

# IOWATER

Volunteer Water Quality Monitoring

## Habitat Restoration, Water Quality Monitoring, and Biological Sampling in the Boone River Watershed

by Eileen Bader, The Nature Conservancy

The Boone River in north-central Iowa flows nearly 100 miles south before joining the Des Moines River which ultimately empties into the Mississippi River. It drains approximately 581,000 acres of one of the most productive agricultural areas in the world. The watershed lies within the landform region known as the Des Moines Lobe, which was created by the last major continental glacier. Meltwaters from the glacier helped create the Boone River and its tributaries.

Eighty-four percent of the land use is in row crop agriculture. Despite the inputs from agriculture, the Boone River supports excellent biodiversity and a relatively undegraded stream ecosystem. The Nature Conservancy (the Conservancy) is working towards multiple goals in the Boone River watershed including assisting landowners and producers with conservation practice implementation, addressing altered hydrology and lack of aquatic habitat, and developing and supporting watershed-wide, long-term monitoring, including support for volunteer monitoring.

One of the Conservancy's newest projects in the Boone River watershed is an oxbow restoration project. An oxbow forms when a meander of a river channel is cut off from the main stem of the river during the process of a river's natural lateral migration. Oxbows that still hold water can provide critical habitat for wildlife, such as fish and birds, in addition to water quality improvements and small areas of flood mitigation. However, oxbows sometimes



*Oxbow restoration project in Greene County, Iowa, before restoration (photo above) and after restoration (photo below). Photos by Aleshia Kenney, U.S. Fish & Wildlife Service (reprinted with permission).*



get filled in with sediment and no longer provide any benefits. Partners in the Boone River Watershed, including the Iowa Department of Natural Resources, The Nature Conservancy, Iowa Soybean Association, and the U.S. Fish and

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## ...from IOWATER's Coordinator

### The Value of a Volunteer

Every so often, I am asked the question "What is the value of the IOWATER program to the State of Iowa?" It is a difficult question to answer, since the term "value" has so many different meanings. On one hand, we can count up the number of hours you, the volunteers, have donated to the program. In 2010, the total number of volunteer hours recorded by the IOWATER program was more than 18,000 hours and represents almost \$400,000 in labor donated to the State. Thank you – what an amazing accomplishment!

However, your value to the State of Iowa is so much greater than the sum total of hours you donate. Every time you dip a test strip in the water, or pluck a tire from the stream, or do the "benthic shuffle" looking for critters, you demonstrate a commitment and a passion for improving Iowa's natural resources.

So, how exactly does one put a value on dedication, commitment, and passion? I am at a loss for words to adequately describe it and I am quite sure that a dollar amount misses the boat completely. Priceless? Yes, definitely. What about the value of data on a stream or lake that previously had none? Again, experience teaches us that the value of having this historical data is much greater than the individual cost associated with the labor to take the sample or in analyzing the water. Ultimately, I think the safe thing to say is that your efforts will be most appreciated and valued by the generations to come. Thanks and keep up the great work!

*Mary Skopec*  
IOWATER Coordinator

Wildlife Service, have come together to work with interested landowners to restore functionality to oxbows along the Boone River and its tributaries.

The oxbow restoration process removes sediment deposits, which allows the oxbow to hold water, and recreates critical habitat. The oxbow project will inventory and assess oxbow habitat quantity and quality, conduct landowner outreach, and eventually restore a small number of oxbows. The restored oxbows will then be monitored for water quality and fish habitat improvements. In particular, the slow-moving water present in oxbows is actually critically important to the life cycle of the federally endangered fish, the Topeka shiner. Fish surveys completed only one year after oxbow restorations in Greene County, Iowa, found that not only were populations present, they were flourishing. Monitoring from other restored oxbows has also shown significant nutrient reduction when oxbows are coupled with drainage tile outfalls. In addition to

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the multiple benefits that this practice provides, the placement is also ideal as the majority of oxbows are located near streams where land is often times not ideal for row crop production.

In addition to monitoring habitat restoration projects, The Conservancy is also conducting long-term monitoring of benthic macroinvertebrates and mussels, which has included opportunities for volunteers to get involved. In September 2010, volunteers and staff from the Iowa DNR and The Conservancy gathered in Webster City to conduct a snapshot sampling day. Teams of volunteers and staff were able to sample for benthic macroinvertebrates at four sites in just about three hours. A week later, professionals sampled the same locations in an effort to compare results between volunteer and professionally collected data.

Using Jaccard's Index of Similarity to compare how well the volunteer and professional data matched, it was determined that data collected by volunteers and professionals were not consistently similar; similarity ranged between 36-67%. In three of the four locations sampled, the professional team collected a greater number of taxa than volunteers. In one of the four locations, taxa richness was the same between the datasets. However, the percentage of EPT taxa (EPT refers to the families of aquatic insects within the orders of **E**phemeroptera, **P**lecoptera, and **T**richoptera or mayflies, stoneflies, and caddisflies, respectively; their presence represents higher quality water) collected by volunteers and professionals was very similar (varied by no more than 8% at any site). In addition, using the IOWATER Index of Biotic Integrity, overall IBI scores for the four streams



*Volunteers sampling the Boone River.*



*Volunteers identify sampled aquatic insects, including a dragonfly larva (above right).*

were consistent between the volunteer and professionally collected data. The volunteers and professionals both ranked two sites as "good" and one site at "fair." The volunteer data ranked the fourth site as "good" while the professional data ranked this site as "fair" - the difference in score was 0.13.

To more accurately assess differences between professional and volunteer data, a larger sample set is needed. In general, variation in biological data (even within a small timeframe) can be expected. In addition, professionals who conduct biological sampling on a consistent basis may be more efficient at sampling – reaching more microhabitats within the stream reach during the allotted sampling time. However, the differences between the volunteer and professionally collected data were not vast. Taxa richness varied between datasets, and overall IBI scores were very similar. For biologists and scientists researching fine-scale population dynamics, professionally collected samples may still be the best choice. However, to expand the amount of sampling completed each year, add to the statewide database of long-term biological monitoring, and identify major stream health issues, volunteer-collected data is a valuable asset to Iowa.

# Volunteer viewpoints

... in their own words



## Water monitoring and river cleanups inspire and strengthen relationship

article by Jim Urban and Bailey Berghold



Bailey and Jim conduct water testing along the Turkey River while on Project AWARE. Photo by Iowa DNR.

**Jim** - I got hooked on water after attending a Wayne Petersen presentation as part of the Master Conservationist Program. I am involved with IOWATER because I am truly fascinated by water. My first test site, Camp Cardinal Pond in the Iowa City area, was an urban man-made pond without any development around it. I wanted to see what happened as the area developed. It was tested for 2 ½ years until the developer put up "No Trespassing" signs and was not able to be convinced of the value of IOWATER testing.

After my testing partner moved in 2008, I enlisted my granddaughter, Bailey, to help me. We had been doing my sites and snapshots when IOWATER staff asked if we would be interested in Project AWARE as water testers in 2009. Since then, we were hooked on AWARE, too. We have capsized, waded streams, lost sight of fingers in muddied water, seen eagles and fawns along the rivers' edge, and have frozen our feet in cold water tributaries.

I am amazed at the results I see through testing, walking and traveling the streams and rivers. I feel

somehow we are improving the water for everyone either directly by removal of items that shouldn't be there or by providing a photograph or test results for study. I have become an educator and trainer, but mostly have been able to share and learn together. No other way than being in, on, or about the waters of Iowa could my granddaughter Bailey and I have ever established the relationship that we will continue to share. Watching your granddaughter wade waist deep in an urban stream or scream at a fish that jumped into your canoe is a visual you'll have forever. But better yet, here are my granddaughter Bailey's own words concerning IOWATER and Project AWARE.

**Bailey** - The reason I have been involved in water monitoring and river clean-ups is because of my Grandpa Jim. I started doing IOWATER when I was 7 or 8. When I first started, we only tested a pond called Camp Cardinal Pond. We now test 4 different sites.

It was fun from the start and so I started to really love water and I wanted to help out. Then my grandpa told me about a river clean up called Project AWARE (A Watershed Awareness River Expedition). I was excited and started Project AWARE for the first time in 2009. On Project AWARE you pick up garbage along the river and meet other volunteers while on this project. You learn how to paddle, learn about the river and its history, and to be centered with nature.

I try to get my friends and family to go to ponds, rivers, and creeks to clean it up and make it safer for life and plants. Project AWARE has inspired me to help our environment and keep it clean and safe for animals, bugs, plants, and people.

During Project AWARE I learned that if you want to have fun and meet new people, Project AWARE would be a memorable experience.

## The Incredible Journey

*Life [Project AWARE] is a journey, not a destination.* If Ralph Waldo Emerson could experience the magic of the DNR's annual river cleanup and watershed awareness event, might he be inclined to modify his famous quote? It may be a bit self-indulgent to presume that the leader of the American transcendental movement would hold this humble event in such high regard, but for those who have had an opportunity to experience AWARE, it may not be such a quantum leap.



*Photo above by Bill Witt; photo upper right by Iowa DNR; photo below right by Jamie Porter.*

Project AWARE, after all, which stands for A Watershed Awareness River Expedition, moves to a different Iowa watershed each year. As an annual weeklong journey, the expedition is designed to connect Iowans with their rivers, providing them with opportunities to experience Iowa's diverse landscapes while at the same time strengthening their sense of place within the natural world. In other words, Project AWARE is all about the journey.

The ninth annual event, which took place July 9-16, 2011, targeted the Turkey River watershed in northeast Iowa, where in just one week, 429 volunteers removed over 32 tons of trash (96% of which was recycled) from 90 miles of river. What really made an impression on volunteers,



however, wasn't the staggering statistics, the overwhelming support from local communities, or striking scenery. Rather, it was something much simpler. Something everyone wants for Iowa's rivers, but something few rivers achieve. Unlike previous AWARE destinations, the water in the Turkey ran clear.

Therefore, it was with great interest that volunteers learned about the efforts of the Turkey River Watershed Alliance and Turkey River Recreational Corridor, and with great excitement that they celebrated the official dedication of the Turkey River Water Trail amongst scores of local river enthusiasts. Working together, watershed residents in this region have built a model that works for stronger economies, enhanced quality of life, and healthier rivers.

Had Mr. Emerson had the opportunity to experience this event on this river, perhaps his quote would change altogether. Project AWARE is a journey, but it's the destination that made it incredible.



## QUIZ - What do you know about invasive species?

Over the years, there have been more instances and more types of non-native species introduced to Iowa water bodies. Ultimately, the cost of invasive species (both terrestrial and aquatic) in the United States amounts to more than \$100 billion each year. Test your knowledge on some of the “uninvited guests” who now call Iowa water bodies home.

1. Which of the following is **not** considered an aquatic invasive species in Iowa?
  - a. Bighead carp
  - b. Asian silver carp
  - c. Eurasian water milfoil
  - d. Zebra mussels
  - e. Duckweed
2. Why are “stocked” grass carp **not** considered an invasive species in Iowa?
  - a. Because they are native to Iowa.
  - b. Because they are incapable of reproducing.
  - c. Because they eat vegetation and do not prey on other fish.
  - d. Because of their relatively long life span.
3. It is illegal to possess, introduce, purchase, sell or transport aquatic invasive species in Iowa.  
**True or False**
4. Which aquatic species below is non-native, but “introduced to Iowa?”
  - a. Brook trout
  - b. Spiny water flea
  - c. Rat-tailed maggot
  - d. Brown trout
5. Most Iowa water bodies are infested with aquatic invasive or nuisance species?  
**True or False**
6. It is illegal to introduce any live fish, except for hooked bait, into public waters.  
**True or False**
7. Which of the following is **not** an effect of aquatic invasive species?
  - a. Loss or degradation to habitat
  - b. Decreased water quality
  - c. Reduced native species populations
  - d. Damage to boats, other equipment, and property
  - e. All are effects of aquatic invasive species.
8. All non-native species introduced to Iowa water bodies cause water quality and habitat degradation.  
**True or False**



Answers at the bottom of page 7. Photos by Iowa DNR.

# River of Words®

Every year, River of Words® (ROW) conducts an international environmental poetry and art competition for youth aged 5 to 19 in grades K-12, in affiliation with The Library of Congress Center for the Book. This free contest is designed to help youth explore the natural environment and cultural history of the place they live, and to express what they discover through poetry and art. Iowa entries not chosen as finalists or grand prize winners in the international contest are returned to IOWATER, where they are judged in a statewide competition. (See back page of this newsletter for 2012 ROW competition information.)

Over 420 students from Iowa entered the 2011 contest, either through their schools, community art centers, local libraries, or on their own. Thirty-four works of poetry and art were selected to be included in a traveling ROW exhibit which will be at the National Mississippi River Museum and Aquarium in Dubuque from October 17-November 14; the Knoxville Public Library in Knoxville from December 1-January 3; and the Iowa State Capitol in Des Moines from April 24-27, 2012. If you are unable to see the traveling ROW exhibit, you can enjoy all 34 works of poetry and art by talented Iowa students by viewing the 2011 Exhibit program online at <http://www.iowadnr.gov/riverofwords>.



2011 IOWA WINNER

Grades 10–12 Art

Joshua Byrne, Age 15

Davenport Central High School, Davenport, Iowa

*Mississippi Food Web*

## Outside

Trees are leafless.  
Water is still.  
Small, black birds.  
Big, brown geese.  
Tall, big trees.  
Birds chirping songs.  
Big butterfly garden.  
Round fire pit.  
Tall, bare trees.  
Grass still green.  
Ripples on water.  
Light, gray clouds.  
Small orange leaves.  
Tall fox tails.  
Heat from sunshine.

2011 IOWA WINNER

Grades 4–6 Poetry

Anna Stork, Age 10

Atlantic, Iowa

*Outside*

## IOWATER action!

Press releases, events, and news articles involving IOWATER monitors.

Many thanks to all of you for your continued efforts.

- **Wright County** – IOWATER Volunteer Ramona Kraft was nominated by the Wright County Soil & Water Conservation District as the *Wright County Earth Team Volunteer of the Year*. Ramona conducts water monitoring at various locations around Wright County and assists high school students at Clarion-Goldfield with the monitoring they do.

Congratulations Ramona!



## IOWATER

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**QUIZ**  
What do you know  
about invasive species?

**STUDENTS**  
ages 5-19 in grades K-12

# IOWATER

announces

## 2012 RIVER of WORDS®

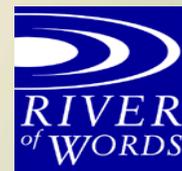
### Iowa Environmental Poetry & Art Contest



2011  
IOWA WINNER Grades K-3 ART

*Sea World*

Sarah Douglas, age 9  
Charles City, IA



Deadline is Dec. 1, but entries are accepted year-round for next year's contest.  
For more information and entry forms, visit:  
<http://www.iowadnr.gov/riverofwords/> or email [riverofwords@dnr.iowa.gov](mailto:riverofwords@dnr.iowa.gov)