

Glen Lake Association Water Quality Committee Annual Report 2008/2009

The Glen Lake Association Water Quality Committee has focused on the following activities during the past year:

- I. **Water Quality Monitoring GLA CLMP Volunteer Activity**
- II. **Lake Biologist Activities**
- III. **Big Little Glen Invasive Aquatic Plant Survey**
- IV. **ML&SA Annual Meeting**
- V. **Hatlem Creek**

I. 2009 Water Quality Monitoring GLA CLMP Volunteer Activity

Mean Water Transparency (avg. for season)

	2001	2002	2003	2004	2005	2006	2007	2008	2009 YTD 8/1/09
Little Glen	6.9 ft.	5.4 ft.	6.0 ft.	6.8 ft.	5.1 ft.	8.9 ft.	8.8 ft.	7.6 ft.	9.0 ft.
Big Glen	18.0 ft.	17.2 ft.	16.6 ft.	17.5 ft.	18.1 ft.	20 ft.	18.4 ft.	18.5 ft.	20.5 ft.
Little Fisher						B	B	B	B
Big Fisher						B	B	B	B
Brooks Lake						9 ft.	10.2 ft.	11.1 ft.	10.9 ft.

B=Bottom Little Fisher 14 ft. Big Fisher 15 ft.

Chlorophyll a

	2001	2002	2003	2004	2005	2006	2007	2008
Little Glen	2.0 ug/l	2.4 ug/l	2.2 ug/l	1.8 ug/l	2.1 ug/l	1.3 ug/l	1.2 ug/l	2.0 ug/l
Big Glen	1.2 ug/l	1.4 ug/l	1.1 ug/l	<1.0 ug/l	1 ug/l	.7 ug/l	.6 ug/l	.5 ug/l
Little Fisher						1.4 ug/l	.5 ug/l	.5 ug/l
Big Fisher						1.5 ug/l	.5 ug/l	.5 ug/l
Brooks Lake						12.4 ug/l	9.1 ug/l	22.3 ug/l

Total Phosphorus – Spring Overturn

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Little Glen	5 ug/l	8 ug/l	6 ug/l	7 ug/l	4 ug/l	5 ug/l	5 ug/l	5 ug/l	4 ug/l
Big Glen	5-7 ug/l	10 ug/l	4 ug/l	6 ug/l	4 ug/l	5 ug/l	4 ug/l	4 ug/l	4 ug/l
Little Fisher						6 ug/l	7 ug/l	5 ug/l	3 ug/l
Big Fisher						6 ug/l	5 ug/l	5 ug/l	3 ug/l
Brooks Lake						14 ug/l	14 ug/l	29 ug/l	13 ug/l

Total Phosphorus – Late Summer

	2001	2002	2003	2004	2005	2006	2007	2008
Little Glen	4 ug/l	10 ug/l	10 ug/l	16 ug/l	10 ug/l	6 ug/l	9 ug/l	10 ug/l
Big Glen	5 ug/l	<2 ug/l	3 ug/l	14 ug/l	5 ug/l	3 ug/l	<2 ug/l	6 ug/l
Little Fisher						4 ug/l	7 ug/l	8 ug/l
Big Fisher						4 ug/l	4 ug/l	7 ug/l
Brooks Lake						12 ug/l	8 ug/l	10 ug/l

Observations from above water quality monitoring parameters:

Big Glen – Water transparency, spring overturn and late summer phosphorus and chlorophyll a levels show stable conditions with no adverse trends. All parameters indicate that Big Glen is well within the oligotrophic Carson Trophic State (TCI) index rating. Water clarity readings in Big Glen have not changed due to the arrival of zebra mussels, probably because zebra mussels are not as prevalent as in our other shallower lakes.

Little Glen – While Little Glen phosphorus and chlorophyll a levels remain stable, water transparency trends since 2006 show an increasing level of water transparency. Likely this is due to the proliferation of zebra mussels since that time. Water clearing due to their filtering of algae and phytoplankton will cause deeper light penetration, and is apt to promote greater aquatic plant growth. Little Glen continues to be rated in the early mesotrophic TSI_{tp&chl} classification range.

Big and Little Fisher – All parameters of these closely connected lakes remain relatively consistent. This probably should be expected as there is direct flow from Big Glen which has shown little if any change over the past few years. As is Big Glen, both lakes are classified as oligotrophic. We would not expect a Secchi disk transparency change due to zebra mussels, even though they are present in greater quantities than in Big Glen (as measured in numbers per sq. meter in the sediment). Secchi disk observations have always been visible on the bottom of both lakes.

Brooks Lake – The 2008 chlorophyll a and spring overturn phosphorus readings for Brooks were considerably higher than the 2 years prior (this is when we initiated our monitoring program on Brooks). The relatively high reading for Brooks Lake phosphorus may help explain the greater chlorophyll a results as well. This spike in the reading goes hand in hand with the increase in chlorophyll a reading. The late summer phosphorus reading however dropped to similar levels for the 2 previous years indicating the affect only occurred in the spring. A resident of Brooks Lake, and a water quality committee member, observed that there was more aquatic plant growth in the lake last year than previous years. Along with our test results this observation, though anecdotal, supports the possibility that there was an increase in nutrient loading during the spring of 2008. The high nutrient event may have been the result of heavy spring rains causing fertilizer runoff from lawns or fields. We discourage riparians using phosphorus fertilizer

II. Lake Biologist's Activities 2009

Hydrolab Studies

- Sampling occurs every two weeks from April to November
- Sampling stations include deep basins of Big & Little Glen, Brooks Lake, Big & Little Fisher, and the headwaters, middle reaches, and mouth of the Crystal River.
- Overall results show healthy conditions and little change from the last four years
- Hatlem Creek has variable specific conductivity from drought to a heavy rain event

Plankton Studies

- Plankton sampling stations have been expanded and now include Big & Little Glen and Big & Little Fisher.
- Phytoplankton populations again appear to be less diverse in Little Glen – perhaps due to zebra mussels and the abundance of Microcystis
- Zooplankton appears to be changing and diversity is lower than over the past three years.
- Photo archiving of plankton continues

Naturalization of Shorelines

- Riparians are being presented with “Lakescaping” awards at the annual meeting
- Shoreline erosion is less than last year.

Shoreline Surveys

- Shoreline survey work continues with all photo imaging complete. Evaluation of greenbelt and erosion is underway.
- Annual meeting will hopefully provide a forum for sign-ups for home visits

Cladophora Survey

- Second week in August is the target date for survey
- Team of Colter Fatt and one other person will be staged to do the work
- M. Litch will create Topo maps in September
- Results will help set priorities for next year's shoreline survey and naturalization planning

Swimmer's Itch Control

- 21 Common Mergansers were relocated from Big Glen Lake to Lake Michigan
- A swimmer's itch personal survey was conducted and the number of itch cases are down.

E.coli Monitoring

- The mouth of Hatlem Creek has been monitored for E.coli. No beach closings so far this year.

III. Aquatic Plant Study 2008/2009

The Aquatic Plant Study includes an invasive plant search on Little and Big Glen and Big and Little Fisher. The three main species that are the object of the search on these four lakes are Eurasian watermilfoil, Hydrilla, and Curly-leaf pondweed. A complete Aquatic Plant Study was done on Little Fisher in 2008 which included the drying, pressing, mounting and identification of each of the nine species of plant found. This year (2009) a complete aquatic plant survey was conducted on Brooks Lake. Thirteen species of plants were found and a plant density rating was also determined. Brooks Lake has more plant species than any of our other surveyed lakes. No invasive species were found. Eleven volunteers are involved in our surveys of the five lakes.. Over 300 sites were sampled, with a corresponding 1,000 collections taken.

IV. ML&SA Annual Meeting 2009

The 48th annual ML&SA Spring conference was held April 24 and 25 at the Comfort suites, Lakeside Resort on Houghton Lake. Mike and Sarah Litch of the Water Quality Committee attended the conference including the Cooperative Lakes Monitoring Program training and other sessions. Special sessions of particular interest included Michigan’s new Water Withdrawal Assessment Process, Inland Lake Algae, Overview, Inland Lake Water Quality and Riparian Property Values, and the Muskegon River Watershed Projects and Future Outlook. **The Muskegon River Watershed presentation was especially interesting as it included a discussion on Houghton Lake’s Eurasian watermilfoil management and control efforts. In 2002 Sonar (fluridone) was used to treat 10,800 acres of milfoil at a cost of \$1,000,000. After this treatment to control milfoil in their heavily infested waters, Houghton Lake is now employing weevil control to maintain a very much reduced infestation. Weevil control of milfoil has resulted in much lower total cost since 2003 (weevil costs have been approximately \$63,000).**

V. Hatlem Creek

- Macroinvertebrate surveys were performed in the Spring and Fall during 2008 and in the Spring of 2009 as had been done during the past 2 years. Hatlem Creek conditions last year and the Spring of this year have remained basically unchanged as indicated by the species diversity and numbers collected. In an attempt to understand if Glen Lake is being affected by suspected property septage problems E.coli measurements were made during the Summer of 2008 after 2 heavy rain events. At the mouth of Hatlem Creek where it enters Big Glen on 6/13/09 E.coli readings exceeded 2419 colonies/ml and riparians east and west of that point were alerted not to swim until readings had fallen below the MDEQ E.coli beach closing limits for swimming and wading. One week later residents were notified levels were ok.

- Five E.coli samplings have been performed this summer so far. General bacteria counts remain high after rain events. It has been recommended that riparians avoid swimming and wading in the immediate area for 24 hours after heavy rain. All 5 readings were negative for human specific bacteria. This indicates there was no human waste influence in these readings. Bill Crawford of the Benzie/Leelanau Health Department has scheduled an inspection of suspect properties along Hatlem Creek this summer based on the finding last summer that human bacteria was as factor in the high readings.

Water Quality Committee:

Volunteers:

John Lund	Gerry Powley	Mike Litch	Bruce Lichliter	Mike Hasselbeck	Elaine Pentilla
Carol Lund	June Powley	Sarah Litch	Emery Blanksma	Candy Hasselbeck	Barb LeJeune
John Hayes	Cal Killen	Andy DuPont			

Lake Biologist:

Rob Karner, MS

7/31/09