Nonpoint Source
News-Notes
January 2006, #77
The Condition of the Water-Related Environment
The Control of Nonpoint Sources of Water Pollution
The Ecological Management & Restoration of Watersheds

Special Focus Issue: Environmental Education and Outreach

Notes on the National Scene

Weather Watchers Keep Their Eyes on the Environment

Every day, millions of Americans tune into their local weather forecasts to find out whether they need to reach for sunscreen, a jacket, or an umbrella when venturing outdoors. Viewers trust their broadcast meteorologists, and look to them to translate the complicated science of weather into understandable information. Now, thanks to a new program, broadcast meteorologists have a chance to interpret and share more than just the weather.

The National Environmental Education & Training Foundation (NEETF) is partnering with the American Meteorological Society (AMS) and others on a program called "Eyes on the Environment," which emphasizes the close connection between weather, watersheds, and the environment. The partners developed the project idea in response to research that NEETF conducted in 2000. The research indicated that the general public had little awareness of environmental issues, and that the information gap between scientists and the public

Rain barrels as art . . .
See article on page 20.

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was growing. Because so many people faithfully tune into their local weather forecast, the partners hope the new program can help broadcast meteorologists to bridge the environmental information gap by conveying important environmental information that is relevant to people's daily lives.

The AMS embraces the concept that AMS weathercasters can become resident "station scientists" and can, with additional training, be called upon to cover many science-based news topics. The "Eyes on the Environment" program, funded through federal and foundation grants, helps to prepare meteorologists for this role by offering a series of resources, including environmental education and training materials, Web-based and on-air environmental news stories, and the "Earth Gauge" environmental information service.

Environmental Education and Training for Meteorologists

Although weathercasters are experts in atmospheric sciences and the art of broadcasting, they typically have a more limited background in environmental science topics. NEETF is partnering with the University Corporation for Atmospheric Research's (UCAR) Cooperative Program for Meteorology, Education and Training (COMET) to develop a set of online courses with a strong relationship to ongoing weather reporting. Course content will not only give broadcast meteorologists a solid background in environmental topics such as watersheds/water quality and airsheds/air quality, but will also provide tools and resources to enhance their ability to "tell the story" to their viewers. NEETF expects to release the first course (focused on watersheds) in Spring 2006.

The courses will be housed on COMET's MetEd Web site (www.meted.ucar.edu), along with other resources to help meteorologists move beyond the forecast. The courses will become an optional part of AMS' continuing education program. Broadcast meteorologists must successfully complete courses from the continuing education program every five years if they wish to retain possession of the coveted AMS seal.

Piloting the Envirocast® on Air

In 2002, NEETF tested the "station scientist" concept with Chief Meteorologist Bob Ryan, at WRC-TV in Washington, DC. To provide Ryan and his weather team with the information resources needed, NEETF worked with StormCenter Communications to launch a Chesapeake Bay-specific pilot program focused on combining weather forecasting and environmental issues. The partners developed a Web site about the Chesapeake Bay Watershed (http://wrc.iewatershed.com), complete with satellite imagery, educational information, and up-to-date descriptions of watershed events and information. The Web site has served as a source of background information for more than 30 on-air stories mentioned by the WRC weather team. Based on the success of the WRC-TV pilot, StormCenter Communications has expanded its Envirocast® Web/TV program to seven other media markets. More information about StormCenter's Envirocast® program is provided in a separate article in this newsletter.

Earth Gauge: Making it Onto the Airwaves

To further arm broadcast meteorologists with the environmental information they need, NEETF is partnering with AMS and The Weather Channel to offer Earth Gauge, a free environmental information service. Once a week, a trained Earth Gauge researcher looks up the three- to five-day forecast for each participating media market, and, based on the approaching weather, develops a brief, tailored "factoid" along with a relevant viewer action tip. The researcher then e-mails the market-specific information to interested broadcasters in participating markets. NEETF began issuing Earth Gauge information to four media markets at the end of June 2005, and has periodically added new locations since then. The service currently reaches meteorologists at The Weather Channel and fourteen major U.S. media markets. By early 2006, Earth Gauge has the potential to reach more than 50 million people across 18 metropolitan areas. NEETF plans to continue to expand the program—ultimately reaching broadcasters throughout at least 20 major media markets.

Earth Gauge: Coming Soon to a City Near You

Cities Already Participating

Albany, NY	Jacksonville, FL
Atlanta, GA	Miami, FL
Boston, MA	Nashville, TN
Cleveland, OH	Providence, RI
Dayton, OH	San Francisco, CA
Denver, CO	Seattle, WA
Detroit, MI	Washington, DC

Cities with Participation Pending

Burlington, VT	Dallas, TX
Chicago, IL	Raleigh/Durham, NC

Weather Watchers Keep Their Eyes on the Environment (continued)

To supplement its information distribution efforts, NEETF maintains an Earth Gauge Web site (www.earthgauge.net). The site offers general information about the program, and provides examples of the types of Earth Gauge information issued under different weather conditions and in different cities.

Example Earth Gauge Bulletin E-mailed to Broadcasters in Atlanta, GA.

Weather Forecast: Rain in Atlanta, GA
Earth Gauge Alert: Be Careful With Chemicals: Atlanta gets 80 percent of its water from the Chattahoochee River, one of the smallest rivers serving a major city in the U.S. Because granite underlies much of the Atlanta area, the city is dependent on surface water.

Viewer Tip: Remember that pollutants, such as yard care chemicals and motor oil, can be carried directly into surface waters when it rains. Protect your drinking water by never dumping anything in a storm drain, and taking hazardous substances to a collection facility. You can find collection facilities in your area by visiting www.cleanup.org or calling 1-800-CLEANUP.

NEETF has received positive feedback about the new service, notes NEETF's Sara Espinoza. "Meteorologists appreciate having the prepared Earth Gauge information readily available for them to drop into the forecast." NEETF is currently working to identify a reliable method for tracking how often Earth Gauge bulletins are actually used.

NEETF's Earth Gauge and StormCenter's expanded Envirocast® program complement each other well, adds Espinoza. "StormCenter has successfully expanded the Web-based pilot projects to new markets, focusing on local watersheds. Earth Gauge, based on the three- to five-day forecast, covers a broad range of weather and environment topics." Thanks to these many new programs, environmental literacy among the television viewing public should soon be on the rise.

[For more information, contact Sara Espinoza, The National Environmental Education & Training Foundation. 1707 H Street, NW, Suite 900, Washington, DC 20006. Phone: 202-833-2933; E-mail: sara@neetf.org; Web: www.neetf.org.]

Envirocast® Web/TV Reaches Millions

StormCenter Communications is looking to the Web and television to help raise the environmental IQ of America. The company is venturing down a new avenue of environmental education—using weather forecasts—and is creating a blend of media, environmental science, and meteorological expertise packaged specifically to help guide the way. StormCenter likes to be considered as a remote-sensing image translator: the company uses remote-sensing images and scientific data from government and commercial sources and translates them into formats and explanations that can easily be used and understood by a wide array of users, including broadcast meteorologists.

Broadcast Meteorologists Look to Envirocast® Web/TV

The Envirocast® Web/TV pilot program is one of StormCenter's key outreach services. For each media market targeted, StormCenter staff works with broadcast meteorologists and local environmental representatives to develop a comprehensive Web site that offers detailed content about watersheds, forests, and coastal areas. The Web site also includes information such as real-time water quality and stream flow information, ground water information and coastal observations, semi-monthly environmental news stories related to a specific watershed, satellite images, a calendar of events, and a weekly article that connects local viewers with local watershed issues. The broadcast meteorologists use these resources to help integrate environmental information into their forecasts, and they also direct the public to access the Web site for more information.

After the Web site is developed, StormCenter continues to maintain and update the information over time. In each market, StormCenter organizes and frequently communicates with a group of eight to ten local environmental stakeholders from both government and nonprofit organizations. This group keeps StormCenter informed of breaking news and watershed events and allows StormCenter to maintain an updated, relevant Web site for the area.

StormCenter's program has been underway for three years and continues to expand. Envirocast® Web/TV was initially funded by EPA grants as a pilot program—now, interested organizations must obtain their own funding. An Envirocast® Web/TV program costs an average of $75,000 for the first year for Web site development, and requires a minimum of $36,000 annually thereafter to support ongoing maintenance, which includes updating site content and event calendars, and

Envirocast® Web/TV Reaches Millions (continued)

researching and writing locally relevant environmental articles. Larger media markets may require more frequent updates and additional Web functionality, which StormCenter is capable of providing at additional cost. Envirocast® Web/TV is now available for Washington, DC; Austin, TX; Minneapolis, MN; Mobile and Montgomery, AL; New Orleans, LA, Philadelphia, PA; and Tampa, FL. StormCenter is currently working with groups in many other media markets to help them identify and acquire the funding necessary to launch the program.

The Envirocast® Web/TV program has received a lot of positive feedback from meteorologists and the public, notes StormCenter's Ed Gross. "People recognize that Envirocast is a great way to get environmental messages out to a wide audience—at a relatively small cost." As the program continues to grow and expand, Gross hopes that corporations will take notice and offer to sponsor the program over the long-term.

Not Just Web/TV….

StormCenter offers other Envirocast® products in addition to Envirocast® Web/TV. Each day, StormCenter e-mails a free Envirocast® Bulletin to a long list of recipients—the bulletin provides images and story vignettes that can be used on TV or the Web. On its Web site, StormCenter offers "Envirocast® On-Line," which posts relevant earth science imagery from around the globe. StormCenter also offers "Envirotrack® Hurricane Wind Field Forecast System," developed to augment the official National Hurricane Center forecast. This product allows television meteorologists to accurately describe the size of land-falling hurricanes. StormCenter executives believe that more people will evacuate threatened areas along the coastline when they see just how large hurricanes can be. Finally, StormCenter offers an "Envirocast® Newsletter," which includes detailed information and news about watersheds in certain locations. StormCenter hopes that as more people are exposed to environmental information from a variety of sources, they will better understand environmental issues and be able to make informed decisions.

[For more information, contact Ed Gross, StormCenter Communications, Inc., Columbia Corporate Park 100, 6021 University Blvd, Suite 140, Ellicott City, MD 21043. Phone: 410-203-1316; E-mail: ed@stormcenter.com; Web: www.stormcenter.com.]

EPA Sponsors Webcast Series on Watershed Topics

EPA's Watershed Academy recently launched a series of free Webcast seminars. Local watershed organizations, municipal leaders, and others across the nation are invited to sign up for these free, online Webcast training sessions. The seminars, held approximately once per month, address key topics related to watershed management.

Participants may register for the two-hour seminars and receive information through a phone and/or personal computer. To maximize the reach of these seminars, EPA encourages watershed practitioners to invite a group to gather in a conference room for the Webcasts and connect through a speakerphone and project the PowerPoint presentation onto a screen. Information on the Webcasts held to date and on future Webcasts is posted on EPA's Web site at epa.gov/watershedwebcasts. Interested participants are urged to register early because the number of toll-free telephone lines available for these Webcasts is limited. For those people not able to register for a Webcast, EPA makes audio, PDF, and PowerPoint versions of Webcasts available online soon after each is conducted.

Previous Webcasts included:

- Eight Tools for Watershed Protection in Developing Areas (held 6/22/05)
- Getting In Step: Developing Your Message and Publicizing it Effectively (held 7/20/05)
- The ABCs of TMDLs for Stakeholders (held 9/28/05)
- Low Impact Development Strategies, Tools, and Techniques for Sustainable Watersheds (held 10/19/05)

EPA Sponsors Webcast Series on Watershed Topics (continued)

- Stormwater Phase II Requirements: Improving Stormwater Quality Over the Long-Term (held 11/16/05)
- Introduction to Trading for Water Quality Protection (held 12/14/05)

Future Webcasts will feature sustainable finance tools for watershed protection, water quality trading, and other watershed-related topics. For more information, or to download a previous Webcast, see epa.gov/watershedwebcasts.

Nonpoint Source PSAs and Films Honored at People's Choice Awards

The first-ever national People's Choice Awards for Nonpoint Source and Stormwater Pollution Outreach to honor excellence in watershed outreach production was held on October 17, 2005 in Chicago. This premiere event took place on the eve of the Fourth National Conference on Nonpoint Source and Stormwater Pollution Education Programs sponsored by the U.S. EPA and hosted by the Chicago Botanic Garden. Following a nationwide call for television and radio public service announcements (PSAs) and film segments with watershed protection and nonpoint source pollution control themes, and a special logo category, conference planners compiled and produced a two-hour awards program. Complete with a regal red carpeted entry, spotlighted hosts and presenters in tuxedos and gowns trading witty one-liners, and a festive crowded ballroom atmosphere at a downtown Chicago hotel, the affair was loosely modeled after Hollywood's Academy Awards show.

In response to the nationwide call for PSAs, film segments, and logos, entries for the People's Choice Awards were submitted by the organizations that produced them (state environmental agencies, local municipalities, and watershed organizations), as well as by peers on their behalf, and were augmented by PSAs from the featured products section of EPA's draft Nonpoint Source Outreach Digital Toolbox. To fit the show's two-hour format, entries submitted in response to the nationwide call were first reviewed by a three-person review board (one EPA representative, one eastern state representative and one western state representative) and culled from more than two hours of submitted material to just over an hour of content to be judged during the show. Two of the review board members screened all submitted materials to a private peer audience, which assisted in selecting the final slate of nominees. To accommodate time for longer films during the awards show, film nominations were limited to submitting five-minute excerpts, along with several two- to three-minute short films that were offered in their entirety.

A three-judge panel determined winners for each category by gauging audience applause. All nominated entries were shown (or heard, in the case of the radio PSAs) back-to-back one category at a time. Only after all nominations within a category were seen or heard by the audience did the applause-based voting occur, with the aid of PSA and film titles and iconic still images displayed in sequence during the designated time for applause.

At the evening's conclusion, the gala was deemed to be not only a lot of fun, but quite worthwhile by those who attended. Don Waye, U.S. EPA's conference liaison, and one of the evening's organizers, summed it up this way: "The response was tremendous. Most of the stormwater outreach specialists who had come from all over the U.S. were amazed at the high production values, the incredible display of creativity, and impressive range of selections on display that night." Because of the spirit of cooperation among the agencies and organizations that produced these materials, outreach professionals who had been contemplating making their own ads now realize they have a rather nice choice, as most or all of the owners of these ads and films have generous permission policies for use or adaptation in other parts of the country. The winners and contact information for the ten video and radio categories are provided (see box on next page). An eleventh category, for best logo used in a nonpoint source outreach campaign, was voted on throughout the 3-day conference, one ballot per registered conference attendee. Congratulations are due not just to all the winners, but to all the nominees for generating high quality outreach products that have the ability to engage the public in positive water quality behaviors.

MINNESOTA WATER
LET'S KEEP IT CLEAN

The winning logo, out of 19 accepted entries and nearly 200 ballots cast, was created by Minnesota's Metro WaterShed Partners, a coalition of more than 40 public, private, and nonprofit organizations in the Minneapolis-St. Paul region. For more information about the partnership and its campaign, visit www.cleanwatermn.org or e-mail Ron Struss at ron.struss@cleanwatermn.org.

People's Choice Award Winners for Outstanding Nonpoint Source and Stormwater Messages

- Best Video for Watershed or Stormwater Education: Water Down the Drain with Alex the Frog; Center for Global Environmental Education, Hamline University, St. Paul, Minnesota (more information at http://cgee.hamline.edu/cgee_store)
- Best Radio PSA for Specific Stormwater Messages: Don't Trash Fresno, Smith and Jones II; City of Fresno, California (more information at www.donttrashcalifornia.info/radio_tv.htm)
- Best Radio PSA for General Stormwater Education: The Call; Texas Commission on Environmental Quality (more information at www.epa.gov/nps/toolbox/beta/detailspopup.html#107)
- Best Television PSA for Waste Management: Think Blue San Diego: Don't Trash Our Future, City of San Diego, California (more information at www.thinkbluesd.org/play.htm or www.epa.gov/nps/toolbox/beta/detailspopup.html#523)
- Best Television PSA for Yard Care: Delicious; Chesapeake Club, U.S. EPA Chesapeake Bay Office (more information at www.chesapeakeclub.org/TVads.htm)
- Best Television PSA for Septic Care or Pet Care: Scoop the Poop; Lake Champlain, Vermont (more information at www.echovermont.org)
- Best Television PSA for Stormwater Education - North Region: We All Live Downstream, 2004 version; Salt Lake County Stormwater Coalition (more information at www.stormwatercoalition.org)
- Best Television PSA for Stormwater Education - South Region: Think Blue San Diego; Fowl Water (Rubber Duckies), City of San Diego, California (more information at www.thinkbluesd.org/play.htm or www.epa.gov/nps/toolbox/beta/detailspopup.html#513)
- Best Television PSA for Watershed Education: My Water (with Publix) (more information at www.adoptawaterway.com: look under "gallery" tab.)
- Horizon Award: Take it Back (with Pink Floyd); Florida Department of Environmental Protection (more information at www.dep.state.fl.us/water/nonpoint/pubs.htm)

USDA Study Evaluates Impact of Conservation Practices

Are expanded Farm Bill conservation programs working as intended? A new study by the U.S. Department of Agriculture (USDA) is attempting to find out. Through its Conservation Effects Assessment Project (CEAP), the USDA is trying to quantify the environmental effects of conservation practices implemented through Farm Bill programs. Why? The 2002 Farm Bill dramatically increased spending on conservation programs, especially the Environmental Quality Incentives Program (EQIP). Through EQIP, producers can receive up to 75 percent cost-share to implement conservation practices. EQIP funding increased from an average of $200 million annually under the 1996 Farm Bill to over $1 billion annually in the 2002 Farm Bill. CEAP was initiated in 2003 to assess the impact of these increases and to evaluate other programs such as the Conservation Reserve Program, which pays producers to convert cropland to long-term vegetative cover.

The CEAP analyses, the first of which will be available in 2006, will potentially have broad application for:

(1) policy makers creating or revising agricultural conservation programs,

(2) scientists and economists evaluating physical and social impacts,

(3) watershed organizations developing and implementing plans to reach water quality goals, and

(4) agricultural producers making farm-level decisions about practice implementation.

CEAP Components

CEAP has two main components—a national assessment and series of watershed assessments. The national assessment component will provide scientifically credible estimates of the environmental benefits obtained from USDA conservation programs, while the watershed assessment studies will provide in-depth assessments of water quality and other benefits at a finer scale than is possible for the national assessment. Both types of assessments are discussed in more detail below.

(1) National Assessment—USDA is studying three active components within the national assessment: cropland, wildlife, and wetlands:

USDA Study Evaluates Impact of Conservation Practices (continued)

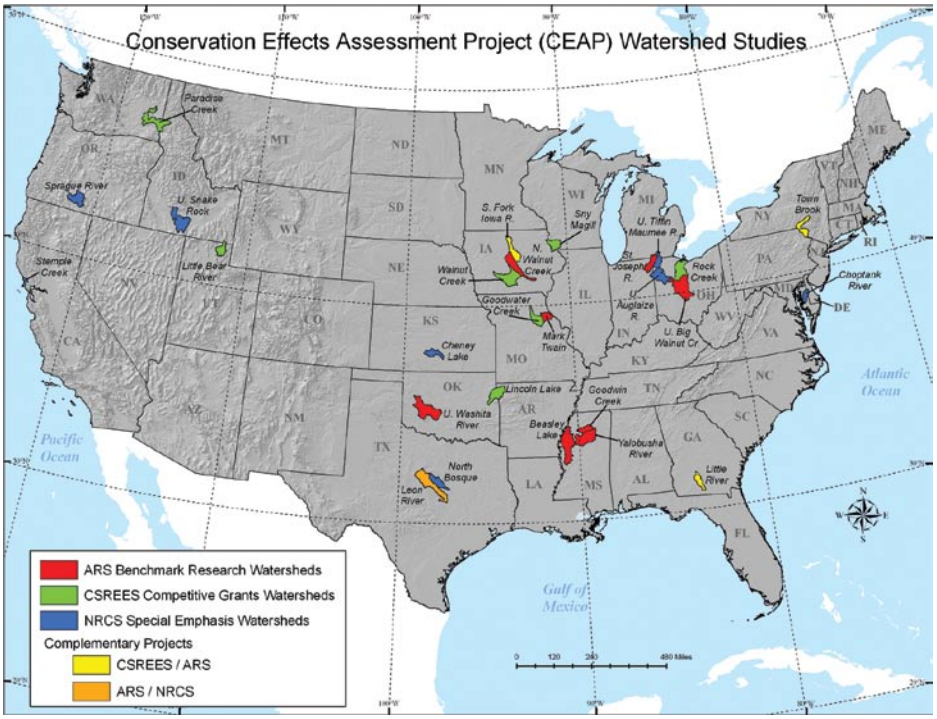
- In the cropland component, USDA uses a sampling and modeling approach to estimate the effects of conservation practices on water quality, water quantity, and soil quality nationwide.
- In the wildlife component, USDA is working with regional workgroups to build on existing efforts by states and wildlife organizations.
- In the wetlands component, USDA will quantify the environmental, biological and ecological effects of wetland conservation practices and systems on agricultural landscapes through collaborative regional assessments. The first two wetlands assessments are being conducted in the Prairie Pothole Region and the Mississippi Alluvial Valley. Additional wetland regional assessments will be added as funding becomes available.

A grazing lands component will be added to the national assessment in 2006. Air quality may be addressed in the future.

(2) Watershed Assessments—USDA agencies and their partners are currently studying individual watersheds across the country to gather more in-depth information for CEAP. The watersheds are separated into three categories:

- *Benchmark Watersheds.* The Agricultural Research Service (ARS) is conducting detailed research in 12 intensively studied watersheds that will be used to improve the performance of models used in the National Assessment and at the watershed level.
- *Special Emphasis Watersheds*. The Natural Resources Conservation Service (NRCS) is conducting eight watershed studies to look at specific resource concerns not fully addressed in the benchmark watersheds, such as manure management from animal feeding operation and water use and conservation on irrigated cropland.
- *Competitive Grants Watersheds*. The Cooperative State Research, Education and Extension Service (CSREES) is sponsoring eight studies that will focus on understanding on how best to schedule and locate conservation efforts within a watershed. These studies include outreach components as well as socio-economic components such as using a survey to identify primary social, cultural, and economic motivations and barriers related to conservation practices.

USDA currently has 24 watershed assessment studies underway across the country (see map). CSREES recently announced new grants to four more watershed projects to bring the total to 28 watershed projects.



CEAP Resources

As part of the CEAP program, the USDA is creating extensive bibliographies and literature reviews. In 2004, the USDA's National Agricultural Library (NAL) published a four-volume CEAP bibliography of citations and abstracts for literature published between 1985 and early 2004 on the effects of conservation practices and programs. This comprehensive bibliography contains over 2,700 citations and is available at www.nrcs.usda.gov/technical/nri/ceap/review.html. To keep the information current, NAL has developed online "dynamic" bibliographies (see www.nal.usda.gov/wqic/Bibliographies/dynamic.html). A dynamic bibliography is created when a predefined search strategy is run against a bibliographic database (such as

USDA Study Evaluates Impact of Conservation Practices (continued)

AGRICOLA). The term "dynamic" refers to the fact that a new bibliography is generated each time a search is run, so the bibliography's records are always up-to-date. By the end of 2005, the public will be able to access two literature reviews synthesizing the current state of the science on the environmental effects of conservation practices.

CEAP Partnerships

CEAP is possible thanks to a strong partnership between USDA agencies and others. Several USDA agencies, including NRCS, ARS, CSREES, National Agricultural Statistical Service (NASS), and Farm Service Agency (FSA), are working cooperatively to meet the CEAP goals. Other federal agencies such as the U.S. Geological Survey and U.S. Environmental Protection Agency are also involved. The watershed assessments involve many partners including universities, Cooperative Extension, conservation districts, drinking water suppliers, agricultural and environmental organizations, producers, and state agencies. Detailed information about CEAP is available at www.nrcs.usda.gov/technical/nri/ceap.

[For more information, contact Roberta Parry, CEAP Coordinator, USDA-NRCS, MS 5410, 5601 Sunnyside Ave., Beltsville, MD 20705. Phone: 301-504-2340; E-mail: roberta.parry@wdc.usda.gov]

News From the States, Tribes, and Localities

Makings WAVs: Innovative Program Helps Florida Volunteers Reach Out

The St. John's River Water Management District is blessed both with beautiful waterways and the energy of many volunteers devoted to protecting those waterways. The volunteers work though the St. John's River Water Management District's (District) Watershed Action Volunteer (WAV) Program, a unique partnership between the District and local governments in east-central and northeast Florida. The WAV Program connects individuals from all walks of life with watershed-related volunteer opportunities and serves as a model for others implementing nonpoint source pollution education and public involvement projects.

Map showing location of the counties participating in the St. John's River Water Management District's Watershed Action Volunteer Program.

The WAV Program began in the early 1990s when District staff member Bill Watkins secured a $60,000 Near Coastal Waters grant from EPA Region 4 and started a volunteer monitoring program. The District then received an EPA Clean Water Act Section 319 grant in the late 1990s, which allowed the District to enhance and expand the nonpoint source pollution education and outreach aspects of their volunteer program. Since then, the WAV Program has continued to grow and adapt to meet the needs of local organizations, volunteers, and the environment.

Program Structure

The District administers the WAV Program, which is available to all 18 counties in the District's service area. Currently, the District offers cost-share agreements of up to $10,000 per county that can be matched annually by local governments and/or organizations interested in water issues. Interested entities in each county can collaborate and contribute a combined match. Currently, 39 cash-contributing partners are at work throughout 14 of the District's 18 counties. Partners in most participating counties jointly contribute more than the minimum match of $10,000. "A full match allows us to provide a complete program. If the partners in a county provide more than the minimum, we are then able to enhance the program with additional resources," explains Watkins.

Contributing partners in each county work directly with that county's WAV Program coordinator, who is typically a contractor hired either by the District or the county, depending on each county's preference. Each county-level WAV Program coordinator works with the Watershed Action Volunteers (WAVs) in their county to implement projects for and with the contributing partners. The county-level WAV Program coordinator also works with the District's WAV Program staff as needed. Consequently, project decisions are made at the county level, with program support, structure, and materials provided as needed by the District WAV Program.

The District WAV Program promotes a central theme of water resource protection, watershed restoration, conservation, and education. Although each county's WAV Program is unique, most offer similar activities for volunteers, including water quality and submerged aquatic vegetation monitoring, storm drain marking, wetland and shoreline cleanups, administrative or laboratory support, education presentations, and public outreach efforts at special events. As many as 3,000 volunteers have worked on WAV projects over the past ten years of the program, and approximately 800 people are currently active. Everyone is welcome to volunteer—WAVs range in age from teenagers to retirees.

Projects Chosen on Local Level

Participants in each county's WAV Program help to design and select projects that best suit the needs of local partner organizations and the area's environmental resources. Here's a small taste of the variety of supported projects:

- WAVs from Clay County wanted more people to understand that storm drains often lead directly to natural waterbodies. The WAVs worked with Orange Park town employees and Cub Scouts to distribute brochures and label drains with markers asking people to remember, "no dumping -- flows to waterways."
- In Brevard County, WAVs collect and label insect specimens for the county's Natural Resource Management Office, which studies the insects to assess the region's ecology.
- Nassau County WAVs conducted native species counts at North Ocean Front Park and Seaside Park in Fernandina Beach to assess the health of the region's wildlife.
- WAVs in Alachua County made a collection of invasive species to show to the Lily Garden Club so they could recognize them if they appeared in their gardens.
- Clay County WAVs gave presentations on aquifer and watershed protection to library, school, and summer camp groups in the spring and summer of 2005.
- The Flagler County WAV Program partners with Palm Coast's Stormwater Management Department to monitor the health of canals in the city. WAVs are sampling water quality and the presence of invasive plants in the canals, using training and supplies provided by the District.

For more detailed information on these and other ongoing WAV projects, see www.sjrwmd.com/programs/outreach/education/wav.

WAV Program Pays Off for Partners

The program continues to be so successful, explains Watkins, because it benefits the partners on multiple levels. "We are finding that the WAV Program is building stronger collaborative relationships. Municipalities that had trouble communicating in the past are now gathering around the table talking about potential projects." By communicating better, local governments are now more likely to find ways to pool resources and save money on important projects.

The WAV Program also helps many of its partners—particularly the small counties and municipalities—meet their National Pollutant Discharge Elimination System (NPDES) permit requirements for stormwater-related public education and public participation. Small local governments are particularly well suited to benefit, as they often do not have staff with experience in environmental education or volunteer coordination, and they have limited resources for procuring the level

of service required by NPDES permits. In exchange for a modest fiscal contribution, the WAV Program provides these services. Some counties have been able to use the WAV Program to help meet requirements for other NPDES minimum control measures. Examples include providing municipal employee "good housekeeping" training, soliciting volunteers to carry out screening-level illicit discharge surveys, and involving students in GIS-based structural inventory mapping.

With help from Alachua County WAV Coordinator Lesley Leader, teens participating in an after-school program work together to net and examine macroinvertebrates in Possum Creek in northwest Gainesville.

All partners, whether or not they are trying to meet NPDES regulations, benefit from the energy and enthusiasm of volunteers. By donating time to watershed causes, WAVs allow under-funded and understaffed partner organizations to implement projects that they otherwise could not do. The volunteers also benefit, added Watkins. "Volunteers help because they are interested in protecting water resources, want to learn more, and want to be active in their community. The WAV Program works because it matches volunteers with the types of projects that interest them the most."

[For more information, contact Bill Watkins, St. John's River Water Management District, Watershed Action Volunteer Coordinator, 4049 Reid Street, Palatka, FL 32177. Phone: 386-329-4345; E-mail: bwatkins@sjrwmd.com; Web: www.sjrwmd.com/wav.]

Many WAVs Splash into Science

One education project in particular has been so successful that almost every county's WAV Program has adopted it on a continuing basis. Splash Into Science is a school-based education program that involves both students and their parents in watershed learning and interactive programs. The District initially launched the project in a few schools and received a lot of positive feedback from teachers, students, and parents. The District then handed over primary responsibility for the Splash into Science project to each county-based WAV Program Coordinator. The county-based WAV Coordinators work with the partners and the WAVs to implement the programs in schools throughout each county. When needed, the District WAV Program Education Coordinator is available to provide advice, program support, and materials.

The program teaches about water resources both in a classroom and in a "special event" setting. First, the county WAV Coordinator and participating WAVs visit upper elementary and middle schools, providing a series of grade-appropriate demonstrations and presentations. At that time, the students learn the basics of the water quality issues that will be presented at a "Splash into Science night." WAV presenters encourage the students to share the information and sell the importance of the issue to their parents prior to the night event. At the event, both students and WAVs help manage exhibit booths and lead interactive educational programs for the whole family. WAV partners and other community environmental organizations, such as local watershed groups and extension agencies, also join the event and set up exhibits and sponsor activities and games. "Splash into Science continues to grow by leaps and bounds," explains Watkins. "We've had almost 1,500 children and adults participate in one school's classroom and nighttime events. The program is great for the kids, their parents, and the volunteers."

After the Fire: Sowing Seeds and a Sense of Community

In May 2000, a prescribed burn on northern New Mexico's Cerro Grande summit raged out of control and became the largest wildfire in the state's history. By the time firefighters extinguished it a full month later, the fire had burned nearly 43,000 acres and destroyed more than 235 structures that housed 400 families. The local community and government agencies then faced the daunting task of restoring watersheds—and restoring citizens' morale. Multiple groups and agencies jumped in to help with the restoration effort. One project in particular—making and scattering seed balls—attracted a lot of local media attention and grabbed the community's interest and enthusiasm. In

the end, this project not only planted the seeds for new vegetation, but also provided an avenue to educate and energize community members about watershed protection and fire ecology.

Widespread Devastation

The Cerro Grande Fire impacted federal, tribal, and private lands, including a portion of the town of Los Alamos. Los Alamos was home to the largest concentration of people directly affected. Most of the homes burned were located along the west and north sides of town. Community members were shocked not only by the loss of homes, but also by the changed landscape around them. The nearby hills—once coveted as forested recreational areas and natural retreats—had become blackened and lifeless. Fueled by unnaturally dense stands of ponderosa pine, the extremely hot fire destroyed an estimated 37 million trees, as well as all other vegetation and viable seeds present on the ground and in the upper soil layers. The bare earth left behind was very vulnerable to erosion—and had no immediate seed source to naturally initiate revegetation.

Helping Hands Aid the Healing Process

People and organizations from all over the region quickly mobilized to stabilize the burned area. One group, the Pajarito Plateau Watershed Partnership (PPWP), has continued to be an active participant in the restoration effort. In 2001, PPWP received a $50,000 Clean Water Act Section 319 grant to conduct a variety of restoration projects, including tree planting, trail rehabilitation, and seed ball construction and distribution. Although all of PPWP's projects helped the recovery effort, the seed ball demonstration project was particularly noteworthy because of its ability to engage a wide cross-section of the community in watershed education and restoration activities at a relatively small cost. The project, which restored more than 40 acres, cost $10,000—most of which ($8,000) was used to buy seeds.

PPWP asked one of its member organizations, the Los Alamos-based Volunteer Task Force (VTF), to lead the seed ball demonstration project on 40 acres of burned area just west of Los Alamos. To effectively cover the 40-acre site, the VTF estimated that it would need a minimum of 150,000 seed balls. Working quickly, one person could only make about 200 seed balls in an hour. The VTF recognized that they'd need volunteers, and seized the opportunity to combine the seed ball-making effort with watershed education. VTF decided to ask for help from upper elementary grades in Los Alamos schools.

VTF approached school administrators with an offer they couldn't refuse. VTF developed a lesson plan that included introductory watershed education and pre- and post-fire ecology information presented by VTF members. The VTF offered to provide all materials and instructions for seed ball-making sessions at the schools. Finally, VTF offered to lead follow-up field trips to conduct vegetation assessments and seed ball scattering. To top it off, VTF's lesson plan fulfilled a long list of state-mandated educational standards (for a copy of the lesson plan, see www.volunteertaskforce.org/ppwatershed and click on the "Seed Balls" box in the left column). Because of the win-win nature of the offer, school administrators readily agreed to the partnership, and the seed ball project began in the fall of 2002.

Hands-on Education—at Its Muddiest

As would be expected, everyone enjoyed playing in the mud—and it made great news. Photographs of happy, mud-covered children frequented the local newspapers. "I think the children's favorite part of the whole project was plunging their hands into that first bucket of gooey mud," explained Craig Martin, VTF member and Los Alamos County Open Space Specialist. Word spread and the

What Are Seed Balls?

Seed balls are mud balls made of clay, sand, humus (organic material), and seeds. They are best suited for restoration in hot, dry climates. The mud protects the seeds from the hot sun and from predation by rodents, birds, and insects. When rain arrives, it soaks the seed balls until the ball disintegrates—allowing the seeds to sprout in moist, nutrient-rich pockets of earth.

To make a seed ball, thoroughly combine three parts clay, one part humus, one part sand, one part native seed mix, and enough water to bring the mixture to the consistency of cookie dough. The mixture should be sticky enough to hold together in a ball, but not so sticky that it adheres to hands. A pinch of the mix is rolled between the hands to form a sphere about ¾ inch in diameter. The rolled seed balls are air-dried and then stored until ready for distribution.

Seedball sprouts after a rain.

seed ball-making effort was quickly adopted by other elementary schools in nearby Santa Fe, as well as scout groups, church groups, school service groups, senior citizens, and others throughout the area. Senior citizens—many of whom could not participate in the more physical volunteer restoration projects such as spreading mulch or planting seedlings—were delighted to have an opportunity to participate. By the spring of 2003, more than 2,700 community volunteers had created 250,000 seed balls.

Elementary student admires his mud-covered hands during a seed ball-making session.

In Spring 2003, VTF conducted seed ball distribution field trips for the schoolchildren. First, the children participated in a ground cover study at the demonstration site to establish baseline data for monitoring seed ball effectiveness. Then, each student took a bucket of seed balls, lined up an arm's length away from the next child, and began to walk, dropping a seed ball after every other step. After walking and dropping seed balls for approximately 50 yards, project leaders asked the students to turn around and toss their remaining seed balls into the coverage area. A few other groups, including scouts and school service groups, also made special trips to help distribute the balls they had made a few months earlier. Now, the volunteers had to just sit back and wait for the seeds to sprout when the rains came.

The Rain Never Came…

Unfortunately, dry conditions during 2003 and 2004 stalled the project. Los Alamos averages 19 inches of precipitation per year; 2003 yielded only 9.3 inches. Rainfall patterns in 2004 were similar. With precipitation 50 percent of normal during the study period, seed balls could not sprout and take hold. "When the seeds did sprout, they quickly dried out and died," explained Martin. VTF's follow-up vegetative cover assessment in the demonstration area showed virtually no change over the 18-month study period. Control areas, which had not received treatment with seed balls, had an average ground cover that was about the same.

If at First You Don't Succeed…

During the project period, volunteers created 100,000 more seed balls than VTF had estimated it would need to cover the 40-acre demonstration site. Even now, some volunteers continue to contribute seed balls, adds Martin. "Many groups that volunteered to make seed balls in 2002 have asked to do so again." Since 2003, VTF has used the surplus seed balls to re-treat some of the demonstration site, and to cover an additional 20 acres of burned area outside of town. As the county's Open Space Specialist, Martin drops seed balls wherever he thinks they might make a difference. "Thanks to these volunteers, I am supplied with a bucket of seed balls wherever I go."

Students drop seed balls in the burned area.

During 2005, the region has experienced more normal rainfall, although long periods of hot and dry weather have continued to hamper growing conditions. Still, Martin is beginning to see more and more plants that he links to seed ball application. "Although it has been too dry for many of the warm season grasses to take hold, I frequently see wildflowers that we included in the seed ball mixtures. From a distance the burned area still looks black and lifeless—but the closer you get, the greener it looks!"

Although the weather prevented the seed ball demonstration project from being the tremendous re-vegetation success it could have been, notes Martin, "the true success was the project's ability to reach the community and allow people to feel like they made a difference." VTF's use of a relatively simple fire restoration tool allowed nearly 3,000 individuals—ranging in age from five to 84 years old—to participate in restoring their community and to learn about watersheds and fire ecology. "Based on our experience," concluded Martin, "I strongly believe that seed balls are a great addition to any community's post-fire restoration toolbox."

[For more information, contact Craig Martin, Open Space Specialist, County of Los Alamos, Parks Division, P.O. Box 30, Los Alamos, NM 87544. Phone: 505-661-8480; E-mail: openspace@lac.losalamos.nm.us; Web: www.volunteertaskforce.org.]

Notes On Watershed Management

Subwatershed Reconnaissance Helps Target Outreach Efforts

Urban subwatershed restoration has traditionally focused on the stream corridor, with less attention paid to upland areas where neighborhoods and businesses are located. However, these upland areas are important in subwatershed restoration, since they contribute stormwater pollutants to the stream corridor. Now, the non-profit Center for Watershed Protection (CWP) has developed a new method to enable watershed practitioners to better assess whether residents and business owners in these upland areas engage in behaviors that can influence water quality. The method, known as Unified Subwatershed and Site Reconnaissance (USSR), can be used to help develop watershed plans and can also help to identify specific audiences for education and outreach efforts.

How Does it Work?

The CWP developed the USSR as a field survey that can be used by watershed groups, municipal staff, and consultants to quickly assemble a comprehensive initial inventory of potential pollution sources and restoration opportunities within urban subwatersheds. The USSR is quick and inexpensive, applies over a wide range of subwatershed conditions and climates, and has four major assessment components:

- Neighborhood Source Assessment (NSA), which profiles pollution source areas, stewardship behaviors, and residential restoration opportunities within individual neighborhoods.
- Hotspot Site Investigation (HSI), which ranks the potential severity of each commercial, institutional, industrial, municipal, or transport-related hotspot found within a subwatershed.
- Pervious Area Assessment (PAA), which evaluates the potential to reforest turf areas or restore natural area remnants at all open parcels within a subwatershed.
- Streets and Storm Drains (SSD), which measures the average pollutant accumulation in the streets, curbs, and catchbasins of a subwatershed, and investigates the on-site retrofit potential for parking lots.

CWP created the USSR to provide a quick but thorough characterization of all upland areas for the purposes of (1) identifying major source areas that are contributing pollutants to the stream and (2) controlling pollution sources through education, source controls, pervious area management, and improved municipal maintenance. Together, the four USSR assessments produce a wealth of useful data to help identify and locate potential restoration practices in a subwatershed, such as lawn care education, stormwater pond maintenance, natural landscaping and reforestation, street sweeping, and hotspot permit enforcement, among others.

To conduct the USSR in a subwatershed, a watershed practitioner primarily relies on maps and a "windshield survey" of the subwatershed's uplands, followed by some data analysis. First, the practitioner will review maps and aerial photographs (if available) to locate neighborhood areas for study and to identify potential pollution sources. Then, a field crew will drive down every street in the subwatershed and look for possible restoration sites and specific pollution sources and hotspots. When necessary, the crew can get out of the vehicle for a closer look. The crew fills out field forms for the four different types of assessment components noted above. These field forms are provided by CWP and can be modified by the watershed practitioner to best suit the subwatershed under assessment. "We have found that a two-person team typically covers an average of two square miles each day," explained CWP's Jennifer Zielinski. "Subwatersheds with more urban features usually take a little longer."

CWP designed the USSR to be used in different places by groups with varying degrees of resources and technical capabilities, explained Zielinski. "Preparing and conducting the USSR is fairly easy. Once you have gathered the basic data, you have many analysis options—ranging from just

Need More Information?

The CWP's publication Urban Subwatershed Restoration Manual No. 11, ***Unified Subwatershed and Site Reconnaissance: A User's Manual***, provides more detailed information on the USSR and is available from CWP (www.cwp.org) for $30. This manual includes a CD that provides electronic forms that can be modified to suit the assessment needs of individual subwatersheds.

Subwatershed Reconnaissance Helps Target Outreach Efforts (continued)

looking over the field sheets and making lists to inputting the data into spreadsheets or databases for analysis." CWP estimates that a subwatershed survey (about 10 square miles) will cost between $2,500 and $7,400. Costs will vary depending on the area of the subwatershed, payment status of the field crew (paid staff versus volunteers), field crew's experience, equipment needed, the number of sites to visit, and the type of data analyses conducted. The USSR manual provides suggestions about how to analyze the data to obtain different types of information.

A Closer Look

CWP had found two of the four assessments—the NSA and the HSI—to be especially useful in developing watershed education and outreach plans, developing pollution source control plans, and identifying sites for on-site, small-scale stormwater retrofit and restoration projects. The NSA focuses on assessing residential neighborhoods, whereas the HSI focuses on assessing stormwater "hotspots."

Neighborhood Source Assessment

The NSA is a rapid field survey that quantifies potential pollution sources within neighborhoods and identifies potential stewardship and restoration practices. During the NSA portion of the windshield survey, the field crew systematically assesses the residential behaviors that contribute to stormwater problems by subsampling individual lots, curbs, catchbasins, and common areas and recording the information on a NSA field form. A NSA field form evaluates five parts of a typical neighborhood:

- Neighborhood Characterization: Compiles basic information about the neighborhood, such as housing type and average lot size.
- Yard and Lawn Conditions: Assesses vegetative cover and management practices on typical lawns in the neighborhood.
- Driveways, Sidewalks, and Curbs: Evaluates housekeeping on these impervious areas, including pet waste pick-up and car washing, and estimates pollutant accumulation.
- Rooftops: Quantifies how rooftop runoff is managed on the average residential lot.
- Common Areas: Evaluates practices in common neighborhood areas, such as stormwater ponds, buffers, presence of pet waste, and flood plains.

The NSA collects data on more than 30 neighborhood factors (such as pet waste, septic system care, car care, etc.) that can be linked either to pollution sources or potential stewardship practices (see the USSR User Manual for details). For example, a neighborhood found to have a lot of high management turf would be paired with the stewardship factor "reduce fertilizer use." A neighborhood found to have pet waste present on the ground would be paired with the stewardship factor "pet waste education/enforcement." This information helps the watershed practitioner know what type of targeted education is needed for each neighborhood. The last part of the NSA form

Applying Subwatershed and Neighborhood Metric Screening

Subwatershed metrics allow users to rank the restoration potential among groups of neighborhoods and subwatersheds. The basic approach is simple: select metrics (types of measurements) that are most important to your watershed planning goals, then see how individual neighborhoods or subwatersheds rank in the process. Table 1 provides a hypothetical example of how neighborhood screening works. In this case, the pollutants of concern for the subwatershed were nutrients and bacteria. Four neighborhood metrics were developed that were strongly related to these pollutants. These metrics include the proportion of high management ("high input") turf, overall turf cover, and the presence of pet waste and septic systems. This simple screening process indicated that neighborhood A should be the top priority for nutrient education since it scored high for three of the four metrics.

Table 1: Example of USSR Data Being Used to Compare Across Neighborhoods

Neighborhood	% High Input Turf	Turf Cover as % of Lot Area	Pet Waste Scores	Presence of Septic Systems
A	65	70	Yes	15
B	10	35	No	12
C	5	35	No	17

Subwatershed Reconnaissance Helps Target Outreach Efforts (continued)

identifies key residential behaviors causing pollution in the neighborhood and computes an index that rates the overall severity of nonpoint source pollution for the neighborhood as a whole. NSA data from individual neighborhoods is then used to generate counts, maps, lists of projects, and metrics that may be used to prioritize neighborhood and subwatershed education and outreach activities.

Hotspot Site Investigation

The HSI is a rapid survey to assess the impacts of hotspot operations in urban subwatersheds. Stormwater "hotspots" are defined as commercial, industrial, institutional, municipal, or transport-related operations that produce higher levels of stormwater pollutants, and/or present a higher potential risk for spills, leaks, or illicit discharges. The HSI investigates six distinct pollution sources at each suspected hotspot, and identifies pollution prevention practices to address those sources. The HSI produces a comprehensive list of confirmed hotspots for each subwatershed ranked by their relative severity. The list can be used to determine what, if any, outreach and education, pollution prevention, or discharge prevention strategies should be pursued. The HSI field form consists of seven parts:

- Site Data and Basic Classification: Collects basic location and land use information about the site, and includes a brief description of its operations.
- Vehicle Operations: Evaluates routine vehicle maintenance and storage practices at the site, as well as vehicle fueling and washing operations.
- Outdoor Materials: Examines the type and exposure of any outdoor materials stored at the site or mobilized at loading docks.
- Waste Management: Assesses housekeeping practices for waste materials generated at the site, including dumpster leachate.
- Physical Plant: Assesses maintenance practices used for cleaning, remodeling or repairing buildings, outdoor work areas, and parking lots.
- Turf/Landscaping Areas: Examines the practices used to maintain lawn or landscaping areas, with special emphasis on fertilizer use and non-target irrigation.
- Stormwater Infrastructure: Examines and evaluates the condition of infrastructure and control practices used to convey or treat stormwater, including the curb and gutter, catchbasins, and any stormwater treatment practices.

The HSI collects data on more than 20 site factors linked either to pollution sources or potential pollution prevention practices. The HSI form provides a grid to sketch the site and locate potential pollution prevention practices. During the windshield survey, the field crew takes photographs to document site conditions. The last part of the HSI evaluates the overall pollution potential for the site and designates it as either a potential, confirmed, or severe hotspot, or not a hotspot at all. The hotspot designation dictates the type of follow up actions needed for the site. HSI data for the subwatershed as a whole are then entered into a spreadsheet, database, or GIS to examine both hotspot density and severity. The resulting counts, maps, and metrics may be used to prioritize pollution prevention and education/outreach activities and target audiences among commercial, industrial, institutional, and municipal property owners.

Applying USSR

Over the past few years CWP has tested and refined the USSR while developing approximately 20 watershed plans around the country. Zielinski recommends that anyone crafting a watershed plan should conduct an assessment like the USSR. "During watershed planning, people tend to look only at the stream corridor and often overlook the pollution sources in the uplands. Not only does the USSR give you the tools you need to develop a comprehensive watershed plan, it also helps you to get to know all of your watershed."

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"Practicing What You Teach" Pays Off

Florida is very flat. As a result, residents sometimes have a difficult time understanding the concept of a watershed. In 2002, the Southwest Florida Water Management District (District) recognized the need to develop a coordinated, comprehensive watershed education program to raise watershed awareness and protect water resources. Before embarking on a large-scale project, District staff decided to implement a pilot program in a single watershed—and they are glad they did. Although very successful in its own right, the pilot program highlighted some aspects of the effort that could be improved. Now, armed with the pilot program's information, the District recently launched an expanded, improved education program throughout a number of watersheds.

Brooker Creek Watershed Pilot Education Program

The District's initial work began in 2003 and focused on the development and implementation of a pilot program in the Brooker Creek watershed, a 39-square-mile watershed that ultimately drains to Tampa Bay. The District selected this watershed, located in northern Pinellas and Hillsborough counties, because it contains the last green space in a very densely populated region in Florida. Brooker Creek was also chosen because it still maintains relatively good water quality, despite escalating development pressure. Issues arising from development pressures in this watershed are representative of other watersheds in the District.

The first step of the Brooker Creek pilot project consisted of researching and analyzing the target audience for the program—watershed residents. The District designed a comprehensive public survey to determine perceptions of watershed issues, common practices related to the areas of concern, behaviors in which watershed residents currently engage, and behaviors that should be the focus of the messages developed for the pilot program. The results of the survey confirmed the need to develop and implement a watershed education program for the Brooker Creek watershed: only 4 percent of residents who were surveyed were able to clearly explain what a watershed is; fewer than 7 percent knew they lived in the Brooker Creek watershed; and only 19 percent of residents surveyed knew they lived in a watershed at all.

Based on its research and the survey results, the District worked with a consultant to develop a comprehensive watershed education plan for Brooker Creek. The plan followed the six-step protocol outlined in EPA's "Getting in Step: A Guide for Conducting Watershed Outreach Campaigns" by including information about the District's goals; plan objectives; key target audiences and their characteristics; selected messages, formats, and distribution mechanisms for the messages; and evaluation indicators of the education effort.

As described in the plan, in the first year of the program, the District concentrated mainly on helping people to better understand both the watershed concept and how people can impact water resources. Because so many target audience members reported reading two particular newspapers more frequently than others, the District developed an educational watershed newspaper insert for distribution through the regional editions of those papers that cover the watershed area. The District printed 47,000 inserts, 31,000 of which were distributed through those newspapers. The District distributed the remainder of the inserts through area schools, at special events, and in several public locations. The District also ran newspaper ads publicizing watershed events.

Other materials developed and distributed by the district included slideshows, a youth activity packet for school-age children, posters and other display materials, and giveaways including totebags, magnets, mirrors, pens and pencils, and small drip-irrigation kits for gardens. The District also used other means to spread their message, including hosting a school artwork competition, a school field trip to the Brooker Creek Preserve Environmental Education Center, a homeowner workshop, and a rain barrel workshop. The District sent materials through direct mail, offered materials at mall displays, showed an educational watershed ad in 20 theaters for eight weeks (providing 142,085 impressions), and aired three 30-second television public service announcements (PSAs) and three radio PSAs. In addition, the District held a number of "parking lot" events to educate residents about the Brooker Creek watershed. Two area radio stations promoted the events and were on-hand for live broadcasts. Finally, the District partnered with Pinellas and Hillsborough

counties to develop and post 25 watershed signs along frequently used roads in those counties. The signs alert drivers that they are entering the Brooker Creek Watershed and that the watershed is part of the Greater Tampa Bay Watershed.

Results of the Pilot Program

The Brooker Creek pilot program was completed at a cost of $179,000, which included all consultant, survey, planning, materials, staff time, mail and media, and evaluation costs for a two-year period. To determine effectiveness of the outreach materials and activities undertaken for the pilot project, the District conducted a follow-up phone survey in November 2004. The survey focused on the respondents' recall of receipt of watershed educational materials and messages through various media mechanisms and activities carried out for the project. The survey also measured post-project watershed awareness and assessed whether the target audience had heard of, or attended, any of the project events or activities.

The survey showed that the pilot project succeeded in increasing people's watershed awareness. Survey statistics indicate that only 19 percent of respondents knew they lived in a watershed before the project began, compared to 30 percent after the project was completed. While this statistic points out that a sizeable knowledge gap remains, the results do show that the pilot program yielded a 58 percent increase in watershed awareness within an estimated watershed population of 28,000.

The survey showed that the use of newspaper inserts was most successful in raising awareness. In the baseline survey, only 8 percent of those respondents indicating that they'd heard of the Brooker Creek watershed obtained this information from the newspaper, compared to 28 percent in the post-pilot project survey.

Lessons Learned from Pilot Program

Upon final review of the Brooker Creek pilot program, the District identified several lessons learned that they are incorporating into the education programs in their follow-up watersheds, including:

- Don't try to do too much at once. The District learned to focus on two or three efforts that are manageable and can be properly implemented and evaluated. This is especially important considering the limited staff and budget available to these projects. Current watershed efforts are focusing on a limited number of behaviors and audiences.
- Isolated public events are not cost-effective—try to combine events. Although the targeted "parking lot" events were successful at reaching people not knowledgeable about watersheds, the turnout did not justify the expense and staff time. In the follow-up watershed efforts, the District changed tactics and began piggybacking onto existing special events, creating more targeted presentations in the community, and holding watershed leadership workshops.
- The need for partners is substantial. The Brooker Creek pilot project had few participating partners, which left much of the effort to a small staff. In follow-up watershed efforts the District has made partnerships a top priority, coordinating the creation of a consortium of watershed stakeholders to share research, expand audiences, and compound results.
- Place more emphasis on awareness and education at the outset versus behavior change. At the beginning of the pilot program, the District hoped to change behaviors throughout the watershed. However, as the effort moved forward, the District quickly learned residents first had to become aware of watersheds and their importance.

Moving from Lessons Learned to Next Steps

The District's "new and improved" watershed education efforts are continuing in the Brooker Creek watershed (as Phase 2) and are expanding into four additional watersheds: Peace River, Lemon Bay, Hillsborough River, and King's Bay/Crystal River. In the future, the District will develop educational programs for all eleven major watersheds in its jurisdiction.

For each of the watersheds addressed by the current education project, the District is researching which materials and activities can be used/modified from the Brooker Creek pilot and what new

"Practicing What You Teach" Pays Off (continued)

components will need to be developed. The District expects that the experience gained and materials developed during the pilot will ultimately pay off in the other watersheds. "Because we first implemented the program as a pilot, we had the freedom to try different tactics to see what would work the best. We also designed the tools as templates to be adapted for other watersheds," explains Beth Bartos, Communications Manager with the Southwest Florida Water Management District. "Now that we know what type of research to conduct and what tools to use, we will definitely save money over the long term."

[For more information, contact Beth Bartos, Communications Manager, Southwest Florida Water Management District, 2379 Broad Street, Brooksville, Florida 34604. Phone: 352-796-7211, ext. 4761; E-mail: beth.bartos@swfwmd.state.fl.us.]

Nuts for Watershed Restoration?

Collecting fall nuts isn't just a squirrel's job anymore. Volunteers all over the Chesapeake Bay Watershed are scooping up acorns, walnuts, and other seeds from native trees and donating them to the non-profit Growing Native program to support watershed restoration. Growing Native delivers the nuts and seeds to state nurseries throughout the Potomac River watershed, where the seeds are planted and nurtured until ready to be transplanted into forest buffers. Educators, community groups, and individuals across the watershed are thrilled to have the opportunity to learn about and participate in watershed restoration.

Why Use Nuts from Native Trees?

Growing Native specifies that volunteers must collect nuts from native trees. Why? Native trees are especially beneficial in watershed restoration efforts because they evolved in the region in response to climate, soils, rainfall amounts, drought, and frost. Additionally, the wildlife in the local community has evolved along with these native species and relies on them for food and shelter. Thus, native plants possess the correct traits that make them uniquely adapted to local conditions.

The Potomac Watershed Partnership and the non-profit Potomac Conservancy launched the Growing Native program in 2001 in the Potomac River watershed, a major tributary of the Chesapeake Bay. At that time, demand for native seedlings had exploded as more and more landowners began planting forest buffers and restoring streamside areas in response to financial assistance opportunities and an increasing awareness of the benefits of riparian buffers. Prior to the Growing Native effort, State Forest Service employees had collected all the nuts and seeds on their own, in addition to attending to their other duties. As a result, state nurseries struggled to meet the increasing demand for native tree seedlings. By coordinating the efforts of volunteer "nut collectors," Growing Native has ensured that a bountiful supply of native trees will be available for watershed restoration efforts.

Scout leaders proudly display a small sampling of the 500 pounds of native seeds collected by twelve troops at a site in Prince George's County, Maryland in 2003 (photo copyright Ed Tenney). "Growing Native was a wonderful fit for the Girl Scouts. It offered the girls a hands-on science lesson while participating in a positive community service project," said Ann Rowe, who leads a Girl Scout troop in Rockville, Maryland.

Success!

The Growing Native program has continued to expand since its inception. The program provides an easy way for people of all ages and abilities to help with watershed restoration and has proven to be so popular that it has quickly spread from the Potomac River watershed throughout the entire Chesapeake Bay watershed. In 2001 and 2002, volunteers collected 11,000 pounds and 15,000 pounds of native hardwood tree seeds, respectively. By 2003, that number had grown to more than 18,800 pounds, collected by more than 7,000 volunteers at more than 300 sites across the Chesapeake Bay watershed, from Pennsylvania to Virginia. School children, scouts, churches, homeowner associations, businesses, and individual families donated more than 14,000 hours of volunteer service by "getting nuts for clean water." Few nuts were collected in 2004, explained Richard Garrett, Manager of Ayton State Tree Nursery in Preston, Maryland, because nut trees are cyclical and have one year out of three or four when they produce few nuts. The nut harvest rebounded in 2005—more than 5,000 volunteers collected an estimated 20,000 pounds of nuts.

Nut collectors are asked to adhere to "proper collection guidelines" to protect nut quality. The guidelines include information about how to identify healthy trees and nuts, how to store them after collection, and how to label them. Most of the nuts collected become available as seedlings in one to two years. Bryan Seipp, the Potomac Conservancy's Forester and Director of Restoration, says, "We've seen an average survival rate in our projects of 85 to 90 percent." The high survival rate translates into big savings for the state's watershed restoration budget. Since its inception in 2001, the Potomac Conservancy estimates that Growing Native has saved the states of Maryland and Virginia a combined $1.5 million through seed collection and seedling plantings.

Reaping What You Sow

In Spring 2003, the program came full circle—volunteers began planting seedlings from the 2001 nut harvest in riparian areas along the Potomac River and its tributaries. Since then, the Potomac Conservancy has coordinated the planting of more than 7,500 trees in community areas, including parks in Virginia's Arlington and Loudoun Counties and Maryland's Frederick and Montgomery Counties. In addition to the Potomac Conservancy's plantings, Maryland and Virginia have planted countless trees through the U.S. Department of Agriculture's Conservation Reserve Enhancement Projects and other programs. Volunteer groups throughout the Chesapeake Bay watershed have also planted many trees as part of their streamside restoration efforts.

Growing Native volunteers take part in tree plantings along streams in their community, often using trees that grew from seeds collected by other volunteers two years earlier (Photo courtesy of the Potomac Conservancy).

Many of the same volunteers who planted trees have also been involved in gathering nuts. Patrick Earle, a teacher at T.C. Williams High School in Alexandria, VA, has been involved in the program with his students. He said, "If we hope to cultivate a stewardship ethic in our young people, it's essential that we give them hands-on opportunities to get involved in the protection of our environment. The Growing Native program did just this. Students were motivated to get involved and make a difference. What excites me most is that this can be an ongoing project year after year so that students will eventually be able to plant the seedlings from seeds collected by prior students. In the future, students will be able to return to the trees that they plant and take pride in knowing that they planted that tree years ago."

Growing Native is a program of the Potomac Watershed Partnership (PWP), a public-private watershed restoration and stewardship venture. Growing Native is funded through grants from Ford Motor Company and Aveda. The Potomac Conservancy, which serves as a key member of PWP, continues to serve as the Growing Native coordinator for the Chesapeake Bay watershed. PWP is composed of seven major partners: the USDA Forest Service, the Virginia Department of Forestry, the Maryland Forest Service, the Pennsylvania Department of Environmental Protection, Ducks Unlimited, the George Washington and Jefferson National Forests, and the Potomac Conservancy. For more information about the program, see www.growingnative.org.

An Award-Winning Idea

In 2003, CF Industries recognized the Growing Native program by awarding it one of only four National Watershed Awards. The award recognizes model programs that protect local watersheds. Matthew Logan, President of Potomac Conservancy, explains the benefits of the Growing Native program, "The state of our streamside lands is the most important factor affecting the quality of our waters. By supplying seedlings to restore degraded forests along our rivers and streams, Growing Native supports one of the most effective measures we can take to protect the waters on which we all depend for our health and enjoyment."

[For more information, contact Colleen Langan, Growing Native Program Coordinator, Potomac Conservancy, 8601 Georgia Ave., Suite 612, Silver Spring, MD 20910. Phone 301-608-1188 x 211; E-mail: coordinator@growingnative.org; Web: www.growingnative.org.]

Notes On Education

Roll Out the Barrels: The "Art" of Nonpoint Source Education

What catches the rain and the eye of passersby? People living in central Kentucky likely know the answer—an artistic rain barrel! For the past two years, the nonprofit group Bluegrass PRIDE (Personal Responsibility In a Desirable Environment) has sponsored the decoration, display, and auction of rain barrels as a way to both educate community members about stormwater runoff and to raise funds to support the organization's work.

Bluegrass PRIDE Says "Weather Matters"

Bluegrass PRIDE's Weather Matters Month is a multi-faceted campaign designed to inform Central Kentucky citizens about stormwater and other nonpoint source pollution—what it is, how people's actions contribute to it, and what people can do to help. First implemented in 2004, the campaign targets both youth and adults; outreach components included "Storm Water Sleuths" sticker books, informational placemats for restaurants, storm drain stenciling, rain barrel workshops, display of artistic rain barrels, and public service announcements on television, radio, and in print media. Weather Matters Month, celebrated in April of each year, is the key water quality component of Bluegrass PRIDE's overall environmental outreach program. For more information, see www.kentuckypride.com.

The idea began in early 2004 when the group was planning a new stormwater outreach program called "Weather Matters Month" (see box). Bluegrass PRIDE had received a donated rain barrel and planned to give it away as part of the program. Staff member Brenda Lynch suggested that Bluegrass PRIDE could easily make rain barrels from readily available food-grade and bourbon barrels, and perhaps sell them to support the outreach program. She went on to mention how the City of Lexington had raised money for local arts groups by displaying and selling decorated horse statues. She suggested that PRIDE try the same tactic with decorated rain barrels—and a great idea was born.

In the spring of 2004, Bluegrass PRIDE sent out an e-mail seeking local artists who would be willing to volunteer their time and talent to decorate converted wooden bourbon barrels and plastic food barrels. Word spread quickly and the response was overwhelming, explains Amy Sohner, Deputy Director of Bluegrass PRIDE. "The first year, we were surprised not only by the large number of artists who came forward to help, but also by the incredible pictures they created." Response to Bluegrass PRIDE's artist solicitation in 2005 was just as enthusiastic, added Sohner. The participating artists ranged from high school groups with artistic talent to individuals who typically sold their work through art galleries. To help offset costs associated with barrel decorating, Bluegrass PRIDE gave artists $30 for each large barrel they decorated.

Barrel Displays Draw Attention….

In April of both years, Bluegrass PRIDE placed approximately 35 decorated barrels in libraries, coffee shops, restaurants, and other local businesses throughout Central Kentucky. The vivid, creative barrels drew visitors' attention—and invited them to take a closer look. A display by each barrel provided information about the artist(s) and offered free brochures that explained the rain barrel program, described stormwater pollution, and illustrated how people could reduce their contributions to nonpoint source pollution. The brochures also invited readers to visit Bluegrass PRIDE's Web site to view all of the decorated rain barrels and to vote for their favorite. Once at the Web site, viewers had access to even more information about nonpoint source pollution prevention.

The whimsical "Gazebo," created by two local artists, won first prize in the 2005 rain barrel competition. The runner-up, "Healthy Water, Healthy Planet," shows a high school group's interpretation of the interconnectedness of our environment.

Media coverage has contributed to the ongoing success of the rain barrel project. In 2004, the Lexington Herald Leader featured the campaign in a lead article in the paper's Home and Garden section. In 2005, the paper included the auction information in its community calendar section. Local radio stations and local NBC, ABC, and CBS affiliate television stations broadcast information about the barrels and the auctions in both 2004 and 2005. The attention generated significant traffic on Bluegrass PRIDE's Web site—

between April and July 2005, more than 1,600 first-time visitors stopped by. The media coverage also prompted an untold number of people to go out of their way to see the barrels in the community gathering places and to attend the auction events.

In 2005, some artists also painted decorative, non-functioning rain barrels to display at businesses that lacked room for large rain barrels. "Fun with Horses" reflects Kentucky's close association with the horse.

Sold to the Highest Bidder

In the summer of both years, Bluegrass PRIDE sold the decorated rain barrels at auction. The first year, Bluegrass PRIDE held its bi-annual awards meeting, followed by an evening silent auction of the rain barrels. Both events were open to the public and advertised through local media. That year, the silent auction raised $5,000—enough to pay for an AmeriCorps student to help Bluegrass PRIDE work with the local schools for the 2004-2005 academic year.

The second year (2005), Bluegrass PRIDE held a live auction for the rain barrels in conjunction with a "celebrity waiter" fundraising dinner in July. Local celebrities, such as TV personalities and politicians, volunteered to wait tables in exchange for donations to Bluegrass PRIDE. The evening also included a silent auction of a variety of items donated by local businesses. In all, the second event raised $11,000 to support the group's mission.

Lessons Learned

Bluegrass PRIDE is very pleased with the rain barrel project so far. However, Sohner notes that they are continually trying to improve the program. For example, the group used a combination of wooden and plastic rain barrels in 2004. Unfortunately, the paint did not adhere well to the plastic barrels and began chipping off during transport, so in 2005 Bluegrass PRIDE chose to use mostly wooden barrels, explained Sohner. "In Kentucky, wooden bourbon barrels are easy to come by, easy to paint, and look great as rain barrels." However, when the group used all wooden barrels they became aware of other difficulties. "We found that wooden barrels are extremely heavy, difficult to transport, and require constant maintenance to ensure they don't dry out or smell." Next year, Sohner plans to switch back to all plastic barrels, and is already talking to an auto body company about finding a protective top coat that can be applied over the paint.

Sohner also plans to keep the rain barrel auction separate from other large fundraising efforts in the future. Although the 2005 celebrity waiter event was very successful, Sohner felt "it overshadowed the rain barrel auction held that same night." By separating the events in the future, Sohner hopes that each can get the attention it deserves.

Sharing the "Art" of Education

Bluegrass PRIDE's innovative idea to combine art exhibition with stormwater education is another great example of social marketing—find out what attracts people's attention, and then tailor the environmental message to match it. In this case, the colorful, creative barrels drew the notice of art enthusiasts and the "just plain curious"—leading most to look at the simple brochure and absorb at least some of the stormwater management message. Some of these people, many of whom had never really thought much about stormwater before, eventually installed a rain barrel on their property. Bluegrass PRIDE's successful rain barrel project serves as a model of what environmental groups can achieve when they get creative!

[For more information, contact Amy Sohner, Deputy Director, Bluegrass PRIDE, P.O. Box 910384, Lexington, KY 40591. Phone: 859-266-1572; E-mail: Amy@KentuckyPRIDE.com.]

Targeting Stormwater Hot Spots

Bluegrass PRIDE targeted its rain barrel distribution efforts in communities with municipal separate storm sewer systems (MS4) located in and around Lexington. Bluegrass PRIDE focused on these areas because stormwater flowing across the land in these areas is generally collected and conveyed directly to local waterways by ditches, storm drains, or other means. Federal regulations require that all MS4s which meet a threshold population density criteria implement programs—including education programs—to control polluted stormwater runoff. Through its stormwater education work, Bluegrass PRIDE is serving the region's citizens and helping municipalities comply with regulations. For more details on MS4s, refer to the EPA's MS4 Web site at http://cfpub.epa.gov/npdes/stormwater/munic.cfm.

Editor's Note: The following three articles highlight a growing trend in environmental education—the effort by environmental groups to devise new and innovative ways to help students of all ages and backgrounds understand their place in the larger environment. In the first article, an environmental group sponsors a watershed education boating trip for a group of high school students. The students travel hundreds of miles by boat from their headwaters farming community downriver to an island in the middle of the Chesapeake Bay. The experiences and education provided during the trip helped the students appreciate the "big picture"—how activities upstream affect people and natural systems downstream. The second article describes another environmental group's 2,000-mile Mississippi River watershed boat trip designed to deliver a similar message. By following the path that a drop of water would take from the headwaters to the sea, and teaching about it along the way, the group hopes to help people better understand and protect river systems.

Expedition Chesapeake Offered Students a Journey of a Lifetime

Expedition Chesapeake participants paddle in canoes along the Shenandoah River, a major tributary of the Potomac River.

In Summer 2005, a small group of rural Virginia students embarked on a unique educational journey. Led by the Chesapeake Bay Foundation (CBF), 16 Future Farmers of America (FFA) students from Turner Ashby High School in Virginia's Shenandoah Valley traveled 355 miles by canoe and kayak through farmland and forests, urban and industrial areas, and coastal and open water areas. They started their 30-day journey on the South Fork of the Shenandoah River in Rockingham County, the most intensively farmed county in the state, and ended at Tangier Island, a waterman's village in the middle of the Chesapeake Bay. Like farmers, Tangier residents depend on healthy natural resources to carve out a living. Instead of raising cattle or growing corn, watermen harvest crabs, oysters, and fish from the Bay. The journey, called Expedition Chesapeake, highlighted the connection between the health of the Chesapeake Bay and the quality of water draining from its tributaries, and explored how farmers and others can help reduce nonpoint source pollution.

Making Connections

While on the journey, students investigated connections between land use and water quality and monitored pollution levels, dissolved oxygen, biodiversity, and other indicators of ecosystem health. The National Oceanic and Atmospheric Administration provided the group with a sophisticated water quality probe, which the group towed behind one of the boats. The water quality probe, nicknamed "Margaret" by the students, analyzed the water every three minutes and beamed a signal to a satellite every 30 minutes. The data was then placed on the Expedition Chesapeake Web site as soon as possible—providing an almost real-time look at the water quality during the trip. "This type of probe has been used in the past for stationary monitoring in brackish and salt water, but this is the first time it has collected data while on the move from freshwater into saltwater" explained Eric Fitzgerald, a Turner Ashby High School agriculture teacher and FFA advisor who helped organize and lead the trip. Data from the trip may be viewed online at http://maps2.chesapeakebay.net/website/expeditionchesapeake/viewer.htm.

Students on Expedition Chesapeake watched the character of the watershed change as they progressed from the headwaters of the Shenandoah River to Tangier Island, located in the open waters of the Chesapeake Bay.

Trip participants also connected with communities as they traveled, sharing their experiences with local, state, and federal elected officials and community leaders at various stops along the journey. CBF hosted nine outreach events in Virginia, Maryland and Washington, DC, including a visit to an award-winning working farm, an opportunity to fly fish with a local fisherman, a visit to Washington DC's Blue Plains sewage treatment plant, and a visit to one of the few remaining oyster farms and packing houses on the Yeocomico River.

As CBF had hoped, these and other outreach efforts generated dialog with communities and among decision makers about the need for solutions to problems facing the Chesapeake Bay and its tributaries. "Everyone learned from the discussions at the special events," noted Fitzgerald. "When discussing issues with the legislators, scientists, and other community leaders, the students were exposed to differing ideas and opinions. They definitely came away with a much broader perspective of water quality and other environmental issues. I think the same can be said for the community leaders—they were very impressed with the students' knowledge and enthusiasm, and appreciated hearing them speak from a farming community's perspective."

Some of the trip's very best conversations came around campfires, added Fitzgerald. Every night, the group would gather and talk about the day's activities. The students shared information and debated issues. "The evening discussions alone provided the kids with an incredible education," he emphasized.

Spreading the Word…

CBF also hoped that the media coverage about the journey would help raise awareness of the value of productive farms and healthy waterways, and inspire interest and awareness of the Chesapeake Bay and its tributaries as tremendous and diverse recreational resources. To that end, CBF retained the services of a public relations firm to heavily promote and market the journey in advance and throughout the trip. As a result, the journey received significant local, regional, and national TV coverage, and was featured in many newspaper and newsletter articles. L.L. Bean, which contributed partial funding for the program, included an article about Expedition Chesapeake in its summer catalog.

Later in the journey, the students traded their canoes for kayaks as they tackled the wider, deeper waters of the Potomac River and Chesapeake Bay.

Media coverage continues, even months after the trip ended. The students and teachers participating on the trip recently appeared on four farming-related television programs (two local, one state, and one international program), and are slated to appear as part of a National Geographic film focused on the travels of Captain John Smith in the Chesapeake Bay watershed. CBF is producing a professional DVD documentary of the journey that will be used as a promotional piece.

CBF created a Web site (www.baybound.org) to allow the public to follow the journey online through journal entries and photographs posted and updated regularly during the trip. The Web site focuses on the journey, the participants, and what they saw and experienced along the way. CBF also marketed the journey in CBF's electronic newsletter, reaching more than 36,000 individuals watershed-wide with each posting.

CBF worked to link to numerous other Web sites, including partner organizations, other environmental groups, and daily newspapers in order to promote electronic access to the journey. CBF sent a "pass it on" announcement to all the teachers in its database (numbering nearly 5,000) notifying these teachers and their students of the journey and the online chronicle of the participating students.

The follow-up to the journey is continuing to provide the students with educational opportunities, noted Fitzgerald. "The students have spoken on numerous television programs, and have presented at the county fair, to the school board, and at many civic club meetings. Each time, they practice and improve their public speaking skills—becoming more and more confident in their abilities." As an added bonus, Virginia's Blue Ridge Community College offered to award each student four college credits for participating in the journey, keeping a daily journal, and participating in follow-up public presentations.

Investment Yields Returns

The month-long journey cost CBF more than $150,000 (approximately $9,000 per student), including food, transportation, marketing, equipment, and supplies. L.L. Bean provided $35,000 for the program, and CBF funded the rest using grants and donations. "Was it worth it? I think so," said

Fitzgerald. "Many groups benefited greatly from the program." Fitzgerald explained that the media exposure helped highlight the CBF and its mission—particularly its diverse environmental education efforts. In addition, the students learned an enormous amount, and are now positioned as community leaders in the effort to protect local water quality and the Bay. The agricultural producers have also benefited. "The reach of the project into the region's farming community has been tremendous," explained Fitzgerald. "Farmers feel closer to the issues now, and are more familiar with the challenges faced by all those depending on water resources in the Chesapeake Bay watershed."

Future Expeditions?

Thanks to the overwhelming success of the first Expedition Chesapeake, CBF plans to launch similar journeys annually. In 2006, CBF plans to lead a group of Pennsylvania students on a trip from the headwaters of the Susquehanna River—the Bay's largest tributary—down to the Bay. CBF intends to continue rotating the program to the Bay's other major tributaries as funds allow.

> "From this adventure I have received everlasting knowledge and experiences that will travel with me for the rest of my life, and no one can take those memories away!" *Kelsey Brunton, 17 years old, Expedition Chesapeake Student Team Leader*

Expedition Chesapeake was a life-changing experience for the students, noted Don Baugh, CBF Vice President for Education. "By night, the students wrote and wrote, chronicling their journey. As those who have read their journals know, their experiences gained new insight and became more profound each day as they connected their observations to a deeper understanding of how the Bay and its tributaries, its land uses, and politics all come together."

Chris Morris, a 2005 graduate of Turner Ashby and a trip participant, shares similar thoughts from a student's perspective. "I can help save the Bay by doing the little things; they don't always have to be the big things that you hear about in the news. I hope to set an example of environmental protection that will hopefully help change the state of the Bay for the better." He sums up the trip this way: "I have been hot, I have been sweaty, but most of all, I have been changed."

[For more information, contact Alice Christman, Chesapeake Bay Foundation, Philip Merrill Environmental Center, 6 Herndon Avenue, Annapolis, MD 21403. Phone: 410-268-8816; E-mail: AChristman@savethebay.cbf.org, or (2) Eric Fitzgerald, Turner Ashby High School, 800 North Main Street, Bridgewater, VA 22812. Phone: 540-828-2008; E-mail: efitzgerald@rockingham.k12.va.us.]

A Typical Day?

Expedition Chesapeake participants quickly grew accustomed to the elements. They frequently endured extremely hot days, mosquito-filled nights, cold food, dirty clothing, no showers, and makeshift bathrooms. Just when they thought they couldn't take it anymore, along would come a hot breakfast with bacon and eggs, a hot shower at a campground, a clean portable toilet, or a trip to the laundromat. The students began to appreciate even the most modest modern conveniences.

Each day's structure varied according to the length of the day's planned paddle and any other planned stops. Usually the group wanted to get an early start on the river to avoid paddling during the hottest part of the day, so they ate quick breakfasts of cereal, fruit, and other cold food. While on the river, small groups of boats would paddle together and discuss what they observed. The students noticed situations that impacted the health of the river, including bank erosion and livestock in the stream. The group would frequently stop to rest and observe, and to discuss water quality, nonpoint source pollution, wildlife, or land use issues. The students recorded many of their observations in their nightly journals, available online. At lunchtime, the students usually pulled off onto a rock along the river and enjoyed a quick sandwich and drink.

Usually by early- to mid-afternoon the group would have completed that day's paddle. The group helped load the boats onto a trailer, and then would travel by vehicle to a nearby campground. Occasionally the group camped along the river at state parks or at pre-arranged locations on private land. The group frequently attended special events in the afternoon, such as trips to historic sites or farms with award-winning conservation practices.

At the campground, everyone had a job. The participants rotated through one of four duty teams on a weekly basis, including news (writing and posting online journal entries), cooking, cleaning, or "on call" (free time except when asked to help with tasks as needed). After all jobs were complete, everyone would gather for group discussion—often around a campfire. Here, they talked through what they had accomplished and learned that day. Finally, the group would head for their tents and sleep, eagerly anticipating the next day's events.

Epic River Journey Reaches Out to Students

In early September 2005, a bicycle-powered pontoon boat set out on a 2,190-mile environmental education journey. The boat and its crew of two are simulating the path of a water drop (albeit a rather large one!) as it moves from Chautauqua Lake in upstate New York, down the Allegheny, Ohio, and Lower Mississippi Rivers, and finally into the Gulf of Mexico. The vessel is stopping at schools and museums in towns along each river to teach people about the importance of water and watersheds, and to make people aware of the origins and destinations of the water that they use on a daily basis. The journey's organizers expect the trip to conclude in early January 2006 after more than four months of river travel.

"WaterWorks: A River Journey to the Sea" will take the crew on a water journey across the United States.

Officially titled "WaterWorks: A River Journey to the Sea," the trip is the brainchild of Morgan Simmons, director of the nonprofit River WaterWorks organization (www.riverwaterworks.org). The organization strives to educate people of all ages about river and watershed systems to enable and encourage individuals to become more active in protecting and preserving aquatic environments.

Unique Vessel Turns Heads

The WaterWorks vessel is constructed upon an 18 x 8 foot aluminum pontoon platform. Its primary system of propulsion is a bicycle-powered paddlewheel system with an auxiliary 25 horsepower outboard motor in place for emergency collision avoidance. Two bicycles drive independent paddlewheels located behind each pontoon. When the boat is not in need of the bicycles, they can be easily removed from the vessel's propulsion system and ridden on land. The vessel has a small shelter constructed on its deck capable of sleeping three people and housing the necessary supplies for the trip. A battery bank and solar cell array generates electricity to power communications equipment and onboard computer systems. The nature of the vessel's renewable energy sources complements the journey's theme of personal resource responsibility.

Teaching Along the Way

The two-person crew is stopping frequently at communities along the river to present an interdisciplinary watershed education program. The program, which includes a mixture of science, history, social studies, language arts, and music, is designed to meet the National Education Standards for fourth graders. The education program defines and illustrates the concepts of watersheds, groundwater, and conservation. To add a touch of the rivers' historical culture, the crew talks about and plays traditional river music. So far the presentations have been very successful, says Simmons, who serves as boat captain and project leader. "The audiences are responding well—they are interested in the material and seem to be having fun."

River WaterWorks' unusual bicycle-powered pontoon boat is sure to attract attention during its 2,190-mile journey.

As the crew moves from place to place, they adapt the program for both the new location and the ages of the audiences expected. During a typical week, the crew presents to fourth grade classes as well as to the general public at museums and science centers located in municipalities along the rivers. Trip organizers hope that many teachers and individuals not able to participate directly in the education program will follow the journey via the Web at www.riverwaterworks.org. Interested individuals can download the program's curriculum, which lists many suggested readings and supplemental educational resources.

The vessel is carrying an onboard water sampling instrument capable of measuring temperature, conductivity, pH, turbidity, and dissolved oxygen throughout the entire length of the rivers. The crew plans to periodically post the water quality data on the Web site, where teachers and other interested individuals can access it. The crew will use the data from the instrument to help educate people about the basic principles of water quality.

Epic River Journey Reaches Out to Students (continued)

The WaterWorks river journey is funded primarily by the Sea Education Association (www.sea.edu), a nonprofit oceanographic educational institution based out of Woods Hole, MA. Additional funding and donations came from the Project Aware Foundation, numerous individuals, and small businesses.

[For more information, contact Morgan Simmons, Director, River WaterWorks, PO Box 565, Somerset, PA 15501. Phone: 814-442-8629 (office) or 315-559-9520 (on the river until January 2006); E-mail: morgan@riverwaterworks.org.]

College Students Complete Educational Voyage on the Colorado

In 2003, a team of ten competitively-selected university students and four education professionals from the Colorado Basin states embarked on *Discover a Watershed: The Colorado*, a six-week expedition that followed the path of John Wesley Powell through the Colorado River watershed. Focused on gaining a holistic perspective of the watershed, the team explored the headwaters of the Colorado and Green Rivers, floated the length of the Grand Canyon, visited tribal reservations, toured agricultural fields, canoed in the delta, met with a variety of local water users and resource managers, and visited dams, diversions, and water treatment facilities.

Prior to the trip, participants in the expedition were required to research a specific Colorado Basin water resource topic of their choice, such as Native American water rights, the effects of tourism on water quality, and the history of reclamation in Utah, among others. Upon reaching areas that related to these topics, students presented their research to the team. This method, combined with meetings with experts throughout the basin, helped the group to gain deep understanding of a wide range of topics.

The journey was sponsored by International Project WET, a non-profit water resources and education publisher (www.projectwet.org). Project WET used the research gathered and insight gained by the participants to develop a 300-page educator's guide that focuses on Colorado River watershed issues (available at www.discoverawatershed.org). The guide provides science-based, multidisciplinary activities for secondary teachers throughout the basin and beyond.

[For more information about the journey, see www.discoverawatershed.org/news/DAWColo_expedition_story9-12-03.pdf.]

Software Spotlight

Plan2Fund: Financial Management Tool Assists Organizations

Funding is a large and inescapable preoccupation of watershed associations, government entities, utilities, and other organizations that implement environmental programs. Finding funding, leveraging it, or trying to use it to attract even more funding is the name of the game. The Environmental Finance Center for US EPA Region 10 at Boise State University (EFC-10) understands this well. Their business is to help those facing the "how to pay" challenges of environmental protection. EFC-10 recently released a new software package—Plan2Fund—that helps local utilities, drinking water agencies, local governments, and private organizations track their workloads against their budgets.

Plan2Fund is a watershed planning tool that walks users through (1) estimating the costs of their watershed plans and the plan's goals and objectives, (2) assessing any local match, and (3) determining the remaining funding amount needed to meet the goals and objectives of the plan. The program helps organizations better track their workflow management with their budget. Register, and Download the Plan2Fund tool at http://sspa.boisestate.edu/efc/Tools_Services/Plan2Fund/plan2fund.htm. User assistance for Plan2Fund is available through a slideshow-based demonstration of the tool's capabilities available at the Web site, as well as by e-mail and phone support.

Program Design

Plan2Fund is designed with four user interfaces: (1) Program Planning Data, (2) Financial Information, (3) Contact List, and (4) Reports.

Plan2Fund: Financial Management Tool Assists Organizations (continued)

- Program Planning: allows users to enter descriptive information about their programs, including contact information, mission, goals, objectives that track to each goal, and specific tasks that track to each objective.
- Financial Information: allows users to enter budget categories such as personnel, equipment, travel, supplies, and construction. Users may also enter information about financial contributors and contributions (including grants) that can be tracked alongside expenses. Non-financial contributions can be given an estimated dollar value and added along with a description of the donation. This data entry builds up to a comprehensive screen for tracking budgetary expenses against incoming financial contributions, where the database calculates the "balance needed," or the funding needed to complete the project.
- Contact List: allows the users to extract contact information related to individual projects into the database, at which point the user may cross-link information and generate reports.
- Reports: offers users a suite of pre-designed reports that can be culled from the entered information. Examples of available reports include "Contributions by Task," "Comprehensive Planning Summary," "Current Budget Summary," "Grants by Status," and so forth.

Plan2Fund identifies not only the budget shortfalls, but also the parts of the watershed program that need the money. To help in the search for additional resources, EFC-10 offers another resource, "The Directory of Watershed Resources," to help people search for and identify appropriate funding sources (http://efc.boisestate.edu). Users perform these searches outside the framework of Plan2Fund.

[For more information, contact Amy Williams, Environmental Finance Center, 1910 University Drive, Boise, ID 83725-1936. Phone: 208-426-4990; E-mail: awillia2@boisestate.edu; Web: http://sspa.boisestate.edu/efc.]

Reviews and Announcements

Actual Water Quality Improvements Featured on EPA's New Success Stories Web Site

EPA recently established a new Clean Water Act Section 319 Nonpoint Source Success Stories Web site (www.epa.gov/nps/success). The site features projects that have received grant funds from the Section 319 program and have achieved documented water quality improvements. Water quality improvements are demonstrated through the achievement of: water quality standards for one or more pollutants/uses; nonpoint source total maximum daily load allocations (and removal from a state's Section 303(d) list of impaired waters); measurable, in-stream reduction in a pollutant; or improvement in a parameter that indicates stream health (e.g., increases in fish or macroinvertebrate counts). Stories also demonstrate innovative strategies used to reduce nonpoint source pollution, the growth of partnerships, and diversity of funding sources. For more information, or to suggest another Section 319 success story, contact Stacie Craddock at 202-566-1204 or by e-mail at craddock.stacie@epa.gov.

Book Explores New Snow and Ice Control Methods

The Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) recently released Synthesis 344 on *Winter Highway Operations.* Synthesis 344 focuses on how practices and strategies being used to control the impacts of winter weather on traffic changed between 1994 and 2004. The book is now available for $17 at the Transportation Research Board Business Office, 500 Fifth Street, Washington, D.C. 20001 or at www.national-academies.org/trb/bookstore. Also scheduled for release early next year is TRB/NCHRP Project 06-16, the *Guidelines for the Selection of Snow and Ice Controls to Mitigate Environmental Impacts*. This document will complement Synthesis 344 by providing information on the performance of snow and ice removal materials and their impacts on the environment, infrastructure, and vehicles.

EPA Issues Community-Based Estuarine Watershed Management Handbook

EPA recently released a 98-page handbook titled *Community-Based Watershed Management: Lessons from the National Estuary Program*, which addresses questions about managing pollution runoff, increasing wildlife habitat, and controlling invasive species in the nation's estuaries. The handbook describes innovative approaches developed and conducted by the 28 National Estuary Programs, which are community-based watershed-management organizations that restore and protect coastal watersheds. The handbook is available for free either online at www.epa.gov/owow/estuaries/nepprimer, or in hardcopy (specify publication # EPA 842-B-05-003) through the National Service Center for Environmental Publications (Phone: 800-490-9198; Web: www.epa.gov/ncepihom).

EPA Launches Watershed Discussion Forum

EPA recently initiated a new online Watershed Discussion Forum that offers watershed protection practitioners and citizens a platform to exchange ideas, so that innovative solutions and ideas can be easily shared among watershed practitioners. The Forum currently includes the following six categories: Community Involvement, Smart Growth/Low Impact Development, Source Water Protection, Stormwater Best Management Practices, Sustainable Financing, and Watershed Planning Tools. See www.epa.gov/watershedforum to join.

EPA Publishes Final 2006 Integrated Report Guidance

EPA has released the *2006 Integrated Report Guidance* for states, territories, authorized tribes, and interstate commissions to help them prepare and submit their Clean Water Act reports on water quality. The document outlines development of biennial Integrated Reports (IR) that support EPA's strategy for achieving a broad-scale inventory of water quality conditions by combining the reporting requirements under Section 303(d), 305(b), and 314 of the Clean Water Act. Each IR will report on the water quality standards attainment status of all waters, document the availability of data and information for each waterbody, identify certain trends in water quality conditions, and provide information to managers in setting priorities for future actions to protect and restore the health of our nation's water resources. The IR Guidance, fact sheet, and highlights are posted on EPA's Web site at www.epa.gov/owow/tmdl/2006IRG.

EPA Releases Acid Rain Report

The EPA recently released the *Acid Rain Program 2004 Progress Report*, which explains how the EPA's Acid Rain Program has significantly reduced acid deposition in the United States over the past 10 years by cutting sulfur dioxide and nitrogen oxide emissions from power plants. The report describes the environmental advances and public health, technology, and market-based improvements accomplished by the program. For more information, see www.epa.gov/airmarkets/cmprpt/arp04/2004report.pdf.

EPA Releases Wetlands and Riparian Areas Nonpoint Source Management Measures

EPA recently published *National Management Measures to Protect and Restore Wetlands and Riparian Areas for the Abatement of Nonpoint Source Pollution*, a technical guidance and reference document for use by state, territory, and authorized tribal managers, as well as the public, in the implementation of nonpoint source pollution management programs. The new guidance contains information on the best available, economically achievable means of reducing nonpoint source pollution through the protection and restoration of wetlands and riparian areas, as well as the implementation of vegetated treatment systems. For more information about the guidance or to download the document (in PDF format), see www.epa.gov/nps/wetmeasures. You may request a free hardcopy of this guidance by contacting the National Service Center for Environmental Publications via phone at 800-490-9198 or via the Web at www.epa.gov/ncepihom and specifying publication # EPA 841-B-05-003.

Guide Helps Readers Discover a Watershed

Discover a Watershed: The Watershed Manager Educators Guide, is a 193-page Project WET (Water Education for Teachers) guide that contains 19 science-based, multidisciplinary activities that teach what a watershed is, how it works, and why we must all consider ourselves watershed managers. Although the guide targets K-12 educators and students, anyone interested in learning or teaching about watersheds will find this curriculum a useful key to watershed concepts, data, terminology, maps, photos, and illustrations. Each activity adapts to your local watershed, contains links for further Web research, and is correlated to the National Standards for Science. This document is available for $29.95—see www.discoverawatershed.org for ordering information.

Low Impact Development Film Available on DVD

Reining in the Storm—One Building at a Time, a 30-minute educational film, defines in simple terms the basic principles of low impact development (LID), the need for LID, and LID's environmental and economic benefits. The film features elected officials, developers, local government staff, homeowners, and others who successfully adopted LID practices. Although made for Virginia, the film can be modified or supplemented to make it more directly relevant to other states (for example, Massachusetts modified the film for their state by adding 15 minutes of local LID information). For state contacts who may be interested in developing and replicating a large supply of the DVD for distribution throughout their state, contact Sarah King, VA Department of Conservation and Recreation, at 804-225-3785 or by e-mail at sarah.king@dcr.virginia.gov.

Manual #2 of CWP's Watershed Restoration Series Released

The Center for Watershed Protection recently released another publication in its Watershed Restoration series. *Manual 2: Methods to Develop Restoration Plans for Small Urban Watersheds* outlines a practical, step-by-step approach to develop, adopt, and implement a subwatershed plan in your community. Within each step, the manual describes 32 different desktop analysis, field assessment, and stakeholder involvement methods used to make critical restoration management decisions. The manual is available for download for $35 and in hardcopy for $40. For more information, see www.cwp.org/publicationstore/usrm.htm.

Publication Explains the Basics of Social Marketing

GreenCOM, the Environmental Education and Communication Project of U.S. Agency for International Development (USAID), offers *Social Marketing: Does Your Project Require That People Do Something Completely Different?*, a fact sheet describing how to ask people or organizations to change their practices for the good of the community. The fact sheet, available at www.greencom.org/greencom/factsheets.asp, outlines a new set of techniques based on social science research and commercial marketing methods that can effectively motivate people to make these changes in a sustainable manner.

Recent and Relevant Periodical Articles

Controlling Erosion After an Inferno: The San Bernardino Experience.

In the March/April 2005 issue of *Erosion Control*, Lynn Merrill explores the steps taken in 2003 by California's San Bernandino area officials to mitigate potential flooding from winter storms after a particularly intense fire season. See: www.erosioncontrol.com/ecm_0503_controlling.html.

The Language of Conservation.

In 2004, The Nature Conservancy and the Trust for Public Land commissioned Fairbank, Maislin, Maullin & Associates, an opinion research and public policy analysis firm, to complete an analysis of how the presentation of environmental information can influence how the public perceives it.

The paper identifies what language most successfully communicates conservation concepts to the public. See: http://extension.usu.edu/wrdc/files/pdf/LanguageConservationGoetz.pdf.

Municipal Stormwater System Maintenance.

In the September/October 2005 Issue of *Stormwater Magazine*, Andrew Reese and Henrietta Presler provide an overview of challenges in structuring local stormwater system maintenance programs, offer a snapshot of communities' maintenance practices from a nationwide survey of local governments, and suggest a methodology for understanding and upgrading maintenance programs. See: www.stormh2o.com/sw_0509_municipal.html.

Wolves and the Ecology of Fear: Can Predation Risk Structure Ecosystems?

In the August 2004 issue of *Bioscience*, authors William Ripple and Robert Beschta discuss how the reintroduction of wolves to Yellowstone National Park in 1995 could have caused recent beneficial vegetative changes in riparian areas. See: www.cof.orst.edu/cof/fe/pdf/beschta_wolves.pdf. More articles discussing the same subject are available at www.cof.orst.edu/wolves/articles.php.

Web Sites Worth A Bookmark

Habitattitude

www.habitattitude.net. This Web site describes a national public campaign designed to help aquarium and water garden owners prevent the release of invasive aquatic fish and plants into the wild. The Aquatic Nuisance Species (ANS) Task Force developed the campaign, with the support of partners including the Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the Pet Industry Joint Advisory Council (PIJAC).

National Geographic's EdNet

www.ngsednet.org. The National Geographic Education Network is a new online service from National Geographic Society's Education and Children's Programs department. EdNet serves as a one-stop shop for education news, resources, discussion, and much more. Several of EdNEt's resources pertain to watersheds and wetlands.

Smart WaterWays

www.smartwaterways.org. This Web site, maintained by Vermont's Chittenden County Regional Stormwater Education Program, provides multimedia educational information about stormwater. The site offers an interactive stormwater game, a variety of television public service announcements, fact sheets, and other resources. The site also offers information about a social marketing campaign the County conducted to better target its educational information.

Tools of Change

www.toolsofchange.com. This Canada-based Web site, founded on the principles of community-based social marketing, offers specific tools, case studies, and a planning guide for helping people take actions and adopt habits that promote health and/or are more environmentally-friendly.

Urban and Community Conservation

www.urban.nacdnet.org. The National Conservation District's Urban, Community, and Coastal Resources Committee developed this Web site to address conservation districts' increasing involvement in resource management issues in urban and suburban areas. The site highlights how districts have dealt with a variety of resource concerns, lists resources available at the national level, and outlines how districts can coordinate and implement resource programs at the local level.

Calendar

January 2006

26-27 — *Sixth National Conference on Science, Policy, and Environment: Energy for a Sustainable and Secure Future,* Washington, DC. For more information, see www.ncseonline.org/ncseconference/2006conference.

February 2006

5-9 — *National Water Conference: USDA-Cooperative State Research, Education, and Extension Service (CSREES),* San Antonio, TX. For more information, see www.soil.ncsu.edu/swetc/waterconf/2006/main.htm.

20-24 — *International Erosion Control Association Conference: Environmental Connection 2006,* Long Beach, CA. For more information, see www.ieca.org.

21-22 — *Stormwater BMPs for Low Impact Development (LID) and LID Structural Practice Design,* Dallas, NC. For more information, see www.bae.ncsu.edu/workshops/Gastonia.

22-23 — *Stormwater Treatment: How It Works (Or Does It?),* Portland, OR. For more information, see www.stormwaterbook.com/short_course.html.

March 2006

12-14 — *2006 National Green Building Conference,* Albuquerque, NM. For more information, see www.nahb.org.

13-16 — *16th Annual Association for Environmental Health and Sciences (AEHS) Meeting & West Coast Conference on Soils, Sediments, and Water,* San Diego, CA. For more information, see www.aehs.com/conferences/westcoast.

16-17 — *Safe Drinking Water: Where Science Meets Policy,* Chapel Hill, NC. For more information, see www.cep.unc.edu/symposium/2006.

16-17 — *Stormwater Wetland and Bioretention Design Workshop,* Winston-Salem, NC. For more information, see www.bae.ncsu.edu/workshops/Winston-Salem.

16-18 — *2006 International Symposium on Waterborne Pathogens,* Atlanta, GA. For more information, see www.awwa.org/conferences/pathogens.

April 2006

2-6 — *Interdisciplinary Solutions for Watershed Sustainability—Joint 8th Federal Interagency Sedimentation Conference and 3rd Federal Interagency Hydrologic Modeling Conference,* Reno, NV. For more information, see http://water.usgs.gov/wicp/acwi/sos/conf.

8-12 — *International Conference on Hydrology and Management of Forested Wetlands,* New Bern, NC. For more information, see www.asabe.org/meetings/Forest2006.

23-26 — *2006 Ground Water Summit,* San Antonio, TX. For more information, see www.ngwa.org/e/conf/0604235095.cfm.

24-27 — *9th National Mitigation and Conservation Banking Conference,* Portland, OR. For more information, see www.mitigationbankingconference.com.

May 2006

5-9 — *River Network's National River Rally 2006*, Bretton Woods, NH. For more information, see www.rivernetwork.org/rally.

7-11 — *5th National Monitoring Conference—Monitoring Networks: Connecting for Clean Water*, San José, CA. For more information, see www.tetratech-ffx.com/nwqmc06.

23-26 — *2nd National Water Quality Trading Conference—Implementation at the Watershed Scale,* Pittsburgh, PA. For more information, see www.epa.gov/npdes/training.

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