PCBS IN THE DELAWARE RIVER AND DELAWARE'S EFFORTS TO ACCELERATE PCB REDUCTIONS

EPA Cross Program Contaminant Symposium

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Delaware Department of Natural Resources and Environmental Control

Division of Watershed Stewardship

January 25, 2023

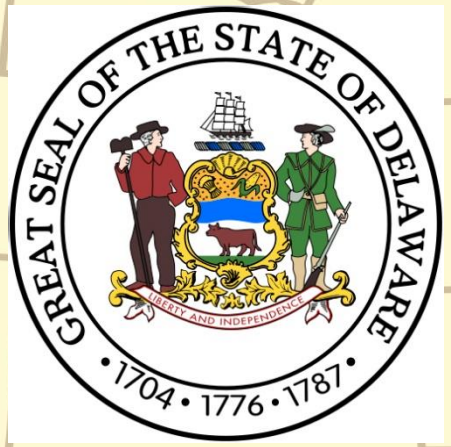
PRESENTATION OUTLINE

The Delaware River and Basin

DRBC and PCB TMDLs

Delaware's Approach & Example

DELAWHERE?


GREAT SEAL OF THE STATE OF DELAWARE
LIBERTY AND INDEPENDENCE
•1704 • 1776 • 1787•

DELAWARE RIVER AND BASIN

- Longest undammed river East of the Mississippi River
- Contains both tidal and non-tidal environments
- 330 miles long, entirely interstate
- Headwaters begin in Hancock, NY
- Mouth is located at Cape May, NJ and Lewes, DE where it drains to the Atlantic Ocean
- More than 2,000 tributaries, 216 classified as "major tributaries"
- Non-tidal portion stretches 200 miles from NY to Trenton, NJ
- Tidal potion extends 133 miles from Trenton, NJ to Delaware Bay (aka Delaware Estuary)

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https://www.state.nj.us/drbc/basin/

DELAWARE RIVER AND BASIN

- Basin includes 10 main sub-watersheds
- 5 physiographic regions
- 4 states
- 42 Counties
- 868 municipalities
- 13.3 million people rely of its water for drinking, agriculture and industrial use
- 6.4 billion gallons of water withdrawn daily
- Supports Philadelphia and New York City, two of the nation's largest cities
- 850 million gallons/day is consumed and not returned
- Supports a $20 billion water-based economy annually
- Supports 600,000 jobs

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BRIEF POLLUTION HISTORY

- By the mid-1900s, the urbanized part of the river around Philadelphia was being used as an open water sewer.
- The resulting lack of dissolved oxygen caused tremendous aquatic life impacts – fish couldn't survive
- By 1964, about 1M pounds of non-disinfected waste per day was being discharged by sewage treatment plants and industries
- Discharges also included slaughterhouse waste, oil from refineries, and toxic waste from chemical companies
- Sturgeon and shad, among other aquatic species all but disappeared

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https://whyy.org/articles/the-death-of-the-delaware-river/

DELAWARE RIVER BASIN COMMISSION

- In 1961, President Kennedy and the Governors of DE, NJ, PENN and NY signed legislation that created the Delaware River Basin Commission (DRBC).
- Charge is to "oversee a unified approach to managing a river system without regard to political boundaries"

- In 1972 Congress passed the Clean Water Act.
- Over the course of decades, efforts have resulted in noticeable improvement.
- Today, efforts continue to restore this great natural resource.

https://www.state.nj.us/drbc/

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DRBC FUNCTIONAL RESPONSIBILITIES

- Water Supply
- Drought Management
- Flood Loss Reduction
- **Water Quality**
- Watershed Planning
- Regulatory Review (permitting)
- Outreach/Education
- Recreation

https://www.state.nj.us/drbc/basin/

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TAKE A TOUR OF THE DELAWARE RIVER BASIN

https://www.state.nj.us/drbc/library/documents/DelawareRiverTour_DoaneAcademy_jan2019.pdf

FOR MORE INFORMATION

https://www.state.nj.us/drbc/basin/

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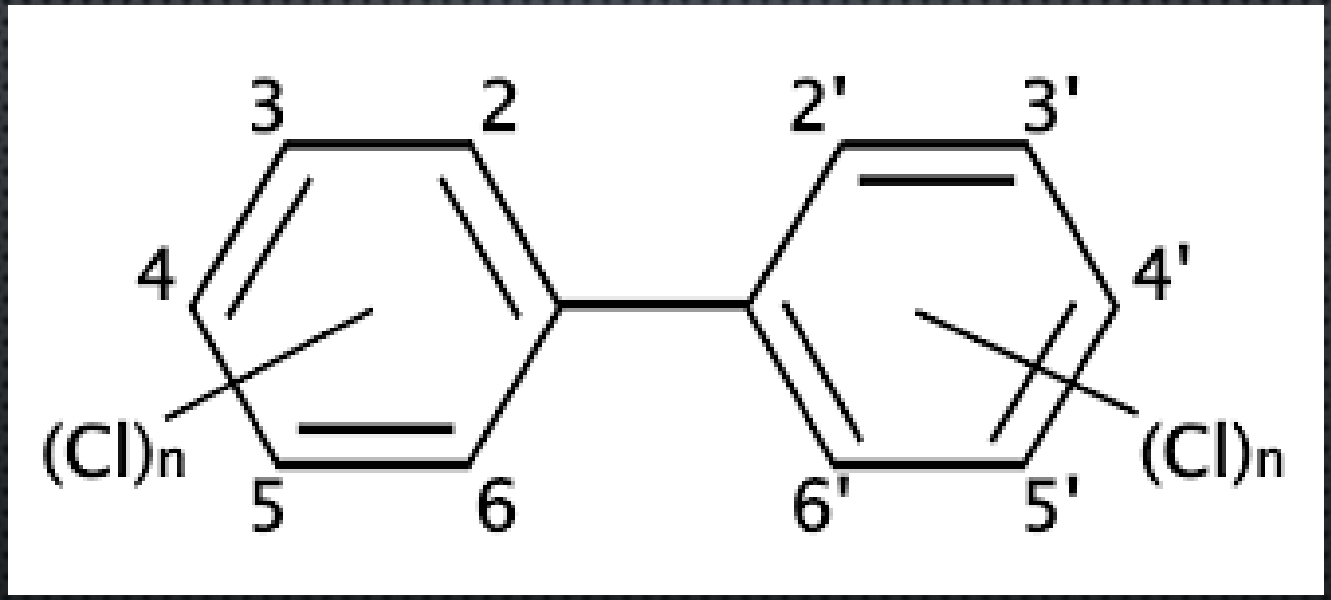
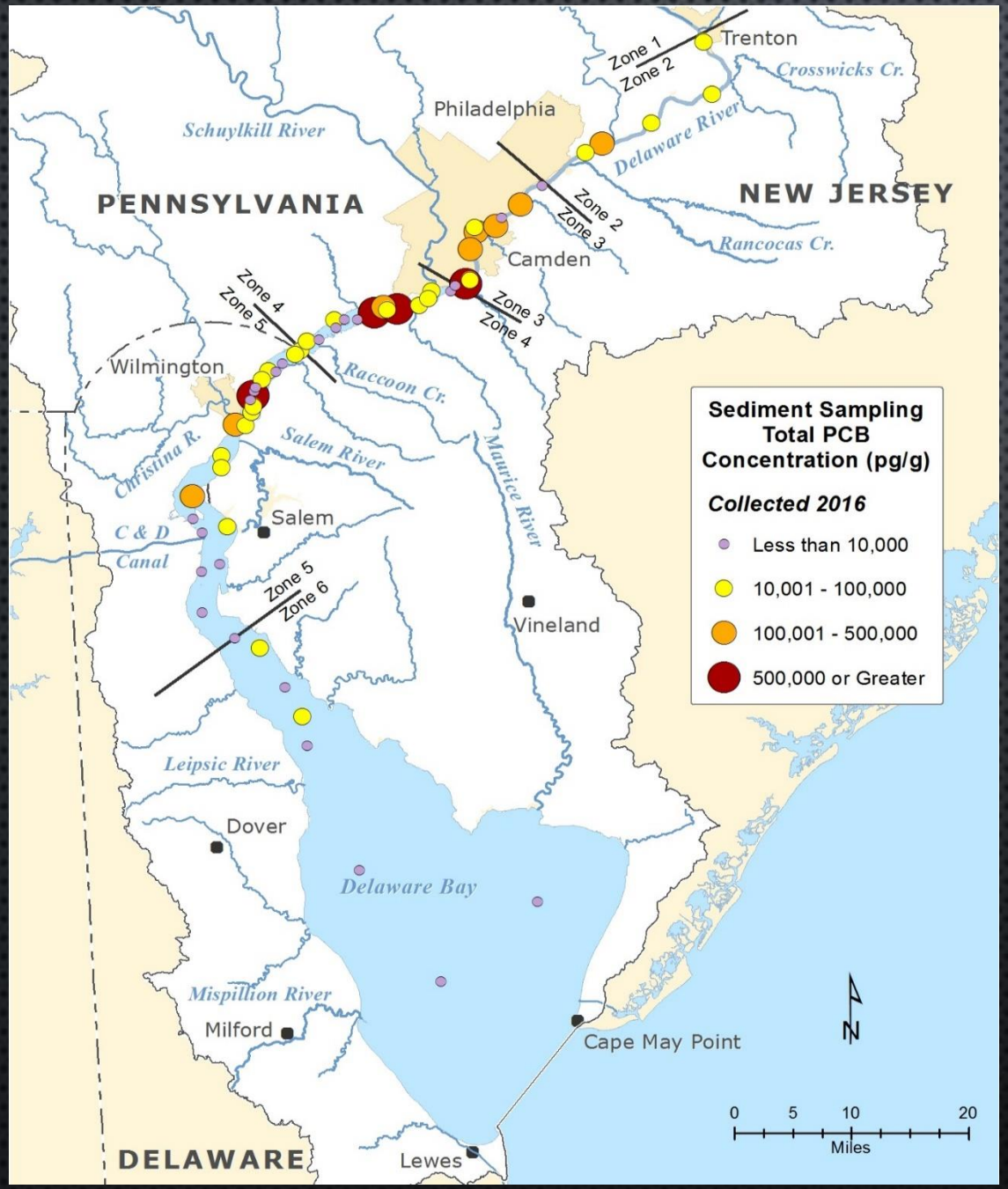
LET'S TALK ABOUT THE PCBS



PCB WATER QUALITY CRITERIA – DE RIVER ESTUARY

Aquatic Life	Acute (µg/L)	Chronic (µg/L)
Freshwater (0-5 ppt)	1.0	0.014
Marine (>5 ppt)	5.0	0.03

Human Health (at 10^{-6})	Water + Fish Consumption (µg/L)	Fish Consumption Only (µg/L)
Freshwater	0.000016	0.000016
Marine	NA	0.000016
Human Health - Systemic	**Water + Fish Consumption (µg/L)**	**Fish Consumption Only (µg/L)**
Freshwater	0.00839	0.00849
Marine	NA	0.00149



MONITORING SEDIMENT QUALITY (DRBC)

- Sediment can be a significant source of PCBs
- Understanding the distribution, concentrations and chemical signature provides information regarding potential sources
- DRBC sediment sampling for PCBs last occurred in 2016 (n=60)

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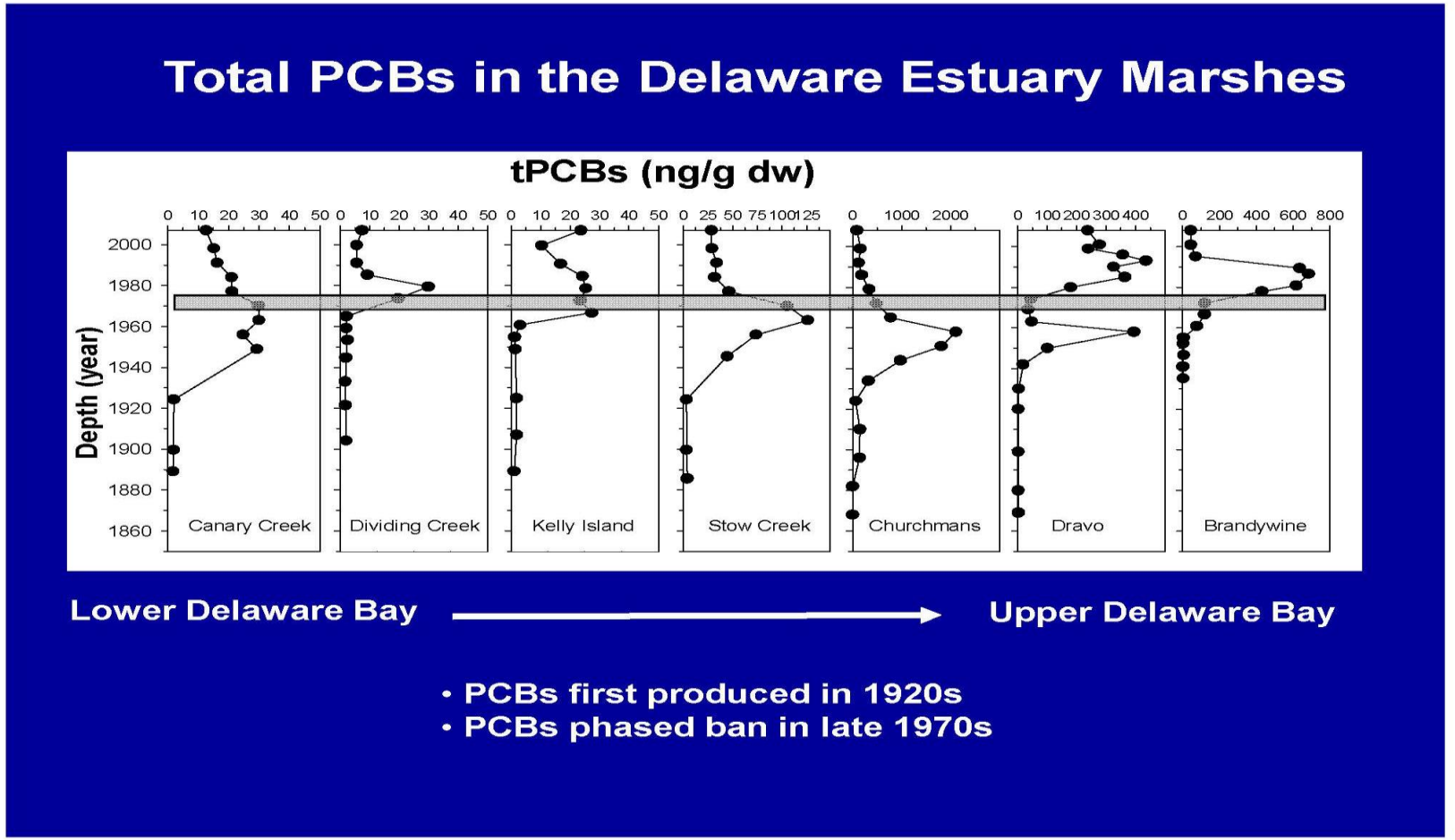
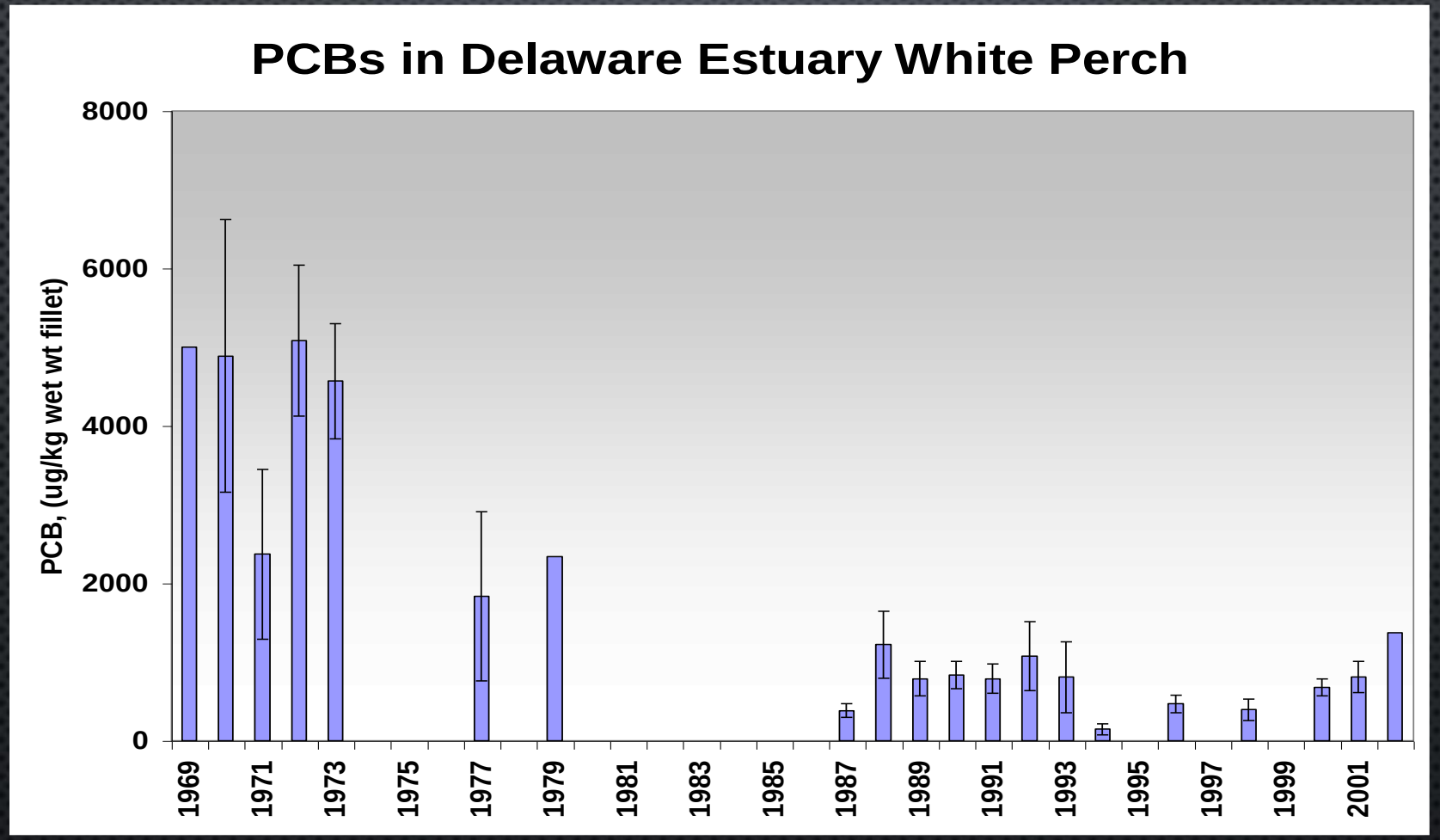
PCBS IN FRINGE MARSHES ADJACENT TO DE ESTUARY



Sampling conducted in 2007 & 2008 by Univ. of DE and Academy of Natural Sciences

MONITORING FISH QUALITY

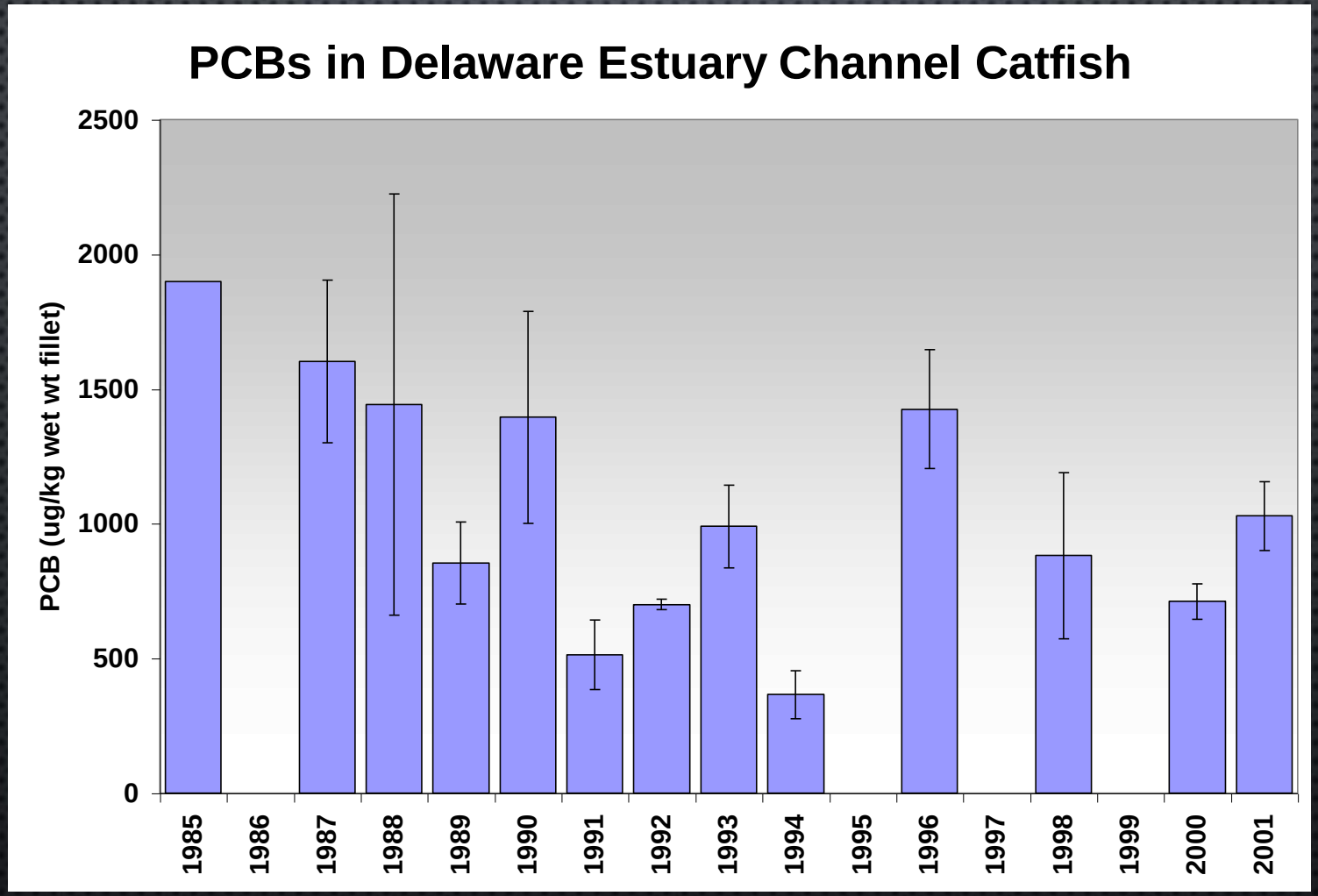


Longest Record Available

Mean & S.E. averaged over Zones 2-6

PCB Levels Dropping Overall

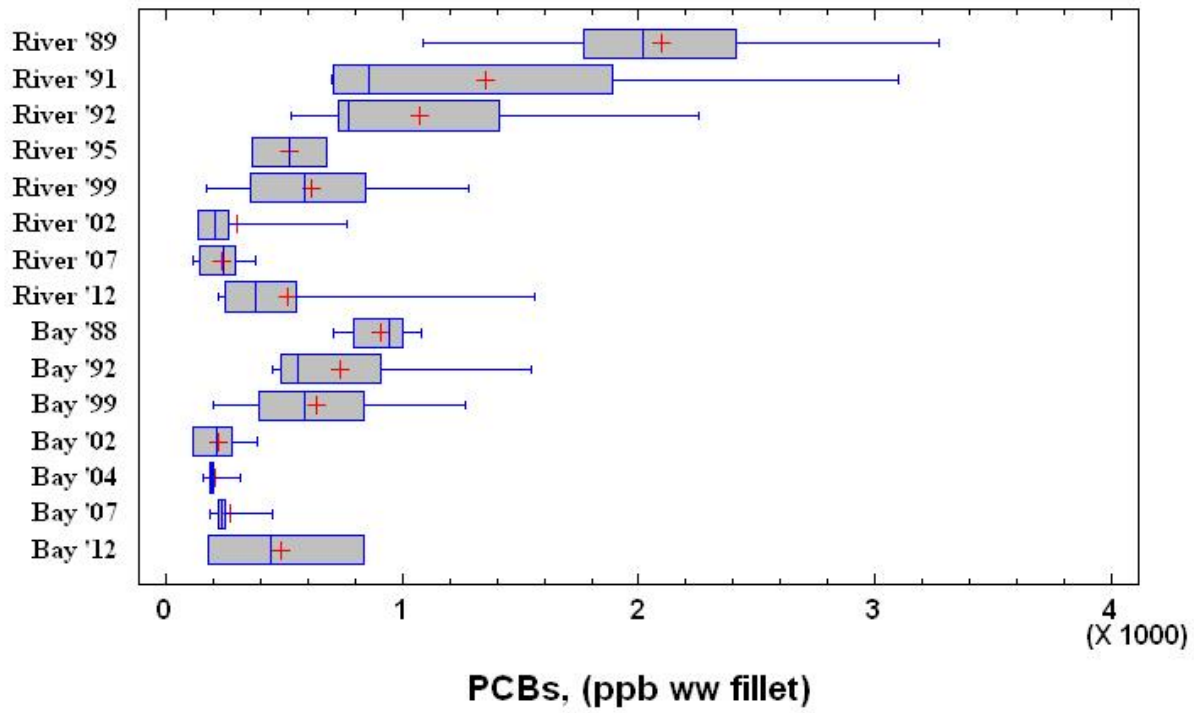
MONITORING FISH QUALITY



Mean and S.E. averaged over Zones 2-6

PCB Levels dropping overall

MONITORING FISH QUALITY



River = Cherry Island Flats – upper estuary spawning grounds in Zone 5

Bay = Lower Estuary in Zone 6

PCB Levels Dropping Overall

PCB TOTAL MAXIMUM DAILY LOAD

Delaware Estuary portion of the Basin (133 river miles) consists of 5 water quality management units called "Zones"

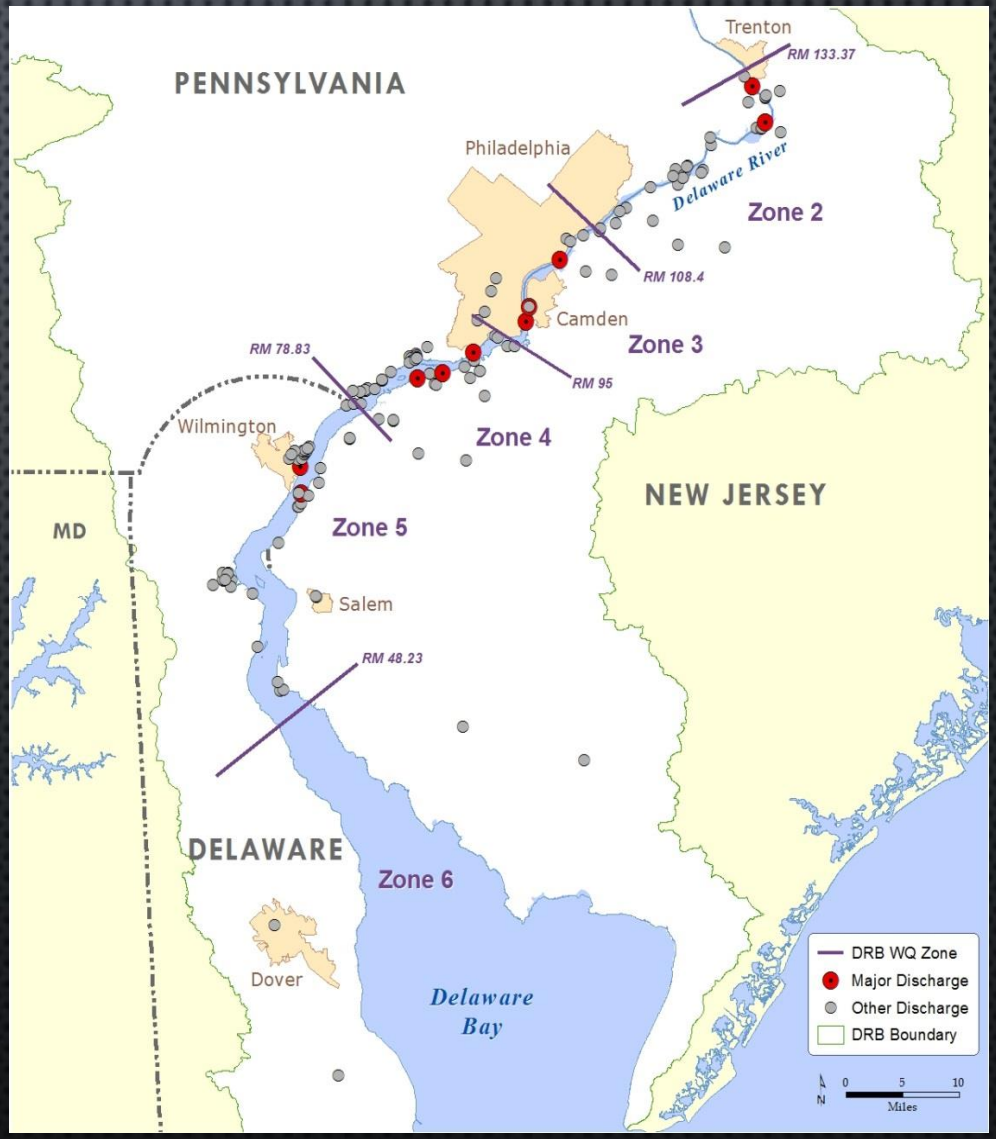
- Zone 3 to upper Zone 5 is urban/industrial
- Zone 6 agriculture/rural/marsh

Delaware Estuary was listed as impaired on 303(d) list for PCBs in fish in mid-late 1990s

Stage 1 PCB TMDLs established for Zones 2-5 in 2003, and for Zone 6 in 2006

PCB Water Quality Criterion of 16 pg/L adopted by DRBC in 2013

State 2 PCB TMDL is currently in development



https://www.state.nj.us/drbc/basin/

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STAGE 1 PCB TMDL REQUIREMENTS

- Monitoring using EPA Method 1668 A
- Development of Pollutant Minimization Plans (PMPs)
- Implementation of minimization measures identified by PMPs

- Monitoring and PMPs required through NPDES permits or directly through DRBC regulations (>90% of dischargers participating)
- DRBC Coordinates TMDL activities between EPA Regions 2 and 3 and the basin States
- DRBC developed and maintains a PCB Database

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POLLUTANT MINIMIZATION PLANS (PMPS)

Goal: Reduction of PCB loadings to the Estuary

Key PMP Elements

- Source identification and reduction
- Monitoring and progress report
- Remediation/reduction activities

PMP Approaches:

- Perform trackdown studies to identify sources
- Remove PCB transformers and capacitors
- Contaminated sediment control and/or removal
- Control solids
- Investigate inadvertent PCB production

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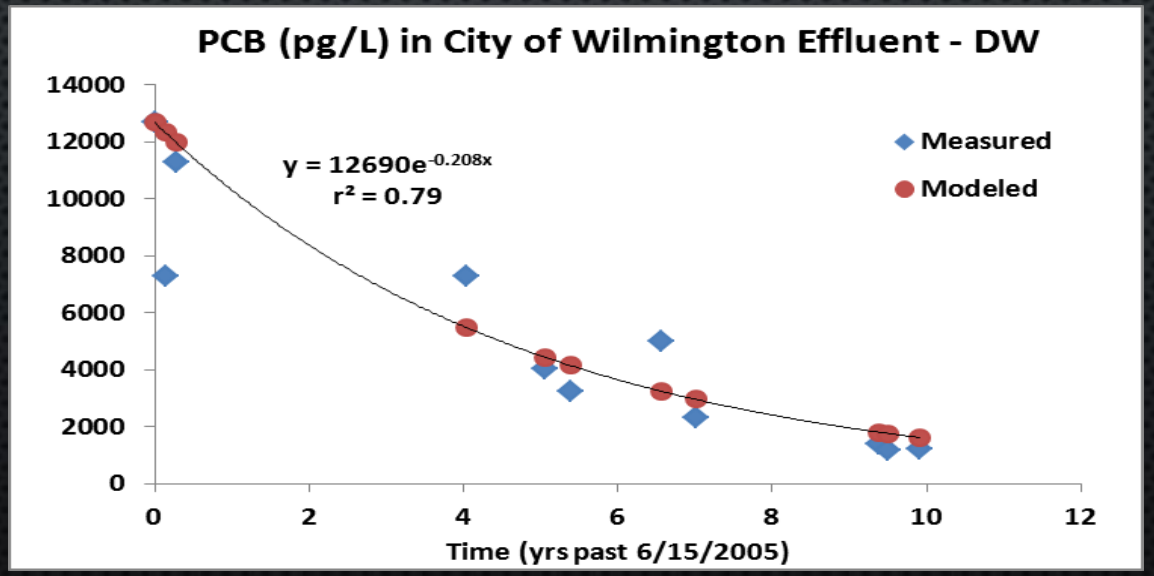
OVERALL PCB POINT SOURCE LOADING REDUCTIONS

- PCB reductions observed in municipal and industrial discharges across the entire Estuary
- The 10 largest point sources reduced loadings by 76% between 2005 and 2016.
- All point sources reduced loadings by 64% between 2005 and 2013



PHASE I PCB TMDL CONCLUSIONS

The implementation of the PCB TMDLs in the Delaware Estuary and Bay has achieved remarkable success. The realization is that more needs to be done.

Essential elements include:

- Consistent monitoring (Method 1668A) and reporting methodologies, and a centralized database management system to track reductions
- Continued implementation of PMPs which provide a framework for evaluating PCB loadings and subsequent reductions
  - Identifying and removing sources
  - Trackdown of legacy contamination and performance of remedial measures
- Review of annual reports and feedback to dischargers, fostering an environment of collaboration

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FISH CONSUMPTION ADVISORY CHANGES

NEWS for immediate release

For more information: DNREC Public Affairs Office 302-739-9902

Contact: Melanie Rapp, DNREC Public Affairs, 302-739-9902
DHSS: Rita Landgraf, Secretary; Jill Fredel, Director of Communications, 302-255-9047

Delaware issues updated fish consumption advisory

Updated advisory for the tidal Delaware River reflects long-term environmental improvements

DOVER (Oct. 23, 2013) – The Department of Natural Resources and Environmental Control and the Department of Health and Social Services' Division of Public Health today updated the fish consumption advisory for fish caught in the tidal Delaware River. The updated advisory is a result of analysis of chemical contaminants in fish caught in the tidal Delaware River and elsewhere throughout the state. The change reflects long-term environmental improvements in the tidal Delaware River.

The fish consumption advisory for the tidal Delaware River from the Delaware/Pennsylvania/New Jersey border to the C&D Canal has been updated to a less restrictive advisory due to falling levels of polychlorinated biphenyls (PCBs), dioxins and furans, chlorinated pesticides, and mercury. For the general adult population, the current advice has been changed from "eat no finfish caught in the tidal Delaware River north of the C&D Canal" to "eat no more than one eight ounce meal of finfish per year," while retaining the "do not eat" advice for women of childbearing age and young children. This advisory is being issued today in collaboration with the New Jersey Toxics in Biota Committee and the Delaware River Basin Commission.

In 2018, for the general adult population, the advice was changed again, from "eat nor more than one eight-ounce meal of finfish per year caught in the Delaware River north of the C&D Canal" to "eat no more than three eight-ounce meals of finfish per year."

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DRAFT STAGE 2 PCB TMDL*

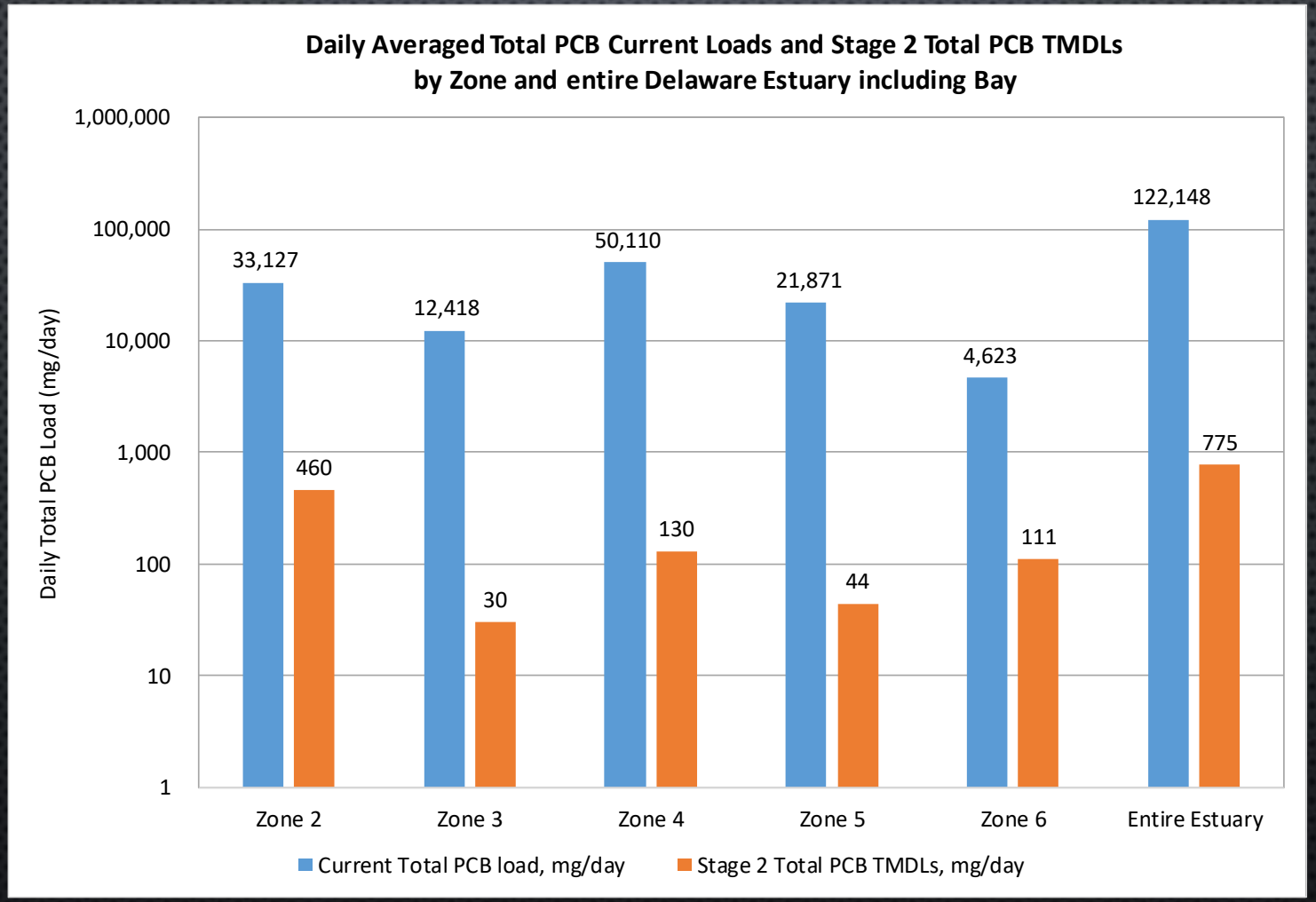
EPA, DRBC, and the basin States have been working on the Stage 2 PCB TMDL for the Delaware River Estuary and Bay since 2017.

Primary Differences, if approved:

- Revised water quality standard set at 16 pg/L
- Updated current source loads
- Allocation Procedure: Equal Percent Reduction (EPR) to Equal Effluent Concentration (EEC)
  - All source categories assigned an allocation based upon a uniform effluent concentration. Allocation = Flow * 15.2 pg/L (criterion - MOS)
  - Allocations for updated source inventory including 83 contaminated sites
  - Updated Pollution Minimization Plan (PMP) approach to reach WLAs

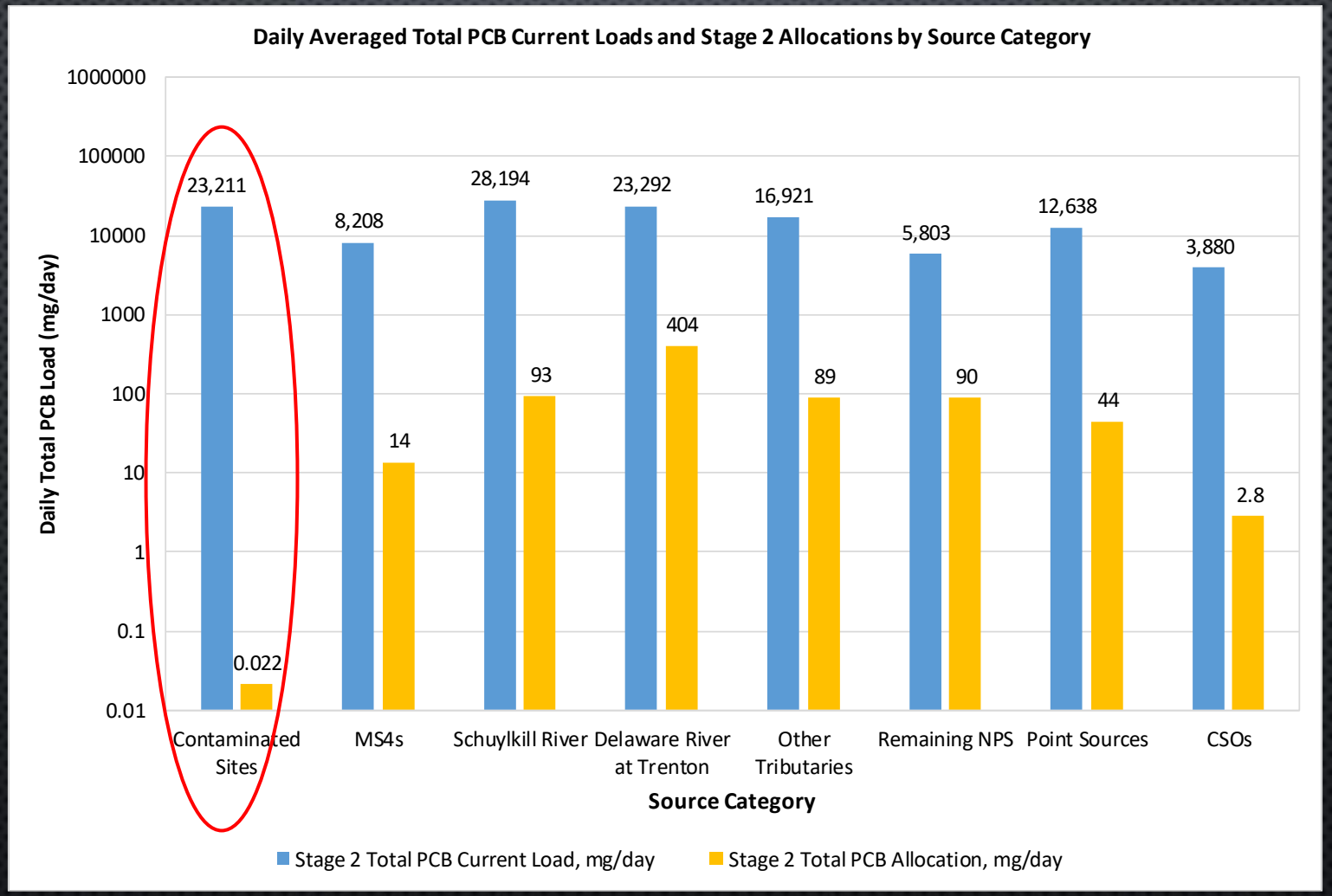
*Stage 2 PCB TMDL is under development, and is considered DRAFT

CURRENT PCB LOAD VS DRAFT STAGE 2 PCB TMDL*



*Stage 2 PCB TMDL is under development, and is considered DRAFT

CURRENT PCB LOAD VS STAGE 2 TMDL ALLOCATION*



*Stage 2 PCB TMDL is under EPA review/edit, and is considered DRAFT

WHAT IS DELAWARE DOING TO HELP?

DNREC'S APPROACH TO THE PCB PROBLEM

- Holistic - A matter of scale and too much to do alone

- Collaborative – Delaware committed to being part of the solution along with other Delaware River Basin states.
  - Delaware River Basin Commission (DRBC) is the integrator
  - EPA, with support from DRBC and basin states, issued Delaware River PCB Total Maximum Daily Load (TMDL) which applies to Delaware River and tidal tributaries.

- Through **WATAR** – DNREC program that combines goals of multiple Sections:
  - DNREC-Remediation Section– CERCLA/RCRA style cleanup programs
  - DNREC Watershed Assessment & Management Section – CWA compliance programs
  - DNREC-Surface Water Discharges Section– CWA permitting programs

De.gov/WATAR

WHAT IS WATAR?

WATERSHED APPROACH TO TOXICS ASSESSMENT AND RESTORATION

- **"Whole Basin Management" framework** – "*…programs from throughout DNREC work in an integrated manner to assess different geographic areas of the State defined on the basis of drainage patterns*"
- **Focus on Persistent, Bioaccumulative, and Toxic (PBT) compounds** – *Risk drivers for fish consumption advisories*
- **Linking Sources and Sinks** – *advanced sampling and analysis utilizing multiple lines of evidence*
- **Major Goal –** fishable, swimmable and potable in the shortest timeframe possible

OBJECTIVES OF WATAR

- Compile toxics data for the surface waters, sediments, and biota
- Create a "clearing house" of data for regulatory and remedial decision making and prioritization (EQuIS)
- Sample levels of toxic substances in priority waters
- Establish TMDLs/TMDL Alternatives for toxics as needed
- Identify high priority remediation projects that have potential for significant watershed scale improvement
- Facilitate technology transfer to incorporate WATAR into management decisions

FISHABLE, SWIMMABLE & POTABLE IN THE SHORTEST TIMEFRAME POSSIBLE

HIGH RESOLUTION MULTI-MEDIA SAMPLING

SURFACE WATER

- PCBs by EPA Method 1668
- Dioxins and Furans by EPA Method 1613
- Organochlorine Pesticides by EPA Method 1699
- PAHs + Alkylated Homologs by EPA Method 8270/1625

General WATER parameters and sorbents

- BC of Suspended Sediments
- PC, POC, DOC
- Chl-a
- TSS
- DO, T, Cond, pH

SEDIMENT

- PCBs by EPA Method 680/1668
- Dioxins and Furans by EPA Method 1613
- Organochlorine Pesticides by EPA Method 8081
- PAHs + Alkylated Homologs by EPA Method 8270 SIM
- Mercury by EPA Method 7471
- Metals by EPA Method 6020 (Christina Basin)

General SEDIMENT parameters and sorbents

- TOC/BC
- Bulk Density
- Specific Gravity of Solids
- % Moisture
- Grain Size

FISH TISSUE

- PCBs by EPA Method 1668
- Dioxins and Furans by EPA Method 1613
- Organochlorine Pesticides by EPA Method 1699
- PAHs + Alkylated Homologs by EPA Method 8270/1625
- Total Mercury by EPA Method 1631
- Methyl Mercury by EPA Method 1630
- PFAS by EPA Method 537(M)
- % lipid

Other for Water, Sediment and Fish

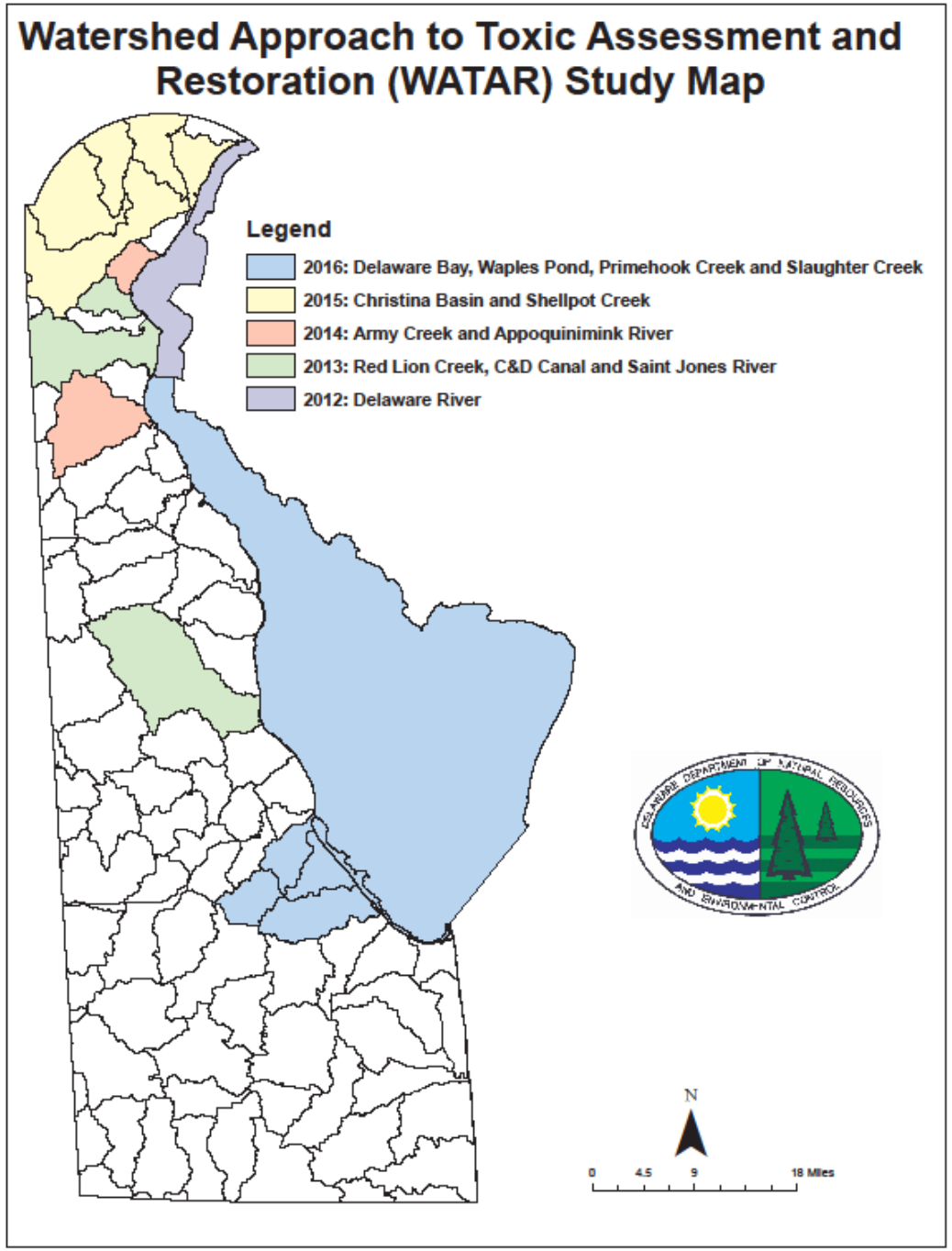
- Chlorinated Benzenes in Red Lion Watershed
- Ambient toxicity (Water only – DRBC)

HOW ARE THE DATA BEING USED ?

- Document improvements (trends) in fish contamination and support revised fish consumption advisories
- Improve/Justify 303(d) listing/delisting decisions and TMDLs
- Identify/Prioritize target areas for follow-up investigation/remediation
- Develop State-specific BAFs & BSAFs and associated human health water quality criteria
- Support NRDA evaluations/actions
- Support other DNREC programs when addressing toxic contaminant issues

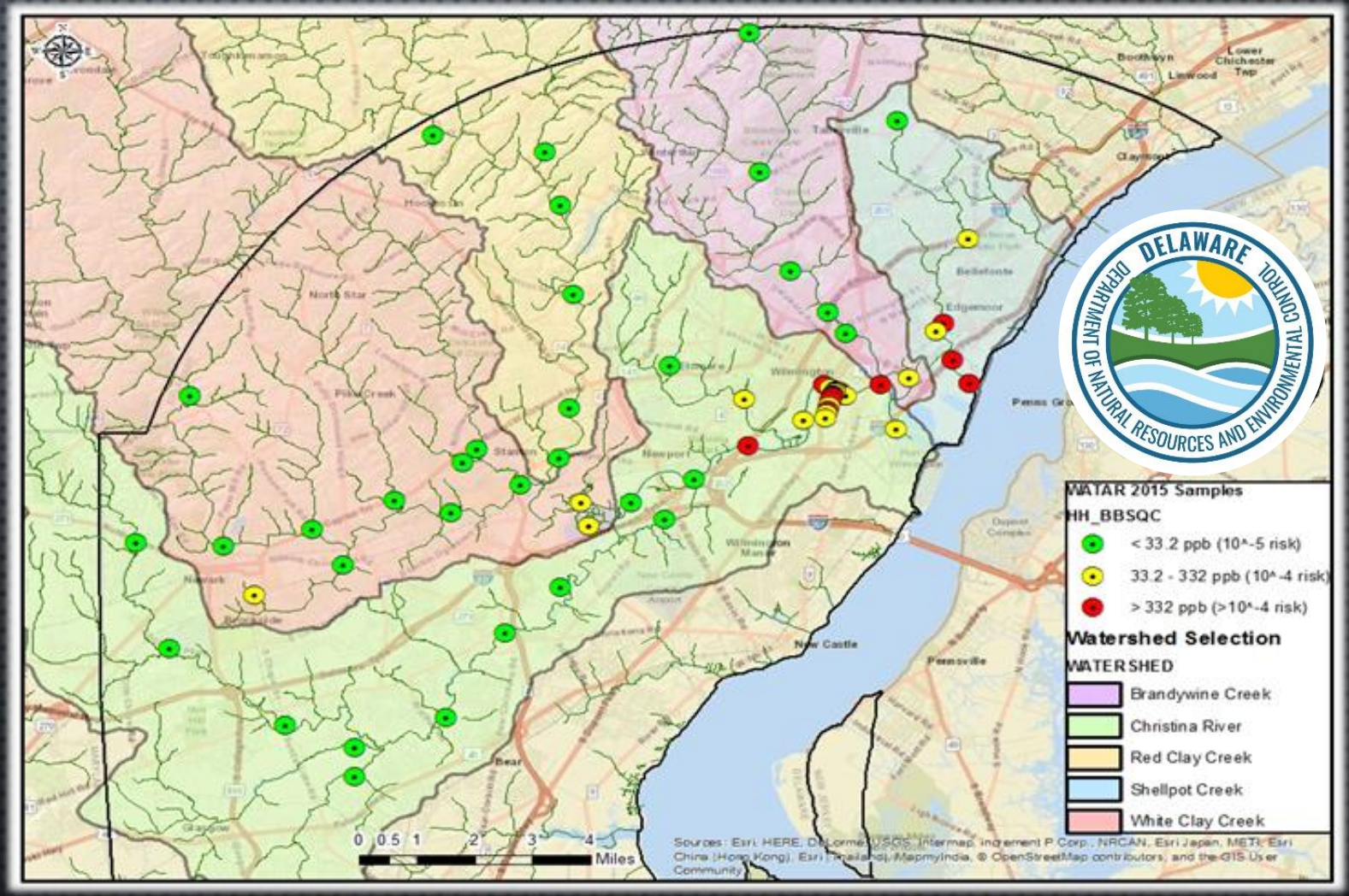
WATERSHEDS SAMPLED

- **2012 -** Delaware River
- **2013 -** Red Lion Creek, C&D Canal, Saint Jones River
- **2014 -** Army Creek, Appoquinimink River
- **2015 -** Christina River Basin (Christina River, White Clay Creek, Red Clay Creek, Brandywine Creek) and Shellpot Creek
- **2016 -** Delaware Bay, Waples Pond, Prime Hook Creek, Slaughter Creek, Red Clay Creek Trout Study
- **2017-2018 -** Chesapeake Bay Drainages
- **2019-2023 -** Return to impacted watersheds and AOCs (tidal Christina/Brandywine); continue to collect fish data for trend assessments



2015 – CHRISTINA BASIN, SHELLPOT WATERSHED

- 65 Sediment Samples
- 25 Surface Water Samples
- 25 Fish Tissue Samples



PCB Risk to Human Health: Sediment to Fish

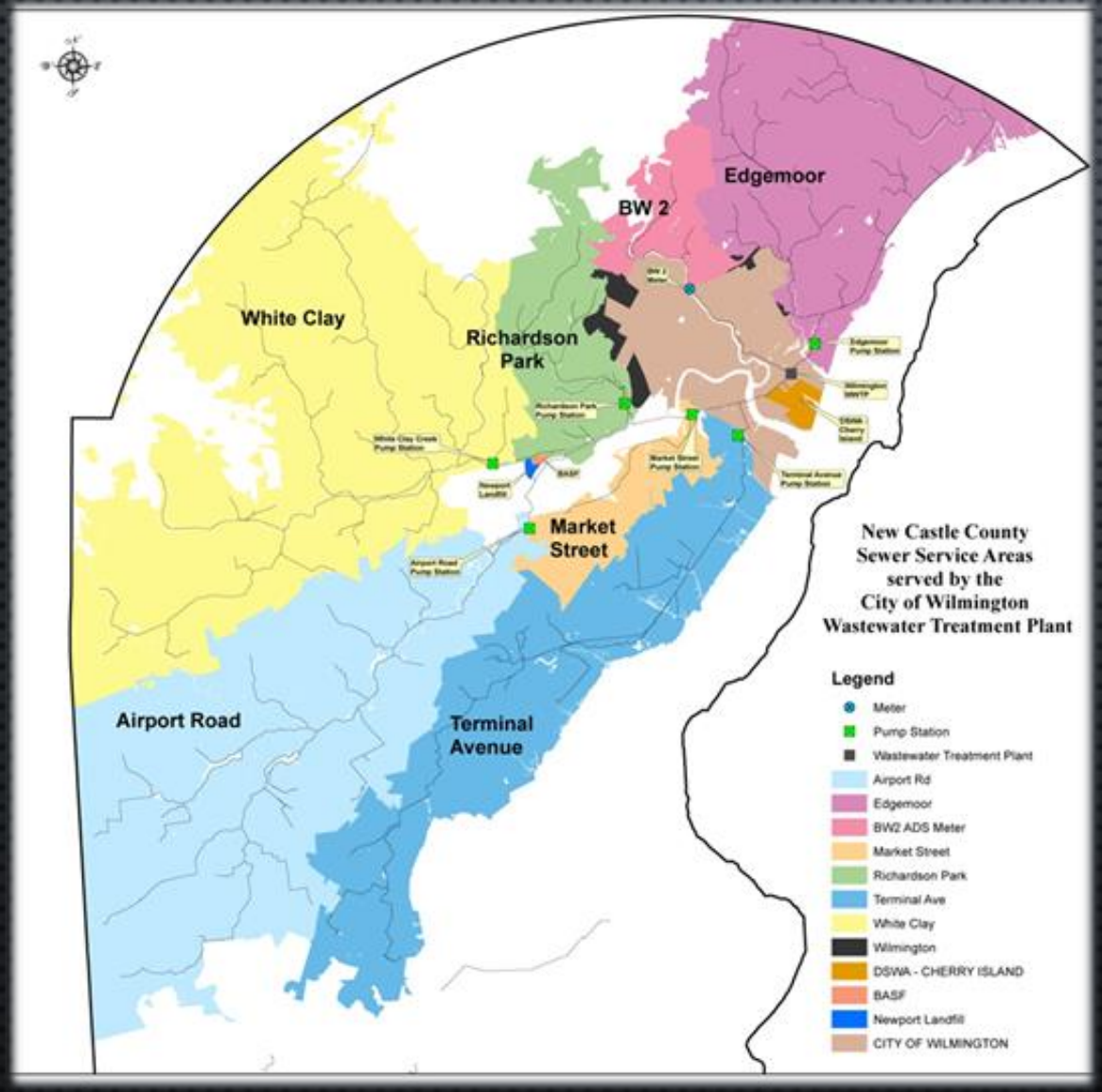
WATAR COORDINATION AMONG PROGRAMS

What are the main sources of PCBs and other PBTs?

1. NPDES Permitted Discharges
2. Storm-Water Discharges
3. Hazardous Substance (waste) Site Loads

TMDL = WLA + LA + MOS

SANITARY SEWERSHED TRACKBACK



City of Wilmington has NPDES permit to discharge treated wastewater to Delaware Estuary.

WWTP PCB discharge exceeds waste load allocation in TMDL.

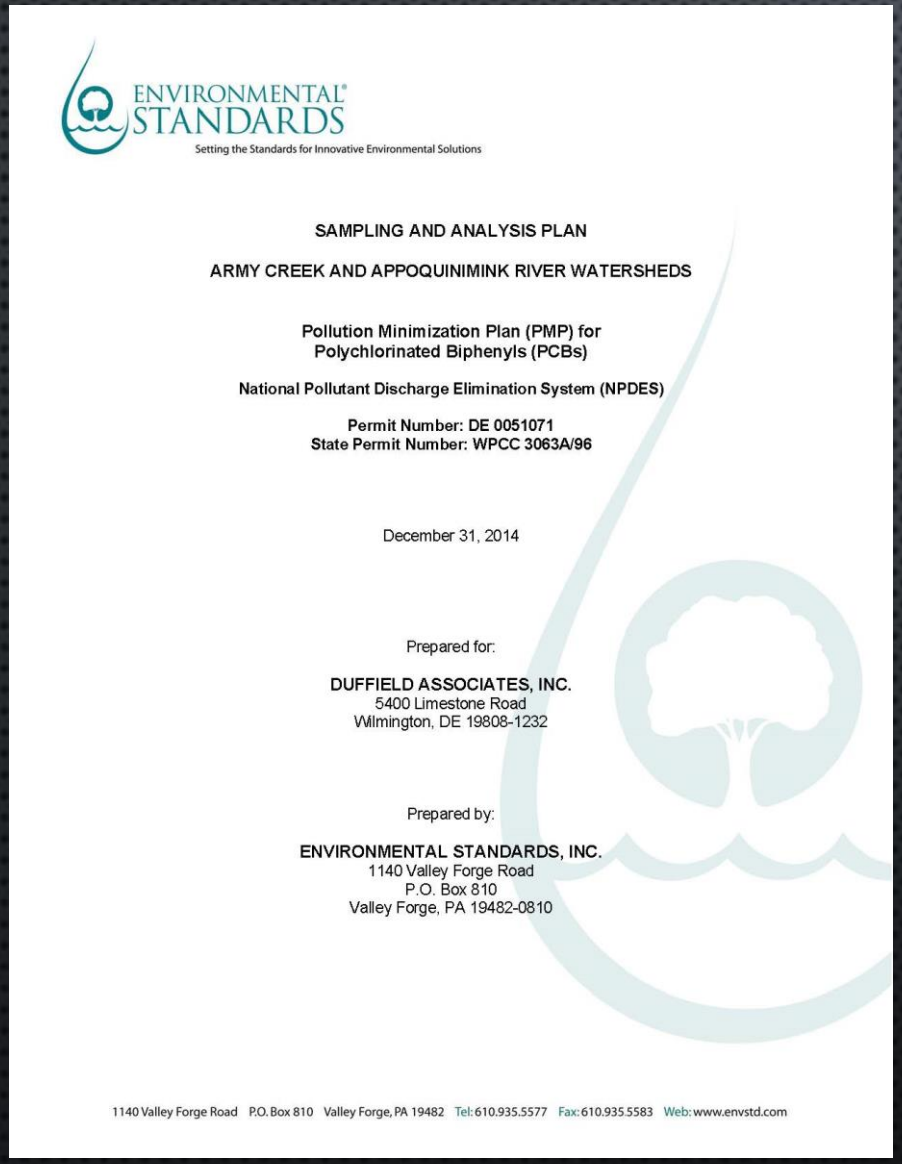
Permit has condition to reduce PCB load through pollutant minimization plan (PMP).

Key element of PMP is a PCB trackback to locate & mitigate sources.

WATAR team assists in data assessment.

Progress continues to show reduction in load to WWTP.

NCC/DELDOT MS4 PCB PMP



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SAMPLING AND ANALYSIS PLAN

ARMY CREEK AND APPOQUINIMINK RIVER WATERSHEDS

Pollution Minimization Plan (PMP) for
Polychlorinated Biphenyls (PCBs)

National Pollutant Discharge Elimination System (NPDES)

Permit Number: DE 0051071
State Permit Number: WPCC 3063A/96

December 31, 2014

Prepared for:

DUFFIELD ASSOCIATES, INC.
5400 Limestone Road
Wilmington, DE 19808-1232

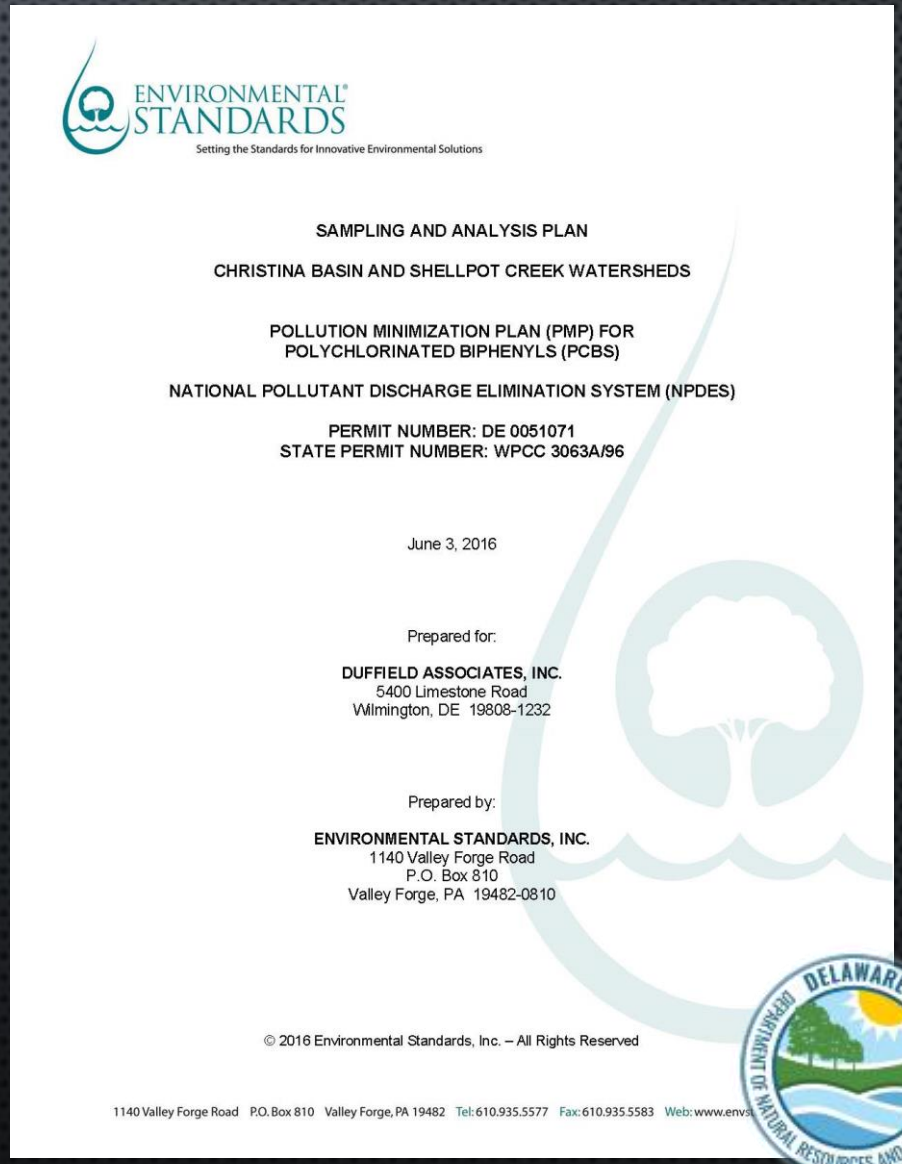
Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
P.O. Box 810
Valley Forge, PA 19482-0810

1140 Valley Forge Road P.O. Box 810 Valley Forge, PA 19482 Tel: 610.935.5577 Fax: 610.935.5583 Web: www.envstd.com

WATAR assisted in SAP design & suggested an approach for data assessment/display

Compliance through progress solidifies partnerships



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Setting the Standards for Innovative Environmental Solutions

SAMPLING AND ANALYSIS PLAN

CHRISTINA BASIN AND SHELLPOT CREEK WATERSHEDS

POLLUTION MINIMIZATION PLAN (PMP) FOR
POLYCHLORINATED BIPHENYLS (PCBS)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

PERMIT NUMBER: DE 0051071
STATE PERMIT NUMBER: WPCC 3063A/96

June 3, 2016

Prepared for:

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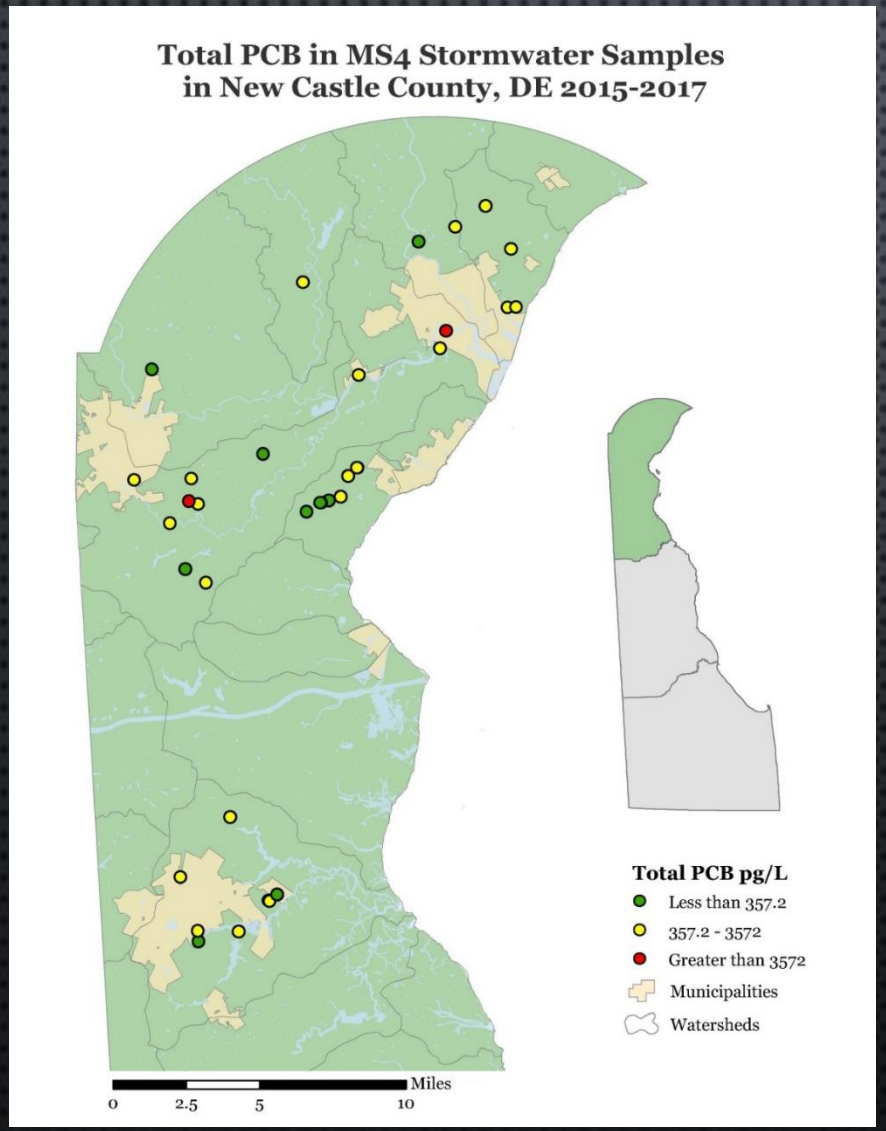
DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

EXAMPLE: PCB CONCENTRATIONS ABOVE BACKGROUND IN SELECT STORMWATER SYSTEMS



Baseline for comparison: PCBs in rainwater

COORDINATION WITH DNREC-REMEDIATION SECTION

Hazardous Substance Cleanup Act (HSCA) sites along the Christina River in New Castle County, Delaware

PCB MASS LOADING FROM DE WASTE SITES

Purpose: Estimate PCB load from waste sites to surface water via overland flow + groundwater transport

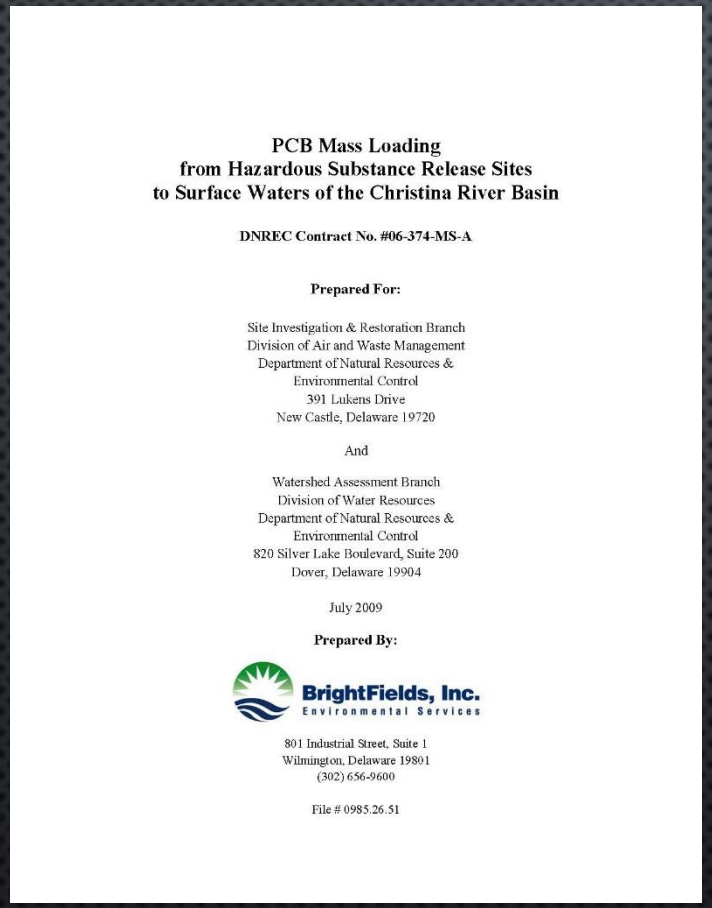
Collaboration between RS & WAMS served as catalyst for WATAR Program development

Phase I completed 2009 (n = 32, Christina Basin); Phase II completed 2015 (n = 29, rest of DE); Updated in 2017; Currently under review again.

Directly supports the DRBC PCB TMDL

https://dnrec.alpha.delaware.gov/waste-hazardous/remediation/watar/pcb-mass-loading/

WASTE SITE LOADING – 2017 UPDATE



PCB Mass Loading
from Hazardous Substance Release Sites
to Surface Waters of the Christina River Basin

DNREC Contract No. #06-374-MS-A

Prepared For:

Site Investigation & Restoration Branch
Division of Air and Waste Management
Department of Natural Resources &
Environmental Control
391 Lukens Drive
New Castle, Delaware 19720

And

Watershed Assessment Branch
Division of Water Resources
Department of Natural Resources &
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820 Silver Lake Boulevard, Suite 200
Dover, Delaware 19904

July 2009

Prepared By:

BrightFields, Inc.
Environmental Services

801 Industrial Street, Suite 1
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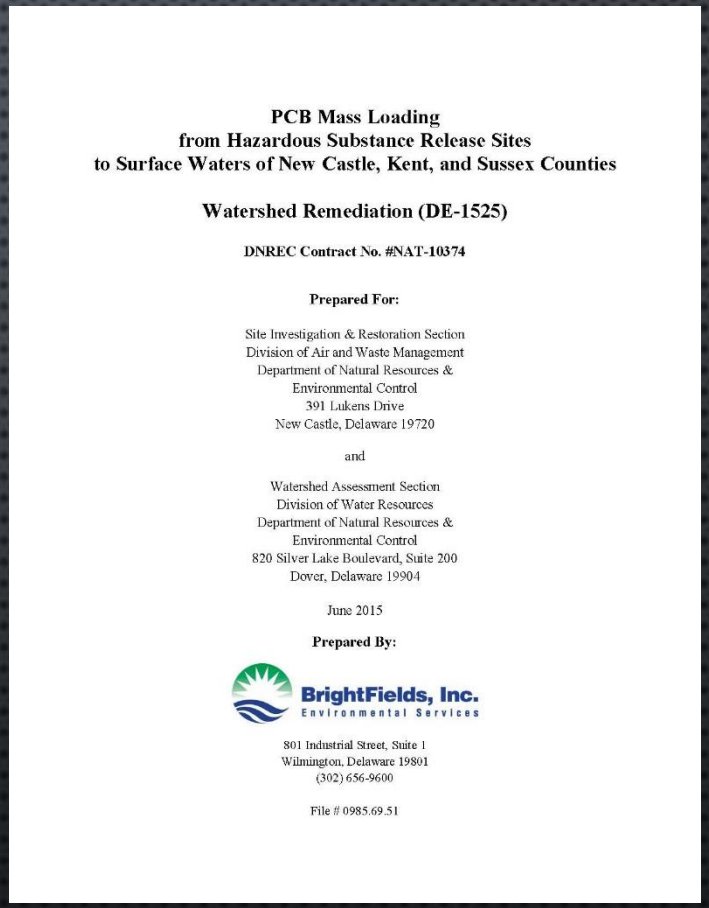
File # 0985.26.51



PCB Mass Loading
from Hazardous Substance Release Sites
to Surface Waters of New Castle, Kent, and Sussex Counties

Watershed Remediation (DE-1525)

DNREC Contract No. #NAT-10374

Prepared For:

Site Investigation & Restoration Section
Division of Air and Waste Management
Department of Natural Resources &
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391 Lukens Drive
New Castle, Delaware 19720

and

Watershed Assessment Section
Division of Water Resources
Department of Natural Resources &
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June 2015

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(302) 656-9600

File # 0985.69.51

2017 update for Stage II PCB TMDL development - Uncontrolled PCB Waste sites reduced from 58 to 22

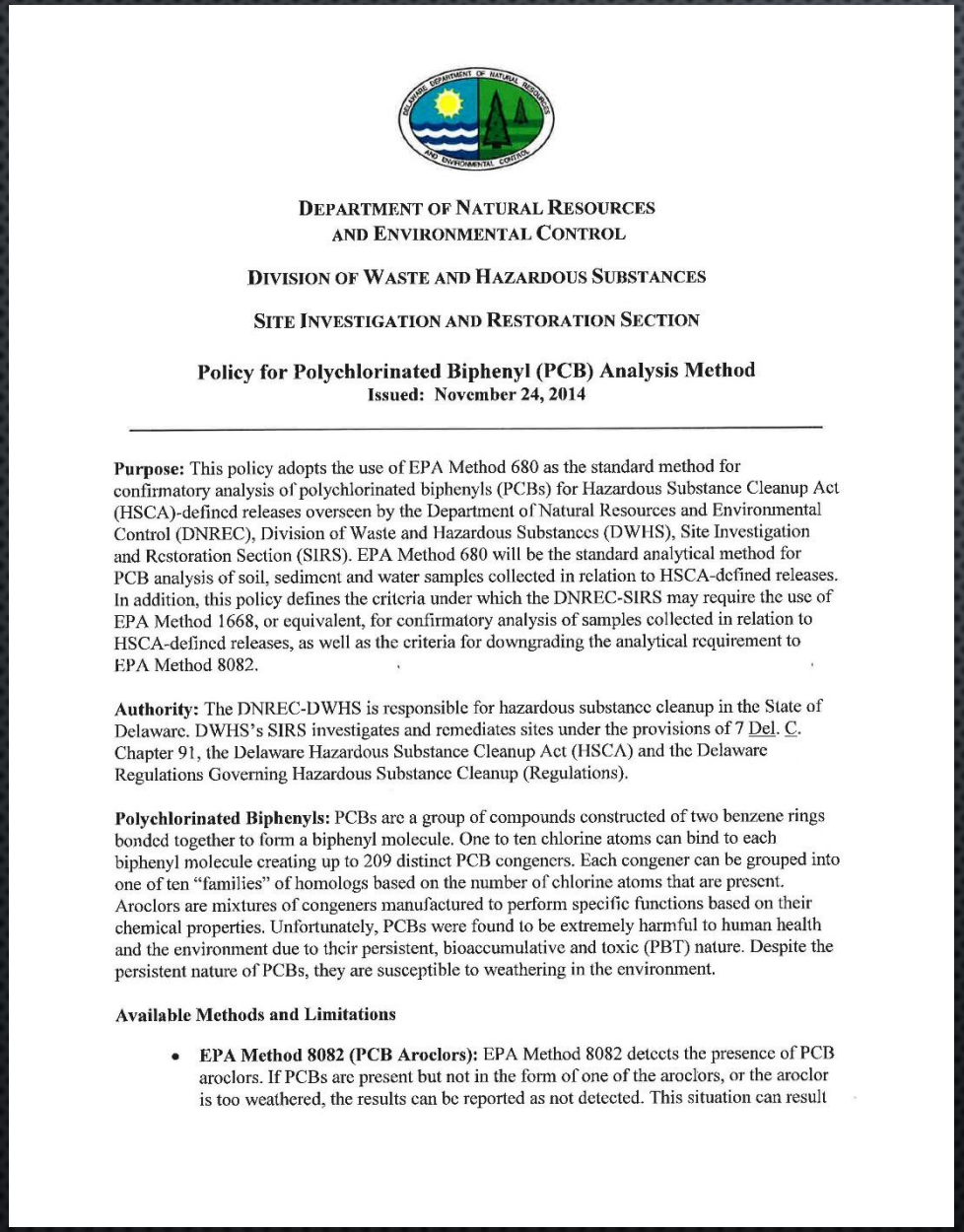
Potential PCB load changed from 24,400 mg/day to 12,600 mg/day (Zone 5) – 48% Reduction

WASTE SITE PCB LOADING – TOP 10*

1. Amtrak Refueling (DE-0266) – Final Plan Issued August 2020 – Estimated $43M for cleanup
2. Amtrak Maintenance (DE-0170) – Final Plan Issued February 2022 – Estimated $12M for cleanup
3. Amtrak West Yards (DE-0159) – Remedial Investigation Approved January 2022
4. ~~American Scrap & Waste (DE-1131)~~
5. ~~South Wilmington Wetland Area (Kreiger Sites & Marsh) (DE-1500)~~
6. ~~Former Carney Harris (DE-1397)~~
7. ~~Dravo Shipyard – Harbor Associates (DE-1096)~~
8. American Tank & Trailer Cleaning (DE-1180) – TSCA Removal > 50ppm in 2018, Cap required by 2024
9. ~~Purina Tower B (DE-1246)~~
10. ~~Electric Hose & Rubber (DE-0174)~~

*Based Upon 2009 Mass Loading Summary Report with 2017/2022 Updates.

---------- Negligible Load Following Site Remediation



DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

DIVISION OF WASTE AND HAZARDOUS SUBSTANCES

SITE INVESTIGATION AND RESTORATION SECTION

Policy for Polychlorinated Biphenyl (PCB) Analysis Method
Issued: November 24, 2014

Purpose: This policy adopts the use of EPA Method 680 as the standard method for confirmatory analysis of polychlorinated biphenyls (PCBs) for Hazardous Substance Cleanup Act (HSCA)-defined releases overseen by the Department of Natural Resources and Environmental Control (DNREC), Division of Waste and Hazardous Substances (DWHS), Site Investigation and Restoration Section (SIRS). EPA Method 680 will be the standard analytical method for PCB analysis of soil, sediment and water samples collected in relation to HSCA-defined releases. In addition, this policy defines the criteria under which the DNREC-SIRS may require the use of EPA Method 1668, or equivalent, for confirmatory analysis of samples collected in relation to HSCA-defined releases, as well as the criteria for downgrading the analytical requirement to EPA Method 8082.

Authority: The DNREC-DWHS is responsible for hazardous substance cleanup in the State of Delaware. DWHS's SIRS investigates and remediates sites under the provisions of 7 Del. C. Chapter 91, the Delaware Hazardous Substance Cleanup Act (HSCA) and the Delaware Regulations Governing Hazardous Substance Cleanup (Regulations).

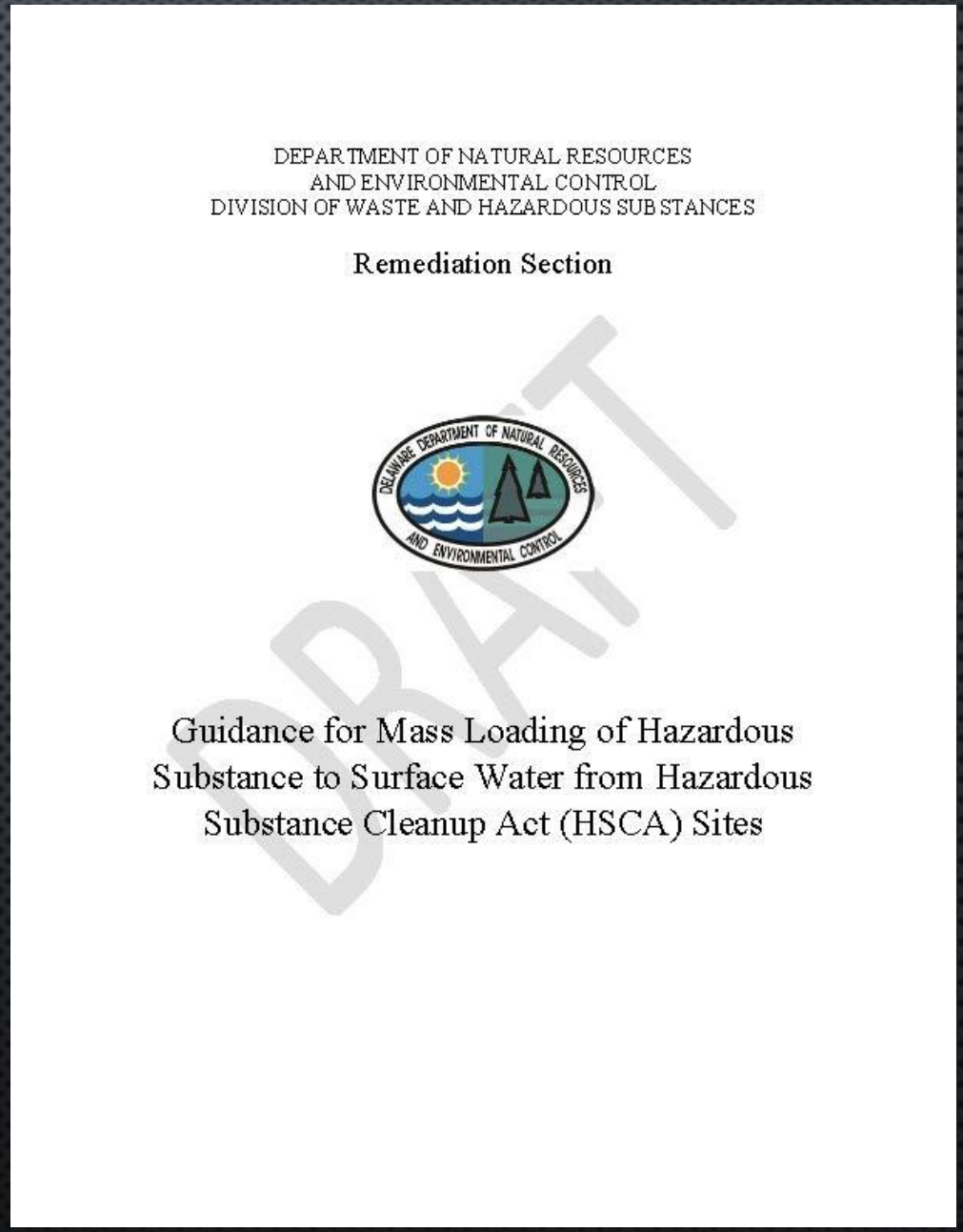
Polychlorinated Biphenyls: PCBs are a group of compounds constructed of two benzene rings bonded together to form a biphenyl molecule. One to ten chlorine atoms can bind to each biphenyl molecule creating up to 209 distinct PCB congeners. Each congener can be grouped into one of ten "families" of homologs based on the number of chlorine atoms that are present. Aroclors are mixtures of congeners manufactured to perform specific functions based on their chemical properties. Unfortunately, PCBs were found to be extremely harmful to human health and the environment due to their persistent, bioaccumulative and toxic (PBT) nature. Despite the persistent nature of PCBs, they are susceptible to weathering in the environment.

Available Methods and Limitations

- **EPA Method 8082 (PCB Aroclors):** EPA Method 8082 detects the presence of PCB aroclors. If PCBs are present but not in the form of one of the aroclors, or the aroclor is too weathered, the results can be reported as not detected. This situation can result

- Policy highlights ineffective use of EPA Method 8082 to characterize historic and weathered PCB releases.
- Requires use of EPA Method 680 (homolog method) as new standard for PCB confirmatory analysis of environmental samples collected at HSCA regulated sites.
- Specifies criteria for use of EPA Method 1668 (congener method) for environmental samples collected at waste sites that are in close proximity to 303(d) listed water bodies.

- Currently developing guidance for the calculation of specific contaminant mass loads from soils at contaminated sites.
- Intended to be used in 303(d) listed watersheds for risk driving contaminants.
- Information may be used as a line of evidence to evaluate impacts within remedial investigations/feasibility studies.



DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES

Remediation Section

DRAFT

Guidance for Mass Loading of Hazardous Substance to Surface Water from Hazardous Substance Cleanup Act (HSCA) Sites

WATAR – INNOVATIVE REMEDIATION

- Mirror Lake
- Meco Ditch/Little Mill Creek
- Fort Dupont PRB
- Amtrak Eastern Drainage Ditch
- A-Street Ditch
- Planning CBR4 Project






OTHER WATAR ACTIVITIES/ONGOING INITIATIVES

Christina & Brandywine Rivers Remediation, Restoration & Resilience Project (CBR4)

A-Street Ditch SediMite™ Pilot Study

Brandywine Dam Sediment Assessment

White Clay Creek Dam Sediment Assessment

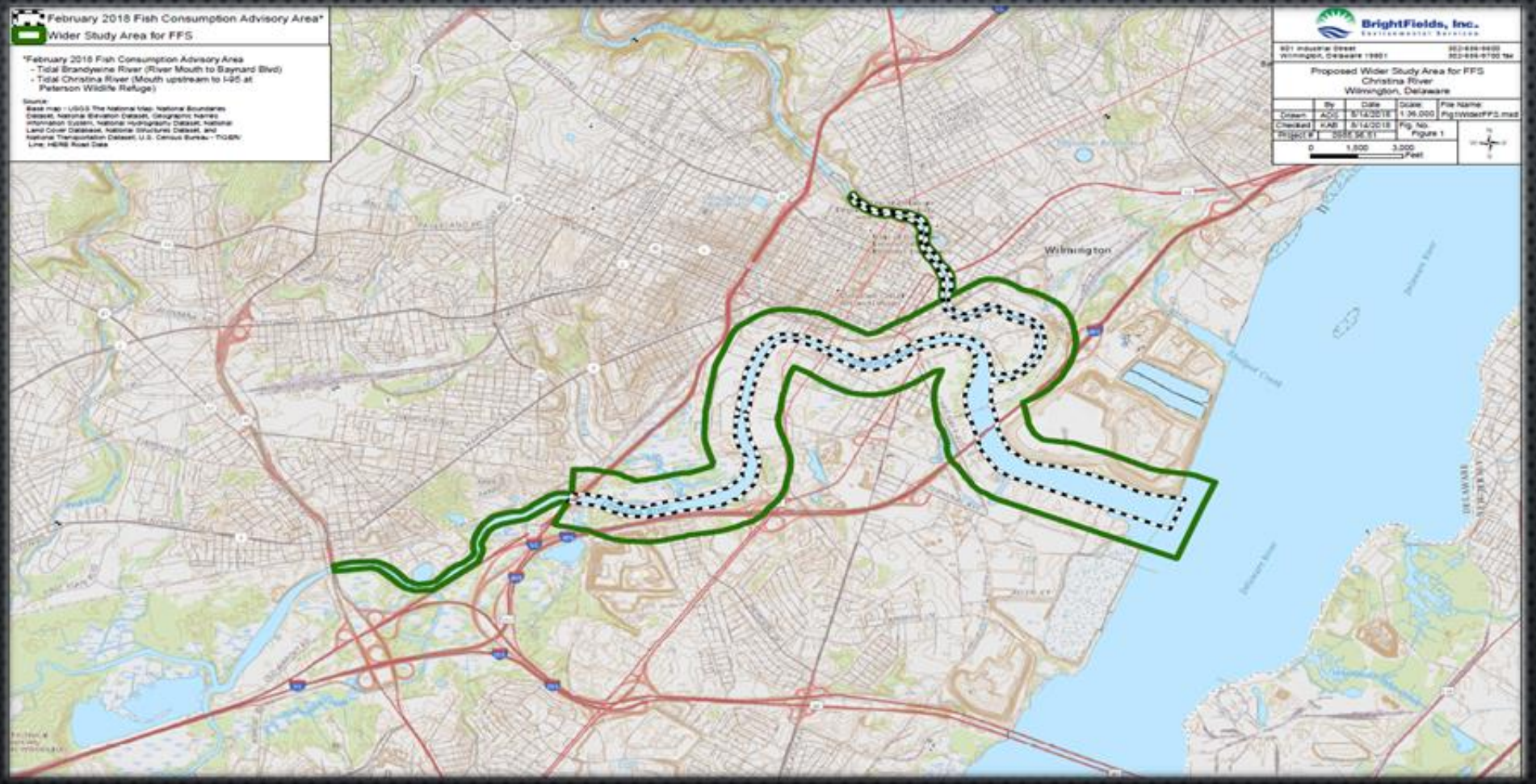
Advanced Restoration Plan Development

Delaware Dredging Framework Update

PFAS in Fish

PFAS in Surface Water

CHRISTINA & BRANDYWINE RIVERS REMEDIATION, RESTORATION & RESILIENCE PROJECT (CBR4)



2,183 acres and 7 linear miles of tidal mainstem river

https://dnrec.alpha.delaware.gov/waste-hazardous/remediation/watar/cbr4/

CHRISTINA & BRANDYWINE RIVERS *REMEDIATION*, RESTORATION & RESILIENCE PROJECT (CBR4)

- PCB loading from major land-based sources are either already controlled or are on track to be controlled in the near term.

THIS BY ITSELF WILL NOT BE ENOUGH TO ACHIEVE THE GOAL OF CLEAN WATER AND CLEAN FISH

- In-place, legacy contamination of aquatic sediments will remain a secondary source for decades.
- Transfer of contamination from secondary sediment sources to the food chain can be interrupted through a combination of targeted remedial actions.
- The time to plan for these targeted remediation actions is now …. while the last primary land-based sources are being controlled.
- DNREC WATAR has contracted Brightfields, Inc. and AnchorQEA to develop a sediment remediation Feasibility Study and cost estimate for the project area.

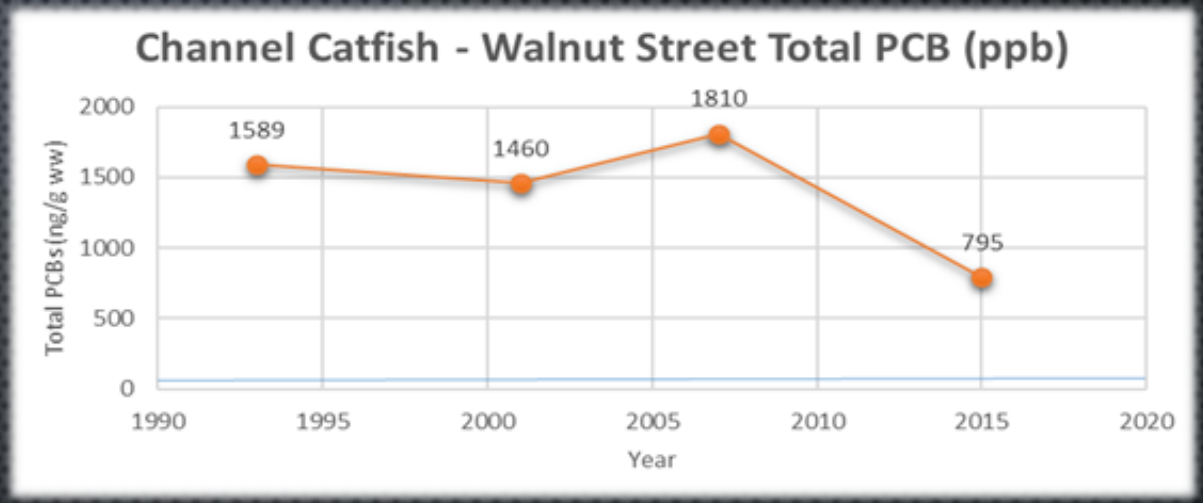
https://dnrec.alpha.delaware.gov/waste-hazardous/remediation/watar/cbr4/

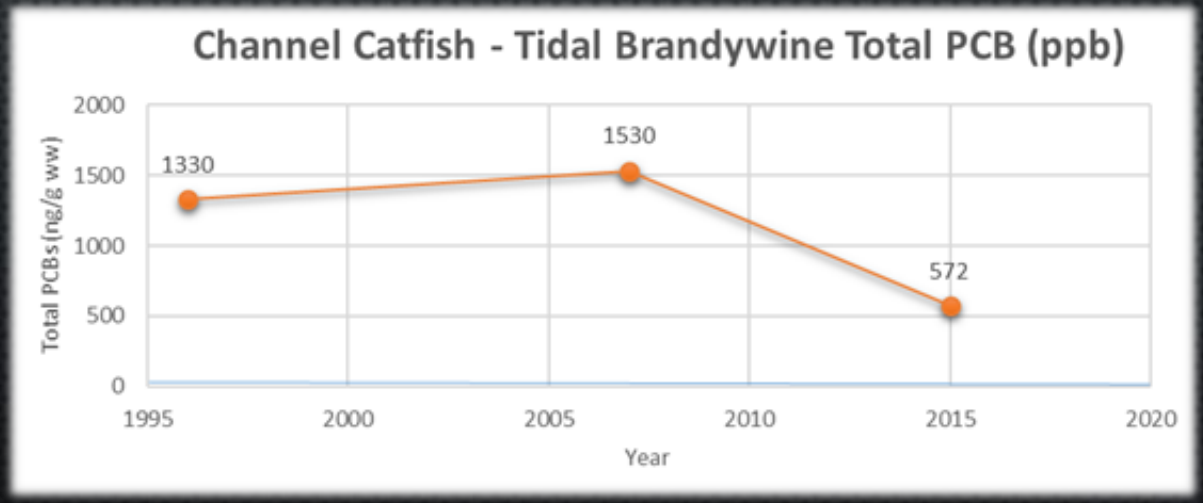
CHRISTINA & BRANDYWINE RIVERS REMEDIATION, *RESTORATION & RESILIENCE* PROJECT (CBR4)

- The Christina Conservancy and American Rivers received a NFWF Grant in 2021 to develop a "logical step-wise ecosystem-based approach to assess, prioritize and plan for a suite of restoration and resilience projects."
- Projects will be aimed at restoration of tidal wetlands, nearshore, onshore and riparian areas to improve habitat for critical fish species and populations and offer resilience to sea level rise and climate change.
- Development of project partners is a critical step.
- DNREC WATAR and DNREC Coastal Programs will help to ensure that NFWF grant goals and objectives will coordinate with remediation plans.

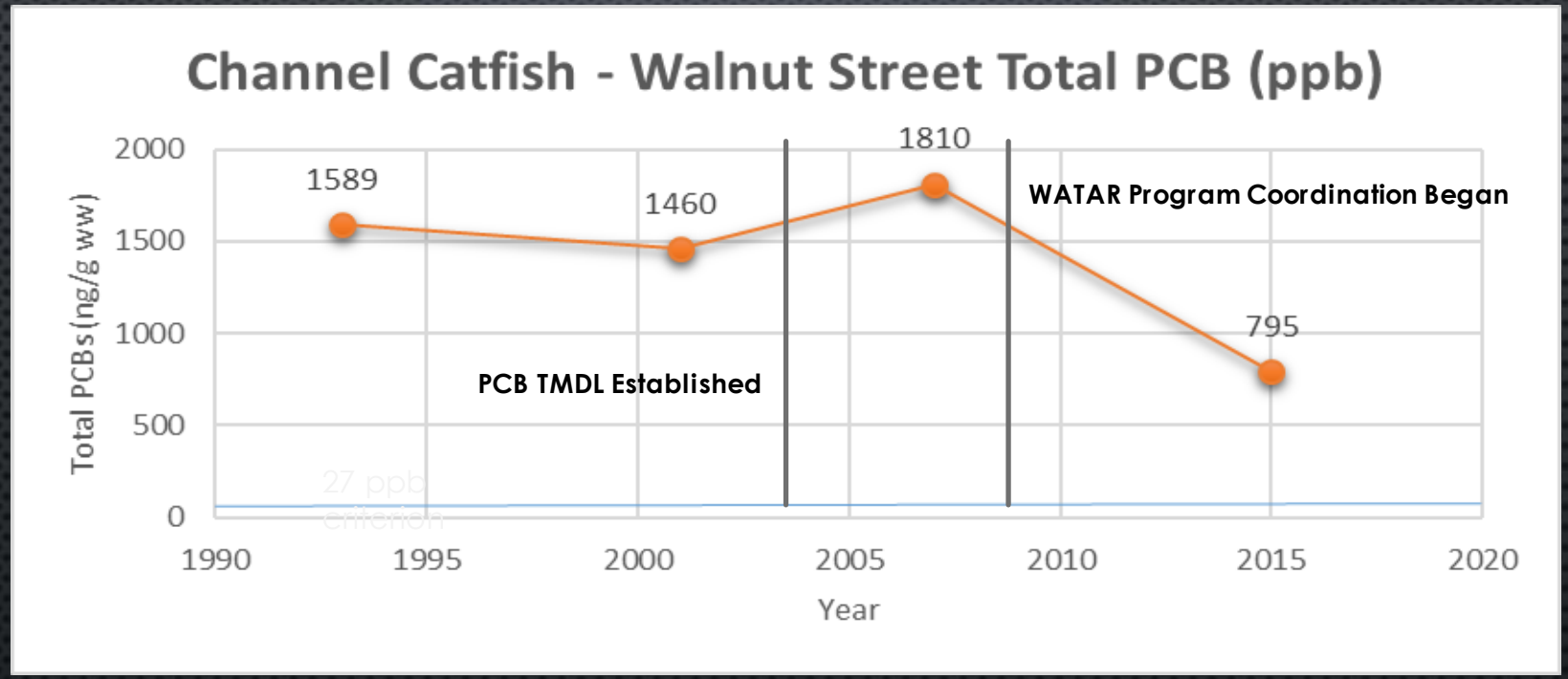
https://dnrec.alpha.delaware.gov/waste-hazardous/remediation/watar/cbr4/

FISH TISSUE TRENDS IN CBR4 AREA

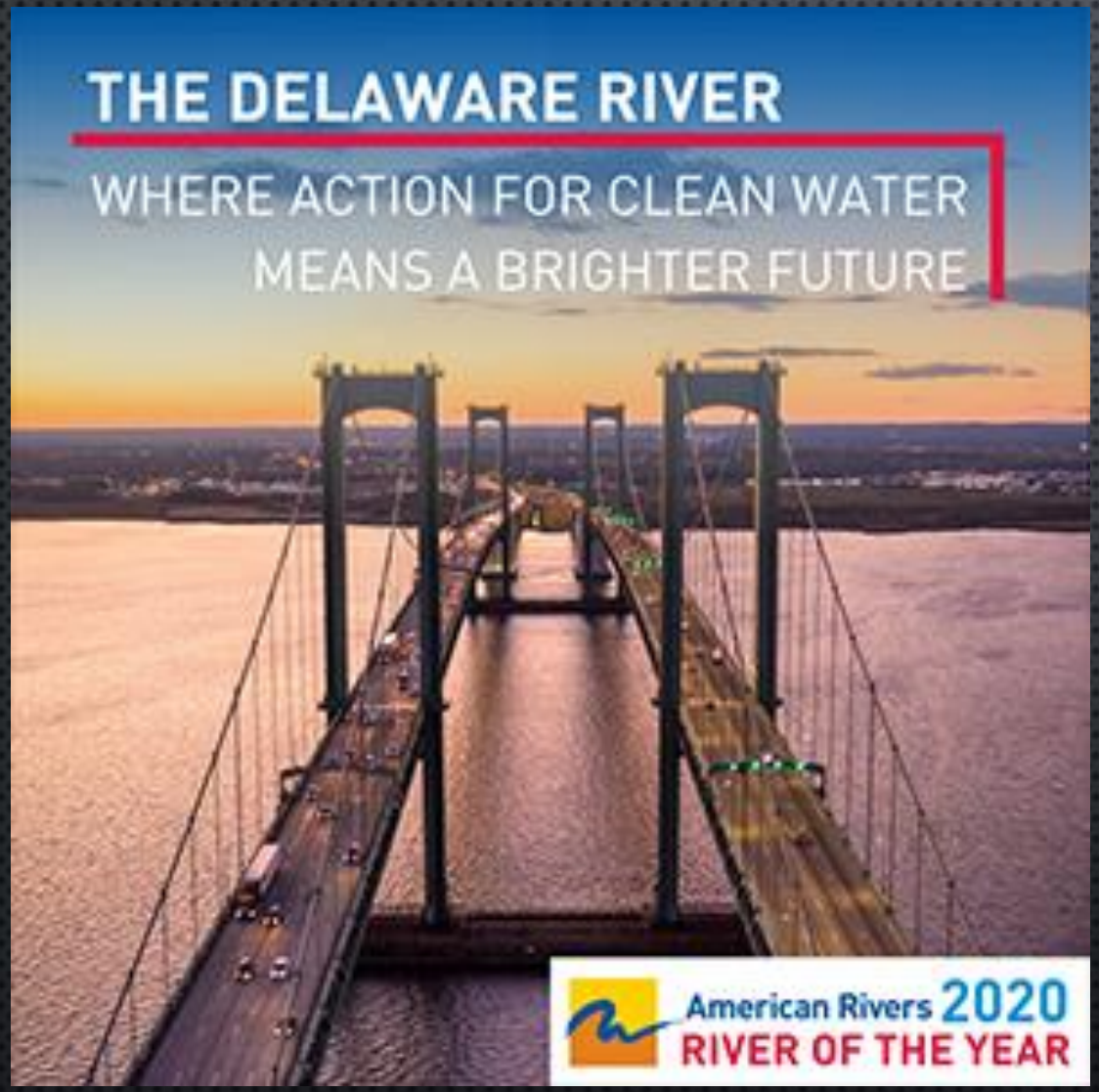




FISH TISSUE IMPROVEMENTS-TIDAL CHRISTINA RIVER



- Tidal Christina
  - Improvement attributed to cleanup of upland PCB sources, along with better control of NPDES and MS4 discharges. Highlights cooperation between WATAR and DRBC, along with other DNREC programs.



"Today, what was once a cesspool is a river reborn. Fish populations have returned, and the river now contributes about $25 Billion in annual economic activity."

"Detailed plans and science-driven policy by the DRBC have helped lead to way for the river's dramatic improvements we enjoy today."

"We also know there is more work that needs to be done."

http://www.americanrivers.org/Delaware2020

CONTACT INFORMATION

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QUESTIONS ?