Water Quality in Twin and Pine Lakes

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In Your Lake Plan

Identify…

- Water quality goals (Improve? Protect? Maintain?)
- Long-term monitoring strategy
- Strategies that lead to healthy shorelands
- How to support healthy watershed land management practices
A lake is a reflection of its watershed...
Water Quality

- Dissolved Oxygen
- Water Clarity
- Nutrients
- Minerals and Pollutants
Dissolved Oxygen

- Comes from atmosphere/aquatic plants
- Important to aquatic organisms
- Changes with depth and season
Dissolved Oxygen

Pine Lake (Springwater) Dissolved Oxygen (mg/L)

Date
- 2/10/1977
- 6/2/1977
- 6/19/1996
- 5/6/1996
- 6/1/1996
- 7/9/1996
- 9/12/1996
- 7/20/2001
- 11/8/2010
- 2/23/2011
- 4/27/2011
- 6/9/2011
- 6/30/2011
- 7/19/2011
- 2/4/2012
- 6/29/2012
- 7/19/2012
- 8/10/2012
- 8/27/2012

Twin Lake Dissolved Oxygen (mg/L)

Date
- 11/8/2010
- 2/23/2011
- 4/27/2011
- 6/9/2011
- 6/30/2011
- 7/19/2011
- 6/29/2012
- 7/19/2012
- 8/10/2012
- 8/27/2012
Water Clarity

- Measure of light penetration in water

- Effected by
  - Color
  - Sediment
  - Algae

- Controls depth aquatic plants can grow
Water Clarity

Pine Lake - Springwater Secchi Depth

Twin Lake Secchi Depth
Nutrients

- Phosphorus
- Nitrogen

Common Sources of Nutrients in Lakes

- Wetlands
- Soils
- Plants
- Animals
- Atmospheric deposition (wet & dry)
- Resuspension and release from sediments
- Septic systems
- Fertilizers
- Wastewater
- Erosion/runoff
- Livestock waste
Wisconsin Phosphorus Standard
Deep Seepage Lakes
(20 µg/L)
~Flag Value~
(15 µg/L)

Wisconsin Phosphorus Standard
Shallow Seepage Lakes
(40 µg/L)
~Flag Value~
(15 µg/L)
## Pine Lake “Nutrient Scorecard”

<table>
<thead>
<tr>
<th></th>
<th>GOOD</th>
<th>FAIR</th>
<th>POOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total P (ppb)</strong></td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Median summer concentration)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inorganic N (ppm)</strong></td>
<td></td>
<td>0.22</td>
<td></td>
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<tr>
<td>(Spring)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Chlor-a (mg/L)</strong></td>
<td>2.2</td>
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</table>
### Twin Lake “Nutrient Scorecard”

<table>
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</thead>
<tbody>
<tr>
<td><strong>Total P (ppb)</strong> (Summer)</td>
<td>15</td>
<td></td>
<td></td>
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<tr>
<td><strong>Inorganic N (ppm)</strong> (Spring)</td>
<td></td>
<td>0.22</td>
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<tr>
<td><strong>Chlor a (mg/L)</strong></td>
<td></td>
<td>3.8</td>
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</tbody>
</table>
Pollutants

- Sulfate
- Chloride
- Potassium
- Sodium
## Pine Lake Potential Contaminants

<table>
<thead>
<tr>
<th>(mg/L)</th>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
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<tbody>
<tr>
<td>Chloride</td>
<td>1.8</td>
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<tr>
<td>Potassium</td>
<td>0.6</td>
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<tr>
<td>Sodium</td>
<td></td>
<td>2.0</td>
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</tbody>
</table>

| Atrazine | 0.10 ug/L |
# Twin Lake Potential Contaminants

<table>
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<tr>
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<th>MEDIUM</th>
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</thead>
<tbody>
<tr>
<td>Chloride</td>
<td>0.7</td>
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<tr>
<td>Potassium</td>
<td>0.5</td>
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</tr>
<tr>
<td>Sodium</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atrazine</td>
<td>&lt;0.01 ug/L</td>
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</table>
What should be done to address water quality?

- Control of runoff and groundwater contamination
- Limit release of contaminants to environment
- Monitoring
General Recommendations

• Over-application of chemicals should be avoided. Landowners in the watershed should be made aware of their connection to the lake and should work to reduce their impacts through the implementation of water quality-based best management practices.

• Taking steps to maintain or improve water quality in Pine Lake depends upon understanding the sources of nutrients and pollutants to the lake and identifying those that are manageable. The Waushara County Land Conservation Department and Natural Resources Conservation Service (NRCS) have staff available to assist landowners interested in learning how they can improve water quality through changes in land management practices.

• Encourage a soil testing program.
Acknowledgements

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Waushara County

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UW-Stevens Point Undergraduate Students
Questions?