Status of Fox Chain ‘O’ Lakes 2014

Kathleen Paap
Water Quality Specialist – LCHD-ES
Fox River Summit, 2015
Watershed

- Land which drains to a stream, lake, ocean
- Fox River Watershed 1,300 sq. miles
- Wisconsin 938 sq. miles (SEWRPC)
- Lake County 362 sq. miles (Lake County Mapping)
Land Use

- Agricultural: 41.8%
- Disturbed Land: 9.0%
- Forest and Grassland: 7.2%
- Government and Institutional: 5.9%
- Industrial: 6.2%
- Residential (Multi & single): 11.3%
- Public and Private Open Space: 14.5%
- Retail/Commercial: 1.0%
- Transportation, Utilities & Waste Facilities: 0.8%
- Water: 1.2%
- Wetlands: 0.8%
2014 Monitoring

- Water Clarity
- Total Suspended Solids
- Nutrients
- Conductivity and Chlorides
- Dissolved Oxygen
- Temperature and pH
- Vegetation
- Algae - Harmful Algal Blooms
Water Clarity

- 2014
- 2002
- Lake County (2.95 ft)
Catherine and Channel

Lake Catherine Secchi Depth

Channel Lake Secchi Depth

LEGEND
- Lake County Median Secchi Depth (ft.)
- outlier
The importance of citizen monitoring!
What impacts water clarity?

- Nutrients
  - Phosphorus
  - Nitrogen
- Total Suspended Solids (TSS)
  - Sediments
  - Plankton/Algae
- Precipitation
- Presence or absence of aquatic vegetation
- Invasive species
Total Suspended Solids

- Sediments (non-volatiles)
- Plankton/Algae (volatiles)
Total Suspended Solids

- Lake County Median: (8.2 mg/L)
- TSS Impairment (IEPA): *
- Chain'O'Lakes Median: (17.0 mg/L)
Total Phosphorus

- Outlier

Lake County Median (0.068 mg/L)
IEPA Impairment (0.050 mg/L)
Internal Cycling Phosphorus

<table>
<thead>
<tr>
<th></th>
<th>Epilimnion</th>
<th>Hypolimnion</th>
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</thead>
<tbody>
<tr>
<td><strong>0.112</strong></td>
<td>0.108</td>
<td></td>
</tr>
<tr>
<td><strong>0.063</strong></td>
<td>0.512</td>
<td></td>
</tr>
<tr>
<td><strong>0.088</strong></td>
<td>1.010</td>
<td></td>
</tr>
<tr>
<td><strong>0.084</strong></td>
<td>0.838</td>
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<tr>
<td><strong>0.166</strong></td>
<td>0.182</td>
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</tbody>
</table>

![Lake Marie monthly TP Epilimnion](image)
Nitrogen

- Nitrogen used for plant growth. Target nutrient for reduction of hypoxic zone in Gulf.
- Wetlands may be the most efficient method of removal.
- In lakes, spikes in nitrogen in spring can fuel summer algal blooms.
Algae

- Important to aquatic systems
- Plants maintain balanced algal populations
- Increased phosphorus leads to Cyanobacteria dominated system
Algae – Harmful Algal Blooms

- Cyanobacteria
- Have the ability to fix nitrogen
- Photosynthesize like algae – actually bacteria
- Can produce toxins upon cell lyse. Toxin not always produced.
- Toxins can affect human and pet health.
Beaches and HAB

- Monitored subset of licensed beaches for HABs since 2013
- Monitor bi-monthly
- Sample sent to an independent laboratory for enzyme linked immuno-assay testing
Beaches

- HABs
  - If toxin is present, Abraxis test performed to detect toxin
  - If toxin present in levels $\geq 10$ ppb beach manager advised
E-Coli

- Sample licensed beaches
- If e-coli colonies > 235 cells/mL – swim ban issued
- Beach tested until colonies diminish
Aquatic Vegetation

- Critical Component in aquatic systems
- Estimated total average cover of vegetation within the Fox Chain ‘O’ Lakes is 27.3%.
- 20 plant species detected. FQI = 29.7
Aquatic Vegetation

- 91-100%
- 61-90%
- 41-60%
- 11-40%
- 1-10%
- No Plants

Maps showing the distribution of aquatic vegetation across various lakes, including Channel Lake, Lake Catherine, Lake Marie, Bluff Lake, Grass Lake, Spring Lake, Nippersink Lake, Dunns Lake, Pistakee Lake, Fox Lake, Redhead Lake, and Lake Matthews.
### Dominant Plant Species

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Epithet</th>
<th>Average Cover</th>
<th>Frequency</th>
<th>Relative Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coontail</td>
<td><em>Ceratophyllum demersum</em></td>
<td>6.3</td>
<td>20.4</td>
<td>42.7</td>
</tr>
<tr>
<td>White Water Lily</td>
<td><em>Nymphaea odorata</em></td>
<td>5.5</td>
<td>19.7</td>
<td>39.3</td>
</tr>
<tr>
<td>American Lotus</td>
<td><em>Nelumbo lutea</em></td>
<td>6.4</td>
<td>14.6</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Coontail *(Ceratophyllum demersum)*

RIV = 42.7%

White Water Lily *(Nymphaea odorata)*

RIV (39.3%)

American Lotus *(Nelumbo lutea)*

RIV = 37.5%
American Lotus

1946 – 1142 acres
Grass Lake – 736 acres
Lotus 2000 – 2014 LCHD-ES

Lotus on the Fox Chain 'O' Lakes 1939 - 2014.

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</thead>
<tbody>
<tr>
<td>Acres</td>
<td>272</td>
<td>115</td>
<td>105*</td>
<td>97</td>
<td>290</td>
<td>295</td>
<td>213</td>
<td>0</td>
<td>406</td>
<td>1142</td>
<td>1057</td>
</tr>
</tbody>
</table>
Prevent Spread

Before launching and before leaving... Inspect everything!

Illinois Law PA 97-850 (01-2013)
• requires removal of materials from their vehicle, seaplane or watercraft before operating or transporting onto a highway or placing the vehicle into a navigable water other than the water in which the material became attached.
Hydrilla

- Keep your eyes out for this species
- If you suspect that you have encountered in Illinois
  - E-mail a picture of plant placed on light colored background
  - If you do not have an e-mail account contact or cannot send digital picture e-mail [HydrillaHunt@niipp.net](mailto:HydrillaHunt@niipp.net) or call the LCHD at (847)377-8020 Mike Adam or (847)377-8030
- In Wisconsin
  - Call the DNR (608-266-9270) or the Wisconsin Sea Grant Program (920-683-4697) for identification. Visit the Wisconsin DNR website Aquatic Invasive Species.
Acknowledgements

- LCHD-ES Staff – Michael Adam, Alana Bartolai, Gerard Urbanozo, interns and past WQ specialists
- Illinois DNR staff
- Fox Waterway Agency
- Southeastern Wisconsin Planning Commission – Mapping Division
- David Lester – Photo rights – The History of Boating on the Fox Chain ‘O’ Lakes
Meeting Dates

South Chain
- Thursday March 26th, 2015
- 7:00 – 8:00 PM
- Lakefront Park Main Room
- 71 Nippersink Blvd,
- Fox Lake, IL 60020
  - Redhead Lake
  - Lake Matthews
  - Dunn’s Lake
  - Pistakee Lake
  - Fox Lake
  - Grass Lake
  - Nippersink Lake

North Chain
- Tuesday March 31st, 2015
- 7:00 - 8:00 PM
- Antioch Township Hall
- 1625 Deep Lake Rd,
- Lake Villa, IL 60046
  - Lake Catherine
  - Channel Lake
  - Bluff Lake
  - Lake Marie
  - Petite Lake
  - Spring Lake