Bughs Lake

Creating A Lake Management Plan

A partnership between citizens, Waushara County, local lake associations, and the Center for Watershed Science and Education (UW Stevens Point)
Why Plan?

- Correct past problems, preserve or improve current conditions, provide for the future
- Reduce conflicts
- Allow for proactive responses
- Incorporates actions from a variety of responses
- Increasing required for WDNR grants
- No cost to lake group
The Planning Process

Meeting 1
- Background
- Overview of process

Meeting 2-4
- Topic-specific
- Input from specialists
- Develop vision, goals and action strategies

Plan Adoption Follow-up
- Lake Association/District
- Town
- County
- State

Feedback
Revise
Typical Plan Chapter Topics:
Aquatic Plants

- In Lake
- Near-Shore
- Invasive
Typical Plan Chapter Topics:
Shoreland and Near-shore
Typical Plan Chapter Topics:
Fish, Habitat, and Lake Levels
Typical Plan Chapter Topics:
Recreation
Typical Plan Chapter Topics:

Water Quality and Watershed
Typical Plan Chapter Topics: Communication
Fishing and Recreation

Lake Emily residents enjoy many different recreational opportunities on the lake. Based on survey results, the most popular recreational activities on Lake Emily included fishing, enjoying scenery, walking, motor boating, and swimming/snorkeling. Because Lake Emily is one of only three lakes in Portage County that is big enough to allow a wake, the lake is heavily used for motor boating, waterskiing/tubing, etc. Conflicts with the different activities can easily occur; recreational needs and uses on the lake will likely continue to increase as populations and development in the area increases. To help alleviate some of the conflict among uses, no-wake hours were put into place on Lake Emily. The majority of survey respondents indicated that the no-wake hours are working on the lake and wish to keep them in place, but there is some confusion regarding who must obey the no-wake hours.

Healthy lake ecosystems are valuable natural resources for all lake users. It is important to maintain a good fishery so that anglers and families are able enjoy the fishery on Lake Emily, as fishing is the top recreational activity on the lake and is valued by lake users. Survey respondents felt that the quality of fishing in Lake Emily was average and perceived that fishing had stayed the same or declined in recent years. Survey respondents perceived the decline in quality fishing was due to heavy recreational use of the lake and overfishing.

Vision: Provide recreational opportunities for lake users while providing safe conditions and protecting a healthy lake ecosystem.

Goal 7: Preserve the water quality and habitat on Lake Emily and safety of Lake Emily users while allowing for a variety of recreational opportunities.

Objective 7.1: Provide recreational opportunities to enjoy Lake Emily while minimizing conflicts between users and protecting lake water quality and habitat.

<table>
<thead>
<tr>
<th>Action</th>
<th>Lead person/group</th>
<th>Start/end dates</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide aCourtesy Code handout explaining no wake rules - share with park users, place at boat landing, share with riparians</td>
<td></td>
<td></td>
<td>WDNR&lt;br&gt;UWEX Lakes&lt;br&gt;UWSP</td>
</tr>
<tr>
<td>Continue to take “neighborly approach”, kindly explaining the no-wake hours with users of the lake</td>
<td></td>
<td></td>
<td>UWEX Lakes</td>
</tr>
<tr>
<td>Keep parking lot size the way it is and do not expand boat launches</td>
<td></td>
<td></td>
<td>Portage County Parks</td>
</tr>
<tr>
<td>Explore/find out how firework debris/residue affects water quality</td>
<td></td>
<td></td>
<td>UWSP&lt;br&gt;UWEX Lakes</td>
</tr>
</tbody>
</table>
Ways to Participate

- Take each of 4 online monthly surveys
- Attend planning sessions
- Review meeting notes & presentations online
- Receive info by email or Facebook
Bughs Lake:
Background and Lake Study Results
May 2014
Presentation Highlights

- Lakes and Land Use
  - Watersheds to Shorelines
- Water Quality
- Aquatic Plants
Surface Area: 24 acres
Maximum Depth: 18 feet
Seepage Lake
Where is water coming from?

- Near shore runoff
- Surface watershed
- Groundwater
Surface Watershed: 559 acres

- Developed, agricultural land
Groundwater
What influences water quality?

- Lake type
- Natural geology, soil, and topography
- Seasonal and environmental changes
- Land use management within the watershed
- Near shore activities
- In lake activities
More Impervious Surface = More Runoff

In a forest, rain soaks into the ground and is taken up by tree roots or moves down through the soil into the groundwater.

When rain falls on impervious surfaces, it cannot soak into the ground and instead becomes runoff. Water (runoff) carries sediments and nutrients to the lake.
Shoreline Vegetation

- Reduces runoff
- Filters contaminants (sediment, nutrients, etc.)
- Stabilizes the shoreline
Shoreline Vegetation and Woody Habitat

- Provides habitat, shelter, and food for wildlife

[Images of wildlife and vegetation]
Shoreland Vegetation

Preserve

Restore
Native Plants

• Have deeper roots that stabilize soil
• Lessen raindrop impact & erosion
• Stay upright in runoff to filter sediment
• Provide food & shelter for wildlife
Water Quality

- Water Clarity
- Dissolved Oxygen
- Nutrients (fertilizer)
- Minerals and Pollutants
Water Clarity

- Measure of light penetration in water

- Effected by
  - Sediment
  - Color
  - Algae

- Controls depth aquatic plants can grow
Water Clarity

Bugh's Lake Secchi Depth

- Historic Secchi Depth (ft)
- Current Average Depth (ft) 2010-2012
Dissolved Oxygen

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

- Nitrogen and Phosphorus
- Grow plants and algae
- Occurs naturally
- Can be significantly increased by
  - Exposing soil
  - Lawn/garden/agricultural fertilizer
  - Animal waste
  - Septic systems
  - Re-suspending bottom sediments
Average Phosphorus Spring/Fall

Bughs Lake

Definitions for eutrophic, mesotrophic and oligotrophic are on the previous page.
## “Trophic Scorecard”

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<thead>
<tr>
<th></th>
<th>GOOD</th>
<th>FAIR</th>
<th>POOR</th>
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<tbody>
<tr>
<td><strong>Total P (ppb)</strong></td>
<td></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>(Summer median)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inorganic N (ppm)</strong></td>
<td>0.05</td>
<td>0.25</td>
<td></td>
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<tr>
<td>(Spring)</td>
<td>(min)</td>
<td>(max)</td>
<td></td>
</tr>
<tr>
<td><strong>Chlor a (mg/L)</strong></td>
<td>0.5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(min)</td>
<td>(max)</td>
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</table>
## Lake Other Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
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<tbody>
<tr>
<td>Sulfate</td>
<td>2.9</td>
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<tr>
<td>Chloride</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atrazine</td>
<td>&lt;0.01 µg/L</td>
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Diversity of Aquatic Plants

Waushara County Lake Study
Total Species
Summer/Fall 2013
Aquatic Invasive Species

Hybrid Water Milfoil
Eurasian Water Milfoil

Curly Leaf Pondweed
Acknowledgements

Waushara County Citizens and Lake Groups
Waushara County

Wisconsin Dept. of Natural Resources
UWSP Water and Environmental Analysis Lab

Aquatic Plants - Jen McNelly, Golden Sands RC&D, Onterra
Paleolimnology - Dr. Samantha Kaplan and Paul Garrison (Wisconsin DNR)
Shoreland Assessments and Build Outs - Dan McFarlane
Water Quality and Watersheds – Ed Hernandez (Waushara Co.)
Nancy Turyk and Dr. Paul McGinley

UW-Stevens Point Graduate and Undergraduate Students
Questions?