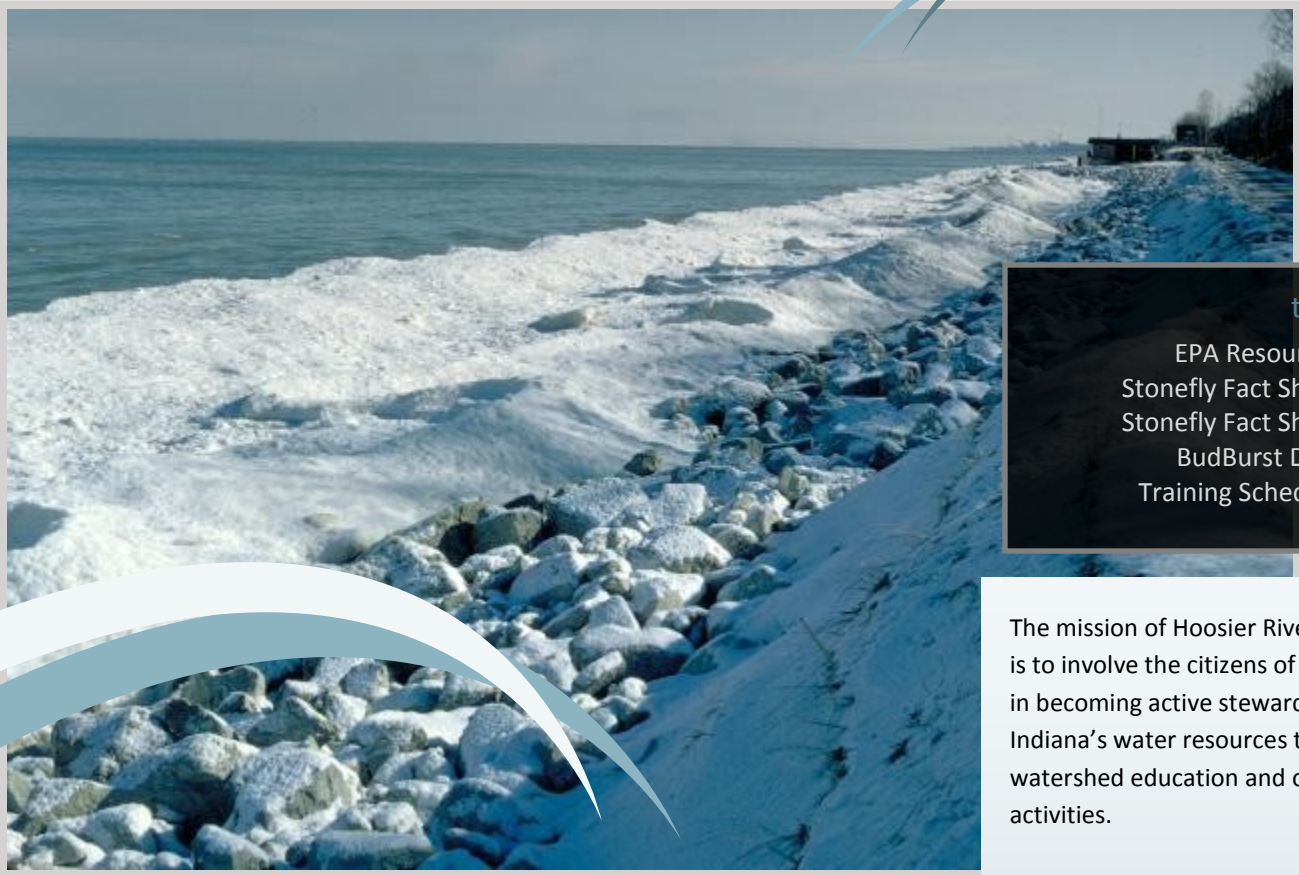
Riffles & Pools

January/February • 2013



Lake Michigan, Indiana National Park Service, Indiana Dunes National Lakeshore

this issue

The mission of Hoosier Riverwatch is to involve the citizens of Indiana in becoming active stewards of Indiana's water resources through watershed education and clean-up activities.

Hoosier Riverwatch is sponsored by the Indiana Department of Environmental Management

Riverwatch News

Welcome to 2013. As you may notice, our newsletter has a new look. The content will be similar, but with a new year comes change. One of the changes I am sure many of you have heard about, is the move from the Department of Natural Resources to the Department of Environmental Management. This is a great opportunity for Riverwatch to become more involved in watershed planning and restoration efforts around the state. I am happy to report that I am settling into my new space at 2525 N. Shadeland Avenue.

Although Riverwatch will be involved in some new projects, we will still continue to provide training workshops, access to loaner monitoring equipment for certified volunteers, and support to help you with your monitoring. We are in the process of setting up the website, so if you have any questions or concerns you may contact me at riverwatch@idem.in.gov or at 317-308-3392.

Impact of Nutrient Pollution to Recreation

Nutrient pollution is one of the nation's most widespread and costly environmental problems. Excess nitrogen and phosphorus from farm and lawn fertilizer, pet and livestock waste, roads and houses, faulty septic systems, and treated sewage can turn waters green with slime and pollute waters for swimming, boating, and fishing. To help raise awareness about this growing environmental problem, EPA has released a short video to illustrate the potential impacts of nutrient pollution on recreation. The Choice is Yours: Clean or Green Water can be viewed on EPA's YouTube Channel at http://bit.ly/11yjpcd. The new video complements another EPA YouTube video, http://bit.ly/UmlQcu that provides a broad overview of nutrient pollution. Both videos are available in broadcast quality upon request. If interested, please contact: scott.patricia@epa.gov.

Photo Credit: Florida Slime Tracker

Revamped Septic Website

Nearly one in four households in the U.S. depends on an individual septic system or small community cluster system to treat their wastewater. EPA has recently revamped its septic website to better serve homeowners, state and local officials, industry professionals, and its partner organizations. The website includes a suite of new case studies demonstrating what communities across the country are doing to effectively manage their decentralized wastewater infrastructure and find solutions to meet their own unique wastewater infrastructure needs. Click here to view the case studies of individual and clustered wastewater management programs and here to view the new website.

CLEAR CHOICES
CLEAN WATER
make a difference

Clear Choices Clean Water

Some time ago , you may recall that I mentioned the *Clear Choices , Clean Water* campaign to reduce phosphorus entering the water via fertilizers. I hope that many of you took the time to visit this website and take the pledge. However, if you did not see this the first time or it has been a while since you have visited the website, take a click to www.clearchoicescleanwater.org.

Clear Choices, Clean Water is a campaign to increase awareness about choices we make and the impact they have on our streams and lakes. The website has other pledges you can take to improve water quality, including picking up after your pet, planting native, and updating septic system. In addition, there is information about water related issues.

It's a new year, what a great resolution to improve the quality of our water.

MISSOURI STREAM TEAM

Stream Team Academy Fact Sheet Series

- #1 Tree Planting Guide
- #2 Spotlight on Big Muddy
- #3 Lewis & Clark
- #4 Missouri Is Number One?
- #5 Responsible ATV Use
- #6 Headwater Streams
- #7 Whatology?
- #8 Exotic Does Not Mean Beauty
- #9 Wetlands
- #10 Stream Sedimentation
- #11 Emerald Ash Borer Found in Missouri
- #12 Protecting Prairies = Protecting Streams
- #13 Life Cycle & Natural History of Aquatic Insects (Part 1)
- #14 Life Cycle & Natural History of Aquatic Insects (Part 2)
- #15 Life Cycle & Natural History of Aquatic Insects (Part 3)

Watch for more "Stream Team Academy Fact Sheets" coming your way soon. Plan to collect the entire educational series for future reference! Contact us at 1-800-781-1989 if you'd like a copy of previous Fact Sheets or a binder for storing them.

Stream Team Academy Fact Sheet #15

Life Cycles & Natural History of Aquatic Insects

Part 3 – The Stoneflies (Plecoptera)

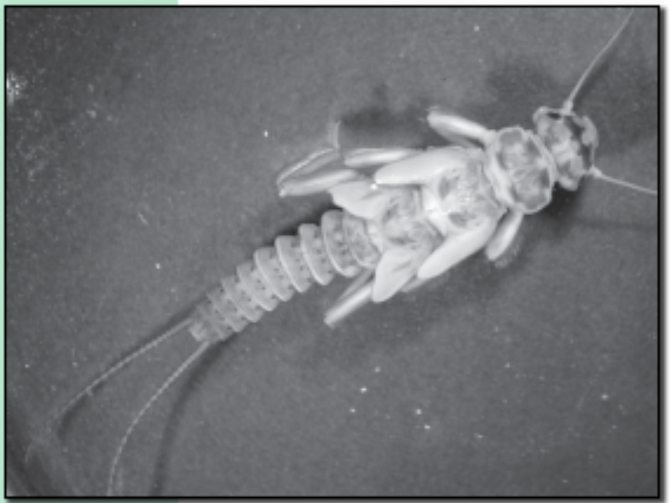
An Educational Series For Stream Teams To Learn and Collect

By Paul Calvert

The Plecoptera (Stoneflies) are an order of insects that are poorly understood because many immature stages have not been associated to a particular adult form, making it difficult for taxonomists to organize this order. The North American stoneflies are generally divided into two groups: **Euholognatha**, those with mouth parts adapted for herbivory (scrapers, grazers, collector–gatherers, shredders, gougers, and detritivores) and **Systellognatha**, those who have mouthparts mainly adapted for predation, including sharp-cusped mandibles and toothed lacinia (the inner portion of the maxilla) for grasping and holding prey. There are 9 families in the United States and 8 are found in Missouri.

Life Cycle

Stoneflies have an incomplete life cycle, or are hemimetabolous. When they lay their eggs, the females generally dip their abdomen into the water as they fly over the surface. Others deposit eggs while submerged, and one flightless species actually runs across the surface and deposits them as she travels. The eggs settle to the bottom where their gelatinous covering enables them to attach to the bottom substrate. In most stonefly species, the first nymphal instar develops in the egg, so, when the egg hatches it is actually the second instar. The nymphs go through 12 to 36 molts depending on the species and the water temperature. Water temperature plays an interesting role in the development of the nymphs. Most wait out the warmer temperatures of summer by burrowing deeper into the substrate. Others actually exhibit a summer diapause or aestivation where their metabolism is slowed dramatically as they wait for cooler water temperatures. Most species actually develop more in the winter months. Life cycles are from 1 to 4 years. This is why we may see two or three different sizes when we sample. Most are univoltine, meaning that there is only one hatch that occurs each year, or one flight season. This flight season is when we see the adults mating and depositing their eggs.



Hydroperla fugitans. Photo by Amy Meier, Missouri Department of Conservation.

The last instar crawls out of the water and rests on objects on the ground like rocks or leaves before emerging as an adult. These nymphs are highly vulnerable during this time and many are lost to predation. After emerging, the adults live from 1 to 4 weeks while they look for mates and reproduce. Stonefly males have the ability to communicate by

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vibrating their abdomens on the substrate, or vibrating fast enough to emit high frequency sounds. This is known as drumming, is species-specific, and is used by males to attract females.

Feeding

Stonefly nymphs are generally shredders (i.e. they shred detritus materials for consumption) or predators. Some groups demonstrate both forms with early nymphs being shredders and later nymphs becoming predacious. Predators are engulfers; they swallow their prey whole or bite off chunks and swallow them. They are either active search or pursuit predators (hunters) that feed as opportunists (feeding on anything that moves), or selective hunters (feeding on a specific size and type of prey). In the adult forms, some species feed and others do not, living only long enough to mate and lay eggs.

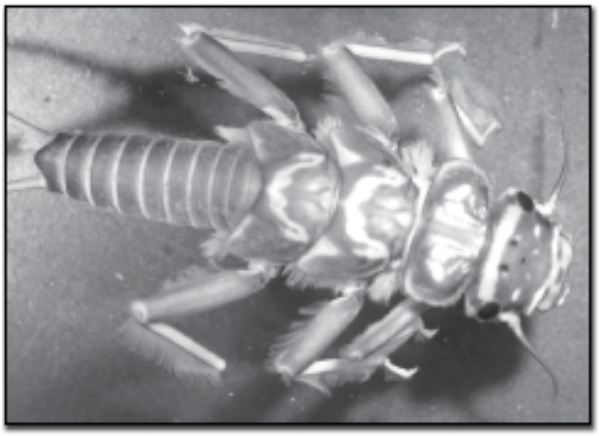
Respiration

Nymphs of many stonefly species breathe through tufts of filamentous tracheal gills. These are affectionately known as "hairy armpits." A few that are restricted to cold, swift flowing streams rely entirely on oxygen exchange through the cuticle; in other words, they absorb oxygen through their exoskeleton.

Conclusion

Stoneflies are very sensitive to changes in water quality. When you are monitoring, and you find stoneflies in your net sets, remember that they are great indicators of good water quality.

An adult stonefly rests on vegetation near the Maries River in Osage County. Photo by Chris Riggert, Missouri Department of Conservation.



Above is Acroneuria abnormis from the Missouri River. Photo by Amy Meier, Missouri Department of Conservation.

Our next fact sheet will cover the caddisflies, another group of our sensitive aquatic insects. Don't forget to send any questions you may have to streamteam@mdc.mo.gov or call 1-800-781-1989.

Sources:

Freshwater Macroinvertebrates of Northeastern North America. Barbara L Peckarsky et al. 1990.

Aquatic Entomology–the Fishermen's and Ecologists' Illustrated Guide to Insects and Their Relatives. W. Patrick McCafferty. 1998.

BudBurst Data Help Determine Best time to Sample Streams.

The following excerpt was taken from the most recent edition of the Project Bud-Burst Community Newsletter. Project BudBurst, http://neoninc.org/budburst/, is a citizen science project where participants make regular observations of plants in their local area.

Last month, at the American Geophysical Union Conference, Drs. Stephanie Parker and Charlotte Roehm, Aquatic Ecologists for the National Ecological Observatory Network (NEON), gave a presentation to an audience of scientists and educators focused on how their team was using Project BudBurst data. It turns out that period of time right before the First Leaf phenophase tends to be a period of high light for stream channels, which increases algal production in the stream. And, the 50% Leaf Fall period that occurs later in the season influences the composition of the invertebrate community (caddis fly larvae, worms, clams, and other critters that fish eat) in a stream, favoring 'leaf shredders' more than other types of invertebrates.

Because the NEON Aquatic Scientists are sampling streams across the United States, they can't always be present to know when First Leaf and 50% Leaf Fall are going to occur. That's where Project BudBurst citizen scientists are helping. The First Leaf and 50% Leaf Fall observations you report to Project BudBurst are used by Stephanie, Charlotte and other NEON scientists to more accurately assess the best time to sample stream systems for algae and invertebrates in future years. As changing environmental conditions alter the timing of First Leaf and 50% Leaf Fall phenophases, your observations will prove invaluable for the scientists to keep their sampling times up to date with the latest changes in plant phenology.

Thank you for your observations.

Go Bananas

Take the Go Bananas! Challenge—a competition that challenges schools and scout groups, across the country, to Answer the Call, and create campaigns to collect and recycle cell phones to help save gorillas. Collect the most cell phones and win up to $5,000 for your school/scout group. Coltan, a mineral found in cell phones, is mined in gorilla habitat. By recycling old cell phones you reduce the demand. Join the challenge online and start thinking about a creative campaign.

http://cincinnatizoo.org/savingspecies/

Contest ends April 8, 2013 and the winning group will be announced Earth Day April 22nd, 2013.

Loaner Trunks

Riverwatch has Loaner Trunks located throughout the state. Loaner Trunks have all the equipment you need to monitor and may be borrowed for varying lengths of time.

Arrangements are made on an individual basis for each location.

To locate a Loaner Trunk in your area, email Lisa at riverwatch@idem.in.gov for a map and contact information

Training Schedule

Hoosier Riverwatch schedules workshops throughout the state from March—October. We are in the process of setting our schedule for 2013. Contact riverwatch@idewm.in.gov at any time for the most updated schedule.

Volunteer Water Quality Monitoring "Basic" Training introduces citizens and educators to water quality monitoring utilizing hands-on habitat, chemical, and biological assessment methods. The sessions are held both inside and outdoors. Any interested adult is welcome to attend, and once certified, may teach students how to monitor.

Although Volunteer Stream Monitoring training workshops are free, you must contact the local host in advance to register. Most workshops are held from **8:30 am - 4:30 pm** unless noted.

Tuesday, March 5

Bloomington, IN—Karst Farm Park

To register, visit http://bloomington.in.gov/documents/viewDocument.php?document_id=530 . This class includes a $5 fee for snacks.

Friday, April 5

Rensselaer, IN
To register contact Darci Zolman at darci.zolman@in.nacdnet.net or 574-267-7445, x3

Thursday, June 20

Brook, IN - Brook Conservation Club
To register contact Darci Zolman at darci.zolman@in.nacdnet.net or 574-267-7445, x3

Saturday, September 28

Elkhart, IN - Elkhart Conservation Club
To register contact Nancy Brown at nancy.brown@in.nacdnet.net or 574-533-4383 ext. 3

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