



## STOP AQUATIC HITCHHIKERS!™

Prevent the transport of nuisance species.  
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### Zebra Mussels: Little Mussels that Cause Big Problems

If you look closely around many DNR boat ramps, you might see a sign that says “Stop Aquatic Hitchhikers.” Though this phrase may call to mind the image of someone standing on a sandbar, sticking out their thumb in hopes of getting a ride, the hitchhikers being referred to are invasive species, plants, and animals that can be spread by human activities. An invasive species of particular interest in the Midwest is *Dreissena polymorpha*, the zebra mussel. Zebra mussels are native to southern Russia, and were first discovered in Lake St. Claire in 1988. Named for the striped pattern on their shells, zebra mussels have a triangular or D-shaped shell and typical adults are about the size of a fingernail. Since their introduction to the U.S., zebra mussels have spread to 23 states, including Indiana (Figures 1-3).

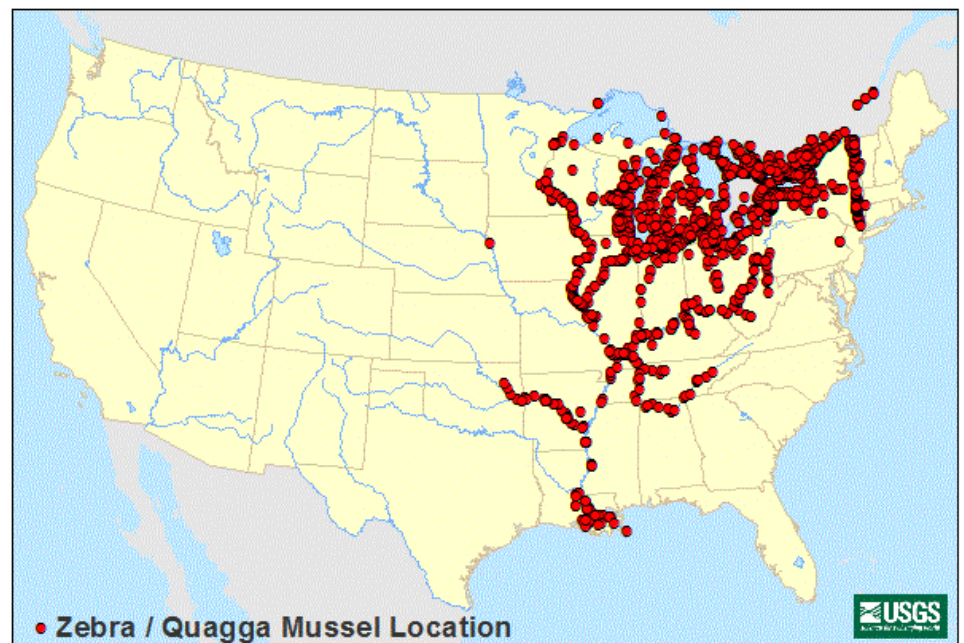
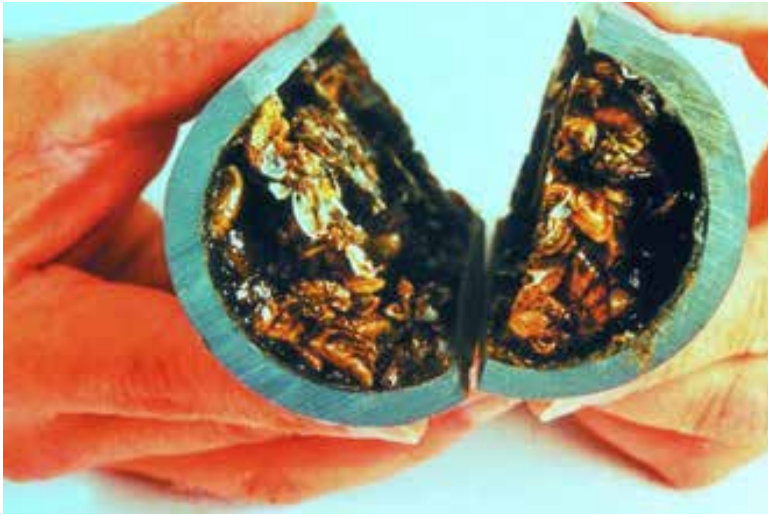


Figure 1. Zebra mussel distribution: Zebra mussels have spread outward since their discovery in Lake St. Claire in 1988. Because of the large economic burden in removing zebra mussels, many western states have plans in place to prevent zebra mussel spread.



(a)



(b)



(c)



(d)

Figure 2. Zebra mussels can grow very densely on any hard surface, which is problematic for water intake pipes (a), submerged items of all sorts (b), and other aquatic life, such as this crayfish (c). Adults mussels typically reach about 1 inch in length (d).

### What's so bad about them?

These little mussels pose a big threat to aquatic habitats in the United States. Their destructiveness lies in their sheer numbers, as zebra mussels can grow in very dense clusters (Figures 4-5) and can attach to any hard surface with their strong byssal threads. The surface they attach to could be anything from rocks to your boat hull to other animals, including other mussels. Because they grow so densely packed, zebra mussels can clog water intake pipes, which cost billions of dollars to clean each year. They also change the ecology of lakes by very effectively filtering algae and detritus from the water, which can shift a lake from algae-dominated to plant-dominated. Zebra mussels can also negatively affect threatened native mussels through their competitive usage of space and food.

### How do you know if a lake has zebra mussels?

Zebra mussels can be found on many different substrates, including rocks, docks, boats, and other hard surfaces. When they've recently attached to a surface, the mussels will feel like the grit of sandpaper. You can visually or tactilely inspect surfaces in a lake for zebra mussels. The larval form of zebra mussels, known as veligers, can be found using a zooplankton tow net followed by inspecting the sample under a microscope to identify the presence of zebra mussel veligers.

### What can you do?

Everyone has a role to play in the fight against zebra mussel invasion. When you boat in a lake, whether it is known to have zebra mussels or not, be sure to thoroughly clean the boat and trailer with a 2% bleach solution and empty all bilge water before entering another lake. Veligers, the larval form of zebra mussels, could be present in and on anything that

has been in the water. While you're at it, be sure to remove any aquatic vegetation hanging on the boat hull, motor, or trailer as well. Alternatively, you can allow a week for the boat to dry before entering another lake. Tell your friends too, and help spread the word about aquatic hitchhikers and how they can be stopped.

The Clean Lakes Program is starting a volunteer monitoring program for zebra mussels in lakes around Indiana. We will provide an artificial substrate that can be checked for the presence of zebra mussels, and removed and sent to the lab if zebra mussels are found. Stay tuned for more information about this new program and how you can get involved.

Want more information? Visit the DNR website at [http://www.in.gov/dnr/files/fw-Zebra\\_Mussel.pdf](http://www.in.gov/dnr/files/fw-Zebra_Mussel.pdf) to learn more about zebra mussels. You can also view an interactive map of confirmed zebra mussel lakes and rivers at <http://mussels.geos.pdx.edu/#>.

#### **WATER COLUMN**

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## *Zebra mussels in your lake?*

Join the Clean Lakes Program to track them, avoid their spread, and detect them for early control efforts! It's easy!

***If you already have zebra mussels:*** We simply need volunteers from lakes that have zebra mussels to test out artificial substrate to determine the best material for early detection monitoring.

***If you don't have them:*** Hopefully, they won't invade, but if they do, you'll be able to track their presence with early detection.

We provide the materials (artificial substrate for mussels to attach and growth and a marking buoy). The lake volunteer monitors the substrate and ships us samples when mussels are first detected. We identify the organisms to confirm their presence. Volunteers will need a lake location, preferably need the boat ramp where they are introduced, to position the monitoring buoy.

Please contact us if you'd like more information and if you'd like to join our Aquatic Invasive Species Monitoring efforts! Email: Sara Powers ([sarellis@indiana.edu](mailto:sarellis@indiana.edu)) or Melissa Clark ([mlaney@indiana.edu](mailto:mlaney@indiana.edu))

*Stay tuned for further details...*



### **Indiana Aquatic Invasive Species Monitoring "Training Workshops"**

**Saturday, October 4th, 2014  
9:00 am-12:00 pm**

The Indiana Clean Lakes Volunteer Lake Monitoring Program will be offering an aquatic invasive plant monitoring program, "Aquatic Invasive Species Monitoring." The information gathered through this program will help maintain a record of aquatic vegetation (native and invasive) as well as provide an early warning for new invasive plants on our lakes.

We will be hosting a training workshop to learn the basics of conducting vegetation surveys and identifying both native and invasive aquatic plants. The workshop will be held at Ivy Tech Community College 1820 Park Road, Rochester, IN 46975 in room 140. (574) 223-3228 ext. 5031. Everyone (current and new volunteers) is welcome and multiple volunteers per lake are encouraged.

Please register by September 23rd by emailing Sarah Powers at [Indianaclp@gmail.com](mailto:Indianaclp@gmail.com) with your name, contact information, and lake or call (812)855-1600. You can find more information about the program online at [www.indiana.edu/~clp](http://www.indiana.edu/~clp). We appreciate all of your efforts on behalf of Indiana lakes and hope to see you there!

Thank you to our workshop sponsors:



Indiana Lakes Management Society  
<http://indianalakes.org/>

Lake Manitou Association  
<http://www.lakemanitou.org/>

Ivy Tech Community College at Rochester, IN

*The Indiana Clean Lakes Program is administered through the Indiana University School of Public and Environmental Affairs and sponsored by the Indiana Department of Environmental Management.*

# A Reflection on the Cleanliness of Lakes

~ Micky Leonard

I have had the pleasure of spending much of my summer on the glistening, serene, magical and sometimes challenging lakes of Indiana. Sampling as an intern for the Clean Lakes Program is truly an excellent experience for the outdoorsy Master of Science candidate.

Also this summer I was lucky enough to spend a week canoeing through the Quetico Provincial Park in Ontario, Canada. The Quetico is a truly unique wilderness area. It sits in a spring-fed watershed that receives no industrial inputs. The water all flows in from natural springs and is completely untouched by

human pollution as the majority of the watershed is protected park area. Natural inputs and natural filtration by essentially unpolluted soils and flora mean that the water in this extensive lakes system is drinkable. That's right, you can simply dip your water bottle over the gunnel of your canoe and take a sip of the freshest water North America has to offer.

The Quetico is a truly incredible park and while I've spent time there in previous summers I've never had the opportunity to so directly contrast my experience there with the lakes of my home state in Indiana. I've spent most of the last four years focusing on the problems of degrading water quality in the developed world and when you spend so many hours of your week taking in the history of humanity's environmental folly it can



Figure 3. Micky Leonard and Bridget Borrowdale, MSES students from the School of Public and Environmental Affairs, Indiana University, exploring the Quetico Provincial Park for a two-week adventure.

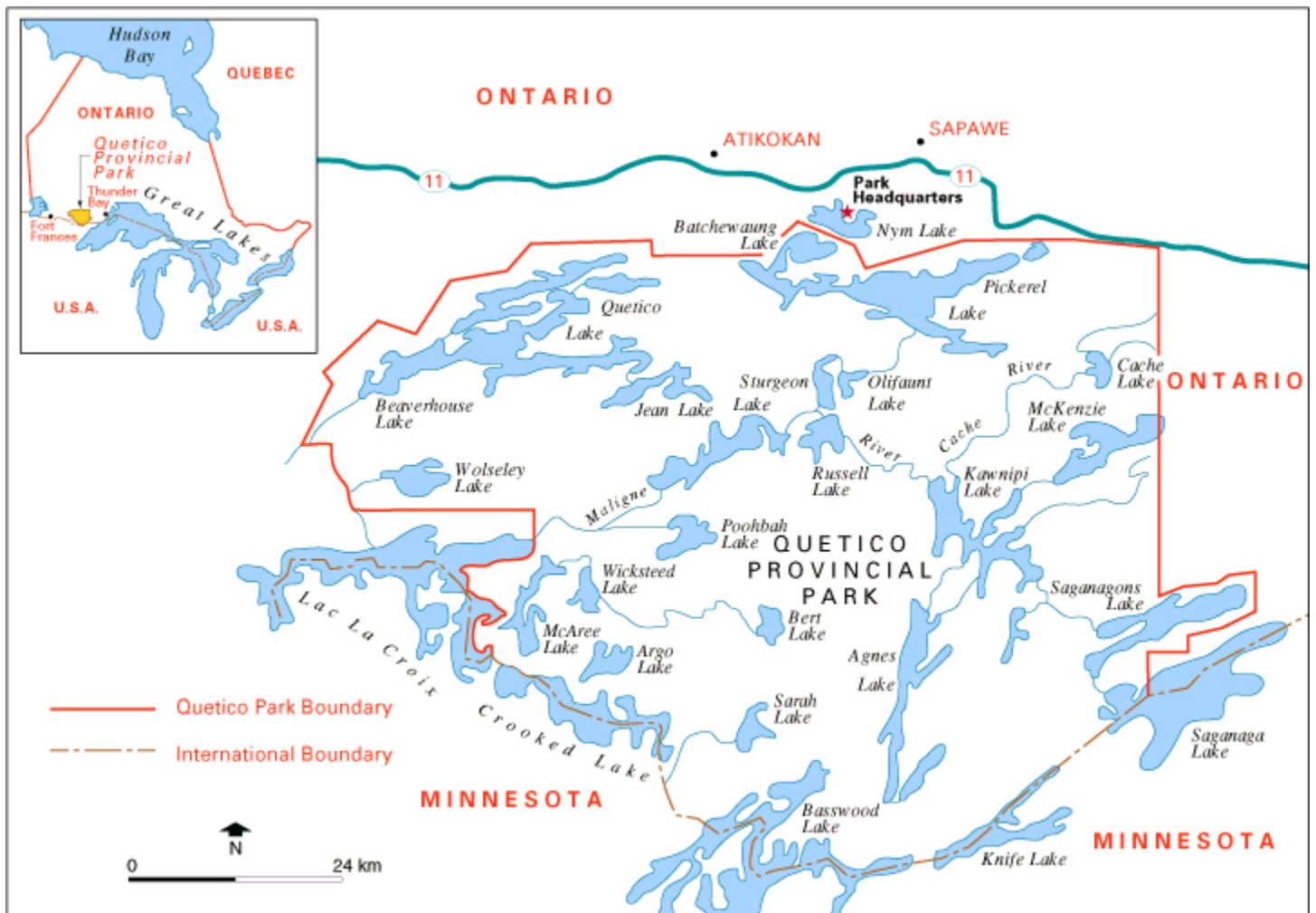


Figure 4. Map of Quetico Provincial Park.

be difficult to find the light at the end of the civilized development tunnel.

As readers of the CLP *Water Column* I imagine many of you have experienced similar frustrations. However, as positive wilderness experiences often do, this summer's Quetico trip greatly reinvigorated my faith in the possibility of a sustainably clean environment. The success story of the Quetico Provincial Park is inspiring and really quite simple.

French voyageur fur traders first entered the area in the early 18<sup>th</sup> century and began trapping and trading with the Ojibwe indigenous tribes. Throughout the 19<sup>th</sup> and into the early 20<sup>th</sup> centuries the typical fishing, trapping, and logging environmental problems, as well as the typical conflicts with the natives ensued. As resource utilization transformed from traditionally respectful voyageur fur trappers to loggers and moose trophy hunters, concerned citizens of Minnesota and Ontario worked to place restrictions on hunting and logging and the Quetico was established as a Game Preserve in 1909 and eventually as a protected park with stringent restrictions including no motor boats and limited access points.

By letting nature take this area back over, this lakes system has remained one of the most pristine wildernesses in the developed world. The park has many lessons to offer. One which stuck with me especially strongly this summer was the idea that sometimes the best management action is inaction.

Shoreline development, industrial and agricultural runoff, and over-recreation cause Indiana's most significant lake problems including eutrophication, sedimentation and erosion. Lake management associations anxiously seek solutions to these problems including chemical treatments and dredging among other band-aid solutions. While hindsight indeed offers more clarity than

present vision in finding management solutions to lake issues I hope Hoosiers can remember that nature will find a balance if left at least relatively undisturbed.

So next time your neighbor sprays for weeds along his golf-course lake-side lawn or the next time your lake association considers further development remember the Quetico. Remember that nature left alone is often infinitely more rewarding on its own than results of even the best intentioned human tampering. Also remember that while there are indeed many serious environmental

issues with lakes in Indiana and in the developed world in general there will (hopefully) always be the Quetico; where a quiet lakes system still prospers and where waters still run truly clean.

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

## *Perspectives*

“If there is magic on this planet, it is contained in water.”

~Loren Eiseley

## **Volunteer Corner**

~Sarah Powers

Summer has quickly passed us by. It has been a whirl wind for us finishing up sampling and processing volunteer samples. If you have yet to send samples in please do so as soon as possible. The quicker we get the samples the quicker we can process the data. If your boat is still in the water and you are out on the lake we encourage you to continue to take Secchi disk measurements and submit them to us. Aquatic vegetation is still thriving in many parts of the state so continue to survey the lake for invasive plants as well.

For Lakes Appreciation Month in July we asked volunteers to collect Secchi depth readings and submit those by August 10<sup>th</sup> to be entered to win a Clean Lakes Program t-shirt. I am happy to report that during that period we had 79 Secchi depth measurements submitted and Ray Dausman on Lake Manitou submitted the most measurements during the competition period. Thank you to all those who participated and I hope to make this a reoccurring event. If you missed out this year be sure to be ready next summer to help appreciate our lake a little more than normal.

Mark your calendars for the October 4<sup>th</sup> for our next Aquatic Invasive Plant Workshop. Thank you for your continued support of the Indiana Clean Lakes Program Volunteer Citizen Scientist. You are an invaluable part of what we do! Happy sampling!

# Aquatic Invasive Monitoring Plant Highlight

This will be the ninth 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.

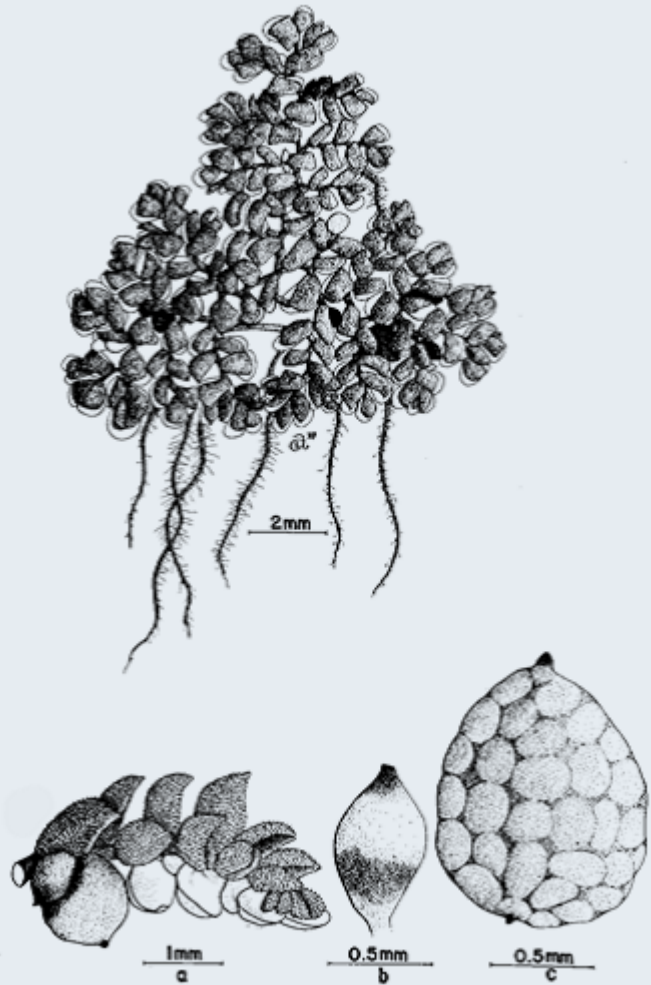
## Mosquito Fern (*Azolla pinnata*) – INVASIVE

Mosquito Fern is an invasive aquatic plant in Indiana that the Indiana Department of Natural Resources has encouraged residents to be on the lookout for. The Mosquito Fern is prohibited in the United States by federal law and can easily spread to new bodies of water as it has spread through the Southeastern United States. The Mosquito Fern is a small triangular shaped plant, similar to a Christmas tree, with pale green leaves and a brown base.

You can find more information about our Invasive Plant Monitoring Program and the Mosquito Fern on the Clean Lakes Program website at [www.indiana.edu/~clp](http://www.indiana.edu/~clp). We will continue updating the Invasive Plant Monitoring page to include links to several resources and tips on identification guides.

Identification tips:

- Christmas tree shape
- Tiny leaves are green, often with a red or brown tint and feather-like roots.
- Free floating aquatic



*Azolla pinnata*

- a. branch with basal sporocarp
- b. female (mega-) sporocarp
- c. male (micro-) sporocarp