

Talkin' TREB

2022 Technical Report for the Estuary and Basin

Presented By: Partnership for the Delaware Estuary &
Delaware River Basin Commission



Coalition for the
Delaware River
Watershed

Thank you
Sponsors:

11th Annual Delaware River Watershed Forum

Small Wonder, Big Impact across the Delaware River Watershed.



Proud Member of
The Corps Network
Strengthening America through
service and conservation



Housekeeping

- Please turn phones on silent
- Take care of your needs!
 - Feel free to use the restroom/get water as needed
 - If you need more transition time between sessions, feel free to leave when needed
- If you haven't yet, please download our event app! Search for CVENT in app store or scan the QR code posted around the event site
 - The app houses all important Forum info including upcoming sessions and room locations
- Staff hosts are available if you need anything!



*Managing, protecting and improving the water resources
of the Delaware River Basin since 1961*



*Connecting people, science, and nature
for a healthy Delaware River and Bay*



Meet Your Presenters



LeeAnn Haaf, Ph.D.
Assistant Director of Estuary Science
Partnership for the Delaware Estuary
lhaaf@delawareestuary.org
Pronouns (she/her)



Leah Morgan
Estuary Science Coordinator
Partnership for the Delaware Estuary
lmorgan@delawareestuary.org
Pronouns (she/her)



Michael Thompson, P.E.
Senior Water Resource Engineer
Delaware River Basin Commission
michael.thompson@drbc.gov



Jacob Bransky
Senior Aquatic Biologist
Delaware River Basin Commission
jacob.bransky@drbc.gov

Talkin' TREB

Delaware River Watershed Forum
September 29, 2023

Partnership for the Delaware Estuary
LeeAnn Haaf, PhD
Leah Morgan

Delaware River Basin Commission
Michael Thompson, PE
Jacob Bransky



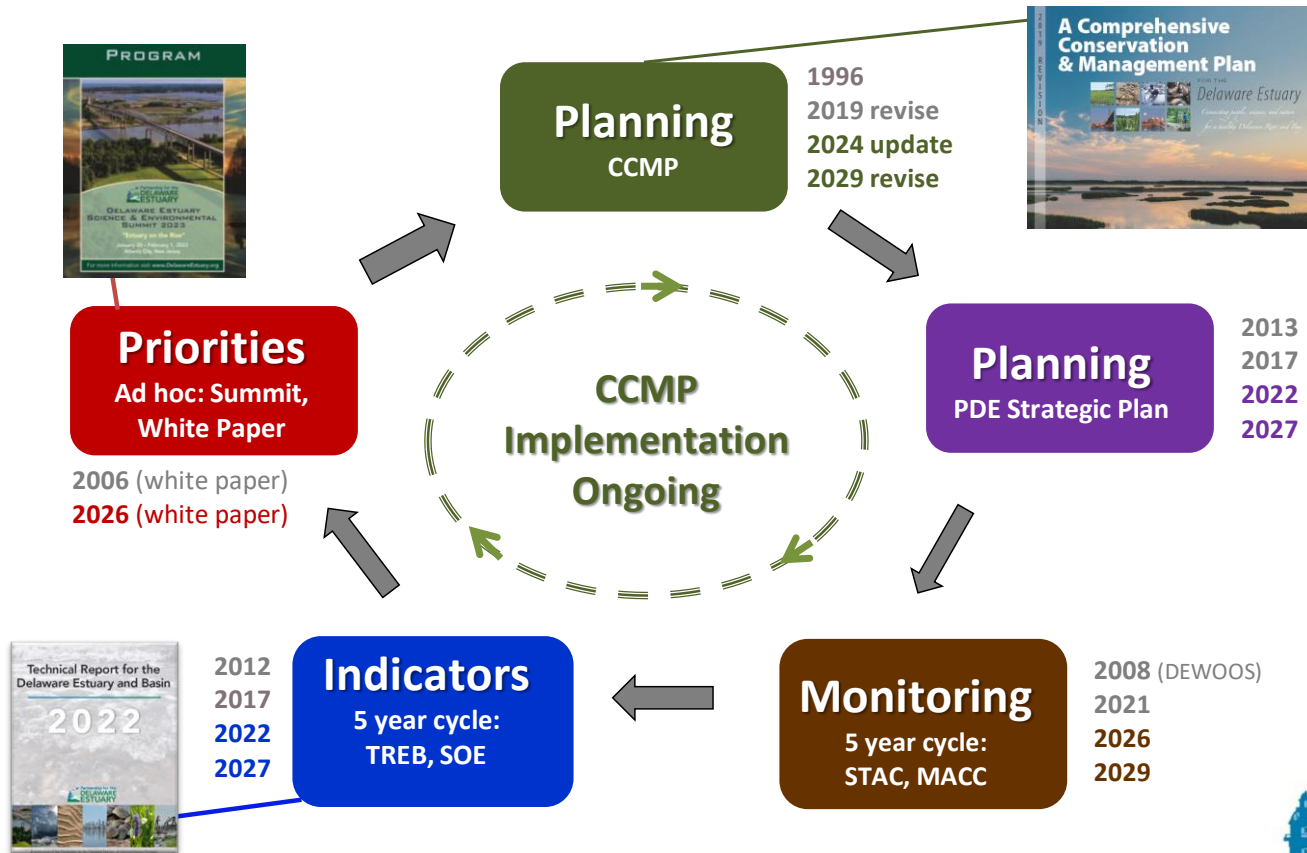
Technical Report for the Delaware Estuary and Basin

2022



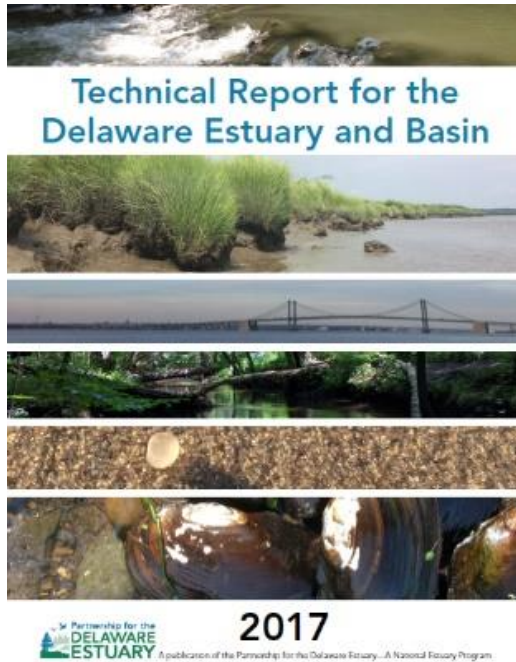
A publication of the Partnership for the Delaware Estuary: A National Estuary Program

Delaware Estuary Program – Products

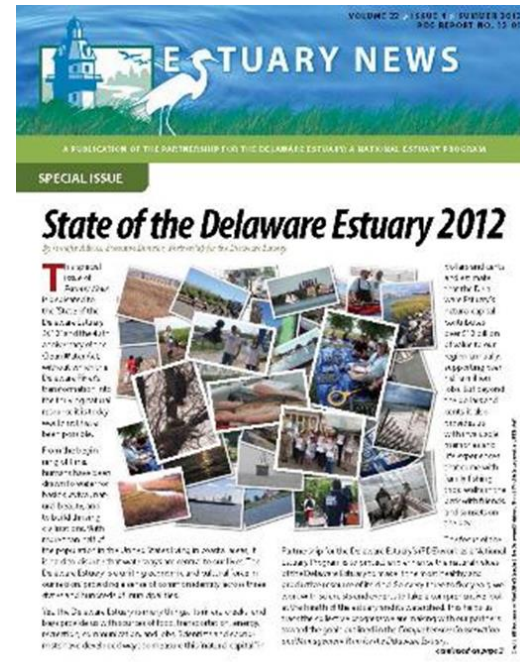


State of the Estuary Reporting

Technical Report > Public Report



Environmental Professionals



The Public

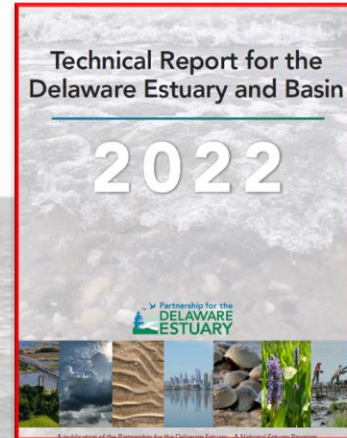


TREB 2022

Status, trends, predictions,
actions and needs for key
environmental indicators

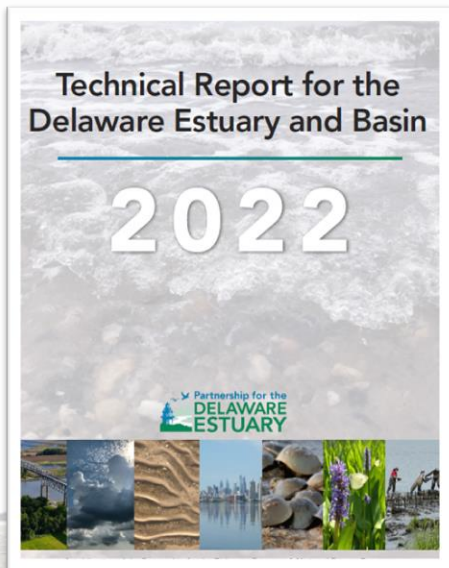
- A synopsis of the health of the Delaware Estuary and Basin
- Written for a technical audience
- Updated every 5 years

2012, 2017, **2022**



TREB 2022

70%+ of 2017 TREB indicators updated



1. Watersheds & Landscapes*

Population, Land Use

2. Climate Change

Temperature, Precipitation, SLR

3. Water Quantity*

Withdrawals, Groundwater

4. Water Quality*

DO, Nitrogen, PCBs

5. Sediments

Loads, Contamination

6. Habitats

Tidal Wetlands, Forests, Fish Passage

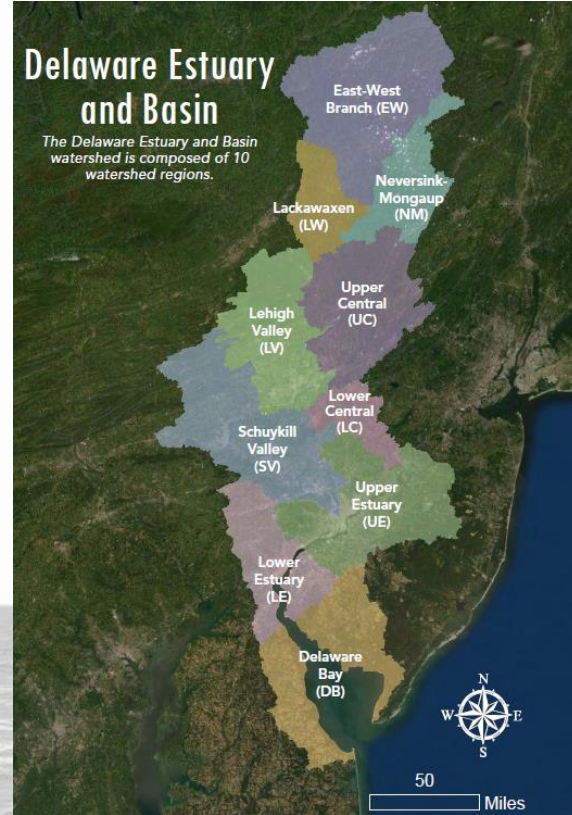
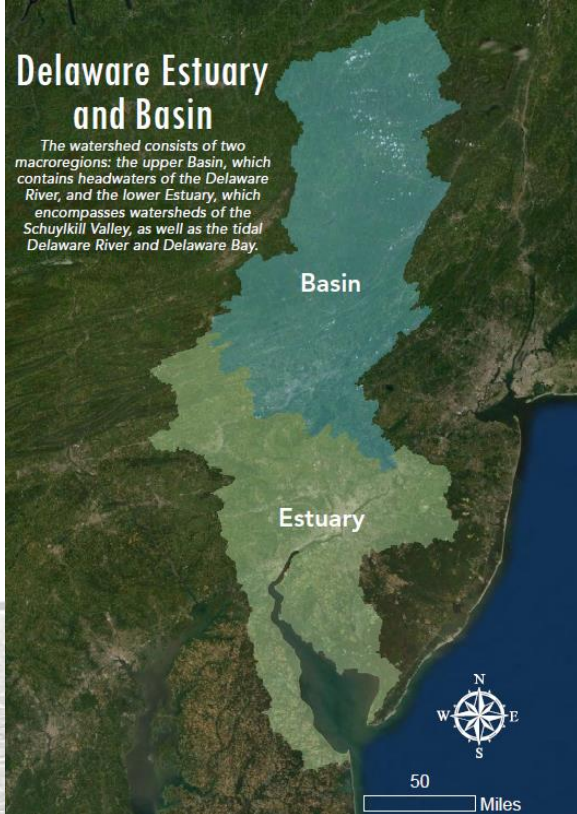
7. Living Resources*

Crabs, Oysters, Macroinvertebrates

8. Restoration

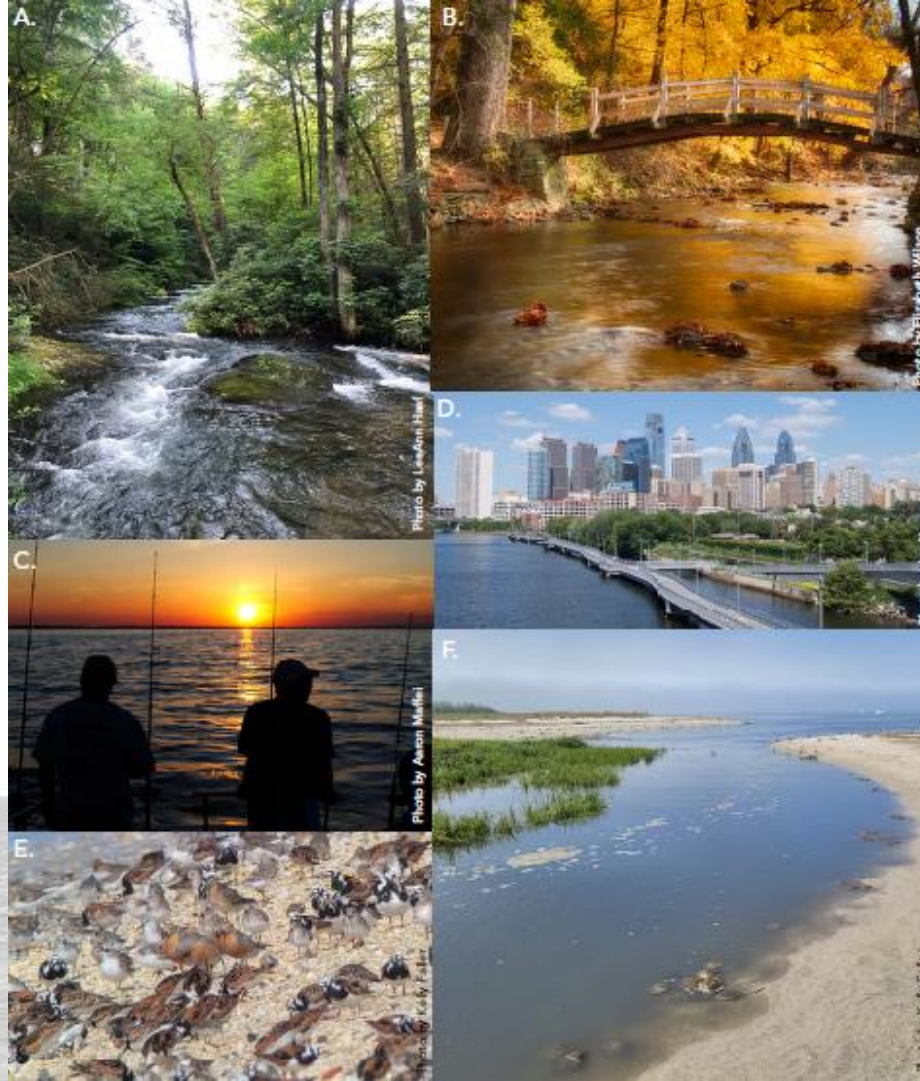
Acres Restored, Types, Investment

Orientation – Watershed Regions



Orientation Indicators

- Description
- Past Trends
- Present Status
- Future Predictions
- Actions & Needs
- Summary



2022 TREB Results

- Some indicators have shown positive trends, some negative trends
- The current status is compared to historic conditions
- Future predictions are only possible for some indicators
- Showing only a few examples – full report contains more detail



Watersheds & Landscapes



Estuary and Basin has >2,900 sq mi of protected lands, with a increase by 1.3% in the last decade



Development increased by ~17.5 acres per day from 1996-2016



Author: **Andrew Homsey***

Climate Change



Not yet a significant increase in hot temperature extremes, despite average warming trends



Sea levels rose between ~4-6 cm per decade from 1992-2021 in the Estuary



Water Quantity



Peak water withdrawals occurred in 2006-2007 and have subsequently declined



No negatives observed



Water Quality



Concentrations increased dramatically 1960's to present



Water temperatures are possibly increasing, but more monitoring and analysis will be required



Many fish consumption advisories remain; ecotoxins in pharmaceuticals & personal care products remain a concern



Sediments



Declined from 2005-2010 to 2017-2021, especially in the Lower Estuary (but this could also have negative effects on tidal wetlands in the Bayshore)



Sediment contaminant concentrations highest in areas of the Estuary near Environmental Justice communities



Habitats



Between 2017-2021, 29 dams have been removed in the Delaware River Basin



From 1996-2016, 340 hectares of tidal wetland were lost; losses were >15% for tidal freshwater wetlands



Living Resources



Osprey, blue crab, American eel, and sturgeon populations have increased



Striped Bass, Weakfish, White Perch, and freshwater mussel populations show signs of decline



Authors: **Jenny Shinn*** (ed), various others

Restoration



Increase in restored acres in 2017-2022, compared to 2006-2011 and 2012-2016



The time and complexity of permits required to do restoration may be increasing





3

TECHNICAL REPORT FOR THE ESTUARY AND BASIN

Water Quantity

Chapter 3 authors

Michael Thompson, P.E.

Sara Sayed

Amy Shallcross, P.E.

Chad Pindar, P.E.

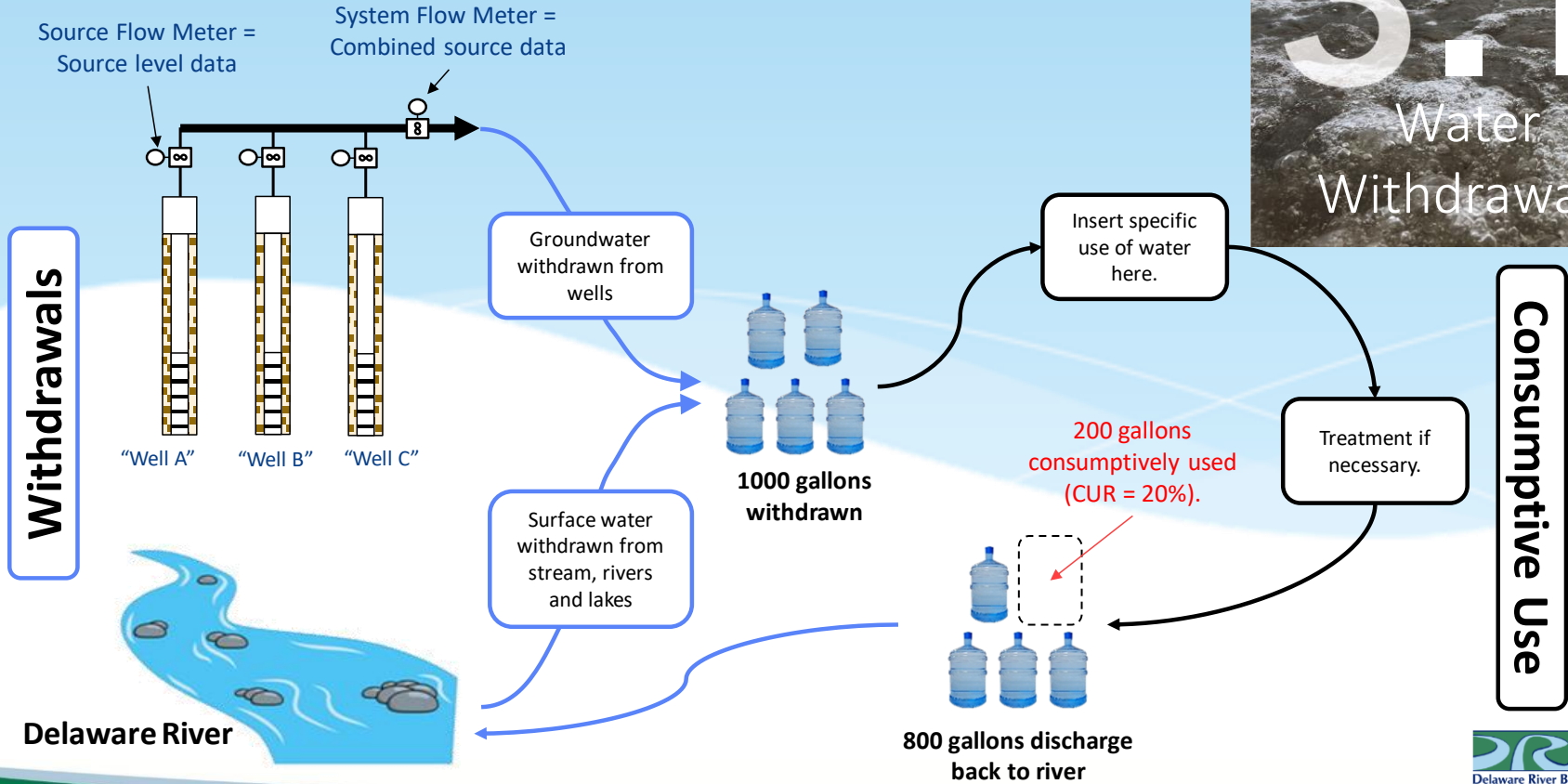
3

TECHNICAL REPORT FOR THE ESTUARY AND BASIN

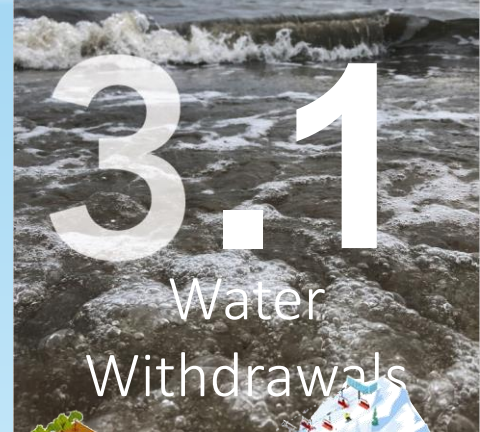
Water Quantity

- 3.1 Water Withdrawals:
Tracking Water Supply & Demand**
- 3.2 Consumptive Use**
- 3.3 Groundwater Availability**
- 3.4 Salt Front Location & Movement**

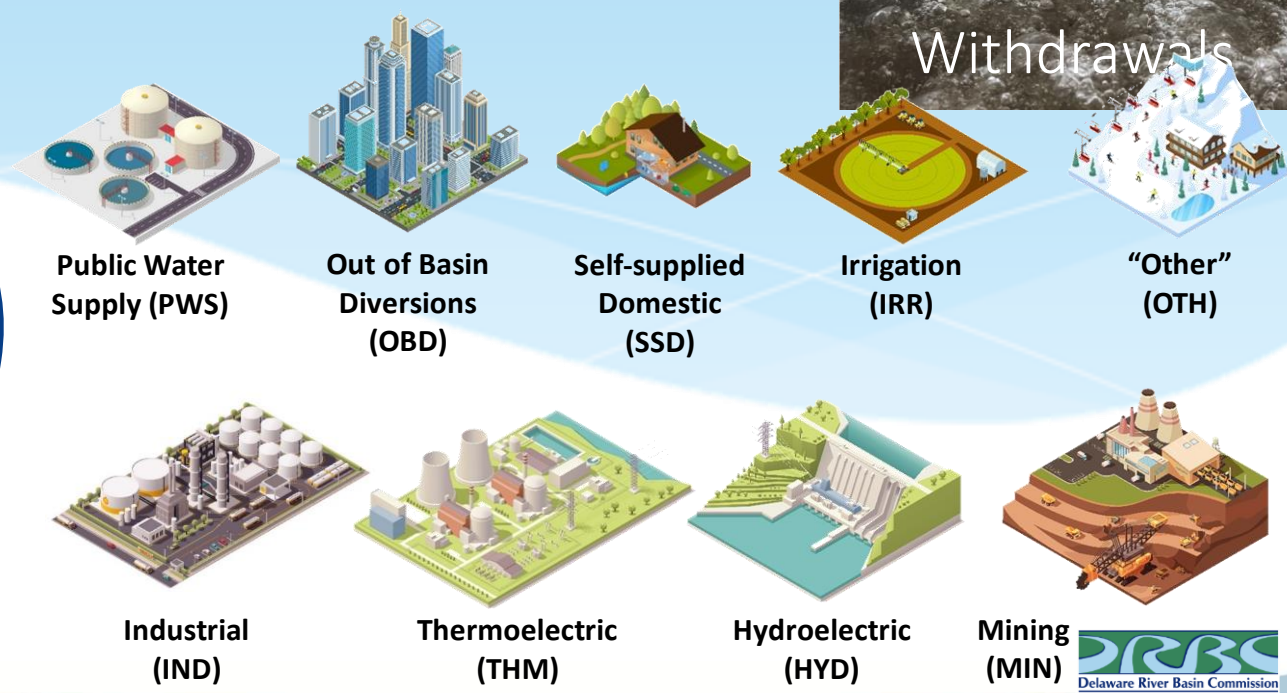
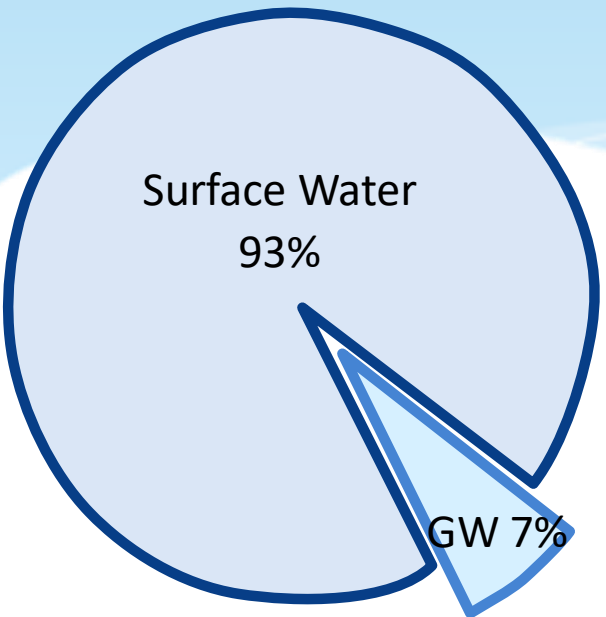
Terminology: What data are we looking at?



Water Withdrawals Sectors Evaluated in the Delaware River Basin



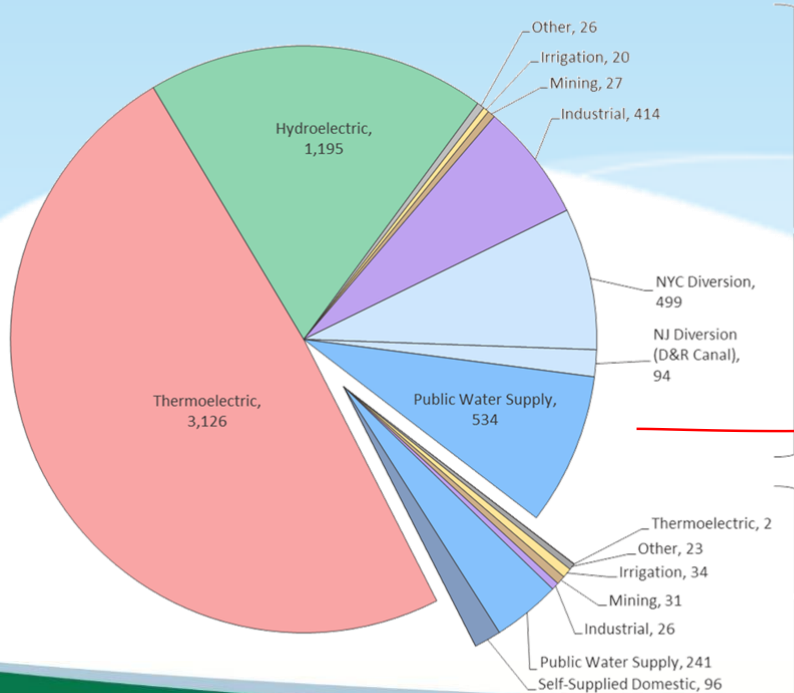
3.1
Water
Withdrawals



Withdrawals from the Delaware River Basin

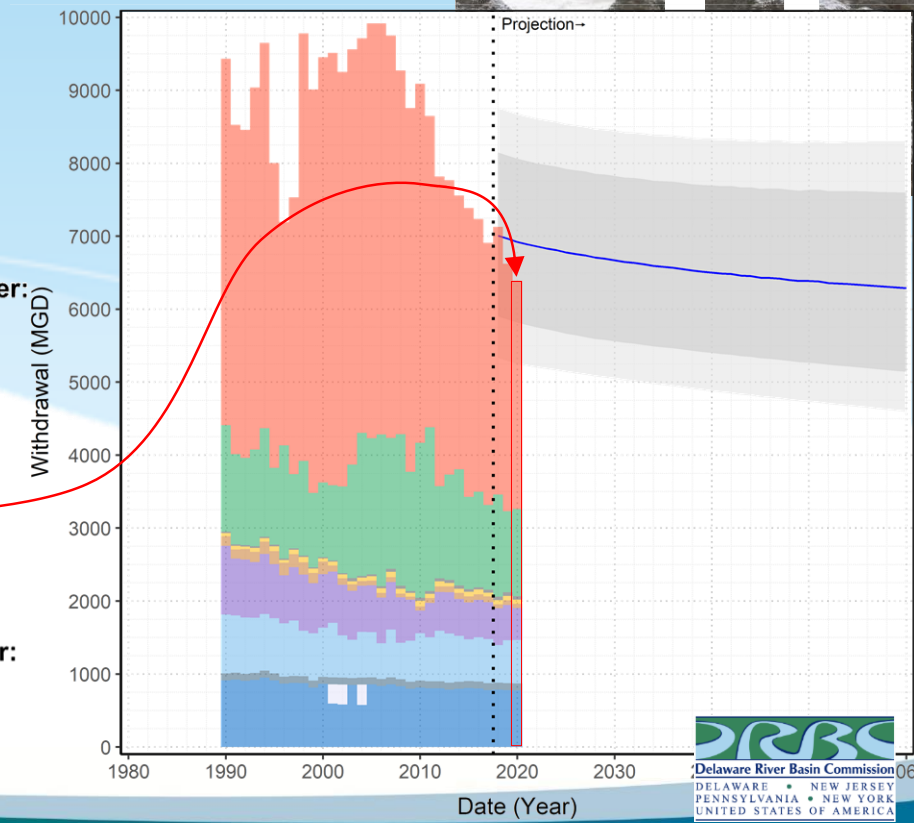


Total Water Withdrawals
(ground and surface) from the Delaware River Basin, 2020:
6,389 MGD

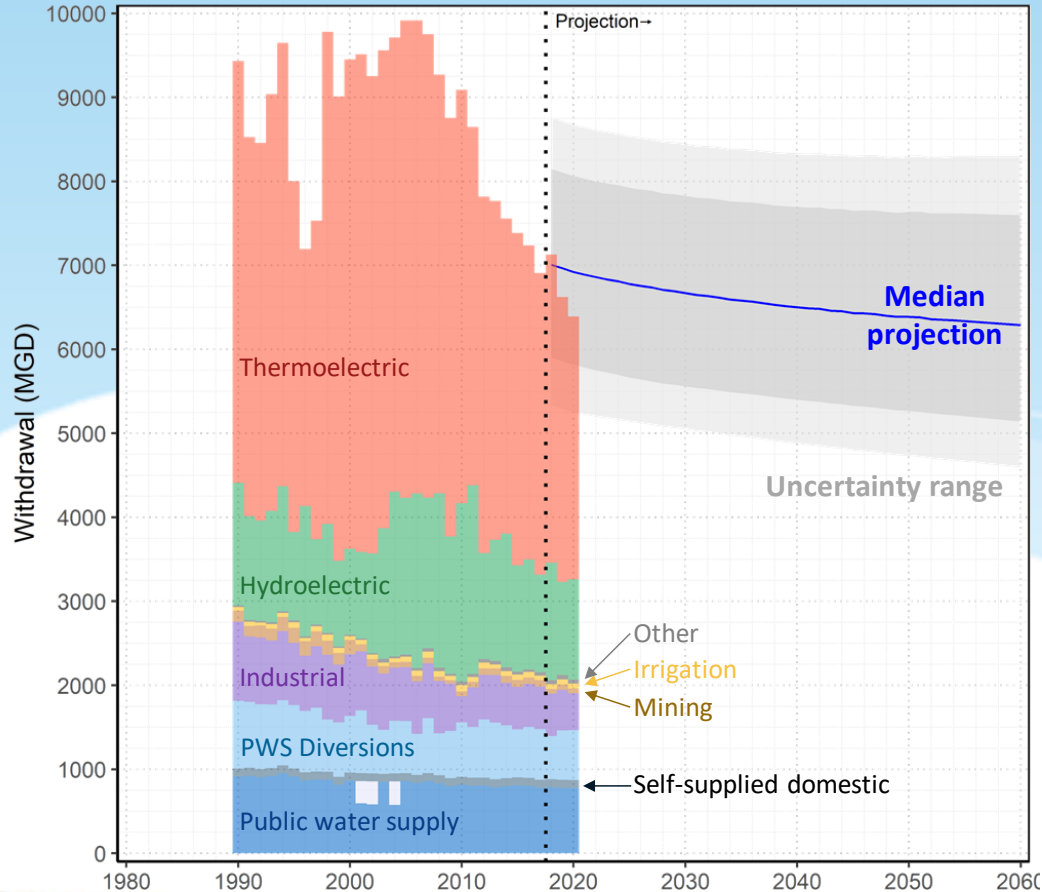


Surface water:
5,936 MGD
(93%)

Groundwater:
453 MGD
(7%)

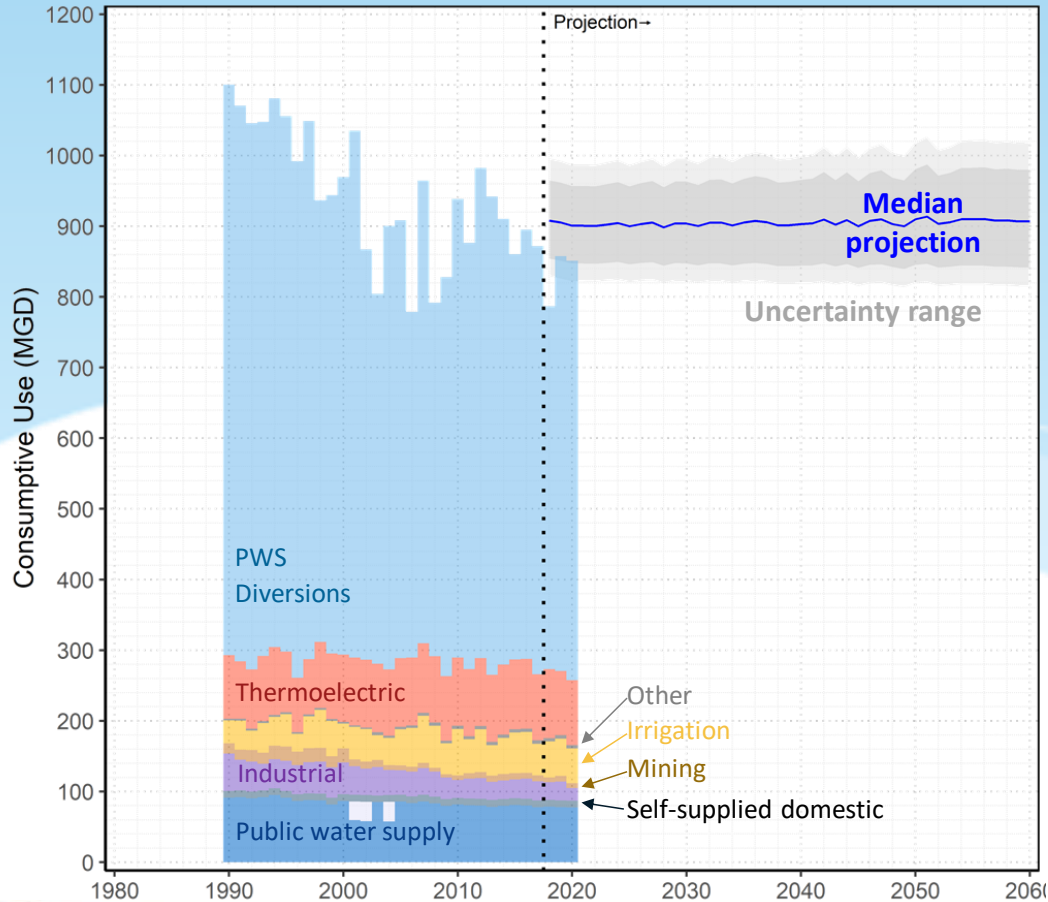


Historical and projected water withdrawals use in the Delaware River Basin



**Peak withdrawals have
already occurred**

Historical and projected consumptive use in the Delaware River Basin

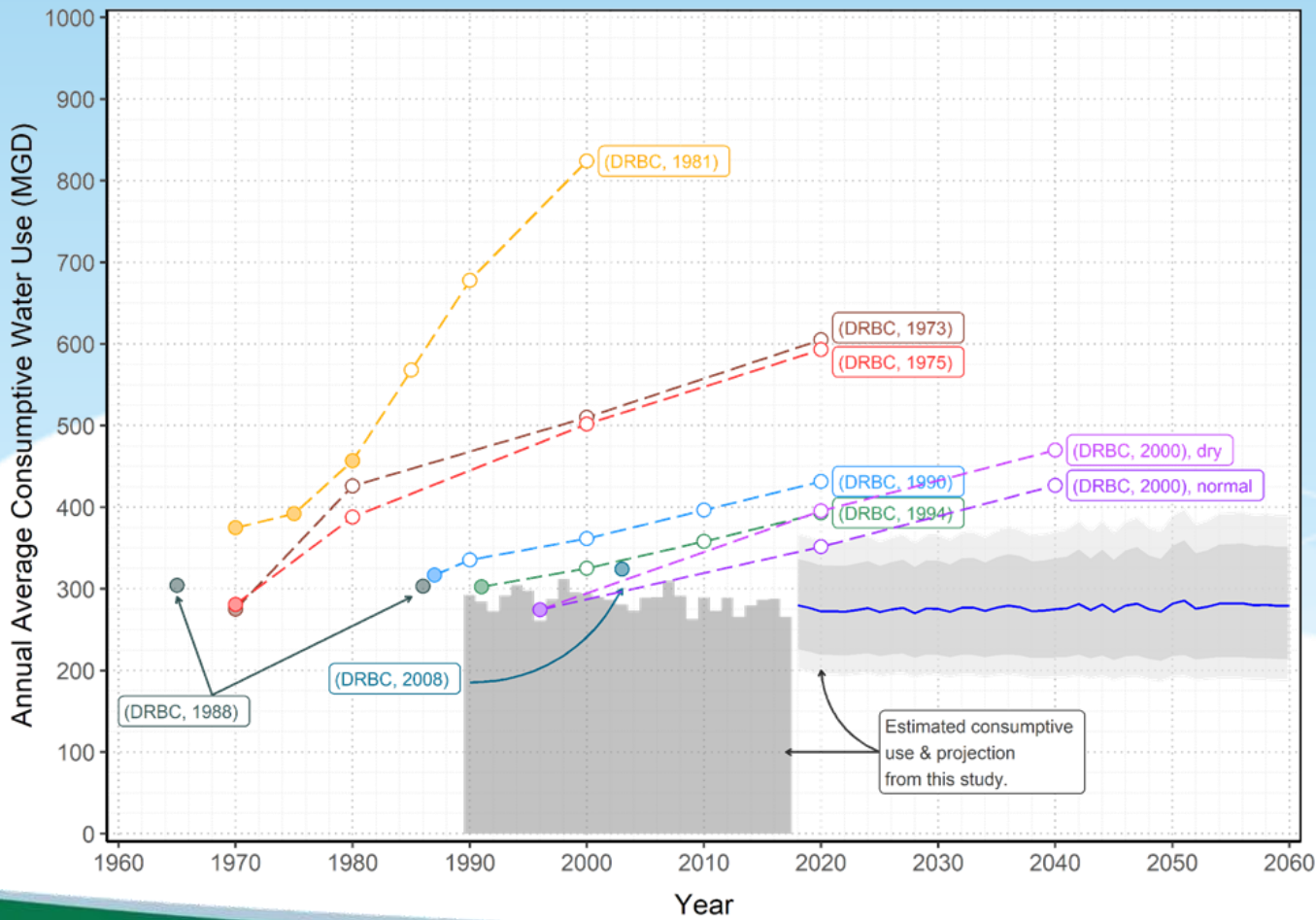


Consumptive use projected to remain relatively constant



3.2
Consumptive
Use

Previous DRBC projections of Basin-wide consumptive water use (comparison)





3

TECHNICAL REPORT FOR THE ESTUARY AND BASIN

Water Quantity

Several billion gallons are withdrawn each day from the Delaware River Basin for a variety of uses.

It is essential that we continue monitoring and planning to ensure that **future demand can be met sustainably.**

4



TECHNICAL REPORT FOR THE ESTUARY AND BASIN

Water Quality

Chapter 4 authors

Jake Bransky

Ron MacGillivray, PhD

4.1



TECHNICAL REPORT FOR THE ESTUARY AND BASIN

Water Quality

4.1.1 Tidal – Chemistry and Nutrients

4.1.1.1 Dissolved Oxygen

4.1.1.2 Nutrients

4.1.1.3 Salinity

4.1.1.4 pH

4.1.1.5 Temperature

4.1.2 Non-Tidal – Chemistry and Nutrients

4.1.2.1 Dissolved Oxygen

4.1.2.2 Nutrients

4.1.2.3 pH

4.1.2.4 Temperature

JULY DAILY AVERAGE DISSOLVED OXYGEN AT BEN FRANKLIN BRIDGE 1965-2020

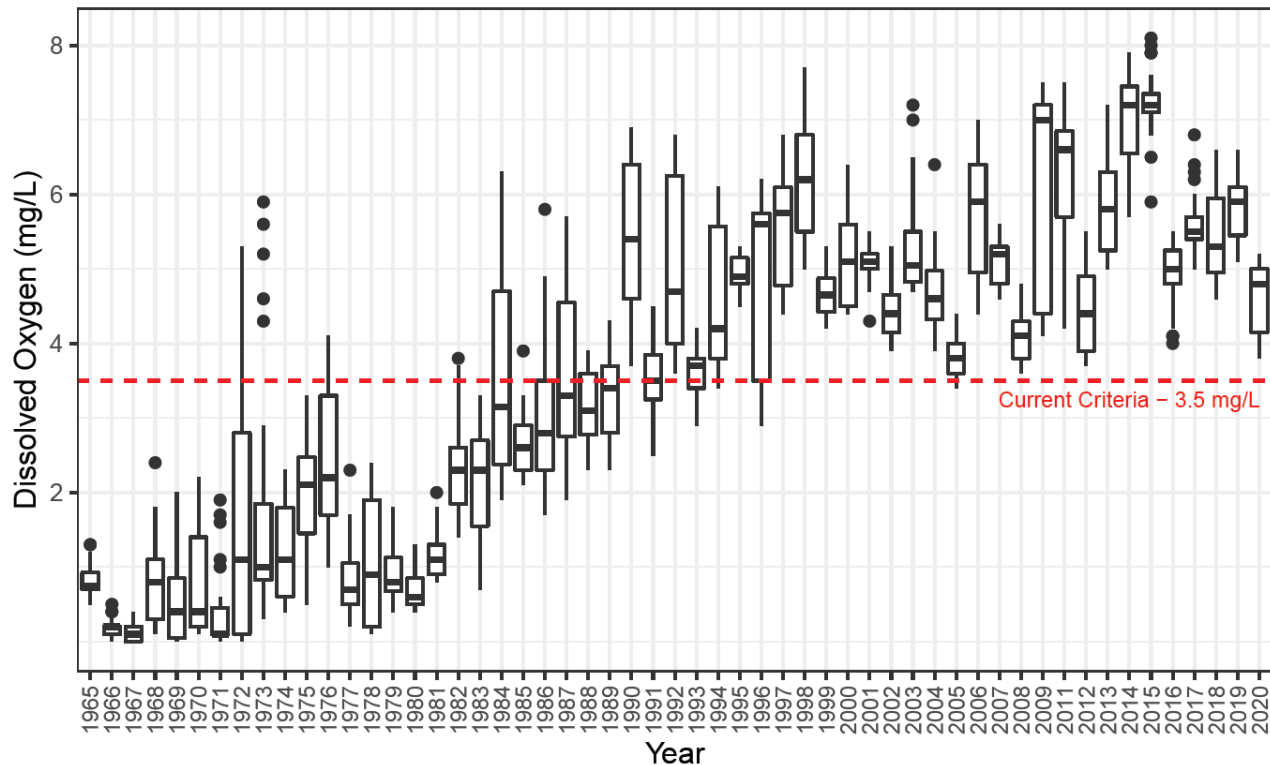
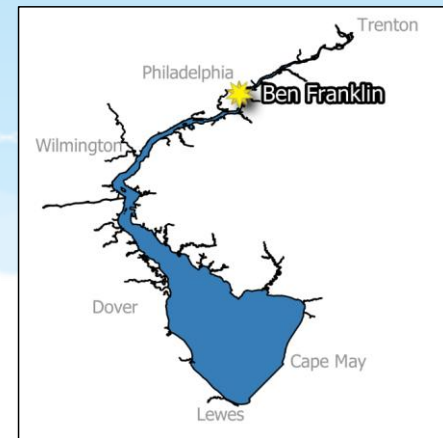


Figure 4.1.2 Delaware Estuary July daily mean dissolved oxygen concentrations by year at USGS at Ben Franklin Bridge, 1965 through 2020.

4.1

Tidal – Chemistry and Nutrients

Dissolved Oxygen



SPECIFIC CONDUCTIVITY AT BEN FRANKLIN BRIDGE 1964-2020

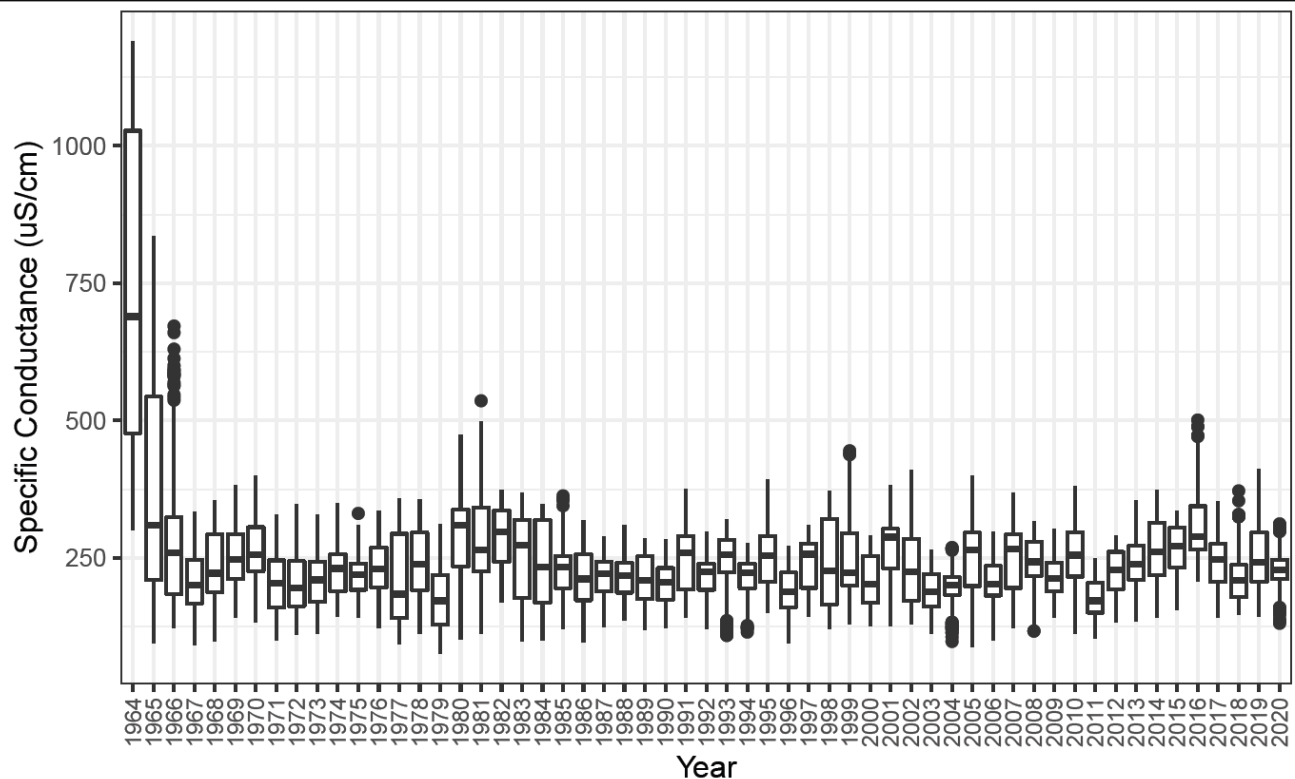
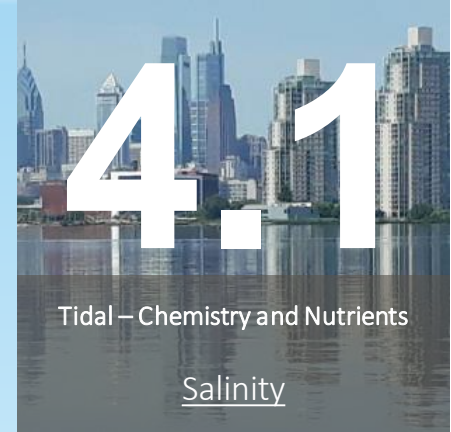


Figure 4.1.13 Long-term specific conductivity box and whisker plots at USGS 01467200, Ben Franklin Bridge.



DAILY TEMPERATURE RESIDUALS AT BEN FRANKLIN BRIDGE AND REEDY ISLAND 1964-2020



Tidal – Chemistry and Nutrients

Temperature

*Ben
Franklin*

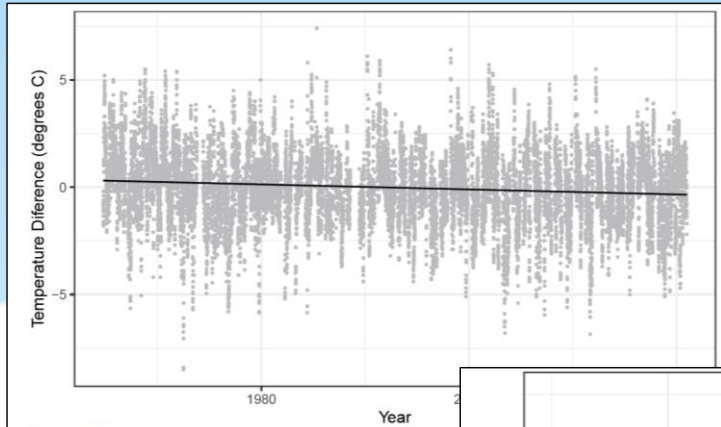


Figure 4.1.21 Delaware River summer residuals at USGS 01467

*Reedy
Island*

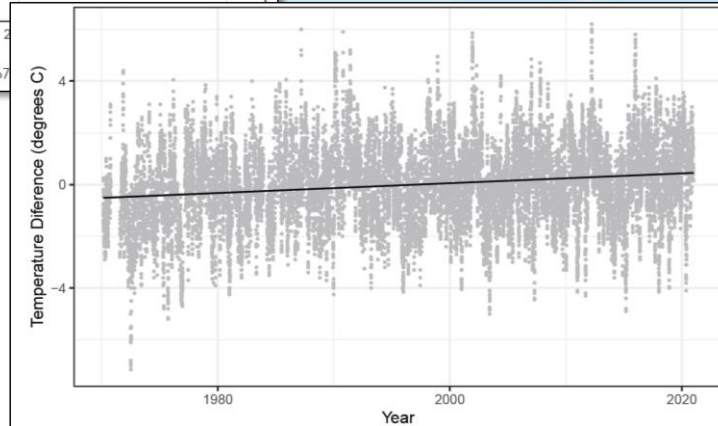
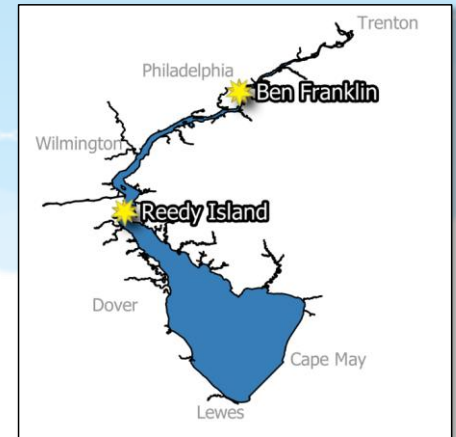


Figure 4.1.22 Delaware River summer residuals at USGS 01482800, Reedy Island Jetty.



4.2



TECHNICAL REPORT FOR THE ESTUARY AND BASIN

Water Quality

4.2.1 Tidal – Contaminants

4.2.1.1 Contaminants

4.2.1.2 Fish Contaminant Levels

4.2.1.3 Emerging Contaminants

4.2.1.4 Whole Effluent Toxicity

4.2.2 Non-Tidal – Contaminants

4.2.2.1 Contaminants

4.2.2.2 Fish Contaminant Levels

4.2.2.3 Emerging Contaminants

PHARMACEUTICAL AND PERSONAL CARE PRODUCTS IN SURFACE WATER OF THE DELAWARE ESTUARY

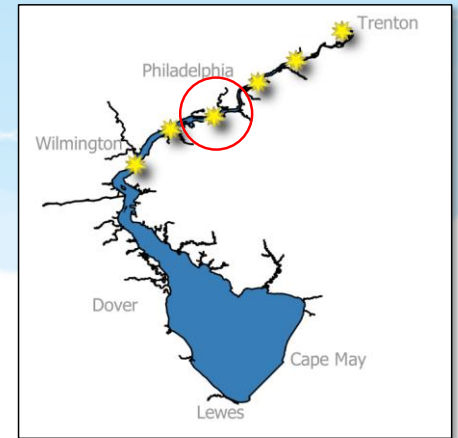
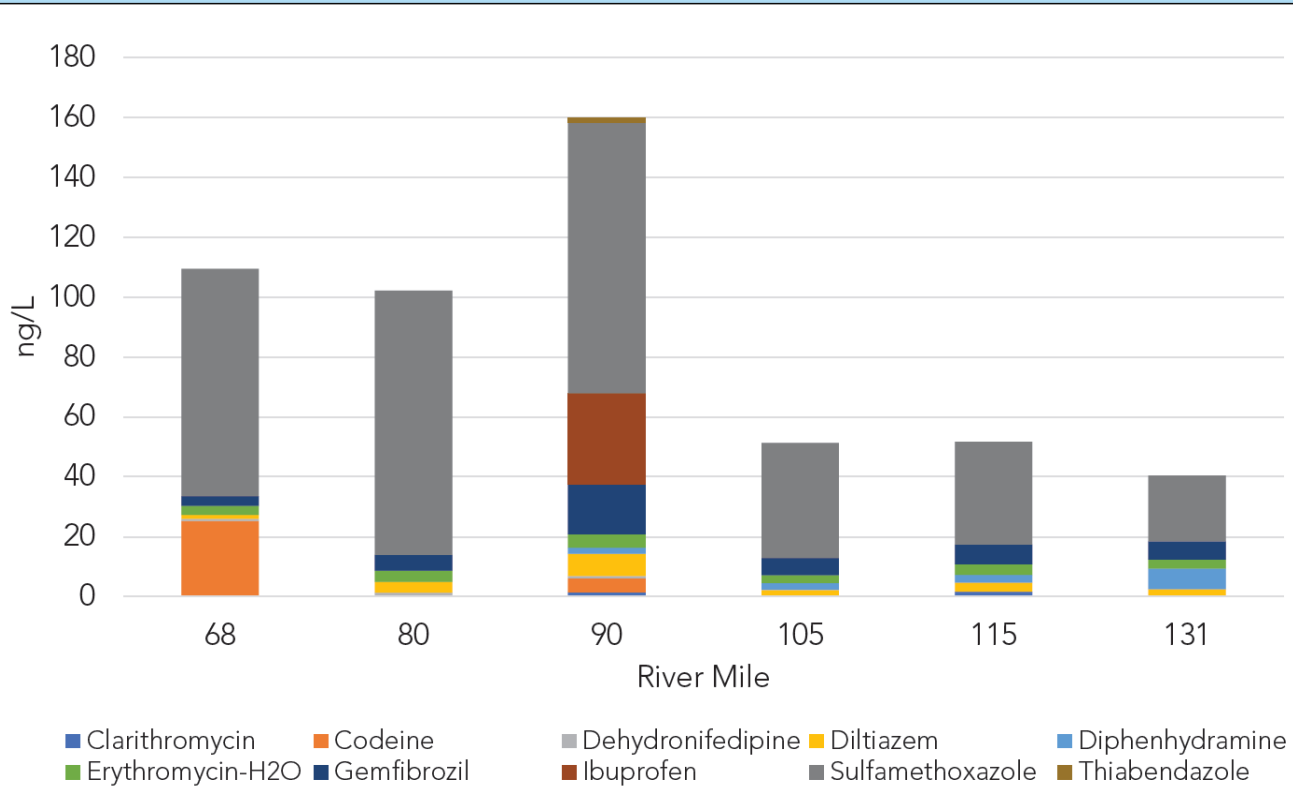


Figure 4.2.1 PPCP in surface water collected on September 25, 2017, from the Delaware River.

PFAS IN SURFACE WATER OF THE DELAWARE ESTUARY

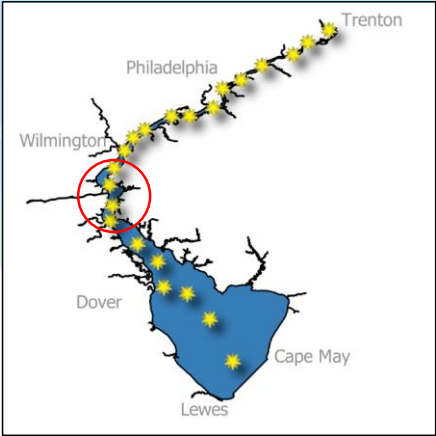
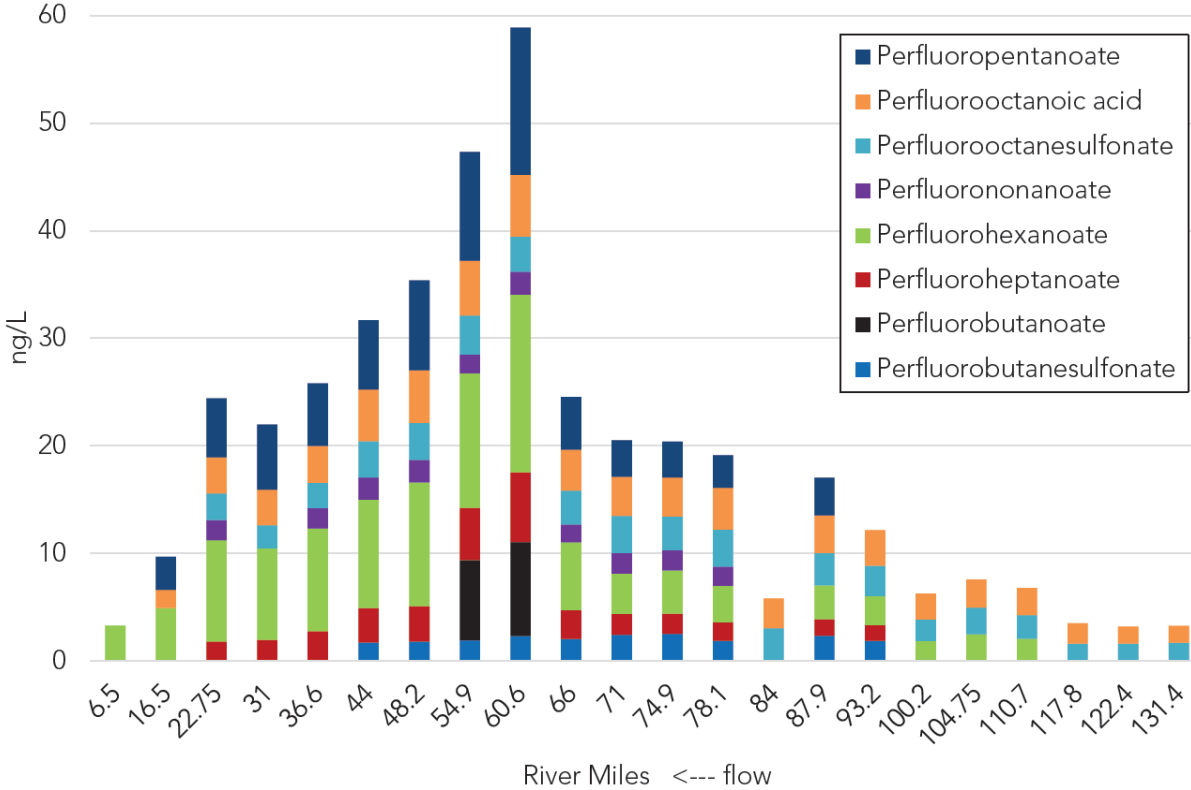


Figure 4.2.2 PFAS in surface water collected on September 20, 2021, from the Delaware River.

4



TECHNICAL REPORT FOR THE ESTUARY AND BASIN

Water Quality

Aspects of Delaware Estuary water quality have **improved remarkably** from historical lows in the mid-20th century.

Further improvement is possible and continued work is necessary **to protect and enhance water quality** in the face of climate change, sea level rise, development, and other unforeseen stressors.

Thank you for joining us!

Give feedback on this session and find your next session on the
CVENT Attendee Hub!

Please dispose of your trash and return chairs to
their original position upon leaving.

Join the conversation on social media! Tag @DelRivCoalition
with #DelRivForum2023!



Coalition for the
Delaware River
Watershed

11th Annual Delaware River Watershed Forum

Small Wonder, Big Impact across the Delaware River Watershed.

Thank you
Sponsors:



Proud Member of
The Corps Network
Strengthening America through
service and conservation

