

Riffles & Pools

Office of Water Quality www.idem.IN.gov



As with most of Indiana and the Midwest, summer lingered on past its appointed time this year; making for a very brief visit from autumn colors. Involve your kids by searching the internet for the science behind leaf color change.

Photo of Mongo Mill Pond, an impoundment of Pigeon Creek in Mongo, IN, on Nov. 3, 2018, by Doug Newhouse

Greetings Riverwatchers!

All living things are affected by stress. It comes in the form of finding a mate, fighting for territory, finding food or shelter, putting down roots, surviving storms, breathing bad air, and so forth. The impact of such stress is cumulative and can lead to illness or death.

In aquatic environments, stresses that impact an organism might include lowered dissolved oxygen at night (or under ice), elevated pH during the day (due to photosynthesis), or an influx of sediments that smother, abrade, or make food collection difficult. Mix in some chlorides from winter road salt or toxins from a misapplied pesticide and ... well ... you get the picture.

While no one will notice the loss of a few individuals, regular monitoring—as summarized in this [Story Map](#) of the Upper White River—can indicate to the observer when an entire species of macroinvertebrate, fish, or plant has disappeared from a waterbody. This is why monitoring of benthic macroinvertebrates is such an integral part of Hoosier Riverwatch's volunteer monitoring program.

The macroinvertebrates have a story to tell if we pay attention; a story we might miss by sampling chemistry alone in an ever-changing river or stream. Besides that, those little buggy guys are a lot of fun to work with, aren't they?

Here's hoping your winter is safe and stress free! See you in the spring!

— Carol Newhouse, Hoosier Riverwatch Coordinator

Winter 2018

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MARK YOUR CALENDARS!

Stay tuned for more workshops next spring.

— OR —

Contact us for assistance in organizing and hosting one in your area during 2019.

Hoosier Riverwatch is administered by



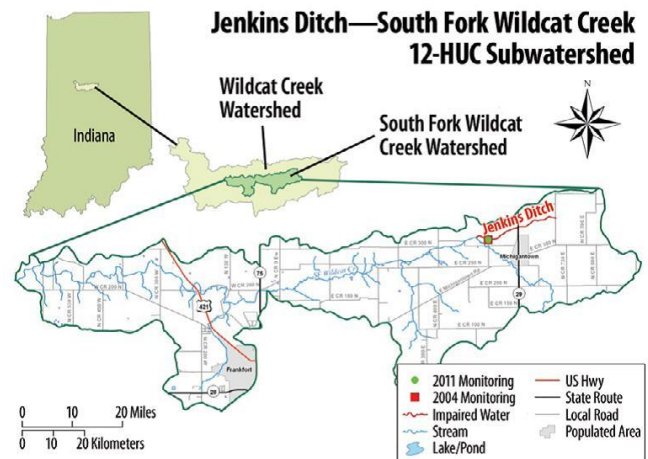
Watershed Success Stories: Jenkins Ditch

The 4th installment of the [watershed success stories](#) collected by IDEM staff and grant recipients over the years:

Jenkins Ditch is a headwater stream of the [South Fork Wildcat Creek watershed](#) in Clinton County. It is 2.13 miles long, is classified as a legal drain, and covers about 250 square miles. The drainage area of Jenkins Ditch contains more than 60 miles of streams, 36 of which are listed as outstanding rivers in Indiana.

In 2004, IDEM's chemical, physical, and biological sampling in this watershed indicated that the stream did not support the aquatic life [designated use](#).

Row crop agriculture accounts for 78% of the land use in this watershed. As some of the natural headwater streams were modified/channelized, the result was the movement of sediment, nutrients, and other nonpoint source pollutants into the waterways. Grant monies used from 1999–2003 funded local technical staff and a watershed coordinator ahead of any documented impairments. This laid a great foundation for the efforts that would follow. Subsequent funding (listed in detail below) focused on education and outreach, workshops, field days, newsletters, and cleanups, as well as independent monitoring, plan development, and local participation in utilizing various water quality conservation practices on the land.



In 2004, Jenkins Ditch scored 30 points on the index of biotic integrity (IBI) scale; 6 points shy of being supportive of aquatic life use. After investing time, money, and energy towards improving the watershed conditions, IDEM sampling from 2011 showed Jenkins Ditch to be fully supporting of aquatic life use with an IBI score of 38.

In addition to IDEM's Sec. 106 monitoring funds, the following funds were spent on the Jenkins Ditch watershed between 2005–2012:

- \$729,000 in [Sec. 319 grants](#) from IDEM for implementing agricultural best management practices (BMPs), developing a watershed management plan, conducting water monitoring, and piloting a septic system repair program
- \$229,700 in [Sec. 205\(j\) funds](#) from IDEM
- \$462,000 in local in-kind and cash match
- \$10,000 in [Clean Water Indiana](#) program funds
- \$1.11 million in [Conservation Reserve](#) and [Conservation Reserve Enhancement](#) program funds to install and implement BMPs
- \$1.54 million in [Conservation Stewardship](#) and [Wildlife Habitat Incentive](#) program funds

Among the many partners in this effort were the Clinton, Howard, Tipton and Tippecanoe County Soil and Water Conservation Districts; the Greater Wabash River Resource Conservation and Development Council; Purdue Cooperative Extension; Hoosier Riverwatch; and the U.S. Department of Agriculture's Natural Resources Conservation Service.

These efforts successfully reduced the amount of sediments, nitrate-nitrites, and *E. coli* bacteria entering the waterways, allowing streams in this watershed to improve. Subsequent sampling by IDEM staff indicated fish life has improved and the waterway is no longer listed as impaired for aquatic life use. Kudos to the local farmers, residents, and decision-makers who came together to help restore Wildcat Creek to the glory that listed it as outstanding in the first place!

Riverwatch 2018 Workshop Recap

The 2018 Hoosier Riverwatch (HRW) workshop season was productive despite the number of rainstorms or other obstacles encountered. A number of newly trained instructors jumped right in to assist as a total of 26 workshops were held around the state.

The **26** workshops conducted in 2018 consisted of:

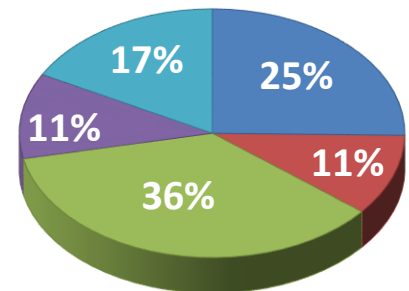
- 24 basic workshops held in 15 counties
- 2 advanced workshops held in 2 counties

Participation in these workshops included **255** persons from 39 Indiana counties and three other states.

As shown in the pie chart (upper right), the self-reported occupations of this year's participants included:

- Interested Citizens – 25%
- University or High School Students – 11%
- Educators – 36%
- Natural Resource/Environmental Professionals – 11%
- Other – 17%

Percentage of Participants by Occupation, 2018

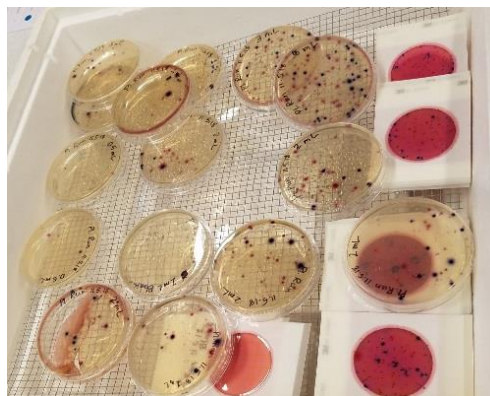


- Interested Citizens
- University and High School Students
- All Educators
- Natural Resource Professionals
- Other

HRW staff received seven [equipment grant](#) applications during 2018 and awarded them to three high schools, two watershed groups, an SWCD office, and a national wildlife refuge. Staff also [received](#) and shipped [refill supplies](#) to nearly 50 groups.

The most popular of our advanced workshop topics is the *E. coli* training. Instructors are beginning to include some database orientation at the end of each *E. coli* workshop, to the delight of those who have participated.

A [six-state study by Midwest citizen groups](#) in the early- to mid-2000s showed that the 3M™ Petrifilm™ technique was as accurate and reliable as more advanced methods used by professional agencies. Coliscan Easygel® was not far behind. Hoosier Riverwatch supplies both to volunteers who have completed the training to use them.



E. coli samples prepared in advance of a workshop enable participants to practice reading and counting plates.



A recently trained volunteer monitor practices the setup of an Easygel® pour plate.

Lake versus Stream Sampling

Leave the lake sampling to the professionals or to trained volunteers with boats.



Leave big rivers to the professionals and avoid streams under conditions that cannot be safely waded.



Stick to wadeable streams with flowing water. Use the correct index for your waterbody, or simply refer to the raw data rather than an overall calculated score if it does not apply.



Indiana is fortunate to have two statewide volunteer monitoring programs. The older is the [Indiana Clean Lakes Program](#) administered by Indiana University's (IU) School of Public and Environmental Affairs (SPEA) in Bloomington through [Sec. 319](#) funding from IDEM. Volunteer lake monitors started collecting data in 1989. This program utilizes the [Volunteer Lake Monitoring Manual](#) and basic (Secchi disc) and expanded (total phosphorus and Chlorophyll *a*) sampling options. The other is none other than the Hoosier Riverwatch program, whose newsletter you are reading.

Volunteer monitoring efforts can supplement professional monitoring in multiple ways. Staff and students at IU/SPEA collect and analyze lake data for IDEM on public lakes and reservoirs during the summer while rotating around the state. Lake volunteers sample private as well as public lakes and do so during every season, year after year.

With regard to rivers, staff at IDEM are equipped to handle large, boatable and moderate, wadeable waterbodies. But, the number and miles of remote headwater streams surrounded by private property far outweighs bigger creeks and rivers in the state. No agency has the resources to sample all places at all times. Volunteers are crucial to this effort by virtue of their proximity and ability to access/sample these small, yet vital, streams that drive water conditions downstream.

While lakes, rivers, and streams are pretty much connected throughout Indiana, they are intrinsically different in a number of ways.

In general, riverine (or lotic) systems are constantly flowing, unidirectional, and thoroughly mixed waterbodies. In smaller, wadeable systems, their quality changes rapidly, is driven mainly by temperature, and dependent on precipitation, snowmelt, and springs to keep from drying up entirely.

Lake or lacustrine systems, on the other hand, contain still or standing (i.e., lentic) water. They are less impacted by flow or drought conditions and may have a water exchange rate that lasts months or years. They are deep, three-dimensional waterbodies often divided into zones and stratified into layers which do not readily mix. Their physical and chemical qualities are relatively stable. They are light dependent and can have a large volume of water that is devoid of oxygen. In Indiana, sampling usually occurs at the deepest part of a lake during worst-case conditions in the heat of summer.

Lake versus Stream Sampling (cont.)

Parameters of interest in both waterbodies include nutrients such as phosphorus and nitrogen constituents. Parameters that differ slightly might include:

Rivers and Streams

Temperature
Dissolved oxygen
Turbidity (using a meter or turbidity tube)
Various forms of solids (total, dissolved, etc.)
Fish community
Macroinvertebrate community

Lakes

Temperature profile (taken at various depths)
Dissolved oxygen profile (at various depths)
Transparency/light penetration (via a Secchi disc)
% light transmission at a specific depth
Fish and plant communities
Algae and plankton communities

But collecting, assessing, and understanding water quality data from these two types of waterbodies differs greatly. And the scoring mechanisms used for each are not interchangeable. A stream WQI (water quality index) or PTI (pollution tolerance index of the macroinvertebrates collected) score is not applicable when assessing lakes, nor are lake pIBI (plant index of biotic integrity) or TSI (trophic state index) scores of any meaning when assessing a stream. It would be like attaching RBI (runs batted in) stats to a football player or referring to passing yards with regard to a baseball player. Such indices have no meaning outside of the sports for which they were generated.

The Hoosier Riverwatch [database](#) does not currently differentiate between streams, ponds, rivers, lakes, or wetlands and will errantly calculate a stream-related score given a set of data. Don't be fooled by this. We will try to amend such calculations in the future. But, please be aware what an overall index score means or where it applies before using it for water assessment purposes. And don't hesitate to become cross-trained (and equipped!) in both volunteer monitoring programs! Some of the earliest Riverwatch adopters were those who were already sampling lakes and saw the value of assessing the streams flowing into and out of these lakes. Kudos to them for beginning to work on a watershed basis early on in the game!

Oh, and if you head over to check out the lakes program website, be sure to sign up to receive their excellent newsletter [Water Column](#). It's an outstanding water quality resource to have at your disposal!



IDEM staff collect a water column sample from an Indiana lake for analysis of phytoplankton. This sampling is done as part of IDEM's cyanobacteria beach sampling program.

IU/SPEA students collect a sediment core sample from an Indiana lake for analysis. Photo by Melissa Laney of the Indiana Clean Lakes Program (used by permission)



Mark Your Calendars

Hoosier Riverwatch training workshops have concluded for the year.

Welcome to all who joined us in 2018! Thanks to those who hosted and helped train!



Check the next [newsletter](#) in March 2019 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 2019!



Autumn colors near a Taylor University lake on Nov. 1, 2018. Photo by Jim Garringer (used by permission).

**Whatever you do,
you need courage.**

– Ralph Waldo Emerson



Late summer sunset over a prairie pond in Benton County. Photo by Ann Stevenson (used by permission).

**We don't get to
choose what is
true. We only get
to choose what
we do about it.**

– Kami Garcia



Sunset over Dogwood Lake at Glendale Fish and Wildlife Area, just upstream of my old office at—and the water source for—East Fork State Fish Hatchery.



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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*.



Get out and WANDER Indiana's many parks, trails, and nature preserves. Nature preserves are owned and managed by multiple entities, be they the Indiana Department of Natural Resources, The Nature Conservancy, city and county parks departments, universities, museums, private and nonprofit groups (e.g., land trusts) such as ACRES Land Trust, where Lyn Crighton photographed this lovely waterfall during autumn (used by permission).