



From Shore to Shore

For Minnesota citizens promoting the health of our rivers & lakes

May-June 2007

#79

Calendar of Events

- Shoreland Landscaping
May 5 (Part 1) & May 19 (Part 2) – Fifty Lakes, MN
Contact: Bobbie Graham, 218-763-3874, bgrahm@emily.net

- Composting, Mulching, and Rain Harvesting
May 9, 2007 – Brainerd, MN
Contact: Jackie Froemming, 218-824-1068, froem022@umn.edu

- Shoreland Conservation Maintenance
May 18, 2007 – Grand Rapids, MN
Contact: Itasca SWCD, 218-326-0017, kathy.loucks@mn.nacdn.net

- Rain Garden Design
May 22, 2007 – Chisago City, MN
Contact: Susan Humble, Chisago SWCD, 651-674-2333, susan.humble@mn.nacdn.net

- Introduction to Shoreland Landscaping
May 25, 2007 – Deerwood, MN
Contact: Ron or Sandy Kretlow, 218-534-3147, kretlow@mlecmn.net

- Introduction to Shoreland Landscaping
June 2, 2007 – Battle Lake, MN
Contact: Clair Prody, 218-864-5375, cprody@lmhc.org

- Rain Gardens
June 2, 2007 – Brainerd, MN
Contact: Jackie Froemming, 218-824-1068, froem022@umn.edu

- Shoreland Planting
June 9, 2007 – Deerwood, MN
Contact: Ron or Sandy Kretlow, 218-534-3147, kretlow@mlecmn.net

- Fairview Conservancy: A Low-Impact Development
June 14, 2007 – Brainerd, MN
Contact: Jackie Froemming, 218-824-1068, froem022@umn.edu

- Shoreland Planting
June 16, 2007 – Fifty Lakes, MN
Contact: Bobbie Graham, 218-763-3874, bgrahm@emily.net

Where Does Phosphorus Come From? Choosing the Right Model

Ann Lewandowski, University of Minnesota, 612-624-6765, alewand@umn.edu

When excess algae and low oxygen are a problem in lakes, the common culprit in Minnesota is excess phosphorus. Where that phosphorus comes from – and the most effective strategy for reducing it – varies from one watershed to the next. Since it is impractical to measure phosphorus runoff from every corner of a watershed, planners turn to models to estimate where it's coming from and how much reduction could be achieved from each source.

In Minnesota, a model for analyzing phosphorus (and other water quality issues) is the Minnesota Watershed Treatment Model (MWTM). A similar model has been used for many years in Maryland and other states, but a version for Minnesota was developed recently and is now available for field testing. The MWTM, which can be useful for educating stakeholders, estimates and compares the relative phosphorus contribution from various sources. It is free and is based on Microsoft Excel so no specialized computer expertise or software is required.

Four training sessions for the MWTM are scheduled for June across central Minnesota: St. Cloud area (June 6), Alexandria (June 7), Park Rapids (June 21), and Brainerd (June 22). All sessions are from 1 p.m. to 4 p.m. Workshops are free, but class size is limited so please pre-register. To register, contact Ann Lewandowski (612-624-6765, alewand@umn.edu). ■

It's Important to Monitor Your Lakes!

Val Were, University of Minnesota Extension, 612-624-7430, were0005@umn.edu

Legislation such as the Clean Water Act of 1972 made water resources management an important part of environmental policy in Minnesota. Whereas in other states water quantity is often the issue, Minnesota is focused on improving the water quality of its abundant streams and lakes.



Monitoring is essential to assessing changes in water quality. By collecting and analyzing water samples, we can identify trends over time and also identify emerging problems. Where pollution control programs are implemented, monitoring helps determine whether the programs are working and in general helps direct pollution control efforts where they are most needed.

In 2006, the University's Extension Program Outdoor Corps again provided water quality monitoring services to lake associations and communities for a fee. Clients received a lake sampling package that included temperature, dissolved oxygen and pH profiles and chemical analysis to total phosphorous and chlorophyll-a. They could also opt for a presentation at the end of the sampling season for an additional fee. Two adult supervisors

and eight high school students worked during the summer sampling in Benton, Stearns, Cass, Crow Wing, Kandiyohi, and Meeker counties. Samples were collected at a total of 33 sites on 27 lakes and sent for total phosphorous and chlorophyll-a analysis to A.W. Research Lab in Brainerd. For more on the program and its activities, please visit <http://www.outdoor-corps.net/>.

In 2007, the Outdoor Corps team will not be providing water sampling services. We will focus on redesigning the program to ensure its long term sustainability, purchasing new equipment, applying for grant dollars, and building a stronger network of supporters. We plan to gather information from our clients, partners, and supporters this summer. If you are interested in participating in this process please call Val Were at 612-624-7430 or send an e-mail to were0005@umn.edu. ■



Check it out!

We have added a new feature to the *From Shore to Shore* Web site! You can still browse archived issues, but now you can also find articles by topic using a searchable database. To try it out, go to www.shorelandmanagement.org and click on "shore to shore news." Under "Search for Shoreland Information," click on the link, then type in a topic and search. As a bonus, articles are easy to cut and paste for use in your lake association newsletter.

Toxicity From Blue-Green Algae? Recent Research

Barb Luikkonen, Water Resources Center and Minnesota Sea Grant Program, 612-625-9256, liukk001@umn.edu

Recent research conducted by Matt Lindon and Steve Heiskary of the Minnesota Pollution Control Agency (MPCA) investigated blue-green algal Cyanobacteria toxicity in our Minnesota lakes. In Minnesota, accounts of algal toxicity go back to the 1800s, but it seems we're hearing more about the problem these days.

In 2004, three dog deaths were attributed to algal toxicity, including one on Fish Lake in Kanabec County, and two on Lake Benton in Lincoln County. In 2005, the MPCA joined the state departments of Natural Resources and Health and the Minnesota Veterinary Medicine Association to form the Minnesota Blue-green Algal Toxicity Workgroup. In 2006, a study on Microcystin was conducted on twelve eutrophic (nutrient rich) lakes in south central Minnesota. The study lakes were selected based on a history of high algal levels."

Many algae species produce toxins that can have adverse effects on animals, (including humans). Probably the most studied algal toxin is Microcystin (MC). MC, a hepatotoxin (relating to liver damage) is produced by several bluegreen species including: *Microcystis*, *anabaena*, *planktothrix*, *nostoc*, and *hapalo-siphon*, and some other algal species. Some algae, such as *anabaena*, also produce neurotoxins like anatoxin and saxitoxin. The type and amount of toxins produced can also vary among different strains of toxin producing species.

Currently there are no guidelines or standards for Microcystin levels in Minnesota lakes. The World Health Organization (WHO) has set a standard for drinking water of <1 ppb and these standards for recreational exposure:

- Level 1: 4 ppb (avoid bathing, emerging head, or ingestion)
- Level 2: 20 ppb (avoid visible scums or strong green color)
- Level 3: Surface scum (avoid spray, wear protective clothing)

For this study, researchers used the following Risk Categories: 1 ppb MC = Very Low (below drinking water guideline), 1-10 = Low; 10-20 = Moderate; 20-2000 = High; >2000 = Very High.

They studied 12 eutrophic or hypereutrophic lakes in south central Minnesota during the summer of 2006, sampling six times from May to September. They sampled twice on each lake: once at a mid-lake "pelagic" site for which they ran a full water chemistry analysis and MC; and at a second site near shore where they analyzed for MC and chlorophyll-*a*.

Their study was designed to address these questions:

- What levels of MC would typically occur in eutrophic/hypereutrophic MN Lakes?
- Would near-shore results differ from pelagic sites?
- How did MC levels vary through the summer?
- What limnological and physical factors appear to be associated with high MC concentrations?

Initial results from their research indicated that there are no strong seasonal patterns evident in these Minnesota lakes, that there was a greater occurrence of high-risk levels at near-shore sites, and that the likelihood of encountering high risk MC levels near shore was increased when there was a surface scum present.

Twenty-five percent of the results (from all lakes, all sample dates) exceeded the WHO low risk category. As algal bloom intensity increased, there was a greater likelihood of encountering high MC values; when chlorophyll-*a* exceeded 30 ppb (severe nuisance bloom levels) the risk of finding high MC levels increased to ~ 15%. In contrast, at lower bloom levels, (<30 ppb chlorophyll-*a*), MC was always in the low risk category.

Other limnological factors that appear to be associated with high MC levels include higher pH, higher total suspended volatile solids, higher chlorophyll-*a* content, and a higher percent of chlorophyll-*a* from MC producers. As the Secchi disk depth and alkalinity decreased, the likelihood of toxic algal blooms seemed to increase.

In conclusion, MC was detected regularly in these 12 eutrophic lakes in south central Minnesota, and at some concerning levels:

- 94% of the MC results were above the low risk level;
- 25% of the MC results were above the WHO low risk category;
- The likelihood of a moderate to high risk of MC at a near-shore site when scum was present was 25%.

This report, titled *Microcystin Levels in Eutrophic South Central Minnesota Lakes*, will be posted on the PCA web site later this month at <http://www.pca.state.mn.us/water/lakequality.html#reports>.

Questions? Contact Matt Lindon at the MPCA, at Matthew.Lindon@state.mn.us. ■

Secchi Transparency Slide Show

Jennifer L.K. Klang, Minnesota Pollution Control Agency

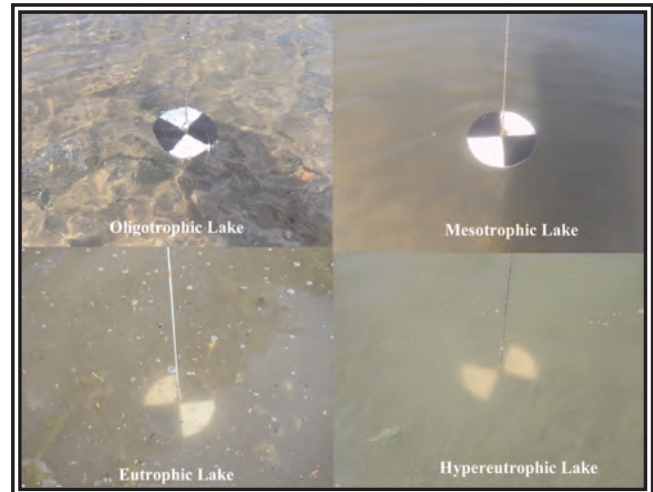
For more information contact: Johanna Schussler, Volunteer Monitoring Coordinator, johanna.schussler@pca.state.mn.us, 651-282-6411 – Twin Cities Metro, 800-657-3864 – Greater MN only

Minnesota is known for its many lakes. Our lakes differ in terms of size, shape, and depth and can also vary in quality and condition, ranging from exceptionally good (oligotrophic) to extremely poor (hypereutrophic).

Secchi transparency, or clarity, is a quick and easy measurement of lake's water quality. Secchi transparency provides an indirect measure of the amount of suspended material in the water, which in many Minnesota lakes is the amount of algae in the water. Secchi transparency can vary greatly among Minnesota's lakes and tends to decrease as algal concentrations increase over the summer.

The Minnesota Pollution Control Agency (MPCA) has developed a slide show that follows the change in Secchi transparency for four Minnesota lakes for one season (May – October). The lakes are from four different water quality classifications: oligotrophic to hypereutrophic. You can compare the four categories to each other, or you can watch the water clarity of each of the four lake groups as they change over the summer in response to increases or

decreases in algae levels. There are some "underwater" shots as well. To visit the MPCA's Secchi Transparency Slide Show, visit www.pca.state.mn.us/water/secchi-slideshow.html. ■

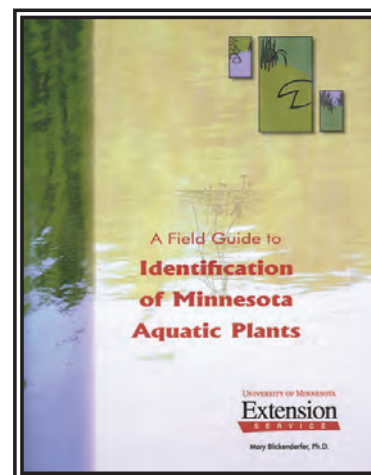


A comparison of all four lake groups in July

A Field Guide to Identification of Minnesota Aquatic Plants: New for 2007

This is a useful guide for people with no prior botanical training to identify most families of aquatic plants found in Minnesota lakes and rivers – even when the plants are not blooming. This laminated publication includes detailed information on aquatic invasive species, a glossary of basic botanical terms, and aquatic plant references. Cost: \$20 Item: 08242

To purchase online, visit <http://shop.extension.umn.edu/>.



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