Phosphorus Impairment in Lake Erie Tributaries in Ohio

Lake Erie Phosphorus Task Force
May 23, 2007

Overview

• What does “impairment” mean?

• What we’ve reported about phosphorus in Lake Erie basin tributaries

• How we’re addressing phosphorus impairments in the Lake Erie basin
Defining an “Impairment”

- Identified during our integrated surveys (chemistry, biology, physical measurements)
- Depends primarily on meeting biological criteria; chemistry mostly used to indicate causes and sources of impairment
- Chemistry sampling is for total phosphorus

Clean Water Act Reporting: Sections 305(b) and 303(d)

- 305(b): report status of waters statewide
- 303(d) requires States to
  - List and prioritize impaired waters
  - For each impaired water, evaluate what action is needed to fix problems
- 303(d) is safety net for when the technological controls don’t work
Summary Stats for Lake Erie Basin

- 331 HUCs in Ohio, 98 are in Lake Erie drainage

- Nearly all are considered to be impaired for some use (aquatic life, recreation, fish tissue), or we don’t have data

- Statewide, nutrients cited as impairment cause in 42% of watersheds and 24% of large rivers

Overall Impairment
Aquatic Life Use Summary

• Of the 98 Lake Erie basin HUCs
  ◦ 1: attaining WQS
  ◦ 24: status “unknown” due to lack of data
  ◦ 73: at least one area of not attaining WQS
    • 20: TMDLs completed
    • 53: TMDLs underway or planned

• 40 of the 73 are impaired for nutrients (55%)
Impaired by Nutrients

Legend

- Watersheds Impaired for Nutrients

Impaired by Organic Enrichment/D.O.

Legend

- Watersheds with Impairment from Organic Enrichment/D.O.
Impaired by Siltation

Legend
- Watersheds Impaired for Silt

Impaired by Nutrients/Silt/Enrichment

Legend
- Nutrients + Silt + Organic Enrichment/DO
- Silt + Organic Enrichment/DO
- Organic Enrichment/DO
Deciding What to Target

- No numerical phosphorus criterion in Ohio WQS

- Narrative criterion: phosphorus should be limited to prevent nuisance growths of algae and weeds (OAC 3745-1-04, E)

- TMDL targets based on Ohio EPA data on associations of healthy aquatic communities to phosphorus levels
Deciding What to Target

- Best communities where phosphorus lowest
- Scaled by drainage area size and ecoregion
- Typical targets (mg/l):

<table>
<thead>
<tr>
<th>Headwaters</th>
<th>Wadable</th>
<th>Small River</th>
<th>Large River</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20 sq mi</td>
<td>20 - 200 sq mi</td>
<td>200 – 1000 sq mi</td>
<td>≥1000 sq mi</td>
</tr>
<tr>
<td>0.08</td>
<td>0.10</td>
<td>0.17</td>
<td>0.30</td>
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</tbody>
</table>

Completed TMDLs in Lake Erie Basin

<table>
<thead>
<tr>
<th></th>
<th>D.O.</th>
<th>Phosphorus</th>
<th>Sediment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuyahoga</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Rocky</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>upper Auglaize</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>upper Sandusky</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Old Woman</td>
<td></td>
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</tr>
<tr>
<td>Euclid</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Huron</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Toussaint</td>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>Vermilion (draft)</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Chagrin (draft)</td>
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<td>x</td>
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</tbody>
</table>
TMDL Results for Phosphorus

<table>
<thead>
<tr>
<th>Project</th>
<th>Year</th>
<th>Phosphorus Reduction (%)</th>
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<tbody>
<tr>
<td>Cuyahoga</td>
<td>2000-03</td>
<td>28 - 76</td>
</tr>
<tr>
<td>Rocky (Plum)</td>
<td>2001</td>
<td>14</td>
</tr>
<tr>
<td>upper Auglaize</td>
<td>2004</td>
<td>15 - 96</td>
</tr>
<tr>
<td>upper Sandusky</td>
<td>2004</td>
<td>25 - 65</td>
</tr>
<tr>
<td>Euclid</td>
<td>2005</td>
<td>41</td>
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<tr>
<td>Huron</td>
<td>2005</td>
<td>5 - 43</td>
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<tr>
<td>Toussaint</td>
<td>2006</td>
<td>18 – 32</td>
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<tr>
<td>Vermilion (draft)</td>
<td>--</td>
<td>15 - 23</td>
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<tr>
<td>Chagrin (draft)</td>
<td>--</td>
<td>22</td>
</tr>
</tbody>
</table>

Typical Point Source Recommendations

- Limit point source effluent phosphorus to 1 mg/l
  - Not new to major dischargers in Lake Erie basin
  - Sometimes down to 0.5 mg/l
  - Include compliance schedule
- New monitoring for facilities that don’t monitor.
- Eliminate sanitary sewer overflows
- Limit combined sewer overflows (CSOs), especially in Cuyahoga, also in upper Auglaize
Typical Nonpoint Source Recommendations

- Habitat restoration and protection
- Agricultural conservation practices
- Manure management plans
- Home septic system improvements (including elimination in favor of central sewers)
- Watershed awareness education
- Try to work in sync with local watershed action plans

Recommendation Follow-Through

- Point sources: enforced through NPDES permits, long-term control plans, Director’s orders
- Non point sources: have directed 319 and other incentive funding to TMDL recommendations, and worked with NRCS to align with their funding
- New monitoring to assess effectiveness