

Water Quality Committee

The GLA 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. **Aquatic Plant Survey**
- IV. **ML&SA Annual Meeting**
- V. **Hatlem Creek**

VI. **2009 Water Quality Monitoring GLA CLMP Volunteer Activity**

Mean Water Transparency (avg. for season) B=Bottom Little Fisher 14 ft. Big Fisher 15 ft.

Year	Little Glen	Big Glen	Little Fisher	Big Fisher	Brooks Lake
2001	6.9 ft.	18.0 ft.			
2002	5.4 ft.	17.2 ft.			
2003	6.0 ft.	16.6 ft.			
2004	6.8 ft.	17.5 ft.			
2005	5.1 ft.	18.1 ft.			
2006	8.9 ft.	20 ft.	B	B	9 ft.
2007	8.8 ft.	18.4 ft.	B	B	10.2 ft.
2008	7.6 ft.	18.5 ft.	B	B	11.1 ft.
2009	9.4 ft.	21.3 ft.	B	B	11.6 ft.

Chlorophyll a

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

2009	.8 ug/l	.6 ug/l	.5 ug/l	.5 ug/l	9.0 ug/l
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Total Phosphorus – Spring Overturn

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

Total Phosphorus – Late Summer

Year	Little Glen	Big Glen	Little Fisher	Big Fisher	Brooks Lake
2001	4 ug/l	5 ug/l			
2002	10 ug/l	<2 ug/l			
2003	10 ug/l	3 ug/l			
2004	16 ug/l	14 ug/l			
2005	10 ug/l	5 ug/l			
2006	6 ug/l	3 ug/l	4 ug/l	4 ug/l	12 ug/l
2007	9 ug/l	<2 ug/l	7 ug/l	4 ug/l	8 ug/l
2008	10 ug/l	6 ug/l	8 ug/l	7 ug/l	10 ug/l
2009	7 ug/l	4 ug/l	4 ug/l	5 ug/l	8 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. Because Big and Little Fisher are so closely connected, and because their total water volumes are relatively small compared with Big and Little Glen, and the flow through is rapid such that the water resident time is small, it was decided we would only test Big Fisher on a regular basis beginning in 2010.

Brooks Lake –

The 2009 chlorophyll a and both spring and fall phosphorus readings for Brooks were back in line with readings taken prior to 2008. Apparently the high spring readings last year were the result of a major rain event as was suspected last year. Because of the heavy rain experienced within a 24 hour period in June there may be a similar spike which could show up in our June or July readings. We will have to await the lab test results available later to verify this.

II. Lake Biologist's Activities 2010

Hydrolab Studies

- Hydrolab sampling occurs every two weeks from April to November. Year-round sampling occurs on Hatlem Creek, Crystal River, and Brooks Lake
- Sampling stations include deep basins of Big & Little Glen, Brooks Lake at the bridge, deep basin of Big & Little Fisher, and the headwaters, middle reaches, and mouth of the Crystal River.
- As a result of a new grant, more sampling Hydrolab stations will be added.
- Overall results show healthy conditions and little change from the last five years.

- Two lakes, Big Glen and Brooks Lake, have the predicted near zero oxygen at the deep basins a few months a year.
- Our aging Hydrolab will need replacing next year allowing for upgrades to the dissolved oxygen sensor.

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 continues to be changing and diversity is lower (still healthy) than over the past four years.
- Plankton analysis includes species composition and relative abundance data (five-year continuous study).

Naturalization of Shorelines

- Riparians, contractors, and educators are being presented with “Lakescaping” awards at the annual meeting to continue to foster positive action to preserve and protect our water quality.
- Home visits are encouraged to evaluate septic, greenbelt, and land use practices.

Shoreline Surveys

- Shoreline survey work has been completed with all data compiled in a database. Riparians can request their score and follow-up home visits are being conducted.
- Annual meeting will provide a forum for viewing examples of the best greenbelts around the watershed.

Cladophora Survey

- Second week in August is the target date for the 2010 Cladophora survey.
- Team of Colter Fatt and one other person will be staged to do the work.
- Mike Litch will create maps in September of the highest cladophora along shorelines.
- Results will help set priorities for next year’s shoreline survey and naturalization planning.

Swimmer’s Itch Control

- Due to the denial of our permit application to live trap and relocate Mergansers, pyrotechnics have used extensively during the spring and early summer.
- Two reported cases of swimmers itch have been noted for late May and early June, 2010.

E.coli Monitoring

- The mouth of Hatlem Creek has not been monitored for E.coli so far this year. A new grant will include monitoring the creek with test results coming in summer and fall of 2010.

III. Aquatic Plant Survey

The GLA is in its ninth year of Aquatic Plant Surveys. Little and Big Glen, Little and Little and Big Fisher, and Brooks Lake have all had complete aquatic plant surveys done. Samples from each lake have been pressed and mounted for a record of the Aquatic Plants in our lakes. Now we are just doing a search for the Invasive Species of concern: Hydrilla, Curly leaf pondweed, Eurasian milfoil, Fern leaf pondweed, and Starry stonewort. Three hundred sites will be surveyed this year with a corresponding 1,000 collections taken. This survey is done in an effort to find invasive plants early so appropriate controls can be carried out before the plant becomes a big problem. Several years ago Houghton Lake spent three million dollars to control Eurasian milfoil and now each riparian is assessed over one hundred dollars per year for its control. Four members of the Glen Lake Association Water Quality Committee participated in the Aquatic Plant Survey training held at the Leelanau Government Center this spring conducted by Dr. Jo Latimore from Michigan State. All the major lakes in Leelanau County plus Sleeping Bear National Lakeshore participated in this training.

IV. ML&SA Annual Meeting 2010

Andy DuPont, Sarah and Mike Litch attended the 49th annual spring ML&SA meeting held at the Lansing Radisson, April 30 – May 1. Andy completed the Cooperative Lake Management Program (CLMP) training and materials were collected for performing our tests this season.

The Natural Shoreline Landscaping and Erosion Control for Inland Lakes session presented by Jane Herbert, of the MSUE Kellogg Biological Station, Land & Water Unit was of particular interest. Her presentation showed landscaping techniques to protect our lakes from pollution and degradation.

Her co-presenter John Skubinna, MDNRE from Lansing, introduced a new state program, Michigan Natural Shoreline Partnership. This program was started to train contractors and landscape professionals to use lake friendly strategies. The training is accomplished by development of demonstration sites on public lake front areas. The landscape professionals can become certified through this training and offer their services to homeowners. Three training centers exist downstate and one may be in the planned for location in northwest Lower Michigan.

The keynote speaker, Patrick Lindemann, Ingham County Drain Commissioner, gave a very interesting speech on how the county is solving their storm water and water quality problems by what he called Source Control, which is enforcing codes that require new developments and construction sites to contain rain water on site and direct it through catchments and vegetated areas to the ground water system.

V. Hatlem Creek

Hatlem Creek, the only significant inlet into Glen Lake, has been studied over the past three years. The three-year stream studies, using macroinvertebrates as a guide, and using sampling methods approved by the DNR, resulted in ranking Hatlem Creek as “poor”. Also, the headwaters of the creek have undergone deforestation leading to increased water temperature and siltation. Further, our sampling for E.coli two years ago showed that during significant rain events, the water at the mouth of Hatlem Creek has E.coli levels seven times the safe levels for swimming. Two samples were sent to two different DNA laboratories to determine if the E.coli was coming from human sewage. One of the two laboratories indicated that the E.coli sources was from human sewage. The Leelanau County Health Department conducted a survey of ten septic systems along portions of Hatlem Creek. Future testing for human E.coli is planned to try and pinpoint the exact location of the septic failure.

Another action step that the GLA took was to write a common letter recommending that all Hatlem Creek residents have their septic system inspected and/or tested and if upgrades were needed, that they be encouraged to take action as a positive response to our E.coli outbreaks in Glen Lake.

There have been discussions about creating an opportunity for residents of Hatlem Creek that would provide financial assistance to upgrade their septic systems to meet current sanitation codes for residential properties. No action has been taken on this and a subcommittee would be formed to further the progress on this next step in our effort to improve the water quality of Hatlem Creek.

Finally, the action steps for each riparian affected by the effluent of Hatlem Creek, is to refrain from swimming in Glen Lake after a significant rain event and do not return to the water to swim until the water clears up again (usually a few days).

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Volunteers:

Lake

Biologist:

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7/20/10