

River Voices

The Impact of Watershed Education on the River Protection Movement:

No River Left Behind

by Jan Hosier & Alyssa Hawkins, Earth Force www.earthforce.org

“So, Doug, do you know what a watershed is?” I asked the smiling 5th grader standing in the brackish water of the Bogue Sound. “A building that holds water,” Doug the Dung Beetle (his animal choice, not mine) said non-committally as he searched the substrate for signs of movement. He showed only partial comprehension when I explained what it really was. I switched strategies and asked him why people should care about water. This he was able to get his head around. “Because we drink it and we cook with it and we flush our toilets with it! AND because cool animals live in the water!”

I was new to the field of watershed education and clearly may not have understood my audience as well as I should have. I had all of this knowledge that I wanted to share with this little fella who just wanted to look for crabs in the sand, but I didn’t have a foolproof way to go about it.

Are 5th graders the right audience? Do 5th graders need to know the definition of a watershed? Should watershed education be taught in school, after school...to kids or to adults? And what encompasses watershed education anyway?

Eight years later and much more experienced, I have found there to be no single school of thought, no perfect formula or method, no Easy Button, no manual entitled *The Idiot’s Guide to Watershed Education*. What I have found is that it takes solid partnerships, some innovation and a fair amount of elbow grease to make sure that no river (and therefore no lake, wetland, estuary or sea) is left behind in the movement to protect and restore our nation’s rivers.

And I do believe that young people should know that

watersheds encompass the land on which their homes sit and the creeks in which they hunt for crawdads. I now work for a nonprofit whose mission aligns with my beliefs. Earth Force believes it is important to invest time and energy in facilitating opportunities for young people to experience their local watershed, because this will ultimately lead to a greater understanding of their role in the protection of rivers. We see this as critical to ensuring that every generation can make sound decisions about our precious rivers.

Why Watershed Education?

“To an increasing extent, citizens are being asked to make decisions that affect (directly and indirectly) their environment. Specifically, citizens make these decisions as they cast votes on community issues; as they elect representatives to policy-making bodies; as they directly act upon the environment itself. Citizens can be effective in influencing sound policy in other ways. They can ask informed questions, at the proper time, of the right people. They can serve on advisory and policy-making committees. They can support sound legislation directed at resolving environmental problems. To perform these tasks effectively, it is vital that the citizenry be knowledgeable concerning their biophysical environment and associated problems, aware of how they can help solve these problems and motivated to work toward effective solutions.” These words were written over 35 years ago by Dr. William Stapp, often considered the father of environmental education, who spent his life educating people— young and old—about environmental protection.

In 1984 when Dr. Stapp was a University of Michigan professor, he became involved in a local water quality issue. A group of high school students in Ann Arbor,



River Network

Connecting People, Saving Rivers

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From The President



There are many types of watershed education and many avenues for it. Even if your organization does not have a formal education program, it has a role to play in increasing the number of people who understand what a watershed is, how it works, what makes it special and why its health is important to its people.

Education is too important to be limited to the young! For many watershed groups, the first priority should be to increase the number of voters and public officials who understand the watershed basics, as well as key current water-related issues in their area. This can be accomplished in many ways—through publications, community meetings, media work, watershed tours and simple everyday conversations, to name just a few. Public education shouldn't just be the work of one or two staff members some of the time. It should be the work of every member of a watershed group all of the time.

As important and urgent as adult education is, education of young people is probably even more important in the long run. Young people who learn how their watershed works and how they affect it tend to become much better stewards of it in later years. Because they also tend to develop a deep personal connection to it, they are much more likely to be active and influential in addressing watershed issues over time.

Whether or not your organization's mission includes direct watershed education work, you can advance the cause by weaving it into your other activities and programs. We hope this issue of *River Voices* will provide some useful ideas to help you do so.

Don Elder

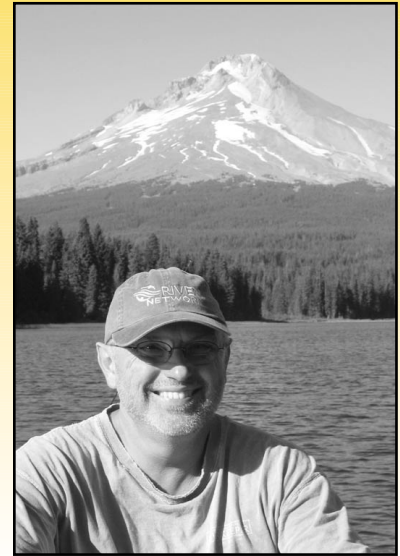


Photo credit: River Network Collection

No River Left Behind, cont.

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MI, became concerned when a number of their classmates, all of whom were windsurfers in the Huron River, contracted hepatitis A. Fecal coliform testing at the river's windsurfing area revealed fecal coliform levels above national standards for partial and full body contact after storm events. The recreation department who handled the windsurfer rental concession refused to believe that windsurfers were exposed to dangerous levels of bacteria, since windsurfing was theoretically not a full contact sport (they obviously never actually tried it!). The students had their data verified by the health department and the University of Michigan and then took it to the city council and the editor of the local paper.

Not only did the students obtain knowledge about fecal coliform testing methods, data analysis and potential causes of high bacteria levels (combined sewer overflows in this case), they also became aware of how to use this knowledge to affect a positive change in the river. Because this issue directly affected them and their classmates, they were motivated to present their data and several viable solutions to address the problem to the city council. Their work convinced the city to close the windsurfing concession and install signs warning against swimming after storms. Later in the school year, students also engaged in door-to-door work educating voters about the contamination issue to garner support for a levy to pay for a new sewer treatment plant.

The experience with those Ann Arbor high school students inspired Dr. Stapp and some of his colleagues and graduate students to develop a community-based interdisciplinary education program, which later evolved into the Global Rivers Environmental Education Network (GREEN). GREEN became a premier international watershed education program and encouraged not only the acquisition of knowledge about watershed issues but encouraged the use of that

knowledge by citizens to protect and enhance the world's waterbodies.

Here at Earth Force, now the home of GREEN, we focus on young people and approach environmental education and indeed watershed education, very much according to the vision of Dr. Stapp. GREEN students investigate their local river or stream and gather information about it through research and water quality monitoring. Once they identify an issue or problem that they care about and want to tackle, local community experts are engaged to ground truth information and offer varying perspectives. The students then democratically decide how to address the issue and determine a strategy for doing so. Once their action plan is carried out, they are encouraged to reflect on their journey and what they have learned. Students are not just fed information—they are engaged in a process that respects their voice and encourages student ownership around an issue.

Earth Force views watershed education as a process; a continuum from knowledge to comprehension and understanding to inspiration and action. Often, this process requires the involvement of a multitude of community members: agency experts, corporate volunteers, parents, citizens and on and on. We see real change happening when people of all ages are both informed and engaged as change agents in improving the conditions in their watersheds. Young people have great power, and we have seen them effect incredible change in their communities by tackling watershed issues that are relevant and important to them with innovative ideas they have developed (see sidebar, page 5).

This same process that we use in classrooms can also apply to the adults in your communities. People engage in causes that they believe in, that they can relate to.

Research and experience have shown that information alone is not enough to change attitudes and behaviors. One-time experiences are often not enough to fully grasp someone's attention. Many exposures may be necessary and there must be opportunity for deeper engagement. Earth Force believes that people must have experiences that inspire and empower them to act, ones that give them the confidence and skills to bring about change again in the future.

While events such as river clean-ups, water monitoring events and legislator breakfasts are critical entry points to serious issues, watershed education efforts should also incorporate elements that aim to change attitudes and behaviors. Involving members of the community as you design your watershed protection programs can help you identify those elements and lead communities to take ownership and pride in the work you are doing.

Education is an important piece of the work we all do, whether it's with government officials, neighborhood organizations or second graders. If you are new to providing educational opportunities in your community, start small. Ask other organizations for suggestions, engage in partnerships and research existing programs. Do what you have the capacity to do—be it webpages, brochures, workshops or charrettes—and know that any effort to educate and involve your communities in watershed protection is a good one.

Conclusion

Watershed issues vary across the country and the world. The southwest struggles with sharing its limited water supplies with an ever-increasing number of people and uses. Hurricane-prone regions and floodplains must find ways to deal with too much water. Dead zones cause economic hardships and ecological nightmares in the Gulf of Mexico,

TIPS FOR SUCCESS

Know your audience ~ Explaining the concept of a watershed to a 5th grader will be different than explaining it to a teen. A college student has different perspectives than a retired engineer. Therefore, it is helpful to understand learning styles, generational traits and even personality types to tailor your delivery. Tailor your programming to be as relevant as possible for your specific audience.

Embrace the partnership model ~ It takes a village to raise a child. One organization may choose to focus on content delivery while another organizes community outreach events to spur interest around the resource while still another might work towards public or private policy change in a community. All of these pieces are important in the overall goal of river protection but no one entity need be responsible for all the pieces of the pie. Communicate, leverage resources and celebrate together.

Don't reinvent the wheel ~ There are tons of great ideas and curricula and resources out there. Ask to use them. If you have a tried and true activity, method or handout, share it!

Empower citizen monitors to use their data ~ Often the strongest voice for a cause is one with direct ties to the data or information source.

Encourage balanced viewpoints/fact-finding ~ Understanding opposing viewpoints can lead to more effective arguments and ultimately to more supported and sustainable solutions to issues.

Involve all stakeholders in a community ~ Only by actively engaging everyone (people of all ages, economic status, race and ethnicity) in the education process can a sustainable and successful educational effort unfold.

Ask your communities what they would like to see change ~ Involving citizens in the generation of ideas and projects will improve their support and participation in your efforts. Genuinely welcome their input but do not seek it out if your goals are already set. Meaningful citizen involvement will lead to positive community change.

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Lake Erie and at the mouth of the mighty Columbia River. The common theme is that humans, whether we are citizens or scientists or students, have the power to address all of these issues.

As citizens, we hold immense power. We in the watershed community have a responsibility to make sure community members are informed and to involve them in developing plans for watershed improvement. We, the people who embody our passion about rivers in our personal and our professional lives, can be the catalyst for changing how we view and protect our nation's rivers.

Jan Hosier is an Earth Force program manager for the Global Rivers Environmental Education Network (GREEN) in Indiana and Ohio. She supports a partnership which engages local environmental partners, teachers and their students and General Motors volunteers in an effort to protect and restore local water quality.

Alyssa Hawkins is the Director of the GREEN program at Earth Force. She coordinates the watershed monitoring efforts of local environmental organizations, students, teachers and mentors from General Motors in communities around the country.

It takes a village to improve water quality in a river, pass sound environmental legislation, advocate for wetland protection or implement a watershed management plan. And the more educated and genuinely engaged the village, the more successful and widespread its efforts will be.



Y O U N G P E O P L E I N A C T I O N !

Students at Hampton Elementary in Bay City, Michigan noticed a large volume of storm water running off their school parking lots and became alarmed. They had been learning about water quality and the impact of impervious surfaces on runoff so they understood the impact this runoff could have on local streams. Their knowledge inspired action. The students and their teacher worked closely with community volunteers from General Motors to plan two rain gardens near the parking lot and specially designed bus turn-around to help manage excess runoff. The entire school is slated to help with the rain garden plantings later this month. The school plans to utilize this area in the future as an outdoor classroom!

Students from Holy Innocents' Episcopal School in Doraville, Georgia have been monitoring Long Island Creek for more than four years. In the fall of 2006, during a monthly water monitoring field trip they did as part of the GREEN program, students noted some concerns about the park where they conduct their testing and the condition of the stream in that area. They watched as the trash cans filled up and were not emptied regularly, observed sedimentation issues and a lack of in-stream diversity and noticed a newly deposited pile of grass clippings and a fallen tree blocking the stream. They compiled these concerns into letters written to the Sandy Springs City Council and received a prompt reply from the City Manager. They also received a detailed report from the City Engineer, who had visited Long Island Creek to inspect the students' concerns himself. The City Engineer detailed the legitimacy of the students' concerns and outlined plans for addressing each of them. The City Engineer has had the fallen tree removed and has attended subsequent monitoring events with the students. Holy Innocents' Episcopal School students should be commended for their consistent attention to Long Island Creek and their pursuit of solutions through a partnership with the City of Sandy Springs.

How to Develop a Watershed Education Program

As environmental nonprofit organizations, we are forced to continually look at ways to inform the general public of the need, value and long-term connection they have with the resource(s) we work to preserve, conserve and/or restore. At the core of this mission is education. Education provides a proactive and positive approach to broadening an agency's sphere of influence in its work to meet program objectives and goals. It is hoped that this article will provide the structure to develop an effective and sustainable educational program for grassroots, community-based nonprofit organizations. The following checklist outlines the key components necessary to start an educational program that serves to integrate organizational programming while providing a tool that facilitates a deeper connection to the community it hopes to serve through its work.

☐ Identify and Align Educational Programming with Organizational Programming

Clearly, educational programming should be developed to support the overall mission of the organization. In this way two products are developed over the long-term: 1) future advocates and stewards of the targeted resource(s), and 2) educational programming that consistently and credibly supports the organization's primary long-term goal (i.e., restoration of a watershed, preservation of a threatened species, etc.). For some organizations there may be a variety of goals. I would advocate your broadest goal as a starting point for alignment with the initial educational program offerings. For example, if the organization is focusing on the restoration of anadromous fish species, then in-stream flows and water quality issues could be captured in a water conservation educational program offering. Once the program is established, as discussed later,

then additional programming could be developed to address more specific component goals of your organization. However, success depends upon the initial programs having a clear link to your organization's expertise which in turn gives credibility to your program offerings.

☐ Identify Your Target Audience

The nature of our work results in a broad and varied group of stakeholders, resource management agencies and community members, all of whom should be included in fostering an information network that affects positive change. Therefore, it is important to determine what audience you are most interested in educating on the issues revolving around your campaign. Yes, *campaign* most accurately describes our approach to attaining program goals. Once a goal is reached, the campaign shifts to reflect the progress made and identify the next step in building upon success. In identifying the target audience many factors may come into play. If you are hoping to increase membership and the subsequent funding it represents, then an adult program that gives more value to the membership may be the focus. Currently the South Yuba River Citizens League (SYRCL) is actively developing an adult education program that will provide a monthly opportunity to learn more about the Yuba River watershed and will be facilitated by instructors in-house and drawn from within the community. Our primary goal is to give additional "value" to a member, in discount class fees, while generating a new revenue stream and creating a more knowledgeable base of citizen advocates. Another benefit of this approach is the development of a database of potential volunteers for future data collection and restoration projects within the Yuba Watershed. However, the first educational programming prioritized by SYRCL targeted public school students

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A Checklist for Success, cont.

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grades kindergarten through eighth. Three distinct pilots were developed, which included an in-class science docent program, an experiential learning stormwater drain labeling program and “The Great Water Mystery” water conservation assembly program. All three were created as part of our RiverTeachers program and consistently aligned with SYRCL’s organizational goals and objectives.

Develop Partnership/ Collaboration

The active development of partnerships and collaboration is the life-blood of the nonprofit sector. The development of mutually beneficial relationships broadens an organization’s sphere of influence while diluting the cost basis for implementation. Early identification and scoping of collaborative opportunities will assist one with narrowing the focus of the proposed educational program to insure appropriate scope and future success. An early collaboration with the Yuba County Water Agency (YCWA) allowed RiverTeachers to develop and implement the “Great Water Mystery” school assembly program. Using the success of the program allowed RiverTeachers to leverage funding in Sacramento County the following year. Five years later, this program has been presented in thirteen counties to over 155,000 students statewide. The program is entirely funded through partnerships with collaborative agencies including water districts, stormwater quality agencies, federal and state agencies and private



Photo credit: SYRCL

donors. As RiverTeachers continues to grow its educational programming, it is based on scoping with potential partners, such as school districts for the Salmon Expedition program, and existing collaborators. Furthermore, as an example of alignment with organizational goals, the Salmon Expedition education program is uniquely integrated into SYRCL’s “Journey of the Salmonids” assembly program and salmon restoration campaign.

Create Authentic Learning Models

Once the content area has been identified, the next step is developing the methodology for implementation. Your target audience should guide this step in developing your educational programming. If you anticipate working with public schools, then align your curriculum to your state’s Content Standards and Curriculum Framework to insure credibility with public school administrators and faculty. Keep in mind that a cross-curricular approach insures the greatest reach in terms of diverse learning styles and subsequent student engagement. The Full SYRCL educational model is an experiential learning approach. RiverTeachers strive to develop cross-curricular lessons, aligned with California Content Standards, utilizing a “hands-



Photo credit: SYRCL

on,” student-directed teaching methodology. It is time well spent researching educational programs of similar agencies to yours. Quite possibly those groups may provide materials, references and/or services that compliment your program goals. In effect, you’ve developed just one more partnership to draw upon, avoiding the “reinvention of the wheel.” The RiverTeachers school water audit program was developed after many hours of research and adapted from existing water audit programs throughout the country. However, the bottom line is that the learning needs to be authentic. The information presented must be done in a way that the student takes away a valid piece of knowledge that can be applied in a real world context, whether that takes place in the classroom, in the field or in the students’ personal lives.

❑ Pilot

Once the curriculum packet is complete and the audience has been secured, a pilot program can be implemented. It’s important to design your pilot program almost as a “field experiment,” paying close attention to the tools you’ll use to evaluate all elements of your new program. A pilot also allows for “on the fly” revision and extension where necessary. With good communication and on-going evaluation and assessment, the program can be polished into a finished product or identified as not meeting the goals and objectives of the organization. Flexibility is key during the implementation of the pilot phase. Keep the pilot program small and manageable so that the size does not dictate its success or failure based on the organization’s ability to “keep up” with or adequately fund it. The RiverTeachers school water audit pilot program was conducted



Photo credit: SYRCL

with three teachers on three separate campuses. The program allowed us to pilot the curriculum packet to three unique demographic sets while not overwhelming our staff resources. Based upon the thorough evaluation of our pilot, RiverTeachers staff were able to adequately target areas for revision for future implementation.

❑ Evaluate and Assess Your Program

Valid evaluation and assessment tools are an integral part of any educational program. The evaluation and assessment component provides valuable feedback regarding the educational value (learning that is taking place) of the curriculum packet, public relations value (how the program and your

organization is perceived) and how well the program is supporting the organization’s overarching goals and objectives. Assessment and evaluation tools can be as simple as pre- and post-program questionnaires or as sophisticated as online quizzes/tests. We’ve found that a combination of pre- and post-

program quizzes combined with teacher evaluation forms provide an adequate amount of data for analyzing the majority of SYRCL’s educational programs. The water audit pilot program incorporated an online quiz and daily water monitoring data input component. However, the site was relatively costly to develop and difficult to manage over the long-term. When developing your evaluation tools, consider the expertise of your staff and build on that strength. Develop your evaluative tools carefully so that they accurately reflect the program’s strengths and weaknesses. The more accurately you can assess the program, the more likely you will be able to secure funding for its long-term implementation

A Checklist for Success, cont.

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Revise and Adapt

Be prepared to revise and adapt the pilot program once the evaluation and assessment data has been analyzed. There always seems to be content areas that need modification. This can be a result of site constraints, student demographics, teacher feedback or changes in program focus.

RiverTeachers staff has found it useful to develop broad content areas for the pilot program and then scale back and revise the curriculum packet to reflect the feedback resulting from the evaluation and assessment models. The pilot program should be developed fairly broad with the focus of the program being narrowed during the revision and adaptation stage. This will insure that you capture all relevant concepts and eliminate excess information for the final program.

Insure Economic Sustainability

Funding is as scarce for public schools as it is for nonprofits. However, schools and nonprofits create unique and valuable partnerships that stand a great chance for funding through grant awards. Grants provide the start-up capital necessary to get a good idea from concept to product and have proven to be a great way to leverage additional funding into the future. If your organization has a watershed focus, then opening dialogue between water purveyors and land use managers can result in mutually beneficial relationships whereby the nonprofit provides state-mandated educational programming within the



Photo credit: SYRCL

agency's jurisdictional boundaries. Don't shy away from approaching the same agencies that you've spoken against in the public forum for funding educational programs. It can be a win/win situation and provide an avenue for deliberate dialogue addressing the significant issues associated with the resources at the center of the debate. However, never assume funding will be available indefinitely, and begin to strategize ways to fund the program outside of grants and partnerships. The development of "fee for service" rates will allow an organization to expand their educational programming into areas where funding through partnerships doesn't exist or isn't adequately funded to provide services to meet the demand. Much like a stock portfolio, a diversified funding stream is less likely to dry up over the long-term.



Jeff Martinez currently serves at the South Yuba River Citizens League (SYRCL) as the RiverTeachers Director. In that capacity he is charged with the development and implementation of the "Full SYRCL" education program. Jeff has been an educator, backcountry guide and advocate for democracy in education for the past twenty years. His current focus is providing experiential learning opportunities to the under-served socioeconomic and ethnic student populations within the Yuba River Watershed from "Source to Sea."

Don't Reinvent the Wheel:

An Overview of Existing Programs

Project WET

In its 23 years of operation, Project WET has created one of the most extensive sets of original education materials in the world. Its more than 300 hands-on, interactive activities are designed to facilitate and promote the awareness, appreciation, knowledge and stewardship of water resources. While universal in their lessons, Project WET activities provide unique opportunities for exploring local water resources and related challenges including rivers and watersheds.

Audience: Annually, Project WET's global delivery network (27 countries) conducts over 1,200 "train-the-trainer" workshops, training more than 30,000. In turn, these thousands of teachers have reached millions of students with interactive, hands-on lessons in sustainable water resources management. Members of Project WET's delivery network also frequently interact with students at community or school water festivals.

Program Description: Activities in Project WET's Educators Guides, including the award-winning Discover A Watershed series, are used by both formal and non-formal educators and are appropriate for educators working with preschool to grade 12 audiences. Project WET's Kids in Discovery series activity booklets, which complement school curricula and Project WET's Educator Guides, are designed for children ages eight through 12.

Cost/Resources: Project WET publications are available for sale at <http://store.projectwet.org>. Project WET publications target both educators and students and cover a variety of water-related topics including water conservation, water quality, watershed

protection, wetlands conservation and groundwater. The *Project WET Curriculum and Activity Guide*, Project WET's cornerstone publication containing 91 activities, is available through Project WET workshops. Links to state Project WET programs and their workshop schedules can be found at www.projectwet.org/usa/statecontacts.php.

To facilitate widespread use, Project WET activities utilize many of the materials found in a classroom or around the house. For example, to complete the activity

"Hitting the Mark," educators need clay, a meter stick, pencils, paper and crayons or markers. In the activity, students learn the difference between precision and accuracy and how the two terms relate to water

quality data collection. This example illustrates both the minimal and inexpensive materials utilized in Project WET activities as well as the interdisciplinary nature of Project WET activities.

Sponsors: Some of Project WET's partners and sponsors include the thousands of educators who purchase Project WET materials each year, the agencies and organizations that sponsor Project WET at the state and country level, the National Oceanic and Atmospheric Administration, the National Association of Conservation Districts, Nestlé Waters, the Bureau of Reclamation, UNICEF, UNESCO-IHP and Ducks Unlimited.

For more information: contact Stephanie Kaleva, Director of Communications at 406/585-4115, visit www.projectwet.org or email: stephanie.kaleva@projectwet.org.

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olunteer Water Quality Monitoring Program

The Volunteer Water Quality Monitoring Program (VWQM) is an activity of a larger program, the Missouri STREAM TEAM Program, currently 68,000 people strong. The Stream Team Program began with litter pickups and a visual stream inventory of adopted streams. In the beginning there was no actual water quality monitoring. In 1992, volunteers indicated by survey that some would like to do more than just pick up trash; they wanted to monitor the water quality of their stream. As a result, in 1993 the Volunteer Water Quality Monitoring Program was developed to teach volunteers to monitor the water of Missouri's rivers and streams. The program is sponsored by the Missouri Department of Conservation, Missouri Department of Natural Resources and the Conservation Federation of Missouri. Funding has been provided by both the Missouri Department of Conservation and the Missouri Department of Natural Resources.

Audience: VWQM is open to anyone. The only requirements for attendance are to have an interest in water quality and for those under the age of 18, to be accompanied by an adult. As with most monitoring programs, it is a work in progress. Initially one level of training was offered to the volunteers that covered watersheds education, physical, chemical and biological monitoring. The program has evolved to currently offer four levels of training: an Introductory, Level 1, Level 2 and Level 3.

Program Description: In the Introductory level workshops, volunteers learn about watersheds and watershed mapping, conducting visual surveys, safety and trespass and biomonitoring using stream macroinvertebrates to assess water quality. In

the Level 1 workshop, they sharpen their invertebrate identification skills, learn to measure stream discharge and monitor basic water chemistry such as pH, conductivity, temperature, DO and water temperature. In both the Introductory and Level 1 workshops, methods and techniques are demonstrated on a nearby stream. The Level 2 workshop is really a Quality Assurance/Quality Control (QA/QC) workshop where volunteers build their confidence by testing their methods, techniques and analyses. Volunteers bring their chemical monitoring equipment and check their analyses against certified standards of unknown values. They are also given a test to identify 16 preserved invertebrates to be identified to the common name. Level 3 is a QA/QC audit in the field at their monitoring site and they must complete all core parameters and analyses correctly.

When the program started, it was decided that education would be the number one goal with data collection a close second. Since the program is a multi agency sponsored program, it was a bit unusual and many personnel from the sponsoring agencies have put their blood, sweat and tears into the development and maintenance of this program. The program has evolved and undergoes a yearly overhaul of training materials and in some cases a "tweaking" of methods. However, the real success of the program is due to the overwhelming response of people who are interested in making a difference in our aquatic resources. Our program continues to be very successful; many of the Introductory workshops often have waiting lists and we look for creative ways to keep up with demand.

Tips: Over the years, I have had the rare opportunity to advise many developing new volunteer monitoring programs. Setting goals for the program can be the most

difficult task. Some goals to think about are: Do you want data, education or both? Based on those goals will you focus on training a few core volunteers to conduct most of the work, educate as many as possible or somewhere in-between? What will you monitor, and why? What will your funding support? Last and not least, do you want them to be advocates of proper resource management? Keep in mind that the key word here is *advocacy*. There is no right or wrong; it depends on the needs and the focus of the program. One thing to remember, the volunteer always comes first.

For more information: To find more information on the VWQM Program and Stream Team Program look us up on our web site at www.moststreamteam.org.

T rout in the Classroom

Trout in the Classroom (TIC) programs have been in place all across the country for more than 20 years, the results of numerous collaborations between teachers, volunteers, government agencies and local organizations including (but not limited to) Trout Unlimited. The programs were designed specifically for teachers who wanted to incorporate more environmental education into their curriculum.

Audience/Scope: K-12 school and after-school groups

Program Description: Trout in the Classroom (TIC) is an increasingly popular environmental education program in which students and teachers receive trout eggs in the autumn or winter, raise the trout to small fry and release them in appropriate waters in the spring. Some schools raise trout eggs in the spring or raise salmon in the classroom (SIC), depending on local ecosystems and resources. Trout are

coldwater fish which require very clean water and specific environmental conditions. Because of this, trout are considered an indicator species; the abundance of trout in a coldwater stream correlates directly with the health of that stream ecosystem. Raising trout in the classroom, therefore, provides an excellent context for discussing the need for clean water throughout the students' watersheds. The trout can also inspire interdisciplinary lessons involving science, math, language arts, social studies, fine arts and/or physical education.



Resources Available: Trout Unlimited (TU) supports many TIC programs across the country. Many other organizations also sponsor TIC and SIC. To see who sponsors the program in your area, start by visiting www.troutintheclassroom.org. This website includes many resources for teachers and supporters, including lesson plans, web links, FAQs, a discussion board and more.

Costs Associated/Resources Needed: TIC requires start-up costs of approximately \$1,000 for all needed equipment. Yearly maintenance costs are around \$100. The tank (approximately 36" x 18" x 24") should be situated in a stable space with a nearby sink for water.

For More Information: Visit www.troutintheclassroom.org and feel free to contact us using the form available there.

cont. on page 14

An Overview of Existing Programs, cont.

cont. from page 13

SmartStart for Paddlers

Designed for the newcomer to canoeing and kayaking, this easy to present 20 minute orientation is a great way to get students and watershed residents interested in paddling your river.

Audience Scope: SmartStart for paddlers is a curriculum and presentation kit that is designed for use targeting paddlers of all ages and abilities.

Program Description: This one-hour orientation course will expose participants to basic safety and paddling skills. The presentation is designed to allow program providers to offer basic paddling skills instruction and orientation in a format that is fun and educational through the means of a flip-chart, PowerPoint or DVD presentation.

This curriculum includes:

- ▲ SmartStart for Paddlers Presentation (Hard copy & PowerPoint presentation format)
- ▲ SmartStart for Paddlers Lesson Plan
- ▲ SmartStart Paddling Orientation Video
- ▲ QuickStart your Kayak DVD
- ▲ QuickStart your Canoe DVD

Resources Available: The SmartStart for Paddlers Presentation kit is available from the American Canoe Association either on-line or via phone (see below).

Cost Associated / Resources Needed: The SmartStart for Paddlers Presentation Kit is available for \$49.95 (\$44.95 for ACA Members). The presentation kit is all you need to conduct a classroom session. For the on-water SmartStart Paddling Orientation program, providers will also need appropriate paddling and safety equipment.

For more information: Contact the American Canoe Association, 7432 Alban Station Blvd; Suite B-232, Springfield, VA 22150. 703/451-0141.

www.americancanoe.org.

Paddle Safe, Paddle Smart (PS2)

PS2 is a new national research-based educational curriculum designed to introduce middle and high school age youth to the joys and skills of paddling a canoe and/or kayak.

Audience: PS2 is specifically designed for school based education in middle and high schools. It can also be used by community programs as well as parks and recreation programs.

Program Description: The curriculum emphasizes safety and skills and is designed for teachers and youth leaders who want to include paddle sport instruction in their programs. The focus of the program is on risk assessment and risk management. PS2 will help students recognize potential risk and take steps to avoid, reduce or eliminate them. A factor that must be emphasized is that this curriculum prepares them only to paddle in protected flat water venues. Students completing this curriculum are not prepared to paddle in venues with swift currents, rapids, white water, waves or heavy boat traffic. To do this, they need further instruction. Our goal is to encourage youth to participate in paddle sports as a lifelong physical-recreational activity, and to do so in a safe manner. This curriculum was a joint venture of the American Canoe Association and the American Association for Physical Activity and Recreation, an association of the American Alliance for Health, Physical Education, Recreation and Dance. It was produced under a grant from the Aquatic Resources (Wallop-Breaux)

Trust Fund administered by the U.S. Coast Guard.

Resources available: Curriculum is currently in the process of being printed. Once completed, the full curriculum and resource materials (texts / videos) are available from the American Canoe Association.

Costs Associated/Resources Needed: Currently in the process of being established.

For more information: Contact the American Canoe Association, 7432 Alban Station Blvd; Suite B-232, Springfield, VA 22150. 703/451-0141.

www.americancanoe.org.

Respect the Beach – Watershed Works

Respect the Beach is the Surfrider Foundation's award-winning coastal educational program that includes field trips, classroom lectures, handouts, video and hands-on projects designed to explain coastal watershed processes, shoreline ecology and coastal areas stewardship to K-12 students and community groups.

Audience: Curriculum for school, video for all ages

Program Description: The activities in Watershed Works presents students with opportunities to learn how water sculpts the earth's surface to create watersheds and the landforms they see in their daily lives; how these processes support distinct but interdependent ecosystems; and how they relate to modern environmental problems on our coasts.

The Sea to Summit video traces the entire hydrological cycle, using a mix of computer generated graphics and filmed footage to illustrate the process as water falls to earth in the form of precipitation, before filtering down through watersheds into urban and

agricultural areas and finally flows out to sea, where it is eventually evaporated into the atmosphere to start the entire process over again. In addition to appearances by skateboarding legend Tony Hawk and top women's snowboarder Tara Dakides, the video features professional surfers Donavon Frankenreiter, Brad Gerlach and Jodie Nelson. The video is also narrated by renowned ESPN and X-Games commentator Sal Masakela. Running time: 19 minutes.

Resources Available: Download the *Watershed Works User Guide* and order the video at www.surfrider.org/whatwedo3a.asp.

Costs Associated: The suggested activities require some supplies, but everything can be bought at a local hardware store.

For More Information: www.surfrider.org.

Nonpoint Education for Municipal Officials

The Nonpoint Education for Municipal Officials (NEMO) Project was created in 1991-1992 at the University of Connecticut, as a collaboration of the Cooperative

Extension System, the

Connecticut Sea Grant
College Program and the
Natural Resources
Management and

Engineering Department. A
major objective of NEMO was
to focus on local land use decision

makers as the educational target audience. NEMO was created in recognition of the relative lack of education and assistance available for community land use commissioners. In Connecticut as in many places, land use decisions are a key determinant of the social, economic and



cont. on page 16

Overview of Programs, cont.

cont. from page 15 environmental health of our communities, yet our local decision makers are volunteers with little or no training in land planning or natural resource protection. Many lack professional staff or outside assistance.

Audience/Scope: Local land use decision-makers

Program Description: NEMO uses a combination of sophisticated technology and old-fashioned extension education methods to engage its target audience of local decision makers. Satellite-based remote sensing images and GIS are used to better understand landscape patterns. However, the basic educational tool of the program remains face-to-face workshops for local officials. NEMO promotes natural resource-based land use planning and design as the overall approach that communities can use to guide their future landscape. The ideal audience is a group that has representation from all of the local land use boards, as well as municipal departments (planning, engineering, public works) and any interested organizations (land trusts, chamber of commerce). Most workshops are about two hours long—an hour for the presentation and an hour for discussion. In addition, NEMO has developed a number of web-based tools to assist decision-makers after the workshop is done.

The National NEMO Network, which now numbers 34 projects in 31 states, is a federation of projects adapted from the original Connecticut model. Each project involves a unique consortium involving federal, state, regional and local partners, and the Network is perhaps the only group in the country that intersects the USDA Land Grant, NOAA Sea Grant and NASA Space Grant University-based research and outreach systems. Coordination and leadership of the Network is provided by the UConn “Hub,” a staff of two people working closely with the Connecticut Program.

Resources Available: NEMO Website: nemo.uconn.edu; National NEMO Network website: nemonet.uconn.edu

For More Information: For information on the NEMO Program, contact John Rozum, CT NEMO Director, john.rozum@uconn.edu.

For information on the *National Network*, contact David Dickson, National Network Coordinator, david.dickson@uconn.edu.

Big River Education Workshops

Living Lands & Waters (LL&W) is a 501(c)(3) environmental organization whose mission is to aid in the protection, preservation and restoration of the natural environment of the nation’s major rivers and their watersheds; to expand awareness of environmental issues and responsibility encompassing the river and to create a desire and an opportunity for stewardship and responsibility for a cleaner river environment.

Program Description: Established in 2003, Big River Educational Workshops are free educational programs covering a variety of themes related to Big River Systems in the United States. These workshops take place directly on the river, aboard Living Lands & Waters floating classroom and garbage barges. Excursions in smaller boats will also be featured, providing participants an authentic, up-close river experience. There are several different programs offered through LL&W’s Big River Educational Workshops. Most programs are designed for teachers and youth leaders, but workshops can be targeted to meet group needs. Programs vary in length and focus, so please visit the website for a description of each workshop before choosing the right one for you.

Audience: Because a small portion of the workshops cover indoor/outdoor classroom activities and curriculum ideas, these workshops are targeted specifically for educators, including both traditional school teachers and non-formal educators such as youth group leaders, government employees, etc. If seats are available, we will then open it up to interested citizens.

Resources Available: All participants receive a free river curriculum with activities and information to take back to the classroom.

For More Information: Visit www.livinglandsandwaters.org/Education/Workshops/default.htm or contact Tammy Becker at 309/236.0725, tammy@livinglandsandwaters.org.



Each year, millions of people whitewater raft, fly-fish, sea kayak and enjoy watershed-based recreational activities through the services of professional guides. Headwaters Institute's (HWI) trains guides to identify and interpret the cultural, historical, natural and ecological "teachable moments" that naturally arise on each trip. A thoughtful and well-balanced interpretation of place by an informed guide in the immediate context of an outdoor activity is an unmatched opportunity to reach this recreational constituency and to build broader public support for recreation, conservation and stewardship of rivers, coasts and other watershed resources.

Audience: Since 1996, HWI has trained over 6,000 guides at nearly 100 seminars and generated a unique pulse of educational outreach that has reached nearly 2.5 million guests.

Program Description: The fundamental ingredient in every one of these past seminars is annual teamwork between many hundreds of individuals. Local coordinators organize each seminar through steering committees made up of outdoor educators, outfitters, resource managers, guides, conservation organizations, local and national sponsors and many others with a common and unified interest in guide education and public outreach.

Headwaters Institute trained-guides are a low-key, yet potent public outreach tool with national impact. In 2007, HWI seminars were on the front lines of informing and educating guides about the impacts of global warming on seasonal precipitation, snow pack and water flows.



Seminars for guides organized by leading outdoor educators can in turn inform, motivate and inspire the public in the context of commercial adventure and nature tourism to new levels of watershed awareness back home. The cumulative outreach of guides can promote change in public opinion and policy and new appreciation for water. Issues such as dam removal, clean water, endangered species, FERC relicensing, flood plain management and the related human and natural history of an area are among the topics covered at seminars. HWI trained guides effectively speak with their guests as a well-informed river ambassador or River Jedi.

For More Information: Please contact Executive Director Tom Hicks via tomhicks@headwatersinstitute.org or 415/309-2098 to inquire how you or your organization can help provide leadership in watershed education.



Clearly, author Douglas Adams was not referring to the watershed conservation community when he wrote: *Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.* In fact, little doubt exists that the concepts, strategies and techniques shared below will indeed be replicated by River Network Partners across the country.

Reel Initiative

Friends of the White River has begun work on “Riverwise,” a program for African American and Latino children and adults that focuses on health and safety issues related to recreational uses of the waterway, especially in downtown Indianapolis. Initial work on the project has been made possible with the generous support of the Nina Mason Pulliam Charitable Trust, which has provided a \$60,000 grant over a two-year period. The funding will allow Friends to begin recruiting partners from city, county and state government, as well as from the private sector, to work together to inform the target audience about considerations such as fish consumption advisories, regulations and how to avoid heavily-polluted areas.

This is a tremendous opportunity for our organization to reach out to people who may not be aware that there are some areas that are better suited for recreation than others. The program ties in nicely with our Kids Fishing Invitational, an annual event focusing on the river as a resource right in the midst of an urban area.

The Trust had previously supported Friends efforts to reach out to new and changing audiences. A grant they made two years ago for River School, an interactive learning program for students, led to development of an ongoing program that has enabled several hundred teens, young adults, educators, community leaders and volunteers to have a day-long experience on the waterway that runs through the heart of the city.

Friends of the White River (IN)

www.friendsofwhiteriver.org

www.river-school.org

Dive Right In

We developed a water quality brochure—available on our webpage—that reviews steps which can improve water quality (focusing specifically on the Charles River). This booklet is handed out to our hundreds of volunteers after they spend a day working out on the banks of the Charles River so that they can continue to help improve the river even after they leave the volunteer event. Another project that we are working on is the Swimmable Charles Initiative which is aimed at bringing public swimming back to the Charles River. As one can imagine there is a lot of education that is involved with this project in letting people know what the river is actually like and what has to be done to make swimming a reality. Presentations have been developed to talk about the history and future of swimming in the Charles River.



Photo credit: CRC

The Charles River Conservancy (MA)

www.thecharles.org

Drain Brain

Clean Ocean Action has designed an activity and free guide for groups of all ages interested in reducing polluted stormwater runoff by raising public awareness. In the activity, titled “Storm Drain Stenciling: Drains to Waterways,” individuals paint a stencil onto a storm drain, reminding people not to dump any kind of litter or waste inside it. The project takes a grassroots approach to educating participants and citizens of all ages about how polluted stormwater runoff and nonpoint source pollution contaminate our waterways and our ocean. Clean Ocean Action’s guide to the activity also teaches participants how to conduct a successful campaign to implement environmental change. Individuals or groups interested in storm drain stenciling can contact Clean Ocean Action at Education@CleanOceanAction.org to obtain educational guides or material kits.



Photo credit: Clean Ocean Action

Clean Ocean Action (NJ)
www.cleanoceanaction.org

Whatever Floats Your Boat

SPLASH (Student Participation in Learning Aquatic Science & History) takes passengers back in time to the river’s rich history, and its story of changing ecology, from George Washington’s crossing the Delaware to the wildlife that inhabit the water and shores. Once a vibrant waterway for commerce, the river now supplies drinking water for 17,000,000 people and is a recreational and educational gem for students, boaters, fishermen, photographers, artists, writers and scientists of all ages. SPLASH boards in Lambertville, NJ and seats 49 passengers on covered and open decks. It is a Coast Guard certified vessel with a crew of scientists and engineering professionals. Students see the steam engine to learn first hand about this historic vessel, a replica of a local 1880 steamboat. Our educational programs can be tailored for any school or youth group. We typically trace rain from the river to the faucet, while teaching river ecology (with an “enviroscape” watershed model), water chemistry (with test kits), water physics (steam engine) and water safety (life jacket use), all adjusted to student grade level. Teachers can also conduct their own lesson, such as microscopic viewing of plankton. Standard interactive components include bird spotting and historical role-playing (e.g. choosing federation over confederation and then electing George Washington as first President).

Delaware River Steamboat Floating Classroom, Inc. (NJ)
steamboatclassroom.org

MEEP Ecology

The Mattole Ecological Education Program (MEEP) serves all six public schools in the Mattole River Watershed in northwestern California. MEEP is a comprehensive ecological education program that achieves science lessons based on the unique ecology of the Mattole River watershed. We focus on field trips, experiential, place-based learning, with emphasis on native local salmonids (coho, Chinook and steelhead). Emphasis is also on innovative, new and timely lessons each year; recent and upcoming topics include worm bin composting, water conservation, biomimicry and mycoremediation.

Mattole Restoration Council (CA)
www.mattole.org

Let's All Play Downstream

The Stony Brook-Millstone Watershed Association recently completed a 17-page guide entitled, *Environmental Education Programs: Developing a System to Value Natural Resources*. It includes topics such as writing curricula, making contacts with schools, what supplies you need, resources and case studies from NJ groups that already have established programs. The cost is \$5 (plus Shipping & Handling), and can be ordered by contacting Alyse Greenberg at 609/737-3735 or by email at: publications@thewatershed.org.

Additionally, we offer a variety of educational programs and activities. *Downstream – The Outdoor Watershed Game* is a play-oriented, outdoor activity illuminating various factors that affect water quality as a stream moves through the natural and human environment. During an introduction, we highlight the importance of water as a resource and examine the waters in and around our own communities. In our simulation game, students roll a giant die and then travel downstream via one of three waterways (rural, suburban, urban). As they flow through the landscape they encounter natural and human elements that alter water quality. (They collect/exchange colored ping pong balls in buckets during their journey. Each color represents a different impact or type of pollution. No real water is used during the game.) The action concludes with all participants flowing into the same lake. Students then examine how the landscape influenced the quality of water and discuss/explore strategies for maintaining/improving water quality. This activity is ideal for middle and high school students (grades 5 through 12) as well as municipal officials (environmental commissions, planning boards, town councils). In addition to conducting this activity at numerous schools, we have presented this at several environmental education conferences in and around New Jersey and are seeking other venues for demonstration.

Stony Brook-Millstone Watershed Association (NJ)
www.thewatershed.org/education.php

CLEAN It Up!

CLEAN (Children Linking with the Environment Across the Nation) is an innovative program offering students hands-on environmental education activities while safely participating in a canoe trip or stream walk in the Cahaba River watershed. CLEAN is based on the Chesapeake Bay Foundation's environmental science education program, which has a 30-year track record of proven educational value. To date we have served over



Photo credit: Cahaba River Society

6 counties throughout the state. The CLEAN program serves public, private and home schools in the Cahaba watershed and Birmingham Water Works Board's drinking water service area through delivery of 1) field trips, 2) restoration and 3) teacher training.

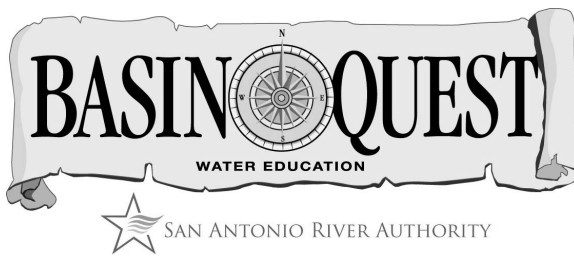
Cahaba River Society (AL)
www.cahabariversociety.org

What Is Your Quest?

BasinQuest is tailored to show students the relationship between universal science processes and concepts that they are required to know under Texas Essential Knowledge and Skills (TEKS) and the area in which they live—the San Antonio River Basin.

The program was developed in partnership with Texas State University's Edwards Aquifer Research and Data Center and educators within the basin. It is a "5E Inquiry Method" curriculum, encouraging students to explore and learn on their own with guidance from the teacher. The lessons are designed around engagement, exploration, elaboration, explanation and evaluation activities.

Each 6th, 7th and 8th grade classroom set includes a teacher's guide and 30 student booklets. Each lesson plan features the TEKS processes and concepts addressed within the lesson, a materials list, the duration of each activity, the lesson objectives and a 5E Inquiry Model at a Glance lesson overview. Teacher tips, guiding questions, conversion and measurement charts and step-by-step guidance through the lessons make incorporating the material easy. For teachers and students wishing to take the materials one step further, "Gifted/Talented" activities and numerous references to web, agency and other resources allow for additional classroom tailoring. Educators interested in obtaining the printed classroom materials must complete a single day training session on the program's use.



San Antonio River Authority (TX)

www.sara-tx.org/site/public_info/education.php

Choose to Cruise



Photo credit: Hackensack Riverkeeper (for Urban Fishing Program)

Our signature environmental education program, Eco-Cruises, has given over 30,000 people the opportunity to see the Hackensack River and its estuary, the Meadowlands, in an up-close and personal way. The public exposure helped to create a core constituency for the Meadowlands that ultimately saved all 8,400 acres of urban wetlands and waterways within the estuary. Eco-Cruises are conducted for schools, Scouts, groups of all sorts and the general public from May through October. The successes of this program led to the creation

of our Eco-Walk, Guided Paddle and River Cleanup Programs, which engage thousands more people each year in learning about, appreciating and caring for our watershed.

Additionally, our award-winning Urban Watershed Education Program created in partnership with the New Jersey Department of Environmental Protection (NJ DEP) in 1997, annually serves hundreds of inner-city middle school students. During a four-day period, participants are introduced to the concept of watershed citizenship and engage in community cleanups, stormdrain marking, water quality testing, on-water exploration of their home waters and the opportunity to try their hand at catch-and-release fishing.

Hackensack Riverkeeper also serves as one of the host agencies for the NJ Watershed Ambassador Program, a unique statewide environmental education program that places an AmeriCorps intern in each of the state's 20 Watershed Management Areas to conduct watershed-based curricula. In 2006, the Ambassadors monitored over 1,000 stream segments and conducted 130 monitoring training workshops. Watershed Ambassadors also made 760 presentations to community organizations and schools reaching 19,000 people.

Hackensack Riverkeeper (NJ)

www.hackensackriverkeeper.org

REYS-ing Grades

While some traditional cookbook or “structured” laboratories used in environmental education can expose students to elements of science, they do not always stimulate the higher-level thinking and problem-solving skills required for environmental literacy. “Restoration Ecology for Young Stewards,” or REYS, is a model of how restoration professionals working with youth can utilize inquiry-based teaching methods to better foster critical thinking skills and a curiosity towards science. REYS is a curriculum for students in grades 5-10 that uses stream restoration as a vehicle to develop knowledge of key concepts in watershed ecology and proficiency in scientific inquiry. To learn background information on salmon and streams, students begin with hands-on activities, such as collecting observational data and performing simple experiments. They measure and compare the water quality and riparian structure of “good” and “poor” salmon habitat within their watershed, and use models to test how trees affect soil erosion. Students also use field guides and create dichotomous keys to explore the identification and ecology of native and invasive plants. Throughout these initial lessons, students’ questions are compiled and used to teach students how to use the process of science to answer their own inquiries into stream ecosystems. Ultimately, students use these skills to design a restoration project that includes a relevant experimental component, such as “How does plant spacing affect invasive weed growth?” Evaluation of student tests and performance on the state’s science WASL (standardized achievement test), indicate that application of this model has increased learning.



Photo credit: Silly-Snohomish Fisheries Enhancement Task Force

Silly-Snohomish Fisheries Enhancement Task Force (WA)
www.stillysnofish.org/review/edgrant.htm

Down the Drain

We used the storm drain stenciling combined with an EnviroScape to educate over 100 high school and college students in Statesboro, Georgia last year about nonpoint source pollution. Over 340 storm drains in Statesboro, Georgia were stenciled with the words, “Dump No Waste, Drains to Stream” or a variation. This project has helped to educate not only students but general passersby about where water goes when it enters the storm drain system.

Ogeechee-Canoochee Riverkeeper® (GA)
www.ogeecheecanoocheeriverkeeper.org

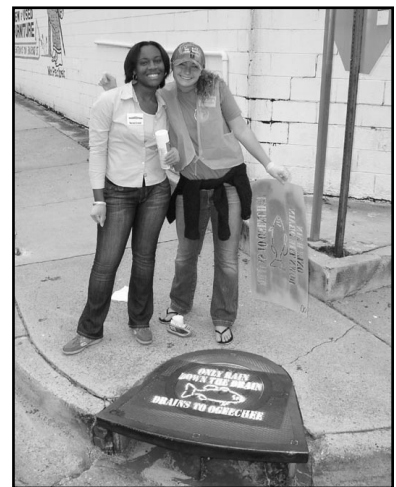


Photo credit: Ogeechee-Canoochee Riverkeeper

On the Rocks – No Salt

One of our training programs follows the *Winter Parking Lot and Sidewalk Maintenance Manual*. The training covers proper calibration, application rates and the effect of incorrect salt and sand application on our environment. The goal of the program is to reduce the environmental impact of chloride on our waters and wildlife. Starting in the fall, Winter Parking Lot and Sidewalk Maintenance workshops offer professional certification in winter maintenance through the Minnesota Pollution Control Agency. Even though the Winter Parking Lot certification is only available in Minnesota, the information provided by the training is useful for any other state dealing with snow and ice during the winter.

Fortin Consulting (MN)

www.pca.state.mn.us/roadsalt

www.fortinconsulting.com

Basic Training

A workshop called *Watersheds 101 – Watershed Education: the Watered Down Version* is geared toward formal and non-formal educators, watershed coordinators and other adults interested in learning about watersheds. The activities used are from a variety of resources including Project WET, the *Watershed Managers Educators Guide* produced by Project WET, *Rivers and Streams* by P. Fink Martin and other activities found online.

Some of the activities regularly used include: *Rolling River*, an activity using dice to help visualize stream orders; *Paper Watershed*, an activity to help participants recognize ridges and valleys and how elevation determines the watershed boundary; *Mapping a Watershed*, by using topographical maps participants can identify watersheds and estimate the size of the watershed area; *Oatmeal Runoff*, an activity to help visualize the cumulative effect of non-point source pollution as it flows downstream; and *8,4,1 – One for All*, an activity that identifies the multiple users of the water resource and how each user has the responsibility to protect and provide adequate water quality and quantity to the next user downstream.

Arkansas Dept. of Environmental Quality (AR)

www.adeq.state.ar.us



Photo credit: ADEQ

Problem SOLV-ed

The Oregon Adopt-A-River program is run by SOLV, a statewide nonprofit that emphasizes community building through its environmental volunteer programs. Oregon Adopt-A-River engages many stakeholders from all across Oregon and is run in association with the Oregon State Marine Board, the Bureau of Land Management, The U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.

At the heart of Oregon Adopt-A-River are the adopters, known as Stream Stewards. Stream Stewards make a two year commitment to a two mile stretch along any Oregon waterway and agree to hold clean-ups at least twice a year. SOLV provides them with free information on watershed health, a step-by-step planning guide to them prepare for a safe and effective cleanup, an extensive resource guide, garbage collection bags, program guidance, and an adoption certificate in recognition of their efforts. Interested Stream Stewards have the option of taking a free Volunteer Action Training with information on how to plan their cleanup. This training includes tips on recruiting volunteers, engaging stakeholders, approaching businesses for sponsorships and creating media releases. There are currently 104 adoptions in 24 counties in Oregon covering approximately 430 miles of shoreline. In 2006, 1,900 volunteers gathered 66,800 pounds of litter and debris.

SOLV (OR)

www.solv.org

That's Just SWELL

Our goal with Project SWELL is to promote environmental stewardship among San Diego youth, while also enhancing educational opportunities for local students. To achieve this goal, the San Diego Unified School District (SDUSD), the City of San Diego and San Diego Coastkeeper have united to enhance the existing science curriculum to address pressing environmental issues.

With the launch of the 2nd grade unit, which will go into full rotation in September 2007, Project SWELL will reach over 42,000 elementary school students annually in San Diego City Schools. But we're not stopping there; Project SWELL has expanded to the Oceanside Unified School District (5th & 6th grades), and we are already planning for our next SWELL lessons for SDUSD. Our goal with Project SWELL is simple: promote environmental stewardship among San Diego youth, while also enhancing educational opportunities for local students.

San Diego Coastkeeper (CA)

www.sdbaykeeper.org

No Trout Left Behind

Two years ago, the Dan River Basin Association (DRBA) and Trout in the Classroom (TIC) formed an exciting partnership to promote shared goals of stewardship and education for students in Henry County, Patrick County and the city of Martinsville. For over three months, students and teachers collected data, regulated feedings, monitored water quality and successfully raised the trout to fingerling size. Events were later held to release the trout into the Smith River.

2,000 or more students participated in the school-wide program and were responsible for the care of the trout; 1,500 participated in the release of over 2,000 trout into the Smith River during 16 separate events. The teachers found creative ways to relate the young trout and their health to science, math, art, history, government and writing. The enthusiasm generated by this hands-on project has been unprecedented in producing students who want to come to school to learn. School administrators have been so impressed with the overall positive effect on classroom participation that some are planning to implement curriculum changes to parallel the TIC and DRBA project.

Dan River Basin Association (NC & VA)

www.danriver.org

Something Smells Fishy

Nooksack Salmon Enhancement Association (NSEA) uses education and outreach to engage the community in salmon recovery. Our strategic plan seeks to both 1) implement watershed based stewardship programs that integrate education with restoration outreach and 2) develop and implement education programs for elementary through post-secondary level students. Programs include Stream Stewards, Nooksack River Stewards, Students for Salmon Program, Service Learning, Earth Service Corps, Saturday Streamside Science Education Programs and Service Learning and Internship Programs.

Nooksack Salmon Enhancement Association (WA)

www.n-sea.org

Howdy Partner!

River Source has the Clean Water Partners Program, a social science curriculum that engages students in the civics of water policy in New Mexico. It reaches high school students and community members. In several schools community members, such as Hispanic or Native American elders, become resources for students to learn about past land use and the wisdom the elders have learned about land use and water practices that have benefited or harmed the watershed.

River Source (NM)

riversource.net/content/view/10/103

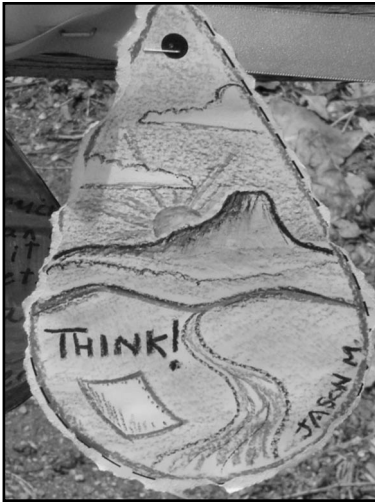


Photo credit: Center for Biological Diversity

Good to the Last Drop

As part of the Save the Verde Campaign and the Little Drop of Water Project, the Center for Biological Diversity's Verde Program Staff have been bringing the Save the Verde message to students and children throughout Yavapai County. A series of lessons were developed to teach students about the Verde River Watershed, the inter-connection between groundwater, surface water and human water use, the importance of riparian habitat to Arizona's wildlife and people and how to care for Arizona's water resources through conservation and stewardship.

Verde Program Staff and volunteers have worked with over 850 school children, ranging from preschool to high school. The response to this outreach has been tremendous with numerous letters of hope and gratitude from teachers and

students, as well as hundreds of decorated water droplets with wishes for the Verde River and promises to use water wisely. Approximately 1,300 Little Drops have been contributed, by people of all ages, so far. The Little Drops have been displayed at businesses and events on an ongoing basis throughout the community and continue to help raise public awareness about the need to protect the Upper Verde River.

Save the Verde (AZ)
www.savetheverde.org

Down by the Rivershed

Rivershed Society of British Columbia (RSBC) hosts four of our key education programs: 1. *Rivershed Education Program*, a 60-minute multi media presentation by RSBC's executive director about his Fraser River swim and the importance of stewardship within the Fraser River Basin, the greatest salmon-system on Earth. The presentation includes a



Photo credit: Rivershed Society of BC

discussion about issues threatening rivershed ecosystem health and how students can reduce their impact. Presentations can be assembly-style in the gym or in a multi-purpose room. 2. *Project Rivershed – Brunette*, an exciting demonstration project in the Brunette Rivershed. developed by the RSBC. During an innovative and pioneering series of workshops, community leaders were asked to come up with a vision of sustainability for the Brunette Rivershed. From there, a list of concrete priorities were created and divided into three main categories or Cornerstones: Healthy & Diverse Communities, Environment and Economy. Those actions can now be seen on the RSBC website and progress is being monitored and measured monthly. This pilot project will create a community process that can be adopted in riversheds throughout the Fraser River Basin and beyond. 3. *Sustainable Living Leadership Program*, a three-week nature-based educational program that includes a 1,200km journey along the Fraser River. 4. *Riversheds Forum*, an annual event whereby Fraser River Stewards from the Headwaters to the Lower Fraser Regions are invited to share ideas, exchange information and update one another during the always popular "Rivershed Stories." Participants engage in activities and discussions, and get outdoors on a field trip to explore the Chehalis area within the Harrison Rivershed.

Rivershed Society of British Columbia (BC)
www.rivershed.com

Dreaming of the Confluence:

Connecting Kids to the Waters Edge

by Deb Perryman
Elgin High School
Elgin, IL

I have the honor of teaching the very fine young people of Elgin High School (EHS) in Illinois the intricacies of their natural world (i.e., Environmental Science). I decided to apply for a teaching position at EHS for two reasons: it has an oak-hickory woodland, floodplain, fen and creek (Poplar Creek) on school property, and it has a diverse human population. Elgin High has 2,200 students speaking 56 languages with a poverty rate of 50%. In addition to teaching, I am Founder and Co-Chair of the Poplar Creek Watershed Planning Commission. Our group has been together for ten years and was originally formed due to the concerns/actions of my students. As a teacher, I look forward to getting my students in the creek because they come to see that it is a living breathing entity. I also find myself each school year striving to create a new kind of confluence.

As most of you know, “confluence” has two geographical definitions. The first is two or more bodies of water flowing into one. A confluence can also be a point where latitude and longitude meet. I would like to propose a new definition: The blending of ideas and insights of people from all latitudes and longitudes.



Service Learning

In order to create the new confluence, I utilize a teaching strategy called Service Learning. I require my students to work within the community to solve the problems they identify. My job as their teacher is to

make sure that I am addressing the state learning standards as they are working on the community issue. In order to utilize this teaching strategy, I need the assistance of natural resource professionals and grassroots organizations as my partners. I work with over 100 organizations/people that I call my “Partners in Service Learning.” They provide me with equipment, grant writing assistance and accurate information. In return, I am able to provide them with highly motivated and trained volunteers. I was able to develop these partnerships through an organization called the Kane Environmental Science Teacher Resource Education League or KESTREL. The organization consisted of middle and high school science teachers and natural resource professionals from Kane County. We met once a month at a different resource office or nature center. During the meeting we each had an opportunity to talk about what we were doing in class. It was wonderful because we had time to talk to natural resource professionals who had access to the materials and information we needed to make our lesson plans come to life. The natural resource professionals had access to educators who could provide volunteers and advice. It was one big Northeastern Illinois “think tank.” We became so close, we started organizing teacher workshops, hosted an annual Student Watershed Leadership Conference and started a monitoring network.

What I just describe is optimal, and we were fortunate because our County Assistant Superintendent made sure we had the funding to meet each year (The Kane County Regional Office of Education paid for all of the half day subs). Then “No Child Left Behind” (NLCB) was passed into law, and we could not prove to the federal government that KESTREL directly increased test scores. We all knew how vital the program was, but could not prove it to the federal government.

Working with Teachers

One of the things you must understand is that educators have one thing on their brain: testing. I would like to give you some pointers in this test crazy age. First, get a copy of your state learning standards. You should be able to download a copy from your department of education. The state standards will give you an idea of what topics are taught at each grade level. Think of the state standards as a communication tool. This document can tell your organization what is being taught and should guide your program development. When you are ready to approach a school with your educational outreach program, be sure to highlight the state standards that will be met during the activities/workshop.

You should also know that each state develops a testing regimen that monitors the progress of NCLB. You should be able to go to your department of education's website to determine what tests are being administered. Then request practice/sample tests and look through the questions. Try to find a way to incorporate the questions into your activities. Being able to show teachers and administrators this feature of your programming will definitely help open doors. Currently, reading and math are in the crosshairs of NCLB. I have had several elementary teachers approach me concerned that they are being encouraged by administrators to minimize time spent teaching science to provide more time for math and reading. As tragic as this is, times are changing. Science will be phased in as a NCLB criterion within the next few years. So be ready! Teachers at all levels will be in need of your organization's expertise.

No Child Left Inside

Let me end by encouraging you. Please find a way to bring your expertise to our young people. The hope of our nation lies in its young people. If we want clean air, water and soil, we must inspire each new generation to



Photo credit: Project WET International Foundation, Inc.

care. There has never been a better time to become involved. I know at times you are frustrated because all of your efforts seem to be for nothing. They are not. Keep your eyes on the prize and find a way to move our young people to action!

In fact, I would like to propose a service learning project for everyone reading this article. Let's join forces and teach our young people about the reauthorization of "No Child Left Inside." Those students who see the value of the act can join via the internet to create a student coalition determined to educate their community and ask our federal government for the funding needed to make the act viable. I volunteer Elgin High School to take the lead (at least for the moment). If you are interested in participating, please send an email to debbieperryman@u-46.org. I can't wait to connect with your organization and the young people in your community! As many of my students would say "Si, se puede", or "Yes, it can be done"!



RECOMMENDED RESOURCES

- Edens Lost and Found
www.edenslostandfound.org
- US Department of Education
www.doe.gov
- Learn and Serve America
www.nylc.org

Applying Adult Learning Theory to Workshop Design: Teaching Old Dogs New Tricks

by **Steve Dickens**
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Healthy Waters,
Healthy Communities
River Network

It is unfortunate that a great deal of what we know about how adults learn best is ignored in the design and implementation of most courses and training workshops. In this article, we will look at some key components of adult learning theory and how that knowledge can be used to produce effective trainings.

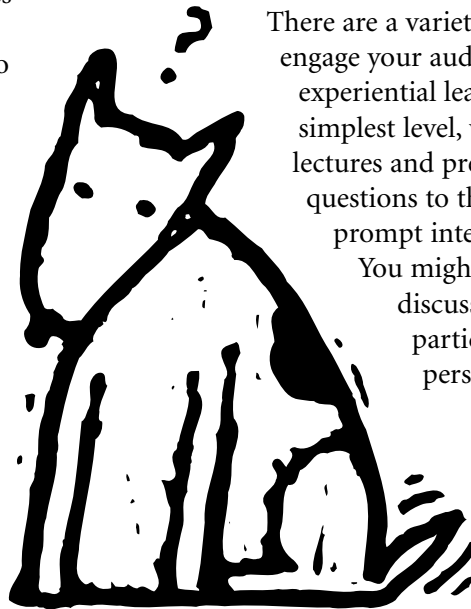
The Conundrum

The attention span of the average adult learner during a lecture is estimated to be anywhere between eight to fifteen minutes. Despite numerous research studies which confirm this, adult trainers and college lecturers alike continue to offer workshops and classes comprised of lectures and PowerPoint presentations lasting upwards of 30 minutes to an hour or more. Many well meaning conference and workshop leaders who understand this problem have responded by designing panel discussions whereby anywhere from three to six presenters share a stage, each talking sequentially for perhaps ten to fifteen minutes. While such efforts clearly add diversity to the information presented, and limit the presentation time of any one dreadful speaker, they do little to mitigate the learning conundrum posed by the limited attention span of most adult learners.

Effective Teaching Strategies

So what is one to do with this conundrum? Rest assured, there are training approaches that can effectively address these challenges of adult learning. First, it is important to stop any lecture/presentation about every ten to fifteen minutes and interject some type of

experiential learning. We know that adults need to be actively engaged in the learning process for the material to be integrated into long-term memory. Employing experiential exercises makes it more likely that the material being trained will be retained. While most of your audience will appreciate the opportunity to actively participate in their learning, a small number of participants may initially resist. That's likely because such a large segment of our population has become so accustomed to the passive entertainment characterized by the television with which most of us have grown up. These individuals are simply not used to having to actively apply themselves in learning situations.



There are a variety of ways to actively engage your audience in the experiential learning process. At the simplest level, when you pause your lectures and presentations, pose questions to the audience geared to prompt interactive discussion.

You might seed those discussions by asking participants to turn to the person next to them to answer the question first in pairs, before then asking a few people to present their answers to the larger group.

An even more valuable approach is to engage participants in active learning exercises during these pauses. This might take several forms. You might ask participants to turn to one another to share what they think are the most salient points of your presentation thus far and then again ask for a sampling of responses from the larger group. This encourages participants

to synthesize and categorize what they've learned, both essential steps to integrate learning into long-term memory. Another valuable approach is to pose either hypothetical or real problems for participants to solve using the information you've thus far presented. Such exercises are often best performed in small groups. Typically allow 20-30 minutes for such small group exercises.

If it isn't already apparent, it's vitally important that

presenters think about the layout of their training room in order to successfully implement these experiential learning strategies. Nothing interferes more with experiential learning and the ability to actively engage participants than auditorium style seating. Such traditional classroom settings perpetuate the notion that learners are there simply to passively absorb what is presented, and to be entertained. A far more effective learning environment might consist of ballroom style seating where participants are seated in small rounds of four or five, encouraging them to work effectively in small groups.

Changing how we go about presenting material to participants to employ adult learning theory is not easy. It requires presenters to allocate significantly more preparation time to develop creative and experiential learning exercises that will enhance information presented in lecture format. Effectively implementing these suggestions requires the involvement of not only trainers but workshop and conference organizers as well. It does little good for presenters to prepare extensive small group exercises only to find that they've been assigned to a room set up for a lecture.



Photo credit: Rivershed Society of British Society

What were three salient points of this article that stand out to you?



Water Words that Work—And Don't: Talking the Talk

by Eric Eckl
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In survey after survey, Americans tell pollsters that water is their top environmental priority. If drinking water and river water are both on the list, they'll rank drinking water #1, river water #2, and all other environmental problems below that. It doesn't seem to matter where the poll is conducted, or what the sex, age, race, income or education the participants are. Exceptions to this pattern exist, but are rare. It's been this way for at least ten years and probably longer.

So why is it so hard for us to educate and motivate people to take a side or take action to protect and restore the rivers they say they care so much about? Why don't they whip out their checkbooks more readily when they receive our fundraising appeals? Why don't more of them call their Senators in a rage after reading our quotes in the newspaper? Why do so many spend lavishly on lawn chemicals and pinch pennies when buying lightbulbs?

Polls are correct that everyday Americans care an awful lot about clean water and healthy rivers. But what polls often don't tell us is how shockingly ignorant Americans are about water and rivers. Polls don't tell us how this lack of knowledge skews their perception of what we say and write.

Here are ways that lack of knowledge inhibits otherwise sympathetic citizens:

Problem #1: Low Vocabulary. Many Americans simply do not understand a lot of the river shop talk that creeps into our speaking and writing. When confronted with words like "watershed," "sprawl," "nonpoint source pollution," "biodiversity," "impervious

surface," "instream flow," and even "water quality," many will draw a complete blank or imagine something very different from what you meant.

And when we try to fill those gaping holes in people's knowledge, that's when we run into problem #2.

Problem #2: Short Attention Span. Human brains fatigue quickly when they are trying to absorb unfamiliar topics. If you've forgotten how that feels, try reading a computer manual cover to cover in one sitting. That's how everyday Americans feel when we try to tell them everything we know about river conservation in one sitting. When people start tuning out our long winded explanations, they're not being rude. They're often just tired.

Problem #3: Low Confidence and Initiative. Everyday Americans believe that much of what they read and hear about the environment has an agenda behind it, and they doubt their own ability to distinguish truth from spin. That self doubt inhibits them when evaluating claims about a policy proposal, when reading the label on a "green" product or when contemplating some river-friendly step they can take at home.

So ordinary citizens' lack of knowledge is a barrier that prevents us from tapping into genuinely supportive attitudes, and it's unrealistic to believe we can teach all 300 million of our fellow citizens to understand and use our language. So what's a river group leader to do? Use water words that work!

The water words that work are a list of two dozen terms that test well with Americans from all walks of life. Everybody



understands them...and uses them to talk about environmental trends when the river rats aren't around with all that intimidating shop talk. So what do these water words that work have in common and what makes them work?

They're simple. People understand what they mean.

They're general. Words like "pollution," "nature" and "the law" may be vague and unsatisfying to a river rat like you, but they mean something to regular people. More specific terms in those categories, words like stormwater, riparian buffer zones, or Total Maximum Daily Load, often mean nothing at all to regular people.

They're moral. Everyday Americans view environmental protection through the prism of being a good citizen and leader. They expect themselves and others to be "responsible," "fair," "accountable" and to "balance" competing needs. You can often recognize the moral implications of the facts of a situation, but others can't. Don't make them guess—come right out and say it.

They're personal. Everyday Americans perceive the world as a troubled place with more problems than they could possibly ever solve. Use words like "trends," "family" and "it affects you" to bring your problem home and set it apart from all the others.

They're empowering. How do you make somebody feel like they can make a difference? Tell them "you can make a difference, and here's what you can do" for starters. And apply a little peer pressure by pointing out that others are doing it, so they will be "working together."

It takes a little practice to learn how to fluidly substitute words that work for those that don't, but the payoff is well worth the investment of time and effort. Once you master this technique, you'll be able to educate more people and more easily convince them to join your organization, change their behavior, take your side in a dispute and tell their friends to do the same.

And that will make your life—and your river—a whole lot better.

Eric Eckl is a campaign and strategy consultant for Beaconfire in Arlington, Virginia. He has worked closely with river groups, land trusts and public lands friends groups for more than a decade. Eric maintains the Water Words That Work blog (<http://waterwordsthatwork.com>) to provide communications insights and model contemporary publishing techniques for clean water, nature protection and pollution control experts.



SOME WORDS THAT WORK

Learn why at: <http://waterwordsthatwork.com/words>

Accountability	Balance	Choice	Corporations
Enough clean water	Fair	Family and children	Freedom
Future generations	Healthy	Investment	It affects you
Law	Make a difference	Nature protection	Planning ahead
Pollution control	Responsible	Safe	Save money
Trends	What you can do	Wildlife	Working together

SOME WORDS THAT DON'T

Learn why and what to use instead at <http://waterwordsthatwork.com/words-that-dont>

Anadromous	Animal waste	Biodiversity	Climate change
Conservation easement	Endangered species	Infrastructure	Instream flow
Landscape	Land use planning	Nutrients	Nonpoint source
Pollution	Open space	Parks	Recreation
Riparian	Run out of water	Sprawl	Stormwater
Tourism	Undeveloped land	Water conservation	Watershed
Water quality			

Leveraging Community Partnerships for Watershed Research and Education: Universities - Gateways to Education

by Kara Salazar
Center for Earth &
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www.cees.iupui.edu



Universities, colleges and community colleges often have resources available to assist with community outreach and education. Watershed groups across the country should look to higher-educational facilities to assist with the development and implementation of educational programs.

The Center for Earth and Environmental Science (CEES) at Indiana University ~ Purdue University Indianapolis (IUPUI) is an interdisciplinary research and outreach center bridging applied environmental research to community problem solving. CEES has more than 30 community partners from the public and private sectors involved in research, education, and public service collaborations. Research and outreach activities include water resource evaluation, watershed management, ecological assessment and restoration, environmental data management and visualization, science education and public outreach. These collaborations have resulted in environmental research projects, implementation of best management practices and environmental stewardship initiatives. Three of these initiatives: the Central Indiana Water Resource Partnership, Eagle Creek Watershed Alliance and the CEES Environmental Service Learning Program are examples where CEES community partnerships are advancing watershed research and education outreach in central Indiana.



Central Indiana Water Resource Partnership

The Central Indiana Water Resource Partnership (CIWRP) between Veolia Water Indianapolis, LLC. and CEES has engaged in research on central Indiana's water resources to both protect and improve water quality since 2002. The partnership has focused on a multitude of research questions, including watershed and reservoir nutrient cycling, algal community response, best management practices for surface water quality and watershed restoration and the development of remote sensing tools for rapid assessment of source water quality. CIWRP has not only expanded the knowledge, research base and understanding of water resource issues in central Indiana, but has provided student training, linkages to volunteer stewardship and the opportunity for new community partnerships to develop in the areas of watershed management and source water protection. CIWRP has been a major focus for watershed and water resource program development for CEES and Veolia Water Indianapolis, LLC.

Eagle Creek Watershed Alliance

The Eagle Creek Watershed Alliance (ECWA) is the result of a successful collaboration between CEES and a host of community partners. Pressures from agriculture, urban development and rapidly changing land use from increasing population demands threaten the sustainability of Eagle Creek Watershed and Eagle Creek Reservoir, a public water supply resource for the City of Indianapolis. CEES and partners in ECWA were awarded funds for a 3-year Section 319 Implementation

Grant from the U.S. Environmental Protection Agency under an assistance agreement with the Indiana Department of Environmental Management. CEES is the sponsor of the grant and houses the watershed coordinator who manages the program elements. Partners from the public and private sector include Veolia Water Indianapolis, Eagle Creek Watershed Task Force, the Boone, Hamilton, Hendricks and Marion County Soil and Water Conservation Districts, Boone County Solid Waste Management District, Boone County Health Department, Hoosier Heartland Resource Conservation and Development, Central Indiana Land Trust, Indiana Wildlife Federation, Eagle Creek Park Foundation, Indy Parks, the Indiana Department of Natural Resources, the Indiana Department of Environmental Management and citizen volunteers, among others. Partners are utilizing funds from the Implementation Project for education, outreach and watershed restoration projects to alleviate nonpoint source pollution in the Eagle Creek Watershed.

Environmental Service Learning Program

The CEES Environmental Service Learning Program is the education and outreach extension of watershed management projects that enables participation in environmental stewardship projects and applied field experiences. Locations include those on the IUPUI campus and numerous central Indiana parks, greenways and natural areas. Participants include IUPUI students, other Indianapolis-area university students, community members, corporate groups and K-12 students and teachers. The program's work days help to address urban environmental issues while creating awareness of ecological health issues as they relate to water quality. Participants learn about improving Indianapolis-area water

quality and combating nonpoint source pollution through experiential education programs and applications of restoring wetland and floodplain ecosystems. The projects provide participants an opportunity to directly experience environmental management in the field as well as to observe how communities can work together to solve environmental problems. The goal of this program is to provide education and awareness programs founded in sound and rational science that result in changing behavior to improve the environment—especially water quality.

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Kara Salazar holds Masters Degrees in both Natural Resources Management & Nonprofit Management and in Urban Education & Science Education. In her role as the Education Outreach Coordinator for IUPUI's Center for Earth & Environmental Science, Kara develops, implements and evaluates environmental science curriculum and outreach programs based on CEES research activities for K-12 students and teachers, university students, community members and environmental professionals.

Resources & References

The **Child's Place in the Environment Series** is an integrated hands-on environmental education curriculum with children's literature connections for K-6 teachers. The site offers publications and information on aquatic studies. www.acpe.lake.k12.ca.us

The **Clean Water Education Partnership** provides television spots that can be shown to different audiences. Some of the issues expressed range from awareness to action. www.nccleanwater.org/outreach/television_spots.php

The **Environmental Protection Agency's** education resource page is easy to navigate and spans a wide variety of education resources catering to both students and teachers. www.epa.gov/adopt/resources/toprelated.html

The **Global Rivers Environmental Education Network** program seeks to engage primarily middle school and high school-aged students as active citizens who improve conditions in their watersheds now and in the future. www.earthforce.org/section/programs/green

Internet Watershed Educational Tool (InterWET) was developed to help educate local officials and other concerned citizens about water resources. InterWET gives a technical and multi-perspective response to local watershed issues and can be used as a stand-alone educational resource and as part of larger watershed educational efforts for a variety of people in many different watersheds. www.interwet.psu.edu

Nonpoint Education for Municipal Officials is an organization that promotes alternative ways of land-use planning and localizing the decision-making process. This site provides educational trainings and workshops for people interested in this issue. nemo.uconn.edu

The **Ohio Watersheds Network** leads the reader to different sites and organizations that provide educational publications that can be used for personal research and in the classroom settings. www.ohiowatersheds.osu.edu/library/10.html

Penn State University's comprehensive site has links to watershed publications that explore large and diverse sources of information, delving into topics including: acid rain, roadside dumps, stream bank fencing to other points of information that include USGS information and biotic index cards. water.cas.psu.edu/28.htm

Project WET is a resource for teachers to engage with students about water issues through hands-on and relevant curriculum building exercises and aids. www.projectwet.org

Respect the Beach is Surfriders educational program that includes lectures, handouts, video and hands-on projects designed to coastal watershed processes, shoreline ecology and coastal areas stewardship to K-12 students and community groups. www.respectthebeach.com

Stormwater Managers Resource Center site presents a library that owns a wealth of great information about watershed education. It also has downloadable articles from various publications. www.stormwatercenter.net

Trout in the Classroom provides materials and programs for experiential learning related to trout and salmon habitat and life-cycles. www.troutintheclassroom.org

The **U.S. Geological Survey** serves as a rich resource with links that include: educational sites, bookstores, bulletin boards, agencies, journals and more. water.usgs.gov/wsc/wshed_education.html

The **Water Environment Federation** provides educational events and conferences annually on water quality and hosts a wide variety of workshops year round. www.weftec.org

Watersheds.org has a broad variety of teacher resources that navigates through visual aids (diagrams, maps, etc...) to worksheets with general to more in-depth information about watershed eco-systems. www.watersheds.org/teacher/teacher.htm

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Please charge my credit card: Visa MasterCard American Express

Card # _____ Exp. Date _____

Signature/Name on Card _____

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- River Talk! Communicating a Watershed Message
- Listening to Watersheds - A Community-Based Approach to Watershed Protection
- Testing the Waters - Chemical & Physical Vital Signs of a River

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