Curtis Lake

Summary Report 2013

University of Wisconsin-Stevens Point
and
Waushara County Staff and Citizens
To protect the lake we must protect the “watershed,” the land that drains or sheds its water into the lake.
Curtis Lake – Location

Southwest of Wautoma
South of Highway 21
East of County Road B
Township of Deerfield

Surface Area: 35 acres
Maximum Depth: 45 feet

Water Flow

- Curtis Lake is a drainage lake; most water enters via groundwater and a small inlet on the northwest side. Surface water runoff and direct precipitation also contribute water to lesser extents.
- Most water exits Curtis Lake through the North Branch of Wedde Creek and via groundwater.

WAUSHARA COUNTY
LAKE STUDY –

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<thead>
<tr>
<th>#</th>
<th>Lake Name</th>
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<tbody>
<tr>
<td>1</td>
<td>Pine (Springwater)</td>
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<td>2</td>
<td>Twin</td>
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<td>3</td>
<td>Gilbert</td>
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<td>4</td>
<td>Long (Saxeville)</td>
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<td>5</td>
<td>Long (Oasis)</td>
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<td>6</td>
<td>Huron</td>
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<td>7</td>
<td>Wilson</td>
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<td>8</td>
<td>Kusel</td>
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<td>9</td>
<td>Silver (Springwater)</td>
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<tr>
<td>10</td>
<td>Round</td>
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<tr>
<td>11</td>
<td>Big Hills</td>
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<td>12</td>
<td>Napowan</td>
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<td>13</td>
<td>Beans</td>
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<td>14</td>
<td>Morris</td>
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<td>15</td>
<td>Pine (Hancock)</td>
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<td>16</td>
<td>Fish</td>
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<td>17</td>
<td>Marl</td>
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<td>18</td>
<td>W. Branch Mill Pond</td>
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<td>19</td>
<td>Porters</td>
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<td>20</td>
<td>Pearl</td>
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<td>21</td>
<td>Johns</td>
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<td>22</td>
<td>Bughs</td>
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<tr>
<td>23</td>
<td>Irogami</td>
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<tr>
<td>24</td>
<td>Alpine</td>
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<tr>
<td>25</td>
<td>Silver (Wautoma)</td>
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<tr>
<td>26</td>
<td>Deer</td>
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<tr>
<td>27</td>
<td>Little Hills</td>
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<td>28</td>
<td>White Riv. Flowage</td>
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<tr>
<td>29</td>
<td>Witters</td>
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<tr>
<td>30</td>
<td>Lucerne</td>
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<tr>
<td>31</td>
<td>Spring</td>
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<tr>
<td>32</td>
<td>Curtis</td>
</tr>
<tr>
<td>33</td>
<td>Pleasant</td>
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<tr>
<td>34</td>
<td>Mah pleasing</td>
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Land uses and land management practices occurring in a watershed can affect the water quality in a lake.

Land uses and land management also play major role in how water moves across the landscape and how much water soaks into the ground (for long-term storage) or quickly runs off the land.

The surface watershed of Curtis Lake is 804 acres.

The primary land use in the watershed is agriculture.

Wetlands surround Curtis Lake. Generally, the land closest to the lake has the greatest immediate impact on water quality.
**Groundwater** provides water to lakes in Waushara County throughout the entire year. Hard surfaces on the landscape prevent water from soaking into the ground and becoming groundwater. This results in less water flowing to the lake during the winter and between rains. Groundwater pumping can also reduce the amount of water entering lakes.

The quality of groundwater reflects what is happening on the land surface. Precipitation falling on forested land produces clean groundwater, whereas precipitation falling on lands that have chemical use can leach contaminants to groundwater. Groundwater contamination in central Wisconsin may include nitrogen, pesticides, herbicides and other soluble chemicals originating from septic systems, crops, barnyards, road maintenance, etc. Once in the groundwater, these chemicals slowly move towards a lake or river.

On the map below, arrows indicate the direction of groundwater flow to and from the lakes. Most of the groundwater enters Curtis Lake from the northwest.
Shoreland vegetation is critical to a healthy lake’s ecosystem. It provides habitat for many aquatic and terrestrial animals including birds, frogs, turtles, and many small and large mammals. It also helps to improve the quality of the runoff that is flowing across the landscape towards the lake. Healthy shoreland vegetation includes a mix of tall grasses/flowers, shrubs and trees.

Shorelands around Curtis Lake were surveyed in 2011. Some of Curtis Lake’s shoreland is healthy, but many stretches are in need of restoration.
Aquatic plants are the forest landscape within a lake. They provide food and habitat for terrestrial and aquatic creatures such as fish, ducks, turtles, invertebrates and other animals. They increase oxygen levels in the water and utilize nutrients that would otherwise be used by algae. A healthy lake typically has a variety of aquatic plant species creating diversity that can help to prevent the establishment of aquatic invasive species.

- The aquatic plant community in Curtis Lake is characterized by above-average diversity of plant species when compared to other lakes in the Waushara County Lakes Study, with 17 documented species.
- Much of the diversity observed in Curtis Lake was found on the northwestern side of the lake.
During the 2011 aquatic plant survey of Curtis Lake, 80 percent of the sites sampled had vegetative growth. The average depth of sampled sites was 9 feet, with a maximum depth of 22 feet.

The most frequently encountered aquatic plant species were muskgrass, southern naiad, and coontail.

No invasive species were observed in Curtis Lake.

**Species Richness** is a count of the number of plant species found at a survey point. A greater number of species in a lake helps to make the aquatic plant community more resilient to year-to-year changes and aquatic invasive species. More plant species means more diverse habitat and food sources are available.

**Bladderworts** are carnivorous plants. They use special trigger hairs to sense an insect—which then is sucked into digestive “bladders” in the plant. Like other bladderworts, common bladderwort blooms above the water surface.
Lakes go through a natural aging process that results in increased aquatic plant growth, fish and wildlife over time. Within a lake’s watershed, human activity on the land, in a wetland, or in the lake can dramatically accelerate this process. Depending on land management practices, changes in a lake that may have normally taken centuries to occur may take place in decades or even years. The amounts of nutrients, algal growth, and water clarity measurements help to define the age of a lake. Based on these measures, lakes can be classified for comparison to one another.

**Oligotrophic Lakes**

- **Common uses:**
  - Swimming
  - Skiing
  - Boating

- **Vegetation of oligotrophic lakes:**
  - Very little vegetation

**Mesotrophic Lakes**

- **Common uses:**
  - Boating
  - Fishing

- **Vegetation of mesotrophic lakes:**
  - Increased vegetation
  - Occasional algal blooms

**Eutrophic Lakes**

- **Common uses:**
  - Fishing
  - Wildlife watching

- **Vegetation of eutrophic lakes:**
  - Lots of aquatic plants
  - Frequent algal blooms

Winter fish kills can occur in shallow lakes due to low oxygen levels.
**Phosphorus** is a major nutrient that can lead to excessive algae and rooted aquatic plant growth in lakes. In fact, one pound of phosphorus entering a lake can result in 500 pounds of algal growth. All Waushara County lakes have either sufficient or excessive nutrients for aquatic plant growth, so these lakes will benefit from limiting the addition of more nutrients. Sources of phosphorus include septic systems, animal waste, storm water runoff, soil erosion, and fertilizers for lawns, gardens and agriculture.

- Total phosphorus levels measured when the lake was well-mixed in spring and fall are displayed in the graph to the left.
- During fall 2010-spring 2012, the average total phosphorus levels in Curtis Lake were much higher than historic measurements. This indicated that Curtis Lake may be shifting towards eutrophic conditions.

**Water clarity** is a measure of how deep light can penetrate (Secchi depth). Clarity is affected by water color, turbidity (suspended sediment), and algae. Water clarity helps determine where rooted aquatic plants can grow.

- The graph to the left shows water clarity measurements taken between April and November. It is typical for water clarity to vary throughout the year.
- During the summers of 2011 and 2012, on average, the poorest average water clarity was 13 feet in September and the best was 14.5 feet in June and July. In comparison to measurements prior to 2011, water clarity was about the same during the summer, but was much poorer in May and November.
Curtis Lake – What can you do to help?

Stop the Spread of Aquatic Invasive Species!

Wetlands and Shorelands:
- LEARN how to identify invasive plants and animals, and know who to contact if found.
- DO NOT PURCHASE prohibited and restricted species! Whenever possible purchase native plants.
- NEVER transplant water garden plants or aquarium plants into lakes, streams, wetlands, or storm water ponds. Properly dispose of unwanted plants and animals!
- REMOVE invasive exotic plants from your landscape and replace them with native plants or non-invasive exotic plants. Scout annually for new invasive plants.
- AVOID using garden plants from other regions whose invasive potential is poorly understood.

Lakes and Rivers:
- LEARN what Wisconsin invasive plants and animals look like and who to contact if seen in a lake or river.
- INSPECT your boat, trailer and equipment when traveling to different water bodies and REMOVE any attached aquatic plants or animals (before launching, after loading, and before transporting on a public highway).
- DRAIN all water from boats, motors, and all equipment after use at a lake.
- NEVER release live fish, bait or pets into a wetland or water body.
- BUY minnows from a Wisconsin bait dealer. Only use leftover minnows at that same water body.

Lake Users:
- ✓ Run boat engines efficiently
- ✓ Observe no/low wake zones
- ✓ Refuel away from water
- ✓ Dispose of trash properly
- ✓ Remove all aquatic plants from boats and trailers
- ✓ Respect wildlife and other lake users

Land Owners:
- ✓ Control soil erosion
- ✓ Keep livestock out of lakes and streams
- ✓ Control manure runoff
- ✓ Carefully manage nutrients and pesticides
- ✓ Leave natural shoreland vegetation in place or restore if it has been removed
- ✓ Learn to identify and look for invasive species

Home Owners:
- ✓ Leave natural shoreland vegetation in place or restore if it has been removed
- ✓ Leave woody habitat for young fish, turtles and frogs
- ✓ Eliminate the use of fertilizer or use no phosphorus fertilizer
- ✓ Eliminate or minimize use of pesticides
- ✓ Control soil erosion
- ✓ Control runoff from rooftops and hard surfaces
- ✓ Clean up after pets
- ✓ Learn to identify and look for invasive species
Curtis Lake – Primary Authors

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