

## Volunteer Lake Data are Now Available Online

All Indiana volunteer lake data, 22 years worth, can now be accessed from the Indiana CLP Website. You can view yearly summary reports, or search the data available for an individual lake.

To access the information visit: [www.indiana.edu/~clp](http://www.indiana.edu/~clp). Click on "Volunteer Data," which is located along the left-hand margin under the "Volunteer Monitoring" section. From the Volunteer Data page (Figure 1) you can access the yearly reports or the search function.

Use the drop-down menus to search all of the volunteer lake data. There are three possible search parameters: county, lake, and year. You can select any combination of the three to search the volunteer data. For example, if you choose to search for Monroe County, the search result will be:

Griffy Lake  
Lemon Lake  
Monroe (Lower) Lake  
Monroe (Upper) Lake

You can then click on any of the links to view the available data for that lake. All the available data matching your search will be displayed in a table.

If you choose to narrow down your search by year, you have the additional option of seeing that data graphically. When a single year is selected, an icon will be visible in top right corner of the page. If you click on it, the Secchi depth data for that year will be graphed for you.

If you have any questions or comments, let us know using the "Feedback" button.



Figure 1. New volunteer data access screen.

## The Indiana Clean Lakes Program is Now on Facebook!

The Indiana Clean Lakes Program is now on Facebook. We encourage anyone who is interested in Indiana lakes to use the site. The Clean Lakes Program Facebook page provides citizens and volunteers with a place to interact, and share ideas and pictures with the Program. Use the page to receive information in your news feed from the Clean Lakes Program about upcoming lake events and workshops. The Facebook page is a great place for Indiana lake enthusiasts to share information and their passion for lakes. We encourage you to post messages for other users of the site and to post photos of your lake. Or you can read and reply to messages other users have left.

To find us, just search for the Indiana Clean Lakes Program on Facebook, or find the link on our Website.

We will post announcements, news and other information on our Facebook page. We look forward to hearing from you and seeing your comments.

## When Non-native Plants Invade Your Lake or Pond

~ Sarah Powers

In November I was given the opportunity to attend the international symposium "The Water Cycle: Managing the Challenges in Water Resources" hosted by the North American Lake Management Society (NALMS) in Oklahoma City. As a student, this was a great opportunity for me. The conference brings together professionals from aquatic management and science to share information and collaborate on topics in water resources. During the conference I was able to attend several sessions on various topics. The session that stood out to me the most was "Aquatic Plant Community Ecology." The session included information on the ecological effects of aquatic invasive plant communities.

Michael Smart, from the U.S. Army Corps of Engineers, gave a presentation titled "Ecological Attributes of Exotic and Native Aquatic Plant Communities." He presented the findings of an aquatic

plant study he conducted. In the study, Dr. Smart introduced two exotic plants, *hydrilla* and *Eurasian watermilfoil*, to his study ponds. Once the ponds were completely covered with the exotic plants, he looked at changes in water quality and fish populations.

In the ponds with exotic plants, they found fewer and smaller numbers of both bluegill and bass (Figure 2). Fish survival rates were also lower, which was a result of large fluctuations in dissolved oxygen and poor habitat quality. Both *Eurasian watermilfoil* and *hydrilla* create dense canopies of vegetation near or at the water surface. Dense plant mats such as these produce an abundance of oxygen during the day due to photosynthesis, but oxygen concentrations can plummet at night in these mats as the dense plants respire and consume the oxygen. These large swings in dissolved oxygen can be devastating for aquatic organisms such as zooplankton, aquatic insects, and fish.

Dense mats of non-native plants also can shelter small panfish that can maneuver around the stems, but can block bass and other predators from entering the plant beds to eat the small panfish. Elongated predators such as bass, walleye, and pike are designed for straight-ahead speed and can't maneuver around dense plants. This causes stunting (low growth rate) in the panfish because they hide in the plant beds to avoid being eaten and in the predators because they can't access the panfish to eat.

Figure 2 illustrates what happens when *hydrilla* moves into a pond. Pond 17 was designed to contain only native plants, but *hydrilla* was accidentally introduced. The low fish standing crop biomass in Pond 17 was a result of a *hydrilla* infestation.

So, what does this mean for Indiana? Aquatic invasive plants can limit recreation, reduce fisheries, and cost large sums of



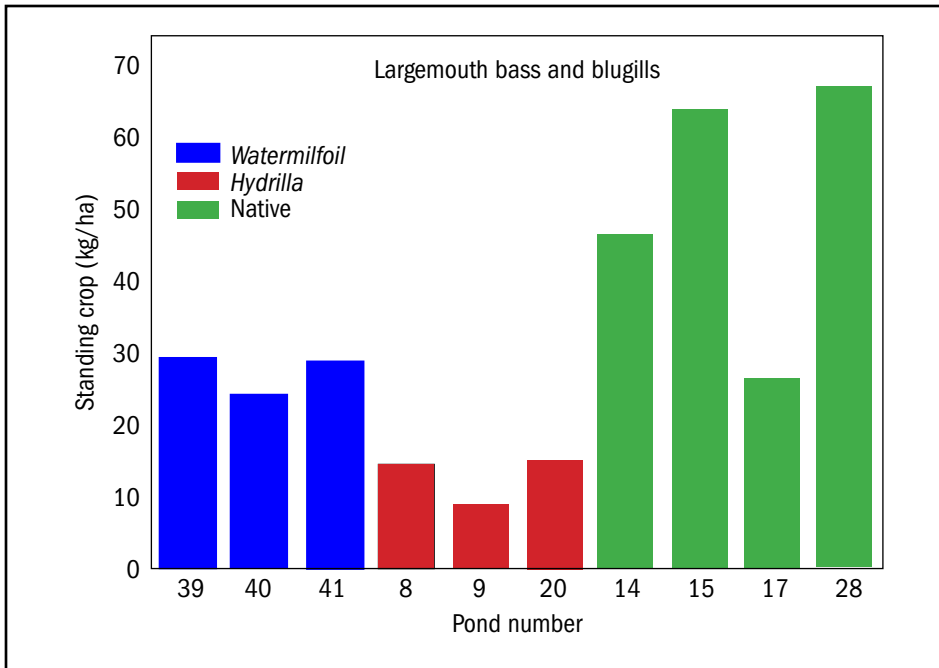


Figure 2. Standing crops of young-of-year bluegill and largemouth bass in ponds dominated by different vegetation types after one year. Source: Smart et al. 2009.

money to control. Invasive species prevention and control is estimated to cost \$3 million annually in Indiana. *Eurasian watermilfoil* is one of the most prevalent aquatic invasive plants in Indiana waters. As of 1998 it was estimated that Indiana lake associations were spending over \$800,000 annually on herbicide control for *Eurasian watermilfoil* alone. Another great concern is new invasions of other species. For example, both *hydrilla* and *Brazilian elodea* were recently found and treated in Indiana waters at great expense for eradication. As citizens and lake managers the best thing we can do is to educate ourselves about aquatic invasive species to help reduce the spread and to report new sightings. The Indiana Department of Natural Resources provides a Website to aid in the identification and reporting of aquatic invasive species: <http://www.in.gov/dnr/3123.htm>. To read more about the Smart study, go to <http://el.ercd.usace.army.mil/elpubs/pdf/trel09-10.pdf>.

#### References

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#### WATER COLUMN

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## Nutrient Criteria – Protecting Our Waters

~ Julia Bond

In November of 2010, I had the opportunity to attend the 30<sup>th</sup> Annual North American Lake Management Society Symposium. Experts in the field of lake management spoke about a wide variety of topics. One of these topics was the issue of nutrient criteria. An entire day of the three-day symposium was dedicated to the topic. The following should introduce you to the topic and much of the information I learned at the symposium.

Nutrient criteria are numerical upper bounds on certain nutrient concentrations in water bodies. They were originally proposed by the U.S. Environmental Protection Agency (EPA) as part of the 1998 Clean Water Action Plan to help preserve our nation's waters. One component of the plan involved the establishment of numeric nutrient criteria for four major types of water bodies: lakes and reservoirs, rivers and streams, estuaries, and wetlands. The purpose of these criteria is to establish numeric water quality standards that will serve as a guideline to help protect water bodies from nutrient enrichment and eutrophication. Numeric nutrient criteria provide a basis for evaluating water quality and protecting human water uses.

Nutrient enrichment is a major cause of water quality impairment in the United States and prompted the development of nutrient criteria. In fact, the recent National Lakes Assessment found that high nutrient levels were the second-most important stressor to lake biological health. Nutrients such as nitrogen and phosphorus are essential for the growth and health of aquatic plants and animals. The concern is when lakes receive more nutrients than necessary. If this happens, the ecological balance is disrupted, and often leads to



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a substantial increase in algae or aquatic plants and eutrophication. Excessive algal growth can be unsightly, limit recreational activities, and alter the aquatic ecosystem.

Nutrient enrichment is a national concern, but given the diversity of the nation, no single criteria can be applied uniformly across the country. Instead, the EPA has adopted an ecoregion approach. An ecoregion is an area where the ecological features are similar: geology, soils, land use, climate, natural vegetation, etc. For the purpose of devising nutrient criteria, the country has been divided into 14 aggregate ecoregions. Indiana is covered by three of these aggregate ecoregions (Figure 3). Water bodies differ between regions, so the nutrient criteria will also differ.

Four measures are being addressed by the nutrient criteria:

- Chlorophyll-*a*
- Total nitrogen
- Total phosphorus
- Turbidity/secchi depth

Nitrogen and phosphorus serve as the indicators of excessive nutrients. Chlorophyll-*a* and turbidity, on the other hand, represent the response

measurements, or the result of the increase in nutrients. With higher concentrations of total nitrogen or phosphorus, we typically see an increase in chlorophyll-*a* concentration (as a result of additional algae) and a decrease in water transparency. The nutrient

criteria will set upper limits on the concentration of the nutrients within a water body.

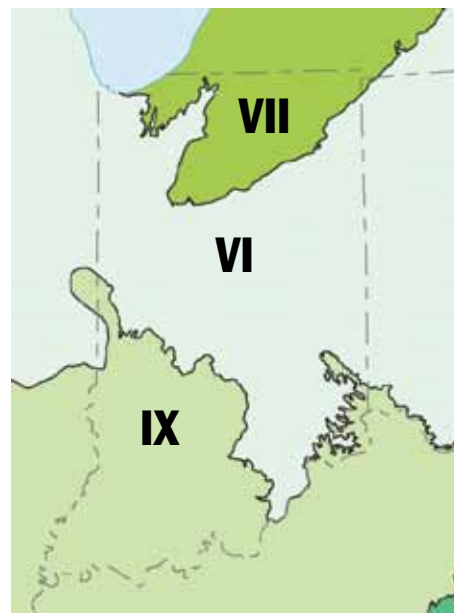
### Indiana

States have the option to develop their own, state-specific nutrient criteria, rather than use those established by the EPA. Indiana is in the process of finalizing lake nutrient criteria. In order to generate criteria, the state used a large amount of lake water quality data. Over 500 lakes were used in the analysis, with data going back to 1989.

Given Indiana's unique geography, the state decided to classify lakes based on three types: natural lakes, reservoirs, and surface mine pits. Each lake type will have its own specific criteria for chlorophyll-*a*, total phosphorus, and turbidity.

Once finalized, these Indiana-specific criteria will be reviewed by the EPA. When approved, the lake nutrient criteria will provide a basis for evaluating the health of the state's water bodies and a tool to protect our lakes from the adverse effects of nutrient enrichment.

You can read more about the development of nutrient criteria here: <http://water.epa.gov/scitech/swguidance/waterquality/standards>.



Indiana Aggregate Ecoregions

- VI = Corn Belt and Northern Great Plains
- VII = Mostly Glaciated Dairy Region
- IX = Southeastern Temperate Forested Plains and Hills

Figure 3. Nutrient criteria aggregate ecoregions within Indiana.