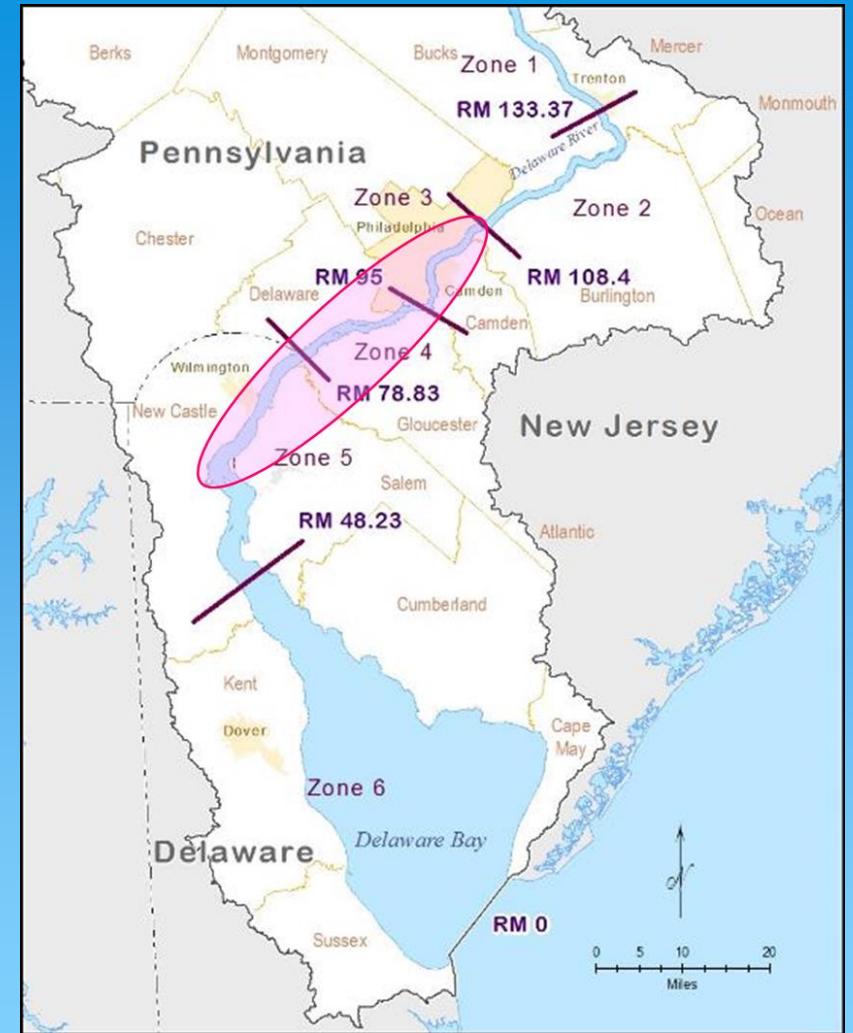


Analysis of Attainability Progress Update

Water Quality Advisory Committee
June 14, 2022



Presented to an advisory committee of the
DRBC on June 14, 2022.



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What is this “Analysis of Attainability”?

Regulatory
basis

- Aquatic life use defined as the degree of propagation associated with a given dissolved oxygen condition

Purpose

- **Highest Attainable Dissolved Oxygen (HADO) condition to be determined based on feasibility, costs, and benefits in the fish maintenance area**

Outcome

- Revised designated use will be the enhanced degree of propagation associated with the HADO condition

Analysis of
Attainability

Rulemaking

Review:

Elements of “Analysis of Attainability”

Core modeling elements

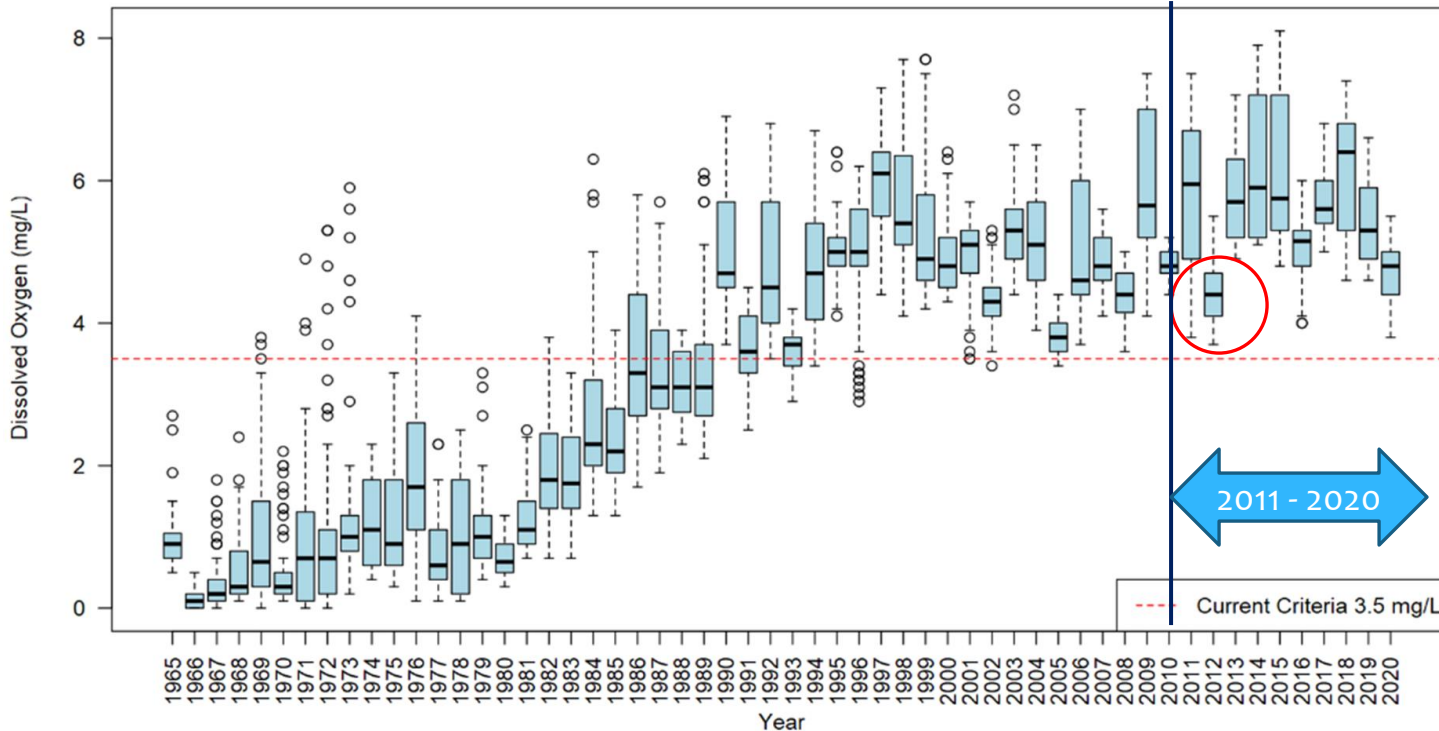
- ❑ Design condition
 - Permitted loads under critical conditions
 - Provides a baseline against which to compare future scenarios
- ❑ Test Scenarios
 - Source sensitivity scenarios
 - Load reduction scenarios
- ❑ Metrics to compare scenarios
 - Basis to compare one scenario with another
 - Dissolved oxygen metrics

Subsequent elements for future discussion

- ❑ Selection of candidate scenarios
- ❑ Characterization of costs and benefits
 - Systemwide characterization
 - Benefits can be characterized based on DO improvement and increase in estuary value
- ❑ Affordability evaluation
 - Facility-specific
 - May influence scenario selection and/or compliance schedule

Design Condition Methodology

July & August Dissolved Oxygen by Year
USGS Monitor 01467200 Delaware River at Ben Franklin Bridge



- 2012 hydrology and climate
 - With shipping channel dredged
- **WWTPs simulated at permitted flows**
 - Working with States to finalize permitted flows
 - Testing to confirm approach is suitable
- Point source concentrations
 - Direct impacts
 - Ammonia, CBOD
 - Nitrate
 - Dissolved oxygen
 - Indirect impacts – other parameters
 - 50th percentile of seasonal values from intensive monitoring period (2018-2019)

Sarah Beganskas

Revised DO Relative Stress Index



Delaware River Basin Commission

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Preliminary Simulations

□ Purpose

- To test and illustrate AA methodology

□ Test Scenarios

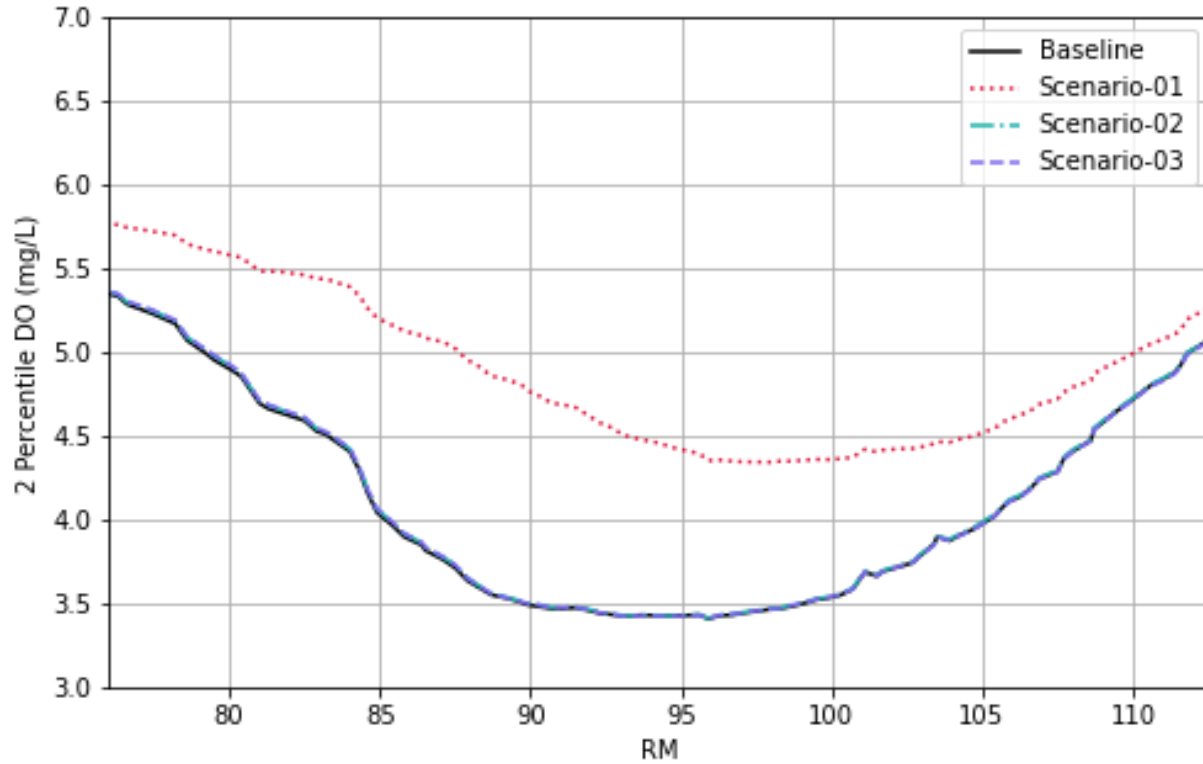
- Baseline: 2012 actual conditions bathymetry adjusted for dredging depth
- Scenario-01: Baseline with Tier 1 discharges set to 1.5 mg/L ammonia
- Scenario-02: Baseline with Tier 2 discharges set to 1.5 mg/L ammonia
- Scenario-03: Baseline with Tier 3 discharges set to 1.5 mg/L ammonia

□ Results compared from May 01 through October 15

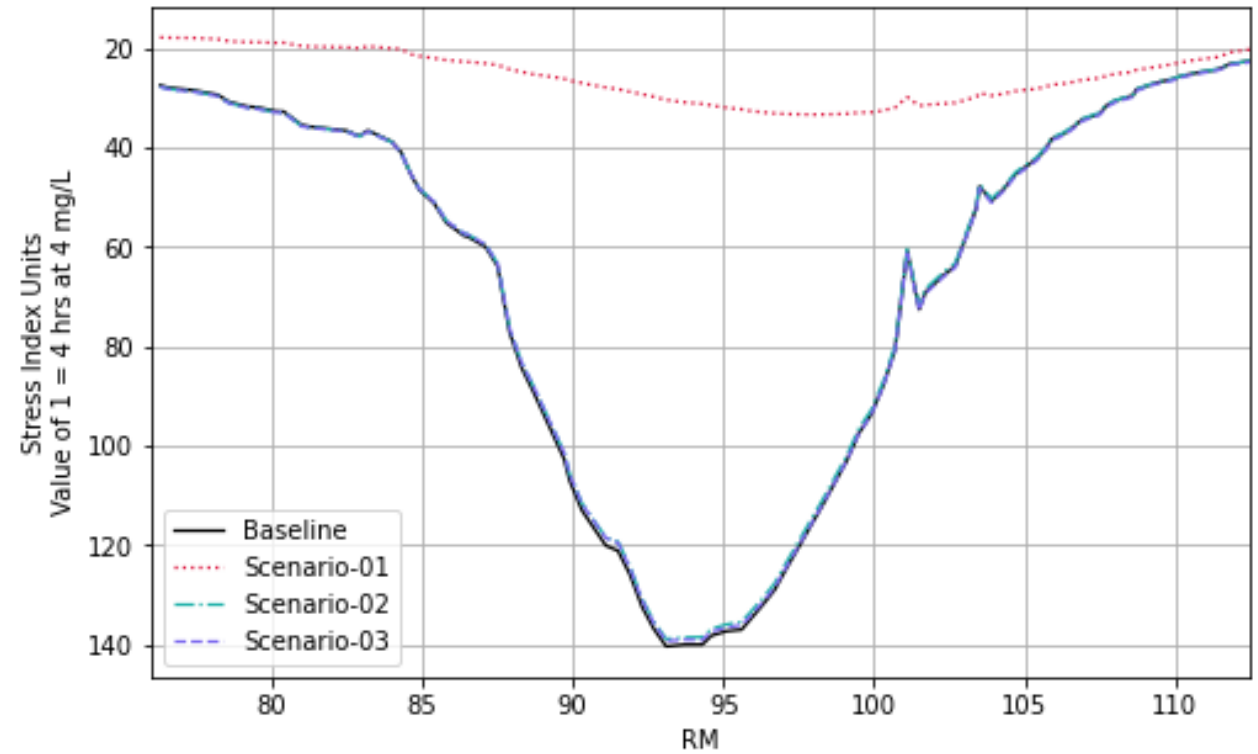
- 2nd Percentile DO
- DO Stress Index
- Tabular Δ DO Map

Dissolved Oxygen Metrics

2 Percentile DO, May 1 to October 15



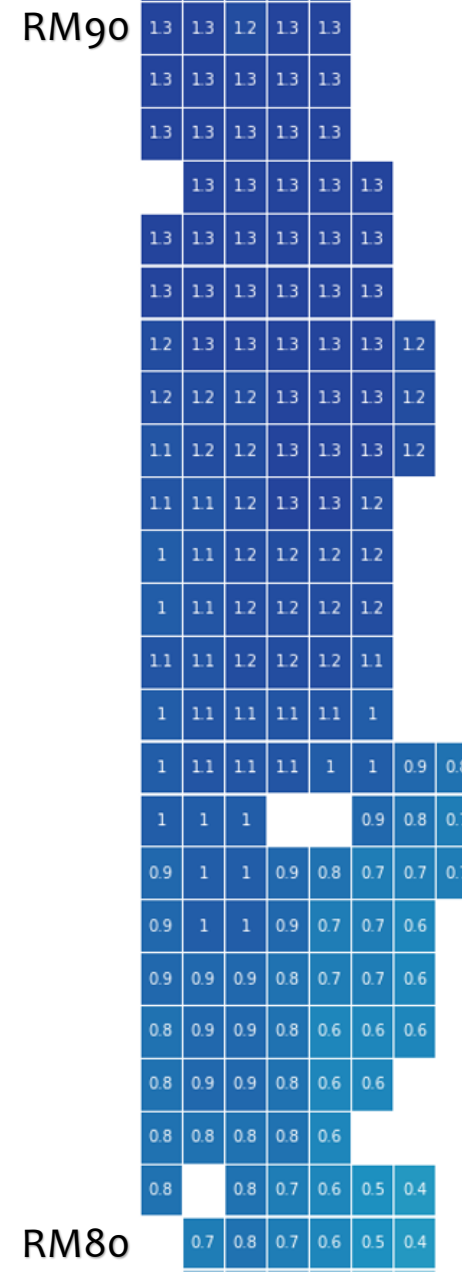
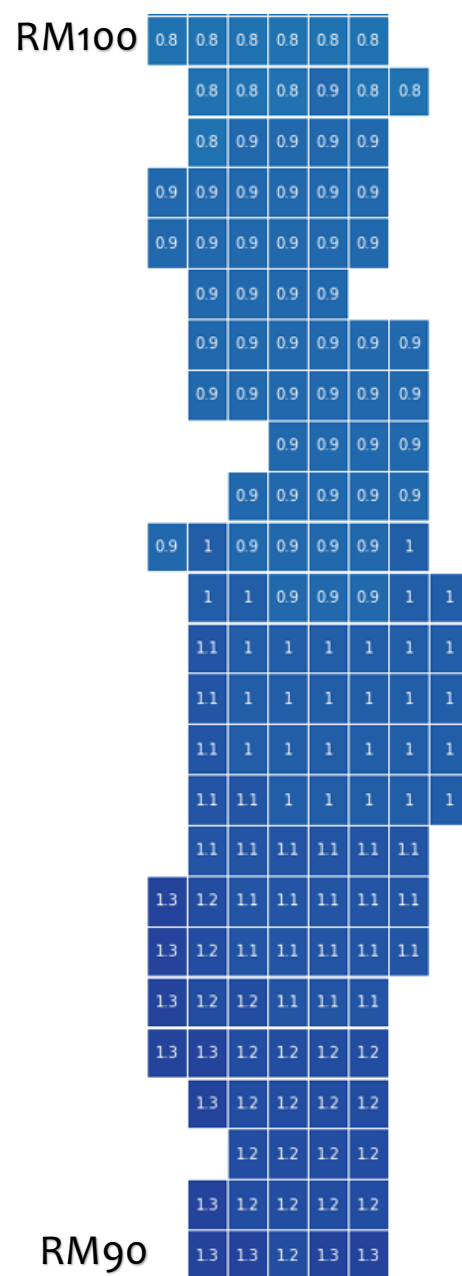
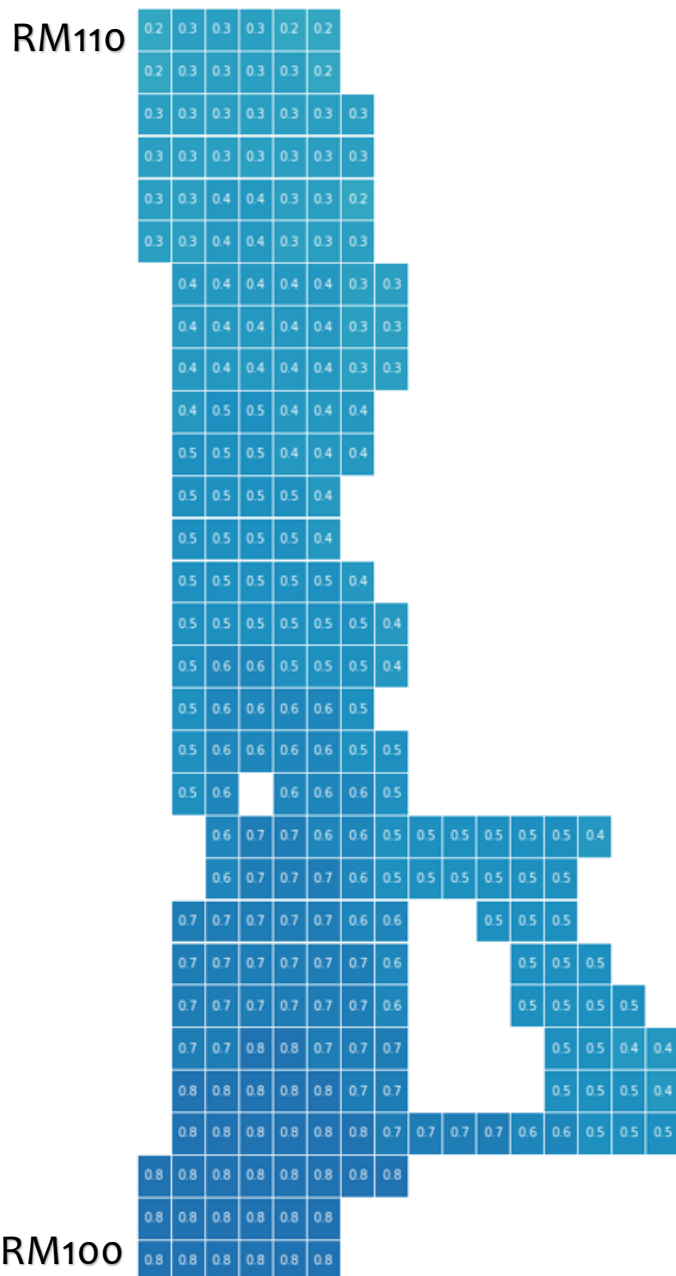
DO Relative Stress Index, May 1 to October 15



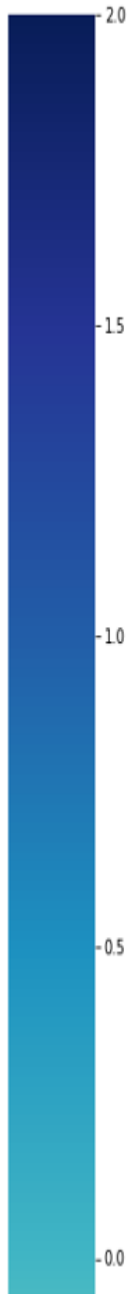
Tabular Δ DO Map (RM 80-110)

Scenario 01 - Baseline
May 01 to October 15

Downstream



Change in 2-Percentile DO (mg/L)



Discussion

Next Steps

- ❑ Immediate
 - Finalize design condition
 - Develop and run Test Scenarios
 - Four levels of nitrogen point source reductions from Cost Study
 - NH₃ = 10, 5, 1.5 mg/L → adjust NO₃ accordingly
 - TN = 4 mg/L
 - Applied to: Tier 1 only, Tier 1 + 2, all
 - * Individual WWTP sensitivity for Tier 1 for selected scenarios
 - Effluent DO and CBOD sensitivity runs
 - Source sensitivity
 - Tracer evaluations of what sources impact specific locations
 - Reduce carbon and nitrogen loads
 - Applied to: tributaries/MS4, CSOs, selected WWTPs
 - Evaluate test scenario results (iterative process)
- ❑ Upcoming
 - Select candidate scenarios
 - Characterize costs and benefits (preliminary)

Upcoming Reports

- ❑ Draft Water quality model calibration report
 - June 2022
- ❑ Draft Socio-economic evaluations study report
 - June 2022
- ❑ 2nd draft of Linking Aquatic Life Uses with DO Conditions report
 - Targeted for June but may slide into July 2022
- ❑ Draft analysis of attainability
 - September 2022