



The Lake Beat

Volunteer Lake Monitoring Program

Spring/Summer 2013

Articles:

- Discussion of Harmful Algal Blooms (HABs) in Illinois, particularly Cyanobacteria such as *Microcystis*.
- Katie Hollenbeck discusses some of the biological and economic impacts of HABs.
- A spotlight on an Aquatic Invasive Species (AIS), *Hydrilla Verticillata*.

Harmful Algal Blooms in Illinois

Blue-green algae are microscopic organisms that occur naturally in Illinois lakes and streams. Despite their name, blue-green algae are actually types of bacteria known as Cyanobacteria. When certain conditions are present, such as high nutrient and light levels, these organisms can reproduce rapidly. This dense growth of algae is called a bloom. While blooms can occur at any time of year, they are primarily a concern during the months of July through September.

Adverse health effects could occur when waters exhibiting a blue-green algal bloom are swallowed, come in contact with skin, or when airborne droplets containing toxins are inhaled while swimming, boating, waterskiing, tubing, bathing or showering. Pets are also at risk when allowed to drink or swim in surface water containing a blue-green algae bloom. Health effects can include asthma-like symptoms, abdominal pain, vomiting, diarrhea, rashes, or severe neurotoxicity

depending on the exposure level and type of toxin present in the water.



(Left)

Lake Ontario

Harmful Algal Blooms, Continued

Identifying HABs: When Blue-green algae reproduce quickly and bloom, there are physical signs. The blooms can look like green paint spilled into the water, thick puffy foams on the surface of the water (scums), or swirling colors beneath the surface of the water. A blue-green algal bloom will coat an object when it is dipped into the water. Blue-green algal blooms also have distinct smells. They can smell grassy or septic and in some cases the smell can cause nausea. These algal blooms can accumulate near the shoreline of lakes, and can move based on wind and wave action in the lake.



Above and below:

2012 Northern IL Lakes



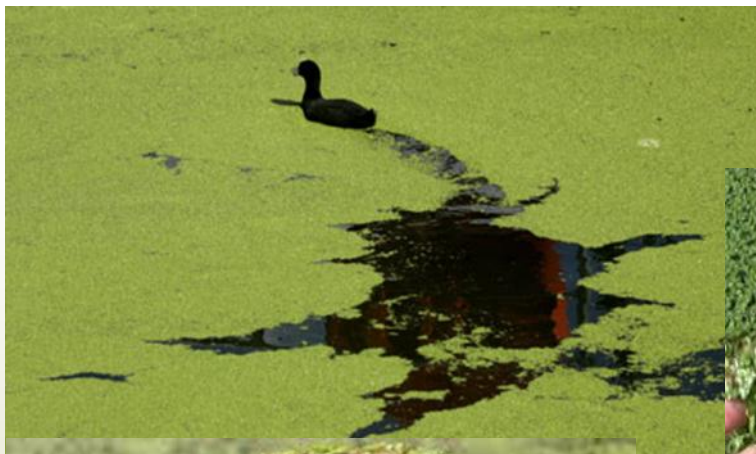
Left: 2011 Central IL Lake

Harmful Algal Blooms, Continued

Mistaken for Blue-Green Algae: Long strands of green algae, duckweed, and filamentous macro-algae are sometimes confused with blue-green algal blooms. .



Filamentous Algae



Duckweed

Harmful Algal Blooms, Continued

Reporting HABs.

If you suspect that blue green algae are blooming on your lake or a public lake you've visited; you can report it to Illinois EPA. (The link to the report forms and contact info from the HAB website is "Under Construction.") As soon as possible after seeing the bloom; download a form at the Illinois EPA website and fill out any information you can describing the bloom. If possible take photographs of the algae. One photo should be a close-up of the algae scum. Another photo should be taken of the landscape to help identify the location of the bloom/scum on the lake. You may also contact your VLMP coordinator and request that they file the report of the algal bloom on your behalf. If you would like information and updates on the condition of the bloom you reported, make sure your contact information is on the form.

What Happens Next?

If the report and photos indicate that a bloom or scum has the potential of producing toxins, a HAB responder will be sent to investigate the bloom as soon as possible. This could be an Illinois EPA em-

ployee or a VLMP coordinator. The HAB responder will investigate and provide technical assistance and if necessary, will collect samples.

HAB Responder

A HAB Responder will use the report to locate the bloom, and may contact you for further information. The Responder will collect a sample for microcystin. On a case by case basis, the Responder may collect samples for chlorophyll, nutrients, field parameters, and weather and site related information. The Responder will then analyze the microcystin sample using a qualitative Abraxis Microcystin Test for Recreational Waters. The Responder will log all information into a database and provide results to the reporter. If the test reveals levels of microcystin above 10 ppb, the remaining sample will be sent for further quantitative analysis. At this time the management entity may post an advisory at the lake warning people of the elevated toxin levels on the lake. Additional qualitative samples will be taken, on a site specific basis, to provide the lake managers with information suitable for lifting or extending the closure/ advisory of the lake. Two consecu-

tive weeks of results below 10 ppb are required before it is recommended that an advisory be lifted. The Illinois EPA does not require closure or advisories on HAB. The Agency's role is to advise.

HAB Safety

Extreme caution should be taken in the case of any exposure to a possible Harmful Algal Bloom. People should avoid direct skin contact with the water, inhaling droplets of the water, and ingesting any water. When working near or investigating blooms safety equipment including gloves, carpenter's masks, waders, goggles, and personal flotation devices is recommended. If you come into contact with a HAB wash your skin and any equipment with soap and tap water immediately after exposure. Do not use lake water that looks clear to clean. Even lake water that appears to not have algae in it, can have toxins associated with it. Do not allow pets or children to come into contact with the water, even water surrounding the scum that looks clear, may be contaminated with toxins.



HABs: Bad for You, Bad for Your Lake

Harmful algal blooms (HABs), an increasing occurrence throughout Illinois' inland lakes and streams due to eutrophication, are notorious for causing problems in more ways than one. HABs have several prevalent mechanisms of disruption. Perhaps the most well-known direct effect of HABs is the effect on human health. Yet, HABs also have detrimental effects on the economy, wildlife, and habitat as well. HABs degrade the water quality of our finite freshwater resources, and taste and odor issues are especially noticeable. More pressingly, HABs are notorious for producing different types of toxins, including neurotoxins, hepatotoxins, and dermatotoxins. This is due to drastic changes in nutrients, light, temperature, and trace metals.

One of the most well-known dangerous varieties of phytoplankton is called microcystis, a type of cyanobacteria, otherwise known as blue-green algae. At certain concentrations, microcystis produces a hepatotoxin known as microcystin that damages the liver of humans and pets that drink or swim in the water where blooms are present. High concentrations of microcystis can also cause respiratory distress in beachgoers as well. In some cases, ingestion, inhalation, or direct contact can cause severe illness, or in rare cases, death.

Human health can also be impacted by HABs through consumption of fish or shellfish contaminated by toxic algae. Poisoning caused by ingesting fish that contain toxins produced by a HAB can occur in some marine environments. Symptoms may include nausea, vomiting, tingling extremities, or neurological symptoms. Symptoms can last anywhere from between a few days to a few years. Poisoning occurs due to bioaccumulation of toxins in the food chain of freshwater habitats. Toxins start at the bottom of the food chain and make their way up to the larger predatory fish where they become very concentrated. Regardless of the type of aquatic environment, caution should be taken when eating fish caught where large HABs occur.

NOAA estimates that HABs in U.S. water systems are now costing the economy \$82 million. HABs are responsible for fishery closures, tourism losses, human health care requirements, and cleanup and removal costs. Due to the decrease in water quality, HABs may be responsible for declines in commercial or sport fishing revenue, recreational activities such as boating or jet skiing, and travel to coastal tourism destinations. Toxic HABs are accountable for increased health care costs of treating symptoms from exposure HABs like micro-

cystis. Not only that, but HABs are very costly to monitor, treat, and remove. Cleanup of HABs is time intensive and requires an adequate workforce, which one or both may not be readily available.

Accumulation of HAB biomass also causes potentially harmful effects on habitat and wildlife. Perhaps the most damaging side effect of HABs is through the manifestation of hypoxic "dead zones." Blooms that are large in size eventually die and settle at the bottom of a water body. Depletion of most of the oxygen in the water ensues when the algae decays. These dead zones cause subsequent death of marine animals and benthic organisms and are responsible for fish kills and habitat destruction. HABs can also alter aquatic habitat in other ways by blocking light penetration into the lake and clogging the gills of fish. Blooms are especially a problem in the food chain because HABs such as microcystis are especially unpalatable to many zooplankton grazers. Corruption of the aquatic food web due to HABs has only exacerbated the problem. Despite the fact that HABs are relatively new, clearly, they are a multifaceted problem in Illinois water bodies and action needs to be taken to best prevent any developing incidences.

-Katie Hollenbeck

Harmful Algal Bloom (HAB)

Contact emails:

EPA.HAB@illinois.gov

&

your regional VLMP coordinator

Regional Coordinators:

VLMP Statewide Contacts

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

Northern Coordinator

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

Lake County Coordinator

Kelly Deem, LCHD, Libertyville, 847-377-3009 & kdeem@lakecountyil.gov

Southern Coordinator

Travis Taylor, GERPDC, Marion, 618-997-9351 & travistaylor@greateregypt.org

www.epa.state.il.us/water/conservation/vlmp

Aquatic Invasive Species Spotlight: *Hydrilla Verticillata*

Hydrilla Verticillata is native to Africa. The plants grow submersed and have horizontal stems with whorls of leaves along them. The horizontal stem branches out as it nears the surface water. The plant produces both turions and tubers as dual processes of reproduction. Turions are buds that are produced along the stem and they break off to settle and start new plants. Tubers are formed at the end of the root system and are pea-like. Tubers can remain dormant for periods

of years before they begin to grow new plants. Another common reproduction method is through fragmentation, broken pieces resettling to form new plants, and a fourth lesser common method is through seed. Plants form large dense

populations and can displace native species as well as impact recreational use of the waterway.

References: www.ecy.wa.gov/programs/wq/plants/weeds/hydrilla.html

<http://el.erdc.usace.army.mil/aqua/apis/PlantInfo/PlantListTotal.aspx>

Photo: www.iisgcp.org/exoticscp/hydrilla.htm



If you find Hydrilla, contact your regional VLMP coordinator.