

A Moment of Appreciation

~ Melissa Clark

How many times have you appreciated that wonderful lake you so often recreate in or glance upon? You may have been out on a routine fishing trip around the perimeter, or zoomed across the wakes on your wet bike, or simply sat at the edge with a preferred beverage. We often get caught up in the moment and the fast pace of life and forget to fully appreciate those wonderful resources and opportunities before us. July is Lake Appreciation Month!

While the month is half over, make an extra effort to reflect and enjoy the present these freshwater resources provide. Get out on that canoe that has been turned over behind the garage for months or finally plan the fishing trip with the grandkids. There are also many ways you can directly and indirectly help protect and enhance these lakes, some of which we highlight in this Water Column.

Try this little exercise: Close your eyes and picture your lake or one that you like to visit. Think of enough details to describe it to a friend. So, what did you include in your mental picture?

The Indiana Clean Lakes Program is in full sampling season, so we've been out working all over Indiana and will continue through August. By sampling for water quality parameters, we are accustomed to thinking of the whole water body, all the way to the deepest depth. I imagine that most lake users think of the surface, the rough or calm water, the color and clarity of the top few meters, and perhaps the muck between their toes when they step in at the lake edge. I welcome and challenge you all to expand your perspective by going out and looking at all the lake characteristics and the lands surrounding your lake. How deep is the lake? Does it have various deep basins and coves? Look at the shoreline. How does the type of shoreline contribute to the lake ecology? Are the surrounding lands forested, all lawns, row crop, or mixed? Does all aquatic wildlife have enough homes? What kind of boating activity takes place and how might that change what lives in the lake. One very exciting activity that we did this summer during our training was to visit Bryant Creek Lake in Monroe County and explore the underwater ecosystem with snorkeling gear! It was a

fascinating venture and really helped the participants capture that whole lake environment (Figure 1). Plus, it was fun!

After you get out and broaden your observations, repeat the above exercise and see the different mental picture you create. Enjoy the remaining summer months and take a moment to appreciate our freshwater resources!



Figure 1. Indiana Clean Lakes Program employees taking a break from lab and field sampling to explore the underwater environment of Bryant Creek Lake in Monroe County.

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Phosphorus Runoff from Your Yard

~ Nick Cooper

As spring begins and moves toward summer, many people begin planting gardens and flower beds, and spending more time overall on lawn care. These activities often result in the use of many fertilizers to help grow healthy lawns and gardens. However, people often do not realize the large impacts that fertilizer use can have on lakes, reservoirs, and streams within Indiana.

Have you ever taken a trip to your favorite lake and noticed an excessive amount of aquatic plants or a green layer of algae on the surface? These things are typical of this time of year in many lakes and streams in Indiana (Figure 2). While a certain amount of plants and algae are essential and naturally occurring in many waterbodies, these attributes are often largely exacerbated by excessive nutrient inputs. Excessive plant and algal growth can have several other negative impacts such as:

- poor aesthetic value for recreation
- decreased water clarity
- decreased oxygen in the water due to decomposition (which



Figure 2. Algal bloom on an Indiana Lake.

can be harmful to fish and other wildlife)

- create a poor taste and unpleasant odor to drinking water
- potential to produce forms of algae that can be toxic

Phosphorus is the driving force behind much of this plant and algal production in lakes and streams. Certain amounts of phosphorus are necessary for plant growth. However, the phosphorus that many folks add to their lawns through fertilizers will allow plants and algae to grow at excessive rates.

How does phosphorus move from our lawns to lakes and reservoirs? Phosphorus that is not bound to soils has a high potential to enter waterbodies in runoff during and after rain events. Even phosphorus that is bound to soils has a high potential to enter waterbodies from runoff of soil particles that can happen through erosion. Areas with large amount of impervious surfaces, such as residential and commercial areas, are at the greatest risk because of increased runoff rates.

Another common lawn care practice that can greatly contribute to excessive nutrients in lakes is mowing your lawn. Grass clippings contain phosphorus, and when they enter waterbodies from runoff before having time to mix with the soil these clippings can increase phosphorus inputs by 30 to 40 percent

Solution

The solution is simple: Do not add excessive amounts of phosphorus to lawns. Most lawns naturally have a sufficient amount of phosphorus in the soil to grow.

To ensure that the fertilizer you are adding to your lawn are

phosphorus free, look at the labels that occur on all fertilizer bags. Fertilizers have a series of three numbers that represent the nitrogen, phosphorus, and potassium as a percentage of each nutrient by weight. For example, a 100-lb. fertilizer bag that displays the numbers 20-27-5 contains 20 lbs. of nitrogen, 27 lbs. of phosphorus, and 5 lbs. of potassium (Figure 3). To prevent phosphorus pollution, buy fertilizers that display a zero for the center number.

There are many other things that each individual can do to improve the management of lawns and reduce nutrient runoff, such as:

- If you live along a lake, leave at least a ten-foot buffer of unfertilized area
- Mow higher, mow regularly, and leave grass clippings on your lawn
- Use “natural organic” or slow-release fertilizers if you must fertilize
- Avoid applying fertilizers on sidewalks, streets, driveways, and near storm drains
- Conduct a soil test to determine your individual lawn needs



Figure 3. Lawn fertilizer with nutrient numerical code.

- Fertilize during the proper season
- Plant proper vegetation to reduce soil erosion, and thus phosphorus runoff

For more information about water quality and proper lawn care management to prevent nutrient runoff visit <http://www.clearchoicescleanwater.org/>, <http://www.in.gov/idem/>, and <http://www.epa.gov/osw/conserve/tools/greenscapes/owners.htm>

Have you checked out the Indiana Clean Lakes Program Web page lately? Take a look at www.indiana.edu/~clp/ and see what's new and happening with the program and with Indiana lakes!

ANNOUNCEMENTS



IDEM Blue-green Algae Updates

IDEM updates the blue-green algal sampling results through the end of August. Explore the website for results from some designated swimming beaches around Indiana. IDEM has also produced an official fact sheet to cyanobacteria, which is included in this *Water Column* issue, below; <http://www.in.gov/idem/algae/index.htm>.



EPA has Watershed Academy Webcast Seminars

The EPA has Watershed Academy Webcast Seminars that are free and designed to be helpful to local watershed organizations, municipal leaders, and others through online webcast training sessions. Attendees must register in advance to participate in webcasts. During the webcasts, trainees log onto the Web to participate in live training conducted by expert instructors. Your computer must have the capability of playing sound in order to attend the webcasts. The Watershed Academy offers a certificate to those who attend webcasts. Streaming audio versions of past Webcasts are available: "Summer 2013 Webcast Series to Build Awareness about Harmful Algal Blooms and Nutrient Pollution" (http://water.epa.gov/learn/training/wacademy/webcasts_index.cfm).



2013 Secchi Dip-In – June 29 - July 21, 2013

There just a few more days remaining to participate in the Secchi Dip-In. Volunteers have been submitting information during the annual Dip-In snapshot since 1994. Over 2,000 waterbodies are now tracked for trends in transparency. Please join them in this international effort to track changes in water quality.

FACT SHEET

SUMMER 2013



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Blue-Green Algae

Office of Water Quality
Watershed Assessment and Planning Branch

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www.idem.IN.gov

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Description:

- Blue-green algae, also known as Cyanobacteria, are a group of photosynthetic bacteria found in a wide range of water bodies throughout Indiana, the United States, and the world.
- When ideal temperature and water conditions coincide, periods of significant algae growth, or algal "blooms", may occur – commonly from May to October in Indiana.
- Factors promoting algal growth can include sunlight, warm weather, low turbulence, and nutrient sources, such as phosphorus and nitrogen. Still, some types of algae prefer turbid, or cloudy, water with low levels of light.
- Water containing high levels of blue-green algae may appear greenish in color and occasionally in some shades of blues, browns and even white. Some appear to have a thick, paint-like scum on the surface.
- Blooms may appear for only a few hours or remain unchanged for weeks depending on water and wind conditions.

- There are many types of freshwater blue-green algae, but only about one-third (1/3) of them are capable of producing toxins. The mechanisms for toxin production are not well known. Toxins may be produced as part of the natural growth process of the algae and be excreted into the water during growth or upon death.

Environmental Impacts:

- All Indiana lakes contain algae; however, the concentration and type of algae varies greatly.
- When algal blooms die off, they sink to the bottom. The degradation of this organic matter consumes available oxygen in the water. In some high concentrations, the depletion of oxygen may be great enough to result in fish kills.
- In extremely rare instances, toxin-producing blue-green algae have resulted in the sickness or death of other animals, including livestock and dogs.
- Some blue-green algae blooms can create an earthy or musty smell in lakes and reservoirs. In some cases, taste and odor from algal blooms can impair drinking water supplies that use a surface water source. Taste and odor compounds are not harmful and treated water is safe to drink.

IDEM's Role:

- The Indiana Department of Environmental Management (IDEM) is responsible for protecting our environment through the monitoring and managing of Indiana's water quality.
- IDEM manages water quality, including public drinking water supplies, through the regulation of point and non-point sources of pollution that run into waterways, monitoring of permit compliance, enforcing protective regulations, and implementing various prevention programs.
- IDEM samples selected swimming areas at some state parks and state recreation areas for cyanobacteria and their toxins between June and September. IDEM scientists take water samples, identify types of blue-green algae and analyze for two algal toxins: microcystin and cylindrospermopsin.
- The Indiana Department of Natural Resources (DNR) advises the public of the blue-green algae threat through signs at the swimming areas and on the DNR website for the properties being sampled. Together with the DNR, the State Department of Health (ISDH), and the Board of Animal Health, IDEM provides updates and information via the Web site www.algae.IN.gov.

Citizen's Role:

- Citizen involvement is a vital component in the effort to manage algae blooms.
- There are a number of actions every citizen can take to reduce the influx of nutrients into the watershed and improve overall water quality:
 - Do not over fertilize. Most established lawns need few nutrients to be healthy.
 - Check soil nutrient levels prior to applying garden fertilizer to ensure correct application. Soil test kits can be purchased from some local hardware stores and through online distributors.
 - If applying fertilizer, use phosphorus-free lawn fertilizers. Lawn-fertilizer packaging is labeled with three (3) numbers for nutrient content. Look for a zero (0) as the middle number (phosphorus content) to indicate phosphorus-free fertilizer.
 - Do not fertilize up to the edge of a waterway. Check with your local government for any specific setback requirements.
 - Do not dispose of grass clippings or leaves in or near a waterway.
 - To prevent nitrogen input from human waste, have your septic system inspected and tank pumped out at least every two years.
 - If conducting land disturbing activity, prevent soil and organic matter from washing into waterways as soil can carry nutrients into the waterway.
- Public health officials suggest avoiding contact with waters visibly impacted by algae, and showering or bathing with warm, soapy water after recreating in reservoirs, lakes, rivers, and streams.
- Veterinarians recommend not allowing pets and livestock to drink or swim in waters visibly impacted by algae.

More Information:

- For more information on the most recent levels of blue green algae, blue-green algae toxins (if any), environmental impacts, health guidelines and other information, please visit the Web site at: <http://www.algae.IN.gov>.

Exploring the Impacts of Speed

~ Ashlee Haviland

Stone Lake, located in the city of La Porte, in La Porte County, Indiana is a 150-acre natural public freshwater lake. The lake is attributed with a natural shoreline, low development, a public beach, and a public boat launch for easy access to both Stone and Pine Lakes. Stone Lake has historically had excellent water quality and great diversity among its submerged aquatic vegetation community.

The Indiana Natural Resources Commission (NRC) was approached in early April to allow a motorboat race on Stone Lake, La Porte, IN. A permit to allow the race was issued and was subjected to several conditions, with one being that the Department of Natural Resources (DNR) Division of Fish and Wildlife would work to assess the shoreline, water quality, vegetation, and any other concerns, prior to the event, during the event, and after the event to determine any effects the race had on the lake.

A monitoring team was assembled, as this was a unique opportunity to document conditions and determine, if any, effects might result. Lake and River Enhancement (LARE) Program Specialist Ashlee Haviland, along with District 1 Fisheries Biologist Tom Bacula, Lake and River Enhancement Biologist Rod Edgell, Assistant Fisheries Biologist Jamie Pejza, and Assistant Fisheries Biologist Tyler Delauder were involved with conducting the monitoring at Stone Lake.

Bacula and Pejza provided assistance in installing bank pins in the shoreline at six different sites to determine if any shoreline erosion would be a result due to the increased wave action this lake doesn't typically see.

Edgell and Delauder provided efforts in assessment of the submerged aquatic vegetation (SAV) community by performing a Tier II survey prior to and after

racing to assess, if any, changes to the SAV community. Haviland, with assistance from the Aquatic Invasive Species Coordinator, Eric Fischer, completed a hydroacoustic assessment and water quality monitoring before, during, and after the race and is also responsible in preparing the final document that will report the combined results of the monitoring program to the NRC by the end of the year.

Equipment to monitor water quality and laboratory analysis was provided by the Indiana Clean Lakes Program, a program administered by the School of Public and Environmental Affairs at Indiana University and sponsored by the Indiana Department of Environmental Management. The IN Clean Lakes Program has collected water quality samples at Stone Lake in 1989, 1995, 1999, 2005, and 2010, which will provide excellent historical water quality information to determine, if any, long-term impacts at Stone Lake to the water quality. A late summer water sample will be collected this year during the typical time range as previous historical samples have been collected to see, if any, changes have occurred within the lake as a result of the boat race.

A final document discussing the monitoring efforts will be prepared for review by the NRC before the end of the year. Stay tuned!

In Other News . . .

Monitoring confirms that boaters, not ducks, moving aquatic invasive species around

MADISON – Preliminary results from systematic monitoring of Wisconsin lakes for aquatic invasive species confirm that boaters, not ducks or other birds, are spreading the invaders around, state and University of Wisconsin-Madison researchers say.

None of the wilderness lakes surveyed – those in remote places and easily accessible only to wildlife – had any invasive species

present while there was a direct link between the presence of invasive species and boat access from public and private property.

Thirty percent of the lakes with boat access, however, had Eurasian watermilfoil, 18 percent of the suitable lakes surveyed with boat access had zebra mussels, and three lake systems with boat access had spiny water fleas.

"The fact that accessible lakes are the ones that are invaded indicates that these species are moved by boaters," says Alex Latzka, a University of Wisconsin-Madison graduate student involved in the research. "While birds could transport invasive species from one lake to another, our finding that remote lakes do not have invasive species strongly indicates that birds are not an important factor."

In recent years, DNR and the UW-Madison have collectively surveyed 450 lakes for aquatic invasive species like zebra mussels, Eurasian watermilfoil, and spiny water fleas.

UW-Madison researchers looked for aquatic invasive species in a range of lakes, including wilderness lakes.



Figure 4. State researchers in SCUBA gear looked for aquatic invasive species as part of a five-year monitoring effort. WDNR photo

As a reminder to prevent the spread of Aquatic Invasive Species (AIS), boater, anglers, and others enjoying Indiana waters are required to:

INSPECT boats, trailers, and equipment

REMOVE all attached plants and animals

DRAIN all water from boats, vehicles, and equipment

NEVER MOVE plants or live fish away from a water body

DNR focused its sampling on those lakes more likely to have invasive species present because they had boat access that ranged from wide, paved public boat launches to private boat launches to yard access. DNR is two years into its five-year sampling effort to understand the prevalence of aquatic invasive species in lakes statewide and also to understand whether efforts to slow the spread are working.

Two years of sampling is not enough to tell if the rate of spread is slowing in lakes with boat access, although there are some positive signs, says Scott Van Egeren, the DNR limnologist who coordinated DNR's sampling over the past two years.

- The number of lakes DNR surveyed and found with the different invasive species was about the same for both years. Finishing up the five years of monitoring will help provide information on the rate of the spread.
- Most lakes with boat access were still free of the worst invasive species; 70 percent of the lakes with public access surveyed were free of Eurasian watermilfoil, despite the fact the invasive plant has been present in Wisconsin for more than 50 years and is considered a relatively widespread aquatic invasive species. And 82 percent of suitable lakes with public access are still clear of zebra

mussels, present inland for more than 20 years.

"While we did find one or more invasive species in many of the lakes with private and public boat access, the prevalence of any one of them is relatively low given that some of these invasive species have been present in Wisconsin waters for decades," Van Egeren says. Bob Wakeman, who coordinates DNR response to aquatic invasive species, says the preliminary results underscore how important it is that boaters take the required steps to prevent the spread of aquatic invasive species.

Regulations since 2006 for oceangoing ships have effectively halted the introduction to the Great Lakes of new invasive species, Wakeman says, "so it's up to boaters to keep those invasive species already in the Great Lakes from being spread to inland lakes.

"Out of 184 invasive species introduced to Lake Michigan over the past century, just 29 have made it to inland Wisconsin lakes," Wakeman says. "Boaters have done a good job in recent years in following the rules, and they can continue to keep the damaging species out of inland waters as long as they take a few minutes to take some simple steps. "And we're happy to say that ducks are not going to undo your hard work!"

FOR MORE INFORMATION CONTACT: Bob Wakeman 262-574-2149; Scott Van Egeren 608-264-8895; or Jake Vander Zanden, UW-Madison, 608-262-9464

Lakes Festival A Success

~ Sarah Powers

We had the opportunity to participate in the Northern Indiana Lakes Festival last month. We have so much fun every year participating in the Lake Education activities. Each year we try to bring something new to the festival to educate the public on different aquatic communities. This year our display was on different zones of aquatic vegetation and the benefits of aquatic plants. Read more about the lakes festival below. (Reprinted from Stacey's Page Online <http://www.staceypageonline.com>).

Kosciusko Lakes and Streams (KLAS), which is Grace College's water research center, hosted the fifth annual Northern Indiana Lakes Festival. The festival took place in Warsaw and Winona Lake Friday through Sunday, June 7-9.

"The lakes are vital to our economy, environment, recreation and our very sense of community. The Lakes Festival was able to celebrate this by creating opportunities to both experience and be educated about the lakes," says Anna Burke, Lakes Festival coordinator and KLAS program manager.

Attendees participated in the numerous fun and educational events the festival offered. Children and adults alike learned how to keep lakes and streams clean from displays in the Lake Education area. There was also great participation in the Art Around the Lakes activities, Run for Others 5K, Warsaw Aqua Mile, and several new events associated with the festival. Favorite activities included the live animal show, canoeing and kayaking, bounce houses, 5,000-gallon aquarium, and the Lake City Skiers performance.

"We are so appreciative of the wonderful community members that helped us be successful this year; the sponsors, event

Perspectives

"Seven days of no swimming makes one weak."

~ Author unknown

organizers, volunteers, attendees, everyone."

The event was made possible by the efforts of over 200 volunteers and over 100 community businesses and organizations.

Nate Bosch, director of KLAS and the Lakes Festival, says "We went from having about 2,000 attendees last year to over 4,000 this year. I'm excited that we involved more people in our community and hope that we can involve even more next year."

The 2014 Lakes Festival will be June 14-15.

To learn more about KLAS, visit water.grace.edu.

Festival Stats

4,000 Attendees
200 Volunteers
100 Partnering Organizations
41 Sponsors
35 Vendors
3 Days



Figure 5. Alex Kain, CLP staff, educating a festival participant about aquatic plants.



Figure 6. Lake festival participants at the amphibian and reptile show holding a snake.



Figure 7. Lake festival participants at the aquarium display enjoying the native fish display.

WATER COLUMN

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The Volunteer Lake Monitoring Corner

~ Sarah Powers

In my role with the Indiana Clean Lakes Program I regularly work with citizens and citizen scientist, whether it be to conduct workshops on aquatic plants, train new volunteers or work an educational booth at a festival. I am always intrigued by the use of the word weed when referring to all aquatic plants. The word weed is often used to refer to "undesirable" plants. While many people may find all aquatic plants undesirable these plants do have a vital role in the lake ecosystem.

Aquatic plants make up what is referred to as the littoral zone of the lake (Figure 8). The typical aquatic food chain only shows predator prey relationships of the aquatic ecosystem (Figure 9). This diagram limits our perspective and does not take in to account the other important factors that the aquatic life depend on to thrive. Rather aquatic ecosystems are a much more complex unit than this simplified diagram leads us to believe. The lake ecosystem is dependent on the plant community, in the littoral zone,

to provide oxygen, nutrients, and habitat for aquatic life (Figure 10). Oxygen is essential to fish and plants diffuse oxygen in the water as they remove it from carbon dioxide in the process of photosynthesis. Beavers, muskrats, turtles, ducks, geese and song birds graze on a variety of parts of aquatic plants. Nutrients are taken up by plants that might otherwise be used by phytoplankton (algae) to grow. The habitat that aquatic plants provide is critical to maintain fisheries in lakes as well.

Aquatic plants have numerous benefits, but we still view them as a problem to the lake in some circumstances. While most people do not enjoy swimming in overgrown plant material or trying to fish in a dense mat of plants, aquatic plants do have an important role in the lake. The issue usually arises from plants becoming too dense for users to enjoy the water and dense growth can limit fish habitat as well.

The challenge is to find balance between our personal needs of the lake and what is best for the entire ecosystem. One of the most important ways we can manage aquatic plants is to monitor the changes over time and to deal with issues that may be lead to plant

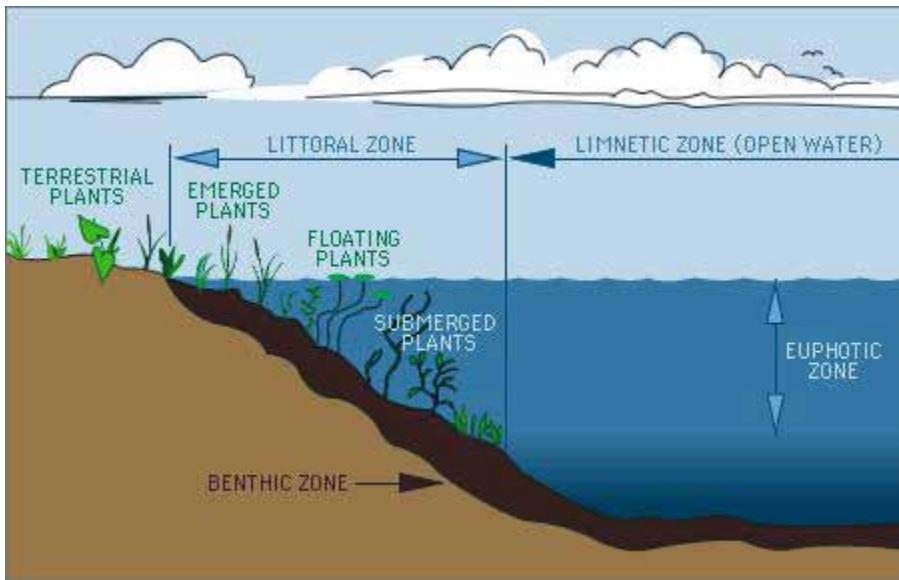


Figure 8. The littoral zone is the near shore area where plants grow because light penetrates to the bottom of the lake.

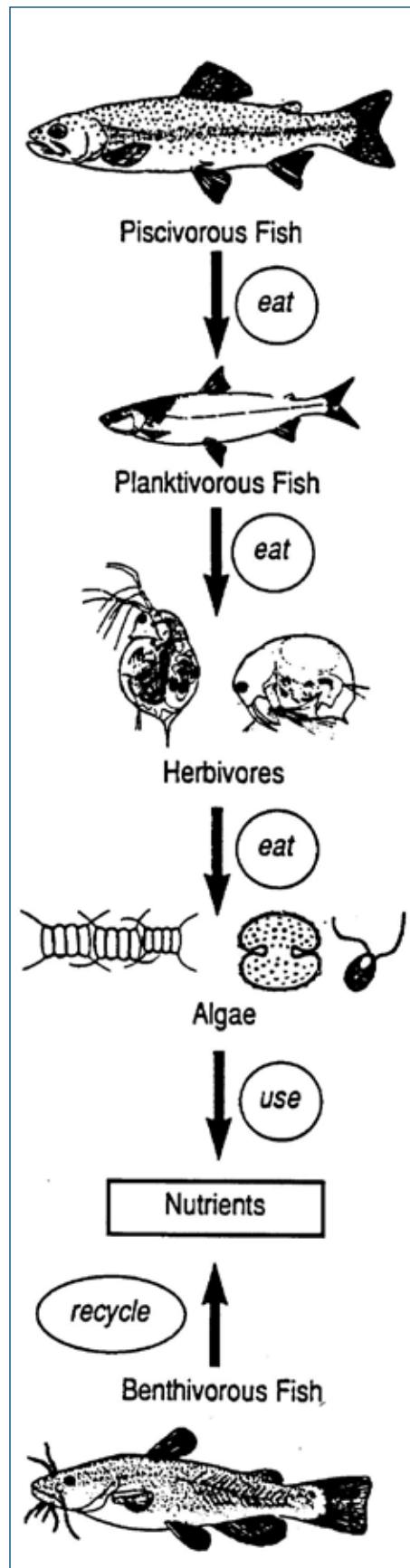


Figure 9. Simplified aquatic food chain.
Source: Thorp and Covich 1991

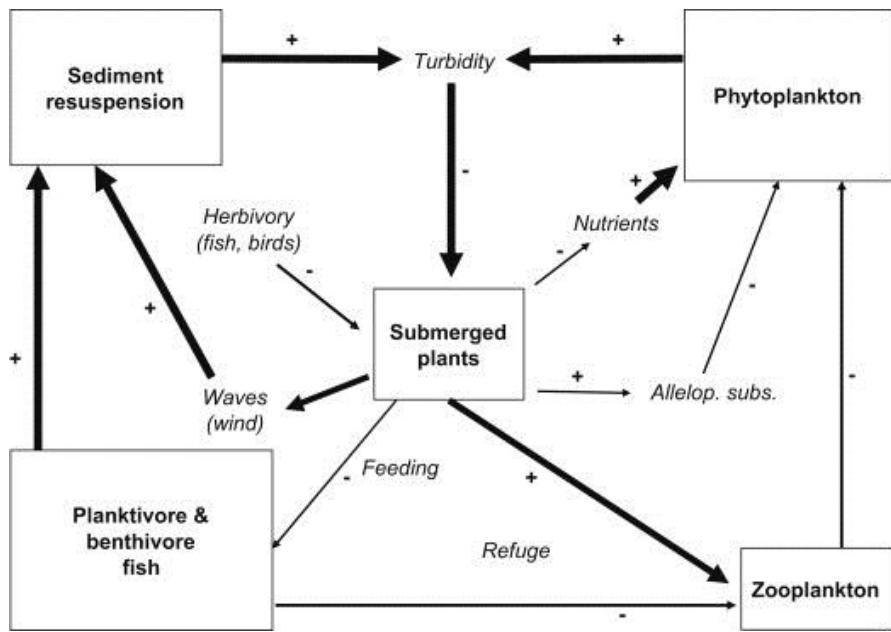


Figure 10. Web of impacts the plant community has in the lake. Source: Gulati et al. 2008.

overgrowth. Some of these issues could be excessive nutrient inputs to the lake causing increased plant growth or introduction of invasive species to the lake. It is important to understand the drivers of changes as well as the best ways to control the issues to maintain balance a balance in the ecosystem. It is important to understand that not all plants are weeds; plants are vital to the ecosystem and should be valued as such.

For more information on aquatic plants go to our website where you can find resources on plant identification and a fact sheet on the benefits of aquatic plants.

Aquatic Weed Watchers Plant Highlight

This will be the fifth plant in the plant highlight series. We will be featuring one aquatic plant in each Water Column issue. We will feature both native and invasive plants to improve our plant identification skills

Water Shield (*Brasenia schreberi*) – NATIVE

Water shield is a common floating leafed plant found throughout North American and Indiana. Some other floating plants can be mistakenly identified as water shield during early growth forms. Water shield provides high-quality fish habitat and can grow in water up to 6 feet deep. The jelly-like substance on the underside of the leaf and on the stem is a distinguishing feature. Water shield is a common palatable pond weed.

The leaves and stems of young plants can be eaten raw in salads or put in soups.

You can find more information about our Invasive Species Monitoring Program, this plant and many others on the Clean Lakes Program website www.indiana.edu/~clp. We will be updating the Invasive Species Monitoring page to include links to several resources and tips on identification guides.

Identification tips

- Floating leafed, stems rooted
- Stems are attached to the center of the leaf
- Leaf entire with no cut or lobes
- Leaf 2-3 inches long and oblong
- Jelly-like substance on the underside and stem of the plant
- Red flowers and occasional reddish color to leaves

