

Riffles & Pools

Office of Water Quality www.idem.IN.gov



"Life doesn't have to be perfect to be wonderful." - Annette Funicello (1942-2013)

2017 workshop trainees in the Tippecanoe River, North Webster, IN – Photo by Eileen Oaks

Greetings Riverwatchers!

What a year to be reminded of the power of nature. Hurricanes, floods, droughts and fires were overwhelming at times. In light of such events, it is good to take stock of what is in our control, whether we do so as individuals or as a community. I have friends who get away yearly to evaluate where they are as a family and ascertain the strengths and needs of themselves and each of their children for the coming year.

It is easy to imagine that most of us would benefit from such moments of introspection, especially regarding the environment. Identifying and applying ourselves to tasks that move us forward is key. Having a backup plan in case of detours helps, and so does taking stock of assets before they are threatened.

Many of our active volunteer stream monitors do just that by 1) taking inventory of species in creeks nearby, 2) establishing baselines for chemistry, habitat and flow data, and 3) sharing and analyzing what they have learned with others around them.

May you have a safe and introspective winter! See you again in spring 2018!

– Carol Newhouse, Hoosier Riverwatch Coordinator

Winter 2017

In this Issue:

- [Hoosier Riverwatch 2017 Recap](#)
- [The Value of a Volunteer Hour](#)
- [Nonpoint Source Survey Due Dec. 6](#)
- [Beetles in Our Streams](#)
- [Tidbits and Trivia](#)
- [Recent Creek Outings](#)

MARK YOUR CALENDARS!

Stay tuned for more workshops next spring.

— OR —

Contact us for assistance in organizing and hosting one in your area during 2018.

Hoosier Riverwatch is administered by



Hoosier Riverwatch 2017 Recap

The Hoosier Riverwatch program hit the ground running in 2017. Two-thirds of this year's [workshops](#) were held before the 4th of July holiday arrived. Milder summer temperatures seemed to encourage workshops to continue through July and August this year, with numbers still picking up again in September. Great job to all who participated—hosts, instructors and newly trained volunteers alike!

The **24** workshops conducted in 2017 consisted of:

- 22 basic workshops held in 19 counties
- 2 advanced workshops held in 2 counties

● See red dots on map (lower right).

The **213** workshop participants represented:

- 46 Indiana counties
- 2 additional states

● See blue dots on map (lower right).

Of those participating this year, **209** self-reported their occupations as:

- **Interested Citizens** – 69 people (*up from previous years, percent-wise*)
- **University (32 people) and High School (3 people) Students** – 35 people (*much lower than previous years, percent-wise*)
- **Educators** – 47 people (*up from previous years, percent-wise*)
- **Natural Resource/Environmental Professionals** – 24 people (*fluctuates year-to-year, percent-wise*)
- **Other Persons** – 34 people (*remains unchanged year-to-year, percent-wise*)

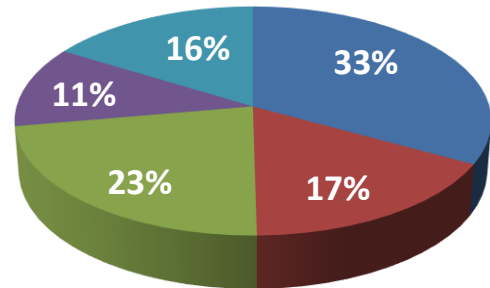
See percentages in pie chart (upper right).

Hoosier Riverwatch equipment requests during 2017 included the following:

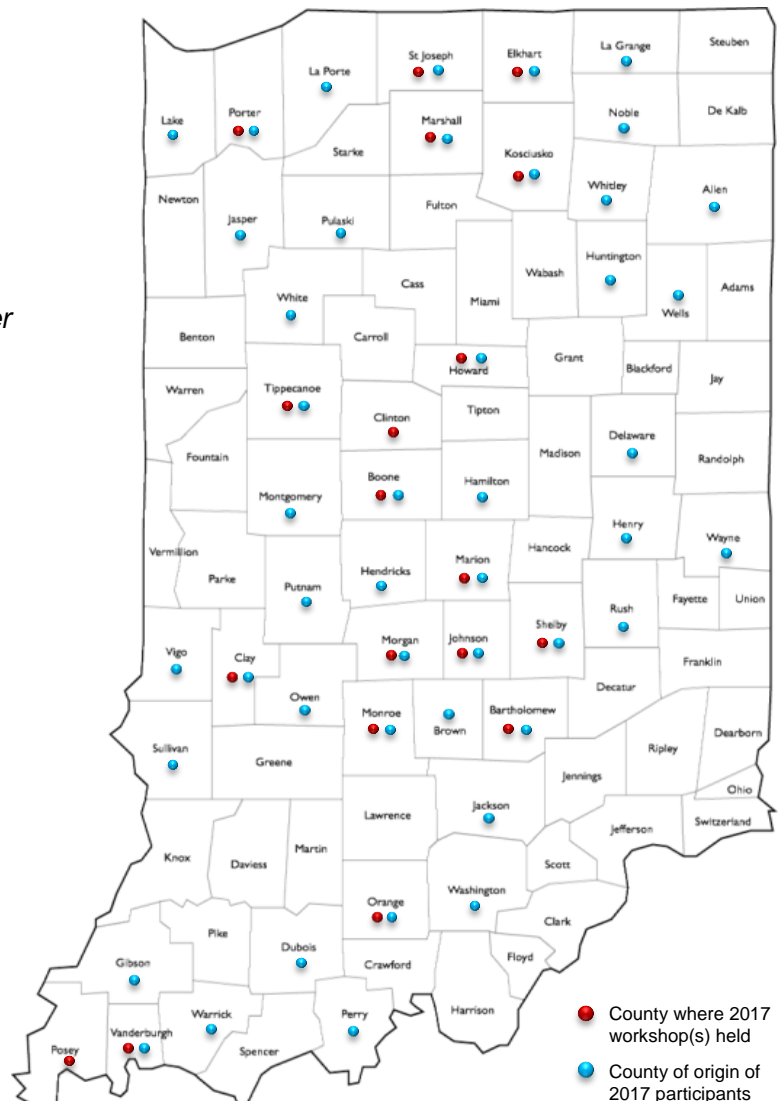
- **11** [equipment grant](#) packages awarded to qualifying groups
- **60** supply [refill requests](#) processed and shipped by IDEM staff

Hoosier Riverwatch staff updated and released a revised [Chapter 7](#) in the training manual (available [online](#)) to correspond with the latest database updates.

Percentage of Participants by Occupation, 2017



- Interested Citizens
- University and High School Students
- Educators
- Natural Resource/Environmental Professionals
- Other Persons



Beetles in Our Streams

Did you know that the most numerous and diverse fauna on Earth are beetles? We're not referring to those lads from Liverpool, of course, but the 6-legged variety (think ladybug). According to various sources, beetles comprise 25-30 percent of Earth's animal species and nearly 40 percent of all insect species. There are between 300,000-400,000 species of beetles with more still being discovered.

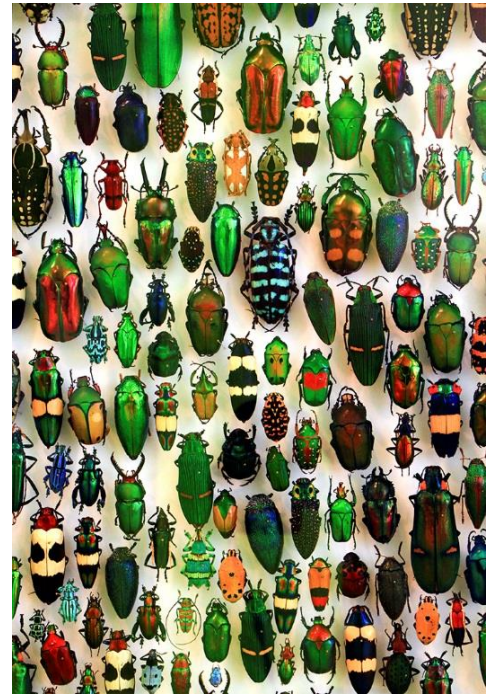
The North American continent has about 23 families of beetles, comprised of 23,000-24,000 species with about 1,000 species being aquatic at some point in their life cycle. Indiana potentially has anywhere from 500 to 600 aquatic beetle species.

Beetles have a complete life cycle including egg, larva, pupa and adult. The larval stage of most aquatic beetles is spent in the water with most pupal stages being terrestrial. While a few beetles spend their entire life in water, others spend only their adult stage in a water environment.

Beetles belong to the order named Coleoptera, which means "sheath wings," a reference to their hardened forewings known as elytra. Under the elytra are found large, folded, membranous hindwings with which they fly. Adults are often aided by carrying an air bubble beneath their elytra, which enables them to breathe underwater. A few have a spine on their abdomen and can pierce the stems of submerged plants to breathe from the air spaces found there. These are but a few examples of the fantastic adaptations beetles have made in response to their environment!

When it comes to eating, some beetles are herbivores, living on fungi or consuming various plant parts, sometimes by burrowing in or under them. Some beetles are predators or scavengers and a few are parasites. Common aquatic beetles noted by habitat and feeding group include:

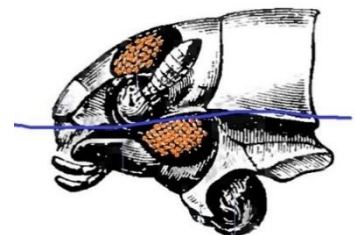
- **Crawling water beetles** (Family Haliplidae) – mostly herbivores with a few predators that are found in dense vegetated beds in standing or slow water.
- **Predacious diving beetles** (Family Dytiscidae) – comprise about half of all aquatic beetle species; predators as both larva and adult and are found in weedy, shallow, small waterbodies and slow streams.
- **Riffle beetles** (Family Elmidae) – mostly scrapers that feed on algae growing on rocks and debris and are found in areas with lots of water movement, such as fast parts of streams and near-shore areas of ponds and lakes.



The beauty and variety of beetles. (Photo by H. Zell [Own work] [CC-BY-SA-3.0](#), via Wikimedia Commons).



Air bubbles trapped under the hardened forewings (elytra) of adult beetles allow many to breathe underwater.



A side view of a Gyrinid (i.e., whirligig) beetle illustrates how the compound eye is split into two parts for vision above and below water level. (Illustration adapted from a public domain file originating from an 1899 report by Minnesota entomologist, Otto Lugger).

Beetles in Our Streams (cont.)

- **Water penny larvae** (Family Psephenidae) – adults are terrestrial; they scrape algae from rock surfaces and look like pennies attached to stones in areas of moderate to fast flowing water of creeks or wave-washed areas of large lakes.

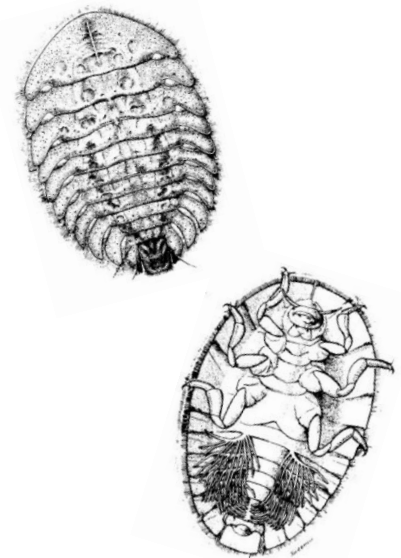
The only endangered aquatic beetle near to Indiana, according to the U.S. Fish and Wildlife Service, is the [Hungerford's Crawling Water Beetle](#) (*Brychius hungerfordi*). It occurs in only five isolated locations in Michigan and Ontario, Canada. You can keep track of Indiana's endangered, threatened, or rare species using a [clickable county map](#) maintained online by the Indiana Department of Natural Resources.

Meanwhile, a handful of non-native beetles in North America are showing promise as helpers, as they are being used under tightly-controlled conditions to aid in the [control of the invasive aquatic plant, purple loosestrife](#). These non-native fauna include leaf-eating, root-boring and flower-feeding beetles and weevils, which are a subgroup of beetles. Sadly, this is not the case with most exotic species, as is evident with recent impacts in Indiana and elsewhere of the devastating forest losses caused by the terrestrial beetle *Agilus planipennis* Fairmaire, also known as the [Emerald Ash Borer](#).

As water quality indicators, beetles vary in sensitivity to or tolerance of pollution. For professional stream biologists, knowing the habitat and water quality requirements of some Coleoptera species, either larvae and/or adults, can help assess the quality of a given waterbody. Hoosier Riverwatch uses a presence/absence scoring system for benthic aquatic macroinvertebrates. Of these, the presence of adult riffle beetles (Elmidae family), as well as larval riffle and water penny beetles (Psephenidae family), indicate high water quality to Hoosier Riverwatch volunteer stream monitors.



Adult riffle beetle



Larval water penny beetle viewed from above and below.

Beetle Resources – In addition to the handy pocket field guides for identifying insects, many of which are now available as eBooks, many useful websites and apps are also available to aid in identification of the next beetle that you encounter. Some particularly nice ones include:

- [Aqua Bugs App](#) – by the Isaak Walton League of America.
- [Bioindicators of Water Quality Flash Cards](#) – downloadable from Purdue Extension (co-produced by Hoosier Riverwatch instructor Julie Speelman).
- [Macroinvertebrate Key](#) – downloadable from Stroud Water Research Center.
- [Aquatic Macroinvertebrate Collection](#) – an online tool by Carnegie Museum of Natural History.

Nonpoint Source Management Plan Survey Due December 6!

The [Indiana State Nonpoint Source \(NPS\) Management Plan](#) guides the usage of Clean Water Act Section 319 funds received by the Indiana Department of Environmental Management (IDEM) from the U.S. Environmental Protection Agency (U.S. EPA). Current U.S. EPA policy requires states to update their plans every five years. IDEM's Office of Water Quality (OWQ) developed and submitted the last state nonpoint source plan in 2014. OWQ is starting work on the next revision, which will be completed in 2019. As OWQ begins to revise the plan, it is important to get stakeholder feedback on IDEM's program and work.

Please complete the [survey](#) by December 6, 2017 to assist with the 2019 revision of the Indiana State NPS Management Plan. If you cannot meet the deadline, please email your comments directly to Joe Schmees in the Watershed Assessment and Planning Branch of IDEM's Office of Water Quality at jschmees@idem.IN.gov. Thank you in advance for your feedback.

The Value of a Volunteer Hour

The [Corporation for National & Community Service's](#) online report provided this overview for Indiana in 2015:

- 26.9% of Hoosiers volunteered, ranking us 25th among the 50 states and Washington, DC
- 1.47 million volunteers
- 25.2 volunteer hours per capita
- 132.14 million hours of service
- \$3.1 billion in services contributed
- 51% of residents donated \$25 or more to charity

Graphs on this website further indicate that those who actively volunteer are also donating financially to charities twice as often as those who do not volunteer (80% of volunteers vs. 40% of non-volunteers). With the U.S. Census Bureau reporting an estimated 6.62 million residents in Indiana in 2015, the figures suggest about 1.2 million volunteers and 2.1 million non-volunteers donate financially to charities.



Volunteers are invaluable to the Hoosier Riverwatch program.

A March 14, 2013, article by Diane Knoepke in [The Chronicle of Philanthropy](#) makes some interesting points regarding calculating the monetary value of volunteers to an organization. The author discusses the value of tasks that organizational staff would have to complete should volunteers not be available, plus any added value of tasks that would not be completed otherwise based on whether or not special skills are needed to complete said tasks. The author goes on to subtract from the overall value of volunteer times the amount spent by an organization on staff needed to supervise volunteers. This last item came as a surprise since it is pretty much the position that your Hoosier Riverwatch coordinator holds at IDEM. The final point made in the article is that financial consideration is "only one slice of a much bigger picture of the volunteer-measurement discussion" that includes social and emotional benefits for both the volunteers and the organizations they serve.

According to the [Independent Sector](#), the average 2016 dollar value assigned to an hour of volunteer work in Indiana is \$23.38. The national value of \$24.14 per hour assigned in 2016 is up \$7.87 over 2001 calculations. For Hoosier Riverwatch, volunteer instructor hours have long been tracked at a flat rate of \$20 per hour; although we know that instructor, and even volunteer, time and effort is invaluable. Hoosier Riverwatch simply would not exist without the role all of you play. It may be an interesting exercise for Hoosier Riverwatch staff to run a report based on the amount of time volunteers spend in training versus stream monitoring versus data entry over the years! If the staff has time to play with such numbers for you this winter, we will report them to you in an upcoming edition of *Riffles & Pools*.

Tidbits and Trivia



New Instructors – Hoosier Riverwatch staff have 10 people lined up to be trained as instructors for next year. There is potential for placing instructors in regions of the state that have not had an instructor for some time. Watch for new names and faces teaching workshops in 2018!

Kudos go out to Nancy Brown, who lined up a replacement instructor for Hoosier Riverwatch before retiring from the Elkhart County Soil and Water Conservation District. For over 30 years (16 with Hoosier Riverwatch) Nancy did a great job of teaching Hoosiers of all ages and walks of life about the importance of water quality amidst the joy of discovering aquatic insects. Nancy's job replacement will soon be trained to fill her shoes running Hoosier Riverwatch workshops locally.

Instructor Sandy Belth teaches trainees to collect and identify aquatic insects on creek rocks at Karst Farm Park near Bloomington, Indiana in 2017. (Photo by Kriste Lindberg)

Tick Eaters – The Virginia opossum (*Didelphis virginiana*) is North America's only marsupial. It looks like a rat but is more closely related to koalas. If you should run into an opossum while out sampling your local creek or in your backyard, leave him or her be for the opossum truly is an ally.

In 2014 the [Cary Institute of Ecosystem Studies](#) and *NewsTimes* published an [article](#) showing that opossums are fastidious groomers. The study had to do with ticks on animals, but researchers were amazed to learn that—while many animals tolerate (think spread to humans) Lyme-carrying ticks—opossums quickly cleaned and consumed 95 percent of the ticks from their own fur.

Researchers concluded that in addition to getting rid of rotten fruit, mice, slugs, and cockroaches from our yards and gardens, a single opossum may consume up to 5,000 ticks a season. So, in areas where Lyme disease is a concern, having an opossum around would seem very beneficial, especially since they are rarely affected by rabies.

Still, opossums are opportunistic feeders and to live in harmony with them, it is best to keep any live chickens, trash cans, and pet food secure at night. That way, they will have an appetite for ticks!



North American Opossum with winter coat. (Photo by Cody Pope, [Own work] [CC-BY-SA-3.0](#), via Wikimedia Commons)

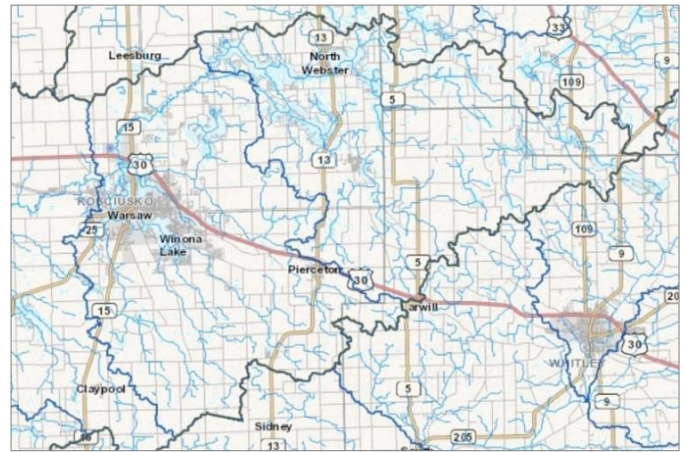


Loaner Kits – Look for updates related to [locations](#) of loaner [monitoring equipment](#) kits in 2018. Some old sites have been renewed (Henry County) or moved. Some new sites will be added this winter (Marshall and Johnson counties).

Some of the equipment items available for Hoosier Riverwatch volunteers to use via loaner sites around Indiana.

The Watershed Foundation's First Snapshot Monitoring Day

The Watershed Foundation (TWF) in North Webster, Indiana has been active in protecting and enhancing water quality in the Upper Tippecanoe River Watershed since 1997. On October 2, 2017, TWF hosted its first Snapshot Monitoring Day. Over 182 volunteers divided into 26 teams tested water at 96 sampling sites within the watershed. TWF covers 246 square miles in portions of three counties (Kosciusko, Noble and Whitley). The volunteer teams were staged out of one of three sites—Crooked Lake Biological Station in Columbia City, North Webster Community Center in North Webster, and Center Lake Pavilion in Warsaw.



TWF's area of interest is comprised of two 11-digit hydrologic unit areas coded as 05120106010 and -020. (Map: [IndianaMap](#))

Sample sites were assessed ahead of time to determine safety and accessibility, and included wetlands, small ditches and large streams feeding into the area's many glacial lakes. Volunteers utilized Hoosier Riverwatch-provided and other sampling supplies to test temperature, dissolved oxygen and transparency in the field. They then brought water samples back to their appointed staging sites to measure pH, nitrates, orthophosphates and *E. coli*.

TWF's director and staff credit their great success to the volunteers and financial support and assistance from generous [event funders and special partners](#). On October 24, 2017, TWF released the [results](#) of this joint monitoring event along with informative maps depicting their findings, [photos documenting the event](#), and acknowledgements to funders and partners. A hearty congratulations to everyone involved! What great community involvement to understand and work towards protecting and improving the quality of local water resources!

Recent Creek Outings



IDEM scientists Ali Meils, Raisa Espejo, Paul McMurray, Kayla Werbianskyj, and Stacy Burke engaged students along Fall Creek near Millersville in Indianapolis in October (Photo used with permission of Millersville at Fall Creek Valley, Inc.)

Fall Creek – After encountering scientists from the Indiana Department of Environmental Management (IDEM) in the creek this summer (see page 2 in the [Summer 2017 Riffles & Pools](#)), volunteers and staff of the Millersville at Fall Creek Valley, Inc. neighborhood association asked IDEM staff to return for a special program for local students. On October 6, 2017, fifth graders from Horizon Christian School enjoyed learning about water quality and how to help improve it at the Millersville at Fall Creek Preserve in Indianapolis. Check out the Millersville website to learn more about [this event](#) and all the great things going on along Fall Creek. Also peruse their Letter Gallery for letters the students wrote about preventing litter in the watershed!

Recent Creek Outings (cont.)



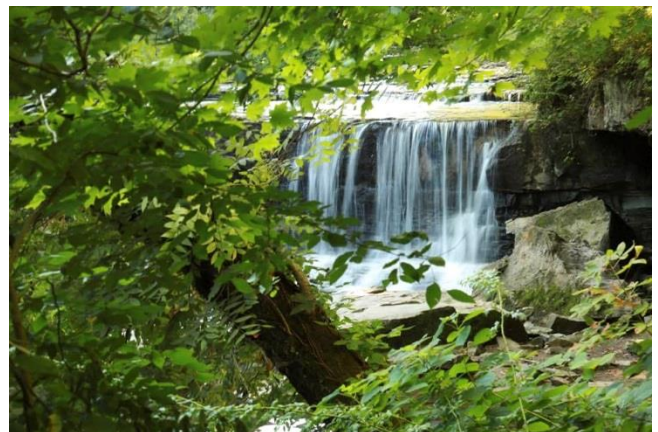
St. Richard's Episcopal School – IDEM's Cindy Jewell leads St. Richard's students through a watershed tarp demonstration near the Indianapolis Sailing Club at Geist Reservoir in November. Teacher and Hoosier Riverwatch volunteer Noelle King loves getting Indianapolis kids out and engaged in the creeks that supply their school's drinking water.



St. Richard's Episcopal School – IDEM's Myra McShane talks to St. Richard's students about water quality monitoring efforts during their class tour along Fall Creek in November. IDEM staff spent part of the day leading the students through watershed and water monitoring activities.



White River Smallies – Hoosier Riverwatch database contractor Jon Eynon took a break from computer and website developer duties in November to wet a line and catch a nice smally on the White River in Hamilton County. (Photo used with permission of Jon Eynon)



Anderson Falls – Whether hiking, fishing or collecting water quality samples, a drive out to see lovely Anderson Falls on Clifty Creek in Bartholomew County is well worth the trip. (Photo by Jennifer Wilson Wright)

Mark Your Calendars

Hoosier Riverwatch training workshops have concluded for the year.

Welcome to all who joined us in 2017! Thanks to those who hosted and helped train!



Check the next [newsletter](#) in March 2018 to see what workshops are lined up for early spring. We invite you to review the steps for *What it Takes to Host a Workshop* (listed on [page 6](#) of the Spring 2017 newsletter) for helpful reminders on how to organize and hold a successful workshop. You may also wish to contact a [Hoosier Riverwatch instructor](#) near you to discuss organizing and hosting a workshop for your area in 2018!

Against the Current

Why do some aquatic animals swim upstream?

First, facing upstream allows many insects, mussels and other arthropods to hold their position while food particles float downstream to them. This is an energy saving (and possible territory maintaining) strategy. It is also evident in a few fish species, especially salmonids, whose body shape allows them to expend less energy facing upstream versus down.

Second, though not fully understood, there is a mechanism which drives certain aquatic macroinvertebrates and fish species towards headwater areas to spawn or lay eggs. Muskellunge, for instance, would normally swim into adjacent wetland areas to spawn and lay eggs, as such shallow vegetated areas serve as prime nursery spots for the rather sedentary muskie fry.

In Indiana, where lakes often lack peripheral wetlands, this nursery function is carried out by [fish hatcheries](#) operated by the Indiana Department of Natural Resources. Likewise, rainbow trout (pictured here)—in order to spawn—typically swim from salt to fresh water, from lake to stream, or towards cooler, cleaner waters (normally found upstream).

Regardless of the mechanism at work, the analogy of swimming upstream is encouraging and necessary at times, though one must choose wisely when it is time to do so versus just going with the flow.



Rainbow trout (*Oncorhynchus mykiss*) on display in the DNR building at the Indiana State Fair. This non-native species is a popular sport fish in Indiana.

"Success doesn't come from what you do occasionally. It comes from what you do consistently."

– Marie Forleo, life coach, motivational speaker, author and entrepreneur



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"The sea, the great unifier, is man's only hope. Now, as never before, the old phrase has a literal meaning: We are all in the same boat."

– Jacques Cousteau (1910-1997)

IDEM Office of Water Quality Mission

The Office of Water Quality's mission is to monitor, protect, and improve Indiana's water quality to ensure its continued use as a drinking water source, habitat for wildlife, recreational resource, and economic asset.

The office achieves this by developing rules, guidance, policies, and procedures; assessing surface and ground water quality; regulating and monitoring drinking water supplies and wastewater facilities; protecting watersheds and wetlands; and providing outreach and assistance to the regulated community and the public while supporting environmentally-responsible economic development.

Hoosier Riverwatch Mission

The mission of Hoosier Riverwatch is to involve the citizens of Indiana in becoming active stewards of Indiana's water resources through watershed education, water monitoring, and cleanup activities. [Hoosier Riverwatch](http://www.hoosierriverwatch.com) is a water quality monitoring initiative sponsored by the Indiana Department of Environmental Management's Office of Water Quality.



With a few precautions (warm clothing layers, PFD, etc.) canoeing in Indiana during autumn and winter can be enjoyable, as seen here on University Lake, Bloomington, Indiana, in October 2017.

Photo by Melissa Laney, Senior Lecturer, IU School of Public and Environmental Affairs