Delaware River Basin Commission

Dissolved Oxygen, Aquatic Life Uses, and the Delaware Estuary

Water Resources Association of the Delaware River Basin
Fall Conference

Rutgers EcoComplex, Bordentown, NJ
November 1, 2018
John Yagecic, P.E.
Historically, summer DO in estuary near Philadelphia & Camden was too low for migratory fish to reach upstream to spawn

- DRBC adopted water quality standards (1967) & wasteload allocation (1968)
- Secondary treatment added at wastewater treatment plants 70’s & 80’s – funding CWA
Delaware Estuary Dissolved Oxygen 1963
Success No. 1 – Dissolved Oxygen

* 3.5 mg/L criteria near Philadelphia, Camden, & Wilmington protect fish migration (not propagation)

* By 2000’s that criteria is nearly always met
Next Phase – Dissolved Oxygen

Relative Point Discharge Load by Delaware Estuary River Mile
NH3 - Ammonia, whole water Loading
1) What are existing uses?

EPA’s regulations define existing uses as “...those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.”1,2 Existing uses are relevant to two provisions in the Federal regulation – 40 C.F.R. § 131.10(g), designated uses, and 40 C.F.R. § 131.12(a)(1), antidegradation. Overall, these provisions:

- Prohibit removal of a designated use that would also remove an existing use.3
- Require the maintenance and protection of existing instream water uses and the level of water quality necessary to protect existing uses when implementing a state’s or tribe’s antidegradation policy.4
## Atlantic Sturgeon

<table>
<thead>
<tr>
<th>1979 Task Force</th>
<th>PSEG target (12 spp)</th>
<th>NJ: 10 K/yr and 10/yr groups</th>
<th>Common name</th>
<th>Scientific name</th>
<th>Zone 3</th>
<th>Any evidence of successful reproduction?</th>
<th>Regular evidence of successful reproduction?</th>
<th>Strong numbers &amp; high consistency of successful reproduction?</th>
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</thead>
<tbody>
<tr>
<td>PSEG target (12 spp)</td>
<td>NJ: 10 K/yr and 10/yr groups</td>
<td></td>
<td>Atlantic Sturgeon</td>
<td><em>Acipenser oxyrhynchus</em></td>
<td>Zone 3</td>
<td>?</td>
<td>N</td>
<td>N</td>
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<tr>
<td>Zone 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 4</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<tr>
<td>Zone 5 (upper)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 5 (upper)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<tr>
<td>RM 70-78.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 5 (lower)</td>
<td>?</td>
<td>N</td>
<td>N</td>
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<tr>
<td>RM 48.2-70</td>
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Some **strong** evidence for successful reproduction for:

- White Perch (Zones 3 & 4),
  Striped Bass (Zone 5)

Some **moderate** evidence for successful reproduction for:

- American Shad (Zone 3),
  Alewife (Zones 3 & 4),
  Bay Anchovy (Zones 4 & 5)

Evidence for **weak** reproductive success in each Zone:

- Atlantic Sturgeon (Zone 4),
  American Shad (Zone 4),
  Blueback Herring (Zones 3 & 4)

Evidence for nursery habitat in each Zone across most species evaluated.
Resolution 2017-4

- Shared achievement & goals
  - Continuous water quality improvement
- Study to determine attainability of new DO criteria, with a fixed schedule
- Initiate rulemaking
- DO early action workgroup
- Recognition of PWD’s DO partnership

- Adopted September 13, 2017
Actions Underway

- Development of estuary eutrophication model
  - Model expert panel
- Engineering evaluation & cost estimate for improved WWTP ammonia & TN
  - Benefit analysis
- DO early action workgroup
- DO needs report from ANS

- Enhanced monitoring for model development
  - Point discharge monitoring
  - Boat run to year-round
  - Added salinity at tidal boundaries
  - Added nitrate at Trenton & Chester
  - Extensive tributary monitoring
  - Light extinction monitoring
  - Primary production
Contracted with Kleinfelder
Planning level cost estimate for top 12 loading facilities to achieve new ammonia effluent levels
Coordination with facilities
Initiated summer 2018
2-year contract
Questions & Discussion?
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