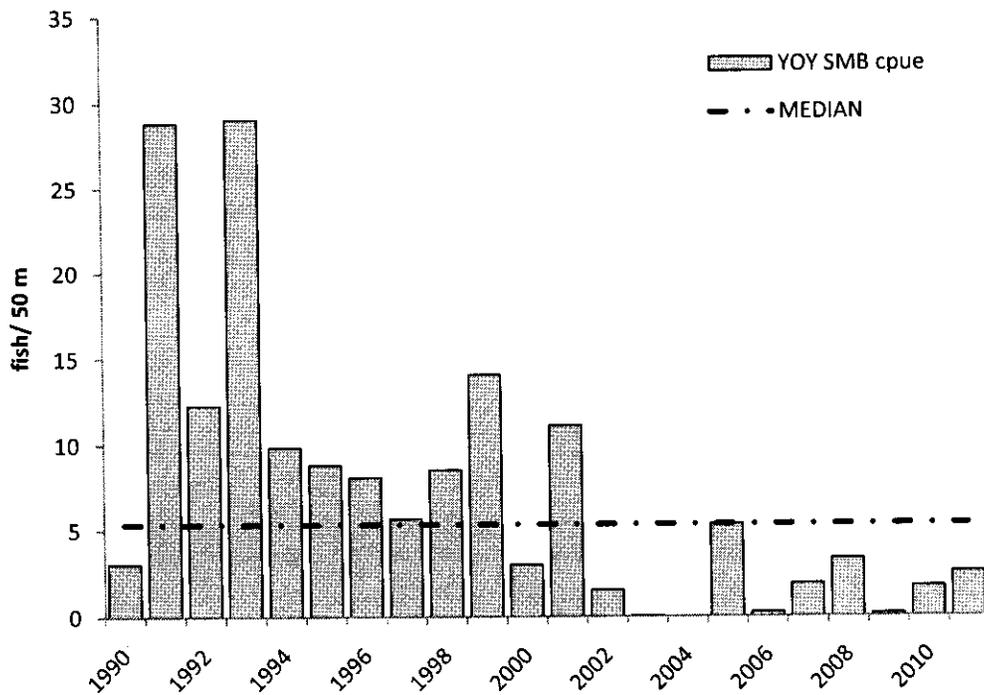
Dear Ms. Pulket:

On behalf of the Pennsylvania Fish and Boat Commission (PFBC), the Chesapeake Bay Foundation, Citizens for Pennsylvania's Future (PennFuture), American Rivers, and the Pennsylvania Council of Trout Unlimited, please accept this data submission for consideration for the 2012 303(d) listing process. This evidence supports listing 98 miles of the Susquehanna River, from the Adam T. Bower Memorial Dam in Sunbury, PA to the Holtwood Dam near Holtwood, PA, on the 303(d) impaired water list due to the failure of this stretch of river to attain its protected uses.

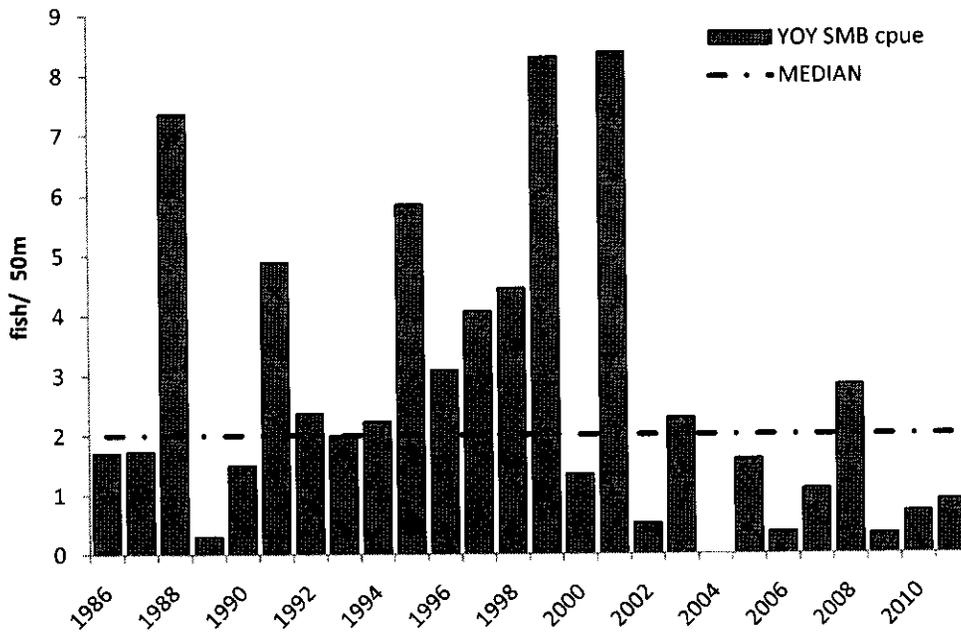
Since 2005, large-scale disease outbreaks have plagued young-of-year (YOY) smallmouth bass in the Susquehanna River and its major tributaries. Substantial disease outbreaks have occurred in 2005, 2007, 2008, 2010, and 2011 and to a lesser extent in 2006 and 2009 (Figure 1). These disease outbreaks are comprised of bacterial infections (primarily, *Flavobacterium columnare* or *columnaris* and motile Aeromonads), viral infections, and parasite infestations. The current hypothesis of the PFBC contends stressful water quality conditions (notably low dissolved oxygen levels, high pH levels, and high temperatures, among others) in the habitats these fish utilize in their early life stages are predisposing them to disease. In response to these concerns, investigations were initiated by the PFBC who funded the U.S. Geological Survey (USGS) to conduct water quality studies, and who worked with USGS, Susquehanna River Basin Commission (SRBC), U.S. Environmental Protection Agency (EPA), and Pennsylvania Department of Environmental Protection (DEP) staff to do additional water quality monitoring and disease investigations. The preliminary results prompted former PFBC Executive Director Austen to submit a letter on September 29, 2008 to then DEP Secretary Hanger requesting that the existing, outdated dissolved oxygen criterion be updated to the EPA-recommended criterion for protection of early life stages of warm water fishes that was developed in 1986 (Attachment 1). In addition, measured declines in smallmouth bass abundance (Figures 2-3) led the PFBC Board of Commissioners to pass a resolution on January 28, 2010 declaring the Susquehanna River impaired to a point to be limiting the current sport fishery for smallmouth bass (Attachment 2).



**Figure 1:** Prevalence of disease among young-of-year (YOY) smallmouth bass *Micropterus dolomieu* since discovery in 2005 at the different reaches of the Susquehanna River (upper-North Branch; middle – Sunbury to York Haven Dam; lower – York Haven Dam to Holtwood Dam).



**Figure 2:** Catch rates (fish/ 50 m) of young-of-year smallmouth bass *Micropterus dolomieu* at the middle Susquehanna River (Sunbury to York Haven Dam). Blank values indicate years when no surveys were conducted, not zero values.



**Figure 3:** Catch rates (fish/ 50 m) of young-of-year (YOY) smallmouth bass *Micropterus dolomieu* at the lower Susquehanna River (York Haven Dam to Holtwood Dam). Blank values indicate years when no surveys were conducted, not zero values.

The Susquehanna River is currently identified as having the following general, state-wide protected uses in 25 Pennsylvania Code Chapter 93:

- Warm-water fishery (WWF)
- Potable water supply (PWS)
- Industrial water supply (IWS)
- Livestock water supply (LWS)
- Wildlife water supply (AWS)
- Irrigation (IRS)
- Boating (B)
- Fishing (F)
- Water contact sports (WC)
- Esthetics (E)

Current water quality conditions are preventing the Susquehanna River in the identified reach from attaining two of these uses: warm-water fishery aquatic life use and fishing recreational use.

**Warm-Water Fishery (WWF)**

25 Pennsylvania Code 96.3(c) states that "To protect existing and designated surface water uses, the water quality criteria described in Chapter 93 (relating to water quality standards), including the criteria in § § 93.7 and 93.8a(b) (relating to specific water quality criteria; and toxic substances) shall be achieved in all surface waters at least 99% of the time, unless otherwise specified in this title." Based on a growing body of water quality data collected over

several years and summarized below, it does not appear that this requirement is being satisfied within the 98-mile reach of the Susquehanna River described above.

**pH**

Under Title 25, Chapter 93 of the Pennsylvania Code § 93.7, the current pH criteria for a WWF designation is “from 6.0 to 9.0 inclusive”. The pH criterion is a common secondary measure of increased plant productivity and subsequently eutrophication. Throughout the subject river reach, there were several instances where U.S. Geological Survey (USGS) measurements have documented violations of the maximum pH criterion of 9.0 standard units. Exceedances occurred during all three years of the USGS study<sup>1</sup> and at all of the locations where continuous monitors were deployed (Tables 1-3).

**Table 1:** Number and percentage of exceedances of daily maximum pH criterion (9.0 Standard Units) at the Susquehanna River in main channel habitat at Clemson Island, New Buffalo, PA during 2008 and 2009.

	<b>No. of exceedances of 9 pH units</b>	<b>No. of observations</b>	<b>% of observations that exceeded 9 pH units</b>
2008	13	131	9.9
2009	29	147	19.7

**Table 2:** Number and percentage of exceedances of daily maximum pH criterion (9.0 Standard Units) at the Susquehanna River in channel margin habitat at Clemson Island, New Buffalo, PA during 2008 and 2009.

	<b>No. of exceedances of 9 pH units</b>	<b>No. of observations</b>	<b>% of observations that exceeded 9 pH units</b>
2008	8	130	6.2
2009	11	147	7.5

**Table 3:** Number and percentage of exceedances of daily maximum pH criterion (9.0 Standard Units) at the Susquehanna River in main channel habitat at City Island, Harrisburg, PA during 2008 - 2010.

	<b>No. of exceedances of 9 pH units</b>	<b>No. of observations</b>	<b>% of observations that exceeded 9 pH units</b>
2008	4	146	2.7
2009	6	155	3.9
2010	21	146	14.4

<sup>1</sup> Reports generated from data include Chaplin, J.J., Crawford, J.K. and Brightbill, R.A. 2009. Water-quality monitoring in response to young-of-year smallmouth bass (*Micropterus dolomieu*) mortality in the Susquehanna River and major tributaries, Pennsylvania-2008: U.S. Geological Survey Open-File Report 2009-1216, 59 p. and Chaplin, J.J. and Crawford, J.K. in press. Streamflow and water quality monitoring in response to young-of-year smallmouth bass (*Micropterus dolomieu*) in the Susquehanna River and major tributaries with comparisons to the Delaware and Allegheny rivers: 2008-2010. (Attachment 3)

In total, the average percentage of exceedance in the pH criterion for all sampled habitats from 2008 to 2010 is approximately 9.2% (n=1002). This reflects that during the sample period established pH was met 90.8% of the time. As noted above, § 96.3(c) requires that waters meet their criteria no less than 99% of the time. This is typically evaluated based on long-term conditions at extremely low flows (Q<sub>7-10</sub>). We believe that the data indicate that this reach of the Susquehanna River fails to meet pH criteria under § 93.7.

**Dissolved Oxygen (DO)**

Under Title 25, Chapter 93 of the Pennsylvania Code § 93.7, the current dissolved oxygen criterion for a WWF designation is “minimum daily average 5.0 mg/L; minimum 4.0 mg/L” despite the EPA recommendation to elevate these concentrations to minimum daily average of 6.0 mg/L; minimum of 5.0 mg/L to be more protective of early life stages of warm-water fisheries (U.S. EPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440/5-86-003. National Technical Information Service, Springfield, VA). Measurements made by the USGS in 2008 (Attachment 3) documented violations of the current DEP criterion during five days of a 123-day study period at the Clemson Island location near New Buffalo, PA (Table 4). If the EPA-recommended criterion was applied, violations of the minimum criterion would be more numerous (27 in 2008 and 1 in 2009; Table 4) and present at the City Island location at Harrisburg, PA (Table 5). These violations are a result of respiratory demand of dissolved oxygen by the river’s plant community associated with the increased productivity caused by eutrophication.

**Table 4:** Number and percentage of exceedances of daily minimum dissolved oxygen (DO) criterion (4.0 mg/L) and EPA-recommended daily minimum dissolved oxygen criterion (5.0 mg/L) protective of early life stages of warm-water fishes at the Susquehanna River in channel margin habitat at Clemson Island, New Buffalo, PA during 2008 and 2009.

	DO minima exceedance 4.0 mg/L	DO minima exceedance 5.0 mg/L	No. of measurements	% of exceedances 4.0 mg/L	% of exceedances 5.0 mg/L
2008	5	27	123	4.07	21.95
2009	0	1	147	0.00	0.68

**Table 5:** Number and percentage of exceedances of daily minimum dissolved oxygen (DO) criterion (4.0 mg/L) and EPA-recommended daily minimum dissolved oxygen criterion (5.0 mg/L) protective of early life stages of warm-water fishes at the Susquehanna River in main channel habitat at City Island, Harrisburg, PA during 2008 - 2010.

	DO minima exceedance 4.0 mg/L	DO minima exceedance 5.0 mg/L	No. of measurements	% of exceedances 4.0 mg/L	% of exceedances 5.0 mg/L
2008	0	4	143	0.0	2.8
2009	0	0	155	0.0	0.0
2010	0	20	146	0.0	13.7

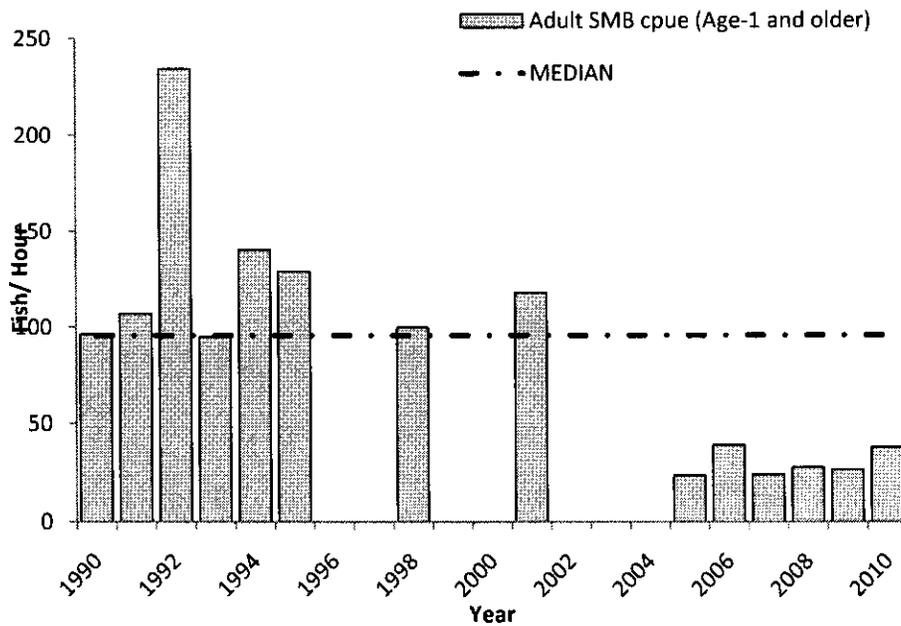
Although the data indicate that the current DO criterion is not being notably exceeded in the reach of the River in question, the adequacy of the current criteria is questionable. Applying the more appropriate and scientifically justifiable U.S. EPA criteria of 4.0 mg/L to all monitoring points indicates that such a standard is being exceeded approximately 7.8 % of the time (n=714). In other words, the criteria would be met roughly 92.1% of the time during the sampling period. § 96.3(c) requires that criteria be met no less than 99% of the time. This is typically

evaluated based on long-term conditions at extremely low flows ( $Q_{7-10}$ ). We believe that the data indicate that this reach of the River is experiencing depressed DO levels and should be considered impaired.

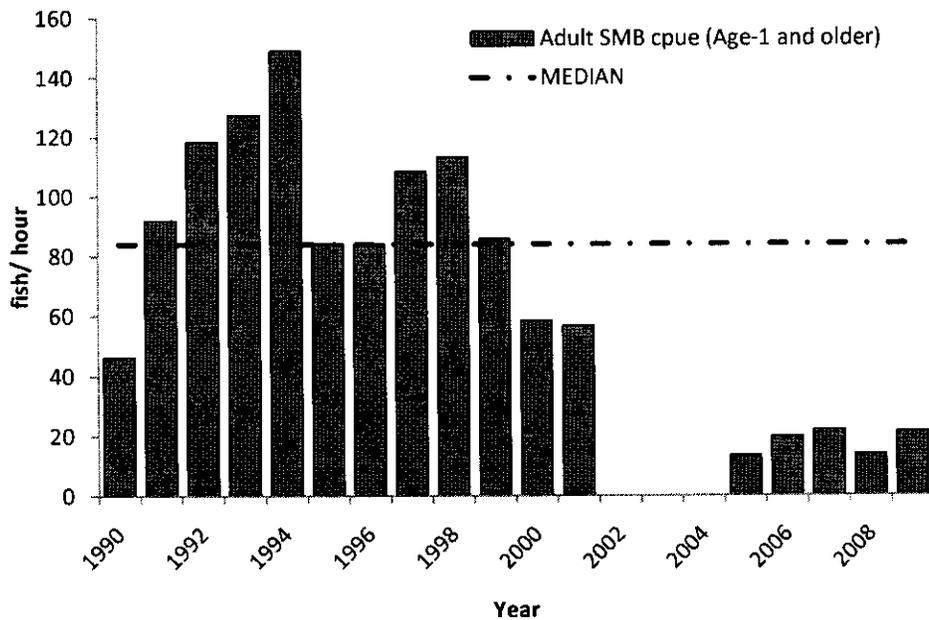
**Fishing (F)**

As referenced above, we contend that 98 miles of the Susquehanna River are not attaining general water quality criteria set forth at 25 Pennsylvania Code § 93.6(a) ("Water may not contain substances attributable to point or nonpoint source discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life."). 25 Pennsylvania Code §96.3(c) states that "The general water quality criteria in § 93.6 (relating to general water quality criteria) shall be achieved in surface waters at all times at design conditions." The large-scale disease outbreaks noted previously herein and attachment 6 establish that §96.3(c) is not being attained with respect to this section of the Susquehanna River.

Due to the failure to attain 25 Pennsylvania Code § 93.6(a), the PFBC Executive Director enacted an Executive Order on October 5, 2010 to impose a catch-and-immediate-release regulation that prohibited the lawful taking of smallmouth bass from the Susquehanna River from Sunbury downstream to Holtwood Dam (98.0 miles) and the Juniata River from Port Royal downstream to the mouth (31.7 miles) for a period of one year beginning January 1, 2011 and ending December 31, 2011. The PFBC Commissioners voted on April 12, 2011 to formally adopt the catch-and- immediate-release regulation for these waters, thereby extending the regulation for an indefinite period of time until abundance rebounds. Pending Commission approval, further regulatory action is anticipated at the September 27, 2011 PFBC Commission meeting that would impose a closed season for bass during the spring spawning period on the sections of the Susquehanna and Juniata Rivers mentioned above. These increasingly restrictive bass fishing regulations are designed to enhance protection of the remaining bass fishery in the face of the large declines in the population that the PFBC has documented. As such, by adversely impacting the recruitment of smallmouth bass, the current water quality conditions of the Susquehanna River are limiting the quality of the fishery (Figures 4-5) and its associated opportunities for recreational angling use.



**Figure 4:** Catch rate (fish/hour) of adult smallmouth bass *Micropterus dolomieu* at the middle Susquehanna River (Sunbury to York Haven Dam) between 1990 and 2010. Blank values indicate years when no surveys were conducted, not zero values.



**Figure 5:** Catch rate (fish/hour) of adult smallmouth bass *Micropterus dolomieu* at the lower Susquehanna River (York Haven Dam to Holtwood Dam) between 1990 and 2009. Blank values indicate years when no surveys were conducted, not zero values.

**Conclusion**

25 Pa. Code § 96.4(a), states, "The Department will identify surface waters or portions thereof that require the development of TMDLs, prioritize these surface waters for TMDL development, and then develop TMDLs for these waters." Based upon the data presented herein and attached, we the undersigned believe that 98 miles of the Susquehanna River, from the Adam T. Bower Memorial Dam in Sunbury, PA to the Holtwood Dam near Holtwood, PA, should be listed on the 303(d) impaired water list due to the failure of this stretch of river to attain its protected uses.

Thank you for the consideration of this request. We look forward to the opportunity to work collaboratively to further protect Pennsylvania’s water resources and their associated protected uses.

Sincerely,

John Arway, Executive Director  
 Pennsylvania Fish and Boat Commission

Matt Ehrhart, Executive Director, Pennsylvania Office  
 Chesapeake Bay Foundation



Jan Jarrett, President & CEO  
Citizens for Pennsylvania's Future (PennFuture)



Liz Garland Deardorff, Associate Director  
American Rivers Clean Water Program, Pennsylvania



Ken Undercoffer, President  
Pennsylvania Council of Trout Unlimited

Enclosure:

Data Submission Form  
September 28, 2008 Letter from the PFBC to DEP  
PFBC Susquehanna River Smallmouth Bass Fishery Resolution  
USGS Water Quality Monitoring Reports  
pH Data for the Susquehanna River  
Dissolved Oxygen Data for the Susquehanna River