

Improving Dissolved Oxygen and Aquatic Life Uses in the Delaware River Estuary

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Photo: Paul Michael Bergeron



Photo: Delaware River Waterfront Corporation

**Partnership for the Delaware Estuary
Science and Environmental Summit**

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Photo: Partnership for the Delaware Estuary



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Topic	Presenter
<u>Why are we here?</u>	<u>Steve Tambini</u>
How did DRBC address low dissolved oxygen in the Delaware Estuary - then and now?	Namsoo Suk
Where do ammonia and other nutrients in the Delaware Estuary originate, and how do we know?	John Yagecic
What is this estuary-wide eutrophication model and why do we need it?	Li Zheng
What matters and what doesn't with regard to low dissolved oxygen events in the Delaware Estuary?	Fanghui Chen
What combination of wastewater improvements will achieve the best dissolved oxygen outcome in the Delaware Estuary?	Sarah Beganskas
What is the highest attainable dissolved oxygen condition in the Delaware Estuary, and what will it mean for aquatic life uses?	Thomas Amidon
Q&A Panel: Enhancing support for aquatic life uses in the Delaware Estuary	All

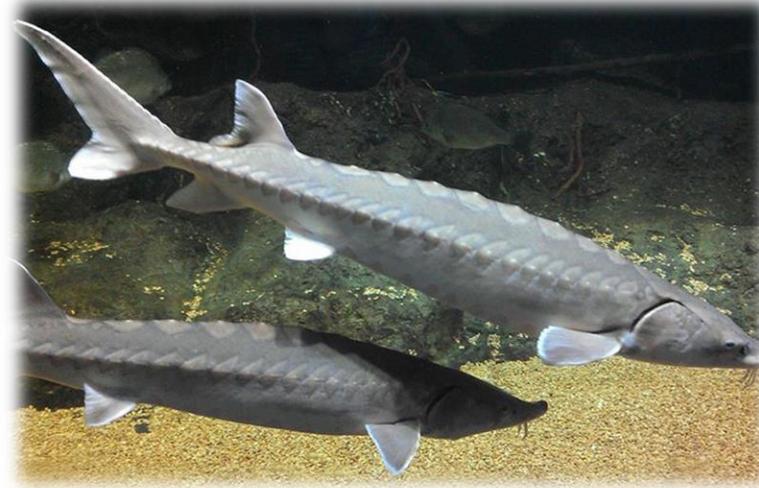
Shared Goals Clean Water Act (1972)

“...fishable, swimmable waters...”

**“for the protection and propagation of fish, shellfish, and wildlife,
and to provide for recreation in and on the water.”**



Photo: Lane Fike



fisheries.noaa.gov

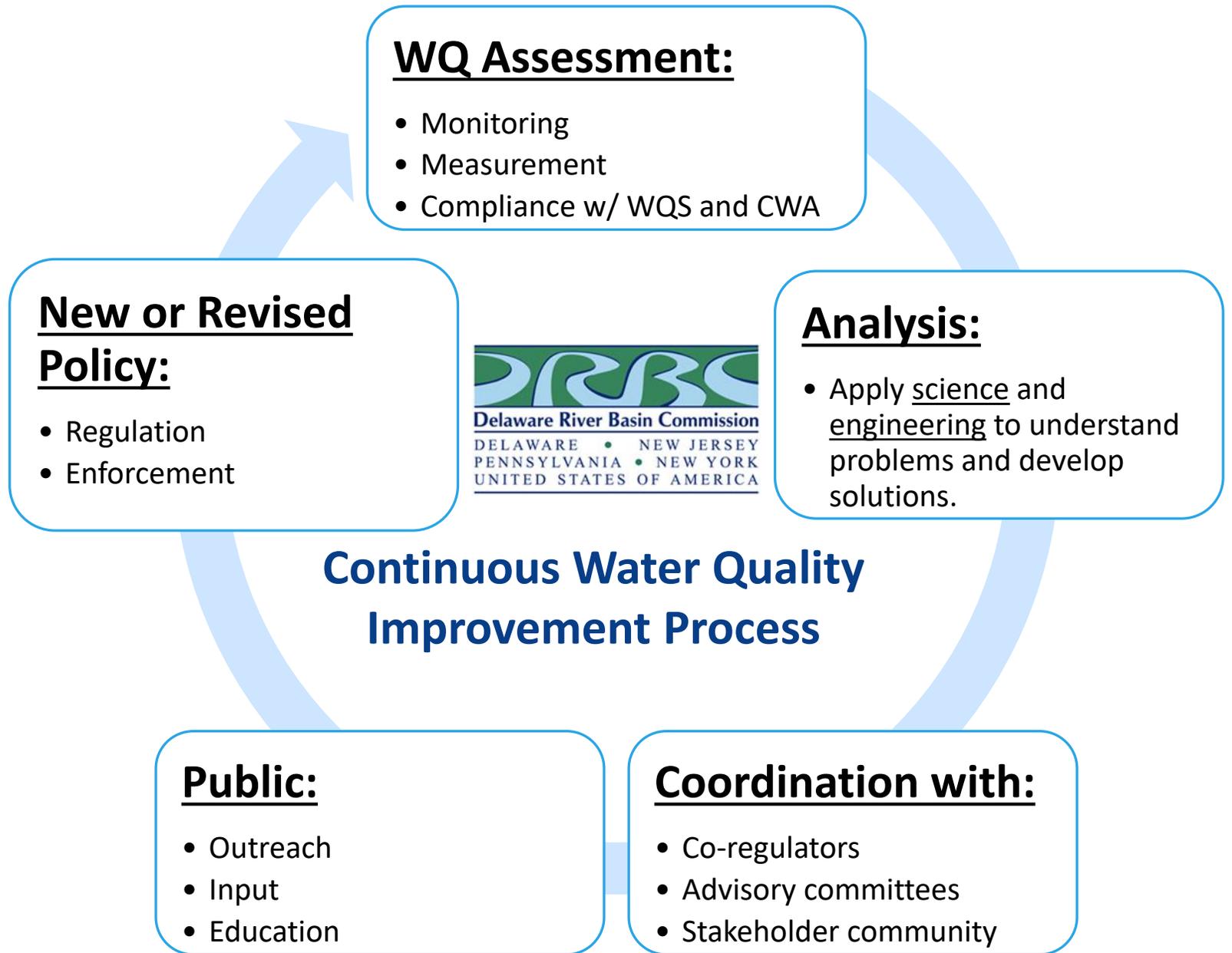
Shared Goals

DRBC Water Quality Regulations

Uses to be Protected:

1. agricultural, industrial, and public water supplies after reasonable treatment, except where natural salinity precludes such uses;
- 2. wildlife, fish and other aquatic life;**
3. recreation;
4. navigation;
5. controlled and regulated waste assimilation to the extent that such use is compatible with other uses;
6. such other uses as may be provided by the Comprehensive Plan.

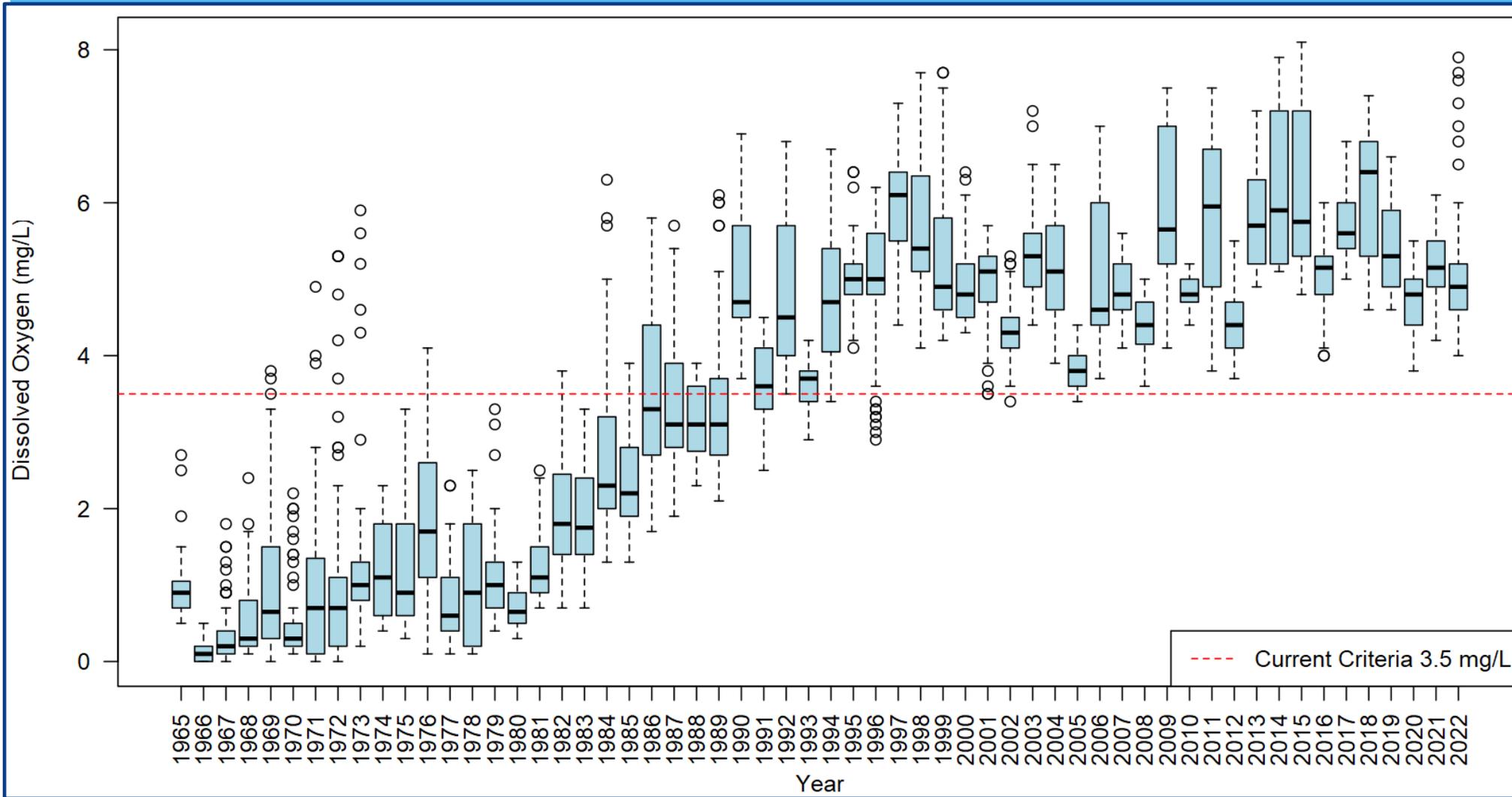
Objective: Reduce Pollutant Loads



Focus on the Delaware River Estuary

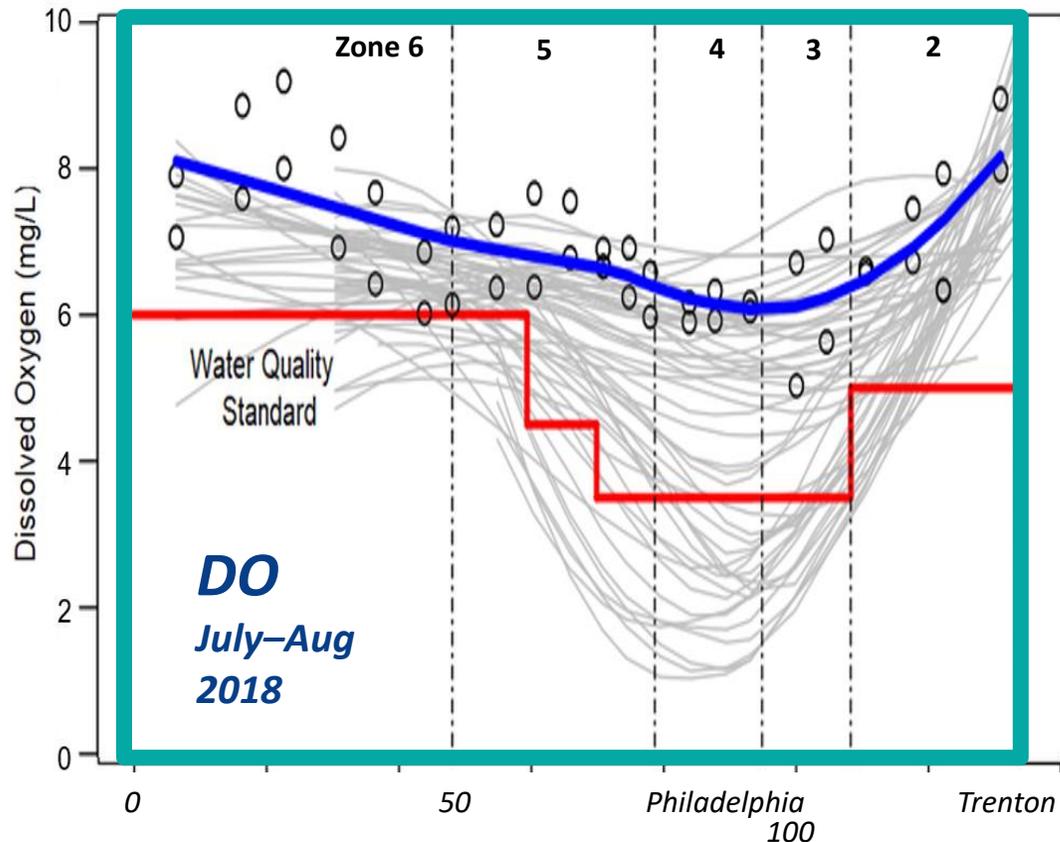


Since the mid-1990s, DO in the urban estuary consistently meet water quality criteria

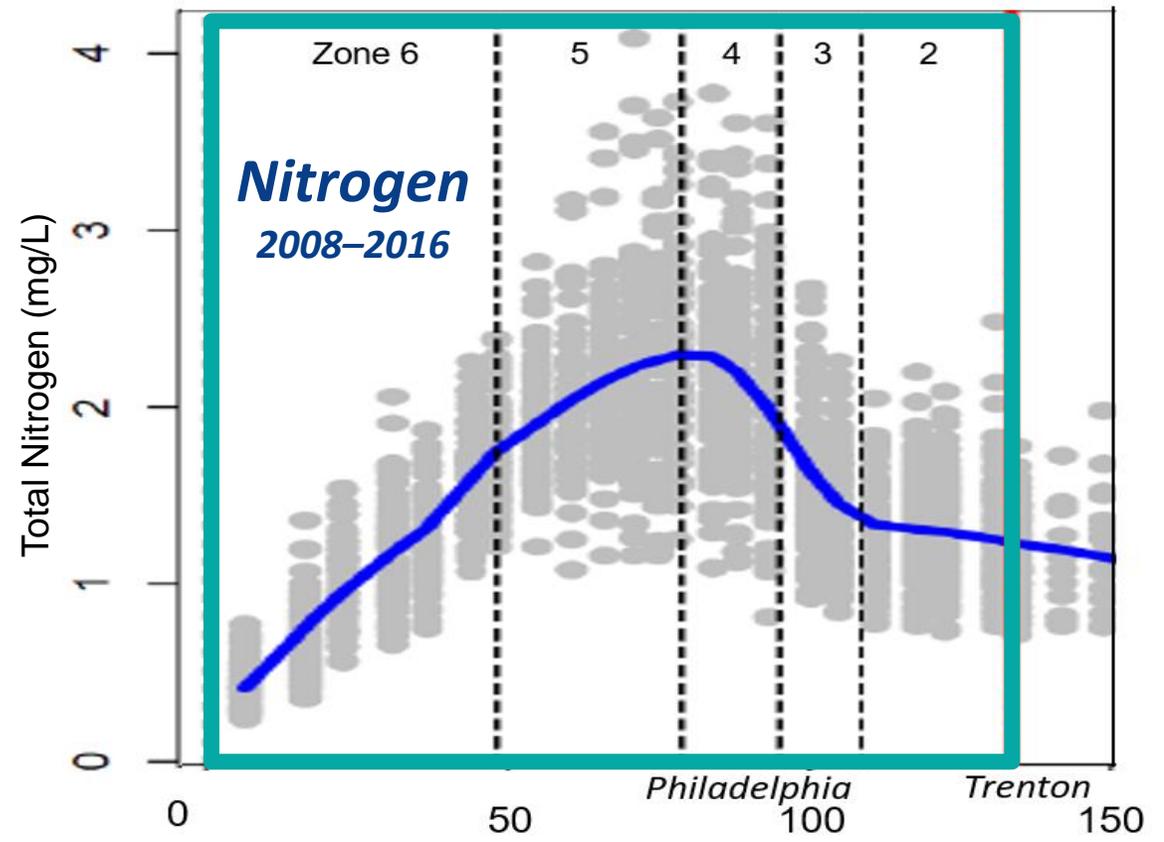


*USGS gage,
Delaware River
at Ben Franklin
Bridge
(River Mile 100)*

Nitrogen levels are highest in the urban estuary where DO levels are lowest



← RIVER MILE DOWNSTREAM



← RIVER MILE DOWNSTREAM

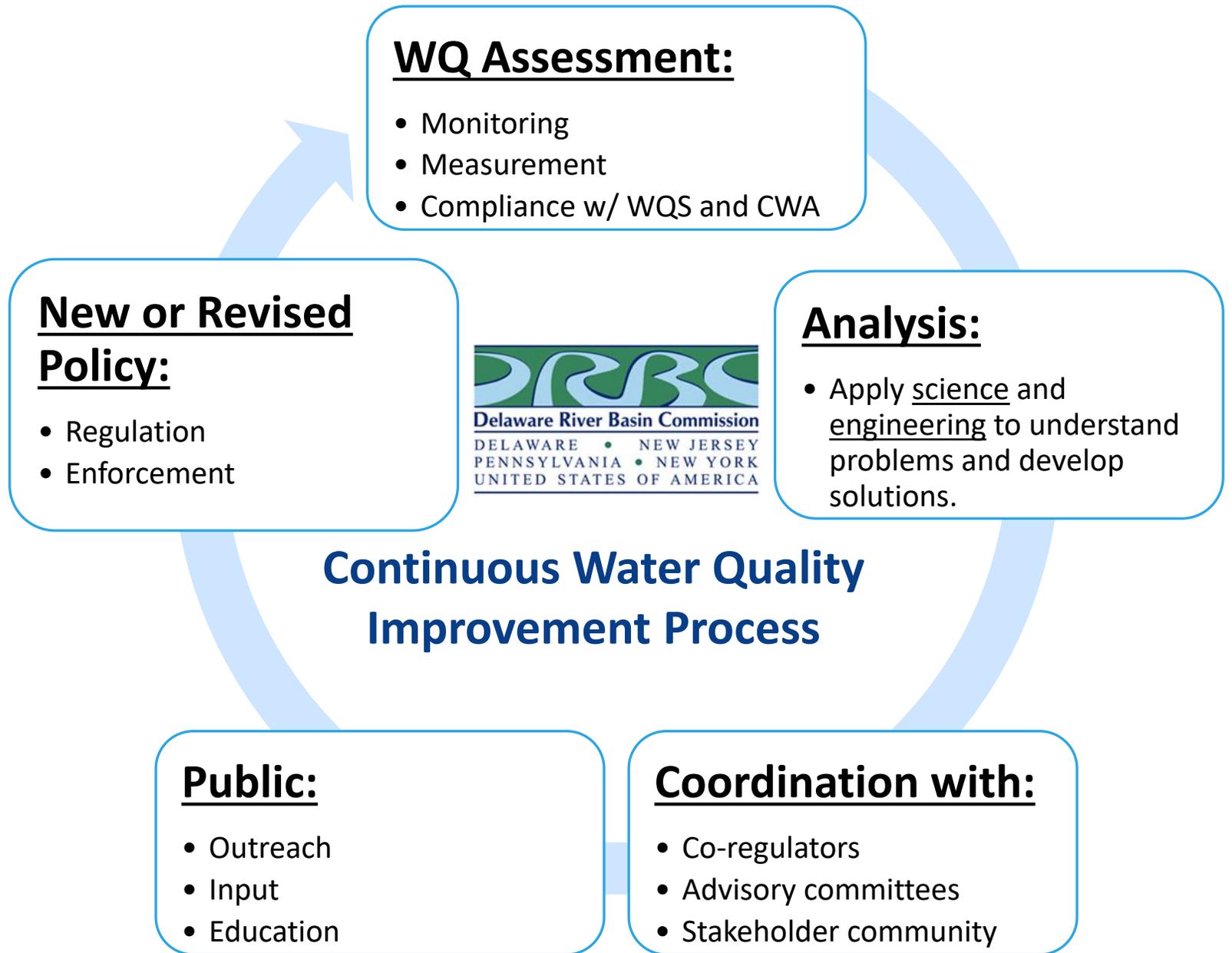
Delaware Estuary Fisheries



Map Credit: DRBC, Fish Images: PFBC

- **The health of fish communities is an indicator of water quality**
- The Delaware River Basin supports a diverse array of fisheries
- Location in the basin determines what species of fish will be present
- The Delaware Estuary is an important habitat for several anadromous species
 - ✓ Atlantic sturgeon
 - ✓ Striped bass
 - ✓ American shad
- **Iconic species of the Delaware Estuary**

Objective: Reduce Pollutant Loads to Improve WQ



DRBC Resolution 2017-4

Review of Aquatic Life Designated Uses Studies required before Rulemaking

Fish/DO Studies

6(a). Input on the **dissolved oxygen requirements of aquatic species**

6(b). Field studies of the occurrence, spatial and temporal distribution of the life stages of Estuary fish species

6(c). Input from consultations pursuant to the **Endangered Species Act** ("ESA")

Modeling Studies

6(d). Development and calibration of a **eutrophication model** for the Delaware River Estuary and Bay;

6(e). Determination of the nutrient **loadings from point and non-point sources** necessary to support key aquatic species;

Cost/Feasibility Studies

6(f). Evaluation of the **capital and operating costs for treatment** capable of achieving higher levels of dissolved oxygen;

6(g). Evaluation of the physical, chemical, biological, **social and economic factors affecting the attainment of uses,**

6. "Analysis of Attainability"

6(h). Preparation of a **draft report and final report** containing findings and conclusions.

Water Security for over 13 million people



Delaware River Basin Commission

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PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

**Water
Quality**

**Water
Equity**

**Water
Availability**

**Water
Resiliency**



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