Pennsylvania Lake Erie Phosphorus Reduction Domestic Action Plan (DAP)

June 15, 2017
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Tom Wolf, Governor
Secretary Patrick McDonnell
Agenda

• Overview of DEP’s Office of the Great Lakes
• Pennsylvania’s role in the Great Lakes Water Quality Agreement (GLWQA)
• Draft Pennsylvania Lake Erie Phosphorus Reduction Domestic Action Plan

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DEP Office of the Great Lakes

- Located at the Tom Ridge Environmental Center at Presque Isle State Park.
- Multi-disciplinary staff covering wide array of environmental technical and policy areas.
- A focus on Great Lakes water quality and quantity and linking the community with the resource.
- Forming community partnerships to encourage municipal and county cooperation and protect the environment.
Great Lakes Water Quality Agreement

• **First GLWQA signed between US and Canada in 1972**
  - Focused on reducing algae through a coordinated approach to reducing phosphorus inputs.
  - Established basin-wide water quality goals and formed the Great Lakes Water Quality Board and Research Advisory Board.

• **GLWQA of 1978:**
  - Reaffirmed and replaced the 1972 Agreement.
  - Focused on an “ecosystem approach” with an end goal of restoring and maintaining chemical, physical, and biological integrity of the Great Lakes.
  - Included additional emphasis on toxic substances.
Great Lakes Water Quality Agreement

• **1987 Amendments**
  - Included Areas of Concern and commitments to restore.

• **2012 Amendments:**
  - Emphasized General and Lake Ecosystem Objectives.
  - While US and Canada are responsible for final decision-making, the 2012 Amendments created the Great Lakes Executive Committee to oversee progress on water quality protection and restoration efforts.
Annex 4 requires:

- Management of phosphorus concentrations and loadings.
- Establishment of Lake Ecosystem Objectives.
- Establishment of Substance Objectives for total phosphorus concentrations and loadings.
- Program evaluation and enhancement.
Lake Ecosystem Objectives

- Minimize hypoxic zones.
- Maintain algae below nuisance.
- Maintain healthy algae species.
- Maintain cyanobacteria at levels below which are a threat to humans or ecosystem.
- Maintain mesotrophic conditions in West/Central Erie and oligotrophic conditions in East Erie.
Within 3 years for Lake Erie: 2016
- Review interim objectives and loading targets.
- Determine loading allocations by country.
- Develop concentrations for nearshore waters.
- Establish load reduction targets for priority tributary watersheds.
  - **COMPLETED**

Within 5 years: 2018
- U.S. and Canada must develop Binational Strategy and Domestic Action Plans
Applicable Lake Erie Phosphorus Target:

To minimize the extent of hypoxic zones in the waters of the central basin of Lake Erie: 40 percent reduction in total phosphorus entering the western and central basins of Lake Erie—from the United States and from Canada—to achieve an annual load of 6,000 metric tons to the central basin.
Regional Objectives:

- Regional reduction objectives established through load modeling conducted by Maccoux, et al.

- Maccoux estimates better for larger sources (tributaries and point sources) that had more data available.

- Valuable for determining and assigning significant reductions that need to occur on the lake-wide scale.
• Difficulties in using Maccoux data.

• Lack of high-frequency data in PA.

• Maccoux mixed watersheds from different basins.

• Questions on extent of Central Basin.

• Use of reference and surrogate watersheds for loading estimations.
Defining Central Basin:

- Utilized existing information from multiple sources.
**Point Sources**

237 NPDES permitted discharges in Central Basin watershed.

- 2 Concentrated Animal Feeding Operations
- 5 MS4 Permits: 4 General, 1 Individual, 1 waived
- 7 POTWs: 5 Minor (>1 MGD), 2 Major (1<5)
- 33 Industrial: 27 Minor, 5 No Discharge
- 166+ Private Wastewater Discharges
Estimating non-point sources:

- Pennsylvania tributaries Ashtabula Creek or Conneaut Creek are combined into Ashtabula-Conneaut Complex, others lumped into “Direct Discharge” when they were modeled.
- Used Ashtabula-Conneaut Complex as a reference watershed for loading characteristics.

Table 1: Estimated Pennsylvania Annual TP Loading to the Ashtabula-Conneaut Complex (2008-2013)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Complex Total TP Loading (MTA)</th>
<th>Prorated PA Complex TP Loading (MTA)</th>
<th>PA Percent TP Reduction Over 2008 Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>69</td>
<td>32.0</td>
<td>62.20%</td>
</tr>
<tr>
<td>2009</td>
<td>26</td>
<td>12.1</td>
<td>65.30%</td>
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<tr>
<td>2010</td>
<td>24</td>
<td>11.1</td>
<td>41.80%</td>
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<tr>
<td>2011</td>
<td>40</td>
<td>18.6</td>
<td>24.70%</td>
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<tr>
<td>2012</td>
<td>52</td>
<td>24.1</td>
<td>81.30%</td>
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<tr>
<td>2013</td>
<td>13</td>
<td>6.0</td>
<td></td>
</tr>
</tbody>
</table>

*Statistics and percent reductions derived from data presented by Maccoux.
**PA Total Phosphors Loading to Central Basin:**

- Total Ashtabula-Conneaut Complex comparable to entire PA Central Basin watershed.

- Used the Ashtabula-Conneaut Complex to estimate PA Central Basin loading.

- Based on this assessment, PA averages 40.7 MTA, or 0.51% of the total HEC, WB, CB load for the years 2008-2013.

### Table 2: Estimated Pennsylvania Annual TP Loading to the Central Basin (2008-2013)

<table>
<thead>
<tr>
<th>Year</th>
<th>Complex Total TP Loading (MTA)</th>
<th>Estimated PA Central Basin TP Loading (MTA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>69</td>
<td>75.2</td>
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<tr>
<td>2009</td>
<td>26</td>
<td>28.3</td>
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<td>40</td>
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<td>2012</td>
<td>52</td>
<td>56.7</td>
</tr>
<tr>
<td>2013</td>
<td>13</td>
<td>14.2</td>
</tr>
</tbody>
</table>

2008-2013 Average Annual TP Loading: 37.3

### Table 3: Estimated Pennsylvania Annual Percent TP Loading to the Central Basin (2008-2013)

<table>
<thead>
<tr>
<th>Year</th>
<th>Maccoux Central Basin TP Loading (MTA)</th>
<th>Estimated PA Central Basin TP Loading (MTA)</th>
<th>Estimated PA Central Basin % of Total Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>9736</td>
<td>75</td>
<td>0.77</td>
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<tr>
<td>2009</td>
<td>7637</td>
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<td>2010</td>
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<td>2012</td>
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<td>57</td>
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<tr>
<td>2013</td>
<td>7493</td>
<td>14</td>
<td>0.19</td>
</tr>
</tbody>
</table>

2008-2013 Estimated Average PA Percentage of Total CB Loading: 0.51
**PA Central Basin Loading Conclusions:**

- PA’s phosphorus contributions to CB are de minimus and have little overall effect on the hypoxia/anoxia being observed in CB.

- Even if it were possible for PA to reduce tributary loading from current levels, those reductions would only relieve hypoxia/anoxia in the Central Basin by a small fraction of a percent.

- Pennsylvania’s loading contributions to the Central Basin of Lake Erie are likely already attaining the 40% reduction in TP over the 2008 baseline.

- Additionally, the loading estimations suggest that any large-scale phosphorus reductions in many Pennsylvania tributaries may affect the biologic productivity of the stream systems.
Measuring Progress and Achieving Consensus

- PA DEP will compile NPDES discharge loading data.

- PADEP will report known phosphorus contributions and reductions on a frequency to be mutually determined between PA DEP and U.S. EPA.

- PADEP will participate in the submission of phosphorus contribution and reduction data for the purposes of tracking and accounting for total lakewide phosphorus reductions.
Public Comment on the PA DAP was announced in the May 27, 2017 edition of the Pennsylvania Bulletin. Comments will be accepted between May 27, 2017 and June 26, 2017. Comments can be provided via the eComment system, by email, or by mail.

- eComment and Draft DAP Document Access: www.ahs.dep.pa.gov/eComment
- Written comments accepted by email at ecomment@pa.gov or by mail to Department of Environmental Protection, Policy Office, Rachel Carson State Office Building, P.O. Box 2063, Harrisburg, PA 17105-2063
Provide Greater Assurance of Pennsylvania Phosphorus Loading Estimations - Pennsylvania will conduct the following activities by the year 2021 to attain greater confidence in the loading estimations:

- **Research and Assemble all Available Water Quality Data for Central Basin Tributaries**
- **Evaluate and Assess Applicability of Existing Data and Report**
- **Conduct Tributary Land Use Assessment and GIS-based Nutrient Modeling**

During the years 2021 and 2022, Pennsylvania will evaluate the existing data, land use and land cover assessments, any available pollutant transport modeling, and determine additional data needs.
Prioritize Delivery of PA DEP Nutrient Reduction Programs to Central Basin Tributaries

- **PADEP Clean Water**
  - SWM Associated with Construction Activities
  - Small Flow Treatment Facilities
  - Concentrated Animal Feeding Operations
  - MS4 Permitting
  - Act 537 Sewage Facilities Planning Program
  - NPDES E&S Control Permitting
  - Manure and Nutrient Management
  - Agricultural Erosion and Sediment Management

- **PADEP Coastal Resource Management Program**
  - Coastal Zone Management Program
DEP Partnerships with County/Local Governments and Non-Governmental Organizations

- PA Vested in Environmental Sustainability Program (VinES)
  - Erie County Conservation District

- Erie County Small Flow Treatment Facility Program
  - Erie County Department of Health

- Urban Stormwater Management and Green Infrastructure Initiatives
  - Erie County Department of Planning and NGO Partners
“To protect Pennsylvania’s air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. We will work as partners with individuals, organizations, governments, and businesses to prevent pollution and restore our natural resources.”