Water Quality Conditions
Assessment and Reporting of the Nutrient Problem Affecting Ohio Water Resources

Jeffrey E. DeShon, Ohio EPA Ecological Assessment Section
Ohio Nutrient Forum - November 14, 2012

Clean Water Act
The goal is to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.
Reporting/Listing in a Nutshell

- assess condition
- prioritize problems
- schedule work

Integrated Report 2012

Integrated Report Process

Data
- Biology
- Chemistry
- Habitat
- Tissue
- Bacteria

Analysis

Every two years...

Compile statewide data

For each use, assign category

Prioritize

Schedule

Integrated Water Quality Monitoring and Assessment Report

Watershed-level work: use status, TMDLs, permits, grants
### Watersheds: Results by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Human Health</th>
<th>Recreation</th>
<th>Aquatic Life</th>
<th>Public Drinking Water Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully supporting</td>
<td>180</td>
<td>102</td>
<td>312</td>
<td>36</td>
</tr>
<tr>
<td>Can't tell</td>
<td>850</td>
<td>671</td>
<td>247</td>
<td>76</td>
</tr>
<tr>
<td>Not supporting – action not required</td>
<td>0</td>
<td>344</td>
<td>440</td>
<td>1</td>
</tr>
<tr>
<td>Not supporting – action required</td>
<td>508</td>
<td>421</td>
<td>539</td>
<td>4</td>
</tr>
</tbody>
</table>

### Large Rivers: Results by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Human Health</th>
<th>Recreation</th>
<th>Aquatic Life</th>
<th>Public Drinking Water Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully supporting</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Can't tell</td>
<td>2</td>
<td>18</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Not supporting – action not required</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Not supporting – action required</td>
<td>35</td>
<td>15</td>
<td>18</td>
<td>3</td>
</tr>
</tbody>
</table>
Determining Aquatic Life Use Attainment Status
And Causes and Sources of Impairment

- Attainment status is driven by response indicators (i.e., Ohio’s biocriteria).
- Cause and source determination involves the interpretation of multiple lines of evidence.
  - Water chemistry data
  - Sediment data
  - Physical habitat data
  - Effluent data
  - Biomonitoring test data
  - Land use data
  - Biological response signatures within the biological data
- The assignment of principal causes and sources of impairment represents the association of the impairment (defined by response indicators) with the most probable stressor and exposure indicators.
What’s Causing the Problems?
Most aquatic life impairment is caused by land disturbances related to agriculture activities and urban development.

Five Common Aquatic Life Causes

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percent of Impaired Assessment Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Enrichment/DO</td>
<td>21% (Large River) 21% (Watershed)</td>
</tr>
<tr>
<td>Hydromodification</td>
<td>38% (Large River) 45% (Watershed)</td>
</tr>
<tr>
<td>Habitat alterations</td>
<td>37% (Large River) 53% (Watershed)</td>
</tr>
<tr>
<td>Nutrients</td>
<td>52% (Large River) 60% (Watershed)</td>
</tr>
<tr>
<td>Siltation/sediment</td>
<td>21% (Large River) 58% (Watershed)</td>
</tr>
</tbody>
</table>
Hydromodification

Examples:

- stream impoundments (e.g., low-head dams)
- agricultural drainage systems (e.g., field tiles)
- urbanization (e.g., “hardening”)

Streams impacted by hydromodification:

Large Rivers – 21%
Watersheds – 36%

Habitat Alterations

Examples:

- removal of riparian vegetation
- channelization
- stream bank modifications
- culverting

Streams impacted by habitat alterations:

Large Rivers – 53%
Small Streams – 45%
Silt and Sediment

Examples:
• construction
• unrestricted livestock access
• overland erosion

Streams impacted by silt and sediment:
Large Rivers – 21%
Watersheds – 58%

Organic Enrichment and Dissolved Oxygen

Examples:
• wastewater treatment plants
• home sewage treatment systems
• livestock manure discharges

Streams impacted by organic enrichment:
Large Rivers – 68%
Small Streams – 52%
Nutrients

Streams impacted by nutrients:
Large Rivers – 37%
Small Streams – 60%

Examples:
• agriculture (e.g., crop fertilization)
• urban runoff (e.g., lawn fertilizers)

Initial Questions?