Indiana Water Monitoring Council
Maximizing resources through improved communication, coordination, data sharing, and collaboration

March 2017
Volume 4, Issue 2

WATER IN THE NEWS

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Task Force, Indiana's State Nutrient Reduction Strategy continue to tackle Gulf of Mexico dead zone

By: Ben Gavelek, ISDA and Julie Harrold, ISDA

Improving water quality takes collaboration, especially when it comes to the Gulf of Mexico. For years, excess nutrients carried down the Mississippi River from multiple states have drained into the Gulf, creating a large area of low oxygen that cannot support aquatic life, referred to as a "dead zone." These excess nutrients can come from a variety of different sources, such as wastewater treatment facilities or runoff from agricultural land, but they can also occur naturally, as a result of weathering of rocks/soil in the watershed or mixing of water currents in the ocean. To tackle this issue in the Gulf, a task force came together in 1997 to:

- Better understand the causes and effects of the nutrient pollution;
- Coordinate activities to reduce the size, severity, and duration of the dead zone in the Gulf;
- Improve the effects of low oxygen, or hypoxia.

Today, the Hypoxia Task Force is made up of 12 states (including Indiana) and federal agencies and tribes that together provide executive level direction and support for coordinating the actions of participating organizations working on nutrient management within the Mississippi River/Gulf of Mexico Watershed.

Since its inception, the task force has provided new programs and technical tools to support and reduce excess nutrients from entering the Gulf. One of these tools is the Gulf Hypoxia Action Plan 2008, which was updated in 2013. From the time the plan was released, each state has developed their own nutrient reduction strategy, in collaboration with their partners, to better manage the issue. Click here to learn more about Indiana's State Nutrient Reduction Strategy.

Gulf of Mexico contiued…

In 2015, the task force announced that it would retain the original goal of reducing the areal extent of the Gulf of Mexico hypoxic zone to less than 5,000 square-kilometers and extend the time of attainment to 2035. The task force also for the first time agreed on an interim target of a 20 percent nutrient load reduction by the year 2025.

Twice a year the task force meets to discuss the progress that states have made, collaborate on best management practices, and review the updated federal strategy. From Minnesota to Wisconsin, many states have implemented a variety of successful projects and programs to reduce nutrient loads entering the Gulf. To read some of the success stories, click here.

The Indiana State Nutrient Reduction Strategy is the product of an inclusive effort of the Indiana Conservation Partnership (ICP), under the leadership of the Indiana State Department of Agriculture and the Indiana Department of Environmental Management. The ICP works to identify present and future statewide endeavors in Indiana that positively impact the state's waters, as well as gauge the progress of conservation, water quality improvement and soil health practice adoption in Indiana. Although the work of the Hypoxia Task Force is ongoing as is implementation of Indiana's State Nutrient Reduction Strategy, , there is no quick solution to the Gulf hypoxia issue. The ICP continues to work with key stakeholders and conservation partners to acknowledge the challenges, reduce sediment and nutrient loads to our waterbody's, prioritize watersheds, discuss water quality monitoring strategies, and assist farmers with their voluntary conservation practices.

The State Nutrient Reduction Strategy also serves as a renewed effort to encourage outreach and education to conservation partnerships and the public regarding stewardship of Indiana's waters. This strategy acknowledges that while the potential to reduce nitrogen and phosphorus entering our waters is great, the achievement of these objectives is dependent upon the cooperation of state, federal and local organizations and initiatives.

Another goal of the strategy is to help raise awareness about the location and nature of conservation practices on productive agricultural ground and other rural best management practices (BMPs) such as filter strips, buffers, cover crops and managed drainage. Septic system management, appropriate residential fertilizer applications, erosion control at construction sites and urban BMPs, such as green infrastructure, will be a key to controlling nutrient runoff.

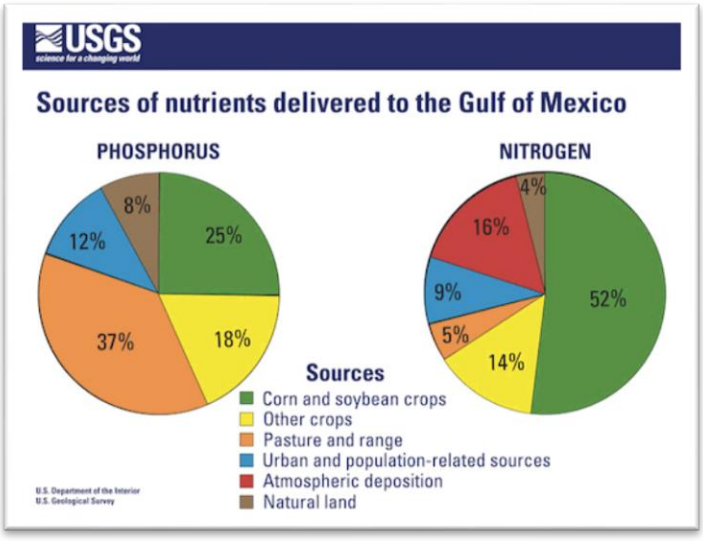


Photo Source: U.S. Department of the Interior and U.S. Geological Survey
URL:http://water.usgs.gov/nawqa/sparrow/gulf_findings/primary_sources.html
Page Contact Information: gs-w_nawqa_whq@usgs.gov

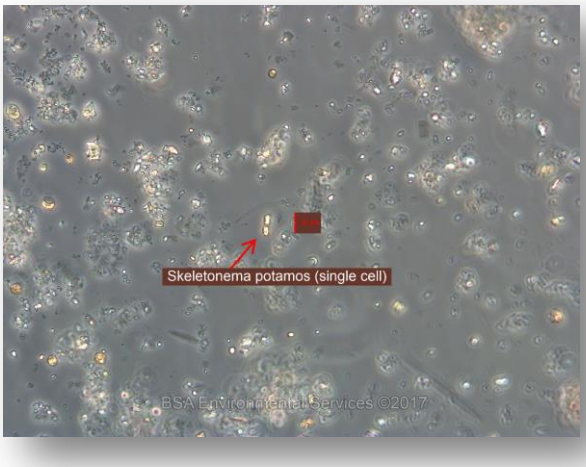
U.S. Army Corps of Engineers Louisville District Water Quality Team documents first appearance of phytoplankton taxa

By: Jennifer Thomason, Biologist, USACE-Louisville District

The Water Quality Team of the U.S. Army Corps of Engineers (USACE) Louisville District has been analyzing and entering the 2016 sampling data into the district's water quality database.

While entering the phytoplankton results, the Water Quality Team has documented the first appearance in the database of *Skeletonema potamos* at three Indiana reservoirs and one Ohio reservoir. The Indiana reservoirs where the taxa has been documented for the first time include Cagle's Mill, J. Edward Roush (aka Huntington), and Mississinewa Reservoirs.

The National Park Service lists *Skeletonema potamos* as an aquatic invasive species and notes that this diatom typically co-occurs with cyanobacteria and is generally associated with elevated concentrations of phosphorus, nitrogen and chloride. While the Water Quality Team has not yet evaluated the 2016 data to determine if these relationships apply to the Indiana and Ohio reservoirs, this is a goal of the program.



U.S. Army Corps of Engineers Louisville District Water Quality Team plans to assess fish and macroinvertebrate communities in two reservoir basins

By: Zachary Wolf, Biologist, USACE-Louisville District

The Water Quality Team of the U.S. Army Corps of Engineers (USACE) Louisville District plans to examine fish and macroinvertebrate communities in two of the district's reservoir basins: Brookville Reservoir (Franklin County, IN) and Cecil M. Harden Reservoir (aka Raccoon Lake, Parke County, IN).

The sampling plan includes the collection of field water quality parameters, habitat evaluation forms, and fish and macroinvertebrate communities at the tailwaters and tributaries of these reservoirs following protocols used by the Indiana Department of Environmental Management (IDEM).

Data from this effort, including Index of Biotic Integrity (IBI) scores for biological communities, will be used to determine water quality conditions of reservoir tributaries, assess for compliance with state criteria in the tailwaters, and overall support the Water Quality Team's mission of evaluating the water quality of Brookville and Harden Reservoirs and best management practices of dam operations.

How streams affect our lakes

By: Dr. Nate Bosch, Director, Center for Lakes & Streams

Like trains transporting people and goods from one city to another, streams carry water, sediment, and nutrients from the land to the lake. Luna Leopold describes streams as, "The gutters down which flow the ruins of continents." However, streams do more than simply transport cargo, unchanged, while flowing across landscapes; streams are dynamic ecosystems that recycle the nutrients contained in the shipment as it travels, which can impact the lakes into which some streams flow.

There is a sensitive relationship between nutrients and a lake's aquatic life. Food chains in both lakes and streams begin with nutrients, whether brought in by residential and agricultural fertilizers, livestock and human waste, sediment particles, or fallen leaves and grass clippings. In limited amounts, these nutrient sources support intricate and dynamic ecosystems in both streams and lakes, with plants and animals making up the next links in the food chains.

Unlike lakes, however, the plants using the nutrients in streams tend to be attached algae (periphyton) rather than free-floating algae (phytoplankton). Along with aquatic rooted plants (macrophytes), attached algae anchors itself to stream bottoms to avoid washing away.

Aquatic insects, such as Caddisflies and Stoneflies, graze on attached algae like cattle, or shred and collect tiny bits of leaves. These aquatic insects are often used as indicators of stream health due to their intolerance of poor water quality.

Fish make up the final level of the stream food chain as they utilize aquatic insects for food. Some fish species common in our lakes, such as Smallmouth Bass and Sunfish, also live in local streams; however, other fish species, such as the Mottled Sculpin and Rainbow Darter, are unique to our streams.

A stream, therefore, is not merely a "gutter" which transports materials from land to lakes; it is an active ecosystem worthy of value and care. Whether a large river, small agricultural ditch, or a woodland creek, a stream's added importance comes from the fact that it is an efficient transporter of the nutrients and sediments that, in excess, cause many challenges in our lakes. Thus, the way we use the land, even miles away from a lake, can still impact the lake downstream.

*Images: Stonefly larve and rainbow darter

News and important dates

29th Annual Indiana Lakes Management Conference

Thursday- Friday, March 2nd -3rd, begins at 8 am
Fourwinds Lakeside Inn and Marina, 9301 Fairfax Road, Bloomington, Indiana

The Indiana Lakes Management Society (ILMS) promotes the understanding and comprehensive management of Indiana lakes and reservoirs and their watershed ecosystems by:

- Providing a forum and technical assistance network for information sharing
- Assisting with development of lake restoration and protection programs, policies, and legislation
- Encouraging local and statewide organization cooperation

You can register online at http://www.indianalakes.org/?page_id=377

Looking for good educational material?

Do you or your organization ever find yourself looking for great content for your next newsletter? Or maybe you find yourself wishing you had easy access to simple summaries of complex water resource topics in order to help your colleagues, clients, students, family or whoever understand water issues? It's your lucky day! The Indiana Water Monitoring Council has prepared 'short and sweet' summaries to help people grow their understanding of common water issues like nutrients, pathogens, fish advisories, arsenic, etc. These issue papers are less than a page in length and include links to important supporting resources for those that want to know more. Check out these great resources and take advantage of them in your outreach effort!

U.S. Army Corps of Engineers Louisville District Water Quality Team gears up for intensive surveys in 2017

By: Jade L. Young, Army Corps of Engineers Limnologist

The Louisville District Army Corps of Engineers Water Quality Team has intensive surveys planned at two of its 20 reservoirs in 2017. Brookville and Cecil M. Harden Reservoirs (both located in Indiana) will be surveyed during the spring, summer, and fall seasons with samples collected from the reservoirs as well as their respective tailwaters and tributaries. Each site will be measured for several field water quality parameters and samples will be collected and shipped to the lab for analysis. At each site within the reservoir, the epilimnion, metalimnion, and hypolimnion will each be sampled. Biological samples including phytoplankton and zooplankton will also be collected at select sites and depths. Additionally, the monitoring of continuous lake and tailwater water quality parameters will be conducted in partnership with the U.S. Geological Survey and made available on the survey's website.

Currently, the plans for the intensive surveys are still preliminary. The Water Quality Team held a meeting with Indiana water quality agencies and stakeholders on February 13th to share and discuss these plans in order to promote agency coordination and solicit feedback. After this meeting, the intensive survey sampling plans will be quickly finalized so that sampling can begin in spring. For more information about this effort, please visit http://www.lrl.usace.army.mil/Missions/Civil-Works/Water-Information/Water-Quality/ . You can contact the Water Quality Team by email at louisvillewaterquality@usace.army.mil or by calling 502-315-7439.

Biological monitoring in a two-stage ditch

By: Greg Bright, Commonwealth Biomonitoring

During the last 10 years, a stream modification process called a "two-stage ditch" has been implemented at various sites throughout Indiana. The physical modifications in this type of ditch allow storm flow to spread out within the stream channel in a way that mimics a natural flood plain. The flow velocity is decreased during storms, and nutrient loading is decreased.

One of the first of these two-stage ditches, about 2,000 feet long, was constructed in 2007 on a section of Shatto Ditch, a tributary of the Tippecanoe River in Kosciusko County.. Aquatic communities of the stream were examined before, during, and after construction and the results were presented to The Nature Conservancy (the project sponsor) in 2009.

In 2015 a follow-up study was done to measure the ecological health of the stream seven years after construction and also after implementation of best management practices (BMPs) in the watershed upstream from the two-stage section. Six sites were chose for study. Sites 1 and 2 were within the two-stage ditch section at on the northwestern end of the map below. Site 3 was immediately upstream from the two-stage section, and the remaining sites were increasingly upstream.

Habitat quality in Shatto Ditch is poor. Installation of the two-stage ditch did not improve habitat significantly. The macroinvertebrate biotic index scores improved immediately after construction but have remained about the same since then. However, the average scores upstream from the two-stage stretch have increased remarkably (from 9 in 2008 to 20 in 2015). Mayflies and caddisflies are considered to be aquatic insect groups that are intolerant of poor habitat and water quality. In 2006, prior to construction, no mayflies or caddisflies were collected from Shatto Ditch. There was one individual of one species collected in 2007. By 2008, three mayfly species were present in the two-stage section. In 2015, three mayfly and three caddisfly species were present. These increases represent increasing biological health of Shatto Ditch over time.

The Indiana Fish Index of Biotic Integrity was calculated for each of the six sites.
A total of 20 fish species were collected from Shatto Ditch. The most common fish was the tolerant minnow *Semotilus atromaculatus* (creek chub). Four species of sunfish and three species of suckers were also present. Fish community scores were better within the two-stage section of Shatto Ditch than those upstream:

Fish Index of Biotic Integrity (IBI) scores

Year	Upstream	Two-Stage Section
2015	24	32

Prior to two-stage ditch construction, the only representative of the sunfish family was green sunfish, a relatively tolerant species. After construction, rock bass and smallmouth bass – both considered sensitive species, along with bluegills, and pumpkinseeds were found in Shatto Ditch.

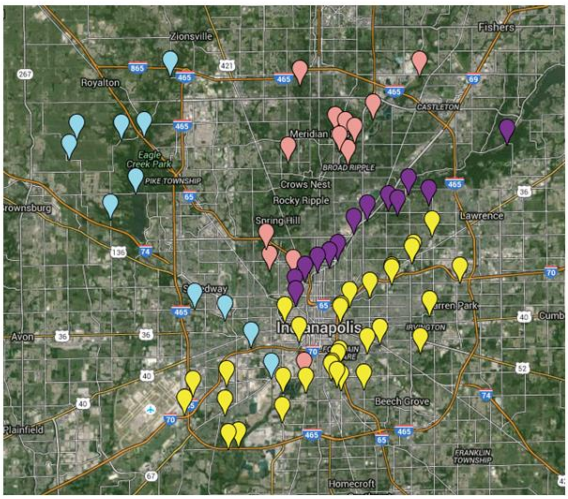
Biological communities in Shatto Ditch are improving as a result of the two-stage ditch construction project. Implementation of other BMPs in the watershed have also contributed to biological improvement in the stream.

New MCPHD website features monitoriong results

By: Gretchen Quirk, Marion County Health Department

The Marion County Public Health Department (MCPHD) recently launched a new and improved website. On the Water Quality & Hazardous Materials Management Department's webpage, users can now link to a separate webpage devoted to MCPHD's Surface Water Program making it easier to locate surface water sampling results with maps showing current and historic sampling sites. The results are available as links to Excel spreadsheets organized by watershed. The physical, bacteriological, and chemical results are cumulative, with some sampling dating as far back as 1995. In addition, macroinvertebrate sampling results can also be found on the new webpage. Water sampling results are updated quarterly, while the macroinvertebrate results are updated on an annual basis.

Other recent efforts under MCPHD's Surface Water Program include adding signs to promote the new website at some of the county's sampling sites. The hope is to engage the public by educating them about water quality monitoring and encouraging them to look up results on the website. Another effort involves partnering with the Indiana Department of Environmental Management to include MCPHD's data in the newly-launched External Data Framework, which allows other agencies and groups to share and use surface water sampling data.



Check it out!
http://marionhealth.org/surface-water-program/

Marion County Public Health Department offers lab services for drinking water and soil testing

By: Gretchen Quirk, Marion County Health Department

Lab Services Available to the General Public

The Marion County Public Health Department's Public Health Laboratory offers many services for both residents and non-residents of Marion County. These services include drinking water and garden soil testing.

The public can purchase sample bottles and return them to the lab for analysis. A list of parameters and there associated costs is provided on the next page.

Monitoring results contiued…

Type	Parameter(s) Included	Cost per Sample
Water Testing		
Bacteria	Total Coliform and *E. coli*	$10
Metals	Arsenic, Barium, Cadmium, Chromium, Iron, Lead, Mercury, Copper	$10
Anions	Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate	$10
Soil Testing		
pH and Metals	Arsenic, Lead, Cadmium, Chromium	$30

For more information, contact the MCPHD Public Health Laboratory:
3838 N. Rural St.
Indianapolis, IN 46205
317.221.4671

MARION COUNTY PUBLIC HEALTH DEPARTMENT
Prevent. Promote. Protect.

Indiana Water Monitoring Council
100 North Senate Ave Indianapolis, IN 46204

Phone:
317-308-3179

Fax:
317-308-3219

E-Mail:
info@InWMC.org

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Become a member!

The Indiana Water Monitoring Council (InWMC) invites you to become a member today!

The InWMC addresses the full range of water resources, physical, chemical, and biological, including ground and surface waters.

Visit our website to learn more or click here to join today!

InWMC serves as a broad-based collaborative body to help achieve effective and efficient collection, interpretation, and dissemination of basic data and processed information for use in addressing issues of Indiana waters.

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http://www.inwmc.org/page-303780