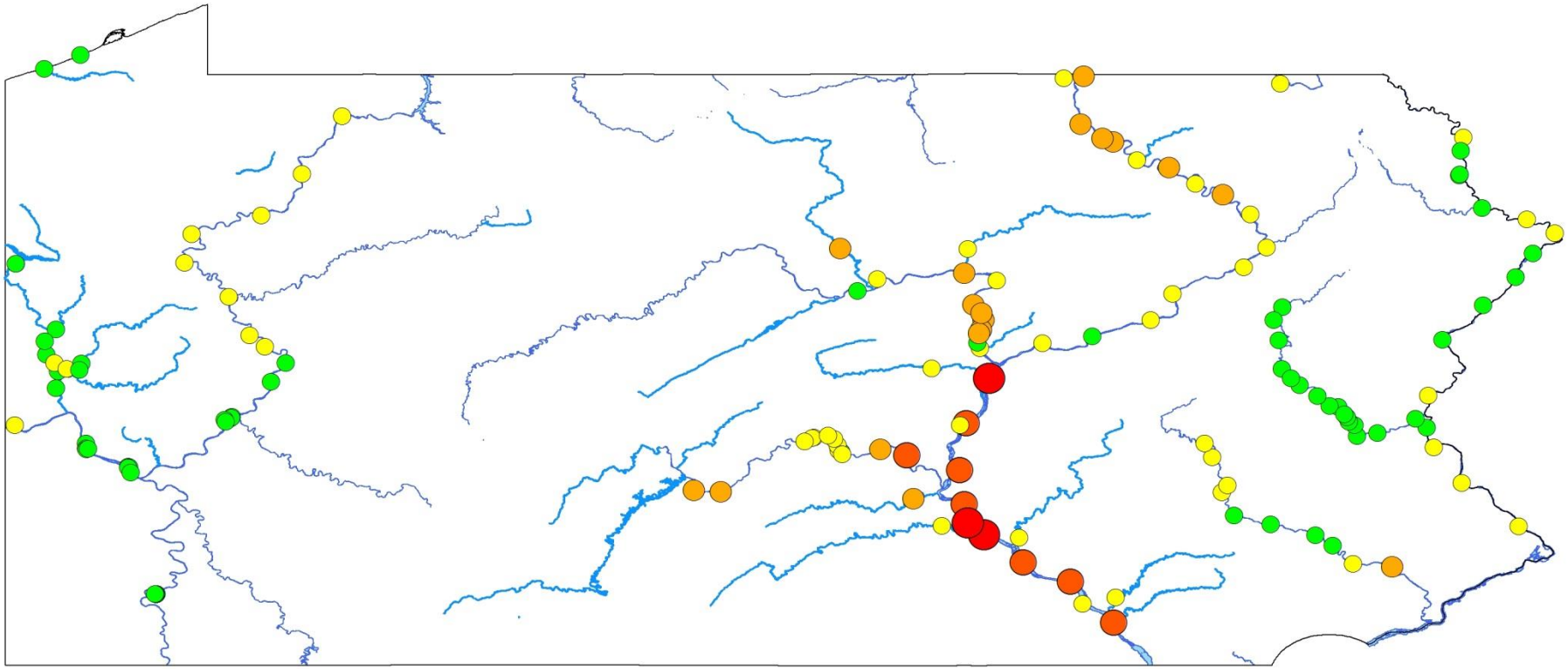
Smallmouth Bass Update

Chesapeake Bay Commission
November 05, 2014

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

Background

- Young-of-year (YOY) Smallmouth Bass disease outbreaks began in 2005
- Scope and degree of prevalence have varied annually
- State-wide YOY Smallmouth Bass data set: 1990-2014



Legend

YOY Smallmouth Bass

Disease Occurrence (Years)

- No Incidence
- 1 - 2 years
- 3 - 4 years
- 5 - 6 years
- 7 - 8 years

N

W E

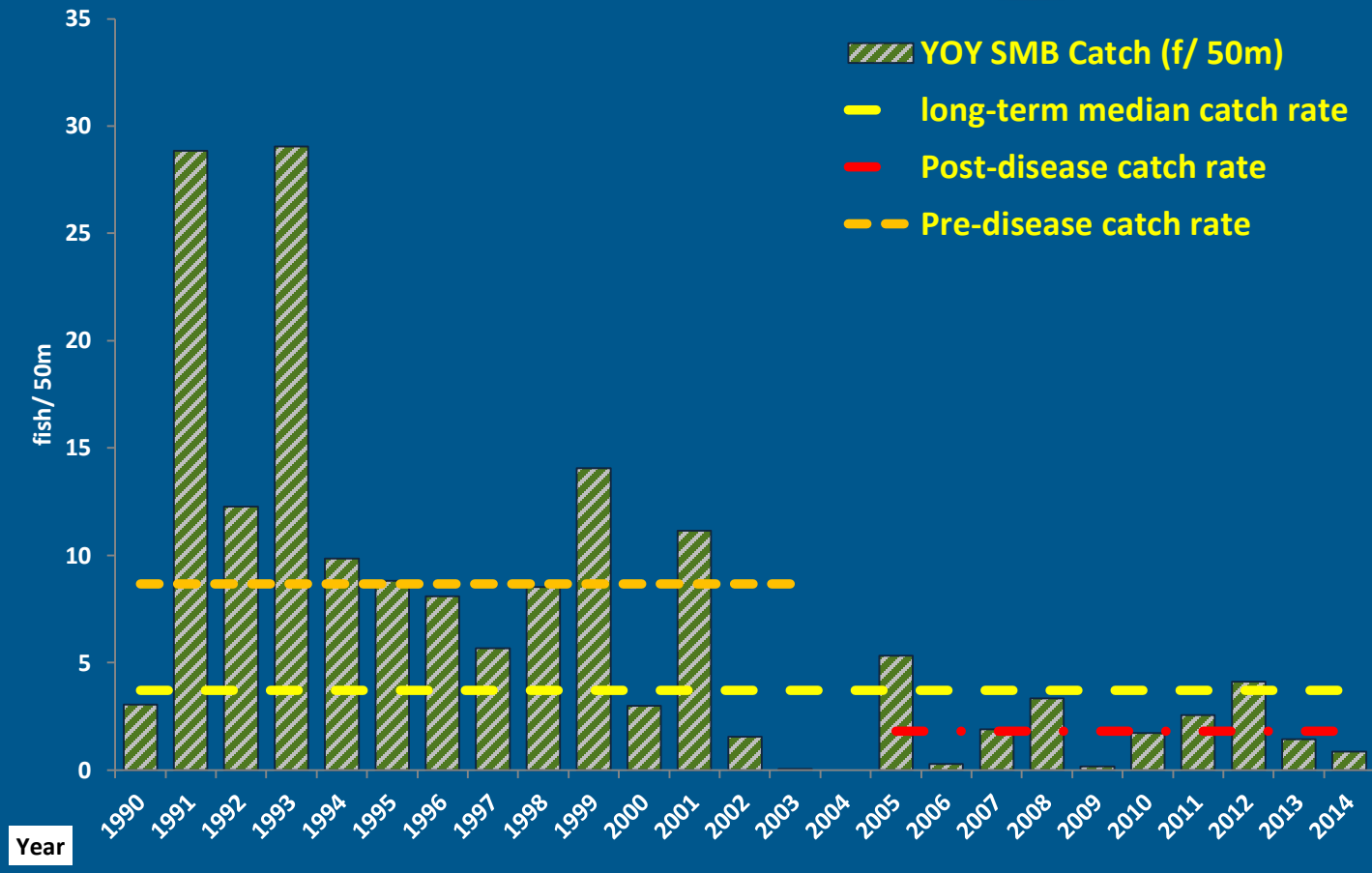
S

0 15 30 60 90 120

Miles

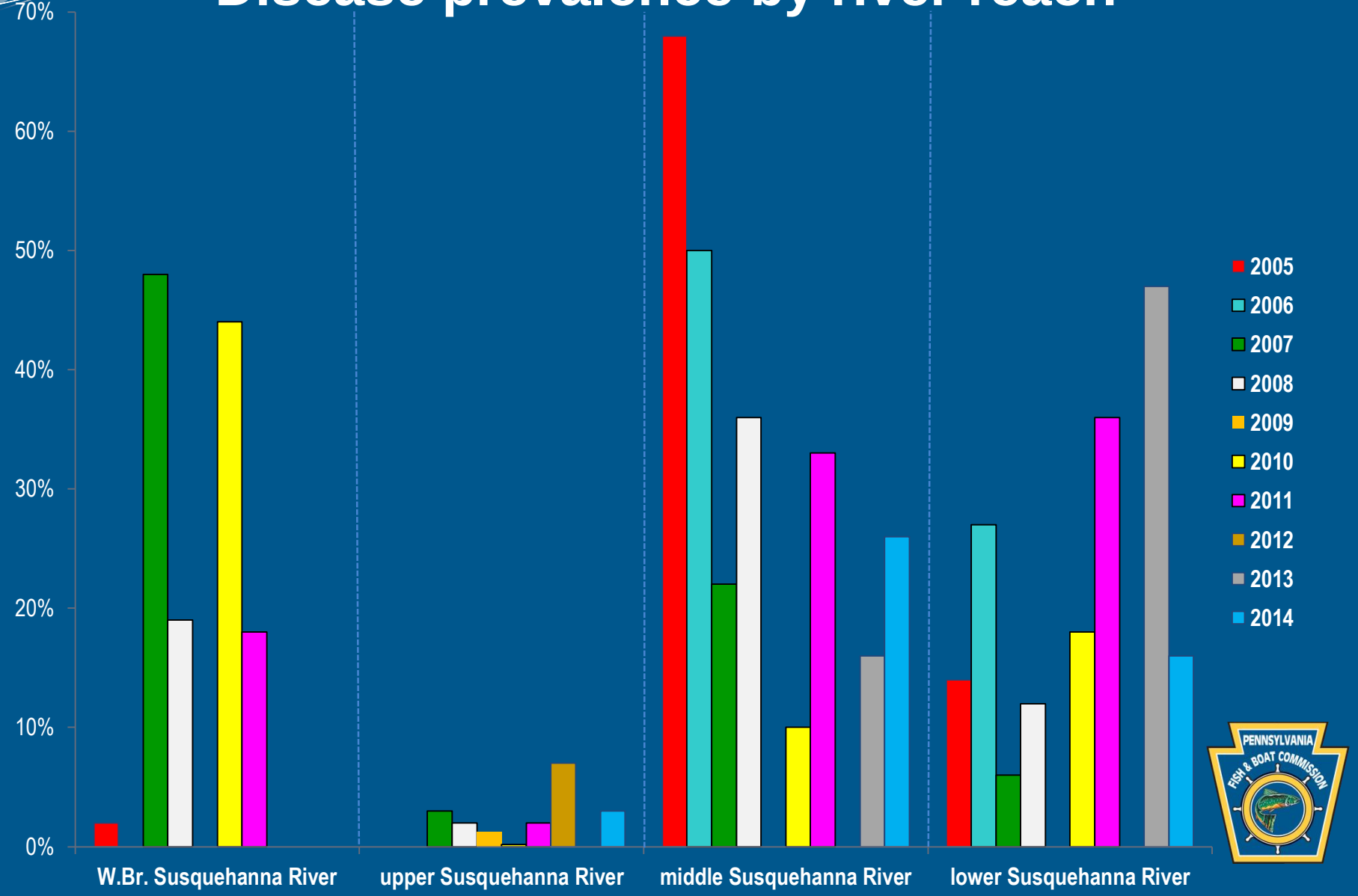
2014 SMB YOY Basin-wide Summary

- Low density in surveys
  - Juniata River
  - West Branch Susquehanna River
  - Upper Susquehanna River
  - Middle Susquehanna River
- Average density
  - Lower Susquehanna River
- Exceptional year classes on some tributaries

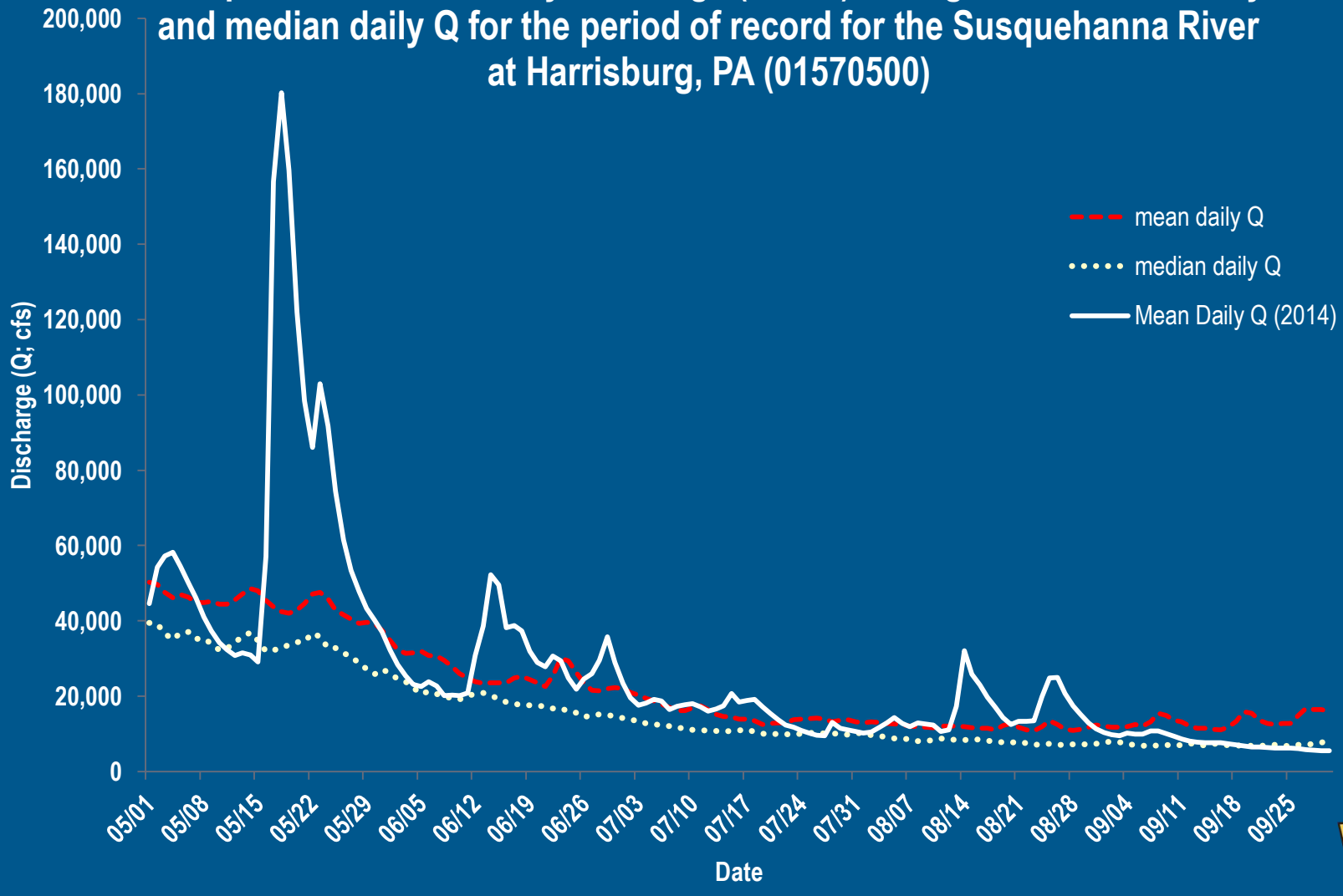


Catch per unit effort (CPUE; fish/ h) of YOY Smallmouth Bass (hatched bars) compared to the median CPUE of YOY Smallmouth Bass during pre- and post-disease periods at the Susquehanna River between Sunbury and York Haven, Pennsylvania during backpack electrofishing surveys from 1990 to present.

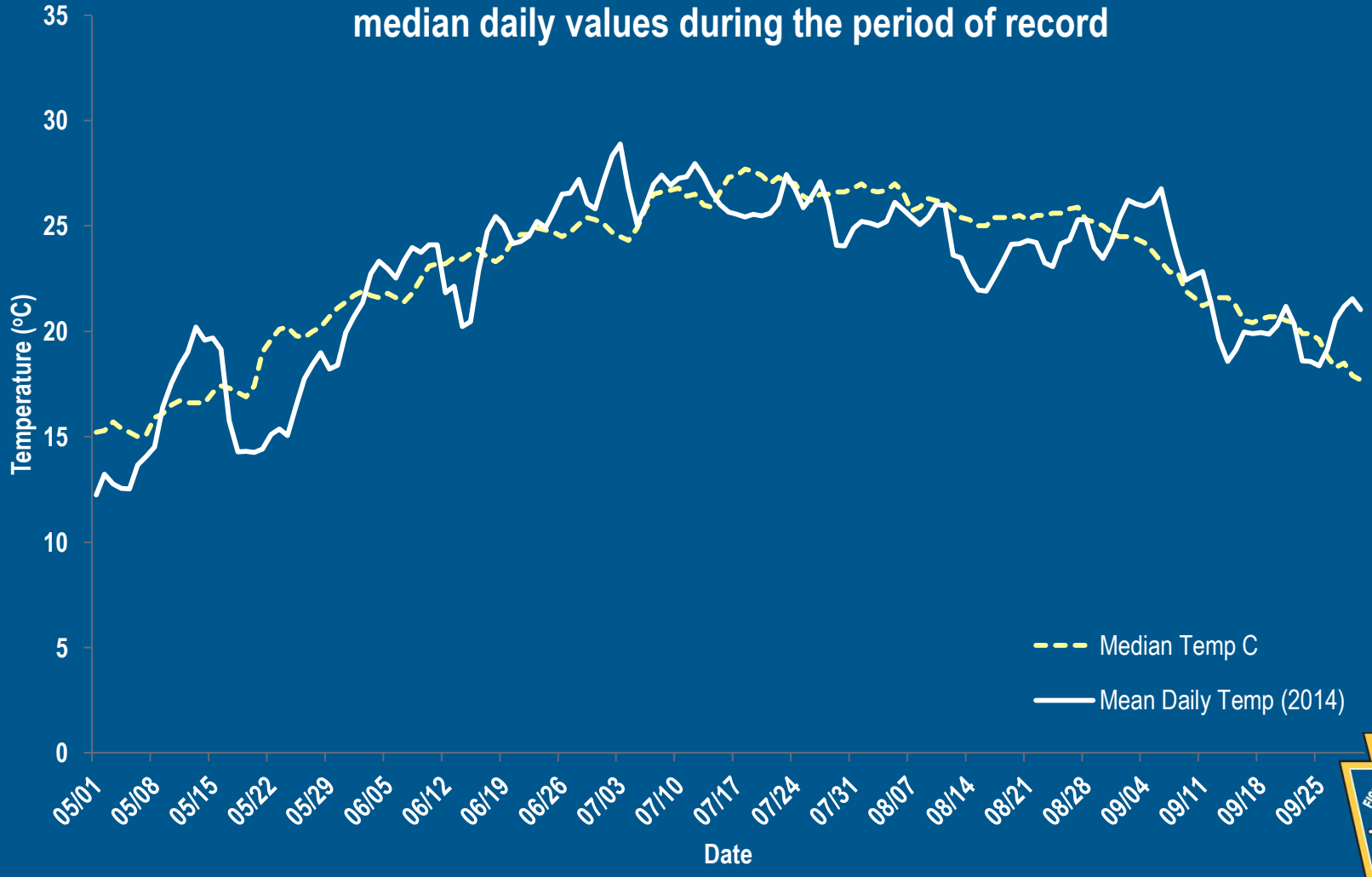
Disease prevalence by river reach

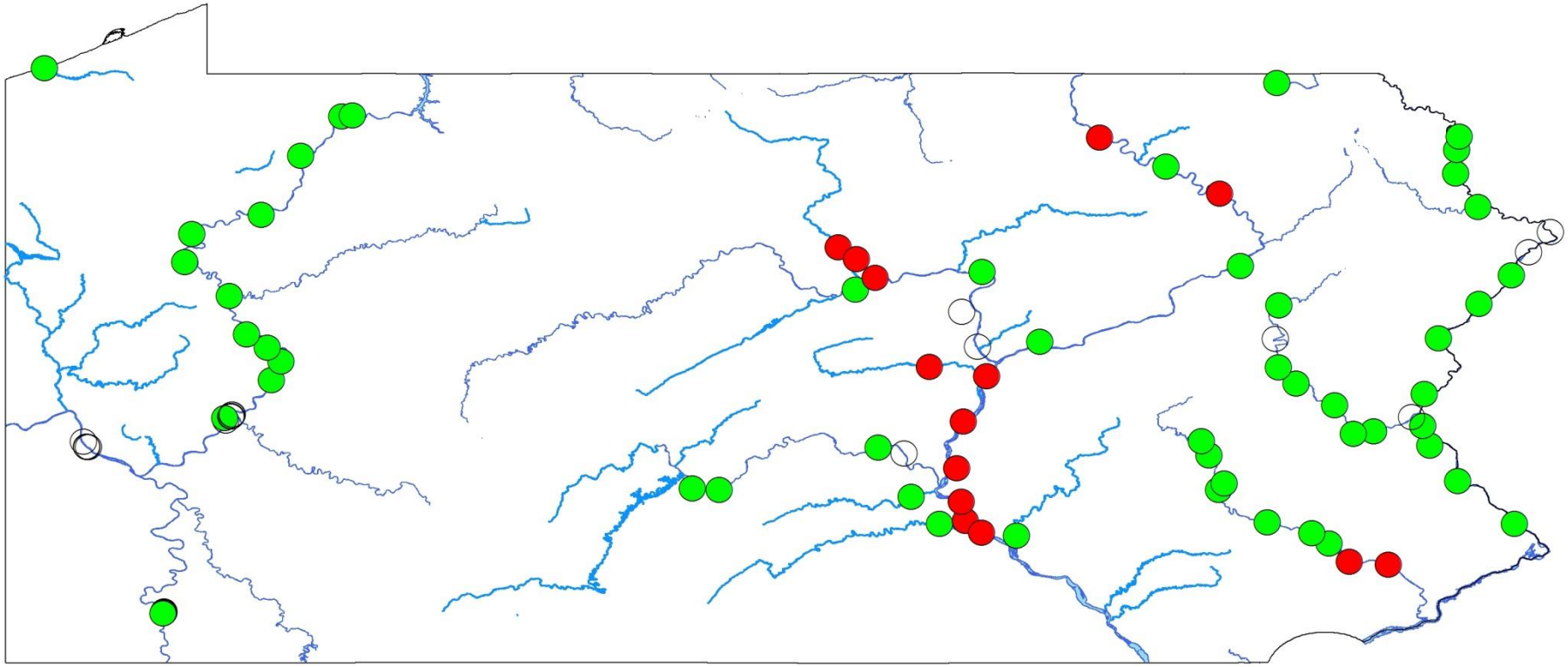


Comparison of mean daily discharge (Q; cfs) during 2014 to mean daily and median daily Q for the period of record for the Susquehanna River at Harrisburg, PA (01570500)



Comparison of mean daily water temperature (°C) of the Susquehanna River at Harrisburg, PA (USGS 01570500) during 2014 to the median of median daily values during the period of record





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YOY Smallmouth Bass 2014 Incidence

- No Fish
- No
- Yes

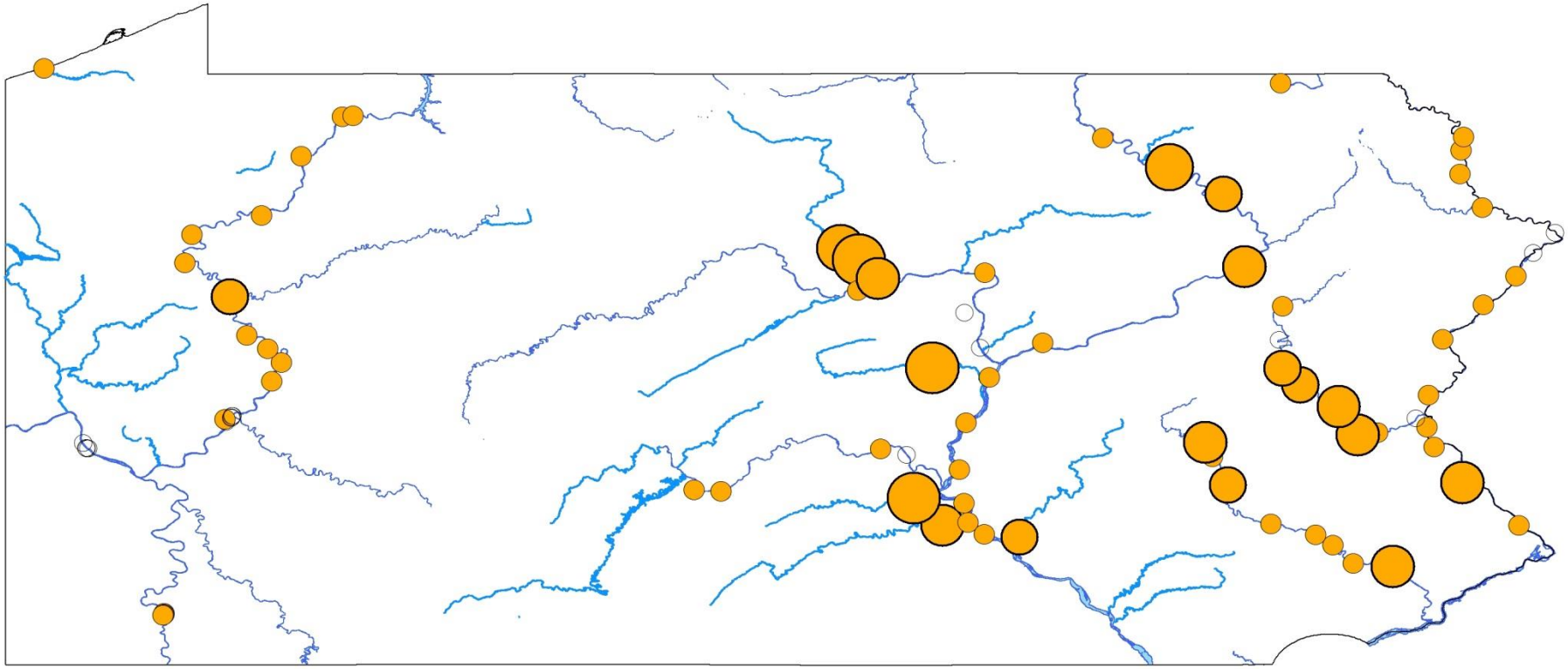
N

W E

S

0 15 30 60 90 120

Miles



Legend

Total Catch (per 300m)

- No Catch
- 1 - 11
- 12 - 24
- 24 - 43
- 44 - 106
- 107 - 183

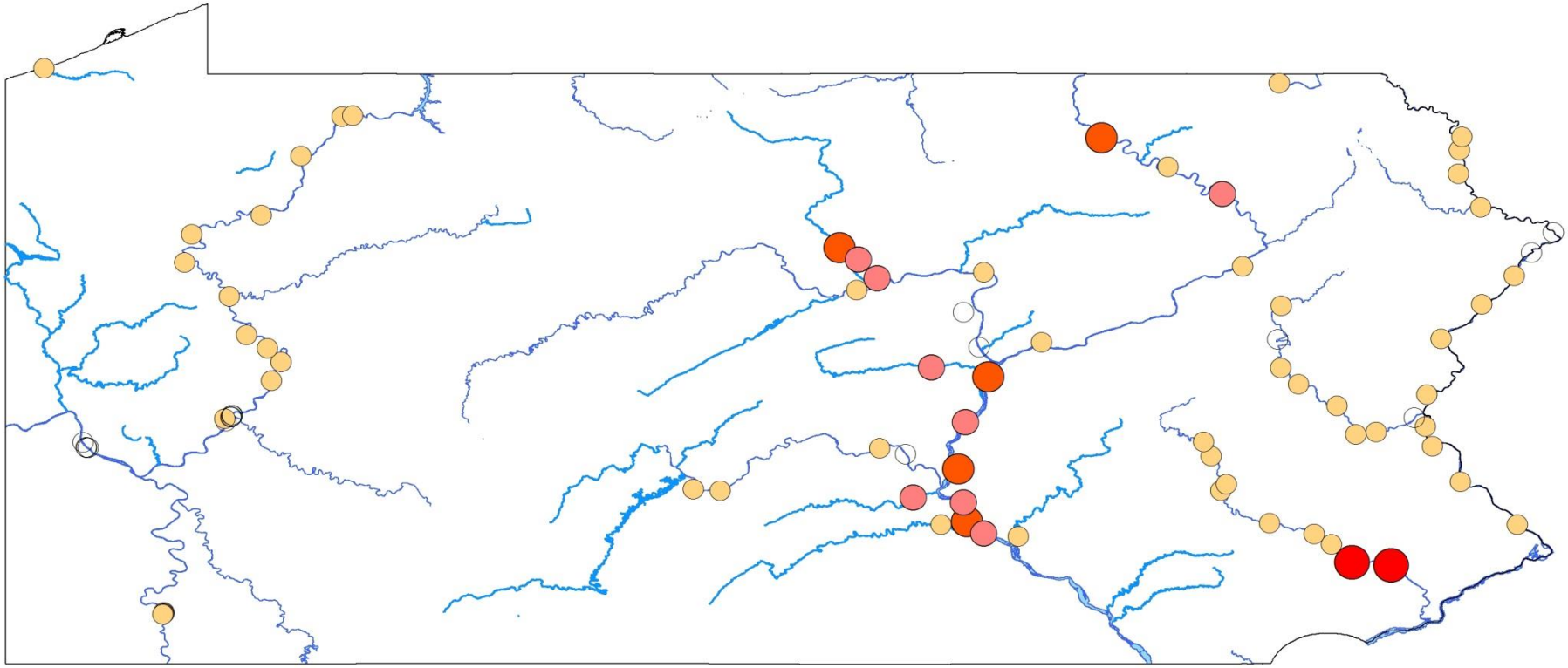
N

W E

S

0 15 30 60 90 120

Miles



Legend

Prevalence

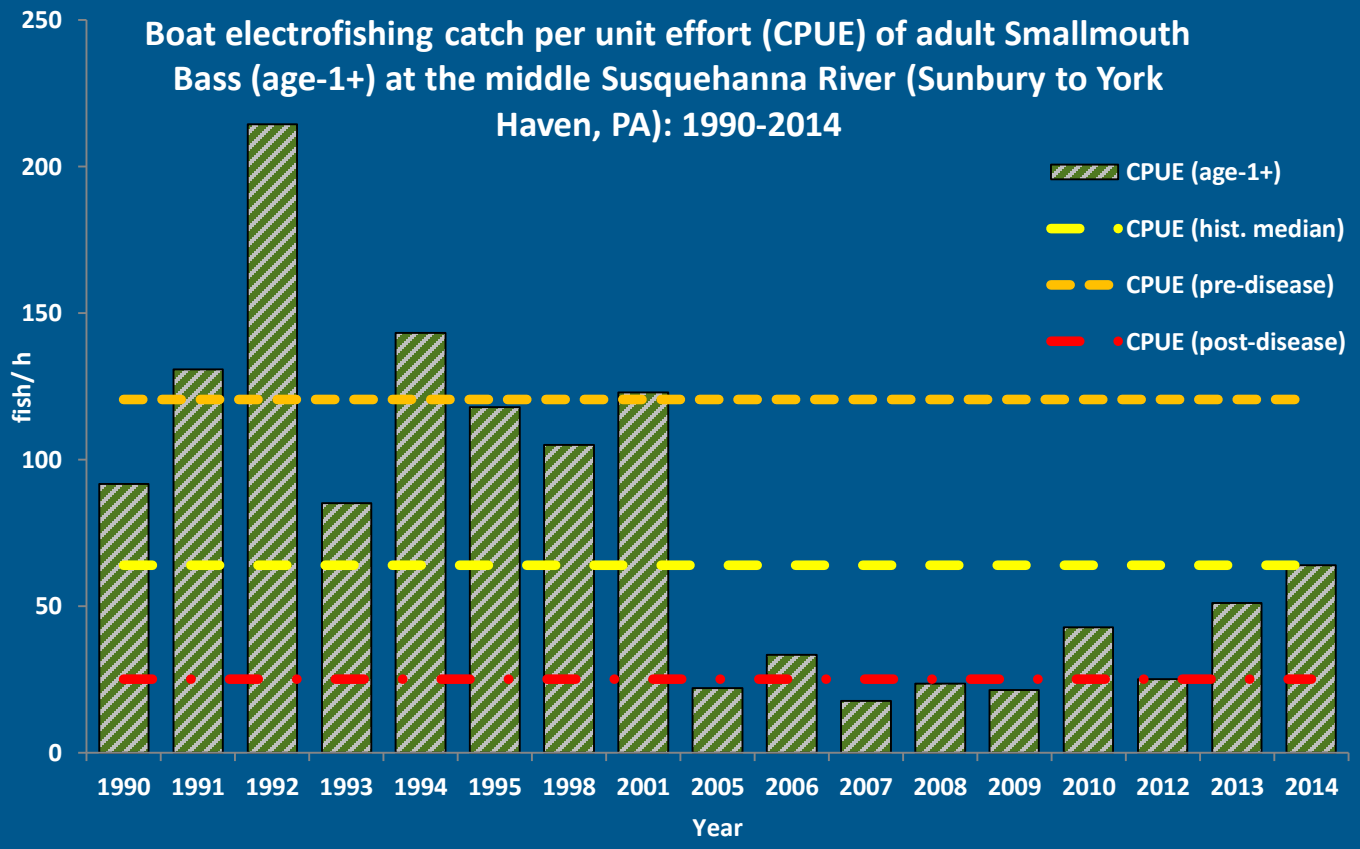
- No Catch
- No Disesae
- 1 - 25%
- 26 - 50%
- 51 - 100%

N
W E
S

0 15 30 60 90 120
Miles

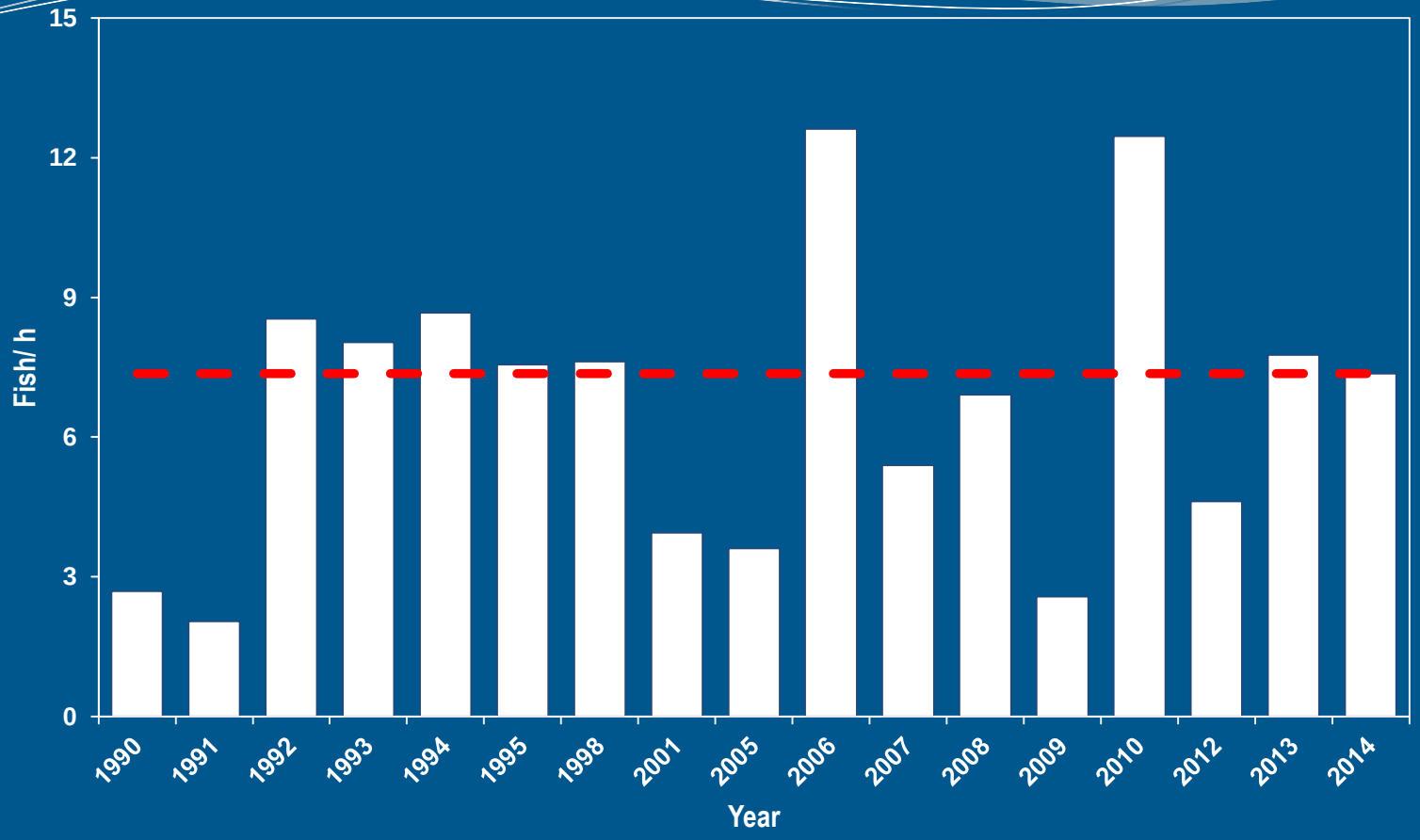
Adult Smallmouth Bass surveys

- Completed 9/26
- Sampling conditions difficult
- Completed 3 of 4 historic sites on the middle Susquehanna River

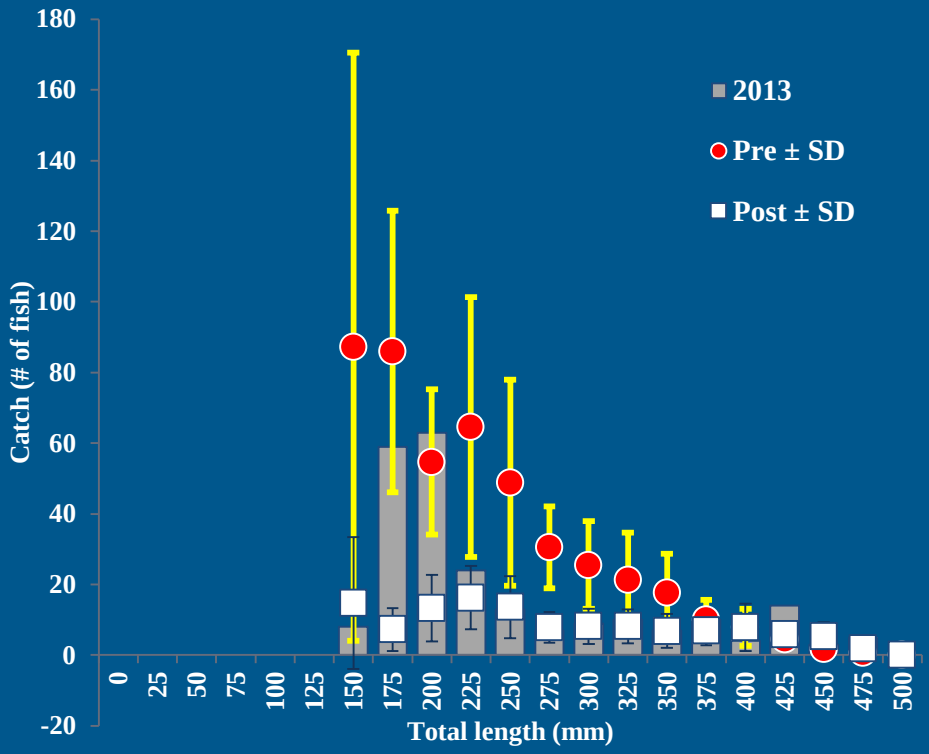


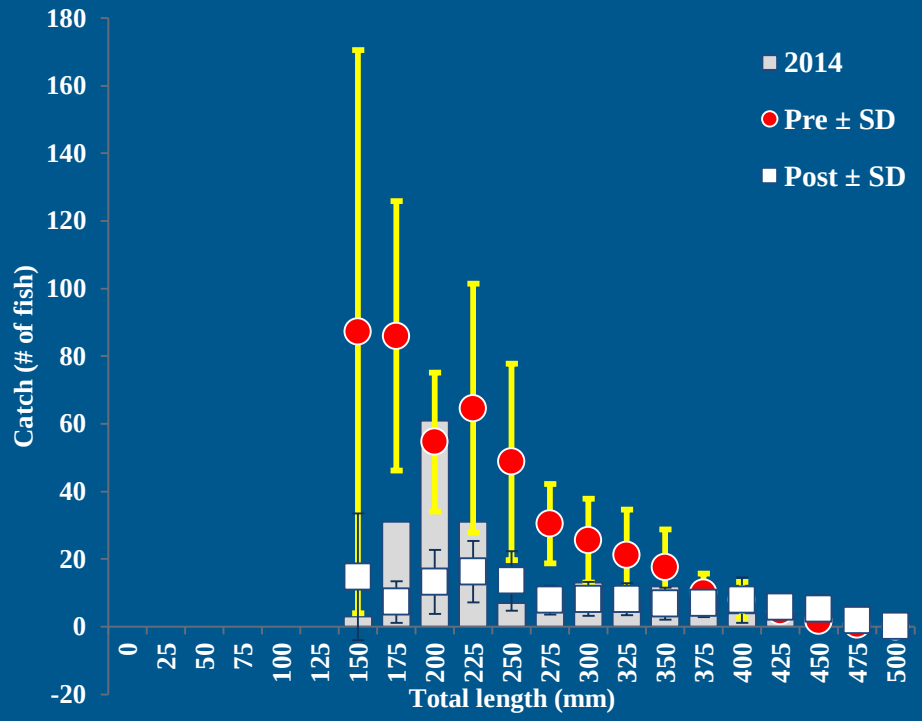
Catch per unit effort (CPUE; fish/ h) of adult Smallmouth Bass (≥ age-1; white bars) compared to the median CPUE of adult Smallmouth Bass during pre- and post-disease periods at the Susquehanna River between Sunbury and York Haven, Pennsylvania during boat electrofishing surveys from 1990 to present.

**Age estimated by length-frequency distribution for 2014 survey and not yet confirmed by scale analysis.*



Catch per unit effort (CPUE; fish/ h) of adult Smallmouth Bass ≥ 375mm TL (white bars) compared to the median CPUE of adult Smallmouth Bass ≥ 375mm TL (black dotted line) at the Susquehanna River between Sunbury and York Haven, Pennsylvania during boat electrofishing surveys from 1990 to present.



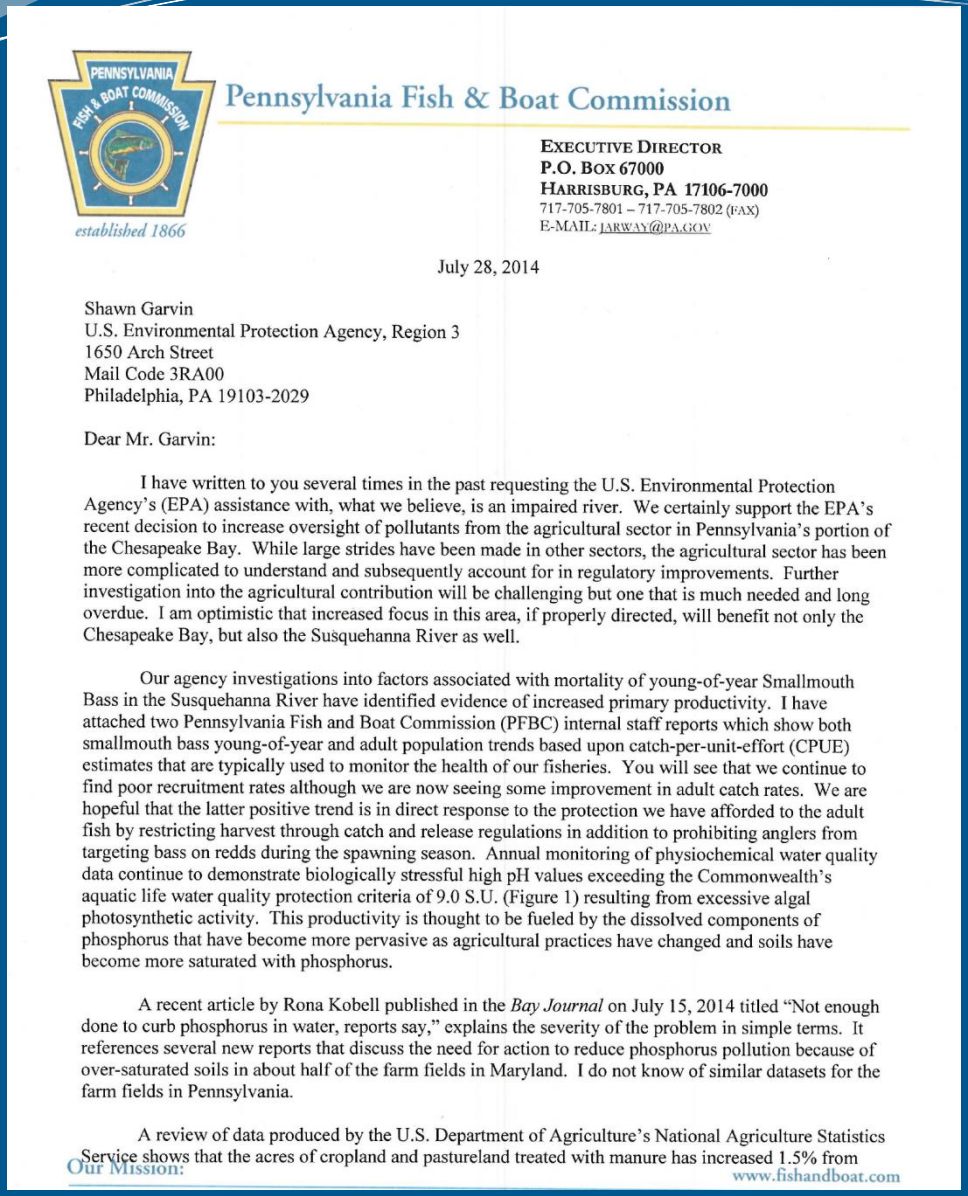


Comparison of length-frequency distribution of electrofishing catch of adult Smallmouth Bass during pre-disease surveys (1990-2001; mean catch ± SD; open circle), post-disease surveys (2005-2012; mean catch ± SD; filled square), and 2013 and 2014 surveys (mean catch ± SD; gray bars) at the Susquehanna River between Sunbury and York Haven, Pennsylvania.

Summary

- **Young-of-year (YOY) Smallmouth Bass**
  - **Low abundance across most large-river reaches in Susquehanna Basin**
  - **Disease outbreaks still occurring (low-moderate during 2014)**

- **Adult Smallmouth Bass**
  - **Slight increases in abundance in recent years**
    - **Largely result of 2012 year class**
    - **Time will tell how this plays out**



Pennsylvania Fish & Boat Commission

established 1866

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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.

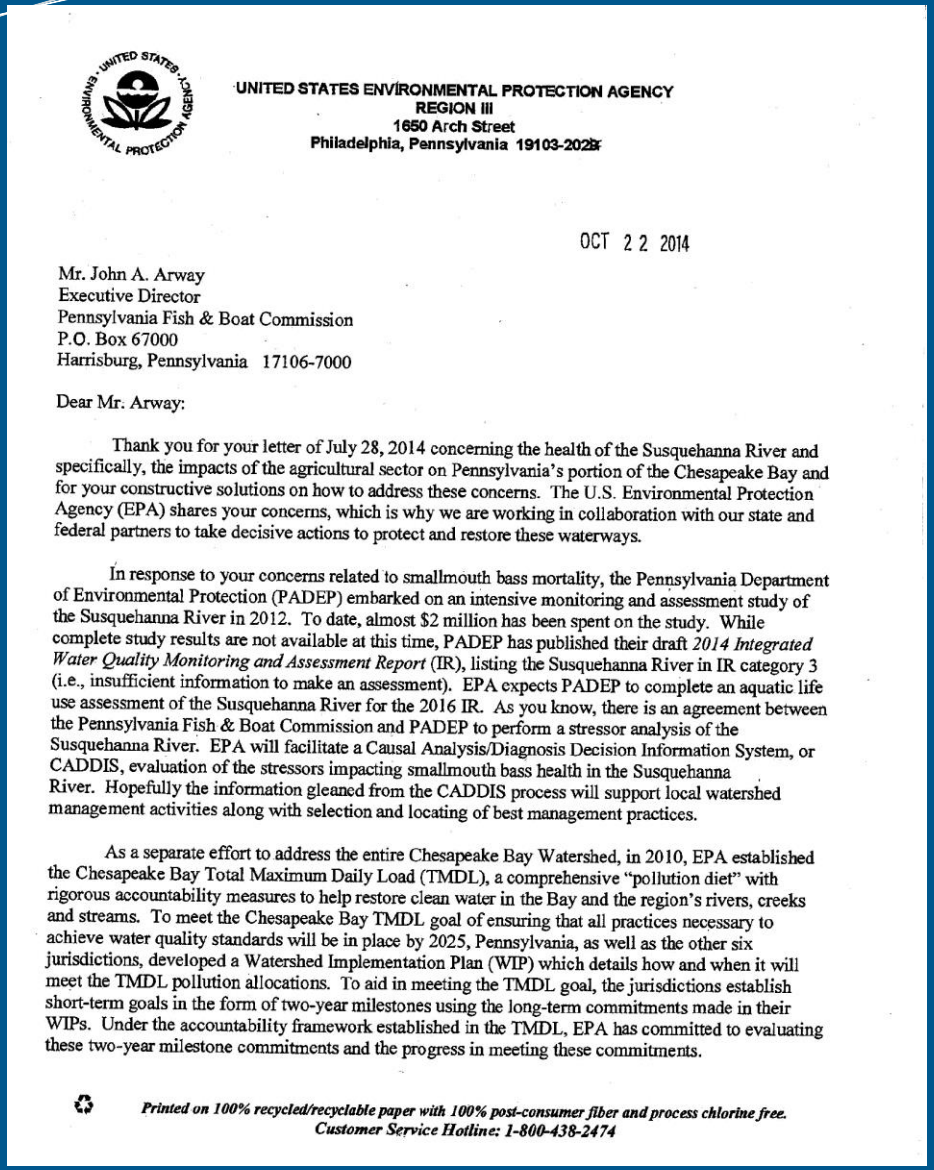
Our agency investigations into factors associated with mortality of young-of-year Smallmouth Bass in the Susquehanna River have identified evidence of increased primary productivity. I have attached two Pennsylvania Fish and Boat Commission (PFBC) internal staff reports which show both smallmouth bass 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

28 July 2014 PFBC Letter to U.S. EPA Region 3

1. Support EPA's decision to increase oversight in PA.
2. WQ criteria exceedances for pH and DO..
3. Increased manure application on less land in PA (USDA).
4. Dissolved phosphorus and algae concerns.
5. SMB trend data.
6. IJC report recommendations for Lake Erie produced in 2 years.
7. Collaboration to get an answer!



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

OCT 22 2014

Mr. John A. Arway
Executive Director
Pennsylvania Fish & Boat Commission
P.O. Box 67000
Harrisburg, Pennsylvania 17106-7000

Dear Mr. Arway:

Thank you for your letter of July 28, 2014 concerning the health of the Susquehanna River and specifically, the impacts of the agricultural sector on Pennsylvania's portion of the Chesapeake Bay and for your constructive solutions on how to address these concerns. The U.S. Environmental Protection Agency (EPA) shares your concerns, which is why we are working in collaboration with our state and federal partners to take decisive actions to protect and restore these waterways.

In response to your concerns related to smallmouth bass mortality, the Pennsylvania Department of Environmental Protection (PADEP) embarked on an intensive monitoring and assessment study of the Susquehanna River in 2012. To date, almost $2 million has been spent on the study. While complete study results are not available at this time, PADEP has published their draft *2014 Integrated Water Quality Monitoring and Assessment Report* (IR), listing the Susquehanna River in IR category 3 (i.e., insufficient information to make an assessment). EPA expects PADEP to complete an aquatic life use assessment of the Susquehanna River for the 2016 IR. As you know, there is an agreement between the Pennsylvania Fish & Boat Commission and PADEP to perform a stressor analysis of the Susquehanna River. EPA will facilitate a Causal Analysis/Diagnosis Decision Information System, or CADDIS, evaluation of the stressors impacting smallmouth bass health in the Susquehanna River. Hopefully the information gleaned from the CADDIS process will support local watershed management activities along with selection and locating of best management practices.

As a separate effort to address the entire Chesapeake Bay Watershed, in 2010, EPA established the Chesapeake Bay Total Maximum Daily Load (TMDL), a comprehensive "pollution diet" with rigorous accountability measures to help restore clean water in the Bay and the region's rivers, creeks and streams. To meet the Chesapeake Bay TMDL goal of ensuring that all practices necessary to achieve water quality standards will be in place by 2025, Pennsylvania, as well as the other six jurisdictions, developed a Watershed Implementation Plan (WIP) which details how and when it will meet the TMDL pollution allocations. To aid in meeting the TMDL goal, the jurisdictions establish short-term goals in the form of two-year milestones using the long-term commitments made in their WIPs. Under the accountability framework established in the TMDL, EPA has committed to evaluating these two-year milestone commitments and the progress in meeting these commitments.

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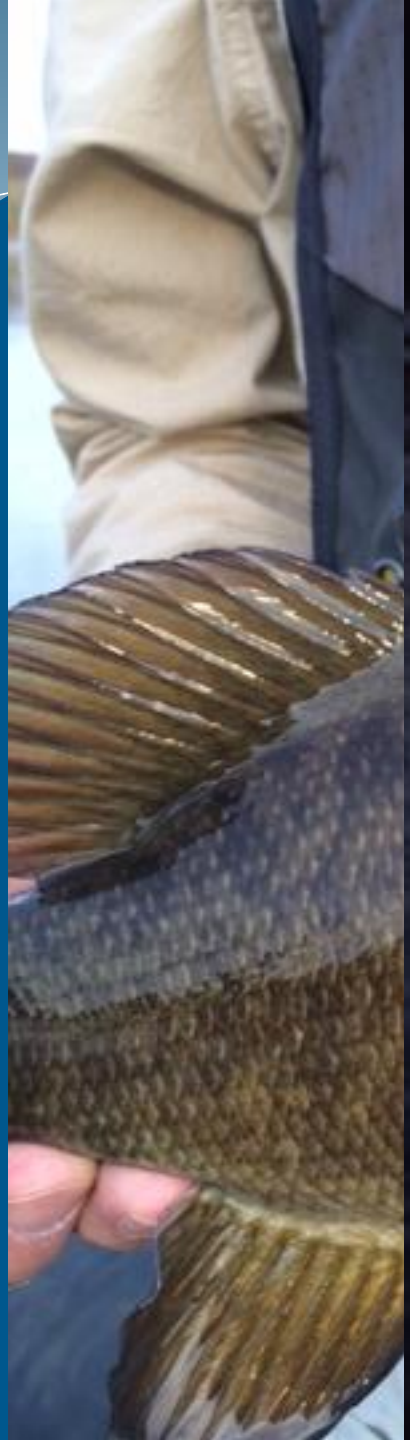
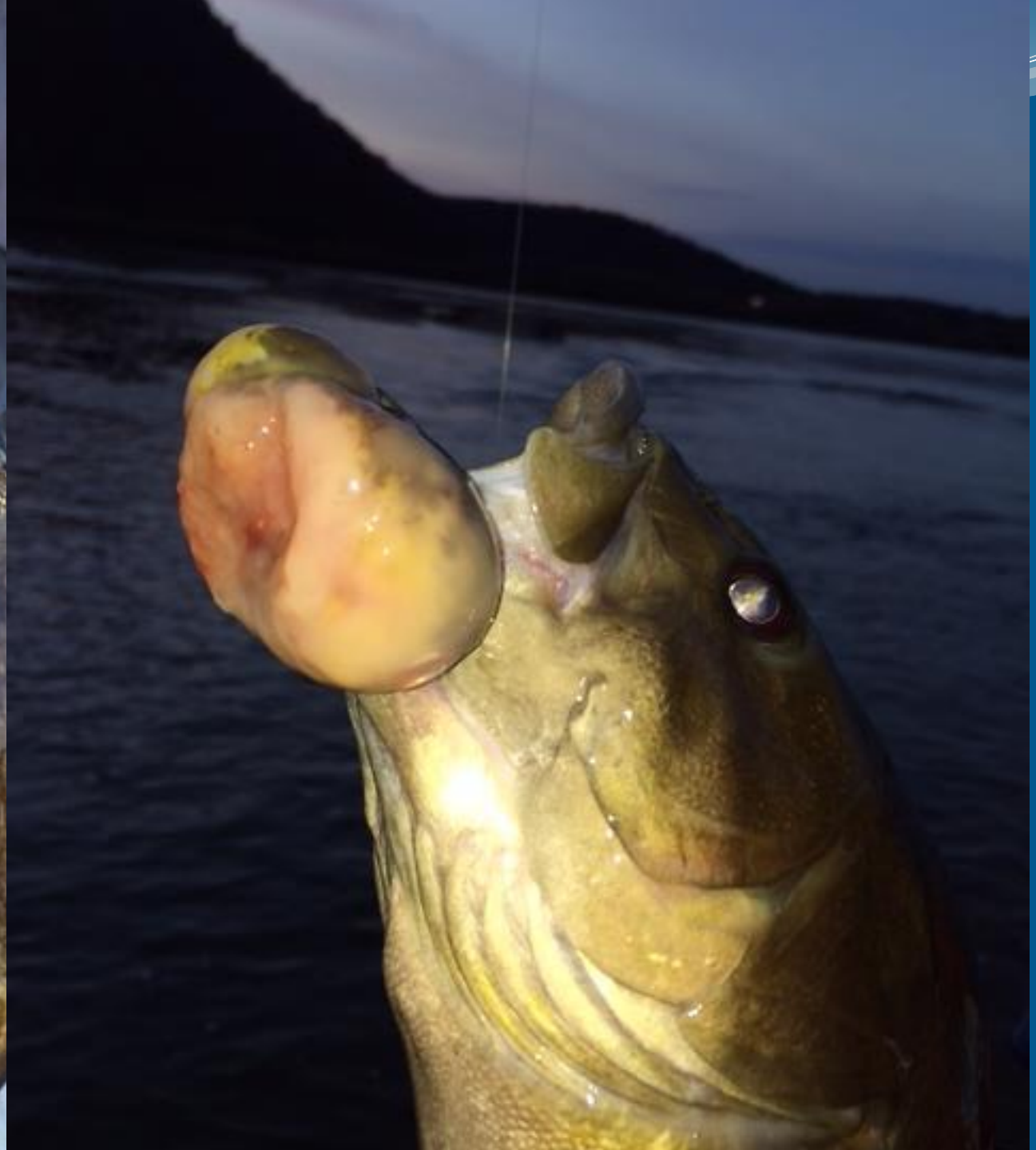
22 October U.S. EPA Region 3 Response

1. **EPA shares concerns.**
2. **$2M spent by DEP collecting data.**
3. **2014 Integrated Report lists river as IR Cat 3– insufficient data to make an assessment.**
    1. **EPA expects DEP to make an assessment for the 2016 IR!**
    2. **Causal Analysis/Diagnosis Decision Information System (CADDIS)**
4. **CB TMDL limits by 2025.**
    1. **2 year milestones**
    2. **Increased PA oversight and increase high priority BMPs.**
5. **$1M investment in green infrastructure projects.**


CHAMPIONS





Questions?