The Lake Beat

Volunteer Lake Monitoring Program's E-Newsletter

September 2018

In this Newsletter:

- **GPSI Program**
- **HAB Season**
- **Dissolved Oxygen and Temperature**
- **Invasive Species**
- **Season Wrap-up**
- **Calendar**
- **Contact Information**
- **Hydrilla and Starry Stonewort**

The beaver (*Castor canadensis*) is the largest North American rodent, averaging between 50 and 65 pounds. It is easily identified on land by its flat tail, brown fur coat, and large front teeth.

Graduate Interns in the Lakes Unit

The Graduate Public Service Internship (GPSI) is a program that allows graduate students at the University of Illinois at Springfield (UIS) to get real world experience while working within the public sector. After spending two years working in government, many interns are prepared to continue a life of public service at the local, state, or even federal level. This allows a new generation to be trained in public service at a time when many government employees are getting ready to retire.

> "Many, many former interns who become state employees have become supervisors in the (GPSI) program."
>
> -Sherrie Elzinga, GPSI Program Director

UIS (formerly Sangamon State University) has been working with the Illinois EPA for the past three decades. Across all Agencies, there are 97 new and 85 returning interns for this fall. When asked, GPSI Program Director Sherrie Elzinga stated, "Many, many former interns who become state employees have become supervisors in the (GPSI) program. I think that this 'full circle' speaks volumes for the (GPSI) program and shows that interest in public service cultivated during the internship remains throughout their professional careers."

The 2017-2019 Lakes Unit intern is Gregg Miller, a second-year graduate student at UIS. He is studying to gain his Master's in Sustainable Development and Policy, as well as a GIS certificate. Volunteers might see him helping with various training activities, monitoring on Lake Sangchris or attending one of ILMA's workshops. In addition, Gregg spends his time maintaining portions of the Illinois EPA lakes databases, updating the GIS coverage of Illinois lakes, and processing Secchi Monitoring forms. He will be graduating UIS in May 2019.

Special thanks to Sherrie Elzinga and the GPSI Office for their data and comments.

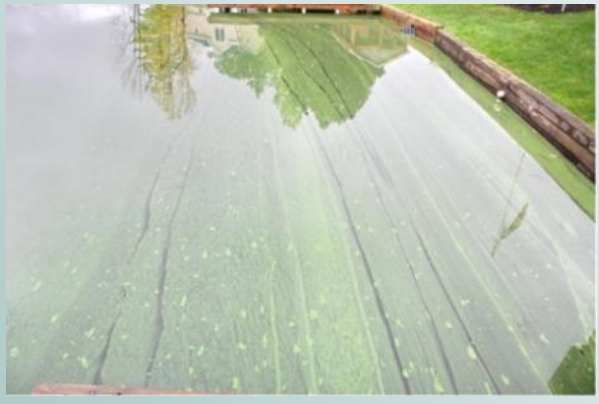
HAB Season Is Not Over—Remain Alert!

Even though the calendar says September, the season for harmful algal blooms (HABs) is far from over. Please stay alert out there and let us know if you suspect a HAB in your lake.

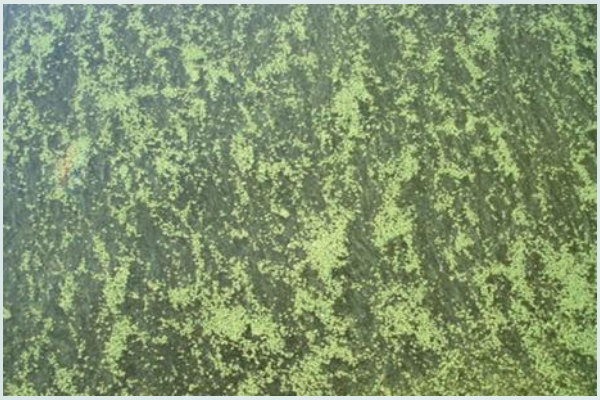
Since HABs have the potential to produce toxins that can adversely affect humans, pets, and ecosystems, it is important that you learn how to recognize a HAB when present. HABs will often exhibit certain characteristics that can help you identify them. Some HABs looks like (see pictures below): (1) pea soup (thick and green), (2) spilled paint on the surface of the water, (3) green streaks, but the streaks can be other colors as well, or (4) small green flecks that can then clump together to look like globs at a distance.

1)

2)



3)



4)

If you suspect a HAB in your lake, AVOID ALL CONTACT with the water. Do not let your pets swim in or drink from a lake with a suspected HAB. Notify your local lake manager and report the bloom to Illinois EPA by filling out a Bloom Report form or by using the bloomWatch app. A link to the Bloom Report form and information about the bloomWatch smartphone app can be found on the Illinois EPA HAB webpage http://www.epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting/index.

Dissolved Oxygen and Temperature

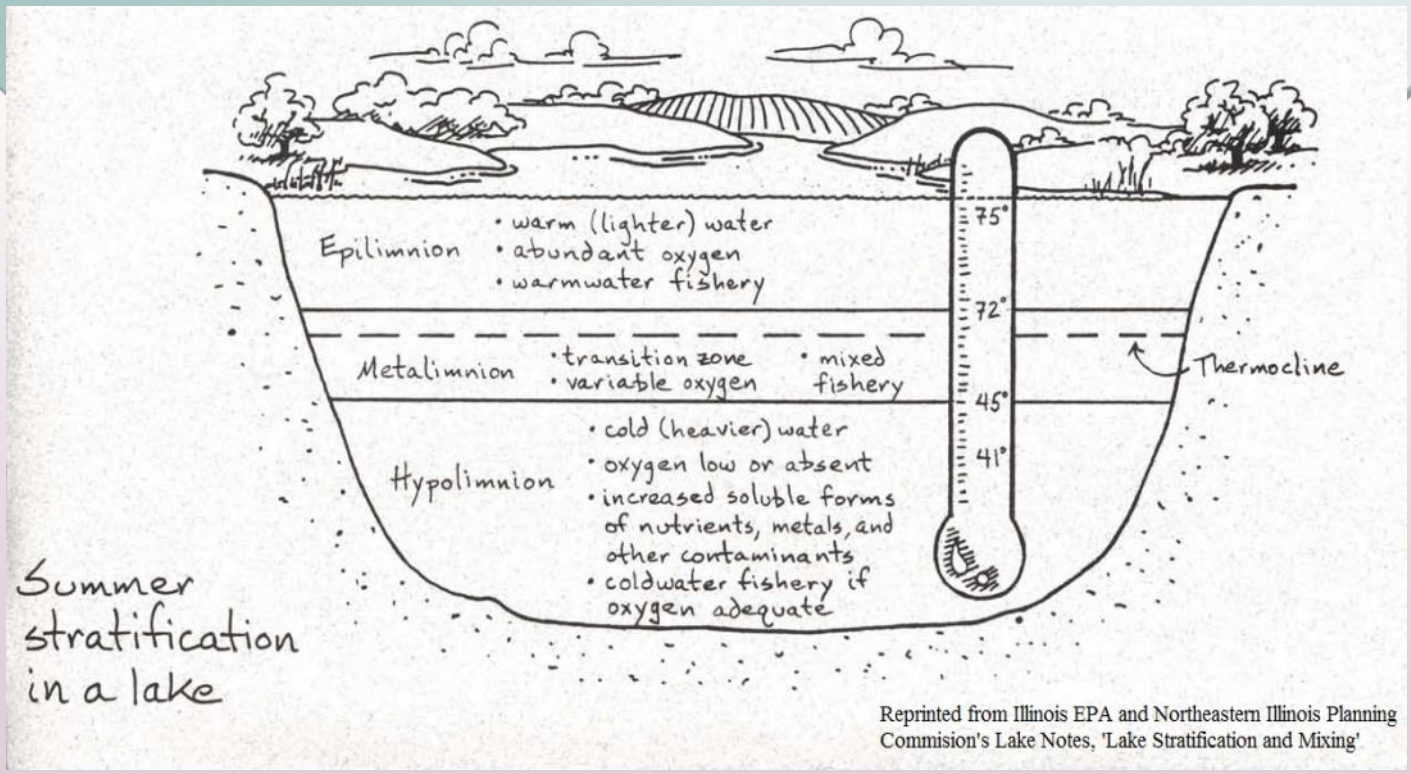
Dissolved oxygen (DO) and temperature are important for lake ecosystems, because they influence the distribution and diversity of aquatic life, lake productivity, the intensity of abiotic chemical reactions, and lake physical structure.

Temperature affects the density of water with colder waters being heavier than warmer waters. Heavier waters sink to the lake bottom and warmer less-dense waters float to the top. At the lake bottom, DO is intensively used by the decomposition process, but oxygen cannot be replenished because there is no direct contact with air, and the air diffusion is slow. Also, the deep dark waters are not aerated as algae and aquatic plants do not inhabit this depth. As we can see, the changes in water temperature result in the formation of distinct water layers. This process is known as thermal stratification.

In the summer, lakes are usually stratified and have three distinct layers. The epilimnion, the upper water layer, is warm and well-oxygenated. Below the epilimnion is the metalimnion, a zone distinguished by a rapid temperature change and the presence of the thermocline, a point of the sharpest temperature change. The hypolimnion is found below the metalimnion and extends to the bottom of the lake. The hypolimnion is the darkest coldest and the least oxygenated lake zone. Some ponds and shallow lakes do not stratify because they heat evenly to the bottom.

Aquatic creatures as well as terrestrial organisms need oxygen. Some creatures require more oxygen for their metabolism, while other organisms can successfully live in waters with lower DO. For example, trout require high DO concentrations of 8 mg/L, smallmouth bass have lower requirements of 5-6 mg/L, and some fish, like carp, can thrive under low oxygen conditions of 1-2 mg/L. Low DO concentrations limit the growth and development of an organism and cause mortalities. In warm waters, fish need more oxygen as its metabolism is higher than in cold waters.

Dissolved oxygen also affects nutrient cycling in lakes. Under low DO conditions, anaerobic bacteria digest sediment-deposited organic matter and release phosphorus. Excessive phosphorus causes algal blooms in lakes and consequently reduce DO in waters when algae decomposition begins. This self-fueling pattern of low oxygen and high phosphorus concentrations, and algal blooms is hard to stop.

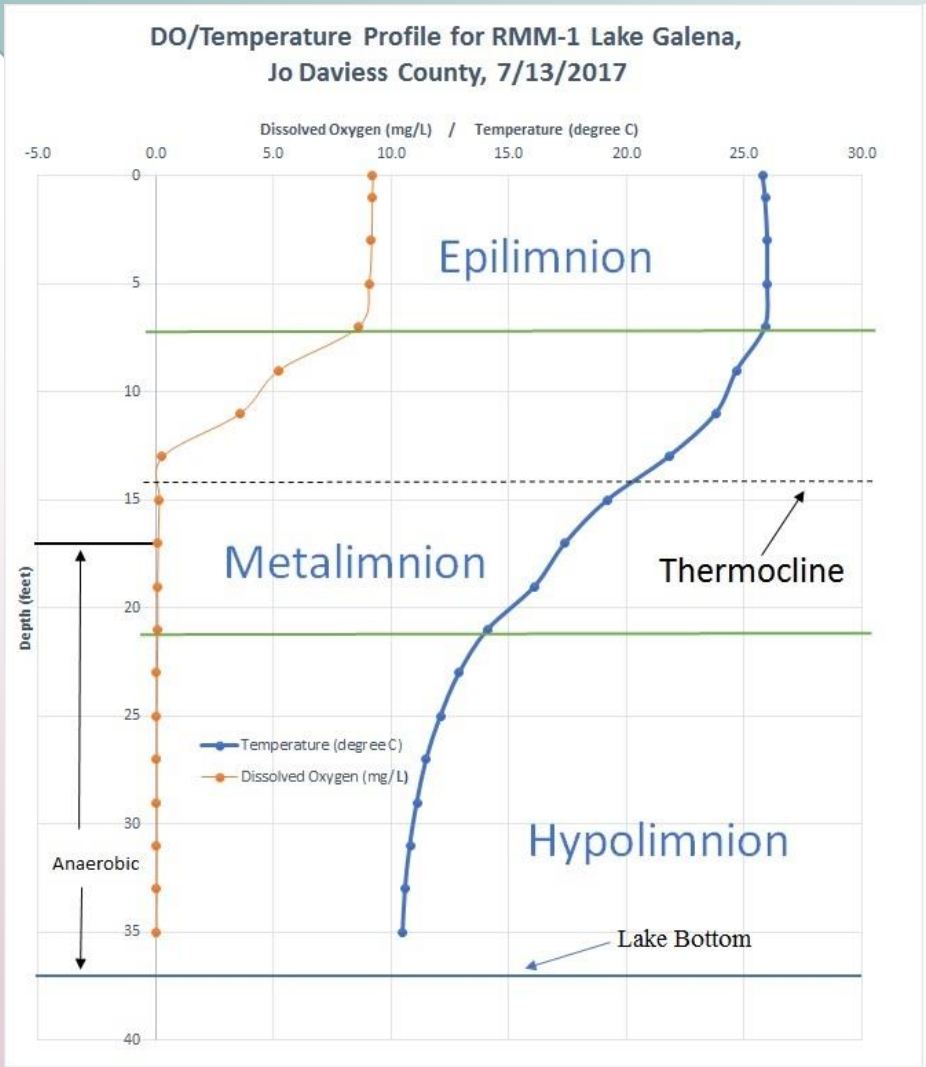


Reprinted from Illinois EPA and Northeastern Illinois Planning Commision's Lake Notes, 'Lake Stratification and Mixing'

Under anaerobic conditions, ammonia, a compound of nitrogen and hydrogen, also becomes more available and is released from sediment to water. High ammonia levels are toxic to aquatic life. Under anaerobic conditions, other compounds, such as iron, manganese, and sulfur, become more water-soluble as well and cause water taste and odor problems.

In the Volunteer Lake Monitoring Program (VLMP), DO and temperature are measured at lake sites monitored for Secchi transparency. DO and temperature are taken from the lake surface to a depth of 2 feet above the lake bottom at 2-foot intervals after taking readings at near surface and 1-foot below the surface. DO and temperature measurements are made twice a month from May to October. All VLMP volunteers from the Tier 3 and some volunteers from the Tier 2 collect these parameters usually using Hach HQ30D or Hach HQ40D multi-parameter meters. These meters have DO and temperature probes and are connected to a 15-meter (49-feet) long cable for depth deployment. The table below shows a typical data collection by the VLMP volunteers.

The collected data can easily be visualized by a depth profile graph. A depth profile graph depicts the changes in DO and temperature through lake depth. These graphs are used to determine the stratification of the lake and the location of a thermocline if lake is stratified. Anaerobic lake conditions can also be observed on these plots. When anaerobic conditions are persistent, water chemistry samples might show the increase in phosphorous and ammonia concentrations near the lake bottom. The best management practices for addressing this issue can be found and implemented. For example, an aerator can be used to break up thermal stratification and oxygenate hypolimnetic waters to alleviate effects of anaerobic conditions.



DO/Temperature data collected at RMM-1, 09:35 hours start on 07/13/2017		
Depth (feet)	**DO (mg/l)**	**Temperature (°C)**
0	9.2	25.8
1	9.2	25.9
3	9.2	26
5	9.1	26
7	8.6	25.9
9	5.2	24.7
11	3.6	23.8
13	0.3	21.8
15	0.1	19.2
17	0.1	17.4
19	0.1	16.1
21	0.1	14.1
23	0.0	12.9
25	0.0	12.1
27	0.0	11.5
29	0.0	11.1
31	0.0	10.8
33	0.0	10.6
35	0.0	10.5

Stop the Spread of Aquatic Exotics

Follow this checklist to defeat the spread of aquatic exotics:

If you are a boater, angler, water skier, sailor, canoeist or some other type of water enthusiast, there are some important things you can do to help prevent the spread of aquatic exotic species.

- Don't transport water, animals, or plants from one lake or river to another. Never dump live fish from one body of water to another. Remove plants and animals from your boat, trailer, and accessory before leaving the water access area. Drain live-wells, bilge water, and transom wells before leaving the water access area. Empty bait buckets on land, not in the water. Never dip your bait buckets in one lake if it has water in it from another.
- Wash boats, tackle, downriggers, and trailers with hot water as soon as possible. Flush water through motor's cooling system and any other parts that may have been exposed to lake or river water. If possible, let everything dry for three days.
- Learn what these organisms look like. Don't purchase exotic species as bait or for ornamental plantings. If you suspect a new infestation of an exotic plant or animal, report it to Illinois EPA's Lakes Unit (217/782-3362), Illinois DNR's Division of Natural Heritage (217/785-8774), Illinois DNR's Natural History Survey at the Havana Field Station (309/543-6000), or the Lake Michigan Biological Station (847/872-6877).
- Consult with the Illinois Department of Agriculture for guidance before you try to control or eradicate an exotic "pest." Remember, exotic species thrive on disturbance. Do-it-yourself control treatments often make matters worse and can harm native species!

End of Season Wrap-Up

Thanks!

- ◊ Send any completed Secchi forms to your Regional Coordinator by November 10th. Please!
- ◊ Recycle all unused lab sheets and 1/2 gallon jugs.
- ◊ Unused sample bottles may be retained for use in a following season.
- ◊ Remove batteries from Dissolved Oxygen meter and Depth Sounder.
- ◊ Secchi Disk: make sure the tape or surveyor line is dry, untangled and wound without folds.
- ◊ Rinse and **dry** all monitoring equipment before storing in a location that is safe for the winter.
- ◊ Please contact your coordinator if you're not continuing in the program.

Have A Great Fall & Winter!

VOLUNTEER'S CALENDAR OF EVENTS

October 31st: Last Official VLMP Monitoring Day!

November 10th: All Completed Secchi Forms Due to Coordinators.

December 31st: ILMA Scholarship Applications Due (See Below).
ILMA Conference - Call for Abstracts/Presentations Due.

February 1st-March 12th: Primary Registration for 2019 VLMP

Guarantee a spot in the VLMP program by registering before the ILMA conference. You are more likely to get one of those coveted Tier 2 spots as well.

March 14th-16th: 34th Annual Illinois Lake Management Association Conference.

The Illinois Lake Management Association is hosting its 34th Annual Conference at the Holiday Inn Crystal Lake Conference Center in Crystal Lake, Illinois from March 14 through March 16, 2019. Online registration will begin sometime this fall.

March 13th-April 30th: Late Registration for 2019 VLMP

Get your lake registered! The season is closing in fast.

May 1st: VLMP Training Officially Begins

Returning Tier I volunteers should already have their packets and can get started right away. Experienced Tier 2 volunteers are awaiting their supplies to get started. Everyone else is awaiting their training date.

July 1st-July 31st: Secchi Dip-In

The concept of the Dip-In is simple: individuals in volunteer lake monitoring programs take a transparency measurement on one day during the month of July and submit their data to the Dip-In database. These transparency values are used to assess the transparency of volunteer monitored lakes in the United States and Canada. For more information about the Secchi Dip-In, go to http://www.secchidipin.org.

Did you know?

Illinois Lake Management Association (ILMA) has scholarships available for students attending an Illinois College/ University or any Illinois resident attending college or university in Indiana, Minnesota, Ohio, or Wisconsin. This is a great opportunity! Spread the word.

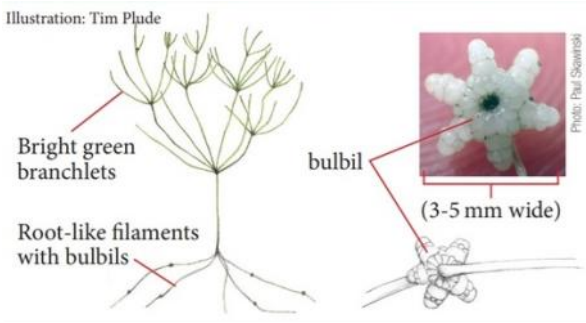
Applications are due December 31,2018. To find out more information and to apply visit: https://ilma-lakes.org/scholarship.

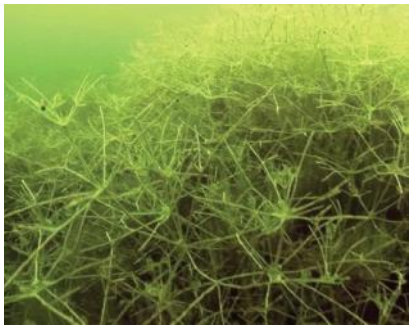
What do I do if I find Hydrilla or Starry Stonewort in my lake?

If you think you have found Hydrilla or Starry Stonewort (you received a new watch card this year for Starry Stonewort) in your lake, grab pieces from the lake and take a few pictures with your phone. Send the best couple of pictures to your coordinator so the pictures can be evaluated. Please include date found, lake and county, and the latitude and longitude (if you have that capacity). There are free apps for smart phones to determine gps coordinates.

Hydrilla (picture to the right)

Starry Stonewort (pictures at the bottom)





For questions, contact your regional VLMP coordinator below or email epa.VLMPHELP@illinois.gov or epa.HAB@illinois.gov.

Regional Coordinators:

VLMP Statewide Contact

Greg Ratliff, IEPA, Springfield, 217-782-3362 & greg.ratliff@illinois.gov

Northeastern Coordinator

Holly Hudson, CMAP, Chicago, 312-454-0400 & hhudson@cmap.illinois.gov

Lake County Coordinator

Alana Bartolai, LCHD, Libertyville, 847-377-8009 & ABartolai2@lakecountyil.gov

Southern Coordinator

Tyler Carpenter, GERPDC, Marion, 618-997-9351 & tylercarpenter@greateregypt.org