

Delaware River Basin Commission

Status Update: *Aquatic Life Designated Use Program*

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Water Quality Advisory Committee

November 3, 2021



Presented to an advisory committee of the DRBC on November 3, 2021.
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DRBC Resolution 2017-04

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;

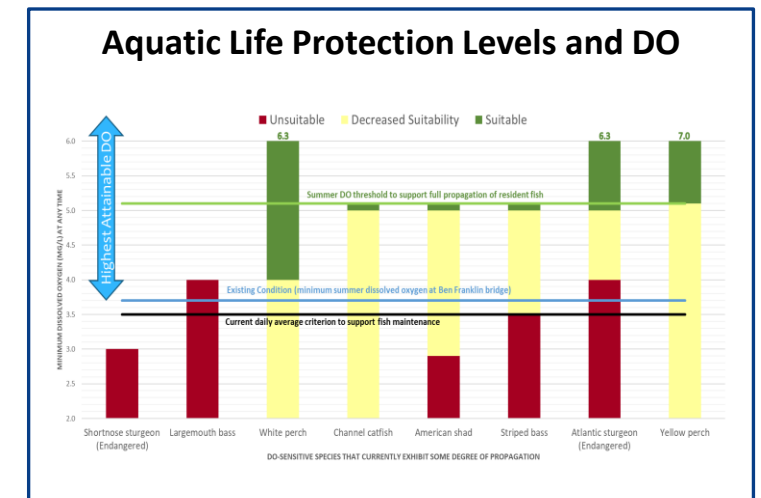
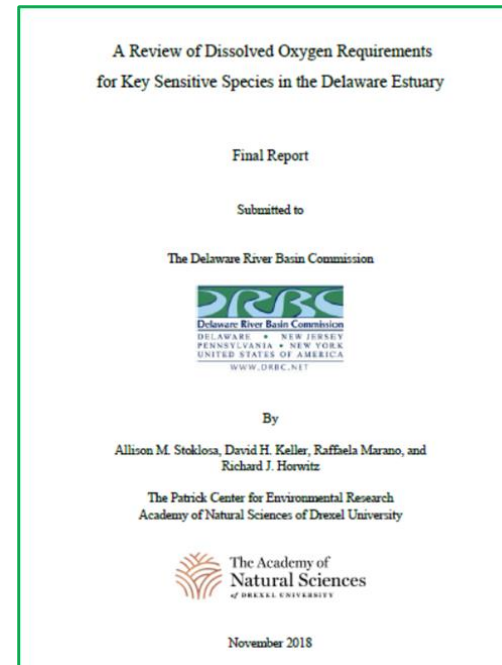
6(g). Evaluation of the physical, chemical, biological, **social and economic factors affecting the attainment of uses,**

6. "Analysis of Attainability"

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

Fish / DO Studies

- Contracted with Academy of Natural Sciences-Drexel University (completed)
- Ichthyoplankton survey by PSEG and augmented by DRBC (completed)
- Conceptual model for DO needs and individual fish species being developed by DRBC staff

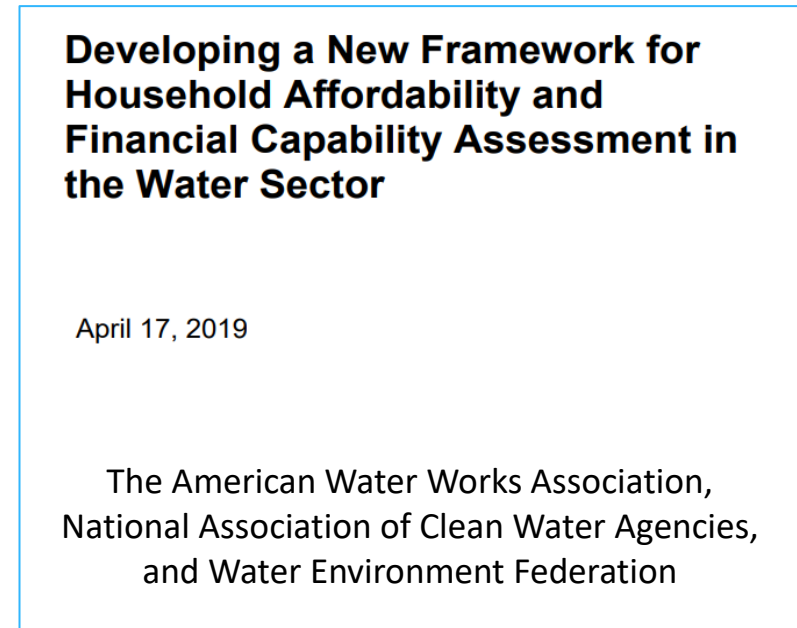
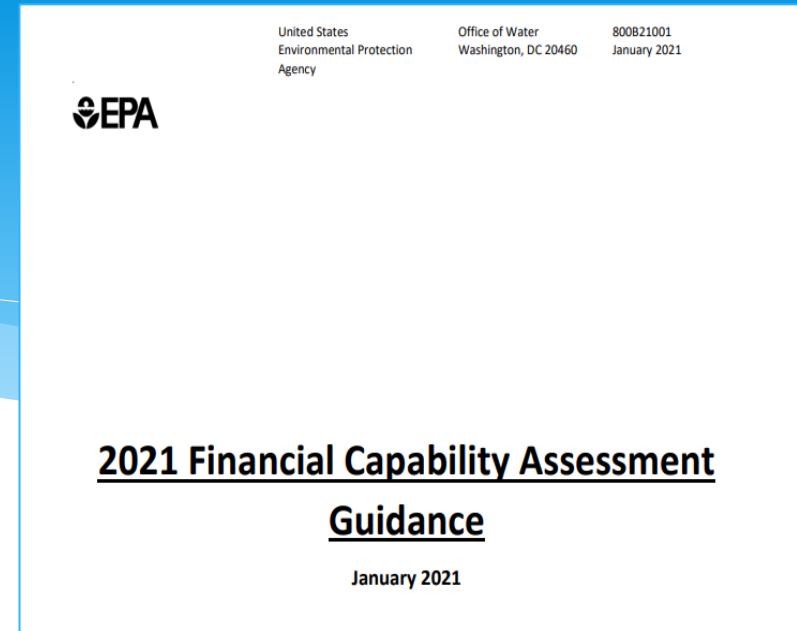


Modeling Studies (slide from WQAC 4/15/2021)

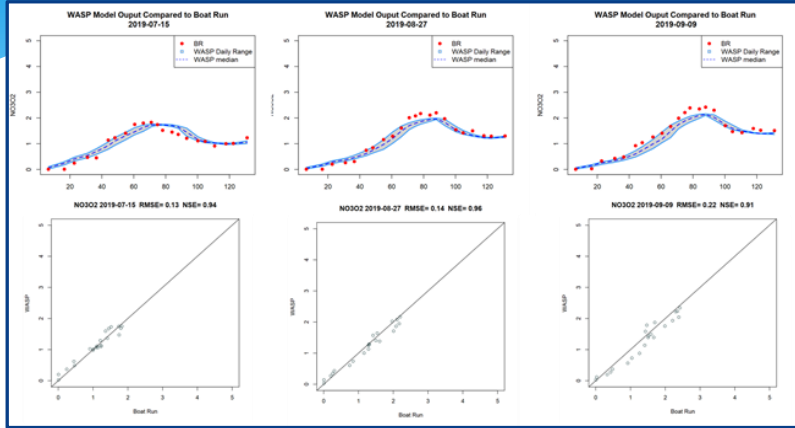
- **Model enhancement:**
 - Upgraded re-aeration function using the energy dissipation rate – required code modification in both EFDC and WASP models
 - Incorporated 3rd version of the Delaware Estuary specific light extinction formulation
 - Debugging of the beta version of WASP through collaboration with EPA Region 4
- **Model calibration:**
 - Completed the vertical resolution evaluation
 - Focused on phytoplankton dynamics and sediment diagenesis
- **DRBC modeling team** meets with the model expert panel every 3 weeks
 - The joint meeting between the WQAC and the model expert panel will be scheduled as the model calibration progress

Cost and Feasibility Study

- Planning level cost estimate curves for top 12 loading facilities to achieve various ammonia effluent levels (10 mg/L – 1.5 mg/L) by Kleinfelder (Completed)
- Initiated affordability and financial capability assessment by DRBC utilizing two guidance documents
 - Resolution 2021-5 for the collection of additional information essential to the evaluation of social and economic factors affecting the attainment of uses in the Delaware River Estuary in accordance with Resolution No. 2017-4.
(https://www.nj.gov/drbc/library/documents/Res2021-05_Socio-Economic.pdf)
 - Information is being submitted from twelve Tier-1 Dischargers



Eutrophication Model Calibration



Design Condition / Future Scenarios

Eutro Model

Refined Candidate Scenarios

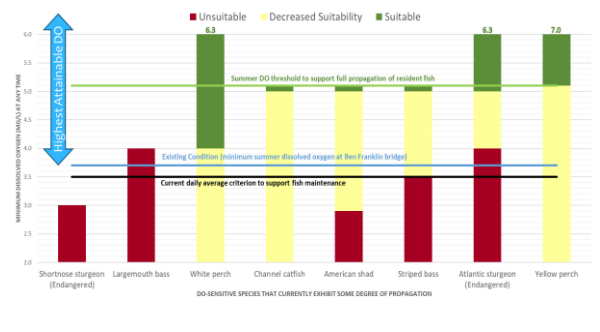
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How much would DO condition improve if:

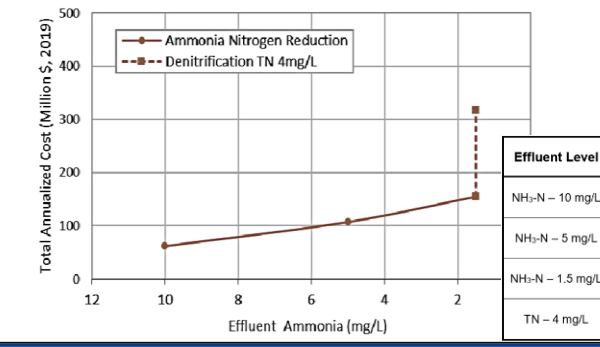
- Each of the point source nutrient scenarios were implemented
- Tributary boundaries were reduced
- Nonpoint sources were reduced
- Various sources reduced



Aquatic Life Protection Levels and DO



Treatability and Cost

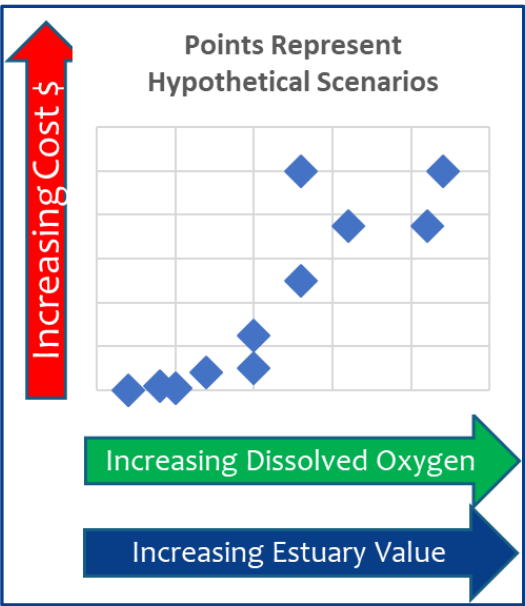


Socio and Economic Evaluation

- Impact of enhanced fisheries on estuary value
- Evaluation of affordability
 - Implementation schedule
- Consideration of equity

Elements of "Attainability Analysis"

Analysis of Attainability



TENTATIVE SCHEDULE

| Task | Target Date |
|---|--------------------|
| Draft Hydrodynamic Model Report | November 30, 2021 |
| Draft Water Quality Model Report | December 31, 2021 |
| Affordability Assessment | January 31, 2022 |
| Aquatic Life Protection Levels and Dissolved Oxygen | January 31, 2022 |
| Procedure for Analysis of Attainability | February 15, 2022 |
| Draft Analysis of Attainability | August 31, 2022 |
| Final Analysis of Attainability | September 30, 2022 |

DRBC TEAM MEMBERS

| Name | Title | Specialty and Responsibility |
|---------------------|-------------------------------------|---|
| Kristen B. Kavanagh | Deputy Executive Director | Project management / multi-task |
| Tom Amidon | Manager, Water Resource Modeling | Oversees modeling in general / data analysis |
| Sarah Beganskas | Water Resource Scientist | Modeling / data management |
| Jacob Bransky | Aquatic Biologist | Data collection / data analysis / Fish-DO relationship |
| Fanghui Chen | Senior Water Resource Engineer | Modeling / data retrieval / post processor |
| Vince DePaul | Hydrologist (USGS) | Modeling / NPS load / atmospheric deposition |
| Elaine Panuccio | Water Resource Scientist | Data collection / data management / load calculation |
| Namsoo Suk | Director, Science and WQ Management | Project management / multi-task / modeling |
| John Yagecic | Manager, Water Quality Assessment | Data analysis / post processor / affordability Assessment |
| Li Zheng | Senior Water Resource Engineer | Modeling / Data analysis |