

The Delaware River Basin Commission: Its History and Current Issues

**New Jersey Water Environment Association –
Fall Technology Transfer Seminar**
October 21, 2025

Kristen Bowman Kavanagh, P.E., *Executive Director*
Thomas Amidon, MS, BCES, *Manager of Water Resource Modeling*



The Delaware River Basin Commission is a federal-interstate Compact agency established in 1961.



Keith Balderston

Our Mission

Manage, protect, and improve the water resources of the Delaware River Basin.

Our Vision

Provide trusted, effective, and coordinated management of the Basin's shared water resources.

The Delaware River Basin Compact charges the Commission to balance competing needs.



The Basin state Governors and the USACE NAD Commander are the DRBC Commissioners.



Delaware Governor, Matt Meyer,
DRBC Chair



Pennsylvania Governor, Josh Shapiro
DRBC Vice Chair



New Jersey Governor, Phil Murphy



North Atlantic Division Commander
US Army Corps of Engineers, Col. Jesse Curry

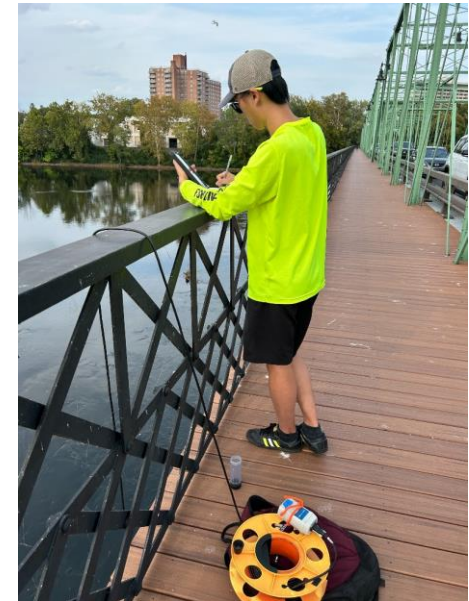


New York Governor, Kathy Hochul



Staff effectuate Commission policies & programs with a limited budget.

- Professional scientists, engineers, and planners
- 40 budgeted staff (10% vacancy rate)
- FY2026 budget = \$9 million
- Located in West Trenton, NJ



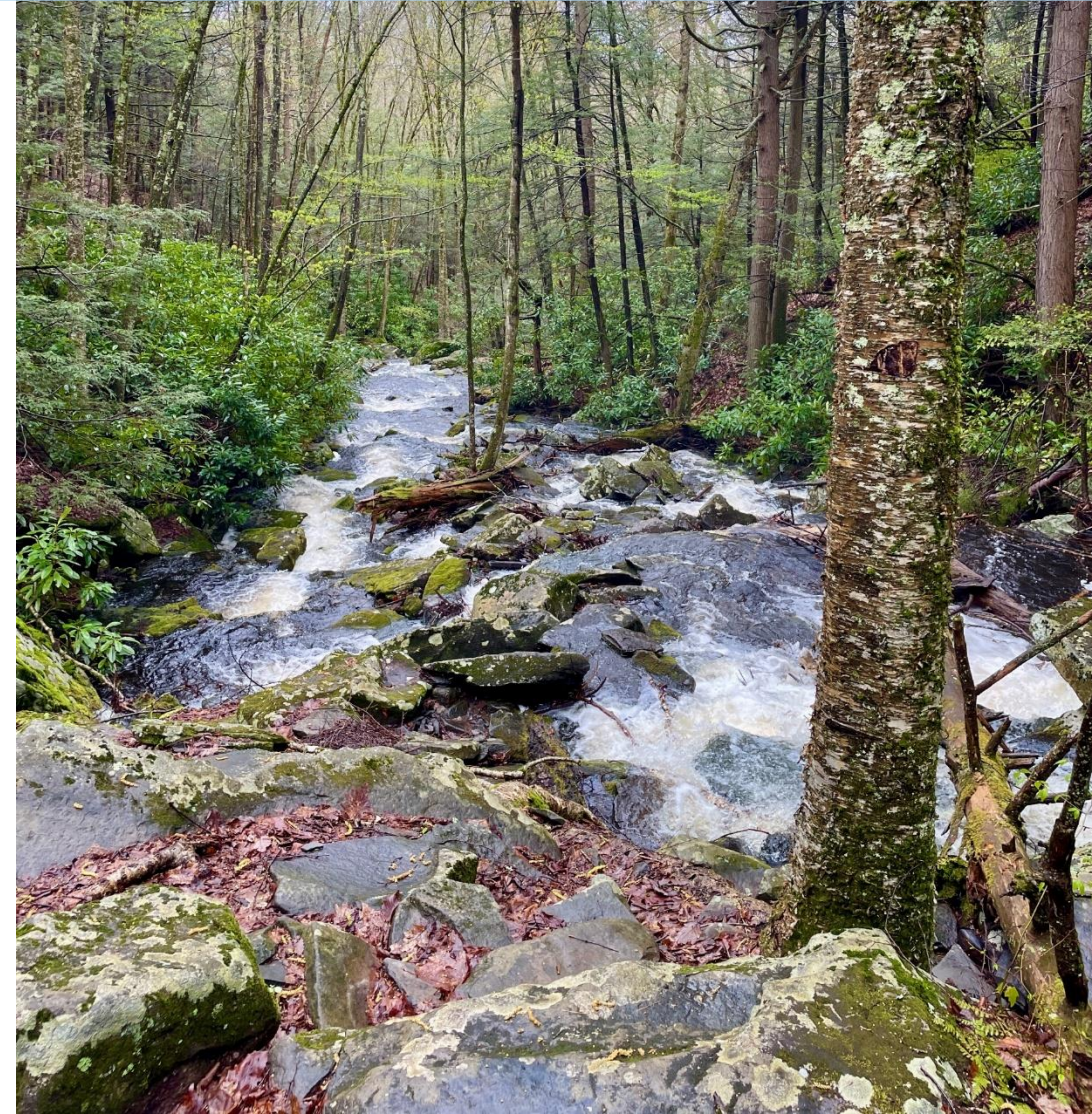
DRBC's programs address two broad topics.

WATER QUANTITY

An adequate and
sustainable
supply of water

WATER QUALITY

Clean and
healthy water
resources



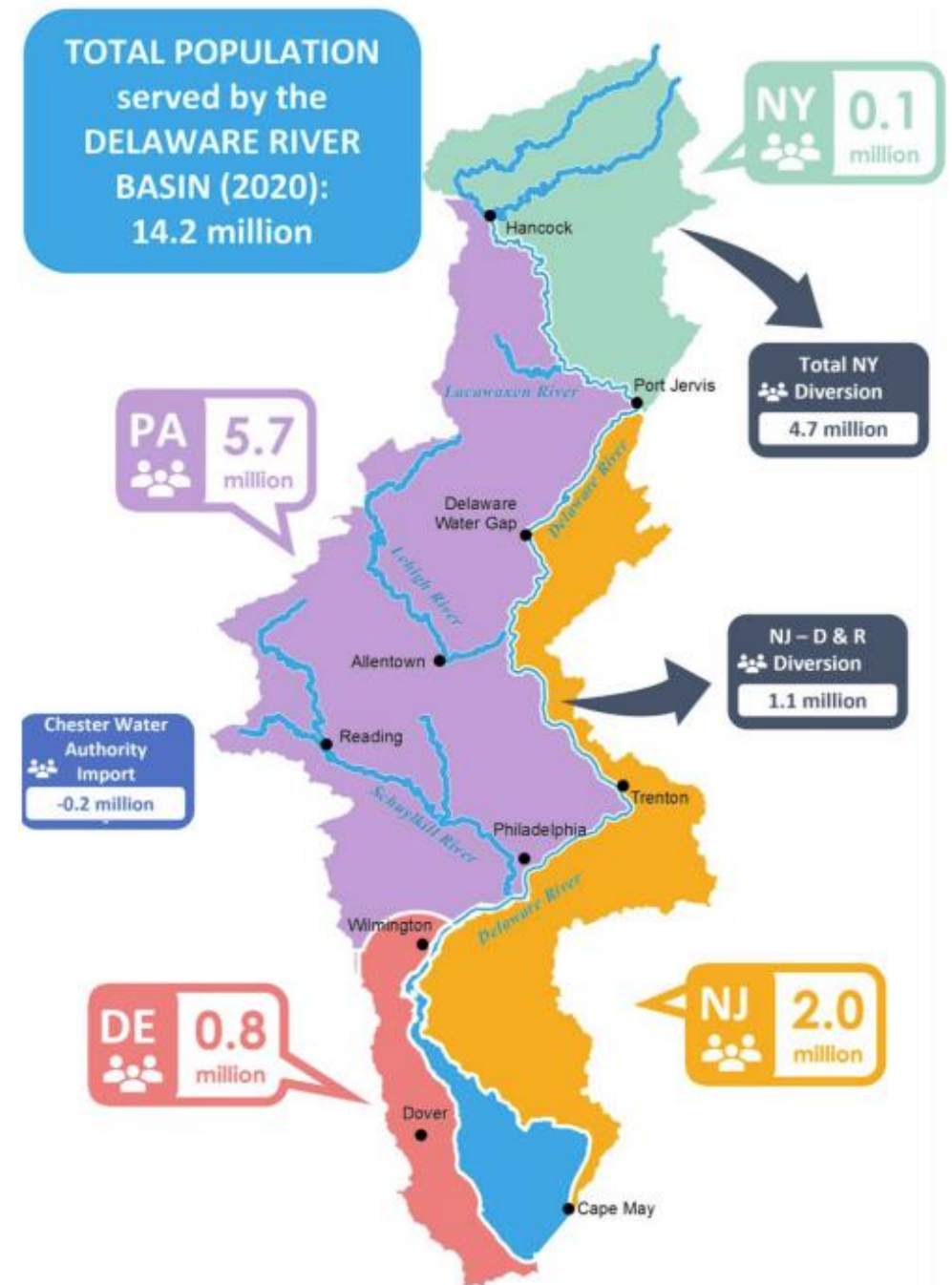


DRBC's water resources programs support comprehensive Basin management.

Planning	Operations	Regulation	Science
Sustainable water availability	Flow / reservoir management	Water withdrawals	Water quality assessments & criteria development
Future water use	Drought management	Wastewater discharges	Water quality monitoring
Consumptive water use	Salinity control	Special protection waters	Emerging contaminants
Water efficiency	Decree parties	Groundwater protected areas	Toxic pollutants
Water audits	Hydrologic models	Water quality standards - interstate waters	Fish tissue analyses
Source water protection	Water charges	Flood protection	Reduction of legacy pollutants - PCBs
Intergovernmental Coordination and Action ~ Project Review ~ Watershed Management Resilience Planning ~ Equitable Access ~ Public Outreach, Education and Input			

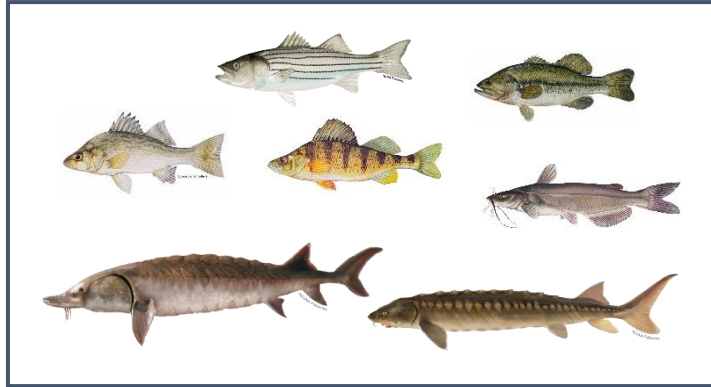
The waters of the Basin are a critical resource for the mid-Atlantic region:

- Drinking water for >14 million people (~5% of U.S.)
- 2nd highest electric-producing watershed in the nation
- Largest freshwater port in U.S.
- Critical habitat
- Over \$21B in economic value





How is water used and regulated in the Basin?



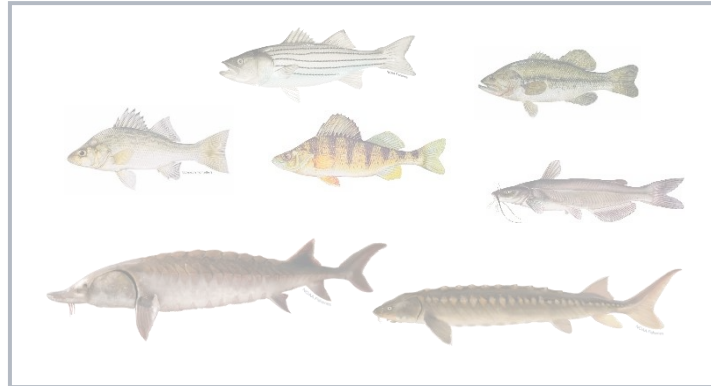
Dissolved oxygen: a pathway toward continued restoration.



What's next?



How is water used and regulated in the Basin?

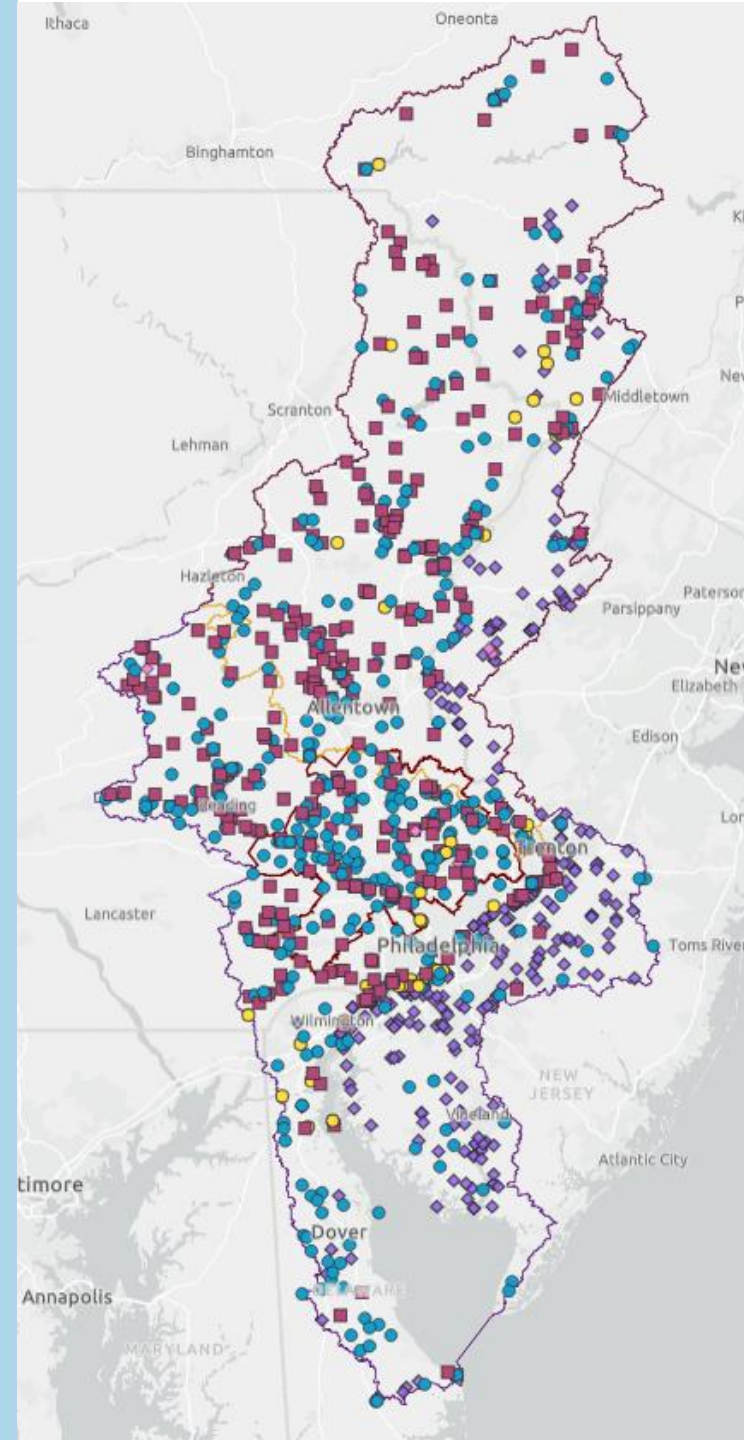


Dissolved oxygen: a pathway toward continued restoration.



What's next?

The majority of dockets in the Basin are for water withdrawals and discharges.



Delaware River Basin

Approved Dockets

All Docket

- Water Withdrawal
- Wastewater Discharge
- ◆ Combined Dockets
- Other

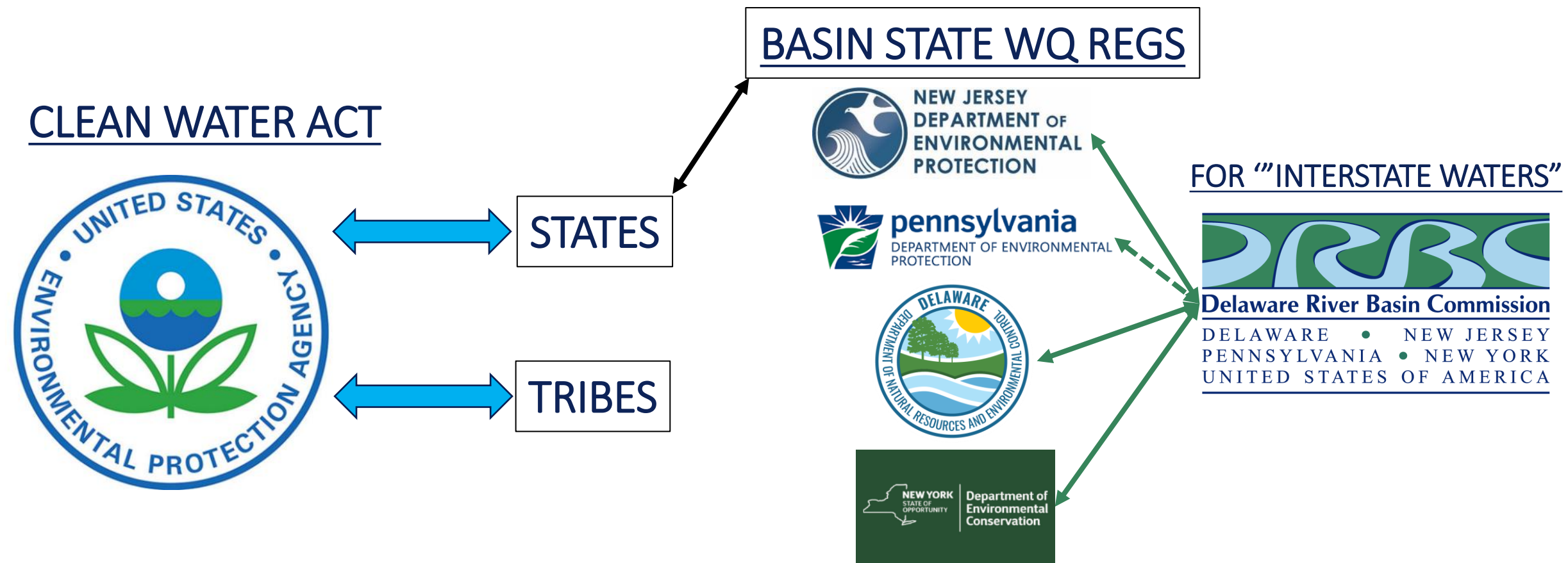
OP Dockets



What projects are reviewable by the DRBC?

- Any project which may have a substantial effect on the water resources of the Basin (Compact, Section 3.8)
- 18 CFR 401.35 includes classifications of reviewable projects including WWTP discharges & withdrawals:
 - WWTP Discharges:
 - $\geq 50,000$ gpd design capacity
 - *Exception: $\geq 10,000$ gpd design capacity in Special Protection Waters (SPW)*
 - SW & GW Withdrawals:
 - $> 100,000$ gpd during any consecutive 30-day period
 - *Exception: $> 10,000$ gpd GW in SE PA Groundwater Protected Area*

Basin state regulations “refer or defer” to DRBC for water quality management in “interstate” waters.



NJDEP has an AA with DRBC under One Permit Program.

- Eligible projects include withdrawals and WWTP discharges in NJ.
- Managed through **single, more efficient process** resulting in one approval (permit) issued by the state.
- Achieves same or improved environmental results.



Does not change the authority and/or regulatory standards of the DRBC or state agency.

What does the One Permit Program look like for discharges?



- Applies to Domestic and Industrial WWTPs:
 - $\geq 10,000$ gpd design capacity in Special Protection Waters (SPW)
 - $\geq 50,000$ gpd design capacity in Non-SPW
- [NJDEP lead](#) agency
- Regular collaboration between State and DRBC
- NJPDES permit includes finding, based on DRBC staff's recommendation, that project does not substantially impair or conflict with DRBC Comprehensive Plan
- **One permit** – issued by State that includes State *and* DRBC requirements, relying on the most protective/stringent

What does the One Permit Program look like for withdrawals?



- Applies to Withdrawals of Surface Water or Groundwater:
- >100,000 gpd average over any consecutive day period
- **NJDEP lead** agency
- Regular collaboration between State and DRBC
- Water Allocation permit includes finding, based on DRBC staff's recommendation, that project does not substantially impair or conflict with DRBC Comprehensive Plan
- **One permit** – issued by State that includes State and DRBC requirements, relying on the most protective/stringent

What to expect in a One Permit Program permit?



- DRBC Recommendations within 30 days of issuance of pre-draft or draft permits
- Standard DRBC conditions in Permit
- **Additional effluent monitoring** for DRBC effluent limitations
- **Additional DRBC conditions or requirements** (PCB monitoring, toxicity or thermal mixing zone analysis, etc.)
- Section 3.8 FINDING statement

Keep an eye out in 2026 for DRBC's new online applicant portal.



Delaware River Basin Commission Portal

[Need to Register?](#)

[Reset Password?](#)

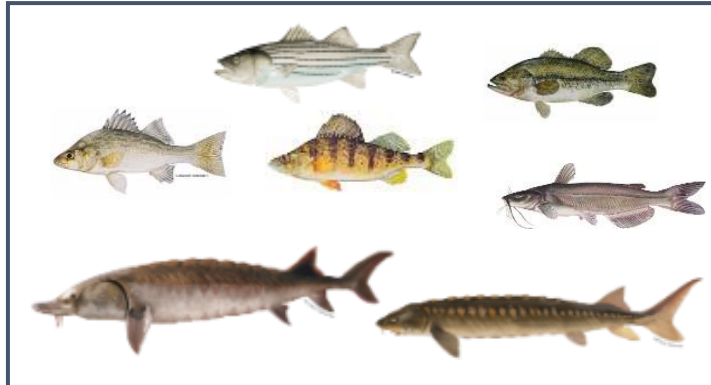
Sign In

Delaware River Basin Commission
Access is restricted to authorized users only.
Contact the [System Administrator](#) with any questions.





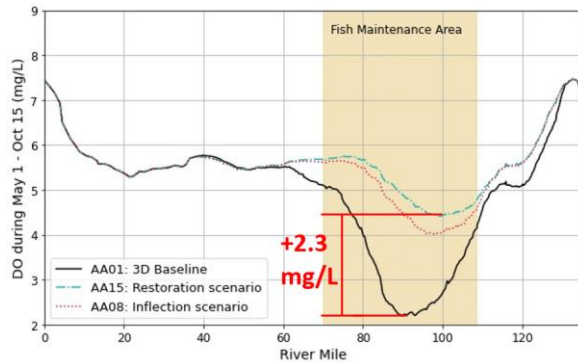
How is water used and regulated in the Basin?



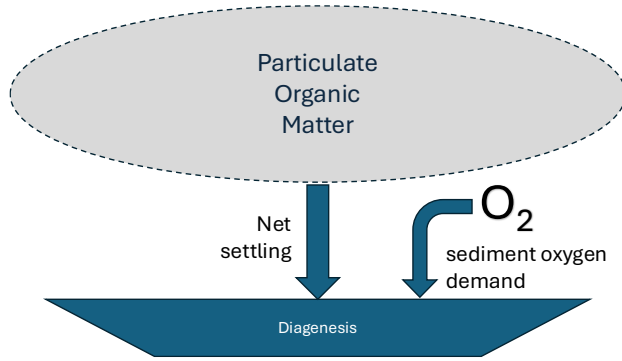
Dissolved oxygen: a pathway toward continued restoration.



What's next?



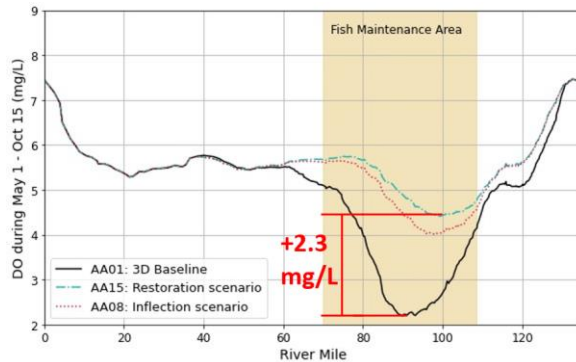
A Pathway for Continued Restoration of Dissolved Oxygen in the Estuary



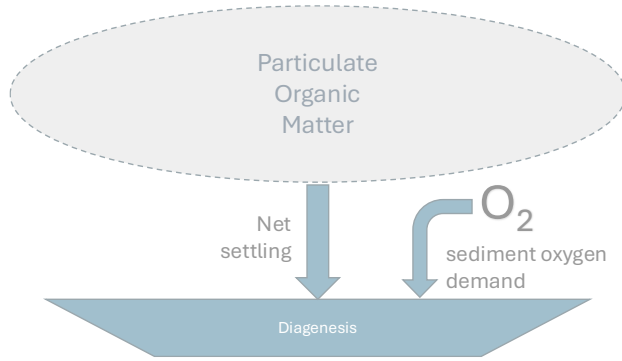
What improvements is DRBC making to its model and why?



Implementation Strategy for New Dissolved Oxygen Criteria



A Pathway for Continued Restoration of Dissolved Oxygen in the Estuary

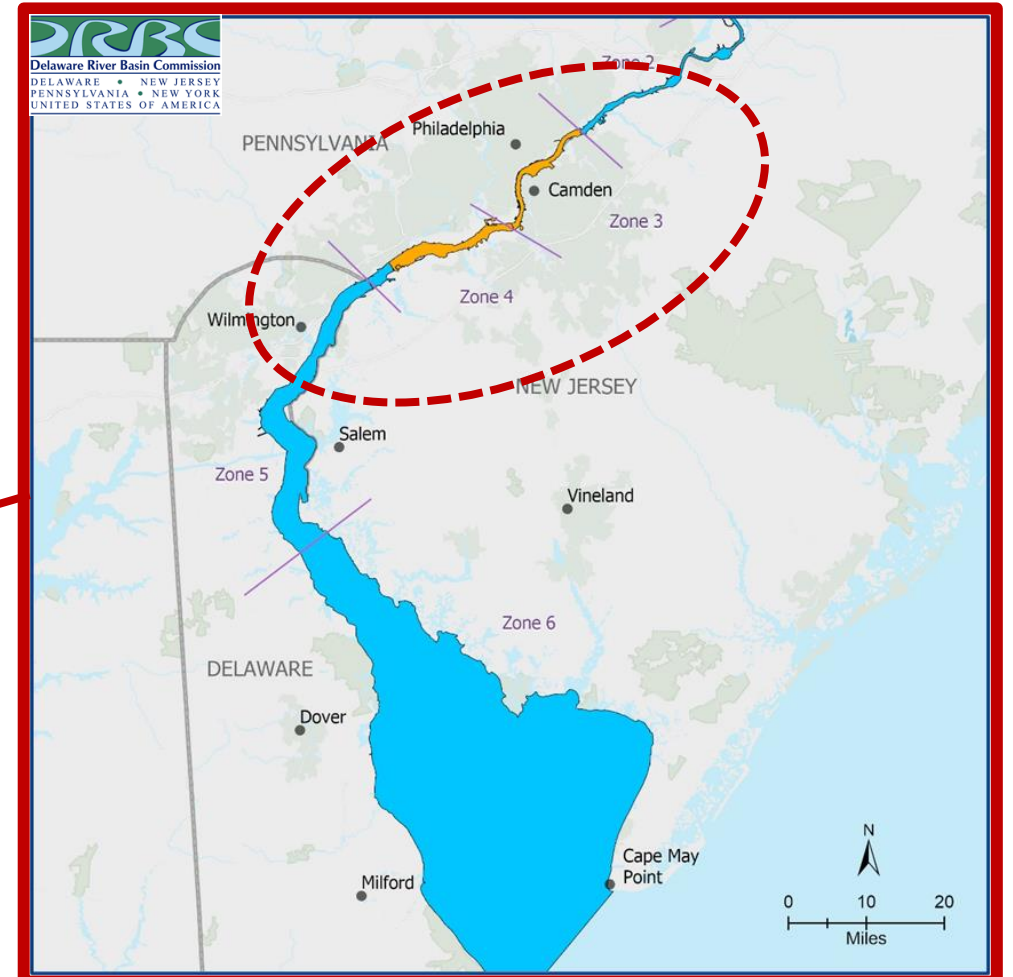
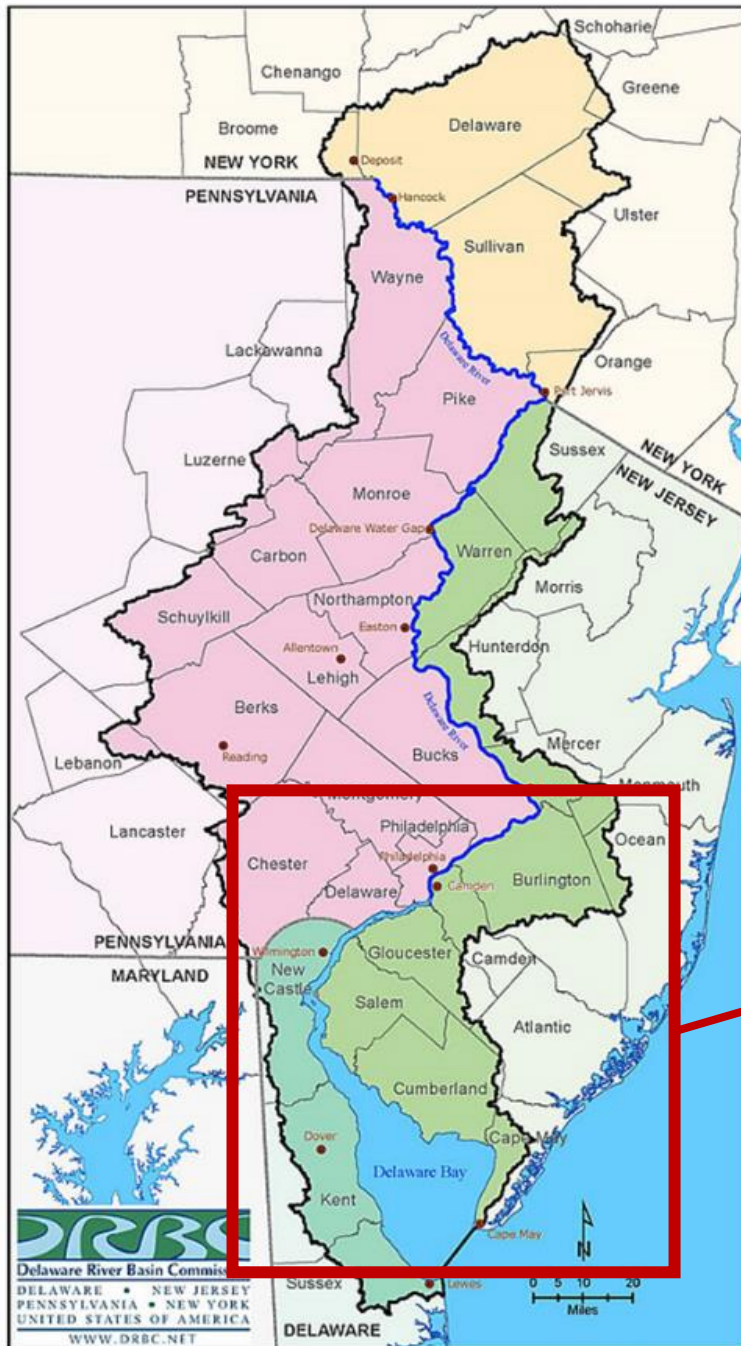


What improvements is DRBC making to its model and why?



Implementation Strategy for New Dissolved Oxygen Criteria

This presentation will focus
on water quality in the
Delaware River Estuary

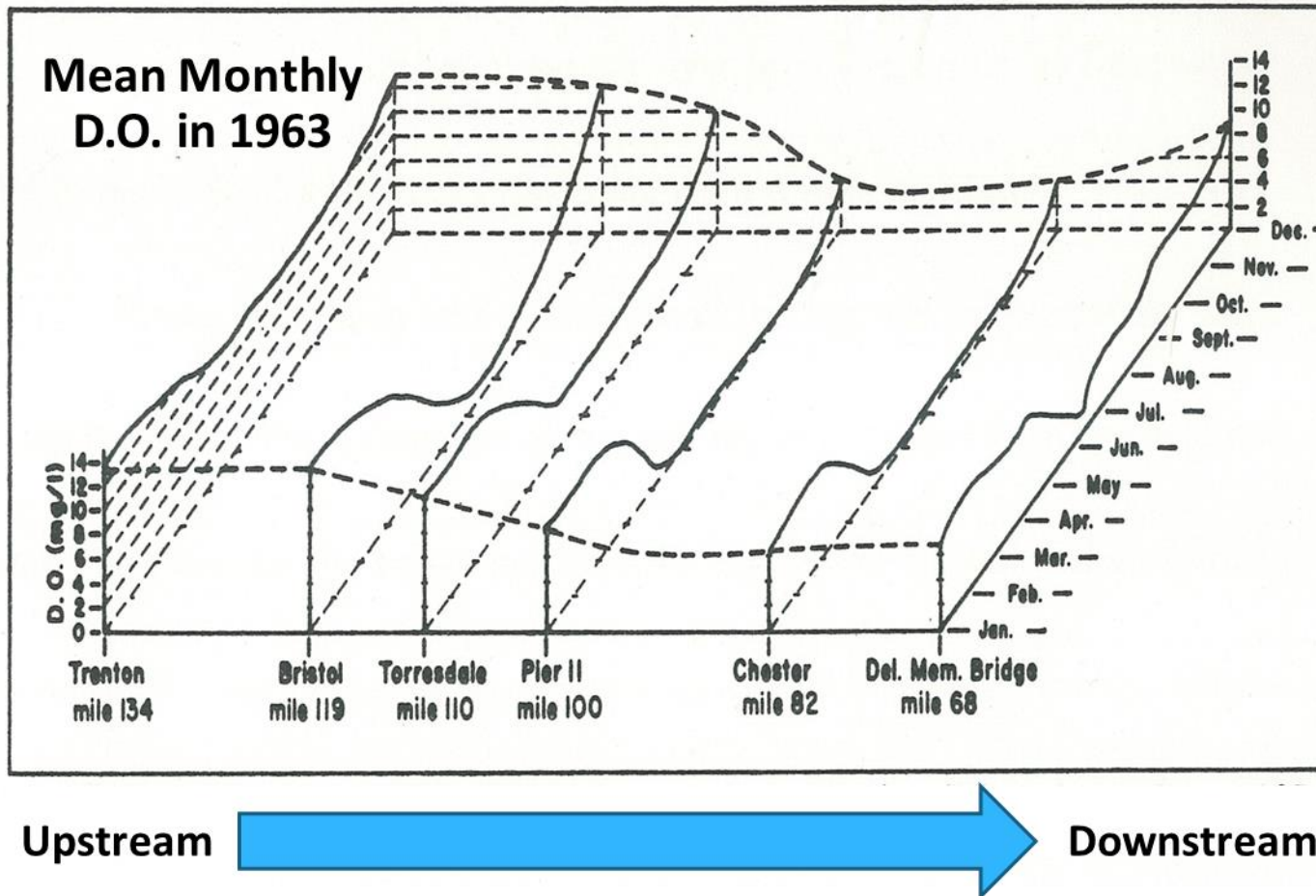




Water Quality in mid-1900s in Delaware Estuary

- Historically, Estuary was anoxic throughout the summer from Ben Franklin Bridge to Chester
- Caused by human and industrial wastes
 - CBOD: oxidation of carbon
 - NBOD: oxidation of ammonia
- DRBC established
 - Water Quality Standards in 1967*
 - CBOD wasteload allocations in 1968
- Federal grants provided under Clean Water Act

*** Goal for urban estuary was fish maintenance with ≥ 3.5 mg/L DO**

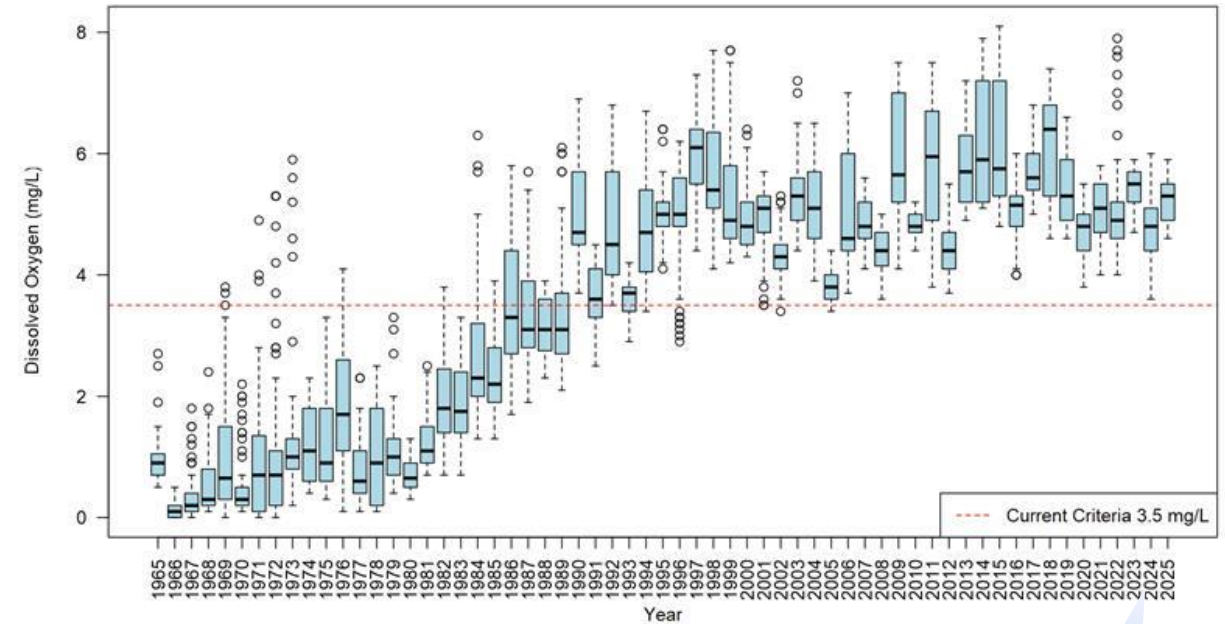


Historical dissolved oxygen recovery driven by carbon reductions

- DRBC wastewater CBOD allocations in 1968
- Federal Clean Water Act grants for improved wastewater treatment

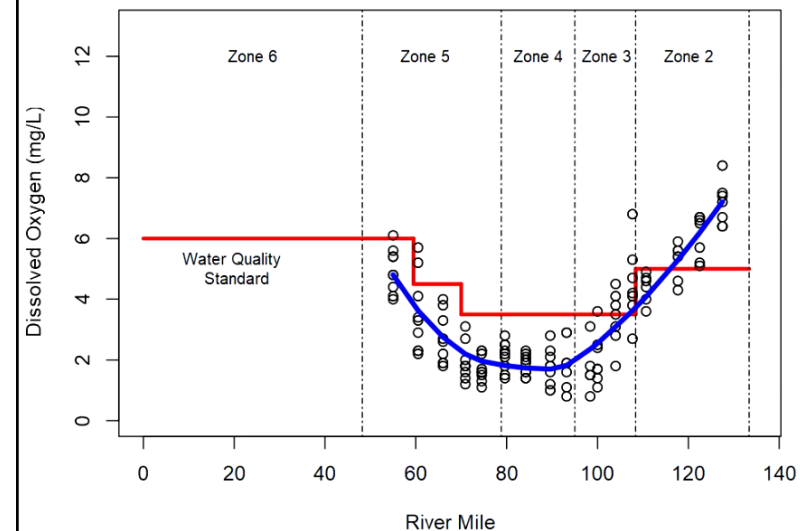


July & August Dissolved Oxygen by Year
USGS Monitor 01467200, Delaware River at Penns Landing (formerly Ben Franklin Bridge)



Graphs prepared by John Yagecic, DRBC

DRBC Delaware Estuary Monitoring
July & August 1967

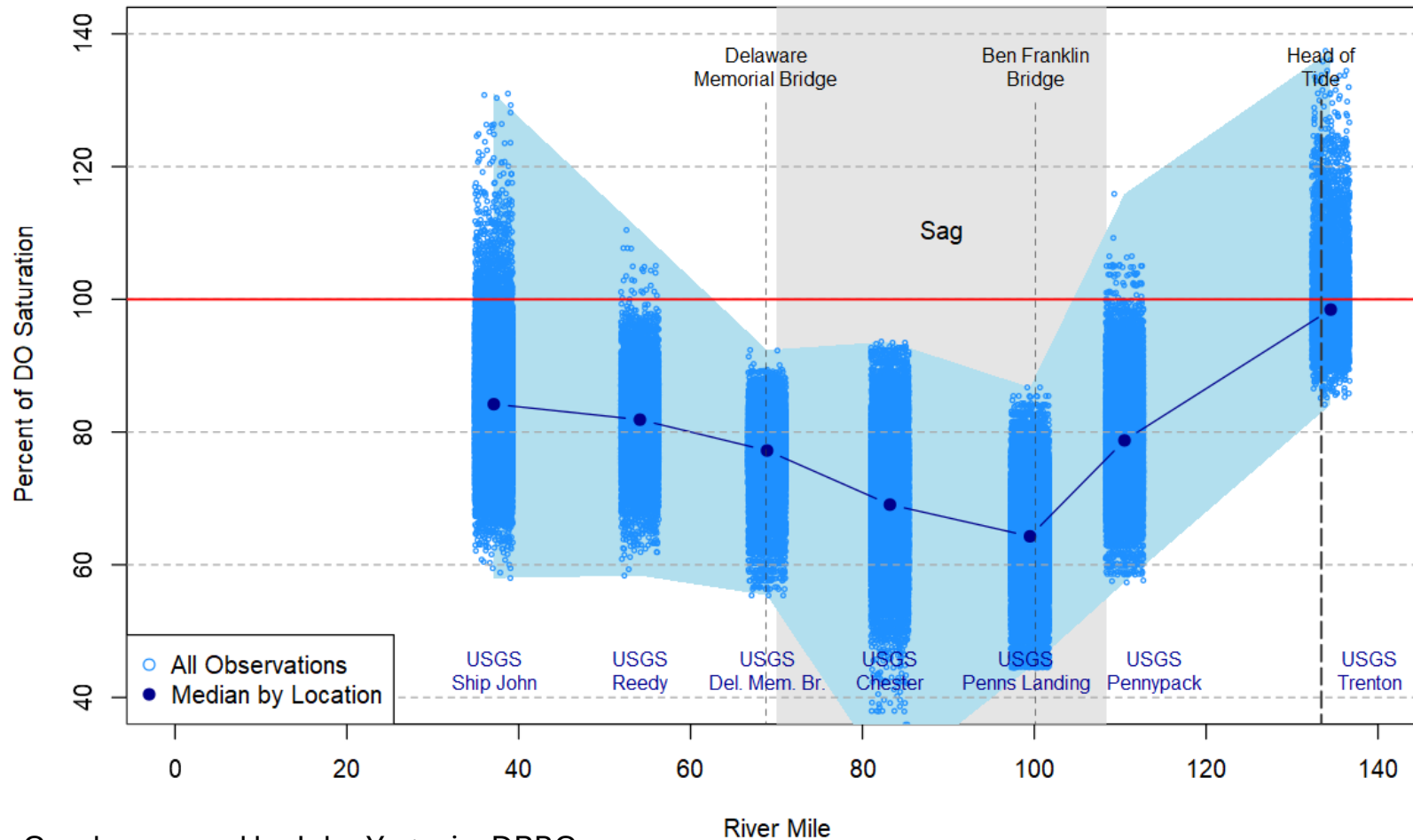


Historical
Dissolved
Oxygen
Recovery



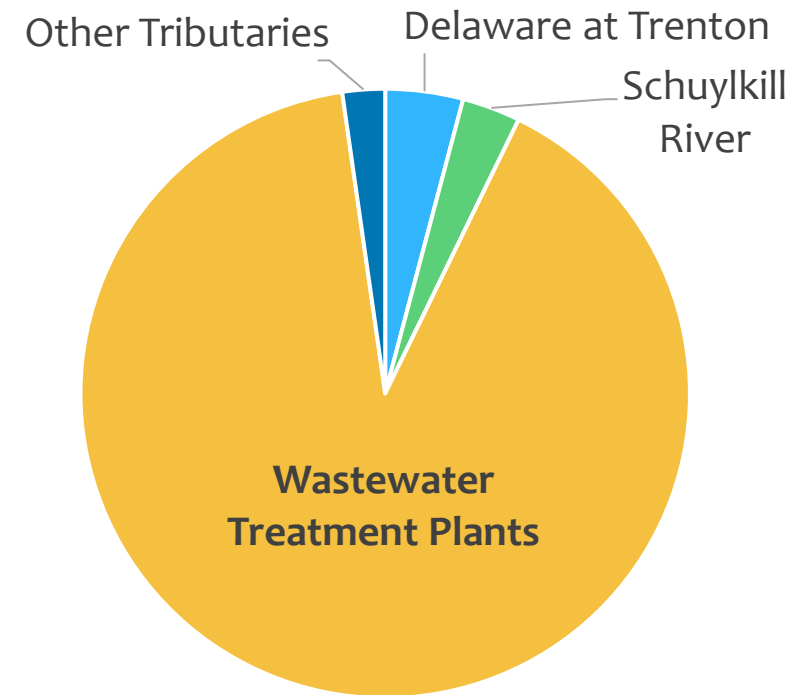
“DO sag” still persists

Delaware Estuary Dissolved Oxygen
July & August 2023 to 2025 USGS Observations



Graph prepared by John Yagecic, DRBC

Ammonia Loads by Source

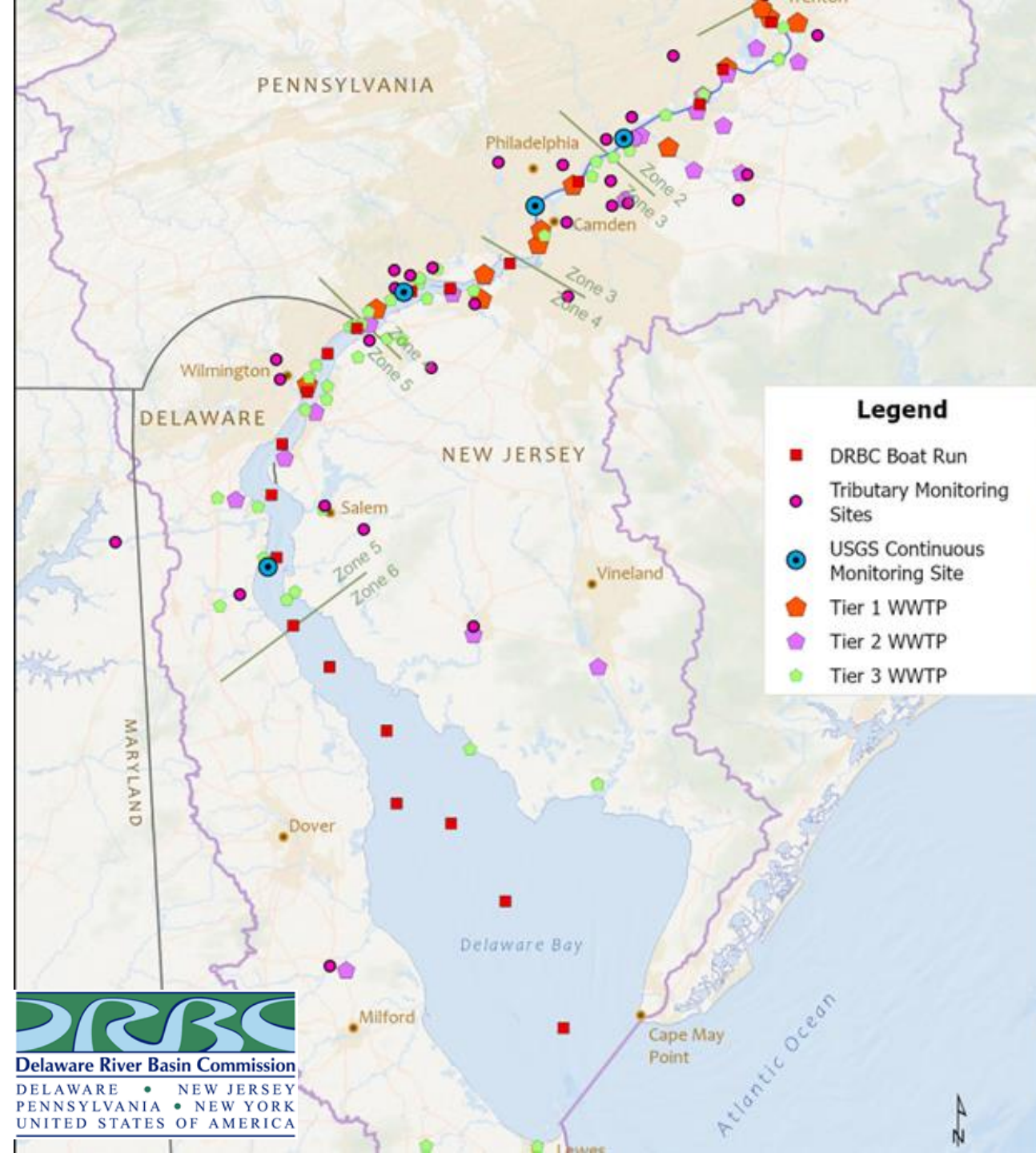


DRBC performed detailed technical studies

- Extensive monitoring 2018-19
- Hydrodynamic modeling
- Water quality modeling
- Final reports published 2024
 - Incorporated WQAC comments from 2022 draft reports

Purpose:

To determine dissolved oxygen levels that would result from various pollutant reduction scenarios.



September 2024

A PATHWAY FOR CONTINUED RESTORATION: IMPROVING DISSOLVED OXYGEN IN THE DELAWARE RIVER ESTUARY

Technical Report No. 2024-6

FINAL REPORT

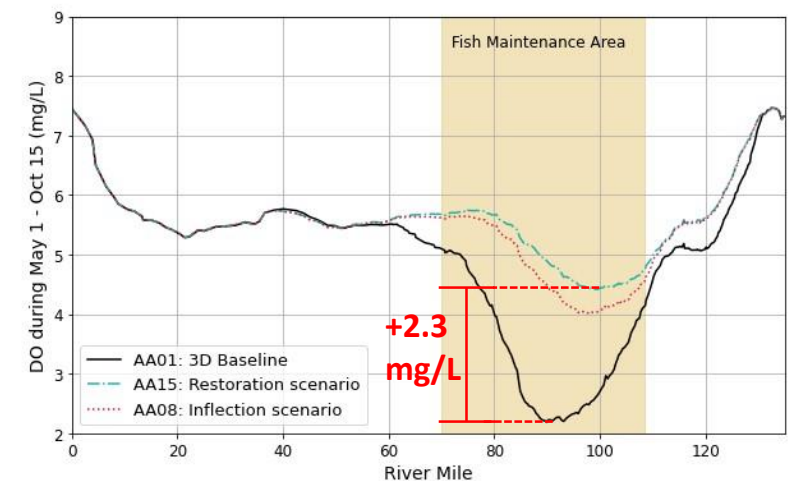
Managing, Protecting and Improving
the Water Resources of the
Delaware River Basin since 1961

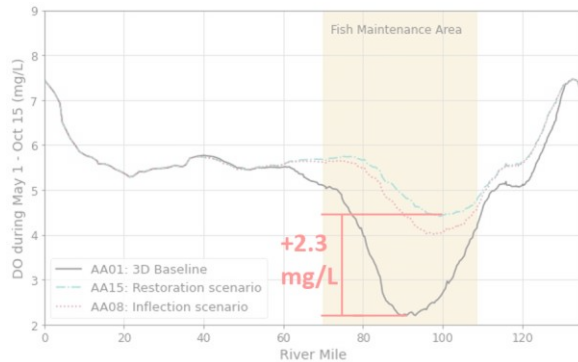


The “Pathway for Continued Restoration” shows that:

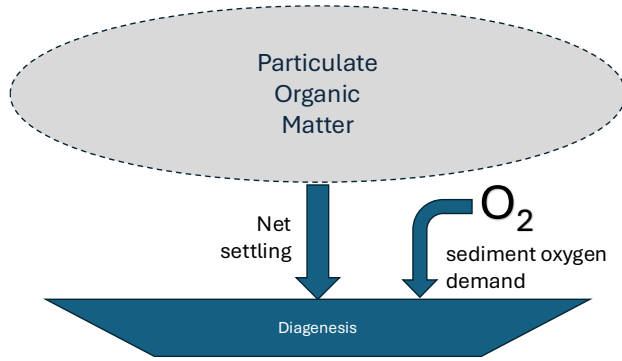
- The “DO sag” is driven by summer ammonia loads from a small number of WWTPs
- The addition of feasible treatment would significantly improve DO in the urban estuary.

1st Percentile DO





A Pathway for Continued Restoration of Dissolved Oxygen in the Estuary



What improvements is DRBC making to its model and why?



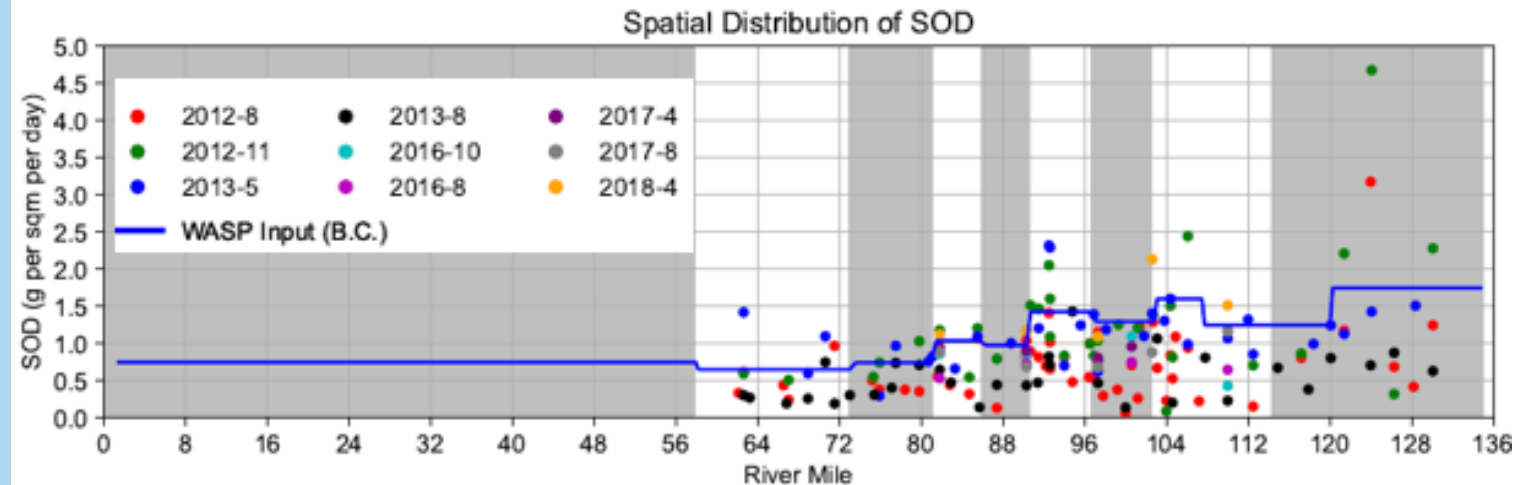
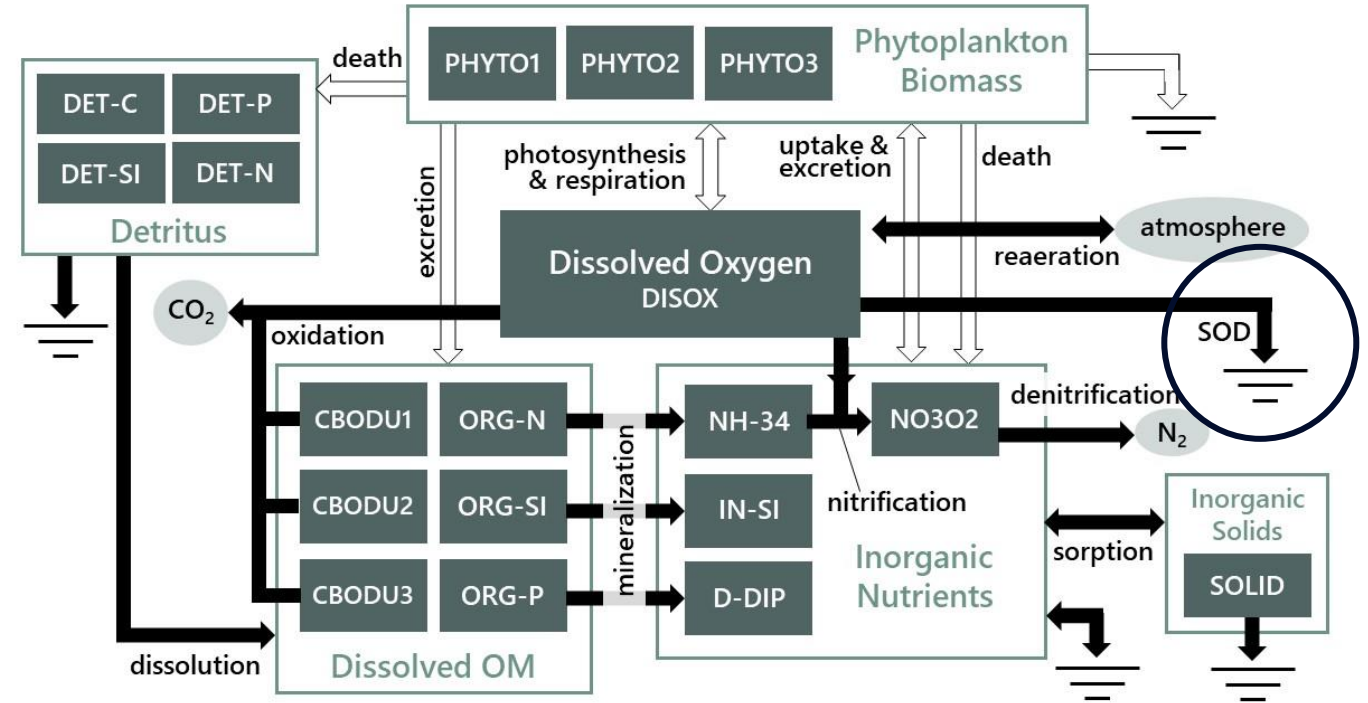
Implementation Strategy for New Dissolved Oxygen Criteria

Why is DRBC making improvements to its estuary DO model?

- Sediments impact DO in water column
- Prescribed SOD rates do not account for future changes
- Gain insight into causes and future prospect of SOD

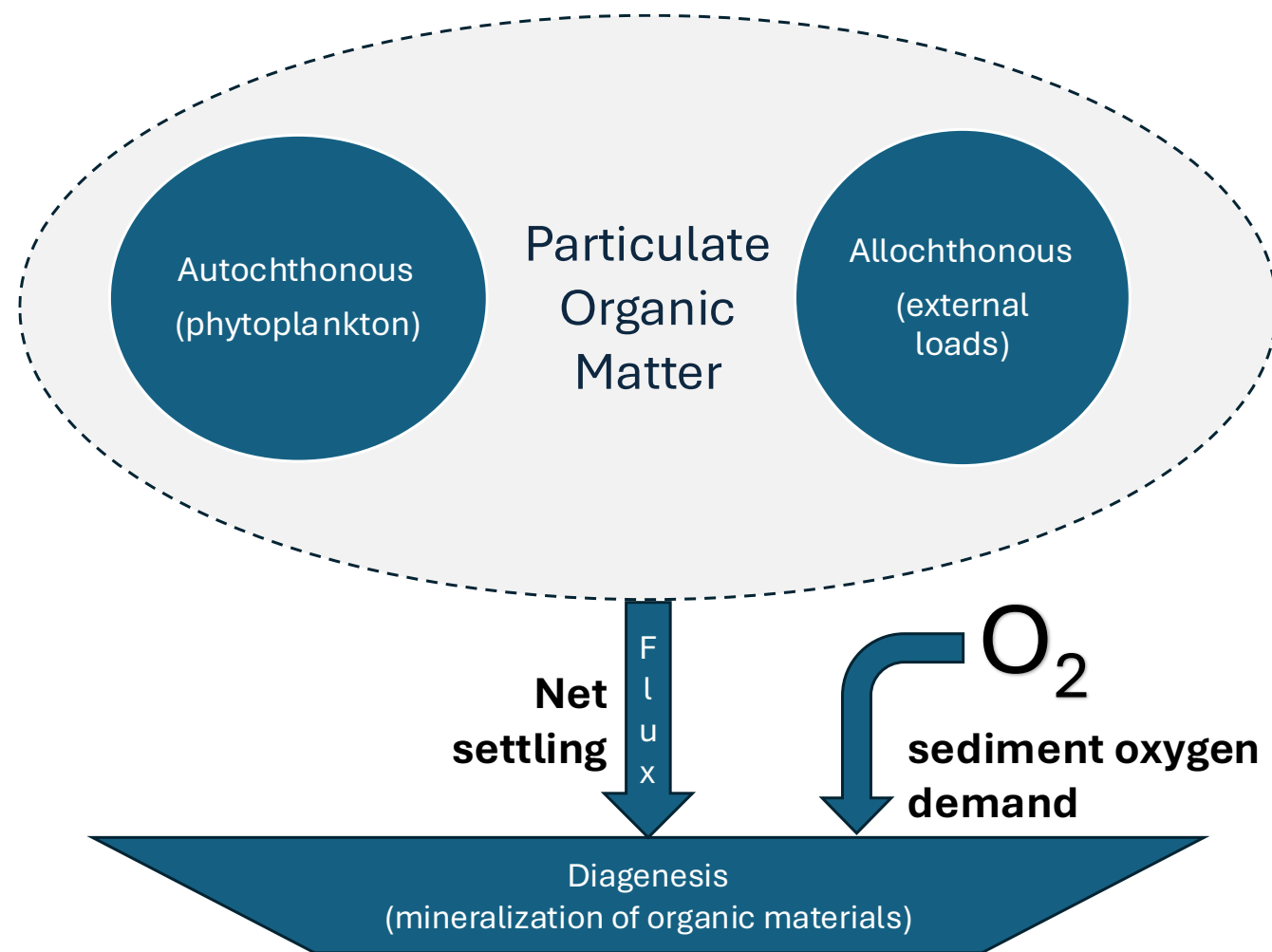


Dissolved Oxygen Model Kinetics (WASP)



Coupling WQ with sediment diagenesis

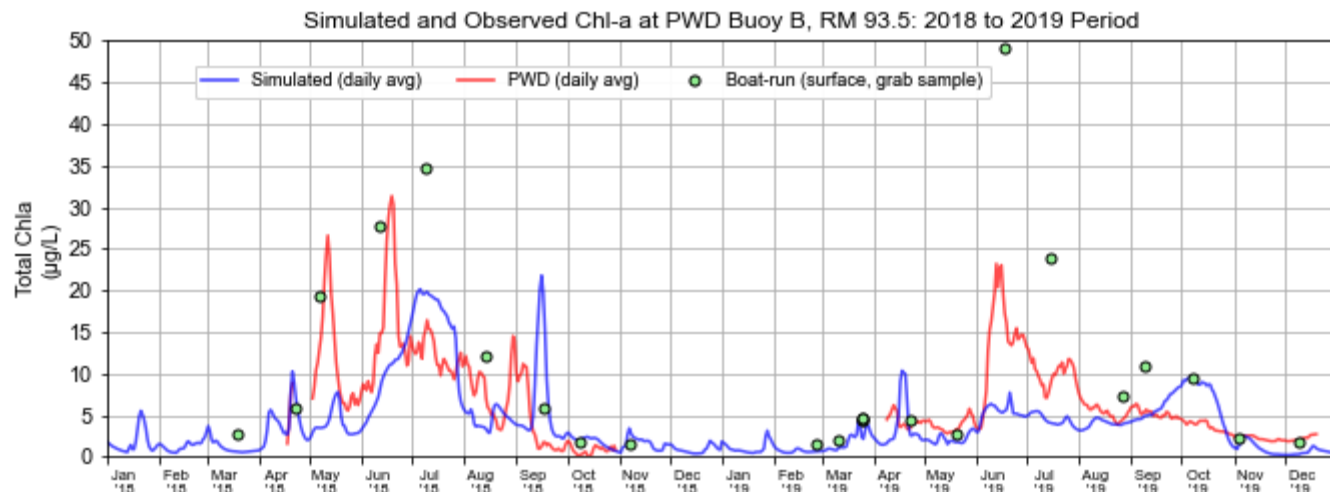
- External POM – specification of POM at major tributaries
- Internal POM – prediction of phytoplankton
- POM ↔ Phytoplankton



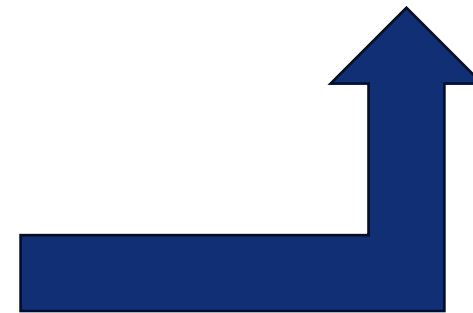
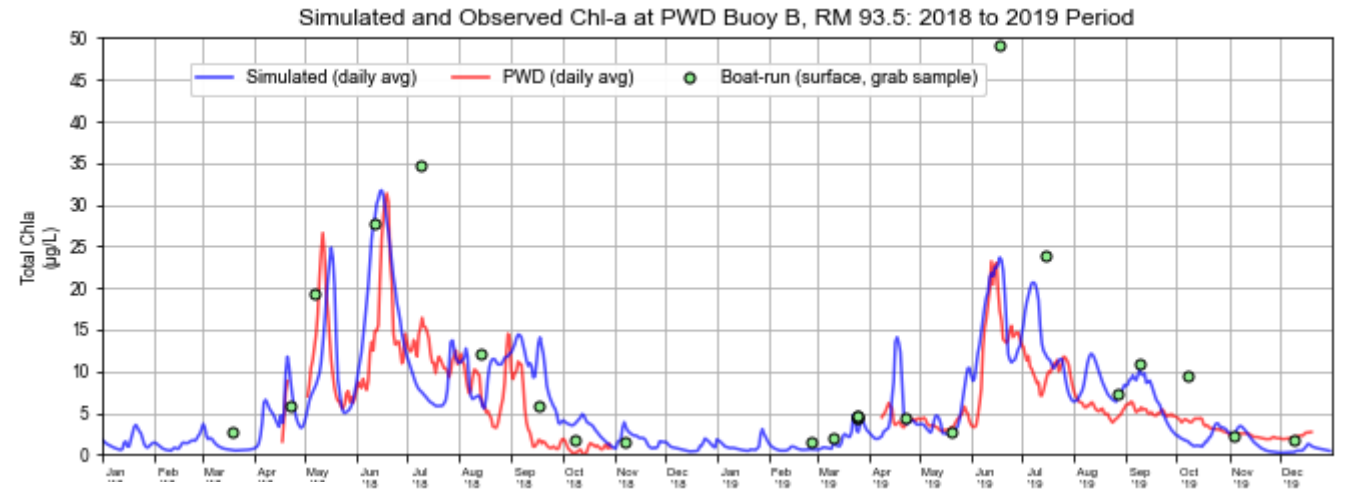
Ongoing work is yielding significant improvements!

phytoplankton
corresponds to
internal POM

Published calibration

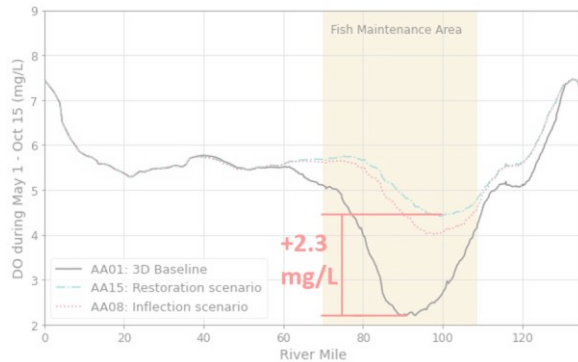


Ongoing revised calibration

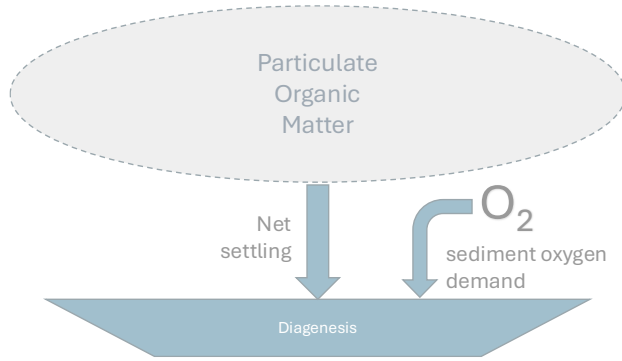


What have we learned?

- Observed levels of SOD and benthic fluxes can be explained by better characterization of POC loads
- POC loads driven by
 - Tributaries (including DR @Trenton)
 - Phytoplankton
 - Marshes
- Future changes to sediment fluxes expected to be driven mostly by changes in DO and ammonia gradients



A Pathway for Continued Restoration of Dissolved Oxygen in the Estuary

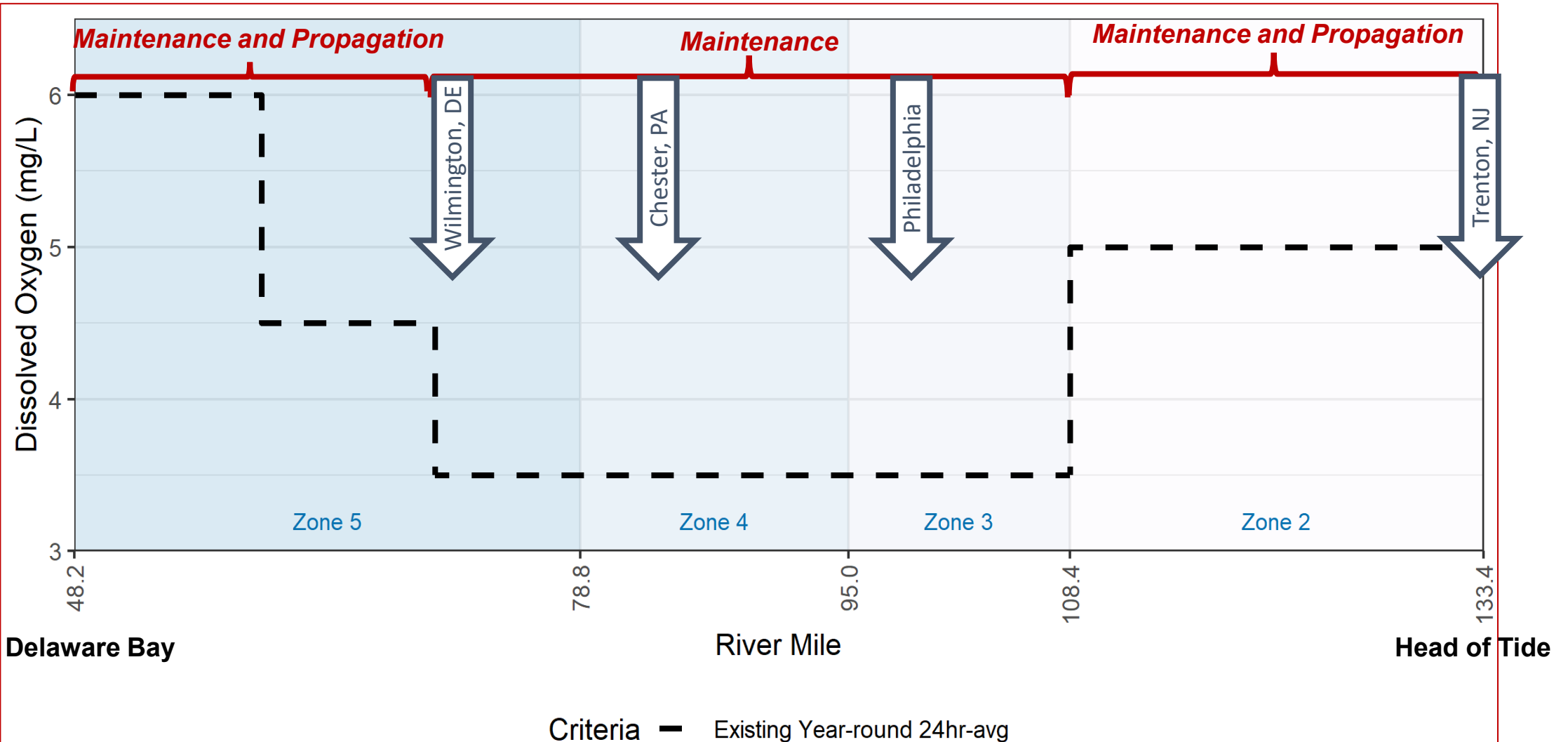


What improvements is DRBC making to its model and why?



Implementation Strategy for New Dissolved Oxygen Criteria

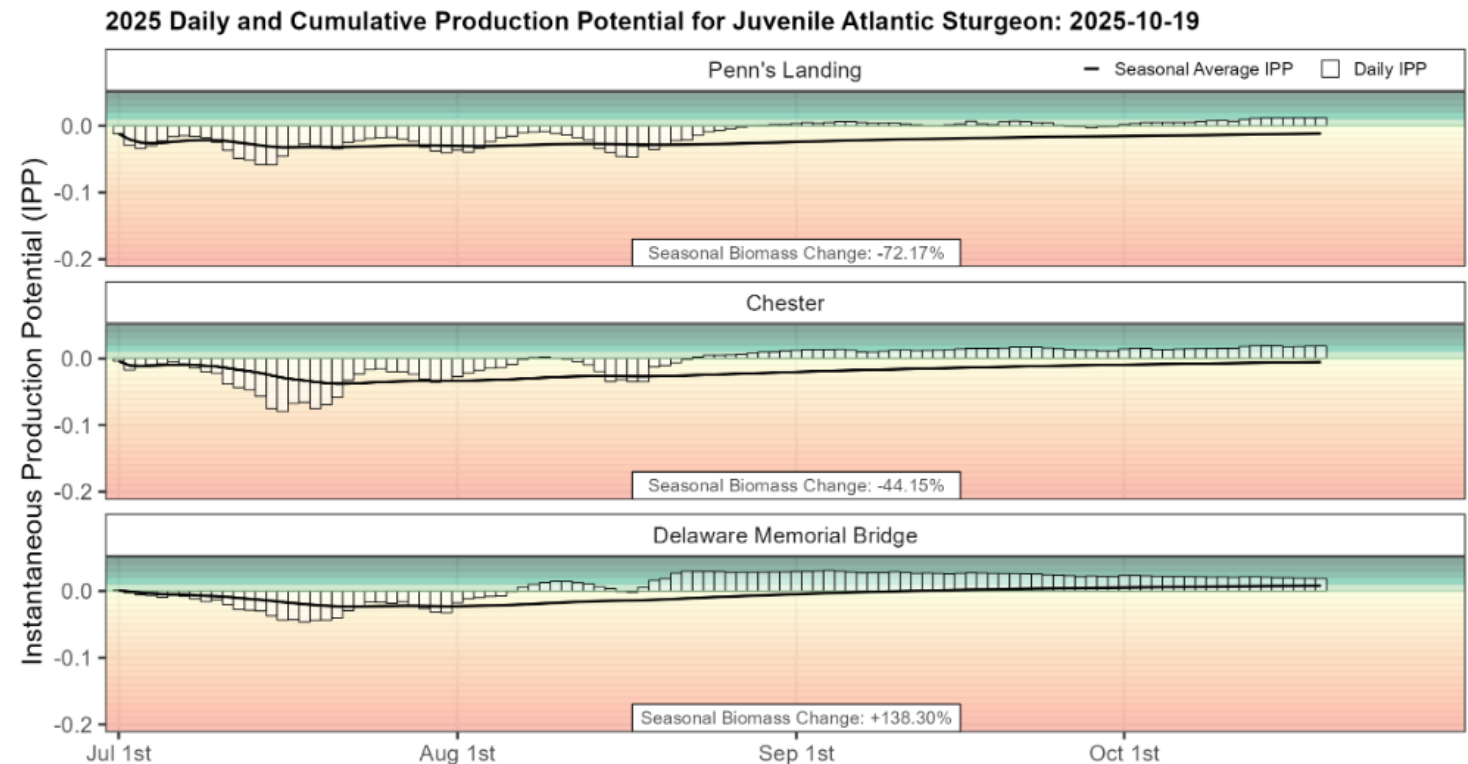
The “Fish Maintenance Area” (FMA) includes the “urban Estuary” from RM 70 to RM 108



On Sept 29, 2025, EPA:

- Upgraded aquatic life use to include fish propagation
- Upgraded DO criteria to support the new use

SEASON	MAGNITUDE (% oxygen saturation)	DURATION	EXCEEDANCE FREQUENCY
<i>Spawning and Larval Development</i> (March 1 – June 30)	66%	Daily average	12 days cumulative (10% of 122-day season)
<i>Juvenile Development</i> (July 1 – October 31)	66%	Daily average	12 days cumulative (10% of 123-day season)
	74%	Daily average	61 days cumulative (50% of 123-day season)
<i>Overwintering</i> (November 1 – February 28/29)	66%	Daily average	12 days cumulative (10% of 120/121-day season)



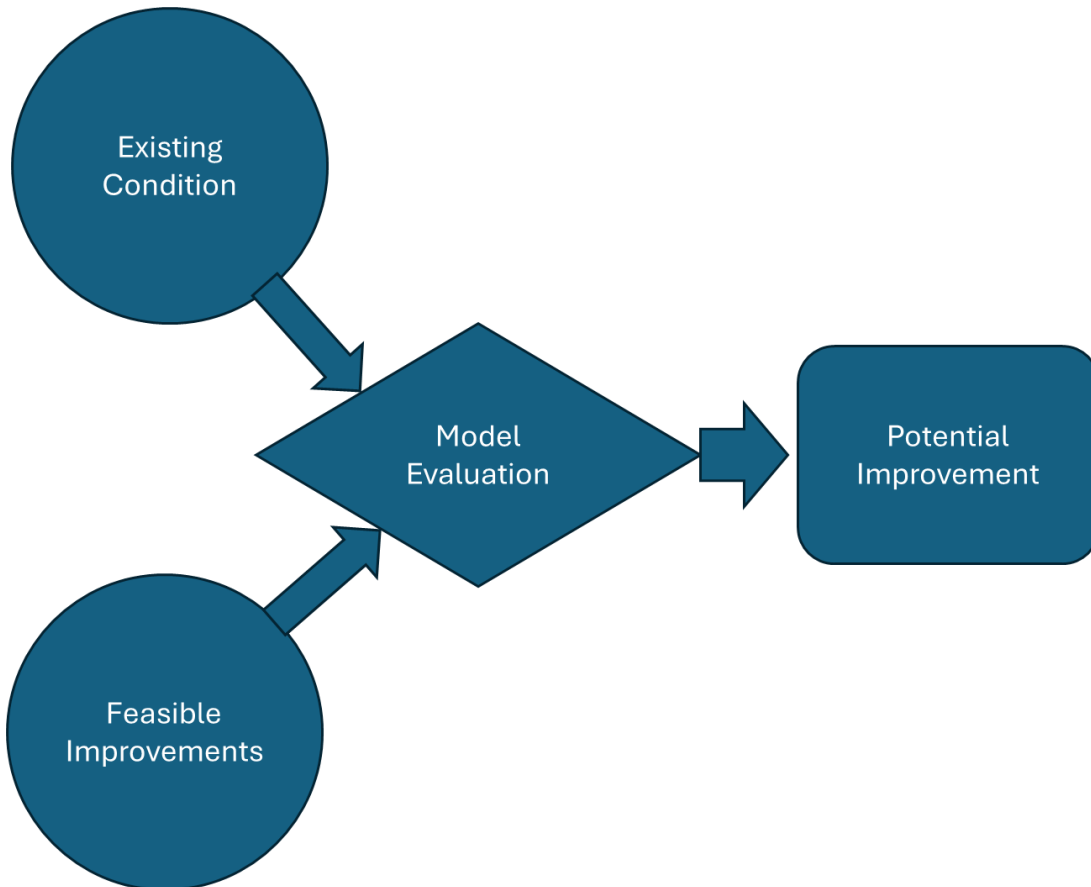
A Strategy to Implement New Dissolved Oxygen Criteria in the Delaware River Estuary



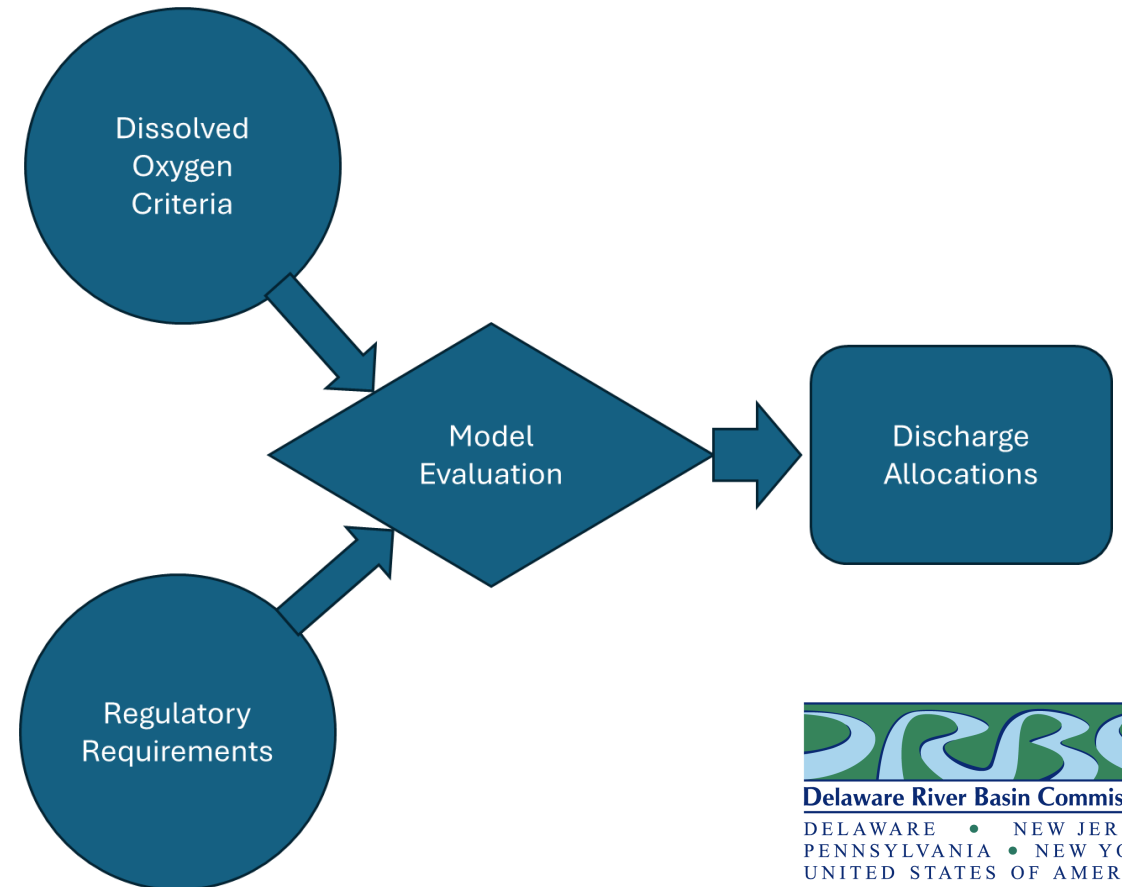
- Background
 - A new DO criteria is established
 - CWA requires implementation
 - Multiple discharges in a complex tidal environment must be evaluated together
- Core Elements of Strategy
 - DRBC will perform a WLA Study **in coordination with States** (and WQAC) and EPA
 - Study will provide technical basis for States to derive and impose WQBELs
 - Translates DO criteria into specific allocations of ammonia, CBOD, etc
 - Components include design condition, nonpoint source quantification, reserve capacity
- Strategy document available on DRBC [website](#)

Why is a WLA study necessary and beneficial?

“Pathway” Analysis



WLA Study



Recap

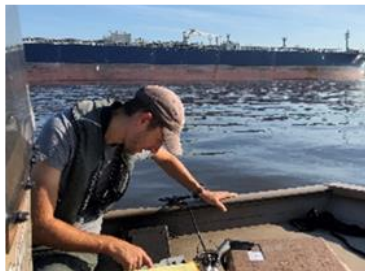
- **Big Picture:** the addition of feasible treatment to remove ammonia from a relatively small number of WWTPs would improve the level of DO in the urban estuary, resulting in a significant ecological uplift.
- **Model Improvements:** DRBC is finalizing model improvements that will allow us to dynamically simulate sediment interactions and changes, thereby allowing us to better understand future sediment impacts.
- **Model Application:** DRBC is working directly with the estuary States and USEPA to calculate the individual wasteload allocations required to implement DO criteria in the estuary.



Questions?
For more information, contact:

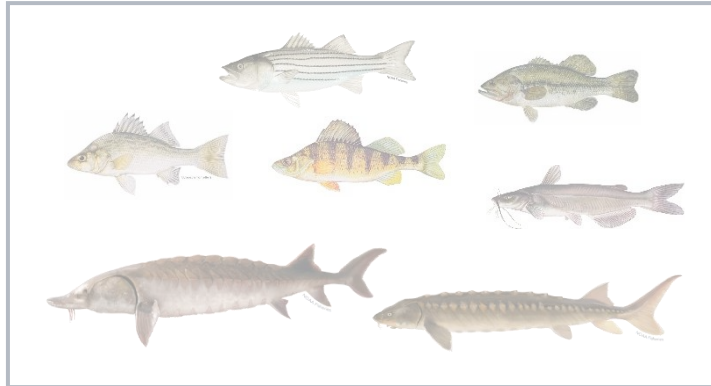


Thomas.Amidon@drbc.gov
Namsoo.Suk@drbc.gov





How is water used and regulated in the Basin?



Dissolved oxygen: a pathway toward continued restoration.



What's next?

DRBC is planning for water resources resilience.

DELAWARE RIVER
BASIN COMMISSION'S

WATER RESOURCES RESILIENCE PLAN

Share your thoughts:
<https://tinyurl.com/DRBCCommentCard>

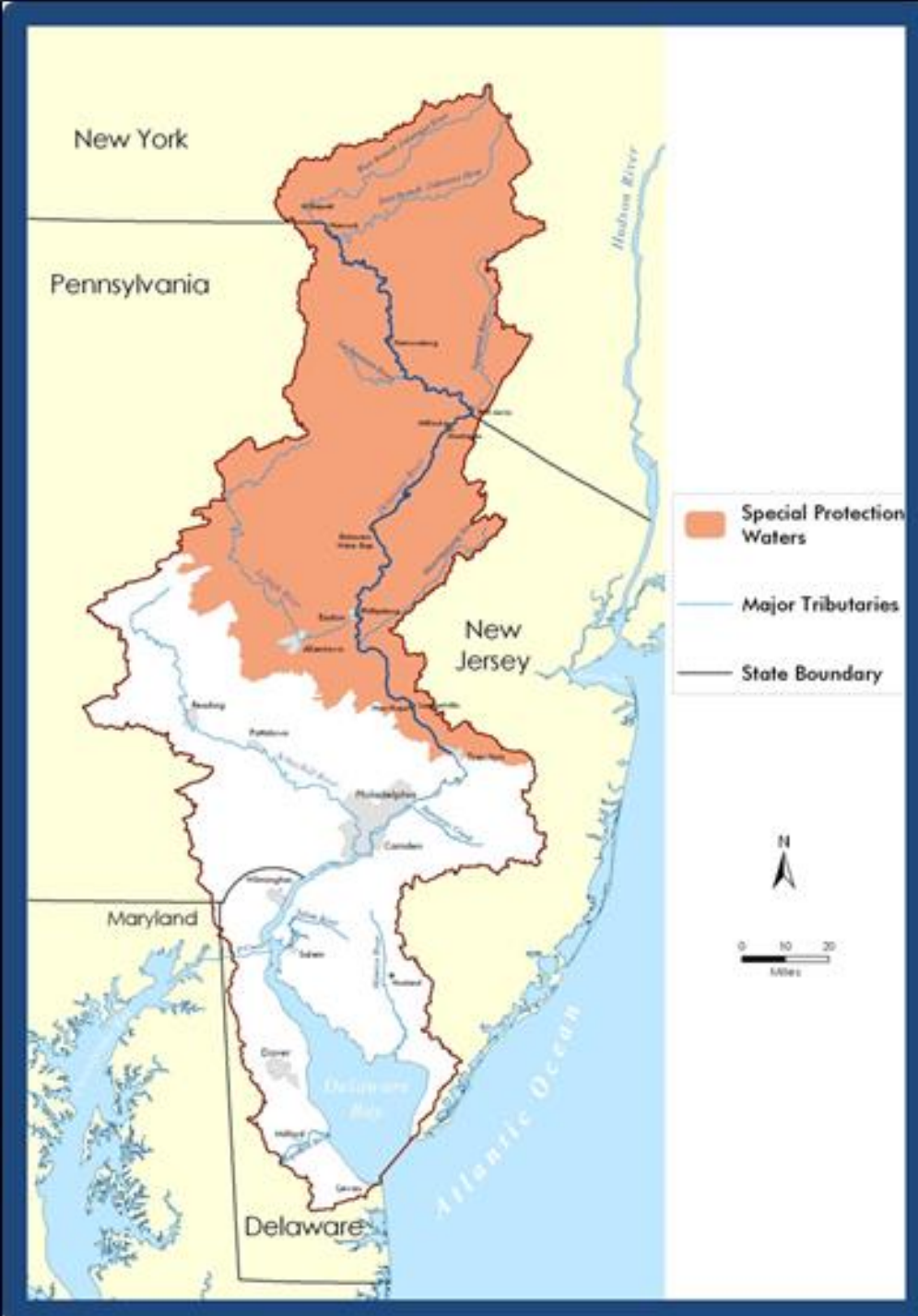


- Climate change and extreme weather impacting Basin
- Phase 1 work underway
- Phase 2 begins next year
- Seeking public input



DRBC Special Protection Waters help keep clean waters clean.

- Entire basin upstream of Trenton
- 75% within National Wild & Scenic Rivers System
- Anti-degradation/ No measurable change
- Different thresholds & requirements for discharges
- Current challenges – chlorides/salts, PFAS, cold water habitats



The Basin is located within the “Salt Belt,” and chlorides are trending upwards.

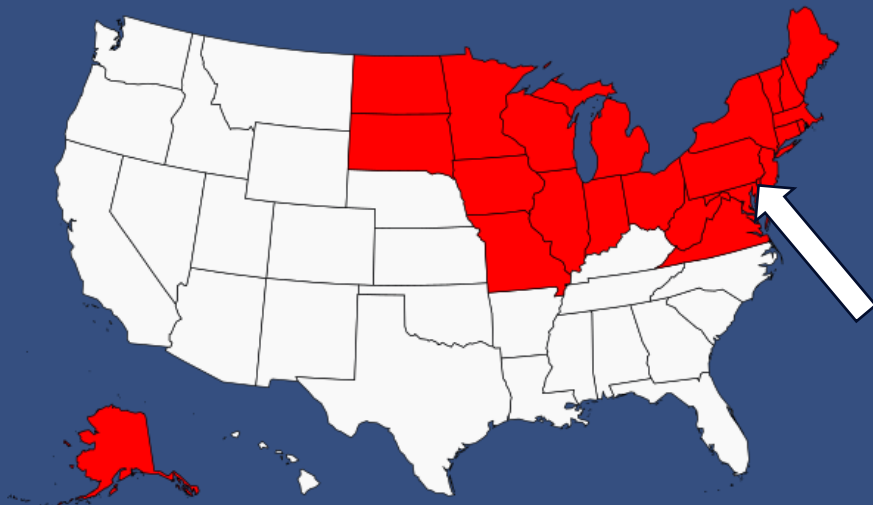
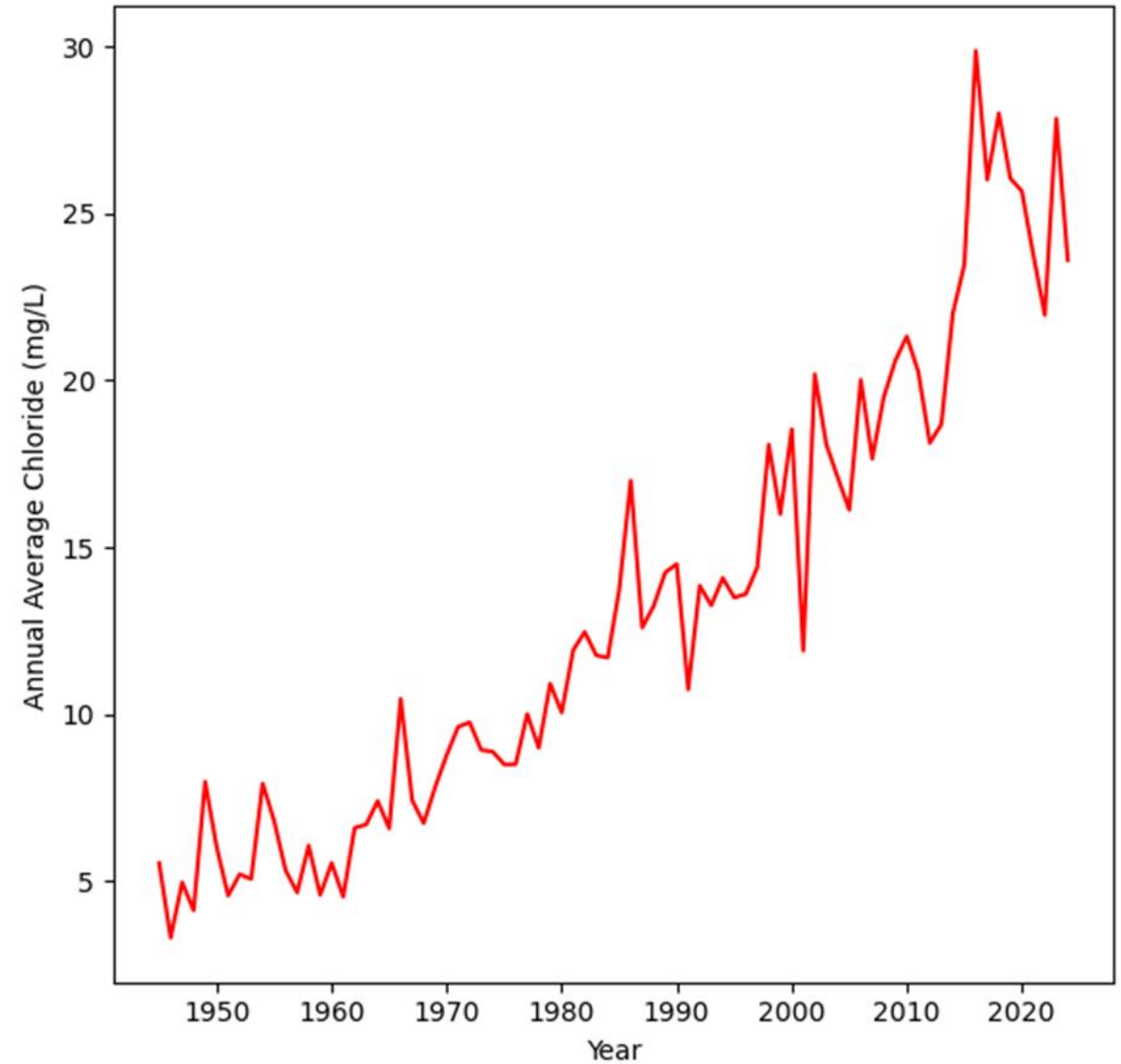


Image: by Randommapmaker, Wikimedia Commons, CC BY-SA 4.0



Delaware River at Trenton - Chloride



Data obtained from the Water Quality Portal

Increasing chlorides pose a risk to human health.

Salt contamination in DRB

WARREN COUNTY

A town found the source of its contaminated wells: road salt. What's being done about it?

Updated: Feb. 27, 2019, 1:00 p.m. | Published: Feb. 27, 2019, 7:00 a.m.

ENVIRONMENT

Knowlton and Warren County to fund water filtration for Columbia residents



Bruce A. Scruton
New Jersey Herald

Published 9:43 a.m. ET Jan. 27, 2023

Chloride is highly corrosive



The Science Behind It: Corrosion Caused Lead-Tainted Water in Flint, Michigan

By Kathy Riggs Larsen on 5/4/2020 1:40 PM

Increasing chloride in rivers of the conterminous U.S. and linkages to potential corrosivity and lead action level exceedances in drinking water

E.G. Stets^{a,*}, C.J. Lee^b, D.A. Lytle^c, M.R. Schock^c

^a U.S. Geological Survey, National Research Program, Boulder, CO 80303, USA

^b U.S. Geological Survey, Kansas Water Science Center, Lawrence, KS 66049, USA

^c U.S. Environmental Protection Agency, Water Supply and Water Resources Division, Cincinnati, OH 45268, USA



Delaware River Basin Commission

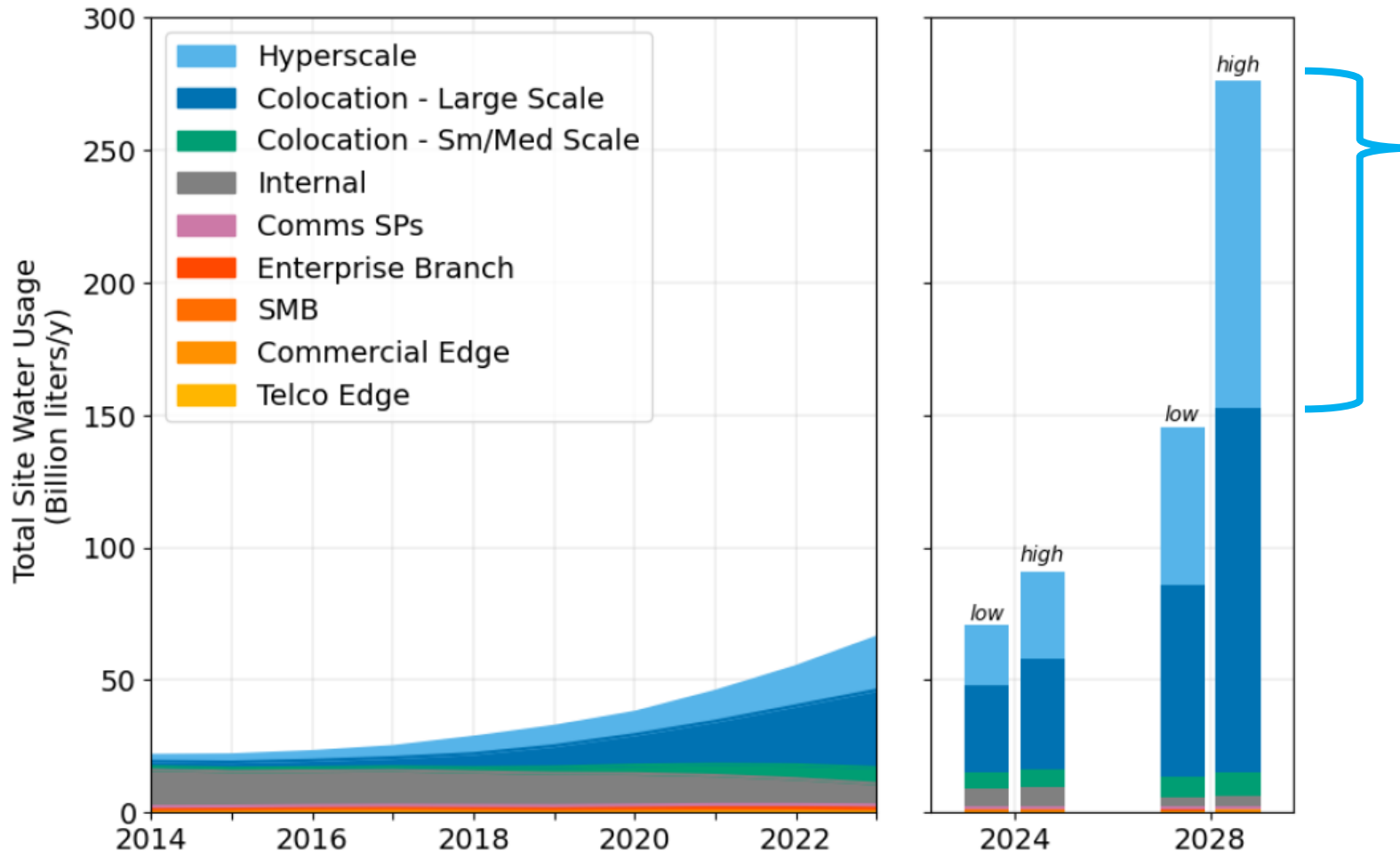
DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

DRBC is taking steps to manage freshwater salinization.



- Increased monitoring
- Salinity Impacts
Freshwater Toxicity
(SIFT) workgroup
- Municipal partnerships

Data centers may be an emerging sector in the Basin with significant direct water demands.



40 -73 BGY for data centers in the U.S. – future data centers dominated by Hyperscale and Large Colocation

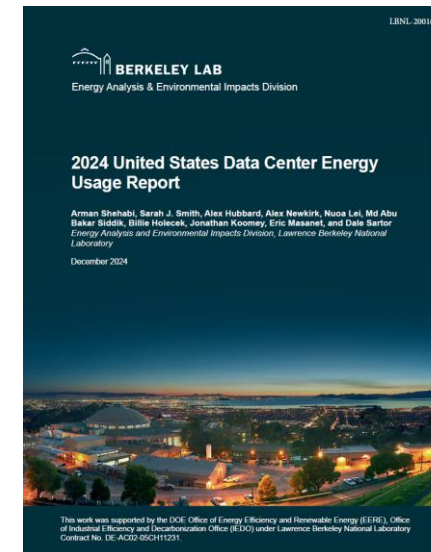
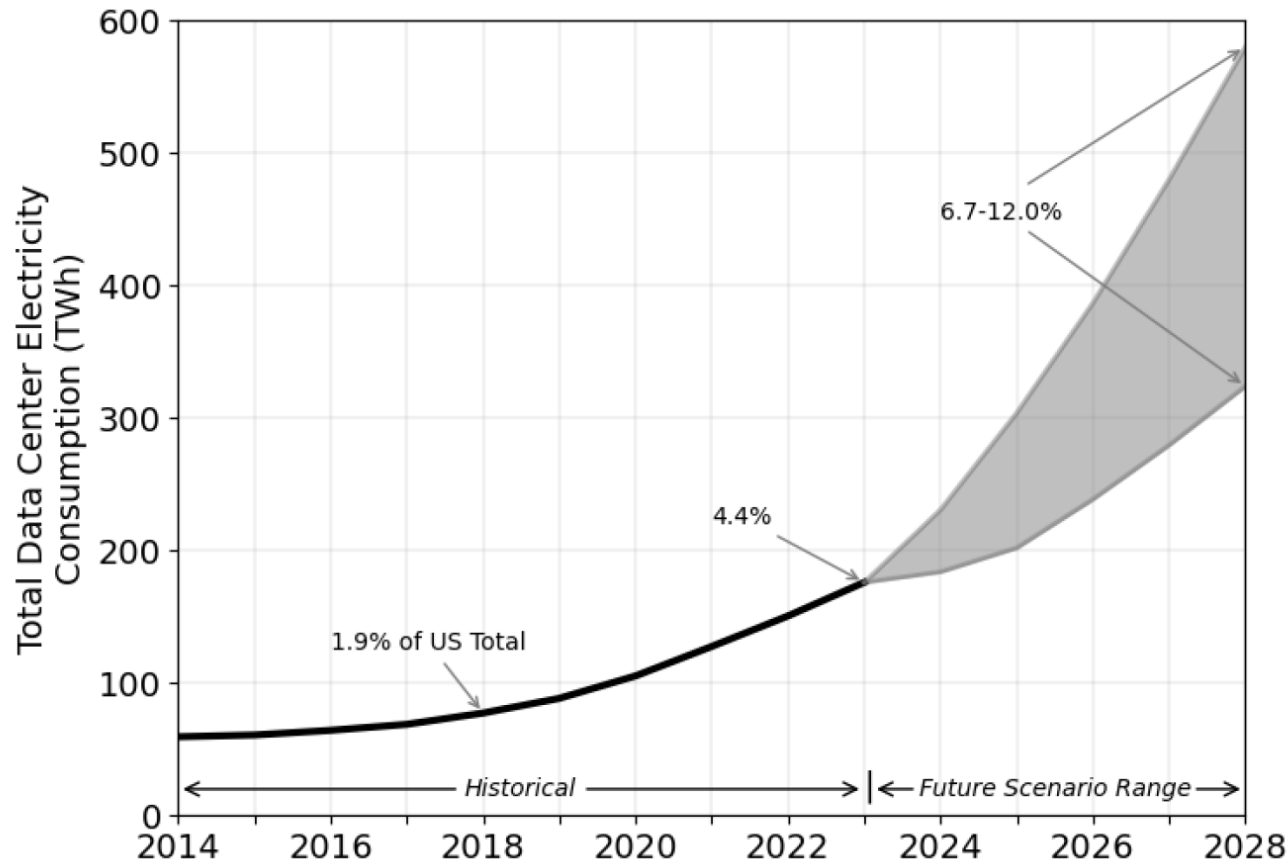


Figure 5.9. Direct water consumption by data center type.

Electric consumption by data centers may have a significant indirect water footprint in the Basin.



Increase in electricity consumption may impact water withdrawals from thermoelectric generators in the Basin.

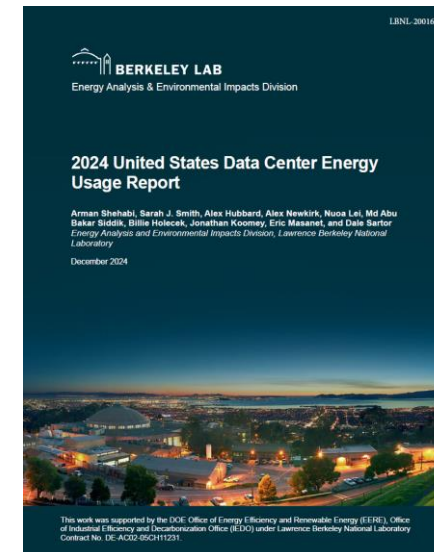


Figure ES-1. Total U.S. data center electricity use from 2014 through 2028.

Work is underway to better understand water resources considerations for data centers in the DRB.



- Are water use trends changing?
- Do we have adequate protections for surface & ground water?
- Are our drought management plans sufficient?
- What are potential impacts to wastewater discharges?

Hear/Ask questions about DRBC's work at an upcoming advisory committee meeting.



- Monitoring Advisory & Coordination Committee (MACC) – 12/9
- Regulated Flow Advisory Committee (RFAC) – 12/15
- Water Quality Advisory Committee (WQAC) – tbd (Dec)
- Advisory Committee on Climate Change (ACCC) – tbd (Dec)

Stay engaged with the DRBC.

Follow DRBC on Social:



@drbc1961



Delaware-River-Basin-Commission



@drbc1961



@DRBC_1961



Kristen Bowman Kavanagh, Executive Director

Kristen.B.Kavanagh@drbc.gov, 609.414.3302

Thomas Amidon, Manager of Water Resource Modeling

Thomas.Amidon@drbc.gov, 609.477.7253