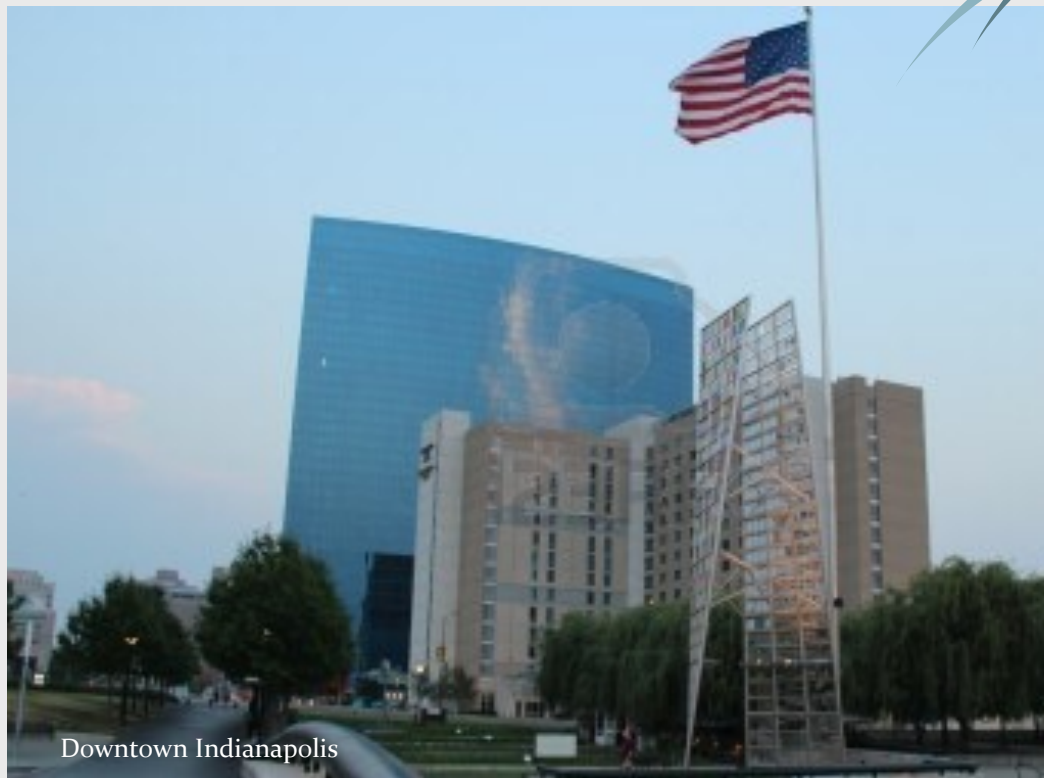


# Riffles & Pools

July/August • 2013



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## Riverwatch News

"Summer is the time when one sheds one's tensions with one's clothes, and the right kind of day is jeweled balm for the battered spirit. A few of those days and you can become drunk with the belief that all's right with the world."

-Ada Louise Huxtable

Hoosier Riverwatch is dedicated to improving the quality of its services offered to volunteer monitors and we are seeking input to better serve you. Your opinion is important to us and we are asking for your feedback by participating in a brief online survey about the HoosierRiverwatch.com website. Please visit, <http://www.in.gov/idem/riverwatch/> to complete the survey.

At the conclusion, we will draw the name of **three (3) people** from those who completed the survey to receive one of our incentive prizes. These may include a

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 Continued

Riverwatch starter kit, set of 50 benthic macroinvertebrate posters, or a book from our library.

Please complete this survey **no later than Friday, August 2nd to be entered into this drawing**. Your answers will then be combined with others in confidentiality and at no time will individual respondents be identified in the results. Thank you for your assistance on this important project.

Happy Monitoring



## 2013 Riverwatch Equipment Applications

Applications are now available for equipment packages. Hoosier Riverwatch



equipment is available to groups that meet the following criteria.

- Be affiliated with a non-profit organization, school, or government agency
- Agree to the Cooperative Agreement (pg. 4), including:
- Attend a Basic Training Workshop (Must be registered for a 2013 workshop upon submission of application)
- Monitor and submit data online at

least 4 times per year for 2 years (*Total of 8 data sets by December 31, 2015*)

- Return the completed 2013 Equipment Application no later than **September 1, 2013**.

**NOTE:** Applications are processed on a rolling basis. Equipment Packages available beginning in **April 2013**. The award process is competitive, so please complete your application in detail so that we may fully assess your organization's suitability as a recipient.

Please visit, <http://www.in.gov/ideM/riverwatch/2334.htm>, for your application. You may contact the Riverwatch office at [riverwatch@ideM.in.gov](mailto:riverwatch@ideM.in.gov) with additional questions.



## Riverwatch Newsletter Subscription

If you subscribe to newsletters from the state, you may have received word that we are transitioning to a new delivery service. Instead of being delivered through Outlook, GovDelivery will be used starting with the next newsletter.

Please visit, <http://www.in.gov/ideM/riverwatch/2361.htm> and click on the link to re-subscribe to the *Riffles & Pools* newsletter.

Unfortunately, I cannot transfer you all over, so please take a moment to renew.

I will also continue to post a .PDF version on the website.

## Hoosier Riverwatch Special Topic Workshop: Macroinvertebrates

Wednesday, November 6, 2013

9:00 – 12:00

IDEM Shadeland Office  
2525 N Shadeland Avenue,  
Suite 100  
Indianapolis, IN 46219



This hands-on special topic workshop includes information about macroinvertebrates in Indiana as well as sampling and identification methods. Participants will improve their ability to identify macros by obtaining assistance from Indiana Department of Environmental Management's (IDEM) biologists using lab techniques.

The goal is to develop participant knowledge of macroinvertebrate ecology and identification skills.

### Tentative Agenda

- Overview of IDEM methodology
- Information on Aquatic Life Use and biological criteria
- Varieties of macroinvertebrates found in Indiana
- Identification techniques.
- Support identifying your local sample to family level.

This workshop is open to certified Riverwatch volunteer monitors. There is no cost to attend the workshop, but you need to pre-register by contacting Hoosier Riverwatch at [riverwatch@idem.in.gov](mailto:riverwatch@idem.in.gov) or 317-308-3392. Please bring a macro sample from your local waterbody to identify in the lab.

## 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](mailto:riverwatch@idem.in.gov) for a map and contact information

## Call for Abstracts

*Working Together for Clean Water*, the **National Water Quality Monitoring Council's (NWQMC) 9th National Monitoring Conference**, to be held in Cincinnati, Ohio from April 28 - May 2, 2014.

This conference focuses on the many facets of water quality and quantity monitoring for improved understanding, protection, and restoration of our natural resources and communities.

This centerpiece forum attracts 800 - 1,000 water practitioners from all backgrounds, including federal, state, local, tribal, volunteer, academic, private, and other water stakeholders.

Attendees exchange information about water monitoring, assessment, research, protection, restoration, and management; learn about new findings on the quality of the Nation's streams and rivers, groundwater, estuaries, lakes and wetlands; and develop new skills and professional networks.

The conference includes presentations, panels, poster sessions, exhibits, hands-on interactive workshops, field trips and Fluid 5K run, as well as time for after-hours meetings and networking.

Please refer to the "Call for Abstracts" at: <http://acwi.gov/monitoring/conference/2014/CFA.pdf> for specifics on themes and potential topics of interest. For additional conference information or to submit an abstract go to: <http://acwi.gov/monitoring/conference/2014/index.html#>

**All abstracts must be  
received no later  
than  
September 20, 2013**





### 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)
- #16 Life Cycle & Natural History of Aquatic Insects (Part 4)
- #17 Life Cycle & Natural History of Aquatic Insects (Part 5)

Collect this 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 #17

# LIFE CYCLES & NATURAL HISTORY OF AQUATIC INSECTS

## Part 5 – The Beetles (Coleoptera)

### An Educational Series For Stream Teams To Learn and Collect

By Paul Calvert

Beetles are the largest group of animals, representing one-fifth of all known living organisms and one-fourth of all animals on earth. Although the beetles (Coleoptera) are the largest order of insects, only about 10% of the described species are aquatic. When asked what could be inferred about the work of the Creator from a study of his works, the British scientist J.B.S. Haldane is reported to have replied, that He has "an inordinate fondness for beetles." The 350,000 described species of beetles, composed of approximately 35,000 aquatic species, contribute greatly to the tremendous diversity in our aquatic systems, both lotic (flowing) and lentic (still). The beetles found in stream systems are typically sensitive to moderately sensitive and are useful water quality indicators.

Beetles are known for their anterior wings that are hard and leathery (the elytra). These wings are not used in flight, but protect all or part of the membranous hindwings that are. Aquatic adaptations have occurred in 14

families of beetles, not including semiaquatic species or those that occur in riparian areas. Of these 14 families, six have both aquatic larvae and adults, five have aquatic larvae and terrestrial adults, and three have the unusual life cycle of terrestrial larvae and aquatic adults.

### LIFE CYCLE

Terrestrial adults of aquatic beetles are typically short-lived and emerge synchronously to optimize breeding success. Mating occurs and sometimes is preceded by some form of acoustical signaling similar to other insects like the Hemiptera (true bugs) or the Orthoptera (grasshoppers and crickets) or some form of courtship behavior. Most deposit eggs singly or in small masses in or on submerged vegetation, rocks, or whatever the available substrate is.

Beetles have a complete life cycle or are holometabolous and most are univoltine (one generation per year) but some may be multigenerational. Eggs begin to hatch in one or two weeks. Larvae molt 3 to 8 times before pupating. The pupal phase in all beetles is technically considered terrestrial. The mature larvae either crawl out of the water to pupate on land or remain submerged within a silken cocoon formed around an air bubble. Following pupation, adults emerge in two to three weeks.

### HABITAT

Beetles are found in a wide variety of aquatic habitats including both lotic and lentic systems. They can inhabit general habitats like ponds, pools, runs, and riffles in warm, cool, or cold water. Some have adapted and evolved to inhabit very specialized habitats



*The larvae of many beetle species can be difficult to identify.  
Photo by Rich Merritt, courtesy of Society for Freshwater Science.*

(continued on back)



## Stream Team Academy Fact Sheet #17

Like acid bogs, calcareous fens, brackish water, or marine environments.

Beetle species also vary by where they can be found within a given habitat. They can be found climbing on vegetation, burrowing into the substrate, swimming, or clinging to rocks and logs.

### FEEDING

Like their diverse habitat selections, beetles have very diverse feeding methods.

Larvae can be herbivores (chewing or piercing plant material), scavengers (eating dead plant and animal material), or predators (chewing, engulfing, or piercing prey). Adult forms may be grazers, detritivores, or predators. Predacious beetle larvae and adults have been reported to consume small vertebrates, especially small fish and tadpoles. One researcher documented an adult predacious diving beetle consuming a small snapping turtle in an aquarium setting.

### RESPIRATION

Most larvae respire cutaneously (through their exoskeleton) with additional oxygen transfer through tracheal gills. Adult respiration is as diverse as the order. Some carry oxygen in an air bubble under their elytra and replenish this with periodic trips to the surface. This oxygen is transferred to the tracheae through openings in the abdomen called spiracles. This method is dangerous because traveling to the surface exposes individuals to predation. The form of respiration used by most of the aquatic adults found in streams involves using a plastron or plate composed of hydrofuge (water repellant) hairs for oxygen transfer. These beetles are typically very sensitive to changes in water quality. Pollutants can adhere to the hairs or cause them to be less repellant, reducing the

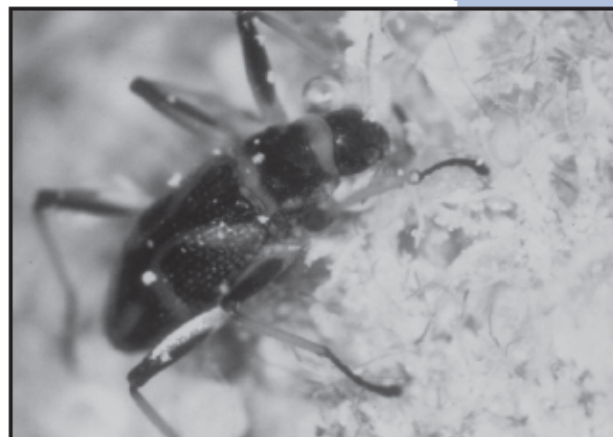
transfer of oxygen. Finally, a specialized form of respiration, rarely seen in Missouri, uses a slender pointed spine to pierce plant tissue and draw oxygen directly from the tissue.

### CONCLUSION

Beetles are tremendously diverse and important to the world around us, including our aquatic resources. They play an important role as indicators of good water quality. Although larvae are sometimes difficult to identify, the adult forms are not and when we see them in our samples, we can breathe a sigh of relief that our stream is in pretty good shape.



*Riffle beetle larvae, like the one pictured above, undergo six to eight molts before pupating. Photo by Amy Meier, Missouri Department of Conservation.*



*Adult riffle beetles use a plastron for respiration, crawling along the bottom rather than swimming in the water column. Photo by Randy Sarver, courtesy of Society for Freshwater Science.*

Our next fact sheet will cover the dragonflies and damselflies. Don't forget to send your questions to [streamteam@mdc.mo.gov](mailto: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.

# Training Calendar

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.

Although 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.

## Saturday, July 13

South Bend, IN - St. Patrick's County Park

To register, contact the park office at 574-654-3155.

## Tuesday, July 16

Bloomington, IN - Twin Lakes Lodge (This class includes a \$5 facility fee.)

To register, contact the Hoosier Riverwatch office at [riverwatch@idem.in.gov](mailto:riverwatch@idem.in.gov) or 317-308-3392.

## Tuesday, July 16

Winslow, IN - Sugar Ridge Fish & Wildlife Area

To register contact Ann Ice at [ann.ice@in.nacdnet.net](mailto:ann.ice@in.nacdnet.net) or 812-385-5033 x 110.

## Thursday, July 18

Battle Ground, IN - Brier Environmental Education Center, Tippecanoe Battlefield

To register contact Mary Cutler at [mcut@msn.com](mailto:mcut@msn.com) or 765-567-2993.

## Saturday, September 7

Indianapolis, IN - Holliday Park

To register contact John Ulmer at [watersheds@tds.net](mailto:watersheds@tds.net) or 317-769-3500.

## Saturday, September 28

Elkhart, IN - Elkhart Conservation Club

To register contact Nancy Brown at [nancy.brown@in.nacdnet.net](mailto:nancy.brown@in.nacdnet.net) or 574-533-4383 ext. 3.

## Saturday, September 28

Dubois, IN - Patoka Lake Regional Water and Sewer District

To register contact Jim McFaul at [JMcFaul@vinu.edu](mailto:JMcFaul@vinu.edu) or 812-481-5909.

## Special Topic Workshops

### ***E. coli* Workshop**

If you have already attended a Riverwatch Basic Training but would like more information on *E. coli*, attend this advanced workshop.

#### **Saturday, September 21**

Zionsville, IN - Zion Nature Center (9:00 am—12:00 pm)

To register contact John Ulmer at [watersheds@tds.net](mailto:watersheds@tds.net) or 317-769-3500.

### **Protecting Our Watersheds**

Hoosier Riverwatch will be partnering with Earth Force to offer a Protecting Our Watersheds workshop. This community action program from Earth Force / GREEN guides your middle school / high school class or adult watershed organization through the process of analyzing your data, determining where problems may exist in your watershed, and taking action in your community to protect water quality.

#### **Friday, September 20**

Indianapolis, IN - IDEM Shadeland Office (9:00 am – 4:00 pm)

To register contact Hoosier Riverwatch at [Riverwatch@idem.in.gov](mailto:Riverwatch@idem.in.gov) or 317-308-3392.

### **Macroinvertebrate Workshop**

This hands-on special topic workshop includes information about macroinvertebrates in Indiana as well as sampling and identification methods. Participants will improve their ability to identify macros by obtaining assistance from Indiana Department of Environmental Management's (IDEM) biologists using lab techniques.

The goal is to develop participant knowledge of macroinvertebrate ecology and identification skills.

#### **Wednesday, November 6**

Indianapolis, IN - IDEM Shadeland Office (9:00 am – 12:00 pm)

To register contact Hoosier Riverwatch at [Riverwatch@idem.in.gov](mailto:Riverwatch@idem.in.gov) or 317-308-3392.

